## Gestetner RロCOM SaVIn



## B003/B004/B006/B007 SERVICE MANUAL

# Gestetner <br> RICOMT <br> 53VII 



RICOH GROUP COMPANIES

# Gestetner RICOM SaVIn 

## B003/B004/B006/B007 SERVICE MANUAL

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## IMPORTANT SAFETY NOTICES

## PREVENTION OF PHYSICAL INJURY

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

## HEALTH SAFETY CONDITIONS

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

## OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

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

## 1. SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

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

## LASER SAFETY

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

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



| INSTALLATION B003/B004/B006/B007 |
| :--- | :--- |
| LARGE CAPACITY TRAY A683 |
|  |







INSTALLATION

## 1. INSTALLATION PROCEDURE

## $\triangle$ CAUTION

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

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

### 1.1 INSTALLATION REQUIREMENTS



### 1.1.1 ENVIRONMENT

1. Temperature Range: $\quad 10^{\circ} \mathrm{C}$ to $30^{\circ} \mathrm{C}\left(50^{\circ} \mathrm{F}\right.$ to $\left.86^{\circ} \mathrm{F}\right)$
2. Humidity Range: $15 \%$ to $80 \%$ RH
3. Ambient Illumination:

Less than 1,500 lux (do not expose to direct sunlight.)
4. Ventilation:
5. Ambient Dust:

Room air should turn over at least $30 \mathrm{~m}^{3} / \mathrm{hr} /$ person
Less than $0.10 \mathrm{mg} / \mathrm{m}^{3}\left(2.7 \times 10 / 6 \mathrm{oz} / \mathrm{yd}^{3}\right)$
6. Avoid areas exposed to sudden temperature changes:

1) Areas directly exposed to cool air from an air conditioner.
2) Areas directly exposed to heat from a heater.
7. Do not place the machine where it will be exposed to corrosive gases.
8. Do not install the machine at any location over $2,000 \mathrm{~m}(6,500 \mathrm{ft}$.) above sea level.
9. Place the main machine on a strong and level base. Inclination on any side should be no more than 5 mm (0.2").
10. Do not place the machine where it may be subjected to strong vibrations.

### 1.1.2 MACHINE LEVEL

Front to back: $\quad$ Within $5 \mathrm{~mm}(0.2$ ") of level
Right to left: $\quad$ Within $5 \mathrm{~mm}\left(0.2^{\prime \prime}\right)$ of level

### 1.1.3 MINIMUM SPACE REQUIREMENTS

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


726 mm (28.6")
A: Front: > 75 cm (29.,6 ")
B: Left: > 10 cm (4")
C: Rear: $>10 \mathrm{~cm}$ (4")
D: Right $>10 \mathrm{~cm}$ (4")


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

### 1.1.4 POWER REQUIREMENTS

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

1. Input voltage level:

North America 120 V, 60 Hz : More than 12 A
Europe/Asia 220V~240V, $50 \mathrm{~Hz} / 60 \mathrm{~Hz}$ : more than 8 A
2. Permissible voltage fluctuation: $\pm 10 \%$
3. Never set anything on the power cord.

### 1.2 INSTALLATION FLOW CHART

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


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

### 1.3 MAIN MACHINE INSTALLATION

### 1.3.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:
Description ..... Q'ty

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

### 1.3.2 INSTALLATION PROCEDURE



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

## Development Unit and PCU



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

6. Spread a large piece of paper on a flat surface.

NOTE: Make sure the area is free of pins, paper clips, staples, etc. to avoid attraction to the magnetic development roller.
7. Slide the development unit $[A]$ out and place it on the paper.
8. Remove the tape and tag $[B]$ from the development unit
9. Remove the entrance seal plate [C] ( $(5) \mathrm{x} 2)$.

10. Remove the development roller unit [A], and set it on the paper.
11. Pour the developer $[B]$ into the development unit.

NOTE: The developer lot number is embossed on the end of the developer package. Do not discard the package until you have recorded the lot number. (1-14)

1) Pour approximately $1 / 3$ of the developer evenly along the length of the development unit.
2) Rotate the drive gear [C] to work the developer into the unit.
3) Repeat until all the developer is in the development unit.
4) Continue to turn the drive gear until the developer is even with the top of the unit.
12. Reassemble the development unit.

NOTE: Make sure that the earth plate [D] is positioned correctly.
13. Re-install the development unit and PCU.


## Toner Bottle

1. Raise the toner bottle holder lever $[A]$, push the lever $[B]$ to the side, and then pull the toner bottle holder [C] out.
2. Shake the new toner bottle well.

NOTE: Do not remove the toner bottle cap [D] until after shaking.
3. Unscrew the bottle cap and set the bottle in the holder.

NOTE: Do not touch the inner bottle cap [E].
4. Push the toner bottle holder into the main machine until it locks in place, and then lower the holder lever to secure the toner bottle.
NOTE: The holder lever cannot be lowered unless the toner bottle is installed.

## Paper Trays



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

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

## Initialize TD Sensor and Developer

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

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

## Set Paper Size for Paper Trays

1. Press User Tools/Counter $\boxed{\Delta / \text { /raza }}$.

2. On the touch panel, press System Settings.

| roㅇㅇ System Settings |  |  |  | 14NOV 2000 11:52 |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Exit |  |
| Select one of the following default settings. |  |  |  |  |  |
| General Features Paper Size Setting | Timer Setting | Interface Settings | File Transter | Key Operator Tools |  |
| Panel Tone | ON | Function Reset Timer |  | 3 seconds |  |
| Warm Up Notice | ON | Output: Copier |  | Internal tray 1 |  |
| Copy Count Display | Up | Output: Document Server |  | Intemal tray 1 |  |
| Function Priority | Copier | Output: Facsimile |  | Internal tray 1 |  |
| Print Priority | Display mode | 1/2 |  | arears | 7 Nest |

3. Press the Paper Size Setting tab.
4. Press the button for the tray to change.
5. Change the setting and press the OK button.
6. Repeat for each tray installed.
7. Press Exit twice to return to the main display

- The 1st and 2nd paper trays are provided with paper size dial selectors. The dial settings on the paper trays have priority over the UP settings. However, if you select the asterisk (*) position on the paper size dial, you can select the paper size with the UP setting.
- The 3rd and 4th paper trays of the paper output unit are not equipped with paper-size selection dials, so you must use the Paper Size UP settings for the 3rd and 4th trays.

8. Check the copy quality and machine operation.

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

## Electrical Total Counter

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


## HDD Caution Decal (for only NA models)

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

### 1.2 PAPER TRAY UNIT INSTALLATION

### 1.2.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:
Description Q'ty

1. Knob Screw - M3 ..... 1
2. Knob Screw - M4 ..... 1
3. Joint Bracket ..... 1
4. Front Stand ..... 1
5. Rear Stand ..... 1
6. Stand Bracket ..... 1
7. NECR ..... 1
8. Installation Procedure ..... 1

### 1.2.2 INSTALLATION PROCEDURE


[B]


## $\triangle$ CAUTION <br> Switch off the main machine and unplug its power cord before starting the following procedure.

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

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

12. Install the front and rear stands $[A]$ and $[B]$. First attach at (1) and then swing the other end round to (2).
13. Install the stand bracket [C].

NOTE: The stand bracket must be installed on the left side in order to allow installation of the Two-Tray Finisher.

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

### 1.3 1-BIN TRAY UNIT INSTALLATION

### 1.3.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:
Description ..... Q'ty

1. Ground Bracket ..... 1
2. Connector Cover ..... 1
3. Base Cover ..... 1
4. Copy Tray ..... 1
5. Mylar Strip. ..... 1
6. Stepped Screw - M3x8 ..... 5
7. Screw $-\mathrm{M} 3 \times 8$ ..... 2
8. Screw - M4x7 ..... 1
9. Tapping Screw $-M 3 \times 6$ ..... 2
10. Tapping Screw - M3x14 ..... 1
11. Tapping Screw - M3x8 ..... 1
12. Installation Procedure ..... 1

### 1.3.2 INSTALLATION PROCEDURE



## $\triangle$ CAUTION <br> Switch off the main machine and unplug its power cord before starting the following procedure.

1. Remove the scanner unit

NOTE: If the ARDF is installed, remove the ARDF before removing the scanner unit.

1) Remove the connector cover [A].
2) Disconnect the scanner cable [B].
3) Remove the scanner unit $[C](\hat{\xi} \times 3)$.

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

9. Secure the 1-bin tray unit $[A]\left({ }^{2} \times 1: M 3 \times 14\right)$.
10. Remove the cover [B].
11. Install the grounding bracket [C] (
12. Connect the harness [D].
13. Install the connector cover $[E]$ (
14. Re-install the front bracket [F] ( $\mathcal{S}^{(1)} \times 2$ : $44 \times 7, M 4 \times 10$ ) and the rear bracket [G] (帠 $\times 1 \mathrm{M} 4 \times 10$ ).

[E]

15. Attach the copy tray.

## Bridge Unit (B397) not installed:

1) Attach the decal $[A]$.
2) Secure $[B]$ ( $\hat{\xi}^{2} \times 2$ : Stepped screw) into the side of the 1-bin tray housing.
3) Attach the copy tray [C] to the stepped screws.

## Bridge Unit (B397) installed:

1) Open the cover of the bridge unit [D].
2) Install the copy tray bracket $[E]$ ( $\hat{\xi}^{2} \times 1$ : tapping screw).
3) Install the copy tray [F] ( $35 \times 1$ ).


16. Remove the scanner stand cover [A] ( $\hat{\xi}^{(1)} \times 1$ ).
17. To adjust the height of the scanner stand, first remove $[B]$ ( $\times 2$ ) to release the scanner stand [C].
18. Raise the scanner stand until the next set of screw holes in the main frame can be seen through the screw holes in the scanner stand.
19. Secure the stand and install the cover [D] (

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

### 1.4 BRIDGE UNIT INSTALLATION

### 1.4.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:
Description ..... Q'ty

1. Stepped Screw ..... 2
2. Connector Cover ..... 1
3. Exit Mylar ..... 2
4. Installation Procedure ..... 1

### 1.4.2 INSTALLATION PROCEDURE



## $\triangle$ CAUTION <br> Switch off the main machine and unplug its power cord before starting the following procedure.

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

If the optional external output tray (A825) will be installed (instead of a finisher), do Step 4.
4. Remove the two small covers [D].
5. Remove the cover [E] ( $\mathrm{E} \times 1$ )
6. Remove the cap $[\mathrm{F}]$.

7. If an optional finisher is to be installed, attach two mylars $[A]$ to the bridge unit.
8. Remove the cover [B].
9. Install the bridge unit [C] ( E 2 ).
10. Connect the bridge unit I/F harnesses [D] (玉退 x 2 ).
11. Install the connector cover [E].
12. Turn on the main switch and check the bridge unit operation (make sure that there are no paper jams).

### 1.5 1000-SHEET FINISHER INSTALLATION

### 1.5.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:
Description ..... Q'ty

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

### 1.5.2 INSTALLATION PROCEDURE



## $\triangle$ CAUTION <br> Switch off the main machine and unplug its power cord before starting the following procedure.

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

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

2. Fasten $[\mathrm{A}](\hat{\xi} \times 2)$ loosely.
3. Hang the front stand $[B]$ and rear stand $[C]$ on the screws installed in step 2.
4. To secure the front and rear stands tighten $[\mathrm{A}](\hat{\xi} \times 2)$ and secure the stands ( $(\hat{\xi}$ x4).
5. At the front, use handle [D] to pull out the stapler unit.
6. Remove the locking lever $[\mathrm{E}]\left(\mathbb{Z}^{2} \times 1\right)$.
7. Align the finisher on the stands, and lock it in place by pushing the locking lever.
8. Secure the locking lever ( $\widehat{(1)} \times 1$ ) and push the stapler unit into the finisher.

9. Secure the finisher $[A](\hat{\xi} \times 1)$.
10. Adjust the securing knobs $[B]$ under the front and rear stands until the finisher is perpendicular to the floor.
11. Install the shift tray [C] (snap ring $\times 1$ ).

NOTE: Make sure that the three pegs [D] fit into the slots [E] properly.
12. Connect the finisher cable $[F]$ to the main machine.
13. Turn on the main power switch and check the finisher operation.

### 1.6 TWO-TRAY FINISHER INSTALLATION

### 1.6.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:
Description ..... Q'ty

1. Front Joint Bracket ..... 1
2. Rear Joint Bracket ..... 1
3. Shift Tray ..... 2
4. Screw $-\mathrm{M} 3 \times 6$ ..... 2
5. Screw $-\mathrm{M} 4 \times 14$ ..... 4
6. Lower Ground Plate ..... 1
7. Installation Procedure ..... 1

### 1.6.2 INSTALLATION PROCEDURE




## $\triangle$ CAUTION <br> Switch off the main machine and unplug its power cord before starting the following procedure.

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

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

3. Install the left joint bracket $[A](\hat{\xi} \times 2 M 4 \times 14)$ and right joint bracket $[B](\hat{\xi} \times 2$ M4x14).
4. Attach the ground plate [C] ( $\mathrm{E} \times 2 \mathrm{M} 3 \times 6$ ) to the center of the paper tray.
5. Open the front door of the finisher, and pull out the locking lever $[D]\left(\hat{\xi}^{3} \times 1\right)$.
6. Push the finisher to the side of the machine with the holes in the finisher aligned with the joint brackets, and then dock the finisher against the machine.
7. Push in the locking lever and secure it ( F ) , then close the front door.


8. Install two trays $[A]$ ( $\hat{\xi}^{2} \times 1$ each).
9. Connect the finisher cable $[B]$ to the main machine below the right rear handle.
10. Turn on the main switch and check the finisher operation.

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

### 1.7 PUNCH UNIT INSTALLATION

### 1.7.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:
Description Q'ty

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

### 1.7.2 INSTALLATION PROCEDURE



1. Unpack the punch unit and remove all tapes and shipping retainers.
2. Open the front door and remove the rear cover $[A]\left(\mathcal{E}^{2} \times 4\right)$.


3. Remove the hopper cover $[A]\left(\mathcal{S}^{2} \times 2\right)$.
4. Install the sensor bracket $[B]$ (stepped $\times 1$ ).
5. Install the spring [C].
6. Install the 2 mm spacer [D].
7. Install the punch unit [E] ( $(\underset{\xi}{(1)} \times 2$, stepped $\times 1)$


8. Connect the harnesses $[\mathrm{A}]$ and clamp them as shown.

NOTE: No special DIP switch settings are required for this punch unit. The punch unit sends an identification signal to the machine board so it knows what type of punch unit has been installed.
10. Slide the hopper $[B]$ into the machine.
11. Fasten the two 1 mm spacers [C] to the rear frame for future adjustment.

NOTE: The spacers are used to adjust the horizontal positioning of the holes.
12. Reassemble the finisher and check the punch operation.

### 1.8 AUTO REVERSE DOCUMENT FEEDER INSTALLATION

### 1.8.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:
Description ..... Q'ty

1. Stepped Screw ..... 2
2. Screw $-\mathrm{M} 4 \times 10$ ..... 2
3. Installation Procedure ..... 1

### 1.8.2 INSTALLATION PROCEDURE




## $\triangle$ CAUTION <br> Unplug the main machine power cord before starting the following procedure.

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

5. Connect the $I / F$ cable $[A]$ ( $⿷^{\int l l} \mathrm{x} 1$ ) to the main machine.
6. Turn on the main switch.
7. Check the ARDF operation and copy quality. Be sure to check and adjust the registration for the ARDF with SP 6006.

### 1.9 LCT INSTALLATION

### 1.9.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:
Description Q'ty

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

### 1.9.2 INSTALLATION PROCEDURE


[C]

## ⒸAUTION <br> Switch off the main machine and unplug its power cord before starting the following procedure.

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

1. Unpack the LCT and remove the tapes.
2. Open the right cover [A] of the paper tray unit.
3. Open the lower right cover [B] and cut the holding band [C].

NOTE: When cutting the holding band, the upper part of the band should be cut as shown. Otherwise, paper jams may occur.
4. Remove the right lower cover.

6. Install the joint pins $[A]$.
7. Push the release lever $[B]$ and slide the LCT to the right (front view).
8. Hang the LCT [C] on the joint pins, then secure the brackets $[D]\left(\mathcal{F}^{(1)} x 4\right)$.
9. Return the LCT to the previous position and connect the LCT cable [E].
10. Open the LCT cover and load the paper.
11. Turn on the ac switch and check the LCT operation.

### 1.10 PLATEN COVER INSTALLATION



1. Install $[A]\left(\mathcal{S}^{2} \times 2\right)$ on the top cover as shown.
2. Position the platen cover bracket $[B]$ on the heads of the stud screws and slide the platen cover [C] to the left.

### 1.11 KEY COUNTER INSTALLATION




## $\triangle$ CAUTION <br> Unplug the machine power cord before starting the following procedure.

1. Hold the key counter plates $[A]$ on the inside of the key counter bracket $[B]$ and insert the key counter holder [C]
2. Secure the key counter holder to the bracket ( $\hat{E}^{2} \times 2$ ).
3. Attach the key counter cover [D] ( $\hat{E}^{2} \times 2$ ).
4. Remove the connector cover [E].
5. Remove the knockout [F] from the connector cover.


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

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


### 1.12 ANTI-CONDENSATION HEATER

1. Remove the ARDF and exposure glass.

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

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

6. Install the heater brackets [E] ( $\mathrm{S}^{2} \times 2$, M3x6).
NOTE: Use the screws already attached at the same position.
7. Install the heater [F] ( $\mathcal{E}^{2} \times 2, \mathrm{M} 4 \times 6$ ) and route the harness.

8. Install the ac harness assembly [G] ( $\hat{\xi^{2}} \times 2$, M4x6) and connect the connector [H].

9. Remove the rear lower cover $[I]\left(\mathcal{E}^{2} \times 4\right)$.
10. Remove knockout [J].
11. Pull out ac harness [K].

12. Connect the ac harness [L] to the ac outlet [M].
NOTE: Do not remove the ground wire from the ac outlet.
13. Install the ac outlet.
14. Install the ground wire $[\mathrm{N}]$ ( $\hat{\xi}^{(1)} \times 1, \mathrm{M} 4 \times 6$ ).
15. Re-install the rear cover, rear lower cover.
16. Connect the harness [O].


### 1.13 TRAY HEATER




## $\triangle$ CAUTION <br> Unplug the machine power cord before starting the following procedure.

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

### 1.14 TRAY HEATER (OPTIONAL PAPER TRAY UNIT)



## $\triangle$ CAUTION

Unplug the machine power cord before starting the following procedure.

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

## PREVENTIVE MAINTENANCE

## 2. PREVENTIVE MAINTENANCE SCHEDULE

### 2.1 PM TABLE

NOTE: Amounts mentioned as the PM interval indicate the number of prints.
Symbol key: C: Clean, R: Replace, L: Lubricate, I: Inspect

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


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


| B003/B004B006/B007 | EM | 150K | 300K | 450K | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| FUSING UNIT AND PAPER EXIT |  |  |  |  |  |
| Fusing Entrance and Exit Guide Plates |  | C | C | C | Water or alcohol. |
| Hot Roller |  | R | R | R |  |
| Pressure Roller |  | R | R | R |  |
| Fusing Thermistors |  | R | R | R |  |
| Cleaning Roller |  | C | C | C | Water or alcohol. |
| Cleaning Roller Bushings |  | L | L | L | Grease: Barrierta JFE 55/2 |
| Hot Roller Strippers |  | C | R | C | Water or alcohol. |
| Paper Exit Guide Ribs |  | C | C | C | Water or alcohol. |
| Exit Sensor |  | C | C | C |  |
| DRIVE |  |  |  |  |  |
| Drive Belts |  |  | 1 |  | Replace if necessary |


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


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


| A683 |  | EM | 150K | 300K | 450K |
| :--- | :---: | :---: | :---: | :---: | :--- |
| NOTE |  |  |  |  |  |
| LCT | R | R | R | Check counter with SP7-204. If <br> $\geq 150 ~ K, ~ r e p l a c e ~ r o l l e r . ~ A f t e r ~$ |  |
| replacing the roller, do SP7-816 |  |  |  |  |  |
| to reset counter. |  |  |  |  |  |$|$


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


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

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


REPLACEMENT AND ADJUSTMENT

# 3. REPLACEMENT AND ADJUSTMENT <br> 3.1 GENERAL CAUTIONS 

| $\uparrow$ CAUTION |
| :--- | :--- |
| To avoid damage to the transfer belt, drum, or development unit when it is <br> removed or re-installed, never turn off either power switch while electrical <br> components are active. |


| $\triangle$ CAUTION |
| :--- |
| Turn off the main power switch and unplug the machine before attempting |
| any of the procedures in this section. |

### 3.1.1 LASER UNIT

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

### 3.1.2 USED TONER

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

### 3.2 SPECIAL TOOLS AND LUBRICANTS

### 3.2.1 SPECIAL TOOLS

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

### 3.2.2 LUBRICANTS

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

### 3.2.3 SYMBOLS USED IN TEXT

Screw: Connector: 気 C-clamp (snap ring): E-clamp: \&

### 3.3 FRONT DOOR



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

### 3.4 DUPLEX UNIT



1. Connector cover $[A]$ (気 x1)
2. Duplex connectors [B] (E[ll $x 2$ )
3. Duplex support arm [C] ( ( 3 ) $\times 1$ )
4. Duplex unit [D]

NOTE: Grip the duplex unit with both hands, slowly rotate it towards you and then lift up.

### 3.5 UPPER RIGHT COVER



NOTE: Work carefully to avoid damaging the development roller.

1. Duplex Unit ( -3.4 )
2. Transfer belt unit ( -3.13 .1 )
3. Metal support arm $[A]\left(\mathcal{F}^{2} \times 1\right)$
4. Band support arm $[B]$ (loop fastener)
5. Connector [C] (E®\# E 1 )
6. Upper right cover (3) $x 1$, Bushing $x 1$ )

### 3.6 BY-PASS TRAY



1. Duplex unit (-3.4)
2. Left cover $[A]\left(\mathcal{E}^{2} \times 1\right)$
3. Right cover $[B]\left(\hat{\xi}^{3} \times 1\right)$
4. Connectors [C] (E\#\# E )
5. By-pass unit [D] ( $\hat{\xi}^{2} \times 4$ )

NOTE: After removing the screws, lift to unhook the by-pass tray unit from the frame of the machine.

### 3.7 REAR COVERS

### 3.7.1 REAR UPPER COVER



1. Left corner cover $[A](\hat{\xi} \times 2)$
2. Rear upper cover $[B]\left(\mathcal{F}^{2} \times 2\right)$

### 3.7.2 REAR LOWER COVER



1. Rear lower cover $[A]\left(\mathcal{B}^{3} \times 4\right)$

### 3.8 LEFT COVERS

### 3.8.1 LEFT UPPER COVER



1. Rear left corner cover $[A](\hat{\xi} \times 2)$
2. Left upper cover $[B](\hat{E}) x 4)$

### 3.9 SCANNER UNIT

### 3.9.1 ARDF



1. Interface connector
2. ARDF $[A]$ ( ${ }^{2} \times 2$ ) Push the ARDF towards the front of the machine to align the keyholes (not shown) of the ARDF base with the heads of the stud screws and lift.

### 3.9.2 EXPOSURE GLASS



1. Open the ARDF or platen cover.
2. Rear scale $[A]\left(\mathcal{F}^{7} \times 3\right)$
3. Left scale $[B]$ ( ${ }^{2} \times 2$ )
4. Exposure glass [C]
5. DF exposure glass [D]

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

### 3.9.3 SCANNER EXTERIOR PANELS/OPERATION PANEL



1. ARDF ( 3.9.1)
2. Exposure glass and DF exposure glass( 3.9.2)

3. Operation panel base $[B](\hat{E} \times 4)$
4. Rear cover [C] ( $\hat{\xi}^{3} \times 4$ ). Carefully lift in the direction of the arrow to disconnect the tab.
5. Right cover $[\mathrm{D}]\left(\begin{array}{l}\text { 舟 } \times 3)\end{array}\right.$
6. Left cover [E] (

### 3.9.4 LENS BLOCK/SBU ASSEMBLY



1. ARDF (-3.9.1)
2. Exposure glass and DF exposure glass ( 3.9.2)
3. Lens cover $[A](\hat{\xi} \times 4)$
4. Flexible cable $[\mathrm{B}]\left(\mathrm{E}_{\mathrm{ll}}^{\mathrm{l}} \mathrm{x} 1\right)$
5. Lens block assembly [C] ( $\hat{\xi}^{(1)} \times 4$ )

NOTE: The elements of the lens block assembly have been factory adjusted and paint locked at 8 points. Do not attempt to replace these items. Replace the unit.
6. Perform scanner and printer copy adjustments (-3.21)

### 3.9.5 ORIGINAL SIZE SENSORS



1. ARDF ( 3.9.1)
2. Exposure glass (-3.9.2)
3. Lens block ( 3.9.4)




### 3.9.6 EXPOSURE LAMP



1. ARDF (-3.9.1)
2. Exposure glass ( -3.9 .2 )
3. Operation panel $[A]\left(\hat{\xi}^{2} \times 2, ~ E=\| x 1\right)$
4. Slide 1st scanner $[B]$ to the cutout to expose connector and screw.
5. Exposure lamp [C] ( $\hat{\xi}^{3} \times 1$, 気 $\mathrm{El} \times 1$ )

NOTE: Never touch the glass surface of the exposure lamp with fingers. Slide the exposure lamp toward the rear to disengage the tab on its base from the hole below and then lift out.

### 3.9.7 SCANNER HP SENSOR/PLATEN COVER SENSOR



1. ARDF ( 3.9.1)
2. Scanner rear cover ( -3.9 .3 )
3. Scanner HP sensor bracket $[A](\hat{E} \times 1)$
4. Scanner HP sensor $[B]$ ( $\mathrm{E}_{\mathrm{ll}}^{\mathrm{U}} \mathrm{x} 1$ )


### 3.9.8 SCANNER MOTOR



1. ARDF (-3.9.1)
2. Scanner rear cover (-3.9.3)

3. Scanner motor bracket $[\mathrm{B}]$ ( $\mathrm{S}^{2} \times 3$, 気 El x1, spring x1, timing belt x1)

NOTE: Loosen motor bracket $[B](\hat{\xi} \times 3)$ to release tension on belt (motor slides side to side).

6. Perform scanner and printer copy adjustments ( 3.21)

### 3.9.9 LAMP STABILIZER AND SCANNER MOTOR DRIVE BOARD



1. ARDF (-3.9.1)
2. Scanner rear cover (-3.9.3)

3. Lamp stabilizer $[B]$ ( $⿷^{\Perp l} \times 2$, standbys $\times 3$ )


### 3.9.10 SCANNER WIRE



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

## Front wire:

4. Left stay $[A]\left(\mathcal{S N}^{2} \times 5\right)$
5. Right stay $[B]\left(\mathcal{F}^{\mathrm{E}} \times 5\right)$
6. Front stay $\left.[C]()^{3} \times 6\right)$
7. Front scanner rail [D] (
8. To replace the scanner wire, see page 3-19.

## Rear wire:



1. Scanner HP sensor bracket $[A]\left(\mathcal{S}^{2} \times 1\right)$
2. Scanner motor (-3.9.8)
3. Rear bracket $[B]\left(\hat{E}^{7} \times 9\right)$
4. Rear scanner rail [C] ( ${ }^{2} \times 2$ )
5. Scanner drive pulley [D] ( $\hat{\xi}^{2} \times 1$ )


## To replace the scanner wire:

1. Front and rear scanner wire bracket $[A]$ ( $\hat{\xi} \times 1$ ea.)
2. Tension spring $[B]$
3. Tension bracket [C] ( $\mathrm{F} \times 1$ ). Loosen and do not remove!
4. Remove wires, front and rear.
5. Attach the new wires.

NOTE: Illustration above shows the front wire.
6. Pass the wire through the pulleys as shown in the illustration, and then pass the bead-end of the wire through the slot in the pulley.
7. Turn the pulley until you see the red mark on the wire. 2 turns and 6 turns (see top illustration)
8. Without allowing the wire to loosen, tape the wire to the pulley.
9. Pass the wire through (1).
10. Complete threading the wire: (2) $\rightarrow$ (3) $\rightarrow$ (4) $\rightarrow$ Tension spring $\rightarrow$ Screw
11. Scanner wire bracket (5) (


## Completion:

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

### 3.10 LASER UNIT

| $\boxed{4}$ WARNING |
| :--- |
| Turn off the main power switch and unplug the machine before attempting <br> any of the procedures in this section. Laser beams can seriously damage <br> your eyes. |

### 3.10.1 CAUTION DECAL LOCATIONS

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


## 3．10．2 LASER UNIT



## $\triangle$ WARNING <br> Turn off the main power switch and unplug the machine before attempting this procedure．Laser beams can seriously damage your eyes．

1．Open the front door and raise the toner bottle holder handle［A］．
2．Front door $[B]$（pins $\times 2$ ）
3．Inner cover［C］（解 x2，气気x2）
4．Shield glass［D］
5．Shield plate $[\mathrm{E}](\hat{\xi} \times 2)$

NOTE：Hold the LD board securely when disconnecting connectors．
7．Laser unit［G］（ ${ }^{2} \times 2$ ）
NOTE：When sliding out the laser unit，do not hold the LD board．Hold the laser unit casing．

### 3.10.3 POLYGON MIRROR MOTOR



- 45 cpm machine-

- 35 cpm machine-


1. Laser unit (-3.10.2)
2. Laser unit cover $[A]$ ( $\times 4,2$ hooks)

3. After replacing the motor, do the image adjustment. ( -3.21 )

### 3.10.4 LASER SYNCHRONIZATION DETECTOR



1. Laser unit (-3.10.2)


### 3.10.5 LD UNIT



1. Laser unit (-3.10.2)

NOTE: To avoid damaging the LD board, hold it securely when disconnecting the connectors. Hold the laser unit casing.
2. After replacing the LD board, perform SP 2-109 to adjust the laser beam pitch (described on the next page).

## Laser beam pitch adjustment

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

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

1. Set SP2-110 to 0 (for 400 dpi ).
2. Do SP 2-109-8.
3. For SP2-109-1 input 144.

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


Adjustment not complete


Adjustment complete

### 3.11 PHOTOCONDUCTOR UNIT (PCU)

### 3.11.1 PCU



1. Open the front door.
2. Lower the by-pass tray, open the duplex unit, and open the transfer unit right cover.
3. Loosen $[A]\left(\mathcal{S}^{2} \times 1\right)$.
4. Rotate bracket $[B]$ to the left.
5. Push the release lever $(1)$, pull the PCU out slightly (2), then push the development unit (3) to the left.
6. Grasp handle [C], and slowly pull the PCU out.

NOTE: If the right cover is to be left open for a long time, cover the drum with paper, or remove the PCU and cover it with paper. This prevents exposing the drum to strong light. Before you re-install the PCU, align the brackets on the PCU with the rails above and make sure they are engaged before you slowly push the PCU into the machine.

### 3.11.2 DRUM



1. $\mathrm{PCU}(-3.11 .1)$
2. Toner cap $[A]$
3. Insert cap $[A]$ into the toner entrance hole $[B]$.
4. Make sure that the cap is inserted completely into the hole.
5. Turn the PCU upside-down, and remove lower PCU cover [C] (
6. Pull the drum [D] towards the front (2) (the left side in the illustration) while releasing the charge roller $[E]$ using the release lever (1) $[F]$, and then remove the drum (3).
CAUTION: Never touch the drum surface with bare hands.
7. After replacing the drum, perform the ID sensor initial setting using SP3-001-2.
8. Do the process initial setting procedure (SP2-805).

### 3.11.3 PICK-OFF PAWLS



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

## Pick-off pawl position adjustment

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

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


### 3.11.4 CHARGE ROLLER/CHARGE ROLLER CLEANING PAD



1. Remove the drum. ( -3.11 .2 )
2. Two snap rings $[A]$ ( (8) $x 2$ )
3. Slide out front charge roller holder [B]
4. Charge roller [C]

NOTE: Do not touch the charge roller.
5. Remove charge roller cleaning pad [D] (4 hooks)
6. After replacing the charge roller, check the value of SP2-001-1. If it is not at the standard value (1630V), set SP2-001-1 to -1630V.
NOTE: If this is not done, the carrier will be attracted to the drum because the charge roller voltage will be too high.

### 3.11.5 DRUM CLEANING BLADE



1. Remove the drum. ( -3.11 .2 )
2. Remove the charge roller. ( -3.11 .4 )
3. Remove the drum cleaning blade $[A]\left(\hat{\xi}^{2} \times 2\right)$

### 3.11.6 ID SENSOR



1. $\mathrm{PCU}(-3.11 .1)$
2. Fusing unit (-3.15.1)
3. Development unit (-3.12.1)


4. Remove the ID sensor [C] ( ${ }^{(1)} \times 1$ )
5. Perform the ID sensor initial setting with SP3-001-2 (Chapter 5, "Service Tables")

## DEVELOPMENT

### 3.12 DEVELOPMENT

### 3.12.1 DEVELOPMENT UNIT



1. Open the right upper cover and front cover.
2. PCU. ( -3.11 .1 )

NOTE: Spread paper on a clean flat surface that is free of pins, paper clips, staples, screws or any other metal objects.
3. Loosen $[A]\left(\mathcal{S}^{3} \times 1\right)$
4. Rotate bracket $[B]$ left.
5. Development unit [C]

NOTE: Pull slowly to avoid scratching or nicking the development roller.
6. Set the development unit on the spread paper.
7. If you are temporarily installing a used development unit for test purposes, perform SP2-220 and 2-802-1 after installation (Chapter 5, "Service Tables)

### 3.12.2 DEVELOPMENT FILTER


[C]

1. Development unit (-3.12.1)
2. Upper development cover $[A](\sqrt{3}) \times 2)$
3. Development filter [B]

NOTE: Make sure that the surface with the red mark is facing up.
4. Make sure that the ground plate [C] is positioned correctly.

### 3.12.3 DEVELOPMENT ROLLER



1. Development unit (-3.12.1)
2. Upper development cover (-3.12.2)
3. Development roller [A] (包 x2)

NOTE: Work carefully to avoid scratching or nicking the development roller.

### 3.12.4 DEVELOPER



1. Development unit (-3.12.1)
2. Remove the development roller ( -3.12 .3 )
3. Empty toner [A]
4. Turn drive gear $[B]$ to ensure that no developer remains in the unit or on the developer roller.
NOTE: Dispose of the used developer in accordance with local regulations.
Work carefully to avoid scratching or nicking the development roller.
5. Pour approximately $1 / 3$ of the developer [C] evenly along the length of the development unit.
6. Rotate the drive gear [D] to work the developer into the unit. Repeat [C] and [D] until all toner is in the unit and level with the edges.

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

### 3.12.5 TD SENSOR



1. Remove the development unit (-3.12.1)
2. Empty all developer from the developer ( 3.12.4)
3. TD sensor $[A]\left(\mathcal{E}^{2} \times 1\right)$

NOTE: The TD sensor is attached to the casing with double-sided tape. Pry it off with the flat head of a screwdriver. Use fresh double-sided tape to re-attach the sensor.
4. Pour new developer into the development unit and perform the TD sensor initial setting using SP2-801.
NOTE: When performing the TD sensor initial setting, cover the toner entrance hole with a piece of paper ( -3.12 .4 ).

### 3.13 TRANSFER UNIT

### 3.13.1 TRANSFER BELT UNIT



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

1. Lower the by-pass tray, open the duplex unit, and open the right cover.
2. Transfer unit $[A]$ (1 hook)
3. Transfer belt [B] (springs $x 2,1$ hook)

NOTE: Avoid touching the transfer belt surface.

### 3.13.2 TRANSFER BELT



1. Remove the transfer belt unit. ( -3.13 .1 )
2. Belt drive gear $[A]$
3. Set screws [B] (角 x2)
4. Lay on a flat, clean surface and fold the unit to release the tension on the belt [C].
5. Transfer belt [D]

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

### 3.13.3 TRANSFER BELT CLEANING BLADE AND TONER OVERFLOW SENSOR



## Transfer Belt Cleaning Blade

1. Transfer belt unit. ( -3.13 .1 )
2. Transfer belt. ( -3.13 .2 )
3. Transfer belt cleaning blade $[A]\left(\mathcal{E}^{3} \times 3\right)$

NOTE: Avoid touching the edge of the new blade. Check the new blade for dust or damage.

## Toner Overflow Sensor

1. Transfer belt unit. (-3.13.1)
2. Transfer belt. (-3.13.2)
3. Transfer belt cleaning blade $[A]\left(\mathcal{E}^{2} \times 3\right)$
4. Turn over the transfer unit and empty the used toner in the transfer unit.

NOTE: Re-install the color-coded wires in the correct order.

### 3.14 PAPER FEED

### 3.14.1 PICK-UP, SEPARATION, AND FEED ROLLERS



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

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

### 3.14.2 LOWER RIGHT COVER



1. Duplex unit (-3.4)
2. By-pass tray (-3.6)
3. LCT (if installed)
4. Lower right cover $[\mathrm{A}](\mathrm{E} \times 5)$
5. Vertical transport cover [B]

NOTE: Push the cover completely to the left and then press in on the right tab to release the peg from the hole.

## PAPER FEED

### 3.14.3 RELAY/UPPER PAPER FEED AND LOWER PAPER FEED CLUTCHES



1. Rear lower cover (-3.7.2)
2. First paper feed clutch bracket $[A]$ ( $\mathcal{F}^{2} \times 2$, bushing $\times 1$ )
3. Second paper feed clutch bracket $[B]\left(\mathcal{B}^{3} \times 2\right.$, bushing $\left.\times 1\right)$
4. Drive bracket $[C]\left(\mathcal{E}^{2} \times 1\right.$, spring $\times 1$, bearing $\times 1$ )
5. Relay clutch [D] (Elll E 1 )
6. Upper paper feed clutch $[\mathrm{E}]\left(\mathrm{E}_{\mathrm{El}}^{\mathrm{E}} \mathrm{x} 1\right)$
7. Lower paper feed clutch $[\mathrm{F}]\left(\mathrm{E}_{\mathrm{\#})}^{\mathrm{E}} \mathrm{x} 1\right)$

### 3.14.4 UPPER PAPER FEED UNIT FOR TRAY 1




1. Upper paper tray
2. Right lower cover. (-3.14.2)
3. Upper right cover ( 3.5)
4. Upper paper feed clutch $[\mathrm{A}](-3.14 .3)$
5. 3 relay gears $[B]$


## PAPER FEED

### 3.14.5 LOWER PAPER FEED UNIT FOR TRAY 2



1. Lower the paper trays
2. Right lower cover (-3.14.2)
3. Remove the lower paper feed clutch $[A](-3.14 .3)$
4. Relay gears $[B](x 3)$

5. Gear [D] (x1)
6. Lower paper feed unit $[E](\hat{\xi} \times 2$, 気 $\|$ l $)$

### 3.14.6 PAPER END/PAPER HEIGHT/RELAY SENSORS



1. Appropriate paper feed unit ( $-3.14 .4,3.14 .5$ )
2. Paper height sensor $[A]$ (臤 x 1 )
3. Paper end sensor $[B]$ ( $\mathrm{E}_{\mathrm{El}}^{\mathrm{l}} \mathrm{x} 1$ ).
4. Relay sensor bracket [C] (
5. Relay sensor [D]

### 3.14.7 REGISTRATION SENSOR

1. Front door (-3-3•)
2. Rear upper cover ( -3.7 .1 )
3. Right door and transfer belt unit (-3.5, 3.13 .1
4. PCU ( 3.11.1)
5. Development unit ( -3.12 .1 )
6. Inner cover [A] (気 x2)
7. Front registration holder $[\mathrm{B}](\hat{\xi} \times 1)$
8. Front registration roller gear [C] ( $\& x 1$ )
9. Registration roller bushing [D] (Spring $\times 1$ )

10. High voltage power supply board [E]

11. Flywheel $[F]$ (
12. Right rear cover [G] ( $\mathcal{E}^{2} \times 3$ )

13. Right cover switch bracket $[H]\left(\mathcal{S}^{2} \times 1\right)$
14. Rear registration holder [I] ( $\mathcal{E} \times 1$, spring x1)
15. Registration roller bushing [J] (\& x1)



16. Guide plate $[A]$ and registration roller $[B]$ (spring $\times 1$, (3) $\times 1$ )

17. Sensor bracket [D] (


## PAPER FEED

### 3.14.8 TRAY LIFT MOTOR



1. Rear lower cover (-3.7.2)
2. Bracket $[A]$ ( ${ }^{3} \times 2$ )

3. Tray lift motor [C] ( E x)

### 3.14.9 FEED/DEVELOPMENT MOTOR



1. Rear lower cover (
2. Rear upper cover ( $\left.\mathrm{K}^{\mathrm{E}} \mathrm{x} 4\right)(-3.7 .1)$
3. Tray lift motor (-3.14.8)
4. Support $[A]$ (管 $\times 2$, harnesses $\times 2$ )
5. Timing belt $[B]$ (Raise arm to release tension on belt.)
6. Feed/development motor [C] (

### 3.15 FUSING

### 3.15.1 FUSING UNIT

## $\triangle$ CAUTION <br> Allow time for the unit to cool before doing the following procedure.



1. Open front door, duplex unit, and right door.
2. Set screw $[A]$ ( $\mathcal{E}^{2} \times 1$ )
3. Fusing unit release lever [B]
4. Slide out fusing unit [C]

NOTE: After removing the fusing unit, close the right cover.

### 3.15.2 FUSING UNIT EXIT GUIDE



1. Fusing unit (-3.15.1)
2. Exit guide [A]

NOTE: Press the guide to the left and then press on the right end to release the peg from the hole.

### 3.15.3 HOT ROLLER STRIPPERS



1. Fusing unit (-3.15.1)
2. Fusing unit cover $\left.[A]()^{2} \times 4\right)$

NOTE: Note the positioning of the step screws x 2 and the set screws x 2 .
3. Hot roller strippers $x 7$, springs $x 7$

FUSING

### 3.15.4 FUSING LAMPS



1. Fusing unit (-3.15.1)
2. Fusing unit cover ( -3.15 .3 )
3. Fusing entrance guide $[\mathrm{A}](\mathrm{S} \times 2)$
4. Lower cover $[B]\binom{$ § }{$\times 1}$

## Left side

5. Two terminals [C] (
6. Center fusing lamp lead $[\mathrm{D}]$ (3 clamps)
7. Bracket $[\mathrm{E}]\left(\hat{e}^{7} \times 1\right)$


- Right side -

1. Two terminals $[A]$ (氞 $\times 2$ )
2. Spring [B]
3. Connector bracket [C] (会 x2)
4. Bracket [D] ( $\mathrm{E}_{\mathrm{E}}^{\mathrm{E}} \mathrm{x}$ )

NOTE: To avoid breaking the fusing lamps, handle them with care. Avoid touching the lamps with your fingers. Note the top/bottom positioning of the fusing lamps as you remove them. The sizes of the holes in the holder match the sizes of the ends of the 650 W lamp (red) and 550 W lamp (brown).
5. Remove both fusing lamps.

FUSING

### 3.15.5 THERMISTORS AND THERMOSTATS



1. Fusing unit (-3.15.1)
2. Fusing upper and lower cover. ( $-3.15 .3,3.15 .4$ )


CAUTION: The thermistors are thinly coated and extremely fragile. Handle with care to avoid damaging them. They should be replaced every 150K.
3. Center thermostat [C] ( $\hat{\xi}^{2} \times 2$ )
4. End thermostat [D] (象 x2)

### 3.15.6 FUSING ROLLER/PRESSURE ROLLER



1. Fusing unit ( -3.15 .1 )
2. Fusing upper and lower cover. ( $-3.15 .3,3.15 .4$ )
3. Fusing lamp. ( -3.15 .4 )
4. Springs $x 2[A]$ (both sides)
5. Arms $x 2[B]$ (both sides)
6. Pawl bracket [C] ( $\hat{\xi}^{7} \times 4$ )

7. Hot roller $[A]$

CAUTION: The hot roller is easily damaged. Always handle it carefully.
2. C -rings $\mathrm{x} 2[\mathrm{~B}]$ (both ends)
3. Drive gear [C]
4. Bushing $x 2[D]$ (both ends)
5. Pressure roller [E]
6. Fusing knob $[F]\left(\mathcal{E}^{2} \times 1\right)$
7. Bushing $\times 2$ [G] (both ends)

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

### 3.16 BY-PASS TRAY

### 3.16.1 COVER REPLACEMENT



1. Rear cover $[A]\left(\hat{\xi}^{2} \times 1\right)$
2. Front cover $[B](\hat{\xi} \times 1)$
3. Hinge cover $[C]\left(\begin{array}{l}\text { ( }\end{array} \mathrm{x} 1\right)$
4. Upper cover [D] ( $\hat{\xi}^{2}$ x2)
5. Close duplex unit and pull out upper cover.

### 3.1.2 BY-PASS PAPER FEED AND PICK-UP ROLLER REPLACEMENT



1. Upper cover (-3.16.1)
2. Lift up paper end feeler [A] to lock feeler in position.

NOTE: Before reinstalling the upper cover, return the paper end feeler to its original position.
3. Replace the paper feed roller $[B](\sqrt{3}) \times 1)$
4. Replace pick-up roller [C].

### 3.16.3 BY-PASS SEPARATION ROLLER REPLACEMENT



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

### 3.16.4 PAPER END SENSOR AND PICK-UP SOLENOID REPLACEMENT



1. Upper cover (-3.16.1)
2. Lift paper end feeler [A].

NOTE: Before reinstalling the upper cover, return the paper end feeler to its original position.
3. Replace paper end sensor [B] (気 El x 1 ).


### 3.16.5 PAPER SIZE SENSOR BOARD REPLACEMENT



1. Hook [A]
2. Paper tray [B] ( $\mathrm{E}^{\mathrm{I}} \mathrm{d} 1$ ).
3. Size sensor board [C].

NOTE: To avoid breaking the hook of the paper size sensor board, handle it carefully during removal.

### 3.16.6 BY-PASS TABLE REMOVAL



1. Hinge cover ( -3.16 .1 )
2. Harness $[A]\left(⿷^{\mathbb{H}} \mathrm{l} 1\right)$.
3. Screws $[B]$ ( $\mathbb{Z}^{\mathrm{E}} \mathrm{x} 2$ )
4. Retard spring bracket and remove the by-pass table [C].

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

### 3.16.7 PAPER FEED CLUTCH REPLACEMENT



1. By-pass tray.
2. Paper feed unit $[A]$ ( $\hat{\beta}^{2} \times 2$, 気 ${ }^{\|} \times 2$ )
3. Rear bracket $[B]$ ( $\hat{\xi}^{2} \times 4$, clip $x 1$, bushing $\times 1$ )
4. Paper feed clutch [C] (気 E 1)

DUPLEX UNIT

### 3.17 DUPLEX UNIT

### 3.17.1 DUPLEX COVER REMOVAL



1. Duplex unit cover $[A]\left(\mathcal{E}^{2} \times 4\right)$

### 3.17.2 DUPLEX ENTRANCE SENSOR REPLACEMENT



1. Duplex unit cover (-3.17.1)
2. Sensor holder $[A](\hat{B} \times 1)$
3. Entrance sensor $[B](E \mathbb{E} \times 1)$

### 3.17.3 DUPLEX EXIT SENSOR REPLACEMENT



1. Duplex unit (-3.4)
2. Sensor bracket $[A]\left(\mathcal{E}^{3} \times 1\right)$


## 3．18 DRIVE AREA

## 3．18．1 REGISTRATION CLUTCH AND TRANSFER BELT CONTACT CLUTCH



1．Rear upper cover（not shown）（筸 $\times 2$ ）
2．High voltage supply board $[A]\left(⿷^{\|} \times 6, \hat{E}^{2} \times 3\right)$
NOTE：Make sure that you re－connect the wires in the correct order．They are labeled $1 \rightarrow 2$

$$
\rightarrow B \rightarrow C
$$

3．Flywheel $[B]\left(\hat{S}^{3} \times 3\right)$
4．Registration clutch $[\mathrm{C}]$（ $8 \times 1$ ，気 Cl 1 ）



DRIVE AREA

### 3.18.2 MAIN MOTOR



1. Rear upper cover, high voltage power supply, flywheel (-3.18.1)
2. Timing belt $[A] \times 1$
3. Bracket $\left.[B]()^{2} \times 3\right)$
4. Main motor [C] (ㅌㅔㅔ $x 2, \hat{\beta}^{2} \times 3$ )

### 3.18.3 TONER SUPPLY MOTOR



1. Open the front door
2. Raise holder handle $[\mathrm{A}]$
3. Push the holder lever $[B]$ to the right
4. Stopper [C]
5. Toner bottle holder and bottle [D]
6. Motor harness [E] (clamps x 2)
7. Toner supply motor [F] (hooks x2, 匪 l 1 )

NOTE: Press in on both sides of the motor to release it.

### 3.19 PRINTED CIRCUIT BOARDS

### 3.19.1 HIGH VOLTAGE POWER SUPPLY



1. Rear upper cover (-3.7.1)


### 3.19.2 I/O BOARD




1. Rear upper cover ( -3.7 .1 )
2. Rear left corner cover (-3.8.1)
3. Expansion box $[A](\hat{\xi} \times 5)$

NOTE: Make sure that the DIP switch settings on the new board are the same as those on the old board.

### 3.19.3 BICU BOARD



1. I/O Board (-3.19.2)


### 3.19.4 PSU



1. Left upper cover (-3.8.1)


## 3．20 HARD DISK／CONTROLLER BOARD

1．Left rear corner cover（－3．8．1）
2．Expansion spacer $[A](\hat{\xi} \times 2)$
3．Controller board $[B]$（包 x2）
NOTE：Use the wire handle to slide the HDD out of the expansion box．
［B］


4．HDD unit bracket［C］（ ${ }^{(1)} \times 3$ ，気 ${ }^{\|}$x2）
5．HDD unit［D］（令 x4）
NOTE：Work carefully to avoid dropping or hitting the HDD．


### 3.21 COPY ADJUSTMENTS: PRINTING/SCANNING

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

- Scanner Wire
- Lens Block/SBU Assembly
- Scanner Drive Motor
- Polygon Mirror Motor
- Paper Side Fence
- Memory All Clear
( Chapter 5, "Service Tables")


### 3.21.1 PRINTING

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

## Registration - Leading Edge/Side-to-Side

1. Check the leading edge registration, and adjust it using SP1-001. Specification: $3 \pm 2 \mathrm{~mm}$.
2. Check side-to-side registration for each paper feed station, and adjust with the following SP modes.

|  | SP mode | Specification |
| :--- | :---: | :---: |
| 1st paper feed | SP1-002-1 |  |
| 2nd paper feed | SP1-002-2 |  |
| 3rd paper feed <br> (Optional PFU tray 1) | SP1-002-3 |  |
| 4th paper feed <br> (Optional PTU tray 2) | SP1-002-4 | $2 \pm 1.5 \mathrm{~mm}$ |
| From the duplex tray | SP1-002-5 |  |
| By-pass feed | SP1-002-6 |  |
| LCT | SP1-002-7 |  |



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

## Blank Margin

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

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

|  | SP mode | Specification |
| :--- | ---: | ---: |
| Trailing edge | SP2-101-2 | $3 \pm 2 \mathrm{~mm}$ |
| Right edge | SP2-101-4 | $2+2.5 /-1.5 \mathrm{~mm}$ |
| Leading edge | SP2-101-1 | $3 \pm 2 \mathrm{~mm}$ |
| Left edge | SP2-101-3 | $2 \pm 1.5 \mathrm{~mm}$ |
| Trailing edge (duplex <br> copy, 2nd <br> colde | SP2-101-5 | $1.2 \pm 2 \mathrm{~mm}$ |
| Left edge (duplex copy, <br> $2^{\text {nd }}$ side) | SP2-101-6 | $0.3 \pm 1.5 \mathrm{~mm}$ |
| Right edge (duplex <br> copy, 2nd | SP2-101-7 | $0.3+2.5 /-1.5 \mathrm{~mm}$ |



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

## Main Scan Magnification

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

## Parallelogram Image Adjustment

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

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


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

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

### 3.21.2 SCANNING

Before doing the following scanner adjustments, perform or check the printing registration/side-to-side adjustment and the blank margin adjustment.
NOTE: Use an OS-A3 test chart to perform the following adjustments.

## Registration: Platen Mode

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

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



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

## Magnification

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

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


A: Main scan magnification

### 3.21.3 ADF IMAGE ADJUSTMENT

## Registration



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

| SP Code | What It Does | Adjustment Range |
| :---: | :--- | :---: |
| SP6-006-1 | Side-to-Side Registration | $\pm 3.0 \mathrm{~mm}$ |
| SP6-006-2 | Leading Edge Registration (Simplex) | $\pm 3.0 \mathrm{~mm}$ |
| SP6-006-3 | Leading Edge Registration (Duplex: Front) | $\pm 4.2 \mathrm{~mm}$ |
| SP6-006-4 | Leading Edge Registration (Duplex: Back) | $\pm 4.2 \mathrm{~mm}$ |

### 3.21.4 TOUCH SCREEN CALIBRATION

After clearing the memory, or if the touch panel detection function is not working correctly, follow this procedure to calibrate the touch screen.
NOTE: Do not attempt to use items [2] to [9] on the Self-Diagnostic Menu. These items are for design use only.

1. Press $\widehat{\infty}$, press (1)(9)(3) and then press (0) 5 times to open the SelfDiagnostics menu.

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

| $0_{k} \quad$ Touch Screen Adjust |  |
| :--- | :--- |
|  | Touch the upper left mark and then the lower <br> right mark of the panel using a pointed tool. |
| Press the [c] key to auit. <br> Re-input is available using $[/ / *]$ key. |  |

3. Use a pointed (not sharp!) tool to press the upper left mark ${ }^{\circ} \mathbf{K}$.
4. Press the lower right mark ${ }^{\boldsymbol{*}}$ O 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.

## TROUBLESHOOTING

## 4. TROUBLESHOOTING

## $\triangle$ CAUTION <br> Never turn off the main power switch when the power LED is lit or flashing. To avoid damaging the hard disk or memory, press the operation power switch to switch the power off, wait for the power LED to go off, and then switch the main power switch off.

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

### 4.1 SERVICE CALL CONDITIONS

### 4.1.1 SUMMARY

There are 4 levels of service call conditions.

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

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

### 4.1.2 SC CODE DESCRIPTIONS

| Code No. |  | Symptom | Possible Cause |
| :---: | :--- | :--- | :--- |
| 101 | C | Exposure lamp error <br> The standard white level was not <br> detected properly when scanning the <br> white plate. | Exposure lamp defective <br> Lamp stabilizer defective <br> Exposure lamp connector defective <br> Standard white plate dirty <br> Scanner mirror or scanner lens out of <br> position or dirty |
| SBU defective |  |  |  |


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


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


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


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


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

## SERVICE CALL CONDITIONS

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


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

## SERVICE CALL CONDITIONS

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


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

## SERVICE CALL CONDITIONS

| Code No. | Symptom | Possible Cause |
| :--- | :--- | :--- |
| 732 | C | Finisher upper tray shift motor error |


| Code No. |  | Symptom | Possible Cause |
| :---: | :---: | :---: | :---: |
| 828 | B | Self-diagnostic Error: ROM | Controller board defective Firmware defective |
|  |  | The resident read-only memory returned an error during the selfdiagnostic test. |  |
| 829 | B | Self-diagnostic Error: Optional RAM | RAM DIMM defective Controller board defective |
|  |  | The optional RAM returned an error during the self-diagnostic test. |  |
| 835 | B | Self-Diagnostic Error: Parallel Interface | Loopback connector not detected IEEE1284 connector defective Controller board defective |
|  |  | Loopback test error. |  |
| 836 | B | Self-diagnostic Error: Resident Font ROM | Font ROM defective |
|  |  | The resident font ROM returned an error during the self-diagnostic test. |  |
| 837 | B | Self-diagnostic Error: Optional Font ROM | Font ROM defective |
|  |  | The optional font ROM returned an error during the self-diagnostic test. |  |
| 838 | B | Self-diagnostic Error: Clock Generator | Clock generator abnormal I2C bus abnormal CPU port for the I2C bus abnormal |
|  |  | Verify error occurred when setting data was read from the clock generator via the I2C bus. |  |
| 850 | B | Network 1/F Abnormal | NIB defective Controller board defective |
|  |  | NIB interface error. |  |
| 851 | B | IEEE 1394 I/F Abnormal | - IEEE1384 interface board defective Controller board defective |
|  |  | IEEE1394 interface error. |  |
| 860 | C | Startup without HD connection at main power on | Cable between HDC and HD loose or defective <br> HD power connector loose or defective HD defective <br> HDC defective |
|  |  | The hard disk connection is not detected. |  |
| 861 | C | Startup without HD detection at power key on | Cable between HDC and HD loose or defective <br> HD power connector loose or defective HD defective HDC defective |
|  |  | The hard disk connection is not detected. |  |
| 862 | A | Maximum number of bad sectors detected on HD | SC863 returned while reading data from the HD and the number of registered bad sectors reached 101. |
|  |  | Up to 101 bad sectors have appeared in the area on the hard disk where image data is archived, and the hard disk may require replacement. |  |
| 863 | B | Startup without HD data lead | A bad sector occurred during operation of the HD |
|  |  | Data stored on the hard disk is not read correctly. |  |
| 864 | B | HD data CRC error | Data transfer was abnormal in the data read from the HD. |
|  |  | During operation of the HD, the HD responded with a CRC error. |  |
| 865 | B | HD access error | Error detected other that the bad sectors error (SC863) or the CRC error (SC864) |
|  |  | The hard disk detected an error. |  |

## SERVICE CALL CONDITIONS

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


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

## ELECTRICAL COMPONENT DEFECTS

### 4.2 ELECTRICAL COMPONENT DEFECTS

### 4.2.1 SENSORS

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


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

### 4.2.2 SWITCHES

| Component <br> (Symbol) | CN | Condition | Symptom |
| :---: | :---: | :--- | :--- |
| Right Lower <br> Cover (SW1) | 232-3 <br> (PFB) | Open | "Doors/Covers Open" is displayed even if the <br> right lower cover is closed. |
|  | Shorted | LCD goes blank when the lower cover is <br> opened. |  |
| Main (SW3) | $102-1 \sim 4$ <br> (PSU) <br> $107-1$ | Open | machine does not turn on. |
|  |  | Shorted | Machine does not turn off. |
| Front Cover <br> Safety (SW4) | $107-1$ <br> (PSU) | Open | "Doors/Covers Open" is displayed even if the <br> front cover is closed. |
|  |  | Shorted | "Doors/Covers" Open is not displayed even if the <br> front cover is opened. |

### 4.3 BLOWN FUSE CONDITIONS

| Fuse | Rating |  | Symptom at power on |
| :---: | :--- | :--- | :--- |
|  | 115 V | $210 \sim 230 \mathrm{~V}$ |  |

### 4.4 LEDS

## BICU

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

### 4.5 TEST POINTS

## Controller Board

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

## SERVICE TABLES

## 5. SERVICE TABLES


#### Abstract

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


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

### 5.1 SERVICE PROGRAM MODE

### 5.1.1 SERVICE PROGRAM MODE OPERATION

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

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


## Entering and Exiting SP mode

1. Press the Clear Mode key.
2. Use the keypad to enter "107".
3. Hold down Clear/Stop for at least 3 seconds.
4. Enter the Service Mode.

To enter the Normal Service Mode:
Copy SP
\# Copy SP
Exit
On the touch-panel, press Copy SP.
To enter the Special service Mode:
Hold down \# and then press Copy SP.
5. Press Exit twice to return to the copy window.

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

## SP Mode Button Summary

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

(1) Opens all SP groups and sublevels.
(2) Closes all open groups and sublevels and restores the initial SP mode display.
(3) Opens the copy window (copy mode) so you can make test copies. To return to the SP mode screen, press SP Mode (highlighted) in the copy window.
(4) Enter the SP code directly with the number keys if you know the SP number and then press \#\#. (SP Mode must be highlighted before you can enter the number. Just press SP Mode if it is not highlighted.)
(5) Press twice to leave the SP mode and return to the copy window to resume normal operation.
(6) Press any Group number to open a list of SP codes and titles for that group. For example, to open the SP code list for SP1-nnn, press Group1. If an SP has sublevels, click the appropriate button to expand the list.
(7) Press to scroll the display to the previous or next group.
(8) Press to scroll to the previous or next display in segments the size of the screen display (page).
(9) Press to scroll the display to the previous or next line, line by line.
(10) Press to move the highlight on the left to the previous or next selection in the list.

## Switching Between SP Mode and Copy Mode for Test Printing

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

## Selecting the Program Number

Program numbers have two or three levels.

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


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

1. To enter a setting"

- Press ${ }^{\circledast}$ to toggle between plus and minus and then use the keypad to enter the appropriate number. The number you enter will write over the previous setting.
- Press ® to enter the setting. (If you enter a number that is out of range, the $^{\text {t }}$ key press is ignored.)
- When you are prompted to complete the selection, press Yes.

2. 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 (1) twice, and then press SP Mode (highlighted) in the copy window to return to the SP mode display.
3. When you are finished, press Exit twice to return to the copy window.

### 5.1.2 SERVICE PROGRAM MODE TABLES

## Service Table Key

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

## SP1-xxx: Feed

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


| SP1 | Mode Number |  | Function and [Setting] |  |
| :---: | :---: | :---: | :---: | :---: |
| 1012* |  | Exit Junction Solenoid Start Timing | Adjust the operation timing of the solenoids at the entrance and exit of the paper exit section to accommodate the increased speed of the duplex unit. <br> This SP has been added to compensate for the increased operation speed of the duplex unit for this machine. Increase the value if the leading edges are jamming. Decrease the value if trailing edges are bending at the entrance. |  |
|  | 1* | Exit Entrance Junction Solenoid | $\begin{aligned} & \text { B003 \& } \\ & \text { B006 } \end{aligned}$ | [200~450 ms / $370 \mathrm{~ms} / 10 \mathrm{~ms}$ ] |
|  | 2* | Exit Last Junction Solenoid | $\begin{aligned} & \text { B004 \& } \\ & \text { B007 } \end{aligned}$ | $\begin{aligned} & {[200 \sim 450 \mathrm{~ms} / 300 \mathrm{~ms} \text { (entrance) }} \\ & \mathbf{3 7 0 ~ \mathrm { ms } \text { (exit) } / 1 0 \mathrm { ms } ]} \\ & \hline \end{aligned}$ |
| 1103* |  | Fusing Idling | Switches fusing idling on/off. When on, the hot roller will not rotate until enough time has elapsed so the hot roller can reach optimum temperature. This ensures even heat on the hot roller. <br> Switch on if fusing on the 1st and 2nd copies is incomplete (this may occur if the room is cold.) |  |
|  | 1* | Enable Fusing Idling | $0=0 f f, 1=O n$ <br> In a cold environment, switch on and then set the idling time with SP1-103-2 to ensure the quality of the first copies. |  |
|  | 2* | Fusing Idling Interval | $[0 \sim 60 \mathrm{sec} . / 30 \mathrm{sec} . / 1 \mathrm{sec} .]$ <br> You must switch SP1-103-1 on before you can set the fusing idling interval. |  |
| 1104* |  | Fusing Temperature Control | Selects the fusing temperature control mode. [ $0=\mathbf{O n} /$ Off / 1 phase |  |
| 1105* |  | Fusing Temperature Adjustment | Adjusts the fusing temperature at the center and both ends of the hot roller for paper fed from a tray. Use SP1-105-1, SP1-105-2 to adjust for any tray other than the by-pass tray. Use SP1-105-3, SP1-105-4 to adjust for by-pass tray. Allows adjustment of the hot roller temperature at the center and ends of the roller for the quality or thickness of the paper. The hot roller in this machine has two fusing lamps: one heats the center of the roller, the other heats both ends. Each fusing lamp can be adjusted separately. |  |
|  | 1* | Roller Center: Trays | $\begin{aligned} & {\left[120^{\circ} \mathrm{C} \sim 200^{\circ} \mathrm{C} / 160^{\circ} \mathrm{C}\left(\mathrm{~B} 004 \& \mathrm{~B} 007: 180^{\circ} \mathrm{C}\right) /\right.} \\ & \left.1^{\circ} \mathrm{C} \text { step }\right] \end{aligned}$ |  |
|  | 2* | Roller Ends: Trays | $\begin{aligned} & {\left[120^{\circ} \mathrm{C} \sim 200^{\circ} \mathrm{C} / 170^{\circ} \mathrm{C}\left(\mathrm{~B} 004 \& \mathrm{~B} 007: 185^{\circ} \mathrm{C}\right) /\right.} \\ & 1^{\circ} \mathrm{C} \text { step] } \end{aligned}$ |  |
|  | 3* | Roller Center: By-pass | $\begin{aligned} & {\left[120^{\circ} \mathrm{C} \sim 220^{\circ} \mathrm{C} / 175^{\circ} \mathrm{C}\left(\mathrm{~B} 004 \& \mathrm{~B} 007: 190^{\circ} \mathrm{C}\right) /\right.} \\ & 1^{\circ} \mathrm{C} \text { step] } \end{aligned}$ |  |
|  | 4* | Roller Ends: By-pass |  |  |
|  | 5* | Re-load Temp. Minus: Roller Center | Adjusts the temperature for re-heating the hot roller. Re-load Temp. = Fusing. Temp - SP Value $\left[0^{\circ} \mathrm{C} \sim 60^{\circ} \mathrm{C} / 30^{\circ} \mathrm{C} / 1^{\circ} \mathrm{C} \text { step }\right]$ <br> When the fusing temperature surpasses this setting, the machine can operate. Do not set up a re-load temperature (Spec. Temp - SP Value) that is higher than the SP1-105-2 setting. |  |
|  | 6* | Re-load Temp. Minus: Roller Ends |  |  |
|  |  |  |  |  |

## SERVICE PROGRAM MODE

| SP1 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
|  | 7* | Roller Center: By-pass (Thick Paper) | Adjusts temperature of the hot roller when feeding thick paper. $\begin{aligned} & {\left[120^{\circ} \mathrm{C} \sim 220^{\circ} \mathrm{C} / 190^{\circ} \mathrm{C}\left(\mathrm{~B} 004 \& \mathrm{~B} 007: 200^{\circ} \mathrm{C}\right) /\right.} \\ & \left.1^{\circ} \mathrm{C} \text { step }\right] \end{aligned}$ |
| 1105* | 8* | Roller Ends: By-Pass (Thick Paper Feed) |  |
|  | 9* | Re-load Temp. Minus: Roller Center (Thick Paper) | Forces paper feed to wait until the fusing unit has reached the specified temperature. <br> Feed temp. = Spec. temp. for thick paper - SP value <br> Feed begins when the hot roller reaches the specified temperature. <br> $\left[0^{\circ} \mathrm{C} \sim 60^{\circ} \mathrm{C} / 0^{\circ} \mathrm{C}\right.$ (B004 \& B007: $5^{\circ} \mathrm{C} / 1^{\circ} \mathrm{C}$ step] |
|  | 10* | Re-load Temp. Minus: Roller Ends (Thick Paper) |  |
| 1106 |  | Fusing Temperature Display | Displays the fusing temperature for the center or ends of the hot roller. <br> This machine has two fusing lamps inside the hot roller: one lamp heats the center of the roller, the other lamp heats both ends. |
|  | 1 | Roller Center |  |
|  | 2 | Roller Ends |  |
| 1109* |  | Fusing Nip Band Check | $\begin{aligned} & \text { Checks the fusing nip band. }-5.1 .7) \\ & {[0=\mathrm{Off}, 1=\mathrm{On}]} \end{aligned}$ |
| 1111* |  | Paper Reverse Timing (Duplex) | Adjusts the timing for stopping the rotation of the reverse roller after the trailing edge of the paper passes the duplex entrance sensor. $[+5 \sim-5 / 0 \mathrm{~mm} / 1 \mathrm{~mm} \text { step }$ <br> Adjust the timing if paper frequently jams at the inverter gate in the duplex unit. |

SP2-xxx: Drum

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



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


| SP2 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 2209* | $2^{*}$ | Toner Supply Correction Data | Displays the toner supply correction coefficient (K). It can also be used to adjust $K$, but the value is changed again when $V_{T}$ is measured for the next copy. <br> The toner supply rate depends on the amount of toner in the toner bottle. This change is corrected using this coefficient. This SP can be used to check the toner supply condition. The lower the value of $K$, the lower the toner density. <br> [25 ~300/300/25 step] |
| 2210* |  | ID Sensor Pattern Interval | Sets the interval between ID sensor pattern prints. This setting allows adjustment for customers who do not make many copies daily. The zero value disables this setting. [0~200 / 10 / 1 copy step] |
| 2213* | 1* | Copies After Toner NearEnd | Selects the number of copies that can be printed once the copier has detected toner near-end. <br> Select 1 or 2 if the customer normally makes copies of high density. <br> 0: 90 copies <br> 1: No copies <br> 2: 10 copies |
| 2220* |  | Vref Manual Setting | Adjusts the TD sensor reference voltage (Vref). [1.0 ~ $5.00 \mathrm{~V} / 4.00 \mathrm{~V} / 0.01 \mathrm{~V}$ step] |
|  |  | Change this value after replacing the development unit with another unit that contains toner. <br> 1. Check the value of SP2-220 in both the machine containing the test unit and the machine that you are going to move it to. <br> 2. Install the test development unit, and then input the VREF for this unit into SP2220. <br> 3. After the test, put back the old development unit, and change SP2-220 back to the original value. |  |
| 2223* |  | Vt Display | Displays the TD sensor output voltage for each copy. |
|  | 1* | Current | Displays TD sensor output voltage of the immediately previous copy. |
|  | 2* | Average Previous 10 copies | Displays the average of the most recent TD sensor outputs (from the previous 10 copies). |
|  | $3^{*}$ | Rate of Change | Displays the rate of change in the TD sensor output. |
|  | 4* | GAIN | Displays GAIN used to calculate the on time for the toner supply motor. |
|  | 5* | Image Pixel Count | Displays the image pixel count. |
| 2301* |  | Transfer Current Adjustment | Adjusts the current applied to the transfer belt during copying the 5 phases listed below. |
|  | 1* | 1st Side of Paper | Printing the first side of the paper (image area). If the user uses thicker paper, the current may have to be increased to ensure sufficient transfer of toner. $[20 \sim 100 \mu \mathrm{~A} / 35(\mathrm{B004} \& \mathrm{~B} 007: 45) / 1 \mu \mathrm{~A} \text { step }]$ |
|  | 2* | 2nd Side of Paper | Printing the second side of the paper (image area). [20~100 $\mu \mathrm{A} / 35$ (B004 \& B007: 40) / $1 \mu \mathrm{~A}$ step] |


| SP2 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 2301* | 3* | Leading Edge | Copying at leading edge of the paper. Increase the current to separate the paper from the drum properly in high humidity and high temperature conditions. $[20 \sim 100 \mu \mathrm{~A} / 35(\mathrm{B004} \& \mathrm{~B} 007: 45) / 1 \mu \mathrm{~A} \text { step] }$ |
|  | 4* | By-pass Feed | Copying from the by-pass tray (image area). If the user normally feeds thicker paper from the bypass tray, use a higher setting. $\text { [20~100 } \mu \mathrm{A} / 35 \text { (B004 \& B007: 45) / } 1 \mu \mathrm{~A} \text { step] }$ |
|  | 5* | Leading Edge By-pass Feed | Copying at the leading edge of paper fed from the by-pass tray. <br> Increase the current to separate the paper from the drum properly in high humidity and high temperature conditions. $\text { [20~100 } \mu \mathrm{A} / 45 \text { (B004 \& B007: 60) / 1 } \mu \mathrm{A} \text { stepl }$ |
| 2309* |  | Transfer Current Correction | Corrects the transfer current for the items below. |
|  | 1* | Paper Lower Width (a) | Adjusts the lower paper width threshold for the transfer current, charge voltage, and development bias corrections. <br> Use this SP when an image problem (e.g., insufficient toner transfer) occurs with a small width paper. If the paper width is smaller than this value, the transfer current will be multiplied by the factor in SP2-309-3 (paper tray) or SP2-309-5 (by-pass). [0~297 / 150 / 1 mm step] |
|  | $2^{*}$ | Paper Upper Width (b) | Adjusts the upper paper width threshold for the transfer current, charge voltage, and development bias corrections. <br> As for SP2-309-1, but the factors are in SP2-309-4 (paper tray) and SP2-309-6 (by-pass). <br> [0~297 / 216 / 1 mm step] |
|  | 3* | Paper Tray ( $\alpha$ ) | Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-1. $\text { [1.0~3 / } 1.2 / 0.1 \mathrm{~mm} \text { step] }$ |
|  | 4* | Paper Tray ( $\beta$ ) | Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-2. <br> [1.0~3/1.2 / 0.1 mm step] |
|  | 5* | By-Pass Feed ( $\gamma$ ) | Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-1. <br> [1.0~3/1.5 / 0.1 mm step] |
|  | 6* | By-Pass Feed ( $\delta$ ) | Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-2. <br> [1.0~3/1.5/0.1 mm step] |
| 2801* |  | TD Sensor Initial Setting | Performs the TD sensor initial setting. This SP mode controls the voltage applied to the TD sensor to make the TD sensor output about 4.0 V. Press 1 to start. After finishing this, the TD sensor output voltage is displayed. <br> Use this mode only after installing the machine, changing the TD sensor, or adding new developer. |



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



## SP3-xxx: Process

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

SP4-xxx: Scanner

| SP4 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 4008* | Scanner Sub Scan <br> Magnification | Scanner Sub Scan Magnification | Adjusts the magnification of the sub scan direction during scanning. Changing this value changes the scanner motor speed. Press $)^{2}$ to toggle $\pm$. $[-0.9 \sim 0.9 / 0.0 / 0.1 \mathrm{~mm} \text { step] }$ |
| 4010* |  | Scanner Leading Edge Registration | Adjusts the leading edge registration for scanning. Press $\square$ to toggle $\pm$. <br> As you enter a negative value, the image moves toward the leading edge. $[-0.9 \sim 0.9 / 0.0 / 0.1 \mathrm{~mm} \text { step] }$ |
| 4011* |  | Scanner Side-to-Side Registration | Adjusts side-to-side registration for scanning. Press ${ }^{\circ}$ to toggle $\pm$. <br> As you enter negative values, the image will disappear at the left, and as you enter positive values, the image will appear at the left. $[-4.6 \sim+4.6 / 0.0 / 0.1 \mathrm{~mm} \text { step] }$ |
| 4012* |  | Scanner Erase Margin | Adjusts scanning margins for the following items. Do not adjust unless the customer desires a scanner margin greater than the printer margin. |
|  | 1* | Leading Edge | Adjusts leading edge erase margin for sub scanning. Specification: $3 \pm 2 \mathrm{~mm}$ <br> [ $0 \sim 9 / 1.0 / 0.1 \mathrm{~mm}$ step] |
|  | 2* | Trailing Edge | Adjusts trailing edge erase margin for sub scanning. Specification: $2 \pm 2 \mathrm{~mm}$ <br> [ $0 \sim 9 / 0.5 / 0.1 \mathrm{~mm}$ step] |
|  | 3* | Right | Adjusts right margin for main scanning. <br> Specification: +2.5 ~ -1.5 mm <br> [ $0 \sim 9 / 0.5 / 0.1 \mathrm{~mm}$ step] |
|  | 4* | Left | Adjusts left margin for main scanning. <br> Specification: $2 \pm 1.5 \mathrm{~mm}$ <br> $[0 \sim 9 / 1.0 / 0.1 \mathrm{~mm} \mathrm{step}]$ |
| 4013 |  | Scanner Free Run | Performs a scanner free run with the exposure lamp off. |
| 4301 |  | APS Sensor Output Display | Displays the time required to detect the size of the paper on the scanner exposure glass. <br> Asterisks (*) are displayed if the size cannot be detected. Chap. 6, "Original Size Detection in Platen Mode". <br> Dimensions are displayed in inches for North America and in mm for other areas. |
| 4303* |  | APS A5/LT Size Detection | Determines whether the original is A5/HLT size when the APS sensor does not detect the original size. <br> $\mathbf{0}$ : not detected, 1: A5 length $51 / 2 \times 81 / 2$ If 1 is selected, paper sizes that cannot be detected are regarded as $A 5$ lengthwise. If 0 is selected, "Cannot detect original size" will be displayed. |


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


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


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


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


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


| SP4 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 4903* | 42* | MTF Filter Strength: Text/Photo 25\%~64\% | Selects the MTF filter strength in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. <br> [0~7/1/1 step] |
|  | 43* | Filter Level: Text/Photo 65\%~154\% | Selects the MTF filter coefficient in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. $\text { [0~15 / } 10 \text { / } 1 \text { step }$ |
|  | 44* | MTF Filter Level: Text/Photo 65\%~154\% | Selects the MTF filter coefficient in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. $\text { [0~13 / } 13 \text { / } 1 \text { step }]$ |
|  | 45* | MTF Filter Strength: Text/Photo 64\%~154\% | Selects the MTF filter strength in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. <br> [0~7/1/1 step] |
|  | 46* | MTF Filter Strength: Text/Photo 65\%~154\% | Selects the MTF filter strength in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. $\text { [0~7 / } 1 \text { / } 1 \text { step] }$ |
|  | 47* | Filter Level: Text/Photo 155\%~256\% | Selects the MTF filter coefficient in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. $\text { [0~15 / } 14 \text { / } 1 \text { step] }$ |
|  | 48* | MTF Filter Level: Text/Photo 155\%~256\% | Selects the MTF filter coefficient in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. $\text { [0~13 / } 13 \text { / } 1 \text { step }$ |


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


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


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


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


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

## SERVICE PROGRAM MODE

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

SP5-xxx: Mode

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



| SP5 | Mode Number |  | Function and [Setting] |
| :--- | :--- | :--- | :--- |
| $5501^{*}$ | $2^{*}$ | Original Count Alarm | Sets the alarm to sound after the specified total <br> number of originals goes through the ARDF. <br> 0: Disabled, $1:$ Enabled |


| SP5 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 5508* | $2^{*}$ | Continuous Jam Occurrence | Switches the control call on/off for the occurrence of consecutive jams. DFU <br> 0: Off, 1: On <br> If you select " 1 ", the alarm will sound if 5 consecutive jams occur in the copier. |
|  | 3* | Continuous Door Open | Switches the control call on/off for the cover open alarm. DFU <br> 0: Off, 1: On <br> If you select " 1 ", the alarm will sound if the door remains open for 15 minutes. |
| 5801* |  | Memory Clear | Resets all correction data for process control and all software counters, and returns all modes and adjustments to their default values. (5.18) To execute, hold down (1) for over 3 seconds, and then turn the copier off and on again. Use this SP only after replacing the NVRAM, or after the copier has malfunctioned due to a damaged NVRAM. |
| 5802* |  | Printer Free Run | Performs a free run. The scanner scans once and the printer prints for the number of copies requested. <br> To perform the free run, after selecting " 1 ", press the Copy Window to enter copy mode, input the number of copies, and then press the Start key. To stop the free run, press ciol. 0: Off, 1:On |
| 5803 |  | Input Check | Displays the signals received from sensors and switches. (-5.1.4) |
| 5804 |  | Output Check | Turns on the electrical components individually for test purposes. ( 5.1.5) |
| 58070 |  | Option Connection Check | Checks the connectors to the optional peripheral devices. Execution will return either a " 1 " or " 0 ": <br> 1: Device connected correctly. <br> 2: Device not connected correctly. |
|  | 1 | ARDF |  |
|  | 2 | Bank (Paper Tray Unit) |  |
|  | 3 | LCT |  |
|  | 4 | Finisher (1000-sheet, Two-Tray finisher) |  |
| 5811* | 1* | Machine Serial Number | Use to input the machine serial number. This is normally done at the factory. <br> If you want to know the serial number, print the system parameter list. Press $\odot$ and then input " $A$ ". |
| 5812* |  | Service Tel. No. Setting |  |
|  | 1* | Service Tel. Number | Use this to input the telephone number of the service representative. This number is displayed when a service call condition occurs. <br> Press the $\odot$ key to input a pause. Press the "Clear modes" key to delete the telephone number. |


| SP5 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 5812* | $2^{*}$ | SMC Report Transfer Fax. No. | Use this to input the fax number of the service representative This number is printed on the Counter Report (UP: System No. 19) Press the key to input a pause. Press the "Clear modes" key to delete the telephone number. |
| 5816* | 1 | CSS Function On/Off | Japan Only <br> 0: Off, 1: On. |
|  | 2 | CE Call | $\begin{aligned} & \hline \text { Japan Only } \\ & \mathbf{0}: \text { Start, } 1: \text { Finish } \\ & \hline \end{aligned}$ |
| 5821* |  | CSS PI Device Code | Selects the PI device code. DFU [0~4 / 0 / 1 step] |
| 5824 |  | NVRAM Data Upload | Uploads the UP and SP mode data (except for counters and the serial number) from NVRAM on the control board to a flash memory card. 5.3.1) <br> While using this SP mode, always keep the front cover open. This prevents a software module accessing the NVRAM during the upload. |
| 5825 |  | NVRAM Data Download | Downloads the content of a flash memory card to the NVRAM on the control board. ( -5.3 .2 ) While using this SP mode, always keep the front cover open. This prevents a software module accessing the NVRAM during the download. After executing this SP, switch the copier off and on. |
| 5828* | 25* | Software Switch | Sets the reference for the network software. [00000000~FFFFFFFFh / 00000000h/1 hex unit step] |
|  | 26* | Network Operation Mode Setting | Sets the TCP operation mode for the network. [00000000~FFFFFFFFh $/ 00000000 \mathrm{~h} / 1$ hex unit step] |
|  | $27^{*}$ | Network Syslog Server Address Setting | Sets the syslog server address for the network. [00000000~FFFFFFFFh / 7F000001h / 1 hex unit step] |
|  | 28* | Network Time Server Address Setting | Sets the time server address for the network. [00000000~FFFFFFFFh / 00000000h/1 hex unit step] |
|  | 29* | Network DNS Server Address Setting | Sets the DNS server address for the network. [00000000~FFFFFFFFh $/ 00000000 \mathrm{~h} / 1$ hex unit step] |
|  | 30* | Network Directprint Port Number Setting | Sets the directprint port number for the network. [1024~65535 / 9100 / 1 step] |
|  | 31* | Network IPP Timeout Setting | Sets the IPP timeout for the network. $\text { [30~65535 / 900 / } 1 \text { step] }$ |
|  | 32 | Network IPX Address Setting (NetWare) | Sets the IPX Address. |
|  | 33* | Network Remote Printer Number Setting (NetWare) | Sets the remote printer number for the network. $\text { [ } 0 \sim 254 / 0 / 1 \text { step] }$ |
|  | 34* | Network Software Switch Setting (NetWare) | Sets the software switch for the network. [0000~FFFFh / 0003h / 1 hex unit step] |
|  | 35* | Network Transport <br> Protocol of Print Server <br> Setting (NetWare) | Sets the transport protocol of print server for the network. <br> 0001h: TCP \& IPX <br> 0100h: TCP\& IPX (Priority: IPX) <br> 0102h: TCP Only (Priority: TCP) <br> 0001h: IPX Only |


| SP5 | Mode Number |  | Function and [Setting] |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 5828* | 36 | Network AppleTalk Module Setting | Sets the AppleTalk module for the network. <br> 2: EtherTalk Phase2 |  |  |
|  | 37 | Network NetNo Setting (AppleTalk) | Sets the NetNo of AppleTalk network. |  |  |
|  | 38 | Network Object Name Setting (AppleTalk) | Sets the object name of AppleTalk network. |  |  |
|  | 39* | Network AppleTalk Type Setting | Sets the AppleTalk type for the network. |  |  |
|  | 40 | Network Working Zone Setting (AppleTalk) | Sets the AppleTalk working zone for the network. |  |  |
|  | 47* | Network Job Analysis Timeout Setting (Centronics) | Sets the Centronics job analysis timeout for the network.$[0 \sim 4200 \mathrm{~s} / 3 \mathrm{~s} / 1 \mathrm{sec} \text {. step] }$ |  |  |
|  | 48* | Network Job Timeout Setting (Centronics) | Sets the Centronics job timeout for the network. [ $0 \sim 4200 \mathrm{~s} / 0 \mathrm{~s} / 1 \mathrm{sec}$. step] |  |  |
|  | 49* | Network Noise Cancel Setting (Centronics) | Sets the noise cancel level for the network. [4~7/4/1 clock per step] |  |  |
|  | 50* | Network 1284 Compatibility Setting (Centronics) | Switches Centronics IEEE1284 compatibility on/off for the network. <br> 0 : Disabled, 1: Enabled <br> Selecting "0" disables bi-directional data transmission. |  |  |
|  | 51* | Network Data Transfer Speed Setting (Centronics) | Sets the Centronics transfer speed for the network. <br> 0: SLOW, 1: FAST <br> If you select "0" there will be a $120 \mu$ s delay from the STP signal to the data transfer. (With 1: FAST there is no delay.) |  |  |
|  | 52* | Network ECP Setting (Centronics) | Switches the ECP setting for Centronics off/on. 0 : Disabled, 1: Enabled <br> With "1" selected, SP5-828-050 must be enabled for 1284 mode compatibility. |  |  |
|  | 53* | Network Transmission Speed Setting | $\begin{aligned} & \text { Selects the Ethernet transmission speed. } \\ & {[0 \times 00 \sim 0 \times 03 / 0 \times 00 / 0 \times 01 \text { step] }} \end{aligned}$ |  |  |
|  |  |  | Bit1 | Bit2 | Speed |
|  |  |  | 0 | 0 | Auto Sense |
|  |  |  | 0 | 1 | 10Base-T |
|  |  |  | 1 | 0 | 100Base-Tx |
|  |  |  | 1 | 1 | Auto |
| 5833 |  | Job Log Transfer On/Off Setting | Switches the job log transfer on/off for Poplar server. <br> 0: Off (disable), 1: On (enable) |  |  |
| 5834 |  | Enable Operation Panel Image Settings | Enables and disables the operation panel read (dump) feature. After powering on the machine, set this option to 1 to enable this feature. <br> 0: Off (disable), 1: On (enable) <br> To reset the machine to 0 , the machine must be turned off and on again. Selecting 0 for this option without cycling the power off and on does not restore the default setting (0). |  |  |


| SP5 | Mode Number |  | Function and [Setting] <br> $5907^{*}$ |
| :--- | :--- | :--- | :--- |

SP6-xxx: Peripherals


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

## SERVICE PROGRAM MODE

## SP7-xxx: Data Log



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


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


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


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


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



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

## SERVICE PROGRAM MODE

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

### 5.1.3 TEST PATTERN PRINTING: SP2-902

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

1. Enter the SP mode and select SP2-902.
2. Press (2) or (3).

- (2) IPU Test Print
- (3) Test Pattern

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

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

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

## SERVICE PROGRAM MODE

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

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

### 5.1.4 INPUT CHECK

## Main Machine Input Check: SP5-803

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

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

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


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



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

Table 1: By-pass Feed Table Paper Size Data

| Number. | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Paper Width |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4: By-pass | 1 | 1 | 1 | 1 | Post Card |
|  | 1 | 1 | 1 | 0 | B6 lengthwise |
|  | 1 | 1 | 0 | 1 | B5 lengthwise |
|  | 1 | 1 | 0 | 0 | A5 lengthwise / 5.5" |
|  | 1 | 0 | 1 | 1 | B4 lengthwise |
|  | 1 | 0 | 0 | 1 | A4 lengthwise / 8.5" / 8" |
|  | 0 | 1 | 1 | 1 | A3 lengthwise |
|  | 0 | 0 | 1 | 1 | $11^{\prime \prime} \times 17^{\prime \prime}$ |

## ARDF Input Check: SP6-007

1. Enter the SP mode and select SP6-007.
2. Enter the number $(1-13)$ for the item that you want to check. A small box will be displayed on the SP mode screen with a series of 0's and 1's.
The meaning of the display is as follows.
00000000
Bit 76543210
3. Check the status of each item against the corresponding bit numbers listed in the table below.

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

### 5.1.5 OUTPUT CHECK

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

## Main Machine Output Check: SP5-804

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


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

SP5-804 Output Check Table

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

## SERVICE PROGRAM MODE

## ARDF Output Check: SP6-008)

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

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

### 5.1.6 SMC PRINT OUT LISTS: SP5-990

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

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

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

## List Contents

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

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


| - System Counts |  |  |
| :---: | :---: | :---: |
| Other SCs Count Timing No Counts Other | SC's generated other than those listed above for Scanner, IPU, Printer. <br> --- <br> -- |  |
| Operation Time  <br> Count Timing <br> No Counts <br> Other Operation time of the main motor in increments of 100 ms. <br> -- <br> Counts scanner and ARDF operation time when these devices are <br> operating alone so these counts will not match the time count for drum <br> rotation.  |  |  |
| - Application Software Counts |  |  |
| Original Tota Count Timing Other | Copy Applica Counts the nu original feed-in. For double-sid Inverting is no reading descri | ber of times the size of an original is detected for every <br> d originals, counts 1 the first time the backside is set. counted. This count is different from the ADF Feed-ins ed above. |
| Copy Total for Copy Application <br> Count Timing <br> OtherFeed-ins started. <br> Blank (white) pages output. |  |  |
| - Mode Counts for Copy Application |  |  |
| Copies by Ma Reduction Reduction 1:1 Enlargeme Enlargeme Custom (P area, etc.) Count Timing Other | $\begin{aligned} & \hline \hline \text { fications } \\ & \% \sim 49 \%) \\ & \% \sim 99 \%) \\ & 101 \% \sim 200 \%) \\ & \text { 201\%~400\%) } \\ & \text { r, dimensions, } \end{aligned}$ | Number of executions for each magnification category. Also counts white (blank) copies, and the number of times the operation panel keys are operated for zooming. For example, an AMS 71\% copy is not counted for $50 \% \sim 90 \%$. |
| Copies by Co Black Cop Red Copie Blue Copi 2-Color Co |  |  |
| Count Timing <br> Other |  | Feed-in starts for each category. Counts according to the selection information of the basic screen. Also counts white sheets according to the mode. |
| Copies by Qu Text/Photo Photo Mod Photo Orig Pencil Orig Count Timing | Mode de <br> Mode Mode | Feed-in starts for each category. Counts according to the selection information of the basic screen. |



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

### 5.1.7 NIP BAND WIDTH ADJUSTMENT: SP1-109

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

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

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

| Pressure spring position | Nip width |
| :--- | :--- |
| Upper (default position) | $6.0 \pm 0.5 \mathrm{~mm}$ |
| Lower | $6.5 \pm 0.6 \mathrm{~mm}$ |

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

### 5.1.8 MEMORY ALL CLEAR: SP5-801

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

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

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

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

4. Press Execute, and then follow the prompts on the display to complete the procedure.
5. Make sure that you perform the following settings:

- Do the laser beam pitch adjustment (SP2-109).
- Do the printer and scanner registration and magnification adjustments ( 3.21 Replacement and Adjustment, "Copy Adjustments").
- Do the touch screen calibration ( 3.21.4 Replacement and Adjustment, "touch screen calibration").
- Referring to the SMC data lists, re-enter any values, which had been changed from their factory settings.
- Do SP 3-001-2 (ID Sensor Initial Setting) and SP4-911-1 (HDD media check).

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

### 5.1.9 SOFTWARE RESET

The software can be reboot when the machine hangs up. Use the following procedure.
Turn the main power switch off and on.
-or-
Press and hold down $\because \circledast$ together for over 10 seconds. When the machine beeps once release both buttons. After "Now loading. Please wait" is displayed for a few seconds the copy window will open. The machine is ready for normal operation.

### 5.1.10 SYSTEM SETTINGS AND COPY SETTING RESET

## System Setting Reset

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

1. Press User Tools/Counter $\Delta / \boxed{\Delta 23}$
2. Hold down $\#$ and then press System Settings.

NOTE: You must press \# first.

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 $\Delta /\left[\begin{array}{ll}123 \\ \hline\end{array}\right.$
2. Hold down $\#$ and then press Copier/Document Server Settings. NOTE: You must press \# first.

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

### 5.2 SOFTWARE DOWNLOAD

1. Turn off the main power switch.
2. Remove the IC card $[A]$ cover.
3. Insert the IC card $[B]$ containing the software you wish to download into the card slot of the controller.
4. Turn on the main power.
5. Follow the instructions displayed on the LCD panel
6. Monitor the downloading status on the operation panel.

- While downloading is in progress, the LCD will
 display "Writing". When downloading has been completed, the panel will display "OK".
- For operation panel software, the Start key lights red while downloading is in progress, and then lights green again after downloading is completed.


## . CAUTION <br> Never switch off the power while downloading. Switching off the power while the new software is being downloading will damage the boot files in the controller.

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

### 5.3 UPLOADING/DOWNLOADING NVRAM DATA

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

### 5.3.1 UPLOADING NVRAM DATA (SP5-824)

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


### 5.3.2 DOWNLOADING NVRAM DATA (SP5-825)

The following data are not downloaded from the flash card:

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

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


Note that the following errors could occur during downloading:

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


### 5.4 SELF-DIAGNOSTIC MODE

### 5.4.1 SELF-DIAGNOSTIC MODE AT POWER ON

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

## Self-Diagnostic Test Flow



### 5.4.2 DETAILED SELF-DIAGNOSTIC MODE

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

| No. | Name |
| :---: | :---: |
| G02119350 | Parallel Loopback Connector |

## Executing Detailed Self-Diagnosis

Follow this procedure to execute detailed self-diagnosis.

1. Switch off the machine, and connect the parallel loopback device to the Centronics I/F port.
2. Hold down $\#$, press and hold down $\circledast$, and then while pressing both keys at the same time, switch on the machine.
You will see "Now Loading" on the touch-panel, and then you will see the results of the test.

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


### 5.5 USER PROGRAM MODE

The user program (UP) mode is accessed by users and operators, and by sales and service staff. UP mode is used to input the copier's default settings. The default settings can be reset at any time by the user. ( -1.10 )

### 5.5.1 HOW TO USE UP MODE

## UP Mode Initial Screen: User Tools/Counter Display



To enter the UP mode, press User Tools/Counter $\Delta /$ / 123 .

## System Settings

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

| 匈 System Settings |  |  |  | 14NOV 2000 12:20 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Exit |  |  |
| Select one of the following default settings. |  |  |  |  |  |  |
| General Features Paper Size Setting | Timer Setting | Interface Settings | File Transter | Key Operator Tools |  |  |
| Panel Tone | ON | Function Reset Timer |  | 3 seconds |  |  |
| Warm Up Notice | ON | Output: Copier |  | Internal tray 1 |  |  |
| Copy Count Display | Up | $\frac{\text { Output: Document Server }}{\text { (ex }}$ |  | Internal tray 1 |  |  |
| Function Priority | Copier | Output: Facsimile |  | Internal tray 2 |  |  |
| Print Priority | Display mode | 1/2 |  | \% Teveev |  | 7 Next |

## Copier/Document Server Features

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


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

## Printer, Facsimile, Scanner Settings

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

| 14NOV 2000 12:26 |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| B Printer Features |  |  |  | Ext |  |
| Select one of the following items. |  |  |  |  |  |
| Paper input List/Test Print | Maintenance | System | Host interface | PCL Config. Page |  |
| Connig. Page |  |  |  |  |  |
| Menu List |  |  |  |  |  |
| PS Font List |  |  |  |  |  |
| PCL Contig. Page |  |  |  |  |  |
| Hex Dump |  |  |  |  |  |

## Counter

In the User/Tools Counter display, press Counter.


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

### 5.6 DIP SWITCHES

Controller: DIP SW2

| DIP SW No. | ON | OFF |
| :---: | :--- | :---: |
| 1 | IC Card Boot | System ROM Boot |
| 2 |  |  |
| 3 | Keep at "OFF" |  |
| 4 |  |  |

## I/O Board: DIP SW101

| DIP SW No. | Function |  | ON | OFF |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Copy Speed | $35 \mathrm{cpm}(180 \mathrm{~mm} / \mathrm{s})$ |  | $45 \mathrm{cpm}(230 \mathrm{~mm} / \mathrm{s})$ |  |
| 2 | Jam Detection (see Note) | Off |  | On |  |
| 3 | SC Generation | Disabled |  | Enabled |  |
| 4 | Not used | OFF (Do not change) |  |  |  |
| 5 | Not used | OFF (Do not change) |  |  |  |
| $\begin{aligned} & 6 \\ & 7 \end{aligned}$ | Destination | OFF Japan OFF | ON North America OFF | OFF Europe ON | ON Not used ON |
| 8 | Not used | OFF (Do not change) |  |  |  |

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

## DETAILED DESCRIPTIONS

## 6. DETAILED SECTION DESCRIPTIONS

### 6.1 OVERVIEW

### 6.1.1 COMPONENT LAYOUT



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

### 6.1.2 PAPER PATH



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

## OVERVIEW

### 6.1.3 DRIVE LAYOUT



1 Transfer Belt Clutch
2 Registration Clutch
3 Upper Paper Feed Clutch
4 Lower Paper Feed Clutch

5 Relay Clutch
6 Main Motor
7 Paper Feed/Development Motor

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

### 6.2 BOARD STRUCTURE

### 6.2.1 BLOCK DIAGRAM



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

1. Controller (Main Board)

Takes charge of controlling memory and all peripheral devices.
2. BICU (Base Engine and Image Control Unit)

This is the engine control board. It controls the following functions.

- Engine sequence
- Timing control for peripherals
- Image processing, video control

3. IOB (Input/Output Board)

The IOB handles the following functions:

- Drive control for the sensors, motors, and solenoids of the main unit
- PWM control for the high voltage supply board
- Serial interface with peripherals
- Fusing control

4. PFB (Paper Feed Control Board)

Controls paper feed.
5. SIB (Scanner Interface Board)

Controls the scanner, and serves as the signal I/F board for the SBU and the OPU. The SIB passes signals between the BICU and the scanner unit components, and transmits video signals from the SBU to the BICU.
6. OPU (Operation Panel Unit)

Controls operation panel and display.
7. SBU (Sensor Board Unit)

Receives analog signals from the CCD and converts them into digital signals.
8. LDDR (Laser Diode Driver)

The LD driver circuit board.
9. MDB (Motor Drive Board)

Controls the scanner motor.
10. Mother Board

This board interfaces the controller and the BICU and FCU.
11. FCU (Facsimile Control Unit)

Controls fax communications and fax features.

### 6.2.2 CONTROLLER



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

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

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

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

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

| Partition | Size | Function | Power OFF | Comment |
| :--- | ---: | :--- | :--- | :--- |
| File System 1 | 500 MB | Downloaded fonts, <br> forms. | Remains |  |
| File System 2 | 200 MB | Job spooling area. | Erased |  |
| File System 3 | 1500 MB | Work data area | Remains | Used for document <br> server application. |
| Image TMP | 2780 MB | Collation, sample print, <br> protected print. | Erased | Commonly used area <br> for applications. Stores <br> copy, printer, fax, and <br> scanner data. <br> Storage capacity: <br> About 9000 pages <br> (3,000 files) |
| Image LS*1 | 4320 MB | Document server, local <br> storage archive | Remains |  |
| Image Area <br> Management | 100 MB | Stores image area <br> information | Remains |  |
| Job Log | 10 MB | Job log. | Remains |  |
| Total | $\mathbf{1 0 ~ G B}$ |  | Remains |  |

${ }^{*}$ When an application uses an image page, first it uses the Image LS area. If this area is in use and not available, then it uses the Image TMP area.

### 6.3 COPY PROCESS OVERVIEW




## Exposure

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

## Drum charge

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

## Laser exposure

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

## Development

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

## Image transfer

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

## Separation

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

## ID sensor

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

## Cleaning

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

## Quenching

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

### 6.4 SCANNING

### 6.4.1 OVERVIEW



1 Exposure lamp
2 1st Scanner
3 Exposure glass
4 Lens block
5 Scanner drive motor
6 Original length sensor 3

7 Original length sensors 1, 2
8 Original width sensors
9 2nd Scanner
10 Anti-condensation heater (option)
11 Exposure glass (for document feeder)
12 Scanner HP sensor

The original is illuminated by the exposure lamp (a xenon lamp). The image is reflected onto a CCD (charge coupled device) on the lens block via the 1st, 2nd, and 3rd mirrors, and through the lens on the lens block.
The 1st scanner consists of the exposure lamp, a reflector, and the 1st mirror.
The exposure lamp is energized by a dc supply to avoid uneven light intensity while the 1st scanner moves in the sub scan direction (down the page). The entire exposure lamp surface is frosted to ensure even exposure in the main scan direction (across the page).
The light reflected by the reflector is of almost equal intensity in all directions, to reduce shadows on pasted originals.
When the optional optics anti-condensation heater is installed on the left side of the scanner, it turns on whenever the power cord is plugged in.

### 6.4.2 SCANNER DRIVE



## Book Mode

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

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

In reduction or enlargement mode, the scanning speed depends on the magnification ratio. The returning speed is always the same, whether in full size or magnification mode. The image length change in the sub scan direction is done by changing the scanner drive motor speed, and in the main scan direction it is done by image processing on the BICU board.
NOTE: Magnification in the sub-scan direction can be adjusted by changing the scanner drive motor speed using SP4-008.

## ADF mode

The scanners are always kept at their home position (the scanner home position sensor [E] detects the 1st scanner) to scan the original. The ADF motor feeds the original through the ADF. In reduction/enlargement mode, the image length change in the sub-scan direction is done by changing the ADF motor speed. Magnification in the main scan direction is done in the BICU board, like for book mode.
NOTE: Magnification in the sub-scan direction can be adjusted by changing the ADF motor speed using SP6-017. In the main scan direction, it can be adjusted with SP2-909, like for book mode.

### 6.4.3 ORIGINAL SIZE DETECTION IN PLATEN MODE



The original width sensors [A] detect the original width, and the original length sensors $[B]$ detect the original length. These reflective photo sensors are referred to collectively as the APS (Auto Paper Select) sensors.
While the power is on, these sensors are active and the original size data is always sent to the CPU. However, the CPU checks the data only when the platen cover sensor [C] is activated after the platen reaches about 15 cm above the exposure glass as it is closed. The main CPU detects the original size by the on/off signals received from the APS sensors.
NOTE: If the copy is made with the platen fully open, the main CPU determines the original size from the sensor outputs after the Start $(\operatorname{C)}$ key is pressed.


| Original Size |  | Length Sensor |  |  | Width Sensor |  | SP4-301 display |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A4/A3 version | LT/DLT version | L3 | L2 | L1 | W2 | W1 |  |
| A3 | $11^{\prime \prime} \times 17^{\prime \prime}$ | O | 0 | 0 | 0 | 0 | 00011111 |
| B4 | $10^{\prime \prime} \times 14^{\prime \prime}$ | O | 0 | 0 | X | O | 00011101 |
| F4 | 8.5 " $144^{\prime \prime}$ (8" $\left.\times 13^{\prime \prime}\right)$ | O | O | 0 | X | X | 00011100 |
| A4-L | 8.5 " $\times 11^{\prime \prime}$ | X | O | 0 | X | X | 00001100 |
| B5-L |  | X | X | 0 | X | X | 00000100 |
| A4-S | $11^{\prime \prime} \times 8.5$ " | X | X | X | O | O | 00000011 |
| B5-S |  | X | X | X | X | O | 00000001 |
| A5-L, A5-S | $5.5^{\prime \prime} \times 8.5$ ", 8.5" $\times 5.5$ " | X | X | X | X | X | 00000000 |

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

For other combinations, "CANNOT DETECT ORIG. SIZE" will be indicated on the operation panel display.
The above table shows the outputs of the sensors for each original size. This original size detection method eliminates the necessity for a pre-scan and increases the machine's productivity.
However, if the by-pass tray is used, note that the machine assumes that the copy paper is lengthwise (L). For example, if A4 sideways paper is placed on the bypass tray, the machine assumes it is A3 paper and scans a full A3 area, disregarding the original size sensors.

### 6.5 IMAGE PROCESSING



### 6.5.1 OVERVIEW

SBU: $\quad$ The SBU (Sensor Board Unit) converts the analog signal from the CCD to an 8-bit digital signal and sends it to the SIB.
SIB: $\quad$ Relays image signals and controls the scanner.
BICU: $\quad$ The BICU (Base Engine Image Control Unit) performs timing control and command control. The IPU on the BICU processes auto shading, filtering, magnification, $\gamma$ correction, and gradation. The memory controller performs image compression, decompression, and memory address control (for binary picture processing mode only)
LD Unit: Performs dual channel multi-beam exposure, multiple exposure, and synchronous detection.
Controller: Controls image archiving, controls printing, and secondary image compression/decompression.

### 6.5.2 SBU (SENSOR BOARD UNIT)



The CCD converts the light reflected from the original into an analog signal. The CCD line has 7200 pixels at a resolution of 600 dpi .
The CCD has two output lines to the analog processing ASIC, one for handling odd and one for handling even pixels. The analog processing ASIC performs the following operations on the signals received from the CCD:

1. Z/C (Zero/Clamp)

Adjusts the black level for even pixels to match the odd pixels.
2. Signal composition

Analog signals for odd and even pixels from the CCD are merged by a switching device.
3. Signal amplification

The analog signal is amplified by amplifiers in the AGC circuit. The maximum gains of the amplifiers are controlled by the CPU on the BICU board.
After the above processing, the analog signals are converted to 8 -bit signals by the A/D converter. This gives a value for each pixel on a scale of 256 shades of gray. Then, this data goes to the BICU via the SIB.

### 6.5.3 AUTO IMAGE DENSITY (ADS)



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

When an original with a gray background is scanned, the density of the gray area is the peak white level density. Therefore, the original background will not appear on copies. Because peak level data is taken for each scan line, ADS corrects for any changes in background density down the page.
As with previous digital copiers, the user can select manual image density when selecting auto image density mode and the machine will use both settings when processing the original.

### 6.5.4 IPU (IMAGE PROCESSING UNIT)

## Overview



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

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

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

### 6.5.5 IMAGE PROCESSING MODES

The user can select one of the following modes with the User Tools screen: Text, Text/Photo, Photo, Pale, Generation. Each of these modes has a range of different settings (e.g. Soft, Normal, Sharp, etc). For each mode, a Custom Setting options is also available. This Custom Setting holds the values selected with the SP modes, which can be adjusted to meet special requirements that cannot be covered by the standard settings.
To display this screen, press User Tools/Counter $\omega /$ 国, press Copier/Document Server Settings, press the General Features tab, and then press Copy Quality.


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

## IMAGE PROCESSING



BICU


### 6.5.6 SUMMARY OF IMAGE PROCESSING FUNCTIONS

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

### 6.5.7 IMAGE PROCESSING STEPS AND RELATED SP MODES

## Text Mode

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


## Text/Photo Mode

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


## Photo Mode

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


## Pale (Low-Density Mode)

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


## Generation Copy Mode

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


## Auto shading (shading correction)

Auto shading does two things.

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


## Background erase

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

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

If any low image density data which is lower than a threshold level remains after auto shading, this data will be changed to " 0 " = white.
The threshold level (erase level) can be changed with the following SP modes.

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

## Independent dot erase

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

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

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

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

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

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

| 0 | 0 | 30 |
| :---: | :---: | :---: |
| 0 |  | 7 |
| 0 | 90 | 0 |
| 0 |  | 0 |
| 0 | 0 | 0 |

## Filtering

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

1. $64 \%$ reduction or less

Main Scan Reduction $\rightarrow$ Filtering
2. $65 \%$ reduction or higher

Filtering $\rightarrow$ Main Scan Magnification
There are two software filters: MTF and smoothing.
MTF emphasizes lines parallel to the direction of feed. There are four types of MTF setting:

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

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

## Pre-Filter

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

```
(Weak) 0 (Off) }->1->2->3\mathrm{ (Strong)
    -SP-903-10: Text Mode (25%~64%)
    -SP-903-11: Text Mode (65%~154%)
    -SP-903-12: Photo Mode
    -SP-903-13: Text/Photo Mode (25%~64%)
    -SP-903-14: Text/Photo Mode (65%~154%)
    -SP-903-15: Low Density Mode
    -SP-903-16: Generation Mode (25%~64%)
```


## Text Mode

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

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

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

| Text mode: 25 ~ 64 \% | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |
| :--- | :---: | :---: | :---: |
| MTF strength | $\mathbf{0}$ | $\mathbf{9}$ | 15 |
| Main scan: Filter coefficient <br> (SP4903-20) | $\mathbf{0}$ | $\mathbf{1 3}$ | 13 |
| Sub scan: Filter coefficient <br> (SP4903-21) | $\mathbf{0}$ | $\mathbf{2}$ | 7 |
| Main scan: Filter strength <br> (SP4903-22) | $\mathbf{0}$ | $\mathbf{2}$ | $\mathbf{7}$ |
| Sub scan: Filter strength <br> (SP4903-23) |  |  |  |


| Text mode: 65 ~ 154 \% |  |  |  |
| :--- | :---: | :---: | :---: |
| MTF strength | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |
| Main scan: Filter coefficient <br> (SP4903-24) | $\mathbf{0}$ | $\mathbf{1 2}$ | 15 |
| Sub scan: Filter coefficient <br> (SP4903-25) | $\mathbf{0}$ | 6 | $\mathbf{1 3}$ |
| Main scan: Filter strength <br> (SP4903-26) | $\mathbf{0}$ | $\mathbf{2}$ | 7 |
| Sub scan: Filter strength <br> (SP4903-27) | $\mathbf{0}$ | $\mathbf{2}$ | 7 |


| Text mode: $\mathbf{1 5 5}$ ~ 256 \% |  |  |  |
| :--- | :---: | :---: | :---: |
| MTF strength | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |
| Main scan: Filter coefficient <br> (SP4903-28) | 0 | $\mathbf{1 4}$ | 15 |
| Sub scan: Filter coefficient <br> (SP4903-29) | 0 | 6 | $\mathbf{1 3}$ |
| Main scan: Filter strength <br> (SP4903-30) | 0 | $\mathbf{2}$ | 7 |
| Sub scan: Filter strength <br> (SP4903-31) | $\mathbf{0}$ | $\mathbf{2}$ | 7 |


| Text mode: 257 ~ 400 \% |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
| MTF strength | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |  |
| Main scan: Filter coefficient <br> (SP4903-32) | $\mathbf{0}$ | $\mathbf{1 4}$ | 15 |  |
| Sub scan: Filter coefficient <br> (SP4903-33) | 0 | 6 | $\mathbf{1 3}$ |  |
| Main scan: Filter strength <br> (SP4903-34) | $\mathbf{0}$ | $\mathbf{2}$ | $\mathbf{7}$ |  |
| Sub scan: Filter strength <br> (SP4903-35) | $\mathbf{0}$ | $\mathbf{2}$ | $\mathbf{7}$ |  |

## Photo Mode

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

| Photo mode |  |  |  |
| :--- | :---: | :---: | :---: |
| MTF strength | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |
| Main scan: Filter coefficient <br> (SP4903-36) | $\mathbf{0}$ | 4 | 6 |
| Filter strength (SP4903-38) | 0 | $\mathbf{1}$ | $\mathbf{7}$ |

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

| Photo mode |  |  |  |
| :--- | :---: | :---: | :---: |
| Smoothing filter | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |
| Smoothing filter coefficient <br> $($ SP4903-37) | $\mathbf{0}$ | $\mathbf{2}$ | 7 |

## Text/Photo Mode

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

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

| Text/Photo mode 25~64\% | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |
| :--- | :---: | :---: | :---: |
| MTF strength | 0 | $\mathbf{9}$ | 16 |
| Main scan: Filter coefficient <br> (SP4903-39) | 0 | $\mathbf{1 0}$ | 13 |
| Sub scan: Filter coefficient <br> (SP4903-40) | 0 | $\mathbf{1}$ | 7 |
| Main scan: Filter strength <br> (SP4903-41) | $\mathbf{0}$ | $\mathbf{1}$ | 7 |
| Sub scan: Filter strength <br> (SP4903-42) |  |  |  |


| Text/Photo mode 65~154\% |  |  |  |  | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| MTF strength | 0 | $\mathbf{1 0}$ | 15 |  |  |  |  |
| Main scan: Filter coefficient <br> (SP4903-43) | 0 | 6 | $\mathbf{1 3}$ |  |  |  |  |
| Sub scan: Filter coefficient <br> (SP4903-44) | 0 | $\mathbf{1}$ | 7 |  |  |  |  |
| Main scan: Filter strength <br> (SP4903-45) | $\mathbf{0}$ | $\mathbf{1}$ | 7 |  |  |  |  |
| Sub scan: Filter strength <br> (SP4903-46) |  |  |  |  |  |  |  |


| Text/Photo mode 155~256\% |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
| MTF strength | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |  |
| Main scan: Filter coefficient <br> (SP4903-47) | 0 | $\mathbf{1 4}$ | 15 |  |
| Sub scan: Filter coefficient <br> (SP4903-48) | 0 | 6 | $\mathbf{1 3}$ |  |
| Main scan: Filter strength <br> (SP4903-49) | 0 | $\mathbf{1}$ | 7 |  |
| Sub scan: Filter strength <br> (SP4903-50) | 0 | $\mathbf{1}$ | 7 |  |


| Text/Photo mode 257~400\% |  |  |  |
| :--- | :---: | :---: | :---: |
| MTF strength | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |
| Main scan: Filter coefficient <br> (SP4903-51) | 0 | $\mathbf{9}$ | 15 |
| Sub scan: Filter coefficient <br> (SP4903-52) | 0 | $\mathbf{1 0}$ | 13 |
| Main scan: Filter strength <br> (SP4903-53) | 0 | $\mathbf{2}$ | 7 |
| Sub scan: Filter strength <br> (SP4903-54) | $\mathbf{0}$ | $\mathbf{2}$ | 7 |

## Low Density Mode

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

| Low density mode | Weakest <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strongest <br> (Sharp) |
| :--- | :---: | :---: | :---: |
| MTF strength | 0 | $\mathbf{1}$ | 6 |
| Filter coefficient (SP4903-55) | 0 | $\mathbf{3}$ | 7 |
| Filter strength <br> (SP4903-56) |  |  |  |

## Generation Mode

The following SPs control MTF for generation mode.

| Generation mode | Weak <br> (Soft) | $\leftarrow$ Default $\rightarrow$ | Strong <br> (Sharp) |
| :--- | :---: | :---: | :---: |
| MTF strength | 0 | $\mathbf{3}$ | 6 |
| Filter coefficient <br> (SP4903-57) | 0 | $\mathbf{1}$ | 7 |
| Filter strength <br> (SP4903-58) |  |  |  |

## Main scan magnification and reduction

Reduction and enlargement in the sub scan direction is achieved by changing the scanner speed. However, reduction and enlargement in the main scan direction are handled by the IPU chip.
To reduce or enlarge an image, imaginary points are calculated that would correspond to a physical enlargement or reduction of the image. The image density is then calculated for each of the imaginary points based on the image data of the nearest four true points. The calculated image data then becomes the new (reduced or enlarged) image data.

## $\gamma$ correction

Gamma $(\gamma)$ correction ensures accurate generation of the various shades in the gray scale from black to white, accounting for the characteristics of the scanner and printer.
Scanner gamma correction corrects the data output to the IPU to account for the characteristics of the scanner (e.g., CCD response, scanner optics).
Printer gamma correction corrects the data output from the IPU to the laser diode to account for the characteristics of the printer (e.g., the characteristics of the drum, laser diode, and lenses).
The data for the scanner and printer gamma correction are fixed and stored in the memory. There are no SP adjustments in this machine.

## Gradation processing

These are three types of gradation processing:

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

These three processes are used as follows.

Text mode
Text/photo mode:
Photo mode:
Generation mode:
Pale mode

Grayscale processing
Error diffusion (256 levels)
Dithering ( 256 levels)
Grayscale processing + line width correction
Grayscale processing

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

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

Laser diode power and pulse width modulation is performed by the laser diode drive board (LDDR). Briefly, the width of the laser pulse for a pixel depends on the output level (from 0 to 255) required for the pixel.
This machine can also change the laser pulse position (at the left side of the pixel, at the center, or at the right side) automatically, depending on the location of the image pixel so that the edges of characters and lines become clearer. There is no SP mode adjustment for this, unlike in some earlier models.

Note that binary picture processing (one bit per pixel) is not used for copy mode. However, it is used for printer and fax mode. In binary picture processing, each pixel is converted from 8-bit to 1-bit in accordance with a threshold value. The threshold value can be adjusted with SP 4-904-12.
Type 2: Error diffusion. This is used only in text/photo mode. The error diffusion process reduces the difference in contrast between light and dark areas of a halftone image. Each pixel is corrected using the difference between it and the surrounding pixels. The corrected pixels are then compared with an error diffusion matrix. Separate error diffusion matrixes are used for copy mode and fax mode.

1. Grayscale processing mode

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

The output image signal level has just 2 levels (white and black).
Type 3: Dithering. This is only used in photo mode. Each pixel is compared with a pixel in a dither matrix. Several matrixes are available, to increase or decrease the detail on the copy.

1. Grayscale processing mode

The matrix type can be selected with SP4-904-2.
2. Binary picture processing

The matrix type can be selected with SP4-904-18.

## Line width correction

This function is effective only in Generation Copy mode.
Usually, lines will bulge in the main scan direction as a result of the negative/positive development system that is used in this model. So, pixels on edges between black and white areas are compared with adjacent pixels, and if the pixel is on a line, the line thickness will be reduced.
The line width correction type can be selected with SP4-903-75~77.

### 6.6 LASER EXPOSURE

### 6.6.1 OVERVIEW



1 LD unit
2 Cylindrical Iens
3 Polygonal mirror
4 Shield glass
5 Mirror
This machine uses two laser diodes to produce electrostatic images on an OPC drum. The laser diode unit converts image data from the BICU board into laser pulses, and the optical components direct these pulses to the drum. To produce a high quality copy image, these are 256 gradations for the laser power.
The output path from the laser diode to the drum is shown above. The LD unit outputs two laser beams to the polygon mirror through the cylindrical lens and the shield glass.
Each surface of the polygon mirror reflects two full main scan lines. The laser beams go to the F-theta mirror, mirror, and BTL (barrel toroidal lens). Then these laser beams go to the drum through the toner shield glass. The laser synchronizing detector determines the main scan starting position.
NOTE: The front door and right door (transfer door) are equipped with safety switches that automatically shut down the laser unit when either door is opened.

### 6.6.2 AUTO POWER CONTROL (APC)

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

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

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

### 6.6.3 DUAL BEAM WRITING

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

The two laser beams follow the path: collimating lenses [C] $\rightarrow$ prism [D] $\rightarrow$ polygonal mirror [E]


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

### 6.6.4 LASER BEAM PITCH CHANGE MECHANISM



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

Both LD unit positions are at fixed distances from the LD unit home position sensor [D].
Usually, the LD unit moves directly to the proper position. However, when the number of times that the resolution has changed reaches the value of SP2-109-5 (LD Beam Pitch Adjustment), the LD unit moves to the home position, and this recalibrates the LD unit positioning mechanism.

## LASER EXPOSURE

### 6.6.5 LD SAFETY SWITCHES



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

### 6.7 PHOTOCONDUCTOR UNIT (PCU)

### 6.7.1 OVERVIEW



1 Toner Collection Coil
2 Toner Collection Plate
3 Spur
4 Pick off Pawl
5 OPC Drum ( $\phi 60 \mathrm{~mm}$ )

6 Transfer Entrance Guide
7 Charge Roller Cleaning Pad
8 Charge Roller
9 Cleaning Blade

### 6.7.2 DRIVE MECHANISM

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

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

### 6.7.3 DRUM PAWLS

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


### 6.7.4 DRUM TONER SEALS

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


### 6.8 DRUM CHARGE

### 6.8.1 OVERVIEW



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

### 6.8.2 CHARGE ROLLER VOLTAGE CORRECTION

## Correction for Environmental Conditions



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

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

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

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

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

| SP Mode | SP Name |  |
| :--- | :--- | :--- |
| SP2-001-1 | Charge Roller Bias Adjustment | Width $216-297 \mathrm{~mm}$ |
| SP2-309-1 | Paper Lower Width [a] | Width limit: 150 mm |
| SP2-309-2 | Paper Upper Width [b] | Width limit: 216 mm |
| SP2-914-1 | C $\alpha$ | Adjust $10 \mathrm{~V} /$ step |
| SP2-914-2 | $\mathrm{C} \beta$ | Adjust $10 \mathrm{~V} /$ step |

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

| $0 \mathrm{~mm} \quad$SP $2-309-1$ SP $2-309-2$ <br> Default: 150 mm Default: 216 mm |  |  |
| :---: | :---: | :---: |
| Voltage: <br> SP2-001-1 + SP2-914-1 <br> Default: -1630+250 V | $\begin{gathered} \text { Voltage: } \\ \text { SP2-001-1 + SP2-914-2 } \\ \text { Default: }-1630+50 \text { V } \end{gathered}$ | $\begin{gathered} \text { Voltage: } \\ \text { SP2-001-1 } \\ \text { Default: -1630 } \end{gathered}$ |

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

### 6.8.3 ID SENSOR PATTERN PRODUCTION TIMING

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

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


### 6.8.4 DRUM CHARGE ROLLER CLEANING



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

### 6.9 DEVELOPMENT

### 6.9.1 OVERVIEW



1 Drum
2 Development Roller
3 Paddle Roller
4 TD Sensor

5 Mixing Auger
6 Development Filter
7 Doctor Blade

### 6.9.2 DRIVE MECHANISM

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

The drive shaft engages and disengages the paddle roller gear when the development unit is inserted into and removed from the machine.
NOTE: The development drive gears are helical gears, quieter than normal gears.


### 6.9.3 DEVELOPER MIXING



The dual mixing roller consists of the outer paddle $[A]$ and the inner auger [B].
The outer paddle moves developer to the front $\mathbf{1}$ and supplies it to the development roller. Developer that spills off by the doctor blade (2) passes through the holes [C] in the outer paddle, and is transported to the rear $\boldsymbol{3}$ by the inner auger.
While the dual mixing roller is moving the developer, some developer also passes back to the development unit through the holes in the bottom of the paddle roller 4. New toner from the toner bottle and recycled toner from the toner collection coil both enter the development unit at [D].

### 6.9.4 DEVELOPMENT BIAS

## Mechanism

In a negative-positive development system, black areas of the latent image are at a low negative charge (about 150 V ) and white areas are at a high negative charge (about -950 V).
To attract negatively charged toner to the black areas of the latent image on the drum, the high voltage supply board [A] applies a bias of -600 volts to the development roller throughout the image development process. The bias is applied to the development roller shaft [B] through the bias terminal spring [C] and bias terminal [D].
The development bias voltage (-600 V) can be adjusted with SP2-201 (Development Bias).

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

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

| SP Mode | SP Name |  |
| :--- | :--- | :--- |
| SP2-201-1 | Development Bias | Width $216-297 \mathrm{~mm}$ |
| SP2-309-1 | Paper Lower Width [a] | Width limit: 150 mm |
| SP2-309-2 | Paper Upper Width $[\mathrm{b}]$ | Width limit: 216 mm |
| SP2-914-3 | Process Control Setting (B $\gamma$ ) | Adjust $10 \mathrm{~V} /$ step |
| SP2-914-4 | Process Control Setting (B8) | Adjust 10V/step |

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


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

### 6.9.5 TONER SUPPLY

## Toner bottle replenishment mechanism



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

The toner bottle holder lever [E] cannot be lowered when a toner bottle is not installed in the holder. This prevents toner falling out of the holder unit as a result of lowering the handle with no toner bottle installed.
The toner bottle has a spiral groove $[\mathrm{H}]$, which rotates the bottle to move toner to the development unit. When the bottle holder unit is pulled out, the chuck [G] releases the toner bottle cap and the toner shutter [D] closes and blocks the opening.

## Toner supply mechanism

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


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


## Toner density control

There are two modes for controlling and maintaining constant toner supply: sensor control (both direct and indirect) and image pixel count control. The mode can be changed with SP2-208-1 (Toner Supply Mode).
NOTE: The factory setting is sensor control mode; image pixel count mode should only be used temporarily until a defective TD or ID sensor can be replaced.

## Sensor Control Mode

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

The machine must vary toner supply for each copy in order to maintain the correct amount of toner in the developer and to account for changes in drum reflectivity due to changes in temperature and humidity. The CPU uses data from the TD sensor and ID sensor to determine whether or not the toner supply motor should be switched on and to calculate how long it should remain on in order to supply more toner to the mixture in the development unit.
TD Sensor. When new developer of standard toner concentration is installed, namely 20 g of toner per 500 g of developer ( $4.0 \%$ by weight), the TD sensor must be set to its initial setting of 4.0 V with SP2-801. This initial setting is used as the toner supply reference voltage or Vref. For every copy cycle, the TD sensor directly checks the toner density in the developer mixture, and after 10 copies these 10 readings are averaged and this value becomes TD sensor output voltage $\mathrm{Vt}(10)$.

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

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

## Image Pixel Count Mode

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

### 6.9.6 TONER NEAR END/END DETECTION

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

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

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

If Vsp is less than 2.0 V , the density of the ID sensor pattern is very light, so the machine detects the toner end condition. However, if Vsp remains higher than 2.0V but 90 copies have been made after toner near end was determined, the machine enters the toner end condition.
NOTE: The number of copies between toner near-end and toner end can be changed with SP2-213. The default is 90 copies.

### 6.9.7 TONER END RECOVERY

If the front door is opened and then closed while a toner near end/end condition exists, the machine will attempt to recover. When the front door is closed, the toner supply motor turns on to supply toner. The machine checks the TD sensor output 2 seconds after the main motor turns on (Vtp), and the sensor is checked again every 1 second (Vtp ${ }^{1}$ )
The machine detects the toner concentration using Vref, Vt (10), Vtp, and Vtp ${ }^{1}$. If the toner concentration is still too low, the toner supply motor remains on for another 10 seconds while the machine checks Vt . If toner concentration is judged to be at the standard level, then the toner near end/end condition is cancelled and K (toner supply coefficient) is reset. If toner concentration has not reached the standard level, the toner supply motor rotates continuously until it does (maximum motor on time is 16 seconds) and then it will switch off.

### 6.9.8 TONER SUPPLY WITH ABNORMAL SENSORS

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

The ID sensor is checked every 10 copies. If readings become abnormal, an SC code is generated and the machine must be repaired. If this happens during a copy job, Vref is not changed, the copy job is allowed to finish, and then the SC code is generated.
If spare parts are not available, the technician can use SP2-208-1 to temporarily put the machine in image pixel count mode. (Chapter 5 Service Tables)

### 6.10 DRUM CLEANING AND TONER RECYCLING

### 6.10.1 DRUM CLEANING

This machine employs a counter blade system. After the image is transferred to paper, a cleaning blade [A] removes any toner remaining on the drum. The toner collection coil [B] carries scraped off toner to the toner collection plate [C].
The collar [D] on the cleaning blade bracket contacts the outer rim of cam gear [E], which moves the cleaning blade side to side. This side-to-side movement disperses accumulated toner to prevent early blade edge wear at one location.


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

### 6.10.2 TONER RECYCLING

Toner collected by the toner collection coil $[A]$ is transported to the opening $[B]$. This toner falls into the development unit with new toner coming from the toner bottle. The paddle roller [C] mixes the collected toner with the new toner.
NOTE: A screen filter [D) has been added to strain out paper dust and other foreign matter.


### 6.11 PAPER FEED

### 6.11.1 OVERVIEW



1 Upper pick-up roller
2 Upper paper height sensor
3 Upper paper feed roller
4 Upper relay sensor
5 Upper relay roller
6 Upper separation roller
7 Lower relay sensor
8 Lower relay roller

9 Lower paper feed roller
10 Lower separation roller
11 Lower paper height sensor
12 Lower pick-up roller
13 Lower paper size dial
14 Lower paper size switch
15 Upper paper size dial
16 Upper paper size switch

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

### 6.11.2 PAPER FEED DRIVE

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

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

### 6.11.3 PICK-UP AND SEPARATION ROLLER RELEASE MECHANISM

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


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


### 6.11.4 PAPER LIFT

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


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

After several paper feed cycles, the paper level gradually lowers and the paper height sensor is de-activated. The tray lift motor turns on again until this sensor is activated again.
When the paper tray is removed from the machine, the tray lift motor coupling gear disengages the pin on the lift arm shaft, and the tray bottom plate then drops under its own weight.

### 6.11.5 PAPER END DETECTION

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

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


### 6.11.6 PAPER REGISTRATION

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

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

The registration sensor [E] is positioned just before the registration rollers. When the leading edge activates the
 registration sensor, the registration clutch is off and the registration rollers are not turning.
However, the relay clutch [F] remains on slightly longer. This delay allows time for the paper to press against the registration rollers and buckle slightly to correct skew.

Next, the registration clutch [D] actuates and the relay clutch re-actuates at the proper time to align the paper with the image on the drum. The registration rollers then feed the paper to the image transfer section.
NOTE: The registration sensor is also used for paper misfeed detection.

### 6.11.7 PAPER SIZE DETECTION

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

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

The CPU disables paper feed from a tray if the paper size cannot be detected. If the paper size actuator is broken, or if there is no tray installed, the printer control board recognizes that the paper tray is not installed.
When the paper size actuator is at the " $*$ " mark, the paper tray can be set up to accommodate one of a wider range of paper sizes by using one of the user tools on the machine's operation panel.

| Models |  | Paper Size Switch |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| North America | Europe/Asia | 1 | 2 | 3 | 4 |
| 81/2" $\times 13$ " Portrait | A3 Portrait | ON | ON | OFF | ON |
| A4 Landscape | A4 Landscape | ON | ON | ON | ON |
| A4 Portrait | A4 Portrait | ON | OFF | ON | ON |
| $11^{\prime \prime} \times 17{ }^{\prime \prime}$ Portrait | A5 Portrait | OFF | OFF | ON | ON |
| 81/2" x 14" Portrait | 8" x 13" Portrait | ON | OFF | OFF | OFF |
| $81 / 2^{\prime \prime} \times 11^{\prime \prime}$ Portrait | 81/2" $\times 11$ Portrait | ON | ON | OFF | OFF |
| 81/2" $\times 11$ " Landscape | 81/2" $\times 11$ " Landscape | ON | OFF | ON | OFF |
| * | * | ON | ON | ON | OFF |

ON: Pushed OFF: Not Pushed

### 6.12 BY-PASS TRAY

### 6.12.1 OVERVIEW



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

### 6.12.2 BY-PASS TRAY OPERATION


[E]

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

### 6.12.3 BY-PASS PAPER SIZE DETECTION



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

DUPLEX UNIT

### 6.13 DUPLEX UNIT

### 6.13.1 OVERVIEW



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

### 6.13.2 DUPLEX DRIVE LAYOUT



1 Inverter roller
2 Inverter motor
3 Upper transport roller

4 Transport motor
5 Lower transport roller

### 6.13.3 DUPLEX BASIC OPERATION

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

## Larger than A4 lengthwise/LT lengthwise

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


## Up to A4 lengthwise/LT lengthwise

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


### 6.13.4 DUPLEX UNIT FEED IN AND EXIT MECHANISM



## Feed-in

The inverter gate solenoid $[A]$ stays off and the inverter rollers $[B]$ rotate clockwise. A sheet of paper is sent to the inverter section [C].
NOTE: The cover guide has been eliminated in order to accommodate paper sizes longer than A4/LT in the reverse feed path which has been lengthened in the design of this machine.

## Inversion and Exit

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

### 6.14 IMAGE TRANSFER AND PAPER SEPARATION

### 6.14.1 OVERVIEW



1 Transfer belt
2 Drive roller
3 Transfer belt cleaning blade
4 Transfer roller
5 Idle roller

6 OPC
7 Pick-off pawls
8 ID sensor
9 Contact lever
10 Transfer belt contact clutch

### 6.14.2 BELT DRIVE MECHANISM

After the main motor switches on during copying, the transfer belt contact clutch [A] switches on after a specified interval and the cam [F] makes a half-turn to raise the contact lever [E] and bring the transfer belt [D] into contact with the drum.
The actuator [C], on the same axis as the cam, and the transfer belt position sensor [ B ] detect whether the drum and transfer belt are in contact.
When the main motor is off, or when the ID sensor pattern is being measured, the
 transfer belt unit separates from the drum.
The ID sensor pattern must not be transferred to the belt. Also, the transfer belt and drum must not remain in contact for too long, to prevent contamination of the drum with oil or other foreign material from the transfer belt.

### 6.14.3 TRANSFER BELT UNIT CONTACT MECHANISM

The belt contact and release mechanism consists of the belt contact clutch [A], cam [B], and contact lever [C]. The belt contact clutch turns on and the cam attached to the clutch rotates half a complete rotation. The contact lever, riding on the cam, is lifted up and the spring [D] pushes the belt into contact with the drum.
The transfer belt position sensor [E] detects the home position of the cam (this is when the belt is away from the drum). The belt must be released from the drum between copy jobs in order to prevent the
 ID sensor pattern from being rubbed off and to prevent contamination of the drum from the surface of the belt.

### 6.14.4 IMAGE TRANSFER AND PAPER SEPARATION MECHANISM

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


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


When the paper enters the gap between the belt and the drum, the high voltage supply board [D] applies a high positive current to the belt to transfer the image to the paper.
After receiving the image from the drum, the paper is fed by the belt. The paper moves to the end of the transfer belt unit, where it separates from the belt as the belt curves away and moves on to the fusing unit.


### 6.14.5 TRANSFER BELT CHARGE

## Mechanism



The high voltage supply board $[\mathrm{A}]$ applies the positive current to the transfer belt $[B]$ through the terminal block [C], terminal plate [D], and the bias roller [E].
The high voltage supply board adjusts the current to the roller to keep a small but constant current flow to ground through the belt, paper, and drum. If this current is not kept constant, efficiency of toner transfer and paper separation will vary with paper thickness, type, environmental condition, or changes in transfer belt surface resistance.

## Correction for paper width and thickness

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

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

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


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

Transfer current can also be adjusted for the leading edge and the image area, and for by-pass feed. The timing for starting to apply leading edge current, for the switchover from leading edge current to image area current, and for switching off at the trailing edge can also be changed.
The table below lists the SP modes you can use to adjust these settings.

| SP2-301 Transfer Current Adjustment |  |  |
| :--- | :--- | :--- |
| Image areas | SP2-301-1 | 1st Side of Paper |
|  | SP2-301-2 | 2nd Side of Paper |
|  | SP2-301-4 | By-pass Feed |
| Leading edge <br> areas | SP2-301-3 | Leading Edge |
|  |  |  |
| SP2-301-5 |  |  | Leading Edge By-pass Feed.$|$| SP2-911 Transfer Current Timing |  |  |
| :--- | :--- | :--- |
| Timing | SP2-911-1 | On Timing |
|  | SP2-911-2 | Switch Timing |
|  | SP2-911-3 | Off Timing |

### 6.14.6 TRANSFER BELT CLEANING MECHANISM



The cleaning blade $[A]$, always in contact with the transfer belt, scrapes off toner and paper dust remaining on the transfer belt.
Scraped off toner and paper dust falls into the toner collection tank $[B]$ in the transfer belt unit. This toner is not recycled. When the toner overflow sensor [C] detects toner overflow, the toner overflow indicator lights. Up to 999 copies can be made before the toner overflow condition shuts down the machine.

### 6.15 IMAGE FUSING AND PAPER EXIT

### 6.15.1 OVERVIEW



1 Paper exit sensor
2 De-curler rollers 1, 2
3 Junction gate
4 Idle roller (duplex unit)
5 Fusing unit exit sensor
6 Spring
7 Fusing exit guide plate
8 Pressure roller
9 Pressure arm

10 Cleaning roller
11 Entrance guide
12 Fusing lamp (center)
13 Fusing lamp (ends)
14 Thermistors (central/end)
15 Thermostat (central)
16 Hot roller
17 Hot roller strippers
18 Exit roller

### 6.15.2 FUSING DRIVE

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


### 6.15.3 FUSING DRIVE RELEASE MECHANISM

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

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


### 6.15.4 FUSING ENTRANCE GUIDE SHIFT MECHANISM

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

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


### 6.15.5 EXIT GUIDE PLATE AND DE-CURLER ROLLERS

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

Stacking has been improved by mounting a face-curl correction mechanism at the paper exit roller.
Two de-curler rollers [B] and [C] have been added under the exit roller [D] to correct the curl that paper acquires during transport through the fusing unit.


### 6.15.6 PRESSURE ROLLER

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


### 6.15.7 CLEANING MECHANISM

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


### 6.15.8 FUSING TEMPERATURE CONTROL

The fusing unit for this machine is equipped with two fusing lamps: the first fusing lamp (center: 650W) [A] heats the center of the fusing roller, and the second fusing lamp (ends: 550W) [B] heats both ends of the fusing roller. This arrangement ensures even heat on all surfaces of the roller.
In order to control the temperature of the roller, two high response thermistors are attached to the unit, one near the center [C]
 and one at the end [D] of the fusing roller.

## Temperature Control




There are two types of temperature control:

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

Either mode can be selected with SP1-104 (Fusing Temperature Control).
After the machine is powered on, the CPU checks the ac frequency for 500 ms , in case phase control is selected later for the temperature control, and then switches on the fusing lamp.
As soon as both the center and end thermistors detect the re-load temperature (Fusing temperature - (minus) $30^{\circ} \mathrm{C}$ ), the machine can operate. As soon as the thermistors detect the fusing temperature, the CPU switches the lamps off but frequently switches on/off again in order to maintain the fusing temperature.

## Fusing Idling Temperature

If copies are not sufficiently fused soon after the main power switch is turned on, fusing idling should be enabled with SP1-103-1. When fusing idling is enabled, it is done when the temperature reaches the value of the re-load temperature. The reload temperature can be adjusted with SP1-105-5, 6.
In the opposite case, even if fusing idling is disabled, it is done when the temperature at power-up $\leq 15^{\circ} \mathrm{C}$
The fusing idling time is as follows.

| Temperature at <br> power-on | Fusing Idling Mode |  |  |
| :--- | :---: | :---: | :---: |
|  | 0: Disabled | $\mathbf{1 :}$ Enabled | SP1-103-1 |
| $15^{\circ} \mathrm{C}$ or less | 30 s | 30 s | SP1-103-2 |
| Higher than $15^{\circ} \mathrm{C}$ | Not done | 30 s |  |

### 6.15.9 OVERHEAT PROTECTION

If the hot roller temperature becomes greater than $250^{\circ} \mathrm{C}$, the CPU cuts off the power to the fusing lamp, and SC543 Fusing Overheat Error will be displayed.
Even if the thermistor overheat protection fails, there is a thermostat in series with the common ground line of the fusing lamp. If the temperature of the thermostat reaches $210^{\circ} \mathrm{C}$, the thermostat opens, removing power from the fusing lamp. At the same time, the copier stops operating. At this time, SC542 Fusing Temperature Warm-up Error will be displayed.

### 6.16 ENERGY SAVER MODES

### 6.16.1 OVERVIEW



When the machine is not used, the energy saver function reduces power consumption by decreasing the fusing temperature.
This machine has two types of energy saver mode as follows.

1) Energy saver mode
2) Auto Off mode

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

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


### 6.16.2 ENERGY SAVER MODE

## Entering the energy saver mode

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

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


## What happens in energy saver mode

When the machine enters energy saver mode, the fusing lamp drops to a certain temperature, and the operation panel indicators are turned off except for the Energy Saver LED and the Power LED.
If the CPU receives the image print out command from an application (e. g. to print incoming fax data or to print data from a PC), the fusing temperature rises to print the data.

## Return to stand-by mode

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

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

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

| Mode | Operation <br> Switch | Energy <br> Saver LED | Fusing Temp. | $\mathbf{+ 2 4 V}$ | System +5V |
| :--- | :---: | :--- | :--- | :---: | :---: |
| Energy <br> Saver | On | On | B003 \& B006: $130^{\circ} \mathrm{C}$ <br> B004 \& B007: $150^{\circ} \mathrm{C}$ | On | On |

### 6.16.3 AUTO OFF MODE

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

## Entering off stand-by and off modes

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

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

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

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


## Off Stand-by mode

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

## Off Mode

The system +5 V supply also turns off. However, +5 VE (+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 +5 V and +24 V supplies are activated.

## Returning to stand-by mode

The machine returns to stand-by mode when the operation switch is pressed. The recovery time is about 10 s for the B003 \& B006 and 15 s for the B004 \& B007.

| Mode | Operation <br> Switch | Energy <br> Saver <br> Mode | Fusing Lamp | $\mathbf{+ 2 4 V}$ | System <br> $\mathbf{+ 5 V}$ | Note |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Off Stand-by | Off | Off | Off <br> (On when printing) | On | On |  |
| Off | Off | Off | Off | Off | Off | $+5 V E$ is <br> supplied |

## SPECIFICATIONS

## SPECIFICATIONS

## 1. GENERAL SPECIFICATIONS

| Configuration | Desktop |  |
| :---: | :---: | :---: |
| Copy Process | Dry electrostatic transfer system |  |
| Original | Sheet/Book |  |
| Original Size | Maximum A3/11" $\times 17^{\prime \prime}$ |  |
| Copy Paper Size | Paper tray, Duplex: | A3/11" $\times 17$ - A5 (L) |
|  | By-pass tray: | A3/11" $\times 17$ " - A6 (L) |
|  | Non-standard sizes: | Width: 100-305 mm (3.9" - 12") Length: $148-432 \mathrm{~mm}\left(5.8^{\prime \prime}-17.0^{\prime \prime}\right)$ |
| Copy Paper Weight | Paper Tray /Duplex: | $64-105 \mathrm{~g} / \mathrm{m}^{2}(20-28 \mathrm{lb})$ |
|  | By-pass: | $52-163 \mathrm{~g} / \mathrm{m}^{2}(16-44 \mathrm{lb})$ |
| Reproduction Ratios | 7R5E: | Metric version (\%): $400,200,141,122,115$, $93,82,75,71,65,50,25$ Inch version (\%): $400,200,155,129,121,93$, $85,78,73,65,50,25$ |
|  | Zoom: | $25 \sim 400 \%$ in 1\% steps |
| Copying Speed | B003 \& B006: | 35 cpm ( $\mathrm{A} 4 / 11^{\prime \prime} \times 8.5^{\prime \prime}(\mathrm{S})$ ) |
|  | B004 \& B007: | 45 cpm (A4/11" $\times 8.5^{\prime \prime}(\mathrm{S})$ ) |
| First Copy Time | B003 \& B006: | $4.5 \mathrm{~s} \mathrm{(11}^{\text {st }}$ Tray, A4/11" $\times 8.5{ }^{\text {" }}$ (S) $) ~$ |
|  | B004 \& B007: | 3.6 s (1 ${ }^{\text {st }}$ Tray, A4/11" $\times 8.5$ " (S)) |
| Warm-up Time | B003 \& B006: | Less than 15 s |
|  | B004 \& B007: | Less than 20 s |
| Continuous Copy | 1~999 (operation panel entry) |  |
| Paper Capacity | 1,050 sheets( 500 sheets/tray $\times 2$ with 50 sheets in by-pass tray) |  |
| Paper Output | A4/81/2 $\times 11^{\prime \prime}$ and smaller | 500 sheets |
|  | B4 and larger: | 250 sheets |
| Power Source | North America: | $120 \mathrm{~V} / 60 \mathrm{~Hz}$, More than 12 A |
|  | Europe/Asia: | $220-240 \mathrm{~V} / 50,60 \mathrm{~Hz}$, More than 8A |
| $\begin{array}{\|l\|} \hline \text { Dimensions } \\ (\mathrm{W} \times \mathrm{D} \times \mathrm{H}) \\ \hline \end{array}$ | $670 \mathrm{~mm} \times 650 \mathrm{~mm} \times 720 \mathrm{~mm}$ ( 26.3 " $\times 25.6$ " $\times 28.3$ ) |  |
| Weight | Less than 78 kg (172 lb) |  |
| Resolution | 600 dpi (Scanning and Printing) |  |
| Gradation | 256 levels (Scanning and Printing) |  |
| Original Archive | More than 9,000 A4 pages for document server. |  |
| Toner Replenishment | Cartridge exchange (550g) |  |
| Total Counter | Electric counter |  |

## SPECIFICATIONS

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


Lengthwise (L)


Sideways (S)

## Power Consumption

Mainframe only

|  | Model -B003 \& B006 | Model -B004 \& B007 |
| :--- | :--- | :--- |
| Copying | Less than 1.0 kW | Less than 1.0 kW |
| Warm-up | Less than 1.5 kW | Less than 1.5 kW |
| Stand-by | Less than $300 \mathrm{~W} / \mathrm{h}$ | Less than $300 \mathrm{~W} / \mathrm{h}$ |
| Energy Saver Mode | Ave. $140 \mathrm{~W} / \mathrm{h}$ | Ave. $178 \mathrm{~W} / \mathrm{h}$ |
| Auto Off Mode | Ave. $10 \mathrm{~W} / \mathrm{h}$ | Ave. $10 \mathrm{~W} / \mathrm{h}$ |

## System

|  | Model -B003 \& B006 | Model -B004 \& B007 |
| :--- | :--- | :--- |
| Copying | Less than 1.3 kW | Less than 1.3 kW |
| Warm-up | Less than 1.5 kW | Less than 1.5 kW |
| Stand-by | Less than $500 \mathrm{~W} / \mathrm{h}$ | Less than $500 \mathrm{~W} / \mathrm{h}$ |
| Energy Saver Mode | Ave. $185 \mathrm{~W} / \mathrm{h}$ | Ave. $223 \mathrm{~W} / \mathrm{h}$ |
| Auto Off Mode | Ave. $10 \mathrm{~W} / \mathrm{h}$ | Ave. $10 \mathrm{~W} / \mathrm{h}$ |

## Noise Emission:

| Mode | Model | Mainframe Only | System |
| :---: | :--- | :--- | :--- |
| Copying |  <br> B006 | $69 \mathrm{~dB}(A)$ or less | $73 \mathrm{~dB}(A)$ or less |
|  |  <br> B007 | $70 \mathrm{~dB}(A)$ or less | $74 \mathrm{~dB}(A)$ or less |
| }{} |  <br> B006 | $42 \mathrm{~dB}(\mathrm{~A})$ or less |  |
|  |  <br> B007 | $42 \mathrm{~dB}(\mathrm{~A})$ or less |  |

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

## 2. MACHINE CONFIGURATION



1 Platen cover
2 ARDF
3 One-bin tray
4 Duplex unit
5 By-pass tray
6 LCT (Large Capacity Tray)

7 Copier
8 Paper tray unit
9 Two-tray finisher (2 shift trays)
10 1000-sheet finisher (1 shift tray)
11 External tray
12 Bridge unit

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

## SPECIFICATIONS

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

|  | Item | Key | Machine Code |
| :---: | :---: | :---: | :---: |
|  | Copier Model - 35CPM |  | B003 |
|  | Copier Model - 45CPM |  | B004 |
|  | Printer Model - 35CPM (USA model only) |  | B006 |
|  | Printer Model - 45 CPPM (USA model only) |  | B007 |
|  | ARDF (See Note 1.) | U | B351 |
|  | Platen Cover (See Note 1.) | C | A381 |
|  | Paper Tray Unit | C | A682 |
| Copier | LCT (Large Capacity Tray) | C | A683 |
| Copier | 1-Bin Tray | U | B376 |
|  | Bridge Unit | U | A688/B397 |
|  | 1000-sheet Finisher (See Note 2.) | C | A681 |
|  | Two-tray Finisher (See Note 2.) | U | B352 |
|  | Punch Unit (See Note 3.) | C | B377-17 (2/3-hole) US |
|  | Punch Unit (See Note 3.) | C | B377-27 (2/4-hole) Metric |
|  | Punch Unit (See Note 3.) | C | B377-31 (4-hole) Northern Europe |
|  | External Output Tray (See Note 4.) | C | A825 |
|  | Key Counter Bracket | C | A674 |
|  | User Account Enhance Unit | U | B443 |
|  | Fax Option | U | B360 |
|  | ISDN Option | U | B367 |
| Fax | G3 Interface Unit | U | B366 |
|  | JBIG | C | A892 |
|  | Handset (USA model only) | C | A646 |
|  | Printer Unit | U | B362 |
|  | Printer/Scanner Unit | U | B361 |
|  | PostScript3 Unit | U | G577 |
|  | Network Interface Board | U | G574 |
| Printer/ | 1394 Interface Unit | C | G590 |
|  | Mailbox | C | G909 |
|  | Mailbox Bridge Unit | C | G912 |
|  | Memory Unit 64 MB | C | G579 |
|  | Memory Unit 32 MB | C | G578 |

## Notes

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

## 3. OPTIONAL EQUIPMENT

## ARDF

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

PAPER TRAY UNIT

| Paper Size: | A5 (L) to A3 <br> HLT (L) to DLT |
| :--- | :--- |
| Paper Weight: | $64 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}(20 \mathrm{lb} \sim 28 \mathrm{lb})$ |
| Tray Capacity: | 500 sheets $\left(80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}\right)$ |
| Paper Feed System: | FRR |
| Paper Height Detection: | 4 steps $(100 \%, 70 \%, 30 \%$, Near end) |
| Power Source: | $24 \mathrm{Vdc}, 5 \mathrm{Vdc}$ (from the copier) |
|  | $120 \mathrm{Vac}: 115 \mathrm{~V}$ version (from the copier) |
|  | $220 \sim 240 \mathrm{Vac} 224 / 240 \mathrm{~V}$ version (from the copier) |$|$| Power Consumption: |
| :--- |
| Weight: |
| Size $(\mathrm{W} \times \mathrm{D} \times \mathrm{H}):$ |

SPECIFICATIONS
ONE-BIN TRAY

| Paper Size: | A5 $(\mathrm{L})$ to A3 <br> HLT to DLT |
| :--- | :--- |
| Paper Weight: | $60 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}(16 \mathrm{lb} \sim 28 \mathrm{lb})$ |
| Tray Capacity: | $125 \mathrm{sheets}\left(80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}\right)$ |
| Power Source: | $5 \mathrm{Vdc}, 24 \mathrm{Vdc}($ from copier $)$ |
| Power Consumption: | 15 W |
| Weight: | Less than $4 \mathrm{~kg}(8.8 \mathrm{lb})$ |
| Size $(\mathrm{W} \times \mathrm{D} \times \mathrm{H}):$ | $470 \mathrm{~mm} \times 565 \mathrm{~mm} \times 140 \mathrm{~mm}\left(18.5^{\prime \prime} \times 22.2^{\prime \prime} \times 5.5^{\prime \prime}\right)$ |

1000-SHEET FINISHER

| Paper Size: | No staple mode: A3 to A6 (L) DLT to HLT (L) <br> Staple mode: <br> A3, B4, A4, B5 (S) DLT to LT |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Paper Weight: | No staple mode: $52 \sim 157 \mathrm{~g} / \mathrm{m}^{2}$ (14~42 lb) Staple mode:64~80 g/m ${ }^{2}$ (17~20 lb) |  |  |  |  |
| Stapler Capacity: | $\begin{aligned} & 20 \text { sheets (A3, B4, DLT, LG) } \\ & 30 \text { sheets (A4, B5 (S), LT) } \end{aligned}$ |  |  |  |  |
| Paper Capacity: | No staple mode: <br> 1,000 sheets (A4/LT or smaller: $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ) 500 sheets (A3, B4, DLT, LG: $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ) <br> Staple mode: ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$, number of sets) |  |  |  |  |
|  | Size $\quad$ Set Size | 2 to 10 |  | 11 to 20 | 21 to 30 |
|  |  | 2 to 5 | 6 to 10 |  |  |
|  | $\begin{array}{\|l\|} \hline \text { A4/LT (S) } \\ \text { B5 (S) } \\ \hline \end{array}$ | 100 | 85 | 40 | 25 |
|  | A4/LT (L) |  |  | 25 | 15 |
|  | A3, B4, DLT, LG |  |  | 25 | - |
| Staple positions | 1 |  |  |  |  |
| Staple Replenishment: | Cartridge (3,000 staples/cartridge) |  |  |  |  |
| Power Source: | $24 \mathrm{Vdc}, 5 \mathrm{Vdc}$ (from the copier/printer) |  |  |  |  |
| Power Consumption: | 48 W |  |  |  |  |
| Weight: | 21 kg (46.3 lbs) |  |  |  |  |
| $\begin{aligned} & \text { Dimensions (W x D x } \\ & \text { H): } \end{aligned}$ | $568 \times 520 \times 625 \mathrm{~mm}(22.4 " \times 20.5$ " $\times 24.6$ " |  |  |  |  |

TWO-TRAY FINISHER
NOTE: The punch unit is an option for this machine.

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

SPECIFICATIONS

## BRIDGE UNIT

| Paper Size: | Standard sizes <br> A6 lengthwise to A3 <br> HLT to DLT <br> Non-standard sizes <br> Width: 100 to 305 mm <br> Length: 148 to 432 mm |
| :--- | :--- |
| Paper Weight: | $52 \mathrm{~g} / \mathrm{m}^{2} \sim 135 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 42 \mathrm{lb}$ |

## LCT

| Paper Size: | A4 (S)/LT (S) |
| :--- | :--- |
| Paper Weight: | $60 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 28 \mathrm{lb}$ |
| Tray Capacity: | 1500 sheets $\left(80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}\right)$ |
| Remaining Paper Detection: | $5 \mathrm{steps}(100 \%, 75 \%, 50 \%, 25 \%$, Near end) |
| Power Source: | $24 \mathrm{Vdc}, 5 \mathrm{Vdc}($ from copier $)$ |
| Power Consumption: | 40 W |
| Weight: | Less than $17 \mathrm{~kg}(37.5 \mathrm{lb})$ |
| Size $(\mathrm{W} \times \mathrm{D} \times \mathrm{H}):$ | $390 \mathrm{~mm} \times 500 \mathrm{~mm} \times 390 \mathrm{~mm}$ <br> $\left(15.4^{\prime \prime} \times 19.7^{\prime \prime} \times 15.4^{\prime \prime}\right)$ |

## MAILBOX

| Number of Trays | 9 trays + proof tray |
| :---: | :---: |
| Tray Capacity: | Trays and proof tray: 100 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ) |
| Paper Size for Trays: | Trays:  <br> Maximum: A3 or $11^{\prime \prime} \times 17^{\prime \prime}$ <br> Minimum: A5 (S) or $11^{\prime \prime} \times 81 / 2 "$ <br> Proof tray:  <br> Maximum: A3 or $11^{\prime \prime} \times 17^{\prime \prime}$ <br> Minimum: A6 (S) or $11^{\prime \prime} \times 8^{1 / 2 "}$,  |
| Paper Weight: | $\begin{aligned} & \hline \text { Trays: } 60 \sim 90 \mathrm{~g} / \mathrm{m}^{2}(16 \sim 24 \mathrm{lb}) \\ & \text { Proof tray: } 52 \sim 157 \mathrm{~g} / \mathrm{m}^{2}(14 \sim 42 \mathrm{lb}) \\ & \hline \end{aligned}$ |
| Power Consumption: | 48 W or less (average) |
| Power Source: | DC24 V, 5 V (from the main unit) |
| Dimensions (W x D $\times$ ) : | $600 \mathrm{~mm} \times 550 \mathrm{~mm} \times 960 \mathrm{~mm}$ ( 23.6 " $\left.\times 21.7^{\prime \prime} \times 37.8^{\prime \prime}\right)$ |
| Weight: | $40 \mathrm{~kg}(88.2 \mathrm{lb})$ |

NOTE: Specifications are subject to change without notice.

## AUTO REVERSE DOCUMENT FEEDER B351

## 1．REPLACEMENT AND ADJUSTMENT

## 1．1 COVERS



1．Front cover $[A](\hat{\xi} \times 2)$
2．Rear cover $\left.[B]()^{2} \times 2\right)$

4．Original tray［D］（巨近 x 1 ，（3） x 1 ）
5．Platen sheet $[E]$（Velcro pads）
6．Original exit tray $[F]\left(\hat{\xi}^{2} \times 2\right)$ ．Slide to the right and then pull out．

| $\lfloor$ CAUTION |
| :--- |
| The hinge of the ARDF is spring－loaded and becomes much lighter with all the <br> covers removed．After removing all the covers，lay a heavy book on the front right <br> corner of the ARDF to prevent it from springing up unexpectedly． |

Feeder
蕒

### 1.2 ORIGINAL FEED UNIT

1. Open the top cover.
2. Original feed unit [A]

Press it toward you on its shaft to release and lift out.


### 1.3 ORIGINAL PICK-UP ROLLER

1. Original feed unit (-1.2)
2. Pick-up roller $[A]$ ( $(3) \times 1)$


### 1.4 ORIGINAL FEED BELT



1. Original feed unit and original pick-up roller (1.2, 1.3)
2. Shaft $[A]$ (级 $\times 1$, spring $\times 1$ )

NOTE: Before removing the shaft, note carefully the positioning of the spring [B]. This must be reset during re-installation.
3. Feed belt cover [C] (Timing belt, gear, shaft, springs x2).

NOTE: Do not lose the springs.
4. Original feed belt [D].

### 1.5 SKEW CORRECTION/INTERVAL/ REGISTRATION/ORIGINAL WIDTH SENSORS



1. Open the top cover.
2. Upper original guide $[\mathrm{A}](\mathrm{E} \times 3)$.
3. Skew correction sensor $[\mathrm{B}]($ (気 x 1 )
4. Interval sensor [C] (ㅌㅔㅔ x 1 )
5. Registration sensor [D] (E気 x 1 )

6. Original width sensors [F]

### 1.6 ORIGINAL LENGTH SENSORS

1. Raise the original table.
2. Lower cover of original tray $[A]\left(\mathcal{S}^{2} \times 4\right)$
3. Original length sensor-1 $[B]\left(⿷_{l l} \mathrm{l} 1\right)$
4. Original length sensor-2 [C] (Elll x 1 )


### 1.7 SEPARATION ROLLER

1. Original feed unit. (-1.2)
2. Separation roller cover $[A]$.
3. Separation roller $[B]$ ( $(3) \times 1)$


### 1.8 INVERTER /ORIGINAL SET SENSORS

1. Rear cover. (1.1)
2. Lower the original stopper $[\mathrm{A}]$ by rotating the pick-up motor.
3. Original feed unit. (-1.2)
4. Feed guide plate $[B](\hat{\xi} \times 5)$

NOTE: Raise the original tray before you re-install the paper feed guide.
5. Separation roller, torque limiter ( ( $35 \times 1$ ) (1.7)

7. Inverter sensor [D] (

8. Original set sensor [E] (E』ll E 1 )

### 1.9 PICK-UP MOTOR/ORIGINAL STOPPER HP SENSOR/PICK-UP HP SENSOR

1. Rear cover (1.1)
 belt)

2. Pick-up HP sensor [C]
3. Original stopper HP sensor [D]


### 1.10 SCANNER MOTOR AND INVERTER MOTOR



1. Rear cover (1.1)

2. Motor bracket $[B]$ (
3. Scanner motor [C] ( $\mathcal{E}^{-1} \times 2$ )

NOTE: To re-install the scanner motor, secure the motor after the motor bracket has been installed.
5. Inverter motor [D] (昰 x2)

### 1.11 FEED MOTOR, SKEW CORRECTION ROLLER CLUTCH



1. Rear cover (1.1)

2. Feed motor $[B]$ (spring $[C] \times 1$ )

NOTE: To re-install the feed motor, secure the motor after the motor bracket has been installed.
4. Clutch stopper [D] (§1)
5. Skew correction roller clutch $[\mathrm{E}]\left(\mathrm{E}_{\boldsymbol{\|}}^{\mathrm{l}} \mathrm{x} 1\right)$

### 1.12 EXIT SENSOR

1. Open the ARDF.
2. Pull platen cover $[A]$ off halfway.
3. Open exit guide plate [B].
4. Exit guide plate cover [C] ( E x2)



### 1.13 STAMP SOLENOID

1. Rear cover, front cover, platen sheet, exit tray (-1.1)
2. Open the original guide $[A]$.
3. Plate $[\mathrm{B}]\left(\begin{array}{l}\text { ( } \\ \mathrm{E}\end{array} \mathrm{x}\right)$

[B]

[C]

### 1.14 CONTROLLER BOARD

1. Rear cover (1.1)
2. Controller board $[A]\left(\hat{\xi} \times 4\right.$, all $\xi^{〔}$ ll $)$


## 2. TROUBLESHOOTING

### 2.1 TIMING CHARTS

### 2.1.1 A4(S)/LT(S) SINGLE-SIDE ORIGINAL MODE



### 1.1.2 A4(S)/LT(S) DOUBLE-SIDED ORIGINAL MODE



### 2.2 JAM DETECTION

| Jam Site | Cause |
| :--- | :--- |
| Original stopper HP <br> sensor (Jam 1) | Original stopper home position could not be detected within 500 ms <br> after the pick-up motor switched on and started rotating counter- <br> clockwise. |
| Pick-up HP sensor <br> (Jam 2) | Pick-up roller home position could not be detected within 500 ms <br> after the pick-up motor switched on and started rotating clockwise. |
| Skew correction <br> sensor jam (Jam 3) | The skew correction sensor does not turn on after the feed motor <br> has fed the original 91.4 mm. |
| Transport jam <br> (Jam 4) | The interval sensor does not turn on after the feed motor has fed the <br> original 70.7 mm. |
| Registration sensor <br> (Jam 5) | The registration sensor does not turn on after the interval sensor <br> turned on and the original has been fed 74.1 mm. |
| Exit jam (Jam 6) | The exit sensor does not turn on after the transport motor has fed <br> the original 124 mm. |
| Exit jam (Jam 7) | The exit sensor does not turn off after the exit sensor turned on and <br> original has been fed 294 mm. |
| Inverter sensor jam <br> (Jam 8) | The inverter sensor does not turn on after the inverter motor has fed <br> the original 50 mm. |
| Interval sensor jam <br> (Jam 9) | The interval sensor does not turn on after the inverter motor has fed <br> the original 388.66 mm. |

## 3. SERVICE TABLES

### 3.1 DIP SWITCHES

| DPS101 |  |  |  | Description |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 |  |
| 0 | 0 | 0 | 0 | Normal operating mode, with/without stamp. |
| 0 | 0 | 0 | 1 | Not used |
| 0 | 0 | 1 | 0 | Not used |
| 0 | 0 | 1 | 1 | Not used |
| 0 | 1 | 0 | 0 | Feed motor rotation (feed mode) 4400 pps (1-2 phase) |
| 0 | 1 | 0 | 1 | Feed motor rotation (pull-out mode) 6100 pps (1-2 phase) |
| 0 | 1 | 1 | 0 | Scanner motor rotation 4320 pps (2 phase) |
| 0 | 1 | 1 | 1 | Inverter motor rotation 6000 pps (1-2 phase) |
| 1 | 0 | 0 | 0 | Free run: one-sided original 100\% |
| 1 | 0 | 0 | 1 | Free run: one-sided original 30\% |
| 1 | 0 | 1 | 0 | Free run: one-sided original 71\% |
| 1 | 0 | 1 | 1 | Free run: one-sided original 200\% |
| 1 | 1 | 0 | 0 | Free run: two-sided original 100\% |
| 1 | 1 | 0 | 1 | Free run: two-sided original 200\% |
| 1 | 1 | 1 | 0 | Free run: one-sided (fax mode) 32.6\% |
| 1 | 1 | 1 | 1 | Free run: one-sided (mixed original size mode) 100\% |

### 3.2 TEST POINTS

| No. | Label | Monitored Signal |
| :---: | :---: | :--- |
| TP100 | (GND) | Ground |
| TP101 | (Vcc) | +5 V |
| TP103 | (TXD) | TXD to the copier |
| TP104 | (RXD) | RXD from the copier |

### 3.3 FUSES

| No. | Function |
| :--- | :--- |
| FU101 | Protects the 24 V line. |

## 4. DETAILED DESCRIPTION

### 4.1 MAIN COMPONENTS



1 Pick-up roller
2 Original tray
3 Original length sensor 1
4 Original length sensor 2
5 Reverse table
6 Inverter roller
7 Junction gate
8 Separation roller
9 Exit roller

10 Exit sensor
11 Idle roller 3
12 Idle roller 2
13 Transport roller
14 Registration sensor
15 Idle roller 1
16 Original width sensor
17 Skew correction roller
18 Feed belt

Pick-up Mechanism. Picks up the originals for scanning.
Feed/Separation Mechanism. Comprised of the feed belt and separation roller, feeds and separates the originals, and corrects skew.

Original Size Detection Sensors. Comprised of 4 width sensors and 2 length sensors, detect the sizes of the originals.

Original Transport Mechanism. Comprised of the transport roller, ADF exposure glass, and exit roller.
Original Reverse/Exit Mechanism. Exit/junction gate.

### 4.2 DRIVE LAYOUT



1 Feed motor
2 Feed belt
3 Pick-up roller
4 Pick-up motor
5 Transport motor

7 Inverter roller
8 Exit roller
9 Separation roller
10 Transport roller
11 Skew correction roller
6 Inverter motor

### 4.3 ORIGINAL SIZE DETECTION

### 4.3.1 BASIC MECHANISM



The original size is detected by the four original width sensors [A] and two original length sensors, $[\mathrm{B}]$ and $[\mathrm{C}]$.

The machine determines the original width when the leading edge of the original activates the registration sensor.
The ARDF detects the original size by combining the readings of four width sensors and two length sensors. This integrated detection mechanism is detailed in the table on the next page.

| Size (Width x Length) | Width Sensor |  |  |  | Length Sensor |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | (1) | (2) | (3) | (4) | B5 | LG |
| A3 L*1 $297 \times 420 \mathrm{~mm}$ ) | ON | ON | ON | ON | ON | ON |
| B4 L ( $257 \times 364 \mathrm{~mm}$ ) | ON | ON | - | - | ON | ON |
| A4 L ( $210 \times 297 \mathrm{~mm}$ ) | ON | - | - | - | ON | - |
| A4 S ${ }^{\text {2 }}$ ( $297 \times 210 \mathrm{~mm}$ ) | ON | ON | ON | ON | - | - |
| B5 L (182 $\times 257 \mathrm{~mm}$ ) | - | - | - | - | ON | - |
| B5 S (257 $\times 182 \mathrm{~mm}$ ) | ON | ON | - | - | - | - |
| A5 L (148 $\times 210 \mathrm{~mm}$ ) | - | - | - | - | - | - |
| A5 S (210 $\times 148 \mathrm{~mm}$ ) | ON | - | - | - | - | - |
| B6 L (128 $\times 182 \mathrm{~mm}$ ) | - | - | - | - | - | - |
| B6 S (182 x 128 mm ) | - | - | - | - | - | - |
| DLT L (11" x 17") | ON | ON | ON | - | ON | ON |
| $11^{\prime \prime} \times 15^{\prime \prime} \mathrm{L}$ | ON | ON | ON | - | ON | ON |
| $10^{\prime \prime} \times 14{ }^{\prime \prime}$ | ON | ON | - | - | ON | ON |
| LG L ( $81 / 2^{\prime \prime} \times 14{ }^{\prime \prime}$ ) | ON | - | - | - | ON | ON |
| F4 L ( $\left.81 / 2^{\prime \prime} \times 13^{\prime \prime}\right)$ | ON | - | - | - | ON | ON |
| FL (8" $\times 13^{\prime \prime}$ ) | ON | - | - | - | ON | ON |
| LT L (8.5" $\times 11^{\prime \prime}$ ) | ON | - | - | - | ON | - |
| LT S (11" $\times 8.5$ " | ON | ON | ON | - | - | - |
| $71 / 4^{\prime \prime} \times 10^{1 / 2} 2^{\prime \prime} \mathrm{L}$ | ON | - | - | - | ON | - |
| $10^{1 / 2} 2^{\prime \prime} \times 71 / 4^{\prime \prime}$ S | ON | ON | ON | - | - | - |
| 8" $\times 10$ " L | ON | - | - | - | ON | - |
| HLT L $51 / 2^{\prime \prime} \times 81 / 2^{\prime \prime}$ | - | - | - | - | - | - |
| HLT S $81 / 2^{\prime \prime} \times 51 / 2^{\prime \prime}$ | ON | - | - | - | - | - |
| $267 \times 390 \mathrm{~mm}$ | ON | ON | ON | - | ON | ON |
| $195 \times 267 \mathrm{~mm}$ | ON | - | - | - | ON | - |
| $267 \times 195 \mathrm{~mm}$ | ON | ON | ON | - | - | - |

${ }^{* 1}$ L: Lengthways
${ }^{* 2}$ S: Sideways
ON: Paper present

### 4.3.2 MIXED ORIGINAL SIZE MODE

This section explains what happens when the user selects mixed original size mode.

Because this ADF is a sheet-tthrough document feeder, the method for original document width detection is the same as when the originals are the same size, but the document length detection method is different. Therefore, the scanning speed is slightly slower.

## Document length detection

From when the registration sensor switches on until the interval sensor switches off, the CPU counts the transport motor pulses. The number of pulses determines the length of the original.

## Feed-in cycle

When the original size for the copy modes listed below cannot be determined, the image cannot be correctly scaled (reduced or enlarged) or processed until the document length has been accurately detected. The length must be determined before the image is scanned.

Auto Reduce/Enlarge
Centering
Erase Center/Border
Booklet
Image Repeat
An original follows this path during transport:

1. Document length detection $\rightarrow$ Scanning glass $\boldsymbol{\rightarrow}$ Inverter table
2. Inverter table $\rightarrow$ Scanning glass $\rightarrow$ Inverter table (restores original order)
3. Inverter table $\rightarrow$ Scanning glass (image scanned) $\rightarrow$ Exit tray

## Normal feed-in

In a copy mode other than those listed above, when the rate of reduction/enlargement has been determined, the originals are scanned normally. In order to store the scanned images, a large area of memory (the detected document width $\times 432 \mathrm{~mm}$ ) is prepared. Next, only the portion of the image up to the detected document length is read from memory and printed.

### 4.4 ORIGINAL FEED-IN MECHANISM

### 4.4.1 PICK AND SEPARATION


[H]

When the original is set on the original table, it contacts the original stopper [A] and pushes the actuator [B] out of the original set sensor [C].
When Start (*) is pressed, the pick-up motor [D] turns on and the original stopper cam [E] rotates. The original stopper lowers and releases the original.
Next, the pick-up roller cam [F] lowers the pick-up roller, and then the feed motor [G] turns on to feed the top sheet of paper. After being fed from the pick-up roller, the top sheet is separated from the stack by the separation roller $[\mathrm{H}]$ and the feed belt [I].

### 4.4.2 ORIGINAL SKEW CORRECTION



This mechanism is the same as the skew correction used by the registration roller in the main machine.

The feed motor and the skew correction clutch control the skew correction roller. Immediately after separation, the skew correction sensor [A] detects the leading edge of the original. The feed belt $[\mathrm{B}]$ moves the paper slightly until it presses against the skew correction roller [C] and buckles slightly to correct any skew.

### 4.4.3 REDUCING THE INTERVAL BETWEEN PAGES




After performing skew correction, the feed motor runs at a speed higher than its original speed in order for the next original to catch up to the one ahead of it. This reduces the gap between the leading edge of the next original with the trailing edge of the one ahead.

When the leading edge of the original activates the interval sensor [A], the feed motor slows to match the speed of paper transport.

### 4.5 ORIGINAL TRANSPORT AND EXIT

### 4.5.1 SINGLE-SIDED ORIGINALS



The transport motor drives the transport roller [A] and the exit roller [B]. When the leading edge of the original activates the interval sensor [C], the transport motor rotates the transport roller. The transport roller then feeds the original through scanning area. After scanning, the original is fed out by the exit roller to the exit tray.

### 4.5.2 DOUBLE-SIDED ORIGINALS

Shortly after the transport motor has been turned on, the inverter solenoid is activated and junction gate [A] opens. The original is then scanned and transported towards the reverse table [B].
[B]

[E]


Then the original is fed to the transport roller and the scanning area $[F]$ (where the reverse side is scanned).


After scanning the reverse side of the original, the original is then sent to the reverse table [G] a second time and turned over. This ensures that the double side original will be properly stacked in the correct order, front side down, in the original exit tray [H].


### 4.6 STAMP



NOTE: This function is only for fax mode.
The stamp [A] is located between the transport roller [B] and the exit roller [C].
When the original reaches the stamp, the transport motor stops and the stamp solenoid turns on if the page is sent successfully (immediate transmission) or stored successfully (memory transmission). After stamping, the ARDF feed motor re-starts to feed out the document.

NOTE: The position of the stamp can be adjusted with the Stamp Position Adjustment SP mode.

## LARGE CAPACITY TRAY A683

\author{

1. OVERALL MACHINE INFORMATION 1.1 SPECIFICATIONS <br> Paper Size: <br> Paper Weight: <br> Tray Capacity: <br> Remaining Paper Detection: <br> Power Source: <br> Power Consumption: <br> Weight: <br> Size (W x D x H) : <br> A4 sideways/LT sideways <br> $60 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 28 \mathrm{lb}$ <br> 1500 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ) <br> 5 steps (100\%, 75\%, 50\%, 25\%, Near end) <br> $24 \mathrm{Vdc}, 5 \mathrm{Vdc}$ (from copier) <br> 40 W <br> 17 kg <br> $390 \mathrm{~mm} \times 500 \mathrm{~mm} \times 390 \mathrm{~mm}$
}

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Relay Roller
2. Relay Sensor
3. Paper Feed Roller
4. Pick-up Roller
5. Paper End Sensor
6. Paper Tray
7. Separation Roller

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Relay Clutch
2. Paper Feed Clutch
3. LCT Motor
4. Paper Height 1 Sensor
5. Paper Height 2 Sensor
6. Paper Height 3 Sensor
7. Main Board
8. Side Fence Position Sensor
9. Lower Limit Sensor
10. LCT Set Sensor
11. Tray Cover Switch
12. Lift Motor
13. Down Switch
14. Relay Sensor
15. Paper End Sensor
16. Lift Sensor
17. Pick-up Solenoid

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | LCT | Drives all rollers. | 3 |
| M2 | Lift | Drives the paper tray up or down. | 12 |
| Sensors |  |  |  |
| S1 | Paper End | Informs the copier when the paper has run out. | 15 |
| S2 | Relay | Detects the copy paper coming to the relay roller and checks for misfeeds. | 14 |
| S3 | Lift | Detects when the paper is at the correct paper feed height. | 16 |
| S4 | Lower Limit | Detects when the tray is completely lowered, to stop the LCT motor. | 9 |
| S5 | Paper Height 1 | Detects the paper height. | 4 |
| S6 | Paper Height 2 | Detects the paper height. | 5 |
| S7 | Paper Height 3 | Detects the paper height. | 6 |
| S8 | LCT Set | Detects whether the LCT is correctly set or not. | 10 |
| S9 | Side Fence Position | Detects when the side fence is set at the A4 size position. | 8 |
| Switches |  |  |  |
| SW1 | Tray Cover | Stops the LCT lift motor when the tray cover is opened. | 11 |
| SW2 | Down | Lowers the LCT bottom plate if pressed by the user. | 13 |
| Solenoids |  |  |  |
| SOL1 | Pick-up | Controls up-down movement of the pick-up roller. | 17 |
| Magnetic Clutches |  |  |  |
| MC1 | Paper Feed | Drives the paper feed roller. | 2 |
| MC2 | Relay | Drives the relay roller. | 1 |
| PCBs |  |  |  |
| PCB1 | Main | Controls the LCT and communicates with the copier. | 7 |

### 1.5 DRIVE LAYOUT



1. Relay Clutch
2. Tray Drive Belts
3. Paper Feed Clutch
4. Lift Motor
5. LCT Motor
6. Separation Roller
7. Tray Bottom Plate
8. Pick-up Roller
9. Paper Feed Roller
10. Relay Roller

## 2. DETAILED DESCRIPTIONS

### 2.1 PAPER FEED MECHANISM



This machine uses the FRR (Feed and Reverse Roller) paper feed system (paper feed roller [A], separation roller [B], pick-up roller [C]).

When the start key is pressed, the pick-up solenoid [D] energizes and the pick-up roller touches the paper.

### 2.2 TRAY LIFT AND PAPER HEIGHT DETECTION MECHANISM



The lift motor [A] controls the vertical position of the tray bottom plate [B] through gears and timing belts [C].

## Tray lifting conditions

When the tray lift sensor [D] turns off in the following conditions, the tray lift motor raises the tray bottom plate until the tray lift sensor [D] turns on again.

- Just after the main switch is turned on
- During copying
- Just after the tray cover is closed
- Just after leaving the energy saving mode


## Tray lowering conditions

In the following conditions, the lift motor lowers the tray bottom plate until the lower limit [E] sensor turns on.

- Just after the paper end sensor turns on
- Just after the down switch is pressed by the user

The amount of the paper in the tray is detected by combination of high/low outputs from three sensors (paper height sensor 1 [F], 2 [G], and 3 [H].)

| Amount of paper | Paper Height <br> Sensor 1 | Paper Height <br> Sensor 2 | Paper Height <br> Sensor 3 |
| :---: | :---: | :---: | :---: |
| Near end | On (High) | Off (Low) | Off (Low) |
| $25 \%$ | Off (Low) | On (High) | Off (Low) |
| $50 \%$ | Off (Low) | On (High) | On (High) |
| $75 \%$ | Off (Low) | Off (Low) | On (High) |
| $100 \%$ | Off (Low) | Off (Low) | Off (Low) |

### 2.3 TRAY UNIT SLIDE MECHANISM



When there is a paper jam between the copier and the LCT, the user releases the lock lever [A] and can slide the LCT away from the copier to remove the jammed paper.
When sliding the LCT back into position, the LCT is secured against the copier in the correct position by the docking pins $[B]$ on the LCT.

## 3. SERVICE TABLES

### 3.1 DIP SWITCHES

|  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| DPS101 |  | Description |  |  |  |  |  |  |
|  | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ | $\mathbf{7}$ | $\mathbf{8}$ |  |

NOTE: 1) Do not use any other settings.
2) To do the free run, proceed as follows:

1. Remove the paper from the LCT (this is because the machine has no jam detection).
2. Set DPS101 for the free run as shown above.
3. Turn the main switch off, wait a few seconds, then switch back on.
4. Press SW101 to start the free run.
5. To stop the free run, press SW102.

### 3.2 TEST POINTS

| No. | Label | Monitored Signal |
| :---: | :---: | :--- |
| TP100 | $(24 \mathrm{~V})$ | +24 V |
| TP101 | (GND) | Ground |
| TP103 | (TXD) | TXD to the copier |
| TP104 | (RXD) | RXD from the copier |
| TP105 | (5 V) | +5 V |
| TP106 | (GND) | Ground |

### 3.3 SWITCHES

| No. |  | Function |
| :---: | :--- | :--- |
| SW101 | Starts the free run |  |
| SW102 | Stops the free run |  |

### 3.4 FUSES

| No. | Function |
| :---: | :--- |
| FU101 | Protects the 24 V line. |

## 4. REPLACEMENT AND ADJUSTMENT

### 4.1 COVER REPLACEMENT



## Tray Cover

1. Remove the tray cover $[A]$ (1 snap ring).

## Front Cover

1. Remove the front cover $[B]$ (2 screws).

## Rear Cover

1. Remove the tray cover.
2. Remove the cover hinge [C] (2 screws).
3. Remove the rear cover [D] (3 screws).

## Right Lower Cover

1. Remove the right lower cover [E] (2 screws).

## Upper Cover

1. Remove the front cover.
2. Remove the rear cover.
3. Remove the upper cover [F].

### 4.2 ROLLER REPLACEMENT

### 4.2.1 PAPER FEED, SEPARATION, AND PICK-UP ROLLERS


[D]

1. Push the down switch to lower the tray bottom plate until it reaches its lowest position.
2. Open the tray cover.

## Pick-up Roller

3. Replace the pick-up roller [A] (1 snap ring).

## Paper Feed Roller

3. Replace the paper feed roller [B] (1 snap ring).

## Separation Roller

3. Remove the guide plate [C] (2 screws).
4. Replace the separation roller [D] (1 snap ring).

### 4.3 TRAY LIFT AND PAPER END SENSOR REPLACEMENT



1. Remove the front and rear cover.
2. Remove the upper cover.
3. Remove the sensor bracket $[A]$ ( 1 screw).

## Tray Lift Sensor

3. Replace the tray lift sensor [B] (1 connector).

## Paper End Sensor

3. Replace the paper end sensor [C] (1 connector).

### 4.4 RELAY SENSOR REPLACEMENT



1. Pull out the LCT.
2. Remove the joint guide $[A]$ (4 screws).
3. Remove the sensor bracket $[B]$ (1 screw).
4. Replace the relay sensor [C] (1 connector).

### 4.5 SIDE FENCE POSITION CHANGE



1. Push the down switch to lower the tray bottom plate until it reaches its lowest position.
2. Remove the tray cover.
3. Remove the front and rear side fences $[A, B]$ ( 1 screw each).
4. Install the side fences in the correct position.

## PAPER TRAY UNIT A682

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

Paper Size:

Paper Weight:
Tray Capacity:
Paper Feed System:
Paper Height Detection:
Power Source:

Power Consumption:
Weight:
Size (W x D x H) :

A5 lengthwise to A3 HLT lengthwise to DLT
$60 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 28 \mathrm{lb}$
500 sheets $\left(80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}\right) \times 2$
FRR (Feed and Reverse Roller)
4 steps ( $100 \%, 70 \%, 30 \%$, Near end)
$24 \mathrm{Vdc}, 5 \mathrm{Vdc}$ (from the copier)
120 Vac: 115 V version (from the copier)
220 ~ 240 Vac: 224/240 V version (from the copier)
50 W
25 kg
$540 \mathrm{~mm} \times 600 \mathrm{~mm} \times 270 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Upper Pick-up Roller
2. Upper Paper Feed Roller
3. Upper Relay Roller
4. Upper Separation Roller
5. Lower Relay Roller
6. Lower Paper Feed Roller
7. Lower Separation Roller
8. Lower Pick-up Roller
9. Lower Tray
10. Upper Tray

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Main Board
2. Upper Tray Switch
3. Lower Tray Switch
4. Tray Motor
5. Upper Lift Sensor
6. Relay Clutch
7. Upper Paper Feed Clutch
8. Tray Lift Motor
9. Lower Paper Feed Clutch
10. Vertical Guide Switch
11. Lower Lift Sensor
12. Lower Paper End Sensor
13. Lower Relay Sensor
14. Upper Relay Sensor
15. Upper Paper End Sensor
16. Lower Paper Height 2 Sensor
17. Lower Paper Height 1 Sensor
18. Upper Paper Height 2 Sensor
19. Upper Paper Height 1 Sensor

## ELECTRICAL COMPONENT DESCRIPTION

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Tray | Drives all rollers. | 4 |
| M2 | Tray Lift | Lifts the upper and lower tray bottom plates (there are two motors in this unit, one for each tray. | 15 |
| Sensors |  |  |  |
| S1 | Upper Lift | Detects when the paper in the upper tray is at the correct feed height. | 5 |
| S2 | Lower Lift | Detects when the paper in the lower tray is at the correct feed height. | 11 |
| S3 | Upper Paper End | Informs the copier when the upper tray runs out of paper. | 15 |
| S4 | Lower Paper End | Informs the copier when the lower tray runs out of paper. | 12 |
| S5 | Upper Relay | Detects misfeeds. | 14 |
| S6 | Lower Relay | Detects misfeeds. | 13 |
| S7 | Upper Paper Height 1 | Detects the amount of paper in the upper tray. | 17 |
| S8 | Upper Paper Height 2 | Detects the amount of paper in the upper tray. | 16 |
| S9 | Lower Paper Height 1 | Detects the amount of paper in the lower tray. | 19 |
| S10 | Lower Paper Height 2 | Detects the amount of paper in the lower tray. | 18 |
| Switches |  |  |  |
| SW1 | Upper Tray | Informs the copier when the upper tray is set in the machine. | 2 |
| SW2 | Lower Tray | Informs the copier when the lower tray is set in the machine. | 3 |
| SW3 | Vertical Guide | Detects whether the vertical guide is opened or not. | 10 |
| Magnetic Clutches |  |  |  |
| MC1 | Upper Paper Feed | Starts paper feed from the upper tray. | 7 |
| MC2 | Lower Paper Feed | Starts paper feed from the lower tray. | 9 |
| MC3 | Relay | Drives the transport rollers. | 6 |
| PCBs |  |  |  |
| PCB1 | Main | Controls the paper tray unit and communicates with copier. | 1 |
|  |  |  |  |

### 1.5 DRIVE LAYOUT



1. Tray Motor
2. Relay Clutch
3. Upper Paper Feed Clutch
4. Lower Paper Feed Clutch
5. Lower Relay Roller
6. Lower Separation Roller
7. Lower Paper Feed Roller
8. Lower Pick-up Roller
9. Upper Separation Roller
10. Upper Relay Roller
11. Upper Paper Feed Roller
12. Upper Pick-up Roller

## 2. DETAILED DESCRIPTIONS <br> 2.1 PICK-UP AND SEPARATION ROLLER RELEASE MECHANISM



When the paper tray [A] is not inside the paper tray unit, the separation roller [B] is away from the paper feed roller [C], and the pick-up roller [D] stays in the upper position.
When the paper tray is put into the paper tray unit, it pushes the release lever [E]. This causes the pick-up roller to move down (top diagram) and the separation roller to move into contact with the paper feed roller (bottom diagram).

### 2.2 PAPER LIFT MECHANISM



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


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

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

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

### 2.3 PAPER END DETECTION



If there is some paper in the paper tray, the paper end feeler [A] is raised by the paper stack and the paper end sensor $[\mathrm{B}]$ is deactivated.
When the paper tray runs out of paper, the paper end feeler drops into the cutout [C] in the tray bottom plate and the paper end sensor is activated.
When the paper tray is drawn out, the paper end feeler is lifted up by the pick-up roller supporter [D].

### 2.4 PAPER HEIGHT DETECTION

The amount of paper in the tray is detected by the combination of two paper height sensors, $[A]$ and $[B]$.
When the amount of 2 paper decreases, the bottom plate pressure lever [C] moves up and the actuator [D] which is mounted on the same drive shaft as the pressure lever rotates.

The following combination of sensor signals is sent to the copier.

| Amount of <br> Paper | Paper Height <br> Sensor $\mathbf{1}$ | Paper Height <br> Sensor 2 |
| :---: | :---: | :---: |
| Full | OFF | ON |
| Near Full | ON | ON |
| Near End 1 | ON | OFF |
| Near End 2 | OFF | OFF |



Near End 1


Near End 2


## 3. SERVICE TABLES

### 3.1 DIP SWITCHES

|  |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
| $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ | $\mathbf{7}$ | $\mathbf{8}$ | Description |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Default |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Free run, feed from upper tray |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | Free run, feed from lower tray |  |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | Free run, feed from upper and lower trays alternately |  |

NOTE: 1) Do not use any other settings.
2) To do the free run, proceed as follows:

1. Remove the paper from the tray (this is because the machine has no jam detection).
2. Set DPS101 for the required free run as shown above.
3. Turn the main power switch off, wait a few seconds, then switch on.
4. Press SW101 to start the free run.
5. To stop the free run, press SW102.

### 3.2 TEST POINTS

| No. | Label | Monitored Signal |
| :---: | :---: | :--- |
| TP100 | $(24 \mathrm{~V})$ | +24 V |
| TP101 | (GND) | Ground |
| TP103 | (TXD) | TXD to the copier |
| TP104 | (RXD) | RXD from the copier |
| TP105 | $(5 \mathrm{~V})$ | +5 V |
| TP106 | $($ GND $)$ | Ground |

### 3.3 SWITCHES

| No. |  | Function |
| :---: | :--- | :--- |
| SW101 | Starts the free run |  |
| SW102 | Stops the free run |  |

### 3.4 FUSES

| No. | Function |
| :---: | :---: |
| FU101 | Protects the 24 V line. |

## 4. REPLACEMENT AND ADJUSTMENT

### 4.1 COVER REPLACEMENT



## Right Cover

1. Remove the right cover [A] (2 screws).

## Rear Cover

1. Remove the rear cover [B] (2 screws).

### 4.2 ROLLER REPLACEMENT

### 4.2.1 PAPER FEED, SEPARATION, AND PICK-UP ROLLERS



1. Remove the paper tray.

## Pick-up Roller

2. Replace the pick-up roller [A].

## Paper Feed Roller

2. Replace the paper feed roller [B] (1 snap ring).

## Separation Roller

2. Replace the separation roller [C] (1 snap ring).

### 4.3 TRAY MOTOR REPLACEMENT



1. Remove the rear cover.
2. Remove the tray motor [A] (1 connector, 3 screws).

### 4.4 PAPER FEED AND RELAY CLUTCH REPLACEMENT



1. Remove the rear cover.
2. Remove the upper paper feed clutch holder [A] (2 screws).
3. Remove the lower paper feed clutch holder [B] (2 screws).
4. Remove the gear holder [C] (3 screws, 1 spring, 1 bearing).
5. Replace the relay clutch [D] (1 connector).
6. Replace the upper feed clutch [E] (1 bushing, 1 connector).
7. Replace the lower feed clutch [F] (1 connector).

### 4.5 PAPER FEED UNIT REPLACEMENT



1. Remove the rear cover.
2. Remove the upper and lower paper feed clutch holder.
3. Remove the gear holder.
4. Remove the upper feed clutch $[A]$ or lower feed clutch $[B]$.
5. Remove the upper or lower gear [C, D].


## Upper Paper Feed Unit

6. Remove the docking bracket $[A]$ ( 1 screw).
7. Remove the vertical transport cover $[B]$ of the copier (1 snap ring).
8. Remove the upper paper feed unit [C] (2 screws, 1 connector).

## Lower Paper Feed Unit

6. Remove the docking bracket [D] (1 screw).
7. Remove the vertical transport guide [E] (2 screws).
8. Remove the lower paper feed unit [F] (2 screws, 1 connector).

### 4.6 PAPER END, TRAY LIFT, AND RELAY SENSOR REPLACEMENT <br> [C]



1. Remove the paper feed unit.

## Paper End Sensor

2. Replace the paper end sensor [A] (1 connector).

## Tray Lift Sensor

2. Replace the tray lift sensor $[B]$ (1 connector).

## Relay Sensor

2. Remove the sensor bracket [C] (1 screw).
3. Replace the relay sensor [D] (1 connector).

## BRIDGE UNIT A688/B397

1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

Paper Size:

Paper Weight:

Standard sizes A6 lengthwise to A3
HLT to DLT
Non-standard sizes
Width: 100 to 305 mm
Length: 148 to 432 mm
$52 \mathrm{~g} / \mathrm{m}^{2} \sim 135 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 42 \mathrm{lb}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Upper Exit Roller
2. Junction Gate Solenoid
3. Junction Gate
4. 1st Transport Roller
5. Relay Sensor
6. 2nd Transport Roller
7. Left Exit Roller

### 1.3 ELECTRICAL COMPONENT LAYOUT



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1. Left Guide Switch
2. Right Guide Switch
3. Tray Exit Sensor
4. Cooling Fan Motor

### 1.4 ELECTRICAL COMPONENT DESCRIPTION



### 1.5 DRIVE LAYOUT



1. Left Exit Roller
2. 2nd Transport Roller
3. Upper Exit Roller
4. 1st Transport Roller

## 2. DETAILED DESCRIPTION

### 2.1 JUNCTION GATE MECHANISM



Depending on the selected mode, the copies are directed up or down by the junction gate $[A]$, which is controlled by the junction gate solenoid $[B]$.
When the upper tray is selected, the junction gate solenoid turns on and the paper is sent to the upper tray through the upper exit roller [C].
When the left tray or the finisher is selected, the junction gate stays off and the paper is sent to the left tray or the finisher through the transport rollers [D] and the left exit roller.

## 3. REPLACEMENT AND ADJUSTMENT <br> 3.1 EXIT SENSOR REPLACEMENT



[D]

1. Remove the whole unit from the copier.
2. Remove the rear upper cover $[A]$ ( 1 screw).
3. Remove the upper cover unit [B] (2 screws, 2 connectors).
4. Remove the exit guide plate [C] (2 screws).
5. Replace the exit sensor [D] (1 connector).

1-BIN TRAY B376

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

Paper Size:
Paper Weight:
Tray Capacity:
Power Source:
Power Consumption:
Weight:
Size ( $W \times D \times H$ ):

A5 lengthwise to A3 HLT to DLT
$60 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 28 \mathrm{lb}$
125 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )
$5 \mathrm{Vdc}, 24 \mathrm{Vdc}$ (from copier)
15 W
4 kg
$470 \mathrm{~mm} \times 550 \mathrm{~mm} \times 110 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT AND DRIVE LAYOUT




1. Paper Limit Sensor
2. Exit Roller
3. Entrance Sensor
4. Entrance Roller
5. Paper Sensor
6. Paper Tray
7. Tray Motor

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Motor Lock Sensor
2. Paper Limit Sensor
3. Main Board
4. Paper Sensor
5. Tray Motor
6. Right Cover Switch
7. Entrance Sensor

### 1.4 ELECTRICAL COMPONENT DESCRIPTION



## 2. DETAILED DESCRIPTIONS

### 2.1 BASIC OPERATION



When the leading edge of the first sheet of copy paper reaches the copier's hot roller, the tray motor [A] starts and turns off approximately 0.5 s after the trailing edge of the paper passes through the exit rollers [B].

The tray lock sensor [C] checks whether the tray motor rotates or not. When the tray lock sensor does not generate pulses for 300 ms while the tray motor is on, the copier will stop and display an SC code.

The paper sensor [D] checks whether there is paper in the tray or not. The paper sensor turns on when paper is stacked in the tray, and the paper indicator is turned on.

The paper limit sensor [E] detects when the tray is full. While a sheet of copy paper is passing this sensor, the sensor feeler is always pushed up by the paper. When the paper limit sensor stays on for more than the expected time (based on the copy speed and paper size), the copier indicates that the tray is full.

## 3. REPLACEMENT AND ADJUSTMENT <br> 3.1 COVER REMOVAL



## Front Cover

1. Remove the scanner unit if it is at the front.
2. Remove the front cover [A] (1 screw).

## Upper Cover

1. Remove the scanner unit.
2. Remove the upper cover [B] (2 screws).

## Rear Cover

1. Remove the scanner unit.
2. Remove the rear cover [C] (2 screws).

### 3.2 PAPER SENSOR REPLACEMENT



1. Remove the front cover.
2. Remove the exit guide plate $[A]$ ( 1 screw ).
3. Replace the paper sensor $[B]$ (1 connector).

### 3.3 ENTRANCE AND PAPER LIMIT SENSOR REPLACEMENT



1. Remove the front and upper covers.

## Paper Limit Sensor

2. Replace the paper limit sensor $[A]$ (1 connector).

## Entrance Sensor

2. Remove the sensor bracket [B] (1 screw, 1 spring).
3. Replace the entrance sensor [C] (1 connector).

## 1,000-SHEET FINISHER A681

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

Paper Size:

Paper Weight:

Stapler Capacity:
20 sheets (A3, B4, DLT, LG)
30 sheets (A4, B5 sideways, LT)
Paper Capacity:
No staple mode:
A3 to A6 lengthwise
DLT to HLT lengthwise
Staple mode:
A3, B4, A4, B5 sideways
DLT to LT
No staple mode: $52 \sim 157 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 42 \mathrm{lb}$
Staple mode: $\quad 64 \sim 80 \mathrm{~g} / \mathrm{m}^{2}, 17 \sim 21 \mathrm{lb}$

No staple mode:
1,000 sheets (A4/LT or smaller: $80 \mathrm{~g} / \mathrm{m}^{2}, 21 \mathrm{lb}$ ) 500 sheets (A3, B4, DLT, LG: $\left.80 \mathrm{~g} / \mathrm{m}^{2}, 21 \mathrm{lb}\right)$
Staple mode: ( $80 \mathrm{~g} / \mathrm{m}^{2}, 21 \mathrm{lb}$, number of sets)

| Size Size of each set | 2 to 10 |  | 11 to 20 | 21 to 30 |
| :---: | :---: | :---: | :---: | :---: |
|  | 2 to 5 | 6 to 10 |  |  |
| A4/LT sideways B5 sideways | 100 | 85 | 40 | 25 |
| A4/LT lengthwise | 50 |  | 25 | 15 |
| A3, B4, DLT, LG | 50 |  | 25 | - |

Staple Positions:
1
Staple Replenishment:
Power Source:
Power Consumption:
Weight:
Dimensions (W x D x H):

Cartridge (3,000 staples/cartridge)
$24 \mathrm{Vdc}, 5 \mathrm{Vdc}$ (from the copier)
48 W
21 kg
$568 \times 520 \times 625 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Shift Tray
2. Exit Roller
3. Exit Roller Release Cam
4. Upper Transport Roller
5. Middle Transport Roller
6. Junction Gate
7. Lower Transport Roller
8. Entrance Roller
9. Stapler Unit
10. Positioning Roller
11. Stack Feed-out Belt

### 1.3 ELECTRICAL COMPONENT LAYOUT

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1. Stack Height Sensor
2. Exit Sensor
3. Shift Tray Upper Limit Switch
4. Exit Motor
5. Exit Guide Plate Open Sensor
6. Exit Guide Plate HP Sensor
7. Exit Guide Plate Motor
8. Shift Tray Half-turn Sensor
9. Shift Motor
10. Junction Gate Solenoid
11. Transport Motor
12. Positioning Roller Solenoid Staple Hammer Motor
13. Shift Tray Lower Limit Sensor
14. Entrance Sensor
25 20. Cartridge Set Switch

### 1.4 ELECTRICAL COMPONENT DESCRIPTIONS

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Transport | Drives the entrance roller, transport rollers, and positioning roller. | 11 |
| M2 | Jogger Fence | Drives the jogger fence. | 24 |
| M3 | Rear Fence | Drives the rear fence. | 26 |
| M4 | Staple Hammer | Drives the staple hammer. | 19 |
| M5 | Stack Feed-out | Drives the stack feed-out belt. | 28 |
| M6 | Exit Guide Plate | Opens and closes the exit guide plate. | 7 |
| M7 | Exit | Drives the exit roller. | 4 |
| M8 | Shift Tray Lift | Moves the shift tray up or down. | 17 |
| M9 | Shift | Moves the shift tray from side to side. | 9 |
|  |  |  |  |
| Sensors |  |  |  |
| S1 | Entrance | Detects copy paper entering the finisher and checks for misfeeds. | 14 |
| S2 | $\begin{aligned} & \text { Jogger Unit } \\ & \text { Paper } \\ & \hline \end{aligned}$ | Detects copy paper in the jogger unit. | 25 |
| S3 | Jogger Fence HP | Detects the home position of the jogger fence. | 22 |
| S4 | Rear Fence HP | Detects the home position of the rear fence. | 27 |
| S5 | Stack Feed-out Belt HP | Detects the home position of the stack feedout belt. | 23 |
| S6 | Staple Hammer HP | Detects the staple hammer home position. | 18 |
| S7 | Exit Guide Plate HP | Detects the home position of the exit guide plate. | 6 |
| S8 | Exit Guide Plate Open | Detects whether the exit guide plate is opened or not. | 5 |
| S9 | Exit | Checks for misfeeds. | 2 |
| S10 | Stack Height | Detects the top of the copy paper stack. | 1 |
| S11 | Shift Tray Lower Limit | Detects the lower limit position of the shift tray. | 13 |
| S12 | Shift Tray <br> Half-turn | Detects the stop position of the shift tray during the side-to-side movement. | 8 |
|  |  |  |  |
| Solenoids |  |  |  |
| SOL1 | Junction Gate | Drives the junction gate. | 10 |
| SOL2 | Positioning Roller | Moves the positioning roller. | 12 |
|  |  |  |  |

## ELECTRICAL COMPONENT DESCRIPTIONS

| Symbol | Name | Function | Index No. |  |
| :---: | :--- | :--- | :---: | :---: |
| Switches | Shift Tray |  |  |  |
| SW1 | Shit <br> Upper Limit | Detects the upper limit position of the shift <br> tray. | 3 |  |
| SW2 | Right Cover <br> Safety | Cuts the dc power when the right cover is <br> opened. | 16 |  |
| SW3 | Cartridge Set | Detects whether a staple cartridge is installed. | 20 |  |
| SW4 | Staple End | Detects staples in the cartridge. | 21 |  |
| PCBs |  |  |  |  |
| PCB1 | Main | Controls the finisher and communicates with <br> the copier. | 15 |  |
|  |  |  |  |  |

### 1.5 DRIVE LAYOUT



1. Exit Guide Plate Motor
2. Exit Motor
3. Exit Roller
4. Shift Tray Lift Motor
5. Shift Motor
6. Lower Transport Roller
7. Positioning Roller Drive Roller
8. Transport Motor
9. Entrance Roller
10. Middle Transport Roller
11. Upper Transport Roller
12. Rear Fence
13. Stack Feed-out Motor
14. Rear Fence Motor
15. Jogger Fence Motor
16. Jogger Fence
17. Stack Feed-out Belt

## 2. DETAILED DESCRIPTIONS

### 2.1 JUNCTION GATE MECHANISM

- Staple mode -

- No staple mode -


Depending on the selected finishing mode, the copies are directed to the left or right by the junction gate [A], which is controlled by the junction gate solenoid [B]. This happens when the exit sensor of the copier turns on.

## Staple mode

When the exit sensor of the copier turns on, the junction gate solenoid is energized. The paper is sent to the jogger unit.

## No staple mode

The junction gate solenoid stays off and the paper is sent to the shift tray directly.

### 2.2 JOGGER UNIT PAPER POSITIONING MECHANISM



In staple mode, each sheet of copy paper is vertically and horizontally aligned when it arrives in the jogger unit.
For the vertical paper alignment, the positioning roller solenoid $[A]$ turns on shortly after the entrance sensor [B] turns off and the positioning roller [C] pushes the copy against the bottom of stack stopper [D].

For the horizontal paper alignment, the jogger fence [E] and the rear fence [F] move to the waiting position, which is 10 mm away from the side of the paper. After the vertical position is aligned, the jogger fence pushes the paper 20 mm against the rear fence to align the paper horizontally. Then the jogger fence moves back to the previous position.

The stapler is mounted on the rear fence.

### 2.3 EXIT GUIDE PLATE OPEN/CLOSE MECHANISM



When stacking a large size of paper (such as A3, DLT) in the jogger unit, the leading edge of the paper reaches the exit rollers. To prevent the paper from running into the exit rollers and not being aligned correctly, the exit guide plate [A] is moved up and this makes a gap between the exit rollers [B]. This operation is done at all paper sizes, but is only needed for the larger sizes.

The exit guide plate motor [C] and exit roller release cam [D] control the exit guide plate movement. When the exit guide plate motor starts, the cam turns and the exit guide plate is moved up. When the exit guide plate open sensor [E] turns on, the motor stops. When stapling is finished, the exit guide plate motor turns on again to close the exit guide plate. When the exit guide plate HP sensor [F] turns on, the motor stops.

### 2.4 STAPLER



The stapler is mounted on the rear fence. When the rear fence moves, the stapler moves.
The staple hammer is driven by the stapler hammer motor [A].
When excessive load is applied to the staple hammer motor, the copier detects a staple jam. When a staple jam has occurred, the jammed staple is inside the staple cartridge [B]. Therefore, the jammed staple can be removed easily after pulling out the staple cartridge.
If there is no staple cartridge in the stapler unit or no staples in the staple cartridge, staple end is indicated on the operation panel.
This machine has only one stapling position.

### 2.5 FEED OUT MECHANISM



The stack feed-out belt [A] and the exit roller feed out the set of stapled copies.
After the copies have been stapled, the stack feed-out motor $[B]$ turns on to drive the stack feed-out belt.

When the leading edge of the copies reaches the exit rollers, the exit guide plate motor turns on and the exit roller comes down to transport the set of stapled copies. Shortly afterwards, the stack feed-out motor stops, and the exit motor feeds out the stack.
When the stack has been fed out to the shift tray, the stack feed-out motor turns on again. When the stack feed-out belt HP sensor [C] turns on, the stack feed-out motor turns off.

### 2.6 SHIFT TRAY UP/DOWN MECHANISM



The shift tray lift motor [A] controls the vertical position of the shift tray [B] through some gears. Just after the main switch is turned on, the tray is initialized at the upper position. The tray upper position is detected when the stack height sensor [C] is activated by the shift tray.

During copying, every ten copies in no staple mode or for each set of copies in staple mode, the shift tray is lowered until the stack height sensor turns off then raised until the stack height sensor turns on, and lowered again until the stack height sensor turns off.
In either mode, the shift tray will rise when the user takes the stack of paper from the tray during copying.
When the shift tray reaches its lower limit, the actuator [D] turns on the shift tray lower limit sensor [E], and copying stops.
When the stack height sensor stays off for 2 seconds in standby mode, the shift tray is raised till the stack height sensor turns on.
The shift tray upper limit switch [F] prevents the drive gears from being damaged if the stack height sensor fails. When the shift tray turns on the shift tray upper limit switch, the switch cuts the power to the shift tray lift motor.

### 2.7 SHIFT TRAY SIDE-TO-SIDE MECHANISM



In the sort/stack mode, the shift tray [A] moves from side to side to separate the sets of copies.

The horizontal position of the shift tray is controlled by the shift motor [B] and the shift gear disk [C]. After one set of copies is made and delivered to the shift tray, the shift motor turns on, driving the shift gear disk and the link [D]. The end fence [E] is positioned by the link, creating the side-to-side movement.
When the shift gear disk has rotated 180 degrees (when the shift tray is fully shifted across), the cut-out in the shift gear disk turns on the shift tray half-turn sensor [F] and the shift motor stops. The next set of copies is then delivered. The motor turns on, repeating the same process and moving the tray back to the previous position.

### 2.8 JAM CONDITIONS

1. When the entrance sensor does not turn off within $1,000 \mathrm{~ms}$ after it turns on.
2. When the exit sensor does not turn off within $1,000 \mathrm{~ms}$ after it turns on.
3. When the exit sensor does not turn on in no staple mode within $1,250 \mathrm{~ms}$ after the entrance sensor turns on.

### 2.9 TIMING CHARTS

### 2.9.1 NO STAPLE MODE (A4 SIDEWAYS, 3 SHEETS/2SETS)



TIMING CHARTS

### 2.9.2 STAPLE MODE (A4 SIDEWAYS, 2 SHEETS/2 SETS)



## 3. SERVICE TABLE

### 3.1 DIP SWITCH TABLE

| DPS101 |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $\mathbf{1}$ | Description |  |  |  |
| 0 | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |  |
| 1 | 0 | 0 | 0 | Default |
| 1 | 1 | 1 | 0 | Free run: staple mode |

### 3.2 TEST POINTS

| No. | Label | Monitored Signal |  |
| :---: | :---: | :--- | :--- |
| TP100 | $(5 \mathrm{~V})$ | +5 V |  |
| TP101 | $($ GND $)$ | Ground |  |

### 3.3 FUSES

| No. | Function |
| :---: | :--- |
| FU100 | Protects the 24 V line. |

## 4. REPLACEMENT AND ADJUSTMENT <br> 4.1 COVER REMOVAL



## Front Door

1. Remove the front door [A] (2 screws).

## Front Cover

1. Remove the front door.
2. Remove the front cover $[B]$ (2 screws).

## Rear Cover

1. Remove the rear cover [C] (2 screws).

## Upper Cover

1. Remove the front door.
2. Remove the front cover.
3. Remove the rear cover.
4. Remove the upper cover [D] (2 screws).


## Lower Left Cover

1. Remove the lower left cover [A] (2 screws).

## Front Shift Tray Cover

1. Remove the front shift tray cover [B] (1 screw).

## Rear Shift Tray Cover

1. Remove the rear shift tray cover [C] (1 screw).

## Shift Tray

1. Remove the shift tray [D] (1 snap ring).

### 4.2 ENTRANCE SENSOR REPLACEMENT



1. Remove the finisher from the copier.
2. Replace the entrance sensor $[A]$ (1 connector).

### 4.3 EXIT SENSOR REPLACEMENT



1. Remove the upper cover.
2. Remove the exit sensor bracket $[A]$ ( 1 screw).
3. Replace the exit sensor $[B]$ ( 1 screw, 1 connector).

### 4.4 STACK HEIGHT SENSOR REPLACEMENT




1. Remove the front cover.
2. Remove the shift tray lift motor $[A]$ (2 screws).

NOTE: The shift tray must be pulled up to remove the two screws.
3. Remove the rear cover.
4. Remove the exit motor unit $[B]$ ( 2 screws, 1 spring, 1 timing belt).
5. Remove the lower exit guide [C] (4 screws).
6. Remove the front and rear end fence holders [D,E] (1 screw each).
7. Remove the end fence [F] (1 snap ring).
8. Remove the stack height sensor cover [G] (1 screw).
9. Remove the stack height sensor bracket $[\mathrm{H}]$ ( 1 screw ).
10. Replace the stack height sensor [I] (1 connector).

### 4.5 POSITIONING ROLLER REPLACEMENT



1. Pull out the jogger unit.
2. Remove the snap ring [A].
3. Release the rubber belt [B].
4. Remove the positioning roller [C].

### 4.6 STAPLER REPLACEMENT



1. Pull out the jogger unit.
2. Disconnect the stapler connector [A].
3. Remove the lower cover screw $[B]$.
4. Remove the upper cover [C] (2 screws).
5. Remove the stapler with the lower cover [D] (2 screws).
6. Release the harness from the lower cover.
7. Replace the stapler.

## $\Rightarrow 4.7$ ROM HISTORY

| A681 Firmware Modification History (1000 Sheet Finisher) |  |  |  |
| :--- | :---: | :---: | :---: |
| Description of Modification | Level | Prod. Date | Ver. |
| Corrects the following: <br> - Paper jams due to an error in the vertical <br> movement of the tray. | A6815103K | NA | K |
| Corrects the following: <br> - Jams that occur when the door is opened <br> during a staple job. <br> After the power is turned on, the copier <br> reaches ready status even though the shift <br> tray lower limit sensor is on (and the stack is <br> full). A jam occurs if a copy job is started. | A6815103J | NA | J |
| Corrects the following: <br> - The mainframe locks up during jam recovery. <br> The frequency of occurrence is extremely low. | A6815103H | NA | H |
| -The user cancels the staple job when there is <br> only one sheet in the staple tray and the sheet <br> is automatically removed from the tray. A <br> paper jam occurs when the next sheet is fed <br> for stapling. |  |  |  |
| Corrects the following: <br> - The jam detection timing has been changed so <br> the A681 can also be used with the A265 and <br> A267. This change has no effect on the A232 <br> series. | A6815103G | NA | G |
| Corrects the following: <br> - Stapled paper did not stack straight. | A6815103F | NA | F |
| Corrects the following: <br> - Paper rolling on the shift tray. | A6815103E | NA | E |

## TWO-TRAY FINISHER B352

## 1. REPLACEMENT AND ADJUSTMENT

### 1.1 COVERS

### 1.1.1 EXTERNAL COVERS

1. Top cover $[A]\left(\hat{S}^{2} x 4\right)$

If the shift tray below is blocking the screw hole, remove the shift tray.
2. Bracket $[\mathrm{B}](\mathrm{E} \times 1)$
3. Front door [C]
4. Rear cover [D] (気 x4)


### 1.1.2 INNER COVER

1. Front cover (1.1.1)
2. Inner cover $[A](\hat{\beta} \times 3$, tabs $[B] \times 3)$


### 1.2 POSITIONING ROLLER

1. Open the front door.
2. Positioning roller $[\mathrm{A}]$ ((3) $\times 1$ )
3. Belt $[B]$


### 1.3 TRAY 1 EXIT SENSOR

1. Top cover (1.1.1)
2. Open transport door $[\mathrm{A}]$

3. Tray 1 exit sensor [C]


## 1．4 ENTRANCE SENSOR／STAPLER TRAY ENTRANCE SENSOR

1．Entrance sensor bracket $[A]\left(\hat{\beta} \times 1, \mathbb{E}^{\|} \times 1\right)$
2．Entrance sensor $[B]\left(\mathcal{E}^{2} \times 1\right)$
3．Stapler tray entrance sensor bracket［C］（ $\hat{\xi} \times 1$ ，気 Cl ）

4．Stapler tray entrance sensor［D］


## 1．5 STAPLER TRAY

［B］


1．External covers，front door，inner cover（ 1．1．1，1．1．2）
2．Two clamps $[\mathrm{A}]$
3．Harnesses $[B]$（脛 $x 8$ ）
4．Stapler tray［C］（雨 x2［D］，${ }^{2} \times 2[E]$ ）
At the front of the finisher，pull the stapler tray toward you and lift it out．

### 1.6 UPPER STACK HEIGHT SENSORS/TRAY 1 UPPER LIMIT SWITCH



1. External covers (1.1.1)
2. Place one hand under tray 2 (the lower tray), press in on the gear [A] to release the tray, and then support it with your hand as it descends.
3. Place one hand under tray 1 (the upper tray), press in on the gear [ $B$ ] to release the tray, and then support it with your hand as it descends.
4. Tray 1 back fence [C] ( $\hat{\xi}^{3} \times 4$ )

5. Plastic bracket [E] ( ${ }^{(1)} \times 1$ )
6. Stack height sensors [F]
7. Metal bracket [G] (解x1)
8. Upper limit switch [H]

### 1.7 EXIT GUIDE PLATE MOTOR

1. Tray 1 back fence (1.6)

Disengage the shaft of the exit guide plate motor from the ring.


### 1.8 LIFT MOTORS

1. Top cover and rear cover (1.1.1)
2. Tray 1 back fence $[A]$ 1.6)
3. Sensor stay $[B](\hat{\xi} \times 4)$


4. Tray 1 lift motor [D] (鳥 x2, drive belt)
5. Tray 2 lift motor [E] ( ${ }^{2} \times 2$, drive belt)


### 1.9 LOWER EXIT SENSOR

1. Front door, external and internal covers. (1.1)
2. Exit guide plate motor (-1.7)
3. Guide plate $[A]$ ( 3 (3) $\times 1$ )

Pull the shaft toward you through the round hole.
4. Guide plate exit assembly $[B]\left(E_{l}^{\|} x 1\right.$, (3) x1)

5. Anti-static brush $[C]\left(\mathcal{E}^{2} \times 2\right)$
6. Bracket guide exit [D] ( $\hat{\xi}^{2} \times 2$ )
7. Lower exit sensor $[E]\left(\mathcal{E}^{3} \times 1\right.$, 気 Cl )


## LOWER STACK HEIGHT SENSORS

### 1.10 LOWER STACK HEIGHT SENSORS

1. Stapler tray (1.5)
2. Sensor bracket $[A]$ (第 X 1 , 気 $\mathrm{El}_{\mathrm{H}} \mathrm{x} 2$ )
3. Bracket $[B]\left(\mathcal{E}^{2} \times 1\right)$
4. Feeler [C]
5. Lower stack height sensors [D]


### 1.11 TRAY 2 SHUNT POSITION SENSOR

1. Stapler tray (-1.5)

2. Tray 2 position shunt sensor $[B]\left(\mathcal{R}^{2} \times 1\right)$


### 1.12 STAPLER UNIT

1. Open the front door
2. Stapler unit $[A]$ (

Hold the stapler holder $[B]$ with one hand as you remove the stapler. Do not twist or rotate the stapler bracket as you remove it.


### 1.13 STAPLER ROTATION HP SENSOR

1. Stapler unit (-1.12)
2. Carefully rotate the stapler holder [A].
3. Stapler cover $[B]\left(\hat{\xi}^{3} \times 1\right)$
4. Sensor bracket [C] (
5. Stapler rotation HP sensor [D]


### 1.14 TRAY 1 INTERIOR

### 1.1.1 TRAY 1 COVERS

1. Tray $1[A]\left(\hat{\xi}^{2} \times 1\right)$
2. Rear tray cover $[\mathrm{B}]\left(\begin{array}{c}(1)\end{array}\right)$
3. Front tray cover $[C]\left(\mathcal{S}^{2} \times 1\right)$
4. Bottom tray cover [D] ( ${ }^{2} \times 2$ )

5. Bottom bracket $\left.[E]()^{3} \times 3\right)$


### 1.14.2 TRAY SHIFT SENSORS AND TRAY RELEASE SENSOR

1. Tray 1 covers (1.14.1)
2. Gear disk [A] ( $(3) \times 1)$
3. Tray shift sensors $[B]$ (気 $\mathbb{d} x 1$ each).



### 1.14.3 TRAY 1 SHIFT MOTOR

1. Tray 1 covers (1.14.1)

2. Tray 1 shift motor $[B]$ ( $(\hat{\xi} \times 3$, belt $x 1$ )


### 1.14.4 BACK FENCE LOCK CLUTCH

1. Tray 1 covers (1.14.1)
 $\mathrm{x} 1)$


### 1.15 FINISHER MAIN BOARD

1. Rear cover (1.1.1)



### 1.16 PUNCH HOLE POSITION ADJUSTMENT

To adjust the position of the punch holes in the paper feed direction, use the appropriate SP mode.
To adjust the horizontal position of the holes, use the spacers provided with the punch unit.

1. Rear cover ( 1.1.1)
2. Punch unit $[A]\left(\mathcal{F}^{2} \times 3, \xi^{\#} \times 5\right)$
3. Spacers [B]

The punch position can be adjusted by up to 4 mm using combinations of the 3 spacers provided with the finisher.


## 2. TROUBLESHOOTING

### 2.1 TIMING CHARTS

### 2.1.1 A4(S)/LT(S) SHIFT MODE WITH PUNCH - TRAY 1



TIMING CHARTS
2.1.2 A4(S)/LT(S) SHIFT MODE WITH PUNCH - TRAY 2

2.1.3 A4(S)/LT(S) STAPLE MODE WITH PUNCH


### 2.2 JAM DETECTION

| Mode |  | Jam | Content |
| :---: | :---: | :--- | :--- |
| Shift | Staple | Ine |  |
| $\checkmark$ | $\checkmark$ | Entrance sensor: <br> On check | The entrance sensor does not turn on within <br> 399 pulse after the main machine exit <br> sensor turns off. |
| $\checkmark$ | $\checkmark$ | Entrance sensor: <br> Off check | The entrance sensor does not turn off within <br> 34 pulse after it turns on. |
| $\checkmark$ |  | Tray exit sensor: <br> On check | The tray exit sensor does not turn on within <br> 66 pulse after the entrance sensor turns off. <br> ${ }_{11}$ |
| $\checkmark$ |  | Tray exit sensor: <br> Off check | The tray exit sensor does not turn off within <br> 66 pulse after the tray exit sensor turns on. |
|  | $\checkmark$ | Stapler tray <br> entrance sensor: <br> On check | The stapler tray entrance sensor does not <br> switch on within 102 pulses after the <br> entrance sensor switched off. ${ }^{*}$ |
|  | $\checkmark$ | Stapler tray <br> entrance sensor: <br> Off check | The staple tray entrance sensor does not <br> turn off within 34 pulse after the stapler tray <br> entrance sensor turns on. ${ }^{* 1}$ |
|  | $\checkmark$ | Lower tray exit <br> sensor: <br> On check | The lower exit sensor des not on within <br> 1260 ms after the stack feed-out motor turns <br> on. |
|  | $\checkmark$ | Lower tray exit <br> sensor: <br> Off check | The lower exit sensor does not off within <br> 1500 ms after it turns on. |

[^0]
## 3. SERVICE TABLES

### 3.1 DIP SWITCH SETTINGS

The DIP switches should not be set to any combination other than those described in the table below.

| DPS101 |  |  |  | Mode |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Description |  |  |  |  |  |
| $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |  |  |
| 0 | 0 | 0 | 0 | Default. |  |
| 1 | 1 | 1 | 0 | Free run. | No paper. |
| 0 | 0 | 0 | 1 | Factory shipping. | See the note below. |

To position the shift trays for shipping, on the finisher main board set DIP SW4 ON, cycle the main machine power off and on, then set DIP SW4 OFF. The shift trays move automatically to the shipping position. After unpacking the machine again and switching on, turn all DIP switches off to put the machine into factory default mode.

### 3.2 TEST POINTS

| No. | Label | Monitored Signal |
| :---: | :---: | :--- |
| TP101 | GND | Ground |
| TP102 | 5 V | 5 V |
| TP103 | RXD | Received command data |
| TP104 | TXD | Transmitted command data |

### 3.3 FUSES

| No. | Function |
| :---: | :---: |
| FU101 | Protects 24 V. |

## 4. DETAILED DESCRIPTIONS

### 4.1 GENERAL LAYOUT



1 Upper junction gate
2 Punch unit (option)
3 Stapler junction gate
4 Pre-stack tray

5 Stapler
6 Stapler tray
7 Tray 2
8 Tray 1

Tray junction gate: Directs paper either to the upper or lower exit. In staple mode, the stack always goes out to the lower exit.
Stapler junction gate: Directs paper either to the lower exit or to the stapler tray.
Pre-stack tray: When stapling multiple copies (A4 S, LT S, B5 S only) in the staple mode, the first sheet of the second copy waits here for the next sheet to feed while the previous stack is stapled. After the second copy is fed, the first and second sheets are fed together to the pre-stack tray. This delay allows enough time for the previous stack to be stapled without interrupting paper feed.

Shift trays: Tray 1 (upper) and tray 2 (lower) shift side to side in the sort mode, and raise and lower to receive ejected copies.
Stapler tray jogger: Employs positioning rollers and jogger fences to align stacks for stapling.
Punch unit. Punches holes in stacked copies.

### 4.2 DRIVE LAYOUT



1. Tray 1 lift motor
2. Lower transport motor
3. Entrance roller
4. Tray 2 lift motor
5. Upper exit roller
6. Tray 1 shift motor
7. Exit guide plate motor
8. Lower exit roller
9. Pre-stack motor
10. Upper transport motor
11. Tray 2 shift motor
12. Exit motor
13. Punch motor
14. Entrance motor
15. Stack feed-out motor
16. Jogger motor
17. Stapler motor
18. Stapler rotation motor

### 4.3 JUNCTION GATES

The two junction gates can direct paper to three destinations.
In sort/stack mode for tray 1, the tray junction solenoid $[A]$ is on, and the copies go to the upper exit $[A]$ (tray 1 is at the upper exit for sort/stack mode).

In sort/stack mode for tray 2, both the tray junction gate solenoid $[\mathrm{A}]$ and stapler junction gate solenoid $[B]$ are off, and copies go to the lower exit.


In staple mode, the tray junction solenoid [A] is off and the stapler junction gate solenoid $[B]$ is on, and copies go to the stapler tray.


### 4.4 TRAY SHIFTING

### 4.4.1 TRAY SHIFT MECHANISMS



## Tray 1 (Upper Tray)

In sort/stack mode, tray $1[A]$ moves from side to side to separate the printed sets.
The tray 1 shift motor [B], inside the shift tray, controls the horizontal position of tray 1 through the timing belt [C] and gear disk [D].
After one print set is delivered to tray 1, the shift motor turns on, driving the gear disk and the arm [E], and the tray drive unit moves to one side.
Two shift sensors [F] detect when to stop this side-to-side movement. There is a cut-out in the gear disk. The shift tray moves in one direction until one of the shift sensors detects the cut-out. Then the shift tray stops.

The next set of prints is then delivered, and the gear disk is turned in the opposite direction until the other shift sensor is activated.

## Tray 2 (Lower Tray)



In sort/stack mode, tray $2[A]$ moves from side to side to separate the sets of prints. The shift mechanism for tray 2 is similar to that used for tray 1 . However, when the tray 2 shift motor $[B]$ turns on, the arm [D] moves the entire end fence [C] from side to side (not just the tray).
After the gear disk has turned 180 degrees, the cut-out in the gear disk enters the tray half-turn sensor [E], and the motor stops. When the next set of prints is delivered, the motor turns on again, and moves the tray back to its previous position.

### 4.5 TRAY UP/DOWN MECHANISMS

### 4.5.1 TRAY 1



## Introduction

The tray 1 lift motor $[A]$ controls the vertical position of tray $1[B]$ through gears and timing belts [C].

## Normal and sort/stack modes

When the main switch is turned on, the tray is initialized at the upper position. To do this, the tray is moved up until upper stack height sensor 1 [D] is de-actuated.
During printing, if upper stack height sensor 2 [ $E]$ is actuated, the tray 1 lift motor lowers the tray for a specified time.

When the tray lowers during printing, the actuator [F] will pass through the tray 1 overflow sensor [G]. When the actuator drops below the sensor (to deactivate the sensor), the machine detects that the paper stack height has exceeded a certain limit.

The upper limit switch for tray $1[\mathrm{H}]$ prevents the drive gear from being damaged if the upper stack height sensor 1 should fail. If the tray is raised to the tray positioning roller [I], the switch will automatically cut the power to the tray 1 lift motor.

## Staple mode



In staple mode, stapled stacks can be delivered to either tray, but they can only go to the lower exit. So, if tray 1 is selected, tray $1[A]$ moves down to the lower paper exit.
Tray 1 lowers until the actuator [B] enters the tray 1 lower limit sensor [C]. Tray 1 then lifts up until lower stack height sensor 1 [D] is activated.
When tray 1 is moved down to the lower exit, tray 2 must be moved down out of the way. So, tray 2 [ E$]$ is also lowered until the tray 2 shunt position sensor [F] detects tray 2 (or the top of the paper stack in tray 2).

The method of paper height detection is the same as for the upper exit area.
When the tray lowers during printing, the actuator will enter the tray 1 overflow 2 sensor [G]. When this happens, the machine detects that the paper stack height has exceeded the overflow limit.

## Tray 1 release mechanism

When tray 1 is selected for staple mode, tray 1 must be moved down to the lower paper exit. However, to move past the sensors at the lower exit, the tray must be moved away from the finisher.
To do this, the tray 1 shift motor turns until the cut-out in the gear disk enters the tray release sensor [A]. At this time, the arm $[\mathrm{B}]$ has reached position [C], and is pushing against the plate [D], in towards the finisher. However, the plate is fixed, so the tray moves out away from the finisher.
Then, the tray 1 shift motor stops, then the tray 1 lift motor lowers tray 1.

When the tray 1 lower limit sensor is activated (as described on the previous page), the tray has moved past the sensors at the lower exit. The tray 1 shift motor turns on again until the gear disk activates the tray shift sensor [E]. This moves the tray back against the finisher.
Next, tray 1 lifts until the finisher detects that the tray is at the correct height.


## TRAY UP/DOWN MECHANISMS

When tray 1 is at the lower exit, the tray lock solenoid [F] is on, and the lever [G] locks the tray. This prevents the user from moving the tray out of position (the first tray has some play when it is at the lower position).

Before tray 1 goes back to the upper exit area, the tray lock solenoid [F] turns off to unlock the tray. In addition, the back fence lock clutch $[\mathrm{H}]$ turns on to hold the back fence [I]. This prevents the springs inside the back fence from suddenly contracting
 (these springs normally keep the tray steady during side-to-side shift).
Then, tray 1 is released and it moves up to the upper exit area.

### 4.5.2 TRAY 2



The tray 2 lift motor $[A]$ controls the vertical position of tray $2[B]$ through gears and timing belts [C].

The paper height detection is the same as for tray 1.
When the tray lowers during printing, the tray is judged to be overflowing when the tray 2 overflow sensor 1 [D] is off and the tray 2 overflow sensor-2 [F] is on (see 'Normal Mode' in the above diagram).

In the multi-tray staple mode (selected by the service technician), the machine detects that the paper stack height has exceeded the overflow limit when the actuator [E] enters the tray 2 overflow 1 sensor [D].
The lower limit sensor [G] for tray 2 detects when tray 2 is at its lowest limit and stops the tray 2 lift motor.
The function of the tray 2 upper limit switch $[\mathrm{H}]$ is the same as for tray 1 .

### 4.5.3 PRE-STACK MECHANISM



This feature is available only when using A4 L, LT L, and B5 L.
During stapling, the main machine must wait. This mechanism reduces the wait by holding the first two sheets of a job while the previous job is still being stapled. It only works during the second and subsequent sets of a multi-set print job.
The pre-stack junction gate solenoid [A] switches on after the first sheet activates the entrance sensor. This directs the sheet to the pre-stack tray $[B]$.
The pre-stack feed roller [C] stops for a specified time after the trailing edge of the paper has passed through the entrance sensor and stops the paper from leaving the pre-stack tray.
At the same time, the pre-stack junction gate solenoid switches off, and the second sheet is sent to the paper guide [D]. The pre-stack feed roller (controlled by the pre-stack motor) starts to rotate again for a specified time after the trailing edge of the second page has been passed through the entrance sensor, and then both sheets are sent to the stapler tray together.

### 4.6 JOGGER UNIT PAPER POSITIONING MECHANISM



In staple mode, each sheet of copy paper is vertically and horizontally aligned when it arrives in the stapler tray.

## Vertical Paper Alignment

After the trailing edge of the paper passes the stapler tray entrance sensor [A], the positioning roller solenoid $[B]$ is energized for a specified time to push the positioning roller [C] into contact with the paper.
The positioning roller rotates to push the paper back and align the trailing edge of the paper against the stack stopper [D].

## Horizontal Paper Alignment

When the start key is pressed, the jogger motor [E] turns on and the jogger fences [F] move to the waiting position, which is 8 mm wider on both sides than the selected paper.

When the trailing edge of the paper passes the stapler tray entrance sensor, the jogger motor turns on to move the jogger fences 5 mm towards the paper. After a short time, the jogger motor turns on again for the horizontal paper alignment then returns to the waiting position.

### 4.7 STAPLER MECHANISM

### 4.7.1 STAPLER MOVEMENT



The stapler can be moved from side to side or rotated according to the requirements of the selected stapling mode.

## Stapler Rotation

After the start key is pressed, the stapler rotation motor [A] rotates the staple unit $[B]$ until the stapler rotation HP sensor [C] is activated. Then, the stapler moves from front to rear of the finisher.

When oblique stapling at one position has been selected, after the stapler moves to the stapling position, the stapler rotation motor rotates the stapler 45 degrees (clockwise) at the stapling position before the stapler fires.

## Side-to-Side Movement

The stapler motor [D] moves the stapler from side to side. After the start key is pressed, the stapler moves from its home position to the stapling position.
The amount of movement required to reach the stapling position is determined by the size of the selected paper. If the two-staple mode is selected, the stapler moves to the front stapling position first, and then moves to the rear stapling position. However, for the next print set, it staples in the reverse order.
After the stapling job is finished, the stapler returns to its home position, determined by the stapler HP sensor [E].

### 4.7.2 STAPLER



The staple hammer is driven by the stapler hammer motor [A] inside the stapler.
As soon as the paper stack is aligned, the staple hammer motor starts. When stapling is finished, the staple hammer HP sensor $[B]$ is turned on, and the staple hammer motor then stops.
The staple end sensor [C] detects the staple end condition and whether the staple cartridge is installed or not. If a stapler cassette is not installed, or after the stapler cassette runs out of staples, a message is displayed in the operation panel. If this condition is detected during a print job, the indicator will appear, but the print job will not stop.
The staple position sensor [D] detects if there is a staple sheet at the stapling position. After a new staple cartridge is installed, the staple hammer motor turns on to transfer the staple sheet until the staple position sensor is activated by the staple sheet.

If a staple jam occurs and overloads the motor, this causes a staple jam message to appear on the operation panel.

### 4.7.3 FEED OUT AND TRANSPORT



When stapling starts, the exit guide plate motor [A] switches on and opens the exit guide plate $[B]$, so that the stapled stack can exit to the tray. The exit guide plate sensor [C] detects when to switch off the exit guide plate motor.

After the prints have been stapled, the stack feed-out motor [D] starts. The pawl [E] on the stack feed out belt [F] lifts the stapled set and feeds it to the tray [G].

The exit guide plate closes at a specified interval after the stapled prints have started to feed out. Then the exit roller takes over the stack feed-out. The stack feed-out motor turns off when the pawl actuates the stack feed-out belt home position sensor [H].
When tray 1 is passing this area on its way back up to the upper exit, the exit guide safety switch [I] cuts power to the tray lift motor if the guide is opened too far. This prevents damage to the user's fingers if they are inside the lower exit when the tray is moving up.

### 4.8 PUNCH UNIT (OPTIONAL)

The punch unit punches holes in printed sheets, one by one. The punch unit is provided with a new punch mechanism to improve the accuracy of punching.


### 4.8.1 PUNCH DRIVE MECHANISM

The punch drive mechanism is driven by the punch motor $[A]$. Each sheet is positioned and punched by pressure from above. A certain time after the trailing edge of the paper passes through the finisher entrance sensor $[B]$, the punch motor turns on and the paper stops. Then the punch clutch [C] turns on to make the punch holes.
The home position is detected by the punch HP sensor [D]. When the cut-out in the punch shaft disk [E] enters the punch HP sensor, the punch clutch turns off.
When the finisher has received the command that changes the number of punch holes, the punch hole motor [F] turns on until the disk changes the status of the punch hole switch [G] (until it switches on or off). This indicates that the cover [H] and the punch cam [I] have moved to one side or the other to change the number of holes.

### 4.8.2 PUNCH WASTE COLLECTION



Waste punchouts are collected in the punch waste hopper [A] below the punch unit inside the finisher.

When the top of the punchout waste in the hopper reaches and actuates the hopper sensor [B], a message will be displayed on the operation panel after the current job is completed.
This sensor also detects whether the punch waste hopper is installed. When the waste hopper is taken out, the arm [C] moves down and this will actuate the sensor and display a message in the operation panel. This message is the same as for the hopper full condition.

# NINE-TRAY MAILBOX AND <br> BRIDGE UNIT G909/G912 

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

Number of Trays
Tray Capacity:
Paper Size for Trays:

Paper Weight:

Power Consumption:
Power Source:
Dimensions (W x D x H):
Weight:

9 trays and a proof tray
Trays and proof tray: 100 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )
Trays:
Maximum: A3 or 11" x 17"
Minimum: A5 (LEF) or 11 " $\times 81 / 2^{\prime \prime}$
Proof tray:
Maximum: A3 or 11" x 17"
Minimum: A6 (LEF) or 11 " x 81/2"
Trays: $60 \sim 90 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 24 \mathrm{lb}$
Proof tray: $52 \sim 157 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 42 \mathrm{lb}$
48 W or less (average)
DC24 V, 5 V (supplied by the main machine)
$600 \times 545 \times 970 \mathrm{~mm}\left(23.6 " \times 21.5 " \times 38.2^{\prime \prime}\right)$
38 kg, 83.6 lb

- Specifications are subject to change without notice.

Legend:

| PRODUCT CODE | COMPANY |  |  |
| :---: | :---: | :---: | :---: |
|  | GESTETNER | RICOH | SAVIN |
| G909 | CS360 | CS360 | CS360 |
| G912 | BRIDGE UNIT | BRIDGE UNIT | BRIDGE UNIT |
|  | TYPE 460 | TYPE 460 | TYPE 460 |

## NOTE:

The installation of the G909 MailBox requires that the A688 Bridge Unit Type 450 and the A682 Paper Tray Unit (PS360) must also be installed.

### 1.2 COMPONENT LAYOUT

### 1.2.1 MECHANICAL COMPONENT LAYOUT



1. Bridge Exit Roller
2. Bridge Exit Sensor
3. Proof Tray
4. Bridge Relay Sensor
5. Relay Junction Gate
6. Proof Tray Paper Sensor
7. Proof Tray Paper Overflow Sensor
8. Proof Tray Exit Roller
9. Proof Tray Exit Sensor
10. Proof Tray Junction Gate
11. Entrance Roller
12. Entrance Sensor
13. Relay Sensor
14. Tray Exit Sensor 1
15. Vertical Transport Guide
16. Tray Exit Sensor 2
17. Tray Exit Sensor 3
18. Tray Gates
19. Paper Overflow Sensor
20. Paper Sensor
21. 9th Tray
22. 1st Tray
23. Bridge Unit

### 1.2.2 DRIVE LAYOUT



1. Proof Tray Exit Roller
2. Proof Tray Transport Motor
3. Bridge Exit Roller
4. Transport Motor
5. Entrance Roller
6. Vertical Transport Motor
7. Tray Feed-out Roller

## ELECTRICAL COMPONENT DESCRIPTIONS

### 1.3 ELECTRICAL COMPONENT DESCRIPTIONS

Refer to the electrical component layout and the point-to-point diagram, printed on waterproof paper and located in a protective sleeve for the component locations.

| Symbols | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Proof Tray Transport | Drives all the proof tray rollers. | 7 |
| M2 | Transport | Drives all rollers in the entrance area and all rollers in the bridge unit. | 8 |
| M3 | Vertical Transport | Drives all tray feed-out rollers. | 19 |
| Sensors |  |  |  |
| S1 | Bridge Exit | Detects misfeeds. | 1 |
| S2 | Bridge Relay | Detects misfeeds. | 2 |
| S3 | Proof Tray Paper Overflow | Detects paper overflow in the proof tray. | 3 |
| S4 | Proof Exit | Detects misfeeds. | 4 |
| S5 | Proof Cover | Detects whether the proof cover is open or closed. | 6 |
| S6 | Entrance | Detects copy paper entering the mail box and detects misfeeds. | 9 |
| S7 | Relay | Detects misfeeds. | 10 |
| S8 | Proof Tray Paper 1 (LED) | Informs the CPU when there is paper on the proof tray. | 14 |
| S9 | Proof Tray Paper 2 (Photo Transistor) | Informs the CPU when there is paper on the proof tray. | 13 |
| S10 | Tray Exit 1 | Detects misfeeds. | 21 |
| S11 | Tray Exit 2 | Detects misfeeds. | 25 |
| S12 | Tray Exit 3 | Detects misfeeds. | 29 |
| S13 | Tray Exit 4 | Detects misfeeds. | 32 |
| S14 | Paper 0 | Contains an LED for paper sensor 1. | 47 |
| S15 | Paper 1 | Informs the CPU when there is paper on the 1st tray. | 15 |
| S16 | Paper 2 | Informs the CPU when there is paper on the 2nd tray. | 43 |
| S17 | Paper 3 | Informs the CPU when there is paper on the 3rd tray. | 41 |
| S18 | Paper 4 | Informs the CPU when there is paper on the 4th tray. | 39 |
| S19 | Paper 5 | Informs the CPU when there is paper on the 5th tray. | 37 |
| S20 | Paper 6 | Informs the CPU when there is paper on the 6th tray. | 36 |
| S21 | Paper 7 | Informs the CPU when there is paper on the 7th tray. | 35 |
| S22 | Paper 8 | Informs the CPU when there is paper on the 8th tray. | 34 |


| Symbols | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| S23 | Paper 9 | Informs the CPU when there is paper on the 9th tray. | 33 |
| S24 | Paper Overflow 1 | Detects paper overflow in the 1st tray. | 49 |
| S25 | Paper Overflow 2 | Detects paper overflow in the 2nd tray. | 46 |
| S26 | Paper Overflow 3 | Detects paper overflow in the 3rd tray. | 44 |
| S27 | Paper Overflow 4 | Detects paper overflow in the 4th tray. | 42 |
| S28 | Paper Overflow 5 | Detects paper overflow in the 5th tray. | 40 |
| S29 | Paper Overflow 6 | Detects paper overflow in the 6th tray. | 38 |
| S30 | Paper Overflow 7 | Detects paper overflow in the 7th tray. | 28 |
| S31 | Paper Overflow 8 | Detects paper overflow in the 8th tray. | 30 |
| S32 | Paper Overflow 9 | Detects paper overflow in the 9th tray. | 31 |
| Solenoids |  |  |  |
| SOL1 | Proof Tray Junction Gate | Opens and closes the proof junction gate to direct paper either into the proof tray or to the trays. | 17 |
| SOL2 | Relay Junction Gate | Opens and closes the relay junction gate to direct paper either to the bridge unit or to the trays. | 15 |
| SOL3 | 1st Tray | Opens and closes the 1st tray gate. | 16 |
| SOL4 | 2nd Tray | Opens and closes the 2nd tray gate. | 18 |
| SOL5 | 3rd Tray | Opens and closes the 3rd tray gate. | 20 |
| SOL6 | 4th Tray | Opens and closes the 4th tray gate. | 22 |
| SOL7 | 5th Tray | Opens and closes the 5th tray gate. | 23 |
| SOL8 | 6th Tray | Opens and closes the 6th tray gate. | 24 |
| SOL9 | 7th Tray | Opens and closes the 7th tray gate. | 26 |
| SOL10 | 8th Tray | Opens and closes the 8th tray gate. | 27 |
| PCBs |  |  |  |
| PCB1 | Main Control | Controls all sorter functions | 48 |
| PCB2 | Proof Control | Drives the motors in the proof unit and informs the sensor status to the main control board. | 5 |
| Switches |  |  |  |
| SW1 | Bridge Cover | Cuts the +24 V power line and detects when the bridge cover is opened. | 12 |
| SW2 | Front Cover | Cuts the +24 V power line and detects when the front cover is opened. | 11 |
|  |  |  |  |

## 2. DETAILED DESCRIPTIONS

### 2.1 BASIC OPERATION



## Proof Tray

When the proof tray is selected as the output tray and the exit sensor of the main machine is actuated by the leading edge of the paper, the transport motor and proof tray transport motor energize, causing the transport rollers to turn.

Soon after the motors start, the proof tray junction gate solenoid energizes and the proof tray junction gate $[A]$ is lowered so that the paper goes to the proof tray.

When the last page passes the proof tray exit sensor and feeds out, the proof tray junction gate solenoid and the proof tray transport motor de-energize.

## Bridge Unit

The relay junction gate $[B]$ in the bridge unit delivers the paper either to the finisher or down to the trays. When the finisher is selected as the output tray, the relay junction gate stays closed, and the paper goes to the bridge unit. When a tray is selected as the output tray, the relay junction gate solenoid energizes and the relay junction gate is open so that the paper goes downwards to the tray area.

## Trays

When the proof tray is selected as the output tray, the transport motor and the vertical transport motor energize. Each tray gate [C] is individually controlled by a solenoid. When a solenoid is energized, the tray gate opens and the paper goes into the tray.

### 2.2 PROOF TRAY SENSORS



### 2.2.1 PAPER SENSOR

The paper sensor in the proof tray consists of two sensor boards; one is an LED board $[A]$ and the other is a phototransistor board $[B]$. The sensor detects whether or not there is paper on the proof tray. When there is paper on the proof tray, the paper interrupts the light from the LED.

### 2.2.2 PAPER OVERFLOW SENSOR

There is also a paper overflow sensor [C] located in the proof tray. The machine detects paper overflow when the top sheet of the paper stack pushes up the sensor feeler. When this occurs, a message will be displayed on the operation panel and the machine stops printing until the paper stack on the proof tray is removed.

### 2.3 TRAY SENSORS




### 2.3.1 PAPER SENSOR

There is a paper sensor [A] for each tray (total 10 pcs ). The paper sensors in tray 1 to tray 8 contain an LED and a phototransistor. The paper sensor in the tray 0 contains only an LED. The paper sensor in tray 9 contains only a phototransistor. The paper detection mechanism and their function are the same as for the proof tray.

### 2.3.2 PAPER OVERFLOW SENSOR

There is a paper overflow sensor [B] above each tray. The machine detects paper overflow in a tray when the top of the paper stack pushes up the sensor feeler [C]. When this condition occurs, the printing job is stopped until the paper stack is removed.

### 2.3.3 TRAY EXIT SENSOR

There is a tray exit sensor board [D] above the 1st tray (the mounting above tray 1 is called 'tray 0 ') and on trays 3,6 , and 9 . The tray exit sensor board on trays 3 and 6 contains an LED and a phototransistor.
The tray exit sensor board above the 1st tray contains only an LED. The tray sensor board on the 9th tray contains only a phototransistor.
The machine detects paper leaving trays 1 to 3 using the sensor above tray 1 and the one on tray 3. When paper passes between those sensors, the light from the LED above tray 1 is interrupted.

### 2.4 TIMING CHART AND MISFEED DETECTION

A4 Sideways (to 1st Tray)



1. On check:

J1: The entrance sensor does not activate within 2460 pulses after the exit sensor of the main machine has been activated.
J2: The relay sensor does not activate within 1965 pulses after the entrance sensor has been activated.
J3: The proof tray exit sensor does not activate within 1665 pulses after the entrance sensor has been activated.
J4: The bridge relay sensor does not activate within 1954 pulses after the entrance sensor has been activated.
J5: The appropriate tray exit sensor does not activate within the appropriate number of pulses (see below) after the relay sensor has been activated.
J5 jam timing

| Tray <br> Exit <br> Sensor | Sensor 1 |  |  | Sensor 2 |  |  | Sensor 3 |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tray No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Pulses | 72 | 139 | 176 | 206 | 242 | 273 | 304 | 343 | 375 |

2. Off check

J6: A sensor does de-activate within the specified number of pulses after that sensor has been activated.
Number of pulses $=$ Paper length (in the paper feed direction) $\times 1.5$
1 pulse $=0.1707 \mathrm{~mm}$

## 3. INSTALLATION PROCEDURE

### 3.1 MAILBOX (G909)

### 3.1.1 ACCESSORY CHECK

Check the accessories in the box against the following list.

| No. | Description | Q'ty | Note |
| :---: | :--- | :---: | :--- |
| 1 | Front Joint Bracket | 1 |  |
| 2 | Rear Joint Bracket | 1 |  |
| 3 | Exit Guide Mylar | 1 | For A229 |
| 4 | Proof Tray Attachment | 1 | For A230, A231, and A232 |
| 5 | Upper Grounding Plate | 1 | For A230, A231, and A232 |
| 6 | Lower Grounding Plate | 2 | One for A230, A231, and A232 <br> Two for A229 |
| 7 | Cushion | 1 |  |
| 8 | Tapping Screw - M4 x 14 | 4 |  |
| 9 | Tray Decals | 1 |  |
| 10 | Installation Procedure | 1 |  |



### 3.1.2 REQUIREMENT OPTIONS FOR MAIN MACHINE

When the mailbox is going to be installed to the A230, A231, or A232 machines, the following options for the main machine are required.

1. Bridge Unit Type 450 (A688)
2. Paper Tray Unit - PS360 (A682)

### 1.1.3 INSTALLATION PROCEDURE



- A230, A231, A232, B003 and B004 machines -


## $\triangle$ CAUTION <br> Unplug the main machines power cord before starting the following procedure.

NOTE: 1) When the finisher (A697) is installed on the machine, the bridge unit for the mailbox (G912) must be installed.
2) The bridge unit for the mailbox must be installed before installing the Mailbox on the main machine.

1. Unpack the finisher and carefully remove all the shipping tapes.

## - A230, A231, A232 B003 and B004 machines -

2. Attach the front joint bracket $[A]$ and rear joint bracket $[B]$ to the main machine (2 screws each).
3. Attach the upper grounding plate [C] (1 screw).
4. Peel off the backing of the double sided tape that is attached to the lower grounding plate [D].
5. Attach one lower grounding plate to the center of the bottom edge of the paper tray unit as shown.

Go to step 7.


## - A229 machines -

2. Remove the four plastic caps $[A]$ from the copier's left cover.
3. Remove the connector cover $[B]$.
4. Attach the front joint bracket [C] and rear joint bracket $[D]$ to the main machine (2 screws each).
5. Peel off the backing of the double-sided tape that is attached to the lower grounding plate [E].
6. Attach two lower grounding plates to the bottom edge of the paper tray unit as shown.

## - All machines -

7. The position of the cushion [F] depends on which main machine the mailbox is installed to. Attach the cushion to the plate as follows:

- Position [G] for A230, A231, and A232 machines.
- Position $[\mathrm{H}]$ for A229 machines.

NOTE: When attaching the cushion to position [H], cut about 40 mm (1.6 inches) off one edge of the cushion.
8. Open the front cover [I] of the mailbox, and remove the screw [J] that secures the locking lever $[\mathrm{K}]$. Then pull the locking lever.
[D]



9. Align the mailbox on the joint brackets, and lock it in place by pushing the locking lever [A].
10. Secure the locking lever ( 1 screw) and close the front door.
11. Connect the mailbox cable $[B]$ to the main machine.
12. A230/A231/A232/B003/B004 machines only: Peel off the backing of the double-sided tape that is attached to the proof tray attachment [C].
13. Install the proof tray attachment on the proof tray.
14. A229 machines only: Install the exit guide mylar [D] on the upper cover just above the anti-static brush.
15. Power on the main switch and check the mailbox operation.

### 1.2 BRIDGE UNIT FOR MAILBOX (G912)

### 1.2.1 ACCESSORY CHECK

Check the accessories in the box against the following list.

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1. | Guide Plate Bracket | 1 |
| 2 | Cable | 1 |
| 3 | Cover Switch | 1 |
| 4 | Grounding Bracket | 1 |
| 5 | Finisher Shielding Plate | 1 |
| 6 | Screw - M4 $\times 8$ | 9 |
| 7 | Screw - M4 $\times 4$ | 4 |
| 8 | Screw - M3 $\times 6$ | 2 |



## BRIDGE UNIT FOR MAILBOX (G912)

### 1.2.2 INSTALLATION PROCEDURE



## $\triangle$ CAUTION <br> Unplug the main machines power cord before starting the following procedure.

NOTE: 1) The bridge unit for the mailbox must be installed when the 3000 sheet finisher (A697) will be installed.
2) The 3000 sheet finisher (A697) can be installed only on the A232/B003/B004 and A229 machines.

1. Unpack the bridge unit and remove the shipping retainers $[A]$. NOTE: Do not remove the protective sheet [B] at this time.
2. Remove the mailbox if it has been previously installed.
3. Remove the rear cover [C] of the mailbox (8 screws).
4. Remove the proof tray unit [D] ( 6 screws, 1 connector).
5. Remove the cover [E].

6. Open the left front cover [A] of the mailbox, and remove the inner plate $[B]$ ( 3 screws).
7. Install the guide plate bracket [C] (4 screws - M4 x 4).
8. Route the cable [D] and affix it to the clamp as shown.
9. Connect the cover switch [E] to the cable then install the cover switch (2 screws $-\mathrm{M} 4 \times 8$ ).
10. Remove the paper guide plate [F] (2 screws).

11. Pull up the tab [A] of the protective sheet.

NOTE: 1) Do not remove the protective sheet at this time.
2) Make sure that all mylars are held between the two folded halves of the protective sheet.
12. Carefully turn over the bridge unit [B] and insert the protective sheet [C] into the gap [ D ] between the paper guides. Next, insert the bridge unit onto the mailbox [E].

NOTE: When holding the bridge unit, do not touch the timing belt. Otherwise the timing belt may come off the gear.
13. Remove the tape $[\mathrm{F}]$ of the protective sheet.
14. Open the upper paper guide $[G]$ then pull out the protective sheet $[H]$.

NOTE: Check that all mylars are set into the gap between the paper guides.

15. Secure the bridge unit [A] (4 screws - M4 x 8).
16. Route the cables $[B]$ through the openings [C].
17. Route the solenoid harness [D] through the opening [C].
18. Connect the cables to the solenoid and sensors and clamp the cable as shown.
19. Reinstall the rear cover and proof tray unit.
20. Install the mailbox on the main machine (refer to the Mailbox Installation procedure for more detail).

If the $\mathbf{3 0 0 0}$ sheet finisher (A697) is going to be installed, perform steps 21 to 25.
21. Install the front joint bracket [E] and rear joint bracket [F] which are contained in the finisher's accessory box.

22. Remove the seal [A].
23. Attach the grounding bracket $[B]$ ( 3 screws - M4 x 8).
24. Attach the shielding plate [C] to the finisher ( 2 screws $-\mathrm{M} 3 \times 8$ ).
25. Attach the finisher to the mailbox (refer to the Finisher Installation Procedure).
26. Power-on the main switch of the main machine and check the bridge unit operation. (Select a copy mode that uses the finisher.)

## 4. REPLACEMENT AND ADJUSTMENT

### 4.1 PROOF TRAY UNIT

### 4.1.1 PROOF TRAY SENSOR AND PAPER OVERFLOW SENSORS



1. Remove the rear cover [A] (8 screws).
2. Remove the proof tray unit $[B]$ ( 6 screws).
3. Remove two screws [C], then turn over the proof tray unit.
4. Remove the sensor bracket [D] ( 2 screws, 1 clamp).
5. Remove the proof tray paper sensor [E] (1 screw each).
6. Remove the proof tray paper overflow sensor [F].

### 4.1.2 PROOF TRANSPORT UNIT

1. Remove the proof tray unit [B] and remove two screws [C].
2. Carefully turn over the proof tray unit and remove the proof transport unit [G] (2 screws).

### 4.2 TRAY UNIT

### 4.2.1 TRAYS



1. Remove the rear cover (8 screws).
2. Disconnect the cable $[A]$ of the tray which will be removed.
3. Remove the grounding wire $[B]$ ( 1 screw, 1 washer) and remove the tray stopper [C].
NOTE: When reinstalling the tray stopper, push the stopper to the left against the tray.
4. Open the front cover [D] and remove the cover bracket [E] (1 screw), then remove the front cover.
5. Remove the two screws $[\mathrm{F}]$ which secure the tray.
6. Remove the tray [G]. (First move the tray to the left and gently flex it, then remove the tray.)

### 4.2.2 PAPER SENSOR, PAPER OVERFLOW SENSOR, AND TRAY EXIT SENSOR



NOTE: When removing the paper sensor or paper overflow sensor for the 1st tray, or the tray exit sensor above the 1st tray, first remove the 1st tray and remove the sensor cover, then remove these sensors.

1. Remove the tray (see Trays).
2. Remove the sensor cover [A] (3 screws).

## Paper Overflow Sensor

3. Remove the grounding wire $[\mathrm{B}]$ (1 screw) and paper overflow sensor bracket [C] (1 screw).
4. Remove the paper overflow sensor [D] (1 connector).

## Paper Sensor

5. Remove the paper sensor [E] (1 screw, 1 connector).

## Tray Exit Sensor (above the 1st tray, and in the 3rd, 6th, and 9th trays)

6. Remove the tray exit sensor [F] (1 screw, 1 connector).
7. After replacing the tray exit sensor, perform the tray exit sensor adjustment (see Tray Exit Sensor Adjustment).
NOTE: After replacing the tray exit sensor, do not put the rear cover back on the mailbox, because the tray exit sensor adjustment must be performed first.

### 4.2.3 MAIN CONTROL BOARD



1. Remove the rear cover $[A]$ ( 8 screws).
2. Remove the main control board $[B]$ (all connectors).
3. After replacing the main control board, perform the tray exit sensor adjustment procedure (see Tray Exit Sensor Adjustment).

### 4.2.4 TRAY EXIT SENSOR ADJUSTMENT

This sensor adjustment must be performed after replacing the tray exit sensor or main control board, using the special paper that comes as a spare part for the tray exit sensor.

The tray exit sensor board has two devices: An LED and a phototransistor. So, when replacing the tray exit sensor on the 3rd tray, the sensor adjustment must be performed between trays 1 and 3 and between trays 4 and 6 . When replacing the main control board, this sensor adjustment must be performed for all sensors. The sensor adjustment procedure is as follows.


Example: Sensor adjustment between trays 1 and 3

1. Insert the special paper (which comes with the tray exit sensor) into the entrance guide of the mailbox.
2. Turn the transport motor gear $[A]$ counterclockwise to transport the paper to the tray unit.
3. When the leading edge of the paper reaches the tray feed-out roller, turn the vertical transport motor $[B]$ clockwise to transport the paper to the appropriate tray.
4. Open the tray gate by pushing the plunger of the tray solenoid [C], and transport the paper until half of it has fed out to the tray.
5. Change switches 1 and 2 of the DIP switch on the main control board to ON.
6. Make sure that the interface cable is connected to the main machine and turn the main switch on.
7. Fully turn the appropriate variable resistor (VR) [D] clockwise, then check that the appropriate LED [E] has turned off (the relationship between tray, VR, and LED are shown in the table below).

## TRAY UNIT

8. Turn back the VR slowly until the LED just turns on.
9. Measure the voltage between TP3 on the main control board and the frame of the mailbox and confirm the voltage is greater than 3.5 Vdc . If it is not, adjust the voltage using the VR (the relationship between tray, TP, and VR are shown in the table below).
10. Remove the special paper from the tray, then measure the voltage on the main control board in the same way as step 9 . The voltage should be less than 1.2 Vdc.
11. After adjusting, change the DIP switch setting to the default (all switches off) and reassemble the machine.

| Adjusted Sensor | VR No. | LED No. | TP No. |
| :---: | :---: | :---: | :---: |
| Trays 1 to 3 | VR1 | LED 2 | TP3 |
| Trays 4 to 6 | VR2 | LED 3 | TP4 |
| Trays 7 to 9 | VR3 | LED 4 | TP13 |

NOTE: The DIP switches to change are the same regardless of the adjusted sensor.

## 5. SERVICE TABLES

### 5.1 DIP SWITCHES/VRIABLE RESISTORS/LEDS

### 5.1.1 DIP SWITCHES

| Item | Switch No. |  |  |  | Function |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1 | 2 | 3 | 4 |  |
| Default | 0 | 0 | 0 | 0 |  |
| Motor Test | 1 | 0 | 0 | 0 |  |
| Solenoid Test | 0 | 1 | 0 | 0 |  |
| Tray Exit Sensor Check | 1 | 1 | 0 | 0 | When detecting paper between the 1st and 3rd trays, LED2 will light. When detecting paper between the 4th and 6th trays, LED3 will light. When detecting paper between the 7th and 9th trays, LED4 will light. |
| Paper Sensor Check (1st to 3rd trays) | 0 | 0 | 1 | 0 | When the 1st tray paper sensor is activated, LED2 will light. <br> When the 2nd tray paper sensor is activated, LED3 will light. <br> When the 3rd tray paper sensor is activated, LED4 will light. |
| Paper Sensor Check (4th to 6th trays) | 1 | 0 | 1 | 0 | When the 4th tray paper sensor is activated, LED2 will light. <br> When the 5th tray paper sensor is activated, LED3 will light. <br> When the 6th tray paper sensor is activated, LED4 will light. |
| Paper Sensor Check (7th to 9th trays) | 0 | 1 | 1 | 0 | When the 7th tray paper sensor is activated, LED2 will light. <br> When the 8th tray paper sensor is activated, LED3 will light. <br> When the 9th tray paper sensor is activated, LED4 will light. |
| Proof Tray Sensors Check | 1 | 1 | 1 | 0 | When the proof paper overflow sensor is activated, LED2 will light. When the proof paper sensor is activated, LED3 will light. |
| Paper Overflow Sensor Check (1st to 3rd trays) | 0 | 0 | 0 | 1 | When the 1st paper overflow sensor is activated, LED2 will light. When the 2nd paper overflow sensor is activated, LED3 will light. When the 3rd paper overflow sensor is activated, LED4 will light. |
| Paper Overflow Sensor Check (4th to 6th trays) | 1 | 0 | 0 | 1 | When the 4th paper overflow sensor is activated, LED2 will light. |


| Item | Switch No. |  |  |  | Function |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1 | 2 | 3 | 4 |  |
| Paper Overflow Sensor Check (4th to 6th trays) | 1 | 0 | 0 | 1 | When the 5th paper overflow sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 6th paper overflow sensor is activated, LED4 will light. |
| Paper Overflow Sensor Check (7th to 9th trays) | 0 | 1 | 0 | 1 | When the 7th paper overflow sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 8th paper overflow sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 9th paper overflow sensor is activated, LED4 will light. |
| Entrance, Bridge Relay, and Bridge Exit Sensor Check | 1 | 1 | 0 | 1 | When the entrance sensor is activated, LED4 will light. |
|  |  |  |  |  | When the bridge relay sensor is activated, LED3 will light. |
|  |  |  |  |  | When the bridge exit sensor is activated, LED2 will light. |
| Proof Exit and Relay Sensor Check | 0 | 0 | 1 | 1 | When the proof exit sensor is activated, LED4 will light. |
|  |  |  |  |  | When the relay sensor is activated, LED3 will light. |
| Free Run | 1 | 1 | 1 | 1 |  |

### 5.1.2 VARIABLE RESISTORS

| Number | Function |
| :---: | :--- |
| VR1 | Adjusts the tray exit sensor sensitivity between trays 1 and 3 |
| VR2 | Adjusts the tray exit sensor sensitivity between trays 4 and 6 |
| VR3 | Adjusts the tray exit sensor sensitivity between trays 7 and 9 |

### 5.1.3 LEDS

| Number | Monitored Signal |
| :---: | :--- |
| LED1 | Monitors the software operation. <br> Blinking: Normal operation <br> Others: Abnormal operation |
| LED2 | The LED lights when the appropriate sensor is activated. (Refer to the <br> DIP switch table for more details.) |
| LED3 |  |
| LED4 |  |

## B361/ B362

PRINTER/SCANNER CONTROLLERS

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## INSTALLATION

## 1. INSTALLATION

### 1.1 INSTALLATION REQUIREMENTS

Please refer to section 1 of the main unit service manual.

### 1.2 PRINTER INSTALLATION

## Accessory Check

Check the accessories in the box against the following list:

| No. | Description | Q'ty |  |
| :---: | :--- | :---: | :--- |
| 1 | Cable | 1 |  |
| 2 | Paper Height Sensors | 4 |  |
| 3 | Edge Clamp | 1 |  |
| 4 | Cable Clamp | 4 |  |
| 5 | Paper Height Sensor Feeler | 2 |  |
| 6 | Paper Sensor | 1 |  |
| 7 | Key Top - Printer | 1 |  |
| 8 | Key Top - Scanner | 1 | Included only in the B362 (printer <br> and scanner) model |
| 9 | Paper Limit Sensor Unit | 1 |  |
| 10 | Tapping Screw - M3x8 | 2 | To secure the paper limit sensor <br> unit |
| 11 | Pan Head Screw - M3x8 | 1 | To secure the paper sensor |
| 12 | Installation Procedure | 1 |  |
| 13 | FCC Label | 1 | Included only in the USA models. |

## Printer Controller Installation

## $\triangle$ CAUTION <br> Unplug the main machine power cord before starting the following procedure.



1. Remove the left rear cover [A] (2 screws) and slide out the controller board [B] (2 screws).
2. Install the printer ROM DIMM [C] on the controller board.
3. Remove the parallel interface cover [D].
4. This step is required only in the USA models.

Attach the FCC label [E] on the controller panel board aligned with the slot [F] so the label is hidden when the left rear cover is replaced.

NOTE: If the NIB (G574), Postscript kit (G577), memory board (G578/G579), or IEEE1394 Interface (G590) are to be installed, remove the HDD and install them before proceeding to the next step.
5. Put back the controller board and replace the left rear cover.

## Paper Height Sensor Installation



[F]

6. Remove the connector cover [A] and lower rear cover [B] (5 screws).
7. Pull out the two paper trays [C].
8. Install edge clamp $[D]$ in the opening.
9. Connect the four paper height sensors $[E]$ to the cable $[F]$.
10. Install the four paper height sensors [E] as shown.
11. Install the four cable clamps [G], then clamp the cable as shown.
12. Lead the cable through the opening $[\mathrm{H}]$. Secure the cable in place with the edge clamp attached in step 8.
13. Connect the cable to CN234 on the PCB [I].

14. Install the paper height sensor feeler $[A]$ on the bottom plate shaft $[B]$ of each paper tray.
15. Reassemble the machine.

## Paper Limit Sensor Installation

If the optional bridge unit has been installed, skip steps 16 and 17.
16. Peel off the black tape [C] from the anti-static brush [D], then pull out the cable [E].
17. Connect the cable to the sensor [F], then install the paper limit sensor unit [G] (2 screws).


Perform steps 18 to 20 only if the optional bridge unit has been installed. If it has not been installed, go on to step 21.
18. Remove the connector cover [A] and bridge unit [B] (2 screws, 2 connectors).
19. Open the right cover [C] of the bridge unit and peel off the black tape [D], then pull out the connector [E].
20. Install the paper sensor [F] (1 screw, 1 connector) and reinstall the bridge unit.

## Completion

21. Remove the bottom cap [G] of the operation panel. Install the Printer key [H] on the operation panel as shown.

## PRINTER INSTALLATION

22. Do not connect the parallel cable at this point. Turn the machine on and check the setting of the following copier SP mode:

- SP5-907: Plug \& Play Name - select the correct one.

23. Print out the configuration page to check if the printer controller is installed properly.
(Configuration page: User Tools/ Printer Settings/ List Test Print/ Config. Page)
24. If the parallel cable is going to be connected, first turn off the machine. After connecting the cable, turn the machine back on.

### 1.3 POSTSCRIPT UNIT (G577)

| $\triangle$ CAUTION |
| :--- |
| Unplug the main machine power cord before starting the following <br> procedure. |

NOTE: To install the Postscript option, the printer option (B361) must be installed first. Please refer to section 1.2 for details of the printer option installation procedure.

1. Remove the left rear cover [A] (2 screws).
2. Remove the controller board [B] (2 screws).

3. Install the Postscript DIMM [C] onto the controller board [D].
4. Put back the controller board and replace the left rear cover.


### 1.4 MEMORY (G578/G579)

## . CAUTION <br> Unplug the main machine power cord before starting the following procedure.

NOTE: To install the memory option, the printer option (B361) must be installed first. Please refer to section 1.2 for details of the printer option installation procedure.

1. Remove the left rear cover [A] (2 screws).
2. Remove the controller board [B] (2 screws).

3. Remove the HDD [C] (2 connectors, 3 screws).

4. Install the memory DIMM [D] onto the controller board [E].
5. Re-install the HDD and put back the controller board.
6. Replace the left rear cover.


### 1.5 NIB (G574)

## $\triangle$ CAUTION <br> Unplug the main machine power cord before starting the following procedure.

NOTE: To install the NIB option, the printer option (B361) must be installed first. Please refer to section 1.2 for details of the printer option installation procedure.

1. Remove the left rear cover [A] (2 screws).
2. Remove the controller board [B] (2 screws).

3. Remove the HDD [C] (2 connectors, 3 screws).

4. Remove the NIB slot cover [D].
5. Attach the NIB [E] to the controller board [F] (2 screws).
6. Re-install the HDD and put back the controller board.

7. Replace the left rear cover.
[D]

### 1.6 IEEE1394 INTERFACE (G590)

## . CAUTION <br> Unplug the main machine power cord before starting the following procedure.

NOTE: To install the IEEE1394 option, the printer option (B361) must be installed first. Please refer to section 1.2 for details of the printer option installation procedure.

1. Remove the left rear cover [A] (2 screws).
2. Remove the controller board [B] (2 screws).

3. Remove the HDD [C] (2 connectors, 3 screws).

4. Remove the IEEE1394 cover [D].
5. Attach the IEEE1394 board [E] to the controller board [F] (2 screws).
6. Re-install the HDD and put back the controller board.
7. Remove the wire handle on the controller panel board and place it on
 the back side of the left rear cover.
8. Replace the left rear cover.

### 1.7 CHECKING THE 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)
The same data can also be printed using the printer service mode. ("Print Summary": SP1-004)
All installed options are listed in the "System Reference" column.

## TROUBLESHOOTING

## 2. TROUBLESHOOTING

### 2.1 CONTROLLER ERRORS

Refer to section 4.1 of the main unit service manual for descriptions on SC code information because the GW architecture includes controller SC codes in the main unit SC code table.

### 2.2 LEDS AND TEST POINTS

LEDs and test points are not used for this option (except for the NIB section 4.4).

## SERVICE TABLES

## 3. SERVICE TABLES

### 3.1 SERVICE PROGRAM MODE

## $\triangle$ CAUTION <br> Before accessing the service menu, do the following: <br> Confirm that there is no print data in the printer buffer (the Data In LED must not be lit or blinking). <br> If there is some data in the buffer, wait until all data has been printed.

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

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

### 3.1.1 ENABLING AND DISABLING SERVICE PROGRAM MODE

## Entering the SP mode



1. Press the Clear Mode key.

Printer SP
Scanner SP
2. Use the keypad to enter "107".
3. Hold down Clear/Stop for at least 3 seconds.
4. Enter the Service Mode.

Press "Printer SP" to enter printer SP mode.
Press "Scanner SP" to enter scanner SP mode.

NOTE: If you switch the machine off, any jobs stored on the hard disk using the sample print and protected print features will be deleted.
Check first if there are any jobs stored with these features
(Printer mode: View Sample Print Jobs/View Locked Print Job).

## Exiting the Service Mode

Press "Exit" on the LCD panel to exit from the service mode.

### 3.2 PRINTER SERVICE MODE

### 3.2.1 SERVICE MODE TABLE

| SP No. | Description | Function and Setting |
| :---: | :--- | :--- |
| 1001 | BitSw\#1 Set | Adjusts bit switch settings. <br> Note: Currently the bit switches are not being used. |
| 1003 | Clear Setting | Not used |
| 1004 | Print Summary | Prints the service summary sheet <br> (An error log is printed in addition to the configuration <br> page). |
| 1005 | Display Version | Displays the version of the controller firmware. |

### 3.2.2 SP MODES RELATED TO PRINTER CONTROLLER

The following SP modes are located in the copier SP mode. Refer to section 5.1 of the main unit service manual.

| SP No. | Description | Function and Setting |
| :---: | :--- | :--- |
| 5104 | A3/DLT Double <br> Count | Specifies whether the counter is doubled for A3/DLT. <br> $0:$ No, 1: Yes <br> If (1) is selected, the total counter and the current user <br> code counter count up twice when A3 or DLT paper is <br> used. |
| 5801 | Memory All Clear | Resets data for process control and all software counters, <br> and returns all modes and adjustments to their defaults <br> values. <br> section 5.1.8 of the main unit manual for details. |
| 5907 | Plug \& Play | Selects the brand name and the production name for <br> Windows Plug \& Play. This information is stored in <br> NVRAM. |
| 7832 | Detailed Display of <br> Self-Diagnostics | Displays the controller self-diagnostic result. <br> section 3.6 of this manual for details. |

### 3.3 SCANNER SERVICE MODE

### 3.3.1 SCANNER PROGRAM MODE TABLE

## Service Table Key

| Notation | What it means |
| :--- | :--- |
| [range / default / <br> step] $]$ | Example: $[-9 \sim+9 /+3.0 / 0.1 \mathrm{~mm}$ step]. The setting can be <br> adjusted in the range $\pm 9$, value reset to +3.0 after an NVRAM <br> reset, and the value can be changed in 0.1 mm steps with each <br> key press. |
| italics | Comments added for your reference. |
| $*$ | This value is stored in NVRAM. After a RAM reset, the default <br> value (factory setting) is restored. |
| DFU | Denotes "Design or Factory Use". Do not change this value. |


| SP1 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 1001 | 1 | Model Name | Displays the model name. |
|  | 2 | Scanner Firmware Version | Displays the scanner firmware version. |
|  | 3 | Scanner Firmware Number | Displays the firmware's part number. |
|  | 4 | Detail Model Name | Displays the detail model name. |
| 1002 |  | Error Log Display | Displays the error log data. |
| 1003* |  | FTP Port Number | Changes the FTP port number. <br> After changing this value, do the following: <br> 1. Run the Registry Editor <br> 2. Access <br> /HKEY_LOCAL_MACHINE/SOFTWARE/ Ricoh/NetworkScanner <br> 3. Change the value of 'PortNo' to this SP mode's value <br> [ 0 - 65535 / 3670 / 1 step] |
| 1004* |  | Compression Type | Selects the compression type for binary picture processing. <br> [1: MH, 2: MR, 3: MMR] |
| 1005* |  | Erase Margin | Creates an erase margin for all edges of the scanned image. <br> If the machine has scanned the edge of the original, create a margin. <br> [ $0-5 / 0 \mathrm{~mm} / 1 \mathrm{~mm}$ step] |
| 1006* |  | Auto Reset Timer | Adjusts the auto reset timer for the scanner function. <br> If this is " 0 ", the auto reset function is disabled. $[0,10-99 / 60 \mathrm{~s} / 1 \mathrm{~s} \text { step }]$ |


| SP2 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 2002 | 1* | MTF Filter Coefficient (Text / Binary / Main scan) | Selects the MTF filter coefficient in the main scan direction for Text mode. <br> Select a higher number for a stronger filter. If this is " 0 ", the MTF filter is not applied. [0-15 / $7 / 1$ step] |
|  | 2* | MTF Filter Coefficient (Text / Binary / Sub scan) | As above, for sub scan [0-13/6/1 step] |
|  | 3* | MTF Filter Strength (Text / Binary / Main scan) | Selects the MTF filter strength in the main scan direction for Text mode. <br> Select a higher number for a stronger filter. [0-7/5/1/ step |
|  | 4* | MTF Filter Strength (Text / Binary / Sub scan) | As above, for sub scan [0-7/5/1 step] |
|  | 5* | Smoothing Filter (Text / Binary) | Selects the smoothing pattern for Text mode when using binary picture processing mode. A larger value could cause moiré to appear in the image. <br> [0-7 / 0 / 1 step] |
|  | 6* | Scanner Gamma (Text / Binary) | Selects the scanner gamma type for Text mode when using binary picture processing mode. $[0-6 / 4 / 1 \text { step }]$ |
|  | 7* | Brightness - Notch 7 (Text / Binary) | Adjusts the image density for each image density level for Text mode when using binary picture processing mode. <br> [0-255 / 128 / 1 step] |
|  | 8* | Contrast - Notch 7 (Text / Binary) | [0-255/128/1 step] |
|  | 9* | Threshold Level - Notch 7 (Text / Binary) | [0-255/160/1 step] |
|  | 10* | $\begin{array}{\|l} \hline \text { Brightness - Notch } 6 \\ \text { (Text / Binary) } \\ \hline \end{array}$ | [0-255/128/1 step] |
|  | 11* | Contrast - Notch 6 (Text / Binary) | [0-255 / 128 / 1 step] |
|  | $12^{*}$ | $\begin{aligned} & \text { Threshold Level - Notch } 6 \\ & \text { (Text / Binary) } \\ & \hline \end{aligned}$ | [0-255/145/1 step] |
|  | 13* | $\text { Brightness - Notch } 5$ (Text / Binary) | [0-255 / 128/1 step] |
|  | 14* | Contrast - Notch 5 (Text / Binary) | [0-255 / 128/1 step] |
|  | 15* | Threshold Level - Notch 5 (Text / Binary) | [0-255 / 135 / 1 step] |
|  | 16* | Brightness - Notch 4 (Text / Binary) | [0-255/128/1 step] |
|  | 17* | Contrast - Notch 4 (Text / Binary) | [0-255 / 128/1 step] |
|  | 18* | Threshold Level - Notch 4 (Text / Binary) | [0-255/128/1 step] |
|  | 19* | $\begin{aligned} & \hline \text { Brightness - Notch } 3 \\ & \text { (Text / Binary) } \end{aligned}$ | [0-255/128/1 step] |


| SP2 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 2002 | 20* | Contrast - Notch 3 (Text / Binary) | Adjusts the image density for each image density level for Text mode when using binary picture processing mode. $\text { [0-255 / 128 / } 1 \text { step] }$ |
|  | 21* | Threshold Level - Notch 3 (Text / Binary) | [0-255 / 100 / 1 step] |
|  | 22* | Brightness - Notch 2 <br> (Text / Binary) | [0-255 / 128/1 step] |
|  | 23* | Contrast - Notch 2 (Text / Binary) | [0-255 / 128/1 step] |
|  | 24* | Threshold Level - Notch 2 (Text / Binary) | [0-255/85/1 step] |
|  | 25* | Brightness - Notch 1 (Text / Binary) | [0-255 / 128/1 step] |
|  | 26* | Contrast - Notch 1 (Text / Binary) | [0-255/128/1 step] |
|  | 27* | Threshold Level - Notch 1 (Text / Binary) | [0-255 / 70 / 1 step] |
|  | 28* | Independent Dot Erase (Text mode) | Selects the independent dot erase level. With a larger SP setting, more dots are detected as independent dots and erased. If this is " 0 ", independent dot erase is disabled. [0-7 / 4 / 1 step] |
|  | 29* | Unevenness correction (Text mode) | Selects whether the unevenness correction is done. <br> This function is like an FCI function. If this is " 1 ", the edges of characters in scanned images will be smoothed. <br> [0: OFF, 1: ON] |
| 2003 | 1* | MTF Filter Coefficient (Text/Photo / Binary / Main scan) | 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. $[0-15 / 4 / 1 \text { step }]$ |
|  | 28* | MTF Filter Coefficient (Text/Photo / Binary / Sub scan) | As above, for sub scan $[0-13 / 4 / 1$ step $]$ |
|  | 3* | MTF Filter Strength (Text/Photo / Binary / Main scan) | Selects the MTF filter strength in the main scan direction for Text/Photo mode. <br> Select a higher number for a stronger filter. <br> [0-7 / 5 / 1 step] |
|  | 4* | MTF Filter Strength (Text/Photo / Binary / Sub scan) | $\begin{aligned} & \text { As above, for sub scan } \\ & {[0-7 / 5 / 1 \text { step }]} \end{aligned}$ |
|  | 5* | Smoothing Filter (Text/Photo / Binary) | Selects the smoothing pattern for Text/Photo mode when using binary picture processing mode. <br> A larger value could cause moiré to appear in the image. <br> [0-7/0/1 step] |


| SP2 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 2003 | 6* | Scanner Gamma (Text/Photo / Binary) | Selects the scanner gamma type for Text/Photo mode when using binary picture processing mode. <br> [0-6 / $5 / 1$ step] |
|  | $7^{*}$ | Brightness - Notch 7 (Text/Photo / Binary) | Adjusts the image density for each image density level for Text/Photo mode when using binary picture processing mode. $\text { [0-255 / } 15 \text { / } 1 \text { step] }$ |
|  | 8* | Contrast - Notch 7 (Text/Photo / Binary) | [0-255 / 110 / 1 step] |
|  | 9* | Threshold Level - Notch 7 (Text/Photo / Binary) | This SP is not available. [0-255/128/1 step] |
|  | 10* | Brightness - Notch 6 (Text/Photo / Binary) | [0-255 / 25 / 1 step] |
|  | 11* | Contrast - Notch 6 (Text/Photo / Binary) | [0-255 / 85 / 1 step] |
|  | 12* | Threshold Level - Notch 6 (Text/Photo / Binary) | This SP is not available. [0-255/128/1 step] |
|  | 13* | Brightness - Notch 5 (Text/Photo / Binary) | [0-255 / $27 / 1$ step] |
|  | 14* | Contrast - Notch 5 (Text/Photo / Binary) | [0-255/51/1 step] |
|  | 15* | Threshold Level - Notch 5 (Text/Photo / Binary) | This SP is not available. [0-255/128/1 step] |
|  | 16* | Brightness - Notch 4 (Text/Photo / Binary) | [0-255 / 70 / 1 step] |
|  | 17* | Contrast - Notch 4 (Text/Photo / Binary) | [0-255 / 70 / 1 step] |
|  | 18* | Threshold Level - Notch 4 (Text/Photo / Binary) | This SP is not available. [0-255/128/1 step] |
|  | 19* | Brightness - Notch 3 (Text/Photo / Binary) | [0-255 / 69 / 1 step] |
|  | 20* | Contrast - Notch 3 (Text/Photo / Binary) | [0-255 / 80 / 1 step] |
|  | 21* | Threshold Level - Notch 3 (Text/Photo / Binary) | This SP is not available. [0-255/128/1 step] |
|  | 22* | Brightness - Notch 2 (Text/Photo / Binary) | [0-255 / 100 / 1 step] |
|  | 23* | Contrast - Notch 2 (Text/Photo / Binary) | [0-255 / 100 / 1 step] |
|  | 24* | Threshold Level - Notch 2 (Text/Photo / Binary) | This SP is not available. [0-255/128/1 step] |
|  | 25* | Brightness - Notch 1 (Text/Photo / Binary) | [0-255 / 128/1 step] |
|  | 26* | Contrast - Notch 1 (Text/Photo / Binary) | [0-255 / 128 / 1 step] |
|  | 27* | Threshold Level - Notch 1 (Text/Photo / Binary) | This SP is not available. [0-255/128/1 step] |


| SP2 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 2004 | 1* | MTF Filter Coefficient (Photo / Binary / Main scan) | Selects the MTF filter coefficient in the main scan direction for Photo mode. <br> Select a higher number for a stronger filter. <br> If this is " 0 ", the MTF filter is not applied. $\text { [0-15 / 0 / } 1 \text { step] }$ |
|  | 2* | MTF Filter Coefficient (Photo / Binary / Sub scan) | As above, for sub scan [0-13/0/1 step] |
|  | 3* | MTF Filter Strength (Photo / Binary / Main scan) | Selects the MTF filter strength in the main scan direction for Photo mode. <br> Select a higher number for a stronger filter. <br> [0-7 / 0 / 1 step] |
|  | 4* | MTF Filter Strength (Photo / Binary / Sub scan) | As above, for sub scan [0-7/0/1 step] |
|  | 5* | Smoothing Filter (Photo / Binary) | Selects the smoothing pattern for Photo mode when using binary picture processing mode. A larger value could cause moiré to appear in the image. <br> [0-7/0/1 step] |
|  | 6* | Scanner Gamma (Photo / Binary) | Selects the scanner gamma type for Photo mode when using binary picture processing mode. <br> [0-6 / $6 / 1$ step] |
|  | $7^{*}$ | Dither Matrix Filter (Photo / Binary) | Selects the dither matrix type for Photo mode when using binary picture processing mode. [1-26/4/1 step] |
|  | 8* | Brightness - Notch 7 (Photo / Binary) | Adjusts the image density for each image density level for Photo mode when using binary picture processing mode. $\text { [0-255 / } 60 \text { / } 1 \text { step] }$ |
|  | 9* | Contrast - Notch 7 (Photo / Binary) | [0-255 / 128/1 step] |
|  | 10* | Threshold Level - Notch 7 (Photo / Binary) | This SP is not available. [0-255 / 128 / 1 step] |
|  | 11* | Brightness - Notch 6 (Photo / Binary) | [0-255 / 100 / 1 step] |
|  | 12* | Contrast - Notch 6 (Photo / Binary) | [0-255 / 128 / 1 step] |
|  | 13* | ```Threshold Level - Notch 6 (Photo / Binary)``` | This SP is not available. [0-255 / 128/1 step] |
|  | 14* | Brightness - Notch 5 (Photo / Binary) | [0-255/120/1 step] |
|  | 15* | Contrast - Notch 5 (Photo / Binary) | [0-255 / 120 / 1 step] |
|  | 16* | Threshold Level - Notch 5 (Photo / Binary) | This SP is not available. [0-255 / 128 / 1 step] |
|  | 17* | Brightness - Notch 4 (Photo / Binary) | [0-255 / 128/1 step] |


| SP2 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 2004 | 18* | Contrast - Notch 4 (Photo / Binary) | Adjusts the image density for each image density level for Photo mode when using binary picture processing mode. <br> [0-255 / 128 / 1 step] |
|  | 19* | Threshold Level - Notch 4 (Photo / Binary) | This SP is not available. [0-255/128/1 step] |
|  | 20* | Brightness - Notch 3 (Photo / Binary) | [0-255/135/1 step] |
|  | 21* | Contrast - Notch 3 (Photo / Binary) | [0-255 / 135 / 1 step] |
|  | $22^{*}$ | Threshold Level - Notch 3 (Photo / Binary) | This SP is not available. [0-255 / 128 / 1 step] |
|  | 23* | Brightness - Notch 2 (Photo / Binary) | [0-255 / 138/1 step] |
|  | 24* | Contrast - Notch 2 (Photo / Binary) | [0-255 / 133 / 1 step] |
|  | 25* | Threshold Level - Notch 2 (Photo / Binary) | This SP is not available. [0-255/128/1 step] |
|  | 26* | Brightness - Notch 1 <br> (Photo / Binary) | [0-255 / 140 / 1 step] |
|  | 27* | Contrast - Notch 1 (Photo / Binary) | [0-255 / 133 / 1 step] |
|  | 28* | Threshold Level - Notch 1 (Photo / Binary) | This SP is not available. [0-255/128/1 step] |
| 2005 | 1* | MTF Filter Coefficient (Grayscale / Main scan) | Selects the MTF filter coefficient in the main scan direction when using grayscale processing mode. <br> Select a higher number for a stronger filter. <br> If this is " 0 ", the MTF filter is not applied <br> [0-15/0/1 step] |
|  | 2* | MTF Filter Coefficient (Grayscale / Sub scan) | As above, for sub scan [0-13/0/1 step] |
|  | 3* | MTF Filter Strength (Grayscale / Main scan) | Selects the MTF filter strength in the main scan direction when using grayscale processing mode. <br> Select a higher number for a stronger filter. [0-7 / 0 / 1 step] |
|  | 4* | MTF Filter Strength (Grayscale / Sub scan) | As above, for sub scan [0-7/0/1 step] |
|  | 5* | Smoothing Filter (Grayscale) | Selects the smoothing pattern when using grayscale processing mode. <br> A larger value could cause moiré to appear in the image. <br> [0-7/0/1 step] |
|  | 6* | Scanner Gamma (Grayscale) | Selects the scanner gamma type when using grayscale processing mode. $\text { [0-6 / / / } 1 \text { step }$ |


| SP2 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 2005 | 7* | Brightness - Notch 7 <br> (Grayscale) | Adjusts the image density for each image density level when using the grayscale processing mode. <br> [0-255 / 98/1 step] |
|  | 8* | Contrast - Notch 7 (Grayscale) | [0-255 / 98/1 step] |
|  | 9* | Threshold Level - Notch 7 (Grayscale) | This SP is not available. [0-255/98/1 step] |
|  | 10* | Brightness - Notch 6 (Grayscale) | [0-255 / 108/1 step] |
|  | 11* | Contrast - Notch 6 (Grayscale) | [0-255 / 108 / 1 step] |
|  | 12* | Threshold Level - Notch 6 (Grayscale) | This SP is not available. [ $0-255 / 108 / 1$ step] |
|  | 13* | $\begin{aligned} & \text { Brightness - Notch } 5 \\ & \text { (Grayscale) } \end{aligned}$ | [0-255 / 118/1 step] |
|  | 14* | Contrast - Notch 5 (Grayscale) | [0-255 / 118/1 step] |
|  | 15* | Threshold Level - Notch 5 (Grayscale) | This SP is not available. [0-255/118/1 step] |
|  | 16* | Brightness - Notch 4 (Grayscale) | [0-255 / 128/1 step] |
|  | 17* | Contrast - Notch 4 (Grayscale) | [0-255 / 128 / 1 step] |
|  | 18* | Threshold Level - Notch 4 (Grayscale) | This SP is not available. [0-255 / 128/1 step] |
|  | 19* | Brightness - Notch 3 (Grayscale) | [0-255/138/1 step] |
|  | 20* | Contrast - Notch 3 (Grayscale) | [0-255 / 138 / 1 step] |
|  | 21* | Threshold Level - Notch 3 (Grayscale) | This SP is not available. [ $0-255 / 138 / 1$ step] |
|  | 22* | Brightness - Notch 2 <br> (Grayscale) | [0-255 / 148/1 step] |
|  | 23* | Contrast - Notch 2 (Grayscale) | [0-255 / 148 / 1 step] |
|  | 24* | Threshold Level - Notch 2 (Grayscale) | This SP is not available. [ $0-255 / 148 / 1$ step] |
|  | 25* | Brightness - Notch 1 (Grayscale) | [0-255 / 158/1 step] |
|  | 26* | Contrast - Notch 1 (Grayscale) | [0-255 / 158/1 step] |
|  | 27* | Threshold Level - Notch 1 (Grayscale) | This SP is not available. [0-255 / 158/1 step] |
| 2006 | 1* | Compression Ratio (Normal image) | Selects the compression ratio for grayscale processing mode. <br> For a lower compression rate, input a smaller value. $\text { [5-95 / } 50 \text { / } 1 \text { step] }$ |

SCANNER SERVICE MODE

| SP2 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 2006 | $2^{*}$ | Compression Ratio <br> (High Quality image) | $[5-95 / 60 / 1$ step $]$ |
|  | $3^{*}$ | Compression Ratio <br> (Low Quality image) | $[5-95 / 40 / 1$ step $]$ |


| SP8 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 8001* |  | Delivery Server IP Address | Sets the IP address for the delivery server. [000.000.000.000] |
| 8002 | 1* | Delivery Re-try (Interval) | Sets the delivery re-try interval. [60-999 / 300s / 1s step] |
|  | 2* | Delivery Re-try (Number of re-try) | Sets the number of delivery re-tries. If this is " 0 ", the machine will not re-try to send an image to the delivery server. [0-99 / 3 times / 1 time step] |
| 8003* |  | ECabinet IP Address | Sets the IP address for the eCabinet. [000.000.000.000] |
| 8004* |  | Network Error Display Time | Selects the length of time that the network error message for the scanner utilities is displayed. <br> If this is " 0 ", the error message is displayed until the error is solved. <br> [0-999 / 300 s / 1 s step] |


| SP9 |  | Mode Number | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 9001 | 1 | Sysop | Bit switches for debugging. DFU |
|  | 2 | Dapp |  |
|  | 3 | Rapp |  |
|  | 4 | Ui |  |
|  | 5 | Nas |  |
|  | 6 | Miw |  |
|  | 7 | Djm |  |
|  | 8 | Hpim |  |
|  | 9 | mib |  |

### 3.4 FIRMWARE UPDATE PROCEDURE

Firmware updating procedure is described in section 5.2 of the main unit service manual.

### 3.5 POWER-ON SELF TEST

The controller tests the following devices at power-on. If an error is detected, an error code is stored in the controller board.

- CPU, ASIC and clock
- Flash ROM
- Resident and optional SDRAM
- Parallel interface
- NIB
- IEEE1394 interface (if installed)
- NVRAM
- HDD
- Refer to section 4.1.2 of the main unit service manual for how to check the error codes (SP 7-832).


### 3.6 SELF DIAGNOSTIC TEST

In addition to the power-on self test, you can set the machine in a more detailed diagnostic mode to test other components and conditions.
It requires a loop-back connector (P/N: G0219350).

1. Turn off the machine and attach the loop-back connector to the parallel interface.
2. Turn on the machine while pressing the "On Line" key and "\# Enter" key together.
3. The machine prints the diagnostic report automatically.

- Refer to section 4.1.2 of the main unit service manual for how to check the error codes (SP 7-832).


### 3.7 USER PROGRAM MODE

### 3.7.1 PRINTER USER PROGRAM MODE

Press the "Printer" key on the operation panel to enter the printer mode.
Press the "User Tools/Counter $\triangle /$ /[i23 ", then select "Printer Settings" to change printer settings.

## User Mode Tree



### 3.7.2 SCANNER USER PROGRAM MODE

Press the "User Tools/Counter $\triangle / \boxed{\pi 23}$ ", then select "Scanner Settings" to change scanner settings.

## User Mode Tree



## DETAILED DESCRIPTIONS

## 4. DETAILED SECTION DESCRIPTIONS

### 4.1 OVERVIEW



This machine uses the GW architecture. To enable the printer features, just install the printer option ROM DIMM on the controller.
Main components:

- CPU: QED RM5231
- SIMAC: GW architecture ASIC. It controls all the functions of the controller board.
- Flash ROM: 8MB Flash ROM for the system program
- SDRAM (resident): 32 MB SDRAM, expandable with 32 MB or 64 MB optional SDRAM.
- NVRAM: Stores the controller settings
- HDD: Used to store additional soft fonts. Also used for collation, locked print, sample print and form overlay
- IEEE 1284 interface

Optional components:

- PostScript3 DIMM
- Memory DIMM
- NIB
- IEEE1394 interface


### 4.2 CONTROLLER FUNCTIONS

### 4.2.1 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 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 maximum number of pages is 2,000 , including jobs using locked print and collation.


### 4.2.2 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 was 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 hard disk can hold up to 30 files, including files stored using sample 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 GB .


### 4.2.3 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 for a paper tray with 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 using the Paper Size Setting in the user tools.
(User Tools/ System Settings/ Paper Size
 Settings)

NOTE: The by-pass tray is not part of the tray search.

## Tray Lock

If Tray Lock is enabled for a tray, the controller skips the "locked" tray in the tray search process.
The Tray Lock setting can be specified by selecting "No" for the "Apply Auto Paper Select" setting in the Paper Size Setting screen in the user tools.
(User Tools/ System Settings/ Paper Size Settings)
NOTE: The by-pass feeder cannot be locked.

## 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.

### 4.2.4 AUTO CONTINUE

When this function is enabled, the machine stops printing and cancels the print job if there is no paper tray which matches the paper size and paper type specified by the driver.

If Auto Continue is enabled, the machine waits for a specified period ( $0,1,5,10$, 15 minutes) for the correct size paper to be set in the tray, then cancels the print job if the interval expires.

- The interval can set with the Printer Settings in the user tools. (User Tools/ Printer Settings/ System/ Auto Continue)
If Auto Continue is disabled, the machine will not print the job, but will not cancel it, so the job stays in the print queue.

If no paper tray matches the paper size and paper type specified by the driver:


NOTE: The default setting for Auto Continue is "Off."

### 4.2.5 PAPER OUTPUT TRAY

The default paper output tray for each application (copy/fax/printer) can be selected using the System Settings menu in the user tools.
(User Tools/ System Settings/ General Features)
If a print job does not specify an output tray or if the driver specifies the default tray, the default paper output tray is used.

## Output Tray Selected

- If an output tray is specified by the driver, it overrides the default tray setting in the user tools.
- If the machine cannot print to the selected output tray, it prints to the default paper output tray.
- If the mailbox unit is installed, paper larger than B4 cannot be printed to the standard (internal) tray.
- If paper overflow is detected at the selected output tray, the controller stops printing until the overflow detector goes off.


## Sequential Stacking

When the nine-tray mailbox is selected as the output tray and "Printer Default" is specified as the output tray in the driver, the machine automatically sends the output to the top tray (1st tray). When that tray fills up, the machine sends the output to the next tray.
This feature is called "Sequential Stacking."

- If a tray becomes full and paper is detected in the next tray, the machine displays an error and stops printing.
When paper in the next tray is removed, the machine automatically resumes printing to the next tray.
- If all trays become full (overflow detected in all trays), the machine displays an error and stops printing. This time, all paper in all trays must be removed.



### 4.2.6 DUPLEX PRINTING

Duplex printing is available with all output bin options but not all paper sizes. If a job specifies duplex printing but the paper size to be used cannot be used by the duplex unit, the job will be printed single-sided.

- When the by-pass feeder is selected as the paper source, duplex printing is automatically disabled.


### 4.2.7 STAPLING

Stapling is available when the two-tray (2250-sheet) finisher or 1000-sheet finisher is installed.
The finishers have the following stapling positions.

1000 Finisher


2 Tray Finisher


- Depending on the paper orientation, the image may have to be rotated. The image rotation is done by the controller.
- There is a limit for the number of sheets which can be stapled. If a job has more than this number, it will not be stapled.


### 4.2.8 PUNCHING

Punching is available only when the punch kit is installed with the two-tray finisher. The number of holes (2, 3, or 4 holes) depends on the type of punch kit.

- There is only one punch position available, so the relationship between the punching position and the printed image depends on the paper feeding orientation and image rotation.



### 4.3 SCANNER FUNCTIONS

### 4.3.1 IMAGE PROCESSING FOR SCANNER MODE

The image processing for scanner mode is done in the IPU chip on the BICU 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



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

After image processing and image compression, the data (TIFF or JPEG) is sent to the scanner Twain driver directory on the computer.

### 4.4 NIB

### 4.4.1 BLOCK DIAGRAM



- The Flash ROM contains the NIB firmware. The firmware can be upgraded using an IC card connected to the controller board.


### 4.4.2 LED INDICATORS



| Description | On | Off |
| :---: | :---: | :---: |
| LED1 (Green): Link status | Link success | Link failure |
| LED2 (Yellow): Data rate | 100 Mbps | 10 Mbps |

### 4.5 IEEE1394 INTERFACE

### 4.5.1 SPECIFICATIONS

## Hardware Specification

Interface: IEEE1394 (6 pins)
(no power supply, cable power repeated, IEEE1394a-2000 compliant)
Ports: 2 ports
Data rates: 400Mbps/200Mbps/100Mbps

## System Requirements

PC: Windows PC with IEEE1394 port
OS: Microsoft Windows 2000 upgraded with service pack 1
Cable length: 4.5 m (15ft)

### 4.5.2 IEEE1394

IEEE1394, also known as FireWire (a name patented by Apple), is an easy-to-use peer-to-peer networking technology allowing speeds of up to 400 Mbps .
The current standard contains the following features, which are supported in most devices:

- Hot swapping (cables can be connected and disconnected while the computer and other devices are switched on)
- Peer-to-peer networking (no hub required)
- No terminator or device ID is required, unlike SCSI
- Automatic configuration of devices upon start-up, or "plug and play."
- Real-time data transfer at 100, 200, and 400 Mbps
- Common connectors for different devices


The cable length is limited to 4.5 m (15ft). However, up to 16 cables and 63 devices can be connected to an IEEE1394 network.

IEEE1394 cables can be either 4-pin (data only) or 6-pin (data and power). IEEE1394 allows either 6-pin or 4-pin connectors. However, this machine only uses the 6-pin connectors. The machine has two 6-pin ports.

### 4.5.3 BLOCK DIAGRAM



- PHY: Physical layer control device
- Link: Link layer control device
- EEPROM: 256-byte ROM


### 4.5.4 PIN ASSIGNMENT



| Pin <br> No. | Signal Description |
| :---: | :--- |
| 1 | Cable Power |
| 2 | GND |
| 3 | Receive strobe |
| 4 | Transmit data |
| 5 | Receive data |
| 6 | Transmit strobe |

### 4.5.5 REMARKS ABOUT THIS INTERFACE KIT

Note the following points about this unit.

- The machine does not print reports specifically for IEEE1394. Just print the Configuration Page at installation to check that the machine recognizes the card.
- There is no spooler or print queue. If a computer tries to print over the IEEE1394 while the printer is busy, the IEEE1394 interface card inside the printer will return a busy signal.
- After starting a job using IEEE1394, do not switch the printer off until the job has been completed. Even though the printer may appear to be dead, it may be in the middle of an IEEE1394 protocol exchange with the computer.
- When using IEEE1394, it is not possible to check the printer status from the computer with a utility such as Printer Manager for Client.


### 4.5.6 TROUBLESHOOTING NOTES

If there are problems printing using the IEEE1394 interface, check the following.

- Is the computer using Windows 2000 with service pack 1 ?
- Has the interface card been replaced recently? Each card has an individual address, similar to the MAC address in an Ethernet card. If the card was changed, the driver cannot find the old card. The new card is another device and a new printer appears in Windows Control panel, and this must be configured in the same way as the printer that was replaced (the old printer icon in Windows Control Panel should be deleted) has to be reconfigured.
- Is there a loop somewhere in the network? An IEEE1394 network must be a chain or a branched chain. There can be no loops.
- Try to find out where in the chain the problem is occurring. Test the machine one-to-one with the computer to determine if the printer is defective (when the printer's interface cable is plugged in, the computer should see 'Printer Ready'; when the cable is disconnected, the computer should see 'Offline').


## SPECIFICATIONS

## SPECIFICATIONS

## 1. GENERAL SPECIFICATIONS

### 1.1 PRINTER

| Printing Speed: | Maximum 45 ppm (A4/LT LEF): B004/B007 model |
| :---: | :---: |
|  | Maximum 35 ppm (A4/LT LEF): B003/B006 model |
| Printer Languages: | PCL6/PCL5e <br> PostScript 3 (option) <br> RPCS (Refined Printing Command Stream) - an original <br> Ricoh PDL) |
| Resolution: | 600 dpi (PCL 6/PCL5e/PS3/RPCS) 300 dpi (PCL5e/PS3) |
| Resident Fonts: | ```PCL: 35 Intellifonts 10 True Type fonts PS3: 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) (option) IEEE1394 (option) |
| Network Protocols: | TCP/IP, IPX/SPX, NetBEUI, Apple Talk |
| Memory: | Maximum 96 MB <br> (Standard 32 MB + 32 MB/64MB optional DIMM) |

## SPECIFICATIONS

Supported Paper Sizes

| Paper | Size (W x L) | Paper Trays Main Unit/Option |  | By-pass Tray | LCT | Duplex |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | US | Eur/Asia |  |  |  |
| A3 | $297 \times 420 \mathrm{~mm}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | Y/Y | $\mathrm{Y}^{*}$ | N | Y |
| B4 | $257 \times 364 \mathrm{~mm}$ | $\mathrm{Y}^{\#} \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#}$ | N | Y |
| A4 SEF | $210 \times 297 \mathrm{~mm}$ | Y/Y | Y/Y | $\mathrm{Y}^{\#}$ | N | Y |
| A4 LEF | $297 \times 210 \mathrm{~mm}$ | Y/Y | Y/Y | $\mathrm{Y}^{\#}$ | Y | Y |
| B5 SEF | $182 \times 257 \mathrm{~mm}$ | $\mathrm{Y}^{\#} \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#}$ | N | Y |
| B5 LEF | $257 \times 182 \mathrm{~mm}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{*}$ | N | Y |
| A5 SEF | $148 \times 210 \mathrm{~mm}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | Y/Y | $\mathrm{Y}^{*}$ | N | Y |
| A5 LEF | $210 \times 148 \mathrm{~mm}$ | N | N | $\mathrm{Y}^{\#}$ | N | N |
| B6 SEF | $128 \times 182 \mathrm{~mm}$ | N | N | $Y^{\text {c }}$ | N | N |
| B6 LEF | $182 \times 128 \mathrm{~mm}$ | N | N | N | N | N |
| A6 SEF | $105 \times 148 \mathrm{~mm}$ | N | N | $\mathrm{Y}^{\text {c }}$ | N | N |
| Ledger | $11 \times 17^{\prime \prime}$ | Y/Y | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{*}$ | N | Y |
| Legal | $8.5 \times 14^{4}$ | Y/Y | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#}$ | N | Y |
| Letter SEF | $8.5 \times 11^{\prime \prime}$ | Y/Y | Y/Y | $\mathrm{Y}^{\#}$ | N | Y |
| Letter LEF | $11 \times 8.5$ " | Y/Y | Y/Y | $\mathrm{Y}^{*}$ | Y | Y |
| Half Letter SEF | $5.5 \times 8.5$ " | Y/Y | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#}$ | N | Y |
| Half Letter LEF | $8.5 \times 5.5$ " | N | N | N | N | N |
| Executive SEF | $7.25 \times 10.5$ " | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{*}$ | N | Y |
| Executive LEF | $10.5 \times 7.25$ " | N | N | $\mathrm{Y}^{*}$ | N | Y |
| F | $8 \times 13^{\prime \prime}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{*}$ | N | Y |
| Foolscap | $8.5 \times 13^{\prime \prime}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#}$ | N | Y |
| Folio | $8.25 \times 13^{\prime \prime}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{*}$ | N | Y |
| Com10 Env. | $4.125 \times 9.5$ " | N | N | N | N | N |
| Monarch Env. | $3.875 \times 7.5$ " | N | N | N | N | N |
| C6 Env. | $114 \times 162 \mathrm{~mm}$ | N | N | N | N | N |
| C5 Env. | $162 \times 229 \mathrm{~mm}$ | N | N | N | N | N |
| DL Env. | $110 \times 220 \mathrm{~mm}$ | N | N | N | N | N |
| 8K | $267 \times 390 \mathrm{~mm}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{*}$ | N | Y |
| 16K SEF | $195 \times 267 \mathrm{~mm}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#}$ | N | Y |
| 16K LEF | $267 \times 195 \mathrm{~mm}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#} / \mathrm{Y}^{\#}$ | $\mathrm{Y}^{\#}$ | N | Y |
| Custom | Minimum: <br> $100 \times 297 \mathrm{~mm}$ <br> Maximum: <br> $148 \times 600 \mathrm{~mm}$ | N | N | $Y^{\text {C }}$ | $N$ | $N$ |

Remarks:

| Y | Supported. The paper size sensor detects the paper size. |
| :--- | :--- |
| $\mathrm{Y}^{\#}$ | Supported. The user has to select the correct paper size for the tray. |
| $\mathrm{Y}^{\mathrm{C}}$ | Supported. The user has to enter the width and length of the paper. |
| N | Not supported. |

### 1.2 SCANNER

| Standard Scanner Resolution: | Main scan/Sub scan 600 dpi |
| :---: | :---: |
| Available scanning Resolution Range: | Twain Mode: |
|  | Book Mode (Main scan/Sub scan) 100 ~ 2400 dpi ADF Mode (Main scan/Sub scan) 100 ~ 1200 dpi |
|  | Delivery Mode: |
|  | Book and ADF Mode (Main scan/Sub scan) $100 \sim 600 \mathrm{dpi}$ |
| Grayscales: | 8 bits/pixel |
| Scanning | 25 spm for TWAIN |
| Throughput: | 53 spm for Delivery mode (A4L, ADF mode) |
| Interface: | Ethernet (100 Base-TX/10 Base-T for TCP/IP) |
| Compression Method: | MH, MR, MMR (Binary Picture Processing) JPEG (Grayscale Processing) |
| Video Memory | 8.3 MB (Twain) |
| Capacity: | 24.9 MB (Delivery mode) |
| Image Storage | Number of originals per file: Maximum 160 pages |
| Capacity: | Maximum of files: 3000 files |

## 2. SOFTWARE ACCESSORIES

### 2.1 PRINTER

The printer drivers and utility software are provided on one CD-ROM. An auto-run installer allows you to select which components to install.

## PRINTER DRIVERS

| Printer Language | Windows <br> 95/98/ME | Windows NT4.0 | Windows 2000 | Macintosh |
| :---: | :---: | :---: | :---: | :---: |
| PCL 6 | Yes | Yes | Yes | No |
| PCL 5e | Yes | Yes | Yes | No |
| PS3 | Yes | Yes | Yes | Yes |
| RPCS | 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.

## UTILITY SOFTWARE

| Software | Description |
| :--- | :--- |
| Agfa Font Manager <br> (Win 95/98/ME, NT4, 2000) | A font management utility with screen fonts for the printer. |
| SmartNetMonitor for Admin <br> (Win 95/98/ME, NT4, 2000) | A printer management utility for network administrators. NIB <br> setup utilities are also available. |
| SmartNetMonitor for Client <br> (Win 95/98/ME, NT4, 2000) | A printer management utility for client users. Peer-to-peer <br> printing utility and parallel/recovery printing functions are <br> included. |
| 1394 Utility (Win 2000) | A utility for removal IEEE 1394 printers. |
| DeskTopBinder V2 Lite |  |
| (Win 95/98/ME, NT4, 2000) | A utility for document management |
| LAN-Fax M1 |  |
| (Win 95/98/ME, NT4, 2000) | PC LAN FAX driver |
| Address Book, |  |
| (Win 95/98/ME, NT4, 2000) |  | A utility for PC LAN FAX. $\quad$| This software provides several convenient functions for printing |
| :--- |
| from Macintosh clients. |

### 2.2 SCANNER

The scanner driver and utility software are provided on one CD-ROM.
SCANNER DRIVER

- Network Twain Driver for Win95/98/ME/NT3.51/NT4.0/2000


## SCANNER UTILITIES

- Scan Router V2 Lite (Cherry-Lite) for Win95/98/ME/NT4.0/2000
- Desk Top Binder V2 Lite (Plumeria-Lite) for Win95/98/ME/NT4.0/2000


## 3. MACHINE CONFIGURATION

### 3.1 SYSTEM COMPONENTS



| Item | Machine Code | No. | Remarks |  |
| :--- | :---: | :---: | :---: | :---: |
| Printer Module <br> (ROM DIMM) | B362 | 1 |  |  |
| Printer/Scanner <br> Module <br> (ROM DIMM) | B361 | 1 |  |  |
| Option |  |  |  |  |
| Mailbox | G909 | 6 |  |  |
| Mailbox Bridge Unit | G912 | 7 |  |  |
| Internal Option | G574 | 3 |  |  |
| NIB | G577 | 2 |  |  |
| PostScript3 | G579 |  |  |  |
| Memory 64 MB | G590 | 4 |  |  |
|  |  |  |  |  |

FAX UNIT B360

## INSTALLATION

## 1. INSTALLATION

### 1.1 FAX UNIT

### 1.1.1 CAUTIONS

NOTE: 1) Never install telephone wiring during a lightning storm.
2) Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3) Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4) Use caution when installing or modifying telephone lines.
5) Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
6) If there is a gas leak, do not use the telephone in the vicinity of the leak to report it.

## $\triangle$ CAUTION

1. Before installing the fax unit, switch off the main power and operation switches, and disconnect the power cord.
2. The fax unit contains a lithium battery. The danger of explosion exists if a battery of this type is incorrectly replaced. Replace only with the same or an equivalent type recommended by the manufacturer. Discard used batteries in accordance with the manufacturer's instructions.

## FAX UNIT

### 1.1.2 FLOW CHART

Before installing the fax unit and/or fax options, refer to the following flow chart.


### 1.1.3 FAX OPTION TYPE 1045 INSTALLATION


[F]


## $\triangle$ CAUTION <br> Before installing this option, do the following:

1. If there is a printer option in the machine, print out all data in the printer buffer.
2. Press the operation switch to enter standby mode. Make sure the power LED is not lit, then turn off the main switch and disconnect the power cord and the network cable.
3. Remove the small cover $[A]$ ( 1 screw) and connector $[B]$.
4. Remove the left rear cover [C] (2 screws), the rear upper cover [D] (2 screws) and the rear lower cover [E] (4 screws).
5. Attach the NCU unit [F] to the machine (2 screws).

NOTE: If any G3 Interface Unit Type 1045 has to been installed, attach the additional NCU boards to the NCU unit before attaching the NCU unit to the machine. Refer to the Installation Procedure for the G3 Interface Unit Type 1045.

4. Remove the FCU cover $[A]$ (2 screws) and the controller unit $[B]$ (2 screws).
5. Turn on the battery switch (SW1) [C] on the FCU board [F], connect the harness [D] to the FCU board. Then slide the FCU board into the right slot of the expansion box.

NOTE: If any following options will be installed at the same time, connect the option board to the FCU board before sliding the FCU board into the expansion box. Refer to the Installation Procedure of each option.

- Fax Function Upgrade Type 185
- G3 Interface Unit Type 1045
- ISDN option Type 1045

6. Attach the edge clamp [E] to the bottom of the expansion box, then clamp the FCU harness [D].
7. Machine Codes B003 and B004: Attach the DIMM board (4MB) to slot 1 (CN7) on the controller board.
Machine Codes B006 and B007: You don't have to attach the DIMM board to the controller board. The 8MB DIMM board is already installed on the controller board of these models.

8. Attach the harness clamps $[A]$ and connect the FCU harness $[B]$ to the NCU board. Then clamp the harness as shown.
9. Reattach the FCU cover and the controller unit.

NOTE: If the ISDN option is installed, cut away the small part from the FCU cover for the ISDN connector. Refer to the Installation Procedure for the ISDN Option Type 1045.
10. Remove parts [C] and [D], then install parts [E], [F] and [G]. Attach the super G3 decal $[\mathrm{H}]$ to the front cover as shown.
11. Cut away the telephone connector cover [I]. Attach the FCC decal and the serial number decal [J] to the rear cover as shown.
12. Reattach the covers.

13. If the ADF has been installed, insert the stamp cartridge [A] into the ADF as shown.
14. Connect the telephone line to the "LINE" jack at the rear of the machine.
15. Plug in the machine and turn on the main power switch.
16. Be sure to set the clock (date and time).
17. Enter service mode and program the serial number into the fax unit (SP-3-102000). The serial number can be found on the serial number label (attached to the machine in step 11).

### 1.1.4 G3 INTERFACE UNIT TYPE 1045 INSTALLATION



## $\triangle$ CAUTION

Before installing this option, do the following:

1. If there is a printer option in the machine, print out all data in the printer buffer.
2. Press the operation switch to enter standby mode. Make sure the power LED is not lit, then turn off the main switch and disconnect the power cord and the network cable.
3. Remove the small cover $[A]$ ( 1 screw) and the connector $[B]$.
4. Remove the rear cover [C] (2 screws), the rear upper cover [D] (2 screws) and the rear lower cover [E] (4 screws).
5. Remove the FCU cover [F] (2 screws) and controller unit (2 screws).

6. Remove the FCU harness $[A]$ and slide out the FCU board $[B]$ from the machine.
7. Attach the four locking supports [D] to the CCUIF board [C]. Then attach the CCUIF board to the FCU board [E] as shown.
8. Attach the flat cable [F] to the FCU board and the CCUIF board.
9. Attach the option G3 board [G] to the lower connector of the CCUIF board (2 screws).


[G]
10. Remove the NCU unit [A] (2 screws).
11. Attach the option NCU unit [B] to the lower portion of the reverse side of the NCU unit (2 screws) as shown. Attach the telephone jack [C] to the bracket [D], run through the harness through the lower hole [E] in the NCU bracket, then secure the telephone jack bracket to the NCU unit (1 screw).
12. Connect harness [F] to the option NCU board, then clamp the harness as shown.
13. Attach the NCU unit [G] to the machine (2 screws), and slide the FCU board into the machine. Then run through the harness $[\mathrm{H}]$ as shown.
14. Attach the ferrite core [I] to the harness.

15. Cut away the small cover [A] for the first option G3 unit.

NOTE: If there is another G3 option unit, cut away the upper small cover [B].
14. Attach the label [C] to the rear cover.
15. Reattach the covers.

NOTE: Attach the second option NCU board [D] and the second option G3 board [E] to the upper side as shown.
16. Attach the ferrite core [F] to the cable and connect the cable to the LINE2 jack, then plug in the machine and turn the main switch on.
17. Enter service mode. Set bit 1 of communication switch 16 to " 1 " for the first option G3 unit. Set bit 3 of communication switch 16 to " 1 " for the second option G3 unit. After that turn the main switch off and on.
18. Print the system parameter list and ensure that "SG3-V34" is listed as an option.
19. Set up and program the items required for PSTN-2 communications.

### 1.1.5 ISDN OPTION TYPE 1045 INSTALLATION




## $\triangle$ CAUTION <br> Before installing this option, do the following:

1. If there is a printer option in the machine, print out all data in the printer buffer.
2. Turn off the main switch and disconnect the power cord and the STP cable.
3. Remove the rear cover [A] (2 screws).
4. Remove the FCU cover [B] (2 screws) and controller unit (2 screws).
5. Remove the FCU harness [C] and slide out the FCU board [D] from the machine.
6. Attach the four locking supports $[A]$ to the CCUIF board [B]. Then attach the CCUIF board to the FCU board [C] as shown.
7. Attach the flat cable [D] to the FCU board and the CCUIF board.
8. Attach the option ISDN board [E] to the upper connector of the CCUIF board (2 screws).
9. Slide the FCU board into the machine,
 and connect the FCU harness.
10. Remove the small plate [F] from the FCU cover, then reattach the FCU cover (2 screws) and controller unit.
11. Reattach the covers.
12. Connect the cable to the LINE2 jack, then plug in the machine and turn the main switch on.
13. Enter service mode and set bit 2 of communication switch 16 to " 1 ". After that turn the main switch off and on.
14. Print the system parameter list and ensure that "SIG4" is listed as an option.
15. Set up and program the items required for ISDN communications.
16. Affix the FCC/IC approval label on the machine around the ISDN jack (This step is only for US/Canada.)

## TROUBLESHOOTING

## 2. TROUBLESHOOTING

### 2.1 ERROR CODES

If an error code occurs, retry the communication. If the same problem occurs, try to fix the problem as suggested below. Note that some error codes appear only in the error code display and on the service report.

| Code | Meaning | Suggested Cause/Action |
| :---: | :---: | :---: |
| 0-00 | DIS/NSF not detected within 40 s of Start being pressed | - Check the line connection. <br> - Check the NCU - FCU connectors. <br> - The machine at the other end may be incompatible. <br> - Replace the NCU or FCU. <br> - Check for DIS/NSF with an oscilloscope. <br> - If the rx signal is weak, there may be a bad line. |
| 0-01 | DCN received unexpectedly | - The other party is out of paper or has a jammed printer. <br> - The other party pressed Stop during communication. |
| 0-03 | Incompatible modem at the other end | - The other terminal is incompatible. |
| 0-04 | CFR or FTT not received after modem training | - Check the line connection. <br> - Check the NCU - FCU connectors. <br> - Try changing the tx level and/or cable equalizer settings. <br> - Replace the FCU or NCU. <br> - The other terminal may be faulty; try sending to another machine. <br> - If the $r x$ signal is weak or defective, there may be a bad line. <br> Cross reference <br> - Tx level - NCU Parameter 01 (PSTN) <br> - Cable equalizer - G3 Switch 07 (PSTN) <br> - Dedicated Tx parameters - Section 4 |
| 0-05 | Unsuccessful after modem training at 2400 bps | - Check the line connection. <br> - Check the NCU - FCU connectors. <br> - Try adjusting the tx level and/or cable equalizer. <br> - Replace the FCU or NCU. <br> - Check for line problems. <br> Cross reference <br> - See error code 0-04. |


| Code | Meaning | Suggested Cause/Action |
| :---: | :---: | :---: |
| 0-06 | The other terminal did not reply to DCS | - Check the line connection. <br> - Check the FCU - NCU connectors. <br> - Try adjusting the $t x$ level and/or cable equalizer settings. <br> - Replace the NCU or FCU. <br> - The other end may be defective or incompatible; try sending to another machine. <br> - Check for line problems. <br> Cross reference <br> - See error code 0-04. |
| 0-07 | No post-message response from the other end after a page was sent | - Check the line connection. <br> - Check the FCU - NCU connectors. <br> - Replace the NCU or FCU. <br> - The other end may have jammed or run out of paper. <br> - The other end user may have disconnected the call. <br> - Check for a bad line. <br> - The other end may be defective; try sending to another machine. |
| 0-08 | The other end sent RTN or PIN after receiving a page, because there were too many errors | - Check the line connection. <br> - Check the FCU - NCU connectors. <br> - Replace the NCU or FCU. <br> - The other end may have jammed, or run out of paper or memory space. <br> - Try adjusting the tx level and/or cable equalizer settings. <br> - The other end may have a defective modem/NCU/FCU; try sending to another machine. <br> - Check for line problems and noise. <br> Cross reference <br> - Tx level - NCU Parameter 01 (PSTN) <br> - Cable equalizer - G3 Switch 07 (PSTN) <br> - Dedicated Tx parameters - Section 4 |
| 0-14 | Non-standard post message response code received | - Check the FCU - NCU connectors. <br> - Incompatible or defective remote terminal; try sending to another machine. <br> - Noisy line: resend. <br> - Try adjusting the tx level and/or cable equalizer settings. <br> - Replace the NCU or FCU. <br> Cross reference <br> - See error code 0-08. |


| Code | Meaning | Suggested Cause/Action |
| :---: | :---: | :---: |
| 0-15 | The other terminal is not capable of specific functions. | The other terminal is not capable of accepting the following functions, or the other terminal's memory is full. <br> - Confidential rx <br> - Transfer function <br> - SEP/SUB/PWD/SID |
| 0-16 | CFR or FTT not detected after modem training in confidential or transfer mode | - Check the line connection. <br> - Check the FCU - NCU connectors. <br> - Replace the NCU or FCU. <br> - Try adjusting the tx level and/or cable equalizer settings. <br> - The other end may have disconnected, or it may be defective; try calling another machine. <br> - If the rx signal level is too low, there may be a line problem. <br> Cross reference <br> - See error code 0-08. |
| 0-17 | Communication was interrupted by pressing the Stop key. | If the Stop key was not pressed and this error keeps occurring, replace the operation panel. |
| 0-20 | Facsimile data not received within 6 s of retraining | - Check the line connection. <br> - Check the FCU - NCU connectors. <br> - Replace the NCU or FCU. <br> - Check for line problems. <br> - Try calling another fax machine. <br> - Try adjusting the reconstruction time for the first line and/or rx cable equalizer setting. <br> Cross reference <br> - Reconstruction time - G3 Switch 0A, bit 6 <br> - Rx cable equalizer - G3 Switch 07 (PSTN) |
| 0-21 | EOL signal (end-of-line) from the other end not received within 5 s of the previous EOL signal | - Check the connections between the FCU, NCU, \& line. <br> - Check for line noise or other line problems. <br> - Replace the NCU or FCU. <br> - The remote machine may be defective or may have disconnected. <br> Cross reference <br> - Maximum interval between EOLs and between ECM frames - G3 Bit Switch 0A, bit 4 |
| 0-22 | The signal from the other end was interrupted for more than the acceptable modem carrier drop time (default: 200 ms ) | - Check the line connection. <br> - Check the FCU - NCU connectors. <br> - Replace the NCU or FCU. <br> - Defective remote terminal. <br> - Check for line noise or other line problems. <br> - Try adjusting the acceptable modem carrier drop time. <br> Cross reference <br> - Acceptable modem carrier drop time - G3 Switch 0 A , bits 0 and 1 |


| Code | Meaning | Suggested Cause/Action |
| :---: | :---: | :---: |
| 0-23 | Too many errors during reception | - Check the line connection. <br> - Check the FCU - NCU connectors. <br> - Replace the NCU or FCU. <br> - Defective remote terminal. <br> - Check for line noise or other line problems. <br> - Try asking the other end to adjust their tx level. <br> - Try adjusting the rx cable equalizer setting and/or rx error criteria. <br> Cross reference <br> - Rx cable equalizer - G3 Switch 07 (PSTN) <br> - Rx error criteria - Communication Switch 02, bits 0 and 1 |
| 0-30 | The other terminal did not reply to NSS(A) in Al short protocol mode | - Check the line connection. <br> - Check the FCU - NCU connectors. <br> - Try adjusting the $t x$ level and/or cable equalizer settings. <br> - The other terminal may not be compatible. <br> Cross reference <br> - Dedicated tx parameters - Section 4 |
| 0-32 | The other terminal sent a DCS, which contained functions that the receiving machine cannot handle. | - Check the protocol dump list. <br> - Ask the other party to contact the manufacturer. |
| 0-52 | Polarity changed during communication | - Check the line connection. Retry communication. |
| 0-70 | The communication mode specified in CM/JM was not available (V. 8 calling and called terminal) | - The other terminal did not have a compatible communication mode (e.g., the other terminal was a V. 34 data modem and not a fax modem.) <br> - A polling tx file was not ready at the other terminal when polling rx was initiated from the calling terminal. |
| 0-74 | The calling terminal fell back to $T .30$ mode, because it could not detect ANSam after sending Cl . | - The calling terminal could not detect ANSam due to noise, etc. <br> - ANSam was too short to detect. <br> - Check the line connection and condition. <br> - Try making a call to another V.8/V. 34 fax. |
| 0-75 | The called terminal fell back to T .30 mode, because it could not detect a CM in response to ANSam (ANSam timeout). | - The terminal could not detect ANSam. <br> - Check the line connection and condition. <br> - Try receiving a call from another V.8/V. 34 fax. |
| 0-76 | The calling terminal fell back to $T .30$ mode, because it could not detect a JM in response to a CM (CM timeout). | - The called terminal could not detect a CM due to noise, etc. <br> - Check the line connection and condition. <br> - Try making a call to another V.8/V. 34 fax. |


| Code | Meaning | Suggested Cause/Action |
| :---: | :---: | :---: |
| 0-77 | The called terminal fell back to $T .30$ mode, because it could not detect a CJ in response to JM (JM timeout). | - The calling terminal could not detect a JM due to noise, etc. <br> - A network that has narrow bandwidth cannot pass JM to the other end. <br> - Check the line connection and condition. <br> - Try receiving a call from another V.8/V. 34 fax. |
| 0-79 | The called terminal detected Cl while waiting for a V. 21 signal. | Check for line noise or other line problems. If this error occurs, the called terminal falls back to T. 30 mode. |
| 0-80 | The line was disconnected due to a timeout in V. 34 phase 2 - line probing. | - The guard timer expired while starting these phases. Serious noise, narrow bandwidth, or low signal level can cause these errors. <br> If these errors happen at the transmitting terminal: <br> - Try making a call at a later time. <br> - Try using V. 17 or a slower modem using dedicated tx parameters. <br> - Try increasing the tx level. <br> - Try adjusting the tx cable equalizer setting. If these errors happen at the receiving terminal: <br> - Try adjusting the rx cable equalizer setting. <br> - Try increasing the tx level. <br> - Try using V. 17 or a slower modem if the same error is frequent when receiving from multiple senders. |
| 0-81 | The line was disconnected due to a timeout in V. 34 phase 3 - equalizer training. |  |
| 0-82 | The line was disconnected due to a timeout in the V. 34 phase 4 - control channel start-up. |  |
| 0-83 | The line was disconnected due to a timeout in the V. 34 control channel restart sequence. |  |
| 0-84 | The line was disconnected due to abnormal signaling in V. 34 phase 4 - control channel start-up. | - The signal did not stop within 10 s . <br> - Turn off the machine, then turn it back on. <br> - If the same error is frequent, replace the FCU. |
| 0-85 | The line was disconnected due to abnormal signaling in V. 34 control channel restart. | - The signal did not stop within 10 s . <br> - Turn off the machine, then turn it back on. <br> - If the same error is frequent, replace the FCU. |
| 0-86 | The line was disconnected because the other terminal requested a data rate using MPh that was not available in the currently selected symbol rate. | - The other terminal was incompatible. <br> - Ask the other party to contact the manufacturer. |
| 0-87 | The control channel started after an unsuccessful primary channel. | - The receiving terminal restarted the control channel because data reception in the primary channel was not successful. <br> - This does not result in an error communication. |
| 0-88 | The line was disconnected because PPR was transmitted/received 9 (default) times within the same ECM frame. | - Try using a lower data rate at the start. <br> - Try adjusting the cable equalizer setting. |
| 2-10 | The modem cannot enter tx mode | - Replace the FCU. |
| 2-11 | Only one V. 21 connection flag was received | - Replace the FCU. |


| Code | Meaning | Suggested Cause/Action |
| :---: | :---: | :---: |
| 2-12 | Modem clock irregularity | - Replace the FCU. |
| 2-13 | Modem initialization error | - Turn off the machine, then turn it back on. <br> - Update the modem ROM. <br> - Replace the FCU. |
| 2-20 | Abnormal coding/decoding (cpu not ready) | - Replace the FCU. |
| 2-23 | JBIG compression or reconstruction error | - Turn off the machine, then turn it back on. <br> - Replace the EXFUNC board if the error is frequent. |
| 2-24 | JBIG ASIC error | - Turn off the machine, then turn it back on. <br> - Replace the EXFUNC board if the error is frequent. |
| 2-25 | JBIG data reconstruction error (BIH error) | - JBIG data error <br> - Check the sender's JBIG function. |
| 2-26 | JBIG data reconstruction error (Float marker error) | - Update the FCU ROM. |
| 2-27 | JBIG data reconstruction error (End marker error) |  |
| 2-28 | JBIG data reconstruction error (Timeout) |  |
| 2-50 | The machine resets itself for a fatal FCU system error | - If this is frequent, update the ROM, or replace the FCU. |
| 2-51 | The machine resets itself because of a fatal communication error | - If this is frequent, update the ROM, or replace the FCU. |
| 3-00 | G4 interface board reset | - Replace the G4 interface board or FCU. |
| 3-10 | Disconnection during ISDN G3 communication | - Check the other terminal and the ISDN line. <br> - The other terminal may have dialed a wrong number. |
| 3-11 | Disconnection during ISDN G4 communication | - Check the other terminal and the ISDN line. |
| 3-20 | A CSA signal was received during ISDN G4 communication | - The operator at the other terminal may have interrupted the communication. |
| 3-21 | A CSA signal was sent during ISDN G4 communication, because the Stop key was pressed | - The local operator has interrupted the communication. |
| 3-30 | Mismatched specifications (rx capability) | - Check the receive capabilities requested from the other terminal. |
| 4-01 | Line current was cut | - Check the line connector. <br> - Check the connection between FCU and NCU. <br> - Check for line problems. <br> - Replace the FCU or the NCU. |
| 4-10 | Communication failed because of an ID Code mismatch (Closed Network) or Tel. No./CSI mismatch (Protection against Wrong Connections) | - Get the ID Codes the same and/or the CSIs programmed correctly, then resend. <br> - The machine at the other end may be defective. |


| Code | Meaning | Suggested Cause/Action |
| :---: | :---: | :---: |
| 5-00 | Data construction not possible | - Replace the FCU. |
| 5-01 | Data reconstruction not possible |  |
| 5-10 | DCR timer expired |  |
| 5-20 | Storage impossible because of a lack of memory | - Temporary memory shortage. <br> - Test the SAF memory. <br> - Replace the FCU or optional EXMEM board |
| 5-21 | Memory overflow |  |
| 5-22 | Mode table overflow after the second page of a scanned document | - Wait for the messages which are currently in the memory to be sent or delete some files from memory. |
| 5-23 | Print data error when printing a substitute rx or confidential rx message | - Test the SAF memory. <br> - Ask the other end to resend the message. <br> - Replace the FCU or optional EXMEM board. |
| 5-24 | Memory overflow after the second page of a scanned document | - Try using a lower resolution setting. <br> - Wait for the messages which are currently in the memory to be sent or delete some files from memory. |
| 5-25 | SAF file access error | - Replace the FCU or EXMEM board. |
| 6-00 | G3 ECM - T1 time out during reception of facsimile data | - Try adjusting the rx cable equalizer. <br> - Replace the FCU or NCU. |
| 6-01 | G3 ECM - no V. 21 signal was received |  |
| 6-02 | G3 ECM - EOR was received |  |
| 6-04 | G3 ECM - RTC not detected | - Check the line connection. <br> - Check connections from the NCU to the FCU. <br> - Check for a bad line or defective remote terminal. <br> - Replace the FCU or NCU. |
| 6-05 | G3 ECM - facsimile data frame not received within 18 s of CFR, but there was no line fail | - Check the line connection. <br> - Check connections from the NCU to the FCU. <br> - Check for a bad line or defective remote terminal. <br> - Replace the FCU or NCU. <br> - Try adjusting the rx cable equalizer <br> Cross reference <br> - Rx cable equalizer - G3 Switch 07 (PSTN) |
| 6-06 | G3 ECM - coding/decoding error | - Defective FCU. <br> - The other terminal may be defective. |
| 6-08 | G3 ECM - PIP/PIN received in reply to PPS.NULL | - The other end pressed Stop during communication. <br> - The other terminal may be defective. |
| 6-09 | G3 ECM - ERR received | - Check for a noisy line. <br> - Adjust the tx levels of the communicating machines. <br> - See code 6-05. |


| Code | Meaning | Suggested Cause/Action |
| :---: | :---: | :---: |
| 6-10 | G3 ECM - error frames still received at the other end after all communication attempts at 2400 bps | - Check for line noise. <br> - Adjust the tx level (use NCU parameter 01 or the dedicated tx parameter for that address). <br> - Check the line connection. <br> - Defective remote terminal. |
| 6-21 | V. 21 flag detected during high speed modem communication | - The other terminal may be defective or incompatible. |
| 6-22 | The machine resets the sequence because of an abnormal handshake in the V. 34 control channel | - Check for line noise. <br> - If the same error occurs frequently, replace the FCU. <br> - Defective remote terminal. |
| 6-99 | V. 21 signal not stopped within 6 s | - Replace the FCU. |
| 22-00 | Original length exceeded the maximum scan length | - Divide the original into more than one page. <br> - Check the resolution used for scanning. Lower the scan resolution if possible. <br> - Add optional page memory. |
| 22-01 | Memory overflow while receiving | - Wait for the files in the queue to be sent. <br> - Delete unnecessary files from memory. <br> - Transfer the substitute reception files to an another fax machine, if the machine's printer is busy or out of order. <br> - Add an optional SAF memory card or hard disk. |
| 22-02 | Tx or rx job stalled due to line disconnection at the other end | - The job started normally but did not finish normally; data may or may not have been received fully. <br> - Restart the machine. |
| 22-04 | The machine cannot store received data in the SAF | - Update the ROM <br> - Replace the FCU. |
| 23-00 | Data read timeout during construction | - Restart the machine. <br> - Replace the FCU |
| 25-00 | The machine software resets itself after a fatal transmission error occurred | - Update the ROM <br> - Replace the FCU. |
| F0-xx | V. 34 modem error | - Replace the FCU. |
| F6-8x | SG3-V34 modem error | - Update the SG3-V34 modem ROM. <br> - Replace the SG3-V34 board. <br> - Check for line noise or other line problems. <br> - Try communicating another V.8/V. 34 fax. |

### 2.2 ERROR CODES FOR THE ISDN OPTION

The tables on the following pages show the error codes for the ISDN option.
The meaning of the numbers in the Action column is as follows.

1. Check Layer 1 signaling with a protocol analyzer to determine the cause of the problem. This may require assistance from a G4 specialist.
2. Repeat the communication. If the problem does not repeat itself, the problem was a temporary one caused by the user connecting the machine to another interface. However, if the problem remains, there is a network problem.
3. There is a network problem.
4. There is a network problem. Do the following:

- Check the error bit rate of the network. If it is high, contact the network and ask them to improve the line.
- Check the network speed (is it 56 or 64 kbps ), and make sure that the bit switch setting is correct. You may also use the dedicated transmission parameters if this problem only occurs when dialing certain numbers.
- Check that the user dialed the correct number.

5. There is a network problem, or a problem in the machine at the other end.
6. There is a problem in the machine at the other end; ask a technician to check it.
7. The machine at the other end is not a Group 4 fax terminal.
8. The machine is not compatible with the machine at the other end. A compatibility test is needed.

Error codes related to the errors detected by the FCU are listed in the service manual of the main body.

### 2.2.1 D-CHANNEL LAYER MANAGEMENT

| Code | Probable Cause | Action |
| :---: | :--- | :---: |
| $7-00$ | Link reset | 2 |
| $7-01$ | Link set-up failed because of time-out. | 2 |
| $7-02$ | Link release failed because of time-out. | 2 |
| $7-03$ | Link set-up parameter error | 2 |

### 2.2.2 D-CHANNEL, LAYER 1

| Code | Probable Cause | Action |
| :---: | :--- | :---: |
| $7-10$ | T3 timeout (layer 1 activation error) | 1 |
| $7-11$ | No connection on the S0 interface | 1 |
| $7-12$ | Deactivated | 1 |

### 2.2.3 D-CHANNEL LINK LAYER

| Code | Probable Cause | Action |
| :---: | :--- | :---: |
| $7-20$ | At the start of link set-up, the machine received an unsolicited S (F=1). | 2 |
| $7-21$ | At the start of link set-up, the machine received an unsolicited DM <br> (F=1). | 2 |
| $7-22$ | At TEI release, the machine received an unsolicited UA (F=1). | 2 |
| $7-23$ | At the start of link set-up, the machine received an unsolicited DM <br> (F=0). | 2 |
| $7-24$ | At TEI release, the machine received an unsolicited UA (F=0). | 2 |
| $7-25$ | SABME received at the start of network link set-up | No error |
| $7-26$ | N200 retransmission error for SABME | 2 |
| $7-27$ | N200 retransmission error for DISC | 2 |
| $7-28$ | N200 retransmission error for situation enquiry (RR) | 2 |
| $7-29$ | N(R) sequence number error | 3 |
| $7-30$ | N(S) sequence number error | 3 |
| $7-31$ | FRMR received | 3 |
| $7-32$ | Non-standard frame received | 3 |
| $7-33$ | Abnormal frame length | 3 |
| $7-34$ | N201 error; information field N in the I frame exceeded N201 | 3 |
| $7-35$ | T201 timeout; timeout while waiting for checking | 3 |
| $7-36$ | T202 timeout; timeout while waiting for ID assignment | 3 |

### 2.2.4 D-CHANNEL NETWORK LAYER

| Code | Probable Cause | Action |
| :---: | :--- | :---: |
| $7-40$ | Insufficient mandatory information elements | 3 |
| $7-41$ | Abnormal LI for a mandatory information element | 3 |
| $7-42$ | T301 timeout; timeout while waiting for R:CONN | 3 |
| $7-43$ | T303 timeout; timeout while waiting for R: CALL-PROC etc. | 3 |
| $7-44$ | T304 timeout; timeout while waiting for R: CALL-PROC etc. | 3 |
| $7-45$ | T305 timeout; timeout while waiting for R:REL | 3 |
| $7-46$ | T308 timeout; timeout while waiting for R:REL-COMP | 3 |
| $7-47$ | T310 timeout; timeout while waiting for R: ALERT etc. | 3 |
| $7-48$ | T313 timeout; timeout while waiting for R:CONN-ACK | 3 |
| $7-49$ | Internal error | 3 |
| $7-51$ | Release call reference during communication | 3 |

2.2.5 B-CHANNEL LINK LAYER

| Code | Probable Cause | Action |
| :---: | :--- | :---: |
| $7-60$ | T3 timeout; timeout while waiting for flag | 4 |
| $7-61$ | T3 timeout; timeout while waiting for SABM during an incoming call | 4 |
| $7-62$ | T1 timeout x N2; timeout while waiting for UA after sending SABM | 5 |
| $7-63$ | T1 timeout x N2; timeout while waiting for a response to a transmitted <br> S frame (P=1) | 5 |
| $7-64$ | T1 timeout x N2; timeout while waiting for SABM or DISC after sending <br> FRMR | 5 |
| $7-65$ | T1 timeout x N2; timeout while waiting for a response to DISC | 5 |
| $7-66$ | RNR x N2 (other end busy, RCB counter error) | 5 |
| $7-67$ | Invalid (Ad) frame received | 5 |
| $7-68$ | Invalid short frame received | 5 |
| $7-69$ | Link reset error | 5 |
| $7-70$ | FRMR received | 5 |
| $7-71$ | Non-standard (Cn) frame received | 5 |
| $7-72$ | An S or U frame having an information field was received | 5 |
| $7-73$ | A frame longer than the maximum N1 length was received | 5 |
| $7-74$ | An S or I frame having an N(R) error was received | 5 |
| $7-75$ | CRC error | 3 |

## ERROR CODES FOR THE ISDN OPTION

### 2.2.6 B-CHANNEL NETWORK LAYER

| Code | Probable Cause | Action |
| :---: | :--- | :---: |
| $7-80$ | A packet having an abnormal GFI was received | 6 |
| $7-81$ | A packet was received that had a logical channel number different <br> from the logical channel being used for the communication | 6 |
| $7-82$ | A packet containing a format error was received | 6 |
| $7-83$ | A packet containing an LI error was received | 7 |
| $7-84$ | A CN packet was received that had a PID different from 02 | 7 |
| $7-85$ | Unsupported packet type received | 7 |
| $7-86$ | Abnormal or unsupported facility received | 7 |
| $7-87$ | P(s) sequence number error | 6 |
| $7-88$ | P(r) sequence number error | 6 |
| $7-89$ | A reset using S:RQ or R:RI occurred | 6 |
| $7-90$ | A restart using S:RQ or R:SI occurred | 6 |
| $7-91$ | Call set-up error; in reply to S:CR, R:CI was received to indicate <br> rejection of the call | 7 |
| $7-92$ | T20 timeout; timeout while waiting for an SF packet | 6 |
| $7-93$ | T21 timeout; timeout while waiting for a CC packet | 6 |
| $7-94$ | T22 timeout; timeout while waiting for an RF packet | 6 |
| $7-95$ | T23 timeout; timeout while waiting for a CF packet | 6 |
| $7-96$ | T10 timeout; timeout while waiting for the first frame |  |

### 2.2.7 TRANSPORT LAYER

| Code | Probable Cause | Action |
| :---: | :--- | :---: |
| $8-00$ | Invalid block received | 8 |
| $8-01$ | TCC block received | 8 |
| $8-02$ | TBR block received | 8 |
| $8-05$ | TCR block; block format error | 8 |
| $8-06$ | TCR block; block size parameter LI error | 8 |
| $8-07$ | TCR block; extended addressing LI error | 8 |
| $8-08$ | TCR block; block size length error | 8 |
| $8-10$ | TCA block; block format error | 8 |
| $8-11$ | TCA block; Tx origin reference data in TCR disagreed with the address <br> reference data in TCA | 8 |
| $8-12$ | TCA block; octet 7 did not equal 0 | 8 |
| $8-13$ | TCA block; extended addressing LI error | 8 |
| $8-14$ | TCA block; block size exceeded that set by TCR | 8 |
| $8-15$ | TCA block; block size parameter LI error | 8 |
| $8-20$ | TDT block; block format error | 8 |
| $8-21$ | TDT block; octet 3 did not equal either 00 or 80(H) | 8 |
| $8-22$ | TDT block; the end indicator was "Continue" even though there was no <br> field data | 8 |
| $8-23$ | TDT block; an end block with no field data was received after an end <br> indicator of "End" | 8 |
| $8-26$ | Timeout during state 0.2 | 8 |
| $8-27$ | Timeout during state 1.1 | 8 |
| $8-28$ | Timeout during state 0.3 | 8 |

### 2.2.8 SESSION LAYER

| Code | Probable Cause | Action |
| :---: | :--- | :---: |
| $8-30$ | Invalid frame received | 8 |
| $8-31$ | RSSN received | 8 |
| $8-32$ | CSA received | 8 |
| $8-34$ | Calling terminal identification error in CSS | 8 |
| $8-35$ | Date and time error in CSS | 8 |
| $8-36$ | Window size error in CSS | 8 |
| $8-37$ | Service identification error in CSS | 8 |
| $8-38$ | Session user data error in CSS | 8 |
| $8-39$ | CSS rejected (new session rejected) | 8 |
| $8-40$ | Called terminal identification error in RSSP | 8 |
| $8-41$ | Date and time error in RSSP | 8 |
| $8-42$ | Date and time in RSSP was not the same as that in CSS | 8 |
| $8-43$ | Window size error in RSSP | 8 |
| $8-44$ | Service identification error in RSSP | 8 |
| $8-45$ | Session user data error in RSSP | 8 |
| $8-47$ | Message synchronization error inside the CCU | 8 |
| $8-48$ | Document task busy | 8 |
| $8-50$ | Ti timeout; non-communication surveillance timer (T.62) | 8 |
| $8-51$ | T2 timeout; timeout while waiting for a response (T.62) | 8 |
| $8-52$ | T3 timeout; CSA timer timeout (T.62) | 8 |
| $8-53$ | G4 board load timer timeout; calling side waited too long for a new <br> session | 8 |
| $8-54$ | G4 board load timer timeout; calling side waited too long for transport <br> probability | 8 |
| $8-55$ | G4 board load timer timeout; called side waited too long for S:RSSP | 8 |
| $8-56$ | G4 board load timer timeout; document transmission surveillance timer <br> timeout | 8 |
| $8-57$ | G4 board load timer timeout; timeout while waiting for a user abort <br> request after a provider fail | 8 |

### 2.2.9 DOCUMENT LAYER

| Code | Probable Cause | Action |
| :---: | :--- | :---: |
| $8-60$ | T.62 coding format error (LI error) | 8 |
| $8-61$ | A mandatory PI was absent, or the LI for a mandatory PI was 0 | 8 |
| $8-62$ | Calling/called terminal identification LI was different from that specified <br> by F.184 (LI = 24) | 8 |
| $8-63$ | The LI for session user data exceeded the maximum value (512) | 8 |
| $8-64$ | The LI for CDUI was not 0 | 8 |
| $8-65$ | Checkpoint and document reference numbers LI error, or they were <br> not in T.61 (ASCII) coding | 8 |
| $8-66$ | The checkpoint reference number differed from the expected value | 8 |
| $8-70$ | RDGR received | 8 |
| $8-71$ | A non-standard PDU was received while in calling mode | 8 |
| $8-72$ | A non-standard PDU was received while in called mode | 8 |
| $8-73$ | Abnormal PDU received while in calling state ds1 | 8 |
| $8-74$ | 15 consecutive CDCL signals received | 8 |
| $8-75$ | Session window size control error (size not equal to 0) | 8 |
| $8-76$ | Internal error | 8 |

### 2.2.10 PRESENTATION LAYER

| Code | Probable Cause | Action |
| :---: | :--- | :---: |
| $8-80$ | X. 209 coding error in session user data (LI error) | 8 |
| $8-81$ | PV error in session user data | 8 |
| $8-82$ | PI error in session user data | 8 |
| $8-83$ | The capabilities in the session user data of CDS/CDC were not the <br> same as those in RDCLP | 8 |
| $8-84$ | X.209 coding error in the DP (LI error) | 8 |
| $8-85$ | X.209 coding error in the SLD (document descriptor/page descriptor) <br> (LI error) | 8 |
| $8-86$ | SLD object type absent | 8 |
| $8-87$ | PI error in the SLD (document descriptor/page descriptor) | 8 |
| $8-88$ | The capabilities in the SLD (document descriptor/page descriptor) are <br> duplicated or are not the same as those in RDCLP | 8 |
| $8-89$ | No document descriptor at the start of the document | 8 |
| $8-90$ | No page descriptor at the start of the page | 8 |
| $8-91$ | Page descriptor PV error | 8 |
| $8-92$ | X.209 coding error in the TU (LI error) | 8 |
| $8-93$ | The TU was absent | 8 |
| $8-94$ | PV error in the TU | 8 |
| $8-95$ | TI error | 8 |
| $8-96$ | X.209 coding nest level >> 8, or an LI form error | 8 |
| $8-97$ | CDPB/CDE received while TU/TI not yet completed, or an unexpected <br> PDU was received while analyzing an SLD | 8 |

### 2.3 FAX SC CODES

### 2.3.1 OVERVIEW

When the FCU detects a Fax SC Code condition other than SC1201 and SC1207, it resets itself automatically (default setting). This initializes the FCU without erasing files in the SAF memory or resetting the switches.
NOTE: For details on Fax SC Codes 1201 and 1207, refer to the following sections.
If bit 7 of System Switch $1 F$ is changed to " 1 ", when the FCU detects a Fax SC Code condition, it displays the code on the display and stops working until the fax unit is initialized using one of the following methods:

- Hold down the "\#" and "*" keys for more than 10 s .
- Turn off the main power switch and turn it back on.


### 2.3.2 SC1201

When the FCU detects an unrecoverable error in the SRAM, which requires a complete SRAM initialization, the fax unit displays this SC Code and stops. There is no way to recover from this error condition without a complete SRAM initialization (all the user and service programmed data will be erased).

The possible causes are:

- SRAM backup battery defect, or SW1 on the FCU is at the "OFF" position
- SRAM on the FCU has a physical defect
- Flash memory card or data copy tool connection was loose


### 2.3.3 SC1207

This is the same as SC1201 except the error location is the SRAM on the Fax Function Upgrade board.

The possible causes are:

- SRAM backup battery defect, or SW1 on the Fax Function Upgrade board is at the "OFF" position.
- SRAM on the Fax Function Upgrade board has a physical defect.
- The Fax Function Upgrade board connection was loose.

FAX SC CODES

### 2.3.4 FAX SC CODE TABLE

| SC Code | Description | Suggested Action | Sys Switch <br> 1F bit 7 = 0 | Sys Switch 1F bit 7 = 1 |
| :---: | :---: | :---: | :---: | :---: |
| 1102 | Handshake error with controller at start-up | Initialize the fax unit. <br> (See section 2.3.1.for the initialization procedure) | Automatic reset | SC Code display |
| 1111 | Command TX/RX error to/from the controller |  |  |  |
| 1112 | Base copier's engine was reset |  |  |  |
| 1120 | Interface module error |  |  |  |
| 1201 | Unrecoverable FCU SRAM error | $\begin{aligned} & \text { Refer to section } \\ & \text { 2.3.2. } \end{aligned}$ | "Service Call" display |  |
| 1207 | Unrecoverable Fax Function Upgrade SRAM error | Refer to section 2.3.3. | "Service Call" display |  |
| 1299 | Software error | Initialize the fax unit. | Automatic reset |  |
| 1305 |  |  |  |  |
| 1310 |  |  |  |  |
| 1311 |  |  |  |  |
| 1312 |  |  |  |  |
| 1401 |  |  |  |  |
| 1405 |  |  |  |  |
| 1601 |  |  |  |  |

### 2.4 ISDN TEST FUNCTION

### 2.4.1 LEDS

There are four LEDs on the G4 board. These LEDs describe the status of the machine.

| LED 1 | LED 2 | LED 3 | LED 4 |
| :--- | :--- | :--- | :--- |

## Initial Settings

Initial check (if the flash ROM is updated)
O=ON, --=OFF

| O | O | O | O |
| :---: | :---: | :---: | :---: |

Handshaking with the FCU ready

| O | O | -- | -- |
| :--- | :--- | :--- | :--- |

## Standby Mode

Ready to communicate


## Communication

Layer 1 activated $\square$
Link setup $\square$
B channel 1 connected


B channel 2 connected

| O | -- | O | O |
| :--- | :--- | :--- | :--- |

### 2.4.2 BACK-TO-BACK TEST

To make a back-to-back test, you need:

- Two machines, with different types of CiG4 option boards.

NOTE: You cannot make a back-to-back test using two machines with identical type CiGH option boards.

The procedure is as follows.

1. Switch off the machines
2. Connect two machines back-to-back using a cross rosette as follows.

3. Make the following bit switch adjustments:

- In the machine acting in NT mode (CiG4 board), set bits 0 and 1 of G4 parameter switch OD to 1.
- In the machine acting in TE mode (SiG4 board) set bit 0 of G4 parameter switch 0 D to 0 and bit 1 to 1 .

4. Reset the machines by switching them off, waiting a few seconds, then switching back on.
5. Place a document in one of the machines, dial a number, then press Start.
6. After you have finished the test, set bits 0 and 1 of G4 parameter switch 0D back to 0 , then reset the machine.

NOTE: The following cannot be tested using this procedure:

- ISDN G3 communication
- Point to Multi (Like a broadcasting test, from one point to many places.)


## SERVICE TABLES

## 3. SERVICE TABLES

| $\boxed{\text { Never turn off the main power switch when the power LED is lit or flashing. }}$ |
| :--- |
| To avoid damaging the hard disk or memory, press the operation power |
| switch to switch the power off, wait for the power LED to go off, and then |
| switch the main power switch off. |

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

### 3.1 SERVICE PROGRAM MODE

### 3.1.1 SERVICE PROGRAM MODE OPERATION

The service program (SP) mode is used to check electrical data, change modes, and adjust values.

## Entering and Exiting SP mode

01 Press the Clear Mode key.
(1)(1)(7) 2 Use the keypad to enter "107".
(0) 3 Hold down Clear/Stop for at least 3 seconds.

Fax SP 4 On the touch-panel, press Fax SP.
Exit 5 Press Exit twice to return to the copy window.

## SP Mode Button Summary

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

(1) Opens all SP groups and sublevels.
(2) Closes all open groups and sublevels and restores the initial SP mode display.
(3) Not used for the Fax SP mode.
(4) Enter the SP mode directly with the number keys if you know the SP number and then press $\#^{\#}$. (SP Mode must be highlighted before you can enter the number. Just press SP Mode if it is not highlighted.)
(5) Press twice to leave the SP mode return to the copy window to resume normal operation.
(6) Press any Group number to open a list of SP modes and titles for that group. For example, to open the SP mode list for SP1-nnn , press Group1. If an SP has sublevels, click the appropriate button to expand the list.
(7) Press to scroll the display to the previous or next group.
(8) Press to scroll to the previous or next display in segments the size of the screen display (page).
(9) Press to scroll the display to the previous or next line, line by line.
(10) Press to move to the highlight to the previous or next selection in the list on the left.

## 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. ( 3.1.2)
2. Click 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.


Refer to the Service Tables for the range of allowed settings. (-3.1.2)

1. To enter a setting"

- Press $\overbrace{}^{*}$ to toggle between plus and minus and then use the keypad to enter the appropriate number. The number you enter write over the previous setting.
- Press $\#^{\#}$ to enter the setting. (If you enter a number that is out of range, the key press is ignored.)
- When you are prompted to complete the selection, press Yes.

2. When you are finished, press Exit twice to return to the copy window.

### 3.1.2 SERVICE PROGRAM MODE TABLES

SP1-XXX (Bit Switches) Section 3.2 Bit Switches

| 1 | Mode No. |  | Function |
| :---: | :---: | :---: | :---: |
| 101 | System Switch |  |  |
|  | 001-032 | 00-1F | Change the bit switches for system settings for the fax option <br> - Section 3.2 Bit Switches |
| 102 | Scanner Switch |  |  |
|  | 001-016 | 00-0F | Change the bit switches for scanner settings for the fax option <br> - Section 3.2 Bit Switches |
| 103 | Printer Switch |  |  |
|  | 001-016 | $00-0 F$ | Change the bit switches for printer settings for the fax option <br> - Section 3.2 Bit Switches |
| 104 | Communication Switch |  |  |
|  | 001-032 | 00-1F | Change the bit switches for communication settings for the fax option <br> - Section 3.2 Bit Switches |
| 105 | G3-1 Switch |  |  |
|  | 001-016 | 00-0F | Change the bit switches for the protocol settings of the standard G3 board Section 3.2 Bit Switches |
| 106 | G3-2 Switch |  |  |
|  | 001-016 | 00-0F | Change the bit switches for the protocol settings of the optional G3 board <br> - Section 3.2 Bit Switches |
| 107 | G3-3 Switch |  |  |
|  | 001-016 | 00-0F | Change the bit switches for the protocol settings of the optional G3 board <br> - Section 3.2 Bit Switches |
| 108 | G4 Internal Switch |  |  |
|  | 001-032 | 00-1F | Change the bit switches for the optional ISDN settings <br> Section 3.2 Bit Switches |
| 109 | G4 Parameter Switch |  |  |
|  | 001-016 | 00-0F | Change the bit switches for optional ISDN parameters <br> - Section 3.2 Bit Switches |

SP2-XXX (RAM Data)

| 2 | Mode No. |  | Function |
| :---: | :---: | :---: | :---: |
| 101 | RAM Read/Write |  |  |
|  | 001 |  | Change RAM data for the fax board directly. <br> - Section 3.5 Service RAM Addresses |
| 102 | Memory Dump |  |  |
|  | 001 | G3-1 Memory Dump | Print out RAM data for the fax board. Section 3.5 Service RAM Addresses |
|  | 002 | G3-2 Memory Dump | Print out RAM data for the SG3-1 board. |
|  | 003 | G3-3 Memory Dump | Print out RAM data for the SG3-2 board. |
|  | 004 | G4 Memory Dump | Print out RAM data for the SiG4 board. |
| 103 | G3-1 NCU Parameters |  |  |
|  | 001-023 | CC, 01-22 | NCU parameter settings for the standard G3 board. Section 3.3 NCU Parameters |
| 104 | G3-2 NCU Parameters |  |  |
|  | 001-023 | CC, 01-22 | NCU parameter settings for the optional G3 board. Section 3.3 NCU Parameters |
| 105 | G3-3 NCU Parameters |  |  |
|  | 001-023 | CC, 01-22 | NCU parameter settings for the optional G3 board. Section 3.3 NCU Parameters |

## SP3-XXX (Tel Line Settings)

| 3 | Mode No. |  | Function |
| :---: | :---: | :---: | :---: |
| 101 | Service Station |  |  |
|  | 001 | Fax Number | Enter the fax number of the service station. |
|  | 002 | Select Line | Select the line type. |
| 102 | Serial Number |  |  |
|  | 000 |  | Enter the fax unit's serial number. |
| 103 | PSTN-1 Port Settings |  |  |
|  | 001 | Select Line | Select the line type setting for the G3-1 line. If the machine is installed on a PABX line, select "PABX", "PABX(GND)" or "PABX(FLASH)". |
|  | 002 | PSTN Access Number | Enter the PSTN access number for the G3-1 line. |
|  | 003 | Memory Lock Disabled | If the customer does not want to receive transmissions using Memory Lock on this line, turn this SP on. |
|  | 004 | Transmission Disabled | If you turn this SP on, the machine does not send any fax messages on the G3-1 line. |
| 104 | PSTN-2 Port Settings |  |  |
|  | 001 | Select Line | Select the line setting for the G3-2 line. If the machine is installed on a PABX line, select "PABX", "PABX(GND)" or "PABX(FLASH)". |
|  | 002 | PSTN Access Number | Enter the PSTN access number for the G32 line. |


| 3 | Mode No. |  | Function |
| :---: | :---: | :---: | :---: |
|  | 003 | Memory Lock Disabled | If the customer does not want to receive transmissions using Memory Lock on this line, change this SP to on. |
|  | 004 | Transmission Disabled | If you turn this SP on, the machine does not send any fax messages on the G3-2 line. |
| 105 | PSTN-3 Port settings |  |  |
|  | 001 | Select Line | Select the line setting for the G3-3 line. If the machine is installed on a PABX line, select "PABX", "PABX(GND)" or "PABX(FLASH)". |
|  | 002 | PSTN Access Number | Enter the PSTN access number for the G33 line. |
|  | 003 | Memory Lock Disabled | If the customer does not want to receive transmissions using Memory Lock on this line, change this SP to on |
|  | 004 | Transmission Disabled | If you turn this SP on, the machine does not send any fax messages on the G3-3 line. |
| 106 | ISDN Port Settings |  |  |
|  | 001 | Select Line | Select the line setting for the ISDN line. If the machine is installed to the $P A B X$ line, select "PABX". |
|  | 002 | PSTN Access Number | Enter the PSTN access number for ISDN line. |
|  | 003 | Memory Lock Disabled | If the customer does not want to receive transmissions using Memory Lock on this line, change this SP to on |
|  | 004 | Transmission Disabled | If you turn this SP on, the machine does not send any fax messages on the ISDN line. |

## SP4-XXX (ROM Versions)

| $\mathbf{4}$ | Mode No. |  | Function |
| :---: | :--- | :--- | :--- |
| 101 | 001 | FCU ROM Version | Displays the FCU ROM version. |
| 102 | 001 | Error Codes | Displays the latest 64 fax error codes. |
| 103 | 001 | G3-1 ROM Version | Displays the G3-1 modem version. |
| 104 | 001 | G3-2 ROM Version | Displays the G3-2 modem version. |
| 105 | 001 | G3-3 ROM Version | Displays the G3-3 modem version. |
| 106 | 001 | G4 ROM Version | Displays the G4 (ISDN) ROM version. |
| 107 | 001 | Charge ROM Version | Not used. |

SP5-XXX (Initializing)

| 5 | Mode No. |  | Function |
| :---: | :---: | :---: | :---: |
| 101 | Initialize SRAM |  |  |
|  | 000 |  | Initializes the bit switches and user parameters, user data in the SRAM, files in the SAF memory, and clock. |
| 102 | Erase All Files |  |  |
|  | 000 |  | Erases all files stored in the SAF memory. |
| 103 | Reset Bit Switches |  |  |
|  | 000 |  | Resets the bit switches and user parameters. |
| 104 | Factory setting |  |  |
|  | 000 |  | Resets the bit switches and user parameters, user data in the SRAM and files in the SAF memory. |
| 105 | Delete All Speed Dials |  |  |
|  | 001 | Speed Dials Enabled | 200 speed dials and 1000 quick dials are available when the Fax Function Upgrade Unit is installed. |
|  | 002 | Speed Dials Disabled | 1200 quick dials (but no speed dials) are available when the Fax Function Upgrade Unit is installed. |

## SP6-XXX (Reports)

| 6 | Mode No. |  | Function |
| :---: | :---: | :---: | :---: |
| 101 | System Parameter List |  |  |
|  | 000 |  | Touch the "ON" button to print the system parameter list. |
| 102 | Service Monitor Report |  |  |
|  | 000 |  | Touch the "ON" button to print the service monitor report. |
| 103 | G3 Protocol Dump List |  |  |
|  | 001 | G3 All Communications | Prints the protocol dump list of all communications for all G3 lines. |
|  | 002 | G3-1 (All Communications) | Prints the protocol dump list of all communications for the G3-1 line. |
|  | 003 | $\begin{aligned} & \text { G3-1 (1 } \\ & \text { Communication) } \\ & \hline \end{aligned}$ | Prints the protocol dump list of the last communication for the G3-1 line. |
|  | 004 | G3-2 (All Communications) | Prints the protocol dump list of all communications for the G3-2 line. |
|  | 005 | G3-2 (1 Communication) | Prints the protocol dump list of the last communication for the G3-2 line. |
|  | 006 | $\begin{aligned} & \hline \text { G3-3 (All } \\ & \text { Communications) } \end{aligned}$ | Prints the protocol dump list of all communications for the G3-3 line. |
|  | 007 | $\begin{aligned} & \text { G3-3 (1 } \\ & \text { Communication) } \\ & \hline \end{aligned}$ | Prints the protocol dump list of the last communication for the G3-3 line. |


| 6 | Mode No. |  | Function |
| :---: | :---: | :---: | :---: |
| 104 | G4 Protocol Dump List |  |  |
|  | 001 | Dch + Bch 1 | Prints the protocol dump lists for the G4 line. |
|  | 002 | Dch |  |
|  | 003 | Bch 1 Link Layer |  |
|  | 004 | Dch Link Layer |  |
|  | 005 | Dch +Bch 2 |  |
|  | 006 | Bch 2 Link Layer |  |
| 105 | All Files print out |  |  |
|  | 000 |  | Prints out all the user files in the SAF memory, including confidential messages. <br> NOTE: Do not use this function, unless the customer is having trouble printing confidential messages or recovering files stored using the memory lock feature. |
| 106 | Journal Print out |  |  |
|  | 001 | All Journals | The machine prints all the communication records on the report. |
|  | 002 | Specified Date | The machine prints all communication records after the specified date. |
| 107 | Log List Print out |  |  |
|  | 001 | All log files | These log print out functions are for designer use only. |
|  | 002 | APIP |  |
|  | 003 | Mail Box |  |
|  | 004 | Operation |  |
|  | 005 | Printer APIP |  |
|  | 006 | SC/TRAP Stored |  |
|  | 007 | Scanner |  |
|  | 008 | JOB/SAF |  |
|  | 009 | Decompression |  |
|  | 010 | Reconstruction |  |
|  | 011 | JBIG |  |
|  | 012 | Fax Driver |  |
|  | 013 | G3CCU |  |
|  | 014 | Fax Job |  |

## SP7-XXX (Test Modes)

These are the test modes for PTT approval.

| $\mathbf{7}$ | Function |
| :--- | :--- |
| 101 | G3-1 Modem Tests |
| 102 | G3-1 DTMF Tests |
| 103 | Ringer Test |
| 104 | G3-1 V34 (S2400baud) |
| 105 | G3-1 V34 (S2800baud) |
| 106 | G3-1 V34 (S3000baud) |
| 107 | G3-1 V34 (S3200baud) |
| 108 | G3-1 V34 (S3429baud) |
| 109 | Recorded Message Test |
| 110 | G3-2 Modem Tests |
| 111 | G3-2 DTMF Tests |
| 112 | G3-2 V34 (S2400baud) |
| 113 | G3-2 V34 (S2800baud) |
| 114 | G3-2 V34 (S3000baud) |
| 115 | G3-2 V34 (S3200baud) |
| 116 | G3-2 V34 (S3429baud) |
| 117 | G3-3 Modem Tests |
| 118 | G3-3 DTMF Tests |
| 119 | G3-3 V34 (S2400baud) |
| 120 | G3-3 V34 (S2800baud) |
| 121 | G3-3 V34 (S3000baud) |
| 122 | G3-3 V34 (S3200baud) |
| 123 | G3-3 V34 (S3429baud) |
| 124 | IG3-1 Modem Tests |
| 125 | IG3-1 DTMF Tests |
| 126 | IG3-1 V34 (S2400baud) |
| 127 | IG3-1 V34 (S2800baud) |
| 128 | IG3-1 V34 (S3000baud) |
| 129 | IG3-1 V34 (S3200baud) |
| 130 | IG3-1 V34 (S3429baud) |
| 131 | IG3-2 Modem Tests |
| 132 | IG3-2 DTMF Tests |
| 133 | IG3-2 V34 (S2400baud) |
| 134 | IG3-2 V34 (S2800baud) |
| 135 | IG3-2 V34 (S3000baud) |
| 136 | IG3-2 V34 (S3200baud) |
| 137 | IG3-2 V34 (S3429baud) |
|  |  |

### 3.2 BIT SWITCHES

## WARNING

Do not adjust a bit switch or use a setting that is described as "Not used", as this may cause the machine to malfunction or to operate in a manner that is not accepted by local regulations. Such bits are for use only in other areas, such as Japan.

NOTE: Default settings for bit switches are not listed in this manual. Refer to the System Parameter List printed by the machine.

### 3.2.1 SYSTEM SWITCHES

| System Switch 00 |  | SP No. 1-101-001 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Dedicated transmission parameter programming 0 : Disabled 1: Enabled | Set this bit to 1 before changing any dedicated transmission parameters. <br> Reset this bit to 0 after programming dedicated transmission parameters. |
| 1 | Confidential RX message print out without the password. <br> 0 : Disabled 1: Enabled | 1: Confidential RX messages can be printed out without the password. Use this bit if the customer forgot the password for the confidential messages. Reset this bit to 0 after printing confidential RX messages. |
| 2 | Technical data printout on the Journal <br> 0: Disabled <br> 1: Enabled | 1: Instead of the personal name, the following data are listed on the Journal for each G3 communication. |
|  | e.g. $0000 \quad 32 \mathrm{~V} 34 \quad$ 288/264 $\quad$ L0100 0304 <br> $\begin{array}{llll}\text { (1) } & \text { (2)(3) (3) (3) (8) }\end{array}$ <br> (1): EQM value (Line quality data). A larger number means more errors. <br> (2): Symbol rate (V. 34 only) <br> (3): Final modem type used <br> (4): Starting data rate (for example, 288 means 28.8 kbps ) <br> (5): Final data rate <br> (6): Rx revel (refer to the note after this table for how to read the $r x$ level) <br> (7): Total number of error lines that occurred during non-ECM reception. <br> (8): Total number of burst error lines that occurred during non-ECM reception. <br> Note: <br> EQM and $r x$ level are fixed at "FFFF" in tx mode. <br> The seventh and eighth numbers are fixed at " 00 " for transmission records and ECM reception records. |  |


| System Switch 00 |  | SP No. 1-101-001 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 2 | Rx level calculation <br> Example: 000032 V34 288/26 <br> The four-digit hexadecimal value The high byte is given first, follo 16 to get the rx level. <br> In the above example, the decim So, the actual $r x$ level is $256 /-16$ | L $\underline{01} \underline{00} 0304$ <br> $(N)$ after " $L$ " indicates the rx level. ed by the low byte. Divide the decimal value of N by - $\text { al value of } N(=0100[H]) \text { is } 256 .$ $=-16 \mathrm{~dB}$ |
| 3-4 | Not used | Do not change the settings. |
| 5 | G3/G4 communication parameter display <br> 0: Disabled <br> 1: Enabled | This is a fault-finding aid. The LCD shows the key parameters (see below). This is normally disabled because it cancels the CSI display for the user. Be sure to reset this bit to 0 after testing. |
| 6 | ```Protocol dump list output after each communication 0 : Off 1: On``` | This is only used for communication troubleshooting. It shows the content of the transmitted facsimile protocol signals. Always reset this bit to 0 after finishing testing. If system switch 09 bit 6 is at " 1 ", the list is only printed if there was an error during the communication. |
| 7 | Not used | Do not change the setting. |

G3 Communication Parameters

| Modem rate | 336: 33600 bps 168: 16800 bps <br> 312: 31200 bps $144: 14400 \mathrm{bps}$ <br> 288: 28800 bps $120: 12000 \mathrm{bps}$ <br> 264: 26400 bps $96: 9600 \mathrm{bps}$ <br> 240: 24000 bps $72: 7200 \mathrm{bps}$ <br> 216: 21600 bps $48: 4800 \mathrm{bps}$ <br> 192: 19200 bps $24: 2400 \mathrm{bps}$ |
| :---: | :---: |
| Resolution | S: Standard ( $8 \times 3.85$ dots $/ \mathrm{mm}$ ) <br> D: Detail ( $8 \times 7.7$ dots $/ \mathrm{mm}$ ) <br> F: Fine ( $8 \times 15.4$ dots $/ \mathrm{mm}$ ) <br> SF: Superfine ( $16 \times 15.4$ dots $/ \mathrm{mm}$ ) <br> 21: Standard ( $200 \times 100 \mathrm{dpi}$ ) <br> 22: Detail ( $200 \times 200 \mathrm{dpi}$ ) <br> 44: Superfine ( $400 \times 400 \mathrm{dpi}$ ) |
| Compression mode | MMR: MMR compression <br> MR: MR compression <br> MH: MH compression <br> JBO: JBIG compression (Optional mode) <br> JBB: JBIG compression (Basic mode) |
| Communication mode | ECM: With ECM NML: With no ECM |
| Width and reduction | A4: A4 (8.3"), no reduction B4: B4 (10.1"), no reduction A3: A3 (11.7"), no reduction |

## BIT SWITCHES

| I/O rate | $0: 0 \mathrm{~ms} / \mathrm{line}$ | $10: 10 \mathrm{~ms} / l i n e$ |
| :--- | :--- | :--- |
|  | $25: 2.5 \mathrm{~ms} / \mathrm{line}$ | $20: 20 \mathrm{~ms} / \mathrm{line}$ |
|  | $5: 5 \mathrm{~ms} / \mathrm{line}$ | $40: 40 \mathrm{~ms} / \mathrm{line}$ |
|  | Note: |  |
|  | "40" is displayed while receiving a fax message using AI short |  |
| protocol. |  |  |

G4 Communication Parameters

| Compression mode | MMR: MMR compression MR: MR compression MH: MH compression |
| :---: | :---: |
| Resolution | 21: Standard ( $200 \times 100$ dpi) <br> 22: Detail (200 200 dpi ) <br> 44: Superfine ( $400 \times 400$ dpi) |
| Width and reduction | A4: A4 (8.3"), no reduction B4: B4 (10.1"), no reduction A3: A3 (11.7"), no reduction |
| Transfer | T: Transfer - : Other |
| Confidential | C: Confidential <br> - : Other |
| Other parameters | The following information is shown in 6-bit format. Bit 1 is the first bit from the left, and bit 6 is at the right end. <br> Bit 1 - Smoothing 0: Off, 1: On <br> (Smoothing is disabled in halftone mode.) <br> Bit 2-CIL printing 0: On, 1: Off <br> Bit 3 - Not used <br> Bit 4 - mm/inch conversion 0: Off, 1: On <br> Bit 5 - Engine type 0: mm, 1: inches <br> Bit 6 - Document resolution unit 0: mm, 1: inches |

System Switch 01 - Not used (Do not change the factory settings.)

| System Switch 02 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-101-003 |
| $0-3$ | Not used | Do not change the settings. |
| $\mathbf{4}$ | File retention time <br> 0: Depends on User Parameter <br> 24[18(H)] <br> 1: No limit | 1: A file that had a communication error will not be <br> erased unless the communication is successful. |
| 5 | Not used | Do not change the setting. |



| System Switch 03 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-101-004 |
| $\mathbf{0}$ | Length of time that RDS is | $00-99$ hours (BCD). |
| to | temporarily switched on when |  |
| $\mathbf{7}$ | bits 6 and 7 of System Switch | This setting is only valid if bits 6 and 7 of System <br> Switch 02 are set to "User selectable". <br>  <br>  <br> 02 are set to "User selectable" <br>  |


| System Switch 04 |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-101-005 |
| 0-2 | Not used | Do not change the settings. |
| $\mathbf{3}$ | Printing dedicated tx <br> parameters on Quick/Speed <br> Dial Lists <br> 0: Disabled <br> 1: Enabled | 1: Each Quick/Speed dial number on the list is <br> printed with the dedicated tx parameters (10 bytes <br> each). <br> The first 10 bytes of data are the programmed <br> dedicated tx parameters; 34 bytes of data are <br> printed (the other 24 bytes have no use for service <br> technicians). |
| 4-7 | Not used | Do not change the settings. |

System Switch 05 - Not used (Do not change the factory settings.)

| System Switch 06 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Margin setting for Create | 71 to 99 (BCD) \%. This setting determines the |
| to | Margin Transmission | reduction ratio when the user uses the Create |
| 7 |  | Margin Transmission feature. |
|  |  | Default setting:1001 0011 (93\%) |

[^1]| System Switch 09 |  | SP No. 1-101-010 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| 0 | Addition of image data from confidential transmissions on the transmission result report 0: Disabled 1: Enabled | If this feature is enabled, the top half of the first page of confidential messages will be printed on transmission result reports. |
| 1 | Inclusion of communications on the Journal when no image data was exchanged. <br> 0: Disabled 1: Enabled | 0: Communications that reached phase C (message $\mathrm{tx} / \mathrm{rx}$ ) of the T .30 protocol are listed on the Journal. <br> 1: Communications that reached phase A (call setup) of T. 30 protocol are listed on the Journal. This will include telephone calls. |
| 2 | Automatic error report printout 0: Disabled 1: Enabled | 0: Error reports will not be printed. <br> 1: Error reports will be printed automatically after failed communications. |
| 3 | Printing of the error code on the error report <br> 0: No 1: Yes | 1: Error codes are printed on the error reports. |
| 4 | Not used | Do not change the setting. |
| 5 | Power failure report 0: Disabled 1: Enabled | 1: A power failure report will be automatically printed after the power is switched on if a fax message disappeared from the memory when the power was turned off last. |
| 6 | Conditions for printing the protocol dump list 0 : Print for all communications 1: Print only when there is a communication error | This switch becomes effective only when system switch 00 bit 6 is set to 1 . <br> 1: Set this bit to 1 when you wish to print a protocol dump list only for communications with errors. |
| 7 | Priority given to various types of remote terminal ID when printing reports <br> $0:$ RTI > CSI > Dial label > Tel. number <br> 1: Dial label > Tel. number > RTI > CSI | This bit determines which set of priorities the machine uses when listing remote terminal names on reports. <br> In G4 communication, G4_TID (Terminal ID) is used instead of RTI or CSI. <br> Dial Label: The name stored, by the user, for the Quick/Speed Dial number. |


| System Switch 0A |  | SP No. 1-101-011 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0-2 | Not used | Do not change the settings. |
| 3 | Continuous polling reception 0: Disabled 1: Enabled | This feature allows a series of stations to be polled in a continuous cycle. This will continue until the polling reception file is erased. The dialing interval is the same as memory transmission. |
| 4 | Dialing on the ten-key pad when the external telephone is off-hook <br> 0: Disabled 1: Enabled | 0: Prevents dialing from the ten-key pad while the external telephone is off-hook. Use this setting when the external telephone is not by the machine, or if a wireless telephone is connected as an external telephone. <br> 1: The user can dial on the machine's ten-key pad when the handset is off-hook. |
| 5 | On hook dial 0: Disabled 1: Enabled | 0 : On hook dial is disabled. |
| 6 | Line used for G3 transmission 0: PSTN 1: ISDN | If an ISDN unit has been installed, this bit determines whether G3 transmissions go out over the PSTN or the ISDN. |
| 7 | Line used when the machine falls back to G3 from G4 if the other end is not a G4 machine 0: PSTN 1: ISDN | This bit switch has no effect if Communication Switch 07 bit 0 is set to 0 . |

System Switch 0B - Not used (Do not change the factory settings.)
System Switch 0C - Not used (Do not change the factory settings.)
System Switch 0D - Not used (Do not change the factory settings.)

| System Switch OE |  |  |
| :---: | :--- | :--- |
| SP No. 1-101-015 |  |  |
| No | FUNCTION | COMMENTS |
| $\mathbf{0 - 2}$ | Not used | Do not change the settings. |
| $\mathbf{3}$ | Action when the external <br> handset goes off-hook <br> 0: Manual tx and rx operation <br> 1: Memory tx and $r x$ operation <br> (the display remains the same) | 0: Manual tx and rx are possible while the external <br> handset is off-hook. However, memory tx is not <br> possible. <br> 1: The display stays in standby mode even when <br> the external handset is used, so that other people <br> can use the machine for memory tx operation. <br> Note that manual tx and rx are not possible with this <br> setting. |
| 4-7 | Not used | Do not change the settings. |


| System Switch 0F |  | SP No. 1-101-016 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| $\begin{gathered} 0 \\ \text { to } \\ 7 \end{gathered}$ | Country/area code for  <br> functional settings (Hex)  <br>   <br> 00: France 11: USA <br> 01: Germany 12: Asia <br> 02: UK 13: Japan <br> 03: Italy 14: Hong Kong <br> 04: Austria 1: South Africa <br> 05: Belgium 16: Australia <br> 06: Denmark 17: New Zealand  <br> 07: Finland 18: Singapore <br> 08: Ireland 19: Malaysia <br> 09: Norway 1A: China <br> 0A: Sweden 1B: Taiwan <br> OB: Switz. 1C: Korea <br> 0C: Portugal 20: Turkey <br> OD: Holland 21: Greece <br> 0E: Spain 22: Hungary <br> 0F: : srael 2: Czech <br> 10: Canada 24: Poland | This country/area code determines the factory settings of bit switches and RAM addresses. However, it has no effect on the NCU parameter settings and communication parameter RAM addresses. <br> Cross reference <br> NCU country code: Function 06, parameter C.C. |


| System Switch 10 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-101-017 |
| $\mathbf{0}$ | Threshold memory level for | Threshold $=\mathrm{N} \times 128 \mathrm{~KB}+256 \mathrm{~KB}$ |
| to | parallel memory transmission | N can be between 00-FF(H) |
| 7 |  | Default setting: $02(\mathrm{H})=512 \mathrm{~KB}$ |


| System Switch 11 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-101-018 |
| $\mathbf{0}$ | TTI printing position <br> 0: Superimposed on the page <br> data <br> 1: Printed before the data <br> leading edge | Change this bit to 1 if the TTI overprints information <br> that the customer considers to be important (G3 <br> transmissions). |
| $\mathbf{1}$ | TSI (G3) or CILTID (G4) <br> printing position <br> 0: Superimposed on the page <br> data <br> 1: Printed before the data <br> leading edge | Change this bit to 1 if the TSI (G3) or CIL/TID (G4) <br> overprints information that the customer considers <br> to be important. |
| $\mathbf{2}$ | CIL: Command Information Line (Group 4) |  |
| $\mathbf{3}$ | Not used <br> TTI used for broadcasting <br> 0: The TTIs selected for each <br> Quick/Speed dial are used <br> 1: The same TTI is used for all <br> destinations | D: The TTI (TTI_1 or TTI_2) which is selected for all <br> destinations during broadcasting. |


| System Switch 11 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-101-018 |
| $\mathbf{4}$ | Type of TTI used for <br> transmission using the ten-key <br> pad <br> 0: TTI_1 <br> 1: TTI_2 | 1: The machine uses TTI_2 when the user dials the <br> destination using the ten-key pad. It is also used for <br> polling transmission and manual transmission using <br> the handset. |
| $5-6$ | Not used | Do not change the factory settings. |
| $\mathbf{7}$ | Use of parallel memory <br> transmission with G4 <br> transmission <br> 0: Disabled 1: Enabled | This determines whether parallel transmission can <br> be used with a G4 transmission or not. <br> Note that this bit is only effective if Parallel Memory <br> transmission is enabled (User Parameter 07-bit 2). |


| System Switch 12 |  | SP No. 1-101-019 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 7 \end{gathered}$ | TTI/CIL printing position in the main scan direction | TTI/CIL: 08 to 92 (BCD) mm Input even numbers only. <br> This setting determines the print start position for the TTI and CIL from the left edge of the paper. If the TTI is moved too far to the right, it may overwrite the file number which is on the top right of the page. On an A4 page, if the CIL is moved over by more than 50 mm , it may overwrite the page number. |

System Switch 13 - Not used (do not change the settings)
System Switch 14 - Not used (do not change the settings)

| System Switch 15 |  | SP No. 1-101-022 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Not used | Do not change the setting. |
| 1 | Going into the Energy Saver mode automatically <br> 0 : Enabled <br> 1: Disabled | 1: The machine will restart from the Energy Saver mode quickly, because the +5 V power supply is active even in the Energy Saver mode. |
| 2-3 | Not used | Do not change the setting. |
| 4-5 | Interval for preventing the machine from entering Energy Saver mode if there is a pending transmission file. | If there is a file waiting for transmission, the machine does not go to Energy Saver mode during the selected period. <br> After transmitting the file, if there is no file waiting for transmission, the machine goes to the Energy Saver mode. |
| 6 | Print user codes on reports. 0: Disabled 1: Enabled | 1: User codes are printed out on the Journal or other reports. |
| 7 | Not used | Do not change the setting. |


| System Switch 16 |  |  |  | SP No. 1-101-023 |
| :---: | :--- | :--- | :---: | :---: |
| No | FUNCTION | COMMENTS |  |  |


| System Switch 17 - Not used (do not change the settings) |
| :--- |
| System Switch 18 - Not used (do not change the settings) |


| System Switch 19 |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-101-026 |
| $\mathbf{0 - 5}$ | Not used | Do not change the settings. |
| $\mathbf{6}$ | Extended scanner page <br> memory after memory option <br> is installed <br> 0: Disabled <br> 1: Enabled | 0: After installing the memory expansion option, the <br> scanner page memory is extended to 4 MB from 2 <br> MB. <br> 1: If this bit is set to 1 after installing the memory <br> expansion option, the scanner page memory is <br> extended to 12 MB. But the SAF memory decreases <br> to 18 MB. |
| $\mathbf{7}$ | Special Original mode <br> 0: Disabled <br> 1: Enabled | 1: If the customer frequently wishes to transmit a form <br> or letterhead which has a colored or printed <br> background, change this bit to "1". "Original 1" and <br> "Original 2" can be selected in addition to the "Text", <br> "Text/Photo" and "Photo" modes. |

[^2]| System Switch 1D |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS |
| $\mathbf{0}$ | RTI/CSI/CPS display <br> 0: Disabled <br> $1:$ Enabled | 1: RTI/CSI/CPS is displayed on the top line of the <br> LCD panel during communication. |
| 1-7 | Not used | Do not change the settings. |


| System Switch 1E |  | SP No. 1-101-031 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Communication after the Journal data storage area has become full <br> 0: Impossible <br> 1: Possible | This setting is effective only when Automatic Journal printout is enabled but the machine cannot print the report (e.g., no paper). <br> $\mathbf{0}$ : If the buffer memory of the communication records for the Journal has become full, fax communications will become impossible, to prevent overwriting the communication records before the machine prints them out. <br> 1: If the buffer memory of the communication records for the Journal is full, fax communications are still possible. But the machine will overwrite the oldest communication records. <br> Cross Reference <br> - Automatic Journal output - User switch 03 bit 7 <br> - Number of communication records for the Journal: <br> 200 records (standard) <br> 1000 records (with the Function Upgrade unit installed) |
| 1 | Action when the SAF memory has become full during scanning <br> 0 : The current page is erased. <br> 1: The entire file is erased. | 0: If the SAF memory becomes full during scanning, the successfully scanned pages are transmitted. <br> 1: If the SAF memory becomes full during scanning, the file is erased and no pages are transmitted. <br> This bit switch is ignored for parallel memory transmission. |
| 2 | RTI/CSI display priority 0: RTI 1: CSI | This bit determines which identifier, RTI or CSI, is displayed on the LCD while the machine is communicating in G3 non-standard mode. |
| 3 | File No. printing <br> 0 : Enabled <br> 1: Disabled | 1: File numbers are not printed on any reports. |
| 4 | Action when authorized reception is enabled but authorized RTIs/CSIs are not yet programmed <br> 0: All fax reception is disabled 1: Faxes can be received if the sender has an RTI or CSI | If authorized reception is enabled but the user has stored no acceptable sender RTIs or CSIs, the machine will not be able to receive any fax messages. <br> If the customer wishes to receive messages from any sender that includes an RTI or CSI, and to block messages from senders that do not include an RTI or CSI, change this bit to " 1 ", then enable Authorized Reception. Otherwise, keep this bit at " 0 (default setting)". |


| System Switch 1E |  | SP No. 1-101-031 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 5 | Address display priority in the Al redial mode <br> 0: RTI/CSI <br> 1: Telephone number | 0: When the machine has both RTI/CSI and the telephone number information, the machine displays RTI/CSI. <br> 1: The machine always displays the telephone number. |
| 6 | Not used | Do not change the setting |
| 7 | RAM initialization after the optional Function Upgrade unit is installed or removed <br> 0: Enabled <br> 1: Disabled | When the machine detects that a Function Upgrade unit has been installed or removed, the machine shows the following message on the display for the customer. <br> "Adding/Removing FAX Feature Expander causes data loss. Turn Main Power Switch off and remove/replace it to avoid loss. To continue, press Yes." <br> If Yes is pressed, the machine initializes the RAM to the "with" or "without card" configuration. However, changing this bit to " 1 " disables this initialization, even if Yes is pressed. <br> Change this bit to 1 after installing the Function Upgrade unit. <br> $\mathbf{0}$ : When the above message is displayed, the machine initializes the RAM if Yes is pressed. The amount of data lost depends on whether the board is in or out. To avoid losing data, the user must switch off immediately and put the Function Upgrade unit back in. <br> 1: When the above message is displayed, the machine does not initialize the RAM even if $Y$ es is pressed. However, the fax unit cannot be used until the user switches off, puts the Function Upgrade |


| System Switch 1F |  | SP No. 1-101-032 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Not used | Do not change the setting. |
| 1 | Report printout after an original jam during SAF storage or if the SAF memory fills up <br> 0: Enabled <br> 1: Disabled | 0: When an original jams, or the SAF memory overflows during scanning, a report will be printed. Change this bit to " 1 " if the customer does not want to have a report in these cases. <br> Memory tx - Memory storage report <br> Parallel memory tx - Transmission result report |
| 2 | Not used | Do not change the setting. |
| 3 | Received fax print start timing (G3 reception) <br> 0 : After receiving each page <br> 1: After receiving all pages | 0: The machine prints each page immediately after the machine receives it. <br> 1: The machine prints the complete message after the machine receives all the pages in the memory. |
| 4 | Received fax print start timing (G4 reception) <br> 0 : After receiving each page <br> 1: After receiving all pages |  |
| 5-6 | Not used | Do not change the factory settings. |
| 7 | Action when a fax SC has occurred <br> 0: Automatic reset <br> 1: Fax unit stops | $\mathbf{0}$ : When the fax unit detects a fax SC code other than SC1201 and SC1207, the fax unit automatically resets itself. <br> 1: When the fax unit detects any fax SC code, the fax unit stops. <br> Cross Reference <br> Fax SC codes - See "Troubleshooting" |

### 3.2.2 SCANNER SWITCHES

Scanner Switch 00 - Not used (do not change the settings)

| Scanner Switch 01 |  | SP No. 1-102-002 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0-7 | Scan density step value (Text mode) | When scan density is adjusted manually away from the Normal setting, the threshold value for binary picture processing changes for each step from the value specified by Scanner Switch 02, by the amount programmed here. <br> For example, with the default setting (14), the threshold value changes as follows. $\begin{array}{ll} +3 \text { (Darkest) }: & 71(=85-14) \\ +2: & 85(=99-14) \\ +1: & 99(=113-14) \\ 0(\text { Normal }): & 113(\text { Scanner Switch } 02 \text { setting }) \\ -1: & 127(=113+14) \\ -2: & 141(=127+14) \\ -3 \text { (Lightest) }: & 155(=141+14) \end{array}$ <br> For smaller steps, input a lower value. |


| Scanner Switch 02 |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-102-003 |
| $\mathbf{0 - 7}$ | Binary picture processing: | Chis setting determines the threshold value for |
|  | Threshold for Text mode - |  |
| Normal setting (center position) | Thinary picture processing in Text mode (when the <br> binan density setting is at the center). <br> scar <br> The value can be between 01 and FF. For a darker <br> threshold, input a lower value. <br> Default setting: 71 (H) $=113(\mathrm{D})$ |  |

Scanner Switch 03 - Not used (do not change the settings)

| Scanner Switch 04 |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-102-005 |
| $\mathbf{0 - 7}$ | Binary picture processing: <br> Threshold for monotone <br> background special original 1 <br> mode - Normal setting (center <br> position) | This setting determines the threshold value for <br> binary picture processing in monotone background <br> special original 1 mode (when the scan density <br> setting is at the center). <br> The value can be between 01 and FF. For a darker <br> threshold, input a lower value. <br> Default setting: A4(H) $164(\mathrm{D})$ |


| Scanner Switch 05 |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-102-006 |
| $\mathbf{0 - 7}$ | Binary picture processing: <br> Threshold for colored <br> background special original 2 <br> mode - Normal setting (center <br> position) | This setting determines the threshold value for <br> binary picture processing in colored background <br> special original 2 mode (when the scan density <br> setting is at the center). <br> The value can be between 01 and FF. For a darker <br> threshold, innut a lower value. <br> Default setting: $28(\mathrm{H})=40(\mathrm{D})$ |


| Scanner Switch 06 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION |  |
| $\mathbf{0}$ | MTF filter level (Text mode) | COMMENTS 1-102-007 |
| to | The value can be between 0(Off) and F. For a weaker threshold, input a lower value. |  |
| $\mathbf{3}$ | Default setting: 7 |  |
|  | This setting is independent from the threshold specified by the copier SP modes. |  |
| $\mathbf{4}$ | MTF filter level (Text/Photo mode) |  |
| to | The value can be between 0(Off) and F. For a weaker threshold, input a lower value. |  |
| $\mathbf{7}$ | Default setting: 7 |  |
|  | This setting is independent from the threshold specified by the copier SP modes. |  |


| Scanner Switch 07 |  |  |  |
| :---: | :--- | :--- | :---: |
| No | FUNCTION | COMMENTS No. 1-102-008 |  |
| $\mathbf{0}$ | Smoothing filter level (Photo | The value can be between 0(Off) and 7. For a |  |
| to | mode) | weaker threshold, input a lower value. |  |
| $\mathbf{2}$ |  | Default setting: 2 <br> This setting is independent from the threshold <br> setting specified by the copier SP modes. |  |
| 3-7 | Not used | Do not change the settings. |  |


| Scanner Switch 08 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-102-009 |
| $\mathbf{0}$ | Independent dot erase level | The value can be between 0 (Off) and 7. |
| to |  |  |
| $\mathbf{2}$ | (Text modes) | For a higher threshold, input a higher value (larger <br> dots are erased). <br> Default setting: 2 |
|  |  | This setting is independent from the threshold <br> setting specified by the copier SP modes. |
| 3-7 | Not used | Do not change the settings. |


| Scanner Switch 09 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | SP No. 1-102-010 |
| $\mathbf{0}$ | Independent dot erase level | The value can be between 0NTS (Off) and 7. |
| to | (monotone background special | For a higher threshold, input a higher value (larger |
| $\mathbf{2}$ | original 1 mode) | dots are erased). |
|  |  | Default setting: 6 |
|  |  | This setting is independent from the threshold |
|  |  | setting specified by the copier SP modes. |
| 3-7 | Not used | Do not change the settings. |


| Scanner Switch 0A |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-102-011 |
| $\mathbf{0}$ | Independent dot erase level |  |
| to |  |  |
| $\mathbf{2}$ | (colored background special |  |
| original 2 mode) | The value can be between 0 (Off) and 7. <br> For a higher threshold, input a higher value (larger <br> dots are erased). <br> Default setting: 1 <br> This setting is independent from the threshold <br> setting specified by the copier SP modes. |  |
| 3-7 | Not used | Do not change the settings. |



| Scanner Switch 0C |  | SP No. 1-102-013 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Action when an original jam has occurred while scanning the original into memory for memory tx <br> 0 : Continues scanning after recovery <br> 1: Stops scanning and erases all scanned pages for that job | This bit is only effective when parallel memory tx is disabled (user parameter 07 - bit 2). <br> If parallel memory $t x$ is enabled, the machine always erases the scanned pages when an original jam occurs. The machine then asks the user to retry from the first page, even if the parallel memory tx is not actually used. <br> 0 : The machine displays a message asking the user to put the jammed page back into the original stack, and continues scanning. <br> The message is displayed for the time period specified by scanner switch $0 E$, bit 2 . <br> 1: The machine erases all the scanned pages and asks the user to retry from the first page. |
| $\begin{gathered} 1 \\ \text { to } \\ 2 \end{gathered}$ | Setting when an original size cannot be recognized <br> Bit 21 Setting <br> 0 No original <br> 01 A5 [ <br> 10 A5 口 <br> 11 No original |  |
| 3-5 | Not used | Do not change the setting. |
| 6 | Scan width used for a document set in the ADF when the width is less than 230 mm . 0: A4 ( 210 mm ) <br> 1: LT ( 216 mm ) | This bit is set at " 1 " when the country code is set to the US. |
| 7 | Not used | Do not change the setting. |


| Scanner Switch OD |  | SP No. 1-102-014 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0-6 | Not used | Do not change the settings. |
| 7 | Scan width for A5 lengthwise or B5 lengthwise originals <br> $0: 210 \mathrm{~mm}\left(8.5^{\prime \prime}\right)$ <br> 1: Original width | 0: The machine scans the original as 210 mm (8.5") width. The transmitted image has a blank area on the right. <br> 1: The machine scans 148 mm (A5) or 182 mm (B5) and centers the scanned data on a 216 mm width transmitted image. |


| Scanner Switch 0E |  | SP No. 1-102-015 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Wait time for the next page when scanning a book original into memory $0: 60 \mathrm{~s}$ $1: 30 \mathrm{~s}$ | This bit determines how long the machine waits for the next page when scanning a book original for memory transmission. If this timer expires, the machine transmits all the pages scanned so far as one document. <br> Note: In immediate tx or parallel memory tx, the wait time for the next page is 10 s . |
| 1 | Scan resolution unit 0: mm <br> 1: inches | This bit determines which resolution unit will be used for scanning a fax message. <br> Default setting: mm |
| 2 | ADF jam alarm display time $0: 60 \mathrm{~s}$ $1: 30 \mathrm{~s}$ | The bit is only effective when bit 0 of scanner bit switch 0 C is " 0 ". <br> This bit determines how long the machine displays the ADF jam alarm after a jam occurred. |
| 3-7 | Not used | Do not change the settings. |


| Scanner Switch 0F |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-102-016 |
| $\mathbf{0}$ | Image rotation before <br> transmission (A4/LT sideways) <br> 0: Disabled <br> 1: Enabled | This bit determines whether the machine rotates the <br> scanned image by 90 degrees before transmission. <br> If this bit is set at 1, A4 (LT) sideways images (297 <br> mm width in the protocol) will be transmitted as A4 <br> (LT) lengthwise images (216 mm width in the <br> protocol). |
| $\mathbf{1}$ | Not used | Do not change the setting. |
| $\mathbf{2}$ | Image rotation before <br> transmission (A5/HLT <br> lengthwise) <br> 0: Disabled <br> 1: Enabled | This bit determines whether the machine rotates the <br> scanned image by 90 degrees before transmission. <br> If this bit is set at "1", A5 (HLT) lengthwise images <br> will be transmitted as A4 (LT) width images (216 <br> mm width in the protocol). |
| 3-7 | Not used | Do not change the setting. |

### 3.2.3 PRINTER SWITCHES

| Printer Switch 00 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-103-001 |
| $\mathbf{0}$ | Page separation mark <br> 0: Disabled <br> 1: Enabled | 0: No marks are printed. <br> 1: If a received page has to be printed out on two <br> sheets, an asterisk inside square brackets is printed <br> at the bottom right hand corner of the first sheet, <br> and a "" inside a small box is printed at the top right <br> hand corner of the second sheet. This helps the <br> user to identify pages that have been split. |
| $\mathbf{1}$ | Repetition of data when the <br> received page is longer than <br> the printer paper <br> 0: Disabled <br> 1: Enabled | 0: The next page continues from where the previous <br> page left off. <br> 1: The final few mm of the previous page are <br> repeated at the top of the next page. The amount of <br> repeated data depends on printer switch 04, bits 5 <br> and 6. |
| $\mathbf{2}$ | Prints the date and time on <br> received fax messages <br> 0: Disabled <br> 1: Enabled | This switch is only effective when user parameter 02 <br> - bit 2 (printing the received date and time on <br> received fax messages) is enabled. <br> 1: The machine prints the received and printed date <br> and time at the bottom of each received page. |
| $\mathbf{3 - 7}$ | Not used | Do not change the settings. |


| Printer Switch 01 |  | SP No. 1-103-002 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0-2 | Not used | Do not change the settings. |
| 3-4 | Maximum print width used in the setup protocol | These bits are only effective when bit 7 of printer switch 01 is " 1 ". |
| 5-6 | Not used | Do not change the settings. |
| 7 | Received message width restriction in the protocol signal to the sender <br> 0: Disabled <br> 1: Enabled | 0: The machine informs the transmitting machine of the print width depending on the paper size available from the paper feed stations. <br> Refer to the table on the next page for how the machine chooses the paper width used in the setup protocol (NSF/DIS). <br> 1: The machine informs the transmitting machine of the fixed paper width which is specified by bits 3 and 4 above. |

Relationship between available paper sizes and printer width used in the setup protocol

| Available Paper Size | Printer width used in the Protocol (NSF/DIS) |
| :---: | :---: |
| A4 or $8.5^{\prime \prime} \times 11^{\prime \prime}$ | 297 mm width |
| B5 | 256 mm width |
| A5 or $8.5^{\prime \prime} \times 5.5^{\prime \prime}$ | 216 mm width |
| No paper available (Paper end) | 216 mm width |


| Printer Switch 02 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-103-003 |
| $\mathbf{0}$ | 1st paper feed station usage for <br> fax printing <br> 0: Enabled <br> 1: Disabled | 0: The paper feed station can be used to print fax <br> messages and reports. |
| $\mathbf{1}$ | 2nd paper feed station usage <br> for fax printing <br> 0: Enabled <br> 1: Disabled | 1: The specified paper feed station will not be used <br> for printing fax messages and reports. |
| $\mathbf{2}$ | 3rd paper feed station usage <br> for fax printing <br> 0: Enabled <br> 1: Disabled | Note: Do not disable usage for a paper feed station <br> which has been specified by User Parameter Switch <br> OF (15), or which is used for the Specified Cassette <br> Selection feature. |
| $\mathbf{3}$ | 4th paper feed station usage <br> for fax printing <br> 0: Enabled <br> 1: Disabled |  |
| $\mathbf{4}$ | LCT usage for fax printing <br> 0: Enabled <br> 1: Disabled |  |
| $5 \mathbf{5 - 7}$ | Not used | Do not change the settings. |


| Printer Switch 03 |  | SP No. 1-103-004 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Length reduction of received data <br> 0 : Disabled <br> 1: Enabled | $\mathbf{0}$ : Incoming pages are printed without length reduction. <br> (Page separation threshold: Printer Switch 03, bits 4 to 7) <br> 1: Incoming page length is reduced when printing. (Maximum reducible length: Printer Switches 04, bits 0 to 4) |
| 1-3 | Not used | Do not change the settings |


|  | er Switch 03 SP No. 1-103-004 |
| :---: | :---: |
| No | FUNCTION COMMENTS |
| c <br> to <br> 7 <br> 7 | Page separation threshold (with reduction disabled with switch 03-0 above) <br> If the incoming page is up to x mm longer than the length of copy paper, the excess portion will not be printed. If the incoming page is more than x mm longer than the length of copy paper, the excess portion will be printed on the next page. <br> The value of x is determined by these four bits. <br> Default setting: 6 mm <br> Cross reference <br> Length reduction On/Off: Printer Switch 03, Bit 0 |


| Printer Switch 04 SP No. 1-103-005 |  |
| :---: | :---: |
| No | FUNCTION COMMENTS |
| $\begin{gathered} \hline 0 \\ \text { to } \\ 4 \end{gathered}$ | Maximum reducible length when length reduction is enabled with switch 03-0 above. <Maximum reducible length $>=$ <Paper length $>+(\mathrm{N} \times 5 \mathrm{~mm})$ <br> " N " is the decimal value of the binary setting of bits 0 to 4 . ```Bit 43210 Setting 000000 mm 000015 mm \(\begin{array}{llllll}0 & 0 & 1 & 0 & 0 & 20 \mathrm{~mm} \text { (default setting) }\end{array}\) \(1155 m m\)``` <br> For A5 sideways and B5 sideways paper <Maximum reducible length> = <Paper length> $+0.75 \times(\mathrm{N} \times 5 \mathrm{~mm})$ |
| $\begin{aligned} & 5 \\ & 6 \end{aligned}$ | Length of the duplicated image on the next page, when page separation has taken place. $\binom{0}{0}=4 \mathrm{~mm}\binom{1}{0}=10 \mathrm{~mm}\binom{0}{1}=15 \mathrm{~mm}\binom{1}{1}=\text { Not used }$ |
| 7 | Not used. $\quad$ Do not change the setting. |

Printer Switch 05 - Not used (do not change the settings)

| Printer Switch 06 |  | SP No. 1-103-007 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Printing while a paper cassette is pulled out, when the Just Size Printing feature is enabled. <br> 0 : Printing will not start <br> 1: Printing will start if another cassette has a suitable size of paper, based on the paper size selection priority tables. | Cross reference Just size printing on/off - User switch 05, bit 5 |
| 1-7 | Not used. | Do not change the settings. |


| Printer Switch 07 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-103-008 |
| $\mathbf{0}$ | Reduction for Journal printing <br> 0: Off <br> 1: On | 1: The Journal is reduced to 91\% to ensure that <br> there is enough space in the left margin for punch <br> holes or staples. |
| 2-3 | Not used. | Do not change the settings. |
| $\mathbf{4}$ | List of destinations in the <br> Communication Failure Report <br> for broadcasting <br> 0: All destination <br> 1: Only destinations where <br> communication failure occurred | 1: Only destinations where communication failure <br> occurred are printed on the Communication Failure <br> Report. |
| 5 5-7 | Not used. | Do not change the settings. |


| Printer Switch 08 - Not used (do not change the settings) |
| :--- |
| Printer Switch 09 - Not used (do not change the settings) |
| Printer Switch 0A - Not used (do not change the settings) |
| Printer Switch 0B - Not used (do not change the settings) |
| Printer Switch 0C - Not used (do not change the settings) |
| Printer Switch 0D - Not used (do not change the settings) |


| Printer Switch 0E |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | SP No. 1-103-015 |
| $\mathbf{0}$ | Paper size selection priority <br> 0: Width <br> 1: Length | 0: A paper size that has the same width as the <br> received data is selected first. <br> 1: A paper size which has enough length to print all <br> the received lines without reduction is selected first. |
| $\mathbf{1}$ | Paper size selected for <br> printing A4 width fax data <br> 0: 8.5" $\times 11$ " size <br> 1: A4 size | This switch determines which paper size is selected <br> for printing A4 width fax data, when the machine has <br> both A4 and 8.5" $\times 11$ " size paper. |


| Printer Switch 0E |  | SP No. 1-103-015 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 2 | Page separation <br> 0 : Enabled <br> 1: Disabled | 1: If all paper sizes in the machine require page separation to print a received fax message, the machine does not print the message (Substitute Reception is used). <br> After a larger size of paper is set in a cassette, the machine automatically prints the fax message. |
| $\begin{gathered} 3 \\ \text { to } \\ 4 \end{gathered}$ | Printing the sample image on   <br> reports   <br> Bit 4 Bit 3 Setting  <br> 0 0 The upper half <br> only <br> 0 1 50\% reduction <br>  <br> 1 <br> 1 0 in sub-scan only <br> 1 1 Same size <br> Not used   | "Same size" means the sample image is printed at $100 \%$, even if page separation occurs. User Parameter Switch 19 (13H) bit 4 must be set to " 0 " to enable this switch. Refer to Detailed Section Descriptions for more on this feature. |
| 5-6 | Not used | Do not change the settings. |
| 7 | Equalizing the reduction ratio among separated pages (Page Separation) <br> 0: Enabled <br> 1: Disabled | 0: When page separation has taken place, all the pages are reduced with the same reduction ratio. 1: Only the last page is reduced to fit the selected paper size when page separation has taken place. Other pages are printed without reduction. |


| Printer Switch 0F |  | SP No. 1-103-016 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} 0 \\ 0 \\ \text { to } \\ 1 \end{gathered}$ | Smoothing feature    <br> Bit $\mathbf{1}$ Bit $\mathbf{0}$ Setting   <br> 0 0 Disabled  <br> 0 1 Disabled  <br> 1 0 Enabled  <br> 1 1 Not used  | $(\mathbf{0 , 0} \mathbf{( 0 , 1 ) : ~ D i s a b l e ~ s m o o t h i n g ~ i f ~ t h e ~ m a c h i n e ~}$ receives halftone images from other manufacturers fax machines frequently. |
| 2 | Duplex printing <br> 0 : Disabled <br> 1: Enabled | 1: The machine always prints received fax messages in duplex printing mode: |
| 3 | Binding direction for Duplex printing <br> 0 : Left binding <br> 1: Top binding |  |
| 4 | Printing fax messages in user code mode <br> 0 : Enabled <br> 1: Disabled | 1: The machine holds the received fax messages until the machine exits the restricted access mode (user code or key counter). <br> If the machine enters the restricted access mode again while printing fax messages, the machine stops printing the machine exits the mode again. |
| 5-7 | Not used | Do not change the settings. |

### 3.2.4 COMMUNICATION SWITCHES

| Communication Switch 00 |  | SP No. 1-104-001 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} \hline 0 \\ \text { to } \\ 1 \end{gathered}$ |  | These bits determine the compression capabilities to be declared in phase $B$ (handshaking) of the T. 30 protocol. |
| $\begin{gathered} \\ \hline 2 \\ \text { to } \\ 3 \end{gathered}$ | Compression modes available   <br> in transmit   <br> Bode   <br> Bit $\mathbf{2}$ Modes <br> 0 0 MH only <br> 0 1 MH/MR <br> 1 0 MH/MR/MMR <br> 1 1 MH/MR/MMR/ <br>    <br>    <br>    <br>    | These bits determine the compression capabilities to be used in the transmission and to be declared in phase B (handshaking) of the T. 30 protocol. |
| 4 | Not used | Do not change the setting. |
| 5 | JBIG compression method: Reception <br> 0 : Only basic supported <br> 1: Basic and optional both supported | Change the setting when communication problems occur using JBIG compression. |
| 6 | JBIG compression method: Transmission 0 : Basic mode priority <br> 1: Optional mode priority | Change the setting when communication problems occur using JBIG compression. |
| 7 | Closed network (reception) <br> 0 : Disabled <br> 1: Enabled | 1: Reception will not go ahead if the ID code of the other terminal does not match the ID code of this terminal. This function is only available in NSF/NSS mode. |


| Communication Switch 01 |  | SP No. 1-104-002 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | $\begin{aligned} & \text { ECM } \\ & \text { 0: Off 1: On } \end{aligned}$ | If this bit is set to 0 , ECM is switched off for all communications. <br> In addition, V. 8 protocol and JBIG compression are switched off automatically. |
| 1 | Not used | Do not change the setting. |
| $\begin{gathered} 2 \\ \text { to } \\ 3 \end{gathered}$ | Wrong connection prevention method | $(0,1)$ - The machine will disconnect the line without sending a fax message, if the last 8 digits of the received CSI do not match the last 8 digits of the dialed telephone number. This does not work when manually dialed. <br> $(1,0)$ - The same as above, except that only the last 4 digits are compared. <br> $(1,1)$ - The machine will disconnect the line without sending a fax message, if the other end does not identify itself with an RTI or CSI. <br> $(0,0)$ - Nothing is checked; transmission will always go ahead. <br> Note: This function does not work when dialing is done from the external telephone. |
| 4-5 | Not used | Do not change the settings. |
| $\begin{gathered} 6 \\ \text { to } \\ 7 \end{gathered}$ |  | The setting determined by these bits is informed to the transmitting terminal in the pre-message protocol exchange (in the DIS/NSF frames). |


| Communication Switch 02 |  | SP No. 1-104-003 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Burst error threshold 0: Low 1: High | If there are more consecutive error lines in the received page than the threshold, the machine will send a negative response. <br> The Low and High threshold values depend on the sub-scan resolution, and are as follows. |
| 1 | Acceptable total error line ratio $0: 5 \% 1: 10 \%$ | If the error line ratio for a page exceeds the acceptable ratio, RTN will be sent to the other end. |
| 2 | Treatment of pages received with errors during G3 reception <br> 0 : Deleted from memory without printing <br> 1: Printed | 0: Pages received with errors are not printed. |


| Communication Switch 02 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-104-003 |
| $\mathbf{3}$ | Hang-up decision when a <br> negative code (RTN or PIN) is <br> received during G3 immediate <br> transmission <br> 0: No hang-up, 1: Hang-up | 0: The next page will be sent even if RTN or PIN is <br> received. <br> 1: The machine will send DCN and hang up if it <br> receives RTN or PIN. |
| This bit is ignored for memory transmissions or if |  |  |
| ECM is being used. |  |  |


| Communication Switch 03 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Maximum number of page | CO4-004 |
| to | retransmissions in a G3 | This setting is not used if ECM is switched on. |
| 7 | memory transmission | Default setting -03(H) |

[^3]| Communication Switch 07 |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-104-008 |
| $\mathbf{0}$ | Fallback from G4 to G3 if the <br> other terminal is not a G4 <br> terminal <br> 0: Disabled <br> 1: Enabled | Also see system switch 0A bit 7. <br> Refer to the ISDN G4 option service manual (G4 <br> Internal Switches 17, 18, 1A, 1B, and 1C) for the <br> CPS code set (Cause Value set) that determines G4 <br> to G3 fallback. |
| $\mathbf{1}$ | Not used | Do not change the setting. |
| $\mathbf{2}$ | Not used | Do not change the setting. |
| $\mathbf{3}$ | Fallback from G4 to G3 <br> reflected in programmed <br> Quick/Speed dials <br> 0: Fallback enabled <br> 1: Always start with G4 | 0: If a communication falls back from G4 to G3, the <br> machine will always start transmission with G3 from <br> the next communication. <br> 1: The machine will always start to transmit with G4. |
| $\mathbf{4}$ | Fallback from G4 to G3 when <br> G4 communication fails on the <br> ISDN B-channel <br> 0: Fallback disabled <br> 1: Fallback enabled | 1: Enable this switch only when G4 communication <br> errors occur because the exchanger connects G4 <br> calls to the PSTNN. <br> This problem occurs with some types of exchanger. |
| $\mathbf{5}$ | Not used | Do not change the setting. |
| $\mathbf{6}$ | Not used | Do not change the setting. |
| $\mathbf{7}$ | Not used | Do not change the setting. |

Communication Switch 08 - Not used (do not change the settings)
Communication Switch 09 - Not used (do not change the settings)

| Communication Switch 0A |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-104-011 |
| $\mathbf{0}$ | Point of resumption of memory <br> transmission upon redialing <br> 0: From the error page <br> 1: From page 1 | 0: The transmission begins from the page where <br> transmission failed the previous time. <br> 1: Transmission begins from the first page, using <br> normal memory transmission. |
| 1-6 | Not used | Do not change the settings. |
| $\mathbf{7}$ | Emergency calls using 999 <br> 0: Enabled 1: Disabled | lf this bit is at 1, the machine will not allow you to <br> dial 999 at the auto-dialer. This is a PTT <br> requirement in the Hong Kong. |


| Communication Switch 0B |  | SP No. 1-104-012 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Use of Economy Transmission during a Transfer operation to end receivers <br> 0 : Disabled 1: Enabled | These bits determine whether the machine uses the Economy Transmission feature when it is carrying out a Transfer operation as a Transfer Station. |
| 1 | Use of Economy Transmission during a Transfer operation to the Next Transfer Stations 0 : Disabled 1: Enabled |  |
| 2 | Use of Label Insertion for the End Receivers in a Transfer operation <br> 0: Disabled 1: Enabled | This bit determines whether the machine uses the Label Insertion feature when it is carrying out a Transfer operation as a Transfer Station. |
| 3 | Conditions required for Transfer Result Report transmission 0: Always transmitted 1: Only transmitted if there was an error | 0: When acting as a Transfer Station, the machine will always send a Transfer Result Report back to the Requesting Station after completing the Transfer Request, even if there were no problems. <br> 1: The machine will only send back a Transfer Result Report if there were errors during communication, meaning one or more of the End Receivers could not be contacted. |
| 4 | Printout of the message when acting as a Transfer Station 0 : Disabled 1: Enabled | When the machine is acting as a Transfer Station, this bit determines whether the machine prints the fax message coming in from the Requesting Terminal. |
| 5 | Action when there is no fax number in the programmed Quick/Speed dials which meets the requesting terminal's own fax number <br> 0 : Transfer is disabled <br> 1: Transfer is enabled | After the machine receives a transfer request, the machine compares the last N digits of the requesting terminal's own fax number with all the Quick/Speed dials programmed in the machine. ( N is the number programmed in communication switch OC.) <br> 0 : If there is no matching number programmed in the machine, the machine rejects the transfer request. <br> 1: Even if there is no matching number programmed in the machine, the machine accepts the transfer request. The result report will be printed at the transfer terminal, but will not be sent back to the requesting terminal. |
| 6-7 | Not used | Do not change the settings. |


| Communication Switch OC |  | SP No. 1-104-013 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| $\begin{gathered} \hline 0 \\ \text { to } \\ 4 \end{gathered}$ | Number of digits compared to find the requester's fax number from the programmed Quick/Speed Dials when acting as a Transfer Station | 00-1F (0 to 31 digits) <br> After the machine receives a transfer request, the machine compares the own telephone number sent from the Requesting Terminal with all Quick/Speed Dials programmed in the machine, starting from Quick Dial 01 to the end of the Speed Dials. <br> This number determines how many digits from the end of the telephone numbers the machine compares. <br> If it is set to 00 , the machine will send the report to the first Quick/Speed Dial that the machine compared. If Quick Dial 01 is programmed, the machine will send the report to Quick 01. If Quick Dial 01 through 04 are not programmed and Quick Dial 05 is programmed, the machine will send the report to Quick 05. <br> Default setting - $05(\mathrm{H})=5$ digits |
| 5-7 | Not used | Do not change the settings. |


| Communication Switch OD |  | SP No. 1-104-014 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} \hline 0 \\ \text { to } \\ 7 \end{gathered}$ | The available memory threshold, below which ringing detection (and therefore reception into memory) is disabled | $00 \text { to FF (Hex), unit }=4 \text { kbytes }$ $\text { (e.g., 06(H) = } 24 \text { kbytes) }$ <br> One page is about 24 kbytes. <br> The machine refers to this setting before each fax reception. If the amount of remaining memory is below this threshold, the machine cannot receive any fax messages. <br> If this setting is kept at 0 , the machine will detect ringing signals and go into receive mode even if there is no memory available. This will result in communication failure. |


| Communication Switch 0E |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-104-015 |
| $\mathbf{0}$ | Minimum interval between | 06 to $\mathrm{FF}(\mathrm{Hex})$, unit $=2 \mathrm{~s}$ |
| to | automatic dialing attempts | $(\mathrm{e} . \mathrm{g} ., 06(\mathrm{H})=12 \mathrm{~s})$ |
| $\mathbf{7}$ |  | This value is the minimum time that the machine |
|  | waits before it dials the next destination. |  |

Communication Switch 0F - Not used (do not change the settings.)

| Communication Switch 10 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-104-017 |
| $\mathbf{0}$ | Memory transmission: | 01-FE (Hex) times |
| to | Maximum number of dialing |  |
| 7 | attempts to the same |  |
|  | destination |  |

Communication Switch 11 - Not used (do not change the settings.)

| Communication Switch 12 |  |  |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS No. 1-104-019 |
| $\mathbf{0}$ | Memory transmission: Interval | 01-FF (Hex) minutes |
| to | between dialing attempts to the |  |
| 7 | same destination |  |

Communication Switch 13 - Not used (do not change the settings.)

| Communication Switch 14 |  | SP No. 1-104-021 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Inch-to-mm conversion during transmission <br> 0: Disabled 1: Enabled | 0: In immediate transmission, data scanned in inch format are transmitted without conversion. <br> In memory transmission, data stored in the SAF memory in mm format are transmitted without conversion. <br> Note: When storing the scanned data into SAF memory, the fax unit always converts the data into mm format. <br> 1: The machine converts the scanned data or stored data in the SAF memory to the format which was specified in the set-up protocol (DIS/NSF) before transmission. |
| 1-5 | Not used | Do not change the factory settings. |
| $\begin{gathered} 6 \\ \text { to } \\ 7 \end{gathered}$ |  | For the best performance, do not change the factory settings. <br> The setting determined by these bits is informed to the transmitting terminal in the pre-message protocol exchange (in the DIS/NSF frames). |

Communication Switch 15 - Not used (do not change the settings)

| Communication Switch 16 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-104-023 |
| $\mathbf{0}$ | Standard G3 unit <br> 0: Disabled <br> 1: Enabled | Set this bit to 0 if the user wants to use only the <br> ISDN line (option G4 unit), even for G3 <br> communications. However, for ISDN on hook <br> dialing, bit 7 of user parameter 30 must be set to 1. <br> Note: If the optional G4 unit is not installed, but this <br> bit is changed to 'disabled', no document can be <br> transmitted. |
| $\mathbf{1}$ | Optional G3 unit (G3-2) <br> 0: Not installed <br> 1: Installed | Change this bit to 1 when installing the first optional <br> G3 unit. |
| $\mathbf{2}$ | Optional ISDN unit <br> 0: Not installed <br> 1: Installed | Change this bit to 1 when installing the optional <br> ISDN unit. |
| $\mathbf{3}$ | Optional G3 unit (G3-3) <br> 0: Not installed <br> 1: Installed | Change this bit to 1 when installing the second <br> optional G3 unit. |
| $\mathbf{4}$ | Not used | Do not change the setting. |
| $\mathbf{5}$ | Not used | Use of the I-G3 line <br> 0: Tx or rx <br> 1: Tx only |
| $\mathbf{7}$ | G4 Dual communication <br> 0: Enabled <br> 1: Disabled | Do not change the setting. <br> Change this bit to 1 when the customer requires. <br> communication. This enables a customer to occupy <br> another B channel for other purposes such as <br> internet communication. |


| Communication Switch 17 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-104-024 |
| $\mathbf{0}$ | SEP reception <br> 0: Disabled <br> 1: Enabled | 0: Polling transmission to another maker's machine <br> using the SEP (Selective Polling) signal is disabled. |
| $\mathbf{1}$ | SUB reception <br> 0: Disabled <br> 1: Enabled | 0: Confidential reception to another maker's <br> machine using the SUB (Sub-address) signal is <br> disabled. |
| $\mathbf{2}$ | PWD reception <br> 0: Disabled <br> 1: Enabled | 0: Disables features that require PWD (Password) <br> signal reception. |
| 3-6 | Not used | Do not change the settings. |
| $\mathbf{7}$ | Action when there is no box <br> with an F-code that matches <br> the received SUB code <br> 0: Disconnect the line <br> 1: Receive the message <br> (using normal reception mode) | Change this setting when the customer requires. |

Communication Switch 18 - Not used (do not change the settings)
Communication Switch 19 - Not used (do not change the settings)
Communication Switch 1A - Not used (do not change the settings)

| Communication Switch 1B |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | SP No. 1-104-028 |
| $\mathbf{0}$ | Extension access code (0 to 7) | If the PABX does not support V.8/V.34 protocol |
| to | to turn V.8 protocol On/Off | procedure, set this bit to "1" to disable V.8. |
| $\mathbf{7}$ | 0: On | Example: If "0" is the PSTN access code, set bit 0 |
|  | 1: Off | to 1. When the machine detects "0" as the first |
|  |  | dialed number, it automatically disables V.8 |
|  |  | protocol. (Alternatively, if "3" is the PSTN access |
|  |  |  |
|  |  |  |


| Communication Switch 1C |  | SP No. 1-104-029 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 1 \end{gathered}$ | Extension access code (8 and 9) to turn V. 8 protocol On/Off <br> 0 : On <br> 1: Off | Refer to communication switch 1E. <br> Example: If " 8 " is the PSTN access code, set bit 0 to 1 . When the machine detects " 8 " as the first dialed number, it automatically disables V. 8 protocol. (If " 9 " is the PSTN access code, use bit 1.) |
| 2-7 | Not used | Do not change the settings. |


| Communication Switch 1D - Not used (do not change the settings) |
| :--- |
| Communication Switch 1E - Not used (do not change the settings) |
| Communication Switch 1F - Not used (do not change the settings) |

### 3.2.5 G3 SWITCHES

| G3 Switch 00 |  | SP No. 1-105-001 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{aligned} & \hline 0 \\ & 1 \end{aligned}$ | Monitor speaker during | $(0,0)$ : The monitor speaker is dis |
|  | communication (tx and rx) | the communication. |
|  | $\begin{array}{ccl}\text { Bit } 1 & \text { Bit } 0 & \text { Setting } \\ 0 & 0 & \text { Disabled }\end{array}$ | $(0,1)$ : The monitor speaker is on up to phase $B$ in the T. 30 protocol. |
|  | 011 Up to Phase B | ( 1,0$)$ : Used for testing. The monitor speaker is on |
|  | $\begin{array}{lll}1 & 0 & \text { All the time } \\ 1 & 1 & \text { Not used }\end{array}$ | all through the communication. Make sure that you reset these bits after testing. |
| 2 | Monitor speaker during memory transmission 0: Disabled 1: Enabled | 1: The monitor speaker is enabled during memory transmission. |
| 3-7 | Not used | Do not change the settings. |


| G3 Switch 02 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-105-003 |
| $\mathbf{0}$ | G3 protocol mode used <br> 0: Standard and non-standard <br> 1: Standard only | Change this bit to 1 only when the other end can <br> only communicate with machines that send T.30- <br> standard frames only. <br> 1: Disables NSF/NSS signals (these are used in <br> non-standard mode communication) |
| 1-4 | Not used | Do not change the settings. |
| $\mathbf{5}$ | Use of modem rate history for <br> transmission using <br> Quick/Speed Dials <br> 0: Disabled <br> 1: Enabled | 0: Communications using Quick/Speed Dials always <br> start from the highest modem rate. <br> 1: The machine refers to the modem rate history for <br> communications with the same machine when <br> determining the most suitable rate for the current <br> communication. |
| $\mathbf{6}$ | Al short protocol (transmission <br> and reception) <br> 0: Disabled 1: Enabled | Refer to Appendix B in the Group 3 Facsimile <br> Manual for details about AI Short Protocol. |
| $\mathbf{7}$ | Short preamble <br> 0: Disabled 1: Enabled | Refer to Appendix B in the Group 3 Facsimile <br> Manual for details about Short Preamble. |


| G3 Switch 03 |  | SP No. 1-105-004 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | DIS detection number (Echo countermeasure) $0: 1$ $1: 2$ | 0: The machine will hang up if it receives the same DIS frame twice. <br> 1: Before sending DCS, the machine will wait for the second DIS which is caused by echo on the line. |
| 1 | V. 8 protocol in manual reception <br> 0 : Disabled <br> 1: Enabled | 0 : The machine sends CED instead of ANSam when starting a manual reception. <br> 1: The machine sends ANSam during manual reception. |
| 2 | V. 8 protocol <br> 0 : Disabled <br> 1: Enabled | $0: \mathrm{V} .8 / \mathrm{V} .34$ communications will not be possible. <br> Note: <br> Do not set to 0 unless the line condition is always bad enough to slow down the data rate to 14.4 kbps or lower. |
| 3 | ECM frame size <br> 0: 256 bytes <br> 1: 64 bytes | Keep this bit at "0" in most cases. |
| 4 | CTC transmission conditions <br> 0 : After one PPR signal received <br> 1: After four PPR signals received (ITU-T standard) | 0: When using ECM in non-standard (NSF/NSS) mode, the machine sends a CTC to drop back the modem rate after receiving a PPR, if the following condition is met in communications at 14.4, 12.0, 9.6 , and 7.2 kbps . <br> $\sqrt{\text { NTransmit } \leq \text { NResend }}$ <br> NTransmit- Number of transmitted frames NResend- Number of frames to be retransmitted <br> 1: When using ECM, the machine sends a CTC to drop back the modem rate after receiving four PPRs. <br> PPR, CTC: These are ECM protocol signals. <br> This bit is not effective in V. 34 communications. |
| 5 | Modem rate used for the next page after receiving a negative code (RTN or PIN) <br> 0 : No change 1: Fallback | 1: The machine's tx modem rate will fall back before sending the next page if a negative code is received. This bit is ignored if ECM is being used. |
| 6 | V. 8 protocol in manual transmission <br> 0 : Disabled <br> 1: Enabled | 1: The machine detects either ANSam or CED during manual transmission. |
| 7 | Not used | Do not change the setting. |


| G3 Switch 04 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Training error detection | $0-\mathrm{F}($ Hex $) ; 0-15$ bits |
| to |  |  |
| 3 | threshold | If the number of error bits in the received TCF is |
|  |  | below this threshold, the machine informs the |
| sender that training has succeeded. |  |  |


| G3 Switch 05 |  | SP No. 1-105-006 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| $\begin{array}{c\|} \hline 0 \\ \text { to } \\ 3 \end{array}$ | Initial Tx modem rate     <br> Bit     <br> 3     $\mathbf{2}$ 1 $\mathbf{0}$ Setting (bps) | These bits set the initial starting modem rate for transmission. <br> Use the dedicated transmission parameters if you need to change this for specific receivers. <br> If a modem rate 14.4 kbps or slower is selected, V. 8 protocol should be disabled manually. <br> Cross reference <br> V. 8 protocol on/off - G3 switch 03, bit2 |
| $\begin{gathered} \hline 4 \\ \text { to } \\ 5 \end{gathered}$ | Initial modem type for 9.6 k or 7.2 kbps . | These bits set the initial modem type for 9.6 and 7.2 kbps, if the initial modem rate is set at these speeds. |
| 6-7 | Not used | Do not change the settings. |


| G3 Switch 06 |  | SP No. 1-105-007 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| $\begin{gathered} 0 \\ \text { to } \\ 3 \end{gathered}$ |  | These bits set the initial starting modem rate for reception. <br> Use a lower setting if high speeds pose problems during reception. <br> If a modem rate 14.4 kbps or slower is selected, V. 8 protocol should be disabled manually. <br> Cross reference <br> V. 8 protocol on/off - G3 switch 03, bit2 |
| $\begin{gathered} 4 \\ \text { to } \\ 7 \end{gathered}$ |  | The setting of these bits is used to inform the transmitting terminal of the available modem type for the machine in receive mode. <br> If V .34 is not selected, V .8 protocol must be disabled manually. <br> Cross reference <br> V. 8 protocol on/off - G3 switch 03, bit2 |


| G3 Switch 07 |  | SP No. 1-105-008 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 1 \end{gathered}$ | PSTN cable equalizer (tx mode: Internal) Bit 1 Bit 0 Setting 0 O None 01 Low $\begin{array}{lll}1 & 0 & \text { Medium } \\ 1 & 1 & \text { High }\end{array}$ | Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. <br> Use the dedicated transmission parameters for specific receivers. <br> Also, try using the cable equalizer if one or more of the following symptoms occurs. <br> - Communication error <br> - Modem rate fallback occurs frequently. <br> Note: This setting is not effective in V. 34 communications. |


| G3 Switch 07 |  | SP No. 1-105-008 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{array}{\|c\|} \hline 2 \\ \text { to } \\ 3 \end{array}$ | PSTN cable equalizer (rx mode: Internal) Bit 3 Bit 2 Setting | Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. <br> Also, try using the cable equalizer if one or more of the following symptoms occurs. <br> - Communication error with error codes such as $0-20,0-23$, etc. <br> - Modem rate fallback occurs frequently. <br> Note: This setting is not effective in V. 34 communications. |
| 4 | PSTN cable equalizer (V.8/V. 17 rx mode: External) <br> 0 : Disabled <br> 1: Enabled | Keep this bit at "1". |
| 5 | PSTN cable equalizer (V. 34 rx mode; External) | Keep this bit at "1". |
| 6- | Not used | Do not change the settings. |

G3 Switch 08 - Not used (do not change the settings)

| G3 Switch 09 |  | SP No. 1-105-010 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} \hline 0 \\ \text { to } \\ 1 \end{gathered}$ | ISDN cable equalizer (tx mode: Internal) Bit 1 Bit 0 Setting $\begin{array}{lll}0 & 0 & \text { None } \\ 0 & 1 & \text { Low } \\ 1 & 0 & \text { Medium } \\ 1 & 1 & \text { High }\end{array}$ | Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. <br> Use the dedicated transmission parameters for specific receivers. <br> Also, try using the cable equalizer if one or more of the following symptoms occurs. <br> - Communication error <br> - Modem rate fallback occurs frequently. <br> Note: This setting is not effective in V. 34 communications. |


| $\begin{gathered} \hline 2 \\ \hline \text { to } \\ 3 \end{gathered}$ | ISDN cable equalizer (rx mode: Internal) Bit 3 Bit 2 Setting $\begin{array}{lll}0 & 0 & \text { None } \\ 0 & 1 & \text { Low } \\ 1 & 0 & \text { Medium } \\ 1 & 1 & \text { High }\end{array}$ | Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. <br> Also, try using the cable equalizer if one or more of the following symptoms occurs. <br> - Communication error with error codes such as 0-20, 0-23, etc. <br> - Modem rate fallback occurs frequently. <br> Note: This setting is not effective in V. 34 communications. |
| :---: | :---: | :---: |
| 4 | ISDN cable equalizer (V.8/V. 17 rx mode: External) <br> 0 : Disabled <br> 1: Enabled | Keep this bit at "0" in most cases. |
| 5 | ISDN cable equalizer (V. 34 rx mode: External) <br> 0 : Disabled <br> 1: Enabled | Keep this bit at "0" in most cases. |
| 6-7 | Not used | Do not change the settings. |


| G3 Switch 0A | witch 0A | SP No. 1-105-011 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{aligned} & 0 \\ & 1 \end{aligned}$ | Maximum allowable carrier drop during image data reception | These bits set the acceptable modem carrier drop time. <br> Try using a longer setting if error code 0-22 is frequent. |
| 2-3 | Not used | Do not change the settings. |
| 4 | Maximum allowable frame interval during image data reception. $0: 5 \mathrm{~s} 1: 13 \mathrm{~s}$ | This bit set the maximum interval between EOL (end-of-line) signals and the maximum interval between ECM frames from the other end. Try using a longer setting if error code 0-21 is frequent. |
| 5 | Not used | Do not change the setting. |
| 6 | Reconstruction time for the first line in receive mode $0: 6 \mathrm{~s} 1: 12 \mathrm{~s}$ | When the sending terminal is controlled by a computer, there may be a delay in receiving page data after the local machine accepts set-up data and sends CFR. This is outside the T. 30 recommendation. But, if this delay occurs, set this bit to 1 to give the sending machine more time to send data. <br> Refer to error code 0-20. <br> ITU-T T. 30 recommendation: The first line should come within 5 s of CFR. |
| 7 | Not used | Do not change the setting. |


| G3 Switch 0B |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | SP No. 1-105-012 |
| $\mathbf{0}$ | Protocol requirements: Europe <br> 0: Disabled 1: Enabled | The machine does not automatically reset these bits <br> for each country after a country code (System |
| $\mathbf{1}$ | Protocol requirements: Spain <br> 0: Disabled 1: Enabled | Switch 0F) is programmed. <br> Change the required bits manually at installation. |
| $\mathbf{2}$ | Protocol requirements: <br> Germany <br> 0: Disabled 1: Enabled |  |
| $\mathbf{3}$ | Protocol requirements: France <br> 0: Disabled 1: Enabled |  |
| $\mathbf{4}$ | PTT requirements: Germany <br> 0: Disabled 1: Enabled |  |
| $\mathbf{5}$ | PTT requirements: France <br> 0: Disabled 1: Enabled |  |
| $\mathbf{6}$ | Not used | Do not change the setting. |
| $\mathbf{7}$ | DTS requirements : Germany <br> 0: Disabled 1: Enabled | Change this bit manually if required. |


| G3 Switch 0C |  |  | SP No. 1-105-013 |
| :---: | :---: | :---: | :---: |
| No |  | NCTION | COMMENTS |
| 0 | Pulse dialing method |  | $\mathrm{P}=$ Number of pulses sent out, $\mathrm{N}=$ Number dialed. |
| 1 | Bit 1 Bit 0 | Setting |  |
|  | 00 | Normal( $\mathrm{P}=\mathrm{N}$ ) |  |
|  | 01 | Oslo (P=10-N) |  |
|  | 10 | Sweden |  |
|  | 11 | ( $\mathrm{N}+1$ ) <br> Not used |  |
| 2-7 | Not used |  | Do not change the settings. |


| G3 Switch 0D |  | SP No. 1-105-014 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0-1 | Not used | Do not change the settings. |
| $\begin{gathered} 2 \\ \text { to } \\ 5 \end{gathered}$ | Data rate threshold during V. 34 reception <br> Bit 5432 Setting <br> 0000 Normal <br> $\begin{array}{llll}0 & 1 & 1 & 1 \\ \text { Lower by }\end{array}$ one step <br> $\begin{array}{llll}1 & 1 & 1 & 1\end{array}$ Lower by two steps | The machine changes the modulation parameters in the MPh signal to lower the initial modem rate during V. 34 reception. If this switch is set to " 0111 ", the machine lowers the initial speed one step, for example, from 28,800 to $26,400 \mathrm{bps}$. <br> This switch reduces transmission time if the machine frequently sends PPR signals during V. 34 reception. |
| 6 | Not used | Do not change the setting. |
| 7 | B signal detection time for V. 34 polling transmission <br> 0: 75 ms (default setting) <br> 1:65 ms | Change this switch only when there are communication errors during V. 34 polling transmission to a machine with a Panasonic modem. |

G3 Switch 0E - Not used (do not change the settings)

| G3 Switch 0F |  | SP No. 1-105-016 |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Alarm when an error Occurred <br> in Phase C or later <br> 0: Disabled <br> 1: Enabled | If the customer wants to hear an alarm after each <br> error communication, change this bit to "1". |
| $\mathbf{1}$ | Alarm when the handset is off- <br> hook at the end of <br> communication <br> 0: Disabled <br> 1: Enabled | If the customer wants to hear an alarm if the <br> handset is off-hook at the end of fax communication, <br> change this bit to "1". |
| 2-7 | Not used | Do not change the settings. |

### 3.2.6 G3-2 SWITCHES

These switches require an optional G3 interface unit.

| G3-2 Switch 00 |  | SP No. 1-106-001 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| 0-1 | Monitor speaker during   <br> communication (tx and rx )  <br> Bit $\mathbf{1}$ Bit 0 Setting <br> 0 0 Disabled <br> 0 1 Up to Phase B <br> 1 0 All the time <br> 1 1 Not used | (0, 0): The monitor speaker is disabled all through the communication. <br> $(0,1)$ : The monitor speaker is on up to phase B in the T. 30 protocol. <br> (1, 0): Used for testing. The monitor speaker is on all through the communication. Make sure that you reset these bits after testing. |
| 2 | Monitor speaker during memory transmission 0 : Disabled 1: Enabled | 1: The monitor speaker is enabled during memory transmission. |
| 3-6 | Not used | Do not change the settings. |


| G3-2 Switch 01 |  | SP No. 1-106-002 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0-3 | Not used | Do not change the settings. |
| 4 | DIS frame length 0: 10 bytes 1:4 bytes | 1: The bytes in the DIS frame after the 4th byte will not be transmitted (set to 1 if there are communication problems with PC-based faxes which cannot receive the extended DIS frames). |
| 5 | Not used | Do not change the setting. |
| 6 | CED/ANSam transmission <br> 0 : Disabled <br> 1: Enabled | Do not change this setting, unless the communication problem is caused by the CED/ANSam transmission. |
| 7 | Not used | Do not change the setting. |


| G3-2 Switch 02 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-106-003 |
| $\mathbf{0}$ | G3 protocol mode used <br> 0: Standard and non-standard <br> 1: Standard only | Change this bit to 1 only when the other end can <br> only communicate with machines that send T.30- <br> standard frames only. <br> 1: Disables NSF/NSS signals (these are used in <br> non-standard mode communication) |
| 1-4 | Not used | Do not change the settings. |
| $\mathbf{5}$ | Use of modem rate history for <br> transmission using <br> Quick/Speed Dials <br> 0: Disabled <br> 1: Enabled | 0: Communications using Quick/Speed Dials always <br> start from the highest modem rate. <br> 1: The machine refers to the modem rate history for <br> communications with the same machine when <br> determining the most suitable rate for the current <br> communication. |
| $\mathbf{6}$ | Al short protocol (transmission <br> and reception) <br> 0: Disabled 1: Enabled | Refer to Appendix B in the Group 3 Facsimile <br> Manual for details about AI Short Protocol. |
| $\mathbf{7}$ | Short preamble <br> 0: Disabled 1: Enabled | Refer to Appendix B in the Group 3 Facsimile <br> Manual for details about Short Preamble. |


| G3-2 Switch 03 |  | SP No. 1-106-004 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | DIS detection number (Echo countermeasure) 0:1 <br> 1:2 | 0 : The machine will hang up if it receives the same DIS frame twice. <br> 1: Before sending DCS, the machine will wait for the second DIS which is caused by echo on the line. |
| 1 | Not used | Do not change the setting. |
| 2 | V. 8 protocol <br> 0 : Disabled <br> 1: Enabled | 0: V.8/V. 34 communications will not be possible. <br> Note: <br> Do not set to 0 unless the line condition is always bad enough to slow down the data rate to 14.4 kbps or lower. |
| 3 | ECM frame size <br> 0: 256 bytes <br> 1: 64 bytes | Keep this bit at "0" in most cases. |
| 4 | CTC transmission conditions <br> 0 : After one PPR signal received <br> 1: After four PPR signals received (ITU-T standard) | 0: When using ECM in non-standard (NSF/NSS) mode, the machine sends a CTC to drop back the modem rate after receiving a PPR, if the following condition is met in communications at 14.4, 12.0, 9.6 , and 7.2 kbps . <br> $\sqrt{\text { NTransmit } \leq N R e s e n d ~}$ <br> NTransmit- Number of transmitted frames NResend- Number of frames to be retransmitted <br> 1: When using ECM, the machine sends a CTC to drop back the modem rate after receiving four PPRs. <br> PPR, CTC: These are ECM protocol signals. <br> This bit is not effective in V. 34 communications. |
| 5 | Modem rate used for the next page after receiving a negative code (RTN or PIN) <br> 0 : No change 1: Fallback | 1: The machine's tx modem rate will fall back before sending the next page if a negative code is received. This bit is ignored if ECM is being used. |
| 6 | Not used | Do not change the setting. |
| 7 | Not used | Do not change the setting. |


| G3-2 Switch 04 |  | SP No. 1-106-005 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} \hline 0 \\ \text { to } \\ 3 \end{gathered}$ | Training error detection threshold | $0-F(H e x) ; 0-15$ bits If the number of error bits in the received TCF is below this threshold, the machine informs the sender that training has succeeded. |
| 4-7 | Not used | Do not change the settings. |


| G3-2 Switch 05 |  | SP No. 1-106-006 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} \hline 0 \\ \text { to } \\ 3 \end{gathered}$ | Initial Tx modem rate | These bits set the initial starting modem rate for transmission. |
|  | Bit 32100 Setting (bps) |  |
|  | 00012.4 k |  |
|  | 00104.8 k | Use the dedicated transmission parameters if you need to change this for specific receivers. |
|  | 001187.2 k |  |
|  | 01009.6 k |  |
|  | 010012.0 k | If a modem rate 14.4 kbps or slower is selected, V. 8 protocol should be disabled manually. |
|  | 0111014.4 k |  |
|  | $\begin{array}{lllll}0 & 1 & 1 & 1 & 16.8 k\end{array}$ |  |
|  | $1 \begin{array}{lllll}1 & 0 & 0 & 0 & 19.2 k\end{array}$ | Cross referenceV. 8 protocol on/off - SG3 switch 03, bit2 |
|  | $\begin{array}{lllll}1 & 0 & 0 & 1 & 21.6 \mathrm{k} \\ 1 & 0 & 1 & 0 & 24.0 \mathrm{k}\end{array}$ |  |
|  | $\begin{array}{lllll} 1 & 0 & 1 & 0 & 24.0 k \\ 1 & 0 & 1 & 1 & 26.4 k \end{array}$ |  |
|  | 110028.8 k |  |
|  | $\begin{array}{lllll}1 & 1 & 0 & 1 & 31.2 k \\ 1 & 1 & 1 & 0 & 336 \mathrm{k}\end{array}$ |  |
|  | Other settings - Not used |  |
| $\begin{gathered} \hline 4 \\ \text { to } \end{gathered}$ | Initial modem type for 9.6 k or 7.2 kbps. | These bits set the initial modem type for 9.6 and 7.2 kbps , if the initial modem rate is set at these speeds. |
| 5 | Bit 5 Bit 4 Setting |  |
|  | 0 0 V. 29 |  |
|  | $\begin{array}{lll}0 & 1 & \mathrm{~V} .17\end{array}$ |  |
|  | $10 \quad \mathrm{~V} .34$ |  |
|  | 11 Not used |  |
| 6-7 | Not used | Do not change the settings. |


| G3-2 Switch 06 |  | SP No. 1-106-007 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Initial Rx modem rate | These bits set the initial starting modem rate for |
| to | Bit 3210 Setting (bps) | reception. |
| 3 | 00012.4 k |  |
|  | 00104.8 k | Use a lower setting if high speeds pose problems |
|  | 00117.2 k | during reception. |
|  | 01009.6 k |  |
|  | 010112.0 k | If a modem rate 14.4 kbps or slower is selected, V. 8 |
|  | $\begin{array}{llllll}0 & 1 & 1 & 14.4 \mathrm{k}\end{array}$ | protocol should be disabled manually. |
|  | $\begin{array}{lllll}0 & 1 & 1 & 16.8\end{array}$ |  |
|  | 10000019.2 k | Cross reference |
|  | $1{ }_{1} 00001121.6 \mathrm{k}$ | V. 8 protocol on/off - SG3 switch 03, bit2 |
|  | $\begin{array}{lllll}1 & 0 & 1 & 0 & 24.0 \mathrm{k} \\ 1 & 0 & 1 & 1 & 26.4 \mathrm{k}\end{array}$ |  |
|  | 110028.8 k |  |
|  | 110131.2 k |  |
|  | 111033.6 k |  |
|  | Other settings - Not used |  |


| G3-2 Switch 06 |  | COMMENTS No. 1-106-007 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| $\begin{gathered} 4 \\ \text { to } \\ 7 \end{gathered}$ |  | The setting of these bits is used to inform the transmitting terminal of the available modem type for the machine in receive mode. <br> If V .34 is not selected, V .8 protocol must be disabled manually. <br> Cross reference <br> V. 8 protocol on/off - SG3 switch 03, bit2 |


| G3-2 Switch 07 |  | SP No. 1-106-008 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 1 \end{gathered}$ | PSTN cable equalizer   <br> (tx mode: Internal)   <br> Bit 1 Bit $\mathbf{0}$ Setting <br> 0 0 None <br> 0 1 Low <br> 1 0 Medium <br> 1 1 High | Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. <br> Use the dedicated transmission parameters for specific receivers. <br> Also, try using the cable equalizer if one or more of the following symptoms occurs. <br> - Communication error <br> - Modem rate fallback occurs frequently. <br> Note: This setting is not effective in V. 34 communications. |
| $\begin{gathered} \hline 2 \\ \text { to } \\ 3 \end{gathered}$ | PSTN cable equalizer   <br> (rx mode: Internal)   <br> Bit 3 Bit 2 Setting <br> 0 0 None <br> 0 1 Low <br> 1 0 Medium <br> 1 1 High | Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. <br> Also, try using the cable equalizer if one or more of the following symptoms occurs. <br> - Communication error with error codes such as $0-20,0-23$, etc. <br> - Modem rate fallback occurs frequently. <br> Note: This setting is not effective in V. 34 communications. |
| 4 | PSTN cable equalizer (V.8/V. 17 rx mode: External) <br> 0 : Disabled <br> 1: Enabled | Keep this bit at "1". |
| 5 | PSTN cable equalizer (V. 34 rx mode; External) | Keep this bit at "1". |
| 6-7 | Not used | Do not change the settings. |

G3-2 Switch 08 - Not used (do not change the settings)
G3-2 Switch 09 - Not used (do not change the settings)

| G3-2 Switch 0A |  | SP No. 1-106-011 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{aligned} & 0 \\ & 1 \end{aligned}$ | Maximum allowable carrier drop during image data reception | These bits set the acceptable modem carrier drop time. <br> Try using a longer setting if error code 0-22 is frequent. |
| 2-3 | Not used | Do not change the settings. |
| 4 | Maximum allowable frame interval during image data reception. $0: 5 \mathrm{~s} \mathrm{1:13s}$ | This bit set the maximum interval between EOL (end-of-line) signals and the maximum interval between ECM frames from the other end. Try using a longer setting if error code 0-21 is frequent. |
| 5 | Not used | Do not change the setting. |
| 6 | Reconstruction time for the first line in receive mode $0: 6 \mathrm{~s} 1: 12 \mathrm{~s}$ | When the sending terminal is controlled by a computer, there may be a delay in receiving page data after the local machine accepts set-up data and sends CFR. This is outside the T. 30 recommendation. But, if this delay occurs, set this bit to 1 to give the sending machine more time to send data. <br> Refer to error code 0-20. <br> ITU-T T. 30 recommendation: The first line should come within 5 s of CFR. |
| 7 | Not used | Do not change the setting. |


| G3-2 Switch 0B |  | SP No. 1-106-012 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Protocol requirements: Europe 0: Disabled 1: Enabled | The machine does not automatically reset these bits for each country after a country code (System Switch $0 F$ ) is programmed. Change the required bits manually at installation. |
| 1 | Protocol requirements: Spain <br> 0 : Disabled 1: Enabled |  |
| 2 | Protocol requirements: Germany <br> 0: Disabled 1: Enabled |  |
| 3 | Protocol requirements: France <br> 0 : Disabled 1: Enabled |  |
| 4 | PTT requirements: Germany <br> 0 : Disabled 1: Enabled |  |
| 5 | PTT requirements: France 0 : Disabled 1: Enabled |  |
| 6 | Not used | Do not change the setting. |
| 7 | Not used | Do not change the setting. |


| G3-2 Switch 0C |  |  | SP No. 1-106-013 |
| :---: | :---: | :---: | :---: |
| No | FUNCTION |  | COMMENTS |
| 0 | Pulse dialing | method | $\mathrm{P}=$ Number of pulses sent out, $\mathrm{N}=$ Number dialed. |
| 1 | Bit 1 Bit 0 | Setting |  |
|  | 00 | Normal( $\mathrm{P}=\mathrm{N}$ ) |  |
|  | 01 | Oslo ( $\mathrm{P}=10-\mathrm{N}$ ) |  |
|  | 10 | Sweden <br> ( $\mathrm{N}+1$ ) |  |
|  | 11 | Not used |  |
| 2-7 | Not used |  | Do not change the settings. |

G3-2 Switch OD - Not used (do not change the settings)
G3-2 Switch 0E - Not used (do not change the settings)
G3-2 Switch 0F - Not used (do not change the settings)
3.2.7 G3-3 SWITCHES

These switches require the second optional G3 interface unit.
The contents of the G3-3 switches are similar to the G3-2.

### 3.2.8 G4 INTERNAL SWITCHES



| G4 Internal Switch 01 - Not used (do not change these settings) |
| :--- | :--- |
| G4 Internal Switch 02 - Not used (do not change these settings) |


| G4 Internal Switch 03 |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Amount of protocol dump data in <br> one protocol dump list <br> $\mathbf{0}$ : Last communication only <br> 1: Up to the limit of the memory <br> area for protocol dumping | Change this bit to 0 if you want to have a <br> protocol dump list of the last communication <br> only. <br> This bit is only effective for the dump list D + <br> Bch1. |
| $\mathbf{1 - 7}$ | Not used | Do not change these settings. |


| G4 Internal Switch 04 |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0-2 | Not used | Do not change these settings. |
| 3 | Auto data rate change for transmission ( 64 kbps to 56 kbps ) <br> 0 : On 1: Off | $\mathbf{0}$ : The machine automatically changes the transmission data rate from 64 kbps to 56 kbps after 3 s if the other end did not accept the call. This is to cope with 56 kbps networks in the USA. Normally, keep this bit at 0 . |
| 4 | Auto data rate change for reception ( 64 kbps to 56 kbps ) <br> 0 : Off 1: On | 1: The machine automatically changes the reception data after 6 s . Change this bit to 1 only when there is a communication error where the other terminal informs 64 kbps in the SETUP signal although it is actually 56 kbps. |
| 5-7 | Not used | Do not change these settings. |


| G4 Internal Switch $\mathbf{0 5}$ |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $\mathbf{0 - 1}$ | Not used | Do not change these settings. |
| $\mathbf{2}$ | Protocol ID check <br> 0: Yes 1: No | The Protocol ID is in the CR packet. |
| 3-7 | Not used | Do not change these settings. |


| G4 Internal Switch 06 - Not used (do not change these settings) |
| :--- |
| G4 Internal Switch 07 - Not used (do not change these settings) |
| G4 Internal Switch 08 - Not used (do not change these settings) |
| G4 Internal Switch 09 - Not used (do not change these settings) |
| G4 Internal Switch 0A - Not used (do not change these settings) |
| G4 Internal Switch 0B - Not used (do not change these settings) |
| G4 Internal Switch 0C - Not used (do not change these settings) |
| G4 Internal Switch 0D - Not used (do not change these settings) |
| G4 Internal Switch 0E - Not used (do not change these settings) |
| G4 Internal Switch 0F - Not used (do not change these settings) |


| G4 Internal Switch 10(Dch. Layer 1) |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $\mathbf{0 - 5}$ | Not used | Do not change these settings. |
| $\mathbf{6}$ | NFO1 signal resend <br> 0: Resend 1: No resend | 0: Some DSUs may not reply to the INFO1 <br> signal with INFO2, if there is noise in the <br> INFO1 signal accidentally. Try changing <br> this bit to 0, to resend INFO1 before the <br> machine displays "CHECK INTERFACE". |
| $\mathbf{7}$ | Not used | Do not change these setting. |


| G4 Internal Switch 11 (Dch. Layer 2) |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0 | Not used | Do not change these setting. |
| 1 | Type of TEI used 0: Dynamic TEI 1: Static TEI | This is normally fixed at 0 . However, some networks may require this bit to be set at 1 (see below). In this case, you may have to change the values of bits 2 to 7 . |
| 2-7 | Static TEI value | Store the lowest bit of the TEI at bit 7 and the highest bit of the TEI at bit 2 . <br> Example: If the static TEI is 011000 , set bits 3 and 4 to 1 and bits $2,5,6$, and 7 to 0. |

G4 Internal Switch 12 - Not used (do not change these settings)

| G4 Internal Switch 13: D channel layer 3 (Attachment IE in S: SETUP) |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0 | Not used | Do not change these setting. |
| 1 | Information transfer capability shift down to retry transmission <br> 0 : Shift down procedure disabled (Default) <br> 1: Shift down and retry the call | 1: The machine changes the ISDN G3 information transfer capability informed in the [SETUP] signal to "Speech" from "3.1 kHz audio" or to " 3.1 kHz audio" from "Speech" automatically and retries the transmission. <br> The information transfer capability used in the first try is determined by the setting of G4 internal bit switch 14 bit 0 . <br> This switch is effective with some types of exchangers and T/As where they only accept calls with information transfer capability "Speech". |
| 2 | Attachment of calling ID and subaddress <br> 0 : No 1: Yes | Normally, this bit should be at 0, because most networks add the calling ID and subaddress to the SETUP signal to the receiver. <br> However, some networks may require the machine to add this ID (and/or subaddress). Only in this case should this bit be at 1. |
| 3 | Attachment of the Lower Layer Capabilities <br> 0: No 1: Yes | This bit determines whether Lower Layer Capabilities are informed in the [SETUP] signal. <br> Keep this bit at 0 in most cases. |
| 4 | Attachment of the Higher Layer Capabilities <br> 0 : Yes 1: No | This bit determines whether Higher Layer Capabilities are informed in the [SETUP] signal or not. <br> Keep this bit at 0 in most cases. |
| 5 | Attachment of the channel information element (CONN) 0 : No 1:Yes | Keep this bit at 0 in most cases. |
| 6 | Attachment of the Higher Layer Capabilities for ISDN G3 transmission <br> 0 : Same as the bit 4 setting <br> 1: Not attached | This bit determines whether Higher Layer Capabilities are informed in the [SETUP] signal for ISDN G3 transmission. This switch is effective in coping with communication problems with some types of T/A and PBX that do not respond to Higher Layer Capability "G3". <br> When this bit is set to 0 , the setting depends on the setting of bit 4 . <br> Keep this bit at 1 in most cases. |


| G4 Internal Switch 13: D channel layer 3 (Attachment IE in S: SETUP) |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 7 | Condition for fallback from G4 to G3 <br> 0: Refer to the CPS code setting <br> 1: Fallback in response to any CPS code | 0 : Fallback occurs when a CPS code is the same as the CPS code settings specified by G4 internal switches $17,18,1 \mathrm{~A}, 1 \mathrm{~B}$, and 1 C. <br> If you wish to enable fallback when any CPS code is detected, set this bit to " 1 ". <br> This switch is effective in coping with fallback problems where the CPS code does not match those specified in the ITU-T recommendation. |


| G4 Internal Switch 14: D channel layer 3 (Selection IE in S: SETUP) |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0 | ISDN G3 information transfer capability <br> $0: 3.1 \mathrm{kHz}$ audio <br> 1: Speech | In tx mode, this determines the information transfer capability informed in the [SETUP] message. <br> In rx mode, this determines the information transfer capability that the machine can use to receive a call. <br> Set this bit to 1 if the ISDN does not support 3.1 kHz audio. |
| 1-2 | Not used | Do not change these settings. |
| 3-4 | Channel selection in [SETUP] in txmodeBit 44 Setting0 0 Any channel <br> 0 1 B1 channel <br> 1 0 B2 channel <br> 1 1 Not used | Any channel: When this is informed to the exchanger, the exchanger will select either B1 or B2. |
| 5 | Called ID mapping <br> 0 : Called party number <br> 1: Keypad facility | 0 : Called ID is mapped to the called party number. <br> 1: Called ID is mapped to the keypad facility. Note that the subaddress in not mapped. On the 5ESS network (USA), set it to 1 . |
| 6 | Numbering plan for the called party number <br> 0 : Unknown <br> 1: E. 164 | E.164: This may be used in Sweden if an AXE10 exchanger is fitted with old software, and in Australia. <br> Unknown: This is the normal setting. |
| 7 | Subaddress coding type 0: IA5 (NSAP) <br> 1: BCD (ISO8348) | This is normally kept at 0 . However, some networks require this bit to be at 1 . |


| G4 Internal Switch 15: D channel layer 3 (Judgement R: MSG) |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Action when receiving [SETUP] <br> signal containing no called <br> subaddress <br> 0: A reply is sent <br> 1: No reply is sent | This bit depends on user requirements. If it is <br> at 1, communication will be halted if the other <br> terminal has not input the subaddress. |
| $\mathbf{1 - 4}$ | Not used | Do not change the settings |
| $\mathbf{5}$ | Global call reference <br> 0: Ignored <br> 1: Global call number is used | Global call reference means 'call reference <br> value $=0$ '. This bit determines how to deal <br> with such an incoming call if received from the <br> network. <br> Keep this bit at 1 in Germany 1TR6. |
| $\mathbf{6 - 7}$ | Not used | Do not change these settings. |


| G4 Internal Switch 16: D channel layer 3 (Approval) |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0-1 | Answer delay time    <br> Bit 1 0  <br> Setting    <br> 0 0 No delay  <br> 0 1 1.0 s delayed (1TR6)  <br> 1 0 0.5 s delayed  <br> 1 1 Not used  | In some countries, a time delay to answer a call is required. <br> Otherwise, use this switch as follows: If the machine is connected to the same bus from the DSU as a model K200 is connected, the machine receives most of the calls because the response time to a call is faster than the K200. <br> If the customer wants the K200 to receive most of the calls, adjust the response time using these bits. <br> If the customer does not want one machine to receive most of the calls, use subaddresses to identify each terminal. |
| 2 | Action when receiving [SETUP] signal containing user-specific called party subaddress 0 : Ignores the call 1: Receives the call | Normally, the 3rd octet of called party subaddress information in the [SETUP] signal is set to NSAP. However, some networks may add "user-specific" subaddress to the [SETUP] signal, and the result of this is that the machine won't answer the call if a subaddress is specified. <br> So, change this bit to 1 to let the machine receive the call if the machine is connected to such a network. |
| 3-4 | Not used | Do not change these settings. |
| 5 | Indicated bearer capabilities 0:56 kbps 1: 64 kbps | 1: 64 kbps calling is indicated in the Bearer Capabilities, but communication is at 56 k . Use this bit if the machine is connected to a network which does not accept a 56 kbps data transfer rate as a bearer capability. |
| 6 | Not used | Do not change these setting. |


| G4 Internal Switch 16: D channel layer 3 (Approval) |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 7 | Transfer capabilities (SI) informed in 1TR6 ISDN G3 transmission <br> 0: G3 Fax <br> 1: Analog | This bit determines whether transfer capabilities informed in the Service Indicator for 1TR6 ISDN G3 transmission. This switch is effective in coping with communication problems with some types of T/A and PBXs. Normally keep this bit at 1 in Germany 1TR6. |


| G4 Internal Switch 17: CPS Code Used for G4 to G3 Fallback -1 |  |
| :---: | :---: |
| No. | FUNCTION COMMENTS |
| 0-6 | Condition for fallback from G4 to G3 <br> Bits 0 to 6 of bit switch 17 contain a CPS code, and bits 0 to 6 of bit switch 18 contain another CPS code. If a CPS code is received which is the same as either of these, communication will fall back from ISDN G4 mode to ISDN G3 mode. The CPS codes must be the same as those specified in table 4-13 of ITU-T recommendation Q. 931 . $\begin{array}{\|llllllll\|} \hline \text { Examples: Bit } 6 & 5 & 4 & 3 & 2 & 1 & 0 & \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 & \text { CPS code } 65 \\ 1 & 0 & 1 & 1 & 0 & 0 & 0 & \text { CPS code } 88 \end{array}$ <br> For the codes in bits 0 to 6 of bit switches 17 and 18 to be recognized, bit 7 of bit switch 17 must be 1. Also, bit 0 of the Communication Switch 07 must be at 0 , or Fallback from G4 to G3 will be disabled. |
| 7 | This bit determines whether fallback from G4 to G3 occurs on receipt of one of the CPS codes programmed in bit switch 17 or 18, or on receipt of a certain standard code. <br> 0 : Fallback occurs on receipt of any of the following CPS codes: <br> Universal (Euro ISDN) - \#3, \#18, \#57, \#58, \# 63, \# 65, \#79, \#88, and \#127 <br> Germany 1 TR6 mode - \#3, \#53, \#58, and \#90 <br> Others - \#3, \#65, and \#88 <br> 1: Fallback from G4 to G3 occurs on receipt any of above CPS codes or one of the CPS codes programmed in bit switch 17, 18, 1A, 1B, or 1 C |


| G4 Internal Switch 18: CPS Code Used for G4 to G3 Fallback - 2 |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMM |
| 0-6 | Condition for fallback from G4 to G3 See the explanation for bits 0 to 6 of bit switch 17 |  |
| 7 | This bit helps to choose the CPS code set for G4 to G3 fallback. <br> $\mathbf{0}$ : Fallback occurs on receipt of the CPS code set, which is specified by the country code setting. <br> 1: Fallback occurs on receipt of the Universal CPS code set (\#3, \#18, \#57, \#58, \# 63, \# 65, \#79, \#88, and \#127) even if another country code is programmed. If bit switch 17 bit 7 is " 1 ", fallback occurs on receipt of the Universal CPS code set or one of the CPS codes programmed in bit switches $17,18,1 \mathrm{~A}, 1 \mathrm{~B}$, or 1 C . |  |

## G4 to G3 fallback

Bit 0 of Communication Switch 07 must be at 0, or fallback from G4 to G3 will be disabled.

The CPS codes for which fallback occurs are decided as follows.

- G4 bit switch 17, bit 7 - If set to " 0 ", fallback occurs on receipt of a code from a set that depends on the country code. If set to "1", fallback occurs for the 5 CPS codes programmed in bits 0 to 6 of $G 4$ bit switches 17, 18, 1A, 1B, and 1C, in addition to the country code set.
Note that if G4 bit switch 18 , bit 7 is set to " 1 ", the CPS code set that is used is always the Universal set, regardless of the country code setting.

| G4 Internal Switch $\mathbf{1 9}$ |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Permanence of the link <br> 0: Set/released each LAPD call <br> 1: Permanent | Keep this at 1 in the USA. In other areas, this <br> bit is normally 0, depending on network <br> requirements. |
| $\mathbf{1}$ | Channel used in ISDN L2 (64k) <br> mode <br> 0: B1 1: B2 | When making an IDSN L2 back-to-back test, <br> you can select either the B1 or B2 channel <br> with this bit switch. |
| $\mathbf{2 - 7}$ | Not used | Do not change the factory settings. |


| G4 Internal Switch 1A: CPS Code Used for G4 to G3 Fallback - 3 |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $\mathbf{0 - 6}$ | Condition for fallback from G4 to G3 <br> See the explanation for bits 0 to 6 of bit switch 17. |  |
| $\mathbf{7}$ | Not used | Do not change this setting. |


| G4 Internal Switch 1B: CPS Code Used for G4 to G3 Fallback - 4 |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $0-6$ | Condition for fallback from G4 to G3 <br> See the explanation for bits 0 to 6 of bit switch 17. |  |
| $\mathbf{7}$ | Not used | Do not change this setting. |


| G4 Internal Switch 1C: CPS Code Used for G4 to G3 Fallback -5 |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $\mathbf{0 - 6}$ | Condition for fallback from G4 to G3 <br> See the explanation for bits 0 to 6 of bit switch 17. |  |
| $\mathbf{7}$ | Not used | Do not change this setting. |

[^4]
### 3.2.9 G4 PARAMETER SWITCHES

| G4 Parameter Switch 00 |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0-2 |  | Do not change the default setting. |
| 3-7 | Not used | Do not change the default settings. |


| G4 Parameter Switch 01 |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Voice coding <br> $0: \mu$ law 1: A law | 0: This setting is used in USA. <br> 1: This setting is used in Europe and Asia. |
| $\mathbf{1}$ | Action when [SETUP] signal <br> without HLC is received <br> 0: Respond to the call <br> 1: Not respond to the call | If there are several TEs on the same bus and <br> the machine responds to calls for another TE, <br> the call may be without HLC information. <br> Identify the type of calling terminal and <br> change this bit to 1 if the caller is not a fax <br> machine. |
| $\mathbf{2 - 6}$ | Not used | Do not change these settings. |
| $\mathbf{7}$ | Signal attenuation for G3 fax <br> signals received from ISDN line (- <br> 6dB) <br> 0: Off 1: On | 0: If an analog signal comes over digital line, <br> the signal level after decoding by the TE is <br> theoretically the same as the level at the <br> entrance to the digital line. However, this <br> sometimes causes the received signal level <br> to be too high at the received end. In this <br> case, set this bit to 1 to adjust the <br> attenuation level. |



G4 Parameter Switch 03 - Not used (do not change these settings)
G4 Parameter Switch 04 - Not used (do not change these settings)

| G4 Parameter Switch 05 |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0-3 | Not used | Do not change these settings. |
| 4 | $\begin{aligned} & \text { B-channel T3 timer } \\ & 0: 30 \mathrm{~s} \quad 1: 57 \mathrm{~s} \end{aligned}$ | 1: This switch is useful when used in combination with the Communication Bit SW 07 bit 4. This is to cope with communication problems where G4 communication fails on the ISDN Bchannel. <br> Normally keep this bit at 1 . |
| 5-7 | Not used | Do not change these settings. |


| G4 Parameter Switch 06 |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Layer 3 protocol <br> 0: ISO8208 1: T.70NULL | Set this bit to match the type of layer 3 <br> signaling used by the ISDN. <br> The dedicated parameters have the same <br> setting for specific destinations. <br> Normally keep this bit at 0. |
| $\mathbf{1 - 7}$ | Not used | Do not change these settings. |

G4 Parameter Switch 07

| No. | FUNCTION | COMMENTS |
| :---: | :--- | :--- |
|  | Packet size | This value is sent in the CR packet. This value | must match the value stored in the other terminal, or communication will stop (Cl will be returned). If the other end returns Cl , check the value of the packet window size with the other party.

Note that this value must be the same as the value programmed for the transport block size (G4 Parameter Switch 0B, bits 0 to 3). Normally, do not change the default setting.

| 4-7 | Not used | Do not change these settings. |
| :--- | :--- | :--- |


| G4 Parameter Switch 08 |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0-3 | Packet window size | This is the maximum number of unacknowledged packets that the machine can send out before having to pause and wait for an acknowledgement from the other end. Normally this should be kept at 7 . |
|  | Bit 32100 Value |  |
|  | $\begin{array}{lllll}0 & 0 & 0 & 1 & 1\end{array}$ |  |
|  | $\begin{array}{lllll}0 & 0 & 1 & 0 & 2\end{array}$ |  |
|  | and so on until |  |
|  | $\begin{array}{lllll}1 & 1 & 1 & 1 & 15\end{array}$ |  |
| 4-7 | Not used | Do not change these settings. |

## G4 Parameter Switch 09 - Not used (do not change these settings) <br> G4 Parameter Switch 0A - Not used (do not change these settings)

| G4 Parameter Switch 0B |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| No. | FUNCTION |  |  | COMMENTS |
| 0-3 | Transport block size |  |  | This value must match the value set in the |
|  | Bit 32 | 10 | Value | other terminal. Note that this value must be |
|  | 01 | 11 | 128 | the same as the value programmed for the |
|  | 10 | 00 | 256 | packet size (G4 Parameter Switch 7, bits 0 to |
|  | 10 | 01 | 512 | 3). Also, the transport block size is limited by |
|  | 10 | 10 | 1024 | the amount of memory in the remote terminal. |
|  | 10 | 11 | 2048 | Normally, do not change the default setting. |
| 4-7 | Not used |  |  | Do not change these settings. |

G4 Parameter Switch 0C - Not used (do not change these settings)

| G4 Parameter Switch 0D |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0-1 |  | When doing a back-to-back test or doing a demonstration without a line simulator, use these bits to set up one of the machines in TE mode, and the other in NT mode Please note that this machine can only be set to TE mode. <br> After the test, return both bits to 0 . See "Back-to-back Testing" in the Troubleshooting section for full details. |
| 2-7 | Not used | Do not change these settings. |

G4 Parameter Switch 0E - Not used (do not change these settings)
G4 Parameter Switch OF - Not used (do not change these settings)

### 3.3 NCU PARAMETERS

The following tables give the RAM addresses and the parameter calculation units that the machine uses for ringing signal detection and automatic dialing. The factory settings for each country are also given. Most of these must be changed by RAM read/write (SP2-102), but some can be changed using NCU Parameter programming (SP2-103, 104 and 105); if SP2-103, 104 and 105 can be used, this will be indicated in the Remarks column. The RAM is programmed in hex code unless (BCD) is included in the Unit column.

NOTE: The following addresses describe settings for the standard NCU. Change the fourth digit from " 5 " to " 6 " (e.g. 680500 to 680600 ) for the settings for the first optional G3 interface unit.
Change the fourth digit from " 5 " to " 7 " (e.g. 680500 to 680700 ) for the settings for the second optional G3 interface unit.

| Address | Function | Unit |  | emarks |
| :---: | :---: | :---: | :---: | :---: |
| 680500 | Country/Area code for NCU parameters | Use the Hex value to program the country/area code directly into this address, or use the decimal value to program it using SP2-103-001 |  |  |
|  |  | Country/Area | Decimal | Hex |
|  |  | France | 00 |  |
|  |  | Germany | 01 | 01 |
|  |  | UK | 02 | 02 |
|  |  | Italy | 03 | 03 |
|  |  | Austria | 04 | 04 |
|  |  | Belgium | 05 | 05 |
|  |  | Denmark | 06 | 06 |
|  |  | Finland | 07 | 07 |
|  |  | Ireland | 08 | 08 |
|  |  | Norway | 09 | 09 |
|  |  | Sweden | 10 | 0A |
|  |  | Switzerland | 11 | OB |
|  |  | Portugal | 12 | OC |
|  |  | Holland | 13 | OD |
|  |  | Spain | 14 | OE |
|  |  | Israel | 15 | OF |
|  |  | USA | 17 | 11 |
|  |  | Asia | 18 | 12 |
|  |  | Hong Kong | 20 | 14 |
|  |  | South Africa | 21 | 15 |
|  |  | Australia | 22 | 16 |
|  |  | New Zealand | 23 | 17 |
|  |  | Singapore | 24 | 18 |
|  |  | Malaysia | 25 | 19 |
|  |  | China | 26 | 1A |
|  |  | Taiwan | 27 | 1B |
|  |  | Korea | 28 | 1 C |
|  |  | Greece | 33 | 21 |
|  |  | Hungary | 34 | 22 |
|  |  | Czech | 35 | 23 |
|  |  | Poland | 36 | 24 |
| 680501 | Line current detection time | 20 ms | Line current detection is disabled. |  |
| 680502 | Line current wait time |  |  |  |
| 680503 | Line current drop detect time |  | Line curre detected contains | $\begin{aligned} & \text { int is not } \\ & \text { if } 680501 \end{aligned}$ FF. |


| Address | Function | Unit | Remarks |
| :---: | :---: | :---: | :---: |
| 680504 | PSTN dial tone frequency upper limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680505 | PSTN dial tone frequency upper limit (low byte) |  |  |
| 680506 | PSTN dial tone frequency lower limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680507 | PSTN dial tone frequency lower limit (low byte) |  |  |
| 680508 | PSTN dial tone detection time | 20 ms | If 680508 contains FF(H), the machine pauses for the pause time (address 68050D / 68050E). <br> Italy: See Note 2. |
| 680509 | PSTN dial tone reset time (LOW) |  |  |
| 68050A | PSTN dial tone reset time (HIGH) |  |  |
| 68050B | PSTN dial tone continuous tone time |  |  |
| 68050C | PSTN dial tone permissible drop time |  |  |
| 68050D | PSTN wait interval (LOW) |  |  |
| 68050E | PSTN wait interval (HIGH) |  |  |
| 68050F | PSTN ring-back tone detection time | 20 ms | Detection is disabled if this contains FF. |
| 680510 | PSTN ring-back tone off detection time | 20 ms |  |
| 680511 | PSTN detection time for silent period after ring-back tone detected (LOW) | 20 ms |  |
| 680512 | PSTN detection time for silent period after ring-back tone detected (HIGH) | 20 ms |  |
| 680513 | PSTN busy tone frequency upper limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680514 | PSTN busy tone frequency upper limit (low byte) |  |  |
| 680515 | PSTN busy tone frequency lower limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680516 | PSTN busy tone frequency lower limit (low byte) |  |  |
| 680517 | PABX dial tone frequency upper limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680518 | PABX dial tone frequency upper limit (low byte) |  |  |
| 680519 | PABX dial tone frequency lower limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 68051A | PABX dial tone frequency lower limit (low byte) |  |  |


| Address | Function | Unit | Remarks |
| :---: | :---: | :---: | :---: |
| 68051B | PABX dial tone detection time | 20 ms | If 68051B contains FF, the machine pauses for the pause time (680520 / 680521). |
| 68051C | PABX dial tone reset time (LOW) |  |  |
| 68051D | PABX dial tone reset time (HIGH) |  |  |
| 68051E | PABX dial tone continuous tone time |  |  |
| 68051F | PABX dial tone permissible drop time |  |  |
| 680520 | PABX wait interval (LOW) |  |  |
| 680521 | PABX wait interval (HIGH) |  |  |
| 680522 | PABX ringback tone detection time | 20 ms | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680523 | PABX ringback tone off detection time | 20 ms |  |
| 680524 | PABX detection time for silent period after ringback tone detected (LOW) | 20 ms | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680525 | PABX detection time for silent period after ringback tone detected (HIGH) | 20 ms |  |
| 680526 | PABX busy tone frequency upper limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680527 | PABX busy tone frequency upper limit (low byte) |  |  |
| 680528 | PABX busy tone frequency lower limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680529 | PABX busy tone frequency lower limit (low byte) |  |  |
| 68052A | Busy tone ON time: range 1 | 20 ms |  |
| 68052B | Busy tone OFF time: range 1 |  |  |
| 68052C | Busy tone ON time: range 2 |  |  |
| 68052D | Busy tone OFF time: range 2 |  |  |
| 68052E | Busy tone ON time: range 3 |  |  |
| 68052F | Busy tone OFF time: range 3 |  |  |
| 680530 | Busy tone ON time: range 4 |  |  |
| 680531 | Busy tone OFF time: range 4 |  |  |
| 680532 | Busy tone continuous tone detection time |  |  |
| 680533 | Busy tone signal state time tolerance for all ranges, and number of cycles required for detection (a setting of 4 cycles means that ON-OFF-ON or OFF-ONOFF must be detected twice). <br> Bits 7, 6, 5, 4 - number of cycles required for cadence detection |  |  |


| Address | Function | Unit | Remarks |
| :---: | :---: | :---: | :---: |
| 680534 | International dial tone frequency upper limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680535 | International dial tone frequency upper limit (low byte) |  |  |
| 680536 | International dial tone frequency lower limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680537 | International dial tone frequency lower limit (low byte) |  |  |
| 680538 | International dial tone detection time | 20 ms | If 680538 contains FF, the machine pauses for the pause time (68053D 68053E). <br> Belgium: See Note 2. |
| 680539 | International dial tone reset time (LOW) |  |  |
| 68053A | International dial tone reset time (HIGH) |  |  |
| 68053B | International dial tone continuous tone time |  |  |
| 68053C | International dial tone permissible drop time |  |  |
| 68053D | International dial wait interval (LOW) |  |  |
| 68053E | International dial wait interval (HIGH) |  |  |
| 68053F | Country dial tone upper frequency limit (HIGH) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680540 | Country dial tone upper frequency limit (LOW) |  |  |
| 680541 | Country dial tone lower frequency limit (HIGH) |  | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 680542 | Country dial tone lower frequency limit (LOW) |  |  |


| Address | Function | Unit | Remarks |
| :---: | :---: | :---: | :---: |
| 680543 | Country dial tone detection time | 20 ms | If 680543 contains FF, the machine pauses for the pause time (680548 / 680549). |
| 680544 | Country dial tone reset time (LOW) |  |  |
| 680545 | Country dial tone reset time (HIGH) |  |  |
| 680546 | Country dial tone continuous tone time |  |  |
| 680547 | Country dial tone permissible drop time |  |  |
| 680548 | Country dial wait interval (LOW) |  |  |
| 680549 | Country dial wait interval (HIGH) |  |  |
| 68054A | Time between opening or closing the DO relay and opening the OHDI relay | 1 ms | See Notes 3, 6 and 8. Function 06-2 (parameter 11). |
| 68054B | Break time for pulse dialing | 1 ms | See Note 3. <br> Function 06-2 (parameter 12). |
| 68054C | Make time for pulse dialing | 1 ms | See Note 3. <br> Function 06-2 (parameter 13). |
| 68054D | Time between final OHDI relay closure and DO relay opening or closing | 1 ms | See Notes 3, 6 and 8. Function 06-2 (parameter 14). <br> This parameter is only valid in Europe. |
| 68054E | Minimum pause between dialed digits (pulse dial mode) | 20 ms | See Note 3 and 8. Function 06-2 (parameter 15). |
| 68054F | Time waited when a pause is entered at the operation panel |  | Function 06-2 (parameter 16). See Note 3. |
| 680550 | DTMF tone on time | 1 ms | Function 06-2 (parameter 17). |
| 680551 | DTMF tone off time |  | Function 06-2 (parameter 18). |
| 680552 | Tone attenuation level of DTMF signals while dialing | $\begin{aligned} & \hline-\mathrm{N} \times 0.5 \quad-3.5 \\ & \mathrm{dBm} \end{aligned}$ | Function 06-2 (parameter 19). <br> See Note 5. |
| 680553 | Tone attenuation value difference between high frequency tone and low frequency tone in DTMF signals | -dBm $\times 0.5$ | Function 06-2 (parameter 20). <br> The setting must be less than -5 dBm , and should not exceed the setting at 680552h above. See Note 5. |
| 680554 | PSTN: DTMF tone attenuation level after dialing | $\begin{array}{\|lll} \hline-\mathrm{N} \times 0.5 & -3.5 \\ \mathrm{dBm} \\ \hline \end{array}$ | Function 06-2 (parameter 21). See Note 5. |
| 680555 | ISDN: DTMF tone attenuation level after dialing | -dBm $\times 0.5$ | See Note 5 |
| 680556 | Not used |  | Do not change the settings. |


| Address | Function | Unit | Remarks |
| :---: | :---: | :---: | :---: |
| 680557 | Time between 68054Dh (NCU parameter 14) and 68054Eh (NCU parameter 15) | 1 ms | This parameter takes effect when the country code is set to France. |
| 680558 | Not used |  | Do not change the setting. |
| 680559 | Grounding time (ground start mode) | 20 ms | The Gs relay is closed for this interval. |
| 68055A | Break time (flash start mode) | 1 ms | The OHDI relay is open for this interval. |
| 68055B | International dial access code (High) | $B C D$ | For a code of 100: |
| 68055C | International dial access code (Low) |  | $\begin{aligned} & 68055 \mathrm{~B}-\mathrm{F} 1 \\ & 68055 \mathrm{C}-00 \end{aligned}$ |
| 68055D | PSTN access pause time | 20 ms | This time is waited for each pause input after the PSTN access code. If this address contains $\mathrm{FF}[\mathrm{H}]$, the pause time stored in address 68054F is used. <br> Do not set a number more than 7 in the UK. |
| 68055E | Progress tone detection level, and cadence detection enable flags | Bit 7 Bit 6 Bit 5 <br> 0 0 0 <br> 0 0 1 <br> 0 1 0 <br> 1 0 0 <br> 1 1 0 <br> Bits 2, 0 -Se | dBm -25.0 -35.0 -30.0 -40.0 -49.0 <br> e Note 2. |
| $\begin{gathered} 68055 F \\ \text { to } \\ 680564 \end{gathered}$ | Not used |  | Do not change the settings. |
| 680565 | Long distance call prefix (HIGH) | BCD | For a code of 0: |
| 680566 | Long distance call prefix (LOW) | BCD | $\begin{aligned} & 680565-\text { FF } \\ & 680566 \text { - FO } \end{aligned}$ |
| $\begin{gathered} 680567 \\ \text { to } \\ 680571 \end{gathered}$ | Not used |  | Do not change the settings. |


| Address | Function | Unit | Remarks |
| :---: | :---: | :---: | :---: |
| 680572 | Acceptable ringing signal frequency: range 1, upper limit | $\begin{aligned} & \hline 1000 / \mathrm{N} \\ & (\mathrm{~Hz}) . \end{aligned}$ | Function 06-2 (parameter 02). |
| 680573 | Acceptable ringing signal frequency: range 1, lower limit |  | Function 06-2 (parameter 03). |
| 680574 | Acceptable ringing signal frequency: range 2, upper limit |  | Function 06-2 (parameter 04). |
| 680575 | Acceptable ringing signal frequency: range 2, lower limit |  | Function 06-2 (parameter 05). |
| 680576 | Number of rings until a call is detected | 1 | Function 06-2 (parameter 06). <br> The setting must not be zero. |
| 680577 | Minimum required length of the first ring | 20 ms | See Note 4. <br> Function 06-2 (parameter 07). |
| 680578 | Minimum required length of the second and subsequent rings | 20 ms | Function 06-2 (parameter 06-2). |
| 680579 | Ringing signal detection reset time (LOW) | 20 ms | Function 06-2 (parameter 09). |
| 68057A | Ringing signal detection reset time (HIGH) |  | Function 06-2 (parameter 10). |
| $\begin{gathered} \text { 68057B } \\ \text { to } \\ 680580 \end{gathered}$ | Not used |  | Do not change the settings. |
| 680581 | Interval between dialing the last digit and switching the Oh relay over to the external telephone when dialing from the operation panel in handset mode. | 20 ms | Factory setting: 500 ms |
| 680582 | Bits 0 and 1 - Handset off-hook detec <br> Bit 10 Setting <br> 00200 ms <br> 01800 ms <br> Other Not used <br> Bits 2 and 3 - Handset on-hook detec <br> Bit 32 Setting <br> 00200 ms <br> 01800 ms <br> Other Not used <br> Bits 4 to 7 - Not used | on time <br> on time |  |
| $\begin{gathered} 680583 \\ \text { to } \\ 6805 \mathrm{AO} \end{gathered}$ | Not used |  | Do not change the settings. |


| Address | Function | Unit | Remarks |
| :---: | :---: | :---: | :---: |
| 6805A1 | Acceptable CED detection frequency upper limit (high byte) | BCD (Hz) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 6805A2 | Acceptable CED detection frequency upper limit (low byte) |  |  |
| 6805A3 | Acceptable CED detection frequency lower limit (high byte) | BCD (Hz) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 6805A4 | Acceptable CED detection frequency lower limit (low byte) |  |  |
| 6805A5 | CED detection time | $\begin{aligned} & 20 \mathrm{~ms} \\ & \pm 20 \mathrm{~ms} \end{aligned}$ | Factory setting: 200 ms |
| 6805A6 | Acceptable CNG detection frequency upper limit (high byte) | BCD (Hz) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 6805A7 | Acceptable CNG detection frequency upper limit (low byte) |  |  |
| 6805A8 | Acceptable CNG detection frequency lower limit (high byte) | BCD (Hz) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 6805A9 | Acceptable CNG detection frequency lower limit (low byte) |  |  |
| 6805AA | Not used |  | Do not change the setting. |
| 6805AB | CNG on time | 20 ms | Factory setting: 500 ms |
| 6805AC | CNG off time | 20 ms | Factory setting: 200 ms |
| 6805AD | Number of CNG cycles required for detection |  | The data is coded in the same way as address 680533. |
| 6805AE | Not used |  | Do not change the settings. |
| 6805AF | Acceptable AI short protocol tone $(800 \mathrm{~Hz})$ detection frequency upper limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 6805B0 | Acceptable AI short protocol tone $(800 \mathrm{~Hz})$ detection frequency upper limit (low byte) |  |  |
| 6805B1 | Acceptable AI short protocol tone ( 800 Hz ) detection frequency lower limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 6805B2 | Acceptable AI short protocol tone $(800 \mathrm{~Hz})$ detection frequency lower limit (low byte) |  |  |
| 6805B3 | Detection time for 800 Hz Al short protocol tone | 20 ms | Factory setting: 360 ms |
| 6805B4 | PSTN: Tx level from the modem | - $\mathrm{N}-3 \mathrm{dBm}$ | Function 06-2 (parameter 01). |
| 6805B5 | PSTN: 1100 Hz tone transmission level | - N 6805B4-0.5N 6805B5-3.5 (dB) See Note 7. |  |
| 6805B6 | PSTN: 2100 Hz tone transmission level | - N6805B4-0.5N 6805B6-3 (dB) See Note 7. |  |
| 6805B7 | PABX: Tx level from the modem | -dBm |  |

NCU PARAMETERS

| Address | Function | Unit | Remarks |
| :---: | :---: | :---: | :---: |
| 6805B8 | PABX: 1100 Hz tone transmission level | - N 6805B7-0.5N 6805B8 (dB) |  |
| 6805B9 | PABX: 2100 Hz tone transmission level | - N 6805B7-0.5N 6805B9 (dB) |  |
| 6805BA | ISDN: Tx level from the modem | -dBm | The setting must be between -12dBm and 15 dBm . |
| 6805BB | ISDN: 1100 Hz tone transmission level | - N 6805BA - 0.5N 6805BB (dB) |  |
| 6805BC | ISDN: 2100 Hz tone transmission level | - N 6805BA - 0.5N 6805BC (dB) |  |
| 6805BD | Modem turn-on level (incoming signal detection level) | $\begin{aligned} & \hline-37-0.5 \mathrm{~N} \\ & (\mathrm{dBm}) \\ & \hline \end{aligned}$ |  |
| $\begin{aligned} & \text { 6805BE } \\ & \text { to } \\ & 6805 \mathrm{C} \end{aligned}$ | Not used |  | Do not change the settings. |
| 6805C7 | Bits 0 to 3 - Not used. <br> Bit 4 - V. 34 protocol dump 0: Simple, 1: Detailed (default) <br> Bits 5 to 7 - Not used. |  |  |
| $\begin{gathered} 6805 \mathrm{C} 8 \\ \text { to } \\ 6805 \mathrm{D} 9 \end{gathered}$ | Not used |  | Do not change the settings. |
| 6805DA | T. 30 T1 timer | 1 s |  |
| $\begin{gathered} \text { 6805E0 } \\ \text { bit } 3 \end{gathered}$ | Maximum wait time for post message | $\begin{aligned} & 0: 12 \mathrm{~s} \\ & 1: 30 \mathrm{~s} \end{aligned}$ | 1: Maximum wait time for post message (EOP/EOM/MPS) can be changed to 30 s . Change this bit to " 1 " if communication errors occur frequently during V. 17 reception. |

## NOTES

1. If a setting is not required, store FF in the address.
2. Italy and Belgium only

RAM address 68055E: the lower four bits have the following meaning.
Bit 2-1: International dial tone cadence detection enabled (Belgium)
Bit 1 - Not used
Bit 0-1: PSTN dial tone cadence detection enabled (Italy)
If bit 0 or bit 2 is set to 1 , the functions of the following RAM addresses are changed.
680508 (if bit $0=1$ ) or 680538 (if bit $2=1$ ): tolerance for on or off state duration (\%), and number of cycles required for detection, coded as in address 680533.

68050 B (if bit $0=1$ ) or 68053 B (if bit $2=1$ ): on time, hex code (unit $=20 \mathrm{~ms}$ ) 68050C (if bit $0=1$ ) or 68053C (if bit $2=1$ ): off time, hex code (unit = 20 ms )
3. Pulse dial parameters (addresses 68054A to 68054F) are the values for 10 pps. If 20 pps is used, the machine automatically compensates.
4. The first ring may not be detected until 1 to 2.5 wavelengths after the time specified by this parameter.
5. The calculated level must be between 0 and 10 .

The attenuation levels calculated from RAM data are:
High frequency tone: $-0.5 \times$ N680552/680554-3.5 dBm
$-0.5 \times \mathrm{N} 680555 \mathrm{dBm}$
Low frequency tone: $-0.5 \times(\mathrm{N} 680552 / 680554+\mathrm{N} 680553)-3.5 \mathrm{dBm}$
$-0.5 \times(\mathrm{N} 680555+\mathrm{N} 680553) \mathrm{dBm}$
NOTE: $\mathrm{N}_{680552}$, for example, means the value stored in address 680552(H)
6. 68054A: Europe - Between Ds opening and Di opening, France - Between Ds closing and Di opening
68054D: Europe - Between Ds closing and Di closing, France - Between Ds opening and Di closing
7. Tone signals which frequency is lower than 1500 Hz (e.g., 800 Hz tone for Al short protocol) refer to the setting at 6805B5h. Tones which frequency is higher than 1500 Hz refer to the setting at 6805B6h.
8. 68054A, 68054D, 68054E: The actual inter-digit pause (pulse dial mode) is the sum of the period specified by the RAM addresses 68054A, 68054D, and 68054E.

### 3.4 DEDICATED TRANSMISSION PARAMETERS

Each Quick Dial Key and Speed Dial Code has eight bytes of programmable parameters allocated to it. If transmissions to a particular machine often experience problems, store that terminal's fax number as a Quick Dial or Speed Dial, and adjust the parameters allocated to that number.
The programming procedure will be explained first. Then, the eight bytes will be described.

### 3.4.1 PROGRAMMING PROCEDURE

1. Set the bit 0 of System Bit Switch 00 to 1 .
2. Press "Dest. Management" in the facsimile standby mode.
3. Press "Program/Change/Delete Quick Dial".
4. Select the destination key you want to program.
5. When the programmed dial number is displayed, press "Start".
Make sure that the LED of the Start button is lit as green.

6. The settings for the switch 01 are now displayed. Press the bit number that you wish to change.
7. To scroll through the parameter switches, either:

8. Select the next switch: press "Next"
or
Select the previous switch: "Prev." until the correct switch is displayed.
Then go back to step 6.
9. After the setting is changed, press "OK".
10. After finishing, reset bit 0 of System Bit Switch 00 to 0 .

### 3.4.2 PARAMETERS

The initial settings of the following parameters are all $\mathrm{FF}(\mathrm{H})$ - all the parameters are disabled.

## Switch 01 <br> FUNCTION AND COMMENTS

ITU-T T1 time (for PSTN G3 mode)
If the connection time to a particular terminal is longer than the NCU parameter setting, adjust this byte. The T 1 time is the value stored in this byte (in hex code), multiplied by 1 second.
Range:
0 to 120 s (00h to 78h)
FFh - The local NCU parameter factory setting is used.
Do not program a value between 79 h and FEh.

| Switch 02 |  |  |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 4 \end{gathered}$ |  | If communication with a particular remote terminal often contains errors, the signal level may be inappropriate. Adjust the Tx level for communications with that terminal until the results are better. <br> If the setting is "Disabled", the NCU parameter 01 setting is used. <br> Note: Do not use settings other than listed on the left. |
| $\begin{gathered} 5 \\ \text { to } \\ 7 \end{gathered}$ | Cable equalizer Bit 765 Setting <br> 000 None <br> 001 Low <br> 010 Medium <br> 011 High <br> 111 Disabled | Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange when calling the number stored in this Quick/Speed Dial. <br> Also, try using the cable equalizer if one or more of the following symptoms occurs. <br> - Communication error with error codes such as $0-20,0-23$, etc. <br> - Modem rate fallback occurs frequently. <br> Note: Do not use settings other than listed on the left. <br> If the setting is "Disabled", the bit switch setting is used. |


| Switch 03 |  |  |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 3 \end{gathered}$ |  <br> Other settings: Not used | If training with a particular remote terminal always takes too long, the initial modem rate may be too high. Reduce the initial Tx modem rate using these bits. <br> For the settings 14.4 or kbps slower, Switch 04 bit 4 must be changed to 0 . <br> Note: Do not use settings other than listed on the left. <br> If the setting is "Disabled", the bit switch setting is used. |
| 4-5 | Not used | Do not change the settings. |
| 6 | $\begin{aligned} & \text { Al short protocol } \\ & \text { 0: Off } \\ & \text { 1: Disabled } \end{aligned}$ | Refer to Appendix B in the Group 3 Facsimile Manual for details about AI Short Protocol. If the setting is "Disabled", the bit switch setting is used. |
| 7 | Not used | Do not change the settings. |


| Switch 04 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| No | FUNCTION |  |  | COMMENTS |
| 0 | Inch-mm conversion before tx |  |  | The machine uses inch-based resolutions for scanning. If "inch only" is selected, the printed copy may be slightly distorted at the other end if that machine uses mm-based resolutions. <br> If the setting is "Disabled", the bit switch setting is used. |
|  | Bit 10 | $\begin{gathered} \text { Bit } 0 \\ 0 \end{gathered}$ | Setting |  |
|  |  |  | Inch-mm |  |
|  |  |  | conversion |  |
|  |  |  | available |  |
|  | 01 | 1 | Inch only |  |
|  |  | 0 | Not used |  |
|  | 1 | 1 | Disabled |  |
| $\begin{array}{\|c\|} \hline 2 \\ \text { to } \\ 3 \end{array}$ | DIS/NSF detection method |  |  | $\mathbf{( 0 , 1 ) : ~ U s e ~ t h i s ~ s e t t i n g ~ i f ~ e c h o e s ~ o n ~ t h e ~ l i n e ~ a r e ~}$ interfering with the set-up protocol at the start of transmission. The machine will then wait for the second DIS or NSF before sending DCS or NSS. <br> If the setting is "Disabled", the bit switch setting is used. |
|  | Bit 3 | Bit 2 | Setting |  |
|  | 0 | 0 | First DIS or |  |
|  |  |  | NSF |  |
|  | 0 | 1 | Second DIS or NSF |  |
|  | 1 | 0 | Not used |  |
|  | , | 1 | Disabled |  |


| Switch 04 |  |  |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 4 | V. 8 protocol <br> 0: Off <br> 1: Disabled | If transmissions to a specific destination always end at a lower modem rate ( $14,400 \mathrm{bps}$ or lower), disable V. 8 protocol so as not to use V. 34 protocol. 0: V. 34 communication will not be possible. If the setting is "Disabled", the bit switch setting is used. |
| 5 | Compression modes available in transmit mode <br> 0 : MH only <br> 1: Disabled | This bit determines the capabilities that are informed to the other terminal during transmission. If the setting is "Disabled", the bit switch setting is used. |
| $\begin{aligned} & 6 \\ & 7 \end{aligned}$ | ECM    during transmission <br> Bit 7 Bit 6 Setting   <br> 0 0 Off   <br> 0 1 On   <br> 1 0 Not used   <br> 1 1 Disabled   | For example, if ECM is switched on but is not wanted when sending to a particular terminal, use the $(0,0)$ setting. <br> Note that V.8/V. 34 protocol and JBIG compression are automatically disabled if ECM is disabled. If the setting is "Disabled", the bit switch setting is used. |


| Switch 05 - Not used (do not change the settings) |
| :--- |
| Switch 06 - Not used (do not change the settings) |



## Switch 08 - Not used

| Switch 09-Optional ISDN G4 kit required |  |  |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 3 \end{gathered}$ | Layer     3 <br> protocol      <br> Bits $\mathbf{3}$ $\mathbf{2}$ $\mathbf{1}$ $\mathbf{0}$ Setting <br>  0 0 0 0 ISO 8208 <br>  0 0 0 1 T.70 NULL <br>  1 1 1 1 Disabled | If the setting is "Disabled", the current setting of G4 parameter switch 6 (bit 0 ) is used. |
| $\begin{gathered} 4 \\ \text { to } \\ 7 \end{gathered}$ |       <br> Packet modulus      <br> Bits $\mathbf{3}$ $\mathbf{2}$ $\mathbf{1}$ $\mathbf{0}$ Setting <br>  0 0 0 0 Modulo 8 <br> 0 0 0 1 Modulo 128  <br>  1 1 1 1 Disabled | If the setting is "Disabled", the current setting of G4 parameter switch 6 (bit 4) is used. |


| Switch $\mathbf{1 0}$ - Optional ISDN G4 kit required |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Attachment of the Higher Layer <br> Capabilities | This bit determines whether Higher Layer <br> Capabilities are informed in the [SETUP] signal or <br> not. |
| $\mathbf{1}$ | Not used | Do not change the setting. |
| $\mathbf{2}$ | ISDN G3 information transfer <br> capability <br> $\mathbf{0 : 3 . 1} \mathrm{kHz}$ audio <br> $\mathbf{1 : S p e e c h}$ | In tx mode, this determines the information transfer <br> capability informed in the [SETUP] messages. <br> In rx mode, this determines the information transfer <br> capability that the machine can use to receive a call. <br> Set this bit to 1 if the ISDN does not support 3.1 kHz <br> audio. |
| 3-7 | Not used | Do not change the settings. |

### 3.5 SERVICE RAM ADDRESSES

| @CAUTION |
| :--- |
| Do not change the settings which are marked as "Not used" or "Read only." |
| 680001 to 680004(H) - ROM version (Read only) |
| 680001(H) - Revision number (BCD) |
| 680002(H) - Year (BCD) |
| 680003(H) - Month (BCD) |
| 680004(H) - Day (BCD) |
| 680006 to 680015(H) - Machine's serial number (16 digits - ASCII) |
| 680018(H) - Total program checksum (low) |
| 680019(H) - Total program checksum (high) |
| 680020 to 68003F(H) - System bit switches |
| 680040 to 68004F(H) - Scanner bit switches |
| 680050 to 68005F(H) - Printer bit switches |
| 680060 to 68007F(H) - Communication bit switches |
| 680080 to 68008F(H) - G3 bit switches |
| 680090 to 68009F(H) - G3-2 bit switches |
| 6800A0 to 6800AF(H) - G3-3 bit switches |
| 6800D0(H) - User parameter switch 00 (SWUER_00) : Not used |
| 6800D1(H) - User parameter switch 01 (SWUSR_01) : Not used |
| 6800D2(H) - User parameter switch 02 (SWUSR_02) |
| Bit 0: Forwarding mark printing on forwarded messages 0: Disabled, 1: Enabled |
| Bit 1: Center mark printing on received copies |
| (This switch is not printed on the user parameter list.) |
| 0: Disabled, 1: Enabled |
| Bit 2: Reception time printing |
| (This switch is not printed on the user parameter list.) |
| 0: Disabled, 1: Enabled |
| Bit 3: TSI print on received messages 0: Disabled, 1: Enabled |
| Bit 4: Checkered mark printing |
| (This switch is not printed on the user parameter list.) |
| 0: Disabled, 1: Enabled |
| Bit 5: CIL printing (G4) 0: Disabled, 1: Enabled |
| Bit 6: TID printing (G4) 0: Disabled, 1: Enabled |
| Bit 7: Not used |

Bit 7: Not used

## 6800D3(H) - User parameter switch 03 (SWUSR_03: Automatic report printout)

Bit 0: Transmission result report (memory transmissions) 0: Off, 1: On
Bit 1: Not used
Bit 2: Memory storage report 0: Off, 1: On
Bit 3: Polling reserve report (polling reception) 0: Off, 1: On
Bit 4: Polling result report (polling reception) 0: Off, 1: On
Bit 5: Transmission result report (immediate transmissions) 0: Off, 1: On
Bit 6: Polling clear report 0: Off, 1: On
Bit 7: Journal 0: Off, 1: On

## 6800D4(H) - User parameter switch 04 (SWUSR_04: Automatic report printout)

Bit 0: Automatic confidential reception report output 0: Off, 1: On
Bits 1 to 6: Not used
Bit 7: Inclusion of a sample image on reports 0: Off, 1: On

## 6800D5(H) - User parameter switch 05 (SWUSR_05)

Bit 0: Substitute reception when the base copier is in an SC condition
0 : Enabled, 1: Disabled
Bits 1 and 2: Condition for substitute $r x$ when the machine cannot print messages (Paper end, toner end, jam, and during night mode)

Bit 21 Setting
00 The machine receives all the fax messages.
01 The machine receives the fax messages with RTI or CSI.
10 The machine receives the fax messages with the same ID code.
11 The machine does not receive anything.
Bit 3: Not used
Bit 4: Not used
Bit 5: Just size printing 0 : Off, 1 : On
Bit 6: Not used
Bit 7: Add paper display when a cassette is empty 0 : Off, 1: On
6800D6(H) - User parameter switch 06 (SWUSR_06)
Bits 0 to 5: Not used
Bit 6: Scan sequence in Book transmission
0 : Left page then right page, 1: Right page then left page
Bit 7: Not used

## 6800D7(H) - User parameter switch 07 (SWUSR_07)

Bits 0 and 1: Not used
Bit 2: Parallel memory transmission 0: Off, 1: On
Bits 3 to 7: Not used

## 6800D8(H) - User parameter switch 08 (SWUSR_08)

Bits 0 and 1: Not used.
Bit 2: Authorized reception
0: Only faxes from senders whose RTIs/CSIs are specified for this feature are accepted.
1: Only faxes from senders whose RTIs/CSIs are not specified for this feature are accepted.
Bits 3 to 7: Not used.
6800D9(H) - User parameter switch 09 (SWUSR_09) : Not used
6800DA(H) - User parameter switch 10 (SWUSR_0A)
Bit 0: Not used
Bit 1: 2 into 1 0: Off, 1: On
Bit 2: Not used
Bit 3: Page reduction 0: Off, 1: On
Bits 4 to 7: Not used

## 6800DB(H) - User parameter switch 11 (SWUSR_0B)

Bit 0: Not used
Bit 1: Method of transmitting numbers after the "Tone" mark over an ISDN line
0: UUI, 1: Tone
Bits 2 to 5: Not used
Bit 6: Printout of messages received while acting as a forwarding station
0 : Off, 1: On
Bit 7: Polling Standby duration 0: Once, 1: No limit
6800DC(H) - User parameter switch 12 (SWUSR_0C): Not used
6800DD(H) - User parameter switch 13 (SWUSR_OD)
(This switch is not printed on the user parameter list.)
Bits 0 to 4: Not used
Bit 5: Action when receiving a SETUP signal containing no called number and the G4 subscriber number was programmed in this machine.

0 : Respond to the call, 1: Do not respond to the call
Bit 6: Action when the received HLC (Higher Level Capabilities) is Tel or BC
(Bearer Capabilities) is Speech.
0 : Do not respond to the call, 1 : Respond to the call
This switch determines which information transfer capabilities the machine can accept when receiving a call.
1: When the received HLC is Tel (digital telephone) or BC is Speech (voice), the machine responds to the call. In short, the machine receives every call.
This switch is useful for communication problems when the other terminal informs the above transfer capabilities although it is a fax machine.
Bit 7: ISDN SPID programming (used only in the USA)

## 6800DE(H) - User parameter switch 14 (SWUSR_0E)

Bit 0: Message printout while the machine is in Night Printing mode 0: On, 1: Off
Bit 1: Maximum document length detection
0: Double letter, 1: Longer than double-letter (well log) - up to $1,200 \mathrm{~mm}$
Bit 2: Batch transmission 0: Off, 1: On
Bit 3: Fax mode settings, such as resolution, before a mode key (Copy/Fax/Printer /Scanner) is pressed

0 : Not cleared, 1: Cleared
Bits 4 to 6: Not used
Bit 7: Manual service call (sends the system parameter list to the service station)
0 : Off, 1: On

## 6800DF(H) - User parameter switch 15 (SWUSR_0F)

Bits 0, 1 and 2: Cassette for fax printout
Bit 2100 Setting
$\begin{array}{llll}0 & 0 & 1 & 1 \text { st paper feed station }\end{array}$
$0 \quad 1 \quad 0 \quad$ 2nd paper feed station
$0 \quad 1 \quad 1 \quad 3 r d$ paper feed station
$1000 \quad$ 4th paper feed station
101 LCT
Other settings Not used
Bits 3 and 4: Not used
Bit 5: Using the cassette specified by bits 0,1 and 2 above only 0 : On, 1: Off
Bits 6 and 7: Not used

## 6800E0(H) - User parameter switch 16 (SWUSR_10)

(This switch is not printed on the user parameter list.)
Bits 0 and 1: Not used
Bit 2: Paper size selection priority for an A 4 size fax message when $\mathrm{A} 4 / \mathrm{LT}$ size paper is not available.
0: A3 has priority, 1: B4 has priority
Bits 3 to 7: Not used

## 6800E1(H) - User parameter switch 17 (SWUSR_11)

Bits 0 and 1: Not used
Bit 2: Inclusion of the "Add" button when a sequence of Quick/Speed dials is selected for broadcasting

0:Not needed, 1: Needed
Bits 3 to 6: Not used
Bit 7: Press "Start" key without an original when using the on hook dial or the external telephone,

0 : displays "Cannot detect original size".
1: Receives fax messages.
6800E2(H) - User parameter switch 18 (SWUSR_12)
Bit 0: TTI date 0: Off, 1: On
Bit 1: TTI sender
0: Off, 1: On
Bit 2: TTI file number 0: Off, 1: On
Bit 3: TTI page number 0: Off, 1: On
Bit 4 to 7: Not used

## 6800E3(H) - User parameter switch 19 (SWUSR_13)

Bit 0: Offset sort function for the fax (only using the shift tray on the 1,000 sheet finisher)

0 : Disabled, 1: Enabled
Bit 1: Journal format
0 : The Journal is separated into transmissions and receptions
1: The Journal is separated into G3-1, G3-2, G3-3 and G4 communications
Bit 2: Action when the paper cassette that was selected by the specified cassette selection feature becomes empty.
(This switch is not printed on the user parameter list.)
0 : The machine will not print any received files until paper is added.
1: The machine will use other cassettes to print received files that are not specified by this feature.
Bit 3: $90^{\circ}$ image rotation during B5 portrait Tx
(This switch is not printed on the user parameter list.)
0 : Off, 1: On
Bit 4: Reduction of sample images on reports to $50 \%$ in the main scan and subscan directions. (This switch is not printed on the user parameter list.)

0: Technician adjustment (printer switch 0E bits 3 and 4), 1:50\% reduction
Bit 5: Use of A5 size paper for reports
(This switch is not printed on the user parameter list.)
0 : Off, 1: On
Bits 6 and 7: Not used
6800E4(H) - User parameter switch 20 (SWUSR_14)
Bit 0: Automatic printing of the PC FAX error report
0 : Off, 1: On
Bit 1: Reprint the documents fail to print from PC Fax driver
0 : Off, 1: On
Bits 2 to 5: Store documents in memory which could not be printed from PC Fax driver

Bit 5431328 Setting
$\begin{array}{lllll}0 & 0 & 0 & 0 & 0\end{array} \mathrm{~min}$.
$\begin{array}{lllll}0 & 0 & 0 & 1 & 1\end{array} \mathrm{~min}$.
ת ת
$\begin{array}{lllll}1 & 1 & 1 & 0 & 14\end{array} \mathrm{~min}$.
$\begin{array}{lllll}1 & 1 & 1 & 15 & 15 \text { min. }\end{array}$
Bits 6 and 7: Not used.
6800E5(H) - User parameter switch 21 (SWUSR_15) : Not used
6800E6(H) - User parameter switch 22 (SWUSR_16): Not used
6800E7(H) - User Parameter switch 23 (SWUSR_17) : Not used

## 6800E8(H) - User parameter switch 24 (SWUSR_18)

Bits 0 and 1: File retention time (Cross reference: System switch 02 bit 4)
Bit 100 Setting
$0 \quad 0 \quad$ File retention impossible
$0 \quad 124$ hours
10 File retention impossible
$1 \quad 1 \quad 72$ hours
Bits 2 to 7: Not used
6800E9(H) - User parameter switch 25 (SWUSR_19)
Bits 0 to 3: Not used
Bit 4: RDS operation
0 : Not acceptable
1: Acceptable for the limit specified by system switch 03
Note: This bit is only effective when RDS operation can be selected by the user (see system switch 02).
Bits 5 to 7: Not used
6800EA(H) to 6800ED(H) - User parameter switch 26 to 29 (SWUSR_1A to 1D) : Not used

## 680EE(H) - User parameter switch 30 (SWUSR_1E)

Bits 0 to 6: Not used
Bit7: On hook dialing 0: PSTN, 1: ISDN
Note: If this bit set to 1, the on hook dialing is available on the ISDN line. But, the machine cannot use the G3 standard analog line for detecting the ringing and on hook dialing.
6800F0 to 6800FF(H) - G4 Parameter Switches
680100 to $68011 F(H)$ - G4 Internal Switches
680160 to 68016E(H) - Service station's fax number (SP3-101)
See 68030C(H) for the type of network used for this number.
68016F to 68017D(H) - Own fax PABX extension number
68017E to 68018C(H) - Own fax number (PSTN)
68018D to 68019B(H) - Own fax number (ISDN G4)
68019C to 6801AA(H) - The first subscriber number (ISDN G3)
6801AB to 6801B9(H) - The second subscriber number (ISDN G3)
6801BA to 6801C8(H) - The first subscriber number (ISDN G4)
6801C9 to 6801D7(H) - The second subscriber number (ISDN G4)
6801D8 to 6801EB(H) - PSTN-1 RTI (Max. 20 characters - ASCII) - See the following note.
6801EC to 6801FF(H) - PSTN-2 RTI (Max. 20 characters - ASCII) - See the following note.
680200 to 680213(H) - PSTN-3 RTI (Max. 20 characters - ASCII) - See the following note.
680217 to 680256(H) - TTI 1 (Max. 64 characters - ASCII) - See the following note.
680257 to $680296(\mathrm{H})$ - TTI 2 (Max. 64 characters - ASCII) - See the following note. 680297 to 6802AA(H) - PSTN-1 CSI (Max. 20 characters - ASCII)

6802AB to 6802BE(H) - PSTN-2 CSI (Max. 20 characters - ASCII)
6802BF to 6802D2(H) - PSTN-3 CSI (Max. 20 characters - ASCII)
6802D3(H) - Number of PSTN-1 CSI characters (Hex)
6802D4(H) - Number of PSTN-2 CSI characters (Hex)
6802D5(H) - Number of PSTN-3 CSI characters (Hex)
NOTE: If the number of characters is less than the maximum ( 20 for RTI, 64 for $\mathrm{TTI})$, add a stop code ( $\mathrm{FF}[\mathrm{H}]$ ) after the last character.
6802E0 to 6802E2(H) - PSTN-1 line settings
6802E0
Bits 0 and 1: PSTN access method from behind a PABX.
Bit 10 Setting
00 Loop start
01 Ground start
10 Flash start
$1 \quad 1$ Not used
Bit 2: Telephone line type.
0 : PSTN, 1: PABX
Bits 3 and 4: Dialing type.
Bit 43 Setting
$0 \quad 0 \quad$ Pulse dialing
01 Not used
10 Tone dialing
11 Not used
Bits 4 to 7: Not used
6802E1: PSTN access number for loop start
Access number Hex value to program (BCD)
0
$\sqrt{3}$
F0
9
,
F9
00
00
ת
ת
99
99
6802E2
Bit 0: Transmission disabled
0 : Tx and Rx, 1: Rx only
Bit 1: Memory Lock reception
0: Enabled, 1: Disabled
Bits 2 to 7: Not used
6802E8 to 6802EA(H) - PSTN-2 line settings
6802F0 to 6802F2(H) - PSTN-3 line settings
6802F8 to 6802EA(H) - ISDN line settings
680300(H) - ID code (low - Hex)
680301(H) - ID code (high - Hex)
680302(H) - Confidential ID (low - BCD)
680303(H) - Confidential ID (high - BCD)

```
680304(H) - Memory Lock ID (low - BCD)
680305(H) - Memory Lock ID (high - BCD)
```

68030C(H) - Network type used for the service station number
01 (H) - PSTN-1
02 (H) - PSTN-2
03 (H) - PSTN-3
$10(\mathrm{H})$ - G4
07 (H) - G3 auto selection
680310 to 680317(H) - Last power off time (Read only)
680310(H) - 01(H) - 24-hour clock, 00(H) - 12-hour clock (AM),
02(H) - 12-hour clock (PM)
680311(H) - Year (BCD)
680312(H) - Month (BCD)
680313(H) - Day (BCD)
680314(H) - Hour
680315(H) - Minute
680316(H) - Second
680317(H) - 00: Monday, 01: Tuesday, 02: Wednesday, ....... , 06: Sunday
680324(H) - Optional equipment (Read only - Do not change the settings)
Bit 0 to 3: Not used
Bit 4: Function Upgrade unit 0: Not installed, 1: Installed
Bit 5 to 7: Not used
680325(H) - Optional equipment (Read only - Do not change the settings)
Bit 0: Function Upgrade unit 0: Not installed, 1: Installed
Bit 1 to 3: Not used

| Bit 4: G3-2 | 0: Not installed, 1: Installed |
| :--- | :--- |
| Bit 5: G3-3 | 0: Not installed, 1: Installed |
| Bit 6: ISDN unit | $0:$ Not installed, 1: Installed |

Bit 7: Not used

```
680358 to \(68036 \mathrm{~F}(\mathrm{H})\) - G4 terminal ID (ASCII - Max. 24 characters)
680370 to 680383(H) - ISDN CSI
680384(H) - Number of ISDN CSI characters (Hex)
680389 to \(68038 \mathrm{C}(\mathrm{H})\) - ISDN G3 sub-address
68038D to 680390(H) - ISDN G4 sub-address
680391 to 680395(H) - SiG4 board ROM information (Read only)
    680391(H) - Suffix
    680392(H) - Version (BCD)
    680393(H) - Year (BCD)
    680394(H) - Month (BCD)
    680395(H) - Day (BCD)
```

680396 to 68039A - Option G3 board (G3-2) ROM information (Read only)
680396(H) - Suffix (BCD)
680397(H) - Version (BCD)
680398(H) - Year (BCD)
680399(H) - Month (BCD)
68039A(H) - Day (BCD)

```
68039B to 68039F - Option G3 board (G3-3) ROM information (Read only)
    68039B(H) - Suffix (BCD)
    68039C(H) - Version (BCD)
    68039D(H) - Year (BCD)
    68039E(H) - Month (BCD)
    68039F(H) - Day (BCD)
6803A2(H) - Option G3 board (G3-2) modem ROM version (Read only)
6803A4(H) - Option G3 board (G3-3) modem ROM version (Read only)
6803A6 to 6803AB(H) - Modem ROM version (Read only)
    6803A6(H) - Part number (low)
    6803A7(H) - Part number (high)
    6803A8(H) - Control (low)
    6803A9(H) - Control (high)
    6803AA(H) - DSP (low)
    6803AB(H) - DSP (high)
680406(H) - Time for economy transmission (hour in 24h clock format - BCD)
680407(H) - Time for economy transmission (minute - BCD)
680422(H) - Transmission monitor volume 00-07(H)
680423(H) - Reception monitor volume 00-07(H)
680424(H) - On-hook monitor volume 00-07(H)
680425(H) - Dialing monitor volume 00-07(H)
680426(H) - Buzzer volume 00-07(H)
```


## DETAILED DESCRIPTIONS

## 4. DETAILED SECTION DESCRIPTIONS

### 4.1 OVERVIEW



The basic fax unit consists of two PCBs: an FCU and an NCU.
The FCU controls all the fax communications and fax features, in cooperation with the controller board. The NCU switches the analog line between the fax unit and the external telephone.

## Fax Options:

1. Extra G3 Interface option: This provides one more analog line interface. This allows full dual access. Up to two extra G3 interface options can be installed. The option G3 unit consists of two PCBs: G3 board and NCU.
2. ISDN unit: This allows the fax unit to communicate over an ISDN line.
3. Fax Function Upgrade Unit: JBIG compression becomes available. In addition, this expands the system's SRAM capacity to hold programmed telephone numbers, memory files, etc.
4. Memory Expansion: This expands the SAF memory and the page memory (used for image rotation); without this expansion, the page memory is not big enough for image rotation at 400 dpi , so transmission at 400 dpi is not possible.

### 4.2 BOARDS

### 4.2.1 FCU



The FCU (Facsimile Control Unit) controls fax communications, the video interface to the base copier's engine, and all the fax options.

## FACE (Fax Application Control Engine)

- CPU
- Data compression and reconstruction (DCR)
- DMA control
- Clock generation
- DRAM backup control
- Ringing signal/tone detection


## FBI (FACE Bridge Interface)

- Interface between the PCI bus and the FACE
- DMA controll

Modem (R288F-29)

- V.34, V33, V17, V.29, V.27ter, V.21, and V. 8


## ROM

- 3MB flash ROMs for system software storage 2MB (16bit x 1M) + 1MB (16bit x 512K)


## DRAM

- The 8 MB of DRAM is shared as follows.

SAF memory
Working memory : 2MB
Page memory : 4MB

- The SAF memory is backed up by a rechargeable battery.


## SRAM

- The 512 KB SRAM for system and user parameter storage is backed up by a lithium battery.


## Memory back-up

- A lithium battery backs up the system parameters and programmed items in the SRAM, in case the base copier's main switch is turned off.
- A Rechargeable battery backs up the SAF memory (DRAM) for 1 hour.


## Switches

| Item | Description |
| :--- | :--- |
| SW1 | Switches the SRAM backup battery on/off. |
| SW2 | Reset switch, to reboot the FCU board |
| SW3 | Determines which firmware the machine boots from. If the switch is OFF, the <br> firmware on the FCU inside the machine is used. If the switch is ON, the firmware <br> on the flash memory card or external FCU is used. |

### 4.2.2 NCU (US)



Jumpers

| Item | Description |
| :---: | :--- |
| JP7 | These jumpers should be shorted when the machine is connected to a dry |
| JP8 | line. |
| DB1 | Also remove DB1 when the machine is connected to a dry line. |

### 4.2.3 NCU (EUROPE/ASIA)



## Control Signals and Jumpers

|  | CSEL1 | RSEL |
| :--- | :---: | :---: |
| Country | CN2-5 | CN1-13 |
| CTR21 | H | H |
| Australia | H | H |
| South Africa | H | H |
| Malaysia | H | H |
| Hong Kong | L | L |
| New Zealand | L | L |
| Singapore | L | L |
| Asia | L | L |
|  | L: Low, $\mathrm{H}:$ High |  |

CTR21 (Common Technical Regulation 21):
France, Germany, UK, Italy, Austria, Belgium, Denmark, Finland, Ireland, Norway, Sweden, Switzerland, Portugal, Holland, Spain, Israel, Greece

### 4.2.4 SG3 BOARD



The SG3 board allows up to two simultaneous communications when used in combination with the FCU.

## CCP (Communication Control Processor)

- Controls the SG3 board.
- CPU (RU8)
- DPRAM (Dual Port RAM): Handshaking with the FCU is done through this block.
- DMA controller
- JBIG interface


## Flash ROM

- 512KB (4 Mbit) flash ROM for SG3 software storage.
- 512 KB (4 Mbit) flash ROM for Panasonic modem software storage.

DRAM

- 512 KB DRAM shared between ECM buffer, line buffer, and working memory.


## QM coder

- QM coder for JBIG compression and decompression.


## V. 34 Modem

- Panasonic V. 34 modem (MN195003MFL)


### 4.2.5 SIG4 BOARD



The SiG4 (Standard ISDN G4) board contains ICCP (ISDN Communication Control Processor), Flash ROM, DRAM, LAPD controller, CODEC, ISDN interface and analog interface. The ICCP controls the entire board.

## ICCP (ISDN Communication Control Processor)

- 16 bit CPU which controls the entire board
- HDLC control
- Channel select for B channel interface control


## CODEC

- A/D, D/A converter for ISDN G3 communication


## LAPD Controller

- ISDN layer 1 and LAPD control

ROM

- 512 kB (4 Mbit) Flash ROM for system software storage

DRAM

- 2MB (16 Mbit) DRAM used


## VIDEO DATA PATH

### 4.3 VIDEO DATA PATH

### 4.3.1 TRANSMISSION



## Memory Transmission and Parallel Memory Transmission

The base copier's scanner scans the original at the selected resolution in inch format. The BiCU processes the data and transfers it to the FCU.
NOTE: When scanning a fax original, the BiCU uses the MTF, independent dot erase and thresholding parameter settings programmed in the fax unit's scanner bit switches, not the copier's SP modes.
Then, the FCU converts the data to mm format, and compresses the data in MMR or raw format to store it in the SAF memory. If image rotation will be done, the image is rotated in page memory before compression.
At the time of transmission, the FCU decompresses the stored data, then recompresses and/or reduces the data if necessary for transmission. Either the NCU or SiG4 (optional) transmits the data to the line.

## Immediate Transmission

The base copier's scanner scans the original at the resolution agreed with the receiving terminal. The BiCU video processes the data and transfers it to the FCU.
NOTE: When scanning a fax original, the BiCU uses the MTF, independent dot erase and thresholding parameter settings programmed in the fax unit's scanner bit switches, not the copier's SP modes.
Then the FCU stores the data in page memory, and compresses the data for transmission. Either the NCU or SiG4 (optional) transmits the data to the line.

## JBIG Transmission

- Memory transmission: If the receiver has JBIG compression, the data goes from the DCR to the QM-Coder on the Function Upgrade Unit for JBIG compression. Then either the NCU or SiG4 (ISDN G3) transmits the data to the line. When an optional G3 unit (SG3) is installed and PSTN2 is selected as the line type, JBIG compression is available, but only for the PSTN-2 line.
- Immediate transmission: If the receiver has JBIG compression, the data goes from the page memory to the QM-Coder on the Function Upgrade Unit for JBIG compression. Then either the NCU or SiG4 (ISDN G3) transmits the data to the line. When an optional G3 unit (SG3) is installed and PSTN2 is selected as the line type, JBIG compression is available, but only for the PSTN-2 line.


## I-G3 (ISDN G3) Transmission

G3 transmission is available through the ISDN line by using the optional G4 unit (SiG4). In this case, the G3 modem is used for the I-G3 transmission. When an optional G3 unit (SG3) is installed, the modem on the SG3 can be also used for the I-G3 transmission. This means that two I-G3 transmission is available at the same time.

## VIDEO DATA PATH

## Adjustments

- Line used for G3 transmissions (PSTN or ISDN): System switch 0A bit 6
- Line used for G3 transmissions (PSTN 1/PSTN 2): System switch 16 bit 1
- I-G3 modem default: System switch 16 bit 2 and 3


### 4.3.2 RECEPTION



First, the FCU stores the incoming data from either an analog line or an ISDN line to the SAF memory. (The data goes to the FACE at the same time, and is checked for error lines/frames.)
The FCU then decompresses the data and transfers it to page memory. If image rotation will be done, the image is rotated in the page memory. The data is transferred to the BiCU .
If the optional G3 unit is installed, the line that the message comes in on depends on the telephone number dialled by the other party (the optional G3 unit has a different telephone number from the main fax board).

## JBIG Reception

When data compressed with JBIG comes in on PSTN-1 (the standard analog line), the data is sent to the Function Upgrade Unit for decompression. Then the data is stored in the page memory, and transferred to the BiCU.

When data compressed with JBIG comes in on PSTN-2 (optional extra analog line), the data is sent to the QM-CODER on the SG3 board for decompression.

### 4.4 FAX COMMUNICATION FEATURES

### 4.4.1 PERSONAL/INFORMATION/TRANSFER BOXES

When an incoming message has a SUB or SEP code attached, the machine will look for a Personal Box, Transfer Box or Information Box with an identical SUB or SEP code. If a matching code is found, the message will be stored in the box and not printed, or it will be forwarded to the receiver if registered.

## Personal Box (Confidential Box)

The user can create personal boxes in the machine's memory for receiving fax messages. Each box must have a name and a code.
If a sender knows the code that was used to create a personal box, they can specify this as the SUB code during transmission. The message will then go to this personal box. If the sender also sends a SID code, this is ignored; the receiver must input the SID code stored in the receiving machine to print the message (the receiver's SID code acts as a password).

The receiver can set up the personal box as a forwarding station - any messages entering the box will be forwarded to another station.

Items to program at the receiving machine

| Items |  |
| :--- | :--- |
| SUB Code (Box number) | Required |
| Box name | Required |
| Password (SID) | Optional |
| Receiver (1 forwarding destination) | Optional (Quick Dial) |

Items for the sender to specify when setting up the transmission

| Items | Note |
| :--- | :--- |
| SUB Code (Box number) | Required (must be the same as the code <br> that was used to set up the personal box) |
| Password (SID) | Optional |

NOTE: 1) Group dial is not available for the forwarding destination
2) If the sender uses a SID code, this code is ignored. The communication can proceed even if the SID code stored in the machine is different. In addition, the SID code stored in the machine must be used to print the stored message, and not the SID code from the sender.
3) If a forwarding destination is programmed, the received file is deleted after delivering the documents to the pre-programmed receiver. If forwarding did not succeed, the forwarding result report is printed out but the file stays in the memory until it is printed out on the machine.

## FAX COMMUNICATION FEATURES

## Transfer Box

The user can create transfer boxes in the machine's memory for forwarding incoming fax messages. Each box must have a name and a code. Each box must also have destinations associated with it; any message arriving in this box will automatically be sent on to these destinations.
If a sender knows the code that was used to create a transfer box, they can specify this as the SUB code during transmission. The message will then go to this transfer box, and will be sent on to the transfer destinations associated with that transfer box.

If the sender also sends a SID code, the SID code stored in the receiver must be the same or the communication will be disconnected.

Items to program at the receiving machine

| Items | Note |
| :--- | :--- |
| SUB Code (Box number) | Required |
| Box name | Required |
| Password (SID) | Optional |
| Receiver (Final destinations) | Required (Quick Dial) |

Items for the sender to specify when setting up the transmission

| Items | Note |
| :--- | :--- |
| SUB Code (Box number) | Required (must be the same as the code <br> that was used to set up the transfer box) |
| Password (SID) | Optional |

NOTE: 1) 5 destinations can be programmed with Group or Quick Dial as the delivery destinations.
2) More than 5 destinations are available if a Group is specified as one of the destinations.
3) If the SID does not match, the communication is disconnected.
4) A result report is not sent back to the transmitter but it is printed on the receiving machine.

## Information Box (Polling Tx)

The user can set up documents in memory to be picked up by another machine. The user makes an information box for each document.

The information box is identified by a code. Anybody who wishes to call the fax machine and receive the document from the information box has to input this code as the SEP code when calling the machine.
In addition, the user who sets up the information box can protect it with a password. This protects the document from other people at the same location (to print the stored document, this password must be input). The person who wishes to receive the document does not have to know this PWD code, but only has to know the SEP code.

Items to program at the machine that has the document on standby for polling

| Items | Note |
| :--- | :--- |
| SEP Code (Box number) | Required |
| Box name | Required |
| Password (PWD) for printing <br> the stored document | Optional |

Items for the caller to specify when picking up the document

| Items | Note |
| :--- | :--- |
| SEP Code (Box number) | Required (must be the same as the code that <br> was used to set up the information box) |

NOTE: 1) Only one fax message can go in each information box.
2) The SEP code must be different for each box.

## FAX COMMUNICATION FEATURES

### 4.4.2 MULTI-PORT

When the optional ISDN Unit or optional extra G3 Interface Unit is installed, communication can take place at the same time through the two or three lines at once.

| Option | Available Line Type | Available protocol Combinations |
| :---: | :---: | :---: |
| Standard only | PSTN | G3 |
| Extra G3 Interface Unit | PSTN + PSTN | G3 + G3 |
| ISDN Unit | PSTN + ISDN | G3 + G4 |
|  | ISDN | I-G3 + G4 |
| Extra G3 Interface Unit Extra G3 Interface Unit | PSTN + PSTN + PSTN | G3 + G3 + G3 |
| Extra G3 Interface Unit ISDN Unit | PSTN + PSTN + ISDN | $\mathrm{G} 3+\mathrm{G} 3+\mathrm{G} 4$ |
|  | PSTN + ISDN | $\begin{gathered} \mathrm{G} 3+\mathrm{I}-\mathrm{G} 3 \\ \text { or } \\ \mathrm{G} 3+\mathrm{I}-\mathrm{G} 3+\mathrm{G} 4 \end{gathered}$ |
|  | ISDN | $\begin{gathered} \text { I-G3 + I-G3 } \\ \text { or } \\ \text { I-G3 + G4 } \end{gathered}$ |

### 4.4.3 DOCUMENT SERVER



The base copier's scanner scans the original at the selected resolution. The BICU video processes the data and transfers it to the controller board.

Then the controller stores the data in the page memory for the copier function, and compresses the data in MMR (by software) to store it in the HDD. If image rotation will be done, the image is rotated in the page memory before compression.

For transmission, the stored image data is transferred to the FCU. The FCU decompresses the image data, then recompresses and/or reduces the data if necessary for transmission. Either the NCU or SiG4 (optional) transmits the data to the line.

The documents can be stored in the HDD (Document Server) from the fax application. The stored documents in the document sever can be used for the fax transmission in many times. More than one document and the scanned document can be combined into one file and then the file can be transmitted.

- When using the document server, the SAF memory is not used.
- The document is compressed with MMR and stored.
- Up to 9000 pages can be stored. (1 file: Up to 1000 pages with Fax Function Upgrade and Expansion Memory) from the fax application.
- Only stored documents from the fax application can be transmitted.
- Scanned documents are given a name automatically, such as "FAX001". But it is possible to change the file name, user name and password.
- Up to 30 files can be selected at once.

NOTE: 1) The compression method of the fax application is different from the copy application. The storing time is longer than the copier storing.
2) When selecting "Print 1st page", the stored document will be reduced to A4 size.

FAX COMMUNICATION FEATURES

### 4.4.4 LAN FAX DRIVER



The fax driver makes print data from an application, then compresses the print data into MMR data. PJL commands are added to the compressed data and the destination telephone number and the line selection are included in the PJL commands. The telephone number can be taken from an address book application.

The fax driver uses TCP/IP protocol to transfer the print (MMR) data to the machine.

## Regular transmission:

The machine stores the print (MMR) data in the SAF memory. Then, the print data is transferred using the same method as memory transfer.

## Print and transmission

The machine stores the print (MMR) data in the page memory on the controller. Then, the machine decompresses the print data and prints out. The decompressed print data is transferred to the FCU and is stored to page memory.

Even if the Expansion Memory is not installed, it is possible to transmit and print the document from the PC with 400 dpi resolution. However, the data is converted to 200 dpi and printed out if the data stored in the SAF memory for memory transmission. This is because the page memory on the FCU is not enough to expand the print data to 400 dpi with only standard memory.

## Using Document Server

At first, the machine stores the print (MMR) data in the HDD, when using the Document Server. Then the print data is transferred to the FCU. But the FCU does not store this data in the SAF memory. Then the print data is transferred using same method as Document Server transmission.

## SPECIFICATIONS

## SPECIFICATIONS

## 1. GENERAL SPECIFICATIONS

| Type: | Desktop type transceiver |
| :---: | :---: |
| Circuit: | PSTN (max. 3ch.) <br> PABX <br> ISDN |
| Connection: | Direct couple |
| Original Size: | Book (Face down) <br> Maximum Length: 432 mm [17 ins] <br> Maximum Width: 297 mm [11.7 ins] <br> ARDF (Face up) <br> (single sided document) <br> Length: 128-1200 mm [5.0-47.2 ins] <br> Width: 105-297 mm [4.1-11.7 inch] <br> (double sided document) <br> Length: 128-432 mm [5.0-17 inch] <br> Width: 105-297 mm [4.1-11.7 inch] |
| Scanning Method: | Flat bed, with CCD |
| Resolution: | G3 <br> $8 \times 3.85$ lines $/ \mathrm{mm}$ (Standard) <br> $8 \times 7.7$ lines $/ \mathrm{mm}$ (Detail) <br> $8 \times 15.4$ line $/ \mathrm{mm}$ (Fine) Note1 <br> $16 \times 15.4$ line/mm (Super Fine) See Note 1 |
|  | $200 \times 100$ dpi (Standard) <br> $200 \times 200$ dpi (Detail) <br> $400 \times 400$ dpi (Super Fine) See Note 1 |
|  | G4 <br> $200 \times 100$ dpi (Standard) <br> $200 \times 200$ dpi (Detail) <br> $400 \times 400$ dpi (Super Fine) See Note 1 |
|  | NOTE: 1. Optional Expansion Memory required |
| Transmission Time: | G3: 3 s at 28800 bps; Measured with G3 ECM using memory for an ITU-T \#1 test document (Slerexe letter) at standard resolution <br> G4: 3 s at 64 kbps ; Measured with an ITU-T \#1 test document (Slerexe letter) at standard resolution |
| Data Compression: | MH, MR, MMR <br> JBIG (optional Fax Function Upgrade Unit required) |
| Protocol: | Group 3 with ECM Group 4 (ISDN unit required) |
| Modulation: | V.34, V.33, V. 17 (TCM), V. 29 (QAM), |

## SPECIFICATIONS

|  | V.27ter (PHM), V.8, V. 21 (FM) |
| :---: | :---: |
| Data Rate: | G3: 33600/31200/28800/26400/24000/21600/ 19200/16800/14400/12000/9600/7200/4800/2400 bps Automatic fallback G4: $64 \mathrm{kbps} / 56 \mathrm{kbps}$ |
| I/O Rate: | With ECM: $0 \mathrm{~ms} / \mathrm{line}$ Without ECM: 2.5, 5, 10, 20, or $40 \mathrm{~ms} / \mathrm{line}$ |
| Memory Capacity: | ECM: 128 KB |
|  | SAF <br> Standard: 2 MB <br> With optional Expansion Memory: 26 MB (2 MB+ 24 MB) |
|  | Page Memory <br> Standard: 4 MB (Print: 2 MB + Scanner: 2 MB) <br> With optional Expansion Memory: 12 MB ( $4 \mathrm{MB}+8 \mathrm{MB}$ ) (Print 8 MB + Scanner: 4 MB) |

## 2. CAPABILITIES OF PROGRAMMABLE ITEMS

The following table shows how the capabilities of each programmable item will change after the optional Fax Function Upgrade Unit is installed.

| Item | Standard | With Fax Function <br> Upgrade Unit |
| :--- | :---: | :---: |
| Quick Dial | 400 | 1200 |
| Groups | 64 | 64 |
| Destination per Group | 500 | 500 |
| Boxes (Information/Personal/Transfer) | 150 | 400 |
| Destinations dialed from the ten-key pad <br> overall | 100 | 1000 |
| Programs | 100 | 200 |
| Auto Document | 6 | 18 |
| Communication records for Journal <br> stored in the memory | 200 | 1000 |
| Specific Senders | 30 | 50 |

The following table shows how the capabilities of the document memory will change after the optional Fax Function Upgrade Unit and the Expansion Memory are installed.

|  |  | Without the Expansion Memory | With the Expansion Memory |
| :---: | :---: | :---: | :---: |
| Memory Transmission file | Without the Fax Function Upgrade Unit | 400 | 400 |
| Maximum number of page for memory transmission |  | 400 | 1000 |
| Memory capacity for memory transmission (Note1) |  | 160 | 1000 |
| Memory Transmission file | With the Fax Function Upgrade Unit | 800 | 800 |
| Maximum number of page for memory transmission |  | 400 | 3000 |
| Memory capacity for memory transmission (Note1) |  | 160 | 2080 |

NOTE: 1) Measured using an ITU-T \#1 test document (Slerexe letter) at the standard resolution, the auto image density mode and the Text mode.

## 3. MACHINE CONFIGURATION



| Item | Machine Code | No. | Remarks |
| :--- | :---: | :---: | :--- |
| Fax Option Type 1045 | B360 | 2,10 |  |
| G3 Interface Unit Type <br> 1045 | B366 | $1,4,7,8,9$ | Up to two options can be installed. <br> You can install either two optional <br> G3 units or one optional G3 and <br> one optional G4 unit. |
| ISDN Option Type <br> 1045 | B367 | 1,6 | U892 |
| Fax Function Upgrade <br> Type 185 | A892 | Used in common with Stinger-C |  |
| Handset Type 450 | A646 | - | USA only |
| Marker Type 30 | H903 | - | Refill ink for stamp |
| Expansion Memory | - | 5 |  |

## TECHNICAL SERVICE BULLETINS

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER:
B003/B004/B006/B007-001
05/23/2001
APPLICABLE MODEL:
GESTETNER - N/A
RICOH - AFICIO 1035P/1045P
SAVIN - 2535P/2545P

## SUBJECT: INCORRECT CD-ROM'S SHIPPED WITH MACHINE

## SYMPTOM:

Document management software will not install and print drivers contained on the printer driver CD are beta version drivers.

## CAUSE:

Old beta versions of the print drivers and document management software were copied to the CD ROM packages.

## Affected CD ROM's

- RICOH Brand Printer Driver CD
- SAVIN Brand Printer Driver CD
- Document Management CD-
- Manual CD-


## SOLUTION:

## PRODUCTION COUNTERMEASURE:

The CD ROM packages will be replaced with newer versions.

## FIELD COUNTERMEASURES:

1. Download the current software from the manufactures web page.

RICOH: http://support.ricoh.com/html_rc/model/af1035_45/af1035_45en.htm
SAVIN:
http://www.savin.com/savin/savininternetsitetemp.nsf/(All)/SoftwareDrivers.html?OpenDocument\& Start=1\&Count=100\&Expand=1.8
2. A one-time shipment of replacement CD packs will be mailed to servicing dealers based on equipment shipment records.

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## UNITS AFFECTED:

All B006/B007 printers manufactured with the Serial Numbers listed below will have defective CD-ROMs.

| Model Name | Serial Number | Defective CD Part Number |
| :--- | :---: | :---: |
| Ricoh Aficio 1035P | H7216300351 ~ 00860 | B3615501 |
|  |  | B3615521 |
|  |  | B3615550 |
| Ricoh Aficio 1045P | H7316300221~00920 | B3615501 |
|  |  | B3615521 |
|  | B3615550 |  |
| Savin 2535P | H7216300001~00350 | B3615505 |
|  |  | B3615521 |
|  | B3615550 |  |
| Savin 2545P | H7316300001~00220 | B3615505 |
|  | B3615521 |  |
|  | B3615550 |  |
|  |  |  |
| Ricoh Aficio 1035P | H7216400671~01570 | B3615550 |
| Ricoh Aficio 1045P | H7316400356 ~00955 | B3615550 |
| Savin 2535P | H7216400001~00670 | B3615550 |
| Savin 2545P | H7316400001~00355 | B3615550 |




[^0]:    ${ }^{* 1}$ Counted by entrance motor pulses because timing differs for feed out.

[^1]:    System Switch 07 - Not used (Do not change the factory settings.)
    System Switch 08 - Not used (Do not change the factory settings.)

[^2]:    System Switch 1A - Not used (do not change the settings)
    System Switch 1B - Not used (do not change the settings)
    System Switch 1C - Not used (do not change the settings)

[^3]:    Communication Switch 04 - Not used (do not change the settings)
    Communication Switch 05 - Not used (do not change the settings)
    Communication Switch 06 - Not used (do not change the settings)

[^4]:    G4 Internal Switch 1D - Not used (do not change these settings)
    G4 Internal Switch 1E - Not used (do not change these settings)
    G4 Internal Switch 1F - Not used (do not change these settings)

