Model J-C1y/z
(Machine Code: B146/B147/B148/B149)

SERVICE MANUAL

⚠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.

5. Dispose of used fusing oil in accordance with local regulations.

LASER SAFETY

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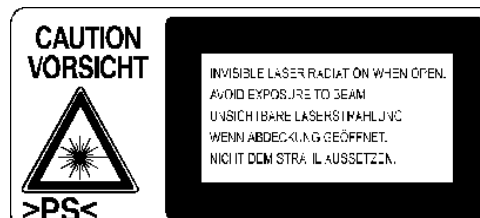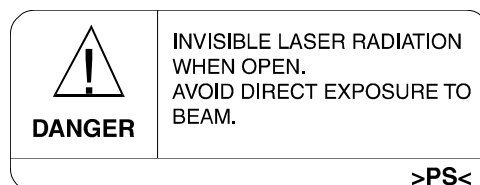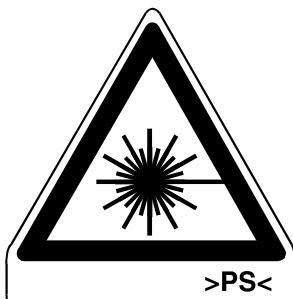
⚠**WARNING**

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

⚠**WARNING**

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:

! DANGER — INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM. >PS<

CAUTION VORSICHT — INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM. UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN. >PS<

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Symbols and Abbreviations

This manual uses several symbols.

Symbol	What it means
☞	Refer to section number
CT	See Core Tech Manual for details
🖉	Screw
⊑🗐	Connector
ℂ	E-ring
⊘	Clip ring
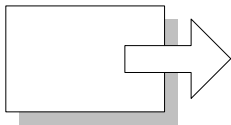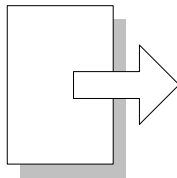
Short Edge Feed (SEF)   **Long Edge Feed (LEF)**

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PERIPHERALS

ARDF (B597)

ONE-TRAY PAPER FEED UNIT (B601)

TWO-TRAY PAPER FEED UNIT (B598)

LARGE CAPACITY TRAY (B600)

TWO-TRAY FINISHER (B599)

BOOKLET FINISHER (B602)

SPECIFICATIONS

1. INSTALLATION

1.1 INSTALLATION REQUIREMENTS

1.1.1 ENVIRONMENT

Ambient Humidity (%RH)

80%	
70%	
	Recommended conditions:
	15 to 25°C
54%	30 to 70 %RH
30%	
15%	

B146I935.WMF   10°C 15°C   30°C 32°C
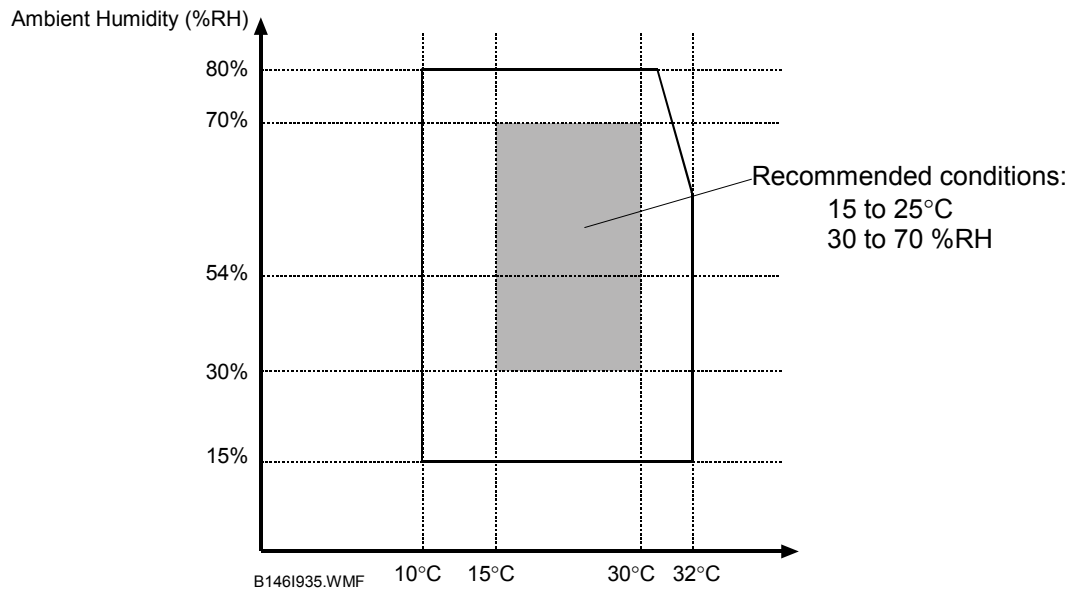
1. Temperature Range: 10°C to 32°C (50°F to 89.6°F)

2. Humidity Range: 15% to 80% RH

3. Ambient Illumination: Less than 1,500 lux (do not expose to direct sunlight)

4. Ventilation: 3 times/hr/person or more

5. Avoid exposing the machine to sudden temperature changes, which include:
    1) Direct cool air from an air conditioner
    2) Direct heat from a heater

6. Avoid installing the machine in areas that might be exposed to corrosive gas.

7. Install the machine at a location lower than 2,500 m (8,200 ft.) above sea level.

8. Install the machine on a strong, level base. (Inclination on any side must be no more than 5 mm.)

9. Avoid installing the machine in areas that may be subjected to strong vibration.

1.1.2 MACHINE LEVEL

Front to back: Within 5 mm (0.2")

Right to left: Within 5 mm (0.2")

1.1.3 MACHINE SPACE REQUIREMENT

Place the machine near the power source, providing clearance as shown.
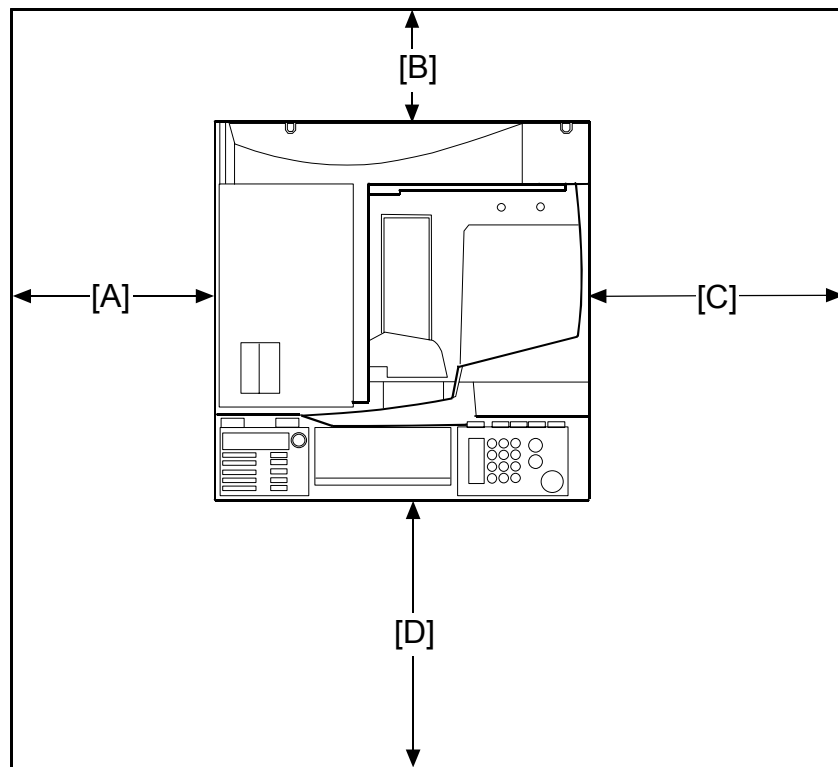
B146I927.WMF

A: Over 10 mm (0.39")
B: Over 100 mm (3.9")
C: Over 550 mm (22")
D: Over 75 mm (3.0")

1.1.4 POWER REQUIREMENTS

⚠**CAUTION**
1. **Insert firmly the plug in the outlet.**
2. **Avoid using an outlet extension plug or cord.**
3. **Ground the machine.**

1. Input voltage level: 120 V, 60 Hz: More than 10 A
                          220 V ~ 240 V, 50 Hz/60 Hz: More than 6 A

2. Permissible voltage fluctuation: ±10 %

3. Do not put or place anything on the power cord.

1.2 OPTIONAL UNIT COMBINATIONS

1.2.1 MACHINE OPTIONS

No.	Options	Remarks
1	1-tray paper feed unit	One from the three
2	2-tray paper feed unit	
3	Large capacity tray	
4	Platen cover	One from the two
5	ARDF	
6	Multi-bin output tray	One from No. 6, No. 7, and No. 9
7	Two-tray finisher	One from No. 6, No. 7, and No. 9
8	*Punch kit (3 types)*	No. 7 required; One of the three types
9	Booklet Finisher	One from No. 6, No. 7, and No. 9
10	*Punch unit (4 types)*	No. 9 required; One of the four types

Italic: Child options (Child options require a parent option.)

1.2.2 CONTROLLER OPTIONS

No.	Options	Remarks
11	Printer/scanner	For Asia model only
12	*256 MB memory*	
13	*NIB*	
14	*IEEE 1394*	One from the four
15	*IEEE 802.11b*	
16	*USB 2.0*	
17	*Bluetooth*	
18	*PostScript 3*	
19	*File Format Converter*	

Italic: Child options (Child options require a parent option.)

1.3 COPIER

1.3.1 POWER SOCKETS FOR PERIPHERALS

⚠**CAUTION**

Rating voltage for peripherals.

Make sure to plug the cables into the correct sockets.

1. ARDF

Rating voltage output connector for accessory Max. DC24V

2. Duplex unit

Rating voltage output connector for accessory Max. DC24V

3. Finisher

Rating voltage output connector for accessory Max. DC24V
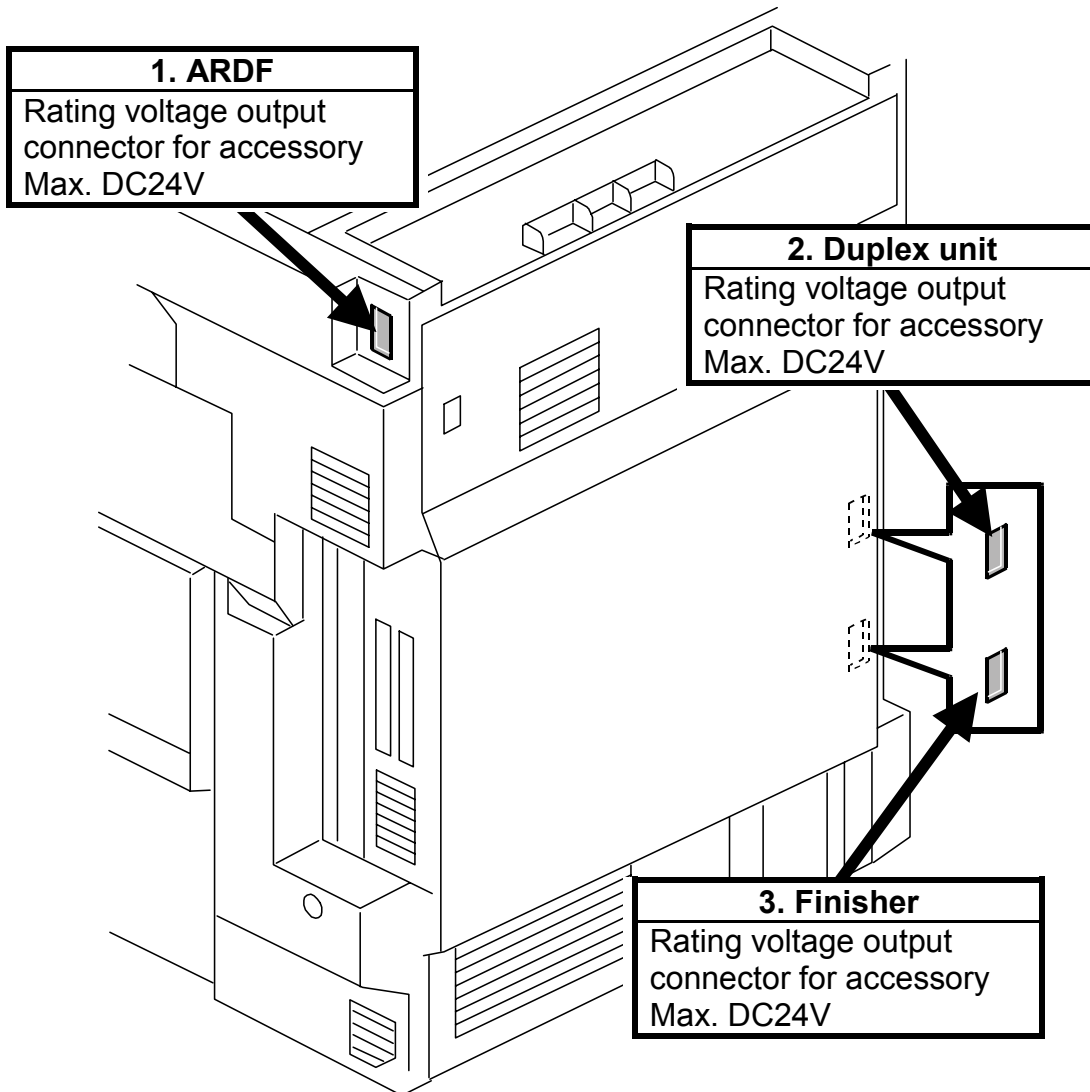
B146I932.WMF

1.3.2 INSTALLATION FLOW CHART

The following flow chart shows the flow of the installation procedures.
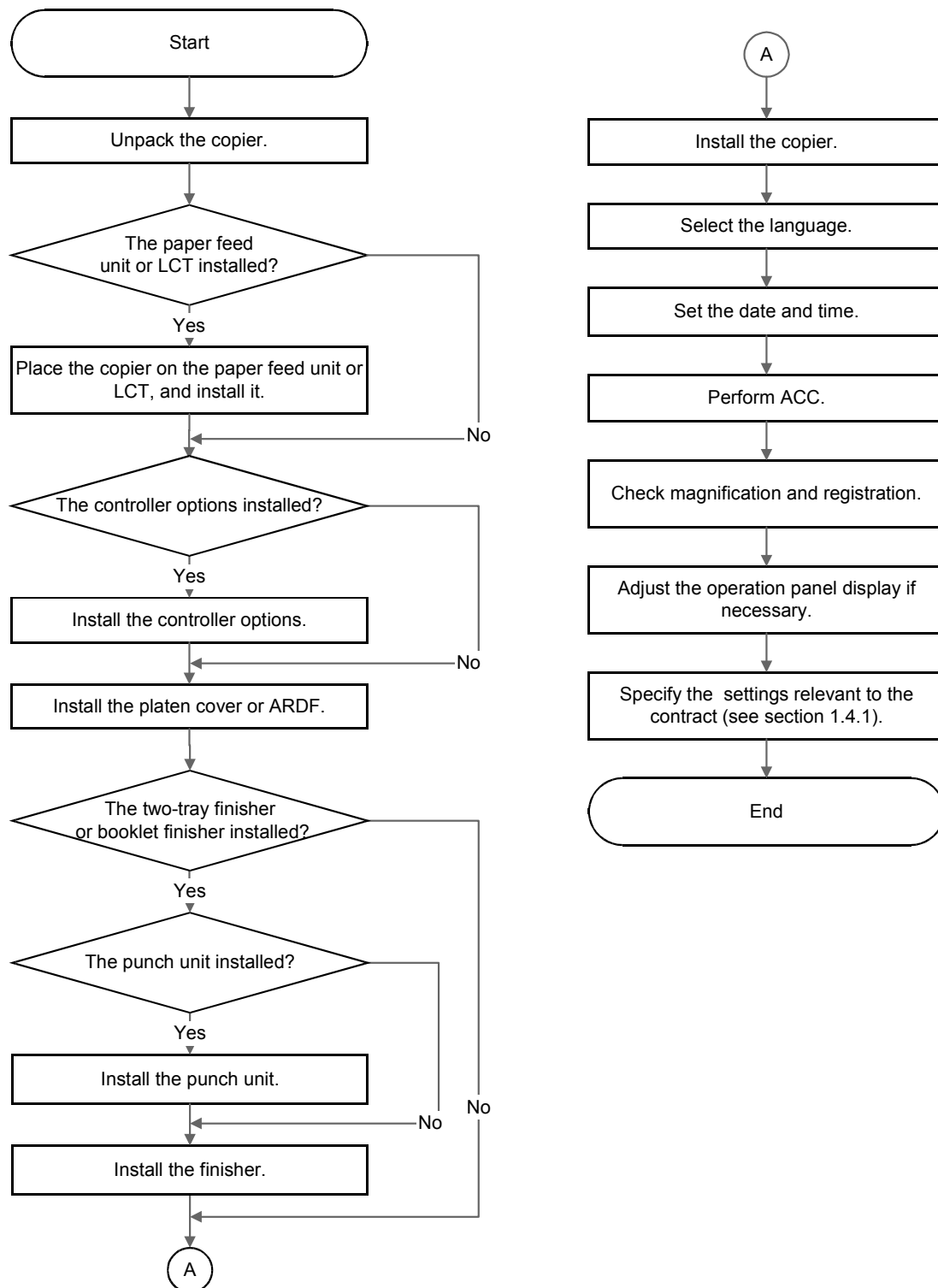
B146I901.WMF

The finisher requires an optional paper tray unit or the LCT.
A punch unit is dedicated to the two-tray finisher or the booklet finisher.

1.4 MACHINE INSTALLATION

1.4.1 COPIER

> ⚠️ **CAUTION**
> **Make sure that the transfer belt is in its correct position before moving the machine, otherwise the transfer belt and the black PCU may be damaged.**

Accessory Check

Check the quantity and condition of the accessories.

Description	Q'ty
1. Operating Instructions–System Setting	1
2. Operating Manual–Copy Reference	1
3. Operating Manual–Printer Reference*	1
4. CD-ROM–Printer/Scanner Driver*	1
5. CD-ROM–Operating Instructions*	1
6. Ferrite Core*	1
7. Paper Size Decal	1
8. Model Name Decal	1
9. Operation Panel Indication Decal	1
10. Energy Star Sticker	1
11. Decal–Inkjet Caution	1
12. Decal–Copy Prohibition	1
13. Oil Supply Unit	1
14. External Tray	1
15. Power Cord	1
16. Toner–Black	1
17. Toner–Magenta	1
18. Toner–Cyan	1
19. Toner–Yellow	1
20. Exposure Glass Cleaning Cloth	1
21. Cloth Holder	1
22. NECR	1

* The Asia model does not include these accessories.

Installation Procedure

⚠**CAUTION**

Remove the tape from the development units (see step 2) before you turn the main switch on. The development units may be severely damaged if they operate with the tape attached.

If you install an optional paper tray unit or the optional LCT at the same time, place the copier on the paper tray unit or the LCT first, then install the copier and other options.

NOTE: Keep the shipping retainers after installing the machine. You may need them (in the future) to transport the machine to another location.

B146I944.WMF

[A]
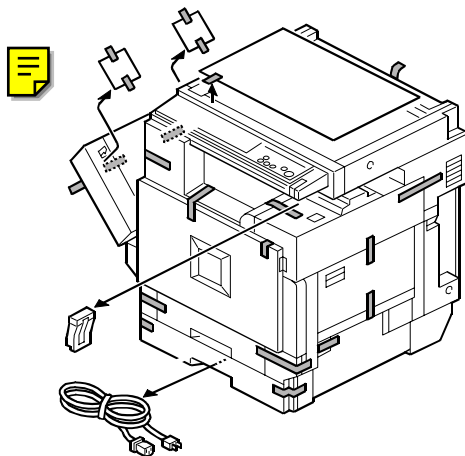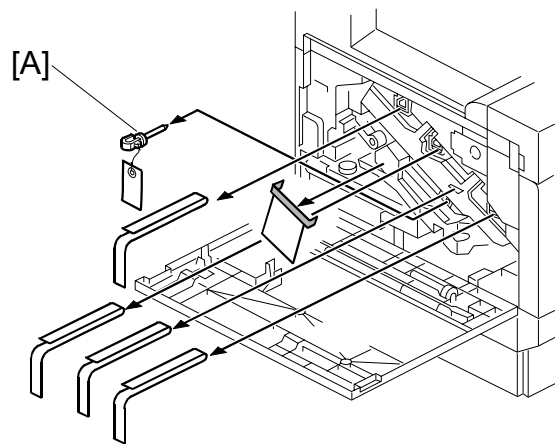
B146I945.WMF

1. Remove the tape and padding on the copier.

2. Remove the pin [A].

    NOTE: Keep the pin. You may need it to transport the machine (☛ 1.4.3).

①
②

B146I913.WMF

③
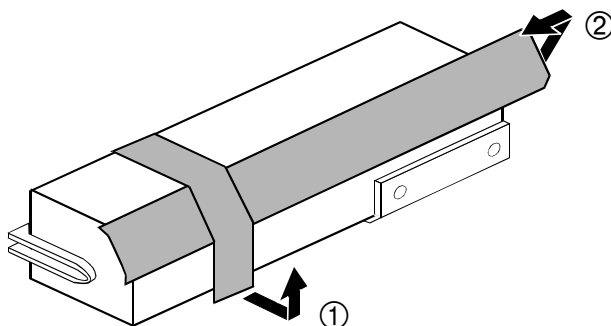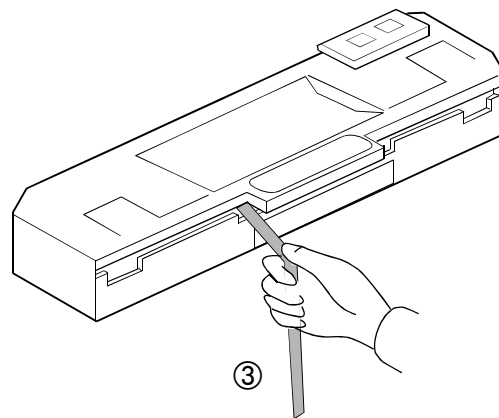
B146I914.WMF

3. Remove the tape from the oil supply unit.

4. Install the oil supply unit to the fusing unit.

5. Install the fusing unit [A] to the copier.

[A]

B146I912.WMF

[B]
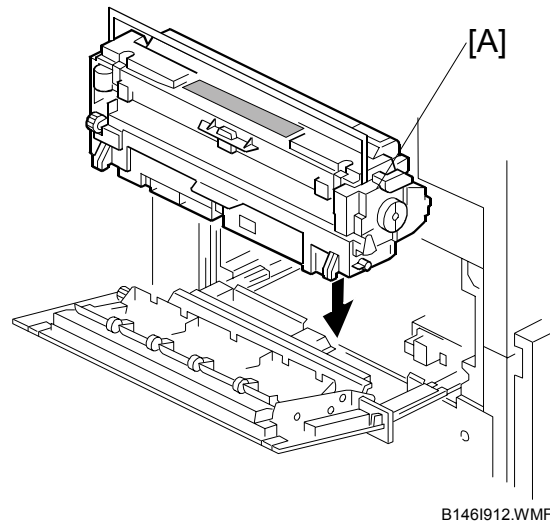
6. Shake the toner cartridge five or six times.

7. Install the toner cartridges to the copier.

8. Check that the hooks [B] hold the cartridge correctly.

B146I915.WMF

[C]
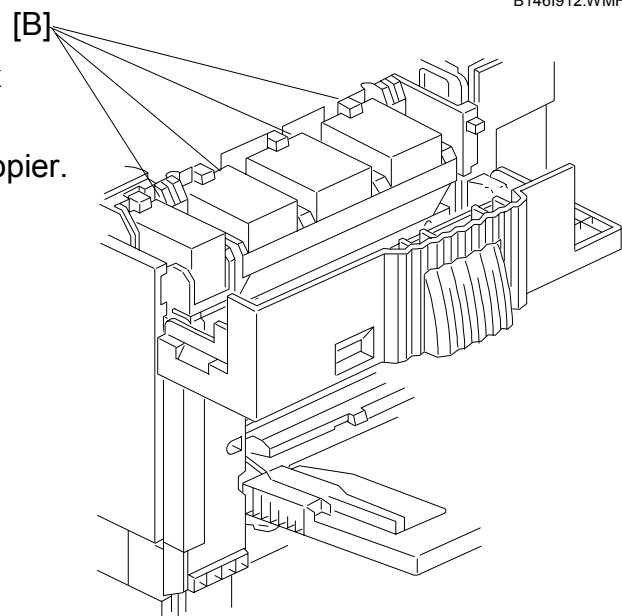
9. Install the external tray [C].

B146I916.WMF

Installation
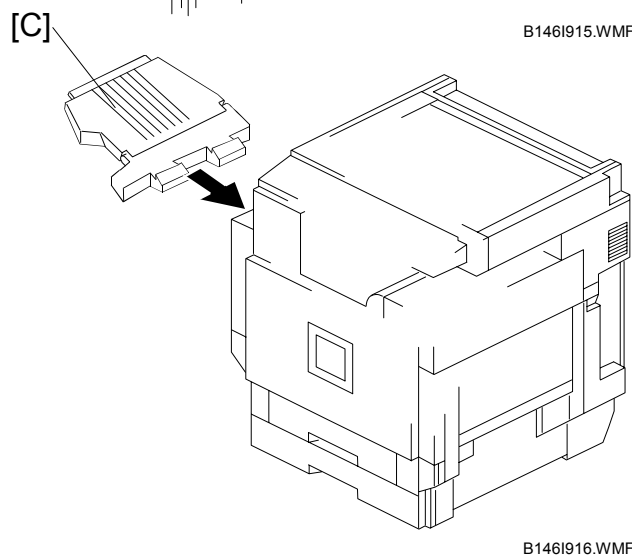
10. Attach the cloth holder [A] to the left side of the scanner unit.

11. Place the contract glass cleaning cloth [B] in the holder.

[B]

[A]
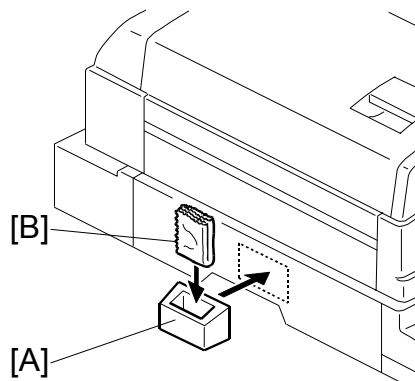
B146I936.WMF

12. Remove the guide cover [C].

13. Attach the duplex inverter guide [D].

14. Attach the guide cover.

[C]

[D]
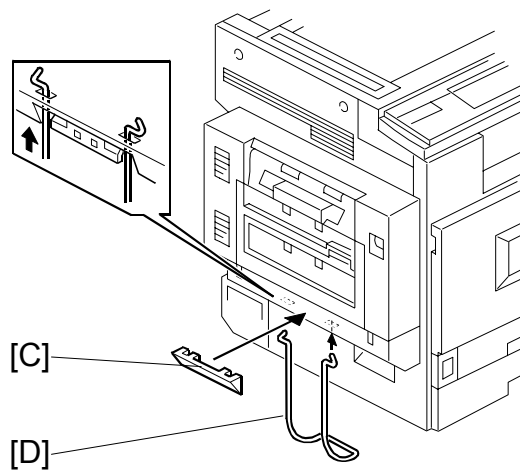
B146I003.WMF

15. Attach the appropriate model name decal [A] to the front cover.

16. Pull each paper tray out, and adjust the side guides and end guide to match the paper size.

    NOTE: To move the side guides, first pull out the tray fully, then push down the green lock at the rear inside the tray.

17. Attach the appropriate paper tray number decals [B] to the paper trays.

    NOTE: Paper tray number decals are also used for the optional paper tray or the optional LCT. Keep any remaining decals for use with these optional units.

18. Install the optional ARDF or the optional platen cover.
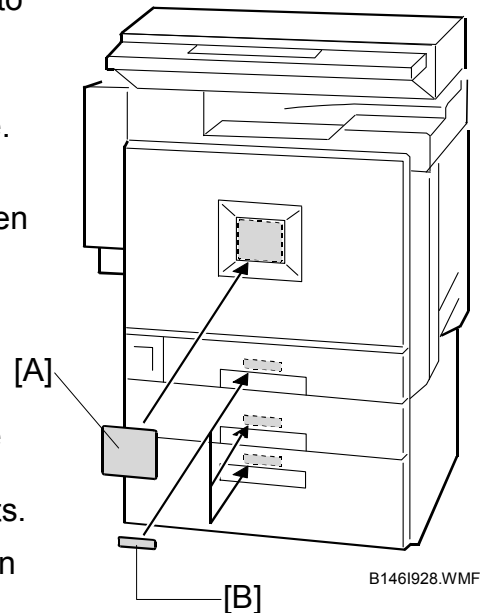
19. Plug in the machine and turn the main power switch on. The machine automatically starts the initialization procedure. After this has finished, the Start button LED (⊚) turns green.

[A]

[B]

B146I928.WMF

20. Make copies of image samples (text, photo, and text/photo modes).

21. Conduct the Automatic Color Calibration (ACC) as follows:

    1) Print the ACC test pattern (UP mode > Maintenance > ACC > Start).
    2) Place the printout on the exposure glass.
    3) Place 10 sheets of white paper on top of the test chart.
    4) Close the ARDF or the platen cover.
    5) Press "Start Scanning" on the LCD panel. The machine starts the ACC.

22. Check that the sample image has been copied normally.

23. Check that the circuit breaker works normally.

Settings Relevant to Contract

If the customer has made a service contract, change the settings of the following SPs in accordance with it.

NOTE: You must select one of the counter methods (developments/prints) in accordance with the contract (☛ SP5-045-001).

Item	SP No.	Function	Default
Counting method	SP5-045-001	Specifies whether the counting method used in meter charge mode is based on developments or prints. **NOTE:** You can specify this setting only one time. After you have specified it, you cannot change the setting.	"0": Developments
A3/11" x 17" double counting	SP5-104-001	Specifies whether the counter is doubled for A3/11" x 17" paper.	"No": Single counting
Serivice Tel. No. Setting	SP5-812-001 through 004	Programs the service station fax number. The number is printed on the counter list when the meter charge mode is selected, so that the user can fax the counter data to the service station.	

Installation

1.4.2 MOVING MACHINE

⚠CAUTION
Make sure that the transfer belt is in its correct position before moving the machine, otherwise the transfer belt and the black PCU may be damaged.

This section assumes that you manually move the machine from a floor to another floor. When using any transport equipment, see section 1.4.3, "Transporting Machine."

The machine stands make it difficult to move the copier with an optional paper tray or LCT installed. You can remove them as necessary.

1. Check that the transfer belt is in its correct position.

2. Remove all trays from the optional paper feed unit or LCT.

3. Remove the front stand [A] (✏ x 2).

G080I910.WMF
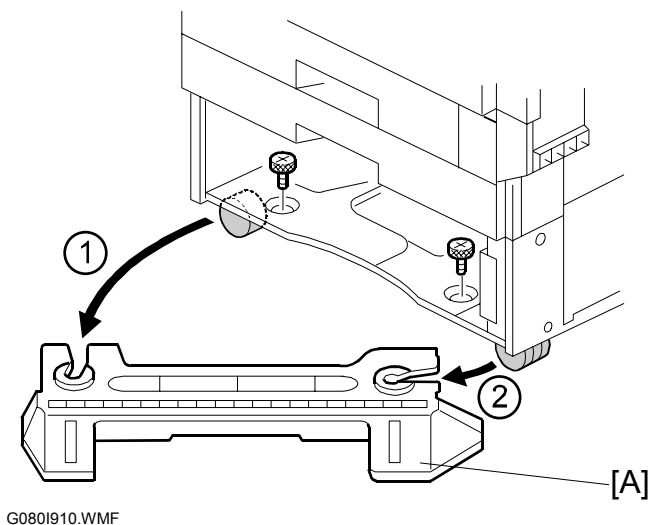
4. Remove the rear stand [B] (✏ x 2, 2 brackets).

G080I911.WMF
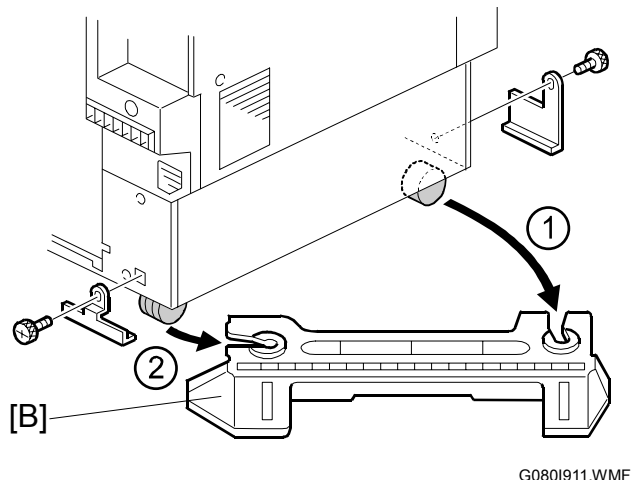
CAUTION: After moving the machine, reinstall the machine stands. Without them, the machine may tip over when you draw out a paper tray or while you work on the machine.

1.4.3 TRANSPORTING MACHINE

⚠**CAUTION**

Make sure that the transfer belt is in its correct position before moving the machine, otherwise the transfer belt and the black PCU may be damaged.

1. Check that the transfer belt is in its correct position.

2. Remove the machine stands (☛ 1.4.2)

3. Remove the toner cartridges to prevent toner from flowing into the toner supply tube due to vibrations experienced during transport. This may cause the tube to be clogged with toner.

4. Put air packing into the toner cartridge holder to shield the toner supply entrance. This prevents toner from flowing out to the toner cartridge holder.

5. Set the lock pin [A] (which comes with the machine) in the transfer belt unit.

   NOTE: The lower end of the transfer belt moves. The surfaces of the belt and PCU may be damaged by the friction between them if you transport the machine without locking the belt.

[A]
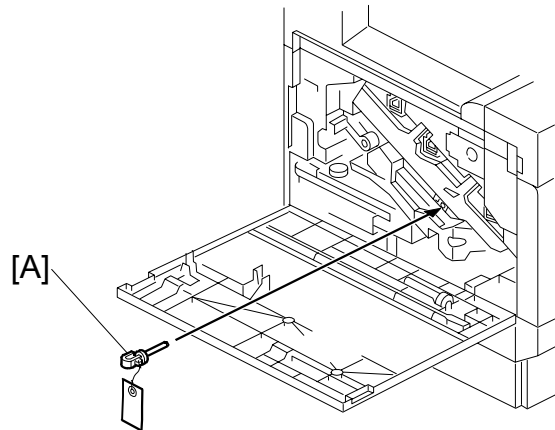
B146I911.WMF

6. Make sure there is no paper left in the paper trays and fix down the bottom plates with a sheet of paper and tape.

7. Empty out the waste toner bottle and attach securing tape to prevent the bottle from coming out.

8. Empty out the waste oil bottle and attach securing tape to prevent the bottle from coming out.

9. Turn the release lever [B] counterclockwise to its lowermost position. (The lever does not stay in this position if you do not hold it.) Stick the lever in this position with tape.
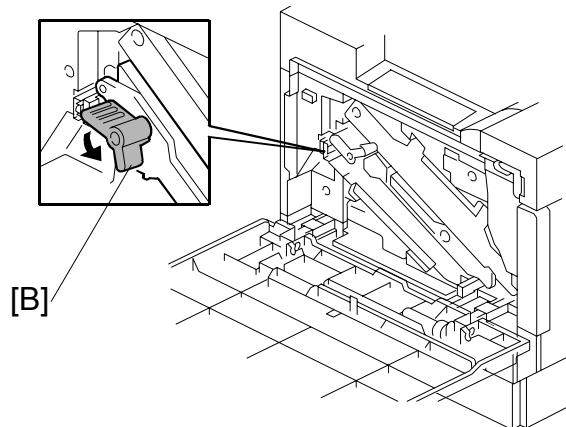
   NOTE: The release lever lifts the transfer belt up and presses it against the black PCU. The surfaces of the belt and PCU may be damaged by the friction between them if you transport the machine with the two units in this position.

[B]

B146I939.WMF

10. Attach shipping tape to the covers and doors, or shrink-wrap the machine tightly.

NOTE: 1) If pre-installing machines for some test prints at a service depot, use a jig oil supply unit, and not the oil supply unit enclosed as an accessory.

   This is because the toner supply system uses a touch-and-release mechanism, which can cause the unit to move freely up and down during transport if shipping the mainframe with the oil supply unit installed. This in turn may cause damage to the white holder on the fusing unit. However if simply moving the machine from floor to floor, the oil supply unit can be left installed.

2) If shipping a used machine to a new location, dispose of the used oil supply unit and install a new one because of the reason explained above. This is not necessary when simply moving the machine from floor to floor.

3) Whenever having moved the machine to a new location, be sure to perform Auto Adjust (User Program mode) or forced Line Position Adjustment (SP5-993-002) to optimize color line alignment.

4) Make sure that the side fences in the trays are properly positioned to prevent color shifting.

1.5 OPTIONAL UNIT

1.5.1 ONE-TRAY PAPER FEED UNIT

Accessory Check

Check the quantity and condition of the accessories.

Description	Q'ty
1. Securing Bracket	1
2. Right Stand Bracket	1
3. Left Stand Bracket	1
4. Front Stand	1
5. Rear Stand	1
6. Screw M4 x 10	4
7. Stepped Screw	2

B146I929.WMF

Installation Procedure

> ⚠ **CAUTION**
>
> 1. **Turn off the main switch of the copier and unplug its power cord before starting the installation procedure.**
>
> 2. **You need two or more persons to lift the copier. The copier is highly unstable when lifted by one person, and may cause human injury or property damage.**
>
> 3. **Do not lift the copier with the paper feed unit installed. The handle and grips may be damaged.**

1. Remove all tape on the paper tray unit.

B146I919.WMF

2. Remove the paper tray and remove all tape and padding.

3. Install the front stand [A] (𝄪 x 2).
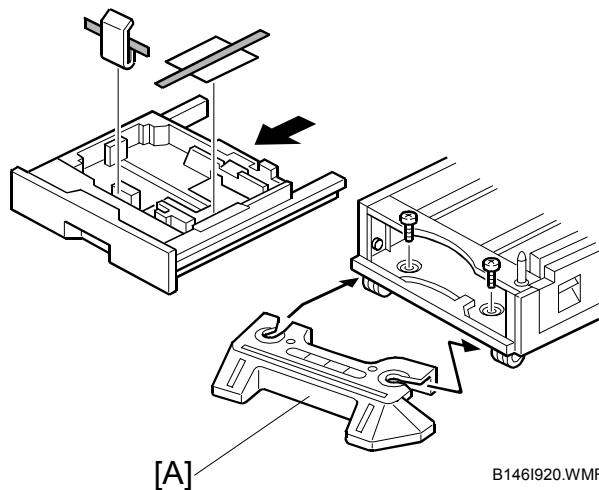
[A]   B146I920.WMF

4. Install the rear stand [A].

5. Attach the stand brackets [B][C]
    (🔩 x 1 for each).

[B]

[C]

[A]
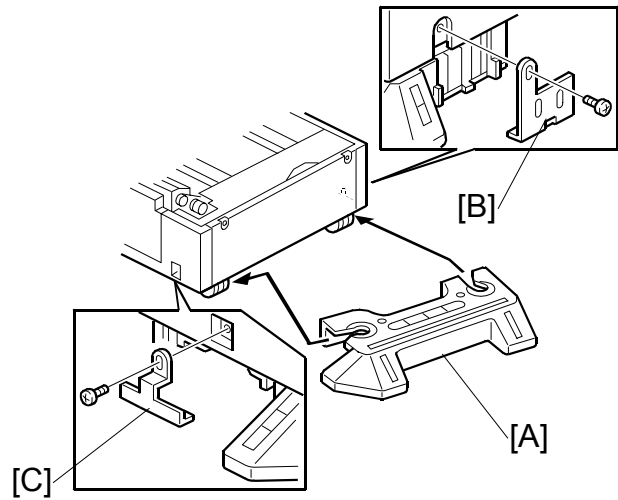
B146I921.WMF

6. Grasp the handle [D] and grips [E] of
    the copier.

7. Lift the copier and install it on the
    paper feed unit [F].

[E]

[D]

[F]

B146I004.WMF

8. Remove tray 2 of the copier.

9. Fasten the knob screw [A].

10. Install tray 2.

[A]

B146I922.WMF

11. Open the right cover.

12. Install the link bracket [B] (1 knob screw).

[B]

B146I923.WMF
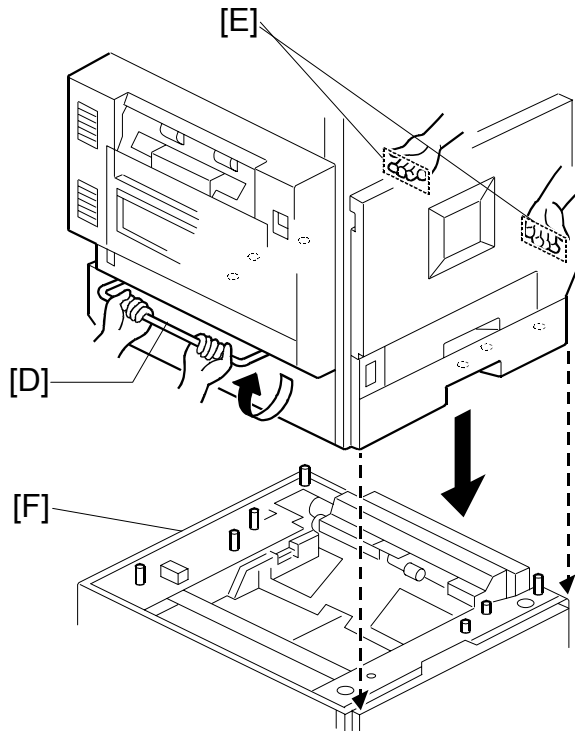
13. Turn on the main switch.

14. Check the machine's operation and copy quality.

1.5.2 TWO-TRAY PAPER FEED UNIT

Accessory Check

Check the quantity and condition of the accessories.

Description	Q'ty
1. Securing Bracket	1
2. Right Stand Bracket	1
3. Left Stand Bracket	1
4. Front Stand	1
5. Rear Stand	1
6. Screw M4 x 10	4
7. Stepped Screw	2

B146I929.WMF

Installation Procedure

> **⚠CAUTION**
>
> 1. **Turn off the main switch of the copier and unplug its power cord before starting the installation procedure.**
>
> 2. **You need two or more persons to lift the copier. The copier is highly unstable when lifted by one person, and may cause human injury or property damage.**
>
> 3. **Do not lift the copier with the paper feed unit installed. The handle and grips may be damaged.**

1. Remove all tape on the paper tray unit.

B456I002.WMF

2. Remove the paper trays and remove all tape and padding.
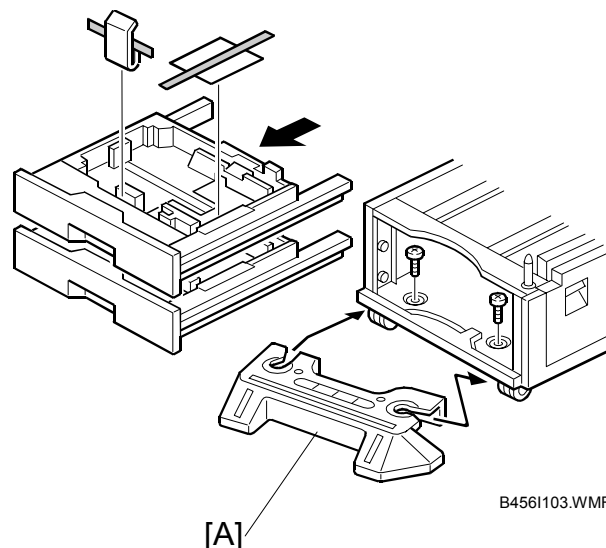
3. Install the front stand [A] ($\hat{F}$ x 2).

[A]

B456I103.WMF

Installation

4. Install the rear stand [A].

5. Attach the stand brackets [B][C]
   (✐ x 1 for each).

B598I901.WMF

6. Grasp the handle [D] and grips [E] of the copier.

7. Lift the copier and install it on the paper feed unit [F].

B146I004.WMF

8. Remove tray 2 of the copier.

9. Fasten the knob screw [A].

10. Install tray 2.

[A]

B146I902.WMF

11. Open the right cover.

12. Install the link bracket [B]
    (1 knob screw).

[B]

B146I903.WMF
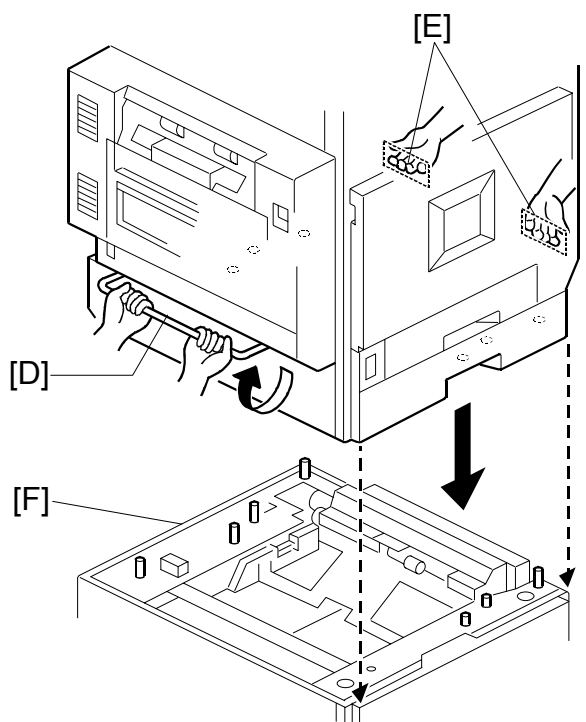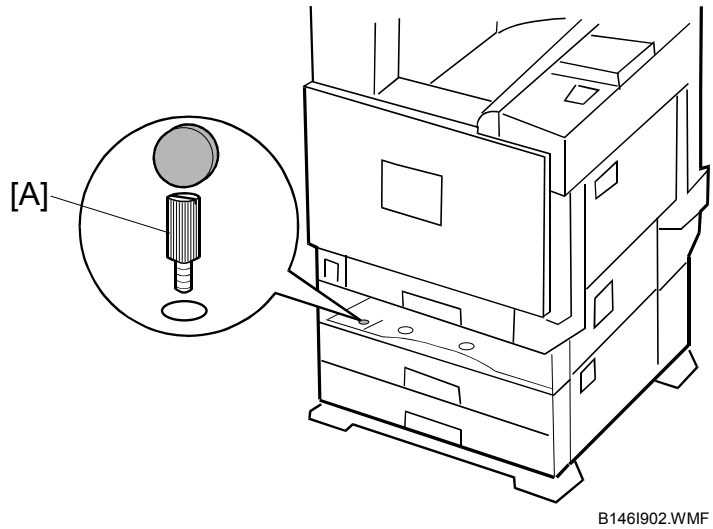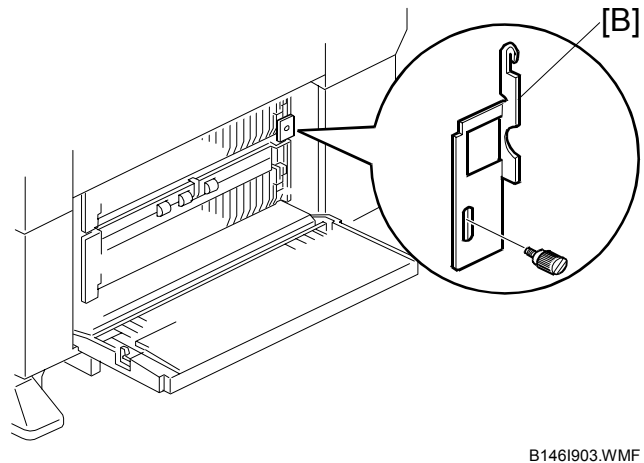
13. Turn on the main switch.

14. Check the machine's operation and copy quality.

1.5.3 LARGE CAPACITY TRAY

Accessory Check

Check the quantity and condition of the accessories.

Description	Q'ty
1. Securing Bracket	1
2. Right Stand Bracket	1
3. Left Stand Bracket	1
4. Front Stand	1
5. Rear Stand	1
6. Screw M 4 x 10	4
7. Stepped Screw	2
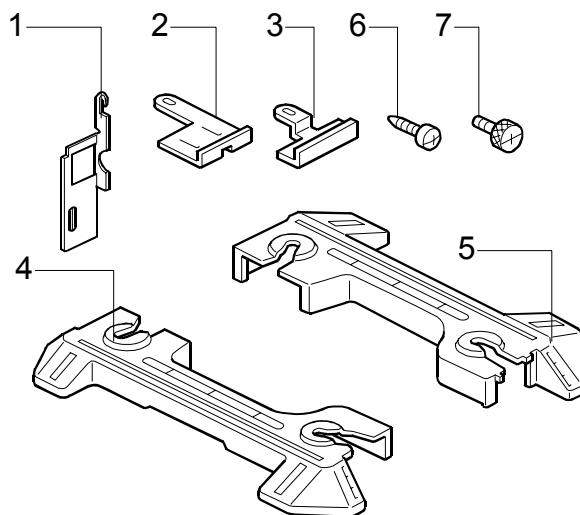
B146I929.WMF

Installation Procedure

⚠CAUTION

1. Turn off the main switch of the copier and unplug its power cord before starting the installation procedure.

2. You need two or more persons to lift the copier. The copier is highly unstable when lifted by one person, and may cause human injury or property damage.

3. Do not lift the copier with the LCT installed. The handle and grips may be damaged.

---

1.   Remove all tape.
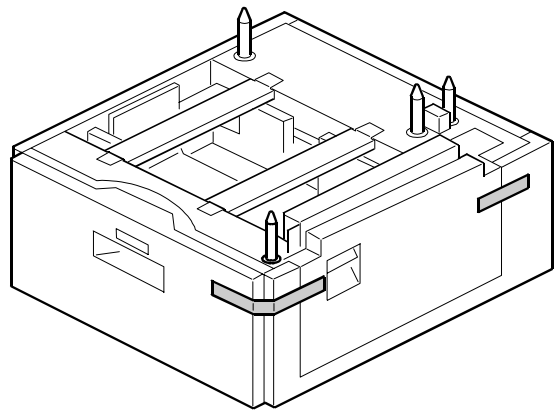
B457I001.WMF

2.   Press the stopper [A] and pull out the tray [B].

3.   Install the front stand [C] (🔩 x 2).

B457I003.WMF
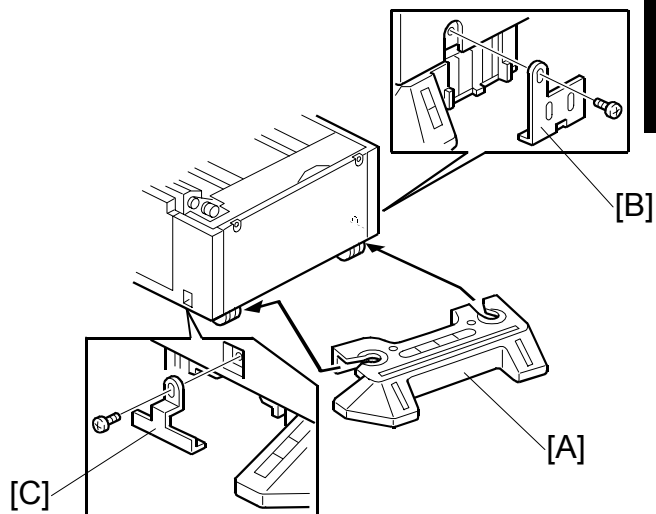
Installation

4. Install the rear stand [A].

5. Attach the stand brackets [B][C]
   (🖋 x 1 for each).

[B]

[A]

[C]

B598I901.WMF

6. Grasp the handle [D] and grips [E] of
   the copier.

7. Lift the copier and install it on the LCT
   [F].

[E]

[D]

[F]
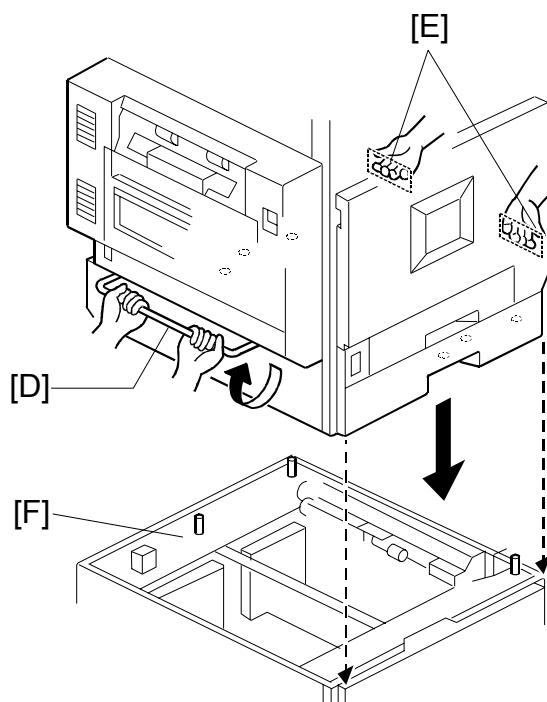
B600I901.WMF

8. Remove tray 2 of the copier.
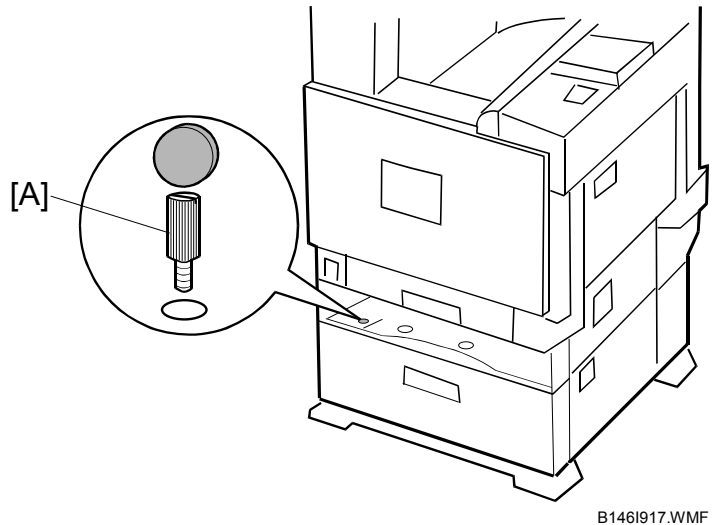
9. Fasten the knob screw [A].

10. Install tray 2.

[A]

B146I917.WMF

11. Open the right cover.

12. Install the link bracket [B]
    (1 knob screw).

[B]

B146I918.WMF
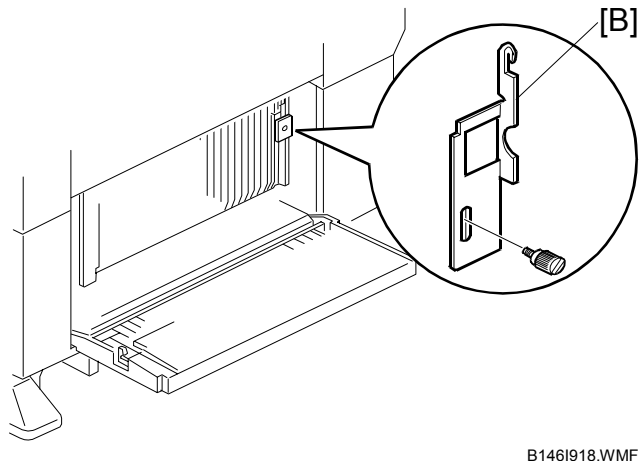
13. Turn on the main switch.

14. Check the machine's operation and copy quality.

1.5.4 AUTO REVERSE DOCUMENT FEEDER

Accessory Check

Check the quantity and condition of the accessories.

Description	Q'ty
1. Left stopper bracket	1
2. Right stopper bracket	1
3. Knob screw	4
4. Stud screw	2
5. Screw M4 x 10	2
6. Screwdriver Tool	1
7. Decal	1
8. Decal	1
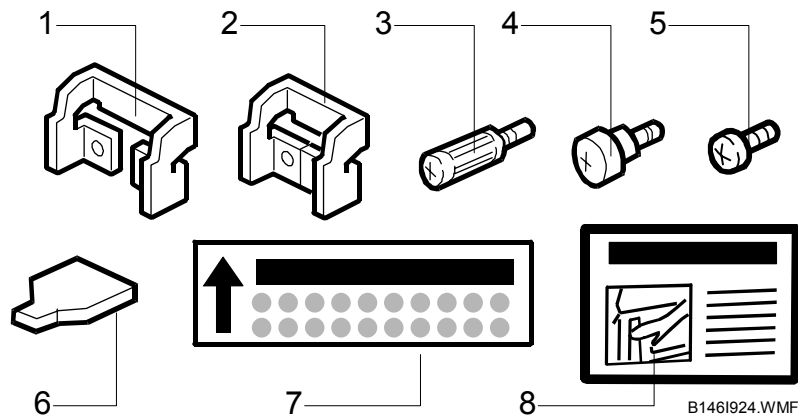
B146I924.WMF

Installation Procedure

⚠CAUTION
Turn off the main switch of the copier and unplug its power cord before starting the installation procedure.

1. Remove all tape.

G564I122.WMF

[E]

[B]

[C]

[D]

B146I930.WMF

B597I901.WMF

[A]

[F]
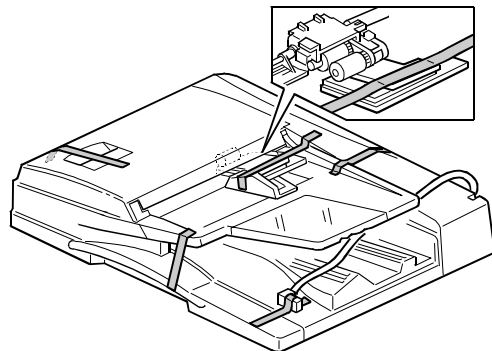
B146I937.WMF
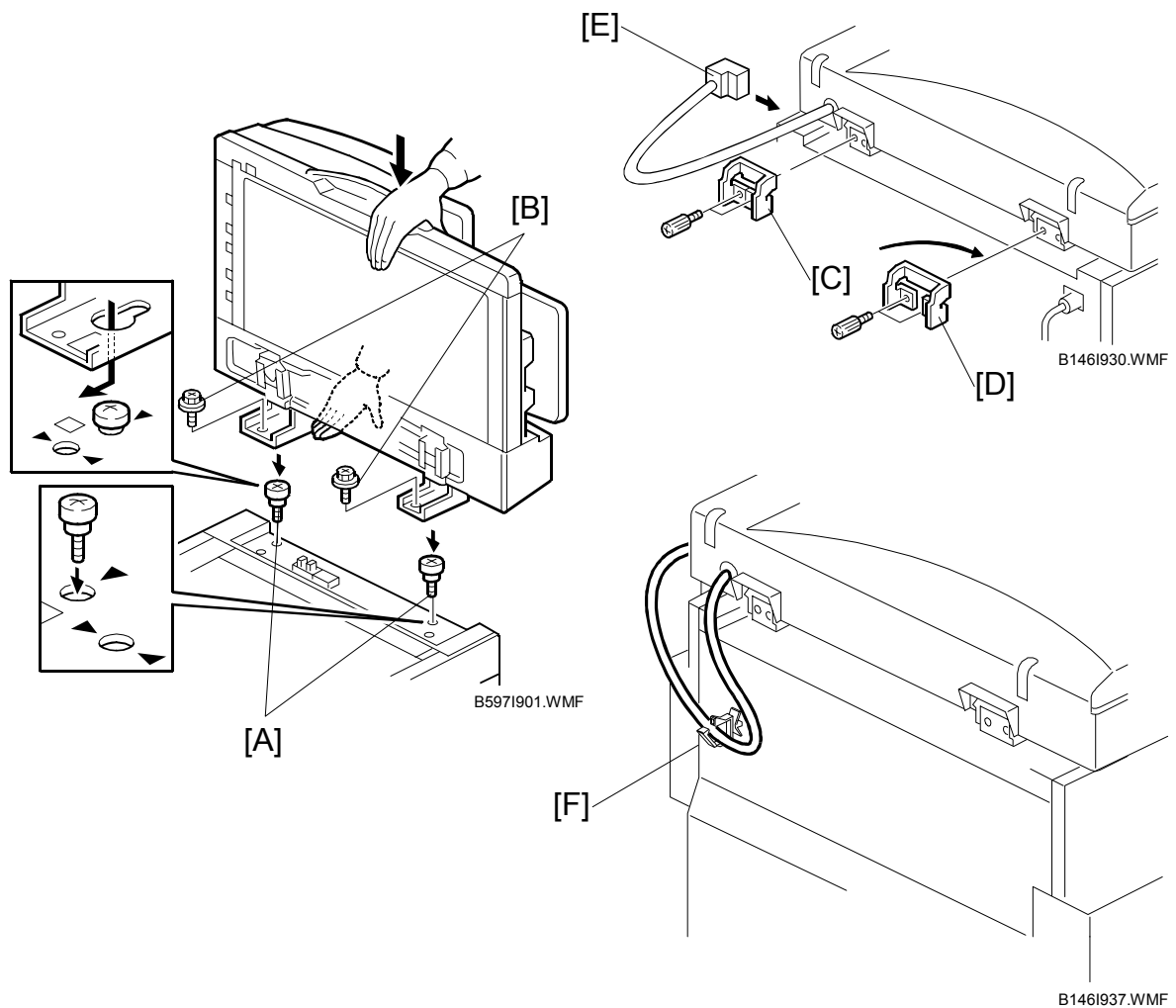
2. Install the two stud screws [A].

3. Mount the ARDF on the copier, and slide it to the front as shown.

    NOTE: To avoid damaging the ARDF, grasp it as shown.

4. Fasten the two screws [B] to secure the ARDF.

5. Attach the left [C] and right [D] stopper brackets (Knob screw x 2 for each).

6. Connect the cable [E] to the copier.

7. Fasten the cable with the clamp [F].

Installation

G564I102.WMF

B146I931.WMF
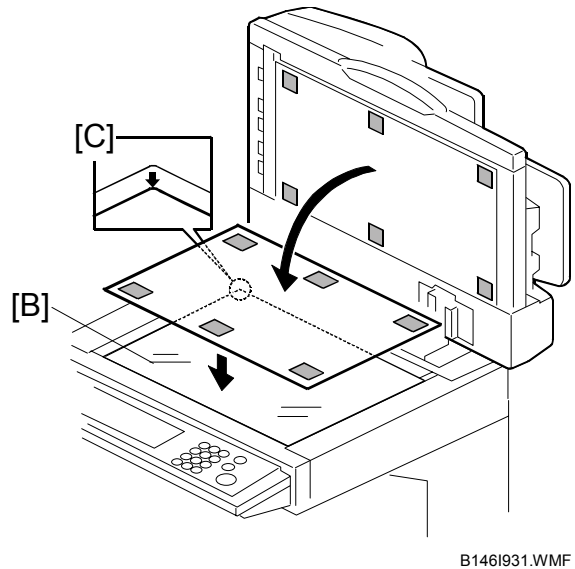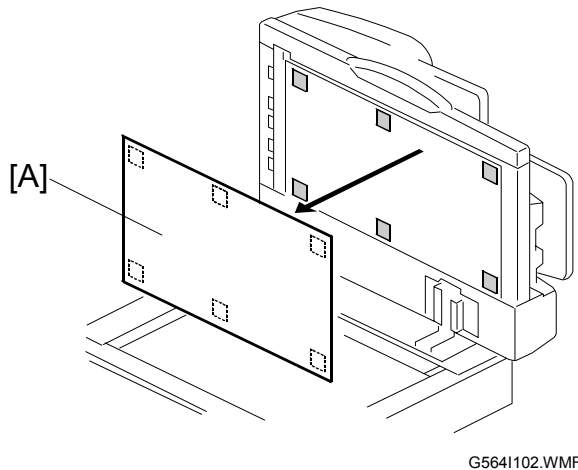
8. Remove the platen sheet [A] and place it on the exposure glass [B].

9. Align the rear left corner (of the platen sheet) flush against the corner [C] on the exposure glass.

10. Close the ARDF.

11. Open the ARDF and check that the platen sheet is correctly attached.

12. Attach the decal [D] with the arrow (on the decal) pointing at the ARDF exposure glass.

G564I105.WMF
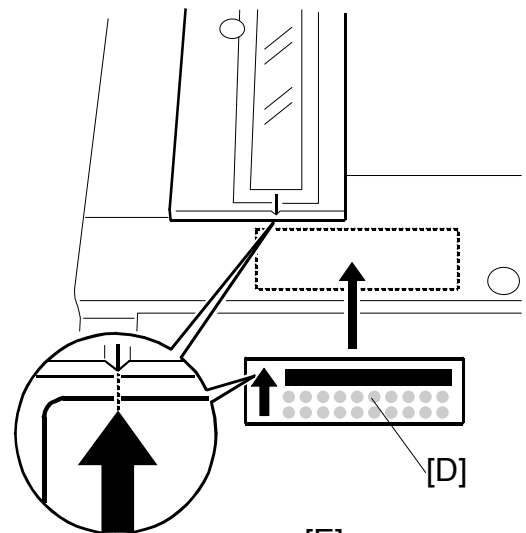
13. Attach the decal [E] on the top.

14. Turn the main switch on, and check the operation.

15. Make a full size copy, and check that the registrations (side-to-side and leading edge) and image skew are correct. If they are not, adjust the registrations and image skew with the SP mode.

G564I106.WMF
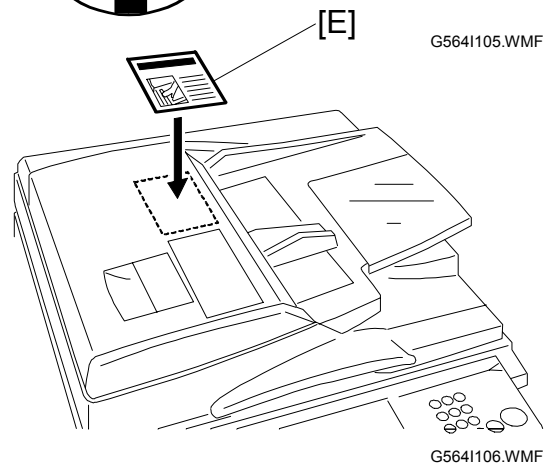
1.5.5 TWO-TRAY FINISHER

Accessory Check

Check the quantity and condition of the accessories.

Description	Q'ty
1. Duplex-unit support	1
2. Tray	2
3. Link rail	1
4. Link-rail holder	1
5. Screw M4 x 12	6
6. Screw M4 x 8	2
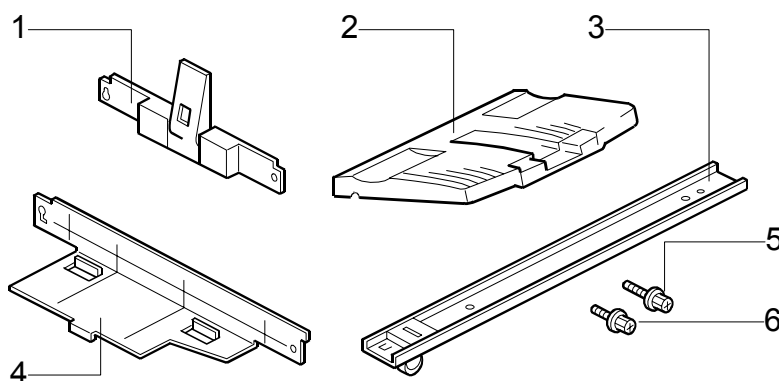
B146I926.WMF

Installation Procedure

> ⚠**CAUTION**
>
> **Turn off the main switch of the copier and unplug its power cord before starting the installation procedure.**

1. Remove all tape. Check that no tape remains inside the front cover and on the left cover.
2. Fold the external tray [A].

[A]
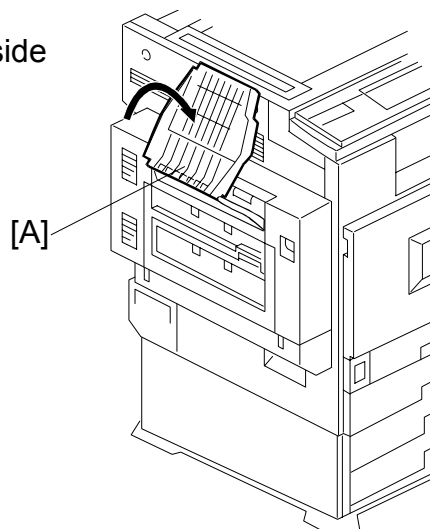
B146I905.WMF

3. Set the link rail [A] on the link-rail holder [B].

4. Install the link-rail holder (with the link rail) to the copier [C] (🖉 x 2).

[C]

[B]

[A]

B146I906.WMF
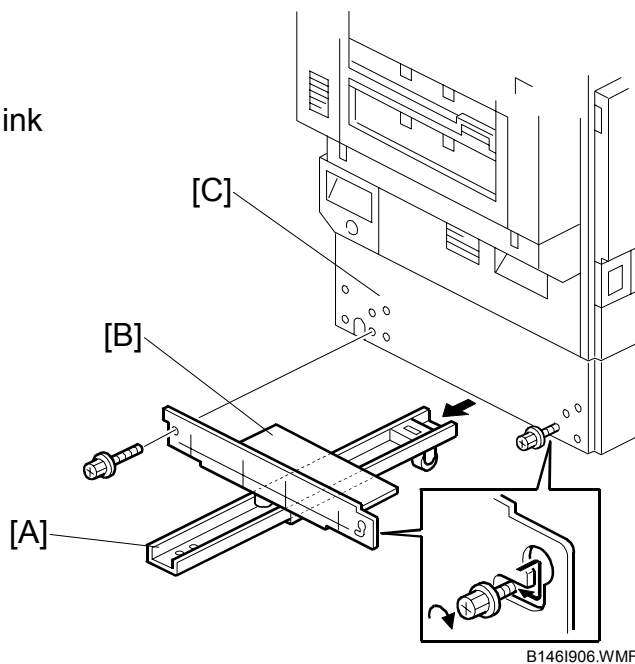
5. Install the duplex-unit support [D] to the copier (🖉 x 3).

[D]

B146I907.WMF
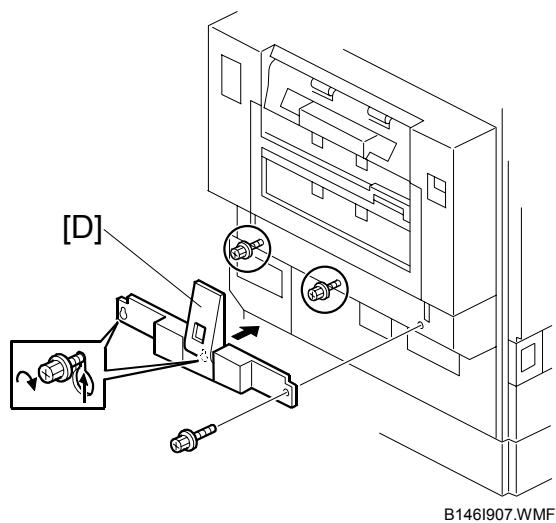
6. Adjust the position of the connection bracket [A] as necessary (✐ x 2):
   - Upper position for the copier with the two-tray paper feed unit or LCT.
   - Lower position for the copier with the one-tray paper feed unit.

[A]

B146I908.WMF
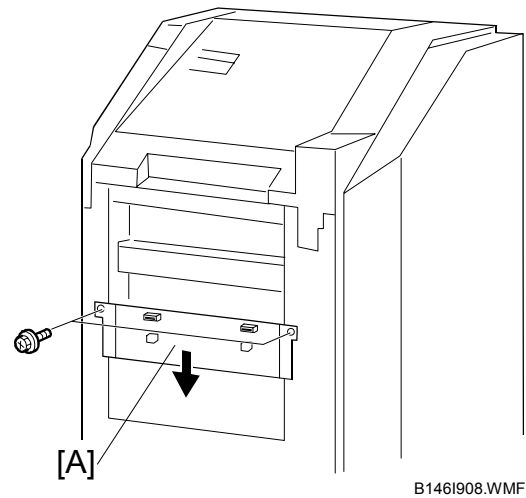
7. Connect the finisher [B] with the copier (✐ x 1).

8. Connect the finisher cable to the connector of the copier.

[B]

B146I909.WMF
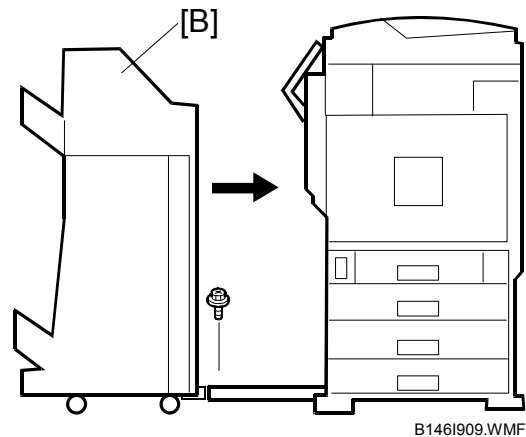
9. Install the two trays [C] (✐ x 1 for each).

10. Extend the external tray of the copier (see step 2).

11. Turn the main switch on and check the operation.

[C]

B146I910.WMF
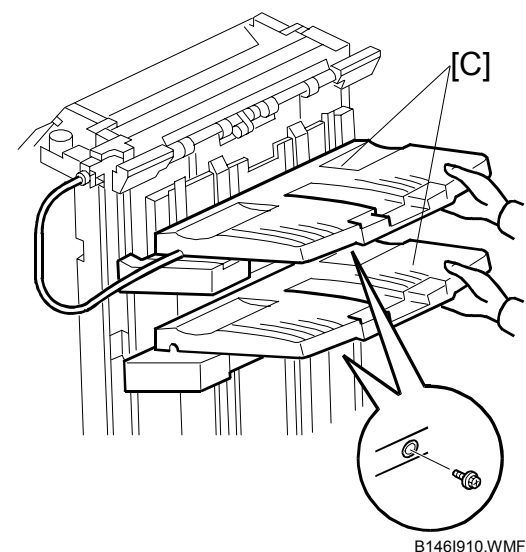
1.5.6 PUNCH UNIT

Accessory Check

Check the quantity and condition of the accessories.

Description	Q'ty
1. Punch unit	1
2. Sensor arm	1
3. Spring	1
4. Screw M3 x 6	2
5. Step screw	2
6. Hopper	1
7. Spacer (2 mm)	1
8. Spacer (1 mm)	2

B146I933.WMF
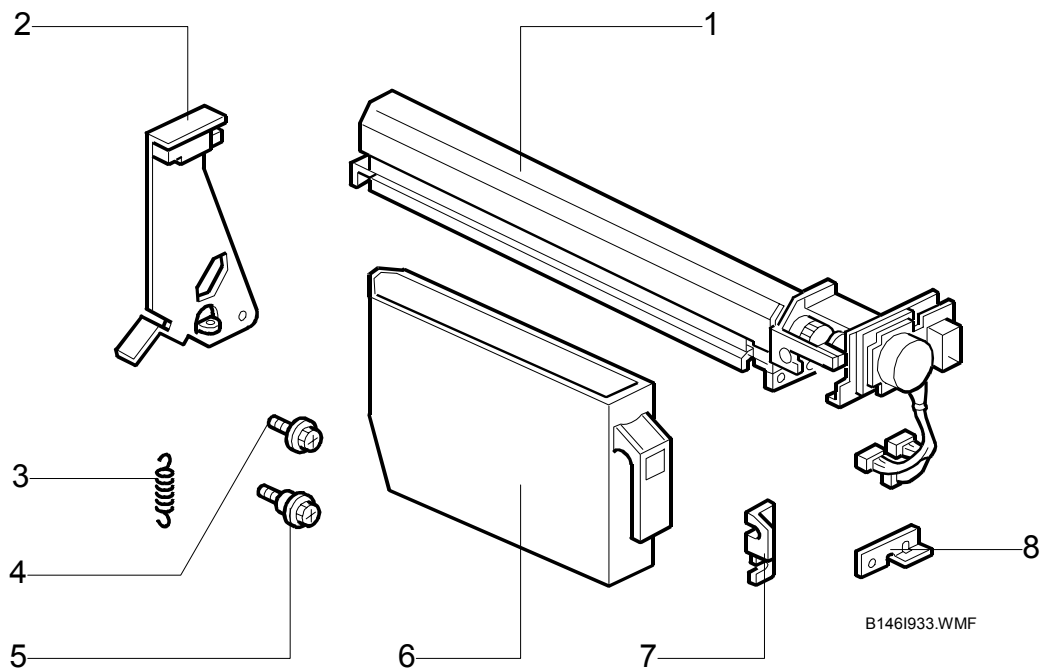
Installation Procedure

> ⚠️**CAUTION**
> **Switch off the main machine and unplug its power cord. If the two-tray finisher has been installed, disconnect it and pull it away from the machine.**

B377I102.WMF
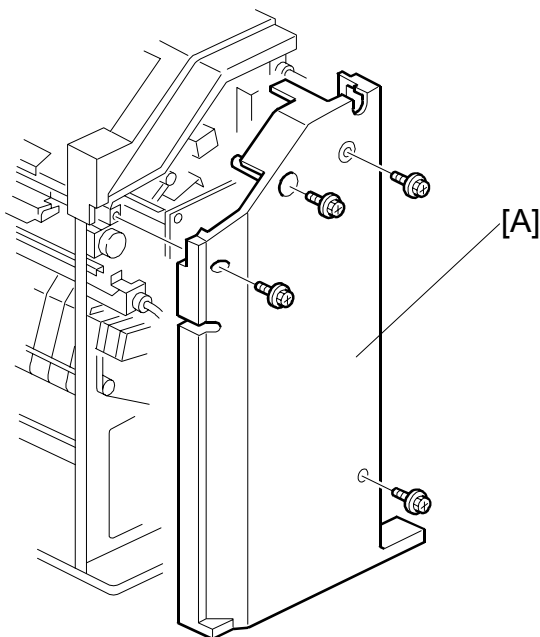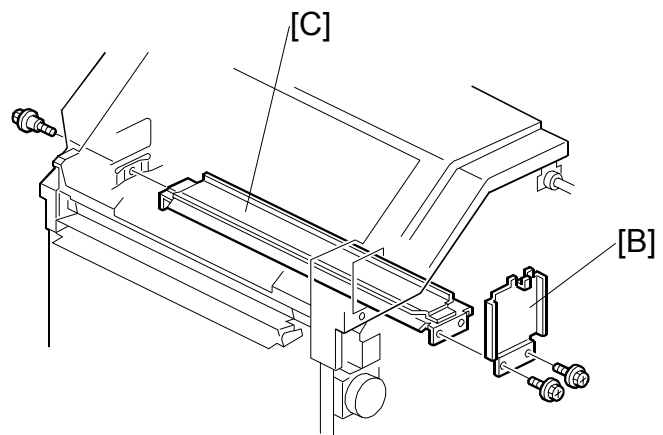
B377I103.WMF

1. Unpack the punch unit and remove all tapes and shipping retainers.

2. Open the front door and remove the rear cover [A] (🗝 x 4).

3. Remove the bracket [B] (🗝 x 2) and paper guide [C] (stepped 🗝 x 1).

B377I101.WMF

B377I104.WMF
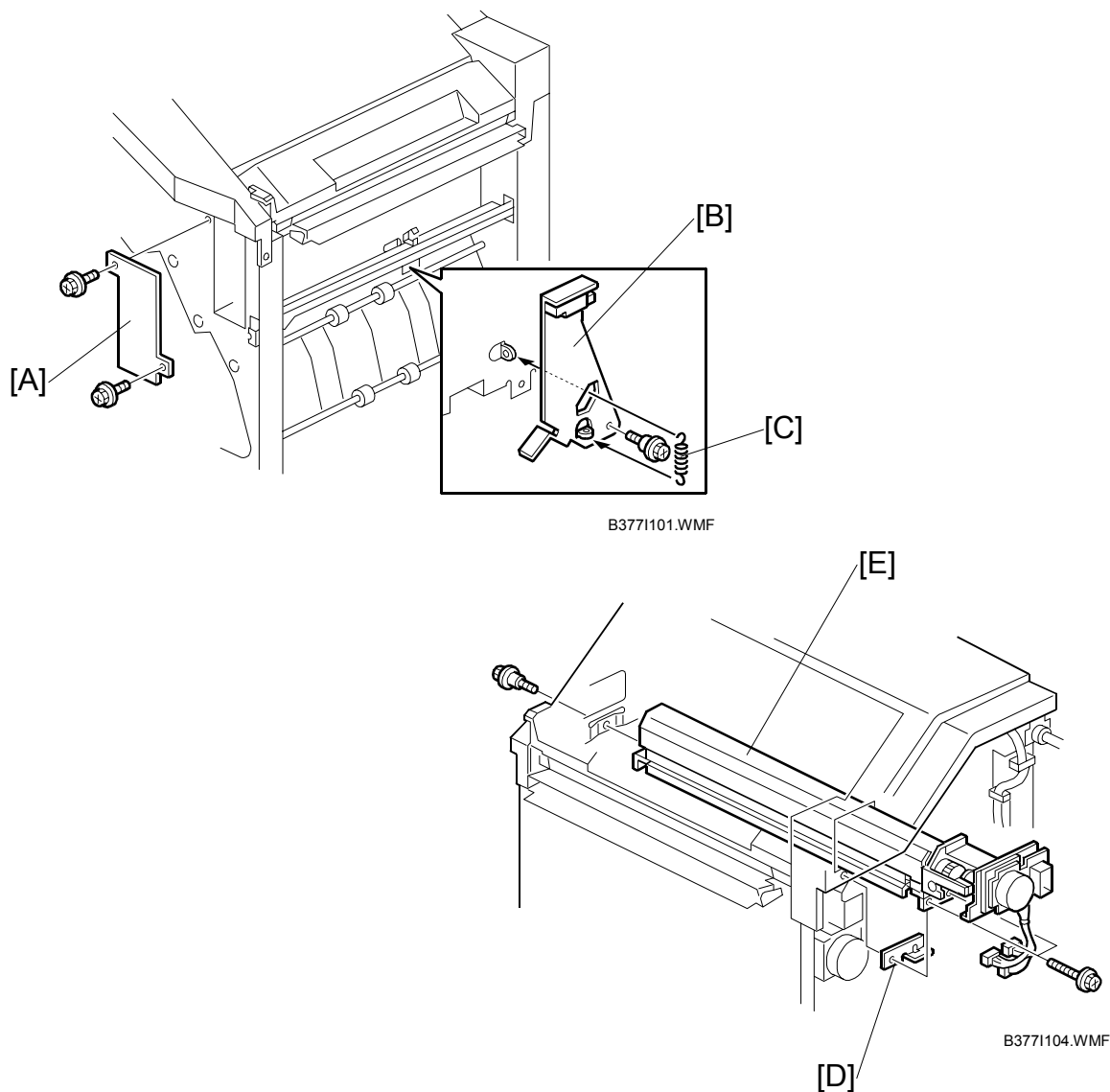
4. Remove the hopper cover [A] (✆ x 2).

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).

B377I200.WMF
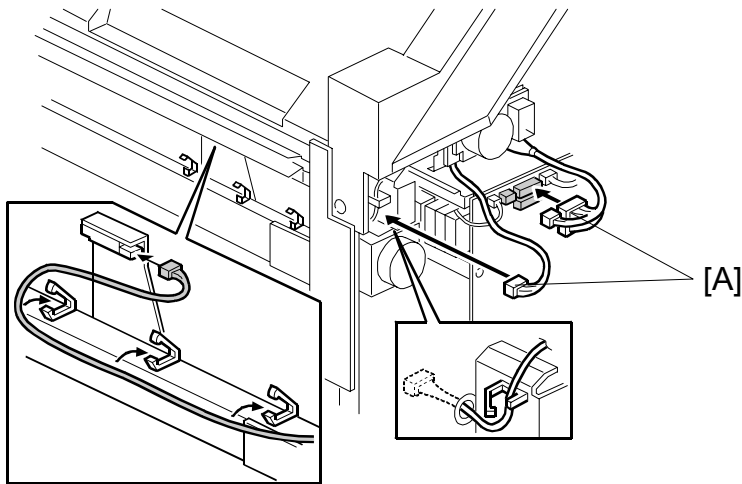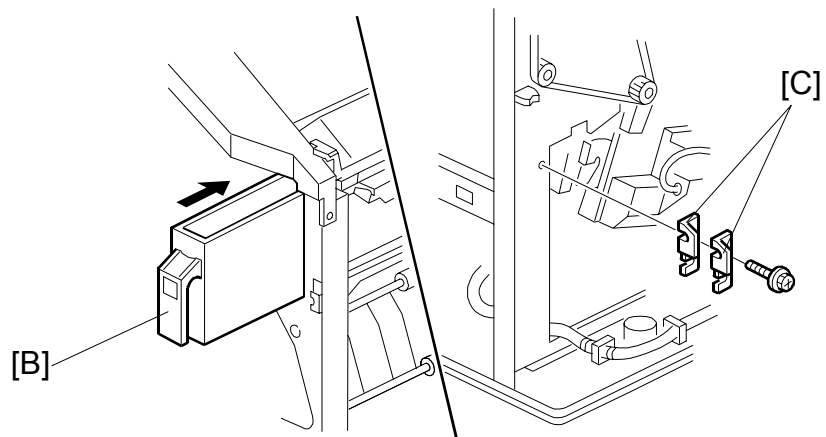
B377I106.WMF

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

10. Slide in the hopper [B].

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 punch
              holes.

12. Reassemble the finisher and check the punch operation.

Installation

1.5.7 MULTI-BIN OUTPUT TRAY

Accessories Check List

Check the quantity and condition of the accessories.

Description	Q'ty
1. Front Tray Holder	1
2. Rear Tray Holder	1
3. Tray	2
4. Screw (M3 x 14)	4
5. Discharge Brush	2
6. Ground Plate for Left Cover	1
7. Ground Plate for Upper Exit	1
8. Ground Plate for Lower Exit	1

B146I934.WMF
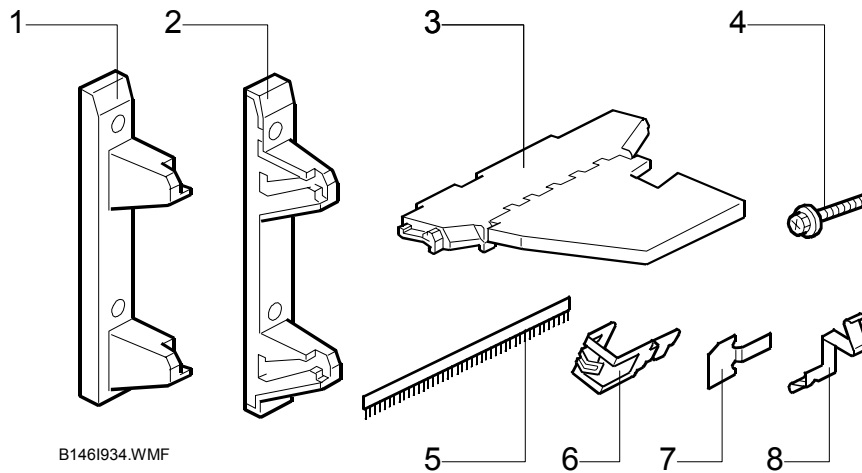
Installing the Multi-Bin Output Tray

NOTE: Before installing the multi-bin output tray, install the duplex unit.

1. Open the left cover [A] of the duplex unit.

2. Install the ground plate [B] behind the magnet.

3. Install the ground plate [C] on the rear of the left cover.

4. Attach the ground plate to the top cover, aligning the bottom edges of the plate [D] and cover [E].
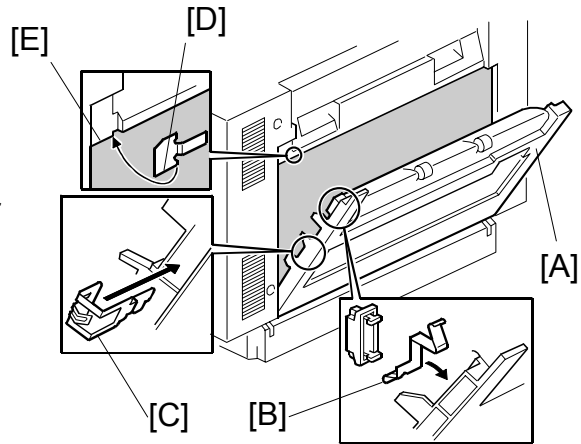
G306I101.WMF

5. Attach the discharge brushes [F][G] to the upper edges of the paper exits, so that the ends of the brushes [H][I] touch the ground plates [C][D] respectively.

   NOTE: Make sure the brushes do not obstruct paper coming from the exits.
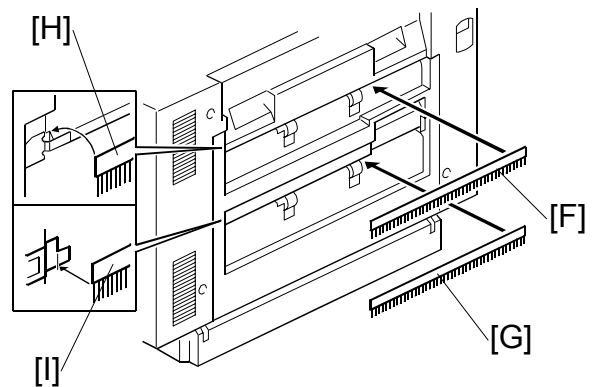
G306I102.WMF

6. Install the front [A] and rear [B] tray holders on the top cover (🖋 x 2 for each).

7. Install the upper [C] and lower [D] trays.

8. Turn the main switch on; select the SP mode menu, SP6–901–1; and change the multi-bin output tray setting.

NOTE: The multi-bin output tray is not automatically recognized by the printer mainframe. The multi-bin output tray cannot be used until you have changed this SP mode setting.
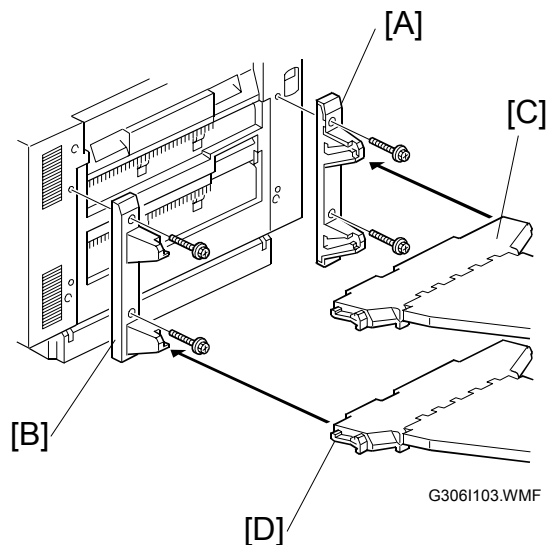
G306I103.WMF

1.5.8 BOOKLET FINISHER

Accessory Check

Check the quantity and condition of the accessories.

Description	Q'ty
1. Regular tray	1
2. Rail holder	1
3. Magnet catch–rear	1
4. Magnet catch–front	1
5. Duplex-unit support	1
6. Rail joint	1
7. Screw M4 x 12	6
8. Screw M4 x 6	8
9. Screw M3 x 14	4
10. Rail	1
11. Stapler unit	1
12. Staple cartridge	1
13. Pad	3

B602I912.WMF
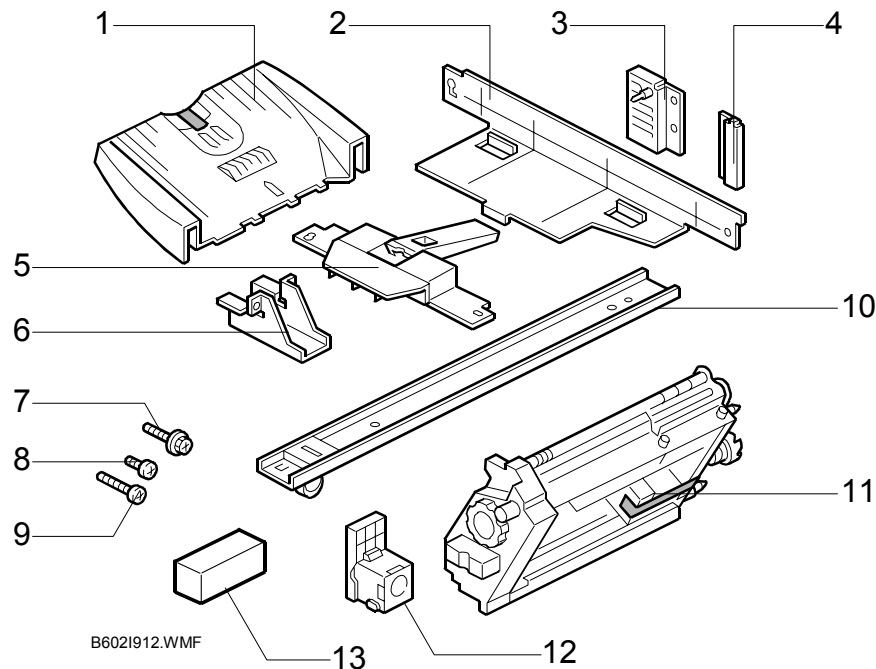
NOTE: Make sure that you retain the pads. The pads are white and made of styrofoam.

Adjusting the Height

B602I008.WMF

B602I901.WMF
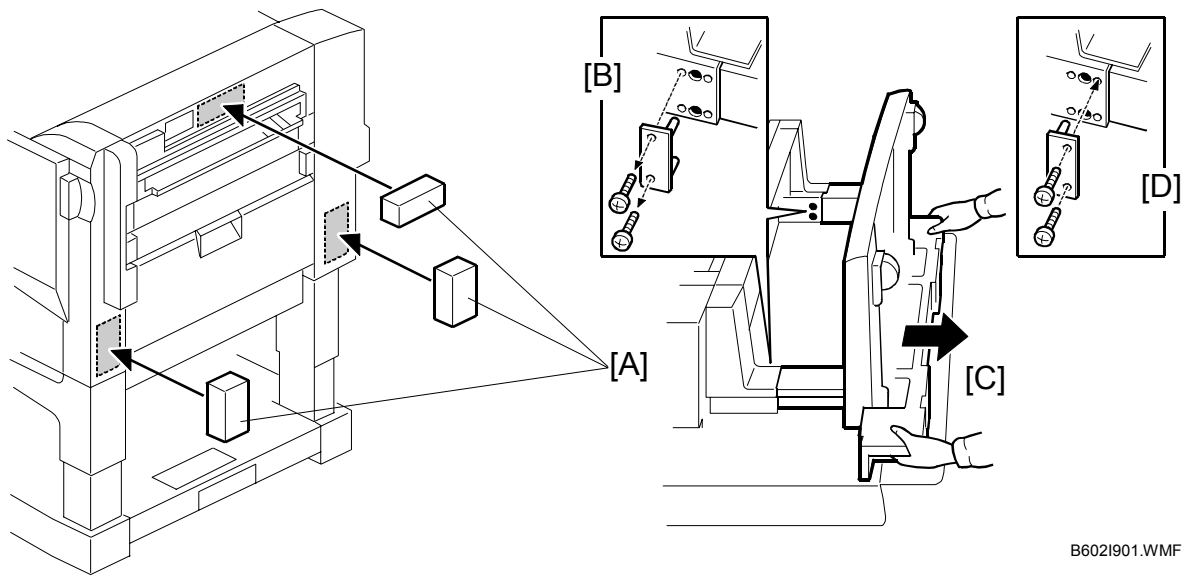
1. Check the type of the optional paper tray:

   - If the optional two-tray paper feed unit or the optional LCT is installed, go to step 2.
   - If either of them is not installed, go to "Main Body."

2. Tape the pads [A] to the right-hand side of the machine.

3. Lay the machine on its right-hand side.

4. Remove the adjuster plates [B] (🔩 x 2).

5. Change the height [C].

6. Reinstall the adjuster plates [D].

7. Take out the machine from the box and stand it up.

8. Check that the height is correct, and remove the pads.

Installation

Main Body

1. Remove all tape and padding.
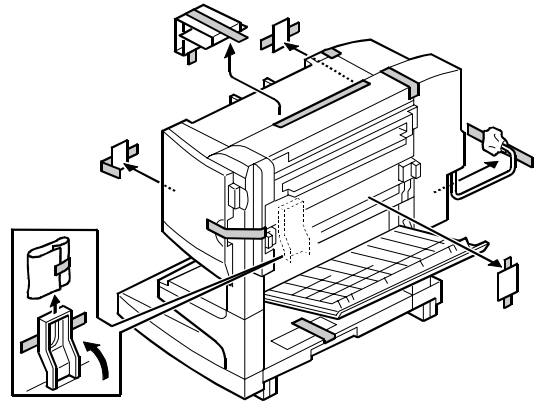
B602I001.WMF

2. Remove the screw cover [A].
3. Install the rail joint [B] ($\mathscr{J}$ x 4).
4. Reinstall the screw cover.

[A]

[B]
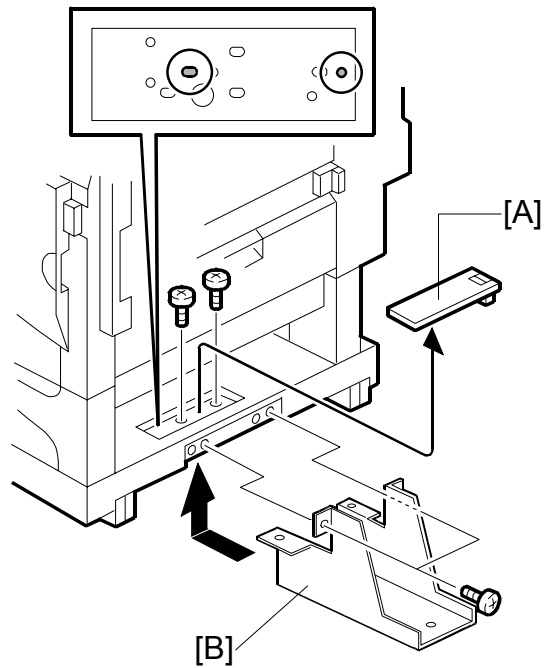
B602I902.WMF

5. Install the regular tray [C] ($\mathscr{J}$ x 4).

[C]
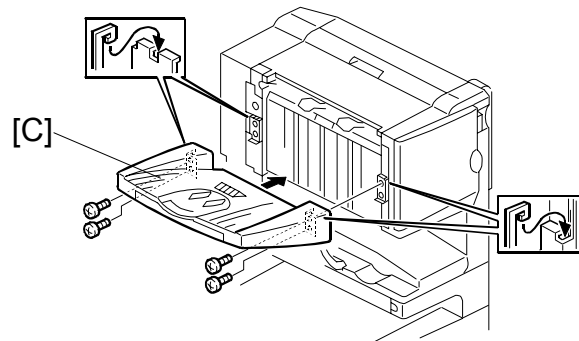
B602I903.WMF

6. Install the magnet catches [A][B]
   (✐ x 2 for each).

7. Install the duplex-unit support [C] (✐ x 3).

[A]

[C]

[B]

B602I004.WMF
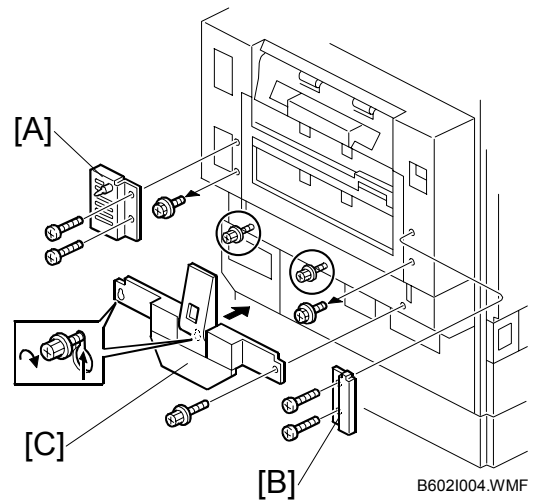
8. Set the rail [D] through the rail holder [E].

9. Install the rail holder (with the rail) to the
   copier (✐ x 2).

[D]   [E]

B602I904.WMF
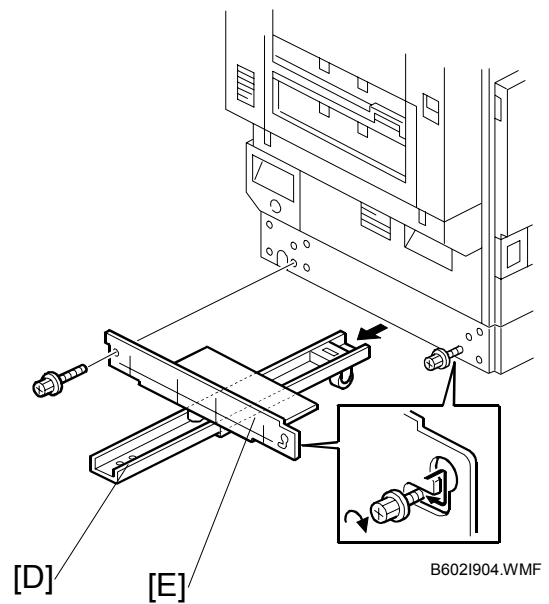
10. Connect the booklet finisher unit to the copier ($\mathscr{P}$ x 1).
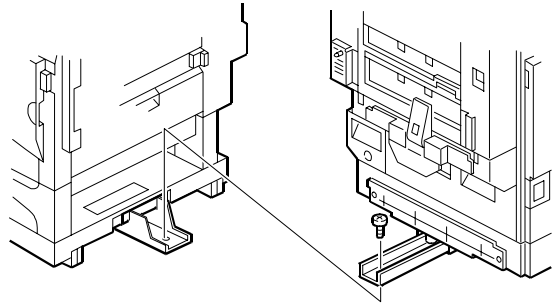
B602I905.WMF

11. Install the stapler unit [A].

[A]
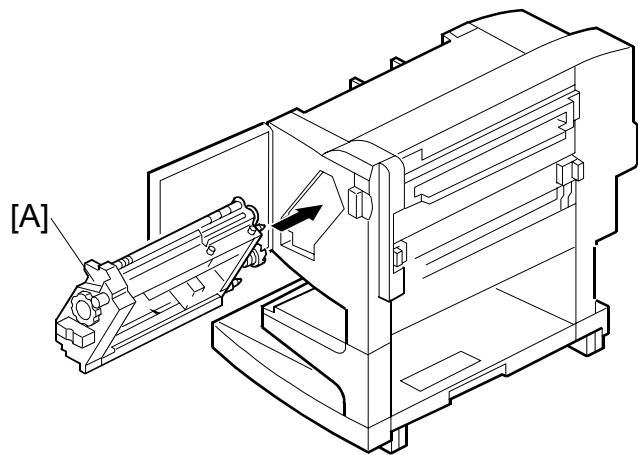
B602I907.WMF

12. Turn the knob [B] clockwise until the staple-cartridge holder [C] reaches the front-most position.

13. Install the staple cartridge [D] firmly to the staple-cartridge holder.

[B]

[C]

[D]
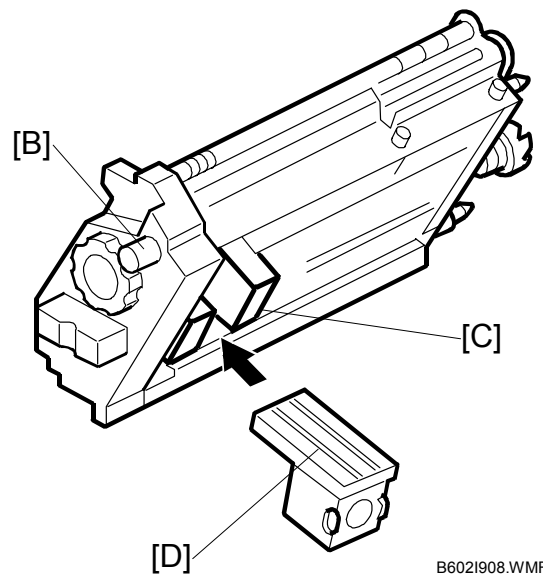
B602I908.WMF

14. Turn on the main switch and check the operation.

Optional Punch Unit

Check the quantity and condition of the accessories.

Description	Q'ty
1. Punch unit	1
2. Decal	1
3. Screw M4 x 6 (with the base)	1
4. Cable	2
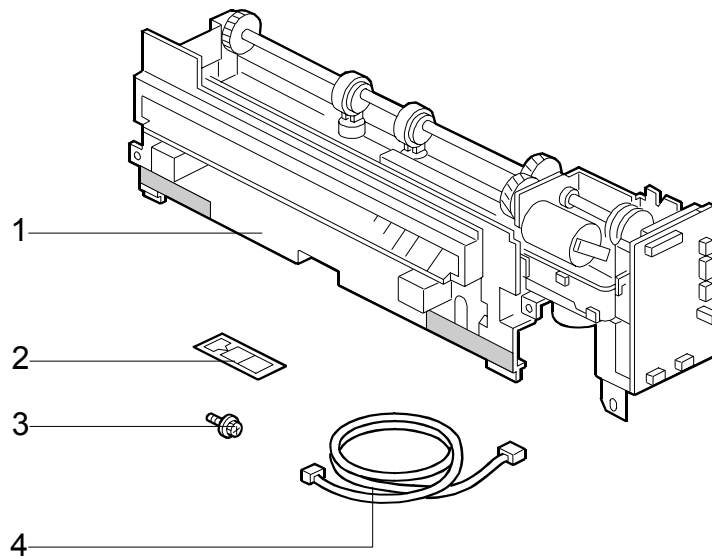
B647I001.WMF

1. Remove the front lower cover
    [A] (🔩 x 2).

[A]

B602R988.WMF

Installation
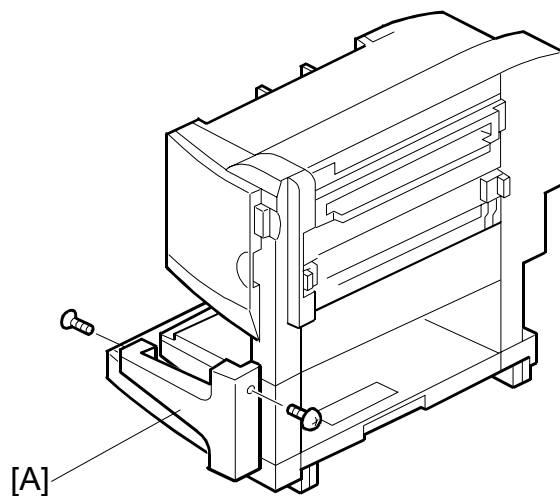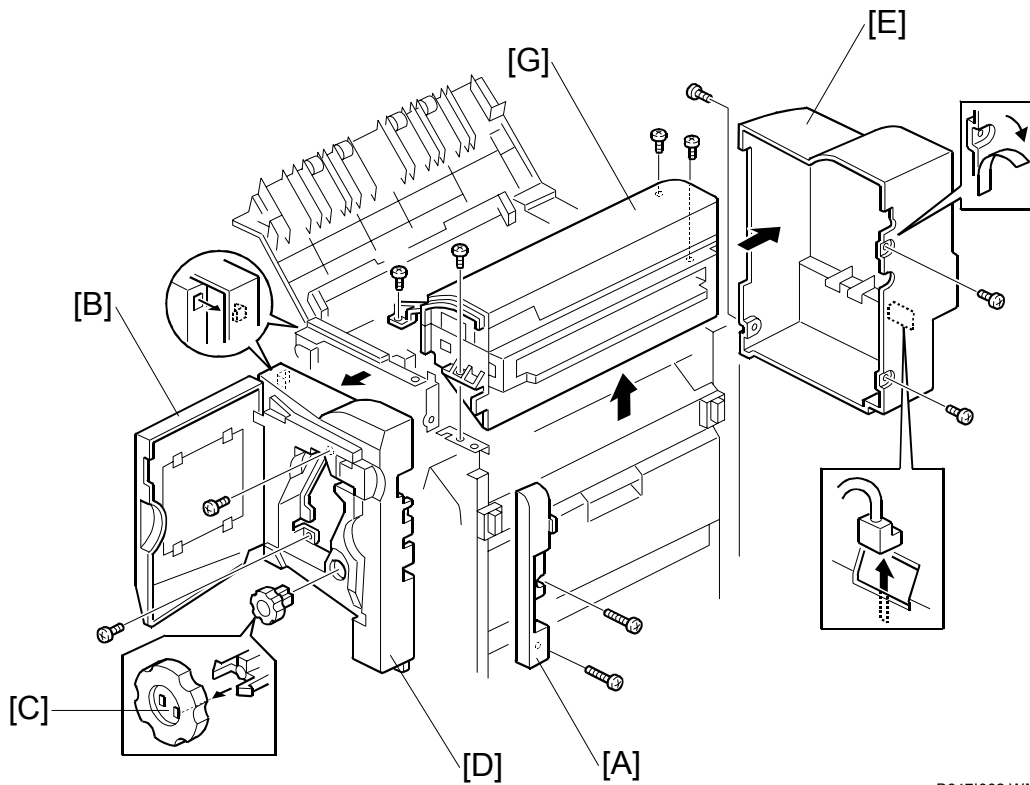
B647I002.WMF

2. Remove the joint guard [A] (🔩 x 2).

3. Open the front door [B].

4. Release the stopper and remove the knob [C].

5. Remove the front cover [D] (🔩 x 4).

6. Remove the rear cover [E] (🔩 x 3).
    NOTE: Do not damage the mylar when you remove the screw.

7. Remove the right top cover with the paper entrance cover [G] (🔩 x 4).

8. Remove the right top cover [A] from the paper entrance cover [B].

[A]

[B]
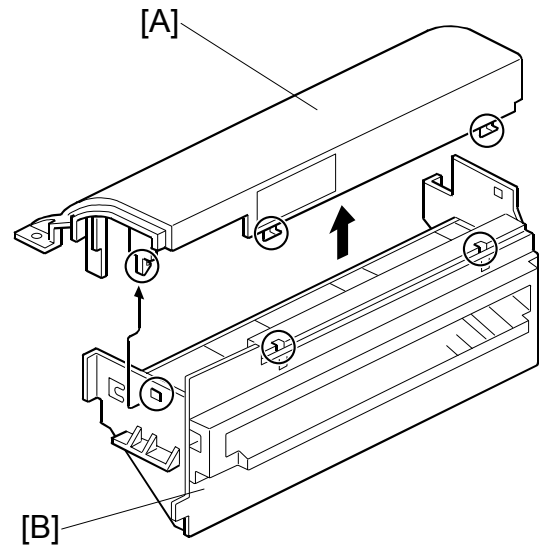
B647I003.WMF

9. Install the punch unit [C] (🖉 x 2, 1 screw with the base [D])

[D]

[C]
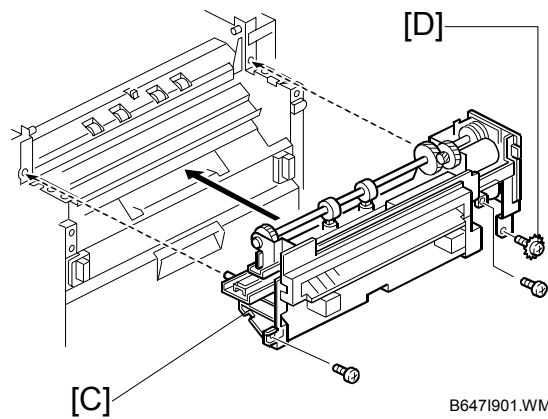
B647I901.WMF

10. Install the right top cover [E] (🖉 x 2).

[E]
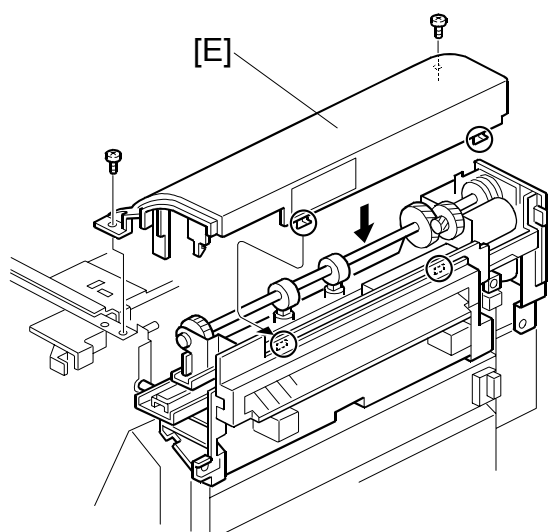
B647I005.WMF
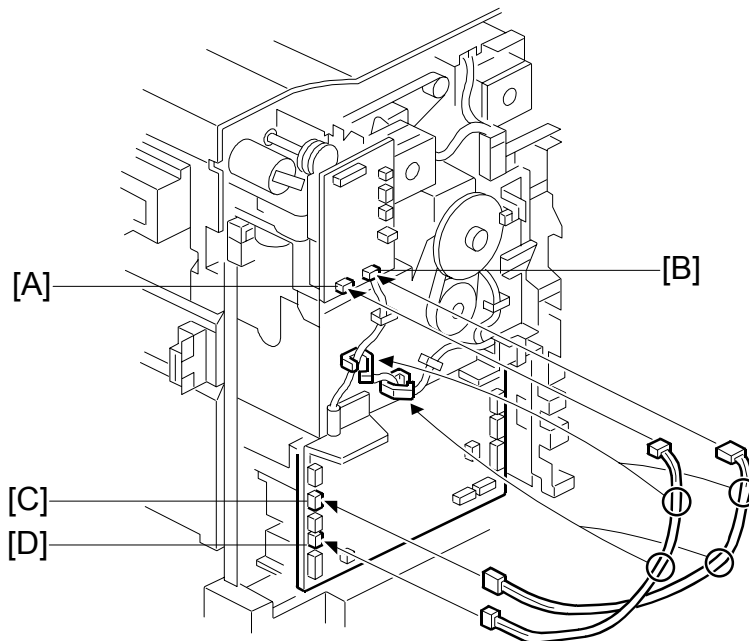
B647I006.WMF

11. Install the cable to the connectors as follows:
   - J1003 (punch unit) [A] to CN12 (booklet finisher unit) [D]
   - J1004 (punch unit) [B] to CN14 (booklet finisher unit) [C]
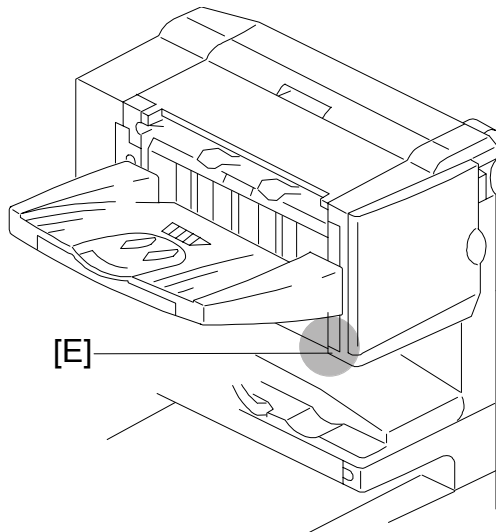
B602I911.WMF
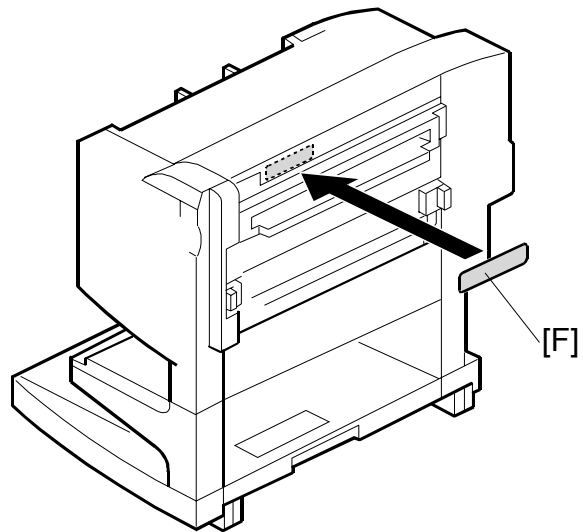
B647I903.WMF

12. Fasten the cable with the clamps.

13. Reassemble the booklet finisher unit.
   NOTE: Check that the side guide and the front cover correctly join with each other [E].

14. Attach the decal [F].

15. Turn on the main switch and check the punch operation.

1.5.9 PRINTER SCANNER UNIT (FOR ASIA MODEL ONLY)

The printer scanner unit is a standard unit for the models other than the Asia model.

Accessory Check

Check the accessories in the box against the following list:

Description	Q'ty
1. Key Tops – Printer (English: 1 set, Universal: 1 set)	2
2. Key Tops – Scanner (English: 1 set, Universal: 1 set)	2
3. NIB	1
4. IEEE 1284 Interface Board	1
5. SD Card	1
6. Ferrite Core (For LAN cable)	1

Installation Procedure

> ⚠**CAUTION**
> **Switch the main switch off and unplug the power cord before starting any procedure described in these instructions.**

CAUTION: When installing an SD card, keep pushing it into the card slot until the slot holds the card (you hear a click). If you release it too early, the SD card may be pushed out of the slot.

You need to install the optional 256 MB memory with the printer/scanner unit.

B612I901.WMF

Installation

1. Remove the slot cover [A] from the I/F Card Slot B (screw x 2).

2. Install the Ethernet board [B] (Knob-screw x 2).

[B]

[A]
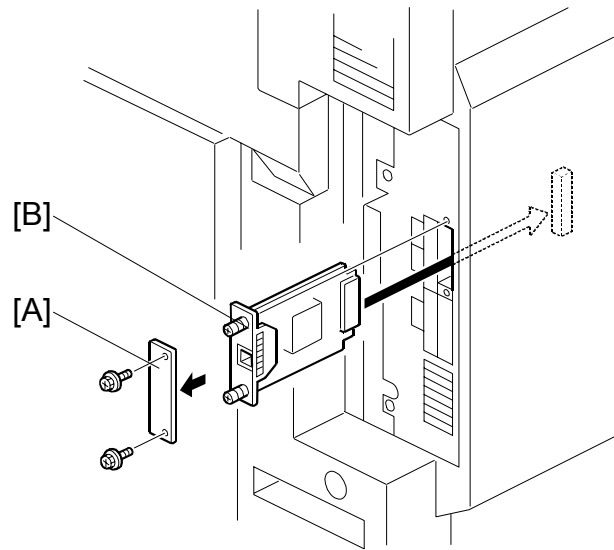
B612I002.WMF

3. Remove the slot cover from I/F Card Slot A [C] (screw x 2).

4. Install the IEEE 1284 interface board [D] (Knob-screw x 2).

[D]

[C]
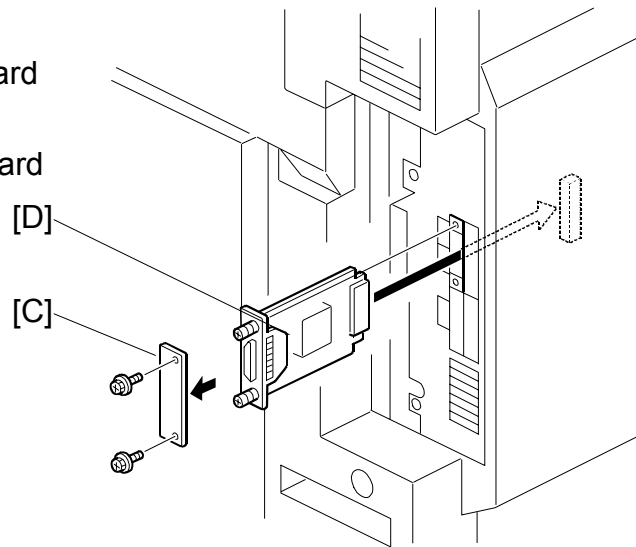
B612I903.WMF

5. Remove the slot cover [A] from SD Card Slot 1 (🔩 x 1).

6. Turn the SD-card face [B] to the rear of the machine, and push it slowly into the slot until you hear a click.

7. Attach the slot cover (🔩 x 1).

[B]

[A]
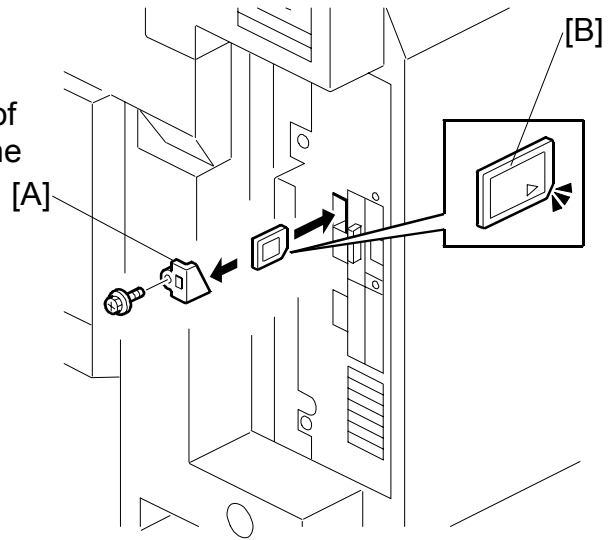
B612I004.WMF

8. Remove the dummy keys [C] and install one of the printer keys [D][d] and one of the scanner keys [E][e].

[C]

| [D] | [d] | [E] | [e] |
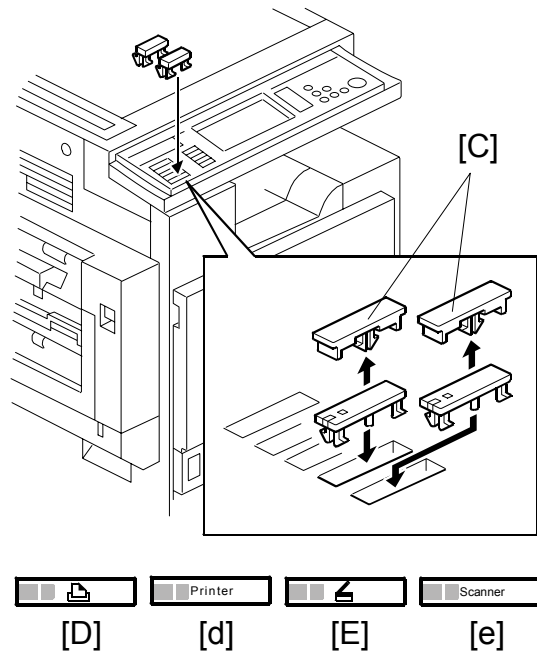
B612I902.WMF

9. Attach the ferrite core [F] to the LAN cable.

10. Connect the LAN cable.

[F]

B603I904.WMF

1-50
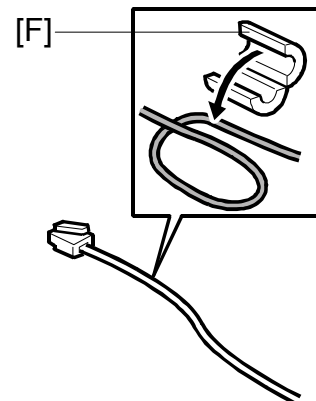
1.5.10 POSTSCRIPT 3

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

1. Remove the slot cover [A] from SD Card Slot 2 (🔩 x 1).

2. Turn the SD-card face [B] to the rear of the machine, and push it slowly into the slot until you hear a click.

3. Attach the slot cover (🔩 x 1).
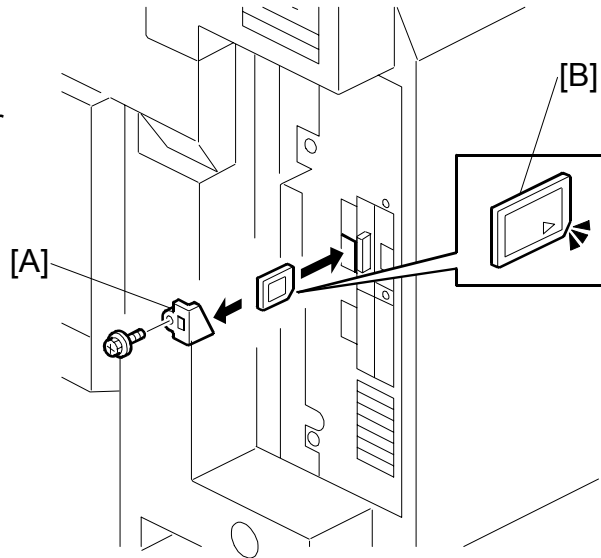
G369I901.WMF

4. Attach the "Adobe PostScript 3" decal [C] to the front cover.

Adobe®PostScript® 3™
>PS<
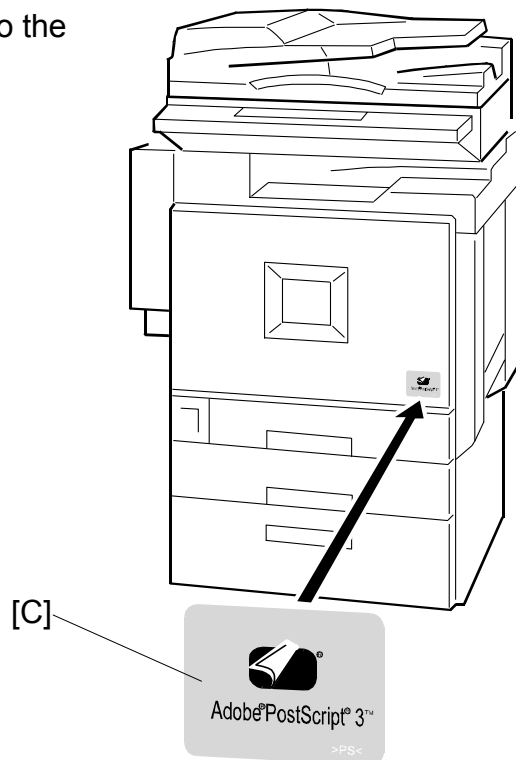
G369I902.WMF

1.5.11 256 MB MEMORY

⚠CAUTION
Unplug the main machine power cord before starting the following procedure.
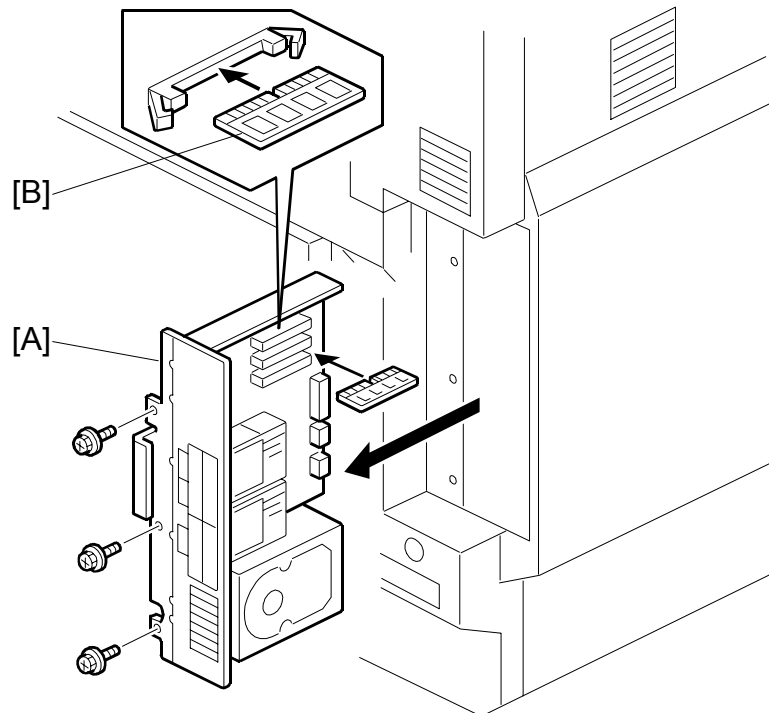
B612I001.WMF

1. Remove the controller board [A] (🔩 x 3).

2. Install the expansion memory [B].

3. Reinstall the controller board (🔩 x 3).

1.5.12 FILE FORMAT CONVERTER

> ⚠**CAUTION**
> **Unplug the main machine power cord before starting the following procedure.**
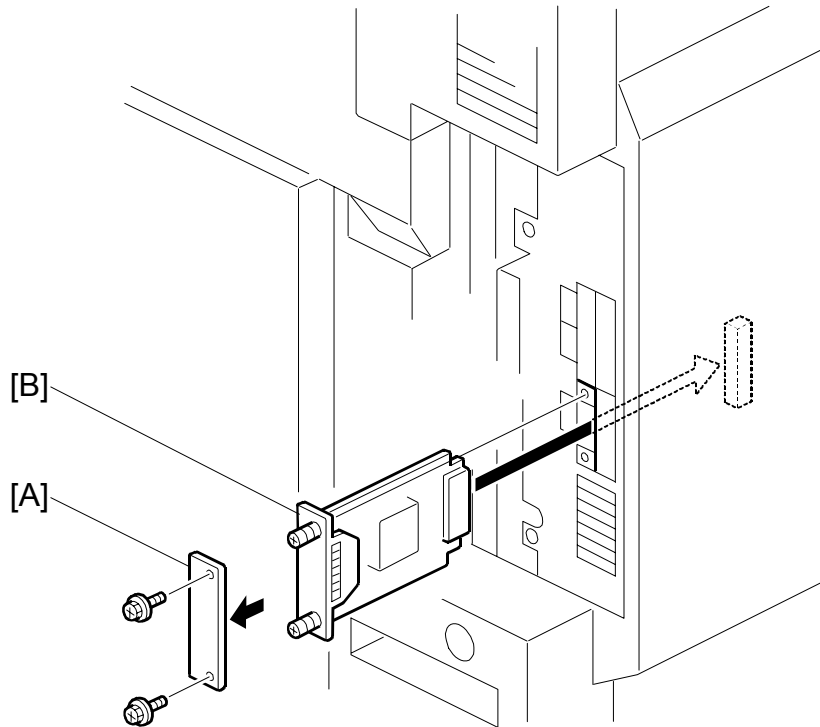
B609I901.WMF

1. Remove the slot cover from I/F Card Slot C [A] ($\mathcal{F}$ x 2).
2. Install the file format converter board [B] (Knob-screw x 2).

1.5.13 IEEE 1394 (FIREWIRE)

Installation Procedure

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

B581I901.WMF
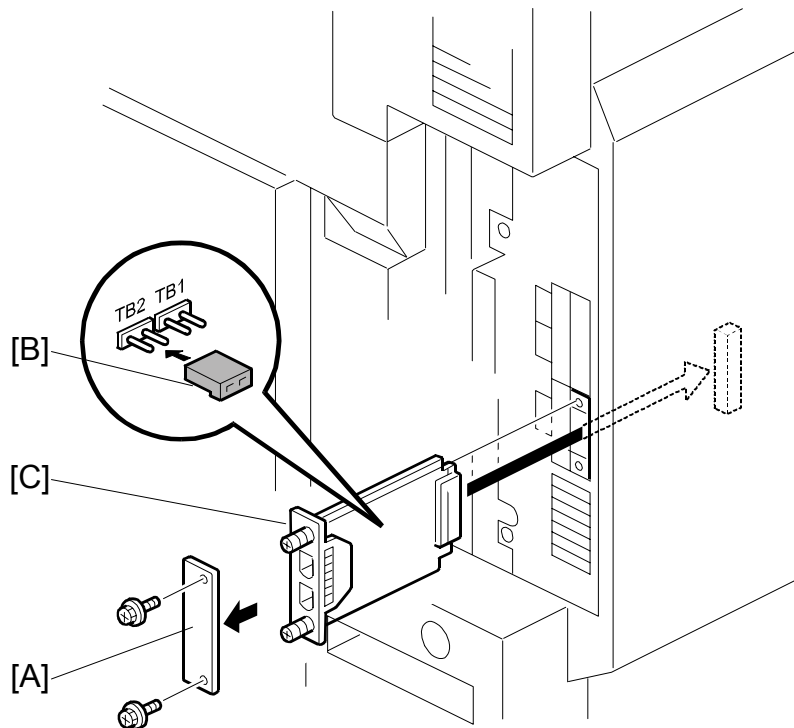
You can install one of the following network interfaces: IEEE 802.11b (Wireless LAN), USB 2.0, IEEE1394 (FireWire), Bluetooth. (For the information on the Asia model, see section 1.5.9.)

1. Remove the slot cover from I/F Card Slot D [A] (✏ x 2).

2. Make sure that the jumper [B] is set on "TB2."

3. Install the FireWire board [C] (Knob-screw x 2).

UP Mode Settings for IEEE 1394

Enter the UP mode and follow the procedure below to perform the initial interface settings for IEEE 1394. These settings take effect every time the machine is powered on.

1. Press the ⬦⃞ key.

2. On the touch panel, press System Settings.

3. Press Interface Settings.

4. Press the key and enter the following settings:
    *   IP Address
    *   Subnet Mask
    *   IP Over 1394. Enable or disable this setting as required. This setting enables IP Over 1394 as the default setting for the printing method.
    *   SCSI Print. Enable or disable this setting as required. This setting enables SCSI Print as the default setting for the printing method.
    *   SCSI Print Bi-directional. Switch bi-directional printing on or off for SCSI print.

SP Mode Settings for IEEE 1394

The following SP commands can be set for IEEE 1394.

SP No.	Name	Function
5839 004	Host Name	Sets the name of the device used on the network. Example: RNPXXXXXXXXXX
5839 007	Cycle Master	Enables or disables cycle master function of the IEEE 1394 standard bus.
5839 008	BCR Mode	Sets the BCR (Broadcast Channel Register) setting for the Auto Node operation for the standard IEEE1394 bus for when IRM is not in use. The following three settings are available: "Standard," "IRM Color Copy," and "Always Effective."
5839 009	IRM 1394a Check	Determines whether an IRM check for IEEE 1394a is conducted for the Auto Node when IRM is not used.
5839 010	Unique ID	Enables the "Node_Unique_Id" setting for enumeration on the standard IEEE 1394 bus.
5839 011	Logout	Determines how successive initiator login requests are handled during login in for SBP-2.
5839 012	Login	Enables or disables exclusive login for SBP-2.
5839 013	Login MAX	Sets the limit for the number of logins for SBP-2. Range: 1 ~ 62.

1.5.14 USB 2.0

Installation Procedure

> ⚠️**CAUTION**
> **Unplug the main machine power cord before starting the following procedure.**
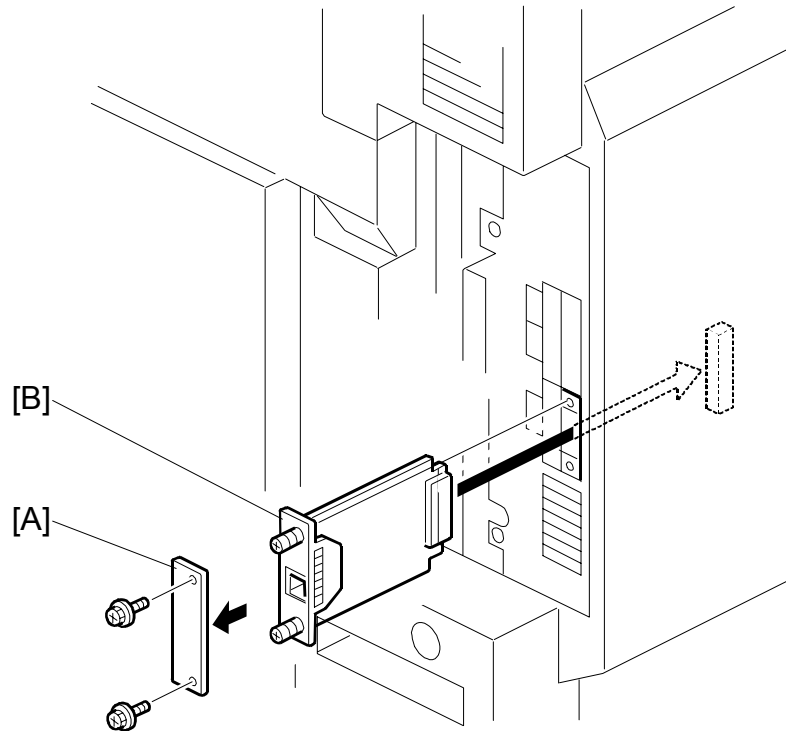
B596I901.WMF

You can install one of the following network interfaces: IEEE 802.11b (Wireless LAN), USB 2.0, IEEE1394 (FireWire), Bluetooth. (For the information on the Asia model, see section 1.5.9.)

1. Remove the slot cover from I/F Card Slot D [A] (🖉 x 2).

2. Install the FireWire board [B] (Knob-screw x 2).

USB SP Settings

The following SP commands are available. However, only one setting may require adjustment and this setting should be performed only if the customer is experiencing USB data transmission errors.

NOTE: Do not change the settings marked "DFU". These settings are for design and factory use only.

SP No.	Name	Function	
5844 001	Transfer Rate	Adjusts the USB transfer rate. Do not change the setting unless there is a data transfer error using the USB high speed mode.	
		HS/FS:	High speed/Full speed auto adjust (480Mbps/12Mbps)
		FS:	Full speed (12Mbps fixed)
5844 002	Vendor ID	Displays the vendor ID. **DFU**	
5844 003	Product ID	Displays the product ID. **DFU**	
5844 004	Dev. Release Number	Displays the development release version number. **DFU**	

1.5.15 IEEE 802.11b (WIRELESS LAN)

Installation Procedure

> ⚠**CAUTION**
> **Unplug the main machine power cord before starting the following procedure.**
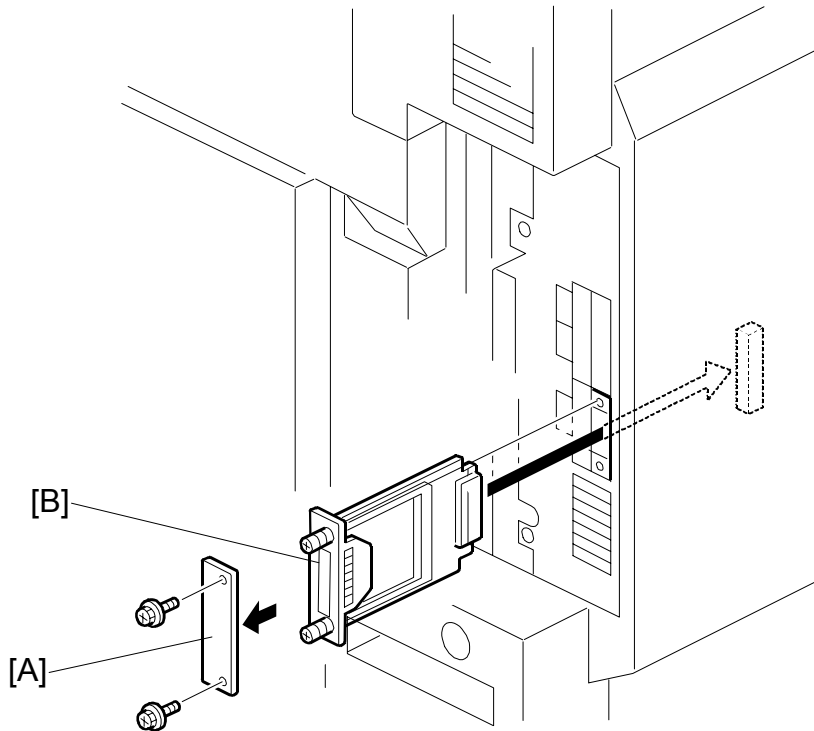
B582I901.WMF

You can install one of the following network interfaces: IEEE 802.11b (Wireless LAN), USB 2.0, IEEE1394 (FireWire), Bluetooth. (For the information on the Asia model, see section 1.5.9.)

1. Remove the slot cover from I/F Card Slot D [A] (🗲 x 2).

2. Install the wireless LAN board [B] (Knob-screw x 2).
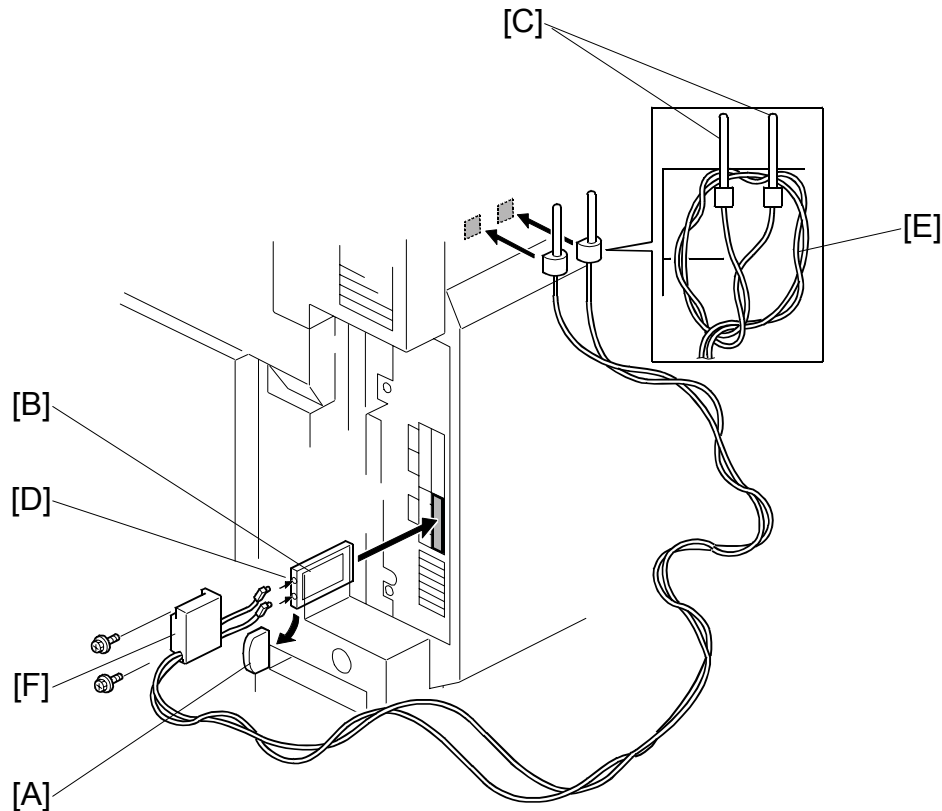
B582I902.WMF

3. Pull off the edge connector protector [A] off the card and discard it.

4. With the card label facing left, insert the card [B] into the PCI slot.

5. Use the Velcro pads to install the antennas [C] on the left rear corner of the machine.
   NOTE: The antennas should be separated by at least 40 ~ 60 mm (1.5~2.5").
   Always detach the antennas from the corners of the machine and disconnect them before moving the machine.

6. Connect the antennas to the terminals [D].

7. Coil the cables [E] and hang them over the antennas as shown.

8. Attach the cover [F] (✒ x 2).

9. If reception is poor, you may need to move the machine:
   • Make sure that the machine is not located near an appliance or any type of equipment that can generate a strong magnetic field.
   • Position the machine as close as possible to the access point.

UP Mode Settings for Wireless LAN

Enter the UP mode and follow the procedure below to perform the initial interface settings for IEEE 802.11b. These settings take effect every time the machine is powered on.
NOTE: The wireless LAN cannot be used if Ethernet is being used.

1. Press the User Tools/Counter key.

2. On the touch panel, press System Settings.
   NOTE: The Network I/F (default: Ethernet) must be set for either Ethernet or wireless LAN.

3. Select Interface Settings → Network (tab) → Network I/F Settting

4. Select either "Ethernet" or "IEEE 802.11b".

5. Press IEEE 802.11b. Only the wireless LAN options are displayed.

6. **Transmission Mode**. Select either "Ad Hoc Mode" or "Infrastructure Mode".

7. **SSID Setting**. Enter the SSID setting. (The setting is case sensitive.)

8. **Channel**. This setting is required when Ad Hoc Mode is selected.
   Range: 1 ~ 14 (default: 11)
   NOTE: The allowed range for the channel settings may vary for different countries.

9. **WEP (Privacy) Setting**. The WEP (Wired Equivalent Privacy) setting is designed to protect wireless data transmission. In order to unlock encoded data, the same WEP key is required on the receiving side. There are 64 bit and 128 bit WEP keys.

   Range of Allowed Settings:
64 bit	10 characters
128 bit	26 characters

10. **Bandwidth Status**. This setting is enabled only for the Infrastructure Mode. Press here to display the current status of the bandwidth. One of the following is displayed to reflect the reception status of the wireless LAN:

Good	76 ~ 100%
Fair	41 ~ 75%
Poor	21 ~ 40%
Unavailable	0 ~ 20%

11. **Transmission Speed**. Press the Next button to display more settings, then select the transmission speed for the mode: Auto, 11 Mbps, 5.5 Mbps, 2 Mbps, 1 Mbps (default: Auto). This setting should match the distance between the closest machine or access point, depending on which mode is selected.
    NOTE: For the Ad Hoc Mode, this is the distance between the machine and the closest PC in the network. For the Infrastructure Mode, this is the distance between the machine and the closest access point.

11 Mbps	140 m (153 yd.)
5.5 Mbps	200 m (219 yd.)
2 Mbps	270 m (295 yd.)
1 Mbps	400 m (437 yd.)

12. To initialize the wireless LAN settings, use page 2/2. Press Execute to initialize the following settings:
    - Transmission mode
    - Channel
    - Transmission Speed
    - WEP
    - SSID
    - WEP Key

SP Mode Settings for IEEE 802.11b Wireless LAN

The following SP commands can be set for IEEE 802.11b

SP No.	Name	Function
5840 004	SSID	Used to confirm the current SSID setting.
5840 006	Channel MAX	Sets the maximum range of the channel settings for the country.
5840 007	Channel MIN	Sets the minimum range of the channels settings allowed for your country.
5840 010	WEP Key	Used to confirm the current WEP key setting.
5840 011	WEP Key Select	Used to select the WEP key (Default: 00).
5840 020	WEP Mode	Used to display the maximum length of the string that can be used for the WEP Key entry.

1.5.16 BLUETOOTH

⚠CAUTION
Unplug the main machine power cord before starting the following procedure.
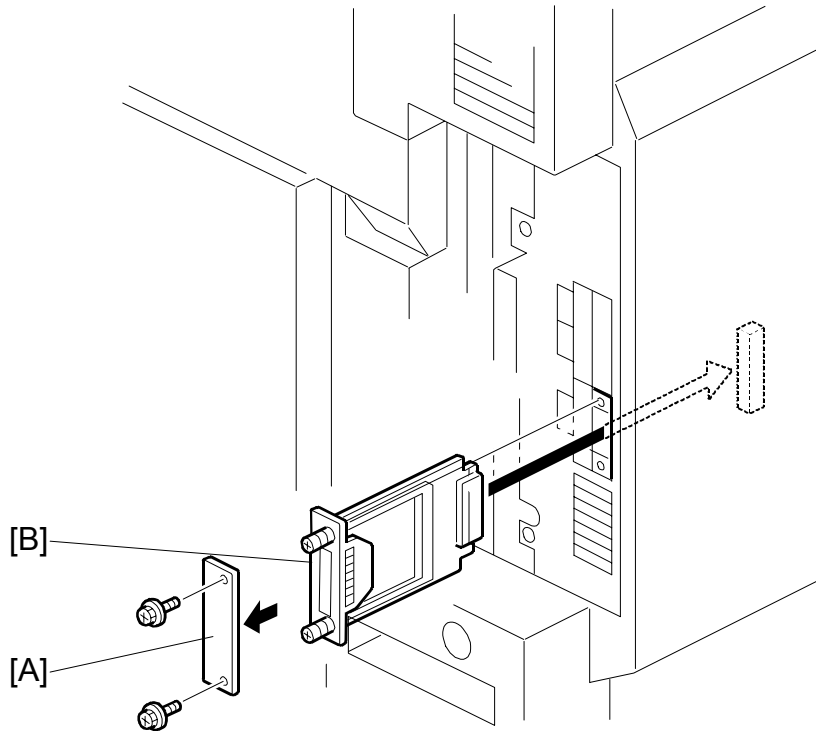
B582I901.WMF

You can install one of the following network interfaces: IEEE 802.11b (Wireless LAN), USB 2.0, IEEE1394 (FireWire), Bluetooth. (For the information on the Asia model, see section 1.5.9.)

1. Remove the slot cover from I/F Card Slot D [A] (🔩 x 2).

2. Install the Bluetooth board [B] (Knob-screw x 2).

G377I901.WMF
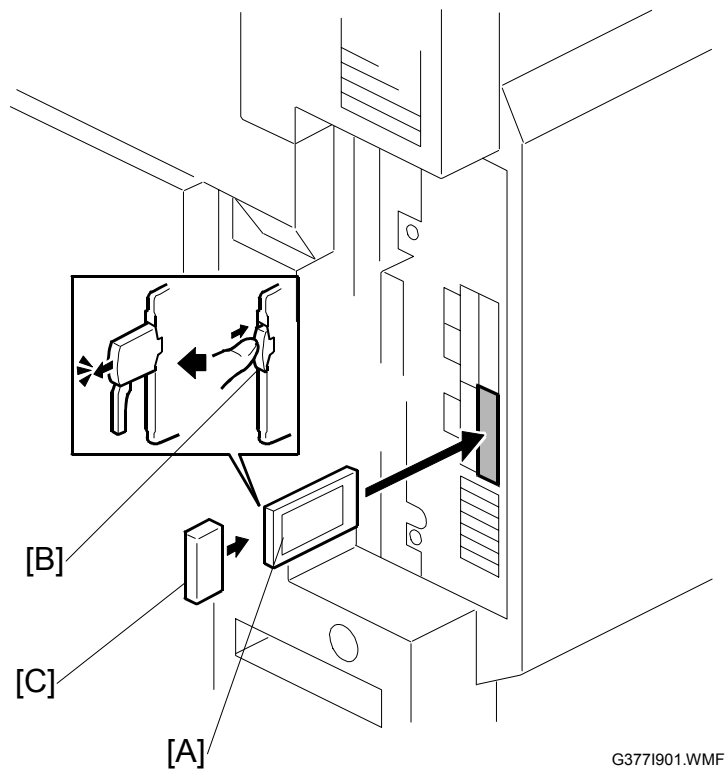
3. Insert the Bluetooth card [A] into the slot.

4. Press the antenna [B] to extend it.

5. Attach the antenna cap [C].

1.5.17 CHECK ALL CONNECTIONS

1. Plug in the power cord and turn on the main switch.

2. Enter the printer user mode and print the configuration page.

> User Tools > Printer Settings > List Test Print > Config. Page

NOTE: The same data can also be printed by executing SP1-004 – Print Summary. All installed options are listed in the "System Reference" column.

1.5.18 KEY COUNTER HOLDER

1. Remove the rear cover [A] (✐ x 5).

[A]

B146R102.WMF
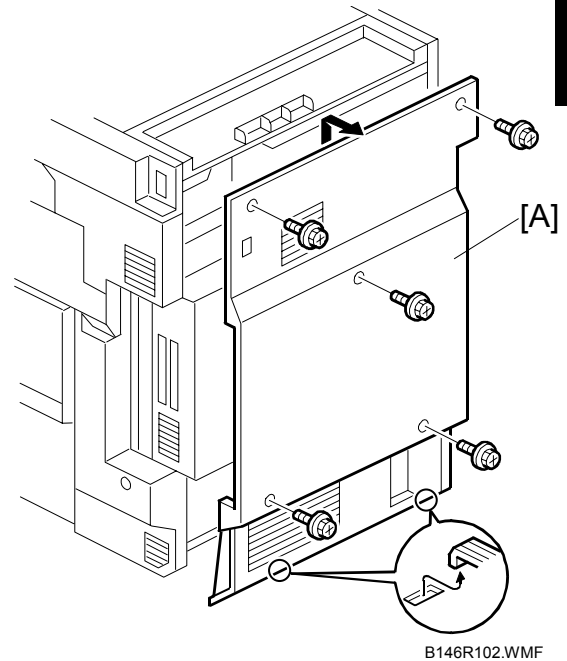
2. Cut a 15-mm (0.6") piece [B] off the tape.
   NOTE: You do not need the smaller piece for the installation.

[B]

15 mm (0.6")

3M VHB
3M VHB
3M VHB
3M VHB
3M VHB
3M VHB

A674I901.WMF
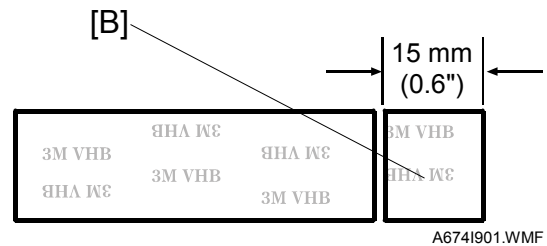
3. Remove the scanner right cover [A] (✐ x 2).

4. Clean the area [B] with alcohol.

5. Attach the tape.

[A]

[B]

A674I902.WMF

Installation

A674I903.WMF
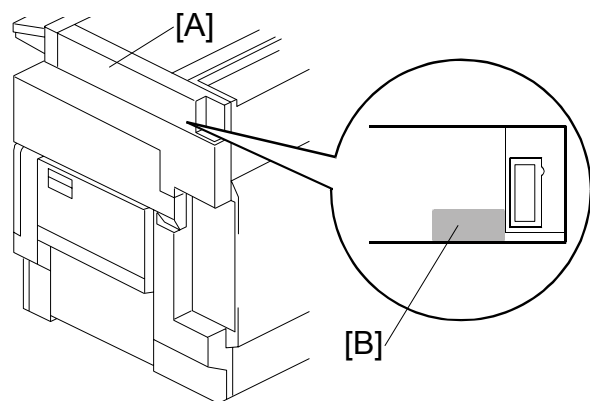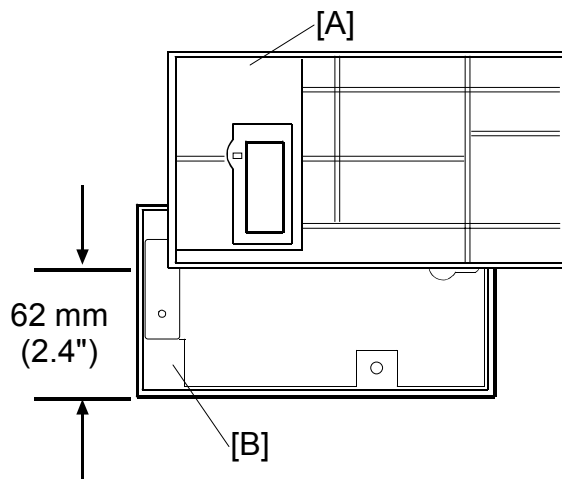
The view from the back

A674I904.WMF
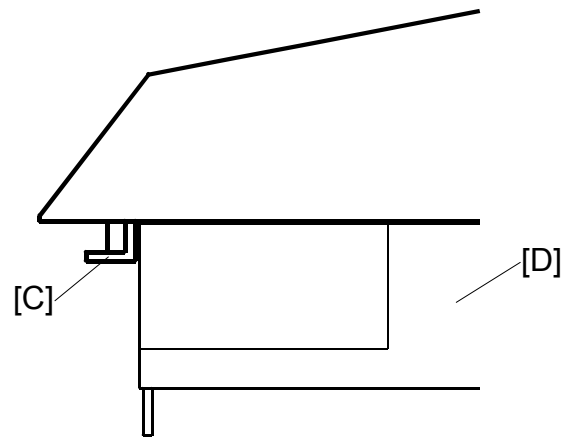
The view from the top

6. Attach the key counter holder as follows.
   - The bottom end of the key counter holder [B] is 62 mm (2.4") below the bottom end of the scanner right cover [A].
   - The bracket on the back of the key counter holder [C] is aligned to the rear end of the scanner cover [D].

7. Reassemble the covers.

A674I905.WMF
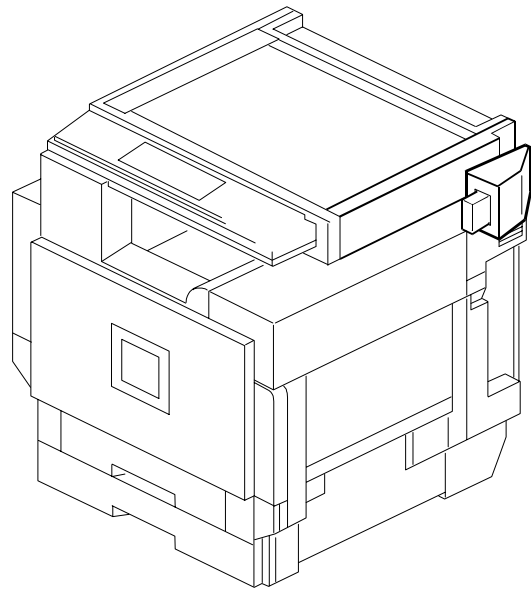
1.5.19 ANTI-CONDENSATION HEATER

1. Remove the rear cover [A] (🖉 x 5).
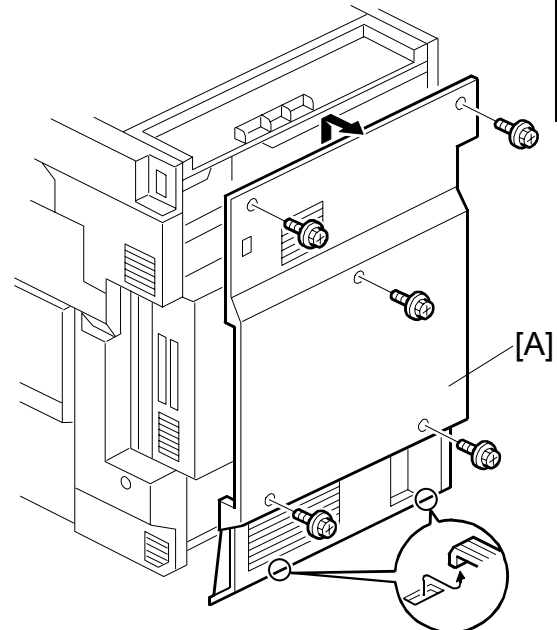
B146R102.WMF

2. Remove the scanner right cover [B] (🖉 x 2).

3. Remove the rear scale [C] (🖉 x 3).

4. Remove the exposure glass [D] with the left scale [E] (🖉 x 2).

NOTE: You do not have to remove the ARDF exposure glass. If the glass is removed, position the glass marker [F] at the rear-left corner when reattaching.
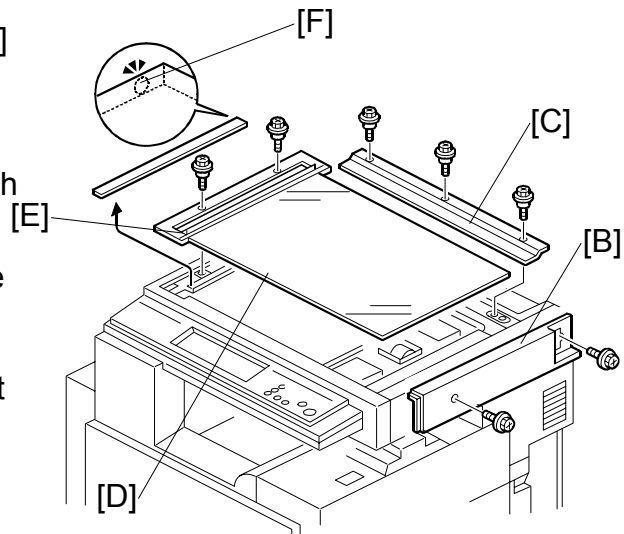
B146I940.WMF

5. Install the anti-condensation heater [A] in the rear-left corner of the scanner unit ($\mathscr{F}$ x 2).

6. Pass the cable through the opening [B] in the rear.

B146I942.WMF
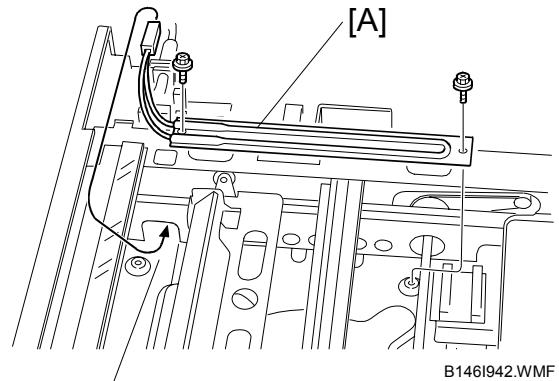
7. Attach the clamps [C] to the rear frame.

8. Fasten the cable with the clamps.

9. Connect the connector [D].

10. Reassemble the copier.

B146I943.WMF
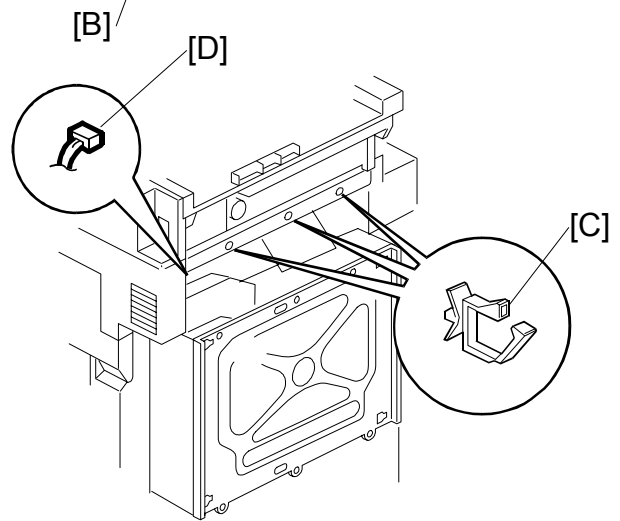
1.5.20 ANTI-CONDENSATION HEATER

> ⚠**CAUTION**
> 1. **Unplug the main machine power cord before starting the following procedure.**
> 2. **After cutting the lower-most rectangular piece off the right-bottom corner of the rear cover, file the edges to smooth them. Rough edges may hurt the user. The user pushes the tray-heater switch through this rectangular opening.**

1. Remove the rear cover [A] (✐ x 5).

2. Remove the switch bracket [B] (✐ x 2).

3. Remove tray 1 and tray 2.
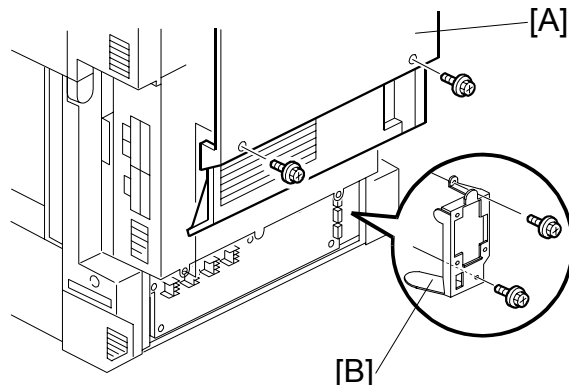
B146I947.WMF

4. Cut the lower-most rectangular piece [C] off the right-bottom corner (viewed from the rear) of the rear cover.

5. File the edges to smooth them.
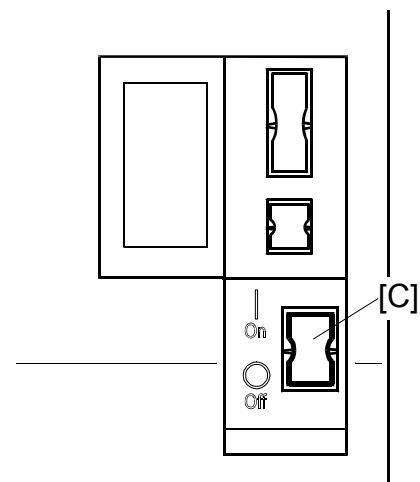
B146I946.WMF

6. Make sure that the heater switch [D] is not upside down. The "**–**" sign [E] is on the upper end and the "O" sign [F] is on the lower end.
    NOTE: The "**–**" sign means "on." The "O" sign means "off."

7. Install the switch to the bracket [G].

8. Make sure that the heater switch is off.

B146I948.WMF

1-69
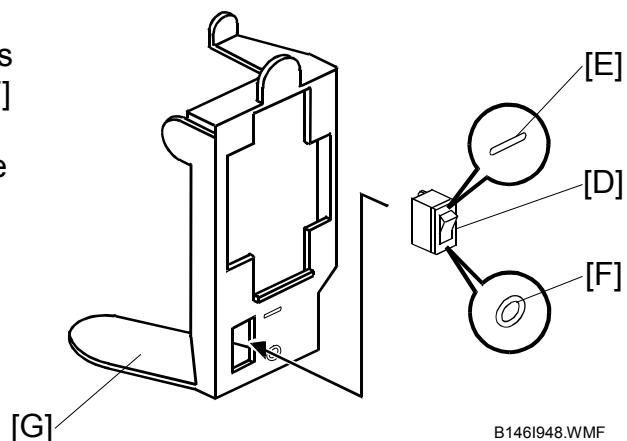
9. Install the switch bracket (with the heater switch) to the original place. Do not fasten the screws yet.

10. Connect the white connectors to the switch.

11. Insert the red connector [A] into the opening on the frame [B].
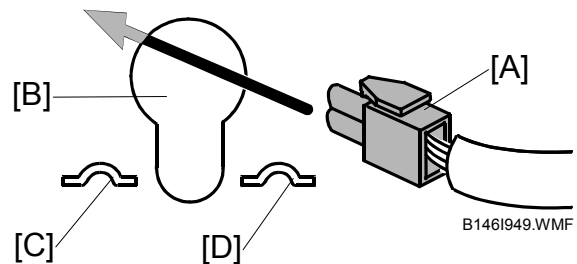
12. Fasten the two screws on the switch bracket.

13. Align the caution decal [E] with the mark [F] on the front of the heater cover [G], and attach the caution decal there.
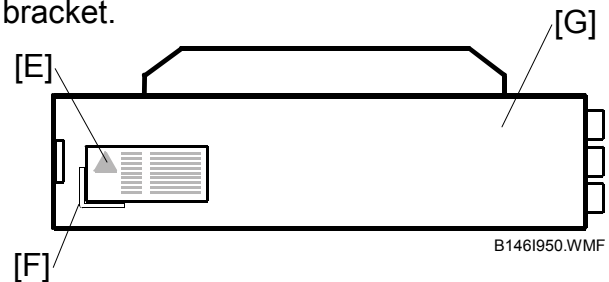
14. Align the tray heater [H] with the marks [I][J] on the back of the heather cover, and attach the tray heater there.
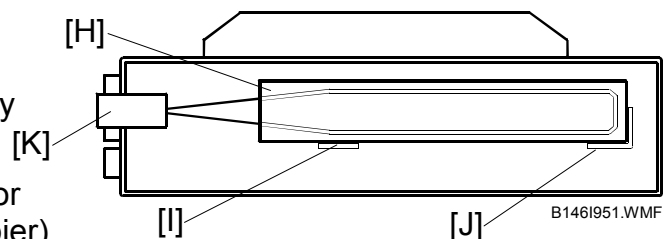
15. Connect the tray heater connector [K] (from the front side of the copier) to the red connector [A].

16. Insert the heater cover to the openings [C][D] from the front side ($\mathscr{O}$ x 1).
   NOTE: The connectors [A][K] are under the heater-tray cover.

17. Reassemble the copier and install tray 1 and tray 2.

18. Attach the "On/Stand by" decal on the left-hand side of the main switch (not the tray heater switch).

B146I949.WMF

B146I950.WMF

B146I951.WMF

B146I952.WMF
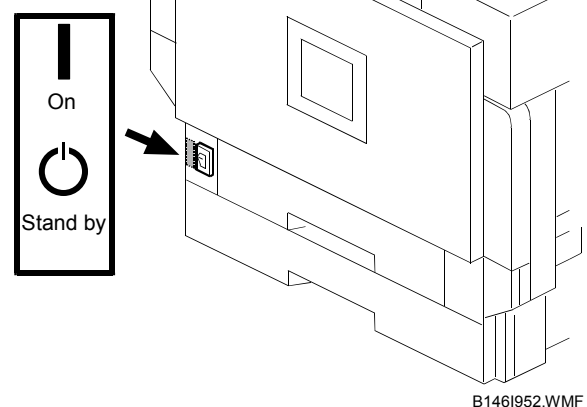
2. PREVENTIVE MAINTENANCE

2.1 SETTINGS

New Unit Set

You must enable New Unit Set (SP5-999) <u>before</u> you replace the following units:

- PCU–K (SP5-999-001)
- PCU–Y (SP5-999-002)
- PCU–M (SP5-999-003)
- PCU–C (SP5-999-004)
- Development Unit–K (SP5-999-005)
- Development Unit–C (SP5-999-006)
- Development Unit–M (SP5-999-007)
- Development Unit–Y (SP5-999-008)
- Fusing Unit (SP5-999-009)

To enable the New Unit Set program (and to replace a unit), perform as follows:

1. Start the SP mode (☛ 5.1.1).
2. Select a program from SP5-999-001 to 009.
3. Select "1. Enable."
4. Select "OK."
5. Quit the SP mode.
6. Turn the main switch off.
7. Replace the unit.
8. Turn the main switch on. The machine starts the initialization for the new unit.

Counter Reset

After you replace the following units, you reset the counter (SP7-804):

- By-pass tray (SP7-804-011)
- Tray 1 (SP7-804-012)
- Tray 2 (SP7-804-013)
- Tray 3/LCT (SP7-804-014)
- Tray 4 (SP7-804-015)
- Transfer unit (SP7-804-017)
- Transfer belt cleaning unit (SP7-804-018)

To enable the New Unit Set program (and to replace a unit), perform as follows:

1. Start the SP mode (☛ 5.1.1).
2. Select a program from SP7-804-011 to 018.
3. Select "EXECUTE."
4. Quit the SP mode.

2.2 PM TABLES

Chart: A4 (LT)/5%
Mode: 3 copies/original (prints/job)
Environment: Normal temperature and humidity
Yield may change depending on circumstances and print conditions.

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

Copier

Item	20K	40K	60K	120K	140K	EM	Remarks
Scanner							
1st/2nd/3rd mirrors				C			Optics cloth
Front and Rear Rails				C			Dry cloth
Exposure Glass				C		C	Dry cloth; alcohol
ADF Exposure Glass				C		C	Dry cloth; alcohol
Exposure Lamp						I	Dry cloth; alcohol
APS Sensor				C			Dry cloth
Development							
Dev. Unit–K			R				☛ 2.1
Dev. Unit–C			R				☛ 2.1
Dev. Unit–M			R				☛ 2.1
Dev. Unit–Y			R				☛ 2.1
PCU–K		R					☛ 2.1
PCU–CMY		R					☛ 2.1
Transfer							
Waste Toner Bottle		R					
Fusing							
Fusing Unit			R				☛ 2.1
Oil Supply Unit	R						
Paper Path							
Registration Sensor						C	Blower brush
Duplex Unit							
Inverter Roller						C	Damp cloth
Transport Roller						C	Damp cloth
Inverter Sensor						C	Blower brush
Miscellaneous							
Dust Filter					R		Distributed with development unit-K
Breaker						I	

ARDF

Item	240K	EM	Remarks
Pick-up Roller	R	C	Damp cloth; alcohol
Feed Belt	R	C	Damp cloth; alcohol
Separation Roller	R	C	Damp cloth; alcohol
Sensors	C	C	Blower brush
Platen Sheet Cover		C	Damp cloth; alcohol (Replace if required.)
White Plate		C	Dry or damp cloth
Drive Gear	L		Grease G501
Transport Roller		C	Damp cloth; alcohol
Exit Roller		C	Damp cloth; alcohol
Inverter Roller		C	Damp cloth; alcohol
Idle Rollers		C	Damp cloth; alcohol

NOTE: 240k copies (= 80k originals x 3 copies/original)

One-Tray Paper Feed Unit

Item	240K	EM	Remarks
Feed Roller		C	Damp cloth
Pickup Roller		C	Damp cloth
Separation Roller		C	Damp cloth

Two-Tray Paper Feed Unit

Item	240K	EM	Remarks
Feed Rollers		C	Damp cloth
Pickup Rollers		C	Damp cloth
Separation Rollers		C	Damp cloth

LCT

Item	240K	EM	Remarks
Relay Roller		C	Damp cloth
Bottom Plate Pad		C	Damp cloth

Two-Tray Finisher

Items	240K	EM	Remarks
Rollers		C	Damp cloth
Discharge Brush		C	Dry cloth
Sensors		C	Blower brush
Jogger Fences		I	Replace if required.

Two-Tray Finisher Punch Kit

Item	240K	EM	Remarks
Punch Chad		C	Discard chad.

Preventive Maintenance

2-4

Booklet Finisher

Item	60K	EM	Remarks
Rollers		C	Damp cloth
Shafts		C	Damp cloth
Sensors		C	Blower brush
Jogger fences		I	

Booklet Finisher Punch Kit

Item	60K	EM	Remarks
Punch Chad	C	C	Discard chad.

2.3 OTHERS

NOTE: These units are considered as EM parts since their expected lifetimes are relatively long.

Copier

Item	150K	500K	1000K	Remarks
Transfer				
Transfer Unit			R	☛ 2.1
Belt Cleaning Unit		R		☛ 2.1
Bypass Tray				
Feed Roller	R			☛ 2.1
Pickup Roller	R			☛ 2.1
Separation Roller	R			☛ 2.1

One-Tray Paper Feed Unit

Item	150K	500K	1000K	Remarks
Feed Roller		R		Damp cloth
Pickup Roller		R		Damp cloth
Separation Roller		R		Damp cloth

Two-Tray Paper Feed Unit

Item	150K	500K	1000K	Remarks
Feed Rollers		R		Damp cloth
Pickup Rollers		R		Damp cloth
Separation Rollers		R		Damp cloth

LCT

Item	150K	500K	1000K	Remarks
Relay Roller		R		Damp cloth
Bottom Plate Pad		R		Damp cloth

Preventive Maintenance

3. REPLACEMENT AND ADJUSTMENT

┌───┐
│ ⚠️CAUTION   │
│ **Turn off the main switch and unplug the machine before beginning any of** │
│ **the procedures in this section.**   │
└───┘

NOTE: This manual uses the following symbols.

☛ : See or refer to   ✐ : Screw   ⬚ : Connector

⟲ : Clip ring   ℂ : E ring

3.1 SPECIAL TOOLS

Part Number	Description	Q'ty
B6455010	SD Card	1
B6456700	PCMCIA Card Adapter	1
B6456800	USB Reader/Writer	1
A029 9387	Digital Multimeter – FLUKE87	1
G021 9350	Loop-back Connector – Parallel	1
C401 9503	20X Magnification Scope	1
A2579300	Grease Barrierta – S552R	1
52039501	Silicon Grease G-501	1
A0929503	C4 Color Test Chart (3 pcs/set)	1
A0069104	Scanner Positioning Pin (4pcs/set)	1

Replacement
Adjustment

3.2 IMAGE ADJUSTMENT

3.2.1 SCANNING

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

NOTE: Use a C4 test chart to perform the following adjustments.

Scanner 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 to adjust if necessary.
   Standard: ±1.0%.
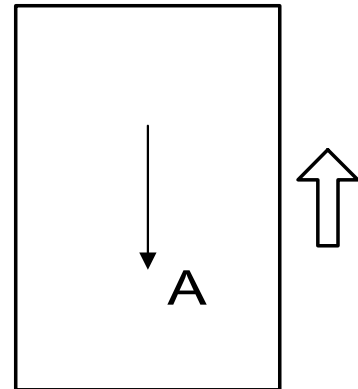
A: Sub-scan magnification

B146R962.WMF

Scanner leading edge and side-to-side registration

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. Standard: 0 ± 2mm.

	SP mode
Leading Edge Registration	SP4-010-001
Side-to-Side Registration	SP4-011-001
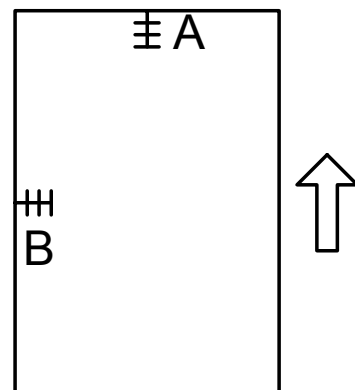
B146R963.WMF
A: Leading Edge Registration
B: Side-to-side Registration

Main scan dot position correction

NOTE: Before adjusting the scanner, adjust the printer registration.

1. Enter the SP mode and open SP4-010 and SP4-011.

2. Check that each value corresponds to the factory-set value.

3. Press the "COPY Window" key and copy the C-4 chart in the full-color photo mode.
   NOTE: Be sure to copy in the photo mode. This is because color displacement cannot be checked properly in text mode.

4. Check the yellow and cyan vertical lines. (Use a Magnification Scope to do this.) If they exactly overwrite the black line at the edges of the copy, exit the SP mode to end the adjustment. If the yellow and cyan lines significantly extend beyond the black line, proceed to the next step.

5. Press the "SP Mode" key to return to the SP mode and open SP4-932. Compare the current values against the table.

SP4-932-1	Dot correction R left edge
SP4-932-2	Dot correction R right edge
SP4-932-3	Dot correction B left edge
SP4-932-4	Dot correction B right edge

<div align="right">

**Replacement
Adjustment**

</div>

3.2.2 ARDF

ARDF side-to-side and leading edge registration

B146R964.WMF

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

B146R965.WMF
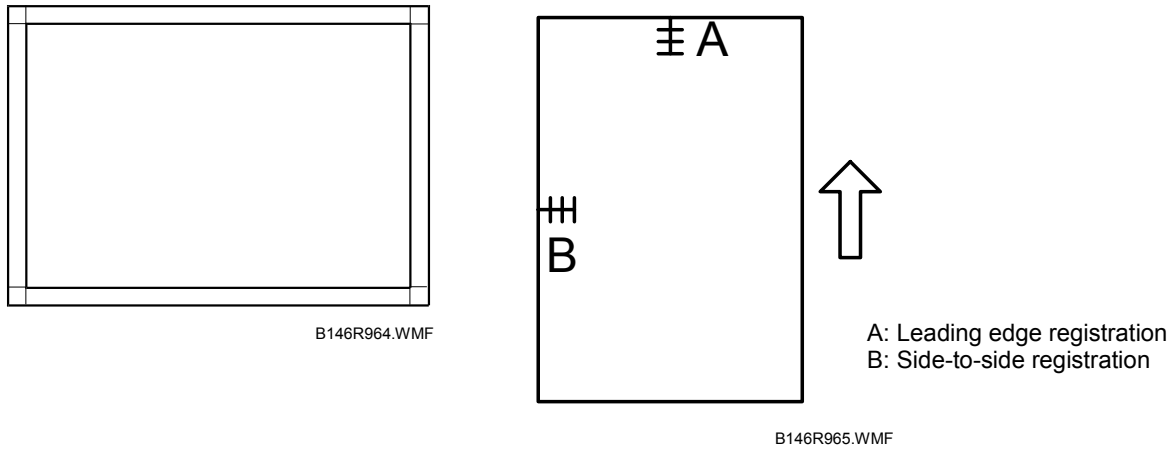
Make a temporary test chart as shown above using A3/DLT paper.

1. Place the temporary test chart on the ARDF and make a copy from one of the feed stations.

2. Check the registration, and adjust using the following SP modes if necessary.

SP Code	What It Does	Adjustment Range
SP6-006-001	Side-to-Side Registration	$\pm$ 3.0 mm
SP6-006-002	Leading Edge Registration (Simplex)	$\pm$ 42 steps
SP6-006-003	Buckle: Duplex Front	$\pm$ 42 steps
SP6-006-004	Buckle: Duplex Rear	$\pm$ 45 steps

3.2.3 REGISTRATION

Image Area

The image area shown in the illustration must be guaranteed. So make sure that the registration is adjusted within the adjustment standard range as described below.

A = B = C = 4.2mm (1.6")

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Feed direction

Image Area
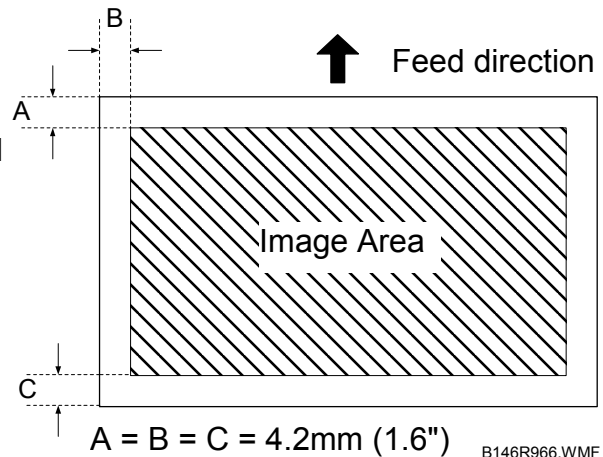
Leading Edge

Adjusts the leading edge registration for each paper type and process line speed.

Side to Side

Adjusts the side to side registration for each paper feed station. The side to side registration for the optional paper feed unit, LCT, and duplex unit can be adjusted with SP mode (SP1-002).

Adjustment Standard

- Leading edge (sub-scan direction): 3 ± 0 mm
- Side to side (main-scan direction): 2 ± 0 mm

Paper Registration Standard

The registration in both main- and sub-scan directions may fluctuate within the following tolerance.

1st side
- Sub-scan direction: 0 ± 1.5 mm
- Main-scan direction: 0 ± 2 mm

2nd side in duplex
- Sub-scan direction: 0 ± 3 mm
- Main-scan direction: 0 ± 4 mm

Adjustment Procedure

1. Enter SP mode and access SP5-997.

2. Print out the pattern (14: 1-dot trimming pattern) with SP5-997.
    NOTE: Registration may change slightly print by print as shown above.
    Therefore print a few pages of the trimming pattern for step 3 and 4,
    and average the leading edge and side-to-side registration values and
    adjust each SP mode.

3. Perform the leading edge registration adjustment.
    1) Check the leading edge registration and adjust it with SP1-001.
    2) Select the adjustment conditions (paper type and process line speed).
    3) Input the value then press the ⊕ key.
    4) Check the leading edge adjustment by generating the trim pattern.

4. Perform the side to side registration adjustment.
    1) Check the side to side registration and adjust it with SP1-002.
    2) Select the adjustment conditions (paper feed station).
    3) Input the value then press the ⊕ key.
    4) Check the side to side adjustment by generating the trim pattern.

3.2.4 COLOR REGISTRATION

Line Position Adjustment

Normally, the automatic line position adjustment is executed under a specified
condition to optimize the color prints. If color registration shifts, execute "Auto
Adjust" with the user tools (Maintenance menu – Color registration) or SP5-993-2
to do the forced line position adjustment. In addition, it is recommended to perform
the line position adjustment under the following conditions:

*   After transporting or moving the copier (If copier are pre-installed at the
    workshop and transported to the user location, forced line position adjustment
    should be done after copier installation is completed at the user location.)
*   When opening the drum positioning plate
*   When removing or replacing the motors, clutches, and/or gears related to the
    drum/development/transfer sections
*   When removing or replacing the transfer belt or laser optical housing unit

Adjustment of Line Speed for Thick Paper

You must adjust the line speed of the fusing unit (the speed of development motor-
K) under the following conditions:

*   The color registration shifts more on the trailing edge than on the leading
    edge.
*   This problem has not been solved by the line position adjustment.

3.2.5 PRINTER GAMMA CORRECTION

NOTE: Normally, the ACC is enough to adjust the color balance to achieve the optimum print output. The printer gamma correction is only required for fine-tuning to meet user requirements.

The printer gamma curve created during ACC can be modified using SP modes. The gamma data for highlight, middle, shadow areas, and IDmax can be adjusted. The adjustable range is from 0 to 15 (16 steps).

Copy Mode

KCMY Color Balance Adjustment

The adjustment uses only "Offset" values.

NOTE: Never change "Option" values (default value is 0).

Highlight (Low ID)	Levels 2 through 5 in the C4 chart 10-level scale
Middle (Middle ID)	Levels 3 through 7 in the C4 chart 10-level scale
Shadow (High ID)	Levels 6 through 9 in the C4 chart 10-level scale
ID max	Level 10 in the C4 chart 10-level scale (affects the entire image density.)
Offset	The higher the number in the range associated with the low ID, middle ID, high ID, and ID max, the greater the density.

There are four adjustable modes (SP4-918-009):

- Copy Photo mode
- Copy Letter mode
- Copy Letter (Single Color) mode
- Copy Photo (Single Color) mode

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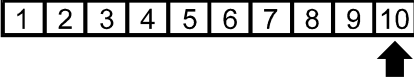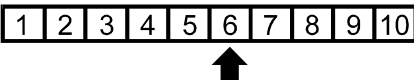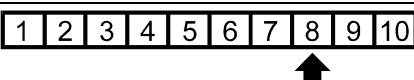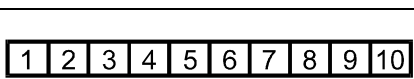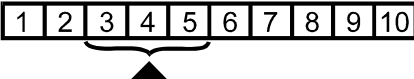
Adjustment Procedure

1. Copy the C-4 chart in mode that you are going to adjust.

2. Enter the SP mode.

3. Select "Copy SP."

4. Select SP4-918-009.

5. Adjust the offset values until the copy quality conforms to the standard (☛ the table below).
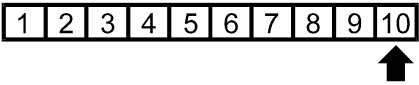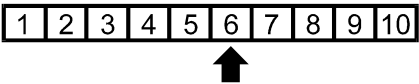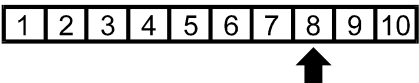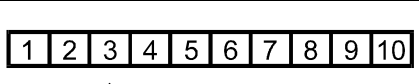
NOTE: 1) Never change "Option" value (default value is 0).
2) Adjust the density in order from "ID Max," "Middle," "Shadow," and then "Highlight."
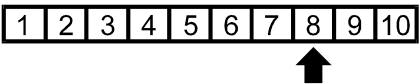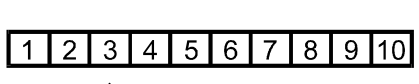
- Photo Mode, Full Colour -

Step	Item to Adjust	Level on the C-4 chart	Adjustment Standard
1	ID max: (K, C, M, and Y)	1 2 3 4 5 6 7 8 9 10 ⬆	Adjust the offset value so that the density of level 10 matches that of level 10 on the C-4 chart.
2	Middle (Middle ID) (K, C, M, and Y)	1 2 3 4 5 6 7 8 9 10 ⬆	Adjust the offset value so that the density of level 6 matches that of level 6 on the C-4 chart.
3	Shadow (High ID) (K, C, M, and Y)	1 2 3 4 5 6 7 8 9 10 ⬆	Adjust the offset value so that the density of level 8 matches that of level 8 on the C-4 chart.
4	Highlight (Low ID) (K, C, M, and Y)	1 2 3 4 5 6 7 8 9 10 ⬆	Adjust the offset value so that dirty background is not visible on the copy and the density of level 3 is slightly lighter that of level 3 on the C-4 chart.
5	K Highlight (Low ID) (C,M, and Y) <on the full color copy>	1 2 3 4 5 6 7 8 9 10 ⬆	Adjust the offset value so that the color balance of black scale levels 3 through 5 in the copy is seen as gray (no C, M, or Y should be visible). If the black scale contains C, M, or Y, redo step 1 to 4.
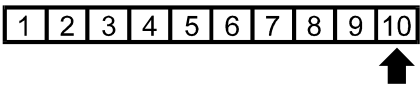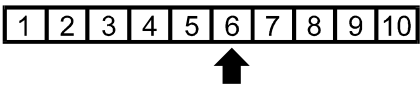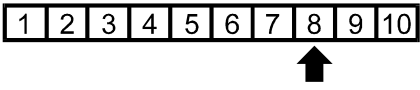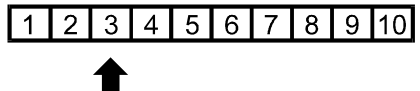
- Photo Mode, Single Colour -

Step	Item to Adjust	Level on the C-4 chart	Adjustment Standard
1	ID max: (K)	1 2 3 4 5 6 7 8 9 10 (arrow at 10)	Adjust the offset value so that the density of level 10 matches that of level 10 on the C-4 chart.
2	Middle (Middle ID) (K)	1 2 3 4 5 6 7 8 9 10 (arrow at 6)	Adjust the offset value so that the density of level 6 matches that of level 6 on the C-4 chart.
3	Shadow (High ID) (K)	1 2 3 4 5 6 7 8 9 10 (arrow at 8)	Adjust the offset value so that the density of level 8 matches that of level 8 on the C-4 chart.
4	Highlight (Low ID) (K)	1 2 3 4 5 6 7 8 9 10 (arrow at 3)	Adjust the offset value so that dirty background is not visible on the copy and the density of level 3 is slightly lighter that of level 3 on the C-4 chart.

Replacement Adjustment

- Text (Letter) Mode, Full Colour -

Step	Item to Adjust	Level on the C-4 chart (K)	Adjustment Standard
1	ID max: (K, C, M, and Y)	1 2 3 4 5 6 7 8 9 10 (arrow at 10)	Adjust the offset value so that the density of level 10 matches that of level 10 on the C-4 chart.
2	Middle (Middle ID) (K, C, M, and Y)	1 2 3 4 5 6 7 8 9 10 (arrow at 6)	Adjust the offset value so that the density of level 6 matches that of level 6 on the C-4 chart.
3	Shadow (High ID) (K, C, M, and Y)	1 2 3 4 5 6 7 8 9 10 (arrow at 8)	Adjust the offset value so that the density of level 8 matches that of level 8 on the C-4 chart.
4	Highlight (Low ID) (K, C, M, and Y)	1 2 3 4 5 6 7 8 9 10 (arrow at 3)	Adjust the offset value so that dirty background is not visible on the copy and the density of level 3 is slightly lighter that of level 3 on the C-4 chart.

- Text (Letter) Mode, Single Colour -

Step	Item to Adjust	Level on the C-4 chart (K)	Adjustment Standard
1	ID max: (K)	1 2 3 4 5 6 7 8 9 10 (↑ at 10)	Adjust the offset value so that the density of level 10 matches that of level 10 on the C-4 chart.
2	Middle (Middle ID) (K)	1 2 3 4 5 6 7 8 9 10 (↑ at 6)	Adjust the offset value so that the density of level 6 matches that of level 6 on the C-4 chart.
3	Shadow (High ID) (K)	1 2 3 4 5 6 7 8 9 10 (↑ at 8)	Adjust the offset value so that the density of level 8 matches that of level 8 on the C-4 chart.
4	Highlight (Low ID) (K)	1 2 3 4 5 6 7 8 9 10 (↑ at 3)	Adjust the offset value so that dirty background is not visible on the copy and the density of level 3 is slightly lighter that of level 3 on the C-4 chart.

NOTE: After adjusting 'shadow' as explained above, text parts of the test pattern may not be printed clearly. If this happens, check whether the 5 line/mm pattern at each corner is printed clearly. If it is not, adjust the offset value of 'shadow' again until it is.

Printer Mode

There are six adjustable modes (select these modes with printer SP1-102-001):

- 1200 x 1200 photo mode
- 600 x 600 text mode
- 1800 x 600 text mode
- 600 x 600 photo mode
- 1800 x 600 photo mode
- 1200 x 1200 text mode

	K	C	M	Y
Highlight	SP1-104-1	SP1-104-21	SP1-104-41	SP1-104-61
Middle	SP1-104-2	SP1-104-22	SP1-104-42	SP1-104-62
Shadow	SP1-104-3	SP1-104-23	SP1-104-43	SP1-104-63
IDmax	SP1-104-4	SP1-104-24	SP1-104-44	SP1-104-64

Replacement Adjustment

Adjustment Procedure

1. Do ACC for the printer mode.

2. Turn the main power off and on.

3. Enter SP mode.

4. Select "Printer SP".

5. Select SP1-102-001 and select the print mode that you are going to adjust.

6. To review the image quality for these settings, choose SP1-103-1 to print out a tone control test sheet.

7. Adjust the color density with SP1-104 as shown below comparing the tone control test sheet with the C4 test chart.
   NOTE: Adjust the density in order from "ID Max", "Shadow", "Middle", and then "Highlight".

8. Save the adjusted settings with SP1-105-001.

Adjustment Reference For Gamma Correction

The following tables show the adjustment reference for gamma correction. The tables show the level of the color scale on the C4 test chart and on the tone control test sheet printed in the printer SP mode. For example, for K at text mode, grade 12 on the tone control test sheet should be the same as grade 7 on the C4 chart.

Normally, it is not necessary to adjust the gamma data as shown in the table since ACC adjusts the gamma curve automatically. The fine-tuning of color balance by gamma data adjustment will be required only when the result from ACC and Color Calibration does not meet the customer's requirements.

			C4 test chart	1	2	3	4	5	6	7	8	9	10
K	Test sheet	Photo	600 x 600	-	1	3	5	6	9	10	11	16	-
			1800 x 600	-	1	3	5	6	8	10	11	16	-
			1200 x 1200	-	1	3	4	6	8	10	12	15	16
		Text	600 x 600	-	1	3	5	6	9	10	11	16	-
			1800 x 600	-	1	3	5	6	9	10	12	16	-
			1200 x 1200	-	1	3	5	6	9	11	12	15	16

			C4 test chart	1	2	3	4	5	6	7	8	9	10
C	Test sheet	Photo	600 x 600	-	1	3	5	6	9	10	12	13	14
			1800 x 600	-	1	3	5	6	8	10	11	12	13
			1200 x 1200	-	1	3	4	5	8	10	11	12	13
		Text	600 x 600	-	1	3	4	5	8	10	11	12	13
			1800 x 600	-	1	3	5	6	9	10	11	12	14
			1200 x 1200	-	1	3	4	5	9	10	11	12	13

			C4 test chart	1	2	3	4	5	6	7	8	9	10
M	Test sheet	Photo	600 x 600	-	1	4	6	8	11	12	14	16	-
			1800 x 600	-	1	4	6	8	11	12	15	16	-
			1200 x 1200	-	1	4	6	7	10	12	14	16	-
		Text	600 x 600	-	1	4	6	7	10	12	14	16	-
			1800 x 600	-	1	4	6	8	11	13	14	16	-
			1200 x 1200	-	1	4	6	7	10	12	13	16	-

			C4 test chart	1	2	3	4	5	6	7	8	9	10
Y	Test sheet	Photo	600 x 600	1	3	4	9	11	12	14	15	16	-
			1800 x 600	1	3	5	8	10	11	14	15	16	-
			1200 x 1200	1	3	5	8	10	11	14	15	16	-
		Text	600 x 600	1	2	5	8	10	11	14	14/15	15	16
			1800 x 600	1	3	6	9	10	12	14	15	16	-
			1200 x 1200	1	2	4	7	9	10	13	15	16	-

3.3 DUPLEX INVERTER UNIT

3.3.1 TOP COVER

1. External tray [A]

2. Open the duplex left cover [B].

3. Top cover [C] (𝄽 x 4)

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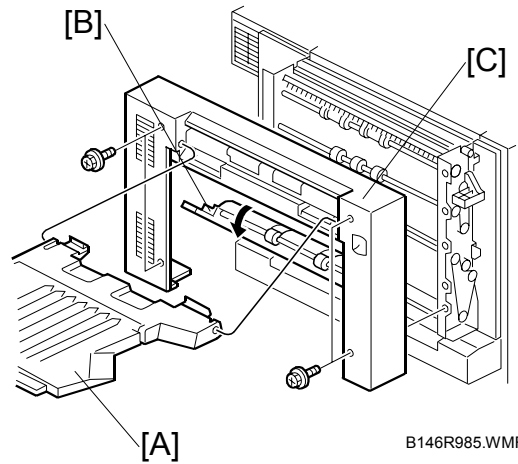
Replacement Adjustment

3.3.2 DUPLEX CONTROL BOARD

1. Top cover (☛ 3.3.1)

2. Duplex control board [A] (𝄽 x 4, ⬚ x 7)

B146R925.WMF

3-13
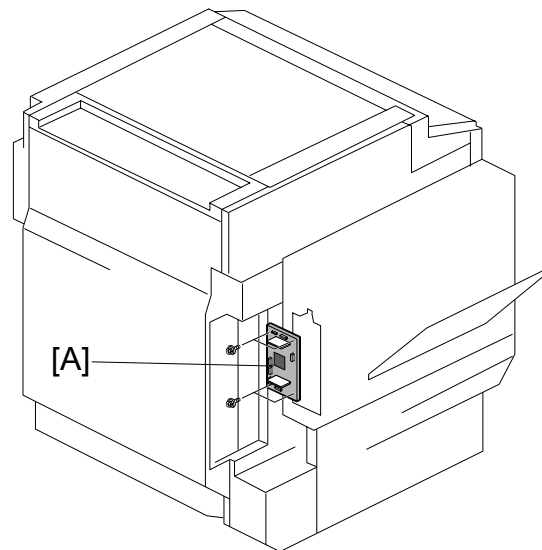
3.3.3 DUPLEX INVERTER MOTOR 1

1. Top cover (☛ 3.3.1)

2. Exit tray [A]

3. Duplex unit [B] (🗍 x 1, 🖭 x 1)
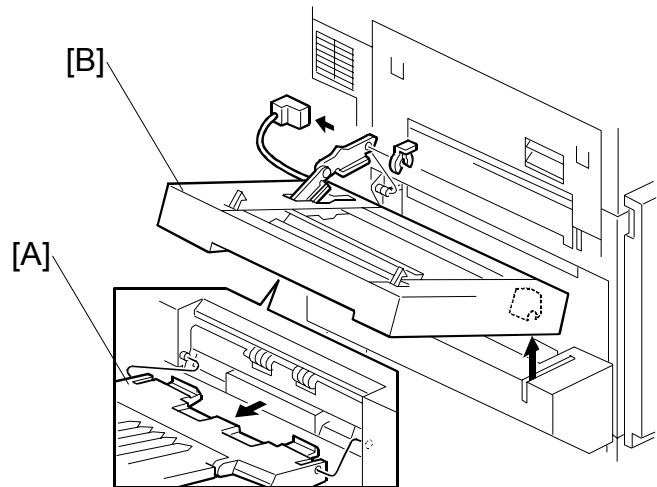
B146R955.WMF

4. Inner cover [C] (🗝 x 2)

5. Duplex control board bracket [D]
   (🗝 x 2, 🖭 x 7)
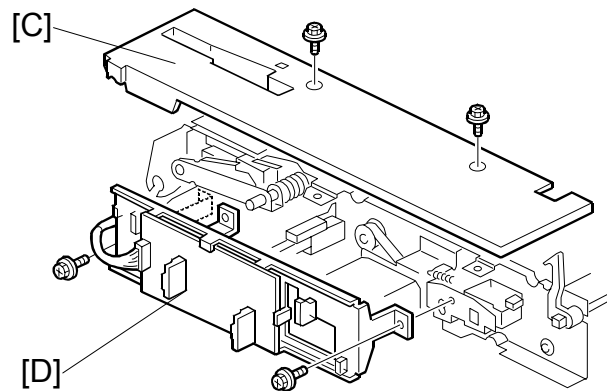
B146R986.WMF

6. Duplex inverter motor 1 [E]
   (🗝 x 2, 1 timing belt)
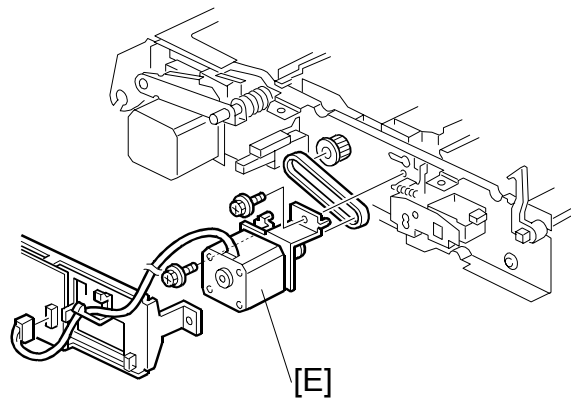
B146R500.WMF

3.3.4 DUPLEX INVERTER MOTOR 2 AND SWITCH

1. Duplex control board bracket (☞ 3.3.3)

2. Duplex inverter unit switch [A]
   (🔩 x 1, 🔌 x 1)

3. Duplex inverter motor 2 [B]
   (🔩 x 2, 1 timing belt)
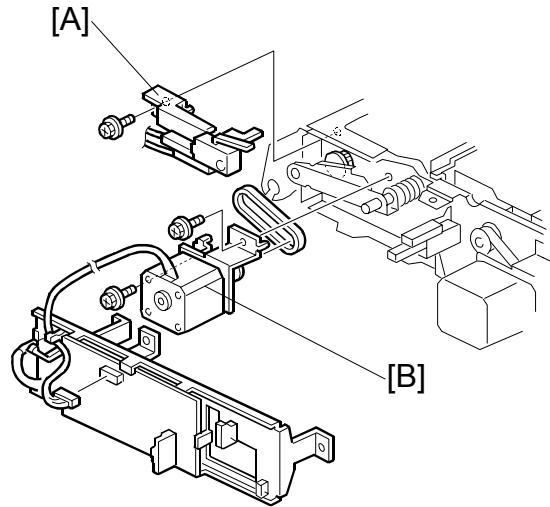
B146R501.WMF

3.3.5 EXIT SENSOR 3 AND DUPLEX INVERTER SENSOR

1. Open the duplex inverter unit [A]

2. Exit sensor 3 [B] (🔌 x 1)

3. Duplex inverter sensor [C]
   (🔩 x 1, 🔌 x 2)
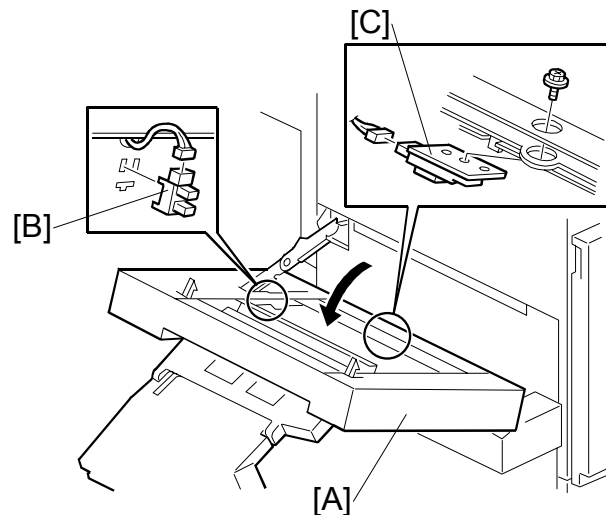
B146R134.WMF

3.3.6 EXIT SENSOR 1 AND 2

1. Top cover (☞ 3.3.1)

2. Open the duplex unit.

3. Exit sensor 1 [A]
   (🔩 x 1, 🔌 x 1, 1 bracket)

4. Exit sensor 2 [B] (🔌 x 1)

B146R135.WMF

3-15
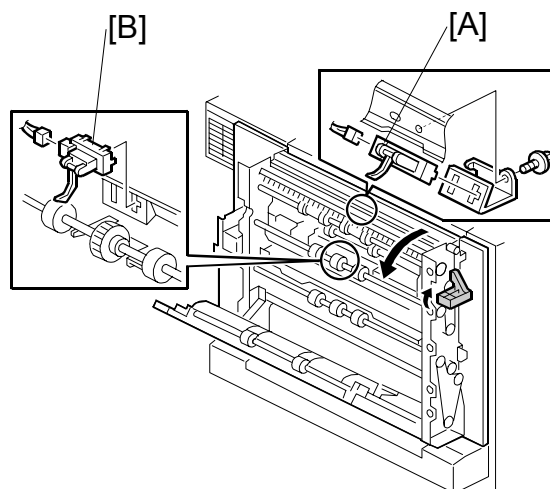
3.4 DUPLEX FEED UNIT

3.4.1 DUPLEX DRIVE BOARD
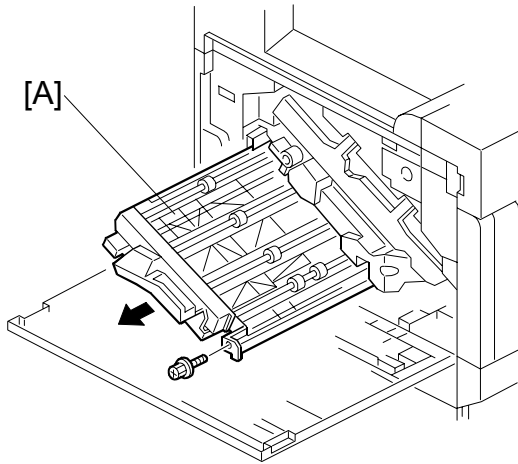
B146R114.WMF
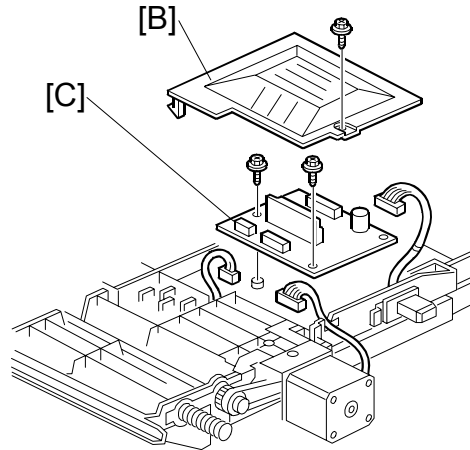
B146R136.WMF

1. Open the front cover

2. Duplex feed unit [A] (🔩 x 1)

3. Inner cover [B] (🔩 x 1)

4. Duplex drive board [C] (🔩 x 2, 🔌 x 3)

3.4.2 DUPLEX FEED MOTOR

1. Duplex feed unit (☛ 3.4.1)

2. Inner cover [A] (🔩 x 1)

3. Duplex feed motor [B]
   (🔩 x 1, 🔌 x 1, 1 timing belt)
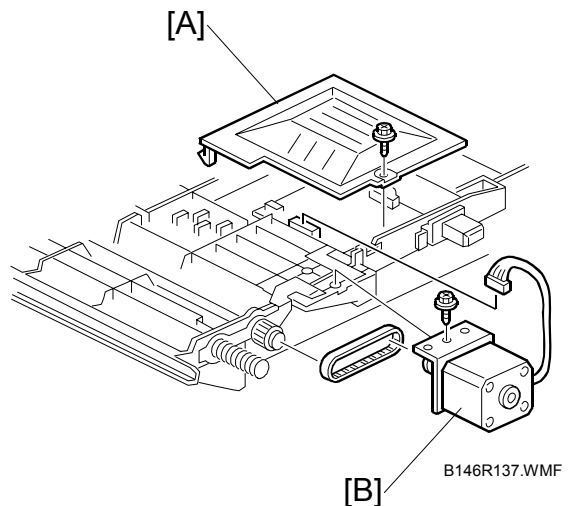
B146R137.WMF

3.4.3 DUPLEX FEED SENSOR
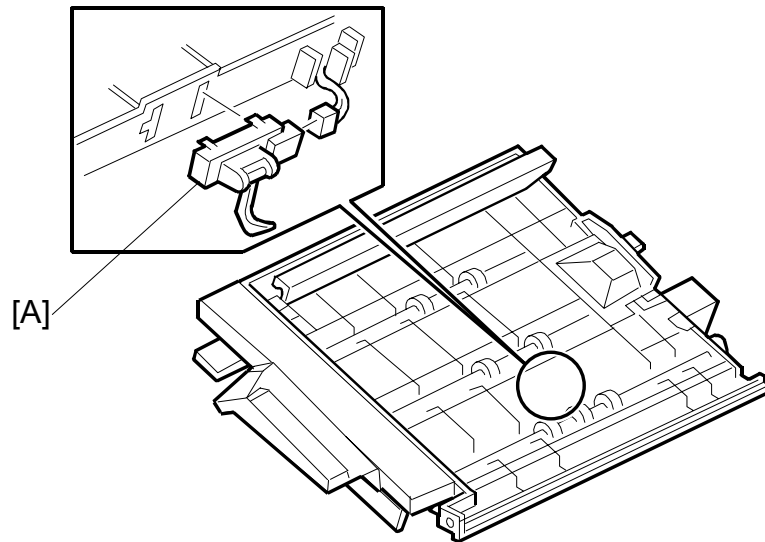
B146R138.WMF

1. Duplex feed unit (☛ 3.4.1)
2. Duplex feed sensor [A] (🗳 x 1)

Replacement Adjustment

3.5 EXTERIOR COVERS

NOTE: 1) For the procedure to remove the paper exit tray, see section 3.7.2, "Laser Optics Housing Unit."
2) For the procedure to remove the paper exit cover, see section 3.12.14, "Paper Exit."

3.5.1 REAR, FRONT, AND RIGHT SIDES

1. ARDF or platen cover (if installed)
2. Rear cover [A] ($\mathscr{F}$ x 5, 2 hooks)

B146R102.WMF
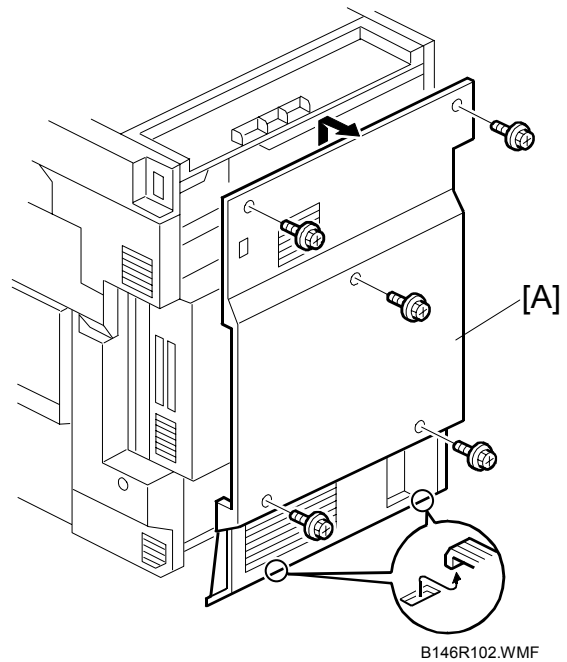
3. Front cover [B] (2 pins)

B146R917.WMF
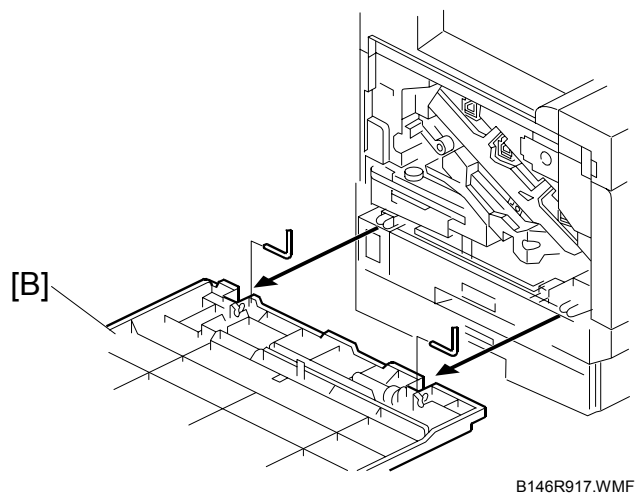
4. Open the by-pass tray [A].

5. Right cover [B] ($\hat{F}$ x 2)

6. Upper right cover [C] (1 strap)

7. Upper front cover [D] ($\hat{F}$ x 2)

[D]

[C]

[A]

[B]

B146R918.WMF
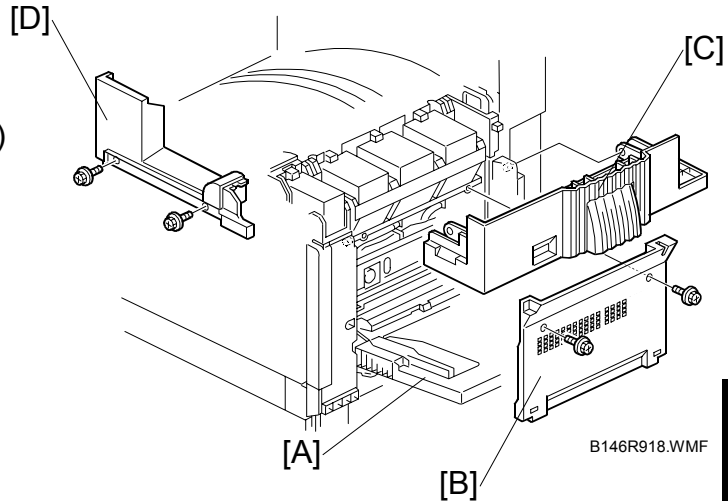
Replacement Adjustment

CAUTION: Do not put anything on the operation panel. After you remove the upper front cover, the operation panel may become unstable.

8. Scanner right cover (☛ 3.5.3)

9. Rear right cover [E]
($\hat{F}$ x 4, 1 hook)

[E]

B146R905.WMF
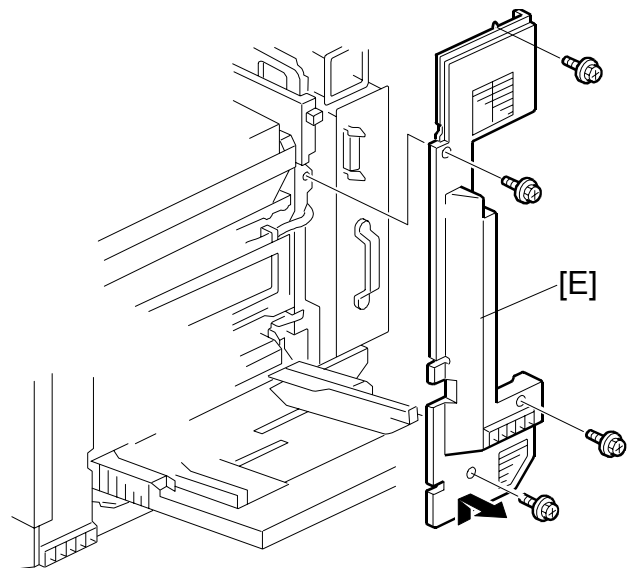
3.5.2 LEFT SIDE
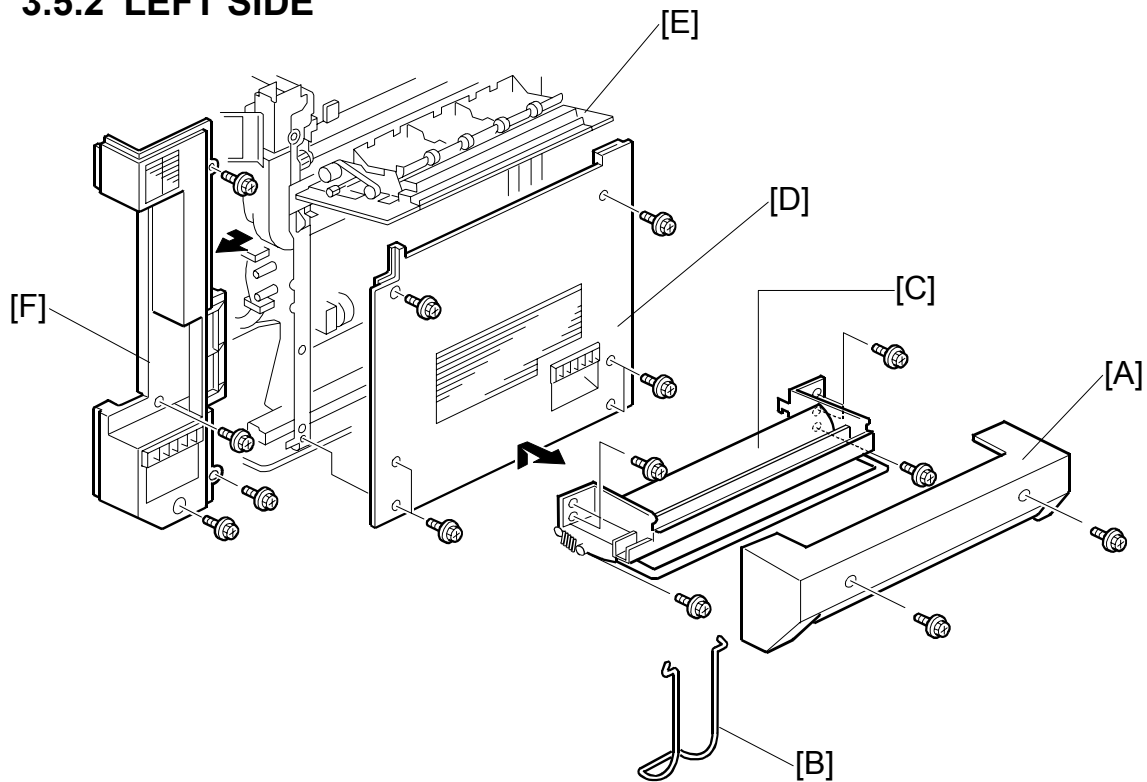
B146R921.WMF

1. Duplex unit (☛ 3.3.3)

2. Duplex unit base cover [A] (𝄘 x 2)

3. Duplex inverter guide [B]

4. Duplex unit base [C] (𝄘 x 6)

5. Left cover [D] (𝄘 x 6, 1 hook)

6. Rear cover (☛ 3.5.3)

7. Open the upper left cover [E]

8. Scanner left cover (☛ 3.5.3)

9. Rear left cover [F] (𝄘 x 4)

3.5.3 OPERATION PANEL AND SCANNER COVERS
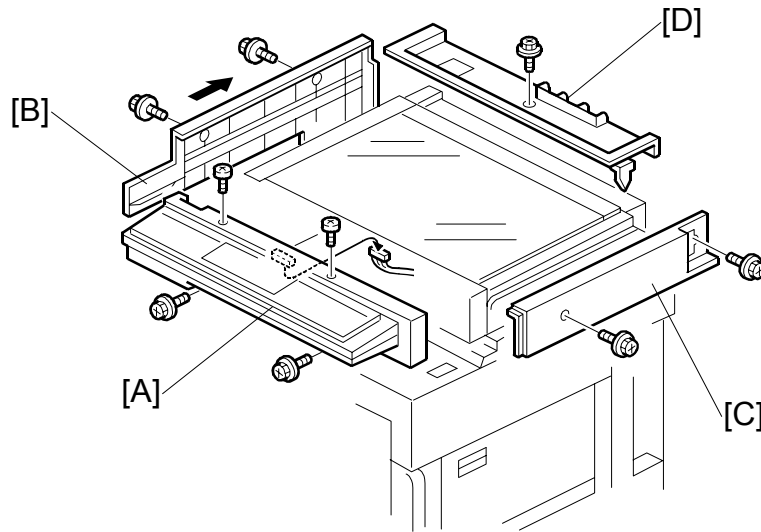
B146R919.WMF

1. ARDF or platen cover (if installed)
2. Rear cover (☛ 3.5.1)
3. Upper front cover (☛ 3.5.1)
4. Operation panel [A] (🗲 x 4, 🔌 x 1)
5. Scanner left cover [B] (🗲 x 2, 1 hook)
6. Scanner right cover [C] (🗲 x 2)
7. Scanner rear cover [D] (🗲 x 1)

3.6 SCANNER UNIT

3.6.1 EXPOSURE GLASS

1. Rear scale [A] (🔩 x 3)

2. Exposure glass with left scale [B]
    (🔩 x 2)

3. ARDF exposure glass [C]

NOTE: When reattaching the exposure
glass and ARDF exposure glass,
position the glass marker [D] at
the rear-left corner.
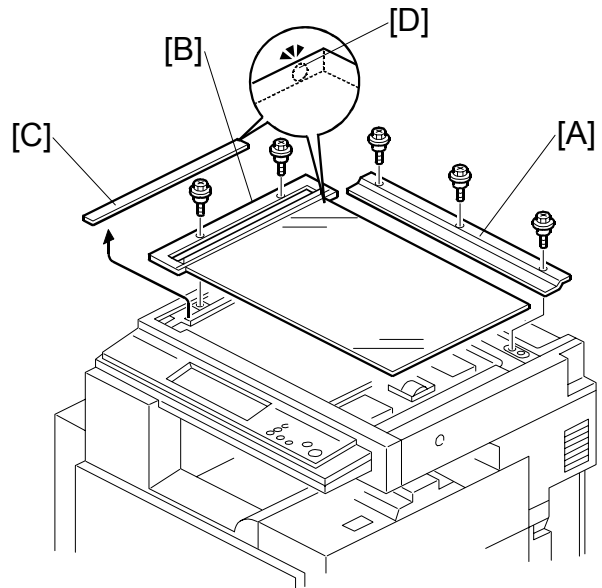
B146R987.WMF

3.6.2 ORIGINAL LENGTH/WIDTH SENSOR

1. Exposure glass with left scale
    (☛ 3.6.1)

2. Original length sensors [A]
    (🔩 x 2, 🔌 x2)

3. Original width sensor 1 [B]
    (🔩 x 1, 🔌 x1)
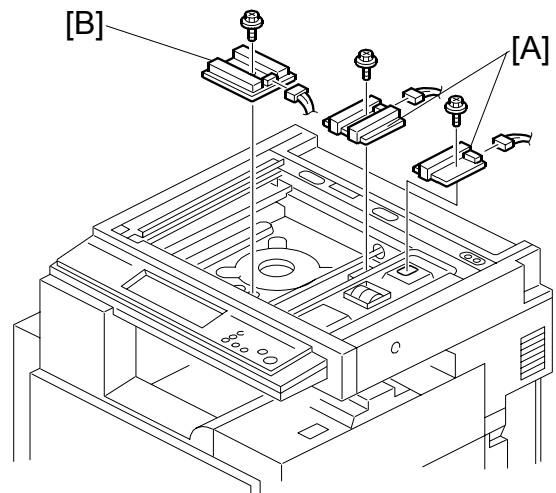
B146R927.WMF

3.6.3 SENSOR BOARD UNIT (SBU)

1. Rear cover (☛ 3.5.1)

2. Exposure glass (☛ 3.6.1)

3. Scanner right cover (☛ 3.5.3)

4. Inner cover [A] (📌 x 4)

[A]

B146R127.WMF

[B]
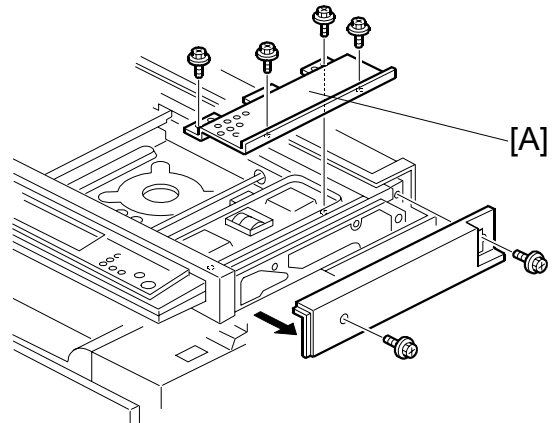
5. Sensor board unit
   [B] (📌 x 4, 🔌 x 4)
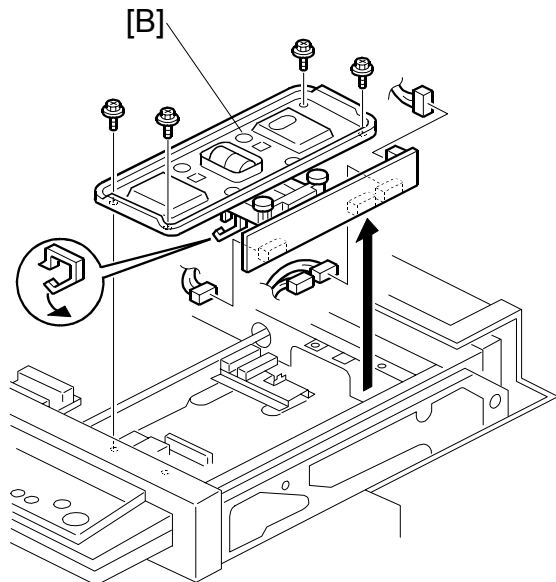
B146R128.WMF

6. After replacing the sensor board unit, adjust the following SP modes (☛ 3.3.12):
   - SP4–008 (Scanner leading edge magnification)
   - SP4–010 (Scanner leading edge registration)
   - SP4–011 (Scanner side-to-side registration)

3.6.4 EXPOSURE LAMP STABILIZER

1. Exposure glass with left scale
   (☛ 3.6.1)

2. Sensor board unit (☛ 3.6.3)

3. Exposure lamp stabilizer [A]
   ($\mathscr{F}$ x 2, ⫣ x 2)
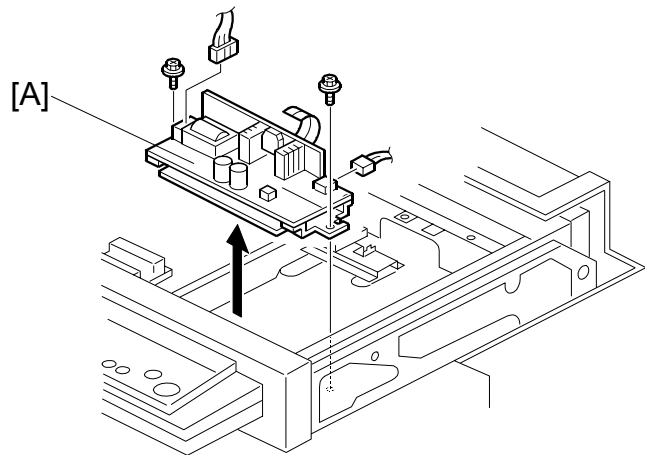
B146R129.WMF

3.6.5 XENON LAMP

1. Rear cover (☛ 3.5.1)

2. Operation panel and scanner covers
   (☛ 3.5.3)

3. Exposure glass with left scale
   (☛ 3.6.1)

4. Left frame [A] ($\mathscr{F}$ x 2)

5. Front frame [B] ($\mathscr{F}$ x 5)
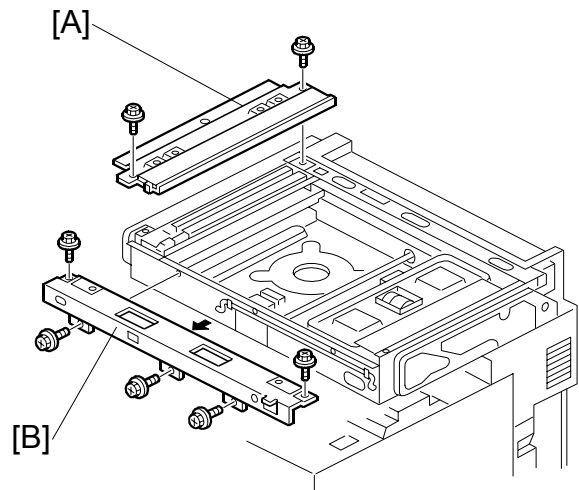
B146R130.WMF

6. Xenon-lamp cover [C] ($\mathscr{F}$ x 5)

7. Xenon lamp [D] (2 clamps)

B146R131.WMF

3-24
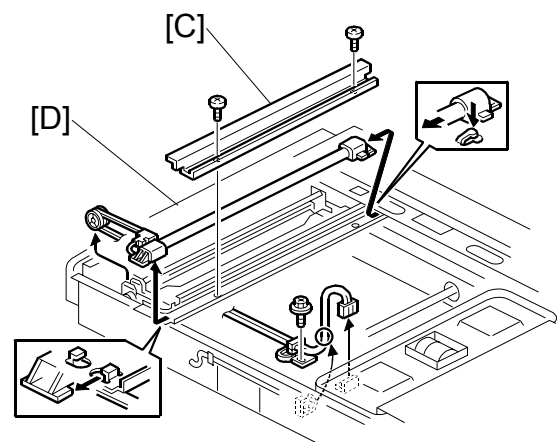
Reassembling

1. Take up the cable slack.

2. Adjust the cable clamp position [A] if necessary.

[A]
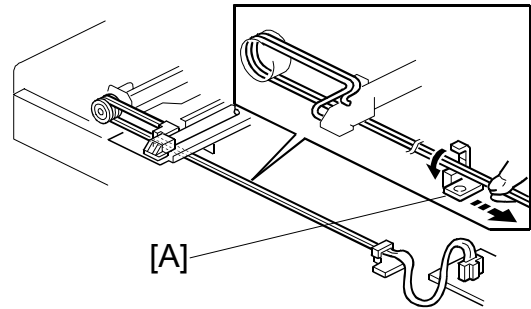
B146R139.WMF

3.6.6 SCANNER POWER SUPPLY UNIT (PSU)

1. Rear cover (☛ 3.5.1)

2. Scanner power supply unit [A] (all 📁's, 🔩 x 6)

[A]
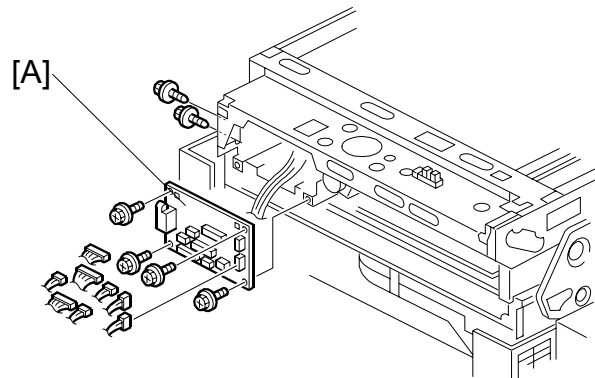
B146R132.WMF

3.6.7 SCANNER MOTOR

1. Scanner PSU (☛ 3.6.6)

2. Scanner motor [A] (🔩 x 2, Spring x 1)

3. Timing belt [B]

[B]

Reassembling

1. Install the motor.

2. Install the timing belt.

3. Install the spring.

4. Fasten the screws.

[A]
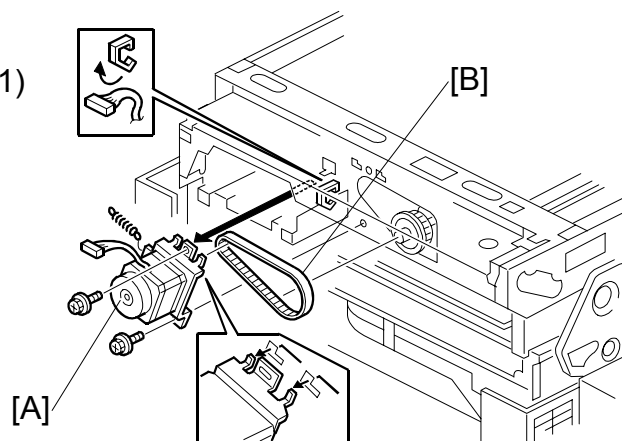
B146R133.WMF

3.6.8 FRONT SCANNER WIRE

1. Front frame (☛ 3.6.5)

2. Front scanner wire clamp [A]

3. Front scanner wire bracket [B]
    (🔩 x 1)

4. Front scanner wire and scanner
    drive pulley [C] (🔩 x 1)

[A]

[C]

[B]

B146R140.WMF
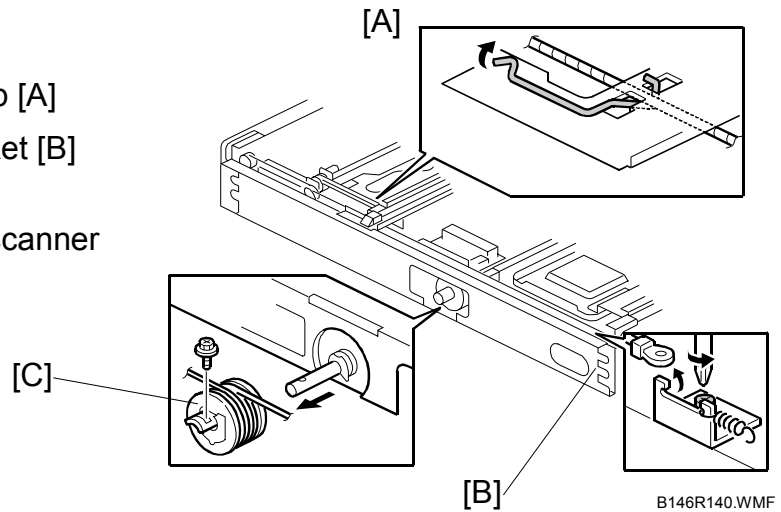
Reassembling the Front Scanner Wire

1. Position the center ball [A]
    in the middle of the forked
    holder.

2. Pass the right end (with
    the ring) [B] through the
    square hole, and the left
    end (with the ball) [C]
    through the notch.

3. Wind the right end
    clockwise (viewed from the
    machine's front) three
    times; wind the left end
    counterclockwise five
    times.

[B]

[C]

[A]

[D]

5

3
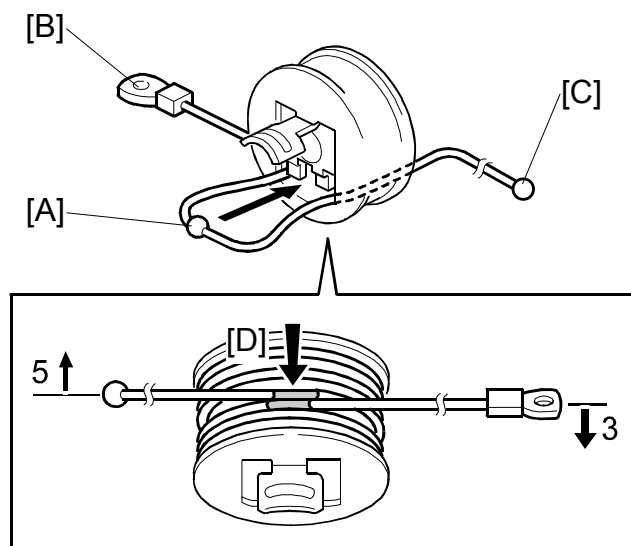
B146R141.WMF

NOTE: The two red marks [D] meet when you have done this. Stick the wire to
the pulley with tape, so you can handle the assembly easily during
installation.

4. Install the drive pulley on the shaft [A].

   NOTE: Do not secure the pulley to the shaft with the screw yet.

5. Insert the left end into the slit [B], with the end going via the rear track of the left pulley [C] and the rear track of the movable pulley [D].

[B] [C] [D]

[A]

B146R142.WMF
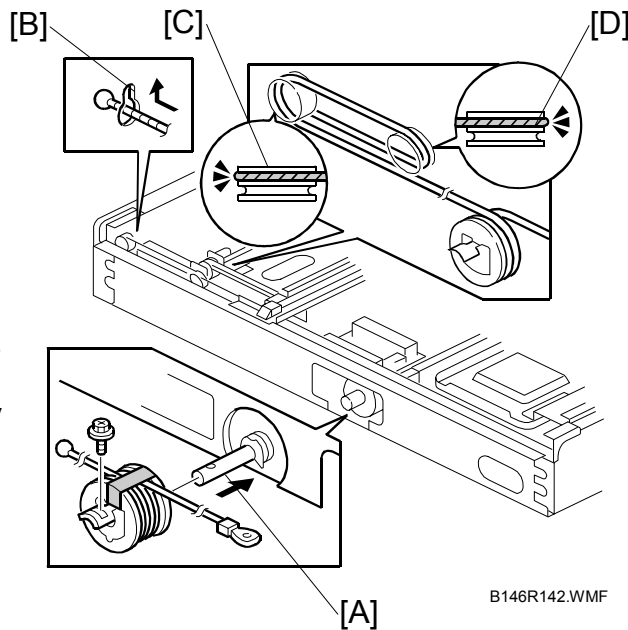
6. Hook the right end onto the front scanner wire bracket [E], with the end going via the front track of the right pulley [F] and the front track of the movable pulley [G].

   NOTE: Do not secure the scanner wire bracket with the screw yet.

[E]

[G]

B146R143.WMF

[F]
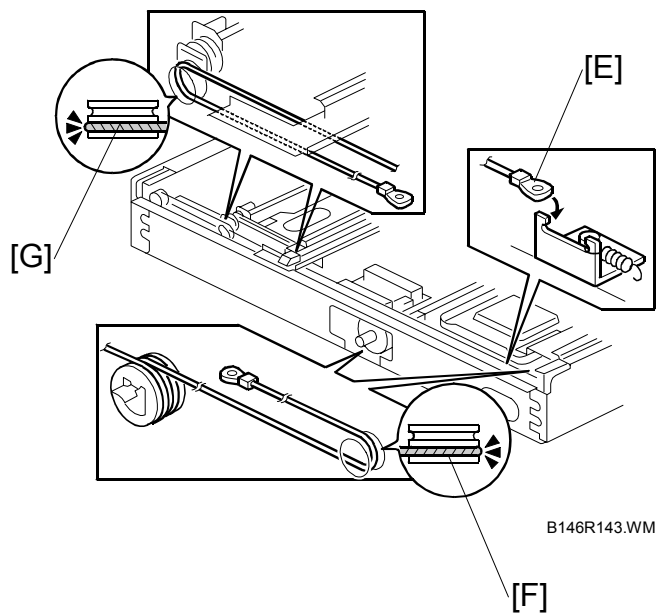
7. Remove the tape from the drive pulley.

8. Insert a scanner positioning pin [A] through the 2nd carriage hole [B] and the left holes [C] in the front rail. Insert another scanner positioning pin [D] through the 1st carriage hole [E] and the right holes in the front rail [F].

9. Insert two more scanner positioning pins in the holes in the rear rail.

B146R144.WMF

10. Screw the drive pulley to the shaft [G].

11. Screw the scanner wire bracket to the front rail [H].

12. Install the scanner wire clamp [I].

13. Pull out the positioning pins.
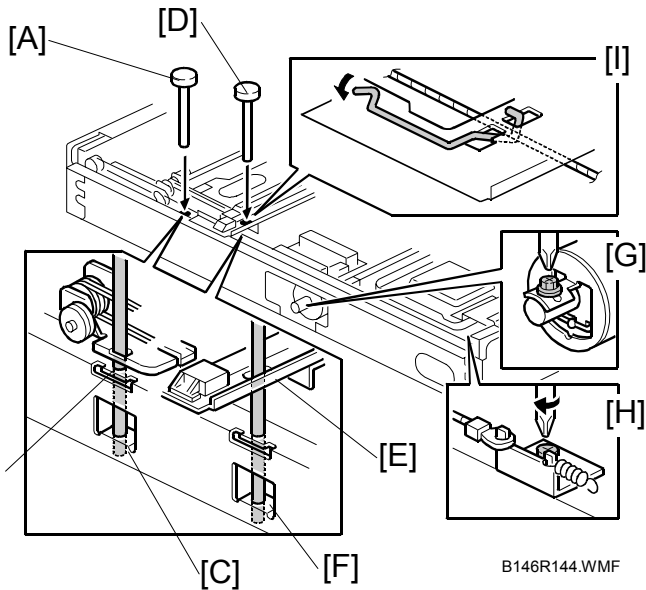
NOTE: After removing the positioning pins, make sure the 1st and 2nd carriages move smoothly. If they do not, repeat steps 8 through 13.

3.6.9 REAR SCANNER WIRE

CAUTION: Do not remove screw [S₁], screw [S₂], or screw [S₃] in the diagram below. Image adjustment may become difficult if these screws are removed.

B146R928.WMF
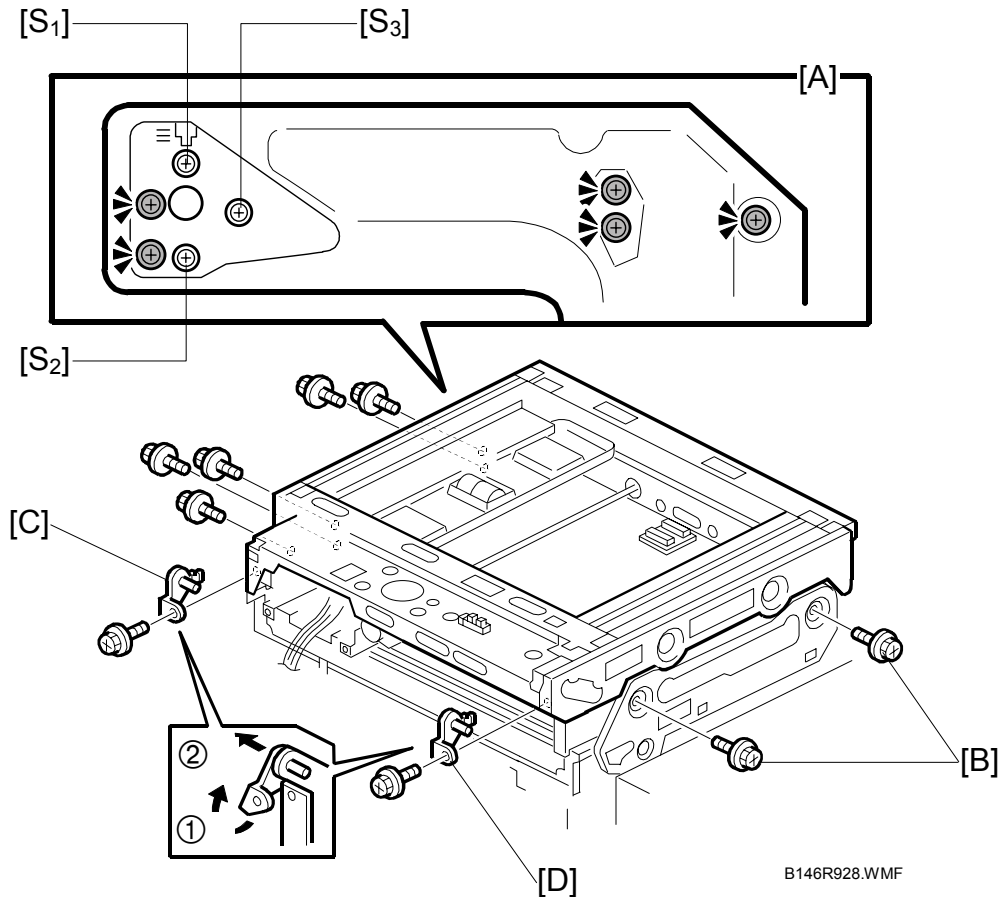
1. Rear cover (☛ 3.5.1)

2. Operation panel and scanner covers (☛ 3.5.3)

3. Exposure glass with left scale (☛ 3.6.1)

4. Left frame (☛ 3.6.5)

5. Scanner PSU (☛ 3.6.6)

6. Five screws on the right-hand side (viewed from the front) [A]

7. Two screws on the left-hand side (viewed from the front) [B]

8. Pivot brackets [C][D] (🖉 x 1 for each)
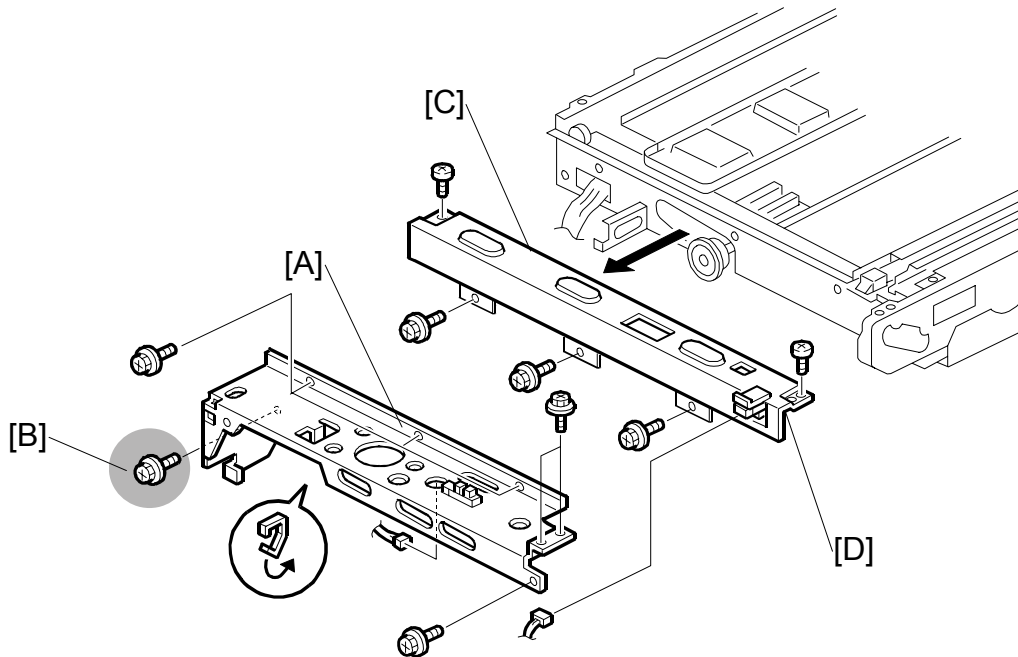
B146R929.WMF

9. Rear frame [A] (⧉ x 2, ⧂ x 7)

   NOTE: To remove the screw [B] on the bottom-right corner (viewed from the
   front), lift the right-hand side (viewed from the front) of the scanner unit.

10. Rail frame [C] (⧂ x 5)

   NOTE: When reassembling, make sure that the home position sensor [D] is
   not damaged by the sensor blade near the rear end of the xenon lamp.

11. Rear scanner wire clamp [E]

12. Rear scanner wire bracket [F]
    (⧂ x 1)

13. Loosen the two screws on the
    scanner-motor bracket (☛ 3.6.7)

14. Scanner motor gear [G] (⧂ x 1)

15. Rear scanner wire and scanner
    drive pulley [H] (⧂ x 1)
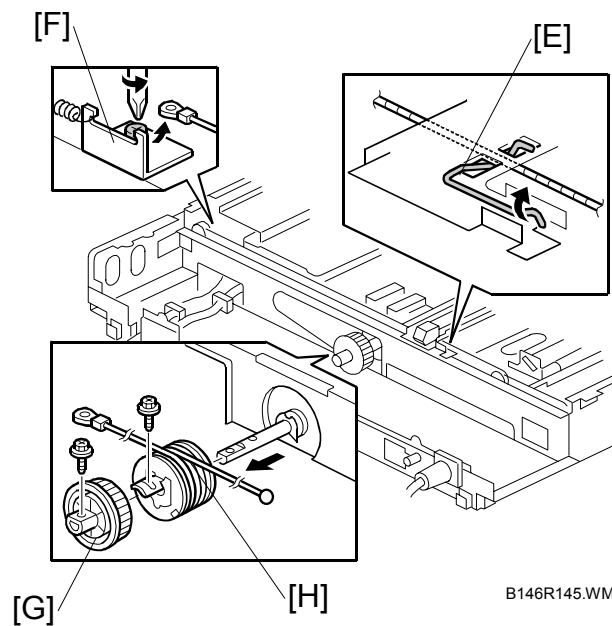
B146R145.WMF

Reassembling the Rear Scanner Wire

1. Position the center ball [A] in the middle of the forked holder.

2. Pass the left end (with the ball) [B] through the drive pulley notch, and the right end (with the ring) [C] through the drive pulley hole.

3. Wind the left end counterclockwise (viewed from the machine's front) five times; wind the right end clockwise three times.
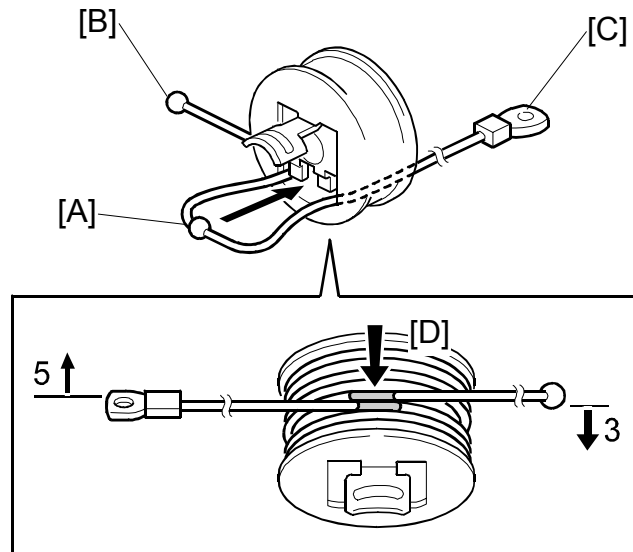
B146R146.WMF

   NOTE: The two red marks [D] meet when you have done this. Stick the wire to the pulley with tape, so you can handle the assembly easily during installation.

4. Install the drive pulley on the shaft.

   NOTE: Do not secure the pulley on the shaft with the screw yet.

5. Install the wire.
   NOTE: The winding of the wire on the three pulleys at the rear of the scanner should be the same as the winding on the three pulleys at the front, except that it should appear as a mirror image.
   Example: At the front of the machine, the side of the drive pulley with the three windings should face the front of the machine. At the rear of the machine, it should face the rear.

6. Perform steps 7 through 13 in the "Reassembling the Front Scanner Wire" Section.

3.6.10 TOUCH PANEL POSITION ADJUSTMENT

NOTE: It is necessary to calibrate touch panel in the following cases:
- When the operation panel is replaced.
- When the controller board is replaced.
- When the touch panel detection function is not working correctly

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 Ⓒ⊘ 5 times to open the Self-Diagnostics menu.
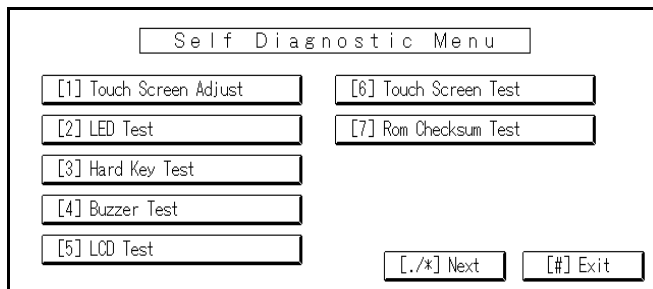
```
┌──────────────────────────────────────────────────┐
│          Self  Diagnostic  Menu                    │
│                                                    │
│   [1] Touch Screen Adjust      [6] Touch Screen Test│
│                                                    │
│   [2] LED Test                 [7] Rom Checksum Test│
│                                                    │
│   [3] Hard Key Test                                │
│                                                    │
│   [4] Buzzer Test                                  │
│                                                    │
│   [5] LCD Test                 [./*] Next   [#] Exit│
└──────────────────────────────────────────────────┘
```
B146R147.WMF

2. On the touch screen press "Touch Screen Adjust" (or press ①).
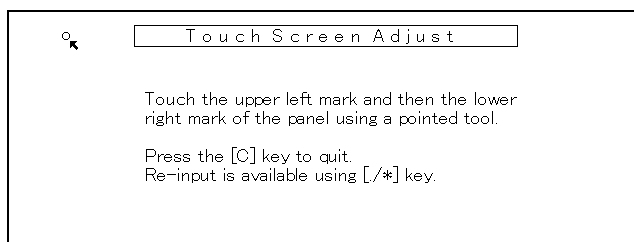
```
┌──────────────────────────────────────────────────┐
│  ○↖     Touch Screen Adjust                        │
│                                                    │
│      Touch the upper left mark and then the lower  │
│      right mark of the panel using a pointed tool. │
│                                                    │
│      Press the [C] key to quit.                    │
│      Re-input is available using [./*] key.        │
│                                                    │
└──────────────────────────────────────────────────┘
```
B146R148.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.

3.7 LASER OPTICS

> ⚠ **WARNING**
>
> **Turn off the main switch and unplug the machine before beginning any of the procedures in this section. Laser beams can cause serious eye injury.**

3.7.1 CAUTION DECAL LOCATIONS

Caution decals are placed as shown below.

B146R900.TIF

B146R107.WMF

B146R901.TIF
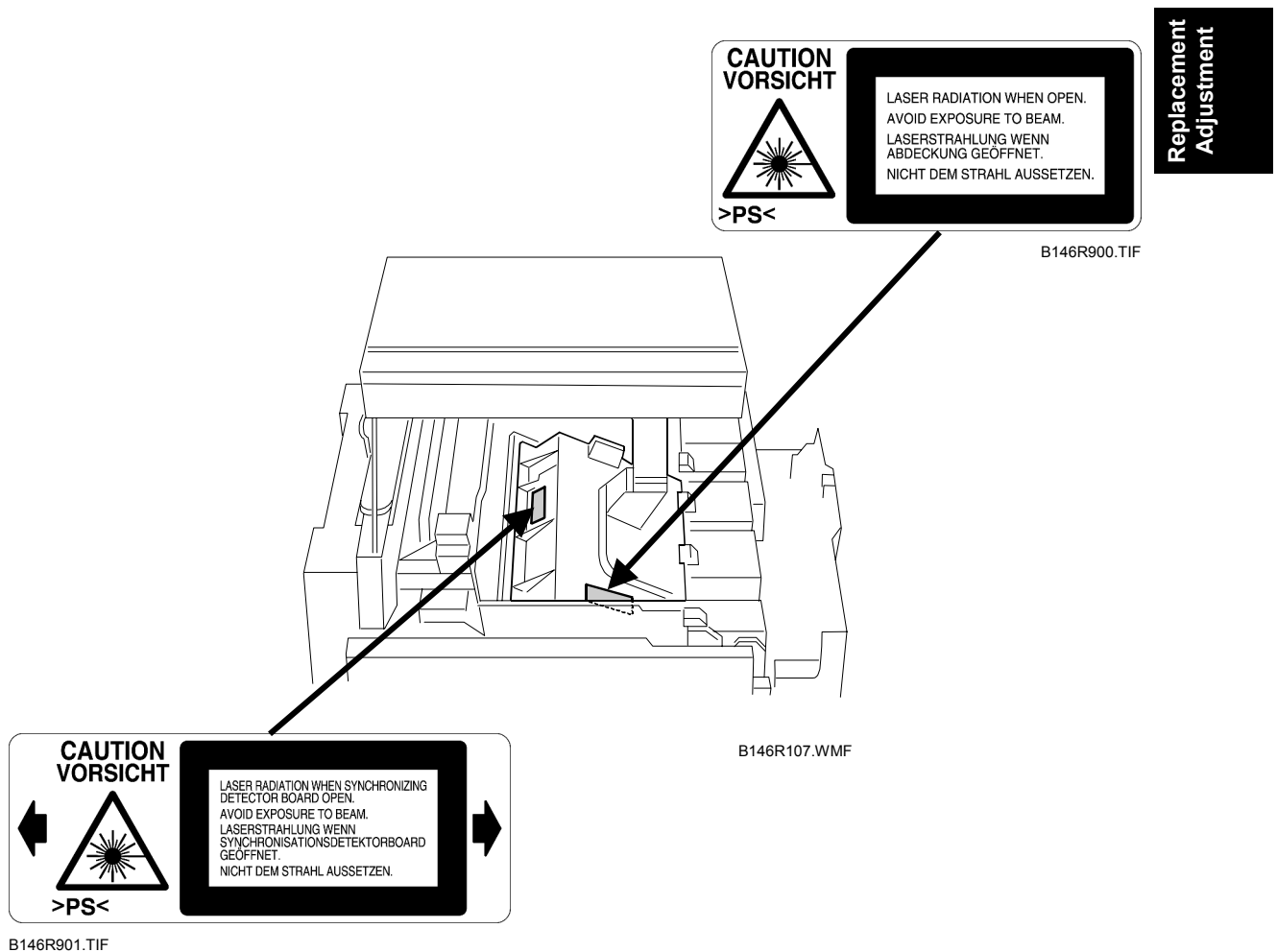
> ⚠ **WARNING**
>
> **Be sure to turn off the main switch and disconnect the power plug from the power outlet before beginning any disassembly or adjustment of the laser unit. This printer uses a class IIIb laser beam with a wavelength of 655 nm and an output of 7 mW. The laser can cause serious eye injury.**

3.7.2 LASER OPTICS HOUSING UNIT

CAUTION: Before installing a new laser optics housing unit, remove the sponge padding and the tag from the new unit.

Steps 1 through 4 refer to the procedure for a newly supplied unit that replaces the old one.

1. Top cover of the laser optics housing unit [A] (✐ x 4)

2. Sponge padding [B]

3. Tag [C]

4. Reinstall the top cover.
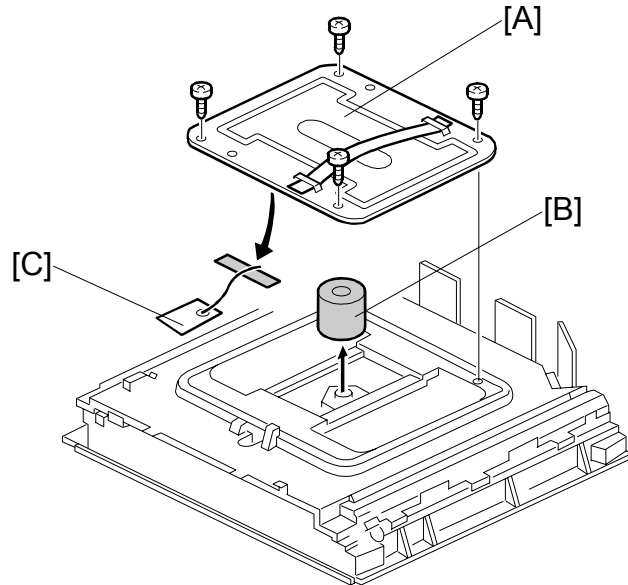
B146R149.WMF

5. ARDF or platen cover (if installed)

6. Rear cover (☛ 3.5.1)

7. Open the duplex inverter unit [D].

8. Open the front cover [E].
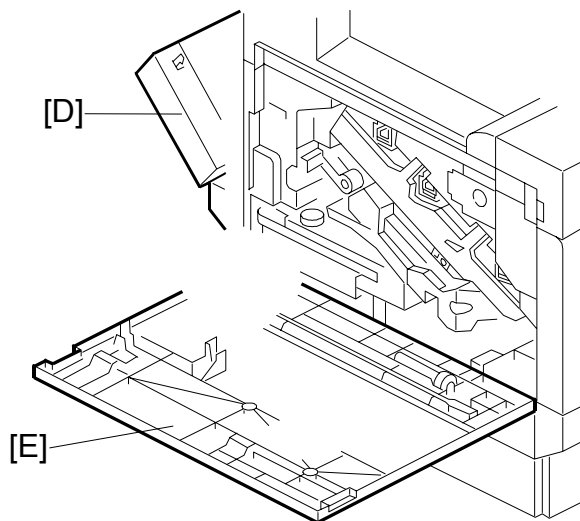
B146R922.WMF

10. Right cover, upper right cover, and upper front cover (☛ 3.5.1)

11. Operation panel, scanner left cover, scanner right cover, and scanner rear cover (☛ 3.5.3)

12. Remove the support [A] on the front of the scanner unit.
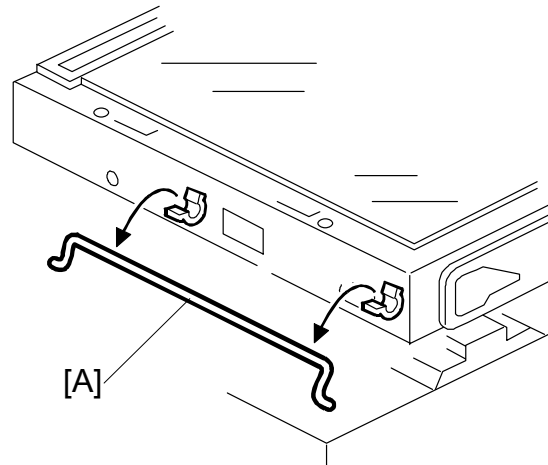
B146R920.WMF

CAUTION: 1) Before going to the next step, make sure that the cables on the rear of the scanner unit are safe. The whole function (not only the scanner unit) may be disabled if some of the cables are damaged.
2) Do not remove screw [S_1], screw [S_2], or screw [S_3] in the diagram below. Image adjustment may become difficult if these screws are removed.

13. Lift the scanner unit [B] (🔩 x 7) and prop the unit with the support [C].

    NOTE: Remove screw [D] and screw [E].

CAUTION: Do not lift the scanner unit any higher after setting the support under the scanner unit. The support may come off the opening [F].
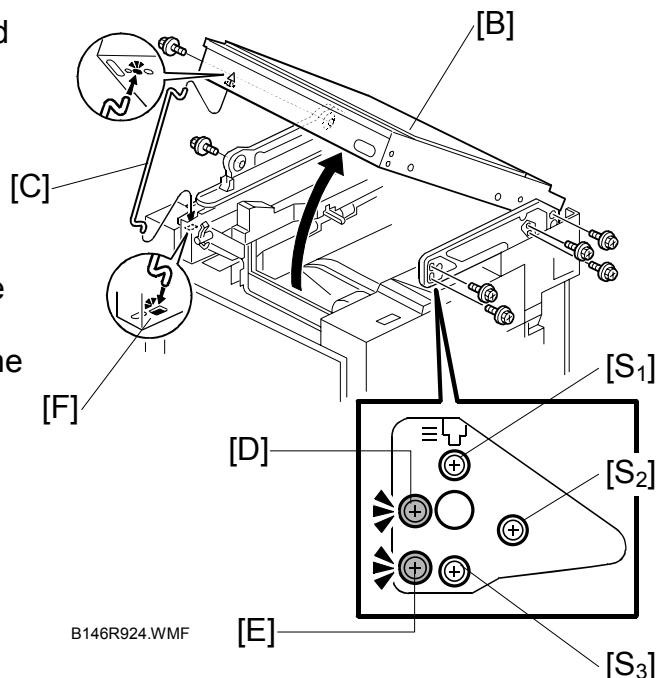
B146R924.WMF

14. Securing screws for the paper exit tray
[A] (🔩 x 2)

   NOTE: Do not remove the paper exit
   tray yet.
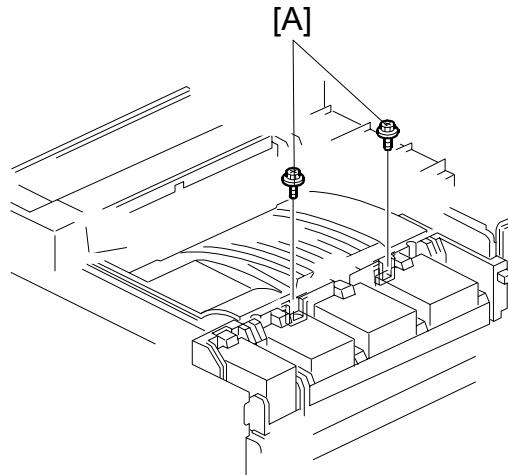
B146R912.WMF

15. Securing screws for the toner supply
unit [B] (🔩 x 4)

16. Securing screws for the laser optics
housing unit [C] (🔩 x 2)
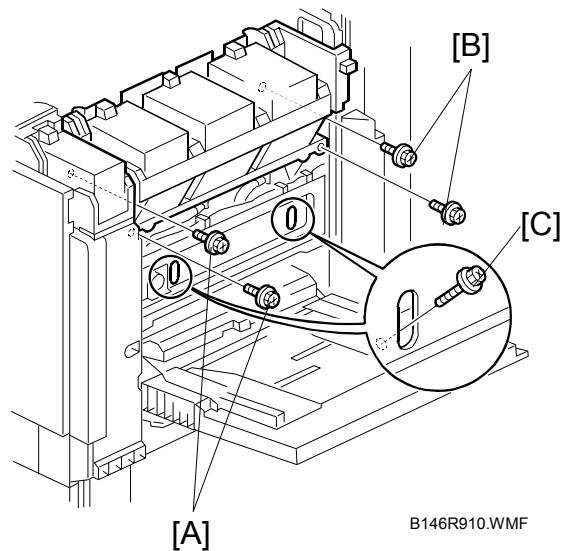
B146R910.WMF

17. Hold the toner supply unit [D] up ① and
lower it ②, so the pins [E] on the front
and rear shafts hold the unit.
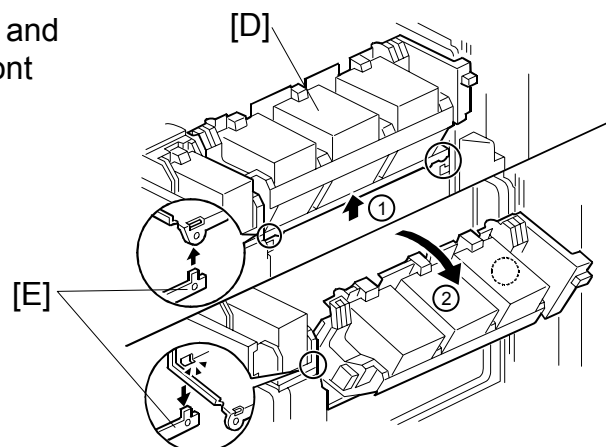
B146R914.WMF

18. Paper exit tray [A]

[A]

B146R923.WMF
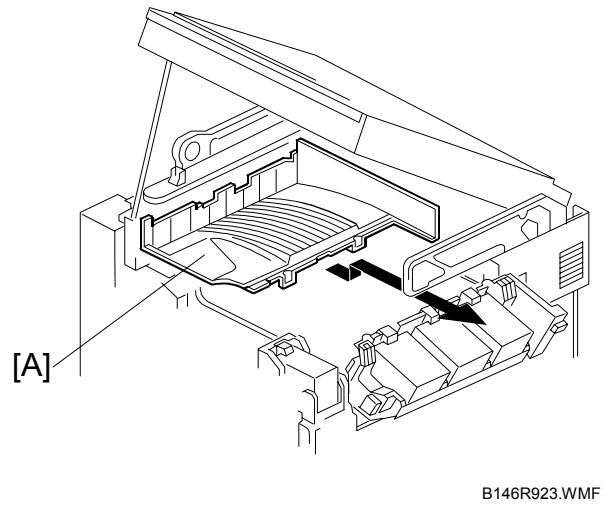
19. Connector cover [B] (🔩 x 3)
20. Four flat cables [C]
21. Connector [D]

[C]

[B]

[D]

B146R909.WMF
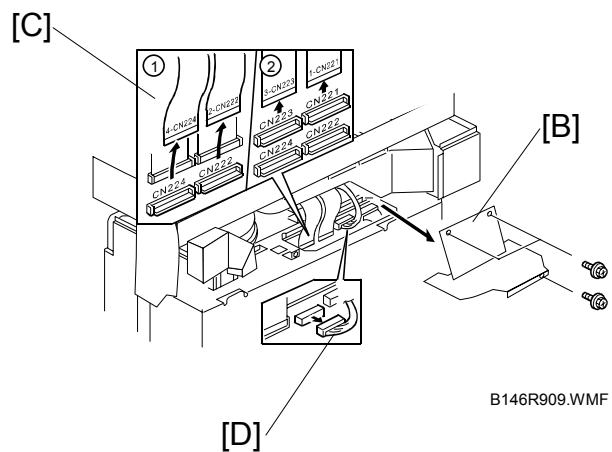
22. Flat cable bracket [E] (🔩 x 1)
23. Release the cable from the clamps [F].

[E]

[F]

B146R913.WMF
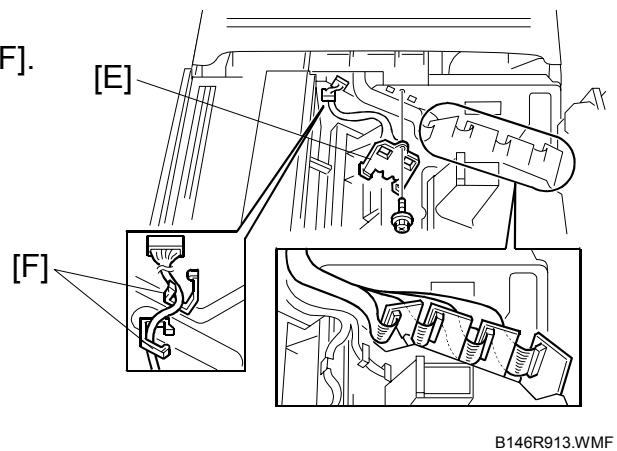
24. Duct [A]

25. Securing screws for the laser optics housing unit [B] (🔩 x 2)
    NOTE: When reassembling, attach the ground cable [C].

26. Palace a sheet of paper [D] between the laser optic housing unit and the machine rear frame.
    NOTE: This ensures that the cables are not caught by the brackets when you lift the laser optics housing unit.

27. Hold the unit with both hands and slowly lift it up, making sure that the flat cables from the laser diode board are not caught by the brackets.
    NOTE: If you roughly remove the unit, the cables can be caught by the brackets and the laser diode board may be damaged.

28. After reinstalling the laser optics housing unit, do adjustments (☛ the procedures on the following page).

B146R911.WMF
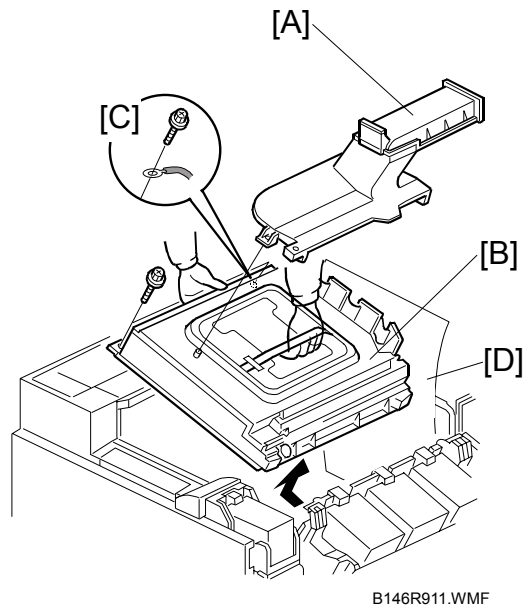
After installing the laser optics housing unit, execute the forced line position adjustment (SP5-993-2 or User Tools > Maintenance > Colour Registration > Auto Colour Registration > OK).

Adjustments after Replacing the Laser Optics Housing Unit

1. Enter SP mode.

2. Input the values printed on three decals on the new laser optics housing unit into the following SPs. Each decal contains two values.

	Value on the left	**Value on the right**	**Function**
Decal 1	SP2-109-3	SP2-109-2	Laser beam pitch
Decal 2	Not used	Not used	Main-scan registration correction for black and cyan
Decal 3	Not used	Not used	Main-scan registration correction for magenta and yellow

Decal 1

Jp:xxxxx   P:46,41

600dpi   1200dpi
B146R152.WMF

Decal 2

Jp:xxxxx   KC:-2,-2

K   C
B146R150.WMF

Decal 3

Jp:xxxxx   MY:-2,-2

M   Y
B146R151.WMF
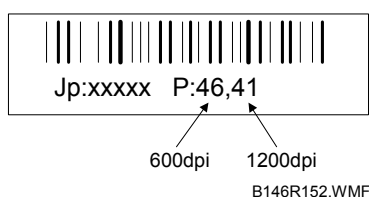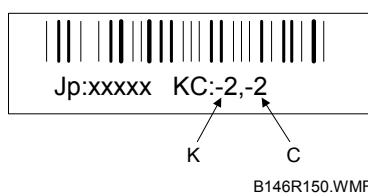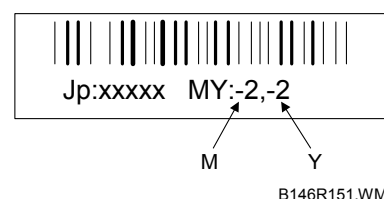
Replacement Adjustment

> **NOTE:** The values on decals 2 and 3 do not need to be input, as the machine performs the main scan registration correction for each color during automatic line position adjustment.

3. Print out the following test pattern (Cross Stitch M) with SP5-997.

4. Check these test patterns. If the laser beam pitch is not correct, vertical black strips seem to appear.
   - Cross-stitch pattern: The thin lines should be of uniform thickness (no striping effect should appear on the printout).

5. Adjust the laser beam pitch values in SP2-109-2 and -3 until the printout is correct, as shown below.

Feed direction

Adjustment not completed   Adjustment completed

B146R153.WMF
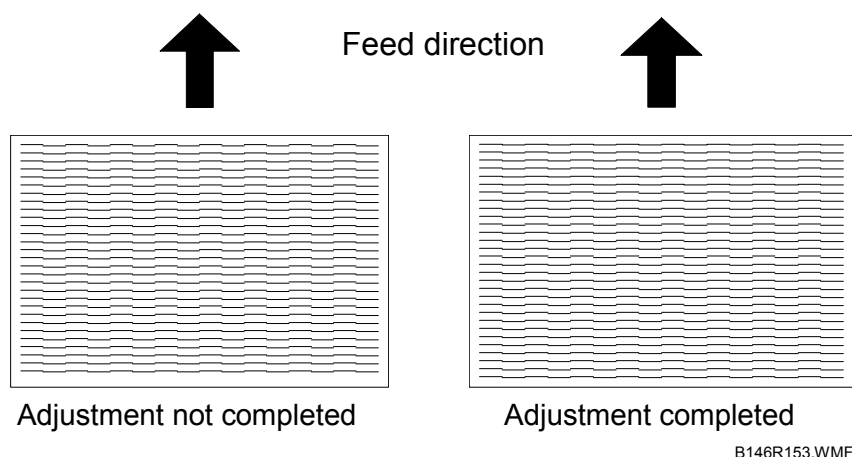
6. Execute SP5-993-2 or "Auto Colour Registration" in the User Tools (Maintenance > Colour Registration > Auto Colour Registration > OK).

3.7.3 POLYGON MIRROR MOTOR

1. Laser optics housing unit (☛ 3.7.2)

2. Cover [A] (𝄐 x 4)

3. Polygon mirror motor [B]
   (🔌 x 1, 𝄐 x 4)
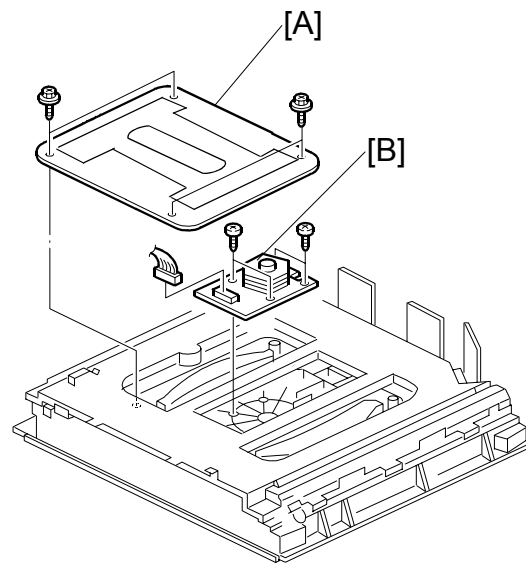
B146R915.WMF

3.7.4 LASER SYNCHRONIZING DETECTOR BOARDS

1. Laser optics housing unit (☛ 3.7.2)

2. Synchronizing detector boards [A]
   (🔌 x 1 for each, 𝄐 x 1 for each)

B146R916.WMF

3-40
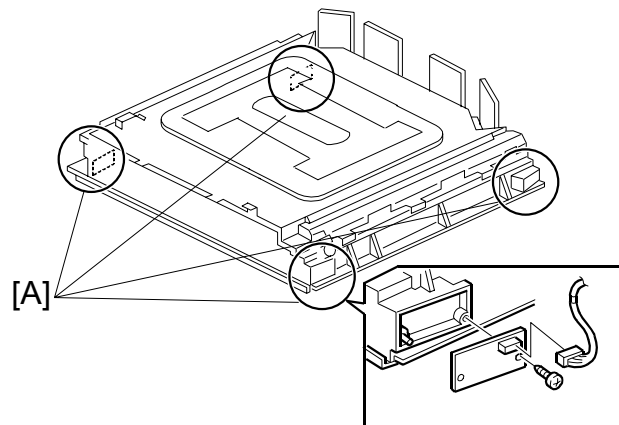
3.8 PCU AND DEVELOPMENT UNIT

NOTE: Do not touch the PCU drum. Do not let any metal object touch the development sleeve.

1. Start the SP mode and execute the New Unit Set:
   - PCU: SP5-999-001 ~ 004
   - Development unit: SP5-999-005 ~ 004

2. Turn the main switch off.

3. Open the front cover [A].

4. Loosen the 2 screws [B₁][B₂] (on the drum positioning plate).
   NOTE: When reassembling, fasten screw [B₁] first, and screw [B₂] second.

5. Turn the release lever [C] counter-clockwise.

6. Lift the drum positioning plate.

7. Pull a development unit [D] out.

8. Check that the development units are installed in the proper color order (black → yellow → cyan → magenta from left to right).

B146R930.WMF

Replacement Adjustment

B146R154.WMF

9. Release the lever and pull a PCU [E] out until the handle appears.

10. Grasp the handle [F] and pull the PCU out of the machine.

11. Turn the main switch on. The machine starts the initialization for the new unit.
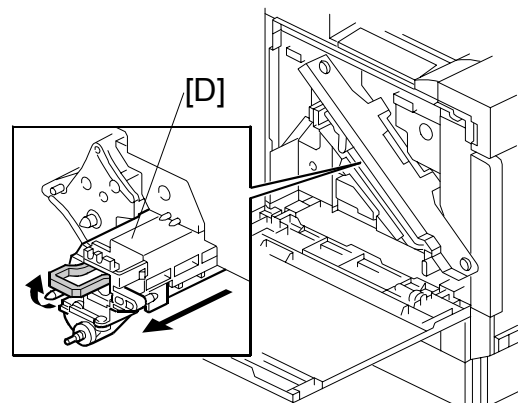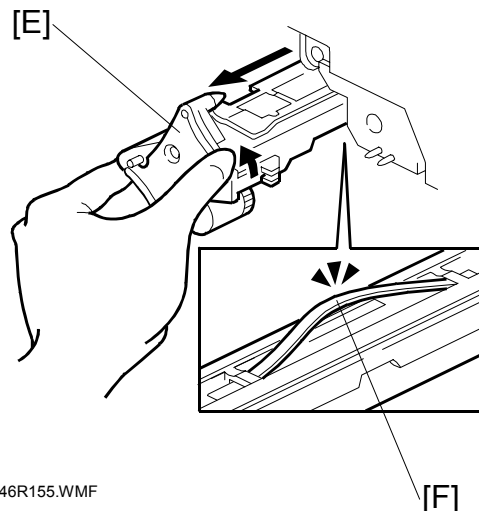
B146R155.WMF

[F]

3.9 PAPER FEED

3.9.1 PICK-UP, FEED, AND SEPARATION ROLLERS

Tray 1 and Tray 2

1. Tray 1 and Tray 2

2. Pick-up roller [A] (⬚ x 1)

3. Feed roller [B] (⬚ x 1)

4. Separation roller [C] (⬚ x 1)

B146R961.WMF
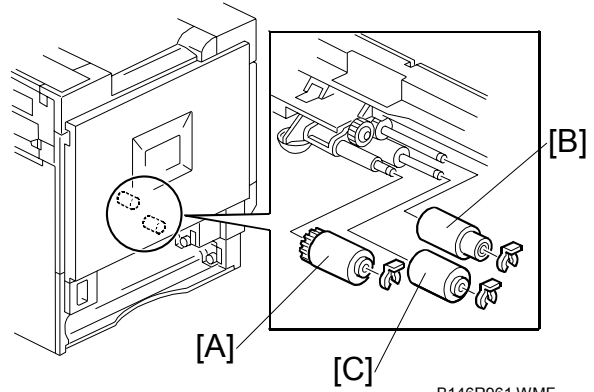
By-pass Tray

1. Open the right door.

2. By-pass tray cover [A] (1 hook, 🔩 x 1)

3. Raise the paper end sensor actuator [B].

4. Pick-up roller [C] (1 hook)

B146R932.WMF
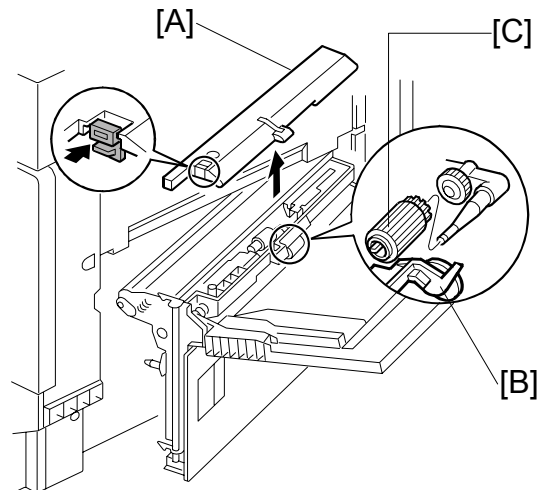
5. Feed roller [D] (⬚ x 1)

6. Vertical transport cover [E] (🔩 x 4)

   NOTE: To have easier access to the four screws, remove the right rear cover (☞ 3.9.4).

7. Separation roller [F] (⬚ x 1)

B146R156.WMF
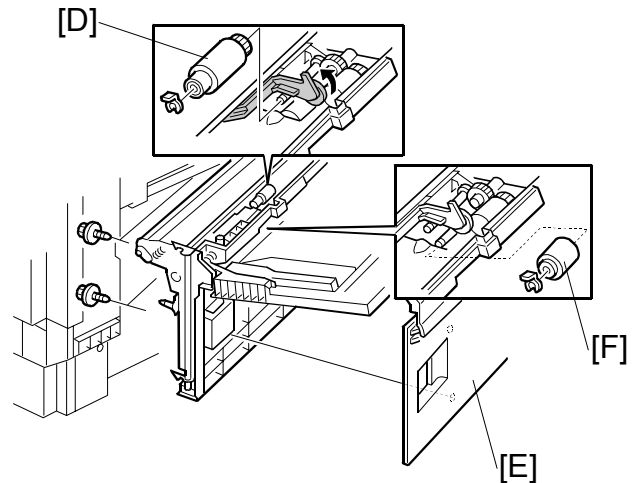
3.9.2 PAPER WIDTH DETECTION BOARD
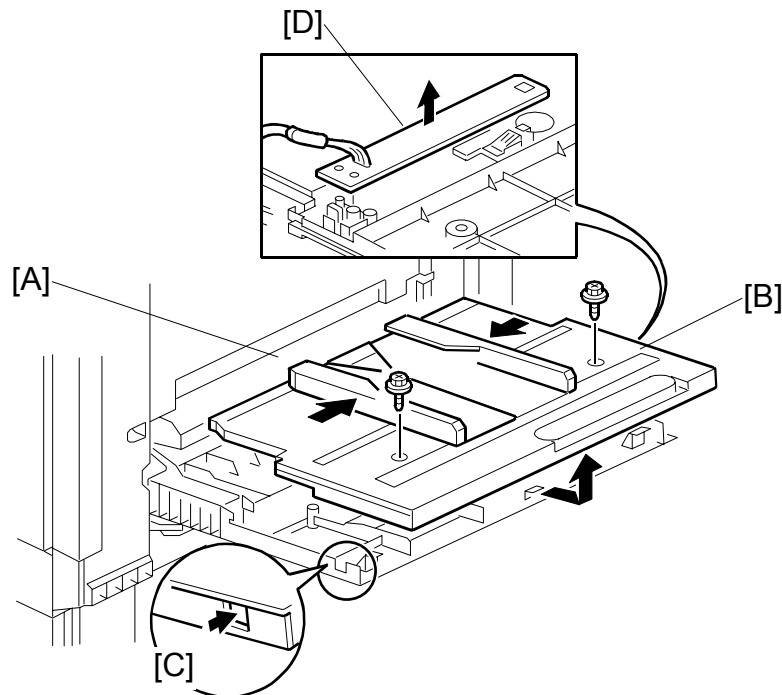
B146R933.WMF

1. Open the by-pass tray.

2. Center the side fences [A].

3. By-pass tray cover [B] (🔩 x 2, 2 hooks)

   NOTE: There is a square opening [C] on each side. Release the hooks by
   pushing them through these openings.

4. Paper width detection board [D] (🔌 x 1)

   NOTE: To remove the connector,
   open the bottom cover [E].

B146R157.WMF

3-43
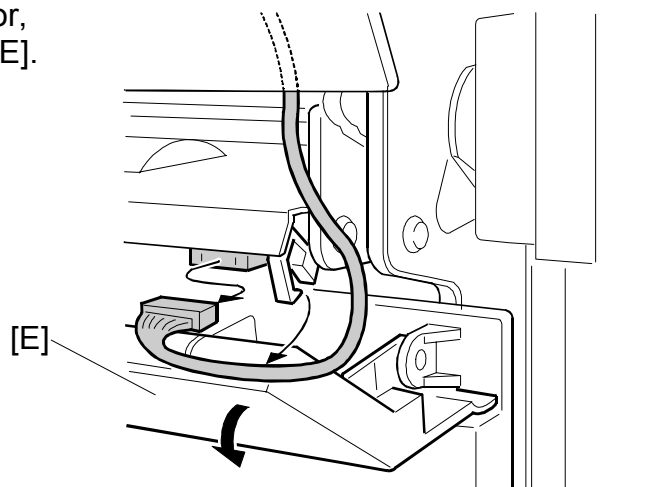
3.9.3 VERTICAL TRANSPORT SENSOR
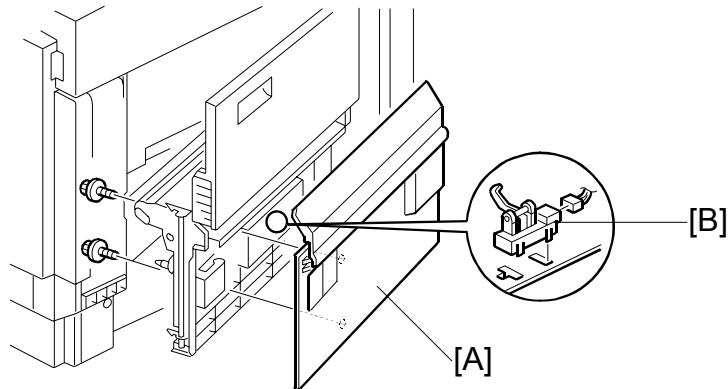
B146R158.WMF

1. Open the right door.

2. Vertical transport cover [A] (🔩 x 4)

    NOTE: To have easier access to the four screws, remove the right rear cover
    (☛ 3.9.4).

3. Vertical transport sensor [B] (🔌 x 1)

3.9.4 RIGHT DOOR UNIT
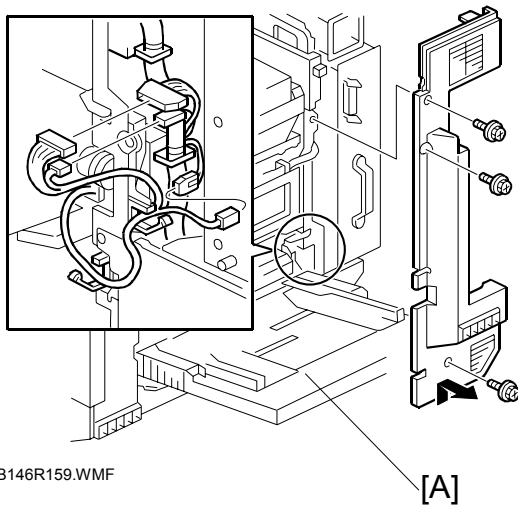
B146R159.WMF
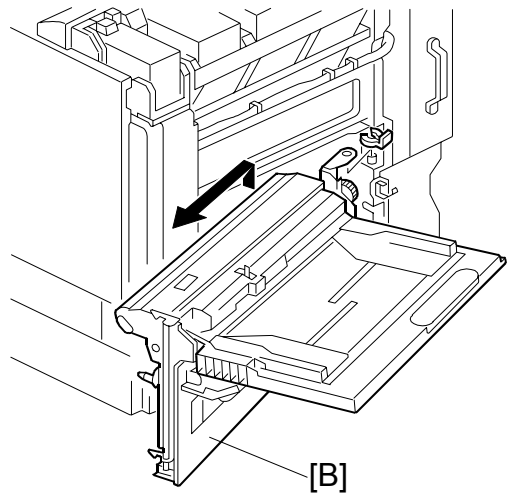
B146R160.WMF

1. Rear right cover (☛ 3.5.1)

2. Open the right door [A].

3. Lift the vertical transport unit [B] to remove it from its hinges (🔌 x 3, ⊘ x 1).

3.9.5 REGISTRATION SENSOR AND RELAY SENSORS
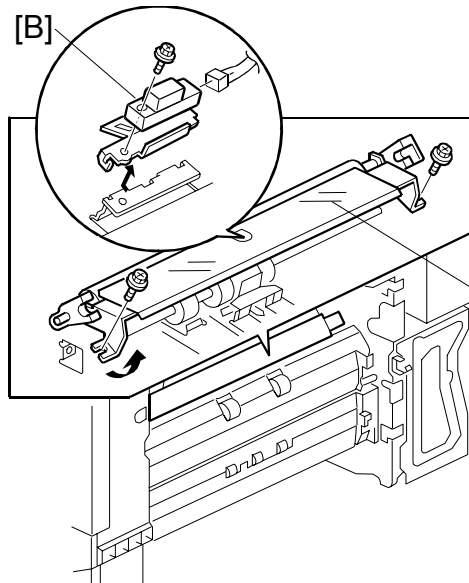
B146R956.WMF
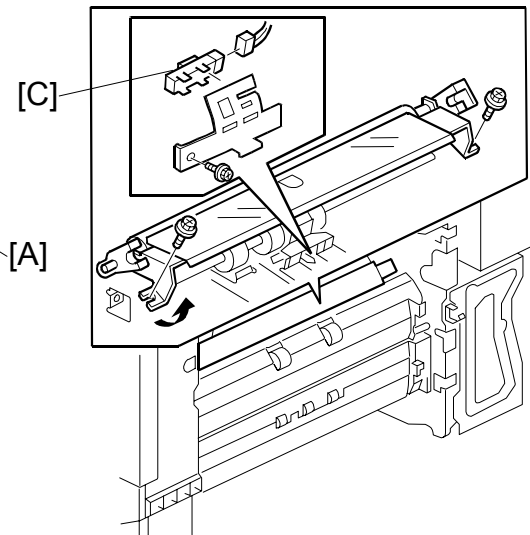
B146R934.WMF

1. Right door unit (☛ 3.9.4)
2. Registration guide [A] (🔩 x 2)
3. Registration sensor [B] (🔩 x 1, 🖇 x 1)
4. Relay sensor [C] (🔩 x 1, 🖇 x 1)

3.9.6 PAPER FEED CLUTCHES

1. Paper trays
2. Rear cover (☛ 3.5.1)
3. Swing out the high voltage supply unit (☛3.13.2).
4. Clutch holder [A] (🔩 x 2, 1 bearing)
5. Paper feed clutch for tray 1 [B] (🖇 x 1)
6. Clutch holder [C] (🔩 x 2, 1 bearing)
7. Paper feed clutch for tray 2 [D] (🖇 x 1)
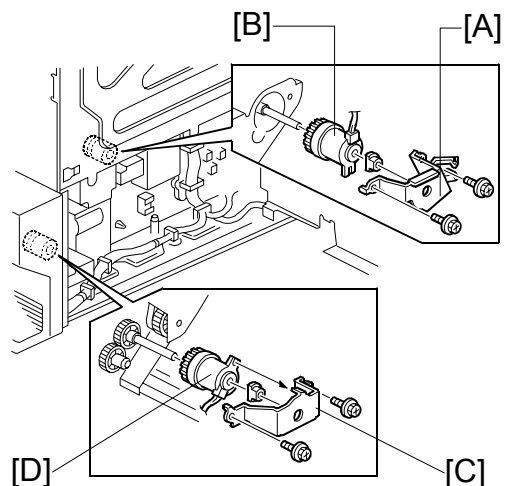
B146R161.WMF

3.9.7 BY-PASS FEED CLUTCH

1. Right door unit (☛ 3.9.4)

2. By-pass tray cover [A]
    (🔩 x 1, 1 hook)

3. Loosen the screw on the right
    door latch [B].

4. Turn the latch in the opposite
    direction.

5. Upper guide plate [C]
    (🔩 x 4, 🔌 x 1)

6. Support plate [D] (🔗 x 2)

7. Relay gear [E] (1 hook)

8. By-pass feed clutch [F] (🔌 x 1)
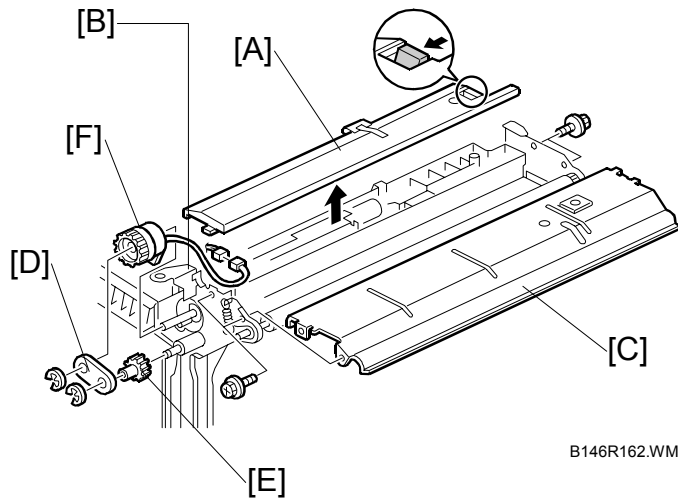
B146R162.WMF

3.9.8 TRAY LIFT MOTOR

1. Rear cover (☛ 3.5.1)

2. Rear cover (☛ 3.5.1)

3. Swing out the high voltage supply
    unit (☛ 3.13.2).

4. Sub power supply unit [A]
    (🔌 x 2, 🔩 x 3)

5. Tray lift motors (tray 1 [B], tray 2 [C])
    (🔩 x 2, 🔌 x 1)
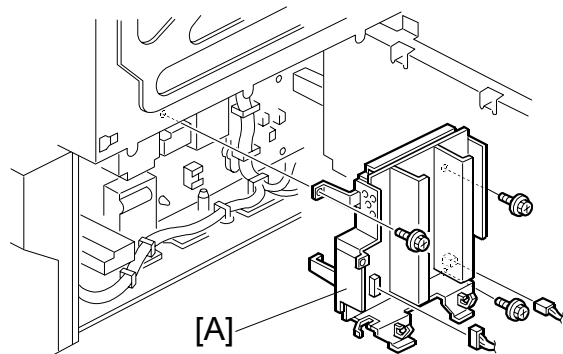
B146R122.WMF
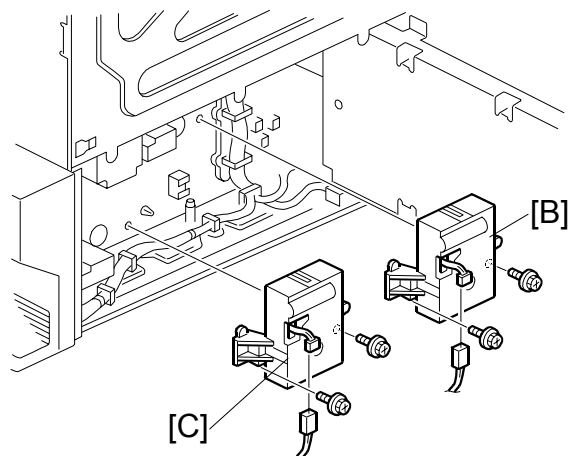
B146R163.WMF

3.9.9 PAPER FEED MOTOR
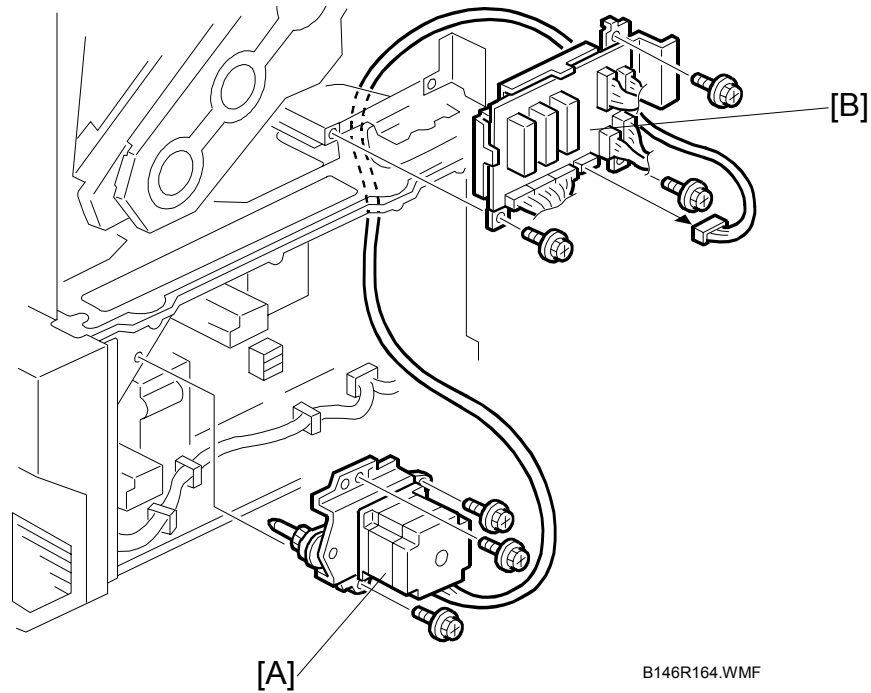
B146R164.WMF

1. Rear cover (☛ 3.5.1)
2. Sub power supply unit (☛ 3.9.8)

   NOTE: This step is necessary to release the cable.

3. Paper feed motor [A] (🔩 x 3, 🔌 x 1)

   NOTE: The connector is CN604 on the driver board [B].

3.10 TRANSFER AND PAPER TRANSPORT UNIT

3.10.1 TRANSFER UNIT

NOTE: When removing or installing the transfer unit, grasp the central areas of the front and rear frame. Do not touch the transfer belt [A]. Do not damage the entrance mylar [B].

After replacing the transfer unit, reset the maintenance counter, SP7-804-16, and conduct the output check, SP5-804-74.
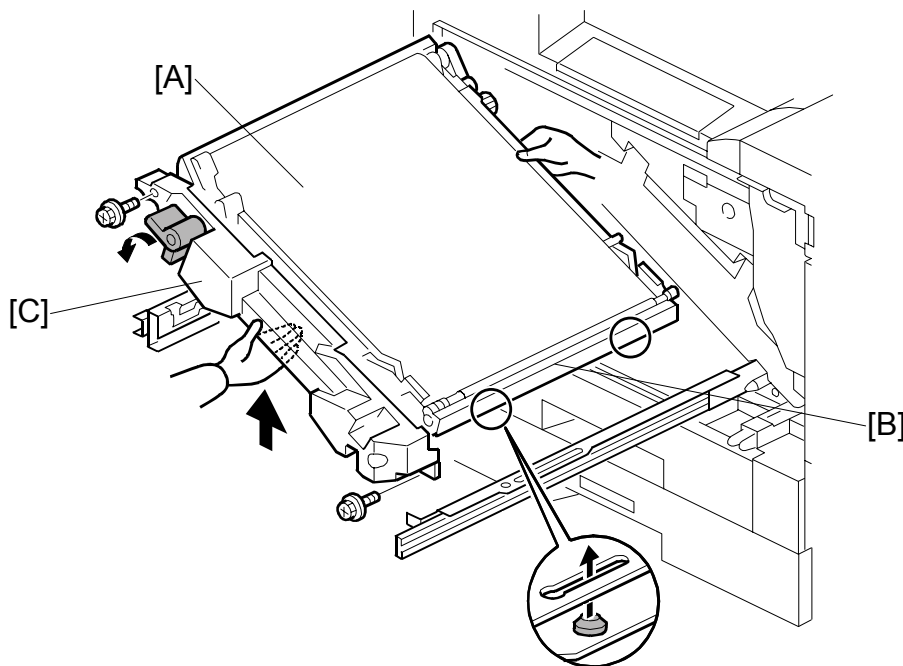
B146R958.WMF

1. Duplex feed unit (☛ 3.4.1)

2. Turn the release lever counterclockwise. (☛ 3.8)

3. Pull out the transfer unit [C] until the entire unit is visible (🔗 x 2).

4. Grasp the transfer unit grips as shown above. Lift the unit to remove it.

NOTE: Grasp the front grip. Use caution not to damage the actuator on the rear.

After replacing the transfer unit:

- Perform forced line position adjustment (SP5-993-002 or ⬥/🔢 > Maintenance > Color Registration).
- Print the 1-dot grid pattern on A3/11" x 17" paper and check the color shift level (☛ 4.6.3).

3.10.2 TRANSFER BELT CLEANING UNIT

NOTE: After replacing the transfer belt cleaning unit, reset the maintenance counter, SP7-804-17.
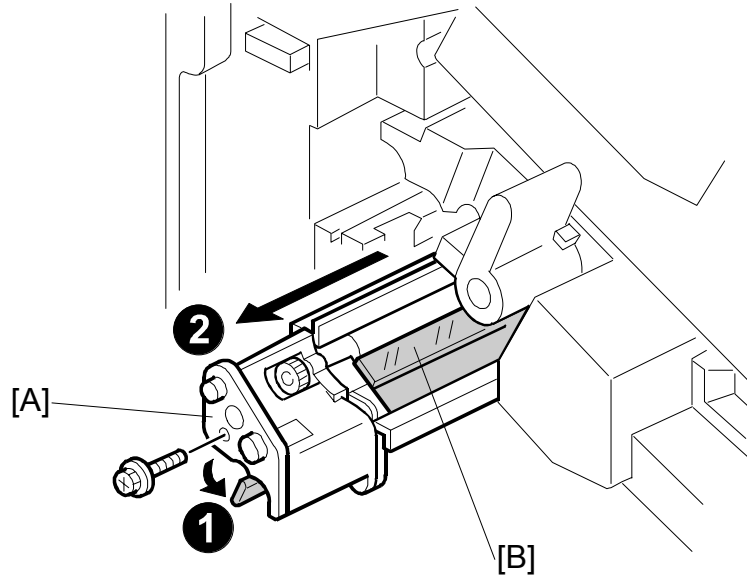
B146R165.WMF

While pushing the lever, pull out the transfer belt cleaning unit [A] (🖊 x 1).

NOTE: 1) The blade [B] may damage the belt if you do not keep pushing the lever.
2) When reassembling, check that the transfer unit release lever is put back to the original position (☛ 3.8).

After replacing the transfer belt cleaning unit, perform forced line position adjustment (SP5-993-002 or 🔲 > Maintenance > Color Registration).

Replacement
Adjustment

3-49

3.10.3 CLEANING BLADE AND CLEANING ROLLER
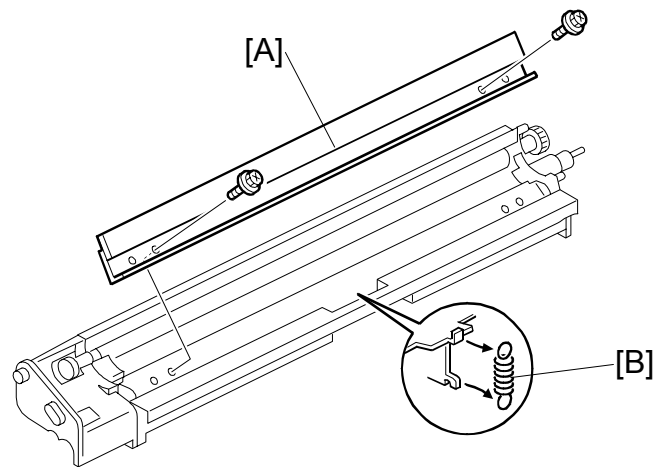
B146R166.WMF

1. Transfer belt cleaning unit (☛ 3.10.2)

2. Cleaning blade [A] (🔩 x 2)

3. Tension spring [B]
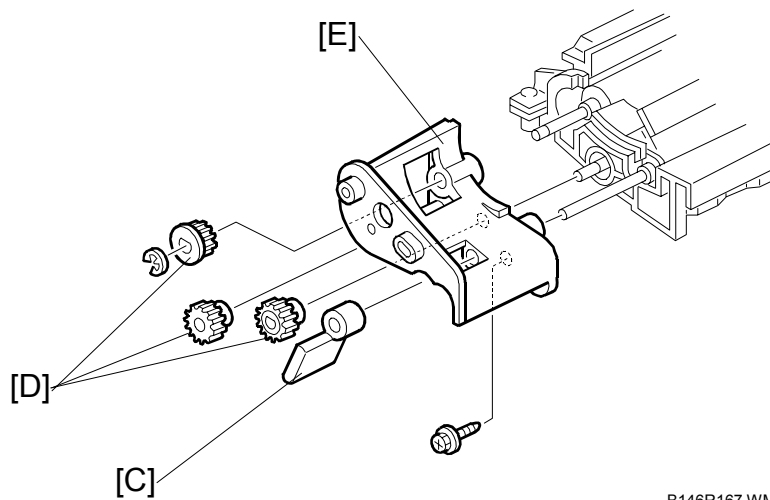
B146R167.WMF

4. Lever [C]

5. 3 gears [D] (Ⓒ x 1)

6. Gear box [E] (🔩 x 1)
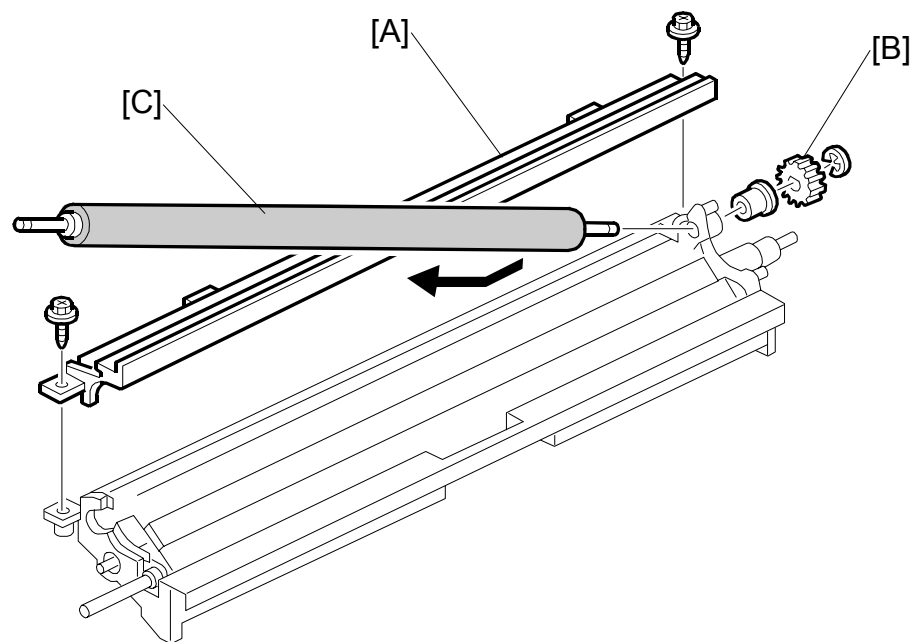
B146R168.WMF

7. Roller cover [A] (𝒫 x 2)

8. Cleaning brush gear [B] (ℂ x 1)

9. Cleaning brush [C] (Bushing x 1)

After replacing the cleaning blade, perform forced line position adjustment (SP5-993-002 or "Maintenance menu – Color registration - Auto Adjust" in User Program mode).

3.10.4 TRANSFER BELT

NOTE: Do not touch the transfer belt during handling. When replacing the belt, hold the belt at its end.
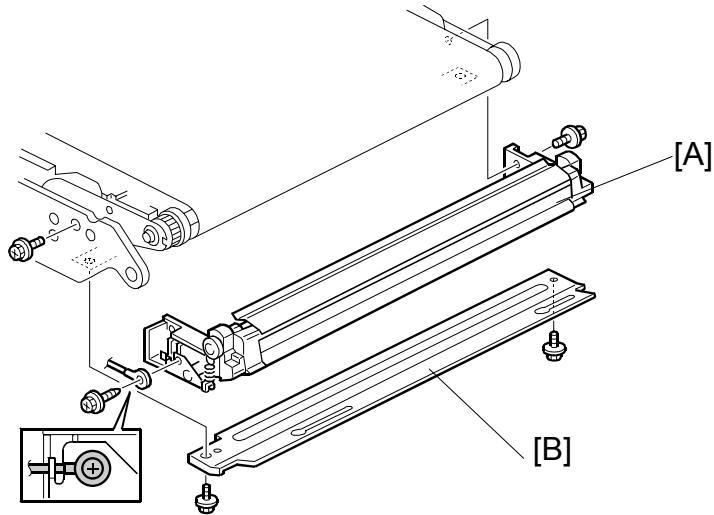
B146R169.WMF

1. Transfer belt cleaning unit (☛ 3.10.2)

2. Transfer unit (☛ 3.10.1)

3. Transfer entrance guide [A] (✏ x 3)

4. Right bracket [B] (✏ x 2)
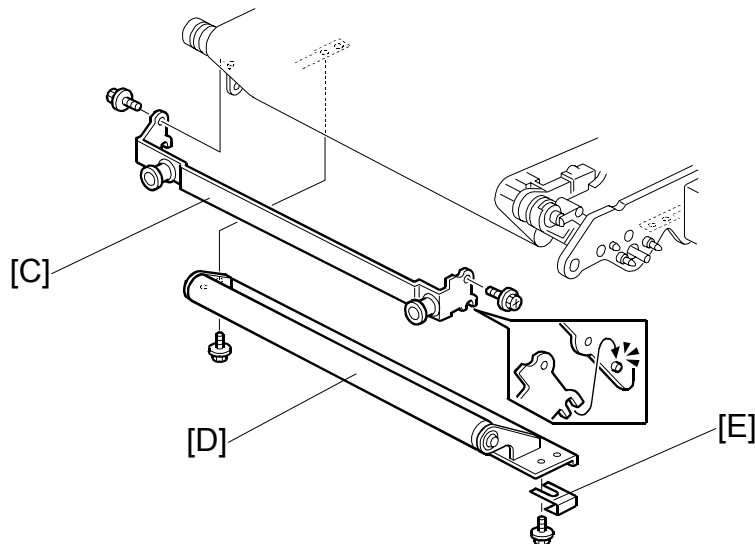
B146R936.WMF

5. Left bracket [C] (✏ x 2)

6. Tension roller [D] (✏ x 2, Spacer [E] x 1)
    NOTE: When reassembling, attach the spacer [E] to the original position.
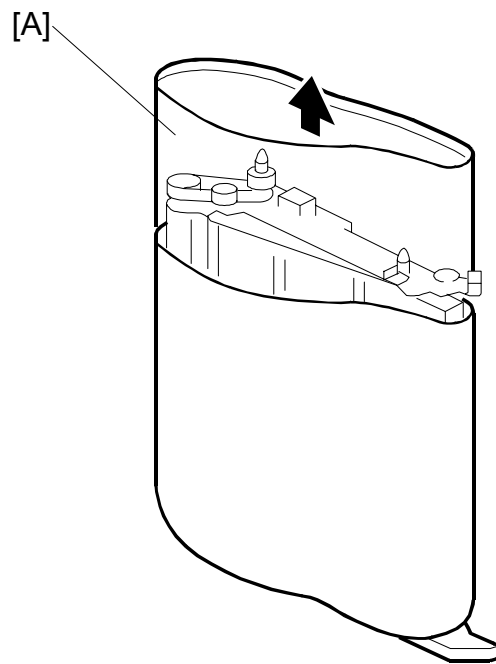
B146R170.WMF

7. Lay the transfer unit on its side.

8. Grasp the upper end of the transfer belt and pull the transfer belt [A] up and out.

   NOTE: If the drive rollers are dirty, clean them with a damp cloth.

After replacing the transfer belt, perform forced line position adjustment (SP5-993-002 or ⊗/⊞ > Maintenance > Color Registration).

Replacement Adjustment

3.10.5 TRANSFER UNIT DRIVE MOTOR
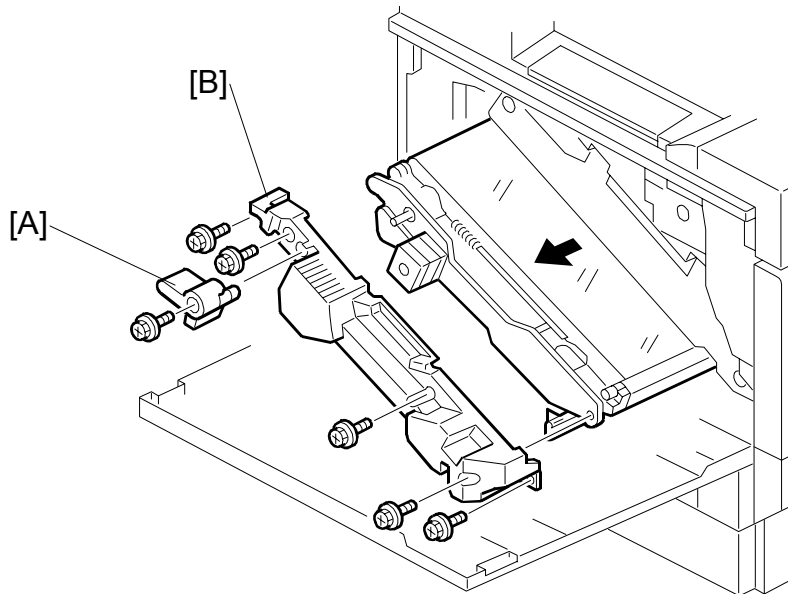
B146R171.WMF

1. Transfer belt cleaning unit (☛ 3.10.2)

2. Pull out the transfer unit (☛ 3.10.1).

3. Release lever [A] (📎 x 1)

4. Front cover [B] (📎 x 3)
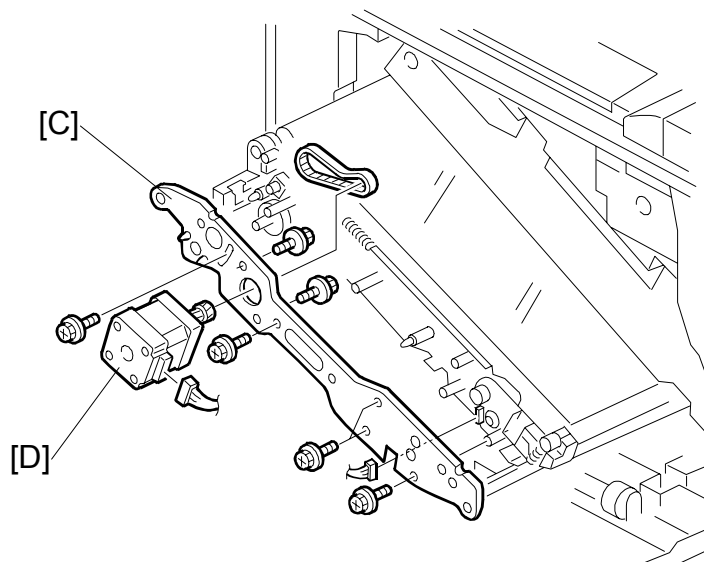
B146R937.WMF

5. Front plate [C] (📎 x 5, 🔌 x 2, Timing belt x 1)

6. Transfer unit drive motor [D] (📎 x 2)

3.11 ID SENSORS
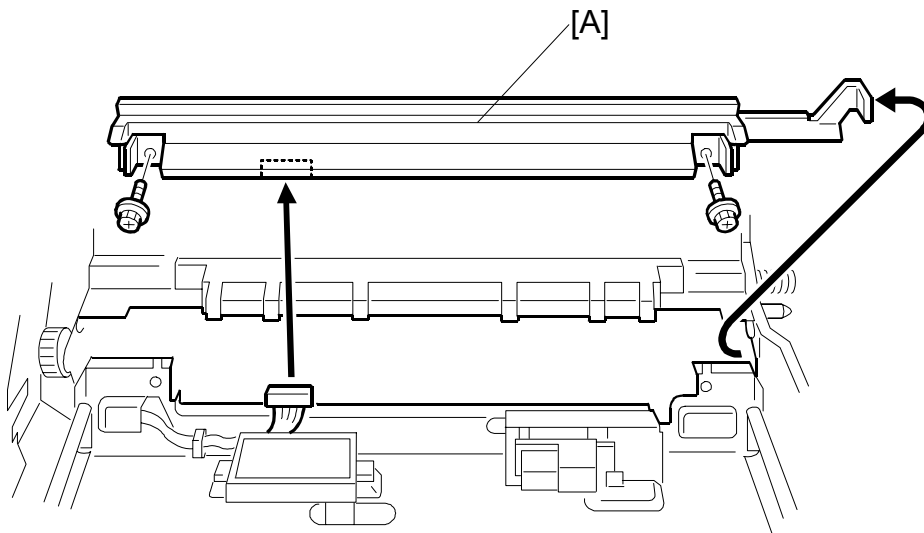
B146R172.WMF

1. Transfer unit (☛ 3.10.1)

2. Fusing unit (☛ 3.12.1)

3. Black PCU (☛ 3.8)

4. ID sensor bracket [A] (𝒫 x 2, ◻ x 1)

When reassembling, check that the ID sensor bracket receives the drum-positioning plate correctly.

3.12 FUSING

> ⚠️**CAUTION**
> **1. Be careful when handling the fusing unit. It is very hot.**
> **2. Take care not to spill silicone oil.**

3.12.1 FUSING UNIT

B146R173.WMF
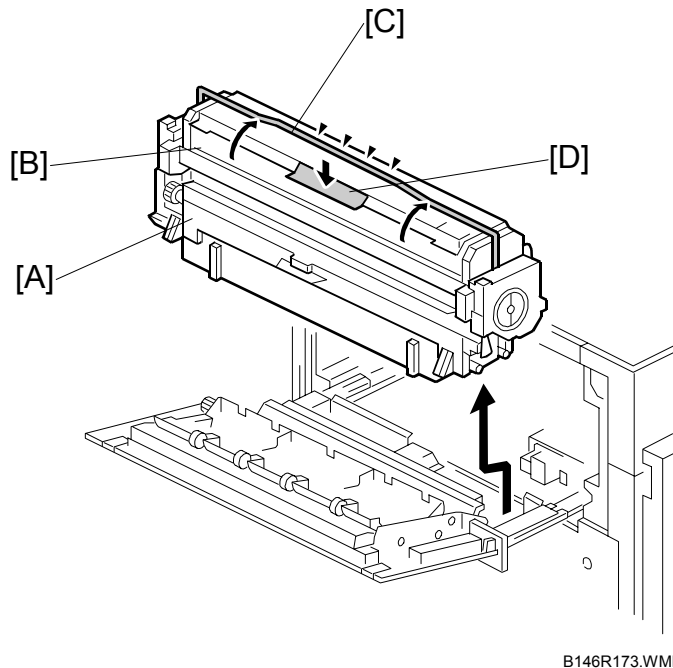
CAUTION: Do not tilt the fusing unit [A] while handling it. The oil supply unit [B] can fall off the fusing unit after the grip [C] is released from the oil supply unit.

1. Start the SP mode and execute the New Unit Set (SP5-999-009).

2. Turn the main switch off.

3. Detach the finisher from the printer if it is installed.

4. Open the duplex inverter unit if it is installed.

5. Push the heat insulator [D]. The grip [C] is released from the oil supply unit.

6. Fusing unit [A]

7. Turn the main switch on. The machine starts initialization for the new unit.

After replacing the fusing unit, if the customer uses thick paper, make some test prints on a sample of the paper used by the customer. If there are any color registration problems, adjust the line speed for thick paper with the following SP:

- SP1-004-007 (Development Motor Speed–[K] 62.5 Thick)

3.12.2 OIL SUPPLY UNIT AND UPPER COVER
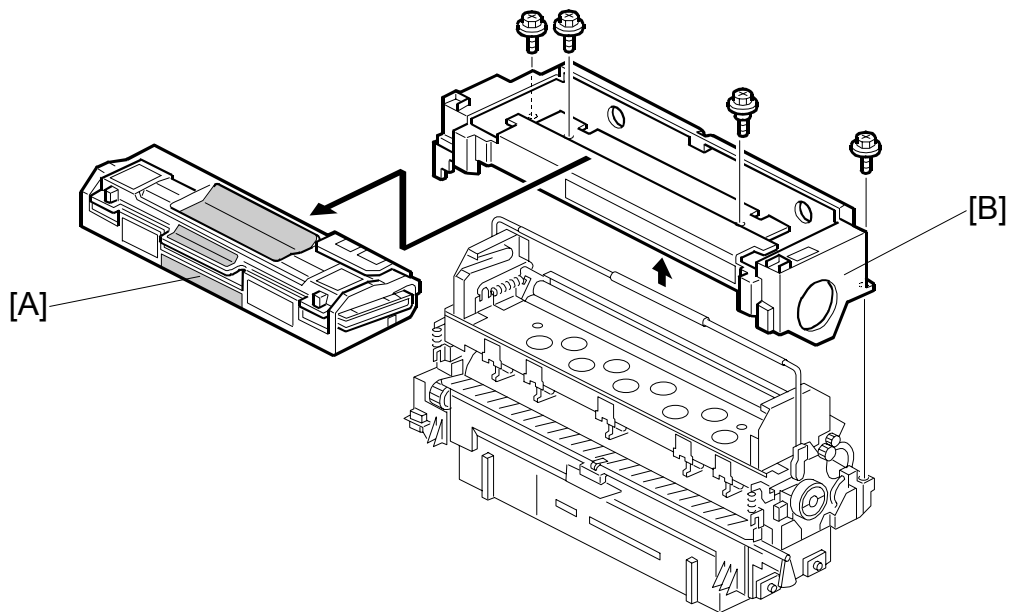
B146R174.WMF

1. Detach the finisher from the printer if it is installed.

2. Open the duplex inverter unit if it is installed.

3. Fusing unit (☛ 3.12.1)

4. Oil supply unit [A]

5. Upper cover [B] (🖉 x 4)

3.12.3 CLEANING UNIT

B146R175.WMF
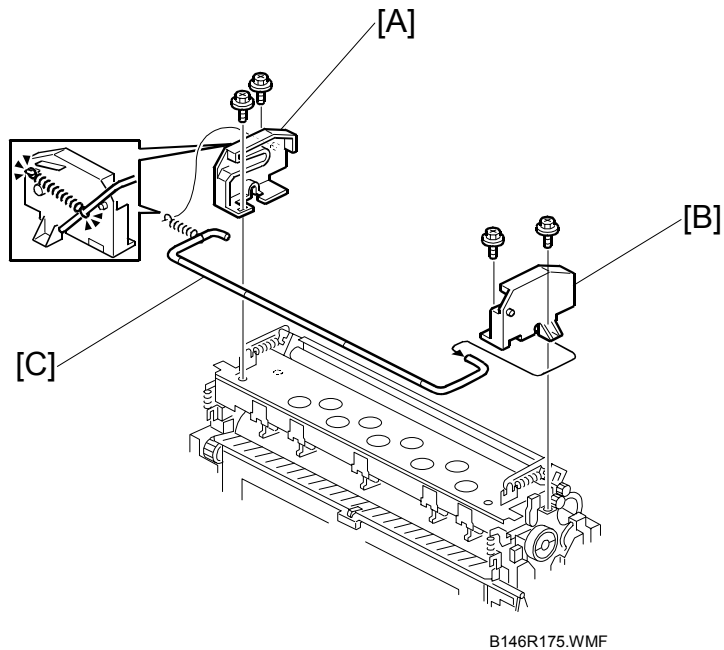
1. Upper cover (☛ 3.12.2)

2. 2 handle guides [A][B] (🖉 x 2 for each)

3. Handle [C] (Spring x 1)

B146R176.WMF
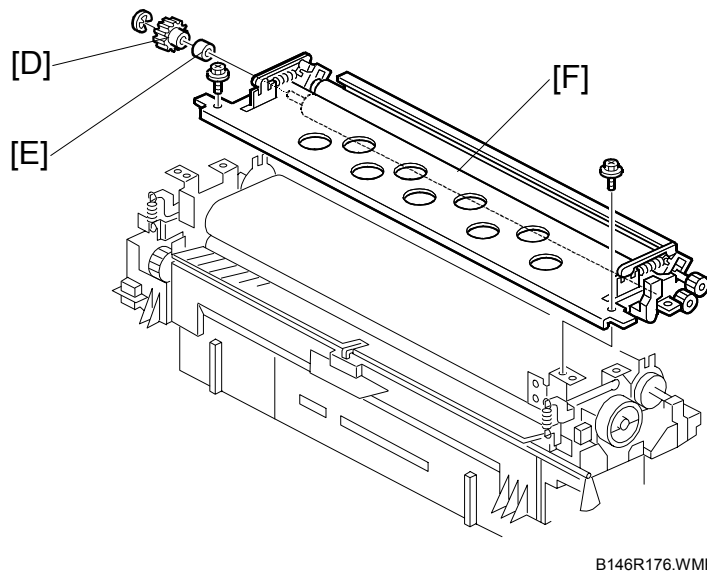
4. Gear [D] and collar [E] (Retaining ring x 1)

5. Cleaning unit [F] (🖉 x 2)

NOTE: When reattaching, make sure that you set the cleaning unit [F] in place first and then attach the gear [D] and collar [E].

3.12.4 HEATING ROLLER LAMP
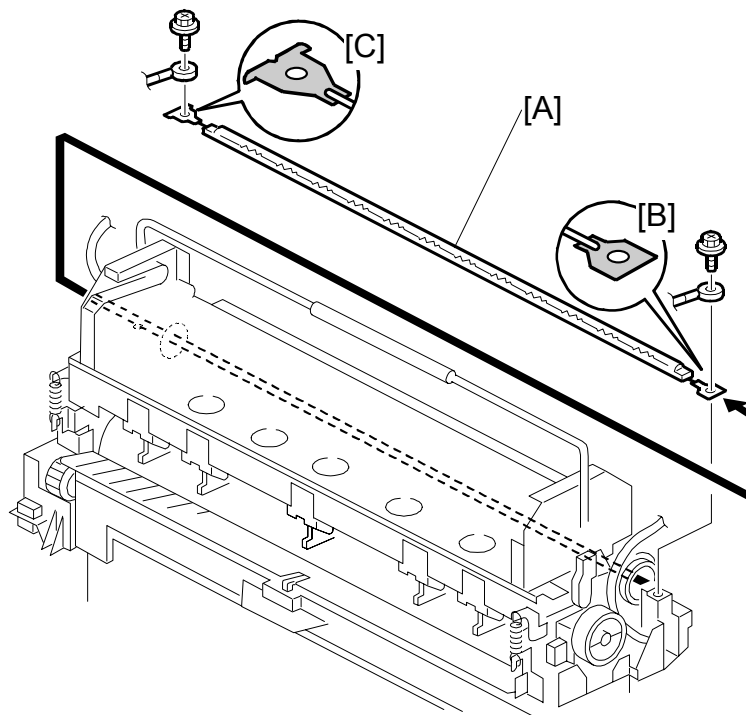
B146R177.WMF

1. Upper cover (☛ 3.12.2)

2. Heating roller lamp [A] (🔩 x 2)

NOTE: When reinstalling, make sure the front [B] and rear [C] ends of the lamp are on the correct terminals.

3.12.5 FUSING BELT UNIT

B146R178.WMF
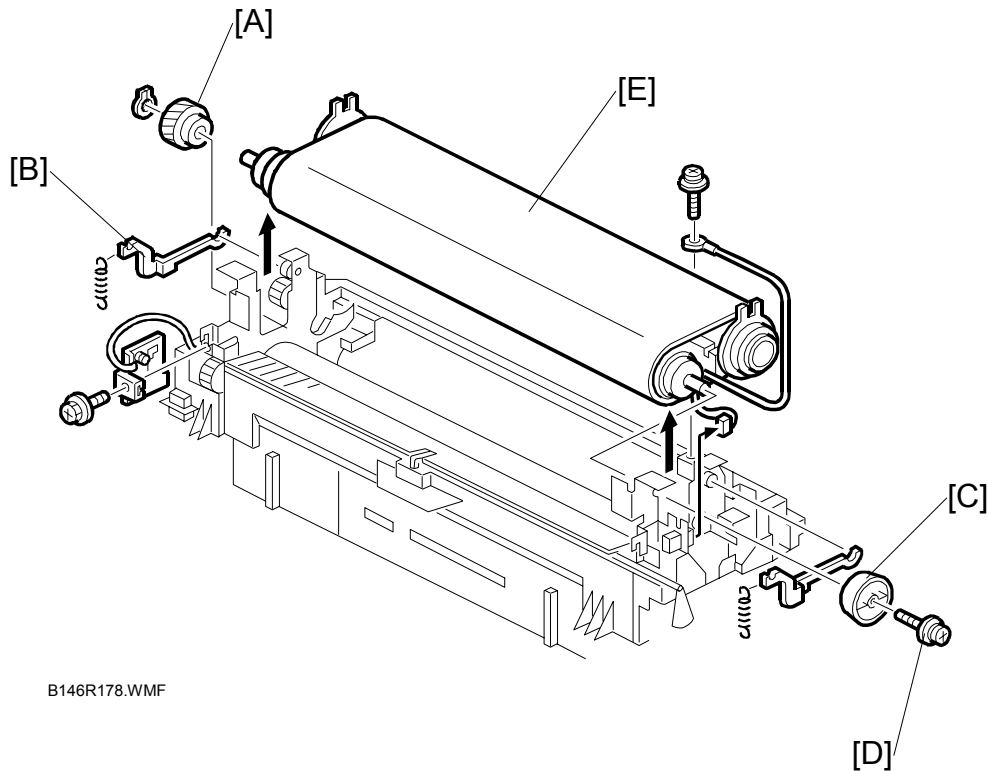
1. Cleaning unit (☛ 3.12.3)

2. Heating roller lamp (☛ 3.12.4)

3. Upper paper guide plate (☛ 3.12.8)

4. Pressure roller gear [A] (C ring x 1)

5. 2 pressure brackets [B][C] (Spring x 1 for each)

6. Knob [D] ($\mathscr{F}$ x 1)

7. Fusing belt unit [E] ($\mathscr{F}$ x 1, ⊑⫘ x 1)

3.12.6 HOT ROLLER
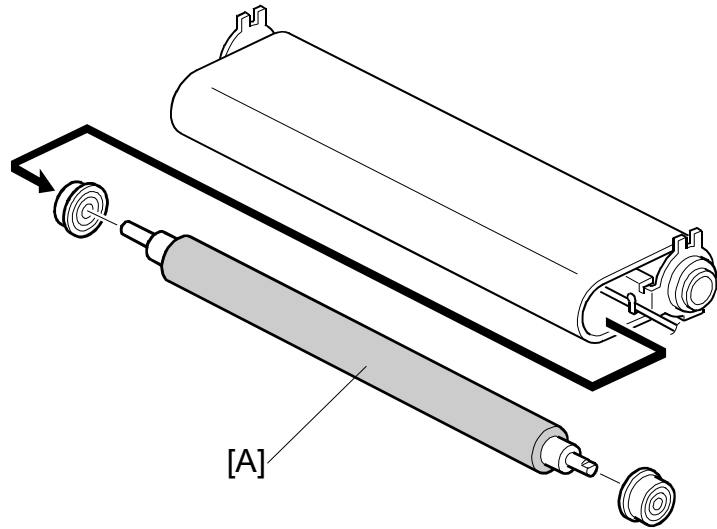
B146R179.WMF

1. Fusing belt unit (☛ 3.12.5)

2. Hot roller [A] (Bushing x 2)

3.12.7 HEATING ROLLER
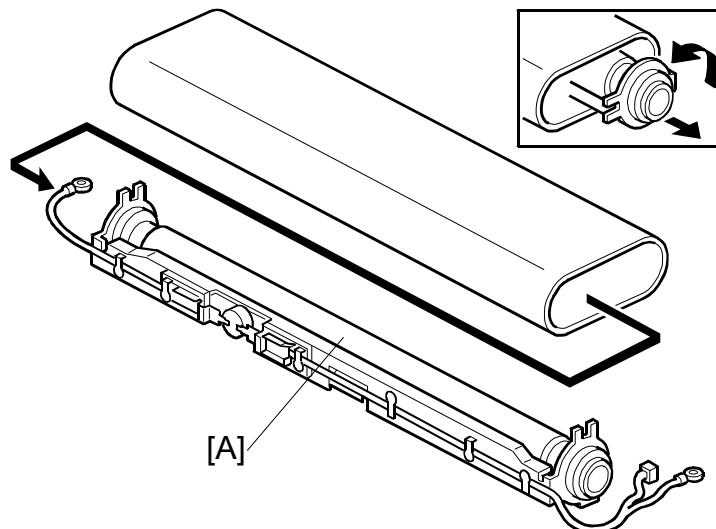
B146R180.WMF

1. Pressure roller (☛ 3.12.6)

2. Heating roller [A]

Replacement Adjustment

3.12.8 PAPER GUIDE PLATES AND STRIPPER PAWLS

B146R181.WMF
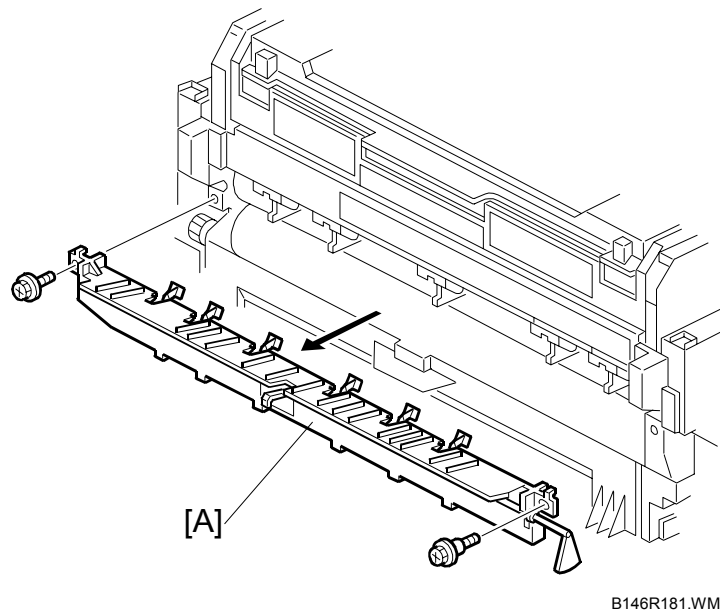
1. Upper cover (☛ 3.12.2)
2. Lower paper guide plate [A] (🔩 x 2)

B146R182.WMF
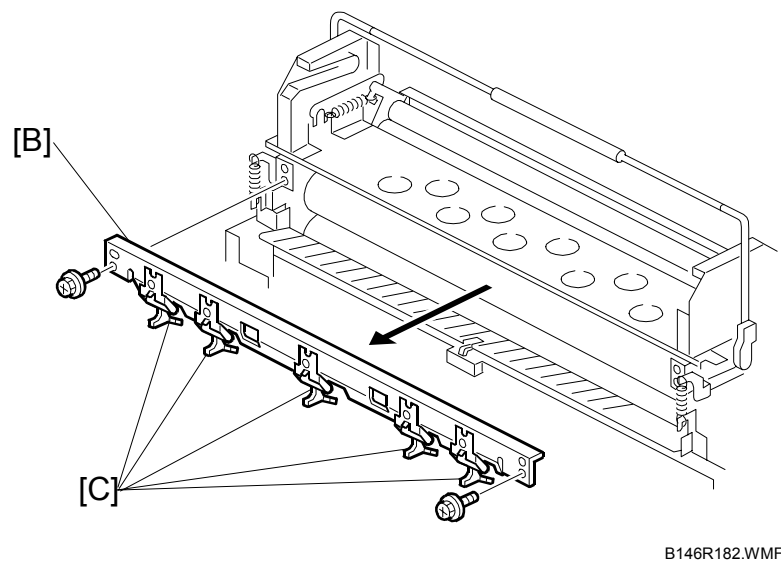
3. Upper paper guide plate [B] (🔩 x 2)
4. 5 stripper pawls [C]

3.12.9 THERMISTOR AND FUSE
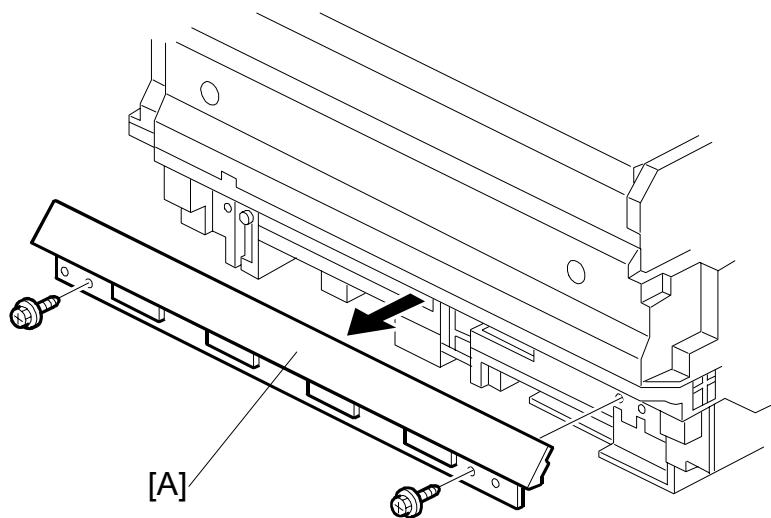
B146R183.WMF

1. Lower right cover [A] ($\mathscr{F}$ x 2)
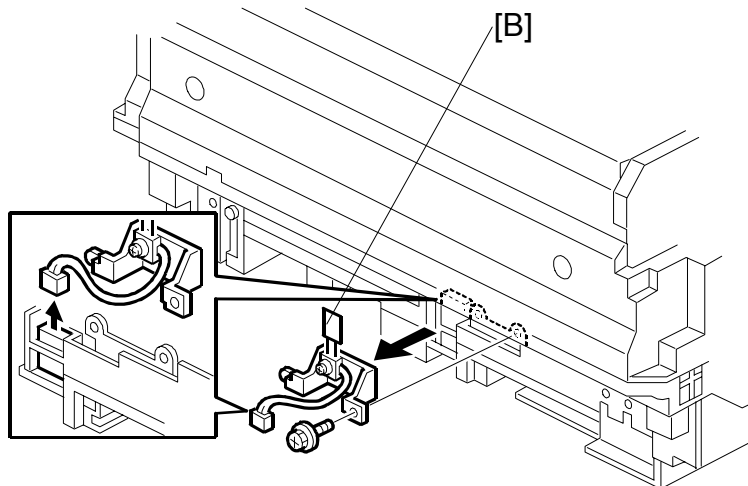
B146R184.WMF

2. Thermistor [B] ($\mathscr{F}$ x 1, ⬚ x 1)

B146R185.WMF
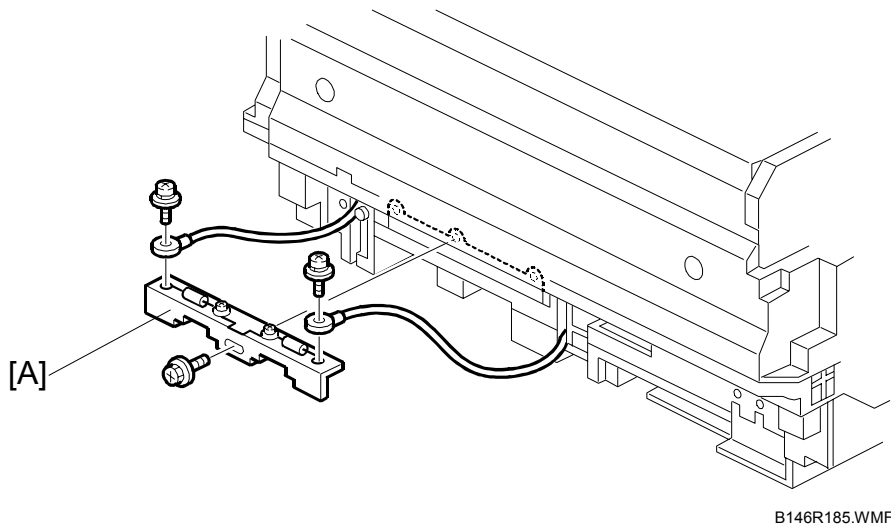
3. Fuse [A] (🔩 x 3)

3.12.10 PRESSURE ROLLER FUSING LAMP

B146R186.WMF
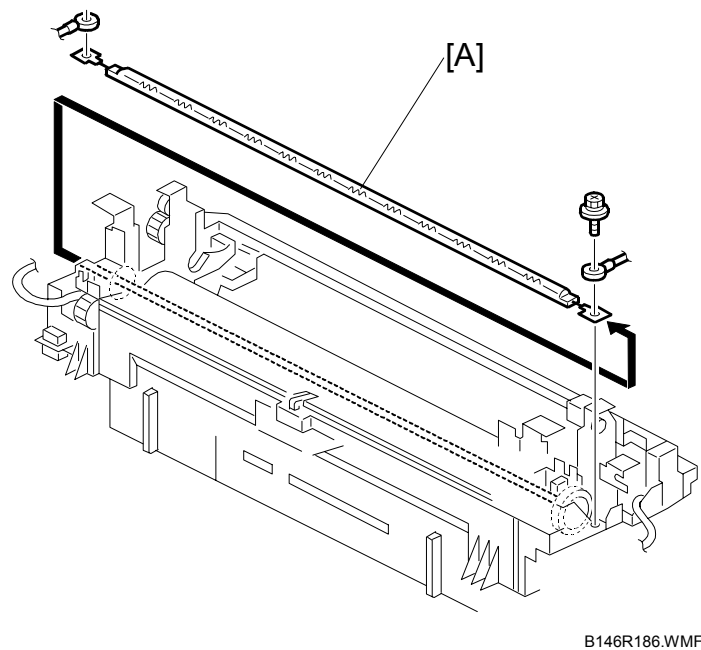
1. Fusing belt unit (☛ 3.12.5)

2. Pressure roller fusing lamp [A] (🔩 x 2)

3.12.11 PRESSURE ROLLER
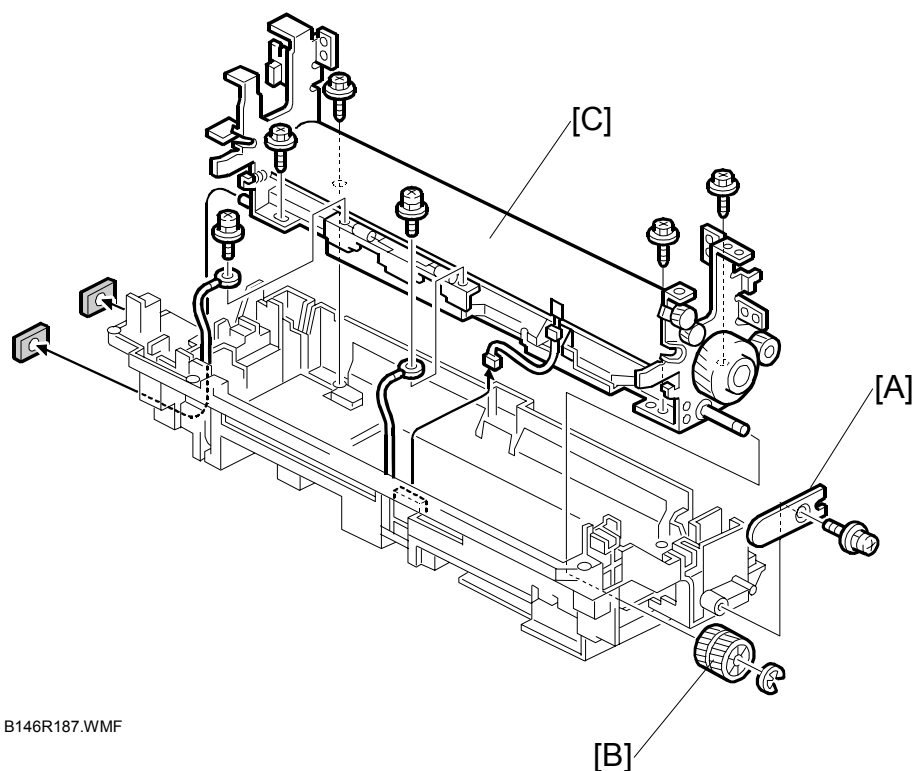
B146R187.WMF

1. Pressure roller fusing lamp (☛ 3.12.10)
2. Lower paper guide plate (☛ 3.12.8)
3. Drive gear holder [A] (𝄢 x 1)
4. Drive gear [B] (𝄢 x 1)
5. Lower right cover (☛ 3.12.9)
6. Pressure roller unit [C] (𝄢 x 5, ⬗ x 2)
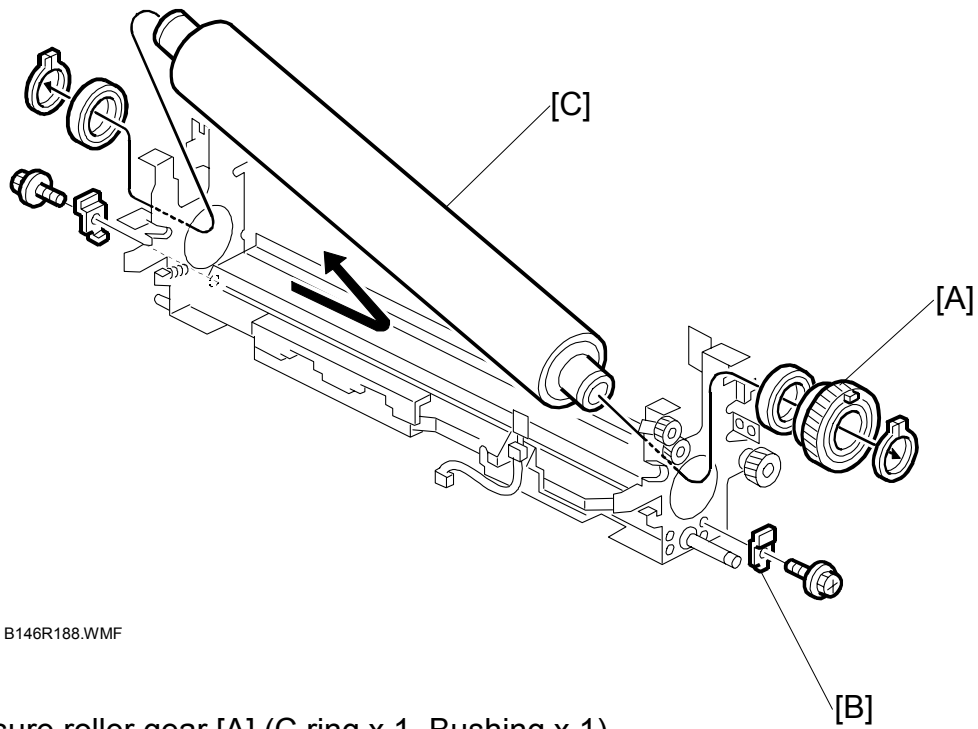
B146R188.WMF

7. Pressure roller gear [A] (C ring x 1, Bushing x 1)

8. Pressure roller holder [B] (✎ x 1)

9. Pressure roller [C] (C ring x 1)

3.12.12 FUSING UNIT FAN

⚠️**CAUTION**

When reinstalling, make sure that the fan faces to the correct direction. The arrow on the fan [D] and the arrow on the duct [D] must face to the same direction.

1. Rear cover (☛ 3.5.1)

2. Left cover, rear left cover (☛ 3.5.2)

3. Connector cover (on the top of the controller box) (☛3.13.1)

4. Fusing fan duct [A] (🔩 x 2, 📎 x 1)
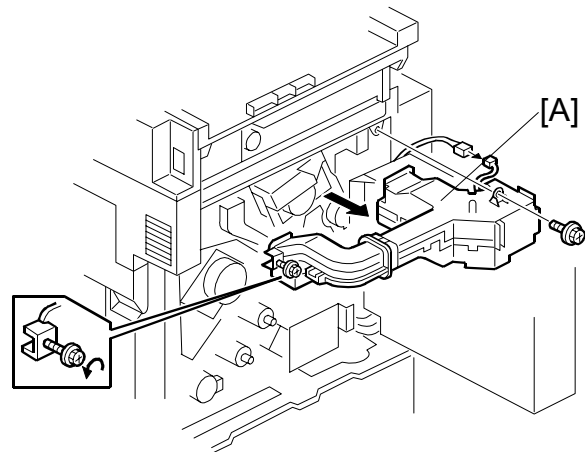
B146R116.WMF

5. Release the hooks and remove the upper cover [B].

6. Fusing fan [C]
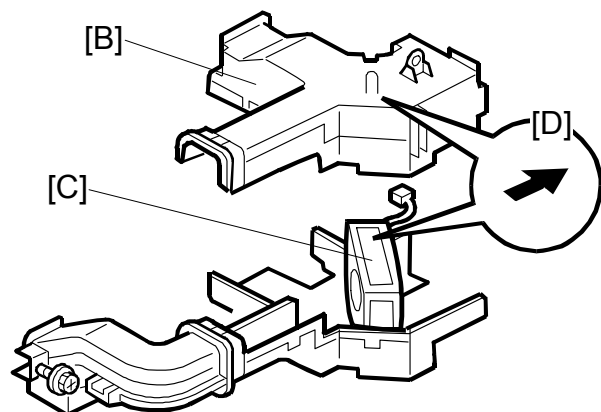
B146R939.WMF

3.12.13 WASTE OIL BOTTLE

1. Open the front cover [A].

2. Release the hook [B].

3. Waste oil bottle [C]

4. Close the bottle with the lid [D].

5. Dispose of the bottle (with waste oil in it) in accordance with your local regulations.
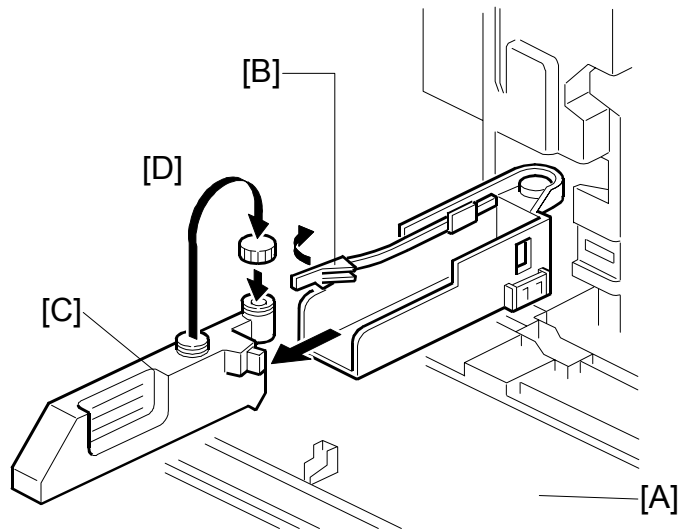
B146R189.WMF

NOTE: 1) The message, "Waste Oil Bottle is Almost Full," is cleared when the front cover is closed. You do not need to turn the main switch off and on.

2) The message, "Waste Oil Bottle Setting Error," indicates that the bottle is not in position. Check that the bottle is correctly reinstalled if this message is displayed.

3.12.14 PAPER EXIT

1. Lift the scanner unit (☞ 3.7.2).

2. Paper exit cover [A] (🔧 x 2)

3. Exit upper limit sensor [B]

4. Paper exit sensor [C]
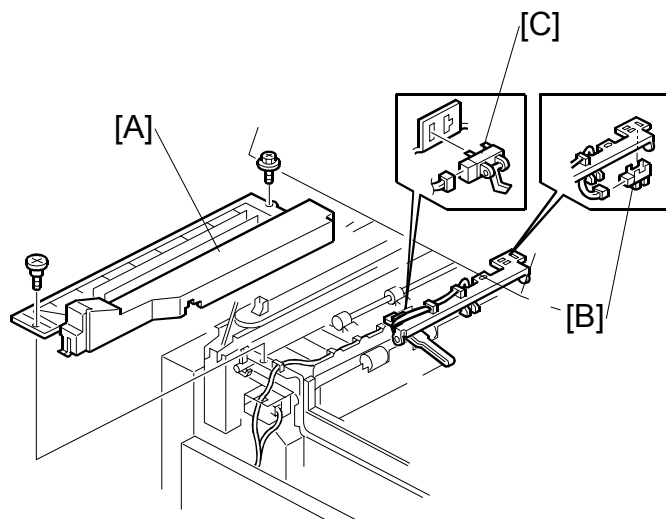
B146R938.WMF

3.13 ELECTRICAL COMPONENTS

3.13.1 MOVING THE CONTROLLER BOX OUT OF THE WAY

1. Rear cover (☛ 3.5.1)

2. Connector cover [A] (𝒫 x 3)

3. Four flat cables [B]

4. Connector [C]

5. Ground cable [D] (𝒫 x 1)

B146R959.WMF
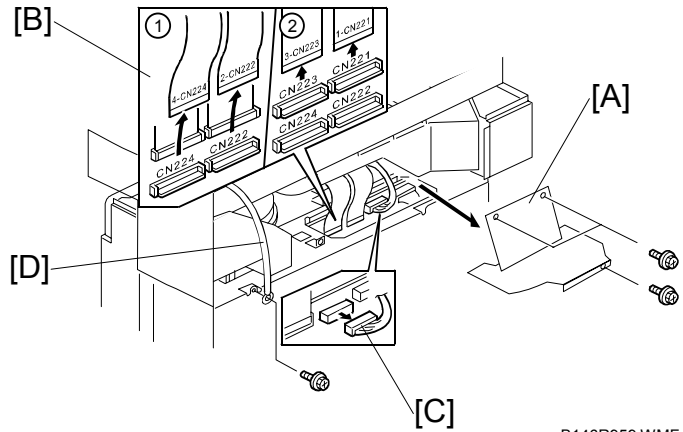
6. Duct [E] (🗐 x 1, 𝒫 x 2)

7. Ground cable [F] (𝒫 x 1)

8. Two connectors [F]

9. Swing out the controller box [G] (𝒫 x 5).

B146R960.WMF
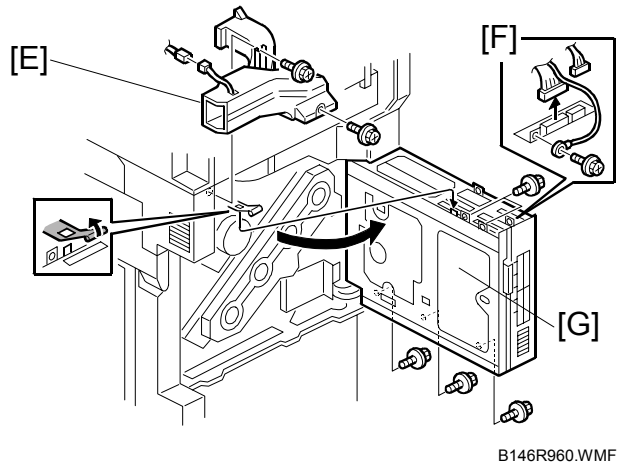
3.13.2 MOVING THE HIGH VOLTAGE SUPPLY UNIT - C, B OUT OF THE WAY

1. Rear cover (☞ 3.5.1)

2. Swing out the high voltage supply unit [A] (🔩 x 2).
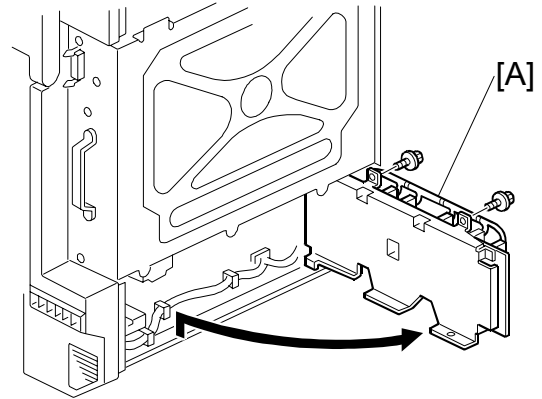
B146R190.WMF

3.13.3 CONTROLLER, IPU, AND BCU

NOTE: 1) Before replacing the BCU or controller, print out the SMC reports ("SP Mode Data" and "Logging Data").
2) After replacing the BCU or controller, remove the NVRAM on the old board and install it on the new board.
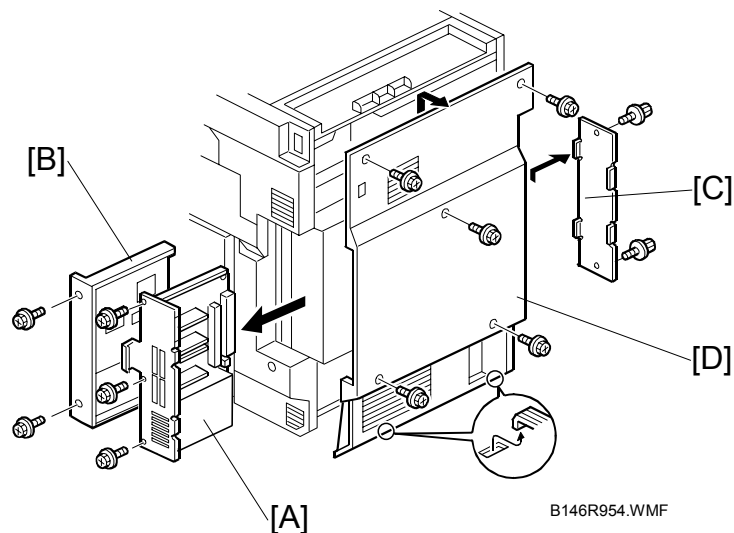
B146R954.WMF

1. Controller [A] (🔩 x 3)

2. IPU [B] (🗐 x 2, 🔩 x 2)

3. Option bracket [C] (🔩 x 2)

4. Rear cover [D] (☞ 3.5.1)

5. Connector cover (☛ 3.13.1)

6. Cover bracket [A] (𝄢 x 4)

7. Inner bracket [B] (𝄢 x 2)

B146R942.WMF
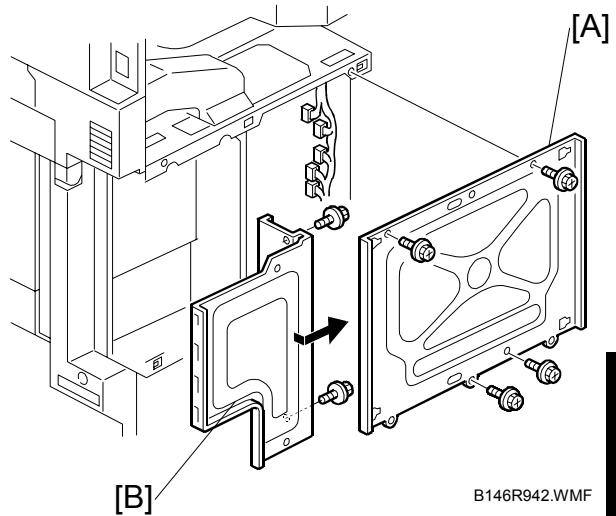
8. BCU [C] (Flat cables x 4,
   All ▤'s, 𝄢 x 8)

B146R943.WMF

[E]   [D]
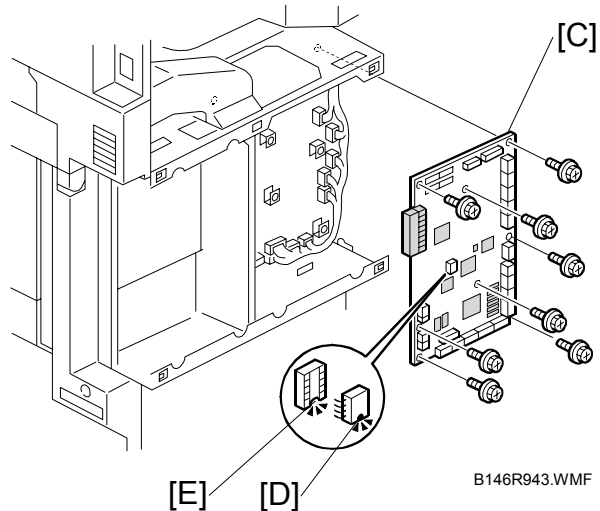
CAUTION: 1) When handling NVRAMs, keep them away from any objects that can cause static electricity. The data in NVRAMs may be corrupted by static electricity.

2) Make sure the NVRAM is correctly installed on the board. A half-disk [D] is engraved on one side of the NVRAM, while a guide mark [E] is on one side of the NVRAM slot. Install the NVRAM so that the half-disk and the guide mark are on the same side.

3) When replacing the BCU, make sure that the DIP-switch settings on the old board and on the new board are the same (☛ 5.10).

NOTE: 1) Before replacing the NVRAM, make sure the SMC reports ("SP Mode Data" and "Logging Data") has been printed out.

2) After replacing the BCU or controller, remove the NVRAM on the old board and install it on the new board. If the NVRAM on the old board is defective, replace the NVRAM (☛ 3.13.5).

3.13.4 HDD

You cannot separate the hard-disk drive into two different hard-disk drives. If you should separated it into two and replace one of them, the controller does not recognizes the hard-disk drive.

1. Controller (☛ 3.13.3)

2. HDD [A] (🔩 x 4, Shoulder-screw x 3)

[A]

B146R191.WMF
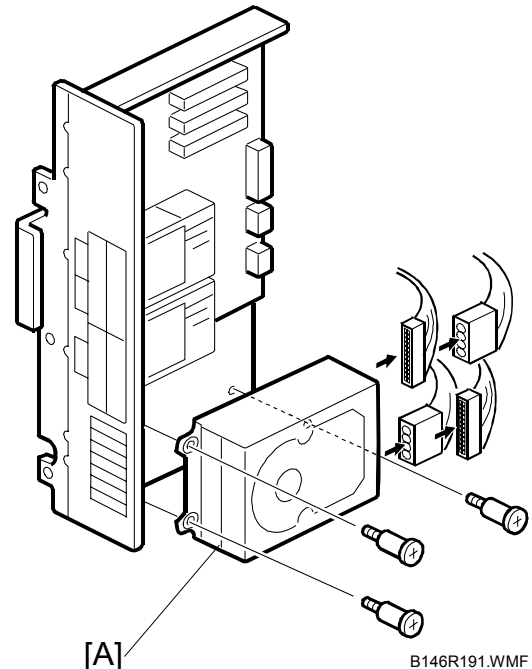
3.13.5 NVRAM REPLACEMENT PROCEDURE

NVRAM on BCU

1. Make sure that you have the SMC report (factory settings) that comes with the copier.

2. Output the SMC data (☛ SP5-990-001) if possible.

3. Copy the NVRAM data to an SD card (☛ SP5-824) if possible.

4. Turn off the main switch and unplug the power cord.

5. Replace the NVRAM on the BCU and reassemble the machine.

6. Select a paper-size type (☛ SP5-131-001).

7. Specify the device number and destination code of the machine.

>   **NOTE:** 1) Contact your supervisor for details on how to enter the device number and destination code.
>   2) SC 999 or "Fusing Unit Setting Error" may be displayed until the device number and destination code is properly programmed.

8. Turn the main switch off and on.

9. Copy the data from the SD card to the NVRAM (☛ SP5-825-001) if you have successfully copied them to the SD card.

10. Reset the settings for meter charge (☛ SP5-930-002).

11. Specify the SP and UP mode settings.

12. Execute the process control self-check.

13. Perform ACC for the copier application program.

14. Perform ACC for the printer application program.

NVRAM on Controller

1. Make sure that you have the SMC report (factory settings) that comes with the copier.

2. Output the SMC data (☛ SP5-990-001) if possible.

3. Copy the NVRAM data to an SD card (☛ SP5-824) if possible.

4. Enter SP mode and print out the SMC reports (☛ SP5-990-001) if possible.

5. Turn off the main switch and unplug the power cord.

6. Replace the NVRAM on the controller and reassemble the machine.

7. Turn the main switch on.

8. Copy the data from the SD card to the NVRAM (☛ SP5-825-001) if you have successfully copied them to the SD card.

9. Specify the SP and UP mode settings.

10. Perform ACC for the copier application program.

11. Perform ACC for the printer application program.

3.13.6 REMOVING THE HIGH VOLTAGE SUPPLY BOARD - C, B

B146R121.WMF
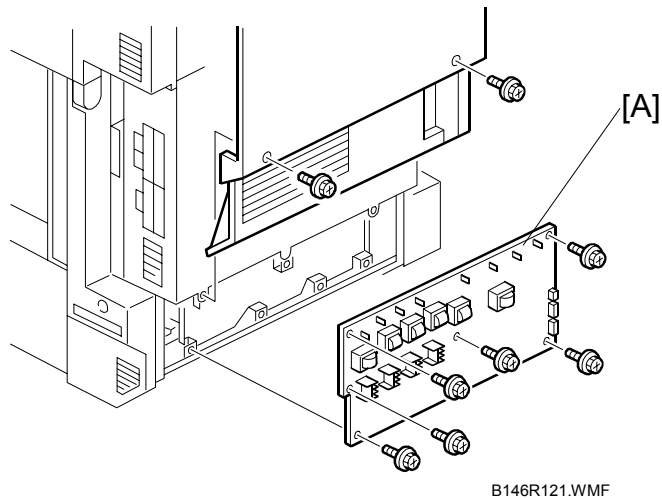
1. Rear cover (☛ 3.5.1)

2. High voltage supply board [A] (All ⬚'s, 🔩 x 6)

3.13.7 SUB POWER SUPPLY UNIT

B146R122.WMF
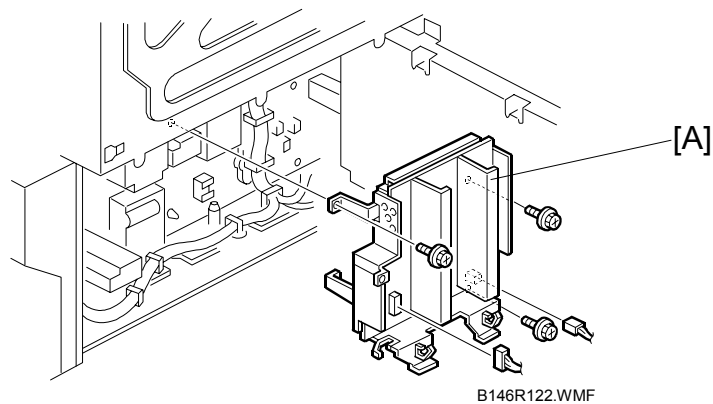
1. Rear cover (☛ 3.5.1)

2. Swing out the high voltage supply unit (☛ 3.13.2)

3. Sub power supply unit [A] (⬚ x 2, 🔩 x 3)

3.13.8 PSU
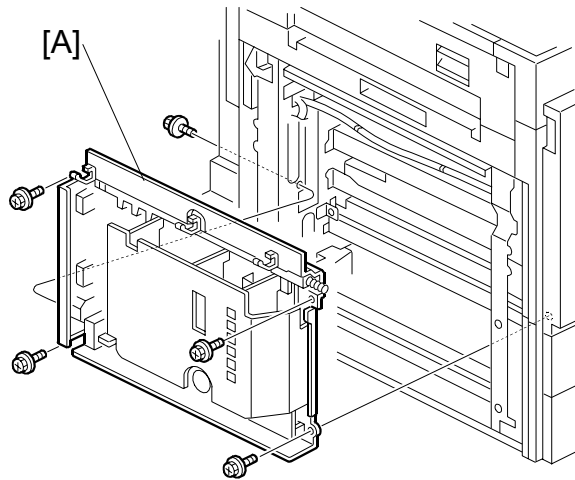
B146R192.WMF

1. Left cover (☛ 3.5.2)

2. PSU [A] (All 🗐's, 🔩 x 5)

   NOTE: Check that the interlock switches on the PSU work normally after reinstalling the PSU (open/close the left and front doors).

3.13.9 DRIVER BOARD
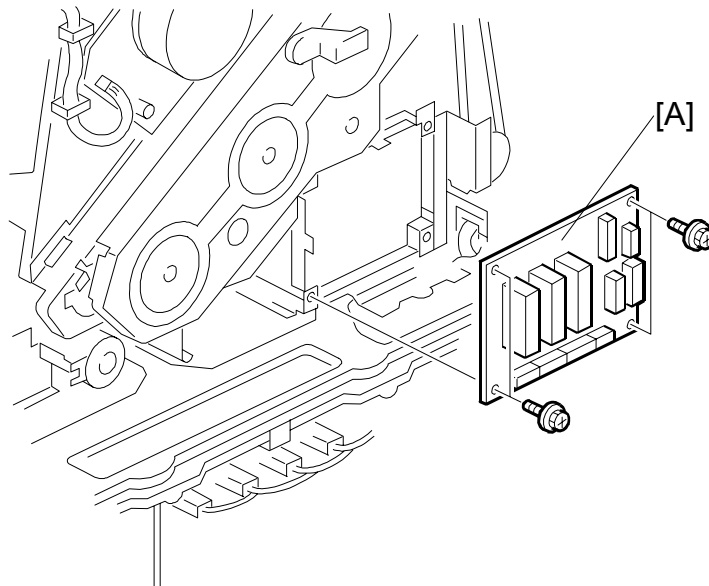
B146R193.WMF

1. Rear cover (☛ 3.5.1)

2. Swing out the controller box (☛ 3.13.1).

3. Driver board [A] (All 🗐's, 🔩 x 4)

3.14 DRIVE UNIT

3.14.1 REGISTRATION CLUTCH
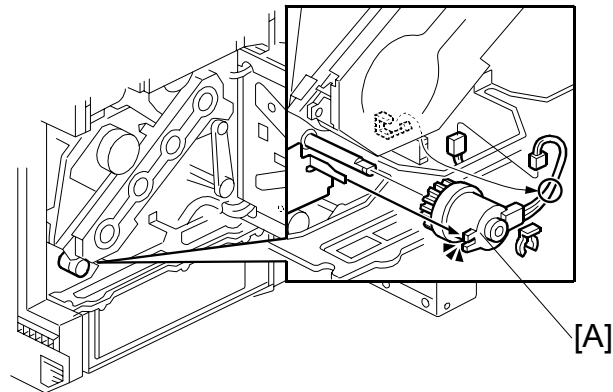
B146R944.WMF

7. Rear cover (☛ 3.5.1)

8. Swing out the controller box (☛ 3.13.1).

9. Registration clutch [A] (⊘ x 1, ▣ x 1)

3.14.2 DEVELOPMENT CLUTCHES

1. Drum gears (☛ 3.14.3).

2. Development clutch assembly [A]
    (▣ x 1, ⌀ x 1)

3. Clutch holder [B]

4. Clutch shaft [C] (1 bushing, ⊘ x 1)
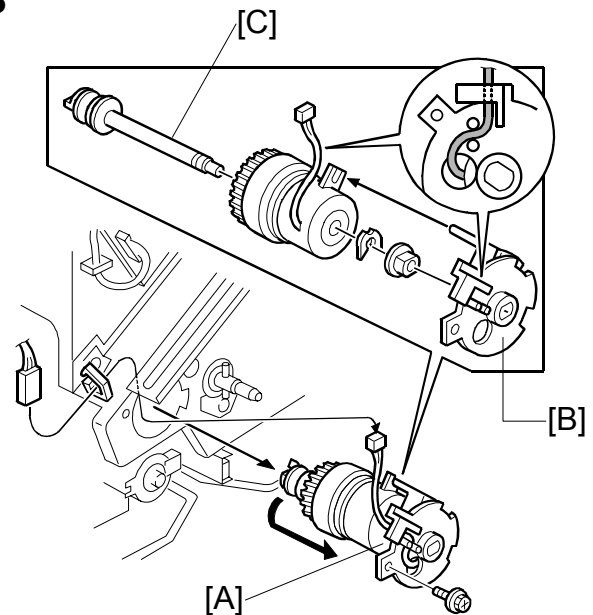
B146R945.WMF

3.14.3 DEVELOPMENT MOTOR - CMY
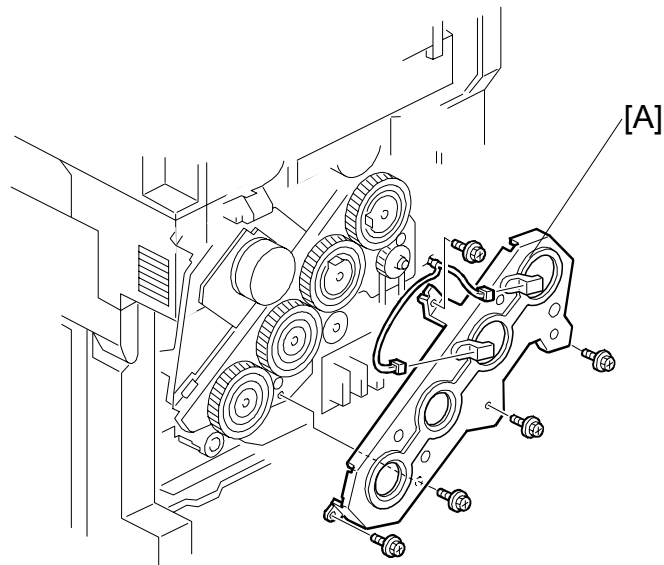
B146R946.WMF

1. Rear cover (☛ 3.5.1)

2. Swing out the controller box (☛ 3.13.1).

3. Drum gear cover [A] (🔌 x 2, 🔩 x 5)
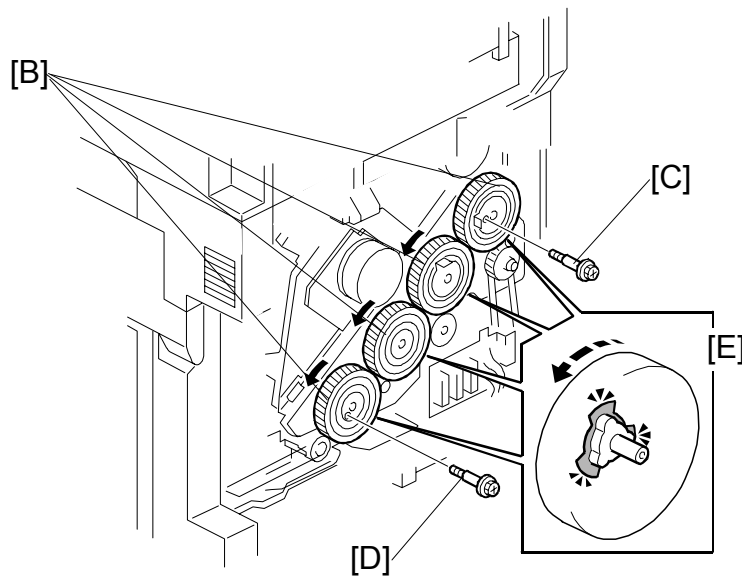
B146R947.WMF

4. Turn the drum gears [B] counterclockwise, so the shoulder screws [C][D] are in the three, seven, or eleven o'clock position.

NOTE: By doing that, you can align the three corners of each drum-gear shaft to the three openings on the development-clutch securing plate [E].

Replacement
Adjustment
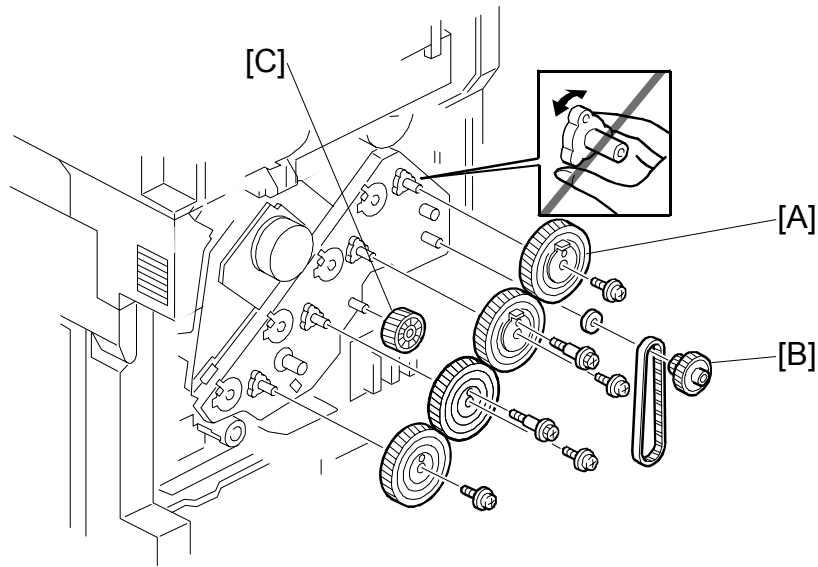
B146R948.WMF

5. 4 drum gears [A] (🔩 x 2 for each)

   NOTE: 3) Do not move the drum-gear shafts after removing the drum gears.
   4) The print quality may be affected if any of the teeth on the drum gears are damaged. Make sure they are intact.

6. Timing belt gear [B] (Timing belt x 1, Bushing x 1)

7. Idle gear [C]
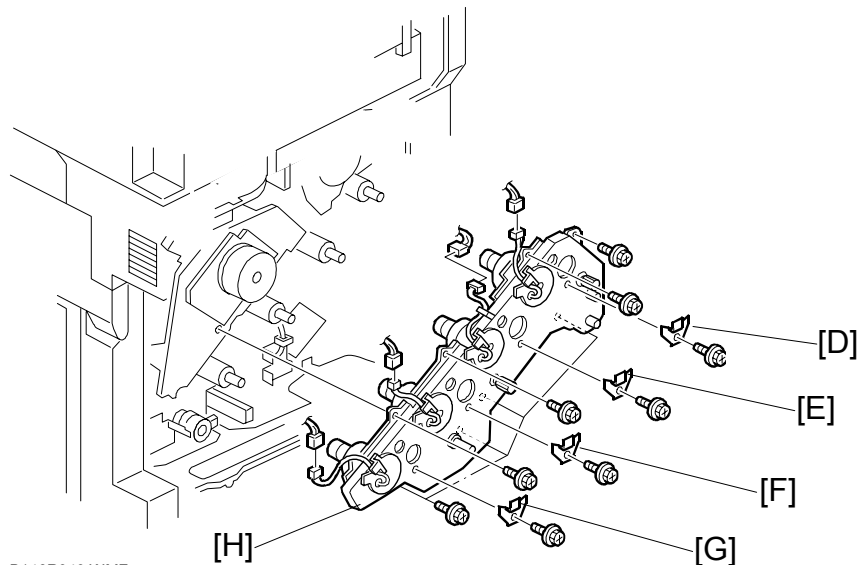
B146R949.WMF

8. 4 gear drive holders [D]~[G] (🔩 x 1 for each)

9. Development clutch securing plate [H] (🔩 x 8, 🔌 x 6)

   NOTE: Two of the six connectors are on the rear side.
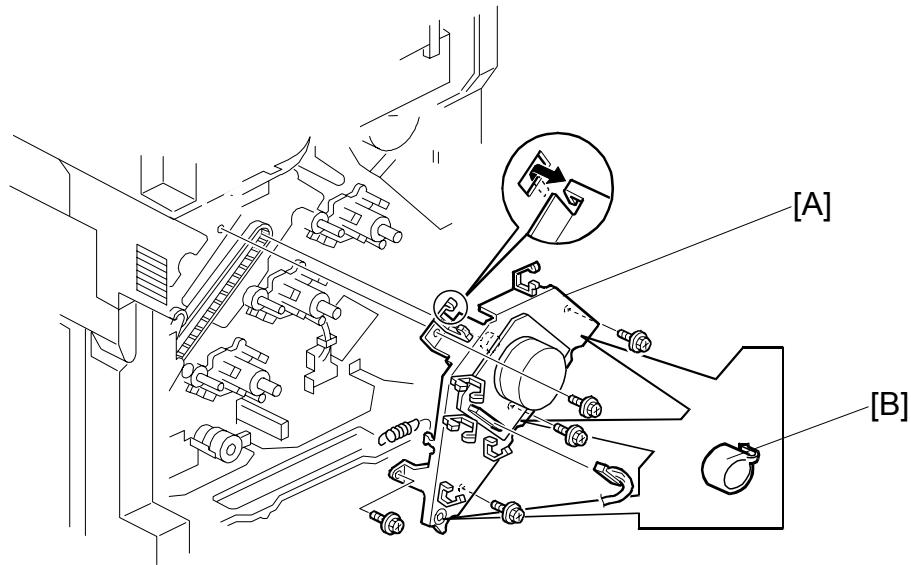
B146R950.WMF

10. Development drive motor - CMY [A] (🔩 x 5, 🔌 x 1, Spring x 1)

> **NOTE:** When reassembling, remove the three bushings [B] and install the development drive motor first. After this, install the bushings.

3.14.4 DRUM DRIVE MOTOR - CMY AND DRUM DRIVE MOTOR - K

1. Development clutch securing plate (☛ 3.14.3)

2. Drum drive motor - CMY [A] (🔩 x 2)

3. Drum drive motor - K [B] (🔩 x 2)

B146R194.WMF

3-79
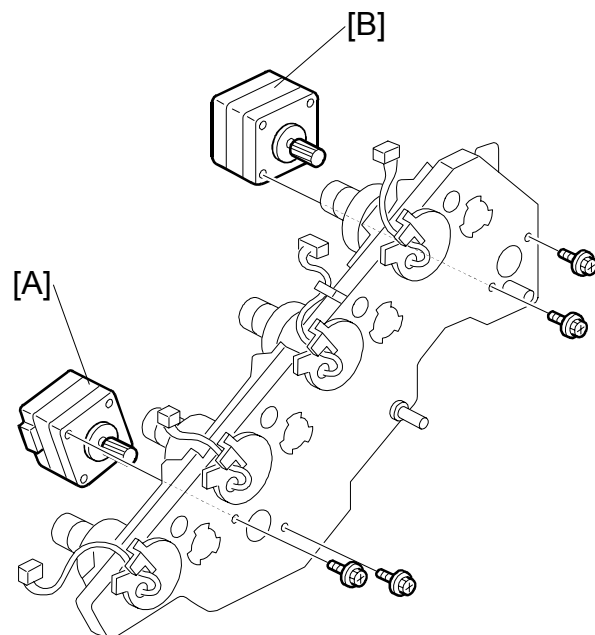
3.14.5 DEVELOPMENT DRIVE MOTOR - K

1. Fusing fan duct (☛ 3.12.12)

2. Development clutch securing plate
   (☛ 3.14.3)

3. Solenoid cover [A] (𝄐 x 2)

[A]
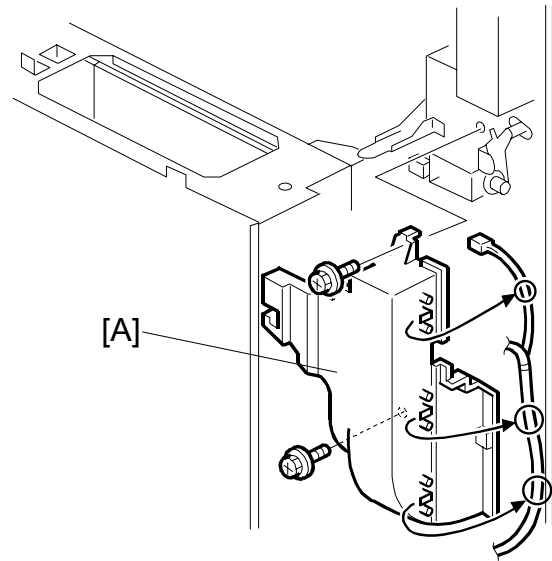
B146R951.WMF

B146R952.WMF   [D]   [B]

[C]
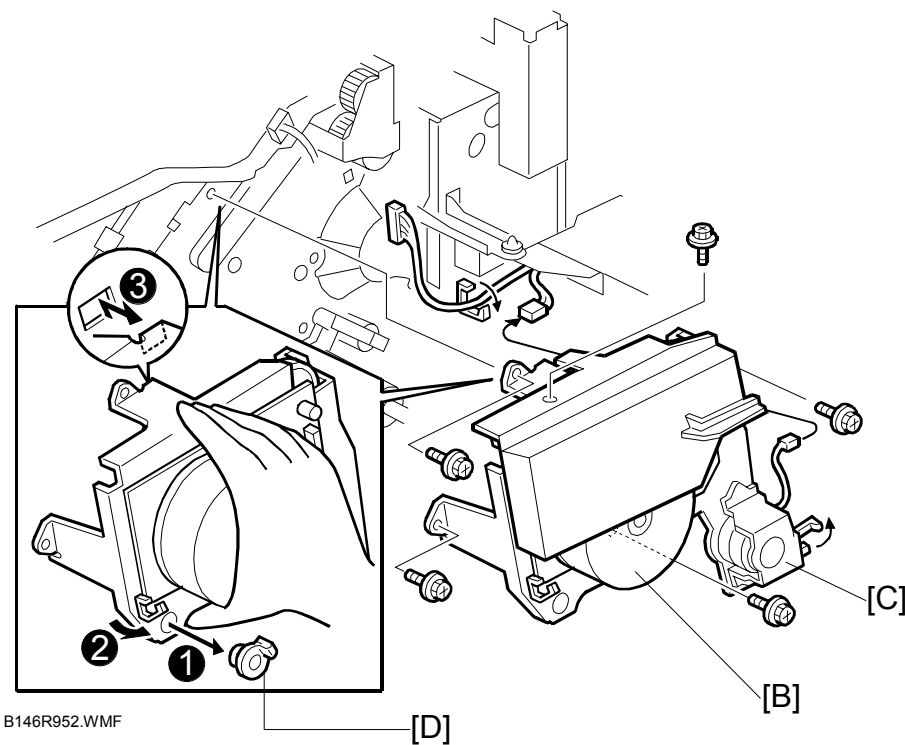
4. Development clutch securing plate (☛ 3.14.3)

5. Development drive motor – K [B] (with the fusing clutch [C]) (𝄐 x 4, ⬗ x 2)

   NOTE: When reassembling, remove the bushing [D] and install the
   development drive motor–K (with the fusing clutch) first. After this,
   install the bushing.

3.15 TONER SUPPLY UNIT

NOTE: 1) Do not touch the PCU drum. Do not let any metal object touch the development sleeve.

2) Having removed the PCUs, cover them with paper or cloth. Keep them in a dark place.

M Toner Supply Unit

B146R953.WMF
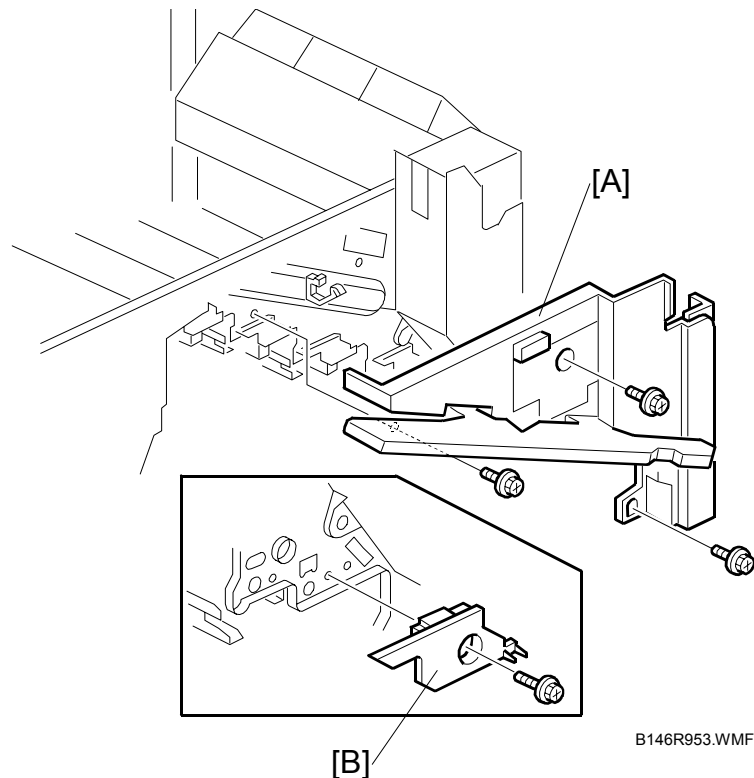
1. Laser optics housing unit (☛ 3.7.2)

2. All development units and PCUs (☛ 3.8)

3. Transfer unit (☛ 3.10.1)

4. Development clutch securing plate (☛ 3.14.3)

5. Right inner cover with the drum positioning plate [A] (🗲 x 3)

6. M development unit plate [B] (🗲 x 1)

B146R195.WMF
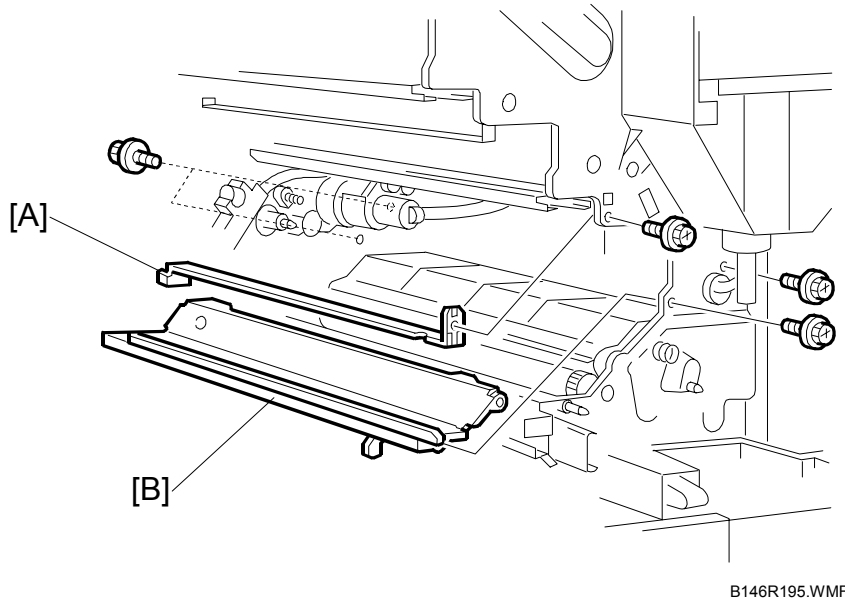
7. Development unit left guide [A] (🔩 x 1)

8. Open the right door.

9. Registration upper stay [B] (🔩 x 4)

B146R196.WMF
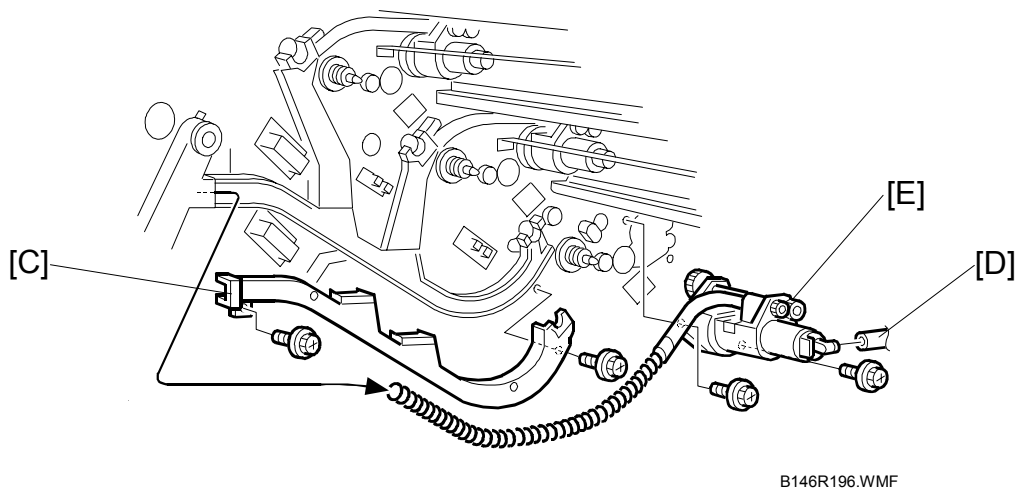
CAUTION: 1) When you remove the toner path cover and a toner supply pipe, the toner spills out. Before removing them, place some paper or cloth beneath the toner supply unit and waste toner collection path.
2) After removing a pipe, close it with a paper clip or tape.

10. Toner path cover [C] (🔩 x 2)

11. Toner supply pipe [D]

12. Toner supply unit [E] (🔩 x 2, 🔌 x 1)

Reinstalling the M Toner Supply Unit
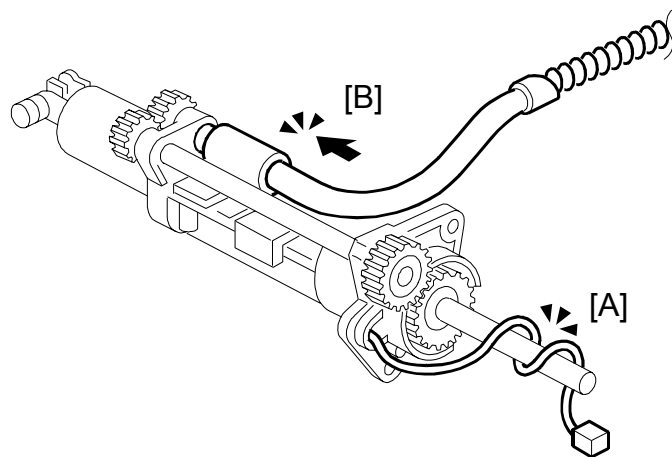
B146R197.WMF

1. Wind the harness [A] on the shaft.

2. Insert the toner collection pipe [B].

NOTE: Check that the pipe does not come off the unit.
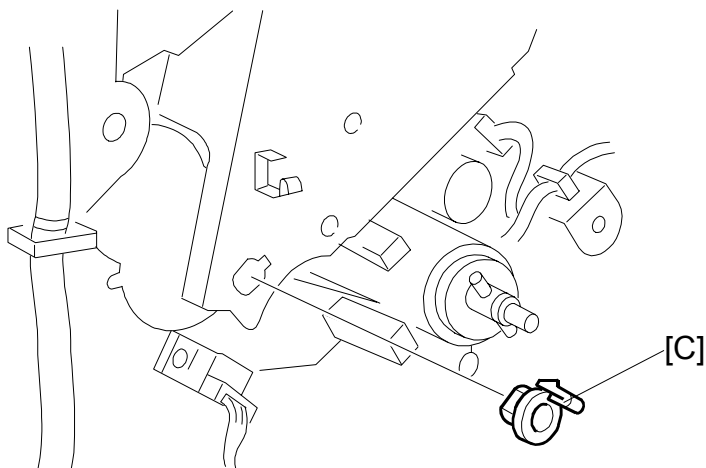
B146R198.WMF

3. Remove the toner supply unit bushing [C].

B146R199.WMF
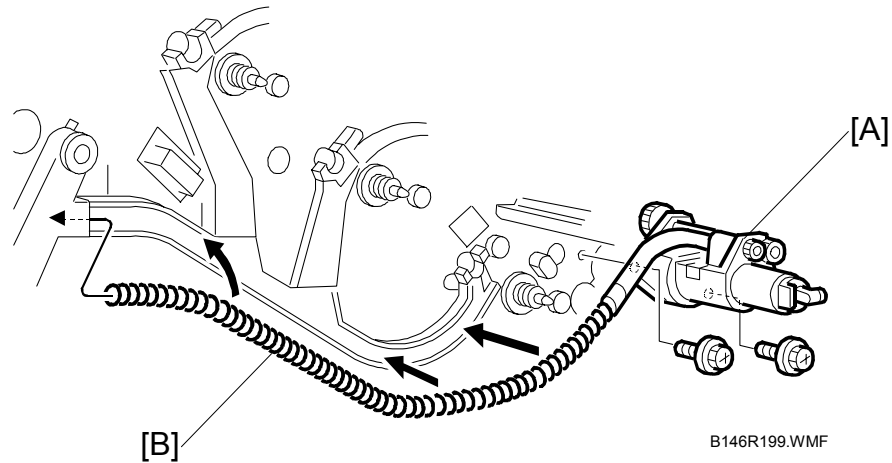
4. Install the unit [A] and secure it with the screws.

5. Unwind the harness and connect it.

6. Install the bushing.

7. Connect the toner supply pipe and the waste toner collection pipe [B].

8. Check that the pipes [C] do not come off the unit.

9. Attach the toner path cover and secure it with screws.

10. Reassemble the machine.

B146R200.WMF
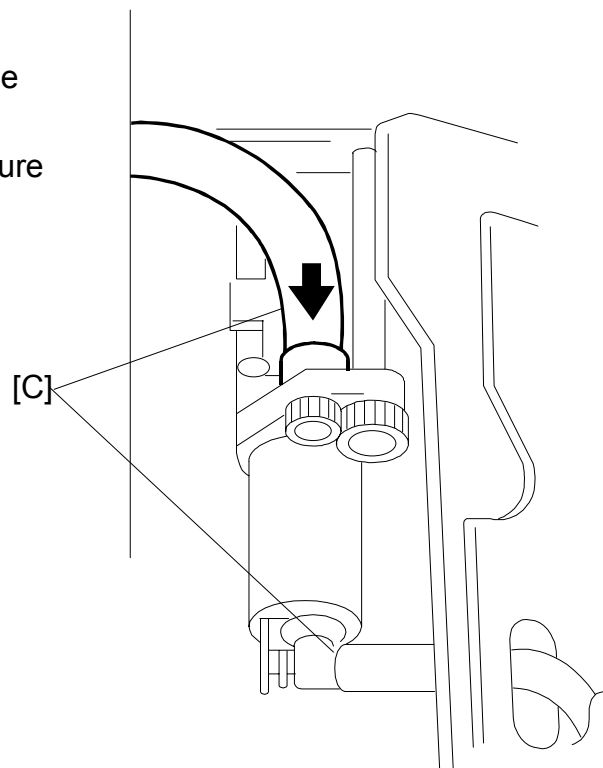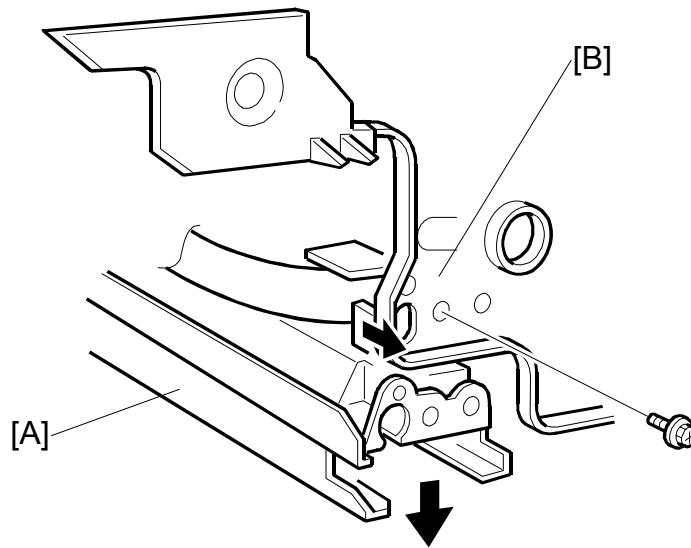
C and Y Toner Supply Units

B146R201.WMF

1. Development drive motor - CMY (☛ 3.14.3)

2. Development unit plates (☛ M Toner Supply Unit)

    NOTE: To replace the C toner supply unit, remove the C and M development unit plates. To replace the Y toner supply unit, remove the Y and C development plates.

3. Development unit left guide (☛ M Toner Supply Unit)

4. PCU 3C guide rail [A] (🔩 x 2)

    NOTE: 1) To replace the C toner supply unit, remove the M PCU guide. To replace the Y toner supply unit, remove the C PCU guide.
    2) Pull the front plate [B] slightly.
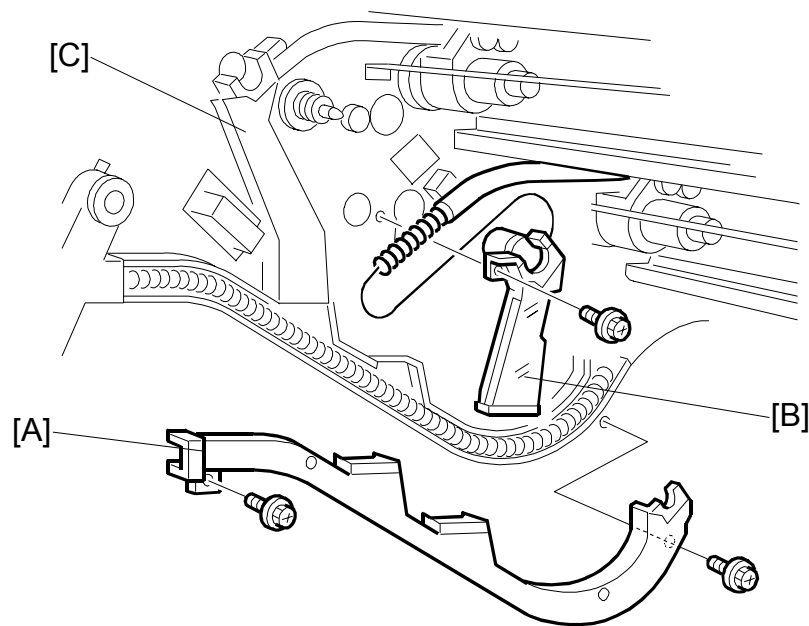
B146R202.WMF

5. Toner path cover [A] ($\mathscr{F}$ x 2)

6. Branch toner path covers [B][C] ($\mathscr{F}$ x 1)

>   **NOTE:** To replace the C toner supply unit, remove the cover on the right-hand
>   side [B]. To replace the Y toner supply unit, remove the cover on the
>   left-hand side [C].

7. Toner supply pipe and toner supply unit (☛ M Toner Supply Unit)

K Toner Supply Unit

1. K and Y development unit plates (☛ M Toner Supply Unit)

2. Development unit left guide (☛ M Toner Supply Unit)

3. PCU 3C guide rail (☛ C and Y Toner Supply Units)
    NOTE: Remove the Y PCU guide.

4. Toner supply unit (☛ M Toner Supply Unit)

4. TROUBLESHOOTING

4.1 PROCESS CONTROL ERROR CONDITIONS

4.1.1 DEVELOPER INITIALIZATION RESULT

SP-3-005-006 (Developer Initialization Result)

No.	Result	Description	Possible Causes	Action
0	Not performed	Developer initialization is not performed.	When initializing only the black developer, the initialization result becomes "1000".	When done in SP mode, do the developer initialization again. If the result is the same, reinstall the engine main firmware. When done at unit replacement: • Check if a new unit is installed • Check if the unit detection system is working • Check if SP2-223-001 (auto initialization at unit replacement) is enabled.
1	Successfully completed	Developer initialization is successfully completed.	-	-
2	Forced termination	Developer initialization was forcibly terminated.	A cover was opened or the main switch was turned off during the initialization.	When done in SP mode, do the developer initialization again. If the result is the same, reinstall the engine main firmware. When done at unit replacement, turn the main switch off and on.
3	Vt error	Vt is less than 0.5V and "Reset development unit" is displayed.	1. Check if the drum stay is properly set and secured. 2. Check if the development unit is properly set. 3. If the problem is still the same, check the following: • Poor connection of connectors • TD sensor defective • Harness damage • BCU board failure • Firmware problem (engine main or MUSIC)	

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No.	Result	Description	Possible Causes	Action
8	Toner supply error	During toner fill-up mode, Vt does not reach the target value.	1. Check if the toner cartridge is properly set. 2. Check if the amount of toner left in the toner cartridge is insufficient. 3. Check if toner is coagulated. (If yes, shake the toner cartridge well.) 4. Check if the connectors of the following parts are properly set, and/or replace the parts. Toner attraction pump / Air Pump / Valves 5. Check if the toner supply tube is bent, caught, or damaged.	
9	Failure	Vt cannot be adjusted within $3.0 \pm 0.1V$. SC370 - 373 will be displayed. Turning the main switch off and on clears this SC code.	1. Shielding tape is not removed.	1. Remove the shielding tape to supply developer to the unit.
			2. Development unit is not firmly installed, causing poor connection of the TD sensor connector.	2. Reinstall the development unit.
			3. TD sensor defective.	3. Replace the development unit.

NOTE: After you set "Enable" in SP5-999-005, 006, 007, or 008, the machine starts developer initialization. If an error other than Error 8 occurs, developer initialization is automatically resumed by opening and closing the front door or turning the main switch off and on.

4.1.2 PROCESS CONTROL SELF-CHECK RESULT

SP3-975-001 (Process Control Self-check Result)

No.	Result	Description	Possible Causes	Action
0	Not performed	Process control self-check is not done.	-	Do the process control self-check again.
1	Successfully completed	Process control self-check successfully completed.	-	-
2	ID sensor adjustment error	Vsg cannot be adjusted within 4.0 ± 0.5V.	1. Dirty ID sensor (toner, dust, or foreign material)	1. Clean the ID sensor.
			2. Dirty transfer belt	2. Check the belt cleaning, and clean or replace the transfer belt.
			3. Scratched or damaged transfer belt	3. Replace the transfer belt.
			4. Defective ID sensor	4. Replace the ID sensor.
3	Vmin error	Vmin is not within the specified range.	Vmin is calculated during the self-check. Even when the calculated Vmin value is out of the specified range, an optimum value is automatically used instead. Therefore, this error code does not usually occur. If no problem is observed with image density and/or development gamma, nothing needs to be done. If an image problem such as low image density is observed, check the following points: Transfer belt / Belt guide plate / ID sensor	
4	Sampling data error	Not enough data can be sampled.	1. ID sensor pattern density is too high or low.	1. Check the image development process and correct toner density if necessary.
5	Gamma error	Gamma is out of range. 0.3 > Gamma, or 6.0 < Gamma	2. Residual image on transfer belt	2. Check the transfer belt cleaning unit.
6	Vk error	Vk is out of range. -150 > Vk or 150 < Vk	3. Toner dropped from development unit 4. Scratched or damaged transfer belt	3. Clean the development unit and correct toner density. 4. Replace the transfer belt.
7	Vt error	Vt is out of range. 0.5 > Vt or 4.8 < Vt	1. Development unit not properly installed.	1. Check.
			2. Toner density is too low or high.	2. Check and/or correct toner density.
			3. TD sensor defective.	3. Replace development unit.
8	Sampling data error during LD power correction	Not enough data can be sampled during the LD power correction (if "LD Power" is set in SP3-125-002).	See the possible causes and action for error codes 4, 5, and 6.	
9	Forced termination	Process control self-check was forcibly terminated.	A cover was opened or the main switch was turned off during the self-check.	Do the process control self-check again.

4.1.3 LINE POSITION ADJUSTMENT RESULT

SP5-993-007 (Line Position Adjustment Result)

No.	Result	Description	Note
01	Successfully completed	Data sampling was correctly done and line position adjustment was successfully completed.	
02	Out of adjustment range (over ±2 mm)	The calculated result for line position correction is greater than ±1.4 mm.	
03	Calculation Error	Distance between the lines is greater than ±1.4 mm.	
04	Sampling Error	Data sampling cannot be done properly.	
05	Descending slope error	The ascending or descending slope of the ID sensor signal wave is out of specification.	(See **Note 1**)
06	Ascending slope error		(See **Note 1**)
07	Pattern lines mismatch (less than 64 lines)	The detected number of pattern lines is less than 64.	(See **Note 1**)
08	Sampling time-out	Data sampling cannot be done within the allocated time.	
09	Sampling start error	The start mark cannot be detected within the allocated time.	
10	Pattern length mismatch	The pattern length is shorter or longer than specified.	(See **Note 1**)
11	Pattern lines mismatch (over 64 lines)	The detected number of pattern lines is over 64.	
12	Magnification mismatch	The calculated magnification value does not match any data in the laser power frequency adjustment data table.	
13	Toner condition	The machine is in the toner near-end or toner end condition.	
17	Not executed	The machine is not ready to do the line position adjustment manually from the user menu.	
18	Potential control error	Line position adjustment cannot be done due to failed potential control.	
19	Cyan line error	The necessary mirror angle correction is outside the adjustment range (cyan only).	
29	Magenta line error	The necessary mirror angle correction is outside the adjustment range (magenta only).	
39	Cyan & Magenta line error	The necessary mirror angle correction is outside the adjustment range (cyan and magenta).	
49	Yellow line error	The necessary mirror angle correction is outside the adjustment range (yellow only).	
59	Cyan & yellow line error	The necessary mirror angle correction is outside the adjustment range (cyan and yellow).	
69	Magenta & yellow line error	The necessary mirror angle correction is outside the adjustment range (magenta and yellow).	
79	Cyan, magenta, & yellow line error	The necessary mirror angle correction is outside the adjustment range (cyan, magenta, and yellow).	

Note 1: Concerning the error codes (05, 06, 07 or 10) which stop sampling data when either the front, center, or rear ID sensor detect an error, the machine may display the error code for both ID sensors in some cases.

Possible causes of errors in the line position adjustment

	Possible Cause	Possible Error Code	Action
1	The pattern does not reach the proper density.		
	1. Dirty ID sensor (toner, dust, or foreign material)	04, 05, 06, 07, 08, 09, 10	1. Clean the ID sensors.
	2. Incorrect toner density Low: ID sensor cannot detect the pattern lines. High: Lines may be partially blank due to improper toner density and/or paper transfer current.		2. Correct the toner density.
	3. Incorrect transfer current		3. Correct the transfer current.
2	The ID sensors are affected by electrical noise or dirt/damage on the transfer belt.		
	1. Scratched or damaged OPC drum	02, 03, 04, 05, 06, 10, 11, 12	1. Replace PCU
	2. Scratched or damaged transfer belt		2. Replace transfer belt
	3. Dirty transfer belt		3. Clean or replace transfer belt
	4. High voltage leak in transfer unit		4. Fix the high voltage leak
	5. Residual image on transfer belt		5. Check transfer belt cleaning and clean the belt
	6. Toner dropped from development unit		6. Clean the development unit and adjust the toner density
	7. Carrier dropped from development unit		7. Clean the development unit and adjust the toner density
3	The transfer belt is covered with toner.		
	Development does not work properly.	All error codes	Check all units and high voltage cable connectors.
4	None of the patterns are developed.		
	Development does not work properly.	09, 04	Check all units and high voltage cable connectors.
5	Some of the patterns are not developed;		
	Development does not work properly.	07, 08	Check all units and high voltage cable connectors.
6	The machine is not in the condition to execute the line position adjustment;		
	The machine is in the toner near end or end condition.	13	Replenish toner.
	The machine is not ready to do the line position adjustment manually from the user menu.	17	Wait until machine becomes the ready condition from the energy saver or auto off mode.
	Line position adjustment cannot be done due to failed potential control.	18	Fix the problem causing the potential control error.
7	The MUSIC CPU is abnormal (1)		
	No error code is displayed. However, the machine keeps displaying "execution" on the screen. In addition, the green LED on the BICU stays on or off under the following condition. 1. The MUSIC CPU resets due to electrical noise generated by a high voltage leak on a damaged OPC drum.	-	1. Fix the bias leak and/or replace PCU

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	Possible Cause	Possible Error Code	Action
8	The MUSIC CPU is abnormal (2)		
	No error code is displayed. However, the machine keeps displaying "execution" on the screen. The green LED on the BICU keeps blinking faintly (this is normal) even under one of the following conditions. 1. Poor connection between the toner cartridge detection board and the memory chip on the toner cartridge 2. The memory chip on the toner cartridge fails.	-	1. Check the connection between the detection board and memory chip. 2. Replace the toner cartridge.

4.2 SCANNER TEST MODE

4.2.1 VPU TEST MODE

To make sure the scanner VPU control is functioning, output the VPU test pattern with SP4-907. After you have set the SP mode settings and pressed the start key, the VPU test pattern is printed out.

SP4-907-1 VPU Test Pattern: R

SP4-907-2 VPU Test Pattern: G

SP4-907-3 VPU Test Pattern: B

- If the copy is abnormal and the VPU test pattern is normal, the CCD on the SBU board may be defective.
- If the copy is normal and the VPU test pattern is abnormal, the harness may not connected properly between SBU and IPU, or the IPU or SBU board may be defective.

4.2.2 IPU TEST MODE

You can check the IPU board with the SP mode menu, SP4-904-1 or 2.

If no error is detected, the test ends, and the completion code appears in the operation panel display. If an error is detected, the test is interrupted and an error code is displayed. The table below lists the completion and error codes.

SP4-904-1 Register Write/Read Check Result

	Code	Defective ASIC
Normal end	00	—
Abnormal end	11	ASIC 1
	12	
	13	ASIC 2
	14	ASIC 3
	15	Ri 10

SP4-904-2 Image Path Check Result

	Code	Error detected in the image data path
Normal end	00	—
Abnormal end	21	ASIC 1 → ASIC 2
	22	ASIC 1 → ASIC 3 → ASIC 1 → ASIC 2
	23	ASIC 2 → ASIC 1 → ASIC 3 → ASIC 1 → ASIC 2
	24	ASIC 3 → Ri 10
	25	Scanner ASIC → ASIC 1

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Errors may be caused by the following problems:

1) Short circuit on the signal lines
   - When the IPU board is installed, a pin or two on the ASIC is damaged.
   - Some conductive matter or object is trapped among the pins.
   - Condensation
2) Destruction of circuit elements
   - Overcurrent or a defective element has broken the circuit.
3) Abnormal power supply
   - The required voltage is not supplied to the devices.
4) Overheat/overcooling
   - The board (the scanner unit) is in an inappropriate environment.
5) Static electricity
   - Static electricity of a high voltage occurred during the test.
6) Others
   - Error code 25 may be detected if the scanner and IPU are incorrectly connected.

When you have conducted a check, turn the main switch off and on before conducting another check. When you have conducted all necessary checks, turn the main switch off and on.

4.3 SERVICE CALL CONDITIONS

4.3.1 SUMMARY

Section 4.4 classifies the SC codes into the controller errors and other errors. The latter (the errors other than the controller errors) are classified into four types by their reset procedures. The table lists the classification of the SC codes.

	Key	Definition	Reset Procedure
Controller errors	CTL	The error has occurred in the controller.	See "Troubleshooting Procedure" in the table.
Other errors	A	The error involves the fusing unit. The machine operation is disabled. The user cannot reset the error.	Turn the main switch off and on. Reset the SC (set SP5-810 to 1). Turn the main switch off and on.
	B	The error involves one or some specific units. The machine operates as usual, excluding the related units.	Turn the operation switch off and on.
	C	The error is logged. The SC-code history is updated. The machine operates as usual.	The SC will not be displayed. Only the SC history is updated.
	D	The machine operation is disabled. You can reset the machine by turning the operation switch or main switch off and on. If the error recurs, the same SC code is displayed.	Turn the operation switch or main power switch off and on.

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After you turn the main switch off, wait for one second or more before you turn the main switch on (☛ SC 672). All SCs are logged. Printing logging data (SP5-990-004) in SP mode can check the latest 10 SC codes detected and total counters when the SC code is detected.

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.

SC Code Classification

The table lists the classification of the SC codes:

Class 1	Section	SC Code	Detailed section
1XX	Scanning	100 -	Scanner
		190 -	Unique for a specific model
2XX	Laser exposure	200 -	Polygon motor
		220 -	Synchronization control
		230 -	FGATE signal related
		240 -	LD control
		260 -	Magnification
		280 -	Unique for a specific model
3XX	Image development 1	300 -	Charge
		330 -	Drum potential
		350 -	Development
		380 -	Unique for a specific model
4XX	Image development 2	400 -	Image transfer
		420 -	Paper separation
		430 -	Cleaning
		440 -	Around drum
		460 -	Unit
		480 -	Others
5XX	Paper feed / Fusing	500 -	Paper feed
		515 -	Duplex
		520 -	Paper transport
5XX	Paper feed / Fusing	530 -	Fan motor
		540 -	Fusing
		560 -	Others
		570 -	Unique for a specific model
6XX	Communication	600 -	Electrical counters
		620 -	Mechanical counters
		630 -	Account control
		640 -	CSS
		650 -	Network
		670 -	Internal data processing
		680 -	Unique for a specific model
7XX	Peripherals	700 -	Original handling
		720 -	Two-tray finisher
		740 -	Booklet finisher
8XX	Controller	800 -	Error after ready condition
		820 -	Diagnostics error
		860 -	Hard disk
		880 -	Unique for a specific model
9XX	Others	900 -	Counter
		920 -	Memory
		990 -	Others

4.4 SC TABLE

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 101	Exposure lamp error	• The standard white level is not properly detected when scanning the shading plate. (The shading data peak does not reach the specified threshold.)	• 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		1. Turn the main switch off and on. 2. Turn the power key off and on. 3. Check and clean the scanner mirror(s) and scanner lens. 4. Check and clean the shading plate. 5. Replace the exposure lamp. 6. Replace the lamp stabilizer. 7. Replace the scanner mirror(s) or scanner lens. 8. Replace the SBU.	D
SC 120	Scanner home position error 1	• The scanner home position sensor does not detect the on condition during scanning.	• Scanner I/O board or SBU defective • Scanner motor defective • Harness between scanner I/O board and scanner motor disconnected • Scanner HP sensor defective • Harness between SBU and HP sensor disconnected • Scanner wire, timing belt, pulley, or carriage defective	SC 121 and 122	1. Turn the main switch off and on. 2. Check the cable connection between the scanner I/O board and scanner motor. 3. Check the cable connection between the SBU and HP sensor. 4. Replace the SBU or scanner I/O board. 5. Replace the scanner motor. 6. Replace the HP sensor. 7. Replace the scanner wire, timing belt, pulley, or carriage.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 121	Scanner home position error 2	• The scanner home position sensor does not detect the off condition during scanning.	• Scanner I/O board or SBU defective • Scanner motor defective • Harness between scanner I/O board and scanner motor disconnected • Scanner HP sensor defective • Harness between SBU and HP sensor disconnected • Scanner wire, timing belt, pulley, or carriage defective	SC 120 and 122	1. Turn the main switch off and on. 2. Check the cable connection between the scanner I/O board and scanner motor. 3. Check the cable connection between the SBU and HP sensor. 4. Replace the SBU or scanner I/O board. 5. Replace the scanner motor. 6. Replace the HP sensor. 7. Replace the scanner wire, timing belt, pulley, or carriage.	D
SC 122	Scanner home position error 3	• The scanner home position sensor does not detect the home position during initialization.	• Scanner I/O board or SBU defective • Scanner motor defective • Harness between scanner I/O board and scanner motor disconnected • Scanner HP sensor defective • Harness between SBU and HP sensor disconnected • Scanner wire, timing belt, pulley, or carriage defective	SC 120 and 121	1. Turn the main switch off and on. 2. Check the cable connection between the scanner I/O board and scanner motor. 3. Check the cable connection between the SBU and HP sensor. 4. Replace the SBU or scanner I/O board. 5. Replace the scanner motor. 6. Replace the HP sensor. 7. Replace the scanner wire, timing belt, pulley, or carriage.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 142	White level detection error	• The white level cannot be adjusted within the target during auto gain control.	• Dirty exposure glass or optics section • SBU board defective • IPU board defective • Exposure lamp defective • Lamp stabilizer defective		1. Turn on the main switch off and on. 2. Clean the exposure glass, white plate, mirrors, and lens. 3. Check if the exposure lamp is lit during initialization. 4. Check the harness connection between SBU and IPU. 5. Replace the exposure lamp. 6. Replace the SBU board. 7. Replace the IPU board	D
SC 144	SBU communication error	• The SBU hardware is inconsistent with the software.	• Defective SBU hardware • Incorrect software		1. Turn the main switch off and on. 2. Replace the SBU. 3. Update the software.	D
SC 161	IDU error	• After the command is written into the DFID self-diagnosis startup register, the correct value is not stored in the register in the specified duration. NOTE: This error is detected when the main switch is turned on. • After the negate interruption of FGATE occurs, IDU is not recognized in the specified duration. NOTE: This error is detected during scanning operations.	• IPU board defective (defective connection between ASIC and DFID, or Defective LSYNC)		1. Turn the main switch off and on. 2. Replace the IPU board.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 195	Serial Number Mismatch	• Serial number stored in the memory does not consist of the correct code.	• NVRAM defective • BCU replaced without original NVRAM • Incorrect DIP-switch setting		Open the front cover and turn on the main switch. Check the serial number with SP5-811-002. If the stored serial number is incorrect, contact your product specialist for details of how to solve the problem. For DIP-switch settings, see section 5.10.	D
SC 201	Polygon motor error	• The polygon mirror motor does not reach the targeted operating speed within 10 seconds after turning on. • The lock signal does not become high within 10 seconds after turning off the polygon motor. • The lock signal does not become low within 0.2 second after the polygon motor reaches the targeted operating speed.	• Polygon mirror motor error • Abnormal GAVD behavior • Cable disconnection		1. Turn the main switch off and on. 2. Check the cables. 3. Replace the polygon motor.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 220	Synch. detection signal error 1 220-001: Y 220-002: M 220-003: C 220-004: K0 220-005: K1	The front (for K&Y) or rear (for C&M) laser synchronizing detector board, which is used to determine the start timing of laser writing, does not send a signal while the polygon motor is operating normally and the LD is on.	• Disconnection of the cable between front (K&Y) or rear (C&M) synchronizing detector board and the LD unit • Incorrect installation of front (K&Y) or rear (C&M) synchronizing detector board (the beam does not target the photo detector.) • Defective LD unit • Defective BCU • Defective +5VLD circuit		1. Turn the main switch off and on. 2. Check the cable connection between front (for K&Y) or rear (for C&M) synchronizing detector board and the LD unit. 3. Check or reinstall the front (for K&Y) or rear (for C&M) synchronizing detector board. 4. Replace the front (for K&Y) or rear (for C&M) synchronizing detector board. 5. Replace the laser optics housing unit. 6. Replace the BCU. 7. Replace the PSU.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 221	Synch. detection signal error 2 221-001: Y 221-002: M 221-003: C 221-004: K	Main scan length detection is not properly completed ten consecutive times. The front (for C&M) or rear (for K&Y) laser synchronizing detector boards are used for the main scan length detection, which automatically corrects the main-scan magnification.	• Damaged or disconnected cable between front (C&M) or rear (K&Y) laser synchronizing detector board and the LD unit • Incorrect installation of front (C&M) or rear (K&Y) synchronizing detector board (the beam does not target the photo detector.) • Defective front (C&M) or rear (K&Y) synchronizing detector board • Defective LD unit		After doing any of the following, print ten jobs or more to see if the same SC code is displayed: 1. Turn the main switch off and on. 2. Check or replace the cable connecting front (for C&M) or rear (for K&Y) synchronizing detector board and the LD unit. 3. Check or reinstall the front (for C&M) or rear (for K&Y) synchronizing detector board. 4. Replace the front (for C&M) or rear (for K&Y) synchronizing detector board. 5. Replace the laser optics housing unit. 6. Replace the BCU. If a synch. detector board cannot be replaced, do the following as a temporary measure: • Disable main scan length detection (SP 2-919-001)	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 230	FGATE error 230-001: Y 230-002: M 230-003: C 230-004: K	The BCU generates the FGATE signal based on the registration sensor ON timing. Then, it sends the signal to the LD units. The LD units send a feedback signal to the BCU. When the LD units start emitting laser beams, the feedback signal changes from High to Low. The SC code is generated when the BCU receives no feedback signal (stays High) from the LD unit 1 second after paper reaches the position where the laser should start writing.	• Poor connection between BCU and LD units • Defective BCU • Defective LD unit		1. Turn the main switch off and on. 2. Check the cables between the LD units and the BCU. 3. Replace the laser optics housing unit. 4. Replace the BCU.	D
SC 231	FGATE timeout 231-001: Y 231-002: M 231-003: C 231-004: K	When LD units emit laser beams to print a job, the feedback signal stays Low and becomes High after laser exposure for a page is completed. The SC code is detected in the following cases: • When the feedback signal stays Low 7 seconds after completing the laser exposure, or • When the feedback signal stays Low until the laser exposure timing for the next page in multi-page print mode.	• Poor connection between BCU and LD units • Defective BCU • Defective LD unit		1. Turn the main switch off and on. 2. Check the cables between the LD units and the BCU. 3. Replace the laser optics housing unit. 4. Replace the BCU.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 240	LD over 240-001: Y 240-002: M 240-003: C 240-004: K	The power supply for the LD unit exceeds 67 mA.	• LD worn out (current/light output characteristics have changed.) • LD broken (short circuit)		1. Turn the main switch off and on. 2. Replace the laser optics housing unit.	D
SC 260	LD HP sensor not switched on (for K only)	During homing, it takes more than five seconds to switch the HP sensor on (the sensor actuator does not cover the sensor).	• Defective motor • Defective sensor • Mechanical problem when switching the actuator • Brown fuse (FU81) on the Power supply unit		1. Turn the main switch off and on. 2. Check the sensor actuator position of the LD positioning motor. 3. Replace the LD positioning motor. 4. Replace the LD home position sensor. 5. Check and/or replace the PSU.	D
SC 261	LD HP sensor not switched off (for K only)	After the laser beam pitch was changed, it takes more than five seconds for the HP sensor to switch off.	• Defective motor • Defective sensor • Mechanical problem when switching the actuator • Brown fuse (FU81) on the Power supply unit		1. Turn the main switch off and on. 2. Check the sensor actuator position of the LD positioning motor. 3. Replace the LD positioning motor. 4. Replace the LD home position sensor. 5. Check and/or replace the PSU.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 285	Line position adjustment (MUSIC) error	Line position adjustment fails three consecutive times.	• Pattern sampling error due to insufficient image density of patterns used for the adjustment • Inconsistency in the sampling line position adjustment pattern due to dust on the pattern, damage to the OPC drum, damage or toner dropped on the transfer belt, or a dirty or defective ID sensor		1. Turn the main switch off and on. 2. Check and fix the problem that causes low image density. . 3. Clean or replace the transfer belt and/or the ID sensor. 4. Replace the PCU or clean the development unit that causes toner to drop on the transfer belt.	D
SC 370	TD sensor [K]: Adjustment error	During the developer initialization, the output value of the TD sensor is without the adjustment range (3.0 ± 0.1V).	• Poor connection (TD sensor outputs is less than 0.5V.) • Defective TD sensor		1. Turn the main switch off and on. 2. Reset the related color development unit. 3. Replace the related color development unit.	D
SC 371	TD sensor [Y]: Adjustment error					
SC 372	TD sensor [C]: Adjustment error					
SC 373	TD sensor [M] : Adjustment error					
SC 374	Vt error [K]	During the image development, Vt value is less than 0.5V	• Poor connection (TD sensor outputs is less than 0.5V.) • Defective TD sensor		1. Turn the main switch off and on. 2. Reset the related color development unit. 3. Replace the related color development unit.	D
SC 375	Vt error [Y]					
SC 376	Vt error [C]					
SC 377	Vt error [M]					

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 380	Black development motor error	When the motor speed is within the target level, the motor sends a lock signal (High to Low at CN214-5) to the BCU. SC380 is detected under the following conditions: • The Lock signal stays High 2 seconds after the motor turns on. • The Lock signal stays Low 2 seconds after the motor turns off. • The Lock signal stays High for more than 2 seconds while the motor is on.	• Defective motor • Defective BCU		1. Turn the main switch off and on. 2. Replace the motor. 3. Replace the BCU.	D
SC 381	Color development motor error					
SC 385	ID sensor VSG adjustment error	Vsg is the out of adjustment range during a process control self-check. Adjustment range: $4.0 \pm 0.5V$	• Defective ID sensor • Dirty ID sensor • ID sensor disconnected • Dirty drum (cleaning incomplete)		1. Turn the main switch off and on. 2. Clean the ID sensor and adjacent parts. 3. Check the drum cleaning condition. 4. Check the ID sensor connector. 5. Replace the ID sensor.	D
SC 386	Development gamma error K	Any of the following conditions happens three consecutive times: • When the development gamma is out of the following range: $0.3 \leq \gamma \geq 6.0$ • When Vk is out of the following range: $-150V \leq Vk \geq 150V$ • Development gamma calculation error	• Unsuitable toner density • Toner supply mechanism problem • Laser exposure problem • Image transfer problem		1. Turn the main switch off and on . 2. Check the process control self-check result (SP3-975). If the result is not "1", fix the problem according to the table in section 4.1.2. 3. Print a full color image by disabling SC detection (SP5-809-001) and check if the image quality is OK. If the image quality is not OK, fix the problem. Then, enable the SC detection again.	D
SC 387	Development gamma error Y					
SC 388	Development gamma error C					
SC 389	Development gamma error M					

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type

SC 390	Development Bias output error	The high voltage supply board (C/B) monitors the circuit and detects abnormal conditions such as a voltage leak or no output condition. If this happens, the high voltage supply board sends an error signal (High to Low at CN204-A18) to the BCU.
		
		The BCU monitors this signal every 2 ms and generates this SC code when the error condition occurs 250 consecutive times.
			• Loose connection
			• Defective power pack C/B output
			• Damaged cable
			• Defective development unit
			• Defective BCU
					1. Turn the main switch off and on.
					2. Check if the harness and cables are properly connected.
					3. Disconnect the high voltage supply cables from the bias terminals on the high voltage supply board C/B. Measure the DC voltage using a multi-meter.
					  • Replace the high voltage supply board if no voltage is supplied.
					4. If the result is OK at step 2, check if the high voltage supply cable or development unit is grounded.
					  • Replace the high voltage supply cable if it damages.
					  • Replace the development unit if it damages.
					5. Check the PWM signals are sent to the high voltage supplied board from the BCU. Replace the BCU or harness between the BCU and high voltage supply board if the voltage is 0.
						D

SC 391-01	Charge AC: output error 391-01: K 391-02: Y 391-03: M 391-04: C	The high voltage supply board sends the feedback signal (CN228-2 to 5; MCYK). The BCU monitors these feedback signals every 8 ms. If the average of the sampled data is not within the control target 20 consecutive times, this SC code is generated.	• Power pack disconnected • Charge receptacle or terminal • Defective PCU bias input terminal • Incorrect power pack B/C output • Damaged cable • Defective BCU • PCU not found		1. Turn the main switch off and on. 2. Check the connector. 3. Check that the PCU is correctly installed. 4. Check the PCU charge voltage input (the spring/conducting shaft) or replace the PCU. 5. Replace the power pack B/C. 6. Replace the cable. 7. Replace the BCU.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 393-001	TD sensor error during warming up 393-001: K 393-002: Y 393-003: C 393-004: M	The development-unit drive starts. TD sensor signal is 0.78 V or less.	• Loose cable connection • Positioning plate out of place • Defective TD sensor • Development unit not found		1. Turn the main switch off and on. 2. Check that the development unit is correctly installed. 3. Remove the development unit and check the connector on the rear. 4. Check the positioning plate. 5. Replace the development unit.	D
SC 440-001	Drum motor error 440-001: Black 440-002: Color	No drum gear position sensor signal is detected within 0.7 second (185 mm/s), 1.0 second (125 mm/s), or 2.0 seconds (62.5 mm/s).	• Defective PCU • Defective drum motor • Defective drum gear position sensor		1. Turn the main switch off and on. 2. Check and/or replace the PCU. 3. Check and/or replace the sensor.	D
SC 460-001	Thermistor 1 error (open circuit)	When the temperature detected by thermistor 1, which is at the left (fusing unit) side of the laser optics unit, is less than -30°C for 10 seconds consecutively, the BCU determines that the circuit is opened and displays this SC code.	• Thermistor 1 defective • Cable connection error • BCU defect		1. Turn the main switch off and on. 2. Check the cable connections. 3. Replace the thermistor. 4. Replace the BCU.	D
SC 460-002	Thermistor 1 error (short circuit)	When the temperature detected by the thermistor 1, which is at the left (fusing unit) side of the laser optics unit, is higher than 70°C for 10 seconds consecutively, the BCU determines that the circuit is shorted and displays this SC code	• Thermistor 1 defective • Cable connection error • BCU defect		1. Turn the main switch off and on. 2. Check the cable connections. 3. Replace the thermistor. 4. Replace the BCU.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 461-001	Thermistor 2 error (open circuit)	When the temperature detected by the thermistor 2, which is at the right (paper feed section) side of the laser optics unit, is less than -30°C for 10 seconds consecutively, the BCU determines that the circuit is opened and displays this SC code.	• Thermistor 2 defective • Cable connection error • BCU defect		1. Turn the main switch off and on. 2. Check the cable connections. 3. Replace the thermistor. 4. Replace the BCU.	D
SC 461-002	Thermistor 2 error (short circuit)	When the temperature detected by the thermistor 2, which is at the right (paper feed section) side of the laser optics unit, is higher than 70°C for 10 seconds consecutively, the BCU determines that the circuit is shorted and displays this SC code	• Thermistor 2 defective • Cable connection error • BCU defect		1. Turn the main switch off and on. 2. Check the cable connections. 3. Replace the thermistor. 4. Replace the BCU.	D
SC 471	Transfer belt H.P. error	The transfer belt HP sensor signal does not change from Low to High (home position) or vice versa 1 second after the transfer belt contact motor turns on.	• Transfer belt unit not set properly • Defective transfer belt H.P. sensor and/or transfer belt sensor • Defective transfer belt contact motor • Transfer belt unit problem		1. Turn the main switch off and on. 2. Reset the transfer belt unit. 3. Clean or replace the transfer belt sensor. 4. Replace the transfer belt contact motor. 5. Check the contact and release mechanism of the transfer belt unit.	D
SC 481	Waste toner vibrator error	The waste toner vibrator does not operate.	• Loose connector • Defective motor		1. Turn the main switch off and on. 2. Replace the motor.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 490	Transfer bias / paper attraction roller bias leak error	The high voltage supply board - Transfer monitors the circuit and detects current leaks. If this happens, the high voltage supply board sends a SC signal (High to Low at CN213-8) to the BCU. The BCU monitors this signal every 2 ms and generates this SC code when the error condition occurs 250 consecutive times.	• Defective high voltage supply board - Transfer • Damaged transfer belt • Transfer unit • Damaged high voltage supply cables • Damaged cables between the BCU and high voltage supply board • Defective BCU		1. Turn the main switch off and on. 2. Check the transfer unit and replace the belt and/or the transfer unit if any damage is found. 3. Replace the high voltage supply board - Transfer. 4. Check and/or replace the high voltage supply cables. 5. Check and/or replace the dc cables between the BCU and high voltage supply board. 6. Replace the BCU.	D
SC 501	Paper Tray 1 error	When the tray lift motor is turned on, if the upper limit is not detected within 10 seconds, the machine asks the user to reset the tray. If this condition occurs three consecutive times, the SC is generated.	• Defective paper lift sensor • Defective tray lift motor • Defective bottom plate lift mechanism		1. Turn the main switch off and on. 2. Check if the bottom plate smoothly moves up and down manually. 3. Check and/or replace the paper lift sensor. 4. Check and/or replace the tray lift motor.	B
SC 502	Paper Tray 2 error					

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 503-01	Tray 3 error (Paper Feed Unit or LCT)	For the paper feed unit: When the tray lift motor is turned on, if the upper limit is not detected within 18 seconds, the machine asks the user to reset the tray. If this condition occurs three consecutive times, the SC is generated. For the LCT: This SC is generated under the following conditions: • If the upper or lower limit is not detected within 15 seconds when the tray lift motor is turned on to lift up or lower the tray • If the paper stack is not transported within a specific number of pulses after the tray motor and stack transport clutch turn on to transport the paper stack • If the end fence home position sensor stays ON for a specific number of pulses after the tray motor and stack transport clutch turn on to transport the paper stack.	For the paper feed unit: • Defective tray lift motor or connector disconnection • Defective lift sensor or connector disconnection For the LCT: • Defective stack transport clutch or connector disconnection • Defective tray motor or connector disconnection • Defective end fence home position sensor or connector disconnection • Defective upper limit sensor or connector disconnection • Defective tray lift motor or connector disconnection		1. Turn the main switch off and on. 2. Check the cable connections. 3. Check and/or replace the defective component.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 503-02	Tray 3 error (Paper Feed Unit or LCT)	• If the following condition occurs 3 consecutive times, this SC is generated. For the paper feed unit: When the main switch is turned or when the tray is set and if the upper limit is already detected, the lift motor turns on to lower the bottom plate until the lift sensor goes off. If the motor turns on for 7 seconds or more, the machine asks the user to reset the tray. For the LCT: When the main switch is turned on or when the LCT is set, if the end fence is not in the home position (home position sensor ON), the tray lift motor stops.	For the paper feed unit: • Defective tray lift motor or connector disconnection • Defective lift sensor or connector disconnection For the LCT: • Defective stack transport clutch or connector disconnection • Defective tray motor or connector disconnection • Defective end fence home position sensor or connector disconnection		1. Turn the main switch off and on. 2. Check the cable connections. 3. Check and/or replace the defective component.	B
SC 504-01	Tray 4 error (3 Tray Paper Feed Unit)	When the tray lift motor is turned on, if the upper limit is not detected within 18 seconds, the machine asks the user to reset the tray. If this condition occurs three consecutive times, the SC is generated.	• Defective tray lift motor or connector disconnection • Defective lift sensor or connector disconnection		1. Turn the main switch off and on. 2. Check the cable connections. 3. Check and/or replace the defective component.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 504-02	Tray 4 error (3 Tray Paper Feed Unit)	When the main switch is turned or when the tray is set and if the upper limit is already detected, the lift motor turns on to lower the bottom plate until the lift sensor goes off. If the motor turns on for 7 seconds or more, the machine asks the user to reset the tray. If this condition occurs 3 consecutive times, this SC is generated.	• Defective tray lift motor or connector disconnection • Defective lift sensor or connector disconnection		1. Turn the main switch off and on. 2. Check the cable connections. 3. Check and/or replace the defective component.	B
SC 530	Fusing fan motor error	The BCU does not receive the lock signal (CN210-B5) 5 seconds after turning on the fusing fan.	• Defective fusing fan motor or connector disconnection • Defective BCU		1. Turn the main switch off and on. 2. Check the connector and/or replace the fusing fan motor. 3. Replace the BCU.	D
SC 541	Heating roller thermistor error	The temperature measured by the heating roller thermistor does not reach 7 °C for ten seconds.	• Loose connection of the heating roller thermistor • Defective heating roller thermistor • Defective BCU		1. Check if the heating roller thermistor is firmly connected. 2. Replace the fusing unit. 3. Replace the BCU.	A
SC 542	Heating roller warm-up error	After the main switch is turned on or the cover is closed, the heating roller temperature does not reach the ready temperature within 60 seconds during fusing unit warm-up.	• Heating roller fusing lamp broken • Defective heating roller thermistor • Defective BCU		1. Check if the heating roller thermistor is firmly connected. 2. Replace the fusing unit. 3. Replace the BCU.	A
SC 543	Heating roller fusing lamp overheat	The detected fusing temperature stays at 210°C or more for five seconds.	• Defective PSU • Defective BCU		1. Replace the PSU. 2. Replace the BCU.	A

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 544	Heating roller fusing lamp high temperature error	During stand-by mode or a print job, the detected heating roller temperature stays at 210 °C or more for 0.2 second.	• Defective heating roller thermistor • Defective PSU • Defective BCU		1. Replace the fusing unit. 2. Replace the PSU. 3. Replace the BCU.	A
SC 545	Heating roller fusing lamp consecutive full power	When the fusing unit is not running in the Ready condition, the heating roller fusing lamp keeps on with full power for 30 consecutive seconds.	• Heating roller thermistor out of position		1. Replace the fusing unit.	A
SC 546	Heating roller fusing lamp temperature fluctuation	The heating roller temperature changes by ±20°C or more in one second. This occurs three times in one minute or two consecutive times.	• Loose connection of the thermistor • Loose connection between the fusing unit and main frame		1. Check if the fusing unit is properly set and connected to the main frame. 2. Check if the heating roller thermistor connector is firmly connected. 3. Replace the fusing unit.	A
SC 551	Pressure roller thermistor error	The measured pressure roller temperature does not reach 7°C for 30 seconds.	• Loose connection of pressure roller thermistor • Defective pressure roller thermistor • Defective BCU		1. Check that the pressure roller thermistor is firmly connected. 2. Replace the fusing unit. 3. Replace the BCU.	A
SC 552	Pressure roller warm-up error	After the main switch is turned on or the door is closed, the pressure roller temperature does not reach the ready temperature within 180 seconds during fusing unit warm-up.	• Pressure roller fusing lamp broken • Defective pressure roller thermistor • Defective BCU		1. Check if the pressure roller thermistor is firmly connected. 2. Replace the fusing unit. 3. Replace the BCU.	A
SC 553	Pressure roller fusing lamp overheat	The detected pressure roller temperature stays at 210°C or more for five seconds.	• Defective PSU • Defective BCU		1. Replace the fusing unit. 2. Replace the PSU. 3. Replace the BCU.	A

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 555	Pressure roller fusing lamp consecutive full power	When the fusing unit is not running in the Ready condition, the pressure roller fusing lamp keeps ON with full power for 100 consecutive seconds.	• Pressure roller thermistor out of position		1. Replace the fusing unit.	A
SC 556	Pressure roller fusing lamp temperature fluctuation	The pressure roller temperature changes by ±20°C or more in one second. This occurs three times in one minute or two consecutive times.	• Loose connection of the pressure roller thermistor • Loose connection between the fusing unit and main frame		1. Check if the fusing unit is properly set and connected to the main frame. 2. Check if the pressure roller thermistor connector is firmly connected. 3. Replace the fusing unit.	A
SC 560	Zero cross error	When the main switch is turned on, the machine checks how many zero-cross signals are generated during 500 ms. If the number of zero-cross signal generated is either more than 66 or less than 45 and when this condition is detected 10 consecutive times, this code is displayed.	• Electrical noise in the supply from the power cord		1. Replace the PSU.	A
SC 570	Fusing oil end	Fusing oil is running out.	• Insufficient fusing oil		1. Replace the fusing oil unit. 2. Turn off and on the main switch.	A
SC 571	Waste oil full	Waste oil bottle is full.	• Full waste oil bottle		1. Replace the waste oil bottle. 2. Close the font cover. 3. Wait for about 10 seconds, and turn off and on the main switch.	A
SC 620	ARDF communication error	• After the ARDF is detected, the break signal occurs or communication timeout occurs.	• Incorrect installation of ARDF • ARDF defective • IPU board defective • External noise		1. Turn the main switch off and on. 2. Check the cable connection of the ARDF. 3. Shut out the external noise. 4. Replace the ARDF. 5. Replace the IPU board.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 621	Two-tray finisher/booklet finisher communication error	While the BCU communicates with an optional unit, an SC code is displayed if one of following conditions occurs. 1. The BCU receives a signal which is generated by the peripherals only just after the main switch is turned on. 2. When the BCU does not receive an OK signal from a peripheral 100ms after sending a command to it. The BCU resends the command. The BCU does not receive an OK signal after sending the command 3 times.	• Cable problems • BCU problems • PSU problems in the machine • Main board problems in the peripherals		1. Turn the main switch off and on. 2. Check if the cables of peripherals are properly connected. 3. Replace the PSU if no power is supplied to peripherals. 4. Replace the BCU or main board of peripherals.	D
SC 622	Bank communication error					
SC 623	Duplex unit communication error		• Cable problems • BCU problems • PSU problems in the machine • Duplex control board problem		1. Turn the main switch off and on. 2. Check if the cable of the duplex inverter unit is properly connected. 3. Replace the PSU if no power is supplied to the peripherals. 4. Replace the duplex control board in the inverter unit.	D
SC 630	CSS communication error	An communication error has occurred during communication with the CSS.	• Communication line error		Logging only.	CTL
SC 632	MF accounting device error 1	The controller sends data to the accounting device, but the device does not respond. This occurs three times.	• Loose connection between the controller and the accounting device		1. Turn the main switch off and on. 2. Check the connection.	CTL
SC 633	MF accounting device error 2	After communication is established, the controller receives the brake signal from the accounting device.				

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 634	MF accounting device error 3	The accounting device sends the controller the report that indicates a backup RAM error has occurred.	• Defective controller of the MF accounting device • Battery error		1. Turn the main switch off and on. 2. Replace the controller board of the accounting device. 3. Replace the battery.	CTL
SC 635	MF accounting device error 4	The accounting device sends the controller the report that indicates the battery voltage error has occurred.				
SC 640	BCU - Controller communication error (check sum error)	The check sum of the interface between the BCU and controller is not the same.	• Defective controller • Defective BCU		1. Turn the main switch off and on. 2. Replace the controller. 3. Replace the BCU.	CTL
SC 641	BCU – Controller communication error (no response)	The controller does not receive any response from the BCU three consecutive times when sending a signal every 100ms.	• Loose connection • Defective controller • Defective BCU		1. Turn the main switch off and on. 2. Check the connection between the BCU and controller. 3. Replace the controller. 4. Replace the BCU.	CTL
SC 670	No response from BCU at power on	When the main power is turned on or the machine starts warming up from energy-saving mode, the controller does not receive a command signal from the BCU.	• Loose connection • Defective controller • Defective BCU		1. Turn the main switch off and on. 2. Check the connection between the BCU and controller. 3. Replace the controller. 4. Replace the BCU.	CTL

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 672	Controller-to-operation panel communication error at startup	• After the machine is powered on, the communication between the controller and the operation panel is not established, or communication with controller is interrupted after a normal startup. • After startup reset of the operation panel, the attention code or the attention acknowledge code is not sent from the controller. • After the controller issues a command to check the communication line with the controller at 30-second intervals, the controller fails to respond twice.	• Controller stalled • Controller board installed incorrectly • Controller board defective • Operation panel connector loose or defective • The controller is not completely shutdown when you turn the main switch off.		1. Turn the main switch off and on. 2. Check the condition of the controller board. 3. Check the condition of the operation panel. 4. Replace the controller board. 5. Replace the operation panel. 6. Turn the main switch off, wait for one second or more, and turn the main switch on.	CTL
SC 680	BCU/ MUSIC communication error	After the engine CPU sends a message, the Music CPU does not respond within five seconds three consecutive times.	• Toner cartridge memory chip loose connection • Memory chip problem • Memory chip cable wiring problem		1. Turn the main switch off and on. 2. Check if the toner cartridge is installed correctly. 3. Replace the toner cartridge. 4. Check if the harnesses are not damaged. 5. Replace the BCU.	D
SC 685	SBU-IPU communication error	• During data transfer, a checksum error occurs. • During any operation except initialization, the SBU sends a hardware-reset acknowledgement to the IPU.	• Loose connection between SBU and IPU • SBU board defective • IPU board defective • External noise		1. Turn the main switch off and on. 2. Shut out the external noise. 3. Check the cable connection of the scanner unit. 4. Replace the SBU board. 5. Replace the IPU board.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 686	BCU-IPU communication error	• After the machine is powered on or recovering from the power save mode, timeout occurs during BCU communication. • The break signal is received after the communication is normally established with the BCU. • Timeout occurs while the communication with the BCU is retried after a communication error.	• Board connector between BCU and controller loose • Board connector between controller and motherboard loose • Board connector between motherboard and IPU loose • BCU board defective • IPU board defective • Controller board defective • Motherboard defective		1. Turn the main switch off and on. 2. Check the cable connection between the board connector and BCU. 3. Check the cable connection between controller and motherboard. 4. Check the cable connection between motherboard and IPU. 5. Replace the BCU board. 6. Replace the IPU board. 7. Replace the controller board. 8. Replace the motherboard.	D
SC 687	Memory address command error	The BCU does not receive a memory address command from the controller 60 seconds after paper is in the position for registration.	• Loose connection • Defective controller • Defective BCU		1. Turn the main switch off and on. 2. Check if the controller is firmly connected to the BCU. 3. Replace the controller. 4. Replace the BCU.	D
SC 690-001	GAVD I2C communica-tion error 690-001: Y 690-002: M 690-003: C 690-004: K	• The I2C bus device ID is not identified during initialization. • A device-status error occurs during I2C bus communication. • The I2C bus communication is not established due to an error other than a buffer shortage.	• Loose connection • Defective BCU • Defective LD controller board		1. Turn the main switch off and on. 2. Check the cable connection. 3. Replace the laser optics housing unit. 4. Replace the BCU board.	D

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 691	Scanner startup error	• After the machine is powered on or recovering from the power save mode, the scanner ready signal is not verified.	• Board connector between controller and motherboard loose • Board connector between motherboard and IPU loose • IPU board defective • Controller board defective • Motherboard defective		1. Turn the main switch off and on. 2. Check the cable connection between controller and motherboard. 3. Check the cable connection between motherboard and IPU. 4. Replace the IPU board. 5. Replace the controller board. 6. Replace the motherboard.	CTL
SC 692	GAPCII2C communication error	• The I2C bus device ID is not identified during initialization. • A device-status error occurs during I2C bus communication. • The I2C bus communication is not established due to an error other than a buffer shortage.	• Loose connection • Defective BCU • Defective LD controller board		1. Turn the main switch off and on. 2. Check the cable connection. 3. Replace the BCU.	D
SC 700	ARDF original pick-up malfunction	• After the pick-up motor is turned on, the original stopper HP sensor is not activated.	• Original stopper HP sensor defective • Pick-up motor defective (not rotating) • Timing belt out of position • ARDF main board defective	SC 701	1. Turn the main switch off and on. 2. Replace the HP sensor. 3. Turn the main switch off and on. 4. Replace the pick-up motor. 5. Replace the control board.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 701	ARDF original pick-up/paper lift mechanism malfunction	• The original pick-up HP sensor is not activated after the pick-up motor is turned on.	• Original pick-up HP sensor defective • Pick-up motor defective • ARDF main board defective	SC 700	1. Turn the main switch off and on. 2. Replace the pick-up motor. 3. Replace the control board. 4. Replace the HP sensor.	D
SC 722	Two-tray finisher jogger motor error	• The jogger fences of the two-tray finisher donot return to home position within a specific time. • The two-tray finisher jogger motor does not leave home position within a given time.	• Defective jogger H.P. sensor • Loose connection • Defective jogger motor		1. Turn the main switch off and on. 2. Check the connection of jogger H.P. sensor and jogger motor connectors 3. Replace the jogger H.P. sensor. 4. Replace the jogger motor.	B
SC 724	Two-tray finisher staple hammer motor error	Stapling does not finish within 150 ms after the staple hammer motor turns on.	• Staple jam • Loose connection • Overload caused by stapling too many pages • Defective staple hammer motor		1. Turn the main switch off and on. 2. Check if the staple hammer motor connector is properly connected. 3. Check if the staple jam occurs. 4. Replace the staple hammer motor.	B
SC 725	Two-tray finisher stack feed-out motor error	The stack feed-out belt H.P. sensor does not activate within a specified time after the stack feed-out motor turns on.	• Defective stack feed-out H.P. sensor • Loose connection • Stack feed-out motor overload • Defective stack feed-out motor		1. Turn the main switch off and on. 2. Check if the connectors of the stack feed-out H.P. sensor and motor are properly connected. 3. Replace the stack feed-out H.P. sensor. 4. Replace the stack feed-out motor.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 726	Two-tray finisher shift tray 1 lift motor error	• The upper stack height 1 sensor is activated consecutively (detecting paper) for 15 seconds after the shift tray starts moving up. • The upper stack height sensor 1 is deactivated consecutively (not detecting paper) for 15 seconds after the shift tray starts moving down. • When the upper tray moves from lower paper exit to the upper paper exit, the upper stack height 1 sensor is activated.	• Loose connection • Defective upper stack height 1 sensor • Defective shift tray 1 lift motor • Motor overload		1. Turn the main switch off and on. 2. Check if the connectors of the sensor and motor are properly connected. 3. Replace the upper stack height 1 sensor. 4. Replace the shift tray 1 lift motor.	B
SC 727	Two-tray finisher stapler rotation motor error	The stapler cannot return to its home position within a specified time after the stapler rotation motor starts rotating.	• Loose connection • Defective stapler rotation motor • Motor overload		1. Turn the main switch off and on. 2. Check if the stapler rotation motor connector is properly connected. 3. Replace the stapler rotation motor.	B
SC 729	Two-tray finisher punch motor error	The punch home position is not detected within 250 ms after the punch clutch turns on.	• Loose connection • Defective punch H.P. sensor • Defective punch clutch • Defective punch hole motor		1. Turn the main switch off and on. 2. Check if the connectors of sensor, clutch and/or motor are properly connected. 3. Replace the punch H.P. sensor. 4. Replace the punch clutch. 5. Replace the punch hole motor.	B
SC 730	Two-tray finisher stapler motor error	The stapler home position is not detected within a specified time after the staple motor turns on.	• Loose connection • Defective stapler H.P. sensor • Defective stapler motor		1. Turn the main switch off and on. 2. Check if the connectors of the sensor and motor are properly connected. 3. Replace the stapler H.P. sensor. 4. Replace the stapler motor.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 731	Two-tray finisher exit guide plate motor error	The exit guide plate open sensor is not activated within a specified time after the exit guide plate motor turns on.	• Loose connection • Defective exit guide plate open sensor • Defective exit guide plate motor		1. Turn the main switch off and on. 2. Check if the connectors of the sensor and motor are properly connected. 3. Replace the exit guide plate open sensor. 4. Replace the exit guide plate motor.	B
SC 732	Two-tray finisher tray 1 shift motor error	Tray 1 home position is not detected within a specified time after the tray 1 shift motor turns on.	• Loose connection • Defective tray shift 1 sensor • Defective tray 1 shift motor		1. Turn the main switch off and on. 2. Check if the connectors of the sensor and motor are properly connected. 3. Replace the tray shift 1 sensor. 4. Replace the tray 1 shift motor.	B
SC 733	Two-tray finisher tray 2 lift motor error	• The lower stack height 1 sensor is activated consecutively (detecting paper) for 15 seconds after the shift tray starts moving up. • The lower stack height sensor 1 is deactivated consecutively (not detecting paper) for 15 seconds after the shift tray starts moving down.	• Loose connection • Defective lower stack height 1 sensor • Defective tray 2 lift motor • Motor overload		1. Turn the main switch off and on. 2. Check if the connectors of the sensor and motor are properly connected. 3. Replace the lower stack height 1 sensor. 4. Replace the tray 2 lift motor.	B
SC 734	Two-tray finisher tray 2 shift motor error	Tray 2 home position is not detected within a specified time after the tray 2 shift motor turns on.	• Loose connection • Defective tray shift 2 sensor • Defective tray 2 shift motor		1. Turn the main switch off and on. 2. Check if the connectors of the sensor and motor are properly connected. 3. Replace the tray shift 2 sensor. 4. Replace the tray 2 shift motor.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 740	Booklet finisher transport motor error	• The folder home position sensor does not turn off within 2 seconds after the folder rollers start to move. • The folder home position sensor does not turn on within 2 seconds after the folder rollers start transporting the paper to the booklet tray.	• Defective transport motor • Loose connection of the transport motor • Defective folder home position sensor • Loose connection of the holder home position sensor		1. Turn the main switch off and on. 2. Check the connection of the transport motor. 3. Check the connection of the folder home position sensor. 4. Replace the transport motor.	B
SC 741	Booklet finisher paddle motor error	• The paddle home position sensor does not turn off within 2 seconds after the paddles start to move. • The paddle home position sensor does not turn on within 2 seconds after the paddles start to operate. • The stack-tray upper roller home position sensor does not turn off within 2 seconds after the paddle motor starts to lower the roller. • The stack-tray upper-roller home-position sensor does not turn on with in 2 seconds after the paddle motor starts to lower the roller.	• Defective paddle motor • Loose connection of the paddle motor • Defective paddle home position sensor • Loose connection of the paddle home position sensor • Defective stack-tray upper-roller home-position sensor • Loose connection of the stack-tray upper-roller home-position sensor		1. Turn the main switch off and on. 2. Check that the connection of the paddle motor. 3. Check the connection of the paddle home position sensor. 4. Check the connection of the stack-tray upper-roller home-position sensor. 5. Replace the paddle motor.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 742	Booklet finisher stapler slide motor error	• The stapler home position sensor does not turn off within 1 second after this same sensor turns on. • The stapler home position sensor does not turn on within 1 second when the stapler is coming back to its home position.	• Defective stapler slide motor • Loose connection of the stapler slide motor • Defective stapler home position sensor • Loose connection of the stapler home position sensor		1. Turn the main switch off and on. 2. Check the connection of the stapler slide motor. 3. Check the connection of the stapler home position sensor. 4. Replace the stapler home position sensor. 5. Replace the stapler slide motor.	B
SC 743	Booklet finisher front jogger fence motor error	• The front-jogger-fence home-position sensor does not turn off within 3 seconds after the front-jogger-fence motor starts. • The front-jogger-fence home-position sensor does not turn on within 3 seconds when the front-jogger-fence motor is driving the fence to its home position.	• Incorrect assembling of the front jogger fence • Loose connection of the front jogger fence motor • Defective front-jogger-fence home-position sensor • Loose connection of the front-jogger-fence home-position sensor		1. Turn the main switch off and on. 2. Check the connection of the front jogger fence motor. 3. Check the connection of the front-jogger-fence home-position sensor. 4. Replace the front-jogger-fence home-position sensor. 5. Replace the front jogger fence motor.	B
SC 744	Booklet finisher rear jogger fence motor error	• The rear-jogger-fence home-position sensor does not turn off within 3 seconds after the rear-jogger-fence motor starts. • The rear-jogger-fence home-position sensor does not turn on within 3 seconds when the rear-jogger-fence motor is driving the fence to its home position.	• Incorrect assembling of the rear jogger fence • Loose connection of the rear jogger fence motor • Defective rear-jogger-fence home-position sensor • Loose connection of the rear-jogger-fence home-position sensor		1. Turn the main switch off and on. 2. Check the connection of the rear jogger fence motor. 3. Check the connection of the rear-jogger-fence home-position sensor. 4. Replace the rear-jogger-fence home-position sensor. 5. Replace the rear jogger fence motor.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 745	Booklet finisher stack-tray exit motor error	• The stack-tray-belt home-position sensor does not turn off within 394 milliseconds after the stack-tray exit roller starts to drive the belts. → The stack-tray exit motor retries to drive the belts, but the stack-tray-belt home-position sensor still does not turn off within another 394 milliseconds. • The stack-tray-belt home-position sensor does not turn on within 1,084 milliseconds after the same home-position sensor turns off. → The stack-tray exit motor retires to drive the belts, but the stack-tray belt home-position sensor still does not turn on within another 1,084 milliseconds.	• Defective stack-tray exit motor • Loose connection of the stack-tray exit motor • Defective stack-tray-belt home-position sensor • Loose connection of the stack-tray-belt home-position sensor		1. Turn the main switch off and on. 2. Check the connection of the stack-tray exit motor. 3. Check the connection of the stack-tray-belt home-position sensor. 4. Replace the stack-tray-belt home-position sensor. 5. Replace the stack-tray exit motor.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 746	Booklet finisher stapler/folder motor error	• The stapler/folder motor starts. But the controller does not receive the signal from the encoder sensor within 0.1 second. • The stapler/folder motor starts to drive the stapler unit, and the stapler switch is on. But the controller does not receive the signal from the home position sensor for 0.5 second. • The stapler starts to staple the paper. But the controller does not receive any signal from the home position sensor, and the stapler switch is off. • The stapler/folder motor starts to drive the folder rollers. But the home position sensor does not turn off within 9.247 seconds. • The home position sensor does not turn on within 9.247 seconds after this same sensor turns off.	• Malfunction of the stapler/folder motor • Loose connection of the stapler/folder motor • Loose connection of the encoder sensor • Defective encoder sensor • Loose connection of the stapler switch • Defective stapler switch • Loose connection of the stapler home position sensor • Defective stapler home position sensor • Loose connection of the folder-roller home-position sensor • Defective folder-roller home-position sensor		1. Turn the main switch off and on. 2. Check the connection of the stapler/folder motor. 3. Check the connection of the encoder sensor. 4. Check the connection of the stapler switch. 5. Check the connection of the stapler home position sensor. 6. Check the connection of the folder-roller home-position sensor. 7. Replace the stapler/folder motor. 8. Replace the encoder sensor. 9. Replace the stapler switch. 10. Replace the stapler home position sensor. 11. Replace the folder-roller home-position sensor.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 747	Booklet finisher lift motor error	• The upper limit sensor detects the regular tray while the lift motor is lifting the regular tray. • The paper height sensor does not turn off within 10 seconds after the lift motor starts to lower the regular tray. • The upper limit sensor does not turn off within 10 seconds after the lift motor starts to lower the regular tray. • The paper height sensor does not turn on within 10 seconds after the lift motor starts to lift the regular tray. • The controller does not receive the signal from the lift motor encoder sensor within 50 milliseconds after the lift motor starts.	• Defective paper height sensor • Loose connection of the paper height sensor • Defective upper limit sensor • Loose connection of the upper limit sensor • Defective lift motor • Loose connection of the lift motor • Incorrect assembling of the lift motor • Defective lift motor encoder sensor • Loose connection of the lift motor encoder sensor		1. Turn the main switch off and on. 2. Check the connection of the paper height sensor. 3. Check the connection of the upper limit sensor. 4. Check the connection of the lift motor encoder sensor. 5. Check the connection of the lift motor. 6. Replace the paper height sensor. 7. Replace the upper limit sensor. 8. Replace the lift motor encoder sensor. 9. Replace the lift motor.	B
SC 748	Booklet finisher backup data error	The CPU tries to write data in the EEPROM three times, but fails to write data.	• Defective EEPROM • EEPROM not installed		1. Turn the main switch off and on. 2. Check that the EEPROM is installed. 3. Replace the EEPROM.	B
SC 749	Booklet finisher punch-unit communication error	A communication-error alarm is not cleared for 3 seconds.	• The finisher controller cannot communicate with the punch-unit controller.		1. Turn the main switch off and on. 2. Check the connection between the finisher controller and the punch-unit controller.	B
SC 750	Booklet finisher punch-unit controller error	The checksum in the backup data is inconsistent.	• Defective EEPROM (on the punch-unit controller) • EEPROM not installed		1. Turn the main switch off and on. 2. Check that the EEPROM is installed. 3. Replace the EEPROM.	B

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 751	Booklet finisher punch-unit sensor error 1	The paper edge and size sensors receive the 2.5-volt light or weaker light even when the source emits 4.4-volt light.	• Defective sensors • Dirty sensors		1. Turn the main switch off and on. 2. Clean the sensors. 3. Replace the sensors.	B
SC 752	Booklet finisher punch-unit registration motor error	• The registration motor drives the slide unit to the rear side for 1 second. But the home position sensor does not turn on. • The registration motor drives the slide unit to the front side for 1 second. But the home position sensor does not turn off.	• Incorrect assembly of the registration motor • Loose connection of the registration motor • Defective home position sensor • Loose connection of the home position sensor		1. Turn the main switch off and on. 2. Check the connection of the registration motor. 3. Check the connection of the home position sensor. 4. Replace the home position sensor. 5. Replace the registration motor.	B
SC 753	Booklet finisher punch-unit punch motor error	• The punch motor starts to drive the punch cams. But the controller does not receive the encoder-lock signal for 60 milliseconds. • The punch motor start to drive the punch cams. But the home positions sensor does not turn on for 250 milliseconds.	• Malfunction of the punch motor • Loose connection of the punch motor • Defective home position sensor • Loose connection of the home position sensor • Loose connection of the encoder sensor • Defective encoder sensor		1. Turn the main switch off and on. 2. Check that the connection of the punch motor. 3. Check the connection of the home position sensor. 4. Check the connection of the encoder sensor. 5. Replace the home position sensor. 6. Replace the encoder sensor. 7. Replace the punch motor.	B
SC 754	Booklet finisher punch-unit sensor error 2	The A/D inputs of the sensor are not corrected by varying the D/A outputs.	• Defective sensor • Dirty sensor		1. Turn the main switch off and on. 2. Clean the sensors. 3. Replace the sensors.	B
SC 818	Watch-dog error	While the system program is running, other processes do not operate at all.	• Defective controller • Software error		1. Turn the main switch off and on. 2. Replace the controller. 3. See **NOTE 1 at the end of the SC table**	CTL

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 819			**Fatal error**			
[696E]	Process error	System completely down	• Defective RAM DIMM		1. Turn the main switch off and on.	CTL
[766D]	Memory error	Unexpected system memory size	• Defective ROM DIMM • Defective controller • Software error		2. Check and/or replace the RAM DIMM. 3. Check and/or replace the ROM DIMM. 4. Replace the controller. 5. See **NOTE at the end of the SC table**.	
[4361]	Kernel stop error	The cache error trap occurs in the CUP.	• CPU cache error		1. Replace the controller.	CTL
	Kernel stop error	Any error in the operation system (An error message is output.)	• Defective CPU • Defective memory • Defective flash memory • Incorrect software		1. Replace the memory. 2. Replace the controller.	CTL
SC 820		Self-diagnostics error: CPU [XXXX]: Detailed error code				
[0001] to [06FF]	CPU error	During the self-diagnostic, the controller CPU detects an error. There are 47 types of error code (0001 to 4005) depending on the cause of the error. The CPU detects an error and displays the specific error code with the program address where the error occurs).	• System firmware problem • Defective controller		1. Turn the main switch off and on. 2. Reinstall the controller system firmware. 3. Replace the controller. When the problem cannot be fixed with the above procedure, the following information displayed on the screen needs to be fed back to a technical support center. • SC code • Detailed error code • Program address	CTL

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
[0702] [0709] [070A]	CPU/Memory Error		• System firmware problem • Defective RAM-DIMM • Defective controller		1. Turn the main switch off and on. 2. Reinstall the controller system software. 3. Replace the RAM-DIMM. 4. Replace the controller.	CTL
[0801] to [4005]	CPU error	Same as [0001]				CTL
[0B00]	ASIC error	The write-&-verify check error has occurred in the ASIC.	• Defective ASIC device		1. Replace the controller.	CTL
SC 821 [0D05]	Self-diagnosis error: ASIC	The CPU checks if the ASIC timer works properly compared with the CPU timer. If the ASIC timer does not function in the specified range, this SC code is displayed.	• System firmware problem • Defective RAM-DIMM • Defective controller		1. Turn the main switch off and on. 2. Reinstall the controller system firmware. 3. Replace the RAM-DIMM. 4. Replace the controller board.	CTL
SC 822		Self-diagnostic error: HDD (Hard Disk Drive) [XXXX]: Detailed error code				
[3003]	Timeout error	When the main switch is turned on or starting the self-diagnostic, the HDD stays busy for the specified time or more.	• Loose connection • Defective HDD • Defective controller		1. Turn the main switch off and on. 2. Check that the HDD is properly connected to the controller. 3. Replace the HDD. 4. Replace the controller.	CTL
[3004]	Command error					
SC 823		Self-diagnostic error: NIB [XXXX]: Detailed error code				
[6101]	MAC address check sum error	The result of the MAC address check sum does not match the check sum stored in ROM.	• Defective controller		1. Turn the main switch off and on. 2. Replace the controller.	CTL
[6104]	PHY IC error	The PHY IC on the controller cannot be properly recognized.				
[6105]	PHY IC loop-back error	An error occurred during the loop-back test for the PHY IC on the controller.				

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 824 [1401]	Self-diagnosis error: Standard NVRAM	The controller cannot recognize the standard NVRAM installed or detects that the NVRAM is defective.	• Loose connection • Defective standard NVRAM • Defective controller		1. Turn the main switch off and on. 2. Check the standard NVRAM is firmly inserted into the socket. 3. Replace the NVRAM. 4. Replace the controller.	CTL
SC 826		Self-diagnostic error: RTC [XXXX]: Detailed error code				
[1501]	Self-diagnostic Error: RTC/ Optional NVRAM	• An RTC device is recognized, and the difference between the RTC device and the CPU exceeds the defined limit. • No RTC device is recognized.	• RTC defective • NVRAM without RTC installed • Backup battery discharged		1. Turn the main switch off and on. 2. Replace the NVRAM with another NVRAM with an RTC device.	CTL
[15FF]	Self-diagnostic Error: RTC/ Optional NVRAM	• The RTC device is not detected.	• NVRAM without RTC installed • Backup battery discharged		1. Turn the main switch off and on. 2. Replace the NVRAM with another NVRAM with an RTC device.	CTL
SC 827		Self-diagnostic error: Standard SDRAM DIMM [XXXX]: Detailed error code				
[0201]	Verification error	Error detected during a write/verify check for the standard RAM (SDRAM DIMM).	• Loose connection • Defective SDRAM DIMM • Defective controller		1. Turn the main switch off and on. 2. Replace the SDRAM DIMM. 3. Replace the controller.	CTL
[0202]	Resident memory error	The SPD values in all RAM DIMM are incorrect or unreadable.	• Defective RAM DIMM • Defective SPD ROM on RAM DIMM • Defective 12C bus		1. Replace the RAM DIMM.	CTL
SC 828		Self-diagnostic error : ROM [XXXX]: Detailed error code				
[0101]	Check sum error 1	The boot monitor and OS program stored in the ROM DIMM is checked. If the check sum of the program is incorrect, this SC code is displayed.	• Defective ROM DIMM • Defective controller		1. Turn the main switch on and off. 2. Replace the ROM DIMM 3. Replace the controller.	CTL

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
[0104]	Check sum error 2	All areas of the ROM DIMM are checked. If the check sum of all programs stored in the ROM DIMM is incorrect, this SC code is displayed.				
SC 829		Self-diagnosis error: optional RAM [XXXX]: Detailed error code				
[0302]	Composition error (Slot 0)	The result of checking the composition data of the RAM in Slot 0 (CN5) on the controller is incorrect.	• Not specified RAM DIMM installed • Defective RAM DIMM		1. Turn the main switch off and on. 2. Replace the RAM DIMM. 3. Replace the controller board.	CTL
[0401]	Verification error (Slot 1)	The data stored in the RAM in Slot 1 does not match the data when reading.				
[0402]	Composition error (Slot 1)	The result of checking the composition data of the RAM in Slot 1 (CN6) on the controller is incorrect.				
SC 835		Self-diagnosis error: Centronics interface [XXXX]: Detailed error code				
[1102]	Verification error	The controller detects that the loop-back connector is not properly connected.	• Loose connection • Defective loop-back connector • Defective Centronics connector • Defective controller		1. Turn the main switch off and on. 2. Check the connection between the Centronics connector and loop-back connector. 3. Reconnect the loop-back connector. 4. Replace the controller.	CTL
[110C]	DMA verification error	A DMA data abnormality is detected even when the loop-back connector is properly set.				
[1120]	Loop-back connector error	The loop-back connector is not set when starting the detailed self-diagnostics.				
SC 840	EEPROM access error	An error has occurred during I/O processing.	Defective EEPROM		1. Replace the EEPROM on the controller.	CTL
SC 841	EEPROM read error	The EEPROM stores three different data in mirrored areas.	Defective EEPROM		1. Replace the EEPROM on the controller.	CTL
SC 850	Network interface error	The network is unusable.	• Defective controller		1. Turn the main switch off and on. 2. Replace the controller.	CTL

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 851	IEEE1394 interface error	The 1394 interface is unusable.	• Defective IEEE1394 • Defective controller.		1. Turn the main switch off and on. 2. Replace the IEEE1394 interface board. 3. Replace the controller.	CTL
SC 853	Wireless LAN card not detected	The wireless LAN card is not detected before communication is established, though the wireless LAN board is detected.	• Loose connection	SC 854	1. Check the connection.	CTL
SC 854	Wireless LAN card not detected	The wireless LAN card is not detected after communication is established, though the wireless LAN board is detected.	• Loose connection	SC 853	1. Check the connection.	CTL
SC 855	Wireless LAN card error	An error is detected in the wireless LAN card.	• Loose connection • Defective wireless LAN card		1. Check the connection. 2. Replace the wireless LAN card.	CTL
SC 856	Wireless LAN card error	An error is detected in the wireless LAN board.	• Defective wireless LAN board • Loose connection		1. Check the connection. 2. Replace the wireless LAN board.	CTL
SC 857	USB interface error	The USB interface cannot be used due to a driver error.	• Defective USB driver • Loose connection		1. Check the connection. 2. Replace the USB board.	CTL
SC 860	HDD: Initialization error	The controller detects that the hard disk fails.	• HDD not initialized • Defective HDD		1. Turn the main switch off and on. 2. Reformat the HDD. 3. Replace the HDD.	CTL
SC 861	HDD: Reboot error	The HDD does not become ready within 30 seconds after the power is supplied to the HDD.	• Loose connection • Defective cables • Defective HDD • Defective controller		1. Turn the main switch off and on. 2. Check the connection between the HDD and controller. 3. Check and replace the cables. 4. Replace the HDD. 5. Replace the controller.	CTL

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 862	Defective sector error	The 101st defective sector is detected in the hard disk.	• Same as SC 863 (SC 862 counts the number of SC 863 occurrence.)		1. Replace the HDD.	CTL
SC 863	HDD: Read error	The data stored in the HDD cannot be read correctly.	• Defective HDD • Defective controller		1. Turn the main switch off and on. 2. Replace the HDD. 3. Replace the controller.	CTL
SC 864	HDD: CRC error	While reading data from the HDD or storing data in the HDD, data transmission fails.	• Defective HDD		1. Turn the main switch off and on. 2. Replace the HDD.	CTL
SC 865	HDD: Access error	An error is detected while operating the HDD.	• Defective HDD		1. Turn the main switch off and on. 2. Replace the HDD.	CTL
SC 866	SD card authentication error	A correct license is not found in the SD card.	• SD-card data has corrupted.		1. Store correct data in the SD card.	CTL
SC 867	SD card error	The SD card is ejected from the slot.	• The SD card is ejected from the slot.		1. Install the SD card. 2. Turn the main switch off and on.	CTL
SC 868	SD card access error 243-252: File system error 253: Device error	An error report is sent from the SD card reader.	• An error is detected in the SD card.		1. For a file system error, format the SD card on your PC. 2. For a device error, turn the mains switch off and on. 3. Replace the SD card. 4. Replace the controller.	CTL
SC 870	Address book error	An error is detected in the data copied to the address book over a network.	• Defective software program • Defective HDD • Incorrect path to the sever		1. Turn the main switch off and on. 2. Initialize the address book data (SP5-846-050). 3. Initialize the user information (SP5-832-006/007). 4. Replace the HDD.	CTL
SC 871	FCU flash ROM error	An error is detected in the flash ROM that stores the address-book data.	• Defective flash ROM		1. Turn the main switch off and on. 2. Replace the MBU (on the FCU).	CTL

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 872	HDD mail data error	An error is detected in the HDD at machine initialization.	• Defective HDD • Power failure during an access to the HDD		1. Turn the main switch off and on. 2. Initialize the HDD partition (SP5-832-007). 3. Replace the HDD.	CTL
SC 873	HDD mail transfer error	An error is detected in the HDD at machine initialization.	• Defective HDD • Power failure during an access to the HDD		1. Turn the main switch off and on. 2. Initialize the HDD partition (SP5-832-008). 3. Replace the HDD.	CTL
SC 880	File format converter error	The file format converter does not respond.	• Defective file format converter		4. Turn the main switch off on. 5. Replace the file format converter.	CTL
SC 900	Electric counter error	Abnormal data is stored in the counters.	• Defective NVRAM • Defective controller		1. Turn the main switch off and on. 2. Check the connection between the NVRAM and controller. 3. Replace the NVRAM. 4. Replace the controller.	CTL
SC 901	Mechanical total counter error 1	The mechanical counter is not connected. **NOTE:** This error is detected by the North America model only.	• The counter is manually ejected. • Loose connection • Defective counter • Incorrect DIP-switch setting		1. Make sure that the counter is correctly installed. 2. Replace the counter. 3. Check that the DIP-switch setting is correct (☞ 5.10).	D
SC 902	Mechanical total counter error 2					
SC 920	Printer application error	An error is detected in the printer application program.	• Defective software • Unexpected hardware resource (e.g., memory shortage)		1. Turn the main switch off and on.	CTL
SC 921	Printer font error	A necessary font is not found in the SD card.	• A necessary font is not found in the SD card. • The SD card data is corrupted.		1. Check that the SD card stores correct data.	CTL

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 925	Net file function error	The management area or management file on the HDD is corrupted.	• Defective HDD • Data inconsistency (e.g., caused by power failure)		• When SC 860-865 keep occurring: 1. Follow the troubleshooting procedures. • In other cases: 2. Turn the main switch off and on. 3. Initialize the net file partition. 4. Initialize the hard disk. 5. Replace the HDD.	CTL
SC 990	Software performance error	The software makes an unexpected operation.	• Defective software • Defective controller • Software error		1. Turn the main switch off and on. 2. Reinstall the controller and/or engine main firmware. 3. See **NOTE 1 at the end of the SC table**.	CTL
SC 991	Software continuity error	The software has attempted to perform an unexpected operation. However, unlike SC 990, the object of the error is continuity of the software.	• Software program error • Internal parameter incorrect, insufficient working memory.		This SC is not displayed on the LCD (logging only).	CTL
SC 992	Undefined error	An undefined error has occurred.	• Defective software program			CTL
SC 995	BCU error	The DIP witch on the BCU is incorrectly set.	• The DIP switch on the BCU is incorrectly set.		1. Set the DIP switch correctly. 2. Turn the main switch off and on.	D
SC 997	Application function selection error	• The application selected by the operation panel key does not start or ends abnormally.	• Software (including the software configuration) defective • An option required by the application (RAM, DIMM, board) is not installed	SC 998	1. Check the devices necessary for the application program. If necessary devices have not been installed, install them. 2. Check that application programs are correctly configured. 3. Take necessary countermeasures specific to the application program. If the logs can be displayed on the operation panel, see the logs.	CTL

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 998	Application start error	No applications start within 60 seconds after the power is turned on.	• Loose connection of RAM-DIMM, ROM-DIMM • Defective controller • Software problem		1. Turn the main switch off and on. 2. Check if the RAM-DIMM and ROM-DIMM are properly connected. 3. Reinstall the controller system firmware. 4. Replace the controller.	CTL

SC No.	Item	Definition	Possible Cause	Related SCs	Troubleshooting Procedure	Type
SC 999	Program download error	• The download (program, print data, language data) from the IC card does not execute normally.	• Board installed incorrectly • Engine board defective • IC card defective • Incorrect IC card used (machine type/model, card version) • NVRAM defective • Loss of power during downloading NOTE 1: This error is not logged because the error occurs in the download mode (different from the normal operation mode). NOTE 2: If the machine loses power while downloading, or if the download does not normally end for some other reason, this could damage the controller board or the target PCB of the downloading and prevent subsequent downloading. If this problem occurs, the damaged PCB must be replaced.		1. Turn the main switch off and on. 2. If you can download necessary programs, do it by using an appropriate card. 3. If you cannot download necessary programs, use the special card and tool for downloading or replace the board having been used for the unsuccessful downloading.	CTL

NOTE 1: If a problem always occurs in a specific condition (for example. printer driver setting, image file), the problem may be caused by a software error. In this case, the following data and information needs to be sent back to your product specialist.
- Symptom / Possible Causes / Action taken
- Summary sheet (SP mode '1 Service/Printer SP', SP1-004 [Print Summary])
- SMC - All (SP5-990-002)
- SMC - Logging (SP5-990-004)
- Printer driver settings used when the problem occurs
- All data displayed on the screen (SC code, error code, and program address where the problem is logged.)
- Image file which causes the problem, if possible

4.5 TROUBLESHOOTING GUIDE

4.5.1 IMAGE QUALITY

Work-flow

The following work-flow shows the basic troubleshooting steps for the considerable image quality problems on this product.

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(From previous page)

A

Problem is related to the scanner section.

Make a test print from SBU in SP4-907 in each colour.

Can the problem be duplicated?

Yes

Make a test print from IPU in SP4-417 by selecting related colour.

Can the problem be duplicated?

Yes

Check connection between the IPU/ Controller, or replace the IPU.

Possible Symptoms

• Colour shift
Check the level of the colour shift and follow the troubleshooting guide if required.

Check Points

• Connection of flat cable between the controller and laser optic housing unit.
• Mirror position of related colour located in the laser optic housing unit.
• Controller or BCU board defective

No → Check the scanner section (exposure glass, mirrors, scanner movement, etc.)

No → Check the connection between the SBU/IPU or replace the SBU.

B

All colour? — **Yes** → Possible Symptoms

No

Colour missing — **Yes** → Check Points

No

Specify the colour that caused the image problem.

Check the image processing area of the colour specified in the previous step

---

Considerable Symptom

• Faint image (K)
 Check the image transfer unit position lever.
• Cyan/Magenta jitter
 Check if the registration roller speed is suitable for the type of paper used.
• Toner blasting
 Check which colour is blasting and adjust the toner limit or transfer bias.
• Image density change
 Check when the problem is reported and follow the necessary steps.
• Dirty Background
 Check in which condition the problem is reported, and follow the required procedure.
• Colour vertical bands/lines/dirty background
 Check the OPC drum and/or development unit.
• Colour shift
 Check the level of the colour shift and follow the troubleshooting guide if required.
• Colour lines/bands/dirty background
 When the PCU/development unit is close to its life end, the developer or the cleaning blade of the PCU wears out, causing vertical colour lines, bands, or dirty background. Check the related colour unit and replace it if necessary.

B146T902.WMF

4.6 TROUBLESHOOTING GUIDE

4.6.1 IMAGE QUALITY

The table below shows the troubleshooting procedure for the following image problems.

- Smeared image for 4C thin lines or White lines in solid image areas
- Dirty background
- Fireflies
- Crow marks
- Image density change
- Toner blasting

Subject	Symptom	Cause	Action
Smeared image for 4C thin lines or white lines in solid image areas	4C thin lines become smeared in the paper feed direction or white lines appear in solid image areas.	Spurs are located just before the fusing section to prevent paper from touching the fusing unit. When paper touches the spurs and the spurs do not rotate, the spurs scratch the image.	Clean the edges of the spurs and change the position of the spurs as shown below. If 4C thin lines become smeared: B146T903.WMF If white lines appear in solid image areas: B146T904.WMF

Subject	Symptom	Cause	Action
Dirty background	Dirty background may continuously appear on the left side (relative to paper feed) under very low temperature and humidity conditions.	When the developer has deteriorated or when prints are made in a very low humidity condition, dirty background may appear continuously.	Perform forced toner refresh mode (SP3-921-1 or 2). The machine automatically does this in the following sequence. (It takes about 20 minutes to complete this mode.) 1. Consumes toner in the development unit without toner supply until toner end is detected. 2. Starts toner recovery mode. 3. Starts process control self-check. **NOTE:** It takes about 20 minutes to complete this mode, to prevent carrier flowing out.
	Dirty background may intermittently appear with originals that have a high image area ratio after making multiple prints of originals with a low image area ratio.	While making prints with a low image area ratio, the toner-carrier attraction tends to increase. Then, when a large amount of toner is supplied under this condition, the supplied toner cannot be properly charged, causing toner to flow out from the development unit.	Change the settings of the following SP modes: SP3-906-1 Job End Process Control Self-check 200 (Default) to 100 SP3-920-3 OPC Refresh – Prints 200 (Default) to 100 SP3-920-6 Toner Refresh Mode 0 (Default: Disable) to 1 (Enable) During the above mode, toner refresh will automatically be done after job end process control self-check, and will consume the coagulated or overcharged toner. SP3-125-3 Auto TD Adjust Default 0 (Disable) to 1 (Initial process control) Making prints with a low image area ratio causes the toner-carrier attraction to increase, resulting in low image density. Activating the Auto TD Adjustment corrects toner density within the target range; however, it takes up to 6 minutes to complete the self-check and Auto TD Adjustment.
Fireflies	Fireflies may appear with originals that have a high image area ratio after making multiple prints of originals with a low image area ratio.	While making prints with a low image area ratio, developer is agitated with less toner supplied. This may cause some toner to coagulate and harden. Then, when switching over to originals with a high image area ratio, this toner may cause fireflies.	

TROUBLESHOOTING GUIDE

Subject	Symptom	Cause	Action
Crow marks	When making duplex prints in low temperature and humidity conditions, crow marks may appear on black images, especially in halftone areas on the 2nd side.	A charge is applied to the paper at each color station in order to attract each toner onto the paper. Therefore, the initial toner colors will receive multiple charging as they pass each station, which increases the attractive force between the toner and paper. Since black is the last toner to be applied, the attractive force between it and the paper is lowest. Black toner moves on the paper during transport to the fusing section, due to discharge from the toner to the surrounding guide plates.	Using SP2-301 (Transfer Current), increase the paper transfer current for black in the mode in which the problem occurs. **NOTE:** White dotted lines may appear on outputs if the transfer current is increased too much. Therefore, after adjusting the transfer current, it is necessary to check the results by making a solid or halftone image in duplex mode.
Image density change (1)	When the machine is tuned on in the morning (having been unused for a while), the ID of the initial outputs may be relatively low or high, in which case the machine needs to compensate by raising or lowering the ID during machine operation.	When the machine is off, the environmental conditions can begin to affect the machine's development capability. When the main switch is tuned on, the machine starts a process control self-check and adjusts the development parameters to achieve the proper development potential gap without adjusting the toner concentration. Over the course of the print operation, the ID will then get closer and closer to the target level.	If this is often pointed out by users who are very particular about image density, turn on Auto TD Adjustment (SP3-125-3) as a solution. **NOTE:** It takes about 5 minutes to complete the self-check.

Subject	Symptom	Cause	Action
Image density change (2)	Image density is too low or high.	If the machine has never been turned off and Energy Saver 2 (Auto Off mode) is disabled, the machine has never performed the initial process control self-check, causing the image density to become low or high.	Change the settings of the following SP modes: SP3-906-3 Non-use Time 1 0 (Default) to 500 SP3-906-4 Non-use Time 2 30 (Default) to 480 • If Energy Saver 1 is activated (Default: Off), the non-use time process control self-check will not function. Therefore, make sure that Energy Saver 1 is Off (SP5-101-3 or UP mode). • With the above setting, the self-check automatically starts after 500 prints and after no prints have been made for 480 minutes (8 hours). Based on the average daily printing volume of 500 prints, self-check would be performed first thing every morning. These settings are suitable for machines, which are used during the day and then kept On in Ready status throughout the night. Therefore, this SP mode should be set based on the particular way the customer uses the printer.
Toner blasting	Toner may blast, causing smeared text characters and/or lines in 2C or process black mode (depending on the PDL setting or type of paper used.)	An excessive amount of toner is used for development.	Change the toner limit setting in SP mode. • If toner blasted images appear for text or lines in 2C, decrease the setting for Text from 190% to 150 - 170%. • If toner blasted images for text and lines recognized as pure image data (i.e. not processed as text/line data), decrease the setting for Photo from 260% to 170 - 190%. **NOTE:** If the toner limit is lowered too much, it may cause the density of shadow areas to be not smooth.

Detailed Explanation

The table below shows the troubleshooting procedure for the considerable image problems.

Subject	Symptom	Cause	Action
Symptoms not related to color			
Vertical white dotted lines	If the paper transfer bias is excessive for the paper type used in the low humidity condition, vertical white dotted lines may appear.	In the low humidity condition, the electrical resistance of paper tends to increase. Excessive paper transfer bias may cause electrical leak, causing vertical white lines.	• Check if the optional heater has been installed in the paper tray and it is activated. • Customize (decrease) the paper transfer current for the related mode (SP2-301).
Vertical white lines	In high temperature and humidity conditions, vertical white lines may appear in halftone areas on thick paper after multiple prints of the same image.	In this condition, the drum sensitivity tends to drop. Since the image transfer efficiency differs between plain and thick paper, sensitivity drop may cause changes in image transfer efficiency on thick paper, causing vertical white lines.	The drum sensitivity recovers, and this symptom disappears after waiting for about 5 minutes after this symptom has been observed.
Dirty lines/bands or background on 2nd side		The cleaning blade of the transfer belt cleaning may be worn away or damaged when the transfer belt cleaning unit becomes close to its life (500KP).	Check and replace the transfer belt-cleaning unit.
Poor fusing / Fusing offset		The type of paper selected in the printer driver does not match the paper type used for printing, causing the fusing temperature not to be controlled for the paper used.	Please instruct users to select the correct paper type in the printer driver.
Smeared image	When making prints of an original with a solid image near the trailing, a smeared image may appear.	The paper's trailing edge tends to flip up and come very close to the fusing belt after it passes the paper transfer unit. The static electricity built up on the fusing belt may cause toner to move, resulting in the smeared image. This is most noticeable with 600x600dpi printing.	Please instruct users to select 1800x600 or 1200x1200dpi.

Subject	Symptom	Cause	Action
Crow marks	When making duplex prints in low temperature and humidity conditions, crow marks may appear on black images, especially in halftone areas on the 2nd side.	A charge is applied to the paper at each color station in order to attract each toner onto the paper. Therefore, the initial toner colors will receive multiple charging as they pass each station, which increases the attractive force between the toner and paper. Since black is the last toner to be applied, the attractive force between it and the paper is lowest. Black toner moves on the paper during transport to the fusing section, due to discharge from the toner to the surrounding guide plates.	Using SP2-301 (Transfer Current), increase the paper transfer current for black in the mode in which the problem occurs. **NOTE:** White dotted lines may appear on outputs if the transfer current is increased too much. Therefore, after adjusting the transfer current, it is necessary to check the results by making a solid or halftone image in duplex mode.

Symptoms related to color

Subject	Symptom	Cause	Action
Faint image (black)	Only black becomes lighter.	The transfer belt position is not in the correct position.	Check the transfer belt unit position and/or the transfer belt unit release lever.
Magenta and/or cyan jitter	Magenta jitter may appear at 67 mm and/or cyan jitter at 165 mm from the trailing edge.	If the registration roller speed is too fast for the paper types used, the shock when the trailing edge has just passed the registration roller generates vibration, causing the jitter. This may appear especially when using thick paper because of its stiffness.	Adjust the registration roller speed depending on the paper types and/or mode selected. SP1-004-4: Normal paper (1200 dpi) SP1-004-5: Normal paper (600 dpi) SP1-005-3: Thick paper (1200 dpi) If SP1-005-3 cannot improve the level even when setting it to "-1.0", follow the procedure below. 1. Set SP1-005-3 to "-1.0". 2. Print the samples by adjusting SP1-004-4 from 100% (-0.2% to -0.8%). After adjusting SP1-004-4, check the image quality also with normal paper in the 1200 dpi mode. Readjust it so that the image quality level is acceptable for both thick and normal paper if necessary.

TROUBLESHOOTING GUIDE

Subject	Symptom	Cause	Action
Toner blasting (1)	Toner may blast, causing smeared text characters and/or lines in 2C or process black mode (depending on the PDL setting or type of paper used.)	An excessive amount of toner is used for development.	Change the toner limit setting in SP mode. • If toner blasted images appear for text or lines in 2C, decrease the setting for Text from 190% to 150 - 170%. • If toner blasted images for text and lines recognized as pure image data (i.e. not processed as text/line data), decrease the setting for Photo from 260% to 170 - 190%. **NOTE:** If the toner limit is lowered too much, it may cause the density of shadow areas to be not smooth.
Toner blasting (2)	Black toner may blast on the 2nd side of paper under the low temperature.	Black toner moves on the paper during transport to the fusing section, due to discharge from the toner to the surrounding guide plates.	Increase the paper transfer current in SP data from the default setting to a recommended value depending on the mode selected as shown below. SP2-301-3 ([K] 125mm/sec): "16" to "21" SP2-301-4 ([K] 180mm/sec): "27" to "32" SP2-301-16 ([FC, K] 125mm/sec): "9" to "13" SP2-301-17 ([FC, K]180mm/sec): "15" to "20" **NOTE:** If the toner limit is lowered too much, it may cause the density of shadow areas to be not smooth.
Image density change (1)	When the machine is tuned on in the morning (having been unused for a while), the ID of the initial outputs may be relatively low or high, in which case the machine needs to compensate by raising or lowering the ID during machine operation.	When the machine is off, the environmental conditions can begin to affect the machine's development capability. When the main switch is tuned on, the machine starts a process control self-check and adjusts the development parameters to achieve the proper development potential gap without adjusting the toner concentration. Over the course of the print operation, the ID will then get closer and closer to the target level.	If this is often pointed out by users who are very particular about image density, turn on Auto TD Adjustment (SP3-125-003) as a solution. **NOTE:** It takes about 5 minutes to complete the self-check.

Subject	Symptom	Cause	Action
Image density change (2)	Image density is too low or high.	If the machine has never been turned off and Energy Saver 2 (Auto Off mode) is disabled, the machine has never performed the initial process control self-check, causing the image density to become low or high.	Change the settings of the following SP modes: SP3-906-003 Non-use Time 1 0 (Default) to 500 SP3-906-004 Non-use Time 2 30 (Default) to 480 • If Energy Saver 1 is activated (Default: Off), the non-use time process control self-check will not function. Therefore, make sure that Energy Saver 1 is Off (SP5-101-3 or UP mode). • With the above setting, the self-check automatically starts after 500 prints and after no prints have been made for 480 minutes (8 hours). Based on the average daily printing volume of 500 prints, self-check would be performed first thing every morning. These settings are suitable for machines, which are used during the day and then kept On in Ready status throughout the night. Therefore, this SP mode should be set based on the particular way the customer uses the printer.
Dirty background	Dirty background may continuously appear on the left side (relative to paper feed) under very low temperature and humidity conditions.	When the developer has deteriorated or when prints are made in a very low humidity condition, dirty background may appear continuously.	Perform forced toner refresh mode (SP3-921-001 or 002). The machine automatically does this in the following sequence. (It takes about 20 minutes to complete this mode.) 4. Consumes toner in the development unit without toner supply until toner end is detected. 5. Starts toner recovery mode. 6. Starts process control self-check. **NOTE:** It takes about 20 minutes to complete this mode, to prevent carrier flowing out.

Subject	Symptom	Cause	Action
Color Shift	Color shift level is out of the adjustment standard.	The adjustment standard on this product is "maximum 150 μm". The color shift level may change depending on a type of paper used.	Check the level of the color shifts reported from user and follow the troubleshooting procedure described in section 4- if necessary.
Color missing	Color(s) is missing on the outputs.	• The position of 3rd mirror moves due to the rough transportation of service part; and then, becomes out of position. • Flat cable(s) is not properly connected to the BCU board.	• When replacing the laser optic housing unit due to any reason, make a color demo page in the UP mode. If color(s) is missing, open the unit and reposition the mirror(s). • Reconnect the flat cable(s) firmly.

Copy Image processing

Symptom	Mode	Cause	Action
Black image is weaker when the ACS is on.	ACS	The ACS Mode use K toner and CMY toner to create black images. CMY toner makes black images weaker.	Specify "Black & White" in the following menu: ⊛🖅> Copier/Document Server Features > Adjust Color Image > ACS Priority
Black ballpoint pen images are colored.	FC	This symptom is caused by the characteristic of ballpoint pen ink.	Specify "Darker" level in the following menu: 🖎> Copy Quality > Adjust UCR > Darker
Generation copy makes less colorful images.	FC	Generation copy is executed in the text mode. Photo images become less colorful.	Select "Photo" as the original type.
Maps are incorrectly colored.	FC	The Map Mode uses CMYK toner to create black letters. Sometimes black images are somewhat colored.	• Specify "Darker" level in the following menu: 🖎> Copy Quality > Adjust UCR > Darker • Raise the "Sharp" level in the following menu: 🖎> Copy Quality > Sharp/Soft > Sharp
The ACS does not correctly distinguish between color and black & white images.	ACS	Darker images are sometimes incorrectly taken as black & white images.	Specify "Full Color" in the following menu: ⊛🖅> Copier/Document Server Features > Adjust Color Image > ACS Priority
Color images are enclosed by black lines. Black letters are enclosed by while lines.	FC, Text/Photo	When the following originals are used, color images are sometimes incorrectly taken as black letters, or black letters are incorrectly enclosed by white lines: • Outputs from a printer (laser or ink-jet) • Copied images	Raise the "Photo" level in the following menu: 🖎> Copy Quality > Text/Photo Sensitivity > Photo
Black letters and black lines are colored.	FC, Text/Photo	Black letters and lines are colored when the background of the original is not clear.	Raise the "Text" level in the following menu: 🖎> Copy Quality > Text/Photo Sensitivity **NOTE:** If you raise the "Text" level too much, some weaker images are enclosed by black lines.
Mono color images are not sharp enough.	B&W, Text/Photo, ACS	This symptom is based on the copier characteristics.	Raise the "Soft" level in the following menu: 🖎> Copy Quality > Sharp/Soft > Soft

Symptom	Mode	Cause	Action
Letters are not clear when the background is shaded.	B&W, Text/Photo, ACS	This symptom is based on the copier characteristics.	• Raise the "Sharp" level in the following menu: ⊞> Copy Quality > Sharp/Soft > Sharp • Specify the full-color mode when using color originals. • Specify the text mode when using black-and-white originals.
Letters are not clear when the background is slightly shaded.	B&W, Text/Photo, ACS	This symptom is based on the copier characteristics. This symptom tends to occur when the background is shaded with a rough dot pattern.	• Raise the "Sharp" level in the following menu: ⊞> Copy Quality > Sharp/Soft > Sharp • Specify the full-color mode when using color originals. • Specify the text mode when using black-and-white originals.

4.6.2 COLOR SHIFT

The following briefly explain the factors causing color shifts and what to do on the machine to correct it:

- Temperature change causes the optical components in the laser optics housing unit to contract, causing the main scan magnification to change. To correct the line position, the machine automatically does the line position adjustment when the temperature changes by 5°C since the last position adjustment. If the line position adjustment functions properly, no color shift occurs. If the line position adjustment fails (result: SP5-993-007), color lines may shift anywhere on the outputs.

- The process speed at each stage (registration roller, transfer belt, and fusing belt/roller) affects the paper transport speed. If the paper transport speed changes during image transfer of a color, the color line being transferred shifts with respect to the color line already transferred to the paper. The registration roller speed (adjusted by color development motor speed) and fusing belt/roller speed (adjusted by black development motor speed) are adjusted by the manufacturer.
  Paper speed may slightly change due to the type of paper used or after replacing the parts related to the drive sections of the registration section, transport unit, and fusing unit. (After replacing the fusing unit, the speed adjustment should be done in the User Program mode.) Also, the position where color shift occurs depends on which section starts moving at the incorrect speed.

- Paper skew directly affects the color shift between the front and rear sides. There are several factors. One of them is the position of the side fences.

The black development motor drives the fusing unit pressure roller. The motor speed is adjustable in the SP mode.

The transfer motor drives the transfer belt. The motor speed is not adjustable.

The color development motor drives the registration rollers. The motor speed is adjustable in SP mode.

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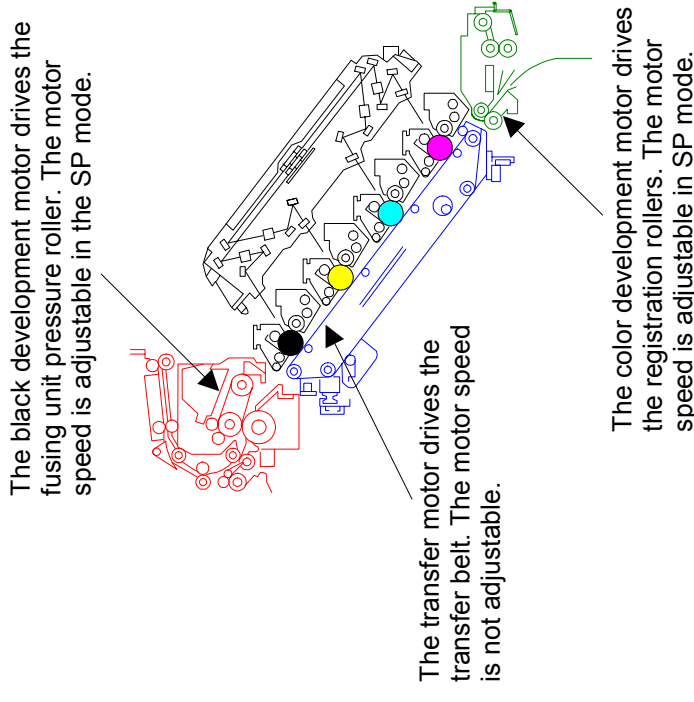
As explained on the previous page, there are several types of color shift problem. The following table shows the symptoms, factors, action required, and the page to see for details.

	Symptom	Factors	Action Required	Refer to #
1	Color shift on entire image in main-scan and/or sub-scan directions	• Line position adjustment does not function properly. • Transfer belt unit has just been replaced.	• Check the result of the line position adjustment (SP5-993-007) and solve the problem if an error was detected. • Check which color lines are shifted from black line and adjust the SP modes for registration and magnification.	Page 4-4 Main-scan Page 4-56/57 Sub-scan Page 4-54/55 Transfer Unit Page 4-60
2	Color shifts only at the leading edge area (sometimes causing shock jitter, magenta or cyan lines)	Registration roller speed is not appropriate.	Adjust the color development motor speed (SP1-004-4, 5, and SP1-005-003) depending on the process speed.	Page 4-54
3	Color shifts only at the trailing edge area	Fusing belt/roller speed is not appropriate.	Adjust the black development motor speed (SP1-004-001, 002, and 007, or "Fuser Adjust" in the User Program mode) depending on the process speed.	Page 4-54
4	Color shifts between the front and rear sides	Paper skew on transfer belt • Side fences are not properly set. • Pressure between the paper attraction roller and transfer belt is not even at the front and rear sides.	Reposition the side fences. Reposition the paper attraction roller unit.	Page 4-57

Adjustment Standard: *Max. 150 µm*

The flowchart illustrates the procedure to adjust line positions.

NOTE: The allowance of color shift is 150µm. Keep the color shift in the range of 0 to 150µm.

Start

Print out the SMC sheets (SP5-990-002).

SP2-103-055 (M: [K] 64.3 MHz) is …

— 250 or higher → Set the factory settings in the following SPs:
SP2-909-001, 002, and 003
SP2-103-055, 056, 057, and 058

Less than 250

Print out a pattern with the following settings:
SP5-997-002 "1 dot grid (R)"
SP5-997-004 "Full Color"
SP5-997-005 "600 x 600"

How much do the lines shift?

— 2 mm or more → Set the factory settings in the following SPs:
SP2-909-001, 002, and 003
SP2-916-008, 009, and 010
SP2-103-056, 057, and 058

Less than 2 mm

Execute the line position adjustment (SP5-993-002).

Has the SP ended normally?

— No → Are the transfer belt and ID sensors clean?

— No → Replace or clean the transfer belt and/or the ID sensors.

— Yes → Execute the forced toner-density adjustment with the following SP:
SP3-126-002

Yes

Print out a pattern with the following settings:
SP5-997-002 "1 dot grid (R)"
SP5-997-004 "Full Color"
SP5-997-005 "600 x 600"

Do the lines shift?

— Yes → (A)

— No → **End**

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When you have come to this step, the lines shift 0.2 mm or less.

(A)

How the lines shift?

Sub-scan direction

Which part of the lines shift?

Whole part

Adjust the sub-scan registration with the following SPs:
SP5-993-016
SP5-993-017
SP5-993-018
SP5-993-019
SP5-993-020
SP5-993-021

Execute the line position adjustment with the following SP:
SP5-993-002

Print out a pattern with the following settings:
SP5-997-002 "1 dot grid (R)"
SP5-997-004 "Full Color"
SP5-997-005 "600 x 600"
and "1200 x 1200"

Leading or trailing edge

Check the transfer-belt speed with the following SPs:
SP5-993-031
SP5-993-033

Leading or trailing edge

Disable the transfer-belt feedback feature with the following SP:
SP5-995-020

Which edges of the color lines has shifted?

Trailing edges

Adjust the development-motor speed with the following SPs:
SP1-004-002
SP1-004-001
SP1-004-007

Enable the transfer-belt feedback feature with the following SP:
SP5-995-020

Do the lines shift?

Yes

No

Leading edges

Adjust the development-motor speed with the following SPs:
SP1-004-005
SP1-004-004
SP1-005-003
SP1-007-001

Main-scan direction

Are the black lines and color lines parallel?

No

Adjust the magnification with the following SPs:
SP5-993-013
SP5-993-014
SP5-993-015

Yes

Adjust the main-scan registration with the following SPs:
SP5-993-010
SP5-993-011
SP5-993-012

Execute the line position adjustment with the following SP:
SP5-993-002

Print out a pattern with the following settings:
SP5-997-002 "1 dot grid (R)"
SP5-997-004 "Full Color"
SP5-997-005 "600 x 600"

Do the lines shift?

Yes

No

End

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Direction	Area	Symptom	Possible Cause	Action Required		Procedure / Remarks
				Output Mode	SP Mode	
Sub-scan	Leading edge	Color shift, especially 100 mm from the leading edge. (Refer to pattern 1 on page 4-57 for the symptom.)	Registration roller speed is not suitable for the paper used.	Normal Paper 1200 dpi	SP1-004-004	Check the magenta line position against the black line. If the registration roller is too fast or slow, the magenta line appears above or below the black line.
				Normal Paper 600 dpi	SP1-004-005	Above: Speed is too fast: Decrease speed Below: Speed is too slow: Increase Speed
				Thick Paper 1200 dpi (by-pass feed)	SP1-005-003	When adjusting the speed, change the setting in 0.05 steps, and check the result by printing the grid pattern. Then, repeat this until the shift between magenta and black is minimized. **NOTE:** If the registration roller is too fast, magenta jitter may appear at 67 mm and/or cyan jitter at 165 mm from the trailing edge. This is caused by the mechanical shock when the trailing edge of the paper passes the registration rollers.
	Trailing edge	Color shift, especially 100 mm from the trailing edge. (Refer to pattern 2 on page 4-57 for the symptom.)	Fusing roller speed is not suitable for the paper used.	Normal Paper 1200 dpi	SP1-004-001	Check the magenta line position against the black line. If the fusing roller is too fast or slow, the magenta line appears above or below the black line.
				Normal Paper 600 dpi	SP1-004-002	Above: Speed is too fast: Decrease speed Below: Speed is too slow: Increase Speed
				Thick Paper 1200 dpi (by-pass feed)	SP1-004-007	When adjusting the speed, change the setting in 0.1 steps, and check the result by printing the grid pattern. Then, repeat this step until the shift between magenta and black is minimized.

Direction	Area	Symptom	Possible Cause	Action Required		Procedure / Remarks
				Output Mode	**SP Mode**	
Sub-scan	Entire image	Color shift on the entire image, and the amount of shift from leading to trailing edge is almost the same.	SP mode setting is not suitable for the paper used.	Normal Paper 600 dpi	SP5-993-016 (Y) SP5-993-017 (M) SP5-993-018 (C)	Measure the gap between the black line and other colors (YMC) using a magnification scope. Convert the measured value from [μm] to [dots] with the following formula. Then, add or subtract the calculated dot value in the SP mode. Correction [dots] = Measured value [μm] / 21.2 or 42.4 600 dpi mode: 1 dot = 42.4 μm 1200 dpi mode: 1 dot = 21.2 μm
				Normal Paper 1200 dpi	SP5-993-019 (Y) SP5-993-020 (M) SP5-993-021 (C)	If color (YMC) has shifted up in relation to black, add the above value to the current value. If color (YMC) has shifted down in relation to black, subtract the above value from the current value. **Examples** • If the magenta line has shifted up in relation to black by 40μm in 600dpi mode, add 1 to the current setting of SP5-993-017. Correction [dots] = +(40/42.4) = Approx. +1 • If the magenta line has shifted down in relation to black by 70μm in 600dpi mode, subtract 2 from the current setting of SP5-993-17. Correction [dots] = -(70/42.4) = Approx. -2

Direction	Area	Symptom	Possible Cause	Action Required		Procedure / Remarks
				Output Mode	SP Mode	
Main-scan	Entire image	Color shifts on the entire image, and the amount of shift differs at front, center, and rear. (Refer to pattern 3 on page 4-45 for the symptom.)	Main-scan magnification is not correctly adjusted.	-	SP5-993-013 (Y) SP5-993-014 (M) SP5-993-015 (C)	Measure the gap between the black line and other colors (YMC) using a magnification scope. Convert the measured value [mm] to [%] with the following formula. Then, add or subtract the calculated value in the SP mode Correction [%] = Measured value [mm] / 287 x 10000 If the color line is enlarged in relation to black, add the correction value to the current setting. If the color line is reduced in relation to black, subtract the correction value from the current setting. **NOTE:** Line position adjustment (SP5-993-002 or 'Auto Adjust' in User Program mode) should be done to check the result after changing the main-scan magnification data. This is because the changes will affect the line position adjustment. **Examples** • If the magenta line is enlarged by 0.1mm in relation to the black line, add "4" to the current setting of SP5-993-014. Correction [%] = (0.1/287) x 10000 = Approx. +4 • If the magenta line is reduced by 0.05 mm in relation to the black line, subtract "2" from the current setting of SP5-993-014. Correction [%] = -(0.05/287) x 10000 = Approx. -2

Direction	Area	Symptom	Possible Cause	Action Required		Procedure / Remarks
				Output Mode	SP Mode	
Main-scan	Entire image	Color shifts on the entire image and amount of shifts is almost the same at front, center, and rear sides. (Refer to pattern 4 on page 4-45 for the symptom.)	Main-scan registration is not correctly adjusted.	-	SP5-993-010 (Y) SP5-993-011 (M) SP5-993-012 (C)	Measure the gap between the black line and other colors (YMC) using a magnification scope. Convert the measured value [μm] to [dots] with the following formula. Then, add or subtract the calculated dot value in the SP mode. Correction [dots] = Measured value [μm] / 21.2 If color (YMC) has shifted to the left in relation to black, add the above value to the current setting. If color (YMC) has shifted to the right in relation to black, subtract the above value from the current setting. **Examples** ● If the magenta line has shifted to the left by 40μm, add 4 to the current setting of SP5-993-011 Correction [dots] = +(40/21.2) = Approx. +2 ● If the magenta line has shifted to the right by 70μm, subtract 3 from the current setting of SP5-993-011. Correction [dots] = -(70/21.2) = Approx. -3
	Front or rear	The amount of color shift at the front and rear sides becomes gradually bigger toward the trailing edge.	● Side fence position ● Transfer belt position	-	-	● Check if the side fences of the paper trays are properly positioned. If there is clearance between the paper and the side fences, this causes paper to skew during paper transport. ● Check if the transfer belt is in correct position, if the tension springs are properly set, or if the paper attraction roller is properly installed... (☛ 3.7.4 Transfer Belt)

How to measure the gap between color lines

Use a magnification scope to measure the gap [A] between two lines. Measure the distance between the same sides of two lines. For example (see the illustration), measure between the left edges of the lines.

Magnification scope

Black line

Color line

B146T908.WMF
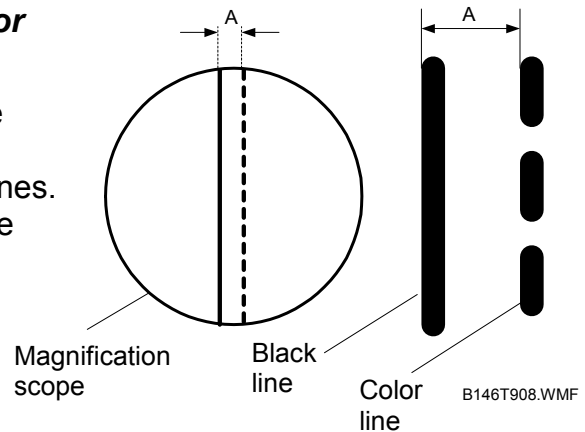
Pattern 1

Color shift in the sub-scan direction at the leading edge

This illustration shows that the colored (dotted) line is above the black line. This means that the registration roller speed is too high for the paper used. Therefore, the registration roller speed needs to be reduced by decreasing the setting (percentage) of SP1-004-004, 005, and SP1-005-003 depending on the mode selected.

- SP1-004-004 Normal paper,
  Color mode, 1200 dpi (62.5 mm/s)
- SP1-004-005 Normal Paper,
  Color mode, 600 dpi (125 mm/s)
- SP1-005-003 Thick Paper (62.5 mm/s)

B146T909.WMF
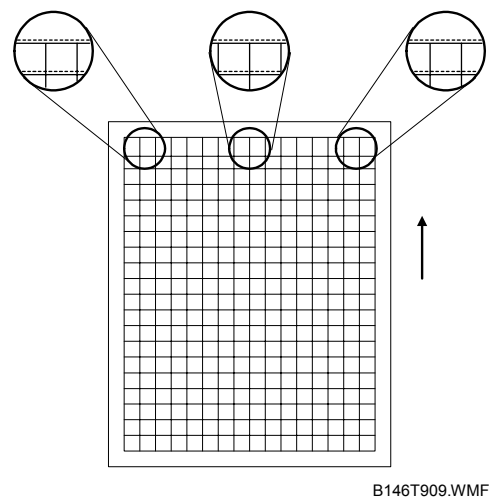
Pattern 2

Color shift in the sub-scan direction at the trailing edge

This illustration shows that the colored (dotted) line is above the black line. This means that the fusing roller speed is too high for the paper used. Therefore, the fusing roller speed needs to be slower by decreasing the setting (percentage) of SP1-004-001, 002, or 007 depending on the mode selected.

- SP1-004-001 Normal paper,
  Color mode, 1200 dpi (62.5 mm/s)
- SP1-004-002 Normal Paper,
  Color mode, 600 dpi (125 mm/s)
- SP1-004-007 Thick Paper (62.5 mm/s)

B146T913.WMF
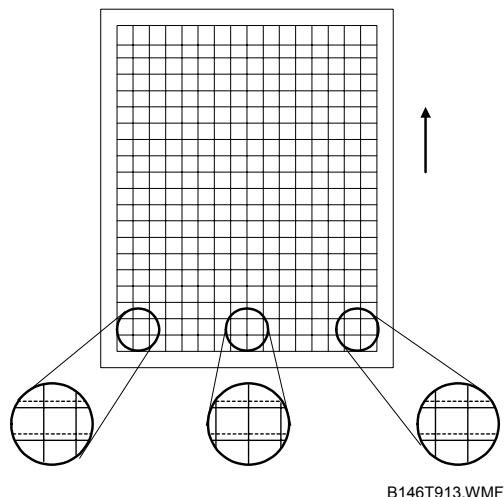
Pattern 3

Color shift (magnification change) in the main-scan direction

Fig. 1 and 2 show that the colored (dotted) line has shifted away from the black line and the amount of shift differs at the front, center, and rear. Both Fig. 1 and Fig. 2 show the color grid is larger than the black grid. Yellow becomes larger from left to right in Fig. 1, but cyan and magenta become larger from right to left. This is because the laser writing direction for B&Y is different from C&M.

B146T911.WMF

Fig. 1 (Yellow)

B146T910.WMF

Fig. 2 (Cyan & Magenta)

Trouble-shooting
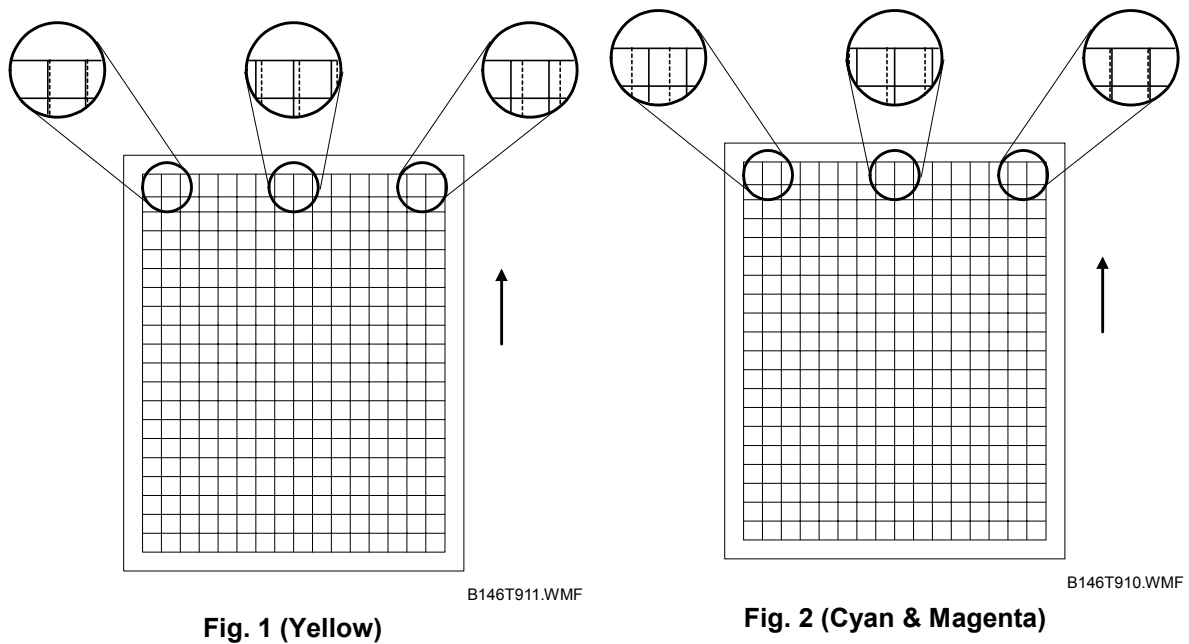
Pattern 4

Color shift (registration) in the main-scan direction

Colored line shifts in the main-scan direction and the amount of shift is the same at left, center, and right.
This is caused by incorrect color registration.

B146T912.WMF

4-77
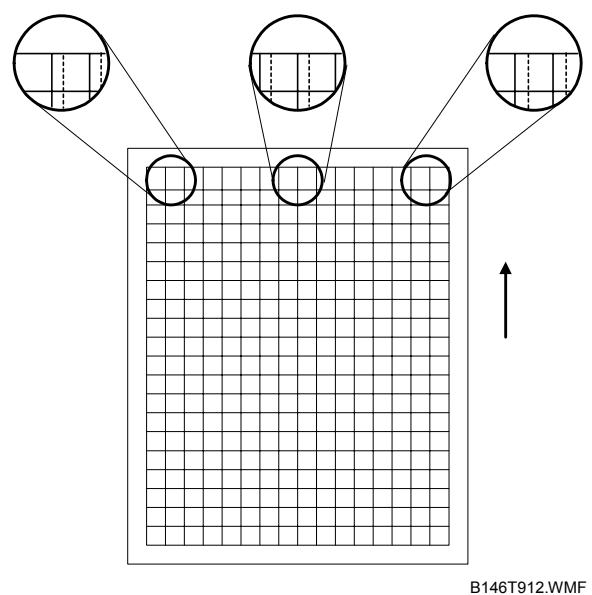
4.6.3 COLOR SHIFT AFTER TRANSFER UNIT REPLACEMENT

If the color shift level is not within the target range (max 150μm) after replacing the transfer unit and performing the forced line position adjustment (SP5-993-002 or Auto Color Registration), follow the procedure explained below.

Check the color shift level

1. Make sure that OPC Refresh (SP3-920-005) has been done.
2. Print out the SMC sheets (SP5-990-002).
3. Print a 1-dot grid pattern using A3/11" x 17" paper. Refer to the following table for detailed SP mode settings.

Mode	SP5-997 (Test Pattern) Setting				
	Tray selection	Pattern	Color mode	Resolution	Paper size (By-pass)
Normal, color, 600 dpi	2	05	Full Color	600x600	—
Normal, color, 1200 dpi	2	05	Full Color	1200x1200	—

> **NOTE:** Each adjustment needs to be done by using the paper type which the customer normally uses.

4. Check the tendency of color shift in the grid pattern printed in step 3. Sometimes, a magnification scope must be used to measure the amount of color shift between colors.
5. If the result is not within the target, go to the next step.

Fusing/ Registration Roller Speed Adjustment

SP mode (sub-scan registration) reset

1. Make sure that the SMC sheets (SP5-990-002) have been printed out.

2. Reset the setting of SP5-993-016 to 021 to "0."

Transfer belt aging

1. Remove all PCUs. Place them on clean sheets of paper and cover the drums with a few sheets of paper to prevent the drums from light fatigue. Then, secure the drum positioning plate (2 screws) and return the transfer unit release lever to the original position.

2. Perform the transfer belt idling with SP5-804-074 (Drum M H CW) for about 3 minutes. (This is to stabilize the transfer belt side-to-side movement.)

3. Reinstall the PCUs.

4. Perform the line position adjustment (SP5-993-002 or 'Auto Adjust' in User Program mode).

5. Print a 1-dot grid pattern using A3/11" x 17" paper in 600 dpi mode.

6. If the color shift in the main-scan direction is not within the adjustment standard, follow the troubleshooting guide.

Fusing roller speed adjustment

1. Perform the line position adjustment (SP5-993-002 or 'Auto Adjust' in User Program mode).

2. Print a 1-dot grid pattern for each of the following modes using A3/11" x 17" paper.

    (1) Normal, 600 dpi
    (2) Normal, 1200 dpi
    (3) Thick, 1200 dpi

3. If the color has shifted within 100 mm from the trailing edge, follow the troubleshooting procedure (Sub-scan/Trailing edge).

Registration roller speed adjustment (for color mode)

1. Perform the line position adjustment (SP5-993-002 or 'Auto Adjust' in User Program mode).

2. Print a 1-dot grid pattern for each of the following modes using A3/11" x 17" paper.

    (1) Normal, 600 dpi
    (2) Normal, 1200 dpi

3. If the color has shifted within 100 mm from the leading edge, follow the troubleshooting procedure (Sub-scan/Leading edge).

NOTE: The registration roller speed for by-pass paper feed is the same as for normal 1200 dpi mode.

Line position fine adjustment for sub-scan

1. Print a 1-dot grid pattern each for each of the following modes using A3/11" x 17" paper.

Mode	SP5-997 (Test Pattern) Setting				
	Tray selection	Pattern	Color mode	Resolution	Paper size (By-pass)
Normal, color, 600 dpi	2	05	Full Color	600x600	-
Normal, color, 1200 dpi	2	05	Full Color	1200x1200	-
Thick paper	0	05	Full Color	1200x1200	A3 / 11x17

2. Check if there is any color which has shifted from the black line by the same amount all the way down the page from leading to trailing edge. If there is, follow the troubleshooting procedure (Sub-scan/Whole image).

Trouble-shooting

Registration roller speed adjustment (For B&W mode)

1. Input the following values in the SP modes.

   SP1-004-006 = (Value of SP1-004-005)
   SP1-005-002 = (Value of SP1-004-005) – 0.2%

2. Print a 2-dot pattern (pattern 12) using A3/11" x 17" paper.

Mode	SP5-997 (Test Pattern) Setting				
	Tray selection	Pattern	Single Color	Color Mode	Resolution
Normal color 600 dpi	2	12	6 (Black)	Single Color	600x600

3. Depending on the paper used, a horizontal band may appear at 60 mm (2.76") from the leading edge on A3 (11" x 17") paper. If the horizontal band is observed on the 2-dot pattern, decrease the setting of SP1-004-006 in 0.05% steps until the problem is solved.

4.6.4 BLACK OVER PRINT

Black Over Print prevents unexpected white lines from appearing when black letters or lines are printed with color background. You can enable or disable this feature from the printer driver (default: disabled).

When it is enabled, Black Over Print has the following unpleasant side effects:

- Crispness may deteriorate because the black toner spreads out.
- More toner is consumed.
- The background color may be seen through black letters or lines.

Black Over Print Disabled

Black lines and color background are printed as follows:

1. The color toner (for example, magenta [B] and yellow [A] toner) is transferred on the paper [C]. Some space [D] is left blank for the black toner.

2. The black toner [E] is transferred in the blank space.

If the line position of the black toner is not correct, an unexpected white line [F] appears.

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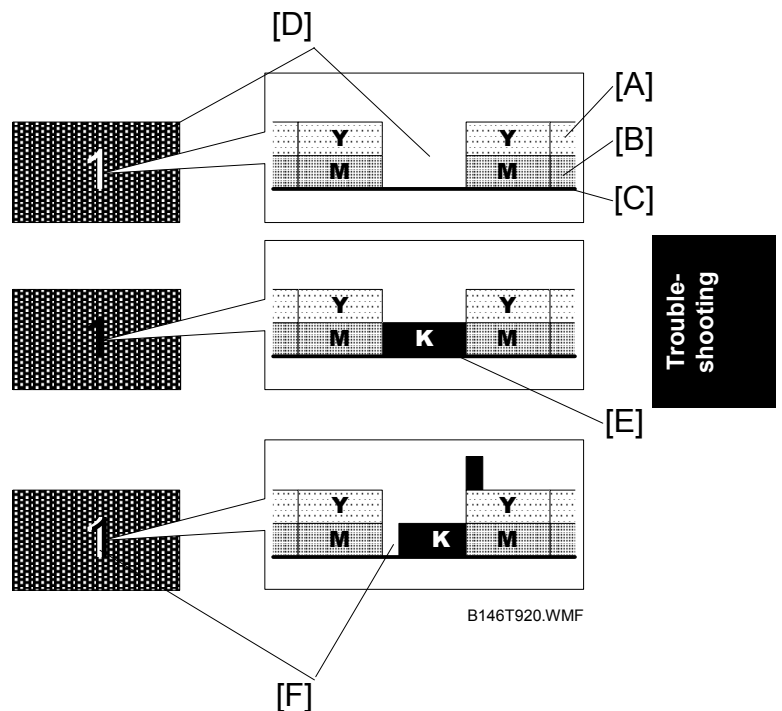
Black Over Print Enabled

Black lines and color background are printed as follows:

1. The color toner (for example, magenta [B] and yellow [A] toner) is transferred on the paper [C].

2. The black toner [D] is transferred on the color toner.

Even if the line position of the black toner is not correct, an unexpected white line does not appear.

B146T921.WMF
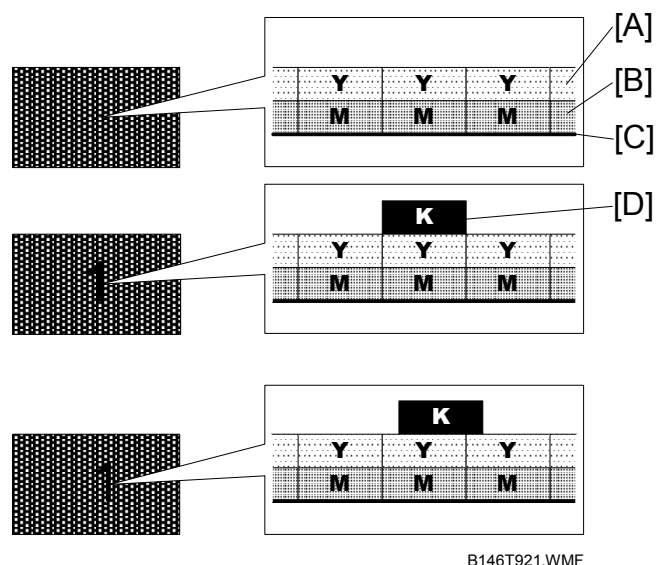
4.7 ELECTRICAL COMPONENT DEFECTS

4.7.1 SENSORS

Component	CN	Condition	Symptom
Scanner Home Position	632-A2	Open	SC121
		Shorted	SC120
Platen Cover	648-2	Open	APS and ARE do not function properly.
		Shorted	No symptom
Original Width	632-A	Open	CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
Original Length-1	632-B	Open	CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
Original Length-2	632-B	Open	CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
LD H.P. sensor	220-B12	Open	SC261
		Shorted	SC260
TD sensor	K: 210-A3 C: 210-B9 M: 209-A19 Y: 210-A9	Open	SC370/371/372/373
		Shorted	SC370/371/372/373 or SC374/375/376/377
Transfer belt sensor	210-A12	Open	SC471
		Shorted	
ID sensor	Rear: 228-3 Center: 228-4, 7 Front: 228-8	Open	SC385
		Shorted	
Paper end sensor	Tray1: 205-A5 Tray2: 205-B9 By-pass: 209-A15	Open	The Paper End indicator lights even if paper is placed in the paper tray.
		Shorted	The Paper End indicator does not light even if there is no paper in the paper tray.
Paper lift sensor	Tray1: 205-A2 Tray2: 205-B6	Open	The bottom plate of the paper feed unit is not lifted up.
		Shorted	SC501/502
Relay sensor	205-A8	Open	Paper Jam is detected whenever a print is made.
		Shorted	Paper Jam is detected even if there is no paper.
Vertical transport sensor	208-B11	Open	Paper Jam is detected whenever a print is made.
		Shorted	Paper Jam is detected even if there is no paper.

Component	CN	Condition	Symptom
Registration sensor	209-B2	Open	Paper Jam is detected whenever a print is made.
		Shorted	Paper Jam is detected even if there is no paper.
Fusing exit sensor	212-A7	Open	Paper Jam is detected whenever a print is made.
		Shorted	Paper Jam is detected even if there is no paper.
Paper exit sensor	212-B4	Open	Paper Jam is detected whenever a print is made.
		Shorted	Paper Jam is detected even if there is no paper.
Paper overflow sensor	212-A2	Open	The paper overflow message is not displayed even when a paper overflow condition exists, causing paper jam.
		Shorted	The paper overflow message is displayed.
Toner end sensor	K: 209-A2 Y: 206-A7 C: 206-A4 M: 206-A1	Open	Toner near end may not be detected even when the toner near end condition is satisfied.
		Shorted	Toner near end may be detected even when the toner near end condition is not satisfied.
Drum gear position sensor	K: 213-13 CMY: 210-B12	Open	SC440
		Shorted	
Waste oil sensor	212-A13	Open	Waste oil near full message is displayed.
		Shorted	Waste oil near full message is not displayed even when a waste oil near full condition exists, causing a waste oil leak.
Waste oil bottle set sensor	212-A16	Open	The message "Reset waste oil bottle correctly" is displayed even when it is set correctly.
		Shorted	The message "Reset waste oil bottle correctly" is not displayed even when it is not set correctly.
Waste toner sensor	213-A4	Open	Waste toner near full message is displayed, even when a waste toner near full condition does not exist.
		Shorted	Waste toner near full message is not displayed even when a waste toner near full condition exists, causing waste toner leak.

NOTE: The CN numbers are the connector numbers on the BCU.

4.8 BLOWN FUSE CONDITIONS

Fuse	Rating		Symptom when turning on the main switch
	115 V	**220 - 240 V**	
Power Supply Unit			
FU1	15A/125V	—	No response (No power is supplied to the electrical components.)
CB1	—	8A/250V	
FU2	10A/125V	5 A/250V	No response (No DC power is supplied to the electrical components.)
FU91	10A/125V	10A/125V	Only 24V DC power is not supplied. The ⊘ LED lights. But you see no other response.
High Voltage Power Supply Board–Transfer			
IP101	1.5A/50V		SC285 (The electricity to the following components is cut off: the transfer roller, paper attraction roller, and transfer exit roller.)

4.9 LEDS (BCU)

LED	Status	
	Blinking	**Stays OFF or ON**
LED 3 (Red)	The Main CPU functions correctly.	The Main CPU does not function properly.
LED 2 (Green)	The MUSIC CPU functions correctly.	The MUSIC CPU does not function properly.
LED 1 (Yellow)	The DSP functions correctly.	The DSP does not function properly.

5. SERVICE TABLES

5.1 SERVICE PROGRAM MODE

> ⚠**CAUTION**
>
> Before starting the SP mode, check that the data-in LED (✦) is not on. This LED indicates that some data is coming to the copier. When the LED is on, wait for the copier to process the data.

5.1.1 ENABLING AND DISABLING SERVICE PROGRAM MODE

NOTE: The Service Program Mode is for use by service representatives only, so that they can properly maintain product quality. If this mode is used by anyone other than service representatives for any reason, data might be deleted or settings might be changed. In such case, product quality cannot be guaranteed any more.

Entering SP Mode

⌧	1. Press the Clear Mode key.
①⓪⑦	2. Use the keypad to enter "107".
©/⊘	3. Hold down Clear/Stop for at least 3 seconds.
	4. Enter the Service Mode.

Exiting SP Mode

Exit	5. Press Exit twice to return to the copy window.

**Service
Tables**

5.1.2 TYPES OF SP MODES

Copy SP........... SP modes related to the engine functions

Printer SP .... SP modes related to the controller functions

Scanner SP...... SP modes related to the scanner functions

Fax SP .... SP modes related to the fax functions

After accessing the SP mode, select one of the Service Program modes (Copy, Printer, Scanner, or Fax) from the touch panel as shown in the diagram below. This section explains the functions of the Printer/Copy/Scanner SP modes. Please refer to the Fax service manual for the Fax SP modes.
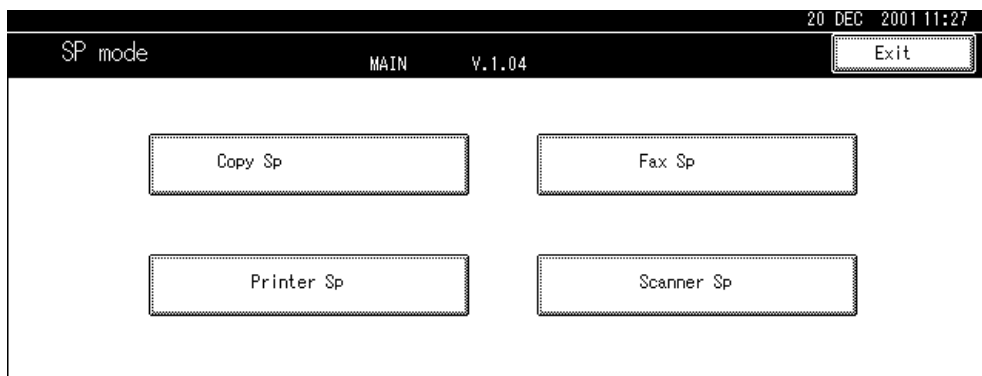
B146S910.WMF

SP Mode Button Summary

Here is a short summary of the touch-panel buttons.
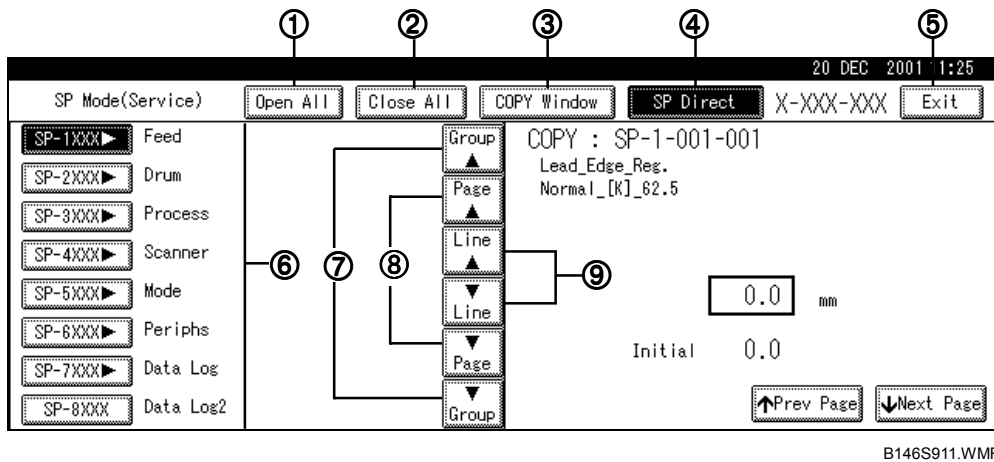
B146S911.WMF

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 ⌗. (The required SP Mode number will be highlighted when pressing ⌗. If not, just press the required SP Mode number.)

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

⑥ Press any Class 1 number to open a list of Class 2 SP modes.

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.

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.
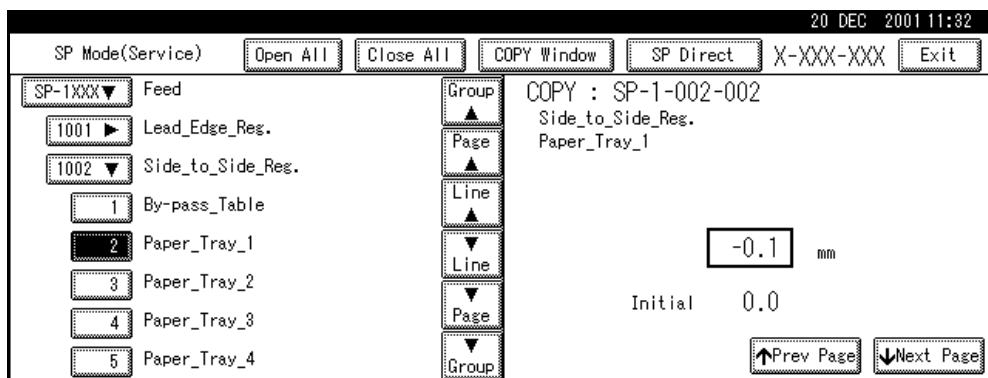
B146S912.WMF

NOTE: Refer to the Service Tables for the range of allowed settings.

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 writes 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 ⊘, 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.

Exiting Service Mode

Press the Exit key on the touch-panel.

NOTE: To make the following settings effective, you must turn the main switch off and on after exiting service mode.

SP Modes Related to the Engine	SP Modes Related to the Controller
SP2-208-009	SP5-302-002
SP2-213-001	SP5-801-003 to 013
SP2-224-001 to 004	SP5-824-001
SP5-150-001	SP5-825-001
SP5-994-001 and 002	SP5-832-001 to 011
SP5-998-001	
SP5-999	

NOTE: If the settings of SP modes 5-993-013 to 015 are changed, these changes will affect the next line position adjustment.

5.1.3 REMARKS

Display on the Control Panel Screen

Since the maximum number of characters which can be displayed on the control panel screen is limited (20 characters), the description of SP modes displayed on the screen needs to be abbreviated The following are the major abbreviations used for the SP modes for which the full description is over 20 characters.

Paper Type
N: Normal paper
TH: Thick paper

Color Mode [Color]
[K]: Black in B&W mode
[Y], [M], or [C]: Yellow, Magenta, or Cyan in Full Color mode
[YMC]: Only for Yellow, Magenta, and Cyan
[FC]: Full Color mode
[FC, K], [FC, Y], [FC, M], or [FC, C]: Black, Yellow, Magenta, or Cyan in full color mode

Paper Feed Station
P: Paper tray
B: By-pass table

Fusing Section
H: Heating roller
P: Pressure roller

Print Mode
S: Simplex
D: Duplex

Process Speed
62.5, 125, 185

Service
Tables

As shown in the following table, the process speed (mm/s) depends on the print mode (B&W or Color), resolution, and/or type of paper selected. Some SP mode settings depend on the process speed.

Mode	Resolution (dpi)	Line speed (mm/s)	Print speed (ppm)
B/W	600 x 600 1,800 x 600	185	38
	1,200 x 1,200	125	28
Color	600 x 600 1,800 x 600	125	28
	1,200 x 1,200	62.5	14
OHP/Thick	600 x 600 1,800 x 600 1,200 x 1,200	62.5	10

The process speed (mm/s) depends on the print mode (B&W or Color), resolution, and/or type of paper selected. Some SP mode settings depend on the process speed.

Others

The following symbols are used in the SP mode tables.

FA: Factory setting
(Data may be adjusted from the default setting at the factory. Refer to the factory setting sheets enclosed, which is located underneath the jammed paper removal decal.)

DFU: Design/Factory Use only
Do not touch the SP mode in the field.

A sharp (#) to the right hand side of the mode number column means that the main switch must be turned off and on to effect the setting change.

An asterisk (*) to the right hand side of the mode number column means that this mode is stored in the NVRAM. If you do a RAM clear, this SP mode will be reset to the default value. "BCU" and "CTL" indicate which NVRAM contains the data.
- BCU: NVRAM on the BCU board
- CTL: NVRAM on the controller board

The settings of each SP mode are explained in the right-hand column of the SP table in the following manner.

[Adjustable range / Default setting / Step] Alphanumeric

NOTE: If "Alphanumeric" is written to the right of the bracket as shown above, the setting of the SP mode is displayed on the screen using alphanumeric characters instead of only numbers. However, the settings in the bracket in the SP mode table are explained by using only the numbers.

5.2　COPY SERVICE MODE

5.2.1　SERVICE MODE TABLE

SP1-XXX (Feed)

1001	**[Lead Edge Reg.]** Leading Edge Registration (Paper Type, [Color], Process Speed), Paper Type -> N: Normal, OHP, TH: Thick		
	Adjusts the leading edge registration by changing the registration clutch operation timing for each mode.		
1001 1	Normal [K] 62.5	*BCU	[-10.0 to 10.0 / <u>0.0</u> / 0.1 mm/step] **FA**
1001 2	Normal [K] 125	*BCU	
1001 3	Normal [K] 185	*BCU	
1001 4	Normal [FC] 62.5	*BCU	
1001 5	Normal [FC] 125	*BCU	
1001 6	Thick [K]	*BCU	
1001 7	Thick [FC]	*BCU	
1001 8	OHP [K]	*BCU	
1001 9	OHP [FC]	*BCU	

1002	**[Side to Side Reg.]** Side-to-Side Registration		
	Adjusts the side-to-side registration by changing the laser main scan start position for each mode.		
1002 1	By-pass Table	*BCU	[-10.0 to 10.0 / <u>0.0</u> / 0.1 mm/step] **FA**
1002 2	Paper Tray 1	*BCU	
1002 3	Paper Tray 2	*BCU	
1002 4	Paper Tray 3	*BCU	[-10.0 to 10.0 / <u>0.0</u> / 0.1 mm/step]
1002 5	Paper Tray 4	*BCU	
1002 6	Duplex	*BCU	

1003	**[Paper Buckle]** Paper Buckle (**P**aper Tray or **B**y-pass, Paper Type, Process Speed), Paper Type: N: Normal, TH: Thick		
	Adjusts the amount of paper buckle at the registration roller by changing the paper feed timing.		
1003 1	Paper Tray 62.5	*BCU	[-5 to 5 / <u>0</u> / 1 mm/step]
1003 2	Paper Tray 125	*BCU	
1003 3	Paper Tray 185	*BCU	
1003 4	By-pass N 62.5	*BCU	
1003 5	By-pass N 125	*BCU	
1003 6	By-pass N 185	*BCU	
1003 7	By-pass TH	*BCU	
1003 8	By-pass OHP	*BCU	

1004	**[Dev. Motor Speed]** Development Drive Motor Speed ([Color], Process Speed, Paper Type), Paper Type -> N: Normal, TH: Thick		
	Adjusts the development drive motor speed for correcting color shifts at the leading edge or trailing edge area. Black Motor [K]: Adjusts fusing roller speed for the trailing edge area. Color Motor [YMC]: Adjusts registration roller speed for the leading edge area. **NOTE:** • SP1-004-002 and 005 is for color mode. Fine adjustment for B&W mode can be done with SP1-005-001 and 002. • SP1-004-004 is for normal paper. Fine adjustment for thick paper can be done with SP1-005-003.		
1004 1	[K] 62.5 Normal	*BCU	[96.0 to 104.0 / <u>97.8</u> / 0.1 %/step]
1004 2	[K] 125	*BCU	[96.0 to 104.0 / <u>97.6</u> / 0.1 %/step]
1004 3	[K] 185	*BCU	[96.0 to 104.0 / <u>98.1</u> / 0.1 %/step]
1004 4	[YMC] 62.5	*BCU	[96.00 to 104.00 / 100.00 / 0.05 %/step] **FA**
1004 5	[YMC] 125	*BCU	
1004 6	[YMC] 185	*BCU	
1004 7	[K] 62.5 Thick	*BCU	

1005	**[Dev. Motor Speed2]** Development Drive Motor Speed 2 ([Color], Process Speed, Paper Type), Paper Type -> TH: Thick		
1005 1	[K]	*BCU	[-0.2 to +1.0 / <u>+0.2</u> / 0.1 %/step]
	Adjusts the black development drive motor speed for the B&W 125mm/s process speed. The value stored in this SP mode is different from SP1-004-002 (see the note for SP 1-004). At the 125mm/s process speed, the transfer unit position for B&W is different than for color mode. The transfer unit position affects the paper transport quality, causing the paper to flip up at the fusing section if the same speed as color mode is used for B&W mode. To minimize the occurrence of paper flipping up, which causes smeared images in the trailing area, this SP mode can change the motor speed in B&W mode.		
1005 2	[YMC]	*BCU	[-1.00 to 1.00 / <u>0</u> / 0.05 %/step] **FA**
	Adjusts the color development drive motor speed for the B&W 125mm/s process speed. The value stored in this SP mode is different from SP1-004-005 (see the note for SP 1-004). At the 125mm/s process speed, the transfer unit position for B&W is different than for color mode. The transfer unit position affects the paper transport speed slightly. This SP mode can adjust the motor speed for B&W mode.		
1005 3	[YMC] Thick	*BCU	[-0.30 to 0.30 / <u>0</u> / 0.05 %/step]
	Adjust the color development drive motor speed for thick paper in by-pass mode. The value stored in this SP mode is different from SP1-004-004 (see the note for SP 1-004). Normal and thick paper are different types of paper, and this sometime causes color shift due to paper slippage. This SP mode can change the motor speed for thick paper.		

1006	**[Dev. Motor Speed3]** Development Drive Motor Speed 3 ([Color], Process Speed, Paper Type), Paper Type -> SP: Special		
	Adjusts the development motor speed for special paper.		
1006 1	[K] 62.5 Special	*BCU	[-4.0 to 4.0 / <u>0</u> / 0.1 %/step]
1006 2	[K] 125 Special	*BCU	
1006 3	[YMC] 62.5 Special	*BCU	[-4.00 to 4.00 / <u>-0.1</u> / 0.05 %/step]
1006 4	[YMC] 125 Special	*BCU	

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1007	**[Dev. Motor Speed4]** Development Drive Motor Speed 4		
	Adjusts the development motor speed for postcards.		
1007 1	[CL] Mail TH	*BCU	[-1.00 to 0.00 / -0.40 / 0.05%/step]

1008	**[Drum STM Speed]** Drum STM Speed Adjustment		
	Adjusts the drum speed of each line-speed mode (62.5 mm/s and 125 mm/s); this adjusts drum speed but not transfer belt speed.		
1008 1	[CL] 62.5	*BCU	[0 to 10/ 7 / 1 /step] **DFU**
1008 2	[CL] 125	*BCU	[0 to 10/ 7 / 1 /step] **DFU**
1008 3	[Bk] 62.5	*BCU	[0 to 10/ 5 / 1 /step] **DFU**
1008 4	[Bk] 125	*BCU	[0 to 10/ 3 / 1 /step] **DFU**
1008 5	OHP	*BCU	[0 to 10/ 3 / 1 /step] **DFU**
1008 6	MUSIC	*BCU	[0 to 10/ 3 / 1 /step] **DFU**

1104	**[Fusing Control]**		
1104 1	Control Method	*BCU	[0 or 1 / 0 / -] Alphanumeric 0: ON/OFF Control 1: Phase Control
	Selects the fusing control method. **NOTE:** This mode can be used only for N. America models		
1104 25	Process Speed	*BCU	[0 to 4 / 4 / 1/step] Alphanumeric 0: Color 62.5 mm/s (temperature specified by SP 1-105-8 and 19) 1: Color 125 mm/s (temperature specified by SP 1-105-9 and 20) 2: Thick / OHP (temperature specified by SP 1-105-13 and 24) 3: K 125 mm/s (temperature specified by SP 1-105-4 and 15) 4: K 185 mm/s (temperature specified by SP 1-105-5 and 16)
	Selects the power-on default target fusing operation temperature. The target operating fusing temperature depends on the process speed. When the machine is switched on, it starts warming up for the process speed specified in this SP mode.		

1105	**[Fusing Temperature]**		
	(**H**eating or **P**ressure roller: Paper Type, [Color], **S**implex/**D**uplex, Process Speed) Paper Type -> N: Normal, OHP. TH: Thick, SP: Special Some settings of fusing temperature depend on the destination (US or Europe/Asia). US: Setting for US, EU: Setting for Europe/Asia		
1105 1	H: Ready	*BCU	[10 to 100 / 10 / 1°C/step]
	Sets the heating roller temperature for the printing ready condition. After the main switch has been turned on, the machine enters the print ready condition when the heating roller temperature reaches the temperature specified in this SP mode. When the machine is in the recovery mode from the energy saver or auto off mode, the machine becomes ready when both heating and pressure roller temperatures reach the specified temperature. Ready temperature = (Target temperature specified in SP1-104-25 or 105-3 to 28) – Temperature specified in this SP mode.		

Service Tables

1105	[Fusing Temperature]		
1105 2	P: Ready	*BCU	[10 to 100 / NA: 10, EU: 20 / 1oC/step]
	Sets the pressure roller temperature for the printing ready condition. Ready temperature = (Target temperature specified in SP1-104-25 or 105-3 to 28) – Temperature specified in this SP mode		
	The following SPs set the target operating temperatures of the heating and pressure rollers in various modes. (The default settings are different for N. America and Eur./Asia)		
1105 4	H:N [K] S 125	*BCU	[100 to 190 / NA: 180, EU: 175 / 5°C/step]
1105 5	H:N [K] S 185	*BCU	[100 to 190 / NA: 180, EU: 180 / 5°C/step]
1105 6	H:N [K] D 125	*BCU	[100 to 190 / NA: 165, EU: 165 / 5°C/step]
1105 7	H:N [K] D 185	*BCU	[100 to 190 / NA: 175 , EU: 175 / 5°C/step]
1105 8	H:N[FC] S 62.5	*BCU	[100 to 190 / NA: 150, EU: 150 / 5°C/step]
1105 9	H:N[FC] S 125	*BCU	[100 to 190 / 180 / 5°C/step]
1105 10	H:N[FC] D 62.5	*BCU	[100 to 190 / NA: 145, EU: 145/ 5°C/step]
1105 11	H:N[FC] D 125	*BCU	[100 to 190 / NA: 165, EU: 170 / 5°C/step]
1105 13	H:OHP	*BCU	[100 to 190 / 165 / 5°C/step]
1105 15	P:N [K] S 125	*BCU	[0 to 190 / NA: 160, EU: 155 / 5°C/step]
1105 16	P:N [K] S 185	*BCU	[0 to 190 / NA: 155, EU: 160 / 5°C/step]
1105 17	P:N [K] D 125	*BCU	[0 to 190 / NA: 135, EU: 145 / 5°C/step]
1105 18	P:N [K] D 185	*BCU	[0 to 190 / NA: 145, EU: 155 / 5°C/step]
1105 19	P:N[FC] S 62.5	*BCU	[0 to 190 / NA: 125, EU: 130 / 5°C/step]
1105 20	P:N[FC] S 125	*BCU	[0 to 190 / 160 / 5°C/step]
1105 21	P:N[FC] D 62.5	*BCU	[0 to 190 / NA: 120, EU: 125 / 5°C/step]
1105 22	P:N[FC] D 125	*BCU	[0 to 190 / NA: 135, EU: 150 / 5°C/step]
1105 24	P:OHP	*BCU	[0 to 190 / 150 / 5°C/step]
1105 26	H:TH	*BCU	[0 to 190 / 175 / 5°C/step]
1105 28	P:TH	*BCU	[0 to 190 / 155 / 5°C/step]
1105 29	H:Envelop	*BCU	[0 to 190 / 175 / 5°C/step]
1105 30	P:Envelop	*BCU	[0 to 190 / 155 / 5°C/step]
1105 31	H: Slow Down	*BCU	[1 to 20 / 5 / 1°C/step]
	Sets the heating roller temperature for the printing start condition when changing the process speed. Fusing temperature must be decreased when the machine changes to a process speed that is slower than the current process speed (for example, when the speed changes from 185 mm/s to 62.5 mm/s). The machine idles while reducing the fusing temperature. When the fusing temperature becomes lower than the ready temperature, the machine starts printing. Ready Temperature = Target temperature + Temperature specified in this SP mode.		
1105 32	P: Slow Down	*BCU	[1 to 20 / 10 / 1°C/step]
	Sets the pressure roller temperature for the printing start condition when changing the process speed.		
1105 33	H:SP 62.5	*BCU	[-20 to +30 / +10 / 1°C/step]
1105 34	H:SP 125	*BCU	[-20 to +30 / +10 / 1°C/step]
1105 35	H:SP 185	*BCU	[-20 to +30 / +10 / 1°C/step]
1105 36	P:SP 62.5	*BCU	[-20 to +30 / +10 / 1°C/step]
1105 37	P:SP 125	*BCU	[-20 to +30 / +10 / 1°C/step]
1105 38	P:SP 185	*BCU	[-20 to +30 / +20 / 1°C/step]

1106	[Temperature Display] Fusing Temperature Display (Heating or Pressure)	
	Displays the current temperature of the heating and pressure rollers.	
1106 1	Heat Roller	[0 to 200 / - / 5°C/step]
1106 2	Pressure Roller	

1902	**[Paper Size]** Tray Paper Size		
1902 1	Tray 1 A4/LT	*BCU	[0 or 1 / <u>0</u> / -] Alphanumeric 0: A4 sideways, 1: LT sideways Tray 1 can only use these two sizes. US: 1 **FA**
	Specifies the paper size for tray 1.		
1902 2	Tray 2 B4/LG	*BCU	[0 or 1 / <u>0</u> / -] Alphanumeric 0: B4 lengthwise, 1: LG lengthwise This specifies which size is detected for a sensor output of 1101 (see section 6 for details). US: 1 **FA**
	Specifies the paper size for tray 2.		
1902 3	Tray 2 A4/LT	*BCU	[0 or 1 / <u>0</u> / -] Alphanumeric 0: A4 lengthwise, 1: LT lengthwise This specifies which size is detected for a sensor output of 0110 (see section 6 for details). US: 1 **FA**
	Specifies the paper size for tray 2.		
1902 4	Tray 2 B5/LT	*BCU	[0 or 1 / <u>0</u> / -] Alphanumeric 0: LT, 1: B5 lengthwise This specifies which size is detected for a sensor output of 1011 (see section 6 for details).
	Specifies the paper size for tray 2.		

1910	**[Fusing Idling Time]**		
	Specifies the timer for deciding whether to do fusing idling when receiving a print command. When receiving a new job within the time specified in this SP mode after the last job is completed, fusing idling is not done because the fusing section was already warmed up during the last job.		
1910 1	Idling Time	*BCU	[0 to 180 / 1 / 1 minute/step] **DFU**

Service
Tables

1912	[Machine Temp. Cor.] Machine Temperature Correction Th: Threshold, Heating or Pressure roller		
	Corrects the fusing temperature depending on the temperature inside the machine. If the temperature inside the machine is too high or low, this may cause hot or cold offset image at the fusing section. To avoid the offset image, the fusing temperature is corrected depending on the temperature inside machine, which is monitored by the thermistor located on the right side of the laser optics housing unit.		
	If the temperature inside the machine is detected as high or low (based on the settings of SP1-912-001 or 002), the fusing temperature is decreased or increased by the temperature specified in SP1-912-003 to 006. Also see SP 1-917-1.		
1912 1	Th:High Temp	*BCU	[0 to 50 / 30 / 1°C/step]
	Sets the threshold for entering the high temperature condition.		
1912 2	Th:Low Temp	*BCU	[0 to 50 / 17 / 1°C/step]
	Sets the threshold for entering the low temperature condition.		
1912 3	H:High Temp	*BCU	[0 to 15 / 0 / 1°C/step]
	Sets the fusing temperature decrease for the high temperature condition.		
1912 4	P:High Temp	*BCU	[0 to 15 / 0 / 1°C/step]
1912 5	H:Low Temp	*BCU	[0 to 15 / 5 / 1°C/step]
	Sets the fusing temperature increase for the low temperature condition.		
1912 6	P:Low Temp	*BCU	[0 to 15 / 5 / 1°C/step]

1913	[Temperature. Cor. 1] Fusing Temperature Correction (Correction Timing)		
	Specifies the number of sheets to determine whether or not to apply the fusing temperature correction. During a multi print job, the fusing temperature tends to slightly overshoot around the 10th sheet and then stabilize. Temperature overshooting may cause the glossiness to increase. To minimize the overshooting, both fusing and pressure roller temperatures are decreased by the amount specified in SP1-914 at the number of sheets specified in this SP mode, until the end of the job. The temperatures are decreased in two steps. Example: 125 mm/s line speed First step (also called 'Mode 1'): After 5 sheets (SP 1-913-2), temperature drops by 5C (SP 1-914-2). Second step (also called 'Mode 2'): After 20 sheets (SP 1-913-7), temperature drops by 10C (SP 1-914-7). Narrow: LT/A4 SEF width or less Wide: Wider than LT/A4 SEF		
1913 1	Mode 1 185	*BCU	[1 to 255 / 5 / 1 sheet/step]
1913 2	Mode 1 125	*BCU	[1 to 255 / 5 / 1 sheet/step]
1913 3	Mode 1 62.5	*BCU	[1 to 255 / 5 / 1 sheet/step]
1913 4	Mode 1 OHP narrow	*BCU	[1 to 255 / 5 / 1 sheet/step]
1913 5	Mode 1 185 wide	*BCU	[1 to 255 / 10 / 1 sheet/step]
1913 6	Mode 2 185	*BCU	[1 to 255 / 20 / 1 sheet/step]
1913 7	Mode 2 125	*BCU	[1 to 255 / 20 / 1 sheet/step]
1913 8	Mode 2 62.5	*BCU	[1 to 255 / 20 / 1 sheet/step]
1913 9	Mode 2 185 narrow	*BCU	[1 to 255 / 10 / 1 sheet/step]
1913 10	Mode 2 185 wide	*BCU	[1 to 255 / 20 / 1 sheet/step]

1914	**[Temperature Cor. 2]** Fusing Temperature Correction (Temperature Setting)		
	Specifies the temperature to be subtracted from the targeted temperatures specified in SP1-105-4 to-24. Narrow: LT/A4 SEF width or less Wide: Wider than LT/A4 SEF		
1914 1	Temp 1 185	*BCU	[0 to 20 / <u>0</u> / 5°C /step]
1914 2	Temp 1 125	*BCU	[0 to 20 / <u>5</u> / 5°C /step]
1914 3	Temp 1 62.5	*BCU	[0 to 20 / <u>0</u> / 5°C /step]
1914 4	Temp 1 OHP narrow	*BCU	[0 to 20 / <u>5</u> / 5°C /step]
1914 5	Temp 1 OHP wide	*BCU	[0 to 20 / <u>5</u> / 5°C /step]
1914 6	Temp 2 185	*BCU	[0 to 20 / <u>10</u> / 5°C /step]
1914 7	Temp 2 125	*BCU	[0 to 20 / <u>10</u> / 5°C /step]
1914 8	Temp 2 62.5	*BCU	[0 to 20 / <u>10</u> / 5°C /step]
1914 9	Temp 2 OHP narrow	*BCU	[0 to 20 / <u>5</u> / 5°C /step]
1914 10	Temp 2 OHP wide	*BCU	[0 to 20 / <u>5</u> / 5°C /step]

1915	**[Stand-by Time]**		
1915 1	Job Receiving	*BCU	[0 to 180 / <u>60</u> / 10 seconds/step] 0: The machine does not shift to the stand-by mode.
	Specifies the time to shift the machine into the stand-by mode when not receiving a print start command after receiving a print preparation command.		
1915 2	Job End	*BCU	[0 to 180 / 30 / 10 seconds/step] 0: The machine does not shift to the stand-by mode.
	Specifies the time to shift the machine into the stand-by mode after the last job is completed.		

1916	[Idling Mode]		
1916 1	Mode Set	*BCU	[0 to 1 / <u>0</u> / 1 /step] 0: Off 1: On
	Executes the extra idling operation after the fusing unit becomes ready just after the main switch has been turned on.		
1916 2	Idling Time	*BCU	[10 to 120 / <u>30</u> / 10 sec/step]
	Specifies how long the extra idling operation is executed.		
1916 3	PreJob Mode	*BCU	[0 to 1 / <u>0</u> / 1 /step] 0: Off 1: On
	Executes the extra idling operation after the fusing unit becomes ready when a print job arrives at the copier.		
1916 4	Idling Time	*BCU	[0 to 360 / <u>0</u> / 1 sec/step]
	Specifies how long the extra idling operation is executed when special paper is used and the line speed is 185 mm/s.		

Service Tables

1996	[OHP/TH Fusing] OHP/Thick Paper Fusing Temperature Correction (Heating or Pressure Roller)		
	Specifies the temperature for starting a print job. The fusing section is already warmed up when the last print job was completed. If prints are made on OHP or thick paper at this time, the fusing temperature tends to be higher than the target, causing exit roller marks or a paper jam in the fusing section. To prevent this, the print job will not start if the heating and pressure roller temperatures are higher than the following: (Target temperature specified by SP1-105-12, -13, -23, -24) - (Temperature specified by this SP mode (default: 5°C for heating roller, 10°C for pressure roller))		
1996 4	H:Print Temp	*BCU	[0 to 20 / 5 / 1°C /step]
1996 5	P:Print Temp	*BCU	[0 to 20 / 10 / 1°C /step]
1996 6	PreJob Mode	*BCU	[0 to 1 / 0 / 1 /step] 0: Off 1: On
	This SP enables or disables the 30-second fusing unit idling at the start of an OHP print job. When enabled, idling is done even if the machine is in the ready condition.		

SP2-XXX (Drum)

2001	[Charge Bias] Charge Roller Bias (DC or AC component: [Color], Process Speed) U: Upper, L: Lower		
	Adjusts the DC component of the charge roller bias in the various print modes. Charge bias (DC component) is automatically adjusted during process control; therefore, adjusting these settings does not effect while process control mode (SP3-125 Default: ON) is activated. When deactivating process control mode with SP3-125, the values in these SP modes are used for printing.		
2001 1	DC:[K]	*BCU	[300 to 1000 / 700 / 10 volts/step] **DFU**
2001 2	DC:[Y]	*BCU	
2001 3	DC:[M]	*BCU	
2001 4	DC:[C]	*BCU	
	• Displays the AC component of the charge roller bias adjusted during machine initialization or process control self-check. • Sets AC bias in the various print modes for test purposes. If the optimum AC bias cannot be selected because of the upper and lower limits (SP2-001-10 and 11 for K, SP 2-001-21 and 22 for YMC), this may cause white spots on images and black spots on background. (In particular, spots may appear if the room temperature is very low.) Check the printouts after changing the AC bias with these SP modes (SP2-001-12 to 20) and exiting SP mode. If increasing or decreasing the AC bias for relevant color solves the spot problem, shift the AC upper and lower limits (SP2-001-10 and 11 for K, SP 2-001-21 and 22 for YMC) by the value increased or decreased during the test. **NOTE:** The AC upper and lower limits have been optimized by the manufacturer; therefore, these settings should not be adjusted in the field.		
2001 5	AC:[K] 62.5		[0 to 255 / 40 / 1/step] **DFU**
2001 6	AC:[K] 125		[0 to 255 / 71 / 1/step] **DFU**
2001 7	AC:[K] 185		[0 to 255 / 159 / 1/step] **DFU**
2001 8	AC:[Y] 62.5		[0 to 255 / 40 / 1/step] **DFU**
2001 9	AC:[Y] 125		[0 to 255 / 71 / 1/step] **DFU**
2001 10	AC:[M] 62.5		[0 to 255 / 40 / 1/step] **DFU**
2001 11	AC:[M] 125		[0 to 255 / 71 / 1/step] **DFU**
2001 12	AC:[C] 62.5		[0 to 255 / 40 / 1/step] **DFU**
2001 13	AC:[C] 125		[0 to 255 / 71 / 1/step] **DFU**
	Sets the upper limit of the AC component adjustable range for black. During machine initialization and process control self-check, the AC component of the charge roller bias is automatically adjusted within the range specified by SP2-001-014 through 017.		
2001 14	AC Target [K]	*BCU	[0 to 255 / 86 / 1/step] **DFU**
2001 15	AC Target [Y]	*BCU	[0 to 255 / 83 / 1/step] **DFU**
2001 16	AC Target [M]	*BCU	[0 to 255 / 86 / 1/step] **DFU**
2001 17	AC Target [C]	*BCU	[0 to 255 / 83 / 1/step] **DFU**

2101	[TrimAdjust] Trimming Adjustment		
	This program adjusts the trimming area (the area in which no image is created).		
2103 1	front	*BCU	[0.0 to 6.0 / 3.0 / 0.1 mm/step]
2103 2	back	*BCU	[0.0 to 6.0 / 3.0 / 0.1 mm/step]
2103 3	lead	*BCU	[0.0 to 6.0 / 2.0 / 0.1 mm/step]
2103 4	trail	*BCU	[0.0 to 6.0 / 2.0 / 0.1 mm/step]

Service Tables

2103	**[LD Control]** LD Power Control ([Color Mode, Color], Process Speed, **K** or **C**olor mode) P: Power, M: Magnification		
	Adjusts the laser power by changing the current applied to LD. Laser power is automatically adjusted during process control; therefore, adjusting these data has no effect while Process Control (SP3-125 Default : ON) is activated. After deactivating Process Control with SP3-125, the values in these SP modes are used for printing.		
2103 1	P:[K] 62.5 C	*BCU	[0 to 1023 / <u>576</u> / 1/step] **DFU**
2103 2	P:[K] 125 C	*BCU	[0 to 1023 / <u>640</u> / 1/step] **DFU**
2103 4	P:[Y] 62.5 C	*BCU	[0 to 1023 / <u>576</u> / 1/step] **DFU**
2103 5	P:[Y] 125 C	*BCU	[0 to 1023 / <u>640</u> / 1/step] **DFU**
2103 7	P:[M] 62.5 C	*BCU	[0 to 1023 / <u>576</u> / 1/step] **DFU**
2103 8	P:[M] 125 C	*BCU	[0 to 1023 / <u>640</u> / 1/step] **DFU**
2103 10	P:[C] 62.5 C	*BCU	[0 to 1023 / <u>576</u> / 1/step] **DFU**
2103 11	P:[C] 125 C	*BCU	[0 to 1023 / <u>640</u> / 1/step] **DFU**
2103 13	P:[K] 62.5 K	*BCU	[0 to 1023 / <u>576</u> / 1/step] **DFU**
2103 14	P:[K] 125 K	*BCU	[0 to 1023 / <u>576</u> / 1/step] **DFU**
2103 15	P:[K] 185 K	*BCU	[0 to 1023 / <u>601</u> / 1/step] **DFU**
2103 26	P:[0 1] 125 K	*BCU	[0 to 1023 / <u>576</u> / 1/step] **DFU**
2103 27	P:[0 1] 185 K	*BCU	[0 to 1023 / <u>601</u> / 1/step] **DFU**
	Main Scan Magnification ([Color], Laser Exposure Frequency)		
	Displays the result of the latest line position adjustment. Changing this affects the main scan magnification; however, this will be automatically corrected at the next line position adjustment. If a fine adjustment is required, it can be done with SP5-993-013 to 015 (this affects the way that the adjustment is done, and will be effective from the next line position adjustment). **NOTE:** If the line position adjustment does not work properly, the line position can be adjusted manually with this SP mode as a temporary measure. In this case, the line position adjustment needs to be disabled with SP5-993-001.		
2103 55	M:[K] 64.3MHz	*BCU	[0 to 280 / <u>140</u> / 1 dot/step] 1 dot = 20μ **DFU**
2103 56	M:[Y] 64.3MHz	*BCU	
2103 57	M:[M] 64.3MHz	*BCU	
2103 58	M:[C] 64.3MHz	*BCU	
2103 59	M:[K] 47.6MHz	*BCU	
2103 101	CF:[K,K] 1	*BCU	[0 to 1023 / <u>604</u> / 1/step] **DFU**
2103 102	CF:[K,K] 2	*BCU	[0 to 1023 / <u>604</u> / 1/step] **DFU**
2103 103	CF[FC,K]	*BCU	[0 to 1023 / <u>720</u> / 1/step] **DFU**
2103 104	CF:[FC:Y]	*BCU	[0 to 1023 / <u>720</u> / 1/step] **DFU**
2103 105	CF:[FC,M]	*BCU	[0 to 1023 / <u>720</u> / 1/step] **DFU**
2103 106	CF:[FC,C]	*BCU	[0 to 1023 / <u>720</u> / 1/step] **DFU**
2103 107	CF:[K] OHP/TH	*BCU	[0 to 1023 / <u>590</u> / 1/step] **DFU**
2103 108	CF:[Y] OHP/TH	*BCU	[0 to 1023 / <u>590</u> / 1/step] **DFU**
2103 109	CF:[M] OHP/TH	*BCU	[0 to 1023 / <u>590</u> / 1/step] **DFU**
2103 110	CF:[C] OHP/TH	*BCU	[0 to 1023 / <u>590</u> / 1/step] **DFU**

2109	**[LD Beam Pitch]** LD Beam Pitch		
	Sets the beam pitch for black in 1200 dpi or 600 dpi mode. **NOTE:** After replacing the laser optics housing unit, the data printed on the decal attached to the new unit must be input with this SP mode.		
2109 2	Pitch 1200	*BCU	[0 to 255 / <u>50</u> / 50 pulse/step] **FA**
2109 3	Pitch 600	*BCU	[0 to 255 / <u>42</u> / 50 pulse/step] **FA**
2109 5	Display 1200		[0 to 255 / - / 1 pulse/step]
2109 6	Display 600		[0 to 255 / - / 1 pulse/step]

2112	**[Polygon OFF Timing 1]** Polygon Mirror Motor OFF Timing		
2112 1	Warming-up	*BCU	[0 to 60 / <u>10</u> / 1 second/step] 0: Not turned off except for Energy Saver mode
	The polygon mirror motor turns off if the machine receives no print start command for the time specified in this SP mode after receiving the print preparation command.		
2112 2	Job End	*BCU	[0 to 60 / <u>10</u> / 1 second/step] 0: Not turned off except for Energy Saver mode
	The polygon mirror motor turns off if the machine receives no print job for the time specified in this SP mode after the previous job was completed.		

2113	**[Polygon OFF Timing 2]** Polygon Mirror Motor OFF Timing	[0 or 1 / <u>0</u> / 1 /step] 0: Enable, 1: Disable
2131 1	The polygon mirror motor does not turn on until the copier enters the ready condition even after receiving the print start command. **NOTE:** When a user complains about high frequency noise, enabling this mode can minimize the noise.	

2201	**[Dev. Bias]** Development Bias ([Color], Process Speed)		
	Adjusts the development bias. Development bias is automatically adjusted during process control; therefore, adjusting these settings has no effect while Process Control (SP3-125 Default: ON) is activated. After deactivating Process Control with SP3-125, the values in these SP modes are used for printing.		
2201 1	[K] 62.5	*BCU	[200 to 800 / <u>500</u> / 10 V/step] **DFU**
2201 2	[K] 125	*BCU	
2201 3	[K] 185	*BCU	
2201 4	[Y] 62.5	*BCU	
2201 5	[Y] 125	*BCU	
2201 6	[M] 62.5	*BCU	
2201 7	[M] 125	*BCU	
2201 8	[C] 62.5	*BCU	
2201 9	[C] 125	*BCU	

2207	**[Forced Toner Supply]** Forced Toner Supply ([Color])		
	Forces toner to be supplied to the development unit. The toner supply clutch turns on for 0.7 s and off for 1.3 s.		
2207 1	[K]		[0 or 1 / <u>0</u> / 1 /step]
2207 2	[Y]		0: Not execute
2207 3	[M]		1: Execute
2207 4	[C]		

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2208	**[Toner Supply Mode]** Toner Supply Mode ([Color])		
	Selects the toner supply method.		
2208 1	[K]	*BCU	[0 to 2 / 1 / 1/step] Alphanumeric
2208 2	[Y]	*BCU	0: Fixed supply (with the supply rates stored
2208 3	[M]	*BCU	with SP2-208-5 to 8)
2208 4	[C]	*BCU	1: Fuzzy control supply
			2: Proportional control supply (using the Vref values stored with SP2-224-5 to 8)
	Sets the toner supply rate used when the toner supply method (SP2-208-1 to 4) is set to '0' (fixed supply mode).		
2208 5	Fixed Rate [K]	*BCU	[0 to 100 / 5 / 1%/step]
2208 6	Fixed Rate [Y]	*BCU	
2208 7	Fixed Rate [M]	*BCU	
2208 8	Fixed Rate [C]	*BCU	
	Specifies the maximum possible toner supply, expressed as a percentage of the maximum amount of toner that can possibly be supplied for a sheet of paper. If too much toner is supplied to the development unit especially for black or in the low humidity condition, this may cause dirty background due to insufficient agitation. This SP mode limits the maximum possible toner supply for black and only in the low humidity condition for color. **NOTE:** The main switch must be turned off and on to effect the setting change.		
2208 9	Upper Limit	*BCU #	[0 to 100 / 63 / 1 %/step] **DFU**
	Adjusts the toner supply amount (fixed rate) when making multiple prints of pages with low image ratio (coverage). When printing with a low image ratio, toner concentration is controlled only with Vt outputs since pixel count is not done for low image ratios. This may cause the attraction force between toner and carrier to increase, resulting in low image density on outputs. To prevent this, the machine counts the number of pixels and supplies a fixed amount of toner if the accumulated number of pixels becomes greater than the specified level.		
2208 10	LowCoverage[K]	*BCU	[0 to 100 / 0 / 1 %/step] **DFU**
2208 11	LowCoverage[Y]		
2208 12	LowCoverage[M]		
2208 13	LowCoverage[C]		
	Specifies each constant to adjust the toner supply amount. The optimum value is specified before shipment.		
2208 14	Vt Coeff[Bk]	*BCU	[0 to 10.0 / 0.3 / 0.1 %/step] **DFU**
2208 15	Vt Coeff[Y]		
2208 16	Vt Coeff[M]		
2208 17	Vt Coeff[C]		
	Specifies each constant to adjust the toner supply amount. The optimum value is specified before shipment.		
2208 18	Img Coeff[Bk]	*BCU	[0 to 10.0 / 0.7 / 0.1 %/step] **DFU**
2208 19	Img Coeff[Y]		
2208 20	Img Coeff[M]		
2208 21	Img Coeff[C]		
	Specifies each constant to adjust the toner supply amount. The optimum value is specified before shipment.		
2208 22	ImgCrctCoef[Bk]	*BCU	[0 to 10.0 / 0.1 / 0.1 %/step] **DFU**
2208 23	ImgCrctCoef[Y]		
2208 24	ImgCrctCoef[M]		
2208 25	ImgCrctCoef[C]		

2210	**[Toner Supply Counter]** Toner Supply Counter ([Color])		
	Displays the total time that the toner supply clutch has been on. This data is stored in the memory chip on each toner cartridge.		
2210 5	[K]	*BCU	[0 to 5000 / 0 / 1 second/step]
2210 6	[Y]	*BCU	
2210 7	[M]	*BCU	
2210 8	[C]	*BCU	

2212	**[Toner Near/End]** Toner Near End / End Detection Threshold ([Color])		
	When the amount of toner amount left in the cartridge becomes less than this value, the machine starts monitoring the Vt values for toner near end detection.		
2212 1	Start [K]	*BCU	[0 to 1000 / 100 / 10 g/step]
2212 2	Start [YMC]	*BCU	
	Specifies the threshold for toner near-end detection. The machine detects toner near-end when the following happens 10 times consecutively. Vt > Vref + Threshold		
2212 5	Near [K]	*BCU	[0 to 5.0 / 0.4 / 0.1 V/step]
2212 6	Near [YMC]	*BCU	
	Specifies the threshold for toner end detection. The machine detects toner end when the following happens 10 times consecutively. Then, the machine stops printing, even during a print job. Vt > Vref + Threshold		
2212 7	End [K]	*BCU	[0 to 5.0 / 0.5 / 0.1 V/step]
2212 8	End [YMC]	*BCU	
	Specifies the number of sheets with full image coverage that can be printed after toner near-end has been detected. When near-end is detected, the pixels in the images are counted. The machine detects toner end when the following happens, and the machine stops printing even during a print job. Pixel count = 5 A4/LT sheets with full image coverage **NOTE:** The setting of SP2-212-11 has priority for deciding when to stop printing.		
2212 9	Pixel [K]	*BCU	[0 to 255 / 50 / 1 sheet/step]
2212 10	Pixel [YMC]	*BCU	
	Specifies the minimum number of sheets that can be printed after toner near-end has been detected. However, when the following happens 10 consecutive times, the machine stops printing even during a print job or if this guaranteed minimum has not been met. Vt > Current Vref value + 1.2V or Vt > 4.8V		
2212 11	Min. Print	*BCU	[0 to 50 / 10 / 1 sheet/step]
	Displays the average signal value of the toner end sensor. Printed images can be weak when the value is larger. Each toner sensor detects the toner that is falling through the toner path beneath the toner cartridge. Each sensor outputs "0" when it detects toner in the toner path, or outputs "1" when it does not detect toner. The signal is "1" if toner is not passing through the path even though the toner cartridge contains toner. These signals, "0" and "1", are periodically checked and used to calculate the signal average. When enough toner is in the cartridge, the signal average is a smaller value ("0" or its vicinity). When toner is insufficient, the average is a larger value ("1" or its vicinity).		
2212 12	sensor avg [K]	*BCU	[0 to 1 / 0 / 0.01/step]
2212 13	sensor avg [Y]		
2212 14	sensor avg [M]		
2212 15	sensor avg [C]		

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2213	**[Toner End ON/OFF]** Toner End Detection ON/OFF		
	Enables or disables toner near-end and end detection (if disabled, the toner supply clutch on time is still counted). Use this SP only when tests are necessary under the toner end or toner near end condition. Specify the default value after the tests. **NOTE:** The main switch must be turned off and on to effect the setting change.		
2213 1	T End ON/OFF	*BCU #	[0 to 2 / 1 / 1 /step] Alphanumeric, **DFU** 0: Both sensors disabled 1: Both sensors enabled 2: Toner end sensor disabled and TD sensor enabled

2223	**[TD Vcnt Control]** TD Sensor Vcnt Control		
2223 1	Initialization	*BCU	[0 or 1 / 1 / -] Alphanumeric, **DFU** 0: Disabled 1: Enabled
	Enables or disables the Vcnt Auto Adjustment when detecting a new development unit. When the machine detects a new development unit, developer initialization automatically starts. During the developer initialization, Vcnt is automatically adjusted so that Vt is within 3.0 ± 0.1V.		
2223 2	Humidity	*BCU	[0 or 1 / 1 / -] Alphanumeric 0: Disabled 1: Enabled
	Enables or disables the Humidity Auto Correction. This corrects the Vcnt value for the current humidity. This correction is applied to both the Vcnt values automatically adjusted during developer initialization and manually adjusted with SP2-224-1 to 4. If this correction does not work well under certain environmental conditions or due to a defective humidity sensor, deactivate the Humidity Auto Correction and adjust the Vcnt value in SP2-224-1 to 4 (by trial and error).		
2223 3	Toner Fill Up	*BCU	[0 or 1 / 0 / -] Alphanumeric, **DFU** 0: Deactivate 1: Activate
	Activates or deactivates the Toner Fill Up mode, which fills up the toner supply tube with toner during developer initialization. This function is required only at machine installation. Although the default is "0", the factory setting is "1". After toner fill-up occurs during machine installation, the setting is changed to "0" automatically.		

2224	**[Vcnt / Vref]** Vcnt / Vref ([Color])		
	Adjusts the Vcnt value manually. The value in this SP mode is effective until after the next process control self-check. To always use this value for some reason, select proportional control supply mode with SP2-208-1 to 4. **NOTE:** The main switch must be turned off and on to effect the setting change.		
2224 1	Vcnt [K]	*BCU #	[0 to 22.0 / 10.0 / 0.1 V/step] **FA**
2224 2	Vcnt [Y]		
2224 3	Vcnt [M]		
2224 4	Vcnt [C]		
	Adjusts the Vref value manually. The value in this SP mode is effective until the next process control self-check. To always use this value for some reason, select proportional control supply mode with SP2-208-1 to 4.		
2224 5	Vref [K]	*BCU	[0 to 5.0 / 2.8 / 0.1 V/step]
2224 6	Vref [Y]	*BCU	
2224 7	Vref [M]	*BCU	
2224 8	Vref [C]	*BCU	

2301	**[Transfer Current]**		
	([Color Mode, Color], **P**aper Tray or **B**y-pass, **S**implex or **D**uplex, Process Speed) Paper Type -> TH: Thick Paper, SP: Special Paper		
	Adjusts the transfer current for each color and each print mode.		
	NOTE: If the transfer current is increased too much, image offset may occur especially in halftone areas.		
2301 1	[K]P S 125	*BCU	[0 to 50 / 15 / 1 μA/step]
2301 2	[K]P S 185	*BCU	[0 to 50 / 22 / 1 μA/step]
2301 3	[K]P D 125	*BCU	[0 to 50 / 16 / 1 μA/step]
2301 4	[K]P D 185	*BCU	[0 to 50 / 27 / 1 μA/step]
2301 5	[K]B S 62.5	*BCU	[0 to 50 / 5 / 1 μA/step]
2301 6	[K]B S 125	*BCU	[0 to 50 / 15 / 1 μA/step]
2301 7	[K]B S 185	*BCU	[0 to 50 / 22 / 1 μA/step]
2301 8	[FC,K]P S 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 9	[FC,K]P S 125	*BCU	[0 to 50 / 13 / 1 μA/step]
2301 10	[FC,Y]P S 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 11	[FC,Y]P S 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 12	[FC,M]P S 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 13	[FC,M]P S 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 14	[FC,C]P S 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 15	[FC,C]P S 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 16	[FC,K]P D 62.5	*BCU	[0 to 50 / 9 / 1 μA/step]
2301 17	[FC,K]P D 125	*BCU	[0 to 50 / 15 / 1 μA/step]
2301 18	[FC,Y]P D 62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 19	[FC,Y]P D 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 20	[FC,M]P D 62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 21	[FC,M]P D 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 22	[FC,C]P D 62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 23	[FC,C]P D 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 24	[FC,K]B S 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 25	[FC,K]B S 125	*BCU	[0 to 50 / 13 / 1 μA/step]
2301 26	[FC,Y]B S 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]

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2301	**[Transfer Current]** ([Color Mode, Color], **P**aper Tray or **B**y-pass, **S**implex or **D**uplex, Process Speed) Paper Type -> TH: Thick Paper, SP: Special Paper		
2301 27	[FC,Y]B S 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 28	[FC,M]B S 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 29	[FC,M]B S 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 30	[FC,C]B S 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 31	[FC,C]B S 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 32	[K]OHP 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 33	[FC,K]OHP 62.5	*BCU	[0 to 50 / 13 / 1 μA/step]
2301 34	[FC,Y]OHP 62.5	*BCU	[0 to 50 / 11 / 1 μA/step]
2301 35	[FC,M]OHP 62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 36	[FC,C]OHP 62.5	*BCU	[0 to 50 / 9 / 1 μA/step]
2301 37	[K]TH R62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 38	[FC,K]TH R62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 39	[FC,Y]TH R62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 40	[FC,M]TH R62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 41	[FC,C]TH R62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 42	[K]SP S62.5	*BCU	[0 to 50 / 8 / 1 μA/step]
2301 43	[K]SP S125	*BCU	[0 to 50 / 15 / 1 μA/step]
2301 44	[K]SP S185	*BCU	[0 to 50 / 22 / 1 μA/step]
2301 45	[FC,K]SP S62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 46	[FC,Y]SP S62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 47	[FC,M]SP 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 48	[FC,C]SP 62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 49	[FC,K]SP 125	*BCU	[0 to 50 / 13 / 1 μA/step]
2301 50	[FC,Y]SP 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 51	[FC,M]SP 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 52	[FC,C]SP 125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 57	[K]TH S62.5	*BCU	[0 to 50 / 6 / 1 μA/step]
2301 58	[FC,K]TH S62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 59	[FC,Y]TH S62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 60	[FC,M]TH S62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 61	[FC,C]TH S62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 62	[K]SP D62.5	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 63	[K]SP D125	*BCU	[0 to 50 / 16 / 1 μA/step]
2301 64	[K]SP D185	*BCU	[0 to 50 / 27 / 1 μA/step]
2301 65	[FC,K]SP D62.5	*BCU	[0 to 50 / 9 / 1 μA/step]
2301 66	[FC,Y]SP D62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 67	[FC,M]SP D62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 68	[FC,C]SP D62.5	*BCU	[0 to 50 / 7 / 1 μA/step]
2301 69	[FC,K]SP D125	*BCU	[0 to 50 / 15 / 1 μA/step]
2301 70	[FC,Y]SP D125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 71	[FC,M]SP D125	*BCU	[0 to 50 / 10 / 1 μA/step]
2301 72	[FC,C]SP D125	*BCU	[0 to 50 / 10 / 1 μA/step]

2309	**[Current Paper Size]** Transfer Current - Paper Size Correction Paper Type -> N: Normal, TH: Thick, OHP		
	Corrects the transfer current for paper size. When small paper is used for printing, the transfer current flows to the drum at the non image areas where the transfer belt touches the OPC drum. This may cause an abnormal image due to insufficient current at the image areas. **NOTE:** Increase only when an abnormal image (insufficient image transfer) occurs on a small paper size. However, increasing the current too much may cause image offset.		
2309 5	N LT SEF	*BCU	[1.0 to 4.0 / 1.4 / 0.1/step]
2309 6	N A5 SEF	*BCU	[1.0 to 4.0 / 1.8 / 0.1/step]
2309 7	TH LT SEF	*BCU	[1.0 to 4.0 / 1.2 / 0.1/step]
2309 8	TH A5 SEF	*BCU	[1.0 to 4.0 / 1.4 / 0.1/step]
2309 9	OHP LT SEF	*BCU	[1.0 to 4.0 / 1.4 / 0.1/step]
2309 10	OHP A5 SEF	*BCU	[1.0 to 4.0 / 4.0 / 0.1/step]

2402	**[Transfer Ctrl]** Transfer Control		
2402 1	C Mode Posit	*BCU	[0 to 500 / 170 / 10/step] **DFU**
	Adjusts the transfer belt position for color printing. SP2-402-1 is valid only when auto correct (SP2-402-2) is disabled (☛ 6.7.5).		
2402 2	Auto Correct	*BCU	[0 to 1 / 1 / 1/step] **DFU** 0: Disabled 1: Enabled
	Enable or disable the auto-adjustment of the transfer belt position. • When SP2-402-2 is enabled, the transfer belt position for color printing is decided in accordance with the result of the initialization processing (☛ 6.7.5). • SP2-402-2 validates the setting of SP2-402-1, but does not affect the setting of SP2-402-3.		
2402 3	Bk Mode Posit	*BCU	[0 to 500 / 130 / 10/step] **DFU**
	Adjusts the transfer belt position for monochrome printing. SP2-402-3 is always valid regardless of the setting in SP2-402-2.		

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2801	[PA Roller Current] Paper Attraction Roller Current ([Color], **S**implex or **D**uplex, Process Speed): Current Adjustment (**P**aper or **B**y-pass): Paper Size Correction		
	Adjusts the paper attraction roller current for color printing. If paper misfeeds occur at the transfer unit in color mode, check and/or adjust the paper attraction roller current. **NOTE:** The magenta development section is close to the paper attraction roller. Decreasing the current may not cause paper misfeed. If the current is increased too much, the following image problems may occur depending on the humidity. <u>High humidity:</u> Insufficient image transfer in magenta due to current flow to the magenta OPC drum <u>Low humidity:</u> Offset image in magenta halftone areas due to paper charged positive too much When adjusting the current with this SP mode, the value should be lower than transfer current.		
2801 6	[FC] S 62.5	*BCU	[0 to 50 / <u>1</u> / 1 µA/step]
2801 7	[FC] S 125	*BCU	[0 to 50 / <u>1</u> / 1 µA/step]
2801 8	[FC] D 62.5	*BCU	[0 to 50 / <u>5</u> / 1 µA/step]
2801 9	[FC] D 125	*BCU	[0 to 50 / <u>10</u> / 1 µA/step]
2801 14	[K] B TH S	*BCU	[10 to 30 / <u>5</u> / 0.1/step]
2801 15	[FC] B TH S	*BCU	[10 to 30 / <u>1</u> / 0.1/step]
2801 16	[K] B OHP	*BCU	[10 to 30 / <u>5</u> / 0.1/step]
2801 17	[FC] B OHP	*BCU	[10 to 30 / <u>1</u> / 0.1/step]
2801 18	[K] B TH D	*BCU	[10 to 30 / <u>5</u> / 0.1/step]
2801 19	[FC] B TH D	*BCU	[10 to 30 / <u>1</u> / 0.1/step]
2801 20	[K] SP S	*BCU	[10 to 30 / <u>8</u> / 0.1/step]
2801 21	[K] SP D	*BCU	[10 to 30 / <u>12</u> / 0.1/step]
2801 22	[FC] SP S 62.5	*BCU	[10 to 30 / <u>1</u> / 0.1/step]
2801 23	[FC] SP S 125	*BCU	[10 to 30 / <u>1</u> / 0.1/step]
2801 24	[FC] SP D 62.5	*BCU	[10 to 30 / <u>1</u> / 0.1/step]
2801 25	[FC] SP D 125	*BCU	[10 to 30 / <u>1</u> / 0.1/step]

2802	[PA Current Paper Size] Paper Attraction Roller Current - Paper Size Correction Paper Type -> N: Normal, TH: Thick, OHP		
	Adjusts the correction, depending on the paper size. When small-width paper is used for printing, the paper attraction roller current flows to the non-image areas of OPC drum where the transfer belt touches the drum. This may cause paper misfeed due to insufficient current. To increase the current by 1.5 times, set the SP mode to "1.5." **NOTE:** Adjust only when a paper misfeed occurs with a small paper size. Increasing the current too much may cause image offset in magenta halftone areas.		
2802 1	N LT SEF	*BCU	[1.0 to 4.0 / <u>1.5</u> / 0.1/step]
2802 2	N A5 SEF	*BCU	[1.0 to 4.0 / <u>2.0</u> / 0.1/step]
2802 3	TH LT SEF	*BCU	[1.0 to 4.0 / <u>1.5</u> / 0.1/step]
2802 4	TH A5 SEF	*BCU	[1.0 to 4.0 / <u>2.0</u> / 0.1/step]
2802 5	OHP LT SEF	*BCU	[1.0 to 4.0 / <u>2.4</u> / 0.1/step]
2802 6	OHP A5 SEF	*BCU	[1.0 to 4.0 / <u>4.0</u> / 0.1/step]

2908	**[Mirror Motor]** Mirror Positioning Motor ([Color])		
	Displays the result of the latest line position adjustment. Changing this affects the mirror position, which corrects the optically skewed image; however, this will be automatically corrected at the next line position adjustment. **NOTE:** If the line position adjustment does not work properly, the line position can be adjusted manually with this SP mode as a temporary measure. In this case, the line position adjustment needs to be disabled with SP5-993-001.		
2908 2	[C]	*BCU	[-128 to 127 / 0 / 1 pulse/step] **DFU**
2908 3	[M]	*BCU	
2908 4	[Y]	*BCU	

2909	**[Main-scan Reg.]** Main-scan Registration ([Color])		
	Displays the result of the latest line position adjustment. Changing this affects the main scan registration; however, this will be automatically corrected at the next line position adjustment. If a fine adjustment is required, it can be done with SP5-993-010 to 012 (this affects the way that the adjustment is done, and will be effective from the next line position adjustment. **NOTE:** If the line position adjustment does not work properly, the line position can be adjusted manually with this SP mode as a temporary measure. In this case, the line position adjustment needs to be disabled with SP5-993-001. 1 dot = 20µ		
2909 1	[Y]	*BCU	[-500 to 500 / 0 / 1 dot/step] **DFU**
2909 2	[M]	*BCU	
2909 3	[C]	*BCU	
2909 4	[K]	*BCU	

2916	**[Sub-scan Reg.]** Sub-scan Registration ([Color Mode, Color], Resolution)		
	Displays the result of the latest line position adjustment. Changing this affects the sub scan registration; however, this will be automatically corrected at the next line position adjustment. If a fine adjustment is required, it can be done with SP5-993-016 to 021 (this affects the way that the adjustment is done, and will be effective from the next line position adjustment. **NOTE:** If the line position adjustment does not work properly, the line position can be adjusted manually with this SP mode as a temporary measure. In this case, the line position adjustment needs to be disabled with SP5-993-001. 600 dpi: 1 dot = 40µ, 1200dpi: 1 dot = 20µ		
2916 1	[K] 1200	*BCU	[0 to 20000 / 7510 / 1 dot] **DFU**
2916 2	[FC,K] 1200	*BCU	[0 to 20000 / 15038 / 1 dot] **DFU**
2916 3	[FC,Y] 1200	*BCU	[0 to 20000 / 10402 / 1 dot] **DFU**
2916 4	[FC,M] 1200	*BCU	[0 to 20000 / 1136 / 1 dot] **DFU**
2916 5	[FC,C] 1200	*BCU	[0 to 20000 / 5762 / 1 dot] **DFU**
2916 6	[K] 600	*BCU	[0 to 20000 / 3755 / 1 dot] **DFU**
2916 7	[FC,K] 600	*BCU	[0 to 20000 / 7519 / 1 dot] **DFU**
2916 8	[FC,Y] 600	*BCU	[0 to 20000 / 5201 / 1 dot] **DFU**
2916 9	[FC,M] 600	*BCU	[0 to 20000 / 568 / 1 dot] **DFU**
2916 10	[FC,C] 600	*BCU	[0 to 20000 / 2881 / 1 dot] **DFU**

2919	**[Main Scan Lgth Det]** Main-scan Length Detection		
	Enables or disables the main-scan length detection.		
2919 1	MScan Lgth D	*BCU	[0 or 1 / 1 / -] Alphanumeric 0: Disable 1: Enable

2994	[Main Scan Reg Cor] Main-scan Registration Correction ([Color]) Not used. DFU		
2994 1	[Y]	*BCU	[-128 to 127 / 0 / 1 dot/step] DFU
2994 2	[M]	*BCU	[-128 to 127 / 1 / 1 dot/step] DFU
2994 3	[C]	*BCU	[-128 to 127 / 1 / 1 dot/step] DFU
2994 4	[K]	*BCU	[-128 to 127 / 0 / 1 dot/step] DFU

2995	[Motor Reset] Mirror Positioning Motor Reset		
	Rotates the mirror position motors (CMY) by 250 pulses clockwise; then by 125 pulses counterclockwise. This moves the mirrors back to the initial position. Then, the settings of SP2-908-002 to 004 are reset to 0. When the line position adjustment fails, it is one of possible causes when the mirror position motor locks. Performing this SP mode can move the mirrors back to the original position if it locks. Then, do the forced line position adjustment (SP5-993-002).		
2995 1	Motor Reset	*BCU	

SP3-XXX (Process)

3005	**[TD Initial]** TD Sensor Initialization ([Color])		
3005 1	[K]		Initializes the developer. **DFU**
3005 2	[Y]		
3005 3	[M]		
3005 4	[C]		
3005 5	[All Color]		
3005 6	Result	*BCU	[1 to 9 / - / -] 1: Success 2 to 9: Failure
	Displays the developer initialization result. All colors are displayed. Values is displayed in the order K Y C M. e.g., 1 1 2 1: Initialization of Cyan failed but the others succeeded See the troubleshooting section for details.		

3006	**[Vcnt Initial]** Vcnt Initial Setting Display ([Color])		
	Displays the initial Vcnt value.		
3006 1	[K]	*BCU	[0 to 240 / <u>100</u> / 0.1/step]
3006 2	[Y]	*BCU	
3006 3	[M]	*BCU	
3006 4	[C]	*BCU	

3007	**[Vcnt Current]** Vcnt Current Value Display ([Color])		
	Displays the current Vcnt value.		
3007 1	[K]	*BCU	[0 to 240 / - / 0.1/step]
3007 2	[Y]	*BCU	
3007 3	[M]	*BCU	
3007 4	[C]	*BCU	

3008	**[Humidity]**		
3008 1	Humidity	*BCU	[0 to 100 / - / 1/step]
	Displays the humidity measured by the humidity/temperature sensor.		

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Tables

3107	[Vsg Display] Vsg Display (Front or Rear)		
3107 1	Vsg Front	*BCU	[0.00 to 5.00 / - / 0.01V/step]
	Displays the Vsg value of the front ID sensor. Vsg is normally 4.0 ± 0.5 V. If Vsg is out of the adjustment range and this is detected 3 times consecutively, it leads to SC385.		
3107 2	LED Current Front	*BCU	[0 to 1023 / - / 1]
	Displays the ID sensor LED current adjusted during Vsg adjustment.		
3107 3	Vsg Center	*BCU	[0.00 to 5.00 / - / 0.01V/step]
	Displays the Vsg value of the center ID sensor. Vsg is normally 4.0 ± 0.5 V. If Vsg is out of the adjustment range and this is detected 3 times consecutively, it leads to SC385.		
3107 4	LED Current Center	*BCU	[0 to 1023 / - / 1]
	Displays the ID sensor LED current adjusted during Vsg adjustment.		
3107 5	Vsg Rear	*BCU	[0.00 to 5.00 / - / 0.01V/step]
	Displays the Vsg value of the rear ID sensor. Vsg is normally 4.0 ± 0.5 V. If Vsg is out of the adjustment range and this is detected 3 times consecutively, it leads to SC385.		
3107 6	LED Current Rear	*BCU	[0 to 1023 / - / 1]
	Displays the ID sensor LED current adjusted during Vsg adjustment.		
3107 7	Vsg avg bk	*BCU	[0.00 to 5.00 / - / 0.01V/step]
	Displays the average black Vsg value of the center ID sensor.		

3120	[Dev. Gamma Target] Development Gamma Target ([Color])		
	Adjusts the development gamma by changing the Vref value used for toner density control. Vref is automatically corrected so that the gamma measured during the process control self-check becomes "the value set with this SP mode ± 0.15"		
3120 1	[K]	*BCU	[1.00 to 3.00 / 1.90 / 0.01 mg/cm^2/KV / step] **DFU**
3120 2	[Y]	*BCU	[1.00 to 3.00 / 1.65 / 0.01 mg/cm^2/KV / step] **DFU**
3120 3	[M]	*BCU	
3120 4	[C]	*BCU	

3121	[Dev. Gamma Display] Development Gamma Display ([Color])		
	Displays the development gamma measured during the process control self-check.		
3121 1	[K]	*BCU	[0 to 10 / - / 0.01 mg/cm2/KV /step]
3121 2	[Y]	*BCU	Normal Range: 1.00 to 2.00
3121 3	[M]	*BCU	
3121 4	[C]	*BCU	

3122	[Vk Display] Vk Display ([Color])		
	Displays the current Vk value.		
3122 1	[K]	*BCU	[-255 to 255 / - / 1 V/step]
3122 2	[Y]	*BCU	Normal Range: -50 to 50
3122 3	[M]	*BCU	
3122 4	[C]	*BCU	

3123	**[Vref Display]** Current Vref Display ([Color])		
	Displays the current Vref value.		
3123 1	[K]	*BCU	[0.0 to 5.0 / - / 0.1V/step]
3123 2	[Y]	*BCU	
3123 3	[M]	*BCU	
3123 4	[C]	*BCU	

3125	**[Process Control]**		
3125 1	ON/OFF	*BCU	[0 or 1 / <u>1</u> / 1/step] Alphanumeric 0: OFF (Use the fixed values for VD, VL and VB set with SP2-001, SP2-103, and SP2-201.) 1: ON
	Enables or disables process control.		
3125 2	LD Control	*BCU	[0 to 2 / <u>1</u> / 1/step] Alphanumeric 0: Fixed (at the value in SP2-103) 1: Controlled by process control 2: Controlled by LD power selection
	Selects the LD control mode.		
3125 3	Auto TD Adj.	*BCU	[0 to 3 / <u>0</u> / 1/step] Alphanumeric 0: Disable 1: Initial & Non-use self-check 2: Job end & Non-use self-check 3: Initial & Job end & Non-use self-check
	Specifies when to perform the Auto Toner Density Adjustment. When performing the Auto Toner Density Adjustment, the machine supplies or consumes toner so that the development gamma is within ± 0.15 of the gamma target. *Change if the customer complains of toner density fluctuations. Before changing the setting away from 0, check whether the forced TD adjustment (3-126-2) is effective. If the problem is persistent, then change to 1, 2, or 3. However, the machine takes several minutes to do this adjustment.*		
3125 4	ACC	*BCU	[0 to 2 / <u>2</u> / 1/step] 0: Disable 1: Process Control Self-check 2: Auto TD Adjustment & Process Control Self-check
	Enables or disables the process control self-check before printing the ACC pattern. **NOTE:** If color balance changes during multi-copy runs after ACC is performed, select 1 or 2. Setting 2 can precisely adjust the image density; however, it takes about 6 minutes. Select 1 or 2 depending on the customer's requirement.		
3125 5	TD Adj. Cndtn	*BCU	[0 to 1 / <u>1</u> / 1/step] 0: No 1: Yes
	Specifies whether temperature and humidity are taken into account when deciding the timing of the auto toner density adjustment (described in SP 3-125-3). Timing for the auto toner density adjustment is determined by the setting of SP3-125-003. In addition, if SP 3-125-5 is set to 1, the auto toner density adjustment is done when the temperature and humidity meet specified conditions (same conditions as used for transfer current correction). Specify "1" when both temperature and humidity are both high or low.		

Service
Tables

3125	**[Process Control]**		
3125 6	TD Adj. Times	*BCU	[1 to 3 / 3 / 1/step]
	Limits the number of auto toner density adjustments. The auto toner density adjustment consists of three steps: detecting the development gamma, supplying or consuming toner, and detecting the development gamma again. When these three steps are all complete, it means a single auto toner density adjustment is complete.		

3126	**[Forced Self Check]** Forced Self-check		
3126 1	Forced Self Check		Performs a forced process control self-check.
3126 2	Forced TD Adj.		Performs a forced auto toner density adjustment.

3902	**[Pointer Display]** Pointer Table Display ([Color])		
	Displays the number in the pointer table that was selected during the latest process control self-check.		
3902 1	Printer [K]	*BCU	[1 to 30 / - / 1/step]
3902 2	Printer [Y]	*BCU	
3902 3	Printer [M]	*BCU	
3902 4	Printer [C]	*BCU	
3902 5	CF [K]	*BCU	
3902 6	CF [Y]	*BCU	
3902 7	CF [M]	*BCU	
3902 8	CF [C]	*BCU	

3903	**[M/A Target]** M/A Target ([Color])		
	Adjusts the M/A (**M**ass per **A**rea, mg/cm^2) value used during the process control self-check. Adjusting this changes the development bias. This causes the solid ID to increase or decrease. If developer capability causes an ID problem, toner density needs to be adjusted with SP3-120-1 to 4, depending on the color.		
3903 1	Printer [K]	*BCU	[0 to 1.50 / 0.60 / 0.05 mg/cm^2 /step] **DFU**
3903 2	Printer [Y]	*BCU	
3903 3	Printer [M]	*BCU	
3903 4	Printer [C]	*BCU	
3903 5	CF [K]	*BCU	
3903 6	CF [Y]	*BCU	
3903 7	CF [M]	*BCU	
3903 8	CF [C]	*BCU	

3904	**[M/A for LD]** M/A Target for LD Correction ([Color])		
	Adjusts the M/A value used during the LD correction mode. This value is effective when SP3-125-2 "LD Control Selection" is set to "2". Adjusting this data effects the image reproduction especially in highlight areas.		
3904 1	Printer [K]	*BCU	[0 to 1.00 / 0.10 / 0.01 mg/cm2 /step] **DFU**
3904 2	Printer [Y]	*BCU	[0 to 1.00 / 0.12 / 0.01 mg/cm2 /step] **DFU**
3904 3	Printer [M]	*BCU	
3904 4	Printer [C]	*BCU	
3904 5	CF [K]	*BCU	[0 to 1.00 / 0.13 / 0.01 mg/cm2 /step] **DFU**
3904 6	CF [Y]	*BCU	[0 to 1.00 / 0.14 / 0.01 mg/cm2 /step] **DFU**
3904 7	CF [M]	*BCU	
3904 8	CF [C]	*BCU	

3905	**[M/A Target]**		
	Adjusts the target amount of each toner on paper sheets. These values are optimized before shipment. Do not change the values. Changing these values does not affect toner density on paper sheets.		
3905 1	Intrvl [K]	*BCU	[0 to 1.50 / 0.30 / 0.01 mg/cm^2 /step] **DFU**
3905 2	Intrvl [Y]	*BCU	
3905 3	Intrvl [M]	*BCU	
3905 4	Intrvl [C]	*BCU	
	Displays the amount of each toner on the paper. A problem may have occurred in the copier engine if the value is high or low (i.e., if the difference between SP3-905-1/2/3/4 and SP3-5/6/7/8 is larger than ±0.03 mg/cm^2). Possible problems: Defective TD sensor, defective ID sensor, toner near-end (if the value is lower than the target), defective toner supply mechanism		
3905 5	Intrvl [K]	*BCU	[0 to 1.500 / - / 0.001 mg/cm^2 /step]
3905 6	Intrvl [Y]	*BCU	
3905 7	Intrvl [M]	*BCU	
3905 8	Intrvl [C]	*BCU	

3906	**[PC Self Check]** Process Control Self-checks		
3906 1	Job End	*BCU	[0 to 999 / 200 / 1 print/step]
	Specifies the execution timing of the job end process control self-check. The job end process control self-check is automatically done after a job is completed when 200 prints have been made since the last self-check. The counter for the job end process control self-check resets when one of the following process control self-checks is done. • Initial • Interval: Interrupt • Non-use Time • During Toner End When K prints are made, the number of prints is calculated with the K coefficient in SP3-906-5.		
3906 2	Interrupt	*BCU	[0 to 999 / 0 / 1 print/step]
	Specifies the execution timing of the interrupt process control self-check. The interrupt process control self-check is automatically done if the number of prints in the job exceeds the number set in this SP mode. When the print job is completed, the counter is reset, even if the interrupt self check did not occur. When K prints are made, the number of prints is calculated with the K coefficient in SP3-906-5.		
3906 3	Non-use Time 1	*BCU	[0 to 999 / 0 / 1 print/step] 0: Disable
	Specifies the executing timing of the non-use time process control self-check. The non-use time process control self-check is automatically done after the number of prints set with this SP mode have been made and no prints have been made for the time set with SP mode 3-906-4 since the last print job. If the conditions are met, the self-check will be done after the print job is completed. The counter is reset when the initial process control self-checks is done or when a print is made.		
3906 4	Non-use Time 2	*BCU	[0 to 2550 / 480 / 10 minutes/step] 0: Disable
	Specifies the executing timing of the non-use time process control self-check.		

Service Tables

3906	[PC Self Check] Process Control Self-checks		
3906 5	K Coefficient	*BCU	[0 to 1.00 / 1.00 / 0.01/step] **DFU**
	Sets the coefficient to calculate the counter value for black-and-white prints. With the default setting (100), counters used for process control count up by 1 when 1 black-and-white print has been made.		

3910	[Vmin Display] Vmin Display ([Color])		
3910 1	[K]	*BCU	[0 to 2.00 / 0 / 0.01/step]
	Displays the current Vmin value for K		
3910 2	[Color]	*BCU	[0 to 2.00 / 0 / 0.01/step]
	Displays the lowest current Vmin value for the colors (CMY).		

3911	[Vt Current Display] Vt Current Display ([Color])		
	Displays the current Vt value.		
3911 1	[K]	*BCU	[0.0 to 5.0 / - / 0.1V/step]
3911 2	[Y]	*BCU	
3911 3	[M]	*BCU	
3911 4	[C]	*BCU	

3912	[Vt Average Display] Vt Average Display ([Color])		
	Displays the average Vt value.		
3912 1	[K]	*BCU	[0.0 to 5.0 / - / 0.1V/step]
3912 2	[Y]	*BCU	
3912 3	[M]	*BCU	
3912 4	[C]	*BCU	

3913	[Tonver Supply Time] Toner Supply Time Display ([Color])		
	Displays the toner supply clutch on time for the most recent page.		
3913 1	[K]	*BCU	[0 to 5000 / - / 10 ms/step]
3913 2	[Y]	*BCU	
3913 3	[M]	*BCU	
3913 4	[C]	*BCU	

3920	[OPC Refresh]		
3920 1	Temperature	*BCU	[10 to 30 / 25 / 1°C /step]
	This SP determines the temperature threshold for determining whether refresh mode is done just after the machine is switched on. The charge roller generates NOx (nitrogen oxides), and these contaminate the OPC drum surface and may cause a smeared image. Just after the main switch is turned on, if the temperature measured by both the thermistor located at the right side on the laser optics housing unit and the temperature/humidity sensor is greater than the temperature specified in this SP mode, refresh mode is done before initial process control. During refresh mode, toner is developed on the OPC with 50V development potential and cleaned to remove NOx. This cycle is repeated a few times.		
3920 2	Humidity	*BCU	[10 to 90 / 75 / 1%/step]
	This SP determines the humidity threshold for determining whether refresh mode is done just after the machine is switched on. Just after the main switch is turned on, if the humidity measured by the temperature/humidity sensor is greater than the humidity specified in this SP mode, refresh mode is done before the initial process control self-check.		
3920 3	Prints	*BCU	[10 to 2550 / 200 / 10 prints/step]
	Specifies how often refresh mode is done. When the total number of prints since the last refresh mode exceeds the number specified in this SP mode, refresh mode is done before the job end process control self-check.		
3920 4	Mode Set	*BCU	[0 to 2 / 2 / 1/step] Alphanumeric 0: Disabled 1: Done at power on and toner end recovery 2: Done at power on, toner end recovery, and after the specified number of prints.
	Enables/disables refresh mode. **NOTE:** Refresh mode is done during the toner end recovery self-check after a new toner cartridge is installed.		
3920 5	Forced		
	Executes a forced refresh mode. Use this mode when the image is smeared. It takes about 1 minute. Also use after replacing the components of the transfer unit (see section 3).		
3920 6	Auto Toner Refresh (Auto Toner Refresh)	*BCU	[0 or 1 / 1 / -] 0: Disabled 1: Enabled
	Performs a toner refresh during the OPC refresh mode by changing the development bias from 50V to 400V. Enable this SP mode when dirty background and/or firefly spots appear intermittently on prints with a low image area ratio. While making prints with a low image area ratio, developer is agitated with less toner supplied. This may cause the toner-carrier attraction force to increase or toner to coagulate. This sometimes causes firefly spots or dirty background when a large amount of toner is supplied. **NOTE:** When enabling this SP mode, the following SP modes should be changed. SP3-906-001 Job End Process Control Self-check 200 (Default) -> 100 SP3-920-003 OPC Refresh Mode / Prints 200 (Default) -> 100		

Service Tables

3921	[Forced Toner Refresh] Forced Toner Refresh		
	Perform forced toner refresh mode. When the developer has deteriorated or when prints are made in a very low humidity condition, dirty background may appear continuously. When this kind of dirty background appears, check whether or not the development gamma is within the target (SP3-120 and 121). If the development gamma is not within the target, do this SP mode. The machine automatically does the toner refresh mode in the following sequence. 1. Consumes toner in the development unit without toner supply until toner end is detected 2. Starts toner recovery mode. 3. Starts process control self-check. **NOTE:** If toner is drastically consumed for a short time, this may cause carrier to flow out. To prevent this, toner is consumed over a long period of time. (It takes about 20 minutes to complete this toner refresh mode).		
3921 1	K		
3921 2	All Color		

3922	[OPC Refresh2]		
	Specifies when the OPC refresh is executed for CMY drums, which forcibly creates a temporary 15mm-wide toner line on the drum surface by applying the development bias (200V) and turning on the development clutch at the end of a job. Note that this OPC refresh is a separate process from the one controlled by SP 3-920 and 3-921.		
3922 1	Mode Set	*BCU	[0 ~ 2 / 1 / 1 /step] 0: Disable (OPC refresh is not executed.) 1: Low coverage (OPC refresh is executed after an output of low coverage ratio.) 2: Every time (OPC refresh is executed after every job.)

3975	[P Control Result] Process Control Self-check Result		
	Displays the result of the latest process control self-check. All colors are displayed. The results are displayed in the order "K Y C M" e.g., 1 1 9 1: The self-check for Cyan failed but the others were successful See the troubleshooting section for details		
3975 1	P Ctrl Result	*BCU	[0 to 9999 / - / 1/step]

SP4-XXX (Scanner)

4008	[SubScanMagnification] Sub-scan Magnification Adjustment		
	Adjusts the sub-scan magnification by changing the scanner motor speed.		
4008 1	**SubScanMagnification**	*CTL	[-1.0 to 1.0 / 0 / 0.1%/step] **FA**

4010	[Leading Edge Reg.] Leading Edge Registration Adjustment		
	Adjusts the leading edge registration by changing the scanning start timing in the sub-scan direction.		
4010 1	Leading Edge Reg.	*CTL	[-3.0 to 3.0 / 0 / 0.1 mm/step] **FA**

4011	[Side-to-Side Reg.] Side-to-Side registration Adjustment		
	Adjusts the side-to-side registration by changing the scanning start timing in the main scan direction.		
4011 1	Side-to-Side Reg.	*CTL	[-6.0 to 6.0 / 0 / 0.1 mm/step] **FA**

4012	[Blank Margin] Blank Margin Adjustment		
	Sets the blank margin at each side for erasing the original shadow caused by the gap between the original and the scale.		
4012 1	Leading Edge	*CTL	[0 to 3.0 / 0 / 0.1 mm/step] **FA**
4012 2	Trailing Edge		
4012 3	Left		
4012 4	Right		

4013	[Scanner Free Run]		
	Performs the scanner free run with the exposure lamp on or off in the following mode. Full color mode / Full Size / A3 or DLT		
4013 1	Lamp: OFF		
4013 2	Lamp: ON		

4017	[Scan Operation]		
	Makes one scan with generating an F-Gate signal and shading on or off in the following mode. Full color mode / Full Size / A3 or DLT		
	Uses this SP mode to check if the F-Gate signal is properly generated (F-Gate tells the engine to start printing data).		
4017 1	Shading ON		
4017 2	Shading OFF		

Service Tables

4205	[Black ADS Level] DFU		
4205 1	Black ADS Level	*CTL	Do not change the setting. Use SP4-460.

4301	[APS Operation Check]		
	Displays a code that represents the original size detected by the original sensors. (See Input Check Table.)		
4301 1	APS Operation Check		

4303	[APS A5size Detection]		
	Specifies the result of the detection when the outputs from the original sensors are all OFF.		
4303 1	APS A5size Check	*CTL	[0 or 1 / <u>0</u> / -] 0: No original 1: A5 Lengthwise

4305	[8K/16K Detection]	*BCU	[0 or 1 / <u>0</u> / -] 0: A/B 1: 8K/16K
4305 1	This program enables the machine to automatically recognize the 8K/16K size.		

4417	[IPU Test Pattern]		
	Selects the IPU test pattern.		
4417 1	IPU Test Pattern		[0 to 16 / <u>0</u> / 1/step] 0: Scanned image 1: Grid pattern 2: Slant grid pattern 3: Gradation main scan1 4: Gradation sub scan1 5: Gradation RBGYMCK 6: UCR pattern 7: Color patch 16 (1) 8: Color patch 16 (2) 9: Color patch 64 10: Grid pattern YMCK 11: Color patch YMCK 12: Gray pattern (1) 13: Gray pattern (2) 14: Gradation main scan2 15: Scanned + Grid pattern 16: Scanned + Gray scale

4440	[Saturation Adj.] Saturation Adjustment		
	Adjusts the level of saturation for copying.		
4440 1	Saturation Adj.	* CTL	[0 to 5 / 3 / 1/step] 0: High 1: Lowest 2: Lower 3: Default 4: Higher 5: Highest

4460	[Digital Black ADS Level]	*BCU	[0 to 128 / 10 / 1 step]
4460 1	Specifies the level of deleting the background in the ADS mode.		

4540	[Printer V]		[-127 to 128 / 1 / 1/step]
4540 1	R:K	*CTL	Specifies the printer vector correction value.
4540 2	R:C		
4540 3	R:M		
4540 4	R:Y		
4540 5	Y:K		
4540 6	Y:C		
4540 7	Y:M		
4540 8	Y:Y		
4540 9	G:K		
4540 10	G:C		
4540 11	G:M		
4540 12	G:Y		
4540 13	C:K		
4540 14	C:C		
4540 15	C:M		
4540 16	C:Y		
4540 17	B:K		
4540 18	B:C		
4540 19	B:M		
4540 20	B:Y		
4540 21	M:K		
4540 22	M:C		
4540 23	M:M		
4540 24	M:Y		

4628	[R Gain Display] Gain Adjustment Red		
	Displays the gain value of the amplifiers on the controller for Red.		
4628 1	R EVEN		
4628 2	R ODD		

Service
Tables

4629	[G Gain Display] Gain Adjustment Green		
4629 1	G EVEN		Displays the gain value of the amplifiers on the controller for Green.
4629 2	G ODD		
4629 3	G BK EVEN		
4629 4	G BK ODD		

4630	[B Gain Display] Gain Adjustment Blue		
4630 1	B EVEN		Displays the gain value of the amplifiers on the controller for Blue.
4630 2	B ODD		

4661	[R Gain Display (Last Adjust)] Gain Adjustment Red (Last Adjustment)		
4661 1	R EVEN	*BCU	This program displays the previous result of SP4-628.
4661 2	R ODD		

4662	[G Gain Display (Last Adjust)] Gain Adjustment Green (Last Adjustment)		
4661 1	G EVEN	*BCU	This program displays the previous result of SP4-629.
4661 2	G ODD		

4663	[B Gain Display (Last Adjust)] Gain Adjustment Blue (Last Adjustment)		
4661 1	B EVEN	*	This program displays the previous result of SP4-630.
4661 2	B ODD	BCU	

4685	[Reference Adj.: R] Reference Adjustment Red DFU		
4685 1	Reference Adj.: R	*BCU	Do not change the setting. Use SP4-885.

4686	[Reference Adj.: G] Reference Adjustment Green DFU		
4686 1	Reference Adj.: G	*BCU	Do not change the setting. Use SP4-886.

4687	[Reference Adj.: B] Reference Adjustment Blue DFU		
4687 1	Reference Adj.: B	*CTL	Do not change the setting. Use SP4-887.

4688	**[DF: Density Adj.]** DF Density Adjustment		
	Adjusts the white shading parameter when scanning an image with the ARDF. Adjusts the density level if the ID of outputs made in the DF and Platen mode is different.		
4688 1	DF: Density Adj.	*CTL	[83 to 100 / <u>86</u> / 1 %/ step]

4800	**[DF: Density Correction]**		
	Sets a coefficient to adjust the image density level when scanning an image with the ARDF.		
4800 1	R	*CTL	[-20 to 20 / <u>0</u> / 1/step] **DFU**
4800 2	G		
4800 3	B		

4885	**[Level Convert Adj.: R]**	*BCU	[-128 to 127 / <u>49</u> / 1/step]
4885 1	This SP adjusts the gray valance of red.		

4886	**[Level Convert Adj.: G]**	*BCU	[-128 to 127 / <u>49</u> / 1/step]
4886 1	This SP adjusts the gray valance of green.		

4887	**[Level Convert Adj.: B]**	*BCU	[-128 to 127 / <u>49</u> / 1/step]
4887 1	This SP adjusts the gray valance of blue.		

Service Tables

4903	**[Ver. Line Correct]**	*CTL	[0 to 4 / <u>0</u> / 1/step]
4903 1	This SP selects the level of the vertical line correction. The vertical line can occur while the ARDF is feeding the originals from the original tray. 0: Deactivated 1: Very low 2: Low 3: High 4: Very highl		

4904	[Scanner IPU Test]		
4904 1	Test1:Register Access		00: OK 11, 12, 13, 14, 15: NG
	Performs a write and read check of the ASICs on the scanner IPU board and displays the result.		
4904 2	Test2: Image Path		00: OK 21, 22, 23, 24, 25: NG
	Performs an image path check on the scanner IPU board and displays the result.		

4905	[Dither Selection]		
	Changes the parameters for error diffusion.		
4905 1	Dither Selection	*CTL	[0 to 255 / 0 / 1/step] **DFU**

4907	[VPU Test Pattern]		
4907 1	Test Pattern: R		[0 to 4 / 0 / 1 /step] 0: Default (Scanned Image) 1: Cyan pattern 2: White pattern 3: Cyan Pattern 16 steps 4: Line pattern
	Selects the test pattern generated by the controller board.		
4907 2	Test Pattern: G		[0 to 4 / 0 / 1 /step] 0: Default (Scanned Image) 1: Magenta pattern 2: White pattern 3: Magenta Pattern 16 steps 4: Line pattern
	Selects the test pattern generated by the controller board.		
4907 3	Test Pattern: B		[0 to 4 / 0 / 1 /step] 0: Default (Scanned Image) 1: Yellow pattern 2: White pattern 3: Yellow Pattern 16 steps 4: Line pattern
	Selects the test pattern generated by the scanner IPU board.		

4918	[Manual Gamma Adj.]		
4918 9	Adjusts the offset data of the printer gamma for yellow in Photo mode. See 'Replacement and Adjustment – Gamma Correction – Copy Mode' for how to use.		
	Offset: Highlight	*CTL	[0 to 30 / 15 / 1 /step]
	Offset: Middle		
	Offset: Shadow		
	Offset: IDmax		
	Adjusts the option data of the printer gamma for yellow in Photo mode.		
	Option: Highlight	*CTL	[0 to 255 / 0 / 1 /step] **DFU**
	Option: Middle		
	Option: Shadow		
	Option: IDmax		

4932	[Dot Position Cor.] Main Scan Dot Position Correction		
	Corrects the left or right side alignment of the red or blue filter on the CCD. For details on this adjustment, see Replacement and Adjustment – Image Adjustment - Scanner		
4932 1	R: Left	*CTL	[0 to 9 / 5 / 1 /step]
4932 2	R: Right		
4932 3	B: Left		
4932 4	B: Right		

4999	[ADF Scan Glass Dust Check]		
4999 1	Check ON/OFF Change	*CTL	0: OFF/1: ON)
4999 2	Detect Level		[0 to 8 / 5 / 1 /step]
			0: Lowest ←→ 8: Highest

SP5-XXX (Mode)

5024	[mm/inch Display Selection]		
	Display units (mm or inch) for custom paper sizes.		
5024 1	mm/inch display	*CTL	0: mm (Europe/Asia) 1: inch (USA)

5045	[Counter Method]		
	Selects the counting method if the meter charge mode is enabled with SP5-930-001. **NOTE:** The counting method can be changed only once, regardless of whether the counter value is negative or positive.		
5045 1	Counter Method	*CTL	[0 or 1 / 0 / -] 0: Developments 1: Prints

5046	[Rom Update Display]		
	Enables or disables the ROM Update utility. When enabled, this utility will be displayed in the user program mode.		
5046 1	ROM Update	*CTL	[0 or 1 / 1 /-] **DFU** 0: Enable 1: Disable

5104	[A3/DLT Double Count]		
	Specifies whether the counter is double clicked for A3/DLT size prints.		
5104 1	Double Count	*CTL	[0 or 1 / 0 / -] 0: Normal count 1: Double count

5113	[Optional Counter Type]	*CTL	

5113 1	This program specifies the counter type.
	   0: None 1: Key card (RK 3, 4) 2: Key card (down)
	   3: Prepaid card 4: Coin rack 5: MF key card
	   8: Key counter + Vendor 9: Bar-code Printer		

5118	[Disable Copying]	*CTL	[0: Not disabled/1: Disabled]
5118 1	This program disables copying.		

5120	Mode Clear Opt. Counter Removal	*CTL	[0: Yes (removed)/1: Standby (installed but not used)/2: No (not removed)]
5120 1	This program updates the information on the optional counter. When you install or remove an optional counter, check the settings.		

5121	Counter Up Timing	*CTL	[0: Feed/1: Exit]
5121 1	This program specifies when the counter goes up. The settings refer to "paper feed" and "paper exit" respectively.		

5127	APS Mode	*CTL	[0: Not disabled/1: Disabled]
5127 1	This program disables the APS.		

5128	Code Mode With Key/Card Option	*CTL	
5128 1	**DFU**		

5131	**Paper Size Type Selection**	*CTL	[0: DOM (Japan)/1: USA /2: ERP (Europe)]
5131 1	The program selects a paper size system from the following alternatives: the AB system (0), the LT system (1), and the AF system (2).		

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

5162	**App. Switch Method**	*CTL	[0: Soft Key Set/1: Hard Key Set]
5162 1	This program specifies the switch that selects an application program.		

5212	**Page Numbering**	*CTL	
	This program adjusts the position of the page numbers.		
5212 3	Duplex Printout Right/Left Position	[0 ~99 / 0 / 1 mm/step]	
5212 4	Duplex Printout High/Low Position	[0 ~99 / 0 / 1 mm/step]	

5302	[Set Time]		
	Adjusts the RTC (real time clock) time setting for the local time zone. Examples: For Japan (+9 GMT), enter 540 (9 hours x 60 min.) NA :-300 (New York) EU :+ 60 (Paris) CH :+480 (Peking) TW :+480 (Taipei) AS :+480 (Hong Kong)		
5302 2	Set Time	*CTL #	[-1440 to 1440 / 60 / 1 min./step]

5404	[User Code Counter Clear]		
	Clear all counters for users.		
5404 1	UCodeCtrClr		[0 to 1 / 1 / 0/step] 0: Not executed 1: Executed

Service Tables

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

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

5505	Error Alarm	*CTL	[0~255 / **50** / 100 copies per step] **Japan only**

5507	Supply Alarm	*CTL	
5507 1	Paper Supply Alarm	**0: Off**, 1: On, **DFU**	
5507 2	Staple Supply Alarm	**0: Off**, 1: On, **Japan only**	
5507 3	Toner Supply Alarm	**0: Off**, 1: On, **DFU**	
5507 128	Interval :Others	[00250 ~ 10000 / **1000** / 1 Step] **DFU**	
5507 132	Interval :A3		
5507 133	Interval :A4		
5507 134	Interval :A5		
5507 141	Interval :B4		
5507 142	Interval :B5		
5507 160	Interval :DLT		
5507 164	Interval :LG		
5507 166	Interval :LT		
5507 172	Interval :HLT		

5508*	CC Call	*CTL	
5508 1*	Jam Remains	0: Disable, **1**: Enable	
	Enables/disables initiating a call for an unattended paper jam.		
5508 2*	Continuous Jams	0: Disable, **1**: Enable	
	Enables/disables initiating a call for consecutive paper jams.		
5508 3*	Continuous Door Open	0: Disable, **1**: Enable	
	Enables/disables initiating a call when the front door remains open.		
5508 4*	Low Call Mode	0: Normal mode, **1**: Reduced mode	
	Enables/disables the new call specifications designed to reduce the number of calls.		
5508 11*	Jam Detection: Time Length	[03~30 / **10** / 1]	
	Sets the time a jam must remain before it becomes an "unattended paper jam". This setting is enabled only when SP5508 004 is set to 1.		

5508 12*	Jam Detection: Continuous Count	[02~10 / **5** / 1]
	Sets the number of consecutive paper jams required to initiate a call. This setting is enabled only when SP5508 004 is set to 1.	
5508 13*	Door Open: Time Length	[03~30 / **10** / 1]
	Sets the length of time the door remains open before the machine initiates a call. This setting is enabled only when SP5508 004 is set to 1.	
5508 21*	Jam Operation: Time Length	0: Automatic Call **1:** Audible Warning at Machine
	Determines what happens when a paper jam is left unattended.	
5508 22*	Jam Operation: Continuous Count	0: Automatic Call **1:** Audible Warning at Machine
	Determines what happens when consecutive paper jams occur.	
5508 23*	Door Operation: Time Length	0: OFF, **1:** ON
	Determines what happens if the door remains open (15 min.). Displays a warning if set to ON. Pressing the call button will contact the service center. This setting is available for setting only if SP5508 004 is set for 1.	

5610	**[ACC Factory Setting]**		
5610 4	Recall		
	Recalls the factory settings.		
5610 5	Overwrite		
	Overwrites the current values onto the factory settings.		
5610 6	Previous Setting		
	Recalls the previous settings.		

5611	**[Toner Ratio in 2C]**		
	Adjusts the color balance of a single color (blue, green, or red) by changing the proportion of color toner (C, M, and/or Y).		
5611 1	B-C	*CTL	[0 to 100 / <u>90</u> / 1 %/step]
5611 2	B-M		[0 to 100 / <u>80</u> / 1 %/step]
5611 3	G-C		[0 to 100 / <u>90</u> / 1 %/step]
5611 4	G-Y		[0 to 100 / <u>80</u> / 1 %/step]
5611 5	R-M		[0 to 100 / <u>100</u> / 1 %/step]
5611 6	R-Y		[0 to 100 / <u>80</u> / 1 %/step]

5801	**[Memory Clear]** **NOTE**: For more information, see "NOTE 1" following this table.		
5801 1	All Clear		
	Resets all correction data for process control and all software counters, and returns all modes and adjustments to their default values. *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.*		
5801 2	ENG All		
	Initializes items 2 ~ 12 below.		
5801 3	SCS		
	Clears the system settings.		
5801 4	IMH Memory Clr		
	Clears IMH data. **DFU**		

5801 5	MCS		
	Clears MCS data. **DFU**		
5801 6	Copier Application		
	Clears the copy application settings.		
5801 7	Fax Application		
	Clears the fax application settings.		
5801 8	Printer Application		
	Clears the printer application settings.		
5801 9	Scanner Application		
	Clears the scanner application settings.		
5801 10	Network Application		
	Delete the netfile application management files and thumbnails, and initializes the job login ID.		
5801 11	NCS		
	Initializes the system default and interface settings (IP address also), SmartNetMonitor for Admin, WebStatusMonitor settings, and the TELNET settings.		
5801 12	R-FAX		
	Initializes the job login ID, SmartNetMonitor for Admin, job history, and local storage file numbers.		
5801 13	IPU		
	Clears the IPU settings		
5801 14	Clear DCS Settings		
5801 15	Clear UCS Settings		

5802	**EngineFreeRun**		
5802 1	EngineFreeRun		
	Performs a free run on the copier engine. **NOTE:** • The machine starts free run in the same condition as the sequence of A4/LT printing from the 1st tray. Therefore, paper should be loaded in the 1st tray, but paper is not fed. • The main switch has to be turned off and on after using the free run mode for a test.		

5803	**[Input Check]**		See section 5-3-2.
5804	**[Output Check]**		See section 5-3-3.

5808	**[Destination Code]** Destination Code Display		
	Displays the destination code.		
5808 1	Destination	*BCU	

5809	**[SC Detection ON/OFF]** SC Detection ON/OFF		
	Enable or disables the service call detection (SC codes will be ignored if disabling this SP mode).		
5809 1	All	*BCU	[0 or 1 / <u>0</u> / -] Alphanumeric 0: Enable 1: Disable
5809 2	Vib Motor		

5810	[SC Reset]		
	Resets a type A service call condition. **NOTE:** Turn the main switch off and on after resetting the SC code.		
5810 1	SC Reset		

5811	[Machine Serial No.] **Machine** Serial Number Display		
	Displays the machine serial number.		
5811 2	SN Display	*BCU	

5812	[Service Tel. No. Setting]		
5812 1	Service	* CTL	
	Sets the telephone number for a service representative. This number is printed on the Counter List, which can be printed with the user's "Counter" menu. This can be up to 20 characters (both numbers and alphabetic characters can be input).		
5812 2	Facsimile	*CTL	
	Sets the fax or telephone number for a service representative. This number is printed on the Counter List, which can be printed with the user's "Counter" menu if the Meter Charge mode is selected with SP5-930-1. This can be up to 13 characters (both numbers and alphabetic characters can be input).		
5812 3	Supply	*CTL	
	Use this to input the telephone number of your supplier for consumables. Enter the number and press #. *Press the ⊙ key to input a pause. Press the "Clear modes" key to delete the telephone number.*		
5812 4	Operation	*CTL	
	Use this to input the telephone number of your sales agency. Enter the number and press #. *Press the ⊙ key to input a pause. Press the "Clear modes" key to delete the telephone number.*		

5816	[Remote Service]		
5816 1	I/F Setting	*CTL	[0 to 1 / 0 / 1/step] **DFU**
5816 2	CE Call		0: Disable
5816 3	Function Flag		1: Enable
5816 4	Communication Test Call		
5816 5	Device Information Call		
5816 6	Device Information Call Display Setting		
5816 7	SSL Disable		
5816 8	RCG Connect Timeout		
5816 9	RCG Write Timeout		
5816 10	RCG Read Timeout		
5816 11	Port 80 Enable		

Service Tables

5821	**[CSS-PI Device Co]**		
5821 1	CSS-PI Device Co	*CTL	[0 to 4 / 0 / 1/step] **DFU**
5821 2	RCG IP Address		

5824	**[NV-RAM Data Upload]**		
	Uploads the UP and SP mode data (except for counters and the serial number) from the NVRAM to a flash memory card.		
5824 1		#	[0 to 1 / 0 / 1/step] 0: Not executed 1: Executed

5825	**[NV-RAM Data Download]**		
	Downloads the UP and SP mode data from a flash memory card to the NVRAM		
5825 1	NvramDownload	#	[0 to 1 / 0 / 1/step] 0: Not executed 1: Executed

5828	**[Network Setting]**		
5828 66	Job Spooling Clear: Start Time	*CTL	Treatment of the job when a spooled job exists at power on. 0: Data is cleared **1: Automatically printed**

5828 69	Job Spooling (Protocol)		Validates or invalidates the job spooling function for each protocol.
			0: Validates
			1: Invalidates
			  bit0: LPR
			  bit1: FTP
			  bit2: IPP
			  bit3: SMB
			  bit4: BMLinkS
			  bit5: DIPRINT
			  bit6: (Reserved)
			  bit7: (Reserved)

5828 74	Delete Password		Deletes passwords.
5828 84	Print Settings List		Prints the NCS parameter list
5828 90	TELNET (0: OFF 1: ON)		Validates or invalidates the Telnet protocol.
5828 91	Web (0: OFF 1: ON)		Enables or disables the Web operation.
5828 115	SMB Computer Name		Specifies the SMB computer name.
5828 116	SMB Work Group Name		Specifies the SMB workgroup name.

5832	**[HDD]** HDD Initialization		
5832 1	HDD Formatting (ALL)		Initializes the hard disk. Use this SP mode only if there is a hard disk error.
5832 2	HDD Formatting (IMH)		
5832 3	HDD Formatting (Thumbnail)		
5832 4	HDD Formatting (Job Log)		
5832 5	HDD Formatting (Printer Fonts)		
5832 6	HDD Formatting (User Info)		
5832 7	Mail RX Data		
5832 8	Mail TX Data		
5832 9	HDD Formatting (Data for a Design)		
5832 10	HDD Formatting (Log)		
5832 11	HDD Formatting (Ridoc I/F)		

5833	**[Job Log On/Off]**		
	Saves the result of the jobs in the job log. If this mode is enabled, the result is written on the HDD. If no HDD is installed, this feature is disabled even if this SP is set to 'enabled'.		
5833 7	JobLog ON/OFF	*CTL	[0 or 1 / <u>0</u> / -] 0: Disabled 1: Enabled

5836	Capture Settings	*CTL	
5836 1	Capture Function (0:Off 1:On)		**0**: Disable, 1: Enable
	With this function disabled, the settings related to the capture feature cannot be initialized, displayed, or selected.		
5836 2	Panel Setting		**0**: Disable, 1: Enable
	Determines whether each capture related setting can be selected or updated from the initial system screen. The setting for SP58361 has priority		
	5836 71 to 5836 76, Copier and Printer Document Reduction The following 6 SP modes set the default reduction for stored documents sent to the document management server via the MLB. [0~2 / **2** / 1] *Enabled only when optional MLB (Media Link Board) is installed*		
5836 71	Reduction for Copy Color		0: 1to-1, 1: ½, **2**: 1/4
5836 72	Reduction for Copy B&W Text		0: 1to-1, 1: ½, **0**: 1/4
5836 73	Reduction for Copy B&W Other		0: 1to-1, 1: ½, **0**: 1/4
5836 74	Reduction for Printer Color		0: 1to-1, 1: ½, **2**: 1/4
5836 75	Reduction for Printer B&W		0: 1to-1, 1: ½, **0**: 1/4
5836 76	Reduction for Printer B&W HQ		0: 1to-1, 1: ½, **0**: 1/4
5836 77	Reduction for Printer Color 1200		
5836 78	Reduction for Printer B&W 1200		
	5836 81 to 5836 86, Stored document format The following 6 SP modes set Sets the default format for stored documents sent to the document management server via the MLB. *Enabled only when optional MLB (Media Link Board) is installed*		

Service
Tables

5836 081	Format for Copy Color	**0**: JFIF/JPEG, 1: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR
5836 082	Format for Copy B&W Text	0: JFIF/JPEG, **1**: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR
5836 083	Format Copy B&W Other	0: JFIF/JPEG, **1**: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR
5836 084	Format for Printer Color	**0**: JFIF/JPEG, 1: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR
5836 085	Format for Printer B&W	0: JFIF/JPEG, **1**: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR
5836 086	Format for Printer B&W HQ	0: JFIF/JPEG, 1: TIFF/MMR, **2**: TIFF/MH, 3: TIFF/MR
5836 091	Default for JPEG	[5~95 / **50** / 1]
	Sets the JPEG format default for documents sent to the document management server via the MLB with JPEG selected as the format. *Enabled only when optional MLB (Media Link Board) is installed.*	

5839	**[IEEE1394]**		
5839 4	Host Name	*CTL	**DFU**
5839 7	Cycle Master		**DFU**
5839 8	BCR mode		**DFU**
5839 9	IRM 1394a Check		**DFU**
5839 10	Unique ID		**DFU**
5839 11	Logout		**DFU**
5839 12	Login		**DFU**
5839 13	Login MAX		**DFU**

5840	**[IEEE 802.11b]**		
5840 4	Current SSID	*CTL	
	Enters a unique ID (up to 32 characters long) to identify the device when it is operating in an area with another wireless LAN network.		
5840 6	Channel Max	*CTL	[1 to 11 or 13 / 1 / 1 /step] Europe/Asia: 1 to 13 USA: 1 to 11
	Sets the maximum number of channels available for data transmission via the wireless LAN. The number of channels available varies according to location. The default settings are set for the maximum end of the range for each area. Adjust the upper 4 bits to set the maximum number of channels. **DFU** **Note**: Do not change the setting		
5840 7	Channel Min	*CTL	[1 to 11 or 13 / 1 / 1 /step] Europe/Asia: 1 to 13 USA: 1 to 11
	Sets the minimum number of channels available for data transmission via the wireless LAN. The number of channels available varies according to location. The default settings are set for the minimum end of the range for each area. Adjust the lower 4 bits to set the minimum number of channels. **DFU** **Note**: Do not change the setting		

5840 11	WEP key Select	*CTL	[00~11 / 00 / 1 binary] 00: Key #1 01: Key #2 (Reserved) 10: Key #3 (Reserved) 11: Key #4 (Reserved)
	Selects the WEP key.		
5840 18*	SSID Key Check		
5840 20	WEP mode	*CTL	[0~1/0/1] 0: Max. 64-bit (10 characters) 1: Max. 128-bit (10, 26 characters) Displayed only when the option 801.11b for wireless LAN is installed.
	Determines the operation mode of the WEP key.		

5841	[Supply Name Setting]		
5841 1	Tone Name Setting: Black	*CTL	Specifies supply names. These appear on the screen when the user presses the Inquiry button in the user tools screen.
5841 2	Tone Name Setting: Cyan		
5841 3	Tone Name Setting: Yellow		
5841 4	Tone Name Setting: Magenta		
5841 5	OrgStamp		
5841 7	OrgStamp		
5841 11	Staple Std1		
5841 12	Staple Std2		
5841 13	Staple Std3		
5841 14	Staple Std4		

5844	[USB]		
5844 1	Transfer Rate	*CTL	[0 to 1 / 0 / 1/step] 0: Auto Change 1: Full speed
	Adjusts the USB transfer rate.		
5844 2	Vendor ID	*CTL	Displays the vendor ID. **DFU**
5844 3	Product ID	*CTL	Displays the product ID. **DFU**
5844 4	Device Release Number	*CTL	Displays the development release version number. **DFU**

Service Tables

5845	Delivery Server Setting	*CTL	
	Provides items for delivery server settings.		
5845 1	FTP Port No.	[0~65535 / **3670** / 1]	
	Sets the FTP port number used when image files to the Scan Router Server.		
5845 2	IP Address (Primary)	Range: **000.000.000.000** ~ 255.255.255.255	
	Use this SP to set the Scan Router Server address. The IP address under the transfer tab can be referenced by the initial system setting.		
5845 6	Delivery Error Display Time Netfiles:	[0~999 / **300** / 1]	
	Use this setting to determine the length of time the prompt message is displayed when a test error occurs during document transfer with the NetFile application and an external device.		
5845 8	IP Address (Secondary)	Range: **000.000.000.000** ~ 255.255.255.255	
	Specifies the IP address assigned to the computer designated to function as the secondary delivery server of Scan Router. This SP allows only the setting of the IP address without reference to the DNS setting.		
5845 9	Delivery Server Model	[0~4/ **0** / 1]	
	Allows changing the model of the delivery server registered by the I/O device. 0: Unknown 1: SG1 Provided 2: SG1 Package 3: SG2 Provided 4: SG2 Package		
5845 10	Delivery Svr Capability		[0~255 / 0 / 1]
	Bit7 = 1 Comment information exits		Changes the capability of the registered that the I/O device registered.
	Bit6 = 1 Direct specification of mail address possible		
	Bit5 = 1 Mail RX confirmation setting possible		
	Bit4 = 1 Address book automatic update function exists		
	Bit3 = 1 Fax RX delivery function exists		
	Bit2 = 1 Sender password function exists		
	Bit1 = 1 Function to link MK-1 user and Sender exists		
	Bit0 = 1 Sender specification required (if set to 1, Bit6 is set to "0")		

5846	UCS Settings	*CTL		
5846 1	Machine ID (For Delivery Server)		Displays ID	
	Displays the unique device ID in use by the delivery server directory. The value is only displayed and cannot be changed. This ID is created from the NIC MAC or IEEE 1394 EUI. The ID is displayed as either 6-byte or 8-byte binary.			
5846 2	Machine ID Clear (For Delivery Server)		Clears ID	
	Clears the unique ID of the device used as the name in the file transfer directory. Execute this SP if the connection of the device to the delivery server is unstable. After clearing the ID, the ID will be established again automatically by cycling the machine off and on.			
5846 3	Maximum Entries		[2000~50000/ **2000** /1]	
	Changes the maximum number of entries that UCS can handle. If a value smaller than the present value is set, the UCS managed data is cleared, and the data (excluding user code information) is displayed.			
5846 4	Delivery Server Model		**0:** Not used, 1:SG1 Provided, 2: SG1 Package, 3: SG2 Provided 4: SG2 Package	
	Changes the model of the transfer server registered for the I/O device.			
5846 5	Delivery Server Capability		Bit 7 = 1 Comment information Bit 6 = 1 Address direct entry possible Bit 5 = 1 Mail Rx confirmation possible Bit 4 = 1 Address book auto update Bit 3 = 1 Fax Rx function [0~255 / **0** / 2]	
	Changes the capability of the server registered for the I/O device.			
5846 6	Delivery Server Retry Timer		[0~255/ **0** /1]	
	Sets the interval for retry attempts when the delivery server fails to acquire the delivery server address book.			
5846 7	Delivery Server Retry Times		[0~255/ **0** /1]	
	Sets the number of retry attempts when the delivery server fails to acquire the delivery server address book.			
5846 8	Delivery Server Maximum Entries		[2000~50000 / **2000** / 1]	
	Sets the maximum number account entries of the delivery server user information managed by UCS.			
5846 10	LDAP Search Timeout		[1~255 / **60** / 1]	
	Sets the length of the timeout for the search of the LDAP server.			
5846 50	Initialize All Directory Info.		Clears all directory information managed by UCS, including all user codes.	
5846 70	LDAP Attribute (Name)		Allows you to enter a search attribute other than the default mail (cn) for the LDAP server search.	
5846 71	LDAP Attribute (Mail)		Allows you to enter a search attribute other than the default mail address (mail) for the LDAP server search.	
5846 72	LDAP Attribute (Fax)		Allows you to enter a search attribute other than the default facsimile telephone number (FacsimileTelephoneNumber) for the LDAP server search.	
5846 73	LDAP Attribute (Organization)		Allows you to enter a search attribute other than the default organization name (o) for the LDAP server search.	
5846 74	LDAP Attribute (Organizational Unit)		Allows you to enter a search attribute other than the default organization unit name (ou) for the LDAP server search.	

Service
Tables

5846 80	Backup FCU	Backs up all directory information on the HDD to the FCU ROM.
5846 90	Plain Data Forbidden	Allows you to prevent the address from plain data. This is a security function that prevents unauthorized access to address book data. **0**: No check. Address book data not protected. 1: Check. Allows operation of UCS without data from HDD or SC card and without creating address book information with plain data.

5847	Net File Resolution Reduction	*CTL	
	5847 1 through 5847 6 changes the default settings of image data transferred externally by the Net File page reference function. [0~2 / **2** / 1] 5847 21 sets the default for JPEG image quality of image files handled by NetFile. "Net files" are jobs to be printed from the document server using a PC and the DeskTopBinder software.		
5847 1	Rate for Copy Color	0: 1x	
5847 2	Rate for Copy B&W Text	1: 1/2x	
5847 3	Rate for Copy B&W Other	**2**: 1/3x	
5847 4	Rate for Printer Color	3: 1/4x	
5847 5	Rate for Printer B&W		
5847 6	Rate for Printer B&W HQ		
5847 7	Rate for Printer Color 1200dpi		
5847 8	Rate for Printer B&W 1200dpi		
5847 21	Network Quality Default for JPEG		
	Sets the default value for the quality of JPEG images sent as NetFile pages. This function is available only with the MLB (Media Link Board) option installed. [5~95 / **50** / 1]		

5848	Web Service	*CTL	
	5847 2 sets the 4-bit switch assignment for the access control setting. Setting of 0001 has no effect on access and delivery from Scan Router. 5847 100 sets the maximum size allowed for downloaded images. The default is equal to 1 gigabyte.		
5848 1	Access Control: Netfile Protocol	Bit switch settings.	
	0000: No access control 0001: Denies access to DeskTop Binder. Access and deliveries from Scan Router have no effect on capture.		
5848 2	Access Control: Repository (only Lower 4 bits)	0000: No access control 0001: Denies access to DeskTop Binder.	
5848 3	Access Control: DocBox Print (only Lower 4 bits)	Switches access control on and off. 0000: OFF	
5848 4	Access Control: User Directory (only Lower 4 bits)		
5848 5	Access Control: Delivery Input (only Lower 4 bits)		
5848 6	Access Control: Fax Control (only Lower 4 bits)		
5848 7	Access Ctrl: Comm. Log Fax (Lower 4 bits)		

5848 8	Access Ctrl: Comm. Log Scan (Lower 4 bits)	Switches access control on and off. 0000: OFF
5848 9	Access Ctrl: Job Ctrl (Lower 4 bits)	
5848 11	Access Ctrl: Device Ctrl Sys (Lower 4 bits)	
5848 12	Access Ctrl: Device Ctrl Copy (Lower 4 bits)	
5848 13	Access Ctrl: Device Ctrl Fax (Lower 4 bits)	
5848 14	Access Ctrl: Device Ctrl Printer (Lower 4 bits)	
5848 15	Access Ctrl: Device Ctrl Scanner (Lower 4 bits)	
5848 21	Access Ctrl: Delivery (Lower 4 bits)	
5848 100	Repository: max size of download image	[1 to 1024 / 1024 / 1/K]

5849	Installation Date	*CTL	
5849 1	Display	**DFU**	
5849 2	Switch to Print	**DFU**	

5850	Address Book Function	*CTL	**Japan Only**
5850 3	Replacement of Circuit Classification		
	The machine is sold ready to use with a G3 line. This SP allows you to switch all at once to convert to G4 after you add a G4 line. Conversely, if for some reason the G4 line becomes unusable, you can easily switch back to G3.		

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

5856	**[Remote ROM Update]**		
	Allows the technician to upgrade the firmware using a parallel cable		
5856 2	Local Port	*CTL	[0 to 1 / 0 / 1/step] 0: Disable 1: Enable

5857	Debug Log Save Function	*CTL	
5857 1	On/Off (1:ON 0:OFF)	**0**: ON, 1: OFF	
	Switches the debug log feature on and off. The debug log cannot be captured until this feature is switched on.		
5857 2	Target (1:IC Card 2:HDD)	**1**:IC Card, 2:HDD	
	Select "1" (IC Card) if an HDD unit is not installed in the machine, or if the HDD unit is temporarily out of service. The IC card can store only 4 MB so use the HDD selection.		

5857 5	Save to HDD	**DFU**	
	Saves the debug log in memory to the HDD. A unique file name is generated to avoid overwriting existing file names on the SD Card. Up to 4MB can be copied to an SD Card. 4 MB segments can be copied one by one to each SD Card.		
5857 9	Copy HDD to SD Card (Latest 4 MB)		
5857 10	Copy HDD to SD Card (Latest 4 MB Any Key)		
5857 11	Erase HDD Debug Data		
5857 12	Erase SD Card Debug Data		
5857 13	Free Space on SD Card		
5857 14	Copy SD to SD (Latest 4 MB)		
5857 15	Copy SD to SD (Latest 4 MB Any Key)		
5857 16	Make HDD Debug		
5857 17	Make SD Debug		

5858	Debug Save When	*CTL	
	These SPs select the content of the debugging information to be saved to the destination selected by SP5857 002. SP5858 3 stores one SC specified by number. Refer to Section 4 for a list of SC error codes.		
5858 1	Engine SC Error	Stores SC codes generated by copier engine errors.	
5858 2	Controller SC Error	Stores SC codes generated by GW controller errors.	
5858 3	Any SC Error	[0~65535 / **0** / 1]	
5858 4	Jam	Stores jam errors.	

5859	**Debug Save Key No.**	*CTL	
5859 1	Key 1	These SPs allow you to set up to 10 keys for log files for functions that use common memory on the controller board. (☛5.3.1) [-9999999~9999999 / 0 / 1]	
5859 2	Key 2		
5859 3	Key 3		
5859 4	Key 4		
5859 5	Key 5		
5859 6	Key 6		
5859 7	Key 7		
5859 8	Key 8		
5859 9	Key 9		
5859 10	Key 10		

5860	**SMTP/POP3/IMAP4**	*CTL	
5860 20	Partial Mail Receive Timeout		[1~168 / **72** / 1]
	Sets the amount of time to wait before saving a mail that breaks up during reception. The received mail is discarded if the remaining portion of the mail is not received during this prescribed time.		
5860 21	MDN Response RFC2298 Compliance		[0~1 / **1** /1]
	Determines whether RFC2298 compliance is switched on for MDN reply mail. 0: No 1: Yes		
5860 22	SMTP Auth. From Field Replacement		[0~1 / **0** / 1]
	Determines whether the FROM item of the mail header is switched to the validated account after the SMTP server is validated. **0**: No. "From" item not switched. 1: Yes. "From item switched.		

5870	Common Key Info Writing	*CTL	
	Writes to flash ROM the common proof for validating the device for NRS specifications.		

5871	HDD Function Disable **DFU**	*CTL	[0~1 / **0** / 1] (0: OFF, 1: ON)
	Disables the HDD functions by suppressing all functions that write data to the HDD. After this SP is executed, the machine must be switched off and on to enable the setting. **Note**: This SP is intended for use during the installation of the security DIMM, an option that is not yet available.		

5873	**SD Card Appli Move**	
5873 1	Move Exec	This SP copies the application programs from the SD card in SD Card Slot 3.
5873 2	Undo Exec	This SP copies the application programs from the SD card in SD Card Slot 3. Use this menu to

5907	**[Plug & Play Maker/Model Name]** Plug & Play Name Selection		
	Specifies the manufacturer and model name.		
5907 1	Plug/Play	*BCU	[0 to 11 / 0 / 1/step] **FA**

	MF	**Model Name**	**NetBeui**
0	Ricoh	Aficio 2232C	Aficio2232C
1	Ricoh	Aficio 2238C	Aficio2238C
2	Savin	C3324	C3324
3	Savin	C3328	C3328
4	Gestetner	DSc332	DSc332
5	Gestetner	DSc338	DSc338
6	NRG	DSc332	DSc332
7	NRG	DSc338	DSc338
8	Infotec	ISC 2432	ISC2432
9	Infotec	ISC 2838	ISC2838
10	Lanier	LD232c	LD232c
11	Lanier	LD238c	LD238c

Service Tables

5913	Switchover Permission Time	*CTL	[3~30 / **3** / 1 s]
	Sets the amount of time to elapse while the machine is in standby mode (and the operation panel keys have not been used) before another application can gain control of the display.		

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

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

5974	**[Cherry Server]**		
	Specifies which version of ScanRouter, "Lite" or "Full", is installed.		
5974 1	Cherry Server Setting	*CTL	[0 or 1 / 0 / -] 0: Lite 1: Full

5989	**[Loop Back Test]**	
	Executes a communication test with peripherals by using a special tool (connector) which is unique for each peripheral. The machine checks if the communication with the peripherals is OK or NG; then displays the result. **DFU**	
5989 1	Duplex	
5989 3	Finisher	
5989 4	PSU	
5989 5	ADF	

5990	**[SP print mode]**	
	Prints out the SMC sheets.	
5990 1	All (Data List)	
5990 2	SP (Mode Data List)	
5990 3	User Program	
5990 4	Logging Data	
5990 5	Diagnostic Report	
5990 6	Non-Default	
5990 7	NIB Summary	
5990 8	Net File Log	
5990 21	Copier User Program	
5990 22	Scanner SP	
5990 23	Scanner User Program	

5991	[Jam OFF/ON] Jam ON/OFF		
	Enables or disables jam detection.		
5991 1	Jam OFF/ON		[0 or 1 / 0 / -] Alphanumeric 0: Enable 1: Disable

5993	[Line Position Adj.] Line Position Adjustment		
	Line Positioning Adjustment ([Color]) M: Main-scan, S: Sub-scan, Reg.: Registration, Mag.: Magnification For example: M Reg = Main scan registration		
5993 1	Mode Selection	*BCU	[0 to 2 / 1 / 1/step] Alphanumeric 0: Never done 1: Done at a) all process control self checks except after toner end recovery and developer initialization, b) new PCU detected, and c) the temperature has changed by 5°C since the last adjustment 2: As for setting '1', except it is not done during self-checks. However, it is done at the initial process control self check.
	Specifies when the automatic line position adjustment is done. The size of the 5°C difference can be changed with SP5-993-3.		
5993 2	Execute		
	Use to make a line position adjustment.		
5993 3	Temperature	*BCU	[3 to 15 / 5 / 1/°C]
	Specifies the temperature for starting the line positioning adjustment. The line position adjustment automatically starts when the temperature differs by the amount specified in this SP mode from the temperature when the last adjustment was done. There are two thermistors on the laser optics-housing unit. The thermistor close to the fusing unit monitors the temperature for this adjustment.		
5993 4	Interrupt	*BCU	[0 or 1 / 1 / -] Alphanumeric 0: Disabled 1: Enabled
	Enables or disables the line position adjustment during a print job when the temperature differs by the amount specified in SP5-993-003 from the temperature at the last adjustment.		
5993 5	Stand-by	*BCU	[0 or 1 / 0 / -] Alphanumeric 0: Disabled 1: Enabled
	Enables or disables the line position adjustment during stand-by mode when the temperature differs by the amount specified in SP5-993-003 from the temperature at the last adjustment.		
5993 6	Job Start	*BCU	[0 or 1 / 1 / -] 0: Disabled 1: Enabled
	Enables or disables the line position adjustment just before starting a color print job when the temperature differs by the amount specified in SP5-993-003 from the temperature when the machine woke up from energy saver mode.		

Service Tables

5993 7	Result	*BCU	

	Displays the result of the latest line position adjustment in 4 digits.
	
	First and second digits: Error detected on the rear ID sensor
	Third and fourth digits: Error detected on the center ID sensor
	Fifth and sixth digits: Error detected on the front ID sensor
	
	  0 1 0 1 0 1
	  The 6th digit ↑ ↑ The 1st digit
	Refer to the Troubleshooting section for more details about the two-digit codes.			

5993 8	Exe. Counter	*BCU	
	Displays how many times the line position adjustment has been executed. Counts up by +1 normally. After a forced adjustment and a PCU replacement, it counts up +3 Also includes adjustments done at the factory.			
5993 9	Error Counter	*BCU	Displays how many times errors have been detected during the line position adjustment.
	The way that the auto line position adjustment is done can be adjusted using the following SP modes (SP5-993-010 to 021). These are coefficients used for the adjustment. Normally, do not change except if the automatic adjustment gives poor results immediately after installing a new optics housing unit. Change the value then do a forced line position adjustment (SP 5-993-2) to check the effects of the changes. Example: If magenta is always shifted one dot to the left, reduce 5-993-11 by 1.			
5993 10	M Reg. [Y]	*BCU	A fine adjustment to the main-scan registration.
5993 11	M Reg. [M]	*BCU	[-128 to 127 / 0 / 1 dot/step] **FA**
5993 12	M Reg. [C]	*BCU	1 dot = 20µ
5993 13	M Mag. [Y]	*BCU	A fine adjustment to the main-scan
5993 14	M Mag. [M]	*BCU	magnification.
5993 15	M Mag. [C]	*BCU	[-100 to 100 / 0 / 0.01 %/step] **FA** **NOTE:** The setting changes in this SP mode will be affect the next line position adjustment.
5993 16	S Reg. 600[Y]	*BCU	A fine adjustment to the sub-scan registration
5993 17	S Reg. 600[M]	*BCU	for each color (color registration).
5993 18	S Reg. 600[C]	*BCU	[-128 to 127 / 0 / 1 dot/step] FA
5993 19	S Reg. 1200[Y]	*BCU	600dpi: 1 dot = 40µ
5993 20	S Reg. 1200[M]	*BCU	1200 dpi: 1 dot = 20µ
5993 21	S Reg. 1200[C]	*BCU	
5993 22	Interrupt	*BCU	[10 to 250 / 100 / 10 sheets/step]
	Specifies the number of sheets to be printed before a line position adjustment is done during a print job. SP 5-993-4 must be set to 'enabled'. When the temperature difference meets the conditions specified in SP5-993-3, the machine starts counting the number of prints in the job. The machine interrupts the print job and does the line position adjustment if the number of prints exceeds the number specified in this SP mode. If the counted number of prints does not exceed the number specified, the machine resets the counter, then continues to monitor the temperature and does the line position adjustment next time.			
5993 24	Mscan Lgth Det	*BCU	[100 to 990 / 211 / 10 sec/step]
	Performs the main scan length detection when the polygon motor has operated consecutively for the time specified in this SP mode.			
5993 25	Drm Gear Phase	*BCU	[0 to 345 / 0 / 15 degrees/step] **DFU**
	Adjusts the phases of the black drum gear and the color drum gear.			

5993 26	Initialization	*BCU	[0 to 1 / 1 / 1/step] 0: Disable 1: Enable
	Enables or disables the line position adjustment during initialization.		
5993 27	Toner Refresh	*BCU	[0 to 1 / 1 / 1/step] 0: Disable 1: Enable
	Enables or disables the toner refreshing operation. Repetitive line position adjustments can cause abnormal outputs such as white spots. To prevent this, toner is consumed and supplied after line position adjustment.		
5993 31	PPS: 125	This SP checks the transfer PPS in the 125-mm/s mode.	
5993 32	PPS Set: 125	*BCU	[6043 to 6166 / 6105 / 1 step]
	This SP adjusts the transfer PPS in the 125-mm/s mode.		
5993 33	PPS: 62.5	This SP checks the transfer PPS in the 62.5-mm/s mode.	
5993 34	PPS Set: 62.5	*BCU	[6043 to 6166 / 6105 / 1 step]
	This SP adjusts the transfer PPS in the 62.5-mm/s mode.		
5993 35	Color Adj level	*BCU	[LOW, MID, HIGH]
	This SP specifies the level of color adjustment. This SP sets the following SPs as listed.		

	HI	MID	LOW
SP3-906-001	200	200	255
SP3-906-002	200	0	0
SP3-906-003	200	0	0
SP3-906-004	480	480	480
SP3-906-005	1.00	1.00	0.5
SP3-993-001	1	1	1
SP3-993-003	3	5	7
SP3-993-004	1	1	1
SP3-993-005	0	0	0
SP3-993-006	1	1	0
SP3-993-022	100	100	250
SP3-993-024	105	211	422
SP3-993-026	1	0	0

<div style="text-align:right">Service Tables</div>

5994	**[Unit Detection ON/OFF]** Maintenance Unit Detection ON/OFF		
5994 1	Dev/PCU	*BCU #	[0 or 1 / 0 / -] Alphanumeric **DFU** 0: Enable 1: Disable
	Enables or disables PCU and development unit detection. **NOTE:** If this mode is disabled, new unit detection also does not function. Use this mode as a temporary measure, only when the micro-switches are defective.		
5994 2	Oil Supply Unit	*BCU #	[0 or 1 / 0 / -] Alphanumeric 0: Enable 1: Disable
	NOTE: Use this mode as a temporary measure, only when the unit detection mechanism is defective.		

5995	[ColorGapAdj2] Color Gap Adjustment 2		
5995 20	Trans Drv FB	*BCU	Enables or disables the transfer belt feedback feature. [0 or 1 / <u>0</u> / -] 0: Enabled 1: Disabled

5997	[Test Pattern]		
5997 1	Tray Selection		[0 to 4 / <u>1</u> / 1/step] 0: By-pass Table 1: Tray 1 2: Tray 2 3: Tray 3 4: Tray 4
	Selects the tray for making a test print. **NOTE:** The machine makes a test pattern on the paper size loaded in the selected paper tray.		
5997 2	Pattern		[0 to 23 / <u>0</u> / 1/step] 0: None 1: 1-dot sub-scan line 2: 2-dot sub-scan line 3: 1-dot main-scan line 4: 2-dot main-scan line 5: 1-dot grid pattern (Fine) 6: 2-dot grid pattern (Fine) 7. 1-dot grid pattern (Rough) 8. 2-dot grid pattern (Rough) 9. 1-dot slant grid pattern 10. 2-dot slant grid pattern 11. 1-dot pattern 12. 2-dot pattern 13. 4-dot pattern 14. 1-dot trimming pattern 15. 2-dot trimming pattern 16. Cross stitch: sub-scan 17. Cross stitch: main-scan 18. Belt pattern (Horizontal) 19. Belt pattern (Vertical) 20. Checkered Flag 21. Grey scale (Vertical) 22. Grey scale (Horizontal) 23. Solid
	Selects a test pattern.		
5997 3	Single Color		[0 to 6 / <u>6</u> / 1/step] Alphanumeric 0: Red 1: Green 2: Blue 3: Yellow 4: Magenta 5: Cyan 6: Black
	Selects the color for making a test pattern.		
5997 4	Color Mode		[0 or 1 / <u>0</u> / 1/step] Alphanumeric 0: Full Color 1: Single Color
	Selects the color mode for making a test print.		
5997 5	Resolution		[0 to 2 / <u>1</u> / 1/step] Alphanumeric 0: 600x600 1: 1800x600 2: 1200x1200
	Selects the resolution for making a test print.		

5997 6	By-pass Paper Size		[0 to 3 / 0 / 1/step] Alphanumeric 0: A4 LEF 1: LT LEF 2: A3 3: DLT
	Selects the paper size for making a test pattern from the by-pass table.		
5997 7	Print		
	Prints the test pattern with the settings specified with SP5-997-001 to 006. **NOTE:** When exiting the SP mode, the test print mode is automatically canceled.		

5998	**[Memory Clear]** **NOTE**: For more information, see "NOTE 1" following this table.		
5998 1	ENG Setting		Clears the engine settings except for counters.
5998 2	ENG Counter		Clears all counters.

5999	**New Unit Set**	*BCU #	**[0: Disable/1: Enable]**
5999 1	PCU: Bk		This program makes the machine to start the initialization processing for a newly installed unit. You set "0: Enable" before installing a new unit.
5999 2	PCU: Y		
5999 3	PCU: M		
5999 4	PCU: C		
5999 5	Dev. U: Bk		
5999 6	Dev. U: Y		
5999 7	Dev. U: M		
5999 8	Dev. U: C		
5999 9	Fuser		

SP6-XXX (Peripherals)

6006	[DF Registration Adj.] DF Registration Adjustment		
	Adjusts the side-to-side and leading registration of originals with the ARDF.		
6006 1	Side-to-Side	*CTL	[-3.0 to 3.0 / 0 / 0.1 mm/step]
6006 2	Leading Edge		[-42 to 42 / 0 / 1 /step]
	Adjusts the amount of paper buckle to correct original skew for the front and rear sides.		
6006 3	Buckle: Duplex Front	*CTL	[-42 to 42 / 0 / 1 /step]
6006 4	Buckle: Duplex Rear		[-45 to 45 / 0 / 1 /step]
	Adjusts the erase margin at the original trailing edge.		
6006 5	Rear Edge Erase	*CTL	[-20 to 10 / -3 / 1 /step]

6007	[ADF Input Check]	
	Displays the signals received from the sensors and switches of the ARDF.	
6007 1	Group 1	☛ 5.2.2
6007 2	Group 2	
6007 3	Group 3	

6008	[ADF Output Check]	
	Activates the electrical components for functional check. It is not possible to activate more than one component at the same time.	
6008 1	Fee-in Motor Fwd.	
6008 2	Feed-in Motor Rev.	
6008 3	Drive Motor Fwd.	
6008 4	Reverse Motor Fwd.	
6008 5	Reverse Motor Rev.	
6008 6	Feed Clutch	
6008 7	Inverter Solenoid	
6008 8	Pick-up Motor Fwd.	
6008 9	Pick-up Motor Rev.	

6009	[DF Free Run]	
	Performs a DF free run in duplex mode or stamp mode.	
6009 1	Duplex Mode	
6009 2	Stamp Mode	

6010	[Stamp Position Adj.] Fax Stamp Position Adjustment		
	Adjusts the horizontal position of the stamp on the scanned originals.		
6010 1	Stamp Position Adj.	*CTL	[-3.5 to 3.5 / 0 / 0.5 mm/step]

6016	[Original Size Priority] Original Size Detection Priority
	Specifies the original size for a size detected by the original sensor, since original sensors cannot recognize all sizes.

| 6016 1 | Original Size Priority | *CTL | [0 or 1 / <u>0</u> / -]
0: Setting 1
1: Setting 2

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

Bits used for detection differ depending on destination as shown below.
Bit 7 to 6: Only for Japan
Bit 5 to 2: Only for US
Bit 1 to 0: Only for EU/AA |

6017	**[DF Magnification Adj.]** DF Magnification Adjustment		
	Adjusts the magnification in the sub-scan direction for the ARDF.		
6017 1	DF Magnification Adj.	*CTL	[-5.0 to 5.0 / <u>0</u> / 0.1 %/step]

6110	**[Punch Position]**		
	Adjusts the punching position. Punch 1 US: 2 punch holes Europe: 2 punch holes North Europe: 4 punch holes Punch 2 US: 3 punch holes Europe: 4 punch holes Increment: Holes move toward the paper center. Decrement: Holes move toward the paper edge.		
6110 1	MF Fin 1	*BCU	[-7.5 to 7.5 / <u>0</u> / 0.5 mm/step]
6110 2	MF Fin 2	*BCU	
6110 3	Booklet Fin		[-2.5 to 7.5 / <u>0</u> / 0.5 mm/step]

6111	**[Staple Position]**		
	Adjusts the stapling position. Increment: Staple position moves toward the edge of paper. Decrement: Staple position moves toward the center of paper. **NOTE:** Although the adjustable range is ±3.5 mm, the stapling position can be changed only by 1.0 mm when stapling one position at the front or rear side even when the input value is more than 1.0.		
6111 1	MF Fin	*BCU	[-3.5 to 3.5 / <u>0</u> / 0.5 mm/step]
6111 2	Booklet Fin		[-3.75 to 3.75 / <u>0.</u> / 0.25 mm/step]

6112	**[Fold Position]**	*BCU	[-3.75 to 3.75 / <u>0.</u> / 0.25 mm/step]

Service Tables

6111 1	A3/DLT	Adjusts the folding positions of the optional booklet finisher.
6111 2	B4/LG	
6112 3	A4/LT	
6112 4	A3/DLT	
6112 5	B4/LG	
6112 6	A4/LT	

6901	[Multi Bin Set]		
	Specifies whether or not the optional multi-bin output tray is installed. When installing the multi-bin output tray, this SP mode should be set to "1".		
6901 1	Multi Bin Set	*BCU	[0 or 1 / 0 / -] 0: Not installed 1: Installed

SP7-XXX (Data Log)

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

7002	[Original Counter]		
	Displays the total original count (number of originals fed) for the selected mode.		
7002 1	Total	*CTL	
7002 2	Copy		
7002 3	Fax		
7002 4	Doc. Svr. Application		
7002 5	Scanner		
7002 6	Others		

7003	[Print Counter] Meter Charge Counter (**P**rint, **D**evelopment)		
	Displays the values of the color counters.		
7003 1	Total Count	*CTL	[-9999 to 9999999 / 0 / 1/step]
7003 2	Copy: B&W		
7003 4	Copy: Full Color		
7003 5	FAX: B&W		
7003 7	Print: B&W		
7003 8	Print: Full Color		
7003 10	Development: CMY	*CTL	These SP modes are development counters for the meter charge mode.
7003 11	Development: K		
7003 12	Copy: Single Color	*CTL	Displays the values of the color counters.
7003 13	Copy: Twin Color		
7003 20	Total: Full Color	*CTL	These SP modes are used for Japanese market only.
7003 21	Total: B&W Single		
7003 22	Total: Single		
7003 23	Total: B&W	*CTL	This SP mode is print counters for the meter charge mode.
7003 24	Copy: Full Color	*CTL	These SP modes are used for Japanese market only.
7003 25	Print: Full Color		
7003 26	Copy: Color	*CTL	These SP modes are print counters for the meter charge mode.
7003 27	Copy: B/W		
7003 28	Print: Color		
7003 29	Print: B&W		
7003 30	Total: Color Total		

7007	[Other Counter]		
	Displays counter values.		
7007 1	Duplex	*CTL	[0 to 9999999 / 0 / 1 sheet/step]
7007 2	A3/DLT		
7007 3	Staple		

7101	[**Print** Count–Paper Size] Paper Size Counter		
	Displays the counter values for each paper size.		
7101 5	A4 LEF	*CTL	[0 to 9999999 / 0 / 1 sheet/step]

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7101 6	A5 LEF
7101 14	B5 LEF
7101 38	LT LEF
7101 44	HLT LEF
7101 132	A3 SEF
7101 133	A4 SEF
7101 134	A5 SEF
7101 141	B4 SEF
7101 142	B5 SEF
7101 160	DLT SEF
7101 164	LG SEF
7101 166	LT SEF
7101 172	HLT SEF
7101 255	Other

7105	[Print Count–Paper Size] Paper Size Counter		
	Displays the counter values for each paper size.		
7105 1	Normal	*CTL	[0 to 9999999 / 0 / 1 sheet/step]
7105 2	Recycled		
7105 3	Special		
7105 4	Colour		
7105 5	Letterhead		
7105 6	Letterhead		
7105 7	Label		
7105 8	Thick		
7105 9	Used		
7105 11	Index		
7105 12	Others		

7201	[Total Scan Counter]		
	Displays the total number of scans.		
7201 1	Total Scan Counter	*CTL	[0 to 9999999 / 0 / 1 scan/step]

7204	[Print Counter–Paper Tray] Paper Feed Section Counter		
	Displays the number of sheets fed from each paper feed station. NOTE: The LCT is counted as the 3rd feed station.		
7204 1	Bypass	*CTL	[0 to 9999999 / 0 / 1 sheet/step]
7204 2	Tray 1		
7204 3	Tray 2		
7204 4	Tray 3		
7204 5	Tray 4		
7204 6	Duplex		

7205	[Total ADF Counter]		
	Displays the total number of originals fed by the ARDF.		
7205 1	ADF Total Counter	*CTL	

7206	[Staple Counter]		
7206 1	Normal Staple	*CTL	Displays the number of stapler operations.

7206 2	Binding Staple		

7209	**[Punch Counter]**		
	Displays the number of times hole punching has been done.		
7209 1	Punch	*CTL	[0 to 9999999 / 0 / 1/step]

7401	**[Total SC Counter]**		
	Displays the number of SC codes detected.		
7401 1	SC Counter	*CTL	[0 to 9999 / 0 / 1/step]

7403	**[SC History]**		
	Logs the SC codes detected. The 10 most recently detected SC Codes are not displayed on the screen, but can be seen on the SMC (logging) outputs.		
7403 1	Latest	*CTL	
7403 2	Latest 1		
7403 3	Latest 2		
7403 4	Latest 3		
7403 5	Latest 4		
7403 6	Latest 5		
7403 7	Latest 6		
7403 8	Latest 7		
7403 9	Latest 8		
7403 10	Latest 9		

7502	**[Total Paper Jam Counter]**		
	Displays the total number of jams detected.		
7502 1	Total Jam	*CTL	[0 to 9999 / 0 / 1 sheet/step]

7503	**[Total Original Jam Counter]**		
	Displays the total number of original jams.		
7503 1	Original Jam counter	*CTL	[0 to 9999 / 0 / 1 original/step]

7504	**[Paper Jam Location]** D: Duplex, MB: Mail Box, F; Finisher, E: External, I: Internal ON: On check, OFF: Off Check		
	Displays the number of jams according to the location where jams were detected.		
	NOTE: The LCT is counted as the 3rd feed station.		
7504 3	Tray 1: ON	*CTL	
7504 4	Tray 2: ON		
7504 5	Tray 3/LCT: ON		
7504 6	Tray 4: ON		
7504 8	Regist.: ON		
7504 9	External Tray: ON		
7504 10	Internal Tray: ON		
7504 11	Duplex: ON		
7504 12	Duplex Exit 1: ON		
7504 13	Duplex Exit 2: ON		

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7504 14	Duplex Exit 3: ON		
7504 15	Duplex Feed: ON		
7504 51	Tray 1: OFF		
7504 52	Tray 2: OFF		
7504 53	Tray 3/LCT: OFF		
7504 54	Tray 4: OFF		
7504 61	Registration: OFF		
7504 63	External Tray: OFF		
7504 64	Internal Tray: OFF		
7504 65	Duplex: OFF		
7504 66	Duplex Exit 1: OFF		
7504 67	Duplex Exit 2: OFF		
7504 68	Duplex Exit 3: OFF		
7504 69	Duplex Feed: OFF		
7504 100	Finisher Entrance		
7504 101	Finisher Shift Tray 1		
7504 102	Finisher Shift Tray 2		
7504 103	Finisher Staple		
7504 104	Finisher Exit		
7504 105	Finisher Drive		
7504 106	Finisher Tray Up/Down		
7504 107	Finisher Jogger		
7504 108	Finisher Staple		
7504 109	Finisher Exit		
7504 110	Finisher Punch		
7504 111	Finisher Jam Clear		
7504 120	Finisher 120		
7504 121	Finisher 121		
7504 122	Finisher 122		
7504 123	Finisher 123		
7504 124	Finisher 124		
7504 125	Finisher 125		
7504 126	Finisher 126		
7504 127	Finisher 127		
7504 128	Finisher 128		
7504 129	Finisher 129		
7504 130	Finisher 130		
7504 131	Finisher 131		

7505	**[Original Jam Detection]**		
	Displays the total number of original jams by location.		
7505 1	At Power On	*CTL	
7505 3	Skew Correction Sensor (On Check)		
7505 4	Interval Sensor (On Check)		
7505 5	Registration Sensor (On Check)		
7505 6	Relay Sensor (On Check)		
7505 7	Inverter Sensor (On Check)		
7505 53	Skew Correction Sensor (Off Check)		
7505 54	Interval Sensor (Off Check)		
7505 55	Registration Sensor (Off Check)		
7505 56	Relay Sensor (Off Check)		
7505 57	Inverter Sensor (Off Check)		

7506	[Jam Count by Paper Size]		
	Displays the number of jams according to the paper size.		
7506 5	A4 LEF	*CTL	[0 to 9999 / 0 / 1 sheet/step]
7506 6	A5 LEF		
7506 14	B5 LEF		
7506 38	LT LEF		
7506 44	HLT LEF		
7506 132	A3 SEF		
7506 133	A4 SEF		
7506 134	A5 SEF		
7506 141	B4 SEF		
7506 412	B5 SEF		
7506 160	DLT SEF		
7506 164	LG SEF		
7506 166	LT SEF		
7506 172	HLT SEF		
7506 255	Others		

7507	[Plotter Jam History]		
	Displays the 10 most recently detected paper jams.		
7507 1	Latest	*CTL	
7507 2	Latest 1		
7507 3	Latest 2		
7507 4	Latest 3		
7507 5	Latest 4		
7507 6	Latest 5		
7507 7	Latest 6		
7507 8	Latest 7		
7507 9	Latest 8		
7507 10	Latest 9		

7508	[Original Jam History]		
	Displays the 10 most recently detected original jams.		
7508 1	Latest	*CTL	
7508 2	Latest-1		
7508 3	Latest-2		
7508 4	Latest-3		
7508 5	Latest-4		
7508 6	Latest-5		
7508 7	Latest-6		
7508 8	Latest-7		
7508 9	Latest-8		
7508 10	Latest-9		

7801	[ROM No./Firmware Version]		
	Displays the version of each firmware		
7801 255	Firmware Version		

Service Tables

7803	**[PM Counter]**		
	(**S**heets or **R**otations, Unit, [Color]) Dev.: Development Unit, PF: Paper Feed Rollers, Oil Supply: Oil Supply Unit, Fusing: Fusing Unit, Transfer: Transfer Unit		
	Displays the number of sheets printed for each current maintenance unit. PM counters click up based on the number of A4 (LT) LEF size sheets printed. Therefore, the A3 (DLT) Double Count is activated. The Double Count cannot be deactivated. When a unit is replaced, the machine automatically detects that the new unit is installed. Then, the current PM counter value is automatically moved to the PM Counter - Previous (SP7-906-1 to 9) and is reset to "0". The total number of sheets printed with the last unit replaced can be checked with SP7-906-1 to 9. **NOTE**: The LCT is counted as the 3rd feed station.		
7803 1	Paper	*BCU	[0 to 9999999 / 0 / 1 sheet/step]
7803 2	S: PCU [K]		
7803 3	S: PCU [Y]		
7803 4	S: PCU [M]		
7803 5	S: PCU [C]		
7803 6	S: Dev. [K]		
7803 7	S: Dev. [Y]		
7803 8	S: Dev. [M]		
7803 9	S: Dev. [C]		
7803 10	S: Oil Supply		
7803 11	PF By-pass		
7803 12	PF Tray 1		
7803 13	PF Tray 2		
7803 14	PF Tray 3		
7803 15	PF Tray 4		
7803 16	S: Fusing		
7803 17	S: Transfer		
	Displays the number of revolutions of motors or clutches for each current maintenance unit. [0 to 9999999 / 0 / 1 revolution/step] When a unit is replaced, the machine automatically detects that the new unit is installed. Then, the current PM counter value is automatically moved to the PM Counter - Previous (SP7-906-10 to 20) and is reset to "0". The total number of revolutions made with the last unit replaced can be checked with SP7-906-10 to 20.		
7803 18	R: PCU [K]	*BCU	Target Revolution: 300,000
7803 19	R: PCU [Y]		Target Revolution: 319,000
7803 20	R: PCU [M]		Target Revolution: 319,000
7803 21	R: PCU [C]		Target Revolution: 319,000
7803 22	R: Dev. [K]		Target Revolution: 1,142,000
7803 23	R: Dev. [Y]		Target Revolution: 1,146,000
7803 24	R: Dev. [M]		Target Revolution: 1,146,000
7803 25	R: Dev. [C]		Target Revolution: 1,146,000
7803 26	R: Oil Supply		Target Revolution: 2,559,000
7803 27	R: Fusing		Target Revolution: 8,397,000
7803 28	R: Transfer		
	Displays the number of sheets printed until the waste toner bottle becomes full or toner runs out.		
7803 29	S: Waste Toner	*BCU	[0 to 9999999 / - / 1 sheet/step]
7803 30	S: Toner [K]		
7803 31	S: Toner [Y]		
7803 32	S: Toner [M]		

7803 33	S: Toner [C]		
	Displays the total operating time for the toner attraction pump.		
7803 34	Toner Supply[K]	*BCU	[0 to 9999999 / - / 1 s/step]
7803 35	Toner Supply[Y]		
7803 36	Toner Supply[M]		
7803 37	Toner Supply[C]		
	Displays the value given by the following formula: (Current revolution ÷ Target revolution) × 100, where "Current revolution" is the current value for the counter of the part, and "Target revolution" is the values of SP7-803-17 through 27. This shows how much of the unit's expected lifetime has been used up. The R% counter is based on rotations, not prints. If the number of rotations reaches the limit, the machine enters the end condition for that unit. If the print count lifetime is reached first, the machine also enters the end condition, even though the R% counter is still less than 100%. Oil supply unit: When the R% counter reaches 100%, it enters the near-end condition, not the end condition. The end condition occurs some number of rotations after this (not adjustable). **NOTE:** The machine internally adjusts or compensates as necessary, depending on conditions of machine usage. Due to this, at the oil supply unit near-end condition, the R% counter of the oil supply unit can be 100%, lower than 100%, or higher than 100%.		
7803 38	R(%): PCU [K]	*BCU	
7803 39	R(%): PCU [Y]		
7803 40	R(%): PCU [M]		
7803 41	R(%): PCU [C]		
7803 42	R(%): Dev [K]		
7803 43	R(%): Dev [Y]		
7803 44	R(%): Dev [M]		
7803 45	R(%): Dev [C]		
7803 46	R(%): Oil Spply		
7803 47	R(%): Fusing		
7803 48	S: Trans Cln		
7803 49	R: Trans Cln		

7804	[PM Counter Reset] PM Counter Clear		
	(Unit, [Color]) Dev.: Development Unit, PF: Paper Feed Rollers, Transfer: Transfer Unit		
	Clears the PM counter. Press the Enter key after the machine asks "Execute?". When a unit is replaced, the machine automatically detects that the new unit is installed. Then, the current PM counter value is automatically moved to the b PM Counter - Previous (SP7-906-1 to 25) and is reset to "0". **NOTE:** The LCT is counted as the 3rd feed station.		
7804 1	Paper		
7804 2	PCU [K]		
7804 3	PCU [Y]		
7804 4	PCU [M]		
7804 5	PCU [C]		
7804 6	Dev. [K]		
7804 7	Dev. [Y]		
7804 8	Dev. [M]		
7804 9	Dev. [C]		
7804 10	Oil Supply		
7804 11	PF By-pass		
7804 12	PF Tray 1		

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7804 13	PF Tray 2		
7804 14	PF Tray 3		
7804 15	PF Tray 4		
7804 16	Fusing		
7804 17	Transfer		
7804 18	Trans Cln		
7804 50	All		

7807	**[SC/Jam Counter Reset]**		
	Clears the counters related to SC codes and paper jams.		
7807 1	SC/Jam Clear		

7808	**[Counter Reset]** **NOTE**: For more information, see "NOTE 1" following this table.		
	Clears all counters.		
7808 1	Counter Clear		

7810	**[Access Code Clear]**		
	Use to clear the access code if the customer forgets the code (password).		
7810 1	Access Code Clear		

7811	**[Original Counter Clear]**		
7811 1	This program reset the original counter (SP7-002-001 through 006).		

7816	**[Tray Clear]** Paper Tray Counter Clear		
	Clears the counters (SP7-204) for the number of sheets fed from the paper feed stations. **NOTE:** The LCT is counted as the 3rd feed station.		
7816 1	Bypass Tray		
7816 2	Tray 1		
7816 3	Tray 2		
7816 4	Tray 3/LCT		
7816 5	Tray 4		
7816 6	Duplex		

7826	**[MF Error Counter] Japan Only**		
7826 1	Error Total		
7826 2	Error Staple		

7827	**[MF Error Counter Clear] Japan Only**		

7832	**[Self-Diagnose Result Display]**		
	Displays the result of the diagnostics.		
7832 1	Diag. Result	*CTL	

7833	[Coverage] Pixel Coverage Ratio		
	Displays the image coverage ratio for each color of the last output. This SP mode displays the "coverage ratio" of the output, i.e. the ratio of the total pixel area of the image data to the total printable area on the paper. Note that this value is not directly proportional to the amount of toner consumed, although of course it is one factor that affects this amount. The other major factors involved include: the type, total image area and image density of the original, toner concentration and developer potential.		
7833 1	Last [K]	*BCU	[0 to 100.00 / - / 0.01 %/step]
7833 2	Last [C]		
7833 3	Last [M]		
7833 4	Last [Y]		
	Displays accumulated average value of image coverage ratio for each color. <u>SP 7-833-5 to -8 vs SP 8-831-1 to –4</u> The averages for K (SP 7-833-5 and SP 8-831-1) are the same. For CMY, SP 8-831 does not include black-and-white pages in the middle of a colour job. However, SP 7-833 does include these pages in the average. As a result, the readings of SP 7-833 will be lower, because these averages include pages for which there is zero for CMY, but the averages calculated for SP 8-831 do not include these pages.		
7833 5	Average [K]	*BCU	[0 to 100.00 / - / 0.01 %/step]
7833 6	Average [C]		
7833 7	Average [M]		
7833 8	Average [Y]		
	Displays the total number of toner cartridges replaced.		
7833 11	Toner [K]	*BCU	[0 to 65535 / - / 1 cartridge/step]
7833 12	Toner [C]		**NOTE:** Currently, the data in SP7-833-011 through 014 and the data in SP8-781-001 through 004 are the same.
7833 13	Toner [M]		
7833 14	Toner [Y]		

7834	[Coverage Clr] Coverage/Toner Data Clear		
7834 1	Average		This menu resets the data in SP7-833-005 through 008.
7834 2	Toner		This menu resets the data in SP7-833-011 through 014 and SP8-781-001 through 004.
7834 3	S: PREV Toner		This menu resets the data in SP8-901-001 through 004.
7834 4	S: Coverage 0-100		This menu resets the data in SP8-851-001 through 004, SP8-861-001 through 004, SP 8-871-001 through 004, and SP8-881-001 through 004.
7834 255	All		This menu resets all the data listed above.

7835	ACC Counter	*CTL	[0 ~ 9999999 / 0 / 1 /step]
7835 1	Copy ACC		Displays the number of times ACC has been done.
7835 2	Printer ACC		

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

Service Tables

7852	**ADF Scan Glass Dust Check Counter**		
	Counts the number of occurrences (0 ~ 65,535) when dust was detected on the scanning glass of the ADF. Counting is done only if SP4991 1 (ADF Scan Glass Dust Check) is switched on. Memory All Clear (SP5801) resets this counter to zeror		

7901	**[Assert Info]**		
	Records the location where a problem is detected in the program. The data stored in this SP is used for problem analysis. **DFU**		
7901 1	File Name		
7901 2	Number of Lines		
7901 3	Location		

7905	**[Alert Display]**		
7905 10	Wst Oil: Full	*BCU	[232 to 464 / 232 / 1 kilo-revolutions/step]
	Specifies the number of revolutions the development drive motor-K can make after the message, "Waste Oil Bottle is Almost Full", is displayed. The machine stops after the motor has made the specified number of revolutions. This SP specifies the interval from near end to end for the waste oil bottle. 232k revolutions equals 2.5k prints. If it is set to 464, the end condition is 5.0k prints after near end.		
7905 14	Oil: Alert: Page	*BCU	[25.0 to 27.5 / 27.5 / 0.1 kilo-sheets/step]
	Specifies the number of sheets the machine can output after the oil supply reaches the near-end condition.		

7906	**[PM Counter: Previous]**		
	(**S**heets or **R**otations, Unit, [Color]), Dev.: Development Unit		
	Displays the number of sheets printed with the previous maintenance units.		
7906 1	S:PCU [K]	*BCU	[0 to 9999999 / 0 / 1 sheet/step]
7906 2	S:PCU [Y]		
7906 3	S:PCU [M]		
7906 4	S:PCU [C]		
7906 5	S:Dev. [K]		
7906 6	S:Dev. [Y]		
7906 7	S:Dev. [M]		
7906 8	S:Dev. [C]		
7906 9	S:Oil Supply		
7906 10	S:Fusing		
	Displays the number of revolutions for motors or clutches in the previous maintenance units.		
7906 11	R:PCU [K]	*BCU	[0 to 9999999 / 0 / 1 revolution/step]
7906 12	R:PCU [Y]		
7906 13	R:PCU [M]		
7906 14	R:PCU [C]		
7906 15	R:Dev. [K]		
7906 16	R:Dev. [Y]		
7906 17	R:Dev. [M]		
7906 18	R:Dev. [C]		
7906 19	R:Oil Supply		
7906 20	R:Fusing		
	Displays the number of sheets printed with the previous maintenance unit or toner cartridge.		
7906 21	S:Waste Toner	*BCU	[0 to 9999999 / 0 / 1 sheet/step]

7906 22	S:Toner [K]		
7906 23	S:Toner [Y]		
7906 24	S:Toner [M]		
7906 25	S:Toner [C]		
	Displays the value given by the following formula: (Current count ÷ Yield count) x 100, where "Current count" is the current values in the counter for the part, and "Yield count" is the recommended yield.		
7906 26	R(%): PCU [K]	*BCU	[0 to 999 / 0 / 1 %/step]
7906 27	R(%): PCU [Y]		
7906 28	R(%): PCU [M]		
7906 29	R(%): PCU [C]		
7906 30	R(%): Dev [K]		
7906 31	R(%): Dev [Y]		
7906 32	R(%): Dev [M]		
7906 33	R(%): Dev [C]		
7906 34	R(%): Oil Spply		
7906 35	R(%): Fusing		

7907	[Check Sum]		
	Displays the check sum of the firmware.		
7907 1	Engine Main	*BCU	
7907 2	Engine MUSIC		

SP8-xxx: Data Log2

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

SP Numbers	What They Do
SP8 211~SP8 216	The number of pages scanned to the document server.
SP8 401~SP8 406	The number of pages printed from the document server
SP8 691~SP8 696	The number of pages sent from the document server

Specifically, the following questions can be answered:

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

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

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

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

Key for Abbreviations

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

Service
Tables

Abbreviation	What it means
PGS	Pages. A page is the total scanned surface of the original. Duplex pages count as two pages, and A3 simplex count as two pages if the A3/DLT counter SP is switched ON.
PJob	Print Jobs
Ppr	Paper
PrtJam	Printer (plotter) Jam
PrtPGS	Print Pages
R	Red (Toner Remaining). Applies to the wide format model A2 only. This machine is under development and currently not available.
Rez	Resolution
SC	Service Code (Error SC code displayed)
Scn	Scan
Sim, Simplex	Simplex, printing on 1 side.
S-to-Email	Scan-to-E-mail
SMC	SMC report printed with SP5990. All of the Group 8 counters are recorded in the SMC report.
Svr	Server
TonEnd	Toner End
TonSave	Toner Save
TXJob	Send, Transmission
YMC	Yellow, Magenta, Cyan
YMCK	Yellow, Magenta, Cyan, Black

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

8 001	T:Total Jobs	*CTL	These SPs count the number of times each
8 002	C:Total Jobs	*CTL	application is used to do a job.
8 003	F:Total Jobs	*CTL	[0~9999999/ **0** / 1]
8 004	P:Total Jobs	*CTL	**Note**: The L: counter is the total number of times the
8 005	S:Total Jobs	*CTL	other applications are used to send a job to the
8 006	L:Total Jobs	*CTL	document server, plus the number of times a file
8 007	O:Total Jobs	*CTL	already on the document server is used.

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

Service Tables

8 011	T:Jobs/LS	*CTL	These SPs count the number of jobs stored to the document server by each application, to reveal how local storage is being used for input. [0~9999999/ **0** / 1] The L: counter counts the number of jobs stored from within the document server mode screen at the operation panel.
8 012	C:Jobs/LS	*CTL	
8 013	F:Jobs/LS	*CTL	
8 014	P:Jobs/LS	*CTL	
8 015	S:Jobs/LS	*CTL	
8 016	L:Jobs/LS	*CTL	
8 017	O:Jobs/LS	*CTL	

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

8 021	T:Pjob/LS	*CTL	These SPs reveal how files printed from the document server were stored on the document server originally. [0~9999999/ **0** / 1] The L: counter counts the number of jobs stored from within the document server mode screen at the operation panel.
8 022	C:Pjob/LS	*CTL	
8 023	F:Pjob/LS	*CTL	
8 024	P:Pjob/LS	*CTL	
8 025	S:Pjob/LS	*CTL	
8 026	L:Pjob/LS	*CTL	
8 027	O:Pjob/LS	*CTL	

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

8 031	T:Pjob/DesApl	*CTL	These SPs reveal what applications were used to output documents from the document server. [0~9999999/ **0** / 1] The L: counter counts the number of jobs printed from within the document server mode screen at the operation panel.
8 032	C:Pjob/DesApl	*CTL	
8 033	F:Pjob/DesApl	*CTL	
8 034	P:Pjob/DesApl	*CTL	
8 035	S:Pjob/DesApl	*CTL	
8 036	L:Pjob/DesApl	*CTL	
8 037	O:Pjob/DesApl	*CTL	

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

8 041	T:TX Jobs/LS	*CTL	These SPs count the applications that stored files on the document server that were later accessed for transmission over the telephone line or over a network (attached to an e-mail, or as a fax image by I-Fax). [0~9999999/ **0** / 1] **Note**: Jobs merged for sending are counted separately. The L: counter counts the number of jobs scanned from within the document server mode screen at the operation panel.
8 042	C:TX Jobs/LS	*CTL	
8 043	F:TX Jobs/LS	*CTL	
8 044	P:TX Jobs/LS	*CTL	
8 045	S:TX Jobs/LS	*CTL	
8 046	L:TX Jobs/LS	*CTL	
8 047	O:TX Jobs/LS	*CTL	

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

8 051	T:TX Jobs/DesApl	*CTL	These SPs count the applications used to send files from the document server over the telephone line or over a network (attached to an e-mail, or as a fax image by I-Fax). Jobs merged for sending are counted separately. [0~9999999/ **0** / 1] The L: counter counts the number of jobs sent from within the document server mode screen at the operation panel.
8 052	C:TX Jobs/DesApl	*CTL	
8 053	F:TX Jobs/DesApl	*CTL	
8 054	P:TX Jobs/DesApl	*CTL	
8 055	S:TX Jobs/DesApl	*CTL	
8 056	L:TX Jobs/DesApl	*CTL	
8 057	O:TX Jobs/DesApl	*CTL	

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

8 061	T:FIN Jobs		*CTL	[0~9999999/ **0** / 1]
	These SPs total the finishing methods. The finishing method is specified by the application.			
8 062	C:FIN Jobs		*CTL	[0~9999999/ **0** / 1]
	These SPs total finishing methods for copy jobs only. The finishing method is specified by the application.			
8 063	F:FIN Jobs		*CTL	[0~9999999/ **0** / 1]
	These SPs total finishing methods for fax jobs only. The finishing method is specified by the application. Note: Finishing features for fax jobs are not available at this time.			
8 064	P:FIN Jobs		*CTL	[0~9999999/ **0** / 1]
	These SPs total finishing methods for print jobs only. The finishing method is specified by the application.			
8 065	S:FIN Jobs		*CTL	[0~9999999/ **0** / 1]
	These SPs total finishing methods for scan jobs only. The finishing method is specified by the application. Note: Finishing features for scan jobs are not available at this time.			
8 066	L:FIN Jobs		*CTL	[0~9999999/ **0** / 1]
	These SPs total finishing methods for jobs output from within the document server mode screen at the operation panel. The finishing method is specified from the print window within document server mode.			
8 067	O:FIN Jobs		*CTL	[0~9999999/ **0** / 1]
	These SPs total finishing methods for jobs executed by an external application, over the network. The finishing method is specified by the application.			
8 06x 1	Sort	Number of jobs started in Sort mode. When a stored copy job is set for Sort and then stored on the document server, the L: counter increments. (See SP8 066 1)		
8 06x 2	Stack	Number of jobs started out of Sort mode.		
8 06x 3	Staple	Number of jobs started in Staple mode.		
8 06x 4	Booklet	Number of jobs started in Booklet mode. If the machine is in staple mode, the Staple counter also increments.		
8 06x 5	Z-Fold	Number of jobs started In any mode other than the Booklet mode and set for folding (Z-fold).		
8 06x 6	Punch	Number of jobs started in Punch mode. When Punch is set for a print job, the P: counter increments. (See SP8 064 6.)		
8 06x 7	Other	Reserved. Not used.		

8 071	T:Jobs/PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count the number of jobs broken down by the number of pages in the job, regardless of which application was used.		
8 072	C:Jobs/PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count and calculate the number of copy jobs by size based on the number of pages in the job.		
8 073	F:Jobs/PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count and calculate the number of fax jobs by size based on the number of pages in the job.		
8 074	P:Jobs/PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count and calculate the number of print jobs by size based on the number of pages in the job.		
8 075	S:Jobs/PGS		[0~9999999/ **0** / 1]
	These SPs count and calculate the number of scan jobs by size based on the number of pages in the job.		
8 076	L:Jobs/PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count and calculate the number of jobs printed from within the document server mode window at the operation panel, by the number of pages in the job.		
8 077	O:Jobs/PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count and calculate the number of "Other" application jobs (Web Image Monitor, Palm 2, etc.) by size based on the number of pages in the job.		
8 07x 1	1 Page	8 07x 8	21~50 Pages
8 07x 2	2 Pages	8 07x 9	51~100 Pages
8 07x 3	3 Pages	8 07x 10	101~300 Pages
8 07x 4	4 Pages	8 07x 11	301~500 Pages
8 07x 5	5 Pages	8 07x 12	501~700 Pages
8 07x 6	6~10 Pages	8 07x 13	701~1000 Pages
8 07x 7	11~20 Pages	8 07x 14	1001~ Pages

Service Tables

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

8 111	T:FAX TX Jobs	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of jobs (color or black-and-white) sent by fax, either directly or using a file stored on the document server, on a telephone line. **Note**: Color fax sending is not available at this time.		
8 113	F:FAX TX Jobs	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of jobs (color or black-and-white) sent by fax directly on a telephone line. **Note**: Color fax sending is not available at this time.		
8 116	L:FAX TX Jobs	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of jobs (color or black-and-white) sent by fax on a telephone line using a file stored on the document server. Documents sent from fax memory are not counted. **Note**: Color fax sending is not available at this time.		
8 11x 1	B/W		
8 11x 2	Color		

- These counters count jobs, not pages.
- This SP counts fax jobs sent over a telephone line with a fax application, including documents stored on the document server.
- If the mode is changed during the job, the job will count with the mode set when the job started.
- If the same document is faxed to both a public fax line and an I-Fax at a destination where both are available, then this counter increments, and the I-Fax counter (8 12x) also increments.
- The fax job is counted when the job is scanned for sending, not when the job is sent.

8 121	T:IFAX TX Jobs	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of jobs (color or black-and-white) sent, either directly or using a file stored on the document server, as fax images using I-Fax. **Note**: Color fax sending is not available at this time.		
8 123	F:IFAX TX Jobs	*CTL	[0~9999999/ **0** / 1]
	These SPs count the number of jobs (color or black-and-white) sent (not stored on the document server), as fax images using I-Fax. **Note**: Color fax sending is not available at this time.		
8 126	L:IFAX TX Jobs	*CTL	[0~9999999/ **0** / 1]
	These SPs count the number of jobs (color or black-and-white) sent using a file stored on the document server , as fax images using I-Fax. **Note**: Color fax sending is not available at this time.		
8 12x 1	B/W		
8 12x 2	Color		

- These counters count jobs, not pages.
- The counters for color are provided for future use; the color fax feature is not available at this time.
- The fax job is counted when the job is scanned for sending, not when the job is sent.

8 131	T:S-to-Email Jobs	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of jobs (color or black-and-white) scanned and attached to an e-mail, regardless of whether the document server was used or not.		
8 135	S:S-to-Email Jobs	*CTL	
	These SPs count the number of jobs (color or black-and-white) scanned and attached to e-mail, without storing the original on the document server.		
8 136	L:S-to-Email Jobs	*CTL	
	These SPs count the number of (color or black-and-white) jobs using a file stored on stored on the document server, and attaching it to e-mail.		
8 13x 1	B/W		
8 13x 2	Color		

- These counters count jobs, not pages.
- If the job is stored on the document server, after the job is stored it is determined to be color or black-and-white then counted.
- If the job is cancelled during scanning, or if the job is cancelled while the document is waiting to be sent, the job is not counted.
- If the job is cancelled during sending, it may or may not be counted, depending on what stage of the process had been reached when the job was cancelled.
- If several jobs are combined for sending to the Scan Router, Scan-to-Email, or Scan-to-PC, or if one job is sent to more than one destination. each send is counted separately. For example, if the same document is sent by Scan-to-Email as well as Scan-to-PC, then it is counted twice (once for Scan-to-Email and once for Scan-to-PC).

8 141	T:Deliv Jobs/Svr	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of jobs (color or black-and-white) scanned and sent to a Scan Router server.		
8 143	F:Deliv Jobs/Svr	*CTL	
	These SPs count the number of jobs (color or black-and-white) scanned in fax mode and sent to a Scan Router server.		
8 145	S:Deliv Jobs/Svr	*CTL	
	These SPs count the number of jobs (color or black-and-white) scanned in scanner mode and sent to a Scan Router server.		
8 14x 1	B/W		
8 14x 2	Color		

- These counters count jobs, not pages.
- The jobs are counted even though the arrival and reception of the jobs at the Scan Router server cannot be confirmed.
- If even one color image is mixed with black-and-white images, then the job is counted as a "Color" job.
- If the job is cancelled during scanning, or if the job is cancelled while the document is waiting to be delivered, the job is not counted.
- If the job is cancelled during sending, it may or may not be counted, depending on what stage of the process had been reached when the job was cancelled.
- Even if several files are combined for sending, the transmission counts as one job.

8 151	T:Deliv Jobs/PC	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of jobs (color or black-and-white) scanned and sent to a folder on a PC (Scan-to-PC). **Note**: At the present time, 8 151 and 8 155 perform identical counts.		
8 155	S:Deliv Jobs/PC	*CTL	
	These SPs count the total number of jobs (color or black-and-white) scanned and sent with Scan-to-PC.		
8 15x 1	B/W		
8 15x 2	Color		

- These counters count jobs, not pages.
- If the job is cancelled during scanning, it is not counted.
- If the job is cancelled while it is waiting to be sent, the job is not counted.
- If the job is cancelled during sending, it may or may not be counted, depending on what stage of the process had been reached when the job was cancelled.
- Even if several files are combined for sending, the transmission counts as one job.

8 161	T:PCFAX TX Jobs	*CTL	These SPs count the number of PC Fax
8 163	F:PCFAX TX Jobs	*CTL	transmission jobs. A job is counted from when it is registered for sending, not when it is sent. [0~9999999/ **0** / 1] **Note**: At the present time, these counters perform identical counts.

- This counts fax jobs started from a PC using a PC fax application, and sending the data out to the destination from the PC through the copier.

8 191	T:Total Scan PGS	*CTL	These SPs count the pages scanned by each
8 192	C:Total Scan PGS	*CTL	application that uses the scanner to scan images.
8 193	F:Total Scan PGS	*CTL	[0~9999999/ **0** / 1]
8 195	S:Total Scan PGS	*CTL	
8 196	L:Total Scan PGS	*CTL	

- SP 8 191 to 8 196 count the number of scanned sides of pages, not the number of physical pages.
- These counters do not count reading user stamp data, or reading color charts to adjust color.
- Previews done with a scanner driver are not counted.
- A count is done only after all images of a job have been scanned.
- Scans made in SP mode are not counted.

Examples

- If 3 B5 pages and 1 A3 page are scanned with the scanner application but not stored, the S: count is 4.
- If both sides of 3 A4 sheets are copied and stored to the document server using the Store File button in the Copy mode window, the C: count is 6 and the L: count is 6.
- If both sides of 3 A4 sheets are copied but not stored, the C: count is 6.
- If you enter document server mode then scan 6 pages, the L: count is 6.

8 201	T:LSize Scan PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of large pages input with the scanner for scan and copy jobs. Large size paper (A3/DLT) scanned for fax transmission are not counted. **Note**: These counters are displayed in the SMC Report, and in the User Tools display.		
8 205	S:LSize Scan PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of large pages input with the scanner for scan jobs only. Large size paper (A3/DLT) scanned for fax transmission are not counted. **Note**: These counters are displayed in the SMC Report, and in the User Tools display..		

8 211	T:Scan PGS/LS	*CTL	These SPs count the number of pages scanned into the document server . [0~9999999/ **0** / 1] The L: counter counts the number of pages stored from within the document server mode screen at the operation panel, and with the Store File button from within the Copy mode screen
8 212	C:Scan PGS/LS	*CTL	
8 213	F:Scan PGS/LS	*CTL	
8 215	S:Scan PGS/LS	*CTL	
8 216	L:Scan PGS/LS	*CTL	

- Reading user stamp data is not counted.
- If a job is cancelled, the pages output as far as the cancellation are counted.
- If the scanner application scans and stores 3 B5 sheets and 1 A4 sheet, the S: count is 4.
- If pages are copied but not stored on the document server, these counters do not change.
- If both sides of 3 A4 sheets are copied and stored to the document server, the C: count is 6 and the L: count is 6.
- If you enter document server mode then scan 6 pages, the L: count is 6.

8 221	ADF Org Feeds		*CTL	[0~9999999/ **0** / 1]
	These SPs count the number of pages fed through the ADF for front and back side scanning.			
8 221 1	Front	Number of front sides fed for scanning: With an ADF that can scan both sides simultaneously, the Front side count is the same as the number of pages fed for either simplex or duplex scanning. With an ADF that cannot scan both sides simultaneously, the Front side count is the same as the number of pages fed for duplex front side scanning. (The front side is determined by which side the user loads face up.)		
8 221 2	Back	Number of rear sides fed for scanning: With an ADF that can scan both sides simultaneously, the Back count is the same as the number of pages fed for duplex scanning. With an ADF that cannot scan both sides simultaneously, the Back count is the same as the number of pages fed for duplex rear-side scanning.		

- When 1 sheet is fed for duplex scanning the Front count is 1 and the Back count is 1.
- If a jam occurs during the job, recovery processing is not counted to avoid double counting. Also, the pages are not counted if the jam occurs before the first sheet is output.

8 231	Scan PGS/Mode		*CTL	[0~9999999/ **0** / 1]
	These SPs count the number of pages scanned by each ADF mode to determine the work load on the ADF.			
8 231 1	Large Volume	Selectable. Large copy jobs that cannot be loaded in the ADF at one time.		
8 231 2	SADF	Selectable. Feeding pages one by one through the ADF.		
8 231 3	Mixed Size	Selectable. Select "Mixed Sizes" on the operation panel.		
8 231 4	Custom Size	Selectable. Originals of non-standard size.		
8 231 5	Platen	Book mode. Raising the ADF and placing the original directly on the platen.		

- If the scan mode is changed during the job, for example, if the user switches from ADF to Platen mode, the count is done for the last selected mode.
- The user cannot select mixed sizes or non-standard sizes with the fax application so if the original's page sizes are mixed or non-standard, these are not counted.
- If the user selects "Mixed Sizes" for copying in the platen mode, the Mixed Size count is enabled.
- In the SADF mode if the user copies 1 page in platen mode and then copies 2 pages with SADF, the Platen count is 1 and the SADF count is 3.

8 241	T:Scan PGS/Org		*CTL	[0~9999999/ **0** / 1]		
	These SPs count the total number of scanned pages by original type for all jobs, regardless of which application was used.					
8 242	C:Scan PGS/Org		*CTL	[0~9999999/ **0** / 1]		
	These SPs count the number of pages scanned by original type for Copy jobs.					
8 243	F:Scan PGS/Org		*CTL	[0~9999999/ **0** / 1]		
	These SPs count the number of pages scanned by original type for Fax jobs.					
8 245	S:Scan PGS/Org		*CTL	[0~9999999/ **0** / 1]		
	These SPs count the number of pages scanned by original type for Scan jobs.					
8 246	L:Scan PGS/Org		*CTL	[0~9999999/ **0** / 1]		
	These SPs count the number of pages scanned and stored from within the document server mode screen at the operation panel, and with the Store File button from within the Copy mode screen					
8 247	O:Scan PGS/Org		*CTL	[0~9999999/ **0** / 1]		
	These SPs count the number of pages scanned by original type by Other applications.					
	8 241	**8 242**	**8 243**	**8 245**	**8 246**	**8 247**
8 24x 1: Text	Yes	Yes	Yes	Yes	Yes	Yes
8 24x 2: Text/Photo	Yes	Yes	Yes	Yes	Yes	Yes
8 24x 3: Photo	Yes	Yes	Yes	Yes	Yes	Yes
8 24x 4: GenCopy, Pale	Yes	Yes	No	Yes	Yes	Yes
8 24x 5: Map	Yes	Yes	No	Yes	Yes	Yes
8 24x 6: Normal/Detail	Yes	No	Yes	No	No	No
8 24x 7: Fine/Super Fine	Yes	No	Yes	No	No	No
8 24x 8: Binary	Yes	No	No	Yes	No	No
8 24x 9: Grayscale	Yes	No	No	Yes	No	No
8 24x 10: Color	Yes	No	No	Yes	No	No

Service Tables

- If the scan mode is changed during the job, for example, if the user switches from ADF to Platen mode, the count is done for the last selected mode.

8 251	T:Scan PGS/ImgEdt	*CTL	These SPs show how many times Image Edit features have been selected at the operation panel for each application. Some examples of these editing features are: • Erase> Border • Erase> Center • Image Repeat • Centering • Positive/Negative [0~9999999/ **0** / 1] Note: The count totals the number of times the edit features have been used. A detailed breakdown of exactly which features have been used is not given.
8 252	C:Scan PGS/ImgEdt	*CTL	
8 254	P:Scan PGS/ImgEdt	*CTL	
8 256	L:Scan PGS/ImgEdt	*CTL	
8 257	O:Scan PGS/ImgEdt	*CTL	

The L: counter counts the number of pages stored from within the document server mode screen at the operation panel, and with the Store File button from within the Copy mode screen.

8 261	T:Scan PGS/ColCr	*CTL	
8 262	C:Scan PGS/ ColCr	*CTL	
8 26x 1	Color Conversion	These SPs show how many times color creation features have been selected at the operation panel.	
8 26x 2	Color Erase		
8 26x 3	Background		
8 26x 4	Other		

8 281	T:Scan PGS/TWAIN	*CTL	These SPs count the number of pages scanned using a TWAIN driver. These counters reveal how the TWAIN driver is used for delivery functions. [0~9999999/ **0** / 1] **Note**: At the present time, these counters perform identical counts.
8 285	S:Scan PGS/TWAIN	*CTL	

8 291	T:Scan PGS/Stamp	*CTL	These SPs count the number of pages stamped with the stamp in the ADF unit. [0~9999999/ **0** / 1] The L: counter counts the number of pages stored from within the document server mode screen at the operation panel, and with the Store File button from within the Copy mode screen
8 293	F:Scan PGS/Stamp	*CTL	
8 295	S:Scan PGS/Stamp	*CTL	
8 296	L:Scan PGS/Stamp	*CTL	

8 301	T:Scan PGS/Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by size the total number of pages scanned by all applications. Use these totals to compare original page size (scanning) and output (printing) page size [SP 8-441].		
8 302	C:Scan PGS/Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by size the total number of pages scanned by the Copy application. Use these totals to compare original page size (scanning) and output (printing) page size [SP 8-442].		
8 303	F:Scan PGS/Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by size the total number of pages scanned by the Fax application. Use these totals to compare original page size (scanning) and output page size [SP 8-443].		
8 305	S:Scan PGS/Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by size the total number of pages scanned by the Scan application. Use these totals to compare original page size (scanning) and output page size [SP 8-445].		
8 306	L:Scan PGS/Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by size the total number of pages scanned and stored from within the document server mode screen at the operation panel, and with the Store File button from within the Copy mode screen. Use these totals to compare original page size (scanning) and output page size [SP 8-446].		
8 30x 1	A3		
8 30x 2	A4		
8 30x 3	A5		
8 30x 4	B4		
8 30x 5	B5		
8 30x 6	DLT		
8 30x 7	LG		
8 30x 8	LT		
8 30x 9	HLT		
8 30x 10	Full Bleed		
8 30x 254	Other (Standard)		
8 30x 255	Other (Custom)		

Service Tables

8 311	T:Scan PGS/Rez	*CTL	[0~9999999/ **0** / 1]
	These SPs count by resolution setting the total number of pages scanned by applications that can specify resolution settings.		
8 315	S:Scan PGS/Rez	*CTL	[0~9999999/ **0** / 1]
	These SPs count by resolution setting the total number of pages scanned by applications that can specify resolution settings. **Note**: At the present time, 8 311 and 8 315 perform identical counts.		
8 31x 1	1200dpi ~		
8 31x 2	600dpi~1199dpi		
8 31x 3	400dpi~599dpi		
8 31x 4	200dpi~399dpi		
8 31x 5	~199dpi		

- Copy resolution settings are fixed so they are not counted.
- The Fax application does not allow finely-adjusted resolution settings so no count is done for the Fax application.

8 321	T:Scan PGS/Comp	*CTL	[0~9999999/ **0** / 1]
	These SPs count by compression method the total number of pages scanned.		
8 325	S:Scan PGS/Comp	*CTL	[0~9999999/ **0** / 1]
	These SPs count by compression method the total number of pages scanned by the Scan application. **Note**: At the present time, 8 321 and 8 325 perform identical counts.		
8 32x 1	JPEG		
8 32x 2	JPEG2000		
8 32x 3	TIFF (Comp OFF)		
8 32x 4	TIFF (Comp ON)		
8 32x 5	PDF		
8 32x 6	Other		

8 381	T:Total PrtPGS	*CTL	These SPs count the number of pages printed by the customer. The counter for the application used for storing the pages increments. [0~9999999/ **0** / 1] The L: counter counts the number of pages stored from within the document server mode screen at the operation panel. Pages stored with the Store File button from within the Copy mode screen go to the C: counter.
8 382	C:Total PrtPGS	*CTL	
8 383	F:Total PrtPGS	*CTL	
8 384	P:Total PrtPGS	*CTL	
8 385	S:Total PrtPGS	*CTL	
8 386	L:Total PrtPGS	*CTL	
8 387	O:Total PrtPGS	*CTL	

- When the A3/DLT double count function is switched on with SP5104, 1 A3/DLT page is counted as 2.
- When several documents are merged for a print job, the number of pages stored are counted for the application that stored them.
- These counters are used primarily to calculate charges on use of the machine, so the following pages are not counted as printed pages:
  - Blank pages in a duplex printing job.
  - Blank pages inserted as document covers, chapter title sheets, and slip sheets.
  - Reports printed to confirm counts.
  - All reports done in the service mode (service summaries, engine maintenance reports, etc.)
  - Test prints for machine image adjustment.
  - Error notification reports.
  - Partially printed pages as the result of a copier jam.

Service Tables

8 391	LSize PrtPGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count pages printed on paper sizes A3/DLT and larger. **Note**: In addition to being displayed in the SMC Report, these counters are also displayed in the User Tools display on the copy machine.		

8 401	T:PrtPGS/LS	*CTL	These SPs count the number of pages printed from the document server. The counter for the application used to print the pages is incremented. The L: counter counts the number of jobs stored from within the document server mode screen at the operation panel. [0~9999999/ **0** / 1]
8 402	C:PrtPGS/LS	*CTL	
8 403	F:PrtPGS/LS	*CTL	
8 404	P:PrtPGS/LS	*CTL	
8 405	S:PrtPGS/LS	*CTL	
8 406	L:PrtPGS/LS	*CTL	

- Print jobs done with Web Image Monitor and Desk Top Binder are added to the L: count.
- Fax jobs done with Web Image Monitor and Desk Top Binder are added to the F: count.

8 411	Prints/Duplex	*CTL	This SP counts the amount of paper (front/back counted as 1 page) used for duplex printing. Last pages printed only on one side are not counted. [0~9999999/ **0** / 1]

8 421	T:PrtPGS/Dup Comb	*CTL	[0~9999999/ **0** / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing. This is the total for all applications.		
8 422	C:PrtPGS/Dup Comb	*CTL	[0~9999999/ **0** / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing by the copier application.		
8 423	F:PrtPGS/Dup Comb	*CTL	[0~9999999/ **0** / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing by the fax application.		
8 424	P:PrtPGS/Dup Comb	*CTL	[0~9999999/ **0** / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing by the printer application.		
8 425	S:PrtPGS/Dup Comb	*CTL	[0~9999999/ **0** / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing by the scanner application.		
8 426	L:PrtPGS/Dup Comb	*CTL	[0~9999999/ **0** / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing from within the document server mode window at the operation panel.		
8 427	O:PrtPGS/Dup Comb	*CTL	[0~9999999/ **0** / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing by Other applications		
8 42x 1	Simplex> Duplex		
8 42x 2	Duplex> Duplex		
8 42x 3	Book> Duplex		
8 42x 4	Simplex Combine		
8 42x 5	Duplex Combine		
8 42x 6	2>	2 pages on 1 side (2-Up)
8 42x 7	4>	4 pages on 1 side (4-Up)
8 42x 8	6>	6 pages on 1 side (6-Up)
8 42x 9	8>	8 pages on 1 side (8-Up)
8 42x 10	9>	9 pages on 1 side (9-Up)
8 42x 11	16>	16 pages on 1 side (16-Up)
8 42x 12	Booklet		
8 42x 13	Magazine		

- These counts (SP8 421 to SP8 427) are especially useful for customers who need to improve their compliance with ISO standards for the reduction of paper consumption.
- Pages that are only partially printed with the n-Up functions are counted as 1 page.
- Here is a summary of how the counters work for Booklet and Magazine modes:

Service Tables

Booklet	
Original Pages	Count
1	1
2	2
3	2
4	2
5	3
6	4
7	4
8	4

Magazine	
Original Pages	Count
1	1
2	2
3	2
4	2
5	4
6	4
7	4
8	4

8 431	T:PrtPGS/ImgEdt	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of pages output with the three features below, regardless of which application was used.		
8 432	C:PrtPGS/ImgEdt	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of pages output with the three features below with the copy application.		
8 434	P:PrtPGS/ImgEdt	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of pages output with the three features below with the print application.		
8 436	L:PrtPGS/ImgEdt	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of pages output from within the document server mode window at the operation panel with the three features below.		
8 437	O:PrtPGS/ImgEdt	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total number of pages output with the three features below with Other applications.		
8 43x 1	Cover/Slip Sheet	Total number of covers or slip sheets inserted. The count for a cover printed on both sides counts 2.	
8 43x 2	Series/Book	The number of pages printed in series (one side) or printed as a book with booklet right/left pagination.	
8 43x 3	User Stamp	The number of pages printed where stamps were applied, including page numbering and date stamping.	

8 441	T:PrtPGS/Ppr Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by print paper size the number of pages printed by all applications.		
8 442	C:PrtPGS/Ppr Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by print paper size the number of pages printed by the copy application.		
8 443	F:PrtPGS/Ppr Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by print paper size the number of pages printed by the fax application.		
8 444	P:PrtPGS/Ppr Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by print paper size the number of pages printed by the printer application.		
8 445	S:PrtPGS/Ppr Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by print paper size the number of pages printed by the scanner application.		
8 446	L:PrtPGS/Ppr Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by print paper size the number of pages printed from within the document server mode window at the operation panel.		
8 447	O:PrtPGS/Ppr Size	*CTL	[0~9999999/ **0** / 1]
	These SPs count by print paper size the number of pages printed by Other applications.		
8 44x 1	A3		
8 44x 2	A4		
8 44x 3	A5		
8 44x 4	B4		
8 44x 5	B5		
8 44x 6	DLT		
8 44x 7	LG		
8 44x 8	LT		
8 44x 9	HLT		
8 44x 10	Full Bleed		
8 44x 254	Other (Standard)		
8 44x 255	Other (Custom)		

- These counters do not distinguish between LEF and SEF.

8 451	PrtPGS/Ppr Tray		*CTL	[0~9999999/ **0** / 1]
	These SPs count the number of sheets fed from each paper feed station.			
8 451 1	Bypass	Bypass Tray		
8 451 2	Tray 1	Copier		
8 451 3	Tray 2	Copier		
8 451 4	Tray 3	Paper Tray Unit (Option)		
8 451 5	Tray 4	Paper Tray Unit (Option)		
8 451 6	Tray 5	LCT (Option)		
8 451 7	Tray 6	Currently not used.		
8 451 8	Tray 7	Currently not used.		
8 451 9	Tray 8	Currently not used.		
8 451 10	Tray 9	Currently not used.		

8 461	T:PrtPGS/Ppr Type	*CTL	[0~9999999/ **0** / 1]
	These SPs count by paper type the number pages printed by all applications. • These counters are not the same as the PM counter. The PM counter is based on feed timing to accurately measure the service life of the feed rollers. However, these counts are based on output timing. • Blank sheets (covers, chapter covers, slip sheets) are also counted. • During duplex printing, pages printed on both sides count as 1, and a page printed on one side counts as 1.		
8 462	C:PrtPGS/Ppr Type	*CTL	[0~9999999/ **0** / 1]
	These SPs count by paper type the number pages printed by the copy application.		
8 463	F:PrtPGS/Ppr Type	*CTL	[0~9999999/ **0** / 1]
	These SPs count by paper type the number pages printed by the fax application.		
8 464	P:PrtPGS/Ppr Type	*CTL	[0~9999999/ **0** / 1]
	These SPs count by paper type the number pages printed by the printer application.		
8 466	L:PrtPGS/Ppr Type	*CTL	[0~9999999/ **0** / 1]
	These SPs count by paper type the number pages printed from within the document server mode window at the operation panel.		
8 46x 1	Normal		
8 46x 2	Recycled		
8 46x 3	Special		
8 46x 4	Thick		
8 46x 5	Normal (Back)		
8 46x 6	Thick (Back)		
8 46x 7	OHP		
8 46x 8	Other		

8 471	PrtPGS/Mag	*CTL	[0~9999999/ **0** / 1]
	These SPs count by magnification rate the number of pages printed.		
8 471 1	~49%		
8 471 2	50%~99%		
8 471 3	100%		
8 471 4	101%~200%		
8 471 5	201% ~		

- Counts are done for magnification adjusted for pages, not only on the operation panel but performed remotely with an external network application capable of performing magnification adjustment as well.
- Magnification adjustments done with printer drivers with PC applications such as Excel are also counted.
- Magnification adjustments done for adjustments after they have been stored on the document server are not counted.
- Magnification adjustments performed automatically during Auto Reduce/Enlarge copying are counted.
- The magnification rates of blank cover sheets, slip sheets, etc. are automatically assigned a rate of 100%.

8 481	T:PrtPGS/TonSave	*CTL	
8 484	P:PrtPGS/TonSave	*CTL	
	These SPs count the number of pages printed with the Toner Save feature switched on. **Note**: These SPs return the same results as this SP is limited to the Print application. [0~9999999/ **0** / 1]		

8 491	T:PrtPGS/Col Mode	*CTL	These SPs count the number of pages printed
8 492	C:PrtPGS/Col Mode	*CTL	in the Color Mode by each application.
8 493	F:PrtPGS/Col Mode	*CTL	
8 496	L:PrtPGS/Col Mode	*CTL	
8 49x 1	B/W		
8 49x 2	Single Color		
8 49x 3	Two Color		
8 49x 4	Full Color		

8 501	T:PrtPGS/Col Mode	*CTL	These SPs count the number of pages printed
8 504	P:PrtPGS/Col Mode	*CTL	in the Color Mode by the print application.
8 50x 1	B/W		
8 50x 2	Single Color		
8 50x 3	Full Color		

8 511	T:PrtPGS/Emul	*CTL	[0~9999999/ **0** / 1]	
	These SPs count by printer emulation mode the total number of pages printed.			
8 514	P:PrtPGS/Emul	*CTL	[0~9999999/ **0** / 1]	
	These SPs count by printer emulation mode the total number of pages printed.			
8 514 1	RPCS			
8 514 2	RPDL			
8 514 3	PS3			
8 514 4	R98			
8 514 5	R16			
8 514 6	GL/GL2			
8 514 7	R55			
8 514 8	RTIFF			
8 514 9	PDF			
8 514 10	PCL5e/5c			
8 514 11	PCL XL			
8 514 12	IPDL-C			
8 514 13	BM-Links	Japan Only		
8 514 14	Other			

- SP8 511 and SP8 514 return the same results as they are both limited to the Print application.
- Print jobs output to the document server are not counted.

8 521	T:PrtPGS/FIN	*CTL	[0~9999999/ **0** / 1]
	These SPs count by finishing mode the total number of pages printed by all applications.		
8 522	C:PrtPGS/FIN	*CTL	[0~9999999/ **0** / 1]
	These SPs count by finishing mode the total number of pages printed by the Copy application.		
8 523	F:PrtPGS/FIN	*CTL	[0~9999999/ **0** / 1]
	These SPs count by finishing mode the total number of pages printed by the Fax application. **Note**: • Print finishing options for received faxes are currently not available.		
8 524	P:PrtPGS/FIN	*CTL	[0~9999999/ **0** / 1]
	These SPs count by finishing mode the total number of pages printed by the Print application.		
8 525	S:PrtPGS/FIN	*CTL	[0~9999999/ **0** / 1]
	These SPs count by finishing mode the total number of pages printed by the Scanner application.		
8 526	L:PrtPGS/FIN	*CTL	[0~9999999/ **0** / 1]
	These SPs count by finishing mode the total number of pages printed from within the document server mode window at the operation panel.		
8 52x 1	Sort		
8 52x 2	Stack		
8 52x 3	Staple		
8 52x 4	Booklet		
8 52x 5	Z-Fold		
8 52x 6	Punch		
8 52x 7	Other		

NOTE: 1) If stapling is selected for finishing and the stack is too large for stapling, the unstapled pages are still counted.
2) The counts for staple finishing are based on output to the staple tray, so jam recoveries are counted.

8 531	Staples	*CTL	This SP counts the amount of staples used by the machine. [0~9999999/ **0** / 1]

8 581	T:Counter	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total output broken down by color output, regardless of the application used. In addition to being displayed in the SMC Report, these counters are also displayed in the User Tools display on the copy machine.		
8 581 1	Total		
8 581 2	Total: Full Color		
8 581 3	B&W/Single Color		
8 581 4	Development: CMY		
8 581 5	Development: K		
8 581 6	Copy: Color		
8 581 7	Copy: B/W		
8 581 8	Print: Color		
8 581 9	Print: B/W		
8 581 10	Total: Color		
8 581 11	Total: B/W		

8 582	C:Counter	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total output of the copy application broken down by color output.		
8 582 1	B/W		
8 582 2	Single Color		
8 582 3	Two Color		
8 582 4	Full Color		

8 583	F:Counter	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total output of the fax application broken down by color output.		
8 583 1	B/W		
8 583 2	Single Color		

8 584	P:Counter	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total output of the print application broken down by color output.		
8 584 1	B/W		
8 584 2	Single Color		
8 584 3	Full Color		

8 586	L:Counter	*CTL	[0~9999999/ **0** / 1]
	These SPs count the total output of the local storage broken down by color output.		
8 582 1	B/W		
8 582 2	Single Color		
8 582 3	Two Color		
8 582 4	Full Color		

8 591	O:Counter	*CTL	[0~9999999/ **0** / 1]
	These SPs count the totals for A3/DLT paper use, number of duplex pages printed, and the number of staples used. These totals are for Other (O:) applications only.		
8 591 1	A3/DLT		
8 591 2	Duplex		
8 591 3	Staple		

8 631	T:FAX TX PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the number of pages sent by fax to a telephone number.		
8 633	F:FAX TX PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the number of pages sent by fax to a telephone number.		
8 63x 1	B/W		
8 63x 2	Color		

- If a document has color and black-and-white pages mixed, the pages are counted separately as B/W or Color.
- At the present time, this feature is provided for the Fax application only so SP8631 and SP8633 are the same.
- The counts include error pages.
- If a document is sent to more than one destination with a Group transmission, the count is done for each destination.
- Polling transmissions are counted but polling RX are not.
- Relay, memory, and confidential mailbox transmissions and are counted for each destination.

Service Tables

8 641	T:FAX TX PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the number of pages sent by fax to as fax images using I-Fax.		
8 643	F:FAX TX PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the number of pages sent by Fax as fax images using I-Fax.		
8 64x 1	B/W		
8 64x 2	Color		

- If a document has color and black-and-white pages mixed, the pages are counted separately as B/W or Color.
- At the present time, this feature is provided for the Fax application only so SP8641 and SP8643 are the same.
- The counts include error pages.
- If a document is sent to more than one destination with a Group transmission, the count is done for each destination.
- Polling transmissions are counted but polling RX are not.
- Relay, memory, and confidential mailbox transmissions and are counted for each destination.

8 651	T:S-to-Email PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the total number of pages attached to an e-mail for both the Scan and document server applications.		
8 655	S:S-to-Email PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the total number of pages attached to an e-mail for the Scan application only.		
8 656	L:S-to-Email PGS	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the total number of pages attached to an e-mail for LS applications only.		
8 65x 1	B/W		
8 65x 2	Color		

NOTE: 1) The count for B/W and Color pages is done after the document is stored on the HDD. If the job is cancelled before it is stored, the pages are not counted.
2) If Scan-to-Email is used to send a 10-page document to 5 addresses, the count is 10 (the pages are sent to the same SMTP server together).
3) If Scan-to-PC is used to send a 10-page document to 5 folders, the count is 50 (the document is sent to each destination of the SMB/FTP server).
4) Due to restrictions on some devices, if Scan-to-Email is used to send a 10-page document to a large number of destinations, the count may be divided and counted separately. For example, if a 10-page document is sent to 200 addresses, the count is 10 for the first 100 destinations and the count is also 10 for the second 100 destinations, for a total of 20.).

Service
Tables

8 661	T:Deliv PGS/Svr	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the total number of pages sent to a Scan Router server by both Scan and LS applications.		
8 665	S:Deliv PGS/Svr	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the total number of pages sent to a Scan Router server by the Scan application.		
8 666	L:Deliv PGS/Svr	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the total number of pages sent to a Scan Router server by LS applications.		
8 66x 1	B/W		
8 66x 2	Color		

NOTE: 1) The B/W and Color counts are done after the document is stored on the HDD of the Scan Router server.
2) If the job is canceled before storage on the Scan Router server finishes, the counts are not done.
3) The count is executed even if regardless of confirmation of the arrival at the Scan Router server.

8 671	T:Deliv PGS/PC	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the total number of pages sent to a folder on a PC (Scan-to-PC) with the Scan and LS applications.		
8 675	S:Deliv PGS/PC	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the total number of pages sent with Scan-to-PC with the Scan application.		
8 676	L:Deliv PGS/PC	*CTL	[0~9999999/ **0** / 1]
	These SPs count by color mode the total number of pages sent with Scan-to-PC function with the LS applications.		
8 67x 1	B/W		
8 67x 2	Color		

8 681	T:PCFAX TXPGS	*CTL	These SPs count the number of pages sent by PC
8 683	F:PCFAX TXPGS	*CTL	Fax. These SPs are provided for the Fax application only, so the counts for SP8 681 and SP8 683 are the same. [0~9999999/ **0** / 1]

- This counts pages sent from a PC using a PC fax application, from the PC through the copier to the destination.
- When sending the same message to more than one place using broadcasting, the pages are only counted once. (For example, a 10-page fax is sent to location A and location B. The counter goes up by 10, not 20.)

8 691	T:TX PGS/LS	*CTL	These SPs count the number of pages sent from the document server. The counter for the application that was used to store the pages is incremented. [0~9999999/ **0** / 1] The L: counter counts the number of pages stored from within the document server mode screen at the operation panel. Pages stored with the Store File button from within the Copy mode screen go to the C: counter.
8 692	C:TX PGS/LS	*CTL	
8 693	F:TX PGS/LS	*CTL	
8 694	P:TX PGS/LS	*CTL	
8 695	S:TX PGS/LS	*CTL	
8 696	L:TX PGS/LS	*CTL	

NOTE: 1) Print jobs done with Web Image Monitor and Desk Top Binder are added to the count.
2) If several documents are merged for sending, the number of pages stored are counted for the application that stored them.
3) When several documents are sent by a Fax broadcast, the F: count is done for the number of pages sent to each destination.

8 701		TX PGS/Port	*CTL	[0~9999999/ **0** / 1]
		These SPs count the number of pages sent by the physical port used to send them. For example, if a 3-page original is sent to 4 destinations via ISDN G4, the count for ISDN (G3, G4) is 12.		
8 701 1		PSTN-1		
8 701 2		PSTN-2		
8 701 3		PSTN-3		
8 701 4		ISDN (G3,G4)		
8 701 5		Network		

8 741		RX PGS/Port	*CTL	[0~9999999/ **0** / 1]
		These SPs count the number of pages received by the physical port used to receive them.		
8 741 1		PSTN-1		
8 741 2		PSTN-2		
8 741 3		PSTN-3		
8 741 4		ISDN (G3,G4)		
8 741 5		Network		

Service Tables

8 771	Dev Counter	*CTL	[0~9999999/ **0** / 1]
	These SPs count the frequency of use (number of rotations of the development rollers) for black and other color toners.		
8 771 1	Total		
8 771 2	K		
8 771 3	Y		
8 771 4	M		
8 771 5	C		

8 781	Toner Botol Info.	*BCU	[0~9999999/ **0** / 1]
	These SPs display the number of already replaced toner bottles. **NOTE:** Currently, the data in SP7-833-011 through 014 and the data in SP8-781-001 through 004 are the same.		
8 781 1	Toner [BK]	The number of black-toner bottle	
8 781 2	Toner [Y]	The number of yellow-toner bottle	
8 781 3	Toner [M]	The number of magenta-toner bottle	
8 781 4	Toner [C]	The number of cyan-toner bottle	

8 791	LS Memory Remain	*CTL	This SP displays the percent of space available on the document server for storing documents. [0~100/ **0** / 1]

8 801	Toner Remain	*CTL	[0~100/ **0** / 1]
	These SPs display the percent of toner remaining for each color. This SP allows the user to check the toner supply at any time. **Note:** This precise method of measuring remaining toner supply (1% steps) is better than other machines in the market that can only measure in increments of 10 (10% steps).		
8 801 1	K		
8 801 2	Y		
8 801 3	M		
8 801 4	C		

8 831	Coverage	*BCU	[0~100/ **0** / 1]
	These SPs display the average coverage by color. (☛SP 7-833)		
8 831 1	Average [BK]		
8 831 2	Average [Y]		
8 831 3	Average [M]		
8 831 4	Average [C]		

8 841	Coverage	*BCU	[0~100/ **0** / 1]
	These SPs display the coverage of the last print by color. (☛SP 7-833)		
8 841 1	Last [BK]		
8 841 2	Last [Y]		
8 841 3	Last [M]		
8 841 4	Last [C]		

8 851	Coverage: 0-10%	*BCU	[0~9999999/ **0** / 1]
	These SPs display the number of scanned sheets on which the coverage of each color is from 0% to 10%.		
8 851 1	S: BK		
8 851 2	S: Y		
8 851 3	S: M		
8 851 4	S: C		

8 861	Coverage: 11-20%	*BCU	[0~9999999/ **0** / 1]
	These SPs display the number of scanned sheets on which the coverage of each color is from 11% to 20%.		
8 851 1	S: BK		
8 851 2	S: Y		
8 851 3	S: M		
8 851 4	S: C		

8 871	Coverage: 21-30%	*BCU	[0~9999999/ **0** / 1]
	These SPs display the number of scanned sheets on which the coverage of each color is from 21% to 30%.		
8 871 1	S: BK		
8 871 2	S: Y		
8 871 3	S: M		
8 871 4	S: C		

8 881	Coverage: 31%-	*BCU	[0~9999999/ **0** / 1]
	These SPs display the number of scanned sheets on which the coverage of each color is 31% or higher.		
8 881 1	S: BK		
8 881 2	S: Y		
8 881 3	S: M		
8 881 4	S: C		

8 891	PM Counter	*BCU	[0~9999999/ **0** / 1]
	These SPs display the number of sheets output by the scan application.		
8 891 1	S: Toner [BK]		
8 891 2	S: Toner [Y]		
8 891 3	S: Toner [M]		
8 891 4	S: Toner [C]		

8 901	PM Counter: Previous	*BCU	[0~9999999/ **0** / 1]
	These SPs display the number of sheet output by the scan application with the previously replaced units.		
8 901 1	S: Toner [BK]		
8 901 2	S: Toner [Y]		
8 901 3	S: Toner [M]		
8 901 4	S: Toner [C]		

Service
Tables

8 941	Machine Status	*CTL	[0~9999999/ **0** / 1]
	These SPs count the amount of time the machine spends in each operation mode. These SPs are useful for customers who need to investigate machine operation for improvement in their compliance with ISO Standards.		
8 941 1	Operation Time	Engine operation time. Does not include time while controller is saving data to HDD (while engine is not operating).	
8 941 2	Standby Time	Engine not operating. Includes time while controller saves data to HDD. Does not include time spent in Energy Save, Low Power, or Off modes.	
8 941 3	Energy Save Time	Includes time while the machine is performing background printing.	
8 941 4	Low Power Time	Includes time in Energy Save mode with Engine on. Includes time while machine is performing background printing.	
8 941 5	Off Mode Time	Includes time while machine is performing background printing. Does not include time machine remains powered off with the power switches.	
8 941 6	Down Time/SC	Total down time due to SC errors.	
8 941 7	Down Time/PrtJam	Total down time due to paper jams during printing.	
8 941 8	Down Time/OrgJam	Total down time due to original jams during scanning.	
8 941 9	Down Time/TonEnd	Total down time due to toner end.	

8 951	AddBook Register	*CTL	
	These SPs count the number of events when the machine manages data registration.		
8 951 1	User Code	User code registrations.	[0~9999999/ **0** / 1]
8 951 2	Mail Address	Mail address registrations.	
8 951 3	Fax Destination	Fax destination registrations.	
8 951 4	Group	Group destination registrations.	
8 951 5	Transfer Request	Fax relay destination registrations for relay TX.	
8 951 6	F-Code	F-Code box registrations.	
8 951 7	Copy Program	Copy application registrations with the Program (job settings) feature.	[0~255 / **0** / 255]
8 951 8	Fax Program	Fax application registrations with the Program (job settings) feature.	
8 951 9	Printer Program	Printer application registrations with the Program (job settings) feature.	
8 951 10	Scanner Program	Scanner application registrations with the Program (job settings) feature.	

NOTE: Memory Clear (SP5-801 & 7-808)

The following tables list the items that are cleared. The serial number information, meter charge setting (SP5-930), and meter charge counters (SP7-003) are not cleared.

5801		[Memory Clear]	
5801 3	SCS	SP5-009, 101, 104, 305, 812, 833, 961, and 970 SP7-101, 204, 209, 401, 502, 504, 506, and 507
5801 4	IMH	No SP modes are cleared. But, all files stored in the HDD are cleared.
5801 5	MCS	No SP modes are cleared.
5801 6	Copier application	Initializes all copier application settings.
5801 7	Fax application	Initializes the fax reset time, job login ID, all TX/RX settings, local storage file numbers, and off-hook timer.
5801 8	Printer application	The following service settings: • Bit switches • Gamma settings (User & Service) • Toner Limit The following user settings: • Tray Priority • Menu Protect • System Setting except for setting of Energy Saver • I/F Setup (I/O Buffer and I/O Timeout) • PCL Menu
5801 9	Scanner application	Initializes the scanner defaults for the scanner and all the scanner SP modes.
5801 10	Netfile application	Deletes the network file application management files and thumbnails, and initializes the job login ID.
5801 11	NCS	All setting of Network Setup (User Menu)
5801 12	IPU	Clears the IPU settings
5801 13	R-Fax	Initializes the job login ID, SmartNetMonitor for Admin, job history, and local storage file numbers.

5998		[Memory Clear]	
5998 1	ENG Setting	All engine related SP modes except for the following: • Serial number information • SP modes related to meter charge • Counters and logging data
5998 2	ENG Counter	All counters and logging data related to engine

7808		[Counter Clear]	
7808 1	Counter Clear	SP7-101, 204, 209, 502, 504, 506, and 507

Service Tables

5.2.2 INPUT CHECK TABLE

When entering the Input Check mode, 8 digits display the result for a section. Each digit corresponds to a different device as shown in the table.

Bit No.	7	6	5	4	3	2	1	0
Result	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1

5803	Bit	Description	Reading	
			0	**1**
5803 1		**Paper Tray 1**		
	0	Paper End Sensor	Paper end	Paper detected
	1	Paper Lift Sensor	Deactivated	Activated (Actuator not inside sensor)
	2	Paper Height Sensor 1	See Table 1.	
	3	Paper Height Sensor 2		
	4	Tray Set	Not set	Set
5803 2		**Paper Tray 2**		
	0	Paper End Sensor	Paper end	Paper detected
	1	Paper Lift Sensor	Deactivated	Activated (Actuator not inside sensor)
	2	Paper Height Sensor 1	See Table 1. 1: Activated (Actuator inside sensor)	
	3	Paper Height Sensor 2		
	4	Paper Size Switch 1	See Table 2. 1: Pushed	
	5	Paper Size Switch 2		
	6	Paper Size Switch 3		
	7	Paper Size Switch 4		
5803 3		**By-pass Table**		
	0	Paper End Sensor	Paper end	Paper detected
	1	Paper Size 1	See Table 3.	
	2	Paper Size 2		
	3	Paper Size 3		
	4	Paper Size 4		
5803 4		**Doors**		
	0	Front Door Switch	Opened	Closed
	1	Left Door Switch	Opened	Closed
	2	Right Door Switch	Opened	Closed
	3	Vertical Transport Switch	Opened	Closed
	4	Duplex Inverter Unit Switch	Opened	Closed
	5	Right Door Switch (LCT/PFU)	Opened	Closed
5803 5		**Paper Feed**		
	0	Relay Sensor	Paper not detected	Paper detected
	1	Vertical Transport Sensor	Paper not detected	Paper detected
	2	Upper Relay Sensor (PFU)	Paper not detected	Paper detected
	3	Lower Relay Sensor (PFU)	Paper not detected	Paper detected
	4	Registration Sensor	Paper not detected	Paper detected
	5	Duplex Inverter Sensor	Paper not detected	Paper detected
	6	Duplex Feed Sensor	Paper not detected	Paper detected

5803 6	**Paper Exit**			
	0	Fusing Exit Sensor	Paper not detected	Paper detected
	1	Paper Exit Sensor	Paper not detected	Paper detected
	2	Duplex Exit Sensor 1	Paper not detected	Paper detected
	3	Duplex Exit Sensor 2	Paper not detected	Paper detected
	4	Duplex Exit Sensor 3	Paper not detected	Paper detected
	5	Exit Upper Limit Sensor	Not full	Full
5803 7	**Fusing Unit**			
	0	Fusing Unit (Set)	Not set	Set
	1	Fusing Unit (New)	0 to 1 : New unit installed	
	2	Oil Supply Unit (Set)	Set	Not set
	3	Oil Supply Unit (New)	1 to 0 : New unit installed	
	4	European Version	US	Europe
	5	Waste Oil Bottle Set Sensor	Not Set	Set
	6	Waste Oil Sensor	Not full	Full
5803 8	**Motor Lock**			
	0	Development Drive Motor - CMY	Not locked	Locked
	1	Development Drive Motor - K	Not locked	Locked
	2	Fusing Fan Motor	Not locked	Locked
	3	Air Pump Motor - MY	Not locked	Locked
	4	Air Pump Motor - CK	Not locked	Locked
5803 9	**Dev. Unit/ PCU**			
	0	Development Unit - K	Not set	Set
	1	Development Unit - C	Not set	Set
	2	Development Unit - M	Not set	Set
	3	Development Unit - Y	Not set	Set
	4	PCU - K	Not set	Set
	5	PCU - C	Not set	Set
	6	PCU - M	Not set	Set
	7	PCU - Y	Not set	Set
5803 10	**Toner End Sens**			
	0	Black Toner	Not end	End
	1	Cyan Toner	Not end	End
	2	Magenta Toner	Not end	End
	3	Yellow Toner	Not end	End
5803 13	**Others**			
	0	LD H.P. Sensor	Not H.P.	H.P.
	1	Transfer Belt Sensor	Not contact	Contact
	2	-	-	-
	3	Used Toner Sensor	Not full	Full
	4	Used Toner Bottle Set Sensor	Not set	Set
	5	Drum Gear Position Sensor - K	Deactivated	Activated (Actuator inside sensor)
	6	Drum Gear Position Sensor - CMY	Deactivated	Activated (Actuator inside sensor)

Service Tables

5803	Bit	Description	Reading	
			0	1
5803 15		**Mail Box 1 (Not used)**		
	0	Tray 1 Paper Overflow Sensor	Not full	Full
	1	Tray 1 Paper Sensor	Paper not detected	Paper detected
	2	Tray 2 Paper Overflow Sensor	Not full	Full
	3	Tray 2 Paper Sensor	Paper not detected	Paper detected
	4	Tray 3 Paper Overflow Sensor	Not full	Full
	5	Tray 3 Paper Sensor	Paper not detected	Paper detected
	6	Tray 4 Paper Overflow Sensor	Not full	Full
	7	Tray 4 Paper Sensor	Paper not detected	Paper detected
5803 16		**Mail Box 2 (Not used)**		
	0	Vertical Transport Sensor 1	Paper not detected	Paper detected
	1	Vertical Transport Sensor 2	Paper not detected	Paper detected
	2	Door Safety Switch	Opened	Closed

ARDF Input Check: SP6-007

6007	Bit	Description	Reading	
			0	1
6007 1	7	Original width sensor 4	Paper not detected	Paper detected
	6	Original width sensor 3	Paper not detected	Paper detected
	5	Original width sensor 2	Paper not detected	Paper detected
	4	Original width sensor 1	Paper not detected	Paper detected
	3	Skew correction sensor	Paper not detected	Paper detected
	2	Original set sensor	Paper not detected	Paper detected
	1	Original length sensor 1*	Paper not detected	Paper detected
	0	Original length sensor 2*	Paper not detected	Paper detected
6007 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
6007 3	7	(Not used)	—	—
	6	(Not used)	—	—
	5	(Not used)	—	—
	4	(Not used)	—	—
	3	(Not used)	—	—
	2	(Not used)	—	—
	1	(Not used)	—	—
	0	Original length sensor 3*	Paper not detected	Paper detected

NOTE: The original length sensors detect the following paper sizes: B5 (sensor 1), LG (sensor 2), and A4 (sensor 3).

Table 1: Paper Height Sensor

Low: Deactivated, High: Activated (actuator inside sensor)

Remaining paper	Paper height sensor 1	Paper height sensor 2
Full	Low	Low
Nearly full	Low	High
Near end	High	High
Almost empty	High	Low

Table 2: Paper Size Switch (Tray 2)

0: Not pushed, 1: pushed

Models		Switch Location			
North America	Europe/Asia	1	2	3	4
11" x 17" SEF	11" x 17" SEF	0	1	0	0
A3 SEF	A3 SEF	1	0	1	0
8 1/2" x 14" SEF [*1]	B4 SEF [*1]	1	1	0	1
8 1/2" x 11" SEF [*2]	A4 SEF [*2]	0	1	1	0
11" x 8 1/2" LEF [*3]	11" x 8 1/2" LEF [*3]	1	0	1	1
A4 LEF	A4 LEF	0	1	0	1
B5 LEF	B5 LEF	0	0	1	0
A5 LEF	A5 LEF	0	0	0	1

NOTES:
[*1]: The machine detects either 8 1/2" x 14" SEF or B4 SEF, depending on the setting of SP 1-902-2
[*2]: The machine detects either 8 1/2" x 11" SEF or A4 SEF, depending on the setting of SP 1-902-3
[*3]: The machine detects either 11" x 8 1/2" LEF or B5 SEF, depending on the setting of SP 1-902-4

Service Tables

Table 3: Paper Size (By-pass Table)

Models		Bit No.			
North America	Europe/Asia	4	3	2	1
11" x 17" SEF	11" x 17" SEF	0	0	1	1
A3 SEF	A3 SEF	0	0	0	1
-	B4 SEF	0	0	1	0
8 1/2" x 11" SEF	A4 SEF	0	1	1	0
8" x 13" SEF	F SEF	0	1	0	0
-	A5 SEF	1	1	0	0
5 1/2" x 18 1/2" SEF	B6 SEF	1	0	0	0
Post Card	Post Card	0	0	0	0

Table 4: Original Size Detection

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	132
B4	10" x 14"	O	O	O	X	O	141
F4	8.5" x 14" (8" x 13")	O	O	O	X	X	165
A4-L	8.5" x 11"	X	O	O	X	X	133
B5-L		X	X	O	X	X	142
A4-S	11" x 8.5"	X	X	X	O	O	5
B5-S		X	X	X	X	O	14
A5-L, A5-S	5.5" x 8.5", 8.5" x 5.5"	X	X	X	X	X	128

5.2.3 OUTPUT CHECK TABLE

CH: **C**harge
PF: **P**aper **F**eed
TS: **T**oner **S**upply
CW: Clockwise
CCW: Counterclockwise
MB: 4-bin **M**ail**b**ox
DI: **D**uplex **I**nverter

5804		Description
5804 1	Lift M UP (1)	Tray 1 Lift Motor / UP
5804 2	Lift M DOWN(1)	Tray 1 Lift Motor / DOWN
5804 3	Lift M UP(2)	Tray 2 Lift Motor / UP
5804 4	Lift M DOWN(2)	Tray 2 Lift Motor / DOWN
5804 5	By-pass CL	By-pass Feed Clutch
5804 6	Pick-up SOL	Pick-up Solenoid
5804 7	PF CL (1)	Paper Feed Clutch - Tray 1
5804 8	PF CL (2)	Paper Feed Clutch - Tray 2
5804 9	PF GRP SOL	Grip Roller Release Solenoid
5804 10	Regist CL	Registration Clutch
5804 11	Junction SOL	Exit Junction Gate Solenoid
5804 12	Oil Supply SOL	Oil Supply Unit Solenoid
5804 13	Fusing CL	Fusing Clutch
5804 14	Wst Tn Vib M	Waste Toner Vibration Motor
5804 19	K Dev CL	Development Unit Clutch - K
5804 20	C Dev CL	Development Unit Clutch - C
5804 21	M Dev CL	Development Unit Clutch - M
5804 22	Y Dev CL	Development Unit Clutch - Y
5804 23	K Dev M H	Development Motor - K / High Speed
5804 24	K Dev M M	Development Motor - K / Middle Speed
5804 25	K Dev M L	Development Motor - K / Low Speed
5804 26	K Dev M Card	Black Development Motor - Thick paper
5804 27	FC Dev M H	Color Development Motor - 185mm/s
5804 28	FC Dev M M	Color Development Motor - 125mm/s
5804 29	FC Dev M L	Color Development Motor - 62.5mm/s
5804 30	TS CL [Y]	Toner Supply Clutch for Yellow
5804 31	TS CL [M]	Toner Supply Clutch for Magenta
5804 32	TS CL [C]	Toner Supply Clutch for Cyan
5804 33	TS CL [K]	Toner Supply Clutch for Black
5804 34	Valve SOL [K]	Air Flow Valve solenoid for Black
5804 35	Valve SOL [C]	Air Flow Valve solenoid for Cyan
5804 36	Valve SOL [M]	Air Flow Valve solenoid for Magenta
5804 37	Valve SOL [Y]	Air Flow Valve solenoid for Yellow
5804 38	Toner Sply Mt1	Toner Supply Motor 1 - yellow and magenta
5804 39	Toner Sply Mt2	Toner Supply Motor 2 - cyan and black
5804 40	Air Supply [Y]	Air Pump Motor and Valve for Yellow
5804 41	Air Supply [M]	Air Pump Motor and Valve for Magenta
5804 42	Air Supply [C]	Air Pump Motor and Valve for Cyan
5804 43	Air Supply [K]	Air Pump Motor and Valve for Black
5804 44	T End Sens [Y]	Toner End Sensor - Y

**Service
Tables**

5804		Description
5804 45	T End Sens [M]	Toner End Sensor - M
5804 46	T End Sens [C]	Toner End Sensor - C
5804 47	T End Sens [K]	Toner End Sensor - K
5804 50	PSU Fan	PSU Cooling Fan Motor
5804 51	Fusing Fan H	Fusing Fan Motor / High Speed
5804 52	Fusing Fan L	Fusing Fan Motor / Low Speed
5804 53	M Fan	Laser Optics Housing Unit Cooling Fan
5804 54	Belt M CW	Transfer Belt Contact Motor / Clockwise
5804 55	Belt M CCW	Transfer Belt Contact Motor / Counterclockwise
5804 56	Belt M Break	Transfer Belt Contact Motor / Break
5804 57	Fusing Relay	Fusing Relay
5804 58	Heat Lamp	Heating Roller Fusing Lamp
5804 59	Pressure Lamp	Pressure Roller Fusing Lamp
5804 65	Drum M L CW	Drum Drive Motors (K & CMY) / Low Speed / Clockwise
5804 66	Drum M M CW	Drum Drive Motors (K & CMY) / Middle Speed / Clockwise
5804 67	Drum M H CW	Drum Drive Motors (K & CMY) / High Speed / Clockwise
5804 76	PF M L CW	Paper Feed Motor / Low Speed / Clockwise
5804 77	PF M M CW	Paper Feed Motor / Middle Speed / Clockwise
5804 78	PF M H CW	Paper Feed Motor / High Speed / Clockwise
5804 79	PF M Feed	Paper Feed Motor / Feed Speed / Clockwise
5804 80	By-Pass M L CW	Paper Feed Motor / Low Speed / Clockwise
5804 81	By-Pass M C CW	Paper Feed Motor / Thick paper or OHP mode / Clockwise
5804 82	By-Pass M M CW	Paper Feed Motor / Middle Speed / Clockwise
5804 89	CH DC [Y]	Charge DC Bias for Yellow / 125 mm/s
5804 90	CH DC [M]	Charge DC Bias for Magenta / 125 mm/s
5804 91	CH DC [C]	Charge DC Bias for Cyan / 125 mm/s
5804 92	CH DC [K]	Charge DC Bias for Black / 125 mm/s
5804 93	CH AC [FC] 62.5	Charger AC / Full Color / 62.5 mm/s
5804 94	CH AC [K] 62.5	Charger AC / Black / 62.5 mm/s
5804 95	CH AC [FC] 125	Charger AC / Full Color / 125 mm/s
5804 96	CH AC [K] 125	Charger AC / Black / 125 mm/s
5804 97	CH AC [FC] 185	Charger AC / Full Color / 185 mm/s
5804 98	CH AC [K] 185	Charger AC / Black / 185 mm/s
5804 99	Dev DC [Y]	Development DC Bias for Yellow
5804 100	Dev DC [M]	Development DC Bias for Magenta
5804 101	Dev DC [C]	Development DC Bias for Cyan
5804 102	Dev DC [K]	Development DC Bias for Black
5804 103	Dev AC [FC] 62.5	Development AC Bias for Color - 62.5 mm/s
5804 104	Dev AC [K] 62.5	Development AC Bias for Black - 62.5 mm/s
5804 105	Dev AC [FC] 125	Development AC Bias for Color - 125 mm/s
5804 106	Dev AC [K] 125	Development AC Bias for Black - 125 mm/s
5804 107	Dev AC [FC] 185	Development AC Bias for Color - 185 mm/s
5804 108	Dev AC [K] 185	Development AC Bias for Black - 185 mm/s
5804 109	Transfer [Y]	Transfer Current for Yellow
5804 110	Transfer [M]	Transfer Current for Magenta
5804 111	Transfer [C]	Transfer Current for Cyan

5804		Description
5804 112	Transfer [K]	Transfer Current for Black
5804 113	Cleaning Bias	Transfer Belt Cleaning Roller Bias
5804 114	PA Roller Bias+	Paper Attraction Roller Bias
5804 115	PA Roller Bias-	Paper Attraction Roller Bias
5804 116	DevAC TRG [FC]	Development AC Trigger for Color
5804 117	DevAC TRG [K]	Development AC Trigger for Black
5804 118	DevPWM TRG [K]	Development PWM Trigger for Black
5804 119	DevPWM TRG [C]	Development PWM Trigger for Cyan
5804 120	DevPWM TRG [M]	Development PWM Trigger for Magenta
5804 121	DevPWM TRG [Y]	Development PWM Trigger for Yellow
5804 122	CHdcPWM TRG [K]	Charge DC PWM Trigger for Black
5804 123	CHdcPWM TRG [C]	Charge DC PWM Trigger for Cyan
5804 124	CHdcPWM TRG [M]	Charge DC PWM Trigger for Magenta
5804 125	CHdcPWM TRG [Y]	Charge DC PWM Trigger for Yellow
5804 126	CHac1 TRG [FC]	Charge AC1 Trigger for Color
5804 127	Chac2 TRG [FC]	Charge AC2 Trigger for Color
5804 128	Chac3 TRG [FC]	Charge AC3 Trigger for Color
5804 129	CHac1 TRG [K]	Charge AC1 Trigger for Black
5804 130	Chac2 TRG [K]	Charge AC2 Trigger for Black
5804 131	Chac3 TRG [K]	Charge AC3 Trigger for Black
5804 132	ID Sensor LED	ID Sensor LED
5804 133	TD Vcnt	TD Sensor / Vcnt
5804 134	Memory Chip	Memory Chip / Power (5V) Supply
5804 136	PCU Cln Bias K	PCU Cleaning Bias Black
5804 137	PCU Cln Bias YMC	PCU Cleaning Bias YMC
5804 141	Polygon M 29	Polygon Motor / 29.528
5804 142	Polygon M 21	Polygon Motor / 21.850
5804 143	LD FC[K]62.5	LD Power for Black in Color Mode / 62.5
5804 144	LD FC[K]125	LD Power for Black in Color Mode / 125
5804 145	LD FC[Y]62.5	LD Power for Yellow in Color Mode / 62.5
5804 146	LD FC[Y]125	LD Power for Yellow in Color Mode / 125
5804 147	LD FC[M]62.5	LD Power for Magenta in Color Mode / 62.5
5804 148	LD FC[M]125	LD Power for Magenta in Color Mode / 125
5804 149	LD FC[C]62.5	LD Power for Cyan in Color Mode / 62.5
5804 150	LD FC[C]125	LD Power for Cyan in Color Mode / 125
5804 151	LD1 [K] 62.5	LD1 Power for Black / 62.5
5804 152	LD1 [K] 125	LD1 Power for Black / 125
5804 153	LD1 [K] 185	LD1 Power for Black / 185
5804 154	LD2 [K] 62.5	LD2 Power for Black / 62.5
5804 155	LD2 [K] 125	LD2 Power for Black / 125
5804 156	LD2 [K] 185	LD2 Power for Black / 185
5804 157	LD [K]62.5	LD Power for Black / 62.5
5804 158	LD [K]125	LD Power for Black / 125
5804 159	LD [K]185	LD Power for Black / 185
5804 165	PSU M	Optional Paper Feed Unit (PSU: Paper Supply Unit) / Motor
5804 166	PF CL PFU (1)	Paper Feed Clutch / Optional Paper Feed Unit / Tray 1
5804 167	PF CL PFU (2)	Paper Feed Clutch / Optional Paper Feed Unit / Tray 2

Service
Tables

5804		Description
5804 168	Pick-up SOL PSU	Pick-up Solenoid / Optional Paper Feed Unit (PSU: Paper Supply Unit)
5804 170	MB M	4-bin Mailbox Main Motor
5804 171	MB SOL1	4-bin Mailbox Junction Gate Solenoid 1
5804 172	MB SOL2	4-bin Mailbox Junction Gate Solenoid 2
5804 173	MB SOL3	4-bin Mailbox Junction Gate Solenoid 3
5804 174	MB Gate SOL	4-bin Mailbox Junction Gate Solenoid
5804 176	Duplex SOL	Duplex Junction Gate Solenoid
5804 177	DI M1 62.5CCW	Duplex Inverter Motor 1 / 62.5 / Counterclockwise
5804 178	DI M1 65CCW	Duplex Inverter Motor 1 / 65 / Counterclockwise
5804 179	DI M1 125CCW	Duplex Inverter Motor 1 / 125 / Counterclockwise
5804 180	DI M1 130CCW	Duplex Inverter Motor 1 / 130 / Counterclockwise
5804 181	DI M1 185CCW	Duplex Inverter Motor 1 / 185 / Counterclockwise
5804 182	DI M1 193CCW	Duplex Inverter Motor 1 / 193 / Counterclockwise
5804 183	DI M1 370CCW	Duplex Inverter Motor 1 / 370 / Counterclockwise
5804 184	DI M1 370CW	Duplex Inverter Motor 1 / 370 / Clockwise
5804 185	DI M1 450CW	Duplex Inverter Motor 1 / 450 / Clockwise
5804 186	DI M2 62.5CCW	Duplex Inverter Motor 2 / 62.5 / Counterclockwise
5804 187	DI M2 65CCW	Duplex Inverter Motor 2 / 65 / Counterclockwise
5804 188	DI M2 125CCW	Duplex Inverter Motor 2 / 125 / Counterclockwise
5804 189	DI M2 130CCW	Duplex Inverter Motor 2 / 130 / Counterclockwise
5804 190	DI M2 185CCW	Duplex Inverter Motor 2 / 185 / Counterclockwise
5804 191	DI M2 193CCW	Duplex Inverter Motor 2 / 193 / Counterclockwise
5804 192	DI M2 370CCW	Duplex Inverter Motor 2 / 370 / Counterclockwise
5804 193	DI M2 370CW	Duplex Inverter Motor 2 / 370 / Clockwise
5804 194	DI M2 450CW	Duplex Inverter Motor 2 / 450 / Clockwise
5804 195	DI M2 OFF	Duplex Inverter Motor 2 / OFF
5804 196	DI M12 62.5CCW	Duplex Inverter Motor 1&2 / 62.5 / Counterclockwise
5804 197	DI M12 65CCW	Duplex Inverter Motor 1&2 / 65 / Counterclockwise
5804 198	DI M12 125CCW	Duplex Inverter Motor 1&2 / 125 / Counterclockwise
5804 199	DI M12 130CCW	Duplex Inverter Motor 1&2 / 130 / Counterclockwise
5804 200	DI M12 185CCW	Duplex Inverter Motor 1&2 / 180 / Counterclockwise
5804 201	DI M12 193CCW	Duplex Inverter Motor 1&2 / 193 / Counterclockwise
5804 202	DI M12 370CCW	Duplex Inverter Motor 1&2 / 370 / Counterclockwise
5804 203	DI M12 370CW	Duplex Inverter Motor 1&2 / 370 / Clockwise
5804 204	DI M12 450CW	Duplex Inverter Motor 1&2 / 450 / Clockwise
5804 205	PF M 125CCW	Duplex Feed Motor / 125 / Counterclockwise
5804 206	PF M 230CCW	Duplex Feed Motor / 230 / Counterclockwise
5804 207	PF M 370CCW	Duplex Feed Motor / 370 / Counterclockwise

5.2.4 TEST PATTERN (SP5-997)

Test Pattern Selection (SP5-997-002)
0: None
1: 1-dot sub-scan line
2: 2-dot sub-scan line
3: 1-dot main-scan line
4: 2-dot main-scan line
5: 1-dot grid pattern (Fine)
6: 2-dot grid pattern (Fine)
7. 1-dot grid pattern (Rough)
8. 2-dot grid pattern (Rough)
9. 1-dot slant grid pattern
10. 2-dot slant grid pattern
11. 1-dot pattern
12. 2-dot pattern
13. 4-dot pattern
14. 1-dot trimming pattern
15. 2-dot trimming pattern
16. Cross stitch: sub-scan
17. Cross stitch: main-scan
18. Belt pattern (Horizontal)
19. Belt pattern (Vertical)
20. Checkered Flag
21. Grey scale (Vertical)
22. Grey scale (Horizontal)
23. Solid

```
                    ┌─────────────────────┐
                    │ Test Pattern Printting│
                    └──────────┬──────────┘
                               │
                    ┌──────────▼──────────┐
SP5-997-001 ──────▶ │ Selects the tray in which│
                    │ desired paper size is│
                    │      loaded.        │
                    └──────────┬──────────┘
                               │
                    ┌──────────▼──────────┐
SP5-997-002 ──────▶ │  Selects a pattern. │
                    └──────────┬──────────┘
                               │
                    ┌──────────▼──────────┐
SP5-997-003 ──────▶ │ Selects a color if printing│
                    │ the test pattern in the│
                    │  Single Color mode. │
                    └──────────┬──────────┘
                               │
                    ┌──────────▼──────────┐
SP5-997-004 ──────▶ │ Selects the Single Color│
                    │ or Full Color mode. │
                    └──────────┬──────────┘
                               │
                    ┌──────────▼──────────┐
SP5-997-005 ──────▶ │ Selects the resolution.│
                    └──────────┬──────────┘
                               │
                          ◆────▼────◆                    ┌──────────────┐
                         ╱ Tray or   ╲ ──By-pass──▶      │Selects the desired│◀── SP5-997-006
                         ╲ by-pass   ╱                   │  paper size. │
                          ◆────┬────◆                    └──────────────┘
                               │
                             Tray
                    ┌──────────▼──────────┐
SP5-997-007 ──────▶ │ Prints the test pattern.│
                    └─────────────────────┘
```

B146S913.WMF

Service Tables

5.3 PRINTER SERVICE MODE

SP1-XXX (Service Mode)

1001	[Bit Switch]		
1001 1	Bit Switch 1 Settings	*CTL	Adjusts the bit switch settings. **DFU**
1001 2	Bit Switch 2 Settings		
1001 3	Bit Switch 3 Settings		
1001 4	Bit Switch 4 Settings		
1001 5	Bit Switch 5 Settings		
1001 6	Bit Switch 6 Settings		
1001 7	Bit Switch 7 Settings		
1001 8	Bit Switch 8 Settings		

1003	[Clear Setting]
1003 1	Initialize Printer System
	Initializes settings in the "System" menu of the user mode.
1003 3	Delete Program

1004	[Print Summary]
1004 1	Print Summary
	Prints the service summary sheet (a summary of all the controller settings).

1005	[Display Version]
1005 1	Disp. Version
	Displays the version of the controller firmware.

1006	[Sample/Locked Print]	*CTL	0: Linked, 1: On
1006 1	Enables and disables the document server. When you select "0," the document server is enabled or disabled in accordance with Copy Service Mode SP5-967. When you select "1," the document server is enabled regardless of Copy Service Mode SP5-967.		

1101	[Data Recall]		
	Recalls a set of gamma settings. This can be either a) the factory setting, b) the previous setting, or c) the current setting.		
1101 1	Factory	*CTL	
1101 2	Previous		
1101 3	Current		
1101 4	ACC		

1102	[Resolution Setting]
	Selects the printing mode (resolution) for the printer gamma adjustment.
1102 1	1200x1200 Photo, 1800x600 Photo, 600 x 600 Photo, 1200x1200 Text, 1800x600, Text, 600x600 Text

1103	[Test Page]
	Prints the test page to check the color balance before and after the gamma adjustment.

1103 1	Color Gray Scale
1103 2	Color Pattern

1104	[Gamma Adjustment]		
	Adjusts the printer gamma for the mode selected in the "Mode Selection" menu.		
1104 1	Black: Highlight	* CTL	[0 to 30 / 15 / 1/step]
1104 2	Black: Shadow		
1104 3	Black: Middle		
1104 4	Black: IDmax		
1104 21	Cyan: Highlight		
1104 22	Cyan: Shadow		
1104 23	Cyan: Middle		
1104 24	Cyan: IDmax		
1104 41	Magenta: Highlight		
1104 42	Magenta: Shadow		
1104 43	Magenta: Middle		
1104 44	Magenta: IDmax		
1104 61	Yellow: Highlight		
1104 62	Yellow: Shadow		
1104 63	Yellow: Middle		
1104 64	Yellow: IDmax		

1105	[Save Tone Control Value]
	Stores the print gamma adjusted with the "Gamma Adj." menu item as the current setting. Before the machine stores the new "current setting", it moves the data currently stored as the 'current setting' to the "previous setting" memory storage location.
1105 1	ToneCtlSave

1106	[Toner Limit]		
	Adjusts the maximum toner amount for image development.		
1106 1	Toner Limit: Photo	*CTL	[100 to 400 / 260 / 1 %/step]
1106 2	Toner Limit: Text		[100 to 400 / 190 / 1 %/step]

Service Tables

5.4 SCANNER SP MODE

SP1-xxx (System and Others)

1004	[Compression Type]		
	Selects the compression type for binary picture processing.		
1004 1	Compression Type	* CTL	[1 to 3 / 1 / 1/step] 1: MH, 2: MR, 3: MMR

1005	[Erase margin]		
	Creates an erase margin for all edges of the scanned image. *If the machine has scanned the edge of the original, create a margin.*		
1005 1	Erase Margin	* CTL	[0 to 5 / 0 / 1 mm/step]

1007	[Store Priority]	* CTL	[1: Send/2: Store Only/3: Send & Store]
1007 1	This program specifies how scanned data is processed as default.		

SP2-XXX (Scanning-image quality)

2002	[Text (Print) mode settings]		
2002 1	MTF Filter Coefficient (Main scan)	* CTL	[0 to 255 / 4 / 1/step] **DFU**
	Selects the MTF filter coefficient in the main scan direction for Text mode. *Select a higher number for a stronger filter.* *If this is "0", the MTF filter is not applied.*		
2002 2	MTF Filter Coefficient (Sub scan)	* CTL	[0 to 255 / 4 / 1/step] **DFU**
	As above, for sub scan		
2002 7	Smoothing Filter	* CTL	[0 to 255 / 1 / 255/step] **DFU**
	Selects the smoothing pattern for Text mode when using binary picture processing mode. *A larger value could cause moiré to appear in the image.*		
2002 8	Scanner Gamma	* CTL	[0 to 6 / 4 / 11/step] **DFU** 0: Standard 1: Smooth 2: Clearly 3: Liner 4: Text image for the delivery function 5: Text/photo image for the delivery function 6: Photo image for the delivery function
	Selects the scanner gamma type for Text mode when using binary picture processing mode.		
	Adjusts the image density for each image density level for Text mode when using binary picture processing mode.		
2002 11	Notch No.7: (Lighter): Brightness	* CTL	[0 to 255 / 128 / 1/step] **DFU**
2002 12	Notch No.7: (Lighter): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2002 13	Notch No.7: (Lighter): Threshold		[0 to 255 / 128 / 1/step] **DFU**
2002 14	Notch No.6: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2002 15	Notch No.6: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2002 16	Notch No.6: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2002 17	Notch No.5: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2002 18	Notch No.5: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2002 19	Notch No.5: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2002 20	Notch No.4 (Middle): Brightness		[0 to 255 / 128 / 1/step] **DFU**
2002 21	Notch No.4 (Middle): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2002 22	Notch No.4 (Middle): Threshold		[0 to 255 / 128 / 1/step] **DFU**
2002 23	Notch No.3: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2002 24	Notch No.3: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2002 25	Notch No.3: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2002 26	Notch No.2: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2002 27	Notch No.2: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2002 28	Notch No.2: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2002 29	Notch No.1: (Darker): Brightness		[0 to 255 / 128 / 1/step] **DFU**
2002 30	Notch No.1: (Darker): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2002 31	Notch No.1: (Darker): Threshold		[0 to 255 / 128 / 1/step] **DFU**

Service
Tables

2003	[Text (OCR) mode settings]		
2003 1	MTF Filter Coefficient (Main scan)	* CTL	[0 to 255 / <u>11</u> / 1/step] **DFU**
	Selects the MTF filter coefficient in the main scan direction for Text/Photo mode. *Select a higher number for a stronger filter.* *If this is "0", the MTF filter is not applied.*		
2003 2	MTF Filter Coefficient (Sub scan)	* CTL	[0 to 255 / <u>11</u> / 1/step] **DFU**
	As above, for sub scan		
2003 7	Smoothing Filter	* CTL	[0 to 255 / <u>0</u> / 1/step] **DFU**
	Selects the smoothing pattern for Text/Photo mode when using binary picture processing mode. *A larger value could cause moiré to appear in the image.*		
2003 8	Scanner Gamma	* CTL	[0 to 11 / <u>5</u> / 1/step] **DFU**
	Selects the scanner gamma type for Text/Photo mode when using binary picture processing mode.		
	Adjusts the image density for each image density level for Text mode when using binary picture processing mode.		
2003 11	Notch No.7: (Lighter): Brightness	* CTL	[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 12	Notch No.7: (Lighter): Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 13	Notch No.7: (Lighter): Threshold		[0 to 255 / <u>215</u> / 1/step] **DFU**
2003 14	Notch No.6: Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 15	Notch No.6: Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 16	Notch No.6: Threshold		[0 to 255 / <u>200</u> / 1/step] **DFU**
2003 17	Notch No.5: Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 18	Notch No.5: Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 19	Notch No.5: Threshold		[0 to 255 / <u>185</u> / 1/step] **DFU**
2003 20	Notch No.4: (Middle): Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 21	Notch No.4: (Middle): Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 22	Notch No.4: (Middle): Threshold		[0 to 255 / <u>170</u> / 1/step] **DFU**
2003 23	Notch No.3: Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 24	Notch No.3: Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 25	Notch No.3: Threshold		[0 to 255 / <u>150</u> / 1/step] **DFU**
2003 26	Notch No.2: Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 27	Notch No.2: Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 28	Notch No.2: Threshold		[0 to 255 / <u>130</u> / 1/step] **DFU**
2003 29	Notch No.1: (Darker): Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 30	Notch No.1: (Darker): Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2003 31	Notch No.1: (Darker): Threshold		[0 to -255 / <u>110</u> / 1/step] **DFU**

2004	[Text/Photo mode settings]		
2004 1	MTF Filter Coefficient (Main scan)	* CTL	[0 to 255 / 3 / 1/step] **DFU**
	Selects the MTF filter coefficient in the main scan direction for Text/Photo mode. *Select a higher number for a stronger filter.* *If this is "0", the MTF filter is not applied.*		
2004 2	MTF Filter Coefficient (Sub scan)	* CTL	[0 to 255 / 3 / 1/step] **DFU**
	As above, for sub scan		
2004 7	Smoothing Filter	* CTL	[0 to 255 / 2 / 1/step] **DFU**
	Selects the smoothing pattern for Text/Photo mode when using binary picture processing mode. *A larger value could cause moiré to appear in the image.*		
2004 8	Scanner Gamma	* CTL	[0 to 11 / 6 / 1/step] **DFU**
	Selects the scanner gamma type for Text/Photo mode when using binary picture processing mode.		
	Adjusts the image density for each image density level for Text mode when using binary picture processing mode.		
2004 11	Notch No.7: (Lighter): Brightness	* CTL	[0 to 255 / 128 / 1/step] **DFU**
2004 12	Notch No.7: (Lighter): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2004 13	Notch No.7: (Lighter): Threshold		[0 to 255 / 128 / 1/step] **DFU**
2004 14	Notch No.6: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2004 15	Notch No.6: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2004 16	Notch No.6: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2004 17	Notch No.5: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2004 18	Notch No.5: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2004 19	Notch No.5: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2004 20	Notch No.4: (Middle): Brightness		[0 to 255 / 128 / 1/step] **DFU**
2004 21	Notch No.4: (Middle): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2004 22	Notch No.4: (Middle): Threshold		[0 to 255 / 128 / 1/step] **DFU**
2004 23	Notch No.3: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2004 24	Notch No.3: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2004 25	Notch No.3: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2004 26	Notch No.2: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2004 27	Notch No.2: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2004 28	Notch No.2: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2004 29	Notch No.1: (Darker): Brightness		[0 to 255 / 128 / 1/step] **DFU**
2004 30	Notch No.1: (Darker): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2004 31	Notch No.1: (Darker): Threshold		[0 to -255 / 128 / 1/step] **DFU**

Service Tables

2005	[Photo mode settings]		
2005 1	MTF Filter Coefficient (Main scan)	* CTL	[0 to 255 / 2 / 1/step] **DFU**
	Selects the MTF filter coefficient in the main scan direction for Photo mode. *Select a higher number for a stronger filter.* *If this is "0", the MTF filter is not applied.*		
2005 2	MTF Filter Coefficient (Sub scan)	* CTL	[0 to 255 / 2 / 1/step] **DFU**
	As above, for sub scan		
2005 7	Smoothing Filter	* CTL	[0 to 255 / 7 / 1/step] **DFU**
	Selects the smoothing pattern for Photo mode when using binary picture processing mode. *A larger value could cause moiré to appear in the image.*		
2005 8	Scanner Gamma	* CTL	[0 to 11 / 7 / 1/step] **DFU**
	Selects the scanner gamma type for Photo mode when using binary picture processing mode.		
2005 9	Dither Matrix Filter	* CTL	[1 to 11 / 5 / 1 step] **DFU**
	Selects the dither matrix type for Photo mode when using binary picture processing mode.		
	Adjusts the image density for each image density level for Text mode when using binary picture processing mode.		
2005 11	Notch No.7: (Lighter): Brightness	* CTL	[0 to 255 / 128 / 1/step] **DFU**
2005 12	Notch No.7: (Lighter): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2005 13	Notch No.7: (Lighter): Threshold		[0 to 255 / 128 / 1/step] **DFU**
2005 14	Notch No.6: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2005 15	Notch No.6: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2005 16	Notch No.6: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2005 17	Notch No.5: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2005 18	Notch No.5: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2005 19	Notch No.5: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2005 20	Notch No.4: (Middle): Brightness		[0 to 255 / 128 / 1/step] **DFU**
2005 21	Notch No.4: (Middle): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2005 22	Notch No.4: (Middle): Threshold		[0 to 255 / 128 / 1/step] **DFU**
2005 23	Notch No.3: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2005 24	Notch No.3: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2005 25	Notch No.3: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2005 26	Notch No.2: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2005 27	Notch No.2: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2005 28	Notch No.2: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2005 29	Notch No.1: (Darker): Brightness		[0 to 255 / 128 / 1/step] **DFU**
2005 30	Notch No.1: (Darker): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2005 31	Notch No.1: (Darker): Threshold		[0 to 255 / 128 / 1/step] **DFU**

2006	[Gray – scale mode settings]		
2006 1	MTF Filter Coefficient (Main scan)	* CTL	[0 to 255 / 0 / 1 step] **DFU**
	Selects the MTF filter coefficient in the main scan direction when using grayscale processing mode. *Select a higher number for a stronger filter.* *If this is "0", the MTF filter is not applied*		
2006 2	MTF Filter Coefficient (Sub scan)	* CTL	[0 to 255 / 0 / 1 step] **DFU**
	As above, for sub scan		
2006 7	Smoothing Filter	* CTL	[0 to 255 / 0 / 1/step] **DFU**
	Selects the smoothing pattern when using grayscale processing mode. *A larger value could cause moiré to appear in the image.*		
2006 8	Scanner Gamma	* CTL	[0 to 11 / 11 / 1/step] **DFU**
	Selects the scanner gamma type when using grayscale processing mode.		
	Adjusts the image density for each image density level for Text mode when using binary picture processing mode.		
2006 11	Notch No.7 (Lighter): Brightness	* CTL	[0 to 255 / 128 / 1/step] **DFU**
2006 12	Notch No.7 (Lighter): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2006 13	Notch No.7 (Lighter): Threshold		[0 to 255 / 128 / 1/step] **DFU**
2006 14	Notch No.6: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2006 15	Notch No.6: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2006 16	Notch No.6: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2006 17	Notch No.5: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2006 18	Notch No.5: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2006 19	Notch No.5: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2006 20	Notch No.4: (Middle): Brightness		[0 to 255 / 128 / 1/step] **DFU**
2006 21	Notch No.4: (Middle): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2006 22	Notch No.4: (Middle): Threshold		[0 to 255 / 128 / 1/step] **DFU**
2006 23	Notch No.3: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2006 24	Notch No.3: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2006 25	Notch No.3: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2006 26	Notch No.2: Brightness		[0 to 255 / 128 / 1/step] **DFU**
2006 27	Notch No.2: Contrast		[0 to 255 / 128 / 1/step] **DFU**
2006 28	Notch No.2: Threshold		[0 to 255 / 128 / 1/step] **DFU**
2006 29	Notch No.1: (Darker): Brightness		[0 to 255 / 128 / 1/step] **DFU**
2006 30	Notch No.1: (Darker): Contrast		[0 to 255 / 128 / 1/step] **DFU**
2006 31	Notch No.1: (Darker): Threshold		[0 to 255 / 128 / 1/step] **DFU**

Service Tables

2007	[Full Color (Text) mode settings]		
2007 1	MTF Filter Coefficient (Main scan)	* CTL	[0 to 255 / 0 / 1/step] **DFU**
	Selects the MTF filter coefficient in the main scan direction when using grayscale processing mode. *Select a higher number for a stronger filter.* *If this is "0", the MTF filter is not applied*		
2007 2	MTF Filter Coefficient (Sub scan)	* CTL	[0 to 255 / 0 / 1/step] **DFU**
	As above, for sub scan		
2007 3	Smoothing Filter	* CTL	[0 to 255 / 4 / 1/step] **DFU**
	Selects the smoothing pattern when using grayscale processing mode. *A larger value could cause moiré to appear in the image.*		
	Adjusts the scanner gamma for RGB.		
2007 4	R-Gamma Curve	* CTL	[0 to 11 / 9 / 1 /step] **DFU**
2007 5	G-Gamma Curve		
2007 6	B-Gamma Curve		
	Adjusts the image density for each image density level for Text mode when using binary picture processing mode.		
2007 11	Notch No.7(Lighter): R - Brightness	* CTL	[0 to 255 / 128 / 1/step] **DFU**
2007 12	Notch No.7(Lighter): G - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2007 13	Notch No.7(Lighter): B - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2007 14	Notch No.7(Lighter): R - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2007 15	Notch No.7(Lighter): G - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2007 16	Notch No.7(Lighter): B - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2007 17	Notch No.7(Lighter): R - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2007 18	Notch No.7(Lighter): G - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2007 19	Notch No.7(Lighter): B - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2007 20	Notch No.6: R - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2007 21	Notch No.6: G - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2007 22	Notch No.6: B - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2007 23	Notch No.6: R - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2007 24	Notch No.6 G - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2007 25	Notch No.6: B - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2007 26	Notch No.6: R - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2007 27	Notch No.6: G - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2007 28	Notch No.6: B - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2007 29	Notch No.5: R - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2007 30	Notch No.5: G - Brightness		[0 to 255 / 128 / 1/step] D**FU**
2007 31	Notch No.5: B - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2007 32	Notch No.5: R - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2007 33	Notch No.5 G - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2007 34	Notch No.5: B - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2007 35	Notch No.5: R - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2007 36	Notch No.5: G - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2007 37	Notch No.5: B - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2007 38	Notch No.4(Middle): R - Brightness		[0 to 255 / 128 / 1/step] **DFU**

2007 39	Notch No. 4(Middle): G - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 40	Notch No. 4(Middle): B - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 41	Notch No. 4(Middle): R - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 42	Notch No. 4(Middle) G - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 43	Notch No. 4(Middle): B - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 44	Notch No. 4(Middle): R - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 45	Notch No. 4(Middle): G - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 46	Notch No. 4(Middle): B - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 47	Notch No.3: R - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 48	Notch No.3: G - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 49	Notch No.3: B - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 50	Notch No.3: R - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 51	Notch No.3 G - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 52	Notch No.3: B - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 53	Notch No.3: R - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 54	Notch No.3: G - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 55	Notch No.3: B - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 56	Notch No.2: R - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 57	Notch No.2: G - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 58	Notch No.2: B - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 59	Notch No.2: R - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 60	Notch No.2 G - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 61	Notch No.2: B - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 62	Notch No.2: R - Threshold	*	[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 63	Notch No.2: G - Threshold	CTL	[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 64	Notch No.2: B - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 65	Notch No.1(Darker): R - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 66	Notch No. 1(Darker): G - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 67	Notch No. 1(Darker): B - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 68	Notch No. 1(Darker): R - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 69	Notch No. 1(Darker) G - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 70	Notch No. 1(Darker): B - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 71	Notch No. 1(Darker): R - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 72	Notch No. 1(Darker): G - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2007 73	Notch No. 1(Darker): B - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**

Service Tables

2008	[Full Color (Photo) mode settings]		
2008 1	MTF Filter Coefficient (Main scan)	* CTL	[0 to 255 / 5 / 1/step] **DFU**
	Selects the MTF filter coefficient in the main scan direction when using grayscale processing mode. *Select a higher number for a stronger filter.* *If this is "0", the MTF filter is not applied*		
2008 2	MTF Filter Coefficient (Sub scan)	* CTL	[0 to 255 / 5 / 1/step] **DFU**
	As above, for sub scan		
2008 3	Smoothing Filter	* CTL	[0 to 255 / 0 / 1/step] **DFU**
	Selects the smoothing pattern when using grayscale processing mode. *A larger value could cause moiré to appear in the image.*		
	Adjusts the scanner gamma for RGB.		
2008 4	R-Gamma Curve	* CTL	[0 to 10 / 10 / 1 /step] **DFU**
2008 5	G-Gamma Curve		
2008 6	B-Gamma Curve		
	Adjusts the image density for each image density level for Text mode when using binary picture processing mode.		
2008 11	Notch No.7 (Lighter): R - Brightness	* CTL	[0 to 255 / 128 / 1/step] **DFU**
2008 12	Notch No.7 (Lighter): G - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2008 13	Notch No.7 (Lighter): B - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2008 14	Notch No.7 (Lighter): R - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2008 15	Notch No.7 (Lighter): G - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2008 16	Notch No.7 (Lighter): B - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2008 17	Notch No.7 (Lighter): R - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2008 18	Notch No.7 (Lighter): G - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2008 19	Notch No.7 (Lighter): B - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2008 20	Notch No.6: R - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2008 21	Notch No.6: G - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2008 22	Notch No.6: B - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2008 23	Notch No.6: R - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2008 24	Notch No.6 G - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2008 25	Notch No.6: B - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2008 26	Notch No.6: R - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2008 27	Notch No.6: G - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2008 28	Notch No.6: B - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2008 29	Notch No.5: R - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2008 30	Notch No.5: G - Brightness		[0 to 255 / 128 / 1/step] D**FU**
2008 31	Notch No.5: B - Brightness		[0 to 255 / 128 / 1/step] **DFU**
2008 32	Notch No.5: R - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2008 33	Notch No.5 G - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2008 34	Notch No.5: B - Contrast		[0 to 255 / 128 / 1/step] **DFU**
2008 35	Notch No.5: R - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2008 36	Notch No.5: G - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2008 37	Notch No.5: B - Threshold		[0 to 255 / 128 / 1/step] **DFU**
2008 38	Notch No.4 (Middle): R - Brightness		[0 to 255 / 128 / 1/step] **DFU**

2008 39	Notch No. 4 (Middle): G - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 40	Notch No. 4 (Middle): B - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 41	Notch No. 4 (Middle): R - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 42	Notch No. 4 (Middle) G - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 43	Notch No. 4 (Middle): B - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 44	Notch No. 4 (Middle): R - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 45	Notch No. 4 (Middle): G - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 46	Notch No. 4 (Middle): B - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 47	Notch No.3: R - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 48	Notch No.3: G - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 49	Notch No.3: B - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 50	Notch No.3: R - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 51	Notch No.3 G - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 52	Notch No.3: B - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 53	Notch No.3: R - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 54	Notch No.3: G - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 55	Notch No.3: B - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 56	Notch No.2: R - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 57	Notch No.2: G - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 58	Notch No.2: B - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 59	Notch No.2: R - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 60	Notch No.2 G - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 61	Notch No.2: B - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 62	Notch No.2: R - Threshold	*	[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 63	Notch No.2: G - Threshold	CTL	[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 64	Notch No.2: B - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 65	Notch No.1 (Darker): R - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 66	Notch No.1 (Darker): G - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 67	Notch No.1 (Darker): B - Brightness		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 68	Notch No.1 (Darker): R - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 69	Notch No.1 (Darker) G - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 70	Notch No.1 (Darker): B - Contrast		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 71	Notch No.1 (Darker): R - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 72	Notch No.1 (Darker): G - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**
2008 73	Notch No.1 (Darker): B - Threshold		[0 to 255 / <u>128</u> / 1/step] **DFU**

2021	**[Compression ratio of gray-scale]**		
	Selects the compression ratio for grayscale processing mode (JPEG) for the three settings that can be selected at the operation panel.		
2021 1	Compression ratio (Normal image)	*	[5 to 95 / <u>50</u> / 1 /step]
2021 2	Compression ratio (High quality image)	CTL	[5 to 95 / <u>60</u> / 1 /step]
2021 3	Compression ratio (Low-quality image)		[5 to 95 / <u>40</u> / 1 /step]

Service
Tables

5-1

2022	[ACS settings]		
2022 1	Color judge rate	* CTL	[1 to 100 / 1 / 1 %/step]
	This menu specifies the area ratio that is checked by the auto-color sensing feature.		
2022 2	Color gap Notch No.1	* CTL	[0 to 255 / 30 / 1 /step]
2022 3	Color gap Notch No.2	* CTL	[0 to 255 / 28 / 1 /step]
2022 4	Color gap Notch No.3	* CTL	[0 to 255 / 25 / 1 /step]
2022 5	Color gap Notch No.4	* CTL	[0 to 255 / 22 / 1 /step]
2002 6	Color gap Notch No.5	* CTL	[0 to 255 / 10 / 1 /step]
	This program specifies the color difference for each image density level.		
2002 7	Adjustment value of threshold	* CTL	[-127 to 127 / -80 / 1 /step]
	This menu specifies the threshold of the auto-color sensing feature.		

5.5 REBOOT / SYSTEM SETTING RESET

5.5.1 SOFTWARE RESET

The software can be rebooted 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.

5.5.2 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.
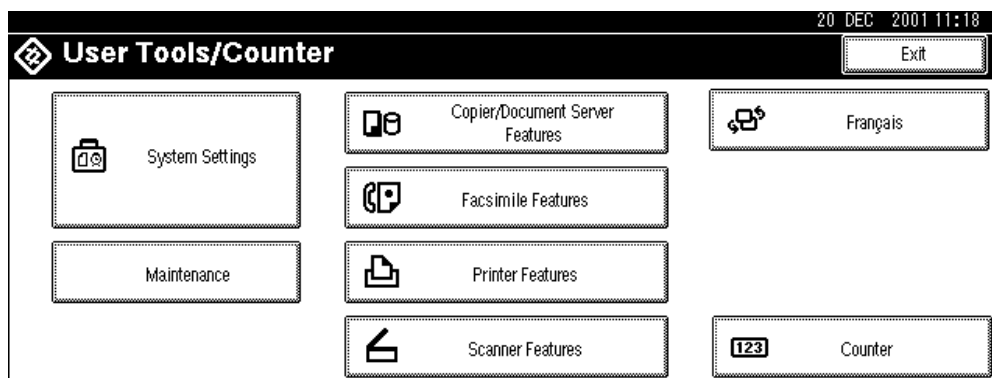
B146S914.WMF

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 ⊚/⒓⒊.

2. Hold down ⌗ and then press Copier/Document Server Settings.
    NOTE: You must press ⌗ first.

```
                                                    20 DEC  2001 11:18
 ⊛ User Tools/Counter                                      [  Exit  ]

  ┌─────────────────┐  ┌─────────────────────┐  ┌─────────────────────┐
  │                 │  │ ⬚⬚  Copier/Document  │  │ ⬚⬚    Français       │
  │ ⬚⬚ System       │  │      Server Features │  │                     │
  │     Settings    │  └─────────────────────┘  └─────────────────────┘
  │                 │  ┌─────────────────────┐
  │                 │  │ ⬚⬚  Facsimile        │
  └─────────────────┘  │      Features        │
  ┌─────────────────┐  └─────────────────────┘
  │    Maintenance  │  ┌─────────────────────┐
  └─────────────────┘  │ ⬚⬚  Printer Features │
                       └─────────────────────┘
                       ┌─────────────────────┐  ┌─────────────────────┐
                       │ ⬚⬚  Scanner Features │  │ [123]    Counter    │
                       └─────────────────────┘  └─────────────────────┘
```
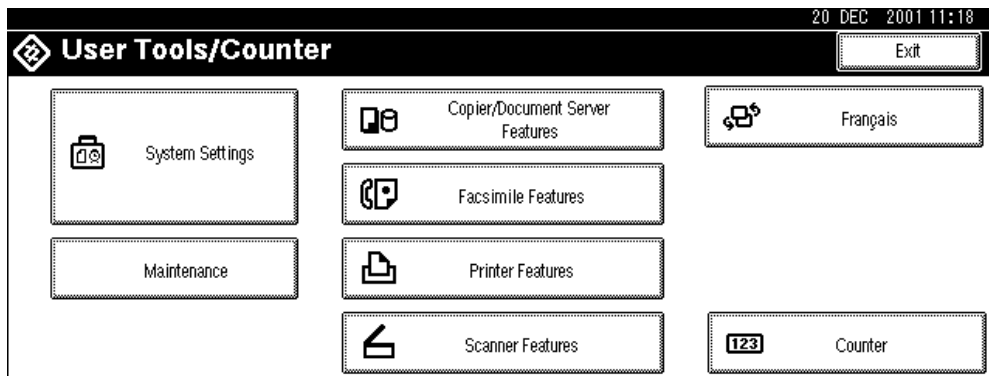
B146S915.WMF

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".

5.6 FIRMWARE UPDATE

To update the firmware for this machine, you must have the new version of the firmware downloaded onto an SD (Secure Digital) Card. The SD Card is inserted into SD Card Slot 3 on the right side of the controller box.

5.6.1 TYPE OF FIRMWARE

There are 16 types of firmware as shown below.

Type of firmware	Function	Location of firmware	Message displayed
Engine - Main	Printer engine control	BCU Flash ROM	Engine
Engine - Music	Line position adjustment	BCU MUSIC CPU	Music
Engine - DSP	Line position adjustment	BCU DSP CPU	DSP
System	Operating system	Flash ROM on the controller board	Onboard System
Netfile Application	Feature application	Flash ROM on the controller board	Netfile DocBox
Printer Application	Feature application	Printer/scanner SD card	Onboard Printer
Scanner Application	Feature application	Printer/scanner SD card	Onboard Scn
Fax Application	Feature application	Flash ROM on the controller board	Opt DIMM Fax
NIB	Network Interface	Flash ROM on the controller board	Network Support
Scanner IPU	Scanner control	IPU Flash ROM	Scanner IPU
Operation Panel	Panel control	Operation Panel	Ope Panel. XX
Fax FCU	Fax control	FCU	Jupi FCU (XXX)-1
Language (16 languages)	Language firmware Two languages can be selected from 16 languages.	Operation Panel	LANG.1 LANG.2
WebDocBox	Document server application	Flash ROM on the controller board	Web Document Box
WebSys	Web Service application	Flash ROM on the controller board	Web Support
SG3-PRE1	Optional G3 fax control	FCU	SG3DREI-1

Service Tables

5.6.1 BEFORE YOU BEGIN…

An SD card is a precision device, so always observe the following precautions when handling SD cards:

- Always switch the machine off before inserting an SD card. Never insert the SD card into the slot with the power on.
- After the power has been switched on, never remove the SD card from the service slot.
- Never switch the machine off while the firmware is downloading from the SD card.
- Store SD cards in a safe location where they are not exposed high temperature, high humidity, or exposure to direct sunlight.
- Always handle SD cards with care to avoid bending or scratching them. Never drop an SD card or expose it to other shock or vibration.

Keep the following points in mind while you are using the firmware update software:

- "Upload" means to send data from the machine to the SD card, and "download" means to send data from the SD card to the machine.
- To select an item on the LCD, touch the appropriate button on the soft touch-screen of the LCD, or press the appropriate number key on the 10-key pad of the operation panel. For example, "Exit (0)" displayed on the screen means you can touch the Exit button on the screen, or press the ⓪ button on the operation panel of the copier.
- Before starting the firmware update procedure, always make sure that the machine is disconnected from the network to prevent a print job for arriving while the firmware update is in progress.

5.6.2 UPDATING FIRMWARE

1. Turn the main power switch off.

2. Remove the slot cover of SD Card Slot 3 (🔩 x 1).

3. With the label on the SD card [B] facing as shown in the diagram, insert the SD card into SD Card Slot 3 [C].

4. Slowly push the SD card into the slot so it locks in place.

5. Make sure the SD card is locked in place.
   NOTE: To remove the SD, push it in to unlock the spring lock and then release it so it pops out of the slot.

[C]

[B]

[A]
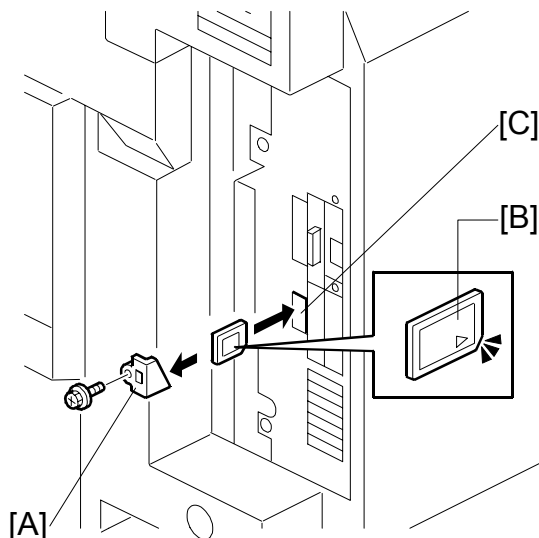
B146S901.WMF

6. If the machine is connected to a network, disconnect the network cable from the copier.

7. Switch the main power switch on. After about 45 seconds, the initial version update screen appears on the LCD in English.

```
Update Menu

    ┌──────────────────────┐
    │  Firmware      (1)   │
    ├──────────────────────┤
    │  Language Data(2)    │
    └──────────────────────┘








                              ┌──────────┐
                              │  Exit(0) │
                              └──────────┘
```
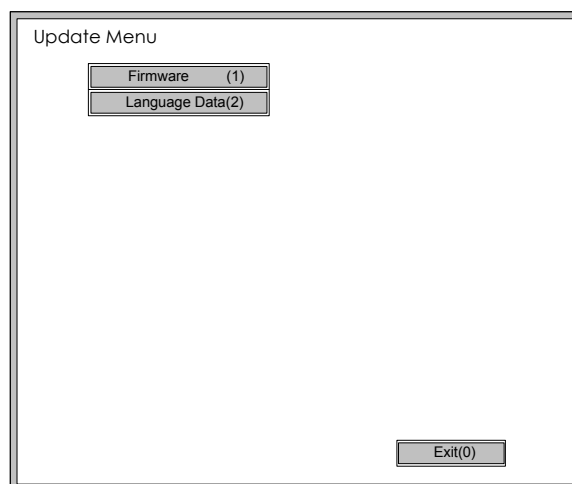
B146S916.WMF

KEY	WHAT IT DOES
Firmware (1)	Press this button on the touch-screen (or ① on the 10-key pad) to open the firmware update screen.
Language Data (2)	Press this button on the touch-screen (or ② on the 10-key pad) to open the language update screen.
Exit (0)	Press this key on the touch-screen (or ⓪ on the 10-key pad) to quit the update procedure and return to normal machine operation.

NOTE: The firmware update and language update cannot be performed during the same session. If you need to do both, do the firmware update, switch the machine off and on to confirm the successful update of the firmware, then do the language update.

8. Touch "Firmware (1)" to open the firmware update screen.

```
PCcard -> ROM Page01

   ┌─────────────────┐   ROM: G0000000    NEW: G0000000
   │ Printer     (1) │   ROM: 0.01        NEW: 0.0X
   ├─────────────────┤   ROM: B0705254    NEW: B0705254
   │ Engine      (2) │   ROM: 2.16:16     NEW: 2.16:16
   ├─────────────────┤   ROM: B0705370    NEW: B0705370
   │ OpePanel.DOM (3)│   ROM: 1.22        NEW: 2.00
   └─────────────────┘




                                  ┌──────────┐
                                  │  Exit(0) │
                                  └──────────┘
```
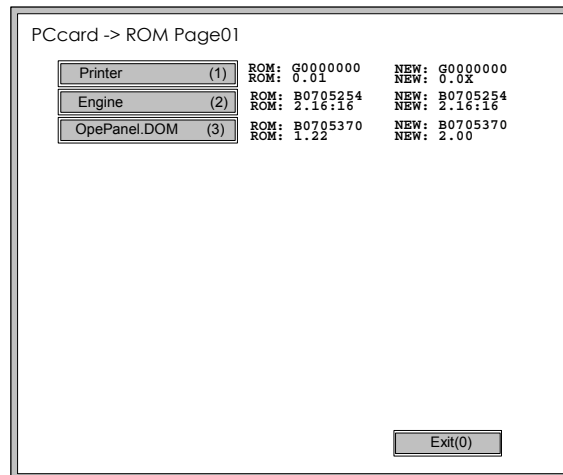
B146S917.WMF

ROM/NEW	WHAT IT MEANS
ROM:	Tells you the number of the module and name of the version presently installed. The first line is the module number, the second line the version name.
NEW:	Tells you the number of the module and name version on the SD card. The first line is the module number, the second line the version name.

9. On the screen, touch the button or press the corresponding number key on the operation panel to select the item in the menu that you want to update.

10. After pressing the module button, or entering the appropriate number with the 10-key pad to select the module, the "Verify" and "Update" keys appear at the bottom of the screen.
    NOTE: The screen below shows only the "Printer" option selected for update.

```
PCcard -> ROM Page01

   Printer        (1)   ROM: G0000000    NEW: G0000000
                        ROM: 0.01        NEW: 0.0X
   Engine         (2)   ROM: B0705254    NEW: B0705254
                        ROM: 2.16:16     NEW: 2.16:16
   OpePanel.DOM   (3)   ROM: B0705370    NEW: B0705370
                        ROM: 1.22        NEW: 2.00




                    Verify(./*)    Exit(0)    UpDate(#)
```
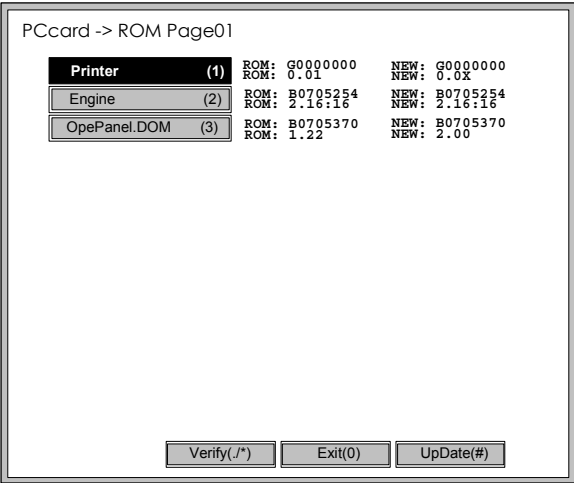
B146S918.WMF

KEY	WHAT IT DOES
Verify (./*)	Press this button (or ⊙/⁎) to verify the selected module.
Update(#)	Press this button (or #) to upgrade the selected module.
Exit(0)	Press this button (or 0) to return to the previous screen.

Service Tables

11. To start the update, touch "UpDate (#)" (or #).

After selecting "Update", three lines are displayed on the screen:

```
PCcard -> ROM


                    ┌─────────────────────────┐
                    │         Loading         │
                    ├─────────────────────────┤
                    │         Printer         │
                    ├─────────────────────────┤
                    │       *****_____         │
                    └─────────────────────────┘
```
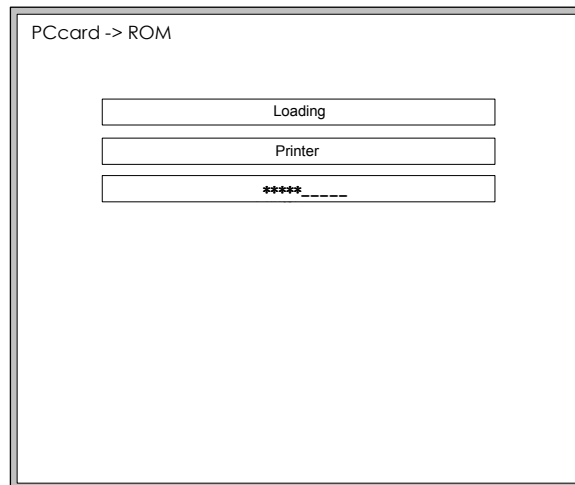
B146S919.WMF

The first line tells you what is happening, the second line is the name of the module, and the third line tells you about the progress of the operation. As the update progresses, the underscores (_) in the progress bar are replaced by asterisks.

The update is finished after all 10 underscores are replaced by asterisks.

NOTE: The progress bar (*****_ _ _ _) is not displayed for the operation panel firmware after you touch "OpePanel". While the LCDC firmware is updating, the power on key flashes on and off at 0.5 s intervals. When the update is finished, the power key flashes on and off slower at 3 s intervals.

When the update is finished, you will see a screen like the one below:

```
PCcard -> ROM


                    ┌─────────────────────────┐
                    │       Update done.      │
                    ├─────────────────────────┤
                    │   Printer Card No.: 1/1  │
                    └─────────────────────────┘
```
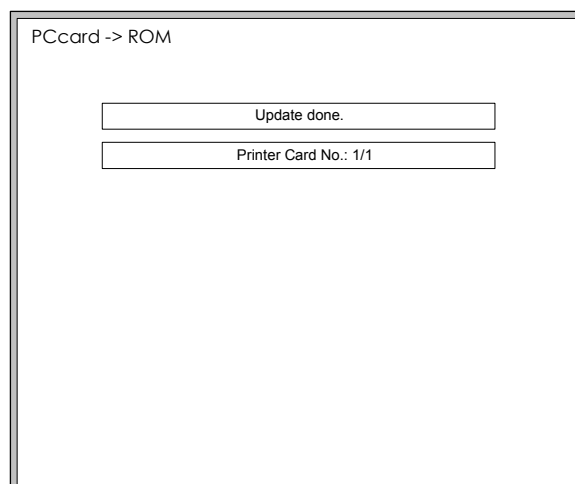
B146S920.WMF

The first line prompts you that the update is finished, and the second line tells you the name of the module that has just been updated.

NOTE: If you have selected more than one module for updating, only the screen for the last module updated will be displayed.

12. When you see the "Update Done" message, switch the copier main power switch off.

13. Press in the SD card to release it, then remove it from the slot.

14. Switch the copier on for normal operation.

   Error Messages

   If an error occurs during the download, an error message will be displayed in the first line.

   ```
   PCcard -> ROM


           [        No Valid Data    E24        ]
           [                                    ]







                         [    Exit(0)    ]
   ```
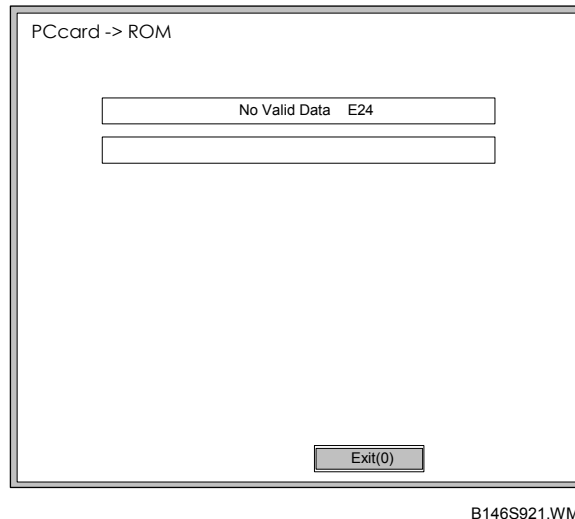
   B146S921.WMF

   The error code consists of the letter "E" and a number. The example above shows error "E24" displayed. For details, refer to the Error Message Table. (☛5.6.8)

Firmware Update Error

If a firmware update error occurs, this means the update was cancelled during the update because the module selected for update was not on the SD card.

```
PCcard -> ROM


           Reboot after card insert.    E82
           BLC2 eplot Card No.:1/1
```
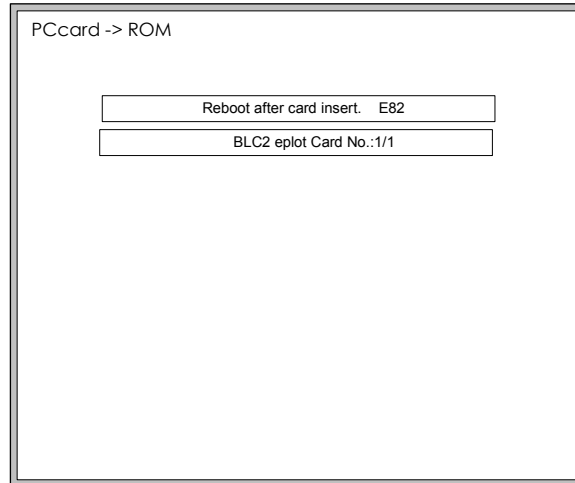
B146S922.WMF

Recovery After Power Loss

If the ROM update is interrupted as a result of accidental loss of power while the firmware is updating, then the correct operation of the machine cannot be guaranteed after the machine is switched on again. If the ROM update does not complete successfully for any reason, then in order to ensure the correct operation of the machine, the ROM update error will continue to be displayed until the ROM is updated successfully.

In this case, just insert the card once again and switch on the machine to continue the firmware download automatically from the card without the menu display.

5.6.3 VERIFYING A SUCCESSFUL UPDATE

Follow this procedure to verify that a module has been updated successfully.

1. Switch off the main power switch.

2. If the SD card is not in the machine, insert it into SD Card Slot 3.

3. Switch the main power switch on. After about 45 seconds, the initial screen appears on the LCD in English.

```
Update Menu

         ┌──────────────────────┐
         │   Firmware      (1)   │
         ├──────────────────────┤
         │  Language Data(2)     │
         └──────────────────────┘




                                  ┌──────────┐
                                  │  Exit(0)  │
                                  └──────────┘
```
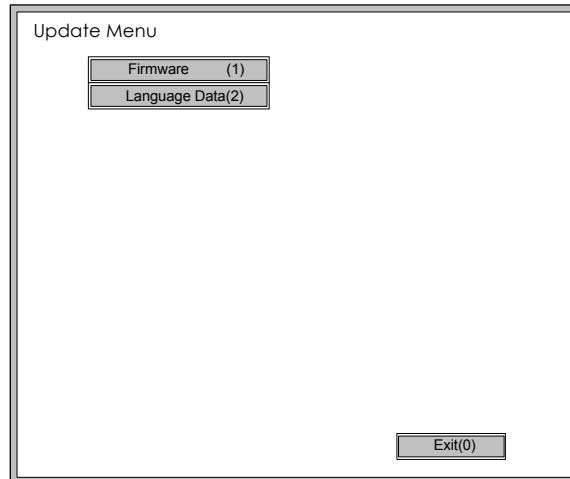
B146S923.WMF

4. Press "Firmware (1)" to open the firmware update screen.

```
PCcard -> ROM Page01

 ┌──────────────────┐  ROM: G0000000    NEW: G0000000
 │ Printer      (1)  │  ROM: 0.01        NEW: 0.0X
 ├──────────────────┤  ROM: B0705254    NEW: B0705254
 │ Engine       (2)  │  ROM: 2.16:16     NEW: 2.16:16
 ├──────────────────┤  ROM: B0705370    NEW: B0705370
 │ OpePanel.DOM (3)  │  ROM: 1.22        NEW: 2.00
 └──────────────────┘




                                  ┌──────────┐
                                  │  Exit(0)  │
                                  └──────────┘
```
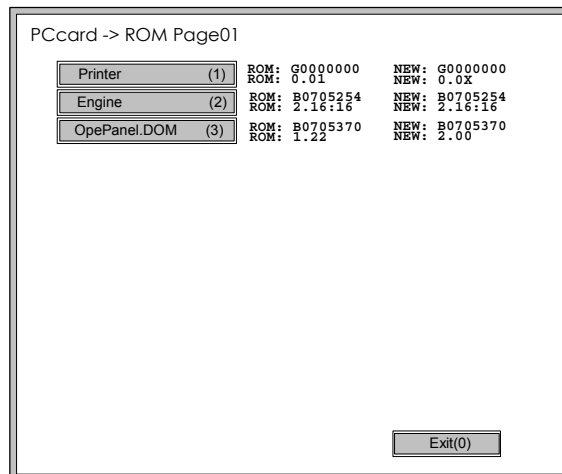
B146S924.WMF

5. On the touch-screen, touch the button or press the corresponding number key on the operation panel to select the item in the menu that you want to verify

6. After pressing the key, the items selected for verification are displayed in reverse and the "Verify" and "Update" keys appear at the bottom of the screen.

7. To start the verification, touch "Verify (./*" (or press ⊙).
    After selecting "Verify", two lines are displayed on the screen:

```
┌─────────────────────────────────────────────┐
│ ┌───────────────────────────────────────┐   │
│ │ PCcard -> ROM                         │   │
│ │                                       │   │
│ │     ┌───────────────────────────┐     │   │
│ │     │        Verify done.       │     │   │
│ │     ├───────────────────────────┤     │   │
│ │     │    Printer Card No.: 1/1   │     │   │
│ │     └───────────────────────────┘     │   │
│ │                                       │   │
│ │                                       │   │
│ │                                       │   │
│ │                                       │   │
│ │                                       │   │
│ │                                       │   │
│ └───────────────────────────────────────┘   │
└─────────────────────────────────────────────┘
```
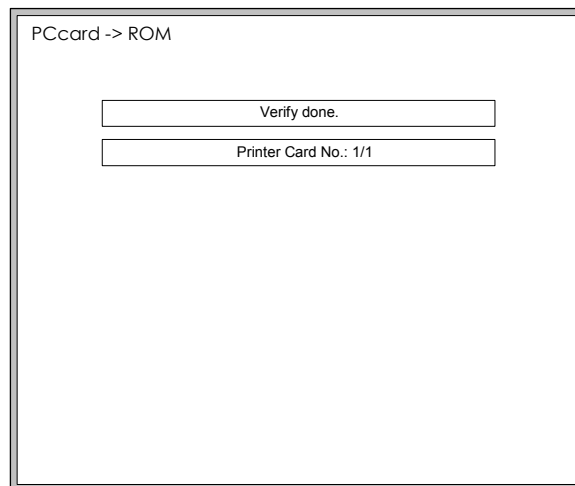
                                                    B146S925.WMF

The first line tells you the status of the verification for the item selected from the menu, and the second name tells you the name of the item verified.

NOTE: If you selected more than one item for verification, the "Verify Done" message is displayed only once for the last module verified.

9. When you see the "Verify Done" message, switch the copier main power switch off.

10. Press in the SD card to release it, then remove it from the slot.

11. Switch the copier on for normal operation.

Error during Verification

If anything abnormal is detected during verification, an error message is displayed:

```
PCcard -> ROM


        ┌─────────────────────────────────────┐
        │             Verify Error            │
        ├─────────────────────────────────────┤
        │         Printer Card No.: 1/1       │
        └─────────────────────────────────────┘
```
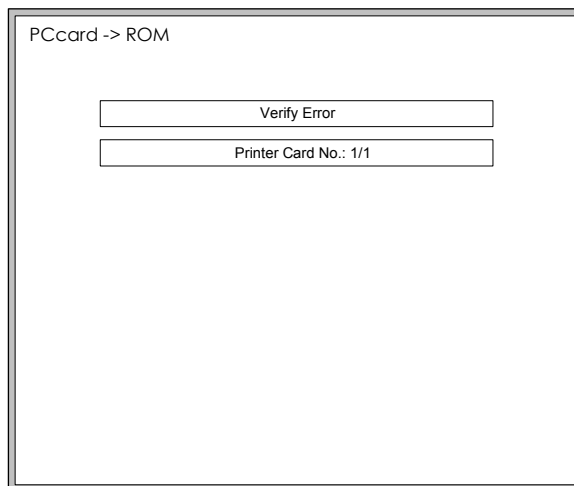
B146S926.WMF

The second line tells you the name of the module where the error was detected.

If an error occurs during verification, switch the printer off and download the firmware from the SD card again.

Service Tables

5.6.4 UPDATING THE LCDC FOR THE OPERATION PANEL

Follow this procedure to update the LCDC (LCD Control Board).

1. Turn the copier main switch off.

2. Insert the SD card into SD Card Slot 3.

3. Switch the copier main switch on.

4. After about 45 seconds the initial screen opens in English.

5. Touch "OpePanel".
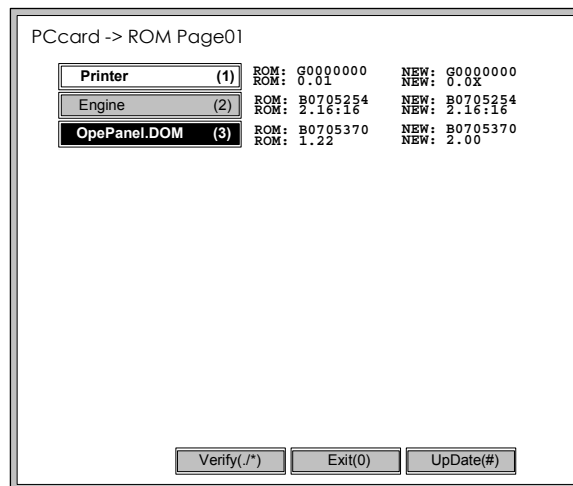
```
PCcard -> ROM Page01

  ┌─────────────────┐   ROM: G0000000    NEW: G0000000
  │  Printer    (1) │   ROM: 0.01        NEW: 0.0X
  └─────────────────┘
  ┌─────────────────┐   ROM: B0705254    NEW: B0705254
  │  Engine     (2) │   ROM: 2.16:16     NEW: 2.16:16
  └─────────────────┘
  ┌─────────────────┐   ROM: B0705370    NEW: B0705370
  │ OpePanel.DOM(3) │   ROM: 1.22        NEW: 2.00
  └─────────────────┘




     ┌──────────┐  ┌──────────┐  ┌──────────┐
     │ Verify(./*)│ │ Exit(0)  │ │ UpDate(#)│
     └──────────┘  └──────────┘  └──────────┘
```

B146S927.WMF

6. Touch "UpDate(#) (or #) to start the update.

    After about 9 seconds, the downloading starts.

    While the data is downloading, the operation panel goes off and the main power on key flashes in red at 0.5 s intervals. When the update is finished, the same key starts flashing in green at 1 s intervals.

7. Switch the copier main power switch off, remove the SD card, then switch the copier on again.

5.6.5 DOWNLOADING STAMP DATA

The stamp data should be downloaded from the controller firmware to the hard disks:

- When the machine is installed.
- After the hard disks have been replaced.

The print data contains the controller software, so execute SP5853 to download the fixed stamp data required by the hard disks.

1. Enter the SP mode.

2. Select SP5853 then press "Execute". The following screen opens while the stamp data is downloading.

PCcard -> ROM
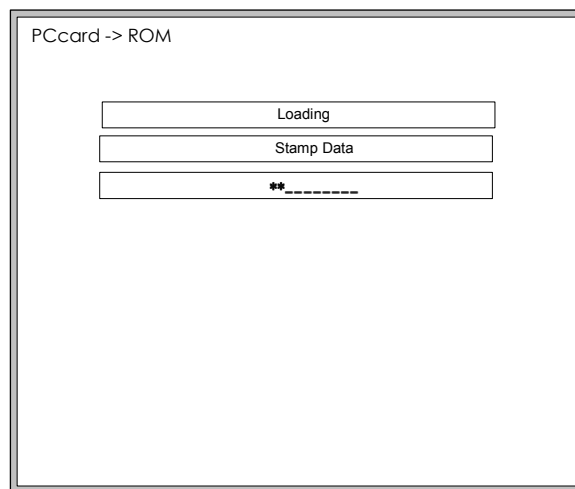
| Loading |
| Stamp Data |
| **_____ |

B146S928.WMF

The download is finished with the message prompts you to close.

Processing finished. Switch on the main power switch.
Note: May re-set automatically.
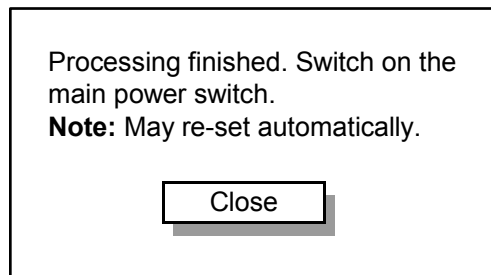
Close

B146S929.WMF

3. Press the "Close" button then cycle the copier off and on again.

5.6.6 NVRAM DATA UPLOAD/DOWNLOAD

Uploading Content of NVRAM to an SD card

Follow this procedure to upload SP code settings from NVRAM to an SD card.

NOTE: This data should always be uploaded to an SD card before the NVRAM is replaced.

1. Before switching the machine off, execute SP5990 001 (SMC Print). You will need a record of the NVRAM settings if the upload fails.

2. Switch the copier main power switch off.

3. Insert the SD card into SD Card Slot 3, then switch the copier on.

4. Execute SP5824 001 (NVRAM Data Upload) then press the "Execute" key

   When uploading is finished, the following files are coped to an NVRAM folder on the SD card. The fileis saved to the path and filename:

   NVRAM\\<serial number>.NV

   Here is an example with Serial Number "B1490017":

   `NVRAM\B1490017.NV`

5. In order to prevent an error during the download, be sure to mark the SD card that holds the uploaded data with the number of the machine from which the data was uploaded.

   NOTE: NVRAM data from more than one machine can be uploaded to the same SD card.

Downloading an SD Card to NVRAM

Follow this procedure to download SP data from an SD card to the NVRAM in the machine.

- If the SD card with the NVRAM data is damaged, or if the connection between the controller and BCU is defective, the NVRAM data down load may fail.
- If the download fails, repeat the download procedure.
- If the second attempt fails, enter the NVRAM data manually using the SMC print you created before uploading the NVRAM data. (☛5.6.6)

1. Switch the copier main power switch off.

2. Insert the SD card with the NVRAM data into SD Card Slot 3.

3. Switch the copier main power switch on.

4. Execute SP5825 001 (NVRAM Data Download) and press the "Execute" key.
   NOTE: In order for the NVRAM data to download successfully, the serial number of the file on the SD card must match the serial number of the machine. If the serial numbers do not match, the download will fail.
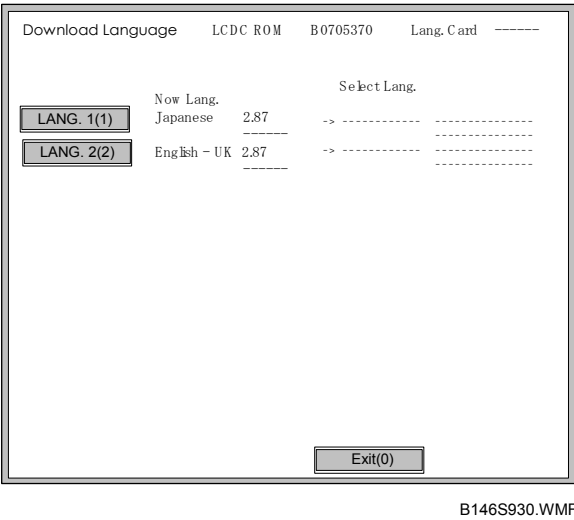
This procedure downloads the following data to the NVRAM:

- Total Count
- C/O, P/O Count

5.6.7 INSTALLING ANOTHER LANGUAGE

Many languages are available for selection, but only two can be selected for switching. Follow this procedure to select the two languages, either of which can be selected for the user interface on the operation panel.

1. Switch the copier main power switch off.

2. Insert the SD card with the language data into SD Card Slot 3.

3. Switch the copier main power switch on. The initial screen opens after about 45 seconds.
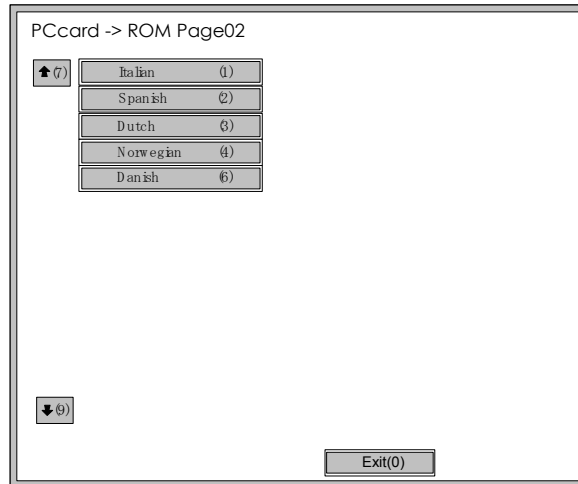
4. Touch the "Language (2)" on the screen (or press ②).


```
Download Language     LCDC ROM     B0705370     Lang. Card   ------

                                          Select Lang.
                      Now Lang.
  ┌──────────┐        Japanese    2.87     -> ------------   ---------------
  │ LANG. 1(1) │                  ------                      ---------------
  └──────────┘
  ┌──────────┐        English - UK 2.87    -> ------------   ---------------
  │ LANG. 2(2) │                  ------                      ---------------
  └──────────┘



                          ┌──────────┐
                          │  Exit(0)  │
                          └──────────┘
```

B146S930.WMF

5. Touch "LANG. 1(1)" or "LANG 2(2)

Key	What it does
LANG. 1(1)	Touch this button on the screen (or press ① on the 10-key pad) to open the next screen so you can select the 1st language.
LANG. 1(2)	Touch this button on the screen (or press ② on the 10-key pad) to open the next screen so you can select the 2nd language.
Exit(0)	Touch this key on the screen (or press ⓪ on the 10-key pad) to quit the update procedure and return to normal screen.

Service
Tables

6. To select the 1st Language, touch "LANG 1(1)".
   -or-

   To select the 2nd Language, touch "LANG(2)".

```
PCcard -> ROM Page02

 [↑(7)]   | Italian      (1) |
          | Spanish      (2) |
          | Dutch        (3) |
          | Norwegian    (4) |
          | Danish       (5) |




 [↓(9)]

                              | Exit(0) |
```

B146S931.WMF

7. Touch the appropriate button on the screen (or press the number on the 10-keypad) to select a language as the 1st (or 2nd) Language.
   If a language is already selected, it will be displayed in reverse.

   Touching "Exit(0)" also returns the previous screen.

8. If you do not see the language that you want to select, touch "↑(7)" or "↓(9)" on the screen (or press ⑦ or ⑨) to display more choices.

After you select a language, the Download Screen opens.

The 1st or 2nd language selected for updating is displayed.

To the right of the selection, the first column displays the language currently selected and the 2nd column displays the language selected to replace that language.

The example below shows that the download will replace "Japanese" with "Italian" as the 1st language.
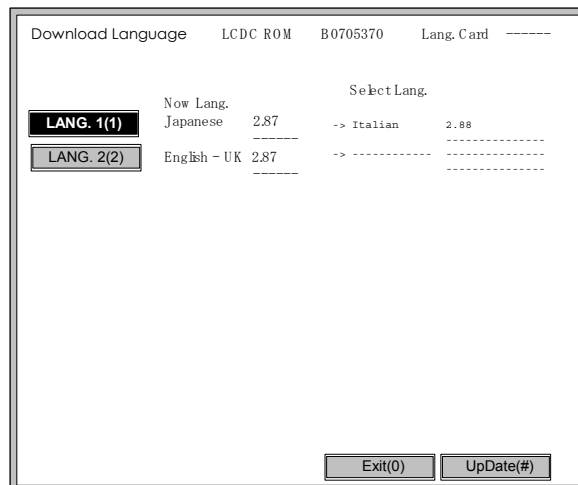
B146S932.WMF

9. Touch "Update(#)" on the screen (or press ⌗) to start the download.

Another screen with a progress bar is not displayed while the language is downloading.

While the language is downloading:

- The operation panel switches off.
- The LED on the power on key flashes rapidly.

10. After the Start LED begins to flash slowly, switch the copier main power switch off, then remove the SD card from the slot.

11. Switch the copier main power switch on to resume normal operation.

5.6.8 HANDLING FIRMWARE UPDATE ERRORS

If an error occurs during a download, an error message will be displayed in the first line. The error code consists of the letter "E" and a number ("E20", for example).

Error Message Table

Code	Meaning	Solution
20	Cannot map logical address	Make sure SD card inserted correctly, or use another SD card.
21	Cannot access memory	HDD connection incorrect or replace hard disks.
22	Cannot decompress compressed data	Incorrect ROM data on the SD card, or data is corrupted.
23	Error occurred when ROM update program started	Controller program abnormal. If the second attempt fails, replace controller board.
24	SD card access error	Make sure SD card inserted correctly, or use another SD card.
30	No HDD available for stamp data download	HDD connection incorrect or replace hard disks.
31	Data incorrect for continuous download	Insert the SD card with the remaining data required for the download, the re-start the procedure.
32	Data incorrect after download interrupted	Execute the recovery procedure for the intended module download, then repeat the installation procedure.
33	Incorrect SD card version	Incorrect ROM data on the SD card, or data is corrupted.
34	Module mismatch - Correct module is not on the SD card)	SD update data is incorrect. Acquire the correct data (Japan, Overseas, OEM, etc.) then install again.
35	Module mismatch – Module on SD card is not for this machine	SD update data is incorrect. The data on the SD card is for another machine. Acquire correct update data then install again.
36	Cannot write module – Cause other than E34, E35	SD update data is incorrect. The data on the SD card is for another machine. Acquire correct update data then install again.
40	Engine module download failed	Replace the update data for the module on the SD card and try again, or replace the BCU board.
42	Operation panel module download failed	Replace the update data for the module on the SD card and try again, or replace the LCDC.
43	Stamp data module download failed	Replace the update data for the module on the SD card and try again, or replace the hard disks.
44	Controller module download failed	Replace the update data for the module on the SD card and tray again, or replace controller board.
50	Electronic confirmation check failed	SD update data is incorrect. The data on the SD card is for another machine. Acquire correct update data then install again.

5.7 SD CARD APPLI MOVE

5.7.1 OVERVIEW

The service program "SD Card Appli Move" (SP5-873) enables you to copy application programs from an SD card to another SD card.

The machine has three SD card slots. It can use two of them–Slot 1 and Slot 2–as the storage of application programs. Slot 3 is for maintenance work only. You cannot use three SD cards at the same time as the application program storage. If your application programs are in three or more SD cards, choose one or two SD cards from them, and save all the application programs into the SD card(s).

Extreme caution should be exercised when using AD Card Appli Move:

1. The data necessary for authentication is transferred with the application program from an SD card to another SD card. Authentication fails if you try to use the SD card after you copy the application program from the card to another card.

2. Do not use the SD card if it has been used by the user on the computer. Normal operation is not guaranteed when such SD card is used.

3. Keep the SD card in a safe place after you copy the application program from the card to another card. This is because: ① The SD card can be the only proof that the user is licensed to use the application program. ② You may need to check the SD card and its data to solve a problem in the future.

4. You cannot copy PostScript data to another SD card. You have to copy another data to the SD card that stores PostScript data.

5.7.2 MOVE EXEC

The menu "Move Exec" (SP5-873-001) enables you to copy application programs from the original SD card to another SD card.

1. Turn the main switch off.

2. Make sure that an SD card is in SD Card Slot 1. The application program is copied into this SD card.

3. Insert the SD card (having stored the application program) to SD Card Slot 3. The application program is copied from this SD card.

4. Turn the main switch on.

5. Start the SP mode.

6. Select SP5-873-001 "Move Exec."

7. Follow the messages displayed on the operation panel.

8. Turn the main switch off.

9. Remove the SD card from SD Card Slot 3.

10. Turn the main switch on.

11. Check that the application programs run normally.

5.7.3 UNDO EXEC

The menu "Undo Exec" (SP5-873-002) enables you to copy back application programs from an SD card to the original SD card. You can use this program when, for example, you have mistakenly copied some programs by using Move Exec (SP5-873-001).

1. Turn the main switch off.

2. Insert the original SD card in SD Card Slot 1. The application program is copied back into this card.

3. Insert the SD card (having stored the application program) to SD Card Slot 3. The application program is copied back from this SD card.

4. Turn the main switch on.

5. Start the SP mode.

6. Select SP5-873-002 "Undo Exec."

7. Follow the messages displayed on the operation panel.

8. Turn the main switch off.

9. Remove the SD card from SD Card Slot 1

10. Remove the SD card from SD Card Slot 3 and insert it to SD Card Slot 1.

    NOTE: This step assumes that the application programs in the SD card are used by the machine.

11. Turn the main switch on.

12. Check that the application programs run normally.

Service Tables

5.8 CONTROLLER SELF-DIAGNOSTICS

5.8.1 OVERVIEW

There are three types of self-diagnostics for the controller.

- Power-on self-diagnostics: The machine automatically starts the self-diagnostics just after the power has been turned on.
- Detailed self-diagnostics: The machine does the detailed self-diagnostics by using a loop-back connector (P/N G0219350)
- SC detection: The machine automatically detects SC conditions at power-on or during operation.

The following shows the workflow of the power-on and detailed self-diagnostics.
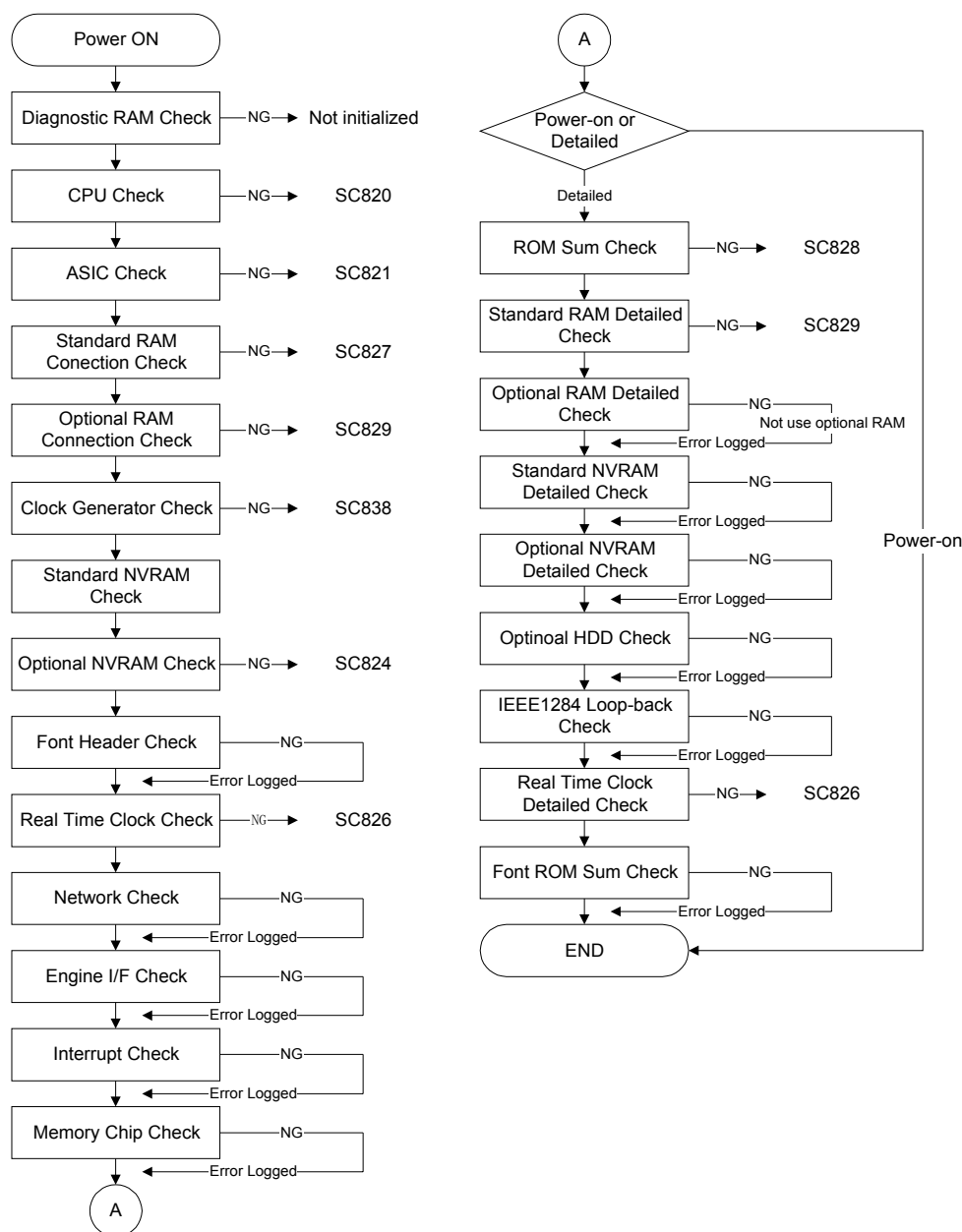
B146S933.WMF

5.8.2 DETAILED SELF-DIAGNOSTICS

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
G0219350	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.
    The machine automatically starts the self-diagnostics and prints the diagnostic report after completing the test.
    • Refer to the diagnostics report for the detected errors. The errors detected during self-diagnostics can be checked with SP7-832-001 (Diag. Result).
    • Refer to section 4.2 for details about the error codes.

Service Tables

5.9 USER PROGRAM MODE

5.9.1 MENU

System Settings

General Features
- Panel Tone
- Warm Up Notice
- Copy Count Display
- Function Priority
- Print Priority
- Function Reset Timer
- Output: Copier
- Output: Document Server
- Output: Facsimile
- Output: Printer
- <F/F4> Size Setting

Tray Paper Settings
- Paper Tray Priority: Copier
- Paper Tray Priority: Facsimile
- Paper Tray Priority: Printer
- Tray Paper Size: Tray 2
- Paper Type: Bypass Tray
- Paper Type: Tray 1
- Paper Type: Tray 2
- Cover Sheet Tray
- Slip Sheet Tray

Timer Settings
- Auto Off Timer
- Energy Saver Timer
- Panel Off Timer
- System Auto Reset Timer
- Copier/Document Server Auto Reset Timer
- Facsimile Auto Reset Timer
- Scanner Auto Reset Timer
- Set Date
- Set Time

Interface Settings
- Network
- Parallel Interface
- Print List

File Transfer
- Delivery Option
- SMTP Server
- SMTP Authentication
- POP before SMTP
- Reception Protocol
- POP3/IMAP4 Settings
- Key Operator's E-mail Address
- E-mail Reception Port
- E-mail Reception Interval
- Maximum Reception E-mail Size
- E-mail Storage in Server
- Default User Name/Password (Send)
- Program/Change/Delete E-mail Message
- Program/Change/Delete Subject
- Scanner Recall Interval Time
- Number of Scanner Recalls
- E-mail Account

Key Operator Tools
- User Code Management
- Key Counter Management
- External Charge Unit Management
- Key Operator Code
- Extended Security
- Display/Print Counter
- Display/Clear/Print Counter per User Code
- Print Address Book: Destination List
- Panel Off Level
- Address Book Management
- Address Book Program/Change/Delete Group
- Address Book: Program/Change/Delete Transfer Request
- Address Book: Change Order
- Address Book: Edit Title
- Address Book: Select Title
- Auto Delete File
- Delete All Files
- Password Management for Stored Files
- AOF
- Program/Change LDAP Server
- User LDAP Server

Maintenance

Auto Color Calibration

Color Registration

Copier Document Server Features

General Features
- Auto Paper Select Priority
- Paper Display
- Original Type Display
- Original Type Priority
- Original Photo Type Priority
- Auto Tray Switching
- Duplex Mode Priority
- Copy Orientation in Duplex Mode
- Original Orientation in Duplex Mode
- Change Initial Mode
- Maximum Copy Quantity
- Tone: Original Remains
- Job End Call
- Copy Function Key: F1
- Copy Function Key: F2
- Copy Function Key: F3
- Copy Function Key: F4
- Copy Function Key: F5
- Document Server Storage Key: F1
- Document Server Storage Key: F2
- Document Server Storage Key: F3
- Document Server Storage Key: F4
- Document Server Storage Key: F5
- Clear Bypass Mode
- Color Mode Priority
- Two Color Mode Priority
- Auto Image Density Priority

Reproduction Ratio
- Shortcut R/E 1
- Shortcut R/E 2
- Shortcut R/E 3
- Enlarge 1
- Enlarge 2
- Enlarge 3
- Enlarge 4
- Enlarge 5
- Priority Setting: Enlarge
- Reduce 1
- Reduce 2
- Reduce 3
- Reduce 4
- Reduce 5
- Reduce 6
- Priority Setting: Reduce
- Ratio for Create Margin
- R/E Priority

Edit
- Front Margin: Left/Right
- Back Margin: Left/Right
- Front Margin: Top/Bottom
- Back Margin: Top/Bottom
- 1 Sided → 2 Sided Auto Margie: T to T
- 1 Sided → 2 Sided Auto Margie: T to B
- Erase Boarder Width
- Erase Original Shadow in Combine
- Erase Center Width
- Front Cover Copy in Combine
- Copy Order in Combine
- Image Repeat Separation Line
- Double Copies Separation Line
- Separation Line in Combine
- Orientation Magazine

Stamp
- Preset Stamp
- User Stamp
- Date Stamp
- Page Numbering

Input/Output
- Switch to Batch
- SADF Auto Reset
- Rotate Sort: Auto Paper Continue
- Auto Sort
- Memory Full Auto Scan Restart
- Letterhead Setting

Adjust Color Image
- Background Image of ADS (Full Color/Two Color)
- Color Sensitivity
- A.C.S. Sensitivity
- A.C.S. Priority

Service Tables

Facsimile Features

General Settings/Adjustment
- Memory/Immediate Transmission Switch
- Text Size Priority
- Original Type Priority
- Auto Image Density
- Adjust Scan Density
- Select Title
- Change Initial Mode
- Adjust Sound Volume
- Program Fax Information
- Scan End Reset
- TX Stamp Priority
- Line Priority Setting
- Program Economy Time
- On Hook Mode Release Time
- Quick Operation Key 1
- Quick Operation Key 2
- Quick Operation Key 3

Reception Settings
- Switch Reception Mode
- Authorized RX
- Forwarding
- RX File Print Quantity
- 2 Sided Print
- RX Reverse Printing
- Paper Tray
- Specify Tray for Lines
- Checkered Mark
- Center Mark
- Print Reception Time

E-mail Settings
- Internet Fax Settings
- Maximum E-mail Size
- SMTP RX File Delivery Setting

Key-Operator Tools
- Program/Change/Delete Standard Message
- Store/Change/Delete Auto Document
- Program/Change/Delete Scan Size
- Print Journal
- Transmission Page Count
- Forwarding
- Memory Lock RX
- ECM
- Parameter Setting
- Program Special Sender
- Box Setting
- Transfer Report
- Program Confidential ID
- Program Polling ID
- Program Memory Lock ID
- Reception File Setting
- Stored RX File User Code Setting

Printer Features

Paper Input
- Bypass Paper Size

List/Test Print
- Multiple List
- Configuration Page
- Error Log
- Menu List
- PCL Configuration/Font Page
- PS Configuration/Font Page
- Hex Dump

Maintenance
- Menu Protect
- 4 Color Graphic Mode

System
- Print Error Report
- Auto Continue
- Memory Overflow
- Job Separation
- Memory Usage
- B&W Page Detect
- Duplex
- Copies
- Sub Paper Size
- Page Size
- Letterhead Setting

Host Interface
- I/O Buffer
- I/O Timeout

PCL Menu
- Orientation
- Form Lines
- Font Source
- Font Number
- Point Size
- Font Pitch
- Symbol Set
- Courier Font
- Extend A4 Width
- Append CR to LF
- Resolution

Scanner Features

Scan Settings	Destination List Settings	Send Settings
• Default Scan Settings	• Destination List Display Priority 2	• TWAIN Standby Time
• Wait Time for Next Original: Exposure Glass	• Select Title	• File Type Priority
• Wait Time for Next Original(s): SADF		• Compression (Black & White)
• Original Setting		• Compression (Gray Scale/Full Color)
• Original Feed Type Priority		• Print & Delete Scanner Journal
• Mixed Original Sizes Priority		• Maximum E-mail Size
• Original Orientation Priority		• Divide & Send E-mail
• Change Initial Mode		• E-mail Information Language
• Auto Color Select: Mode Priority		• Sender's Name Default
• A.C.S. Sensitivity Level		

(Language)

—

Inquiry

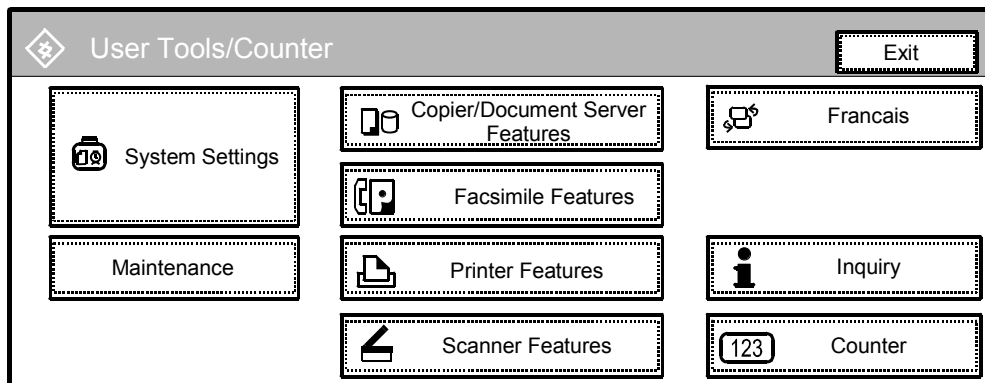Print Inquiry List

Counter

Print Counter List

Service Tables

5.9.2 DISPLAY

Selecting Menu

To start the UP mode (User Tools/Counter), press the ⬦/123 key. The initial screen is displayed.

⬦ User Tools/Counter		Exit
🔲 System Settings	🔲 Copier/Document Server Features	🔲 Francais
	🔲 Facsimile Features	
Maintenance	🔲 Printer Features	ℹ️ Inquiry
	⬛ Scanner Features	123 Counter

B146S908.WMF

For the list of the menus and submenus, see section 5.9.1, "Menu."

Inquiry

The menu "Inquiry" displays the information specified by the corresponding SPs:

Information		Specified by
Consumables	Telephone number to order	SP5-812-003
Machine maintenance/Repair	Telephone number	SP5-812-001
Sales representative	Telephone number	SP5-812-004

5.10 DIP SWITCHES

Controller Board

DIP SW No.	OFF	ON
1	Boot-up from flash ROM	Boot-up from IC card
2 to 4	Factory Use Only: Keep these switches OFF.	

BCU Board

Set the DIP switch on the BCU as listed in the table.

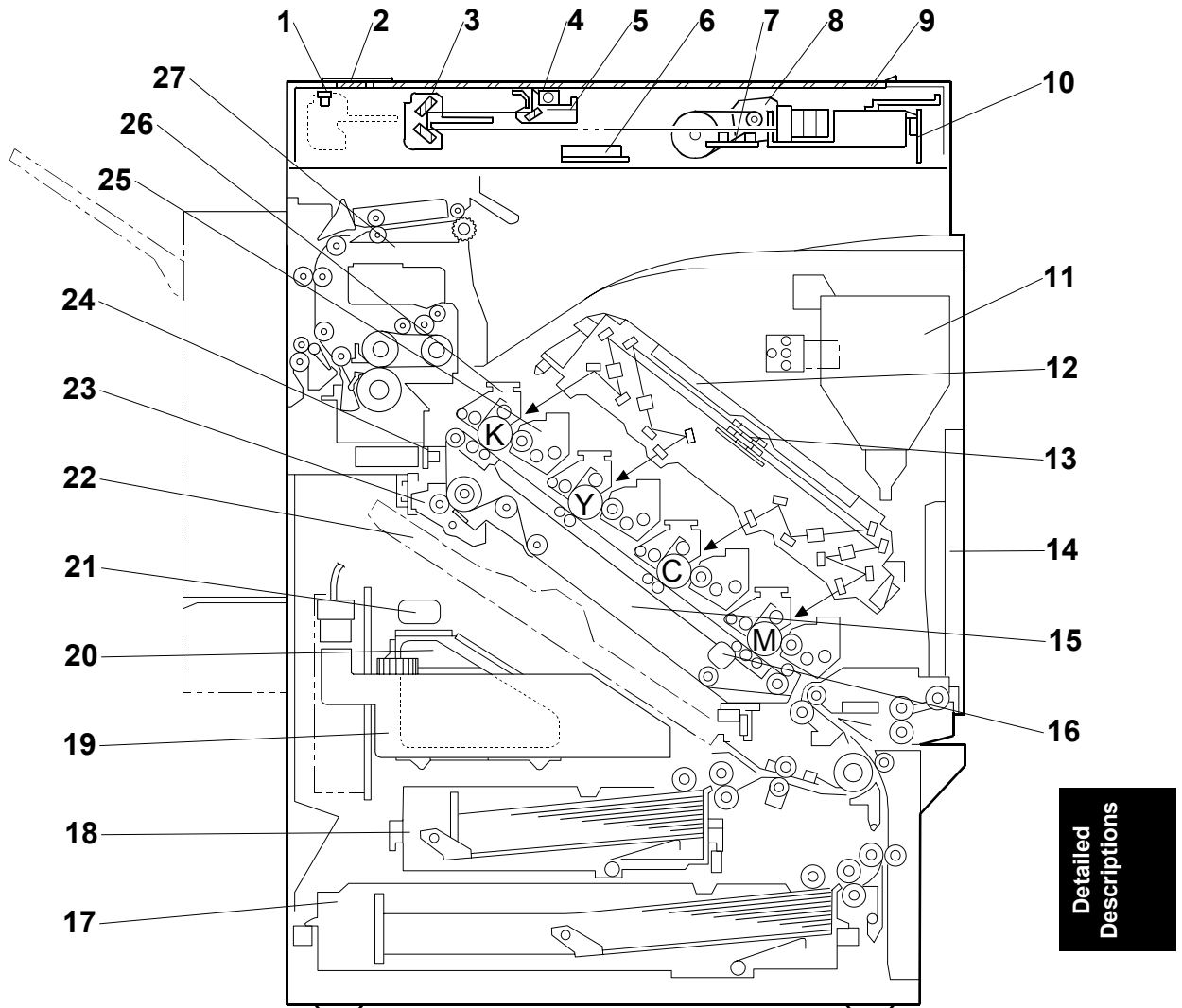| Model	DIP Switch				
	1	2	3	4	
				C1y	C1z
North/South America	ON	OFF	OFF	OFF	ON
Europe	OFF	ON	OFF	OFF	ON
Asia	ON	ON	OFF	OFF	ON
Taiwan	ON	OFF	ON	OFF	ON
Korea	OFF	ON	ON	OFF	ON

When the DIP switch is incorrectly set, one of the following error occurs:

- "SC195"
- "SC902"
- "Fusing Unit Setting Error"

Service Tables

5-167

6. DETAILED SECTION DESCRIPTIONS

6.1 OVERVIEW

6.1.1 COMPONENT LAYOUT

B146D901.WMF

1. Scanner HP sensor
2. ADF exposure glass
3. 2nd scanner (2nd carriage)
4. Scanner lamp
5. 1st scanner (1st carriage)
6. Original width sensor
7. Original length sensor
8. Scanner motor
9. Exposure glass
10. Sensor board unit (SBU)
11. Toner cartridge
12. Laser optics housing unit
13. Polygon mirror motor
14. By-pass feed table

15. Transfer unit
16. Rotation encoder
17. Tray 2
18. Tray 1
19. Waste oil bottle
20. Waste toner bottle
21. Waste toner vibrator
22. Duplex feed unit
23. Transfer belt cleaning unit
24. ID sensor
25. Development unit (each color)
26. PCU (each color)
27. Fusing unit

Detailed Descriptions

6.1.2 PAPER PATH
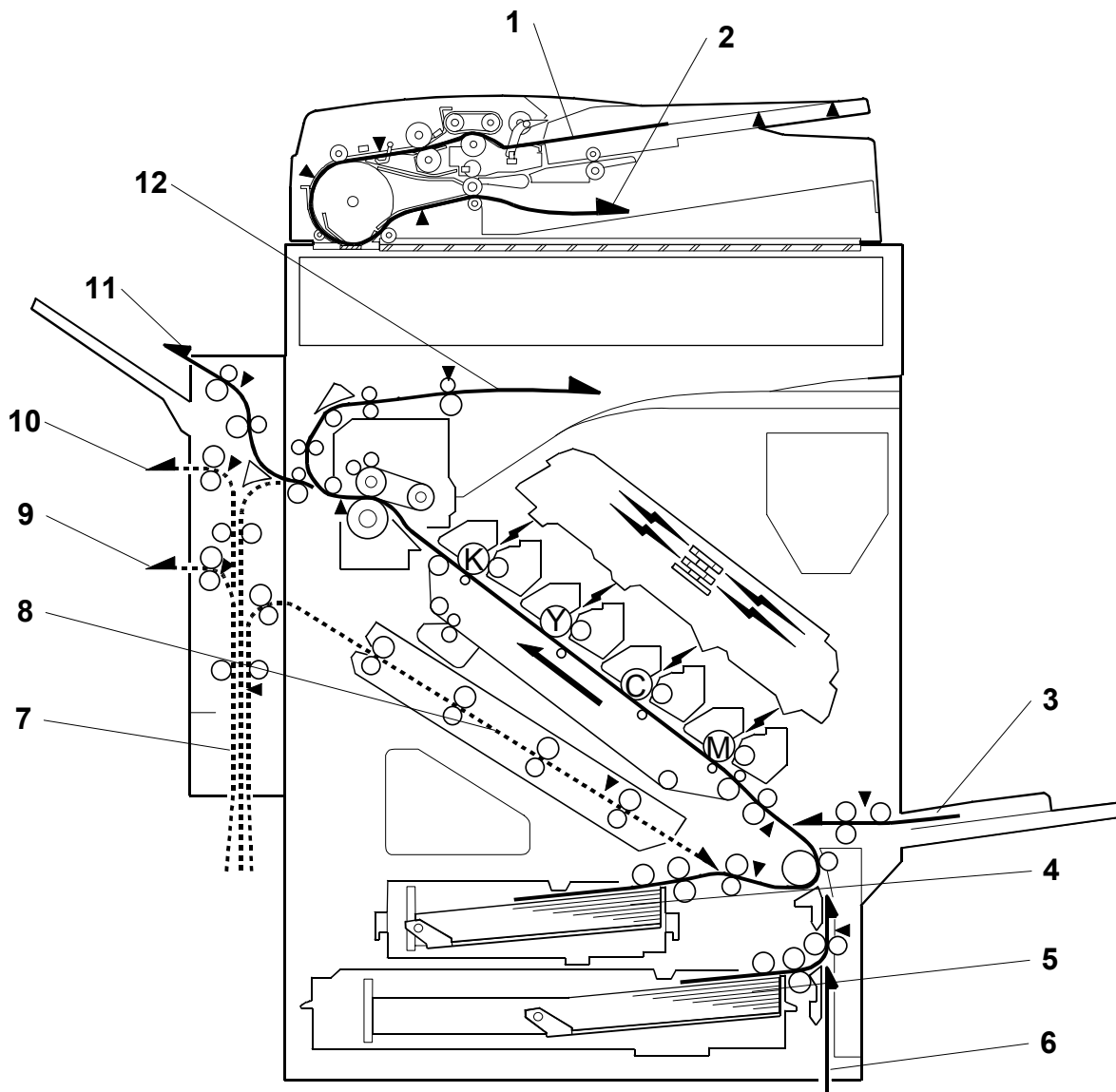
B146D911.WMF

1. Original tray	7. Duplex inverter unit
2. Original exit tray	8. Duplex feed unit
3. By-pass tray	9. To optional finisher
4. Tray 1	10. To optional finisher
5. Tray 2	11. External Tray
6. Optional paper feed unit/LCT	12. Standard tray

The two-tray finisher requires an optional paper feed unit or the LCT. The duplex inverter unit has two exits for the two-tray finisher. When the one-tray paper feed unit is installed, paper feeds out to the two-tray finisher from the upper exit. When the two-tray paper feed unit or LCT is installed, paper feeds out to the two-tray finisher from the lower exit.

6.1.3 DRIVE LAYOUT
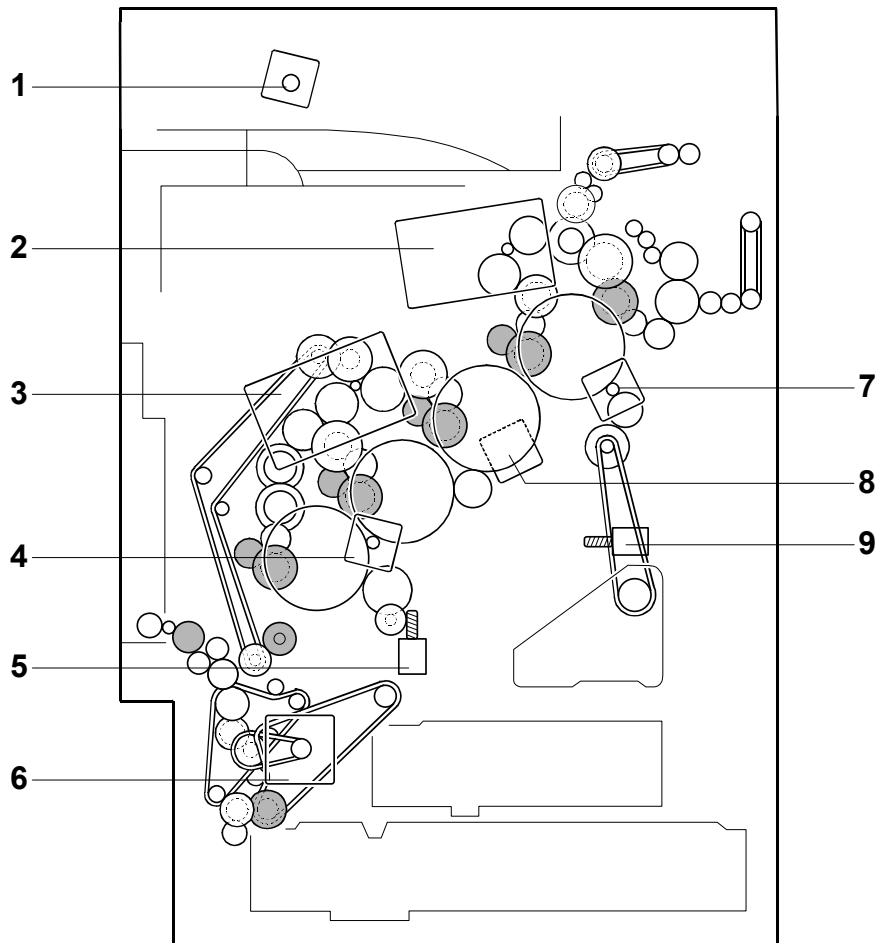
B146D912.WMF

1. Scanner motor: Drives the scanner unit.

2. Development drive   Drives the development unit for black, the fusing unit, and the paper
   motor-K: exit section.

3. Development drive   Drives the color development units (magenta/cyan/yellow), the
   motor-CMY: registration roller, and the waste toner collection coils from the PCUs.

4. Drum drive motor-CMY: Drives the PCUs for magenta, cyan, and yellow.

5. Transfer belt contact   Moves the transfer belt into contact and away from the color PCUs.
   motor:

6. Paper feed motor: Drives the paper feed mechanisms (tray 1/tray 2/by-pass tray).

7. Drum drive motor-K: Drives the black PCU and the collection coil in the waste toner bottle.

8. Transfer unit drive   Drives the transfer unit.
   motor:

9. Waste toner vibration   Makes vibration to prevent the waste toner from clogging the waste
   motor: toner path.

Detailed Descriptions

6.1.4 BOARD STRUCTURE

Overview
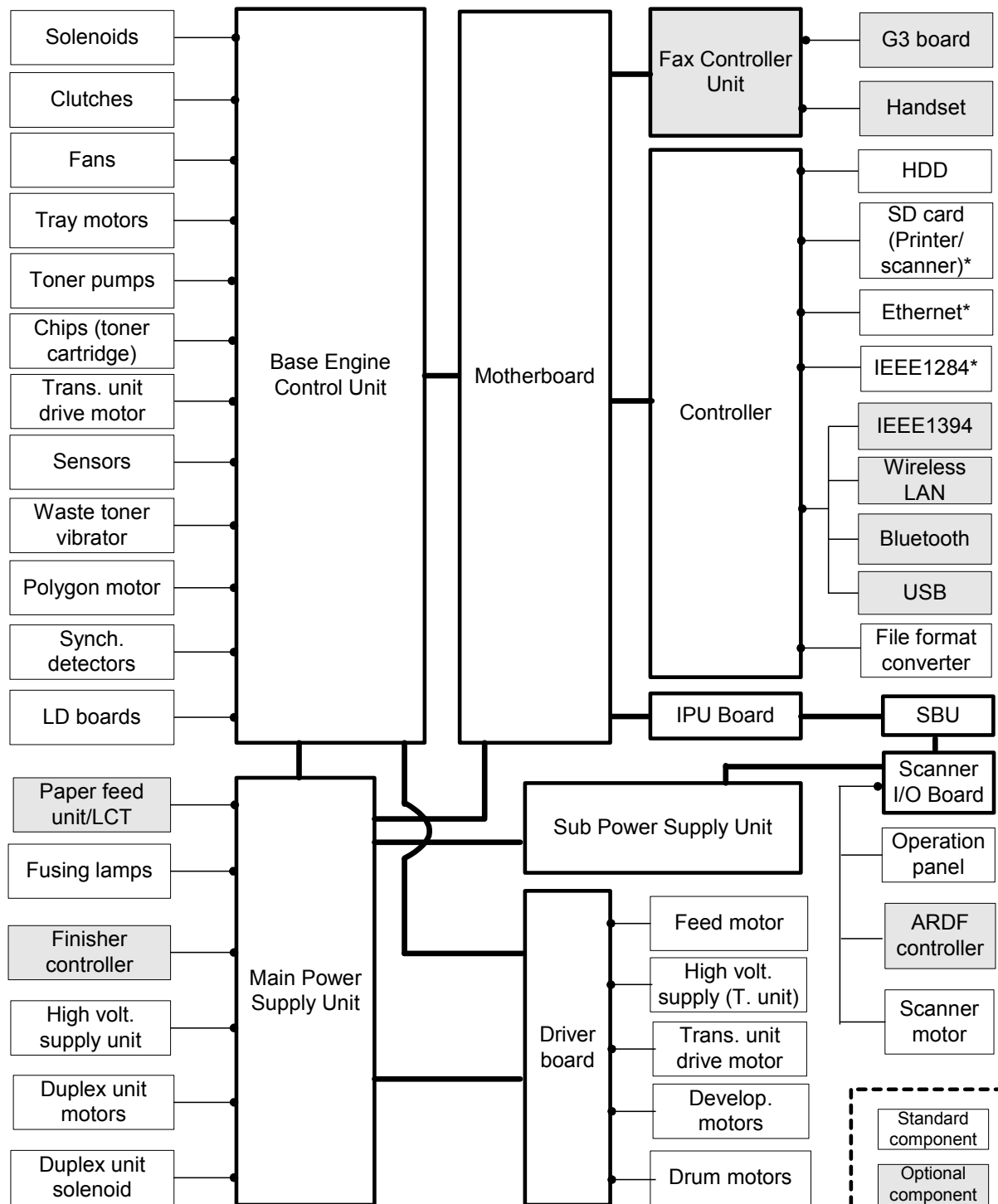
B146D913.WMF

* The SD card (printer/scanner), the IEEE 1284 interface, and the Ethernet interface are optional components for the Asia model.

Descriptions

BCU (Base Engine Control Unit):
The BCU controls all the mechanical components. The BCU has three CPUs (Main, MUSIC, and DSP). The CPUs control the following functions:

Main CPU

- Engine sequence
- Engine operation
- Timing for peripherals
- High voltage supply, laser, and fusing
- Sensors, drive board, and solenoids
- Motors

MUSIC (Mirror Unit for Skew and Interval Correction) CPU

- TD sensor
- Line position adjustment
- Memory chip on the toner cartridge

DSP (Digital Signal Processor)

- Line position adjustment

Controller:
The controller connects to the BCU through a PCI bus. The controller handles the following functions:

- Machine-to-host interface
- Operation panel interface
- Network interface
- Interfacing and control of the optional USB, Bluetooth, IEEE1394, IEEE802.11b (wireless LAN), HDD, and DRAM DIMM

LD Drive Board:
This is the laser diode drive circuit board.

DRB:
The DRB (driver board) controls the paper feed motor, development motors (color/black), drum drive motors (color/black), transfer unit drive motor, and transfer voltage.

IPU:
The Image Processing Unit is a large-scale integrated circuit. This unit processes digital signals.

SBU:
The Sensor Board Unit has a CCD (charge-coupled device) and an analog-to-digital conversion circuit.

Operation Panel Board:
Controls the display panel, the LED, and the keypad.

Motherboard:
The motherboard is the main circuit board connecting with the BCU, FCU, controller, IPU, and main power supply unit.
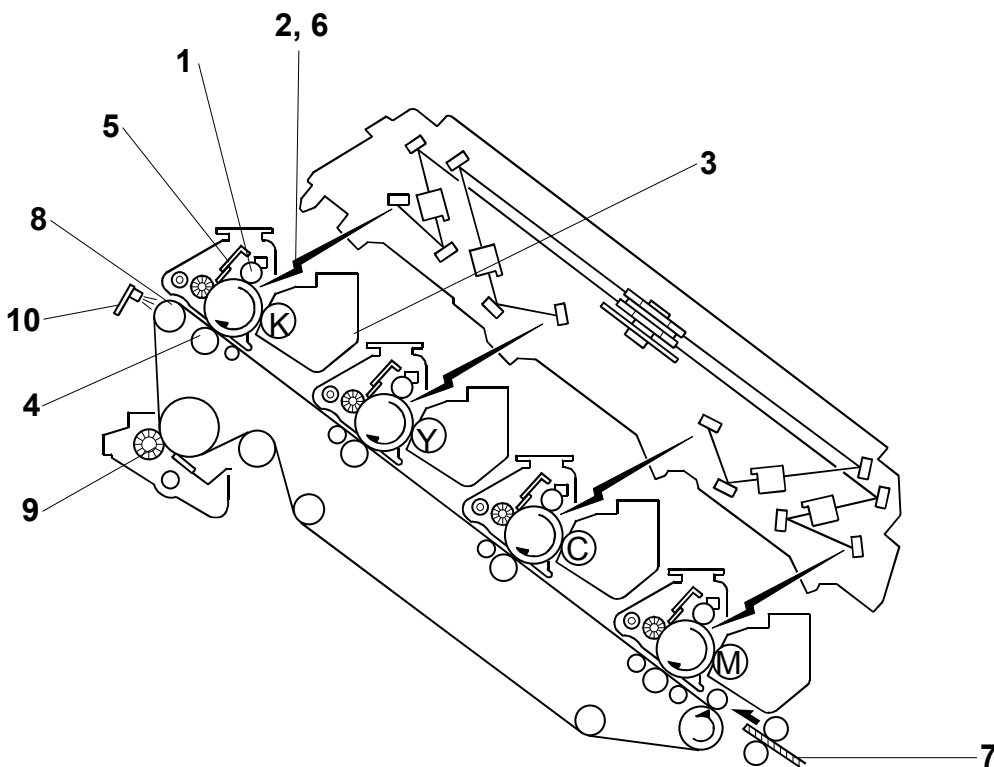
Detailed Descriptions

FCU:

The FCU (fax controller unit) manages the fax programs and communicates with the controller to share copier resources.

Scanner I/O Board:

The scanner I/O board is a circuit board that transmits control signals, image data, and electricity.

6.1.5 PRINTING PROCESS

B146D500.WMF

This machine uses four PCUs, four development units, and four laser beams for color printing. Each PCU consists of a drum, charge roller, cleaning brush, and blade. From the left, the PCU stations are black, yellow, cyan, and magenta.

A transfer belt feeds paper past the PCUs, and the toner image on each drum is transferred to the paper.

The paper path is inclined about 38 degrees to make the machine as compact as possible.

Drum charge:
The charge roller gives the drum a negative charge

Laser exposure:
The laser beam from the laser diode (LD) goes through the lens and mirrors and reaches the drum. The machine creates a latent image on the drum by turning the laser beam on and off.

Development:
The development roller carries negatively charged toner to the latent image on the drum surface. This machine uses four independent development units (one for each color).

Image transfer:
The charge applied to the transfer roller attracts the toner from the drum to the paper. Four toner images are super-imposed onto the paper.

Cleaning for OPC drum:
The cleaning brush and blade remove any toner remaining on the drum surface after image transfer to the paper.

Quenching for OPC drum:
Quenching is done by illuminating the whole area of the drum with the laser at the end of every job.

Paper attraction:
Paper is attracted to the transfer belt by the charge applied to the paper attraction roller.

Separation:
Paper separates from the transfer belt when the belt curves away from it.

Cleaning and quenching for transfer belt:
The cleaning brush and blade clean the belt surface. The grounding roller inside the transfer belt unit removes the remaining charge on the belt.

Detailed Descriptions

ID sensor:
The ID sensor board contains three ID sensors (one at the front, center, and rear). The ID sensor detects the density of the ID sensor pattern on the transfer belt. The ID sensor output is used for process control and for automatic line position, skew, and color registration adjustments for the latent image.

6.2 PROCESS CONTROL

6.2.1 OVERVIEW

This machine provides the following two forms of process control:
- Potential control
- Toner supply control

The process control facilities of this machine have the following features:
- Three ID (image density) sensors (front, center, and rear). Only the center ID sensor is used for process control. The front, center, and rear ID sensors are used for line positioning and other adjustments.
- TD (toner density) sensor.

6.2.2 POTENTIAL CONTROL

Overview

Potential control controls development to maintain the density of the toner images on the drums. It does this by compensating for variations in drum chargeability and toner density.

The machine uses the ID sensor to measure the reflectivity of the transfer belt and the density of a standard sensor pattern. This is done during the process control self check.

The machine determines the following depending on the ID sensor output and a reference table in memory.
- V_D: Drum potential without exposure – to adjust this, the machine adjusts the charge roller voltage.
- V_B: Development bias
- V_L: Drum potential at the strongest exposure – to adjust this, the machine adjusts the laser power.

(In addition, V_{REF} is corrected. This is used for toner supply control.)

This process controls the development potential so that the maximum amount of toner applied to the drum is constant. However, to control the development potential to improve reproduction of highlight parts of images, the laser power control method can be changed. This depends on the setting of SP3-125-2. The default setting is 1 (normal control method). To change to the highlight range control method, set this SP to 2.

If SP3-125-1 is set to 0 (Off), the machine does not do the potential control, but uses the development bias adjusted with SP2-201-1 to -9, the charge roller voltage adjusted with SP2-001-1 to -9, and the laser power selected with SP2-103-1 to -27. However, these SPs should normally not be adjusted in the field.

Process Control Self Check

This machine carries out potential control using a procedure called the process control self check. There are seven types of process control self check, categorized according to their execution timing.

1. Forced

   This is done when SP3-126-1 is used.

2. Initial

   This starts automatically when the power is turned on or when recovering from energy saver mode, but only if the fusing unit pressure roller temperature is 60°C or less.

3. Interval: Job End

   This starts automatically at the end of a print job when the total print counter for this feature exceeds 200 (this can be changed with SP3-906-1). After any process control is done (except for forced process control), the counters are reset to "0."

4. Interval: Interrupt (default: not done)

   This interrupts printing and then starts automatically when the machine makes a certain number (A) of continuous color prints in the same job and the main scan length detection is executed. After it is completed, the machine continues to make prints.

   The value A can be adjusted with SP3-906-2 (default: off).

   At this time, only V_{REF} is corrected. Potential control (V_D, V_B, V_L correction) is not done.

5. Non-use Time (default: not done)

   This starts before the next print job if the machine has no job for a certain time (M) after it makes more than a certain number (N) of prints.

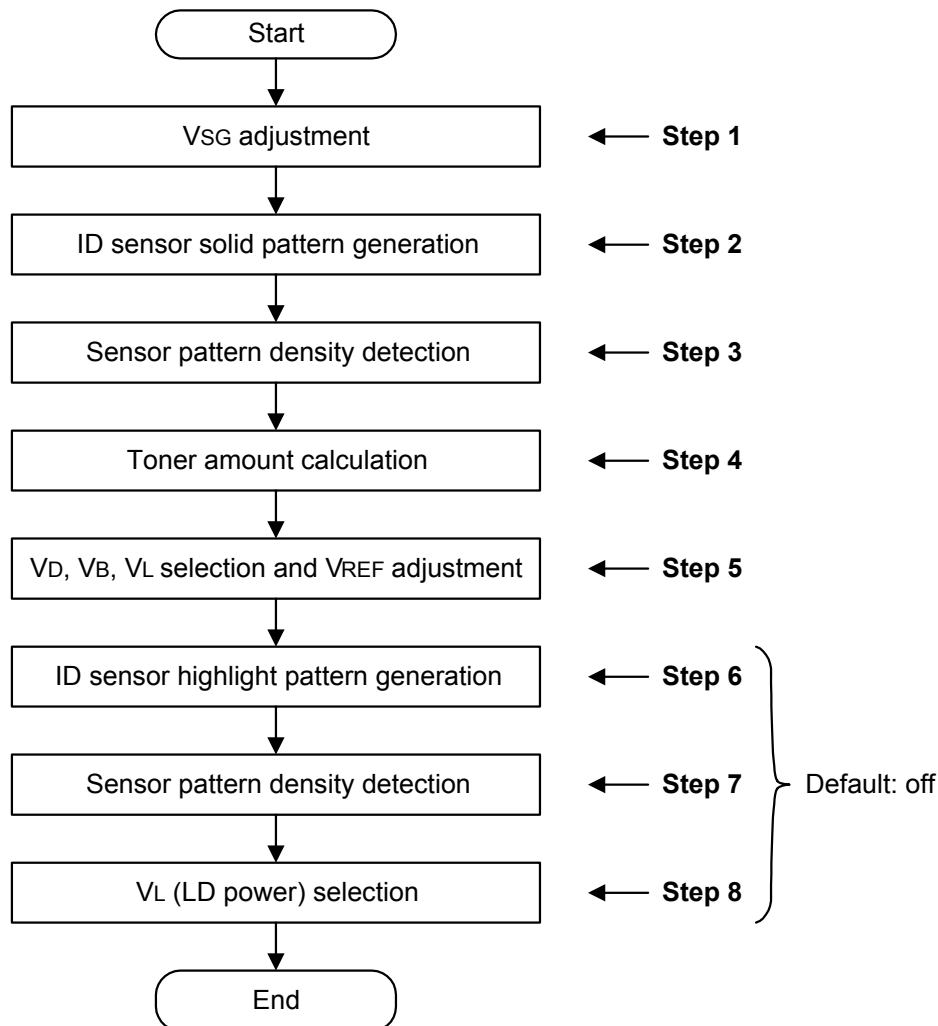   M is adjusted with SP3-906-4 and N is adjusted with SP3-906-3.

6. After Toner End Recovery

   This starts after recovery from a toner end condition.

7. After Developer Initialization

   The machine executes the Auto Toner Density Adjustment (SP3-125-003). This starts after a developer initialization is done. Developer initialization occurs automatically after a new development unit has been installed.

Detailed Descriptions

6.2.3 PROCESS CONTROL SELF CHECK PROCEDURE

```
                    ┌──────────────┐
                    │    Start     │
                    └──────┬───────┘
                           ▼
        ┌──────────────────────────────┐
        │        VSG adjustment         │  ◄──── Step 1
        └──────────────┬───────────────┘
                       ▼
        ┌──────────────────────────────┐
        │  ID sensor solid pattern      │  ◄──── Step 2
        │        generation             │
        └──────────────┬───────────────┘
                       ▼
        ┌──────────────────────────────┐
        │ Sensor pattern density        │  ◄──── Step 3
        │        detection              │
        └──────────────┬───────────────┘
                       ▼
        ┌──────────────────────────────┐
        │  Toner amount calculation     │  ◄──── Step 4
        └──────────────┬───────────────┘
                       ▼
        ┌──────────────────────────────┐
        │ VD, VB, VL selection and      │  ◄──── Step 5
        │    VREF adjustment            │
        └──────────────┬───────────────┘
                       ▼
        ┌──────────────────────────────┐
        │ ID sensor highlight pattern   │  ◄──── Step 6  ┐
        │        generation             │                │
        └──────────────┬───────────────┘                │
                       ▼                                  │
        ┌──────────────────────────────┐                 ├ Default: off
        │ Sensor pattern density        │  ◄──── Step 7  │
        │        detection              │                │
        └──────────────┬───────────────┘                │
                       ▼                                  │
        ┌──────────────────────────────┐                 │
        │   VL (LD power) selection     │  ◄──── Step 8  ┘
        └──────────────┬───────────────┘
                       ▼
                    ┌──────────────┐
                    │     End      │
                    └──────────────┘
```

B146D501.WMF

Step 1: VSG Adjustment

This machine uses three ID sensors (direct reflection type). They are located at the front, center, and rear of the transfer unit. Only the center ID sensor is used for process control. The ID sensor checks the bare transfer belt's reflectivity and the machine calibrates the ID sensor until its output (known as V_{SG}) is as follows.

- V_{SG} = 4.0 ± 0.5 Volts

This calibration compensates for the transfer belt's condition and the ID sensor condition, such as dirt on the surface of the belt or ID sensor.

Step 2: ID Sensor Solid Pattern Generation

Transfer belt

B146D502.WMF
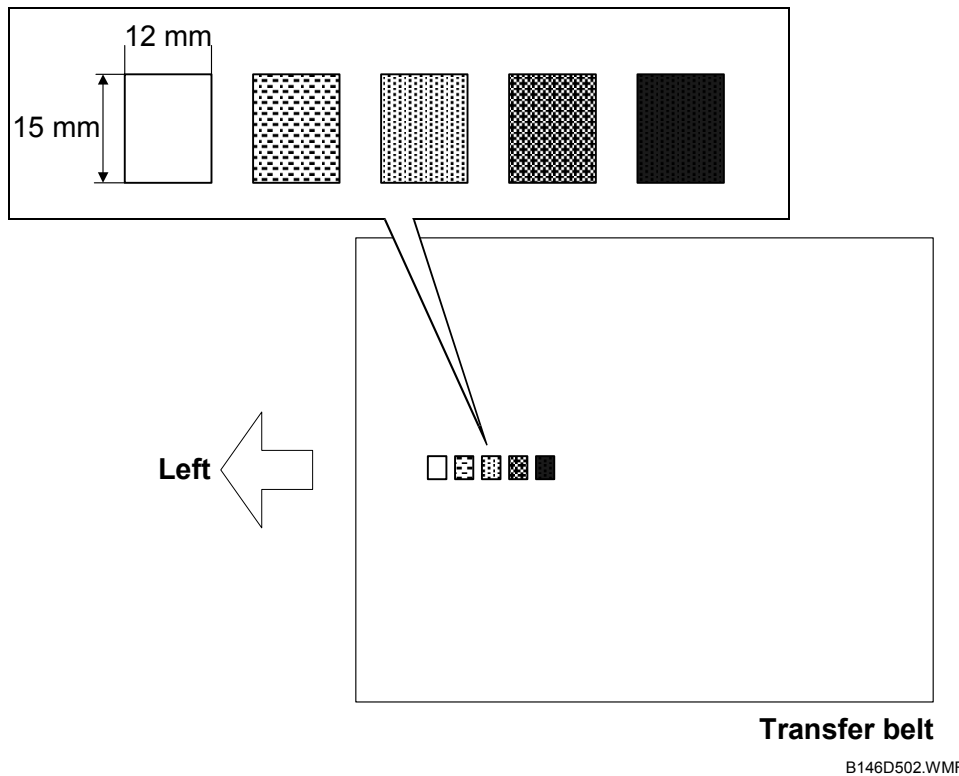
First, the machine agitates the developer for between 15 and 30 seconds until the fluctuation in TD sensor output becomes less than 0.3V.

Second, the machine makes the first series of grade patterns. See the diagram; this 5-grade pattern is made in black, in yellow, in cyan, and in magenta (20 squares in total). They are made by changing the development bias and charge roller voltage. The difference between development bias and charge roller voltage is always the same.

Third, the machine makes the second series of grade patterns in the same order as the first series. The development bias and charge roller voltage are different from those of the first series.

Step 3: Sensor Pattern Detection

The ID sensor detects the densities of the 10 solid-color squares for each color (5 squares in the first series and another 5 squares in the second series). This data goes to memory.

Step 4: Toner Amount Calculation

The amount of toner on the transfer belt (M/A, mass per unit area, mg/cm^2) is calculated for each of the 10 grades of the sensor pattern from the ID sensor output value from each grade of the pattern.

Detailed Descriptions

Step 5: V_D, V_B, V_L Selection and V_{REF} Adjustment
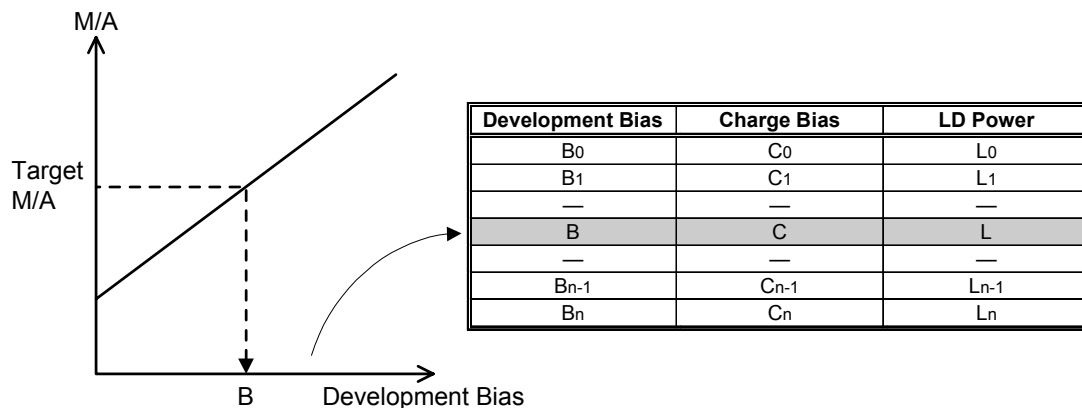
B146D503.WMF

The machine determines the relationship between the amount of toner on the transfer belt and the development bias for each of the 10 grades. The machine now selects the development bias and charge roller voltages for the target M/A for each color by referring to a table in memory.

The way that the laser power (V_L) is selected depends on the setting of SP3-125-2.

- If it is set to 0, the LD power is fixed at the value of SP2-103-1, to -27.
- If it is set to 1, LD power is selected using the same memory table as mentioned above.
- If it is set to 2, LD power is determined by ID sensor highlight pattern generation (steps 6 to 8 later in this procedure).

The machine also adjusts V_{REF} (toner density target) at the same time so that the development gamma detected by process control will be the value stored in SP3-120-1 to -4 (do not adjust in the field unless advised to do so).

NOTE: The patterns on the transfer belt are cleaned by the transfer belt cleaning unit.

Allowable changes to V_D, V_B, and V_L as a result of process control:

This depends on the process control type as follows.
- Forced : No limit
- Initial, After Developer Initialization: ± 80 volts
- Interval (Job End/ Non-use Time/ During Toner End Recovery): ± 40 volts
- Interval (Interrupt): Constant (The memory table is not used.)

Steps 6 to 8 are carried out only if SP3-125-2 is set to 2. (Default: Steps 6 to 8 are not used)

Step 6: ID Sensor Highlight Pattern Generation

Transfer belt

B146D504.WMF
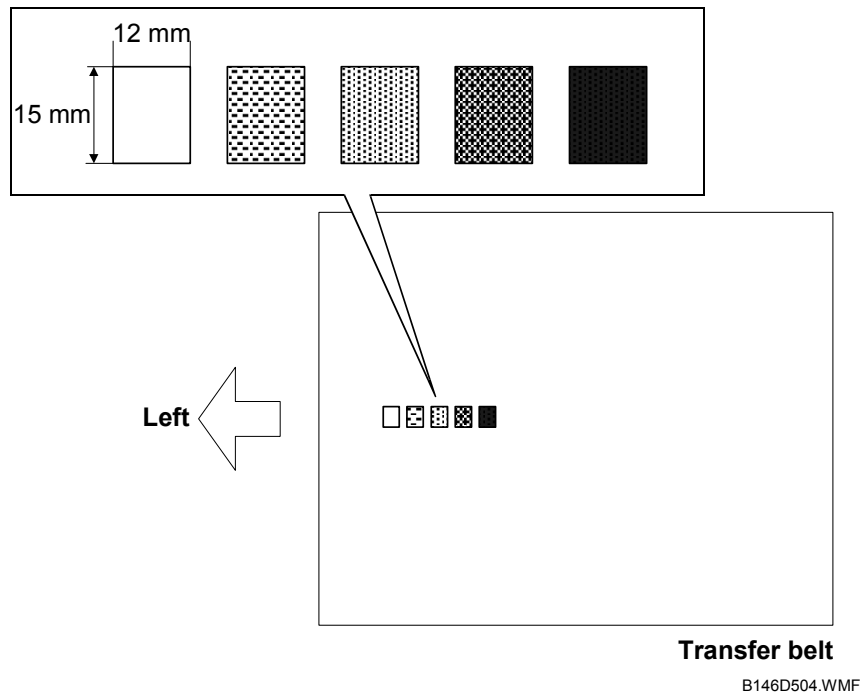
The machine makes a 10-grade pattern on the transfer belt for each toner color. The pattern consists of 10 squares. Each of the squares is 12 mm x 15 mm, and is a dot-pattern squares (not solid-color squares like in the process of step 2). They are made using constant bias and charge roller voltages selected from one of the types mentioned above, and the various grades are made by changing the LD power.

Step 7: Sensor Pattern Density Detection

The ID sensor detects the densities of the 10 grade-pattern squares for each color. This data goes to memory.

Step 8: V$_L$ (LD Power) Selection

The machine determines the relationship between the amount of toner on the transfer belt and the laser power for each of the 10 grades. The machine now selects the laser power to get the target M/A.

B146D505.WMF

Detailed Descriptions
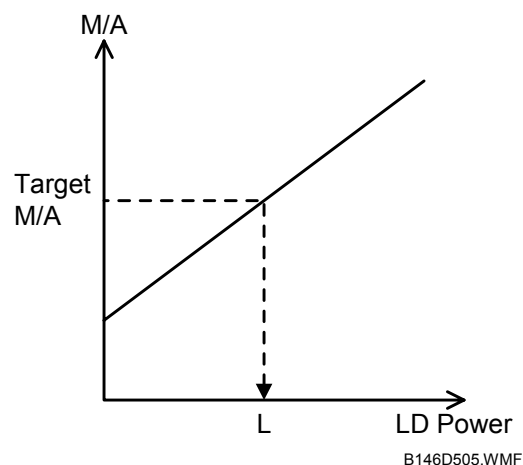
6.2.4 VREF COMPENSATION DURING A PRINT JOB
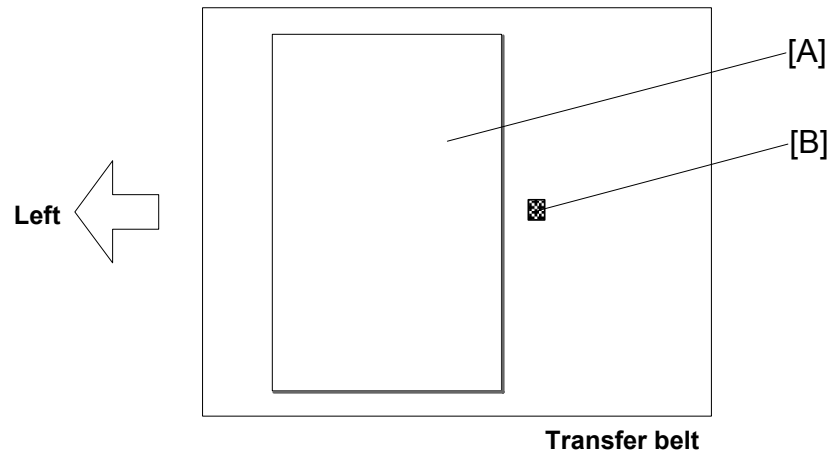
Transfer belt

B146D506.WMF

Highlight Pattern

The M/A target (mass-per-area target) is the target toner amount in a given area. To adjust the toner amount, a highlight pattern [B] is created on the transfer belt at the following times during each print job.

Job	Interval	Color of highlight pattern
Black-and-white printing	After every four pages	Black
Color printing	After every one page	One of four colors

For color jobs, the order of pattern generation is K $\rightarrow$ Y $\rightarrow$ M $\rightarrow$ C $\rightarrow$ K $\rightarrow$ Y $\rightarrow$ M $\rightarrow$ C.... The highlight pattern is created about 2 cm after the trailing edge of the paper [A].

Adjustment Process

The machine generates a highlight pattern (just one grade) of a specified density. The center ID sensor checks the density and the machine adjusts V_{REF} by comparing the reading with the target of each color (SP3-905-1 to 4). When this adjustment is not sufficient, the machine adjusts V_{CNT} too.

6.2.5 TONER SUPPLY CONTROL

Overview

Toner supply control uses the following to determine the amount of toner to be supplied. This is done before every development for each color.

- Density of the toner in the developer (as detected by the TD sensor) - V_{REF}, V_T
- Pixel count

The image density is kept constant by adjusting the density of toner in the development unit, while accommodating to changes in the development conditions through the potential control mechanism. Environmental changes and the number of prints made are also used in the calculation.

The amount of toner supplied is determined by the "on" time of the toner supply clutch. The total "on" time for each toner supply clutch is stored in the memory chip for the relevant toner cartridge. The amount of toner supplied also depends on the process line speed for the current job. The machine supplies the calculated amount of toner for each color.

Toner Supply Control Modes

This machine has three toner supply control modes. They are selected with SP2-208-1 to -4.

1. Fuzzy control mode
   This is the default toner supply control mode. The TD sensor, ID sensor, and pixel count are used in this mode.

2. Proportional control mode
   This mode is used when the ID sensor at the center becomes faulty. Only the TD sensor is used to control toner supply. The machine uses the V_{REF} that is stored in SP2-224-5 to -8.

3. Fixed supply mode
   This mode is used when the TD sensor becomes faulty. The amount of toner supply can be adjusted with SP2-208-5 to -8 if the image density is incorrect (the default setting is 5%).

Detailed Descriptions

6.2.6 TONER NEAR END/TONER END DETECTION
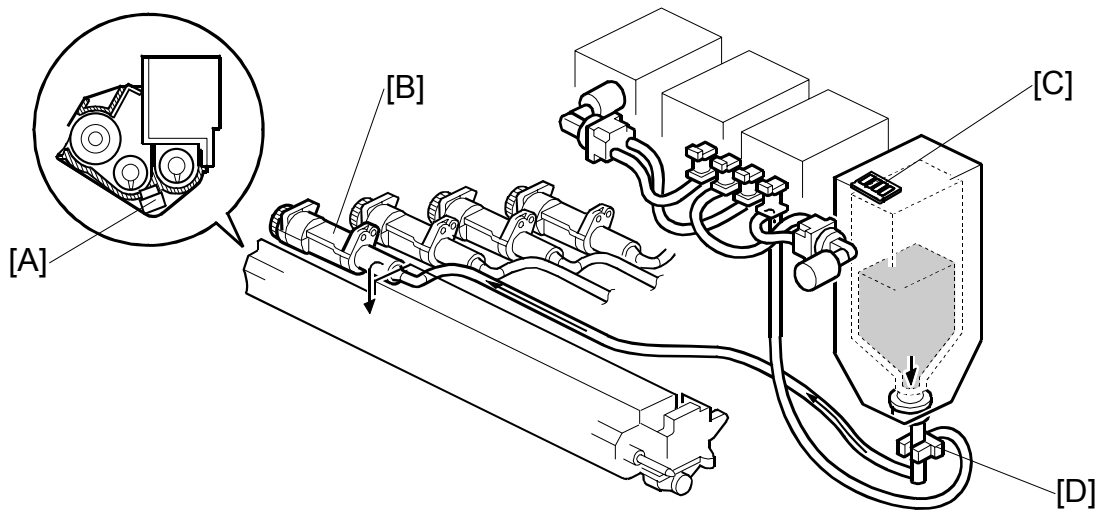
B146D507.WMF

Introduction

Toner Near End

To determine the toner near end status, the controller considers the following information:

- TD sensor [A] in the development unit
- Operation time counter of the toner attraction pump [B]
- Memory chip [C] on the toner cartridge
- Toner end sensor [D]

There are two different toner near-end detection procedures (after here, referred to as "Toner Near End Detection 1" and "Toner Near End Detection 2"). If either of these detect near end, the machine enters the near-end condition.

Toner End

To determine the toner end status, the controller considers the following information:

- TD sensor [A] in the development unit
- Pixel counter

Toner Near End Detection 1

The controller considers the information from the TD sensor.

1) The controller checks that the following condition is satisfied ten times consecutively:

$$V_{REF} + 0.4\ V < V_T$$

   NOTE: The condition can be adjusted with SP2-212.

2) If the above condition is satisfied, toner is supplied to the development unit. The messages, "Loading Toner" and "Please wait," are displayed.

3) The controller checks the above condition again.

   a) If the condition is satisfied, the controller decides that the machine is in the toner near end status. The messages, "Toner is almost empty," "Replace Toner Cartridge(s)," and "Xxxxx," are displayed; where "Xxxxx" indicates the color, such as cyan.

   b) If the condition is not satisfied, the controller decides that the machine is not in the toner near end status. The machine resumes its normal operation.

Toner Near End Detection 2

The controller considers the information from the operation time counter of the toner attraction pump, the memory chip on the toner bottle, and the toner end sensor.

1) To calculate the toner amount remaining in the toner cartridge, the controller considers the operation time counter of the toner attraction pump and the initial amount of the toner (recorded in the memory chip).

2) If the amount reaches the predefined weight (default: 100 g), the controller checks the signals from the toner end sensor.

   NOTE: The weight can be adjusted with SP2-212-1 and -2.

   a) If the signals indicate the toner amount has fallen to a certain level (determined by SP 2-212-12 to -15), the controller decides that the machine is in the toner near end status. The messages, "Toner is almost empty," "Replace Toner Cartridge(s)", and "Xxxxx," are displayed; where "Xxxxx" indicates the color, such as cyan.

   b) If the signals indicate the toner amount is not less than a certain level, the controller decides that the machine is not in the toner near end status. The machine resumes its normal operation.

Detailed Descriptions

Toner End Detection

The machine flags the toner end status when one of the conditions below is detected for a toner color. The messages, "No Toner," "Replace Toner Cartridge," and "Xxxxx," are displayed; where "Xxxxx" indicates the color, such as cyan.

- $V_{REF} + 0.5$ V $< V_T$ (ten times consecutively)
- The pixel counter counts up the equivalent of 50 A4 sheets of pixels (100% coverage) since near-end was detected.

However, if fewer pages have been made since near-end than the number guaranteed with SP 2-212-11 (default: 10 pages), printing will continue.

NOTE: If one of the following conditions is detected 10 consecutive times, the machine flags a "toner end condition" regardless of the number of pages printed since near-end.

- $V_{REF} + 1.2$ V $< V_T$
- $V_T > 4.8$ V

After the machine detects toner end for black, it cannot print until the toner cartridge is replaced. If cyan, magenta, or yellow are in a toner end condition during standby mode, the machine can print with black and white only; color printing is disabled.

NOTE: If the yellow, cyan, or magenta toner ends during a color printing job, the job is suspended until toner is supplied. If new color toner is not installed, the user can print black-and-white jobs but not color jobs.

Toner End Recovery

The machine assumes that the toner cartridge has been replaced if either of the following occurs when the near-end or end status exists:

- The upper right cover is opened and closed.
- The main switch is turned off and on.

The machine then starts to supply toner to the development unit. After supplying toner, the machine clears the toner near-end or end status if the following conditions are detected.

- Vt [0] – Vt [3] > 0.5V
- Vt – Vref > 0.3V

## 6.2.7 DEVELOPER INITIALIZATION

After installing a new development unit, you set "Enable" in SP5-999-005, 006, 007, or 008 for the machine to detect the new unit. When detecting a new unit, the copier initializes the developer.

First, the copier agitates the developer for about 100 seconds. Second, it adjusts V_{CNT} (control voltage for TD sensor) so that V_T (TD sensor output) becomes 3.5 ± 0.1 volts. Third, the copier stores this V_T as V_{REF}.

V_{CNT} is corrected for the current humidity every print job. V_{CNT} is also corrected for the total number of prints, to prevent the developer Q/M from varying.

If the humidity correction is giving poor results (for example, if the humidity sensor [A] is broken), it can be disabled with SP2-223-2. Then a value for V_{CNT} must be input manually using SP2-224-1 to -4 (adjust by trial and error).

During developer initialization, the machine forcibly supplies toner because there is no toner inside the toner transport tube at installation. Then the machine does the process control self check.

[A]
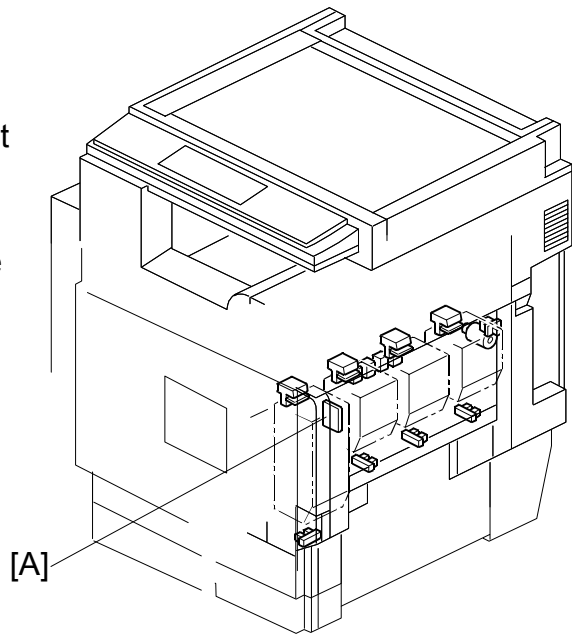
B146D903.WMF

**Detailed Descriptions**

6.3 SCANNING

6.3.1 OVERVIEW
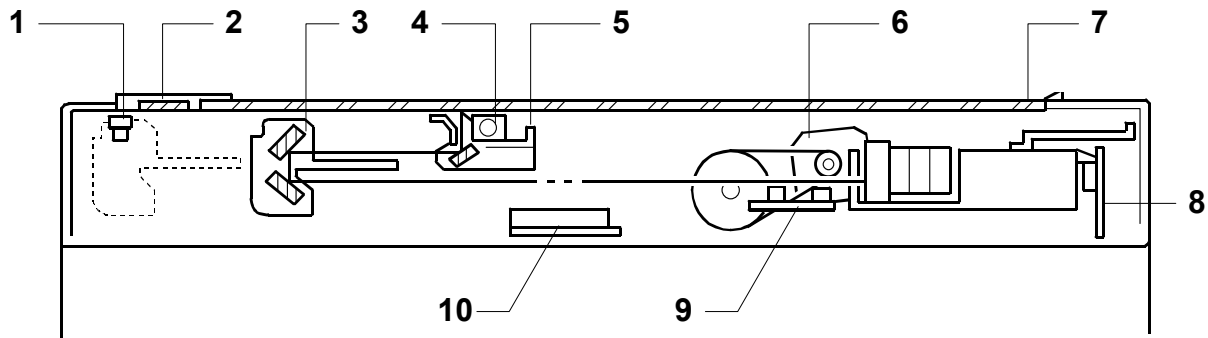
B146D904.WMF

1. Scanner HP sensor	6. Scanner motor
2. ADF exposure glass	7. Exposure glass
3. 2nd scanner (2nd carriage)	8. Sensor board unit (SBU)
4. Scanner lamp	9. Original length sensor
5. 1st scanner (1st carriage)	10. Original width sensor

The original on the exposure glass or ARDF exposure glass reflects the light emitted from the scanner lamp. The reflected light goes to the CCD on the sensor board by way of the 1st and 2nd scanners. The sensor board converts the CCD analog signals into digital signals.

When the original is manually placed on the exposure glass, the scanner motor pulls the 1st and 2nd scanners via mechanical linkage. The original is scanned from left to right as shown above.

When the original is fed from the optional ARDF, it is automatically transported onto the ARDF exposure glass, and to the original exit. The original does not stay on the glass, but keeps going to the exit. The 1st and 2nd scanners stay at their home positions.

6.3.2 SCANNER DRIVE
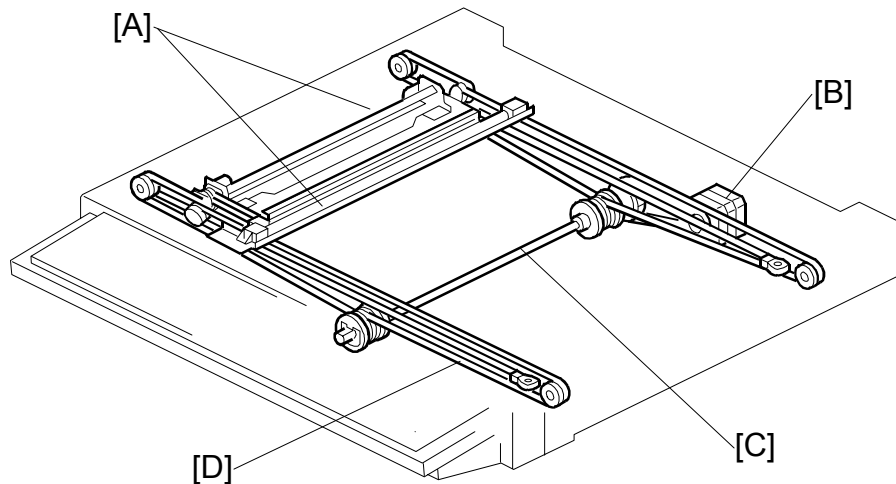
B146D508.WMF

The 1st and 2nd scanners [A] are driven by the scanner motor [B] through the scanner drive pulley, scanner drive shaft [C], and two scanner wires [D].

- Book mode -

The SBU board controls the scanner drive motor. The 2nd scanner speed is half that of the 1st scanner.

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

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

- ARDF mode -

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

Magnification in the sub-scan direction can be adjusted by changing the ARDF motor speed using SP6-017

Detailed Descriptions

6.3.3 ORIGINAL SIZE DETECTION
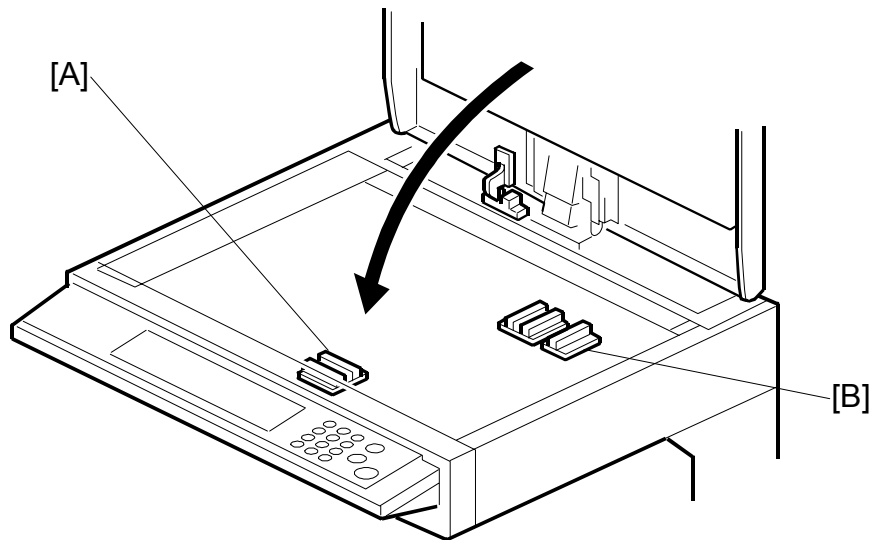
B146D905.WMF

- The original width sensors [A] detect the original width, and the original length sensors [B] detect the original length.
- The SBU controller on the SBU board checks each sensor status when the platen cover sensor is activated as it is closed. It detects the original size by the on/off signals received from each sensor.
- If the copy is made with the platen cover fully open, the SBU controller on the SBU determines the original size from the sensor outputs after the Start key is pressed.

L1 L2   L3

W1
W2
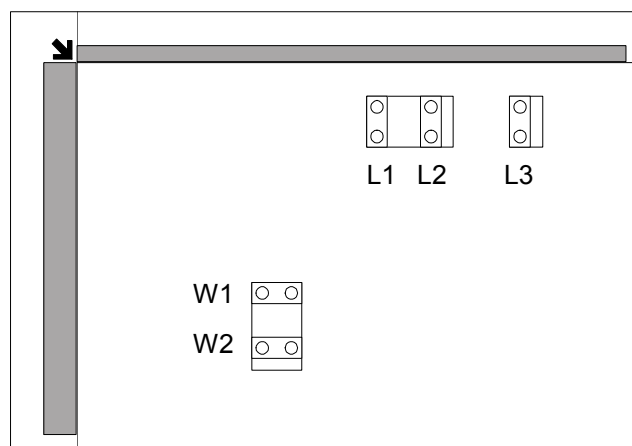
B146D509.WMF

Original Size		Length Sensor			Width Sensor		SP4-301 display
Metric version	Inch version	L3	L2	L1	W2	W1	
A3	11" x 17"	O	O	O	O	O	132
B4	10" x 14"	O	O	O	X	O	141
F4	8.5" x 14" (8" x 13")	O	O	O	X	X	165
A4-L	8.5" x 11"	X	O	O	X	X	133
B5-L		X	X	O	X	X	142
A4-S	11" x 8.5"	X	X	X	O	O	5
B5-S		X	X	X	X	O	14
A5-L, A5-S	5.5" x 8.5", 8.5" x 5.5"	X	X	X	X	X	128

NOTE: L: Lengthwise, S: Sideways, O: Paper present, X: Paper not present

For other combinations, "Cannot detect original 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.

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

Detailed Descriptions

6.3.4 ANTI-CONDENSATION HEATER

The anti-condensation heater is available as an optional unit. The anti-condensation heater prevents condensation on the mirrors, which may occur when the scanner unit is, for example, carried from a cold room to a warm room. Such condensation can cause abnormal images.
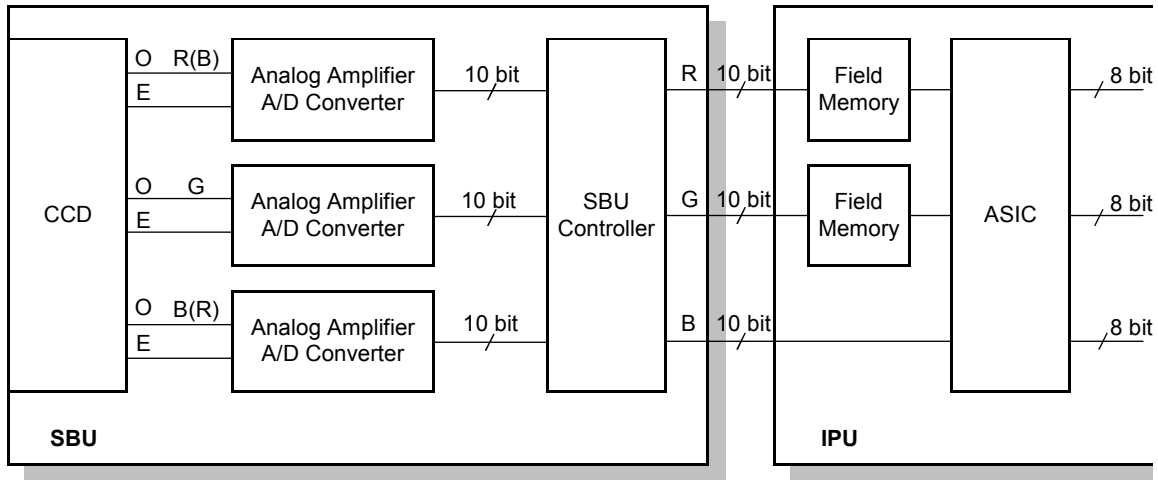
6.4 IMAGE PROCESSING

6.4.1 OVERVIEW
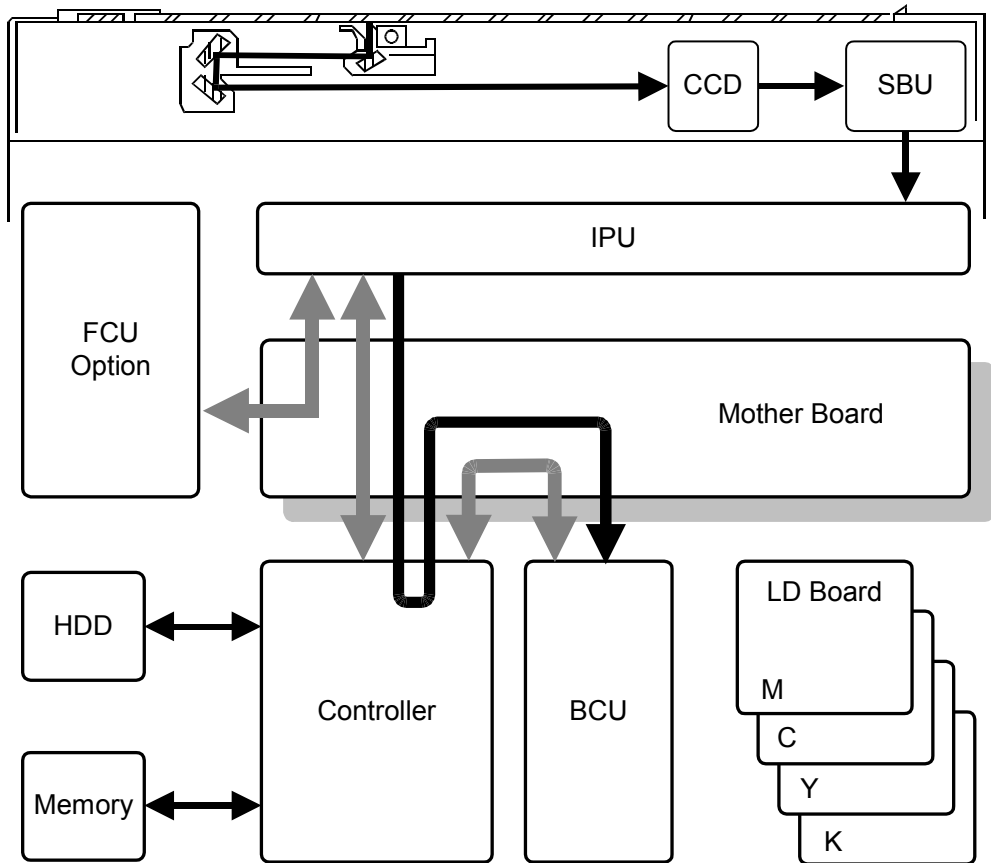
B146D917.WMF

Memory

K

- The CCD (Charged Coupled Device) generates three analog video signals.
- The SBU (Sensor Board Unit) converts the three analog signals to 10-bit digital signals. It sends these signals to the IPU (Image Processing Unit).
- The IPU processes the image, then the image data is sent to the controller.

6.4.2 SBU BLOCK DIAGRAM

B146D929.WMF

Signal Processing

1. Signal Amplification
   - Odd-pixel and even-pixel RGB analog signals from the CCD are amplified by operational amplifiers.

2. Signal Composition
   - The amplified signals (even-pixel and odd-pixel for each RGB color) are combined by the MPX circuit after A/D conversion.

A/D Conversion

- The analog signals (CCD output) are converted to 10-bit (1024 gradations) digital signals.

White Level Correction

A white plate is on the back of the left scale. When you turn the switch on, the scanner scans this plate to see the actual white level. To compensate the difference between the actual white level and the ideal white level (target white level), the CCD-gain control is conducted.

Others

The SBU controller exchanges the R and B signals if the original is scanned by using ARDF.

Detailed Descriptions

Black Level Correction

- Improves image reproduction for high-density areas.
- Reads the black video level at black elements on the CCD. These pixels are masked off, and should produce a pure black signal.
- This is subtracted from the value of each pixel.
- Calculated for each scan line.
- Corrects the image data for any changes in black level with time, as the machine scans down the page.

Adjustments

The properties of the scanner unit, which are necessary for controlling the scanner VPU (video processing unit), are stored in the NVRAM on the controller.

After replacing the SBU, adjust the following:

SP4–008	Scanner sub-scan magnification
SP4–010	Scanner leading edge registration
SP4–011	Scanner side-to-side registration

VPU Test Mode

To make sure the scanner VPU control is functioning, output the VPU test pattern with SP4-907. (☛ "4. Troubleshooting" for details)

6.4.3 IPU BLOCK DIAGRAM
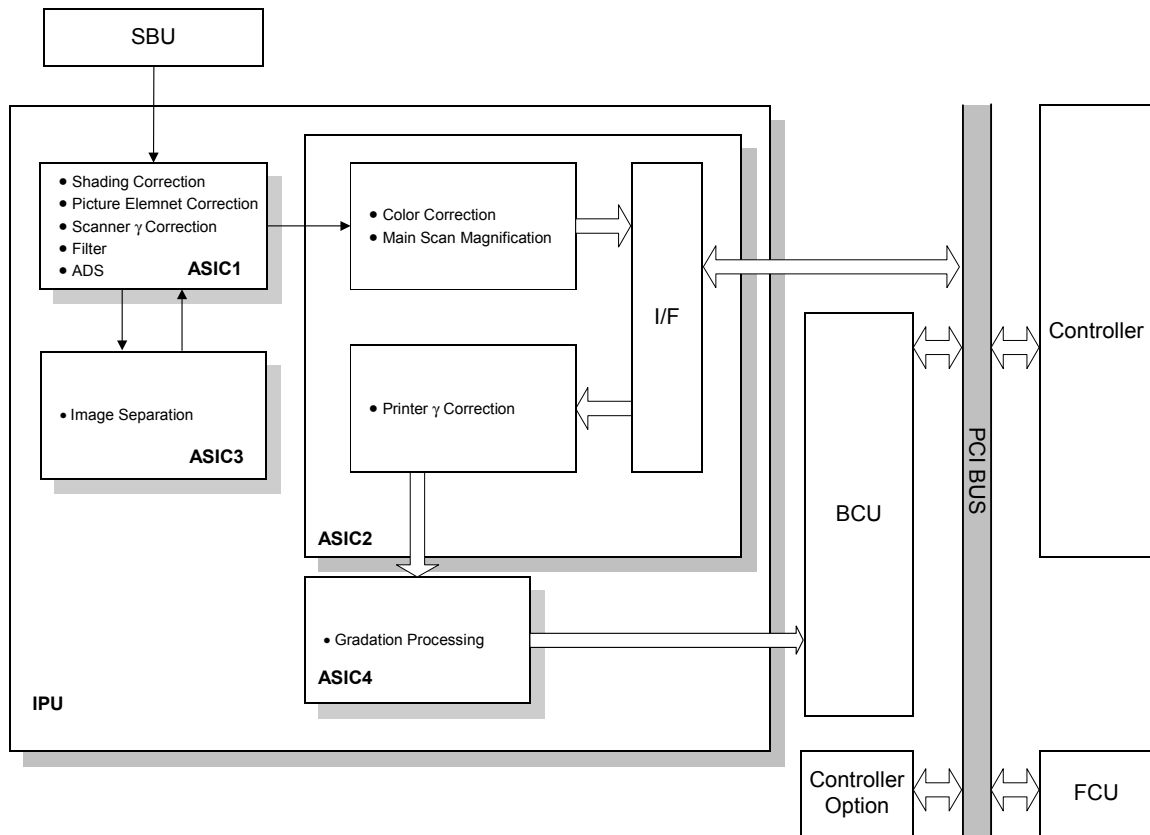
B146D931.WMF

Shading Correction

Auto shading compensates for the possible differences in the amount of light at the edge and center of a scanned image caused by the scanner lens, or variations among pixels of the CCD.

Picture Element (Dot Position) Correction

Picture element correction does two things.

1. Completion of the scan line correction process.

2. Correction if the CCD is not perpendicular to the light.

- The green CCD line is taken as a standard.
- Both ends of the red and blue lines are adjusted to match.
- Use SP 4-932-1 to 4-932-4 to change the vertical line correction level
  (☛ "3. Replacement and Adjustment – Image Adjustments").

Scan Line Correction

R, G, and B CCD lines are spaced 4 lines apart (8 lines total) when full size magnification is used.

- Scan line correction synchronizes these signals by storing each line in memory.
- The difference between the R, G and B signals depends on the magnification ratio.
- If this calculation does not result in an integer, the corrected data is set to the closest integer, but further correction is needed (☛ "Picture Element Correction").

Image Separation

The machine separates the original image into text and photo (dot screen) areas.

Edge Separation
- Used to locate text and line diagrams
- Locates areas of strong contrast.
- Looks for continuity of black or colored pixels.
- Looks for continuity of white pixels around black or colored pixels.
- Only uses data from the green CCD.

Dot Screen Separation
- If white pixels are not detected around non-white pixels, it is a dot screen area.

Colored Text Separation
- Identifies whether the text area's pixels are black or color.
- Based on:
    1) Differences among the RGB maximum signal levels.
   2) Output levels of the RGB video signals.

ACS (Auto Color Select)

RGB signal after scanner γ correction

B146D511.WMF

B146D510.WMF
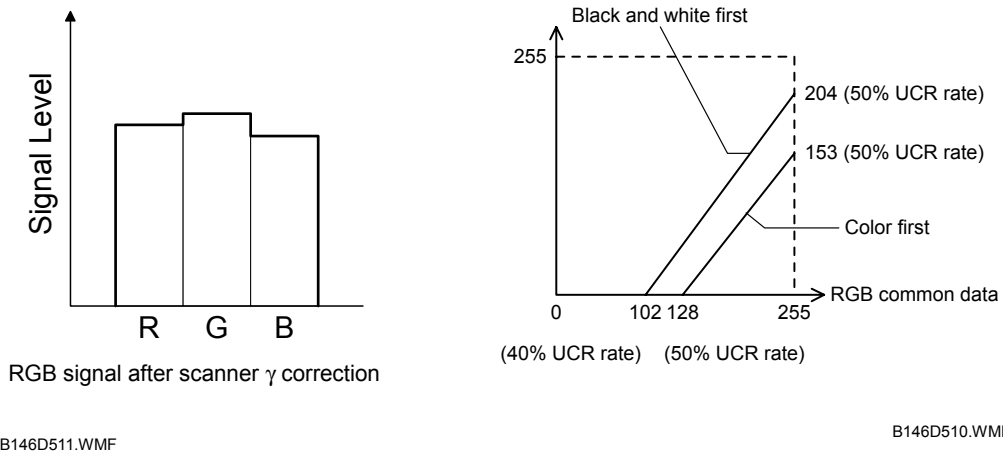
The Auto Color Select determines if an original is black/white or color. Black copy mode or full color mode is automatically selected.
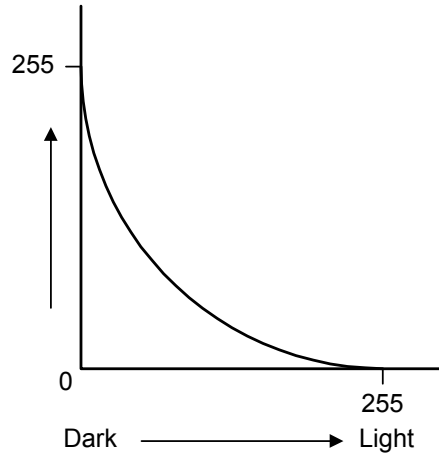
Selection is made based on the difference between the RGB signal levels.

RGB video signals are compared.

If the maximum difference among RGB signals is within a certain range, the original is considered black and white.

Scanner Gamma Correction (RGB Gamma Correction)
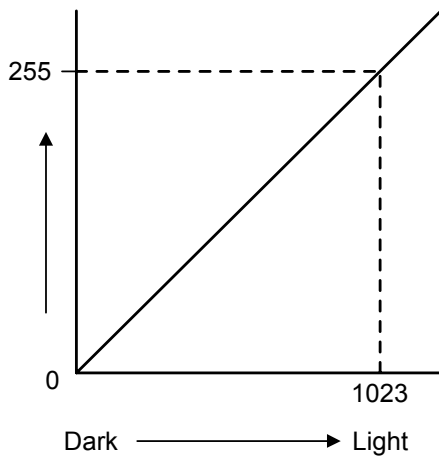
Fig. 1

B146D513.WMF

Fig. 2

B146D512.WMF

The RGB video signals from the CCD are sent to the IPU section. This signal is proportional to the intensity of light reflected from the original image (Fig. 1). Scanner gamma correction inverts the video signals. The shading circuit converts the signal from 10-bit to 8-bit.

- The IPU section converts the signal levels as shown in Fig. 2.
- This improves the accuracy of RGB to CMY color conversion (conversion is done later in the image process).
- The same table is used for R, G, and B signals.

Filtering

Appropriate software filters are applied to the RGB video signals.

- Varies depending on the results of auto text/photo separation (or on the selected original mode).
- RGB smoothing is applied to photo areas
- Edge emphasis applied to text areas.

Background Density Control

- Removes low ID image signals (background) that are less than a certain threshold.
- The threshold depends on the color mode (single color or full color).

Users can select a different threshold for each mode.

ADS (Auto Image Density Selection)

- Full color mode
  1) Refers to the RGB data taken from the entire original.
  2) Calculates a threshold for removing the background based on this data.
- Black and white mode
  1) Determines the peak white level.
  2) Peak level data is taken for each scan line.
  3) Removes the peak white level from the image. This produces a white background.
  4) Also uses the peak white level to determine the white reference value for A/D conversion.
  5) Background density is adjusted before data is input to the A/D converter.

Detailed Descriptions

Color Conversion

Transparency for each color toner is not ideal. Color conversion compensates for the differences between the ideal and actual characteristics. A matrix converts the RGB video signals into CMYK video signals while the original is scanned once.

Conversion Matrix

The following color conversion table is an example of the results from the matrix operation.

- Simple color copying.
- No special modes applied.
- To represent green, the yellow and cyan toners are used in a 1:1 ratio.

Color Conversion Table

Original Color / Toner	K	R	Y	G	C	B	M	W
Y	1	1	1	1	0	0	0	0
M	1	1	0	0	0	1	1	0
C	1	0	0	1	1	1	0	0
K	1	0	0	0	0	0	0	0

User Program Mode

When the user selects one of the following special modes, the values in this table may fall between 0 and 1.

Photo mode
- Glossy Photo
- Printed Photo
- Copied Photo

Others
- Generation Mode
- Pale Mode
- Map Mode

Two-color mode
- Separates black areas and colored areas.
- Converts black areas to a color selected by the user.
- All other areas are converted to a second color selected by the user.
  (☛ the operator's manual for details)

Main Scan Magnification

While the machine changes the scanner speed to reduce or enlarge the original in the sub-scan direction, the ASIC2 chip on the IPU board handles reduction and enlargement in the main scan direction.

- Scanning and laser writing are done at a fixed pitch (CCD elements cannot be squeezed or expanded).
- Imaginary points are calculated, corresponding to a physical enlargement or reduction.
- Image density is then calculated for each of the imaginary points based on the image data for the nearest two true points.
- The calculated data then becomes the new (reduced or enlarged) image data.

NOTE: The actual calculations for main scan magnification use the polynomial convolution method. This mathematical process is beyond the scope of a service manual and will not be covered here.

Detailed Descriptions

Printer Gamma Correction
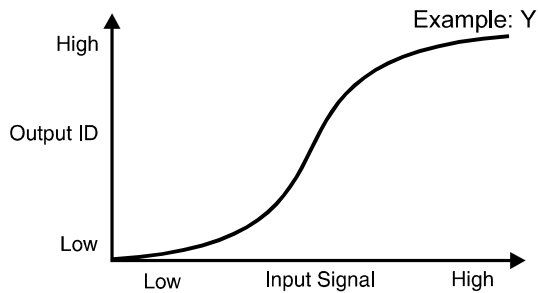
Fig. 1

B146D515.WMF
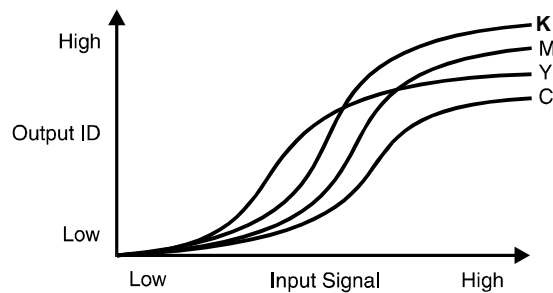
Fig. 2

B146D514.WMF

Ideally, the gamma curves for Yellow, Magenta, Cyan, and Black should be identical, as shown in figure 1. However, slight variations in the electrical components can result in varying gamma curves, as shown in figure 2.

- Printer characteristics are much more variable than the scanner. Printer gamma needs recalibration and adjustment from time to time.
- The Auto Color Calibration (ACC) procedure compensates for any discrepancies in color reproduction.
- ACC makes new gamma curves for each color in each mode (text, photo, and black text).
- After ACC, the gamma curve for each color can be adjusted with service programs (SP4-909 to SP4-918).
- 4 different modes:
  - 1) ID max.
  - 2) Shadow (High ID)
  - 3) Middle (Middle ID)
  - 4) Highlight (Low ID)
- If the previous gamma curve was better, it can be recalled.
- Factory settings can be loaded using SP 5-610-4.
  NOTE: If the factory settings have been overwritten, this will return the new values, not the actual settings made in the factory. This is deliberate, since some drift is expected. After a time, the original factory settings may no longer be suitable.
- Factory settings can be overwritten by the current gamma settings using SP5-610-5.
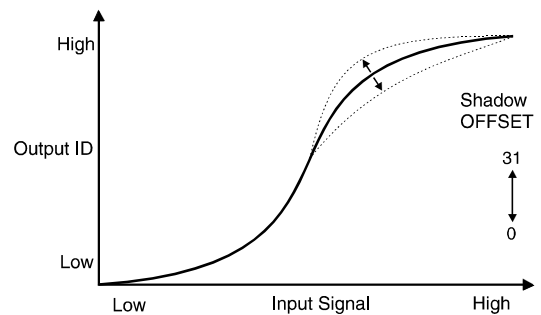
ID Max.
This mode adjusts the total image density
as shown in figure 3.

High

Output ID

Low

Low   Input Signal   High

ID MAX
OFFSET
31

0
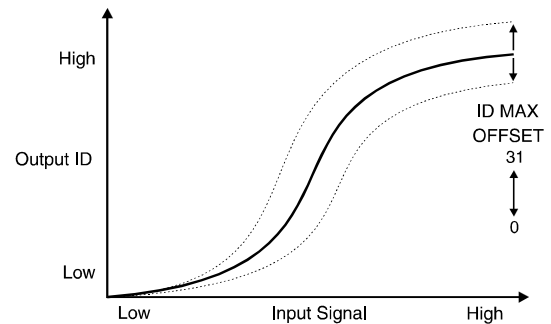
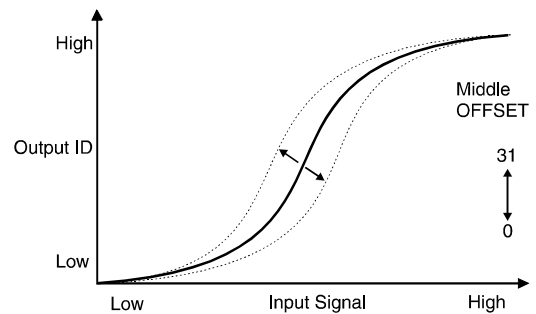**Fig. 3**   B146D516.WMF

Shadow (High ID)
The High ID mode adjusts the image
density between Level 6 and Level 9 of the
color gradation scale on the C-4 test chart
(figure 4).

High

Output ID

Low

Low   Input Signal   High

Shadow
OFFSET

31

0

Fig. 4   B146D517.WMF

Middle (Middle ID)
The Middle ID mode adjusts the image
density between Level 3 and Level 7 of the
color gradation scale on the C-4 test chart
(figure 5).

High

Output ID

Low

Low   Input Signal   High

Middle
OFFSET

31

0

Fig. 5   B146D518.WMF

**Detailed
Descriptions**

Highlight (Low ID)
The Low ID mode adjusts the image density
between Level 2 and Level 5 of the color
gradation scale on the C-4 test chart (figure
6).

High

Output ID

Low

Low   Input Signal   High

Highlight
OFFSET

31

0
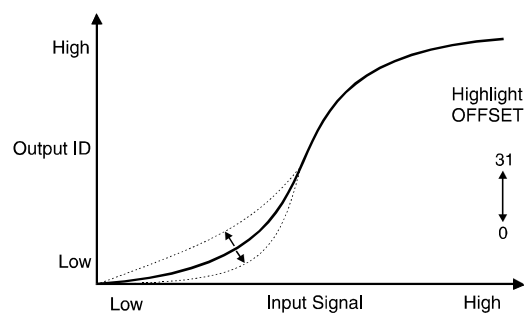
**Fig. 6**   B146D519.WMF

Auto Color Calibration Test Pattern

The test pattern has eight 17-step gradation scales for each color (CMYK), including background white, for Text and Photo modes.

ACC automatically calibrates the printer gamma curve. The user starts the ACC process.

1. The user prints an ACC Test Pattern.

2. The user places the test pattern on the exposure glass.

3. The copier makes 8 scans to read each color scale.

4. The copier corrects the printer gamma by comparing the ideal settings with the current image density.

5. The copier combines the corrected gamma curve with the Shadow, Middle, and Highlight values currently in memory.

6. The copier then calculates the ID max (amplitude of the gamma curve) based on data from the ACC scan.

7. The corrected printer gamma curves can be adjusted further using SP modes (SP4-909 to SP4-918).

Dark ◄─────────► Light

K
C
M
Y
K
C
M
Y
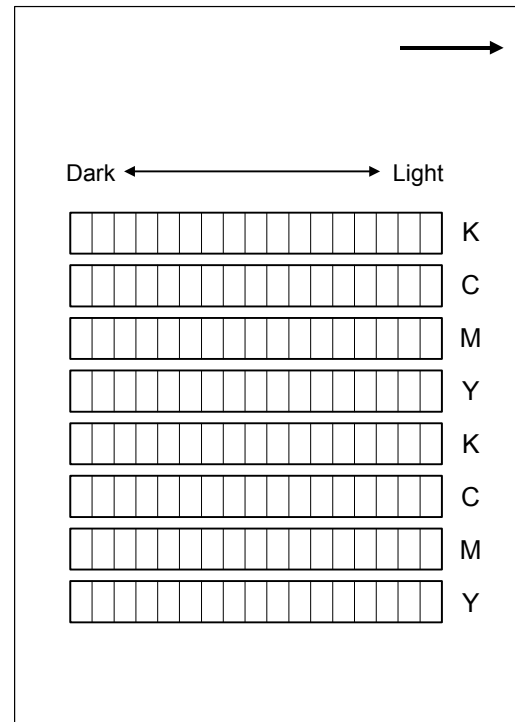
B146D520.WMF

Error Diffusion

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

IPU Board Test

You can check the IPU board with the SP mode menu, SP4-904-1 or 2.
(☛ "4. Troubleshooting" for details)

6.5 IMAGE DATA PATH
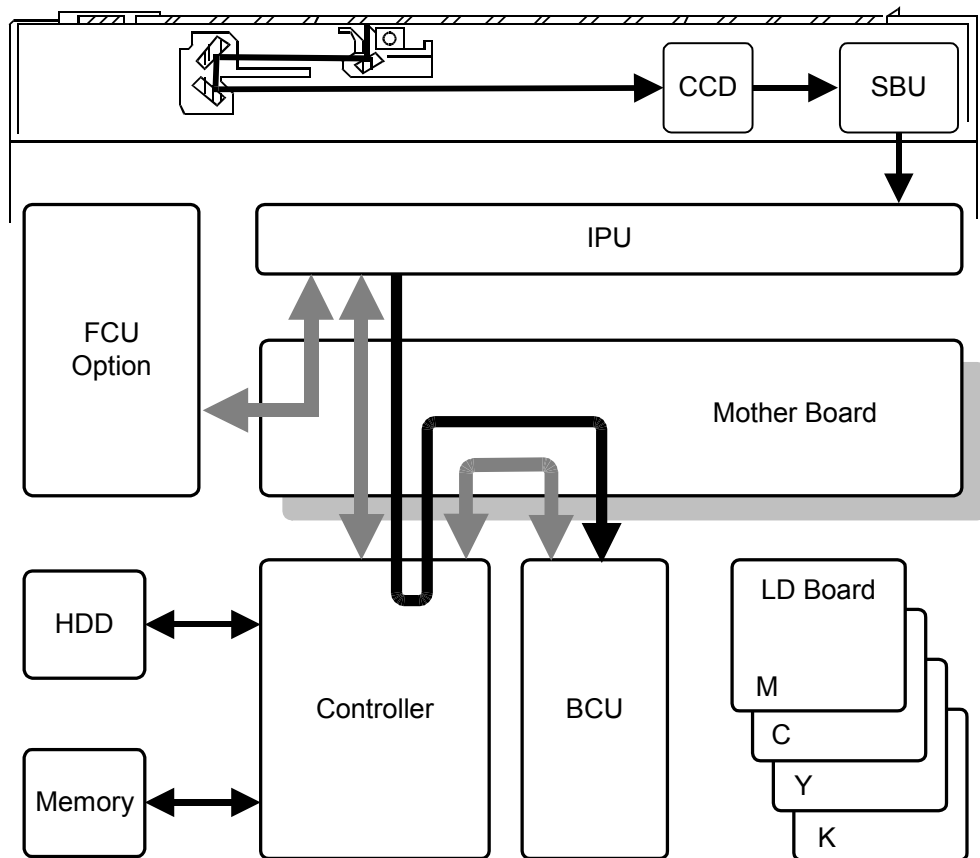
B146D917.WMF

Copier Application

SBU → IPU → Controller (HDD/Memory) → IPU → Controller (straight through) → BCU

Printer Application

Controller → IPU (through) → Controller → BCU

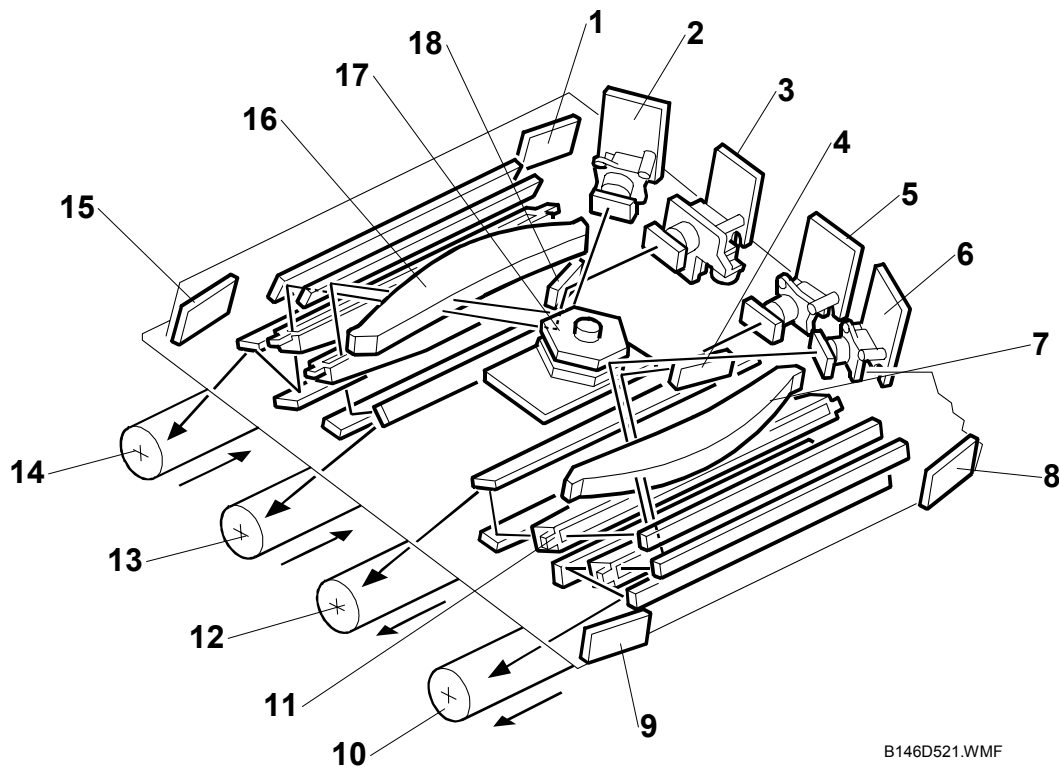## *Scanner Application (1 bit/8 bits)*

SBU → IPU → Controller (HDD/Memory)

Fax Application (Transmission/Reception)

Transmission: SBU → IPU → FCU

Reception: FCU → IPU → Controller (straight through) → BCU

**Detailed
Descriptions**

6.6   LASER EXPOSURE

6.6.1 OVERVIEW

B146D521.WMF

1. Synchronizing detector board-Y, K-E
2. LD unit-Y
3. LD unit-K
4. LD Mirror-M
5. LD unit-M
6. LD unit-C
7. F-theta lens-M, C
8. Synchronizing detector board-M, C-S
9. Synchronizing detector board-M, C-E
10. OPC drum-M
11. WTL
12. OPC drum-C
13. OPC drum-Y
14. OPC drum-K
15. Synchronizing detector board-Y, K-S
16. F-theta lens-Y, K
17. Polygon mirror motor
18. LD Mirror-K

This machine uses four LD units and one polygon mirror motor to produce latent images on four OPC drums (one drum for each color toner).

There are two hexagonal mirrors. Each mirror reflects beams from two LD units. The LD unit for black has two laser diodes to do dual beam writing (this is only done for black-and-white printing; for full color printing, only one of the beams is used).

Laser exposure for magenta and cyan starts from the rear side of the drum, but for yellow and black it starts from the front side of the drum. This is because the units for magenta and cyan are on the other side of the polygon mirror from the units for yellow and black.

6.6.2 OPTICAL PATH
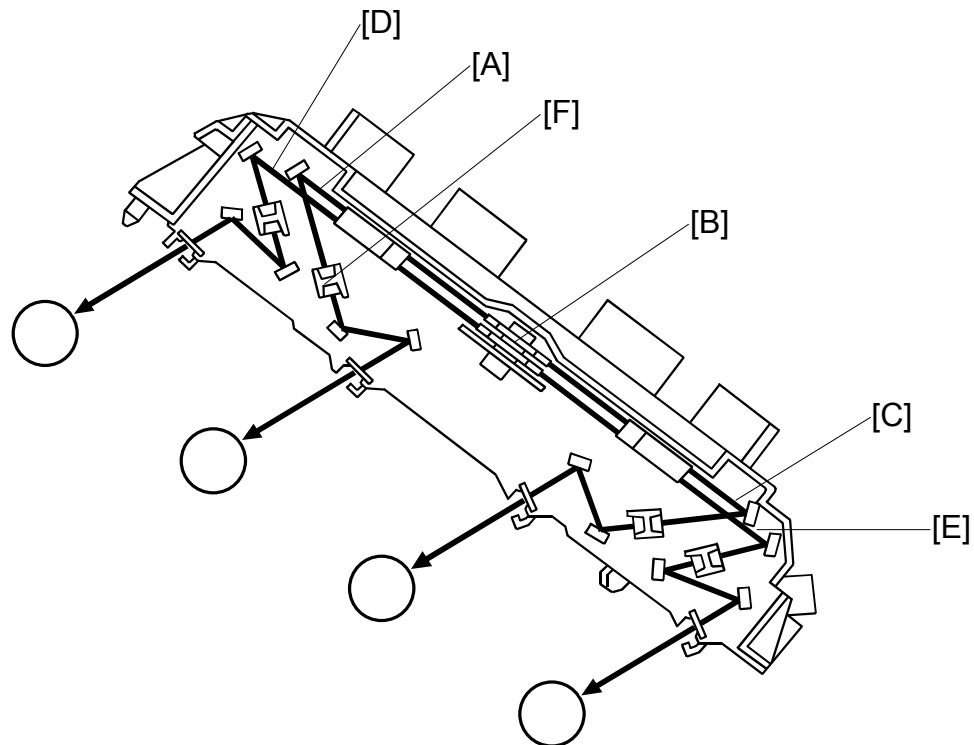
B146D522.WMF

The laser beams for cyan [C] and yellow [A] are directed to the upper part of the polygon mirror [B], and those for magenta [E] and black [D] are directed to the lower part of the polygon mirror. The LD mirrors (see the previous page) deflect the laser beams for magenta and black towards the lower polygon mirror.

The WTL [F] corrects the main scan line; without this component, the line bends out towards the middle of the main scan. The central bend of the WTL is adjusted in the factory.

The speed of the polygon mirror depends on the selected mode (see below).

Mode	Resolution (dpi)	Polygon motor speed (rpm)	Process line speed (mm/s)	Print speed (ppm)	Remarks
B/W (except OHP/Thick paper)	600 x 600 1,800 x 600	21,850	185	38	Dual beam writing
	1,200 x 1,200	29,528	125	28	
Color (except OHP/Thick paper)	600 x 600 1,800 x 600	29,528	125	28	
	1,200 x 1,200	29,528	62.5	14	
OHP/Thick	600 x 600 1,800 x 600 1,200 x 1,200	29,528	62.5	10	

6.6.3 LASER SYNCHRONIZING DETECTOR
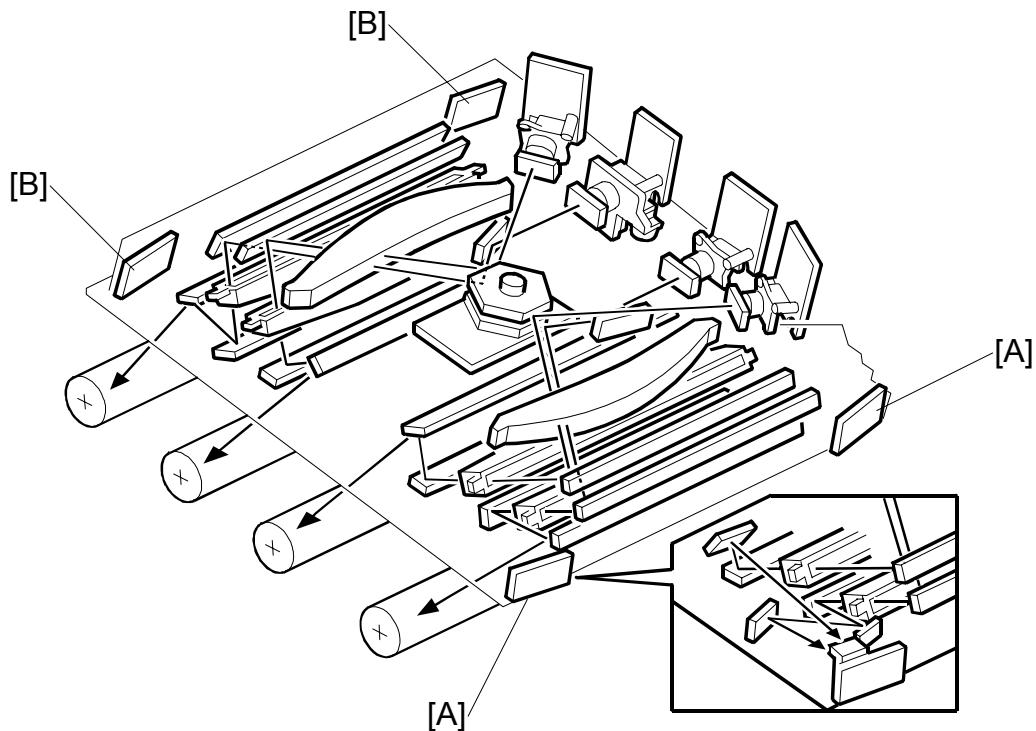
B146D523.WMF

Overview

The machine has four laser synchronizing detector boards (LSD), one at each corner of the laser optics housing unit.

Each pair of boards detects two colors. The machine recognizes each color from the time that they are detected. The two LSDs at the right [A] are used for magenta and cyan, and the two [B] at the left are used for yellow and black.

Main Scan Start Detection

For magenta and cyan, the LSD at the rear detects the start of the main scan. For yellow and black, the LSD at the front detects the start of the main scan.

Clock Frequency Adjustment

Each pair ensures that the number of laser clock pulses in the main scan is constant. If the count for one particular beam varies from normal, the LD clock frequency for that beam is adjusted.
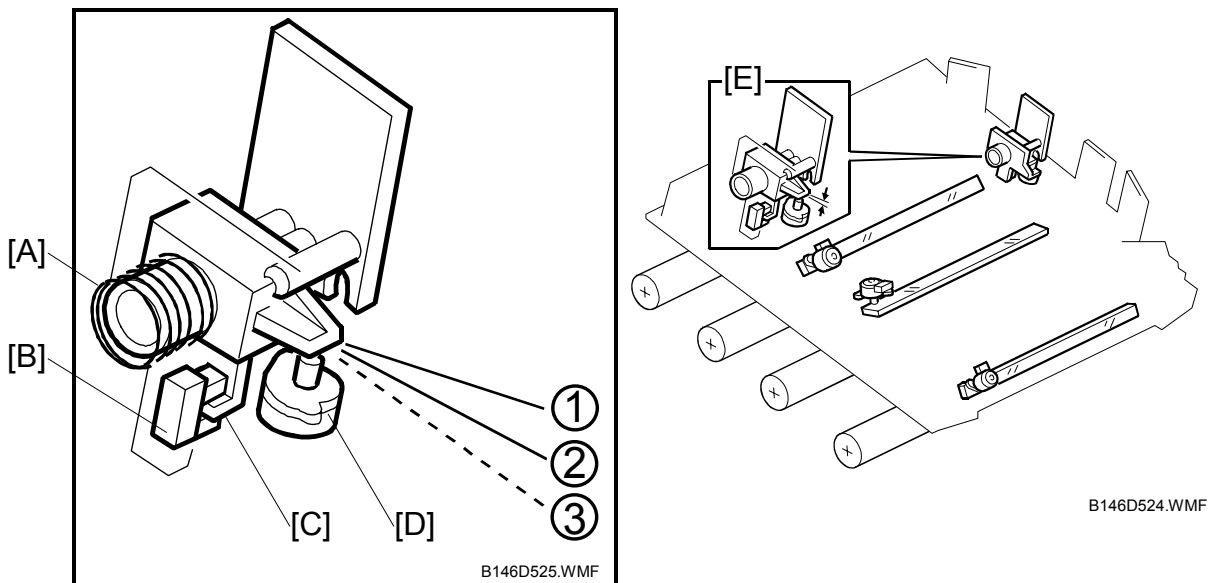
If the board at the end position is defective, this cannot be detected. In such case, you must disable the detection feature with SP2-919-1.

6.6.4 DUAL BEAM WRITING

Dual Beam Mechanism

The LD unit for black has two laser diodes. Each face of the polygon mirror writes two main scan lines. This only happens for black and white printing.

Laser Beam Pitch Change Mechanism

There is a spring [A] at the front end of the black LD unit [E], and there is a positioning motor [D] at the right end. The spring pushes the unit clockwise, while the motor pushes it counterclockwise. These two components drive the unit to one of the following three positions:

- 600-dpi position   [①]
- 1,200-dpi position [②]
- Home position   [③]

Before it is driven to the 600-dpi position or the 1,200-dpi position, the black LD unit is set to its home position. When driven from one position to another, the unit goes as follows:

- 600-dpi position   → Home position →   1,200-dpi position
- 1,200-dpi position → Home position →   600-dpi position

The home position is detected by the home position sensor [B]. When the unit is in its home position, the actuator [C] is out of the sensor. The 600-dpi and 1,200-dpi positions are determined by the distance from the home position. The distance is calculated from the operation time of the LD positioning motor.

Detailed Descriptions

Printing Mode and Black LD Unit Position

The machine changes the main scan resolution between 600 and 1,200 dpi for black and white printing by rotating the LD unit, except for OHP sheets and thick paper (remains at the 600 dpi position).

The table lists the printing modes and the positions of the black LD unit.

Mode		Position
Monochrome	600 dpi	600-dpi position
	1,200 dpi	1,200-dpi position
Color	600 dpi	600-dpi position
	1,200 dpi	600-dpi position

After the laser optics housing unit has been replaced, the beam pitch for 600 dpi and 1,200 dpi must be adjusted (SP2-109-2, -3).
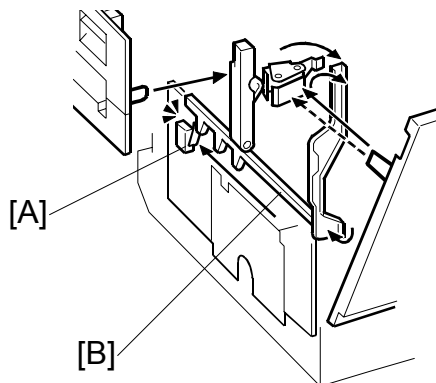
6.6.5 LD SAFETY SWITCH

B146D923.WMF
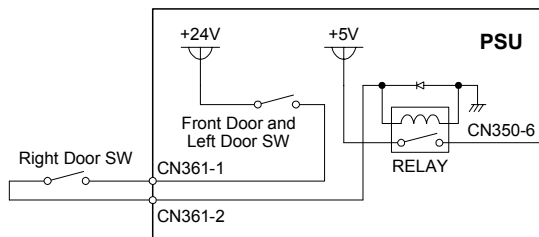
A relay on the PSU ensures technician and user safety and prevents the laser beam from inadvertently switching on during servicing. This relay turns off when the front cover, upper left cover, or right door is opened, and cuts the power (+5V) supplied to the LD board for each color through the BCU.

Two safety switches are used to turn the relay off. One switch is used for the front cover and upper left cover. This safety switch is off when either of the two covers is opened. Another safety switch is used for the right door.
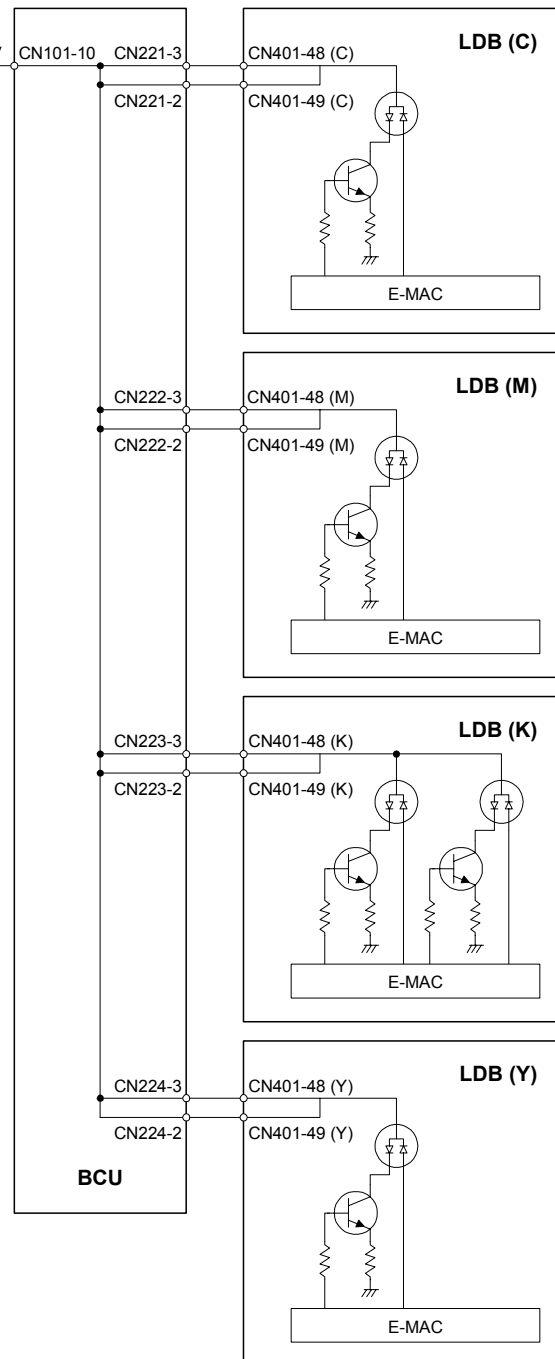
- E-MAC: Enhanced Modulation ASIC on CMOS
- LDB: LD Drive Board (included in the LD Unit)

Front and Upper Left Cover Switch

The micro switch [A] on the PSU is activated or deactivated by the actuator [B] when the front cover or the upper left cover is opened and closed.
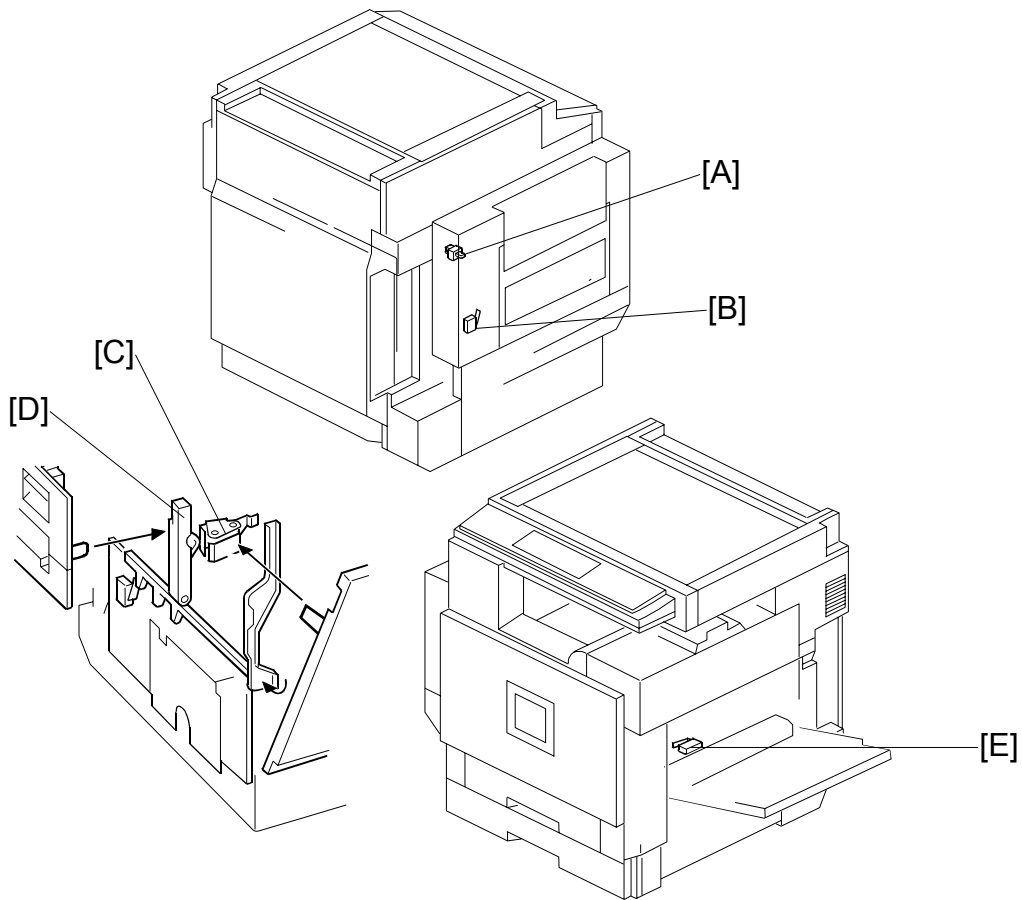

B146D526.WMF

Detailed Descriptions

6-43

Error Messages

B146D918.WMF

Cooperating with other switches, the LD safety switches help display error messages related to external covers. When one or more covers are open, the messages, "Cover is open as shown" and "Close it," are displayed with a diagram. The diagram indicates which cover is open. The table lists the diagram indications and the switch conditions. Note that some diagram indications take precedence over others.

| Diagram indication	Condition			
	[A] Upper left cover switch	[B] Duplex unit switch	[C] Front door switch	[E] Right door switch
Upper left cover	Open	(any)	(any)	(any)
Duplex unit	(any)	Open	(any)	(any)
Front cover	Closed	(any)	Open	(any)
Right door	Closed	(any)	Closed	Open

NOTE: 1) In the table, "any" indicates the condition does not affect the diagram indication.
2) The left door switch [D] is closed when the upper left cover switch [A] is closed.

6.6.6 AUTOMATIC LINE POSITION ADJUSTMENT

Overview

YY, KK, CC, MM: Spaces between two lines of the same color
KY, KC, KM: Spaces between a black line and a color line
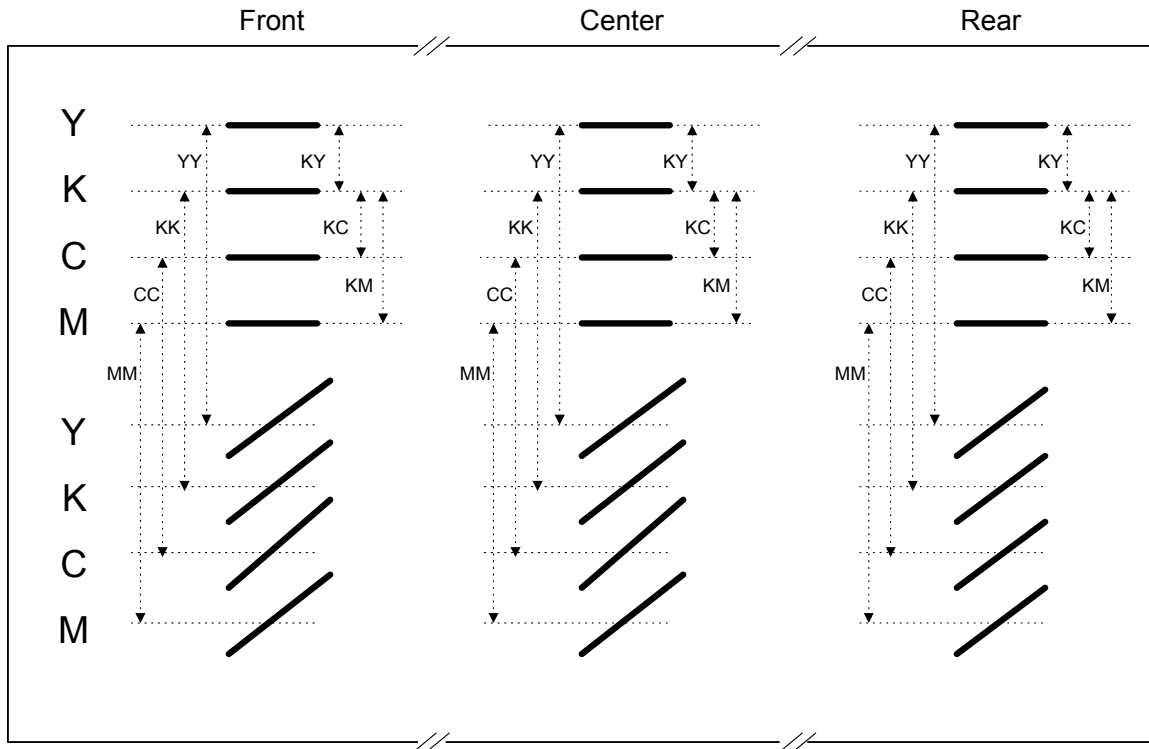
B146D527.WMF

During automatic line position adjustment, the line patterns above are created eight times on the transfer belt. The spaces between the lines (YY, KK, CC, MM, KY, KC, KM) are measured by the front, center, and rear ID sensors. The controller takes the average of the spaces, and adjusts the following positions and magnification:

- Sub scan line position for YCM
- Main scan line position for KYCM
- Magnification ratio for KYCM
- Skew for YCM

After the patterns are measured, the transfer belt cleaning unit cleans the transfer belt. If an error is detected three times consecutively, SC285 is generated.

Detailed Descriptions

Summary of Each Adjustment

Sub scan line position for YCM

The adjustment of the sub-scan line position for YCM is based on the line position for K (color registration). The machine measures the gaps between the lines of each color in the pattern on the transfer belt. If the gaps for a color are not correct, the machine moves the image of the color up or down the sub scan axis. To do this, it changes the laser write timing for that color.

Main scan line position for KYCM

If the machine detects that the image is out of position in the main scan direction, it changes the laser write start timing for each scan line.

Magnification adjustment for KYCM

If the machine detects that magnification adjustment is necessary, it changes the LD clock frequency for the required color.

Skew for YCM

The adjustment of the skew for YCM is based on the line position for K.

Adjustment Conditions

Line position adjustment timing depends on several SP mode settings. Among them, the mode selection, SP5-993-001, takes precedence over the others. The table below lists the conditions and the processes to be executed. Note that the adjustments of the sub-scan line position, main scan line position, and magnification are executed under the same conditions.

The numbers in the mode selection column indicate the setting of SP 5-993-001. For details, refer to the description for SP 5-993-001 in the SP table.

Mode selec- tion	Condition		Setting	S-pos./ M-pos./ Magni.	Skew
1	Process control	Job End	SP3-906-001	✓	
		Interrupt	SP3-906-002	✓	
		Non-use Time 1, 2	SP3-906-003, 004	✓	
		Recovery (fusing tempera-ture 60°C or lower)	None	✓	✓
1 or 2	Temperature difference	Standby	SP5-993-003, 005	✓	
		Job start	SP5-993-003, 006	✓	
		Interrupt	SP5-993-003, 04, 022	✓	
	Main scan length detection		SP5-993-024	✓*	
	Recovery (fusing temperature over 60°C)		SP5-993-026	✓	
	Replacement of development unit or PCU		None	✓	✓
0, 1, or 2	Forced self check		SP5-993-002	✓	✓

S-pos. : Sub-scan line position   ✓ : Executed
M-pos. : Main scan line position   ✓* : Executed one time when the
Magni. : Magnification   conditions are met twice

NOTE: 1) "Recovery" includes turning on the main switch.
2) Fusing temperature is measured by the thermistor in the fusing unit. Other temperature is measured by the sensors on the laser optics housing unit.
3) You can use SP5-993-035 to select one of the three frequency levels of color adjustment.

Detailed Descriptions

Main Scan Skew Adjustment
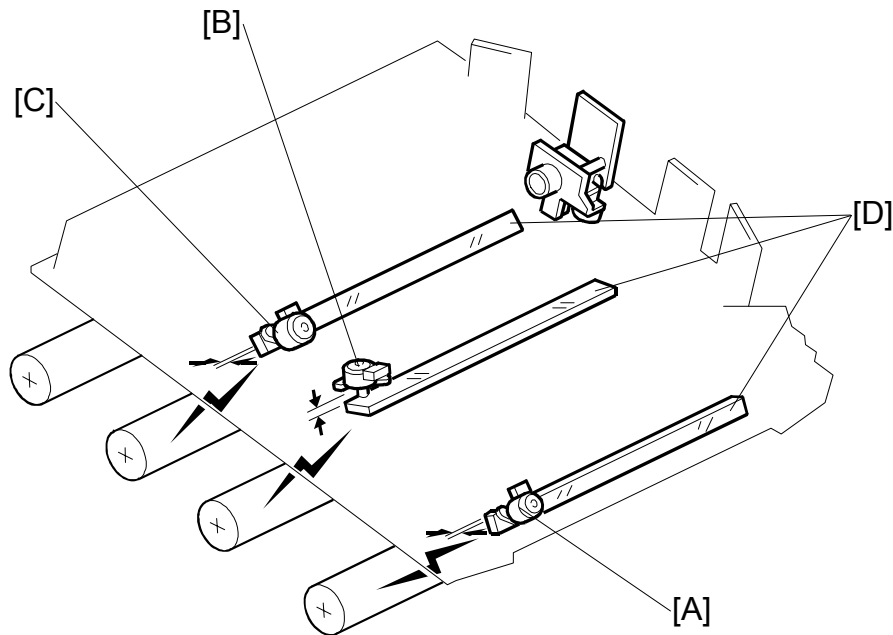
B146D528.WMF

The 3rd mirror positioning motors for magenta [A], cyan [B], and yellow [C] adjust the angle of the 3rd mirrors [B] respectively, based on the 3rd mirror position for black. This mechanism corrects main scan skew.

6.6.7 DIFFERENCES IN THE COPY AND PRINTER MODES

To improve reproduction in the copy mode, the machine generates the print image with 2 bits per pixel. Different parameters are used for the copy and print modes as shown in the table below.

Function	Copy Mode	Printer Mode
Gradation for printing	2 bits / pixel	1 bit / pixel
LD control	SP2-103-101 to -110	SP2-103-1 to -59
Pointer table display	SP3-902-5 to -8	SP3-902-1 to -4
M/A target	SP3-903-5 to -8	SP3-903-1 to -4
M/A target for LD correction	SP3-904-5 to -8	SP3-904-1 to -4

6.7 PHOTOCONDUCTOR UNIT

6.7.1 OVERVIEW
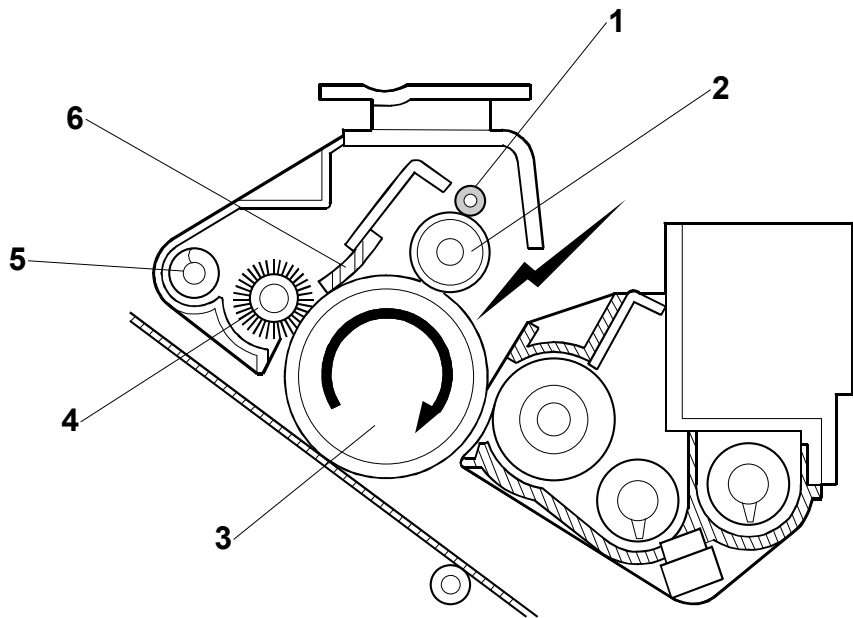
B146D529.WMF

1. Cleaning brush roller
2. Charge roller (non-contact)
3. OPC drum
4. Cleaning brush
5. Waste toner collection auger
6. Cleaning blade

This machine has four independent PCUs, one for each color. Each PCU consists of an OPC drum, non-contact charge roller, cleaning brush, and cleaning blade. The diameter of the drum is 30 mm (circumference: about 94.25 mm).

The photoconductor gap between a PCU and the corresponding development roller is determined by the drum positioning plate and the rear shaft, and is not adjustable in the field.

The push switches in the drum positioning plate detect when a new PCU has been installed.

Detailed Descriptions

6.7.2 DRIVE
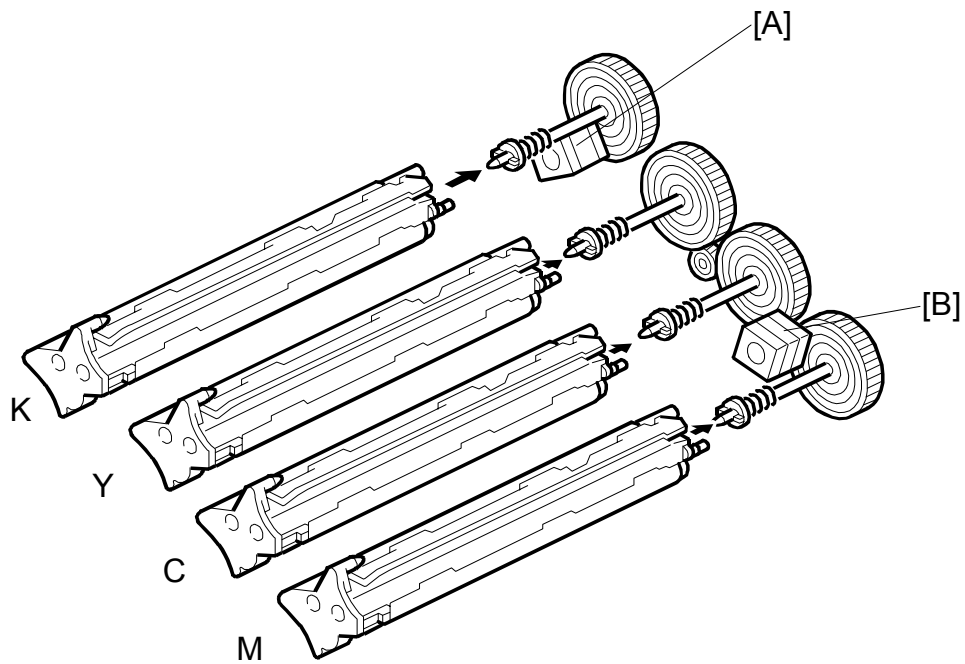
G080D927.WMF

The drum drive motor-K [A] drives the PCU for black.

The drum drive motor-CMY [B] drives the PCUs for magenta, cyan, and yellow. Using one motor to drive these three drums reduces CMY color misalignment.

6.7.3 DRUM GEAR POSITION SENSORS

B146D530.WMF

Mechanism

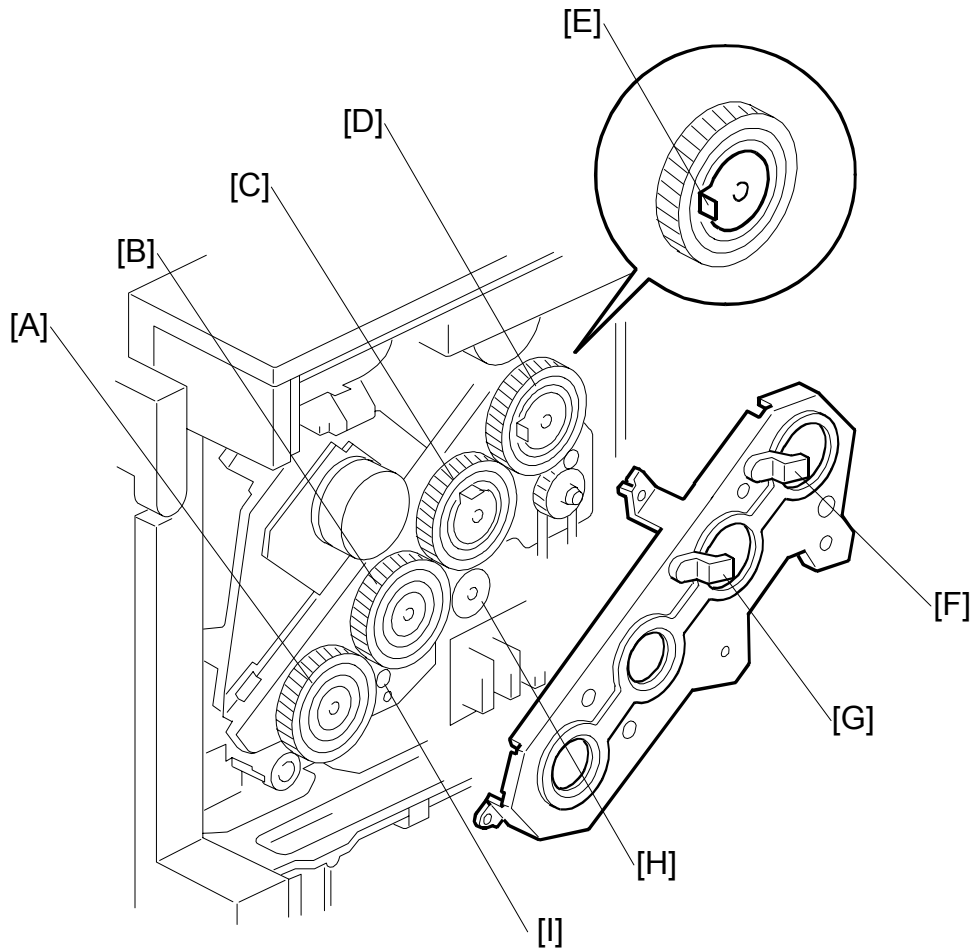The machine uses these sensors to detect if the drum motors rotate. When it detects that the drum motor is not moving, SC440 appears. These sensors also help the machine to initialize the relative positions of the gears when turning on the main switch and initializing. This prevents phase fluctuation between printouts.

There is an interrupter [E] on each of the black [D] and yellow [C] drum gears. The drum gear position sensors [F][G] detect the positions of these interrupters respectively. The sensors check that the two interrupters are parallel. This mechanism makes sure that output quality does not vary. The cyan [B] and magenta [A] drum gears operate with the yellow drum gear because these three drum gears are linked through other gears [H][I].

In the ready status, the two interrupters stay in a parallel position. If they are not in a parallel position (as shown in the illustration), the machine adjusts the position of the black drum gear.

Detailed Descriptions

Initialization Process and SC Codes

When a drum gear position sensor has found an error, SC code 440-1 or 440-2 is displayed. The table lists the steps of the initialization process, possible errors, and corresponding SC codes.

	Initialization process	Possible error	SC code
Step 1	The four drums are simultaneously operated for seven seconds. The two drum position sensors detect the two drum gear interrupters several times.	The black drum gear interrupter is not detected.	440-1
		The yellow drum gear interrupter is not detected.	440-2
		Both black and yellow drum gear interrupters are not detected.	440-1
Step 2	The time lags between detection of the black drum gear interrupter and detection of the yellow drum gear interrupter are checked. The average time lag is calculated.		
Step 3	The black drum is operated. The position of the gear is adjusted according to the average time lag.	The black drum gear interrupter is not detected (☛NOTE).	440-1

NOTE: If the connector of the black drum position sensor has been connected to the yellow drum position sensor (and the connector of the yellow drum position sensor, to the black drum position sensor), no error occurs in step 1 and step 2.

6.7.4 DRUM CHARGE AND QUENCHING
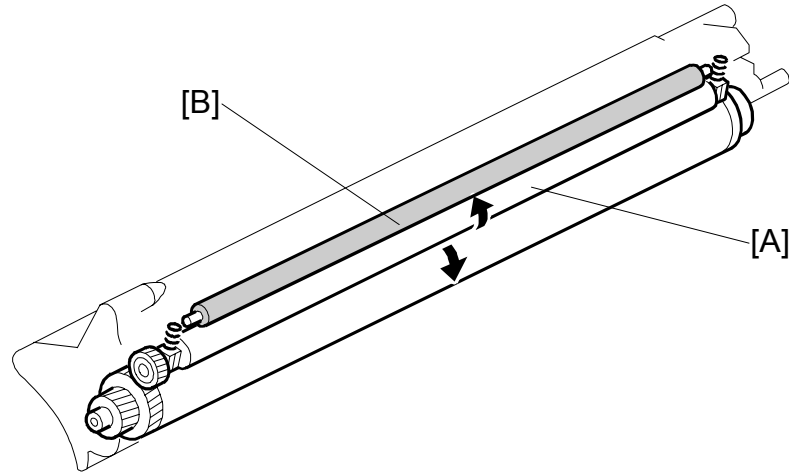
B146D531.WMF

This machine uses a non-contact charge roller [A] to reduce ozone. The non-contact charge roller gives the drum surface a negative charge. The high voltage supply board – C, B, which is located at the rear of the machine, applies a dc and ac voltage (at a constant current) to the roller. The ac voltage helps to ensure that the charge given to the drum is as uniform as possible.

The machine automatically controls the charge roller voltage if automatic process control is enabled (i.e., if SP3-125-1 is set to 0). However, if process control is switched off, (i.e., if SP3-125-1 is set to 1), the dc voltage is the value stored in SP2-001-1 to -9 (do not adjust in the field unless advised to do so).

The diameter of the roller is 11.14 mm (circumference about 35 mm). The gap between a drum and the corresponding charge roller is about 50 μm.

The cleaning brush roller [B], which always contacts the charge roller, cleans the charge roller.

The charge roller can generate small amounts of nitrogen oxide gases (known as NOx), which may be absorbed by the surface of the drum. This can cause unfocused copies. To avoid this, the film of NOx is removed at power on, at the end of a job (if more than 200 prints), and when a toner cartridge has been replaced. SP3-920-1 to -4 determine when this procedure (known as "refresh mode") is done. It can also be executed at any time (using SP3-920-5) if the prints are smeared.

Quenching is done by illuminating the whole area of the drum with the laser at the end of every job.

Detailed Descriptions

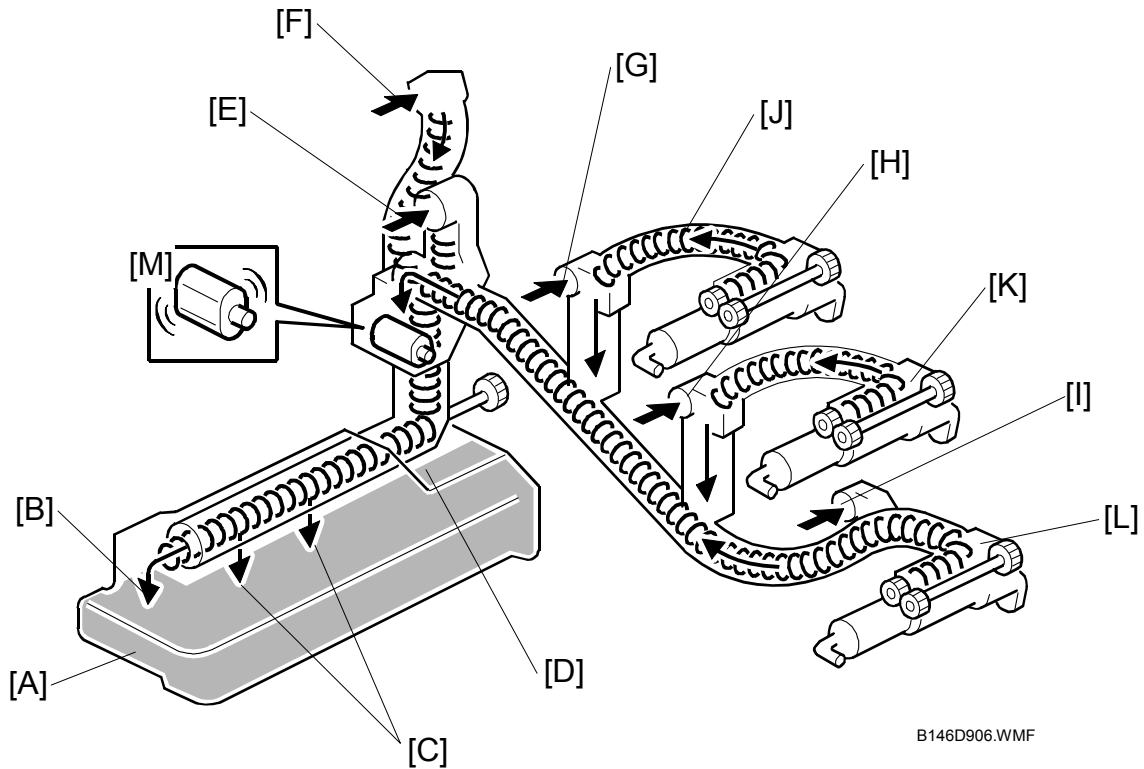## 6.7.5 DRUM CLEANING
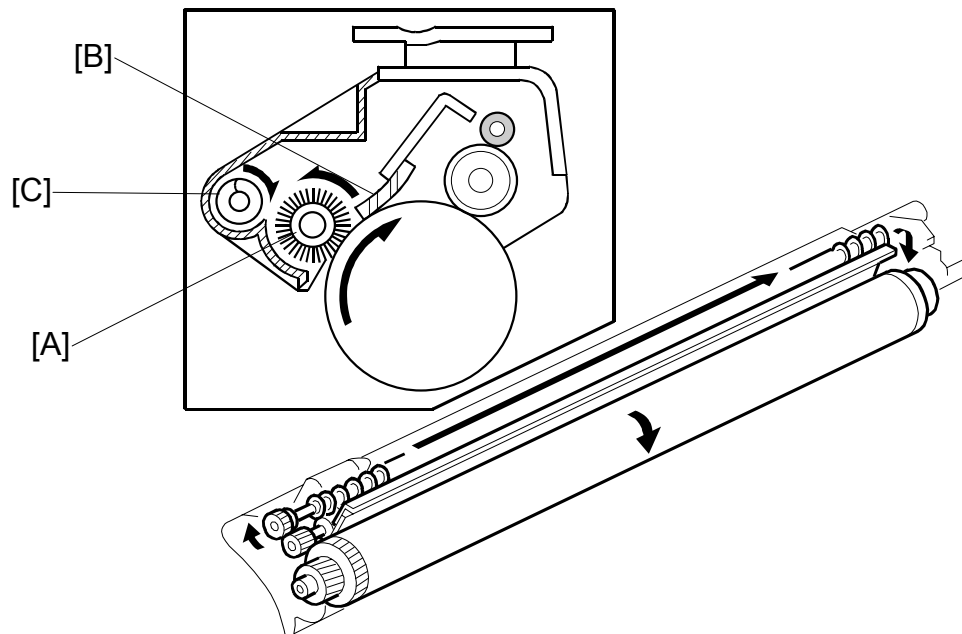
B146D532.WMF

The cleaning brush [A] spreads out the waste toner remaining on the drum. The cleaning blade [B] then scrapes it off. The toner collection auger [C] transports the toner towards the waste toner collection duct.

6.7.6 WASTE TONER COLLECTION

B146D906.WMF

Waste Toner Path

The waste toner from the collection augers in the four PCUs drops into the waste toner collection duct from the four openings [F][G][H][I] at the rear of the PCUs. The toner collection coils [J][K][L] in the duct transport this waste toner towards the waste toner bottle [A]. The coils [J][K][L] are driven by development drive motor-CMY. The openings and PCUs correspond as follows: black → [F], yellow → [G], cyan → [H], magenta → [I].

The waste toner from the transfer belt cleaning unit drops into the waste toner collection duct from another opening [E].

The end of the waste toner collection duct is in the waste toner bottle [A]. There are three openings [B][C] and one collection coil [D] in this part. The waste toner drops into the bottle through the openings. The collection coil [D] is driven by drum drive motor-K.

Waste Toner Vibrator

The waste toner vibrator contains one motor [M]. The motor operates for about one second at a time. Its vibration prevents the waste toner from clogging the waste toner path.

The table lists the conditions under which the motor operates.

Machine status	Motor operation
During machine start (machine initialization)	Two times
At the beginning of the process control	One time
Printing jobs that output five or less papers	At the job end if 3 or more papers have been output since the previous operation (of the motor) (①)
Printing jobs that output 6 or more papers	Every five papers and at the job end (②)

Suppose: The copier executes two jobs, the first job outputs one paper, and the second job outputs two papers. In this case, the motor operates one time at the end of the second job (see ①).

Suppose: The copier executes one job, and the job outputs 12 papers. In this case, the motor operates one time during the fifth printing, one time during the tenth printing, and one more time at the job end (see ②).

Suppose: The copier executes two jobs, the first job outputs one paper, and the second job outputs 12 papers. In this case, the motor operates one time during the fifth printing of the second job, one time during the tenth printing of the second job, and one more time at the end of the second job (see ②; This case does not satisfy condition ①).

6.7.7 WASTE TONER BOTTLE FULL DETECTION
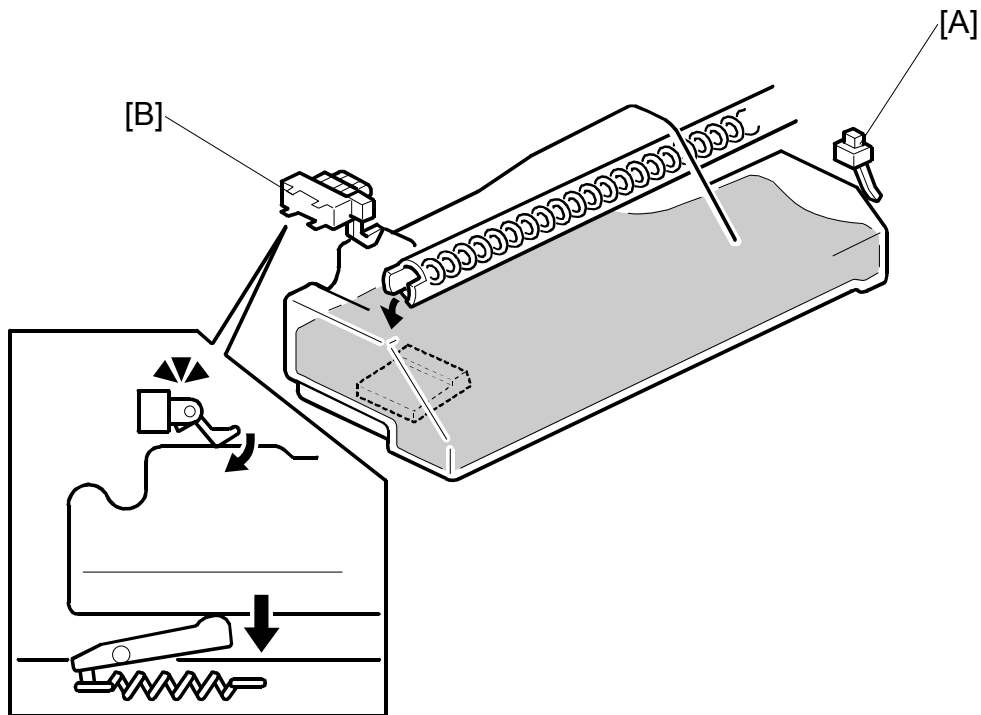
B146D533.WMF

The waste toner bottle set switch [A] detects the bottle when it is placed in the machine.

The waste toner sensor [B] detects the weight of the bottle and informs when it is almost full.

When the bottle contains a certain amount of waste toner, the sensor is deactivated. The machine detects that the waste toner bottle is almost full and displays "Waste Toner is Almost Full".

After that, the machine can print about 2,500 more sheets. After printing 2,500 sheets, it displays "Replace Waste Toner," and after the end of the job, the machine cannot be used until the bottle is replaced or emptied.

NOTE: The number of sheets is calculated on the assumption that the paper size is A4 and that the coverage ratio of each color is 5%.

Detailed Descriptions

6.8 DEVELOPMENT

6.8.1 OVERVIEW

B146D534.WMF
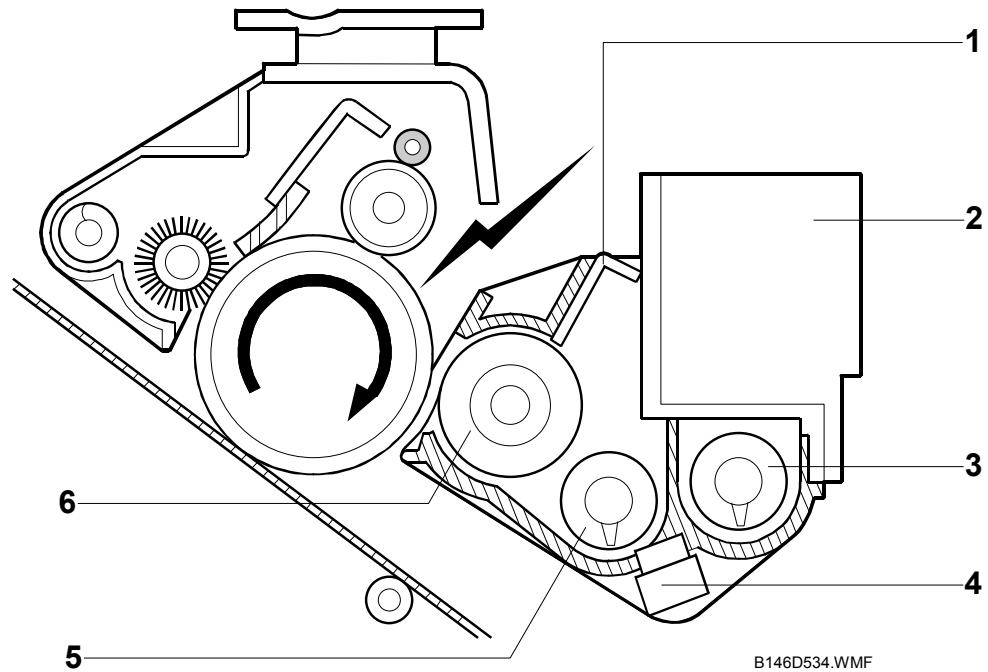
1. Doctor blade
2. Developer hopper
3. Mixing auger (right)
4. TD sensor
5. Mixing auger (left)
6. Development roller

This machine has four independent development units, one for each color. Each contains 280 g of developer when new. The developer in each unit is supplied to the development roller by the two mixing augers and attracted onto the surface of the roller.

The photoconductor gap between PCU and development roller is determined by the drum positioning plate and the rear shaft, and is not adjustable in the field.

The push switches in the drum positioning plate detect a new development unit when it has been installed, and detect whether the development unit is in the machine.

The TD sensor and center ID sensor control toner density. Each development unit has a TD sensor.

The diameter of the development roller is 18 mm (circumference about 56.5 mm).

6.8.2 DRIVE
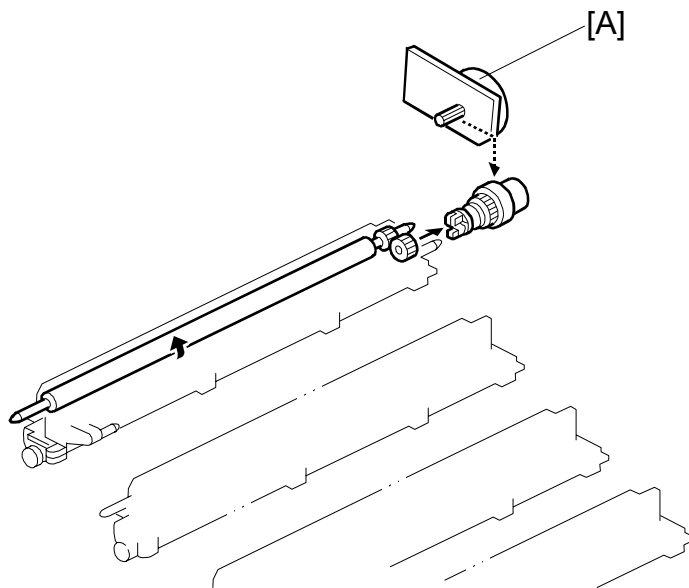
B146D535.WMF
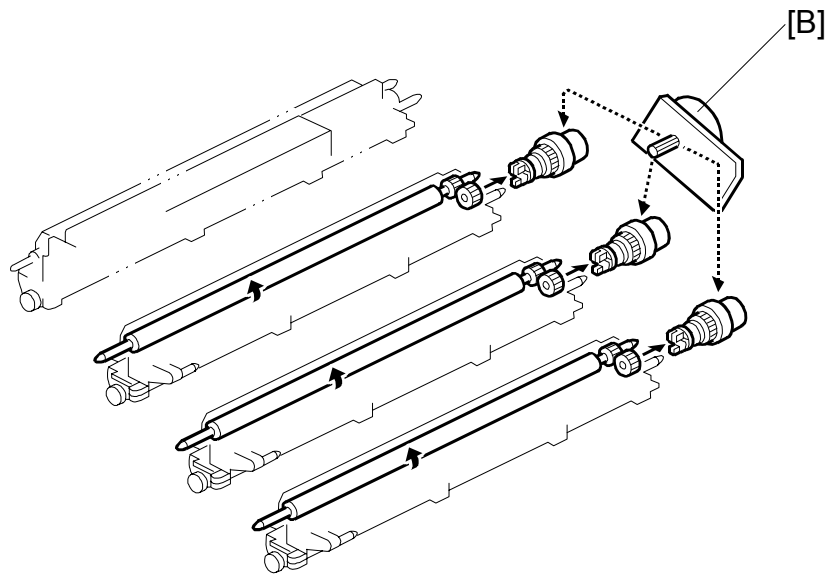
B146D536.WMF

The development drive motor-K [A] drives the development roller for black through gears and a clutch. This motor also drives the fusing unit and paper exit rollers. The gear trains are indicated in the diagram by dotted lines.

The development drive motor-CMY [B] drives the development unit for magenta, cyan, and yellow through gears and clutches. This motor also drives the registration roller.

6.8.3 DEVELOPER AGITATION

[A]   [B]   B146D537.WMF
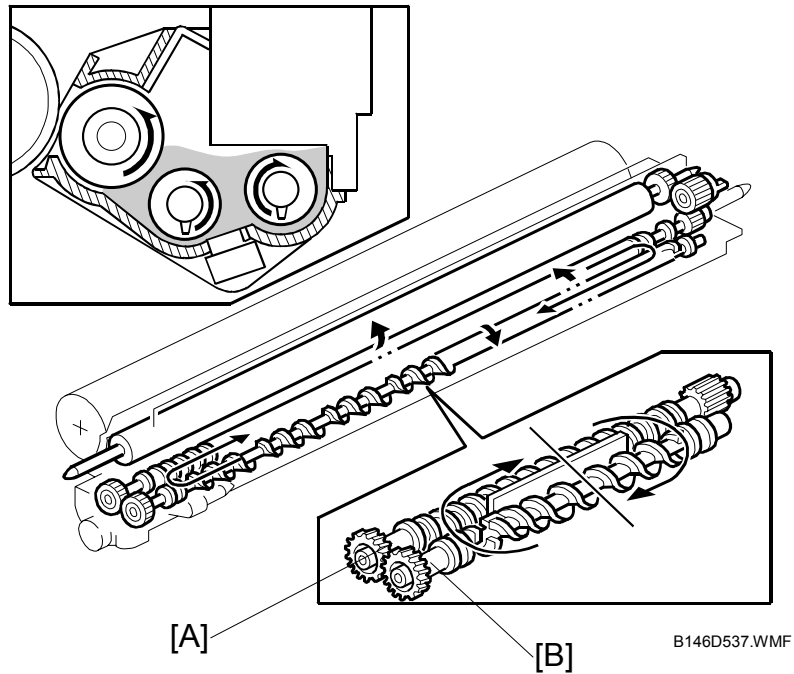
Two mixing augers [A and B] circulate the developer forward and backward to agitate the developer.

This happens during the process control self check, during toner supply, and during development.

6.8.4 DEVELOPMENT BIAS

B146D930.WMF
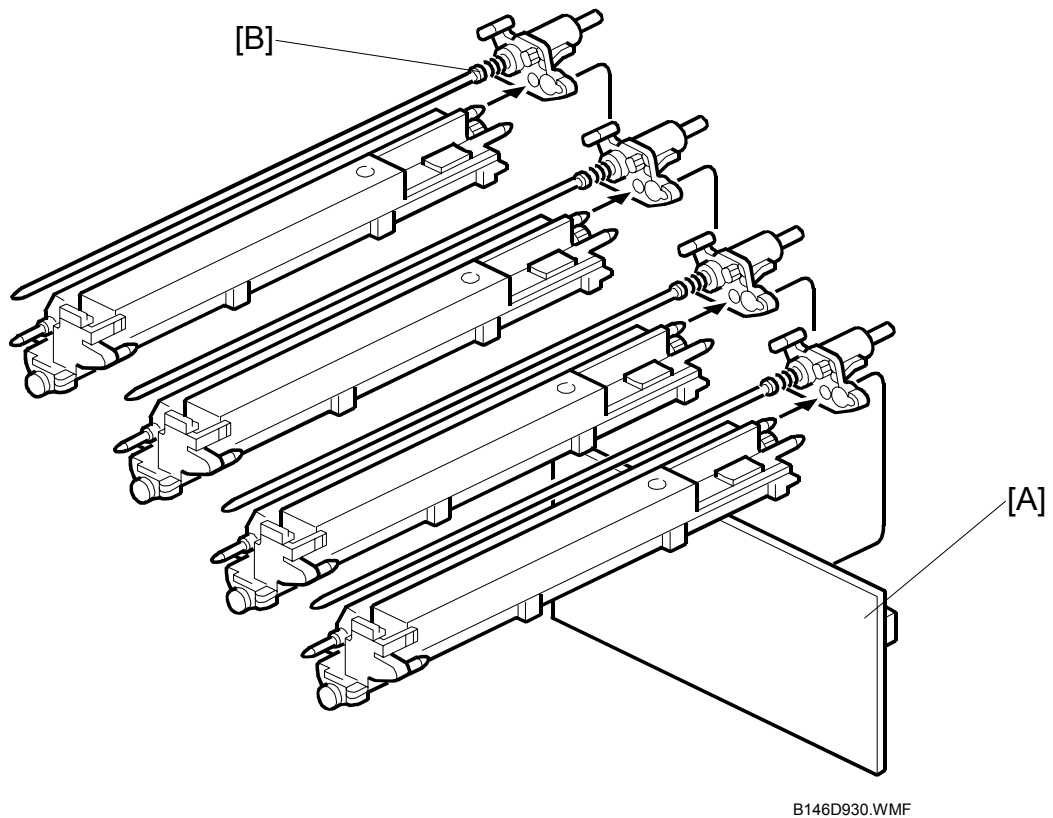
The high voltage supply board [A] supplies development bias to the development roller via the receptacle [B] at the rear of each development unit.

There are both ac and dc bias voltages. The ac bias improves toner transfer to the drum.

The machine automatically controls the dc bias, if automatic process control is enabled (i.e., if SP3-125-001 is set to 0). However, if process control is switched off, (i.e., if SP3-125-001 is set to 1), the dc bias is the value stored in SP2-201-001 to 009 (do not adjust in the field unless advised to do so).

The ac bias cannot be adjusted.

Detailed Descriptions

6.8.5 TONER SUPPLY MECHANISM

B146D538.WMF
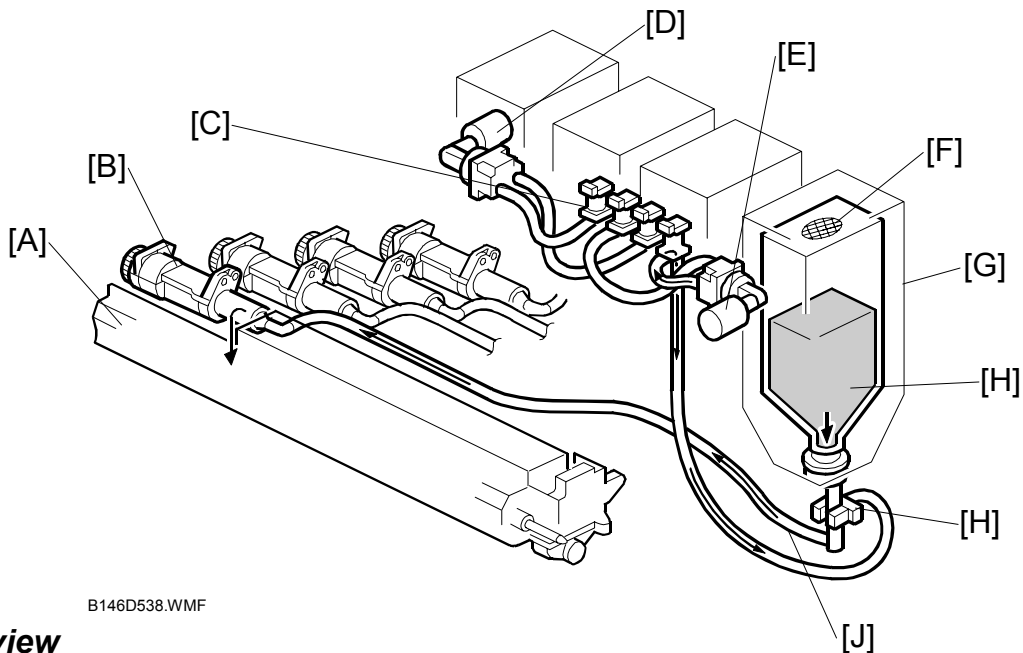
Overview

The air transport system agitates the toner [H] in the toner cartridges [G]. Toner is transported to the development unit [A] by the toner attraction pump [B] (each cartridge has a separate pump). This provides a more stable way to transport fine powder than previous methods.

Toner Agitation and Attraction

The rear air pump [D] supplies air to the yellow and magenta toner cartridges, while the front air pump [E] supplies air to the black and cyan toner cartridges. Air agitates all the toner in each cartridge. The pumps and four valves [C] control the air flow. Mixed with air, the toner passes part of the way along the transport tube [J] towards the toner attraction pump. This pump draws the toner the rest of the way (☛ Toner Transport).

The air pump turns on to supply air to the toner cartridges for one second under any of the following conditions:

- During normal operation, when the "on" time for a toner supply clutch reaches a certain value
- When forced toner supply (SP2-207) is done
- When forced toner density adjustment (SP3-126-002) is done
- At toner end recovery
- Developer initialization

The filter [F] on the inner package of the toner cartridge ensures that the internal pressure does not become too high.

Air Flow and Toner Flow
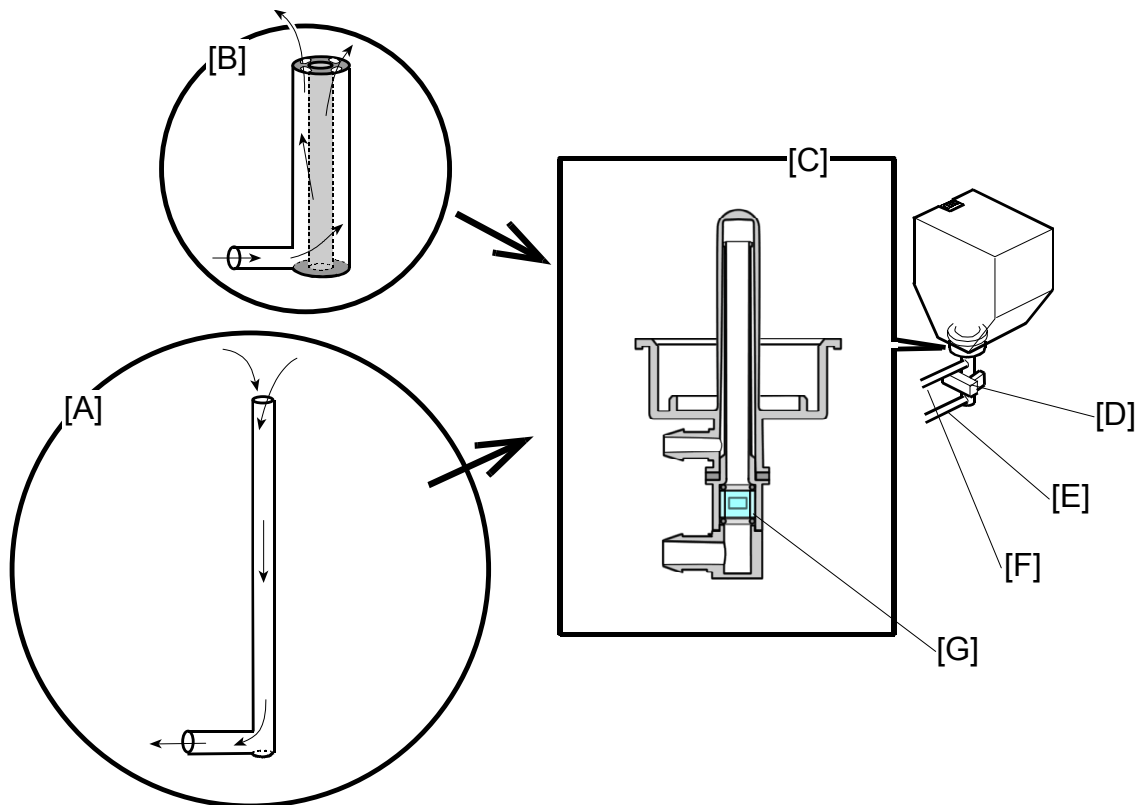
B146D539.WMF

The air tube [F] and the toner tube [E] are connected to the joint [C] at the bottom of the toner cartridge holder. This joint contains an inner pipe [A] and an outer pipe [B]. These two pipes are L-shaped. The inner pipe goes through the outer pipe, and is longer than the other.

The toner goes through the inner pipe [A], and reaches the toner tube [E] at the bottom end of the pipe. On its way to the toner tube, the toner passes the sensor windows [G]. These windows are at the front side and the rear side of the pipe, and are transparent. The light emitted from the toner end sensor [D] goes through this area if the toner is not going through the pipe.

The air flow generated by the air pump goes through the outer pipe [B], and comes out of the four openings at the top end.

Detailed Descriptions

Toner Near End Detection

Toner end sensors [D] detect toner near end conditions (☛ 6.2.6).
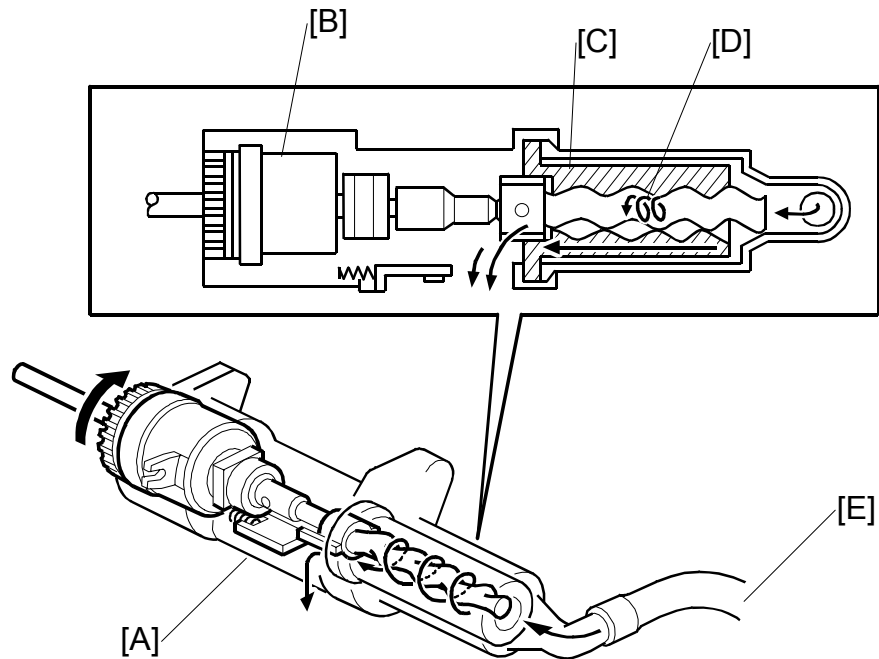
Toner Transport

B146D540.WMF

Each toner attraction pump has the same mechanism. The pump (toner attraction pump) [A], which consists of the toner supply clutch [B], rubber tube [C], and rotor [D], attracts the toner in the toner transport tube [E] toward the development unit.

The toner supply clutch drives the rotor, which draws the toner in from the cartridge and passes it to the development unit. When supplying toner, the clutch is on for 0.7 second and off for 1.3 seconds. The clutch turns on and off as many times as necessary to supply the appropriate amount of toner. The amount of toner depends on the results of toner supply control.

Motor drive comes from the development drive motors.

Shutter Mechanism
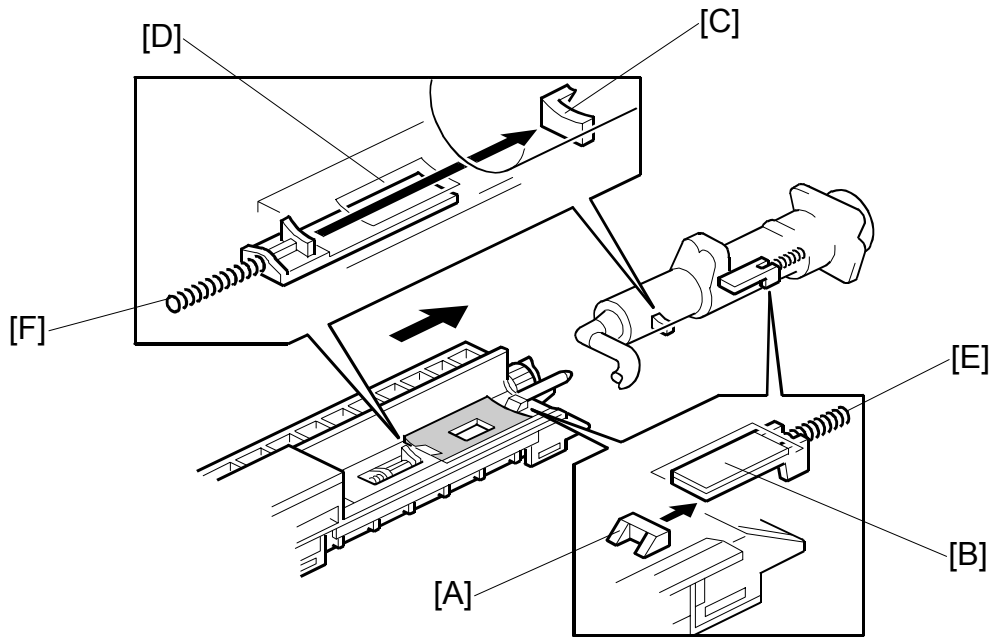
B146D541.WMF

The development unit and toner attraction pump each have a shutter mechanism. When the development unit is placed in the machine, the protrusion [A] on the development unit opens the shutter [B] in the pump, and the protrusion [C] on the pump opens the shutter [D] in the development unit. When both shutters are open, toner can enter the development unit from the toner attraction pump.

When the development unit is removed, the shutter spring [E and F] pulls and closes the shutter.

6.8.6 TONER CARTRIDGE DETECTION

The memory chip [A] on each toner cartridge stores the total "on" time of the toner supply clutch. This is used to calculate the amount of toner remaining in the toner cartridge. The chip is also used to detect whether the cartridge is installed (if the cartridge is not installed, the machine does not detect a signal from the memory chip).

B146D542.WMF

Detailed Descriptions
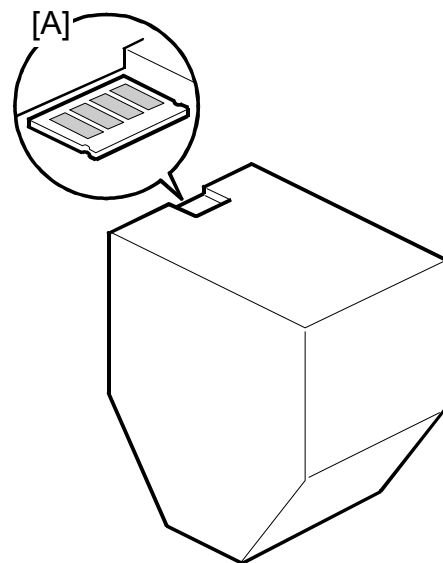
6.9   PAPER FEED

6.9.1 OVERVIEW
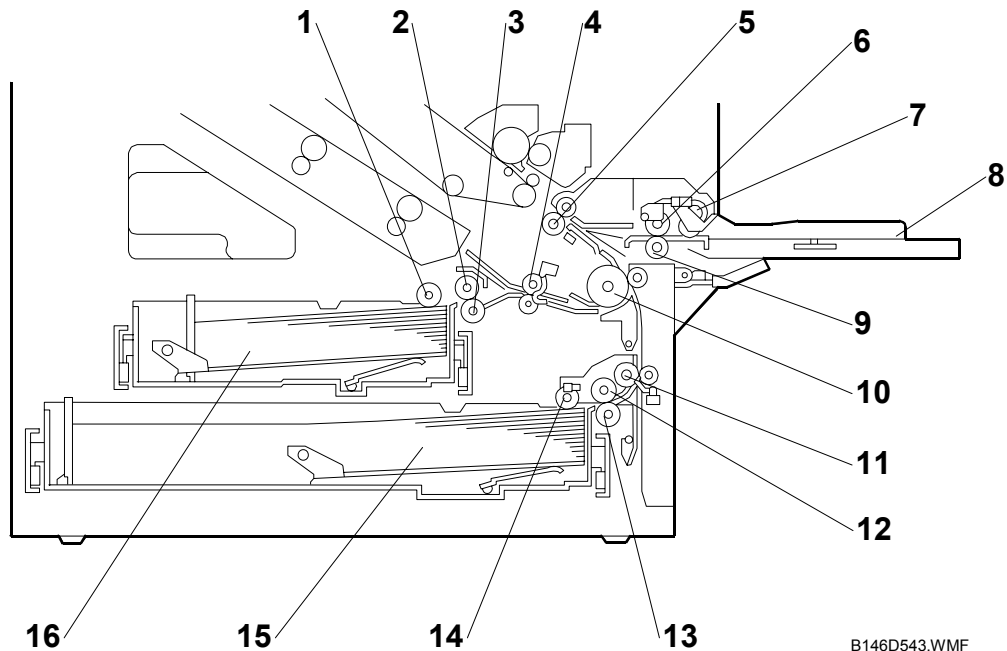
B146D543.WMF

1. Pick-up roller - tray 1
2. Feed roller - tray 1
3. Separation roller - tray 1
4. Relay roller
5. Registration roller
6. Feed roller - By-pass feed
7. Pick-up roller - By-pass feed
8. By-pass feed table

9. Separation roller - By-pass feed
10. Transport roller
11. Vertical transport roller
12. Feed roller - tray 2
13. Separation roller - tray 2
14. Pick-up roller - tray 2
15. Paper tray 2
16. Paper tray 1

There are two paper trays (500 sheets each), and a by-pass feed table (100 sheets).

The paper feed mechanism uses an FRR system.

Tray 1 can only hold A4 or letter paper. Tray 2 can hold a range of sizes.

6.9.2 DRIVE – TRAY 1, TRAY 2, AND BY-PASS TRAY

B146D544.WMF

B146D545.WMF
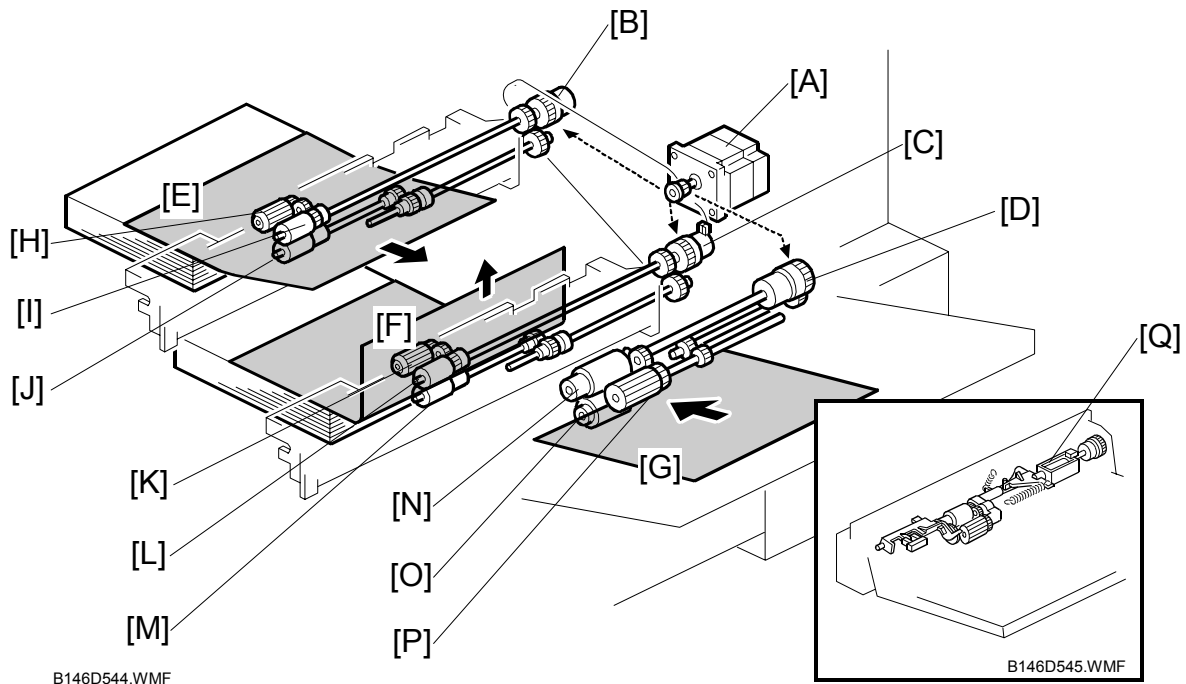
The paper feed motor [A] drives the pick-up and feed mechanisms in tray 1 [E], tray 2 [F], and the by-pass tray [G], using clutches and complex trains of gears (the locations of the gear trains are indicated by dotted lines in the above diagram).

When tray 1 and tray 2 are inside the machine, their pick-up rollers [H][K] are always in contact with each top sheet of the paper stack. On the other hand, the pick-up roller [P] of the by-pass tray stays away until the by-pass pick-up solenoid [Q] turns on. When the paper feed clutch [B][C][D] turns on, the pick-up, feed [I][L][N], and separation [J][M][O] rollers start rotating to feed the paper. The paper feed clutch stays on until shortly after the registration sensor activates.

Detailed Descriptions

6.9.3 PAPER LIFT – TRAYS 1 & 2
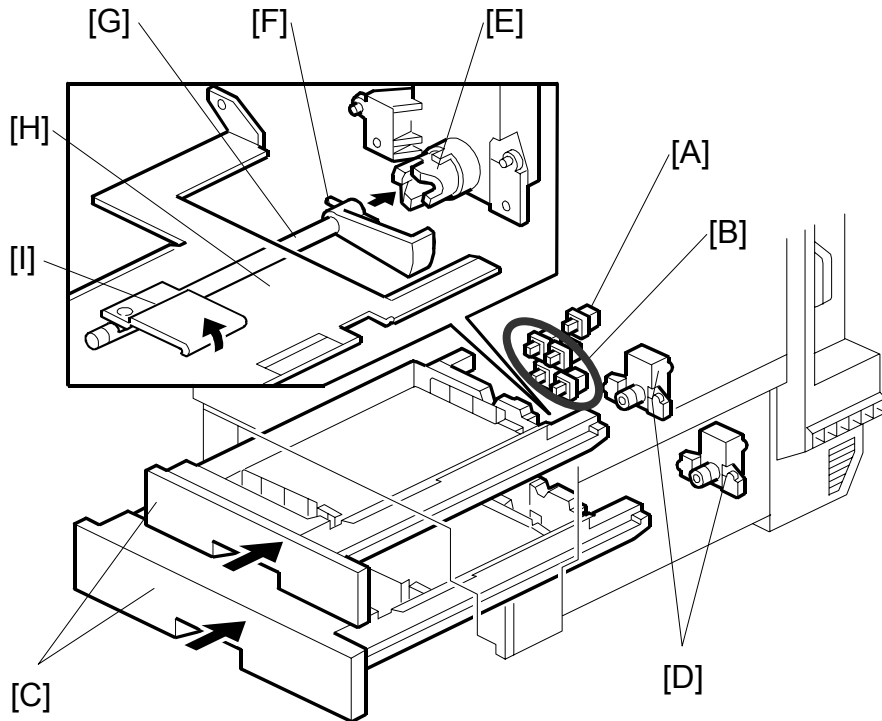
B146D546.WMF

The tray 1 set switch [A] and tray 2 paper size switches [B] detect when the paper trays [C] are placed in the machine. When the machine detects that a tray has been placed in the machine, the tray lift motor [D] rotates and the coupling gear [E] on the tray lift motor engages the pin [F] on the lift arm shaft [G]. Then the tray lift arm [I] lifts the tray bottom plate [H] until the paper lift sensor for the tray detects that the top of the stack is at the paper feed position.

6.9.4 PAPER SIZE DETECTION – TRAYS 1 & 2
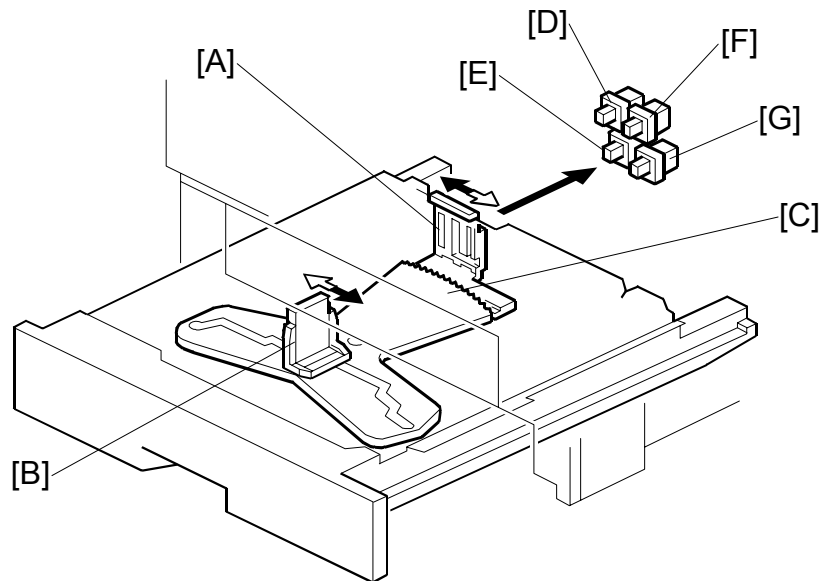
B146D547.WMF

For tray 1, there is no size switch. The paper size is fixed at either A4 or LT; this can be changed with SP1-902-1.

For tray 2, four paper size switches, working in combination, detect the paper size as shown in the table below. The actuators are on the side plate [A]. The side plate is moved by the end plate [B] through a cam [C].

1: Pushed

Models		Switch Location			
North America	Europe/Asia	1 [D]	2 [E]	3 [F]	4 [G]
11" x 17" SEF	11" x 17" SEF	0	1	0	0
A3 SEF	A3 SEF	1	0	1	0
8$1/2$" x 14" SEF *1	B4 SEF *1	1	1	0	1
8$1/2$" x 11" SEF *2	A4 SEF *2	0	1	1	0
11" x 8$1/2$" LEF *3	11" x 8$1/2$" LEF *3	1	0	1	1
A4 LEF	A4 LEF	0	1	0	1
B5 LEF	B5 LEF	0	0	1	0
A5 LEF	A5 LEF	0	0	0	1

NOTE:
*1: The machine detects either 8$1/2$" x 14" SEF or B4 SEF, depending on the setting of SP 1-902-2
*2: The machine detects either 8$1/2$" x 11" SEF or A4 SEF, depending on the setting of SP 1-902-3
*3: The machine detects either 11" x 8$1/2$" LEF or B5 SEF, depending on the setting of SP 1-902-4

The machine disables paper feed from a tray if the paper size cannot be detected (if the paper size actuator is broken or no tray is installed).

6.9.5 PAPER HEIGHT DETECTION – TRAYS 1 & 2
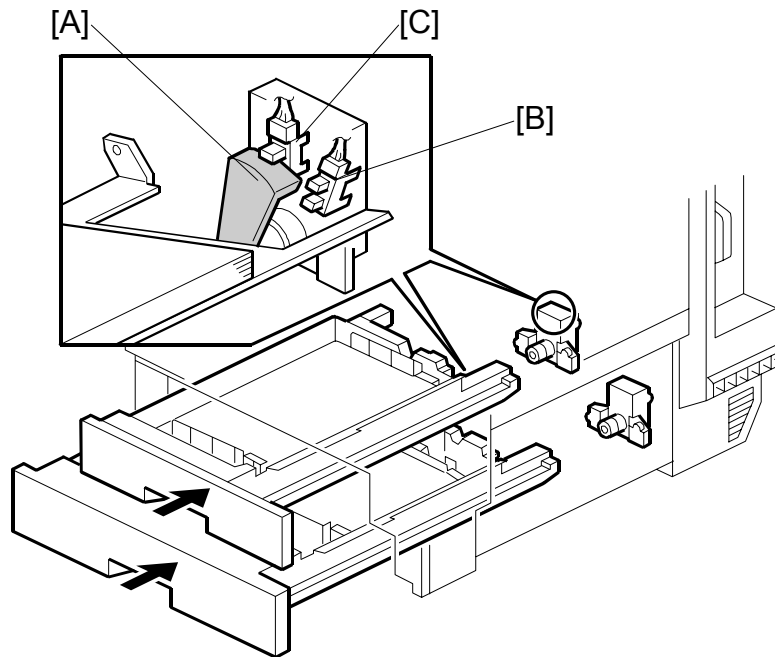
B146D548.WMF

Two paper height sensors, working in combination, detect the amount of paper in the tray.

When the amount of paper decreases, the bottom plate pressure lever moves up and the actuator [A] (on the pressure lever drive shaft) rotates.

Remaining paper	Paper height sensor 2 [B]	Paper height sensor 1 [C]
Full	OFF	OFF
Nearly full	ON	OFF
Near end	ON	ON
Almost empty	OFF	ON

OFF: No actuator

6.9.6 PAPER END DETECTION – TRAYS 1 & 2

If there is some paper in the paper tray, the paper stack raises the paper end feeler and the paper end sensor deactivates.

When the paper tray runs out of paper, the paper end feeler drops into the cutout in the tray bottom plate, and this activates the paper end sensor.

6.9.7 REGISTRATION
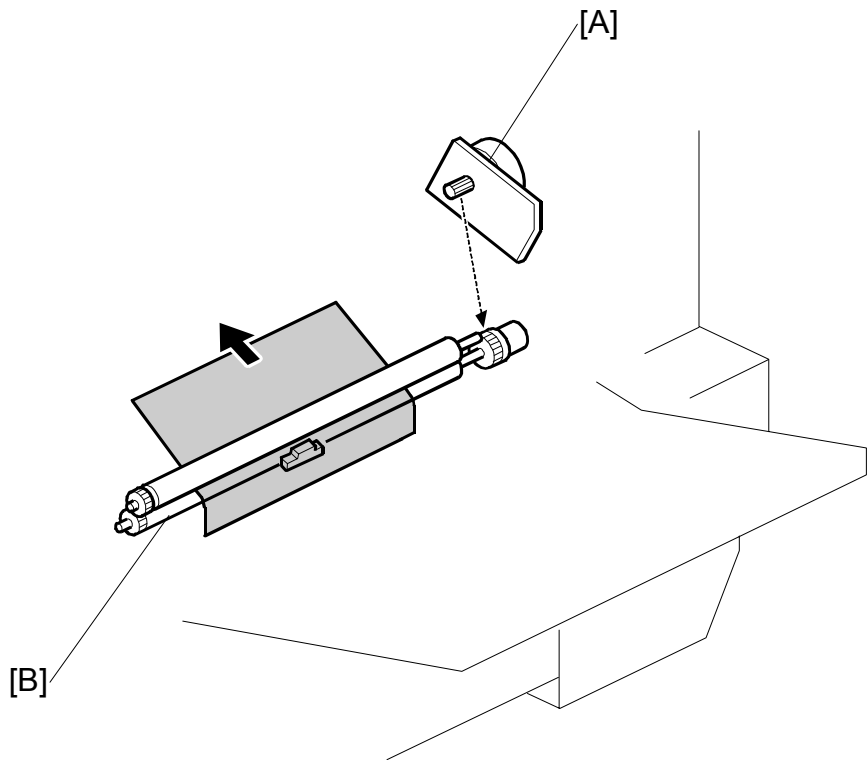
B146D549.WMF

The development drive motor - CMY [A] drives the registration roller [B] using a clutch and a complex train of gears (the location of the gear train is indicated by dotted lines in the above diagram).

The machine makes a paper buckle at the registration roller to correct paper skew. The paper buckle can be adjusted with SP1-003-1 to - 8.

Detailed Descriptions

6.9.8 PAPER FEED LINE SPEED

This machine has three process line speeds (for feed from registration roller to fusing unit) depending on the mode and selected resolution

Mode	Resolution (dpi)	Line speed (mm/s)	Print speed (ppm)
B/W	600 x 600 1,800 x 600	185	38
	1,200 x 1,200	125	28
Color	600 x 600 1,800 x 600	125	28
	1,200 x 1,200	62.5	14
OHP/Thick	600 x 600 1,800 x 600 1,200 x 1,200	62.5	10

During a monochrome print job, the machine changes the line speed if there is a page with color in the middle of the job. However, it will not change the line speed if there is a monochrome page in the middle of a color print job.

	Line speed (mm/s)
Paper feed from tray to registration roller	230
Fusing, paper exit to standard tray, and mailbox	A bit slower than "Process line speed"
Duplex invert and feed	370
Finisher	450

6.9.9 GRIP ROLLER RELEASE MECHANISM
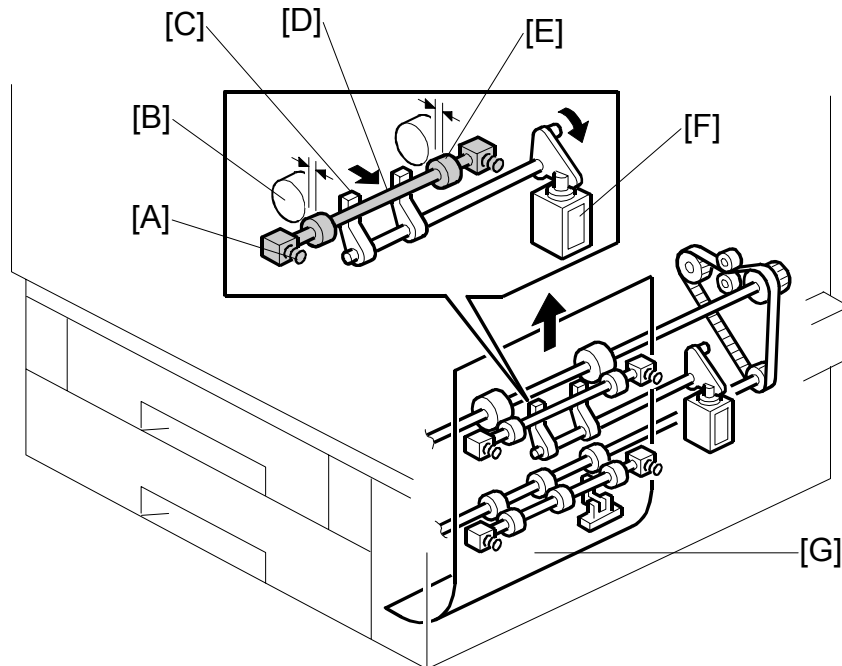
B146D550.WMF

The grip roller release mechanism reduces the pressure of the grip roller [E].

The grip roller transports a sheet of paper to the transfer unit. When the transfer unit starts to feed the leading edge of the paper [G], the trailing edge has still not reached the grip roller. So the paper is handled by the transfer unit and the grip roller at the same time. If the handling speeds are not the same, this may skew the paper. Longer paper sizes are more affected by the speed difference than shorter sizes. From the viewpoint of image crispness, multi-color images are more easily affected than mono-color images.

To solve this possible problem, the grip roller release mechanism is activated under the following conditions:

    1) B4 paper or longer is being fed.
    2) The machine is operating in the full-color mode.
    3) The leading edge of the paper has been fed in the transfer unit.

The spring [A] is always pressing the grip roller against the transport roller [B]. When the above conditions are met, the solenoid [F] turns on, the lever [C] pushes the grip roller shaft [D], and the grip roller moves away from the paper.

Detailed Descriptions

6.10 DUPLEX UNIT

6.10.1 OVERVIEW

B146D551.WMF
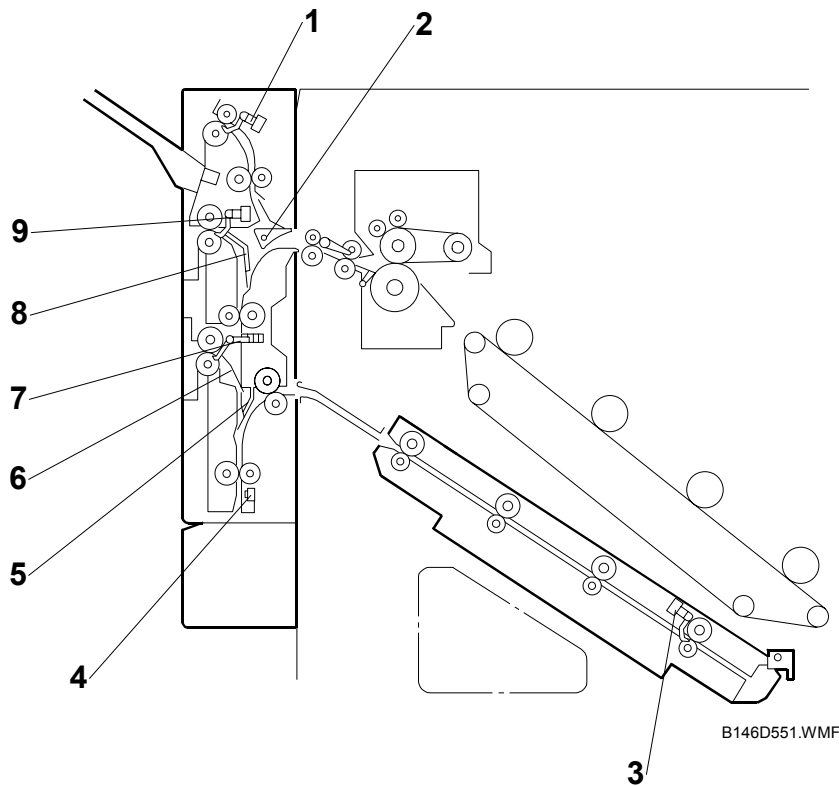
1. Exit sensor 1	6. Junction mylar 2
2. Junction gate	7. Exit sensor 3
3. Duplex feed sensor	8. Junction mylar 1
4. Duplex inverter sensor	9. Exit sensor 2
5. Junction mylar 3	

- For duplex printing, the second page (rear side) is printed first.
- To print on the second side, the duplex inverter unit (on the side of the machine) inverts the paper from the fusing unit and feeds it to the duplex feed unit (inside the machine).
- The duplex feed unit feeds the inverted paper back to the paper feed section.
- When both sides have been printed, the duplex inverter unit feeds the paper out to the finisher.
- If the mailbox or standard exit tray (on top of the machine) was selected to receive the duplex copies, the print will not enter the duplex unit after the second side has been printed. The junction gate inside the machine directs it upwards to the selected tray.
- Duplex copies are not fed out to the external tray (on the left of the machine).

6.10.2 DUPLEX OPERATION

Up to A4/LT (81/2" x 11") LEF

There are three sheets of paper in the paper feed path at the same time. The interleave method is used.

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 paper (if shaded, this indicates the second side).

B146D552.WMF
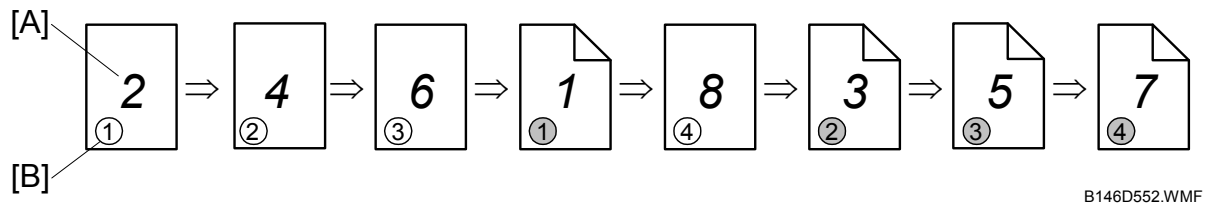
Larger than A4/LT (81/2" x 11") LEF

There are two sheets of paper in the paper feed path at the same time. The interleave method is used.

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 paper (if shaded, this indicates the second side).

B146D553.WMF

Detailed Descriptions
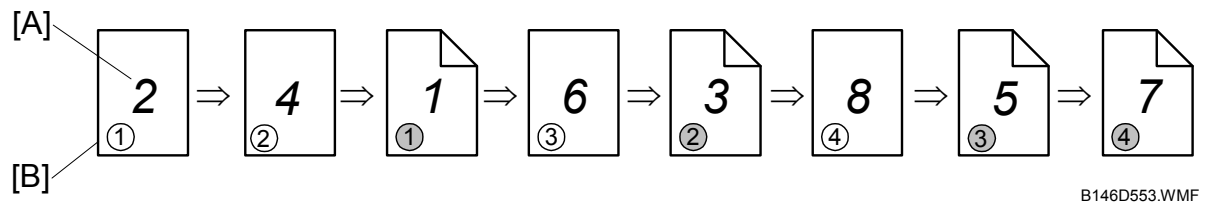
6.10.3 DUPLEX INVERTER UNIT
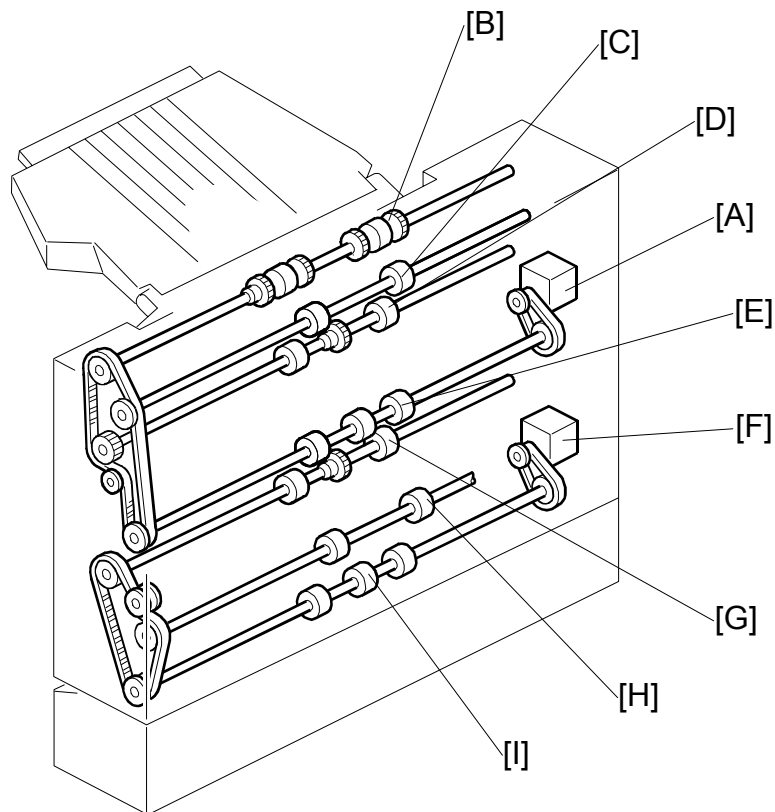
B146D554.WMF

The duplex inverter motor 1 [A] drives the paper exit roller 1 [B], paper transport roller [C], paper exit roller 2 [D], and upper inverter roller [E].

The duplex inverter motor 2 [F] drives the exit roller 3 [G], paper exit roller 4 [H], and lower inverter roller [I].

6.10.4 FEED TO EXTERNAL EXIT TRAY (NON-DUPLEX MODE)
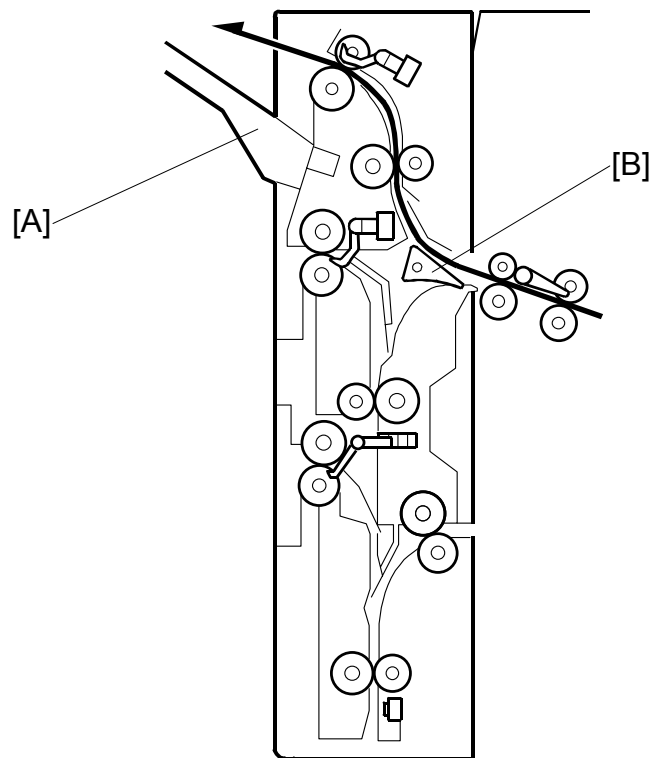
B146D555.WMF

This shows how the machine feeds paper through the duplex unit to the external tray [A], when duplex mode is not selected.

NOTE: The paper cannot be fed out to the external tray if duplex printing is selected.

The junction gate [B] directs the paper from the fusing unit out to the external tray if thick paper or OHP mode is selected, or if the external tray is selected as the output tray with the operation panel or the printer driver.

Detailed Descriptions

6.10.5 FEED TO DUPLEX FEED UNIT

B146D556.WMF   [B]   B146D557.WMF
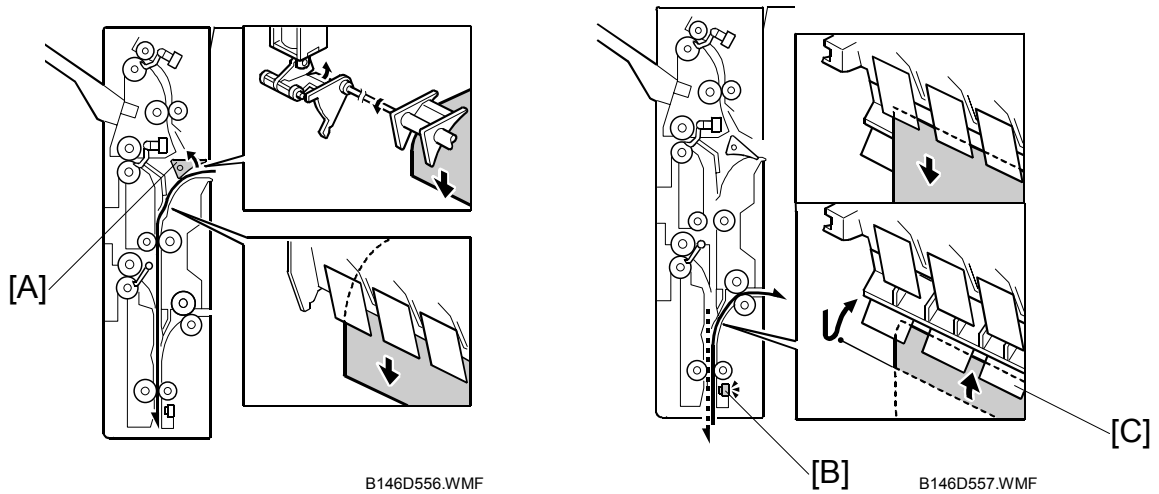
This shows how the machine feeds paper back into the machine after side 1 is printed.

The junction gate [A] diverts the paper from the fusing unit to the lower part of the inverter unit. After the duplex inverter sensor [B] is activated, the machine waits until the trailing edge has passed junction mylar 3 [C]. Then, the paper is switched back and junction mylar 3 directs the paper back into the machine for the second side.

The next page shows how the paper is fed out to the finisher after both sides are printed.

6.10.6　FEED TO TWO-TRAY FINISHER AND BOOKLET FINISHER

With Optional One-Tray Paper Feed Unit

B146D559.WMF

B146D558.WMF
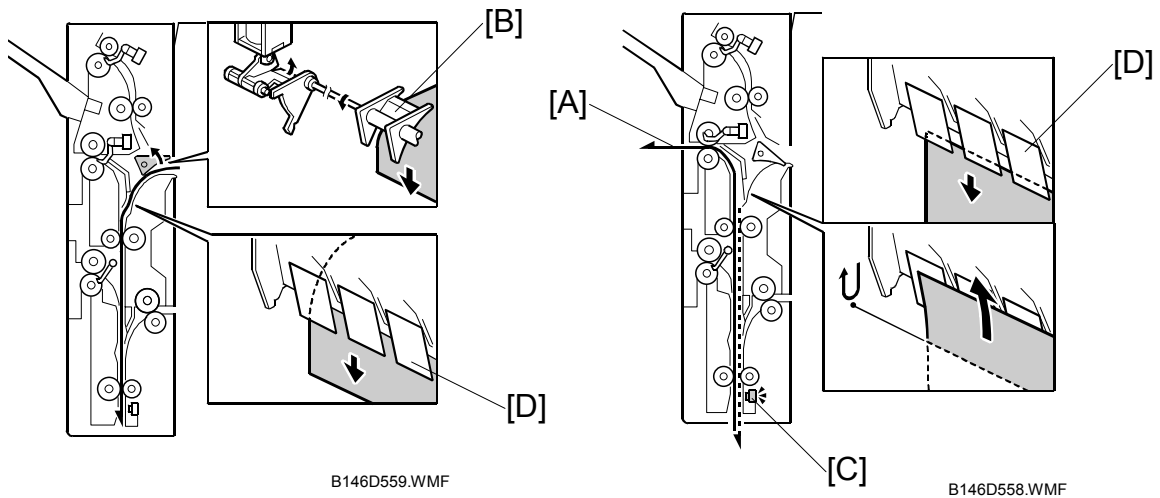
The paper is fed out to the finisher from the upper exit [A].

The junction gate [B] diverts the paper from the fusing unit to the lower part of the inverter unit. After the duplex inverter sensor [C] is activated, the machine waits until the trailing edge has passed junction mylar 1 [D]. Then, the paper is switched back and junction mylar 1 directs the paper out to the finisher.

With Optional LCT or Two-Tray Paper Feed Unit

B146D561.WMF

B146D560.WMF
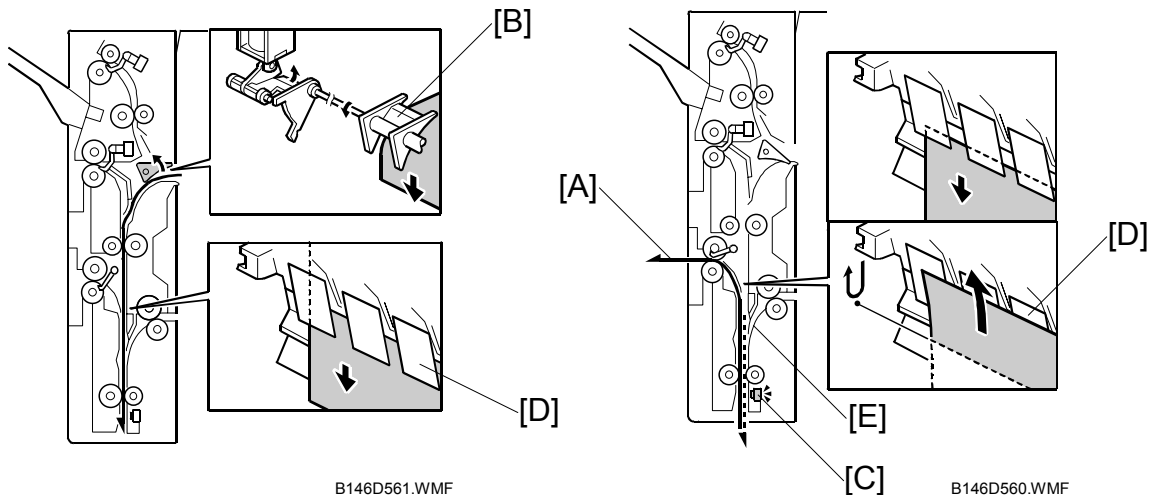
The paper is fed out to the finisher from the lower exit [A].

The junction gate [B] diverts the paper from the fusing unit to the lower part of the inverter unit. After the duplex inverter sensor [C] is activated, the machine waits until the trailing edge has passed junction mylar 2 [D], but before it passes junction mylar 3 [E]. Then, the paper is switched back and junction mylar 2 directs the paper out to the finisher.

Detailed Descriptions

6.10.7 DUPLEX FEED UNIT

Drive
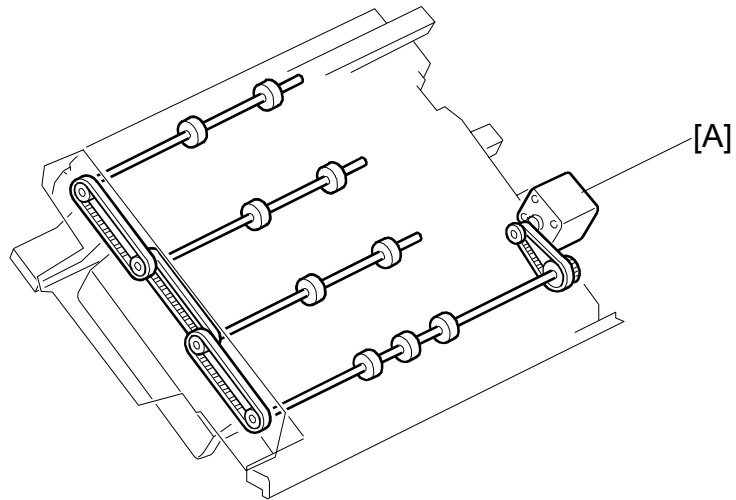
B146D562.WMF

The duplex feed motor [A] drives all paper transport rollers.

Feed-in and feed-out
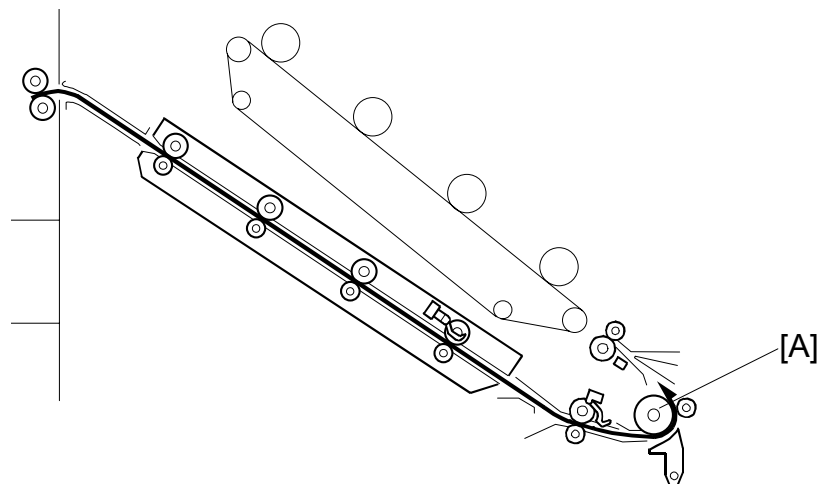
B146D563.WMF

The duplex feed unit feeds the paper from the duplex inverter unit to the relay roller [A].

6.11 IMAGE TRANSFER AND PAPER SEPARATION

6.11.1 OVERVIEW

G080D701.WMF
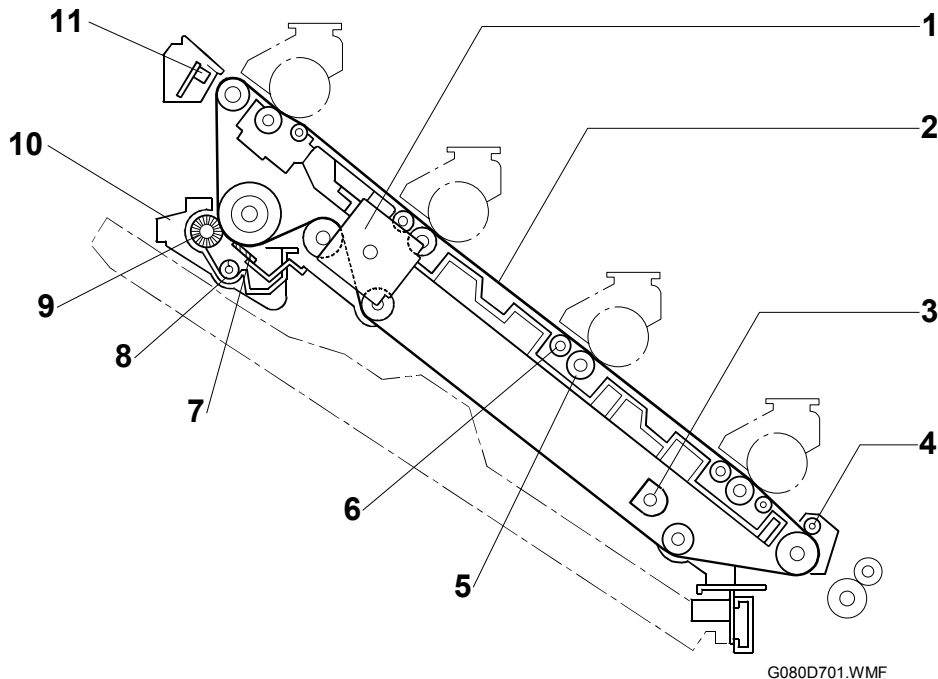
1. Transfer unit drive motor
2. Transfer belt
3. Rotation encoder
4. Paper attraction roller
5. Transfer roller
6. Back-up roller

7. Cleaning blade
8. Toner collection auger
9. Cleaning brush
10. Cleaning unit
11. ID sensor

Paper is fed to the transfer belt before image transfer begins. The paper attraction roller charges the paper to ensure that the paper is attracted to the belt.

The magenta, cyan, yellow, and black color images transfer to the paper while the transfer belt feeds the paper past the drums towards the fusing unit. A positive charge is applied to the paper under the transfer belt, opposite each drum, to transfer the toner from the drums onto the paper. The back-up roller ensures that the contact area between the drum and belt is sufficient.

The cleaning unit in the transfer unit cleans the belt surface with the cleaning blade and brush. The waste toner collected from the belt is transported to the waste toner bottle.

There are three ID sensors (front, center, and rear). Only the center ID sensor detects the image density of the patterns generated on the transfer belt for process control. The other function of the ID sensors is for automatic line position adjustment. All ID sensors are used for this.

Detailed Descriptions

6.11.2 TRANSFER BELT DRIVE

Drive Motor
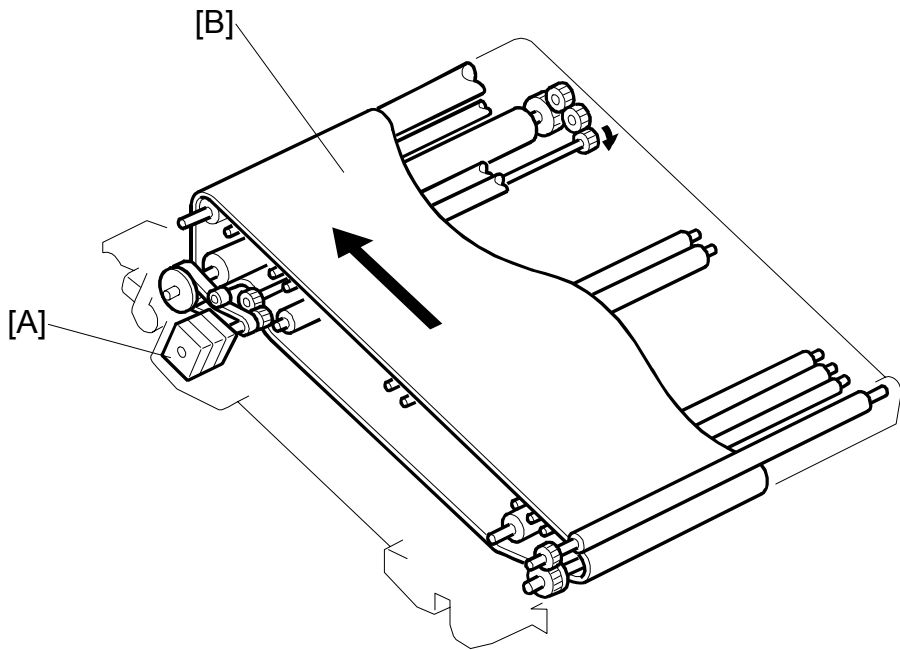
B146D564.WMF

The transfer unit drive motor [A] drives the transfer belt [B] and the cleaning unit via the timing belt and gears. The speed of transfer belt drive depends on the process line speed.

Rotation Encoder
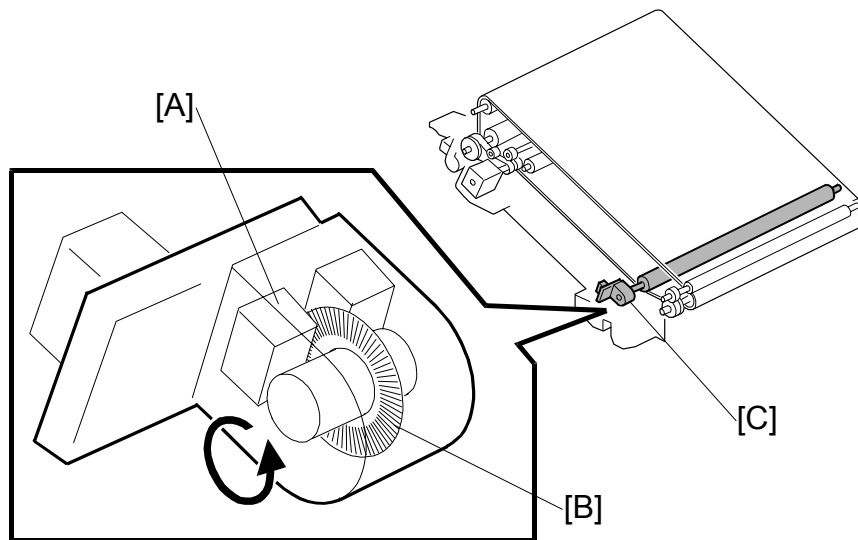
B146D914.WMF

An encoder [C] is on one of the rollers. This encoder checks the rotation speed of the transfer belt. The controller analyzes the signals from the encoder, and adjusts the rotation speed of the transfer belt.

The encoder contains a disk that has 300 notches on its surface [B]. These notches are read by the sensor [A]. The controller counts the number of notches that the sensor has read in the unit of time. If the sensor has read an unusually large number of notches or an unusually small number of notches, the controller ignores such unusual signals. Thanks to this feature, incorrect reading does not affect the rotation speed.
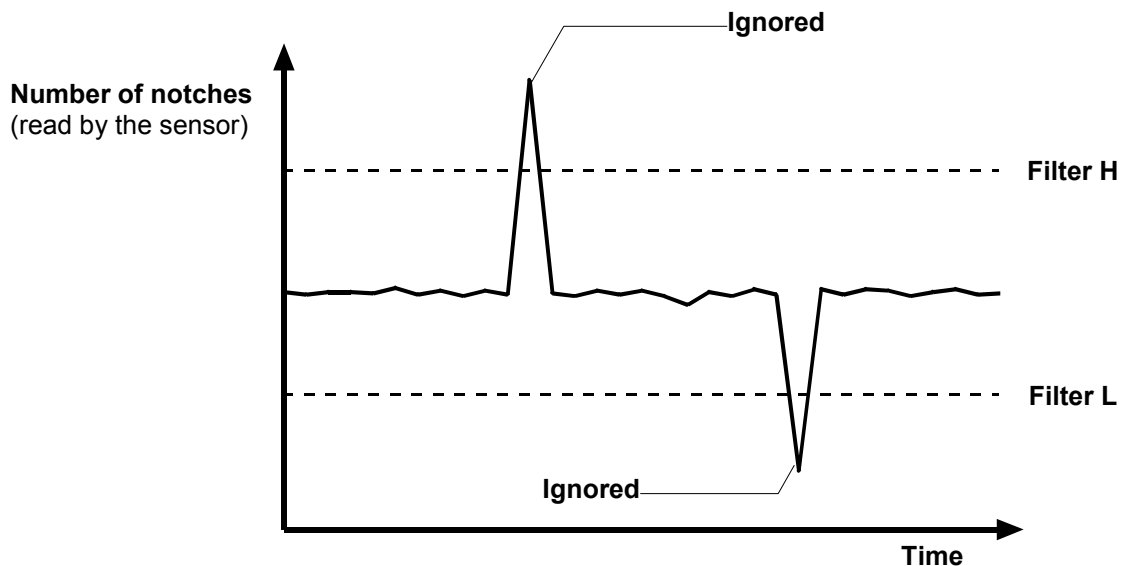
B146D915.WMF

Filter H: The number of notches read by the sensor when the rotation speed of the transfer belt is at its possible highest.

Filter L: The number of notches read by the sensor when the rotation speed of the transfer belt is at its possible lowest.

6.11.3 TRANSFER CURRENT

B146D565.WMF
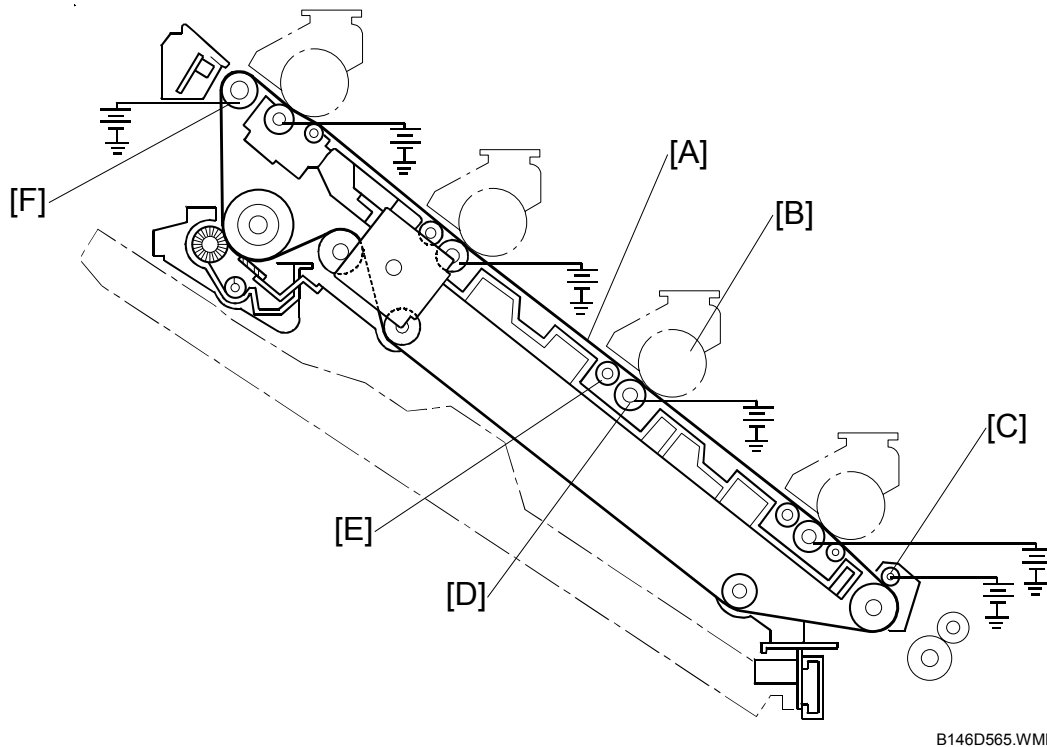
The transfer roller [D] applies a current to transfer the toner to the paper on the transfer belt [A]. The high voltage supply board – Transfer applies a current to the transfer roller and the paper attraction roller [C].

These currents are automatically corrected for paper size, temperature (measured by the thermistor on the right side of the laser optics housing unit), and humidity (measured by the humidity sensor).

Available adjustments are summarized below.

- The transfer roller current for each printing mode (color or B/W, resolution, paper type) can be adjusted with SP2-301-1 to -56. The by-pass tray settings are used when the duplex unit has not been installed and the user is making duplex prints manually from the by-pass tray. There is a correction for narrow-width paper with SP2-309-1 to -4.
- The current for paper attraction can be adjusted with SP2-801-1 to -9. There is a correction for narrow-width paper with SP2-801-10 to -13.

The back-up roller [E] makes a wider contact area between the drum [B] and the belt. The transfer exit roller [F] is charged to 2 kV. The roller prevents the toner from being scattered while the paper is leaving the transfer unit.

The other rollers are grounded to neutralize the belt surface.

6.11.4 TRANSFER BELT CLEANING

B146D567.WMF
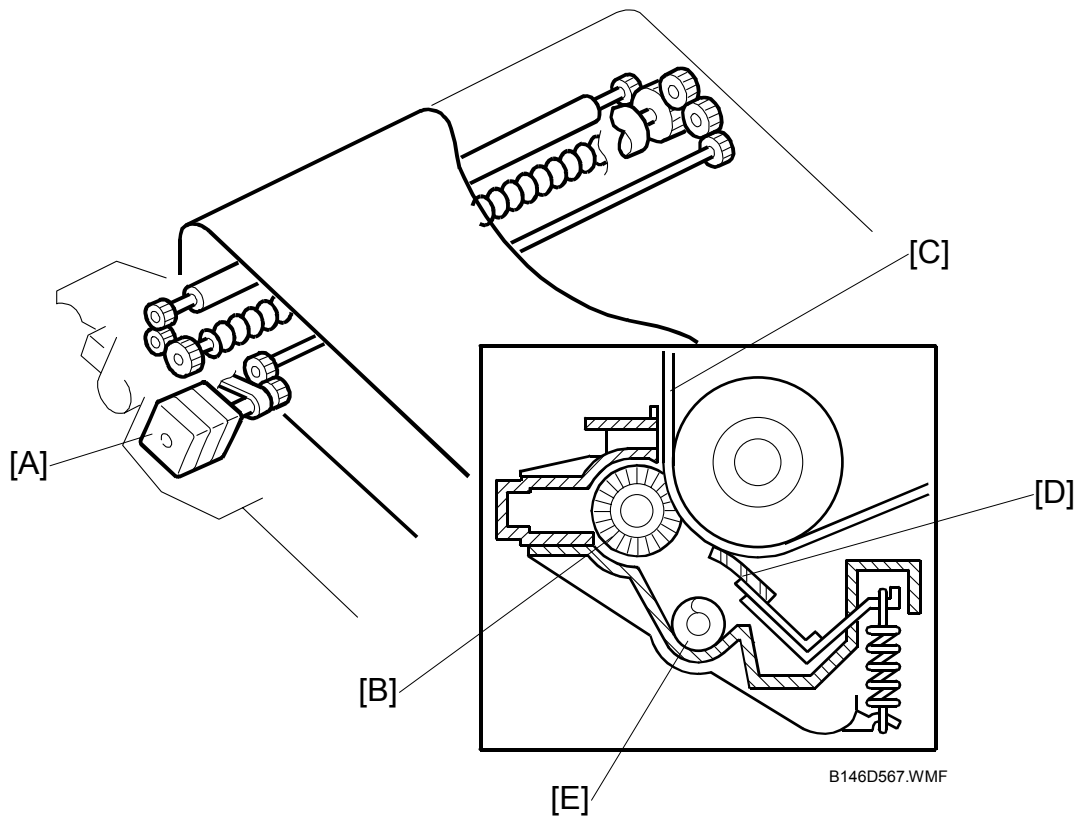
The transfer belt cleaning unit removes toner (during printing) and the ID sensor patterns (during process control or automatic line position adjustment) on the belt. Belt cleaning is completed while the transfer belt makes one rotation. The transfer unit drive motor [A] drives the unit.

The cleaning brush [B] always contacts the transfer belt [C], and removes waste toner from the belt. The cleaning blade [D] in the cleaning unit scrapes the toner off the transfer belt. The toner collection auger [E] transports the toner towards the waste toner collection duct.

Detailed Descriptions

6.11.5 TRANSFER BELT CONTACT
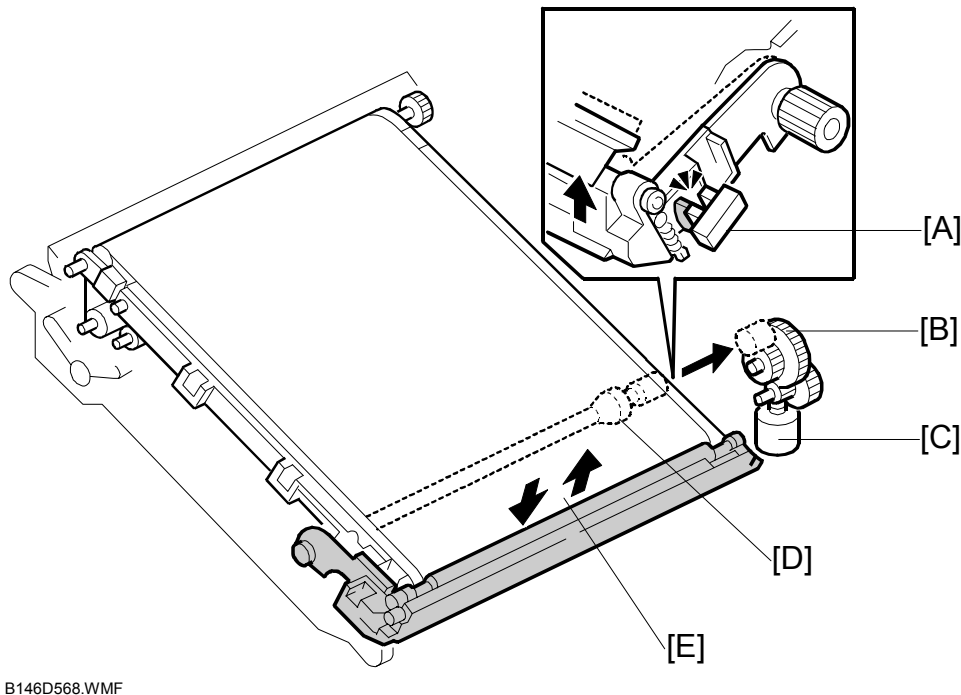
B146D568.WMF

Mechanism

The transfer belt contact and release mechanism improves the lifetime of the transfer belt and drums.

The drum for black always contacts the belt, but the transfer belt moves away from the other drums during monochrome printing.

In the standby mode, the transfer belt contacts only the black drum. The transfer belt comes away from the black drum when you turn the release lever counterclockwise.

When the machine prints a color page, the machine waits until the previous page has gone through the transfer unit. Then the transfer belt contact motor [C] turns on and a cam [D] moves the lower end [E] of the transfer belt upward, so that it contacts the other three drums.

The machine does not release the transfer belt from the color drums during the job, even if a monochrome page comes again. This is because the total printing speed reduces if the transfer belt changes position often.

The belt comes away from the color drums if the job is interrupted by any error except a power failure.

NOTE: If a power failure occurs when the transfer belt is in contact with the drum, the belt stays in this position. To release the belt, swing out the controller box, and turn the drive gear [B] manually.

Transfer Belt Sensor

The transfer belt sensor [A] works as the detection sensor during machine initialization, and works as the position sensor during machine operations.

Before machine initialization, the lower end of the transfer belt is in the home position. When initialization starts, the transfer belt contact motor lifts the lower end until the actuator has passed the sensor, and lowers it to its home position. This action actuates the sensor in a certain pattern.

The table lists the sensor actuation patterns.

Machine status		Sensor pattern
Initialization		On → Off → On → Off → On
Operation	Standby (Default)	On
	B/W printing	On
	Color Printing	Off

On: The actuator is out of the sensor.
Off: The actuator is interrupting the sensor.

Copier ACS

The Auto Color Select manages the transfer belt and PCUs. To print color pages, the ACS lifts the transfer belt and operates the four PCUs. To print black and white pages, the ACS manages the transfer belt and the PCUs as follows:

1. The ACS keeps the transfer belt in the lower position and operates the black PCU (does not operate the other PCUs) if the first print of a job is a black and white page.

2. The ACS lifts the transfer belt to the upper position and operates the four PCUs if a color page appears in the job.

3. The ACS keeps the transfer belt in the upper position and keeps operating the four PCUs after the first color page. Note that all PCUs are in operation even when black and white pages are processed.
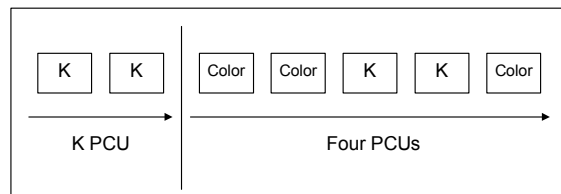
B146D935.WMF

The ACS works when the user pushes the Auto Color Select key from the operation panel. The table lists which PCUs are in operation.

Key	Original		
	B/W Only	**Color Only**	**B/W and Color**
Auto Color Select	Black PCU	Four PCUs	Black PCU or four PCUs
Full Color	Four PCUs	Four PCUs	Four PCUs
Black and White	Black PCU	Black PCU	Black PCU

Detailed Descriptions

Printer ACS

The user can validate or invalidate the ACS from the following menu: ◈/⌨ > Printer Features > System > B&W Page Detect. The ACS works when B&W Detect is on, and does not work when B&W detect is off. The tables list which PCUs are in operation.

B&W Page Detect: On

Printer Driver	Print		
	B/W Only	**Color Only**	**B/W and Color**
Black and White	Black PCU	Black PCU	Black PCU
Color	Black PCU	Four PCUs	Black PCU or four PCUs

B&W Page Detect: Off

Printer Driver	Print		
	B/W Only	**Color Only**	**B/W and Color**
Black and White	Black PCU	Black PCU	Black PCU
Color	Four PCUs	Four PCUs	Four PCUs

6.12 FUSING

6.12.1 OVERVIEW

B146D569.WMF
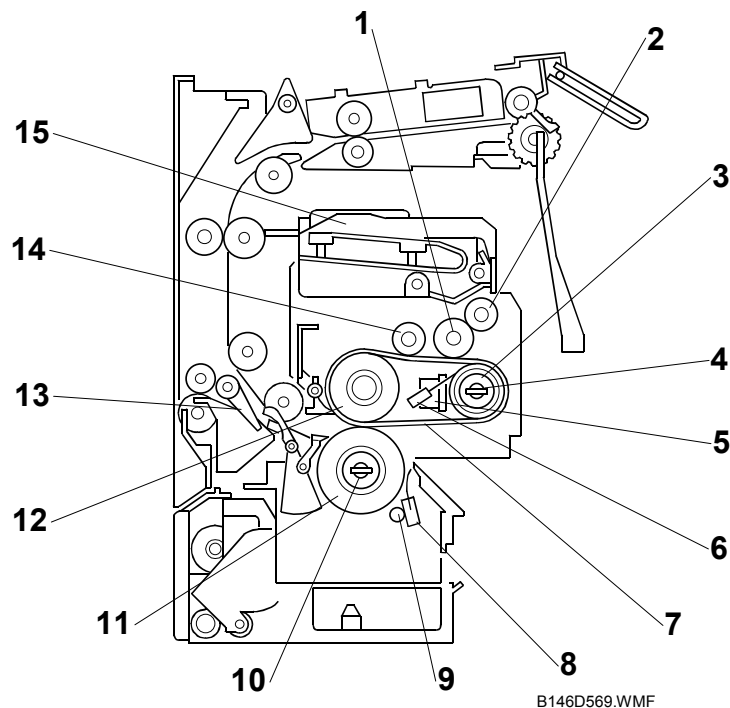
1. Oiling roller
2. Oil supply roller
3. Heating roller
4. Heating roller fusing lamp
5. Heating roller thermostat
6. Heating roller thermistor
7. Fusing belt
8. Pressure roller thermistor

9. Pressure roller thermo fuse
10. Pressure roller fusing lamp
11. Pressure roller
12. Hot roller
13. Junction gate
14. Cleaning roller
15. Oil supply unit

- A belt fusing system is used. This has a faster warm-up time than a conventional hot and pressure roller system.
- The heating roller is made of aluminum to increase the temperature of the fusing belt quickly.
- The hot roller is made of sponge, which flattens slightly, also increasing the fusing nip. This roller does not contain a fusing lamp.
- Each of the heating and pressure rollers has a fusing lamp.
  – NA: 770W for the heating roller, 350W for the pressure roller
  – EU: 700W for the heating roller, 325W for the pressure roller
- The heating roller thermistor and pressure roller thermistor control the temperature of these lamps.
- Temperature is normally controlled by turning the fusing lamps on and off. To change between on/off control and phase control: SP1-104-1.
- The oil supply roller supplies oil to the fusing belt through the oiling roller. This mechanism spreads the oil on the fusing belt evenly.

Detailed Descriptions

6.12.2 FUSING UNIT DRIVE

[A]

[B]

[C]

[D]

[E]

[F]

[G]

B146D570.WMF
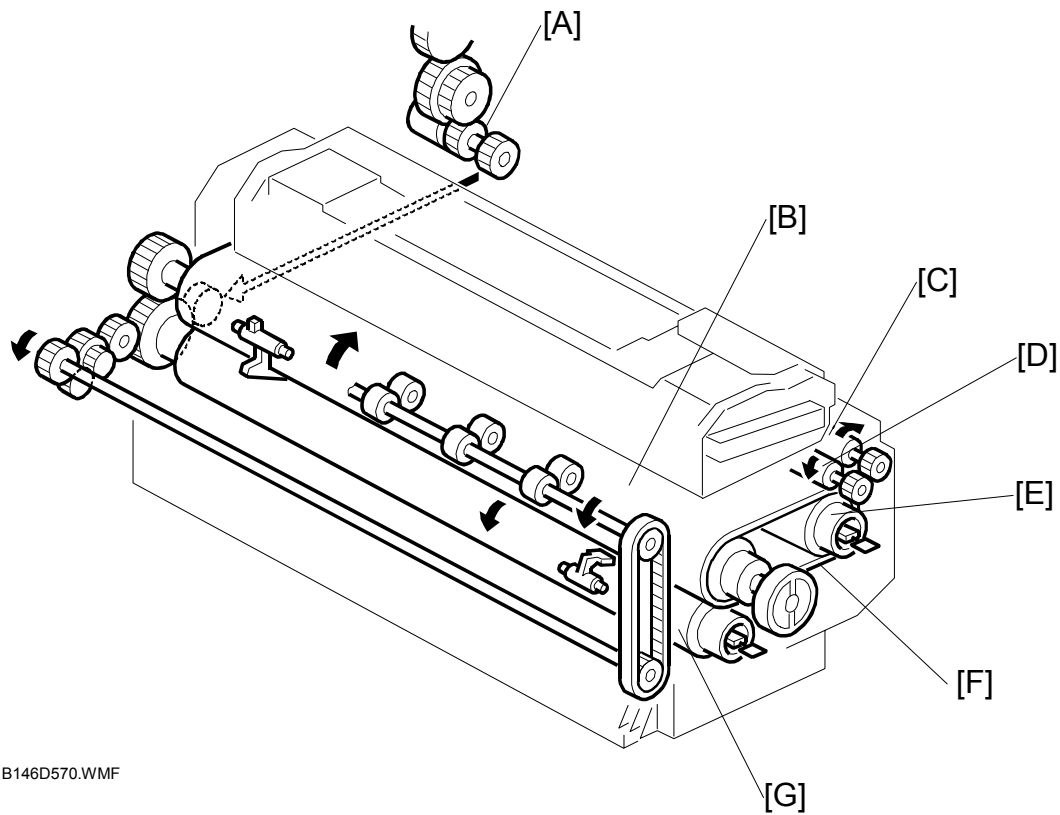
Belt and Rollers

Development drive motor-K drives the pressure roller [G], hot roller [B], oil supply roller [C], and oiling roller [D] through the gear train. The heating roller [E] is driven by the pressure with the fusing belt [F].

Fusing Clutch

The fusing clutch [A] turns off and cuts the drive power when the fusing unit does not need to operate. This mechanism prevents the belt and rollers from wearing and saves the fusing oil.

NOTE: The fusing clutch turns off when images and patterns are created on the transfer belt during process control and line position adjustment.

6.12.3 FUSING TEMPERATURE CONTROL

Fusing Temperatures

When the main switch turns on, the CPU turns on the fusing lamp. The lamp stays on until the thermistor detects the standby temperature. Then the CPU raises the temperature to the printing temperature.

The fusing temperature for each mode is as follows.

Mode	Resolution (dpi)	Temperature of Heating Roller	Temperature of Pressure Roller	Note
Energy saver level 1		100°C	130°C	
Standby mode		NA: 175°C EU: 170°C	NA: 145°C EU: 140°C	If SP1-104-025 is set to 4
Color	1,200 x 1,200	150°C	NA: 125°C EU: 130°C	
	1,800 x 600 600 x 600	180°C	160°C	
Black and white	1,200 x 1,200	NA: 180°C EU: 175°C	NA: 160°C EU: 155°C	
	1,800 x 600 600 x 600	NA: 185°C EU: 180°C	NA: 155°C EU: 160°C	
OHP	All	165°C	150°C	
Thick	All	175°C	155°C	
Color (duplex)	1,200 x 1,200	145°C	NA: 120°C EU: 125°C	
	1,800 x 600 600 x 600	NA: 165°C EU: 170°C	NA: 135°C EU: 150°C	
Black and white (duplex)	1,200 x 1,200	165°C	NA: 135°C EU: 145°C	
	1,800 x 600 600 x 600	175°C	NA: 145°C EU: 155°C	

The heating and pressure roller temperatures for fusing are stored in SP1-105-4 to -28.

When the machine is switched on, the fusing lamp temperatures increase to those specified by SP1-104-25.

The print ready temperature is slightly less than the fusing temperature. The difference is specified by SP1-105-1 and -2.

Detailed Descriptions

Temperature Corrections

To prevent excessive glossiness caused by fusing temperature overshoot, the following SP modes are available:

- 1-913: Fusing temperature is reduced after this number of pages during the job.
- 1-914: This shows how much the temperature is reduced

If a job using OHP or thick paper starts while the fusing unit is still warm, the fusing temperature could be higher than the target for this type of paper, causing marks on the output. To prevent this problem, we have the following SP modes:

- 1-996-4, 5: These SPs specify a limit, above which printing will not start.

Overheat Protection

If the heating or pressure roller temperature becomes higher than 210°C, the CPU cuts off the power to the fusing lamp. SC543 for the heating roller or SC553 for the pressure roller is generated.

If thermistor overheat protection fails, there are the thermostat for the heating roller and two thermofuses for the pressure roller in series with the common ground line of the fusing lamp.

- If the thermostat temperature becomes higher than 215°C, the thermostat opens, removing power from the fusing lamp.
- If either of the two thermofuses temperature becomes higher than 126°C, the thermofuse opens, removing power from the fusing lamp.
  NOTE: These thermofuses make a series circuit.

In either case, the machine stops operation.

6.12.4 OIL SUPPLY AND CLEANING

Oil Supply Pad and Roller

B146D571.WMF
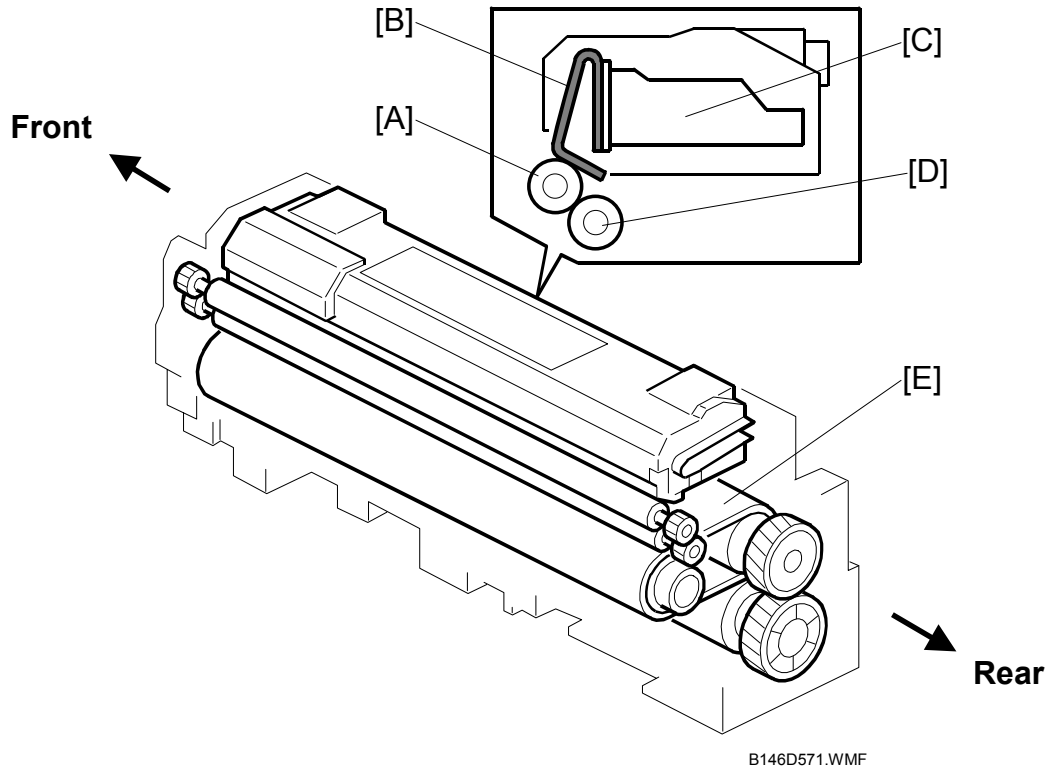
The fusing oil makes it easier for paper to separate from the fusing belt and roller after fusing. The oil [C] from the oil supply pad [B] is supplied to the oil supply roller [A]. The oil supply roller rotates and supplies a bit of oil to the oiling roller [D]. The oiling roller applies the oil to the fusing belt [E].

Detailed
Descriptions

Oil Supply Mechanism

Rear

[A]
[B]
[C]

[G]
[F]

Front

[E]
[D]

B146D572.WMF
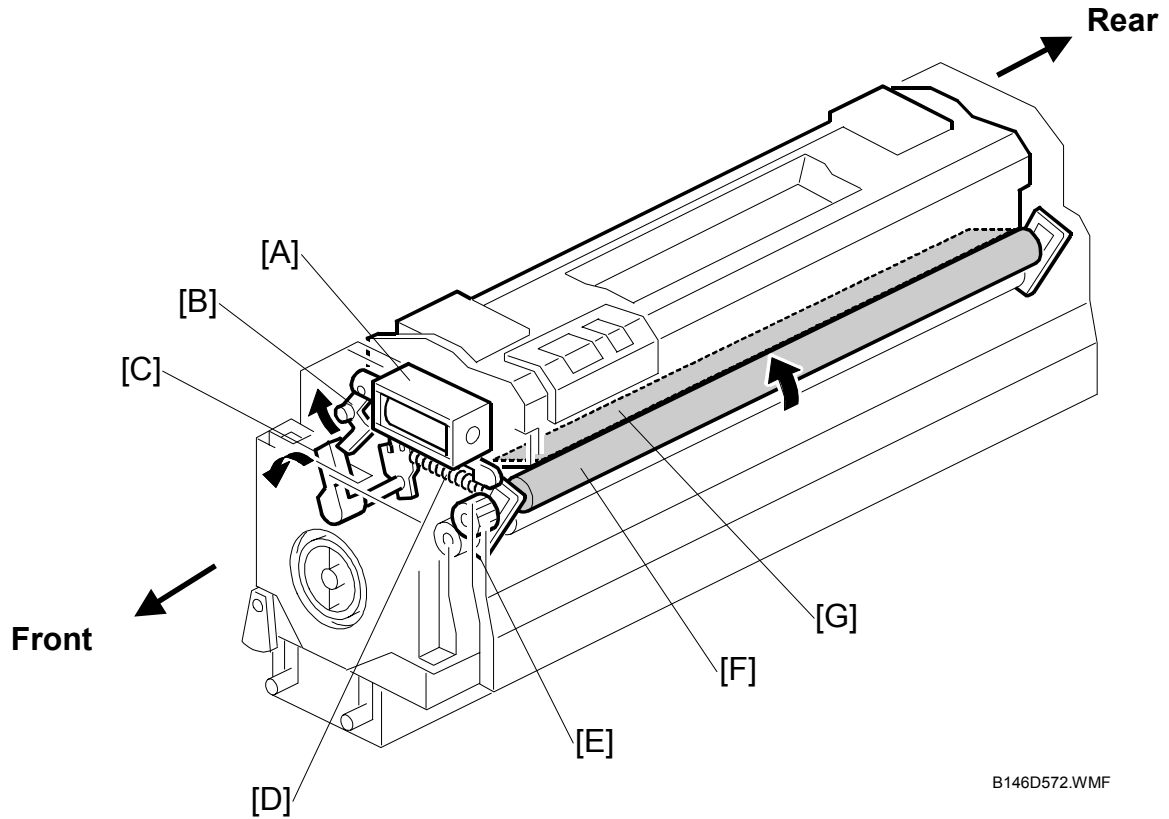
When the solenoid [A] turns on, the solenoid lever [B] pushes the oil supply lever [C] on the fusing unit. The movement is transmitted by the link [D] and the bracket [E] to the oil supply roller [F]. The roller is lifted and touches the oil supply pad [G].

6.12.5 WASTE OIL

B146D919.WMF
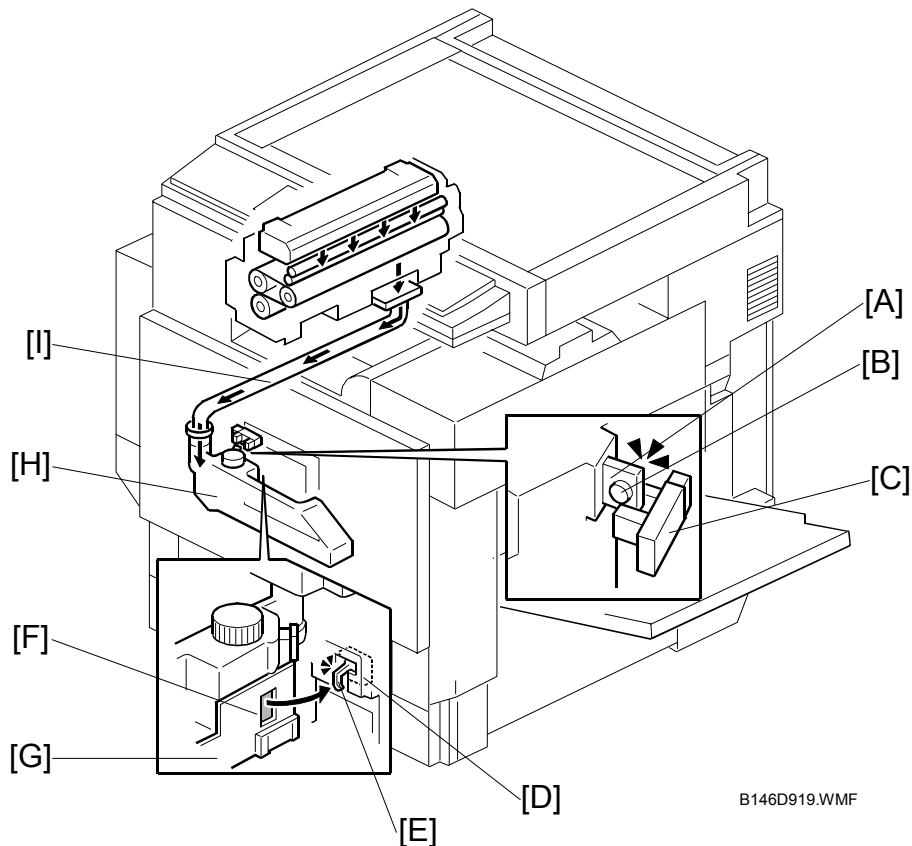
Bottle Set Sensor

Excess fusing oil is collected in the waste oil bottle [H] through the pipe [I]. There is a feeler [E] behind the waste oil bottle holder [G]. The feeler is linked to the bottle set sensor [D]. The feeler is pushed when the bottle is in the holder and the holder is set in place.

NOTE: 1) The feeler goes through an opening [F] on the rear side of the holder. The bottle pushes the feeler directly.
2) The bottle set sensor is checked when the main switch is turned on or when the front or left door is opened and closed.

If the sensor does not detect the bottle, the message, "Waste Oil Bottle Setting Error," is displayed. This message is cleared after the bottle is set and the front cover is closed (or the main switch is turned off and on). Just opening and closing the cover does not clear the message.

NOTE: With this error message, another message, "Waste Oil Bottle is Almost Full," can be displayed (☛ Waste Oil Sensor).

Detailed
Descriptions

Waste Oil Sensor

There is an enclosed area [A] on the rear left shoulder of the waste oil bottle. On the inside wall of this area are two pinholes, through which the waste oil can flow into the enclosed area. This enclosed area contains an actuator [B], which interrupts the waste oil sensor [C] if no oil is in the area.

When the amount of waste oil becomes large enough for the waste oil to flow into the area, the actuator floats on the oil. When the actuator leaves the waste oil sensor, the message, "Waste Oil Bottle is Almost Full," is displayed on the operation panel.

NOTE: With this error message, another message, "Waste Oil Bottle Setting Error," can be displayed (☛ Bottle Set Sensor).

After this message appears, the copier can operate until the number of rotations of development drive motor K reaches the value specified with SP7-905-010. When the number has reached this value, SC571 is displayed and the copier stops its operation. When you dispose of the waste oil, the machine resumes its normal operations (no need to switch the machine off/on).

6.12.6 NEW FUSING OIL SUPPLY UNIT DETECTION
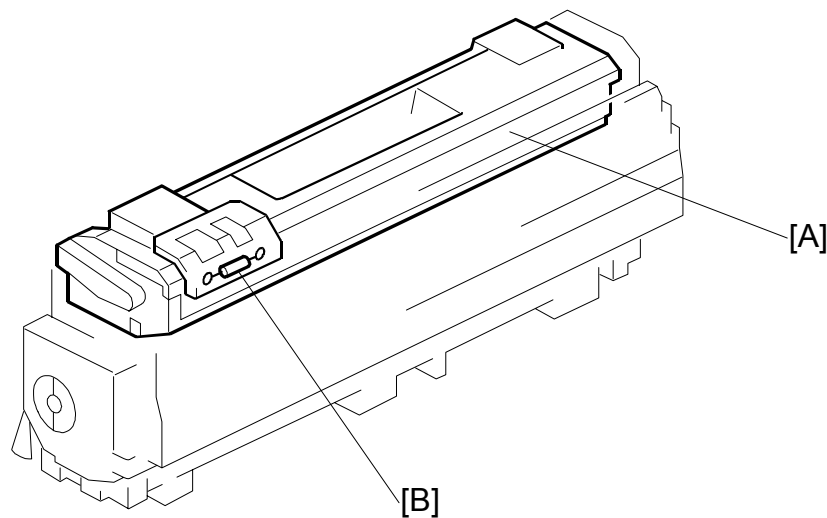
B146D573.WMF

The fusing oil supply unit [A] contains a fuse [B] in a circuit between the fusing unit and the BCU board. The fuse opens shortly after a new unit has been installed in the machine and the power is switched on. When the power is turned on or the left cover is closed, the BCU checks whether a new fusing oil supply unit is installed by checking the fuse condition. If the fusing oil supply unit has been replaced, the machine detects the new unit and automatically resets the counter for the unit.

Oil near-end is detected by counting the number of prints made. The machine indicates oil near-end 2,500 sheets before the life of the oil supply unit runs out. This timing can be changed with SP7-905-14. When the oil is all used, SC570 is displayed and the copier stops its operation.

6.12.7 ENERGY SAVER MODES

Overview
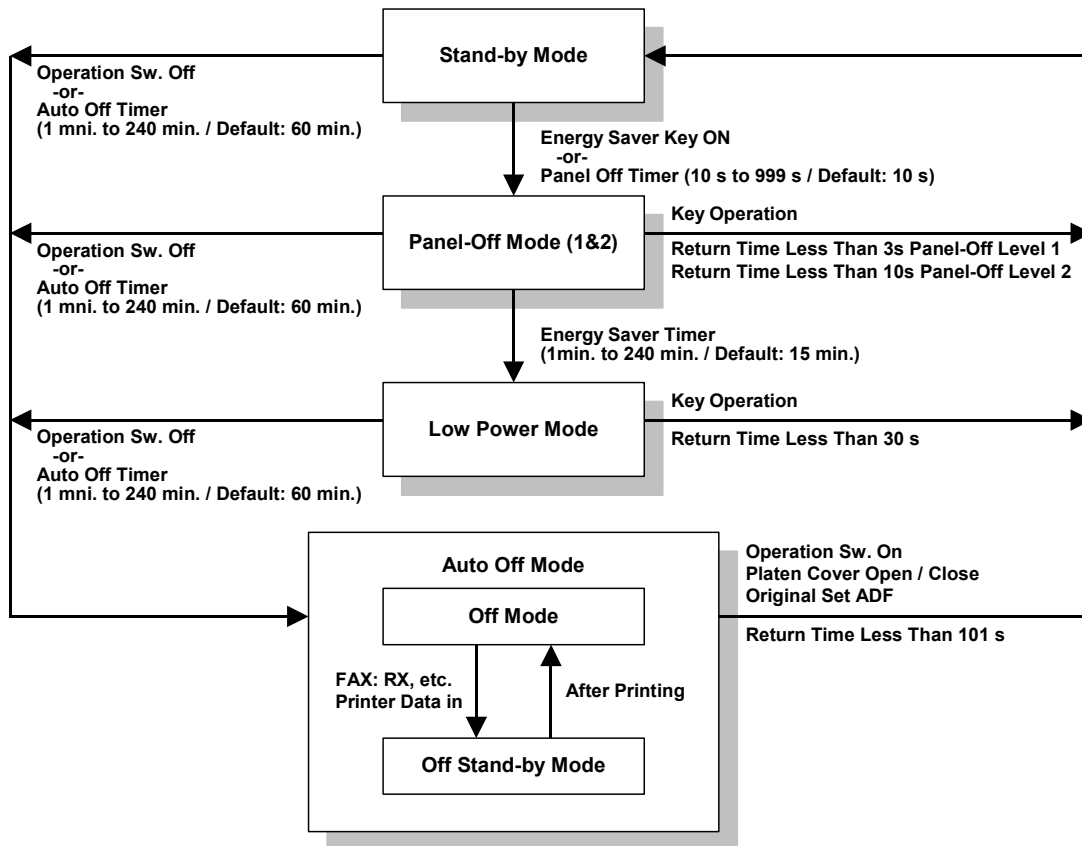
B146D936.WMF

When the machine is not being 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) Panel-off mode
> 2) Auto Off mode

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

- Panel off timer: User Tools – System Settings – Timer Setting – Panel Off Timer
- Auto off timer: User Tools – System Settings – Timer Setting – Auto Off Timer
- Auto off disabling: User Tools – System Settings – Key Operator Tools – AOF (Always ON). This disables the auto off mode.

Detailed Descriptions

Panel Off Mode

Entering the panel off mode

The machine enters the panel off mode when one of the following is done.

- The panel off timer runs out.
- The Clear Mode/Energy Saver Key is held down for one second.

If the value specified in the panel off timer is larger than the value specified in the energy saver timer, the machine goes into the low power mode without going into the panel off mode. A similar thing happens when the value in the panel off timer is larger than that in the auto off timer. To make the panel off mode effective, specify a value smaller than the values in the energy saver timer and auto off timer.

What happens in panel off mode

When the machine is in the panel off mode, each of the fusing lamps are kept at the temperatures indicated in the table at the bottom of the page, and the operation panel indicators are turned off except for the Energy Saver LED and the Power LED.

If the controller receives an image print out command from an application program (e.g. to print incoming fax data or to print data from a PC), the temperature of each fusing lamp 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 return time from the panel off mode is less than 30 seconds.

Mode	Operation Switch	Energy Saver LED	Fusing Temperature	+24V	System +5V
Panel off	On	On	Heating roller: $100^{o}C$ Pressure roller: $130^{o}C$	On	On

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 it enters the Auto Off mode.

Entering off stand-by and off modes

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

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

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

- Error or SC condition
- Image data is stored in the memory
- During memory TX or polling RX
- The handset is off hook
- An original is in the ARDF
- The ARDF 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 return time is less than 99 seconds.

Mode	Operation Switch	Energy Saver LED	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

6.13 PAPER EXIT

6.13.1 OVERVIEW

B146D574.WMF

B146D920.WMF
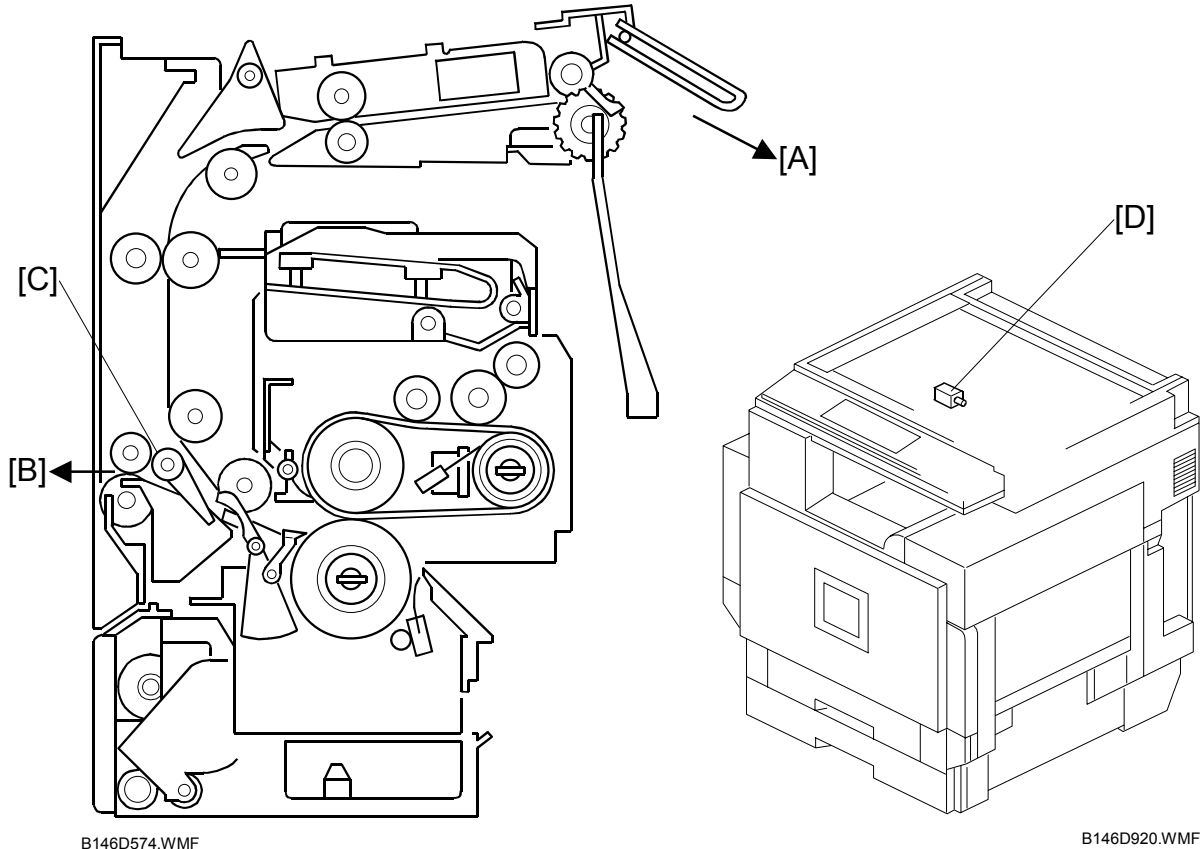
[A]: To standard paper tray
[B]: To external paper tray
[C]: Junction gate
[D]: Junction gate solenoid

After fusing, the junction gate feeds paper to the standard paper tray or the external paper tray. The junction gate solenoid [D] controls the junction gate as follows:

- To the standard paper tray: The junction gate solenoid is off (default)
- To the external paper tray: The junction gate solenoid is on.

Development drive motor-K drives the exit rollers.

6.13.2 PAPER OVERFLOW DETECTION

[A]
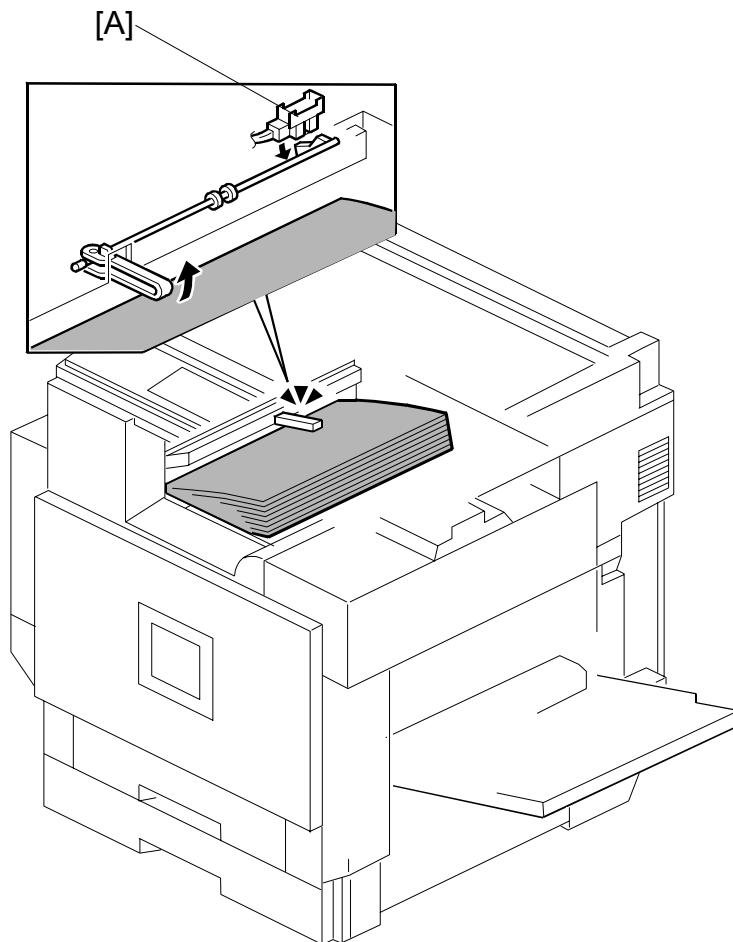
B146D921.WMF

When the paper overflow sensor [A] is activated, the machine detects that the paper stack height has exceeded a certain limit, and stops printing.

6.14 PRINTER FUNCTIONS

6.14.1 OVERVIEW

The printer/scanner unit is provided as a standard unit for North America and Europe models. For other models, install the printer/scanner unit to use scanner functions.
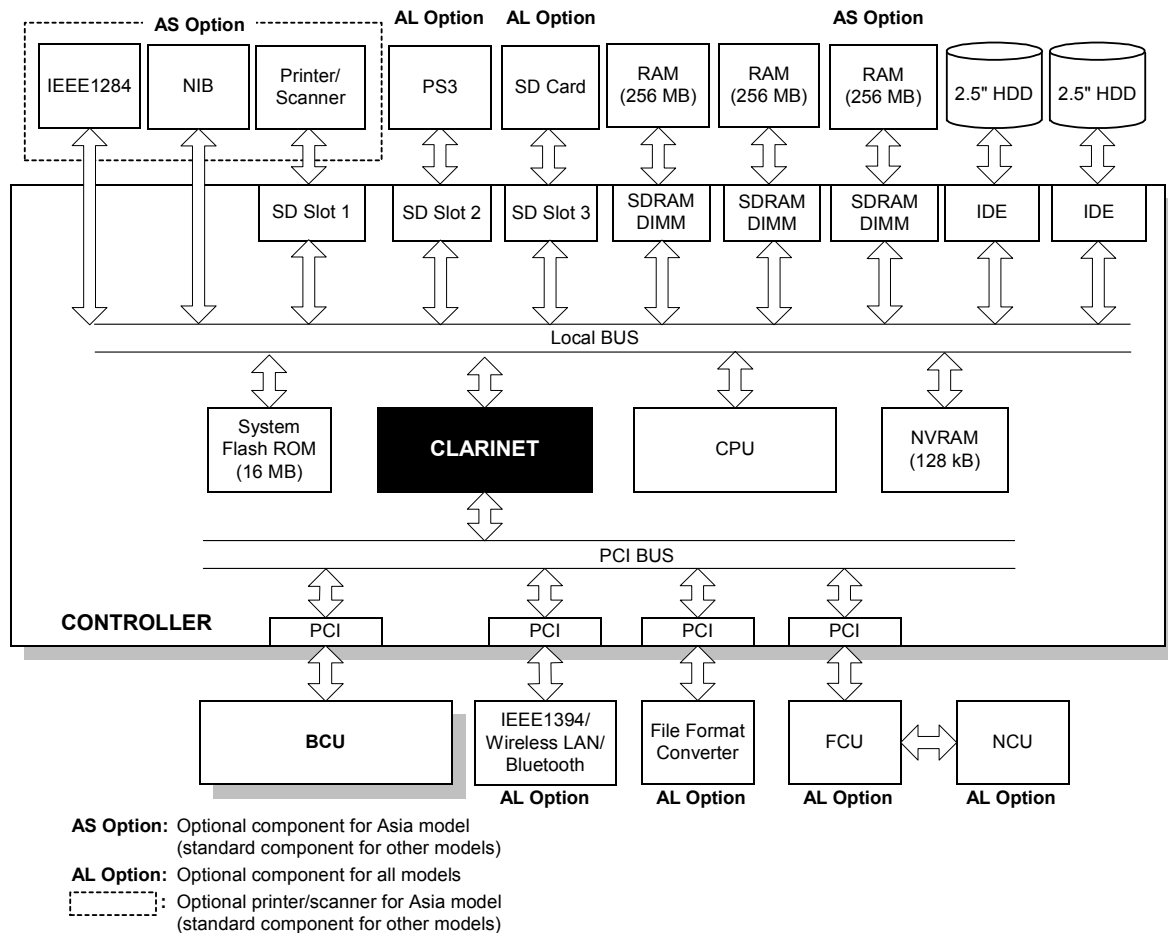
B146D924.WMF

The controller is based on the GW (Grand Work) architecture.

CPU: RM7065C-533 (496 MHz)

CLARINET:
This is one of the GW-architecture ASICs. It uses a 124 MHz bus to interface with the CPU and memory. CLARINET controls the interface, memory, local bus, interruption processing, PCI bus, video data, HDD, network, operation panel, IEEE1284, and image processing.

Flash ROM: The 16-MB flash ROM is for the system program.

SDRAM DIMM (3 slots):
The controller has 512-MB resident SDRAM. You can expand the memory up to
768 MB (256 MB x 3).

NVRAM:
The 128-KB NVRAM stores the engine/controller settings and logs.

Ethernet:
100Base-TX/10Base-T is an optional component for the Asia model, and a
standard component for other models.

IEEE1284 Interface:
The IEEE1284 interface is a standard component for the Europe and North
America models, and an optional component for other models.

NIB:
The network interface board is a standard component for the Europe and North
America models, and an optional component for other models.

Interface Option:
You can install one of the four network components (USB 2.0, IEEE1394, Wireless
LAN, Bluetooth).

HDD:
Two 40-GB HDDs are among standard components. Each hard disk is partitioned
as shown below. You cannot change the partition sizes.

Detailed Descriptions

6.14.2 HARD DISK

Overview

The capacity of the hard disk is 80 GB. The controller partitions it into several drives and allocates them for different functions. You can initialize these partitions as necessary (☛ SP5-832). The table lists the contents of the hard disk.

Contents	Capacity (MB)	Volatile/ Nonvolatile	Initialization (SP5-832)
Images	37,500	Nonvolatile	002
	25,000	Volatile	
Thumbnails	2,400	Nonvolatile	003
Job logs	10	Nonvolatile	004
Printer fonts	500	Nonvolatile	005
User information	100	Nonvolatile	006
Mail RX data	200	Nonvolatile	007
Mail TX data	1,000	Nonvolatile	008
Designer data	1,256	Nonvolatile	009
	1,000	Volatile	
Logs	150	Nonvolatile	010
Ricoh interfaces	500	Nonvolatile	011

Volatile: The data is lost when you turn the main switch off.
Nonvolatile: The data is retained when you turn the main switch off.

Data Transfer

The copier executes the direct memory access (DMA) two times as fast as the conventional DMA.

The controller has two identical hard disk drives. One HDD interface connects these drives with the memory. There is a 32-bit data bus between the memory and the HDD interface; and a 16-bit data bus between the HDD interface and each hard disk drive (two 16-bit data busses in total).

When receiving 32-bit data from the memory, the HDD interface divides them into two 16-bit data and transfers them to each hard disk drive. Hard disk drive 1 stores data in an address; hard disk drive 2 stores data in an address. These two addresses correspond with each other. When receiving two 16-bit data from two corresponding addresses of the hard disk drives, the HDD interface combines them and transfers 32-bit data to the memory.

B146D937.WMF

If a bad sector is found in an address of one hard disk drive, the sector in the corresponding address of the other hard disk drive is also treated as a bad sector.
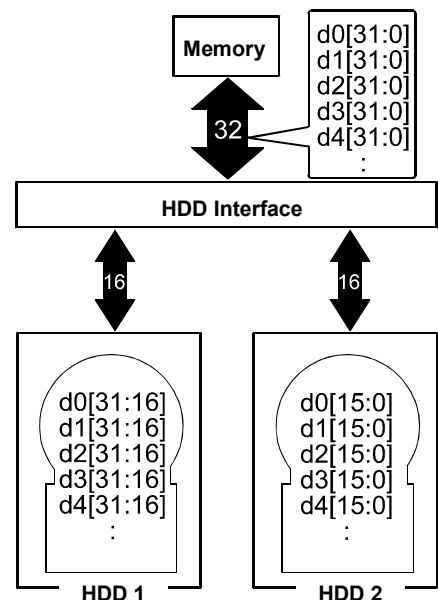
6.14.3 PRINT DATA PROCESSING

RPCS Driver

B146D932.WMF

PCL5c Driver

B146D933.WMF
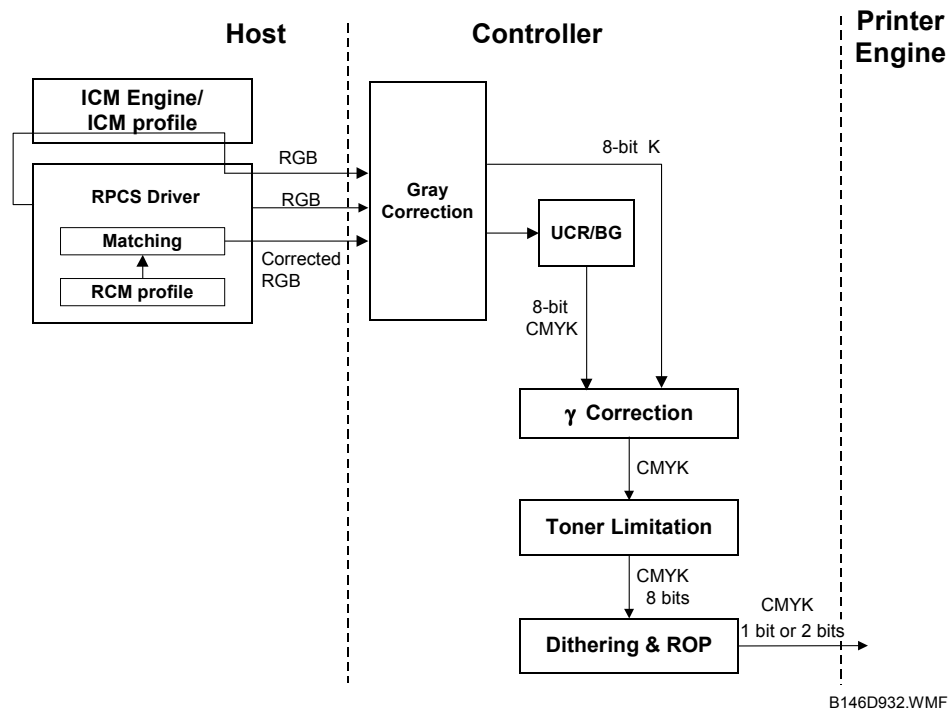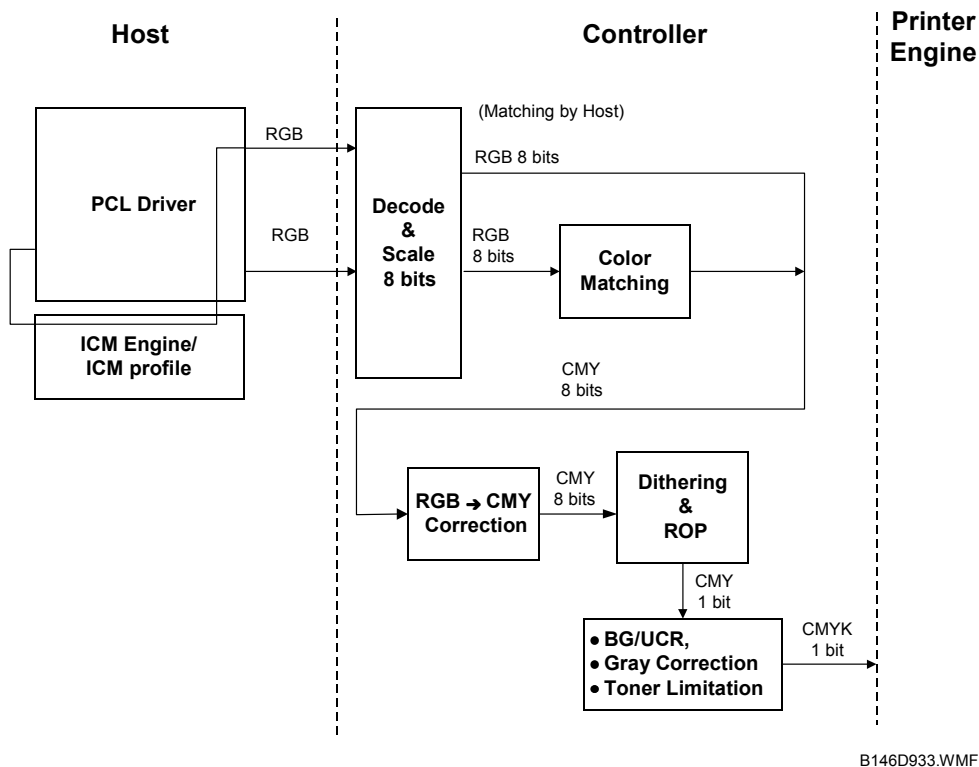
Detailed Descriptions

PS3 Driver
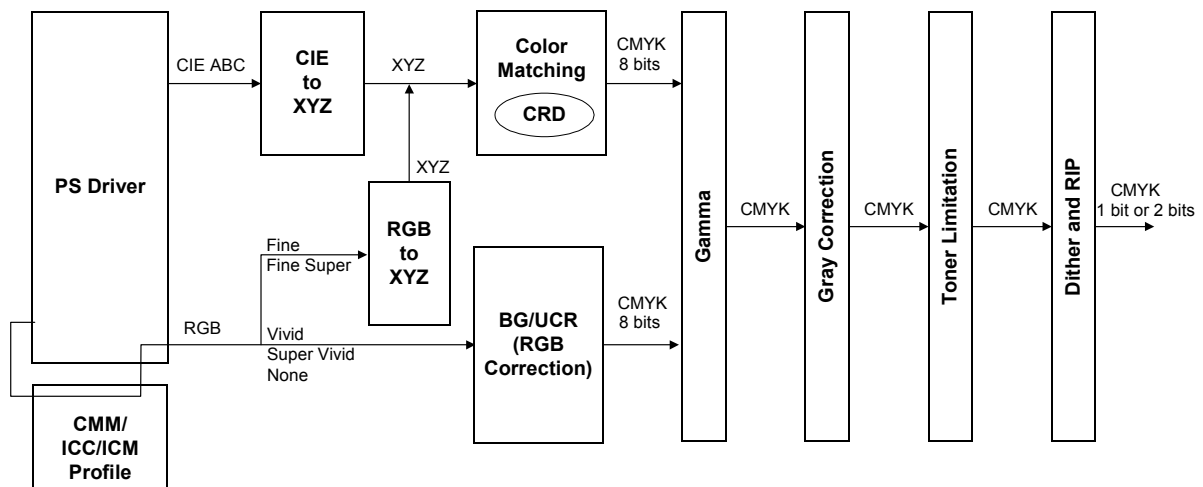
B146D934.WMF

CMS (Color Management System)

CMS optimizes the color print quality using a color profile that is based on the characteristics of the printer. With RPCS, the color profile is applied by the driver. With PS3 and PCL5c, the color profile is applied in the matching/CRD module on the controller except when using CMM/ICC/ICM profiles.

CMS is not used when the color profile setting in the printer driver is set to "Off."

Gray Correction

Gray correction processes gray with the K or CMYK toner depending on the driver settings.

BG/UCR (Black Generation/Under Color Removal)

The RGB data is converted to CMYK data with BG/UCR. During CMYK conversion, some CMY data is replaced with K data by the BG/UCR algorithm.

Gamma Correction

The printer gamma can be adjusted with controller SP mode (Gamma Adj.). For CMYK, there are15 points between 0 and 100%. The corrected gamma data is stored in NVRAM.

Toner Limitation

Toner limitation prevents toner from being scattered around text or printed lines.

Maximum values have been prepared independently for text and photo. They can be adjusted with controller SP mode (Toner Limit).

- Default: 190% for text, 260% for photo
- Adjustable range: 100% to 400%

Dither Processing and ROP/RIP

Dither patterns have been prepared for photo and text independently. Dithering converts 8-bit data to 1-bit or 2-bit data. However, these dither patterns create the illusion of 256 gradations for high quality prints. The optimum dither pattern is selected depending on the selected resolution.

RIP: Raster Image Processing
ROP: Raster Operation

Detailed Descriptions

6.14.4 CONTROLLER FUNCTIONS

Sample Print

This feature was formerly known as "Proof Print." This function gives users a chance to check the print results before starting a multiple-set print run.

- The size of the hard disk partition for the sample print feature is 5.8 GB. This partition is also used by the collation and locked print features.
- The partition can hold up to 30 files, including files stored using locked print.
- The partition can hold a log containing up to 20 errors, excluding jobs stored using locked print.
- The maximum number of pages is 2,000, including jobs using locked print and collation.

Locked Print

Using this feature, the print job is stored in the machine but will not be printed until the user inputs an ID at the machine's operation panel. This ID must match the ID that has been input with the printer driver.

- Stored data is automatically deleted after it is printed.
- Stored data can be manually deleted at the operation panel.
- The partition can hold up to 30 files, including files stored using sample print.
- The partition can hold a log containing up to 20 errors, excluding logs stored using locked print.
- The maximum number of pages is 2,000, including jobs using sample print and collation.
- Locked print uses the same hard disk partition as sample print and collation, which is 5.8 GB.

6.14.5 JOB SPOOLING

Print data can be spooled (stored) in the machine's HDD, and the machine starts to print when data transfer is complete. Since the machine stores all data first before printing, the host computer is freed up more quickly.

NOTE: 1) The supported print protocols are IPP and LPR.
2) The default setting for this feature is 'off'. The user must switch it on using UP mode to enable this feature.

- The size of the HDD partition for job spooling is 1 GB.
- The partition can hold up to 150 jobs.

Related SP Modes

Job spooling can be turned on and off using the SP mode (SP5-828-069) for each protocol.

The machine does not spool jobs when job spooling is switched off with the SP mode, even when the customer switches it on with the user mode.

Detailed Descriptions

Paper Source Selection

Tray Priority (Auto Tray Select)

The "Tray Priority" setting determines the start of the tray search when the user selects "Auto Tray Select" with the driver. The machine searches paper trays for the specified paper size and type.

When no tray contains paper that matches the paper size and type specified by the driver, the controller stops printing until the user loads the correct paper.

The "Tray Priority" setting can be specified in the following menu: ⬧/123 > System Settings > Tray Paper Settings > Paper Tray Priority: Printer.

```
                    Priority Tray  ◄ - - - -  Start of
                          │                   Tray Search
                          ▼
                        Tray 1
                          │
                          ▼
                        Tray 2
                          │
              ┌───────────┴───────────┐
              ▼                       ▼
        LCT (Optional)         Tray 3 (Optional)
                                      │
                                      ▼
                               Tray 4 (Optional)
```

B146D575.WMF

NOTE: The by-pass feed table is not part of the tray search.
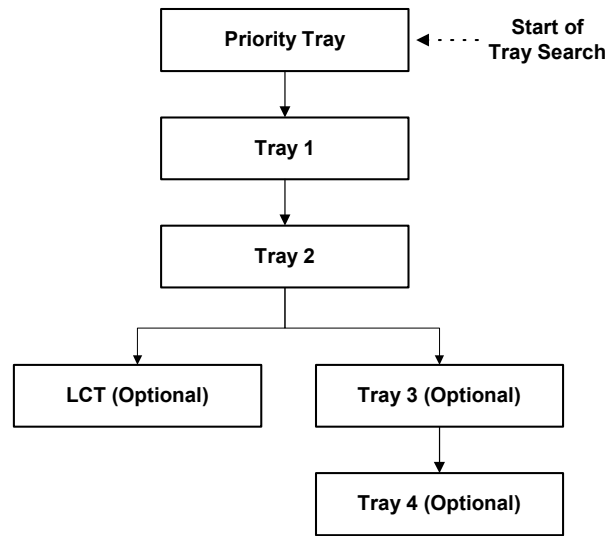
Tray Locking

If "Tray Locking" is enabled for a tray, the controller skips the "locked" tray in the tray search process.

The "Tray Locking" setting can be specified in the following menu: ⬧/123 > System Settings > Tray Paper Settings > Paper Type: Tray # > Apply Auto Paper Select (where the "#" indicates the tray number).

NOTE: The by-pass feed table cannot be unlocked (Tray Locking is always enabled).

Manual Tray Select

If the selected tray does not have the paper size and type specified by the driver, the controller stops printing until the user loads the correct paper.

Auto Continue

Overview

When this function is enabled, the machine waits for a specified period (0, 1, 5, 10, 15 minutes) for the correct paper size and type to be set in the tray. If the timer runs out, the machine starts printing, even if there is no paper tray which matches the paper size and paper type specified by the driver.

The machine searches for a paper tray in the following way:

- The interval can be set with the following menu: 🔷/🔢 > Printer Features > System > Auto Continue.

NOTE: The default setting for this feature is "Off."

Auto Tray Select

When there is no paper tray that matches the paper size and type specified by the driver, the machine searches for any tray that has paper, and prints from the first tray it finds. The start of the tray search is the tray selected as the priority tray.
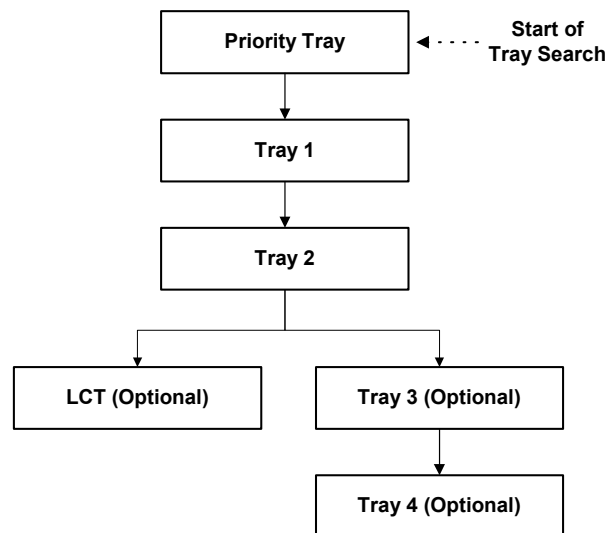
B146D576.WMF

Manual Tray Select

The machine prints from the selected tray even if the paper size and type do not match the setting specified from the driver.

If "Auto Continue" is disabled, the machine waits until the user loads the correct paper in the tray.

Paper Output Tray

You can select output trays as follows: User Tools > System Settings > Tray Paper Settings. If a print job does not specify an output tray or if the driver specifies the default tray, the output tray selected with this user tool will be used.

Output Tray Selected

- If the machine cannot print to the selected output tray, it prints to the default paper output tray.
- If paper overflow is detected at the selected output tray, the controller suspend printing.

Stapling

The optional two-tray finisher and booklet finisher can staple papers. Both finishers support the following stapling positions:

[A]: One staple (vertical) is at the rear right corner.
[B]: Two staples (vertical) are at the right middle edge.
[C]: One staple (vertical) is at the front right corner.
[D]: One staple (slant) is at the front right corner.

Paper exit

The two-tray finisher supports the following stapling position (the booklet finisher does not):

[E]: One staple (slant) is at the front right corner.

The booklet finisher supports the following stapling position (the two-tray finisher does not):

B146D922.WMF

[F]: Two staples (vertical) are at the center.
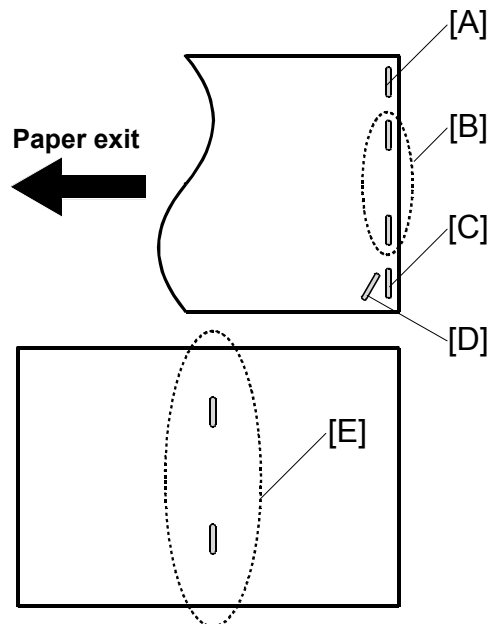
The table lists the number of papers that the finishers can staple.

	Position	Paper size	
		A4, B5, LT	A3, Ledger, Legal
Two-tray finisher	[A][B][C][D][E]	50 sheets	30 sheets
Booklet finisher	[A][B][C][D][E]	50 sheets	25 sheets
	[F]	—	10 sheets

NOTE: For more paper sizes, see the specifications.

Punching

To enable a finisher to punch out holes, you must install the optional punch unit to it. Each punch unit needs the dedicated punch unit. Note that these punch units are not interchangeable with each other. To make two holes on a sheet of paper, you must install the two-hole type; to make three, the three-hole type; and to make four, the four-hole type. The table shows which type you can install to your finisher.

Finisher model	Two holes	Three holes	Four holes
North America	✖	✖	N/A
Europe (excluding North Europe)	✖	N/A	✖
North Europe	N/A	N/A	✖

✖: Available
N/A: Not available

Detailed Descriptions

6.15 ETHERNET BOARD

6.15.1 ETHERNET BOARD LAYOUT
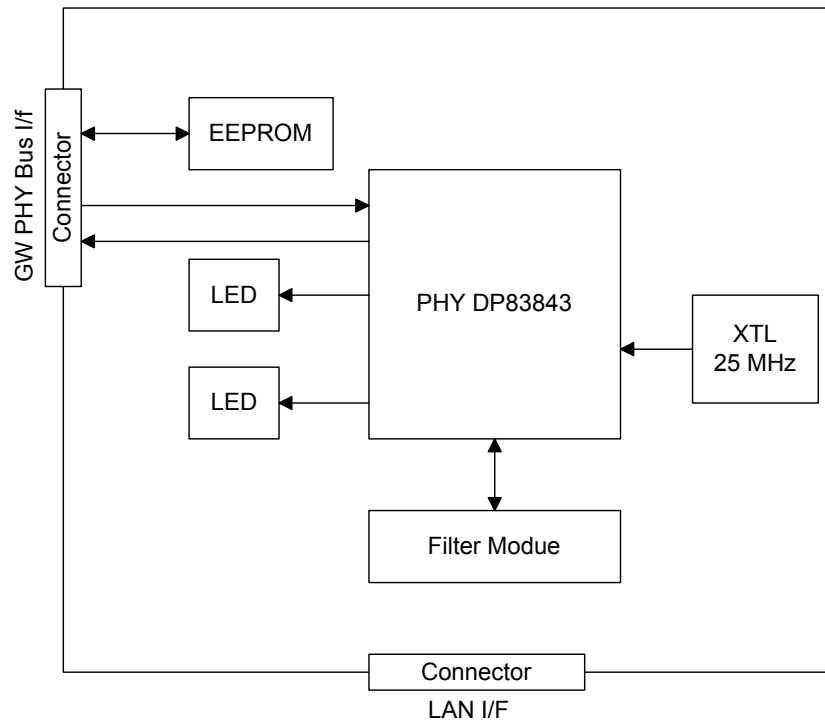
B146D579.WMF

Function Blocks	Description
PHY (Physical Layer Device)	Completely standardized physical layer device for the functions of each device in the network.
EEPROM	Stores the MAC address.

The physical layer device, the lowest layer of the OSI reference model, refers to the physical components of the network: cables, connectors, and so on. OSI, the *Operating Standard Interface*, is a framework upon which networking standards are arranged. It is commonly diagramed as a layered cake.

6.15.2 ETHERNET BOARD OPERATION

The NIB is a standard IEEE802.3u type which implements 10/100Mbps auto negotiation. System initialization sets the network for 10Mbps/100Mbps.
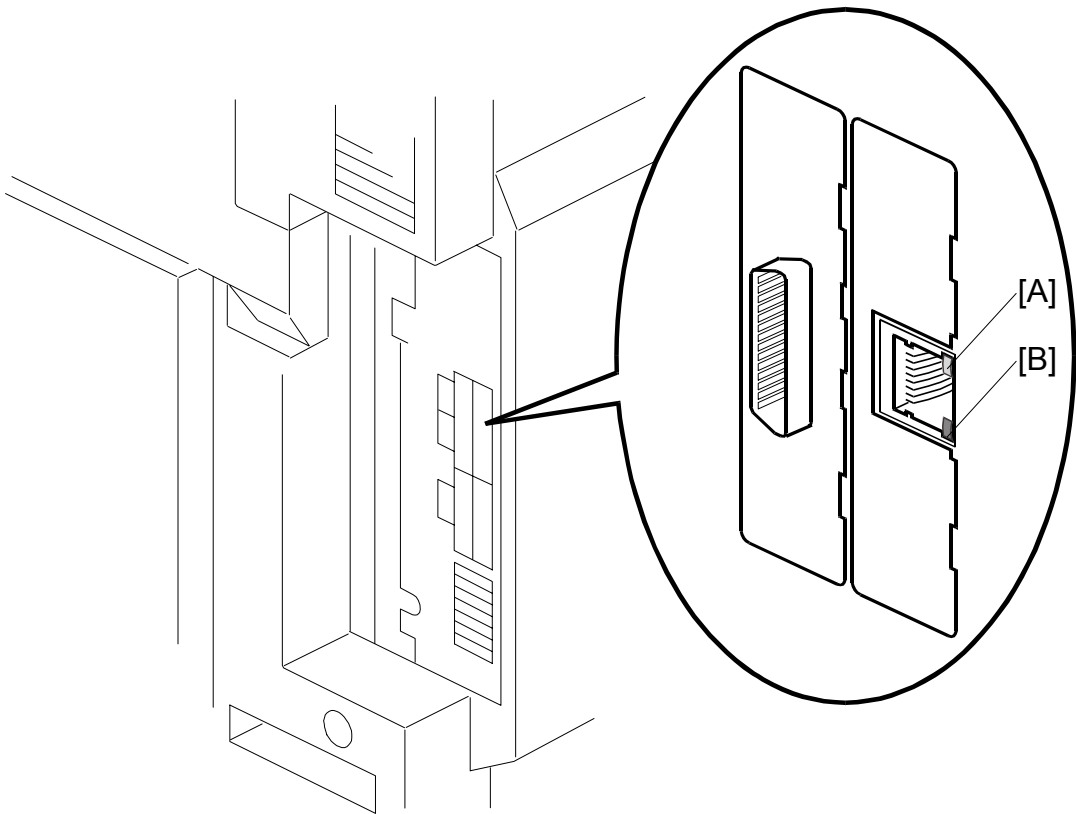
B146D580.WMF

LED [A] (Orange)	Indicates the operation mode: On: 100 Mbps mode Off: 10 Mbps mode
LED [B] (Green)	Indicates the link status: On: Link Safe Off: Link Fail

Detailed Descriptions

6.16 IEEE1394 BOARD (FIREWIRE)

6.16.1 OVERVIEW

An IEEE1394 interface board is available as an option for this machine to provide high speed connectivity through what is commonly called Firewire or i.LINK (Sony). Some important advantages of Firewire are:

- High speed data transmission at 400 Mbps.
- Easier connectivity (many devices can be connected without a host).
- Devices in a computer can be connected to external devices on a shared bus.

IEEE1394 supports two printing methods: 1) SCSI Print, and 2) IP Over 1394. IP Over 1394 supports printing by setting an IP address, and SCSI supports printing without an IP address.
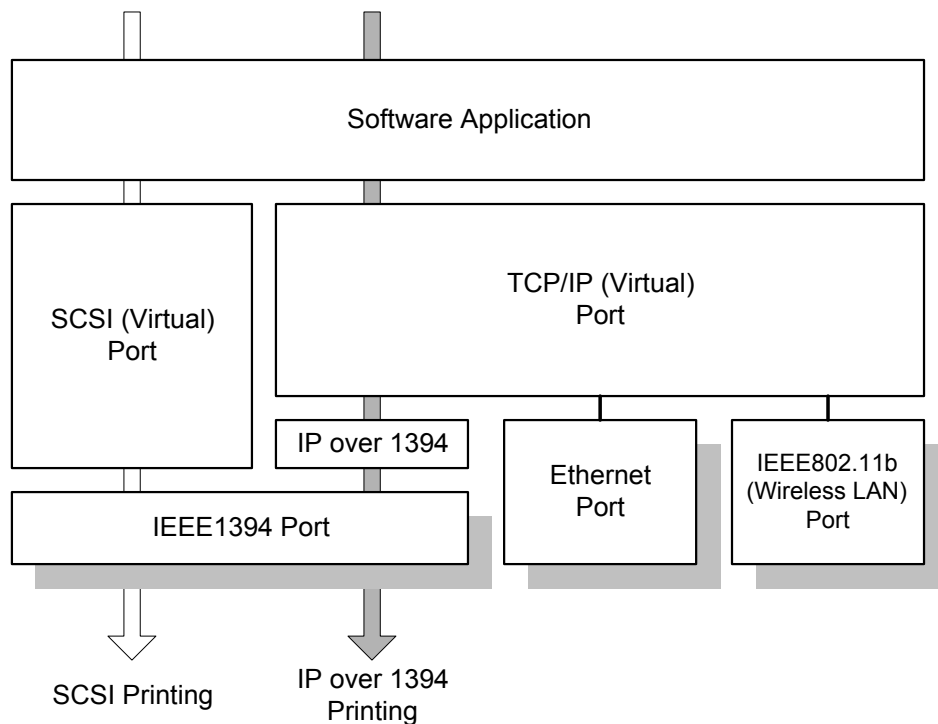
B146D581.WMF

NOTE: 1) Windows Me and Windows XP support IP over 1394.
2) Windows XP and 2000 support IEEE1394 SCSI printing.

When the host computer powers up, it queries all the devices connected to the bus and assigns each one an address, a process called enumeration. Here are some general features of Firewire:

- Firewire is Plug-and-Play.
- Firewire devices are hot pluggable (they can be plugged while the system is operating).
- Firewire uses 64-bit fixed addressing, based on the IEEE 1212 standard. There are three parts to each packet of information sent by a device over FireWire:
  - 10-bit Bus ID. Used to determine the Firewire bus where the data came from.
  - 6-bit Physical ID. Used to identify the device that sent the data.
  - 48-bit Storage Area. Capable of addressing 256 terabytes of information for each node
- The Bus ID and Physical ID comprise the 16-bit Node ID. 64,000 nodes are allowed on each system.
- Up to 16 hops are allowed (4.5 m/hop) for a total of 72 meters devices are daisy-chained.
- Firewire allows its devices to draw power from the Firewire connection. Two power connectors in the cable can supply power (8 to 40 V, 1.5 amp max.)
- An important element of Firewire is its support of isochronous devices. When isochronous devices are in the isochronous mode, data streams between the device and the host in real time with guaranteed bandwidth and no error correction. Essentially, this means that a device like a digital camcorder can request that the host computer allocate enough bandwidth for the camcorder to send uncompressed video in real time to the computer. The camera can sent data via the Firewire connection in a steady flow to the computer without anything disrupting the process. This is one of the main reasons why 1394 has been widely adopted by the consumer electronics industry.

Detailed Descriptions

6.17 USB

6.17.1 SPECIFICATIONS

USB connectivity is provided as an option for this machine.

Interface: USB 1.1, USB 2.0
Data rates: 480 Mbps (high speed), 12 Mbps (full speed), 1.5 Mbps (low speed)
             High speed mode is only supported by USB 2.0.

6.17.2 USB 1.1/2.0

USB (Universal Serial Bus) offers simple connectivity for computers, printers, keyboards, and other peripherals. In a USB environment, terminators, device IDs (like SCSI), and DIP switch settings are not necessary.

USB 1.1 provides the following features:

- Plug & Play. As soon as a new device is connected via USB, the operating system recognizes it, and the appropriate driver is installed for it automatically if the driver is available. If the driver is not available, a message prompts the user for the driver disk for immediate installation.
- Hot swapping (cables can be connected and disconnected while the computer and other devices are switched on)
- No terminator or device ID required
- Data rates of 12 Mbps (full speed), and 1.5 Mbps (low speed)
- Common connectors for different devices
- Bi-directional data communication between device and host computer via a 4-byte header and DEVICE ID.

USB 2.0 is an evolution of the USB 1.1 specification. It uses the same cables, connectors, and software interfaces so the user will see no change. It provides an easy-to-use connection to a wide range of products with a maximum data rate of 480Mbps (high speed).

Up to 127 devices can be connected and 6 cascade connections are allowed. Power is supplied from the computer and the maximum cable length is 5 m.

6.17.3 USB CONNECTORS

USB is a serial protocol and a physical link, which transmits all data on a single pair of wires. Another pair provides power to downstream peripherals. The USB standard specifies two types of connectors, type "A" connectors for upstream connection to the host system, and type "B" connectors for downstream connection to the USB device.

Type A connector
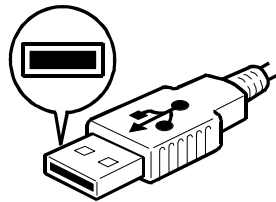
B146D583.WMF

Type B connector
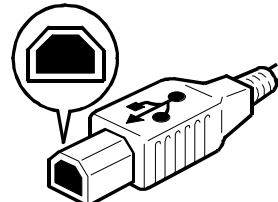
B146D582.WMF

6.17.4 PIN ASSIGNMENT

The controller has the type B receptacle (CN10).

B146D928.WMF
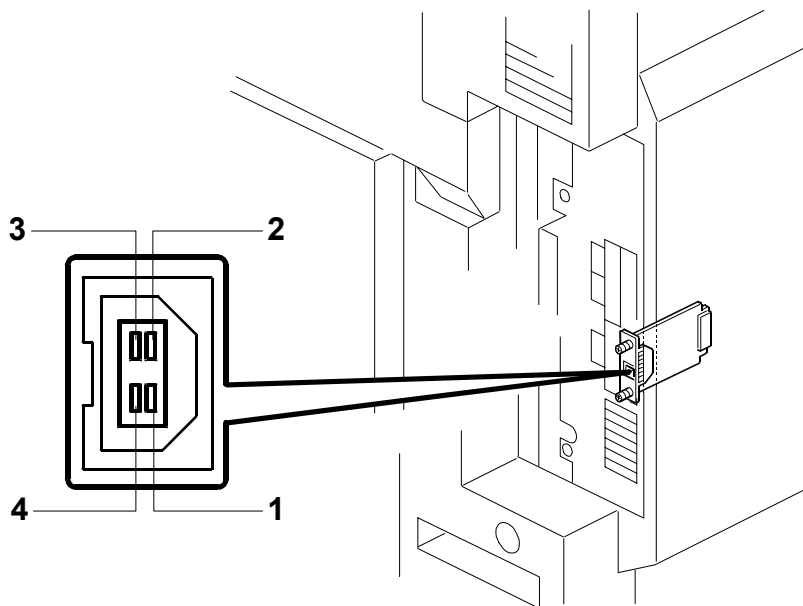
Detailed Descriptions

Pin No.	Signal Description	Wiring Assignment
1	Power	Red
2	Data –	White
3	Data +	Green
4	Power GND	White

6.17.5 REMARKS ABOUT USB

- The machine does not print reports specifically for USB.
- Only one host computer is allowed for the USB connection.
- After starting a job using USB, do not switch the printer off until the job has been completed. When a user cancels a print job, if data transmitted to the printer has not been printed at the time of cancellation, the job will continue to print up to the page where the print job was cancelled
- When the controller board is replaced, the host computer will recognize the machine as a different device.

Related SP Mode

"USB Settings" is in SP5-844. Data rates can be adjusted to full speed fixed (12 Mbps). This switch may be used for troubleshooting if there is a data transfer error using the high speed mode (480Mbps).

Data rates can also be adjusted using the UP mode "USB Setting" in the Host Interface in the System menu. This mode can be accessed only when the "Enter", "Escape", then "Menu" keys are pressed to enter the UP mode.

6.18 IEEE 802.11B (WIRELESS LAN)

6.18.1 SPECIFICATIONS

The IEEE 802.11b wireless LAN interface card is available as an option for this machine.

A wireless LAN is a flexible data communication system used to extend or replace a wired LAN. Wireless LAN employs radio frequency technology to transmit and receive data over the air and minimize the need for wired connections.

- With wireless LANs, users can access information on a network without looking for a place to plug into the network.
- Network managers can set up or expand networks without installing or moving wires.
- Most wireless LANs can be integrated into existing wired networks. Once installed, the network treats wireless nodes like any other physically wired network component.
- Flexibility and mobility make wireless LANs both effective extensions of and attractive alternatives to wired networks.

```
Standard applied:        IEEE802.11b
Data transmission rates: Speed        Distance
                         11 Mbps      140 m (153 yd.)
                         5.5 Mbps     200 m (219 yd.)
                         2 Mbps       270 m (295 yd.)
                         1 Mbps       400 m (437 yd.)
Network protocols:       TCP/IP, Apple Talk, NetBEUI, IPX/SPX
Bandwidth:               2.4GHz
                         (divided over 14 channels, 2400 to 2497 MHz for each channel)
```

NOTE: The wireless LAN cannot be active at the same time as the Ethernet LAN. The following user tool setting determines which LAN is active: System Settings – Interface Settings – Network - LAN Type.

Detailed Descriptions

LED Indicators

LED	Description	ON	OFF
LED 1 (Green)	Link Status	Linked	No Link
LED 2 (Orange)	Power Distribution	Power On	Power Off

6.18.2 TRANSMISSION MODES

Wireless communication has two modes: 1) ad hoc mode, and 2) infrastructure mode.

Ad Hoc Mode

The ad hoc mode allows communication between each device (station) in a simple peer-to-peer network. In this mode, all devices must use the same channel to communicate. In this machine, the default transmission mode is ad hoc mode and the default channel is 11. First, set up the machine in ad hoc mode and program the necessary settings, even if the machine will be used in the infrastructure mode.

To switch between ad hoc and infrastructure modes, use the following user tool: Host Interface Menu - IEEE802.11b - Comm Mode
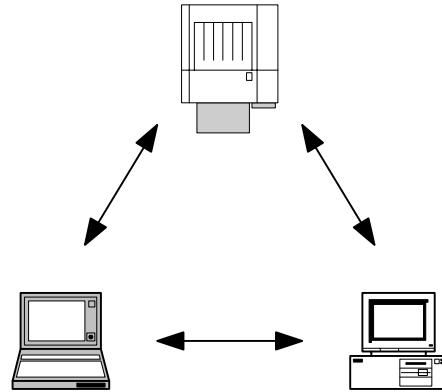
B146D584.WMF

Infrastructure Mode

The infrastructure mode allows communication between each computer and the printer via an access point equipped with an antenna and wired into the network. This arrangement is used in more complex topologies. The wireless LAN client must use the same SSID (Service Set ID) as the access point in order to communicate.
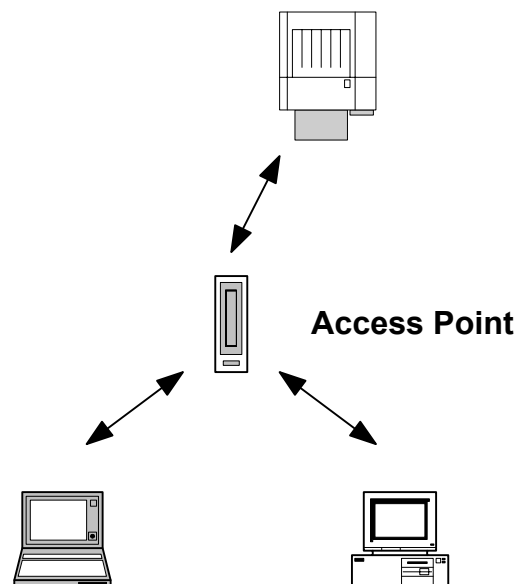
Access Point

B146D585.WMF

6.18.3 SECURITY FEATURES

SSID (Service Set ID)
The SSID is used by the access point to recognize the client and allow access to the network. Only clients that share the same SSID with the access point can access the network.

NOTE: 3) If the SSID is not set, clients connect to the nearest access point.
4) The SSID can be set using the web status monitor or telnet.

Using the SSID in Ad hoc mode

When the SSID is used in ad hoc mode and nothing is set, the machine automatically uses "ASSID" as the SSID. In such a case, "ASSID" must also be set at the client.

NOTE: SSID in ad hoc mode is sometimes called "Network Name."

Some devices automatically change from ad hoc mode to infrastructure mode when the same SSID is used in ad hoc mode and infrastructure mode. In such a case, to use the device in ad hoc mode, use a specified SSID in infrastructure mode and use "ASSID" in the ad hoc mode.

WEP (Wired Equivalent Privacy)
WEP is a coding system designed to protect wireless data transmission. In order to unlock encoded data, the same WEP key is required on the receiving side. There are 64 bit and 128 bit WEP keys. However, this machine supports only 64 bit WEP.

NOTE: The WEP key can be set using the Web Status Monitor or Telnet.

MAC Address
When the infrastructure mode is used, access to the network can also be limited at the access points using the MAC address. This setting may not be available with some types of access points.

Detailed Descriptions

6.18.4 WIRELESS LAN TROUBLESHOOTING NOTES

Communication Status

Wireless LAN communication status can be checked with the UP mode "W.LAN Signal" in the Maintenance menu. This can also be checked using the Web Status Monitor or Telnet.

The status is described on a simple number scale.

Status Display	Communication Status
Good	76 ~ 100
Fair	41 ~ 75
Poor	21 ~ 40
Unavailable	0 ~ 20

NOTE: Communication status can be measured only when the infrastructure mode is being used.

Channel Settings

If a communication error occurs because of electrical noise, interference with other electrical devices, etc., you may have to change the channel settings.

To avoid interference with neighboring channels, it is recommended to change by 3 channels. For example, if there are problems using channel 11 (default), try using channel 8.
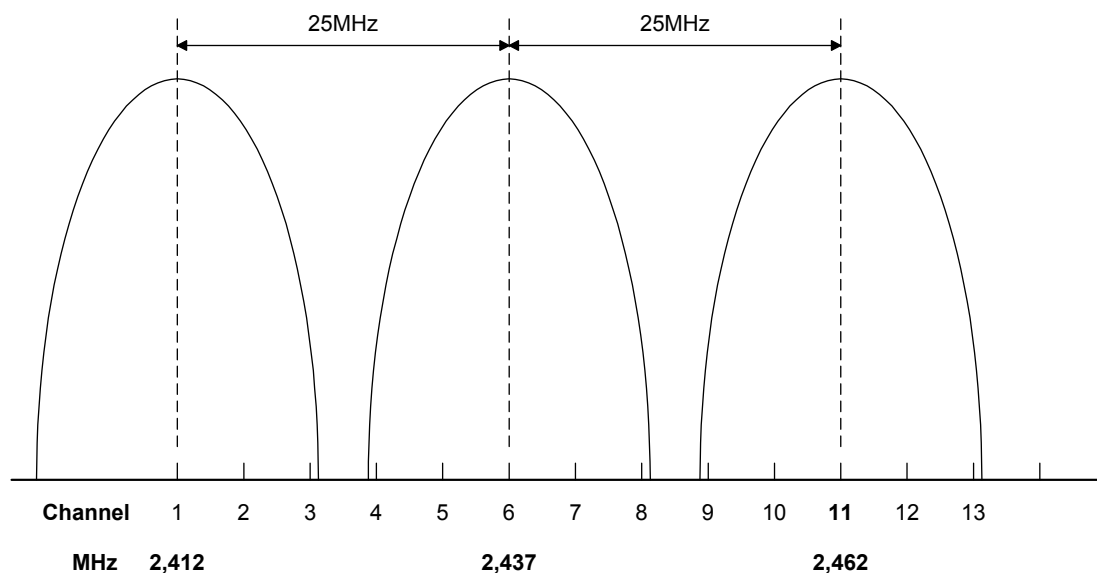
B146D586.WMF

Troubleshooting Procedure

If there are problems using the wireless LAN, check the following.

1) Check the LED indicator on the wireless LAN card.
2) Check if "IEEE802.11b" is selected in the following user tool: Host Interface menu - Network Setup - LAN Type.
3) Check if the channel settings are correct.
4) Check if the SSID and WEP are correctly set.

If infrastructure mode is being used,

1) Check if the MAC address is properly set.
2) Check the communication status.
   If the communication status is poor, bring the machine closer to the access point, or check for any obstructions between the machine and the access point.
   If the problem cannot be solved, try changing the channel setting.

Detailed Descriptions

6.19 BLUETOOTH

6.19.1 SPECIFICATIONS

Bluetooth wireless provides radio links between mobile computers, mobile phones and other portable handheld devices.

Bluetooth contains the following features.

- Cheaper compared to the IEEE802.11b wireless LAN.
- Many protocols for infrared transmission (IrDA) can be used with Bluetooth.
- A Bluetooth device can connect to other Bluetooth devices without any settings.

Standard applied: Bluetooth 1.1 (Bluetooth Special Interest Group)
Data transfer rates: 1 Mbps
Bandwidth: 2.4GHz Frequency Hopping Spread Spectrum (FHSS)

Piconet. Bluetooth devices communicate with each other device in the ad hoc mode. This network is called a "Piconet". A Piconet may contain a maximum of 8 Bluetooth devices.

There is one master device and seven slave devices in a Piconet. The master device controls the hopping frequency and timing, as well as storing the ID codes of the slave devices. The master and slave devices can be swapped. Once the master device leaves the Piconet, a slave device becomes the new master.

Machines with the Bluetooth option become potential slave devices to connect to the PC.

FHSS (Frequency Hopping Spread Spectrum). The Bluetooth device divides 2402 to 2480 MHz into 79 channels of 1 MHz width, and changes the channel 1600 times per second. If other devices in the LAN are using the same radio band, Bluetooth can avoid interference from the other devices.
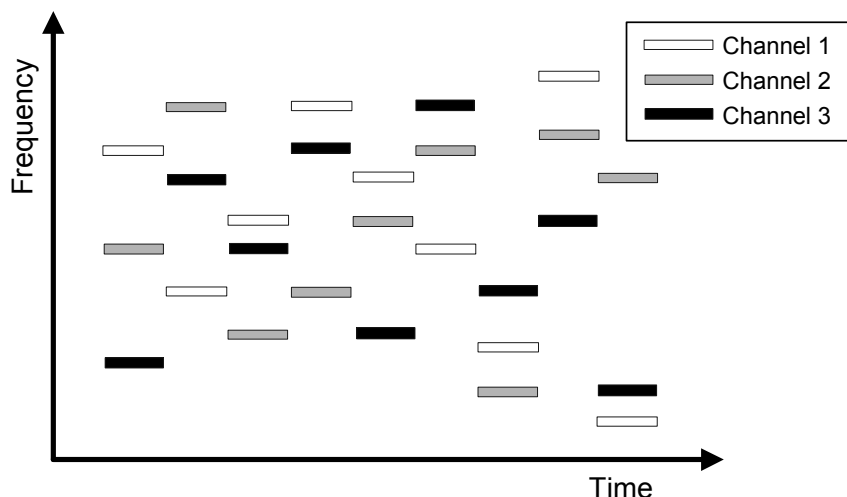
B146D587.WMF

6.19.2 BLUETOOTH PROFILES

A Bluetooth device will not operate if it is located to close another Bluetooth device. However, the Bluetooth device should support the protocols to communicate with each other. There are many types of Bluetooth and service protocols. These are listed below.

Here are 14 profiles for Bluetooth as follows.

- Generic Access Profile
- Service Discovery Profile
- Cordless Telephony Profile
- Intercom Profile
- Serial Port Profile
- Headset Profile
- Dial-up Networking Profile
- Fax Profile
- LAN Access Profile
- Generic Object Exchange Profile
- Object Push Profile
- File Transfer Profile
- Synchronization Profile
- Hardcopy Cable Replacement Profile

Serial Port Profile (SPP) and Hardcopy Cable Replacement Profile (HCRP) are used for the printer products.

SPP is used is place of the serial port, while HCRP is used in place of the parallel port.

6.19.3 BLUETOOTH SECURITY FEATURES

Public and Private Mode. The PC can browse Bluetooth devices. The machine's default is public mode. The PC cannot browse the machine if it has been changed to private mode.

PIN Code (Personal Identification Number). When the PIN code is used, the PC connects to the device that sent the PIN code. The PIN code is a 4 digit number. This machine uses the last four digits of the machine's serial number. It cannot be changed.

Detailed Descriptions

6.20 SCANNER FUNCTIONS

The printer/scanner unit is provided as a standard unit for North America and Europe models. For other models, install the printer/scanner unit to use scanner functions.

6.20.1 IMAGE PROCESSING FOR SCANNER MODE

The image processing for scanner mode is done in the IPU chip on the BCU board. The IPU chip chooses the most suitable image processing methods (gamma tables, dither patterns, etc) depending on the settings made in the driver.

The image compression method can be selected with SP mode (MR/MH/MMR for binary picture processing, JPEG for grayscale processing).

Whether the user selects the image mode using the driver (TWAIN mode) or from the operation panel (Delivery mode), the IPU chip does the image processing using the appropriate image processing methods mentioned above.

Image Data Path

1. Image Store/Image Delivery Mode

B146D926.WMF
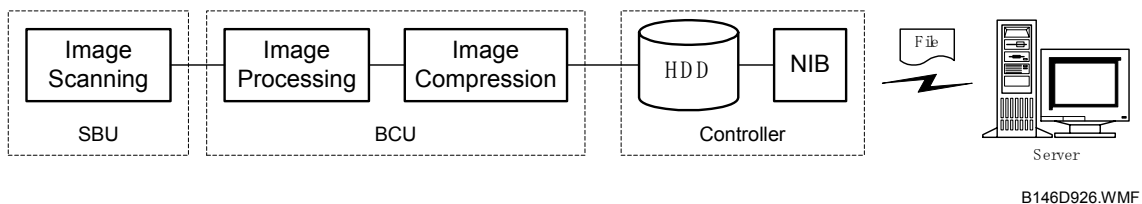
The user can select the following modes from the LCD.

 1) Delivery only
 2) Store only
 3) Store and delivery

After image processing and image compression, all image data for the job are stored in the printer controller HDD using TIFF file format (binary picture processing) or JPEG file format (grayscale processing). The type of TIFF format used depends on the user's scanner settings.

When delivery mode is selected, the controller creates a file which contains the destination and page information, then the controller sends the file to a server.

2. Twain Mode
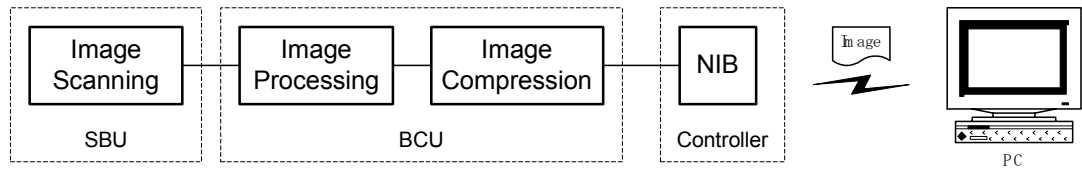
```
┌─────────────┐  ┌──────────────────────────────────┐  ┌──────────┐
│ ┌─────────┐ │  │ ┌─────────┐  ┌─────────────┐      │  │ ┌──────┐ │
│ │  Image  │ │  │ │  Image  │  │    Image    │      │  │ │ NIB  │ │
│ │Scanning │ │  │ │Processing│  │ Compression │      │  │ │      │ │
│ └─────────┘ │  │ └─────────┘  └─────────────┘      │  │ └──────┘ │
└─────────────┘  └──────────────────────────────────┘  └──────────┘
      SBU                      BCU                        Controller
```
B146D927.WMF

After image processing and image compression, the data (TIFF or JPEG) is sent to the scanner Twain driver directory on the computer.

6.20.2 SCANNER ACS (AUTO COLOR SELECTION)

The scanner auto-color selection (ACS) function determines if an original is black and white or color, so that the black and white mode or the full color mode is automatically selected.

Comparing RGB video signals, the ACS processes the original as black and white if the maximum difference among RGB signals is within a certain range.

After the above processing, the G signals are further processed to make black and white data (a pixel is black or white, not gray). In this processing, the following information is compared:

- The G signal level
- The threshold (calculated from the average G signal level)

B146D938.WMF

Signal level — R G B
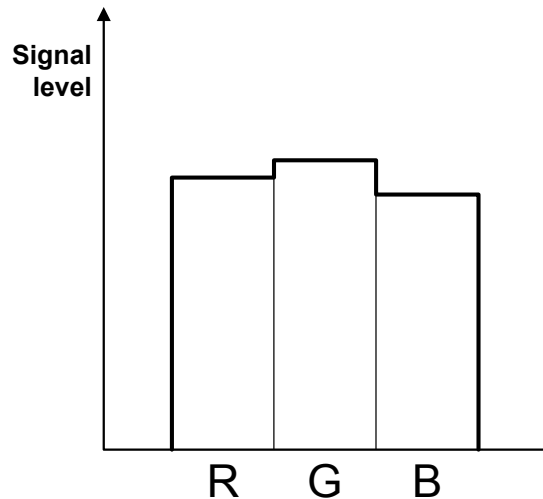
Detailed Descriptions

6.21 FILE FORMAT CONVERTER (MLB)

In previous models (such as A-C2, R-C2), DeskTopBinder V2 could retrieve copy and print jobs from the document server and convert them to TIFF. However, this software-based conversion was slow for many users.

So, for this machine, this conversion has been made hardware-based, using the optional File Format Converter. Without the File Format Converter, copy and print jobs cannot be downloaded to a PC (or e-Cabinet) from the document server.

Two common target formats are provided for conversion to files that can be selected by the SP modes: JPEG, and TIFF.

In scanner mode, users can select file format from TIFF, JPEG, or PDF. The time to create TIFF and JPEG files will be shortened with the File Format Converter, especially for high scanning resolution and large image size. When the customer selects PDF, the machine creates a TIFF or JPEG file from the scanned image first then converts it to PDF. So, the total time to create a PDF is also shortened with the File Format Converter.

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

1.1 BASIC

Configuration:	Desktop
Print Process:	Dry electrostatic transfer system
Number of scans:	1
Resolution:	Scan: 600 dpi
	Print: 600 dpi
Gradation:	Scan: 8 bits/pixel
	Print: 2 bits/pixel
Original type:	Sheets, book, objects
Maximum original size:	A3/11" x 17"
Original reference position:	Left rear corner

Copy speed:
    Normal
      C1y: 24 cpm (color) or 32 cpm (black & white)
      C1z: 28 cpm (color) or 38 cpm (black & white)
    OHP/Thick
      C1y, C1z: 10 cpm (color/black & white)
    ADF 1 to 1
      C1y: 24 cpm (color) or 32 cpm (black & white)
      C1z: 28 cpm (color) or 38 cpm (black & white)

First copy (normal mode):	Color: 10 seconds or less
	Black & white: 8 seconds or less
Warm-up time:	101 seconds or less (23°C, 50%)

Print Paper Capacity:
(80 g/m^2, 20 lb)
Standard tray: 500 sheets x 2
By-pass tray: 100 sheets
Optional paper feed tray: 500 sheets x 1, 500 sheets x 2, Optional LCT: 2000 sheets

Print Paper Size: (Refer to "Supported Paper Sizes".)

	Minimum	Maximum
Tray 1	A4/8$1/2$" x 11" (LEF)	
Tray 2	A5 (LEF)/8$1/2$" x 11"	A3/11" x 17"
By-pass	90 x 148 mm	305 x 458 mm/12" x 18"
Optional Tray	A5 (LEF)/8$1/2$" x 11"	A3/11" x 17"
LCT	A4/8$1/2$" x 11" (LEF)	

Printing Paper Weight:
Standard tray:　　60 to 105 g/m^2 (16 to 28 lb.)
Optional paper tray:　　60 to 105 g/m^2 (16 to 28 lb.)
By-pass tray:　　60 to 163 g/m^2 (16 to 43 lb.)

Spec.

Output Paper Capacity:	Standard exit tray: 500 sheets (face down) External exit tray: 100 sheets (face up)
Continuous copy:	Up to 999 sheets
Zoom:	Arbitrary: From 25 to 400% (1% step)

Fixed:

North America	Europe
25%	25%
50%	50%
65%	65%
73%	71%
78%	75%
85%	82%
93%	93%
100%	100%
121%	115%
129%	122%
155%	141%
200%	200%
400%	400%

Memory:	Standard: 768 MB (Europe and North America model)/ 512 MB (other models*) * One expansion slot is available.
Power Source:	120 V, 60 Hz: More than 12A (for North America) 220 V – 240 V, 50/60 Hz: More than 8A (for Europe)

Power Consumption:

	120V	230V
Maximum	1440 W or less	1500 W or less
Energy Saver	15 W or less	18 W or less

Noise Emission:
(Sound Power Level)

	Mainframe Only	Full System
Printing	68 dB or less	72 dB or less
Stand-by	42 dB or less	
Low power mode	40 dB or less	

NOTE: The above measurements were made in accordance with Ricoh standard methodology.

Dimensions (W x D x H):
    Copier: 670 x 698 x 859 mm (26.4" x 27.5" x 33.8")
    Copier + 1-Tray PFU: 670x 698 x 1,020 mm   (26.4" x 27.5" x 40.2")
    Copier + 2-Tray PFU or LCT: 670 x 698 x 1,118 mm (26.4" x 27.5" x 44.0")

Weight:	Less than 120 kg (265 lb.) [excluding toner]

1.2 PRINTER

Printer Languages: PCL5c
                          Adobe PostScript 3 (optional)
                          RPCS (Refined Printing Command Stream)

Resolution and   PCL5c:
Gradation: 600 x 600 dpi (1 bit/pixel), 300 x 300 dpi (1 bit/pixel)
                          Adobe PostScript 3:
                            1,200 x 1,200 dpi (1 bit/pixel), 1,800 x 600 dpi (1 bit/pixel),
                            600 x 600 dpi (1 bit/pixel)
                          RPCS:
                            1,200 x 1,200 dpi (1 bit/pixel), 1,800 x 600 dpi (1 bit/pixel),
                            600 x 600 dpi (1 bit/pixel)

                          NOTE: 1,800 x 600 dpi (1 bit/pixel) = 600 x 600 dpi (2 bits/pixel)

Printing speed:

		Resolution	**Plain paper**	**Thick/OHP**
C1y	Monochrome	600 x 600 dpi	32 ppm	10 ppm
		1,800 x 600 dpi	32 ppm	10 ppm
		1,200 x 1,200 dpi	28 ppm	10 ppm
	Color	600 x 600 dpi	24 ppm	10 ppm
		1,800 x 600 dpi	24 ppm	10 ppm
		1,200 x 1,200 dpi	14 ppm	10 ppm
C1z	Monochrome	600 x 600 dpi	38 ppm	10 ppm
		1,800 x 600 dpi	38 ppm	10 ppm
		1,200 x 1,200 dpi	28 ppm	10 ppm
	Color	600 x 600 dpi	28 ppm	10 ppm
		1,800 x 600 dpi	28 ppm	10 ppm
		1,200 x 1,200 dpi	14 ppm	10 ppm

Resident Fonts: PCL5c:
                            35 Intelli fonts
                            10 TrueType fonts
                          Adobe PostScript 3:
                            136 fonts (24 Type 2 fonts, 112 Type 14 fonts)

Host Interfaces: Bi-directional IEEE1284 parallel x 1 .... Standard
                         Ethernet (100 Base-TX/10 Base-T) .... Standard
                         USB 2.0 .... Optional
                         IEEE1394 .... Optional
                         IEEE802.11b (Wireless LAN) .... Optional
                         Bluetooth (Wireless) .... Optional

Network Protocols: TCP/IP, IPX/SPX, NetBEUI, AppleTalk, SMB

First Print Speed: Color: 9 seconds or less (from tray 1)
                         Monochrome: 7 seconds or less (from tray 1)

Spec.

1.3 SCANNER

Standard Scanner Resolution:	Main scan/Sub scan 600 dpi

Available scanning Resolution Range:	Twain Mode:
	  100 ~ 1200 dpi
	Delivery Mode:
	  100/200/300/400/600 dpi

Grayscales:	1 bit or 8 bits/pixel each for RGB
Scanning Throughput (ARDF mode):	B/W: 28 ppm LEF Color: 24 ppm LEF
Interface:	Ethernet (100 Base-TX/10 Base-T for TCP/IP), IEEE 1394, Wireless LAN
Compression Method:	B&W: TIFF (MH, MR, MMR) Gray Scale, Full Color: JPEG

2. SUPPORTED PAPER SIZES

2.1 PAPER FEED

Paper	Size (W x L)	North America				Europe/Asia			
		Tray 1	Tray 2/3/4	LCT	By-pass Tray	Tray 1	Tray 2/3/4	LCT	By-pass Tray
A3 W	12" x 18"	N	N	N	Y#	N	N	N	Y#
A3 SEF	297 x 420 mm	N	Y	N	Y#	N	Y	N	Y
A4 SEF	210 x 297 mm	N	Y#/Y*	N	Y#	N	Y	N	Y
A4 LEF	297 x 210 mm	N	Y	N	Y#	Y*	Y	Y	Y#
A5 SEF	148 x 210 mm	N	N	N	Y#	N	N	N	Y
A5 LEF	210 x 148 mm	N	Y	N	Y#	N	Y	N	Y#
A6 SEF	105 x 148 mm	N	N	N	Y#	N	N	N	Y#
B4 SEF	257 x 364 mm	N	Y#/Y*	N	Y#	N	Y	N	Y#
B5 SEF	182 x 257 mm	N	Y#/Y*	N	Y#	N	Y#/Y*	N	Y#
B5 LEF	257 x 182 mm	N	Y	N	Y#	N	Y	N	Y#
B6 SEF	128 x 182 mm	N	N	N	Y#	N	N	N	Y#
Ledger	11" x 17"	N	Y	N	Y	N	Y	N	Y#
Letter SEF	8.5" x 11"	N	Y	N	Y	N	Y#/Y*	N	Y#
Letter LEF	11" x 8.5"	Y*	Y	Y	Y#	N	Y	N	Y#
Legal SEF	8.5" x 14"	N	Y	N	Y#	N	Y#/Y*	N	Y#
Half Letter SEF	5.5" x 8.5"	N	N	N	Y	N	N	N	Y#
Executive SEF	7.25" x 10.5"	N	Y#	N	Y#	N	Y#	N	Y#
Executive LEF	10.5" x 7.25"	N	N	N	Y#	N	N	N	Y#
F SEF	8" x 13"	N	Y#	N	Y#	N	Y#	N	Y
Foolscap SEF	8.5" x 13"	N	Y#	N	Y#	N	Y#	N	Y#
Folio SEF	8.25" x 13"	N	Y#	N	Y#	N	Y#	N	Y#
8K	267 x 390 mm	N	Y#	N	Y#	N	Y#	N	Y#
16K SEF	195 x 267 mm	N	Y#	N	Y#	N	Y#	N	Y#
16K LEF	267 x 195 mm	N	Y#	N	Y#	N	Y#	N	Y#
Custom	Minimum: 90 x 148 mm Maximum: 305 x 458 mm	N	N	N	Y#	N	N	N	Y#
Com10 Env.	4.125" x 9.5"	N	N	N	Y#	N	N	N	N
Monarch Env.	3.875" x 7.5"	N	N	N	Y#	N	N	N	N
C6 Env.	114 x 162 mm	N	N	N	N	N	N	N	Y#
C5 Env.	162 x 229 mm	N	N	N	N	N	N	N	Y#
DL Env.	110 x 220 mm	N	N	N	N	N	N	N	Y#

Spec.

Remarks:

Y	Supported: the sensor detects the paper size.
Y#	Supported: the user specifies the paper size.
Y*	Supported: depends on a technician adjustment
N	Not supported

2.2 PAPER EXIT

Paper	Size (W x L)	Internal Tray (Face Down)	External Tray (Face Up)	2-tray Finisher	Booklet Finisher	Duplex
A3 W	12" x 18"	N	Y	N	N	N
A3 SEF	297 x 420 mm	Y	Y	Y	Y	Y
A4 SEF	210 x 297 mm	Y	Y	Y	Y	Y
A4 LEF	297 x 210 mm	Y	Y	Y	Y*	Y
A5 SEF	148 x 210 mm	Y	Y	N	N	N
A5 LEF	210 x 148 mm	Y	Y	Y	N	Y
A6 SEF	105 x 148 mm	N	N	N	N	N
B4 SEF	257 x 364 mm	Y	Y	Y	Y	Y
B5 SEF	182 x 257 mm	Y	Y	Y	Y*	Y
B5 LEF	257 x 182 mm	Y	Y	Y	Y*	Y
B6 SEF	128 x 182 mm	N	N	N	N	N
Ledger	11" x 17"	Y	Y	Y	Y	Y
Letter SEF	8.5" x 11"	Y	Y	Y	Y	Y
Letter LEF	11" x 8.5"	Y	Y	Y	Y*	Y
Legal SEF	8.5" x 14"	Y	Y	Y	Y	Y
Half Letter SEF	5.5" x 8.5"	Y	Y	N	N	N
Executive SEF	7.25" x 10.5"	Y	Y	Y	N	Y
Executive LEF	10.5" x 7.25"	Y	Y	N	N	N
F SEF	8" x 13"	Y	Y	Y	N	Y
Foolscap SEF	8.5" x 13"	Y	Y	Y	N	Y
Folio SEF	8.25" x 13"	Y	Y	Y	N	Y
8K	267 x 390 mm	Y	Y	Y	N	Y
16K SEF	195 x 267 mm	Y	Y	Y	N	Y
16K LEF	267 x 195 mm	Y	Y	Y	N	Y
Custom	Minimum: 90 x 148 mm Maximum: 305 x 458 mm	Y	Y	N	N	N
Com10 Env.	4.125" x 9.5"	N	Y	N	N	N
Monarch Env.	3.875" x 7.5"	N	Y	N	N	N
C6 Env.	114 x 162 mm	N	Y	N	N	N
C5 Env.	162 x 229 mm	N	Y	N	N	N
DL Env.	110 x 220 mm	N	Y	N	N	N

Remarks:

Y	Supported
N	Not supported
Y*	Stack only (Booklet not supported)

PLATEN/ARDF ORIGINAL SIZE DETECTION

Size (width x length) [mm]	Platen		ARDF	
	Inches	Metric	Inches	Metric
A3 (297 x 420) L	No	Yes	Yes	Yes
B4 (257 x 364) L	No	Yes	No	Yes
A4 (210 x 297) L	No	Yes	No	Yes**
A4 (297 x 210) S	No	Yes	Yes	Yes
B5 (182 x 257) L	No	Yes	No	Yes
B5 (257 x 182) S	No	Yes	No	Yes
A5 (148 x 210) L	No	No*	No	Yes
A5 (210 x 148) S	No	No	No	Yes
B6 (128 x 182) L	No	No	No	Yes
B6 (182 x 128) S	No	No	No	Yes
11" x 17" (DLT)	Yes	No	Yes**	Yes**
11" x 15"	No	No	Yes**	No
10" x 14"	No	No	Yes	No
8.5" x 14" (LG)	Yes	No	Yes**	No
8.5" x 13" (F4)	No	No	Yes**	Yes
8.25" x 13"	No	No	No	No
8" x 13"(F)	No	Yes	No	No
8.5" x 11" (LT)	Yes	No	Yes**	No
11" x 8.5" (LT)	Yes	No	Yes**	No
8" x 10.5"	No	No	No	No
8" x 10"	No	No	Yes**	No
5.5" x 8.5" (HLT)	No*	No	Yes	No
8.5" x 5.5" (HLT)	No	No	Yes	No
8K (267 x 390)	No	No	No	Yes**
16K L (195 x 267)	No	No	No	Yes**
16K S (267 x 195)	No	No	No	Yes
7.25" x 10.5" (Executive)	No	No	Yes	No
10.5" x 7.25" (Executive)	No	No	Yes**	No

*: When the message "Cannot detect original size" appears, use SP4-303 to detect original sizes as A5 lengthwise/HLT.

**: The machine can detect the paper size depending on the setting of SP6-016-1.

3. SOFTWARE ACCESSORIES

The printer drivers and utility software are provided on one CD-ROM. An auto-run installer allows you to select which components to install.

3.1 PRINTER DRIVERS

Printer Language	Windows 95/98/ME	Windows NT4.0	Windows 2000	Windows XP	Windows 2003	Macintosh
PCL 5c	Yes	Yes	Yes	Yes	Yes	No
PS3	Yes	Yes	Yes	Yes	Yes	Yes
RPCS	Yes	Yes	Yes	Yes	Yes	No

NOTE: 1) The printer drivers for Windows NT 4.0 are only for the Intel x86 platform. There is no Windows NT 4.0 printer driver for the PowerPC, Alpha, or MIPS platforms.
2) The PS3 drivers are all genuine AdobePS drivers, except for Windows 2000, which uses Microsoft PS. A PPD file for each operating system is provided with the driver.
3) The PS3 driver for Macintosh supports Mac OS 8.6 or later versions.

3.2 UTILITY SOFTWARE

Software	Description
Agfa Font Manager 2000 (Win95/98/ME, 2000/XP, NT4)	A font management utility with screen fonts for the printer.
SmartNetMonitor for Admin (Win95/98/ME, 2000/XP, NT4)	A printer management utility for network administrators. NIB setup utilities are also available.
SmartNetMonitor for Client (Win95/98/ME, 2000/XP, NT4)	• A printer management utility for client users. • A utility for peer-to-peer printing over a NetBEUI or TCP/IP network. • A peer to peer print utility over a TCP/IP network. This provides the parallel printing and recovery printing features.
Printer Utility for Mac (Mac)	This software provides several convenient functions for printing from Macintosh clients.
IEEE1394 Utility (Win2000)	This utility solves problems with Windows 2000.
DeskTopBinder V2 Lite (Win95/98/ME, 2000/XP, NT4)	DeskTopBinder V2 Lite itself can be used as personal document management software and can manage both image data converted from paper documents and application files saved in each client's PC.
LAN-Fax Driver	This software enables you to fax documents directly form your PC. Address Book Editor and Cover Sheet Editor are to be installed as well. (These require the optional fax unit.)

SCANNER

The scanner driver and utility software are provided on one CD-ROM.

Scanner Drivers

- Network Twain Driver for Win95/98/ME/NT4.0/2000/XP/2003

Scanner Utilities

- Scan Router V2 Lite (Cherry-Lite) for Win95/98/ME/NT4.0/2000/XP
- Desk Top Binder V2 Lite (Plumeria-Lite) for Win95/98/ME/NT4.0/2000/XP/2003

Spec.

4. MACHINE CONFIGURATION

B146V902.WMF
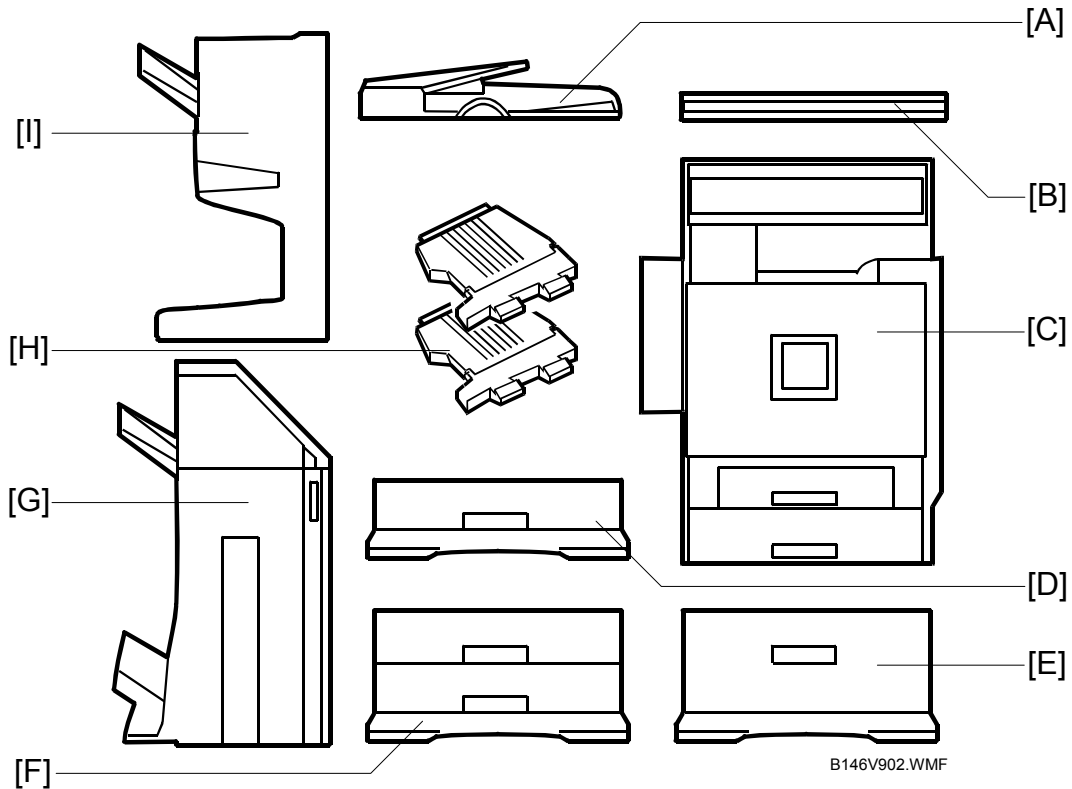
Item	Machine Code		Remarks
Copier	B146	C	
Platen cover	G329	B	One from the two
ARDF	B597	A	
Booklet finisher	B602	I	One from [G], [H], and [I]; Requires one from [D], [E], and [F]
Punch unit (for B602)	B647		Requires [I]
Two-tray finisher	B599	G	One from [G], [H], and [I]; Requires one from [D], [E], and [F]
Punch unit (for B599)	B377		Requires [G]
Multi-Bin output tray	G306	H	One from [G], [H], and [I]
One-tray paper feed unit	B601	D	
Two-tray paper feed unit	B598	F	One from the three
LCT	B600	E	

B146V903.WMF
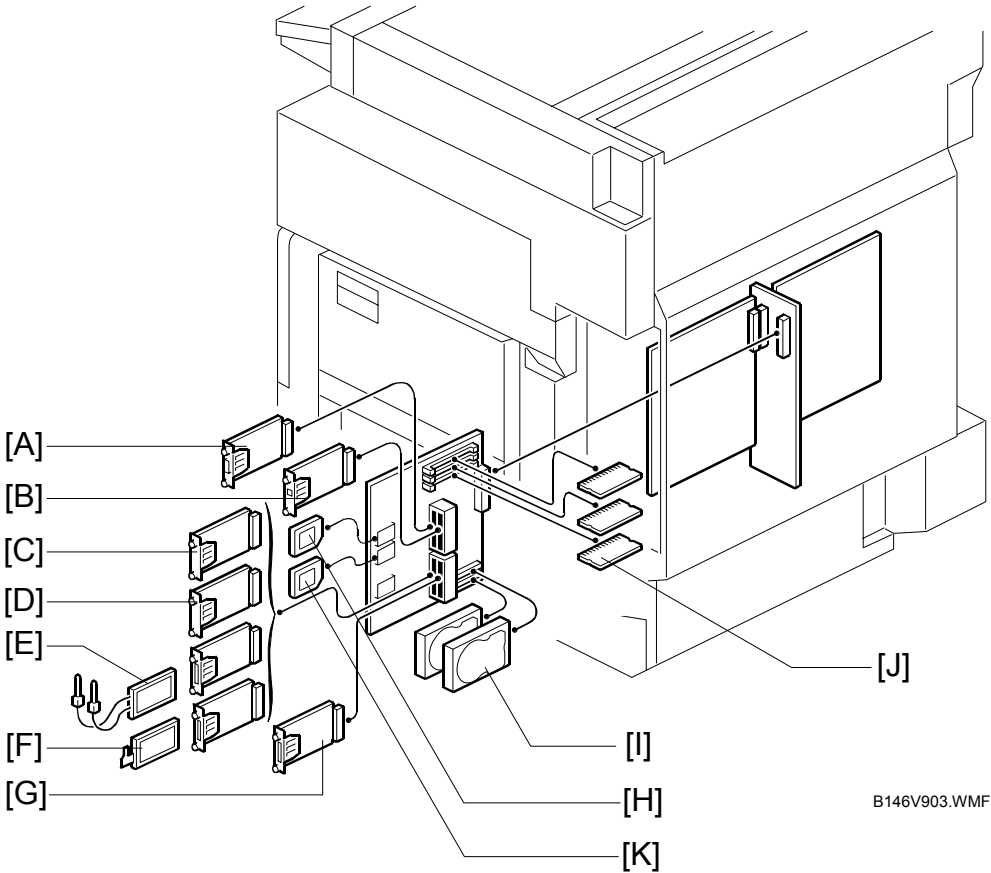
Item	Machine Code		Remarks
IEEE 1284	—	A	Standard
Ethernet	B594	B	Distributed with the optional printer/scanner for the Asia model
IEEE 1394	B581	C	One from the four
USB 2.0	B596	D	
Wireless LAN	B582	E	
Bluetooth	G377	F	
File Format Converter	B609	G	
Printer/Scanner	B612	H	Standard for the Europe and North America models; Optional for other models
Hard Disk Drive	—	I	Standard
256 MB DIMM	G332	J	Distributed with the optional printer/scanner for the Asia model
PostScript 3	G369	K	

Spec.

SPEC-11

5. OPTIONAL EQUIPMENT

5.1 ARDF

Paper Size/Weight:

Simplex	Size	A3 to B6, DLT to HLT
	Weight	40 to 128 g/m^2 (11 to 34 lb.)
Duplex	Size	A3 to B5, DLT to HLT
	Weight	50 to 105 g/m^2 (14 to 28 lb.)

Table Capacity: 80 sheets (80 g/m^2, 20 lb)

Original Standard   Rear left corner
Position:

Separation: Feed belt and separation roller

Original Transport: Roller transport

Original Feed Order: From the top original

Supported Magnification
Ratios:

Copy		50 to 200 %
Fax	Color	32.6 to 200 %
	Black & white	48.9 to 200 %

Power Source: DC 24V, 5V from the scanner unit

Power Consumption: 60 W or less

Dimensions (W × D × H):   570 mm x 518 mm x 150 mm (22.4" x 20.4" x 5.9")

Weight: 12 kg

5.2 ONE-TRAY PAPER FEED UNIT

Paper Size:	Maximum: A3/11" x 17" (SEF)
	Minimum: A5 (LEF)/8$1/2$" x 11"
Paper Weight:	60 to 105 g/m^2 (16 to 28 lb.)
Tray Capacity:	500 sheets (80 g/m^2, 20 lb.)
Paper Feed System:	FRR system
Paper Height Detection:	3 steps (100%, 50%, Near End)
Power Source:	DC 24V, 5V (from the main unit)
Power Consumption:	50 W
Dimensions (W x D x H):	540 x 600 x 172 mm (21.3" x 23.7" x 6.8")
Weight	18 kg (39.7 lb.)

5.3 TWO-TRAY PAPER FEED UNIT

Paper Size:	Maximum: A3/11" x 17" (SEF)
	Minimum: A5 (LEF)/8$1/2$" x 11"
Paper Weight:	60 to 105 g/m^2 (16 to 28 lb.)
Tray Capacity:	500 sheets x 2 (80 g/m^2, 20 lb.)
Paper Feed System:	FRR system
Paper Height Detection:	3 steps (100%, 50%, Near End)
Power Source:	DC 24V, 5V (from the main unit)
Power Consumption:	50 W
Dimensions (W x D x H):	540 x 600 x 270 mm (21.3" x 23.7" x 10.7")
Weight	25 kg (55.2 lb.)

5.4 2000-SHEET LARGE CAPACITY TRAY

Paper Size:	A4/8$1/2$" x 11" (LEF)
Paper Weight:	60 to 105 g/m^2 (16 to 28 lb.)
Tray Capacity:	2000 sheets (80 g/m^2, 20 lb.)
Paper Feed System:	FRR system
Paper Height Detection:	5 steps (100%, 75%, 50%, 25%, Near End)
Power Source:	DC 24V, 5V (from the main unit)
Power Consumption:	50 W
Dimensions (W x D x H):	540 x 600 x 270 mm (21.3" x 23.7" x 10.7")
Weight	25 kg (55.2 lb.)

Spec.

5.5 TWO-TRAY FINISHER & PUNCH UNIT

Print Paper Size:

No punch mode:
A3/11" x 17" to A5 (LEF)/8$1/2$" x 11"

Punch mode:
2 holes: A3/11" x 17" to A4/8$1/2$" x 11" (SEF)
A4/8$1/2$" x 11" to A5 (LEF)
3 holes: A3, B4, 11" x 17" (SEF)
A4, B5, 8$1/2$" x 11" (LEF)
4 holes (Europe): A3, B4, 11" x 17" (SEF)
A4, B5, 8$1/2$" x 11" (LEF)
4 holes (North Europe): A3, B4, 11" x 17" (SEF)
A4, B5, 8$1/2$" x 11" (LEF)

Staple mode:
A3/11" x 17" to B5/8$1/2$" x 11"

Paper Weight:

No punch mode:
60 to 105 g/m^2 (16 to 28 lb.)
Punch mode:
60 to 105 g/m^2 (16 to 28 lb.)
Staple mode:
64 to 90 g/m^2 (17 to 23 lb.)
Label/Thick paper/OHP cannot be stapled

Tray Capacity:

Upper tray:
500 sheets: A4, 8$1/2$" x 11" , B5, A5 (LEF)
250 sheets: 11" x 17", A3, 8$1/2$" x 14", B4
Lower tray (default mode – stapled output only goes to tray 2):
2000 sheets: A4, 8$1/2$" x 11" (LEF)
750 sheets: A3, B4, A4, B5, 8$1/2$" x 14", 11" x 17", 8$1/2$" x 11" (SEF)
500 sheets: A5 (LEF)
Lower tray (multi-tray staple mode – stapled output can go to either tray):
1500 sheets: A4, 8$1/2$" x 11" (LEF)
750 sheets: A3, B4, A4, B5, 8$1/2$" x 14", 11" x 17", 8$1/2$" x 11" (SEF)
500 sheets: A5 (LEF)

Staple capacity:

Single size:
50 sheets: A4, 8$1/2$" x 11" , B5
30 sheets: A3, B4, 8$1/2$" x 14", 11" x 17"
Mixed size:
30 sheets: A4 (LEF) & A3, B5 (LEF) & B4, 8$1/2$" x 11" (LEF) & 11" x 17"

Staple position:

7 positions
1-staple: 4 positions (Top Left, Top Right, Top Left-Oblique, Top Right-Oblique)
2-staples: 3 positions (Left, Top, Right)

Staple replenishment: Cartridge (5000 staples)

Power consumption: 48 W

Dimensions (W x D x H):   680 x 620 x 1030 mm (26.8" x 24.4" x 40.6")

Weight   Without punch unit: 53 kg (116.9 lb.)

                               With punch unit: 55 Kg (121.3 lb.)

5.6 BOOKLET FINISHER

Paper Size: A3, A4, B4, B5, DLT, LG, LT

Booklet Paper Size: A3, B4, A4 SEF, DLT, LG, LT SEF

Paper Weight: Stack/Sort mode:
                                  60 to 128 g/m^2 (16 to 34 lb.)
                               Staple mode:
                                  64 to 90 g/m^2 (17 to 24 lb.)
                               Booklet mode:
                                  64 to 80 g/m^2 (17 to 21 lb.)

Tray Capacity: 1,000 sheets: A4, LT, B5
                               500 sheets: A3, B4, DLT, LG

Booklet Tray Capacity: 2 to 5 sheets/booklet: 20
                               6 to 10 sheets/booklet: 10

Staple capacity: 30 sheets

Booklet capacity: 10 sheets

Staple position: 3 positions (excluding booklet mode)
                                  1-staple: 2 positions (Top right, Top left)
                                  2-staples: 1 positions (Left)

Staple replenishment: Cartridge (5000 staples)

Spec.

5.7 MULTI-BIN OUTPUT TRAY

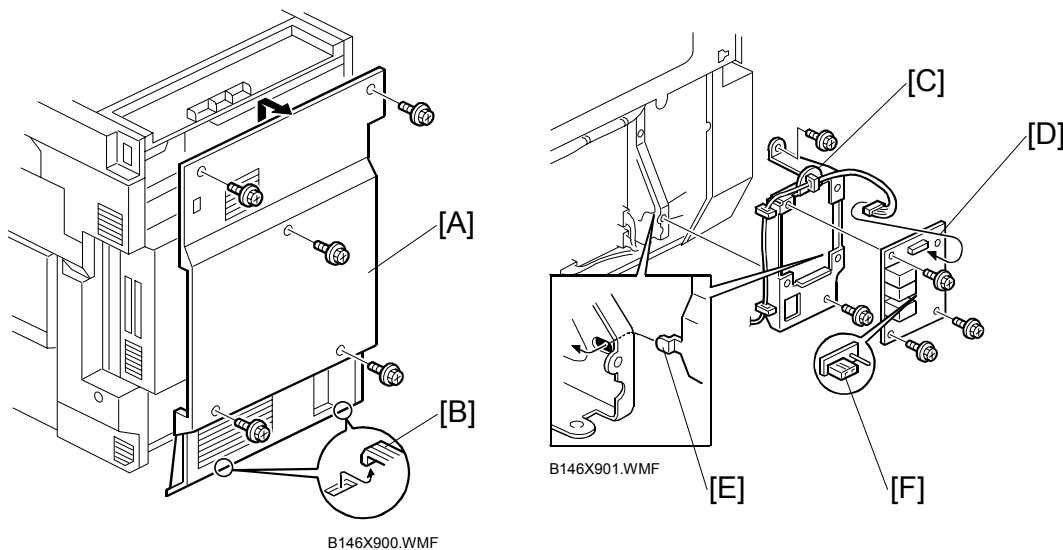|	
Number of Bins	2
Paper Size	Maximum: A3/11" x 17" (SEF)
	Minimum: A5 (LEF)/8$1/2$" x 11"
Paper Weight	60 to 105 g/m^2 (16 to 28 lb.)
Stack Capacity (80 g/m^2, 20 lb.)	Tray 1: 100 sheets
	Tray 2: 100 sheets (A4/smaller than 8$1/2$" x 11")
	250 sheets (B4/8$1/2$" x 14")

APPENDIX 1 (FOR MODEL J-C1)

NOTE: This manual uses the following symbols.

      ✐ : Screw   ⬚ : Connector

1.   RSS (REMOTE SERVICE SYSTEM)

1.1   RSS SET UP

B146X901.WMF

B146X900.WMF

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

1.   Remove the rear cover [A] (✐ x 5, 2 hooks [B]).

2.   Remove the RSS board bracket [C] (✐ x 2).

3.   Install the RSS board [D] to the bracket (✐ x 3).

4.   Install the RSS board assembly to the machine (⬚ x 1, ✐ x 2, 1 hook [E]).

When connecting only one machine to the line adapter, skip step 5.

5.   Set the jumper switch [F] on the RSS board to 2-3 (default setting: 1-2), unless the machine is in position 5 (see the following diagram).
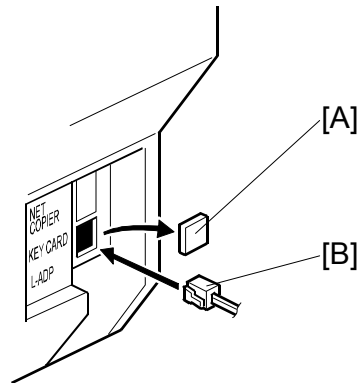
B146X902.WMF
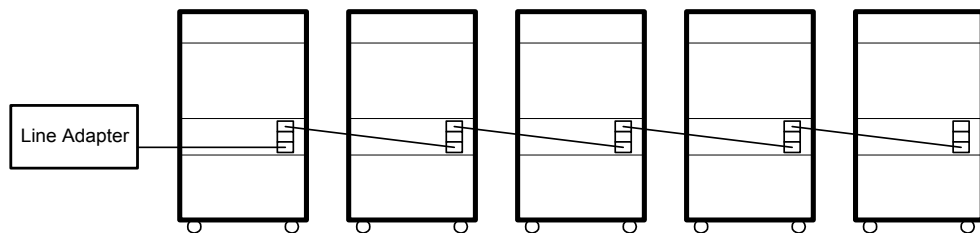
Line Adapter

B146X903.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

6. Remove the cover [A] from the rear cover.

7. Reassemble the machine.

8. Connect the modular cord [B] to the line adapter as shown.

9. Install the line adapter (refer to chapter 2-1 L-ADP Installation Procedure in the CSS Service Manual).

10. Turn on the machine.

When connecting only one machine to the line adapter, skip step 11.

11. 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.

APPENDIX-2

1.2 SP MODE SETTINGS

After installing the machine and line adapter, change the value of SP5-816 (CSS Function) to 1.

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

- SP5-501-1 (PM Alarm Interval)
- SP5-504 (Jam Alarm Setting): 3
- SP5-505 (Error Alarm Setting): 50
- SP5-508-1 (CC201 ON/OFF): 1 (On)
- SP5-508-2 (CC101 ON/OFF): 1 (On)
- SP5-508-3 (CC202 ON/OFF): 1 (On)
- SP5-508-4 (CC Call Screening ON/OFF): 1 (Reduced Mode)

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

1.3 SC CALL

SC Calls

The SC calls are generated according to the SC level as follows.

SC Level	Definition	SC Auto Call Condition
A	Fuser unit SCs which cannot be reset by customer.	SC call is generated immediately.
B	SCs that disable only the features which use the defective item.	SC call is generated immediately. An SC call is generated only once during power on condition (Once an SC call is generated, it will not be generated until the main power switch is turned off and on).
C	SCs that are not shown on the operation panel.	SC call is not generated.
D	SCs caused by incorrect sensor detection which can be reset by turning the main power switch off and on.	SC call is generated for every second SCs.

1.4 CC MANUAL CALL

CC Manual Calls

The CC Manual Call may be generated by the customer when "1: Reduced Mode" is selected in the SP Mode 5508-004 Low Call Mode. The default setting of "SP Mode 5508-004 Low Call Mode" is "1: Reduced Mode".

There are three types of CC calls as follows.

CC Code	Definition
Manual Call: CC 101	When paper jams are detected for number of times specified by "SP Mode 5508-012 Jam Detection: Continuous Count" consecutively without completing any copy job, one of the following will occur. a) CC101 will be automatically generated when "0: Auto Call" is selected in "SP Mode 5508-022 Jam Operation: Continuous Count" b) Manual Call key will appear on the operation panel display when "1: Manual Call" is selected in "SP Mode 5508-022 Jam Operation: Continuous Count". By pressing Manual Call key, a Manual Call: CC101 is generated immediately. "Manual Call: CC101" will be listed as an MC in the Call List screen of the Concorde system and "Manual Call: CC101" will be indicated in the "Symptom Column" of the call detail screen. The default setting of "SP Mode 5508-022 Jam Operation: Continuous Count" is "1: Manual Call".
CC 201	When a paper jam or an original jam condition is not reset for a time specified by "SP Mode 5508-011 Jam Detection: Time Length", one of the following will occur. a) Beeper sounds five times when "1: Audible Warning at Machine" is selected in "SP Mode 5508-021 Jam Operation: Time Length". b) CC201 will be automatically generated when "0: Auto Call" is selected in "SP Mode 5508-021 Jam Operation: Time Length". The default setting of "SP Mode 5508-21 Jam Operation: Time Length" is "1: Audible Warning at Machine".
Manual Call CC 202	When in a paper jam or an original jam condition and accumulated time of cover open condition exceeds the time specified by "SP Mode 5508-013 Door Open: Time Length", one of the following will occur after all doors are closed. a) CC202 will be automatically generated when "0: Auto Call" is selected in "SP Mode 5508-23 Door Operation: Time Length". b) Manual Call key will appear on the operation panel display when "1: Manual Call" is selected in "SP Mode 5508-023 Door Operation: Time Length". By pressing Manual Call key, a Manual Call: CC202 is generated immediately. "Manual Call: CC202" will be listed as an MC in the Call List screen of the Concorde system and "Manual Call: CC202" will be indicated in the "Symptom Column" of the call detail screen. The default setting of "SP Mode 5508-023 Door Operation: Time Length" is "1: Manual Call".

1.5 CC AUTO CALL

CC Auto Call

The CC Auto Call will be automatically generated when "0: Normal Mode (CC Auto Call)" is selected in "SP Mode 5508-004 Low Call Mode". The default setting of "SP Mode 5508-004 Low Call Mode" is "1: Reduced Mode".

There are three types of CC calls as follows.

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

1.6 ALARM CALL

Alarm Calls

There are 10 types of Alarm Calls as follows:

Type	Definition
PM	When the PM counter reaches the value specified by SP Mode 5513-001, a PM Alarm Call is automatically generated.
Original Count	An original count Alarm Call is automatically generated after the total number of originals specified by SP Mode 5513-002 goes through the ARDF.
SC	When SC Alarm counter reaches 5 times, an SC Alarm Call is automatically generated. The SC Alarm counter counts the number of SCs and it decreases when SC does not occur for a specified number of copies.
Jam	When Jam Alarm counter reaches 10 times, a Jam Alarm Call is automatically generated. The Jam Alarm counter counts the number of paper jam and it decreases when paper jam does not occur for a specified number of copies.
Waste Toner Near Full	When the machine detects the waste toner near full condition, a Waste Toner Near Full Alarm Call is automatically generated.
Waste Toner Full	When the machine detects the waste toner full condition, a Waste Toner Full Alarm Call is automatically generated.
Oil Near End	When the machine detects the oil near end condition, an Oil Near End Alarm Call is automatically generated.
Oil End	When the machine detects the oil end condition, an Oil End Alarm Call is automatically generated.
Waste Oil Near Full	When the machine detects the oil near end condition, an Oil Near End Alarm Call is automatically generated.
Waste Oil Full	When the machine detects the oil end condition, an Oil End Alarm Call is automatically generated.

1.7 READ ITEMS

The following table shows the major read items.

Item	Item
Paper end	PM Alarm Counter (k)
Toner end	Main Motor Operation Time (minute)
Staple end	Total SC Counter
Toner near end	SC Counter by type
Door open	SC history
Paper jam location	TD Sensor Initialization Result
Machine condition	Humidity
SC information	Development Gamma Display
Tray paper size information	Current Vref Display
System configuration	Pointer Table Display
Total paper jams counter	Vt Current Display
Total original jams counter	Process Control Self-check Result
Total jams by location	Line Position Adjustment Result
Total original jams by location	Line Position Adjustment Exe. Counter
Total jams by location	ROM No./Firmware Version
Total jams by paper size	PM Parts Counter
Paper jam history	Previous PM Parts Counter
Original jam history	Printer: Bit Switch 1
Total number of scanning	Printer: Bit Switch 2
Total counter	SP8-001 to -007, -012 to -017, -021 to -027, -061, -062, -064, -071, -072, -074, -111, -121, -131, -141, -151, -161, 191 to -193, -195, -196, -205, -211 to -213, -215, -216, -221, -231, -241, -251, -262, -291, -301, -381 to –384, -386, -387, -391, -401 to –404, -411, -421, -422, -424, -431, -441 to -444, -451, -461 to -464, -471 to -484, -491 to -493, -496, -504, -521, -522, -524, -531, -581, -633, -643, -561, -661, -671, -681, -691, -701, -741, -781, -831, -891, -901, -941
Total copy counter	
Total FAX counter	
Total print counter	
Total development counter	
Total copies by paper size	
Total copies by paper type	
Total copies by paper tray	
ADF Total Counter	
Staple Counter	

1.8 READ AND WRITE ITEMS

The following table shows the major read and write items.

| Item	Item
Lead Edge Registration Adjust.: SP1-001	Auto OFF Timer: UP Mode
Side-to-Side Registration Adjust.: SP1-002	PM Alarm Level (k); SP5-501-001
Development Drive Motor Speed: SP1-004 to -007	Jam Alarm Level: SP5-504-001
Process Control Self-checks: SP3-906	Error (SC) Alarm; SP5-505-001
Sub-scan Magnification: SP4-008	Paper Supply Alarm: SP5-507-001
Side-to-Side registration: SP4-011	Staple Supply Alarm: SP5-507-002
Paper Tray Priority: Copier; UP Mode	Toner Supply Alarm: SP5-507-003
Auto Paper Select Priority; UP Mode	Supply Alarm Interval: SP5-507-080 to -172
Magnification Setting: Enlarge; UP Mode	CC Call Setting: CC201 ON/OFF; SP5-508-001
Copy Count Display; UP Mode	CC Call Setting: CC101 ON/OFF; SP5-508-002
Max. Copy Quantity; UP Mode	CC Call Setting: CC202 ON/OFF; SP5-508-003
System Reset Timer; UP Mode	CC Call Setting: Low Call Mode; SP5-508-004
Copier Auto Reset Timer; UP Mode	CC Call Setting: CC201 Interval; SP5-508-011
Energy Saver Timer; UP Mode	CC Call Setting: CC101 Frequency; SP5-508-012
Auto Tray Switching; UP Mode	CC Call Setting: CC202 Interval; SP5-508-013
A3/DLT Double Count; SP5-104-001	CC Call Setting: CC201 Beeper ON/OFF; SP5-508-021
Margin Adjustment; UP Mode	CC Call Setting: CC101 Manual Call ON/OFF; SP5-508-022
Add Margin in Repeat Image; UP Mode	CC Call Setting: CC202 Manual Call ON/OFF; SP5-508-023
Center Erase Adjustment; UP Mode	Serial Number Setting; SP5-811-001
1->2 Duplex Auto Margin Adjust.: Front/Rear; UP Mode	ID2 Setting
1->2 Duplex Auto Margin Adjust.: Lead/Trail; UP Mode	Service Phone Number Setting; SP5-812-001
Cover Sheet: 2 Sided Mode Setting; UP Mode	Image Density
Disable Copying; SP5-118-001	SADF Auto Reset; UP Mode
Set Time: UP Mode	Auto Sort Mode; UP Mode
Auto OFF Set: UP Mode	Staple Position Adjustment; SP6-050-001

1.9   EXECUTE ITEMS

The following table shows the major execute items.

Item	Item
Forced Toner Supply: SP2-207-001 to -004	SC/Jam Counter Reset: SP5-807-001
Forced Process Control Self-check: SP3-126-001 to -002	Counter Reset: SP5-808-001 (Except Total Counter);
SC Reset (Except Level A): SP5-810-001	Original Counter Clear: SP5-811-001
Forced Line Position Adjustment: SP5-993-002	Paper Tray Counter Clear: SP5-816-001 to -006
PM Alarm Counter Clear: SP5-804-001	

1.10   JAM HISTORY

The jam history is read as shown below.

The last 5 digits of the total counter value when the jam occurred

Paper Size
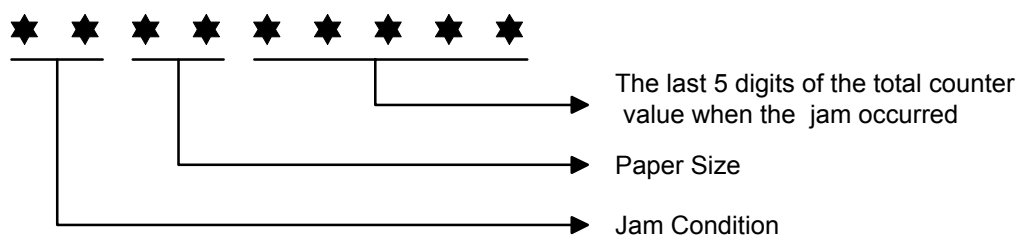
Jam Condition

B146X904.WMF

1.11 CODE TABLE

1.11.1 JAM CONDITION

Copier

Code	Meaning
03	Paper non feed (from paper tray 1)
04	Paper non feed (from paper tray 2)
05	Paper non feed (from paper tray 3 or LCT)
06	Paper non feed (from paper tray 4)
07	Paper non feed (from By-pass tray)
08	Paper does not reach the registration sensor
09	Paper does not reach the fusing exit sensor
0A	Paper does not reach the paper exit sensor
0B	Paper does not reach the duplex inverter sensor
0C	Paper does not reach the duplex exit sensor 1
0D	Paper does not reach the duplex exit sensor 2
0E	Paper does not reach the duplex exit sensor 3
0F	Paper does not reach the duplex feed sensor
33	Paper caught at the paper tray 1

Code	Meaning
34	Paper caught at the paper tray 2
35	Paper caught at the paper tray 3 or LCT
36	Paper caught at the paper tray 4
3D	Paper caught at the registration sensor.
3F	Paper caught at the fusing exit sensor.
40	Paper caught at the paper exit sensor
41	Paper caught at the duplex inverter sensor
42	Paper caught at the duplex exit sensor 1
43	Paper caught at the duplex exit sensor 2
44	Paper caught at the duplex exit sensor 3
45	Paper caught at the duplex feed sensor
64	Finisher Entrance Sensor
65	Finisher Exit Sensor 1
66	Finisher Exit Sensor 2
67	Finisher Staple
68	Paper Jam at Finisher Taking Out
69	Paper Jam at Finisher Drive Error
6A	Finisher Tray Shift Error
6B	Finisher Jogger Drive Error
6C	Finisher Staple Error
6D	Finisher Stack Feed-out Error
6E	Finisher Punch Error
6F	Finisher Jam Clear
78	Booklet Finisher Entrance (On)
79	Booklet Finisher Entrance (Off)
7A	Booklet Finisher Stack-tray Exit
7B	Booklet Finisher Folder (On)
7C	Booklet Finisher Folder (Off)
7D	Booklet Finisher Staple
7E	Booklet Finisher Punch
7F	Booklet Finisher Transport Motor
80	Booklet Finisher Paddle Motor
81	Booklet Finisher Staple Slide/Folder
82	Booklet Finisher Jogger Motors
83	Booklet Finisher Lift Motor

Document Feeder

Code	Meaning
01	Jam at power on.
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

1.11.2 PAPER SIZE

Code	Paper Size	Code	Paper Size
05	A4 sideways	8D	B4
06	A5 sideways	8E	B5 lengthwise
0E	B5 sideways	8F	B6 lengthwise
12	Post card sideways	92	Post card lengthwise
24	8.5" 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	A5	8.5" x 13" lengthwise
2D	7.25" x 10.5" sideways	A6	8.5" x 11" lengthwise
84	A3	A8	8.25" x 13" lengthwise
85	A4 lengthwise	A9	8" x 13" lengthwise
86	A5 lengthwise	AC	8.5" x 5.5" lengthwise
87	A6 lengthwise	AD	7.25" x 10.5" lengthwise

1.12 OTHERS

1.12.1 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 make planned inspections periodically.

1.12.2 PM PROCEDURE OR OTHER MAINTENANCE

Before beginning PM or other maintenance procedures, SP5816-002 should be set to "Start". This will disable the RSS function. When maintenance is completed, SP5816-002 should be set to "End". This will re-enable the RSS function.

NOTE: The RSS function will remain disabled for four hours. Therefore, if maintenance for longer than four hours is required, SP5816-002 should be set to "Start" again to disable RDS.