# Russian Printer

# Aficio AP2700

# SERVICE MANUAL

October 1st, 1999
Subject to change

# ⚠IMPORTANT SAFETY NOTICES

**PREVENTION OF PHYSICAL INJURY**

1. Before disassembling or assembling parts of the copier and peripherals, make sure that the printer power cord is unplugged.
2. The wall outlet should be near the printer and easily accessible.
3. Note that some components of the printer and the paper tray unit are supplied with electrical voltage even if the main power switch is turned off.
4. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
5. 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 and its peripherals must be installed and maintained by a customer service representative who has completed the training course on those models.
2. The NVRAM on the system control board has a lithium battery which can explode if replaced incorrectly. Replace the NVRAM only with an identical one. The manufacturer recommends replacing the entire NVRAM. Do not recharge or burn this battery. Used NVRAM must be handled in accordance with local regulations.

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

## LASER SAFETY

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

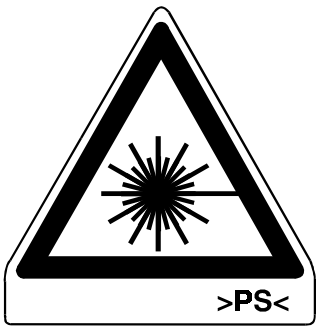
**⚠WARNING**

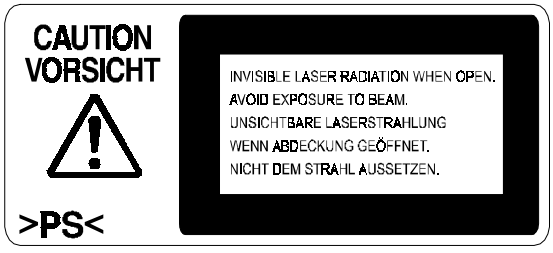
**Use of controls, or adjustment, or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.**

**⚠WARNING**

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

**CAUTION MARKING:**



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## PAPER TRAY UNIT (A861)

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## INTERCHANGE UNIT (G531)



## DUPLEX (G529)

## BRIDGE UNIT (A897)



## FINISHER (A681)

## MAILBOX (G518)

# 1. OVERALL MACHINE INFORMATION



## 1.1 SPECIFICATIONS

### 1.1.1 GENERAL SPECIFICATIONS

| | |
|---|---|
| Printing Speed: | Maximum 27 pages per minute (A4/LT LEF)<br>(22 pages: duplex printing) |
| Printer Language: | PCL6/PCL5e<br>PostScript Level 3<br>TIFF (rev 6.0 compatible) |
| Resolution: | 600 dpi (PCL 6/PCL5e/PS3)<br>300 dpi (PCL 5e/PS3) |
| Resident Fonts: | PCL:<br>35 Intellifonts<br>10 True Type fonts<br>1 Bitmap font<br>PS3:<br>136 fonts (24 Type 2 fonts, 112 Type 14 fonts) |
| Host Interface: | Bi-directional IEEE1284 parallel x 1 (Standard)<br>Ethernet (100 Base-TX/10 Base-T for TCP/IP, IPX/SPX, NetBEUI, Apple Talk) |
| Printing Paper Size: | Maximum: A3/11" x 17"<br>Minimum:<br>1st paper Tray: A5 SEF<br>2nd paper Tray: A6 SEF<br>By-pass: A6/ 90 x 148 mm SEF<br>(Refer to section 1.1.2, "Supported Paper Size".) |
| Printing Paper Weight: | 1st paper tray: 60 to 105 g/m$^2$ (16 to 28 lb.)<br>2nd paper tray: 60 to 157 g/m$^2$ (16 to 42 lb.)<br>By-pass Tray: 60 to 200 g/m$^2$ (16 to 110 Index) |
| Print Paper Capacity: | 1st and 2nd paper tray: 500 sheets x 2<br>Optional paper tray unit:<br>500 sheets x 1/2<br>Optional LCT<br>1000 sheets x 2<br>Optional by-pass tray:<br>100 sheets |
| Output Paper Capacity: | Standard output tray: 500 sheets<br>Optional finisher: 1,000 sheets<br>Optional 4-bin mailbox: 500 sheets total |
| First Print Speed: | 5 s or less (A4/LT LEF, 1st tray) |
| Warm-up Time | Less than 45 seconds |

Memory: Standard 16 MB, up to 80 MB with optional DIMM.

Power Source: 120 V, 60 Hz: More than 10 A (for North America)
220 V - 240 V, 50/60 Hz: More than 6.0 A (for Europe)

Power Consumption:

| | 120V | 230V |
|---|---|---|
| Maximum | 900W or less | 900W or less |
| Printing | 550W or less | 550W or less |
| Energy Saver | 25 W or less | 25 W or less |

Noise Emission:

| | Mainframe Only | Full System |
|---|---|---|
| **Sound Power Level** | | |
| Printing | 51 dB or less | 58 dB or less |
| Stand-by | 23 dB or less | 23 dB or less |

**NOTE:** The above measurements were made in accordance with ISO 9296 at the operator position.

Dimensions (W x D x H): 550 x 520 x 516 mm

Weight: Less than 46 kg

## 1.1.2 SUPPORTED PAPER SIZES

| Paper | Size (W x L) | Trays | | | LCT | Duplex | By-pass/ Tray 2 |
|---|---|---|---|---|---|---|---|
| | | 1st | 2nd | OP | | | |
| Ledger | 11 x 17” | Y | Y | Y | N | Y | Y# |
| Legal | 8.5 x 14“ | Y | Y | Y | N | Y | Y# |
| Letter SEF | 8.5 x 11” | Y | Y | Y | N | Y | Y# |
| Letter LEF | 11 x 8.5” | Y | Y | Y | Y | Y | Y# |
| Half Letter SEF | 5.5 x 8.5” | Y# | Y# | Y# | N | N | Y# |
| Half Letter LEF | 8.5 x 5.5” | N | N | N | N | N | N |
| Executive SEF | 7.25 x 10.5” | Y# | Y# | Y# | N | Y | Y# |
| Executive LEF | 10.5 x 7.25” | Y# | Y# | Y# | N | Y | Y# |
| A3 | 297 x 420 mm | Y | Y | Y | N | Y | Y# |
| B4 | 257 x 364 mm | Y# | Y# | Y# | N | Y | Y# |
| A4 SEF | 210 x 297 mm | Y | Y | Y | N | Y | Y# |
| A4 LEF | 297 x 210 mm | Y | Y | Y | Y | Y | Y# |
| B5 SEF | 182 x 257 mm | Y# | Y# | Y# | N | Y | Y# |
| B5 LEF | 257 x 182 mm | Y# | Y# | Y# | N | Y | Y# |
| A5 SEF | 148 x 210 mm | Y# | Y# | Y# | N | Y | Y# |
| A5 LEF | 210 x 148 mm | N | N | N | N | N | Y# |
| A6 SEF | 105 x 148 mm | N | Y# | N | N | N | Y# |
| Folio | 8.25 x 13” | Y# | Y# | Y# | N | Y | Y# |
| Foolscap | 8.5 x 13” | Y# | Y# | Y# | N | Y | Y# |
| F | 8 x 13” | Y# | Y# | Y# | N | Y | Y# |
| Com10 Env. | 4.125 x 9.5” | N | Y# | N | N | N | Y# |
| Monarch Env. | 3.875 x 7.5” | N | Y# | N | N | N | Y# |
| C6 Env. | 114 x 162 mm | N | Y# | N | N | N | Y# |
| C5 Env. | 162 x 229 mm | N | Y# | N | N | N | Y# |
| DL Env. | 110 x 220 mm | N | Y# | N | N | N | Y# |
| 8K | 267 x 390 mm | Y# | Y# | Y# | N | N | Y# |
| 16K SEF | 195 x 267 mm | Y# | Y# | Y# | N | N | Y# |
| 16K LEF | 267 x 195 mm | Y# | Y# | Y# | N | N | Y# |
| Custom | [Minimum] 90 x 148 mm [Maximum] 297 x 432 mm | N | N | N | N | N | YC |

**Remarks:**

| | |
|---|---|
| Y | Supported. The paper size sensor detects the paper size. |
| Y# | Supported. The user has to select the correct paper size for the tray. |
| YC | Supported. The user has to enter the width and length of the paper. |
| N | Not supported. |

# 1.2 SOFTWARE ACCESSORIES

The printer drivers and utility software are provided on one CD-ROM. An auto-run installer allows you to select which components to install. The service tools are not provided on the CD-ROM.

## 1.2.1 PRINTER DRIVERS

| Printer Language | Windows 3.1x | Windows 95/98 | Windows NT4.0 | Macintosh |
|---|---|---|---|---|
| PCL 6 | Yes | Yes | Yes | No |
| PCL 5e | Yes | Yes | Yes | No |
| PS3 | Yes | Yes | Yes | Yes |

**NOTE:** 1) The printer drivers for Windows NT 4.0 are only for the Intel x86 platform. There is no Windows NT 4.0 printer driver for PowerPC, Alpha, or MIPS platforms.
2) The PS3 drivers are all genuine AdobePS drivers. A PPD file for each operating system is provided with the driver.
3) The PS3 drivers for Macintosh support Mac OS 7.1 or later versions.
4) The PS3 drivers for Windows 3.1x and Windows NT4.0 do not support the “Proof Print” function.

## 1.2.2 UTILITY SOFTWARE

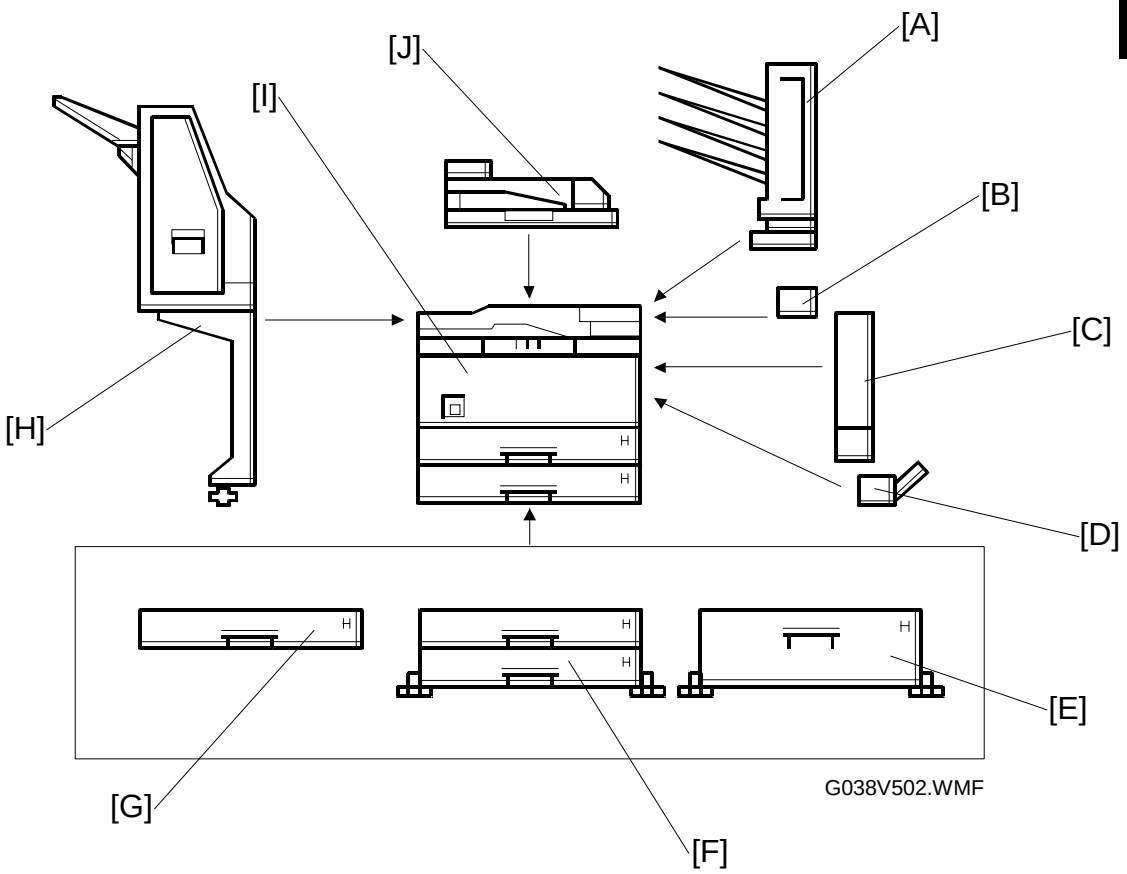
| Software | Description |
|---|---|
| Agfa Font Manager (Win3.1x, 95/98, NT4) | A font management utility with screen fonts for the printer. |
| Aficio Manager for Admin (Win 95/98, NT4) | A printer management utility for network administrators. NIB setup utilities are also available. |
| Aficio Manager for Client (Win95/98, NT4) | A printer management utility for client users. |
| Multi-Direct Print (Win95/98, NT4) | A utility for peer-to-peer printing over a NetBEUI or TCP/IP network. |
| Port Navi (Win95/98, NT4) | A peer to peer print utility over a TCP/IP network. This provides parallel printing and recovery printing function. |

## 1.2.3 SERVICE TOOLS

| Software | Description |
|---|---|
| NBTFTP | NIB firmware update utility for use on a NetBEUI network. This utility is not on the Driver and Utilities CD-ROM; it is issued separately as a service tool |

# 1.3 MACHINE CONFIGURATION

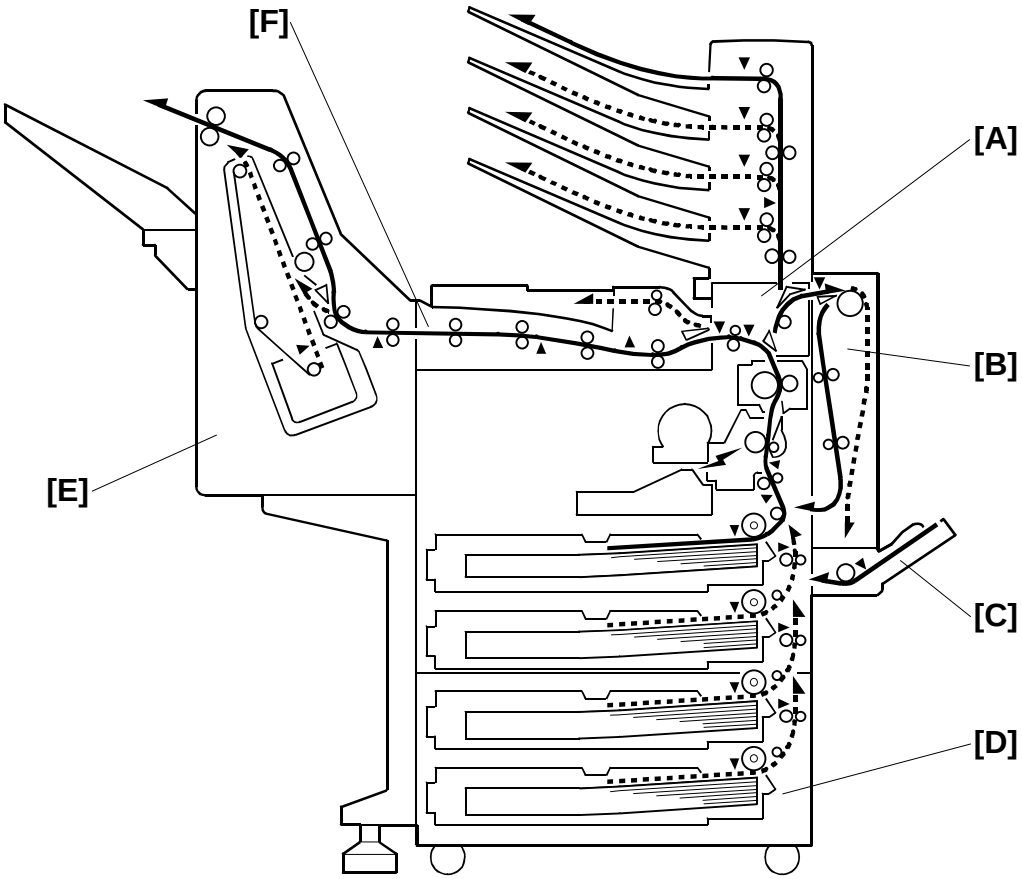
## 1.3.1 SYSTEM COMPONENTS



| Item | Machine Code | No. | Remarks |
|---|---|---|---|
| Main Unit | G038 | I | **User installable** |
| **Option** | | | |
| Paper Tray Unit - 1 tray | A861 | G | Used in common with Stinger-C (See note 1)<br>**User installable** |
| Paper Tray Unit - 2 trays | A860 | F | Used in common with Stinger-C/Russian-C (See note 1)<br>**User installable** |
| LCT | A862 | E | Used in common with Russian-C (See note 1)<br>**User installable** |
| By-pass Tray | A899 | D | Used in common with Russian-C<br>**User installable** |
| Interchange Unit | G531 | B | **User installable** |
| Duplex Unit | G529 | C | (See note 2, 3)<br>**User installable** |
| 4-bin Mailbox | G518 | A | (See note 2)<br>**User installable** |
| Bridge Unit | A897 | I | Used in common with Russian-C<br>(See note 4)<br>Service installation |
| 1000-sheet Finisher | A681 | H | Used in common with Russian-C/NAD<br>(See note 4)<br>Service installation |
| **Internal Option** | | | |
| HDD | G690 | | Used in common with Stinger-C/Russian-C<br>Service installation |
| Memory 32or 64 MB | G688 | | Used in common with Stinger-C/Russian-C<br>**User installable** |
| **Others** | | | |
| Maintenance Kit | G719 | | |

**NOTE:** 1) Only one of these options can be installed on the machine.
2) Requires the Interchange unit to be installed.
3) Requires the memory option to be installed.
4) The Bridge unit must be installed together with the 1000 sheet Finisher. Either the LCT or Paper Tray Unit (2 trays) must also be installed.

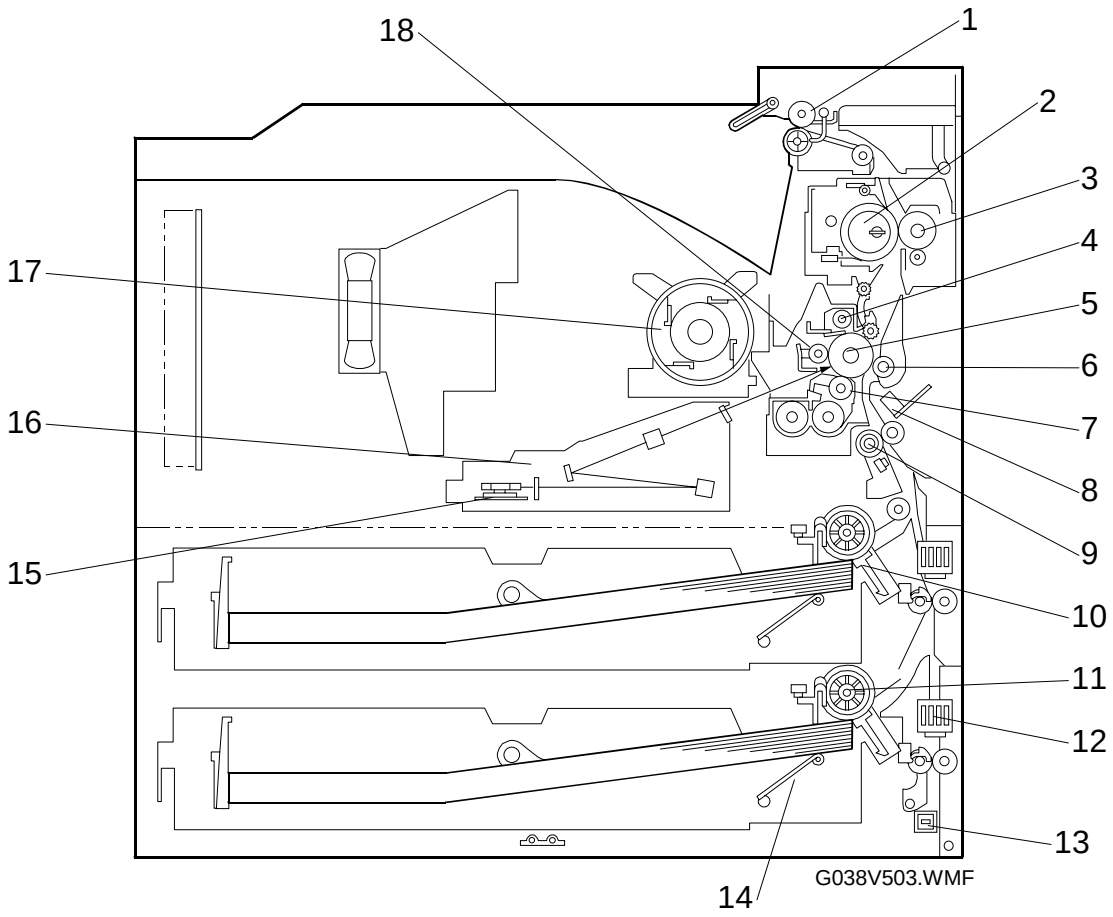
# 1.4 PAPER PATH




G038V101.WMF

[A]: Optional interchange unit
[B]: Optional duplex unit
[C]: Optional by-pass tray
[D]: Optional paper tray unit (2 trays)
[E]: Optional 1000-sheet finisher
[F]: Optional bridge unit

# 1.5 MECHANICAL COMPONENT LAYOUT




1. Exit roller
2. Hot roller
3. Fusing pressure roller
4. Cleaning unit
5. Drum
6. Transfer roller
7. Development roller
8. ID sensor
9. Registration roller
10. Friction pad
11. Paper feed roller
12. Paper size sensor
13. Special paper sensor
14. Bottom plate
15. Polygon mirror motor
16. Laser unit
17. Toner supply bottle holder
18. Charge roller

# 1.6 ELECTRICAL COMPONENT DESCRIPTIONS



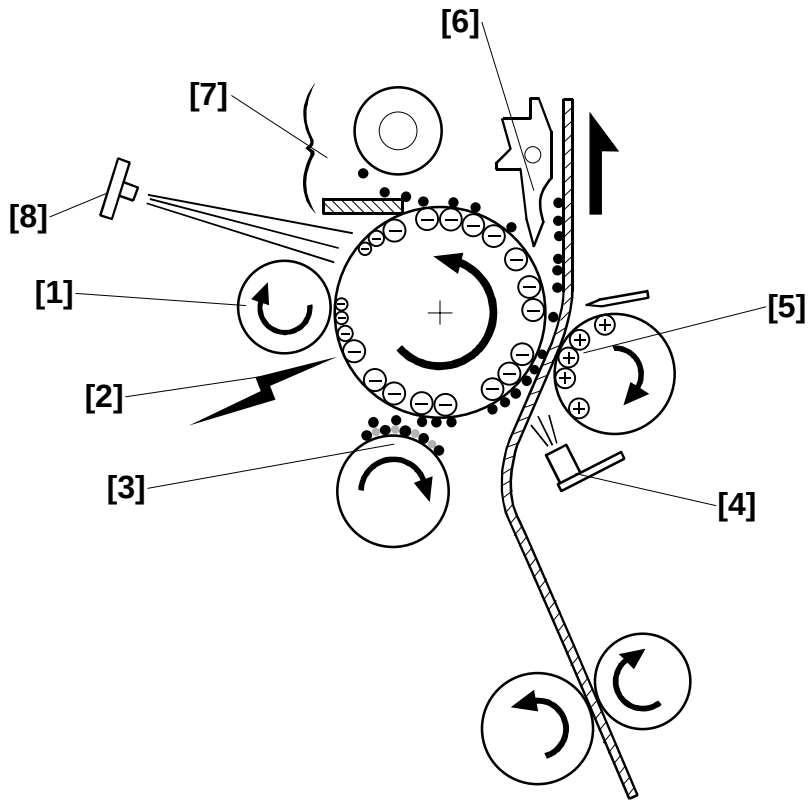
Refer to the electrical component layout on the reverse side of the point-to-point diagram for the location of the components.

| Symbol | Name | Function |
|---|---|---|
| **Motors** | | |
| M1 | Polygonal Mirror | Turns the polygonal mirror. |
| M2 | Main Motor | Drives the main unit components. |
| M3 | Exhaust Fan | Removes heat from around the fusing unit. |
| M4 | Upper Paper Lift | Raises the bottom plate in the 1st paper tray. |
| M5 | Lower Paper Lift | Raises the bottom plate in the 2nd paper tray. |
| M6 | Toner Supply | Rotates the toner bottle to supply toner to the development unit. |
| **Magnetic Clutches** | | |
| MC1 | Upper Paper Feed | Starts paper feed from the 1st paper tray. |
| MC2 | Lower Paper Feed | Starts paper feed from the 2nd paper tray. |
| MC3 | Upper Paper Transport | Drives the upper transport rollers. |
| MC4 | Lower Paper Transport | Drives the lower transport rollers. |
| MC5 | Registration | Drives the registration rollers. |
| **Switches** | | |
| SW1 | Main Switch | Provides power to the machine. If this is off, there is no power supplied to the machine. |
| SW2 | Right Upper Cover | Detects whether right upper cover is open or not. |
| SW3 | Right Cover | Cuts the +5VLD and +24V dc power line and detects whether the right cover is open or not. |
| SW4 | Right Lower Cover | Detects whether right lower cover is open or not. |
| SW5 | Upper Paper Size | Determines what size of paper is in the upper paper tray. |
| SW6 | Lower Paper Size | Determines what size of paper is in the Lower paper tray. |
| SW7 | Special Paper | Determines the special paper is in the lower paper tray. |
| SW8 | New PCU Detect | Detects when a new PCU is installed. |
| SW9 | Front Cover Safety | Cuts the +5VLD and +24V dc power line and detects whether the front cover is open or not. |
| **Sensors** | | |
| S1 | Toner Density (TD) | Detects the amount of toner inside the development unit. |
| S2 | 1st Paper End | Informs the CPU when the 1st paper tray runs out of paper. |
| S3 | 1st Paper End | Informs the CPU when the 2nd paper tray runs out of paper. |
| S4 | Image Density (ID) | Detects the density of various patterns and the reflectivity of the drum for process control. |
| S5 | Paper Overflow | Detects paper overflow condition. |
| S6 | Paper Exit | Detects misfeeds. |
| S7 | Upper Relay | Detects misfeeds. |

| Symbol | Name | Function |
|---|---|---|
| S8 | Lower Relay | Detects misfeeds. |
| S9 | Registration | Detects misfeeds and controls registration clutch off-on timing. |
| S10 | 1st Paper Lift | Detects when the paper in the 1st paper tray is at the feed height. |
| S11 | 2nd Paper Lift | Detects when the paper in the 2nd paper tray is at the feed height. |
| S12 | 1st Paper Height - 1 | Detects the amount of paper in the 1st paper tray. |
| S13 | 1st Paper Height - 2 | Detects the amount of paper in the 1st paper tray. |
| S14 | 2nd Paper Height - 1 | Detects the amount of paper in the 2nd paper tray. |
| S150 | 2nd Paper Height - 2 | Detects the amount of paper in the 2nd paper tray. |
| **PCBs** | | |
| PCB1 | Engine Board | Controls all printer engine functions. |
| PCB2 | Printer Controller Board | Controls the printer functions |
| PCB3 | Network Interface Board | Network interface board |
| PCB4 | PSU (Power Supply Unit) | Provides dc power to the system and ac power to the fusing lamp and heaters. |
| PCB5 | LDD (Laser Diode Driver) | Controls the laser diode. |
| PCB6 | Operation Panel | Controls the operation panel. |
| PCB7 | High Voltage Supply | Supplies high voltage to the drum charge roller, development roller, and transfer roller. |
| PCB8 | Memory (Option) | Expands memory capacity. |
| **Lamps** | | |
| L1 | Fusing Lamp | Heats the hot roller. |
| L2 | Quenching Lamp | Neutralizes any charge remaining on the drum surface after cleaning. |
| **Others** | | |
| TF1 | Fusing Thermofuse | Opens the fusing lamp circuit if the fusing unit overheats. |
| TH1 | Fusing Thermistor | Detects the temperature of the hot roller. |
| LSD 1 | Laser Synchronization Detector | Detects the laser beam at the start of the main scan. |

# 1.7 PRINTING PROCESS

**Overview**




G038V504.WMF

**1. DRUM CHARGE**

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**

Processed data from the computer/network is retrieved from the memory and transferred to the drum by a laser beam, which forms an electrical latent image on the drum surface. The amount of charge remaining as a latent image on the drum depends on the laser beam intensity, which is controlled by the engine board.

**3. DEVELOPMENT**

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

**4. 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.

**5. IMAGE TRANSFER**

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

**6. PAPER SEPARATION**

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

**7. CLEANING**

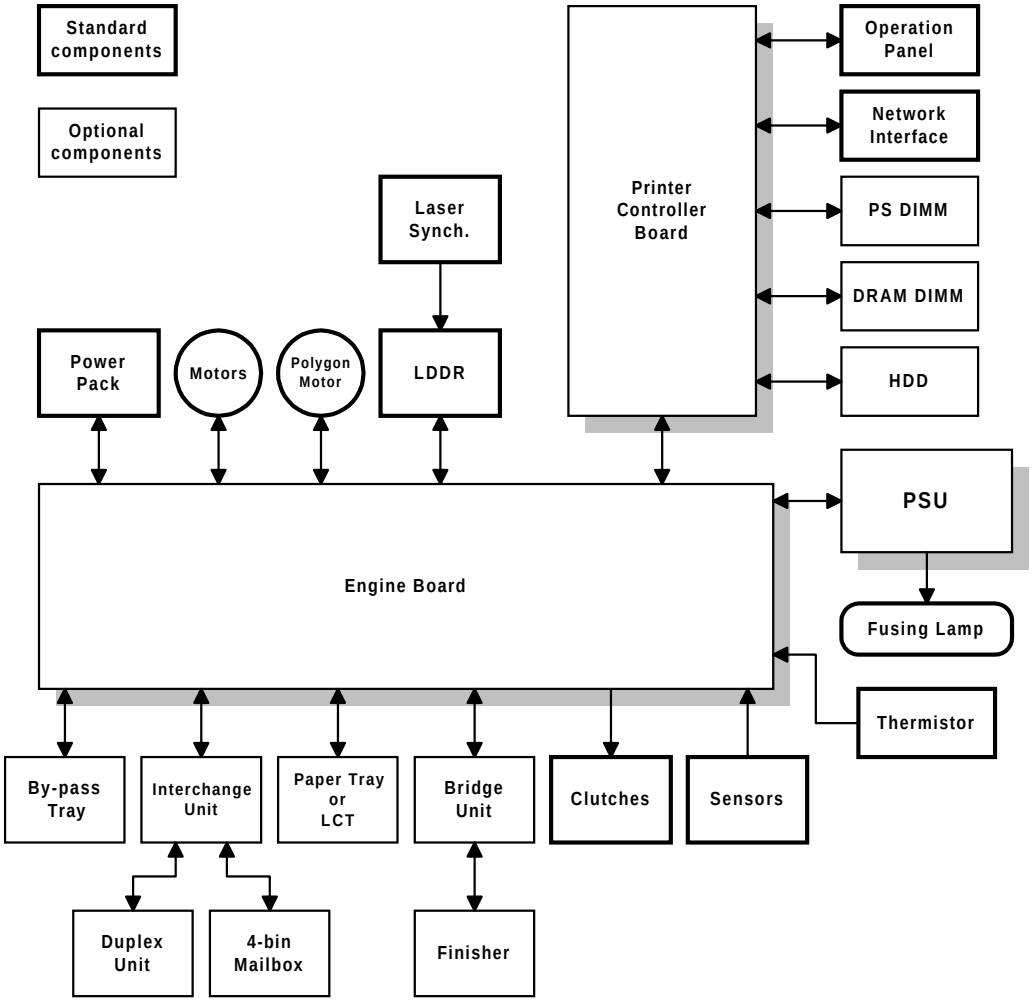
The cleaning blade removes any toner remaining on the drum surface after the image transfers to the paper.

**8. QUENCHING**

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

# 1.8 BOARD STRUCTURE

## 1.8.1 OVERVIEW




G038V501.WMF

The engine control firmware controls the components connected to the engine board. The printer control board controls the connected components.

## 1.8.2 DESCRIPTIONS

### 1. Engine Board

The engine board controls the following functions:

- Engine sequence
- Machine control, printer engine control
- Timing control for peripherals
- Video control
- Drive control for the sensors, motors, solenoids, and high voltage supply board

### 2. Printer Control Board

The printer control board handles the following functions:

- Interface of the connected components to the engine board
- Printer host interface
- Edge smoothing and toner saving
- Operation panel interface
- Interface and control of NIB and the other additional options (HDD, PS DIMM, and DRAM DIMM)

### 3. LD Drive Board

This is the laser diode drive circuit board.

### 4. Network Interface Board (NIB)

The network interface board allows the printer to be used on a network

### 5. HDD Unit (Option)

The HDD unit stores the data to perform the following functions.

- Additional soft fonts
- Collation
- Proof-print
- Downloading forms for form overlay

### 6. PS DIMM

This is to add the PostScript feature.

### 7. DRAM DIMM (Option)

This is used for an additional printer processing memory area and for soft fonts.

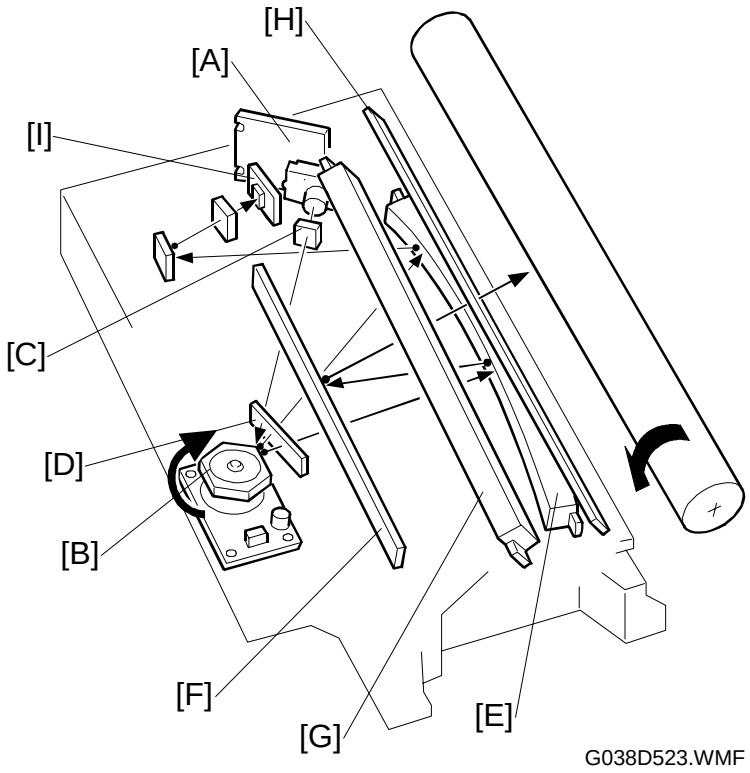
### 8. Control Panel Board

Controls the display panel, the LED, and the touch keypad.

# 2. DETAILED SECTION DESCRIPTIONS

## 2.1 LASER EXPOSURE

### 2.1.1 OVERVIEW



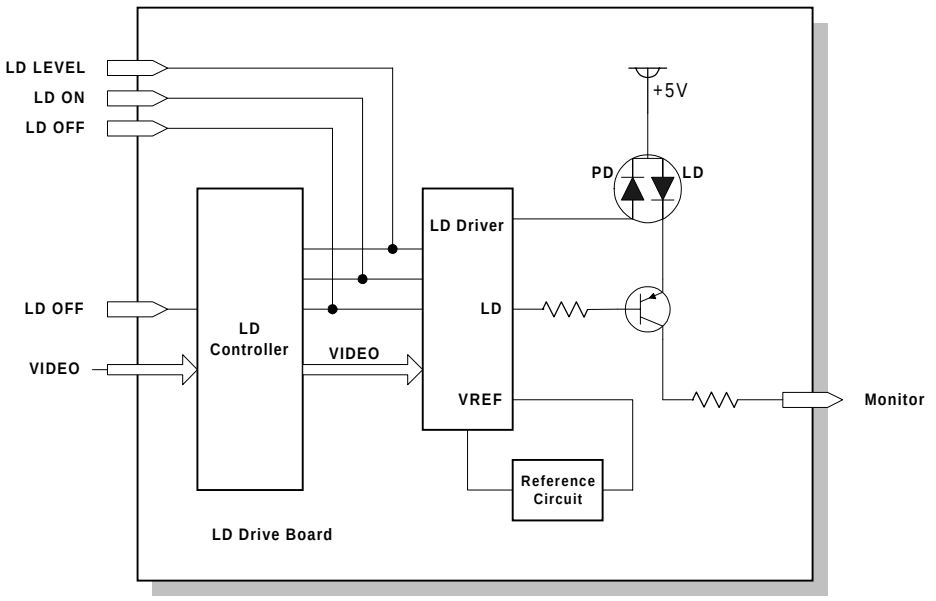

The LD unit [A] outputs a laser beam to the polygon mirror [B] through the cylindrical lens [C]. The shield glass [D] prevents dust from reaching the polygon mirror.

Each surface of the polygon mirror reflects one full main scan line. The laser beam goes to the F-theta mirror [E], mirror [F], and BTL (barrel toroidal lens) [G]. Then the laser beam goes to the drum through the toner shield glass [H].

The laser synchronizing detector [I] determines the starting position for the main scan.

The speed of the polygon mirror motor is 28,818.9 rpm for 600 dpi.

## 2.1.2 AUTO POWER CONTROL (APC)



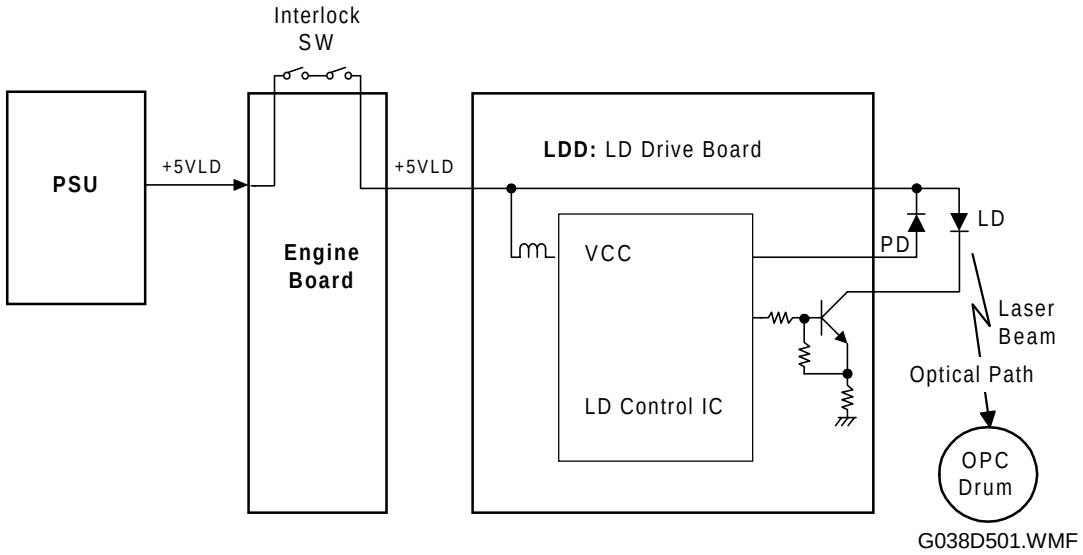

G038D510.WMF

The LD driver IC drives the laser diode. To prevent the intensity of the laser beam from changing because of the temperature, the machine monitors the current passing through the laser diode (LD). The machine adjusts the current to the laser diode by comparing it with the reference level from the reference circuit.
This auto power control is done just after the machine is turned on and during printing while the laser diode is active.

The laser diode power is adjusted on the production line.

**NOTE:** Do not touch the variable resistors on the LD unit in the field.

## 2.1.3 LD SAFETY SWITCH

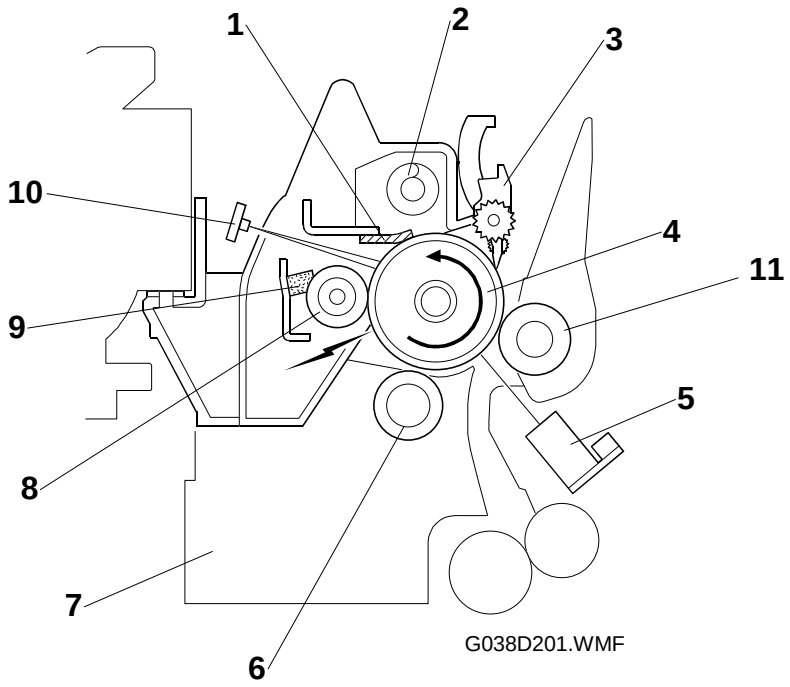



To ensure technician and user safety and to prevent the laser beam from inadvertently switching on during servicing, safety switches are located at the front cover and right cover. The switches are installed on the +5VLD line coming from the power supply unit through the Engine control board.

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

# 2.2 PHOTOCONDUCTOR UNIT (PCU)

## 2.2.1 OVERVIEW




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

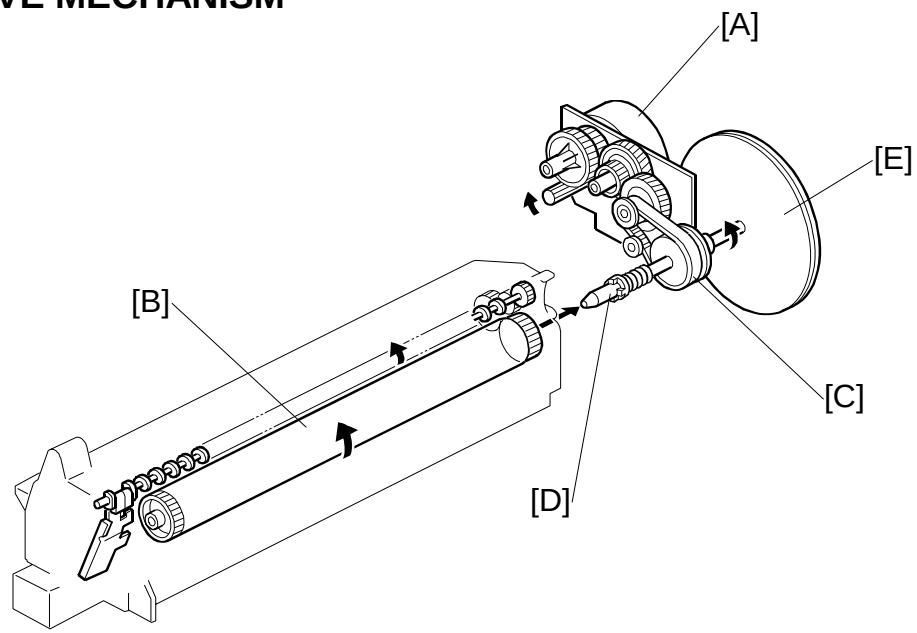
1. Cleaning Blade
2. Toner Collection Coil
3. Pick-off Pawl
4. OPC Drum
5. ID Sensor (see note)
6. Development Roller
7. Development Unit
8. Charge Roller
9. Charge Roller Cleaning Pad
10. Quenching Lamp (see note)
11. Transfer Roller (see note)

**NOTE:** These parts are not included in the PCU.

The machine informs the user when the PCU life has finished. However, the user can continue to make copies.

This warning message can be disabled by the printer engine service mode (Service Menu 2: Change PM Mes).

## 2.2.2 DRIVE MECHANISM

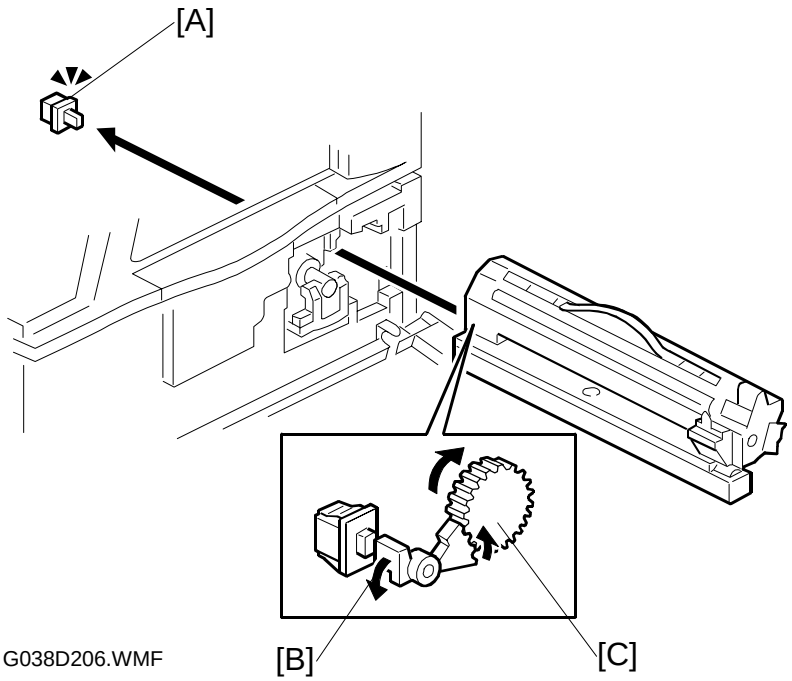



G038D202.WMF

The main motor [A] drives the drum [B] through a series of gears, a timing belt [C], and the drum drive shaft [D]. The main motor assembly includes a drive controller, which outputs a motor lock signal when the rotation speed is out of the specified range.

The fly-wheel [E] on the end of the drum drive shaft stabilizes the rotation speed (this prevents banding and jitter from appearing on printouts).

## 2.2.3 NEW PCU DETECTION MECHANINSM




When the PCU counter reaches 60K, the “Replace PCU” message is displayed.

The new PCU detect switch [A] detects when a new PCU is installed. Each PCU has an actuator [B]. When a new PCU is installed in the machine, the actuator [B] pushes the new PCU detect switch. The actuator is a sector gear, and this gear engages with the drum gear [C]. When the drum rotates, the actuator is released from the drum gear. The actuator drops away from the new PCU detect switch and remains in this "down" position for the duration of the PCU's life.

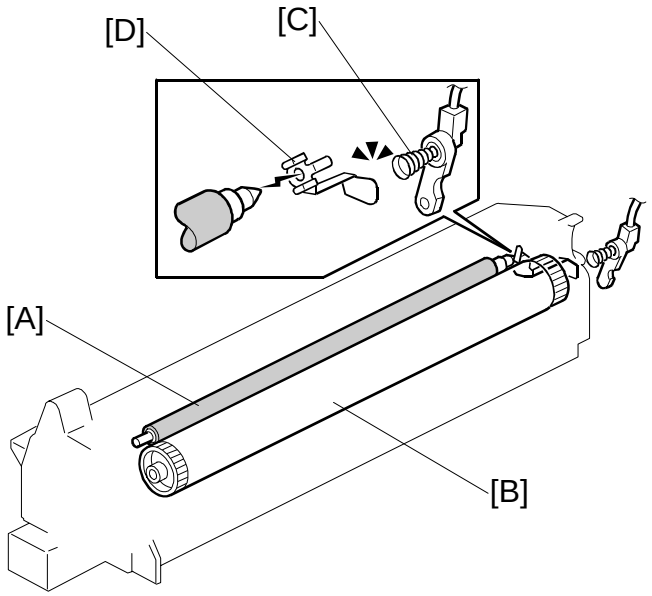
The machine can recognize when a new PCU has been installed in the machine because the actuator of the new PCU comes in contact with the new PCU detect switch. Then, the machine automatically resets the PCU counter.
After the front cover and right cover are closed, the machine then performs the TD sensor initial setting procedure automatically (for about 45 seconds). During this time, the drum rotates and the actuator drops away from the sensor.

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

**NOTE:** The PCU counter can be cleared by the printer engine service mode (Service Menu 2: PCU Count clr).

# 2.3 DRUM CHARGE

## 2.3.1 OVERVIEW



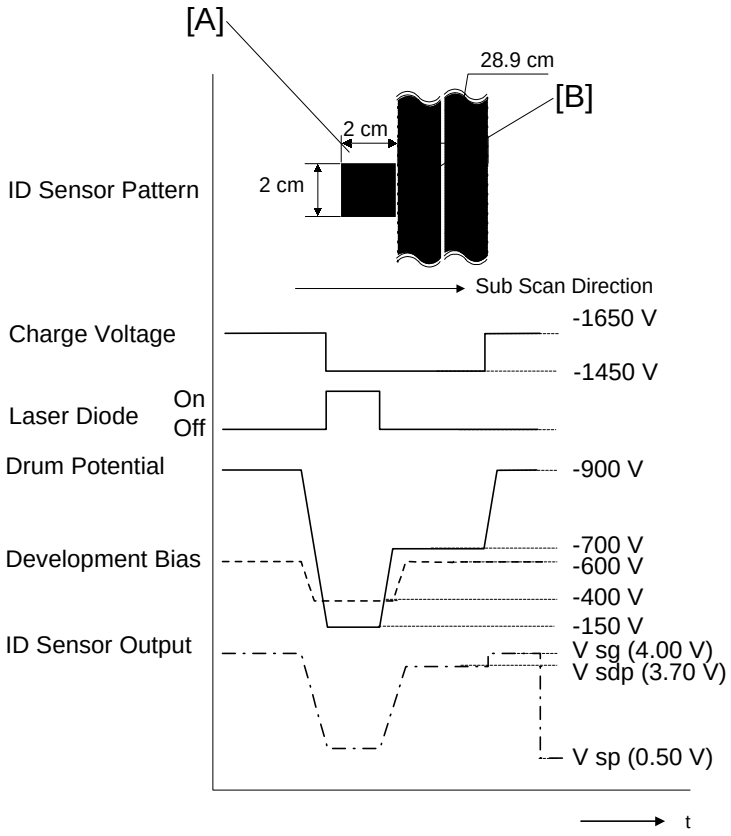

G038D203.WMF

This machine uses a drum charge roller to charge the drum. The drum charge roller [A] always contacts the surface of the drum [B] to give it a negative charge of -900V.

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

## 2.3.1 CHARGE ROLLER VOLTAGE CORRECTION

### *Correction for Environmental Conditions*




G038D516.WMF

With a drum charge roller system, the voltage transferred from roller to drum varies with the temperature and humidity around the drum charge roller. The lower the temperature or humidity is, the higher the applied voltage required.

To compensate, the machine uses the ID sensor to measure the effects of current environmental conditions. For this measurement, the process control parameters are balanced so that any small change in drum potential caused by environmental effects is reflected in a change in the amount of toner transferred to the drum.

This measurement is made immediately after the ID sensor pattern for toner density control. Immediately after making ID sensor pattern [A], the charge roller voltage stays on, but the development bias goes up to -600V; as a result the drum potential is reduced to -700V. The laser diode is not switched on, and the drum potential is now slightly higher than the development bias, so only a very small amount of toner transfers to the drum. The ID sensor measures the density of this pattern [B], and the output voltage is known as Vsdp. This voltage is compared with Vsg (read from the bare drum at the same time).

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

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

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

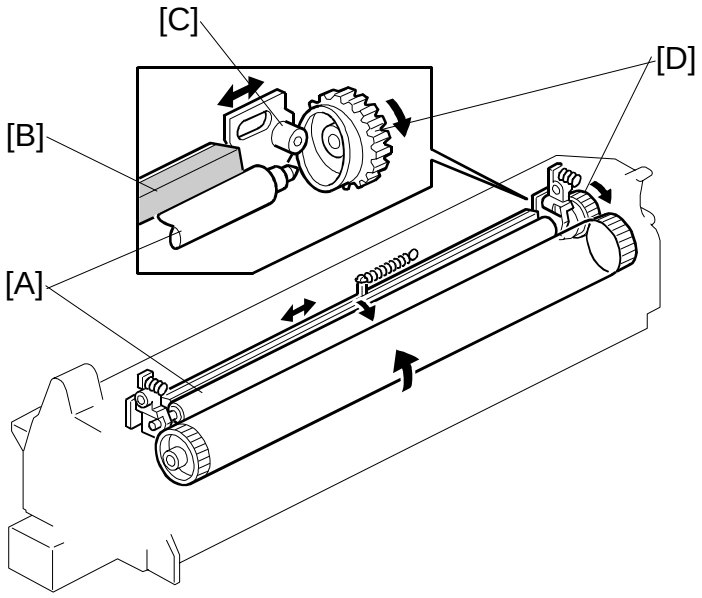


## 2.3.2 ID SENSOR PATTERN PRODUCTION TIMING

An ID sensor pattern is made in the following conditions.

- During warming up at power on
- If the machine starts warming up after entering the energy saver mode

## 2.3.3 DRUM CHARGE ROLLER CLEANING



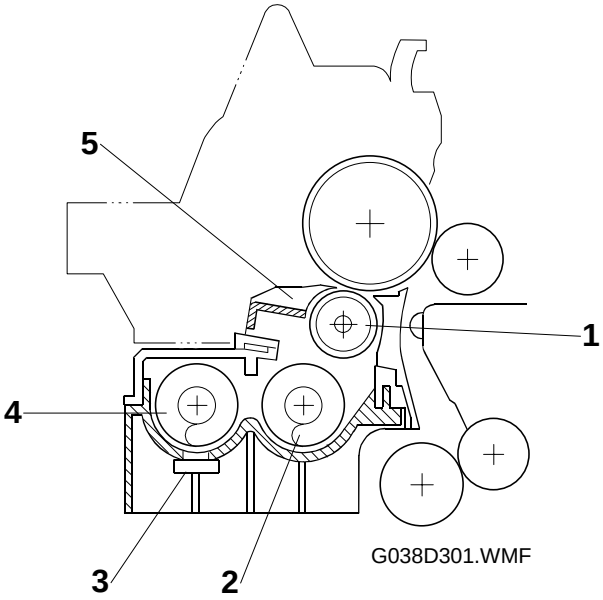

G038D205.WMF

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

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

# 2.4 DEVELOPMENT

## 2.4.1 OVERVIEW

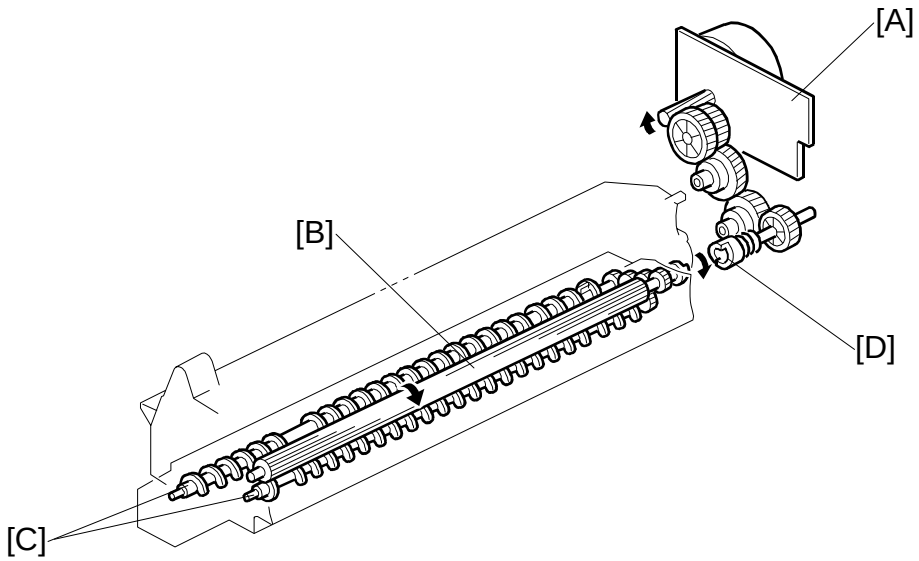



The development unit consists of the following parts.

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

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

## 2.4.2 DRIVE MECHANISM

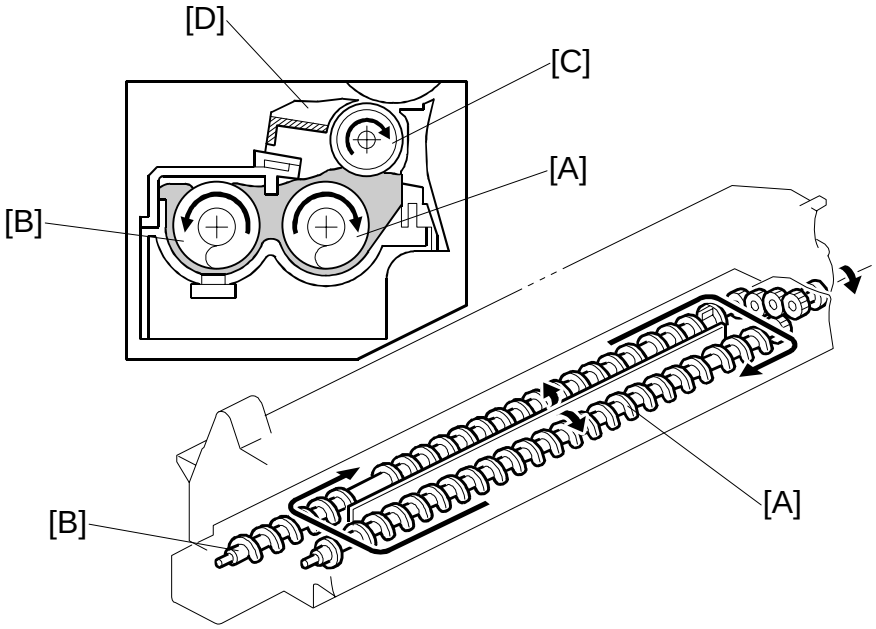



G038D304.WMF

The main motor [A] drives the development roller [B] and mixing augers [C] through a train of gears and the development drive shaft [D]. When the PCU is pushed in, the development drive shaft engages the development roller gear.

The development drive gears (except for the gears in the development unit) are helical gears. These gears are quieter than normal gears.

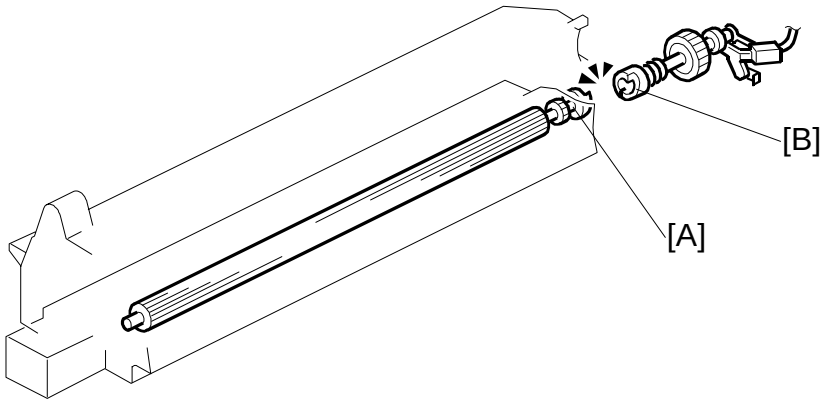
## 2.4.3 DEVELOPER MIXING




G038D302.WMF

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

## 2.4.4 DEVELOPMENT BIAS




G038D303.WMF

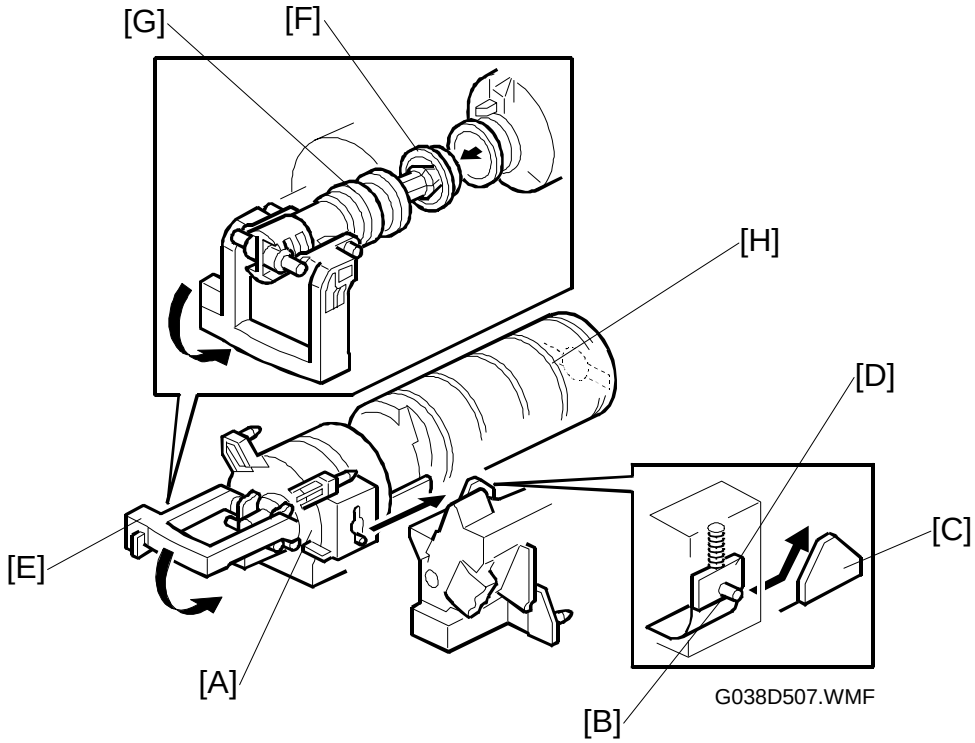
This machine uses a negative-positive development system, in which black areas of the latent image are at a low negative charge (about -150 ± 50 V) and white areas are at a high negative charge (about -900 V).

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

The development bias voltage (-600 V) can be adjusted with the printer service mode (Service Menu 2: Developer bias).

## 2.4.5 TONER SUPPLY

### *Toner bottle replenishment mechanism*



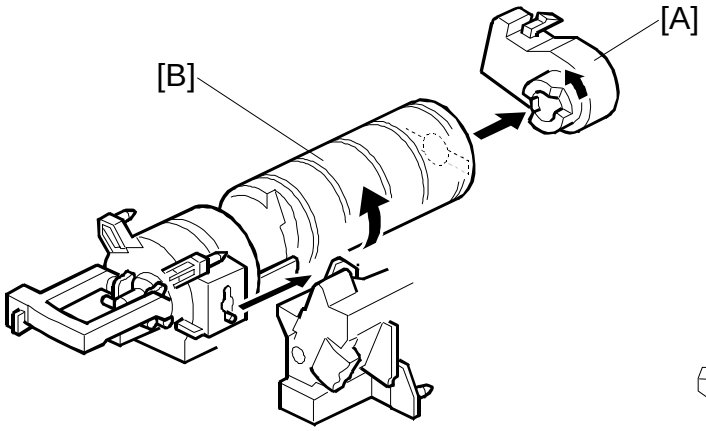

When a toner bottle is placed in the bottle holder unit [A] and the unit is pushed in completely, pin [B] moves against the side [C] of the PCU, and the toner shutter [D] is pulled out to open the bottle. When the toner bottle holder lever [E] is put back in the original position, the cap [F] on the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

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

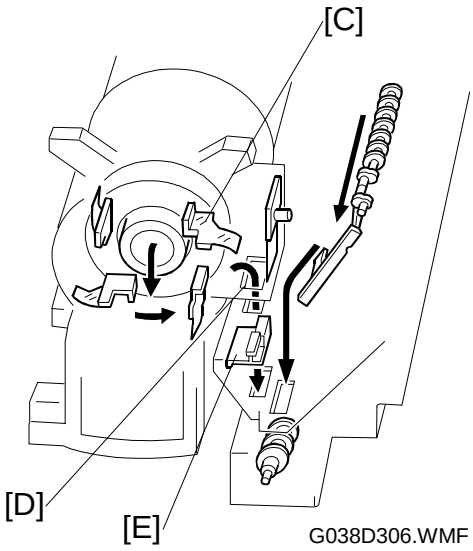
When the bottle holder unit is pulled out to add a new toner bottle, the following happens automatically to prevent toner from scattering.

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

### *Toner supply mechanism*




G038D508.WMF




G038D306.WMF

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

## 2.4.6 TONER DENSITY CONTROL

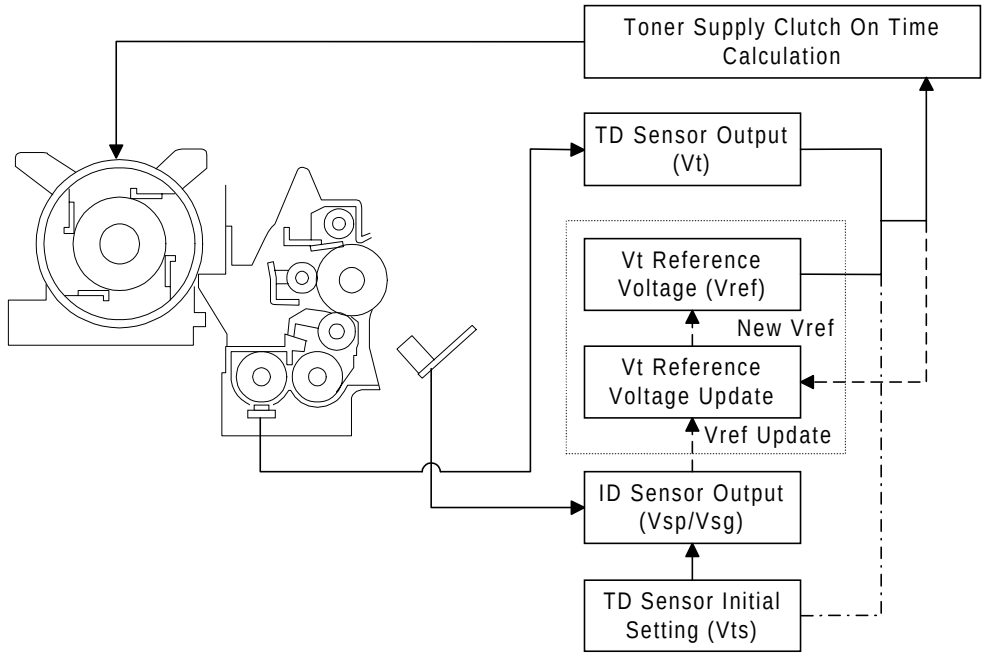
### *Overview*

There are four modes for controlling toner supply as shown in the following tables. The mode can be changed with by the printer service mode (Service Menu 2: Toner supply). The factory setting is P+T control mode.

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

**Cross-reference:** Section 4.2 Service Program Mode






G038D517.WMF

There are four toner density control modes:

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

| Mode | Fixed Quantity 1<br>(Designer's use only; do not use in the field) |
|---|---|
| Toner supply decision | Compare Vt with a reference voltage (Vts) |
| Toner control process | This toner control process is the same as the P+T control mode. However, the reference voltage used is always Vts. |
| Toner supply amount | Varies |
| Toner end detection | Performed |

| Mode | Fixed Quantity 2<br>(Designer's use only; do not use in the field) |
|---|---|
| Toner supply decision | Compare Vt with a reference voltage (Vts or Vref) |
| Toner control process | This toner control process is the same as the P+T control mode. |
| Toner supply amount | Fixed |
| Toner end detection | Performed |

| Mode | T Control<br>(Use temporary if the TD sensor needs to be replaced) |
|---|---|
| Toner supply decision | None |
| Toner control process | Toner is supplied every printed page regardless of Vt. |
| Toner supply amount | Fixed |
| Toner end detection | Not performed |

### *Toner density sensor initial setting*

The TD sensor initial setting procedure is performed automatically when the new PCU is installed in the machine. During TD sensor initial setting, the TD sensor is set to the TD sensor output to the value programmed in the printer service mode (T sensor set: default: 2.3V). This value will be used as the standard reference voltage (Vts) of the TD sensor.

### *Toner density measurement*

Toner density in the developer is detected once every print cycle. The sensor output voltage (Vt) during the detection cycle is compare with the standard reference voltage (Vts) or the toner reference voltage (Vref).

### *Vsp/Vsg detection*

The ID sensor detects the following voltages.

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

In this way, the reflectivity of both the drum surface and the pattern on the drum are checked. This compensates for any variations in the reflectivity of the pattern on the drum or the reflectivity of the drum surface.

The ID sensor pattern is made on the drum by charge roller and laser diode.

Vsg/Vsp is not detected every page or job; it is detected at the following times to decide Vref.

- During warming up at power on
- If the machine starts warming up after a certain time has passed since entering the energy saver mode.

### *Toner supply reference voltage (Vref) determination*

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

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

### *Toner supply determination*

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

### *Toner Supply Motor On Time Determinations*

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

- Vt
- Vref
- TD sensor sensitivity (coefficient: S, value is 0.4)

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

| Level | Decision | Motor On Time (seconds) |
|---|---|---|
| 1 | Vref < Vt ≤ S/16 | 0.6 |
| 2 | Vref < Vt ≤ S/8 | 1.2 |
| 3 | Vref < Vt ≤ S/4 | 2.4 |
| 4 | Vref < Vt ≤ S/2 | 4.8 |
| 5 | Vref < Vt ≤ 4S/5 | 9.6 |
| 6 | Vt ≥ 4S/16 | (30); see note 3 |
| 7 | Vt ≥ Vref+S | (30); see note 3 |

**NOTE:** 1) (30) means that toner is supplied intermittently in a 1/3 duty cycle (1 s on, 2 s off) for 30 seconds

## 2.4.7 TONER NEAR END/END DETECTION AND RECOVERY

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

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



### *Toner Near End Detection*

If Vt is at level 6 (see the table on the previous page) five times consecutively, the machine enters the toner near end condition and the toner end indicator starts blinking. Then the machine supplies toner for a certain time in accordance with the table explained in the previous section.

### *Toner Near End Recovery*

If the machine detects “Vt < (Vref or Vts) + 4S/5” twice consecutively when in one of the following situations, the machine leaves the toner near end condition.

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

### *Toner End Detection*

There are two situations for entering the toner end condition.

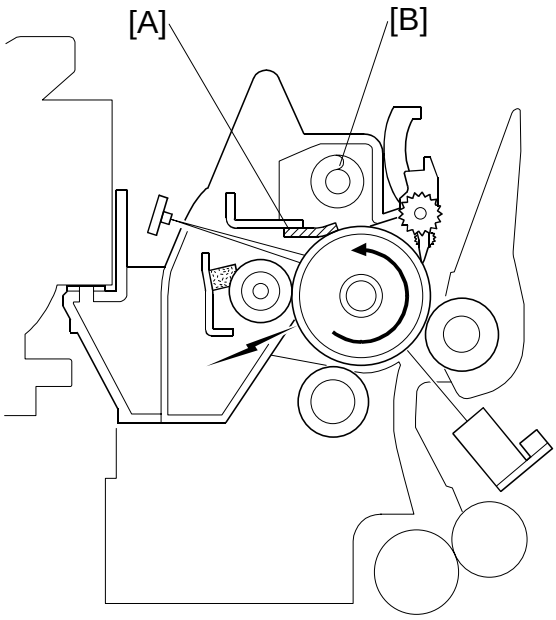
- When Vt is level 7 three times consecutively, the machine enters the toner end condition.
- When “Vt+S > Vt > (Vref or Vts) + 4S/5” is detected in the toner near end condition, then 50 prints can be made after this condition.

### *Toner End Recovery*

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

# 2.5 DRUM CLEANING AND TONER RECYCLING

## 2.5.1 DRUM CLEANING



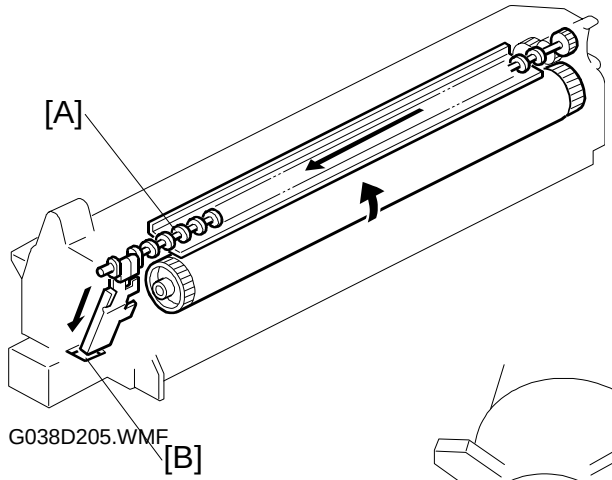

G038D201.WMF

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

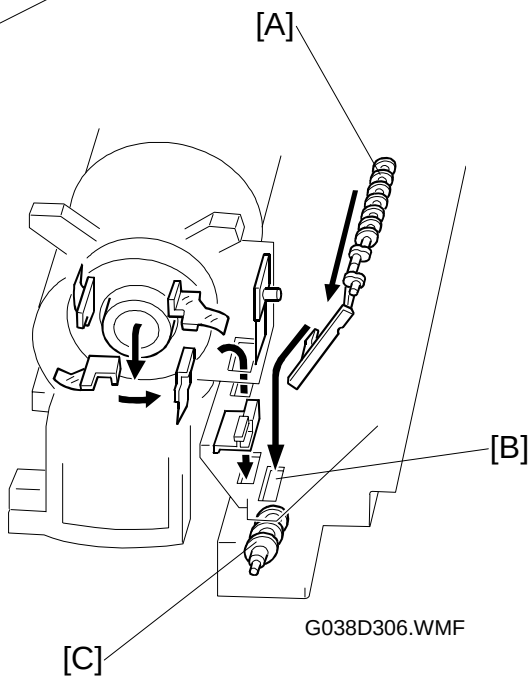
The cleaning blade scrapes off toner remaining on the drum. When toner builds up in the cleaning unit, toner at the top of the pile is removed by the toner collection coil [B].

To remove the toner and other particles that are accumulated at the edge of the cleaning blade, the drum turns in reverse for about 5 mm at the end of every print job.

## 2.5.2 TONER RECYCLING




G038D205.WMF

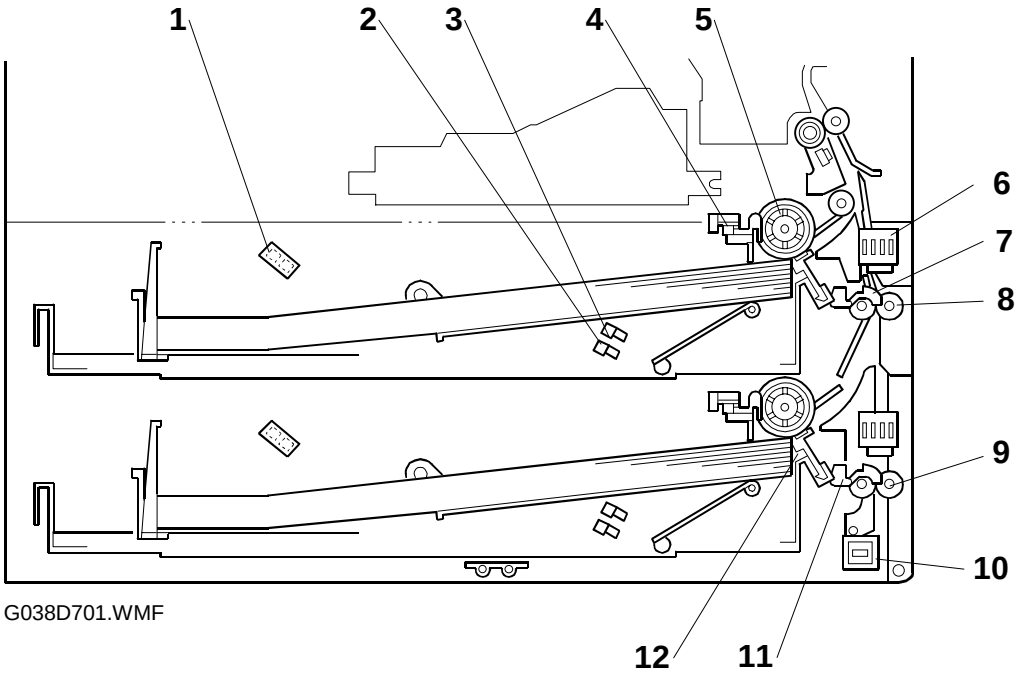



G038D306.WMF

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

# 2.6 PAPER FEED

## 2.6.1 OVERVIEW




G038D701.WMF

There are two paper trays, each of which can hold 500 sheets.

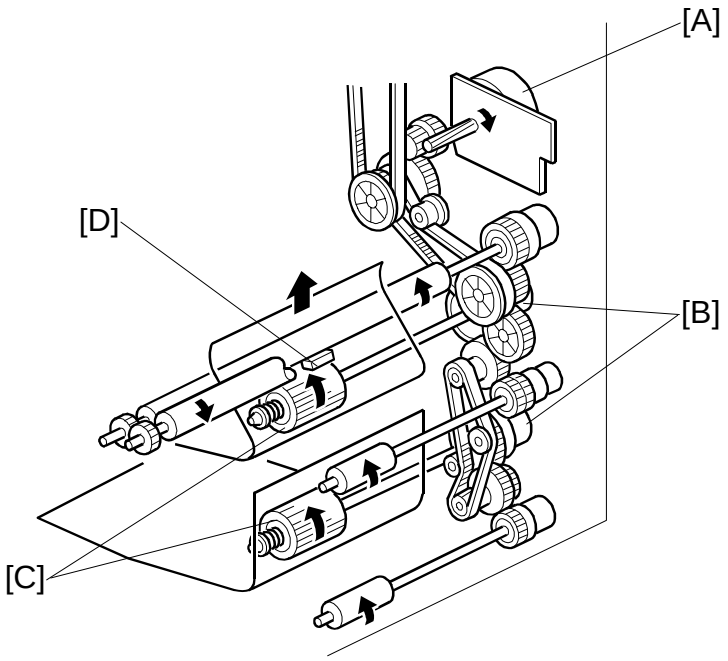
The paper tray feed stations use a friction pad system.

The two relay sensors are used for paper jam detection.

The components of the paper feed station are as follows.

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

## 2.6.2 PAPER FEED DRIVE MECHANISM

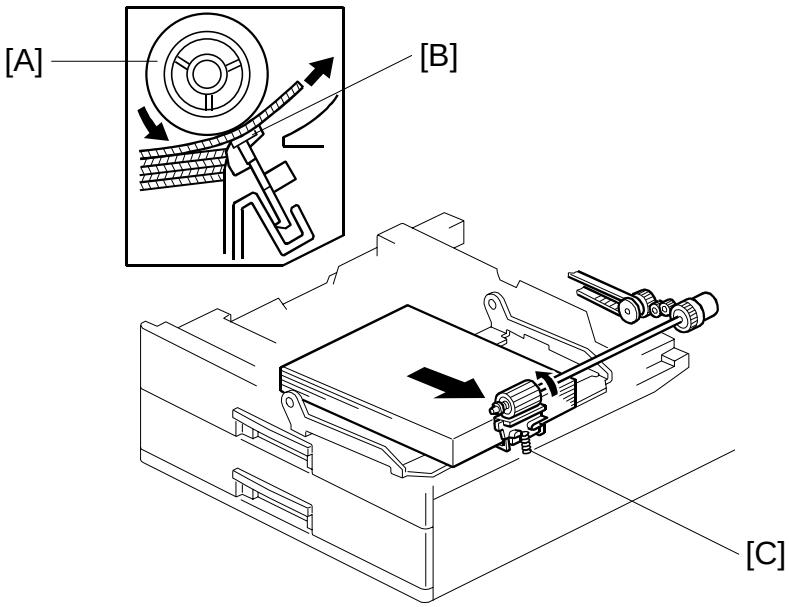



G038D702.WMF

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

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

## 2.6.3 PAPER FEED AND SEPARATION MECHANISM

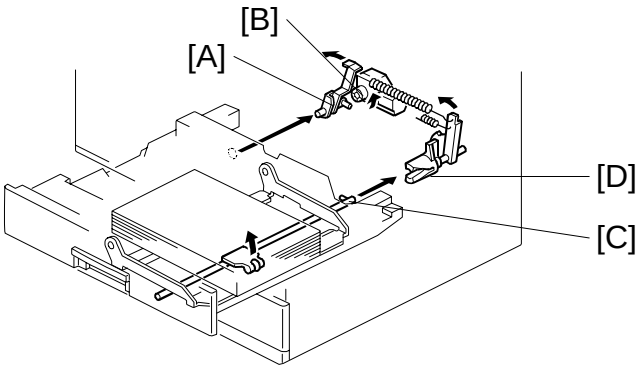



A860D104.WMF

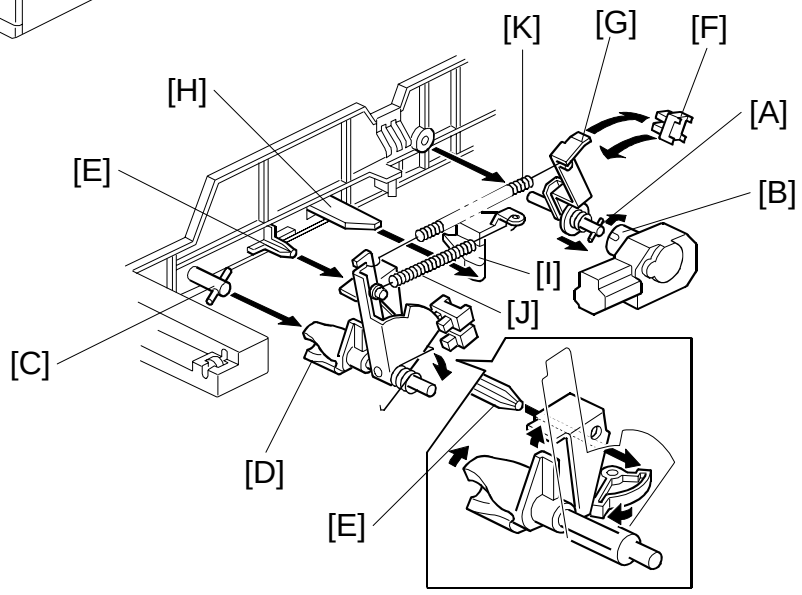
The paper feed roller [A] drives the top sheet of paper from the paper tray. The friction pad [B] allows only one sheet to feed at a time. The friction pad applies pressure to the feed roller with a spring [C].

The friction pad pressure cannot be adjusted.

## 2.6.4 PAPER LIFT MECHANISM




G038D521.WMF




G038D522.WMF

The paper size switch detects when the tray is pushed in.

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

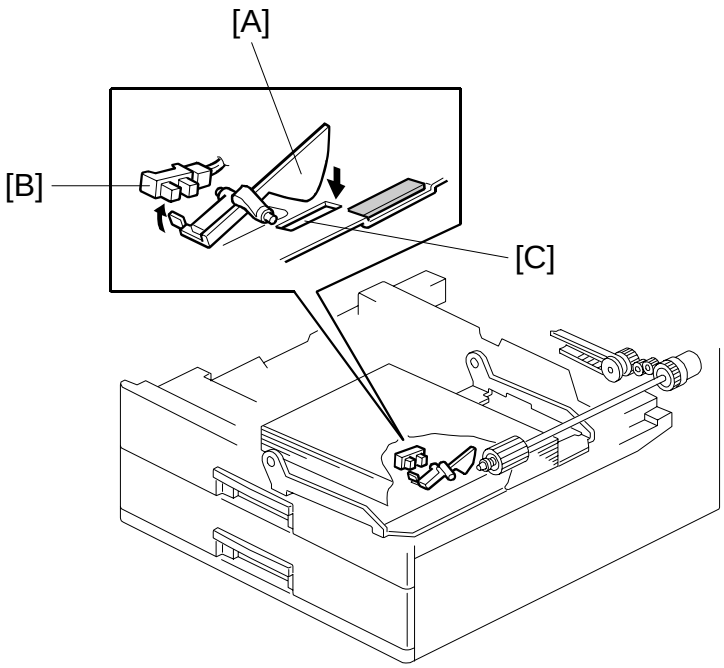
The lift motor turns on, and turns clockwise as viewed on the diagram. The main pressure spring [K] pulls the bottom plate pressure lever, and this lifts the tray bottom plate.

When the top of the stack touches the feed roller, the motor cannot pull up the plate any more, so it pulls the actuator [G] into the lift sensor [F]. Then the lift motor reverses a certain time (200 ms or 600 ms), depending on the paper size, to reduce this pressure. For smaller paper, it reverses the larger amount (600 ms) to reduce the pressure more.

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

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

## 2.6.5 PAPER END DETECTION



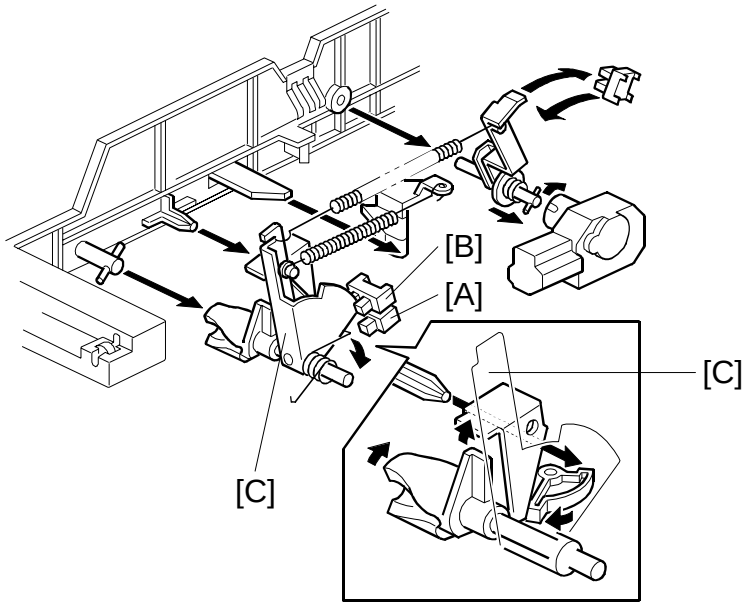

G038D520.WMF

If there is some paper in the paper tray, the paper stack raises the paper end feeler [A] and the paper end sensor [B] is deactivated.

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

When the paper tray is drawn out with no paper in the tray, the shape of the paper end feeler causes it to lift up.

## 2.6.6 PAPER HEIGHT DETECTION




G038D522.WMF

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

When the amount of paper decreases, the bottom plate pressure lever [C] moves the actuator up.

The following combination of sensor signals is sent.

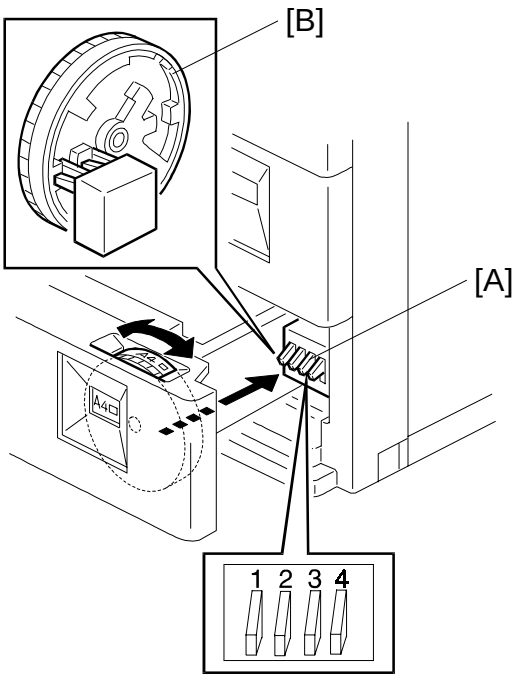
| Amount of Paper | Paper Height Sensor 1 | Paper Height Sensor 2 |
|---|---|---|
| Near End | OFF | ON |
| 30% | ON | ON |
| 70% | ON | OFF |
| 100% | OFF | OFF |

When the tray contains paper of a small width, the paper feed pressure may become too low when the thickness of the remaining stack of paper has decreased. The lift motor rotates forward 400 ms after the sensor detects a certain amount of paper remaining in the tray to increase paper feed pressure, simulating the pressure generated by a full tray.

## 2.6.7 PAPER SIZE DETECTION

| SW / Size | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| A3 | --- | --- | --- | --- |
| A4 LEF | ✓ | ✓ | --- | ✓ |
| A4 SEF | ✓ | ✓ | --- | --- |
| A5 SEF, 8 1/2" x 14" | --- | --- | ✓ | ✓ |
| B4, 11" x 17" | ✓ | --- | ✓ | --- |
| B5 LEF, 11" x 8 1/2" | ✓ | --- | --- | --- |
| B5 SEF, 8 1/2" x 11" | --- | ✓ | ✓ | ✓ |
| * (Asterisk) | --- | ✓ | --- | ✓ |

✓: ON (Not pushed)
---: OFF (Pushed)




G038D533.WMF

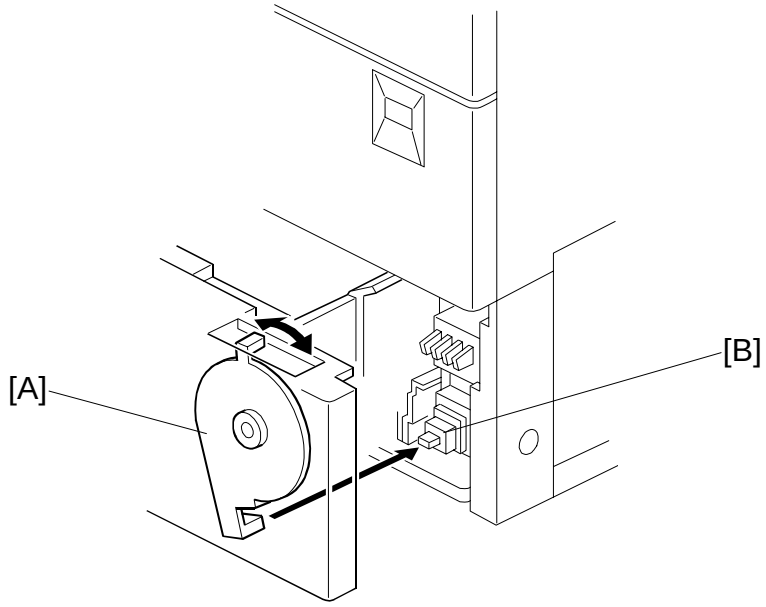
There are four paper size microswitches [A] on the front right plate of the paper tray unit. The switches are actuated by a paper size actuator [B] behind the paper size indicator plate, which is on the front right of the tray.

Each paper size has its own actuator, with a unique combination of notches. To determine which size has been installed, the CPU reads which microswitches the actuator has switched off.

The CPU disables paper feed from a tray if the paper size cannot be detected. If the paper size actuator is broken, or if there is no tray installed, the Add Paper indicator will light.

When the paper size actuator is at the "*" mark, the paper tray can be set up to accommodate one of a wider range of paper sizes by using user tools. If the paper size for this position is changed without changing the user tool setting, a paper jam will result.

## 2.6.8 SPECIAL PAPER SETTING




G038D703.WMF

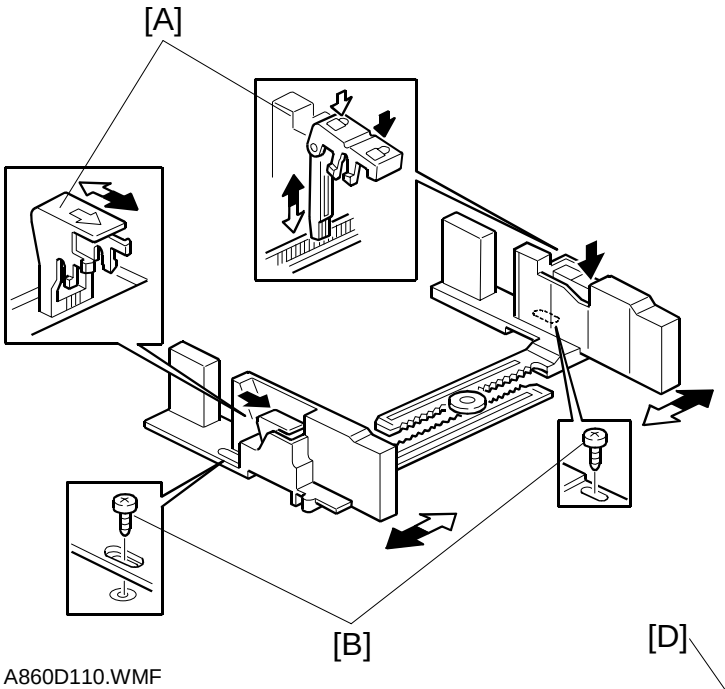
When feeding thick paper and envelopes, the user must use the 2nd paper tray (if the optional by-pass table is not installed), and turn lever [A] to the right. Then, when sliding the tray into the machine, the lever does not push the special paper switch [B] (it stays off), and the machine detects that there is special paper in the 2nd paper tray.

When the machine detects the special paper signal, the fusing temperature and the transfer roller current will be changed as follows.

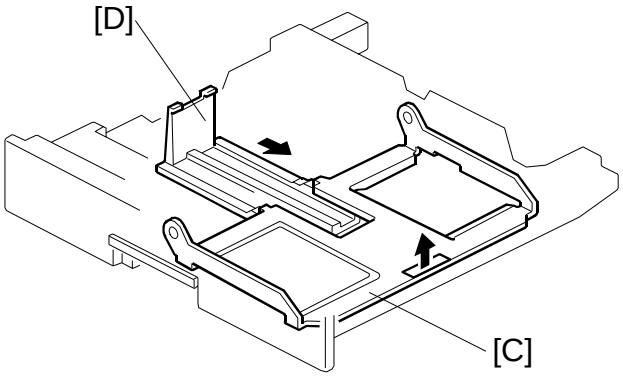
1. Fusing temperature: Current operation temperature +10 °C
2. Transfer roller current:
   A3 width (11"): 14 µA
   B4 width (10"): 15 µA
   A4 width (8.5"): 17 µA
   A5 width (5.5"): 20 µA

Note that for the by-pass tray, the fusing and transfer conditions for special paper are also applied if the user uses thick (non-standard) mode.

## 2.6.9 SIDE AND END FENCES




A860D110.WMF




A860D109.WMF

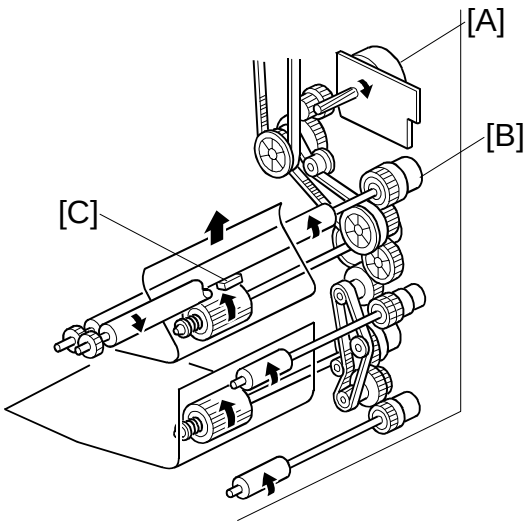
### *Side Fences*

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

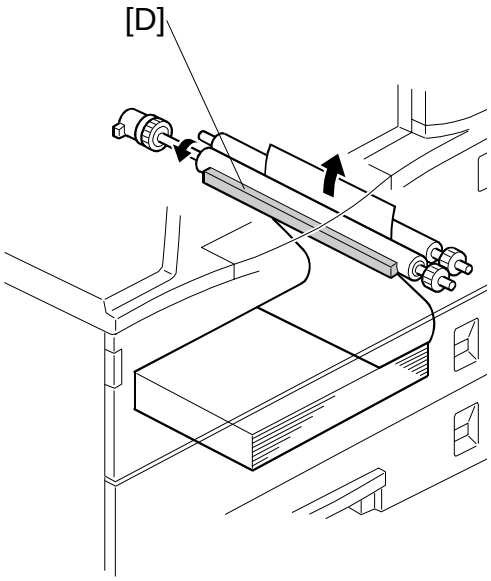
### *End Fence*

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

## 2.6.10 PAPER REGISTRATION




G038D702.WMF




G038D704.WMF

The drive from the main motor [A] is transmitted to the registration roller through the registration clutch gear [B].

The registration sensor [C] is used for correcting paper skew and for detecting paper misfeeds.

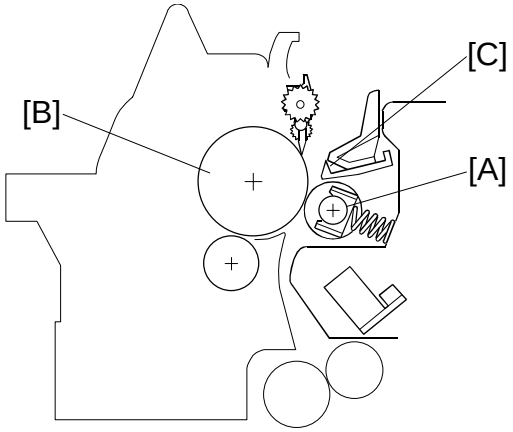
The cleaning pad [D] contacts the registration roller. It removes paper dust from the registration roller so that this dust will not transfer into the development unit through the drum cleaning unit.

The amount of paper buckle at the registration roller to correct skew can be adjusted with the printer service mode (Service Menu 2: Regist Sag).

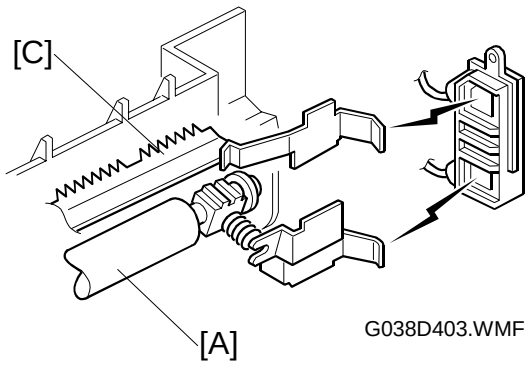
**Cross-reference:** Section 4.2 Service Program Mode

# 2.7 IMAGE TRANSFER AND PAPER SEPARATION

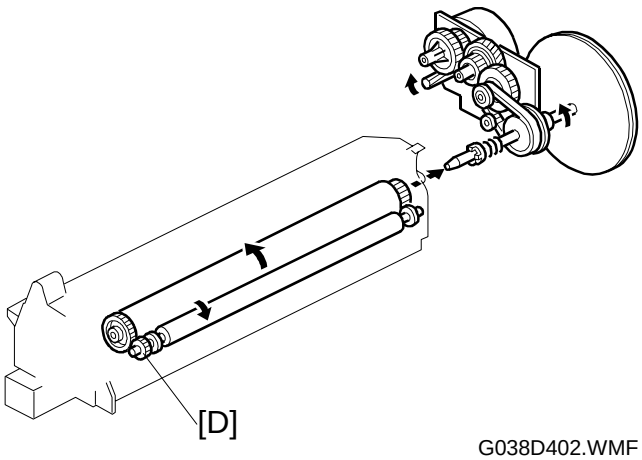
## 2.7.1 OVERVIEW




G038D401.WMF




G038D403.WMF




G038D402.WMF

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

The curvature of the drum and the antistatic plate [C] help the paper to separate from the drum. The high voltage supply board also supplies a negative dc voltage to the antistatic plate.

Drive from the drum through a gear [D] turns the transfer roller

The transfer current can be adjusted by the printer service mode (Service Menu 2: Transfer set).

**Cross-reference:** Section 4.2 Service Program Mode

## 2.7.2 IMAGE TRANSFER MECHANISM

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

1. When the CPU receives the image writing start signal, the CPU instructs the high voltage supply board to supply +10µA (low transfer current level) to the roller. This prevents any positively charged toner on the drum surface from transferring to the transfer roller.
2. At a certain time after the low transfer current has been supplied to the roller, +13µA (paper fed from the paper tray) is applied to the roller to transfer the toner to the paper.
3. After the trailing edge of the paper has passed through the roller, transfer current turns off. In multiple printing, the transfer current shifts again to the low transfer current.



The default transfer roller current (high transfer current level) is as shown in the following table. The transfer current can be adjusted using the printer service mode, except for the low transfer current.

| Paper Size | Paper Tray | Duplex | By-pass Tray / 2nd Paper Tray (Special Paper) |
|---|---|---|---|
| A3/11" x 17",<br>A4/8 1/2 x 11" SEF | 13 µA | 10 µA | 14 µA |
| B4 | 13 µA | 12 µA | 15 µA |
| A4/11" x 8 1/2 LEF,<br>A5/5 1/2 x 8 1/2 SEF | 13 µA | 16 µA | 17 µA |
| A5/8 1/2 x 5 1/2 LEF | 15 µA | 16 µA | 20 µA |

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

## 2.7.3 TRANSFER ROLLER CLEANING

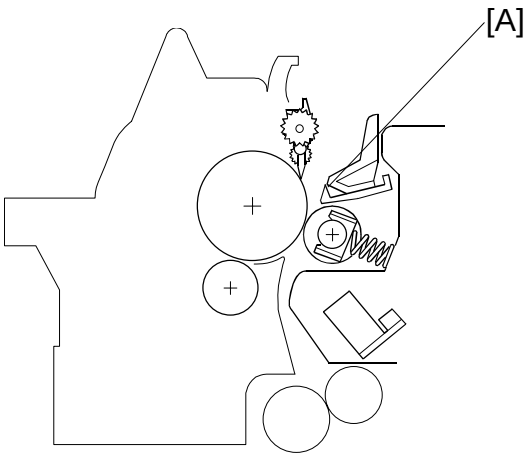
If the paper size is smaller than the image, or if a paper jam occurs during printing, toner may be transferred to the roller surface. To prevent the toner from transferring to the back side of the printouts, the transfer roller requires cleaning before the next printing run.

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

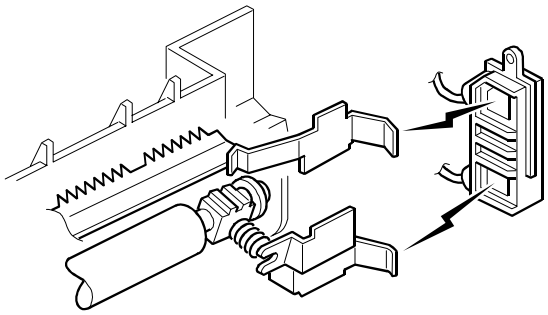
The machine goes through the cleaning mode in the following conditions:

- Before starting the printing job
- Just after the power is switched on.
- After a jam has been cleared

## 2.7.4 PAPER SEPARATION MECHANISM




G038D401.WMF



G038D403.WMF

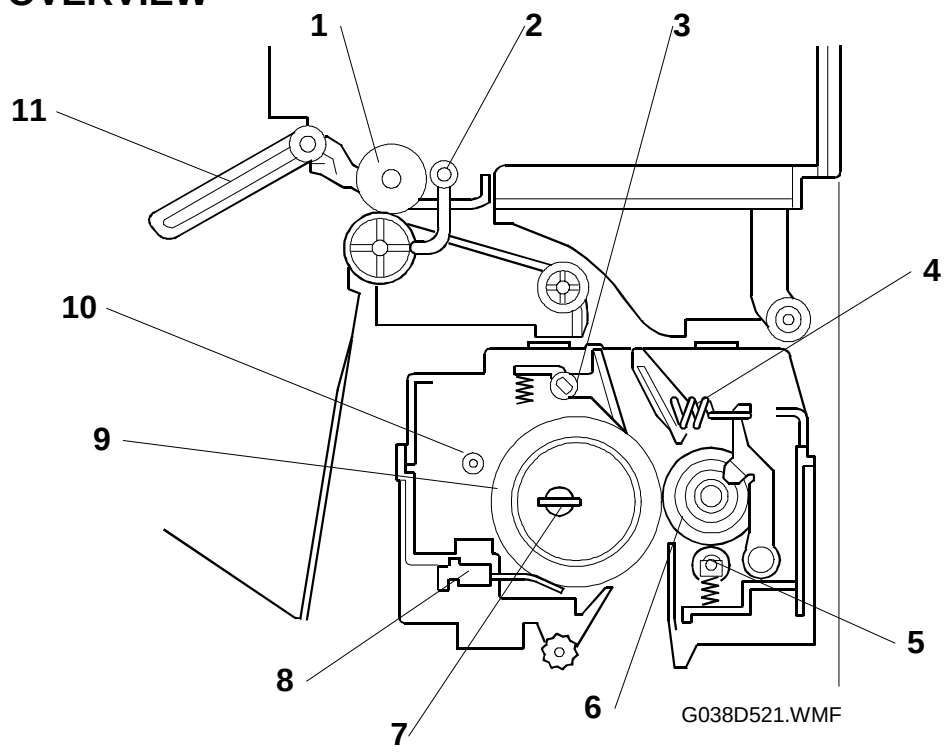
The discharge plate [A] and the drum curvature of the drum help the paper to separate away from the drum. The high voltage supply board applies a constant dc voltage, -1.8 kV (when feeding from a paper tray) or –2.1 kV (from the duplex unit) to the discharge plate.

The discharge plate voltage can be adjusted using the printer service mode (Service Menu 2: Separate volt).

**Cross-reference:** Section 4.2 Service Program Mode

# 2.8 IMAGE FUSING AND PAPER EXIT

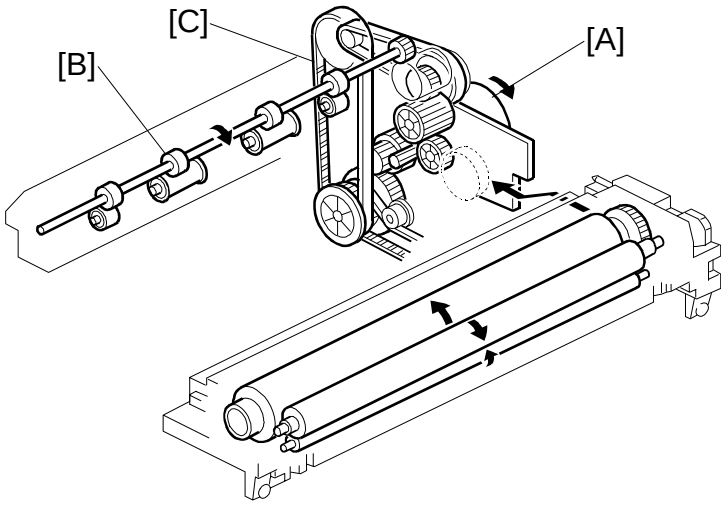
## 2.8.1 OVERVIEW



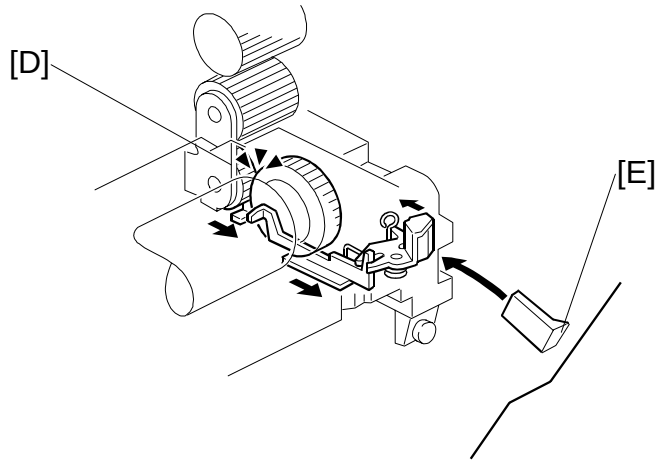

The fusing unit and paper exit area consist of the following parts.

1. Paper exit roller
2. Fusing exit sensor
3. Hot roller strippers
4. Pressure spring
5. Cleaning roller
6. Pressure roller
7. Fusing lamp
8. Thermistor
9. Hot roller
10. Thermofuse
11. Paper overflow sensor feeler

## 2.8.2 FUSING DRIVE AND RELEASE MECHANISM




G038D504.WMF

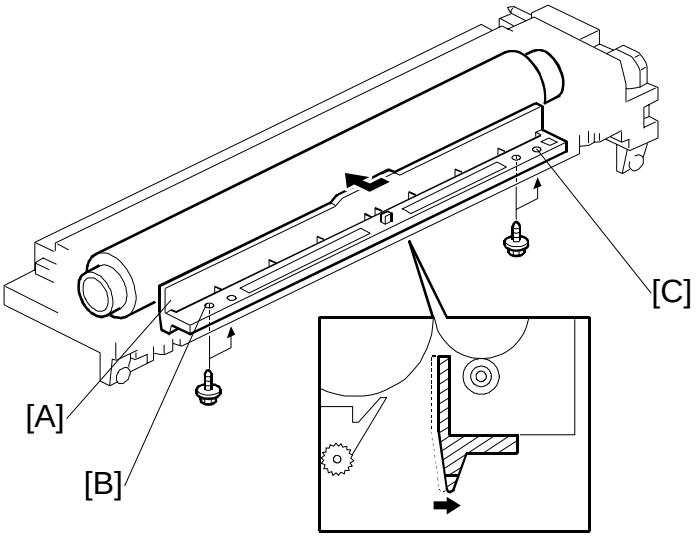



G038D505.WMF

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

The fusing unit release mechanism automatically disengages the fusing unit drive gear [D] when the right cover [E] is opened. This allows the fusing unit drive gear to rotate freely so that misfed paper can easily be removed.

## 2.8.3 FUSING ENTRANCE GUIDE SHIFT MECHANISM

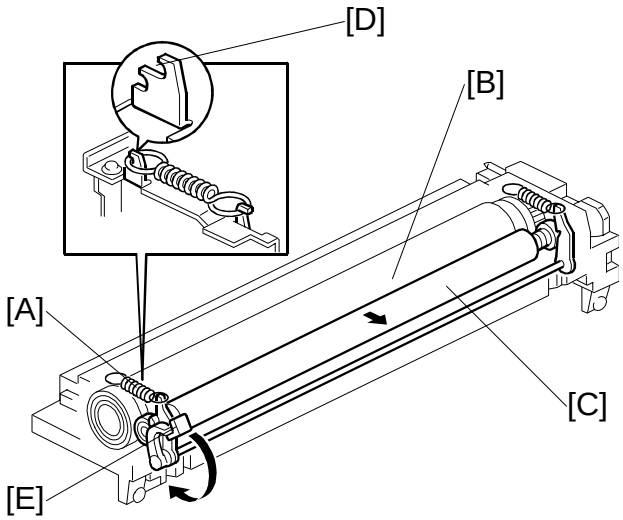



G038D506.WMF

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

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

## 2.8.4 PRESSURE ROLLER



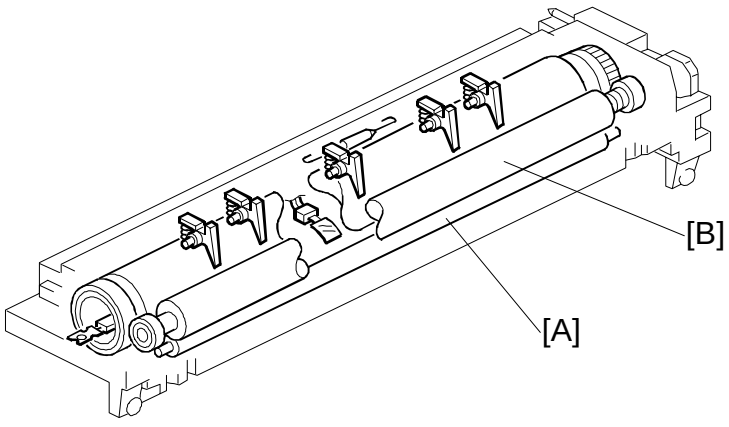

G038D502.WMF

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

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

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

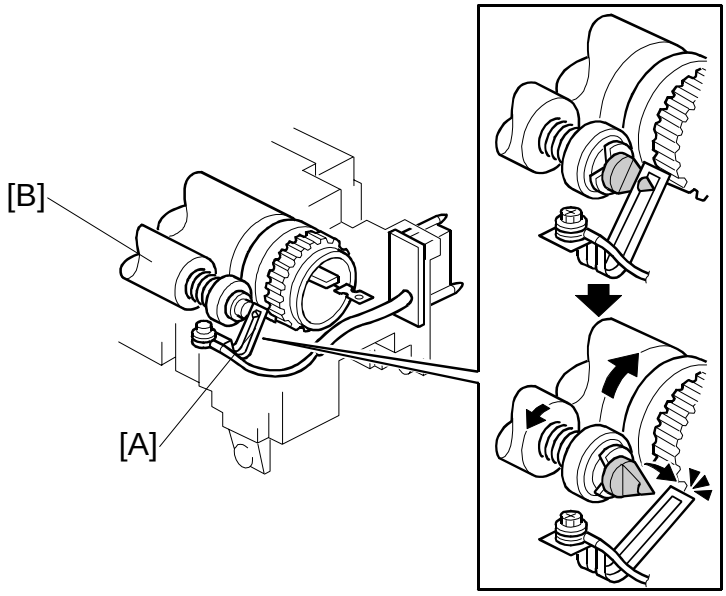
## 2.8.5 CLEANING MECHANISM




G038D503.WMF

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

## 2.8.6 NEW FUSING UNIT DETECTION




G038D500.WMF

When the PM (fusing) counter reaches 120K, "Replace Maintenance Kit" is displayed.

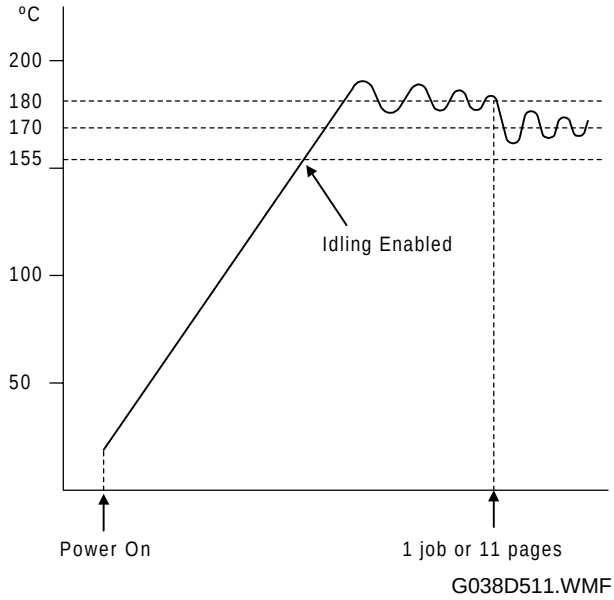
The machine detects when the new maintenance fusing unit is installed by checking the circuit through the detector hook [A]. The detector hook is hooked on the edge of the fusing pressure roller shaft [B]. As the pressure roller rotates, the detector hook is released from the press roller shaft and the circuit becomes opened. Once the detector hook is released, it will not re-engage with the shaft for the duration of the fusing unit's life. Then, the machine clears the PM (fusing) counter.

Please note that this detection is done only with the maintenance fusing unit, and the detector hook is not installed in the fusing unit which is initially installed in the machine.

**NOTE:** If the PM is done by replacing individual parts (not by replacing the maintenance fusing unit), make sure to reset the PM (fusing) counter using the SP mode (Service Menu 2: FuserCount clr). Otherwise the "Replace Maintenance Kit" message on the LCD will not be cleared.

**Cross-reference**: Section 4.2 Service Program Mode

## 2.8.7 FUSING TEMPERATURE CONTROL




### *Temperature Control*

When the main power switch is turned on, the CPU turns on the fusing lamp to maintain the fusing temperature of 180°C for the first job, or for the first 11 consecutive pages of printing. After that, the machine maintains the fusing temperature at 170°C.

To prevent each end of the hot roller temperature from becoming too high, the machine lowers the fusing temperature to 155°C when it detects that paper which is less than 216 mm width is consecutively fed.

### *Fusing Lamp Control*

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

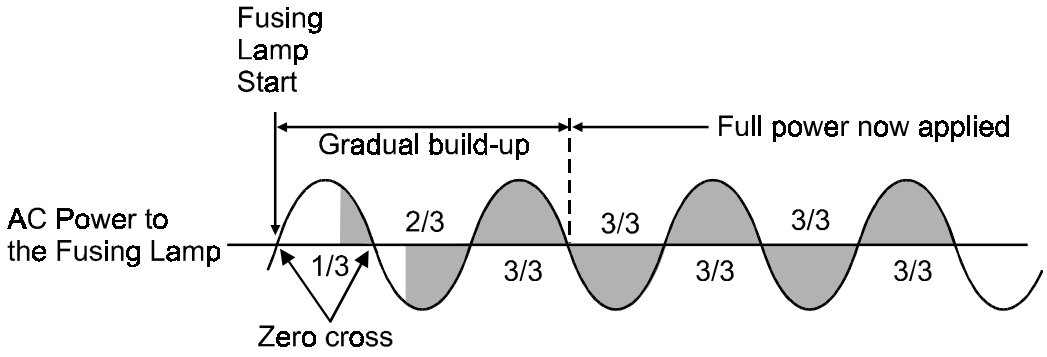
**Fusing temperature detection cycle (Fusing period)**
The CPU checks the output from the fusing thermistor once a second (default setting). The CPU compares the current and previous temperatures. Based on the result, it then decides how long the fusing lamp power should be on during the next one-second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

Starting and stopping the fusing lamp power every second causes fluorescent lighting in the room to flicker. To reduce this flickering, use the printer service mode (Service Menu 2: Fusing period) to change the cycle from 1 second to 3 seconds.

**Fusing soft-start (Fusing times)**
In addition, whenever the fusing lamp power switches on, full power is applied to the fusing lamp gradually, not all at once. This prevents the power in the room from dropping suddenly. This feature is known as “Soft Start”. The machine does this by gradually allowing more power to the fusing lamp over a number of zero-cross cycles of the ac supply. The diagram below shows full power being applied gradually over the duration of 3 zero-cross cycles. With the printer service mode (Service Menu 2: Fusing times), this number can be set to 3, 10, or 20. Soft start occurs every time the fusing lamp power switches on (i.e., at some time during every second), not just at the start of the print job.

**NOTE:** This SP mode is effective to counter flickering lights. However, generated noise increases if the setting is changed from the default. If a radio or a TV is close by the machine, the noise may have some effect on the image or sound.

**Cross-reference:** Section 4.2 Service Program Mode



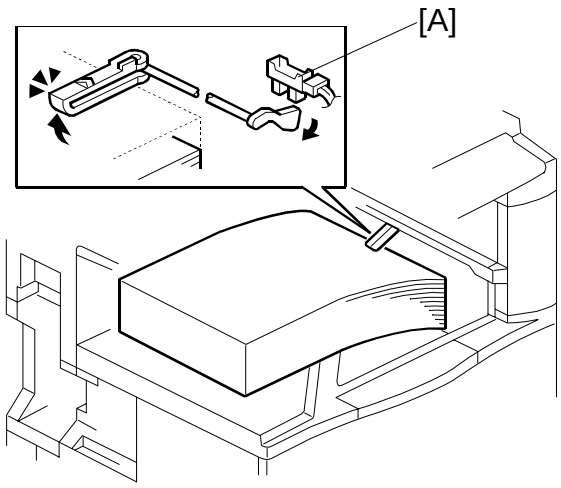

G038D512.WMF

## 2.8.8 OVERHEAT PROTECTION

If the hot roller temperature becomes higher than 231°C, the CPU cuts off the power to the fusing lamp. At the same time, SC543 is generated.

Even if the thermistor overheat protection fails, there is a thermofuse in series with the common ground line of the fusing lamp. If the temperature of the thermofuse reaches 169°C, the thermofuse opens, removing power from the fusing lamp. At the same time, SC 542 is generated and the machine stops operating.

## 2.8.9 PAPER EXIT




G038D601.WMF

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

# 2.9 ENERGY SAVER MODES

When the machine is not used, the energy saver feature reduces power consumption by lowering or switching off the fusing lamp.
This machine has two types of energy saver mode.

- Energy saver mode level 1: The machine lowers the fusing temperature to 60 °C.
- Energy saver mode level 2: The machine turns off the fusing lamp.



### *Entering Energy Saver Mode*

Energy saver mode starts after the machine has been idle for a certain time. This period is specified by the user.

- Energy saver mode level 1: Off, 1 min, 3 min, 5 min, 10 min (default 10 min)
- Energy saver mode level 2: 15 min, 30 min, 1 hr, 2 hrs, 3 hrs (default 15 min)

### *Leaving Energy Saver Mode*

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

- Print command received from the PC
- Front cover opened and closed
- Paper tray pulled out and put back
- Any operation panel keys pressed

# 2.10 CONTROLLER FUNCTIONS

## 2.10.1 PAPER SIZE/TYPE DETECTION AND SELECTION

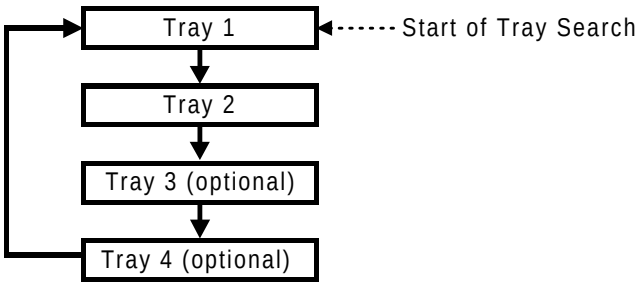
The controller uses the paper sizes detected by the print engine for trays 1, 2, 3 and 4. For the by-pass tray, the user has to specify a paper size using the Job Control menu in the Printer User Tools. Refer to section 1.1.2 for details on supported paper sizes.

The paper type selection is available using the job control menu (Paper Input) for each paper tray.

When the printer controller receives a print job, the controller uses the paper size specified in the PJL, PCL, or PS commands and the paper type specified in the PCL or PS commands for printing.

## 2.10.2 PAPER SOURCE SELECTION

### *Auto Tray Select*

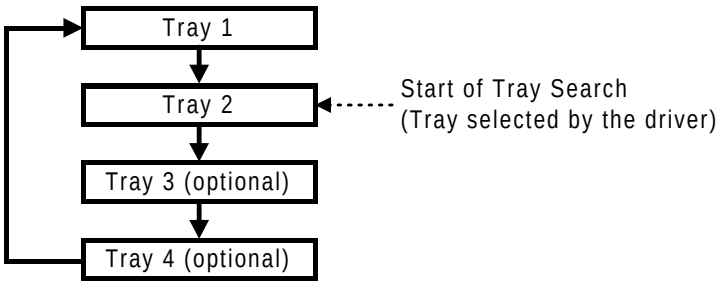



G038D541.WMF

The controller searches for the specified paper size and paper type, starting from Tray 1, and uses the first tray that has the specified paper size and paper type. If the selected tray is pulled out or paper runs out during printing, the controller searches for another tray with the specific paper size and paper type then if found, automatically switches to it. If the controller cannot find another paper tray with the specified paper size and paper type, printing stops and the LCD displays the message “Load Tray 1.”

When selecting the special paper mode in the 2nd paper tray, the 2nd paper tray is not included in the auto tray search cycle.

### *Manual Tray Select*




G038D542.WMF



When the printer driver specifies a tray, the selected tray becomes the first tray checked at the start of the tray search. If the selected tray does not have the size and type of paper specified by the driver, the controller searches the other trays for the same paper size and paper type.

**NOTE:** Tray Priority in the job control menu does not specify the start of the tray search, but specifies the paper size in the selected tray as the default paper size.

### *Tray Lock*

If Tray Lock is enabled for a tray, the controller does not use the “locked” tray in the tray search process. If a tray has, for example, colored A4 size paper, enable tray lock for that tray so that the controller does not select the tray for printing.

If the printer driver selects a “locked” tray, the controller uses the tray for printing only when the specified paper size matches the actual paper size in the tray.

### *By-pass Tray*

The by-pass tray is not part of the automatic tray search. To print from the by-pass tray, the user has to select the by-pass tray using the driver. Even if the by-pass tray is empty, the controller will not switch to another tray; the message on the LCD asks the user to add paper to the by-pass tray.

**NOTE:** Collation and duplex are disabled when the by-pass tray is selected.

### *Paper Size Mismatch*

When the controller could not find the specified paper size and paper type in any of the trays, the machine displays an error message.

Then the user can either load the requested paper size and paper type in a tray or select another tray, e.g., a tray that contains A4 size paper, by pressing the “Form Feed” key.

The controller will print the job if the specified paper size and paper type are detected in a tray, or if the user presses the Enter key after selecting a tray.

## 2.10.3 OUTPUT TRAY SELECTION

Output Tray Priority in the System User Tools specifies the default paper output tray for each application.

If a print job does not specify an output tray or the driver specifies the default tray, the default tray is used.

If the driver specifies an output tray, this overrides the default tray setting in the user tools.

## 2.10.4 COLLATION (SORT)

When the controller has either an optional SDRAM DIMM or an optional HDD installed, collation is enabled.

If the memory or HDD becomes full while storing a job that uses collation, the controller prints the pages that have been stored for collation, empties the memory or HDD, then continues printing the rest of the pages with collation.



| Memory Capacity | Collation | Maximum Pages | Note |
|---|---|---|---|
| 16MB (standard) | Not possible | | |
| 48MB (with 32MB) | Possible | 30 pages | Note 1) |
| 80MB (with 64MB) | Possible | 50 pages | Note 1) |
| With HDD | Possible | 1500 pages | Note 2) |

**NOTE:** 1) The number of pages is calculated using a sample MS-Word document that contains 5,000 characters of plain text. The sample document takes 409.6kB of memory space per page.
If the document is more complex, the memory can hold fewer pages. If the document is simpler, e.g., 1,000 characters per page, the memory can hold more pages.

2) This is the maximum number of pages that the controller can handle.
If the document is more complex, the HDD can hold fewer pages. Even if the document is simpler, e.g., 1,000 characters per page, the HDD cannot hold more than 1,500 pages.
To calculate the pages using the same document as specified in Note 1, the HDD can hold up to 1,250 pages.
About 500 MB of disk space is used for collation.

## 2.10.5 DUPLEX PRINTING

**NOTE:** Duplex printing requires installation of the memory option

Duplex printing is available with all output bin options but not all paper sizes (refer to the specifications section). If a job specifies duplex but the paper size to be used is not usable in the duplex unit, the job will be printed single-sided.

Duplex printing is available in two binding methods: short-edge binding and long-edge binding.

In short-edge binding, when printing the second side of a page, the image may require rotation. The image is rotated by the ASIC (Rocky-R) in the printer controller.

The ASIC (Rocky-R) corrects the image printing order for duplexing as follows.

- Larger than A4 lengthwise/LT lengthwise (example 8 pages)
  2nd page - 1st page - 4th page - 3rd page - 6th page - 5th page - 8th 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

## 2.10.6 STAPLING

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

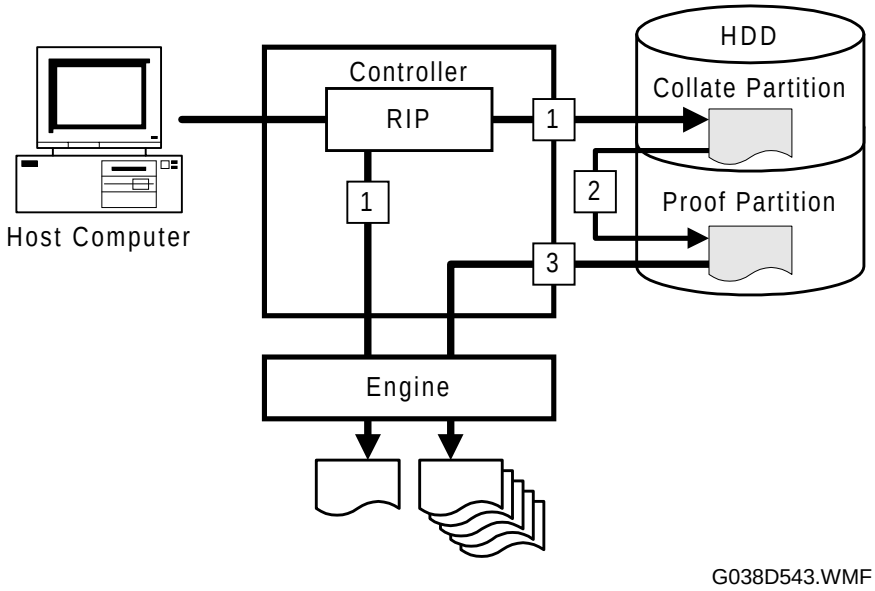
The finishers have the following stapling positions.

1) Upper left, diagonal
2) Upper right, diagonal

Depending on the paper orientation, the image may have to be rotated. This image rotation is done by the ASIC (Rocky-R) in the printer controller.

There is a limit for the number of sheets that can be stapled. If a job that specifies stapling has more than this number of sheets, it will not be stapled.

## 2.10.7 PROOF PRINT




G038D543.WMF

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 (RIP), stores the image data onto the collation partition of the hard disk, and prints one set of the document (step [1] in the above diagram). Then the controller moves the raster image file to the proof print partition of the hard disk (step [2] in the above diagram).

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 (step [3] in the above diagram). 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 in the proof print partition, the controller deletes the file from the collation partition after printing the first set, even though it cannot copy the file to the proof print partition.

**NOTE:** 1) Proof print requires the installation of an optional hard disk.
2) The proof print partition size is about 600 MB. It can hold up to 30 files or 2,000 pages. The maximum number of pages depends on how complex the pages are.
3) Proof print is available with the PCL drivers, the Windows 95/98 PostScript driver, and the Macintosh PostScript driver (with the Proof Print plug-in). The PostScript drivers for Windows 3.x and Windows NT4.0 do not support the proof print function.

## 2.10.8 RESET OPERATIONS

### *Job Reset*

This resets the job being processed and ignores all incoming data until a data end is received.

If a collate job or a proof print job is being printed, the controller stops printing and deletes the file from the RAM or HDD.

### *System Reset*

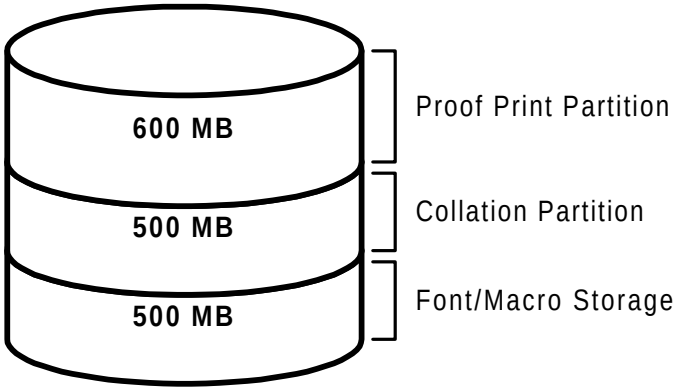
This initializes the collation data, proof print data, fonts and macros downloaded to the RAM. The menu settings, NIB settings, system log data, and error codes remain unchanged.

**NOTE:** Do not use this when the controller is receiving a print job.

### *Menu Reset*

This resets all the menu settings to their default values, including the NIB settings.

## 2.10.9 HDD (OPTIONAL)




G038D544.WMF

The optional 1.6 GB HDD has three partitions.

- The Proof Print partition uses 600 MB for Proof Print file storage.
- The Collation partition uses 500 MB for collation data storage.
- The last partition uses 500 MB for font and macro storage.

# 3. INSTALLATION

## 3.1 INSTALLING THE MACHINE

Refer to the Setup Guide for information about the installation environment and instructions on how to install and set up the machine. Installation procedures for the following equipment are described.

- Paper Tray (1 tray)
- Paper Tray (2 trays)
- LCT
- By-pass Tray Unit
- Interchange Unit
- Duplex Unit
- 4-bin Mailbox Unit
- Memory (SDRAM DIMM) Option

# 3.2 INSTALLING OPTIONAL UNITS

**⚠CAUTION**

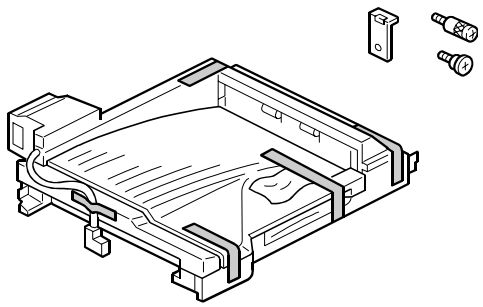
**Before installing this option, do the following:**
**1. Print out all data in the printer buffer.**
**2. Turn off the switch and disconnect the power cord.**

## 3.2.1 BRIDGE UNIT

### *Accessory Check*

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

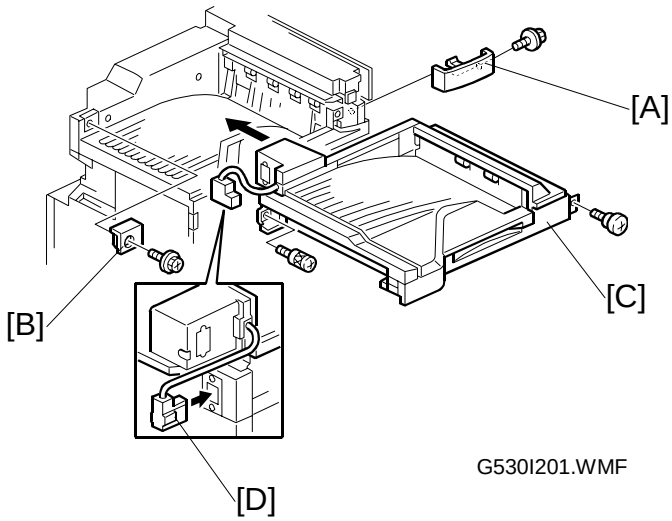
| No. | Description | Q'ty |
|---|---|---|
| 1 | Bridge Unit | 1 |
| 2 | Securing Plate | 1 |
| 3 | Shoulder Screw | 1 |
| 4 | Knob Screw | 1 |



A897I101.WMF

### *Installation Procedure*

1. Remove all tapes.
2. Remove the right front cover [A] (1 screw).
3. Remove the plate [B] (1 screw).
4. Install the bridge unit [C] (1 shoulder screw, 1 knob screw).
5. Replace the right front cover.
6. Connect the I/F cable [D] to the printer.



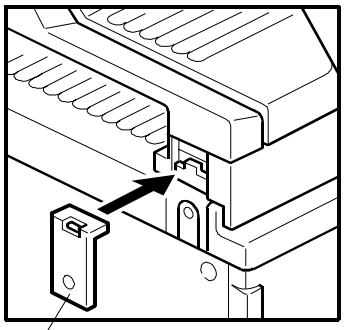

G530I201.WMF

7 Attach the securing plate [E], as shown.

**NOTE:** Do not attach it with a screw; this is done when securing the front stand for the optional finisher.

8. Install the optional finisher (A681) (refer to the 1000-sheet finisher installation procedure).

**End of procedure**



A897I103.WMF

[E]

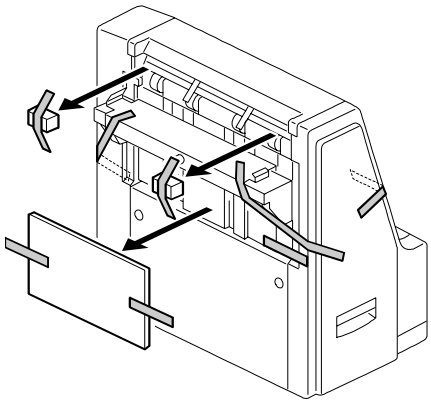
## 3.2.2 1,000-SHEET FINISHER

**NOTE:** The following options must be installed before installing this finisher:

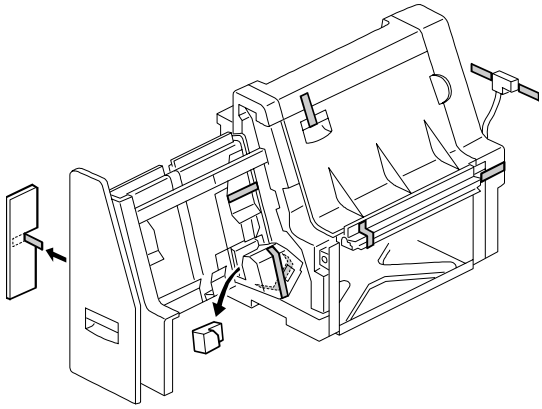
- Bridge Unit (A897)
- Paper Tray Unit (A860/A861) or LCT (A862)

### *Installation Procedure*

1. Unpack the finisher and remove the tapes.

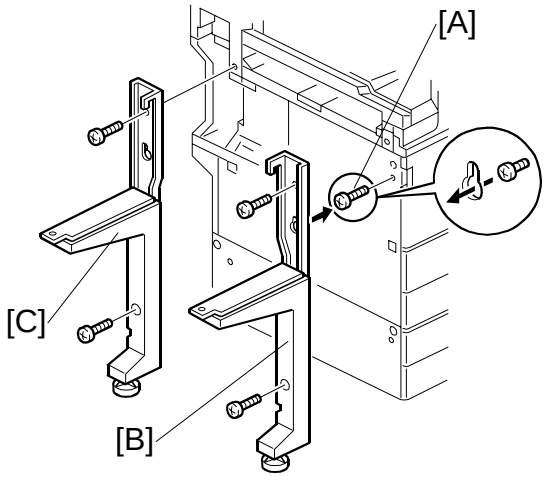


A681I503.WMF



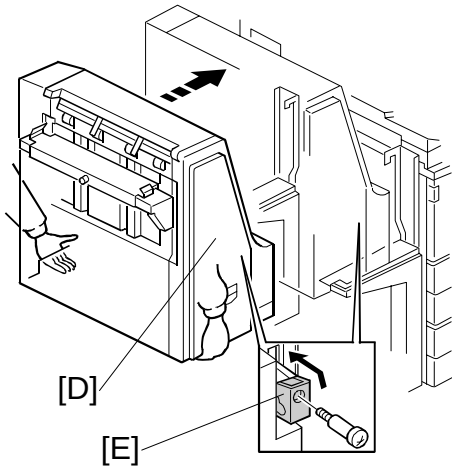
A681I504.WMF

2. Install screw [A] loosely.
3. Hang the front stand [B] on the screw that was installed in step 2.
4. Secure the front stand (3 screws, including screw [A]).
5. Install the rear stand [C] (2 screws).



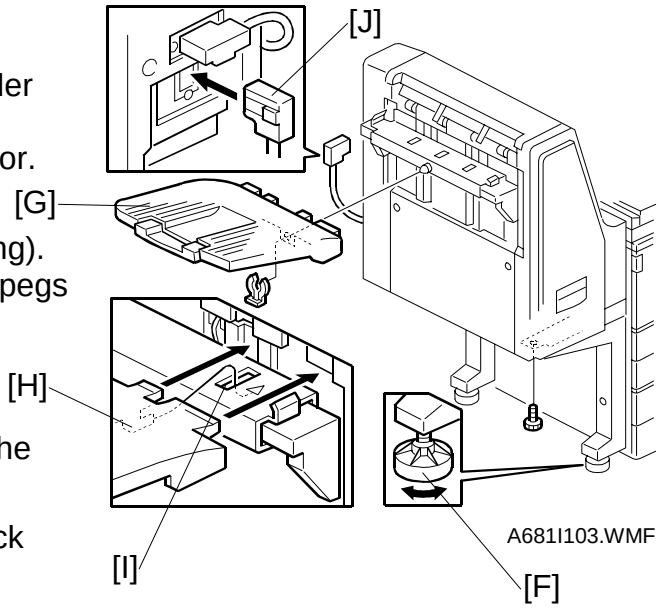

A681I101.WMF

6. Pull out the stapler unit [D].
7. Draw out the locking lever [E] (1 screw).
8. Align the finisher on the stands, and lock it in place by pushing the locking lever.
9. Secure the locking lever (1 screw) and push the stapler unit into the finisher.



A681I502.WMF

10. Secure the finisher (1 screw).
11. Adjust the securing knobs [F] under the front and rear stand until the finisher is perpendicular to the floor.
12. Install the shift tray [G] (1 snap ring).
    **NOTE:** Make sure that the three pegs [H] fit into the slots [I] properly.
13. Connect the finisher cable [J] to the optional bridge unit.
14. Turn on the main switch and check the finisher operation.

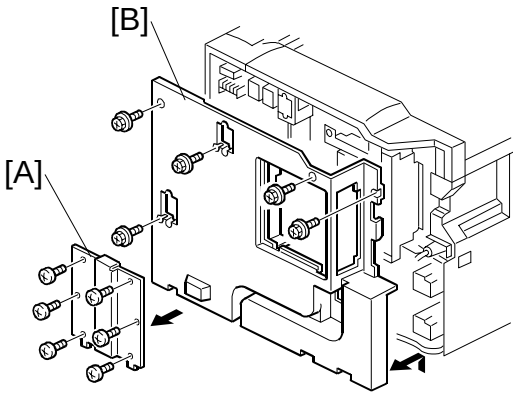


A681I103.WMF

**End of procedure**

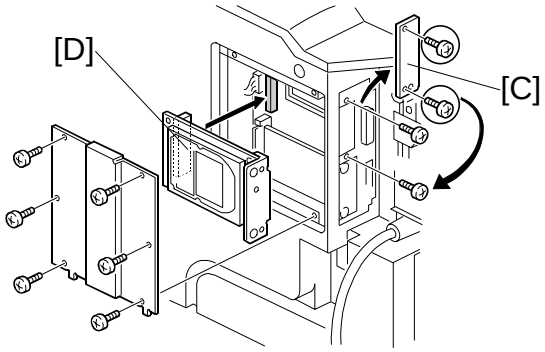
## 3.2.3 HARD DISK (HDD)

1. Remove the controller cover [A] (6 screws), and the rear cover [B] (5 screws).




G038R765.WMF

2. Remove the cover bracket [C] (2 screws).
3. Install the hard disk unit [D] to the upper socket of the printer controller.
4. Reinstall the rear cover and the controller cover.




G038I510.WMF

**End of procedure**

# 4. SERVICE TABLES

## 4.1 GENERAL CAUTION

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

### 4.1.1 PCU

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

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



### 4.1.2 TRANSFER ROLLER UNIT

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

### 4.1.3 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 mirror are very sensitive to dust. Never open the optical housing unit.
4. Do not touch the glass surface of the polygon mirror motor unit with bare hands.

### 4.1.4 FUSING UNIT

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

### 4.1.5 PAPER FEED

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

### 4.1.6 OTHERS

1. The TD sensor initial setting is performed automatically after installing a new PCU and closing the front cover. Never open the front cover or turn off the main switch during this time. The main motor stops when the initial setting has finished.
2. The main switch must be kept on while the toner bottle is replaced.

# 4.2 SERVICE PROGRAM MODE

**⚠CAUTION**

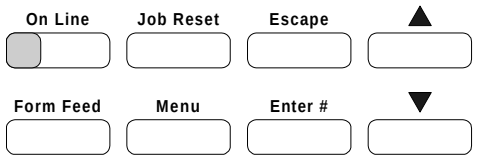
**Before accessing the service menu, do the following:**

**Confirm that there is no print data in the printer buffer (the Data In LED must not be lit or blinking).**
**If there is some data in the buffer, wait until all data has been printed.**

## 4.2.1 ENABLING AND DISABLING SERVICE PROGRAM MODE

### *Entering the Service Mode*

Turn the machine on while pressing the “On Line” key and “Escape” key together until the service mode menu “1.Service Menu1” appears on the display.




G038M501.WMF

### *Accessing the Required Program*

Use the “Up/Down arrow” keys to scroll through the menu listing. To select an item, press the “Enter” key. Then the sub-menu will appear.
Scroll through the sub menu items using the “Up/Down arrow” keys. To go back to a higher level, press the “Escape” key.

### *Inputting a Value or Setting for a Service Program*

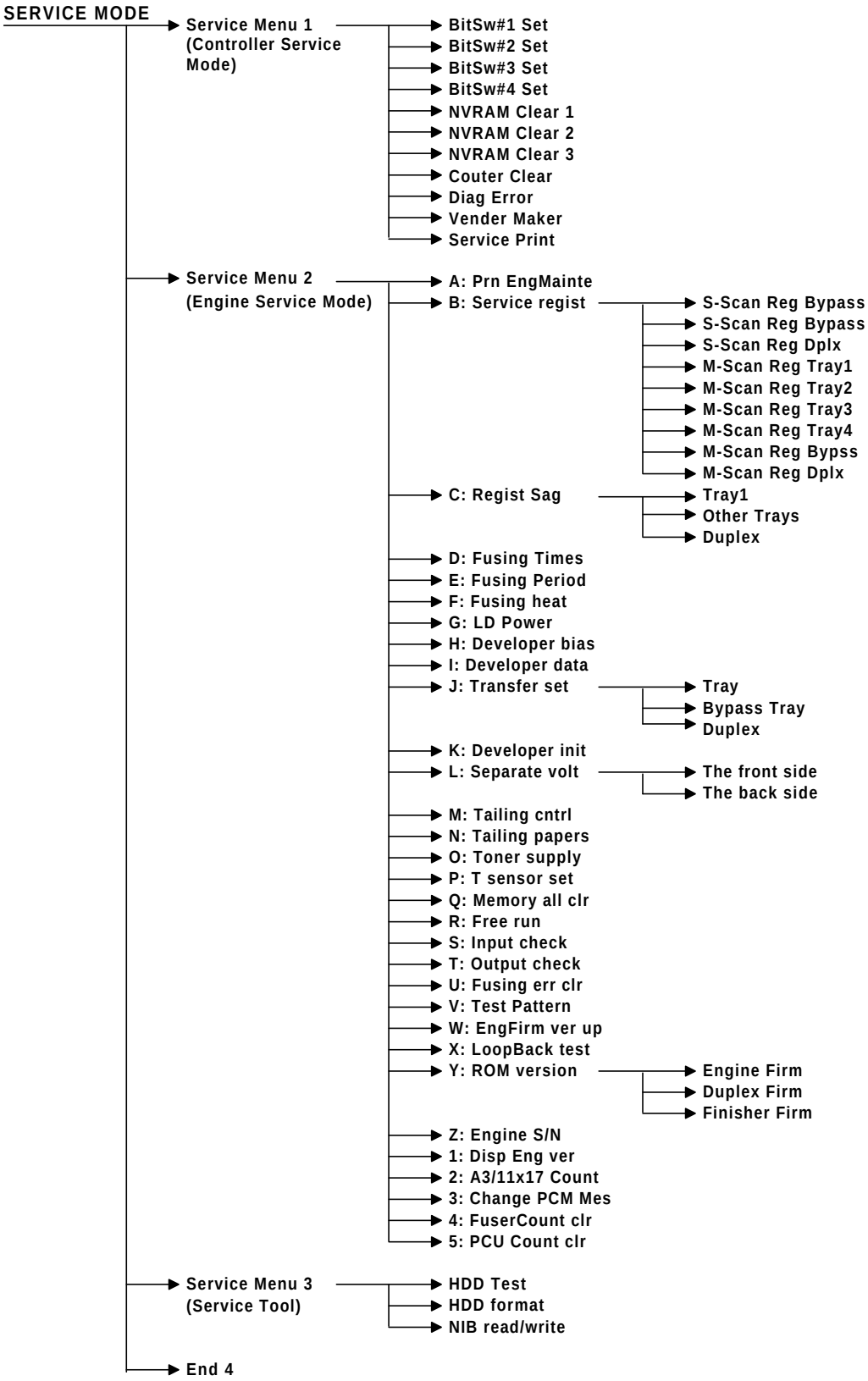
Enter the required program mode as explained above. The setting appearing on the display is the current setting.
Select the required setting using the “Up/Down arrow” keys, then press the “Enter” key. The previous value remains if the “Enter” key is not pressed.

### *Exiting the Service Mode*

Select “4.End” from the SP mode main menu, then press the “Enter” key to exit the SP mode.

## 4.2.2 SERVICE PROGRAM MODE MENU TREE

The following diagram shows the service mode menu tree.




G038M510.WMF

# 4.3 PRINTER CONTROLLER SERVICE MODE

Service Mode Table (Service Menu 1)

| | Title | Description |
|---|---|---|
| A | BitSw#1 Set | Adjusts bit switch settings.<br>**Note:** Currently, the bit switches are not being used. |
| B | BitSw#2 Set | |
| C | BitSw#3 Set | |
| D | BitSw#4 Set | |
| E | NVRAM Clear 1 | Initializes the controller NVRAM except bit switches, NIB settings, and log data. |
| F | NVRAM Clear 2 | Initializes the NVRAM on the controller. |
| G | NVRAM Clear 3 | Initializes the NVRAM on the NIB. |
| H | Counter Clear | Initializes all counters to zero. |
| I | Diag Error | Displays diagnostics error codes on the LCD. |
| J | Vender Maker | Selects the vender name. |
| K | Service Print | Prints the service summary sheet. |



## 4.3.1 BIT SWITCH PROGRAMMING

1. Enter the SP mode and select “1.Service Menu1.”
2. Select A, B, C, or D for the desired bit switch, then press [Enter].
3. Press [Enter] in the “Bit Switch Set” menu.
4. Adjust the bit switch using the following keys.
   - [▲] [▼]: Move to the next bit.
   - [Escape]: Exit without saving changes.
   - [Enter]: Exit and save changes.
5. Press [Enter] to save changes and exit.

### *BIT SWITCHES*

**NOTE:** Currently the bit switches are not being used.

## 4.3.2 NVRAM RESET

**⚠CAUTION**

**Print the service summary report, controller configuration page, and NIB configuration page before resetting the NVRAM(s).**

### *DIAG. ERROR LOG AND PAPER TRAY SETTINGS RESET*

This initializes the following settings in the controller NVRAM.

- Controller diagnostics error log
- Paper type settings for trays
- Paper size setting for the by-pass tray

1. Enter the SP mode, and select “1. Service Menu”.
2. Select “E. NVRAM Clear 1”, then press [Enter].
3. Ensure that you have printed the service summary report, then press [Enter].
4. Press [Enter] to execute. Or press [Escape] to exit.

### *CONTROLLER NVRAM RESET*

This initializes all the data in the controller NVRAM, except the NIB settings.

1. Enter the SP mode, and select “1. Service Menu”.
2. Select “F. NVRAM Clear 2”, then press [Enter].
3. Ensure that you have printed the service summary report and controller configuration page, then press [Enter].
4. Press [Enter] to execute. Or press [Escape] to exit.

### *NIB NVRAM RESET*

This initializes all the data in the NIB NVRAM.

1. Enter the SP mode, and select “1. Service Menu”.
2. Select “G. NVRAM Clear 3”, then press [Enter].
3. Ensure that you have printed the NIB configuration page, then press [Enter].
4. Press [Enter] to execute. Or press [Escape] to exit.

***COUNTER RESET***

This initializes all the print counters in the controller NVRAM. Refer to the service summary report for the counters in the controller NVRAM.

1. Enter the Printer SP mode, and select “1. Service Menu”.
2. Select “H. Counter Clear”, then press [Enter].
3. Press [Enter] to reset all the print counters.
4. Press [Enter] to execute. Or press [Escape] to exit.

**NOTE:** The total counter will not be cleared because the total counter data is stored in the engine board.

## 4.3.3 POWER-ON DIAGNOSTICS ERROR DISPLAY

This displays the latest 8 error codes that were found during the power-on self-test. Refer to chapter 7 (Troubleshooting) for details of the error codes.

1. Enter the SP mode, and select “1. Service Menu”.
2. Select “I. Diag Error”, then press [Enter].
3. Check the error codes on the LCD.
   [▼] [▲]: Move to the previous/next code.
4. Press [Escape] to exit.



## 4.3.4 VENDER MAKER

This enables to select the vender name for the printer.

1. Enter the SP mode, and select “1. Service Menu”.
2. Select “K. Vender Maker”, then press [Enter].
1. Select the vender name using [▼] [▲].
2. Enter the digit using [▼] [▲].
3. Press [Enter] to execute. Or press [Escape] to exit.

## 4.3.5 SERVICE SUMMARY

This prints a summary of all the controller settings.

1. Enter the Printer SP mode, and select “1. Service Menu”.
2. Select “L. Service Print”, then press [Enter].
3. Press [Enter] again to print the report.

### Model Number / System Version / Unit Number

Lists the machine's Plug&Play name, controller firmware version, and the controller part number.

### Program List

Lists the firmware module version.

### Bit Switch

List the current bit switch settings.

**NOTE:** Currently the bit switches are not being used.

### Counter

List all the counters in the controller.

**NOTE:** The total counter data is not stored in the printer controller.

### Exception Information

List CPU exception error information. Designer use only.

### System Logging / System Logging 2

Lists internal log data. Designer use only.

### Option

Lists all the installed optional components.

# 4.4 PRINTER ENGINE SERVICE MODE

## 4.4.1 SERVICE MODE MENU

Service Mode (Service Menu 2)

| | Title | Description | Notes (SP Mode) |
|---|---|---|---|
| A | Prn EngMainte | Prints the engine information | |
| B | Service regist | Man/sub scan registration | 1-001/002 |
| C | Regist sag | Paper feed timing | 1-003 |
| D | Fusing times | Fusing soft start adjustment | 1-107 |
| E | Fusing period | Fusing soft start settings | 1-108 |
| F | Fusing heat | Fusing temperature adjustment | 1-105/106 |
| G | LD power | LD power adjustment | 2-103 |
| H | Developer bias | Development bias adjustment | 2-201 |
| I | Developer data | Development data display | 2-220 |
| J | Transfer set | Transfer current adjustment | 2-301 |
| K | Developer init | Developer initialization | 2-801 |
| L | Separate volt | Separation voltage adjustment | 2-901 |
| M | Tailing cntrl | Tailing correction (shift value) | 2-906-1 |
| N | Tailing papers | Tailing correction (interval) | 2-906-2 |
| O | Toner supply | Toner supply mode | 2-921 |
| P | T sensor set | Standard Vt adjustment | 2-926 |
| Q | Memory all clr | Memory all clear | 5-801 |
| R | Free run | Free run mode | 5-802 |
| S | Input check | Input check mode | 5-803 |
| T | Output check | Output check mode | 5-804 |
| U | Fusing err clr | SC code reset | 5-810 |
| V | Test Pattern | Test pattern print | 5-902 |
| W | EngFirm ver up | Engine board firmware update | 5-932 |
| X | LoopBack test | Loop-back test (not used) | 5-990 |
| Y | ROM version | Displays the ROM number | 7-801 |
| Z | Engine S/N | Serial number programming | 5-811 |
| 1 | Disp Eng ver | Displays the engine version | 9-999-9 |
| 2 | A3/11x17 Count | A3/DLT double count selection | 5-104 |
| 3 | Change PCM Mes | Maintenance replacement warning | 9-999-8 |
| 4 | FuserCount clr | Fusing counter clear | |
| 5 | PCU Count clr | PCU counter clear | |

## 4.4.2 SERVICE MODE TABLES

| Menu Level | | | Function | Settings |
|---|---|---|---|---|
| **Level 1** | **Level 2** | **Description** | | |
| **A:** Prn Eng Mainte | --- | Prints the engine maintenance information | The following items are printed.<br>• Engine serial number<br>• Firmware version (Engine/Duplex unit/Finisher)<br>• Maintenance Counter (Total counter/PCU counter/Motor counter)<br>• Engine settings<br>• (Main/sub scan registration for each trays, density setting)<br>• ID Sensor Error<br>• Remaining amount of paper<br>• Engine error logging (last 10 error) | |
| **B:** Service regist | S-Scan Reg Tray | Leading Edge Registration (Paper Trays) | Adjusts the printing leading edge registration using the test pattern.<br>Use the ▲/▼ keys to increase or decrease. | -9.0 to +9.0<br>0.1 mm/step<br>**0.0 mm** |
| | S-Scan Reg Bypss | Leading Edge Registration (Bypass feed) | | -12.5 to +12.5<br>0.1 mm/step<br>**0.0 mm** |
| | S-Scan Reg Dplx | Leading Edge Registration (Duplex) | | |

| Menu Level | | | Function | Settings |
|---|---|---|---|---|
| **Level 1** | **Level 2** | **Description** | | |
| **B:** Service regist | M-Scan Reg Tray1 | Side-to-Side Registration (Paper Tray 1) | Adjusts the printing side-to-side registration from paper tray 1 using the test pattern. Use the ▲/▼ keys to increase or decrease. | -9.0 to +9.0<br>0.1 mm/step<br>**0.0 mm** |
| | M-Scan Reg Tray2 | Side-to-Side Registration (Paper Tray 2) | | |
| | M-Scan Reg Tray3 | Side-to-Side Registration (Paper Tray 3: optional PFU tray 1 or optional LCT) | | |
| | M-Scan Reg Tray4 | Side-to-Side Registration (Paper Tray 4: optional PFU tray 2) | | |
| | M-Scan Reg Bypss | Side-to-Side Registration (Feed from Bypass Tray) | | |
| | M-Scan Reg Dplx | Side-to-Side Registration (Feed from Duplex unit) | Adjusts the printing side-to-side registration from the duplex unit using the test pattern. | -9.0 to +9.0<br>0.1 mm/step<br>**0.0 mm** |
| **C:** Regist sag | Tray1 | Paper Feed Timing (Tray 1) | Adjusts the paper feed clutch timing at registration. The paper feed clutch timing determines the amount of paper buckle at registration. (A larger setting leads to more buckling.) | 0 to 10<br>1 mm/step<br>**5 mm** |
| | Other Trays | Paper Feed Timing (2nd, 3rd, 4th Paper Feed and By-pass Feed) | | |
| | Duplex | Paper Feed Timing (Duplex) | | 0 to 10<br>1 mm/step<br>**6 mm** |
| **D:** Fusing times | | Fusing Soft Start Adjustment | Adjusts the number of zero-cross cycles of the fusing lamp ac supply needed for the fusing lamp power to reach 100%. Use a higher number if the customer complains about sudden power dropouts. | **0: 3 times**<br>1: 10 times<br>2: 20 times |
| **E:** Fusing period | | Fusing Soft Start Setting | Selects whether the fusing temperature control cycle is 1 or 3 seconds. | **0: 1 sec**<br>1: 3 sec |

| Menu Level | | | Function | Settings |
|---|---|---|---|---|
| **Level 1** | **Level 2** | **Description** | | |
| **F:** Fusing heat | | Fusing Temperature Adjustment | Adjusts the fusing temperature for printing.<br>First, the current fusing temperature is displayed. Use the ▲/▼ keys to scroll to the temperature adjustment menu. | 100 to 190<br>1°C/step<br>**180°C** |
| **G:** LD power | | LD Power Adjustment | Adjusts the LD power.<br>**Important: Do not change the value.** | 0 to 255<br>1 /step<br>**129** |
| **H:** Developer bias | | Development Bias Adjustment | Adjusts the development bias during printing.<br>This can be adjusted as a temporary measure if faint printouts appear due to an aging drum. | -700 to -500<br>10 V/step<br>**-600V** |
| **I:** Developer data | | Developer Data Display | Displays the Vt, Vsp, Vsg, Vdsp, Vtref, and Pspwm values. | |
| **J:** Transfer set | Tray | Transfer Current (Trays) | Adjusts the current applied to the transfer roller during printing from paper trays. | 0: –2 μA<br>**1: 0 μA**<br>2: +2 μA<br>3: +4 μA |
| | Bypass Tray | Transfer Current (Bypass Tray) | Adjusts the current applied to the transfer roller during printing from the by-pass tray. | |
| | Duplex | Transfer Current (Duplex) | Adjusts the current applied to the transfer roller during printing from the duplex unit. | |
| **K:** Developer init | | Developer Initialization | Performs the developer initialization. The machine mixes the developer for 45 s and displays the results. | |
| **L:** Separate volt | The front side | Separation voltage adjustment | Adjusts the voltage applied to the separation plate at the leading edge of the paper on the front side.<br>**Important:** If the printouts have pawl marks, increase this voltage. | -1200 to -4000<br>100 V/step<br>**-1800 V** |
| | The back side | | Adjusts the voltage applied to the separation plate, at the leading edge of the paper on the rear side. | -1200 to -4000<br>100 V/step<br>**-2100 V** |

| Menu Level | | | Function | Settings |
|---|---|---|---|---|
| **Level 1** | **Level 2** | **Description** | | |
| **M:** Tailing cntrl | | Tailing Correction (Shift Value) | Shifts the image across the page at the interval specified by the following SP mode (N: Tailing papers).<br>When making many copies of an original that contains vertical lines (such as a table), separation may not work correctly, then a tailing image will occur (ghosts of the vertical lines will continue past the bottom of the table). This SP prevents this problem. | 0.0 to 5.0<br>0.1 mm/step<br>**0.0 mm** |
| **N:** Tailing papers | | Tailing Correction (Interval) | Changes the interval for the image shift specified by the previous SP mode (M: Tailing cntrl). | 1 to 10<br>1 page/step<br>**1 page** |
| **O:** Toner supply | | Toner Supply Mode | Selects the toner supply mode.<br>**Important:**<br>Normally, only use "P+T Control" setting. Change to "T Control" temporarily if the TD sensor is defective. Do not use other settings; these are for designer's use only. | **P+T Control**<br>Fixed 1<br>Fixed 2<br>T Control |
| **P:** T sensor set | | Standard Vt | Adjusts Vts (Vt for a new PCU). The TD sensor output is adjusted to this value during the TD sensor initial setting process.<br>This SP is not effective when "T Control" of the previous SP mode (O: Toner supply) is selected.<br>**Important: Do not change this value.** | 0.00 to 5.00<br>0.01 V/step<br>**2.30 V** |

| Menu Level | | | Function | Settings |
|---|---|---|---|---|
| **Level 1** | **Level 2** | **Description** | | |
| **Q:** Memory all clr | | Memory All Clear | Resets all software counters and returns all modes and adjustments to the default settings.<br>However, the following items are not reset.<br>• Total counter<br>• PCU counter<br>• Fusing counter<br>• Engine serial number<br>**Important:** Turn the main switch off/on after the reset.<br>This mode should be used only when the EEPROM on the engine board is replaced. | |
| **R:** Free run | | Free Run | Performs a free run of the machine.<br>Press [Enter] to start.<br>Press [Enter] to stop.<br>Please note that the machine will not stop immediately after the [Enter] key is pressed. | |
| **S:** Input check | | Input Check | Displays signals received from sensors and switches.<br>See the “Input Check” section for details. | |
| **T:** Output check | | Output Check | Turns on electrical components individually for test purposes.<br>See the “Output Check” section for details. | |
| **U:** Fusing err clr | | SC Code Reset | Resets the service call (fusing error) conditions.<br>After performing this SP mode, turn the main switch off and on. | |
| **V:** Test Pattern | | Test Pattern Print | Prints a test pattern. This machine could print only the grid test pattern. | |
| **W:** EngFirm ver up | | Engine Board Firmware Update | Downloads the system program from an IC flash memory card to the flash memory on the engine board.<br>Refer to the “Program Download” section for details. | |
| **X:** LoopBack test | | Loop-back test | Internal loop-back test.<br>Designer use only. | |

| Menu Level | | | Function | Settings |
|---|---|---|---|---|
| **Level 1** | **Level 2** | **Description** | | |
| **Y:** ROM version | Engine Firm<br>Duplex Firm<br>Finisher Firm | Displays the ROM Number | Displays the firmware ROM number. | |
| **Z:** Engine S/N | | Serial Number Programming | Use to input the machine serial number. (This is normally done at the factory.) | |
| **1:** Disp Eng ver | | Engine version display | Displays the engine version. | |
| **2:** A3/11x17 Count | | A3/DLT Double Count | Specifies whether the counter is doubled for A3/11" x 17" paper.<br>If “Yes” is selected, the total counter counts up twice when A3/11" x 17" paper is used. | x 2 count<br>**1 count** |
| **3:** Change PCM Mess | | Maintenance Replacement Warning | Enable or disable the PM warning. | **Notify 60K**<br>Notify 60/65K<br>No Message |
| **4:** Fuser Count clr | | Fusing unit counter clear | Use to clear the fusing unit counter clear. | |
| **5:** PCU Count clr | | PCU counter clear | Use to clear the PCU counter clear. | |

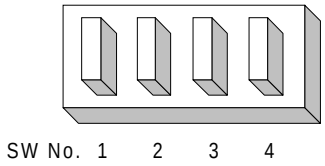
## 4.4.3 INPUT CHECK TABLE

| Number | Description | Reading | |
|---|---|---|---|
| | | 00H | 01H |
| 0 | Not used | | |
| 1 | Front cover safety switch | Closed | Opened |
| 2 | Front cover safety switch - LD5 V | Closed | Opened |
| 3 | Right cover switch | Closed | Opened |
| 4 | Right lower cover switch | Closed | Opened |
| 5 | Tray Cover (optional paper tray unit) | Closed | Opened |
| 6 | Duplex unit open switch (Optional duplex unit) | Closed | Opened |
| 7 | Right upper cover switch | Closed | Opened |
| 8 | Right guide switch (Optional bridge unit) | Closed | Opened |
| 9 | Left guide switch (Optional bridge unit) | Closed | Opened |
| 10 | Not used | | |
| 11 | Paper overflow sensor | Paper not detected | Paper detected |
| 12 - 15 | Not used | | |
| 16 | Upper relay sensor | Paper not detected | Paper detected |
| 17 | Lower relay sensor | Paper not detected | Paper detected |
| 18 | Vertical transport sensor (Optional paper tray unit) | Paper not detected | Paper detected |
| 19 | Registration sensor | Paper not detected | Paper detected |
| 20 | Paper exit sensor | Paper not detected | Paper detected |
| 21 | Exit sensor (Optional interchange unit) | Paper not detected | Paper detected |
| 22 | Duplex entrance sensor (Optional duplex unit) | Paper not detected | Paper detected |
| 23 | Duplex exit sensor (Optional Duplex unit) | Paper not detected | Paper detected |
| 24 | Relay sensor (Optional bridge unit) | Paper not detected | Paper detected |
| 25 | Tray exit sensor (Optional bridge unit) | Paper not detected | Paper detected |
| 26 | Paper end sensor (optional bypass tray) | Paper not detected | Paper detected |
| 27 | Paper size sensor sensor (optional bypass tray) | See Table 2 | |
| 28 - 29 | Not used | | |
| 30 | Special paper switch | Off | On |
| 31 | Upper paper end sensor | Paper not detected | Paper detected |
| 32 | Lower paper end sensor | Paper not detected | Paper detected |
| 33 | Upper paper size switch | See Table 1 | |
| 34 | Lower paper size switch | See Table 1 | |
| 35 | 1st paper height sensors | See Table 3 | |
| 36 | 2nd paper height sensors | See Table 3 | |
| 37 | Upper paper end sensor (or right tray end sensor for the LCT) (Optional paper tray unit or LCT) | Paper not detected | Paper detected |

| Number | Description | Reading | |
|---|---|---|---|
| | | 00H | 01H |
| 38 | Lower paper end sensor (Optional paper tray unit) | Paper not detected | Paper detected |
| 39 | Upper paper size switch (Optional paper tray unit or LCT) | See Table 1 (for paper tray unit) 01: A4, 02: LT (for LCT - there is no sensor) | |
| 40 | Lower paper size switch (Optional paper tray unit) | See Table 1 | |
| 41 | Upper paper height sensor (Optional paper tray unit or LCT) | See Table 3 | |
| 42 | Lower paper height sensor (Optional paper tray unit) | See Table 3 | |
| 43 | Upper paper lift (limit) sensor (Optional paper tray unit or LCT) | Paper not at correct height | Paper at correct height |
| 44 | Lower limit sensor (Optional LCT) | Tray is not down | Tray is down |
| 45 | Rear fence H.P sensor (Optional LCT) | Not home position | At home position |
| 46 | Rear fence return sensor (Optional LCT) | Not return position | At return position |
| 47 | Side fence closed sensor (Optional LCT) | Not detected | Detected |
| 48 | Side fence open sensor (Optional LCT) | Not detected | Detected |
| 49 | Left tray paper end sensor (Optional LCT) | Paper not detected | Paper detected |
| 50 | Tray set switch(Optional LCT) | Off | On |
| 51 - 52 | Not used | | |
| 53 | PCU set signal (a shorted connection in the ID sensor cable) | Not set | Set |
| 54 | New PCU detect switch | Used PCU | New PCU |
| 55 | Paper tray unit type (Optional paper tray unit) | See Table 4 | |
| 56 | Paper tray unit installed | Not installed | Installed |
| 57 - 60 | Not used | | |
| 61 | By-pass tray installed | Not installed | Installed |
| 62 | Duplex unit installed | Not installed | Installed |
| 63 | Fusing unit installed | Not installed | Installed |
| 64 | Interchange unit installed | Not installed | Installed |
| 65 | Finisher installed | Not installed | Installed |
| 66 - 70 | Not used | | |
| 71 | Main motor lock | Off | On |
| 72 | Polygonal mirror motor lock | Off | On |
| 73 | Tray motor lock (Optional paper tray unit) | Off | On |
| 74 | Exhaust fan motor lock | Off | On |
| 75 - 80 | Not used | | |
| 81 | Laser synchronization signal | Not detected | Detected |

| Number | Description | Reading | |
|---|---|---|---|
| | | 00H | 01H |
| 82 | LD error | No error | Error |
| 83 - 99 | Not used | | |

***Table 1: Paper Size Switch (Main Unit)***

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| Number | SW 1 | SW 2 | SW 3 | SW 4 | SP Value | Paper Size |
|---|---|---|---|---|---|---|
| 33, 34, 39, 40 | 0 | 0 | 0 | 0 | 00H | — |
| | 0 | 0 | 1 | 0 | 04H | A4 LEF |
| | 0 | 0 | 1 | 1 | 0CH | A4 SEF |
| | 0 | 1 | 0 | 1 | 0AH | 11" x 17" |
| | 0 | 1 | 1 | 1 | 0EH | 11" x 8 1/2" |
| | 1 | 0 | 0 | 0 | 01H | 8 1/2" x 11" |
| | 1 | 0 | 1 | 0 | 05H | * (Asterisk) |
| | 1 | 1 | 0 | 0 | 03H | 8 1/2" x 14" |
| | 1 | 1 | 1 | 1 | 0FH | A3 |

1: Pushed

***Table 2: By-pass Paper Size Sensor***

| Number | SP Value | Paper Size | |
|---|---|---|---|
| | | mm | inches |
| 27 | 01H | A3 | 11" x 17" |
| | 03H | — | 11" x 17" |
| | 02H | A4 SEF | 8 1/2" x 11" |
| | 06H | 8" x 13" | — |
| | 04H | A5 SEF | 5 1/2" x 8 1/2" |
| | 0CH | — | — |
| | 08H | — | — |

***Table 3: Paper Height Sensors***

| Number | SP Value | Paper Amount |
|---|---|---|
| 35, 36, 41, 42 | 00H | 100% |
| | 01H | 70 - 75% |
| | 02H | Near-end |
| | 03H | 25 - 30% |

***Table 4: Paper Tray Unit Set Sensor***

| Number | SP Value | Unit Installed |
|---|---|---|
| 55 | 00H | None |
| | 10H | LCT |
| | 20H | Paper tray unit (2 trays) |

## 4.4.4 OUTPUT CHECK TABLE

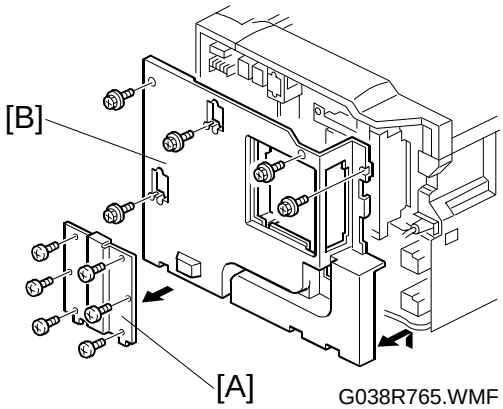
**NOTE:** Pull out the tray before performing the output checks from 29 to 32.

| Number | Description |
|---|---|
| 0 | Not used |
| 1 | Main motor (forward) |
| 2 | Main motor (Reverse) **Do not use this mode.** |
| 3 | Registration clutch |
| 4 | Not used |
| 5 | Toner supply motor |
| 6 | Not used |
| 7 - 8 | Not used |
| 9 | Exhaust fan (High Speed) |
| 10 | Exhaust fan (Low Speed) |
| 11 | Not used |
| 12 | By-pass feed clutch |
| 13 | Upper paper feed clutch |
| 14 | Lower paper feed clutch |
| 15 | Upper paper lift motor (Up) |
| 16 | Upper paper lift motor (Down) |
| 17 | Lower paper lift motor (Up) |
| 18 | Lower paper lift motor (Down) |
| 19 | Lower paper lift motor (Up: Optional paper tray unit) |
| 20 | Lower paper lift motor (Down: Optional paper tray unit) |
| 21 | Upper relay clutch |
| 22 | Lower relay clutch |
| 23 | Relay clutch (Optional paper tray unit) |
| 24 - 25 | Not used |
| 26 | Upper paper feed clutch (Optional paper tray unit) |
| 27 | Lower paper feed clutch (Optional paper tray unit) |
| 28 | Tray motor (Optional paper tray unit) |
| 29 | Upper Paper lift motor<br>(Up: Optional paper tray unit or LCT) |
| 30 | Rear fence motor (forward: Optional LCT) |
| 31 | Upper paper lift motor<br>(Down: Optional paper tray unit or LCT) |
| 32 | Rear fence motor (reverse: Optional LCT) |
| 33 | Side fence solenoid (Optional LCT) |
| 34 | Shift tray motor (Optional shift tray) |
| 35 | Not used |
| 36 | Exit junction gate (Optional interchange unit) |
| 37 | Duplex junction gate (Optional interchange unit) |
| 38 - 39 | Not used |
| 40 | Duplex inverter motor (Reverse: Optional duplex unit) |
| 41 | Duplex inverter motor (Forward: Optional duplex unit) |
| 42 | Duplex transport motor (Optional duplex unit) |
| 43 | Inverter gate solenoid (Optional duplex unit) |

| Number | Description |
|---|---|
| 44 | Not used |
| 45 | Bridge cooling fan motor (Optional bridge unit) |
| 46 | Bridge unit drive motor (Optional bridge unit) |
| 47 | Junction gate solenoid (Optional bridge unit) |
| 48 - 50 | Not used |
| 51 | Polygonal mirror motor |
| 52 | Polygonal mirror motor and laser diode |
| 53 | Laser diode - **Do not use this mode** |
| 54 - 79 | Not used |
| 80 | Duplex unit free run (without paper) |
| 81 | Duplex unit free run (with paper) |
| 82 - 99 | Not used |
| 100 | 4-bin mailbox motor (Optional 4-bin mailbox) |
| 101 | Mailbox turn gate solenoid 1 (Optional 4-bin mailbox) |
| 102 | Mailbox turn gate solenoid 2 (Optional 4-bin mailbox) |
| 103 | Mailbox turn gate solenoid 3 (Optional 4-bin mailbox) |

## 4.4.5 ENGINE BOARD PROGRAM DOWNLOAD

The engine board program software can be upgraded using the flash memory card.

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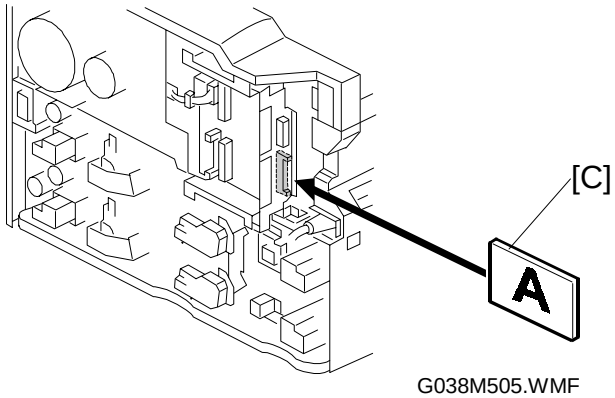


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1. Turn off the main switch.
2. Remove the controller cover [A] and the rear cover [B].
3. Insert the flash memory card [C] into the IC card slot on the engine board through the bracket slot.
   **NOTE:** Insert the flash memory card so that the surface printed “A” faces the back side of the machine as shown.
4. Turn on the main switch to enter the SP mode, then select “2. Service Menu 2.”
5. Scroll through the menu listings using [▼] [▲] keys until “EngFirm ver up” appears on the display, then press [Enter].
6. Press [Enter] to update the program.
7. If the software downloads successfully, the display shows “OK.”
8. Turn off the main switch and remove the IC card.
9. Reinstall the controller cover and the rear cover.

# 4.5 SERVICE TOOLS

## 4.5.1 SERVICE TOOL MENU

Service Mode (Service Tool)

| Title | Description |
|---|---|
| HDD Test | Verifies the FAT and directory entries on the HDD. |
| HDD format | Partitions and formats the HDD. |
| NIB read/write | Backs up the NIB NVRAM and restores it. |

**NOTE:** Items related to the HDD will not be displayed if the HDD is not installed.

## 4.5.2 HDD TEST

This verifies the file and directory entries on the hard disk drive.

1. Enter the SP mode, and select “3. Service Tool.”
2. Select “HDD Test”, then press [Enter].
3. Specify the number of tests, then press [Enter].
   - If “000” is specified, the test will continue until it is manually cancelled.
   - [▲] [▼]: Increment/decrement the digit at the cursor.
   - [Escape]: Exit without executing the test. Cancels the test even while it is being executed.
   - [Enter]: Perform the test.
4. Check the result of the test, then do the following:
   - If the result is OK, press [Enter] to display the available free space on the HDD. Then press [Enter] again to exit.
   - If the result is NG, press [Enter] to do the test again. Or, press [Cancel] to exit.

| **Error Display Details** | |
|---|---|
| Number at the top right corner | Indicates that the error was found in the n’th test. |
| Error Message | “Clstr error”<br>A damaged cluster was found. The damaged cluster was marked as “bad” to avoid future use. |

Service Tables

### 4.5.3 HDD FORMAT

This creates partitions on the HDD and formats them.

1. Enter the SP mode, and select “3. Service Tool”.
2. Select “HDD Format”, then press [Enter].
3. Check the HDD capacity, then press [Enter].
4. Press [Enter] again to start formatting. Or, press [Escape] to exit.
   **NOTE:** Once the format has started, it cannot be cancelled.
5. Check the result of the test, then do the following:
   - If the result is OK, press [Enter] to exit.
   - If the result is NG, check the error message, then press [Enter] to exit.

| **Error Display Details** | |
|---|---|
| Error Messages | “HDD Ident Fail”<br>The controller could not retrieve information from the HDD.<br>“NG Logic Format”<br>Logical format failed.<br>“No Support HDD”<br>Unsupported HDD is detected. |

### 4.5.4 NIB NVRAM BACKUP AND RESTORE

This backs up the NIB NVRAM to the controller, and restores the data to the NIB NVRAM. Use this procedure when replacing a NIB. The following procedure shows how to use this when copying data from one NIB to another.

1. Ensure that the source NIB is installed in the controller.
2. Enter the SP mode, and select “3. Service Tool”.
3. Select “NIB read/write”, then press [Enter].
4. Select the data copy direction “NIB -> CTL”, then press [Enter].
   - [▲] [▼]: Select a data copy direction.
   - [Escape]: Exit.
   - [Enter]: Copy the NIB NVRAM to the controller.
     **NOTE:** Once data copying has started, it cannot be cancelled.
5. Check the result, then do the following:
   - If the result is OK, press [Enter] to exit. Go on to the next step.
   - If the result is NG, check the error message, then press [Enter] to exit.

| **Error Display Details** | |
|---|---|
| Error Message | “NG copying”<br>NIB data copying failed. Try again. |

6. Turn off the machine and replace the NIB.
7. Turn on the machine, and ensure that the target NIB is correctly installed.
8. Enter the SP mode, and select “3. Service Tool”.
9. Select “NIB read/write”, then press [Enter].
10. Select the data copy direction “CTL -> NIB”, then press [Enter].
    - [▲] [▼]: Select the data copy direction.
    - [Escape]: Exit.
    - [Enter]: Copy the NIB NVRAM to the controller.
      **NOTE:** Once data copying has started, it cannot be cancelled.
11. Check the result, then do the following:
    - If the result is OK, press [Enter] to exit.
    - If the result is NG, check the error message, then press [Enter] to exit.

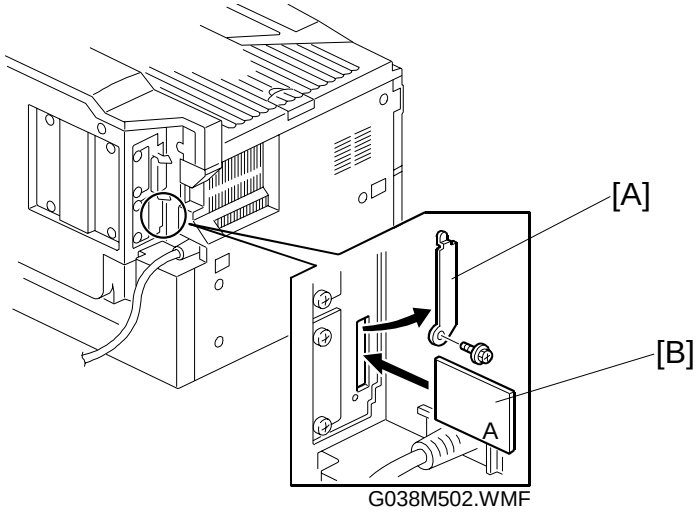
| **Error Display Details** | |
|---|---|
| Error Message | “NG copying”<br>NIB data copying failed. Try again. |

# 4.6 CONTROLLER FIRMWARE UPDATE

## 4.6.1 FIRMWARE DOWNLOAD

This procedure is for upgrading the firmware for the controller, the network interface board, and the PS3 DIMM module.

To update the PS3 firmware, the target DIMM module must already contain a version of the PS3 firmware.



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**⚠CAUTION**

**Do not turn off the machine while downloading the firmware.**

1. Prepare an IC card that contains the required firmware.
2. Turn off the machine and remove the cover [A] (1 screw).
3. Install the card [B] in the IC card slot on the controller.
   **NOTE:** Insert the flash memory card so that the surface printed “A” faces the back side of the machine as shown.
4. Turn on the machine. Start downloading the new firmware by pressing the [Enter] key.
5. After the firmware download has finished, turn off the machine, and remove the card. Then, re-install the cover [A].
6. Turn on the machine, and print the service summary report to confirm that the new firmware version has been installed.

## 4.6.2 ERROR RECOVERY

### *CONTROLLER*

If the controller does not start up after a failed firmware download, use the following procedure. This procedure will force the controller to boot from the IC card.

1. Prepare an IC card with the required controller firmware version on it.
2. Turn off the machine and remove the controller.
3. Change the DIP switch 1 - No. 1 setting to “ON”.
4. Put back the controller and install the card in the IC card slot on the controller.
   **NOTE:** When you see the machine from the back, the “A” side of the card must face the right side.
5. Turn on the machine.
6. Wait until the LEDs between the IC card slot and the parallel interface are both lit (this may take 1 to 2 minutes.).
7. Turn off the machine, remove the card, and reset the DIP switch 1 - No.1 setting to “OFF”. Then, put back the controller.
   **NOTE:** The default settings of the DIP switches are all ‘OFF’.
8. Turn on the machine, and print the service summary report.



### *PS3 DIMM / NIB*

If a download attempt failed, try downloading the new firmware again.

# 4.7 POWER-ON SELF TEST

## 4.7.1 PARALLEL LOOP-BACK TEST

This tests the standard IEEE1284 parallel interface using a loop-back connector. The loop-back connector (P/#: G0219350) is required for this test.

**NOTE:** Do not use the loop-back connector (P/#: G0109350). This loop-back connector causes the “Timeout error”.

1. Turn off the machine and attach the loop-back connector to the Centronics parallel interface.
2. Turn on the machine.
   - Regardless of the test result, the controller starts up as normal.
3. Enter the SP mode and check the “Diag. Error” for the error codes 1101 or 1102.
   - Refer to the section 4.3.3 “Printer Controller Service Mode” for how to check the error codes.
   - Refer to the section 7.2 for the details of error codes.

## 4.7.2 OTHER TESTS

The controller tests the following devises at power-on. If an error is detected, an error code is stored in the NVRAM. Refer to the section 4.3.3 for how to check the error codes, and the section 7.2 for the details of error codes.

- Flash ROM (Firmware)
- CPU, Clock and ASIC
- Resident and optional SDRAM
- Centronics interface (if a loop-back connector is present)
- NVRAM
- Font ROM
- Optional HDD

# 5. PREVENTIVE MAINTENANCE

## 5.1 USER MAINTENANCE

All PM items can be done by the customer, using the maintenance kit. The maintenance kit contains the following items.

When the maintenance counter reaches 120K, "Replace Maintenance Kit" is displayed. After replacing the parts in the maintenance kit, the machine automatically resets the PM (fusing) count.

| Item | Quantity | Remarks |
|---|---|---|
| Paper Feed Rollers | 4 | 2 rollers for the standard trays,<br>2 rollers for optional trays. |
| Friction Pads - Standard Trays | 2 | |
| Friction Pads - Optional Trays | 2 | Optional trays |
| Transfer/Separation Unit | 1 | |
| Fusing Unit | 1 | |
| Feed Roller - LCT | 1 | LCT |
| Pick-up Roller - LCT | 1 | LCT |
| Separation Roller - LCT | 1 | LCT |

# 5.2 SERVICE MAINTENANCE

## 5.2.1 PM TABLE

The following tables describe the PM items when the PM is done by service.

**NOTE:** Make sure to clear the PM (fusing) counter by the SP mode (Service Menu 2: FuserCount clr) when you replace the fusing parts.

**Cross-reference:** Section 4.2 Service Program Mode

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

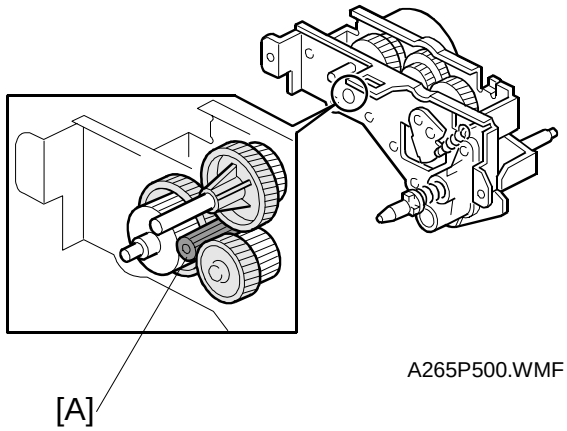
| Item | 120K | EM | Remarks |
|---|---|---|---|
| **Paper Feed** | | | |
| Paper Feed Roller | R | C | Clean with water |
| Friction Pad | R | C | Dry cloth |
| Paper Feed Guides | C | C | Clean with alcohol |
| Registration Rollers | C | C | Clean with water |
| Bottom Plate Pad | C | C | Clean with water |
| Relay Rollers | C | C | Clean with water |
| Registration Roller Mylar | C | C | Clean with water |
| **Around the Drum** | | | |
| Transfer/Separation Unit | R | | |
| **Fusing Unit and Paper Exit** | | | |
| Hot Roller | R | | |
| Pressure Roller | R | | |
| Hot Roller Strippers | R | | |
| Fusing Thermistor | C | | Clean if necessary (suitable solvent) |
| Fusing Entrance and Exit Guide Plates | C | | Clean with water or alcohol. |
| Cleaning Roller | C | | Clean with water or alcohol. |
| Paper Exit Guide Ribs | C | | Clean with water or alcohol. |
| **Others** | | | |
| Main Motor Drive Gear | I | L | Silicone Grease G501 (see note) |

| | 120K | EM | NOTE |
|---|---|---|---|
| **Paper Tray Unit** | | | |
| Paper Feed Roller | R | C | Clean with water |
| Friction Pad | R | C | Dry cloth |
| Paper Feed Guides | C | C | Clean with alcohol. |
| Relay Rollers | C | C | Clean with water. |
| Bottom Plate Pad | C | C | Clean with water. |
| Relay Clutch | I | | Replace if necessary |
| Paper Feed Clutch | I | | Replace if necessary |

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

| | 120K | EM | NOTE |
|---|---|---|---|
| **Finisher** | | | |
| Rollers | | C | Clean with water or alcohol. |
| Brush Roller | I | I | Replace if necessary. |
| Discharge Brush | C | C | Clean with a dry cloth |
| Sensors | | C | Blower brush |
| Jogger Fences | I | I | Replace if necessary. |
| Punch Waste Hopper | I | I | Empty the hopper. |

**NOTE:** Lubricate the main motor drive gear [A] with silicone grease G501 every EM.




A265P500.WMF

# 6. REPLACEMENT AND ADJUSTMENT

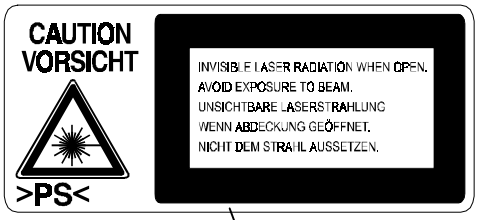
## 6.1 LASER UNIT

**⚠WARNING**

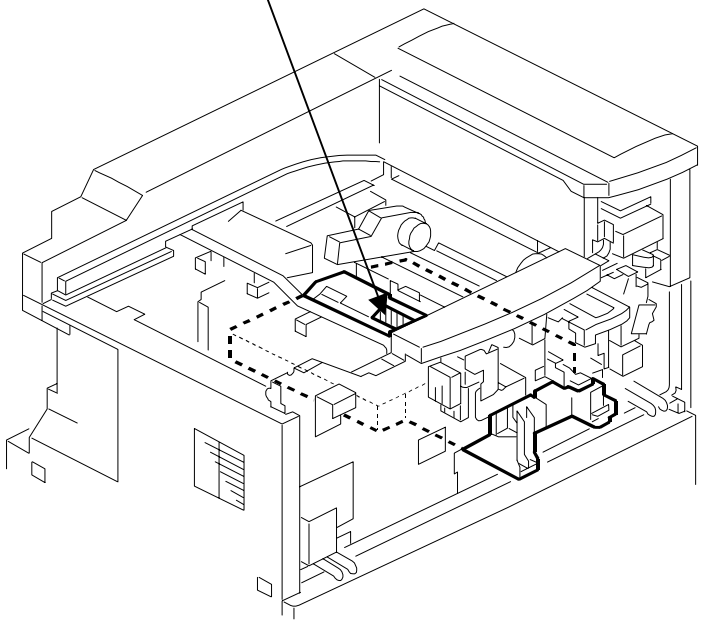
**Turn off the main power switch and unplug the machine before attempting any of the procedures in this section. Laser beams can seriously damage your eyes.**

### 6.1.1 CAUTION DECAL LOCATIONS

Caution decal is located in the laser section as shown below.

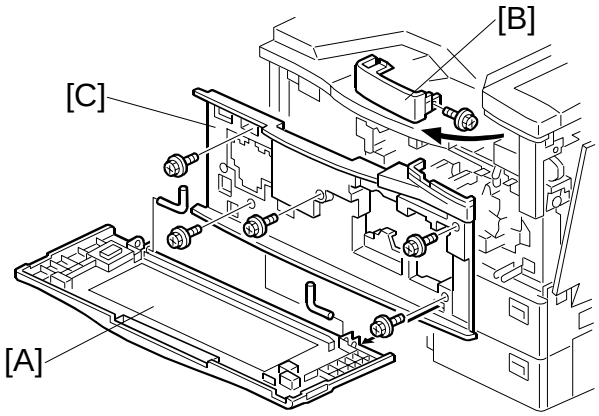



G038R500.WMF

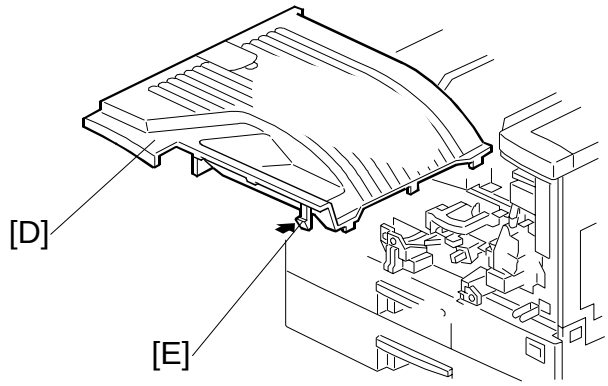


G038R501.WMF

## 6.1.2 LASER UNIT




G038R161.WMF

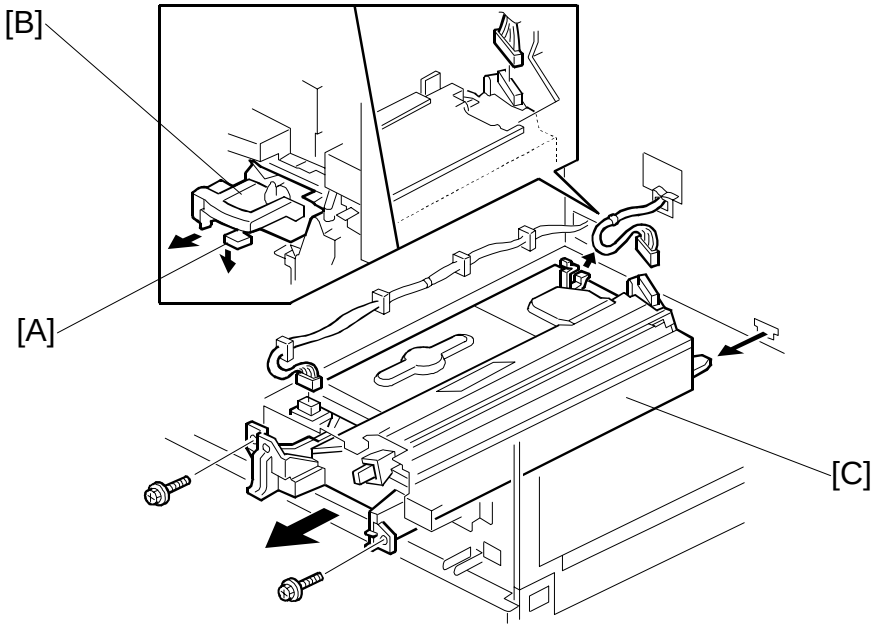



G038R162.WMF

**⚠WARNING**

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

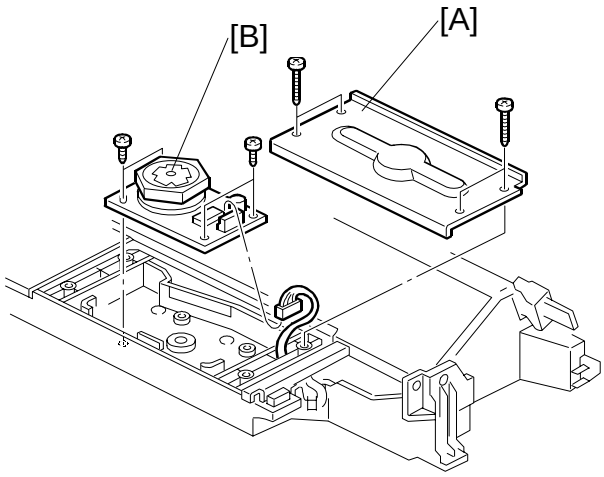
1. Remove the optional finisher and/or bridge unit, if these units have been installed.
2. Remove the front cover [A] (2 pins).
3. Remove the right front cover [B] (1 screw).
4. Swing up the toner bottle lever. Then, remove the inner cover [C] (5 screws).
5. Remove the paper exit tray [D] (1 hook [E]).




G038R503.WMF

6. Release the lock lever [A] and slide out the toner bottle [B].
7. Remove the laser unit [C] (2 screws, 2 connectors).

## 6.1.3 POLYGONAL MIRROR MOTOR

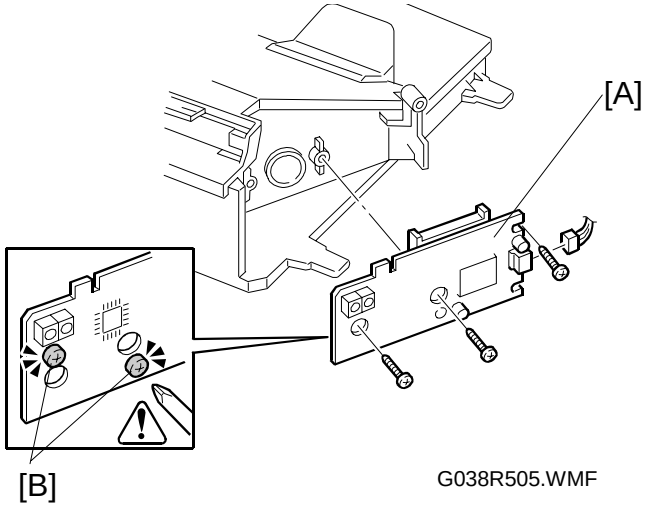



G038R504.WMF

**NOTE:** When performing the following steps, take care not to damage the mirror surface with the tip of the screw driver. Also, do not touch the mirror surface with bear fingers.

1. Remove the laser unit. (See Laser Unit Replacement.)
2. Remove the heat sink [A] (4 screws).
3. Replace the polygonal mirror motor [B] (4 screws, 1 connector).

## 6.1.4 LASER DIODE (LD) UNIT

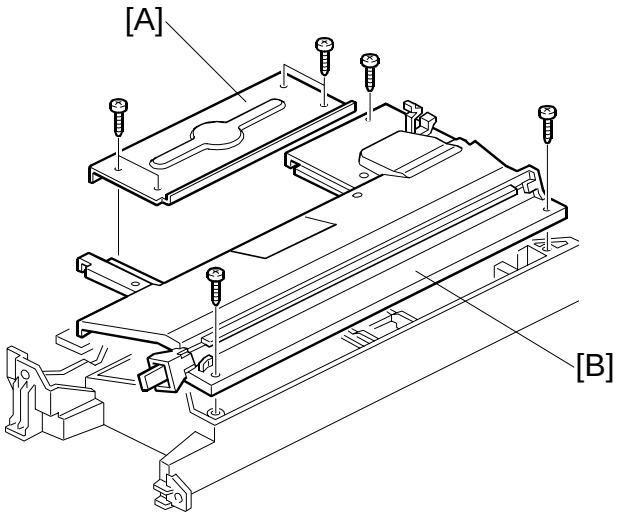



G038R505.WMF

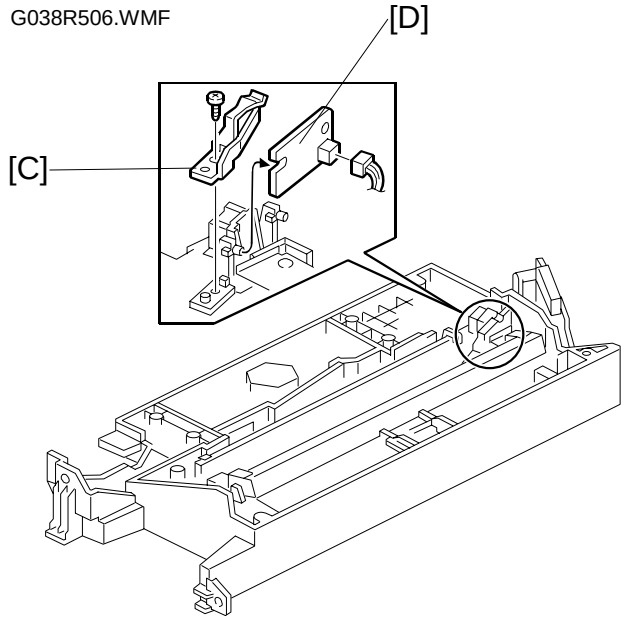
1. Remove the laser unit. (See Laser Unit Replacement).
2. Remove the laser diode unit [A] (3 screws, 1 connector).

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

## 6.1.5 LASER SYNCHRONIZATION DETECTOR




G038R506.WMF

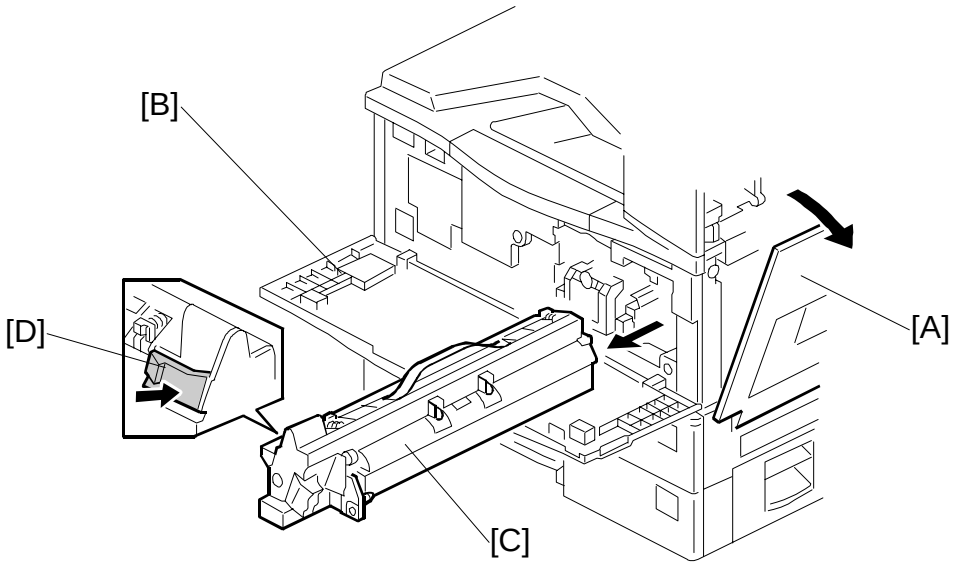



G038R507.WMF

1. Remove the laser unit. (See Laser Unit Replacement).
2. Remove the heat sink [A] (4 screws).
3. Remove the laser upper cover [B] (3 screws).
4. Remove the holding bracket [C] (1 screw).
5. Remove the laser synchronization detector [D] (1 connector).

# 6.2 PHOTOCONDUCTOR UNIT (PCU)

## 6.2.1 PCU



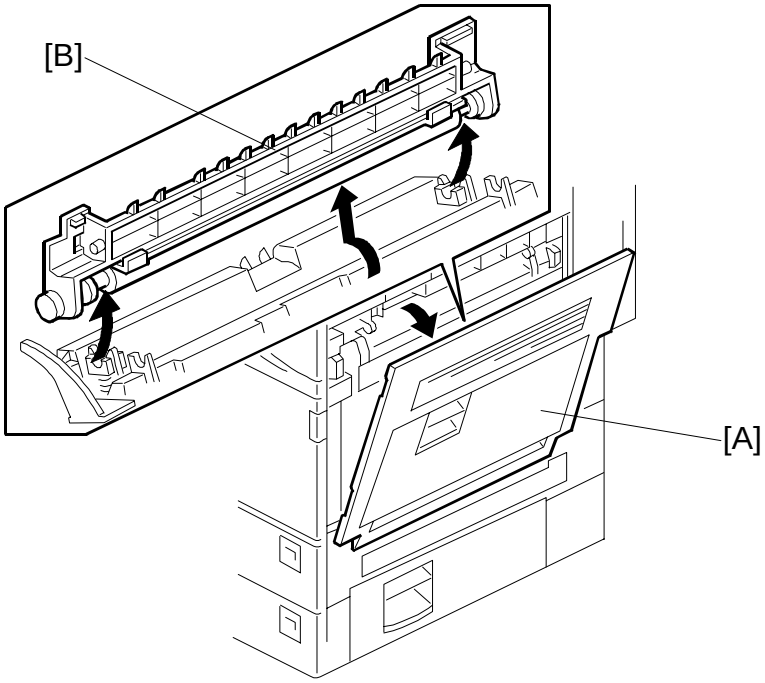

G038R569.WMF

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

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

# 6.3 TRANSFER UNIT

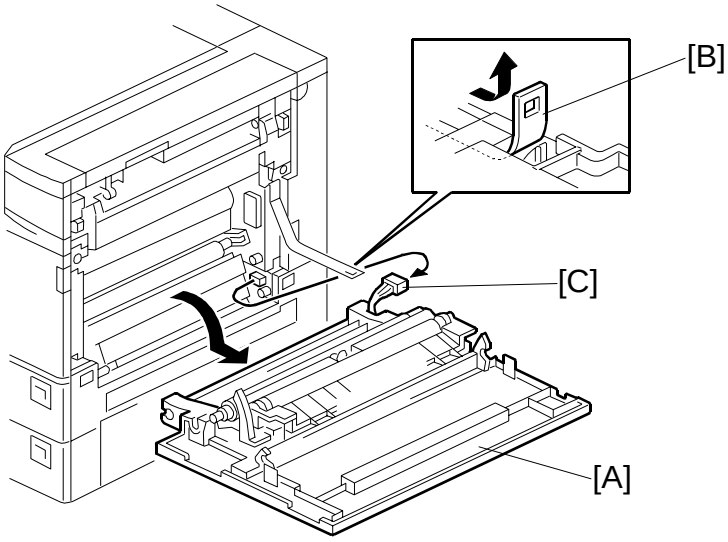
## 6.3.1 TRANSFER ROLLER UNIT



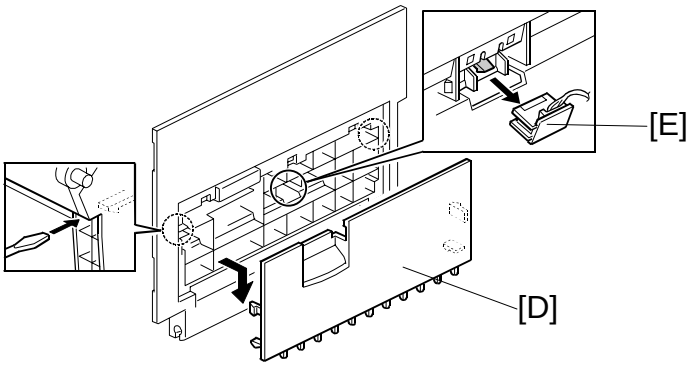

G038R570.WMF

1. Open the right cover [A].
2. Remove the transfer roller unit [B] (1 hook).
   **NOTE:** Do not touch the transfer roller surface.

# 6.4 ID SENSOR




G038R261.WMF

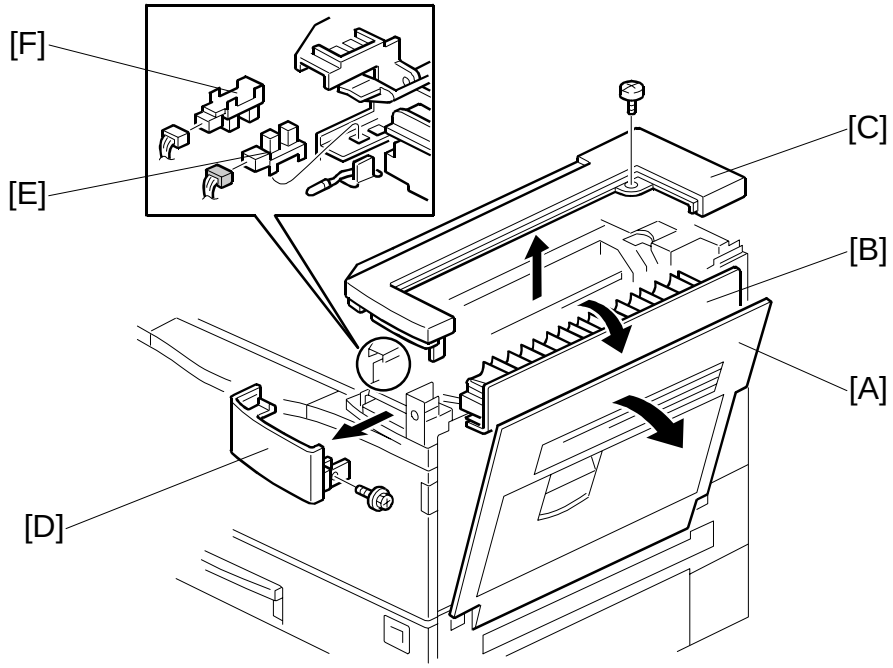



G038R502.WMF

1. Remove the optional duplex unit, if it has been installed.
2. Open the right cover [A].
3. Lift up the right cover band [B] and slide it to the left.
4. Remove the connector of the ID sensor [C] while opening the right cover to a horizontal position.
5. Remove the right cover [A].
6. Remove the sub right cover [D].
7. Remove the ID sensor [E] (removing the harness).

# 6.5 PAPER EXIT

## 6.5.1 PAPER EXIT AND OVERFLOW SENSORS

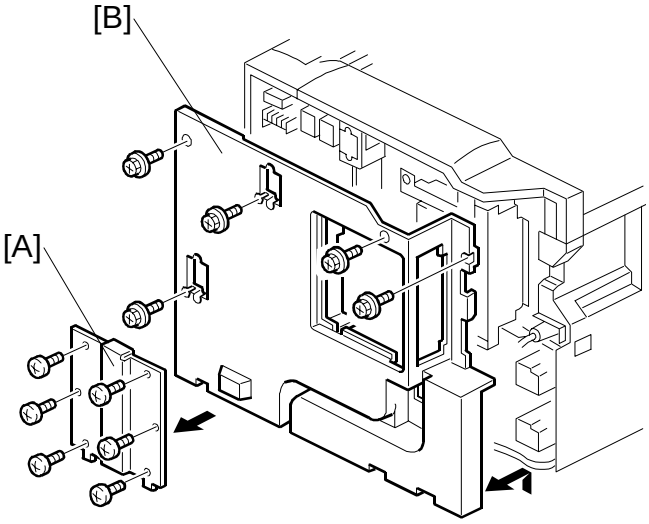



G038R661.WMF

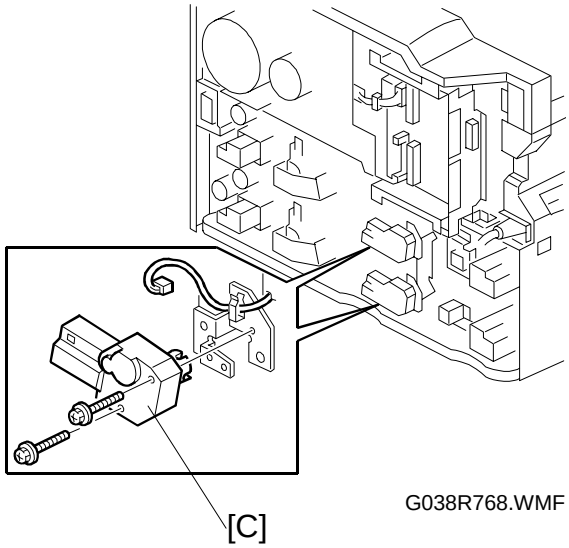
1. Remove the optional 4-bin mailbox unit if it has been installed.
2. Open the right cover [A].
3. Open the paper exit guide cover [B] and remove the upper cover [C] (1 screw).
4. Remove the right front cover [D].
5. Remove the paper exit [E] and overflow [F] sensors (1 connector each).

# 6.6 PAPER FEED AND REGISTRATION

## 6.6.1 PAPER LIFT MOTORS



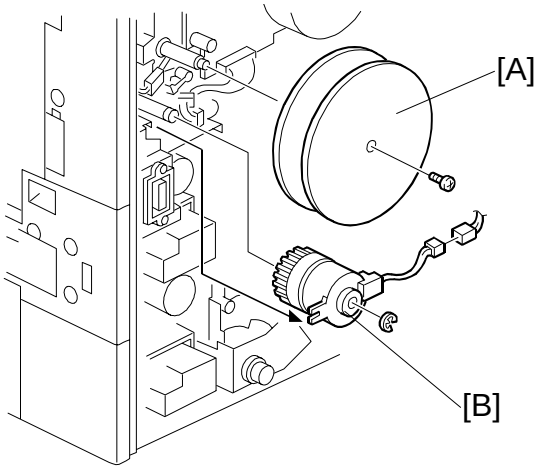

G038R765.WMF




G038R768.WMF

1. Disconnect the interface harness of the optional paper tray unit of LCT.
2. Remove the controller cover [A] (6 screws).
3. Remove the rear cover [B] (5 screws).
4. Remove the upper and lower paper lift motors [C] (1 connector, 2 screws each).

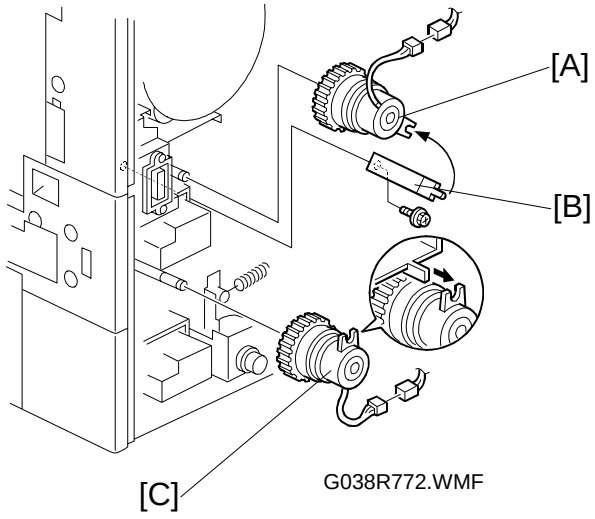
## 6.6.2 REGISTRATION CLUTCH




G038R771.WMF

1. Remove the rear cover. (See Paper Lift Motors.)
2. Remove the fly-wheels [A] (1 screw).
3. Remove the registration clutch [B] (1 connector, 1 E-ring).

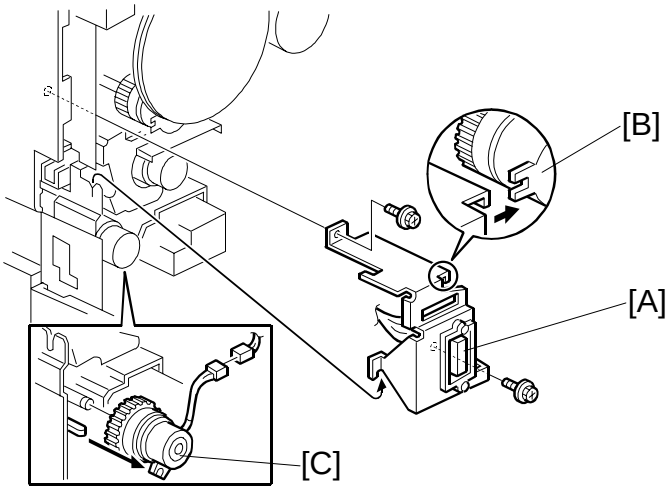
## 6.6.3 PAPER FEED CLUTCHES




G038R772.WMF

1. Remove the rear cover. (See Paper Lift Motors.)
2. Remove the bracket [A]. Then, remove the upper paper feed clutch [B] (1 connector).
3. Remove the lower paper feed clutch [C] (1 connector).

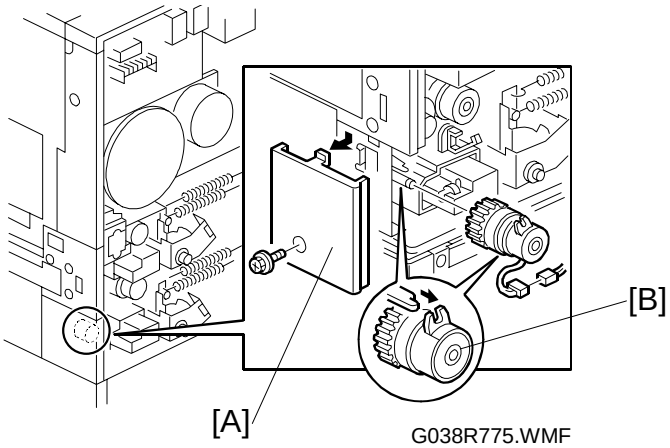
## 6.6.4 UPPER PAPER TRANSPORT CLUTCH




G038R774.WMF

1. Remove the rear cover. (See Paper Lift Motors.)
2. Remove the connector bracket [A] (2 screws).
   **NOTE:** The connector bracket also functions to hold the registration clutch [B] in place. When attaching the bracket, make sure to position it so that the bracket can perform both functions.
3. Remove the upper paper transport clutch [C] (1 connector).

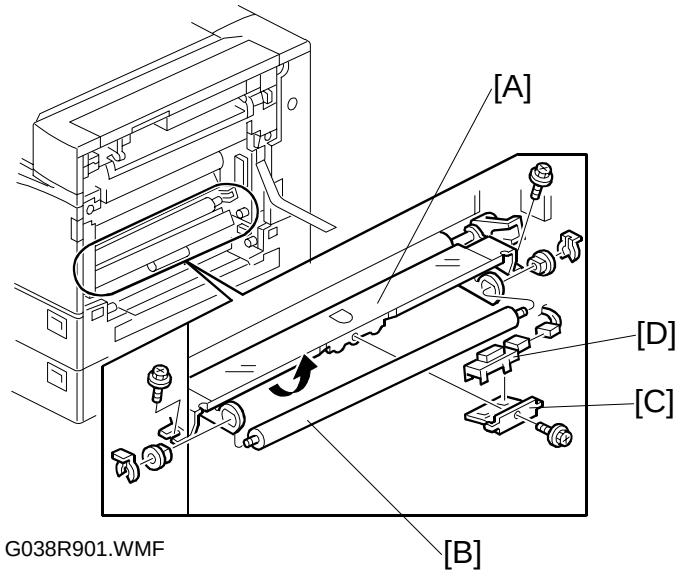
## 6.6.5 LOWER PAPER TRANSPORT CLUTCH




G038R775.WMF

1. Remove the rear cover. (See Paper Lift Motors.)
2. Remove the right rear lower cover (1 screw).
3. Remove the lower paper transport clutch [B] (1 connector).

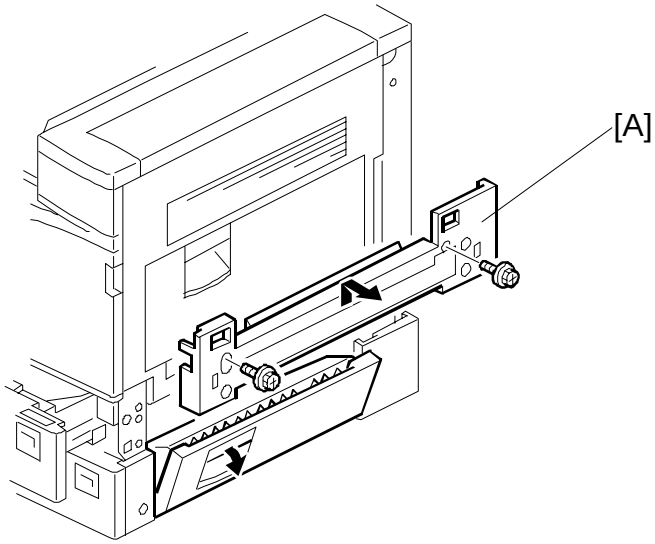
## 6.6.6 REGISTRATION SENSOR



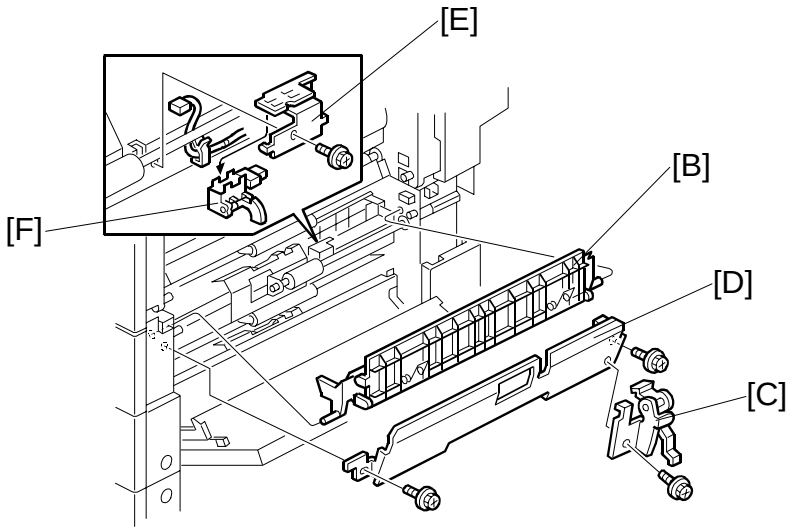

G038R901.WMF

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

## 6.6.7 UPPER RELAY SENSOR



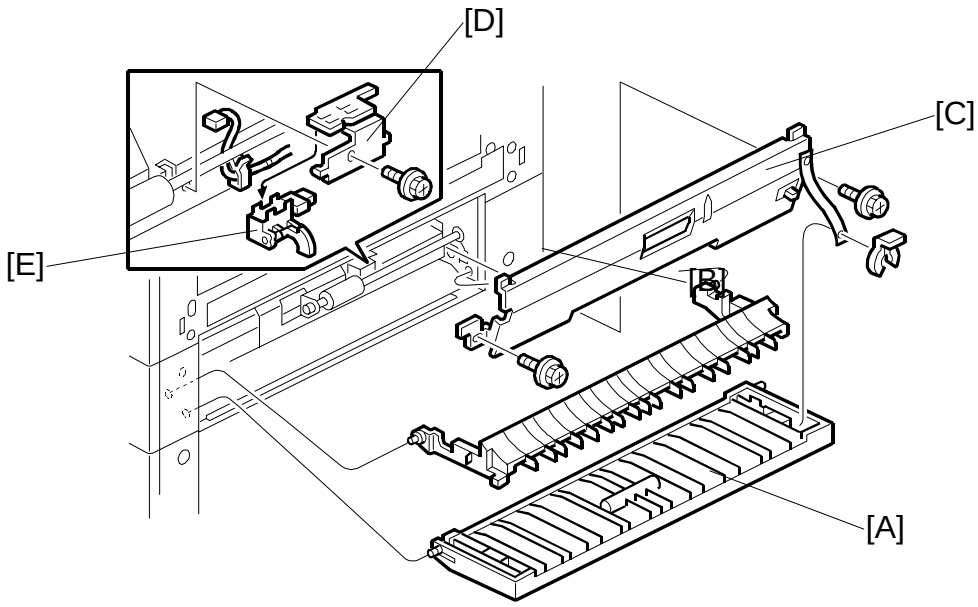

G038R900.WMF




G038R519.WMF

1. Remove the optional duplex and by-pass tray unit, if these unit have been installed.
2. Remove the right cover. (See ID Sensor.)
3. Remove the right lower cover [A] (2 screws).
4. Remove the guide plate [B].
5. Remove the bracket [C] (1 screw).
6. Remove the guide plate [D] (2 screws).
7. Remove the sensor bracket [E] (1 screw).
8. Remove the first paper transport sensor [F] (1 connector).

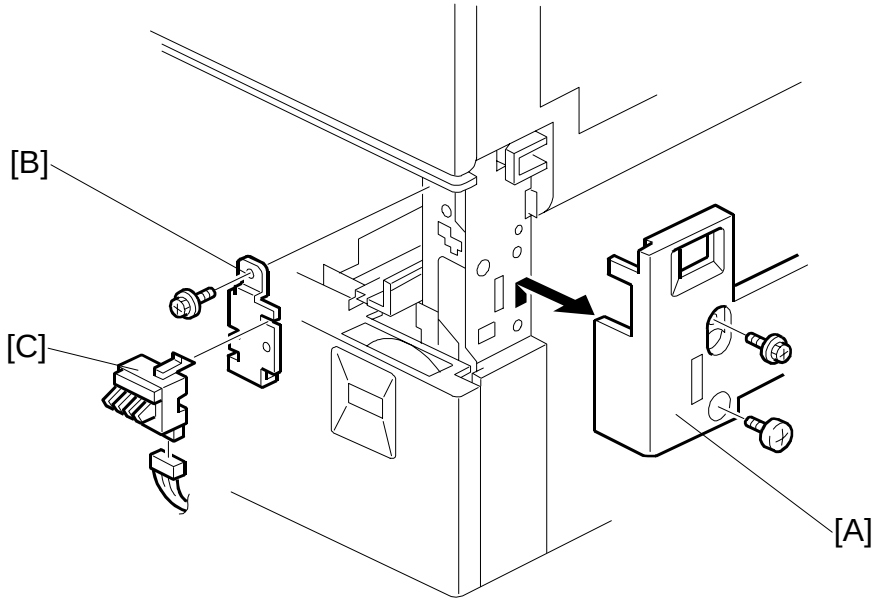
## 6.6.8 LOWER RELAY SENSOR




G038R520.WMF

1. Open the paper transport cover [A] (1 clip).
2. Remove the guide plate [B].
3. Remove the transport stay [C] (2 screws).
4. Remove the sensor bracket [D] (1 screw).
5. Remove the second paper transport sensor [E] (1 connector).

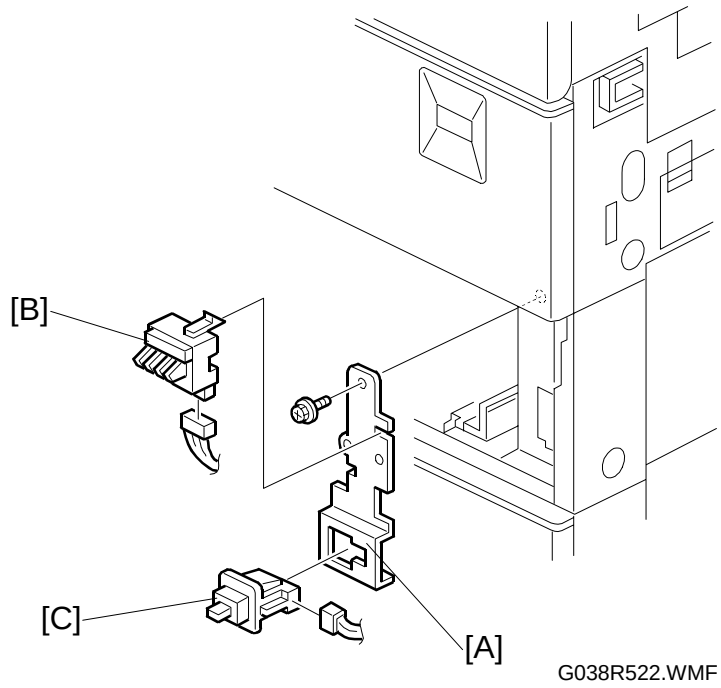
## 6.6.9 UPPER PAPER SIZE SENSOR




G038R521.WMF

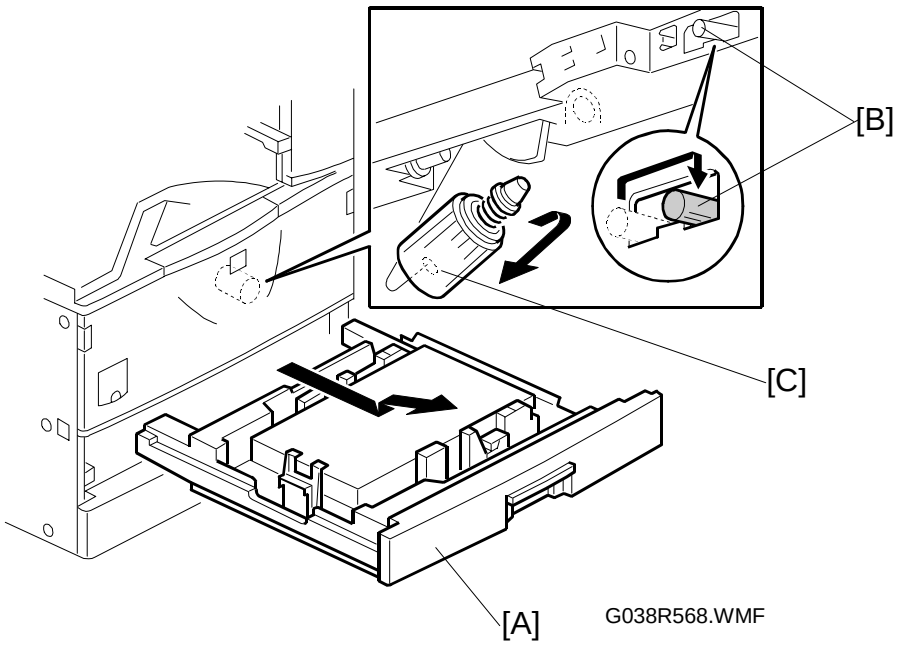
1. Pull out the paper tray.
2. Remove the optional duplex unit and by-pass tray unit, if these units have been installed.
3. Remove the right lower cover [A].
4. Remove the sensor bracket [B] (1 screw).
5. Remove the upper paper size sensor [C].

## 6.6.10 LOWER PAPER SIZE SENSOR/SPECIAL PAPER SENSOR



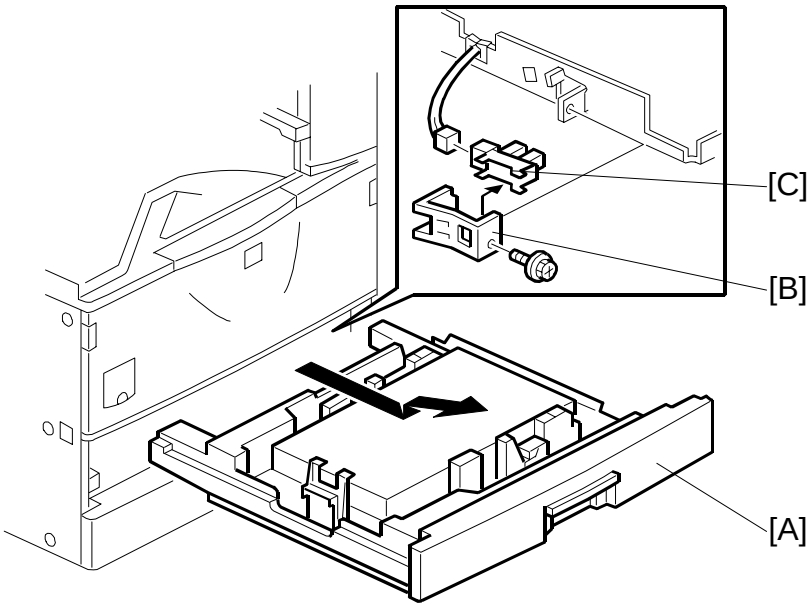

1. Pull out the paper tray.
2. Remove the sensor bracket [A] (1 screw).
3. Remove the lower paper size sensor [B] (1 connector).
4. Remove the special paper sensor [C] (1 connector).

## 6.6.11 FEED ROLLERS




1. Remove the paper tray [A].
2. Pull the lever [B].
3. Replace the feed roller [C].
   **NOTE:** Do not touch the roller surface with bare hands.
   After reinstalling the feed roller, return the lever [B].

## 6.6.12 PAPER END SENSOR (1ST AND 2ND PAPER FEED TRAYS)



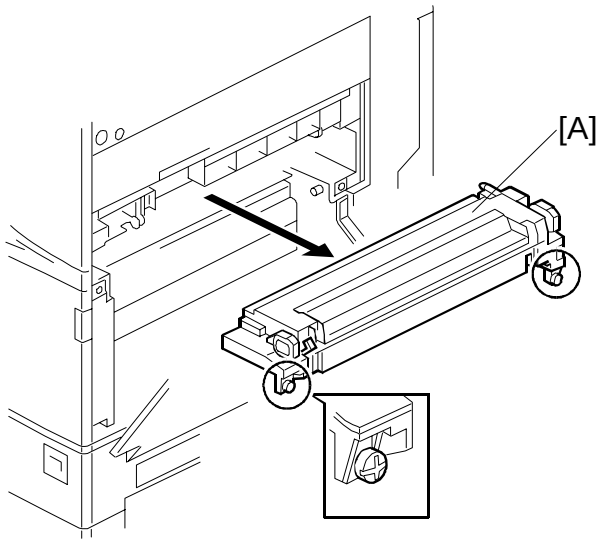

G038R524.WMF

1. Remove the paper tray [A].
2. Remove the sensor bracket [B] (1 screw, 1 connector).
3. Remove the paper end sensor [C].

# 6.7 FUSING

## 6.7.1 FUSING UNIT

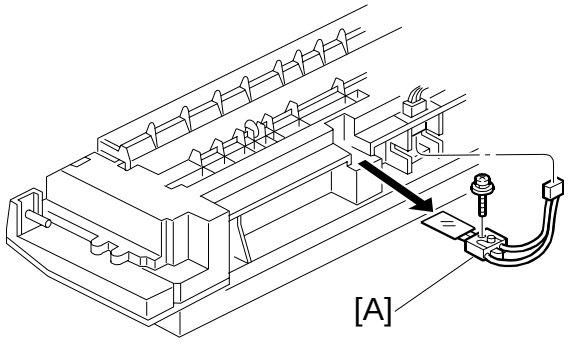
**⚠CAUTION**
**Allow time for the unit to cool before doing the following procedure.**




G038R561.WMF

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

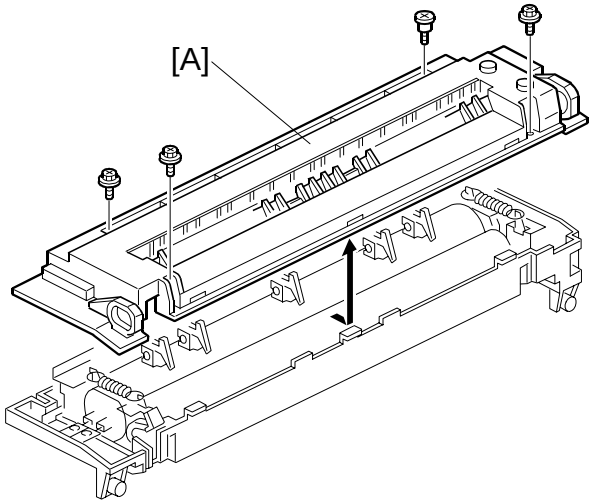
## 6.7.2 THERMISTOR



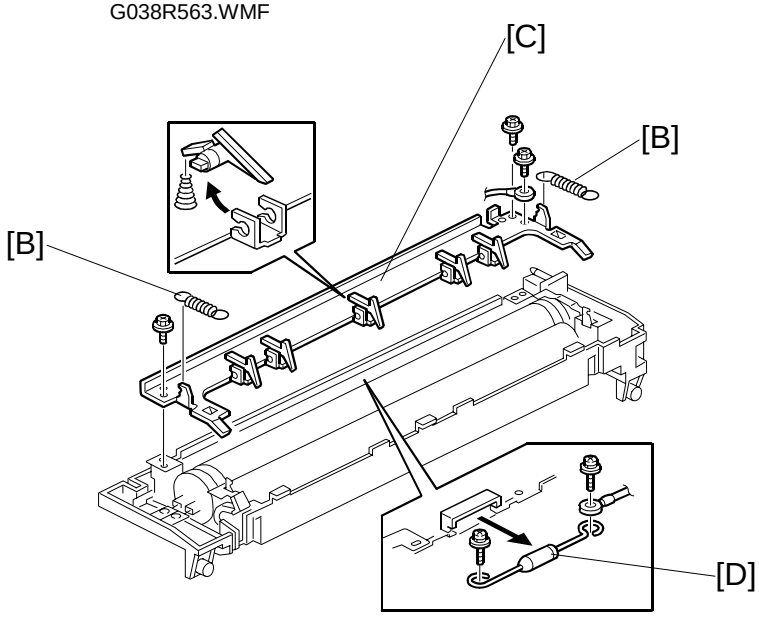

G038R562.WMF

1. Remove the fusing unit. (See Fusing Unit).
2. Replace the thermistor [A] (1 screw, 1 connector).

## 6.7.3 THERMOFUSE



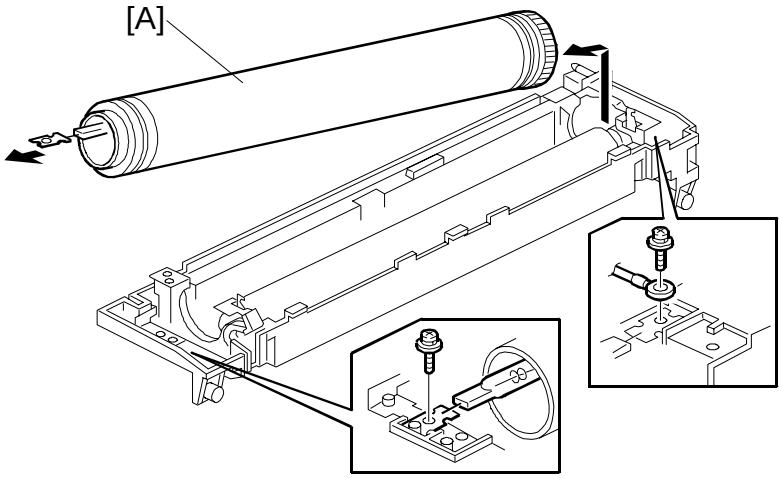

G038R563.WMF



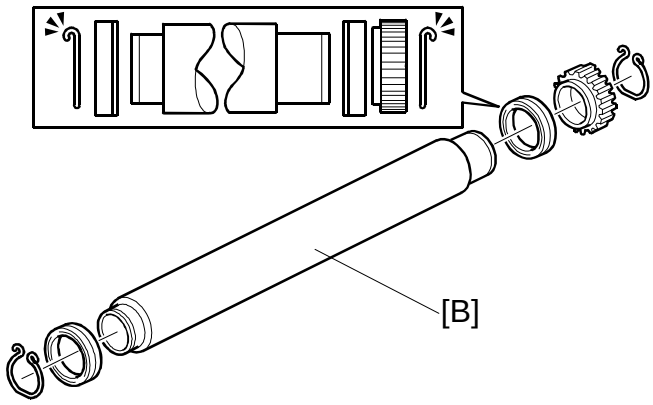

G038R564.WMF

1. Remove the fusing unit. (See Fusing Unit.)
2. Remove the fusing upper cover [A] (4 screws).
3. Remove the pressure springs [B].
4. Remove the hot roller stripper bracket [C] (3 screws).
5. Replace the thermofuse [D] (2 screws).

## 6.7.4 HOT ROLLER AND FUSING LAMP




G038R565.WMF

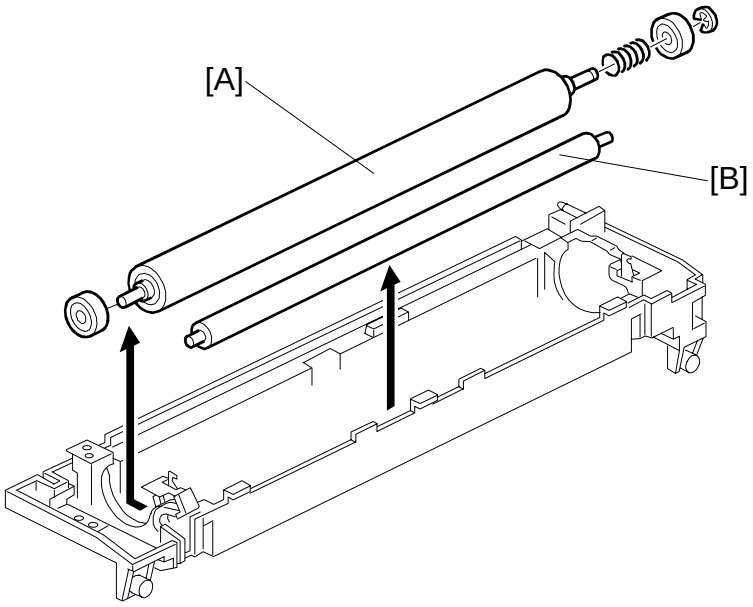



G038R566.WMF

1. Remove the fusing unit. (See Fusing Unit.)
2. Remove the fusing upper cover. (See Thermofuse.)
3. Remove the pressure springs. (See Thermofuse.)
4. Remove the hot roller stripper bracket. (See Thermofuse.)
5. Remove the fusing lamp (2 screws) and hot roller assembly [A].
   **NOTE:** Do not touch the surface of the fusing lamp with bare hands.
6. Replace the hot roller [B] (2 C-rings, 1 gear, 2 bushings).

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

## 6.7.5 PRESSURE ROLLER/CLEANING ROLLER



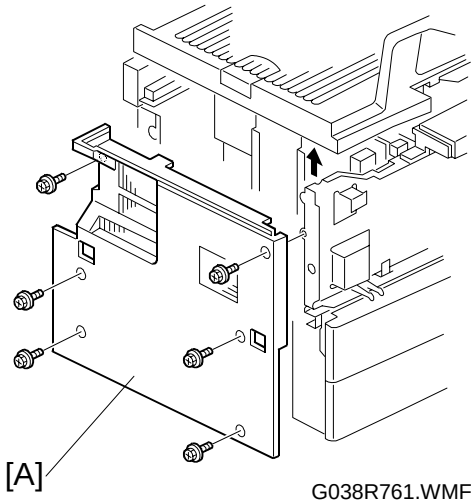

G038R567.WMF

1. Remove the fusing lamp and hot roller assembly. (See Hot Roller and Fusing Lamp.)
2. Replace the pressure roller [A] (1 E-ring, 2 bushings, 1 spring).
3. Replace the cleaning roller [B].

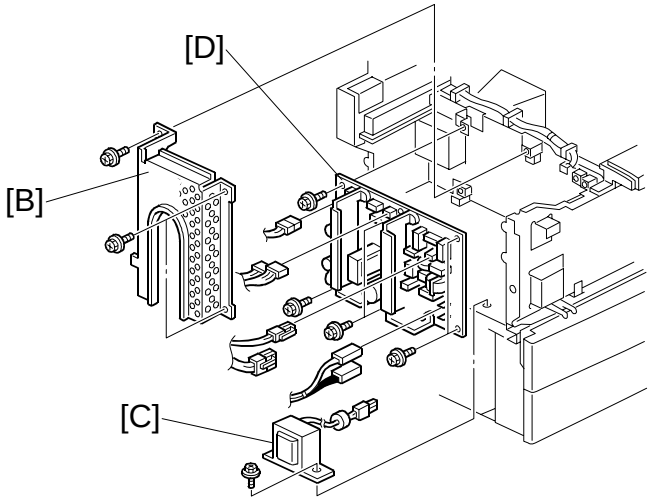
**NOTE:** Do not touch the surface of the rollers.

# 6.8 PCBS AND MOTORS

## 6.8.1 PSU



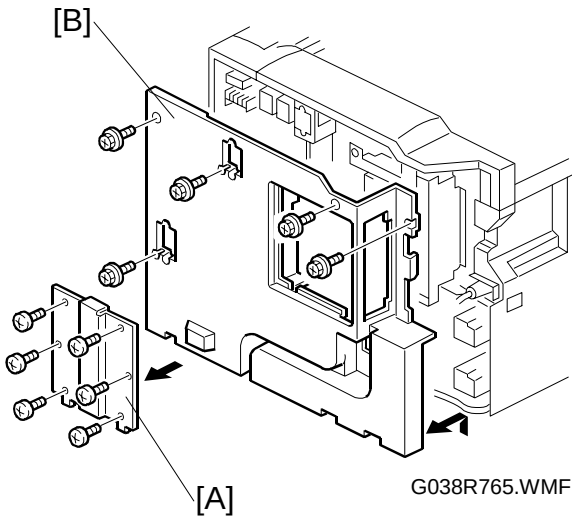

G038R761.WMF



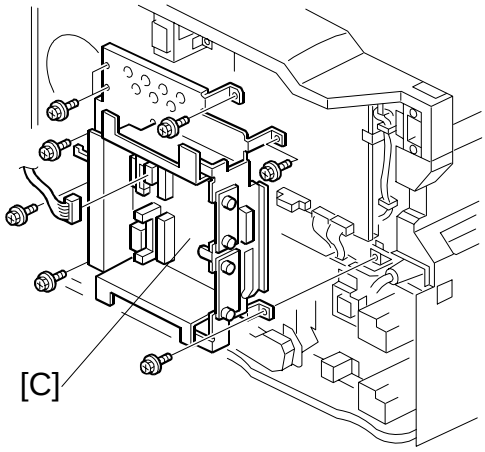

G038R902.WMF

1. Remove the left cover [A] (6 screws).
2. Remove the bracket [B] (3 screws).
3. **230 V machine only:** Remove the coil [C] (1 screw, 1 connector).
4. Remove the PSU [D] (All connectors, 6 screws).

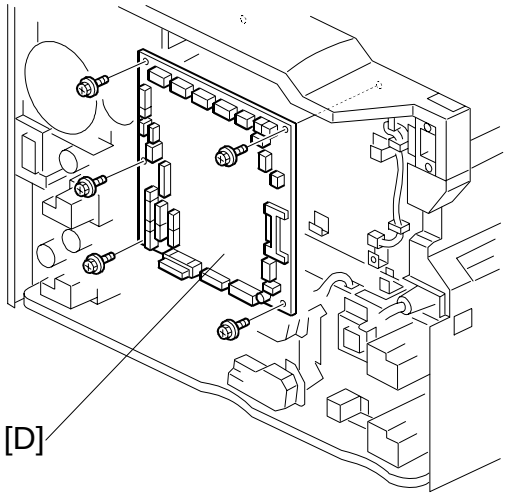
## 6.8.2 ENGINE BOARD




G038R765.WMF




G038R766.WMF

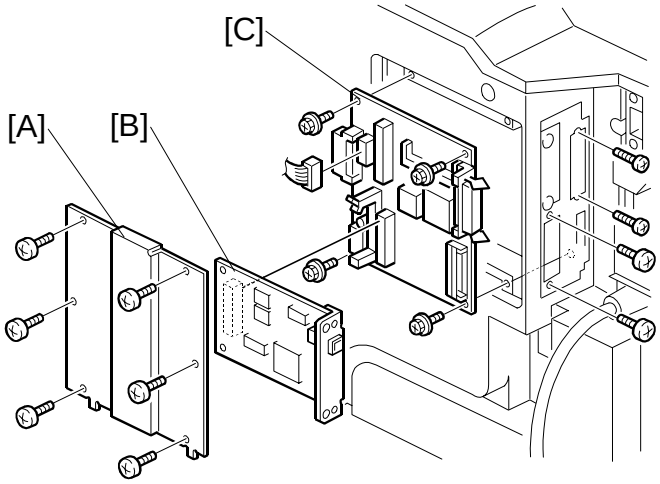



G038R767.WMF



1. Disconnect the interface harness for the optional paper tray unit or LCT.
2. Remove the controller cover [A] (6 screws).
3. Remove the rear cover [B] (5 screws).
4. Remove the controller bracket [C] (1 connector, 10 screws).
5. Disconnect all harnesses and remove the engine board [D] (5 screws).
6. Remove the EEPROM [C] from the old engine board and put it on the new board.

## 6.8.3 PRINTER CONTROLLER / NIB




G038R510.WMF

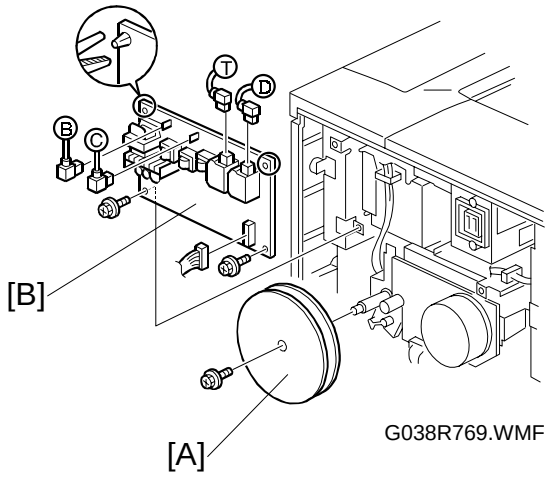
### *Printer Controller*

1. Remove the controller cover [A] (6 screws).
2. Remove the network interface board [B] (2 screws).
3. Remove the printer controller board [C] (6 screws, 1 connector).
4. Remove the NVRAM from the controller board, then install them on the new controller.
5. Install the new controller.
6. Turn on the machine and print the Printer Configuration Page.
7. Ensure that all the controller settings are restored.

### *NIB*

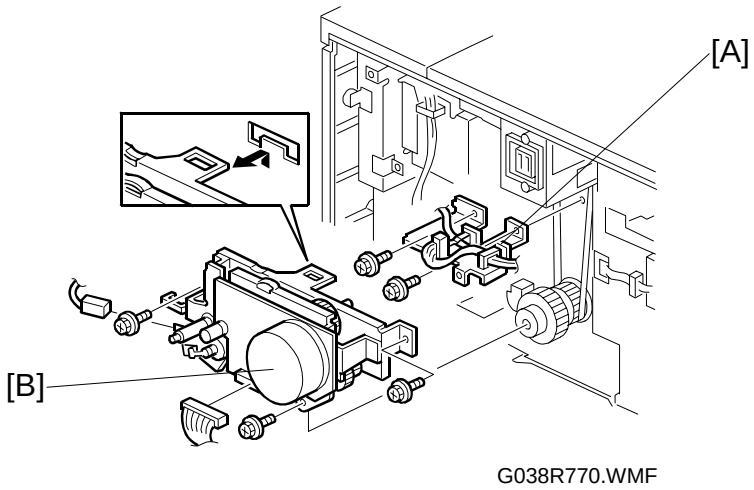
1. Back up the NIB NVRAM to the controller using the Service Tool.
2. Remove the controller cover [A] (6 screws).
3. Replace the network interface board [B] (2 screws).
4. Turn on the machine and restore the NIB NVRAM using the Service Tool.
5. Turn off the machine and turn it back on. Then, print the Printer Configuration Page.
6. Ensure the all the controller settings are restored.

## 6.8.4 HIGH VOLTAGE SUPPLY BOARD



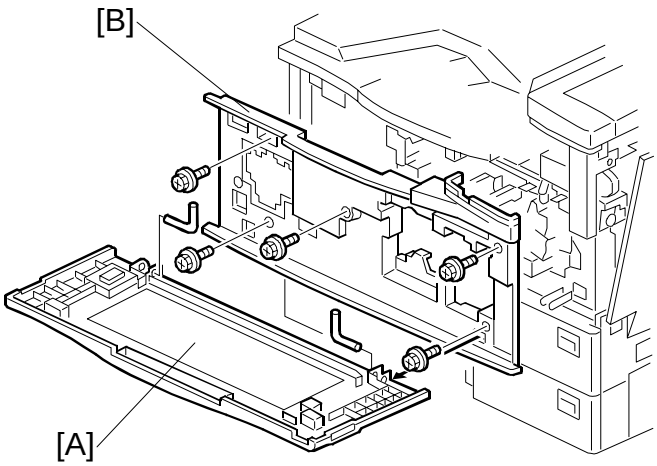

1. Remove the rear cover. (See Engine Board.)
2. Remove the fly-wheels [A] (1 screw).
3. Remove the high voltage supply board [B] (5 connectors, 2 screws, 2 locking supports).

## 6.8.5 MAIN MOTOR

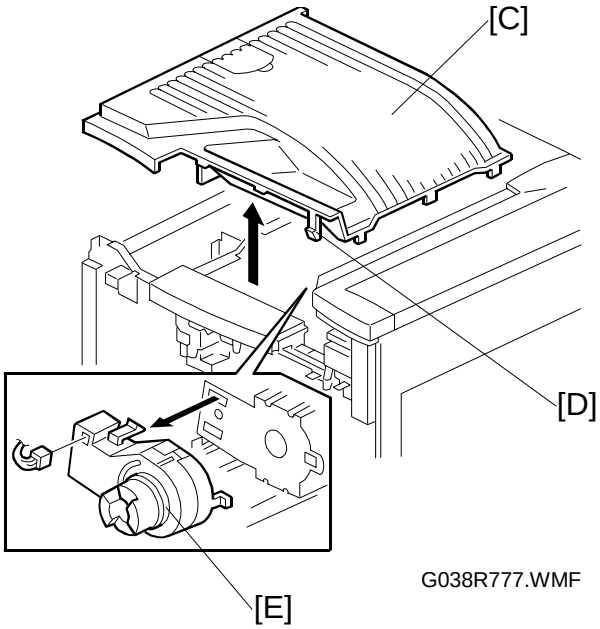



1. Remove the rear cover. (See Engine Board.)
2. Remove the fly-wheels. (See High Voltage Supply Board.)
3. Remove the high voltage supply board (See High Voltage Supply Board.)
4. Remove the bracket [A] (2 screws).
5. Remove the main motor [B] (2 connectors, 3 screws).

## 6.8.6 TONER BOTTLE MOTOR




G038R571.WMF




G038R777.WMF

1. Remove the optional finisher and/or bridge unit, if these units have been installed.
2. Remove the front cover [A] (2 pins).
3. Swing up the toner bottle lever. Then, remove the inner cover [B] (5 screws).
4. Remove the paper exit tray [C] (1 hook [D]).
5. Remove the toner bottle motor [E] (1 connector).

# 7. TROUBLESHOOTING

## 7.1 SERVICE CALL CONDITIONS

### 7.1.1 PRINTER ENGINE SC CODES SUMMARY

There are 3 levels of service call conditions.

| Level | Definition |
|---|---|
| A | To prevent the machine from being damaged, the SC can only be reset by a service representative (see the note below this table).<br>The printer cannot be operated at all. |
| B | The SC might be reset by turning the main switch off and on if the SC was caused by a sensor error. |
| C | The printer can be operated as usual except for the unit related to the service call. |

**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) To reset a Level “A” SC, enter the printer engine service mode (Service Menu 2) and clear the SC code, then turn the main switch off and on. Please refer to the section 4.4 Printer Service Mode for details.

## 7.1.2 PRINTER ENGINE SC CODES

### SC302: High voltage power supply error

Definition: [B]

A charge roller current leak signal is detected.

Possible causes

- Charge roller damaged
- Charge high voltage supply board defective
- Poor connection of the PCU

### SC320: Polygon mirror motor error

Definition: [B]

The polygon mirror motor does not reach its operating speed within 10 seconds after the polygon mirror motor on signal, or the lock signal is not detected for more than 200 ms continuously during operation.

Possible causes

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

### SC321: No laser writing signal (F-GATE) error

Definition: [B]

The laser writing signal (F-GATE) is still not LOW when the laser writing area +5 mm has passed since the laser writing start position on the drum.

Possible Causes:

- Engine board defective
- Printer controller board defective

### SC322: Laser synchronization error

Definition: [B]

The main scan synchronization detector board cannot detect the laser synchronization signal for more than 500 ms.

Possible causes:

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

### SC324: LD drive current over

Definition: [B]

The LD drive board applies more than 100 mA to the LD.

Possible causes:

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

### SC390: TD sensor error

Definition: [B]

The TD sensor outputs less than 0.5V or more than 4.0V 10 consecutively during printing.

Possible causes:

- TD sensor abnormal
- Poor connection of the PCU

### SC391: Development bias leak

Definition: [B]

A development bias leak signal is detected.

Possible causes:

- Poor connection of the PCU
- High voltage supply board defective

### SC392: TD sensor initial setting error

Definition: [B]

TD sensor output voltage falls out of the adjustment range after the TD sensor initial setting has been finished.

Possible causes:

- The toner seal of the PCU was not removed
- ID sensor defective
- TD sensor abnormal
- The Drum is not turning
- Development roller does not turn
- Poor connection of the PCU

**SC401/402: Transfer roller leak error 1/2**

Definition: [B]

Transfer current leak signal is detected.
Transfer current feedback signal is not detected.

Possible causes:

- High voltage supply board defective
- Poor connection of the PCU
- Transfer/separation unit set incorrectly
- Transfer roller damaged

**SC411: Separation bias leak error**

Definition: [B]

Separation bias leak signal is detected.

Possible causes:

- High voltage supply board defective
- Poor connection of the PCU
- Discharge plate defective

**SC500: Main motor lock**

Definition: [B]

A main motor lock signal is not detected for more than 500 ms after the main motor starts to rotate, or the lock signal is not detected for more than 500 ms during rotation after the last signal.

Possible causes:

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

**SC501: 1st paper tray lift motor error**
**SC502: 2nd paper tray lift motor error**
**SC503: 3rd paper tray lift motor error (optional paper tray unit)**
**SC504: 4th paper tray lift motor error (optional paper tray unit)**

Definition: [C]

The paper lift sensor is not activated after the tray lift motor has been on for 18 seconds.

Possible causes:

- Paper lift sensor defective
- Tray lift motor defective
- Too much load on the drive mechanism
- Engine board defective

### SC506: Paper tray motor lock (optional paper tray unit)

Definition: [C]

A motor lock signal is not detected for more than 1.5 s or the lock signal is not detected for more than 1.0 s during rotation.

Possible causes:

- Paper tray unit motor defective
- Too much load on the drive mechanism

### SC507: Tandem tray lift error (optional LCT)

Definition: [C]

The low limit sensor is not activated after the paper tray lift motor has been on to lower the tandem tray for 8 seconds.

Possible causes:

- Paper tray lift motor defective
- Low limit sensor defective
- Too much load on the drive mechanism

### SC508: Rear fence drive error (optional LCT)

Definition: [C]

The return position sensor is not activated after the rear fence drive motor has been on to lower the tandem tray for 8 seconds.

Possible causes:

- Rear fence motor defective
- Return position sensor defective
- Too much load on the drive mechanism

### SC509: Side fence drive error (optional LCT)

Definition: [C]

The side fence positioning sensor is not activated in 3 s when the paper stack in the left tray is moved to the right tray.

The side fence close sensor is not activated in 3 s after moving the paper stack to the right tray.

Possible causes:

- Side fence  motor defective
- Side fence position sensor defective
- Side fence close sensor defective
- Too much load on the drive mechanism

### SC541: Fusing temperature warm-up error

Definition: [A]

The fusing temperature detected by the thermistor was below 13 °C for 10 seconds

Possible causes:

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

### SC542: Fusing temperature warm-up error

Definition: [A]

The fusing temperature does not reach the fusing standby temperature within 40 seconds after the main switch is turned on.

Possible causes:

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

### SC543: Fusing overheat error

Definition: [A]

A fusing temperature of over 230°C is detected for 1 second by the fusing thermistor.

Possible causes:

- Fusing thermistor defective
- Power supply board defective

### SC544: Fusing low temperature error

Definition: [A]

A fusing temperature of lower 100°C is detected for 1 second by the fusing thermistor.

Possible causes:

- Fusing thermistor defective
- Power supply board defective
- Poor connection of the fusing unit

### SC546: Unstable fusing temperature

Definition: [A]

Fusing temperature more than 60 °C: The fusing temperature does not rise 2°C or more within 6 seconds after the fusing lamp has been on.

Fusing temperature 60 °C or less: The fusing temperature does not rise 2°C or more during a 6 second interval (the 6 s timer starts 14 s after the fusing lamp turned on).

Possible Causes:
- Thermistor defective
- Poor connection of the fusing unit
- Power supply unit defective

### SC547: Zero cross signal malfunction

Definition: [A]

Zero cross signals are not detected within a certain period.

Possible causes:
- Power supply board defective
- Engine board defective

### SC590: Fusing fan motor error

Definition: [B]

The CPU detects an exhaust fan lock signal for more than 3.5 seconds.

Possible causes:
- Poor connection of the exhaust fan motor
- Too much load on the motor drive

### SC610: Communication error between the engine board and duplex unit

Definition: [B]

The engine board cannot communicate with the duplex unit properly.

Possible causes:
- Poor connection for the interface cable for the duplex unit
- Duplex control board defective
- Engine board defective

### SC692: Communication error between the engine board and the printer controller

Definition: [B]

The engine board cannot communicate with the printer controller properly.

Possible causes:

- Poor connection between the engine board and the printer controller board.
- Printer controller defective
- Engine board defective

### SC 696: Communication error between the engine board and the finisher

Definition: [B]

The engine board cannot communicate with the finisher properly.

- Possible causes -

- Poor connection of the interface cable for the finisher
- Finisher main board defective
- Engine board defective

### SC722: Finisher jogger motor error

Definition: [B]

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

Possible causes:

- Jogger H.P sensor defective
- Jogger motor defective

### SC725: Finisher stack feed-out motor error

Definition: [B]

The stack feed-out belt H.P sensor is not activated within a certain period after the stack feed-out motor is turned on.

Possible causes:

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

### SC726: Finisher shift motor error

Definition: [B]

Tray shift is not detected within a certain period after the shift motor is turned on.

Possible causes:

- Shift motor defective
- Shift tray half-turn sensor defective

### SC730: Finisher stapler position motor error

Definition: [B]

1) The stapler does not return to its home position within a certain period after the stapler motor is turned on.
2) The stapler H.P sensor is not activated within a certain period after the stapler motor turned on.

Possible causes:

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

### SC733: Finisher stack feed-out motor error

Definition: [B]

The stack feed-out belt H.P sensor is not activated within a certain period after the stack feed-out motor is turned on.

Possible causes:

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

### SC734: Finisher lift motor error

Definition: [B]

The stack height sensor is not activated within a certain period after the shift tray lift motor is turned on.

Possible causes:

- Shift tray lift motor defective
- Stack height sensor defective

### SC735: Finisher exit guide motor error

Definition: [B]

The exit guide plate open sensor or exit guide plate HP sensor does not activate within a certain time after the exit guide plate motor turned on.

Possible causes:

- Exit guide motor defective
- Exit guide plate HP sensor defective
- Exit guide plate open sensor defective

### SC 750: Interchange unit connection error

Definition: [B]

The engine board cannot communicate with the interchange unit properly when the duplex unit is installed.

Possible causes:

- Poor connection between the engine board and the interchange unit

### SC 751: Bridge unit connection error

Definition: [B]

The engine board cannot communicate with the bridge unit properly when the finisher is installed.

Possible causes:

- Poor connection between the engine board and the bridge unit

### SC 752: Finisher connection error

Definition: [B]

The engine board cannot communicate with the finisher properly when the bridge unit is installed.

Possible causes:

- Poor connection between the finisher and bridge unit

### SC980: Program loading error

Definition: [A]

The program cannot load properly.

Possible Causes:

- The connection between the engine board and the IC card is poor
- IC memory card defective
- Engine board defective

  **NOTE**: This SC should be cleared by trying to download again from an IC card.

# 7.2 PRINTER CONTROLLER ERROR

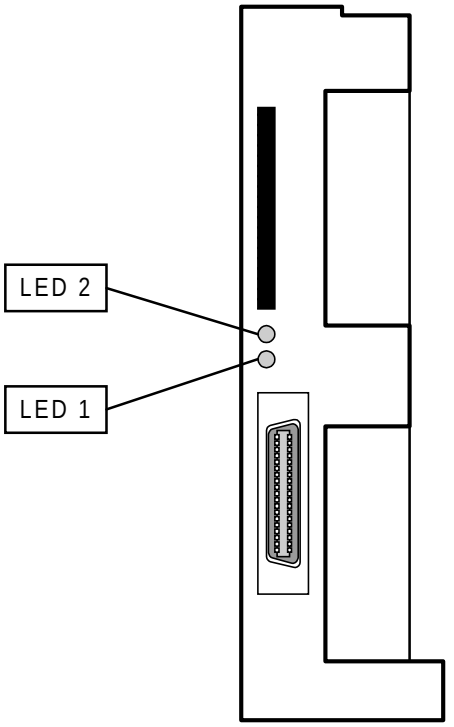
## 7.2.1 ERROR CODES

| Code | Description | Required Action |
|---|---|---|
| 0201 | On-board SDRAM read/verify failed. | Replace the controller if this error is frequent. |
| 0301 | SDRAM DIMM (option) read/verify failed. | Replace the SDRAM DIMM if this error is frequent. |
| 1101 | Data transmission did not finish within the specified time. | An incompatible loop-back connector is connected to the parallel port, or the loop-back connector is not connected. Use the correct loop-back connector (P/#: G0219350) before the test. |
| 1102 | Data looped back to the controller is not the same as the data transmitted. | The loop-back connector may be defective. Try using another one. |
| 11xx | Parallel interface error. | Replace the controller if this error is frequent. |
| 1401 | The controller NVRAM has a problem. | Replace the NVRAM if this error is frequent. |
| 1402 | NVRAM checksum error or the battery has run out. | |
| 1403 | NVRAM write error | |
| 1404 | NVRAM read error | |
| 1501 | RTC error | Replace the controller board if this error is frequent. |
| 1601 | Font ROM error | Replace the controller if this error is frequent. |
| 1602 | The data in the Font ROM is damaged. | Replace the controller if this error is frequent. |
| 1Bxx | Option bus error A | Check the connection to the optional component.<br>Try replacing the optional NIB or HDD. |
| 1Cxx | Option bus error B | Check the connection to the optional component.<br>Try replacing the optional NIB or HDD. |
| 2100 | NIB self test failed. | Turn off the machine and turn it back on.<br>Replace the NIB if this error is frequent. |
| 21xx | NIB error | |
| 2501 | The data in the PS DIMM is damaged. | Replace the PS DIMM if this error is frequent. |
| 2508 | The data in the IC card is damaged. | Reprogram the IC card and try again. |
| 3002 | A damaged cluster was found on the HDD. | The damaged cluster is automatically marked as “bad”.<br>If this error is frequent, format the HDD. |
| 47xx | Controller ASIC error. | Replace the controller. |

# 7.3 CONTROLLER LED DISPLAY

## 7.3.1 LOCATION

The controller uses two LEDs to display error status even while the LCD message is not active.




G038T501.WMF

## 7.3.2 FATAL ERROR

If the controller detected a fatal error during the power-on self-test, it uses two LEDs to notify the cause of the error.
If one of the following fatal errors happens, the LED status changes as shown (read from the left of the diagram to the right).

**Flash ROM Error**


G038T502.WMF

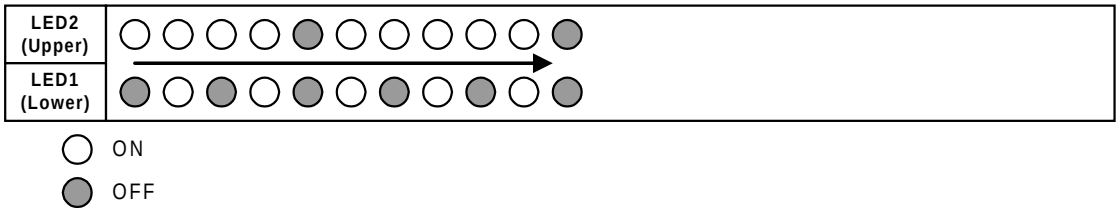
Turn off the machine and turn it back on. If the controller detects the same error, download new firmware from a IC card (refer to section 4.6). If the problem still remains, replace the controller.

### SDRAM Error


G038T503.WMF

Turn off the machine and turn it back on. If the controller detects the same error, replace the controller.

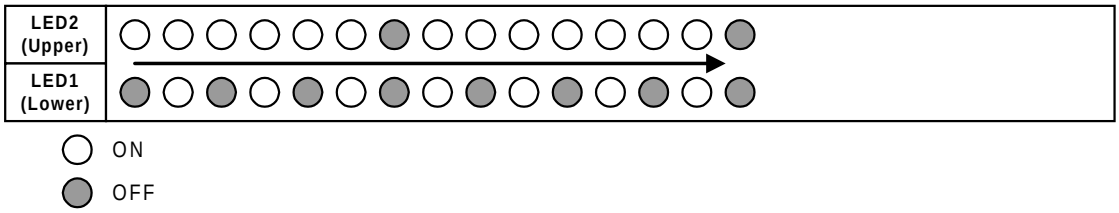
### CPU Error




G038T504.WMF

Turn off the machine and turn it back on. If the controller detects the same error, replace the controller.

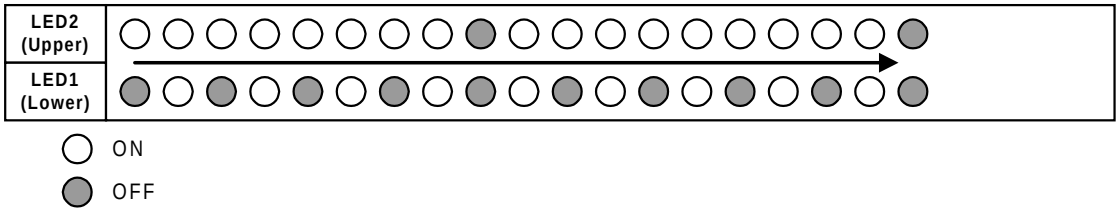
### ASIC Error




G038T505.WMF

Turn off the machine and turn it back on. If the controller detects the same error, replace the controller.

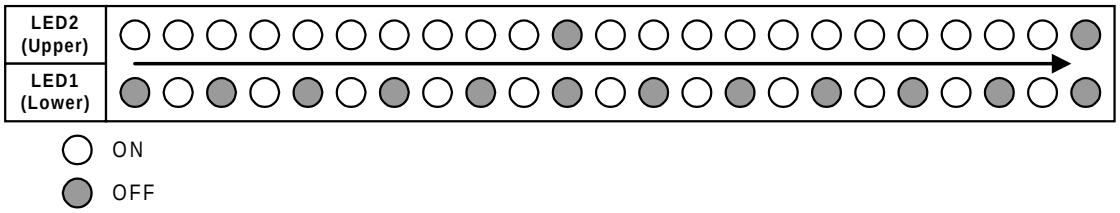
### Other Diagnostic Error




G038T506.WMF

Turn off the machine, check the connection to the optional components, and turn on the machine. If the controller detects the same error, replace the controller or optional HDD/NIB.

### APIP Error




G038T507.WMF

Turn off the machine, check the connection to the engine board, then turn on the machine. If the controller detects the same error, replace the controller, or engine board.

# 7.4 ELECTRICAL COMPONENT DEFECTS

## 7.4.1 SENSORS

**NOTE:** The CN numbers describes the connector number on the engine board.

| Component (Symbol) | CN | Condition | Symptom |
|---|---|---|---|
| Toner Density | 302-3 | Open | SC390 is displayed |
| | | Shorted | |
| 1st Paper End | 306-2 | Open | The Paper End indicator lights even if paper is placed in the 1st paper tray. |
| | | Shorted | The Paper End indicator does not light even if there is no paper in the 1st paper tray. |
| 2nd Paper End | 307-2 | Open | The Paper End indicator lights even if paper is placed in the 2nd paper tray. |
| | | Shorted | The Paper End indicator does not light even if there is no paper in the 2nd paper tray. |
| Image Density | 321-3 | Open | SC392 is displayed (see note) |
| | | Shorted | |
| Paper Over Flow | 324-5 | Open | The paper overflow message is not displayed when the paper overfull condition exist. |
| | | Shorted | The paper overflow message is displayed. |
| Paper Exit | 324-2 | Open | The Paper Jam indicator will light whenever a print is made. |
| | | Shorted | The Paper Jam indicator lights even if there is no paper. |
| Upper Relay | 306-5 | Open | The Paper Jam indicator will light whenever a print is made. |
| | | Shorted | The Paper Jam indicator lights even if there is no paper. |
| Lower Relay | 307-5 | Open | The Paper Jam indicator will light whenever a print is made. |
| | | Shorted | The Paper Jam indicator lights even if there is no paper. |
| Registration | 321-6 | Open | The Paper Jam indicator will light whenever a print is made. |
| | | Shorted | The Paper Jam indicator lights even if there is no paper. |
| 1st Paper Lift | 305-7 | Open | SC501 will be displayed. |
| | | Shorted | Paper jam will occur during printing. |
| 2nd Paper Lift | 305-10 | Open | SC502 will be displayed. |
| | | Shorted | Paper jam will occur during printing. |

| Component (Symbol) | CN | Condition | Symptom |
|---|---|---|---|
| 1st Paper Height - 1 | 308-2 | Open | The CPU cannot determine the paper near-end condition properly. |
| | | Shorted | |
| 1st Paper Height - 2 | 308-5 | Open | The CPU cannot determine the paper near-end condition properly. |
| | | Shorted | |
| 2nd Paper Height - 1 | 308-8 | Open | The CPU cannot determine the paper near-end condition properly. |
| | | Shorted | |
| 2nd Paper Height - 2 | 308-11 | Open | The CPU cannot determine the paper near-end condition properly. |
| | | Shorted | |

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

## 7.4.2 SWITCHES

| Component (Symbol) | CN | Condition | Symptom |
|---|---|---|---|
| Main | 281-1,2 (PSU) | Open | The machine does not turn on. |
| | | Shorted | The machine does not turn off. |
| Right Upper Cover | 324-8 | Open | The Cover Open indicator is not lit even if the right upper cover is opened. |
| | | Shorted | The Cover Open indicator is lit even if the right upper cover is closed. |
| Right Cover | 321-9 | Open | The Cover Open indicator is not lit even if the right cover is opened. |
| | | Shorted | The Cover Open indicator is lit even if the right cover is closed. |
| Right Lower Cover | 307-8 | Open | The Cover Open indicator is not lit even if the right lower cover is opened. |
| | | Shorted | The Cover Open indicator is lit even if the right lower cover is closed. |
| Upper Paper Size | 305-1,2,4,5 | Open | The CPU cannot detect the proper paper size, and misfeeds may occur when a print is made. |
| | | Shorted | |
| Lower Paper Size | 305-6,7,9,10 | Open | The CPU cannot detect the proper paper size, and misfeeds may occur when a print is made. |
| | | Shorted | |
| Special Paper | 305-12 | Open | No symptom. However, the image density problem will occur when using a thick paper. |
| | | Shorted | |
| New PCU Detect | 302-6 | Open | The TD sensor initial setting procedure is not performed when a new PCU is installed. |
| | | Shorted | The TD sensor initial setting procedure is performed whenever the front cover is closed. |
| Front Cover Safety | 209-2, 4 | Open | The Cover Open indicator is not lit even if the front cover is opened. |
| | | Shorted | The Cover Open indicator is lit even if the front cover is closed. |

**NOTE:** CN numbers describes the connector number on the engine board. (except for the main switch).

# 7.5 BLOWN FUSE CONDITIONS

| Fuse | Rating | | Symptom when turning on the main switch |
|---|---|---|---|
| | 115 V | 220 - 240 V | |
| **Power Supply Board** | | | |
| FU1 | 15 A/250 V | ---- | No response |
| FU2 | 8 A/125 V | 3.15 A/250 V | No response |
| FU3 | 3.15 A/125 V | 3.15 A/250V | Normal operation |
| FU4 | 4 A/125 V | 4 A/250V | No response |
| FU5 | 4 A/125 V | 2A /250 V | Optional peripherals do not work. |
| FU6 | 2 A/125 V | 4 A/250V | “Doors/Covers Open” is displayed. |

(CN504)

| Pin No. | Name | Pin No. | Name |
|---|---|---|---|
| 1 | +5V | 16 | +5V |
| 2 | +5V | 17 | +5V |
| 3 | +5V | 18 | +5V |
| 4 | ARKD0 | 19 | ARKD1 |
| 5 | AKRD2 | 20 | ARKD3 |
| 6 | ARKD4 | 21 | ARKD5 |
| 7 | ARKD6 | 22 | ARKD7 |
| 8 | ARFGT | 23 | ARLSNC |
| 9 | ARLGT | 24 | ARCLK |
| 10 | WRSYNC | 25 | FSYNC |
| 11 | TXD2 | 26 | RXD2 |
| 12 | GND | 27 | GND |
| 13 | GND | 28 | GND |
| 14 | GND | 29 | GND |
| 15 | GND | 30 | GND |

(CN509)

| Pin No. | Name | Pin No. | Name |
|---|---|---|---|
| 1 | /CTSTB-CT | 19 | GND |
| 2 | CNTRD1 | 20 | GND |
| 3 | CNTRD2 | 21 | GND |
| 4 | CNTRD3 | 22 | GND |
| 5 | CNTRD4 | 23 | GND |
| 6 | CNTRD5 | 24 | GND |
| 7 | CNTRD6 | 25 | GND |
| 8 | CNTRD7 | 26 | GND |
| 9 | CNTRD8 | 27 | GND |
| 10 | /CTACK-CT | 28 | GND |
| 11 | CTBUSY-CT | 29 | GND |
| 12 | PE-CT | 30 | GND |
| 13 | SELECT-CT | 31 | /INIT-CT |
| 14 | /AFD-CT | 32 | /FAULT-CT |
| 15 | NC | 33 | GND |
| 16 | GND | 34 | NC |
| 17 | GND | 35 | NC |
| 18 | PLH-CT | 36 | /SLCIN-CT |

(CN506, 507)

| Pin No. | Name | Pin No. | Name | Pin No. | Name | Pin No. | Name |
|---|---|---|---|---|---|---|---|
| 1 | /OE | 21 | D19 | 41 | A17 | 61 | A7 |
| 2 | /OPRES | 22 | D18 | 42 | NC | 62 | GND |
| 3 | /WEB3 | 23 | D17 | 43 | A16 | 63 | A6 |
| 4 | /ACK | 24 | D16 | 44 | NC | 64 | GND |
| 5 | /OPCS | 25 | NC | 45 | A15 | 65 | A5 |
| 6 | /XINT | 26 | NC | 46 | NC | 66 | GND |
| 7 | LDIR | 27 | NC | 47 | A14 | 67 | A4 |
| 8 | RSV | 28 | NC | 38 | NC | 68 | GND |
| 9 | D31 | 29 | NC | 39 | A13 | 69 | A3 |
| 10 | D30 | 30 | NC | 40 | +5V | 70 | GND |
| 11 | D29 | 31 | NC | 41 | A12 | 71 | A2 |
| 12 | D28 | 32 | NC | 42 | +5V | 72 | GND |
| 13 | D27 | 33 | NC | 43 | A11 | 73 | /BE3 |
| 14 | D26 | 34 | NC | 44 | +5V | 74 | GND |
| 15 | D25 | 35 | NC | 45 | A10 | 75 | /BE2 |
| 16 | D24 | 36 | NC | 46 | +5V | 76 | GND |
| 17 | D23 | 37 | NC | 47 | A9 | 77 | NC |
| 18 | D22 | 38 | NC | 48 | RSV | 78 | GND |
| 19 | D21 | 39 | NC | 49 | A8 | 79 | NC |
| 20 | D20 | 40 | NC | 50 | GND | 80 | GND |

(CN502)

| Pin No. | Name | Pin No. | Name | Pin No. | Name |
|---|---|---|---|---|---|
| 1 | GND | 25 | D12 | 49 | D18 |
| 2 | D0 | 26 | D13 | 50 | D19 |
| 3 | D1 | 27 | D14 | 51 | D20 |
| 4 | D2 | 28 | DA9 | 52 | D21 |
| 5 | D3 | 29 | A13 | 53 | D22 |
| 6 | D4 | 30 | +5V | 54 | D23 |
| 7 | D5 | 31 | A10 | 55 | /OE |
| 8 | D6 | 32 | A11 | 56 | D24 |
| 9 | D7 | 33 | A15 | 57 | D25 |
| 10 | +5V | 34 | /ROCS1 | 58 | D26 |
| 11 | RSV | 35 | D15 | 59 | D28 |
| 12 | A2 | 36 | A16 | 60 | D27 |
| 13 | A3 | 37 | D16 | 61 | +5V |
| 14 | A4 | 38 | D17 | 62 | D29 |
| 15 | A5 | 39 | GND | 63 | D30 |
| 16 | A6 | 40 | A20 | 64 | D31 |
| 17 | A7 | 41 | A22 | 65 | RSV |
| 18 | A8 | 42 | A23 | 66 | RSV |
| 19 | A12 | 43 | A21 | 67 | RSV |
| 20 | A14 | 44 | /ROCS2 | 68 | RSV |
| 21 | D8 | 45 | A17 | 69 | RSV |
| 22 | D9 | 46 | A18 | 70 | RSV |
| 23 | D10 | 47 | /WEB3 | 71 | RSV |
| 24 | D11 | 48 | A19 | 72 | GND |

(CN233)

| Pin No. | Name |
|---|---|
| 1 | /ST_SET |
| 2 | /RYU_MRK |
| 3 | RYU_SOL |
| 4 | /RYU_M |
| 5 | RYU_FAN |
| 6 | /RYU_SET |
| 7 | RYU_ROP |
| 8 | RYU_MOP |
| 9 | /RYU_FULL |
| 10 | /RYU_RLYS |
| 11 | /RYU_EXTTS |

(CN234)

| Pin No. | Name |
|---|---|
| 1 | FIN_TXD |
| 2 | FIN_RXD |
| 3 | +5V |
| 4 | +5V |
| 5 | GND |
| 6 | GND |
| 7 | /RY_TRG |
| 8 | +24V |

(CN105)

| Pin No. | Name | Pin No. | Name |
|---|---|---|---|
| 1 | 5V | 17 | /PDO1 |
| 2 | 5V | 18 | /PDO2 |
| 3 | GND | 19 | /PLGATE |
| 4 | GND | 20 | /PLSYNC |
| 5 | BD | 21 | /PCLK |
| 6 | REFCLK | 22 | /PPGATE |
| 7 | LDDCLK | 23 | GND |
| 8 | LDDDI | 24 | /LDSYNC |
| 9 | LDDDO | 25 | PSE |
| 10 | /DEVRST2 | 26 | /PDE0 |
| 11 | LDDAXD | 27 | /PDE1 |
| 12 | LDDWXR | 28 | /PDE2 |
| 13 | LDOFF | 29 | DATATHRU |
| 14 | /LDERR | 30 | GND |
| 15 | PSO | 31 | GND |
| 16 | /PDO0 | 32 | 5VS |

(CN231)

| Pin No. | Name |
|---|---|
| 1 | SET |
| 2 | CLOCK |
| 3 | LATCH |
| 4 | OUTDATA |
| 5 | INDATA |
| 6 | SLOAD |
| 7 | SEN31 |
| 8 | SEN32 |
| 9 | ON31 |
| 10 | ON32 |
| 11 | GND |
| 12 | 5V |

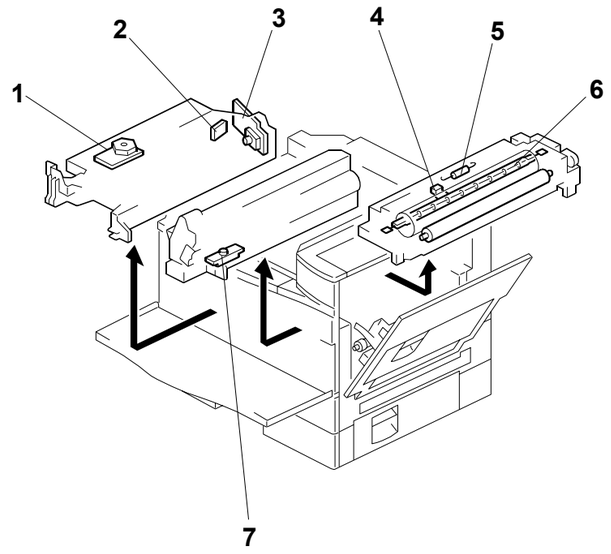
(CN232)

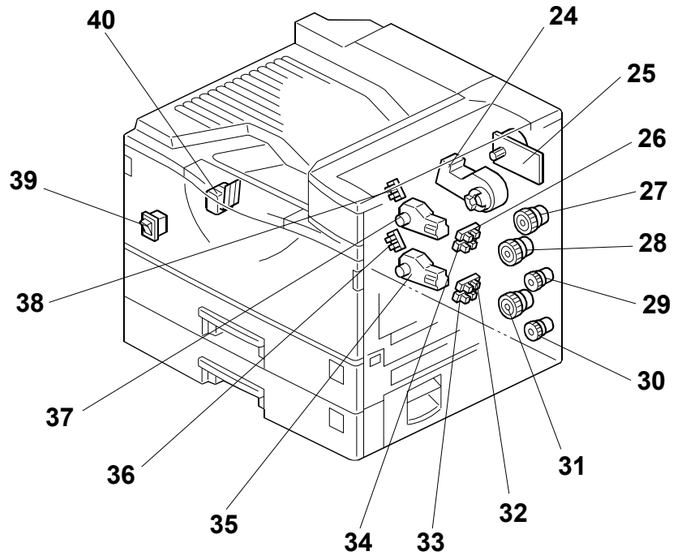
| Pin No. | Name |
|---|---|
| 1 | 5V |
| 2 | GND |
| 3 | RXD |
| 4 | TXD |
| 5 | DPXSET |
| 6 | REG SNS |
| 7 | JCT ON22 |
| 8 | JCT ON21 |
| 9 | 24V |
| 10 | 24V |
| 11 | GND |
| 12 | GND |

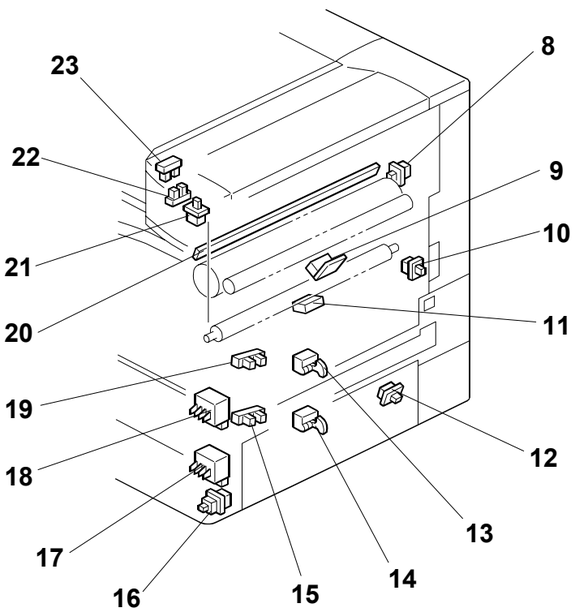
**Note1**
The signal names of CN304 on the engine baord are for the optional tray unit.
The signal names for the optional LCT are described in the LCT (A862) point to point diagram.

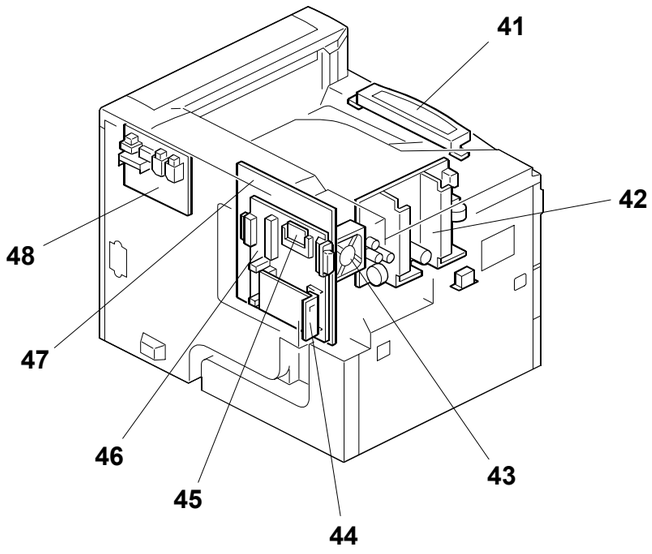
# G038 Point to Point Circuit Diagram

# PRINTER (G038) ELECTRICAL COMPONENT LAYOUT




| Symbol | Name | Index No. | P to P |
|---|---|---|---|
| **Motors** | | | |
| M1 | Polygonal Mirror | 1 | B3 |
| M2 | Main Motor | 25 | G2 |
| M3 | Exhaust Fan | 43 | B1 |
| M4 | 1st Paper Lift | 37 | B1 |
| M5 | 2nd Paper Lift | 35 | B1 |
| M6 | Toner Supply | 24 | B1 |
| **Magnetic Clutches** | | | |
| MC1 | 1st Paper Feed | 28 | C1 |
| MC2 | 2nd Paper Feed | 31 | D1 |
| MC3 | Upper Relay | 29 | C1 |
| MC4 | Lower Relay | 30 | D1 |
| MC5 | Registration | 27 | E1 |
| **Switches** | | | |
| SW1 | Main Switch | 39 | A5 |
| SW2 | Right Upper Cover | 21 | H1 |
| SW3 | Right Cover | 10 | F1 |
| SW4 | Right Lower Cover | 12 | D1 |
| SW5 | 1st Paper Size | 18 | E1 |
| SW6 | 2nd Paper Size | 17 | E1 |
| SW7 | Special Paper | 16 | E1 |
| SW8 | New PCU Detect | 8 | B1 |
| SW9 | Front Cover Safety | 40 | B3 |
| **Sensors** | | | |
| S1 | Toner Density (TD) | 7 | B1 |
| S2 | 1st Paper End | 19 | C1 |
| S3 | 2nd Paper End | 15 | C1 |
| S4 | Image Density (ID) | 9 | S4 |
| S5 | Paper Overflow | 23 | H1 |
| S6 | Paper Exit | 22 | H1 |
| S7 | Upper Relay | 13 | C1 |
| S8 | Lower Relay | 14 | C1 |
| S9 | Registration | 11 | E1 |
| S10 | 1st Paper Lift | 38 | A1 |
| S11 | 2nd Paper Lift | 36 | B1 |
| S12 | 1st Paper Height - 1 | 26 | D1 |
| S13 | 1st Paper Height - 2 | 34 | D1 |
| S14 | 2nd Paper Height - 1 | 32 | D1 |
| S15 | 2nd Paper Height - 2 | 33 | D1 |
| **PCBs** | | | |
| PCB1 | Engine Board | 47 | F2 |
| PCB2 | Printer Controller Board | 46 | D4 |
| PCB3 | Network Interface Board | 44 | --- |
| PCB4 | PSU (Power Supply Unit) | 42 | B5 |
| PCB5 | LDD (Laser Diode Driver) | 3 | A3 |
| PCB6 | Operation Panel | 41 | C7 |
| PCB7 | High Voltage Supply | 48 | G1 |
| PCB8 | Memory (Option) | 45 | --- |
| **Lamps** | | | |
| L1 | Fusing Lamp | 6 | A5 |
| L2 | Quenching Lamp | 20 | C1 |
| **Others** | | | |
| TF1 | Fusing Thermofuse | 5 | A5 |
| TH1 | Fusing Thermistor | 4 | A5 |
| LSD 1 | Laser Synchronization Detector | 2 | A4 |