## Gestetner Incour savin



G035
SERVICE MANUAL

# Gestetner RICOM 5.VII 



# Gestetner RICOM SaVII 

## G035

## SERVICE MANUAL

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## ⒾMPORTANT SAFETY NOTICES

## PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the printer and peripherals, make sure that the printer power cord is unplugged.
2. The wall outlet should be near the printer 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 the print job process starts before the printer completes the warm-up period, keep hands away from the mechanical and the electrical components because the printer starts printing sheets as soon as the warm-up period is complete.
5. The inside and the metal parts of the fusing unit become extremely hot while the printer is operating. Be careful to avoid touching those components with your bare hands.

## HEALTH SAFETY CONDITIONS

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

## OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The printer's peripherals (except for paper tray unit) 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. The manufacturer recommends replacing the entire NVRAM. Do not recharge or burn this battery. Used NVRAM must be handled in accordance with local regulations.

## SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

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

## LASER SAFETY

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

## WARNING

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





## REPLACEMENT AND ADJUSTMENT G035

1000 SHEET FINISHER (A681)


## TROUBLESHOOTING G035

3000 SHEET FINISHER (A697)


| PAPER TRAY UNIT G520 |  |  |  |  |
| :--- | :--- | :---: | :---: | :---: |
| APPENDIX |  |  |  |  |
|  |  |  |  |  |

## OVERALL MACHINE INFORMATION

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

### 1.1.1 PRINTER

| Configuration: | Desktop |
| :--- | :--- |
| Printing Process: | Dry electrostatic transfer system |
| Resolution: | $600 \times 600 \mathrm{dpi}$ (PCL5e, PCL6, PS) |
|  | $400 \times 400 \mathrm{dpi}$ (PS) |
|  | $300 \times 300 \mathrm{dpi}$ (PCL5e, simulated by doubling pixel |
|  |  |
|  |  |
|  | width and height at 600 dpi resolution) |

Gray Scale:
Printing Speed (Maximum)

Printing Emulation:

Printer Font:

Printer Interface:

DRAM Capacity:

Printer Driver:

Not applicable to AP4500
45 ppm (A4/11" x $8.5^{\prime \prime}$ sideways, simplex)
36 ppm (A4/11" x $8.5^{\prime \prime}$ sideways, duplex)
PCL5e and PCL6
PostScript 3
PCL5e/PCL6:
45 scaleable typefaces in 14 typeface families (35 Intellifont and 10 TrueType format fonts) 6 bitmapped typefaces in the Line Printer typeface family
PS:
136 Adobe Type1 fonts
Bi-directional Parallel x 1
Network Interface x 1
Ethernet (100 base-TX/10 base-T for TCP/IP, IPX/SPX, EtherTalk)
8 MB (Standard)
2 DRAM SIMM slots (up to 64 MB) Maximum Total: Up to 72 MB
PCL5e Printer Driver for Windows 3.1/95/98/NT
PCL6 Printer Driver for Windows 3.1/95/98/NT
PS3 Printer Driver for Windows 3.1/95/98/NT and Macintosh


Power Source:
North America
120 V, 60 Hz , More than 10 A
Europe/Asia
220 ~ $240 \mathrm{~V}, 50 / 60 \mathrm{~Hz}$, More than 6 A
$\Rightarrow \quad$ Dimensions $(\mathrm{W} \times \mathrm{D} \times \mathrm{H})$ :
$665 \times 640 \times 570 \mathrm{~mm}$ (26.2" x $25.2^{\prime \prime} \times 22.4^{\prime \prime}$ )
Without options
$\Rightarrow$ Weight:
62 kg (136.7 lb)
Power Consumption:
Mainframe only:

- 115 V/230 V machine -

| Maximum | Less than 1.2 kW |
| :--- | :--- |
| Warm-up | Less than 1.0 kW |
| Energy Saver Mode | Less than $45 \mathrm{~W} / \mathrm{h}$ |

Noise Emission:

|  | Mainframe Only |  |
| :---: | :---: | :---: |
| Sound Power Level |  |  |
| Printing | $70 \mathrm{~dB}(\mathrm{~A})$ | $74 \mathrm{~dB}(\mathrm{~A})$ |
| Stand-by | $42 \mathrm{~dB}(\mathrm{~A})$ | - |

NOTE: The above measurements were made in accordance with ISO 7779.

### 1.1.2 NETWORK INTERFACE BOARD

| Type: | Internal Network Interface Board |
| :--- | :--- |
| Network Topology: | Ethernet (10 base-T) and Fast Ethernet (100 base-TX) |
| Network Interface: | RJ45 x 1 |
| Protocols: | IPX, TCP/IP, EtherTalk |
| SNMP Support: | - IP and IPX SNMP support of MIB-2 and proprietary |
|  | NIC MIB. |
|  | - SNMP support of standard MIB and proprietary |
|  | $\quad$ printer MIBs on compatible printers. |
|  | STP (Shielded Twisted-Pair) cable |
| Required Cable: | Category/Type 5 or better |
|  | NOTE: A cable is not enclosed with this option. |
|  | - MAP (Management Access Protocol) |
|  | - IPX peer-to-peer printing |
|  | - IP peer-to-peer printing |
|  | - BOOTP (16-bit and 32-bit) |
|  | - NetWare setup utility |
|  | - Built-in web server |
|  | - Built-in Telnet server |
|  | - Firmware update over an IPX or IP network |

### 1.2 PAPER EXIT TRAY SELECTION

[B] Longer than B4, 81/2" x 13"

[C]
[A] A4, LT


The machine allows selection between the paper tray exit trays: Internal Tray [A] (standard output tray), External Tray [B] (finisher) and [C] (mail box). If the subscan length is more than 330 mm , the exit tray is as shown below, if the relevant options have been installed.

| Installed options | Exit tray for paper Ionger than $\mathbf{3 3 0} \mathbf{~ m m}$ |
| :--- | :--- |
| Bridge unit \& Finisher (1,000-sheet) | Internal Tray [A] |
| Bridge unit \& Finisher (3,000-sheet) | External Tray [B]: The finisher upper tray |
| Bridge unit and Mailbox | [C]: The mail box tray |
| Bridge unit and Mailbox and Finisher 3000 | [C]: The mail box tray |

### 1.3 MACHINE CONFIGURATION

### 1.3.1 SYSTEM COMPONENTS



| Version | Item | Machine Code | No. |
| :--- | :--- | :---: | :---: |
|  | Printer | G035 | 1 |
|  | LCT (Option) | A683 | 2 |
|  | RAM SIMM (Option) | - | 3 |
|  | Hard Disk (Option) | A853 | 4 |
|  | Paper Tray Unit (Option) | G520 | 5 |
|  | 3,000-sheet Finisher (Option) | A697 | 6 |
|  | $1,000-$ sheet Finisher (Option) | A681 | 7 |
|  | Bridge Unit (Option) | A688 | 8 |
|  | Mailbox Bridge Unit (Option) | G912 | 9 |
|  | Mailbox (Option) | G909 | 10 |
|  | Punch Unit (Option for 3000-sheet Finisher) | A812-17 (3 holes) <br> A812-27 (2 holes) |  |

### 1.3.2 INSTALLABLE OPTION TABLE

## Printer Options

| O= Standard $\quad$ = Available $\quad \mathbf{A}=$ Requires another option |  |  |
| :--- | :---: | :--- |
| Option |  | Note |
| Paper Tray Unit | $\boldsymbol{\bullet}$ |  |
| LCT | $\mathbf{A}$ | Requires the paper tray unit. |
| By-pass Feed Unit | $\bigcirc$ |  |
| Duplex Unit | $\bigcirc$ |  |
| Bridge Unit | $\bullet$ |  |
| 1,000-sheet Finisher | $\mathbf{A}$ | Requires the paper tray unit and bridge unit. |
| 3,000-sheet Finisher | $\mathbf{A}$ | Requires the paper tray unit and bridge unit. |
| Punch Unit | $\mathbf{A}$ | Requires the 3000-sheet finisher. |
| Mailbox | $\mathbf{A}$ | Requires the bridge unit and the paper tray unit |
| Mailbox Bridge Unit | $\mathbf{A}$ | Requires the Mailbox |

### 1.4 MECHANICAL COMPONENT LAYOUT



1. Hot roller
2. Exit roller
3. Paper exit sensor
4. Exit junction gate
5. Pressure roller
6. Entrance sensor
7. Inverter gate
8. Inverter roller
9. Transfer belt cleaning blade
10. Upper transport roller
11. OPC drum
12. Transfer belt
13. Registration roller
14. Lower transport roller
15. Exit sensor
16. Paper end sensor
17. Pick-up roller
18. By-pass tray
19. Paper feed roller
20. Separation roller
21. Upper relay rollers
22. Feed roller
23. Separation roller
24. Pick-up roller
25. Bottom plate
26. Development unit
27. Charge roller
28. Fө mirror
29. Polygonal mirror motor
30. Laser unit
31. Barrel toroidal lens (BTL)
32. Toner supply bottle holder

### 1.5 PAPER PATH



1. Bridge unit
2. Duplex unit
3. By-pass feed unit
4. LCT
5. Paper tray unit
6. Mailbox
7. 3,000-sheet finisher
8. Mailbox bridge unit

## ELECTRICAL COMPONENT DESCRIPTIONS

### 1.6 ELECTRICAL COMPONENT DESCRIPTIONS

Refer to the electrical component layout and the point-to-point diagram on the waterproof paper in the pocket for the locations of these components.

| Symbol | Description | Note | Index No. |
| :---: | :---: | :---: | :---: |
| Printed Circuit Boards |  |  |  |
| PCB1 | Printer Controller | Controls the PC interface, print image processing, operation panel, and other controller options. | 1 |
| PCB2 | Mother | Connects the controller to the BICU board. | 2 |
| PCB3 | NIB (Network Interface Board) | Interfaces printer to the network. | 3 |
| PCB4 | BICU (Base Engine \& Image Control Unit) | Controls all printer engine functions both directly and through other control boards. | 6 |
| PCB5 | IOB (Input/Output Board) | Controls the mechanical parts of the printer (excluding the paper feed section), and the fusing lamp power. | 10 |
| PCB6 | PFB (Paper Feed Control) | Controls the mechanical parts of all paper feed sections. | 9 |
| PCB7 | High Voltage Supply | Supplies high voltage to the drum charge roller, development roller, and transfer belt. | 11 |
| PCB8 | PSU <br> (Power Supply Unit) | Provides DC power to the system and AC power to the fusing. | 7 |
| PCB9 | LDDR (Laser Diode Driver) | Controls the laser diode. | 17 |
| PCB10 | Main (Duplex) | Controls the duplex unit. | 60 |
| Motors |  |  |  |
| M1 | Main | Drives the main body components. | 25 |
| M2 | Tray Lift | Raises the bottom plate in the paper tray. | 37 |
| M3 | Polygonal Mirror | Turns the polygonal mirror. | 20 |
| M4 | LD Positioning | Rotates the LD unit to adjust the LD beam pitch when a different resolution is selected. | 19 |
| M5 | Cooling Fan | Removes heat from the main PCBs. | 26 |
| M6 | Exhaust Fan | Removes heat from around the fusing unit. | 28 |
| M7 | Toner Supply | Rotates the toner bottle to supply toner to the development unit. | 24 |
| M8 | PSU Cooling Fan | Removes heat from the PSU. | 8 |
| M9 | Inverter (Duplex) | Drives the inverter roller. | 59 |
| M10 | Transport (Duplex) | Drives the upper and lower transport rollers. | 61 |
|  |  |  |  |
| Sensors |  |  |  |
| S1 | LD Unit Home Position | Informs the CPU when the LD unit is at the home position. | 18 |
| S2 | Toner Density (TD) | Detects the amount of toner inside the development unit. | 15 |
| S3 | Paper Exit | Detects misfeeds. | 46 |


| Symbol | Description | Note | Index No. |
| :---: | :---: | :---: | :---: |
| S4 | Registration | Detects the leading edge of the paper to determine the stop timing of the paper feed clutch, and detects misfeeds. | 49 |
| S5 | Image Density (ID) | Detects the density of various patterns and the reflectivity of the drum for process control. | 48 |
| S6 | Upper Paper Lift | Detects when the paper in the upper paper tray is at the feed height. | 50 |
| S7 | Lower Paper Lift | Detects when the paper in the lower paper tray is at the feed height. | 52 |
| S8 | Upper Paper End | Informs the CPU when the upper paper tray runs out of paper. | 51 |
| S9 | Lower Paper End | Informs the CPU when the lower paper tray runs out of paper. | 53 |
| S10 | Upper Relay | Detects misfeeds. | 55 |
| S11 | Lower Relay | Detects misfeeds. | 54 |
| S12 | Transfer Belt Position | Informs the CPU of the current position of the transfer belt unit. | 29 |
| S13 | Toner Overflow | Detects toner overflow in the toner collection tank. | 16 |
| S14 | Upper Paper Height 1 | Detects the amount of paper in the upper tray in combination with upper paper height sensor 2. | 41 |
| S15 | Upper Paper Height 2 | Detects the amount of paper in the upper tray in combination with upper paper height sensor 1. | 40 |
| S16 | Lower Paper Height 1 | Detects the amount of paper in the lower tray by the in combination with lower paper height sensor 2. | 39 |
| S17 | Lower Paper Height 2 | Detects the amount of paper in the lower tray by the in combination with lower paper height sensor 1. | 38 |
| S18 | New Unit Detection | Detects the new photoconductor and development unit. | 31 |
| S19 | Entrance (Duplex) | Detects the trailing edge of the paper to turn on the inverter gate solenoid and turn on the inverter motor in reverse. Checks for misfeeds. | 56 |
| S20 | Exit (By-pass) | Checks for misfeeds. | 62 |
| S21 | Cover Guide | Detects whether the cover guide is opened. | 63 |
| S22 | Paper End (By-pass) | Informs the copier when the by-pass tray runs out of paper. | 64 |
| S23 | Paper Size Sensor Board (By-pass) | Detects the paper width. | 67 |
| Switches |  |  |  |
| SW1 | Right Lower Cover | Detects whether the right lower cover is open or closed. | 35 |

## ELECTRICAL COMPONENT DESCRIPTIONS

| Symbol | Description | Note | Index No. |
| :---: | :---: | :---: | :---: |
| SW2 | Right Upper Cover | Cut the +5 VLD and +24 V DC power line and detects whether the right upper cover is open or closed. | 22 |
| SW3 | Main Power | Supplies power to the printer. If this is off, there is no power supplied to the printer. | 44 |
| SW4 | Front Cover Safety | Cuts the +5 VLD and +24 V DC power line and detects whether the front cover is open. | 45 |
| SW5 | Upper Paper Size | Determine the size of paper in the paper tray, based on the dial setting. | 43 |
| SW6 | Lower Paper Size | Determine the size of paper in the paper tray, based on the dial setting. | 42 |
| SW7 | Duplex Unit Open | Detects whether the duplex unit is opened. | 57 |
| Solenoids |  |  |  |
| SOL1 | Inverter Gate | Controls the inverter gate. | 58 |
| SOL2 | Pick-up | Moves the pick-up roller to contact the paper. | 66 |
| SOL3 | Duplex Junction Gate | Controls the duplex junction gate. | 23 |
| SOL4 | Exit Junction Gate | Controls the exit junction gate. | 27 |
| Magnetic Clutches |  |  |  |
| CL1 | Transfer Belt | Controls the touch and release movement of the transfer belt unit. | 30 |
| CL2 | Registration | Drives the registration rollers. | 32 |
| CL3 | Relay | Drives the relay rollers. | 34 |
| CL4 | Upper Paper Feed | Starts paper feed from the upper paper tray. | 33 |
| CL5 | Lower Paper Feed | Starts paper feed from the lower paper tray. | 36 |
| CL6 | Paper Feed (By-pass) | Starts paper feed from the by-pass tray. | 65 |
| Lamps |  |  |  |
| L1 | Fusing | Provides heat to the hot roller. | 14 |
| L2 | Quenching | Neutralizes any charge remaining on the drum surface after cleaning. | 47 |
| Thermistor |  |  |  |
| TH1 | Fusing | Monitors the temperature at the central area of the hot roller. | 12 |
| Thermofuse |  |  |  |
| TF1 | Fusing | Provides back up overheat protection in the fusing unit. | 13 |
| Other |  |  |  |
| LSD | Laser Synchronization Detector | Detects the laser beam at the start of the main scan. | 21 |
|  |  |  |  |

### 1.7 DRIVE LAYOUT



1. Transfer belt clutch
2. Registration clutch
3. Upper paper feed clutch
4. Lower paper feed clutch
5. Relay clutch
6. Main motor

## Duplex



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

### 1.8 PRINT PROCESS

### 1.8.1 OVERVIEW



## 1. 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.

## 2. LASER EXPOSURE

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

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

Paper is fed to the area between the drum surface and the transfer belt at the proper time to align the copy paper and the developed image on the drum surface. Then, the transfer bias roller applies a high positive charge to the reverse side of the paper through the transfer belt. This positive charge pulls the toner particles from the drum surface on to the paper. At the same time, the paper is electrically attracted to the transfer belt.
5. PAPER SEPARATION

Paper separates from the drum as a result of the electrical attraction between the paper and the transfer belt. The pick-off pawls help separate the paper from the drum.
6. 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.

## 7. CLEANING

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

## 8. QUENCHING

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

### 1.9 BOARD STRUCTURE

### 1.9.1 BLOCK DIAGRAM





### 1.9.2 DESCRIPTIONS

1. Printer Controller

The printer controller handles the following functions:

- Printer host interface
- Printing functions
- Operation panel control
- Interface and control of the network interface board
- Interface and control of additional controller options (HDD and DRAM SIMM)

2. Hard Disk (Option)

This HDD stores the additional soft fonts (both PCL and PS fonts).
3. Network Interface Board

The network interface board is a printer interface to allow the printer to be used on a network.
4. DRAM SIMM (Option)

There are two DRAM SIMM slots. This is used for an additional printer processing memory area. 8, 16, or 32 Mbytes standard SIMM modules can be installed. As a result, up to 72 Mbytes of RAM are installable (8 Mbytes on board plus 64 Mbytes of optional SIMM).
5. MB (Mother Board)

This connects the controller to the BICU board in the machine.
6. BICU (Base Engine and Image Control Unit)

This is the main board. It controls the following functions.

- Engine sequence
- Timing control for peripherals


## 7. IOB (Input/Output Board)

The IOB handles the following functions.

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


## DETAILED DESCRIPTIONS

## 2. DETAILED SECTION DESCRIPTIONS

### 2.1 PRINTER CONTROLLER

### 2.1.1 HARDWARE OVERVIEW



The above block diagram shows the major components of the printer controller. The main features are as follows.

1. CPU

The CPU uses an IBM PPC603 processor. A 100-MHz oscillator is the clock source for both the CPU and the co-processor.
2. Co-processor

The co-processor performs the following functions.

- ROM control
- I/O control
- DRAM control
- Printer video interface
- Printer communication interface
- IEEE 1284 compliant bi-directional parallel port interface
- Interrupt control


## 3. ROM memory

Flash ROM (8 MB)
4 MB of flash ROM area is for boot, operation system, PCL5e, and PCL6 codes, and for the font data for both PCL languages (resident fonts). The remaining 4-MB area is for PostScript code and font data.

## 4. NVRAM (8 KB)

This NVRAM contains the printer settings, and the job and error record data.
5. Network Interface Board Interface

This interface controls the optional NIB, and a printer NIB is provided to support the network operations.
6. Hard Disk Drive Interface (Enhanced IDE: Option)

This HDD interface is provided to support storage of fonts downloaded from a PC.
7. IC Card Interface

The flash memory card for updating the controller and PostScript firmware is connected to this flash memory card slot.
8. Power-on Self-diagnostic

When the controller is turned on, the controller performs a self-diagnostic test.

### 2.1.2 IMAGE PRINTING




The printer controller receives the print data from the computer through the parallel or network interface port. The co-processor handles the image data but it only makes a raster image. All image processing, such as edge smoothing and toner saving, are done in the base engine.
The image data from a PC goes to the buffer in the resident RAM. Then, it goes to the co-processor. The co-processor selects the printer language automatically, then it generates the print data to match the selected printer language. After generating the print data, the co-processor sends it to the LD unit through the IPU on the BICU board. At that time, the data is also sent to the hard disk for multiple printing and sorting, as well as backup in case of paper jams.

### 2.1.3 IMAGE DATA PROCESSING

The FCl in the LD unit is responsible for edge smoothing and toner saving functions.

The edge smoothing and toner saving modes can be switched on or off using the printer user tool or the printer driver.

## Edge Smoothing

Fig. A


Fig. B


Usually, binary picture processing generates jagged edge on characters as shown in the above left illustration (Figure A). The FCI reduces the edges of characters using edge smoothing.
Whether or not the object pixel undergoes smoothing depends on the surrounding image data. Changing the laser pulse position smoothes the object pixel.

## Toner Saving Mode

Toner saving is done by reducing the laser power, not by varying the development bias. In toner saving mode, the image data is filtered through a matrix.
Passing through the filter uses less toner to create the latent image on the drum, and black areas print as gray.

### 2.1.4 FEATURES

## Sorting

If "Collate" is turned on and a multi-print job is printed, the first sheet of the job will be printed directly. At the same time, the image data for the print job is stored in the hard disk of the machine. When the machine prints the next sheet, it will be printed from the hard disk.

If the finisher is not installed, the rotate sort feature can be used. The MSU rotates the image, in the same manner as image rotation for the printer.

## Proof Print

The Proof Print function gives users a chance to check the print results before starting a multiple-set print run.
When printing from a host computer, a print job is sent to the controller with a user ID and the current time. Then the controller executes raster image processing, stores the image data onto the proof print partition of the hard disk on the machine, and prints one set of the document.

After the user checks that the print result is OK, the user selects the file using the machine's operation panel, and prints the rest of the sets. After all sets have been printed, the controller deletes the file automatically.
If the proof print result is not OK, the user must delete the file manually.
If there is no available space for a new file or a new page in the proof print partition, the machine displays the overflow status after receiving the new file or new page. The machine prints only one sheet of a file that was received during overflow status and generates error log information.
The error log information can be confirmed on the LCD using the user menu (Proof print - Show error log). The error log contains the user ID and time information. The machine can keep the latest 20 error logs. When the new error log is generated, the machine deletes the oldest error log.

NOTE: 1) The proof print partition size is about 720 MB . It can hold up to 30 files or about 965 pages. The maximum number of pages depends on how complex the pages are.
2) Proof print is available with PCL drivers, Windows 95/98 PostScript drivers, and Macintosh PostScript drivers (with the Proof Print plug-in). The PostScript drivers for Windows 3.x and Windows NT 4.0 do not support the proof print function.

## Duplex Printing

Duplex printing is available with all output bin options but not all paper sizes (refer to the specifications section of the printer manual). If a job specifies duplex but the paper size in the duplex unit is not usable, the job will be print as simplex.
Duplex printing is available in two binding methods: Short- and Long-edge binding.
In short-edge binding, when printing the second side of a page, the image may require rotation. The co-processor in the printer controller rotates the image.
The co-processor corrects the image printing order for duplexing as follows.

- Larger than A 4 lengthwise/LT lengthwise (example 8 pages)

2nd page -1 st page -4 th page -3 rd page -6 th page -5 th page -8 th page - 7th page

- Up to A4 lengthwise/LT lengthwise (example 8 pages)

2nd page - 4th page - 1st page - 6th page - 3rd page - 8th page - 5th page - 7th page

## Stapling

Stapling is only available when the 3000-sheet finisher or 1000-sheet finisher is installed.

The finishers have the following stapling positions.

1) Upper left, diagonal
2) Upper right, diagonal
3) Left, two staples
4) Top, two staples
5) Right, two staples
6) Upper left, horizontal
7) Upper right, horizontal
8) Upper left, vertical
9) Upper right, vertical

NOTE: With the 1,000-sheet finisher, only stapling positions 1) and 2) are available.

Depending on the paper orientation, the image may have to be rotated. The coprocessor in the printer controller does this image rotation.
There is a limit for the number of sheets that each finisher can staple. If a job that specifies stapling has more than this number of sheets, it will not be stapled.

## Punching

Punching is only available when the punch unit is installed with the 3,000 -sheet finisher. The number of holes depends on the type of punching unit. The punching unit has only one available position, so the relationship between the punching position and the printed image depends on the paper feeding orientation and imaging. The punching positions are defined as follows.

1) Left
2) Top
3) Right

## Jam Recovery

If the jam recovery feature is on and a paper jam occurs, the controller will reprint all pages for which it did not receive a feed-out indication from the main machine. In most cases, all image data from the controller is saved on the HDD in the main machine. When a jam occurs, the recovery data is sent from the HDD in the main machine to the controller and printing continues after the jam is removed.

## Auto Tray Select

After selecting "Auto Select" using the printer driver, the printer searches for a tray that contains the specified size of normal plain paper. The search starts from the LCT, and after finding a tray that contains the specified size of paper, the printer starts printing and feeds paper from that tray. The search sequence is as follows.

## LCT - 1st tray - 2nd tray - 3rd tray - 4th tray - LCT

The default setting for the current tray is LCT. If the LCT is not installed, the default is the 1st tray.

## Power On Self Diagnostics

When the controller turns on, it automatically performs a self-diagnostic sequence of tests. If any errors are detected, the operation panel displays an error message.

## Test Items

Devices always tested

- Co-processor
- Flash ROM
- Resident RAM
- NVRAM
- Engine I/F
- Network interface board I/F

Devices tested when they are installed

- DRAM SIMM
- HDD I/F


### 2.1.5 HARD DISK

Two hard disks are used for the printer functions. One is connected to the printer controller (Printer HDD: Option), and the other to the BICU board in the machine (Engine HDD: Standard).

## Printer HDD (Option)

When the main power switch is turned on after the printer HDD is installed, the machine asks you to format the hard disk.
If you press the "Yes" button, the machine formats the hard disk. At this time, two partitions will be made on the hard disk. One is for PCL and the other is for PostScript (fonts and macros only).
If you press the "Ignore" button, the machine determines that there is no optional printer hard disk.

## Engine HDD (Standard)

The hard disk in the main machine, used for printer functions, has two partitions: for printer and proof print files.

### 2.1.6 PAPER OVERFLOW DETECTION

## Standard Output Tray



The standard output tray can stack about 500 sheets. There is a paper limit sensor [A] to prevent paper overflow.

When the tray is full, the paper stack pushes up the feeler [B] then the paper limit sensor is activated. When the sensor stays activated for a certain time, the machine determines that the standard tray is full. The machine stops printing until the paper limit sensor is deactivated.

## Bridge Unit



The bridge unit has a paper sensor [A] to detect paper. This sensor is monitored to ensure that the bridge unit does not contain more than 250 sheets. If a print job of more than 250 sheets is executed, the machine will print up to 250 pages, then the print job stops. Once the output stack is removed, the printing job automatically continues from where it let off.

### 2.2 LASER EXPOSURE

### 2.2.1 OVERVIEW

This machine uses two laser diodes to produce electrostatic images on an OPC drum. The laser diode unit converts image data from the BICU board into laser pulses, and the optical components direct these pulses to the drum.
To produce a high quality print image, there are 256 gradations for the laser pulses, controlled through power modulation ( 32 levels) and pulse width modulation (8 levels).
Exposure of the drum by the laser beam creates the latent image. The laser beam makes the main scan while drum rotation controls the sub scan.

The combined strength of both beams is 0.430 mW on the drum surface at a wavelength of 780 nm .

The polygon motor speed is as follows.

| Resolution | Motor Speed (rpm) | 1 line cycle ( $\mu \mathbf{s}$ ) |
| :---: | :---: | :---: |
| 400 dpi | Approx. 18110 | 276 |
| 600 dpi | Approx. 27170 | 184 |

In previous models, the mirror speed increased for higher resolutions. However, for this machine, the line cycle (time taken to output one main scan line of data to the laser diode) also varies, so a simple relationship does not exist between the resolution and the mirror speed.

### 2.2.2 OPTICAL PATH



The output path from the laser diode to the drum is shown above.
The LD unit [A] outputs two laser beams to the polygon mirror [B] through the cylindrical lens [C] and the shield glass [D].
Each surface of the polygon mirror reflects two full main scan lines. The laser beams go to the F-theta mirror [E], mirror [F], and BTL (barrel toroidal lens) [G]. Then these laser beams go to the drum through the toner shield glass $[\mathrm{H}]$.
The laser synchronizing detector [l] determines the main scan starting position.

### 2.2.3 AUTO POWER CONTROL (APC)



IC2 and IC3 on the LDDR drive the laser diodes. Even if a constant electric current is applied to the laser diode, the intensity of the output light changes with the temperature. The intensity of the output decreases as the temperature increases.
In order to keep the output level constant, IC2 and IC3 monitor the current passing through the photodiode (PD). Then they increase or decrease the current to the laser diode as necessary, comparing it with the reference levels (REF1 and REF2). This auto power control is done just after the machine is turned on and during printing while the laser diode is active.

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

### 2.2.4 DUAL BEAM WRITING



Detailed
Descriptions

This LD unit has two laser diodes; LD1 [A] and LD2 [B] for writing the image. Each face of the polygon mirror writes two main scan lines, and twelve main scans are produced when the polygon mirror rotates once. The reasons for this mechanism are as follows.

1) To reduce the polygon mirror motor rotation speed
2) To reduce the noise generated by the polygon mirror motor
3) To reduce the frequency of the image data clock

Two laser beams are transferred to the polygon mirror [C] through the collimating lens [D] and prism [E]. The two laser beams arrive on the drum surface about 2 mm away from each other in the main scan direction and about 0.06 mm (at 400 dpi) in the sub-scan direction (see the next page).

The reason for the two-mm difference in the main scan direction is so that the machine can detect a laser synchronization signal for each beam.

### 2.2.5 LASER BEAM PITCH CHANGE MECHANISM



The machine changes the resolution between 400 and 600 dpi by rotating the LD unit.

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

Both LD unit positions are at fixed distances from the LD home position sensor [D] (measured by motor pulses). Usually, the LD unit moves directly to the proper position. However, when the number of times that the resolution has changed reaches 100 times, the LD unit moves to the home position (the home position sensor activates), and then it moves to the proper position. This recalibrates the LD unit positioning mechanism.

### 2.2.6 LD SAFETY SWITCHES



To ensure technician and user safety and to prevent the laser beam from inadvertently switching on during service maintenance, there are four safety switches located at the front and upper right covers. These four switches are in series on the LD5 V line that comes from the power supply unit (PSU) through the BICU board.

When opening either the front or upper right covers, the power supply to the laser diode is interrupted.

### 2.3 PHOTOCONDUCTOR UNIT (PCU)

### 2.3.1 OVERVIEW



The PCU consists of the components shown in the above illustration. An organic photoconductor (OPC) drum (diameter: 60 mm ) is used in this machine.

1. Toner Collection Coil
2. Toner Collection Plate
3. ID Sensor
4. Spur
5. Pick off Pawl
6. OPC Drum
7. Transfer Entrance Guide
8. Charge Roller Cleaning Pad
9. Charge Roller
10. Cleaning Blade

### 2.3.2 DRIVE MECHANISM



The drive from the main motor $[\mathrm{A}]$ is transmitted to the drum $[\mathrm{B}]$ through a series of gears, a timing belt [C], and the drum drive shaft [D]. The main motor has a drive controller, which outputs a motor lock signal when the rotation speed is out of the specified range.
The flywheel [E] on the end of the drum drive shaft stabilizes the rotation speed preventing banding and jitters from appearing on sheets printed.
This machine has two flywheels because it operates at a higher speed.

### 2.4 DRUM CHARGE

### 2.4.1 OVERVIEW



This printer uses a drum charge roller instead of a scorotron corona wire to charge the drum. The drum charge roller $[A]$ is always in contact with the surface of the drum $[B]$ to give it a negative charge.
The high voltage supply board [C] gives a negative DC voltage to the drum charge roller through the charge roller terminal [D], bias plate [E], and the rear roller bushing [F]. This gives the drum surface a negative charge of -950 V .

### 2.4.2 CHARGE ROLLER VOLTAGE CORRECTION

## Correction for Environmental Conditions



In the 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 is made. Immediately after making the ID sensor pattern [A], the charge roller voltage drops reducing the drum potential to -600 V . At the same time, the development bias returns to -550 V . The drum potential is now slightly higher than the development bias, so only a very small amount of toner transfers to the drum. The ID sensor measures the density of this pattern [B], and the output voltage is known as Vsdp. This voltage is comparable to Vsg (read from the bare drum at the same time).

If the humidity drops, the drum potential goes up even if the voltage supply for the charge roller remains the same (efficiency of voltage transfer decreases with increased humidity). As a result, more toner is transferred to the ID sensor pattern [B]. If the sensor output reaches a certain point, the drum charge voltage is reduced.
To determine whether to change the drum charge roller voltage, the machine compares Vsdp with Vsg.

- Vsdp/Vsg > 0.90 = Reduce the drum charge voltage by 30 V
- Vsdp/Vsg < 0.85 = Increase the drum charge voltage by 30 V

NOTE: The minimum drum charge roller voltage is -2 kV .

## Correction for Paper Width and Thickness (By-pass Tray Only)

The by-pass tray can feed narrow, thick and special paper types (OHPs) that the standard tray can not. If you use the standard tray with these special paper types, some print quality problems may occur.

To deal with this, the charge roller receives a higher voltage for when using paper fed from the by-pass tray. Adjust the voltage with SP2-13-1 and 2. Charge roller input voltages
Paper width from 216 mm to 297 mm : SP2-5-1
Paper width from 150 mm to 216 mm : SP2-5-1 + 50 V (adj. with SP2-13-2)
Paper width below 150 mm : SP2-5-1 + 250 V (adj. with SP2-13-1)
Similar voltage adjustments are available for development bias and transfer current.

### 2.4.3 ID SENSOR PATTERN PRODUCTION TIMING


$\Rightarrow$ An ID sensor pattern is made during machine initialization (after the main power switch is turned on) and after 10 sheets are printed out.

### 2.4.4 DRUM CHARGE ROLLER CLEANING



The drum charge roller [A] gets dirty easily because it is always in contact with the drum. Therefore, the cleaning pad [B] is also always in contact with the drum charge roller to clean its surface.

The cam gear [D] moves the pin [C] at the rear of the cleaning pad holder, and also moves the cleaning pad from side to side. This movement improves the cleaning process.

### 2.5 DEVELOPMENT

### 2.5.1 OVERVIEW



This machine uses a single-roller development system. A dual mixing roller mechanism is used for developer mixing.

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

### 2.5.2 DRIVE MECHANISM



The main motor [A] drives the development roller [B] through a train of gears and the paddle roller gear [C].
The development drive gears are helical, making them quieter than normal gears.
When the development unit is pushed in, the development drive shaft engages the paddle roller gear.

### 2.5.3 DEVELOPER MIXING



This mechanism supplies toner from the toner bottle to the development roller.
The dual mixing roller consists of the outer paddle $[A]$ and the inner auger $[B]$. The outer paddle moves developer to the front (1) and supplies it to the development roller. The developer that is spilt off by the doctor blade (2) goes through the holes [C] in the outer paddle, and is transported towards the rear (3) by the inner auger. While the dual mixing roller is moving the developer, some developer also goes back to the development unit through the holes in the bottom of the paddle roller (4).

New toner from the toner bottle and recycled toner from the toner collection coil both enter the development unit at the top [D]

### 2.5.4 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 V) and white areas are at a high negative charge (about -950 V ).

To attract negatively charged toner to the black areas of the latent image on the drum, the high voltage supply board [A] applies a bias of -600 volts to the development roller throughout the image development process. The bias is applied to the development roller shaft [B] through the bias terminal spring [C] and bias terminal [D].

The development bias voltage (-600 V) can be adjusted with SP2-8.

## Correction for Paper Width and Thickness (By-pass Tray Only)

The by-pass tray can feed narrow, thick and special paper types (OHPs) that the standard paper tray can not. If you use the standard tray with these special types of paper, some print quality problems may occur.

To deal with this, the charge roller receives a higher voltage for when using paper fed from the by-pass tray. Adjust the voltage with SP2-13-3 and 4.

## Development bias voltages

Paper width from 216 mm to 297 mm : SP2-5-1
Paper width from 150 mm to 216 mm : SP2-5-1 + 50 V (adj. with SP2-13-4)
Paper width below 150 mm : SP2-5-1 + 200 V (adj. with SP2-13-3)
Similar voltage adjustments are available for charge roller input voltage and transfer current.

### 2.5.5 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, the pin [B] moves against the side [C] of the PCU, and pulls out the toner shutter [D] 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 $[\mathrm{H}]$ that helps move toner to the development unit.
When the bottle holder unit is pulled out to add a new toner bottle, the following events happen 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 because of pressure from a spring.


## Toner supply mechanism



[D] [E]

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 into the machine, the development unit opens the shutter [E] under the PCU. Then the toner falls down into the development unit through the slit and the shutter.

## DEVELOPMENT

### 2.5.6 TONER DENSITY CONTROL

## Overview

This machine uses sensor control mode to control toner supply.

## Toner Density Control Flow Chart



## Sensor Control Mode

In sensor control mode, the machine varies the toner supply for each print, to maintain the correct proportion of toner in the developer and to account for changes in drum reflectivity over time. The adjustment depends on two factors:

- The amount of toner required to print the page (based on a black pixel amount for the page)
- Readings from the TD sensor and ID sensor

Each step of the previous flow chart is explained in more detail on the following pages.

## Toner Density Sensor Initial Setting

When new developer with standard toner concentration is installed ( 12.5 g of toner
in 500 g of developer; $2.5 \%$ by weight), use SP2-10 to do the initial setting for the TD sensor. This sets the sensor output to 4.0 V . this value is used as the toner supply reference voltage ( $\mathrm{V}_{\text {treff }}$ ) for the TD sensor.

## Image Pixel Count

The CPU adds up the image data value of each pixel and converts the sum to a value between 0 and 255 . The value would be 255 if the page was completely black or 0 if it were completely white.

## Vt(10) Detection

The toner density in the developer is detected once every print cycle. The sensor output voltage $\mathrm{V}_{\mathrm{t}}(10)$ is the average of the 10 most recent sensor output voltage readings.

## Toner Density Measurement

The machine compares Vt (10) and Vtref . If $\mathrm{Vt}(10)$ is greater than V tref, the toner concentration in the development unit is low and more toner should be added.
When Vt (10) > Vtref has been detected 20 times (toner concentration is consistently low), 0.1 is added to Vref, and the conditions are checked again. The result decides the value of " K " (toner supply rate coefficient), which is one of the factors in the toner supply motor on time calculation.

If Vt (10) > Vtref has not been detected 20 times, 0.2 is subtracted from Vtref, and " K " is decided in a similar way as for the previous condition.

## GAIN Determination

GAIN is another factor in the toner supply motor on time calculation. It is decided using the following data.

- Vtref - Vt(10)
- Ten most recent Vt values


## Toner Supply Motor on Time Calculation

The toner supply motor on time is decided using the following formula:

$$
\begin{align*}
& {\left[\frac{0.7 \mathrm{mg} / \mathrm{cm}^{2} \text { ImagePixelCount } \mathrm{x} \text { Gain }}{\text { Toner Supply Rate } \mathrm{xK}}+\frac{(\mathrm{Vt}-\mathrm{Vtref}) \times 10,000}{\text { Toner Supply Rate } \mathrm{xK}} \ldots \ldots \ldots \ldots \ldots . . .\right.}  \tag{1}\\
& \frac{(255-\text { Image Pixel Count) }}{255} \times \frac{\text { Gain }}{6} \tag{2}
\end{align*}
$$

NOTE: 1) The toner supply rate is fixed at 30.
2) $\mathrm{K}=$ Toner supply rate coefficient (fixed at 3.0).
3) The bracket (2) in the above formula is only used if V tref $<\mathrm{Vt}$.
4) The maximum toner supply motor on time is 1.2 s .

## Vsp and Vsg Detection

The ID sensor (at the lower right area of the drum) detects the following voltages.

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

In this way, the reflectivity of both the drum surface and the pattern on the drum are checked. 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 the charge roller and laser diodes.
Vsg/Vsp is detected every 10 sheets printed to decide the new Vtref.

## New Vtref Determination

Even if the toner concentration in the developer is maintained by checking the TD sensor, the toner potential (chargeability) and the image density both change with humidity and the amount of toner on the carrier. Therefore, the actual image density, using the ID sensor output, is also used as one of the factors for deciding the new Vtref, which is used for toner density control.
The new Vtref is determined using the following data.

- Vtref - Vt(10)
- Vsp/Vsg

From this point, toner density control is done using the new Vtref.

### 2.5.7 TONER NEAR END/END DETECTION

## Toner Near End/End Detection Flow Chart



## DEVELOPMENT

Toner near end is detected using the TD sensor output data.
If Vtref-Vt (10) is less than or equal to -0.45 , the toner concentration is very low. " $K$ " becomes 0.25 and the machine enters the toner near end condition. Then, the toner supply motor turns on to supply toner.
If Vtref-Vt (10) is greater than -0.45 , the toner concentration is still not terribly low, but the machine does further tests by comparing Vtref and Vt (10). If the machine has detected 40 times that Vt (10) is greater than Vtref, the toner supply motor turns on for double the time that it would be with the previous formula. If the toner concentration is still low, the machine enters the toner near end condition.
Toner end is detected using the ID sensor.
If Vsp is bigger than 2.0 V , the density of the ID sensor pattern is very light, so the machine detects a toner end condition. However, if Vsp stays less than 2.0 V but 90 sheets printed have been made after toner near end was determined, the machine enters the toner end condition.

### 2.5.8 TONER END RECOVERY

## Toner End Recovery Flow Chart



## DEVELOPMENT

If the front cover is opened and closed while a toner near end/end condition exists, the machine will attempt to recover the toner near end/end conditions using measurements from the TD sensor.

When the front cover is closed, the toner supply motor turns on to supply toner. The machine checks the TD sensor output 2 s after the main motor turns on. This is called Vtp. It is checked again every 1 second, and these values are called Vtp'.
The machine detects the toner concentration using Vtref, Vt (10), Vtp, and Vtp'. If the toner concentration is still too low, the toner supply motor turns on for another 10 seconds. Then, the machine checks Vt. If toner concentration is at the standard level, the toner near end/end condition is cancelled and " K " is reset. If toner concentration has not reached the standard level, the toner supply motor rotates continuously until it does (maximum motor on time is 16 seconds).

### 2.5.9 TONER SUPPLY IN ABNORMAL SENSOR CONDITIONS

The TD sensor is checked every print. If the readings from the TD sensor become abnormal during a print job, the machine holds the GAIN factor constant (GAIN is normally calculated from TD sensor readings) to allow toner supply to vary with only pixel count for the rest of the print job. Then at the end of the print job, the machine generates an SC code requires repair.
The ID sensor is checked every 10 sheets printed. If readings become abnormal, the machine generates an SC code and requires repair. If this happens during a print job, Vtref is not changed, the print job is allowed to finish, and then the SC code is generated.
Details of how the machine determines abnormal sensor detection are in section 7 (Troubleshooting).

### 2.6 DRUM CLEANING AND TONER RECYCLING

### 2.6.1 DRUM CLEANING ${ }^{[D]}$



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 toner remaining on the drum is scraped off by the cleaning blade, and is transferred to the toner collection coil [B] by the toner collection plate [C].

The collar [D] on the cleaning blade bracket contacts the outer rim of the cam gear [E], and this gear moves the cleaning blade from side to side. (This gear is the same cam gear that moves the cleaning pad for the charge roller from side to side.) This movement helps to disperse spots of accumulated toner to prevent early blade edge wear at any particular location.
To remove the toner and other particles that have accumulated at the edge of the cleaning blade, the drum turns in reverse for about 5 mm at the end of every print job.

### 2.6.2 TONER RECYCLING


[B]

Toner transferred to the toner collection coil $[A]$ is transported to the opening $[B]$ in the bottom of the PCU. Then, it falls into the development unit with the new toner coming from the toner bottle, which the paddle roller [C] mixes together.

### 2.7 PAPER FEED

### 2.7.1 OVERVIEW



There are two paper trays, each of which can hold 500 sheets.
The paper tray feed stations use an FRR system.
There are two relay sensors, one just above each set of relay rollers. These sensors are used for paper jam detection.

The components of the paper feed section are as follows.

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

### 2.7.2 PAPER FEED DRIVE MECHANISM



The main motor $[\mathrm{A}]$ drives the pick-up and feed mechanisms of both the upper and second paper feed stations using gears and paper feed clutches [B].

When the paper tray is inside the machine, the pick-up roller is always in contact with the top sheet of the paper stack (see Pick-up and Separation Roller Release Mechanism for more detail). When the paper feed clutch turns on, the pick-up, paper feed, and separation rollers start rotating to feed the paper. The paper feed clutch stays on until shortly after the registration sensor [C] activates.

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



When the paper tray [A] is not inside the machine, the separation roller [B] moves away from the paper feed roller [C] and the pick-up roller [D] stays in the upper position.
When the paper tray is placed in the machine, it pushes the release lever [E]. This causes the pick-up roller [D] to move down and the separation roller [B] to move up and contact the paper feed roller.

### 2.7.4 PAPER LIFT MECHANISM



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


When the paper tray is placed in the machine, the pick-up roller [A] lowers. When the top sheet of paper reaches the proper height for paper feed, the paper pushes up the pick-up roller, and the actuator $[B]$ on the pick-up roller supporter activates the paper lift sensor [C] to stop the tray lift motor.
After several paper feed cycles, the paper level gradually lowers and the paper lift sensor is de-activated. The tray lift motor turns on again until this sensor is activated again.
When the tray is drawn out of the machine, the tray lift motor coupling gear disengages the pin on the lift arm shaft, and the tray bottom plate then drops under its own weight.

### 2.7.5 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 $[B]$ deactivates.
When the paper tray runs out of paper, the paper end feeler drops into the cutout [C] in the tray bottom plate activating the paper end sensor.
When the paper tray is drawn out, the pick-up roller supporter [D] lifts up the paper end feeler.

### 2.7.6 PAPER HEIGHT DETECTION

Two paper height sensors $[A]$ and $[B]$, working in combination, detect the amount of paper in the tray.

When the amount of paper decreases, the bottom plate pressure lever [C] moves up and the actuator [D] mounted on the same drive shaft as the pressure lever rotates.
The following combinations of sensor signals are sent to the printer controller.

| Amount of <br> Paper | Paper Height <br> Sensor [A] | Paper Height <br> Sensor [B] |
| :---: | :---: | :---: |
| Full | OFF | ON |
| Near Full | ON | ON |
| Near End 1 | ON | OFF |
| Near End 2 | OFF | OFF |



### 2.7.7 PAPER REGISTRATION



A train of gears transmits main motor [A] rotation to the registration clutch gear [B] (located on the lower registration roller shaft).
The registration sensor [C] is positioned just before the registration rollers.
When the leading edge of the paper activates the registration sensor, the registration clutch is off and the registration rollers are not turning. However, the relay clutch [D] stays on for a bit longer. This delay allows time for the paper to press against the registration rollers and buckle slightly to correct skew. Then, the registration clutch energizes and the relay clutch re-energizes at the proper time to align the paper with the image on the drum. The registration and relay rollers feed the paper to the image transfer section.
The registration sensor is also used for paper misfeed detection.

### 2.7.8 PAPER SIZE DETECTION

The paper size switch includes four sensors (microswitches). Actuators behind the paper size dial actuate the sensors.
Each paper size has its own actuator, with a unique combination of notches. To determine the paper size, the CPU reads which switches the actuator has turned off.

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

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

ON: Pushed OFF: Not Pushed

### 2.7.9 PAPER FEED AND JAM TIMING

From 2nd Paper Tray (A4 sideways $\downarrow$ )


T1: The relay clutch and paper feed clutch turn on 500 ms after the main motor.
T2: The relay clutch and paper feed clutch turn off 138 ms after the registration sensor turns on.

T3: The relay clutch and paper feed clutch turn on again and the registration clutch turns on 186 ms after the F-gate signal (laser main scan writing start) has been activated.

T4: The registration clutch turns off 150 ms after the registration sensor.
J1: Checks whether the sensors are activated within 0.3 seconds after the designated time for these sensors.
J2: Checks whether the sensors are deactivated within 0.3 seconds after the designated time for these sensors.

### 2.8 BY-PASS FEED

### 2.8.1 BASIC OPERATION



The printer, through gear [A], directly drives this unit.
When printing starts, the pick-up solenoid [B] turns on and the pick-up roller [C] moves onto the paper.
When the by-pass tray runs out of paper, the paper end feeler [D] drops into the cutout in the by-pass tray activating the paper end sensor [E].

### 2.9 IMAGE TRANSFER AND PAPER SEPARATION

### 2.9.1 OVERVIEW



Instead of using a transfer corona or a transfer roller, this machine uses a transfer belt unit. The transfer belt unit consists of the following parts.

1. Contact lever
2. Transfer roller
3. Transfer belt
4. Idle roller
5. Drive roller
6. Pick-off pawl
7. Transfer belt cleaning blade

The belt has a high electrical resistance, so it can hold a high positive electrical potential to attract toner from the drum onto the paper. Also, the electrical potential attracts the paper itself and helps to separate the paper from the drum and to carry the paper upwards. The pick-off pawl ensures that the paper separates from the drum.

The transfer belt cleaning blade removes toner from the transfer belt to prevent the back side of the paper from being stained.

### 2.9.2 BELT DRIVE MECHANISM



The main motor $[A]$ drives the transfer belt $[B]$ through a train of gears, the belt contact clutch [C], and the drive roller gear [D].

### 2.9.3 IMAGE TRANSFER AND PAPER SEPARATION MECHANISM

The image is transferred from the drum in the following steps.

1. The registration clutch turns on to feed the
paper [A] at the correct time to synchronize the leading edge of the developed latent image on the drum [B] with the leading edge of the paper. The transfer belt [C] is not in contact with the drum at this time.

[A]
2. The transfer belt contact clutch turns on at a certain time after the main motor starts. Then, the transfer belt moves into contact with the drum.

3. When the paper enters the gap between the belt and the drum, the high voltage supply board $[A]$ applies a high positive current to the belt to transfer the image to the paper. $\mathrm{I} 1=\mathrm{It}+\mathrm{I} 2$

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

### 2.9.4 TRANSFER BELT UNIT CONTACT MECHANISM



The belt contact and release mechanism consists of the belt contact clutch [A], cam $[B]$, and contact lever [C].
The belt contact clutch turns on and the cam with the clutch rotates half of a complete rotation. The contact lever, riding on the cam, is lifted up and the spring [D] pushes the belt into contact with the drum.
The home position sensor [E] for the transfer belt contact detects the home position of the cam (this is when the belt is away from the drum).
The belt must be released from the drum between print jobs. The reasons for this are as follows.

- To prevent the ID sensor pattern on the drum from being rubbed off by the transfer belt.
- To prevent a change in the drum's characteristics because of the influence of additives inside the rubber belt.


### 2.9.5 TRANSFER BELT CHARGE

## Overview



The high voltage supply board $[A]$ applies positive transfer belt current to the transfer belt [B] through the terminal block [C], terminal plate [D], and the roller [E]. The terminal block and the terminal plate come in contact with each other when the right cover is closed.
The high voltage supply board adjusts the current supplied to the roller to keep a small but constant current flow to ground through the belt, paper, and drum. If this current is not maintained, the efficiency of the toner transfer and paper separation processes will vary with paper thickness, type, environmental condition, or changes in transfer belt surface resistance.

### 2.9.6 TRANSFER BELT CLEANING MECHANISM



The cleaning blade $[\mathrm{A}]$ is always in contact with the transfer belt. It scrapes off any toner and paper dust remaining on the belt.
To remove toner and other particles that are accumulated at the edge of the cleaning blade, the transfer belt turns in reverse at the end of every print job, in the same way as the drum cleaning blade mechanism.
The toner and paper dust that is scraped off falls down into the toner collection tank [B], which is in the transfer belt unit. This toner is not recycled.
When the toner overflow sensor [C] in the transfer belt unit detects toner overflow, the toner overflow indicator lights. After this, 999 printed sheets can be made before machine operation stops.

### 2.10 IMAGE FUSING AND PAPER EXIT

### 2.10.1 OVERVIEW



This fusing unit contains pressure roller strippers [6]. These prevent the paper from wrapping around the pressure roller (which is possible for a vertical paper transport mechanism).

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

1. Paper exit roller
2. Cleaning roller
3. Fusing exit sensor
4. Entrance guide
5. Junction gate
6. Hot roller
7. Transport roller
8. Fusing lamp(s) (see the note)
9. Pressure spring
10. Thermistor
11. Pressure roller strippers
12. Thermofuse
13. Pressure roller
14. Hot roller strippers

NOTE: For 115 V machines: One lamp.
For 230 V machines: Two lamps.

### 2.10.2 FUSING DRIVE AND RELEASE MECHANISM



The main motor [A] drives the fusing unit through a train of gears and drives the paper exit rollers with a gear and a timing belt [B].
The fusing unit drive release mechanism automatically disengages the fusing unit drive gear [C] when the right cover [D] is opened. This allows the fusing unit drive gear to rotate freely so that misfed paper can be easily removed.
When the right cover is opened, the actuator plate [E] pulls release wire [F]. The wire pulls the fusing drive gear bracket [G] and the fusing unit drive disengages.

### 2.10.3 FUSING ENTRANCE GUIDE SHIFT MECHANISM



The entrance guide $[A]$ for this machine has two holes on each side to adjust for paper thickness, and to prevent creasing. Normally, the right screw hole [B] on each side is used for these purposes.

For thin paper, move the entrance guide to the right by securing it with screw holes $[B]$. This slightly lengthens the paper path, preventing the paper from creasing in the fusing unit.
For thick paper, move the entrance guide to the left (use screw holes [C]). This setting allows more direct access to the gap between the hot and pressure rollers. This prevents thick paper from buckling against the hot roller, which can cause blurring at the leading edge of the print. This setting also aids in preventing thick paper from bending easily, making it less likely to crease.

### 2.10.4 PRESSURE ROLLER



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

Adjusting the position of the pressure springs can change the pressure. The left position [D] is the normal setting. The right position [E] increases the pressure and this maintains the fusing efficiency of the fusing unit.

### 2.10.5 CLEANING MECHANISM



The cleaning roller $[A]$ is always in contact with the pressure roller $[B]$. It collects toner and paper dust adhering to the surface of the pressure roller. This is because the cleaning roller is made of metal and collects matter more easily than the pressure roller, which has a Teflon coating.

### 2.10.6 FUSING TEMPERATURE CONTROL



## Temperature Control

There are two types of control: on/off and phase. Use SP2-3 to toggle between the two modes.

When the main power switch turns on, the CPU checks the AC frequency for 500 milliseconds; this is done in case phase control mode is selected at a later time. Then the CPU turns on the fusing lamp. When the thermistor detects the stand-by temperature $\left(165^{\circ} \mathrm{C}\right)$, the machine can start to print. When the thermistor detects the operating temperature $\left(185^{\circ} \mathrm{C}\right)$, the CPU turns the fusing lamp off/on to maintain this temperature.

## Fusing Idling

To fuse toner at the proper time after the main power switch is turned on, fusing idling should be done when the temperature at power-up is $15^{\circ} \mathrm{C}$ or less and the temperature reaches the value of SP2-4-1 (Fusing temperature adjustment): $-20^{\circ} \mathrm{C}$ The fusing idling time is as follows.

| Power-up temperature | Fusing idling time |
| :--- | :---: |
| $15^{\circ} \mathrm{C}$ or less | 30 seconds |
| Higher than $15^{\circ} \mathrm{C}$ | Not performed |

### 2.10.7 OVERHEAT PROTECTION

If the hot roller temperature becomes greater than $230^{\circ} \mathrm{C}$, the CPU cuts off the power to the fusing lamp. At the same time, an SC543 is generated.

Even if the thermistor overheat protection fails, there is a thermofuse in series with the common ground line of the fusing lamp. If the temperature of the thermofuse reaches $169^{\circ} \mathrm{C}$, the thermofuse opens, removing power from the fusing lamp. At the same time, the copier stops operating. At this time, an SC542 is generated.

DUPLEX

### 2.11 DUPLEX

### 2.11.1 BASIC OPERATION

## Larger than A4 lengthwise/LT lengthwise

The duplex unit can store only one sheet of paper larger than A4 lengthwise.
Example: 8 pages. The number $[A]$ in the illustration shows the order of pages. The number $[B]$ in the illustration shows the order of sheets of paper (if shaded, this indicates the second side).


## Up to A4 lengthwise/LT lengthwise

The duplex unit can store two sheets of paper A4 lengthwise or smaller.
Example: 8 pages. The number $[A]$ in the illustration shows the order of pages. The number $[B]$ in the illustration shows the order of sheets of paper (if shaded, this indicates the second side).

[B]


### 2.11.2 FEED IN AND EXIT MECHANISM



## Feed-in

The inverter gate solenoid [A] stays off and the inverter roller [B] rotates clockwise. A sheet of paper is sent to the inverter section. The inverter section can stack sizes of up to A4 lengthwise when the cover guide [C] is closed. The user must open the cover guide when using larger sizes of paper (longer than A4/LT lengthwise).

## Inversion and Exit

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

### 2.12 ENERGY SAVER MODE

When the machine is not used, the energy saver feature reduces power consumption by switching off fusing lamp.

## Entering the Energy Saver Mode

Energy saver mode starts after the machine has been idle for a certain time. The user specifies this time by user menu. The following choices are available.

- 0 minute: Off (energy saver mode never activates)
- 15 minutes
- 30 minutes (default)
- 1 hour
- 2 hours
- 3 hours

If the user selects "No" for Auto off mode (SP2-17), "0 minutes" does not appear on the LCD in the user menu. (The user will not be able to select "Off" mode.)

NOTE: When the machine is in energy saver mode, the CPU turns off the fusing lamp. Therefore, the time from the print start command to the start of printing is longer than in normal standby mode.

## Leaving Energy Saver Mode

The machine leaves energy saver mode when one of the following happens.

- The print command is received from a PC
- Any key on the operation panel is pressed


### 2.13 NEW UNIT DETECTION MECHANISM



The photoconductor and development unit - maintenance kit has this detection mechanism. When this unit has been replaced, the CPU detects the new unit and automatically removes the "Change Maint. Kit" from the display and resets the maintenance counter.

The photoconductor and development unit has actuating cam [A]. The projection of the cam pushes the feeler $[B]$ of the new unit detection sensor. After the main switch turning on, the new unit sensor turns on, then the machine recognizes that the unit was replaced. Then the machine goes in the initialize mode, the actuating cam is turned [C] by the main motor, therefore, the new unit sensor turns off. If the actuation cam turns once, it never returns the initial position.

## INSTALLATION PROCEDURE

## 3. INSTALLATION PROCEDURE

### 3.1 INSTALLATION REQUIREMENTS

### 3.1.1 ENVIRONMENT

1. Temperature Range: $10^{\circ} \mathrm{C}$ to $30^{\circ} \mathrm{C}\left(50^{\circ} \mathrm{F}\right.$ to $\left.86^{\circ} \mathrm{F}\right)$
2. Humidity Range: $15 \%$ to $90 \%$ 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 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 more than $2,000 \mathrm{~m}(6,500 \mathrm{ft}$.) above sea level.
9. Place the printer 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:
Right to left:

Within 5 mm (0.2") of level
With in $5 \mathrm{~mm}\left(0.2{ }^{\prime \prime}\right)$ of level

### 3.1.3 MINIMUM SPACE REQUIREMENTS

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


NOTE: The 75 centimeters recommended for the space at the front is for pulling out the paper tray only. If an operator stands in front of the printer, more space is required.

### 3.1.4 POWER REQUIREMENTS

## . CAUTION <br> 1. Make sure that the wall outlet is near the printer 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 10 A 220 V ~ $240 \mathrm{~V}, 50 / 60 \mathrm{~Hz}$ : More than 6 A
5. Permissible voltage fluctuation: $\pm 10 \%$
6. Make sure nothing is on or presses against the power cord.

### 3.2 PRINTER INSTALLATION

Please refer to the Operating Instructions to install the main frame.

### 3.2.1 CONNECTING THE INTERFACE CABLES

## Parallel Interface

An IEEE1284 compatible printer cable is required to connect the printer controller to a host PC parallel port.

## Network Interface

A STP (Shielded Twisted Pair) cable with RJ45 connectors is required to connect the Network Interface Board to the computer network. (The cable should be Category/Type 5 or better.) After hardware setup, the user should do the network setup. The setup procedure is described in the NIB section.

### 3.2.2 CHECKING THE CONNECTION

## Connection between Printer Controller (and Related Options; DRAM SIMM, Hard Disk Drive), NIB and Engine

1. Plug in the power cord and turn on the main switch.
2. Enter the printer user mode.
1) Press the Menu key.
2) Press $\boldsymbol{\nabla}$ or $\mathbf{\Delta}$ key until LCD displays "List Print".
3. Print out the printer configuration page.
1) Press the "Enter \#" key, and the LCD displays "Config. Page".
2) Press the "Enter \#" key to print the configuration page. The machine automatically prints the printer configuration page.

NOTE: For more detailed information about the operation panel settings, refer to the operating instructions.

The printer configuration page is similar to that shown on the next page.

## Configuration Page

RICOH Aficio AP4500


[^0]Check the following:

- For the printer controller, confirm that the machine prints the printer configuration page.
- For the firmware version, check "Firmware Version" [A].
- For the hard disk drive, confirm that the configuration page includes it in the "Options" section [B].
- For the NIB, confirm that the configuration page includes the "Network Setup" section [C].
- For DRAM SIMM, confirm that "Total Memory" [D] printed on the configuration page shows the correct amount of memory in the machine (including the 8 MB on board and the SIMM).
If any problem occurs with the above checks, reinstall the printer controller and other options. Then set up the machine again and redo the test.


## Connection between Printer Controller and the Network Interface Board

There are two ways to check the connection between the printer controller and the network interface board.

1. Check "Network Menu" on the configuration page.
2. Check the Network Interface Board Status Sheet with the network information printed automatically after turning the power on.

## Print the Network Interface Board Status Sheet

Whenever the main switch is turned on, the machine automatically prints the network interface board status sheet.
NOTE: If the machine does not print the status sheet, check the Network menu in printer user tools menu.

If any problem occurs with the above check, reinstall the printer controller and other options. Then set up the machine again and redo the test.

### 3.2.3 HARD DISK DRIVE INSTALLATION (A853)


[E]

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

1. Remove the cover [A] (4 screws).
2. Remove the printer controller assembly [B] (2 screws).
3. Attach the HDD brackets [C] to the hard disk drive [D] as shown (2 screws each).
4. Connect the cable [E] to the hard disk drive.
5. Attach the hard disk drive to the printer controller (4 screws, 1 connector).
6. Install the printer controller in the printer.
7. After turning on the main switch and format the hard disk using "SP 1(Controller SP) - 4 (Format Disk)".
8. After formatting the hard disk, turn the main switch off and on.

### 3.3 NETWORK INTERFACE BOARD (NIB) INSTALLATION

Please refer to the Operating Instructions to install the NIB.

### 3.3.1 SERIAL NUMBER AND MAC ADDRESS

Check the serial number and MAC (Media Access Control) address printed on the NIB.
The serial number is a 6-digit number, and is unique to each board.
The MAC address (LAN ADDR.) is a 12-digit hexadecimal number. The upper 6 digits are always "0040AF", and the lower 6 digits are unique to each board.


### 3.3.2 STATUS SHEET

By default, the NIB prints a status sheet every time after the machine is turned on or the NIB has reset itself.

NOTE: Connect a network cable to the NIB before turning on the machine or resetting the NIB. Otherwise, the machine will take several minutes to print the status sheet, and the information on it may not be accurate.

Keep the status sheet with the machine, because it has the following information.

- Unit serial number
- Firmware version
- Network (MAC) address
- Network/Protocol information


### 3.3.3 PROGRAMMING NETWORK/PROTOCOL PARAMETERS

This section gives summaries of how to set up a network interface board in various network environments.

NOTE: It is not recommended for service technicians to program network and protocol parameters. Ask the customer's network administrator to program and manage these parameters.

## IPX Network

The following parameters are required for three types of IPX network printing. Use MAP (Management Access Program) or the NetWare Setup utility to program these parameters.

NOTE: 1) The MAP utility requires the Microsoft IPX/SPX Compatible protocol stack on Windows 9x or Windows NT4.0, and a Web browser (Microsoft Internet Explorer 3.02 or later, or any version of Netscape Navigator). The "World Wide Web Publishing service" must be stopped before starting the MAP utility on the Windows NT server desktop.
2) The NetWare Setup Utility requires the Novell 32-bit Client software on Windows 9x or Windows NT4.0.

| Parameter | Peer-to-Peer <br> Server-less <br> Network | Novell 2.x/3.x/4.x <br> Bindery Network | Novell 4.x <br> NDS Network |
| :--- | :---: | :---: | :---: |
| Enable NetWare <br> (Default = Yes) | Yes <br> (Check the box) | Yes <br> (Check the box) | Yes <br> (Check the box) |
| Print Server Name | Yes | Yes | Yes |
| Print Server Password | No | Optional | Optional |
| Preferred File Server | No | Yes | No |
| Preferred NDS Context | No | No | Yes |
| Preferred NDS Tree | No | No | Yes |
| Print Queue Scan Rate <br> (Default = 1 s) | No | Yes | Yes |
| Ethernet Frame Type <br> (Default = Auto-Sense) | Yes | Yes | Yes |
| Disable Bindery <br> (Default = No) | No | No <br> (Uncheck the box) | Optional |

NOTE: The preferred NDS context must be typed in without a starting dot ( . ).

- OU=Development.O=Corp [OK]
- .OU=development.O=Corp [NG]
- Develoment.Corp [OK]
- .Develoment.Corp [NG]


## TCP/IP Network

## TCP/IP Parameter Details

The following TCP/IP parameters are required for TCP/IP network printing.

| Parameter | Description | How to Change Parameters |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Operation Panel BOOTPL | MAP/Web Browser | Telnet |
| IP Parameters |  |  |  |  |
| IP Address | IP address of the NIB | Yes | Yes | Yes |
| Subnet Mask | Subnet mask for local subnet | Yes | Yes | Yes |
| Default Gateway | Gateway IP address | Yes | Yes | Yes |
| TCP Parameters |  |  |  |  |
| Base Port Number | Port number to receive print jobs | No | Yes | Yes |
| DHCP Parameters |  |  |  |  |
| $\begin{array}{\|l\|l\|} \hline \text { Enable DHCP } \\ \text { (Default = Yes) } \end{array}$ | Yes - The NIB obtains IP parameters from a DHCP server. <br> No - IP parameters must be specified manually. | No | Yes | No |
| IP Address in NVRAM (Default = Yes) | Yes - Once the NIB has been assigned an IP address by a DHCP server, the NIB saves the address in the NVRAM and uses it permanently. <br> No - The NIB tries to obtain IP parameters from a DHCP server every time the machine is turned on or the NIB is reset. The assigned IP address may not be the same all the time. | No | Yes | No |
| LPD Parameters |  |  |  |  |
| Enable LPD Banner (Default = No) | Enables or disables the LPD banner | No | Yes | Yes |
| Available PDLs for NIC Port | Available printer languages are automatically selected. | No | Yes | Yes |

## Possible Problems with DHCP Parameter Settings

1. IP address conflicts with an another host

If DHCP is enabled and an IP Address is saved in NVRAM, and the saved address conflicts with an another host, the NIB does not show any errors. As a result, the NIB cannot receive any print jobs, because the IP protocol is disabled automatically at startup.
In this case, the other host in conflict with the NIB must have a manually assigned IP address. Find the host using the ping and arp commands for example, and assign a correct address.
2. IP address changes after restarting the machine

If DHCP is enabled but an IP address is not saved in the NVRAM, the NIB may have a different IP address from the one before restarting the machine. As a result, the NIB cannot receive any print jobs, because the jobs are sent to the previously assigned IP address.

There are two solutions for this problem.
The first one is simply enable the "IP Address in NVRAM" parameter and assign a correct IP address. The second one is to reserve the IP address on the DHCP server for the NIB's Ethernet (MAC) Address.

## EtherTalk (APPLETALK) Network

The following parameters are required for AppleTalk networks. These parameters are automatically configured at startup as follows:

| Parameter | Default Setting | How to change the parameter |
| :--- | :--- | :--- |
| AppleTalk Enable/Disable | Enabled | MAP, web browser and telnet. |
| Printer Name | Plug\&Play name <br> (SP2-21) | See Note. |
| Zone Name | Default zone | See Note. |

NOTE: 1) The Apple LaserWriter utility can change both the printer name and the zone name. Apple Printer Utility can change the printer name only.
2) Even if the printer name and zone name are changed using a utility, the changed names will be reset to the default at the next power-on, due to NIB-to-Controller interface limitations.

### 3.3.4 SETUP FOR VARIOUS NETWORK TYPES

## Peer-to-Peer Network

## Windows for Workgroups

There is no guaranteed way to print directly to the NIB port. Share a printer connected to an LPT port on a workstation.

Windows 95/98
The Peer-to-Peer printing software that is included with the NIB allows Windows 95/98 PCs to communicate directly with network attached printers. A network server, such as NetWare or Windows NT, is not required for Peer-to-Peer printing.

The Peer-to-Peer printing software must be installed on each PC that will use Peer-to-Peer printing. Once the Peer-to-Peer printing software is installed, all NIBs on the network automatically appear in the list of available printer ports.

The Peer-to-Peer printing software can also be used in networks where servers are present; however, often the server print services are utilized instead. Server based print services offer centralized printing management and spooling and do not require software (other than the printer driver) to be installed on each PC.

The Peer-to-Peer IPX and the Peer-to-Peer IP utilities install redirection to the NIB. The Peer-to-Peer IPX port appears as "RDP_xxxxx" (xxxxxx is the board's serial number) by default.
The Peer-to-Peer IP port appears as "IP Address@10001".
Both work as a local port of the host computer.

## Windows NT (Workgroup Network)

In addition to Peer-to-Peer IPX and Peer-to-Peer IP printing, Windows NT supports LPR printing using TCP/IP protocol.
Use the following parameters to set up an LPR port on an NT workstation.

- Name or address of the server providing Ipd: IP Address of the NIB
- Name of the printer or print queue on that server: PORT1 (uppercase)

After installing a printer connected to the LPR port, share the printer for other workgroup members.

## Novell NetWare Network

## Bindery Network

Use the NetWare Setup utility to set up everything for NetWare printing in a single procedure.

Or, use PCONCOLE to setup printers, print queues, and print servers in the server bindery, then use MAP (Management Access Program) to setup NetWare parameters in the NIB.

NOTE: 1) The NetWare Setup utility requires Novell 32-bit client on Windows $9 x$ or NT. Also, supervisor privileges are required to perform complete setup.
2) The MAP utility requires the Microsoft IPX/SPX SPX compatible protocol stack on Windows 9x or Windows NT4.0, and a Web browser (Microsoft Internet Explorer 3.02 or later, or any version of Netscape Navigator ).

## NDS Network

Use the NetWare Setup utility to set up everything for NetWare printing in a single procedure.
Or, use PCONCOLE or NetWare Administrator to setup printers, print queues, and print servers in the server bindery, then use MAP (Management Access Program) to set up NetWare parameters in the NIB.
NOTE: The NIB does not support "Notification" function on NetWare NDS networks.

## TCP/IP Network

## LPR/LPD Printing

The NIB supports standard lpd. If a Windows or UNIX workstation has an lpr spooler, it can send print jobs to the NIB directly.

## FTP Printing

The NIB can receive print jobs directly from an ftp client.

## Using an Ftp Client

1. Login to the NIB as "port1" (ASCII/PCL) user name.
2. Put a file to print.

## Using NetScape Navigator (Version 2.0 or Later)

1. Open one of the following addresses:

- ftp://port1@<IP Address> (ASCII/PCL)

2. Select [File] - [Upload] to put a print file.

### 3.4 BRIDGE UNIT INSTALLATION (A688)

### 3.4.1 ACCESSORY CHECK

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

1. Stepped screw ..... 2
2. Connector cover ..... 1
3. Entrance mylar ..... 2
4. Exit mylar ..... 2
5. NECR ..... 1
6. Installation procedure ..... 1

### 3.4.2 INSTALLATION PROCEDURE



## ⒸAUTION <br> Unplug the main machine power cord before starting the following procedure.

1. Unpack the bridge unit. Then remove the tapes.

[B]


2. Remove the inner tray $[A]$.
3. Remove three covers $[B]$.
4. Remove the cover [C].
5. Remove the cap [D].
6. Open the right cover [E] of the bridge unit and peel off the black tape [F]; then pull out the connector [G].
7. Install the paper sensor $[\mathrm{H}]$ (which is packed along with the printer itself as an accessory) (1 screw, 1 connector).

8. Attach two mylars $[A]$ to the paper entrance area of the bridge unit as shown.
9. If the optional finisher is installed:

Attach two mylars $[\mathrm{B}]$ to the bridge unit as shown.
10. Remove the cover [C].
11. Install the bridge unit (2 screws) [D].
12. Connect the bridge unit I/F harnesses [E].
13. Install the connector cover.
14. Turn on the AC switch and check the bridge unit operation.

### 3.5 LCT INSTALLATION (A683)

### 3.5.1 ACCESSORY CHECK

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

1. Joint pin ..... 2
2. Stepped screw - M3 $\times 18$ ..... 4
3. Magnet cover ..... 1
4. NECR (-17, -27 machines) ..... 1
5. Installation procedure ..... 1

### 3.5.2 INSTALLATION PROCEDURE



[A]

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

NOTE: The Paper Tray Unit (G520) must be installed before installing the LCT.

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

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

5. Install the joint pins [A].
6. Push the release lever $[B]$ and slide the LCT to the right (front view).
7. Hang the LCT [C] on the joint pins, then secure the brackets [D] (4 screws).
8. Return the LCT to the previous position and connect the LCT cable [E].
9. Open the LCT cover and load the paper.
10. Turn on the AC switch and check the LCT operation.
3.6 1,000-SHEET FINISHER INSTALLATION (A681)
3.6.1 ACCESSORY CHEK
Check the quantity and condition of the accessories in the box against the following list:
Description Quantity

1. Front stand ..... 1
2. Rear stand ..... 1
3. Knob screw ..... 1
4. Screw - M4 x 12 ..... 6
5. NECR (-17, -27 machines) ..... 1
6. Installation procedure ..... 1

### 3.6.2 INSTALLATION PROCEDURE



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

NOTE: If this finisher will be installed on the G035 printer, the following options should be installed.

- Bridge unit (A688)
- Paper tray unit (G520)

1. Unpack the finisher and remove the tapes.

2. Install the two screws [A] loosely.
3. Hang the front stand $[B]$ and rear stand $[C]$ on the screws that were installed in step 2.
4. Secure the front and rear stands ( 6 screws, including the two screws $[A]$ ).
5. Pull out the stapler unit [D].
6. Draw out the locking lever [E] (1 screw).
7. Align the finisher on the stands, and lock it in place by pushing the locking lever.
8. Secure the locking lever ( 1 screw) and push the stapler unit into the finisher.

9. Secure the finisher (1 screw).
10. Adjust the securing knobs [A] under the front and rear stand until the finisher is perpendicular to the floor.
11. Install the shift tray $[B]$ (1 snap ring).

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

### 3.7 3,000-SHEET FINISHER INSTALLATION (A697)

### 3.7.1 ACCESSORY CHECK

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

1. Front joint bracket ..... 1
2. Rear joint bracket ..... 1
3. Entrance guide plate ..... 1
4. Shift tray ..... 1
5. Shift tray guide ..... 1
6. Staple position decal ..... 1
7. Screw - M3 x 6 ..... 2
8. Screw - M4 $\times 14$ ..... 4
9. Screw $-\mathrm{M} 3 \times 8$ ..... 4
10. Cushion ..... 1
11. Upper grounding plate ..... 1
12. Lower grounding plate ..... 2
13. NECR (-17 machine) ..... 1
14. Installation procedure ..... 1

### 3.7.2 INSTALLATION PROCEDURE



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

NOTE: To install this finisher with the printer, the bridge unit (A688) and paper tray unit (G520) must be installed.

1. Unpack the finisher and remove the tapes.

2. Install the front joint bracket $[A]$ and rear joint bracket $[B]$ (2 screws each).
3. Peel off the backing of the double-sided tape that is attached to the lower grounding plate [C].
4. Attach one lower grounding plate to the center position of the paper tray unit as shown.

5. Attach the cushion $[A]$ on the position $[B]$.
6. Install the entrance guide plate [C] (2 screws).

7. If the customer requires the punch unit, install it now, before attaching the finisher to the machine. See Punch Unit Installation.
8. Open the front door of the finisher, and remove the screw [A] that secures the locking lever [B]. Then pull the locking lever.
9. Align the finisher on the joint brackets, and lock it in place by pushing the locking lever.
NOTE: Before securing the locking lever, make sure that the top edges of the finisher and the copier are parallel from front to rear as shown [C].
10. Secure the locking lever ( 1 screw) and close the front door.
11. Install the shift tray guide [D] on the shift tray. If the customer does not wish to install it on the shift tray, store it at the location [E].
NOTE: The shift tray guide helps to properly stack exiting paper. However, it reduces the capacity of the shift tray by 50, from 3000 to 2950.
12. Install the shift tray [F] (4 screws).
13. Connect the finisher cable [G] to the main machine.
14. Turn on the main power switch and check the finisher operation.

### 3.8 MAILBOX INSTALLATION (G909)

### 3.8.1 ACCESSORY CHECK

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

1. Front joint bracket ..... 1
2. Rear joint bracket ..... 1
3. Exit guide mylar ..... 1
4. Proof tray attachment ..... 1
5. Upper grounding plate ..... 1
6. Lower grounding plate ..... 2
7. Cushion ..... 1
8. Tapping screw $-\mathrm{M} 4 \times 14$ ..... 4
9. Bin decals ..... 1
10. Installation procedure ..... 1

### 3.8.2 REQUIREMENT OPTIONS FOR MAIN MACHINE

When the mailbox is going to be installed with the printer, the following options for main machine must be required.

- Bridge unit type 450 (A688)
- Paper tray unit - PS430 (G520)


### 3.8.3 INSTALLATION PROCEDURE



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

NOTE: 1) After installing the finisher (A697) on the machine, the bridge unit for the mailbox (G912) must be installed.
2) The bridge unit for the mailbox must be installed before installing this unit on the main machine.

1. Unpack the finisher and remove the pieces of tape.
2. Attach the front joint bracket $[A]$ and rear joint bracket $[B]$ to the main machine (2 screws each).
3. Peel off the backing of the double-sided tape that is attached to the lower grounding plate [C].
4. Attach one lower grounding plate to the center of the bottom edge of the paper tray unit as shown.

[D] [E]
5. Attach the cushion to $[A]$ the position $[B]$.
6. Open the front cover [C] of the mailbox, and remove the screw [D] that secures the locking lever [ E ]. Then pull the locking lever.

7. Align the mailbox on the joint brackets, and lock it in place by pushing the locking lever [A].
8. Secure the locking lever (1 screw) and close the front door.
9. Connect the mailbox cable $[B]$ to the main machine.
10. Peel off the backing of the double-sided tape that is attached to the proof tray attachment [C].
11. Install the proof tray attachment on the proof tray.
12. Turn on the main switch and check the mailbox operation.

### 3.9 BRIDGE UNIT FOR MAILBOX INSTALLATION (G912)

### 3.9.1 ACCESSORY CHECK

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

1. Guide plate bracket ..... 1
2. Cable ..... 1
3. Cover switch ..... 1
4. Grounding bracket ..... 1
5. Finisher shielding plate ..... 1
6. Screw - M4 x 8 ..... 9
7. Screw - M4 x 4 ..... 4
8. Screw - M3 x 6 ..... 2

### 3.9.2 INSTALLATION PROCEDURE



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

NOTE: The bridge unit for the mailbox must be installed when the 3000 sheet finisher (A697) will be installed.

1. Unpack the bridge unit and remove the shipping retainers [A].

NOTE: Do not remove the protective sheet $[B]$ at this time.
2. Remove the mailbox if it has been installed.
3. Remove the rear cover [C] of the mailbox ( 8 screws).
4. Remove the proof tray unit [D] ( 6 screws, 1 connector).
5. Remove the cover [E].

6. Open the left front cover $[A]$ of the mailbox, and remove the inner plate $[B]$ (3 screws).
7. Install the guide plate bracket [C] (4 screws - M4 x 4).
8. Route the cable [D] and clamp it as shown.
9. Connect the cover switch [E] to the cable then install the cover switch (2 screws - M4 x 8).
10. Remove the paper guide plate [F] (2 screws).

11. Pull up the tab [A] of the protective sheet.

NOTE: 1) Do not remove the protective sheet at this time.
2) Make sure that all mylars are held between the two folded halves of the protective sheet.
12. Turn over the bridge unit $[B]$ and insert the protective sheet [C] into the gap [D] between the paper guides, then put the bridge unit on the mailbox [E].
NOTE: When holding the bridge unit, do not touch the timing belt. Otherwise the timing belt may come off the gear.
13. Remove the tape [F] for the protective sheet.
14. Open the upper paper guide [G] then pull out the protective sheet $[\mathrm{H}]$.

NOTE: Check that all mylars are set into the gap between the paper guides.

15. Secure the bridge unit [A] (4 screws - M4 x 8).
16. Route the cables $[B]$ through the openings [C].
17. Route the solenoid harness [D] through the opening [C].
18. Connect the cables to the solenoid and sensors and clamp the cable as shown.
19. Reinstall the rear cover and proof tray unit.
20. Install the mailbox on the main machine (refer to the Mailbox Installation procedure for more detail).
When the 3,000-sheet finisher (A697) is going to be installed, do steps 21 to 25.
21. Install the front joint bracket [E] and rear joint bracket [F] which are contained in the finisher's accessory box.

22. Remove the seal $[A]$.
23. Attach the grounding bracket $[B]$ ( 3 screws $-\mathrm{M} 4 \times 8$ ).
24. Attach the shielding plate [C] to the finisher ( 2 screws $-\mathrm{M} 3 \times 8$ ).
25. Attach the finisher to the mailbox (refer to the finisher installation procedure).
26. Turn on the main switch of the main machine and check the bridge unit operation. (Select a print mode that uses the finisher.)

### 3.10 PUNCH UNIT INSTALLATION

### 3.10.1 ACCESSORY CHECK

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

1. Spacer-2 mm ..... 1
2. Spacer-1 mm ..... 2
3. Stepped screw - Short ..... 1
4. Stepped screw - Long ..... 1
5. Punch unit knob ..... 1
6. Spring ..... 1
7. Harness - Long ..... 1
8. Harness - Short ..... 1
9. Hopper ..... 1
10. Punch position decal ..... 1
11. Tapping screw $-\mathrm{M} 4 \times 10$ ..... 2
12. Screw with flat washer $-\mathrm{M} 4 \times 6$ ..... 1
13. NECR ..... 1

### 3.10.2 INSTALLATION PROCEDURE




## \1.CAUTION

Unplug the copier power cord and remove the 3,000-sheet finisher from the copier before starting the following procedure.

1. Unpack the punch unit and remove the shipping retainers [A] (4 screws) and [B] (1 screw).
2. Open the front door and remove the hopper cover [C] (2 screws).
3. Remove the finisher rear cover (2 screws) and remove the transport guide plate [D] (4 screws).

4. Install the spacer [A] (thickness = 2 mm ).

NOTE: There are three spacers in the accessory box. Do not lose the other two spacers (1-mm) because they are used for adjusting the punch hole position.
5. Install the punch unit [B] and secure it with a long stepped screw [C].
6. Install the punch unit knob [D] (1 screw).
7. Secure the rear of the punch unit (2 screws).

8. Install the sensor bracket $[A]$ (1 short stepped screw, 1 spring).
9. Connect the harnesses $[B]$.

NOTE: 1) The harness binders [C] must not be between the harness clamps [D].
2) The harness binder [E] must be positioned to the left of the harness clamp.
10. When a three-punch-hole unit is installed: Turn on switch 1 of DIP SW 100 on the finisher control board.
11. Slide the hopper [F] into the finisher.
12. Reassemble the finisher and attach the 3,000-sheet finisher to the copier, then check the punch unit function.

## $\Rightarrow 3.11$ DRAM SIMM

### 3.11.1 REQUIRED SPECIFICATION CHECK

Before installing the DRAM SIMM, check that it satisfies the requirements below.

| Type | PC Compatible |
| :--- | :--- |
| Number of pins | 72 pins |
| Access speed | 60 ns or faster |
| Capacity | 8,16, or 32 MB |
| Parity | Any OK |

### 3.11.2 INSTALLATION PROCEDURE



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

NOTE: When the DRAM SIMM and the printer controller (A850) are installed at the same time, skip steps 1 and 2.

1. Remove the printer controller. (See Covers.)
2. Remove the printer controller assembly [A] (2 screws).
3. Remove the optional hard disk unit $[B]$ (4 screws, 1 connector).
4. Install the DRAM SIMM [C], as shown.

NOTE: Make sure that the DRAM SIMM is installed properly.
5. Reinstall the printer controller in the main machine.

## SERVICE TABLES

## 4. SERVICE TABLES

### 4.1 GENERAL CAUTIONS

Do not turn off the either of the power switches while any of the electrical components are active. Doing so might cause damage to units such as the transfer belt, drum, and development unit when they are pulled out of or put back into the copier.

### 4.1.1 DRUM

An organic photoconductor (OPC) drum is more sensitive to light and ammonia gas than a selenium drum. Follow the cautions below when handling an OPC drum.

1. Never expose the drum to direct sunlight.
2. Never expose the drum to direct light of more than 1,000 Lux for more than one minute.
3. Never touch the drum surface with bare hands. When the drum surface is touched with a finger or becomes dirty, wipe it with a dry cloth or clean it with wet cotton. Wipe with a dry cloth after cleaning with wet cotton.
4. Never use alcohol to clean the drum; alcohol dissolves the drum surface.
5. Store the drum in a cool, dry place away from heat.
6. Take care not to scratch the drum as the drum layer is thin and is easily damaged.
7. Never expose the drum to corrosive gases such as ammonia gas.
8. Always keep the drum in the protective sheet when keeping the drum unit, or the drum itself, out of the copier. Doing so avoids exposing it to bright light or direct sunlight, and will protect it from light fatigue.
9. Before pulling out the PCU, place a sheet of paper under the PCU to catch any spilled toner.
10. Dispose of used drums in accordance with local regulations.
11. When installing a new drum in the PCU, the following must be done in the stated order.
1) Remove the protective sheet after securing the new drum in the drum unit.
2) Make sure that the charge roller voltage supply is at the standard value (SP2-5-1).
3) Do the ID Sensor Initial Setting procedure (SP2-14).
12. When installing the PCU, make sure that the PCU is set in the machine properly.

### 4.1.2 TRANSFER BELT UNIT

1. Replace the transfer belt every PM cycle ( 150 K sheets printed) to avoid bad effects on the drum.
2. Never touch the transfer belt surface with bare hands.
3. Take care not to scratch the transfer belt as the surface is easily damaged.
4. Before installing the new transfer belt, clean all the rollers and the inner part of the transfer belt with a dry cloth to prevent the belt from slipping.

### 4.1.3 LASER UNIT

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

### 4.1.4 CHARGE ROLLER

1. Do not touch the charge roller with bare hands. Oil stains from fingers may cause uneven image density on copies.
2. Clean the charge roller with alcohol and water, then with a dry cloth

### 4.1.5 DEVELOPMENT

1. Be careful not to nick or scratch the development roller.
2. Place the development unit on a sheet of paper after removing it from the copier.
3. Never disassemble the development roller assembly. The position of the doctor plate is set with special tools and instruments at the factory to ensure the proper gap between the doctor blade and the development roller.
4. Clean the drive gears after removing used developer.
5. Dispose of used developer in accordance with local regulations.
6. Never load different types of developer and toner into the development unit. Doing so will cause poor copy quality and toner scattering.
7. Immediately after installing new developer, the TD sensor initial setting procedure should be performed to avoid damage to the copier. Do not perform the TD sensor initial setting with used developer. Do not make any copies before doing the TD sensor initial setting.
8. When using a vacuum cleaner to clean the development unit casing, always ground the casing with your fingers to avoid damaging the toner density sensor with static electricity.
9. After replacing the TD sensor, do the TD sensor initial setting procedure (SP210).

### 4.1.6 FUSING UNIT

1. After installing the fusing thermistor, make sure that it is in contact with the hot roller and that it is movable.
2. Be careful not to damage the edges of the hot roller strippers or pressure 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.

### 4.1.7 PAPER FEED

1. Do not touch the surface of the pick-up, feed, and separation rollers.
2. The side fences and end fence of the paper tray must be positioned correctly to align with the actual paper size to avoid paper misfeeds.

### 4.1.8 USED TONER

1. The used toner in the transfer belt unit should be emptied at every PM cycle, but we recommend checking the amount of used toner at every EM.
2. Dispose of used toner in accordance with local regulations. Never throw toner into an open flame, for toner dust may ignite.

### 4.2 SERVICE PROGRAM MODE

### 4.2.1 SERVICE PROGRAM MODE OPERATION

The service program (SP) mode is used to check electrical data, change modes, and adjust values.

## Operation Panel

Please refer to the illustrations for the key names and their locations.


## Service Program Access Procedure

## Entering the Service Mode

1. Turn the machine on while pressing the [Online] key and [Escape] key together until the service mode appears on the display.
2. Use the $\boldsymbol{\nabla}$ or $\boldsymbol{\Delta}$ key to scroll through the menu listing. To select an item, press the [Enter] key. Then the sub menu will appear.
3. To return to the previous menu, press the [Escape] key.

## Exiting the Service Mode

There are two ways to exit the service mode.

1. Turning off and on
1) Turn off the machine.
2) Wait for a few seconds and then turn it on again. The machine runs the initializing mode then goes to ready.
2. [On Line] key
1) Press the [On line] key.
2) Wait a few seconds, The machine exits service mode automatically.
3) The printer starts to initialize.

## Accessing the Required Program

Select each program level in sequence.

1. Scroll through the 1st level programs using the $\boldsymbol{\nabla}$ or $\boldsymbol{\Delta}$ key. Then press the "Enter \#" key.
2. Scroll through the items in the next lowest level using the $\boldsymbol{\nabla}$ or $\boldsymbol{\Delta}$ key. To go back to a higher level, press the "Escape" key.

## Inputting a Value or Setting for a Service Program

1. Enter the required program mode.

NOTE: The setting appearing initially on the display is the current setting.
2. Select the required setting using the $\boldsymbol{\Delta}$ key (increasing) or the $\boldsymbol{\nabla}$ key (decreasing), then press the "Enter" key.
NOTE: The previous value remains if the "Enter" key is not pressed.
3. Exit service mode.

### 4.2.2 SERVICE PROGRAM MODE TABLES

NOTE: 1) In the Function column, comments are in italics.
2) In the Settings column, the default value is in bold letters.

## 1. Controller SP

| Menu |  |  | Function |
| :---: | :---: | :---: | :---: |
| Menu Level 2 | Menu Level 3 |  |  |
| 1 | 1 | Flash SYS From Parallel | Downloads the printer controller firmware from a PC through the parallel port. |
|  | 2 | $\begin{aligned} & \text { Flash SYS } \\ & \text { From PCMCIA } \end{aligned}$ | Downloads the printer controller firmware using an IC card through the PCMCIA port. |
| 2 | 1 | Flash PS From Parallel | Downloads the PostScript firmware from a PC through the parallel port. |
|  | 2 | $\begin{aligned} & \text { Flash PS } \\ & \text { From PCMCIA } \end{aligned}$ | Downloads the PostScript firmware using an IC card through the PCMCIA port. |
| 3 |  | Copy ROM | Copies the printer controller firmware between ROM DIMM and printer controller |
| 4 |  | Format Disk | Formats the hard disk drive |
| 5 |  | Print Job Log | Prints the print/job count log page |
| 6 |  | Print Err Log | Prints the printer error log page |
| 7 |  | Clear Job Log | Clears the print/job counter |
| 8 |  | Clear Err Log | Clears the error log counter |
| 9 |  | Loop Back | Performs the parallel loop back test |

## 2. Engine SP

| Menu |  |  | Function | Settings [Default] |
| :---: | :---: | :---: | :---: | :---: |
| Menu Level 2 | Menu Level 3 |  |  |  |
| 1 |  | Leading Edge Registration | Adjusts the printing leading edge registration using the trimming area pattern (SP2-12, No.). | $\begin{aligned} & +9.0 \sim-9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & {[+3.0 \mathrm{~mm}]} \end{aligned}$ |
|  | 1 |  | Use the $\mathbf{\triangle}$ or $\boldsymbol{\nabla}$ key to toggle between + and - before entering the value. The specification is $3 \pm 2 \mathrm{~mm}$. See "Replacement and Adjustment - Copy Adjustments" for details on SP2-1 and 2-2. |  |
|  | 2 | Side-to-Side Registration (Tray 1) | Adjusts the printing side-to-side registration from the 1st paper feed station using the trimming area pattern (SP2-12, No.10). | $\begin{aligned} & +9.0 \sim-9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & {[+3.0 \mathrm{~mm}]} \end{aligned}$ |
|  |  |  | Use the $\boldsymbol{\triangle}$ or $\boldsymbol{\nabla}$ key to toggle between + and - before entering the value. The specification is $2 \pm 1.5 \mathrm{~mm}$. |  |


| Menu |  |  | Function | Settings [Default] |
| :---: | :---: | :---: | :---: | :---: |
| Menu Level 2 | Menu Level 3 |  |  |  |
| 1 | 3 | Side-to-Side Registration (Tray 2) | Adjusts the printing side-to-side registration from the 2nd paper feed station using the trimming area pattern (SP2-12, No. 10). Use the $\boldsymbol{\triangle}$ or $\boldsymbol{\nabla}$ key to toggle between + and - before entering the value. The specification is $2 \pm 1.5 \mathrm{~mm}$. | $\begin{aligned} & +9.0 \sim-9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & {[+3.0 \mathrm{~mm}]} \end{aligned}$ |
|  | 4 | Side-to-Side Registration (Duplex) | Adjusts the printing side-to-side registration from the duplex tray using the trimming area pattern (SP2-12, No. 10). <br> Use the $\boldsymbol{\triangle}$ or $\boldsymbol{\nabla}$ key to toggle between + and - before entering the value. The specification is $2 \pm 1.5 \mathrm{~mm}$. | $\begin{aligned} & +9.0 \sim-9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & {[+0.0 \mathrm{~mm}]} \end{aligned}$ |
|  | 5 | Side-to-Side Registration (By-pass feed) | Adjusts the printing side-to-side registration from the by-pass feed table using the trimming area pattern (SP2-12, No.10). | $\begin{aligned} & +9.0 \sim-9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & {[+3.0 \mathrm{~mm}]} \end{aligned}$ |
|  | 6 | Side-to-Side Registration (LCT) | Adjusts the printing side-to-side registration from the LCT using the trimming area pattern (SP2-12, No. 10). <br> Use the $\boldsymbol{\triangle}$ or $\boldsymbol{\nabla}$ key to toggle between + and - before entering the value. The specification is $2 \pm 1.5 \mathrm{~mm}$. | $\begin{aligned} & +9.0 \sim-9.0 \\ & 0.1 \mathrm{~mm} / \mathrm{step} \\ & {[+1.5 \mathrm{~mm}]} \end{aligned}$ |
| 2 | 1 | Paper Feed Timing (Paper Feed Trays) | Adjusts the relay clutch timing at registration. The relay clutch timing determines the amount of paper buckle at registration. (A +ve setting leads to more buckling.) | $\begin{aligned} & +9.0 \sim-9.0 \\ & 1 \mathrm{~mm} / \mathrm{step} \\ & {[+0 \mathrm{~mm}]} \end{aligned}$ |
|  | 2 | Paper Feed Timing (Duplex) |  |  |
|  | 3 | Paper Feed Timing (By-pass) |  |  |
| 3 |  | Fusing Temperature Control | Selects the fusing temperature control mode. | On/Off or Phase [On/Off] |
| 4 | 1 | Fusing Temperature Adjustment (Paper Tray) | Adjusts the fusing temperature for paper fed from a paper tray. | $\begin{aligned} & 170 \sim 200 \\ & 1^{\circ} \mathrm{C} / \text { step } \\ & {\left[185^{\circ} \mathrm{C}\right]} \end{aligned}$ |


| Menu |  |  | Function | Settings [Default] |
| :---: | :---: | :---: | :---: | :---: |
| Menu Level 2 | Menu <br> Level 3 |  |  |  |
| 4 | 2 | Fusing Temperature Adjustment (By-pass) | Adjusts the fusing temperature for paper fed from the by-pass feed unit. | $\begin{aligned} & 170 \sim 200 \\ & 1^{\circ} \mathrm{C} / \text { step } \\ & {\left[185^{\circ} \mathrm{C}\right]} \end{aligned}$ |
| 5 | 1 | Charge Roller Bias Adjustment (Printing) | Adjusts the voltage applied to the grid plate during printing. <br> After replacing the drum or charge roller, change this value to the default. | $\begin{aligned} & -1,000 \sim-2,000 \\ & 10 \mathrm{~V} / \text { step } \\ & {[-1620 \mathrm{~V}]} \end{aligned}$ |
|  | 2 | Charge Roller Bias Adjustment (ID sensor pattern) | Adjusts the voltage applied to the charge roller when making the Vsdp ID sensor pattern (for charge roller voltage correction). The actual charge roller voltage is this value plus the value of SP2-5-1. <br> Do not adjust. | $\begin{aligned} & 0 \sim 700 \\ & 10 \mathrm{~V} / \text { step } \\ & {[350 \mathrm{~V}]} \end{aligned}$ |
| 6 | 1 | Laser Beam Pitch Adjustment 400 dpi | Input the laser beam pitch value for 400-dpi resolution. <br> After replacing the LD unit or replacing or clearing the NVRAM, use this SP mode and SP2-6-3 to adjust the laser beam pitch. Refer to "Replacement and Adjustment - Laser Beam Pitch Adjustment" for details. | $\begin{aligned} & 8 \sim 260 \\ & 4 \text { pulses/step } \end{aligned}$ |
|  | 2 | Laser Beam Pitch <br> Adjustment 600 dpi | Input the laser beam pitch value for 600-dpi resolution. <br> After replacing the LD unit or replacing or clearing the NVRAM, use this SP mode and SP2-6-4 to adjust the laser beam pitch. Refer to "Replacement and Adjustment - Laser Beam Pitch Adjustment" for details. | $\begin{aligned} & 28 \sim 284 \\ & 4 \text { pulses/step } \end{aligned}$ |
|  | 3 | Laser Beam Pitch Initial Setting - 400 dpi | Initializes the laser beam pitch for 400 dpi to the SP2-6-1 value. <br> Press "Enter \#" to initialize. <br> After inputting data for SP2-6-1, this SP must be performed. | Execute |
|  | 4 | Laser Beam Pitch Initial Setting - 600 dpi | Initializes the laser beam pitch for 600 dpi to the SP2-6-2 value. <br> Press "Enter \#" to initialize. <br> After inputting data for SP2-6-2, this SP must be performed. | Execute |
|  | 5 | Beam Pitch Data Reset | Resets the values of current LD unit position and laser beam pitch change counter. Press "Enter \#" to reset. After replacing the LD unit, this SP mode must be done. | Execute |


| Menu |  |  | Function | Settings [Default] |
| :---: | :---: | :---: | :---: | :---: |
| Menu Level 2 | Menu Level 3 |  |  |  |
| 7 |  | Polygon Motor Off Timer | Input the time that the polygon motor turns off after entering the stand-by condition. | $\begin{aligned} & 0 \sim 60 \\ & 5 \text { seconds/step } \\ & {[10 \text { seconds] }} \end{aligned}$ |
|  |  |  | If set at " 0 ", the polygon mirror motor never turns off during stand-by. However, when the machine goes into energy saver mode, the polygon mirror motor turns off regardless of this timer. |  |
| 8 |  | Development Bias Adjustment (for ID sensor) | Adjusts the development bias for developing ID sensor pattern. | $\begin{aligned} & 200 \text { ~ } 700 \\ & 10 \mathrm{~V} / \text { step } \\ & {[410 \mathrm{~V}]} \end{aligned}$ |
|  |  |  | This can be adjusted as a temporary measure if faint prints occur due to an aging drum. |  |
| 9 | 1 | Transfer Current Correction (By-pass feed - a) | Adjusts the transfer current correction coefficient that is used if the paper width is less than 150 mm . | $\begin{aligned} & 1.0 \sim 3.0 \\ & 0.1 / \text { step } \\ & {[1.5]} \end{aligned}$ |
|  | 2 | Transfer Current Correction (By-pass feed -b) | Adjusts the transfer current correction coefficient that is used if the paper width is less than 216 mm . | $\begin{aligned} & 1.0 \sim 3.0 \\ & 0.1 / \text { step } \\ & {[1.5]} \end{aligned}$ |
| 10 |  | TD Sensor Initial Setting | Performs the TD sensor initial setting. This SP mode controls the voltage applied to the TD sensor to make the TD sensor output about 4.0 V. Press "Enter \#" to start. After finishing this, the TD sensor output voltage is displayed. E.g. 4.00 V | Execute |
|  |  |  | Use this mode only after changing the TD sensor and developer, or adding new developer. |  |


| Menu |  |  | Function | Settings [Default] |
| :---: | :---: | :---: | :---: | :---: |
| Menu Level 2 | Menu Level 3 |  |  |  |
| 11 | 1 | $\begin{aligned} & \text { TD Sensor } \\ & \text { Manual } \\ & \text { Setting - VTS } \end{aligned}$ | Adjusts the TD sensor output (VT). Change this value after replacing the development unit with another one that already contains toner. <br> For example, when using a development unit from another machine for test purposes. To adjust VTS, do the following. <br> 1. Check the value of SP2-11-1 in both the machine containing the test unit and the machine that you are going to move it to. <br> 2. Install the test development unit, then input the VTs for this unit into SP2-11-1. <br> 3. After the test, put back the old development unit, and change SP2-11-1 back to the original value. | $\begin{aligned} & 1.0 \sim 5.0 \\ & 0.01 \mathrm{~V} / \text { step } \end{aligned}$ |
|  | 2 | TD Sensor Manual Setting - Vtmin | Adjusts the minimum value for SP2-11-1. | $\begin{aligned} & 1.00 \sim 5.00 \\ & 0.01 \mathrm{~V} / \text { step } \end{aligned}$ |
| 12 | 1 | Test Pattern Printing | Prints the printer test patterns. See section 4.2.3 for how to print test patterns. Example: 10 Trimming area pattern <br> This SP mode is useful for finding whether the LDDR or the BICU is defective. If the printout is not OK, the LDDR is defective. | $\begin{aligned} & 0 \sim 20 \\ & {[0]} \end{aligned}$ |
| 13 | 1 | Process Control Setting -Charge-a | Adjusts the charge roller voltage used when paper with a small width is fed from the by-pass tray. <br> Use this SP when an image problem (such as white spots at the center of black dots or breaks in thin black lines) occurs when paper with a small width is fed from the by-pass feed tray | $\begin{aligned} & 0 \sim 400 \\ & 10 \mathrm{~V} / \mathrm{step} \\ & {[250 \mathrm{~V}]} \end{aligned}$ |
|  | 2 | Process <br> Control Setting -Charge-b | Adjusts the charge roller voltage used when paper with a small width is fed from the by-pass tray. <br> Use this SP when an image problem (see 2-13-1) occurs when paper with a small width is fed from the by-pass feed tray. | $\begin{aligned} & 0 \sim 400 \\ & 10 \mathrm{~V} / \mathrm{step} \\ & {[50 \mathrm{~V}]} \end{aligned}$ |


| Menu |  |  | Function | Settings [Default] |
| :---: | :---: | :---: | :---: | :---: |
| Menu Level 2 | Menu Level 3 |  |  |  |
| 13 | 3 | Process Control Setting - By-pass-a | Adjusts the development bias used when paper with a small width is fed from the by-pass tray. <br> Use this SP when an image problem (see 2-13-1) occurs when paper with a small width is fed from the by-pass feed tray. | $\begin{array}{\|l} \hline 0 \sim 400 \\ 10 \mathrm{~V} / \text { step } \\ {[200 \mathrm{~V}]} \end{array}$ |
|  | 4 | Process Control Setting - By-pass-b | Adjusts the development bias used when paper with a small width is fed from the by-pass tray. <br> Use this SP when an image problem (see 2-13-1) occurs when paper with a small width is fed from the by-pass feed tray. | $\begin{aligned} & 0 \sim 400 \\ & 10 \mathrm{~V} / \mathrm{step} \\ & {[50 \mathrm{~V}]} \end{aligned}$ |
| 14 |  | ID Sensor Initial Setting | Performs the ID sensor initial setting. The ID sensor output for the bare drum (VsG) is adjusted to $4.0 \pm 0.2 \mathrm{~V}$. Press "Enter \#" to initialize. This SP mode should be performed after replacing or cleaning the ID sensor or replacing the drum or doing an NVRAM clear. | Execute |
| 15 | 1 | HDD Setting (Media Test) | Checks for bad sectors on the hard disk that develop during machine use. Press "Enter \#" to start. This takes 4 minutes. <br> This SP mode should be done when an abnormal image is printed. There is no need to do this at installation as the hard disk firmware already contains bad sector information, and damage is not likely during transportation. <br> Bad sectors detected with this SP mode will be stored in the NVRAM with the bad sector data copied across from the firmware. | Execute |
|  | 2 | HDD Setting (Bad Sector Information Reset) | Resets the bad sector information, which is stored in the NVRAM. Press "Enter \#" to reset. <br> This SP should be performed when the hard disk is replaced. | Reset |
| 16 |  | A3/11" x 17" Double Count | Specifies whether the counter is doubled for $\mathrm{A} 3 / 11$ "x17" paper. Press $\boldsymbol{\nabla}$ or $\boldsymbol{\Delta}$ key to select "No" or "Yes". If "Yes" is selected, the total counter and the current user code counter count up twice when A3/11"x17" paper is used. | No or Yes [No] |


| Menu |  |  | Function | Settings [Default] |
| :---: | :---: | :---: | :---: | :---: |
| Menu Level 2 | $\begin{array}{\|c\|} \hline \text { Menu } \\ \text { Level 3 } \\ \hline \end{array}$ |  |  |  |
| 17 |  | Auto Off Mode Disabling | Selects energy saver mode off. Press <br> or $\boldsymbol{\Delta}$ key to select "No" or "Yes". In the default setting, the 0 minute option of the energy saver timer range will appear on the LCD in the user menu, and the user can disable the energy saver mode. (In the user menu, the user will be able to select 0 minutes.) | No or Yes [ No ] |
| 18 |  | Memory All Clear <br> Exceptions: <br> - Electrical total counter <br> - PM Counter <br> - Serial Number <br> - P\&P brand name and Prod. Name setting | Resets the correction data for process control and software counters. <br> Also, returns all modes and adjustments to the default settings. See the "Memory All Clear" section for how to use this SP mode correctly. Press ""Enter \#" twice, then turn the main power switch off and on. Normally, this SP mode should not be used. <br> It is used only after replacing the NVRAM, or when the copier malfunctions due to a damaged NVRAM. |  |
| 19 | $1 \sim 9$ | Input Check | Displays the signals received from sensors and switches. <br> See the "Input Check" section for details. |  |
| 20 | 1 ~ 99 | Output Check | Turns on the electrical components individually for test purposes. See the "Output Check" section for details. |  |
| 21 |  | Plug \& Play Brand Name and Production Name Setting | Selects the brand name and the production name for Windows 95 Plug \& Play. This information is stored in the NVRAM. If the NVRAM is defective, these names should be registered again. <br> After selecting, press the "Enter \#" key. If the setting is completed, a "*" mark will be displayed before the selection. |  |
|  | 1 | SMC Printing - <br> All Data | Prints all the system parameter lists. See the "System Parameter and Data Lists" section for how to print the lists. | Execute |
| 22 | 2 | SMC Printing SP Mode Data | Prints the SP mode data list. See the "System Parameter and Data Lists" section for how to print the lists. | Execute |


| Menu |  |  | Function | Settings [Default] |
| :---: | :---: | :---: | :---: | :---: |
| Menu Level 2 | Menu Level 3 |  |  |  |
| 22 | 3 | SMC Printing <br> - Logging Data | Prints the machine status history data list. <br> See the "System Parameter and Data Lists" section for how to print the lists. | Execute |
|  | 4 | SMC Printing Large Font Size | Prints the SP mode data list with a large font size. <br> See the "System Parameter and Data Lists" section for how to print the lists. | Execute |
| 23 |  | Punch Hole Position Adjustment (2 Punch Hole Type) | Adjusts the punch hole position in the sub-scan direction for the punch unit with two punch holes. | $\begin{aligned} & -7.5 \sim+7.5 \\ & 0.5 \mathrm{~mm} / \mathrm{step} \\ & {[0 \mathrm{~mm}]} \end{aligned}$ |
|  |  |  | Use $\boldsymbol{\triangle}$ or $\boldsymbol{\nabla}$ key to toggle between + and -. A larger value shifts the punch holes towards the edge of the paper. |  |
| 24 |  | Punch Hole Position Adjustment (3 Punch Hole Type) | Adjusts the punch hole position in the sub-scan direction for the punch unit with three punch holes. <br> Use $\boldsymbol{\Delta}$ or $\boldsymbol{\nabla}$ key to toggle between + and -. A larger value shifts the punch holes towards the edge of the paper. | $-7.5 \sim+7.5$ $0.5 \mathrm{~mm} /$ step $[0 \mathrm{~mm}]$ |
|  | 1 | SC/Jam Counter Reset | Resets the SC and jam counters. Press "Enter \#" to reset. | Reset |
| 25 | 2 | Reset the total Copy Counter by Paper Tray | Resets the total copy counter by paper tray. Press "Enter \#" to reset. Use these SP modes when replacing the pick-up, feed, and separation rollers in the paper feed stations | Reset |
| 26 |  | SC Reset | Resets the SC, press "Enter \#". | Reset |
|  |  | Timing Switch | Selects when the timing switch is on. Press $\boldsymbol{\nabla}$ or $\mathbf{\Delta}$ key to select "On" or "Off". | On or Off [Off] |
| 27 |  |  | If a dirty image is printing on the backside of the first sheet, select "On" to prevent this problem. When "On" is selected, the print start timing changes after auto power control (see the "auto power control" section (2.2.3)) is done. |  |
| 28 |  | User Maintenance Off | If the engineer will execute the preventive maintenance, select "No". When "No" is selected for this menu, the machine will not display "Change Maint. Kit". | $\begin{aligned} & \mathrm{No} \text { or Yes } \\ & \text { [No] } \end{aligned}$ |

### 4.2.3 TEST PATTERN PRINTING (SP2-12)

NOTE: Do not operate the machine until the test pattern is printed out completely. Otherwise, an SC may occur.

1. Access the SP mode 2-12, then select a test pattern number by $\boldsymbol{\nabla}$ or $\boldsymbol{\Delta}$ key.
2. Press the "Enter \#" key to store the test pattern.
3. Access the SP mode 2-22-2 (SMC Printing - SP Mode Data).
4. Press "Enter \#" to print selected test pattern.
5. After finished test pattern printing, do either of the following steps to clear stored test pattern.
-access the SP mode 2-12 and set test pattern to "0" (None), then exit the SP mode
-turning off and on machine
6. Exit the SP mode.

Test Pattern Table (SP2-12: Test Pattern Printing - Printing)

| No. | Test Pattern | No. | Teat Pattern |
| :---: | :--- | :---: | :--- |
| 0 | None | 11 | Argyle Pattern |
| 1 | Vertical Line (1-dot) | 12 | 16 Grayscales (Horizontal) |
| 2 | Horizontal Line (1-dot) | 13 | 16 Grayscales (Vertical) |
| 3 | Vertical Line (2 dot) | 14 | 16 Grayscales (Vert./Hor.) |
| 4 | Horizontal Line (2-dot) | 15 | 16 Grayscales (Vert./Hor Overlay) |
| 5 | Grid Pattern (Single-dot) | 16 | Not used |
| 6 | Grid Pattern (Double-dot) | 17 | Horizontal Line (1-dot) |
| 7 | Alternating Dot Pattern | 18 | Grid Pattern (Single-dot) |
| 8 | Full Dot Pattern | 19 | Grid Pattern (Double-dot) |
| 9 | Black Band | 20 | Alternating Dot Pattern |
| 10 | Trimming Area |  |  |

### 4.2.4 INPUT CHECK

## Main Machine Input Check (SP2-19)

1. Access SP mode.
2. Select the menu level 3 SP number which will access the switch or sensor you wish to check.
3. Check the status of the sensor or switch.

NOTE: If you wish to change to another menu 3 level, press the "Next" or "Prev." key.
4. The reading ("0" or " 1 ") will be displayed. The meaning of the display is as follows.

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mid$ | $\mid$ | $\mid$ | $\mid$ | $\mid$ | $\mid$ | $\mid$ | $\mid$ |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |


| Class 3 no. | Bit no. | Description | Reading |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0 | 1 |
| 1 <br> (Upper Tray) | 7 | Not used |  |  |
|  | 6 | Height Sensor 2 | Not activated | Activated |
|  | 5 | Height Sensor 1 | Not activated | Activated |
|  | 4 | Not used |  |  |
|  | 3 | Paper Size Sensor 4 | Switch pressed | Switch not pressed |
|  | 2 | Paper Size Sensor 3 | Switch pressed | Switch not pressed |
|  | 1 | Paper Size Sensor 2 | Switch pressed | Switch not pressed |
|  | 0 | Paper Size Sensor 1 | Switch pressed | Switch not pressed |
| $\stackrel{2}{(\text { Lower Tray) }}$ | 7 | Not used |  |  |
|  | 6 | Height Sensor 2 | Not activated | Activated |
|  | 5 | Height Sensor 1 | Not activated | Activated |
|  | 4 | Not used |  |  |
|  | 3 | Paper Size Sensor 4 | Switch pressed | Switch not pressed |
|  | 2 | Paper Size Sensor 3 | Switch pressed | Switch not pressed |
|  | 1 | Paper Size Sensor 2 | Switch pressed | Switch not pressed |
|  | 0 | Paper Size Sensor 1 | Switch pressed | Switch not pressed |
| $\begin{gathered} 3 \\ \begin{array}{c} \text { (Registration } \\ \& \text { others) } \end{array} \end{gathered}$ | 7 | Zero Cross Signal | Detected | Not detected |
|  | 6 | Transfer Belt Unit H.P Sensor | Not at home position | At home position |
|  | 5 | Exhaust Fan Lock Signal | Not locked | Locked |


| Class 3 no. | Bit no. | Description | Reading |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0 | 1 |
| 3 <br> (Registration \& others) | 4 | Cooling Fan Lock Signal | Not locked | Locked |
|  | 3 | Main Motor Lock Signal | Not locked | Locked |
|  | 2 | Toner Overflow Sensor | Tank not full | Tank Full |
|  | 1 | Cover Open | Cover closed | Cover opened |
|  | 0 | Registration Sensor | Paper detected | Paper not detected |
| 4 <br> (By-pass) | 7 | Not used |  |  |
|  | 6 | Paper End Sensor | Paper detected | Paper not detected |
|  | 5 | Not used |  |  |
|  | 4 | Paper Size Sensor 4 | See table 1 |  |
|  | 3 | Paper Size Sensor 3 |  |  |
|  | 2 | Paper Size Sensor 2 |  |  |
|  | 1 | Paper Size Sensor 1 |  |  |
|  | 0 | Unit Set Signal | Connected | Not connected |
| $\begin{gathered} 5 \\ \text { (Bridge Unit) } \end{gathered}$ | 7 | Not used |  |  |
|  | 6 | Unit Set Signal | Connected | Not connected |
|  | 5 | Paper Sensor | Paper detected | Paper not detected |
|  | 4 | Relay Sensor | Paper not detected | Paper detected |
|  | 3 | Exit Sensor | Paper not detected | Paper detected |
|  | 2 | Left Cover Switch | Switch pressed (cover closed) | Switch not pressed |
|  | 1 | Right Cover Switch | Switch pressed (cover closed) | Switch not pressed |
|  | 0 | Tray Exit Unit Switch | Switch pressed (cover closed) | Switch not pressed |
| $\stackrel{6}{(\text { Unit Set) }}$ | 7 | Not used |  |  |
|  | 6 | F gate Signal | Active | Not active |
|  | 5 | Height Sensor | At feed height position | Not at feed height position |
|  | 4 | Paper Exit Sensor | Paper detected | Paper not detected |
|  | 3 | Fusing Unit | Detected | Not detected |
|  | 2 | Total Counter | Not detected | Detected |
|  | 1 | Key Counter | Detected | Not detected |
|  | 0 | Not used |  |  |
| $\begin{gathered} 7 \\ \text { (Paper End) } \end{gathered}$ | 7 | Not used |  |  |
|  | 6 | Right Lower Cover Switch | Switch not pressed | Switch pressed |
|  | 5 | 2nd Tray Height Sensor | Paper not at upper limit | Paper at upper limit |
|  | 4 | 1st Tray Height Sensor | Paper not at upper limit | Paper at upper limit |


| Class 3 no. | Bit no. | Description | Reading |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0 | 1 |
| $\begin{gathered} 7 \\ \text { (Paper End) } \end{gathered}$ | 3 | Lower Relay Sensor | Paper detected | Paper not detected |
|  | 2 | Upper Relay Sensor | Paper detected | Paper not detected |
|  | 1 | Lower Paper End Sensor | Paper not detected | Paper detected |
|  | 0 | Upper Paper End Sensor | Paper not detected | Paper detected |
| 8 <br> (I/O Board Dip Switch 101) | 7 | Dip Switch - 8 | On | Off |
|  | 6 | Dip Switch - 7 | On | Off |
|  | 5 | Dip Switch - 6 | On | Off |
|  | 4 | Dip Switch - 5 | On | Off |
|  | 3 | Dip Switch - 4 | On | Off |
|  | 2 | Dip Switch - 3 | On | Off |
|  | 1 | Dip Switch - 2 | On | Off |
|  | 0 | Dip Switch - 1 | On | Off |
| $\begin{gathered} 9 \\ \text { (Duplex) } \end{gathered}$ | 7 | Not used |  |  |
|  | 6 |  |  |  |
|  | 5 |  |  |  |
|  | 4 |  |  |  |
|  | 3 | Exit Sensor | Paper detected | Paper not detected |
|  | 2 | Entrance Sensor | Paper detected | Paper not detected |
|  | 1 | Cover Guide Sensor | Cover guide opened | Cover guide closed |
|  | 0 | Duplex Unit Switch | Switch pressed (cover closed) | Switch not pressed |

### 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 (SP2-20)

1. Access SP mode 2-20.
2. Select the SP number that corresponds to the component you wish to check by pressing $\mathbf{\Delta}$ or $\boldsymbol{\nabla}$ key.
3. Press "Enter \#" to check that component.
4. Press "Escape" to interrupt the test.
5. If you wish to check another component, press $\mathbf{\triangle}$ or $\boldsymbol{\nabla}$ key.

| No. | Description |
| :---: | :--- |
| 1 | Upper Paper Feed Clutch |
| 2 | Lower Paper Feed Clutch |
| 3 | Upper Paper Feed Clutch (PTU) |
| 4 | Lower Paper Feed Clutch (PTU) |
| 5 | Paper Feed Clutch (By-pass) |
| 6 | Paper Feed Clutch (LCT) |
| $7 \sim 12$ | Not used |
| 13 | Pick-up Solenoid (By-pass) |
| 14 | Pick-up Solenoid (LCT) |
| 15,16 | Not used |
| 17 | Upper Transport Motor <br> (Finishers) |
| 18 | Lower Transport Motor <br> (3,000-sheet Finisher only) |
| 19 | Shift Tray Exit Motor (3,000- <br> sheet Finisher), Exit Motor <br> (1,000-sheet Finisher) |
| 20 | Staple Hammer Motor <br> (Finishers) |
| 21 | Punch Motor (Punch Unit) |
| $22 \sim 24$ | Not used |
| 25 | LCT Motor (LCT) |
| 26 | Tray Motor (PTU) |
| 27 | Not used |
| 28 | Main Motor |
| 29 | Transport Motor (Duplex) |
| 30 | Inverter Motor - Reverse <br> (Duplex) |
| 31 | Inverter Motor - Forward <br> (Duplex) |


| No. | Description |
| :---: | :--- |
| $32 \sim 34$ | Not used |
| 35 | Relay Clutch (PTU) |
| 36 | Relay Clutch |
| 37 | Not used |
| 38 | Relay Clutch (LCT) |
| 39 | Registration Clutch |
| 40 | Not used |
| 41 | Exit Junction Gate Solenoid <br> (Interchange Unit) |
| 42 | Duplex Junction Gate Solenoid <br> (Interchange Unit) |
| 43,44 | Not used |
| 45 | Inverter Gate Solenoid (Duplex) |
| 46 | Not used |
| 47 | Junction Gate Solenoid <br> (Bridge Unit) |
| 48,49 | Not used |
| 50 | Tray Junction Gate Solenoid <br> (3,000-sheet Finisher only) |
| 51 | Stapler Junction Gate Solenoid <br> (Finishers) |
| 52 | Positioning Roller Solenoid <br> (Finishers) |
| $53 \sim 55$ | Not used |
| 56 | Toner Supply Motor |
| 57 | Transfer Belt Clutch |
| $58 \sim 61$ | Not used |
| 62 | Quenching Lamp |
| 63 | Charge Roller Bias |
| $64 \sim 66$ | Not used |
|  |  |


| No. | Description |
| :---: | :--- |
| 67 | Development Bias |
| 68 | Not used |
| 69 | Transfer Belt Bias |
| 70 | ID Sensor |
| $71 \sim 74$ | Not used |
| 75 | Exhaust Fan Motor |
| 76 | Cooling Fan Motor |
| 77 | Not used |
| 78 | Cooling Fan Motor (Bridge Unit) |
| $79 \sim 84$ | Not used |
| 85 | Not used |
| $86 \sim 89$ | Not used |
| 90 | Laser Diode |


| No. | Description |
| :---: | :--- |
| 91 | Not used |
| 92 | Shift Tray Lift Motor (Finishers) |
| 93 | Jogger Motor (3,000-sheet <br> Finisher)/Jogger Fence Motor <br> (1,000-sheet Finisher) |
| 94 | Stapler Motor (3,000-sheet <br> Finisher) |
| 95 | Stack Feed Out Motor <br> (Finishers) |
| 96 | Shift Motor (Finishers) |
| 97 | Stapler Rotation Motor (3,000- <br> sheet Finisher) |
| $98 \sim 99$ | Not used |

### 4.2.6 SYSTEM PARAMETER AND DATA LISTS (SMC LISTS)

1. Access SP mode 2-22 and select the menu level 3 number corresponding to the list that you wish to print.
2. Press the "Enter \#" key to print the list.
3. Exit SP mode.

### 4.2.7 MEMORY ALL CLEAR (SP2-18)

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

- Electrical total counter value
- PM counter value
- Machine serial number
- Plug \& Play Brand Name and Production Name Setting (SP2-21)

Among the settings that are reset are the correction data for process control and all the software counters.

Normally, this SP mode should not be used. This procedure is required only after replacing the NVRAM or when the copier malfunctions due to a damaged NVRAM.

1. Print out all SMC Data Lists (SP mode 2-22).
2. Access SP mode 2-18.
3. Press the "Enter \#" key twice.
4. Turn the main power switch off and back on.
5. Do the laser beam pitch adjustment.
6. Do the printer registration and magnification adjustments (see Replacement and Adjustment - Copy Adjustments).
7. Referring to the SMC data lists, re-enter any values that had been changed from their factory settings.
8. Do SP2-14 (ID Sensor Initial Setting) and SP2-15-1 (HDD media test).

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

### 4.2.8 SOFTWARE RESET

When the printer hangs up, turn the main switch off and on to reset software.
NOTE: The printer has no software reset mode.

### 4.2.9 PRINTER RESTART AND MENU RESET (USER MENU)

The following parameters are user menu. See section 4.6 User menu.

## Printer Restart

This parameter initializes the printer.

## Menu Reset

This parameter resets the user menu settings to the default value.

### 4.3 DOWNLOADING NEW FIRMWARE

New firmware for the printer controller and PostScript can be downloaded from a PC through the parallel cable and from a flash memory card through the PCMCIA port.

### 4.3.1 FIRMWARE UPDATE USING A FLASH MEMORY CARD (SP1-1-2 AND 1-2-2)

1. Prepare a flash memory card that has been programmed with the latest firmware.
NOTE: When you program a flash memory card with a firmware file, use the following parameter settings.

- Start Address - 000000h
- Length - 3FFFFFh

2. Turn off the machine, remove the cover [A], and insert the flash memory card $[\mathrm{B}]$ into the slot so that the "A" side of the card faces the front of the machine.

3. Turn on the machine and enter SP mode.
4. Choose "1-1-2 - Flash SYS From PCMCIA" or "1-2-2 - Flash PS From PCMCIA" depending on the firmware type.
5. Press "Enter \#" in reply to the confirmation message. Firmware download will take several minutes.
6. After new firmware has been downloaded successfully, turn off the machine, remove the card from the slot, and turn the machine back on.
7. Print the "Printer Configuration Page" to check the new firmware version ([Menu] - [List Print] - [Config. Page]).
The firmware version number is printed in the "Printer Details" section of the configuration page.

### 4.3.2 FIRMWARE UPDATE FROM PARALLEL PORT (SP1-1-1 AND 1-2-1)

1. Prepare the latest firmware file and Fcopy.exe on a host computer.
2. Turn off the machine, connect the host computer using a parallel cable, and turn the machine back on.
3. Enter the SP mode.
4. Choose "1-1-1 - Flash SYS from Parallel" or "1-2-1 - Flash PS From Parallel" depending on the firmware type.
5. Press "Enter \#" in reply to the confirmation message.
6. On the host computer, start MS-DOS Prompt and type the following command.

Either
C:I> FCOPY pathlfilename or

C:l> COPY /b pathlfilename port
CAUTION: Do not turn off the machine while "From Parallel Processing" is displayed on the LCD, even if FCOPY has finished in the MS-DOS Prompt.
7. After new firmware has been downloaded successfully, turn off the machine, disconnect the printer cable if necessary, and turn the machine back on.
8. Print the "Printer Configuration Page" to check the new firmware version ([Menu] - [List Print] - [Config. Page]).
The firmware version number is printed in the "Printer Details" section of the configuration page.

## $\Rightarrow$ 4.3.3 COPY FLASH ROM (SP1-3)

There are two functions; one is to copy the printer controller firmware from the ROM DIMM to the printer controller, the other is to copy the firmware the opposite way.

## Downloading from ROM DIMM to the printer controller

When downloading of the controller firmware is not successful from either the flash memory card or PC (and the printer controller does not start up), any attempts thereafter to download from the card or PC will not be possible. In addition, it will not be possible to return the machine to operating condition.

However, the firmware can be downloaded from the ROM DIMM with this function by following the procedure below.


1. Remove the printer controller.
2. Change the position of the TB1 jumper [A] on the controller from CS0 to CS.
3. Change the position of the TB1 jumper [B] on the ROM DIMM that contains the controller firmware from CS1 to CS0.
4. Install the ROM DIMM on the controller.

CAUTION: Make sure to install the correct ROM DIMM in the PS SIMM connector.
5. Install the printer controller and turn on the machine.
6. Enter SP mode.
7. Choose "1-3-Copy ROM".
8. Press "Yes" in response to the confirmation message.
9. After successfully downloading the firmware, turn off the machine and remove the printer controller. Next, remove the ROM DIMM.
10. Reposition the jumpers on the printer controller and ROM DIMM.
11. Reinstall the printer controller and turn on the machine.
12. Check to see that the printer controller starts up properly.

## Downloading from the controller to ROM DIMM

1. Remove the printer controller.
2. Install the ROM DIMM on the controller.
3. Install the printer controller and turn on the machine.
4. Enter SP mode.
5. Choose "1-3 - Copy ROM".
6. Press "Yes" in response to the confirmation message.
7. After successfully downloading the firmware, turn off the machine and remove the printer controller. Next, remove the ROM DIMM.
8. Reinstall the printer controller and turn on the machine.

### 4.3.4 FORMATING THE HARD DISK (SP1-4)

This function is used to format the printer hard disk. If the hard disk is formatted, the stored data (downloaded fonts and macros) will be erased. So, when performing this function, ask the customer for consent. After this operation, advise the customer to restore their data, if necessary.

1. Enter the SP mode.
2. Choose "1-4 - Format Disk".
3. Press "Enter \#" in reply to the confirmation message. Hard disk formatting will take several minutes.
4. After confirming that formatting was successful, turn the machine off and back on again.

## $\Rightarrow$ 4.3.5 PARALLEL LOOP BACK TEST (SP1-9)

1. Plug the loop back connector into the parallel port of the printer.
2. Enter the printer SP mode then select "1-9 - Loop Back".
3. Press "Yes" in reply to the confirmation message. The result of the test will be displayed on the operation panel.


### 4.4 DOWNLOADING NEW SOFTWARE

In this machine, the BICU software is upgraded using a flash memory card.
The program is downloaded from the flash memory card to the BICU.
NOTE: The procedure for how to write the source software data from a flash memory card writer to a flash memory card is described in the SwapBox FTL manual.


1. Turn off the main power switch.
2. Remove the flash memory card cover $[A]$.
3. Plug the flash memory card $[B]$ into the card slot.

NOTE: Make sure that the surface printed " $B$ " faces the front of the machine.
4. Turn on the main power switch.

NOTE: 1) The machine does not display any message during the download procedure.
2) This procedure takes about 3 minutes.
5. After 3 minutes pass, turn off the machine, remove the card from the slot, and turn the machine back on.

### 4.5 NETWORK INTERFACE BOARD

### 4.5.1 FACTORY RESET (NVRAM CLEAR)

When the machine or the network interface board has moved to a different location, reset the NVRAM contents to the factory default as follows.


1. Remove the network interface board and change the OP2 jumper setting as shown above.
2. Install the network interface board and turn on the machine.
3. The green LED flashes 3 times, then the amber and green LEDs light alternately (once per second).
4. Turn off the machine and remove the network interface board.
5. Reset the OP2 jumper setting to the default, and put the board back in the machine.
6. Turn on the machine.

### 4.5.2 FLASH ROM UPDATE

## Introduction

Before you update network interface card firmware, you need to receive the latest firmware file and set up an update utility that is suitable for the network environment.

A firmware file (*.upd, *.upp, *.upt, or *.upu file) is normally distributed as a ZIP file (e.g., RIC221.ZIP). You need to unzip the file to a temporary directory on a host computer, before starting the firmware update utility.

Two types of utility software, FlashUP and FTPDL, are provided as ZIP files with this document. Use the FlashUP utility for Novell server based IPX networks, or use the FTPDL utility for TCP/IP networks. You do not need to install both because they have the same function.
NOTE: The NIB must be configured with an IP address and subnet mask, before using FTPDL utility.


## Flashup Utility (for Novell IPX Networks)

## System Requirements

- Windows 3.1x/95/98, Windows NT3.5x/4.0
- Novell compatible IPX protocol installed
- Novell compatible NetWare client software installed


## Network Requirements

- NetWare 2.x/3.x/4.x server running in Bindery mode


## Installation Procedure

1. Unzip Flashup.ZIP to a temporary folder (directory). The following files should be extracted there.

FLASHUP.ZIP

| _inst16.ex_ | 274KB | EX_File | 7/10/96 2:15 AM |
| :---: | :---: | :---: | :---: |
| -isdel | 8KB | Application | 9/7/95 8:22 PM |
| _setup. 1 | 233 KB | 1 File | 11/10/98 1:46 PM |
| _setup.dII | 6KB | Application Extension | 4/29/96 8:25 AM |
| setup.lib | 153KB | LIB File | 11/10/98 1:45 PM |
| Disk1.id | 1 KB | ID File | 11/10/98 1:46 PM |
| Readme | 1 KB | Text Document | 11/6/98 8:54 AM |
| Setup | 44KB | Application | 7/24/96 4:00 AM |
| Setup | 1KB | Configuration Settings | 7/31/96 12:50 PM |
| Setup | 64 KB | Internet Communication | 7/31/96 12:50 PM |
| Setup.iss | 1 KB | ISS File | 11/10/98 1:45 PM |
| Setup.pkg | 1KB | PKG File | 11/10/98 1:45 PM |

1. Run "Setup.exe" from the folder (directory).
2. Click "Next >" in the "Welcome" dialog box.
3. Read the readme.txt file displayed in the "Readme Information" dialog box, then click "Next >".
4. In the "Destination Location" dialog box, choose a folder (directory) to install the software, then click "Next >".
5. Confirm the program folder (group) name, then click "Next >".
6. After the software has been installed, click "Finish" in the "Setup Complete" dialog box.

## Firmware Update Procedure

1. Login to the NetWare network as "supervisor" or a user with supervisor privileges.
2. Start the FlashUP utility.

3. Choose a new firmware file and click "OK".

4. Choose a network interface card (or multiple cards) from the unit names listed in the dialog box, then click "OK". Update will start.

5. If you do not see the desired unit in the list, click "Show All" to display all network interface cards that are currently logging in to the server. If you still cannot see the unit, click "Cancel", restart the machine (printer), and try again.
6. After the firmware has been downloaded successfully, the following message pops up. Then click "OK" to finish.

7. The Print Server Card then updates its flash ROM. The machine will print a status report after flash ROM update has finished.

CAUTION: Do not turn off the machine until after it prints a status sheet (after automatic re-initialization). Otherwise, new firmware may not be programmed to the flash ROM successfully.

## Recovery from Failed Download

Even if firmware download has failed, firmware download is still possible.
The NIB in "down" status appears as DWN_xxx_xxxxxx in the dialog box in step 4 above. Download the firmware again to the NIB in "down" status using FlashUp utility.

## FTPDL Utility (for TCP/IP Networks)

## System Requirements

- Windows 3.1x/95/98, Windows NT4.0
- TCP/IP protocol installed


## Network Requirements

- The target network interface board (NIB) must have a valid IP address.

NOTE: If NIB is in the "DOWN" status, this utility cannot be used because no IP address is assigned to the NIB. Use the "Flashup" utility instead.

## Installation

1. Unzip ftpdl.ZIP to a temporary folder (directory). The following files should be extracted there.

## FTPDL.ZIP

| inst16.ex | 274KB | EX_File | 7/10/96 2:15 AM |
| :---: | :---: | :---: | :---: |
| isdel | 8KB | Application | 9/7/95 8:22 PM |
| Setup. 1 | 783KB | 1 File | 6/11/99 4:19 PM |
| Setup.dII | 6KB | Application Extension | 4/29/96 8:25 AM |
| Setup.lib | 153KB | LIB File | 6/11/99 4:19 PM |
| Disk1.id | 1KB | ID File | 6/11/99 4:19 PM |
| Readme | 2KB | Text Document | 6/11/99 4:05 PM |
| Setup | 44KB | Application | 7/24/96 4:00 AM |
| Setup | 1 KB | Configuration Settings | 6/11/99 4:19 PM |
| Setup | 64KB | Internet Communication | 7/31/96 12:50 PM |
| Setup.iss | 1KB | ISS File | 6/11/99 4:18 PM |
| Setup.pkg | 1KB | PKG File | 6/11/99 4:19 PM |

1. Run "Setup.exe" from the folder (directory).
2. Click "Next >" in the "Welcome" dialog box.
3. Read the readme.txt file displayed in the "Readme Information" dialog box, then click "Next >".
4. In the "Destination Location" dialog box, choose a folder (directory) to install the software, then click "Next >".
5. Confirm the program folder (group) name, then click "Next >".
6. After the software has been installed, click "Finish" in the "Setup Complete" dialog box.

## Firmware Update Procedure

1. Start the FTPDL utility.

2. Choose [File] - [Download].

3. Choose a new firmware file and click "OK".

4. Enter the IP address of the network interface card in which you wish to update firmware, then click "OK".

5. Enter the password programmed in the network interface card ("sysadm" is the default), then click "OK".

6. After sending the flash ROM image file to the network interface card, the card updates its firmware.

| Download Status | $x$ |
| :--- | :--- |
| Updating Unit $\quad 133.139 .157 .232$ |  |
| Sending ram image to unit. |  |
| 35\% complete |  |

7. After the firmware has been downloaded, click "OK" to finish.

## FTP Download

Unit updated.

## OK

8. The Print Server Card then updates its flash ROM. The machine will print a status report after the flash ROM update has finished.
CAUTION: Do not turn off the machine until after it prints a status sheet.

## Recovery from Failed Download

If firmware download using FTPDL has failed, use the FlashUP utility to recover the NIB. This is because the NIB may not have IP parameters anymore after failed download.

### 4.6 USER MENU

The user program menu is accessed by users and operators, and by sales and service staff. The user menu is used to input the printer's default settings.

### 4.6.1 HOW TO ENTER AND EXIT USER MENU

Press the "Menu" key, then select the user menu. After finishing with the user menu, press the "Escape" key to exit.

### 4.6.2 USER MENU TABLE

NOTE: The function of each user menu is explained in the Using the Operation Panel section of the operating instructions.

System Setting Table

| Category | Function Menu |  |
| :---: | :---: | :---: |
| Proof Print | Print File |  |
|  | Delete File |  |
|  | Show Error Log |  |
| Job Control | Paper Input | Page Size |
|  |  | Tray Priority |
|  |  | Paper Size |
|  |  | Tray Paper Type |
|  |  | Bypass Paper Type |
|  |  | Auto Tray SW |
|  | Paper Output | Output Tray |
|  |  | Duplex |
|  |  | Sort |
|  |  | Staple |
|  |  | Punch |
|  | Print Quality | Edge Smoothing |
|  |  | Resolution |
|  |  | Image Density |
|  |  | Toner Saving |
|  | System | Copies |
|  |  | Print PS Errors |
|  |  | Energy Saver |
|  |  | Auto Continue |
|  | PCL Menu | Orientation |
|  |  | Form Lines |
|  |  | Font Source |
|  |  | Font Number |
|  |  | Point Size |


| Category | Function Menu |  |
| :---: | :---: | :---: |
| Job Control | PCL Menu | Font Pitch |
|  |  | Symbol Set |
| Host Interface | Printer Lang. |  |
|  | Parallel Setup | I/O Timeout |
|  |  | Bi-direction |
|  | Network Setup | I/O Timeout |
|  |  | IP Address |
|  |  | Subnet Mask |
|  |  | Gateway Address |
| Maintenance | Printer Restart |  |
|  | Menu Reset |  |
|  | Registration | Tray3 Width |
|  |  | Tray4 Width |
| List Print | Config. Page |  |
|  | Menu List |  |
|  | PCL Font List |  |
|  | PS Font List |  |
|  | PCL Demo Page |  |
|  | PS Demo Page |  |
| Language |  |  |

### 4.7 TEST POINTS/DIP SWITCHES/LEDS

### 4.7.1 DIP SWITCHES

## Controller Board: SW2

| No. | Function | On | OFF |
| :---: | :--- | :--- | :--- |
| 1 | Destination for firmware <br> downloading | To flash ROM | To ROM SIMM |
| 2 | Source for firmware <br> downloading | (No.2, 3) <br> On, On: From Host PC <br> On, Off: From flash memory card <br> Off, On: From ROM SIMM <br> Off, Off: From flash ROM |  |
| 4 | Operation mode | Normal operation | Programming firmware |

NOTE: The functions of DIP switches no.1, 2, and 3 are enabled when changing the setting of no. 4 to the off position. However, do not change the default settings (keep them all on). Always do the firmware downloading using SP mode.

I/O Board: DIP SW101

| No. | Function | ON | OFF |
| :---: | :---: | :---: | :---: |
| 1 | Print Speed |  | $45 \mathrm{cpm}(230 \mathrm{~mm} / \mathrm{s})$ |
| 2 | Jam Detection (see Note 1) | Off | On |
| 3 | SC Generation | Disabled | Enabled |
| 4 | Not used | Keep at "OFF" |  |
| 5 | Not used | Keep at "OFF" |  |
| 6 | Destination | Off )Japan On )N. America Off )Europe On )Not used |  |
| 7 |  | Off Off | On |
| 8 | Not used | Keep at "OFF" |  |

NOTE: 1) Disabling the jam detection is effective only for the main machine (not for the options).

### 4.7.2 JUMPER PINS

## TB1: Controller Board

| Function | CS0 | CS1 |
| :---: | :--- | :--- |
| Bank setting for resident flash ROM | Bank setting for flash <br> ROM is " 0 ". | Bank setting for flash <br> ROM is "1". |

TB2: Controller Board

| Function | UN-PROT | PROT |
| :--- | :---: | :---: |
| Not used | Do not change this setting. Keep at "UN-PROT". |  |

### 4.7.3 TEST POINTS

## I/O Board

| Number | Monitored Signal |
| :---: | :--- |
| TP103 | Ground |
| TP104 | +24 V |
| TP136 | +5 V |
| TP154 | Ground |
| TP156 | +12 V |
| TP158 | -12 V |
| TP159 | +5 VE |

BICU

| Number | Monitored Signal |
| :---: | :--- |
| TP105 | GND |
| TP125 | F-gate signal |

### 4.7.4 LEDS

Controller Board

| Symbol | Function |
| :---: | :--- |
| PWR | This LED turns on when +5 V is supplied to the printer controller. |
| LED2 | Refer to section 7.1 .3 (LEDs) for more detail. |
| LED3 |  |
| LED4 |  |
| LED5 |  |

## BICU

| Number | Monitored Signal |
| :---: | :--- |
| LED101 | Monitors whether the program is working normally or not. The LED <br> blinks in normal conditions. |
| LED102 | Monitors +5VE. During the energy saver mode, this LED will blink. |

### 4.8 SPECIAL TOOLS AND LUBRICANTS

### 4.8.1 SPECIAL TOOLS

| Part Number | Description | Q'ty |
| :---: | :--- | :---: |
| A2309003 | Adjustment Cam - Laser Unit | 1 |
| A2309004 | Positioning Pin - Laser Unit | 1 |
| A2309352 | Flash Memory Card - 4MB | 1 |
| A2309351 | Case - Flash Memory Card | 1 |
| A0299387 | Digital Multimeter - FLUKE 87 | 1 |

### 4.8.2 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: The amounts mentioned as the PM interval indicate the number of prints. Symbol key: C: Clean R: Replace L: Lubricate I: Inspect

|  | EM | 150k | 300k | 450k | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| AROUND THE DRUM |  |  |  |  |  |
| Charge Roller |  | R | R | R |  |
| Charge Roller Cleaning Pad |  | R | R | R |  |
| Quenching Lamp |  |  | C |  | Dry cloth |
| Pick-off Pawls |  | R | R | R |  |
| Spur |  | C | C | C | Dry cloth or alcohol |
| ID Sensor |  | C | C | C | Perform the ID sensor initial setting (SP2-14) after cleaning (blower brush) |
| CLEANING UNIT |  |  |  |  |  |
| Drum Cleaning Blade |  | R | R | R |  |
| Cleaning Entrance Seal |  | C | C | C | Blower brush. Replace if necessary. |
| Side Seal |  | I | I | I |  |
| DEVELOPMENT UNIT |  |  |  |  |  |
| Development Drive Gears |  | 1 | I | 1 | Replace every 5 PM (750k) |
| Development Filter |  |  | R |  |  |
| Developer |  | 1 | R | 1 |  |
| Entrance Seal |  | I | I | I |  |
| Side Seal |  | I | I | I |  |
| PAPER FEED |  |  |  |  |  |
| Registration Roller | C | C | C | C | Clean with water or alcohol. |
| Paper Feed Roller | I | R | R | R | Check the counter value for each paper tray station using the SMC Logging Data list (SP2-22-3). If the value has reached 150 k , replace the roller. After replacing the roller, reset the counter (SP2-25-2). |
| Separation Roller | I | R | R | R |  |
| Pick-up Roller | I | R | R | R |  |
| Paper Feed Roller <br> (By-pass feed table) | । | R | R | R |  |
| Separation Roller (By-pass feed table) | 1 | R | R | R |  |
| Pick-up Roller (By-pass feed table) | 1 | R | R | R |  |
| Paper Feed Guides |  | C | C | C | Clean with water or alcohol. |
| Relay Rollers |  | C | C | C | Clean with water or alcohol. |
| Bottom Plate Pad |  | C | C | C | Clean with water or alcohol. |
| Bottom Plate Pad (By-pass feed) |  | C | C | C | Clean with water or alcohol. |
| Registration Sensor |  | C | C | C | Blower brush |
|  |  |  |  |  |  |

PM TABLE

|  | EM | 150k | 300k | 450k | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| TRANSFER BELT UNIT |  |  |  |  |  |
| Transfer Belt | C | R | R | R | Dry cloth |
| Transfer Belt Cleaning Blade |  | R | R | R |  |
| Transfer Belt Rollers |  | C | C | C | Dry cloth |
| Entrance Seal |  | C | C | C | Dry cloth |
| Transfer Entrance Guide | C | C | C | C | Dry cloth |
| Used Toner Tank | I | C | C | C | Empty the tank. |
| 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 Thermistor |  | I | I | 1 | Clean if necessary (suitable solvent) |
| Cleaning Roller |  | C | C | C | Clean with water or alcohol. |
| Cleaning Roller Bushings |  | L | L | L | Grease Barrierta JFE 55/2 |
| Pressure Roller Strippers |  | C | C | C | Clean with water or alcohol. |
| Hot Roller Strippers |  | C | R | C | Clean with water or alcohol. |
| Paper Exit Guide Ribs |  | C | C | C | Clean with water or alcohol. |
| DUPLEX UNIT |  |  |  |  |  |
| Inverter Roller |  | C | C | C | Clean with water or alcohol |
| Upper Transport Roller |  | C | C | C | Clean with water or alcohol |
| Lower Transport Roller |  | C | C | C | Clean with water or alcohol |
| OTHERS |  |  |  |  |  |
| Drive Belts |  |  | 1 |  | Replace if necessary |
|  |  |  |  |  |  |


|  | EM | 150k | 300k | 450k | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| PAPER TRAY UNIT |  |  |  |  |  |
| Paper Feed Rollers |  | R | R | R | Check the counter value for each paper tray station using the SMC Logging Data list (SP2-22-3). If the value has reached 150 k , replace the roller. After replacing the roller, reset the counter (SP2-25-2). |
| Pick-up Rollers |  | R | R | R |  |
| Separation Rollers |  | R | R | R |  |
| Relay Rollers |  | C | C | C | Dry or damp cloth |
| Bottom Plate Pad |  | C | C | C | Dry or damp cloth |
|  |  |  |  |  |  |


|  | EM | 150k | 300k | 450k | NOTE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| LCT |  |  |  |  |  |
| Paper Feed Roller |  | R | R | R | Check the counter value for each paper tray station using the SMC Logging Data list (SP2-22-3). If the value has reached 150 k , replace the roller. After replacing the roller, reset the counter (SP2-25-2). |
| Pick-up Roller |  | R | R | R |  |
| Separation Roller |  | R | R | R |  |
| Bottom Plate Pad |  | C | C | C | Dry or damp cloth |
|  |  |  |  |  |  |


|  | EM |  |  | 150k | 300k | 450k |
| :--- | :---: | :---: | :---: | :---: | :---: | :--- |
|  | NOTE |  |  |  |  |  |
| 1,000-SHEET/3,000-SHEET FINISHERS |  |  |  |  |  |  |
| Rollers | C |  |  |  | Clean with water or alcohol. |  |
| Brush Roller | I | I | I | I | Replace if necessary. |  |
| Discharge Brush | C | C | C | C | Clean with a dry cloth |  |
| Sensors | C |  |  |  | Blower brush |  |
| Jogger Fences | I | I | I | I | Replace if necessary. |  |
| Punch Waste Hopper | I | I | I | I | Empty the hopper. |  |
|  |  |  |  |  |  |  |

## REPLACEMENT AND ADJUSTMENT

## 6. REPLACEMENT AND ADJUSTMENT

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

### 6.1 LASER UNIT

| $\boxed{U}$ 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. |

### 6.1.1 CAUTION DECAL LOCATIONS

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


### 6.1.2 LASER UNIT



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

1. Remove the front cover [A] (2 pins).
2. Remove the shield glass $[B]$.
3. Remove the inner cover [C] (2 screws).
4. Remove the shield plate [D] (2 screws).
5. Remove the laser unit [E] (2 screws, 5 connectors, 1 flexible harness).

NOTE: 1) When disconnecting the harnesses from the LD unit, hold on to the LD unit.
2) When sliding out the laser unit, do not hold the LD unit.

### 6.1.3 POLYGON MIRROR MOTOR



1. Remove the laser unit (see Laser Unit).
2. Remove the laser unit cover [A] (4 screw, 2 pawls).
3. Remove the polygon mirror motor $[B]$ (4 screws, 1 connector).

### 6.1.4 LASER SYNCHRONIZATION DETECTOR



1. Remove the laser unit (See Laser Unit).
2. Remove the laser synchronization detector [A] (1 screw, 1 connector).

### 6.1.5 LD UNIT



1. Remove the laser unit (See Laser Unit).
2. Remove the LD unit [A] (3 screws, 1 connector) NOTE: When disconnecting the harness, hold on to the LD unit.
3. After replacing the LD unit, perform SP 2-6-5, then the laser beam pitch adjustment (see the following procedure).

## Laser beam pitch adjustment

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

- SP2-6-1: LD Beam Pitch Adjustment - 400 dpi
- SP2-6-2: LD Beam Pitch Adjustment - 600 dpi
- SP2-6-3: LD Initial Setting - 400 dpi
- SP2-6-4: LD Initial Setting - 600 dpi
- SP2-12-1, no.12: IPU Test Pattern - Cross Stitch - 400 dpi
- SP2-12-1, no.13: IPU Test Pattern - Cross Stitch - 600 dpi

1. Do SP 2-6-5 Data Reset.
2. Input the value " 144 " into SP2-6-1.
3. Perform SP2-6-3.
4. Print the 400-dpi test pattern onto A3 (11" x $17{ }^{\text {" }}$ ) paper using SP2-12-1 no.12. (See Service Tables - Test Pattern Printing).
5. Write the value of SP2-6-1 on the test pattern (in this case " 144 ").
6. Change the value of SP2-6-1 and print another test pattern, repeating steps 2 to 4. Print about 5 patterns with different values for SP2-6-1 (e.g. "48", "96", "192", "240").
7. Check these test patterns. If the laser beam pitch is not correct, the image looks like a black vertical strip pattern.
NOTE: As an example, if the pattern made with the value "192" has less obvious strips than the other print outs, the correct value is near "192".
8. Adjust the laser beam pitch position until the thin lines are of uniform thickness (no striping effect should appear on the printout), doing steps 2, 3, and 4. In step 2, input a correctly estimated value, then do steps 3 and 4. Then, if necessary, go back to step 2 and try another value.
9. After adjusting the laser beam pitch for 400 dpi, adjust the laser beam pitch for 600 dpi, using the same procedure as for 400 dpi (use the SP modes for 600 dpi). When starting the adjustment for 600 dpi, input a value for SP2-6-2 between 24 and 48 higher than the final result for 400 dpi .


Adjustment not complete


Adjustment complete

### 6.2 PHOTOCONDUCTOR UNIT (PCU) AND DEVELOPMENT UNIT

$\Rightarrow 1$. Open the right cover and front cover.
2. Pull the PCU and development unit $[\mathrm{A}]$ out slightly while pushing the release lever [B].


NOTE: Make sure that the toner supply shutter [C] is at the open position before reinstalling the unit.

### 6.3 PHOTOCONDUCTOR UNIT (PCU)

### 6.3.1 PCU



1. Pull out the PCU and development unit. (See Photoconductor Unit and Development Unit.)
2. Remove the PCU $[A]$ (2 screws) from the development unit [B].

### 6.3.2 DRUM



1. Remove the PCU. (See PCU.)
2. Remove the toner cap $[A]$ and put it over the toner entrance hole $[B]$.
3. Turn the PCU upside-down. Then, remove the lower PCU cover [C] (2 screws, 3 pawls).
4. Push the drum [D] towards the front (2) (the left side in the illustration), while
 releasing the charge roller $[E]$ using the release lever (1) $[F]$. Then, remove the drum (3).
NOTE: Do not touch the drum surface with bare hands.
5. After replacing the charge roller, check the value of SP2-5-1. If it is not at the standard value, change it to the standard value using SP2-5-1.
NOTE: If this is not done, the carrier will be attracted to the drum because the charge roller voltage will be too high.
6. After replacing the drum, perform the ID sensor initial setting using SP2-14.

### 6.3.3 PICK-OFF PAWLS



1. Remove the drum. (See Drum.)
2. Remove the pick-off pawl assembly [A].
3. Remove the pick-off pawl $[B]$ (1 spring, 1 spur).

## Pick-off Pawl Position Adjustment

If a line has appeared on the drum surface because of the pick-off pawl, the pickoff pawl position can be adjusted using either or both of the following:

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


### 6.3.4 CHARGE ROLLER/CHARGE ROLLER CLEANING PAD



1. Remove the drum. (See Drum.)
2. Remove two snap rings $[A]$ and slide out the front charge roller holder $[B]$.
3. Remove the charge roller [C].

NOTE: Do not touch the charge roller with bare hands.
4. Remove the charge roller cleaning pad [D] (4 hooks).
5. After replacing the charge roller, check the value of SP2-5-1. If it is not at the standard value, change it to the standard value using SP2-5-1.
NOTE: If this is not done, the carrier will be attracted to the drum because the charge roller voltage will be too high.
Standard value: -1620V

### 6.3.5 DRUM CLEANING BLADE



1. Remove the drum. (See Drum.)
2. Remove the charge roller. (See Charge Roller.)
3. Remove the drum cleaning blade [A] (2 screws).

### 6.3.6 ID SENSOR



1. Remove the PCU and development unit. (See Photoconductor Unit and Development Unit.)
2. Remove the fusing unit. (See Fusing Unit.)
3. Remove the PCU rail [A] (2 screws, 1 connector).
4. Remove the ID sensor bracket [B] (1 screw, 1 connector).
5. Remove the ID sensor [C] (1 screw).
6. Perform the ID sensor initial setting using SP2-14.

### 6.4 DEVELOPMENT

### 6.4.1 DEVELOPMENT UNIT



1. Pull out the PCU and development unit. (See Photoconductor Unit and Development Unit.)
2. Remove the PCU from the development unit $[A]$ (2 screws).

NOTE: Be careful not to nick or scratch the development roller.
If you are temporarily installing a used development unit for test purposes for a long time, perform 2-11 after installation (see the SP mode table for details).

### 6.4.2 DEVELOPMENT FILTER



1. Remove the development unit. (See Development Unit.)
2. Remove the upper development cover [A] (2 snap rings).
3. Remove the development filter [B]

NOTE: 1) Make sure that the surface with a red mark is facing up.
2) These seals [C] are for protection during transportation. Do not use these sheets after pealing them off (take off the sheets).

### 6.4.3 DEVELOPMENT ROLLER



1. Remove the development unit and upper development cover. (See Development and Development Filter.)
2. Remove the gear $[A]$ (1 snap ring) and the joint bracket $[B]$.
3. Remove the development roller [C] (2 screws).

NOTE: 1) Be careful not to nick or scratch the development roller.
2) When re-installing the development roller, the side seals [D] should be inside the development unit case.

### 6.4.4 DEVELOPER



1. Remove the development unit and place it on a clean sheet. (See Development Unit.)
2. Remove the development roller. (See Development Roller.)
3. Turn over the development unit (the development filter [A] must be at the top as the unit turns over, as shown) and empty all the old developer [B]. Make sure that no developer remains on the development roller or in the unit.
NOTE: 1) Dispose of the used developer in accordance with local regulations.
2) Be careful not to nick or scratch the development roller.
4. Pour all the new developer [C] into the development unit. Then, rotate the gear [D] to distribute the developer evenly.

5. Reassemble the development unit and cover the toner entrance hole with a piece of paper [A], as shown.
6. Reassemble the PCU and the development unit.
7. Install the PCU and development unit into the machine.
8. Turn on the main power switch, make sure that the machine has warmed up, then perform the TD sensor initial setting using SP2-10.
9. After performing the TD sensor initial setting, take out the sheet [A] from the development unit.

NOTE: When doing the TD sensor initial setting, cover the toner entrance hole with a piece of paper. This is because, if used toner in the PCU falls into the development unit through the toner entrance opening during TD sensor initial setting, Vref (toner density reference voltage) will not be measured correctly.

### 6.4.5 TD SENSOR

1. Remove the development unit and empty all the developer. (See Developer.)
2. Remove the TD sensor.

NOTE: When installing the new TD sensor, secure it with double-sided tape.
3. Pour new developer into the development unit and perform the TD sensor initial setting using SP2-10.
NOTE: When performing the TD sensor initial setting, cover the toner entrance hole with a piece of paper (see the above illustration).

## DUPLEX

### 6.5 DUPLEX

### 6.5.1 DUPLEX UNIT



1. Open the by-pass feed table $[A]$.
2. Remove the connector cover $[B]$ (1 screw).
3. Open the duplex unit.
4. Remove the link [C] from the pin [D] (1 snap ring).
5. Remove the duplex unit [E] (2 connectors).

### 6.5.2 DUPLEX UNIT COVER



1. Open the by-pass feed table.
2. Remove the duplex unit cover [A] (4 screws).

### 6.5.3 ENTRANCE SENSOR



1. Remove the duplex unit cover (See Duplex Unit Cover).
2. Remove the sensor holder $[A]$ ( 1 screw).
3. Replace the entrance sensor [B] (1 connector).

## DUPLEX

### 6.5.4 EXIT SENSOR



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

### 6.6 TRANSFER UNIT

### 6.6.1 TRANSFER BELT UNIT

[B]


NOTE: Do not keep the right cover open for a long time, to prevent the drum from being exposed to direct light. When keeping the right cover open for a long time, cover the drum with paper, or remove the PCU then cover the PCU with paper.

1. Open the by-pass feed table.
2. Open the duplex unit.
3. Open the right cover [A].
4. Release the release lever $[B]$ then remove the transfer unit [C].
5. Remove the springs [D].
6. Remove the transfer belt unit [E] (1 hook).

NOTE: Do not touch the transfer belt surface.

### 6.6.2 TRANSFER BELT



1. Remove the transfer belt unit. (See Transfer Belt Unit.)
2. Remove the belt drive gear $[A]$.
3. Remove the screws [B] on both sides and turn the belt holder [C] until it is vertical.
4. Remove the transfer belt [D].

NOTE: 1) Do not touch the transfer belt surface with bare hands.
2) Before installing the new transfer belt, clean all the rollers and shafts with alcohol to prevent the belt from slipping.
3) When re-installing the transfer belt, make sure that the belt is under the pin [E].
4) When re-installing, to avoid damage to the transfer belt, manually turn the rollers and check that the new transfer belt is not running over the edge of any of the rollers.

### 6.6.3 TRANSFER BELT CLEANING BLADE/TONER OVERFLOW SENSOR



## Transfer Belt Cleaning Blade

1. Remove the transfer belt. (See Transfer Belt.)
2. Remove the transfer belt cleaning blade [A] (3 screws).

NOTE: 1) Do not touch the edge of the new blade.
2) Check that there is no dust/no damage on the edge of the new blade.

## Toner Overflow Sensor

1. Remove the transfer belt cleaning blade.
2. Turn over the transfer unit and empty the used toner in the transfer unit.
3. Remove the toner overflow sensor [B] (1 screw, 3 terminal wires).

NOTE: When re-installing the terminal wires, the wire color order is red, purple, and blue, from the top.

### 6.6.4 RIGHT COVER



NOTE: To prevent the drum from being exposed to direct light, DO NOT keep the right cover open for a long time. If it is necessary to keep the right cover open for a long time, cover the drum with paper, or remove the PCU and cover it with paper.

1. Remove the duplex unit. (See Duplex Unit.)
2. Remove the transfer belt unit. (See Transfer Belt Unit.)
3. Remove the screw $[A]$ that secures the link $[B]$.
4. Remove the unit band [C].
5. Remove the clip [D] and bushing [E].
6. Remove the right cover [F] (1 connector).

### 6.7 BY-PASS FEED

### 6.7.1 BY-PASS FEED UNIT



1. Remove the duplex unit. (See Duplex Unit.)
2. Remove the front cover $[A]$ and rear cover $[B]$.
3. Remove the by-pass feed unit [C] (4 screws, 2 connectors).

### 6.7.2 BY-PASS FEED UNIT COVERS



## Rear Cover

1. Remove the rear cover [A] (1 screw).

## Front Cover

1. Remove the front cover $[B]$ (1 screw).

## Hinge Cover

1. Remove the hinge cover [C] (1 screw).

## Upper Cover

1. Remove the hinge cover.
2. Open the duplex unit.
3. Remove two screws for the upper cover.
4. Close the duplex unit and pull out the upper cover [D].

### 6.7.3 PAPER FEED AND PICK-UP ROLLER



1. Remove the upper cover. (See Covers.)
2. Lifts up the paper end feeler [A].

NOTE: When lifted, the paper end feeler locks into position. Therefore, make sure to move it back to its original position before re-installing the upper cover.

## Paper Feed Roller

3. Replace the paper feed roller [B] (1 snap ring).

## Pick-up Roller

3. Replace the pick-up roller [C] (1 snap ring).

### 6.7.4 SEPARETION ROLLER



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

### 6.7.5 PAPER END SENSOR AND PICK-UP SELENOID



1. Remove the upper cover. (See Covers.)

## Paper End Sensor

2. Lift up the paper end feeler [A].

NOTE: When lifted, the paper end feeler locks into position. Therefore, make sure to move it back to its original position before re-installing the upper cover.
3. Replace the paper end sensor [B] (1 connector).

## Pick-up Solenoid

2. Remove the pick-up solenoid [C] (1 screw, 1 spring, 1 connector).

### 6.7.6 PAPER SIZE SENSOR BOARD



1. Release hooks $[A]$ and remove the by-pass table $[B]$ (1 connector).
2. Replace the paper size sensor board [C].

NOTE: When removing the paper size sensor board, be careful not to break its hook.

### 6.7.7 BY-PASS TABLE



1. Remove the hinge cover. (See By-pass Feed Unit Covers.)
2. Disconnect the connector [A].
3. Remove the two screws $[B]$
4. Hold the spring bracket [C] and remove the by-pass table [D].

CAUTION: Pressure is applied to the spring bracket, so when removing the bypass tray, hold the spring bracket by hand as shown.

### 6.7.8 PAPER FEED CLUTCH



1. Remove the by-pass table. (See By-pass Table.)
2. Remove the paper feed unit [A] ( 2 screws, 1 connector).
3. Remove the rear bracket [B] (3 screws, 1 clip, 1 bushing).
4. Replace the paper feed clutch [C] (1 connector)

### 6.8 PAPER FEED

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



1. Remove the paper tray.
2. Remove the pick-up roller [A].
3. Remove the feed [B] and separation rollers [C] (1 clip each).

NOTE: Do not touch the roller surface with bare hands.
After installing the new rollers, do SP2-25-2 for the appropriate paper tray.

### 6.8.2 LOWER RIGHT COVER/LOWER REAR COVER

[F]



NOTE: If the optional LCT has been installed, remove the LCT before doing the following procedure.

1. Remove the duplex unit. (See Duplex Unit.)
2. Remove the by-pass feed unit. (See By-pass Feed Unit.)
3. Remove the upper connector cover [A] and lower connector cover [ $B$ ] then disconnect the harnesses [C].
4. Remove the lower rear cover [D] (4 screws).
5. Remove the unit band [E] (1 clip) and remove the vertical transport cover [F].
6. Remove the lower right cover [G] (5 screws).

### 6.8.3 RELAY/UPPER PAPER FEED/LOWER PAPER FEED CLUTCHES



1. Remove the lower rear cover. (See Lower Right Cover/Lower Rear Cover.)
2. Remove the first paper feed clutch bracket $[A]$ ( 2 screws, 1 bushing, 1 harness clamp).
3. Remove the second paper feed clutch bracket $[B]$ ( 2 screws, 1 bushing).
4. Remove the drive bracket [C] (2 screws, 1 spring, 1 bearing, 4 harness clamps).
5. Remove the relay clutch [D] (1 connector).
6. Remove the upper paper feed clutch [E] (1 connector).
7. Remove the lower paper feed clutch $[F]$ (1 connector).

## PAPER FEED

### 6.8.4 UPPER PAPER FEED UNIT



1. Remove the right cover. (See Right Cover.)
2. Remove the upper paper feed clutch [A]. (See Relay/Upper Paper Feed/Lower Paper Feed Clutches.)
3. Remove three relay gears $[B]$.
4. Remove the lower right cover. (See Lower Right Cover/Lower Rear Cover.)
5. Remove the upper paper feed unit [C] (2 screws, 1 connector).

### 6.8.5 LOWER PAPER FEED UNIT



1. Remove the lower paper feed clutch [A] (See Relay/Upper Paper Feed/Lower Paper Feed Clutches.)
2. Remove two relay gears [B].
3. Remove the paper trays.
4. Remove the lower right cover. (See Lower Right Cover/Lower Rear Cover.)
5. Remove the cover [C] (2 screws).
6. Remove the gear [D].
7. Remove the lower paper feed unit [E] (2 screws, 1 connector).

## PAPER FEED

### 6.8.6 PAPER END/PAPER HEIGHT/RELAY SENSORS



1. Remove the appropriate paper feed unit. (See Upper or Lower Paper Feed Unit.)
2. Remove the paper height sensor $[\mathrm{A}]$ ( 1 connector).
3. Remove the paper end sensor $[\mathrm{B}]$ (1 connector).
4. Remove the relay sensor bracket [C] ( 1 screw, 1 connector).
5. Remove the relay sensor [D].

### 6.8.7 REGISTRATION SENSOR



1. Remove the front cover. (See Laser Unit.)
2. Remove the connector cover and rear cover. (See Covers.)
3. Remove the right rear cover. (See Registration Clutch and Transfer Belt Clutch.)
4. Remove the PCU and development unit. (See PCU and Development Unit.)
5. Remove the transfer belt unit and right cover. (See Transfer Belt and Right Cover.)
6. Remove the inner cover [A] (2 screws).
7. Remove the front registration holder $[\mathrm{B}]$ (1 screw).
8. Remove the registration roller bushing [C] and front registration roller gear [D] (1 E-ring, 1 spring).
9. Remove the right cover switch bracket [E].
10. Remove the rear registration holder [F] (1 screw).
11. Remove the registration roller bushing [G] (1 E-ring, 1 spring).

## PAPER FEED


[F]
12. Remove the guide plate $[A]$ and registration roller $[B]$ ( 1 spring, 1 clip).

NOTE: When re-installing the clip [C], its position must be as shown.
13. Remove the registration guide plate [D] ( 2 screws, 1 connector).
14. Remove the sensor bracket [E] (1 screw).
15. Remove the registration sensor [F] (1 screw, 1 connector).

### 6.9 FUSING

### 6.9.1 FUSING UNIT

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



1. Open the front cover and right cover.
2. Open the duplex unit.
3. Remove the screw [A].
4. Release the fusing lever [B] and slide out the fusing unit [C].

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

### 6.9.2 HOT ROLLER STRIPPERS AND FUSING LAMP



1. Remove the fusing upper cover [ $A$ ] ( 4 screws).
2. Remove the spring $[B]$. Then, remove the hot roller stripper [C].
3. Remove the front fusing lamp wire [D] (1 screw for 115 V machines, 2 screws for 230 V machines).
4. Remove the rear fusing lamp wire [ E ] ( 1 screw for 115 V machines, 2 screws for 230V machines).
5. Remove the front lamp holder [F] (1 screw).
6. Remove the fusing lamp [G] (1 lamp for 115 V machines, 2 lamps for 230 V machines).
NOTE: Do not touch the glass part of the fusing lamp with bare hands.

### 6.9.3 THERMISTOR AND THERMOFUSE



1. Remove the fusing upper cover. (See Hot Roller Strippers and Fusing Lamp.)
2. Remove the thermistor $[A]$ ( 1 screw, 1 connector).
3. Remove the thermofuse $[B]$ ( 2 screws).

Route the cable of the thermistor and thermofuse as shown.

FUSING

### 6.9.4 CLEANING ROLLER



1. Remove the fusing unit. (See Fusing Unit.)
2. Remove the fusing entrance guide [A] (2 screws).

NOTE: The standard position of the fusing entrance guide is the upper position, using the lower screw holes [B]
3. Remove the lower fusing cover [C] (1 screw).

NOTE: When removing the lower fusing cover, be careful not to drop the cleaning roller onto the hot roller.
4. Replace the cleaning roller [D].

### 6.9.5 HOT ROLLER AND PRESSURE ROLLER



1. Remove the fusing lamp. (See Hot Roller Strippers and Fusing Lamp.)
2. Remove the pressure springs $[\mathrm{A}]$.
3. Remove the hot roller stripper bracket $[B]$ (4 screws).
4. Remove the hot roller assembly then replace the hot roller [C] (2 C-rings, 1 gear, 2 bushings)
5. Remove the pressure roller assembly.
6. Remove the fusing knob [D] (1 screw).
7. Remove the spring [E].
8. Replace the pressure roller [F] (2 C-rings, 2 bushings).

NOTE: 1) Before installing the new hot roller, peel off 3 cm (1.2 inches) from both ends of the protective sheet on the new roller.
2) Do not touch the surface of the rollers.
3) Be careful not to damage the surface of the hot roller.
4) The standard pressure roller position is the upper position.
5) When re-installing the hot roller assembly and pressure roller assembly, make sure that the flange position of the bushings is as shown.
6) When re-installing the C-rings [G] of the hot roller, make sure that the position of the C-rings is as shown.

### 6.10 DRIVE AREA

### 6.10.1 REGISTRATION CLUTCH AND TRANSFER BELT CLUTCH


[G]

1. Remove the connector cover $[A]$ and rear cover $[B]$ (4 screws).
2. If the optional LCT has been installed:

Remove the harness cover ( 1 screw) and disconnect the LCT interface harnesses
3. Remove the right rear cover [C] (3 screws).
4. Remove the power pack bracket [D] ( 2 screws, 6 connectors).
5. Remove 2 flywheels [E] (3 screws).
6. Remove the registration clutch $[F]$ (1 E-ring, 1 connector).
7. Remove the transfer belt clutch assembly [G] (2 screws, 2 connectors).

### 6.10.2 MAIN MOTOR



1. Remove the connector cover $[A]$ and rear cover $[B]$ (4 screws).
2. Remove the power pack bracket and fly wheels. (See Registration Clutch and Transfer Belt Clutch.)
3. Remove the bracket [C] (3 screws).
4. Remove the timing belt [D].
5. Remove the main motor [E] (3 screws, 2 connectors).

### 6.10.3 TONER BOTTLE MOTOR



1. Release the toner bottle holder lever [A], then slide out the toner bottle holder [B].
2. Remove the toner bottle $[B]$.
3. Remove the stopper [C] for the holder, then take out the toner bottle holder.
4. Remove the motor harness from the two wire clamps [D].
5. Remove the toner bottle motor [E] (2 hooks).
6. Disconnect the harness from the motor.

### 6.11 COVERS



## Connector Cover and Rear Cover

1. Remove the connector cover $[A]$ and rear cover $[B]$ (4 screws).

## Operation Panel Cover

1. Remove the operation panel cover [C] (2 caps, 2 screws).


## Upper Cover

1. Open the front cover.
2. Remove the connector cover and rear cover. (See Connector Cover and Rear Cover.)
3. Remove the operation panel cover. (See Operation Panel Cover.)
4. Remove the small upper cover [A] (1 screw) and upper cover [B] (3 screws).

## Left Cover and Printer Controller Cover

1. Open the front cover.
2. Remove the connector cover and rear cover. (See Connector Cover and Rear Cover.)
3. Remove the operation panel cover. (See Operation Panel Cover.)
4. Remove the small upper cover and upper cover. (See Upper Cover.)
5. Remove the printer controller cover [C] ( 4 screws) and the left cover [D] (4 screws).

### 6.12 PCBs

### 6.12.1 POWER PACK



1. Remove the connector cover and rear cover. (See Covers.)
2. Remove the power pack [A] (3 screws, 6 connectors).

### 6.12.2 PSU



1. Open the front cover.
2. Remove the operation panel, connector, rear, upper and left covers. (See Covers.)
3. For 230 V machines:

Remove the circuit breaker [A] (1 screw, 1 connector).
4. Remove the PSU [B] (4 screws, all connectors).

### 6.12.3 PRINTER CONTROL BOARD AND NIB



1. Remove the printer controller cover. (See Covers.)
2. Remove the printer controller assembly [A] (2 screws).
3. Remove the optional hard disk unit [B] (4 screws, 1 connector) and DRAM SIMMs that have been installed.
4. Remove the NIB [C] (4 screws, 1 connector).
5. Remove the NVRAM [D] from the old printer control board and install it on the new printer control board.

### 6.12.4 HARD DISK



1. Remove the printer controller cover. (See Covers.)
2. Pull the hard disk assembly [A] (2 connectors).
3. Remove the hard disk unit [B] (8 screws).
4. After replacing the HDD, perform SP2-15-2 "Bad Sector Information Reset".

PCBS

### 6.12.5 I/O BOARD


[B]

1. Open the front cover.
2. Remove the operation panel cover, connector cover, rear cover, upper cover, printer controller cover and left cover. (See Covers.)
3. Remove the printer controller box $[A]$ ( 4 screws, 5 connectors).
4. Remove the I/O board bracket [B] (2 screws, all connectors).
5. Remove the I/O board (4 screws).

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

### 6.12.6 BICU BOARD



1. Open the front cover.
2. Remove the operation panel cover, connector cover, rear cover, upper cover, printer controller cover and left cover. (See Covers.)
3. Remove the printer controller box. (See I/O Board.)
4. Remove the I/O board bracket. (See I/O Board.)
5. Remove the BICU board [A] (5 screws, 1 stud, all connectors).
6. Remove the NV RAM $[B]$ from the old BICU board and install it on the new board.

### 6.13 PRINT IMAGE ADJUSTMENTS

Perform the following adjustments after replacing any of the following parts:

- Rollers and gears
- Polygon mirror motor
- Paper side fence
- Memory all clear
- Paper feed unit

For more details about accessing SP modes, refer to section 4.
NOTE: 1) Make sure the paper is installed correctly in each paper tray before you start these adjustments.
2) Use the Trimming Area Pattern (SP2-12-3, No.10) to print the test pattern for the following procedures.
3) Set SP2-12-3 to 0 again after completing these printing adjustments.

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

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

|  | SP mode | Specification |
| :--- | :---: | :---: |
| 1st paper feed | SP2-1-2 |  |
| 2nd paper feed | SP2-1-3 |  |
| 3rd paper feed (Optional PFU tray 1) | - |  |
| 4th paper feed (Optional PFU tray 2) | - |  |
| Duplex | SP2-1-4 |  |
| By-pass feed | SP2-1-5 |  |
| LCT | SP2-1-6 |  |

NOTE: The default setting $(2.0 \mathrm{~mm})$ for the side-to-side registration of the 3rd and 4th paper feeds cannot be changed because the SP mode is unavailable.


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

## Parallelogram Image Adjustment

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

> [C]


Turn
counterclockwise

1. Check the trimming area pattern image (SP2-12-1, No.10) to determine whether a parallelogram image appears or not, as shown. If it appears, do the following.
2. Remove the laser unit [A] (see Replacement and Adjustment - Laser Unit).
3. Remove the bracket [B] (2 screws).
4. Install the adjusting cam [C] (P/N: A2309003).
5. Secure the adjustment bracket [D] using the two screws which were used for the bracket $[B]$. However, do not tighten the screws at this time.
6. 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).
7. Tighten the adjustment bracket.
8. Print the trimming area pattern to check the image. If it is still the same, repeat steps 6 to 8.

## TROUBLESHOOTING

## 7. TROUBLESHOOTING

### 7.1 SERVICE CALL CONDITIONS

### 7.1.1 SUMMARY

There are 4 levels of service call conditions.

| Level | Definition | Reset Procedure |
| :---: | :--- | :--- |
| A | To prevent the machine from being <br> damaged, the SC can only be reset by a <br> service representative (see the note below). <br> The printer cannot be operated at all. | Enter SP mode, then turn the <br> main power switch off and on. |
| B | Turning the main power switch off and on <br> can reset the SC if the SC was caused by <br> incorrect sensor detection. | Turn the main switch off and on. |
| C | The printer can be operated as usual except <br> for the unit related to the service call. | Turn the main switch off and on. |
| D | The SC history is updated. The printer can <br> be operated as usual. | The SC will not be displayed. All <br> that happens is that the SC <br> history is updated. |

NOTE: 1) If the problem concerns electrical circuit boards, first disconnect then reconnect the connectors before replacing the PCBs.
2) If the problem concerns a motor lock, first check the mechanical load before replacing motors or sensors.
3) When a Level A or B SC occurs while in an SP mode, the display does not indicate the SC number. If this occurs, check the SC number after leaving the SP mode.

### 7.1.2 SC CODE DESCRIPTIONS

## SC302: Charge Roller Current Leak

Definition [B]
A charge roller current leak signal is detected.

## Possible Causes

- Charge roller damaged
- High voltage supply board defective
- Poor PCU connection


## SERVICE CALL CONDITIONS

## SC304: Charge Roller Current Correction Error

Definition [B]
The charge roller bias correction is performed twice even if the maximum charge roller bias $(-2,000 \mathrm{~V})$ is applied to the roller.
Possible Causes

- ID sensor defective


## SC320: Polygon Mirror Motor Error

Definition [B]
The polygon mirror motor does not reach its operating speed within 20 seconds after the polygon mirror motor on signal, or the lock signal is still activated for more than 20 seconds after the polygon mirror motor off signal.

## Possible Causes

- Polygon mirror motor defective
- Poor connection between the polygon mirror motor driver and the BICU board
- BICU board defective


## SC321: No Laser Writing Signal (F-Gate) Error 1

Definition [B]
The laser writing signal (F-gate) does not go to LOW for more than 15 seconds after the paper reaches the registration sensor.

## Possible Causes

- BICU board defective
- Poor printer controller connection
- Printer controller defective


## SC322: 1st Laser Synchronization Error

Definition [B]
The 1st laser synchronization signal cannot be detected by the main scan synchronization detector board even if the laser diodes are activated.

## Possible Causes

- Poor connection between the laser synchronization detector board and the LD unit.
- Laser synchronization detector board out of position
- Laser synchronization detector board defective
- LD unit defective


## SC323: LD Drive Current Over

Definition [B]
The LD drive board applies more than 110 mA to the LD.
Possible Causes

- LD unit defective (not enough power, due to aging)
- Poor connection between the LD unit and the BICU board
- BICU defective


## SC326: 2nd Laser Synchronization Error

## Definition [B]

The 2nd laser synchronization signal cannot be detected by the main scan synchronization detector board even if the laser diodes are activated.

## Possible Causes

- Poor connection between the laser synchronization detector board and the LD unit.
- Laser synchronization detector board out of position
- Laser synchronization detector board defective
- LD unit defective


## SC327: LD Unit Home Position Error 1

Definition [B]
The LD unit home position sensor does not detect an on condition when the LD unit moves to its home position.

## Possible Causes

- LD unit home position sensor defective
- LD positioning motor defective
- LD unit movement blocked because of incorrect connector routing


## SC328: LD Unit Home Position Error 2

Definition [B]
The LD unit home position sensor does not detect an off condition when the LD unit moves from its home position.

## Possible Causes

- LD unit home position sensor defective
- LD positioning motor defective
- LD unit movement blocked because of incorrect connector routing


## SERVICE CALL CONDITIONS

## SC329: Laser Beam Pitch Adjustment Error

Definition [B]
The LD unit home position sensor does not detect an on condition while changing the LD unit position for correcting the LD position or changing the dpi.

## Possible Causes

- The laser beam pitch adjustment (SP2-6-3 and 4) was not done after replacing the NVRAM or doing an NVRAM clear.
- The laser beam pitch adjustment (SP2-6-1 ~ 4) was not done after replacing the LD unit.
- LD unit movement blocked because of incorrect connector routing


## SC350-1: ID Sensor Error 1

Definition [D]
One of the following ID sensor output voltages was detected twice consecutively when checking the ID sensor pattern.

1) $\mathrm{Vsp} \geq 2.5 \mathrm{~V}$
2) $\mathrm{Vsg} \leq 2.5 \mathrm{~V}$
3) $\mathrm{Vsp}=0 \mathrm{~V}$
4) $\mathrm{Vsg}=0 \mathrm{~V}$

Possible Causes

- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- I/O board (IOB) defective
- High voltage supply board defective
- Dirty ID sensor
- Defect at ID sensor pattern writing area of the drum


## SC350-2: ID Sensor Error 2

Definition [D]
The ID sensor output voltage is 5.0 V and the PWM signal input to the ID sensor is 0 when checking the ID sensor pattern.

## Possible Causes

- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- I/O board (IOB) defective
- High voltage supply board defective
- Dirty ID sensor
- Defect at the ID sensor pattern writing area of the drum


## SC350-3: ID Sensor Error 3

Definition [D]
The ID sensor pattern edge voltage is detected to be not 2.5 V twice consecutively during an 800 ms interval.

## Possible Causes

- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- I/O board (IOB) defective
- High voltage supply board defective
- Dirty ID sensor
- Defect at the ID sensor pattern writing area of the drum


## SC350-4: ID Sensor Error 4

Definition [D]
One of the following ID sensor output voltages is detected at ID sensor initialization.

1) $\mathrm{Vsg}<4.0 \mathrm{~V}$ when the maximum PWM input (255) is applied to the ID sensor.
2) $\mathrm{Vsg} \geq 4.0 \mathrm{~V}$ when the minimum PWM input (0) is applied to the ID sensor.

## Possible Causes

- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- I/O board (IOB) defective
- High voltage supply board defective
- Dirty ID sensor
- Defect at the ID sensor pattern writing area of the drum


## SC350-5: ID Sensor Error 5

Definition [D]
Vsg falls out of the adjustment target ( $4.0 \pm 0.2 \mathrm{~V}$ ) during Vsg checking.

## Possible Causes

- ID sensor defective
- ID sensor connector defective
- Poor ID sensor connector connection
- I/O board (IOB) defective
- High voltage supply board defective
- Dirty ID sensor
- Defect at the ID sensor pattern writing area of the drum


## SC360: Hard Disk Drive Error 1

Definition [B]
The machine does not detect the connection signal from the HDD.
Possible Causes

- Poor connection between the HDD and the BICU Board.
- The DC Power Connector to the HDD is disconnected.
- HDD defective
- BICU defective


## SC361: Hard Disk Drive Error

Definition [B]
The image data stored in the HDD cannot be output properly.

## Possible Causes

NOTE: If this error was caused by a temporary condition the problem will be solved after turning the main switch off and on.

- HDD defective


## SC362: IMAC (Image Compression IC) Error

Definition [B]
An error occurs during image processing in the IMAC, which handles image compression and image data transmission.

## Possible Causes

- BICU defective


## SC365: Image Storage Address Error

## Definition [B]

The BICU receives an image data output request signal for data that is not stored in memory.

Possible Causes

- BICU defective


## SC390-1: TD Sensor Error 1

Definition [B]
The TD sensor output voltage is less than 0.5 V or more than 4.0 V 10 times consecutively during printing.

Possible Causes

- TD sensor abnormal
- Poor connection between the TD sensor and the I/O board (IOB)
- I/O board (IOB) defective


## SC390-2: TD Sensor Error 2

Definition [B]
The TD sensor output voltage is less than 1.8 V or more than 4.8 V during TD sensor initial setting.
Possible Causes

- TD sensor abnormal
- No developer in the development unit


## SC391: Development Bias Leak

Definition [B]
A development bias leak signal is detected.

## Possible Causes

- Poor connection between dev. bias terminal and high voltage supply bd.
- High voltage supply board defective


## SC401: Transfer Roller Error

## Definition [B]

The transfer roller current feedback signal is not detected or the transfer roller current leak signal is detected.

## Possible Causes

- High voltage supply board defective
- Poor connection between dev. bias terminal and high voltage supply bd.
- Poor PCU connection


## SC403: Transfer Belt Position Sensor Error

## Definition [B]

The transfer belt position sensor does not activate even if the transfer belt clutch has rotated once.

## Possible Causes

- Main motor/drive malfunction
- Transfer belt position sensor defective
- Poor transfer belt position sensor connection


## SC405: Transfer Belt Error

Definition [B]
The transfer belt does not move away from the drum during ID sensor pattern checking.

## Possible Causes

- Main motor/drive malfunction
- Transfer belt position sensor defective
- Poor transfer belt position sensor connection


## SC440: Main Motor Lock

Definition [B]
The main motor lock signal is longer than 2 seconds while the main motor turns on.

## Possible Causes

- Too much load on the drive mechanism
- Main motor defective


## $\Rightarrow$ SC442: PCU New Unit Detection Error

Definition [B]
After the main motor turns on, the PCU new unit detection sensor remains ON for 2 or more seconds.

Possible Causes

- New unit detection sensor defective
- PCU defective

NOTE: SC442 can be cleared by turning the Main Swicth OFF and ON , it will reoccur if the defective components are not replaced or repaired.

## SC490: Exhaust Fan Motor Lock

Definition [B]
An exhaust fan motor lock signal is not detected within 5 seconds after the exhaust fan motor turns on.

## Possible Causes

- Too much load on the drive mechanism
- Exhaust fan motor defective
- Poor fan motor connector connection


## SC492: Cooling Fan Motor Lock

Definition [B]
A cooling fan motor lock signal is not detected within 5 seconds after the cooling fan motor turns on.

## Possible Causes

- Too much load on the drive mechanism
- Cooling fan motor defective
- Poor fan motor connector connection


## SC493: Bridge Unit Cooling Fan Lock

Definition [B]
A bridge unit cooling fan motor lock signal is not detected within 5 seconds after the bridge unit cooling fan motor turns on.

## Possible Causes

- Too much load on the drive mechanism
- Bridge unit cooling fan motor defective
- Poor fan motor connector connection


## SC501-1: 1st Tray Lift Malfunction 1

Definition [C]
The paper upper limit sensor is not activated after the tray lift motor has been on for 10 seconds.

## Possible Causes

- 1st tray upper limit sensor defective
- Tray lift motor defective
- Poor tray lift motor connection


## SC501-2: 1st Tray Lift Malfunction 2

## Definition [C]

If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper upper limit sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 seconds four times consecutively, this SC will be generated.

## Possible Causes

- 1st tray upper limit sensor defective
- Tray lift motor defective
- Too much paper in the tray


## SC502-1: 2nd Tray Lift Malfunction 1

Definition [C]
The paper upper limit sensor is not activated after the tray lift motor has been on for 10 seconds.

## Possible Causes

- 2nd tray upper limit sensor defective
- Tray lift motor defective
- Poor tray lift motor connection


## SC502-2: 2nd Tray Lift Malfunction 2

Definition [C]
If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper upper limit sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 seconds four times consecutively, this SC will be generated.

## Possible Causes

- 2nd tray upper limit sensor defective
- Tray lift motor defective
- Too much paper in the tray


## SC503-1: 3rd Tray Lift Malfunction 1 (Optional Paper Tray Unit)

Definition [C]
The paper upper limit sensor is not activated after the tray lift motor has been on for 10 seconds.

Possible causes

- 3rd tray upper limit sensor defective
- Tray lift motor defective
- Poor tray lift motor connection


## SC503-2: 3rd Tray Lift Malfunction 2 (Optional Paper Tray Unit)

## Definition [C]

If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper upper limit sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 seconds four times consecutively, this SC will be generated.

## Possible Causes

- 3rd tray upper limit sensor defective
- Tray lift motor defective
- Too much paper in the tray


## SC504-1: 4th Tray Lift Malfunction 1 (Optional Paper Tray Unit)

Definition [C]
The paper upper limit sensor is not activated after the tray lift motor has been on for 10 seconds.

## Possible Causes

- 4th tray upper limit sensor defective
- Tray lift motor defective
- Poor tray lift motor connection


## SC504-2: 4th Tray Lift Malfunction 2 (Optional Paper Tray Unit)

Definition [C]
If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper upper limit sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 seconds four times consecutively, this SC will be generated.

## Possible Causes

- 4th tray upper limit sensor defective
- Tray lift motor defective
- Too much paper in the tray


## SC506: Paper Tray Unit Main Motor Lock (Optional Paper Tray)

## Definition [C]

A main motor lock signal is detected for more than 0.5 s during rotation.

## Possible Causes

- Paper tray unit main motor defective
- Too much load on the drive mechanism
- Poor motor connector connection


## SC507: LCT Main Motor Lock (Optional LCT)

## Definition [C]

A main motor lock signal is detected for more than 0.5 s during rotation.

## Possible Causes

- LCT main motor defective
- Too much load on the drive mechanism
- Poor motor connector connection


## SC510-1: LCT Tray Malfunction 1

Definition [C]

1) The LCT lift sensor does not activate for more than 18 seconds after the LCT lift motor turned on.
2) The LCT lower limit sensor does not activate for more than 18 seconds after the LCT lift motor turned on.
3) The LCT lift sensor is already activated when the LCT lift motor turns on.

## Possible Causes

- LCT lift motor defective
- Pick-up solenoid defective
- Poor motor connector connection
- Poor pick-up solenoid connector connection
- Paper end sensor defective
- LCT lift sensor defective
- LCT lower limit sensor defective


## SERVICE CALL CONDITIONS

## SC510-2: LCT Tray Malfunction 2

Definition [C]

1) During paper lifting, the LCT lift sensor does not activate for more than 1.5 seconds after the paper end sensor turned on. If this condition occurs four times consecutively, this SC will be generated.
2) During paper lifting, after the top of the paper reaches the upper limit position, the paper is lowered until the LCT lift sensor is de-activated. At this time, the LCT lift sensor does not de-activate for more than 5 seconds.

## Possible Causes

- LCT lift motor defective
- Pick-up solenoid defective
- Poor motor connector connection
- Poor pick-up solenoid connector connection
- Paper end sensor defective
- LCT lift sensor defective
- LCT lower limit sensor defective


## SC541: Fusing Thermistor Open

Definition [A]
The fusing temperature detected by the thermistor was below $7^{\circ} \mathrm{C}$ for 16 seconds.

## Possible Causes

- Fusing thermistor defective or out of position
- Poor thermistor terminal connection


## SC542: Fusing Temperature Warming-up Error

Definition [A]
The fusing temperature does not reach the fusing standby temperature within 145 seconds after the main power switch is turned on.

## Possible Causes

- Fusing thermistor defective or out of position
- Fusing lamp open
- Fusing thermofuse open
- BICU defective
- Power supply board defective
- Poor fusing unit connection


## SC543: Fusing Overheat Error 1

Definition [A]
A fusing temperature of over $231^{\circ} \mathrm{C}$ is detected for 5 seconds by the fusing thermistor.

## Possible Causes

- Fusing thermistor defective
- BICU defective
- I/O board (IOB) defective


## SC545: Fusing Overheat Error 2

Definition [A]
The fusing lamp stays on at full power for 30 seconds while in the stand-by condition after warming-up is completed.

Possible Causes

- Fusing thermistor out of position


## SC546: Fusing Ready Temperature Malfunction

Definition [A]
During or after machine warm-up, the sensor detects a $40^{\circ} \mathrm{C}$ change in the fusing temperature 5 or more times in 1 minute.

## Possible Causes

- Poor thermistor connector connection
- Poor fusing unit connection


## SC547: Zero Cross Signal Malfunction

Definition [A]
Zero cross signals are not detected within a certain period within 500 ms after the main power switch has been turned on.

## Possible Causes

- Power supply board defective
- Noise on the ac power line


## SC548: Fusing Unit Installation Error

## Definition [A]

The machine cannot detect the fusing unit when the front cover and right cover are closed.

## Possible Causes

- Fusing unit is not installed
- Poor fusing unit connection


## SC602: Communication Error between BICU and HDD Controller

Definition [B]
The BICU cannot communicate with the HDD controller.
Possible Causes

- Poor connection between the BICU board and HDD controller
- HDD controller defective
- BICU board defective


## SC621: Communication Error between BICU and Finisher

## Definition [B]

The BICU cannot communicate with the finisher properly.

## Possible Causes

- Poor connection between the BICU board and the finisher main board
- Finisher main board defective
- BICU board defective


## SC623: Communication Error between BICU and Paper Tray Unit

Definition [B]
The BICU cannot communicate with the paper tray unit properly.
Possible Causes

- Poor connection between the BICU board and the paper tray unit main board
- Paper tray unit main board defective
- BICU board defective


## SC624: Communication Error between BICU and LCT

Definition [B]
The BICU cannot communicate with the LCT properly.

## Possible Causes

- Poor connection between the BICU board and the LCT main board
- LCT main board defective
- BICU board defective


## SC722: Finisher Jogger Motor Error

Definition [B]

1) The finisher jogger H.P sensor remains de-activated for more than a certain time when returning to home position.
2) The finisher jogger H.P sensor remains activated for more than a certain time when moving away from home position.

## Possible Causes

- Jogger H.P sensor defective
- Jogger motor defective


## SC724: Finisher Staple Hammer Motor Error

## Definition [B]

Stapling does not finish within a certain time after the staple hammer motor turned on.

## Possible Causes

- Staple hammer motor defective
- Staple jam


## SC725: Finisher Stack Feed-out Motor Error

Definition [B]
The stack feed-out belt H.P sensor does not activate within a certain time after the stack feed-out motor turned on.

Possible Causes

- Stack feed-out H.P sensor defective
- Stack feed-out motor defective


## SC726: Finisher Shift/Lift Motor Error

Definition [B]

1) Tray shift does not finish within a certain time after the shift motor turned on.
2) The stack height sensor does not activate within a certain time after the shift tray lift motor turned on.

## Possible Causes

- Shift motor defective
- Shift tray lift motor defective


## SC727: Finisher Stapler Rotation Motor Error

Definition [B]

1) Stapler rotation does not finish within a certain time after the staple rotation motor turned on.
2) The stapler does not return to its home position within a certain time after stapling finished.

Possible Causes

- Stapler rotation motor defective
- Poor stapler rotation motor connection


## SC729: Finisher Punch Motor Error

Definition [B]
The punch H.P sensor does not activate within a certain time after the punch motor turned on.

## Possible Causes

- Punch motor defective
- Punch H.P sensor defective
- Poor punch motor connection


## SC730: Finisher Stapler Position Motor Error

## Definition [B]

1) The stapler home position sensor stays on for longer than normal when the stapler motor turns on to return the stapler to its home position.
2) The stapler H.P sensor does not turn on within a certain time after the stapler motor turned on to move the stapler away from home position.

Possible Causes

- Stapler motor defective
- Stapler H.P sensor defective
- Poor stapler motor connection


## SC900: Electrical Total Counter Error

Definition [A]
The total counter contains a character that is not a number.

## Possible Causes

- NVRAM defective


## SC951: F-Gate Signal Error 2

Definition [B]
When the IPU has already received the F-gate signal, the IPU receives another F-gate signal.
Possible Causes

- BICU defective


## SC954: Printer Image Setting Error

$\Rightarrow$ Definition $[B]$
The IPU does not send the Printer Ready Signal back to the engine software.
Possible Causes

- BICU software defective
- Polygon mirror motor defective
- LD unit defective
- Laser Synchronization Detector Board defective
- BICU Board defective


## SC955: Memory Setting Error

Definition [B]
The settings that are required for image processing using the memory are not sent from the IPU.

## Possible Causes

- Software defective


## SC959: Printer Setting ID Error

$\Rightarrow$ Definition $[\mathrm{B}]$
The IPU sends the Printer Ready signal back to the engine software, but the signal does not contain the correct response code to the original command.
Possible Causes

- BICU Software defective
- BICU Board defective


## SC960: Printer Return ID Error

$\Rightarrow$ Definition $[B]$
The IPU sends the Page Print Complete signal back to the engine software, but the signal does not contain the correct response code to the original command.
Possible Causes

- BICU Software defective
- BICU Board defective


## SC961: Printer Ready ID Error

Definition [B]
The IPU sends the Ready signal back to the engine software for printing the next page, but the signal does not contain the correct response code to the original command.
Possible Causes

- BICU Software defective
- BICU Board defective


## SC962: Memory Setting ID Error

Definition [B]
The ID that is sent from the memory when the IPU sent the memory ready signal is incorrect.
Possible Causes

- Software defective


## SC963: Memory Finishing ID Error

Definition [B]
The ID that is sent from the memory when the IPU sent the memory finish signal is incorrect.

Possible Causes

- Software defective


## SC964: Printer ready error

Definition [B]
The print ready signal is not generated for more than 17 seconds after the IPU received the print start signal.

Possible Causes

- Software defective


## SC980: HDD Access Error

Definition [B]
Incorrect parameter sent to the HDD controller.
Possible Causes

- Software defective
- Poor connection between BICU and HDD.


## SC981: HDD Response Error

Definition [B]
The HDD controller board does not generate any response when the IPU sends a read/write signal to the HDD controller.

## Possible Causes

- Software defective
- Poor connection between BICU and MSU
- HDD defective


## SC982: HDD Construction Error

## Definition [B]

1) The HDD has been installed without the electric sort kit (SIMM memory).
2) A HDD that does not have the correct specifications has been installed.

## Possible Causes

- Hard disk defective
- Incorrect hard disk type
- The electric sort kit is not installed


## SC990: Software Performance Error

Definition [B]
The software performs an unexpected function.

## Possible Causes

- Software defective

NOTE: 1) When this SC occurs, the file name, address, and data will be stored in the NVRAM. These data can be checked by SMC printing-logging data (SP2-22-3).
2) Note the above data and the situation in which this SC occurs. Then report the data and conditions to your technical control center.

### 7.1.3 PRINTER CONTROLLER

## Error Messages

If an error occurred, the error LED lights and an error message is displayed on the LCD.

## Service Call (SC) Codes

| SC No. | Description/Definition | Possible Cause |
| :--- | :--- | :--- |
| SC2000 | Functional problems (Self diagnostic error) | Printer controller defective. |
|  | A diagnostic error occurred at power on. <br> The printer controller has a hardware <br> problem. |  |
|  | Functional problems (Debug trap error) | The controller software has a <br> problem. |
|  | An error has occurred in the printer <br> controller. The controller has a software <br> problem. |  |
| SC2002 | Functional problems (Exception error) | Printer controller defective. |
|  | An error has occurred in the controller. <br> The controller has a software or hardware <br> problem. |  |

## Other Messages

The following errors might need assistance from service.

| Error Message | Condition | Possible Cause |
| :--- | :--- | :--- |
| Printer HDD Error. | A hard disk error was detected <br> during downloading the macro <br> or fonts. | - Printer HDD defective <br> - Printer controller defective |
| Parallel <br> Communication <br> Error. | Parallel communication error <br> occurred during a print job via <br> the parallel port. | - An item in the parallel menu <br> was set incorrectly <br> - Parallel cable defective <br> - Printer controller defective |
| Print Over Run. | This error occurred when a file <br> was being printed in banding <br> mode. A complex page may not <br> have enough time to image a <br> band while the engine is printing <br> the previous page. | Insufficient memory <br> - A complex page is printed <br> - The DRAM SIMM board is <br> - The controller is defective |
| Memory Overflow. | This error occurred during <br> printing. <br> The language has sent a file <br> that is too complex to interpret in <br> the available memory. | - Insufficient memory <br> - A complex page is printed <br> - The DRAM SIMM is board <br> defective <br> - The controller is defective |

## LEDs

## Location

Four LEDs (LED2 to LED5) are located near SW2 on the printer controller. They indicate the progress of the self test, and errors and status conditions.


## LED Code Table

## Self Diagnostic

The following LED table is for the self diagnostic function. When an error occurs during the self diagnostic test, all four LEDs blink then indicate the error as shown in the following table.
e.g.) RAM error:

All LEDs on $(1 \mathrm{~s}) \rightarrow$ off $(1 \mathrm{~s}) \rightarrow$ on (1 s) $\rightarrow$ off $(1 \mathrm{~s}) \rightarrow$ LED4 on $(5 \mathrm{~s}) \rightarrow$ from the beginning.
$1=$ LED is lit, $0=$ LED is off

| LEDs |  |  |  |  |
| :---: | :---: | :---: | :---: | :--- |
| LED2 | LED3 | LED4 | LED5 | Description |
| 0 | 0 | 0 | 1 | ROM error |
| 0 | 0 | 1 | 0 | RAM (resident, SIMM) error: NOTE 1) |
| 0 | 0 | 1 | 1 | NVRAM error: NOTE 1) |
| 0 | 1 | 0 | 1 | Fatal error |
| 0 | 1 | 1 | 0 | Debug trap error: NOTE 2) |

NOTE: 1) SC2000 is also displayed.
2) SC2002 is also displayed.

## Controller Firmware Copy/Download

During controller firmware copying and downloading, the following LED status will be indicated.
$1=$ LED is lit, $0=$ LED is off, $1 / 0=L E D$ is blinking

| LEDs |  |  |  |  |
| :---: | :---: | :---: | :---: | :--- |
| LED2 | LED3 | LED4 | LED5 |  |
| 1 | 0 | 0 | 0 | Data downloading |
| 0 | $1 / 0$ | 0 | 0 | Erasing |
| $1 / 0$ | $1 / 0$ | 1 | 0 | Programming |
| 0 | 0 | 0 | 1 | Verifying |
| 1 | 0 | 0 | 1 | Insufficient RAM error |
| 1 | 0 | 1 | 0 | Verify failure |
| 1 | 0 | 1 | 1 | Download failure (check sum error) |
| 1 | 1 | 0 | 0 | Erase failure |
| 1 | 1 | 0 | 1 | Download failure (other error) |
| 1 | 1 | 1 | 1 | Copy/download success |

### 7.1.4 NETWORK INTERFACE BOARD

## LED Indications

Two LEDs visible from the outside, one amber and one green, indicate the status of the network interface board (NIB). Refer to the diagram on the right for their location.


| Amber (upper) | Green (lower) | Status | Condition(s) |
| :---: | :---: | :---: | :---: |
| Blinks | On | Normal | - The NIB is receiving a packet from the Ethernet. |
| - | On | Normal | - The machine has just been turned on. The NIB then initializes itself. <br> - The NIB is waiting for a print job. |
| - | Blinks 3 times, then stays on | Normal | - The NIB has finished initialization, and will print a status sheet. |
| - | Blinks rapidly | Initialization Error | - The NIB detected a bad RAM chip during initialization. <br> - Turn the machine off and on. If the NIB detects the same error again, replace the NIB. |
| Blinks for 10 s , then goes off | Blinks | Initialization Error | - The NIB detected a data error in the flash ROM (firmware) during initialization. <br> - Recover the firmware by downloading it through the network. |
| - | Blinks rapidly 4 times, then off | Error | - The NIB detected an Ethernet hardware error. <br> - Check the Ethernet connections and restart the machine. If the error is frequent, try replacing the NIB. |
| - | Blinks rapidly | Error | - The NIB has lost connection to NetWare file server(s). <br> - Check the cable connection and the NetWare server status. |
| Blink alternately |  | NVRAM reset | - The NIB has reset its NVRAM to the factory defaults. (Refer to section 4.5.1 for how to reset the NVRAM.) |

### 7.2 ELECTRICAL COMPONENT DEFECTS

### 7.2.1 SENSORS

| Component (Symbol) | CN | Condition | Symptom |
| :---: | :---: | :---: | :---: |
| LD Unit Home Position (S1) | $\begin{aligned} & 220-2 \\ & \text { (IOB) } \end{aligned}$ | Open | SC328 is displayed when the laser beam pitch is changed. |
|  |  | Shorted | SC327 is displayed when the laser beam pitch is changed. |
| Toner Density (TD) (S2) | $\begin{aligned} & 204-3 \\ & \text { (IOB) } \end{aligned}$ | Open | The add toner indicator blinks even if there is toner in the development unit. |
|  |  | Shorted | SC390-1 is displayed. |
| Paper Exit (S3) | $\begin{gathered} \text { 203-B2 } \\ (\mathrm{IOB}) \end{gathered}$ | Open | The Paper Jam indicator will light whenever a printed sheet is made. |
|  |  | Shorted | The Paper Jam indicator lights even if there is no paper. |
| Registration (S4) | $\begin{gathered} \text { 207-B2 } \\ (\mathrm{IOB}) \end{gathered}$ | Open | The Paper Jam indicator lights even if there is no paper. |
|  |  | Shorted | The Paper Jam indicator will light whenever a printed sheet is made. |
| Image Density (ID) (S5) | $\begin{aligned} & 219-5 \\ & \text { (IOB) } \end{aligned}$ | Open | SC350-3 is displayed after printing. |
|  |  | Shorted | SC350-1 is displayed after printing. |
| Upper Paper Lift (S6) | $\begin{aligned} & 235-2 \\ & \text { (PFB) } \end{aligned}$ | Open | Add Paper is displayed even if there is paper. If this condition occurred four times, SC501-2 will be displayed. |
|  |  | Shorted | SC501-1 is displayed. |
| Lower Paper Lift (S7) | $\begin{aligned} & 236-2 \\ & (\text { PFB }) \end{aligned}$ | Open | Add Paper is displayed even if there is paper. If this condition occurred four times, SC502-2 will be displayed. |
|  |  | Shorted | SC502-1 is displayed. |
| Upper Paper End (S8) | $\begin{aligned} & 235-8 \\ & \text { (PFB) } \end{aligned}$ | Open | The Paper End indicator lights even if paper is placed in the upper paper tray. |
|  |  | Shorted | The Paper End indicator does not light even if there is no paper in the upper paper tray. |
| Lower Paper End (S9) | $\begin{aligned} & 236-8 \\ & \text { (PFB) } \end{aligned}$ | Open | The Paper End indicator lights even if paper is placed in the lower paper tray. |
|  |  | Shorted | The Paper End indicator does not light even if there is no paper in the lower paper tray. |
| Upper Relay (S10) | $\begin{aligned} & 235-5 \\ & \text { (PFB) } \end{aligned}$ | Open | The Paper Jam indicator will light whenever a printed sheet is made. |
|  |  | Shorted | The Paper Jam indicator lights even if there is no paper. |
| Lower Relay (S11) | $\begin{aligned} & 236-5 \\ & \text { (PFB) } \end{aligned}$ | Open | The Paper Jam indicator will light whenever a printed sheet is made. |
|  |  | Shorted | The Paper Jam indicator lights even if there is no paper. |
| Transfer Belt Position (S12) | $\begin{gathered} \text { 203-A8 } \\ (\mathrm{IOB}) \end{gathered}$ | Open | No symptom |
|  |  | Shorted | SC403 is displayed |

### 7.2.2 SWITCHES

| Component (Symbol) | CN | Condition | Symptom |
| :---: | :---: | :---: | :---: |
| Right LowerCover (SW1) | $\begin{aligned} & 232-3 \\ & \text { (PFB) } \end{aligned}$ | Open | Doors/Covers Open is displayed even if the right lower cover is closed. |
|  |  | Shorted | The LCD goes blank when the lower cover is opened. |
| Main (SW3) | $\begin{gathered} 102-1 ~ 4 \\ \text { (PSU) } \end{gathered}$ | Open | The machine does not turn on. |
|  |  | Shorted | The machine does not turn off. |
| Front Cover Safety (SW4) | $\begin{gathered} \text { 219-11 } \\ (\mathrm{IOB}) \end{gathered}$ | Open | Doors/Covers Open is displayed even if the front cover is closed. |
|  |  | Shorted | Doors/Covers Open is not displayed even if the front cover is opened. |

### 7.3 BLOWN FUSE CONDITIONS

| Fuse | Rating |  | Symptom when turning on the main power |
| :---: | :---: | :---: | :--- |
|  | $\mathbf{1 1 5} \mathbf{~ V}$ | $\mathbf{2 1 0} \mathbf{~} \mathbf{2 3 0} \mathbf{~}$ |  |
| Power Supply Board |  |  |  |

### 7.4 ROM HISTORY

### 7.4.1 ROM HISTORY - BICU

| Description of Modification | Firmware <br> Level | Serial <br> Number | Firmware <br> Version |
| :--- | :--- | :--- | :---: |
| Initial Production | G0355113 A | 1st Prod. | NA |
| Corrects the following: <br> - SC546 occurs during warm-up, when the machine is <br> turned on or brought out of energy saver mode and <br> the surrounding environment is relatively cold. | G0355113 B | From Dec. <br> 8,99 <br> Prod. | 8.4 |
| Corrects the following: <br> - SC360 occurs just after the HDD is turned on. The | G0355113 C | From Feb. <br> SC360 occurs when replaced with the A6915879 or <br> later version (A6915860 from March 2000) of the <br> HDD and the machine is turned on or brought out of <br> Energy Saver Mode. | 8.9 |
| - Prod. |  |  |  |
| A paper jam occurs between the printer and the <br> mailbox. The jam occurs during printing, when the <br> mailbox is assigned as the output device, after the <br> machine is brought out of Energy Saver Mode. This <br> occurs because the machine cannot identify the <br> mailbox. |  |  |  |
| Corrects the following: <br> SC990/542 occur simultaneously. When the Main <br> Power Switch is turned on or the machine recovers <br> from Energy Saver Mode, an SC990 may occur <br> (Software Performance error) before the machine <br> reaches Stand-by temperature. If this happens an <br> SC542 occurs (Fusing Temperature Warm-up error). <br> The correction turns off the Fusing Temperature <br> control whenever an SC990 occurs. | G0355113 D | From |  |
| June 18, |  |  |  |

## $\Rightarrow$ 7.4.2 ROM HISTORY - CONTROLLER BOARD

| Description of Modification | Firmware Level | Serial Number | Firmware Version |
| :---: | :---: | :---: | :---: |
| Initial Production | G0356080 A | 1st Prod. | NA |
| Corrects the following: <br> - Jam Recovery in Duplex Mode. After jam recovery in Duplex Mode, the original file is printed out but the image is not normal. <br> - This firmware version is Dazel certified. <br> - The position of the image is different when using the PCL driver versus the Post Script driver. <br> - The firmware has been modified to support Job MIB. <br> - The firmware has been modified to allow downloading of document formats. <br> - The firmware has been modified to support Page Count MIB. <br> - An SC2001 sometimes occurs during a print job if Auto Tray Select has been selected. | G0356080 D | From June '00 Prod. | 0.69 |

## PAPER TRAY UNIT G520

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

Paper Size:

Paper Weight:
Tray Capacity:
Paper Feed System:
Paper Height Detection:
Power Source:

Power Consumption:
Weight:
Size (W x D x H) :

A5 lengthwise to A3
HLT lengthwise to DLT
$60 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} . \sim 28 \mathrm{lb}$.
500 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$.)
FRR
4 steps ( $100 \%, 70 \%$, $30 \%$, Near end)
$24 \mathrm{Vdc}, 5 \mathrm{Vdc}$ (from the copier)
$120 \mathrm{Vac}: 115 \mathrm{~V}$ version (from the copier)
220 ~ 240 Vac: 224/240 V version (from the copier)
50 W
25 kg
$540 \mathrm{~mm} \times 600 \mathrm{~mm} \times 270 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Upper pick-up roller
2. Upper paper feed roller
3. Upper relay roller
4. Upper separation roller
5. Lower relay roller
6. Lower paper feed roller
7. Lower separation roller
8. Lower pick-up roller
9. Lower tray
10. Upper tray

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Main board
2. Tray motor
3. Upper paper lift sensor
4. Relay clutch
5. Upper paper feed clutch
6. Tray lift motor
7. Lower paper feed clutch
8. Vertical guide switch
9. Lower paper lift sensor
10. Lower paper end sensor
11. Lower relay sensor
12. Upper relay sensor
13. Upper paper end sensor
14. Lower paper height 2 sensor
15. Lower paper height 1 sensor
16. Upper paper height 2 sensor
17. Upper paper height 1 sensor
18. Tray paper size switch

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Tray | Drives all rollers. | 2 |
| M2 | Tray Lift | Lifts the upper and lower tray bottom plates (there are two motors in this unit, one for each tray. | 6 |
| Sensors |  |  |  |
| S1 | Upper Paper Lift | Detects when the paper in the upper tray is at the correct feed height. | 3 |
| S2 | Lower Paper Lift | Detects when the paper in the lower tray is at the correct feed height. | 9 |
| S3 | Upper Paper End | Informs the copier when the upper tray runs out of paper. | 13 |
| S4 | Lower Paper End | Informs the copier when the upper tray runs out of paper. | 10 |
| S5 | Upper Relay | Detects misfeeds. | 12 |
| S6 | Lower Relay | Detects misfeeds. | 11 |
| S7 | Upper Paper Height 1 | Detects the amount of paper in the upper tray. | 17 |
| S8 | Upper Paper Height 2 | Detects the amount of paper in the upper tray. | 16 |
| S9 | Lower Paper Height 1 | Detects the amount of paper in the lower tray. | 15 |
| S10 | Lower Paper Height 2 | Detects the amount of paper in the lower tray. | 14 |
| Switches |  |  |  |
| SW1 | Vertical Guide | Detects whether the vertical guide is open. | 8 |
| SW2 | Tray Paper Size | Detects the paper size in the paper tray based on a dial setting. | 18 |
| Magnetic Clutches |  |  |  |
| MC1 | Upper Paper Feed | Starts paper feed from the upper tray. | 5 |
| MC2 | Lower Paper Feed | Starts paper feed from the lower tray. | 7 |
| MC3 | Relay | Drives the transport rollers. | 4 |
| PCBs |  |  |  |
| PCB1 | Main | Controls the paper tray unit and communicates with the copier. | 1 |

### 1.5 DRIVE LAYOUT



1. Tray motor
2. Relay clutch
3. Upper paper feed clutch
4. Lower paper feed clutch
5. Lower relay roller
6. Lower separation roller
7. Lower paper feed roller
8. Lower pick-up roller
9. Upper separation roller
10. Upper relay roller
11. Upper paper feed roller
12. Upper pick-up roller

## 2. DETAILED DESCRIPTIONS <br> 2.1 PICK-UP AND SEPARATION ROLLER RELEASE MECHANISM



When the paper tray [A] is not inside the paper tray unit, the separation roller [B] is shifted away from the paper feed roller [C], and the pick-up roller [D] stays in the upper position.
When the paper tray is put into the paper tray unit, it pushes the release lever [E]. This causes the pick-up roller to move down (top diagram) and the separation roller to move into contact with the paper feed roller (bottom diagram).

### 2.2 PAPER LIFT MECHANISM



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


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

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

### 2.3 PAPER END DETECTION



If there is some paper in the paper tray, the paper 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, the pick-up roller supporter [D] lifts up the paper end feeler.

### 2.4 PAPER HEIGHT DETECTION

The amount of paper in the tray is detected by the combination of two paper height sensors $[A]$ and $[B]$.
When the amount of paper decreases, the bottom plate pressure lever [C] moves up and the actuator [D], which is mounted on the same drive shaft as the pressure lever, rotates.

The following combination of sensor signals is sent to the copier.

| Amount of <br> Paper | Paper Height <br> Sensor [A] | Paper Height <br> Sensor [B] |
| :---: | :---: | :---: |
| Full | OFF | ON |
| Near Full | ON | ON |
| Near End 1 | ON | OFF |
| Near End 2 | OFF | OFF |



Near End 1


Near End 2


### 2.5 PAPER SIZE DETECTION

The paper size switch includes four sensors (microswitches). Actuators behind the paper size dial actuate the sensors.
Each paper size has its own actuator, with a unique combination of notches. To determine the paper size, the CPU reads which switches the actuator has turned off.

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

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

| Models |  |  | Switch Location |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| North America | Europe | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |  |
| $81 / 2^{\prime \prime} \times 13^{\prime \prime}$ Portrait | A3 Portrait | ON | ON | OFF | ON |  |
| A4 Landscape | A4 Landscape | ON | ON | ON | ON |  |
| A4 Portrait | A4 Portrait | ON | OFF | ON | ON |  |
| $11 " \times 17^{\prime \prime}$ Portrait | A5 Portrait | OFF | OFF | ON | ON |  |
| $81 / 2^{\prime \prime} \times 14 " ~ P o r t r a i t ~$ | $8 " \times 13^{\prime \prime}$ Portrait | ON | OFF | OFF | OFF |  |
| $81 / 2^{\prime \prime} \times 11 "$ Portrait | $81 / 2^{\prime \prime} \times 11$ Portrait | ON | ON | OFF | OFF |  |
| $81 / 2^{\prime \prime} \times 11^{\prime \prime}$ Landscape | $81 / 2^{\prime \prime} \times 11 "$ Landscape | ON | OFF | ON | OFF |  |
| $*$ | $*$ | ON | ON | ON | OFF |  |

ON: Pushed OFF: Not Pushed

## 3. SERVICE TABLES

### 3.1 DIP SWITCHES

| DPS101 |  |  |  |  |  |  | Description |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ | $\mathbf{7}$ | $\mathbf{8}$ |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Default |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Free run, feed from upper tray |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | Free run, feed from lower tray |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | Free run, feed from upper and lower trays alternately |

NOTE: 1) Do not use any other settings.
2) To do the free run, proceed as follows:
a) Remove the paper from the tray (this is because the machine has no jam detection).
b) Set DPS101 for the required free run as shown above.
c) Turn the main power switch off, wait a few seconds, and then switch it on.
d) Press SW101 to start the free run.
e) To stop the free run, press SW102.

### 3.2 TEST POINTS

| No. | Label | Monitored Signal |
| :---: | :---: | :--- |
| TP100 | $(24 \mathrm{~V})$ | +24 V |
| TP101 | (GND) | Ground |
| TP103 | (TXD) | TXD to the copier |
| TP104 | (RXD) | RXD from the copier |
| TP105 | (5 V) | +5 V |
| TP106 | (GND) | Ground |

### 3.3 SWITCHES

| No. |  |
| :--- | :--- |
| SW101 | Starts the free run |
| SW102 | Stops the free run |

### 3.4 FUSES

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

## 4. REPLACEMENT AND ADJUSTMENT 4.1 COVER REPLACEMENT



## Right Cover

1. Remove the right cover [A] (2 screws).

## Rear Cover

1. Remove the rear cover [B] (2 screws).

### 4.2 ROLLER REPLACEMENT

### 4.2.1 PAPER FEED, SEPARATION, AND PICK-UP ROLLERS



1. Remove the paper tray.

## Pick-up Roller

2. Replace the pick-up roller [A].

## Paper Feed Roller

2. Replace the paper feed roller [B] (1 snap ring).

## Separation Roller

2. Replace the separation roller [C].

### 4.3 TRAY MOTOR REPLACEMENT



1. Remove the rear cover.
2. Remove the tray motor $[A]$ (1 connector, 3 screws).

### 4.4 PAPER FEED AND RELAY CLUTCH REPLACEMENT


[B]

1. Remove the rear cover.
2. Remove the upper paper feed clutch holder [A] (2 screws).
3. Remove the lower paper feed clutch holder [B] (2 screws).
4. Remove the gear holder [C] (3 screws, 1 spring, 1 bearing).
5. Replace the relay clutch [D] (1 connector).
6. Replace the upper feed clutch [E] (1 bushing, 1 connector).
7. Replace the lower feed clutch $[F]$ (1 connector).

### 4.5 PAPER FEED UNIT REPLACEMENT



1. Remove the rear cover.
2. Remove the upper and lower paper feed clutch holder.
3. Remove the gear holder.
4. Remove the upper feed clutch $[A]$ or lower feed clutch $[B]$.
5. Remove the upper or lower gear [C, D].

## PAPER FEED UNIT REPLACEMENT



## Upper Paper Feed Unit

6. Remove the docking bracket $[A]$ ( 1 screw).
7. Remove the vertical transport cover $[B]$ of the copier (1 snap ring).
8. Remove the upper paper feed unit [C] (2 screws, 1 connector).

## Lower Paper Feed Unit

6. Remove the docking bracket [D] (1 screw).
7. Remove the vertical transport guide [E] (2 screws).
8. Remove the lower paper feed unit [F] (2 screws, 1 connector).

### 4.6 PAPER END, TRAY LIFT, AND RELAY SENSOR REPLACEMENT



1. Remove the paper feed unit.

## Paper End Sensor

2. Replace the paper end sensor $[A]$ (1 connector).

## Tray Lift Sensor

2. Replace the paper lift sensor $[B]$ (1 connector).

## Relay Sensor

2. Remove the sensor bracket [C] (1 screw).
3. Replace the relay sensor [D] (1 connector).

## SwapBox ${ }^{\mathbb{T M}}$ and SwapFTLTM Installation Manual

## 1 INTRODUCTION

### 1.1 PRECAUTIONS

### 1.1.1 SWAPBOX AND SOFTWARE

If you purchase SwapBox from an authorized SCM Microsystems dealer, do not use the software enclosed with the SwapBox. You need to purchase the required software and license additionally from Ricoh.
The software part number is: A2309353

### 1.1.2 SOFTWARE LICENSE AGREEMENT

Before you use the software, you must agree to the SCM software license agreement that is enclosed in either the SwapBox or the software.
Users must be responsible for the agreement with SCM Microsystems Inc. Ricoh Co., Ltd. is not responsible for any legal problems caused by user's actions contrary to the agreement.

### 1.2 SYSTEM REQUIREMENTS

- An IBM PC-AT compatible computer with ISA Plug \& Play BIOS
- One empty ISA bus slot (SBI-C2P and SBI-D2P)
- One empty 3.5" drive bay (SBI-D2P)
- Microsoft ${ }^{\circledR}$ Windows ${ }^{\circledR} 95$ operating system 4.00.950a or later version installed (Refer to section 1.4 for more details.)
- At least 2 MB of free disk space on the system partition (the partition where Windows 95 is installed) for SwapFTL software installation


### 1.3 ITEMS TO PREPARE BEFORE INSTALLATION

- Computer hardware user's manual
- Windows 95 installation disks or CD-ROM
- Windows 95 service pack (Refer to section 1.4 for more details.)
- SCM SwapBox SBI-C2P or SBI-D2P

SCM/RCH SwapFTL + SwapUTI (rev. 2.01 or later) software diskette, and a software license

## INTRODUCTION

### 1.4 WINDOWS 95 VERSION CONFIRMATION

Windows 95 has several different versions as shown in the following table.

| Version | Description | Remarks |
| :--- | :--- | :--- |
| 4.00 .950 | First version | Not suitable for SwapBox and SwapFTL <br> installation. |
| 4.00 .950 a | First version (4.00.950) plus <br> service pack 1 | Install service pack 1 (SP1) into Windows 95 <br> version 4.00.950. SP1 is available from <br> Microsoft's web site. |
| 4.00 .950 B | So called "OSR2 (OEM <br> Service Release 2)" | Only computers with Windows 95 pre- <br> installed have had this version since 1997. |
| 4.00 .950 C | So called "OSR2.5 (OEM <br> Service Release 2.5)" | Only computers with Windows 95 pre- <br> installed have had this version since 1998. |

Check the Windows 95 version first, just by clicking the "System" icon in the Windows Control Panel. If you see 4.00.950 in the box shown below, though the example version is 4.00.950a, install "Service Pack 1" into the current Windows operating system. Refer to the next page for how to get "Service Pack 1".


If the version is 4.00 .950 B or 4.00 .950 C , install SwapBox and SwapFTL without updating Windows.
"Service Pack 1" is available from the Microsoft web site.
For the detailed information, refer to the following Internet address. http://www.microsoft.com/windows95/info/service-packs.htm

The service pack file can be downloaded from the following Internet location. Choose the one that is suitable for your Windows version.

| Language | Internet Location |
| :--- | :--- |
| US English | http://www.microsoft.com/windows95/info/service-packs.htm |
| Chinese (Simplified) | Not available. |
| Chinese (Traditional) | http://www.microsoft.com/windows/software/localize/tw-eu.htm |
| Czech | http://www.microsoft.com/windows/software/localize/cz-eu.htm |
| Danish | http://www.microsoft.com/windows/software/localize/dan-eu.htm |
| Dutch | http://www.microsoft.com/windows/software/localize/dut-eu.htm |
| Finnish | http://www.microsoft.com/windows/software/localize/fin-eu.htm |
| German | http://www.microsoft.com/windows/software/localize/frn-eu.htm |
| Greek | http://www.microsoft.com/windows/software/localize/ger-eu.htm |
| Hungarian | http://www./microsoft.com/windows/software/localize/grk-eu.htm |
| Italian | http://www.microsoft.com/windows/software/localize/itn-eu.htm |
| Japanese (PCAT) | http://www.microsoft.com/windows/software/localize/jpcat-eu.htm |
| Korean | http://www.microsoft.com/windows/software/localize/kr-eu.htm |
| Norwegian | http://www.microsoft.com/windows/software/localize/localize-eu.htm |
| Pan-European | http://www.microsoft.com/windows/software/localize/pan-eu.htm |
| Polish | http://www.microsoft.com/windows/software/localize/brz-eu.htm |
| Portuguese <br> (Brazilian) | http://www.microsoft.com/windows/software/localize/pt-eu.htm |
| Portuguese (lberian) | http://www.microsoft.com/windows/software/localize/ru-eu.htm |
| Russian | http://www.microsoft.com/windows/software/localize/slv-eu.htm |
| Slovenian | http://www.microsoft.com/windows/software/localize/spa-eu.htm |
| Spanish | http://www.microsoft.com/windows/software/localize/swe-eu.htm |
| Swedish | http://www.microsoft.com/windows/software/localize/thai2.htm |
| Thai | http://www.microsoft.com/windows/software/localize/trk-eu.htm |
| Turkish |  |

## 2 SWAPBOX INSTALLATION

### 2.1 HARDWARE INSTALLATION

CAUTION: 1) Before installing the SwapBox in a computer, turn off the computer and disconnect the power cable.
2) This manual does not explain how to install an ISA board in your computer. Refer to your computer's users manual for how to do it.

Install the SwapBox as explained in Chapter 1 to 3 of the SwapBox Manual that is enclosed in the SwapBox package.
Then go on to the next section below for the driver installation.

### 2.2 DRIVER INSTALLATION

CAUTION: 1) Do not use the software disks that are enclosed with the SwapBox.
2) Ensure that you have Windows 95-4.00.950a or a later version installed in your computer. (Refer to section 1.4 for more details.)

1. Turn on the computer. "SCM SwapBox" may appear during boot-up.
2. When Windows 95 starts, it finds the SwapBox automatically and installs the necessary driver files from the Windows installation diskette(s) or CD-ROM.
3. After Windows starts, choose "PCCard" from the Control Panel.

- If PCCard Properties is displayed, driver installation has finished.

You can go on to the next section.

- If PCCard Wizard is displayed, go on to the next step.

4. In the PCCard Wizard, choose all the default settings to finish the wizard, then reboot the computer.
5. After Windows 95 has restarted, choose "System" from the Control Panel.
6. Choose "Device Manager" and confirm that "SCM SwapBox Family Plug and Play PCMCIA Controller" is listed in the PCMCIA socket category.
7. Double-click "SCM SwapBox Family Plug and Play PCMCIA Controller" and confirm that the SwapBox is working properly.

## 3 SOFTWARE (SWAPFTL) INSTALLATION

CAUTION: 1) If you purchased SwapBox from an authorized SCM dealer, do not use the software diskettes that are enclosed in the SwapBox package.
2) Use the software diskette which is labeled "SwapBox Software/ RCH SwapFTL + SwapUTI".
3) A software license is required to install a software package on a computer.
4) The SwapFTL software may not work with some PC Card (PCMCIA), CardBus, or ZV port controllers installed in notebook computers.

### 3.1 SWAPFTL SOFTWARE INSTALLATION

1. Ensure that the SwapBox has been installed and configured under the Windows 95 environment.
2. Insert the software diskette in the floppy disk drive.
3. Choose "Run" from the Start menu.
4. Type "A:\setup" and click OK.
5. Follow the instructions on the display.
6. Reboot the computer after installation has finished.

### 3.2 VERIFICATION

### 3.2.1 SOFTWARE VERSION

1. Choose "SwapFTL Binary Utility" from the "SCMSwapFTL" program group.
2. After the utility starts, choose [Help] - [About SwapUti..].
3. Confirm that the version information is as follows:


Swapluti Version V 2.01R
SCM Microsystems
RICOH COMPANY, LTD.
Copyright 6 1996-1997
Additional Information

| VXD Name: | SwapBox |
| :--- | :--- |
| VrD Version: | 1.34 |

### 3.2.2 FLASH MEMORY CARD AUTOMATIC DETECTION

1. Insert the 4MB flash memory card supplied from Ricoh into a card slot.
2. Windows 95 automatically detects the card, if this is the first time a flash card has been used, Windows 95 installs the necessary drivers, and the "Found new hardware" dialog box should appear automatically.
3. Wait about 30 s , then choose "SwapFTL Binary Utility" from the "SCMSwapFTL" program group.

4. After the utility software starts, choose [Image] - [Read]. If "Failed to open PCCard" appears, see Troubleshooting.

5. Click OK to read the card.

If this works successfully, a new file is created as a temporary file, and this can be stored on the computer.

## 4 TROUBLESHOOTING

### 4.1 SWAPBOX RESOURCE CONFLICT

An ISA device must not share resources (IRQ, I/O address, and memory address) with another device.
ISA plug and play BIOS automatically assigns necessary resources to ISA boards. However, this could cause a problem if an ISA board requires specific resources.
The SwapBox requires a specific memory address range to activate card services. So, if another ISA device or PCI device occupies this memory address range, the SwapBox and SwapFTL will not work.

### 4.1.1 IRQ AND I/O ADDRESS

To identify whether an IRQ or I/O address has a conflict with another device, check the SwapBox properties in the Windows device manager. If you find a conflict, follow the instructions given by Windows Help.

### 4.1.2 MEMORY ADDRESS

The SwapBox and card services require a memory Window between 0xC8000 to 0xD3FFF.
The SwapBox properties do not tell you if the memory address is in conflict with others. To identify whether the memory address is in conflict with another device, do the following:

1. Choose "Computer" in the Windows device manager, and click "Properties".
2. Choose "Memory" in the "View resources" tab.
3. Check if any other device is using the address range from $0 \times C 8000$ to 0xD3FFF. If it is a PCI device, you need to adjust the plug and play BIOS settings. If it is an ISA device, you need to remove the device from the system.

## Conflict with a PCI device

1. Shut down Windows and reboot the computer.
2. Enter BIOS setup during system boot-up.

NOTE: How to enter BIOS setup and BIOS setup options depends on your system.
3. Find the ISA plug and play settings in the BIOS setup.
4. Adjust the settings so that the BIOS does not allocate the SwapBox memory range to PCl devices.

## Example: Award BIOS

1. Press the "DEL" key during boot-up to gain access to BIOS setup.
2. Choose "PNP AND PCI SETUP" from the main menu.

3 Change the "ISA MEM BLOCK BASE" setting as follows:

- ISA MEM BLOCK BASE: No/ICU $\rightarrow$ D000
- ISA MEM BLOCK SIZE: 8k

4 Press "Esc" to exit "PNP AND PCI SETUP".
5 Choose "SAVE \& EXIT SETUP".

## Conflict with a plug and play ISA device

1. Shut down the computer.
2. Remove the ISA device that is in conflict with the SwapBox.
3. Restart the computer and see if the SwapBox and the SwapFTL work under the Windows environment.

## Conflict with a legacy ISA device

Either remove the ISA device that is in conflict with the SwapBox to change its jumper settings, or run the setup utility of the device to change the setting.

## 4.2 "FAILED TO OPEN PCCARD" ERRORS

### 4.2.1 TIMELAG TO LOADING DRIVER

Windows requires a certain time, which depends on system performance, to enable card services for a flash memory card after inserting it in a PC card socket. If you try to read, erase, or write to the card before the card service is ready, you receive a "Failed to open PCCard" error.
Wait for about 30 s , then try again.

### 4.2.2 PCCARD NOT CONFIGURED

If the PCCard icon in the Windows Control Panel is not configured, you receive a "Failed to open PCCard" error when you try to access the card.
Configure the PCCard icon using Control Panel as explained in the driver installation procedure.

### 4.2.3 RESOURCE CONFLICT

If you receive a "Failed to open PCCard" error even if the SwapBox looks correctly configured in the device manager, a memory address conflict is causing the error. Refer to section 4.1.2 to solve the problem.

## 4.3 ’INVALID DYNAMIC LINK CALL FROM SWAPENUM..." ERROR

A blue screen error with a message "Invalid dynamic link call from SwapEnum to device xxxx service x" may happen, if SwapFTL software was installed before SwapBox had been activated.
Once this happens, follow the procedure below.

1. Uninstall SwapFTL (choose "SwapFTL Uninstall" from "SCM SwapFTL" program menu).
2. Reboot the computer.
3. After Windows has restarted, double-click "System" icon in the Control Panel.
4. Choose "Device Manager" tab and double-click "SCM SwapBox" in the "PCMCIA sockets" category.
5. If the device was not activated, activate it.
6. Reboot the computer.
7. After Windows has restarted, re-install SwapFTL.

### 4.4 SWAPFTL PROBLEM WITH NOTEBOOK COMPUTERS

### 4.4.1 WINDOWS AND PC CARD DRIVER VERSION

Before installing the SwapFTL software into a notebook computer, ensure the following.

- Windows 95 OSR2 is installed or Service Pack 1 is installed.

For how to identify the version of Windows 95 , refer to section 1.4 for details.

- The latest PC Card driver is installed.

Contact your computer manufacturer or PC Card controller vender.

### 4.4.2 SYSTEM SUMMERY

If you still have problems after updating Windows and the drivers, send your computer's system summary to the support database.
To prepare the system summary as a PostScript file, do the following.

1. Install a PostScript printer (e.g., HP LaserJet 4 PS).
2. Double-click the "System" icon in the Control Panel.
3. Choose the "Device manager" tab, and select "Computer" in the device map.
4. Click the "Print" button.
5. Choose the PostScript printer using the "Setup" button, choose "All devices and system summary" as the report type, and check the "Print to file" box.
6. Click OK to make a PostScript print file.

### 4.5 COMPLETE UNINSTALL

If the SwapBox and the SwapFTL software do not work due to unsuccessful configuration, the following process helps you to restart Windows plug and play from the beginning.
This procedure uninstalls all the software and drivers that were installed for the SwapBox, as well as deleting the Windows registry settings.

1. Uninstall the SCM SwapFTL programs.

Choose "SwapFTL uninstall" from the Start menu.
2. Delete the following files from the \Windows\System directory.

- SOCKETSV.VXD
- FLS2MTD.VXD
- FLS1MTD.VXD
- SRAMMTD.VXD
- CARDDRV.EXE
- CSMAPPER.SYS
- PCCARD.VXD

3. Delete "SCM SwapBox Family Plug and Play PCMCIA Controller" from the Windows device manager.
(Choose 'System" from the Control panel to access the device manager.)
4. Shutdown and restart Windows.

Windows starts the plug \& play process again to install the SwapBox.

## SwapFTL™ Binary Utility Operation Manual

Microsoft and Windows are registered trademarks of Microsoft Corp.
SwapBox and SwapFTL are trademarks of SCM Microsystems Inc.

## 1. OVERVIEW

This software allows a flash memory card to be used as an intermediate medium between a flash ROM (or RAM) on the machine and a Windows 95 based computer.

The basic procedure is as follows:

1. You receive ROM files from a database either via network or via physical medium, and save them onto your computer's local hard disk.

NOTE: Your computer works as a flash memory card programmer after you install SwapBox and SwapFTL software (this software).
2. You program the ROM file to a flash memory card using this software.
3. You carry the programmed card to a machine site and download the ROM data from the card to the machine's internal flash ROM.

NOTE: The 4MB flash memory card that is customized for this application is available from SPC.
You cannot use other types of flash memory card.
4. After downloading ROM data to one machine, you can use the same card with another machine of the same type.


## 2. OPERATION

### 2.1. PROGRAMMING A FLASH MEMORY CARD

### 2.1.1 GETTING A SOURCE FILE

You can (or will be able to) obtain the source firmware file(s) in one of the following ways.

- Notes mail or through a Notes database
- Internet-mail
- BBS
- Floppy disk
- Flash memory card (you need to save the data on the card as a file on a PC before using the data.)
- Others (as yet unspecified)


### 2.1.2 PROGRAMMING A CARD WITH THE SOURCE

## A230/A231/A232 Copy and Fax Main Firmware

You can program copy and fax firmware together onto one 4MB flash memory card, as shown below.


| Start Address (Hex) | 0 | 200000 |
| :---: | :---: | :---: |
| Length (Hex) | 200000 | 200000 |
| Size (kB) | $2,000(2 \mathrm{MB})$ | $2,000(2 \mathrm{MB})$ |

## A230/A231/A232 Fax Modem Firmware and Fax SRAM Backup

## Modem

Program modem firmware using the address and length settings as shown below. You cannot program other data on the card once the modem firmware has been programmed.

## SRAM

Using Fax SP mode, you can make a backup of SRAM data onto the 4MB flash memory card. This will help you set up multiple machines with fax options with the same settings, or will help you restore user data if the SRAM data has been erased accidentally.
To save the SRAM backup data from a fax unit on a 4MB flash memory card as a file, or to program a backup file from a PC onto a 4MB flash memory card, use the address and length settings as shown below.


## OPERATION

### 2.2 DOWNLOADING TO A MACHINE

Refer to the machine's service manual for how to download its firmware to the flash ROM inside it.

### 2.3 SAVING DATA TO A FILE

Some machines can upload an internal flash ROM image to a flash memory card. To save the image on the flash memory card as a computer file, read the card with a specific address range setting that was mentioned in section 2.1.2, and save the read data as a file.

## 3. FUNCTIONS

### 3.1 FILE MENU

### 3.1.1 [FILE] - [OPEN]



This opens a binary file.
Use "Binary Files (*.bin)" or "SwapUti Files (*.dmp). Do not use the others. The default setting is "Binary Files (*.bin).


An 8-bit checksum is displayed at the lower left corner of the opened file.

### 3.1.2 [FILE] - [CLOSE]

This closes an active file that has been opened.

### 3.1.3 [FILE] - [SAVE]

This saves an active file with the same name.

### 3.1.4 [FILE] - [SAVE AS]



This saves an active file with a different name from the original.

### 3.2 VIEW MENU

### 3.2.1 [VIEW] - [TOOLBAR]

This switches on the toolbar display.

### 3.2.2 [VIEW] - [STATUS BAR]

This switches on the status bar display.

### 3.3 IMAGE MENU

### 3.3.1 [Image] - [Erase]



| Field | Description |
| :--- | :--- |
| Source | Card slot number that has a flash memory card currently installed. |
| Start Address | A "0 (zero)" appears at default. <br> To erase the whole card, do not change the setting |
| Length | Hexadecimal length of the card appears at default. <br> To erase the whole card, do not change the setting |
| Base of Address/ <br> Length | Do not change the settings. <br> The default setting is "Hex". |

NOTE: If the specified start address and length do not coincide with block boundaries on the flash memory card, the message below appears.


## FUNCTIONS

### 3.3.2 [IMAGE] - [READ]

## Read from Card

Source:


| Base of $A$ ddress/Length |  |
| :---: | :---: |
| $\square$ Sectors | $\bigcirc$ Decimal |
|  | © Hex |

Start Address:
$\square$
Length:
400000
$\begin{array}{lll}\text { Card Info: } & \begin{array}{ll}\text { BlockCount: } & 0 \times 00000020 \\ & \text { Blocksize: }\end{array} & 0 \times 00020000\end{array}$
OK
Cancel

| Field | Description |
| :--- | :--- |
| Source | Card slot number that has a flash memory card currently installed. |
| Start Address | A "0 (zero)" appears at default. <br> Change this setting if necessary. |
| Length | Hexadecimal length of the card appears at default. <br> Change this setting if necessary. |
| Base of Address/ <br> Length | Do not change the settings. <br> The default setting is "Hex". |

### 3.3.3 [IMAGE] - [WRITE]



| Field | Description |
| :--- | :--- |
| Source | Source file name that is currently active in the application. |
| Target | Card slot number that has a flash memory card currently installed. |
| Card erase <br> before write | If this is checked, the application erases the whole card before writing <br> data from the source file. <br> The default setting is checked ( $=$ erase). |
| Start Address | A "0 (zero)" appears at default. <br> Change this setting if necessary. |
| Length | Hexadecimal length of the source file appears at default. <br> Do not change the setting. |
| Base of Address/ <br> Length | Do not change the settings. <br> The default setting is "Hex". |



After writing the data to a flash memory card, an 8-bit checksum (1) pops up, so that you can compare it with the checksum (2) of the source file.

## FUNCTIONS

### 3.3.4 [Image] - [Verification]



| Field | Description |
| :--- | :--- |
| Source | Source file name that is currently active in the application. |
| Target | Card slot number that has a flash memory card currently installed. |
| Start Address | A "0 (zero)" appears at default. <br> Change this setting if necessary. |
| Length | Hexadecimal length of the source file appears at default. <br> Do not change the setting. |
| Base of Address/ <br> Length | Do not change the settings. <br> The default setting is "Hex". |

If verification was successful, a 'Verification OK!" message pops up.
If verification was not successful, a "Compare error !" message pops up with the source and target addresses.


### 3.4 HELP MENU

### 3.4.1 [HELP] - [ABOUT SWAPUTI...]



## LARGE CAPACITY TRAY A683

## 1. OVERALL MACHINE INFORMATION

### 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
$60 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 16 \mathrm{lb} \sim 28 \mathrm{lb}$
1500 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)
40 W
17 kg
$390 \mathrm{~mm} \times 500 \mathrm{~mm} \times 390 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



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

### 1.3 ELECTRICAL COMPONENT LAYOUT



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

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

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

### 1.5 DRIVE LAYOUT



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

## 2. DETAILED DESCRIPTIONS

### 2.1 PAPER FEED MECHANISM



This machine uses the FRR (Feed and Reverse Roller) paper feed system (paper feed roller [A], separation roller [B], pick-up roller [C]).
When the start key is pressed, the pick-up solenoid [D] energizes and the pick-up roller touches the paper.

### 2.2 TRAY LIFT AND PAPER HEIGHT DETECTION MECHANISM



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

## Tray lifting conditions

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

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


## Tray lowering conditions

In the following conditions, the lift motor lowers the tray bottom plate until the lower limit [E] sensor turns on.

- Just after the paper end sensor turns on
- Just after the down switch is pressed by the user

The amount of the paper in the tray is detected by combination of high/low outputs from three sensors (paper height sensor $1[F], 2[G]$, and $3[H]$.)

| Amount of paper | Paper Height <br> Sensor 1 | Paper Height <br> Sensor 2 | Paper Height <br> Sensor 3 |
| :---: | :---: | :---: | :---: |
| Near end | On (High) | Off (Low) | Off (Low) |
| $25 \%$ | Off (Low) | On (High) | Off (Low) |
| $50 \%$ | Off (Low) | On (High) | On (High) |
| $75 \%$ | Off (Low) | Off (Low) | On (High) |
| $100 \%$ | Off (Low) | Off (Low) | Off (Low) |

### 2.3 TRAY UNIT SLIDE MECHANISM



When there is a paper jam between the copier and the LCT, the user releases the lock lever [A] and can slide the LCT away from the copier to remove the jammed paper.

When sliding the LCT back into position, the LCT is secured against the copier in the correct position by the docking pins [B] on the LCT.

## 3. SERVICE TABLES

### 3.1 DIP SWITCHES

|  |  |  |  |  |  |  |  |  | Description |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ | $\mathbf{7}$ | $\mathbf{8}$ |  |  |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Default |  |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Free run |  |

NOTE: 1) Do not use any other settings.
2) To do the free run, proceed as follows:

1. Remove the paper from the LCT (this is because the machine has no jam detection).
2. Set DPS101 for the free run as shown above.
3. Turn the main switch off, wait a few seconds, then switch back on.
4. Press SW101 to start the free run.
5. To stop the free run, press SW102.

### 3.2 TEST POINTS

| No. | Label | Monitored Signal |
| :---: | :---: | :--- |
| TP100 | $(24 \mathrm{~V})$ | +24 V |
| TP101 | (GND) | Ground |
| TP103 | (TXD) | TXD to the copier |
| TP104 | (RXD) | RXD from the copier |
| TP105 | (5 V) | +5 V |
| TP106 | (GND) | Ground |

### 3.3 SWITCHES

| No. | Function |  |
| :---: | :--- | :--- |
| SW101 | Starts the free run |  |
| SW102 | Stops the free run |  |

### 3.4 FUSES

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

## 4. REPLACEMENT AND ADJUSTMENT

### 4.1 COVER REPLACEMENT



## Tray Cover

1. Remove the tray cover [A] (1 snap ring).

## Front Cover

1. Remove the front cover [B] (2 screws).

## Rear Cover

1. Remove the tray cover.
2. Remove the cover hinge [C] (2 screws).
3. Remove the rear cover [D] (3 screws).

## Right Lower Cover

1. Remove the right lower cover [E] (2 screws).

## Upper Cover

1. Remove the front cover.
2. Remove the rear cover.
3. Remove the upper cover [F].

### 4.2 ROLLER REPLACEMENT

### 4.2.1 PAPER FEED, SEPARATION, AND PICK-UP ROLLERS


[D]

1. Push the down switch to lower the tray bottom plate until it reaches its lowest position.
2. Open the tray cover.

## Pick-up Roller

3. Replace the pick-up roller [A] (1 snap ring).

## Paper Feed Roller

3. Replace the paper feed roller [B] (1 snap ring).

## Separation Roller

3. Remove the guide plate [C] (2 screws).
4. Replace the separation roller [D] (1 snap ring).

### 4.3 TRAY LIFT AND PAPER END SENSOR REPLACEMENT



1. Remove the front and rear cover.
2. Remove the upper cover.
3. Remove the sensor bracket $[A]$ (1 screw).

## Tray Lift Sensor

3. Replace the tray lift sensor $[B]$ (1 connector).

## Paper End Sensor

3. Replace the paper end sensor [C] (1 connector).

### 4.4 RELAY SENSOR REPLACEMENT



1. Pull out the LCT.
2. Remove the joint guide [A] (4 screws).
3. Remove the sensor bracket [B] (1 screw).
4. Replace the relay sensor [C] (1 connector).

### 4.5 SIDE FENCE POSITION CHANGE



1. Push the down switch to lower the tray bottom plate until it reaches its lowest position.
2. Remove the tray cover.
3. Remove the front and rear side fences [A, B] (1 screw each).
4. Install the side fences in the correct position.

# NINE-TRAY MAILBOX AND <br> BRIDGE UNIT G909/G912 

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

Number of Trays
Tray Capacity:
Paper Size for Trays:

Paper Weight:

Power Consumption:
Power Source:
Dimensions (W x D x H):
Weight:

9 trays and a proof tray
Trays and proof tray: 100 sheets ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ )
Trays:
Maximum: A3 or 11" x 17"
Minimum: A5 (LEF) or 11 " x 81/2"
Proof tray:
Maximum: A3 or 11" x 17"
Minimum: A6 (LEF) or 11 " $\times 81 / 2^{\prime \prime}$
Trays: $60 \sim 90 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 24 \mathrm{lb}$
Proof tray: $52 \sim 157 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 42 \mathrm{lb}$
48 W or less (average)
DC24 V, 5 V (supplied by the main machine)
$600 \times 545 \times 970 \mathrm{~mm}\left(23.6 " \times 21.5 " \times 38.2^{\prime \prime}\right)$
38 kg, 83.6 lb

- Specifications are subject to change without notice.

Legend:

| PRODUCT CODE | COMPANY |  |  |
| :---: | :---: | :---: | :---: |
|  | GESTETNER | RICOH | SAVIN |
| G909 | CS360 | CS360 | CS360 |
| G912 | BRIDGE UNIT <br> TYPE 460 | BRIDGE UNIT <br> TYPE 460 | BRIDGE UNIT <br> TYPE 460 |

## NOTE:

The installation of the G909 MailBox requires that the A688 Bridge Unit Type 450 and the A682 Paper Tray Unit (PS360) must also be installed.

### 1.2 COMPONENT LAYOUT

### 1.2.1 MECHANICAL COMPONENT LAYOUT



1. Bridge Exit Roller
2. Bridge Exit Sensor
3. Proof Tray
4. Bridge Relay Sensor
5. Relay Junction Gate
6. Proof Tray Paper Sensor
7. Proof Tray Paper Overflow Sensor
8. Proof Tray Exit Roller
9. Proof Tray Exit Sensor
10. Proof Tray Junction Gate
11. Entrance Roller
12. Entrance Sensor
13. Relay Sensor
14. Tray Exit Sensor 1
15. Vertical Transport Guide
16. Tray Exit Sensor 2
17. Tray Exit Sensor 3
18. Tray Gates
19. Paper Overflow Sensor
20. Paper Sensor
21. 9th Tray
22. 1st Tray
23. Bridge Unit

### 1.2.2 DRIVE LAYOUT



1. Proof Tray Exit Roller
2. Proof Tray Transport Motor
3. Bridge Exit Roller
4. Transport Motor
5. Entrance Roller
6. Vertical Transport Motor
7. Tray Feed-out Roller

## ELECTRICAL COMPONENT DESCRIPTIONS

### 1.3 ELECTRICAL COMPONENT DESCRIPTIONS

Refer to the electrical component layout and the point-to-point diagram, printed on waterproof paper and located in a protective sleeve for the component locations.

| Symbols | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Proof Tray Transport | Drives all the proof tray rollers. | 7 |
| M2 | Transport | Drives all rollers in the entrance area and all rollers in the bridge unit. | 8 |
| M3 | Vertical Transport | Drives all tray feed-out rollers. | 19 |
| Sensors |  |  |  |
| S1 | Bridge Exit | Detects misfeeds. | 1 |
| S2 | Bridge Relay | Detects misfeeds. | 2 |
| S3 | Proof Tray Paper Overflow | Detects paper overflow in the proof tray. | 3 |
| S4 | Proof Exit | Detects misfeeds. | 4 |
| S5 | Proof Cover | Detects whether the proof cover is open or closed. | 6 |
| S6 | Entrance | Detects copy paper entering the mail box and detects misfeeds. | 9 |
| S7 | Relay | Detects misfeeds. | 10 |
| S8 | Proof Tray Paper 1 (LED) | Informs the CPU when there is paper on the proof tray. | 14 |
| S9 | Proof Tray Paper 2 (Photo Transistor) | Informs the CPU when there is paper on the proof tray. | 13 |
| S10 | Tray Exit 1 | Detects misfeeds. | 21 |
| S11 | Tray Exit 2 | Detects misfeeds. | 25 |
| S12 | Tray Exit 3 | Detects misfeeds. | 29 |
| S13 | Tray Exit 4 | Detects misfeeds. | 32 |
| S14 | Paper 0 | Contains an LED for paper sensor 1. | 47 |
| S15 | Paper 1 | Informs the CPU when there is paper on the 1st tray. | 15 |
| S16 | Paper 2 | Informs the CPU when there is paper on the 2nd tray. | 43 |
| S17 | Paper 3 | Informs the CPU when there is paper on the 3rd tray. | 41 |
| S18 | Paper 4 | Informs the CPU when there is paper on the 4th tray. | 39 |
| S19 | Paper 5 | Informs the CPU when there is paper on the 5th tray. | 37 |
| S20 | Paper 6 | Informs the CPU when there is paper on the 6th tray. | 36 |
| S21 | Paper 7 | Informs the CPU when there is paper on the 7th tray. | 35 |
| S22 | Paper 8 | Informs the CPU when there is paper on the 8th tray. | 34 |


| Symbols | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| S23 | Paper 9 | Informs the CPU when there is paper on the 9th tray. | 33 |
| S24 | Paper Overflow 1 | Detects paper overflow in the 1st tray. | 49 |
| S25 | Paper Overflow 2 | Detects paper overflow in the 2nd tray. | 46 |
| S26 | Paper Overflow 3 | Detects paper overflow in the 3rd tray. | 44 |
| S27 | Paper Overflow 4 | Detects paper overflow in the 4th tray. | 42 |
| S28 | Paper Overflow 5 | Detects paper overflow in the 5th tray. | 40 |
| S29 | Paper Overflow 6 | Detects paper overflow in the 6th tray. | 38 |
| S30 | Paper Overflow 7 | Detects paper overflow in the 7th tray. | 28 |
| S31 | Paper Overflow 8 | Detects paper overflow in the 8th tray. | 30 |
| S32 | Paper Overflow 9 | Detects paper overflow in the 9th tray. | 31 |
| Solenoids |  |  |  |
| SOL1 | Proof Tray Junction Gate | Opens and closes the proof junction gate to direct paper either into the proof tray or to the trays. | 17 |
| SOL2 | Relay Junction Gate | Opens and closes the relay junction gate to direct paper either to the bridge unit or to the trays. | 15 |
| SOL3 | 1st Tray | Opens and closes the 1st tray gate. | 16 |
| SOL4 | 2nd Tray | Opens and closes the 2nd tray gate. | 18 |
| SOL5 | 3rd Tray | Opens and closes the 3rd tray gate. | 20 |
| SOL6 | 4th Tray | Opens and closes the 4th tray gate. | 22 |
| SOL7 | 5th Tray | Opens and closes the 5th tray gate. | 23 |
| SOL8 | 6th Tray | Opens and closes the 6th tray gate. | 24 |
| SOL9 | 7th Tray | Opens and closes the 7th tray gate. | 26 |
| SOL10 | 8th Tray | Opens and closes the 8th tray gate. | 27 |
| PCBs |  |  |  |
| PCB1 | Main Control | Controls all sorter functions | 48 |
| PCB2 | Proof Control | Drives the motors in the proof unit and informs the sensor status to the main control board. | 5 |
| Switches |  |  |  |
| SW1 | Bridge Cover | Cuts the +24 V power line and detects when the bridge cover is opened. | 12 |
| SW2 | Front Cover | Cuts the +24 V power line and detects when the front cover is opened. | 11 |
|  |  |  |  |

## 2. DETAILED DESCRIPTIONS

### 2.1 BASIC OPERATION



## Proof Tray

When the proof tray is selected as the output tray and the exit sensor of the main machine is actuated by the leading edge of the paper, the transport motor and proof tray transport motor energize, causing the transport rollers to turn.

Soon after the motors start, the proof tray junction gate solenoid energizes and the proof tray junction gate $[A]$ is lowered so that the paper goes to the proof tray.

When the last page passes the proof tray exit sensor and feeds out, the proof tray junction gate solenoid and the proof tray transport motor de-energize.

## Bridge Unit

The relay junction gate $[B]$ in the bridge unit delivers the paper either to the finisher or down to the trays. When the finisher is selected as the output tray, the relay junction gate stays closed, and the paper goes to the bridge unit. When a tray is selected as the output tray, the relay junction gate solenoid energizes and the relay junction gate is open so that the paper goes downwards to the tray area.

## Trays

When the proof tray is selected as the output tray, the transport motor and the vertical transport motor energize. Each tray gate [C] is individually controlled by a solenoid. When a solenoid is energized, the tray gate opens and the paper goes into the tray.

### 2.2 PROOF TRAY SENSORS



### 2.2.1 PAPER SENSOR

The paper sensor in the proof tray consists of two sensor boards; one is an LED board $[A]$ and the other is a phototransistor board $[B]$. The sensor detects whether or not there is paper on the proof tray. When there is paper on the proof tray, the paper interrupts the light from the LED.

### 2.2.2 PAPER OVERFLOW SENSOR

There is also a paper overflow sensor [C] located in the proof tray. The machine detects paper overflow when the top sheet of the paper stack pushes up the sensor feeler. When this occurs, a message will be displayed on the operation panel and the machine stops printing until the paper stack on the proof tray is removed.

### 2.3 TRAY SENSORS




### 2.3.1 PAPER SENSOR

There is a paper sensor [A] for each tray (total 10 pcs ). The paper sensors in tray 1 to tray 8 contain an LED and a phototransistor. The paper sensor in the tray 0 contains only an LED. The paper sensor in tray 9 contains only a phototransistor. The paper detection mechanism and their function are the same as for the proof tray.

### 2.3.2 PAPER OVERFLOW SENSOR

There is a paper overflow sensor $[B]$ above each tray. The machine detects paper overflow in a tray when the top of the paper stack pushes up the sensor feeler [C]. When this condition occurs, the printing job is stopped until the paper stack is removed.

### 2.3.3 TRAY EXIT SENSOR

There is a tray exit sensor board [D] above the 1st tray (the mounting above tray 1 is called 'tray 0 ') and on trays 3,6 , and 9 . The tray exit sensor board on trays 3 and 6 contains an LED and a phototransistor.

The tray exit sensor board above the 1st tray contains only an LED. The tray sensor board on the 9th tray contains only a phototransistor.
The machine detects paper leaving trays 1 to 3 using the sensor above tray 1 and the one on tray 3. When paper passes between those sensors, the light from the LED above tray 1 is interrupted.

### 2.4 TIMING CHART AND MISFEED DETECTION

A4 Sideways (to 1st Tray)


A4 Sideways (to Proof Tray)


## A4 Sideways (to Bridge Unit)



1. On check:

J1: The entrance sensor does not activate within 2460 pulses after the exit sensor of the main machine has been activated.
J2: The relay sensor does not activate within 1965 pulses after the entrance sensor has been activated.
J3: The proof tray exit sensor does not activate within 1665 pulses after the entrance sensor has been activated.
J4: The bridge relay sensor does not activate within 1954 pulses after the entrance sensor has been activated.
J5: The appropriate tray exit sensor does not activate within the appropriate number of pulses (see below) after the relay sensor has been activated.
J5 jam timing

| Tray <br> Exit <br> Sensor | Sensor 1 |  |  | Sensor 2 |  |  |  | Sensor 3 |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Tray No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |  |  |
| Pulses | 72 | 139 | 176 | 206 | 242 | 273 | 304 | 343 | 375 |  |  |

2. Off check

J6: A sensor does de-activate within the specified number of pulses after that sensor has been activated.
Number of pulses $=$ Paper length (in the paper feed direction) $\times 1.5$

$$
1 \text { pulse = } 0.1707 \text { mm }
$$

## 3. INSTALLATION PROCEDURE

### 3.1 MAILBOX (G909)

### 3.1.1 ACCESSORY CHECK

Check the accessories in the box against the following list.

| No. | Description | Q'ty | Note |
| :---: | :--- | :---: | :--- |
| 1 | Front Joint Bracket | 1 |  |
| 2 | Rear Joint Bracket | 1 |  |
| 3 | Exit Guide Mylar | 1 | For A229 |
| 4 | Proof Tray Attachment | 1 | For A230, A231, and A232 |
| 5 | Upper Grounding Plate | 1 | For A230, A231, and A232 |
| 6 | Lower Grounding Plate | 2 | One for A230, A231, and A232 <br> Two for A229 |
| 7 | Cushion | 1 |  |
| 8 | Tapping Screw - M4 x 14 | 4 |  |
| 9 | Tray Decals | 1 |  |
| 10 | Installation Procedure | 1 |  |



### 3.1.2 REQUIREMENT OPTIONS FOR MAIN MACHINE

When the mailbox is going to be installed to the A230, A231, or A232 machines, the following options for the main machine are required.

1. Bridge Unit Type 450 (A688)
2. Paper Tray Unit - PS360 (A682)

### 3.1.3 INSTALLATION PROCEDURE



- A230, A231 and A232 machines -


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

NOTE: 1) When the finisher (A697) is installed on the machine, the bridge unit for the mailbox (G912) must be installed.
2) The bridge unit for the mailbox must be installed before installing the Mailbox on the main machine.

1. Unpack the finisher and carefully remove all the shipping tapes.

## - A230, A231, and A232 machines -

2. Attach the front joint bracket $[A]$ and rear joint bracket $[B]$ to the main machine (2 screws each).
3. Attach the upper grounding plate [C] (1 screw).
4. Peel off the backing of the double sided tape that is attached to the lower grounding plate [D].
5. Attach one lower grounding plate to the center of the bottom edge of the paper tray unit as shown.
Go to step 7.


- A229 machine -

[J]


## - A229 machines -

2. Remove the four plastic caps $[A]$ from the copier's left cover.
3. Remove the connector cover [B].
4. Attach the front joint bracket [C] and rear joint bracket $[D]$ to the main machine (2 screws each).
5. Peel off the backing of the double-sided tape that is attached to the lower grounding plate [E].
6. Attach two lower grounding plates to the bottom edge of the paper tray unit as shown.

## - All machines -

7. The position of the cushion [F] depends on which main machine the mailbox is installed to. Attach the cushion to the plate as follows:

- Position [G] for A230, A231, and A232 machines.
- Position [H] for A229 machines.

NOTE: When attaching the cushion to position [H], cut about 40 mm (1.6 inches) off one edge of the cushion.
8. Open the front cover [I] of the mailbox, and remove the screw [J] that secures the locking lever $[\mathrm{K}]$. Then pull the locking lever.
[D]


9. Align the mailbox on the joint brackets, and lock it in place by pushing the locking lever [A].
10. Secure the locking lever ( 1 screw) and close the front door.
11. Connect the mailbox cable $[B]$ to the main machine.
12. A230/A231/A232 machines only: Peel off the backing of the double-sided tape that is attached to the proof tray attachment [C].
13. Install the proof tray attachment on the proof tray.
14. A229 machines only: Install the exit guide mylar [D] on the upper cover just above the anti-static brush.
15. Power on the main switch and check the mailbox operation.

### 3.2 BRIDGE UNIT FOR MAILBOX (G912)

### 3.2.1 ACCESSORY CHECK

Check the accessories in the box against the following list.

| No. | Description | Q'ty |
| :---: | :--- | :---: |
| 1. | Guide Plate Bracket | 1 |
| 2 | Cable | 1 |
| 3 | Cover Switch | 1 |
| 4 | Grounding Bracket | 1 |
| 5 | Finisher Shielding Plate | 1 |
| 6 | Screw - M4 $\times 8$ | 9 |
| 7 | Screw - M $4 \times 4$ | 4 |
| 8 | Screw - M3 $\times 6$ | 2 |



## BRIDGE UNIT FOR MAILBOX (G912)

### 3.2.2 INSTALLATION PROCEDURE



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

NOTE: 1) The bridge unit for the mailbox must be installed when the 3000 sheet finisher (A697) will be installed.
2) The 3000 sheet finisher (A697) can be installed only on the A232 and A229 machines.

1. Unpack the bridge unit and remove the shipping retainers $[A]$. NOTE: Do not remove the protective sheet [B] at this time.
2. Remove the mailbox if it has been previously installed.
3. Remove the rear cover [C] of the mailbox (8 screws).
4. Remove the proof tray unit [D] ( 6 screws, 1 connector).
5. Remove the cover [E].

6. Open the left front cover $[A]$ of the mailbox, and remove the inner plate $[B]$ ( 3 screws).
7. Install the guide plate bracket [C] (4 screws $-\mathrm{M} 4 \times 4$ ).
8. Route the cable [D] and affix it to the clamp as shown.
9. Connect the cover switch [E] to the cable then install the cover switch (2 screws $-\mathrm{M} 4 \times 8$ ).
10. Remove the paper guide plate [F] (2 screws).

11. Pull up the tab [A] of the protective sheet.

NOTE: 1) Do not remove the protective sheet at this time.
2) Make sure that all mylars are held between the two folded halves of the protective sheet.
12. Carefully turn over the bridge unit $[B]$ and insert the protective sheet [C] into the gap [D] between the paper guides. Next, insert the bridge unit onto the mailbox [E].

NOTE: When holding the bridge unit, do not touch the timing belt. Otherwise the timing belt may come off the gear.
13. Remove the tape [F] of the protective sheet.
14. Open the upper paper guide [G] then pull out the protective sheet $[\mathrm{H}]$.

NOTE: Check that all mylars are set into the gap between the paper guides.

15. Secure the bridge unit [A] (4 screws - M4 x 8).
16. Route the cables $[B]$ through the openings $[C]$.
17. Route the solenoid harness [D] through the opening [C].
18. Connect the cables to the solenoid and sensors and clamp the cable as shown.
19. Reinstall the rear cover and proof tray unit.
20. Install the mailbox on the main machine (refer to the Mailbox Installation procedure for more detail).

If the $\mathbf{3 0 0 0}$ sheet finisher (A697) is going to be installed, perform steps 21 to 25.
21. Install the front joint bracket [E] and rear joint bracket [F] which are contained in the finisher's accessory box.

22. Remove the seal $[A]$.
23. Attach the grounding bracket $[B]$ ( 3 screws - M $4 \times 8$ ).
24. Attach the shielding plate [C] to the finisher ( 2 screws $-\mathrm{M} 3 \times 8$ ).
25. Attach the finisher to the mailbox (refer to the Finisher Installation Procedure).
26. Power-on the main switch of the main machine and check the bridge unit operation. (Select a copy mode that uses the finisher.)

## 4. REPLACEMENT AND ADJUSTMENT

### 4.1 PROOF TRAY UNIT

### 4.1.1 PROOF TRAY SENSOR AND PAPER OVERFLOW SENSORS



1. Remove the rear cover [A] (8 screws).
2. Remove the proof tray unit [B] (6 screws).
3. Remove two screws [C], then turn over the proof tray unit.
4. Remove the sensor bracket [D] (2 screws, 1 clamp).
5. Remove the proof tray paper sensor [E] (1 screw each).
6. Remove the proof tray paper overflow sensor [F].

### 4.1.2 PROOF TRANSPORT UNIT

1. Remove the proof tray unit [B] and remove two screws [C].
2. Carefully turn over the proof tray unit and remove the proof transport unit [G] (2 screws).

### 4.2 TRAY UNIT

### 4.2.1 TRAYS



1. Remove the rear cover (8 screws).
2. Disconnect the cable [A] of the tray which will be removed.
3. Remove the grounding wire $[B]$ ( 1 screw, 1 washer) and remove the tray stopper [C].
NOTE: When reinstalling the tray stopper, push the stopper to the left against the tray.
4. Open the front cover [D] and remove the cover bracket [E] (1 screw), then remove the front cover.
5. Remove the two screws [F] which secure the tray.
6. Remove the tray [G]. (First move the tray to the left and gently flex it, then remove the tray.)

### 4.2.2 PAPER SENSOR, PAPER OVERFLOW SENSOR, AND TRAY EXIT SENSOR



NOTE: When removing the paper sensor or paper overflow sensor for the 1st tray, or the tray exit sensor above the 1st tray, first remove the 1st tray and remove the sensor cover, then remove these sensors.

1. Remove the tray (see Trays).
2. Remove the sensor cover [A] (3 screws).

## Paper Overflow Sensor

3. Remove the grounding wire $[B]$ (1 screw) and paper overflow sensor bracket [C] (1 screw).
4. Remove the paper overflow sensor [D] (1 connector).

## Paper Sensor

5. Remove the paper sensor [E] (1 screw, 1 connector).

## Tray Exit Sensor (above the 1st tray, and in the 3rd, 6th, and 9th trays)

6. Remove the tray exit sensor [F] (1 screw, 1 connector).
7. After replacing the tray exit sensor, perform the tray exit sensor adjustment (see Tray Exit Sensor Adjustment).
NOTE: After replacing the tray exit sensor, do not put the rear cover back on the mailbox, because the tray exit sensor adjustment must be performed first.

### 4.2.3 MAIN CONTROL BOARD



1. Remove the rear cover $[A]$ ( 8 screws).
2. Remove the main control board $[B]$ (all connectors).
3. After replacing the main control board, perform the tray exit sensor adjustment procedure (see Tray Exit Sensor Adjustment).

### 4.2.4 TRAY EXIT SENSOR ADJUSTMENT

This sensor adjustment must be performed after replacing the tray exit sensor or main control board, using the special paper that comes as a spare part for the tray exit sensor.

The tray exit sensor board has two devices: An LED and a phototransistor. So, when replacing the tray exit sensor on the 3rd tray, the sensor adjustment must be performed between trays 1 and 3 and between trays 4 and 6 . When replacing the main control board, this sensor adjustment must be performed for all sensors. The sensor adjustment procedure is as follows.


## Example: Sensor adjustment between trays 1 and 3

1. Insert the special paper (which comes with the tray exit sensor) into the entrance guide of the mailbox.
2. Turn the transport motor gear [A] counterclockwise to transport the paper to the tray unit.
3. When the leading edge of the paper reaches the tray feed-out roller, turn the vertical transport motor [B] clockwise to transport the paper to the appropriate tray.
4. Open the tray gate by pushing the plunger of the tray solenoid [C], and transport the paper until half of it has fed out to the tray.
5. Change switches 1 and 2 of the DIP switch on the main control board to ON.
6. Make sure that the interface cable is connected to the main machine and turn the main switch on.
7. Fully turn the appropriate variable resistor (VR) [D] clockwise, then check that the appropriate LED [E] has turned off (the relationship between tray, VR, and LED are shown in the table below).

## TRAY UNIT

8. Turn back the VR slowly until the LED just turns on.
9. Measure the voltage between TP3 on the main control board and the frame of the mailbox and confirm the voltage is greater than 3.5 Vdc . If it is not, adjust the voltage using the VR (the relationship between tray, TP, and VR are shown in the table below).
10. Remove the special paper from the tray, then measure the voltage on the main control board in the same way as step 9 . The voltage should be less than 1.2 Vdc.
11. After adjusting, change the DIP switch setting to the default (all switches off) and reassemble the machine.

| Adjusted Sensor | VR No. | LED No. | TP No. |
| :---: | :---: | :---: | :---: |
| Trays 1 to 3 | VR1 | LED 2 | TP3 |
| Trays 4 to 6 | VR2 | LED 3 | TP4 |
| Trays 7 to 9 | VR3 | LED 4 | TP13 |

NOTE: The DIP switches to change are the same regardless of the adjusted sensor.

## 5. SERVICE TABLES

### 5.1 DIP SWITCHES/VRIABLE RESISTORS/LEDS

### 5.1.1 DIP SWITCHES

| Item | Switch No. |  |  |  | Function |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1 | 2 | 3 | 4 |  |
| Default | 0 | 0 | 0 | 0 |  |
| Motor Test | 1 | 0 | 0 | 0 |  |
| Solenoid Test | 0 | 1 | 0 | 0 |  |
| Tray Exit Sensor Check | 1 | 1 | 0 | 0 | When detecting paper between the 1st and 3rd trays, LED2 will light. |
|  |  |  |  |  | When detecting paper between the 4th and 6th trays, LED3 will light. |
|  |  |  |  |  | When detecting paper between the 7th and 9th trays, LED4 will light. |
| Paper Sensor Check (1st to 3rd trays) | 0 | 0 | 1 | 0 | When the 1st tray paper sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 2nd tray paper sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 3rd tray paper sensor is activated, LED4 will light. |
| Paper Sensor Check (4th to 6th trays) | 1 | 0 | 1 <br>  | 0 | When the 4th tray paper sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 5th tray paper sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 6th tray paper sensor is activated, LED4 will light. |
| Paper Sensor Check (7th to 9th trays) | 0 | 1 | 1 | 0 | When the 7th tray paper sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 8th tray paper sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 9th tray paper sensor is activated, LED4 will light. |
| Proof Tray Sensors Check | 1 | 1 | 1 | 0 | When the proof paper overflow sensor is activated, LED2 will light. |
|  |  |  |  |  | When the proof paper sensor is activated, LED3 will light. |
| Paper Overflow Sensor Check (1st to 3rd trays) | 0 | 0 | 0 | 1 | When the 1st paper overflow sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 2nd paper overflow sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 3rd paper overflow sensor is activated, LED4 will light. |
| Paper Overflow Sensor Check (4th to 6th trays) | 1 | 0 | 0 | 1 | When the 4th paper overflow sensor is activated, LED2 will light. |


| Item | Switch No. |  |  |  | Function |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1 | 2 | 3 | 4 |  |
| Paper Overflow Sensor Check (4th to 6th trays) | 1 | 0 | 0 | 1 | When the 5th paper overflow sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 6th paper overflow sensor is activated, LED4 will light. |
| Paper Overflow Sensor Check (7th to 9th trays) | 0 | 1 | 0 | 1 | When the 7th paper overflow sensor is activated, LED2 will light. |
|  |  |  |  |  | When the 8th paper overflow sensor is activated, LED3 will light. |
|  |  |  |  |  | When the 9th paper overflow sensor is activated, LED4 will light. |
| Entrance, Bridge Relay, and Bridge Exit Sensor Check | 1 | 1 | 0 | 1 | When the entrance sensor is activated, LED4 will light. |
|  |  |  |  |  | When the bridge relay sensor is activated, LED3 will light. |
|  |  |  |  |  | When the bridge exit sensor is activated, LED2 will light. |
| Proof Exit and Relay Sensor Check | 0 | 0 | 1 | 1 | When the proof exit sensor is activated, LED4 will light. |
|  |  |  |  |  | When the relay sensor is activated, LED3 will light. |
| Free Run | 1 | 1 | 1 | 1 |  |

### 5.1.2 VARIABLE RESISTORS

| Number | Function |
| :---: | :--- |
| VR1 | Adjusts the tray exit sensor sensitivity between trays 1 and 3 |
| VR2 | Adjusts the tray exit sensor sensitivity between trays 4 and 6 |
| VR3 | Adjusts the tray exit sensor sensitivity between trays 7 and 9 |

### 5.1.3 LEDS

| Number | Monitored Signal |
| :---: | :--- |
| LED1 | Monitors the software operation. <br> Blinking: Normal operation <br> Others: Abnormal operation |
| LED2 | The LED lights when the appropriate sensor is activated. (Refer to the <br> DIP switch table for more details.) |
| LED3 |  |
| LED4 |  |

## BRIDGE UNIT A688

1. OVERALL MACHINE INFORMATION1.1 SPECIFICATIONS

Paper Size:

Paper Weight:

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

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Upper Exit Roller
2. Junction Gate Solenoid
3. Junction Gate
4. 1st Transport Roller

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Left Guide Switch
2. Tray Exit Unit Switch
3. Right Guide Switch
4. Junction Gate Solenoid
5. Tray Exit Sensor
6. Relay Sensor
7. Cooling Fan Motor

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Cooling Fan | Cools the transport unit. | 4 |
| Sensors |  |  |  |
| S1 | Tray Exit | Checks for misfeeds. | 3 |
| S2 | Relay | Checks for misfeeds. | 7 |
| Switches |  |  |  |
| SW1 | Tray Exit Unit | Detects when the tray exit unit is opened. | 5 |
| 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 or left tray. | 6 |

### 1.5 DRIVE LAYOUT



1. Left Exit Roller
2. 2nd Transport Roller
3. Upper Exit Roller
4. 1st Transport Roller

## 2. DETAILED DESCRIPTION

### 2.1 JUNCTION GATE MECHANISM



Depending on the selected mode, the copies are directed up or down by the junction gate [A], which is controlled by the junction gate solenoid [B].

When the upper tray is selected, the junction gate solenoid turns on and the paper is sent to the upper tray through the upper exit roller [C].

When the left tray or the finisher is selected, the junction gate stays off and the paper is sent to the left tray or the finisher through the transport rollers [D] and the left exit roller.

## 3. REPLACEMENT AND ADJUSTMENT

### 3.1 EXIT SENSOR REPLACEMENT




1. Remove the whole unit from the copier.
2. Remove the rear upper cover $[A]$ ( 1 screw).
3. Remove the upper cover unit [B] (2 screws, 2 connectors, Timing Belt).
4. Remove the exit guide plate [C] (2 screws).
5. Replace the exit sensor [D] (1 connector).

## 1,000-SHEET FINISHER A681

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

Paper Size:

Paper Weight:

Stapler Capacity:
No staple mode:
A3 to A6 lengthwise
DLT to HLT lengthwise
Staple mode:
A3, B4, A4, B5 sideways
DLT to LT
No staple mode: $52 \sim 157 \mathrm{~g} / \mathrm{m}^{2}, 16 \sim 42 \mathrm{lb}$
Staple mode: $\quad 64 \sim 80 \mathrm{~g} / \mathrm{m}^{2}, 17 \sim 21 \mathrm{lb}$
20 sheets (A3, B4, DLT, LG)
30 sheets (A4, B5 sideways, LT)
Paper Capacity:
No staple mode:
1,000 sheets (A4/LT or smaller: $80 \mathrm{~g} / \mathrm{m}^{2}, 21 \mathrm{lb}$ ) 500 sheets (A3, B4, DLT, LG: $\left.80 \mathrm{~g} / \mathrm{m}^{2}, 21 \mathrm{lb}\right)$
Staple mode: ( $80 \mathrm{~g} / \mathrm{m}^{2}, 21 \mathrm{lb}$, number of sets)

| Size Size of each set | 2 to 10 |  | 11 to 20 | 21 to 30 |
| :---: | :---: | :---: | :---: | :---: |
|  | 2 to 5 | 6 to 10 |  |  |
| A4/LT sideways B5 sideways | 100 | 85 | 40 | 25 |
| A4/LT lengthwise | 50 |  | 25 | 15 |
| A3, B4, DLT, LG | 50 |  | 25 | - |

Staple Positions:
Staple Replenishment:
Power Source:
Power Consumption:
Weight:
Dimensions (W x D x H):

1
Cartridge (3,000 staples/cartridge)
$24 \mathrm{Vdc}, 5 \mathrm{Vdc}$ (from the copier)
48 W
21 kg
$568 \times 520 \times 625 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Shift Tray
2. Exit Roller
3. Exit Roller Release Cam
4. Upper Transport Roller
5. Middle Transport Roller
6. Junction Gate
7. Lower Transport Roller
8. Entrance Roller
9. Stapler Unit
10. Positioning Roller
11. Stack Feed-out Belt

### 1.3 ELECTRICAL COMPONENT LAYOUT



### 1.4 ELECTRICAL COMPONENT DESCRIPTIONS

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Transport | Drives the entrance roller, transport rollers, and positioning roller. | 11 |
| M2 | Jogger Fence | Drives the jogger fence. | 24 |
| M3 | Rear Fence | Drives the rear fence. | 26 |
| M4 | Staple Hammer | Drives the staple hammer. | 19 |
| M5 | Stack Feed-out | Drives the stack feed-out belt. | 28 |
| M6 | Exit Guide Plate | Opens and closes the exit guide plate. | 7 |
| M7 | Exit | Drives the exit roller. | 4 |
| M8 | Shift Tray Lift | Moves the shift tray up or down. | 17 |
| M9 | Shift | Moves the shift tray from side to side. | 9 |
| Sensors |  |  |  |
| S1 | Entrance | Detects copy paper entering the finisher and checks for misfeeds. | 14 |
| S2 | Jogger Unit Paper | Detects copy paper in the jogger unit. | 25 |
| S3 | Jogger Fence HP | Detects the home position of the jogger fence. | 22 |
| S4 | Rear Fence HP | Detects the home position of the rear fence. | 27 |
| S5 | Stack Feed-out Belt HP | Detects the home position of the stack feedout belt. | 23 |
| S6 | Staple Hammer HP | Detects the staple hammer home position. | 18 |
| S7 | Exit Guide Plate HP | Detects the home position of the exit guide plate. | 6 |
| S8 | Exit Guide Plate Open | Detects whether the exit guide plate is opened or not. | 5 |
| S9 | Exit | Checks for misfeeds. | 2 |
| S10 | Stack Height | Detects the top of the copy paper stack. | 1 |
| S11 | Shift Tray Lower Limit | Detects the lower limit position of the shift tray. | 13 |
| S12 | Shift Tray Half-turn | Detects the stop position of the shift tray during the side-to-side movement. | 8 |
| Solenoids |  |  |  |
| SOL1 | Junction Gate | Drives the junction gate. | 10 |
| SOL2 | Positioning Roller | Moves the positioning roller. | 12 |
|  |  |  |  |

## ELECTRICAL COMPONENT DESCRIPTIONS

| Symbol | Name | Function | Index No. |  |
| :---: | :--- | :--- | :---: | :---: |
| Switches | Shift Tray |  |  |  |
| SW1 | Shift <br> Upper Limit | Detects the upper limit position of the shift <br> tray. | 3 |  |
| SW2 | Right Cover <br> Safety | Cuts the dc power when the right cover is <br> opened. | 16 |  |
| SW3 | Cartridge Set | Detects whether a staple cartridge is installed. | 20 |  |
| SW4 | Staple End | Detects staples in the cartridge. | 21 |  |
| PCBs |  |  |  |  |
| PCB1 | Main | Controls the finisher and communicates with <br> the copier. | 15 |  |
|  |  |  |  |  |

### 1.5 DRIVE LAYOUT



1. Exit Guide Plate Motor
2. Exit Motor
3. Exit Roller
4. Shift Tray Lift Motor
5. Shift Motor
6. Lower Transport Roller
7. Positioning Roller Drive Roller
8. Transport Motor
9. Entrance Roller
10. Middle Transport Roller
11. Upper Transport Roller
12. Rear Fence
13. Stack Feed-out Motor
14. Rear Fence Motor
15. Jogger Fence Motor
16. Jogger Fence
17. Stack Feed-out Belt

## 2. DETAILED DESCRIPTIONS

### 2.1 JUNCTION GATE MECHANISM

- Staple mode -

- No staple mode -


Depending on the selected finishing mode, the copies are directed to the left or right by the junction gate $[A]$, which is controlled by the junction gate solenoid $[B]$. This happens when the exit sensor of the copier turns on.

## Staple mode

When the exit sensor of the copier turns on, the junction gate solenoid is energized. The paper is sent to the jogger unit.

## No staple mode

The junction gate solenoid stays off and the paper is sent to the shift tray directly.

### 2.2 JOGGER UNIT PAPER POSITIONING MECHANISM



In staple mode, each sheet of copy paper is vertically and horizontally aligned when it arrives in the jogger unit.

For the vertical paper alignment, the positioning roller solenoid $[A]$ turns on shortly after the entrance sensor [B] turns off and the positioning roller [C] pushes the copy against the bottom of stack stopper [D].

For the horizontal paper alignment, the jogger fence [E] and the rear fence [F] move to the waiting position, which is 10 mm away from the side of the paper. After the vertical position is aligned, the jogger fence pushes the paper 20 mm against the rear fence to align the paper horizontally. Then the jogger fence moves back to the previous position.
The stapler is mounted on the rear fence.

### 2.3 EXIT GUIDE PLATE OPEN/CLOSE MECHANISM



When stacking a large size of paper (such as A3, DLT) in the jogger unit, the leading edge of the paper reaches the exit rollers. To prevent the paper from running into the exit rollers and not being aligned correctly, the exit guide plate [A] is moved up and this makes a gap between the exit rollers [B]. This operation is done at all paper sizes, but is only needed for the larger sizes.

The exit guide plate motor [C] and exit roller release cam [D] control the exit guide plate movement. When the exit guide plate motor starts, the cam turns and the exit guide plate is moved up. When the exit guide plate open sensor [ $E$ ] turns on, the motor stops. When stapling is finished, the exit guide plate motor turns on again to close the exit guide plate. When the exit guide plate HP sensor [F] turns on, the motor stops.

### 2.4 STAPLER



The stapler is mounted on the rear fence. When the rear fence moves, the stapler moves.

The staple hammer is driven by the stapler hammer motor [A].
When excessive load is applied to the staple hammer motor, the copier detects a staple jam. When a staple jam has occurred, the jammed staple is inside the staple cartridge $[B]$. Therefore, the jammed staple can be removed easily after pulling out the staple cartridge.
If there is no staple cartridge in the stapler unit or no staples in the staple cartridge, staple end is indicated on the operation panel.
This machine has only one stapling position.

### 2.5 FEED OUT MECHANISM


[A]

The stack feed-out belt [A] and the exit roller feed out the set of stapled copies.
After the copies have been stapled, the stack feed-out motor $[B]$ turns on to drive the stack feed-out belt.

When the leading edge of the copies reaches the exit rollers, the exit guide plate motor turns on and the exit roller comes down to transport the set of stapled copies. Shortly afterwards, the stack feed-out motor stops, and the exit motor feeds out the stack.
When the stack has been fed out to the shift tray, the stack feed-out motor turns on again. When the stack feed-out belt HP sensor [C] turns on, the stack feed-out motor turns off.

### 2.6 SHIFT TRAY UP/DOWN MECHANISM



The shift tray lift motor [A] controls the vertical position of the shift tray [B] through some gears. Just after the main switch is turned on, the tray is initialized at the upper position. The tray upper position is detected when the stack height sensor [C] is activated by the shift tray.

During copying, every ten copies in no staple mode or for each set of copies in staple mode, the shift tray is lowered until the stack height sensor turns off then raised until the stack height sensor turns on, and lowered again until the stack height sensor turns off.
In either mode, the shift tray will rise when the user takes the stack of paper from the tray during copying.
When the shift tray reaches its lower limit, the actuator [D] turns on the shift tray lower limit sensor [E], and copying stops.
When the stack height sensor stays off for 2 seconds in standby mode, the shift tray is raised till the stack height sensor turns on.
The shift tray upper limit switch [F] prevents the drive gears from being damaged if the stack height sensor fails. When the shift tray turns on the shift tray upper limit switch, the switch cuts the power to the shift tray lift motor.

### 2.7 SHIFT TRAY SIDE-TO-SIDE MECHANISM



In the sort/stack mode, the shift tray [A] moves from side to side to separate the sets of copies.

The horizontal position of the shift tray is controlled by the shift motor $[\mathrm{B}]$ and the shift gear disk [C]. After one set of copies is made and delivered to the shift tray, the shift motor turns on, driving the shift gear disk and the link [D]. The end fence [ $E$ ] is positioned by the link, creating the side-to-side movement.
When the shift gear disk has rotated 180 degrees (when the shift tray is fully shifted across), the cut-out in the shift gear disk turns on the shift tray half-turn sensor [F] and the shift motor stops. The next set of copies is then delivered. The motor turns on, repeating the same process and moving the tray back to the previous position.

### 2.8 JAM CONDITIONS

1. When the entrance sensor does not turn off within $1,000 \mathrm{~ms}$ after it turns on.
2. When the exit sensor does not turn off within $1,000 \mathrm{~ms}$ after it turns on.
3. When the exit sensor does not turn on in no staple mode within $1,250 \mathrm{~ms}$ after the entrance sensor turns on.

### 2.9 TIMING CHARTS

### 2.9.1 NO STAPLE MODE (A4 SIDEWAYS, 3 SHEETS/2SETS)



### 2.9.2 STAPLE MODE (A4 SIDEWAYS, 2 SHEETS/2 SETS)



## 3. SERVICE TABLE

### 3.1 DIP SWITCH TABLE

| DPS101 |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $\mathbf{1}$ | Description |  |  |  |
| $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |  |
| 1 | 0 | 0 | 0 | Default |
| 1 | 1 | 1 | 0 | Free run: staple mode |

### 3.2 TEST POINTS

| No. | Label | Monitored Signal |  |
| :---: | :---: | :--- | :--- |
| TP100 | $(5 \mathrm{~V})$ | +5 V |  |
| TP101 | $(G N D)$ | Ground |  |

### 3.3 FUSES

| No. | Function |
| :---: | :--- |
| FU100 | Protects the 24 V line. |

## 4. REPLACEMENT AND ADJUSTMENT <br> 4.1 COVER REMOVAL



## Front Door

1. Remove the front door [A] (2 screws).

## Front Cover

1. Remove the front door.
2. Remove the front cover [B] (2 screws).

## Rear Cover

1. Remove the rear cover [C] (2 screws).

## Upper Cover

1. Remove the front door.
2. Remove the front cover
3. Remove the rear cover.
4. Remove the upper cover [D] (2 screws).


## Lower Left Cover

1. Remove the lower left cover [A] (2 screws).

## Front Shift Tray Cover

1. Remove the front shift tray cover $[B]$ (1 screw).

## Rear Shift Tray Cover

1. Remove the rear shift tray cover [C] (1 screw).

## Shift Tray

1. Remove the shift tray [D] (1 snap ring).

### 4.2 ENTRANCE SENSOR REPLACEMENT



1. Remove the finisher from the copier.
2. Replace the entrance sensor [A] (1 connector).

### 4.3 EXIT SENSOR REPLACEMENT



1. Remove the upper cover.
2. Remove the exit sensor bracket $[A]$ ( 1 screw).
3. Replace the exit sensor $[B]$ (1 screw, 1 connector).

### 4.4 STACK HEIGHT SENSOR REPLACEMENT



1. Remove the front cover.
2. Remove the shift tray lift motor [A] (2 screws).

NOTE: The shift tray must be pulled up to remove the two screws.
3. Remove the rear cover.
4. Remove the exit motor unit $[B]$ ( 2 screws, 1 spring, 1 timing belt).
5. Remove the lower exit guide [C] (4 screws).
6. Remove the front and rear end fence holders [D,E] (1 screw each).
7. Remove the end fence [F] (1 snap ring).
8. Remove the stack height sensor cover [G] (1 screw).
9. Remove the stack height sensor bracket $[\mathrm{H}]$ ( 1 screw).
10. Replace the stack height sensor [I] (1 connector).

### 4.5 POSITIONING ROLLER REPLACEMENT



1. Pull out the jogger unit.
2. Remove the snap ring $[A]$.
3. Release the rubber belt [B].
4. Remove the positioning roller [C].

### 4.6 STAPLER REPLACEMENT



1. Pull out the jogger unit.
2. Disconnect the stapler connector $[A]$.
3. Remove the lower cover screw [B].
4. Remove the upper cover [C] (2 screws).
5. Remove the stapler with the lower cover [D] (2 screws).
6. Release the harness from the lower cover.
7. Replace the stapler.

## $\Rightarrow 4.7$ ROM HISTORY

| A681 Firmware Modification History (1000 Sheet Finisher) |  |  |  |
| :--- | :---: | :---: | :---: |
| Description of Modification | Level | Prod. Date | Ver. |
| Corrects the following: <br> - Paper jams due to an error in the vertical <br> movement of the tray. | A6815103K | NA | K |
| Corrects the following: <br> - Jams that occur when the door is opened <br> during a staple job. <br> After the power is turned on, the copier <br> reaches ready status even though the shift <br> tray lower limit sensor is on (and the stack is <br> full). A jam occurs if a copy job is started. | A6815103J | NA | J |
| Corrects the following: <br> - The mainframe locks up during jam recovery. <br> The frequency of occurrence is extremely low. | A6815103H | NA | H |
| -The user cancels the staple job when there is <br> only one sheet in the staple tray and the sheet <br> is automatically removed from the tray. A <br> paper jam occurs when the next sheet is fed <br> for stapling. |  |  |  |
| Corrects the following: <br> - The jam detection timing has been changed so <br> the A681 can also be used with the A265 and <br> A267. This change has no effect on the A232 <br> series. | A6815103G | NA | G |
| Corrects the following: <br> - Stapled paper did not stack straight. | A6815103F | NA | F |
| Corrects the following: <br> - Paper rolling on the shift tray. | A6815103E | NA | E |

## 3,000-SHEET FINISHER A697

## 1. OVERALL MACHINE INFORMATION

### 1.1 SPECIFICATIONS

The punch unit is an option for this machine.
Paper Size:

Paper Weight:

Paper Capacity
No punch mode
Shift Tray: A3 to B5/DLT to LT
(B6 lengthwise in no shift mode and no staple mode)
Upper Tray: A3 to A6 lengthwise/DLT to HLT
Punch mode
2 holes: A3 to A5/DLT to LT
3 holes: A3, B4, A4 sideways, B5 sideways DLT, LT sideways

No punch mode
No staple mode: $52 \mathrm{~g} / \mathrm{m}^{2} \sim 157 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 42 \mathrm{lb}$
Staple mode: $64 \mathrm{~g} / \mathrm{m}^{2} \sim 80 \mathrm{~g} / \mathrm{m}^{2}, 17 \sim 21 \mathrm{lb}$
Punch mode
2 holes: $52 \mathrm{~g} / \mathrm{m}^{2} \sim 128 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 34 \mathrm{lb}$
3 holes: $52 \mathrm{~g} / \mathrm{m}^{2} \sim 105 \mathrm{~g} / \mathrm{m}^{2}, 14 \sim 28 \mathrm{lb}$
Shift tray/no staple mode ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ):

|  | Punch mode | No punch mode |
| :---: | :---: | :---: |
| A4 sideways <br> LT sideways | 2,500 sheets | 3,000 sheets |
| Other sizes | 1,500 sheets | 1,500 sheets |

Shift tray/staple mode/punch mode ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ):

|  | Pages/set | Sets |
| :---: | :---: | :---: |
| B5, A4 lengthwise <br> LT lengthwise | 2 to 9 | 150 |
|  | 10 to 40 | 150 to 37 |
| A4 <br> LT sideways | 2 to 9 | 150 |
|  | 10 to 40 | 250 to 63 |
| Other sizes | 2 to 9 | 100 |
|  | 10 to 25 | 150 to 60 |

Shift tray/staple mode/no punch mode ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ):

|  | Pages/set | Sets |
| :---: | :---: | :---: |
| B5, A4 lengthwise <br> LT lengthwise | 2 to 9 | 150 |
|  | 10 to 50 | 150 to 30 |
| A4 sideways <br> LT sideways | 2 to 9 | 150 |
|  | 10 to 50 | 300 to 60 |
| Other sizes | 2 to 9 | 100 |
|  | 10 to 30 | 150 to 50 |

Upper tray ( $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ ):

|  | Punch mode | No punch mode |
| :---: | :---: | :---: |
| A4/LT or smaller | 200 sheets | 250 sheets |
| Larger than A4/LT | 50 sheets | 50 sheets |

Stapler Capacity (pages/set, $80 \mathrm{~g} / \mathrm{m}^{2}, 20 \mathrm{lb}$ paper):

|  | Punch mode | No punch mode |
| :---: | :---: | :---: |
| A4/LT or smaller | 40 sheets | 50 sheets |
| Larger than A4/LT | 25 sheets | 30 sheets |

Staple Position:
4 positions
1 staple: 3 positions (Front, Rear, Rear-Oblique)
2 staple: 1 position
Staple Replenishment: Cartridge (5,000 staples)
Power Source:
24 Vdc (from copier)
Power Consumption: 48 W
Weight: $\quad 45 \mathrm{~kg}$
Size (W x D x H): $\quad 625 \mathrm{~mm} \times 545 \mathrm{~mm} \times 960 \mathrm{~mm}$

### 1.2 MECHANICAL COMPONENT LAYOUT



1. Upper Tray
2. Upper Tray Exit Roller
3. Upper Transport Roller
4. Tray Junction Gate
5. 1st Entrance Roller
6. Punch Unit
7. 2nd Entrance Roller
8. Punch Waste Hopper
9. Stapler Junction Gate
10. Lower Transport Rollers
11. Alignment Brush Roller
12. Stapler
13. Positioning Roller
14. Stack Feed-out Belt
15. Middle Transport Roller
16. Shift Tray Exit Roller
17. Shift Tray

### 1.3 ELECTRICAL COMPONENT LAYOUT



1. Shift Tray Lift Motor
2. Shift Tray Exit Motor
3. Upper Transport Motor
4. Tray Junction Gate Solenoid
5. Punch Board
6. Punch Motor
7. Punch HP Sensor
8. Hopper Sensor
9. Entrance Sensor
10. Main Board
11. Positioning Roller Solenoid
12. Lower Transport Motor
13. Front Door Safety Switch
14. Stapler Tray Entrance Sensor
15. Shift Tray Lower Limit 1 Sensor
16. Shift Tray Lower Limit 2 Sensor
17. Stapler Motor
18. Stapler Rotation Motor
19. Stapler Rotation HP Sensor
20. Stapler HP Sensor
21. Staple End Switch
22. Cartridge Set Switch
23. Staple Hammer HP Sensor
24. Staple Hammer Motor
25. Stapler Tray Paper Sensor
26. Stack Feed-out Belt HP Sensor
27. Jogger Fence HP Sensor
28. Jogger Motor
29. Stack Feed-out Motor
30. Shift Tray Half-turn Sensor
31. Shift Motor
32. Shift Tray Exit Sensor
33. Stack Height 2 Sensor
34. Stack Height 1 Sensor
35. Shift Tray Upper Limit Switch
36. Stapler Junction Gate Solenoid
37. Upper Tray Paper Limit Sensor
38. Upper Tray Exit Sensor

### 1.4 ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| Motors |  |  |  |
| M1 | Upper Transport | Drives the entrance rollers, the middle and upper transport rollers, and upper tray exit roller. | 3 |
| M2 | Lower Transport | Drives the lower transport rollers, the alignment brush roller, and the positioning roller. | 11 |
| M3 | Jogger | Moves the jogger fence. | 28 |
| M4 | Stapler | Moves the staple unit from side to side. | 17 |
| M5 | Stapler Rotation | Rotates the stapler 45 degrees. | 18 |
| M6 | Staple Hammer | Drives the staple hammer. | 24 |
| M7 | Stack Feed-out | Drives the stack feed-out belt. | 29 |
| M8 | Shift Tray Exit | Drives the exit roller for the shift tray. | 2 |
| M9 | Shift | Moves the shift tray from side to side. | 31 |
| M10 | Shift Tray Lift | Moves the shift tray up or down. | 1 |
| M11 | Punch | Drives the punch shaft and roller. | 6 |
| Sensors |  |  |  |
| S1 | Entrance | Detects the copy paper entering the finisher and checks for misfeeds. | 9 |
| S2 | Stapler Tray Entrance | Detects the copy paper entering the staple tray and checks for misfeeds. | 14 |
| S3 | Jogger Fence HP | Detects the home position of the jogger fence. | 27 |
| S4 | Stapler Tray Paper | Detects the copy paper in the staple tray. | 25 |
| S5 | Stapler HP | Detects the home position of the staple unit for side-to-side movement. | 20 |
| S6 | Stapler Rotation HP | Detects the home position of the stapler unit for 45-degree rotation. | 19 |
| S7 | Staple Hammer HP | Detects the home position of the staple hammer. | 23 |
| S8 | Stack Feed-out Belt HP | Detects the home position of the stack feedout belt. | 26 |
| S9 | Shift Tray Exit | Checks for misfeeds at the shift tray. | 32 |
| S10 | Stack Height 1 | Detects when the top of the copy paper stack in the shift tray is at the correct position. | 34 |
| S11 | Stack Height 2 | Detects when the top of the copy paper stack in the shift tray has become too high. | 33 |
| S12 | Upper Tray Exit | Checks for misfeeds at the upper tray. | 38 |
| S13 | Upper Tray Paper Limit | Detects when the paper stack height in the upper tray is at its upper limit. | 37 |
| S14 | Shift Tray Half-turn | Detects the return position for side-to-side movement of the shift tray. | 30 |

## ELECTRICAL COMPONENT DESCRIPTION

| Symbol | Name | Function | Index No. |
| :---: | :---: | :---: | :---: |
| S15 | Shift Tray Lower Limit 1 | Detects when the shift tray is nearly at its lower limit. | 15 |
| S16 | Shift Tray Lower Limit 2 | Detects when the shift tray is at its lower limit. | 16 |
| S17 | Hopper | Detects when the punch waste hopper is full and detects when the punch tray is set. | 8 |
| S18 | Punch HP | Detects the home position of the punch shaft and roller. | 7 |
| Switches |  |  |  |
| SW1 | Front Door Safety | Cuts the dc power when the front door is opened. | 13 |
| SW2 | Shift Tray Upper Limit | Cuts the power to the shift tray lift motor when the shift tray position is at its upper limit. | 35 |
| SW3 | Staple End | Detects the staples in the cartridge. | 21 |
| SW4 | Cartridge Set | Detects the staple cartridge in the stapler. | 22 |
| Solenoids |  |  |  |
| SOL1 | Tray Junction Gate | Drives the tray junction gate. | 4 |
| SOL2 | Stapler Junction Gate | Drives the stapler junction gate. | 36 |
| SOL3 | Positioning Roller | Moves the positioning roller against the stapling tray. | 12 |
| PCBs |  |  |  |
| PCB1 | Main | Controls the finisher and communicates with the copier. | 10 |
| PCB2 | Punch | Passes signals between the punch unit and the finisher main board. | 5 |

### 1.5 DRIVE LAYOUT



1. Shift Tray Exit Roller
2. Shift Motor
3. Shift Tray
4. Alignment Brush Roller
5. Positioning Roller
6. Lower Transport Rollers 2 and 3
7. Lower Transport Motor
8. Middle Transport Roller
9. Lower Transport Roller 1
10. Shift Tray Exit Motor
11. 2nd Entrance Roller
12. 1st Entrance Roller
13. Upper Transport Roller
14. Upper Transport Motor
15. Upper Tray Exit Roller
16. Shift Tray Lift Motor
17. Stack Feed-out Motor
18. Jogger Motor
19. Jogger Fence
20. Stack Feed-out Belt
21. Stapler Motor
22. Stapler Rotation Motor

## 2. DETAILED DESCRIPTIONS

### 2.1 TRAY AND STAPLER JUNCTION GATE MECHANISM

- Normal mode -
- Sort/stack mode -


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].

## Normal mode

The tray junction gate solenoid turns on. The copies go up to the upper tray.

## Sort/stack mode

The tray junction gate solenoid and the stapler junction gate solenoid remain off. The copies are sent to the shift tray directly.

## Staple mode

The tray junction gate solenoid remains off and the stapler junction gate solenoid turns on. The copies go downwards to the jogger unit.

### 2.2 JOGGER UNIT PAPER POSITIONING MECHANISM



In staple mode, each sheet of copy paper is vertically and horizontally aligned when it arrives in the jogger unit.

## Vertical Paper Alignment

After the trailing edge of the copy passes the stapler tray entrance sensor [A], the positioning roller solenoid $[B]$ is energized for 280 ms to push the positioning roller [C] into contact with the paper. The positioning roller and alignment brush roller [D] rotate to push the paper back and align the trailing edge of the paper against the stack stopper [E].

## Horizontal Paper Alignment

When the print key is pressed, the jogger motor [F] turns on and the jogger fences [G] move to the waiting position, which is 7 mm wider on both sides than the selected paper.

When the trailing edge of the paper passes the staple unit entrance sensor, the jogger motor turns on for approximately 70 ms to move the jogger fences 5 mm towards the paper. After a short time, the jogger motor turns on again approximately for 60 ms for the horizontal paper alignment then goes back to the waiting position.

### 2.3 STAPLER UNIT MOVEMENT MECHANISM



## Side-to-side:

The stapler motor $[A]$ moves the stapler $[B]$ 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. This is detected by the stapler HP sensor [C].

## Rotation:

In the oblique staple position mode, the stapler rotation motor [D] rotates the stapler $45^{\circ}$ after it moves to the stapling position.

### 2.4 STAPLER



The staple hammer $[A]$ is driven by the staple hammer motor $[B]$ via gears $[C]$, two cams [D], and two links [E].

When the aligned copies are brought to the stapling position by the positioning roller, alignment brush roller and jogger fences, the staple hammer motor starts. When the cams complete one rotation, the staple hammer home position sensor [F] turns on, detecting the end of the stapling operation. The staple hammer motor then stops.

There are two sensors in the stapler. One is the staple end switch [G] for detecting staple end conditions (it detects when there is only one sheet of staples left in the cartridge). The other is the cartridge set switch $[\mathrm{H}]$ for detecting whether a staple cartridge is installed.
When a staple end or no cartridge condition is detected, a message is displayed advising the operator to install a staple cartridge. If this condition is detected during a copy job, the indication will appear, but the copy job will not stop.
The staple cartridge has a clinch area [I], in which jammed staples are left. Operators can remove the jammed staples from this area.

### 2.5 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 tray [D].
The speed of the exit roller [E] (driven by the shift tray exit motor) is higher than the stack feed-out belt speed. Therefore, the shift tray exit roller takes over the stack feed-out after the leading edge reaches this roller.
Just before the stapled copies pass through the shift tray exit sensor, the stack-feed-out motor turns off 600 ms to wait until the exit rollers have completely fed the stapled stack out to the shift tray. Then, the stack-feed-out motor turns on again until the pawl actuates the stack feed-out belt home position sensor [F].

### 2.6 SHIFT TRAY UP/DOWN MECHANISM



The shift tray lift motor $[A]$ controls the vertical position of the shift tray $[B]$ through gears and timing belts [C]. When the main switch is turned on, the tray is initialized at the upper position. The tray is moved up until stack height sensor 1 [D] is deactuated.

During copying, the actuator feeler [E] gradually rises as the copy stack grows, and the actuator gradually moves towards stack height sensor 2 [F].
In sort/stack mode, if stack height sensor 2 is actuated for 3 seconds, the shift tray lift motor lowers the shift tray for 15 ms .
In staple mode, when the stack feed-out motor starts, the tray is moved down until stack height sensor 1 is actuated and then moved up until stack height sensor 1 is de-actuated. This corrects the current tray position. Then, the tray is moved down again until stack height sensor 1 is actuated to make space for the coming set of copies and then moved up until stack height sensor 1 is de-actuated. This means the tray lowers earlier in staple mode, to prevent the next copy suddenly exceeding the space currently available on the tray.

For both modes, the shift tray will rise until stack height sensor 1 is de-actuated when the user takes the stack of paper from the shift tray.
This machine has two shift tray lower limit sensors 1 [G], 2 [H]. Shift tray lower limit sensor 1 detects the near lower limit and sensor 2 detects the lower limit. When the actuator [I] enters sensor 1, a message will be displayed and copying will continue. When the actuator enters sensor 2, a message will be displayed and copying will stop.

The shift tray upper limit switch [J] prevents the drive gear from being damaged if stack height sensor 1 fails. When the shift tray pushes up the shift tray positioning roller $[\mathrm{K}]$, the switch will cut the power to the shift tray lift motor.

### 2.7 SHIFT TRAY SIDE-TO-SIDE MECHANISM


[B]

In sort/stack mode, the shift tray [A] moves from side to side to separate the sets of copies.

The horizontal position of the shift tray is controlled by the shift motor [B] and shift gear disk [C]. After one set of copies is made and delivered to the shift tray, the shift motor turns on, driving the shift gear disk and the shaft [D]. The end fence [E] is positioned by the shaft, creating the side-to-side movement.
When the shift gear disk has rotated 180 degrees (when the shift tray is fully shifted across), the cut-out in the shift gear disk turns on the shift tray half-turn sensor [F] and the shift motor stops. The next set of copies is then delivered. The motor turns on, repeating the same process and moving the tray back to the previous position.

### 2.8 PUNCH UNIT DRIVE MECHANISM



The punch unit makes 2 or 3 holes (depending on the type of punch unit) at the trailing edge of the paper.

The punch unit is driven by the punch motor [A]. The punch motor turns on 78 ms after the trailing edge of the paper passes through the entrance sensor [B], and makes the punch holes.

The home position is detected by the punch HP sensor [C]. When the cut-out on the punch shaft gear disk [D] enters the punch HP sensor, the punch motor stops.
The punch position is adjusted as follows:
Right to left: SP mode
Front to rear: Spacers

### 2.9 PUNCH WASTE COLLECTION MECHNISM



The punch waste is collected in the punch waste hopper [A], which is under the punch unit.

When the punch waste covers the hole [B] in the hopper, the hopper sensor [C] turns on and a message will be displayed after the copy job finishes.
The hopper sensor also works as the hopper set sensor. If the punch waste hopper is not set, the hopper sensor moves away from the hole in the hopper holder [D] and a message is displayed. This message is the same as for the hopper full condition.

### 2.10 JAM CONDITIONS

1. The entrance sensor does not turn on within 450 ms after the copier exit sensor turns off.
2. The entrance sensor does not turn off within $1,325 \mathrm{~ms}$ after it turns on.
3. The upper tray exit sensor does not turn on within $1,630 \mathrm{~ms}$ after the entrance sensor turns on.
4. The upper tray exit sensor does not turn off within $1,325 \mathrm{~ms}$ after it turns on.
5. In sort/stack mode, the shift tray exit sensor does not turn on within $2,090 \mathrm{~ms}$ after the entrance sensor turns on.
6. In sort/stack mode, the shift tray exit sensor does not turn off within $1,325 \mathrm{~ms}$ after it turns on.
7. In staple mode, the stapler tray entrance sensor does not turn on within 3,700 ms after the entrance sensor turns on.
8. In staple mode, the stapler tray entrance sensor does not turn off within 1,325 ms after it turns on.
9. In staple mode, the stapler tray paper sensor does not turn off within 250 pulses of the stack feed-out motor after it starts.
10. In staple mode, the shift tray exit sensor does not turn off within $1,260 \mathrm{~ms}$ after the stack feed-out motor starts.

### 2.11 TIMING CHARTS

### 2.11.1 A4 SIDEWAYS (2 SHEETS): NORMAL AND PUNCH MODE



### 2.11.2 A4 SIDEWAYS (2 SHEETS): SORT/STACK AND PUNCH MODE



### 2.11.3 A4 SIDEWAYS (2 SHEETS): STAPLE AND PUNCH MODE



## 3. SERVICE TABLES

### 3.1 DIP SWITCHES

| DPS100 |  |  |  |  | DPS101 |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Description |  |  |  |  |  |  |  |  |
| $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Default |
| 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | Stack feed-out motor on |
| 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | Free run: sort/stack mode |
| 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | Free run: one staple (front side) |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | Free run: two staples |

NOTE: Do not use any other settings.

### 3.2 TEST POINTS

| No. | Label |  | Monitored Signal |
| :---: | :---: | :--- | :--- |
| TP101 | (GND) | Ground |  |

### 3.3 LED

| No. | Function |
| :---: | :---: |
| LED100 | Monitors the stack feed-out motor speed. |

### 3.4 VARIABLE RESISTORS

| No. | Function |
| :---: | :---: |
| VR100 | Adjust the stack feed-out motor speed. |

### 3.5 FUSES

| No. |  |
| :---: | :--- |
| FU100 | Protects 24 V. |

## 4. REPLACEMENT AND ADJUSTMENT

### 4.1 COVER REPLACEMENT


[F]

## Rear Cover

1. Remove the rear cover [A] (3 screws).

## Upper Left Cover

1. Remove the upper left cover [B] (2 screws).

## Upper Cover

1. Remove the upper left cover.
2. Remove the upper cover [C] (2 screws).

## Front Door

1. Remove the upper left cover.
2. Remove the upper cover.
3. Remove the upper bracket [D] (1 screw).
4. Remove the front door [E].

## Left Front Cover

1. Remove the rear cover.
2. Remove the upper cover.
3. Remove the front door.
4. Remove the left front cover [F] (2 screws).


## Shift Tray

1. Remove the rear cover [A].
2. Rotate the shift tray lift motor and lower the shift tray $[B]$.
3. Remove the shift tray (4 screws).

## Lower Left Cover

1. Remove the shift tray.
2. Remove the upper left cover [C].
3. Remove the upper cover [D].
4. Remove the front door [E].
5. Remove the left front cover [F].
6. Remove the lower left cover [G] (4 screws).

## Right Cover

1. Remove the right cover $[\mathrm{H}]$ (2 screws).

## Front Shift Tray Cover

1. Remove the front shift tray cover [I] (1 screw).

## Rear Shift Tray Cover

1. Remove the rear shift tray cover [J] (1 screw).

### 4.2 POSITIONING ROLLER REPLACEMENT



1. Open the front door.
2. Remove the snap ring $[A]$.
3. Release the rubber belt [B].
4. Replace the positioning roller [C].

### 4.3 ALIGNMENT BRUSH ROLLER REPLACEMENT



1. Open the front door and pull out the jogger unit.
2. Remove the rear cover.
3. Remove the main board [A] (6 screws, all connectors).
4. Remove a screw $[B]$ and a tension spring [C] for the tension bracket [D], and release the tension of the timing belt.
5. Remove the front side E-ring [E] and bushing [F].
6. Remove the alignment brush roller assembly.
7. Remove the timing pulley [G] (1 E-ring).
8. Replace the alignment brush roller [H] (1 spacer, 1 bushing).

### 4.4 SENSOR REPLACEMNT

### 4.4.1 STACK HEIGHT SENSOR 1 AND 2



1. Remove the upper left cover.
2. Remove the upper cover.
3. Remove the sensor feeler $[A]$ ( 1 screw, 1 connector).
4. Remove the sensor bracket $[B]$ ( 1 screw).
5. Replace the stack height sensor 1 [C] or 2 [D].

### 4.4.2 UPPER TRAY PAPER LIMIT AND EXIT SENSOR


[B]
[A]

1. Remove the upper left cover.
2. Remove the upper cover.

## Upper Tray Paper Limit Sensor

3. Remove the sensor bracket $[A]$ ( 1 screw).
4. Replace the upper tray paper limit sensor $[B]$ (1 connector).

## Upper Tray Exit Sensor

3. Remove the sensor bracket [C] (1 screw).
4. Replace the upper tray exit sensor [D] (1 connector).

### 4.4.3 SHIFT TRAY EXIT SENSOR



1. Remove the rear cover.
2. Remove the upper left cover.
3. Remove the upper cover.
4. Open the front door and remove the upper exit guide $[A]$ (1 plastic clip).
5. Remove the guide stay $[B]$ (2 screws).
6. Remove the discharge brush [C] (2 screws).
7. Replace the shift tray exit sensor [D] (1 screw, 1 connector).

### 4.4.4 ENTRANCE AND STAPLER TRAY ENTRANCE SENSOR



1. Remove the finisher from the copier.

## Entrance Sensor

2. Remove the sensor bracket [A] (1 screw).
3. Replace the entrance sensor $[B]$ (1 screw, 1 connector).

## Stapler Tray Entrance Sensor

2. Remove the sensor bracket [C] (1 screw).
3. Replace the stapler tray entrance sensor [D] (1 screw, 1 connector).

### 4.4.5 STAPLER ROTATION HP SENSOR



1. Remove the stapler unit.
2. Remove the screw $[A]$ and rotate the stapler bracket $[B]$.
3. Remove the sensor bracket [C] (1 screw).
4. Replace the stapler rotation HP sensor [D] (1 connector).

### 4.5 STAPLER REMOVAL



1. Open the front door and pull out the jogger unit.
2. Move the stapler to the front.
3. Remove the stapler [A] (1 screw, 1 connector).

### 4.6 PUNCH POSITION ADJUSTMENT



## Right to left

This position is adjusted by SP modes.

## Front to rear

The optional punch units have the following 3 spacers as accessories.
1 mm thickness: 2 pcs
2 mm thickness: 1 pc
The punch position can be adjusted by up to 4 mm by combinations of the 3 spacers.

### 4.7 STACK FEED-OUT MOTOR SPEED ADJUSTMENT

NOTE: This adjustment is required after replacing the main board.

1. Set the DIP switches on the finisher main board as follows.

| DIP SW | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |
| :---: | :---: | :---: | :---: | :---: |
| DIP100 | On | On | Off | On |
| DIP101 | On | Off | Off | Off |

2. If LED100 remains lit, turn VR100 counterclockwise until LED100 starts blinking.
3. Turn VR100 clockwise until the LED stops blinking and remains lit.

### 4.8 ROM HISTORY

| A697 Firmware Modification History (3000 Sheet Finisher) |  |  |  |
| :---: | :---: | :---: | :---: |
| Description of Modification | Level | Prod. Date | Ver. |
| Corrects the following: <br> - Modification to allow Chinese paper sizes. <br> - Modification of the start of the shift tray in staple mode. <br> - Corrected the problem of an SC not being displayed even though there was a problem with the paper exit pawl home position sensor during initialization. <br> - If the diagonal staple mode was selected when there was a problem with the stapler rotation motor home position sensor an SC occurred. | A6975656 A | July 1998 Production | A |
| Corrects the following: <br> - To improve the stacking in the shift tray during stapling, the following modifications were implemented. <br> 1. The initial lowering timing of the shift tray is now faster and the stack start time has been modified to allow the shift tray to return to the top position first. <br> 2. The line velocity for the exit roller has been changed from $600 \mathrm{~mm} / \mathrm{sec}$ to $700 \mathrm{~mm} / \mathrm{sec}$. The paper exit pawl speed has also been changed. <br> 3. The timing for lowering the shift tray has been changed to $50 \mathrm{~mm} / \mathrm{sec}$ after the exit sensor has detected the leading edge of the paper. | A6975656 B | July 1998 <br> Production | B |
| Corrects the following: <br> - When a jam occurs in the finisher, if the jam is not removed, the staple movement motor will not shut off. <br> - When the power save mode command from the main unit is received, the machine initializes. | A6975656 C | Sept. 1998 Production | C |
| Corrects the following: <br> - Occurrences of SC990. <br> - Defective paper exit for LG, DLT, A3 and B4 paper sizes. <br> - Two staples missing when B5 size paper is selected. <br> - Stacking problems occur when paper curls during manual staple mode. <br> - During Shift mode, the exit roller rolls up the paper if the paper curl is large. Modification of the shift tray height in shift mode, exit roller rotation speed and shift tray lowering timing. | A6975656 D | Nov. 1998 Production | D |
| Corrects the following: <br> - While receiving a fax in Energy Saver Mode, the A697 power comes on and initializes. <br> - When stacking with curled paper, the tray will move up and down slightly while the stapler is waiting for the remaining page(s) of a staple set. This slight up and down movement from the tray will tend to align any paper that slides out from the stack. | A6975656 E | Not Available | E |
| Corrects the following: <br> - When the G909 was connected, the main engine was unable to recognize the A697. | A6975656 F | Not Available | F |
| Corrects the following: <br> - Jam codes were not defined for paper jams at or before the entrance sensor. | A6975656 G | Not Available | G |
| Corrects the following: <br> - The stack height sensor mis-detects the height, which causes the exit motor to stop and a paper jam occurs. | A6975656 H | Not Available | H |


$\Rightarrow$| A697 Firmware Modification History (3000 Sheet Finisher) |  |  |  |
| :--- | :---: | :---: | :---: |
| Description of Modification | Level | Prod. Date | Ver. |
| Corrects the following: <br> - If a finisher job is initiated from 5 to 105 seconds after <br> the copier recovers from "Energy Saver Mode", Sc990 <br> or a paper jam occurs. | A6975656 J | Not Available | J |
|  |  |  |  |

## APPENDIX

## APPENDIX 1

### 1.1 JAM HISTORY

The jam history is read in this way.


### 1.1.1 JAM CONDITION TABLE

| Code |  |
| :---: | :--- |
| 001 | Jams at power on |
| 003 | 1st paper tray : paper non-feed jam |
| 004 | 2nd paper tray : paper non-feed jam |
| 005 | 3rd paper tray: paper non-feed jam |
| 006 | 4th paper tray: paper non-feed jam |
| 007 | LCT: Paper non-feed jam |
| 008 | Upper relay sensor: paper does not activate the sensor |
| 009 | Lower relay sensor: paper does not activate the sensor |
| 00 A | Upper relay sensor - op. PTU: paper does not activate the sensor |
| 013 | Registration sensor: paper does not activate the sensor |
| 016 | Exit sensor: paper does not activate the sensor |
| 017 | Bridge exit sensor: paper does not activate the sensor |
| 018 | Bridge relay sensor: paper does not activate the sensor |
| 019 | Duplex entrance sensor: paper does not activate the sensor |
| 023 | Duplex exit sensor: paper does not activate the sensor |
| 025 | Fusing entrance sensor: paper does not activate the sensor |
| 026 | 3,000-sheet finisher upper tray exit sensor: paper does not activate the sensor |
| 027 | Finisher shift tray exit sensor: paper does not activate the sensor |
| 028 | Staple tray paper sensor: paper does not activate the sensor |
| 029 | Finisher stack feed-out belt HP sensor: paper does not activate the sensor |
| 030 | Mail box entrance sensor: paper does not activate the sensor |
| 031 | Mail box proof tray exit sensor: paper does not activate the sensor |
| 032 | Mail box relay sensor: paper does not activate the sensor |
| 033 | Mail box sensor: paper does not activate the sensor |
| 057 | LCT: paper doe not activate the sensor |
| 058 | 1st paper tray: paper stays at the sensor |
| 059 | 2nd paper tray: paper stays at the sensor |
| 060 | 3rd paper tray: paper stays at the sensor |


| Code |  |
| :---: | :--- |
| 061 | 4th paper tray: paper stays at the sensor |
| 063 | Registration sensor: paper stays at the sensor |
| 066 | Exit sensor: paper stays at the sensor |
| 067 | Bridge exit sensor: paper stays at the sensor |
| 068 | Bridge relay sensor: paper stays at the sensor |
| 069 | Duplex entrance sensor: paper stays at the sensor |
| 073 | Registration sensor: paper stays at the sensor |

## TECHNICAL SERVICE BULLETINS

TECHNICAL SERMCE BULLETIN

BULLETIN NUMBER: G035-001
12/06/99
APPLICABLE MODEL:
GESTETNER - P7045
RICOH - AP4500
SAMN - SLP45

## SUBJECT: SERVICE MANUAL CORRECTIONS

GENERAL:
The Service Manual page(s) listed below must be replaced with the page(s) supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:

- 1-1
- 1-2
- 1-3
- 2-29
- 2-30

> Updated Information
> Updated Information
> Updated Information
> Updated Information
> Updated Information

An arrow has highlighted the revised areas $\Rightarrow$.

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

### 1.1.1 PRINTER

| Configuration: | Desktop |
| :--- | :--- |
| Printing Process: | Dry electrostatic transfer system |
| Resolution: | $600 \times 600 \mathrm{dpi}$ (PCL5e, PCL6, PS) |
|  | $400 \times 400 \mathrm{dpi}$ (PS) |
|  | $300 \times 300 \mathrm{dpi}$ (PCL5e, simulated by doubling pixel |
|  |  |
|  |  |

$\Rightarrow$ Gray Scale:
Printing Speed (Maximum)
Printing Emulation:

Printer Font:

Printer Interface:

DRAM Capacity:

Printer Driver:

Not applicable to AP4500
45 ppm (A4/11" x 8.5" sideways, simplex)
36 ppm (A4/11" x 8.5" sideways, duplex)
PCL5e and PCL6
PostScript 3
PCL5e/PCL6:
45 scaleable typefaces in 14 typeface families (35 Intellifont and 10 TrueType format fonts) 6 bitmapped typefaces in the Line Printer typeface family
PS:
136 Adobe Type1 fonts
Bi-directional Parallel x 1
Network Interface x 1
Ethernet (100 base-TX/10 base-T for TCP/IP, IPX/SPX, EtherTalk)
8 MB (Standard)
2 DRAM SIMM slots (up to 64 MB)
Maximum Total: Up to 72 MB
PCL5e Printer Driver for Windows 3.1/95/98/NT
PCL6 Printer Driver for Windows 3.1/95/98/NT
PS3 Printer Driver for Windows 3.1/95/98/NT and Macintosh


Power Source:
North America
$120 \mathrm{~V}, 60 \mathrm{~Hz}$, More than 10 A
Europe/Asia
220 ~ $240 \mathrm{~V}, 50 / 60 \mathrm{~Hz}$, More than 6 A
$\Rightarrow \quad$ Dimensions $(\mathrm{W} \times \mathrm{D} \times \mathrm{H})$ :
$665 \times 640 \times 570 \mathrm{~mm}\left(26.2^{\prime \prime} \times 25.2^{\prime \prime} \times 22.4\right.$ ")
Without options
$\Rightarrow$ Weight:
Power Consumption:
62 kg ( 136.7 lb )
Mainframe only:

- 115 V/230 V machine -

| Maximum | Less than 1.2 kW |
| :--- | :--- |
| Warm-up | Less than 1.0 kW |
| Energy Saver Mode | Less than $45 \mathrm{~W} / \mathrm{h}$ |

Noise Emission:

|  | Mainframe Only |  |
| :---: | :---: | :---: |
| Sound Power Level |  |  |
| Printing | $70 \mathrm{~dB}(\mathrm{~A})$ | $74 \mathrm{~dB}(\mathrm{~A})$ |
| Stand-by | $42 \mathrm{~dB}(\mathrm{~A})$ | - |

NOTE: The above measurements were made in accordance with ISO 7779.

## Sensor Control Mode

In sensor control mode, the machine varies the toner supply for each print, to maintain the correct proportion of toner in the developer and to account for changes in drum reflectivity over time. The adjustment depends on two factors:

- The amount of toner required to print the page (based on a black pixel amount for the page)
- Readings from the TD sensor and ID sensor

Each step of the previous flow chart is explained in more detail on the following pages.

## Toner Density Sensor Initial Setting

When new developer with standard toner concentration is installed ( 12.5 g of toner
in 500 g of developer; $2.5 \%$ by weight), use SP2-10 to do the initial setting for the TD sensor. This sets the sensor output to 4.0 V . this value is used as the toner supply reference voltage ( $\mathrm{V}_{\text {treft }}$ ) for the TD sensor.

## Image Pixel Count

The CPU adds up the image data value of each pixel and converts the sum to a value between 0 and 255. The value would be 255 if the page was completely black or 0 if it were completely white.

## Vt(10) Detection

The toner density in the developer is detected once every print cycle. The sensor output voltage $\mathrm{V}_{\mathrm{t}}(10)$ is the average of the 10 most recent sensor output voltage readings.

## Toner Density Measurement

The machine compares $\mathrm{Vt}(10)$ and V tref. If $\mathrm{Vt}(10)$ is greater than V tref, the toner concentration in the development unit is low and more toner should be added.
When Vt (10) > Vtref has been detected 20 times (toner concentration is consistently low), 0.1 is added to Vref, and the conditions are checked again. The result decides the value of "K" (toner supply rate coefficient), which is one of the factors in the toner supply motor on time calculation.
If $\mathrm{Vt}(10)>\mathrm{V}$ tref has not been detected 20 times, 0.2 is subtracted from Vtref, and " K " is decided in a similar way as for the previous condition.

## GAIN Determination

GAIN is another factor in the toner supply motor on time calculation. It is decided using the following data.

- Vtref - Vt(10)
- Ten most recent Vt values


## Toner Supply Motor on Time Calculation

The toner supply motor on time is decided using the following formula:


NOTE: 1) The toner supply rate is fixed at 30.
2) $\mathrm{K}=$ Toner supply rate coefficient (fixed at 3.0 ).
3) The bracket (2) in the above formula is only used if V tref $<\mathrm{Vt}$.
4) The maximum toner supply motor on time is 1.2 s .

## Vsp and Vsg Detection

The ID sensor (at the lower right area of the drum) detects the following voltages.

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

In this way, the reflectivity of both the drum surface and the pattern on the drum are checked. 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 the charge roller and laser diodes.
Vsg/Vsp is detected every 10 sheets printed to decide the new Vtref.

## New Vtref Determination

Even if the toner concentration in the developer is maintained by checking the TD sensor, the toner potential (chargeability) and the image density both change with humidity and the amount of toner on the carrier. Therefore, the actual image density, using the ID sensor output, is also used as one of the factors for deciding the new Vtref, which is used for toner density control.
The new Vtref is determined using the following data.

- Vtref - Vt(10)
- Vsp/Vsg

From this point, toner density control is done using the new Vtref.

## Gestetner R1®ロバ c®VIT

## TECHNICAL SERVCE BULLETIN

BULLETIN NUMBER：G035－002 12／06／99
APPLICABLE MODEL：
GESTETNER－P7045
RICOH－AP4500
SAMN－SLP45

## SUBJECT：PARTS CATALOG UPDATES

## GENERAL：

The following Parts Updates are being issued for all G035 Parts Catalogs．
－UPDATE 1：Page 10．Add index number 34 as follows


|  |  | REFERENCE |  |  |
| :---: | :--- | :---: | :---: | :---: | :---: |
| PART NO． | DESCRIPTION | QTY | PAGE | ITEM |
| A2321299 | Bracket | 2 | 10 | 34 |

－UPDATE 2：Page 25.
Add the following part number for ITEM number 1.

|  |  | REFERENCE |  |  |
| :---: | :---: | :---: | :---: | :---: |
| PART NO． | DESCRIPTION | QTY | PAGE | ITEM |
| A2327266 | Toner Supply Unit $-115 V$（RIC） | 1 | 25 | 1 |

Continued．．．

Tech Service Bulletin No. G035-002
Page 2 of 2

- UPDATE 3: Page 46.

Correct index number from 108 to 101.


|  |  | REFERENCE |  |  |
| :---: | :---: | :---: | :---: | :---: |
| PART NO. | DESCRIPTION | QTY | PAGE | ITEM |
| $04513006 B$ | Tapping screw M3x6 | 1 | 46 | 101 |

- UPDATE 4: Page 52. Add NV-RAM (index number 26) and part number as follows


## Page 52



- UPDATE 5: Page 53

|  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: |
| PART NO. | DESCRIPTION | QTY | PAGE |
| A2849001 | NV-RAM -+1000 Counter | 1 | 53 |

BULLETIN NUMBER: G035-003
03/01/2000

## APPLICABLE MODEL:

GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The Service Manual pages listed below must be replaced with the pages supplied. Each bulletin package contains 1 set of replacement pages.

## PAGES:

The revised areas have been highlighted by an arrow $\Rightarrow$.

- 1-18
- 2-2
- 2-21
- 4-12
- 6-50
- 6-53
- 7-13

Updated Information (Hard Disk (Option))
Updated Information (Hard Disk Drive Interface)
Updated Information (ID Sensor Pattern Production Timing)
Updated Information (Service Program 18)
Updated Information (Printer Control Board and NIB)
Updated Information (BICU Board)
Updated Information (SC546)

### 1.9.2 DESCRIPTIONS

1. Printer Controller

The printer controller handles the following functions:

- Printer host interface
- Printing functions
- Operation panel control
- Interface and control of the network interface board
- Interface and control of additional controller options (HDD and DRAM SIMM)

2. Hard Disk (Option)

This HDD stores the additional soft fonts (both PCL and PS fonts).
3. Network Interface Board

The network interface board is a printer interface to allow the printer to be used on a network.
4. DRAM SIMM (Option)

There are two DRAM SIMM slots. This is used for an additional printer processing memory area. 8, 16, or 32 Mbytes standard SIMM modules can be installed. As a result, up to 72 Mbytes of RAM are installable (8 Mbytes on board plus 64 Mbytes of optional SIMM).
5. MB (Mother Board)

This connects the controller to the BICU board in the machine.
6. BICU (Base Engine and Image Control Unit)

This is the main board. It controls the following functions.

- Engine sequence
- Timing control for peripherals


## 7. IOB (Input/Output Board)

The IOB handles the following functions.

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


## 3. ROM memory

Flash ROM (8 MB)
4 MB of flash ROM area is for boot, operation system, PCL5e, and PCL6 codes, and for the font data for both PCL languages (resident fonts). The remaining 4-MB area is for PostScript code and font data.

## 4. NVRAM (8 KB)

This NVRAM contains the printer settings, and the job and error record data.
5. Network Interface Board Interface

This interface controls the optional NIB, and a printer NIB is provided to support the network operations.
6. Hard Disk Drive Interface (Enhanced IDE: Option)

This HDD interface is provided to support storage of fonts downloaded from a PC.
7. IC Card Interface

The flash memory card for updating the controller and PostScript firmware is connected to this flash memory card slot.
8. Power-on Self-diagnostic

When the controller is turned on, the controller performs a self-diagnostic test.

### 2.4.3 ID SENSOR PATTERN PRODUCTION TIMING


$\Rightarrow$ An ID sensor pattern is made during machine initialization (after the main power switch is turned on) and after 10 sheets are printed out.

### 2.4.4 DRUM CHARGE ROLLER CLEANING



The drum charge roller [A] gets dirty easily because it is always in contact with the drum. Therefore, the cleaning pad [B] is also always in contact with the drum charge roller to clean its surface.

The cam gear [D] moves the pin [C] at the rear of the cleaning pad holder, and also moves the cleaning pad from side to side. This movement improves the cleaning process.

| Menu |  |  | Function | Settings [Default] |
| :---: | :---: | :---: | :---: | :---: |
| Menu Level 2 | $\begin{array}{\|c\|} \hline \text { Menu } \\ \text { Level 3 } \\ \hline \end{array}$ |  |  |  |
| 17 |  | Auto Off Mode Disabling | Selects energy saver mode off. Press <br> or $\boldsymbol{\Delta}$ key to select "No" or "Yes". In the default setting, the 0 minute option of the energy saver timer range will appear on the LCD in the user menu, and the user can disable the energy saver mode. (In the user menu, the user will be able to select 0 minutes.) | No or Yes [ No ] |
| 18 |  | Memory All Clear <br> Exceptions: <br> - Electrical total counter <br> - PM Counter <br> - Serial Number <br> - P\&P brand name and Prod. Name setting | Resets the correction data for process control and software counters. <br> Also, returns all modes and adjustments to the default settings. See the "Memory All Clear" section for how to use this SP mode correctly. Press ""Enter \#" twice, then turn the main power switch off and on. Normally, this SP mode should not be used. <br> It is used only after replacing the NVRAM, or when the copier malfunctions due to a damaged NVRAM. |  |
| 19 | $1 \sim 9$ | Input Check | Displays the signals received from sensors and switches. <br> See the "Input Check" section for details. |  |
| 20 | 1 ~ 99 | Output Check | Turns on the electrical components individually for test purposes. See the "Output Check" section for details. |  |
| 21 |  | Plug \& Play Brand Name and Production Name Setting | Selects the brand name and the production name for Windows 95 Plug \& Play. This information is stored in the NVRAM. If the NVRAM is defective, these names should be registered again. <br> After selecting, press the "Enter \#" key. If the setting is completed, a "*" mark will be displayed before the selection. |  |
|  | 1 | SMC Printing - <br> All Data | Prints all the system parameter lists. See the "System Parameter and Data Lists" section for how to print the lists. | Execute |
| 22 | 2 | SMC Printing SP Mode Data | Prints the SP mode data list. See the "System Parameter and Data Lists" section for how to print the lists. | Execute |

### 6.12.3 PRINTER CONTROL BOARD AND NIB



1. Remove the printer controller cover. (See Covers.)
2. Remove the printer controller assembly [A] (2 screws).
3. Remove the optional hard disk unit [B] (4 screws, 1 connector) and DRAM SIMMs that have been installed.
4. Remove the NIB [C] (4 screws, 1 connector).
5. Remove the NVRAM [D] from the old printer control board and install it on the new printer control board.

### 6.12.6 BICU BOARD



1. Open the front cover.
2. Remove the operation panel cover, connector cover, rear cover, upper cover, printer controller cover and left cover. (See Covers.)
3. Remove the printer controller box. (See I/O Board.)
4. Remove the I/O board bracket. (See I/O Board.)
5. Remove the BICU board [A] (5 screws, 1 stud, all connectors).
6. Remove the NV RAM $[B]$ from the old BICU board and install it on the new board.

## SC543: Fusing Overheat Error 1

Definition [A]
A fusing temperature of over $231^{\circ} \mathrm{C}$ is detected for 5 seconds by the fusing thermistor.

## Possible Causes

- Fusing thermistor defective
- BICU defective
- I/O board (IOB) defective


## SC545: Fusing Overheat Error 2

Definition [A]
The fusing lamp stays on at full power for 30 seconds while in the stand-by condition after warming-up is completed.

Possible Causes

- Fusing thermistor out of position


## SC546: Fusing Ready Temperature Malfunction

Definition [A]
During or after machine warm-up, the sensor detects a $40^{\circ} \mathrm{C}$ change in the fusing temperature 5 or more times in 1 minute.

## Possible Causes

- Poor thermistor connector connection
- Poor fusing unit connection


## SC547: Zero Cross Signal Malfunction

Definition [A]
Zero cross signals are not detected within a certain period within 500 ms after the main power switch has been turned on.

## Possible Causes

- Power supply board defective
- Noise on the ac power line


## SC548: Fusing Unit Installation Error

## Definition [A]

The machine cannot detect the fusing unit when the front cover and right cover are closed.

## Possible Causes

- Fusing unit is not installed
- Poor fusing unit connection

BULLETIN NUMBER: G035-004
03/01/2000

## APPLICABLE MODEL:

GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## SUBJECT: SERVICE MANUAL - INSERT (ROM HISTORY)

## GENERAL:

The Service Manual pages listed below must be replaced with the pages supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:
The revised areas have been highlighted by an arrow $\Rightarrow$.

- Vi
- 7-26

Updated Information (Table of Contents)
New Information (ROM History - BICU)

The PCB ROM revision B (file name G035BICU_REVB.EXE) can be downloaded through the Ricoh Technical Services FTP Site http://tsc.ricohcorp.com.

NOTE: Refer to Facts Line Bulletin \# FLOO2 for more information about the FTP Internet Web Site.
6.9.3 THERMISTOR AND THERMOFUSE ..... 6-41
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6.9.5 HOT ROLLER AND PRESSURE ROLLER. ..... 6-43
6.10 DRIVE AREA ..... 6-44
6.10.1 REGISTRATION CLUTCH AND TRANSFER BELT CLUTCH ..... 6-44
6.10.2 MAIN MOTOR ..... 6-45
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PAPER TRAY UNIT G520

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1.1 SPECIFICATIONS ..... 8-1
1.2 MECHANICAL COMPONENT LAYOUT ..... 8-2
1.3 ELECTRICAL COMPONENT LAYOUT ..... 8-3
1.4 ELECTRICAL COMPONENT DESCRIPTION ..... 8-4
1.5 DRIVE LAYOUT ..... 8-5
2. DETAILED DESCRIPTIONS ..... 8-6
2.1 PICK-UP AND SEPARATION ROLLER RELEASE MECHANISM ..... 8-6
2.2 PAPER LIFT MECHANISM ..... 8-7
2.3 PAPER END DETECTION ..... 8-9
2.4 PAPER HEIGHT DETECTION ..... 8-10
2.5 PAPER SIZE DETECTION ..... 8-11

## $\Rightarrow 7.4$ ROM HISTORY

### 7.4.1 ROM HISTORY - BICU

| Description of Modification | Firmware <br> Level | Serial <br> Number | Firmware <br> Version |
| :--- | :--- | :--- | :--- |
| Correction: <br> - SC546 occurs during warm-up, when the machine is <br> turned on or brought out of Energy Saver Mode and <br> the surrounding environment is relatively cold. | G0355113 B | From Dec. <br> 8,99 <br> Prod. | 8.4 |
| Initial Production | G0355113 A | 1st Prod. | NA |

## BULLETIN NUMBER: G035-005

05/19/2000
APPLICABLE MODEL:
GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## SUBJECT: LIGHT PRINT

## SYMPTOM:

- Light print occurs and is not corrected by replacing the developer.
- The "Toner End" message does not disappear after replacing the toner bottle.


## CAUSE:

The Toner Supply Shutter (P/N A2322321) returns to the closed position when the PCD Unit (PCU and Development Unit) is set into the G035. Normally, the Shutter is not in the closed position when the G035 is shipped. If the technician removes the PCD Unit from the G035 and attempts to separate the PCU from the Development Unit, the Shutter may return to the closed position

## PRODUCTION COUNTERMEASURE:

The following modifications to the Toner Supply Shutter were applied to the October 1999 production.

1. The length of the pawl edge of the Shutter was increased by 2.5 mm to prevent the Shutter from returning to the closed position.
2. The Tension Spring (Item 27 P/N AA062303) included in the User Maintenance Kit was deleted.

## FIELD COUNTERMEASURE:

If you should experience this symptom in the field, remove the PCD Unit from the G035, check the position of the Shutter and return it to the "Open" position. See the illustration below. Carefully place the PCD Unit back in the G035.


Continued...

Tech Service Bulletin No. G035-005
Page 2 of 2

## GENERAL:

The following parts updates are being issued for all G035 Parts Catalogs.


|  |  |  |  |  |  |  |  | REFERENCE |
| :---: | :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| PART NUMBER | DESCRIPTION | QTY | PAGE | ITEM |  |  |  |  |
| AA062303 | Tension Spring | 1 | 27 | 27 |  |  |  |  |
| A2322321 | Shutter - Toner Supply | 1 | 27 | 28 |  |  |  |  |

## UNITS AFFECTED:

All G035 printers manufactured after the Serial Numbers listed below will have the new style Shutter - Toner Supply installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner P7045 | P1891100001 |
| Ricoh AP4500 | P 1891100066 |
| Savin SLP45 | P 1891100001 |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :--- | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## SUBJECT: HOT ROLLER STRIPPER AND TENSION SPRING

## SYMPTOM:

Paper jams in the Fusing Unit.

## CAUSE:

When a mixture of the toner and paper dust accumulates on the tip of the Hot Roller Strippers, a gap develops between the strippers and Hot Roller surface. Under this condition, the paper may not be separated and may be caught by the tip of the Hot Roller Strippers causing a fuser jam.

## SOLUTION:

To reduce the mixture of the toner and paper dust attracted to the Hot Roller Strippers, the material of the strippers was changed. To increase the contact pressure between the Hot Roller and strippers, the tension of the Hot Roller Stripper Springs was changed from 150 mN to 300 mN .


## UNITS AFFECTED:

All G035 printers manufactured after the Serial Numbers listed below will have the new style Hot Roller Strippers and Tension Springs installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner P7045 | P1891200023 |
| Ricoh Aficio AP4500 | P1800100021 |
| Savin SPL45 | P1891200023 |

## BULLETIN NUMBER: G035-007

## SUBJECT: PCU UNIT 1 SEALS

## GENERAL:

The PCU Unit Seals have been registered as service parts. The following parts additional parts are being issued for all G035 Parts Catalogs. Please update your Parts Catalogs with the following information.


[^1]TECHNICAL SERVICE BULLETIN

## BULLETIN NUMBER：G035－008

## APPLICABLE MODEL： <br> GESTETNER－P7045 <br> RICOH－AFICIO AP4500 <br> SAVIN－SLP45

## SUBJECT：RIGHT DOOR SWITCH

## GENERAL：

The following part corrections are being issued for all G035 Parts Catalogs．

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO． | NEW PART NO． | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2325867 |  | Angle Bracket－Push Switch | 1－0 | － | 53 | 16 |
| AW500022 |  | Push Switch | 1－0 | － | 53 | 17 |
| 04513006B |  | Tapping Screw－M $3 \times 6$ | 14－13 | － | 53 | 104 |
| 12042466 | 12042466 | Micro Switch－V－16506－1C25 | 3－4 | － | 53 | 101 |
| AA143512 | AA143519 | Stepped Screw－M2．5 | 3－2 | 3 | 53 | 14 |
| A2325402 | A2845520 | DC Harness－Front Upper | 1－1 | 3 | 53 | 3 |

## UNITS AFFECTED：

All G035 printers manufactured after the Serial Numbers listed below will have the new micro switch and harness installed during production．

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner P7045 | P1890700001 |
| Ricoh Aficio AP4500 | P1890700011 |
| Savin SPL45 | P1890700001 |

## TECHNICAL SERVICE BULLETIN

## BULLETIN NUMBER: G035-009

08/17/2000

## APPLICABLE MODEL:

GESTETNER - P7045
RICOH - AFICIO AP4500
SAVIN - SLP45

## SUBJECT: D JAM (EXIT UNIT OR BRIDGE UNIT)

## SYMPTOM:

A paper jam may occur in the Exit Unit or the Bridge Unit under low humidity conditions. The paper is stopped in the Exit Unit or the Bridge Unit.

## CAUSE:

The jam occurs because static electricity builds up around the Sensor in the Exit Unit or the Bridge Unit.

## SOLUTION:

A countermeasure to prevent the build up of static electricity has been created. The countermeasure consists of a Relay Harness and Metal Plates. Follow the countermeasure procedure outlined below.

## COUNTERMEASURE:

## Exit Unit Installation Procedure

NOTE: The following action should be taken when a paper jam occurs at the Exit Unit.


1. Replace the Anti-Static Brush Assembly with the new type [A] (A2844460) after removing the Bushing [B] (1 E-ring) and Gear [C].

NOTE: Although the groove of the frame can be located in both the front and back, the standard is for the groove to be located in back [D]. The Grounding Plate Pawls for the rear groove should be set first, followed by the setting of those for the front groove.

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Page 2 of 4
2. Install the Bushing [B].
3. Remove the Bushing [E] (1 E-ring).
4. Attach the edge of the Grounding Plate [F] (A2844462) to the back of the attachment projection of the Exit Unit Frame.

5. After removing the Screw [G] which secures the Exit Sensor, attach the Sensor Grounding Plate [H] (A2844463) to the Exit Sensor and secure it with the Screw [G].
NOTE: Make sure that area [I] of the Anti-Static Brush Assembly is facing inward of area [J] of the Sensor Grounding Plate at the time of attachment.

Installation Procedure for Bridge Unit
NOTE: The following action should be taken when a paper jam occurs at the Bridge Unit.


1. Remove the Bridge Unit. Remove the small cover of the drive section [A] (1 Screw).
2. Remove the two Gears [B] and Screw [C].
3. Secure the new Harness [D] (A2845510) with the Screw [C].

NOTE: Make sure that the Harness does not touch the Gear.
4. Attach the two Gears and the small cover. Route the Harness, taking up any slack.

5. Route the Harness under the Drive Belt as shown in the illustration, taking up any slack.
6. Secure the other end of the Harness with the Screw [E] that secures the Stay.

7. Peel back the 2 strips of Mylar [A] attached to the Stay as shown in the illustration above.
8. Peel back the two-sided tape remaining on the Stay (approximately 4 cm total, centered around the Sensor [B]).
9. Remove the Screw [C] (securing the Stay) that is closest to the Sensor.
10. Place the new Plate Spring [D] (A6883914) over the Sensor, return the Mylar and fasten with the Screw removed in step 9.

NOTE: Since there is a possibility of the roller slipping, clean the three Transport Rollers with alcohol or a damp cloth.

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Page 3 of 4

## GENERAL:

The following parts updates are being issued for all G035 Parts Catalogs. Please update your Parts Catalogs with the following information.

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| AA120089 | A2844460 | Anti-static Brush | 1 | 1 | 39 | 8 |
|  | A2844462 | Grounding Plate -Exit Roller | 1 | - | 39 | 31 * |
|  | A2844463 | Grounding Plate -Paper Feed Sensor | 1 | - | 39 | 32* |

## * DENOTES NEW ITEM NUMBER.

The following parts updates are being issued for all A688 Parts Catalogs Section. Please update your Parts Catalogs with the following information.

|  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| PART NUMBER | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2845510 | Grounding Wire | 1 | - | 3 \& 5 | 29* |
| A6883914 | Spring Plate | 1 | - | 5 | 30 * |

* DENOTES NEW ITEM NUMBER.


## UNITS AFFECTED:

All G035 printers manufactured after the Serial Numbers listed below will have the new style Grounding Plates and Anti-static Brush installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner P7045 | P1891000006 |
| Ricoh Aficio AP4500 | A7709890002 |
| Savin SLP45 | P1891000006 |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## BULLETIN NUMBER: G035-010

RICOH - AFICIO AP4500
SAVIN - SLP45

## SUBJECT: PARTS CATALOG UPDATES

## GENERAL:

The following parts updates are being issued for all G035 Parts Catalogs.

- UPDATE 1: Quenching Lamp Magnet - To standardize with other models the quenching lamp magnet has been changed.


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Page 2 of 2

- UPDATE 2: Hard Disk Drive - Due to a vender change the part number for the Hard Disk Drive has been changed.



## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :--- | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## BULLETIN NUMBER: G035-011

08/22/2000

## APPLICABLE MODEL:

GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The Service Manual pages listed below must be replaced with the pages supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:
The revised areas have been highlighted by an arrow $\Rightarrow$.

- 7-6, 7
- 7-26

Updated Information (SC Tables)
Updated Information (ROM History)

## SC360: Hard Disk Drive Error 1

Definition [B]
The machine does not detect the connection signal from the HDD.
Possible Causes

- Poor connection between the HDD and the BICU Board.
- The DC Power Connector to the HDD is disconnected.
- HDD defective
- BICU defective


## SC361: Hard Disk Drive Error

Definition [B]
The image data stored in the HDD cannot be output properly.

## Possible Causes

NOTE: If this error was caused by a temporary condition the problem will be solved after turning the main switch off and on.

- HDD defective


## SC362: IMAC (Image Compression IC) Error

Definition [B]
An error occurs during image processing in the IMAC, which handles image compression and image data transmission.

## Possible Causes

- BICU defective


## SC365: Image Storage Address Error

## Definition [B]

The BICU receives an image data output request signal for data that is not stored in memory.

Possible Causes

- BICU defective


## SC390-1: TD Sensor Error 1

Definition [B]
The TD sensor output voltage is less than 0.5 V or more than 4.0 V 10 times consecutively during printing.

Possible Causes

- TD sensor abnormal
- Poor connection between the TD sensor and the I/O board (IOB)
- I/O board (IOB) defective


## SC390-2: TD Sensor Error 2

Definition [B]
The TD sensor output voltage is less than 1.8 V or more than 4.8 V during TD sensor initial setting.
Possible Causes

- TD sensor abnormal
- No developer in the development unit


## SC391: Development Bias Leak

Definition [B]
A development bias leak signal is detected.

## Possible Causes

- Poor connection between dev. bias terminal and high voltage supply bd.
- High voltage supply board defective


## SC401: Transfer Roller Error

## Definition [B]

The transfer roller current feedback signal is not detected or the transfer roller current leak signal is detected.

## Possible Causes

- High voltage supply board defective
- Poor connection between dev. bias terminal and high voltage supply bd.
- Poor PCU connection


## SC403: Transfer Belt Position Sensor Error

## Definition [B]

The transfer belt position sensor does not activate even if the transfer belt clutch has rotated once.

## Possible Causes

- Main motor/drive malfunction
- Transfer belt position sensor defective
- Poor transfer belt position sensor connection


## SC405: Transfer Belt Error

Definition [B]
The transfer belt does not move away from the drum during ID sensor pattern checking.

## Possible Causes

- Main motor/drive malfunction
- Transfer belt position sensor defective
- Poor transfer belt position sensor connection


### 7.4 ROM HISTORY

### 7.4.1 ROM HISTORY - BICU

| Description of Modification | Firmware <br> Level | Serial <br> Number | Firmware <br> Version |
| :--- | :--- | :--- | :---: |
| Initial Production | G0355113 A | 1st Prod. | NA |
| Corrects the following: <br> - SC546 occurs during warm-up, when the machine is <br> turned on or brought out of energy saver mode and <br> the surrounding environment is relatively cold. | G0355113 B | From Dec. <br> 8,99 <br> Prod. | 8.4 |
| Corrects the following: <br> - SC360 occurs just after the HDD is turned on. The | G0355113 C | From Feb. <br> SC360 occurs when replaced with the A6915879 or <br> later version (A6915860 from March 2000) of the <br> HDD and the machine is turned on or brought out of <br> Energy Saver Mode. | 8.9 |
| - Prod. |  |  |  |
| A paper jam occurs between the printer and the <br> mailbox. The jam occurs during printing, when the <br> mailbox is assigned as the output device, after the <br> machine is brought out of Energy Saver Mode. This <br> occurs because the machine cannot identify the <br> mailbox. |  |  |  |
| Corrects the following: <br> SC990/542 occur simultaneously. When the Main <br> Power Switch is turned on or the machine recovers <br> from Energy Saver Mode, an SC990 may occur <br> (Software Performance error) before the machine <br> reaches Stand-by temperature. If this happens an <br> SC542 occurs (Fusing Temperature Warm-up error). <br> The correction turns off the Fusing Temperature <br> control whenever an SC990 occurs. | G0355113 D | From |  |
| June 18, |  |  |  |

## BULLETIN NUMBER: G035-012

09/13/2000

## APPLICABLE MODEL: <br> GESTETNER - P7045 <br> RICOH - AP4500 <br> SAVIN - SLP45

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The Service Manual pages listed below must be replaced with the pages supplied. Each bulletin package contains 1 set of replacement pages.

## PAGES:

The revised areas have been highlighted by an arrow $\Rightarrow$.

- 2-16
- 2-44
- 6-6
- 7-17 and 18

Updated Information (Photoconductor Unit)
Updated Information (Paper Registration)
Updated Information (Photoconductor Unit and Development Unit)
Updated Information (Service Call Conditions)

### 2.3 PHOTOCONDUCTOR UNIT (PCU)

### 2.3.1 OVERVIEW



The PCU consists of the components shown in the above illustration. An organic photoconductor (OPC) drum (diameter: 60 mm ) is used in this machine.

1. Toner Collection Coil
2. Toner Collection Plate
3. ID Sensor
4. Spur
5. Pick off Pawl
6. OPC Drum
7. Transfer Entrance Guide
8. Charge Roller Cleaning Pad
9. Charge Roller
10. Cleaning Blade

### 2.7.7 PAPER REGISTRATION



A train of gears transmits main motor [A] rotation to the registration clutch gear [B] (located on the lower registration roller shaft).
The registration sensor [C] is positioned just before the registration rollers.
When the leading edge of the paper activates the registration sensor, the registration clutch is off and the registration rollers are not turning. However, the relay clutch [D] stays on for a bit longer. This delay allows time for the paper to press against the registration rollers and buckle slightly to correct skew. Then, the registration clutch energizes and the relay clutch re-energizes at the proper time to align the paper with the image on the drum. The registration and relay rollers feed the paper to the image transfer section.
The registration sensor is also used for paper misfeed detection.

### 6.2 PHOTOCONDUCTOR UNIT (PCU) AND DEVELOPMENT UNIT

$\Rightarrow 1$. Open the right cover and front cover.
2. Pull the PCU and development unit $[\mathrm{A}]$ out slightly while pushing the release lever [B].


NOTE: Make sure that the toner supply shutter [C] is at the open position before reinstalling the unit.

### 6.3 PHOTOCONDUCTOR UNIT (PCU)

### 6.3.1 PCU



1. Pull out the PCU and development unit. (See Photoconductor Unit and Development Unit.)
2. Remove the PCU $[A]$ (2 screws) from the development unit [B].

## SC951: F-Gate Signal Error 2

Definition [B]
When the IPU has already received the F-gate signal, the IPU receives another F-gate signal.
Possible Causes

- BICU defective


## SC954: Printer Image Setting Error

$\Rightarrow$ Definition $[B]$
The IPU does not send the Printer Ready Signal back to the engine software.
Possible Causes

- BICU software defective
- Polygon mirror motor defective
- LD unit defective
- Laser Synchronization Detector Board defective
- BICU Board defective


## SC955: Memory Setting Error

Definition [B]
The settings that are required for image processing using the memory are not sent from the IPU.

## Possible Causes

- Software defective


## SC959: Printer Setting ID Error

$\Rightarrow$ Definition $[\mathrm{B}]$
The IPU sends the Printer Ready signal back to the engine software, but the signal does not contain the correct response code to the original command.
Possible Causes

- BICU Software defective
- BICU Board defective


## SC960: Printer Return ID Error

$\Rightarrow$ Definition $[B]$
The IPU sends the Page Print Complete signal back to the engine software, but the signal does not contain the correct response code to the original command.
Possible Causes

- BICU Software defective
- BICU Board defective


## SC961: Printer Ready ID Error

Definition [B]
The IPU sends the Ready signal back to the engine software for printing the next page, but the signal does not contain the correct response code to the original command.
Possible Causes

- BICU Software defective
- BICU Board defective


## SC962: Memory Setting ID Error

Definition [B]
The ID that is sent from the memory when the IPU sent the memory ready signal is incorrect.
Possible Causes

- Software defective


## SC963: Memory Finishing ID Error

Definition [B]
The ID that is sent from the memory when the IPU sent the memory finish signal is incorrect.

Possible Causes

- Software defective


## SC964: Printer ready error

Definition [B]
The print ready signal is not generated for more than 17 seconds after the IPU received the print start signal.

Possible Causes

- Software defective


## SC980: HDD Access Error

Definition [B]
Incorrect parameter sent to the HDD controller.
Possible Causes

- Software defective
- Poor connection between BICU and HDD.


## TECHNICAL SERVICE BULLETIN

## BULLETIN NUMBER: G035-013

10/18/2000

## APPLICABLE MODEL:

GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## SUBJECT: DEVELOPMENT UNIT

## GENERAL:

- The original Development Unit (P/N G0353050) for the G035 is filled with developer before it is shipped from the factory. The developer has a tendency to spill out during transport. The factory will only supply this unit with developer.
- The Development Unit for the A232 Series (P/N A2327460) can also be used with the G035 if the three components listed below are installed.

NOTE: When installing these three components in the A2327460 unit, you can either use the components from the original Development Unit (G0353050) or newly acquired components.

Additional components required:

1. G0342450 (Item No. 32): Bracket - PCU and Development Unit
2. G0342451 (Item No. 31): Bracket - Development Stay
3. 04503010B (Item No. 106): Tapping Screw - M3x10


| PART NUMBER | DESCRIPTION | QTY |
| :---: | :--- | :---: |
| G0353050 | Development Unit with Developer (G035) | 1 |
| A2327460 | Development Unit with out Developer (A232) | 1 |
| G0342450 | Bracket - PCU and Development Unit | 1 |
| G0342451 | Bracket - Development Stay | 1 |
| 04503010B | Tapping Screw - M3x10 | 1 |

## TECHNICAL SERVICE BULLETIN

BULIFTIN NUMBER
G035-014
10/18/2000
APPLICABLE MODEL:
GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

SUBJECT: SC322/326 DURING INSTALL

## SYMPTOM:

An SC322 or SC326 is generated during installation.

## CAUSE:

The Laser Unit may pass when tested at the factory but the laser beam in some units may be near the edge of the Laser Sync. Detector. During transport, the LD Unit Housing may have become slightly deformed or shifted due to some form of shock. As a result, the position of the Laser was shifted outside the detection range.

## SOLUTION:

The detection width of the Laser Sync. Detector has been increased from 2.3 to 3.0 mm .

## GENERAL:

The following part update is being issued for all G035 Parts Catalogs.

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2325310 | A2935310 | Laser Sync. Detector | 1 | 1 | 13 | 25 |

## UNITS AFFECTED:

All G035 printers manufactured after the Serial Numbers listed below will have the new style Laser Sync. Detector installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner P7045 | P1890900001 |
| Ricoh AP4500 | P1890900041 |
| Savin SLP45 | P1890900001 |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| 3/S | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## TECHNICAL SERVICE BULLETIN

## BULLETIN NUMBER: G035-015

## APPLICABLE MODEL:

GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## SUBJECT: LOW DENSITY BANDS AT 5MM

## SYMPTOM:

Low image density bands appear at approximately 5 mm intervals. This is especially noticeable in the halftone areas.

## CAUSE:

The supporting tension supplied by the ribs of the Idler Gear in the Transport Unit were too high, causing the gear diameter to become slightly warped.

## SOLUTION:

To ensure that the Idler Gear diameter is uniform, the Gear ribs have been removed. A new style Idler Gear has been used in production.

## GENERAL:

The following part update is being issued for all G035 Parts Catalogs.

|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| AB017429 | AB014189 | Gear - 27 Z | 1 | 1 | 31 | 12 |

## UNITS AFFECTED:

All G035 printers manufactured after the Serial Numbers listed below will have the new style Gear - 27 Z installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :--- |
| Gestetner P7045 | P18008xxxx |
| Ricoh AP4500 | P1800800001 |
| Savin SLP45 | P18008xxxx |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## BULLETIN NUMBER: G035-016

10/30/2000
APPLICABLE MODEL:
GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## SUBJECT: PARTS CATALOG UPDATES

## GENERAL:

The following parts updates are being issued for all G035 Parts Catalogs.

- UPDATE 1: Driven Roller and Guide Plate - To prevent the Driven Roller and Guide Plate from becoming deformed by heat, the material has been changed. Please update your Parts Catalog with the following information.


|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| AF040559 | AF040575 | Driven Roller - M9 | 2 | 1 | 33 | 16 |
| A2324491 | A2844491 | Guide Plate - Fusing Unit | 1 | 1 | 33 | 18 |

## UNITS AFFECTED:

All G035 printers manufactured after the Serial Numbers listed below will have the new style Driven Roller and Guide Plate installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :--- |
| Gestetner P7045 | P18008xxxx |
| Ricoh AP4500 | P1800800001 |
| Savin SLP45 | P18008xxxx |

Continued...

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Page 2 of 2

- UPDATE 2: PFB Board - A counter electromagnetic force flows through the clutch drive circuits causing the OFF time of the clutch to be delayed. This may result in a paper jam. A Zener Diode has been added to the drive circuitry of the PFB Board to prevent any counter electromagnetic force for the following clutches: Relay Clutch, Upper Paper Feed Clutch, Lower Paper Feed Clutch and By-Pass Tray Feed Clutch. Please update your Parts Catalog with the following information.


|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2325130 | A2325135 | PFB Board | 1 | 1 | 49 | 20 |

## UNITS AFFECTED:

All G035 printers manufactured after the Serial Numbers listed below will have the new style PFB Board installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :--- |
| Gestetner P7045 | P18008xxxx |
| Ricoh AP4500 | P1800800001 |
| Savin SLP45 | P18008xxxx |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## BULLETIN NUMBER: G035-017

11/17/2000

## APPLICABLE MODEL: <br> GESTETNER - P7045 <br> RICOH - AP4500 <br> SAVIN - SLP45

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The Service Manual pages listed below must be replaced with the pages supplied. Each bulletin package contains 1 set of replacement pages.

## PAGES:

The revised areas have been highlighted by an arrow $\Rightarrow$.

- 4-22
- $4-22 A$ \& $B$
- $4-23$
- 7-8

Updated Information (Copy Flash ROM)
New Information (Copy Flash ROM)
Updated Information (Parallel Loop Back Test)
Updated Information (SC442)

### 4.3.2 FIRMWARE UPDATE FROM PARALLEL PORT (SP1-1-1 AND 1-2-1)

1. Prepare the latest firmware file and Fcopy.exe on a host computer.
2. Turn off the machine, connect the host computer using a parallel cable, and turn the machine back on.
3. Enter the SP mode.
4. Choose "1-1-1 - Flash SYS from Parallel" or "1-2-1 - Flash PS From Parallel" depending on the firmware type.
5. Press "Enter \#" in reply to the confirmation message.
6. On the host computer, start MS-DOS Prompt and type the following command.

Either
C:I> FCOPY pathlfilename or

C:l> COPY /b pathlfilename port
CAUTION: Do not turn off the machine while "From Parallel Processing" is displayed on the LCD, even if FCOPY has finished in the MS-DOS Prompt.
7. After new firmware has been downloaded successfully, turn off the machine, disconnect the printer cable if necessary, and turn the machine back on.
8. Print the "Printer Configuration Page" to check the new firmware version ([Menu] - [List Print] - [Config. Page]).
The firmware version number is printed in the "Printer Details" section of the configuration page.

## $\Rightarrow$ 4.3.3 COPY FLASH ROM (SP1-3)

There are two functions; one is to copy the printer controller firmware from the ROM DIMM to the printer controller, the other is to copy the firmware the opposite way.

## Downloading from ROM DIMM to the printer controller

When downloading of the controller firmware is not successful from either the flash memory card or PC (and the printer controller does not start up), any attempts thereafter to download from the card or PC will not be possible. In addition, it will not be possible to return the machine to operating condition.

However, the firmware can be downloaded from the ROM DIMM with this function by following the procedure below.


1. Remove the printer controller.
2. Change the position of the TB1 jumper [A] on the controller from CS0 to CS.
3. Change the position of the TB1 jumper [B] on the ROM DIMM that contains the controller firmware from CS1 to CS0.
4. Install the ROM DIMM on the controller.

CAUTION: Make sure to install the correct ROM DIMM in the PS SIMM connector.
5. Install the printer controller and turn on the machine.
6. Enter SP mode.
7. Choose "1-3-Copy ROM".
8. Press "Yes" in response to the confirmation message.
9. After successfully downloading the firmware, turn off the machine and remove the printer controller. Next, remove the ROM DIMM.
10. Reposition the jumpers on the printer controller and ROM DIMM.
11. Reinstall the printer controller and turn on the machine.
12. Check to see that the printer controller starts up properly.

## Downloading from the controller to ROM DIMM

1. Remove the printer controller.
2. Install the ROM DIMM on the controller.
3. Install the printer controller and turn on the machine.
4. Enter SP mode.
5. Choose "1-3 - Copy ROM".
6. Press "Yes" in response to the confirmation message.
7. After successfully downloading the firmware, turn off the machine and remove the printer controller. Next, remove the ROM DIMM.
8. Reinstall the printer controller and turn on the machine.

### 4.3.4 FORMATING THE HARD DISK (SP1-4)

This function is used to format the printer hard disk. If the hard disk is formatted, the stored data (downloaded fonts and macros) will be erased. So, when performing this function, ask the customer for consent. After this operation, advise the customer to restore their data, if necessary.

1. Enter the SP mode.
2. Choose "1-4 - Format Disk".
3. Press "Enter \#" in reply to the confirmation message. Hard disk formatting will take several minutes.
4. After confirming that formatting was successful, turn the machine off and back on again.

## $\Rightarrow$ 4.3.5 PARALLEL LOOP BACK TEST (SP1-9)

1. Plug the loop back connector into the parallel port of the printer.
2. Enter the printer SP mode then select "1-9 - Loop Back".
3. Press "Yes" in reply to the confirmation message. The result of the test will be displayed on the operation panel.


## SC440: Main Motor Lock

Definition [B]
The main motor lock signal is longer than 2 seconds while the main motor turns on.

## Possible Causes

- Too much load on the drive mechanism
- Main motor defective


## $\Rightarrow$ SC442: PCU New Unit Detection Error

Definition [B]
After the main motor turns on, the PCU new unit detection sensor remains ON for 2 or more seconds.

Possible Causes

- New unit detection sensor defective
- PCU defective

NOTE: SC442 can be cleared by turning the Main Swicth OFF and ON , it will reoccur if the defective components are not replaced or repaired.

## SC490: Exhaust Fan Motor Lock

Definition [B]
An exhaust fan motor lock signal is not detected within 5 seconds after the exhaust fan motor turns on.

## Possible Causes

- Too much load on the drive mechanism
- Exhaust fan motor defective
- Poor fan motor connector connection


## SC492: Cooling Fan Motor Lock

Definition [B]
A cooling fan motor lock signal is not detected within 5 seconds after the cooling fan motor turns on.

## Possible Causes

- Too much load on the drive mechanism
- Cooling fan motor defective
- Poor fan motor connector connection


## SC493: Bridge Unit Cooling Fan Lock

Definition [B]
A bridge unit cooling fan motor lock signal is not detected within 5 seconds after the bridge unit cooling fan motor turns on.

## Possible Causes

- Too much load on the drive mechanism
- Bridge unit cooling fan motor defective
- Poor fan motor connector connection


## BULLETIN NUMBER: G035-018

11/28/2000
APPLICABLE MODEL:
GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## SUBJECT: PARTS CATALOG UPDATES

## GENERAL:

The following parts updates are being issued for all G035 Parts Catalogs.

- UPDATE 1: Spurs - To prevent toner from adhering to the Spurs, the material of the Spurs has been changed. Please update your Parts Catalog with the following information.




## UNITS AFFECTED:

All G035 printers manufactured after the Serial Numbers listed below will have the new style Spurs installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner P7045 | P18010xxxx |
| Ricoh AP4500 |  |
| Savin SLP45 |  |

Continued...

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- UPDATE 2: Copy Tray Guide - The edge of the Copy Tray Guide has been rounded (made smooth) to ensure that scratches or other minor injuries do not occur. See illustration below. Please update your Parts Catalog with the following information.


|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| A2324498 | A2844498 | Copy Tray Guide | 1 | 1 | 11 | 2 |

## UNITS AFFECTED:

All G035 printers manufactured after the Serial Numbers listed below will have the new style Copy Tray Guide installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner P7045 |  |
| $y$ Ricoh AP4500 | P18010xxxx |
| Savin SLP45 |  |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## BULLETIN NUMBER: G035-019

12/22/2000

## APPLICABLE MODEL: <br> GESTETNER - P7045 <br> RICOH - AP4500 <br> SAIN - SLP45

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The Service Manual page listed below must be added to the Service Manual with the page supplied. Each bulletin package contains 1 set of new pages.

PAGES:
The revised areas have been highlighted by an arrow $\Rightarrow$.

- 7-27

New Information (ROM History - Controller Board)

## $\Rightarrow$ 7.4.2 ROM HISTORY - CONTROLLER BOARD

| Description of Modification | Firmware Level | Serial Number | Firmware Version |
| :---: | :---: | :---: | :---: |
| Initial Production | G0356080 A | 1st Prod. | NA |
| Corrects the following: <br> - Jam Recovery in Duplex Mode. After jam recovery in Duplex Mode, the original file is printed out but the image is not normal. <br> - This firmware version is Dazel certified. <br> - The position of the image is different when using the PCL driver versus the Post Script driver. <br> - The firmware has been modified to support Job MIB. <br> - The firmware has been modified to allow downloading of document formats. <br> - The firmware has been modified to support Page Count MIB. <br> - An SC2001 sometimes occurs during a print job if Auto Tray Select has been selected. | G0356080 D | From June '00 Prod. | 0.69 |

## BULLETIN NUMBER: G035-020

## APPLICABLE MODEL:

GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## SUBJECT: END FENCE

## GENERAL:

The shape of the end fence has been changed to help the end user to correctly position the end fence into the tray and to prevent breakage. Also, the material of the end fence has changed to a stronger type. The following part correction is being issued for all G035 Parts Catalogs.


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Page 2 of 2

## UNITS AFFECTED:

All G035 printers manufactured after the Serial Numbers listed below will have the new style end fence installed during production.

| MODEL NAME | SERIAL NUMBER |
| :---: | :---: |
| Gestetner P7045 | P18012XXXX |
| Ricoh AP4500 | P1810100001 |
| Savin SLP45 | P18012XXXX |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |

## BULLETIN NUMBER: G035-021

10/29/2002

## APPLICABLE MODEL:

GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## SUBJECT: SERVICE MANUAL - INSERT

## GENERAL:

The Service Manual pages listed below must be replaced with the pages supplied. Each bulletin package contains 1 set of replacement pages.

## PAGES:

The revised areas have been highlighted by an arrow $\Rightarrow$.

- 15-34 \& 15-35

A697 Firmware History

### 4.8 ROM HISTORY

| A697 Firmware Modification History (3000 Sheet Finisher) |  |  |  |
| :---: | :---: | :---: | :---: |
| Description of Modification | Level | Prod. Date | Ver. |
| Corrects the following: <br> - Modification to allow Chinese paper sizes. <br> - Modification of the start of the shift tray in staple mode. <br> - Corrected the problem of an SC not being displayed even though there was a problem with the paper exit pawl home position sensor during initialization. <br> - If the diagonal staple mode was selected when there was a problem with the stapler rotation motor home position sensor an SC occurred. | A6975656 A | July 1998 Production | A |
| Corrects the following: <br> - To improve the stacking in the shift tray during stapling, the following modifications were implemented. <br> 1. The initial lowering timing of the shift tray is now faster and the stack start time has been modified to allow the shift tray to return to the top position first. <br> 2. The line velocity for the exit roller has been changed from $600 \mathrm{~mm} / \mathrm{sec}$ to $700 \mathrm{~mm} / \mathrm{sec}$. The paper exit pawl speed has also been changed. <br> 3. The timing for lowering the shift tray has been changed to $50 \mathrm{~mm} / \mathrm{sec}$ after the exit sensor has detected the leading edge of the paper. | A6975656 B | July 1998 <br> Production | B |
| Corrects the following: <br> - When a jam occurs in the finisher, if the jam is not removed, the staple movement motor will not shut off. <br> - When the power save mode command from the main unit is received, the machine initializes. | A6975656 C | Sept. 1998 Production | C |
| Corrects the following: <br> - Occurrences of SC990. <br> - Defective paper exit for LG, DLT, A3 and B4 paper sizes. <br> - Two staples missing when B5 size paper is selected. <br> - Stacking problems occur when paper curls during manual staple mode. <br> - During Shift mode, the exit roller rolls up the paper if the paper curl is large. Modification of the shift tray height in shift mode, exit roller rotation speed and shift tray lowering timing. | A6975656 D | Nov. 1998 Production | D |
| Corrects the following: <br> - While receiving a fax in Energy Saver Mode, the A697 power comes on and initializes. <br> - When stacking with curled paper, the tray will move up and down slightly while the stapler is waiting for the remaining page(s) of a staple set. This slight up and down movement from the tray will tend to align any paper that slides out from the stack. | A6975656 E | Not Available | E |
| Corrects the following: <br> - When the G909 was connected, the main engine was unable to recognize the A697. | A6975656 F | Not Available | F |
| Corrects the following: <br> - Jam codes were not defined for paper jams at or before the entrance sensor. | A6975656 G | Not Available | G |
| Corrects the following: <br> - The stack height sensor mis-detects the height, which causes the exit motor to stop and a paper jam occurs. | A6975656 H | Not Available | H |


$\Rightarrow$| A697 Firmware Modification History (3000 Sheet Finisher) |  |  |  |
| :--- | :---: | :---: | :---: |
| Description of Modification | Level | Prod. Date | Ver. |
| Corrects the following: <br> - If a finisher job is initiated from 5 to 105 seconds after <br> the copier recovers from "Energy Saver Mode", Sc990 <br> or a paper jam occurs. | A6975656 J | Not Available | J |
|  |  |  |  |

## BULLETIN NUMBER: G035-022

03/06/2003
APPLICABLE MODEL:
GESTETNER - P7045
RICOH - AP4500
SAVIN - SLP45

## TECHNICAL SERVICE BULLETIN

## SUBJECT: DEVELOPMENT SLEEVE ASSEMBLY

## GENERAL:

The Doctor Blade Gap has been narrowed from $0.4 \pm 0.05 \mathrm{~mm}$ to $0.38 \pm 0.03 \mathrm{~mm}$ to ensure that toner does not stick to the operator side of the Development Roller. The following part update is being issued for all G035 Parts Catalogs. Please update your parts catalog with the following information.


|  |  |  |  |  | REFERENCE |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OLD PART NO. | NEW PART NO. | DESCRIPTION | QTY | INT | PAGE | ITEM |
| G0343100 | G0343101 | Development Sleeve Assy | 1 | 0 | 35 | 9 |

## INTERCHANGEABILITY CHART:

| 0 | OLD and NEW parts can be used in both OLD and <br> NEW machines. | 2 | NEW parts CAN NOT be used in OLD machines. <br> OLD parts can be used in OLD and NEW machines. |
| :---: | :--- | :---: | :--- |
| 1 | NEW parts can be used in OLD and NEW machines. <br> OLD parts CAN NOT be used in NEW machines. | 3 | OLD parts CAN NOT be used in NEW machines. <br> NEW parts CAN NOT be used in OLD machines. |
| $3 / S$ | Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or <br> previously modified, use the new part numbers individually. |  |  |


[^0]:    $\mathrm{CL}^{\Phi}{ }^{\text {is }}$ is a registered trademark of Hewlett-Packard Company.
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[^1]:    * Denotes new item number.

