## Gestetner $\mathbf{R I C O M}$ SaVIn



B022/B027
SERVICE MANUAL

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# Gestetner <br> RICOM <br> 52VII 



RICOH GROUP COMPANIES

# Gestetner RICOM SEVII 

B022/B027 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. 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.
4. If a job has started before the copier completes the warm-up or initializing period, keep hands away from the mechanical and electrical components because the machine will start making copies as soon as the warm-up period is completed.
5. The inside and the metal parts of the fusing unit become extremely hot while the copier is operating. Be careful to avoid touching those components with your bare hands.

## HEALTH SAFETY CONDITIONS

Toner is non-toxic, but if you get it 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.

## SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Do not incinerate the toner cassettes. Toner dust may ignite suddenly when exposed to an open flame.
2. Dispose of toner cassettes in accordance with local regulations. (This is a non-toxic unit.)
3. Dispose of replaced parts in accordance with local regulations.

## 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 Controller board has a lithium battery which can explode if replaced incorrectly. Replace the NVRAM only with an identical one. Do not recharge or burn this battery. Used NVRAM must be handled in accordance with local regulations.
3. The danger of explosion exists if batteries on the FCU, MBU and JBIG are 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.

## 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.

| $\boxed{ } \uparrow$ WARNING |
| :--- |
| Use of controls, or adjustment, or performance of procedures other than <br> those specified in this manual may result in hazardous radiation exposure. |

## $\triangle$ WARNING FOR LASER UNIT <br> WARNING: Turn off the main switch before attempting any of the procedures in the Laser Unit section. Laser beams can seriously damage your eyes.

CAUTION MARKING:


| DETAILED DESCRIPTIONS B022/B027 |  |
| :--- | :--- |
|  | AUTO REVERSE DOCUMENT FEEDER B386 |
|  |  |


| INSTALLATION B022/B027 |  |  |  |  |
| :--- | :--- | :---: | :---: | :---: |
|  |  |  |  | INTERCHANGE UNIT B300/B416 |
|  | PRINTER/SCANNER <br> CONTROLLERS B453/B461 |  |  |  |


| SERVICE TABLES B022/B027 |  |  |  |  |
| :--- | :--- | :---: | :---: | :---: |
|  |  |  |  | 1-BIN TRAY UNIT A898/B413 |
|  |  |  |  |  |
|  |  |  |  |  |




| PAPER TRAY UNIT A860/B390 |  |
| :--- | :--- |
| BRIDGE UNIT A897/B417 |  |

## OVERALL MACHINE INFORMATION

## 1. OVERALL MACHINE INFORMATION <br> 1.1 SPECIFICATIONS

Configuration:
Copy Process:
Originals:
Original Size:
Copy Paper Size:
Desktop
Dry electrostatic transfer system
Sheet/Book
Maximum A3/11" x 17"
Maximum
A3/11" x 17"
Minimum A5/81/2" x 51/2" lengthwise
Custom sizes
2nd paper tray Width: 100 ~ 297 mm (3.9" ~ 11.5") Length: 148 ~ 432 mm (5.8" ~ 17.0")
By-pass tray (Option):
Width: 90 ~ 305 mm (3.5" ~ 12.0") Length: 148 ~ 1,260 mm (5.8" ~ 49.6")

Copy Paper Weight: Paper Tray:

$$
60 \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 28 \mathrm{lb} \text { (1st paper tray) }
$$

$$
52 \sim 157 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 43 \mathrm{lb} \text { (2nd paper tray) }
$$

By-pass (Option):

$$
52 \sim 157 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 42 \mathrm{lb}
$$

Reproduction Ratios: 5 Enlargement and 7 Reduction

|  | A4/A3 Version | LT/DLT Version |
| :---: | :---: | :---: |
| Enlargement | $400 \%$ | $400 \%$ |
|  | $200 \%$ | $200 \%$ |
|  | $141 \%$ | $155 \%$ |
|  | $122 \%$ | $129 \%$ |
| Redull Size | $115 \%$ | $121 \%$ |
|  | $100 \%$ | $100 \%$ |
|  | $93 \%$ | $93 \%$ |
|  | $87 \%$ | $85 \%$ |
|  | $82 \%$ | $78 \%$ |
|  | $71 \%$ | $73 \%$ |
|  | $65 \%$ | $65 \%$ |
|  | $50 \%$ | $50 \%$ |
|  | $25 \%$ | $25 \%$ |

Zoom: $\quad 25 \%$ to $400 \%$ in $1 \%$ steps (Platen mode) $25 \%$ to $200 \%$ in $1 \%$ steps (ADF mode)
Power Source: $\quad 120 \mathrm{~V}, 60 \mathrm{~Hz}$ :
More than 12 A (for North America)
220 ~ 240 V, $50 / 60 \mathrm{~Hz}$
More than 7 A (for Europe/Asia)
$110 \mathrm{~V}, 50 / 60 \mathrm{~Hz}$
More than 13 A (for Taiwan)
Power Consumption:

|  | Mainframe Only |  | Full System |  |
| :---: | :---: | :---: | :---: | :---: |
|  | 120 V | 220 ~ 240 V | 120 V | $220 \sim 240 \mathrm{~V}$ |
| Maximum | Less than $1.44 \text { kW }$ | $\begin{aligned} & \hline \text { Less than } \\ & 1.5 \mathrm{~kW} \end{aligned}$ | Less than $1.44 \text { kW }$ | Less than 1.5 kW |
| Copying | Approx. 650 Wh | Approx. 650 Wh | Approx. 680 Wh | Approx. 680 Wh |
| Warm-up | Approx. 1.44 kW | Approx. <br> 1.5 kW | Approx. <br> 1.44 kW | Approx. 1.5 kW |
| Stand-by | Approx. 150 Wh | Approx. 150 Wh | Approx. 160 Wh | Approx. 160 Wh |
| Energy Saver / Auto Off | Less than 10 W | Less than 10 W | Less than 10 W | Less than 10 W |

NOTE: 1) Full system: Mainframe + ADF + 1-bin Sorter + Paper Tray Unit + Duplex Unit + Bridge Unit + Finisher
2) Without the optional heaters, fax unit, and printer controller

Noise Emission (Sound Power Level):
Stand-by (Mainframe only): US/Asia Model: $40 \mathrm{~dB}(\mathrm{~A})$
Europe Model: $\quad 40 \mathrm{~dB}(\mathrm{~A})$
Operating (Mainframe only): US/Asia Model: $63 \mathrm{~dB}(\mathrm{~A})$
Europe Model: $63 \mathrm{~dB}(\mathrm{~A})$
Operating (Full System): $\quad 68.5 \mathrm{~dB}(\mathrm{~A})$
NOTE: 1) The above measurements were made in accordance with ISO 7779.
2) Full System: Mainframe + ADF + 1-bin Sorter + Paper Tray Unit + Duplex Unit + Bridge Unit + Finisher

Dimensions (W x D x H): $550 \times 604 \times 709 \mathrm{~mm}(21.7 \mathrm{Cl} \times 23.8 \mathrm{Cl} \times 28.0$ ")
NOTE: Measurement Conditions

1) With the paper tray unit or LCT
2) Without the ADF

Weight:
Less than 55 kg (121.3lb)
Copying Speed (copies/minute):

| B022 | A4 sideways/ <br> $11^{\prime \prime} \times \mathbf{8 1 / 2 "}$ | A3/11" $\times$ 17"' |
| :---: | :---: | :---: |
| Non-memory copy mode | 22 | 13 |
| Memory copy mode | 22 | 13 |


| B027 | A4 sideways/ <br> $11^{\prime \prime} \times 81 / \mathbf{2 " ~}^{\prime}$ | $\mathbf{A 3 / 1 1 " ~} \times$ 17"' |
| :---: | :---: | :---: |
| Non-memory copy mode | 27 | 15 |
| Memory copy mode | 27 | 15 |

NOTE: Measurement Conditions

1) Not APS mode
2) A4/LT copying
3) Full size

Warm-up Time: Less than 10 seconds $\left(20^{\circ} \mathrm{C}, 68^{\circ} \mathrm{F}\right)$ from when the operation switch is turned on.
Less than 15 seconds $\left(20^{\circ} \mathrm{C}, 68^{\circ} \mathrm{F}\right)$ from when the main switch is turned on.
First Copy Time: Less than 4.9 s (A4), less than 5.0 s (LT)
NOTE: Measurement Conditions

1) When the polygonal mirror motor is spinning.
2) From the 1st paper tray
3) Not APS mode
4) Full size

Copy Number Input: Ten-key pad, 1 to 99 (count up or count down)
Manual Image Density: 7 steps

| Paper Tray Capacity: | ```Paper Tray: 500 sheets x 2 (Special paper in the 2nd paper tray:50 sheets) Paper Tray Unit (Option): 500 sheets x } LCT (Option): 1000 sheets x } By-pass Tray (Option): 100 sheets (A4, B5, A5, B6, 81/2" x 11", 51/2" x 81/2") 10 sheets (A3, B4, 11" x 17", 81/2" x 13") 1 sheets (non-standard sizes)``` |
| :---: | :---: |
| Toner Replenishment: | NOTE: Copy paper weight: $80 \mathrm{~g} / \mathrm{m}^{2}$ (20 lb) Cartridge exchange ( $360 \mathrm{~g} /$ cartridge) |
| Toner Yield: | 11 k copies (A4 sideways, $6 \%$ full black, 1 to 1 copying, ADS mode) |
| Copy Tray Capacity: | Copy Tray: 500 sheets (without 1-bin tray) 250 sheets (with 1-bin tray) |
| Memory Capacity: | Standard 32 MB, Optional memory either 32 MB or 64MB |

### 1.2 MACHINE CONFIGURATION

### 1.2.1 SYSTEM COMPONENTS



## MACHINE CONFIGURATION

| Version | Item | Machine Code | No. | Comments |
| :---: | :---: | :---: | :---: | :---: |
| Copier | Copier(B022) | B022 | 13 |  |
|  | Copier(B027) | B027 | 13 |  |
|  | ARDF (Optional) | B386 | 2 | * and new features added |
|  | Platen Cover (Optional) | B406 | 1 | Common with B039 |
|  | Paper Tray Unit-2 tray (Optional) | B390 | 8 | * |
|  | LCT (Optional) | B391 | 7 | * |
|  | 1-bin Tray (Optional) | B413 | 3 | * |
|  | Shift Tray (Optional) | B459 | 12 | * |
|  | Duplex Unit (Optional) | B414 | 5 | * |
|  | By-pass Tray (Optional) | B415 | 6 | * |
|  | Interchange Unit (Optional) | B416 | 4 | * |
|  | Bridge Unit (Optional) | B417 | 11 | * |
|  | 1000-sheet finisher (Optional) | B408 | 10 | New option |
|  | 500-sheet finisher (Optional) | B442 | 9 | The components are the same as the 500-finisher for G062 |
|  | User Account Enhance Unit (Optional) | B443 |  | Common with B003 |
|  | HDD (Optional) | B420 |  |  |
|  | Memory - 32 MB (Optional) | G578 |  | Common with B003 |
|  | Memory - 64 MB (Optional) | G579 |  | Common with B003 |
|  | Key Counter Bracket (Optional) | B452 |  | * |
| Fax | Fax Controller (Optional) | B418 |  |  |
|  | G3 Interface Unit (Optional) | B448 |  |  |
|  | ISDN (Optional) | B449 |  |  |
|  | Fax Function Expander (Optional) | A892 |  | Common with A265 |
|  | Handset (Optional) | B433 |  | Common with B039 |
| Printer / Scanner | Printer Unit (Optional) | B461 |  |  |
|  | Printer/Scanner Unit (Optional) | B453 |  |  |
|  | PS3 (Optional) | B462 |  |  |
|  | NIB (Optional) | G335 |  |  |
|  | IEEE1394 (Optional) | G590 |  | Common with B003 |

* Same as with the A265 with the exception of the color of the external covers.


### 1.2.2 INSTALLABLE OPTION TABLE

## Copier options

| No. | Option | B022/B027 | Note |
| :---: | :---: | :---: | :---: |
| 1 | ARDF (Optional) | $\bigcirc$ | Install either no. 1 or 2. |
| 2 | Platen Cover (Optional) | $\bigcirc$ | Install either no. 1 or 2. |
| 3 | Paper Tray Unit - two-tray (Optional) | $\bigcirc$ | Install either no. 3 or 4. |
| 4 | LCT (Optional) | $\bigcirc$ | Install either no. 3 or 4. |
| 5 | 1-bin Tray (Optional) | $\Delta$ | Requires no.9. |
| 6 | Shift Tray (Optional) | O | Install either no. 6 or 10. |
| 7 | Duplex Unit (Optional) | $\Delta$ | Requires no.9. |
| 8 | By-pass Tray (Optional) | $\bigcirc$ |  |
| 9 | Interchange Unit (Optional) | $\bigcirc$ |  |
| 10 | Bridge Unit (Optional) | $\Delta$ | No. 10 requires no. 11 or 12. <br> Install either no. 6 or 10. |
| 11 | 1000-sheet Finisher (Optional) | $\Delta$ | Install either no. 11 or 12 Requires no.10, and either no. 3 or 4 |
| 12 | 500-sheet Finisher (Option) | $\Delta$ | Install either no. 11 or 12 Requires no.10, and either no. 3 or 4 |
| 13 | Memory $32 \mathrm{MB} / 64 \mathrm{MB}$ (Optional) | $\bigcirc$ |  |
| 14 | Key Counter Bracket | $\bigcirc$ |  |

$\mathrm{O}=$ Available $\quad \Delta=$ Requires another option

## Fax option

All options for the fax unit are available when the fax unit has been installed.

## Printer/scanner options

1. The NIB and IEEE1394 cannot both be installed at the same time.
2. The printer/scanner option requires the NIB and 64MB memory options.
3. The printer option requires the 64 MB memory option.

### 1.3 PAPER PATH



1. Optional ADF
2. Optional 1-bin Tray
3. Optional Interchange Unit
4. Optional Duplex Unit
5. Optional By-pass Feed Tray
6. Optional Paper Tray Unit
7. Optional 1000-sheet Finisher
8. Optional Bridge Unit

MECHANICAL COMPONENT LAYOUT

### 1.4 MECHANICAL COMPONENT LAYOUT



1. 2nd scanner
2. Original width sensor
3. Exposure lamp
4. 1st scanner
5. Original length sensor
6. Lens
7. Scanner motor
8. SBU board
9. Exit roller
10. Fusing hot roller
11. Fusing pressure roller
12. Cleaning unit
13. OPC drum
14. Transfer roller
15. Development roller
16. ID sensor
17. Registration roller
18. Friction pad
19. Paper feed roller
20. Paper size sensor
21. Bottom plate
22. Tray heater
23. Polygon mirror motor
24. Laser unit
25. Toner supply bottle holder
26. Drum charge roller
27. Anti-condensation heater
28. Scanner home position sensor

### 1.5 ELECTRICAL COMPONENT DESCRIPTIONS

Refer to the electrical component layout on the reverse side of the point-to-point diagram for the location of the components.

| Symbol | Name | Function |
| :---: | :---: | :---: |
| Motors |  |  |
| M1 | Scanner | Drives the 1st and 2nd scanners. |
| M2 | Polygonal Mirror | Turns the polygonal mirror. |
| M3 | Main | Drives the main unit components. |
| M4 | Exhaust Fan | Removes heat from around the fusing unit. |
| M5 | Upper Paper Lift | Raises the bottom plate in the 1st paper tray. |
| M6 | Lower Paper Lift | Raises the bottom plate in the 2nd paper tray. |
| M7 | Toner Supply | Rotates the toner bottle to supply toner to the development unit. |
|  |  |  |
| Magnetic Clutches |  |  |
| MC1 | Upper Paper Feed | Starts paper feed from the 1st paper tray. |
| MC2 | Lower Paper Feed | Starts paper feed from the 2nd paper tray. |
| MC3 | Upper Relay | Drives the upper relay rollers. |
| MC4 | Lower Relay | Drives the lower relay rollers. |
| MC4 | Registration | Drives the registration rollers. |
| Switches |  |  |
| SW1 | Main | Provides power to the machine. If this is off, there is no power supplied to the machine. |
| SW2 | Right Upper Cover | Detects when the right upper cover is open. |
| SW3 | Right Cover | Cuts the +5 VLD and +24 V dc power line and detects when the right cover is open. |
| SW4 | Right Lower Cover | Detects when the right lower cover is open. |
| SW5 | Upper Paper Size | Determines what size of paper is in the upper paper tray. |
| SW6 | Lower Paper Size | Determines what size of paper is in the lower paper tray. |
| SW7 | New PCU Detect | Detects when a new PCU is installed. |
| SW8 | Front Cover Safety | Cuts the +5 VLD and +24 V dc power line and detects when the front cover is open. |
| SW9 | Operation | Provides power for machine operation. The machine still has power if this switch is off. |
|  |  |  |
| Sensors |  |  |
| S1 | Scanner HP | Informs the CPU when the 1st and 2nd scanners are at home position. |
| S2 | Platen Cover | Informs the CPU that the platen cover is in the up or down position (related to the APS/ARE functions). |
| S3 | Original Width | Detects original width. This is one of the APS (Auto Paper Select) sensors. |
| S4 | Original Length 1 | Detects original length. This is one of the APS (Auto Paper Select) sensors. |

## ELECTRICAL COMPONENT DESCRIPTIONS

| Symbol | Name | Function |
| :---: | :---: | :---: |
| S5 | Original Length 2 | Detects original length. This is one of the APS (Auto Paper Select) sensors. |
| S6 | Toner Density (TD) | Detects the amount of toner inside the development unit. |
| S7 | 1st Paper End | Informs the CPU when the 1st paper tray runs out of paper. |
| S8 | 2nd Paper End | Informs the CPU when the 2nd paper tray runs out of paper. |
| S9 | Image Density (ID) | Detects the density of various patterns and the reflectivity of the drum for process control. |
| S10 | Paper Overflow | Detects paper overflow in the built-in copy tray. |
| S11 | Paper Exit | Detects misfeeds. |
| S12 | Upper Relay | Detects misfeeds. |
| S13 | Lower Relay | Detects misfeeds. |
| S14 | Registration | Detects misfeeds and controls registration clutch offon timing. |
| S15 | 1st Paper Lift | Detects when the paper in the 1st paper tray is at the feed height. |
| S16 | 2nd Paper Lift | Detects when the paper in the 2nd paper tray is at the feed height. |
| S17 | 1st Paper Height - 1 | Detects the amount of paper in the 1st paper tray. |
| S18 | 1st Paper Height - 2 | Detects the amount of paper in the 1st paper tray. |
| S19 | 2nd Paper Height - 1 | Detects the amount of paper in the 2nd paper tray. |
| S20 | 2nd Paper Height - 2 | Detects the amount of paper in the 2nd paper tray. |
| PCBs |  |  |
| PCB1 | Controller | Controls all applications both directly and through other control boards. |
| PCB2 | PSU (Power Supply Unit) | Provides dc power to the system and ac power to the fusing lamp and heaters. |
| PCB3 | SBCU (Scanner \& Base Engine Control Unit) | Controls the fusing lamp and the mechanical parts of the machine. |
| PCB4 | SBU (Sensor Board Unit) | Contains the CCD, and outputs a video signal to the BICU board. |
| PCB5 | Lamp Stabilizer | Stabilizes the power to the exposure lamp. |
| PCB6 | LDD (Laser Diode Driver) | Controls the laser diode. |
| PCB7 | Operation Panel | Controls the operation panel. |
| PCB8 | High Voltage Supply | Supplies high voltage to the drum charge roller, development roller, and transfer roller. |
| PCB9 | Memory (Option) | Expands the memory capacity for the copier, printer, and scanner features. |
| PCB10 | IPU (Image Processing Unit) | Performs the image processing functions. |
|  |  |  |
| Solenoids |  |  |
| SOL1 | Fusing Drive Release | Releases the drive for the fusing unit. |
|  |  |  |
| Lamps |  |  |
| L1 | Exposure Lamp | Applies high intensity light to the original for exposure. |


| Symbol | Name | Function |
| :---: | :--- | :--- |
| L2 | Main Fusing Lamp | Heats the center of the hot roller. |
| L3 | Secondary Fusing Lamp | Heats both ends of the hot roller. |
| L4 | Quenching Lamp | Neutralizes any charge remaining on the drum <br> surface after cleaning. |
|  |  |  |
| Heaters |  | Turns on when the main power switch is off to <br> prevent moisture from forming on the optics. |
| H1 | Anti-condensation <br> (Option) | Turns on when the main power switch is off to <br> prevent moisture from forming around the paper <br> trays. |
| H2 | Tray (Option) |  |
| Others |  |  |
| TS1 | Fusing Thermostats | Opens the fusing lamp circuit if the fusing unit <br> overheats. |
| TH1 | Fusing Thermistors | Detects the temperature of the hot roller. |
| LSD 1 | Laser Synchronization <br> Detector | Detects the laser beam at the start of the main scan. |
| CO1 | Mechanical Counter | Keeps track of the total number of prints made. |
| CO2 | Key Counter (Option) | Used for control of authorized use. If this feature is <br> enabled for copying, copying will be impossible until <br> it is installed. |
|  |  |  |

### 1.6 DRIVE LAYOUT



1. Scanner Drive Motor
2. Main Motor
3. Registration Clutch
4. Upper Paper Feed Clutch
5. Upper Transport Clutch
6. Lower Paper Feed Clutch
7. Lower Transport Clutch

### 1.7 COPY PROCESS

### 1.7.1 OVERVIEW



## 1. EXPOSURE

A xenon lamp exposes the original. Light reflected from the original passes to the CCD, where it is converted into an analog data signal. This data is converted to a digital signal, processed and stored in the memory. At the time of printing, the data is retrieved and sent to the laser diode. For multi-copy runs, the original is scanned once only and stored to the memory.
2. DRUM CHARGE

In the dark, the charge roller 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.

## 3. LASER EXPOSURE

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

## 4. DEVELOPMENT

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

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

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

## 7. PAPER SEPARATION

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

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

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

### 1.8 BOARD STRUCTURE

### 1.8.1 OVERVIEW



This machine uses the GW (Grand Workware) architecture, which allows the copier to be expanded as an MFP by installing simple modular components (ROM DIMMs) on the controller board.

1. Controller (Main Board)

Controls the memory and all peripheral devices.
2. SBCU (Scanner \& Base Engine Control Unit)

This is the scanner and engine control board. It controls the following functions:

- Engine sequence
- Timing control for peripherals
- Operation control
- Drive control for the sensors, motors, and solenoids of the printer and scanner
- High voltage supply board control
- Serial interfaces with peripherals
- Fusing control


## 3. IPU (Image Processing Board)

This is the scanned image processing board. It controls the following functions.

- Image processing control
- Video control

4. SBU (Sensor Board Unit)

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

### 1.8.2 CONTROLLER



The controller employs GW (Grand Workware) architecture, which 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 requires the FCU and NCU installation.

The following systems and application software can be downloaded from the controller's IC Card slot.

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

For details about how to download software from an IC card, see "Software Download" in 4.3. Program Download.

1. CPU. QED RM5231. Clock frequency: 200 MHz .
2. SIMAC ASIC. This is 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. This is a 32 MB RAM chip, expandable with a 32 MB or 64 MB SDRAM.
4. System Flash ROM. 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. The 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. The NVRAM also has an RTC (Real Time Clock) for time management.
NOTE: Optional NVRAM, which can store up to 400 user accounts, can be installed on the controller.
7. HDD. A 2.5" HDD (more than 6 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 | 500MB | Downloaded fonts, forms. | Remains |  |
| File System 2 | 200MB | Job spooling area. | Erased |  |
| File System 3 | 1500MB | Work data area | Remains | Used for document server application. |
| Image TMP | 900MB | Collation, sample print, locked print. | Erased | Commonly used area for applications. Stores copy, printer, fax, and scanner data. Storage capacity: About 9000 pages (3,000 files) |
| Image LS** | 1640MB | Document server, local storage archive | Remains |  |
| Image Area Management | 20MB | Stores image area information | Remains |  |
| Job Log | 10MB | Job log. | Remains |  |
| Total | 4.8GB |  | Remains |  |

${ }^{1}$ When an application uses an image page, first it uses the Image LS area. If this area is in use and not available, then it uses the Image TMP area.

## DETAILED SECTION DESCRIPTIONS

## 2. DETAILED SECTION DESCRIPTIONS

### 2.1 SCANNING



The original is illuminated by the exposure lamp (a xenon lamp in this model) [A]. The image is reflected onto a CCD (charge coupled device) [B] via the 1st, 2nd, 3rd mirrors, and lens [C].
The 1st scanner [D] consists of the exposure lamp, a reflector [E], and the 1st mirror [F].
A lamp stabilizer energizes the exposure lamp. The light reflected by the reflector is of almost equal intensity, to reduce shadows on pasted originals.
An optics anti-condensation heater [G] is available as an option. It can be installed on the left side of the scanner. It turns on whenever the power cord is plugged in.

### 2.1.2 SCANNER DRIVE



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

## - Book mode -

The scanner drive board controls and operates the scanner drive motor. In full size mode, the 1st scanner speed is $150 \mathrm{~mm} / \mathrm{s}$ during scanning. The 2nd scanner speed is half that of the 1 st scanner.

In reduction or enlargement mode, the scanning speed depends on the magnification ratio. The returning speed is always the same, whether in full size or magnification mode. The image length change in the sub scan direction is done by changing the scanner drive motor speed, and in the main scan direction it is done by image processing on the IPU board.
Magnification in the sub-scan direction can be adjusted by changing the scanner drive motor speed using SP4009. Magnification in the main scan direction can be adjusted using SP4008.

## - ADF mode -

The scanners are always kept at their home position (the scanner H.P sensor [H] 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 IPU board, like for book mode.

Magnification in the sub-scan direction can be adjusted by changing the ADF motor speed using SP6006. In the main scan direction, it can be adjusted with SP4008, like for book mode.

### 2.1.3 ORIGINAL SIZE DETECTION IN PLATEN MODE



In the optics cavity for original size detection, there are four reflective sensors in the 115 V machines ( $[\mathrm{A}]$ and $[B]$ ), and six reflective sensors in the 230 V machines. The original width sensors $[\mathrm{A}]$ detect the original width, and the original length sensors $[B]$ and $[C]$ detect the original length. These are the APS (Auto Paper Select) sensors. Each APS sensor is a reflective photosensor.
While the main switch 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 [D] is activated. This is when the platen is positioned about 15 cm above the exposure glass, for example while it is being closed. The CPU can recognize the original size from the combination of on/off signals from the APS sensors.

If the copy is made with the platen fully open, the CPU decides the original size from the sensor outputs when the Start key is pressed.


| Original Size |  | Length Sensor |  |  |  |  | Width Sensor |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A4/A3 <br> version | LT/DLT <br> version | L4 | L3 | L2 | L1 | W2 | W1 |  |
| A3 | $111^{\prime \prime} \times 17^{\prime \prime}$ | O | O | O | O | O | O |  |
| B4 | $10^{\prime \prime} \times 14^{\prime \prime}$ | O | O | O | O | O | X |  |
| Foolscap | $8.5^{\prime \prime} \times 13^{\prime \prime}$ | O | O | O | X | X | X |  |
| A4-L | $8.5^{\prime \prime} \times 11^{\prime \prime}$ | O | O | X | X | X | X |  |
| B5-L |  | O | X | X | X | X | X |  |
| A4-S | $11^{\prime \prime} \times 8.5^{\prime \prime}$ | X | X | X | X | O | O |  |
| B5-S |  | X | X | X | X | O | X |  |
| A5-L, A5-S |  | X | X | X | X | X | X |  |

NOTE: 1) L: Lengthwise, S: Sideways, O: High (paper present), X: Low
2) The length sensors L3 and L4 are used only for 230 V machines.

For other combinations, "CANNOT DETECT ORIG. SIZE" will be indicated on the operation panel display (if SP 4-303 is kept at the default setting).
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 feeder is used, note that the machine assumes that the copy paper is lengthwise. For example, if A4 sideways paper is placed on the bypass tray, the machine assumes it is A3 paper and scans the full A3 area for the first copy of each page of the original, disregarding the original size sensors. However, for each page, the data signal to the laser diode is stopped to match the copy paper length detected by the registration sensor.
Original size detection using the ADF is described in the manual for the ADF.

### 2.2 IMAGE PROCESSING

### 2.2.1 OVERVIEW



The CCD generates an analog video signal. The SBU (Sensor Board Unit) converts the analog signal to an 8-bit digital signal, then it sends the digital signal to the IPU (Image Processing Unit) board.
The IPU board performs the image processing, such as auto shading, filtering, magnification, gradation processing.
The SIMAC on the controller board performs the image editing, such as image repeat, double copy.

Finally, the IPU board sends the video data to the LD drive board.

### 2.2.2 SBU (SENSOR BOARD UNIT)



The CCD converts the light reflected from the original into an analog signal. The CCD line has 7,450 pixels and the resolution is $600 \mathrm{dpi}(23.6$ lines $/ \mathrm{mm}$ ).
The CCD has two output lines, for odd and even pixels, to the analog processing IC. The analog processing IC performs the following operations on the signals from the CCD:

1. Z/C (Zero Clamp):

Adjusts the black level reference for even pixels to match the odd pixels.
2. Signal Amplification:

The analog signal is amplified by operational amplifiers in the AGC circuit.
3. Auto Gain Control

Adjusts the gain curve for the scanned image density.

After the above processing, the analog signals are converted to 8 -bit signals by the A/D converter. This will give a value for each pixel on a scale of 256 grades. Then, the digitized image data goes to the IPU board.

### 2.2.3 AUTO IMAGE DENSITY



ADS prevents the background of an original from appearing on copies.
The copier scans the auto image density detection area $[\mathrm{A}]$ as shown in the diagram. This corresponds to a few mm at one end of the main scan line. As the scanner scans down the page, the SBU detects the peak white level for each scan line. The IPU performs the ADS function in accordance with the peak white level.
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.

### 2.2.4 IPU (IMAGE PROCESSING UNIT)

## Overview



The image data from the SBU goes to the IPU (Image Processing Unit) ICs on the SBCU board, which carry out the following processes on the image data.
IPU-A

- Auto shading
- Pre-filtering
- Magnification
- Test pattern generation

IPU-B

- Filtering (MTF and smoothing)
- ID gamma correction
- Grayscale processing
- Binary picture processing
- Error diffusion
- Dithering


## Video Controller

- Video path control

The image data then goes to the LD driver (LDD).

## 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 option 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 $\omega /$ /rwas , 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. (- p.2-11 Text Mode) |
| Text/Photo | Good reproduction of mixed text and photographs with accurate <br> grayscaling, better than that achieved in the Text mode. ( p.2-13 <br> Text/Photo Mode) |
| Photo | Best possible reproduction of photographs. (p.2-12 Photo Mode) |
| Pale | Reproduction similar to text mode, but of lower contrast. Ideal for <br> copying thin originals. (p.2-14 Pale Mode) |
| Generation <br> Copy | Attempts to achieve the best reproduction of copied originals that <br> are faded because they are copies of copies. ( p.2-15 Generation <br> Copy) |

In addition, there are two main image processing modes: grayscale processing and binary picture processing. When the optional hard disk has not been installed, the machine uses binary picture processing. However, when the optional hard disk has been installed, the machine uses grayscale processing. The user or technician cannot select the mode.

IMAGE PROCESSING

## Image Processing Path

## Overview

This diagram shows the various stages of the image process and where they are done.


## SP Modes for Each Image Processing Step

The following tables show which settings and SP modes are used for each image processing step.

## Text Mode

|  |  | Text Mode |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Soft | Normal | Sharp | Custom Setting |
| ADS (SBU) |  | As selected at the operation panel |  |  |  |
| Shading | $\sim 34 \%$ | Enabled |  |  |  |
| Correction | 35\%~ |  |  |  |  |
| Small | $\sim 34 \%$ | Three-line filter |  |  |  |
| Smoothing Filter | 35\%~ | One-line filter |  |  |  |
| Main Scan | $\sim 34 \%$ | Enabled |  |  |  |
| Magnification | 35\%~ |  |  |  |  |
| Mirroring | $\sim 34 \%$ | Enabled only in the ADF mode |  |  |  |
|  | 35\%~ |  |  |  |  |
| Characteristic Detection | $\sim 34 \%$ | None |  |  |  |
|  | 35\%~ | Weak | Middle | Strong | 4-903-2 ~ 4 |
| MTF/Smoothing Filter | ~34\% | MTF (Weak) | MTF <br> (Medium) | MTF (Strong) | 4-903-1 |
|  | 35\%~ | Character (Weak) | Character (Medium) | Character (Strong) | 4-903-2 ~ 4 |
| Independent Dot Erase | $\sim 34 \%$ | None |  |  | 4-904-1 |
|  | 35\%~ |  | None |  |  |
| Background Erase | $\sim 34 \%$ | None |  |  | 4-904-6 |
|  | 35\% ~ |  | None |  |  |
| $\gamma$ Correction | $\sim 34 \%$ | Text |  |  | 4-904-11 |
|  | 35\% ~ | Character (Text) |  |  |  |
| Gradation | ~34\% | Normal error diffusion |  | Binary picture processing | 4-903-1 |
|  | 35\%~ | Character error diffusion |  | Binary picture processing | 4-903-2 ~ 4 |
| Line Width Correction | $\sim 34 \%$ | 2-907-1 |  |  |  |
|  | 35\%~ |  |  |  |  |  |

## Photo Mode

|  |  | Photo Mode |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Coarse Print | Print Photo | Glossy Photo | Custom Setting |
| ADS (SBU) |  | As selected at the operation panel |  |  |  |
| Shading | $\sim 34 \%$ | Enabled |  |  |  |
| Correction | 35\%~ |  |  |  |  |
| Small | $\sim 34 \%$ | Three-line filter |  |  |  |
| Smoothing Filter | 35\%~ | One-line filter |  |  |  |
| Main Scan | $\sim 34 \%$ | Enabled |  |  |  |
| Magnification | 35\%~ |  |  |  |  |
| Mirroring | $\sim 34 \%$ | Enabled only in the ADF mode |  |  |  |
|  | 35\%~ |  |  |  |  |
| Characteristic Detection | ~34\% | None |  |  |  |
|  | 35\%~ | None |  |  | 4-903-6 ~ 8 |
| MTF/Smoothing Filter | $\sim 34 \%$ | Character | Smoothing |  | 4-903-5 |
|  | 35\%~ | Smoothing |  | Character | 4-903-6 ~ 8 |
| Independent Dot Erase | $\sim 34 \%$ | None |  |  | 4-904-2 |
|  | 35\%~ | None |  |  |  |
| Background Erase | $\sim 34 \%$ | None |  |  | 4-904-7 |
|  | 35\%~ |  | None |  |  |
| $\gamma$ Correction | $\sim 34 \%$ | $\begin{gathered} \hline \text { Dither } \\ (16 \times 16) \\ \hline \end{gathered}$ | Dither (8x8) |  | 4-904-12 |
|  | 35\%~ |  |  | (Character) |  |
| Gradation | $\sim 34 \%$ | $\begin{aligned} & \text { Dither } \\ & (16 \times 16) \end{aligned}$ | Dither (8x8) | Normal error diffusion | 4-903-5 |
|  | 35\%~ |  |  | Character error diffusion | 4-903-6 ~ 8 |
| Line Width Correction | $\sim 34 \%$ | 2-907-2 |  |  |  |
|  | 35\%~ |  |  |  |  |  |  |

## Text/Photo Mode

|  |  | Text/Photo Mode |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Photo Priority | Normal | Text Priority | Custom Setting |
| ADS (SBU) |  | As selected at the operation panel |  |  |  |
| Shading | $\sim 34 \%$ | Enabled |  |  |  |
| Correction | 35\%~ |  |  |  |  |
| Small | $\sim 34 \%$ | Three-line filter |  |  |  |
| Smoothing Filter | 35\%~ | One-line filter |  |  |  |
| Main Scan | ~34\% | Enabled |  |  |  |
| Magnification | 35\%~ |  |  |  |  |
| Mirroring | $\sim 34 \%$ | Enabled only in the ADF mode |  |  |  |
|  | 35\%~ |  |  |  |  |
| Characteristic Detection | $\sim 34 \%$ | None |  |  |  |
|  | 35\%~ | Strong | Middle | Weak | $\begin{gathered} 4-903-10 \sim \\ 12 \end{gathered}$ |
| MTF/Smoothing Filter | ~34\% | MTF (Weak) | MTF (Medium) | MTF (Strong) | 4-903-9 |
|  | 35\%~ | Character (Weak) | Character (Medium) | Character (Strong) | $\begin{gathered} 4-903-10 \sim \\ 12 \end{gathered}$ |
| Independent Dot | ~34\% | None |  |  | 4-904-3 |
| Erase | 35\%~ | None |  |  |  |
| Background Erase | $\sim 34 \%$ | None |  |  | 4-904-8 |
|  | 35\%~ |  | None |  |  |
| $\gamma$ Correction | $\sim 34 \%$ | Text/Photo |  |  | 4-904-13 |
|  | 35\%~ | Character (Text/Photo) |  |  |  |
| Gradation | $\sim 34 \%$ | Normal error diffusion |  |  |  |
|  | 35\%~ | Character error diffusion |  |  |  |
| Line Width Correction | $\sim 34 \%$ | 2-907-3 |  |  |  |
|  | 35\%~ |  |  |  |  |  |

## Pale Mode



Generation Copy

|  |  | Generation Copy Mode |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Photo Priority | Normal | Text Priority | Custom Setting |
| ADS (SBU) |  | As selected at the operation panel |  |  |  |
| Shading | $\sim 34 \%$ | Enabled |  |  |  |
| Correction | 35\%~ |  |  |  |  |
| Small | $\sim 34 \%$ | Three-line filter |  |  |  |
| Smoothing Filter | 35\%~ | One-line filter |  |  |  |
| Main Scan | $\sim 34 \%$ | Enabled |  |  |  |
| Magnification | 35\%~ |  |  |  |  |
| Mirroring | $\sim 34 \%$ | Enabled only in the ADF mode |  |  |  |
|  | 35\%~ |  |  |  |  |
| Characteristic Detection | $\sim 34 \%$ | None |  |  |  |
|  | 35\%~ | Weak | Middle | Strong | $\begin{gathered} 4-903-18 ~ \\ 20 \end{gathered}$ |
| MTF/Smoothing Filter | ~34\% | MTF (Weak) | MTF (Medium) | MTF (Strong) | 4-903-17 |
|  | 35\%~ | Character (Weak) | Character (Medium) | Character (Strong) | $\begin{gathered} 4-903-18 ~ \\ 20 \end{gathered}$ |
| Independent Dot | $\sim 34 \%$ | Weak |  |  | 4-904-5 |
| Erase | 35\%~ | Weak |  |  |  |
| Background Erase | $\sim 34 \%$ | Weak |  |  | 4-904-10 |
|  | 35\%~ | Weak |  |  |  |
| $\gamma$ Correction | $\sim 34 \%$ | Generation copy |  |  | 4-904-15 |
|  | 35\%~ | Character (Generation copy) |  |  |  |
| Gradation | $\sim 34 \%$ | Normal error diffusion |  |  |  |
|  | 35\%~ | Character error diffusion |  |  |  |
| Line Width Correction | $\sim 34 \%$ | 2-907-5 |  |  |  |
|  | 35\%~ |  |  |  |  |  |

## Auto Shading

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.


## Pre-Filtering

Pre-filter smoothes mainly parallel lines in the main scan direction and extended lines in the sub-scan direction. This reduces moiré and spurious noise in images.

## Main Scan Magnification/Reduction

Changing the scanner speed enables reduction and enlargement in the sub-scan direction. However, the IPU-A chip handles reduction and enlargement in the main scan direction. The processing for main scan magnification/reduction is the same as in the previous digital machines.

## Mirroring for ADF Mode



- ADF Mode -


When making a copy using the ADF, the magnification circuit creates a mirror image. This is because the scanning starting position in the main scan direction is at the other end of the scan line in ADF mode (compared with platen mode). In platen mode, the original is placed face down on the exposure glass, and the corner at $[A]$ is at the start of the main scan. The scanner moves down the page. In ADF mode, the ADF feeds the leading edge of the original to the DF exposure glass, and the opposite top corner of the original is at the main scan start position.
To create the mirror image, the IPU-A stores each line in a LIFO (Last In First Out) memory.

## Characteristic Detection

This function uses software filters to detect edge areas, non-edge areas, and areas of shaded dot patterns.
The result determines the image processing that will be applied to each pixel.

## Filtering

## Overview

There are some software filters for enhancing the desired image qualities of the selected original mode. These filters are the MTF filter, the smoothing filter, characteristic filter, and independent dot erase.
Depending on the original mode and the reproduction ratio, the machine will use either MTF/smoothing, or the filter determined by characteristic detection.
If MTF/smoothing is used, it is applied to all areas of the original, regardless of whether they are edge areas, non-edge areas, or independent dots.

- The MTF filter emphasizes sharpness and is used in all original types except Photo mode.
- The smoothing filter is used in Photo mode.

If the characteristic filter is used, the filter for each pixel depends on the image data type that was detected by characteristic detection.

## MTF Filter

An MTF filter is used for all original types except Photo mode.
When the reproduction ratio is less than $35 \%$, this filter is applied to all image data pixels, regardless of whether they are in an edge area or non-edge area.
When the reproduction ratio is $35 \%$ or more, the type of MTF filter used for each pixel depends on the results of characteristic detection.

## Smoothing Filter

A smoothing filter is used in Photo mode instead of MTF. It is applied to all image data pixels, regardless of whether they are in an edge area or non-edge area.
With some combinations of reproduction ratio and image mode, the type of smoothing used for each pixel depends on the results of characteristic detection (see the Photo mode table in SP Modes for Each Processing Step).

## Characteristic Filter

A characteristic filter is applied instead of MTF, smoothing, and ID gamma correction with some combinations of original type and reproduction ratio. See the 'SP Modes for Each Processing Step' section.
For example, In text mode, for the 'Normal' original type, if the reproduction ratio is less than $35 \%$, MTF (medium) is used for all pixels in the image. However, if the reproduction ratio is $35 \%$ or more, the 'medium' characteristic filter is used, and the processing depends on whether the pixel was in an edge area, a non-edge area, or in an area shaded using a dot pattern.

Each characteristic filter consists of a combination of the following features: MTF, smoothing, error diffusion, dithering, ID gamma correction. For each of these features, the machine chooses from two types when making up a characteristic filter.

## Independent Dot Erase

Independent dot erase removes unwanted dots from the image.
Independent dot erase is enabled only for Generation Copy mode (according to the default settings). However, for the "Custom Setting" original modes, independent dot detection can be enabled and adjusted with SP4-904-2~4. With a larger SP setting, more dots are detected as independent dots and erased, even if the dot density is high. However, dots in mesh-like images may be mistakenly detected as independent dots.

## Background Erase

By default, this process is disabled in all original modes. However, it can be enabled 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 with this function.

The threshold level for erasing can be changed with SP4-904-6~10.

## ID Gamma ( $\gamma$ ) Correction

The machine automatically selects the most appropriate ID gamma correction based on the selected original type.
Also, for certain combinations of reproduction ratio and original type, characteristic detection is used. In this case, the machine can use one of two gamma correction tables. The one that is used is decided separately for each pixel, and depends on the results of characteristic detection.

## Gradation Processing

## Overview

There are four types of gradation processing:

- Grayscale processing: This has 4 output levels for each pixel.
- Binary picture processing: This has only two output levels (black and white).
- Error diffusion: There are two error diffusion processing types (normal and characteristic detection)
- Dithering: There are two dithering processing types (normal and characteristic detection).


## Grayscale Processing

In this machine, the 8-bit image data is converted into 2-bit data. This produces up to 4 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 done by the laser diode drive board (LDD). Briefly, the width of the laser pulse for a pixel depends on the output level (image density level: from 0 to 255) required for the pixel.

Note that although the LDD can create 256 levels per pixel, the machine only uses 8 of these, and only four are used for any one job. A gamma table determines which four output levels are used. The gamma table is different for each original type setting.

## Binary Picture Processing

The 8-bit image data is converted into 1-bit data (black and white image data).

## Error Diffusion

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 compared with an error diffusion matrix.

There are two types of error diffusion processing: One is 'normal'. The other is part of the characteristic detection process, in which the error diffusion method is determined separately for each pixel. The error diffusion type (normal or characteristic) depends on the reproduction ratio and the original type (refer to the SP Modes for Each Image Processing Step tables).

## Dithering

Each pixel is compared with the pixel in the same position in a dither matrix. Several matrixes are available, to increase or decrease the detail on the copy.

## Line width correction

This function is effective in all original modes.
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.

Line width correction is done in the VCU chip on the LDD board.
The line width correction type can be selected with SP2-907.

### 2.2.5 VIDEO CONTROL UNIT (VCU)

## Fine Character and Image (FCI)

The FCI circuit performs image smoothing.


Fig. B


Fig. C


Usually, binary picture processing generates jagged edges on characters, as shown in the above illustration. These are reduced using edge smoothing. The FCI changes the laser pulse duration and position for certain pixels.
Fig. A shows the four possible pulse durations, and Fig. B shows how the laser pulse can be in one of three positions within the pixel. Fig. C shows an example of how edge smoothing is used.

This function only affects the received image for fax mode and for printer mode, even if copy mode is also using binary picture processing.

### 2.3 LASER EXPOSURE

### 2.3.1 OVERVIEW



The optical path from the laser diode to the drum is shown above.
The LD unit $[A]$ outputs a laser beam to the polygon mirror $[B]$ through the cylindrical lens [C]. The shield glass [D] prevents dust from reaching the polygon mirror.

Each surface of the polygon mirror reflects one full main scan line. The laser beam goes to the F-theta mirror [E], mirror [F], and BTL (barrel toroidal lens) [G]. Then the laser beam goes to the drum through the toner shield glass [H].
The laser synchronizing detector [l] determines the main scan starting position.
The speed of the polygon mirror motor is $28,818.9 \mathrm{rpm}$ for 600 dpi .

### 2.3.2 AUTO POWER CONTROL (APC)



The LD driver IC drives the laser diode. To prevent the intensity of the laser beam from changing because of the temperature, the machine monitors the current passing through the laser diode (LD). The machine adjusts the current to the laser diode by comparing it with the reference level from the reference circuit.
This auto power control is done just after the machine is turned on and during printing while the laser diode is active.
The laser diode power is adjusted on the production line.
NOTE: Do not touch the variable resistors on the LD unit in the field.

### 2.3.3 LD SAFETY SWITCH

Front Cover Safety and
Right Cover Switches


To ensure technician and user safety and to prevent the laser beam from inadvertently switching on during servicing, safety switches are located at the front and right covers. The switches are installed on the +5 VLD line coming from the power supply unit through the SBCU and IPU boards.

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

### 2.4 PHOTOCONDUCTOR UNIT (PCU)

### 2.4.1 OVERVIEW



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

1. Cleaning Blade
2. Development Roller
3. Toner Collection Coil
4. Development Unit
5. Pick-off Pawl
6. Charge Roller
7. OPC Drum
8. ID Sensor (see note)
9. Charge Roller Cleaning Roller
10. Quenching Lamp (see note)

NOTE: These parts are not included in the PCU.
The machine informs the user when the PCU life has finished. However, the user can continue to make copies.
SP5-912 can be used to enable or disable this warning message, and to change the default replacement interval (the default is 60 k ).

### 2.4.2 DRIVE



The main motor $[A]$ drives the drum $[B]$ through a series of gears, a timing belt [C], and the drum drive shaft [D]. The main motor assembly includes a drive controller, which outputs a motor lock signal when the rotation speed is out of the specified range.
The fly-wheel [ $E$ ] on the end of the drum drive shaft stabilizes the rotation speed (this prevents banding and jitter from appearing on copies).

### 2.4.3 NEW PCU DETECTION



The new PCU detect switch [A] detects when a new PCU is installed. Each PCU has an actuator [B]. When a new PCU is installed in the machine, the actuator [B] pushes the new PCU detect switch. The actuator is a sector gear, and this gear engages with the drum gear [C]. When the drum rotates, the actuator is released from the drum gear. The actuator drops away from the new PCU detect switch and remains in this "down" position for the duration of the PCU's life.
The machine recognizes when a new PCU has been installed in the machine because the actuator of the new PCU contacts the new PCU detect switch. After the front cover and right cover are closed, the machine then performs the TD sensor initial setting procedure automatically (for about 45 seconds). During this time, the drum rotates and the actuator drops away from the sensor.

Also, while the machine performs the TD sensor initial setting, the machine makes a ID sensor pattern on the drum. This checks whether the developer has fallen into the development unit (in other words, it checks whether the technician remembered to remove the developer seal from the PCU at machine installation). If the machine does not detect the ID sensor pattern, SC 392 will be generated.

### 2.5 DRUM CHARGE

### 2.5.1 OVERVIEW



This copier uses a drum charge roller to charge the drum. The drum charge roller $[\mathrm{A}]$ always contacts the surface of the drum $[\mathrm{B}]$ to give it a negative charge of -900V.

The high voltage supply board gives a negative dc voltage to the drum charge roller through the spring [C] and terminal plate [D].

### 2.5.1 CHARGE ROLLER VOLTAGE CORRECTION

## Correction for Environmental Conditions



With a drum charge roller system, the voltage transferred from roller to drum varies with the temperature and humidity around the drum charge roller. The lower the temperature or humidity is, the higher the applied voltage required.
To compensate, the machine uses the ID sensor to measure the effects of current environmental conditions. For this measurement, the process control parameters are balanced so that any small change in drum potential caused by environmental effects is reflected in a change in the amount of toner transferred to the drum.

This measurement is made immediately after the ID sensor pattern for toner density control. Immediately after making ID sensor pattern [A], the charge roller voltage stays on, but the development bias goes up to -650 V ; as a result the drum potential is reduced to -750 V . The laser diode is not switched on, and 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 this pattern [B], and the output voltage is known as Vsdp. This voltage is compared with Vsg (read from the bare drum at the same time).

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

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

- Vsdp / Vsg > $0.95=$ Reduce the magnitude of the drum charge voltage by 50 V
- Vsdp / Vsg $<0.90=$ Increase the magnitude of the drum charge voltage by 50 V


### 2.5.2 ID SENSOR PATTERN PRODUCTION TIMING

The ID sensor pattern is made in the following conditions:

- During warming up at power on
- If the machine starts warming up after a certain time (default: 30 minutes) has passed since entering night mode or low power mode The 30-minute interval can be changed using SP2995-1.
- At the end of a job, if an ID sensor pattern has not been made for a certain number of sheets (default: 0 sheets = disabled) The number of sheets can be changed using SP2995-2.


### 2.5.3 DRUM CHARGE ROLLER CLEANING



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

### 2.6 DEVELOPMENT

### 2.6.1 OVERVIEW



The development unit consists of the following parts.

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

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

## DEVELOPMENT

### 2.6.2 DRIVE



The main motor [A] drives the development roller [B] and mixing augers [C] through a train of gears and the development drive shaft [D]. When the PCU is pushed in, the development drive shaft engages the development roller gear.
The development drive gears (except for the gears in the development unit) are helical gears. These gears are quieter than normal gears.

### 2.6.3 DEVELOPER MIXING



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

## DEVELOPMENT

### 2.6.4 DEVELOPMENT BIAS



This machine uses a negative-positive development system, in which black areas of the latent image are at a low negative charge (about $-150 \pm 50 \mathrm{~V}$ ) and white areas are at a high negative charge (about -950 V).
To attract negatively charged toner to the black areas of the latent image on the drum, the high voltage supply board applies a bias of -650 volts to the development rollers throughout the image development process. The bias is applied to the development roller shaft [ $A$ ] through the drive shaft $[B]$.
The development bias voltage (-650 V) can be adjusted with SP2-201-1.

### 2.6.5 TONER SUPPLY

## Toner bottle replenishment mechanism



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

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

When the bottle holder unit is pulled out to add a new toner bottle, the following happens automatically to prevent toner from scattering.

- The chuck releases the toner bottle cap into its proper position.
- The toner shutter shuts to block the opening as a result of pressure from a spring.


## DEVELOPMENT

## Toner supply mechanism



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

### 2.6.6 TONER DENSITY CONTROL

## Overview

There are four modes for controlling toner supply as shown in the following tables. The mode can be changed with by SP2-921. The factory setting is sensor control 1 mode.

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


## DEVELOPMENT

There are four toner density control modes as follows.

| Mode | Sensor control 1 (SP2-921, "0"): Normally use this setting only |
| :--- | :--- |
| Toner supply decision | Compare Vt with a reference voltage (Vts or Vref) |
| Toner control process | Toner is supplied to the development unit when Vt is higher <br> than the reference voltage (Vts or Vref). This mode keeps the <br> Vref value for use the next toner density control. |
|  | Vts is used for the first toner density control after a new PCU <br> has been installed, until it has been corrected with the ID <br> sensor output. <br> Vref is used after Vts has been corrected with the ID sensor <br> output voltage (corrected during the first toner density control <br> for a new PCU). |
| Toner supply amount | Varies |
| Toner end detection | Performed |


| Mode | Sensor control 2 (SP2-921, "1"): For designer's use only; do <br> not use in the field |
| :--- | :--- |
| Toner supply decision | Compare Vt with a reference voltage (Vts) |
| Toner control process | This toner control process is the same as sensor control 1 <br> mode. However, the reference voltage used is always Vts. |
| Toner supply amount | Varies |
| Toner end detection | Performed |


| Mode | Fixed control 1 (SP2-921, "2"): For designer's use only; do not <br> use in the field |
| :--- | :--- |
| Toner supply decision | Compare Vt with a reference voltage (Vts or Vref) |
| Toner control process | This toner control process is the same as sensor control 1 <br> mode. |
| Toner supply amount | Fixed (SP2-925) |
| Toner end detection | Performed |


| Mode | Fixed control 2 (SP2-921, "3"): Use temporarily if the TD <br> sensor needs to be replaced |
| :--- | :--- |
| Toner supply decision | None |
| Toner control process | Toner is supplied every printed page regardless of Vt. |
| Toner supply amount | Fixed (SP2-925) |
| Toner end detection | Not performed |

## Toner density sensor initial setting

The TD sensor initial setting procedure is performed automatically when the new PCU is installed in the machine. During TD sensor initial setting, the TD sensor is set so that the TD sensor output to the value of SP2-926 (default: 2.5 V ). This value will be used as the standard reference voltage (Vts) of the TD sensor.

## Toner density measurement

Toner density in the developer is detected once every copy cycle. The sensor output voltage $(\mathrm{Vt})$ during the detection cycle is compared with the standard reference voltage (Vts) or the toner supply reference voltage (Vref).

## Vsp/Vsg detection

The ID sensor detects the following voltages.

- Vsg: The ID sensor output when checking the drum surface
- Vsp: The ID sensor output when checking the ID sensor pattern
- At the end of a job, if an ID sensor pattern has not been made for a certain number of sheets (default: 0 sheets = disabled) The number of sheets can be changed using SP2-995-2.
In this way, the reflectivity of both the drum surface and the pattern on the drum are checked. This compensates for any variations in the reflectivity of the pattern on the drum or the reflectivity of the drum surface.

The ID sensor pattern is made on the drum by charge roller and laser diode.
Vsp/Vsg is not detected every page or job; it is detected at the following times to decide Vref.

- During warming up at power on
- If the machine starts warming up after a certain time (default: 30 minutes) has passed since entering night mode or low power mode
The 30-minute interval can be changed using SP2-995.


## Toner supply reference voltage (Vref) determination

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

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


## Toner supply determination

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

## DEVELOPMENT

## Toner Supply Motor On Time Determinations

For fixed control mode, the toner supply motor on time is specified by the setting of SP2-925, and does not vary. The default setting is 200 ms for each copy. The toner supply motor on time for each value of SP2-925 is as follows.

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

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

- $\Delta \mathrm{Vt}(=\mathrm{Vt}-(\mathrm{Vref}$ or Vts$))$
- TD sensor sensitivity (coefficient: S , value is 0.3 )

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

| Level | Decision | Motor On Time (seconds) |
| :---: | :--- | :--- |
| 1 | $0<\Delta \mathrm{Vt} \leq \mathrm{S} / 16$ | $\mathrm{t}(0.6)$ |
| 2 | $\mathrm{~S} / 16<\Delta \mathrm{Vt} \leq \mathrm{S} / 8$ | $\mathrm{t} \times 2(1.2)$ |
| 3 | $\mathrm{~S} / 8<\Delta \mathrm{Vt} \leq \mathrm{S} / 4$ | $\mathrm{t} \times 4(2.4)$ |
| 4 | $\mathrm{~S} / 4<\Delta \mathrm{Vt} \leq \mathrm{S} / 2$ | $\mathrm{t} \times 8(4.8)$ |
| 5 | $\mathrm{~S} / 2<\Delta \mathrm{Vt} \leq 4 \mathrm{~S} / 5$ | $\mathrm{t} \times 16(9.6)$ |
| 6 | $4 \mathrm{~S} / 5<\Delta \mathrm{Vt} \leq \mathrm{S}$ (near-end) | $\mathrm{T}(30) ;$ see note 3 |
| 7 | $\mathrm{~S}<\Delta \mathrm{Vt}$ (toner end) | $\mathrm{T}(30) ;$ see note 3 |

NOTE: 1) The value of " $t$ " can be changed using SP2-922 (default: 0.6 second)
2) The value of "T" can be changed using SP2-923 (default: 30 seconds)
3) T (30) means that toner is supplied intermittently in a half duty cycle ( 1.5 s on, 1.5 s off) for 30 seconds

### 2.6.7 TONER SUPPLY IN ABNORMAL SENSOR CONDITIONS

## ID sensor

Readings are abnormal if any of the following conditions occur:

- $\mathrm{Vsg} \leq 2.5 \mathrm{~V}$
- $\mathrm{Vsg}<3.5 \mathrm{~V}$ when maximum power (254) is applied
- $\mathrm{Vsp} \geq 2.5 \mathrm{~V}$
- $(\mathrm{Vsg}-\mathrm{Vsp})<1.0 \mathrm{~V}$
- ID sensor power required to make the standard output reaches the maximum value (254)
The above ID sensor values can be checked using SP2-220.
When this is detected, the machine changes the value of Vref to the previous value then does the toner density control process (in a similar way to sensor control mode 2).
No SC code is generated if the ID sensor is defective.


## TD Sensor

The TD sensor is checked every copy. If the readings from TD sensor become abnormal, the machine changes the toner density control mode to fixed supply mode 2, and the toner supply amount per page is always 200 ms , regardless of the value of SP2-925. Then at the end of a job (if the optional fax unit is installed), or 100 copies after the TD sensor error was detected (if no fax unit is installed), an SC code is generated (SC390) and the machine must be repaired. The 100-copy threshold can be adjusted with SP 2-992.

### 2.6.8 TONER NEAR END/END DETECTION AND RECOVERY

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

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

## Toner Near End Detection

If Vt is at level 6 (see the table on the previous page) five times consecutively, the machine enters the toner near end condition and the toner end indicator starts blinking. Then the machine supplies toner for a certain time, which depends on the setting of SP 2-923 (see the previous page).

## DEVELOPMENT

## Toner Near End Recovery

If the machine detects " $\mathrm{S} / 2<\Delta \mathrm{Vt} \leq 4 \mathrm{~S} / 5$ " twice consecutively when in one of the following situations, the machine leaves the toner near end condition.

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


## Toner End Detection

There are two situations for entering the toner end condition.

- When Vt is level 7 three times consecutively, the machine enters the toner end condition.
- When " $4 \mathrm{~S} / 5<\Delta \mathrm{Vt} \leq \mathrm{S}$ " is detected in the toner near end condition, then 50 copies can be made after this condition (the number of copies between this condition and toner end can be changed using SP2-213).


## Toner End Recovery

If the front cover is opened and closed for 10 seconds while a toner end condition exists and the toner bottle is replaced, the machine attempts to recover using the same procedure as for toner near end/end detection.

### 2.7 DRUM CLEANING AND TONER RECYCLING

### 2.7.1 DRUM CLEANING



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

The cleaning blade scrapes off toner remaining on the drum. When toner builds up in the cleaning unit, toner at the top of the pile is removed by the toner collection coil [B].
To remove the toner and other particles that are accumulated at the edge of the cleaning blade, the drum turns in reverse for about 5 mm at the end of every copy job. This feature is controlled with SP 2-998.

In addition, cleaning is done in the middle of a job if 100 sheets have been made since the previous cleaning. This feature is controlled with SP 2-211.

### 2.7.2 TONER RECYCLING



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

### 2.8 PAPER FEED

### 2.8.1 OVERVIEW



There are two paper trays, each of which can hold 500 sheets.
The paper tray feed stations use a friction pad system.
The two relay sensors are used for paper jam detection.
The components of the paper feed station are as follows.

1. Paper Lift Sensor
2. Paper Height -1 Sensor
3. Paper Height -2 Sensor
4. Paper End Sensor
5. Paper Feed Roller
6. Paper Size Sensor
7. Upper Relay Sensor
8. Upper Relay Roller
9. Lower Relay Roller
10. Lower Relay Sensor
11. Friction Pad
12. Tray Heater (Option)

## PAPER FEED

### 2.8.2 PAPER FEED DRIVE MECHANISM



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

When the paper feed clutch turns on, the feed rollers start to feed the paper. The paper feed clutch stays on until shortly after the registration sensor [D] has been activated.

### 2.8.3 PAPER FEED AND SEPARATION MECHANISM



The paper feed roller [A] drives the top sheet of paper from the paper tray to the copier. The friction pad [B] allows only one sheet to feed at a time. The friction pad applies pressure to the feed roller with a spring [C].
The friction pad pressure cannot be adjusted.

### 2.8.4 PAPER LIFT MECHANISM



The paper size switch detects when the tray is pushed in.
When the paper tray is pushed into the machine, the pin [A] for the lift motor pressure shaft engages the lift motor coupling $[B]$ and the pin [C] for the bottom plate lift shaft in the tray engages the bottom plate pressure lever coupling [D]. The pin [E] on the rear of the tray pushes the lock lever so that the lift motor can lift the bottom plate pressure lever.

The lift motor turns on, and turns clockwise as shown in the diagram. The main pressure spring $[\mathrm{K}]$ pulls the bottom plate pressure lever, and this lifts the tray bottom plate.

When the top of the stack touches the feed roller, the motor cannot pull up the plate any more, so it pulls the actuator [G] into the lift sensor [F]. Then the lift motor stops. The pressure of the feed roller on the paper is now too high, so the lift motor reverses a certain time ( 200 ms or 600 ms ), depending on the paper size, to reduce this pressure. For smaller paper, it reverses the larger amount ( 600 ms ) to reduce the pressure more.
NOTE: The relationship between the bottom plate pressure adjustment, paper size thresholds, and the related SP modes is explained in "Bottom Plate Pressure Adjustment for Paper Size".

For A4-width paper or wider, a projection $[\mathrm{H}]$ on the side fence engages the secondary pressure spring [J] through a lever [I]. Then, the secondary pressure spring [J] applies paper feed pressure in addition to the main pressure spring $[\mathrm{K}]$, to ensure that extra pressure is applied to wider paper.

When the paper tray is pulled out, the pins $[A, C]$ disengage from the couplings $[B$, D], and the bottom plate drops. To make it easier to push the tray in, the lift motor rotates backwards 1.7 seconds to return the bottom plate pressure lever coupling [D] to the original position. The amount of reverse can be adjusted with SP 1-912.

### 2.8.5 PAPER END DETECTION

[A]


If there is some paper in the paper tray, the paper stack raises the paper end feeler [A] and the paper end sensor [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 with no paper in the tray, the shape of the paper end feeler causes it to lift up.

### 2.8.6 PAPER HEIGHT DETECTION



The amount of paper in the tray is detected by the combination of on/off signals from two paper height sensors $[A]$ and $[B]$. The paper amount is displayed on the LCD.

When the amount of paper decreases, the bottom plate pressure lever [C] moves the actuator up.
The following combination of sensor signals is sent to the copier.

| Amount of Paper | Paper Height Sensor 1 | Paper Height Sensor 2 |
| :---: | :---: | :---: |
| Near End | OFF | ON |
| $30 \%$ | ON | ON |
| $70 \%$ | ON | OFF |
| $100 \%$ | OFF | OFF |

When the tray contains paper of a small width, the paper feed pressure may become too low when the thickness of the remaining stack of paper has decreased. The lift motor rotates forward 400 ms after the sensor detects a certain amount of paper remaining in the tray to increase paper feed pressure, simulating the pressure generated by a full tray.
NOTE: The relationship between the bottom plate re-adjustment timing, paper size threshold, and the related SP modes is explained in "Bottom Plate Pressure Adjustment for Paper Size".

### 2.8.7 FEED PRESSURE ADJUSTMENT FOR PAPER SIZE

## Overview

For the friction pad system, the pressure from the top of the stack against the feed rolleris very important for paper feed quality from the paper tray. If the pressure is high, double feed may occur. On the other hand, if the pressure is low, non-feed may occur. Because of this, the pressure must be varied depending on the paper size, paper weight, and amount of paper remaining in the tray. To achieve this, the pressure for each paper tray can be adjusted using SP mode.

## Paper Size Thresholds

The upward pressure from the bottom plate spring is always the same. However, downward pressure from the stack on the bottom plate depends on the paper size. Because of this, for a smaller paper size, the pressure of the top of the stack against the feed roller is more than normal (because of the smaller downward pressure from the stack), so adjustment may be necessary.

Using the following SP modes, either two or three paper size ranges can be specified. Using other SP modes (explained later), the pressure can be adjusted separately for each of these ranges to deal with any feed problems that have been occurring.

| Paper Size | Normal | Small Size | Middle Size |
| :--- | :---: | :---: | :---: |
|  | Greater than HLT/A5 <br> (default setting) | HLT/A5 or smaller <br> (default setting) | None <br> (default setting) |
| 1st paper tray | --- | SP1908-8 | SP1908-9 |
| 2nd paper tray | --- | SP1909-8 | SP1909-9 |
| 3rd paper tray | --- | SP1910-8 | SP1910-9 |
| 4th paper tray | --- | SP1911-8 | SP1911-9 |

Paper Size Ranges
For Three Size Ranges
Small paper size range: Paper sizes equal to the 'Small' SP mode value, or smaller.

Middle paper size range: Paper sizes greater than the small paper size, up to and including the middle paper size specified by the 'Middle' SP mode.

Normal paper size range: Paper sizes greater than the 'Middle' SP mode.
For Two Size Ranges
Small paper size range: Paper sizes equal to the 'Small’ SP mode value, or smaller.

Normal paper size range: Paper sizes greater than the 'Small' SP mode.

## Feed Pressure Adjustment

The pressure can be adjusted to solve a paper feed problem. This adjusts the amount of lift motor reverse just after the lift sensor is activated when lifting the stack to the paper feed position. To apply less pressure to the top of the stack, the amount of reverse should be increased.

## Effect of the Amount of Remaining Paper


(3)

## From tray full to paper near-end

The pressure between the top of the stack and the fed roller also depends on the amount of remaining paper, especially for small paper sizes, as shown in the above graph. The pressure for A5 changes significantly between stack heights of 500 sheets and 50 sheets, but not much for A4 or A3 paper.
For 500 sheets of A5, the pressure is too high. To counter this, the lift motor reverses 600 ms (1) in the graph), as explained in the previous section. The SP modes in the following table are for solving feed problems that occur when the tray is between full and near-end.

| Paper Size | Normal | Small Size | Middle Size |
| :--- | :---: | :---: | :---: |
|  | Greater than HLT/A5 <br> (default setting) | HLT/A5 or smaller <br> (default setting) | None <br> (default setting) |
| 1st paper tray | SP1908-1 | SP1908-2 | SP1908-3 |
| 2nd paper tray | SP1909-1 | SP1909-2 | SP1909-3 |
| 3rd paper tray | SP1910-1 | SP1910-2 | SP1910-3 |
| 4th paper tray | SP1911-1 | SP1911-2 | SP1911-3 |
| Default (all trays) | 200 ms | 600 ms | 200 ms <br> (default: not used) |

## From paper near end to paper end

When paper is used up, the pressure on the bottom plate reduces, so the upward pressure increases, causing the pressure of the feed roller against the top of the stack to increase.

However, for small paper sizes, because of the previous correction (600 ms reverse rotation of the lift motor), the pressure between the feed roller and the top of the stack becomes too small at some point as paper is used up, and this could cause paper feed problems. This condition is more significant for smaller paper sizes, such as A5, as shown in the diagram.
If a paper feed problem occurs when the stack is partly used up, the pressure can be re-adjusted (2) in the graph) using the following SP modes. The default is set for 50 sheets (at the near-end point)
The lift motor rotates forward for the time specified by the SP mode to increase the pressure.

| Paper Size | Small Size | Middle Size |
| :--- | :---: | :---: |
|  | HLT/A5 or smaller <br> (default setting) | None <br> (default setting) |
| 1st paper tray | SP1908-4 | SP1908-5 |
| 2nd paper tray | SP1909-4 | SP1909-5 |
| 3rd paper tray | SP1910-4 | SP1910-5 |
| 4th paper tray | SP1911-4 | SP1911-5 |
| Default (all trays) | 400 ms | 300 ms <br> (default: not used) |

Also, the point at which this adjustment is applied (near-end [50 sheets], $25 \%$ full, $75 \%$ full) can be selected (3) in the graph) using the following SP modes.

| Paper Size | Small Size | Middle Size |
| :--- | :---: | :---: |
|  | HLT/A5 or smaller <br> (default setting) | None <br> (default setting) |
| 1st paper tray | SP1908-6 | SP1908-7 |
| 2nd paper tray | SP1909-6 | SP1909-7 |
| 3rd paper tray | SP1910-6 | SP1910-7 |
| 4th paper tray | SP1911-6 | SP1911-7 |
| Default (all trays) | Near-end | Near-end <br> (default: $n 0 t$ used) |

### 2.8.8 PAPER SIZE DETECTION

|  | 1 | 2 | 3 | 4 |
| :---: | :---: | :---: | :---: | :---: |
| A3 | O | O | $\bigcirc$ | O |
| A4 Sideways | $\bullet$ | $\bullet$ | O | $\bullet$ |
| A4 Lengthwise | $\bullet$ | $\bullet$ | O | O |
| A5 Lengthwise, 81/2" x 14" | O | O | - | $\bullet$ |
| B4, 11" $\times 17^{\prime \prime}$ | $\bullet$ | O | - | 0 |
| $\left\lvert\, \begin{aligned} & \text { B5 Sideways, } \\ & 11^{\prime \prime} \times 81 / 2^{" \prime} \end{aligned}\right.$ | - | O | O | O |
| $\begin{array}{\|l\|} \hline \text { B5 Lengthwise, } \\ 81 / 2^{\prime \prime} \times 11^{\prime \prime} \end{array}$ | $\bigcirc$ | - | - | $\bullet$ |
| * (Asterisk) | $\bigcirc$ | $\bullet$ | $\bigcirc$ | $\bigcirc$ |
| - ON (Not pushed) <br> O: OFF (Pushed) |  |  |  |  |



There are four paper size microswitches [A] on the front right plate of the paper tray unit. The switches are actuated by a paper size actuator $[\mathrm{B}]$ behind the paper size indicator plate, which is on the front right of the tray.
Each paper size has its own actuator, with a unique combination of notches. To determine which size has been installed, the CPU reads which microswitches the actuator has switched off.

The CPU disables paper feed from a tray if the paper size cannot be detected. If the paper size actuator is broken, or if there is no tray installed, the Add Paper indicator will light.
When the paper size actuator is at the "*" mark, the paper tray can be set up to accommodate one of a wider range of paper sizes by using user tools. If the paper size for this position is changed without changing the user tool setting, a paper jam will result.

### 2.8.9 SPECIAL PAPER SETTING

Only the 2nd tray can feed special paper such as thick paper or envelopes. The special paper type can be selected either by using the UP mode or with the following operation.

- Select the 2nd tray then press the ${ }^{\#}$ key.


After selecting the special paper type, the fusing temperature and transfer roller current will be changed as follows.

1. Fusing temperature (when thick paper is selected):

Current operation temperature $+15{ }^{\circ} \mathrm{C}$
2. Transfer roller current:

A3 width (11"): $14 \mu \mathrm{~A}$
B4 width (10"): $15 \mu \mathrm{~A}$
A4 width (8.5"): $17 \mu \mathrm{~A}$
A5 width (5.5"): $20 \mu \mathrm{~A}$
Note that for the by-pass tray, the fusing and transfer conditions for special paper are also applied if the user uses thick (non-standard) mode.

### 2.8.10 SIDE AND END FENCES



## Side Fences

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

## End Fence

As the amount of paper in the tray decreases, the bottom plate [C] lifts up gradually. The end fence [ D ] is connected to the bottom plate. When the tray bottom plate rises, the end fence moves forward and pushes the back of the paper stack to keep it squared up.

### 2.8.11 PAPER REGISTRATION




The drive from the main motor [A] is transmitted to the registration roller through the registration clutch gear $[\mathrm{B}]$.
The registration sensor [C] is used for correcting paper skew and for detecting paper misfeeds.
The cleaning mylar [D] contacts the registration roller. It removes paper dust from the registration roller so that this dust will not transfer into the development unit through the drum cleaning unit.
The amount of paper buckle at the registration roller to correct skew can be adjusted with SP 1003.
If jams frequently occur after registration, the paper feed clutch can be reenergized so that the feed roller can assist the registration roller to re-start paper feed. This may be needed when feeding thicker paper. This adjustment is made with SP 1903; it can be adjusted separately for tray 1 and the by-pass feeder, so place the problem paper type in one of these and adjust SP 1-903 for that tray only.

### 2.9 IMAGE TRANSFER AND PAPER SEPARATION

### 2.9.1 OVERVIEW





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

The curvature of the drum and the discharge plate [C] help the paper to separate from the drum. The high voltage supply board also supplies a negative dc voltage to the discharge plate.
Drive from the drum through a gear [D] turns the transfer roller

### 2.9.2 IMAGE TRANSFER CURRENT TIMING

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

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

The transfer current (high transfer current level) depends on the paper feed station, paper width, and the temperature in the machine.

Example: Temperature $=15^{\circ} \mathrm{C} \sim 24^{\circ} \mathrm{C}$

| Paper Width | Paper Tray / <br> By-pass Tray <br> (Normal) | Duplex (2nd Side) | By-pass Tray <br> (Thick) / 2nd <br> Paper Tray <br> (Special Paper) |
| :--- | :---: | :---: | :---: |
| A3/1" $\times 17 "$, <br> A4/81/2 $\times 11$ "sideways | $14 \mu \mathrm{~A}$ | $10 \mu \mathrm{~A}$ | $14 \mu \mathrm{~A}$ |
| B4 | $13 \mu \mathrm{~A}$ | $12 \mu \mathrm{~A}$ | $15 \mu \mathrm{~A}$ |
| A4/11" $\times 81 / 2$ lengthwise, <br> A5/51/2 $\times 81 / 2$ sidewise | $13 \mu \mathrm{~A}$ | $16 \mu \mathrm{~A}$ | $17 \mu \mathrm{~A}$ |
| A5/81/2 $\times 51 / 2$ lengthwise <br> and less | $16 \mu \mathrm{~A}$ | $16 \mu \mathrm{~A}$ | $20 \mu \mathrm{~A}$ |

The transfer current can be adjusted using SP2301, except for the low transfer current.

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

### 2.9.3 TRANSFER ROLLER CLEANING

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

During transfer roller cleaning, the high voltage supply unit supplies a negative cleaning current $(-4 \mu \mathrm{~A})$ to the transfer roller. Any negatively charged toner on the transfer roller is then transferred back to the drum. Then a positive cleaning current $(+10 \mu \mathrm{~A})$ is applied to the transfer roller to push back to the drum any positively charged toner on the transfer roller.

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

- Before starting the printing job (only if enabled with SP2-996; note that the default setting is off)
- Just after the power is switched on.
- After a copy jam has been cleared

The transfer roller cleaning function is done.
Also, the transfer roller cleaning current can be adjusted using SP2-301-4.

### 2.9.4 PAPER SEPARATION MECHANISM



The discharge plate $[A]$ and the drum curvature of the drum help the paper to separate away from the drum. The high voltage supply board applies a constant dc voltage, -1.8 kV (when feeding from a paper tray) or -2.1 kV (from the duplex unit) to the discharge plate.

The discharge plate voltage can be adjusted using SP2-901.

### 2.10 IMAGE FUSING AND PAPER EXIT

### 2.10.1 OVERVIEW



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

1. Paper exit roller
2. Fusing exit sensor
3. Hot roller strippers
4. Pressure spring
5. Pressure roller
6. Cleaning roller
7. Two fusing lamps
8. Two thermistors
9. Four thermostats
10. Hot roller
11. Paper overflow sensor

### 2.10.2 FUSING DRIVE AND RELEASE MECHANISM



The main motor $[A]$ drives the fusing unit through a gear train and drives the paper exit rollers $[B]$ through a timing belt [C].
The fusing unit release mechanism automatically disengages the fusing unit drive gear [D] when the right cover [E] is opened. This allows the fusing unit drive gear to rotate freely so that misfed paper can easily be removed.
Also, the fusing drive is released by the fusing drive release solenoid [F]. To reduce the warming up time, the machine cuts the drive to the fusing unit during warming up. Just after the main switch is turned on, this solenoid is energized and the fusing unit drive gear [D] is disengaged.

However, the fusing unit drive is not released when the temperature is lower than $15^{\circ} \mathrm{C}$.

### 2.10.3 FUSING ENTRANCE GUIDE SHIFT MECHANISM



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

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

### 2.10.4 PRESSURE ROLLER



The pressure springs $[A]$ constantly apply pressure between the hot roller $[B]$ and the pressure roller [C].

Applied pressure can be changed by adjusting the position of the pressure springs. The spring is positioned at the top [D] as the default setting.

The user moves lever [E] when using thicker copy paper or envelopes, to reduce the pressure between the hot and pressure rollers.

### 2.10.5 CLEANING MECHANISM



The cleaning roller $[A]$ is always in contact with the pressure roller [B]. It collects toner and paper dust adhered to the surface of the pressure roller.

### 2.10.6 FUSING TEMPERATURE CONTROL



## Temperature Control

Just after the main power switch is turned on, the CPU turns on the fusing lamp to obtain a fusing temperature of $175^{\circ} \mathrm{C}$ (Main fusing lamp), $165^{\circ} \mathrm{C}$ (Sub fusing lamp) for the first 60 s, or for the first three consecutive pages of printing, whichever comes first. After that, the machine keeps the fusing temperature at $175^{\circ} \mathrm{C}$ for the first 20 consecutive pages of printing. Then the fusing temperature is kept at $165^{\circ} \mathrm{C}$.

The three-page and 60-second limits can be adjusted with SP1-105-8 and -9.
Note that the fusing temperature is higher if the user uses special paper in the 2nd tray or thick paper mode from the bypass tray ( 2.8.9).

## Fusing Lamp Control

Turning on and off the fusing lamp power causes fluorescent light in the room to flicker. To reduce the flickering, use the following SP modes.

## Fusing temperature detection cycle (SP mode 1-108)

The CPU checks the output from the fusing thermistor once a second (default setting). The CPU compares the current and previous temperatures. Based on the result, it then decides how long the fusing lamp power should be on during the next one-second interval (also, if the current temperature is too high, the power will not be needed).

Starting and stopping the fusing lamp power every second causes fluorescent lighting in the room to flicker. To reduce this flickering, use SP1-108 to change the cycle from 1 second to 3 seconds.

## Fusing soft-start

In addition, whenever the fusing lamp power switches on, full power is applied to the fusing lamp gradually, not all at once. This prevents the power in the room from dropping suddenly. This feature is known as "Soft Start". The machine does this by gradually allowing more power to the fusing lamp over a number of zero-cross cycles of the ac supply. The diagram below shows full power being applied gradually over the duration of 3 zero-cross cycles. Soft start occurs every time the fusing lamp power switches on (i.e., at some time during every second), not just at the start of the print job.
NOTE: This feature is effective to counter flickering lights. However, generated noise increases if the setting is changed from the default. If a radio or a TV is close by the machine, the noise may have some effect on the image or sound.


### 2.10.7 OVERHEAT PROTECTION

If the hot roller temperature becomes higher than $231^{\circ} \mathrm{C}$, the CPU cuts off the power to the fusing lamp. At the same time, SC543 is generated.

Even if the thermistor overheat protection fails, there are four thermostats in series with the common ground line of the fusing lamp. If the temperature of the thermostat reaches $210^{\circ} \mathrm{C}$, one of the thermostats opens, removing power from the fusing lamp. At the same time, SC 542 is generated and the machine stops operating.

### 2.10.8 PAPER EXIT



The paper overflow detection sensor $[A]$ is located at the paper exit section of the fusing unit. When this sensor is activated, the machine detects that the paper stack height exceeded a certain limit and stops printing.

### 2.11 ENERGY SAVER MODES

### 2.11.1 OVERVIEW



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

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

1) Energy saver mode
2) Auto Off mode

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

- Panel off timer (energy saver mode timer) : User Tools - System Settings Timer Setting - Panel Off Timer
- Auto off timer: User Tools - System Settings - Timer Setting - Auto Off Timer
- Auto off disabling (SP mode): Set SP 5-305 to 1. This allows the user to disable auto off mode by setting the auto off timer to 0 .


### 2.11.2 ENERGY SAVER MODE

## Entering the energy saver mode

The operation manual uses the term 'panel off mode' for the timer.
The machine enters energy saver mode when one of the following is done.

- The panel off timer runs out
- The Clear Mode/Energy Saver Key is held down for one second

Note that the default setting of the panel off timer is 60 s , which is the same as the auto off timer. In this condition, if the machine is not touched for 60 s , it will go straight to auto off mode. If the user wants an energy saver mode and an auto off mode, the panel off timer must be set to a shorter value than the auto off timer,

## 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 an 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 | $150^{\circ} \mathrm{C}$ | On | On |

### 2.11.3 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 it 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 exists, 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 .

| 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 | $+5 V E ~ i s ~$ <br> supplied |

INSTALLATION

## 3. INSTALLATION PROCEDURE

### 3.1 INSTALLATION REQUIREMENTS

### 3.1.1 ENVIRONMENT

1. Temperature Range: $10^{\circ} \mathrm{C}$ to $32^{\circ} \mathrm{C}\left(50^{\circ} \mathrm{F}\right.$ to $\left.89.6^{\circ} \mathrm{F}\right)$
2. Humidity Range: $15 \%$ to $80 \%$ RH
3. Ambient Illumination: Less than 1,500 lux (do not expose to direct sunlight.)
4. Ventilation: Room air should turn over at least $30 \mathrm{~m} 3 / \mathrm{hr} /$ person
5. Ambient Dust: Less than $0.10 \mathrm{mg} / \mathrm{m}^{3}\left(2.7 \times 10-6 \mathrm{oz} / \mathrm{yd}^{3}\right)$
6. Avoid an area which is exposed to sudden temperature changes. This includes:
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 in an area where it will be exposed to corrosive gases.
8. Do not install the machine at any location over 2,000 m (6,500 ft.) above sea level.
9. Place the copier on a strong and level base. (Inclination on any side should be no more than 5 mm .)
10. Do not place the machine where it may be subjected to strong vibrations.

### 3.1.2 MACHINE LEVEL

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

### 3.1.3 MINIMUM SPACE REQUIREMENTS

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


A: In Front: Over 750 mm (29.6")
B: Left: Over $10 \mathrm{~mm}\left(4^{\prime \prime}\right)$
C: To Rear:Over $10 \mathrm{~mm}\left(4{ }^{\prime \prime}\right)$
D: Right: Over $10 \mathrm{~mm}\left(4{ }^{4}\right)$


E: $620 \mathrm{~mm}\left(24.4^{\prime \prime}\right)$
F: 640 mm (25.2")
G: 550 mm (21.7")
H: 1137 mm (44.8")

NOTE: The 750 mm recommended for the space at the front is only for pulling out the paper tray. If an operator stands at the front of the copier, more space is required.

### 3.1.4 POWER REQUIREMENTS

## $\triangle$ CAUTION <br> 1. Make sure that the wall outlet is near the copier and easily accessible. Make sure the plug is firmly inserted in the outlet.

2. Avoid multi-wiring.
3. Be sure to ground the machine.
4. Input voltage level: $120 \mathrm{~V}, 60 \mathrm{~Hz}$ : More than 12 A 220 V ~ $240 \mathrm{~V}, 50 \mathrm{~Hz} / 60 \mathrm{~Hz}$ : More than 7 A $110 \mathrm{~V}, 50 \mathrm{~Hz} / 60 \mathrm{~Hz}$ : More than 13 A
5. Permissible voltage fluctuation: $\pm 10 \%$
6. Do not set anything on the power cord.

### 3.2 COPIER INSTALLATION

### 3.2.1 POWER SOCKETS FOR PERIPHERALS

## $\triangle$ CAUTION

Rating voltage for peripherals.

Make sure to plug the cables into the correct sockets.


### 3.2.2 INSTALLATION FLOW CHART

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


### 3.2.3 ACCESSORY CHECK

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

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1 | Paper Tray Decal | 1 |
| 2 | Emblem | 1 |
| 3 | Model Name Decal | 1 |
| 4 | NECR | 1 |
| 5 | End Fence | 1 |
| 6 | HDD Caution Decal (-17, -57 only) | 1 |
| 7 | Operating Instructions - System Setting | 1 |
| 8 | Operating Instructions - Copy Reference | 1 |

### 3.2.4 INSTALLATION PROCEDURE




## ©CAUTION

Unplug the machine power cord before starting the following procedure.
If the optional paper tray or the optional LCT is going to be installed now, put the copier on the paper tray unit or the LCT first, then install these options, then install the copier.
NOTE: Keep the shipping retainers after installing the machine. They will be reused if the machine is moved to another location in the future.

1. Remove the tapes and the shipping retainer $[A]$ on the exterior of the copier.
2. Install the end fence $[B]$.

[H]

[F]
3. Open the front cover $[A]$.
4. Remove the red tag $[B]$ and toner seal $[C]$, then peel the sealing tape [D] off to install the developer.
5. Raise the toner bottle holder lever [E], push lever [F] down, and pull the toner bottle holder [G] out.
6. Shake the toner bottle [H] well.

NOTE: Do not remove the toner bottle cap [I] until after shaking.
7. Unscrew the bottle cap [I] and insert the bottle into the holder.

NOTE: Do not touch the inner bottle cap [J].
8. Reposition the holder and press down the holder lever to secure the bottle.

9. Attach the appropriate emblem [A] to the front cover if the emblem is not attached to the front cover.
10. Pull the paper tray out and turn the paper size dial to select the appropriate size. Adjust the side guides and end guide to match the paper size.
NOTE: To move the side guides, first pull out the tray fully, then push down the green lock at the rear of the tray.
11. Attach the appropriate paper tray number decal $[B]$ to the paper tray.

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

12. If the optional bridge unit will not be installed: Swing the sensor feeler [A] out.
13. Install the optional ARDF or the optional platen cover (see ARDF Installation or Platen Cover Installation).
14. Plug in the machine and turn the main power switch on. The machine automatically performs TD sensor initial setting (approximately 15 seconds).
15. Check the copy quality and copying functions.
16. Initialize the electrical total counter using SP7-825, depending on the service contract type.

## HDD Caution Decal (for only -17, -57 models)

1. When installing the optional HDD, attach the HDD caution decal $[B]$ to the front cover.

### 3.3 PAPER TRAY UNIT INSTALLATION

### 3.3.1 ACCESSORY CHECK

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

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1 | Securing Bracket | 2 |
| 2 | Screw - M4×10 | 4 |

### 3.3.2 INSTALLATION PROCEDURE



## . CAUTION

Unplug the machine power cord before starting the following procedure.

1. Remove the strips of tape.
2. Set the copier [A] on the paper tray unit [B].

NOTE: When installing the copier, be careful not to pinch the cable [C].

3. Remove the connector cover $[A]$ ( 1 screw).
4. Connect the cable $[B]$ to the copier, as shown.
5. Attach a securing bracket [C] to each side of the paper tray unit, as shown (1 screw each).
6. Re-install the connector cover.
7. Remove the 2nd paper tray [D] and secure the paper tray unit with two screws [E].

8. Reinstall the 2nd paper tray and attach the appropriate paper tray number decal [A] to the paper tray.
NOTE: The paper tray number decal is in the accessory box for the main copier.
9. Rotate the adjuster [B] until the machine cannot be pushed across the floor.
10. Loads paper into the paper trays and select the proper paper size.
11. Turn on the main switch.
12. Check the machine's operation and copy quality.

### 3.4 LCT INSTALLATION

### 3.4.1 ACCESSORY CHECK

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

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1 | Securing Bracket | 2 |
| 2 | Screw - M4×10 | 4 |
| 3 | Paper Size Decal | 1 |

### 3.4.2 INSTALLATION PROCEDURE



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

1. Remove the strips of tape.
2. Set the copier $[A]$ on the LCT $[B]$.

NOTE: When installing the copier, be careful not to pinch the cable [C].

3. Remove the connector cover [A] (1 screw).
4. Connect the cable $[B]$ to the copier, as shown.
5. Attach a securing bracket [C] to each side of the LCT, as shown (1 screw each).
6. Re-install the connector cover.
7. Remove the 2nd paper tray and secure the LCT with two screws [D].

8. Load paper into the LCT.
9. Reinstall the 2nd paper tray and attach the appropriate paper tray number decal $[A]$ and paper size decal [B] to the LCT.
NOTE: The paper tray number decal is in the accessory box for the main copier.
10. Rotate the adjuster [C] until the machine cannot be pushed across the floor.
11. Loads paper into the paper tray and turn on the main switch.
12. Check the machine's operation and copy quality.

### 3.5 AUTO REVERSE DOCUMENT FEEDER INSTALLATION

### 3.5.1 ACCESSORY CHECK

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

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1 | Scale Guide | 1 |
| 2 | DF Exposure Glass | 1 |
| 3 | Stud Screw | 2 |
| 4 | Knob Screw | 2 |
| 5 | Original Size Decal | 2 |
| 6 | Screwdriver Tool | 1 |



### 3.5.2 INSTALLATION PROCEDURE



[^0]1. Remove the strips of tape.

2. Remove the left scale $[A]$ (2 screws).
3. Place the DF exposure glass $[B]$ on the glass holder.

NOTE: When installing the DF exposure glass, make sure that the white point [C] is on the lower front side of the glass, as shown.
4. Peel off the backing [D] of the double-sided tape attached to the rear side of the scale guide [E], then install it (2 screws removed in step 2).
5. Install the two stud screws [F].
6. Mount the DF on the copier, then slide the DF to the front as shown.
7. Secure the DF unit with two screws [G].
8. Connect the cable $[\mathrm{H}]$ to the copier.

9. Attach the appropriate scale decal $[A]$ as shown.
10. Turn the main power switch on. Then check if the document feeder works properly.
11. Make a full size copy. Then check to make sure the side-to-side and leading edge registrations are correct. If they are not, adjust the side-to-side and leading edge registrations (refer to the service manual).

INTERCHANGE UNIT INSTALLATION

### 3.6 INTERCHANGE UNIT INSTALLATION

### 3.6.1 COMPONENT CHECK

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

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1 | Interchange Unit | 1 |
| 2 | Connector Cover | 1 |
| 3 | Tapping Screw M3×8 | 1 |



### 3.6.2 INSTALLATION PROCEDURE



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

1. Remove all tapes.
2. Open the right cover $[A]$ of the copier.
3. Open cover [B]
4. Remove the metal clip [C].

NOTE: To remove the clip, push the small tab [D] on the clip into the slot [E], then the clip can be removed.
5. Remove the cover $[B]$.

If the optional 1-bin tray unit (B413) will be installed, do steps 6 and 7.
6. Loosen the screw, push down tab [F] with a screwdriver, and remove the front right cover [G].
7. Slide out the exit cover $[H]$.

8. Open the cover $[A]$ of the interchange unit.
9. Install the interchange unit (2 connectors) [B].
10. Secure the interchange unit with the knob screws [C].
11. Attach the connector cover [D] (1 screw).

### 3.7 1-BIN TRAY UNIT INSTALLATION

### 3.7.1 COMPONENT CHECK

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

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1 | 1-Bin Tray Unit | 1 |
| 2 | Tray | 1 |
| 3 | Sub-Tray | 1 |
| 4 | Tray Guide | 1 |
| 5 | Paper Guide | 1 |
| 6 | Tapping Screw M3×8 | 1 |



### 3.7.2 INSTALLATION PROCEDURE



## \. CAUTION <br> Unplug the copier power cord before starting the following procedure.

NOTE: Before installing this 1-bin tray unit, the optional interchange unit (B416) must be installed.

1. Remove all tapes.
2. If the optional bridge unit has been installed, open the right jam removal cover [A] of the bridge unit.
If the optional bridge unit is not installed, skip this step.

3. If the front right cover $[A]$ is installed, remove it.
4. Install the 1-bin tray unit [B] (1 screw).
5. Connect the connector [C].
6. Reinstall the front right cover.
7. Peel off the backing [D] of the double-sided tape attached to the paper guide [E]. Then attach the paper guide to the underside of the scanner unit as shown.

8. Install the tray guide $[A]$.
9. Install the tray [B].
10. Install the sub-tray [C].
11. Turn on the main power switch and check the 1-bin tray unit operation.

### 3.8 SHIFT TRAY

### 3.8.1 COMPONENT CHECK

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

| No. | Description | Q'ty |
| :--- | :--- | :---: |
| 1 | Shift Tray Unit | 1 |
| 2 | Paper Guide - Large | 1 |
| 3 | Paper Guide - Small | 2 |
| 4 | Stepped Screw | 1 |



### 3.8.2 INSTALLATION PROCEDURE



## $\triangle$ CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove all tapes.
2. Remove the plate $[A]$ ( 1 screw).
3. Install the large paper guide $[B]$ and two small paper guides $[C]$, as shown.


Installation
4. Install the stepped screw $[\mathrm{A}]$.
5. Install the shift tray unit [B], as shown.

NOTE: 1) Set the shift tray on the stepped screw.
2) The shift tray must be installed under the paper guide [C] installed in step 3.
6. Connect the cable $[D]$ to the copier.
7. Turn on the main power switch. Then select the shift tray using the UP mode "2. Copier - 3. Input/Output - 6. Sort - Shift Sort".
8. Check the shift tray operation.

### 3.9 BY-PASS FEED UNIT INSTALLATION

### 3.9.1 COMPONENTS CHECK

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

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1 | By-pass Tray Unit | 1 |
| 2 | Unit Holder | 1 |
| 3 | Tapping Screw | 2 |
| 4 | Allen Key | 1 |



### 3.9.2 INSTALLATION PROCEDURE



## $\triangle$ CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove all tapes.
2. Remove the entrance cover $[A]$ (2 screws) and two screws $[B]$.

3. Install the unit holder [A] using the Allen key (4 set screws).

NOTE: 1) Make sure that the four screws are tightened in the proper order, as shown above. Otherwise, when the optional duplex unit (B414) is installed, it will not properly lock in place.
2) After securing the unit, store the Allen key in the inner cover [B] for future use.
4. If the optional duplex unit (B414) will be installed: Remove the indicated parts [C] of the by-pass tray unit [D].
5. Install the by-pass tray unit ( 2 screws, 1 connector).
6. Turn the main power switch on and check the by-pass tray function.
7. Make a copy from the by-pass tray. Then check the registration.

## DUPLEX UNIT INSTALLATION

### 3.10 DUPLEX UNIT INSTALLATION

### 3.10.1 ACCESSORY CHECK

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

| No. | Description | Q’ty |
| :---: | :--- | :---: |
| 1 | Duplex Unit | 1 |
| 2 | Connector Cover | 1 |
| 3 | Bracket | 1 |
| 4 | Clip | 1 |
| 5 | Unit Holder | 1 |
| 6 | Unit Holder Cover | 1 |
| 7 | Allen Key | 1 |
| 8 | Tapping Screw - M3x8 | 4 |





4

### 3.10.2 INSTALLATION PROCEDURE



Installation

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

NOTE: Before installing the duplex unit, the optional interchange unit (B416) must be installed.

1. Remove all tapes.
2. Remove three covers [A].
3. Remove the connector cover [B] (1 screw), the entrance cover [C] (2 screws; if the by-pass tray has not been installed), and two screws [D].
4. Install the bracket [E] (1 screw).
5. If the by-pass tray has already been installed, skip this step: Install the unit holder [F] using the Allen key (4 set screws).
NOTE: 1) Make sure that the four screws are tightened in the proper order, as shown above. Otherwise, the duplex unit will not properly lock in place.
2) After securing the unit, store the Allen key in the inner cover [G] for future use.

6. Set the duplex unit [ $A$ ] on the unit holder [B] or on the by-pass tray unit if it has already been installed.
7. Attach the link [C] to the shaft [D] and secure it with the clip.
8. Connect the cable $[E]$ and install the connector cover $[F]$ ( 1 screw).
9. If the by-pass tray has already been installed, skip this step: Install the unit holder cover [G] (2 screws).
10. Turn on the main power switch and check the duplex unit function.

### 3.11 BRIDGE UNIT INSTALLATION

### 3.11.1 ACCESSORY CHECK

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

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1 | Bridge Unit | 1 |
| 2 | Securing Plate | 1 |
| 3 | Shoulder Screw | 1 |
| 4 | Knob Screw | 1 |



### 3.11.2 INSTALLATION PROCEDURE



## $\triangle$ CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove all tapes.
2. Loosen the screw $[A]$ and remove the front right cover $[B]$.
3. If the sensor feeler [ $C$ ] is out, fold it away into the machine.

4. Remove the cover $[A]$ (1 screw).
5. Install the bridge unit [B] (1 shoulder screw, 1 knob screw).
6. Reinstall the front right cover [C].
7. Connect the cable [D] to the main machine.
8. Attach the securing plate [E], as shown.

NOTE: Do not attach it with a screw; this is done when securing the front stand for the optional finisher.
9. Install the optional finisher (refer to the finisher installation procedure).

### 3.12 1,000-SHEET FINISHER INSTALLATION <br> 3.12.1 ACCESSORY CHECK

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


| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1 | Front Joint Bracket | 1 |
| 2 | Rear Joint Bracket | 1 |
| 3 | Grounding Plate | 1 |
| 4 | Copy Tray | 1 |
| 5 | Staple Position Decal | 1 |
| 6 | Screw - M4×17 | 3 |
| 7 | Knob Screw - M4×10 | 1 |
| 8 | Screw - M3×8 | 1 |
| 9 | Knob Screw - M3×8 | 1 |

## 1,000-SHEET FINISHER INSTALLATION

### 3.12.2 INSTALLATION PROCEDURE



| $\boxed{\text { CAUTION }}$ |
| :--- |
| Unplug the main machine power cord before starting the following <br> procedure. |

NOTE: If this finisher will be installed on the B022 or B027 copier, the following options must be installed before installing this finisher.
Bridge Unit (B417)
Paper Tray Unit (B390) or LCT (B391)

1. Unpack the finisher and remove the tapes.

NOTE: Be sure to keep screw [A]. It will be needed to secure the grounding plate in step 4.


2. Install the front joint bracket [A] (2 screws - M4x17) and rear joint bracket [B] (1 screw - M4x17).
3. Remove the left stand [C] (3 screws)
4. Install the lower grounding plate [D] on the finisher (2 screws - M3x8).

NOTE: Use the screw removed in step 1 and the screw from the accessory box.
5. Open the front door $[E]$. Then pull the locking lever $[F]$.
6. Align the finisher on the joint brackets, and lock it in place by pushing the locking lever.
7. Secure the locking lever ( 1 knob screw $-M 3 \times 8$ ) and close the front door.
8. Install the copy tray [G] ( 1 knob screw - M4x10).
9. Connect the finisher cable $[\mathrm{H}]$ to the main machine.

10. Attach the staple position decal $[A]$ to the ARDF as shown.
11. Turn on the ac switch and check the finisher operation.

### 3.13 500-SHEET FINISHER INSTALLATION

### 3.13.1 ACCESSORY CHECK

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


| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1 | Unit Holder | 1 |
| 2 | Entrance Guide | 1 |
| 3 | Output Tray | 1 |
| 4 | Snap Ring | 2 |
| 5 | Knob Screw | 2 |

### 3.13.2 INSTALLATION PROCEDURE



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

NOTE: Before installing the 500-sheet finisher, the optional bridge unit (B417) must be installed.

1. Unpack the finisher and remove the tapes.
2. Install the entrance guide $[A]$.
3. Install the unit holder $[B]$ (2 screws).
4. Install the 500-sheet finisher [C].

5. Install the output tray [A] as shown (2 snap rings).
6. Connect the finisher cable [B].
7. Turn on the main power switch and check the finisher operation.

### 3.14 PLATEN COVER INSTALLATION



1. Install the platen cover $[A]$ (2 screws).

### 3.14.1 MEMORY (G578/G579)

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



1. Remove the connector cover $[A]$ and rear cover $[B]$ (4 screws).
2. Remove the shield cover [C] (7 screws).
3. Install the memory DIMM [D] on the controller board.
4. Replace the controller board cover and rear cover.

### 3.14.2 HDD (B420)

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


[B]

[G]


1. Attach the HDD [A] to the HDD bracket [B] (4 stepped screws).

NOTE: The PCB side of the HDD must face the HDD bracket.
2. Attach the shield plate [C] to the HDD ( $4-\mathrm{M} 3 \times 3$ screws).
3. Connect the cable [D] to the HDD.

NOTE: The marked location [E] which is not a pinhole must face the HDD.
4. Remove the connector cover [F] and rear cover [G] (4 screws).

5. Connect the other end of the cable to CN509 [A] on the controller board, then install the HDD assembly [B] (2 screws).
6. Replace the rear cover and connector board.
7. Replace the key tops for the appropriate units to be installed.

C: Copy
D: Document Server

### 3.15 KEY COUNTER INSTALLATION

[A]



## $\triangle$ CAUTION

Unplug the machine power cord before starting the following procedure.

1. Remove two caps $[A]$.
2. Connect the key counter cable $[B]$.
3. Install the stepped screw [C].
4. Hold the key counter plate nuts [D] on the inside of the key counter bracket [E] and insert the key counter holder [F].
5. Secure the key counter holder to the bracket ( 2 screws).
6. Install the key counter cover [G] (2 screws).


Installation
7. Connect the cable $[\mathrm{A}]$.
8. Hook the key counter holder assembly $[B]$ onto the stepped screw [C].
9. Secure the key counter holder assembly with a screw [D].
10. The key counter function is available for other models by entering the following:

- User Tools
- System
- Key Operator Tools
- Key Counter Management


### 3.16 ANTI-CONDENSATION HEATER



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

1. Remove the rear scale [A] (3 screws), left scale [B] (2 screws), and exposure glass [C].
NOTE: When reinstalling the exposure glass, make sure that the mark [D] is positioned at the rear left corner, as shown.
2. Move the 1st and 2nd scanners to the right.
3. Install the cable clamp [E].
4. Install the anti-condensation heater [F] (2 screws).
5. Join the connectors [G]
6. Attach the cable cover [H], as shown.

### 3.17 TRAY HEATER



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

1. Remove the connector cover $[A]$ and rear cover $[B]$ (4 screws).
2. Slide out the 1st and 2nd paper trays.
3. Pass the connector [C] through the opening [D].
4. Install the tray heater assembly [E] (1 screw).

5. Remove the 2nd paper lift motor [A] (2 screws, 1 connector).
6. Route the heater cable $[B]$ to the side of rivet [C] and under bracket [D].
7. Clamp the heater cable $[B]$ as shown.
8. Joint the heater cable and the ac cable [E].
9. Reinstall the paper lift motor $[A]$ and reassemble the machine.

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



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

1. Remove the joint brackets $[A]$ (1 screw each).
2. Remove the rear cover $[B]$ for the optional paper tray unit (2 screws).
3. Remove the cable guide [C] (1 screw).
4. Install the clamps [D].
[B]

5. Slide out the two paper trays from the optional paper tray unit.
6. Pass the connector $[A]$ through the opening $[B]$.
7. Install the tray heater assembly [C] (1 screw).
8. Clamp the cables [D], as shown.
9. Join the connectors [E].
10. Reinstall the cable guide.

11. Remove two screws [A] from the rear side of the paper feed unit.
12. Reinstall the rear cover for the optional paper tray unit.
13. Reinstall the two paper trays into the optional paper tray unit.
14. Remove the 2nd paper tray of the copier.
15. Remove two screws [B] and install the screws [C] which were removed in step 12.
16. Reinstall the 2nd paper tray of the copier.

### 3.19 TRAY HEATER (OPTIONAL LCT)



## $\triangle$ CAUTION

Unplug the machine power cord before starting the following procedure.

1. Remove two joint brackets $[A]$ (1 screw each).
2. Remove the rear cover for the LCT [B] (2 screws).
3. Slide out the paper tray [C].
4. Push the stopper [D] on both slide rails and remove the paper tray.
5. Pass the connector $[E]$ through the opening $[F]$.
6. Install the tray heater [G] (1 screw).

7. Install five clamps $[A]$.
8. Connect the cable $[B]$ to the tray heater cable [C].
9. Route the cable and clamp it.
10. Remove the connector cover of the copier [D].
11. Join the connectors [E].
12. Reinstall the connector cover of the copier.

[B]
13. Remove two screws [A] from the rear side of the LCT.
14. Reinstall the rear cover of the LCT.
15. Reinstall the paper tray.
16. Remove the 2nd paper tray of the copier.
17. Remove two screws [B] and install the screws [C] which were removed in step 13.
18. Reinstall the $2 n d$ paper tray of the copier.

## SERVICE TABLES

## 4. SERVICE TABLES

### 4.1 GENERAL CAUTION

## $\triangle$ 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 fax machine or the network server, or while the machine is accessing the hard disk or memory for reading or writing data.

Do not turn off the main switch while any of the electrical components are active. Doing so might cause damage to units, such as the PCU, when they are pulled out of or put back into the copier.

### 4.1.1 PCU (PHOTOCONDUCTOR UNIT)

The PCU consists of the OPC drum, development unit, charge roller, and cleaning unit. Follow the cautions below when handling a PCU.

1. Never touch the drum surface with bare hands. When the drum surface is touched or becomes dirty, wipe it with a dry cloth or clean it with wet cotton. Wipe with a dry cloth after cleaning with the cotton.
2. Never used alcohol to clean the drum; alcohol dissolves the drum surface.
3. Store the PCU in a cool, dry place away from heat.
4. Never expose the drum to corrosive gases such as ammonia gas.
5. Never shake the used PCU. Doing so may cause toner and/or developer to spill out.
6. Dispose of used PCUs in accordance with local regulations.

### 4.1.2 TRANSFER ROLLER UNIT

1. Never touch the transfer roller surface with bare hands.
2. Take care not to scratch the transfer roller as the surface is easily damaged.

### 4.1.3 SCANNER UNIT

1. Clean the exposure glass with alcohol or with glass cleaner to reduce the amount of static electricity on the surface of the glass.
2. Use a blower brush or a cotton pad with water to clean the mirrors and lens.

## GENERAL CAUTION

3. Do not bend or crease the exposure lamp flat cable.
4. Do not disassemble the lens unit. Doing so will throw the lens and the copy image out of focus.
5. Do not turn any of the CCD positioning screws. Doing so will throw the CCD out of position.

### 4.1.4 LASER UNIT

1. Do not loosen the screws that secure the LD drive board to the laser diode casing. Doing so will 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 mirror are very sensitive to dust.
4. Do not touch the glass surface of the polygon mirror motor unit with bare hands.

### 4.1.5 FUSING UNIT

1. After installing the fusing thermistor, make sure that it is in contact with the hot roller and that the hot roller can rotate freely.
2. Be careful not to damage the edges of the hot roller strippers or their tension springs.
3. Do not touch the fusing lamp and rollers with bare hands.
4. Make sure that the fusing lamp is positioned correctly and that it does not touch the inner surface of the hot roller.

### 4.1.6 PAPER FEED

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

### 4.1.7 OTHERS

1. The TD sensor initial setting is performed automatically after installing the new PCU and closing the front cover. Never open the front cover or turn off the main switch during this time. The main motor stops when the initial setting has finished.
2. The toner bottle should be replaced while the main switch is on.
3. If the optional tray, drum, and optics anti-condensation heaters have been installed, keep the copier power cord plugged in, even when the copier main switch is turned off. This keeps the heaters energized.

### 4.2 SERVICE PROGRAM MODE

### 4.2.1 SERVICE PROGRAM MODE OPERATION

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

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


## Entering and Exiting SP mode

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

NOTE: Use SP2-902 to perform test pattern printing. (4.2.3)

## 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, touch 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. 4.2.2)
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. (4.2.2)

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 writes over the previous setting.
- Press $\#$ to enter the setting. (If you enter a number that is out of range, the key press is ignored.)
- When you are prompted to complete the selection, press Yes.

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 () 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.

### 4.2.2 SERVICE PROGRAM MODE TABLES

## 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 $\pm 9$, the setting is reset to +3.0 after an <br> NVRAM reset, and the value can be changed in 0.1 mm steps <br> with each key press. |
| italics | Comments added for reference. |
| * | Value stored in NVRAM. After a RAM reset, this default value <br> (factory setting) is restored. |
| $\mathbf{1 1 1 1}$ | An SP number set in bold-italic denotes a "Special Service <br> Program" mode setting that appears only after entering the SP <br> mode by pressing \# and Copy SP together. ( $-4.2 .1)$ |
| 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



| 1 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 007 | By-pass Paper Size Display |  |  |
|  |  |  | Displays the by-pass paper width sensor output. |
| 103 | Fusing Idling |  |  |
|  |  |  | Switches fusing idling on/off. <br> Switch on if fusing on the 1st and 2nd copies is incomplete (this may occur if the room is cold.) $[1=\text { On } / 0=\text { Off }]$ |
| 105* | Fusing Temperature Adjustment |  |  |
|  | 1 | Roller Center | Adjusts the fusing temperature at the center and both ends of the hot roller for normal printing.$\text { [120~200 / } 165 / 1^{\circ} \mathrm{C} / \text { step] }$ |
|  | 2 | Roller Ends |  |
|  | 3 | Energy Saver | Adjusts the fusing temperature at the center and both ends of the hot roller for energy saver mode. $\left[0 \sim 160 / 150 / 1^{\circ} \mathrm{C} / \text { step }\right]$ |
|  | 4 | Thick Paper (Center) | Adjusts the additional fusing temperature for thick paper for the 2nd paper tray and for the bypass tray.$\text { [0~160/20/1 } \left.{ }^{\circ} \mathrm{C} / \text { step }\right]$ |
|  | 5 | Thick Paper (Ends) |  |
|  | 6 | After Warming-up (Center) | Adjusts the fusing temperature at the center of the hot roller after the machine has warmed up. $\text { [120 ~ } 220 / 165 / 1^{\circ} \mathrm{C} / \text { step] }$ |
|  | 7 | After Warming-up (Ends) | Adjusts the fusing temperature at both ends of the hot roller after the machine has warmed up. $\text { [120 ~ } 220 / 175 / 1^{\circ} \mathrm{C} / \text { step] }$ |
|  | 8 | Number of Pages | In this machine, fusing temperature is kept $10^{\circ} \mathrm{C}$ higher than the normal temperature for a number of pages after the machine has warmed up. This SP selects the number of pages made at this temperature. See Detailed Section Descriptions - Fusing for more details. $[0 \sim 10 / 3 / 1 \text { page/step }]$ |
|  | 9 | Times | In this machine, fusing temperature is kept $10^{\circ} \mathrm{C}$ higher than the normal temperature for a short while after the machine been warmed up. This SP selects the length of time that this temperature is used. See Detailed Section Descriptions - Fusing for more details. $\text { [0 ~ } 180 \text { / } 60 \text { / 1s/step] }$ |
| 106 | Fusing Temp. Display |  |  |
|  | 1 | Roller Center | Displays the fusing temperature for the center or both ends of the hot roller. |
|  | 2 | Roller Ends |  |
|  | 3 | In the Machine at Power On | Displays the temperature in the machine at power on. This temperature is monitored by the thermistor on the SBCU board. |
| 108* | Fusing Soft Start Setting |  |  |
|  | 1 |  | Selects whether the fusing temperature control cycle is 1 or 3 seconds. <br> If this is "1 (3s)", the power supply fluctuation caused by the fusing lamp turning on is less often. $[0=1 \mathrm{~s} / 1=3 \mathrm{~s}]$ <br> Default: $0=$ N. America, $1=$ Europe/Asia |


| 1 | Mode Number/Name |  | Function/[Setting] |  |
| :---: | :---: | :---: | :---: | :---: |
| 109 | Fusing Nip Band Check |  |  |  |
|  |  |  | $\text { Checks the fusing nip band } 4.2 .11 \text { ) }$$[1 \text { = Start / 0 = Stop }$ |  |
| 902 | AC Frequency Display |  |  |  |
|  |  |  | Displays the fusing lamp power control frequency which is detected by the zero cross signal generator. Under " 54 " equals 50 Hz . Otherwise, 60 Hz . |  |
| 903* | Feed Clutch Re-energize |  |  |  |
|  | 1 | By-pass Feed | Adjusts the paper feed amount allowed by the clutch (see the table below) after correcting the skew at registration. <br> [ 0 ~ 10 / 6 / 1 mm/step] |  |
|  |  |  | Paper Feed Station | Clutch |
|  |  |  | By-pass Feed |  |
|  |  |  | 1st Paper Tray Other Paper Trays | 1st Paper Feed <br> Upper Relay |
|  | 2 | 1st Paper Tray | When paper jams occur after restarting paper feed after registration, increase the value to help the registration roller feed the paper.$\text { [ } 0 \sim 10 / 0 / 1 \mathrm{~mm} / \text { step] }$ |  |
|  | 3 | Other Paper Trays |  |  |
| 905* | Tray Paper Full Detection |  |  |  |
|  |  |  | Determines whether or not to detect if the built-in copy tray is full.$[0=\mathrm{No} / 1 \text { = Yes] }$ |  |
| 906* | Tray Paper Full Timer |  |  |  |
|  |  |  | Adjusts the time that the paper overflow sensor must remain on before a message appears on the LCD. The sensor may be switched on and off again if the paper is curled, giving a false tray full detection. This SP prevents this problem. <br> This SP mode is used when SP1-905 is set to 1. [100~5000 / 500 / $10 \mathrm{~ms} / \mathrm{step}$ ] |  |
| 908* | 1st Bottom Plate Pressure Adjustment |  |  |  |
|  | 1 | Normal Size | If a middle size threshold is not stored with SP1-908-9, this SP adjusts the upper paper lift motor reverse time for paper sizes larger than the small size threshold set with SP1-908-8. <br> If a middle size threshold is stored with SP1-908-9, then this SP adjusts the motor reverse time for sizes larger than the middle size. <br> Do not input a value greater than 1,200 . <br> Use this SP when a paper feed problem occurs from the 1st paper tray. <br> See "Paper Lift Mechanism" for details on SP1-908. <br> [ 0 ~ $2000 / 200 / 1 \mathrm{~ms} / \mathrm{step}$ ] |  |


| 1 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 908* | 2 | Small Size | Adjusts the upper paper lift motor reverse time for paper of the same size as or smaller than the small size threshold set with SP1-908-8. <br> Do not input a value greater than 1200. <br> Use this SP when a paper feed problem occurs from the 1st paper tray. <br> See "Paper Lift Mechanism" for details on SP1-908. $\text { [ } 0 \text { ~ } 2000 \text { / } 600 \text { / } 1 \text { ms/step] }$ |
|  | 3 | Middle Size | Adjusts the upper paper lift motor reverse time for paper sizes larger than the small size threshold set with SP1-908-8, up to and including the middle size threshold set with SP1-908-9. If a middle size threshold is not stored with SP1-908-9, this SP is not used. <br> Do not input a value greater than 1200. <br> Use this SP when a paper feed problem occurs from the 1st paper tray. <br> See "Paper Lift Mechanism" for details on SP1-908. [0 ~ 2000 / 200 / 1 ms/step] |
|  | 1st Bottom Plate Pressure Re-adjustment |  |  |
|  | 4 | Small Size | Adjusts the upper paper lift motor forward rotation time for paper of the same size as or smaller than the small size threshold set with SP1-908-8. The motor rotates forward when the remaining paper amount is lower than the value of SP1-908-6. <br> Use this SP when a paper feed problem occurs when paper in the 1st paper tray is running low. <br> See "Paper Lift Mechanism" for details on SP1-908. [ 0 ~ 2000 / $400 / 1 \mathrm{~ms} /$ step] |
|  | 5 | Middle Size | Adjusts the upper paper lift motor forward rotation time for paper sizes larger than the small size threshold set with SP1-908-8, up to and including the middle size threshold set with SP1-908-9. <br> The motor rotates forward when the amount of remaining paper is lower than the value of SP1-908-7. If a middle size threshold is not stored with SP1-908-9, this SP is not used. <br> Use this SP when a paper feed problem occurs when paper in the 1st paper tray is running low. <br> See "Paper Lift Mechanism" for details on SP1-908. <br> [ 0 ~ 2000 / 300 / 1 ms/step] |
|  | 1st Paper Amount |  |  |
|  | 6 | Small Size | Selects the remaining paper amount limit for use with SP1-908-4. <br> Set this SP to 2 or 3 when a paper feed problem occurs before near-end. <br> See "Paper Lift Mechanism" for details on SP1-908. <br> [ $0=$ None (Empty) / $1=$ Near End $/ 2=25 \% / 3=75 \%$ ] |
|  | 7 | Middle Size | Selects the remaining paper amount limit for use with SP1-908-5. <br> Set this SP to 2 or 3 when a paper feed problem occurs before near-end. <br> See "Paper Lift Mechanism" for details on SP1-908. <br> [ $0=$ None (Empty) $/ 1=$ Near End $/ 2=25 \% / 3=75 \%]$ |


| 1 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 908* | 1st Paper Size |  |  |
|  | 8 | 1st Small Paper Size Setting | Selects the small size threshold for the 1st paper tray. " 0 " means that this setting is not used. <br> The size used by SP1-908 is determined by paper width. See "Paper Lift Mechanism" for details on SP1908. $[0=\text { None }(\text { Not used) } / \mathbf{1}=\text { HLT/A5 } / 2=\text { A4 } / 3=\text { LT } / 4$ $=\mathrm{DLT} / 5=\mathrm{A} 3$ |
|  | 9 | 1st Middle Paper Size Setting | Selects the middle size threshold for the upper tray. " 0 " means that this setting is not used. <br> The value must be larger than the small size threshold (SP1-908-8). The size used by SP1-908 is determined by paper width. See "Paper Lift Mechanism" for details on SP1-908. <br> [ $0=$ None (Not used) $/ 1=\mathrm{HLT} / \mathrm{A} 5 / 2=\mathrm{A} 4 / 3=\mathrm{LT} /$ <br> $4=\mathrm{DLT} / 5=\mathrm{A} 3$ ] |
| 909* | 2nd Bottom Plate Pressure Adjustment |  |  |
|  | 1 | Normal Size | If a middle size threshold is not stored with SP1-909-9, this SP adjusts the upper paper lift motor reverse time for paper sizes larger than the small size threshold set with SP1-909-8. <br> If a middle size threshold is stored with SP1-909-9, then this SP adjusts the motor reverse time for sizes larger than the middle size. <br> Do not input a value greater than 1,200. <br> Use this SP when a paper feed problem occurs from the 2nd paper tray. <br> See "Paper Lift Mechanism" for details on SP1-909. <br> [ 0 ~ $2000 / 200 / 1 \mathrm{~ms} / \mathrm{step}$ ] |
|  | 2 | Small Size | Adjusts the upper paper lift motor reverse time for paper of the same size as or smaller than the small size threshold set with SP1-909-8. <br> Do not input a value greater than 1,200. <br> Use this SP when a paper feed problem occurs from the 2nd paper tray. <br> See "Paper Lift Mechanism" for details on SP1-909. <br> [ 0 ~ 2000 / 600 / 1 ms/step] |
|  | 3 | Middle Size | Adjusts the upper paper lift motor reverse time for paper sizes larger than the small size threshold set with SP1-909-8, up to and including the middle size threshold set with SP1-909-9. If a middle size threshold is not stored with SP1-909-9, this SP is not used. <br> Do not input a value greater than 1200. <br> Use this SP when a paper feed problem occurs from the 2nd paper tray. <br> See "Paper Lift Mechanism" for details on SP1-909. [ 0 ~ 2000 / 200 / 1 ms/step] |


| 1 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 909* | 2nd Bottom Plate Pressure Re-adjustment |  |  |
|  | 4 | Small Size | Adjusts the upper paper lift motor forward rotation time for paper of the same size as or smaller than the small size threshold set with SP1-909-8. The motor rotates forward when the remaining paper amount is lower than the value of SP1-909-6. <br> Use this SP when a paper feed problem occurs when paper in the 2nd paper tray is running low. See "Paper Lift Mechanism" for details on SP1-909. [0 ~ 2000 / 400 / 1 ms/step] |
|  | 5 | Middle Size | Adjusts the upper paper lift motor forward rotation time for paper sizes larger than the small size threshold set with SP1-909-8, up to and including the middle size threshold set with SP1-909-9. <br> The motor rotates forward when the remaining paper amount is lower than the value of SP1-909-7. <br> If a middle size threshold is not stored with SP1-909-9, this SP is not used. <br> Use this SP when a paper feed problem occurs when paper in the 2nd paper tray is running low. <br> See "Paper Lift Mechanism" for details on SP1-909. <br> [0 ~ 2000 / 300 / 1 ms/step] |
|  | 2nd Paper Amount |  |  |
|  | 6 | Small Size | Selects the remaining paper amount limit for use with SP1-909-4. <br> Set this SP to 2 or 3 when a paper feed problem occurs before near-end. <br> See "Paper Lift Mechanism" for details on SP1-909. <br> [ $0=$ None (Empty) $/ 1=$ Near End $/ 2=25 \% / 3=75 \%]$ |
|  | 7 | Middle Size | Set this SP to 2 or 3 when a paper feed problem occurs before near-end. <br> See "Paper Lift Mechanism" for details on SP1-909 |
|  | 2nd Paper Size |  |  |
|  | 8 | 2nd Small Paper Size Setting | Selects the small size threshold for the 2nd paper tray. " 0 " means that this setting is not used. <br> The size used by SP1-909 is determined by paper width. See "Paper Lift Mechanism" for details on SP1909. $\begin{aligned} & {[0=\text { None (Not used) } / \mathbf{1}=\mathrm{HLT} / \mathrm{A} 5 / 2=\mathrm{A} 4 / 3=\mathrm{LT} / 4} \\ & =\mathrm{DLT} / 5=\mathrm{A} 3] \end{aligned}$ |
|  | 9 | 2nd Middle Paper Size Setting | Selects the middle size threshold for the upper tray. " 0 " means that this setting is not used. <br> The value must be larger than the small size threshold (SP1-909-8). The size used by SP1-909 is determined by paper width. See "Paper Lift Mechanism" for details on SP1-909. $\begin{aligned} & {[0=\text { None }(\text { Not used) } / 1=\mathrm{HLT} / \mathrm{A} 5 / 2=\mathrm{A} 4 / 3=\mathrm{LT} /} \\ & 4=\mathrm{DLT} / 5=\mathrm{A} 3] \end{aligned}$ |


| 1 |  | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 910* | 3rd Bottom Plate Pressure Adjustment |  |  |
|  | , | Normal Size (Optional PFU) | If a middle size threshold is not stored with SP1-910-9, this SP adjusts the upper paper lift motor reverse time for paper sizes larger than the small size threshold set with SP1-910-8. <br> If a middle size threshold is stored with SP1-910-9, then this SP adjusts the motor reverse time for sizes larger than the middle size. <br> Do not input a value greater than 1200. <br> Use this SP when a paper feed problem occurs from the 3rd paper tray. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-910. <br> [ 0 ~ $2000 / 200 / 1 \mathrm{~ms} / \mathrm{step}$ ] |
|  | 2 | Small Size (Optional PFU) | Adjusts the upper paper lift motor reverse time for paper of the same size as or smaller than the small size threshold set with SP1-910-8. <br> Do not input a value greater than 1200. <br> Use this SP when a paper feed problem occurs from the 3rd paper tray. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-910. <br> [ 0 ~ 2000 / 600 / 1 ms/step] |
|  | 3 | Middle Size (Optional PFU) | Adjusts the upper paper lift motor reverse time for paper sizes larger than the small size threshold set with SP1-910-8, up to and including the middle size threshold set with SP1-910-9. If a middle size threshold is not stored with SP1-910-9, this SP is not used. <br> Do not input a value greater than 1200. <br> Use this SP when a paper feed problem occurs from the 3rd paper tray. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-910. <br> [ 0 ~ 2000 / 200 / 1 ms/step] |
|  | 3rd Bottom Plate Pressure Re-adjustment |  |  |
|  | 4 | $\begin{aligned} & \text { Small Size } \\ & \text { (Optional PFU) } \end{aligned}$ | Adjusts the upper paper lift motor forward rotation time for paper of the same size as or smaller than the small size threshold set with SP1-910-8. The motor rotates forward when the remaining paper amount is lower than the value of SP1-910-6. <br> Use this SP when a paper feed problem occurs when paper in the 3rd paper tray is running low. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-910. <br> [ 0 ~ 2000 / $400 / 1 \mathrm{~ms} / \mathrm{step}$ ] |


| 1 |  | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 910* | 5 | Middle Size (Optional PFU) | Adjusts the upper paper lift motor forward rotation time for paper sizes larger than the small size threshold set with SP1-910-8, up to and including the middle size threshold set with SP1-910-9. <br> The motor rotates forward when the remaining paper is lower than the value of SP1-910-7. <br> If a middle size threshold is not stored with SP1-910-9, this SP is not used. <br> Use this SP when a paper feed problem occurs when paper in the 3rd paper tray is running low. See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-910. <br> [ 0 ~ 2000 / $\mathbf{3 0 0} / 1 \mathrm{~ms} /$ step] |
|  | 3rd Paper Amount |  |  |
|  | 6 | $\begin{aligned} & \text { Small Size } \\ & \text { (Optional PFU) } \end{aligned}$ | Selects the remaining paper amount limit for use with SP1-910-4. <br> Set this SP to 2 or 3 when a paper feed problem occurs before near-end. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-910. <br> [ $0=$ None (Empty) $/ 1=$ Near End $/ 2=25 \% / 3=75 \%$ ] |
|  | 7 | Middle Size (Optional PFU) | Selects the remaining paper amount limit for use with SP1-910-5. <br> Set this SP to 2 or 3 when a paper feed problem occurs before near-end. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-910. <br> [ $0=$ None (Empty) $/ 1=$ Near End $/ 2=25 \% / 3=75 \%$ ] |
|  | 3rd Paper Size |  |  |
|  | 8 | 3rd Small Paper Size Setting (Optional PFU) | Selects the small size threshold for the 3rd paper tray. " 0 " means that this setting is not used. <br> The size used by SP1-910 is determined by paper width. See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-910. $\text { [0 = None (Not used) } / \mathbf{1}=\text { HLT/A5 } / 2=\text { A4 } / 3=\text { LT } / 4$ $=\mathrm{DLT} / 5=\mathrm{A} 3]$ |
|  | 9 | 3rd Middle Paper Size Setting (Optional PFU) | Selects the middle size threshold for the upper tray. " 0 " means that this setting is not used. <br> The value must be larger than the small size threshold (SP1-910-8). The size used by SP1-910 is determined by paper width. See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-910. $[0=\text { None (Not used) } / 1=\text { HLT/A5 / } 2=\mathrm{A} 4 / 3=\mathrm{LT} /$ $4=\mathrm{DLT} / 5=\mathrm{A} 3]$ |


| 1 |  | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 911* | 4th Bottom Plate Pressure Adjustment |  |  |
|  | 1 | Normal Size (Optional PFU) | If a middle size threshold is not stored with SP1-911-9, this SP adjusts the upper paper lift motor reverse time for paper sizes larger than the small size threshold set with SP1-911-8. <br> If a middle size threshold is stored with SP1-911-9, then this SP adjusts the motor reverse time for sizes larger than the middle size. <br> Do not input a value greater than 1200. <br> Use this SP when a paper feed problem occurs from the 4th paper tray. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-911. <br> [ 0 ~ $2000 / 200 / 1 \mathrm{~ms} / \mathrm{step}$ ] |
|  | 2 | Small Size (Optional PFU) | Adjusts the upper paper lift motor reverse time for paper of the same size as or smaller than the small size threshold set with SP1-911-8. <br> Do not input a value greater than 1200. <br> Use this SP when a paper feed problem occurs from the 4th paper tray. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-911. <br> [ 0 ~ 2000 / 600 / 1 ms/step] |
|  | 3 | Middle Size (Optional PFU) | Adjusts the upper paper lift motor reverse time for paper sizes larger than the small size threshold set with SP1-911-8, up to and including the middle size threshold set with SP1-911-9. If a middle size threshold is not stored with SP1-911-9, this SP is not used. <br> Do not input a value greater than 1200. <br> Use this SP when a paper feed problem occurs from the 4th paper tray. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-911. <br> [ 0 ~ 2000 / 200 / 1 ms/step] |
|  | 4th Bottom Plate Pressure Re-adjustment |  |  |
|  | 4 | $\begin{aligned} & \text { Small Size } \\ & \text { (Optional PFU) } \end{aligned}$ | Adjusts the upper paper lift motor forward rotation time for paper of the same size as or smaller than the small size threshold set with SP1-911-8. The motor rotates forward when the remaining paper amount is lower than the value of SP1-911-6. <br> Use this SP when a paper feed problem occurs when paper in the 4th paper tray is running low. See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-911. <br> [ 0 ~ $2000 / 400 / 1 \mathrm{~ms} / \mathrm{step}$ ] |


| 1 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 911* | 5 | Middle Size (Optional PFU) | Adjusts the upper paper lift motor forward rotation time for paper sizes larger than the small size threshold set with SP1-911-8, up to and including the middle size threshold set with SP1-911-9. <br> The motor rotates forward when the remaining paper amount is lower than the value of SP1-911-7. <br> If a middle size threshold is not stored with SP1-911-9, this SP is not used. <br> Use this SP when a paper feed problem occurs when paper in the 4th paper tray is running low. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-911. $\text { [ } 0 \text { ~ } 2000 \text { / } 300 \text { / } 1 \text { ms/step] }$ |
|  | 4th Paper Amount |  |  |
|  | 6 | Small Size (Optional PFU) | Selects the remaining paper amount limit for use with SP1-911-4. <br> Set this SP to 2 or 3 when a paper feed problem occurs before near-end. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-911. <br> [ $0=$ None (Empty) $/ 1=$ Near End $/ 2=25 \% / 3=75 \%$ ] |
|  | 7 | Middle Size (Optional PFU) | Selects the remaining paper amount limit for use with SP1-911-5. <br> Set this SP to 2 or 3 when a paper feed problem occurs before near-end. <br> See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-911. <br> [ $0=$ None (Empty) $/ 1=$ Near End $/ 2=25 \% / 3=75 \%$ ] |
|  | 4th Paper Size |  |  |
|  | 8 | 4th Small Paper Size Setting (Optional PFU) | Selects the small size threshold for the 4th paper tray. " 0 " means that this setting is not used. <br> The size used by SP1-911 is determined by paper width. See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-911. $\begin{aligned} & {[0=\text { None }(\text { Not used }) / 1=\mathrm{HLT} / \mathrm{A} 5 / 2=\mathrm{A} 4 / 3=\mathrm{LT} / 4} \\ & =\mathrm{DLT} / 5=\mathrm{A} 3] \end{aligned}$ |
|  | 9 | 4th Middle Paper Size Setting (Optional PFU) | Selects the middle size threshold for the upper tray. " 0 " means that this setting is not used. <br> The value must be larger than the small size threshold (SP1-911-8). The size used by SP1-911 is determined by paper width. See "Optional Paper Tray Unit - Paper Lift Mechanism" for details on SP1-911. $[0=\text { None }(\text { Not used) } / 1=\mathrm{HLT} / \mathrm{A} 5 / 2=\mathrm{A} 4 / 3=\mathrm{LT} /$ $4=\mathrm{DLT} / 5=\mathrm{A} 3]$ |
| 912* | Tray Motor Reverse Time |  |  |
|  |  |  | Adjusts the tray motor reverse time. The tray motor reverses when the tray is pulled out. The tray can be put back in the machine without damage while the motor reverses. [0 ~ $9000 / 1700 / 1 \mathrm{~ms} / \mathrm{step}]$ |


| 1 | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: |
| 994 | Punch Hole Detection |  |
|  |  | When using paper that has punch holes, the registration sensor may detect the hole and a paper jam will be detected. If you select " 1 ", the machine ignores the registration sensor off signal within 50 mm from the trailing edge of the paper. $[0=\text { No } 1=\mathrm{Yes} \text { ] }$ |

## SP2-XXX: Drum

| 2 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 001* | Charge Roller Bias Adjustment |  |  |
|  | $1^{*}$ | Printing | Adjusts the voltage applied to the charge roller during printing. <br> This value will be changed automatically when the charge roller bias correction is performed. <br> Note that if this value is changed, the charge roller voltage will be corrected based on the new voltage. [2100~1500 / - 1700 / $1 \mathrm{~V} /$ step] |
|  | 2* | Charge Roller Bias Adjustment <br> (ID sensor pattern) | Adjusts the voltage applied to the charge roller when making the Vsdp ID sensor pattern (for charge roller bias correction). <br> The actual charge roller voltage is this value plus the value of SP2-001-1. $\text { [ } 0 \text { ~ } 400 / 200 / 1 \mathrm{~V} / \text { step }]$ |
|  | 3 | Charge Roller Bias Adjustment (Temporally input) | Inputs the charge roller voltage temporarily for test purposes. <br> Do not change the value. <br> [ 0 ~ - 2500 / 0 / $1 \mathrm{~V} /$ step] |
| 005* | Charge Roller Bias Correction |  |  |
|  | 1 | Vsdp Minimum | Adjusts the lower threshold value for the charge roller correction. <br> When the value of Vsdp/Vsg is less than this value, the charge roller voltage increases by 50 V (e.g. from -500 to -550). The size of the increase depends on SP2-005-3. <br> [ 0 ~ 100 / $90 / 1 \% /$ step] |
|  | 2 | Vsdp Maximum | Adjusts the upper threshold value for the charge roller correction. <br> When the value of $V s d p / V s g$ is greater than this value, the charge roller voltage decreases by 50 V (e.g. from 550 to -500). The size of the decrease depends on SP2-005-3. <br> [ 0 ~ 100 / 95 / $1 \% /$ step] |
|  | 3 | Step | Adjusts the size of the charge roller voltage correction. [ 0 ~ 200/50/1 V/step] |


| 2 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 101* | Erase Margin Adjustment |  |  |
|  | $1{ }^{1}$ Leading Edge |  | Adjusts the leading edge erase margin. <br> The specification is $3 \pm 2 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Adjustment" for details. <br> [ 0.0 ~ 9.0 / 3.0 / 0.1 mm/step] |
|  | 2 | $\begin{array}{\|l} \hline \text { Trailing Edge - Small } \\ \text { Paper Size } \end{array}$ | Adjusts the trailing edge erase margin for paper of length 216 mm or less. <br> The specification is $3 \pm 2 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Adjustment" for details. <br> [ 0.0 ~ $9.0 / 2.0 / 0.1 \mathrm{~mm} / \mathrm{step}$ ] |
|  | 3 | $\begin{aligned} & \text { Trailing Edge - Middle } \\ & \text { Paper Size } \end{aligned}$ | Adjusts the trailing edge erase margin for paper of length 216.1 ~ 297 mm . <br> The specification is $3 \pm 2 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Adjustment" for details. <br> [ 0.0 ~ $9.0 / 3.0 / 0.1 \mathrm{~mm} / \mathrm{step}$ ] |
|  | 4 | $\begin{array}{\|l} \hline \text { Trailing Edge - Large } \\ \text { Paper Size } \end{array}$ | Adjusts the trailing edge erase margin for paper longer than 297 mm . <br> The specification is $3 \pm 2 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Adjustment" for details. <br> [ 0.0 ~ $9.0 / 4.0 / 0.1 \mathrm{~mm} / \mathrm{step}$ ] |
|  | 5 | Left Side | Adjusts the left edge erase margin. <br> The specification is $2 \pm 1.5 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Adjustment" for details. <br> [ 0.0 ~ 9.0 / $2.0 / 0.1 \mathrm{~mm} / \mathrm{step}$ ] |
|  | 6 | Right Side | Adjusts the right edge erase margin. <br> The specification is $2+2.5 /-1.5 \mathrm{~mm}$. See <br> "Replacement and Adjustment - Copy Adjustment" for details. $\text { [ } 0.0 \text { ~ } 9.0 \text { / } 2.0 \text { / } 0.1 \text { mm/step] }$ |
|  | 7 | Rear - Trailing Edge | Adjusts the trailing edge erase margin on the reverse side of duplex copies. <br> The actual trailing edge erase margin on the reverse side is this value plus the value of SP2-101-2 or 3 or 4 . The specification is $3 \pm 2 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Adjustment" for details [ 0.0 ~ 9.0 / 1.2 / 0.1 mm/step] |
|  | 8 | Rear - Left Side | Adjusts the left side erase margin on the reverse side of duplex copies. <br> The actual left side erase margin on the reverse side is this value plus the value of SP2-101-5. <br> The specification is $2 \pm 1.5 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Adjustment" for details. [ 0.0 ~ 9.0 / 0.3 / $0.1 \mathrm{~mm} / \mathrm{step}$ ] |
|  | 9 | Rear - Right Side | Adjusts the right side erase margin on the reverse side of duplex copies. <br> The actual right side erase margin on the reverse side is this value plus the value of SP2-101-6. <br> The specification is $2+2.5 /-1.5 \mathrm{~mm}$. See <br> "Replacement and Adjustment - Copy Adjustment" for details. $\text { [0.0~9.0 / } 0.3 / 0.1 \mathrm{~mm} / \text { step }]$ |


| 2 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 101* | 10 | Printer, Rear Trailing Edge | In printer mode, adjusts the trailing edge erase margin on the reverse side of duplex copies. <br> The actual trailing edge erase margin on the reverse side is this value plus the value of SP2-101-7. <br> The specification is $3 \pm 2 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Adjustment" for details <br> [ 0.0 ~ $9.0 / 0.0 / 0.1 \mathrm{~mm} / \mathrm{step}$ ] |
| 103* | LD Power Adjustment |  |  |
|  |  |  | Adjusts the LD power. DFU Do not change the value. [50~170 / 129 / 1/step] |
| 110* | Test Mode dpi |  |  |
|  |  |  | Sets the scanning resolution (dpi). DFU [See below / 8 / 0~18] <br> $0: 400 \times 400 \mathrm{dpi} \quad 1: 391 \times 406 \mathrm{dpi}$ <br> 2: $406 \times 391 \mathrm{dpi} \quad 4: 300 \times 300 \mathrm{dpi}$ <br> 8: $600 \times 600 \mathrm{dpi} \quad 15: 439 \times 430 \mathrm{dpi}$ <br> 16: $476 \times 476 \mathrm{dpi} \quad 17: 483 \times 465 \mathrm{dpi}$ <br> 18: $465 \times 483 \mathrm{dpi}$ |
| 201* | Development Bias Adjustment |  |  |
|  | 1 | Printing | Adjusts the development bias during printing. This can be adjusted as a temporary measure if faint copies appear due to an aging drum. <br> [-1500~2000/-650/1 V/step] |
|  | 2 | ID sensor pattern | Adjusts the development bias for making the ID sensor pattern. <br> The actual development voltage for the ID sensor pattern is this value plus the value of SP2-201-1. This should not be used in the field, because it affects ID sensor pattern density, which affects toner supply. $\begin{aligned} & {[0=\mathrm{N}(200 \mathrm{~V}) / 1=\mathrm{H}(240 \mathrm{~V}) / 2=\mathrm{L}(160 \mathrm{~V}) / 3=\mathrm{HH}} \\ & (280 \mathrm{~V}) / 4=\mathrm{LL}(120 \mathrm{~V})] \end{aligned}$ |
| 210* | Bias Off Time |  |  |
|  | 1 | Charge Bias | Adjusts the charge voltage (-1200V) application time. DFU <br> When the charge voltage and development bias are turned off at the same time, toner or carrier will be attracted to the drum. To reduce the toner or carrier attraction, the machine applies -1200 V to the charge roller before the development bias is turned off. This SP adjusts the time for applying the charge. <br> [ 0 ~ $150 / 80 / 1 \mathrm{~ms} /$ step] |
|  | 2 | Development Bias | Adjusts the development bias off time. DFU <br> [-120 ~ 120 / 0 / 1ms/step] |



| 2 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 301* | 6 | Input - Rear |  |
|  | 7 | Temp inside the machine | Displays the temperature measured inside the machine just after power-on (by the thermistor on the SBCU board) the last time that the fusing unit was less than $40^{\circ} \mathrm{C}$ just after the machine was switched on. The transfer current is corrected in accordance with this value. |
| 801 | Developer Initialization |  |  |
|  |  |  | Initializes the developer and resets the TD and ID sensor outputs to their defaults. <br> Use this if the machine did not detect the new PCU when it was installed, and the TD/ID sensors were not initialized. |
| 802 | Developer Mixing |  |  |
|  |  |  | Mixes the developer and checks Vt. The machine mixes the developer for 2 minutes and while doing this, it reads the TD sensor output (Vt). It does not initialize the TD sensor output. <br> If the machine has not been used for a long time, prints may have a dirty background. In this case, use this SP mode to mix the developer. |
| 803* | Developer Initialization Data |  |  |
|  | 1 | TD Sensor | Displays the TD sensor output after performing the developer initialization. This value will be used in fixed supply mode. |
|  | 2 | ID Sensor PWM Value | Displays the PWM value of the ID sensor after performing the developer initialization. |
| 901* | Separation Voltage Adjustment |  |  |
|  | 1 | Front - Leading Edge | Adjusts the voltage that is applied to the separation plate during printing at the leading edge of the paper on the front side. <br> If the copies have pawl marks at the leading edge, increase this voltage. <br> [-1000~4000 / -1800 / $1 \mathrm{~V} /$ step] |
|  | 2 | Front - Image Area | Adjusts the voltage that is applied to the separation plate during printing on the image area of the paper on the front side. <br> If the copies have pawl marks in the image area, increase this voltage. <br> [-1000~4000 / -1800 / $1 \mathrm{~V} /$ step] |
|  | 3 | Rear - Leading Edge | Adjusts the voltage applied to the separation plate, during printing at the leading edge of the paper on the rear side. $\begin{aligned} & \text { See SP2-901-1. } \\ & {[-1000 \sim 4000 /-2100 / 1 \mathrm{~V} / \text { step }]} \end{aligned}$ |
|  | 4 | Rear - Image Area | Adjusts the voltage applied to the separation plate, during printing at the image area of the paper on the rear side. <br> See SP2-901-2. <br> [-1000~4000 / -2100 / 1 V/step] |


| 2 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 902* | Test Pattern Printing |  |  |
|  | 3 |  | Prints the test patterns. Select the number of the test pattern that you want to print (4.2.3). <br> When adjusting the printing registration, select no. 10 (Trimming Area Pattern). $\text { [ } 0 \sim 41 \text { / } 0 \text { / } 1 \text { step] }$ |
| 906* | Tailing Correction |  |  |
|  | $\begin{array}{r}1 \\ \\ \\ \hline\end{array}$ | Shift Value | Shifts the image across the page at the interval specified by SP2-906-2. <br> When making many copies of an original that contains vertical lines (such as a table), separation may not work correctly, then a tailing image will occur (ghosts of the vertical lines will continue past the bottom of the table). This SP prevents this problem. $[0.0 \sim 1.0 / 0.0 / 1 \mathrm{~mm} / \mathrm{step}]$ |
|  | 2 | Interval | Changes the interval for the image shift specified by SP2-906-1. <br> [1~10/0/1 page/step] |
| 907* | Line Width Correction |  |  |
|  | 1 | Text Mode | Adjusts the line width. The value " 5 " means that line width correction is disabled. A number smaller than 5 makes lines thinner. A number bigger than 5 makes lines thicker. $\begin{array}{\|l} \text { Thinnest } \\ \begin{array}{l} \text { Thickest } \\ 0-1-2-3-4-5-6-7-8-9-10 \\ {[0 \sim 10 / 5 / 1 \text { step }]} \end{array} \\ \hline \end{array}$ |
|  | 2 | Photo Mode | [ $0 \sim 10 / 6 / 1$ step] |
|  | 3 | Text/Photo Mode | [ $0 \sim 10 / 5 / 1$ step] |
|  | 4 | Pale Mode | [ $0 \sim 10 / 5 / 1$ step] |
|  | 5 | Generation Mode | [ $0 \sim 10 / 5 / 1$ step] |
| 908 | Forced Toner Supply |  |  |
|  |  |  | Forces the toner bottle to supply toner to the toner supply unit. <br> Press Execute on the touch panel to start. <br> During this process, the machine supplies toner until the toner concentration in the development unit reaches a standard level. However, if the toner concentration does not reach a standard level, the machine supplies toner for 2 minutes maximum. |
| 909* | Main Scan Magnification |  |  |
|  | 1 | Copy - Short Edge Feed | Adjusts the main scan magnification in copy mode when the machine feeds the paper in the short edge feed orientation. $\text { [-0.5 ~ } 0.5 \text { / } 0.0 \text { / 0.1\%/step] }$ |
|  | 2 | Printer - Short Edge Feed | Adjusts the main scan magnification in printer mode when the machine feeds the paper in the short edge feed orientation. $\text { [-0.5 ~ } 0.5 \text { / } 0.0 \text { / } 0.1 \% / \text { step] }$ |
|  | 3 | Copy - Long Edge Feed | Adjusts the main scan magnification in copy mode when the machine feeds the paper in the long edge feed orientation. $\text { [-0.5 ~ } 0.5 \text { / } 0.0 \text { / } 0.1 \% / \text { step] }$ |


| 2 | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: |
| 909* | $\begin{array}{\|l} \hline \text { Printer - Long Edge } \\ \text { Feed } \end{array}$ | Adjusts the main scan magnification in printer mode when the machine feeds the paper in the long edge feed orientation. $\text { [-0.5 ~ } 0.5 \text { / } 0.0 \text { / } 0.1 \% / \text { step] }$ |
| 910* | Margin Adjustment for By-pass |  |
|  |  | Adjusts the blank margin at the trailing edge of paper fed from the by-pass table. <br> [-9.0~+9.0 / $0.1 \mathrm{~mm} / 1 \mathrm{~mm} / \mathrm{step}]$ |
| 913* | ID Adjustment for Test Pattern |  |
|  |  | Adjusts the image density level for black pixels on test pattern printouts (patterns are made with SP2-902) This SP affects all test patterns except for the grayscale test patterns. $[0 \sim 15 / 15 / 1 / \text { step }]$ |
| 915* | Polygon Motor Idling Time |  |
|  |  | Selects the polygon motor idling time. <br> If the user sets an original, touches a key, or opens the platen cover/DF, the polygon motor starts idling to make a faster first copy. However, with the default (15 $\mathrm{s})$, the motor stops if the user does nothing for 15 s , and stops 15 s after the end of a job. <br> If set at " 0 ", the polygon motor never turns off during stand-by. However, when the machine goes into energy saver mode, the polygon motor turns off regardless of this timer. $[0=\text { None } / \mathbf{1}=\mathbf{1 5} \mathbf{~ s} / 2=25 \mathrm{~s}]$ |
| 921* | Toner Supply Mode |  |
|  |  | Selects the toner supply mode. <br> Normally, only use setting 0 . Change to 3 temporarily it the TD sensor is defective. Do not use settings 1 and 2; these are for designer's use only. $[0=\text { Sensor } 1 / 1=\text { Sensor } 2 / 2=\text { Fixed } 1 / 3=\text { Fixed }$ 2] |
| 922* | Toner Supply Time |  |
|  |  | Adjusts the toner supply motor on time for sensor supply mode. <br> This SP is effective only when SP2-921 is " 0 " or " 1 ". Increasing this value increases the toner supply motor on time. So, use a high value if the user tends to make lots of copies that have a high proportion of black. [ $0.1 \sim 5.0 / 0.6 / 0.1 \mathrm{~s} / \mathrm{step}$ ] |
| 923* | Toner Recovery Time |  |
|  |  | Adjusts the toner supply motor on time during recovery from toner near-end/end. <br> This SP is effective only when SP2-921 is " 0 ", " 1 ", or "2". <br> Note that toner recovery is done in a 3-second cycle. <br> So, the input value should be a multiple of 3 (e.g. 3, 6 <br> ,9). See "Toner Density Control" for more details. <br> [3~60/30/1 s/step] |


| 2 | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: |
| 925* | Toner Supply Rate |  |
|  |  | Adjusts the toner supply rate for fixed toner supply mode. <br> This SP is effective only when SP2-921 is " 2 " or " 3 ". Increasing this value increases the toner supply motor on time. So, use a high value if the user tends to make lots of copies that have a high proportion of black. See "Toner Density Control" for more details. $\begin{array}{ll} 0: t & 4: 12 t \\ 1: 2 \mathrm{t} & 5: 16 \mathrm{t} \\ 2: 4 \mathrm{t} & 6: O n \text { continuously } \\ 3: 8 \mathrm{t} & 7: 0 \mathrm{~s} \\ \mathrm{t}: 200 \mathrm{~ms} \\ {[0 \sim 7 / 0 / 1 / \text { step }]} \\ \hline \end{array}$ |
| 926* | Standard Vt |  |
|  |  | Adjusts Vts (Vt for a new PCU). The TD sensor output is adjusted to this value during the TD sensor initial setting process. <br> This SP is effective only when SP2-921 is " 0 ", " 1 ", or "2". <br> Do not change this value. <br> [ 0.00 ~ 5.00 / 2.50 / $0.01 \mathrm{~V} /$ step] |
| 927* | ID Sensor Control |  |
|  |  | Selects whether the ID sensor is used or not for toner density control. <br> If this value is " 0 ", dirty background may occur after the machine has not been used for a long time. $[0=\text { No } / 1=\mathrm{Yes}]$ |
| 928* | Toner End Clear |  |
|  |  | Clears the toner end condition. <br> Press Execute on the touch panel to clear the toner end condition without adding new toner. <br> If press Execute, the following are cleared. <br> - Toner end indicator (goes out) <br> - Toner near-end counter <br> - Toner near-end level <br> When making a lot of copies after changing this setting to " 1 ", the carrier may be attracted to the drum when the toner runs out, which may damage the drum. |
| 929* | Vref |  |
|  | 1 Upper Limit | Adjusts the upper limit for Vref. [ 0.00 ~ $5.00 / 3.10 / 0.01 \mathrm{~V} /$ step $]$ |
|  | 2 Lower Limit | Adjusts the lower limit for Vref. [ 0.00 ~ $5.00 / 1.40 / 0.01 \mathrm{~V} /$ step] |
| 930* | TD Sensor Manual Setting |  |
|  |  | Adjusts the TD sensor output. DFU [ $0.5 \sim 3.5 / 0.0 \mathrm{~V} / 1 \mathrm{~V} /$ step] |
| 931* | TD (V/wt\%) Setting |  |
|  |  | Adjusts the TD sensor sensitivity (coefficient: S) for toner density control. DFU <br> [ 0.01 ~ 1.50 / 0.4 / 0.1/step] |



| 2 | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: |
| 996* | Transfer Roller Cleaning |  |
|  |  | Selects whether the transfer roller is cleaned before each copy job. <br> Set this to '1' when dirty background appears on the reverse side of the first page of a copy job. However, the first copy time will be longer. <br> If this SP is at 0 , the transfer roller is never cleaned. See 'Detailed Section Descriptions - Transfer Roller Cleaning" for more details. $[0=\text { No / } 1=\text { Yes }]$ |
| 997* | Vts Setting (Factory) | DFU |
| 998* | PCU Reverse Rotation Time |  |
|  | 1 Wait Time | Adjusts the waiting time for starting to rotate the drum in reverse after the end of each job. <br> The wait time calculation formula is as follows. <br> This value $\times 30 \mathrm{~ms}$. 0: Reverses immediately after the end of the job (no waiting) $[0 \sim 99 \text { / } 20 \text { / 1/step] }$ |
|  | 2 Reverse Time | Adjusts the drum reverse rotation time. <br> The reverse rotation time calculation formula is as follows. <br> This value $\times 30 \mathrm{~ms}$. 0 : No reverse at end of job [0~99/1/1/step] |
| 999* | Toner Control Data Display |  |
|  |  | Displays the toner density control data on the debug monitor. DFU $[0=\mathrm{No} / 1=\mathrm{Yes}]$ |

SP4-XXX: Scanner

| 4 | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: |
| 008* | Main Scan Magnification (Scanner) |  |
|  |  | Adjusts the magnification in the main scan direction for scanning. <br> Use the $\because$ key to toggle between + and - before entering the value. The specification is $\pm 1 \%$. See "Replacement and Adjustment - Copy Adjustment" for details. $[-0.9 \sim+0.9 / 0.0 / 0.1 \% \text { step }]$ |
| 009* | Sub Scan Magnification (Scanner) |  |
|  |  | Adjusts the magnification in the sub scan direction for scanning. <br> Use the $\odot$ key to toggle between + and - before entering the value. The specification is $\pm 1 \%$. See "Replacement and Adjustment - Copy Adjustment" for details. $[-0.9 \sim+0.9 / 0.0 / 0.1 \% \text { step }]$ |



| 4 | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: |
| 303* | APS Small Size Original |  |
|  |  | Selects whether the copier determines that the original is A5 size when the APS sensor cannot detect the size. <br> If "A5 lengthwise" is selected, paper sizes that cannot be detected by the APS sensors are regarded as A5 lengthwise. If "Not detected" is selected, "Cannot detect original size" will be displayed. $[0=\text { No (Not detected) } / 1=\text { Yes (A5 lengthwise) }]$ |
| 305* | Original Size Detection |  |
|  |  | Selects whether the machine determines that the original is $A 4 / L T$, or $8 \mathrm{~K} / 16 \mathrm{~K}$. <br> $8 \mathrm{~K} / 16 \mathrm{~K}$ is not available for USA models. <br> [ $\mathbf{0}=$ Normal (LT for USA models, A4 for Europe/Asia models) <br> 1 = Reversed [A4 for USA models, LT for Europe/Asia models] $2=8 \mathrm{~K} / 16 \mathrm{~K}]$ |
| 417 | IPU Test Pattern |  |
|  |  | Prints test patterns from the IPU video data outputs. <br> 0. No Print <br> 1. Vertical Line -1 dot <br> 2. Vertical Line-2 dot <br> 3. Horizontal Line - 1 dot <br> 4. Horizontal Line - 2 dot <br> 5. Alternating Dot Pattern <br> 6. Grid Pattern - 1 dot <br> 7. Vertical Bands <br> 8. Grayscale - Horizontal (8 level) <br> 9. Grayscale - Vertical (8 level) <br> 10.Grayscale - 16 level <br> 11.Cross Pattern <br> 12. Slant Pattern <br> 13. Patch Pattern (256 level) <br> 14 Patch Pattern (64 level) <br> 15.Trimming Area <br> 16.Frequency characteristics - Vertical <br> 15. Frequency characteristics - Horizontal <br> Change to the copy mode display by pressing the $-\exists$ (Interrupt) key, then print the test pattern. |
| 428 | SBU Auto Adjustment |  |
|  |  | Performs the auto scanner adjustment. Using this SP mode after replacing the white plate or erasing the memory on the controller board. See "Replacement and Adjustment - Copy Image Adjustments - Standard White Density Adjustment" for details on how to do this. <br> Press Execute on the touch panel to start. |


| 4 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 901 | SBU Adjustment |  |  |
|  | ${ }^{*}$ | Gain - EVEN | Checks the difference value of the black level for the EVEN channel after adjusting the black level at powerup. DFU <br> However, after doing a memory all clear (SP5-801), use it to re-input the previous value. <br> [ 0 ~ 255 / 40 / 1/step] |
|  | $2^{*}$ | Gain - ODD | Checks the difference value of the black level for the ODD channel after adjusting the black level at powerup. DFU. <br> However, after doing a memory all clear (SP5-801), use it to re-input the previous value. $[0 \sim 255 / 40 / 1 / \text { step }]$ |
|  | 3 | DC Cont - EVEN | Adjusts the coefficient of the D/A converter for the AGC gain curve for DC cont for the EVEN channel. DFU <br> However, after doing a memory all clear (SP5-801), use it to re-input the previous value. <br> [ 0 ~255/25/1/step] |
| 901 | 4 | DC Cont - ODD | Adjusts the coefficient of the D/A converter for the AGC gain curve for DC cont for the ODD channel. DFU. <br> However, after doing a memory all clear (SP5-801), use it to re-input the previous value. <br> [ 0 ~255/25 / 1/step] |
|  | 7 | Current Value | Adjusts the coefficient of the D/A converter for the AGC gain curve for scanning the white plate. <br> DFU. <br> [0~255 / 147 / 1/step] |
| 902 | Exposure Lamp ON |  |  |
|  |  |  | Turns on the exposure lamp. <br> Press $O N$ on the touch panel to turn on the lamp. <br> Press OFF to turn off the lamp. |
| 903* | Image Quality Adjustment |  |  |
|  | 1 | Text : 25\% ~ 34\% | This adjustment is only effective for the "Custom Setting" original type. <br> Adjusts the image quality in Text mode. <br> A larger number increases contrast and sharpens the image but moiré may appear. <br> A smaller number reduces contrast and moiré but the line may become narrower. <br> [ 0 ~ 10 / $4 / 1$ step] |
|  | 2 | Text : 35\% ~ 66\% | [ $0 \sim 10 / 3 / 1$ step] |
|  | 3 | Text: 67\% ~ 141\% | [ $0 \sim 10$ / 4 / 1/step] |
|  | 4 | Text : 142\% ~ 400\% | [ $0 \sim 10$ / 4/1/step] |
|  | 5 | Photo : 25\% ~ 34\% | This adjustment is only effective for the "Custom Setting" original type. <br> Adjusts the image quality in Photo mode. <br> $0 \sim 6$ are for a glossy photo image (error diffusion) <br> 7 ~ 20 are for a printed photo image (dithering) If copy quality is not satisfactory, try another setting (trial and error) <br> [ $0 \sim 20 / 11 / 1 /$ step $]$ |


| 4 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 903* | 6 | Photo : 35\% ~ 66\% | [0 ~ 20 / 11 / 1/step] |
|  | 7 | Photo : 67\% ~ 141\% | [0 ~ 20 / 11 / 1/step] |
|  | 8 | Photo : 142\% ~ 400\% | [0 ~ 20 / 11 / 1/step] |
|  | 9 | Text/Photo: 25\% ~ 34\% | This adjustment is only effective for the "Custom Setting" original type. <br> Adjusts the image quality in Text/Photo mode. A larger number increases contrast and sharpens the image but moiré may appear. <br> A smaller number reduces contrast and moiré but the line may become narrower. <br> [ 0 ~ 10 / 3 / 1 step] |
|  | 10 | Text/Photo : $35 \% ~ ~ 66 \%$ | [0~10 / 5 / 1 step] |
|  | 11 | Text/Photo : 67\% ~ 141\% | [0~10 / 5 / 1 step] |
|  | 12 | $\begin{aligned} & \text { Text/Photo: } \\ & 142 \% ~ \sim 400 \% \\ & \hline \end{aligned}$ | [0~10 / 5 / 1 step] |
|  | 13 | Pale : 25\% ~ 34\% | This adjustment is only effective for the "Custom Setting" original type. <br> Adjusts the image quality in Pale mode. <br> A larger number increase the number of gradations in low contrast areas. <br> [ 0 ~ $10 / 3 / 1$ step $]$ |
|  | 14 | Pale : 35\% ~ 66\% | [0~10 / 3 / 1 step] |
|  | 15 | Pale : 67\% ~ 141\% | [0 ~ 10 / 3 / 1 step] |
|  | 16 | Pale : 142\% ~ 400\% | [0~10 / 3 / 1 step] |
|  | 17 | $\begin{aligned} & \text { Generation : } \\ & 25 \% \sim 34 \% \end{aligned}$ | This adjustment is only effective for the "Custom Setting" original type. <br> Adjusts the image quality in Generation mode. A larger number increases contrast and sharpens the image but moiré may appear. <br> A smaller number reduces contrast and moiré but the line may become narrower. $[0 \sim 10 / 3 / 1 \text { step }]$ |
|  | 18 | $\begin{array}{\|l\|} \hline \text { Generation : } \\ 35 \% ~ \sim 66 \% \\ \hline \end{array}$ | [0 ~ 10 / 5/1 step] |
|  | 19 | Generation : $67 \% ~ ~ ~ 141 \%$ | [0~10 / 5 / 1 step] |
|  | 20 | Generation: $142 \% ~ ~ ~ 400 \%$ | [0~10 / 5 / 1 step] |
| 904* | Independent Dot Erase |  |  |
|  | 1 | Text | This adjustment is only effective for the "Custom Setting" original type. <br> With a larger SP setting, more dots are detected as independent dots and erased. However, dots in meshlike images may be detected as independent dots mistakenly. If "0" is selected, independent dot erase is disabled. $\text { [ } 0 \sim 10 / 0 / 1 \text { step }]$ |
|  | 2 | Photo | [0~10 / 0 / 1 step] |
|  | 3 | Text/Photo | [0~10/0/1 step] |
|  | 4 | Pale | [0~10 / 0 / 1 step] |
|  | 5 | Generation | [0~10 / 3 / 1 step] |


| 4 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 904* | Background Erase |  |  |
|  | 6 | Text | This adjustment is only effective for the "Custom Setting" original type. <br> A larger number reduces dirty background. If "0" is selected, background erase is disabled. $\text { [ } 0 \sim 255 / 0 / 1 \text { step] }$ |
|  | 7 | Photo | [0 ~ 255 / 0 / 1 step] |
|  | 8 | Text/Photo | [0~255/0/1 step] |
|  | 9 | Pale | [0 ~ $255 / 0$ / 1 step] |
|  | 10 | Generation | [0 ~ 255 / 0 / 1 step] |
|  | Gamma Selection |  |  |
|  | 11 | Text | This adjustment is only effective for the "Custom Setting" original type. <br> Selects the gamma table for each original type. [ 0 ~ $2 / 0 / 1 /$ step] <br> 0: Standard gamma table <br> 1: This gamma table reduces the background of the original and gives sharp characters. <br> 2: The gamma table increases the number of gradations in high-density areas. |
|  | 12 | Photo | [0~2/0/1/step] |
|  | 13 | Text/Photo | [0~2/0/1/step] |
|  | 14 | Pale | [0~2/0/1/step] |
|  | 15 | Generation | [0~2/0/1/step] |
| 905* | Image Data Path |  |  |
|  |  |  | Selects one of the following video data outputs which will be used for printing. DFU $\text { [0~3/0 / } 1 \text { step] }$ <br> 0: Normal <br> 1: After black level correction <br> 2: After shading correction without black level correction <br> 3: Shading data |
| 907* | 1 | $\begin{aligned} & \text { Fax 25\%, 50\% } \\ & \text { Reduction } \end{aligned}$ | Determines whether $25 \%$ and $50 \%$ reduction is available in fax mode. $[\mathbf{0}=\text { No, } 1=\mathrm{Yes}]$ |
|  | 2 | Outline Level | Japanese version only DFU |
| 909* | IPU Image Data Path |  |  |
|  |  |  | Selects one of the following image data outputs, which will be used for printing. DFU <br> [ 0 ~ 255 / 0 / 1 step] <br> Bit 7: Shading <br> Bit 6: Scanner gamma <br> Bit 5: Pre-filtering <br> Bit 4: Magnification <br> Bit 3: Scanner/Printer Mask <br> Bit 2: Gradation <br> Bit 1: Filtering <br> Bit 0: Printer gamma |


| 4 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 911* | HDD Formatting |  | Select the desired SP, then press Execute on the touch panel to format each HDD partition. Note: After execution, turn the main power switch off and on. |
|  | 1 | All | Initializes the entire hard disk. |
|  | 2 | Image Files | Initializes documents stored in document server mode, stamp print data, scanner send data, fax send data. |
|  | 3 | NetFiles | Initializes network file application thumbnail images. |
|  | 4 | Job Log | Initializes job logging data (for Poplar server) DFU |
|  | 5 | Printer Fonts | Initializes printer fonts and stored fonts. |
|  | 9 | Debug | DFU |
| 920 | Scanning (Factory) |  | DFU |
| 930* | Sensor Condition |  |  |
|  | 1 | Platen Cover sensor | Checks the following sensors in the scanner unit. [ $0=$ Opened, 1 = Closed] |
|  | 2 | Scanner HP Sensor | [ $0=$ Opened, $1=$ Closed] |

SP5-XXX: Mode

| 5 | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: |
| 024* | mm/inch Selection |  |
|  |  | Selects whether mm or inches are used in the display. Note: After selecting the number, you must turn the main power switch off and on. <br> Eur./Asia model <br> [ $0=\mathrm{mm} / 1=\mathrm{inch}$ ] <br> American model $[0=\mathrm{mm} / 1=\text { inch }]$ |
| 104* | A3/DLT Double Count |  |
|  |  | Specifies whether the counter is doubled for $\mathrm{A} 3 / 11^{\prime \prime} \mathrm{x}$ 17" paper. <br> If "Yes" is selected, the total counter (mechanical counter) and the current user code counter counts up twice when A3/11" $\times 17$ " paper is used. $[0=\mathrm{No} / 1=\mathrm{Yes}]$ |
| 106* | ADS Level Selection |  |
|  |  | Selects the image density level that is used in ADS mode. <br> [1~7/4/1 notch/step] |
| 113* | Option Counter Type |  |
|  |  | Selects the optional counter type. <br> Japan only DFU <br> [0 = No, $1=$ Key Card1, $2=$ Key Card2, $3=$ Pre-paid <br> Card, $4=$ Coin lock, $5=$ MF key card] |
| 118* | Disable Copying | DFU |
| 120* | Opt. Counter Reset Setting |  |
|  |  | This SP is for Japan only. Do not change the value. [ $0=$ Yes / $1=$ Stand-by $/ 2=$ None] |


| 5 | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: |
| 121* | Key Counter Up Timing |  |
|  |  | Determines whether the total counter counts up at paper feed-in or at paper exit. $[0=\text { Feed } \ln / 1=\text { Exit }]$ |
| 127* | APS Mode Setting |  |
|  |  | Selects whether APS mode is selected as the powerup default. <br> [ 0 = Enable / 1 = Disabled] |
| 129* | F Paper Size Selection |  |
|  |  | $\begin{aligned} & \text { Selects the "F" paper size. } \\ & {[0 \sim 2 / 0 / 1 \text { step }]} \\ & 0: 8 " \times 13^{\prime \prime} \\ & 1: 8.5 " \times 13^{\prime \prime} \\ & 2: 8.25 " \times 13^{\prime \prime} \end{aligned}$ |
| 131* | Paper Size Type Selection |  |
|  |  | Selects the paper size (type) for both originals and copy paper. <br> [0~2 / DIP SW setting / 1 step] <br> 0: Japan <br> 1: North America <br> 2: Europe <br> After changing the setting, turn the copier off and on. If the paper size of the archive files stored on the HDD is different, abnormal copies could result. Ask the customer to restore the archive files. |
| 150* | By-Pass Long Paper Mode |  |
|  |  | Determines whether long paper can be fed from the bypass tray. $[0=\mathrm{Off}, 1=\mathrm{On}]$ <br> Normally the paper length from the by-pass tray is limited to 600 mm , but this can be extended with this SP to 1260 mm . <br> Note that, with either setting, the image quality can only be guaranteed for 432 mm . |
| 212* | Page Stamp |  |
|  | 33uplex Printout <br> Right/Left Position | Determines how horizontal printing is executed during duplex printing. Set the upper right corner of the front side and the upper left corner of the back side so the starting points for horizontal printing are the same on both sides DFU. <br> [-10~+10 / 0 / 1 mm step] <br> -10: Extreme right <br> +10 : Extreme left |
|  | $4^{*}$ Duplex Printout <br> High/Low Position <br>   | Determines how vertical printing is executed during duplex printing. Set the upper right corner of the front side and the upper left corner of the back side so the starting points for vertical printing are the same on both sides. DFU <br> [-10~+10 / 0 / 1 mm step] <br> -10: Extreme top <br> +10: Extreme bottom |


| 5 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 302* | 2* | Set Time Zone | Adjusts the RTC (real time clock) time setting for the local time zone. <br> [-1440~+1440/see below/ $1 \mathrm{~min} . /$ step] <br> NA: -300 (New York) <br> EU: +60 (Paris) <br> Asia: +480 (Hong Kong) <br> Example: For Japan (+9 GMT), enter 540 (9 hours x 60 min.) |
| 305* | Auto Off Mode |  |  |
|  | Selects the auto off timer setting range. <br> When " 1 " is selected, the auto off timer range will be wider than the default timer range, and the user can disable the auto off timer. (In UP mode, the user will be able to select a time between 0 and 240 minutes.) When set to " 0 ", the user cannot set the timer to zero. [ $0=$ On (Enabled), $1=$ Off (Disabled) |  |  |
| 401* | Restricted Access Control |  |  |
|  | 2 Copy Mode <br> (Key counter) |  | Selects whether restricted access control is done when using the key counter in copy mode. <br> If this value is changed, the user tool setting is also changed. $\text { [0 = No / } 1 \text { = Yes] }$ |
|  | 3 | Copy Mode (Other counters) | Japan only DFU $[0=\text { No / } 1=\mathrm{Yes}]$ |
|  | 12 | Document Server (Key counter) | Selects whether restricted access control is done when using the key counter in document server mode. If this value is changed, the user tool setting is also changed. $[0=\mathbf{N o} / 1=\mathrm{Yes} \text { ] }$ |
|  | 13 | Document Server (Other counters) | $\begin{aligned} & \text { Japan only DFU } \\ & {[0=\mathrm{No} / 1=\mathrm{Yes}]} \end{aligned}$ |
|  | 22 | Fax Mode (Key counter) | Selects whether restricted access control is done when using the key counter in fax mode. <br> If this value is changed, the user tool setting is also changed. $[0=\mathbf{N o} / 1=\mathrm{Yes} \text { ] }$ |
|  | 23 | Fax Mode (Other counters) | $\begin{aligned} & \text { Japan only DFU } \\ & {[0=\mathrm{No} / 1=\mathrm{Yes}]} \end{aligned}$ |
|  | 32 | Scanner Mode (Key counter) | Selects whether restricted access control is done when using the key counter in scanner mode. <br> If this value is changed, the user tool setting is also changed. $[0=\text { No } / 1=\text { Yes }]$ |
|  | 33 | $\begin{aligned} & \hline \text { Scanner Mode } \\ & \text { (Other counters) } \end{aligned}$ | $\begin{aligned} & \text { Japan only DFU } \\ & {[0=\text { No } / 1=\mathrm{Yes}]} \end{aligned}$ |
|  | 42 | Printer Mode (Key counter) | Selects whether restricted access control is done when using the key counter in printer mode. <br> If this value is changed, the user tool setting is also changed. $[0=\mathbf{N o} / 1=\mathrm{Yes} \text { ] }$ |
|  | 43 | Printer Mode (Other counters) | $\begin{aligned} & \begin{array}{l} \text { Japan only DFU } \\ {[0=\text { No } / 1=\text { Yes }]} \end{array} \end{aligned}$ |


| 5 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 501* | PM Alarm |  |  |
|  | 1 | Interval | Sets the PM interval. <br> The value stored in this SP is used when the value of SP5-501-2 is " 1 ". <br> [ 0 ~ 255 / 0 / 1 k copies/step] |
|  | 2 | Original Alarm | Japan only. DFU <br> Selects whether the PM alarm for the number of scans is enabled or not. <br> If this is " 1 ", the PM alarm function is enabled. $[0=\mathrm{No} / 1=\mathrm{Yes}]$ |
| 504* | Jam Alarm Setting |  |  |
|  |  |  | Sets the alarm to sound for the specified jam level (document misfeeds are not included). <br> Japan only DFU <br> [0~3/3/1 step] <br> 0: Zero (Off) <br> 1: Low ( 2.5 K jams) <br> 2: Medium (3K jams) <br> 3: High ( 6 K jams) |
| 505* | Error Alarm Setting |  |  |
|  |  |  | Sets the error alarm level. Japan only DFU [ $0 \sim 255 / 50 / 100$ copies per step] |
| 507* | Consumable Alarm |  |  |
|  | 1 | Paper | Switches the control call on/off for the paper supply. Japan only DFU <br> 0: Off, 1: On <br> 0 : No alarm. <br> 1: Sets the alarm to sound for the specified number transfer sheets for each paper size (A3, A4, B4, B5, DLT, LG, LT, HLT) |
|  | 2 | Staple | Switches the control call on/off for the stapler installed in the finisher. Japan only DFU <br> 0: Off, 1: On <br> 0 : No alarm <br> 1: Alarm goes off for every 1 K of staples used. |
|  | 3 | Toner | Switches the control call on/off for the toner end. <br> Japan only DFU <br> 0: Off, 1: On <br> If you select " 1 " the alarm will sound when the copier detects toner end. |
|  | 128* | Others | The "Paper Supply Call Level: nn" SPs specify the paper control call interval for the referenced paper sizes. <br> Japan only DFU <br> [00250~10000 / 1000 / 1 Step] |
|  | 132* | A3 |  |
|  | 133* | A4 |  |
|  | 134* | A5 |  |
|  | 141* | B4 |  |
|  | 142* | B5 |  |
|  | 160* | DLT |  |
|  | 164* | LG |  |
|  | 166* | LT |  |
|  | 172* | HLT |  |


| 5 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 508* | CC Call |  |  |
|  | 1 | $\begin{aligned} & \text { Remain of Jam } \\ & \text { (Unattended Jam) } \end{aligned}$ | Switches the control call on/off for an unattended jam. Japan only DFU <br> 0 : Off, 1: On <br> If you select " 1 ", the alarm sound if a jam is left unattended for 15 minutes. |
|  | 2 | Continuous Jam Occurrence | Switches the control call on/off for the occurrence of consecutive jams. Japan only 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. Japan only DFU <br> 0 : Off, 1: On <br> If you select " 1 ", the alarm will sound if the door remains open for 15 minutes. |
|  | 4 | New CC Call Mode | Selects whether or not the new CC call. Japan only DFU <br> 0: Previous Mode, 1: New Mode |
|  | 11 | Time for Remain of Jam | This SP is effective when the value of SP5-508-4 is " 1 ". Japan only DFU <br> [3~30 / $10 / 1 \mathrm{~min} / \mathrm{ste}$ ] |
|  | 12 | Number of continuos Jam | This SP is effective when the value of SP5-508-4 is " 1 ". Japan only DFU <br> [2~10/5/1 time/step] |
|  | 13 | Time of Continuous Door Open | This SP is effective when the value of SP5-508-4 is " 1 ". Japan only DFU <br> [ $3 \sim 30$ / $10 / 1 \mathrm{~min} / \mathrm{ste}$ ] |
|  | 21 | Remain of Jam Mode (Unattended Jam) | This SP is effective when the value of SP5-508-4 is " 1 ". Japan only DFU <br> 0 : Auto Call, 1: Alarm |
|  | 22 | Continuous Jam Occurrence Mode | This SP is effective when the value of SP5-508-4 is " 1 ". Japan only DFU <br> 0: Auto Call, 1: Alarm |
|  | 23 | Continuous Door Open Mode | This SP is effective when the value of SP5-508-4 is " 1 ". Japan only DFU <br> 0 : Auto Call, 1: Alarm |
| 801 | Mem | ry All Clear | Resets all correction data for process control and all software counters, and returns all modes and adjustments to their default values. (4.2.7). <br> To execute, hold down (1) for over 3 seconds, and then turn the copier off and on again. <br> Use this SP only after replacing the NVRAM, or after the copier has malfunctioned due to a damaged NVRAM. |
|  | 1 | All modules | Initializes items $2 \sim 12$ below. |
|  | 2 | Engine | Initializes all registration settings for the engine and processing settings. |
|  | 3 | SCS (System Control Service)/SRAM | Initializes default system settings, CSS settings, operation display coordinates, and ROM update information. <br> SCS: System Control Service |


| 5 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 801 | 4 | IMH (Image Memory Handler) | Initializes the registration setting for the image memory handler. |
|  | 5 | MCS (Memory Control Service) | Initializes the automatic delete time setting for stored documents. |
|  | 6 | Copier application | Initializes all copier application settings. |
|  | 7 | Fax application | Initializes the fax reset time, job login ID, all TX/RX settings, local storage file numbers, and the off-hook timer. |
|  | 8 | Printer application | Initializes the printer defaults, programs registered, the printer SP bit switches, and printer CSS counter. |
|  | 9 | Scanner application | Initializes the scanner defaults for the scanner and all the scanner SP modes. |
|  | 10 | Network application | Deletes the network file application management files and thumbnails, and initializes the job login ID. |
|  | 11 | NCS (Network Control Service) | Initializes the system defaults and interface settings (IP addresses also), SmartNetMonitor for Admin, WebStatusMonitor settings, and the TELNET settings. |
|  | 12 | R-FAX | Initializes the job login ID, SmartNetMonitor for Admin, job history, and local storage file numbers. |
| 802 | Free Run |  |  |
|  |  |  | Performs a free run for both the scanner and the printer. <br> After selecting "1", press "OK" or the © key twice to start this feature. Press the © (Clear/Stop) key to stop. $[0=\mathrm{No} / 1=\mathrm{Yes}$ |
| 803 | Input Check |  |  |
|  |  |  | Displays signals received from sensors and switches. Press the (Clear Modes) key to exit the program. ( 4.2.4) |
| 804 | Output Check |  |  |
|  |  |  | Turns on electrical components individually for test purposes. (4.2.5) |
| 807* | Option Connection Check |  |  |
|  | 1 | ARDF | Checks the connectors to the optional peripheral devices. Execution will return either a "1" or "0": <br> 1: Device connected correctly. <br> 0 : Device not connected correctly. |
|  | 2 | Bank (Paper Tray Unit) |  |
|  | 3 | LCT |  |
|  | 4 | Finisher (1000-sheet, Two-Tray finisher) |  |
| 810 | SC Code Reset |  |  |
|  | 1 | Fusing SC | Resets all level A service call conditions, such as fusing errors. DFU <br> To clear the service call, touch "Execute" on the LCD, then turn the main power switch off/on. |
| 811 | Serial Number Input |  |  |
|  |  |  | Use to input the machine serial number. (This is normally done at the factory.) <br> This serial number will be printed on the SMC report. |


| 5 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 812* | Telephone Number |  |  |
|  | 1 | Service Telephone | Use this to input the telephone number of the service representative (this is displayed when a service call condition occurs). <br> Press the ${ }^{\circ}$ key if you need to input a pause ( - ). Press the ( (Clear/Stop) key to delete the telephone number. |
|  | 2 | Facsimile | Use this to input the fax number which will be printed on the user counter report. <br> Press the $\bigcirc$ key if you need to input a pause (-). <br> Press the (o) (Clear/Stop) key to delete the telephone number. |
|  | 3 | Consumable | Use this to input the telephone number that the customer uses to order toner (this is displayed in the inquiry menu of UP mode). <br> Press the $\bigcirc$ key if you need to input a pause (-). <br> Press the (0) (Clear/Stop) key to delete the telephone number. |
|  | 4 | Sales Telephone | Use this to input the telephone number of the sales representative (this is displayed in the inquiry menu of UP mode). <br> Press the 0 key if you need to input a pause (-). Press the (Clear/Stop) key to delete the telephone number. |
| 816* | CSS Function |  |  |
|  |  |  | This SP is for Japan only. DFU. $[0=\mathrm{No} / 1=\mathrm{Yes}]$ |
| 821 | CSS-PI Device Code |  |  |
|  |  |  | This SP is for Japan only. DFU. $[0=\mathrm{No} / 1=\mathrm{Yes}]$ |
| 824 | NVRAM Data Upload |  |  |
|  |  |  | Uploads the UP and SP mode data (except for counters and the serial number) from the NVRAM on the control board to a flash memory card. 4.2.8) While using this SP mode, always keep the front cover open. This prevents a software module accessing the NVRAM during the upload. |
| 825 | NVRAM Data Download |  |  |
|  |  |  | Downloads the content of a flash memory card to the NVRAM on the control board. 4.2.8) <br> While using this SP mode, always keep the front cover open. This prevents a software module accessing the NVRAM during the download. <br> After executing this SP, switch the copier off and on. |
| 828* | Network Setting |  |  |
|  | 25* | Software Switch | Sets the reference for the network software. [00000000~FFFFFFFFh / 00000000h / 1 hex unit step] |
|  | 26* | Network Operation Mode Setting | Sets the TCP operation mode for the network. [00000000~FFFFFFFFh / 00000000h / 1 hex unit step] |
|  | 27* | Network Syslog Server Address Setting | Sets the syslog server address for the network. [00000000~FFFFFFFFh / 7F000001h / 1 hex unit step] |


| 5 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 828* | 28* | Network Time Server <br> Address Setting | Sets the time server address for the network. [00000000~FFFFFFFFh / 00000000h / 1 hex unit step] |
|  | 29* | Network DNS Server Address Setting | Sets the DNS server address for the network. [00000000~FFFFFFFFh / 00000000h / 1 hex unit step] |
|  | $30^{*}$ | Network Directprint Port Number Setting | Sets the directprint port number for the network. [1024~65535/9100/1 step] |
|  | 31* | Network IPP Timeout Setting | Sets the IPP timeout for the network. [30~65535 / 900 / 1 step] |
|  | 32 | Network IPX Address Setting (NetWare) | Sets the IPX Address. |
|  | 33* | Network Remote Printer Number Setting (NetWare) | Sets the remote printer number for the network. $\text { [0~254 / } 0 / 1 \text { step] }$ |
|  | 34* | Network Software Switch Setting (NetWare) | Sets the software switch for the network. [0000~FFFFh / 0003h / 1 hex unit step] |
|  | 35* | Network Transport Protocol of Print Server Setting (NetWare) | Sets the transport protocol of the print server for the network. <br> 0000h: TCP \& IPX <br> 0100h: TCP\& IPX (Priority: IPX) <br> 0102h: TCP Only (Priority: TCP) <br> 0001h: IPX Only |
|  | 36 | Network AppleTalk Module Setting | Sets the AppleTalk module for the network. DFU 2: EtherTalk Phase2 |
|  | 37 | Network NetNo Setting (AppleTalk) | Sets the NetNo of the AppleTalk network. |
|  | 38 | Network Object Name Setting (AppleTalk) | Sets the object name of the 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. <br> [ $0 \sim 43200 \mathrm{~s} / 3$ s $/ 1 \mathrm{sec}$. step] |
|  | 48* | Network Job Timeout Setting (Centronics) | Sets the Centronics job timeout for the network. [ $0 \sim 43200 \mathrm{~s} / 0$ 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 With "1" selected, SP5-828-050 must be enabled for 1284 mode compatibility. |





SP6-XXX: Peripherals

| 6 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 006* | ADF Registration |  |  |
|  | 1 | Side-to-Side | Adjusts the registration in ADF mode. <br> Use the $\odot$ key to toggle between + and - before entering the value. See "Replacement and Adjustment <br> - Copy Adjustment" for details. <br> $[-5.0 \sim+5.0 / 0.0 / 0.1 \mathrm{~mm} / \mathrm{step}]$ |
|  | 2 | Leading Edge | [-5.0 ~ +5.0 / 0.0 / $0.1 \mathrm{~mm} /$ step] |
|  | 3 | Trailing Edge Erase | Adjusts the trailing edge erase margin in ADF mode. Use the $\because$ key to toggle between + and - before entering the value. See "Replacement and Adjustment - Copy Adjustment" for details. $[-5.0 \sim+5.0 / \mathbf{- 1 . 0} / 0.1 \mathrm{~mm} / \mathrm{step}]$ |
|  | 4 | Side-to-Side/Rear | Adjusts the side-to-side registration on the rear side of the original in ADF mode. <br> Use the $\odot$ key to toggle between + and - before entering the value. See "Replacement and Adjustment <br> - Copy Adjustment" for details. <br> $[-5.0 \sim+5.0 / 0.0 / 0.1 \mathrm{~mm} / \mathrm{step}]$ |


| 6 | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: |
| 006* | Sub Scan Magnification | Adjusts the sub scan magnification in ADF mode. Use the $\odot$ key to toggle between + and - before entering the value. See "Replacement and Adjustment - Copy Adjustment" for details. <br> [-5.0 ~ +5.0 / 0.0 / 0.1 \% step] |
|  | 6 Skew Correction | Selects whether or not skew correction is done in ADF mode. $0=\mathrm{Off}, 1=\mathrm{On}$ |
|  | Original Buckle Adjustment | Adjusts the amount of original buckle at the ARDF registration roller when the ARDF feeds the rear side of the original. <br> This SP is effective only when SP6-006-6 is at " 1 ". <br> Use the $\bigcirc$ key to toggle between + and - before entering the value. See "Replacement and Adjustment - Copy Adjustment" for details. <br> $[-5.0 \sim+5.0 / 0.0 / 0.1 \mathrm{~mm} / \mathrm{step}]$ |
| 007 | ADF Input Check |  |
|  |  | Displays the signals received from sensors and switches of the ARDF. ( 4.2.4) |
| 008 | ADF Output Check |  |
|  |  | Switches on each electrical component (ARDF motor, solenoid, etc.) of the ARDF for testing. (4.2.5) Press (1) to switch on or (0) to switch off. |
| 009 | ADF Free Run |  |
|  |  | Performs an ARDF free run in duplex mode. Press (1) to start. <br> 1: To Start, 0: To cancel <br> This is a general free run controlled from the copier. <br> For more detailed free run modes, see the ARDF manual. |
| 010* | Stamp Position Adjustment |  |
|  |  | Adjusts the stamp position in the sub-scan direction in fax mode. $[-5.0 \sim+5.0 / 0 / 1 \mathrm{~mm} / \text { step }]$ |
| 016* | ADF Original Size Detection |  |
|  |  | Selects whether the machine determines that the original is A4/LT, or $8 \mathrm{~K} / 16 \mathrm{~K}$ when the APS sensor in the ADF does not detect the original size. <br> $8 \mathrm{~K} / 16 \mathrm{~K}$ is not available for 115 V machines. <br> [ $\mathbf{0}=$ Normal (LT for USA models, A4 for Europe/Asia models) <br> 1 = Reversed [A4 for USA models, LT for Europe/Asia models] <br> $2=8 \mathrm{~K} / 16 \mathrm{~K}]$ |
| 117 | Finisher Input Check |  |
|  |  | Displays the signals received from sensors and switches in the finisher. ( 4.2.4) |
| 118 | Finisher Output Check |  |
|  |  | Switches on each electrical component of the finisher for testing. ( 4.2.5) <br> Press (1) to switch on or (0) to switch off. |


| 6 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 901 | ADF APS Data Display |  |  |
|  |  |  | Displays the status of the original size sensors in the ADF. 4.2.10) |
| 910* | ADF Shading Interval Time |  |  |
|  |  |  | Adjusts the interval for shading processing in DF mode. <br> Light and heat may affect the scanner response. If copy quality indicates that white level is drifting during a DF copy job, reduce this setting. <br> [ 0 ~ $120 / 20 \mathrm{~s} / 1 \mathrm{~s} / \mathrm{step}$ ] |
| 920 | ADF Loop Back Test |  |  |
|  | 1 | DF GATE | $\begin{aligned} & \text { DFU } \\ & 0=\text { Gate, } 1 \text { = Asart } \end{aligned}$ |
|  | 2 | DF TXD Break | $\begin{aligned} & \text { DFU } \\ & 0=\text { Off, } 1=\mathrm{On} \end{aligned}$ |
|  | 3 | Serial Communication | $\begin{aligned} & \text { DFU } \\ & 0=\mathrm{NG}, 1=\mathrm{OK} \end{aligned}$ |
|  | 4 | Original Set | $\begin{aligned} & \text { DFU } \\ & 0=\mathrm{Off}, 1=\mathrm{On} \end{aligned}$ |
|  | 5 | Serial Check | DFU |
| 925 | Finisher/Duplex loop Back Test |  |  |
|  | 1 | Loop Back Test | DFU |
|  | 2 | Result | DFU |

SP7-XXX: Data Log

| 7 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 001* | Main Motor Operation Time |  |  |
|  |  |  | The number of prints and drive time for drum revolutions can be obtained by counting the main motor revolution time. If the amount of the time required for the drum to revolve to print 1 copy increases, this data combined with the number of copies can be used to analyze problems and could be useful for future product development. Display: 00000000~99999999 min. |
| 002* | Total Original Counter |  |  |
|  | 1 | All Modes | Select a number to display the total original count (number of originals fed) for the selected item. |
|  | 2 | Copier |  |
|  | 3 | Fax |  |
|  | 4 | Document Box |  |
|  | 5 | Scanner |  |
|  | 6 | Others |  |
| 003* | Total Print Counter |  |  |
|  | 1 | All Modes | Select a number to display the total print count for the selected item. |
|  | 2 | Copier |  |
|  | 3 | Fax |  |


| 7 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 003* | 4 | Printer | Select a number to display the total print count for the selected item. |
|  | 5 | Others |  |
| 006* | C/O, P/O Counters |  |  |
|  | 1 | C/O Counter | Displays the number of copies per original when making more than 10 copies. <br> For example, if you make 15 copies of a 3 page original document, for a total of 45 sheets, then the counter would be 15 (5 copies counted from 11 to $15 x$ 3 originals). No count will be returned for 1~10 copies of an original. |
|  | 2 | P/O Counter |  |
|  |  |  |  |
| 007* | Other Counter |  |  |
|  | 1 | Duplex Counter | Displays the count total for the selected item. |
|  | 2 | A3/DLT Counter |  |
|  | 3 | Staple Counter |  |
|  | 4 | Scan Counter |  |
| 101* | Copy Counter - Paper Size |  |  |
|  | 5 | A4 H (Sideways) | Displays the total number of copies by paper size. |
|  | 6 | A5 H (Sideways) |  |
|  | 14 | B5 H (Sideways) |  |
|  | 38 | LT H (Sideways) |  |
|  | 44 | HLT H (Sideways) |  |
|  | 132 | A3 V (Lengthwise) |  |
|  | 133 | A4 V (Lengthwise) |  |
|  | 134 | A5 V (Lengthwise) |  |
|  | 141 | B4 V (Lengthwise) |  |
|  | 142 | B5 V (Lengthwise) |  |
|  | 160 | DLT V (Lengthwise) |  |
|  | 164 | LG V (Lengthwise) |  |
|  | 166 | LT V (Lengthwise) |  |
|  | 172 | HLT V (Lengthwise) |  |
|  | 255 | Others |  |
| 201* | Total Scan Counter |  |  |
|  |  |  | Displays the total number of scanned originals. |
| 204* | Copy Counter - Paper Tray |  |  |
|  | 1 | 1st | Displays the total number of copies fed from each paper feed station. |
|  | 2 | 2nd |  |
|  | 3 | 3 rd |  |
|  | 4 | 4th |  |
|  | 5 | LCT |  |
|  | 6 | By-pass |  |
| 205* | Total ADF Counter |  |  |
|  |  |  | Displays the total number of originals fed by the ADF. |
| 206* | Staple Counter |  |  |
|  | 1 | Normal | Display the total number of staples fired. |
|  | 2 | Booklet | DFU |
| 209* | Punch Counter |  |  |
|  |  |  | Displays the total times the punch has fired. DFU |


| 7 |  | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 301* | Copy Counter - Mag. |  |  |
|  | 1 | 25\% ~ 49\% | Displays the total number of copies by reproduction ratio and magnification. |
|  | 2 | 50\% ~ 99\% |  |
|  | 3 | Full Size |  |
|  | 4 | 101\% ~ 200\% |  |
|  | 5 | 201\% ~ 400\% |  |
|  | 6 | Direct Mag. |  |
|  | 7 | Direct Size Mag. |  |
|  | 8 | Auto Reduce/Enlarge |  |
| 304* | Copy Counter - Copy Mode |  |  |
|  | 1 | Text Mode | Displays the total number of copies by copy mode. |
|  | 2 | Text/Photo Mode |  |
|  | 3 | Photo Mode |  |
|  | 4 | Generation Mode |  |
|  | 5 | Pale Mode |  |
|  | 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 |  |
|  | 22 | SADF |  |
|  | 23 | Mixed Sizes |  |
|  | 24 | Stamp |  |
|  | 25 | Cover Page/Chapter Page |  |
|  | 26 | Slip Sheet |  |
| 305* | Copy Counter - Set Number |  |  |
|  | 1 | 1 to 1 | Displays the total number of prints for multiple copy jobs. |
|  | 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 |  |


| 7 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 306* | Job Counter - Copy Mode |  |  |
|  | 1 | Sort | Displays the total number of prints based on the job mode. |
|  | 2 | Staple |  |
|  | 3 | Punch |  |
|  | 4 | Reserve Copy |  |
|  | 5 | Check Copy |  |
| 320* | Document Server - Scanning Counter |  |  |
|  |  |  | Displays the original count stored on the document server. |
| 321* | Document Server: Each Size of Originals |  |  |
|  | 4 | A3 | Displays the number of originals by paper size scanned at the copy server. |
|  | 5 | A4 |  |
|  | 6 | A5 |  |
|  | 13 | B4 |  |
|  | 14 | B5 |  |
|  | 32 | DLT |  |
|  | 36 | LG |  |
|  | 38 | LT |  |
|  | 44 | HLT |  |
|  | 128 | Others |  |
| 323* | Document Server: Each Size of Printouts |  |  |
|  | 5 | A4 (S) | Displays the number of prints by paper size. |
|  | 6 | A5 (S) |  |
|  | 14 | B5 (S) |  |
|  | 38 | LT (S) |  |
|  | 44 | HLT (S) |  |
|  | 128 | Other |  |
|  | 132 | A3 (L) |  |
|  | 133 | A4 (L) |  |
|  | 134 | A5 (L) |  |
|  | 141 | B4 (L) |  |
|  | 142 | B5 (L) |  |
|  | 160 | DLT (L) |  |
|  | 164 | LG (L) |  |
|  | 166 | LT (L) |  |
|  | 172 | HLT (L) |  |
| 324* | Document Server - Print Job Counter |  |  |
|  | 1 | Duplex | Displays the number of jobs classed by job content. |
|  | 2 | Sort |  |
|  | 3 | Staple |  |
|  | 4 | Punch |  |
| 324* | 5 | Check Copy | Displays the number of jobs classed by job content. |
|  | 6 | Print 1st Page |  |
| 325* | Document Server: Job Counter - Page Number |  |  |
|  | 1 | 1-page | Displays the number of print jobs classed by size of the job. |
|  | 2 | 2-pages |  |
|  | 3 | 3~5 pages |  |
|  | 4 | 6~10 pages |  |
|  | 5 | Over 11 pages |  |


| 7 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 326* | Document Server: Job Counter - File Number |  |  |
|  | 1 | 1 file | Displays the number of print jobs classed by the number of files. |
|  | 2 | 2~5 files |  |
|  | 3 | 6~10 files |  |
|  | 4 | over 11 files |  |
| 327* | Document Server: Job Counter - Set Number |  |  |
|  | 1 | 1 to 1 | Displays the number of print jobs classed by the set sizes. |
|  | 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 |  |
| 328* | Document Server: Print Counter - Print Mode |  |  |
|  | 6 | Punch | Displays the number of prints by mode. |
|  | 8 | Sort |  |
|  | 9 | Staple |  |
|  | 12 | Duplex |  |
|  | 19 | Booklet |  |
|  | 20 | Magazine |  |
|  | 24 | Stamp |  |
|  | 25 | Cover/Chapter Page |  |
|  | 26 | Slip Sheet |  |
| 401* | Total SC Counter |  |  |
|  |  |  | Displays the total number of service calls that have occurred. |
| 403* | SC History |  |  |
|  | 1 | Latest | Displays the most recent 10 service calls. |
|  | 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 |  |
| 502* | Total Paper Jam Counter |  |  |
|  |  |  | Displays the total number of paper jams. |
| 503* | Total Original Jam Counter |  |  |
|  |  |  | Displays the total number of original jams. |


| 7 | Mode Number/Name |  | Function/[Setting] |
| :---: | :---: | :---: | :---: |
| 504* | Total Jams by Location |  |  |
|  | Paper Late Error No. | $\begin{aligned} & \text { Paper Lag } \\ & \text { Error No. } \end{aligned}$ | Displays the total number of paper jams by location. 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. |
|  | 1 |  | At power on |
|  | 3 |  | Upper relay sensor |
|  | 4 |  | Lower relay sensor |
|  | 5 |  | Vertical transport sensor (optional bank) |
|  | 6 |  | Relay sensor (optional LCT) |
|  | 11 |  | Registration sensor |
|  | 12 | 62 | Paper exit sensor |
|  | 13 | 63 | Bridge relay sensor |
|  | 14 | 64 | Bridge exit sensor |
|  | 15 | 65 | Duplex entrance sensor |
|  | 16 | 66 | Duplex exit sensor |
|  | 17 | 67 | 1 bin tray exit sensor |
|  | 20 |  | Finisher entrance sensor |
|  | 21 |  | Finisher shift tray exit sensor |
|  | 23 |  | Finisher staple tray paper sensor |
|  | 24 |  | Finisher stack feed-out belt HP sensor |
|  | By error |  |  |
|  | 26 |  | Finisher paper taking out |
|  | 27 |  | Finisher drive error |
|  | 28 |  | Finisher tray lift error |
|  | 29 |  | Finisher jogger drive error |
|  | 30 |  | Finisher tray shift drive error |
|  | 31 |  | Finisher stapler error |
|  | 32 |  | Finisher stack-feed out error |
|  | 33 |  | Finisher feed out error |
|  | 34 |  | Finisher no response |
| 505* | 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 Lag" 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. |  |
|  | 5 | 55 | Registration Sensor |
|  | 6 | 56 | Relay Sensor |
|  | 7 | 57 | Inverter Sensor |


| 7 | Mode Number/Name |  | Function/[Setting] |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 506* | Jam Count by Copy Size |  |  |  |  |  |  |  |
|  | 5 | A4 H (Sideways) | Displays the total number of copy jams by paper size. |  |  |  |  |  |
|  |  | A5 H (Sideways) |  |  |  |  |  |  |
|  | 14 | B5 H (Sideways) |  |  |  |  |  |  |
|  | 38 | LT H (Sideways) |  |  |  |  |  |  |
|  | 44 | HLT H (Sideways) |  |  |  |  |  |  |
|  | 132 | A3 V (Lengthwise) |  |  |  |  |  |  |
|  | 133 | A4 V (Lengthwise) |  |  |  |  |  |  |
|  | 134 | A5 V (Lengthwise) |  |  |  |  |  |  |
|  | 141 | B4 V (Lengthwise) |  |  |  |  |  |  |
|  | 142 | B5 V (Lengthwise) |  |  |  |  |  |  |
|  | 160 | DLT V (Lengthwise) |  |  |  |  |  |  |
|  | 164 | LG V (Lengthwise) |  |  |  |  |  |  |
|  | 166 | LT V (Lengthwise) |  |  |  |  |  |  |
|  | 172 | HLT V (Lengthwise) |  |  |  |  |  |  |
|  | 255 | Others |  |  |  |  |  |  |
| 507* | Copy Jam History |  |  |  |  |  |  |  |
|  | 1 | Last | Displays the copy jam history (the most recent 10 jams) |  |  |  |  |  |
|  | 2 | Last 1 |  |  |  |  |  |  |
|  | 3 | Last 2 | Sample Display: |  |  |  |  |  |
|  | 4 | Last 3 | CODE: 007 |  |  |  |  |  |
|  | 5 | Last 4 | SIZE: 05h |  |  |  |  |  |
|  | 6 | Last 5 | TOTAL: 0000334 |  |  |  |  |  |
|  | 7 | Last 6 | DATE: Mon Mar 15 11:44:50 2000 |  |  |  |  |  |
|  | 8 | Last 7 | where: |  |  |  |  |  |
|  | 9 | Last 8 | CODE is the SP7-504-*** number (see above. |  |  |  |  |  |
|  | 10 | Last 9 | TOTAL is the total jam error count (SP7-003) DATE is the date the jams occurred. |  |  |  |  |  |
|  |  |  | Size | Code | Size | Code | Size | Code |
|  |  |  | A4 (S) | 05 | A3 (L) | 84 | DLT (L) | A0 |
|  |  |  | A5 (S) | 06 | A4 (L) | 85 | LG (L) | A4 |
|  |  |  | B5 (S) | 0E | A5 (L) | 86 | LT (L) | A6 |
|  |  |  | LT (S) | 26 | B4 (L) | 8D | HLT (L) | AC |
|  |  |  | HLT (S) | 2C | B5 (L) | 8E | Others | FF |
| 508* | Original Jam History |  |  |  |  |  |  |  |
|  | 1 | Last | Displays the original jam history (the most recent 10 jams. |  |  |  |  |  |
|  | 2 | Last 1 |  |  |  |  |  |  |
|  | 3 | Last 2 | Sample Display: |  |  |  |  |  |
|  | 4 | Last 3 | CODE: | 007 |  |  |  |  |
|  | 5 | Last 4 |  |  |  |  |  |  |
|  | 6 | Last 5 | TOTAL: 0000334 |  |  |  |  |  |
|  | 7 | Last 6 | DATE: Mon Mar 15 11:44:50 2000 |  |  |  |  |  |
|  | 8 | Last 7 | where: <br> CODE is the SP7-505-*** number (see above. |  |  |  |  |  |
|  | 9 | Last 8 | SIZE is the ASAP paper size code in hex. TOTAL is the total error count (SP7-003-001) DATE is the date the jams occurred. |  |  |  |  |  |
|  | 10 | Last 9 |  |  |  |  |  |  |



| 7 | Mode Number/Name | Function/[Setting] |  |
| :---: | :---: | :---: | :---: |
| 832 | Self-Diagnosis Result Display |  |  |
|  |  | Execute to open the "Self-Diagnostics Result Display" to view details about errors. Use the keys in the display on the touch-panel to scroll through all the information. If no errors have occurred, you will see the "No Error" message on the screen. |  |
| 904 | Copy Counter Reset: Copy Mode |  |  |
|  |  | Resets all counters for SP7-301, SP7-304. To reset, press Execute on the touch panel. |  |
| 905 | Job Counter Reset: Set Number |  |  |
|  |  | Resets all counters for SP7-305. To reset, press Execute on the touch panel. |  |
| 907 | Job Counter Reset: Copy Mode |  |  |
|  |  | Resets all counters for SP7-306. To reset, press Execute on the touch panel. |  |
| 909 | PCU Counter Display |  |  |
|  |  | Displays the value of the PCU counter (number of copies since the last PCU change). |  |
| 920 | Document Server: Scan Storage Reset |  |  |
|  |  | Clears the count for SP7-320. To reset, press Execute on the touch panel. |  |
| 921 | Document Server: Original Counter Reset |  |  |
|  |  | Clears the counters for SP7-321. To reset, press Execute on the touch panel. |  |
| 923 | Document Server: Print Counter Reset by Size |  |  |
|  |  | Clears the counters for SP7-323. To reset, press Execute on the touch panel. |  |
| 924 | Document Server: Print Job Counter Reset |  |  |
|  |  | Clears the counters for SP7-324. To reset, press Execute on the touch panel. |  |
| 925 | Document Server: Job Counter Reset - Page Number |  |  |
|  |  | Clears the counters for SP7-325. To reset, press Execute on the touch panel. |  |
| 926 | Document Server: Job Count Reset - File Number |  |  |
|  |  | Clears the counters for SP7-326. To reset, press Execute on the touch panel. |  |
| 927 | Document Server: Job Counter Reset - Set Number |  |  |
|  |  | Clears the counters for SP7-327. To reset, press Execute on the touch panel. |  |
| 928 | Document Server: Print Count Reset - Print Mode |  |  |
|  |  | Clears the counters for SP7-328. To reset, press Execute on the touch panel. |  |
| 930 | Copy Document Server: All Counter Clear |  |  |
|  | - Execute this SP to clear the following SP modes: | 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 |

## SERVICE PROGRAM MODE

| 7 | Mode Number/Name | Function/[Setting] |  |
| :---: | :--- | :--- | :--- |
| 930 |  | 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 |

## SP9-XXX: Debug/Testing

| 9 | Mode Number/Name | Function/[Setting] |
| :---: | :---: | :---: |
| 913* | 2nd Paper Feed Amount |  |
|  |  | Adjusts the amount of paper feed from the 2nd paper tray. <br> Set a larger value when noise occurs during paper feed from the 2nd tray. $[0 \sim 99.9 / 60.0 / 0.1 \mathrm{~mm} / \mathrm{step}]$ |

### 4.2.3 TEST PATTERN PRINTING (SP2-902-3)

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

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

| No. | Test Pattern | No. | Test Pattern |
| :---: | :--- | :---: | :--- |
| 0 | None | 15 | Grayscale (Grid) |
| 1 | Vertical Line (1-dot) | 16 | Grayscale with White Line (Horizontal) |
| 2 | Horizontal Line (1-dot) | 17 | Grayscale with White Line (Vertical) |
| 3 | Vertical Line (2-dot) | 18 | Grayscale with White Line (Vertical <br> /Horizontal) |
| 4 | Horizontal Line (2 dot) | 23 | P Pattern |
| 5 | Grid Pattern (1-dot) | 31 | Grayscale (Horizontal, 8bit, Odd) |
| 6 | Grid Pattern (1-dot pair) | 32 | Grayscale (Vertical, 8bit, Odd) |
| 7 | Alternating Dot Pattern | 33 | Grayscale with White Line (Horizontal <br> 8bit, Odd) |
| 8 | Full Dot Pattern | 34 | Grayscale with White Line (Vertical 8bit, <br> Odd) |
| 9 | Black band | 35 | Grayscale (Horizontal, 8bit, Even) |
| 10 | Trimming Area | 36 | Grayscale (Vertical, 8bit, Even) |
| 11 | Argyle Pattern | 37 | Grayscale with White Line (Horizontal <br> 8bit, Even) |
| 12 | Grayscale (Horizontal) | 38 | Grayscale with White Line (Vertical 8bit, <br> Even) |
| 13 | Grayscale (Vertical) | 40 | Grid (1-dot pair) (OR Outside Data 1) |
| 14 | Grayscale (Vertical/Horizontal) | 41 | Trimming Area (OR Outside Data) |

### 4.2.4 INPUT CHECK

## Main Machine Input Check (SP5-803)

1. Enter the SP mode and select SP5-803.
2. Enter the number $(1-11)$ 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 | 7 | Paper Height Sensor 2 (2nd Tray) | Activated | Deactivated |
|  | 6 | Paper Height Sensor 1 (2nd Tray) | Activated | Deactivated |
|  | 5 | $\begin{aligned} & \text { Paper Height Sensor } 2 \text { (1st } \\ & \text { Tray) } \\ & \hline \end{aligned}$ | Activated | Deactivated |
|  | 4 | Paper Height Sensor 1 (1st Tray) | Activated | Deactivated |
|  | 3 | Paper End Sensor (2nd Tray) | Paper End | Paper is present |
|  | 2 | Upper Relay Sensor | Activated | Deactivated |
|  | 1 | Lower Right Cover Open | Closed | Open |
|  | 0 | Not used |  |  |
| 2 | 7 | Paper Exit Sensor | Activated | Deactivated |
|  | 6 | Fusing Unit | Unit Set | Unit not set |
|  | 5 | PCU Set | Activated | Deactivated |
|  | 4 | New PCU Sensor | Activated | Deactivated |
|  | 3 | Interchange Exit Sensor | Activated | Deactivated |
|  | 2 | 1 bin Tray Unit Set | Unit Set | Unit not set |
|  | 1 | 1 bin Tray Paper Sensor | Activated | Deactivated |
|  | 0 | Interchange Unit Set | Unit Set | Unit not set |
| 3 | 7 | Bridge Exit Sensor | Activated | Deactivated |
|  | 6 | Not used |  |  |
|  | 5 | Bridge Paper Sensor | Activated | Deactivated |
|  | 4 | Bridge Right Guide Switch | Activated | Deactivated |
|  | , | Bridge Left Guide Switch | Activated | Deactivated |
|  | 2 | Bridge Unit Set | Unit Set | Unit not set |
|  | 1 | Bridge Fan Motor Lock | Locked | Unlocked |
|  | 0 | Shift Tray Unit Set | Unit Set | Unit not set |


| Number | Bit | Description | Reading |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0 | 1 |
| 4 | 7 | Wake up Signal | Not detected | Detected |
|  | 6 | Lower Relay Sensor | Activated | Deactivated |
|  | 5 | Vertical Transport Sensor (Optional paper tray unit) | Activated | Deactivated |
|  | 4 | 3rd Tray Paper Size | Activated | Deactivated |
|  | 3 | 4th Tray Paper Size | Activated | Deactivated |
|  | 2 | Motor Lock (Optional paper tray unit) | Not locked | Locked |
|  | 1 | Height Sensor (Optional paper tray unit) | Activated | Deactivated |
|  | 0 | Unit Set (Optional paper tray unit) | Unit set | Unit not set |
| 5 | 7 | Fusing Drive Release Solenoid | Activated | Deactivated |
|  | 6 | Main Motor Brake Signal | Not active | Active |
|  | 5 | Main Motor On Signal | Activated | Deactivated |
|  | 4 | Main Motor Rotation Direction Signal | Not active | Active |
|  | 3 | 3rd Paper End Sensor | Paper End | Paper is present |
|  | 2 | 4th Paper End Sensor | Paper End | Paper is present |
|  | 1 | 3rd Paper Height Sensor | Deactivated | Activated |
|  | 0 | 4th Paper Height Sensor | Deactivated | Activated |
| 6 | 7 | Duplex Unit Set | Unit set | Unit not set |
|  | 6 | Total Counter | Not detected | Detected |
|  | 5 | By-pass Tray Unit Set | Detected | Not detected |
|  | 4 | By-pass Paper End Sensor | Paper End | Paper is present |
|  | 3 | By-pass Paper Size 2 | Activated | Deactivated |
|  | 2 | By-pass Paper Size 1 | Activated | Deactivated |
|  | 1 | By-pass Paper Size 4 | Activated | Deactivated |
|  | 0 | By-pass Paper Size 3 | Activated | Deactivated |
| 7 | 7 | Not Used |  |  |
|  | 6 | Not Used |  |  |
|  | 5 | Not Used |  |  |
|  | 4 | Not Used |  |  |
|  | 3 | Key Counter Set | Detected | Not detected |
|  | 2 | Key Card Set | Detected | Not detected |
|  | 1 | Polygon Motor Ready Signal | Ready | Not ready |
|  | 0 | Not Used |  |  |


| Number | Bit | Description | Reading |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0 | 1 |
| 8 | 7 | Dip Switch - 4 | On | Off |
|  | 6 | Dip Switch - 3 | Off | On |
|  | 5 | Dip Switch - 2 | Off | On |
|  | 4 | Dip Switch - 1 | Off | On |
|  | 3 | Not Used |  |  |
|  | 2 | Front Safety Sw-5V | On | Off |
|  | 1 | Front Safety Sw - 24V | Off | On |
|  | 0 | Main Motor Ready Signal | Ready | Not ready |
| 9 | 7 | Not used |  |  |
|  | 6 | Relay Off Signal | Not detected | Detected |
|  | 5 | Toner Bottle Motor Lock | Locked | Not locked |
|  | 4 | Right Cover Open | Closed | Open |
|  | 3 | Registration Sensor | Activated | Deactivated |
|  | 2 | Exhaust Fan Lock | Not locked | Locked |
|  | 1 | Interchange Cover Open | Closed | Open |
|  | 0 | Paper Overflow Sensor | Activated | Deactivated |
| 10 | 7 | Not Used |  |  |
|  | ¢ 8 | Not Used |  |  |
|  | 5 | Not Used |  |  |
|  | 4 | Upper Relay Sensor | Activated | Deactivated |
|  | 3 | 1st Paper End | Paper End | Paper is present |
|  | 2 | 2nd Paper Lift Sensor | Activated | Deactivated |
|  | 1 | 1st Paper Lift Sensor | Activated | Deactivated |
|  | 0 | Not Used |  |  |
| 11 | 7 | 2nd Paper Size 1 | Activated | Deactivated |
|  | 6 | 2nd Paper Size 2 | Activated | Deactivated |
|  | 5 | 2nd Paper Size 3 | Activated | Deactivated |
|  | 4 | 2nd Paper Size 4 | Activated | Deactivated |
|  | 3 | 1st Paper Size 1 | Activated | Deactivated |
|  | 2 | 1st Paper Size 2 | Activated | Deactivated |
|  | 1 | 1st Paper Size 3 | Activated | Deactivated |
|  | 0 | 1st Paper Size 4 | Activated | Deactivated |

NOTE: Numbers 12 to 14 are not used for this machine.

## ARDF Input Check (SP6-007)

1. Enter the SP mode and select SP6-007.
2. Enter the number $(1-11)$ 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, as shown below. However, only bit 0 at the right side of the screen is valid.

Bit | 00000000 |
| :---: |

3. Check the status of bit 0 for the required item listed in the table below.


| No.. | Description |  | Reading |  |
| :---: | :--- | :--- | :--- | :---: |
|  | $\mathbf{0}$ | $\mathbf{1}$ |  |  |
| 1 | Original set sensor | Paper not detected | Paper detected |  |
| 2 | Original width sensor 1 (W1) | Paper not detected | Paper detected |  |
| 3 | Original width sensor 2 (W2) | Paper not detected | Paper detected |  |
| 4 | Original length sensor 1 (L1) | Paper not detected | Paper detected |  |
| 5 | Original length sensor 2 (L2) | Paper not detected | Paper detected |  |
| 6 | Original trailing edge sensor | Paper not detected | Paper detected |  |
| 7 | ADF cover sensor | Cover closed | Cover opened |  |
| 8 | DF position sensor | ADF closed | ADF opened |  |
| 9 | Registration sensor | Paper not detected | Paper detected |  |
| 10 | Exit sensor | Paper not detected | Paper detected |  |
| 11 | Inverter sensor | Paper not detected | Paper detected |  |

## SERVICE PROGRAM MODE

## Finisher Input Check (SP6-117)

1. Enter the SP mode and select SP6-117.
2. Enter the number $(1-4)$ 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.
Bit

## 00000000

it 76543210
3. Check the status of each item against the corresponding bit numbers listed in the table below.

For 1000-sheet Finisher

| Number | Bit | Description | Reading |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0 | 1 |
| 1 | 7 | Stack Feed-out Belt HP Sensor | Activated | Deactivated |
|  | 6 | Not Used |  |  |
|  | 5 | Jogger Fence HP Sensor | Activated | Deactivated |
|  | 4 | Stapler HP Sensor | Activated | Deactivated |
|  | 3 | Stapler Tray Entrance Sensor | Activated | Deactivated |
|  | 2 | Not Used |  |  |
|  | 1 | Lower Tray Exit Sensor | Activated | Deactivated |
|  | 0 | Entrance Sensor | Activated | Deactivated |
| 2 | 7 | Not Used |  |  |
|  | 6 | Not Used |  |  |
|  | 5 | Stapler Ready Signal | Activated | Deactivated |
|  | 4 | Not Used |  |  |
|  | 3 | Not Used |  |  |
|  | 2 | Staple Sensor | Activated | Deactivated |
|  | 1 | Staple Hammer HP Sensor | Activated | Deactivated |
|  | 0 | Stapler Tray Paper Sensor | Activated | Deactivated |
| 3 | 7 | Not Used |  |  |
|  | 6 | Lower Tray Lower Limit Sensor | Activated | Deactivated |
|  | 5 | Not used |  |  |
|  | 4 | Stack Height Sensor | Activated | Deactivated |
|  | 3 | Not Used |  |  |
|  | 2 | Not Used |  |  |
|  | 1 | Shift HP Sensor | Activated | Deactivated |
|  | 0 | Exit Guide HP Sensor | Activated | Deactivated |


| Number | Bit | Description | Reading |  |
| :---: | :---: | :--- | :--- | :--- |
|  |  |  | $\mathbf{0}$ |  |
| 4 | 7 | Not Used |  |  |
|  | 6 | Not Used |  |  |
|  | 5 | Not Used |  |  |
|  | 4 | Not Used |  |  |
|  | 3 | Upper Tray Paper Limit Sensor | Activated |  |
|  | 2 | Not Used |  |  |
|  | 1 | Not Used |  |  |
|  | 0 | Not Used |  |  |

For 500-sheet Finisher

| Number | Bit | Description | Reading |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0 | 1 |
| 1 | 7 | Stack Near-limit Sensor | Activated | Deactivated |
|  | 6 | Tray Upper Limit Sensor | Activated | Deactivated |
|  | 5 | Lever Sensor | Activated | Deactivated |
|  | 4 | Stack Height Sensor | Activated | Deactivated |
|  | 3 | Top Cover Sensor | Closed | Opened |
|  | 2 | Jogger HP Sensor | Activated | Deactivated |
|  | 1 | Exit Sensor | Activated | Deactivated |
|  | 0 | Entrance Sensor | Activated | Deactivated |
| 2 | 7 | Not Used |  |  |
|  | 6 | Not Used |  |  |
|  | 5 | Not Used |  |  |
|  | 4 | Staple Unit Lock | Locked | Not Locked |
|  | 3 | Staple Cartridge Sensor | Activated | Deactivated |
|  | 2 | Staple End Sensor | Activated | Deactivated |
|  | 1 | Staple Hammer HP Sensor | Activated | Deactivated |
|  | 0 | Staple Unit Cover Switch | Closed | Opened |

### 4.2.5 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.


## Output Check Table

NOTE: Pull out the tray before performing the output checks 25, 26, 29, and 30.

| Number | Description |
| :---: | :--- |
| 0 | Not used |
| 1 | Main motor (forward) |
| 2 | Main motor (Reverse) Do not use |
| 3 | Registration clutch |
| 4 | Not used |
| 5 | Toner supply motor |
| 6 | Exhaust fan (High Speed) |
| 7 | Exhaust fan (Low Speed) |
| 8 | By-pass feed clutch |
| 9 | Upper paper feed clutch |
| 10 | Lower paper feed clutch |
| 11 | Upper paper lift motor (Up) |
| 12 | Upper paper lift motor (Down) |
| 13 | Lower paper lift motor (Up) |


| Number | Description |
| :---: | :--- |
| 14 | Lower paper lift motor (Down) |
| 15 | Upper relay clutch |
| 16 | Lower relay clutch |
| 17 | Fusing drive release solenoid |
| $18 \sim 20$ | Not Used |
| 21 | Relay clutch (Optional paper tray unit) |
| 22 | Upper paper feed clutch (Optional paper tray unit) |
| 23 | Lower paper feed clutch (Optional paper tray unit) |
| 24 | Tray motor (Optional paper tray unit) |
| 25 | Upper Paper lift motor (Up) (Optional paper tray unit or LCT) |
| 26 | Upper paper lift motor (Down) (Optional paper tray unit or LCT) |
| 27 | Lower paper lift motor (Up) (Optional paper tray unit) |
| 28 | Lower paper lift motor (Down) (Optional paper tray unit) |
| 29 | Rear fence motor (forward) (Optional LCT) |
| 30 | Rear fence motor (reverse (Optional LCT) |
| 31 | Side fence solenoid (Optional LCT) |
| 32 | Shift tray motor (Optional shift tray) |
| 33 | Exit junction gate (Optional interchange unit) |
| 34 | Duplex junction gate (Optional interchange unit) |
| $35 \sim 40$ | Not used |
| 41 | Duplex inverter motor (Reverse) (Optional duplex unit) |
| 42 | Duplex inverter motor (Forward) (Optional duplex unit) |
| 43 | Duplex transport motor (Optional duplex unit) |
| 44 | Inverter gate solenoid (Optional duplex unit) |
| $45 \sim 50$ | Not used |
| 51 | Bridge cooling fan motor (Optional bridge unit) |
| 52 | Bridge unit drive motor (Optional bridge unit) |
| 53 | Junction gate solenoid (Optional bridge unit) |
| $54 \sim 59$ | Not used |
| 60 | Polygonal mirror motor |
| 61 | Polygonal mirror motor and laser diode |
| 62 | Laser diode - Do not use |
| $53 \sim 80$ | Not used |
| 81 | Duplex unit free run (without paper) |
| 82 | Duplex unit free run (with paper) |
|  |  |

## 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 | Transport Motor (Forward) |
| 4 | Feed Clutch |
| 5 | Pick-up Solenoid |
| 6 | Junction Gate Solenoid |
| 7 | Stamp Solenoid |

## Finisher Output Check (SP6-118)

1. Open SP mode SP6-118.
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 |  |
| :---: | :--- | :--- |
|  | 1000-sheet finisher | 500-sheet finisher |
| 1 | Upper Transport Motor | Main Motor |
| 2 | Shift Tray Lift Motor | Output Tray Motor |
| 3 | Staple Hammer Motor | Stapler Motor |
| 4 | Shift Motor | Jogger Motor |
| 5 | Lower Transport Motor | Not Used |
| 6 | Shift Tray Exit Motor | Not Used |
| 7 | Tray Junction Gate Solenoid | Not Used |
| 8 | Jogger Motor | Not Used |
| 9 | Stapler Motor | Not Used |
| 10 | Stapler Junction Gate Solenoid | Not Used |
| 11 | Positioning Roller Solenoid | Not Used |
| 12 | Stack Feed-out Motor | Not Used |
| 13 | Exit Guide Plate Motor | Not Used |
| 14 | Not Used | Paddle Roller Solenoid |
| 15 | Not Used | Exit Unit Gear Solenoid |
| 16 | Not Used | Stack Height Lever Solenoid |
| 17 |  |  |

### 4.2.6 SMC DATA 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. Touch "Execute" on the touch panel
3. Select. "Single Face" or "Both Face" then touch "Execute" to start printing.
4. After printing the list, press Exit twice to close the SP Mode screen and return to copy mode.

### 4.2.7 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 |

Normally, this SP mode should not be used. This procedure is necessary only after replacing the NVRAM, or when the copier malfunctions because the NVRAM is damaged.

## Using a Flash Memory Card

1. Upload the NVRAM data to a flash memory card (NVRAM Data Upload).
2. Print out all SMC data lists (SP mode 5-990).

NOTE: Be sure to print out all the lists. If the NVRAM data upload was not completed, it is necessary to change the SP mode settings by hand.
3. Open SP mode 5-801.
4. 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> process settings. |
| 3 | SCS (System Control <br> Service)/SRAM | 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 switches, and the printer CSS <br> counter. |
| 9 | Scanner application | Initializes the scanner defaults for the scanner and <br> all the scanner SP modes. |
| 10 | Network application | Deletes the network file application management <br> files and thumbnails, and initializes the job login ID. |
| 11 | NCS (Network Control <br> Service) | Initializes the system defaults and interface settings <br> (IP addresses also), SmartNetMonitor for Admin, <br> WebStatusMonitor settings, and the TELNET <br> settings. |
| 12 | R-FAX | Initializes the job login ID, SmartNetMonitor for <br> Admin, job history, and local storage file numbers. |

5. Press Execute and turn the main switch off and back on.
6. Download the NVRAM data from a flash memory card NVRAM Data Download).

## Without Using a Flash Memory Card

If there is no flash memory card, follow the steps below.

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.
4. Press Execute and turn the main switch off and back on.
5. Make sure that you do the following:

- Do the printer and scanner registration and magnification adjustments (-3 Replacement and Adjustment, "Copy Adjustments").
- Do the touch screen calibration ( -3 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).
- Do the white level adjustment ( Section 6.8.2 Standard White Density Adjustment)

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

### 4.2.8 UPLOADING/DOWNLOADING NVRAM DATA

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

## Uploading NVRAM Data (SP5-824)

The contents of the NVRAM in the machine can be uploaded to a flash memory card.


1. Turn off the main switch.
2. Remove the application cover [A].
3. Plug the flash memory card $[B]$ into the card slot.
4. Turn on the main switch.
5. Open SP5-824.
6. Touch "Execute" to start uploading the NVRAM data.
7. Turn off the main switch, then remove the IC card.

## Downloading NVRAM Data (SP5-825)

This downloads data from a flash card to the NVRAM inside the machine.
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)
- Duplex, A3/DLT/Over 420 mm, Staple and Scanner application scanning counters (system settings).


1. Turn off the main switch.
2. Remove the application cover [A].
3. Plug the flash memory card $[B]$ into the card slot.
4. Turn on the main switch.
5. Open SP5-825.
6. Touch "Execute" to start download the NVRAM data.
7. Turn off the main switch, then remove the IC card.

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 "Execute"
- If the correct card for the NVRAM data is not inserted in the card slot, after you press "Execute" a message will tell you that downloading cannot proceed because the card is abnormal and the execution will halt.


### 4.2.9 APS OUTPUT DISPLAY (SP4-301)

When open this SP, 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 |
| :---: |
| 76543210 |

Bit 76543210
1 = Paper detected
[230V Machine]

[115V Machine]


| Bit | Description |
| :---: | :---: |
| 7 | L1 |
| 6 | L 2 |
| 5 | L 3 |
| 4 | L 4 |
| 3 | W 2 |
| 2 | W1 |
| 1 | Not Used |
| 0 | Not Used |

### 4.2.10 DF APS SENSOR OUTPUT DISPLAY (SP6-901)

When open this SP, 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.

Bit | 00000000 |
| :---: |
| 7653210 |

1 = Paper detected


|  | Large | Small |  |  |
| :---: | :---: | :---: | :---: | :---: |
| W1 | 0 | 0 | 1 | 1 |
| W2 | 0 | 1 | 0 | 1 |


| Bit | Description |
| :---: | :---: |
| 7 | Not Used |
| 6 | Not Used |
| 5 | W1 |
| 4 | W2 |
| 3 | L1 |
| 2 | L2 |
| 1 | L3 |
| 0 | Not Used |

### 4.2.11 NIP BAND WIDTH MEASUREMENT (SP1-109)



When paper wrinkling or image off-set occurs, the pressure from the pressure roller can be adjusted by changing the position of the pressure springs. At this time, the nip band width can also be checked with SP1-109, as follows.

1. Do a free run (SP5-802) for about 50 sheets.
2. Access SP1-109 and press the " 1 " key.
3. Press Copy Window to return to the copy window.
4. Place an OHP sheet (A4/8.5"x11" sideways) on the by-pass tray or in the 2nd paper tray.
5. Press the "Start" key.

The OHP sheet is stopped in the fusing unit for about 20 seconds, then it will be fed automatically.
6. Check the nip band width [A]. The relationship between the position of the pressure spring and the band width is as follows.
NOTE: Check the nip band width around the center of the OHP.

| 1. Pressure spring position | Nip band width |
| :--- | :--- |
| Upper (default position) | $5.2 \pm 0.5 \mathrm{~mm}$ |
| Lower | $5.3 \pm 0.5 \mathrm{~mm}$ |
| 2. Envelope feed mode (green lever down) at the <br> default pressure spring position | $4.7 \pm 0.5 \mathrm{~mm}$ |

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

### 4.3 PROGRAM DOWNLOAD



1. Turn off the main power switch.
2. Remove the application cover [A].
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.


## $\triangle$ 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.

NOTE: If the download failed, an error message will appear on the panel. Then, download the firmware again using the IC card as usual.

### 4.4 SOFTWARE RESET

The software can be rebooted when the machine hangs up. Use the following procedure.
Turn the main power switch off and on.
-or-
Press and hold down $\odot^{\circledast}$ \# 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.

### 4.5 SYSTEM SETTINGS AND COPY SETTING RESET

### 4.5.1 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 $\Delta / \sqrt{[23}$
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.

### 4.5.2 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 $\Delta /\left[\begin{array}{ll}{[23} \\ \hline\end{array}\right.$
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.

### 4.6 USER TOOLS

The user program (UP) mode can be accessed by users and operators, and by sales and service staff. UP mode is used to input the copier's default settings. The user can reset the default settings at any time. (4.5)

### 4.6.1 HOW TO USE UP MODE

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

To enter the UP mode, press User Tools/Counter $\begin{aligned} & \Delta / \text { 国 }\end{aligned}$


## 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 it 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.

|  |  |  |  |  | AUG | 9,2001 | 4:1 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| -0. System Settings |  |  |  |  |  | Exit |  |
| Select one of the following default settings. |  |  |  |  |  |  |  |
| General Features | Tray P | Timer Setting | Interface Settings | File Transter | Key Operator | Tools |  |
| Panel Tone |  | ON | Function Reset Timer |  | 3 second(s) |  |  |
| Wamm Up Notice |  | ON | Output: Copier |  | Intemal tray 1 |  |  |
| Copy Count Display |  | Up | Output: Document Server |  | Intemal tray 1 |  |  |
| Function Priority |  | Copier | Output: Facsimile |  | Intemal tray 1 |  |  |
| Print Priority |  | Display mode | 1/2 |  | * K- |  | TNex |

## 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 it 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.

## Inquiry

In the User/Tools Counter display, press Inquiry.
The following SP mode settings will be displayed.

- Service Telephone Number (SP5-812-1)
- Sales Telephone Number (SP812-4)
- Consumable Telephone Number (SP812-3)
- Toner Name (SP-841)



## USER TOOLS

## Counter

In the User/Tools Counter display, press Counter.

|  |  |  | ALUG | 3,2001 | 2:26PTM |
| :---: | :---: | :---: | :---: | :---: | :---: |
| [123 Counter |  |  |  | Exit |  |
| - Total | 9998160 |  |  |  |  |
| - Copier | 9998021 | - $\mathrm{A}_{3} / \mathrm{DLT}$ | 999 | 8000 |  |
| - Printer | 9998139 |  |  |  |  |
|  |  |  | Priint Counter List |  |  |

The following SP mode counters will be displayed.

- Copy Counter (SP5-914-2)
- A3/DLT Counter (SP5-918)
- Printer Counter (SP5-914-1)

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.

### 4.7 LEDS

## Controller

| Number | Normal | Controller Software <br> Download | Error |
| :---: | :---: | :---: | :---: |
| LED 1 | Off | Blinking | Off |
| LED 2 | Blinking | Blinking | Lit or Off |
| LED 3 |  |  |  |
| $(+5$ V line $)$ | Lit | Lit | Lit |

## SBCU

| Number | Normal | SBCU Software <br> Download | Error |
| :---: | :---: | :---: | :---: |
| LED 1 | Lit | Lit | Off or Blinking |
| LED 2 | Blinking | Lit | Lit (except downloading) <br> or Off |

## IPU

| Number | Normal | Error |
| :---: | :---: | :---: |
| LED 1 | Lit | Off or Blinking |

### 4.8 DIP SWITCHES

Controller: DIP SW2

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

SBCU: DIP SW102

| DIP SW No. | Function | ON |  | OFF |  |
| :---: | :--- | :--- | :--- | :--- | :---: |
| 1 |  | On: Japan <br> On | Off: NA <br> On <br> On | On: EU/Asia <br> Off <br> On |  |
| 3 | Destination: | Off: Used |  |  |  |
| On |  | Off |  |  |  |
| 4 | Not used | OFF (Do not change) |  | On |  |

### 4.9 SPECIAL TOOLS AND LUBRICANTS

### 4.9.1 SPECIAL TOOLS

| Part Number | Description | Q'ty |
| :---: | :--- | :---: |
| A2929500 | S5S Test Chart (10 pcs/set) | 1 |
| A0069104 | Scanner Positioning Pin (4 pcs/set) | 1 |
| A0299387 | Digital Multimeter - FLUKE 87 | 1 |
| A2309351 | Case - Flash Memory Card | 1 |
| N8036701 | Flash Memory Card - 4MB | 1 |
| B0279099 | NVRAM - Minus Counter | 1 |
| A2309003 | Adjustment Cam - Laser Unit | 1 |
| A2679002 | Positioning Pin - Laser Unit | 1 |

### 4.9.2 LUBRICANTS

| Part Number | Description | Q'ty |
| :---: | :--- | :---: |
| A0289300 | Grease Barrierta - JFE 5 5/2 | 1 |
| 52039501 | Silicone Grease G-501 | 1 |

## PREVENTIVE MAINTENANCE

## 5. PREVENTIVE MAINTENANCE SCHEDULE

### 5.1 PM TABLE

NOTE: 1) The amounts mentioned as the PM interval indicate the number of prints.
2) After carrying out PM, clear the maintenance counter (SP7-804).

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

|  | EM | 120K | 240K | 360K | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| SCANNER/LASER OPTICS |  |  |  |  |  |
| Reflector |  | C | C | C | Optics cloth |
| 1st Mirror | C | C | C | C | Optics cloth |
| 2nd Mirror | C | C | C | C | Optics cloth |
| 3rd Mirror | C | C | C | C | Optics cloth |
| Scanner Guide Rails |  | C | C | C | Do not use alcohol. |
| Platen Sheet Cover | C | I | I | I | Replace the platen sheet, if necessary. <br> Dry cloth or alcohol |
| 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 blower brush |
|  |  |  |  |  |  |
| AROUND THE DRUM |  |  |  |  |  |
| Transfer/Separation Unit |  | R | R | R |  |
| ID Sensor |  | C | C | C | Perform the ID sensor initial setting (SP2-935) after cleaning (blower brush) |
| PAPER FEED |  |  |  |  |  |
| Registration Rollers | C | C | C | C | Clean with water |
| Paper Feed Roller | C | R | R | R | Clean with water |
| Friction Pad | C | R | R | R | Dry cloth |
| Paper Feed Guides | C | C | C | C | Clean with alcohol. |
| Relay Rollers | C | C | C | C | Clean with water. |
| Bottom Plate Pad | C | C | C | C | Clean with water. |
| Registration Roller Mylar | C | C | C | C | Clean with water. |
| FUSING UNIT AND PAPER EXIT |  |  |  |  |  |
| Fusing Entrance and Exit Guide Plates |  | C | C | C | Clean with water or alcohol. |
| Hot Roller |  | R | R | R |  |
| Pressure Roller |  | R | R | R |  |
| Fusing Thermistors |  | R | R | R |  |


|  | EM | 120K | 240K | 360K | NOTE |
| :--- | :---: | :---: | :---: | :---: | :--- |
| Cleaning Roller |  | C | C | C | Clean with water or alcohol. |
| Cleaning Roller <br> Bushings |  | C | C | C | Clean with water or alcohol. |
| Hot Roller Strippers |  | R | R | R |  |
| Hot Roller and <br> Pressure Roller <br> Bushings | L | L | L | L | Grease Barrierta JFE5 5/2 <br> (A0289300) |
| Paper Exit Guide <br> Ribs |  | C | C | C | Clean with water or alcohol. |
|  |  |  |  |  |  |
| OTHERS | L | I | I | I | Silicone Grease G501 <br> (see note 1) |
| Main Motor Drive <br> Gear |  |  |  |  |  |


|  | EM | 120K | 240K | 360K | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| ADF (for originals) |  |  |  |  |  |
| Pick-up Roller | C | R | R | R | Clean with water |
| Feed Belt | C | R | R | R | Clean with water |
| Separation Roller | C | R | R | R | Clean with water |
| Stamp |  | I | I | I | Replace if necessary |
| ADF Exposure Glass | C | C | C | C | Clean with alcohol |
| White Plate | C | C | C | C | Clean with alcohol |
| Platen Sheet | C | C | C | C | Clean with alcohol |


|  |  |  |  |  |  |  | EM | 120K | 240K | 360K | NOTE |  |
| :--- | :---: | :---: | :---: | :---: | :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| PAPER TRAY UNIT |  |  |  |  |  |  |  |  |  |  |  |  |
| Paper Feed Roller | C | R | R | R | Clean with water |  |  |  |  |  |  |  |
| Friction Pad | C | R | R | R | Dry cloth |  |  |  |  |  |  |  |
| Paper Feed Guides | C | C | C | C | Clean with alcohol. |  |  |  |  |  |  |  |
| Relay Rollers | C | C | C | C | Clean with water. |  |  |  |  |  |  |  |
| Bottom Plate Pad | C | C | C | C | Clean with water. |  |  |  |  |  |  |  |
| Relay Clutch |  | I | I | I | Replace if necessary |  |  |  |  |  |  |  |
| Paper Feed Clutch |  | I | I | I | Replace if necessary |  |  |  |  |  |  |  |


|  |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :--- |
| EM |  |  | 120K | 240K | 360K |
|  | NOTE |  |  |  |  |
| LCT |  | R | R | R |  |
| Paper Feed Roller |  | R | R | R |  |
| Pick-up Roller |  | R | R | R |  |
| Separation Roller |  | C | C | C | Clean with water |
| Transport Rollers |  | C | C | C | Clean with water |
| Bottom Plate Pad |  | I | I | I | Replace if necessary |
| Relay Clutch |  | I | I | I | Replace if necessary |
| Paper Feed Clutch |  | I | I | I |  |


|  | EM | 120K | 240K | 360K | NOTE |  |
| :--- | :---: | :---: | :---: | :---: | :--- | :---: |
| 1,000-SHEET FINISHER | C |  |  |  | Clean with water or alcohol. |  |
| Rollers | I | I | I | I | Replace if necessary. |  |
| Brush Roller | C | C | C | C | Clean with a dry cloth |  |
| Discharge Brush | C |  |  |  | Blower brush |  |
| Sensors | I | I | I | I | Replace if necessary. |  |
| Jogger Fences |  |  |  |  |  |  |


|  |  |  |  |  | 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 1.

## Main Motor Drive Gear



Do the following every EM:
Lubricate the main motor drive gear $[\mathrm{A}]$ with silicone grease G501.

REPLACEMENT AND ADJUSTMENT

## 6. REPLACEMENT AND ADJUSTMENT

## $\triangle$ CAUTION <br> Turn off the main power switch and unplug the machine before attempting any of the procedures in this section.

### 6.1 SCANNER UNIT

### 6.1.1 EXPOSURE GLASS



1. Open the ADF or platen cover.
2. Remove the left scale $[A]$ (2 screws).
3. Remove the rear scale $[B]$ (3 screws).
4. Remove the exposure glass [C].

NOTE: When reinstalling the exposure glass, make sure that the mark [D] is positioned at the rear left corner, as shown.

### 6.1.2 SCANNER EXTERIOR/OPERATION PANEL



1. Remove the ADF or platen cover.
2. Remove the exposure glass. ( 6.1.1)
3. Remove the upper front cover $[A]$ ( 1 screw, 1 hook).
4. Remove the operation panel $[B]$ ( 5 screws, 1 connector).
5. Remove the right cover [C] (1 screw, 2 hooks).
6. Remove the rear cover [D] ( 2 screws).
7. Remove the left cover [E] (2 screws, 2 hooks).

### 6.1.3 LENS BLOCK ASSEMBLY



1. Remove the exposure glass. (6.1.2)
2. Remove the lens cover [A] (4 screws).
3. Replace the lens block assembly $[B]$ ( 4 screws, 1 connector, 2 clamps). NOTE: Do not remove the screws which are locked with white paint.
4. Reassemble the machine and do the scanner and printer copy adjustments. 6.8)

### 6.1.4 ORIGINAL SIZE SENSORS



1. Remove the exposure glass. (6.1.1)
2. Remove the lens cover. (-6.1.3)
3. Remove the original width sensor $[A]$ ( 1 screw, 1 connector).
4. Remove the lens block. ( -1.1 .3 )
5. Remove the original length sensors $[B]$ ( 1 screw, 1 connector each).

### 6.1.5 EXPOSURE LAMP




1. Remove the exposure glass. (6.1.1)
2. Remove the operation panel, rear cover, and left cover. (6.1.2)
3. Remove the connector cover [A], disconnect the cable, and remove the rear cover [B] (4 screws).
4. Remove the left upper stay [C] (1 screw).
5. Remove the front frame [D] ( 5 screws).
6. Remove the rear bracket $[E]$ ( 5 screws, 2 connectors).
7. Remove the rear frame [F] (2 screws, 1 connector).
8. Push down the part [G] then slide out the exposure lamp $[\mathrm{H}]$ (1 connector).

NOTE: 1) Do not touch the glass surface of the exposure lamp with bare hands.
2) After installing the lamp, the part [G] must be returned to the original position.

### 6.1.6 SCANNER MOTOR/LAMP STABILIZER



1. Remove the connector cover [A], disconnect the cable, and remove the rear cover [B].
2. Replace the scanner motor [C] ( 3 screws, 1 spring, 1 connector).
3. Replace the lamp stabilizer [D] (2 connectors).
4. Reassemble the machine and do the scanner and printer copy adjustments. 6.8)

### 6.1.7 SCANNER WIRES



1. Remove the exposure glass, operation panel, and all scanner exterior covers. (-6.1.1 and 6.1.2)
2. Remove the left upper stay. ( 6.1.5)
3. Remove the front frame. (6.1.5)
4. Remove the rear bracket. (6.1.5)
5. Remove the rear frame. (-6.1.5)
6. Remove the lens cover. (-6.1.3)
7. Remove the lens block assembly. (6.1.3)
8. Remove the front and rear scanner wire pins $[A]$. Then, remove the 1st scanner.

9. Remove the tension spring $[B]$.
10. Loosen the screw [C] securing the wire tension bracket [D].
11. Remove the scanner drive pulley [ $E$ ] ( 1 set screw).
12. Remove the scanner wire [F].
13. Wrap the new scanner wire around the pulley as shown (1), then temporarily secure the pulley with tape.
14. Re-install the 1 st scanner. Then secure the 1 st and 2 nd scanner with the scanner positioning tools (P/N A0069104), as shown in the illustration on the next page.
15. Wind the new scanner wire around the scanner drive pulley in the correct way, as shown.
16. Wind the end of the new wire with the ball as shown (2).
17. Wind the end of the new wire with the ring as shown (3),4), and (5).
18. Install the tension spring on the wire tension bracket (5).
19. Wind the new scanner wire for the other side as well.

20. Secure the 1 st scanner with the scanner wire pins.
21. Install the tension spring [A] to the tension bracket.
22. Tighten the tension bracket [B].
23. Secure the scanner wire pulley [C] (1 Allen screw).
24. Remove the positioning tools [D]. After sliding the scanner to the right and left several times, re-install the positioning tools to check the scanner wire bracket and tension bracket again.
25. Reassemble the scanner and do the scanner and printer copy adjustments 6.8).

### 6.2 LASER UNIT

| $\triangle$ 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. |

### 6.2.1 CAUTION DECAL LOCATIONS

Two caution decals are located in the laser section as shown below.


### 6.2.2 LASER UNIT

[B]

[D]



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

1. Remove the optional finisher/bridge unit, and either the tray for the optional 1bin tray unit or optional shift tray, if these units have been installed.
2. Remove the upper front cover $[A]$ ( 1 screw, 1 hook).
3. Remove the front cover $[B]$ (2 pins).
4. Remove the inner cover [C] (5 screws).
5. Remove the copy tray [D] (1 hook [E]).
6. Remove the toner bottle holder [F].
7. Remove the laser unit [G] ( 2 screws, 2 connectors).
8. After reassembling the machine, do the scanner and printer copy adjustments.
( 6.8 )

### 6.2.3 POLYGON MIRROR MOTOR



1. Remove the laser unit (-6.2.2).
2. Remove the heat sink $[A]$ ( 4 screws).
3. Replace the polygon mirror motor $[B]$ (4 screws, 1 connector).

NOTE: When installing the new polygon mirror motor, do not touch the surface of the mirror with bare hands.

### 6.2.4 LD UNIT



1. Remove the laser unit (-6.2.2).
2. Replace the LD unit $[A]$ ( 3 screws, 1 connector).

NOTE: 1) Do not remove the screws [B].
2) Do not touch any variable resistors on the LD unit.

### 6.2.5 LASER SYNCHRONIZATION DETECTOR



1. Remove the laser unit ( 6.2.2).
2. Remove the heat sink [A] (4 screws).
3. Remove the laser unit cover [B] (3 screws).
4. Remove the bracket [C] (1 screw).
5. Replace the laser synchronization detector [D] (1 connector).

### 6.3 PHOTOCONDUCTOR UNIT (PCU)

### 6.3.1 PCU



1. Open the right cover $[A]$ and front cover $[B]$.
2. Pull the PCU $[C]$ out slightly while pushing the release lever [D].

NOTE: Do not touch the drum surface with bare hands.

### 6.4 TRANSFER UNIT

### 6.4.1 TRANSFER ROLLER UNIT



1. Open the right cover $[A]$.
2. Remove the transfer roller unit [B] (1 hook).

NOTE: Do not touch the transfer roller surface.

### 6.4.2 IMAGE DENSITY SENSOR

[B]


1. Open the right cover $[A]$.
2. Remove the unit band $[B]$.
3. Remove the right cover $[A]$ (1 connector),
4. Remove the sub right cover [C] (2 hooks).
5. Replace the image density sensor [D] (1 connector).
6. Initialize the new sensor with SP 2-935.

### 6.5 FUSING/EXIT

### 6.5.1 FUSING UNIT

| $\triangle$ CAUTION |
| :--- | :--- |
| Allow time for the unit to cool before doing the following procedure. |



1. Release the duplex unit, if it has been installed, and open the right cover.
2. Remove the fusing unit [A] (2 screws).

### 6.5.2 THERMISTORS



1. Remove the fusing unit. (6.5.1).
2. Remove the plates $[A]$ ( 1 screw each).
3. Replace the thermistors $[B]$ (1 connector).

## FUSING/EXIT

### 6.5.3 THERMOFUSE



1. Remove the fusing unit. (-6.5.1)
2. Remove the fusing upper cover $[A]$ (4 screws).
3. Remove the pressure springs $[B]$.
4. Remove the hot roller stripper bracket [C] (3 screws).

5. Remove the thermostat cover [A] (2 tapping screws).
6. Remove the plate $[B]$ (2 screws with spring washer).
7. Remove the thermostat holder [C] (3 screws each).
8. Replace the thermostats [D].

### 6.5.4 HOT ROLLER AND FUSING LAMP



1. Remove the fusing unit. ( 6.5 .1 )
2. Remove the fusing upper cover. (Thermostat.)
3. Remove the pressure springs. (Thermostat.)
4. Remove the hot roller stripper bracket. (Thermostat.)
5. Remove the fusing lamps (4 screws) and hot roller assembly $[A]$.

NOTE: Do not touch the surface of the fusing lamp with bare hands.
6. Replace the hot roller $[B]$ (2 C-rings, 1 gear, 2 bushings).

NOTE: 1) Apply grease (Barrierta) to the inner surface of the bushing.
2) Before installing the new hot roller, peel off 3 cm ( 1 inch) from both ends of the protective sheet on the new roller. After installation, remove the protective sheet.
3) Do not touch the surface of the rollers.
4) When reinstalling the fusing lamp, secure the front screws first.
5) Be careful not to damage the surface of the hot roller.

### 6.5.5 PRESSURE ROLLER/CLEANING ROLLER



1. Remove the fusing lamp and hot roller assembly. ( 6.5 .4 )
2. Replace the pressure roller $[\mathrm{A}]$ ( 1 E -ring, 2 bushings, 1 spring).
3. Replace the cleaning roller $[B]$.

NOTE: 1) Apply grease (Barrierta) to the inner surface of the bushing for the pressure roller.
2) Do not touch the surface of the rollers.

### 6.5.6 PAPER EXIT SENSOR/PAPER OVERFLOW SENSOR



1. Remove the front upper cover [A] (1 screw, 1 peg).
2. Remove the exit cover $[B]$.

NOTE: If the optional 1 bin tray unit and/or interchange unit have been installed, remove them.
3. Replace the exit sensor [C] (1 connector).
4. Replace the overflow sensor [D] (1 connector).

### 6.6 PAPER FEED

### 6.6.1 FEED ROLLERS



1. Remove the paper tray $[A]$.
2. Pull the lever $[B]$.
3. Replace the feed roller [C].

NOTE: Do not touch the roller surface with bare hands.
After reinstalling the feed roller, return the lever [B].

## PAPER FEED

### 6.6.2 PAPER END SENSOR



1. Remove the paper tray $[A]$.
2. Remove the paper end sensor assembly ( 1 screw, 1 connector).
3. Replace the paper end sensor [B].

### 6.6.3 PAPER TRAY LIFT MOTORS




1. Remove the paper tray.
2. Remove the connector cover [A] (1 screw) and disconnect the cable.
3. Remove the rear cover $[B]$ (4 screws).
4. Remove the duplex connector cover [C] (1 screw).
5. Remove the lower rear cover [D] (2 screws).
6. Replace the paper lift motors [E] (2 screws each, 1 connector each).

## PAPER FEED

### 6.6.4 REGISTRATION CLUTCH



1. Remove the connector cover and the rear cover. (6.6.3)
2. Remove the duplex connector cover and lower rear cover. (6.6.3)
3. Remove the fly wheels [A] (1 screw).
4. Remove the registration clutch $[\mathrm{B}]$ (1 E-ring, 1 connector).

### 6.6.5 PAPER FEED CLUTCHES



## Lower Paper Feed Clutch

1. Remove the rear cover. (6.6.3)
2. Remove the lower rear cover. ( 6.6.3)
3. Replace the lower paper feed clutch $[A]$ (1 connector).

## Upper Paper Feed Clutch.

4. Disconnect the connectors $[B]$ for the SBCU board as shown (14 connectors).
5. Remove 4 screws [C] securing the SBCU board bracket then swing down the I/O board bracket [D].
6. Remove the bracket [E] (1 screw).
7. Replace the upper paper feed clutch [F] (1 connector).

## PAPER FEED

### 6.6.6 RELAY CLUTCHES



1. Remove the optional duplex unit and/or by-pass tray unit if they have been installed.
2. Remove the rear cover and lower rear cover. ( 6.6.3)
3. Remove the lower right cover [A] (2 screws).
4. Remove the scanner right cover. (6.1.2)
5. Remove the right cover [B] (4 screws).
6. Swing down the I/O board bracket. ( 6.6.5)
7. Remove the connector bracket [C] (2 screws).
8. Replace the upper relay clutch [D] (1 connector).
9. Remove the right back cover [E] (1 screw).
10. Replace the lower relay clutch [F] (1 connector).

### 6.6.7 PAPER SIZE DETECTOR



1. Remove the right lower cover $[A]$. ( 6.6.6)
2. Remove the paper trays.
3. Remove the paper size detector assembly (1 screw each).
4. Replace the paper size detectors $[B]$ (1 connector each).

## PAPER FEED

### 6.6.8 REGISTRATION SENSOR



1. Remove the right cover. (-6.4.2)
2. Remove the registration guide plate $[A]$ ( 2 screws).
3. Remove the paper support roller $[B]$ (2 snap rings, 2 bushings).
4. Remove the sensor bracket [C] (1 screw).
5. Replace the registration sensor [D] (1 connector).

### 6.6.9 RELAY SENSORS



## Upper Relay Sensor

1. Remove the right cover. (6.4.2)
2. Remove the lower right cover. (6.6.6)
3. Remove the guide plate $[A]$.
4. Remove the bracket $[B]$ ( 1 screw).
5. Remove the guide plate [C] (2 screws).
6. Remove the sensor bracket [D] (1 screw).
7. Replace the upper relay sensor [E] (1 connector).

## Lower Relay Sensor

1. Remove the right lower door [F] (1 clip).
2. Remove the guide plate [G].
3. Remove the guide plate $[\mathrm{H}]$ (2 screws).
4. Remove the sensor bracket [I] (1 screw).
5. Replace the lower relay sensor [J] (1 connector).

## PCBS AND OTHER ITEMS

### 6.7 PCBS AND OTHER ITEMS

### 6.7.1 CONTROLLER BOARD

[B]


1. Remove the rear cover. (6.6.3)
2. Remove the optional finisher if it has been installed.
3. Remove the application cover [A] (1 screw).
4. Remove the shield plate $[B]$ ( 8 screws) or the optional fax unit if it has been installed.
5. Remove the controller board [C] (2 connectors, 8 screws).
6. Remove the NVRAM [D], and DIMM (printer/scanner, memory, etc) from the old controller board and put them on the new controller board.

### 6.7.2 SBCU BOARD



1. Remove the rear cover. (6.6.3)
2. Remove the SBCU board [A] (All connectors, 6 screws).

### 6.7.3 POWER PACK



1. Remove the rear cover. ( 6.6.3)
2. Swing down the I/O board bracket. ( 6.6.5)
3. Remove the power pack [A] (5 connectors, 3 screws).

## PCBS AND OTHER ITEMS

### 6.7.4 MAIN MOTOR



1. Remove the rear cover. (6.6.3)
2. Swing down the I/O board bracket [A]. ( 6.6.5)
3. Remove the fly wheels $[B]$ ( 1 screw).
4. Replace the main motor [C] (2 connectors, 3 screws).

### 6.7.5 PSU



1. Remove the optional finisher if it has been installed.
2. Remove the application cover $[A]$ ( 1 screw).
3. Remove the left cover $[B]$ ( 6 screws).
4. 220 V machine only: Remove the transformer [C] (1 screw).
5. Remove the PSU [D] (all connectors, 6 screws, 1 clip).

### 6.8 COPY ADJUSTMENTS: PRINTING/SCANNING

NOTE: 1) You need to perform these adjustment(s) after replacing any of the following parts:

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

2) For more details about accessing SP modes, refer to section 4.

### 6.8.1 PRINTING

NOTE: 1) Make sure the paper is installed correctly in each paper tray before you start these adjustments.
2) Use the Trimming Area Pattern (SP2-902-3, No.10) to print the test pattern for the following procedures.
3) Set SP 2-902-3 to 0 again after completing these printing adjustments.

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

1. Check the leading edge registration for each paper feed station, and adjust them using SP1-001.
2. Check the side-to-side registration for each paper feed station, and adjust them using SP1-002.

| Tray | SP mode | Specification |
| :---: | :---: | :---: |
| Any paper tray | SP1-001-1 | $3 \pm 2 \mathrm{~mm}$ |
| By-pass feed | SP1-001-2 |  |
| Duplex | SP1-001-3 |  |
| 1st paper feed | SP1-002-1 | $2 \pm 1.5 \mathrm{~mm}$ |
| 2nd paper feed | SP1-002-2 |  |
| 3rd paper feed (Optional PFU tray 1), or LCT | SP1-002-3 |  |
| 4th paper feed (Optional PFU tray 2) | SP1-002-4 |  |
| By-pass feed | SP1-002-5 |  |
| Duplex, side 2 | SP1-002-6 |  |



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

## Blank Margin

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

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

|  | SP mode | Specification |
| :--- | :--- | :--- |
| Trailing edge | SP2-101- <br> $2 / 3 / 4$ | $3 \pm 2 \mathrm{~mm}$ |
| Right edge | SP2-101-6 | $2+2.5 /-1.5 \mathrm{~mm}$ |
| Leading edge | SP2-101-1 | $3 \pm 2 \mathrm{~mm}$ |
| Left edge | SP2-101-5 | $2 \pm 1.5 \mathrm{~mm}$ |
| Trailing edge (duplex <br> copy, 2nd side) | SP2-101-7 | $2 \pm 2 \mathrm{~mm}$ |
| Left edge (duplex <br> copy, 2nd side) | SP2-101-8 | $2 \pm 1.5 \mathrm{~mm}$ |
| Right edge (duplex <br> copy, 2nd side) | SP2-101-9 | $2+2.5 /-1.5 \mathrm{~mm}$ |



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

## Main Scan Magnification

1. Print the single-dot grid pattern (SP2-902, no.5).
2. Check the magnification, and adjust the magnification using SP2-909 if necessary. The specification is $\pm 1 \%$.

## Parallelogram Image Adjustment

Do the following procedure if a parallelogram is printed while adjusting the printing registration or the printing margin using a trimming area pattern.
NOTE: The following procedure should be done after adjusting the side-to-side registration for each paper tray station.
 counterclockwise

1. Check whether the trimming area pattern (SP2-902, No.10) is printed as a parallelogram, as shown. If it is, do the following.
2. Remove the laser unit $[A](-6.2)$.
3. Remove the bracket $[B]$ (2 screws).
4. Install the adjusting cam [C] (P/N: A2309003).

NOTE: At the completion of the adjustment the adjusting cam remains in the machine.
5. Secure the adjustment bracket [D] (P/N A2679002) using the screw which was used for bracket [B]. However, do not tighten the screws at this time.
6. Reinstall the laser unit.
7. Adjust the laser unit position by turning the adjusting cam. (Refer to the above illustration for the relationship between the image and the cam rotation direction).
8. Tighten the adjustment bracket.
9. Print the trimming area pattern to check the image. If it is still unsatisfactory, repeat steps 4 to 8.

### 6.8.2 SCANNING

NOTE: 1) Before doing the following scanner adjustments, perform or check the printing registration/side-to-side adjustment and the blank margin adjustment.
2) Use an S5S 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 using 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

NOTE: Use an S5S test chart to perform the following adjustment.


> A: Sub Scan Magnification
> B: Main 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, and adjust it using the following SP mode if necessary. The specification is $\pm 1 \%$.

|  | SP mode |
| :--- | :---: |
| Sub Scan Magnification | SP4-009 |
| Main Scan Magnification | SP4-008 |

## Standard White Density Adjustment

This adjusts the standard white density level.
Perform this adjustment in any of the following conditions:

- After replacing the standard white plate.
- After replacing the NVRAM on the controller board. (If only controller board is replaced, this adjustment is not necessary, as the NVRAM from the old controller board is installed on the new controller board.)
- After performing a memory all clear (SP5-801).

Procedure:

1. Place 10 sheets of new A4 sideways (do not use any recycled paper) or A3 paper on the exposure glass and close the platen cover or the ADF.
2. Enter SP 4-428 and select " 1 : Yes". The standard white density is automatically adjusted.

### 6.8.3 ADF IMAGE ADJUSTMENT

## Registration



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


NOTE: Make a temporary test chart as shown above using A3/DLT paper.

1. Place the temporary test chart on the ADF and make a copy from one of the feed stations.
2. Check the registration, and adjust using the following SP modes if necessary.

|  | SP mode |
| :--- | :---: |
| Side-to-side Registration | SP6-006-1 |
| Leading Edge Registration (Simplex) | SP6-006-2 |
| Trailing Edge Blank Margin | SP6-006-3 |
| Side-to-side Registration (Duplex: rear) | SP6-006-4 |

## Sub Scan Magnification

NOTE: Make a temporary test chart as shown above using A3/DLT paper.

1. Place the temporary test chart on the ADF and make a copy from one of the feed stations.
2. Check the magnification, and adjust using the following SP modes if necessary. The specification is $\pm 1 \%$.

| Sub scan magnification | SP mode |
| :---: | :---: |

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

$O_{K} \quad$ Touch Screen Adjust

Touch the upper left mark and then the lower
right mark of the panel using a pointed tool.
Press the [C] key to quit.
Re-input is available using [./*] key.
2. On the touch screen press "Touch Screen Adjust" (or press (1)).
3. Use a pointed (not sharp!) tool to press the upper left mark ${ }^{\circ} \mathbf{K}$.
4. Press the lower right mark ${ }^{\boldsymbol{*}} \circ$ 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

## 7. 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.

### 7.1 SERVICE CALL CONDITIONS

### 7.1.1 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 | SCs that disable only the features that use the <br> defective item. Although these SCs are not shown <br> to the user under normal conditions, they are <br> displayed on the operation panel only when the <br> defective feature is selected. | Turn the operation switch or <br> main switch off and on. |
| C | 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. |
| D | Turning the main switch off then on resets SCs <br> displayed on the operation panel. These are re- <br> displayed if the error occurs again. | Turn the operation switch off <br> and on. |

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.

### 7.1.2 SC CODE DESCRIPTIONS

| Code No. |  | Symptom | Possible Cause |
| :---: | :---: | :---: | :---: |
| 101 | B | Exposure lamp error | - 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 position or dirty <br> - SBU defective |
|  |  | The standard white level was not detected properly when scanning the white plate. |  |
| 120 | D | Scanner home position error 1 | - Scanner drive motor defective <br> - Scanner motor defective <br> - Harness between SBCU and scanner drive motor disconnected <br> - Harness between SBCU and scanner drive motor power source disconnected <br> - Scanner HP sensor defective <br> - Harness between SBCU and HP sensor disconnected <br> - Scanner wire, timing belt, pulley, or carriage defective |
|  |  | The scanner home position sensor does not detect the on condition during initialization or copying. |  |
| 121 | D | Scanner home position error 2 | - SIB or scanner drive motor defective <br> - Scanner motor defective <br> - Harness between SBCU and scanner drive motor disconnected <br> - Harness between SBCU and scanner drive motor power source disconnected <br> - Scanner HP sensor defective <br> - Harness between SBCU and HP sensor disconnected <br> - Scanner wire, timing belt, pulley, or carriage defective |
|  |  | The scanner home position sensor does not detect the off condition during initialization. |  |
| 144 | B | SBU connection error | Cable between SBU and IPU board disconnected. |
|  |  | The IPU does not detect the SBU connection signal. |  |
| 192 | B | Automatic SBU adjustment error | - SBU defective <br> - SBCU board defective <br> - Exposure lamp stabilizer defective <br> - Exposure lamp defective <br> - Dirty white plate |
|  |  | An error is detected during automatic SBU adjustment (SP4-428) |  |
| 193 | B | Image transfer error | - IPU board defective <br> - Controller board defective <br> - Video controller defective |
|  |  | The IPU board does not finish within 1 minute after the image data has been transferred to the controller board. |  |
| 195 | B | DFGATE assert error | - ADF interface cable defective <br> - SBCU board defective <br> - Mismatched firmware between the SBCU board and ADF |
|  |  | The DFGATE signal does not assert within 30 seconds after the original has been scanned. |  |
| 196 | B | DFGATE negate error | - ADF interface cable defective <br> - SBCU board defective <br> - Mismatched firmware between the SBCU board and ADF |
|  |  | The DFGATE signal does not negate within 1 minute after the DFGATE has been asserted. |  |


| Code No. |  | Symptom | Possible Cause |
| :---: | :---: | :---: | :---: |
| 197 | B | DFGATE error | - ADF interface cable defective <br> - SBCU board defective <br> - Mismatched firmware between the SBCU board and ADF |
|  |  | The DFGEATE signal has already been asserted at the original scan. |  |
| 198 | B | Memory address error | - Mismatched firmware between the SBCU board and controller board <br> - Controller defective <br> - SBCU defective <br> - IPU board defective |
|  |  | The IPU board does not receive the memory address from the controller board. |  |
| 199 | B | DF scanning finish error | - ADF interface cable defective <br> - SBCU board defective <br> - Mismatched firmware between the SBCU board and ADF |
|  |  | The original does not finish scanning within 1 minute |  |
| 302 | B | Charge roller current leak | - Charge roller damaged <br> - Charge high voltage supply board defective <br> - Poor connection of the PCU |
|  |  | A charge roller current leak signal is detected. |  |
| 320 | B | Polygon motor error | - Polygon mirror motor defective <br> - Poor connection between the polygon mirror motor driver and the SBCU board <br> - SBCU board defective |
|  |  | The polygon motor does not reach its operating speed within 10 seconds after the polygon motor on signal, or the lock signal is not detected for more than 200 ms continuously during operation. |  |
| 322 | B | Laser synchronization error | - Poor connection between the laser synchronization detector board and the SBCU board <br> - Laser synchronization detector board out of position <br> - Laser synchronization detector board defective <br> - SBCU board defective <br> - LD unit defective |
|  |  | The main scan synchronization detector board cannot detect the laser synchronization signal for more than 10 consecutive 50 ms intervals. |  |
| 323 | B | LD drive current over The LD drive board applies more than 100 mA to the LD. | - LD unit defective (not enough power, due to aging) <br> - Poor connection between the LD unit and the SBCU board <br> - SBCU board defective |
| 390 | D | TD sensor error | - TD sensor abnormal <br> - Poor connection of the PCU |
|  |  | The TD sensor outputs less than 0.5 V or more than 4.0 V 10 times consecutively during copying. |  |
| 391 | B | Development bias leak | - Poor connection of the PCU <br> - High voltage supply board defective |
|  |  | A development bias leak signal is detected. |  |
| 392 | B | TD sensor initial setting error | - Someone forgot to remove the toner seal of the PCU <br> - ID sensor defective <br> - TD sensor abnormal <br> - Drum does not turn <br> - Development roller does not turn <br> - Poor connection of the PCU |
|  |  | TD sensor output voltage falls out of the adjustment range ( $2.0 \pm<>0.2 \mathrm{~V}$ ) after the TD sensor initial setting has been finished. |  |


| Code No. | Symptom | Possible Cause |
| :--- | :--- | :--- |
| 401 | B | Transfer roller leak error 1 |
| 402 | B | Transfer roller leak error 2 |


| Code No. |  | Symptom | Possible Cause |
| :---: | :---: | :---: | :---: |
| 520 | B | Paper tray error | - A defective motor <br> - A defective sensor <br> - Too much load on the drive mechanism |
|  |  | An error occurs (i.e motor error, or sensor error, etc) for any paper tray. |  |
| 541 | A | Fusing thermistor open | - Fusing thermistor defective or out of position <br> - Fusing lamp open <br> - Fusing thermostat open <br> - Power supply board defective <br> - Poor connection of the fusing unit |
|  |  | The fusing temperature detected by the thermistor was below $0^{\circ} \mathrm{C}$ for 5 seconds. <br> The fusing temperature does not rise $+15^{\circ} \mathrm{C}$ (center) or $+12^{\circ} \mathrm{C}$ (at the ends) five times within 2 minutes after the fusing lamps have been turned on. |  |
| 542 | A | Fusing temperature warm-up error | - Fusing thermistor defective or out of position <br> - Fusing lamp open <br> - Fusing thermostat open <br> - Power supply board defective <br> - Poor connection of the fusing unit |
|  |  | The fusing temperature does not reach the standby temperature within 20 seconds after the main switch is turned on. |  |
| 543 | A | Fusing overheat error 1 | - Fusing thermistor defective <br> - Power supply board defective <br> - SBCU board defective |
|  |  | A fusing temperature of over $231^{\circ} \mathrm{C}$ is detected for 5 second by the fusing thermistor. |  |
| 544 | A | Fusing overheat error 2 | - Fusing thermistor defective <br> - Power supply board defective <br> - SBCU board defective |
|  |  | A fusing temperature of over $251^{\circ} \mathrm{C}$ is detected by the fusing temperature monitor circuit in the SBCU board. |  |
| 546 | A | Unstable fusing temperature | - Thermistor defective <br> - Poor connection of the fusing unit <br> - Power supply unit defective |
|  |  | The fusing temperature varies $50^{\circ} \mathrm{C}$ or more within 1 second twice continuously. |  |
| 547 | B | Zero cross signal malfunction | - Power supply board defective <br> - SBCU board defective |
|  |  | Zero cross signals are not detected within a certain period. |  |
| 548 | A | Fusing unit set error | - Poor connection of the fusing unit <br> - The fusing unit is not installed |
|  |  | The machine does not detect the fusing unit. |  |
| 590 | B | Exhaust fan motor error | - Poor connection of the exhaust fan motor <br> - Too much load on the motor drive |
|  |  | The CPU detects an exhaust fan lock signal for more than 5 seconds. |  |
| 611 | B | Communication break error between SBCU and ADF | - Serial line connecting SBCU and ADF unstable <br> - External noise <br> - ADF main board defective <br> - SBCU board defective |
|  |  | The SBCU receives a break signal from the ADF main board. |  |
| 612 | B | Communication command error between SBCU and ADF | - SBCU board defective <br> - Download SBCU firmware again |
|  |  | The SBCU sends a command to the ADF main board that it cannot execute. |  |


| Code No. | Symptom | Possible Cause |
| :--- | :--- | :--- |
| 620 | B | Communication timeout error between <br> SBCU and finisher |


| Code No. |  | Symptom | Possible Cause |
| :---: | :---: | :---: | :---: |
| 722 | B | Finisher jogger motor error (1000-sheet finisher) <br> The finisher jogger H.P sensor remains de-activated for a certain time when returning to home position. <br> The finisher jogger H.P sensor remains activated for a certain time when moving away from home position. | - Jogger H.P sensor defective <br> - Jogger motor defective |
| 724 | B | Finisher staple hammer motor error ( 1000 -sheet finisher) <br> Stapling does not finish within 600 ms after the staple hammer motor turned on. | - Staple jam <br> - Stapler overload caused by trying to staple too many sheets <br> - Staple hammer motor defective |
| 725 | B | Finisher stack feed-out motor error ( 1000 -sheet finisher) <br> The stack feed-out belt H.P sensor does not activate within a certain time after the stack feed-out motor turned on. | - Stack feed-out H.P sensor defective <br> - Stack feed-out motor defective |
| 726 | B | Finisher lift motor error (1000-sheet finisher) <br> The stack height sensor does not activate within a certain time after the shift tray lift motor turned on. | - Shift tray lift motor defective <br> - Stack height sensor defective |
| 727 | B | Finisher staple hammer motor error (500-sheet finisher) <br> Stapling does not finish within a certain time after staple hammer motor turned on. | - Staple jam <br> - Stapler overload caused by trying to staple too many sheets <br> - Staple hammer motor defective |
| 728 | B | Finisher paper stack height error (500sheet finisher) <br> The stack height detection lever does not return to its home position before going to detect the stack height. | - Stack height lever solenoid defective <br> - Stack height sensor defective <br> - Lever sensor defective <br> - Main control board defective |
| 730 | B | Finisher stapler motor error (1000-sheet finisher) <br> The stapler does not return to its home position within a certain time after the stapler motor turned on. <br> The stapler H.P sensor does not activate within a certain time after the stapler motor turned on. | - Stapler motor defective <br> - Stapler H.P sensor defective <br> - Poor stapler motor connection |
| 731 | B | Output tray motor error (500-sheet finisher) <br> Exit guide plate motor error (1000-sheet finisher) <br> The tray upper limit sensor does not activate within a certain time after the shift motor turned on. (500-sheet finisher) <br> The exit guide plate open sensor or exit guide plate HP sensor does not activate within a certain time after the exit guide plate motor turned on. (1000-sheet finisher) | 500-sheet finisher <br> - Output tray motor defective <br> - Tray upper limit sensor defective <br> 1000-sheet finisher <br> - Exit guide plate motor defective <br> - Exit guide plate HP sensor defective <br> - Exit guide plate open sensor defective |

## SERVICE CALL CONDITIONS

| Code No. |  | Symptom | Possible Cause |
| :---: | :---: | :---: | :---: |
| 732 | B | Finisher shift motor error (1000-sheet finisher) <br> Roller shift does not finish within a certain time after the shift motor turned on. | - Shift motor defective <br> - Shift tray HP sensor defective |
| 791 | B | Bridge communication error <br> The SBCU cannot communicate with the bridge unit properly when the finisher is installed. | - Poor connection between the main machine and bridge unit <br> - SBCU board defective |
| 792 | B | Finisher connection error <br> The SBCU cannot communicate with the finisher properly when the bridge unit is installed. | - Poor connection between the finisher and bridge unit <br> - SBCU board defective |
| 793 | B | Interchange communication error The SBCU cannot communicate with the interchange unit properly when the duplex unit is installed. | - Poor connection between the interchange unit and main machine <br> - SBCU board defective |
| 800 | D | Startup without video output end error (K) <br> Video transfer to the engine is started, but the engine did not issue a video transmission end command within the specified time. | Controller board defective |
| 804 | D | Startup without video input end (K) A video transmission was requested from the scanner, but the scanner did not issue a video transmission end command within the specified time. | Controller board defective |
| 818 | D | Watchdog error <br> The CPU does not access the watchdog register within a certain time. | - Controller board defective <br> - Software malfunction - download controller firmware again |
| 819 | D | Kernel mismatch error Software bug | Download controller firmware again |
| 820 | D | Self-Diagnostic Error: CPU The central processing unit returned an error during the self-diagnostic test. | - Controller board defective <br> - Download controller firmware again |
| 821 | D | Self-Diagnostic Error: ASIC <br> The ASIC returned an error during the self-diagnostic test because the ASIC and CPU timer interrupts were compared and determined to be out of range. | Controller board defective |
| 822 | D | Self-Diagnostic Error: HDD The hard disk drive returned an error during the self-diagnostic test. | - HDD defective <br> - HDD connector defective <br> - Controller board defective |
| 823 | D | Self-diagnostic Error: NIB The network interface board returned an error during the self-diagnostic test. | - Network interface board defective <br> - Controller board defective |
| 824 | D | Self-diagnostic Error: NVRAM <br> The resident non-volatile RAM returned an error during the self-diagnostic test. | - Replace the NVRAM on the controller board <br> - Replace the controller board |


| Code No. |  | Symptom | Possible Cause |
| :---: | :---: | :---: | :---: |
| 826 | D | Self-diagnostic Error: NVRAM/Optional NVRAM <br> The NVRAM or optional NVRAM returned an error during the selfdiagnostic test. | Replace the NVRAM on the controller board |
| 827 | D | Self-diagnostic Error: RAM The resident RAM returned a verify error during the self-diagnostic test. | Download controller firmware again |
| 828 | D | Self-diagnostic Error: ROM <br> The resident read-only memory returned an error during the selfdiagnostic test. | - Controller board defective <br> - Download controller firmware again |
| 829 | D | Self-diagnostic Error: Optional RAM The optional RAM returned an error during the self-diagnostic test. | - Replace the optional memory board <br> - Controller board defective |
| 835 | D | Self-Diagnostic Error: Parallel Interface Loopback test error. | - Loopback connector not detected <br> - IEEE1284 connector defective <br> - Controller board defective |
| 836 | D | Self-diagnostic Error: Resident Font ROM <br> The resident font ROM returned an error during the self-diagnostic test. | Replace the controller board |
| 837 | D | Self-diagnostic Error: Optional Font ROM <br> The optional font ROM returned an error during the self-diagnostic test. | Replace the controller board |
| 838 | D | Self-diagnostic Error: Clock Generator A verify error occurred when setting data was read from the clock generator via the I2C bus. | Replace the controller board |
| 850 | D | Network I/F Abnormal NIB interface error. | - NIB defective <br> - Controller board defective |
| 851 | D | IEEE 1394 I/F Abnormal IEEE1394 interface error. | - IEEE1384 interface board defective <br> - Controller board defective |
| 860 | B | Startup without HD connection at main power on <br> The hard disk connection is not detected. | - Cable between HDC and HDD loose or defective <br> - HDD power connector loose or defective <br> - HDD defective <br> - Replace the controller board |
| 861 | B | Startup without HD detection at power key on <br> The hard disk connection is not detected. | - Cable between HDC and HDD loose or defective <br> - HDD power connector loose or defective <br> - HDD defective <br> Replace the controller board |
| 862 | A | Maximum number of bad sectors detected on HD <br> Up to 101 bad sectors have appeared in the area on the hard disk where image data is archived, and the hard disk may require replacement. | SC863 returned while reading data from the HD and the number of registered bad sectors reached 101. |


| Code No. |  | Symptom | Possible Cause |
| :---: | :---: | :---: | :---: |
| 863 | B | Startup without HD data lead | A bad sector occurred during operation of the HDD |
|  |  | Data stored on the hard disk is not read correctly. |  |
| 864 | D | HD data CRC error | Data transfer was abnormal in the data read from the HDD. |
|  |  | During operation of the HD, the HD responded with a CRC error. |  |
| 865 | D | HD access error | Replace the controller board |
|  |  | The hard disk detected an error. |  |
| 900 | D | Electronic total counter error | Replace the NVRAM on the controller board |
|  |  | The value of the total counter has already exceeded 9999999 |  |
| 901 | D | Mechanical total count error | Mechanical total counter defective |
|  |  | The SBCU board cannot receive the mechanical total count data. |  |
| 951 | B | F-gate error at write request | - Download controller firmware <br> - SBCU board defective |
|  |  | After the IPU receives an F-gate signal, it receives another F -gate signal. |  |
| 953 | B | Scanner setting error | Download controller firmware |
|  |  | The IPU does not respond with the scanner setting signal required to start scanning processing. |  |
| 954 | B | Printer setting error | - Replace the IPU board <br> - Replace the controller board <br> - Download the controller firmware |
|  |  | The IPU does not respond with the settings that are required to start image processing by the printer. |  |
| 955 | B | Memory setting error | - Replace the IPU board <br> - Replace the controller board <br> - Download the controller firmware |
|  |  | The IPU does not respond with the settings that are required to start image processing using the memory. |  |
| 964 | B | Printer ready error | - Replace the IPU board <br> - Replace the controller board <br> - Download the controller firmware |
|  |  | The printer ready signal is not generated within 17 seconds after the IPU received the print start signal. |  |
| 984 | D | Print image data transfer error | - Controller board defective <br> - SBCU board defective <br> - Connectors between SBCU and controller loose or defective |
|  |  | The image transfer from the controller to the engine via the PCI bus does not end within 15 s after starting. |  |
| 986 | D | Software write parameter setting error | Download controller firmware again |
|  |  | An unstable area at the storage destination in the settings table is set at NULL for the parameter received by the write module. |  |


| Code No. |  | Symptom | Possible Cause |
| :---: | :---: | :---: | :---: |
| 990 | D | Software performance error | - Software defective <br> - Internal parameter incorrect <br> - Insufficient working memory <br> - 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. |  |
| 991 | C | Software continuity error | - No operation required. This SC code does not appear on the panel, and is only logged. |
|  |  | The software attempted to perform an 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> - Download FCU firmware |
|  |  | FCU board is connected but not ready. |  |
| 997 | B | Application function selection error | - Download the firmware for the application that failed <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 | D | Application start error | - Download controller firmware <br> - Replace the controller board <br> - An option required by the application (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 | D | Program download error | - Board installed incorrectly <br> - SBCU board defective <br> - Controller board 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. |  |

### 7.2 SELF-DIAGNOSTIC MODE

### 7.2.1 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



### 7.2.2 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.

## SELF-DIAGNOSTIC MODE

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


### 7.3 PAPER FEED TROUBLESHOOTING

When a paper double feed or paper non feed problem occurs, fix the problem in accordance with the following flow chart.


## *Note:

If the feed problem always occurs at a certain point before near-end, change the remaining paper threshold with SP 1-908-6, 1-909-6, 1-910-6, and/or 1-911-6


## SKEWED IMAGE

### 7.4 SKEWED IMAGE

Do the following to fix a skewed image problem.


### 7.5 ELECTRICAL COMPONENT DEFECTS

### 7.5.1 SENSORS

| Component (Symbol) | CN | Condition | Symptom |
| :---: | :---: | :---: | :---: |
| Scanner H.P | $\begin{gathered} 337-2 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | SC120 is displayed. |
|  |  | Shorted | The CPU does not detect the scanner home position and the scanner motor does not stop. |
| Platen Cover | $\begin{gathered} \hline 337-5 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | APS and ARE do not function correctly. |
|  |  | Shorted | No symptom |
| Original Width | $\begin{gathered} 335-3,-4 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | The CPU cannot detect the original size |
|  |  | Shorted | properly. APS and ARE do not function correctly. |
| Original Length-1 | $\begin{gathered} 335-8,-9 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | The CPU cannot detect the original size |
|  |  | Shorted | properly. APS and ARE do not function correctly. |
| Original Length-2 | $\begin{gathered} 336-3,-4 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | The CPU cannot detect the original size |
|  |  | Shorted | properly. APS and ARE do not function correctly. |
| Toner Density | $\begin{gathered} \hline 327-3 \\ \text { (SBCU) } \\ \hline \end{gathered}$ | Open | SC390 is displayed |
|  |  | Shorted |  |
| 1st Paper End | $\begin{gathered} 306-2 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | The Paper End indicator lights even if paper is placed in the 1st paper tray. |
|  |  | Shorted | The Paper End indicator does not light even if there is no paper in the 1st paper tray. |
| 2nd Paper End | $\begin{aligned} & 307-A 2 \\ & \text { (SBCU) } \end{aligned}$ | Open | The Paper End indicator lights even if paper is placed in the 2nd paper tray. |
|  |  | Shorted | The Paper End indicator does not light even if there is no paper in the 2nd paper tray. |
| Image Density | $\begin{gathered} \hline 321-3 \\ \text { (SBCU) } \end{gathered}$ | Open | SC392 is displayed (see note) |
|  |  | Shorted |  |
| Paper Over Flow | $\begin{gathered} 324-5 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | The paper overflow message is not displayed when the paper overfull condition exist. |
|  |  | Shorted | The paper overflow message is displayed. |
| Paper Exit | $\begin{gathered} 324-2 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | The Paper Jam indicator will light whenever a copy is made. |
|  |  | Shorted | The Paper Jam indicator lights even if there is no paper. |
| Upper Relay | $\begin{gathered} 306-5 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | The Paper Jam indicator will light whenever a copy is made. |
|  |  | Shorted | The Paper Jam indicator lights even if there is no paper. |
| Lower Relay | $\begin{aligned} & 307-A 5 \\ & \text { (SBCU) } \end{aligned}$ | Open | The Paper Jam indicator will light whenever a copy is made. |
|  |  | Shorted | The Paper Jam indicator lights even if there is no paper. |
| Registration | $\begin{gathered} 321-6 \\ \text { (SBCU) } \end{gathered}$ | Open | The Paper Jam indicator will light whenever a copy is made. |
|  |  | Shorted | The Paper Jam indicator lights even if there is no paper. |
| 1st Paper Lift | $\begin{gathered} \hline 305-7 \\ \text { (SBCU) } \end{gathered}$ | Open | SC501 will be displayed. |
|  |  | Shorted | Paper jam will occur during copying. |

## ELECTRICAL COMPONENT DEFECTS

| Component (Symbol) | CN | Condition | Symptom |
| :---: | :---: | :---: | :---: |
| 2nd Paper Lift | $\begin{aligned} & \hline 305-10 \\ & \text { (SBCU) } \\ & \hline \end{aligned}$ | Open | SC502 will be displayed. |
|  |  | Shorted | Paper jam will occur during copying. |
| 1st Paper Height - 1 | $\begin{aligned} & \hline 307-B 2 \\ & \text { (SBCU) } \end{aligned}$ | Open | The CPU cannot determine the paper near- |
|  |  | Shorted | end condition properly. |
| $\begin{aligned} & \text { 1st Paper Height } \\ & -2 \end{aligned}$ | $\begin{aligned} & \hline 307-B 5 \\ & \text { (SBCU) } \\ & \hline \end{aligned}$ | Open | The CPU cannot determine the paper near- |
|  |  | Shorted | end condition properly. |
| 2nd Paper Height$-1$ | $\begin{aligned} & \hline 307-\mathrm{B9} \\ & \text { (SBCU) } \\ & \hline \end{aligned}$ | Open | The CPU cannot determine the paper near- |
|  |  | Shorted | end condition properly. |
| 2nd Paper Height-2 | $\begin{aligned} & \hline 307-B 12 \\ & (\mathrm{SBCU}) \end{aligned}$ | Open | The CPU cannot determine the paper nearend condition properly. |
|  |  | Shorted |  |

NOTE: An SC condition occurs only when a new PCU is being installed in the machine. During copying, if the ID sensor fails, the image density will be changed.

### 7.5.2 SWITCHES

| Component (Symbol) | CN | Condition | Symptom |
| :---: | :---: | :---: | :---: |
| Main | $\begin{gathered} 281-1,2 \\ \text { (PSU) } \end{gathered}$ | Open | The machine does not turn on. |
|  |  | Shorted | The machine does not turn off. |
| Right Upper Cover | $\begin{gathered} 324-8 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | The Cover Open indicator is not lit even if the right upper cover is opened. |
|  |  | Shorted | The Cover Open indicator is lit even if the right upper cover is closed. |
| Right Cover | $\begin{gathered} 308-9 \\ (\text { SBCU } \end{gathered}$ | Open | The Cover Open indicator is not lit even if the right cover is opened. |
|  |  | Shorted | The Cover Open indicator is lit even if the right cover is closed. |
| Right Lower Cover | $\begin{aligned} & 307-A 8 \\ & (\text { SBCU } \end{aligned}$ | Open | The Cover Open indicator is not lit even if the right lower cover is opened. |
|  |  | Shorted | The Cover Open indicator is lit even if the right lower cover is closed. |
| Upper Paper Size | $\begin{gathered} \text { 308-1,2,4,5 } \\ (\text { SBCU }) \end{gathered}$ | Open | The CPU cannot detect the proper paper size, |
|  |  | Shorted | and misfeeds may occur when a copy is made. |
| Lower Paper Size | $\begin{gathered} 308- \\ 6,7,9,10 \\ (S B C U) \\ \hline \end{gathered}$ | Open | The CPU cannot detect the proper paper size, |
|  |  | Shorted | and misfeeds may occur when a copy is made. |
| New PCU Detect | $\begin{gathered} 327-7 \\ (\mathrm{SBCU}) \end{gathered}$ | Open | The TD sensor initial setting procedure is not performed when a new PCU is installed. |
|  |  | Shorted | The TD sensor initial setting procedure is performed whenever the front cover is closed. |
| Front Cover Safety | $\begin{aligned} & 311-2,4 \\ & (\text { SBCU) } \end{aligned}$ | Open | The Cover Open indicator is not lit even if the front cover is opened. |
|  |  | Shorted | The Cover Open indicator is lit even if the front cover is closed. |
| Operation | $\begin{aligned} & 105-1 \\ & \text { (IPU } \end{aligned}$ | Open | The LCD does not off even if the operation switch is turned off. |
|  |  | Shorted | The LCD does not on even if the operation switch is turned on. |

## BLOWN FUSE CONDITIONS

### 7.6 BLOWN FUSE CONDITIONS

| Fuse | Rating |  | Symptom when turning on the main <br> switch |  |
| :---: | :---: | :---: | :--- | :---: |
|  | $\mathbf{1 1 5 ~ V}$ | $\mathbf{2 2 0} \mathbf{\sim} \mathbf{2 4 0} \mathbf{~ V}$ |  |  |
| Power Supply Board |  |  |  |  |
| FU1 | $15 \mathrm{~A} / 250 \mathrm{~V}$ | ---- | No response. |  |
| FU2 | $8 \mathrm{~A} / 125 \mathrm{~V}$ | $5 \mathrm{~A} / 250 \mathrm{~V}$ | No response |  |
| FU3 | $2 \mathrm{~A} / 125 \mathrm{~V}$ | $1 \mathrm{~A} / 250 \mathrm{~V}$ | Anti-condensation/Tray Heater does not <br> turn on. |  |
| FU4 | $6.3 \mathrm{~A} / 125 \mathrm{~V}$ | $6.3 \mathrm{~A} / 250 \mathrm{~V}$ | Optional finisher, bridge unit, and shift <br> tray does not work then SC792 is <br> displayed. |  |
| FU5 | $6.3 \mathrm{~A} / 125 \mathrm{~V}$ | $6.3 / 250 \mathrm{~V}$ | Covers Open indicator is lit then SC901 <br> is displayed |  |
| FU6 | $6.3 \mathrm{~A} / 125 \mathrm{~V}$ | $6.3 \mathrm{~A} / 250 \mathrm{~V}$ | The touch panel does not turn on. |  |
| FU7 | $4 \mathrm{~A} / 125 \mathrm{~V}$ | $4 \mathrm{~A} / 250 \mathrm{~V}$ | SC990 is displayed |  |

## PAPER TRAY UNIT A860/B390

## 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 to A3
HLT lengthwise to DLT
$60 \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 28 \mathrm{lbs}$.
500 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lbs}$.) x 2 trays
Feed roller and friction pad
4 steps (100\%, 70\%, 30\%, Near end)
24 VDC, 5 VDC (from the copier/printer) 120 Vac:

120 V version, from the copier/printer when the optional tray heater is installed
220 ~ 240 Vac:
230 V version, from the copier/printer when the optional tray heater is installed

Max: 30 W (Copying/printing) 23 W (Optional Tray Heater On)
Average: 17 W (Copying/printing)
15 W (Optional Tray Heater On)
25 kg (55 lbs)
$550 \mathrm{~mm} \times 520 \mathrm{~mm} \times 271 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Upper paper feed roller
2. Lower paper feed roller
3. Upper tray
4. Lower tray
5. Upper bottom plate
6. Lower bottom plate
7. Optional tray heater

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Tray main board
2. Upper lift sensor
3. Upper lift motor
4. Upper paper height 2 sensor
5. Upper paper height 1 sensor
6. Upper paper feed clutch
7. Relay clutch
8. Tray cover switch
9. Lower paper feed clutch
10. Lower paper height 2 sensor
11. Lower paper height 1 sensor
12. Vertical transport sensor
13. Upper paper end sensor
14. Lower paper end sensor
15. Lower paper size switch
16. Upper paper size switch
17. Optional tray heater
18. Lower lift motor
19. Lower lift sensor
20. Tray motor

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Tray | Drives all rollers. | 20 |
| M2 | Upper Lift | Lifts the upper tray bottom plate. | 3 |
| M3 | Lower Lift | Lifts the lower tray bottom plate. | 18 |
| Sensors |  |  |  |
| S1 | Upper Lift | Detects when the paper in the upper tray is at the correct feed height. | 2 |
| S2 | Lower Lift | Detects when the paper in the lower tray is at the correct feed height. | 19 |
| S3 | Upper Paper End | Informs the copier/printer when the upper tray runs out of paper. | 13 |
| S4 | Lower Paper End | Informs the copier/printer when the lower tray runs out of paper. | 14 |
| S5 | Vertical Transport | Detects misfeeds. | 12 |
| S6 | Upper Paper Height 1 | Detects the amount of paper in the upper tray. | 5 |
| S7 | Upper Paper Height 2 | Detects the amount of paper in the upper tray. | 4 |
| S8 | Lower Paper Height 1 | Detects the amount of paper in the lower tray. | 11 |
| S9 | Lower Paper Height 2 | Detects the amount of paper in the lower tray. | 10 |
| Switches |  |  |  |
| SW1 | Tray Cover | Detects when the tray cover is opened. | 8 |
| SW2 | Upper Paper Size | Determines what paper size is in the upper tray. | 16 |
| SW3 | Lower Paper Size | Determines what paper size is in the lower tray. | 15 |
| Magnetic Clutches |  |  |  |
| MC1 | Upper Paper Feed | Starts paper feed from the upper tray. | 6 |
| MC2 | Lower Paper Feed | Starts paper feed from the lower tray. | 9 |
| MC3 | Relay | Drives the relay rollers. | 7 |
| PCBs |  |  |  |
| PCB1 | Tray Main | Controls the paper tray unit and communicates with the copier/printer. | 1 |
| Others |  |  |  |
| H1 | Optional Tray Heater | Removes humidity from the paper in the trays. | 17 |

### 1.5 DRIVE LAYOUT



1. Tray motor
2. Drive belt
3. Upper paper feed clutch
4. Relay clutch
5. Lower paper feed clutch
6. Relay roller
7. Lower paper feed roller
8. Upper paper feed roller

## 2. DETAILED DESCRIPTIONS

### 2.1 PAPER FEED AND SEPARATION MECHANISM



The paper tray holds 500 sheets. The paper feed roller [A] drives the top sheet of paper from the paper tray to the copier/printer. The friction pad $[B]$ allows only one sheet to feed at a time. The friction pad applies pressure to the feed roller with a spring [C].

### 2.2 PAPER LIFT MECHANISM



The paper size switch detects when the tray is pushed in.
When the paper tray is pushed into the machine, the pin [A] for the lift motor pressure shaft engages the lift motor coupling [B] and the pin [C] for the bottom plate lift shaft in the tray engages the bottom plate pressure lever coupling [D]. The pin [E] on the rear of the tray pushes the lock lever so that the lift motor can lift the bottom plate pressure lever.

The lift motor turns on, and turns clockwise as viewed on the diagram. The main pressure spring $[\mathrm{K}]$ pulls the bottom plate pressure lever, and this lifts the tray bottom plate.

When the top of the stack touches the feed roller, the motor cannot pull up the plate any more, so it pulls the actuator [G] into the lift sensor [F].

The pressure of the feed roller on the paper is now too high, so the lift motor reverses to reduce this pressure. It reverses for 300 ms or 600 ms , depending on the paper size. For smaller paper, it reverses the larger amount ( 600 ms ) to reduce the pressure more.

The paper size thresholds for this feature depend on SP1-908-8, 9, 17, and 18. (Note that there are two paper size thresholds for each tray: small and middle. Some models only use the small threshold.) The amount of reverse depends on SP 1-908-1, 2, 3, 10, 11, and 12. (See the table later in this section for details of how these SP modes work.)
For A4-width paper or wider, a projection $[\mathrm{H}]$ on the side fence engages the secondary pressure spring [J] through a lever [I]. Then, the secondary pressure spring [J] applies paper feed pressure in addition to the main pressure spring $[\mathrm{K}]$, to ensure that extra pressure is applied to wider paper.
As stated earlier, various SP modes control this mechanism. The following table summarizes them.

| No Middle Size Programmed | With Middle Size Programmed |
| :---: | :---: |
| Paper width: | Paper width: |
| Tray 1: More than 1-908-8 | Tray 1: More than 1-908-9 |
| Tray 2: More than 1-908-17 |  |
| (Default: Wider than HLT) | Tray 2: More than 1-908-18 |
| Amount of reverse: |  |
| Tray 1: 1-908-1 | Amount of reverse: |
| Tray 2: 1-908-10 |  |
| (Default 300 ms) | Tray 1: 1-908-1 |
| Paper width: | Tray 2: 1-908-10 |

When the paper tray is pulled out, the pins $[A, C]$ disengage from the couplings $[B$, D ], and the bottom plate drops. To make it easier to push the tray in, the lift motor rotates backwards 1.7 seconds to return the bottom plate pressure lever coupling [D] to the original position.

### 2.3 PAPER END DETECTION



If there is some paper in the paper tray, the paper stack raises the paper end feeler $[A]$ and the paper end sensor $[B]$ 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 with no paper in the tray, the shape of the paper end feeler causes it to lift up.

## PAPER HEIGHT DETECTION

### 2.4 PAPER HEIGHT DETECTION



The amount of paper in the tray is detected by the combination of on/off signals from two paper height sensors $[A]$ and $[B]$.
When the amount of paper decreases, the bottom plate pressure lever [C] moves the actuator up.
The following combination of sensor signals is sent to the copier/printer.

| Amount of Paper | Paper Height Sensor 1 | Paper Height Sensor 2 |
| :---: | :---: | :---: |
| Near End | OFF | ON |
| $30 \%$ | ON | ON |
| $70 \%$ | ON | OFF |
| $100 \%$ | OFF | OFF |

When the tray contains paper of a small width, the paper feed pressure may become too low when the thickness of the remaining stack of paper has decreased. The lift motor rotates forward 300 ms after the sensor detects a certain amount of paper remaining in the tray to increase paper feed pressure, simulating the pressure generated by a full tray.

The amount of remaining paper depends on SP modes 1-908-6, 7, 15, and 16. The amount of forward rotation depends on SP1-908-4, 5, 13, and 14. Note that there are two paper size thresholds for each tray: small and middle (this is the same as for the paper lift mechanism described earlier). Some models only use the small threshold. The paper size thresholds depend on SP1-908-8, 9, 17, and 18.
The following table summarizes how these SP modes work.

| No Middle Size Programmed | With Middle Size Programmed |
| :---: | :---: |
| Paper width: <br> Tray 1: More than 1-908-8 <br> Tray 2: More than 1-908-17 <br> (Default: Wider than HLT) <br> Amount of forward rotation: None | Paper width: <br> Tray 1: More than 1-908-9 <br> Tray 2: More than 1-908-18 <br> Amount of forward rotation: None |
| Paper width: <br> Tray 1: 1-908-8 or less <br> Tray 2: 1-908-17 or less (Default: HLT or narrower) <br> Amount of remaining paper: <br> Tray 1: 1-908-6 <br> Tray 2: 1-908-15 <br> (Default: When near-end is detected) <br> Amount of forward rotation: <br> Tray 1: 1-908-4 <br> Tray 2: 1-908-13 <br> (Default: 300 ms ) | Paper width: <br> Tray 1: More than 1-908-8, up to and including 1-908-9 <br> Tray 2: More than 1-908-17, up to and including 1-908-18 <br> Amount of remaining paper: <br> Tray 1: 1-908-7 <br> Tray 2: 1-908-16 <br> Amount of forward rotation: <br> Tray 1: 1-908-5 <br> Tray 2: 1-908-14 |
|  | Paper width: <br> Tray 1: 1-908-8 or less Tray 2: 1-908-17 or less <br> Amount of remaining paper: <br> Tray 1: 1-908-6 <br> Tray 2: 1-908-15 <br> Amount of forward rotation: <br> Tray 1: 1-908-4 <br> Tray 2: 1-908-13 |

### 2.5 PAPER SIZE DETECTION




There are four paper size microswitches [A] on the front right plate of the paper tray unit. The switches are actuated by a paper size actuator $[\mathrm{B}]$ behind the paper size indicator plate, which is on the front right of the tray.
Each paper size has its own actuator, with a unique combination of notches. To determine which size has been installed, the CPU reads which microswitches the actuator has switched off.

The CPU disables paper feed from a tray if the paper size cannot be detected. If the paper size actuator is broken, or if there is no tray installed, the Add Paper indicator will light.
When the paper size actuator is at the "*" mark, the paper tray can be set up to accommodate one of a wider range of paper sizes by using user tools. If the paper size for this position is changed without changing the user tool setting, a paper jam will result.

### 2.6 SIDE AND END FENCES



## Side Fences

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

## End Fence

As the amount of paper in the tray decreases, the bottom plate [C] lifts up gradually. The end fence $[\mathrm{D}]$ is connected to the bottom plate. When the tray bottom plate rises, the end fence moves forward and pushes the back of the paper stack to keep it squared up.

## 3. REPLACEMENT AND ADJUSTMENT <br> 3.1 FEED ROLLER REPLACEMENT



1. Remove the paper tray $[A]$.
2. Move the release lever $[B]$ to the front.
3. Pull the feed roller [C] to the operation side and remove it.
4. Replace the feed roller.


### 3.2 TRAY MAIN BOARD REPLACEMENT

1. Remove the rear cover [A] (4 screws).
2. Replace the tray main board $[B]$ (4 screws and 8 connectors).

### 3.3 TRAY MOTOR REPLACEMENT

1. Remove the rear cover (4 screws).
2. Disconnect 8 connectors from the tray main board $[B]$.
3. Remove the tray main board with the bracket ( 2 screws).
4. Remove the tray motor [C] ( 6 screws and 1 connector).

### 3.4 RELAY CLUTCH REPLACEMENT


[F]

1. Remove the rear cover $[A]$ (4 screws).
2. Remove the right cover $[B]$ (2 screws).
3. Remove the snap ring [C].
4. Remove the bushing [D].
5. Remove the stopper bracket [E] (2 screws).
6. Replace the relay clutch [F] (1 connector).

### 3.5 UPPER PAPER FEED CLUTCH REPLACEMENT



1. Remove the rear cover $[A]$ (4 screws).
2. Remove the bracket $[B]$ (2 screws).
3. Remove the snap ring [C].
4. Remove the bushing [D].
5. Remove the stopper bracket [E] (2 screws).
6. Replace the upper paper feed clutch [F] (1 connector).

### 3.6 LOWER PAPER FEED CLUTCH REPLACEMENT


[B]

1. Remove the rear cover $[A]$ (4 screws).
2. Remove the snap ring $[B]$.
3. Replace the lower paper feed clutch [C].

### 3.7 LIFT MOTOR REPLACEMENT



1. Pull out the paper tray.
2. Remove the rear cover $[A]$ (4 screws) and the bracket $[B]$ ( 2 screws).
3. Disconnect the $2 P$ connector [C].
4. Remove the spring [D].
5. Remove the lift motor unit [E] (3 screws).
6. Remove the lift motor [F] (2 screws).

### 3.8 PAPER END SENSOR REPLACEMENT



1. Remove the paper tray.
2. Remove the paper end sensor bracket $[A]$ ( 1 screw and 1 connector).
3. Replace the paper end sensor [B].

NOTE: After replacing the sensor, pull the sensor cable towards the right side of the frame [C] so that it does not touch the paper in the tray.

### 3.9 VERTICAL TRANSPORT SENSOR REPLACEMENT



1. Open the right door $[\mathrm{A}]$.
2. Remove the right guide plate $[B]$ ( 2 screws).
3. Remove the vertical transport sensor bracket [C] (1 screw and 1 connector).
4. Replace the vertical transport sensor [D].

### 3.10 PAPER SIZE SWITCH REPLACEMENT



1. Remove the upper and lower paper trays.
2. Remove the inner cover [A] (2 screws).
3. Replace the paper size switch $[B]$ (1 connector).

## LCT <br> A862/B391

# 1. OVERALL MACHINE INFORMATION <br> 1.1 SPECIFICATIONS 

## Paper Size:

Paper Weight:
Tray Capacity:
Remaining Paper Detection:
Power Source:
Power Consumption:
Weight:
Size (W x D x H) :

A4 sideways/LT sideways
$60 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 28 \mathrm{lb}$
2,000 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )
5 steps ( $100 \%, 75 \%, 50 \%, 25 \%$, Near end)
$24 \mathrm{Vdc}, 5 \mathrm{Vdc}$ (from copier/printer)
26 W (Max.)/14 W (Ave.)
25 kg ( 55 lbs )
$550 \mathrm{~mm} \times 520 \mathrm{~mm} \times 271 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Pick-up Roller
2. Upper Limit Sensor
3. Paper Feed Roller
4. Relay Sensor
5. Relay Roller
6. Reverse Roller
7. Paper Height Sensors 1, 2, 3
8. Lower Limit Sensor
9. Left Paper End Sensor
10. Paper Height Sensors 4,5

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Main Board
2. Tray Sensor (Switch)
3. Relay Clutch
4. Paper Feed Clutch
5. Tray Motor
6. Tray Lift Motor
7. Tray Heater (option)
8. Right Tray Paper End Sensor
9. Upper Limit Sensor
10. Relay Sensor
11. Side Fence Open/Closed Sensors

### 1.4 ELECTRICAL COMPONENT DESCRIPTIONS

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Tray Motor | Drives all rollers. | 5 |
| M2 | Tray Lift Motor | Drives the paper tray up or down. | 6 |
| M3 | Rear Fence Motor | Moves the rear fence to transfer the paper stack from the paper storage (left) side of the tray to the paper feed (right) side. | 16 |
| Sensors |  |  |  |
| S1 | Right Tray Paper End | Informs the copier/printer when the paper in the right side (paper feed side) of the tray has been used up. If there is a paper stack in the left side (paper storage side), this is moved into the right tray. If there is no paper stack in the left side, paper end is indicated. | 8 |
| S2 | Relay | Detects the copy paper coming to the relay roller and checks for misfeeds. | 10 |
| S3 | Upper Limit | Detects when the paper is at the correct paper feed height. | 9 |
| S4 | Lower Limit | Detects when the tray is completely lowered, to stop the LCT motor. | 13 |
| S5 | Paper Height $1,2,3$ | Detects the amount of paper remaining in the right side of the tray. | 12 |
| S6 | $\begin{aligned} & \text { Paper Height } \\ & 4,5 \\ & \hline \end{aligned}$ | Detects the amount of paper remaining in the left side of the tray. | 19 |
| S7 | Rear Fence Home Position | Detects when the rear fence is at H.P. | 17 |
| S8 | Tray (Switch) | Detects whether the tray is correctly set. | 2 |
| S9 | Side Fence Open/Closed | Detects whether the side fence is opened on closed. | 11 |
| S10 | Rear Fence Return | Detects when the rear fence has moved the paper stack from the left side to the right side. | 15 |
| S11 | Left Tray Paper End | Informs the copier/printer when there is no paper in the left side (paper storage side) of the tray. | 18 |
| Solenoids |  |  |  |
| SOL1 | Side Fence | Controls open-close movement of the side fence. | 14 |
| Magnetic Clutches |  |  |  |
| MC1 | Paper Feed | Drives the paper feed roller. | 4 |
| MC2 | Relay | Drives the relay roller. | 3 |
| PCBs |  |  |  |
| PCB1 | Main | Controls the LCT and communicates with the copier/printer. | 1 |
| Switches |  |  |  |
| SW1 | Right Cover | Detects whether the right cover is open. | 20 |

## 2. DETAILED SECTION DESCRIPTIONS

### 2.1 PAPER FEED



This products uses an FRR type paper feed mechanism.
The paper feed unit consists of the pickup roller [A], paper feed roller [B], reverse roller [C], and grip and transport rollers.

There is a torque limiter in the back of the reverse roller (ferrite powder type).

### 2.2 REVERSE ROLLER AND PICK-UP ROLLER RELEASE



To prevent the paper from being torn when pulling out the paper feed tray, the reverse and pickup rollers are set so that they release automatically.

When the paper tray [A] is not inside the machine, the reverse 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 set into the machine, it pushes the release lever [E]. This causes the pick-up roller [D] to go down into contact with the top sheet of paper and the reverse roller $[B]$ to move up and contact the paper feed roller.

### 2.3 TRAY LIFT



When the paper feed tray is put in the machine, the tray switch $[\mathrm{A}]$ on the back face turns on and the tray lift motor $[B]$ starts up. The base plate lift shaft $[C]$ is coupled to the lift motor at shaft [D], so the base plate of the tray is lifted. After a short while, the top of the paper stack contacts the pick-up roller and lifts it up.
When this occurs, the actuator enters the upper limit sensor, the sensor turns off and the lift motor stops. When paper in the tray is used up, the pick-up roller is gradually lowered, and the actuator leaves the upper limit sensor (turning the sensor on). When this happens, the lift motor begins turning again. The tray will then be lifted until the actuator enters the upper limit sensor (turning the sensor off again).
When the tray is removed from the copier, the coupling between the lift motor [B] and base plate lift shaft [C] is broken and the base plate goes into a controlled free fall (using a damper $[E]$ to slow the fall and prevent damage).

### 2.4 NEAR END/END DETECTION

This tray can hold two stacks of paper, so the machine needs to monitor the status of both these stacks. There are seven sensors to do this.
In the right tray (paper feed side), three height sensors measure the height of the stack, and an end sensor detects when all the paper is used up. As the amount of paper remaining in the tray decreases, the base plate rises and the actuator activates the paper height sensors. When paper runs out in the right tray, the stack in the left tray is moved across to the right tray.
There are also two height sensors ( $[\mathrm{F}]$ in the diagram on the previous page) and an end sensor in the left tray (paper storage side) ([G] in the diagram on the previous page). When there is no paper in both trays, paper end is detected.

The machine determines the amount of remaining paper based on the sensor outputs, as shown in the following table.

## Paper end sensor 1: $\bigcirc=$ Low (no paper), $=$ High (paper present) Other sensors: $O=$ Low (paper present), $=$ High (no paper)

|  | Amount of paper |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 100\% |  |  |  |  |  |  |  |  |
| Paper Height Sensor 1 | O | O | O | O | O | O | - | O | O |
| Paper Height Sensor 2 | $\bigcirc$ | O | O | O | $\bigcirc$ | - | - | $\bigcirc$ | $\bullet$ |
| Paper Height Sensor 3 | $\bigcirc$ | O | $\bullet$ | O | O | - | - | - | - |
| Paper End Sensor 1 | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bullet$ | $\bullet$ | $\bigcirc$ | $\bullet$ | - | $\bullet$ |
| Paper Height Sensor 4 | $\bigcirc$ | - | O | - | - | $\bigcirc$ | O | - | - |
| Paper Height Sensor 5 | $\bigcirc$ | O | O | $\bigcirc$ | $\bullet$ | O | O | $\bigcirc$ | O |
| Paper End Sensor 2 | $\bigcirc$ | O | O | O | - | O | O | O | O |


|  | Amount of paper |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | 25\% |  |  |  |  | End |
| Paper Height Sensor 1 | - | O | O | O | O | - | - | - |
| Paper Height Sensor 2 | - | - | $\bullet$ | O | $\bullet$ | - | - | - |
| Paper Height Sensor 3 | - | - | - | - | - | - | - | - |
| Paper End Sensor 1 | - | - | $\bigcirc$ | - | $\bigcirc$ | - | - | O |
| Paper Height Sensor 4 | O | - | $\bullet$ | - | - | - | - | - |
| Paper Height Sensor 5 | - | $\bigcirc$ | $\bigcirc$ | - | - | - | - | - |
| Paper End Sensor 2 | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | - | - | $\bigcirc$ | - | - |

The following diagram is the sensor layout, as viewed from the front.


### 2.5 RIGHT TRAY SIDE FENCE



When the paper in the right tray is used up, the side fence solenoid [F] activates and stays on until the side fence open/closed sensor [E] detects that the fence is open. The rear fence $[A]$ then moves the stack of paper from the left tray into the right tray, as described in the following section. When the stack has been transferred to the right tray, the rear fence return sensor [G] detects the rear fence and then the cpu turns off the side fence open solenoid (closing the side fence).
The side fence open/closed sensor [D] detects when the side fence is closed. When it is not closed, the user is prompted at the operation panel to free the mechanism.

### 2.6 LEFT TRAY REAR FENCE

If the right tray paper end sensor detects that there is no paper in the tray (while the left tray sensor detects that there is still paper in the left tray), the right side fence [C] opens and the rear fence motor $[\mathrm{H}]$ turns on. The rear fence of the left tray moves and the paper stack is then transferred from the left tray to the right tray.
When the left tray rear fence activates the rear fence return sensor, the machine detects that the paper stack has been transferred to the right tray and the rear fence motor rotates in the opposite direction. When the rear fence HP sensor [B] comes on, the motor stops.

### 2.7 RIGHT TRAY PAPER END DETECTION



The paper end sensor [A] detects when copy paper in the right tray runs out. When there is paper in the tray, the paper pushes up the paper end feeler $[B]$ and causes the actuator to come between the LED and photo diode of the sensor. When paper runs out, the feeler drops and the actuator leaves the photointerruptor, and the machine detects that there is no paper in the tray.
When the tray is being pulled out, the lever [E] lifts the pick-up roller and this also lifts up the feeler.

## 3. REPLACEMENT AND ADJUSTMENT

### 3.1 DETACHING THE TRAY FROM THE MAINFRAME

While pressing the stopper attached to the guide rail, pull out the large capacity tray.
NOTE: When reinstalling the tray, set the tray on the guide rail and carefully push the tray in, making sure to keep the tray level.


### 3.2 REAR FENCE HP SENSOR



1. Pull out the large capacity tray.
2. Remove the left tray rear side fence [A] (2 screws).
3. Remove the rear fence bracket [B] (1 screw).
4. Remove the connector of the rear fence HP sensor.
5. Replace the rear fence HP sensor [C] (1 screw).

NOTE: When securing the sensor in place, be sure to fasten the screw in the proper position.

### 3.3 CHANGING THE TRAY PAPER SIZE



1. Remove the screws of all side fences $[A],[B]$.
2. The position of the rear fence HP sensor can then be changed (see Rear Fence HP Sensor Removal).
3. The paper size display can then be changed with an SP mode.

NOTE: When securing the right tray side fence, fasten the screw after setting the paper in the right tray and adjusting the fence to the width of the paper.

### 3.4 LEFT TRAY PAPER END SENSOR



1. Pull out the large capacity tray.
2. Remove the left tray side fence [A] (2 screws).
3. Remove the rear fence bracket $[B]$ (1 screws).
4. Replace the left tray paper end sensor [C] (1 connector).

### 3.5 TRAY LIFT MOTOR



1. Remove the brackets ( 1 screw for each).
2. Remove the rear cover $[A]$ (2 screws).
3. Remove the tray lift motor $[B]$ (3 screws, 1 connector).

TRAY MOTOR

### 3.6 TRAY MOTOR



1. Remove the rear cover.
2. Remove bracket \#1 [A] (2 screws).
3. Remove bracket \#2 [B] (2 screws).
4. Remove the tray motor [C] ( 6 screws, 1 connector).

### 3.7 PAPER FEED CLUTCH AND RELAY CLUTCH



1. Remove the rear cover.
2. Remove bracket \#1 [A] (2 screws).
3. Remove bracket \#2 [B] (2 screws).
4. Remove all bushings.
5. Remove the paper feed clutch [C] and relay clutch [D].
6. Replace the required clutch.

NOTE: Make sure to properly secure both clutches before completing installation.

### 3.8 PAPER FEED UNIT



1. Remove the paper feed clutch and relay clutch (see Paper Feed Clutch and Relay Clutch Replacement).
2. Remove pulleys $A[A], B[B]$, and $C[C]$.
3. Remove the paper feed harness from the main board.
4. Open the vertical transport guide plate [D].
5. Remove the paper feed unit [E] (2 screws).

### 3.9 UPPER LIMIT, RIGHT TRAY PAPER END, AND RELAY SENSORS



1. Remove the paper feed unit (see Paper Feed Unit Replacement).
2. Replace the required sensor.

- Upper limit [A]
- Relay [B]
- Right tray paper end [C]

NOTE: When replacing the upper limit [A] and paper end sensor [C], please be sure to do so while pushing the release lever [D].

### 3.10 REAR FENCE MOTOR



1. Pull out the paper feed tray unit.
2. Remove the paper feed tray front cover $[A]$ ( 2 screws).
3. Remove the left side fence $[B]$.
4. Remove the rear fence drive gear [C] (1 screw). This is in order to free the end fence [D].
5. Move the end fence to the right (toward the center).
6. Remove the end fence ( 1 screw).
7. Remove the end fence bracket [ $E$ ] (2 screws).
8. Remove the bracket [F] (1 screw).
9. Remove the bracket [G] of the rear fence motor assembly (2 screws).
10. Remove the rear fence motor assembly (2 screws).
11. Replace the motor $[\mathrm{H}]$ (1 connector).

### 3.11 PICK-UP/PAPER FEED/REVERSE ROLLERS



1. Remove the paper tray unit (see Paper Tray Unit Replacement).
2. Remove the snap ring (1 each for the paper feed and reverse rollers).
3. Remove the pick up roller [A].
4. Replace each roller $[B],[C]$.

NOTE: Install the paper feed rollers the correct way round, as shown in the illustration. If the rollers are installed incorrectly, this will cause the one-way clutch to lock.

## AUTO REVERSE DOCUMENT FEEDER B386

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

| Original Size: | Standard sizes <br> Single-sided mode: A3 to A5, DLT to HLT <br> Double-sided mode: A3 to A4, DLT to LT <br> Non-standard sizes (Single-sided mode only) <br> Max. width 297 mm <br> Min. width 105 mm <br> Max. length 1260 mm <br> Min. length 128 mm |
| :---: | :---: |
| Original Weight: | Single-sided mode: $52 \sim 128 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 34 \mathrm{lb}$ Double-sided mode: $52 \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 28 \mathrm{lb}$ |
| Table Capacity: | 30 sheets ( 70 kg ) |
| Original Standard Position: | Center |
| Separation: | FRR |
| Original Transport: | Roller transport |
| Original Feed Order: | From the top original |
| Reproduction Range: | 25 to 200 \% (Sub scan direction only) |
| Power Source: | 24 \& 5 Vdc from the copier |
| Power Consumption: | 50 W |
| Dimensions (W x D $\times$ H): | $550 \times 470 \times 110 \mathrm{~mm}$ |
| Weight: | 10 kg |

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Separation Roller
2. Paper Feed Belt
3. Pick-up Roller
4. Original Set Sensor
5. Original Trailing Edge Sensor
6. Original Width Sensor Board
7. Original Length Sensor 1
8. Original Length Sensor 2
9. Original Table
10. Reverse Table
11. Reverse Roller
12. Junction Gate
13. Exit Roller
14. Original Exit Sensor
15. Stamp
16. 2nd Transport Roller
17. Original Exposure Guide
18. Registration Sensor
19. 1st Transport Roller

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. DF Feed Clutch
2. Feed Cover Open Sensor
3. Original Width Sensor Board
4. Original Length Sensor 1
5. DF Pick-up Solenoid
6. Original Length Sensor 2
7. Junction Gate Solenoid
8. DF Drive PCB
9. DF Position Sensor
10. DF Feed Motor
11. DF Transport Motor
12. Original Exit Sensor
13. Stamp Solenoid
14. Original Trailing Edge Sensor
15. Original Set Sensor
16. Original Reverse Sensor
17. Registration Sensor

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | $\begin{gathered} \hline \hline \text { Index } \\ \text { No. } \end{gathered}$ |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | DF Feed | Drives the feed belt, separation, pick-up, and reverse table rollers. | 10 |
| M2 | DF Transport | Drives the transport and exit rollers | 11 |
| Sensors |  |  |  |
| S1 | DF Position | Detects when the DF is lifted. | 9 |
| S2 | Registration | Detects the leading edge of the original to turn off the DF feed and transport motors, detects the original exposure timing, and checks for original misfeeds. | 17 |
| S3 | Feed Cover Open Sensor | Detects when the feed-in cover is opened. | 2 |
| S4 | Original Width Sensor Board | Detects the original width. | 3 |
| S5 | Original Length - 1 | Detects the original length. | 4 |
| S6 | Original Length - 2 | Detects the original length. | 6 |
| S7 | Original Set | Detects if an original is on the feed table. | 15 |
| S8 | Original Exit | Detects the leading edge of the original to turn on the junction gate solenoid and checks for original misfeeds. <br> Detects the trailing edge of the original to turn off the transport and feed motor and junction gate solenoid. <br> In single-sided mode, used to detect original misfeeds. | 12 |
| S9 | Original Trailing Edge | Detects the trailing edge of the last original to stop copy paper feed and to turn off the transport motor, and checks for original misfeeds. | 14 |
| S10 | Original Reverse Sensor | Detects when the original is fed from the reverse area during duplex scanning. | 16 |
| Solenoids |  |  |  |
| SOL1 | DF Pick-up | Controls the up-down movement of the original table. | 5 |
| SOL2 | Stamp | Energizes the stamper to mark the original. | 13 |
| SOL3 | Junction Gate | Opens and closes the junction gate. | 7 |
| Clutches |  |  |  |
| MC1 | DF Feed | Transfers transport motor drive to the pick-up roller and feed belt. | 1 |
| PCBs |  |  |  |
| PCB1 | DF Drive | Interfaces the sensor signals with the copier, and transfers the magnetic clutch, solenoid and motor drive signals from the copier. | 8 |

### 1.5 DRIVE LAYOUT



1. Separation Roller
2. Original Feed Belt
3. Pick-up Roller
4. DF Feed Clutch
5. DF Transport Motor
6. DF Feed Motor
7. Reverse Table Roller
8. 2nd Transport Roller
9. Exit Roller
10. 1st Transport Roller

## 2. DETAILED SECTION DESCRIPTIONS <br> 2.1 ORIGINAL SIZE DETECTION



The original size detection mechanism consists of the original width sensor board [A] and two original length sensors-1 [B] and -2 [C]. Based on the combined output of the length sensors and the width sensor board, the machine can detect the size of the original. This integrated detection mechanism is detailed in the table on the next page.
Note that the width sensor's terminal plate is attached to the original guide, so the widths of the originals must all be the same.

|  | NA | EU | Original Width-1 | Original Width-2 | Original Width-3 |  |  |  | Original Length-1 | Original Length-2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | P4 | P3 | P2 | P1 |  |  |
| A3 (297 x 420) | $X$ | $\bigcirc$ | L | L | ON | - | - | - | ON | ON |
| B4 (257 x 364) | $X$ | $\bigcirc$ | L | H | - | ON | - | - | ON | ON |
| A4 (Lengthwise) $(210 \times 297)$ | $x$ | $\bigcirc$ | H | L | - | - | ON | - | ON | - |
| A4 (297 x 210) <br> (Sideways) | $x$ | O | L | L | ON | - | - | - | - | - |
| B5 (182 x 257) (Lengthwise) | $x$ | O | H | H | - | - | - | ON | ON | - |
| $\begin{aligned} & \hline \text { B5 (257 x 182) } \\ & \text { (Sideways) } \end{aligned}$ | $x$ | O | L | H | - | ON | - | - | - | - |
| A5 (148 x 210) (Lengthwise) | $x$ | $X$ | H | H | - | - | - | ON | - | - |
| A5 (210 x 148) (Sideways) | $x$ | $\bigcirc$ | H | L | - | - | ON | - | - | - |
| 11" x 17" (DLT) | $\bigcirc$ | $X$ | L | L | ON | - | - | - | ON | ON |
| $11^{\prime \prime} \times 15{ }^{\prime \prime}$ | $\bigcirc$ | $X$ | L | L | ON | - | - | - | ON | ON |
| $10^{\prime \prime} \times 14{ }^{\prime \prime}$ | $\bigcirc$ | $X$ | L | H | - | ON | - | - | ON | - |
| 8.5" $\times 14^{\prime \prime}$ (LG) | $\bigcirc$ | $X$ | H | L | - | - | ON | - | ON | - |
| 8.5 " x 13" (F4) | $X$ | $\bigcirc$ | H | L | - | - | ON | - | ON | - |
| 8" $\times 13^{\prime \prime}$ (F) | $\bigcirc$ | $\bigcirc$ | H | L | - | - | ON | - | ON | - |
| $\begin{aligned} & \hline 8.5 " \times 11 " \\ & \text { (Lengthwise) } \\ & \hline \end{aligned}$ | $\bigcirc$ | $X$ | H | L | - | - | ON | - | ON | - |
| 8.5" x $11^{\prime \prime}$ (Sideways) | $\bigcirc$ | $X$ | L | L | ON | - | - | - | - | - |
| $\begin{aligned} & 10 " \times 8 " \\ & \text { (Lengthwise) } \end{aligned}$ | $\bigcirc$ | $X$ | L | H | - | ON | - | - | ON | - |
| $\begin{array}{\|l} \hline 5.5 " \times 8.5^{\prime \prime} \\ \text { (Lengthwise) } \\ \text { (HLT) } \\ \hline \end{array}$ | $\bigcirc$ | $X$ | H | H | - | - | - | ON | - | - |
| $\begin{aligned} & 5.5^{\prime \prime} \times 8.5^{\prime \prime} \\ & \text { (Sideways) (HLT) } \end{aligned}$ | $\bigcirc$ | $x$ | H | L | - | - | ON | - | - | - |

Key
$X:$ No, O: Yes
ON: Paper present
NA: North America, EU: Europe

NOTE: 1) P1-P4 represent the four positions on the width sensor board. ON indicates the presence of the terminal plate in a given position. "Original Width-1" and "Original Width-2" are the outputs from the sensor board to the DF main board. The state of these outputs ( L or H ) depends on the position of the terminal plate on the sensor board (P1, P2, P3, or P4). For example, if the terminal plate is at P 4 , both outputs are L .
2) A reading of "L" on either of the width sensor outputs indicates that the terminal plate is connecting the GND pattern with the width sensor output signal line.
3) The machine cannot detect more than one size of originals in the same job.

Original Width Sensor Board

GND Pattern
Original Width 1
Original Width 2

Original Side
Guide Position


The signal is "L" when the terminal plate is connected to the GND pattern.

### 2.2 MIXED ORIGINAL SIZE MODE

This section explains what happens when the user selects mixed original size mode.
Because this ADF is a sheet-through 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 it 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 original's 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
The originals follow this path:

1. Length detection $\rightarrow$ Scanning glass $\rightarrow$ Inverter table
2. Inverter table $\rightarrow$ Scanning glass $\rightarrow$ Inverter table (restores the 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 reduction/enlargement ratio has been determined, the originals are scanned normally. In order to store the scanned images, a large area of memory (the detected original width x 432 mm length) is prepared. Next, only the portion of the image up to the detected original length is read from memory and printed.

### 2.3 PICK-UP AND SEPARATION



The original is set with the image facing up. The original pushes actuator $[A]$ and the original set sensor [ $E$ ] is activated.
After pressing the start button, the pick-up solenoid [D] is activated and the lift plate [C] lifts the original up until it comes in contact with the pick-up roller [B]. The pickup roller then feeds the top sheet of paper.
After being fed from the pick-up roller, the topmost sheet is separated from the stack by the separation roller and sent to the first transport roller.
The mechanism is an FRR system, consisting of the original feed belt [F] and separation roller [G].

### 2.4 ORIGINAL TRANSPORT AND EXIT

### 2.4.1 SINGLE-SIDED ORIGINALS



The DF feed motor feeds the separated original to the first transport roller [A] at maximum speed. When the registration sensor $[B]$ detects the leading edge, the motor stops for a short while. Then the feed and transport motors turn on again, and feed the original through scanning area at a lower speed (the scanning area contains the original exposure guide [D] and DF exposure glass [C]). After scanning, the original is fed out by the second transport roller [E] and exit roller [F].

### 2.4.2 DOUBLE-SIDED ORIGINALS



When the registration sensor $[B]$ detects the leading edge of the original, the DF feed motor (which drives the feed roller) and transport motor (which drives the transport roller) both switch off. After a brief interval, the transport motor alone reactivates to drive the first [A] and second transport roller [G] and the exit roller [F]. The front side of the original is then scanned.

When the original exit sensor [C] detects the leading edge of the original, the junction gate solenoid is activated and the junction gate [D] opens. The original is then transported towards the reverse table [H].
Soon after the trailing edge of the original passes the exit sensor [C], the junction gate solenoid switches off and the junction gate [D] is closed. When the original has been fed onto the reverse table, the DF feed motor switches on in reverse. The original is then fed by the reverse roller [E] and then by the exit roller [F] and first transport roller $[A]$ to the scanning area (where the reverse side will be scanned).



The original is then sent to the reverse table [H] a second time to be turned over. This is done so that the duplex copies will be properly stacked front side down in the exit tray [J] in the correct order.

### 2.4.3 ORIGINAL TRAILING EDGE SENSOR

During one-to-one copying, copy paper is fed to the registration roller in advance (while the original is still being scanned), to increase the copy speed. The trailing edge sensor monitors the stack of originals in the feeder, and detects when the trailing edge of the last page has been fed in. The main CPU then stops the copier from feeding an unwanted extra sheet of copy paper.

### 2.5 STAMP



This function is only for fax mode.
There is a stamp [A] between the 2nd transport roller [B] and the exit roller [C], and its solenoid is controlled by the copier directly.

When the original reaches the stamp position, the DF feed motor stops. At 300 milliseconds after stopping the DF feed motor, the stamp solenoid turns on if the page was sent successfully (immediate transmission) or stored successfully (memory transmission). After stamping, the DF feed motor starts again to feed out the document, and its speed is about 1.3 times the normal speed.
The stamping position on the original can be changed by adjusting SP6-010.

### 2.6 TIMING CHART

## LT SIDEWAYS STAMP MODE (DOUBLE-SIDED ORIGINAL MODE)



### 2.7 CONDITION OF JAM DETECTION

JAM 1A: If the registration sensor does not turn on within $114 \mathrm{~mm} \times 2$ since the feed motor started (twice the distance between the original set position and the (registration sensor).
JAM 1B: Duplex mode only: If the registration sensor does not turn on within 161 mm $\times 1.5$ since the feed motor started ( 1.5 times the distance between the original reverse position and the registration sensor).
JAM 2: If the registration sensor does not turn off within $1260 \mathrm{~mm} \times 1.1$ since the feed motor started ( 1.1 times the distance between the paper stop position at registration and the maximum original length).
JAM 3: If the original exit sensor does not turn on within $92 \mathrm{~mm} \times 1.5$ since the feed motor started ( 1.5 times the distance between registration sensor and exit sensor)

JAM 4: If the original exit sensor does not turn off within original length +120 mm since the transport motor started after the exit sensor turns on
JAM 5: Duplex mode only: If the original reverse sensor does not turn on within 161 $\mathrm{mm} \times 1.4$ since the feed motor started ( 1.4 times the distance between the original reverse position and the registration sensor).
JAM 6: If the feeding original is removed.
JAM 7: If the cover is opened or the ADF is lifted while the ADF is in operation.
JAM 8: If an area outside the maximum scannable area is selected.
JAM 9: If scanning of the previous original is not completed when the registration sensor detects the leading edge of the current original.

### 2.8 OVERALL ELECTRICAL CIRCUIT

The DF CPU controls the transport motor, DF feed motor, DF feed clutch, junction Gate solenoid, stamp solenoid, and pick-up solenoid. The DF CPU also monitors all DF sensors and provides updated status information when prompted at regular intervals by the mainframe, which may then take action based on this information. The DF-mainframe connection is checked automatically just after power is supplied to the mainframe.


## 3. SERVICE TABLES

### 3.1 DIP SWITCHES

| SW100 |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |  |
| 0 | 0 | 0 | 0 | Normal operating mode (Default) |
| 0 | 0 | 0 | 1 | No function |
| 0 | 0 | 1 | 0 | Free run with two-sided original $100 \%$ |
| 0 | 0 | 1 | 1 | DF feed clutch operates |
| 0 | 1 | 0 | 0 | Free run with one-sided original 32.6\% |
| 0 | 1 | 0 | 1 | DF pick-up solenoid operates |
| 0 | 1 | 1 | 0 | Motors rotate |
| 0 | 1 | 1 | 1 | No function |
| 1 | 0 | 0 | 0 | Free run with one-sided original $100 \%$ |
| 1 | 0 | 0 | 1 | Junction gate solenoid operates |
| 1 | 0 | 1 | 0 | Free run without two-sided original $100 \%$ |
| 1 | 0 | 1 | 1 | No function |
| 1 | 1 | 0 | 0 | Free run without one-sided original $100 \%$ |
| 1 | 1 | 0 | 1 | Stamp solenoid operates |
| 1 | 1 | 1 | 0 | Free run with two-sided original $32.6 \%$ |
| 1 | 1 | 1 | 1 | Free run without two-sided original $100 \%$ |

## 4. REPLACEMENT AND ADJUSTMENT

### 4.1 DF EXIT TABLE AND COVER



1. Open the DF feed cover.
2. Remove the front cover [A] (3 screws).

Remove the rear cover [B] (3 screws).
3. Open the reverse table [C].

Remove the original exit table [D] (3 screws).

### 4.2 ORIGINAL FEED UNIT



1. Open the left cover.
2. Detach the paper feed unit by sliding it toward the front of the machine (springloaded side) and then lifting the far side.

### 4.3 LEFT COVER



1. Remove the front and rear covers.
2. Remove the left cover [A].
3. Remove the lower left stay unit $[B]$ (2 screws).

### 4.4 PICK-UP ROLLER



1. Remove the original feed unit.
2. Replace the pick-up roller [A] (1 snap ring).

### 4.5 FEED BELT




1. Remove the original feed unit.
2. Open the paper feed guide $[A]$.
3. Remove the belt holders $[B]$.
4. Replace the feed belt [C].

### 4.6 SEPARATION ROLLER



1. Lift the original feed guide $[A]$.
2. Remove the separation roller cover $[B]$.
3. Replace the separation roller [C].

### 4.7 ORIGINAL SET/ORIGINAL REVERSE SENSOR



1. Open the left cover.
2. While pushing the left and right pawls $[A]$, open the original feed guide plate $[B]$.
3. Remove the original set sensor [C]
4. Remove the original reverse sensor [D].

### 4.8 ORIGINAL SIZE SENSOR



1. Open the original table $[A]$.
2. Remove the upper part of the table ( 3 screws).
3. Replace the width sensor board [B], length sensor ( -1 [C] and $-2[D]$ ) and trailing edge sensor [E].

NOTE: To ensure proper detection of paper size, after wiping off the sensor board and terminal plate with a dry cloth (or cloth with alcohol), apply silicone grease (KS-660) to the terminal plate [F].


### 4.9 ORIGINAL FEED DRIVE



First remove the rear cover. Then follow the instructions below for each part replacement:

## DF Feed Clutch

1. Replace the DF feed clutch $[A]$ (1 E-ring, 1 connector).

## Pick-up Solenoid

1. Replace the pick-up solenoid $[B]$ ( 3 screws, 1 snap ring, 1 connector).

## Transport Motor

1. Remove the bracket [C] (2 screws).
2. Replace the transport motor [E] (2 screws, 1 connector).

## DF Feed Motor

1. Remove the bracket [C] (2 screws).
2. Replace the DF feed motor [D] (2 screws, 1 connector).

### 4.10 REGISTRATION SENSOR



1. Remove the front and rear covers.
2. Remove the transport guide plate $[A]$.
3. Replace the registration sensor $[B]$.

### 4.11 STAMP SOLENOID AND ORIGINAL EXIT SENSOR




1. Remove the rear cover (1 connector). Also remove the upper cover (the exit tray).
2. Open the exit guide plate [A]. Next, detach the unit by inserting a screwdriver or other tool into one of the small openings $[\mathrm{B}]$ on either side of the guide plate holder and pushing firmly.
3. Remove the stamp solenoid [C] (1 screw).
4. Remove the original exit sensor [D] (1 connector).

## INTERCHANGE UNIT B300/B416

1. OVERALL MACHINE INFORMATION
1.1 SPECIFICATIONS

| 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: | $52 \mathrm{~g} / \mathrm{m}^{2} \sim 135 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 36 \mathrm{lb}$ |
| Power Consumption: | 15 W |
| Dimensions (W x D $\times$ ) : | $117 \times 447 \times 92 \mathrm{~mm}$ |
| Weight: | 1.6 kg |

### 1.2 MECHANICAL COMPONENT LAYOUT



1. 1-bin Tray (Option)
2. Exit Sensor
3. Duplex Junction Gate
4. Duplex Unit (Option)
5. Exit Junction Gate
6. Fusing Unit (Inside the Copier)
7. Exit Roller
8. Bridge Unit

### 1.3 DRIVE LAYOUT



1. Exit Junction Gate Solenoid
2. Exit Sensor
3. Duplex Junction Gate Solenoid
4. Exit Roller
5. Drive Gear

## 2. DETAILED DESCRIPTION

### 2.1 JUNCTION GATE MECHANISM



Depending on the selected mode, the copies are directed up, left, or right by the exit junction gate $[A]$ and the duplex junction gate $[B]$. These are controlled by the exit junction gate solenoid [C] and the duplex junction gate solenoid [D].

## To the Exit Tray or Bridge Unit (for the Upper Tray on top of the Bridge Unit, or the Finisher)

The exit junction gate solenoid stays off and the paper is directed to the copier exit unit [E].

## To the 1-bin Tray

The exit junction gate solenoid turns on and the duplex junction gate solenoid stays off. The paper is directed to the 1-bin tray [F].

## To the Duplex Unit

The exit junction gate solenoid and the duplex junction gate solenoid both turn on and the paper is directed to the duplex unit [G].

## 3. REPLACEMENT AND ADJUSTMENT

### 3.1 EXIT SENSOR REPLACEMENT



1. Remove the interchange unit.
2. Remove the upper cover $[A]$ of the interchange unit.
3. Remove the exit sensor $[B]$ (1 connector).

## 1-BIN TRAY UNIT A898/B413

1. OVERALL INFORMATION
1.1 SPECIFICATIONS
Paper Size: Standard Size: A5 Lengthwise to A3 HLT Lengthwise to DLT

Non-standard Size:

     Paper Width: 90 ~ 297 mm
    
     Paper Length: 148 ~ 432 mm
    
Paper Weight: $\quad 60 \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 28$ lbs.
Tray Capacity: $\quad 125$ sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lbs}$.)
Power Source: 5 VDC, 24 VDC (from the copier)
Power Consumption: 17 W
Weight: $\quad 1.1 \mathrm{~kg}$
Size (W x D x H): $\quad 530 \mathrm{~mm} \times 410 \mathrm{~mm} \times 120 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Exit Rollers
2. Junction Gate Gear
3. Drive Gear
4. Paper Tray
5. Paper Sensor
6. Junction Gate (Interchange Unit)

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Paper Sensor
2. 1-bin Sorter Exit Tray LED (located in the copier)

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function |  |  |
| :---: | :--- | :--- | :--- | :---: |
| Sensors | Index No. |  |  |  |
| S1 | Paper | Detects when there is paper on the tray. | 1 |  |
| LEDs |  |  |  |  |
| LED1 | 1 Bin Exit Tray | Indicates when there is paper in the tray. This <br> sensor is located in the copier. | 2 |  |
|  |  |  |  |  |

## 2. DETAILED SECTION DESCRIPTIONS

### 2.1 BASIC OPERATION



At the appropriate time after the leading edge of the first sheet of copy paper reaches the copier's registration roller, the junction gate solenoid $[B]$ in the interchange unit turns on to switch the junction gate to direct the paper to the tray [C].
The junction gate solenoid turns off at the appropriate time after the paper is directed to the tray. The main motor in the copier stops after the final sheet passes through the paper sensor [E].
The paper sensor [ E ] turns on when there is paper in the tray, and the paper indicator [F] turns on.

The tray can be opened for easier jam removal by swinging the tray to the left.

## 3. REPLACEMENT AND ADJUSTMENT

### 3.1 PAPER SENSOR REMOVAL



1. Remove the 1-bin tray.
2. Remove the 1-bin sorter unit [A].
3. Remove the paper sensor $[B]$ (1 connector).

## SHIFT TRAY UNIT B313/B459

1 OVERALL MACHINE INFORMATION
1.1 SPECIFICATIONS

| Paper Size: | Standard Size: <br> A5 lengthwise to A3 <br> HLT lengthwise to DLT <br> Non-standard Size: <br> Paper Width: 90 ~ 297 mm <br> Paper Length: 148 ~ 432 mm |
| :---: | :---: |
| Paper Weight: | $60 \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 28 \mathrm{lbs}$. |
| Tray Capacity: | 125 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lbs}$.): B4 or larger 250 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lbs}$.): A4 or smaller |
| Power Source: | $5 \mathrm{VDC}, 24 \mathrm{VDC}$ (from the copier) |
| Power Consumption: | 17 W |
| Weight: | 1.1 kg |
| Size ( $\mathrm{W} \times \mathrm{D} \times \mathrm{H}$ ) | $530 \mathrm{~mm} \times 410 \mathrm{~mm} \times 120 \mathrm{~mm}$ |

### 1.2 COMPONENT LAYOUT



1. Half Turn Sensor
2. Tray Cover
3. Slip Disc
4. Tray Motor
5. Driver PCB

## 2. DETAILED SECTION DESCRIPTIONS

### 2.1 BASIC OPERATION



The shift tray allows copies to be sorted into separate piles on one tray.
From the left-right movement of the tray cover [A], the piles of copies are offset into two positions, slightly overlapping one another.

### 2.2 PRIMARY MECHANISMS

### 2.2.1 TRAY SHIFT



As stated above, the shift tray cover [A] moves from left to right to create two possible positions for the copies to stack up. This motion is driven by the tray motor [B], which connects to the slip disc [C] via a small shaft. The shaft is connected at the rotational center of the disc. However, there is an off-centered white square attached to the top surface of the disc. When the tray cover is attached to the unit, this square fits into a groove [D] (approximately equal to its width) that runs lengthwise along the underside of the tray
When the motor is running, the disc rotation causes the off-centered white square to change position. Since the square only has freedom of movement along the groove [D], the only net motion of the tray is from left to right.

### 2.2.2 HALF TURN DETECTION



Half turn detection is performed through a combination of two components: the slip disc $[A]$ and half turn sensor [C].
The slip disc has a rim extending below the top surface. However, the rim only extends $180^{\circ}$ around the disc. The half turn sensor is below the edge of the disc, opposite the tray motor. The sensor is positioned so that the rim of the disc passes between the LED and photo diode when the disc turns.
While the motor $[B]$ is rotating the disc and moving the tray cover, the disc rim is not between the diode and LED. After the disc has turned its maximum $180^{\circ}$, the rim passes between these two parts and blocks the signal to the LED, stopping the motor. The tray stays in place until the motor is activated again to move the tray across to receive another copy of the original.

## 3. REPLACEMENT AND ADJUSTMENT

### 3.1 TRAY COVER REPLACEMENT



### 3.1.1 TRAY COVER REMOVAL

1. Remove the tray cover $[A]$ by pressing on the two pawls $[B]$ on the left side of the cover.

### 3.1.2 TRAY COVER ATTACHMENT

NOTE: The right side of the tray cover should be attached first.

1. Fit the pawls [C] (just below the cover fin) around the thin bar [D] on the shift tray.
2. Align the square [E] so that it fits into the groove in the underside of the tray cover and does not interfere with the attachment of the cover.
3. Complete the attachment by inserting the left side pawls $[B]$ into place.

### 3.2 TRAY MOTOR AND HALF TURN SENSOR REPLACEMENT



### 3.2.1 REPLACING THE TRAY MOTOR

1. Remove the slip disc $[A]$.
2. Remove the tray motor $[B]$ from the motor holder (1 connector).

### 3.2.2 REPLACING THE HALF TURN SENSOR:

1. Remove the half turn sensor [C] (1 connector).

BY-PASS
A899/B415

## 1 OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

Paper Size:

Paper Weight:
Tray Capacity:
Paper Feed System:

Standard sizes
A6 lengthwise to A3
HLT lengthwise to DLT
Non-standard sizes
Width: 90 to 305 mm
Length: 148 to 432 mm
$52 \mathrm{~g} / \mathrm{m}^{2} \sim 157 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 42 \mathrm{lb}$
50 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )
Friction Pad Paper Feed

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Paper Feed Roller
2. Paper End Sensor
3. Paper Size Sensor Board

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Paper End Sensor
2. Paper Feed Clutch
3. Paper Size Sensor Board

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :--- | :--- | :---: |
| Sensors | S1 | Paper End | Informs the copier/printer when the by-pass <br> tray runs out of paper. |
| S2 | Paper Size <br> Sensor Board | Detects the paper width. | 1 |
|  |  |  | 3 |
| Magnetic Clutches |  | 2 |  |
| MC1 | Paper Feed | Starts paper feed from the by-pass tray. |  |
|  |  |  |  |

## 2 DETAILED DESCRIPTIONS

### 2.1 BASIC OPERATION



The by-pass unit uses a friction pad paper feed mechanism. The transport roller gear in the main copier/printer drives the gear on the paper feed clutch [B] through a series of gears.

When paper is placed in the tray, the paper end sensor [C] switches off. When the Start button is pressed, the paper feed clutch $[B]$ is activated and the paper feed roller [A] feeds the paper one sheet at a time.

### 2.2 PAPER SIZE DETECTION



The paper size sensor board [B] monitors the paper width. The rear side fence [A] is connected to the terminal plate. The pattern for each paper width is unique. Therefore, the copier/printer determines which paper has been placed in the bypass tray by the signal output from the board. However, the copier will not determine the paper length from the by-pass tray hardware (refer to Original Size Detection in the manual for the base copier for details on how paper length is determined).

## 3 REPLACEMENT AND ADJUSTMENT <br> 3.1 PAPER FEED ROLLER/FRICTION PAD/PAPER END SENSOR



1. Remove the upper cover [A] (2 screws).
2. Remove the paper end sensor bracket [B] (1 screw).
3. Remove the paper feed roller [C] (snap-fit).
4. If removing the friction pad [D], do so at this time.

### 3.2 PAPER SIZE SENSOR BOARD



1. Remove the rear cover [A] (2 screws).
2. Remove the by-pass tray $[B]$ (1 connector, 2 release levers [C]).
3. Remove the lever [D] (1 snap ring, 1 pin).
4. While pushing the release lever $[E]$, remove the paper tray $[F]$.
5. Remove the by-pass width sensor [G].

NOTE: When installing the by-pass width sensor [G], move the side fence inward all the way so that the seal on the side face gear faces the surface with the seal $[\mathrm{H}]$ on the by-pass width sensor.

### 3.3 PAPER FEED CLUTCH



1. Remove the rear cover [A] (2 screws).
2. Remove the spring.
3. Remove the drive gear and drive gear bracket $[B]$ (1 E-ring, 1 spring).
4. Remove the paper feed clutch bracket [C] (2 screws).
5. Remove the paper feed clutch [D] (1 connector).

## DUPLEX <br> A896/B414

1. OVERALL MACHINE INFORMATION
1.1 SPECIFICATIONS

| Paper Size: | Standard sizes <br> A5 lengthwise to A3 <br> HLT to DLT <br> Non-standard sizes <br> Width: 140 to 297 mm <br> Length: 182 to 432 mm |
| :---: | :---: |
| Paper Weight: | $64 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb} \sim 28 \mathrm{lb}$ |
| Tray Capacity: | 1 sheet |
| Power Consumption: | 40 W |
| Power Source: | DC $24 \mathrm{~V}, 5 \mathrm{~V}$ |
| Dimensions (W x D $\times$ ) : | $90 \times 495 \times 452 \mathrm{~mm}$ |
| Weight: | 6 kg |

### 1.2 MECHANICAL COMPONENT LAYOUT



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

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Entrance Sensor
2. Inverter Gate Solenoid
3. Inverter Motor
4. Main Board
5. Transport Motor
6. Exit Sensor
7. Duplex Unit Open Switch

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Inverter | Drives the inverter roller. | 3 |
| M2 | Transport | Drives the upper and lower transport rollers. | 5 |
| Sensors |  |  |  |
| S1 | Entrance | Detects the trailing edge of the copy paper to turn on the inverter gate solenoid and turn on the inverter motor in reverse. Checks for misfeeds. | 1 |
| S2 | Exit | Checks for misfeeds. | 6 |
| Switches |  |  |  |
| SW1 | Duplex Unit Open | Detects whether the duplex unit is opened or not. | 7 |
| Solenoids |  |  |  |
| SOL1 | Inverter Gate | Controls the inverter gate. | 2 |
| PCBs |  |  |  |
| PCB1 | Main | Controls the duplex unit and communicates with the copier. | 4 |

### 1.5 DRIVE LAYOUT



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

## 2. DETAILED DESCRIPTIONS

### 2.1 BASIC OPERATION

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

## Longer than A4 sideways/LT sideways

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 sideways/LT sideways

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).



### 2.2 FEED IN AND EXIT MECHANISM



## When paper is fed into duplex unit:

As soon as the paper arrives from the interchange unit, it is sent to the inverter section [C] (the inverter gate solenoid [A] remains off during this process).
The inverter section can hold a sheet of paper up to A3 size. Because of this, the cover guide used in the previous model has become obsolete and has been eliminated from the design.

## Inversion and Exit:

Shortly after the trailing edge of the paper passes the entrance sensor [G], the inverter gate solenoid $[A]$ switches on and the inverter gate $[B]$ switches over to direct the paper to the exit path [E]. The inverter roller [D] then changes its rotation direction and the paper goes to the exit transport area [F]. The paper is then sent to the registration rollers in the main copier via the transport rollers.

## 3. REPLACEMENT AND ADJUSTMENT

### 3.1 COVER REMOVAL



1. Remove the duplex unit cover [A] (4 screws).

### 3.2 ENTRANCE SENSOR REPLACEMENT



1. Remove the duplex unit cover. (Refer to section 3.1.)
2. Remove the sensor holder $[A]$ ( 1 screw).
3. Replace the entrance sensor $[B]$ (1 connector, 1 screw).

### 3.3 EXIT SENSOR REPLACEMENT



1. Open the duplex unit $[A]$.
2. Remove the sensor bracket $[B]$ ( 1 screw).
3. Replace the exit sensor [C] (1 connector).

## BRIDGE UNIT <br> A897/B417

1. OVERALL MACHINE INFORMATION
1.1 SPECIFICATIONS

| 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: | $52 \mathrm{~g} / \mathrm{m}^{2} \sim 135 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 42 \mathrm{lb}$ |
| Power Source: | DC24 V, 5 V (from the copier/printer) |
| Dimensions (W x D $\times$ ) : | $413 \times 435 \times 126 \mathrm{~mm}$ |
| Weight | 3.0 kg ( 6.6 lbs ) |

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Upper Exit Roller
2. Tray Exit Sensor
3. Junction Gate
4. Cooling Fan
5. 1st Transport Roller
6. 2nd Transport Roller
7. 3rd Transport Roller
8. Left Exit Roller
9. Relay Sensor
10. Paper Tray

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Left Guide Switch
2. Right Guide Switch
3. Junction Gate Solenoid
4. Tray Exit Sensor
5. Cooling Fan Motor
6. Relay Sensor
7. Bridge Unit Drive Motor
8. Bridge Unit Control Board

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Cooling Fan | Cools the transport unit. | 5 |
| M2 | Bridge Unit Drive | Drives the bridge unit. | 7 |
| Sensors |  |  |  |
| S1 | Tray Exit | Checks for misfeeds. | 4 |
| S2 | Relay | Checks for misfeeds. | 6 |
| Switches |  |  |  |
| SW2 | Right Guide | Detects when the right guide is opened. | 2 |
| SW3 | Left Guide | Detects when the left guide is opened. | 1 |
| Solenoids |  |  |  |
| SOL1 | Junction Gate | Moves the junction gate to direct the paper to the upper tray (on top of the bridge unit) or to the finisher. | 3 |
| PCBs |  |  |  |
| PCB1 | Bridge Unit Control Board | Controls the bridge unit. | 8 |

### 1.5 DRIVE LAYOUT



1. Left Exit Roller
2. 2nd Transport Roller
3. 1st Transport Roller
4. Upper Exit Roller
5. 3rd Transport Roller
6. Bridge Unit Drive Motor

## 2. DETAILED DESCRIPTION

### 2.1 JUNCTION GATE MECHANISM



The junction gate $[B]$ directs any paper reaching the bridge unit to either the upper tray (on top of the bridge unit) or to the finisher, depending on which has been selected.

If the junction gate solenoid $[A]$ has been activated, the junction gate $[B]$ points downward and directs the paper to the upper tray [D] (dotted line path in illustration). When the solenoid is off, the junction gate points upward and the paper is fed out to the finisher [C] by the transport and exit rollers (solid line).

## 3. REPLACEMENT AND ADJUSTMENT

NOTE: When taking apart the bridge unit, first take the unit out of the copier.

### 3.1 BRIDGE UNIT DRIVE MOTOR REPLACEMENT



1. Remove the bridge unit from the copier. (See the Installation Procedure in the base copier manual.)
2. Remove the rear cover [C] (2 screws).
3. Remove the bridge unit drive motor [D] (2 screws, 1 connector).

### 3.2 TRAY EXIT SENSOR REPLACEMENT



1. Remove the bridge unit from the copier. (See the Installation Procedure in the base copier manual.)
2. Remove the rear cover (2 screws). See Bridge Unit Drive Motor Replacement.
3. Remove the paper tray [A].
4. Remove the exit guide $[B]$ (2 screws).
5. Remove the tray exit sensor [C] (1 connector).

### 3.3 RELAY SENSOR REPLACEMENT



1. Remove the bridge unit from the copier. (See the Installation Procedure in the base copier manual.)
2. Stand the bridge unit up as shown in the illustration and remove the sensor [D].

## 1,000-SHEET FINISHER B408

## 1. REPLACEMENT AND ADJUSTMENT <br> 1.1 MAIN PCB



1. Rear cover $[A]\left(\mathcal{S}^{2} \times 2\right)$


### 1.2 STAPLER UNIT

1. Side cover $[A]\left(\hat{S}^{2} \times 2\right)$
2. Open exit guide plate $[B]$
3. Upper side cover $[C](\hat{\xi} \times 2)$
4. Front cover support plate [D] ( $\mathrm{F}^{\mathrm{B}} \times 1$ )
5. Front cover [E]
6. Front inner cover [F] ( ${ }^{-1} \times 2$ )
7. Harness [G]
8. Unhook the spring $[\mathrm{H}]$
9. Turn the stapler unit [I] and take it out.
10. Bracket [J] ( $\mathrm{S}_{\mathrm{E}} \times 2$ )


### 1.3 MOTORS

### 1.3.1 SHIFT MOTOR

1. Rear cover (-1.1)
2. Shift motor $[A]\left(\mathcal{S}^{2} \times 2\right.$, 気 $\left.{ }^{\|} \times 1\right)$


### 1.3.2 STAPLER MOTOR

1. Rear cover (-1.1)
2. Stapler motor $[B]\left(\mathcal{F}^{3} \times 2\right.$, $\mathrm{E}_{\mathrm{E}}^{\mathrm{E}} \times 1$ )


### 1.3.3 UPPER TRANSPORT MOTOR AND EXIT MOTOR

1. Rear cover (-1.1)
2. Motor assembly [C] (
3. Upper transport motor [D] (
4. Exit motor $[E](\hat{\xi} \times 4)$


MOTORS

### 1.3.4 LOWER TRANSPORT MOTOR

1. Main PCB (-1.1)
2. Lower transport motor $[A]\left(\mathcal{S}^{2} \times 2\right.$, 気 ${ }^{\|} \times$ 1)


### 1.4 MOTORS AND SENSORS

### 1.4.1 PREPARATION

1. Front cover and inner cover (-1.2)


2. Shift tray $[B]\left(\begin{array}{c}\text { 舟 } \times 1)\end{array}\right.$
3. Lower side cover [C] (
4. Loosen the 2 screws [D].
5. Lower the lower tray guide plate [E].
6. Guide plate $[F](\hat{\xi} \times 4)$
[E]

[F]


### 1.4.2 STACK HEIGHT SENSOR

1. Stack height sensor assembly $[A](\hat{\xi} x$
1) 
2. Stack height sensor $[\mathrm{B}]\left(⿷^{\|} \times 1\right)$


### 1.4.3 STAPLER TRAY PAPER SENSOR

1. Stapler tray paper sensor [C] (E』ll $\times 1$ )


### 1.4.4 LOWER TRAY LIFT MOTOR

1. Lower tray lift motor [D] (


### 1.4.5 STACK FEED-OUT MOTOR




## 2. TROUBLESHOOTING

### 2.1 JAM DETECTION

| Mode |  | Jam | Content |
| :---: | :---: | :--- | :--- |
| Shift | Staple |  |  |
| $\checkmark$ | $\checkmark$ | Entrance sensor: <br> On check | The entrance sensor does not turn on within <br> the normal time after the main machine exit <br> sensor turns on |
| $\checkmark$ | $\checkmark$ | Entrance sensor: <br> Off check | The entrance sensor does not turn off within <br> the normal time after it turns on. |
| $\checkmark$ |  | Lower tray exit <br> sensor: On check | The lower tray exit sensor does not turn on <br> within the normal time after the entrance <br> sensor turns off. |
| $\checkmark$ |  | Tray exit sensor: <br> Off check | The tray exit sensor does not turn off within <br> the normal time after it turns on. |
|  | $\checkmark$ | Stapler tray <br> entrance sensor: <br> On check | The stapler tray entrance sensor does not <br> switch on within the normal time after the <br> entrance sensor switched on. |
|  | $\checkmark$ | Stapler tray <br> entrance sensor: <br> Off check | The staple tray entrance sensor does not <br> turn off within the normal time after it turns <br> on. |
|  | $\checkmark$ | Lower tray exit <br> sensor: <br> On check | The lower exit sensor does not turn on after <br> the feed-out pawl feeds out the outputs. |

## 3. SERVICE TABLES

### 3.1 DIP SWITCH SETTINGS

The DIP switch should not be set to any combination other than those described in the table below.

| SW100 |  | Description |  |
| :--- | :--- | :--- | :---: |
| $\mathbf{1}$ | $\mathbf{2}$ |  |  |
| 0 | 0 | Normal operation mode (Default) |  |
| 1 | 0 | Packing mode. |  |

- Before packing the machine, do the following: Set switch 1 to 1 then back to zero. The lower tray moves to the lowest position. Then turn off the main switch.
- After unpacking the machine, do the following: After turning the main switch back on, the lower tray returns to home position automatically.


## 4. DETAILED DESCRIPTIONS

### 4.1 GENERAL LAYOUT



1. Upper Tray
2. Upper Tray Exit Roller
3. Entrance Roller
4. Tray Junction Gate
5. Upper Transport Roller
6. Stapler Junction Gate
7. Lower Transport Rollers
8. Stapler
9. Stack Feed-out Belt
10. Positioning Roller
11. Shift Roller
12. Lower Tray
13. Lower Tray Exit Roller

### 4.2 ELECTRICAL COMPONENT LAYOUT



1. Upper Cover Switch
2. Paper Limit Sensor
3. Entrance Sensor
4. Exit Guide Plate Motor
5. Exit Guide Plate HP Sensor
6. Front Door Safety Switch
7. Stack Height Sensor
8. Lower Tray Exit Sensor
9. Lower Tray Upper Limit Switch
10. Shift HP Sensor
11. Shift Motor
12. Jogger Fence HP Sensor
13. Positioning Roller Solenoid
14. Stapler HP Sensor
15. Stapler Tray Entrance Sensor
16. Stapler Tray Paper Sensor
17. Stapler Hammer Motor
18. Staple Sheet Sensor
19. Stack Feed-out Belt HP Sensor
20. Stapler Rotation HP Sensor
21. Staple Sensor

## ELECTRICAL COMPONENT LAYOUT


22. Tray Junction Gate Solenoid
23. Lower Tray Lift Motor
24. Lower Tray Lower Limit Sensor
25. Stapler Motor
26. Jogger Fence Motor
27. Stack Feed-out Motor
28. Main Board
29. Lower Transport Motor
30. Stapler Junction Gate Solenoid
31. Exit Motor
32. Upper Transport Motor

### 4.3 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Upper Transport | Drives the entrance roller and upper transport rollers. | 32 |
| M2 | Lower Transport | Drives the lower transport rollers and positioning roller. | 29 |
| M3 | Jogger Fence | Drives the jogger fences. | 26 |
| M4 | Staple Hammer | Drives the staple hammer. | 17 |
| M5 | Stack Feed-out | Drives the stack feed-out belt. | 27 |
| M6 | Exit Guide Plate | Opens and closes the exit guide plate. | 4 |
| M7 | Exit | Drives the exit roller. | 31 |
| M8 | Lower Tray Lift | Moves the lower tray up or down. | 23 |
| M9 | Shift | Moves the shift roller from side to side. | 11 |
| M10 | Stapler | Moves the stapler unit from side to side. | 25 |
| Sensors |  |  |  |
| S1 | Entrance | Detects copy paper entering the finisher and checks for misfeeds. | 3 |
| S2 | Paper Limit | Detects when the paper stack height in the upper tray is at its limit. | 2 |
| S3 | Jogger Fence HP | Detects when the jogger fence is at home position. | 12 |
| S4 | Shift HP | Detects when the shift roller is at home position. | 10 |
| S5 | Stack Feed-out Belt HP | Detects when the stack feed-out belt is at home position. | 19 |
| S6 | Stapler HP | Detects when the stapler is at home position. | 14 |
| S7 | Exit Guide Plate HP | Detects when the exit guide plate is at home position. | 5 |
| S8 | Stapler Tray Entrance | Detects copy paper entering the stapler tray and checks for misfeeds. | 15 |
| S9 | Lower Tray Exit | Checks for misfeeds. | 8 |
| S10 | Stack Height | Detects the top of the copy paper stack. | 7 |
| S11 | Lower Tray Lower Limit | Detects when lower tray is at its lower limit position. | 24 |
| S12 | Stapler Tray Paper | Detects when there is copy paper in the stapler tray. | 16 |
| S13 | Staple Sheet | Detects the leading edge of the staple sheet. | 18 |
| S14 | Stapler Rotation HP | Detects when the staple hammer is at home position. | 20 |
| S15 | Staple | Detects whether there are staples in the staple cartridge. | 21 |
| Solenoids |  |  |  |
| SOL1 | Tray Junction Gate | Drives the tray junction gate. | 22 |
| SOL2 | Stapler Junction Gate | Drives the stapler junction gate. | 30 |

## ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :--- | :--- | :---: |
| SOL3 | Positioning <br> Roller | Moves the positioning roller. | 13 |
| Switches |  |  | 9 |
| SW1 | Lower Tray <br> Upper Limit | Detects when lower tray is at its upper limit <br> position. | Cuts the dc power when the front door is <br> opened. |
| SW2 | Front Door <br> Safety | Cuts the dc power when the upper cover is <br> opened. | 1 |
| SW3 | Upper Cover | 28 |  |
| PCBs |  | Controls the finisher and communicates with the <br> copier/printer. | 28 |
| PCB1 | Main |  |  |

### 4.4 DRIVE LAYOUT



1. Exit Motor
2. Upper Transport Motor
3. Lower Transport Motor

4. Shift Motor
5. Exit Guide Plate Motor
6. Lower Tray Lift Motor

7. Stack Feed-out Motor
8. Jogger Motor
9. Stapler Motor

### 4.5 JUNCTION GATES



Depending on the finishing mode, the copies are directed up, straight through, or down by the combination of the tray junction gate [A] and stapler junction gate [B]. These gates are controlled by the tray junction gate solenoid [C] and stapler junction gate solenoid [D].

## Upper tray mode

The tray junction gate solenoid remains off. The copies go up to the upper tray.

## Sort/stack mode

The tray junction gate solenoid turns on and the stapler junction gate solenoid remains off. The copies are sent to the lower tray directly.

## Staple mode

The tray junction gate solenoid and the stapler junction gate solenoid both turn on. The copies go down to the jogger unit.

### 4.6 UPPER TRAY



When the paper limit sensor [A] switches on during feed-out for each of three consecutive sheets of paper, paper overflow is detected.

### 4.7 LOWER TRAY UP/DOWN MECHANISMS



The vertical position of the lower tray [ A ] depends on the height of the copied paper stack on the lower tray. The stack height sensor feeler $[B]$ contacts the top of the stack, and the lower tray lift motor [C] controls the tray height.
When the lower tray reaches its lowest possible position, the actuator [D] turns on the lower tray lower limit sensor [E], and copying stops.

## Tray Up

When the copy paper on the tray is removed, the stack height sensor turns off and the tray lifts up. Then, the tray stops when the sensor turns on again (the tray pushes up the feeler).

## Sort/stack Mode (Tray Down)

Every five sheets of paper, the tray goes down until the sensor turns off again.
Then, it goes up until the sensor is on again.

## Staple Mode (Tray Down)

After a stapled copy is fed out, the tray goes up for 220 ms and stops for 300 ms . Then, it goes down for 1 second, waits for 500 ms , then goes up until the sensor turns on.

### 4.8 PAPER SHIFT MECHANISM



In the sort/stack mode, the shift roller [A] moves from side to side to separate the sets of copies.
The horizontal position of the shift roller is controlled by the shift motor [B] and the shift gear disk [C]. After the trailing edge of the copy passes the upper transport roller, the shift motor turns on, driving the shift gear disk and the link [D].
After the paper is delivered to the lower tray [E], the shift roller moves to the HP, which is detected by the shift HP sensor [F]. Then, when the trailing edge of the next copy passes the upper transport roller, the shift roller shifts again. This operation is done every sheet.
When the trailing edge of each page in the next set of copies passes the upper transport roller, the shift roller shifts in the opposite direction.

### 4.9 JOGGER UNIT PAPER POSITIONING MECHANISM


[B]


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 stapler tray entrance sensor [B] turns off, and the positioning roller [C] pushes the copy against the bottom of the stack stopper [D].

For the horizontal paper alignment, the jogger front fence [E] and the rear fence [F] move to the waiting position, which is 18 mm away from the side of the paper. When aligning the paper vertically, the jogger fence moves in 14 mm from the waiting position. After the vertical position has been aligned, the jogger fence pushes the paper 4 mm against the rear fence to align the paper horizontally. Then the jogger fence moves back to the previous position.

## EXIT GUIDE PLATE

### 4.10 EXIT GUIDE PLATE



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 to make a gap between the exit rollers. This operation is done for all paper sizes, but is only needed for the larger sizes.
The exit guide plate motor $[\mathrm{B}]$ and exit roller release cam [C] control the exit guide plate movement. When the exit guide plate motor starts, the cam turns and the exit guide plate moves up. 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 [D] turns on, the motor stops.

### 4.11 STAPLER MECHANISM



The staple hammer motor [A] drives the staple hammer.
The staple sheet sensor [B] detects the leading edge of the staple sheet at the stapling position to prevent the hammer from operating if there are no staples at the stapling position.
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. The stapler sensor [C] detects this.
The stapler rotation HP sensor [D] checks whether the staple hammer mechanism returns to home position after each stack has been stapled.
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 $[\mathrm{E}]$. Therefore, the jammed staple can be removed easily after pulling out the staple cartridge.

### 4.12 STAPLER UNIT MOVEMENT MECHANISM



The stapler motor moves the stapler [A] from side to side. After the start key is pressed, the stapler moves from its home position to the stapling position.
If two-staple-position mode is selected, the stapler moves to the front stapling position first, then moves to the rear stapling position. However, for the next copy set, it staples in the reverse order (at the rear side first, then at the front side).
After the job is completed, the stapler moves back to its home position. The stapler HP sensor [B] detects this.

### 4.13 PAPER FEED-OUT MECHANISM



After the copies have been stapled, the stack feed-out motor [A] starts. The pawl [B] on the stack feed-out belt [C] transports the set of stapled copies up and feeds it to the shift roller. The shift roller takes over stack feed-out after the leading edge reaches this roller.

Just before the stapled stack passes through the lower tray exit sensor, the stack-feed-out motor turns off until the shift rollers have completely fed the stack out to the lower tray. Then, the stack-feed-out motor turns on again until the pawl [B] actuates the stack feed-out belt home position sensor [D].

## 5. OVERALL MACHINE INFORMATION

### 5.1 SPECIFICATIONS

## Upper Tray

Paper Size:

Power Weight:
Paper Capacity:
A3 to A6
DLT to HLT
60 to $157 \mathrm{~g} / \mathrm{m}^{2}$ (16 to 42 lb )
250 sheets (A4 sideways / LT sideways or smaller: 80 $\mathrm{g} / \mathrm{m}^{2}$, 201b)
50 sheets (A3, B4, DLT, LG: $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )

## Lower Tray

Paper Size:

Paper Weight:

Stapler Capacity:
No staple mode:
A3 to B5
DLT to HLT
Staple mode:
A3, B4, A4, B5
DLT to LT
No staple mode: $60 \sim 157 \mathrm{~g} / \mathrm{m}^{2}(16 \sim 42 \mathrm{lb})$
Staple mode: $\quad 64 \sim 90 \mathrm{~g} / \mathrm{m}^{2}(17 \sim 24 \mathrm{lb})$
30 sheets (A3, B4, DLT, LG)
50 sheets (A4, B5 sideways, LT)
Paper Capacity:
No staple mode:
1,000 sheets (A4/LT or smaller: $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )
500 sheets (A3, B4, DLT, LG: $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )
Staple mode:
( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$, number of sets)

| Set Size | $\mathbf{2}$ to $\mathbf{9}$ | $\mathbf{1 0}$ to $\mathbf{5 0}$ |  |
| :--- | :--- | :--- | :--- |
|  |  | 10 to 30 | 31 to 50 |
| Size | A4/LT sideways <br> B5 sideways | 100 | 100 to 20 |
| A4/LT Lengthwise |  | 50 to 10 | 50 to 10 |
| A3, B4, DLT, LG | 50 | 50 to 10 | - |

Staple positions: 1 Staple: 2 positions (Front, Rear)
2 Staples: 2 positions (Upper, Left)
Staple Replenishment: Cartridge (5,000 staples/cartridge)
Power Source:
Power Consumption:
Weight:
Dimensions (W x D x H):
$24 \mathrm{Vdc}, 5 \mathrm{Vdc}$ (from the copier/printer)
50 W
25 kg (55.2 lbs)
$527 \times 520 \times 790 \mathrm{~mm}\left(20.8^{\prime \prime} \times 20.5^{\prime \prime} \times 31.1^{\prime \prime}\right)$

## 500-SHEET FINISHER G302/B442

## 1. REPLACEMENT AND ADJUSTMENT

### 1.1 EXTERIOR

NOTE: This manual uses several symbols. The meanings for these symbols are as follows:

\author{

- : See or refer to <br> 
}

Front cover
[A]: : Front cover (


## Rear cover

[A]: Rear cover (1)


## EXTERIOR

## Top cover

[A]: Top cover (2 links)

## Front lower guide


[A]: Output tray (欧2)
[B]: Front lower guide (2)
NOTE: 1) When re-attaching the lower guide, be sure that it is not in contact with the exit lower guide and that the exit lower guide moves smoothly.
2) Make sure that the blue and black cables are in the correct position, as engraved on the inside of the front lower guide.

## Right cover

[A]: Grounding plate ( $\mathrm{B}_{\mathrm{B}} 1$ )
[B]: Right cover (


### 1.2 ENTRANCE UPPER GUIDE / PAPER EXIT UNIT



- Front, rear, and top covers and front lower guide (1.1 Exterior)
[A]: Entrance upper guide (
[B]: Paddle gear spring
[C]: Paddle gear (级1)
[D]: Paddle gear holder
[E]: Bushing (<<31)
[F]: Paper exit unit holder (1)
[G]: Rear paper exit unit holder (1)
[H]: Exit unit


NOTE: Keep the paper exit unit stays in the upper position. Rotate the paddle roller into the position shown in the illustration [a]. Then, insert the paddle gear, making sure that the pawl on the gear's outer frame is resting on the clutch link [b].

### 1.3 ENTRANCE LOWER GUIDE

- Entrance upper guide (1.2 Entrance upper guide / Exit unit)
- Exit unit ( 1.2 Entrance upper guide / Exit unit)
[A]: Release tension bracket (
[B]: Reverse roller gear bracket ( 2 )
[C]: Timing belt
[D]: Entrance lower guide
NOTE: When re-assembling the tension bracket, rotate the main motor counter clockwise to tighten the



### 1.4 PAPER EXIT UNIT GEAR / PADDLE ROLLER SOLENOID

- Front cover (1.1 Exterior)
[A]: Gear bracket ( 3 )
[B]: Paper exit unit gear
[C]: Paddle roller solenoid (䉆1)



### 1.5 STAPLER UNIT

- Rear cover (-1.1 Exterior)
[A]: Stapler unit bracket (
[B]: Stapler unit (3)



### 1.6 JOGGER TRAY UNIT

- Entrance upper guide and paper exit unit (-1.2 Entrance upper guide / paper exit unit)
- Entrance lower guide (-1.2 Entrance lower guide)
- Paper exit unit gear and Paddle roller solenoid (1.4 Paper exit unit gear / Paddle roller solenoid)
- Stapler unit ( 1.5 Stapler unit)
[A]: Jogger tray unit holders (

NOTE: Be sure to connect the black cable to the paper exit sensor and the blue one to the jogger home position sensor.



### 1.7 PAPER EXIT SENSOR FEELER

- Jogger tray unit (-1.6 Jogger tray unit)
- Jogger motor (-1.9 Jogger motor)
[A]: Paper exit sensor feeler



### 1.8 MAIN MOTOR

- Right cover (-1.1 Exterior)
[A]: Release tension bracket (
[B]: Main motor (


JOGGER MOTOR

### 1.9 JOGGER MOTOR

- Front lower guide (-1.1 Exterior)
[A]: Jogger motor (



### 1.10 CONTROL BOARD

- Front lower guide (-1.1 Exterior)
[A]: Control board (领1, 気 12 )



## 1．11 OUTPUT TRAY UNIT



［A］：Output tray cover（ ${ }^{(2)}$ ）
［B］：Tray holder（ ${ }^{1} 1$ ）
［C］：Links
［D］：Connector cover
［E］：Output tray motor link unit（ ${ }^{(1)} 1$ ）
［F］：Rear cover（ ${ }^{1} 1$ ）
［G］：Output tray motor（ $⿷ 匚 一 亅 耳_{\text {ll } 1) ~}^{\text {1 }}$

NOTE：When re－attaching the motor link unit，the arrows on each of the gears need to face each other as shown in the illustration．


## 2. DETAILED DESCRIPTIONS

### 2.1 OVERALL MACHINE INFORMATION

### 2.1.1 COMPONENT LAYOUT

## Mechanical component layout



1. Output tray
2. Lower entrance guide
3. Stack height detection lever
4. Upper entrance guide
5. Paper exit roller
6. Paper exit unit
7. Jogger tray
8. Paddle roller
9. Reverse roller
10. Lower exit guide

## Drive layout



1. Main motor
2. Exit roller timing belt
3. Main motor timing belt
4. Output tray motor
5. Output tray link gears
6. Paper exit unit drive gear
7. Reverse roller
8. Paper exit roller

OVERALL MACHINE INFORMATION

### 2.1.2 ELECTRICAL COMPONENT DESCRIPTIONS



See the next page for the component description table.


### 2.2 DETAILED SECTION DESCRIPTIONS

### 2.2.1 OUTPUT TRAY MECHANISM

## Stack height detection



Stack height detection lever [A]: Driven by stack height lever solenoid [B].
Two sensors detect the height of the stack in the output tray: the stack height [C] and lever [D] sensors.

| Stack height <br> sensor | Lever sensor | Status |
| :---: | :---: | :--- |
| Off | Off | The stack height is below the target. The output tray is <br> lifted to the target position. |
| Off | On | Target position |
| On | On | The stack height is more the target. The output tray is <br> lowered to the target position. |
| On | Off | The stack height detection lever is at home position. |

Off: Actuator not in sensor
At the start of a print job, the solenoid turns off. The stack height detection lever comes down, to detect the current stack level.

When a sheet of paper is being fed out, the solenoid turns on and the lever goes back up to home position (inside the unit).

After paper has been fed out, the solenoid turns on again, and the lever detects the level of the stack.

## Output tray up/down mechanism



## Overview

The output tray motor $[\mathrm{A}]$ lifts/lowers the tray if the stack height is not at the target position.
Gears $[B]$ and $[C]$ keep the angle of the tray constant at any tray position.

## Output Tray Downward Movement

The top of the paper stack is checked after every page (or set of pages) has been fed out. If the top of the stack is higher than the target level, the output tray motor moves the tray down.
When the stack near-limit sensor [D] detects the actuator on gear [C], a stack nearlimit signal is transferred to the main frame. The tray cannot move any lower. The next time the top of the stack height is above the target level, printing stops.

## Output Tray Upward Movement

If paper is removed from the stack, the top of the stack will be lower than the target level, and the output tray motor moves the tray up.
When the tray upper limit sensor [ E ] detects the actuator on gear [B], the tray cannot be moved up any more, so the motor stops.

### 2.2.2 PAPER FEED

## Overview

The following paper feed out modes can be selected at the printer driver.

| Mode | Description |
| :---: | :--- |
| Straight feed out mode | Paper is fed directly to the output tray without shifting or stapling. |
| Shift sorting mode | Alternate sets are shifted before being fed to the output tray. |
| Stapling mode | All sets are shifted and stapled, then fed to the output tray. |

## Straight feed out mode

Before the job, the exit unit $[A]$ is up, and the exit unit gear solenoid $[B]$ is on, pulling lever [C] away from the exit unit gear [D].
At the start of the job, the stack height detection lever detects the top of the stack. The tray moves up or down if the top of the stack is not at the correct level.

[B]


When the paper exit sensor in the main frame turns on, the finisher main motor starts. It drives the exit unit gear [D] through idle gear [E]. The gear pulls paper exit unit [A] down, using the paper exit link [F]. The link also moves the paper exit roller [H] up through the exit roller drive gear [G].
When the motor starts, the solenoid switches off and a spring pushes lever [C] into contact with the exit unit gear [D].

When a part of the exit unit gear without threads [I] faces the idle gear, the gear stops turning (see the left-hand diagram). The lever [C] catches a peg on the exit unit gear, to make sure that it stops at the correct position. The paper exit rollers $[\mathrm{H}]$ now contact each other and the main motor feeds out the paper.
When the last page has been fed out, the solenoid turns on to pull the lever away from the gear. The gear starts turning, to lift the exit unit to the standby position.
When the other part of the exit unit gear without threads [J] faces the idle gear, the exit unit gear stops. Then, the main motor stops and the solenoid turns off.

## Shift sorting mode



At the start of the job, and for odd numbered sets of copies, the mechanism is the same as the straight feed out mode. However, even numbered sets are fed back to the jogger tray, which shifts the sets to one side before feeding them out.

This section describes what happens for even-numbered sets (sets 2, 4, 6 etc) of the job.

A short time after the entrance sensor [A] detects the first page of the set, the paper exit unit solenoid turns on to restart the rotation of the paper exit unit gear, raising the paper exit unit to the standby position. It stays there until after the last page of the set.
The paper cannot feed out, so it drops into the jogger tray [B]. The paddle roller solenoid [C] turns on and the paddle roller [D] feeds the paper to the reverse roller [E]. The reverse roller feeds the paper to the end fence [F] of the jogger tray.


After the paper reaches the end fence $[A]$, the jogger fence $[B]$ shifts the paper across. The jogger motor [C] drives the jogger fence. The home position sensor [D] detects when the jogger fence has returned to home position.
When the next set begins, the paper exit unit moves down, and the machine operates the same way as straight feed out mode. At this time, the entire set in the jogger tray is fed out at the same time as the first page of the next set. However, the set coming from the jogger tray has been shifted to one side.
If the last set is an even-numbered set, the paper exit unit must be pulled down to feed the final set out of the jogger tray. Then the exit unit moves back up to the standby position.

The capacity of the jogger tray is 30 sheets. If the set contains more than 30 sheets, the machine feeds out the first 30 from the jogger tray, then continues with the rest of the set, using the jogger tray.

## Stapling mode

[B]

[G]



The stapler is attached to the jogger tray, so all sets go to the jogger tray.
After all pages of a set have entered the jogger tray and been shifted across, the paper exit link [A] pulls the paper exit unit [B] down until knob [C] on the exit unit pushes the link lever [D] for the exit unit switch [E]. This turns on the exit unit switch. When this switch is on, dc is supplied to the stapler unit [F] and the main motor is turned off.

The exit unit switch is activated when the exit unit is pulled part-way down. After stapling the set of prints, the paper exit unit is pulled down again until the unit comes in contact with the paper exit roller [G], and the stapled set is fed out.

### 2.2.3 JAM CONDITIONS

|  | Sensors | Conditions |
| :--- | :---: | :--- |
| Remaining paper detection | Entrance <br> Exit | Either the entrance or exit sensor detects <br> paper just after the unit is initialized. |
| Non-feed at the entrance | Entrance | The entrance sensor is not activated within a <br> certain period after the paper exit sensor <br> detects paper. |
| Jamming at the entrance | Entrance | The entrance sensor is not de-activated after <br> paper is fed 1.3 times the length of the <br> paper. |
| Non-feed inside the unit <br> (Straight feed out mode only) | Exit | The exit sensor is not activated within a <br> certain period after the entrance sensor <br> detects paper. |
| Jamming at the exit | Exit | The exit sensor is not de-activated after <br> paper is fed for a certain period. |
| Jogger tray | Exit | The exit sensor is de-activated during paper <br> shifting or stapling. |

### 2.2.4 ERROR DETECTION

|  | Conditions |
| :--- | :--- |
| Jogger motor error | Jogger home position sensor does not shut off after jogger <br> motor starts. |
| Jogger motor home position <br> detection error | Jogger home position sensor does not turn on after paper <br> shifting. |
| Stapler error | Stapler home position sensor (inside stapler unit) does not <br> turn on after stapling. |
| Output tray upper limit error | Tray upper limit sensor is activated. |
| Output tray motor error | The output tray is away from the target position for more <br> than 10 seconds. |
| Stack height detection error | The stack height detection lever does not return to its home <br> position before going to detect the stack height. |

NOTE: The above errors are indicated as "Finisher jam" at the first occurrence. If the same error happens again in the next job, "finisher error" is indicated.

## 3. OVERALL MACHINE INFORMATION

### 3.1 SPECIFICATIONS

| Paper Size: | A3, B4, A4, B5 sideways (Metric) DLT, LG, LT (Inch) |
| :---: | :---: |
| Paper Weight | $52 \sim 128 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 34 \mathrm{lb}$. |
| Staple Capacity: | 20 sheets (A3, B4, DLT, LG : $80 \mathrm{~g} / \mathrm{m}^{2}, 20$ 30 sheets (A4, B5 sideways, LT : $80 \mathrm{~g} / \mathrm{m}^{2}$, |
| Stack Capacity (Maximum): | 500 sheets (A4/LT or smaller: $80 \mathrm{~g} / \mathrm{m}^{2}, 20$ 250 sheets (A3, B4, DLT and LG: $80 \mathrm{~g} / \mathrm{m}^{2}$, |
| Stapling Positions: | 1 |
| Staple Replenishment: | Cartridge (3,000 staples/cartridge) |
| Power Source: | 24 V DC, 5 V DC (from the copier/printer) |
| Power Consumption: | 48 W |
| Weight: | 8.3 kg (18.4 lbs.) |
| Dimensions (W x D $\times$ H): | $350 \times 490 \times 230 \mathrm{~mm}$ |

# PRINTER/SCANNER CONTROLLERS B453/B461 

## 1. INSTALLATION

### 1.1 INSTALLATION REQUIREMENTS

Please refer to section 3 of the main unit service manual.

### 1.2 PRINTER/SCANNER INSTALLATION

## Accessory Check

Check the accessories in the box against the following list:

| No. | Description | Q'ty | Note |
| :---: | :--- | :---: | :--- |
| 1 | Key Top - Copy | 1 |  |
| 2 | Key Top - Printer | 1 |  |
| 3 | Key Top - Scanner | 1 | Included only in the B453 (printer <br> and scanner) model |
| 4 | CD ROM - Printer | 1 |  |
| 5 | CD ROM - Scanner | 1 | Included only in the B453 (printer <br> and scanner) model |
| 6 | CD ROM - Operation Manual | 1 |  |
| 7 | Operating Instructions | 1 |  |
| 8 | FCC Label | 1 | Included only in the USA models. |

Printer, Printer/Scanner Controller Installation

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

NOTE: 1) When installing this unit, the HDD and/or 64 MB memory should be installed. For the HDD installation, please refer to section 3.14 in main machine manual.
2) The NIB option is required when the printer/scanner controller is installed.

[B]

[C]

1. Remove the rear cover [A] (4 screws).

NOTE: When the paper tray unit or LCT is installed, remove the connector cover [B] (1 screw) and disconnect the cable to prevent this cover from being damaged.
2. Remove the controller board cover [C] (8 screws).
3. Remove the left rear cover [D] (1 screw) and cover(s) for appropriate units to be installed.
[E]: NIB
[F]: IEEE1394
[G]: IEEE1284

4. Install the printer or printer/scanner controller ROM DIMM $[A]$ on the controller board.
NOTE: Use the slot indicated in the diagram.
5. Install the memory 64 MB DIMM $[B]$ onto the controller board.

6. Replace the key top(s) for the appropriate unit(s) to be installed.

A: Copy
B: Printer
C: Scanner
7. Attach the FCC label [D] to the controller panel board, aligned with the slot [E] so the label is hidden when the left rear cover is replaced. NOTE: This step is required only in the USA models.
7 Replace the left rear cover.
8 Replace the controller board cover and rear cover.

### 1.3 PRINTER OPTIONS

### 1.3.1 POSTSCRIPT UNIT (B462)

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

NOTE: To install the Postscript option, the printer option (B453 or B461) must be installed first. Please refer to section 1.2 for details of the printer/scanner installation procedure.


1. Remove the rear cover and controller board cover. Refer to steps 1 and 2 of the printer/scanner installation section.
2. Install the Postscript DIMM [A] on the controller board. NOTE: Use the slot indicated in the diagram.
3. Replace the controller board cover and rear cover.

### 1.3.2 NIB (G335)

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

NOTE: To install the NIB option, the printer option (B453 or B461) must be installed first. Please refer to section 1.2 for details of the printer/scanner installation procedure.
The NIB and the IEEE1394 interface board cannot both be installed in the same machine.


1. Remove the rear cover and controller board cover. Refer to steps 1 and 2 of the printer/scanner installation section.
2. Attach the NIB $[A]$ to the controller board (2 screws).
3. Replace the controller board cover and rear cover.

### 1.3.3 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 (B453 or B461) must be installed first. Please refer to section 1.2 for details of the printer/scanner installation procedure.
The NIB and the IEEE1394 interface board cannot both be installed in the same machine. If the NIB is installed, the NIB should be removed.


1. Remove the rear cover and controller board cover. Refer to steps 1 and 2 of the printer/scanner installation section.
2. Attach the IEEE1394 board [A] to the controller board (2 screws).
3. Attach the gasket [B] as shown. The attachment position is marked on the frame.
4. Replace the controller board cover and rear cover.

## CHECKING THE CONNECTIONS

### 1.4 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.

## 2. TROUBLESHOOTING

### 2.1 CONTROLLER ERRORS

Refer to section 7.1 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).

## 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.

> | $\boxed{\text { Never turn off the main power switch when the power LED is lit or flashing. }}$ |
| :--- |
| 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 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



Printer SP
Scanner SP

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.

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 4.1 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 4.2.7 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 7.2 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/NetworkS̄canner <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 / 5/1 step] |
|  | $2^{*}$ | MTF Filter Coefficient (Text / Binary / Sub scan) | As above, for sub scan [0-13/4/1 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. $[0-7 / 5 / 1 \text { step }]$ |
|  | 4* | MTF Filter Strength (Text / Binary / Sub scan) | As above, for sub scan [0-7/4/1 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 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> [ $0-255$ / $50 / 1$ step] |
|  | 8* | Contrast - Notch 7 (Text / Binary) | [0-255 / 49/1 step] |
|  | 9* | Threshold Level - Notch 7 (Text / Binary) | [0-255 / 111/1 step] |
|  | 10* | Brightness - Notch 6 (Text / Binary) | [0-255 / 50 / 1 step] |
|  | 11* | Contrast - Notch 6 (Text / Binary) | [0-255 / 49 / 1 step] |
|  | 12* | Threshold Level - Notch 6 (Text / Binary) | [0-255 / $107 / 1$ step] |
|  | 13* | $\begin{aligned} & \text { Brightness - Notch } 5 \\ & \text { (Text / Binary) } \end{aligned}$ | [0-255 / 50 / 1 step] |
|  | 14* | Contrast - Notch 5 (Text / Binary) | [0-255 / 49 / 1 step] |
|  | 15* | Threshold Level - Notch 5 (Text / Binary) | [0-255 / 103/1 step] |
|  | 16* | Brightness - Notch 4 (Text / Binary) | [0-255 / 50 / 1 step] |
|  | 17* | Contrast - Notch 4 (Text / Binary) | [0-255 / 49/1 step] |
|  | 18* | Threshold Level - Notch 4 (Text / Binary) | [0-255/99/1 step] |
|  | 19* | $\begin{aligned} & \text { Brightness - Notch } 3 \\ & \text { (Text / Binary) } \\ & \hline \hline \end{aligned}$ | [0-255/60/1 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. <br> [0-255 / 59 / 1 step] |
|  | 21* | Threshold Level - Notch 3 (Text / Binary) | [0-255 / 106 / 1 step] |
|  | 22* | Brightness - Notch 2 <br> (Text / Binary) | [0-255 / 50 / 1 step] |
|  | 23* | Contrast - Notch 2 (Text / Binary) | [0-255 / 49/1 step] |
|  | 24* | Threshold Level - Notch 2 (Text / Binary) | [0-255 / 86 / 1 step] |
|  | 25* | Brightness - Notch 1 (Text / Binary) | [0-255/190/1 step] |
|  | 26* | Contrast - Notch 1 (Text / Binary) | [0-255 / 190/1 step] |
|  | 27* | Threshold Level - Notch 1 (Text / Binary) | [0-255 / 150/1 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. <br> Select a higher number for a stronger filter. If this is " 0 ", the MTF filter is not applied. $[0-15 / 3 / 1 \text { step }]$ |
|  | 28* | MTF Filter Coefficient (Text/Photo / Binary / Sub scan) | As above, for sub scan [0-13/3/1 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 / 4 / 1 step] |
|  | 4* | MTF Filter Strength (Text/Photo / Binary / Sub scan) | As above, for sub scan [0-7/4/1 step] |
|  | 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. $\text { [0-255 / } 50 / 1 \text { step }]$ |
|  | 8* | Contrast - Notch 7 (Text/Photo / Binary) | [0-255 / 160/1 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) | [0-255/50/1 step] |
|  | 11* | Contrast - Notch 6 (Text/Photo / Binary) | [0-255 / 128/1 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) | [0-255/60 / 1 step] |
|  | 14* | Contrast - Notch 5 (Text/Photo / Binary) | [0-255 / 128 / 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) | [0-255/75/1 step] |
|  | 17* | Contrast - Notch 4 (Text/Photo / Binary) | [0-255 / 128 / 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 / 70 / 1 step] |
|  | 20* | Contrast - Notch 3 (Text/Photo / Binary) | [0-255 / 128/1 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 / 80 / 1 step] |
|  | 23* | Contrast - Notch 2 (Text/Photo / Binary) | [0-255 / 128/1 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. If this is " 0 ", the MTF filter is not applied. [0-15/0/1 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. $[0-7 / 0 / 1 \text { step }]$ |
|  | 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. $\text { [0-6 / } 6 / 1 \text { step }]$ |
|  | $7^{*}$ | 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. $\text { [0-255 / 78 / } 1 \text { step] }$ |
|  | 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 / 85/1 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) | [0-255/98/1 step] |
|  | 15* | Contrast - Notch 5 (Photo / Binary) | [0-255 / 128/1 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 / 141 / 1 step] |
|  | 21* | Contrast - Notch 3 (Photo / Binary) | [0-255 / 130 / 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 / 142 / 1 step] |
|  | 24* | Contrast - Notch 2 (Photo / Binary) | [0-255 / 131 / 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) | [0-255/143/1 step] |
|  | 27* | Contrast - Notch 1 (Photo / Binary) | [0-255 / 131 / 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. If this is " 0 ", the MTF filter is not applied [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. [0-6/0/1 step |


| SP2 | Mode Number |  | Function and [Setting] |
| :---: | :---: | :---: | :---: |
| 2005 | 7* | Brightness - Notch 7 (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* | Brightness - Notch 5 (Grayscale) | [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 (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. $\text { [5-95 / } 50 / 1 \text { step }]$ |


| 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 <br> Address | Sets the IP address for the delivery server. <br> $[000.000 .000 .000]$ |
| 8002 | $1^{*}$ | Delivery Re-try <br> (Interval) | Sets the delivery re-try interval. <br> $[60-999 / 300 \mathrm{~s} / 1 \mathrm{~s}$ step] |
|  | $2^{*}$ | Delivery Re-try <br> (Number of re-try) | Sets the number of delivery re-tries. <br> If this is "0", the machine will not re-try to send <br> an image to the delivery server. <br> $[0-99 / 3$ times / 1 time step] |
| $8003^{*}$ |  | ECabinet IP Address | Sets the IP address for the eCabinet. <br> $[000.000 .000 .000]$ |
| $8004^{*}$ | Network Error Display <br> Time | Selects the length of time that the network error <br> message for the scanner utilities is displayed. <br> If this is " ", the error message is displayed until <br> the error is solved. <br> [0-999 / 300 s / s step] |  |

### 3.4 FIRMWARE UPDATE PROCEDURE

Firmware updating procedure is described in section 4.3 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 (if installed)
- IEEE1394 interface (if installed)
- NVRAM
- HDD (if installed)
- Refer to section 7.1.2 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 7.1.2 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 $\triangle /$／⿴囗玉 printer settings．

## User Mode Tree

Printer Mode
（Printer Key pressed） $\longrightarrow$ View Sample Print Jobs


### 3.7.2 SCANNER USER PROGRAM MODE

Press the "User Tools/Counter $\Delta /$ /国 ", then select "Scanner Settings" to change scanner settings.

## User Mode Tree



## 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
- IEEE 1284 interface

OVERVIEW
Optional components:

- HDD: Used to store additional soft fonts. Also used for collation, locked print, sample print and form overlay
- PostScript3 DIMM
- Memory DIMM
- NIB
- IEEE1394 interface


### 4.2 CONTROLLER FUNCTIONS

### 4.2.1 SAMPLE PRINT

This feature requires the optional hard disk.
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 900 MB . 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 1,700 , including jobs using locked print and collation.


### 4.2.2 LOCKED PRINT

This feature requires the optional hard disk.
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 1,700 , including jobs using sample print and collation.
- Locked print uses the same hard disk partition as sample print and collation, which is 900 MB .


### 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.


### 4.2.6 DUPLEX PRINTING

Duplex printing is not available with 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 500 -sheet finisher or 1000 -sheet finisher is installed. The finishers have the following stapling positions.


- Depending on the paper orientation, the image may have to be rotated. The controller does the image rotation.
- There is a limit for the number of sheets that can be stapled. If a job has more than this number, it will not be stapled.


### 4.3 SCANNER FUNCTIONS

### 4.3.1 IMAGE PROCESSING FOR SCANNER MODE

The image processing for scanner mode is done in the IPU board. The IPU board 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 board 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 (This feature requires the optional hard disk)
3) Store and delivery (This feature requires the optional hard disk)

When selecting the delivery only mode, after image processing and image compression using TIFF (binary picture processing) or JPEG (grayscale processing), the controller creates a file which contains the destination and page information, then the controller sends the file to a server. The type of TIFF format used depends on the user's scanner settings.
When selecting the store only or the store and delivery mode, all images for the job are stored in the HDD. Then the controller creates a file and (store and delivery mode only) sends it 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 assignment |  |
| :---: | :---: |
| Pin 1 | Pin 4 |
| Pin 2 | Pin 3 |
| Pin 5 | Pin 6 |


| 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

## 1. GENERAL SPECIFICATIONS

### 1.1 PRINTER

| Printing Speed: | Maximum 22 ppm (A4/LT LEF): B022 |
| :---: | :---: |
|  | Maximum 27 ppm (A4/LT LEF): B027 model |
| Printer Languages: | PCL6/PCL5e <br> PostScript 3 (option) <br> RPCS (Refined Printing Command Stream) - an original Ricoh PDL) |
| Resolution: | $\begin{aligned} & 600 \mathrm{dpi} \text { (PCL 6/PCL5e/PS3/RPCS) } \\ & 400 \mathrm{dpi} \text { (PS3) } \\ & 300 \mathrm{dpi} \text { (PCL 6/PCL5e/PS3) } \end{aligned}$ |
| 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: | 96 MB required <br> (Standard 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 | $297 \times 420 \mathrm{~mm}$ | $Y^{\#} / Y^{\#}$ | 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 | $\mathrm{Y}^{\text {C }}$ | 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 | $8.5 \times 14^{\prime \prime}$ | 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: $100 \times 297 \mathrm{~mm}$ <br> Maximum: $148 \times 600 \mathrm{~mm}$ | 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 ~ 600 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 |  |

## SPECIFICATIONS

## 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 <br> $\mathbf{8 . 6}$ or later |
| :---: | :---: | :---: | :---: | :---: |
| 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 |
| :--- | :--- |
| $\begin{array}{l}\text { Agfa Font Manager } \\ \text { (Win 95/98/ME, NT4, 2000) }\end{array}$ | A font management utility with screen fonts for the printer. |
| $\begin{array}{l}\text { SmartNetMonitor for Admin } \\ \text { (Win 95/98/ME, NT4, 2000) }\end{array}$ | $\begin{array}{l}\text { A printer management utility for network administrators. NIB } \\ \text { setup utilities are also available. }\end{array}$ |
| $\begin{array}{l}\text { SmartNetMonitor for Client } \\ \text { (Win 95/98/ME, NT4, 2000) }\end{array}$ | $\begin{array}{l}\text { A printer management utility for client users. Peer-to-peer } \\ \text { printing utility and parallel/recovery printing functions are } \\ \text { included. }\end{array}$ |
| 1394 Utility (Win 2000) | A utility for removal IEEE 1394 printers. |
| DeskTopBinder V2 Lite | A utility for document management |
| (Win 95/98/ME, NT4, 2000) | PC LAN FAX driver |
| LAN-Fax M1 |  |
| (Win 95/98/ME, NT4, 2000) | A utility for PC LAN FAX. |
| Address Book |  |
| (Win 95/98/ME, NT4, 2000) |  |$)$| 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 (ROM DIMM) | B461 | 1 |  |
| Printer/Scanner Module (ROM DIMM) | B453 | 1 |  |
| Internal Options |  |  |  |
| PostScript3 | G462 | 2 |  |
| NIB | G574 | 3 | Cannot install the NIB and IEEE1394 board in the same machine. |
| IEEE1394 | G590 | 4 |  |
| Memory 32 MB | G578 | 5 | Used in common with the model B039. |
| Memory 64 MB | G579 |  |  |

FAX UNIT B418

## 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.

## ©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.

### 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 1027 INSTALLATION



## CAUTION

Before installing this option, do the following:

1. If the Printer or Printer/Scanner DIMM was previously installed, Do Not remove the installed DIMM and install the Fax DIMM. The Fax option is included on both the printer and Printer/Scanner DIMM.
2. Turn off the main switch and disconnect the power cord and the network cable.
3. Remove the small cover $[A]$ (1 rivet) and the rear cover [ $B$ ] (4 screws).
4. Attach the NCU unit [C] (4 screws) to the machine.
5. Remove the shield cover [D] (8 screws).
6. Attach the DIMM board (4 MB) [E] to slot 1 (CN7) on the controller board. (Refer to Caution Note 1)

7. Turn on the battery switch (SW1) [A] on the MBU board, then attach the FCU unit [B] ( 6 screws). Connect the cables [C], then clamp the cable at [D] as shown. Replace the rear cover and the small cover.
8. Remove parts [E], [G] and [J], then install parts [F], [H] and [I].
9. Attach the FCC decal $[K]$ and the serial number decal $[L]$ to the rear cover as shown. Then install the small cover [M] on the rear cover.
10. Attach the super G3 decal [ N$]$ as shown.

11. If the ADF has been installed, insert the stamp cartridge [A] into the ADF as shown.
12. Connect the telephone line to the "LINE" jack at the rear of the machine.
13. Plug in the machine and turn on the main power switch.

NOTE: The copier must be connected to a properly-grounded socket outlet.
12. Be sure to set the clock (date and time).
13. 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 7).

### 1.2 FAX UNIT OPTIONS

### 1.2.1 G3 INTERFACE UNIT TYPE 1027 INSTALLATION




## ©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. Turn off the main switch and disconnect the power cord and the network cable.
3. Remove the small cover [A] (1 rivet) and the rear cover [B] (4 screws). Then cut away the jack window [C].
4. Remove the NCU unit [D] (4 screws, 2 connectors)
5. Remove the NCU [E] from the NCU unit (4 screws). Connect cable [F] to the FCU.
If the G4 unit is not being installed at the same time, go to step 6 .


Do steps 4 and 5 only when installing the G4 unit at the same time.
4. Remove the G4 board [A] (2 screws), the bracket [C] (2 screws) and the ISDN connector [D] from the G4 unit [B].
5. Attach the G4 board [A] (2 screws), the bracket [C] (2 screws) and the ISDN connector [D] to the G3 unit [E] as shown.

6. Attach the G3 unit [A] to the machine ( 6 screws, 1 connector).
7. Connect cable [B] to the interface board and attach bracket [C] (1 screw). Then attach the NCU [D] (removed from the NCU unit in step 3) to the G3 unit (4 screws). After that, connect cable [E] to the NCU [D], then clamp cable [E] as shown.
8. Replace the rear cover and the small cover.
9. Connect the cable to the LINE2 jack, then plug in the machine and turn the main switch on.
10. Enter service mode and set bit 1 of communication switch 16 to " 1 ". After that turn the main switch off and on.
11. Print the system parameter list and ensure that "SG3-V34" is listed as an option.
12. Set up and program the items required for PSTN-2 communications.

### 1.2.2 ISDN OPTION TYPE 1027 INSTALLATION



## ©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. Turn off the main switch and disconnect the power cord and the network cable.
3. Remove the small cover $[A]$ (1 rivet) and the rear cover $[B]$ ( 4 screws). Then cut away the jack window [C].
4. Remove the NCU unit [D] (4 screws, 2 connectors)
[B]

[D]



Fax Unit
B418
3. Remove the NCU [A] from the NCU unit (4 screws). Connect the cable [B] to the FCU.
4. Attach the G 4 unit [C] to the machine ( 6 screws, 1 connector).
5. Connect the cable $[B]$ to the interface board and attach bracket $[D]$ ( 1 screw). Then attach the NCU [A] (removed from the NCU unit in step 3) to the G4 unit (4 screws). After that, connect the cable [E] to the NCU [A], then clamp cable [E] as shown.
6. Replace the rear cover and the small cover.

7. Connect the cable to the ISDN jack, then plug in the machine and turn the main switch on.
8. Attach the FCC/IC approval label to the machine near the ISDN jack. (This step is only for US/Canada.)
9. Enter service mode and set bit 2 of communication switch 16 to " 1 ". After that turn the main switch off and on.
10. Print the system parameter list and ensure that "G4" is listed as an option.
11. Set up and program the items required for ISDN communications. After setting up the ISDN parameters, be sure to turn the main switch off and on.

## 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 OA , 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 tx level and/or cable equalizer settings. <br> - The other terminal may not be compatible. 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 MBU 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 | 6 |
| $7-92$ | 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 | 6 |

### 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 " 7 " and " 9 " 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 MBU is at the "OFF" position
- SRAM on the MBU has a physical defect
- Flash memory card 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 <br> 1F bit $7=1$ |
| :---: | :---: | :---: | :---: | :---: |
| 1101 | FCU error | Initialize the fax unit. (See section 2.3.1.for the initialization procedure) | Automatic reset | SC Code display |
| 1201 | Unrecoverable FCU SRAM error | Refer to section 2.3.2. | $\begin{gathered} \text { "Service Call" } \\ \text { display } \end{gathered}$ |  |
| 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 |  |  |  |  |
| 1312 |  |  |  |  |
| 1401 |  |  |  |  |
| 1405 |  |  |  |  |

### 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)
Handshaking with the FCU ready

## Standby Mode

Ready to communicate


## Communication

Layer 1 activated
Link setup
B channel 1 connected
B channel 2 connected
$\square$


| O | -- | O | O |
| :--- | :--- | :--- | :--- |

### 2.4.2 BACK-TO-BACK TEST

To make a back-to-back test, you need:

- Two machines, one with the CiG4 board (G4 board used in the B022 and previous models) and the other with the SiG4 board (G4 board used in previous models).
- Cross rosette

NOTE: You cannot make a back-to-back test using two SiG4 machines.

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.)


## 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

Q 1. Press the Clear Mode key.
2. Use the keypad to enter " 107 ".
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 ${ }^{*}$ 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 | 00-0F | 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 |
| 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 optional SG3 board. |
|  | 004 | G4 Memory Dump | Print out RAM data for the SiG4 board. |


| 2 | Mode No. |  | Function |
| :---: | :---: | :---: | :---: |
| 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 |

## 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. |
|  | 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. |
| 106 | ISDN Port Settings |  |  |
|  | 001 | Select Line | Select the line setting for the ISDN line. If the machine is installed to the PABX 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. |
| 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. |


| 6 | Mode No. |  | Function |
| :---: | :---: | :---: | :---: |
| 103 | 003 | $\begin{aligned} & \hline \text { G3-1 (1 } \\ & \text { Communication) } \end{aligned}$ | Prints the protocol dump list of the last communication for the G3-1 line. |
|  | 004 | $\begin{aligned} & \text { G3-2 (All } \\ & \text { Communications) } \end{aligned}$ | Prints the protocol dump list of all communications for the G3-2 line. |
|  | 005 | $\begin{aligned} & \text { G3-2 (1 } \\ & \text { Communication) } \end{aligned}$ | Prints the protocol dump list of the last communication for the G3-2 line. |
| 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 |  |
| 107 | 011 | JBIG | These log print out functions are for designer use only. |
|  | 012 | Fax Driver |  |
|  | 013 | G3CCU |  |
|  | 014 | Fax Job |  |

## SP7-XXX (Test Modes)

These are the test modes for PTT approval.

| 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) |
| 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 <br> 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 32V34 288/264 L0100 0304 <br> $\begin{array}{lllll}\text { (1) } & \text { (2)(3) } & \text { (4) } & \text { (5) } & \text { (6) }\end{array}$ <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): $R x$ 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 288/2 <br> The four-digit hexadecimal valu The high byte is given first, foll 16 to get the rx level. <br> In the above example, the dec So, the actual $r x$ level is 256/-1 | $\text { L } \underline{01} \underline{00} 0304$ <br> $(\mathrm{N})$ 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 <br> 0 : Off <br> 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 $168: 16800 \mathrm{bps}$ <br> 312: 31200 bps 144: 14400 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 |


| I/O rate | $0: 0 \mathrm{~ms} /$ line | $10: 10 \mathrm{~ms} / \mathrm{line}$ |
| :--- | :--- | :--- |
|  | $25: 2.5 \mathrm{~ms} / \mathrm{line}$ | $20: 20 \mathrm{~ms} / \mathrm{line}$ |
|  | 5:5 ms/line | $40: 40 \mathrm{~ms} / \mathrm{line}$ |
|  | Note: |  |
|  | "40" is displayed while receiving a fax message using Al short |  |
|  | protocol. |  |

G4 Communication Parameters

| Compression mode | MMR: MMR compression MR: MR compression <br> MH: MH compression |
| :---: | :---: |
| Resolution | 21: Standard ( $200 \times 100$ dpi) <br> 22: Detail ( $200 \times 200 \mathrm{dpi}$ ) <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 <br> - : 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 (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 $0: \mathrm{mm}$, 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. |
| $\mathbf{5}$ | Not used | Do not change the setting. |


| System Switch 02 |  |  |  | SP No. 1-101-003 |
| :---: | :---: | :---: | :---: | :---: |
| No | FUNCTION |  |  | COMMENTS |
| 6 | Memory read/write by RDS |  |  | ( 0,0 ): All RDS systems are always locked out. ( 0,1 ), ( 1,0 ): Normally, RDS systems are locked out, but the user can temporarily switch RDS on to allow RDS operations to take place. RDS will automatically be locked out again after a certain time, which is stored in System Switch 03. Note that if an RDS operation takes place, RDS will not switch off until this time limit has expired. <br> (1,1): At any time, an RDS system can access the machine. |
| 7 | Bit 7 | 6 | Setting |  |
|  | 0 | 0 | Always disabled |  |
|  | 0 | 1 | User selectable |  |
|  | 1 | 0 | User selectable |  |
|  | 1 |  | Always enabled |  |
|  |  |  |  |  |
|  |  |  |  |  |


| 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 |  |
|  | 02 are set to "User selectable" | This setting is only valid if bits 6 and 7 of System <br> Switch 02 are set to "User selectable". <br> The default setting is 24 hours. |


| 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 | SP No. 1-101-007 |  |
| $\mathbf{0}$ | Margin setting for Create | COMMENTS |
| to | Margin Transmission | 71 to 99 (BCD) \%. This setting determines the |
| 7 |  | reduction ratio when the user uses the Create |
|  |  | Margin Transmission feature. |

[^1]| System Switch 09 |  | SP No. 1-101-010 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 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. 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 <br> 0: Print for all communications <br> 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. <br> 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 | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 7 \end{gathered}$ | 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 15: 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> OA: Sweden 1B: Taiwan <br> OB: Switz. 1C: Korea <br> 0C: Portugal 20: Turkey <br> 0D: Holland 21: Greece <br> 0E: Spain 22: Hungary <br> OF: Israel 23: 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: <br> SP No. 2-103-001 for G3-1 <br> SP No. 2-104-001 for G3-2 |


| System Switch 10 |  |  |
| :---: | :--- | :--- |
| No | SUNCTION | COMMENTS |
| $\mathbf{0}$ | 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 |  | SP No. 1-101-018 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | TTI printing position <br> 0 : Superimposed on the page data <br> 1: Printed before the data leading edge | Change this bit to 1 if the TTI overprints information that the customer considers to be important (G3 transmissions). |
| 1 | TSI (G3) or CIL/TID (G4) printing position <br> 0 : Superimposed on the page data <br> 1: Printed before the data leading edge | Change this bit to 1 if the TSI (G3) or CIL/TID (G4) overprints information that the customer considers to be important. <br> CIL: Command Information Line (Group 4) |
| 2 | Not used | Do not change the factory setting. |
| 3 | TTI used for broadcasting 0 : The TTIs selected for each Quick/Speed dial are used 1: The same TTI is used for all destinations | 1: The TTI (TTI_1 or TTI_2) which is selected for all destinations during broadcasting. |


| System Switch $\mathbf{1 1}$ |  |  |
| :---: | :--- | :--- |
| 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 settings. |
| 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 |
| 0 | Parallel Broadcasting <br> 0 : Disabled <br> 1: Enabled | 1: When the G4 or/and G3 unit is installed, the machine sends messages simultaneously using both available ports (PSTN/ISDN) during broadcasting. |
| 1 | Priority setting for the G3 line. <br> 0: PSTN-1 > PSTN-2 <br> 1: PSTN-2 > PSTN-1 | This function allows the user to select the default G3 line type. The optional SG3 unit is required to use the PSTN-2 setting. |
| 2 | Changing the I-G3 modem default. <br> 0 : PSTN-1 <br> 1: PSTN-2 | This function allows the user to select the default IG3 modem. The optional SG3 unit and ISDN unit are required to use the PSTN-2 setting. |
| 3 | Line used for I-G3 transmissions 0 : Allowed to change 1: Fixed | 0 : The machine will place priority on the line selected by the above bit 2 for I-G3 transmissions. 1: The machine will always use the line selected by the above bit 2 for I-G3 transmissions. |
| 4-7 | Not used | Do not change the settings. |


| System Switch 17 - Not used (do not change the settings) |
| :--- |
| System Switch 18 - Not used (do not change the settings) |


| System Switch 19 |  | SP No. 1-101-026 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0-5 | Not used | Do not change the settings. |
| 6 | Extended scanner page memory after memory option is installed <br> 0: Disabled <br> 1: Enabled | 0 : After installing the memory expansion option, the scanner page memory is extended to 4 MB from 2 MB. <br> 1: If this bit is set to 1 after installing the memory expansion option, the scanner page memory is extended to 12 MB . But the SAF memory decreases to 18 MB . |
| 7 | Special Original mode <br> 0 : Disabled <br> 1: Enabled | 1: If the customer frequently wishes to transmit a form or letterhead which has a colored or printed background, change this bit to " 1 ". "Original 1" and "Original 2 " can be selected in addition to the "Text", "Text/Photo" and "Photo" modes. |

[^2]| System Switch 1D |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | SP No. 1-101-030 |
| $\mathbf{0}$ | 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. |
| $1 \mathbf{1 - 7}$ | 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> a 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 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 |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | SP No. 1-101-031 |
| 5 | Address display priority in the <br> Al redial mode <br> 0: RTI/CSI <br> 1: Telephone number | 0: When the machine has both RTI/CSI and the <br> telephone number information, the machine displays <br> RTI/CSI. <br> 1: The machine always displays the telephone <br> number. |
| $\mathbf{6}$ | Not used | Do not change the setting. |
| $\mathbf{7}$ | RAM initialization after the <br> optional Function Upgrade unit <br> is installed or removed <br> 0: Enabled <br> 1: Disabled | When the machine detects that a Function Upgrade <br> unit has been installed or removed, the machine <br> shows the following message on the display for the <br> customer. |


| System Switch 1F |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-101-032 |
| $\mathbf{0}$ | Not used | Do not change the setting. |

### 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: | Chreshold for Text mode - |
| This setting determines the threshold value for |  |  |
| Normal setting (center position) | binary picture processing in Text mode (when the <br> bcan density 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: 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: | This setting determines the threshold value for |
| Threshold for monotone |  |  |
| background special original 1 |  |  |
| mode - Normal setting (center |  |  |
| position) |  |  | | binary picture processing in monotone background |
| :--- |
| special original 1 mode (when the scan density |
| setting is at the center). |
| The value can be between 01 and FF. For a darker |
| threshold, input a lower value. |
| Default setting: A4(H) $164(\mathrm{D})$ |


| Scanner Switch 05 |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | SP No. 1-102-006 |
| $\mathbf{0 - 7}$ | Binary picture processing: | COMMENTS |
|  | Threshold for colored setting determines the threshold value for |  |
| background special original 2 |  |  |
| mode - Normal setting (center |  |  |
| position) |  |  |$\quad$| binary picture processing in colored background |
| :--- |
| special original 2 mode (when the scan density |
| setting is at the center). |
| The value can be between 01 and FF. For a darker |
| threshold, innut a lower value. |
| 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 $\mathbf{0 7}$ |  |  |  |
| :---: | :--- | :--- | :---: |
| No | FUNCTION | SP No. 1-102-008 |  |
| $\mathbf{0}$ | Smoothing filter level (Photo | The value can be between O(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 |  |
|  |  | setting specified by the copier SP modes. |  |

Scanner Switch 08 - Not used (do not change the settings)
Scanner Switch 09 - Not used (do not change the settings)

| Scanner Switch 0A |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-102-011 |
| 0-3 | Not used | Do not change the settings |
| 4-7 | MTF filter level (Color mode) |  |
| The value can be between 0(Off) and F. For a weaker threshold, input a lower value. |  |  |
| Default setting: 7 |  |  |
| This setting is independent from the threshold specified by the copier SP modes. |  |  |


| Scanner Switch OB |  |  |
| :--- | :--- | :--- |
| No | FUNCTION | SP No. 1-102-012 |
| $\mathbf{0 - 3}$ | Scan margin setting (right and left margin in book scan ADF mode) <br> The setting can be between 0 and $\mathrm{F}(\mathrm{H})$ (unit 0.5 mm$).$ <br> Default setting: 2 mm |  |
| 4-7 | Scan margin setting (top and bottom margin in book scan and ADF mode) <br> The setting can be between 0 and 7 <br> Default setting: 3 mm |  |


| 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 $t x$ <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 $t x$ 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. |
| $\begin{aligned} & 1 \\ & \text { to } \\ & 2 \end{aligned}$ |  |  |
| 3-5 | Not used | Do not change the settings. |
| 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 | $\begin{aligned} & \text { ADF jam alarm display time } \\ & 0: 60 \mathrm{~s} \\ & 1: 30 \mathrm{~s} \end{aligned}$ | 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 OF |  |  |
| :---: | :--- | :--- |
| 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 settings |
| $\mathbf{2}$ | 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 settings. |

### 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 "2" 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 <br> Bit 43 Setting <br> $\begin{array}{lll}0 & 0 & \text { Not used } \\ 0 & 1\end{array}$ <br> 0 1 A3 <br> $\begin{array}{lll}1 & 0 & \text { B4 } \\ 1 & 1 & \end{array}$ | 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" $\times 5.5^{\prime \prime}$ | 216 mm width |
| No paper available (Paper end) | 216 mm width |


| \|rinter 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 |



| Printer Switch 04 SP No. 1-103-005 |  |
| :---: | :---: |
| No | FUNCTION COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 4 \end{gathered}$ | 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 432100 Setting 000000 mm 000015 mm \(\begin{array}{llllll}0 & 0 & 1 & 0 & 0 & 20 \mathrm{~mm} \text { (default setting) }\end{array}\) \(\begin{array}{llllll}1 & 1 & 1 & 155 \mathrm{~mm}\end{array}\)``` <br> For A5 sideways and B5 sideways paper <br> <Maximum reducible length> = <Paper length> $+0.75 \times(\mathrm{N} \times 5 \mathrm{~mm})$ |
| $\begin{aligned} & \hline 5 \\ & 6 \end{aligned}$ | 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. ${ }^{\text {a }}$ ( 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 <br> 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 destinations <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. |
| $5 \mathbf{5 - 7}$ | 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. |
| $\begin{array}{\|c\|} \hline 3 \\ \text { to } \\ 4 \end{array}$ | Printing the sample image on   <br> reports   <br> Bit 4 Bit 3 Setting  <br> 0 0 The upper half <br> 0 1 only <br> $50 \%$ 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. <br> User Parameter Switch 19 (13H) bit 4 must be set to " 0 " to enable this switch. <br> 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 <br> (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 |
| $\begin{gathered} 0 \\ \text { to } \\ 1 \end{gathered}$ | Smoothing feature   <br> Bit 1 Bit 0 Setting <br> 0 0 Disabled <br> 0 1 Disabled <br> 1 0 Enabled <br> 1 1 Not used | $(\mathbf{0}, \mathbf{0})(\mathbf{0}, \mathbf{1})$ : Disable smoothing if the machine 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 mode  <br> Bit $\mathbf{2}$ Modes <br> 0 0 MH only <br> 0 1 MH/MR <br> 1 0 MHR/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. |
| $\begin{array}{\|c\|} \hline 2 \\ \text { to } \\ 3 \end{array}$ | Wrong connection prevention method | $(\mathbf{0}, \mathbf{1})$ - 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. |
| $\begin{array}{\|c\|} \hline 6 \\ \text { to } \\ 7 \\ \hline \end{array}$ | Maximum printable page lengthavailable   <br> Bit 7 6 Setting <br> 0 0 No limit <br> 0 1 B4 $(364 \mathrm{~mm})$ <br> 1 0 A4 $(297 \mathrm{~mm})$ <br> 1 1 Not used | 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 <br> 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. <br> This bit is ignored for memory transmissions or if <br> ECM is being used. |
| 4-7 | Not used | Do not change the settings. |


| Communication Switch 03 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | SP No. 1-104-004 |
| $\mathbf{0}$ | Maximum number of page | COMMENTS |
| to | retransmissions in a G3 | This setting is not used if ECM is switched on. |
| 7 | memory transmission | Default setting -03(H) |

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)

| 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 OA bit 7. <br> Refer to G4 Internal Switches 17, 18, 1A, 1B, and <br> 1C for the CPS code set (Cause Value set) that <br> determines G4 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 PSTN. <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 | If 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 <br> 0: Always transmitted <br> 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 <br> 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 0C |  | SP No. 1-104-013 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| $\begin{gathered} 0 \\ \text { to } \\ 4 \end{gathered}$ | 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. 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(H) $=5$ digits |
| 5-7 | Not used | Do not change the settings. |


| Communication Switch 0D SP No. 1-104-014 |  |  |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 7 \end{gathered}$ | The available memory threshold, below which ringing detection (and therefore reception into memory) is disabled | $\begin{aligned} & 00 \text { to FF }(\mathrm{Hex}) \text {, unit }=4 \text { kbytes } \\ & \text { (e.g., } 06(\mathrm{H})=24 \text { kbytes) } \end{aligned}$ <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 OE |  |  |
| :---: | :--- | :--- |
| 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 <br> 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. |
| $\begin{gathered} 6 \\ \text { to } \\ 7 \end{gathered}$ | Available unit of resolution in <br> which fax messages are <br> received <br> Bit 7 <br> Bit 6   Unit <br> 0   00mm <br> 0 | 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 | CP 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. |
| 3-5 | Not used | Dse 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 | Change this bit to 1 when the customer requires. <br> (: The machine uses only one B channel for <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 |  |  |  |
| :---: | :--- | :--- | :---: |
| No | FUNCTION | SP No. 1-104-029 |  |
| $\mathbf{0}$ | Extension access code (8 and | Refer to communication switch 1B. |  |
| to | 9) to turn V.8 protocol On/Off | Example: If "8" is the PSTN access code, set bit 0 |  |
| $\mathbf{1}$ | 0: On | to 1. When the machine detects " 8 " as the first |  |
|  | 1: Off | dialed number, it automatically disables V.8 |  |
|  |  | protocol. (If "9" is the PSTN access code, use bit 1.) |  |
| $\mathbf{2 - 7}$ | 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 |
| $0$ | Monitor speaker during   <br> communication (tx and rx)  <br> Bit Bit ( | ( 0,0 ): The monitor speaker is disabled all through the communication. <br> $(\mathbf{0}, \mathbf{1})$ : 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. |
| 3-7 | Not used | Do not change the settings. |


| G3 Switch 01 |  | SP No. 1-105-002 |
| :---: | :---: | :---: |
| 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 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) <br> 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 | 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 | $0:$ V.8/V. 34 communications will not be possible. 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 : Ricoh mode (PPR $\times 1$ ) <br> 1: ITU-T mode (PPR x 4) | When using ECM, the machine will choose a slower modem rate after receiving PPR once (Ricoh mode) or four times (ITU-T mode). <br> This bit is ineffective 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 No. 1-105-005 |
| $\mathbf{0}$ | Training error detection <br> to <br> threshold |  |


| G3 Switch 05 |  | SP No. 1-105-006 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 3 \end{gathered}$ |  | 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 | COMMENTS |
| $\begin{gathered} 0 \\ \text { to } \\ 3 \end{gathered}$ |  | 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 |


| G3 Switch 06 |  | SP No. 1-105-007 |
| :---: | :---: | :---: |
| 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 - G3 switch 03, bit2 |


| G3 Switch 07 |  | SP No. 1-105-008 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| $\begin{gathered} \hline 0 \\ \text { to } \\ 1 \end{gathered}$ | PSTN 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. |
| $\begin{gathered} \hline 2 \\ \text { to } \\ 3 \end{gathered}$ | 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". |
| $\begin{aligned} & 6- \\ & 7 \end{aligned}$ | 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 |  |
| $\begin{array}{\|c} \hline 0 \\ \text { to } \\ 1 \end{array}$ | ISDN cable equalizer   <br> (tx mode: Internal)  <br> Bit $\mathbf{1}$ 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. |
| $\begin{gathered} \\ \hline 2 \\ \text { to } \\ 3 \end{gathered}$ | 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) 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 |  | SP No. 1-105-011 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| $\begin{aligned} & \hline 0 \\ & 1 \end{aligned}$ | Maximum allowable carrier drop during image data reception $\begin{array}{ccl} \text { Bit 1 } & \text { Bit 0 } & \text { Value (ms) } \\ 0 & 0 & 200 \\ 0 & 1 & 400 \\ 1 & 0 & 800 \\ 1 & 1 & \text { Not used } \end{array}$ | 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. <br> 0: 5 s 1 : 13 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 settings. |
| 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. 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 <br> Switch 0F) is programmed. <br> Change the required bits manually at installation. |
| $\mathbf{1}$ | Protocol requirements: Spain <br> 0: Disabled 1: Enabled |  |
| $\mathbf{2}$ | 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 ( $\mathrm{P}=10-\mathrm{N}$ ) |  |
|  | 10 | Sweden |  |
|  | 11 | ( $\mathrm{N}+1$ ) |  |
| 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> $\begin{array}{lllll}0 & 1 & 1 & 1 & \text { Lower by }\end{array}$ 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 $26,400 \mathrm{bps}$. This switch reduces transmission time if the machine frequently sends PPR signals during V. 34 reception. |
| 6 | Not used | Do not change the settings. |
| 7 | B signal detection time for V. 34 polling transmission 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 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-105-016 |
| $\mathbf{0}$ | 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 |  | ( 0,0 ): The monitor speaker is disabled all through the communication. <br> $(\mathbf{0}, \mathbf{1})$ : 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 |  |


| G3-2 Switch 01 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS No. 1-106-002 |
| 0-3 | Not used | Do not change the settings. |
| $\mathbf{4}$ | DIS frame length <br> 0: 10 bytes 1:4 bytes | 1: The bytes in the DIS frame after the 4th byte will <br> not be transmitted (set to 1 if there are <br> communication problems with PC-based faxes <br> which cannot receive the extended DIS frames). |
| $\mathbf{5}$ | Not used | Do not change the setting. |
| $\mathbf{6}$ | CED/ANSam transmission <br> 0: Disabled <br> 1: Enabled | Do not change this setting, unless the <br> communication problem is caused by the <br> CED/ANSam transmission. |
| $\mathbf{7}$ | 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 |  |  |
| :---: | :--- | :--- |
| No | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Training error detection | 1-106-005 <br> to <br> $\mathbf{3}$ |
| threshold |  | If the number $0-15$ bits |
|  |  | below this threshold, the machine informs the |
| sender that training has succeeded. |  |  |


| G3-2 Switch 05 |  | SP No. 1-106-006 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| $\begin{gathered} 0 \\ \text { to } \\ 3 \end{gathered}$ | Initial Tx modem rate     <br> Bit     <br> $\mathbf{3}$     <br> 0     $\mathbf{2}_{1} \mathbf{1} \mathbf{0}$ 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 - SG3 switch 03, bit2 |
| $\begin{gathered} 4 \\ \text { to } \\ 5 \end{gathered}$ | Initial modem type for 9.6 k or 7.2 kbps. $\begin{array}{ccl} \text { Bit 5 } & \text { Bit 4 } & \text { Setting } \\ 0 & 0 & \text { V. } 29 \\ 0 & 1 & \text { V. } 17 \\ 1 & 0 & \text { V. } 34 \\ 1 & 1 & \text { Not used } \end{array}$ | 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. |


| G3-2 Switch 06 |  | SP No. 1-106-007 |
| :---: | :---: | :---: |
| No | FUNCTION | COMMENTS |
| 0 | Initial Rx modem rate | These bits set the initial starting modem rate for reception. |
| to | Bit 32100 Setting (bps) |  |
| 3 | 00012.4 k |  |
|  | 00104.8 k | Use a lower setting if high speeds pose problems |
|  | 00117.2 k | during reception. |
|  | 01009.6 k |  |
|  | 0101212.0 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 |
|  | 110028.8 k |  |
|  | 110131.2 k |  |
|  | 111033.6 k |  |
|  | Other settings - Not used |  |


| G3-2 Switch 06 |  | SP No. 1-106-007 |
| :---: | :---: | :---: |
| No | FUNCTION |  |
| $\begin{gathered} \hline 4 \\ \text { to } \\ 7 \end{gathered}$ |  | 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 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. |
| $\begin{gathered} 2 \\ \text { to } \\ 3 \end{gathered}$ | 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 $0: 6 \mathrm{~s} \mathrm{1:12s}$ | 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 0 : Disabled 1: Enabled |  |
| 2 | Protocol requirements: Germany <br> 0: Disabled 1: Enabled |  |
| 3 | Protocol requirements: France 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 |  |
|  | $0 \quad 0 \quad \operatorname{Normal}(\mathrm{P}=\mathrm{N})$ |  |
|  | 010 Oslo ( $\mathrm{P}=10-\mathrm{N}$ ) |  |
|  | 10 Sweden |  |
|  | $1 \quad 1$ 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 G4 INTERNAL SWITCHES



```
G4 Internal Switch 01 - Not used (do not change the settings)
G4 Internal Switch 02 - Not used (do not change the settings)
```

| G4 Internal Switch 03 |  |  |
| :---: | :--- | :--- |
| No. | FUNCTION | COMMENTS |
| $\mathbf{0}$ | Amount of protocol dump data in <br> one protocol dump list <br> 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 the 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 the settings. |


| G4 Internal Switch 05 |  |  |
| :---: | :--- | :--- |
| 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 the 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. |
| $\mathbf{6}$ | INFO1 signal resend |  |
| 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 the setting. |


| G4 Internal Switch 11 (Dch. Layer 2) |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0 | Not used | Do not change these settings. |
| 1 | $\begin{aligned} & \text { Type of TEI used } \\ & \text { 0: Dynamic TEI } \quad \text { 1: Static TEI } \end{aligned}$ | 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 the settings)

| G4 Internal Switch 13: D channel layer 3 (Attachment IE in S: SETUP) |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0 | Not used | Do not change the 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 the settings. |
| 3-4 |  | 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 <br> 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 the settings. |


| G4 Internal Switch 16: D channel layer 3 (Approval) |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0-1 | Answer delay time    <br> Bit 1 0 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 <br> 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 the settings. |
| 5 | Indicated bearer capabilities 0:56kbps 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 the 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 . <br> $\begin{array}{rllllllll}\text { Examples: Bit } 6 & 5 & 4 & 3 & 2 & 1 & 0 & \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 & \text { CPS code } 65 \\ 1 & 0 & 1 & 1 & 0 & 0 & 0 & \text { CPS code } 88\end{array}$ <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 1TR6 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 COMMENTS |
| 0-6 | Condition for fallback from G4 to G3 <br> 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> 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, 1A, 1B, or 1C. |

## 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 19 |  |  |
| :---: | :--- | :--- |
| 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 |  |
| $\mathbf{0 - 6}$ | 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 the 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 the setting. |  |

[^3]
### 3.2.8 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: On0: 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 02

| No. | FUNCTION | COMMENTS |  |
| :---: | ---: | :--- | :--- |
|  | Data rate (kbps) | Other settings: Not used |  |
| $\mathbf{0 - 1}$ | Bit 1 | 0 | Setting |
|  | 0 | 0 | 64 kbps |
| 0 | 1 | 56 kbps |  |
| $\mathbf{2 - 7}$ | Not used |  |  |

G4 Parameter Switch 03 - Not used (do not change the settings)
G4 Parameter Switch 04 - Not used (do not change the settings)

| G4 Parameter Switch 05 |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0-3 | Not used | Do not change the settings. |
| 4 | $\begin{aligned} & \text { B-channel T3 timer } \\ & 0: 30 \mathrm{~s} \mathrm{1:57s} \end{aligned}$ | 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. Normally keep this bit at 1 . |
| 5-7 | Not used | Do not change the 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 the settings. |


| G4 Parameter Switch 07 |  |  |
| :---: | :---: | :---: |
| No. | FUNCTION | COMMENTS |
| 0-3 | Packet size     <br> Bit 3 2 1 0 Value <br> 0 1 1 1 128 <br> 1 0 0 0 256 <br> 1 0 0 1 512 <br> 1 0 1 0 1024 <br> 1 0 1 1 2048 | 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. <br> 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 the 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 . |
|  |  |  |
|  | $\begin{array}{lllll}0 & 0 & 0 & 1 & 1\end{array}$ |  |
|  | $\begin{array}{lllll}0 & 0 & 1 & 0 & 2\end{array}$ |  |
|  | and so on until |  |
|  | $\begin{array}{lllll}1 & 1 & 1 & 1 & 15\end{array}$ |  |
| 4-7 | Not used | Do not change the settings. |


| G4 Parameter Switch 09 - Not used (do not change the settings) |
| :--- | :--- |
| G4 Parameter Switch 0A - Not used (do not change the 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 the settings)

| G4 Parameter Switch OD |  |  |
| :---: | :---: | :---: |
| 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 . <br> See "Back-to-back Testing" in the Troubleshooting section for full details. |
| 2-7 | Not used | Do not change the settings. |

G4 Parameter Switch 0E - Not used (do not change the settings)
G4 Parameter Switch 0F - Not used (do not change the 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.

| 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 | 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 | OA |
|  |  | Switzerland | 11 | 0B |
|  |  | Portugal | 12 | 0 C |
|  |  | 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. <br> Line current is not detected if 680501 contains FF. |  |
| 680502 | Line current wait time |  |  |  |
| 680503 | Line current drop detect time |  |  |  |


| 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, <br> the machine pauses for <br> the pause time (680548 / <br> 680549). |
|  | Country dial tone reset time (LOW) |  |  |


| 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) | BCD | $\begin{aligned} & \text { For a code of 100: } \\ & 68055 \mathrm{~B}-\mathrm{F1} \\ & 68055 \mathrm{C}-00 \end{aligned}$ |
| 68055C | International dial access code (Low) |  |  |
| 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 dBm <br> 0 0 0 -25.0 <br> 0 0 1 -35.0 <br> 0 1 0 -30.0 <br> 1 0 0 -40.0 <br> 1 1 0 -49.0 <br> Bits 2, 0 - See Note 2. |  |
| $\begin{gathered} 68055 \mathrm{~F} \\ \text { to } \\ 680564 \end{gathered}$ | Not used |  | Do not change the settings. |
| 680565 | Long distance call prefix (HIGH) | BCD | $\begin{aligned} & \text { For a code of 0: } \\ & 680565-\text { FF } \\ & 680566-\text { F0 } \end{aligned}$ |
| 680566 | Long distance call prefix (LOW) | BCD |  |
| $\begin{gathered} 680567 \\ \text { to } \\ 680571 \end{gathered}$ | Not used |  | Do not change the settings. |


| Address | Function | Unit | Remarks |
| :---: | :---: | :---: | :---: |
| 680572 | Acceptable ringing signal frequency: range 1, upper limit | $\begin{aligned} & 1000 / \mathrm{N} \\ & (\mathrm{~Hz}) . \end{aligned}$ | SP2-103-003 (parameter 02). |
| 680573 | Acceptable ringing signal frequency: range 1, lower limit |  | SP2-103-004 (parameter 03). |
| 680574 | Acceptable ringing signal frequency: range 2, upper limit |  | SP2-103-005 (parameter 04). |
| 680575 | Acceptable ringing signal frequency: range 2, lower limit |  | SP2-103-006 (parameter 05). |
| 680576 | Number of rings until a call is detected | 1 | SP2-103-007 (parameter 06). <br> The setting must not be zero. |
| 680577 | Minimum required length of the first ring | 20 ms | See Note 4. <br> SP2-103-008 (parameter 07). |
| 680578 | Minimum required length of the second and subsequent rings | 20 ms | SP2-103-009 (parameter 08). |
| 680579 | Ringing signal detection reset time (LOW) | 20 ms | SP2-103-010 (parameter 09). |
| 68057A | Ringing signal detection reset time (HIGH) |  | SP2-103-011 (parameter 10). |
| $\begin{gathered} 68057 \mathrm{~B} \\ \text { to } \\ 680580 \end{gathered}$ | 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 |  |
| $\begin{gathered} 680583 \\ \text { to } \\ 6805 \mathrm{AO} \\ \hline \end{gathered}$ | 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 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 Hz ) detection frequency upper limit (low byte) |  |  |
| 6805B1 | Acceptable AI short protocol tone $(800 \mathrm{~Hz})$ detection frequency lower limit (high byte) | Hz (BCD) | If both addresses contain $\mathrm{FF}(\mathrm{H})$, tone detection is disabled. |
| 6805B2 | Acceptable Al 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 | - $\mathrm{N}-3 \mathrm{dBm}$ | SP2-103-002 (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 |  |


| 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) | $\begin{array}{\|l} \hline-37-0.5 \mathrm{~N} \\ (\mathrm{dBm}) \\ \hline \end{array}$ |  |
| $\begin{gathered} \hline 6805 \mathrm{BE} \\ \text { to } \\ 6805 \mathrm{C} 6 \\ \hline \end{gathered}$ | 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. |  |  |
| $\begin{gathered} \text { 6805C8 } \\ \text { to } \\ 6805 \mathrm{D} 9 \end{gathered}$ | 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 | $\begin{aligned} & \hline 0: 12 \mathrm{~s} \\ & 1: 30 \mathrm{~s} \end{aligned}$ | 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: $-0.5 \times \mathrm{N} 680552 / 680554-3.5 \mathrm{dBm}$
$-0.5 \times \mathrm{N} 680555 \mathrm{dBm}$
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     <br> Bit 7 6 5 Setting <br>  0 0 0 None <br> 0 0 1 Low  <br>  0 1 0 Medium <br>  0 1 1 High <br>  1 1 1 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 |
| $\begin{gathered} 0 \\ \text { to } \\ 3 \end{gathered}$ | Initial Tx modem rate <br> Bit3 $\mathbf{2}$      $\mathbf{1}$ $\mathbf{0}$ Setting (bps) <br> 0 0 0 0 Not used     <br> 0 0 0 1 2,400     <br> 0 0 1 0 4,800     <br> 0 0 1 1 7,200     <br> 0 1 0 0 9,600     <br> 0 1 0 1 12,000     <br> 0 1 1 0 14,400     <br> 0 1 1 1 16,800     <br> 1 0 0 0 19,200     <br> 1 0 0 1 21,600     <br> 1 0 1 0 24,000     <br> 1 0 1 1 2,400     <br> 1 1 0 0 28,800     <br> 1 1 0 1 31,200     <br> 1 1 1 0 33,600     <br> 1 1 1 1 Disabled     <br>          <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 | Al short protocol <br> 0: Off <br> 1: Disabled | 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 setting. |


| 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 1 | Bit 0 | Setting |  |
|  | 0 | 0 | Inch-mm |  |
|  |  |  | conversion |  |
|  |  |  | available |  |
|  |  | 1 | Inch only Not used |  |
|  |  |  | Not used Disabled |  |
| $\begin{array}{\|c\|} \hline 2 \\ \text { to } \\ 3 \\ \hline \end{array}$ | DIS/NSF detection method |  |  | ( $\mathbf{0}, \mathbf{1}$ ): Use this setting if echoes on the line are 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. |
| $\begin{aligned} & \hline 6 \\ & 7 \end{aligned}$ | 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 07 - Optional ISDN G4 kit required |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| No | FUNCTION |  |  | COMMENTS |
| $\begin{gathered} \hline 0 \\ \text { to } \\ 3 \end{gathered}$ | $\begin{array}{lll} \hline \text { Data rate } \\ \text { Bits } & \mathbf{3} & \mathbf{2} \\ & 0 & 0 \\ & 0 & 0 \\ & 1 & 1 \end{array}$ | $\begin{array}{lll} 2 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \\ 1 & 1 & 1 \end{array}$ | Setting 64 kbps 56 kbps Disabled | If the setting is "Disabled", the current setting of G4 parameter switch 2 (bits 0 and 1 ) is used. |
| 4-7 | 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     <br> Bits protocol    <br>  $\mathbf{3}$ $\mathbf{2}$ $\mathbf{1}$ $\mathbf{0}$ <br>  Setting    <br>  0 0 0 0 <br>  ISO 8208    <br>  0 0 0 1 <br>  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. |
| $\begin{gathered} \hline 4 \\ \text { to } \\ 7 \end{gathered}$ | 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



## 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 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 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 A4 size fax message when A4/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
$0 \quad 0 \quad 0 \quad 0 \quad 0 \mathrm{~min}$.
$\begin{array}{lllll}0 & 0 & 0 & 1 & 1\end{array}$
ת ת
$\begin{array}{lllll}1 & 1 & 1 & 0 & 14 \mathrm{~min} .\end{array}$
$\begin{array}{lllll}1 & 1 & 1 & 15 & \mathrm{~min} .\end{array}$
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 $100 \quad$ 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 68011F(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.
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)
6802D3(H) - Number of PSTN-1 CSI characters (Hex)
6802D4(H) - Number of PSTN-2 CSI characters (Hex)

NOTE: If the number of characters is less than the maximum ( 20 for RTI, 64 for TTI), add a stop code (FF[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
$0 \quad 0 \quad$ Loop start
01 Ground start
10 Flash start
11 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
$1 \quad 1$ Not used
Bits 4 to 7: Not used
6802E1: PSTN access number for loop start
Access number Hex value to program (BCD)
0
$\sqrt{2}$
F0
9
F
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
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
$02(\mathrm{H})$ - PSTN-2
10 (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
0 : Not installed, 1 : Installed
Bit 5: Not used
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 68038C(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)
6803A2(H) - Option G3 board (G3-2) modem ROM version (Read only)

## SERVICE RAM ADDRESSES

```
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)
```


## 4. DETAILED SECTION DESCRIPTIONS

### 4.1 OVERVIEW



The basic fax unit consists of three PCBs: an FCU, an MBU and an NCU.
The FCU controls all the fax communications and fax features, in cooperation with the controller board. The MBU contains the ROM and SRAM. 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. Only one extra G3 interface option can be installed. The optional 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.

## FACE2 (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 control

Modem (R288F-29)

- V.34, V33, V17, V.29, V.27ter, V.21, and V. 8


## DRAM

- The 8 MB of DRAM is shared as follows.

SAF memory : 2MB
Working memory : 2MB
Page memory : 4MB

- The SAF memory is backed up by a rechargeable battery.


## Memory back-up

- A Rechargeable battery backs up the SAF memory (DRAM) for 1 hour.


## Switches

| Item | Description |
| :--- | :--- |
| SW1 | Reset switch, to reboot the FCU board |

### 4.2.2 MBU

On this board, the flash ROM contains the FCU firmware, and the SRAM contains the system data and user parameters. Even if the FCU is changed, the system data and user parameters are kept on the MBU board.
ROM

- 3MB flash ROMs for system software storage 2 MB (16bit x 1MB) + 1MB (16bit x 512K)

SRAM

- The 256 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.


## Switches

| Item | Description |
| :--- | :--- |
| SW1 | Switches the SRAM backup battery on/off. |

### 4.2.3 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. |

### 4.2.4 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, H: High |  |

## CTR21 (Common Technical Regulation 21):

France, Germany, UK, Italy, Austria, Belgium, Denmark, Finland, Ireland, Norway, Sweden, Switzerland, Portugal, Holland, Spain, Israel, Greece

### 4.2.5 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.
- 512KB (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)


### 4.2.6 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


### 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 IPU processes the data and transfers it to the FCU.
NOTE: When scanning a fax original, the IPU 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 IPU video processes the data and transfers it to the FCU.
NOTE: When scanning a fax original, the IPU 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 IPU.
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 IPU.
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 ISDN Unit | PSTN + PSTN + ISDN | G3 + G3 +G4 |
|  | PSTN + ISDN | $\begin{gathered} \mathrm{G} 3+\mathrm{l}-\mathrm{G} 3 \\ \text { or } \\ \mathrm{G} 3+\mathrm{I}-\mathrm{G} 3+\mathrm{G} 4 \end{gathered}$ |
|  | ISDN | $\begin{gathered} \mathrm{I}-\mathrm{G} 3+\mathrm{I}-\mathrm{G} 3 \\ \text { or } \\ \mathrm{I} \mathrm{G} 3+\mathrm{G} 4 \end{gathered}$ |

### 4.4.3 DOCUMENT SERVER



The base copier's scanner scans the original at the selected resolution. The IPU 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

## 1. GENERAL SPECIFICATIONS

| Type: | Desktop type transceiver |
| :---: | :---: |
| Circuit: | PSTN (max. 2ch.) <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: | $\begin{aligned} & \text { G3 } \\ & \quad 8 \times 3.85 \text { lines } / \mathrm{mm} \text { (Standard) } \\ & 8 \times 7.7 \text { lines } / \mathrm{mm} \text { (Detail) } \\ & 8 \times 15.4 \text { line } / \mathrm{mm} \text { (Fine) Note } 1 \\ & 16 \times 15.4 \text { line } / \mathrm{mm} \text { (Super Fine) See Note } 1 \end{aligned}$ |
|  | $\begin{aligned} & 200 \times 100 \text { dpi (Standard) } \\ & 200 \times 200 \text { dpi (Detail) } \\ & 400 \times 400 \text { dpi (Super Fine) See Note } 1 \end{aligned}$ |
|  | ```G4 200 x 100 dpi (Standard) 200 x 200 dpi (Detail) 400 x 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) |

## SPECIFICATIONS

| Modulation: | V.34, V.33, V. 17 (TCM), V. 29 (QAM), 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: $0 \mathrm{~ms} /$ 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 <br> 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



| No. | Description | No. | Description | No. | Description |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 1 | NCU board | 5 | MBU board | 9 | CCUIF |
| 2 | FCU board | 6 | FCUIF board | 10 | SiG4 board |
| 3 | Fax Function Upgrade <br> Unit | 7 | DIMM board for Fax <br> application | 11 | Optional G3 board |
| 4 | Expansion Memory | 8 | Controller board | 12 | Optional NCU board |


| Item | Machine Code | No. | Remarks |
| :--- | :---: | :---: | :--- |
| Fax Option Type 1027 | B418 | $1,2,5,6,7$ |  |
| G3 Interface Unit Type <br> 1027 | B448 | $9,11,12$ |  |
| SDN Option Type <br> 1027 | B449 | 9,10 |  |
| Fax Function Upgrade <br> Type 185 | A892 | 3 | Used in common with previous <br> models. |
| Handset Type 450 | A646 | - | USA only |
| Marker Type 30 | H903 | - | Refill ink for stamp |
| Expansion Memory | - | 4 | Used in common with previous <br> models. |


[^0]:    . CAUTION
    Unplug the copier power cord before starting the following procedure.

[^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]:    G4 Internal Switch 1D - Not used (do not change the settings)
    G4 Internal Switch 1E - Not used (do not change the settings)
    G4 Internal Switch 1F - Not used (do not change the settings)

