MODEL H1
(Machine Code: H538)
SERVICE MANUAL

1 November, 2000
Subject to change

⚠IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the machine and peripherals, make sure that the machine power cord is unplugged.
2. The wall outlet should be near the machine and easily accessible.
3. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
4. 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

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

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. Do not incinerate toner cartridge. Toner dust may ignite suddenly when exposed to an open flame.
2. Dispose of used toner cassette in accordance with local regulations. (It is non-toxic supply.)
3. Dispose of replaced parts in accordance with local regulations.

LASER SAFETY

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

⚠WARNING

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

⚠WARNING

This machine contains a laser beam generator. Laser beams can cause permanent eye damage. Do not open the laser unit or look along the laser beam path while the main power is on.

CAUTION MARKINGS:

LASER_PS1.WMF

LASER_PS4.WMF

Lithium Batteries (Memory Back-up)

⚠WARNING

The danger of explosion exists if a battery of this type is incorrectly replaced. Replace only with the same or an equivalent type recommended by the manufacturer. Discard used batteries in accordance with the manufacture's instructions.

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1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

Type	Desktop Transceiver
Circuit	PSTN, PABX
Connection	Direct Couple
Document Size	**Length:** 148 - 356 mm [5.8 - 14.0 ins] Up to 600 mm [23.6 ins], manually assisted **Width:** 148 - 217 mm [5.8 - 8.5 ins] To determine whether an A4/letter width original is detected as A4 width or Letter width, change System Switch 0C bit 3. **Thickness:** 0.05 mm to 0.2 mm (Equivalent to 60 g/m² [16lb] - 90 g/m² [24lb]) Lighter than 70 g/m² [18lb], manually assisted
Document Feed	Automatic feed, face down
ADF Capacity	**Recommended Environment:** 30 sheets using A4 recommended paper 20 sheets using A4 paper **Operating environment:** 15 sheets using A4 paper
Scanning Method	Contact Image Sensor with LED lamp (CIS unit)
Maximum Scan Width	208 mm (A4 setting) 212 mm (Letter setting)
Scan Resolution	**Main scan:** 8 dots/mm **Sub-scan:** Standard - 3.85 lines/mm Detail - 7.7 lines/mm Fine - 15.4 lines/mm
Memory Capacity	**ECM:** 64 Kbytes **SAF:** Standard 1.2MB (96 pages/ITU-T #1) With 2MB option = 3.2MB (200 pages/ITU-T #1)
Protocol	Group 3 with ECM
Compression	MH, MR, MMR
Modulation	V17 (TCM), V29 (QAM), V27ter (PHM), V21 (FM)
Data Rate	14400/12000/9600/7200/4800/2400 bps Automatic fall-back
I/O Rate	**With ECM:** 0 ms/line **Without ECM:** 2.5, 5, 10, 20 or 40 ms/line

Transmission Time	6 seconds Condition: 14400 bps; G3 ECM, MMR and MTF off using memory for an ITU-T #1 test document (Slerexe letter) at standard resolution
Printing System	Laser printing, plain paper, dry toner
Printing Speed	6 ppm for A4 or letter size paper
Paper Size	**Europe:** A4 **Asia:** A4, F4 (Adjustable to Letter and Legal)
Paper Capacity	**Recommended environment:** 100 sheets (A4 recommended paper) **Operating environment:** 80 sheets (A4 paper)
Paper Weight	70 g/m² [18lb] - 90 g/m² [24lb]
Maximum Printing Width	204 mm [8.0 ins]: A4 210 mm [8.3 ins]: Letter and Legal
Print Resolution	**Main Scan:** 16 dots/mm **Sub Scan:** 15.4 lines/mm
Power Supply	AC 220 V-10% - 240 V+10% 50/60 ±3 Hz
Power Consumption	**Stand-by:** Average 10 W **Transmission:** Average 30 W **Reception:** Average 220 W **Copying:** Average 250 W **Maximum Power Consumption:** 600 W
Operating Environment	**Temperature:** 10°C - 35°C [50°F - 95°F] **Humidity:** 15% - 80%
Recommended Environment	**Temperature:** 15°C - 25°C [59°F - 77°F] **Humidity:** 30% - 70%
Dimensions (W x D x H)	341 x 766 x 472 mm [13.2 x 29.9 x 18.4 ins] Including trays (Maximum dimensions)
Weight	9.1kg [20.1 lbs.] Including toner cartridge and trays

1.2 FEATURES

KEY: O = Used, X = Not Used,
A = With optional memory only,
S = Service selectable in some countries

Equipment	
ADF	O
Book scan	X
Bypass feed: 1 sheet	X
Optional cassette	X
Optional cassette: Universal	X
Optional paper feed unit	X
Cabinet	X
Mechanical counter	X
Cutter	X
Handset	X
Telephone Connection	O
TAM Connection	O
Hard disk	X
Manual feed mechanism	X
Marker (Stamp)	X
Monitor speaker	O
Optional memory (2MB)	O
Optional printer interface	X

Video Processing Features	
Automatic image density	X
Contrast	X
Halftone	O
MTF	O
Reduction before TX	X
Scanning resolution	O
Smoothing to 16 x 15.4 l/mm	O

Communication Features - Auto	
AI short protocol	O
Automatic fallback	O
Automatic redialing	O
Confidential reception	X
JBIG compression	X
Dual access	O

Communication Features - Auto	
Resolutions available for reception	
Fine	X
Super fine	X
Substitute reception	O
V.34 communication	X

Communication Features - User Selectable	
Action as a transfer broadcaster	X
AI Redial (last ten numbers)	O
Answering machine interface	O
Authorized Reception	O
Auto dialing (pulse or DTMF)	O
Auto document	X
Automatic voice message	X
Backup transmission	X
Batch transmission	X
Broadcasting	O
Chain dialing	O
Communication result display	X
Confidential ID override	X
Confidential transmission	X
Direct fax number entry	O
Economy transmission	X
Fax on demand	X
Forwarding	X
Groups (3 groups)	O
Hold	X
ID transmission	X
Immediate redialing	O
Immediate transmission	O
ISDN	X
Keystroke programs	X
Memory transmission	O
Multi-step transfer	X
OMR	X
On hook dial	O
Ordering toner	X
Page count	O
Page separation mark	O
Parallel memory transmission	X

Communication Features - User Selectable	
Personal codes	X
Personal codes with conf. ID	X
Partial image area scanning	X
Polling reception (without ID)	O
Polling transmission	X
Polling tx file lifetime in the SAF	X
PWD (rx only)	O
Quick dial (20 stations)	O
Reception modes (Fax, Tel, Auto)	O
Remote control features	X
Remote transfer	X
Restricted access	X
Secured polling reception	X
Secured polling reception with Stored ID override	X
Send later	O
SEP (rx only)	O
SID	O
Silent ringing detection	X
Specified Image area	X
Speed dial (50 stations)	O
SUB (tx only)	O
Telephone directory	X
Tonal signal transmission	O
Transfer request	X
Transmission deadline (TRD)	X
Turnaround polling	X
Two-step transfer	X
Two in one	X
Voice request (immediate TX only)	X

Communication Features - Service Selectable	
AI short protocol	O
Auto-reduction override option	O
Busy tone detection	O
Cable equalizer	O
Closed network (TX and RX)	X
Continuous polling reception	X
Dedicated TX parameters	O
ECM	O

Communication Features - Service Selectable	
EFC	X
Inch-mm conversion	X
JBIG compression	X
Page retransmission times	O
Protection against bad connections	X
Short preamble	X

Other User Features	
Automatic service call	Service
Auto start initial setup	O
Blank document detection	X
Center mark	X
Checkered mark	X
Clearing a memory file	O
Clearing a polling file	O
Clock	O
Confidential ID	X
Copy mode	O
Copy mode restriction	X
Counters	O
Country code	S
Daylight saving time	O
Destination check	X
Direct entry of names	X
Energy saver (Night timer and standby mode)	O
FAX header (TTI)	O
FAX number (CSI)	S
File retention time	X
File retransmission	X
File destination change	X
Function programs	X
ID code	X
Internet fax (LAN type)	X
Internet fax (Dial up type)	X
Label insertion	X
LAN fax	X
Language selection	O
LCD back light	X
LCD contrast control	X
Memory lock	X
Modifying a memory file	X
Multi-sort document reception	X

Other User Features	
Multi-copy mode (up to 99)	O
Own name (RTI)	O
Own number	X
PC scanner	X
PC fax	X
PC print	X
Print density control	X
Printing a memory file	O
Printing a quick dial sheet	O
Program from redial memory	X
Quick dial label printing	O
RDS on/off	X
Reception mode switching timer	X
Reception time printing	X
Remaining memory indicator	O
Remote ID	X
Reverse order printing	O
Service report transmission	O
Speaker volume control	O
Specified cassette selection	X
Status indicator	X
Substitute reception on/off	O
Switch quick dial layout	X
Telephone line type	S
Toner saving mode	X
User function keys	X
User parameters	O
Wild cards	O

Reports - Automatic	
Charge control report	X
Communication failure report	O
Communication result report	O
Confidential file report	X
Error report	O
File clear report	X
File reserve report	X
Journal	O
Power failure report	O
Toner cassette order form	X
Transfer result report	X
Transmission result report	O

Reports - User-initiated	
Charge control report	X
File list	O
Group list	O
Help list	O
Journal	O
Personal code list	X
Program list	X
Programmed special numbers list	X
Quick dial list	O
Speed dial list	O
Transmission status report	X
User parameter list	O

Service Mode Features	
Back-to-back test	X
Bit switch programming	O
Book mode test	X
Cable equalizer	O
Comm. Parameter display	O
Counter check	O
Country code	O
DTMF tone test	O
Echo countermeasure	O
Effective term of service calls	O
Error code display	O
Excessive jam alarm	O
File transfer (all files)	O
LCD contrast adjustment	X
Line error mark	O
Memory file printout (all files)	X
Modem software download	X
Modem test	O
NCU parameters	O
Operation panel test	O
Periodic service call	O
Ping test	X
PM call	O
Printer mechanism test	X
Printer test patterns	O
Programmable attenuation	X
Protocol dump list	O
Protocol dump list (LAN)	X
RAM display/rewrite	O
RAM dump	O

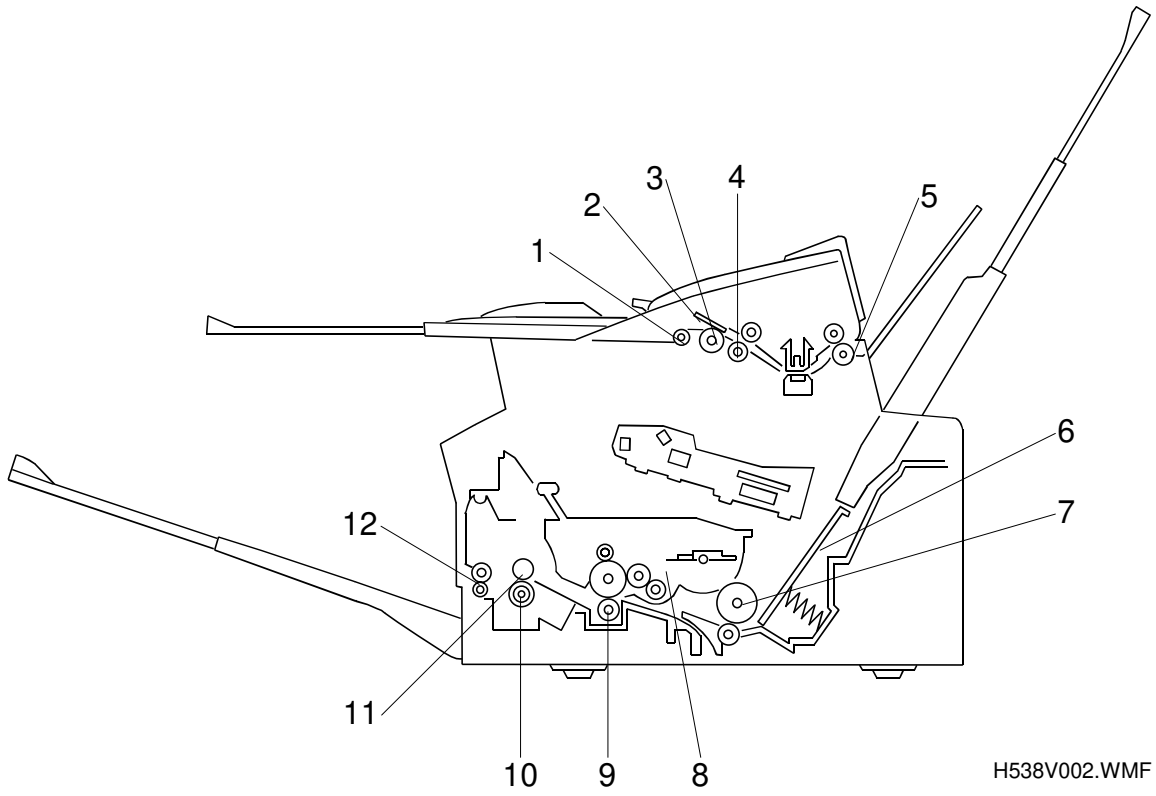
Service Mode Features	
RAM test	O
RDS	O
Ringer test	X
Scanner lamp test	O
Scanner mechanism test	O
Sensor initialization (CIS only)	O
Serial number	O
Service monitor report	O
Service station number	O
Software upload/download	O
SRAM data download	O
System parameter list	O
Technical data on the Journal	O
Thermal head parameters	X

Memory Files/Pages

Maximum number of files: 100
Maximum number of stations/file: 30
Maximum number of stations: 100
Maximum number of pages: 128 (200 with optional memory card)

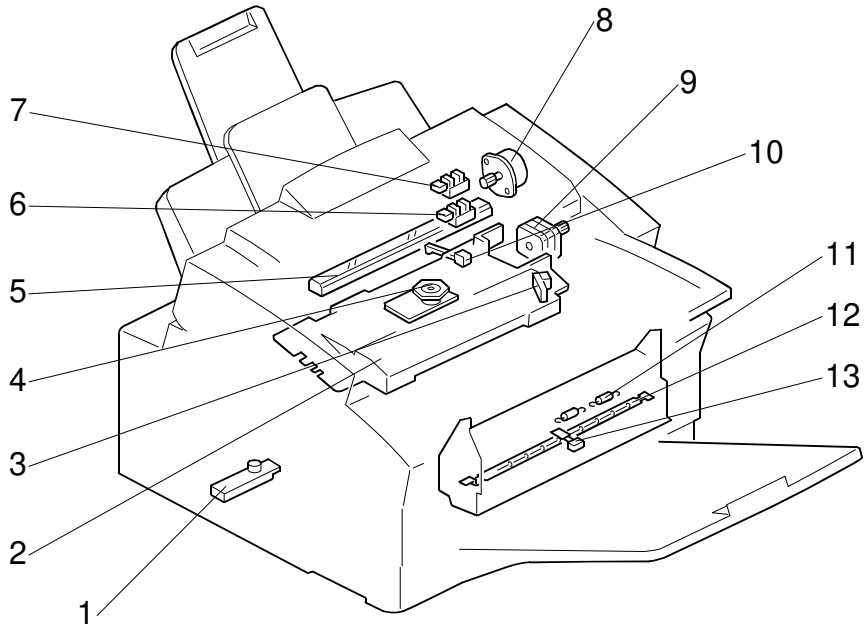
1.3 COMPONENT LAYOUT

1.3.1 MECHANICAL COMPONENTS



No.	Name	Description
1	Pick-up Roller	Picks up pages of the document from the document table one at a time.
2	Separation Pad	Prevents more than one sheet from feeding into the scanner.
3	Document Feed Roller	Feeds the document to R1 roller.
4	R1 Roller	Feeds the document through the scanning area.
5	R2 Roller	Feeds the document out from the scanning area.
6	Upper Tray Bottom Plate	Presses paper stacked in the upper paper tray against the paper feed roller.
7	Paper Feed Roller	Picks up the top sheet of paper from the stack in the upper paper tray and feeds it into the transfer area.
8	Toner Cartridge	Consists of the OPC drum, toner, toner application roller, development roller, charge brush roller, cleaning blade, and other development components.
9	Transfer Roller	Applies a charge to the paper to pull the toner off the drum and onto the copy paper.
10	Pressure Roller	Applies pressure to the paper during fusing.
11	Hot Roller	Fuses the toner to the copy paper.
12	Paper Exit Roller	Feeds the paper out of the printer.

1.3.2 ELECTRICAL COMPONENTS



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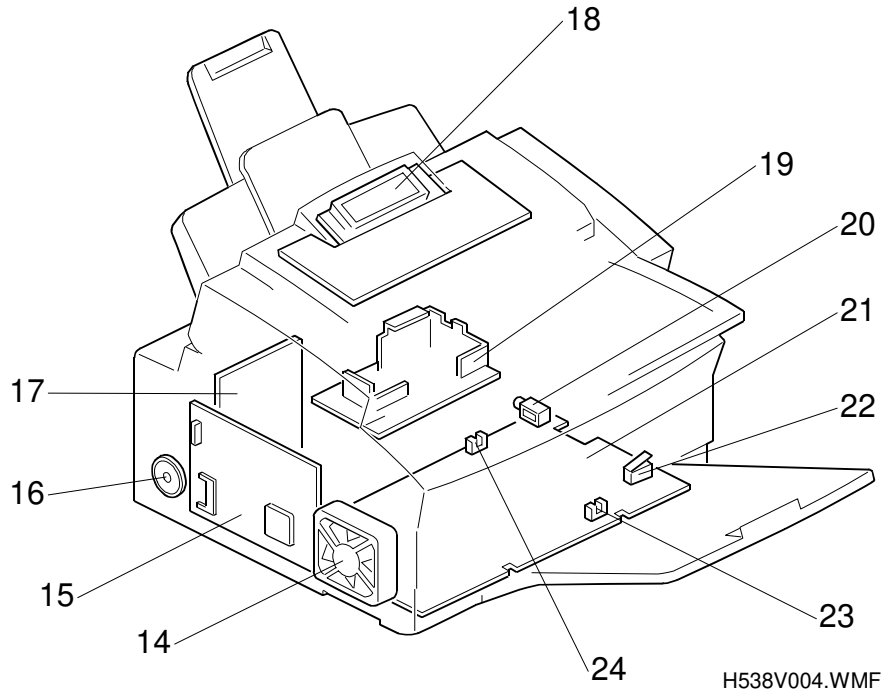
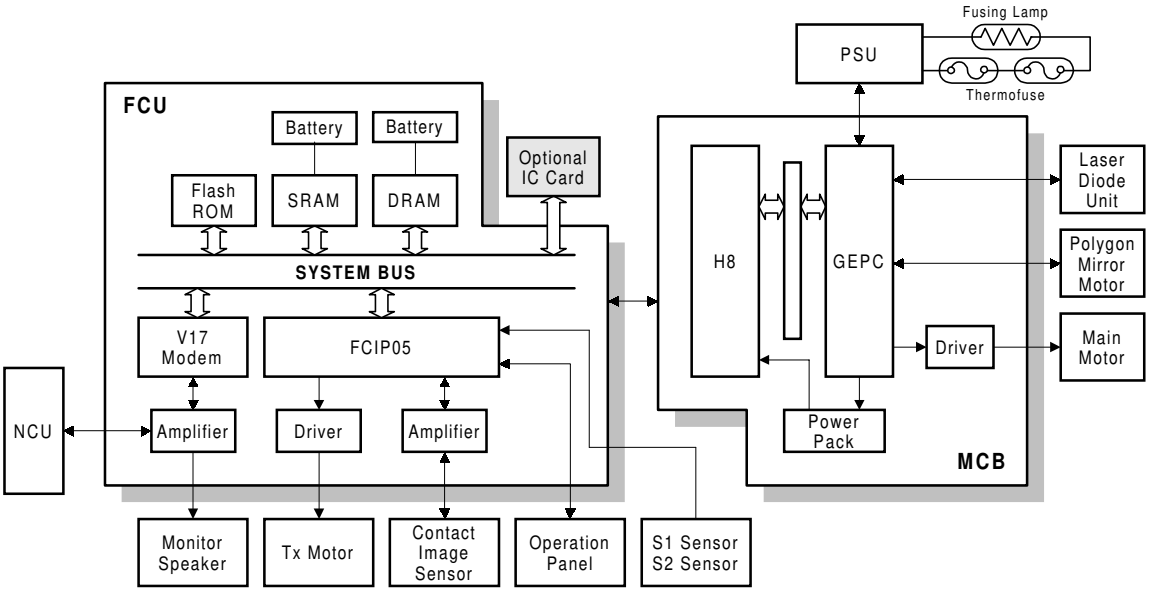
No.	Name	Description
1	Toner End Sensor	This detects when the toner has run out.
2	Laser Unit	Consists of the laser diode unit, cylindrical lens, f-theta lens, polygon mirror motor, and other laser optical components.
3	Laser Diode Unit	
4	Polygon Mirror Motor	
5	Contact Image Sensor (CIS)	Reads and converts the light reflected from the document into an analog video signal.
6	Document Sensor (S1)	This detects the presence of a document in the feeder.
7	Scan Line Sensor (S2)	This detects the leading and trailing edges of originals, and checks for jams.
8	Tx Motor	This stepper motor drives the ADF mechanism.
9	Main Motor	This DC motor drives the toner cassette, paper feed mechanism, and fusing unit.
10	Paper End Sensor	This detects when the paper in the upper paper tray has run out.
11	Thermofuse	Interrupts the AC power supply to the fusing lamp if the temperature of the fuse exceeds 121°C.
12	Fusing Lamp	Fuses the toner to the paper.
13	Thermistor	Monitors the temperature on the hot roller surface.



No.	Name	Description
14	Fan Motor	Blows hot air out of the machine.
15	FCU (Facsimile Control Board)	Controls the machine. It contains the main CPU, flash ROM, system RAM, etc.
16	Monitor Speaker	Allows the user to hear dial tone and the key-touch tone.
17	NCU (Network Control Unit)	Contains relays and switches to interface the machine with the network and the handset.
18	Operation Panel	This board controls the operation panel.
19	PSU (Power Supply Unit)	Supplies power to the machine.
20	Paper Pick-up Solenoid	This releases the cam stopper to pick up a sheet of paper.
21	MCB (Mechanical Control Board)	Controls the printer components.
22	Interlock Switch	If the upper cover is open, this interlock switch cuts the +5VLD power supply for the laser diode and the +24V power supply for the fan motor, polygonal mirror motor, main motor, and other components.
23	Paper Exit Sensor	Detects when paper is fed out of the fusing unit
24	Paper Registration Sensor	Detects when leading edge of the copy paper reaches the registration area.

1.4 OVERALL MACHINE CONTROL



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The FCU (Facsimile Control Unit) contains logical components for overall system control, and a direct interface to the IC card.

The FCU also contains a modem chip and controls the NCU.

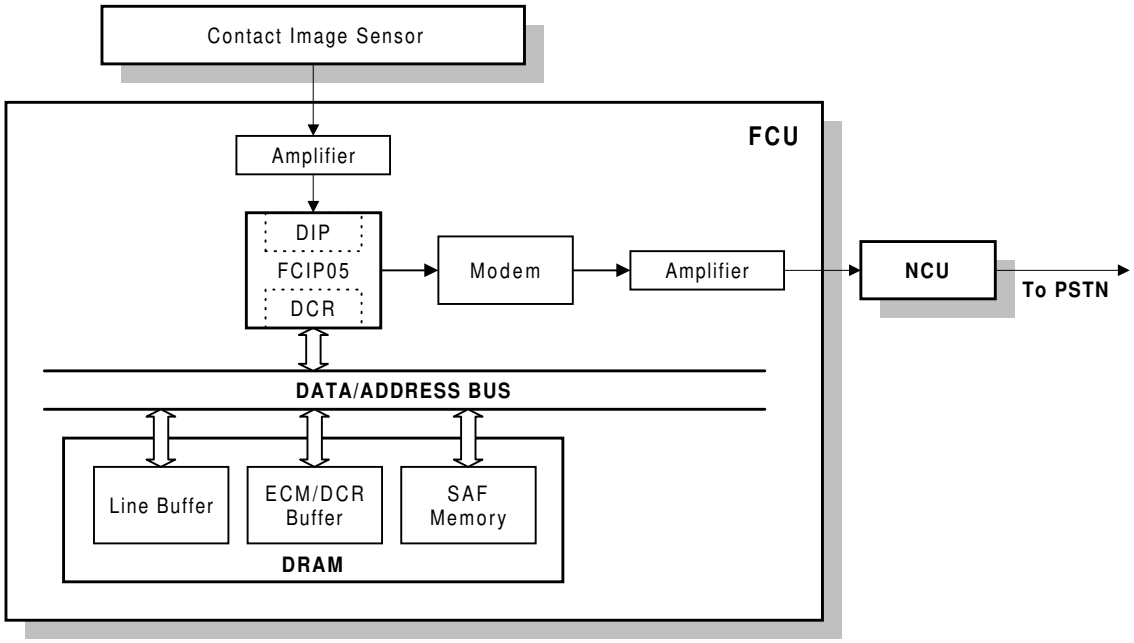
The MCB (Mechanical Control Board) controls devices related to motors and sensors. It also has an onboard power pack that generates high voltage supplies necessary for the printing process.

The NCU (Network Control Unit) contains relays and switches to interface the machine with the network and the telephone.

The PSU (Power Supply Unit) generates constant +24, +5 and -5 DC voltages and supplies them to the boards. It also supplies AC power to the fusing lamp.

1.5 VIDEO DATA PATH

1.5.1 TRANSMISSION



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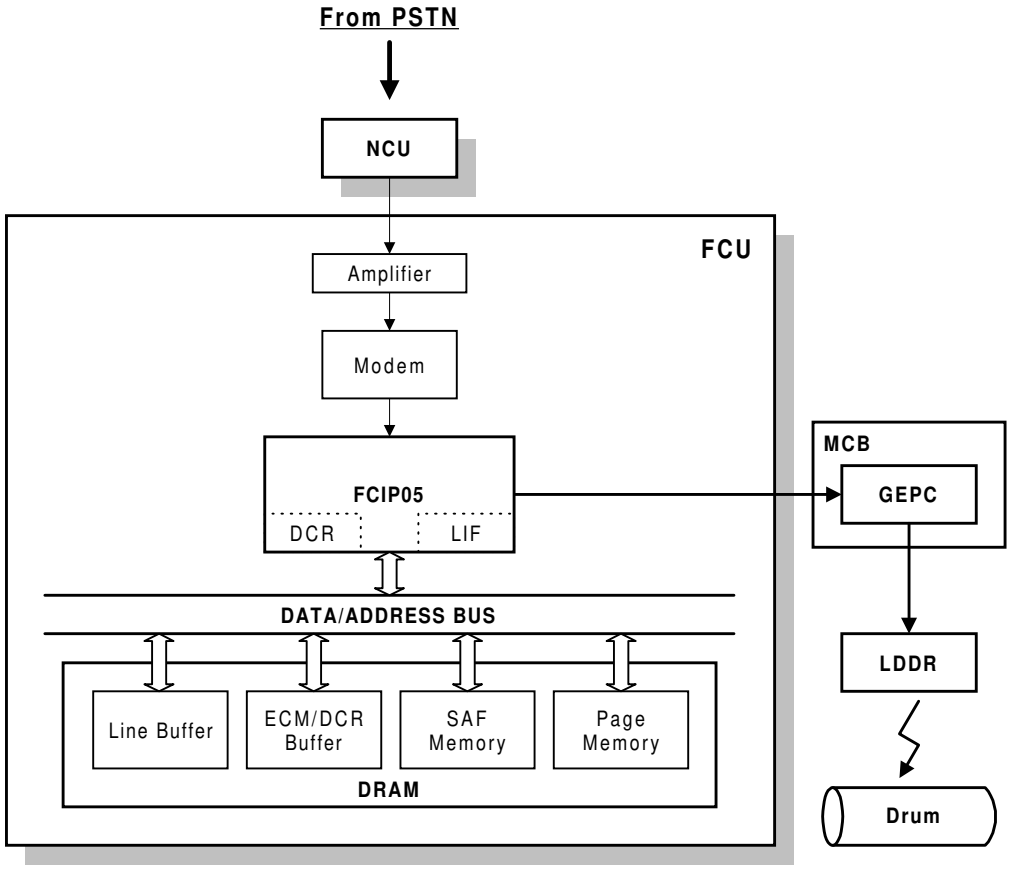
Immediate Transmission:
Scanned data from the CIS (Contact Image Sensor) passes to the DIP in the FCIP05. After analog/digital processing, the DCR compresses the data for transmission. The compressed data passes through the DCR buffer, then to the ECM memory before entering the telephone line through the modem.

Memory Transmission:
First, the scanned data is stored in the SAF memory after compression in the DCR. At the time of transmission, the DCR decompresses the data from the SAF memory, then compresses it again for transmission. The compressed data passes through the DCR buffer, then to the ECM memory before entering the telephone line through the modem.

1.5.2 RECEPTION



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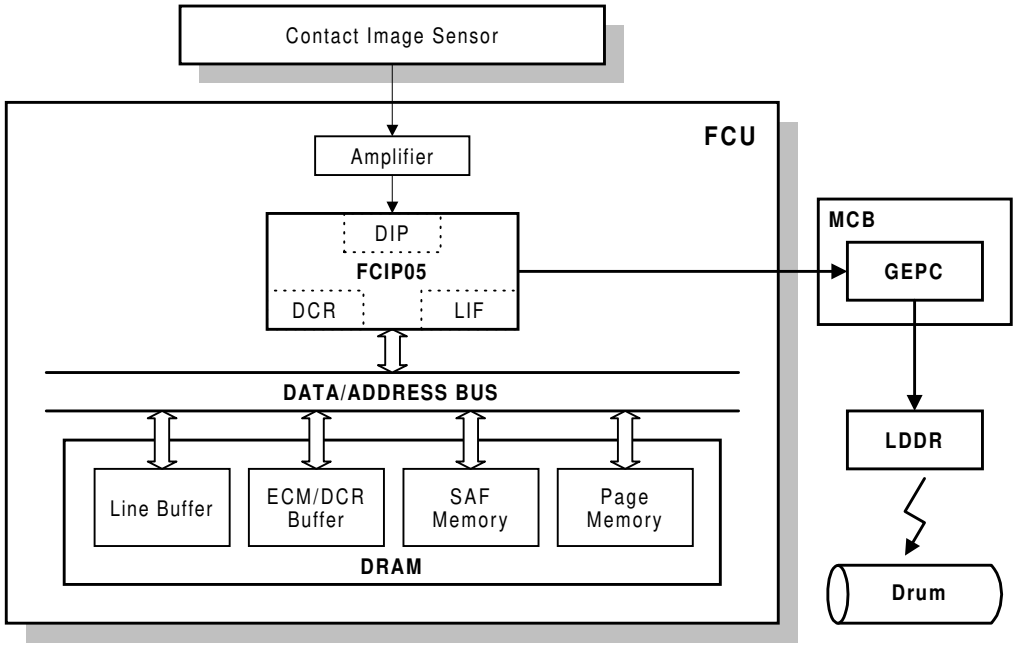
Data from the line passes to the modem through the NCU (Network Control Unit) and analog circuit. After the modem demodulates the data, it passes through the ECM memory, DCR buffer then to the DCR, which decompresses it into raster image data. At the same time, the compressed data passes to the SAF memory as a backup in case of mechanical problems during printing (substitute reception).

The raster image data then passes to the page memory for printing. After a page of data has been stored in the page memory, it is sent to the mechanical control board (MCB).

The MCB sends the control signal to the laser diode driver. Then, the laser beam writes a latent image on the drum.

1.5.3 COPYING



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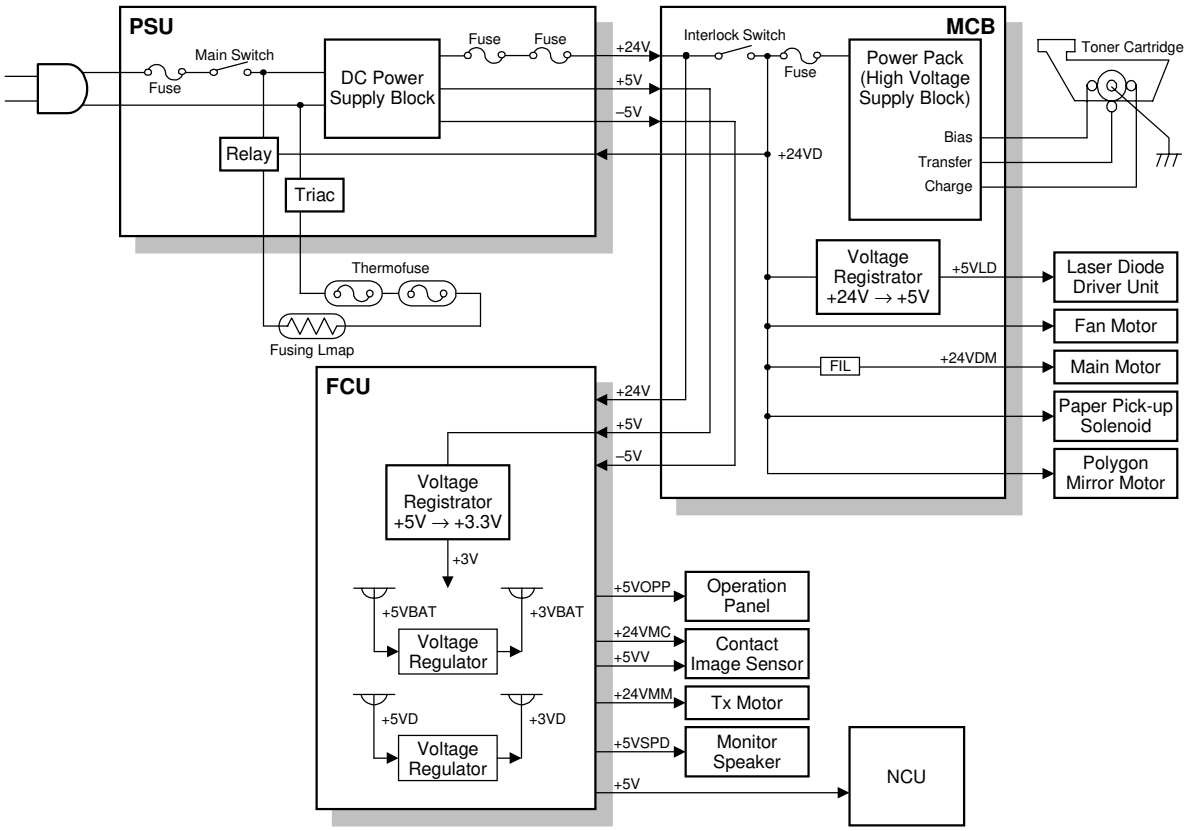
The scanned data passes to the page memory after video processing in the DIP. After a page of data has been stored in the page memory, the processed data sent to the MCB (Mechanical Control Board) through the LIF. The MCB drives the laser diode based on the processed data signal. Then, the laser beam writes a latent image on the drum.

1.6 POWER DISTRIBUTION



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The PSU (Power Supply Unit) generates +24 volts, +5 volts, and –5 volt DC power supplies, and they are supplied as shown below.

The FCU generates +3 volts (actually +3.3 volts) from the +5 volt supply by a regulator, which is used internally.

Voltage	Description
+24V	Normally on when the main switch is on.
+24VD	This is interrupted if the interlock switch is open.
+24VDM	For the main motor
+24VMC	For the CIS
+24VMM	For the TX motor
+5V	Normally on when the main switch is on.
+5VBAT	Supplies back up power to the SRAM on the FCU to back up the programmed data. A lithium battery generates +5VBAT.
+5VD	Supplies back up power for the DRAM and the optional IC card on the FCU. It can back up stored data for 12 hours after the power is switched off. A rechargeable lithium battery on the FCU generates +5VD.
+5VLD	For the LDDR

Voltage	Description
+5VOPP	For the operation panel
+5VMDM	For the modem
+5VSPD	For the monitor speaker
+5VV	For the CIS and for video process
–5VV	For video process
+3V	For the FCIP05 internal circuits
+3VBAT	For the FCIP05 SRAM backup
+3VD	For the FCIP05 DRAM backup
+3VMDM	For the modem
+3VV	For the FCIP05 AD converter

The MCB generates +5 volts from the +24 volts for the laser diode driver (+5VLD), and it also generates high voltage power for development bias, charge voltage, and transfer voltage. The control board generates +3.3 volts from the +5 volt supply, which is used internally.

The MCB contains an interlock switch, which opens when the front cover is opened. If this switch is opened, the +24 volt DC power (+24VD) is cut and the power to the following devices is shut off.

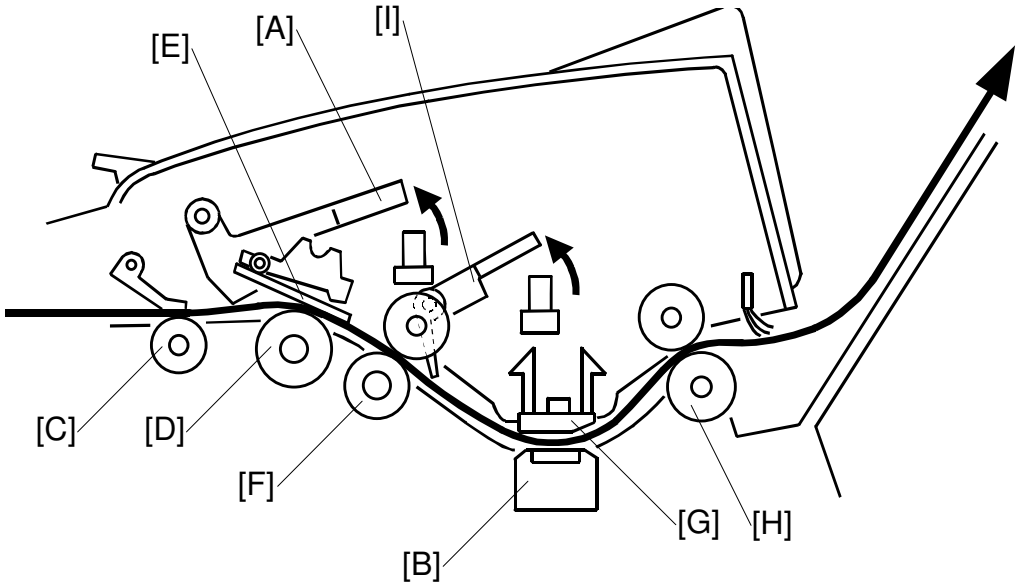
- Power pack
- Main, cooling fan and polygon mirror motors
- Laser diode driver
- Fusing lamp
- Paper pick-up solenoid

2. DETAILED SECTION DESCRIPTIONS

2.1 SCANNER

2.1.1 AUTO DOCUMENT FEEDER (ADF)

Overview



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The document sensor (S1) [A] detects documents set on the document table.

The ADF feeds from the bottom page of the document stack on the document table. During scanning, the page moves past the CIS [B].

The pick-up [C] and feed [D] rollers feed the document into the ADF unit. Only the bottom sheet is fed because the separation pad [E] prevents any other sheets from feeding. The R1 roller [F] feeds the document through the ADF unit.

The shading plate [G] presses the document against the CIS unit [B], so that the CIS unit is able to scan the entire document with the same condition.

After the document passes the scanning position, R2 roller [H] feeds it onto the document exit tray.

The S2 (scan line) sensor [I] detects the leading edge and the trailing edge of the document, and checks for document jams.

The image sensor assembly (CIS unit and support brackets) is factory adjusted, so it does not require adjustment or disassembly in the field.

Jam Conditions

Non-feed

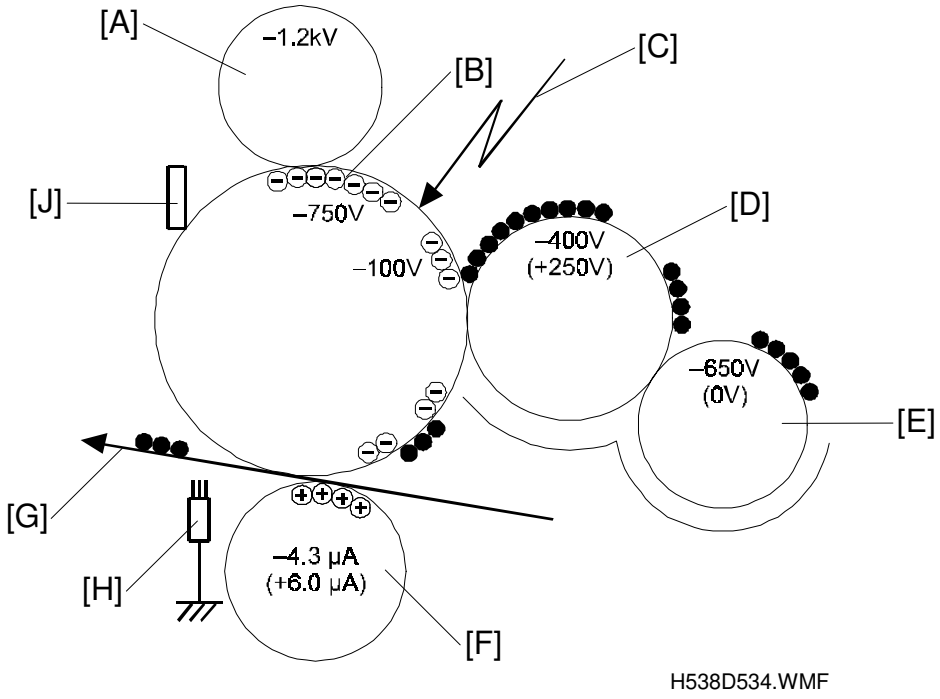
The scan line sensor (S2) does not turn on within 2 seconds after the Tx motor starts (Error Code 1-00).

Maximum Document Length Exceeded

The scan line sensor (S2) does not turn off after the maximum document length (600 mm) has been fed since it turned on (Error Code 1-01).

2.2 PRINTING

2.2.1 PRINTING PROCESSES AROUND THE DRUM



This machine uses a “write to black” system, using negative toner.

Charge: The charge brush roller [A] gives the OPC drum [B] surface a negative charge of –750 volts.

Exposure: A laser [C] writes a latent image on the drum. The area exposed by the laser beam drops to about –100 volts.

Development: The development roller [D] carries toner to the drum and develops the latent image on the drum surface.
Development bias (during printing):
Toner application roller [E]: –650 volts
Development roller [D]: –400 volts
Switching bias (At the start and the end of any print process):
Toner application roller [E]: 0 volts
Development roller [D]: +250 volts

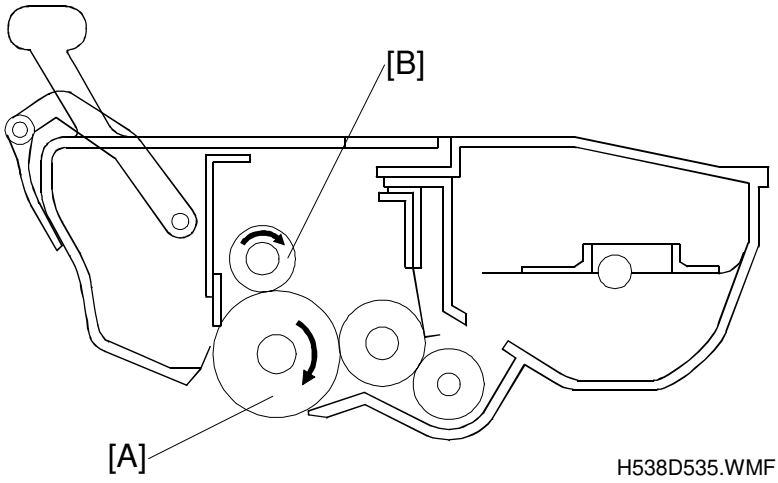
Image Transfer: The transfer roller [F] pulls the toner from the drum onto the paper [G]. A constant current of 4.3 µA (6.0 µA for envelopes) is applied.

Paper Separation: The antistatic brush [H] removes the charge on the underside of the paper to help the paper separate from the drum.

Drum Cleaning: The cleaning blade [J] removes any toner remaining on the drum after the image is transferred to paper.

The high voltages are supplied from the MCB (Mechanical Control Board).

2.2.2 CHARGE



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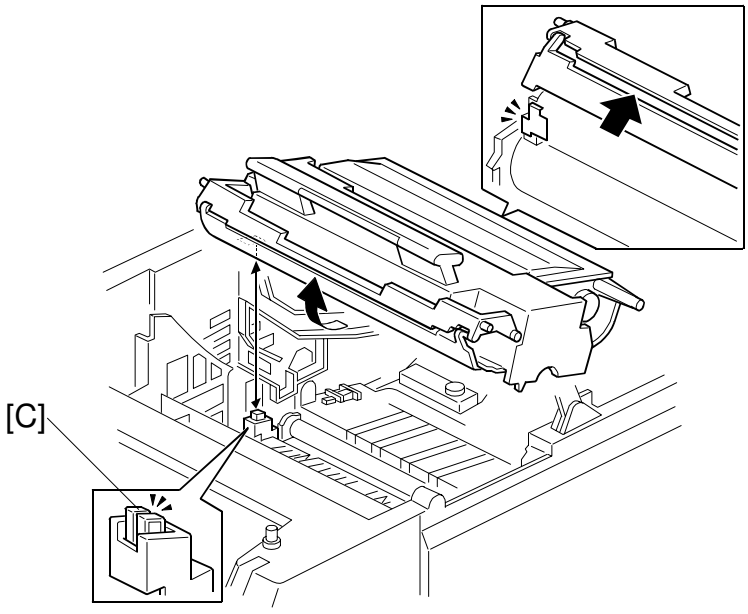
The OPC (Organic Photoconductor) drum [A] used in this machine is small in diameter (24 mm). This allows a very compact design.

A charge brush roller [B] charges the photoconductor. The charge brush has the advantage of not generating ozone. A large negative voltage –1.2 kV) is applied from the MCB board to the charge brush roller. This charge brush roller gives the OPC drum surface a negative charge –750 V). The diameter of the roller is 14 millimeters.



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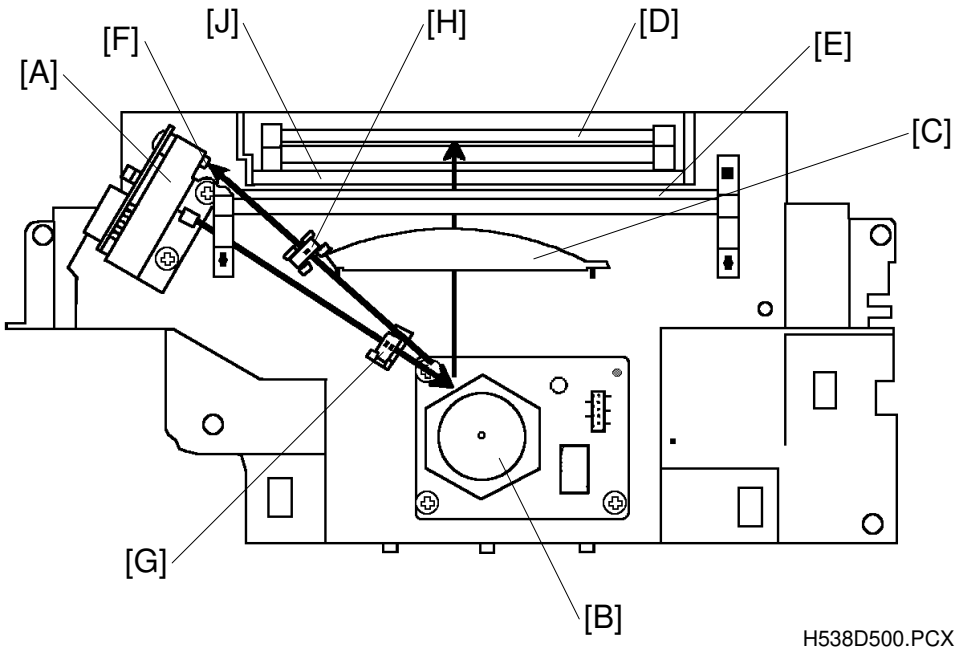
The voltage to the charge brush roller is supplied through the terminal [C] from the MCB (Mechanical Control Board).

2.2.3 LASER EXPOSURE

Overview



Laser Unit Layout

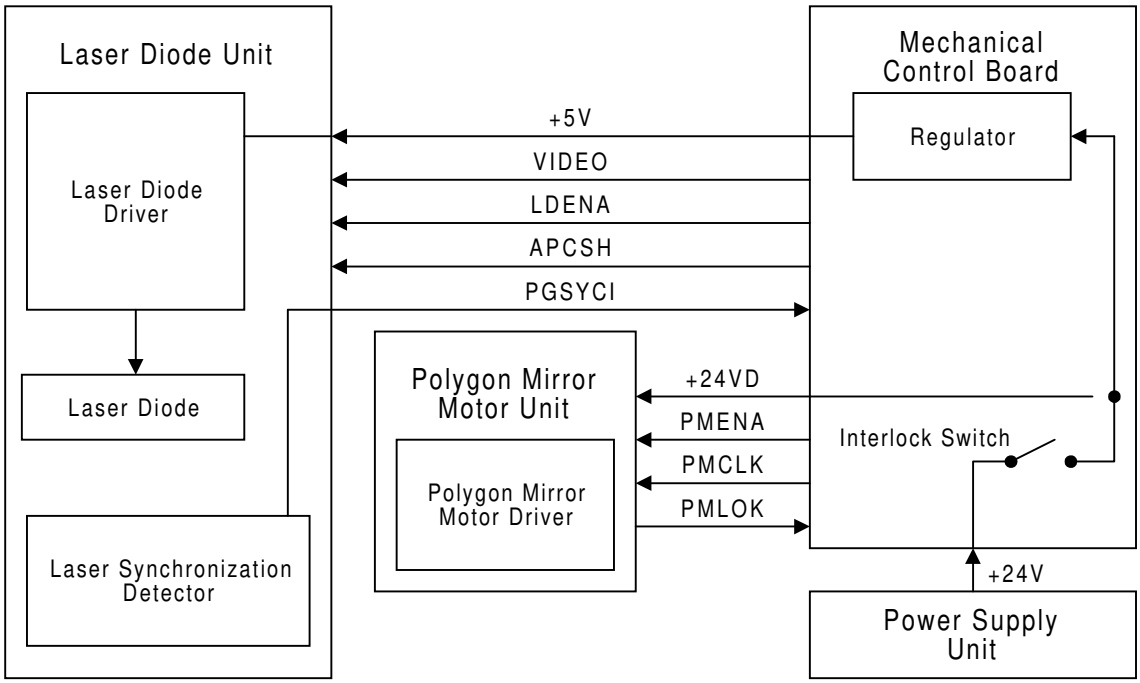
A : Laser Diode Unit
B : Polygon Mirror Motor
C : F-theta Lens
D : First Mirror
E : Second Mirror
F : Laser Synchronization Detector
G : Cylindrical Lens
H : Synchronization Detector Lens
J : Shutter

This machine uses a laser diode to produce an electrostatic latent image on the OPC drum. The laser diode unit converts image data from the mechanical control board into laser pulses, and the optical components direct these pulses to the OPC drum.

The strength of the beam emitted from the laser diode is 0.21 milliwatts at a wavelength of 785 ± 20 nanometers.

As a mechanical safety feature, the shutter [J] closes to block the laser beam path whenever the front cover is opened.

Block Diagram



H538D536.WMF

The Mechanical Control Board controls the laser diode power (APCSH) and transfers data for printing to the laser diode (VIDEO). As an electrical safety feature, there is an interlock switch on the Mechanical Control Board. This switch cuts +24 volts whenever the upper unit is opened.

Error Conditions

Laser Error

The machine detects laser synchronization signal pulses (PGSYCI) 70 milliseconds after the (LDENA) signal is sent. It detects a laser error if the pulse count does not reach the specified number within 100 milliseconds.

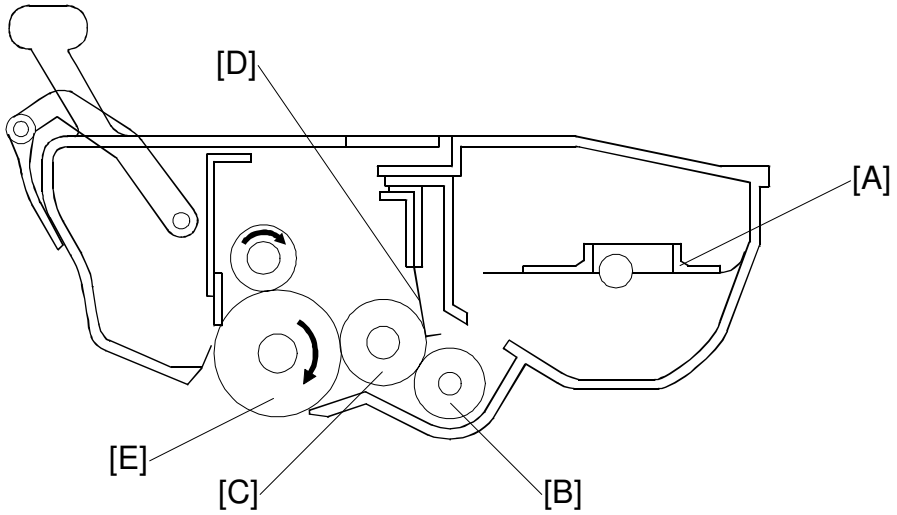
When this occurs, the machine warns the customer on the LCD panel (SC code 2-21, Error code 9-20).

Polygon Mirror Motor Error

The machine detects a polygon mirror motor error when the (PMLOK) signal does not go low within 10 seconds of the (PMENA) signal. When this occurs, the machine warns the customer on the LCD panel (SC code 3-31, Error code 9-23).

2.2.4 DEVELOPMENT

Overview



H538D535.WMF

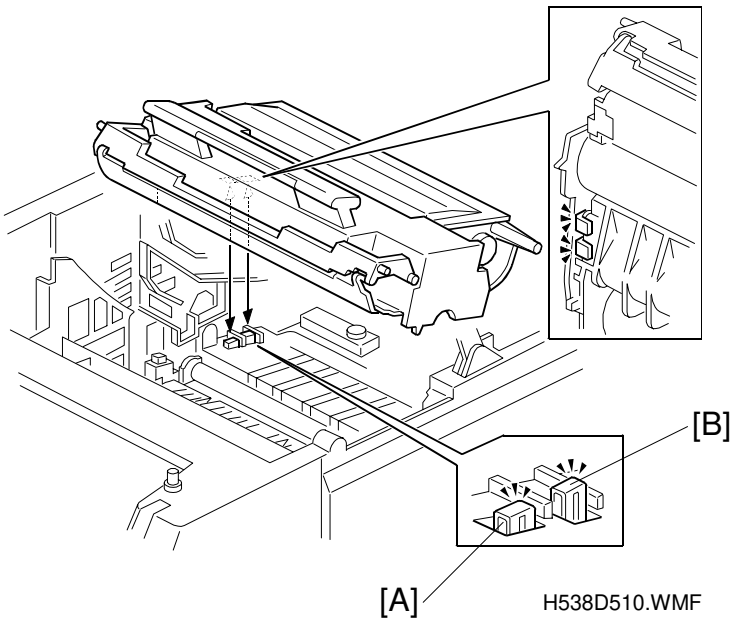
This machine uses monocomponent toner, which is composed of resin and ferrite. The toner mixing bar [A] stirs and carries toner to the toner application roller [B]. The toner application roller supplies toner to the development roller [C]. As the development roller turns past the toner metering blade [D], only a thin coating of negatively charged toner particles stays adhered.

The diameter of development roller is 16 millimeters and the toner application roller is 12.8 millimeters.

During printing, a bias voltage of –650 volts is applied to the toner application roller and another bias voltage of –400 volts is applied to the development roller. The toner is transferred from the toner application roller to the development roller because of the potential difference between these two rollers.

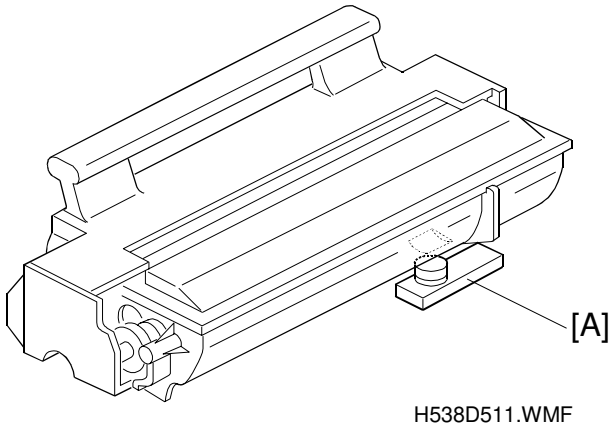
The exposed area on the drum [E] is at –100 volts. The development roller applies toner to these areas of the latent image as they turn past the drum.

At the start and the end of all print process (including the cleaning and initial toner supply modes), 0 volt is applied to the toner application roller, and +250 volts is applied to the development roller. This is to prevent any toner transfer to the drum.



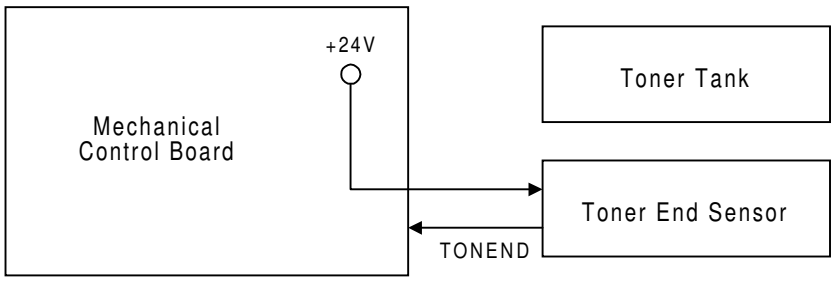
The voltage to the development roller and the toner application roller is supplied through the terminals [A and B] from the MCB (Mechanical Control Board).

Toner End Detection



H538D511.WMF

Toner near-end is detected by the toner end sensor [A], which is below the toner tank in the toner cartridge.



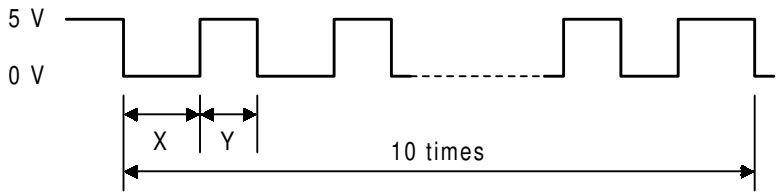
H538D532.WMF

While the main motor is rotating, the machine monitors the voltage (TONEND) output from the toner end sensor. The voltage from the sensor is high when the toner tank is full. When the toner tank is almost empty, the output of the toner end sensor starts occasionally dropping low as the toner level changes with the stirring of the toner mixing bar.

Toner Near-end Condition

When the Mechanical Control Board detects the following output from the toner end sensor, “Toner near-end” is displayed on the LCD. (This is the toner near-end condition).

Toner end sensor output



H538D733.WMF

0.6 s < X and Y < 2 s

The machine clears the toner near-end condition if the output from the toner end sensor goes back high for more than 5 seconds.

Toner End Condition

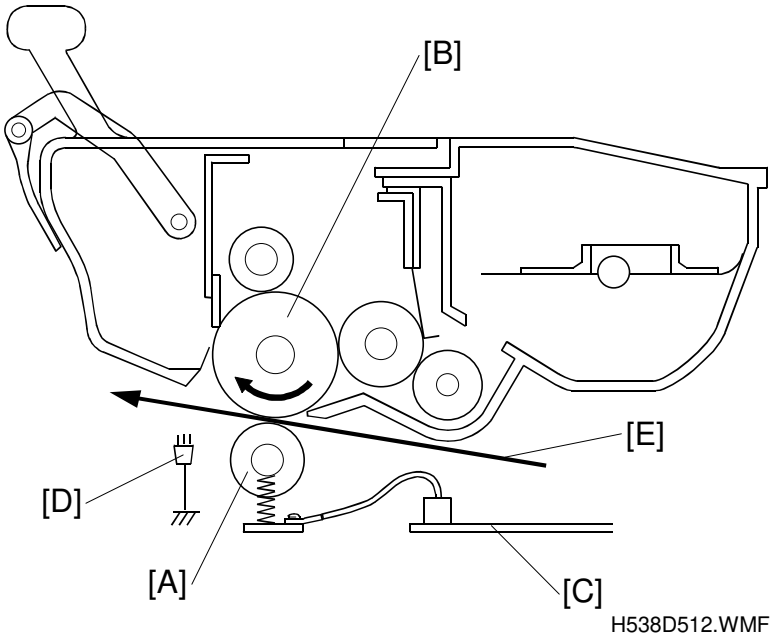
If the machine makes more than 100 copies during the toner near-end condition or the Mechanical Control Board detects a low output for more than 9.2 seconds, it disables copying and “Add toner” is displayed on the LCD. This is the toner end condition.

Toner End Recovery

Replacing the toner cartridge clears the toner end condition. If the main switch is turned off and back on, or the upper unit is opened and closed during the toner near-end condition or toner end condition, the machine assumes that the toner cartridge has been replaced. It then rotates the main motor to initialize the toner cartridge. At the same time, the Mechanical Control Board monitors the output from the sensor. The machine clears the toner end condition if the Mechanical Control Board detects a high output from the toner end sensor for more than 5 seconds.

2.2.5 TRANSFER AND SEPARATION

Overview



This machine uses a transfer roller [A], which touches the surface of the drum [B]. A constant current of +4.3 μA (6.0 μA for envelopes) is applied to the transfer roller from the mechanical control board [C]. The positively-charged transfer roller pulls negatively-charged toner off the drum. The antistatic brush [D] and the curvature of the drum help the paper [E] to drop away from the drum.

The diameter of the transfer roller is 14.6 millimeters.

Cleaning Mode

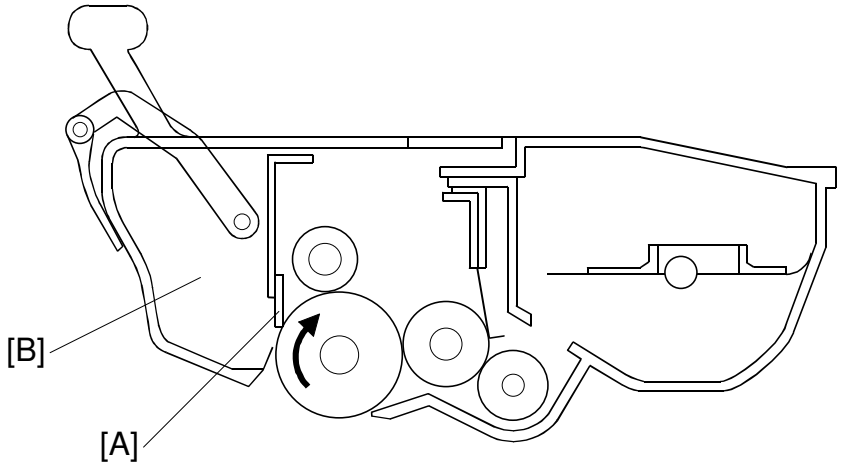
If a paper jam occurs during printing, toner may be transferred to the transfer roller surface. To prevent this toner from transferring to the underside of the paper, the transfer roller has to be cleaned before the next printing run.

While the machine is in the cleaning mode, the mechanical control board applies –1,000 volts to the transfer roller, and charges the drum to –750 volts. The negatively charged toner on the transfer roller is then transferred back to the drum.

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

- At power-up: The process starts when the fusing temperature reaches half of the standby temperature.
- When the cover is opened and then closed during the printing process.
- After a printer jam has been cleared.

2.2.6 DRUM CLEANING



H538D513.WMF

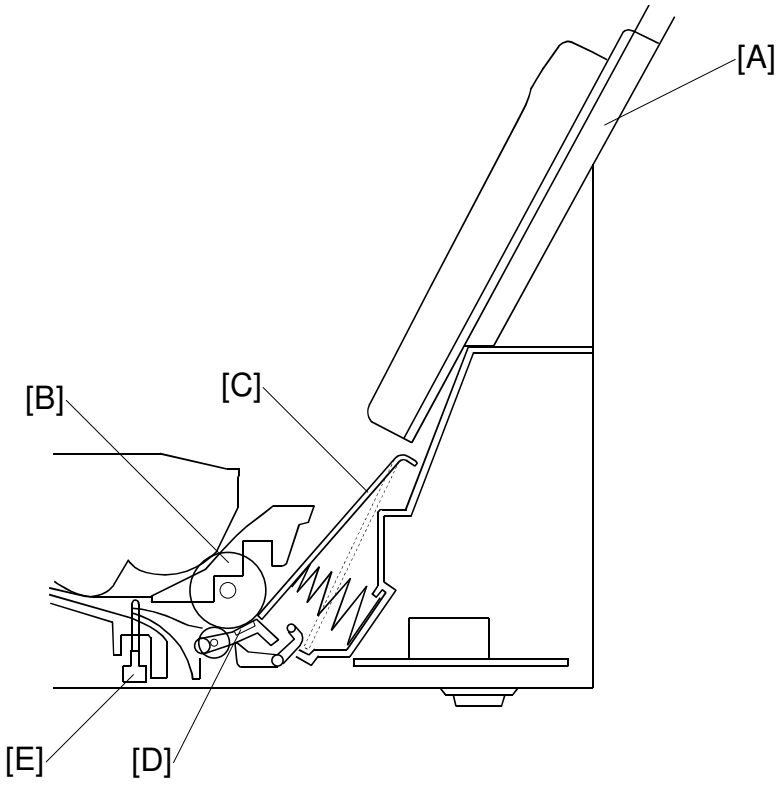
The cleaning blade and the used toner tank are contained in the toner cartridge.

A counter blade system is used for drum cleaning. The cleaning blade [A] removes any toner remaining on the drum after the image is transferred to the paper. This removed toner is stored in the used toner tank [B].

There is no used toner overflow detection mechanism because the used toner tank is large enough for the lifetime of the toner cartridge.

2.2.7 PAPER FEED AND REGISTRATION

Overview



H538D514.WMF

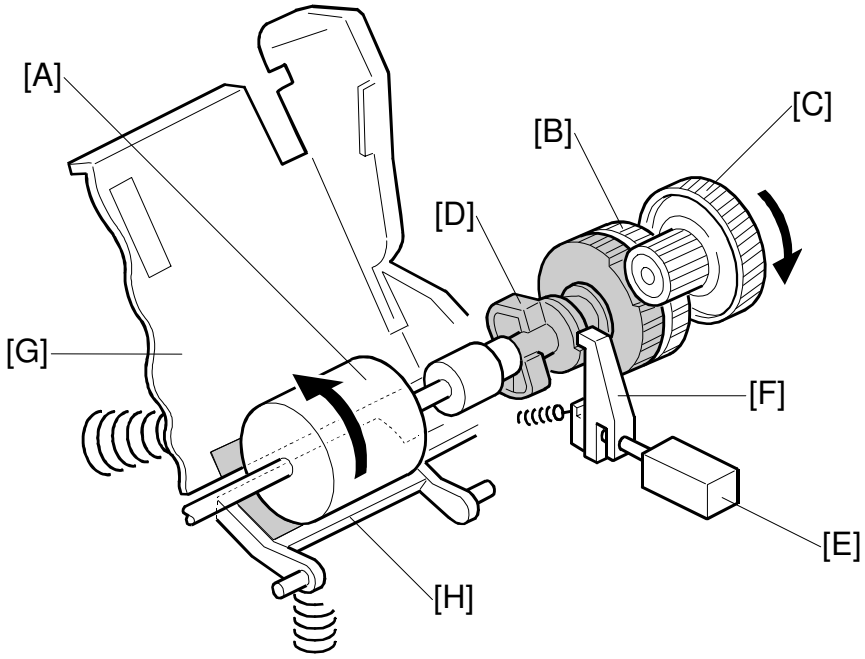
The upper paper tray [A] holds 100 sheets. The left side fence on the paper tray is adjustable to fit to the paper size.

The feed roller [B], the upper tray bottom plate [C], and the friction pad [D] allow only one sheet to feed from the paper tray. They are controlled by the pick-up cam. (See the next page.)

The registration sensor [E] detects the leading edge of the paper and synchronizes paper feed with the activation of the laser diode to write the image on the OPC drum.

Paper Feed Mechanisms

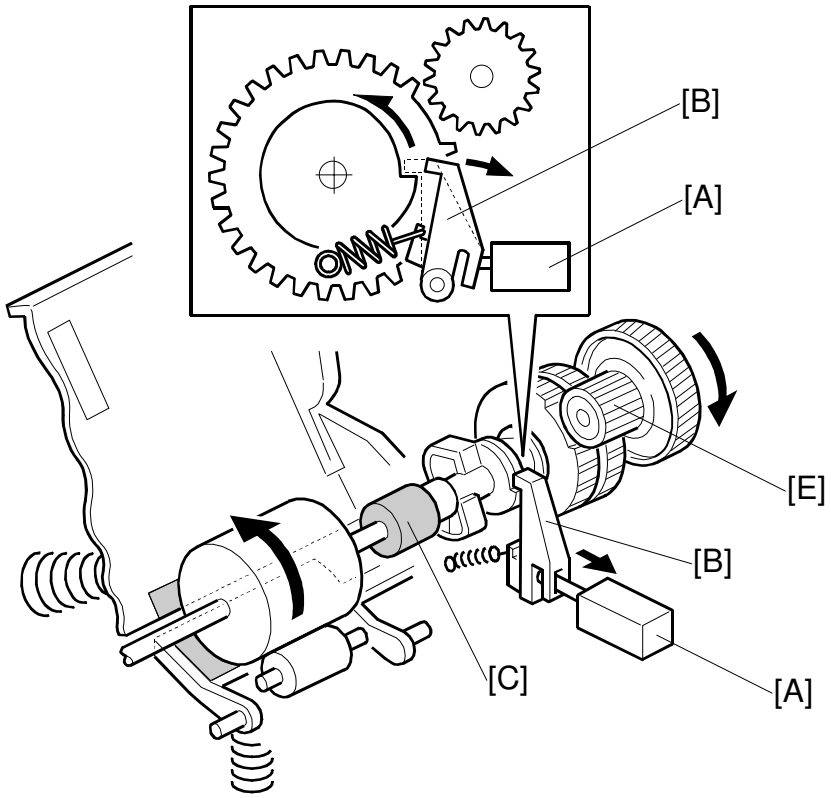
Idling Condition



H538D004.WMF

The paper feed roller [A] always rotates while the main motor rotates, since drive from the motor is transmitted to the feed roller gear [B] (which is fixed to the roller shaft through the paper feed drive gear [C]). The pick-up cam [D] idles on the shaft of the feed roller. This cam (shown by shading in the illustration) is a complex part with four cam surfaces and a gear. When the paper pick-up solenoid [E] is not energized, the cam stopper [F] locks the cam in the idling position. In this position, it holds the upper tray bottom plate [G] and the friction pad [H] away from the feed roller. The rotation of the main motor is not transmitted to the pick-up cam through the gear because cogs are not provided on the section of the cam gear that faces the drive gear during idling.

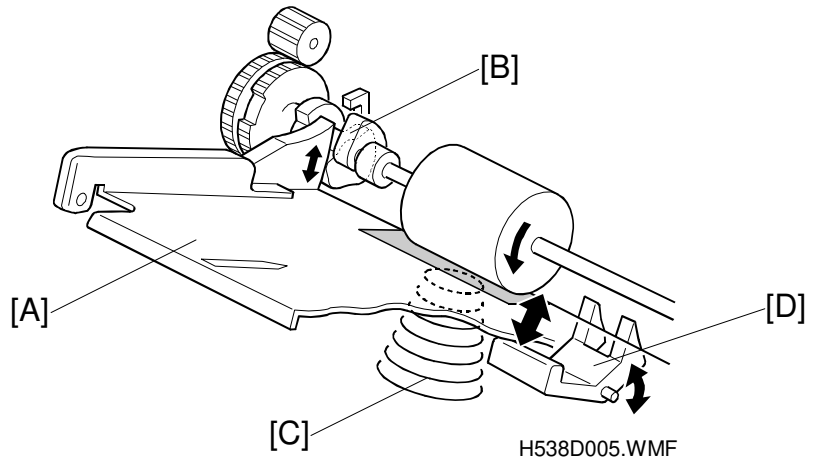
Pick-up Cam Drive Mechanism



H538D003.WMF

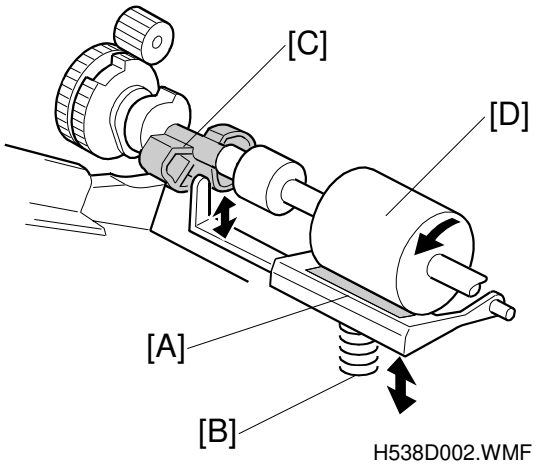
When the machine sends the trigger signal to feed paper, the paper pick-up solenoid [A] is energized for 0.3 seconds to release the cam stopper [B]. The torque limiter [C] starts turning when the cam stopper is released, and this causes the pick-up cam [D] to rotate counterclockwise as shown in the illustration. (Before the torque limiter starts turning, only the shaft rotates; the cam gear and paper feed drive gear do not move.) The cogs of the cam gear and the paper feed drive gear [E] then engage, and rotation from the main motor is transmitted to the cam. After the cam completes one rotation, the cam stopper locks the cam and the cam idles again.

Upper Tray Bottom Plate Operation



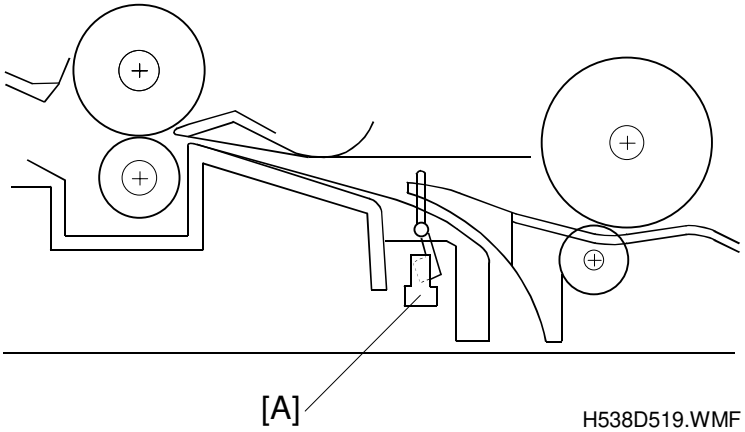
The position of the upper tray bottom plate [A] is determined by the pick-up cam [B]. When at the idle position, the cam holds the bottom plate away from the feed roller. However, when the cam rotates, the bottom plate spring [C] presses the bottom plate toward the feed roller. When the bottom plate is pressed up, it releases the paper stopper [D] and the paper on the bottom plate contacts the feed roller. The feed roller then feeds one sheet past the friction pad. As the cam continues to rotate, it forces the bottom plate back down and the paper stopper [D] separates the paper from the feed roller. After the cam completes one rotation, it stops turning and holds the bottom plate in the idle position.

Friction Pad Operation



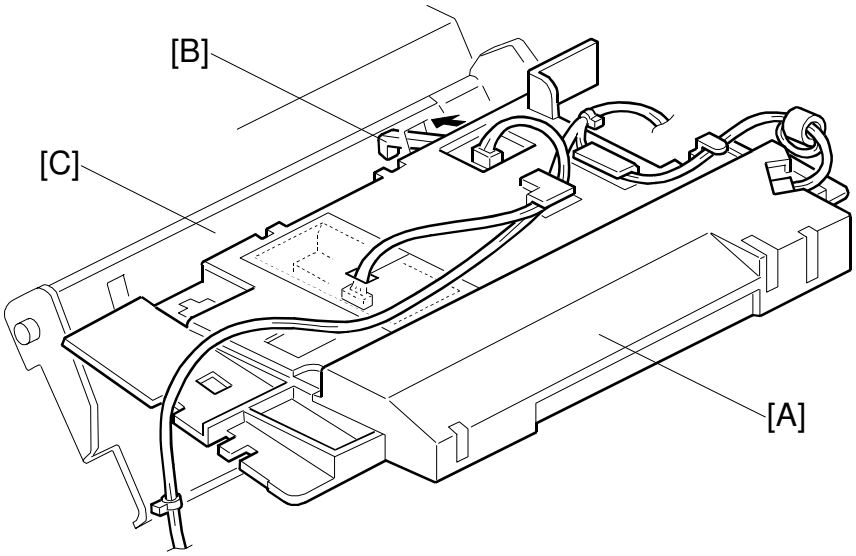
The friction pad [A] is pressed up by the friction pad spring [B]. The friction pad's position is changed by the rotation of the pick-up cam [C]. When the pad is pressed up after the cam starts to rotate, the pad contacts the feed roller. Then the feed roller [D] feeds paper to the registration section. The friction pad allows only the top sheet to feed. As the cam continues to rotate it forces the friction pad back down, and after one rotation, the pad returns to the idle position.

Registration



The registration sensor [A] is in the exit of the paper feed section. This sensor detects the leading edge of the paper and synchronizes paper feed with the writing of the image on the drum, so that the image and the paper match up properly. This sensor also detects paper feed jams.

Paper End Detection



H538D018.WMF

The laser unit [A] has the paper end sensor [B] built into it. The paper end sensor detects the presence or absence of paper. The sensor has an actuator that extends through a slot in the upper tray bottom plate [C], so that the sensor is actuated when paper is placed in the upper tray.

When the upper tray runs out of paper, the actuator of the paper end sensor moves into the slot in the upper tray bottom plate. This informs the CPU that paper has run out.

Jam Detection

Paper jam at the upper paper tray

When the registration sensor does not turn on within 5.5 seconds after the paper pick-up solenoid for the upper tray turns on (Error code 9-07).

Paper did not reach at the fusing unit

When the paper exit sensor does not turn on within 5.0 seconds after the registration sensor turns on (Error code 9-08).

Paper did not pass the registration sensor

When the registration sensor does not turn off within 9.3 seconds after the paper exit sensor turns on (Error code 9-08).

Paper jam in the fusing exit area

When the paper exit sensor does not turn off within 3.95 seconds after the registration sensor turns off (Error code 9-09).

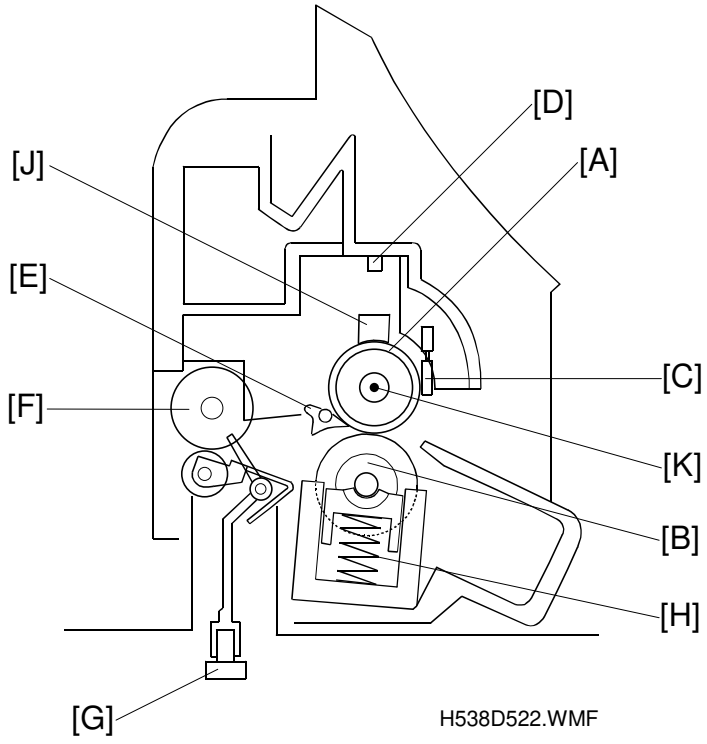
Incorrect position of sensors at standby mode

When the registration sensor turns on in standby mode (No error code generated).

When the paper exit sensor turns on in standby mode (No error code generated).

2.2.8 FUSING

Overview



After the image is transferred, the copy paper enters the fusing unit. The image is fused to the copy paper by applying heat and pressure through the use of a hot roller [A] and pressure roller [B].

The CPU monitors the hot roller temperature through a thermistor [C] that is in contact with the hot roller surface. A thermofuse [D] protects the fusing unit from overheating. For safety, two thermofuses are used (see below).

- Thermistor maximum: 235°C
- Thermofuse 1 maximum: 121°C (The temperature of the hot roller would be about 470°C.) If fuse 1 does not work, fuse 2 (Maximum 131°C) will be effective.

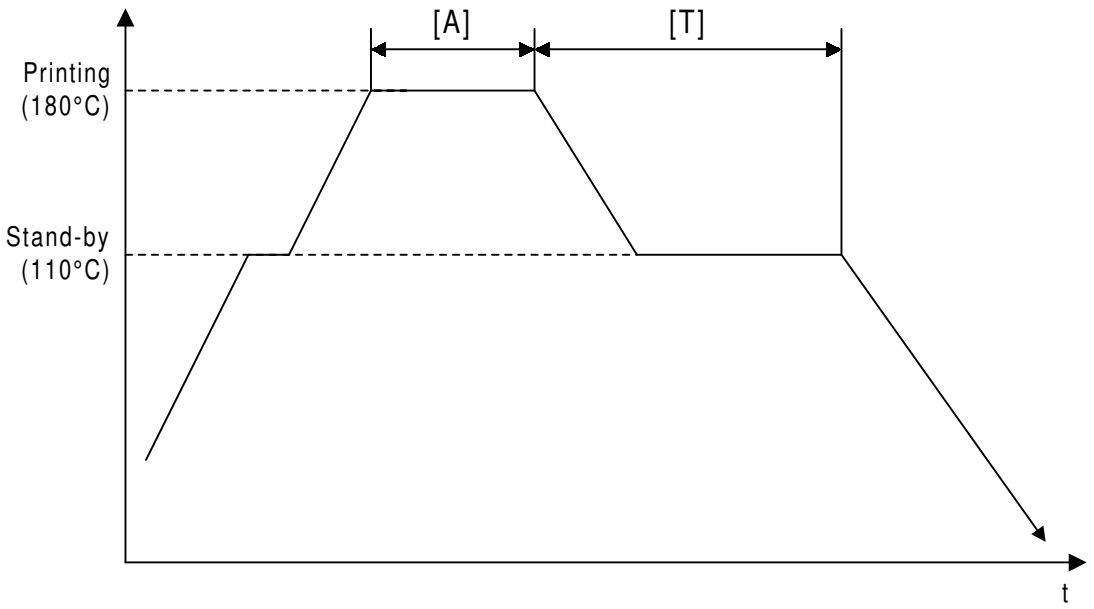
The hot roller strippers [E] separate the copy paper from the hot roller and direct it to the exit rollers [F]. The exit sensor [G], which is under the fusing unit, monitors the progress of the copy paper through the fusing unit and detects misfeeds. The exit rollers [F] drive the copy paper to the paper tray.

Springs [H] at the right and left apply the proper fusing pressure between the hot roller and pressure roller.

The cleaning pad [J] removes paper dust and toner from the hot roller surface. The cleaning pad must be replaced whenever the toner cartridge is replaced. The cleaning pad is packed with the toner cartridge.

Fusing Power Control

Just after the main switch is turned on, the machine turns on the fusing lamp. For printing, the machine raises the fusing temperature to 180°C. The fusing temperature is kept at 180°C during printing.



H538D538.WMF

When the energy saver timer expires, the machine automatically goes into energy saver mode.

Energy Saver Timer

T = 5 minutes (default), 10 minutes or 15 minutes
This timer can be changed with system switch 0B, bit 2 and 3.

NOTE: If more than 10 pages are printed within the same amount of time as the time interval [T], the machine will go into energy saver mode after 15 minutes instead of at [T].
Example 1:
T = 10 minutes
3 pages printed, then 5 minutes rest, then 8 pages printed
11 pages printed in less than 10 minutes, so energy saver starts after 15 minutes
Example 2:
T = 10 minutes
3 pages printed, then 5 minutes rest, then 2 pages printed
5 pages printed, so energy saver starts after 10 minutes

Energy Saver Mode

Entering energy saver mode

After [T] has passed after printing, copying, scanning, or key-input [A], the LCD displays “SAVING ENERGY”, and the fusing lamp and cooling fan go off (energy saver mode turns on).

Exiting energy saver mode

If the machine exits energy saver mode:

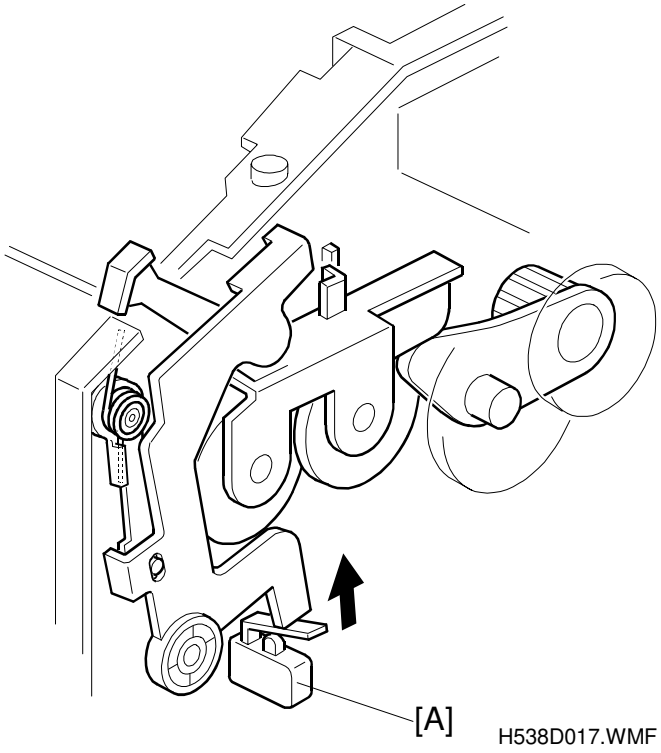
1) The LCD display returns to home position.
2) The fusing lamp and cooling fan turn on.

However, sometimes the LCD shows that energy saver mode has been exited, but the fusing lamp and cooling fan are still off (energy saver mode stays on).

The following table shows all conditions when the LCD returns to home position, and the condition when the machine really exits energy saver mode.

Condition	LCD	Fusing Lamp and Cooling Fan
Still in energy saver mode		
A key is pressed.	Returns to home position	Remain off
A document is inserted into the ADF.	Returns to home position	Remain off
Detection that the external telephone is off hook.	Returns to home position	Remain off
Really exits energy saver mode		
The front cover is opened and closed.	Returns to home position	Turn on
Ringing is detected.	Returns to home position	Turn on
Power is turned off and on.	Returns to home position	Turn on

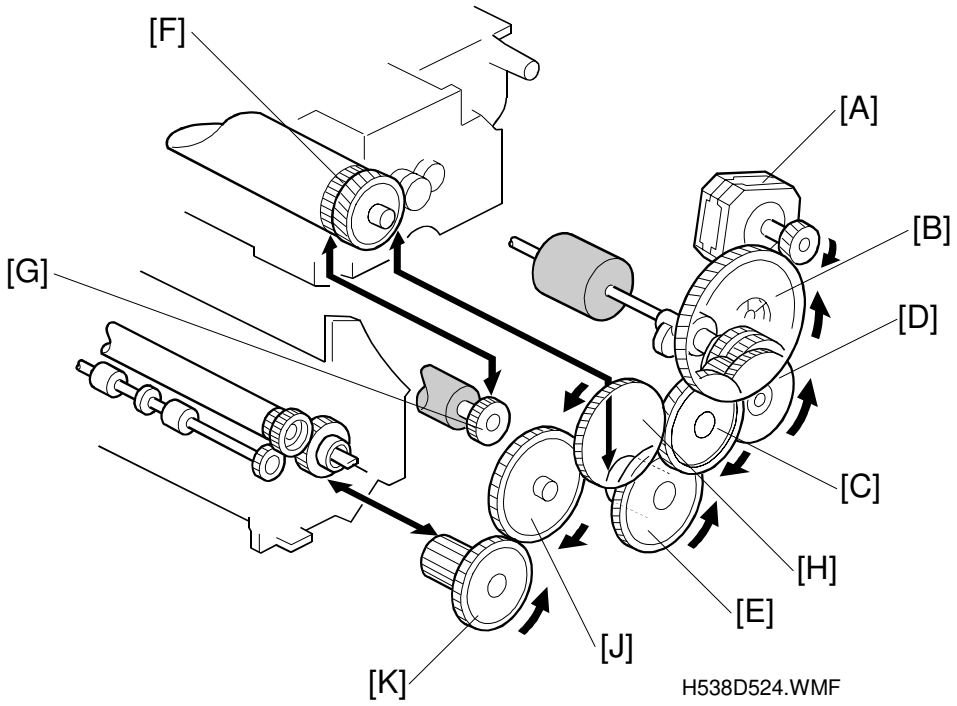
2.2.9 COVER SWITCH



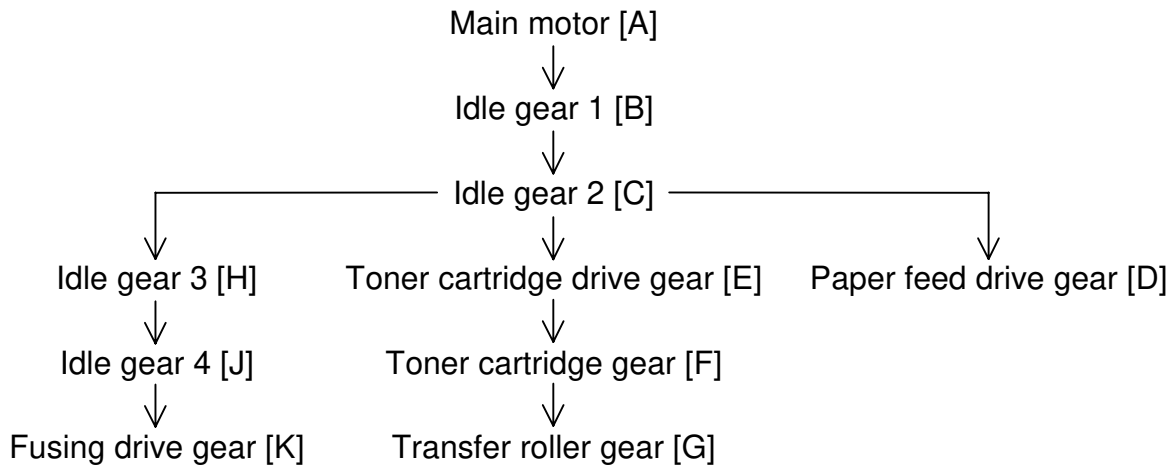
When the upper unit is opened, the interlock switch [A] will be opened and power supply to the following parts will be cut.

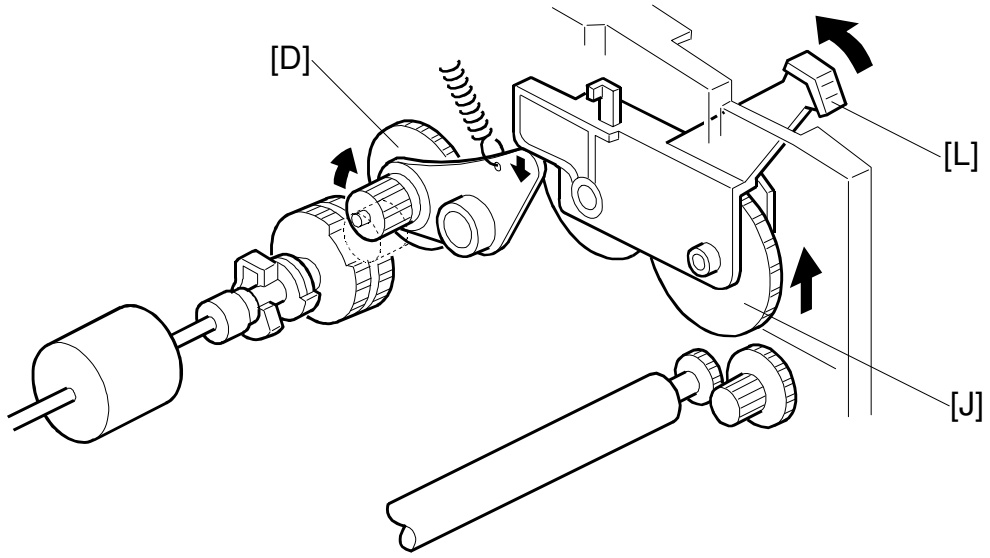
- Power pack
- Laser diode driver
- Fan motor
- Main motor
- Polygon mirror motor
- Fusing lamp
- Paper pick-up solenoid

2.2.10 PAPER FEED DRIVE RELEASE AND FUSING DRIVE RELEASE



The main motor drives the paper feed unit, the transfer roller, the toner cartridge, and fusing unit through a series of gears as follows.



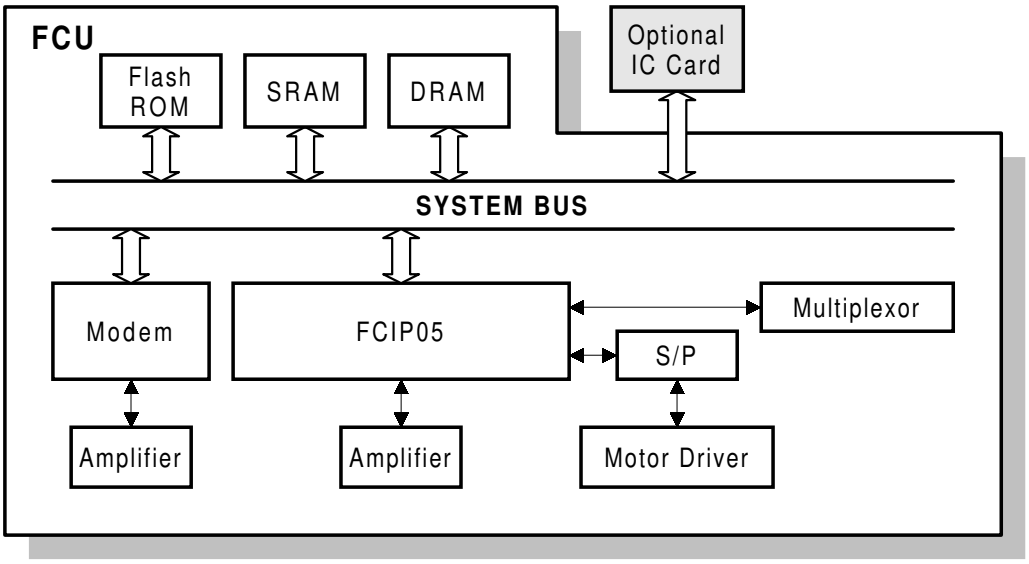


H538D001.WMF

When the paper release lever [L] on the right side of the machine is lifted, the paper feed drive gear [D] and idle gear [J] disengage so that jammed paper can be removed.

2.3 PCBS

2.3.1 FCU



H538D541.WMF

Overall

The FCU (Facsimile Control Board) controls the machine with the assistance of the MCB (Mechanical Control Board). It contains the FCIP05 (Facsimile Control and Image Processor), DRAM, SRAM, Flash ROM, V17 modem, motor driver and analog circuits.

Components and Functions

FCIP05

- CPU
- Data compression and reconstruction (DCR)
- Digital image processor
- Laser interface
- DMA controller
- Clock generation
- Stepper motor control
- DRAM backup control

Flash ROM

- 1MB (8 Mbits) flash ROM for system software storage

DRAM

- 2 MB DRAM shared between the ECM Buffer (64 KB), Page Memory (672 KB), System RAM (10.1 KB), SAF memory (1.2 MB), Line Buffer (11.8 KB), and Working RAM (20.9 KB).

SRAM

- 128 KB SRAM for system and user parameter storage, backed up by the battery on the FCU

V17 Modem (Conexant FM214)

- V.21, V.27ter, V.29, V.17 modems

Motor Driver

- Tx motor control (Other motor is controlled by MCB)

Selector

- Selection of OPU (Operation Panel) or MCB by multiplexer.

Analog Circuit

- Amplifier for V17 modem
- Monitor speaker drive

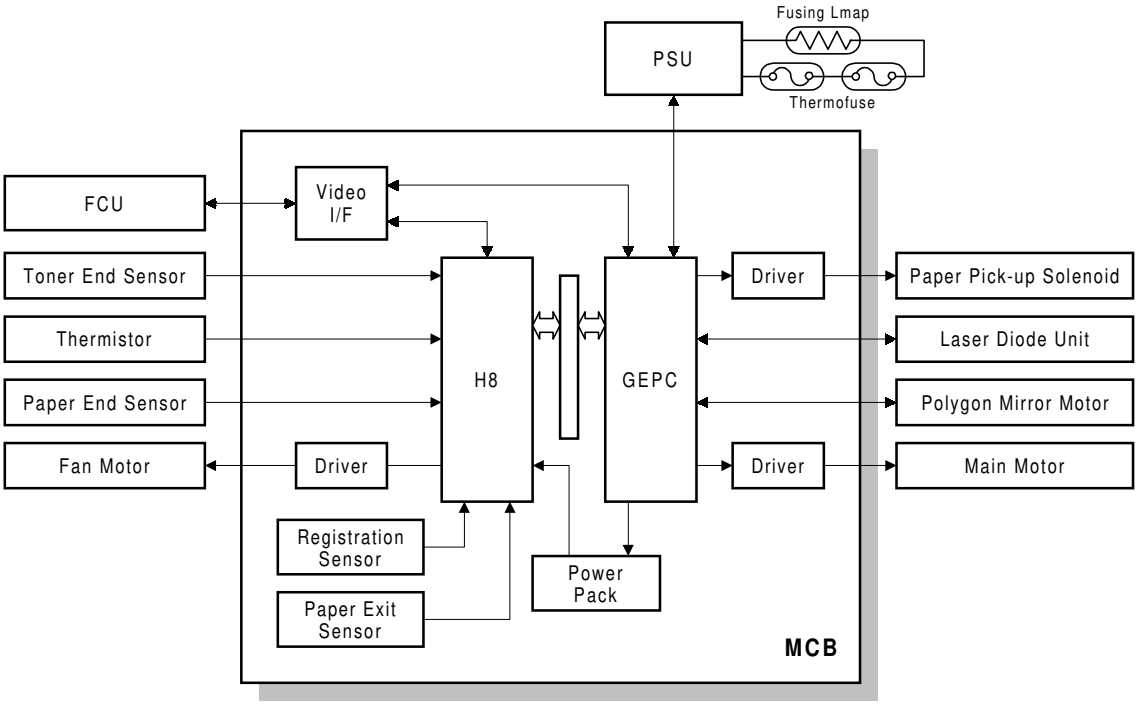
Oscillators

- OSC1: 32.768 kHz oscillator for the real time clock. The battery on the FCU backs this up.
- OSC2: 29.952 MHz oscillator for system and scanner clock generation
- OSC3: 32.256 MHz oscillator for the modem clock

Switch

Item	Description
SW1	Switches the backup battery on/off

2.3.2 MCB



H538D542.WMF

Overall

The MCB (Mechanical Control Board) controls devices related to the printer. The MCB contains a CPU (H8), peripheral control gate array (GEPC), video I/F chips, motor drivers, power pack, and on-board sensors.

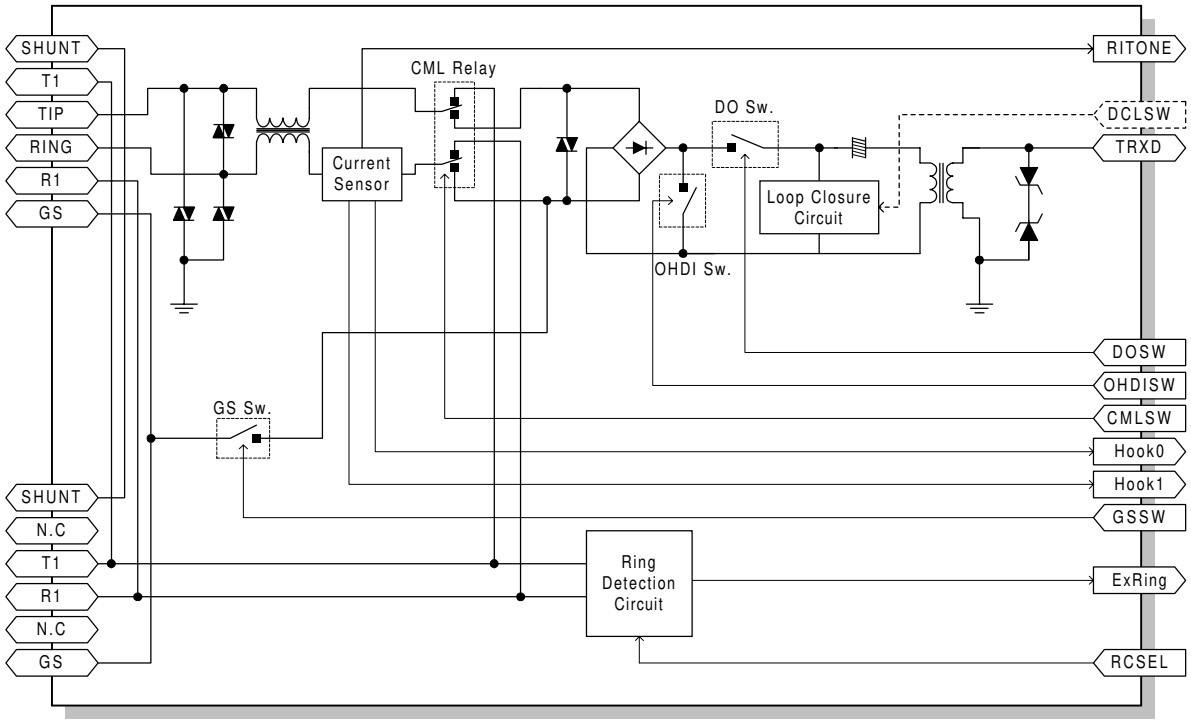
Functions

1. To control the main motor, laser diode driver, polygon mirror motor, sensors, and so on.
2. To control fusing temperature through the power supply unit (PSU).
3. To generate high voltages for development bias, charge voltage, and transfer voltage.

Contents

1. H8
   This eight-bit CPU controls the MCB. It receives outputs from sensors and the thermistor.
2. GEPC
   This chip contains an I/O port and controls the main motor, laser diode driver, polygon mirror motor, optional paper feed unit, and so on. This chip generates the pulse width modulation signal to control the power pack.
3. Video I/F
   This chip is the interface for the control board.
4. Sensors
   The registration sensor and paper exit sensor are built into this board.

2.3.3 NCU (EUROPE)



H538D641.WMF

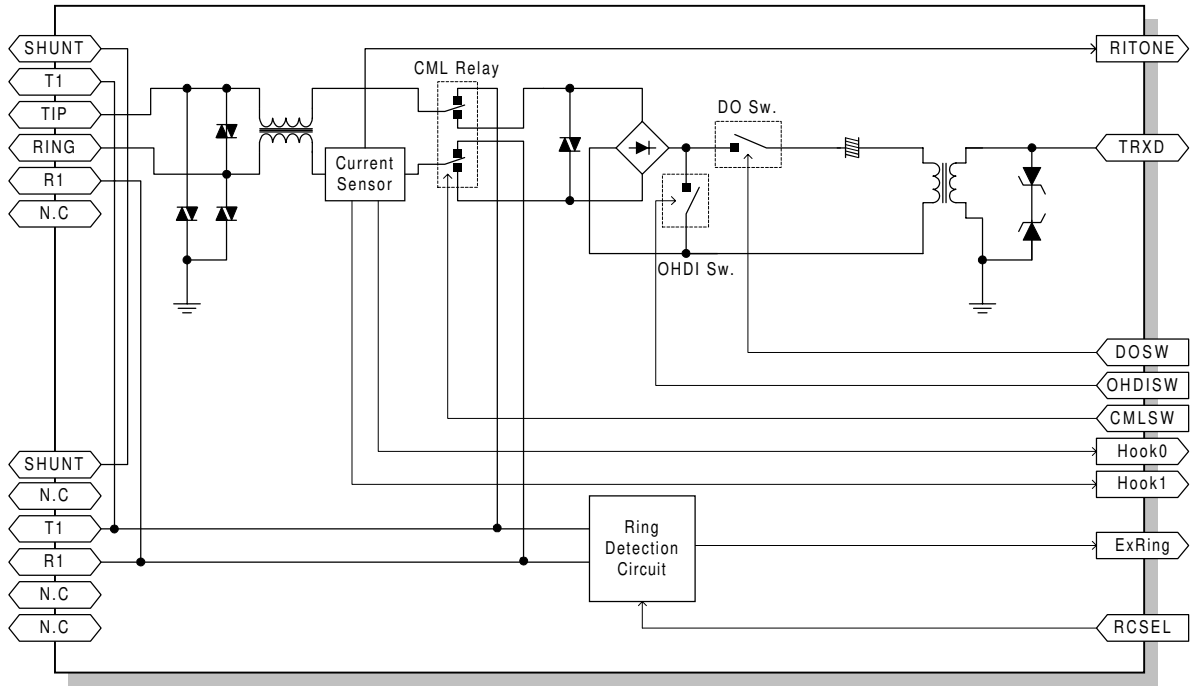
Note: DCLSW to control the loop closure circuit is not used.

Control Signals for Ringing Detection Circuit

RCSEL (CN1-12)	Country
L	Hungary, Poland, Czech Republic
H	TBR21 countries, Israel, South Africa

L: Low, H: High

2.3.4 NCU (ASIA)



H538D741.WMF

Control Signals for Ringing Detection Circuit

RCSEL (CN1-12)	Country
L	Hong Kong, Singapore, New Zealand
H	Malaysia, Thailand, Australia

L: Low, H: High

3. INSTALLATION

3.1 INSTALLING THE MACHINE

Refer to the Installation Guide and Operator's Manual for information about the installation environment and instructions on how to install and set up the machine.

3.2 INITIAL PROGRAMMING

Items to Program (Service Level)	Function No.
Country code (NCU parameter 00)	Function 08
Country code (System switch 0F)	Function 01
Protocol requirements (G3 switch 0B)	Function 01
Machine's serial number	Function 14
Service station's fax number	Function 13
PM call (System switch 01- bit 0)	Function 01
Periodic service call (RAM address 800261)	Function 06

Items to Program (User Administrator Level)	Function No.
Clock	Function 91
Initial programming items	Function 61
On/off switches	Function 62
Display/report language	Function 93
PSTN access code (Also in RAM address 8000BB)	Function 61
PABX access method (User parameter switch 13 - bit 0, 1. (Also in RAM address 8000AD)	Function 63
Number of rings in AUTO mode. (Also in RAM address 8000BC)	Function 61
Telephone line type – *The user cannot change this in some countries.* (Also in RAM address 8000BA)	Function 62

4. SERVICE TABLES AND PROCEDURES

4.1 SERVICE LEVEL FUNCTIONS

In this section, the following symbols refer to frequently-used keys:
- Start key
- Stop key
- Function key
- Yes key
- No key
- Right arrow key
- Left arrow key

4.1.1 SERVICE LEVEL FUNCTION LIST

Level 1	Level 2	Level 3	Functions
01.BIT SW	SYSTEM	—	Bit switches are displayed and can be edited.
	SCANNER	—	
	PLOTTER	—	
	COMMUNICATION	—	
	G3	—	
02.PARAMETER LIST	—	—	The system parameter list is printed.
03.ERROR CODE	—	—	The last 64 error codes are displayed.
04.SERVICE REPORT	—	—	The service monitor report is printed.
05.PROTOCOL DUMP	—	—	The protocol dump list for the most recent communication is printed.
06.MEMORY	0-MEM.R/W	—	RAM data are displayed and can be edited.
	1-MEM.DUMP	—	A RAM data dump list is printed.
07.COUNTER R/W	0-COUNTER	TX RX	Counters are displayed and can be edited. S.JAM = Scan Jam P.JAM = Print Jam
		SCAN PRINT	
		S.JAM P.JAM	
	1-PM	—	
	2-TONER	—	
08.NCU	0-NCU	—	NCU parameters are displayed and can be edited.
	1-MODEM	—	Modem signal and tones can be sent out for use during the PTT approval tests.
	2-DTMF		
	3-DP (Factory use only)	—	
09.OP.PANEL	0-LED/LCD	—	LED and LCD display test.

Level 1	Level 2	Level 3	Functions
10.SCANNER	0-LAMP	—	Lights the LED array in the scanner.
	1-ADF	—	ADF test
	2-SHADING	—	Adjusts the shading level in the CIS.
11.PRINTER	0-PATTERN	0-8	Prints test patterns.
	1-MECH (Factory use only)	—	
12.RAM TEST	0-SRAM	—	Memory test
	1-DRAM	—	
	2-SAFCARD	—	
	3-M->R	—	Software download/upload
	4.M<-R	—	
	5.M<-S	—	SRAM data back up/restore
	6-M->S	—	
13.S.S.NO.	—	—	Service station number
14.SERIAL#	—	—	Machine serial number

⚠CAUTION

Do not turn off the power when the LCD displays "Please wait" or "Programmed".

4.1.2 ENTERING THE SERVICE FUNCTION MODES

1. Function

```
FUNCTION      Y/NEXT
1 TRANS. MODE
```

2. Press # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

4.1.3 EXITING THE SERVICE MODE

1. Function

4.2 SERVICE FUNCTION OPERATION

4.2.1 BIT SWITCH PROGRAMMING (FUNCTION 01)

1. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 0 1 Yes
   _it 7 is on the left, and bit 0 on the right.

```
 SYS DF  :0000 0000
 BITSW 00:0000 0000
```

3. Scroll through the bit switch menu using # or *
   Example: To see the communication switches;
   # x 3.

4. Scroll through the bit switches.
   Increment bit switch: ▶
   Decrement bit switch: ◀
   Example: Display bit switch 3: ▶ x 3

```
 COM DF  :0000 0011
 BITSW 03:0000 0011
```

5. Adjust the bit switch.
   Example: To change the value of bit 7,
   Tpress 7

```
 COM DF  :0000 0011
 BITSW 03:1000 0011
```

6. Either:
   - Adjust more bit switches - go to step 3.
   - Finish: Yes Function

4.2.2 SYSTEM PARAMETER LIST (FUNCTION 02)

The format of the list is as follows:

1. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 0 2 Yes

```
                 START
PARAMETER LIST
```

3. ◈

4. Finish: Function

4.2.3 ERROR CODE DISPLAY (FUNCTION 03)

1. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 0 3 Yes

```
ERROR CODE        <>
1-01 JAN 01 17:30
```

3. Either:
   Scroll through the error codes using ▶ or ◀
   Finish: Function

4.2.4 SERVICE MONITOR REPORT (FUNCTION 04)

1. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 0 4 Yes

```
                  START
SERVICE REPORT
```

3. ◈
4. Finish: Function

4.2.5 PROTOCOL DUMP (FUNCTION 05)

1. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 0 5 Yes

```
                  START
PROTOCOL DUMP
```

3. ◈
4. Finish: Function

4.2.6 RAM DISPLAY/REWRITE (FUNCTION 06)

1. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 0 6 Yes

```
0-MEM.R/W 1-MEM.DUMP
# NO. H5387200  B140
```

3. 0

```
 ADDRESS =000000
 DATA    =6D
```

4. Input the address that you wish to see.
   Example: Address 800020 (8) (0) (0) (0) (2) (0)
   NOTE: If you wish to move the cursor, press ▶.

```
ADDRESS =800020
DATA    =88
```

5. If you wish to change the data, move the cursor to the data field: press ▶

6. Type in the new data.
   Example: 80, press (8) (0)
   I If you wish to move the cursor, press ▶.

```
ADDRESS =800020
DATA    =80
```

7. Either:
   • View more addresses - go to step 4.
   • Finish: Yes Function

4.2.7 RAM DUMP (FUNCTION 06)

1. Function (#) (1) (0) (7) ◇

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. (0) (6) Yes

```
0-MEM.R/W 1-MEM.DUMP
# NO. H5387200  B140
```

3. (1)

```
MEMORY DUMP  START/N
ADD.000000 - 0000FF
```

4. Enter the first four digits of the start and end addresses. For example, enter “8000” for the start address 800000(H), and enter 8001 for the end address 8001FF(H).

```
MEMORY DUMP  START/N
ADD.800000 - 8001FF
```

5. ◇ to print the dump list.
6. Finish: Function

4.2.8 COUNTER DISPLAY/REWRITE (FUNCTION 07)

1. Function (#) (1) (0) (7) ◇

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. (0) (7) Yes

```
0-COUNTER 1-PM
2-TONER
```

3. Either:
   Check the transmitted (TX), received (RX), scanned (SCAN) and printed (PRINT) page counters, and the scanner (S.JAM) and printer (P.JAM) jam counters - Press (0).

```
TX :000136
RX :000251
```

- Scroll through the other counters: # or *.
  Example: Press # x 2 to see scanner and printer jam counters

```
S.JAM  :000001
P.JAM  :000000
```

Check the PM counter - Press 1

```
PM COUNTER  :000265
```

Check the TONER counter - press 2
This is the number of prints made with the current cartridge.

```
TONER       :000265
```

4. To change the contents of a counter, input the new value, then press Yes.
5. To finish: Function

4.2.9 NCU PARAMETERS (FUNCTION 08)

1. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 0 8 Yes

```
0-NCU      1-MODEM
2-DTMF     3-DP
```

3. 0

```
NCU           KPAD/<>
 NO.CC =002
```

OK Scroll through the parameters using ▶ or ◀ .
If you want to change a value, enter the new value at the keypad, then press Yes.
Example: Set NCU parameter 04 to 005.
▶ ▶ ▶ ▶ 0 0 5 Yes

5. To finish: Function

NOTE: 1) Parameter CC is the Country Code, Parameter 01 is the TX level. Refer to section 4.4 for full details on NCU parameters.
2) If you change the NCU country code and exit the service mode, the bit switch country code (system switch 0F) will automatically be changed to the same country code.
3) If you do a factory reset (RAM Reset Level 1), the settings are all reset to the settings for UK. You must set the NCU country code to the correct value first, and then set the bit switch country code if necessary.

4.2.10 MODEM TEST (FUNCTION 08)

1. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 0 8 Yes

```
0.NCU      1.MODEM
2.DTMF     3.DP
```

3. 1

```
MODEM TEST  START/<>
800HZ
```

4. Scroll through the available tests using ▶ or ◀.
5. To start the test: ◈. To stop the test: ▽
6. To finish: Function

4.2.11 DTMF TONE TEST (FUNCTION 08)

1. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 0 8 Yes

```
0.NCU      1.MODEM
2.DTMF     3.DP
```

3. 2

```
DTMF TEST   START/<>
TONE 0
```

4. Scroll through the available tests using ▶ or ◀.
5. To start the test: ◈. To stop the test: ▽
6. To finish: Function

4.2.12 OPERATION PANEL TEST (FUNCTION 09)

1. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 0 9 Yes

```
0-LED/LCD
```

3. 0
4. To start the test: ◈. To stop the test: ▽
5. To finish: Function

4.2.13 LED ARRAY TEST (FUNCTION 10)

1. Function # 1 0 7 ◇
2. 1 0 Yes
3. 0
   The signal peak of the CIS is displayed on the bottom line. It should change when the lamp is lit.
4. ◇
5. To stop the test, press ▽
6. To finish: Function

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

```
0-LAMP    1-ADF
2-SHADING
```

```
                START
LAMP       027
```

4.2.14 ADF TEST (FUNCTION 10)

1. Function # 1 0 7 ◇
2. 1 0 Yes
3. 1
4. Place a document in the feeder, then press ◇.
5. To stop the test, press ▽
6. Finish: Function

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

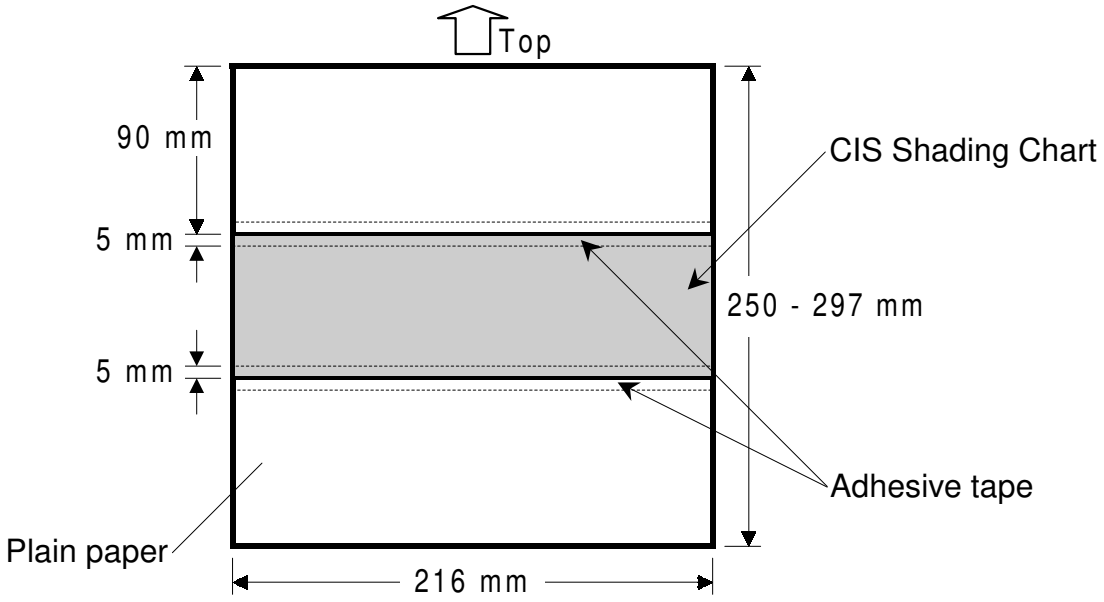
```
0-LAMP    1-ADF
2-SHADING
```

```
                START
ADF
```

4.2.15 CIS SHADING ADJUSTMENT

Do the following after replacing the contact image sensor (CIS) or the FCU. (Also after doing a RAM reset level 1.)

1. Provide the CIS shading chart (P/No. H0689300, refer to section 5-1) and a sheet of letter-width paper.
   If no letter size paper is available, create a piece of letter size paper from A3 paper.
2. Attach a CIS shading chart to the provided paper in accordance with the following drawing.
   The paper width and the CIS shading chart position on the paper are very important, but the paper length is not; the paper length may be between 250mm and A4 length (297mm).
   Do not use glue to attach the chart.



Shading Chart

H538M500.WMF

3. Function # 1 0 7 ◈

4. 1 0 Yes

0-LAMP 1-ADF 2-SHADING

5. 2

START SET SHADING

6. Place a test chart in the feeder, then press ⓐ.
   The test chart is then scanned and the shading value in the CIS is adjusted. The new shading value will be stored in the FCU.

```
NOW SETTING SHADING
```

7. Press Function to finish.
   If the adjustment fails, the display shows **"NG"**. Press ▽ and try again after cleaning the test chart and the CIS.
   NOTE: With normal A4 paper instead of the above shading chart, the shading test is possible, but the adjustment level will not be perfect, so the image quality especially in halftone mode will be poor. Also, if the shading test is done using A4 width paper, some elements at the left side of the CIS cannot be adjusted, because the CIS is letter-width.

4.2.16 PRINTER TEST PATTERNS (FUNCTION 11)

1. Function # 1 0 7 ⓐ

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 1 1 Yes

```
0-PATTERN 1-MECH
```

3. 0

```
PATTERN PRINT   KPAD
 0-8
```

4. Choose a test pattern from 8 different patterns using 0 to 8
5. ⓐ
   A test pattern is printed.
6. To finish: Function

4.2.17 RAM TESTS (FUNCTION 12)

1. Function # 1 0 7 ⓐ

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 1 2 Yes

```
0-SRAM    1-DRAM
2-SAFCARD 3-M->R
```

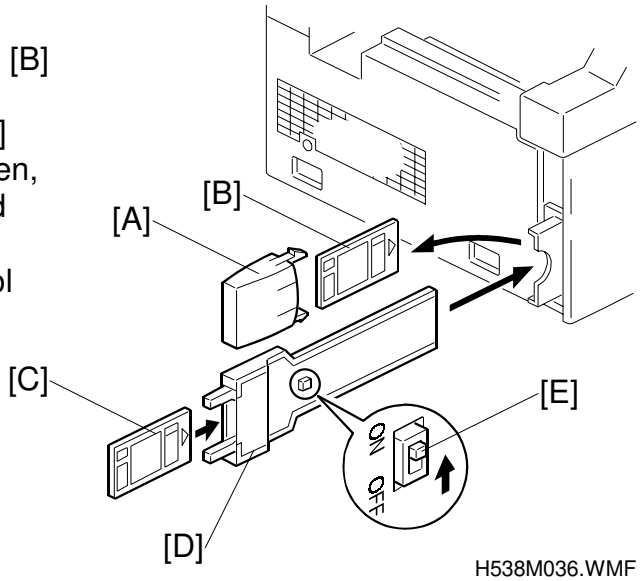
   Either:
   Test the SRAM: Press 0 ⓐ
   Test the DRAM: Press 1 ⓐ
   Test the SAF card: Press 2 ⓐ

   If the test is successful, the display shows **"OK!!"**.
   If the test is unsuccessful, the display shows **"ADDRESS="**.
   To finish: Function

4.2.18 SOFTWARE DOWNLOAD (FUNCTION 12)

This function copies software from an external flash memory card to the flash ROM on the FCU inside the machine.
The software copy tool (P/N: H5479352) must be used for this procedure.

1. Turn off the machine.
2. Remove the IC card cover [A].
   Remove the optional memory card [B] if it is installed.
   Connect the flash memory card [C] with the software copy tool [D]. Then, insert the copy tool into the IC card slot as shown.
   NOTE: The switch on the copy tool [E] must be at the **ON** position.
3. Turn on the machine.



H538M036.WMF

4. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

5. 1 2 Yes

```
0-SRAM    1-SAF
2-SAFCARD 3-M->R
```

6. 3

```
                START
COPY  MACH -> FLROM
```

7. ◈

```
COPYING
COPY  MACH -> FLROM
```

8. If the software downloads successfully, the display shows **"OK"**.
   If the software download fails, the display shows **"CANNOT PROGRAM"**.
   The download should take about 5 minutes.

```
OK!!
COPY  MACH -> FLROM
```

```
   CANNOT PROGRAM
COPY  MACH -> FLROM
```

9. To finish, Function
10. Turn off the machine and disconnect the copy tool. Then turn the machine back on.
11. Print out the system parameter list and check the ROM version on it.

Software Copy Tool

The following table shows the switch settings for each procedure using the software copy tool.

Program Items	Switch Settings
Software download	On
Software upload	Off
SRAM data upload	Off
SRAM data download	Off

4.2.19 SOFTWARE UPLOAD (FUNCTION 12)

This function copies software from the FCU inside the machine to an external memory card.

1. Turn off the machine.
2. Connect the Flash memory card and the software copy tool as shown in the previous section.
   NOTE: The switch [D] on the tool must be at the **OFF** position.
3. Turn on the machine.
4. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

5. 1 2 Yes

```
0-SRAM    1-SAF
2-SAFCARD 3-M->R
```

6. ▶ to go to the next menu.

```
4-M<-R    5-M<-S
6-M->S
```

7. 4 ◈

```
COPYING
COPY MACH <- FLROM
```

8. If the software uploads successfully, the display shows **"OK"**.

```
OK!!
# NO. H5387200B 64F8
```

   If the software upload fails, the display shows **"CANNOT PROGRAM"**.

```
   CANNOT PROGRAM
COPY MACH <- FLROM
```

9. Finish: Function
10. Turn off the machine and disconnect the tool. Then turn the machine back on again.

4.2.20 SRAM DATA UPLOAD (FUNCTION 12)

This function copies all the data stored in the SRAM on the FCU inside the machine to the flash memory card. Use this to save programmed settings before replacing a damaged FCU.

1. Turn off the machine.
2. Connect the flash memory card and the software copy tool as shown in section 4.2.18.
   k l qbW The switch on the copy tool must be at the **OFF** position.
3. Turn on the machine.
4. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

5. 1 2 Yes

```
0-SRAM    1-SAF
2-SAFCARD 3-M->R
```

6. ▶ to go to the next menu.

```
4-M<-R    5-M<-S
6-M->S
```

7. 5 ◈

```
COPYING
COPY MACH <- SRAM
```

8. If the SRAM data uploads successfully, the display shows **"OK"**.
   If the software download fails, the display shows **"CANNOT PROGRAM"**.

```
OK!!
COPY MACH <- SRAM
```

```
   CANNOT PROGRAM
COPY MACH <- SRAM
```

9. Finish : Function
10. Turn off the machine and disconnect the tool. Then turn the machine back on.

4.2.21 SRAM DATA DOWNLOAD

This function copies the data stored in an external flash memory card to the FCU inside the machine. Use this after replacing a damaged FCU to copy any previously programmed settings back to the machine.

1. Turn off the machine.
2. Connect the flash memory card and the software copy tool as shown in section 4.2.18.
   k l qbW The switch on the copy tool must be at the **OFF** position.
3. Turn on the machine.
4. Function # 1 0 7 ◈

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

5. 1 2 Yes

```
0-SRAM    1-SAF
2-SAFCARD 3-M->R
```

Service Tables

6. ▶ to go to the next menu.

```
4-M<-R    5-M<-S
6-M->S
```

7. 6 ◇

```
COPYING
COPY MACH -> SRAM
```

8. If the SRAM data downloads successfully, the display shows **"OK"**.
   If the software download fails, the display shows **"CANNOT PRORAM"**.

```
OK!!
COPY MACH -> SRAM
```

```
   CANNOT PROGRAM
COPY MACH -> SRAM
```

8. Finish: Function
9. Turn off the machine and disconnect the tool. Then turn the machine back on.

4.2.22 SERVICE STATION FAX NUMBER (FUNCTION 13)

1. Function # 1 0 7 ◇

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 1 3 Yes

```
S.S.NO.          KPAD
■■■■■■■■■■■■■■■■
```

3. Input the telephone number of the service station that will receive Auto Service calls from this machine.
   To erase the telephone number: press [Clear].

```
S.S.NO      KPAD/Y/N
212-5555■■■■■■■■■■
```

4. If the display is correct: Yes Function

4.2.23 SERIAL NUMBER (FUNCTION 14)

1. Function # 1 0 7 ◇

```
FUNCTION  KPAD/NEXT>
■■ SERVICE FUNCTIONS
```

2. 1 4 Yes

```
SERIAL #         KPAD
■■■■■■■■■■■■■■■
```

3. Enter the serial number at the keypad.
   To correct a mistake: [Clear]

```
SERIAL #    KPAD/Y/N
RICOH 1234567■■■
```

4. If the display is correct: Yes
5. Finish: Function

4.2.24 ACCESSING THE INITIAL SETTING PROCEDURE

When the machine is switched on for the first time after installation, an initial setting procedure appears. With this procedure, the user can program the initial setting items more easily. However, the initial setting procedure does not appear again.

If you need to use the initial setting procedure again but do not need to display the country code any more, do the following.

1. Set System Switch 15 bit 3 to 0, so that the user cannot change the country code.
2. Press the resolution key, ① key, and ⓪ key all at the same time.
3. After the display shows “Programmed”, turn off the machine.
   Then the machine will show the initial setting procedure when the machine is turned on again.

PROGRAMMED

If you need to use the initial setting procedure again and also need to display the country code, do the following.

CAUTION: THIS PROCEDURE WILL ERASE ALL RAM DATA.

1. Press the resolution key, ① key and ⑨ key all at the same time.
2. ⑨
3. ①
4. ◇
   The machine resets automatically.
5. ②
6. ①
7. Either;
   - ① Yes for Europe models
   - ② Yes for Asia models

   NOTE: Do not choose any other numbers.
8. ▽
9. ⑨

FACTORY ADJUST. SET DOCUMENT
RAM CLEAR 0-2
START FIRST CLEAR
FACTORY ADJUST. SET DOCUMENT
PTT / COUNTRY-CODE 0-1
0-6/Y/N COUNTRY = 1(UK)
FACTORY ADJUST. SET DOCUMENT
RAM CLEAR 0-2

10. ② ◇
    The machine resets automatically and prints a system parameter list. Then the start up initial setting procedure appears.
11. Turn off the machine. The initial setting procedure will appear when the machine is turned on again.

4.3 BIT SWITCHES

⚠WARNING

Do not adjust bit switches described as "Not used", as this may cause the machine to malfunction or to operate in a manner that is unacceptable under local regulations. Such bits are only for use in other areas, such as Japan.

⚠CAUTION

Do not turn off the power when the LCD displays "Please wait" or "Programmed".

NOTE: This manual does not list default settings for bit switches. Refer to the System Parameter List.

4.3.1 SYSTEM SWITCHES

System Switch 00		
No.	**FUNCTION**	**COMMENTS**
0-1	**RAM Reset** **Bit 1 0 Reset Level** 0 0 No reset 0 1 Reset Level 2 1 0 Reset Level 3 1 1 Not used	**Reset Level 3:** Erases all image data files stored in the SAF memory and communication files (e.g. substitute RX files). This is the recommended setting when the SAF requires clearing. **Reset Level 2:** This level erases the following items in addition to those erased by Reset Level 3: own telephone number, bit switches (excluding country code), RTI/TTI/CSI, report data, programmed telephone numbers (Quick/Speed/Groups, service station, etc.), and NCU parameters. The NCU country code is also set to the same as the bit switch country code (System Bit Switch 0F). After erasing, the machine automatically changes these two bits back to 0. **No reset:** Normal operation **Cross-reference** **RAM Reset Level 1 (Factory reset):** Change the RAM address data of 800005 to FF(H), then turn the machine off and on. In addition to those items erased by Reset Level 2, the clock, country code, scan margin settings, CIS shading setting and print registration settings are erased.

System Switch 00		
No.	**FUNCTION**	**COMMENTS**
2	Technical data printout on Journal **0:** Disabled **1:** Enabled	**1:** Instead of a personal code, the Journal lists the following data for each analog G3 communication. E.g. V17 14 M 01 00 03 02 **First number:** Final modem type used **Second number:** Final date rate (for example, 14 means 14.4 kbps) **Third number:** M means modem EQM. L means RX level. **Forth and fifth number:** Line quality data. This is either a measurement of the error rate or the RX level, depending on the bit 3 setting below. (An M on the report indicates that it is error rate, and an L indicates RX level.) The left-hand figure is the high byte and the right-hand figure is the low byte (refer to the note after this table for how to read the RX level). If it measures the error rate, a larger number means more errors. **Sixth number (RX mode only):** Total number of error lines that occurred during non-ECM reception. **Seventh number (RX mode only):** Total number of burst error lines that occurred during non-ECM reception. The sixth and seventh numbers are fixed at 00 for transmission records and ECM reception records.
3	Line quality data output method **0:** Error rate measurement during image data transmission **1:** Rx level	This bit determines the data type printed in the Journal when bit 2 (above) enables a technical data printout.
4	Line error marks **0:** Disabled **1:** Enabled	If this bit is 1, a mark will be printed on the left edge of the page at any place where a line error occurred in the data. A noisy line causes such errors, for example.
5	Communication parameter display **0:** Disabled **1:** Enabled	This is a faultfinding aid. The LCD shows the key parameters (see the next page). This is normally disabled because it cancels the CSI display for the user. Be sure to reset this bit to 0 after testing.

System Switch 00		
No.	**FUNCTION**	**COMMENTS**
6	Protocol dump list output **0:** Disabled **1:** Enabled	This is used for communication troubleshooting. It shows the content of the transmitted facsimile protocol signals. Always reset this bit to 0 after testing. The setting of system switch 09 bit 6 determines the types of communication that the list is printed after.
7	Not used	Do not change the setting.

How to calculate the RX level listed on the Journal (when bit 2 of system switch 00 is set to 1)

Example: V17 14 **L0100**0000

The four-digit hexadecimal values (N) after L indicates the RX level.
The high byte is given first, followed by the low byte. Divide the decimal value of N by -16 to get the RX level.

In this above example, the decimal value of N (=0100[H]) is 256.
So, the actual RX level is 256/-16 = -16 dB.

Communication Parameters

Mode	DCS: ITU-T standard NSS: Non-standard G3
Modem rate	144: 14400 BPS 120: 12000 BPS 96: 9600 BPS 72: 7200 BPS 48: 4800 BPS 24: 2400 BPS
Resolution	F: Fine, transmitted at 8 x 15.4 dots per mm D: Detail, transmitted at 8 x 7.7 dots per mm S: Standard, transmitted at 8 x 3.85 dots per mm
Compression mode	MMR: MMR compression MR: MR compression MH: MH compression
Communication mode	ECM: With ECM NML: With no ECM
Width and reduction	A4: A4, no reduction
I/O rate	0: 0 ms/line 10: 10 ms/line 25: 2.5 ms/line 20: 20 ms/line 5: 5 ms/line 40: 40 ms/line “40” is displayed while receiving a fax message using AI short protocol.

System Switch 01		
No.	**FUNCTION**	**COMMENTS**
0	PM call **0:** Disabled **1:** Enabled	This bit switch determines whether the machine will send an Auto Service Call to the service station when it is time for PM.
1-7	Not used	Do not change these settings.

System Switch 02		
No.	**FUNCTION**	**COMMENTS**
0	Memory file transfer **0:** Disabled **1:** Enabled	**1:** All messages in the memory (including confidential RX messages) are sent to the fax number that is stored as the service station. Always reset this bit to 0 after transfer. **Cross-reference** Service station number: Function 13
1-5	Not used	Do not change these settings.
6-7	**Memory read/write by RDS** **Bit 7 6 Setting** 0 0 Always disabled 0 1 User selectable 1 0 User selectable 1 1 Always enabled	**(0,0):** All RDS systems are always locked out. **(0,1), (1,0):** Normally, RDS systems are locked out, but the user can temporarily switch RDS on to allow RDS operations to take place. RDS will automatically be locked out again after a certain time, which is stored in System Switch 03 (see below). Note that if an RDS operation takes place, RDS will not switch off until this time limit has expired. **(1,1):** At any time, an RDS system can access the machine.

System Switch 03		
No.	**FUNCTION**	**COMMENTS**
0-7	Length of time that RDS is temporarily switched on when bits 6 and 7 of System Switch 02 are set to "User selectable"	00 - 99 hours (BCD). This data is only valid if bits 6 and 7 of System Switch 02 are set to "User selectable". The default setting is 24 hours.

System Switch 04		
No.	**FUNCTION**	**COMMENTS**
0-2	Not used	Do not change these settings.
3	Dedicated transmission parameter programming **0:** Disabled **1:** Enabled	Set this bit to 1 before changing any dedicated transmission parameters.
4-5	Not used	Do not change these settings.
6	CSI programming level **0:** User level **1:** Service level	**1:** Only a service function can program the CSI.
7	Telephone line type programming mode **0:** User level **1:** Service level	**1:** Only a service function can program the telephone line type selection.

System Switch 05		
No.	**FUNCTION**	**COMMENTS**
0-1	Not used	Do not change these settings.
2	Display of both RTI and CSI on the LCD **0:** Disabled **1:** Enabled	**1:** Both RTI and CSI will be displayed alternately on the LCD.
3-7	Not used	Do not change these settings.

System Switch 06		
No.	**FUNCTION**	**COMMENTS**
0	Use of the Stop key during memory transmission **0:** Disabled **1:** Enabled	**1:** The Stop key can be used to halt memory transmissions. However, users might accidentally cancel another person's memory transmission in progress.
1-3	Not used	Do not change these settings.
4	Use of the Stop key during memory transmission **0:** Disabled **1:** Enabled	**1:** The Stop key can be used to halt memory transmissions. After pressing the Stop key, a message (STOP & CLR FILE?) appears on the LCD.
5-7	Not used	Do not change these settings.

System Switch 07 - Not used (do not change any of these settings)
System Switch 08 - Not used (do not change any of these settings)

System Switch 09		
No.	**FUNCTION**	**COMMENTS**
0	Not used	Do not change the setting.
1	Inclusion of communications in the Journal when no image data was exchanged. **0:** Disabled **1:** Enabled	**0:** The Journal lists communications that reached phase C (message TX/RX) of the T.30 protocol. **1:** The Journal lists communications that reached phase A (call setup) of T.30 protocol. This includes telephone calls.
2	Automatic error report printout **0:** Disabled **1:** Enabled	**0:** Error reports are not printed. **1:** Error reports will print automatically after all failed communications, excluding polling reception and immediate transmissions.
3	Print error code on error report **0:** No **1:** Yes	**1:** Error codes are printed on the error reports.
4	Not used	Do not change this setting.
5	Power failure report **0:** Disabled **1:** Enabled	**1:** A power failure report automatically prints after the power is switched on if a fax message disappears from memory when the power was turned off last.

System Switch 09		
No.	**FUNCTION**	**COMMENTS**
6	Conditions for printing the protocol dump list **0:** Print for all communications **1:** Print only when there is a communication error	This switch becomes effective only when system switch 00 bit 6 is set to 1. **1:** Set this bit to 1 when you wish to print a protocol dump list only for communications with errors.
7	Priority given to various types of remote terminal ID when printing reports **0:** RTI > CSI > Dial label > Tel. Number **1:** Dial label > Tel. number > RTI > CSI	This bit determines which set of priorities the machine uses when listing remote terminal names on reports. Dial Label: The name stored with the Quick/Speed Dial number by the user.

System Switch 0A		
No.	**FUNCTION**	**COMMENTS**
0-2	Not used	Do not change these settings.
3	Continuous polling reception **0:** Disabled **1:** Enabled	This feature allows a series of stations to be polled in a continuous cycle.
4	Dialing on the ten-key pad when the handset is off-hook **0:** Disabled **1:** Enabled	**1:** The user can dial on the ten-key pad when the handset is off-hook.
5	On-hook dial **0:** Disabled **1:** Enabled	**0:** On-hook dial is disabled.
6-7	Not used	Do not change these settings.

System Switch 0B		
No.	**FUNCTION**	**COMMENTS**
0-1	Automatic reset timer **Bit 1 0 Timer setting** 0 0 1 minute 0 1 3 minutes 1 0 5 minutes 1 1 No limit	**(1, 1):** Automatic reset is disabled. **(Other):** The machine returns to standby mode when the timer expires after the last operation.
2-3	Energy Saver mode timer **Bit 3 2 Time Limit** 0 0 5 minute 0 1 10 minutes 1 0 15 minutes 1 1 Not used	The machine goes into Energy Saver mode when the timer expires after the last operation. **Cross-reference** Fusing Power Control: Section 2.2.8
4-7	Not used	Do not change these settings.

System Switch 0C		
No.	**FUNCTION**	**COMMENTS**
0-2	Not used	Do not change these settings.

System Switch 0C		
No.	**FUNCTION**	**COMMENTS**
3	ADF A4/Letter width original detection **0:** A4 **1:** Letter	This setting determines whether an A4/letter width original is detected as A4 width or Letter width.
4-7	Not used	Do not change these settings.

System Switch 0D - Not used (do not change any of these settings)
System Switch 0E - Not used (do not change any of these settings)

System Switch 0F		
No.	**FUNCTION**	**COMMENTS**
0-7	Country code for functional settings (Hex) 00: France 10: Not used 01: Germany 11: Not used 02: UK 12: Asia 03: Italy 13: Not used 04: Austria 14: Hong Kong 05: Belgium 15: South Africa 06: Denmark 16: Australia 07: Finland 17: New Zealand 08: Ireland 18: Singapore 09: Norway 19: Malaysia 0A: Sweden 20: Turkey 0B: Swiss. 21: Greece 0C: Portugal 22: Hungary 0D: Holland 23: Czech 0E: Spain 24: Poland 0F: Israel	This country code determines the factory settings of bit switches and RAM addresses. However, it has no effect on the NCU parameter settings and communication parameter RAM addresses. **Cross-reference** NCU country code: Function 08, parameter CC. The bit switch country code will automatically be changed to the same country code with the NCU country code when you change the NCU country code and exit the service mode. **Note:** If RAM reset level 1 is done, this bit switch resets to 02 (UK).

System Switch 10 - Not used (do not change any of these settings)

System Switch 11		
No.	**FUNCTION**	**COMMENTS**
0-5	Not used	Do not change these settings.
6	Memory reception if no RTI or CSI received **0:** Reception disabled **1:** Reception enabled only when there is no problem with the printer mechanism	This switch setting is dependent on user parameter switch 05 bit 1. This Sw U.P.05 bit 1 -- 0 : Reception always enabled 0 1 : Reception disabled 1 1 : Reception enabled only there is no problem with the printer mechanism
7	Not used	Do not change this setting.

System Switch 12		
No.	**FUNCTION**	**COMMENTS**
0-7	TTI printing position in the main scan direction	08 to 92 (BCD) mm. Only input even numbers. This setting determines the TTI print start position from the left edge of the paper. If the TTI is too far to the right, the file number, which is on the top right of the page, may obscure it.

System Switch 13 - Not used (do not change any of these settings)
System Switch 14 - Not used (do not change any of these settings)

System Switch 15		
No.	**FUNCTION**	**COMMENTS**
0-2	Not used	Do not change these settings.
3	Country code programming (Function 61) **0:** Technician only **1:** Technician or user	**1:** The user can change the country code using Function 61.
4-7	Not used	Do not change these settings.

System Switch 16 - Not used (do not change any of these settings)

System Switch 17		
No.	**FUNCTION**	**COMMENTS**
0-5	Not used	Do not change these settings.
6	Notify user when the communication is complete **0:** Not notify **1:** Notify	**1:** The machine notifies the user with a beeper when the communication is complete.
7	Not used	Do not change this setting.

System Switch 18 - Not used (do not change any of these settings)
System Switch 19 - Not used (do not change any of these settings)
System Switch 1A - Not used (do not change any of these settings)
System Switch 1B - Not used (do not change any of these settings)
System Switch 1C - Not used (do not change any of these settings)
System Switch 1D - Not used (do not change any of these settings)
System Switch 1E - Not used (do not change any of these settings)
System Switch 1F - Not used (do not change any of these settings)

4.3.2 SCANNER SWITCHES

Scanner Switch 00		
No.	**FUNCTION**	**COMMENTS**
0-1	Not used	Do not change these settings.
2-3	Maximum transmittable document length **Bit 3 2 Setting** 0 0 600 mm 0 1 1,200 mm 1 0 14 m 1 1 Not used	If the user wants to send very long documents such as well logs, select the higher setting.
4	OR processing in immediate TX and copying (Standard resolution) **0:** Disabled **1:** Enabled	**0:** The machine scans the document in 3.85 line/mm steps, then transmits or makes copies. **1:** The machine scans the document in 7.7 line/mm steps. Each pair of lines goes through OR processing before transmission or copy making. Toner may be used up earlier if OR processing is enabled.
5-7	Not used	Do not change these settings.

Scanner Switch 01 - Not used (do not change any of these settings)
Scanner Switch 02 - Not used (do not change any of these settings)
Scanner Switch 03 - Not used (do not change any of these settings)
Scanner Switch 04 - Not used (do not change any of these settings)
Scanner Switch 05 - Not used (do not change any of these settings)
Scanner Switch 06 - Not used (do not change any of these settings)
Scanner Switch 07 - Not used (do not change any of these settings)
Scanner Switch 08 - Not used (do not change any of these settings)
Scanner Switch 09 - Not used (do not change any of these settings)
Scanner Switch 0A - Not used (do not change any of these settings)
Scanner Switch 0B - Not used (do not change any of these settings)
Scanner Switch 0C - Not used (do not change any of these settings)
Scanner Switch 0D - Not used (do not change any of these settings)
Scanner Switch 0E - Not used (do not change any of these settings)
Scanner Switch 0F - Not used (do not change any of these settings)

4.3.3 PRINTER SWITCHES

Printer Switch 00		
No.	**FUNCTION**	**COMMENTS**
0	Page separation mark **0:** Disabled **1:** Enabled	**0:** No marks printed. **1:** If an incoming fax requires two sheets to print, the machine prints an "x" inside a small box at the bottom right hand corner of the first sheet. Then, it prints a "2" inside a small box at the top right hand corner of the second sheet. This helps the user identify pages that have been split up.
1	Repetition of data when the received page is longer than the printer paper **0:** Disabled **1:** Enabled	**0:** The next page continues from where the previous page left off. **1:** The final few mm of the previous page are printed at the top of the next page.
2-7	Not used	Do not change these settings.

Printer Switch 01		
No.	**FUNCTION**	**COMMENTS**
0	Reset the fusing unit failure **0:** Off **1:** On (Clear)	When a fusing error occurs, set this bit to 1 after fixing the problem. The machine then resets the fusing error. Switch the machine off/on and this bit will reset itself to 0.
1-7	Not used	Do not change these settings.

Printer Switch 02 - Not used (do not change any of these settings)

Printer Switch 03		
No.	**FUNCTION**	**COMMENTS**
0	Reduce the length of received data **0:** Disabled **1:** Enabled	**0:** Incoming pages are printed without length reduction. **Cross-reference** Page separation threshold: Printer Switch. 03, bits 4 to 7. **1:** Incoming pages are reduced in the lengthwise direction when printing. **Cross-reference** Reduction ratio: Printer Switches 04/05
1-3	Not used	Do not change these settings.

Printer Switch 03		
No.	**FUNCTION**	**COMMENTS**
4-7	Page separation threshold (with reduction disabled in switch 03 bit 0 above) If the incoming page is up to x mm longer than the copy paper, the excess portion will not print. If the incoming page is more than x mm longer than the copy paper, the excess portion will print on the next page. These four bits determine the value of x. Hex value of bits 4 to 7 x (mm) 0 0 1 1 and so on until F 15 **Cross-reference** Length reduction On/Off: Printer Switch 03, Bit 0	

Printer Switches 04 and 05		
No.	**FUNCTION**	**COMMENTS**
0-7	Reduction ratios used for different paper sizes (with reduction enabled in switch 03-bit 0 above) If reduction is enabled, the data will be reduced in the lengthwise direction before printing. These switches determine the maximum reduction ratio for each paper size. **Cross-reference** Switch 04/05 Paper used Bit0 A5 sideways/HLT sideways Bit1 A5/HLT/A4 sideways/LT sideways Bit2 LT Bit3 A4 Bit4 F Bit5 LG Bit6 Not used Bit7 Not used SW04 SW05 Reduction Ratio 0 0 Disabled 1 0 4/3 0 1 8/7 1 0 12/11	

Service Tables

Printer Switch 06 - Not used (do not change any of these settings)
Printer Switch 07 - Not used (do not change any of these settings)
Printer Switch 08 - Not used (do not change any of these settings)
Printer Switch 09 - Not used (do not change any of these settings)
Printer Switch 0A - Not used (do not change any of these settings)
Printer Switch 0B - Not used (do not change any of these settings)
Printer Switch 0C - Not used (do not change any of these settings)
Printer Switch 0D - Not used (do not change any of these settings)
Printer Switch 0E - Not used (do not change any of these settings)
Printer Switch 0F - Not used (do not change any of these settings)

4.3.4 COMMUNICATION SWITCHES

Communication Switch 00		
No.	**FUNCTION**	**COMMENTS**
0-1	Compression modes available in receive mode **Bit 1 0 Modes** 0 0 MH only 0 1 MH/MR 1 0 MH/MR/MMR 1 1 Not used	These bits determine the compression capabilities declared in phase B (handshaking) of T.30 protocol.
2-3	Compression modes available in transmit mode **Bit 3 2 Modes** 0 0 MH only 0 1 MH/MR 1 0 MH/MR/MMR 1 1 Not used	These bits determine the compression capabilities used in the transmission and declared in phase B (handshaking) of T.30 protocol.
4-7	Not used	Do not change these settings.

Communication Switch 01		
No.	**FUNCTION**	**COMMENTS**
0	ECM **0:** Disabled **1:** Enabled	If this bit is 0, ECM is switched off for all communications.
1	Not used	Do not change this setting.
2-3	Wrong connection prevention method Bit 3 2 Setting 0 0 None 0 1 8 digit CSI 1 0 4 digit CSI 1 1 CSI/RTI	**(01):** The machine will not transmit if the last 8 digits of the received CSI do not match the last 8 digits of the dialed telephone number. This does not work for manual dialing. **(10):** The same as above, except that only the last 4 digits are compared. **(11):** The machine will not transmit if the other end does not identify itself with an RTI or CSI. **(00):** Nothing is checked; transmission will always go ahead. **Note:** When enabling wrong connection prevention, disable AI short protocol (set G3 switch 02 bit 6 to 0).
4	Operator call if no response is received in reply to NSF/DIS **0:** Disabled **1:** Enabled	Set this bit to 1 if the user expects to receive telephone calls at the same number that the machine is connected to. The machine will then alert the user if a phone call comes in.
5	Not used	Do not change this setting.

Communication Switch 01		
No.	**FUNCTION**	**COMMENTS**
6-7	Maximum printable page length available **Bit 7 6 Setting** 0 0 No limit 0 1 B4 1 0 A4 1 1 Not used	The receiving terminal informs the transmitting terminal of the setting determined by these bits in the pre-message protocol exchange (in the DIS/NSF) frames.

Communication Switch 02		
No.	**FUNCTION**	**COMMENTS**
0	Burst error threshold **0:** Low **1:** High	If the received page has more consecutive error lines than the threshold, the machine sends a negative response. The low and high threshold values depend on the sub-scan resolution, and are as follows. **Resolution Standard Detail** Low settings 6 12 High settings 12 24 This bit is ignored if ECM is in use.
1	Acceptable total error line ratio **0:** 5% **1:** 10%	If the error line ratio of a page exceeds the acceptable ratio, RTN will be sent to the other end. This bit is ignored if ECM is in use.
2	Treatment of pages received with errors during reception **0:** Deleted from memory without printing **1:** Printed	**0:** Pages received with errors are not printed.
3	Hang-up decision after receiving a negative code (RTN or PIN) during immediate transmission **0:** No hang-up **1:** Hang-up	**0:** Sends the next page even if RTN or PIN is received. **1:** The machine will send DCN and hang up if it receives RTN or PIN. This bit is ignored for memory transmissions or if ECM is being used.
4-7	Not used	Do not change these settings.

Communication Switch 03		
No	**FUNCTION**	**COMMENTS**
0-7	Maximum number of page retransmission in a memory transmission	00 - FF (Hex) times. This bit is ignored if ECM is in use.

Communication Switch 04 - Not used (do not change any of these settings)
Communication Switch 05 - Not used (do not change any of these settings)
Communication Switch 06 - Not used (do not change any of these settings)
Communication Switch 07 - Not used (do not change any of these settings)
Communication Switch 08 - Not used (do not change any of these settings)
Communication Switch 09 - Not used (do not change any of these settings)

Communication Switch 0A		
No.	**FUNCTION**	**COMMENTS**
0	Memory transmission resumption point for redialing **0:** From the error page **1:** From page 1	**0:** The transmission begins from the page where transmission failed the previous time. **1:** Transmission begins from the first page.
1-6	Not used	Do not change these settings.
7	Emergency calls using 999 **0:** Enabled **1:** Disabled	If this bit is at 1, the machine will not allow you to dial 999 at the auto-dialer. (Only for Hong Kong)

Communication Switch 0B - Not used (do not change any of these settings)
Communication Switch 0C - Not used (do not change any of these settings)

Communication Switch 0D		
No.	**FUNCTION**	**COMMENTS**
0-7	The available memory threshold, below which ringing detection (and therefore reception into memory) is disabled.	00 to FF (Hex), unit = 2 KB (e.g. 0C(H) = 24 KB) One page is about 24 KB. The machine refers to this setting before each fax reception. If the remaining memory is below this threshold, the machine cannot receive fax messages. If this setting remains at 0, the machine will detect ringing signals and enter receive mode even if there is no available memory. This will result in communication failure.

Communication Switch 0E		
No.	**FUNCTION**	**COMMENTS**
0-7	Minimum interval between automatic dialing attempts	06 to FF (Hex), unit = 2 sec. (e.g., 06(H) = 12 sec.) This value is the minimum time that the machine waits before it dials the next destination.

Communication Switch 0F - Not used (do not change any of these settings)

Communication Switch 10		
No.	**FUNCTION**	**COMMENTS**
0-7	Memory transmission: Maximum number of dialing attempts to the same destination	01 - FE (Hex) times

Communication Switch 11		
No.	**FUNCTION**	**COMMENTS**
0-7	Immediate transmission: Maximum number of dialing attempts to the same destination	01 - FE (Hex) times

Communication Switch 12		
No.	**FUNCTION**	**COMMENTS**
0-7	Memory transmission: Interval between dialing attempts to the same destination	00 - FF (Hex) minutes

Communication Switch 13		
No.	**FUNCTION**	**COMMENTS**
0-7	Immediate transmission: Interval between dialing attempts to the same destination	00 - FF (Hex) minutes

Communication Switch 14		
No.	**FUNCTION**	**COMMENTS**
0-3	Not used	Do not change these settings.

Communication Switch 14		
No.	**FUNCTION**	**COMMENTS**
4	Positive response timing when substitute reception is disabled **0:** When the fusing exit sensor turns on **1:** When all image data are stored in the memory	**0:** The data is not stored in the SAF memory. The machine sends the positive response to the other end when the leading edge of the paper turns on the fusing exit sensor. This informs the other end of successful reception after the received image data has already been printed. **1:** The incoming data is stored in the SAF memory. The machine sends the positive response to the other end when all received image data have been stored in the SAF memory. This sends the positive response earlier than when this bit switch is set to 0, but the page has not been printed yet. The data goes to SAF, like for substitute reception. However, it is different from substitute reception, as follows: • The machine rejects all incoming ringing signals when the printer is out of order. • The received image data are stored in the memory even if no RTI/CSI is received.
5-7	Not used	Do not change these settings.

Communication Switch 15		
No.	**FUNCTION**	**COMMENTS**
0-1	Available resolution for receiving fax messages **Bit 0 1:** 200 x 100/8 x 3.85 **Bit 1 1:** 200 x 200/8 x 7.7	For best performance, do not change the factory settings. The settings determined by these bits are transmitted to the transmitting terminal in the pre-message protocol exchange (in the DIS/NSF frames).
2-7	Not used	Do not change these settings.

Communication Switch 16 - Not used (do not change any of these settings)
Communication Switch 17 - Not used (do not change any of these settings)
Communication Switch 18 - Not used (do not change any of these settings)
Communication Switch 19 - Not used (do not change any of these settings)
Communication Switch 1A - Not used (do not change any of these settings)
Communication Switch 1B - Not used (do not change any of these settings)
Communication Switch 1C - Not used (do not change any of these settings)
Communication Switch 1D - Not used (do not change any of these settings)
Communication Switch 1E - Not used (do not change any of these settings)
Communication Switch 1F - Not used (do not change any of these settings)

4.3.5 G3 SWITCHES

G3 Switch 00		
No.	**FUNCTION**	**COMMENTS**
0-1	Monitor speaker during communication (TX and RX) **Bit 1 0 Setting** 0 0 Disabled 0 1 Up to Phase B 1 0 All the time 1 1 Not used	**(0, 0):** The monitor speaker is not in use throughout communication. **(0, 1):** The monitor speaker is on up to phase B in the T.30 protocol. **(1, 0):** Used for testing. The monitor speaker is on throughout communication. Make sure that you reset these bits after testing.
2	Monitor speaker during memory transmission **0:** Disabled **1:** Enabled	**1:** The monitor speaker is in use during memory transmission.
3-7	Not used	Do not change these settings.

G3 Switch 01		
No.	**FUNCTION**	**COMMENTS**
0-3	Not used	Do not change these settings.
4	DIS frame length **0:** No limit **1:** 4 bytes	**1:** Only the first 4 bytes in the DIS frame will transmit (set to 1 if there are communication problems with PC-based faxes, which cannot receive extended DIS frames).
5	Not used	Do not change this setting.
6	CED/ANSam emission **0:** Enabled **1:** Disabled	Do not change this setting, unless the any communication problem is caused by the CED/ANSam transmission.
7	Not used	Do not change this setting.

G3 Switch 02		
No.	**FUNCTION**	**COMMENTS**
0	G3 protocol mode used **0:** Standard and non-standard **1:** Standard only	**1:** Disables NSF/NSS signals (these are in non-standard mode communication).
1-4	Not used	Do not change these settings.
5	Use of modem rate history when dialing using Quick/Speed dials **0:** Disabled **1:** Enabled	**0:** Communications using Quick/Speed dials always start with the highest modem rate. **1:** The machine uses the modem rate history for communications with the same machine when determining the most suitable rate for the current communication.

G3 Switch 02		
No.	**FUNCTION**	**COMMENTS**
6	AI short protocol (transmission and reception) **0:** Disabled **1:** Enabled	Refer to Appendix B in the Group 3 Facsimile Manual for details about AI Short Protocol.
7	Not used	Do not change this setting.

G3 Switch 03		
No.	**FUNCTION**	**COMMENTS**
0	DIS detection number (Echo countermeasure) **0:** 1 **1:** 2	**0:** The machine will hang up if it receives the same DIS frame twice. **1:** Before sending DCS, the machine waits for the second DIS, caused by echo on the line.
1-2	Not used	Do not change these settings.
3	ECM frame size **0:** 256 bytes **1:** 64 bytes	**1:** The machine transmits with a frame size of 64 bytes. Set this bit to 1 when the other terminal only has a 64 byte frame size.
4	CTC transmission conditions **0:** Ricoh mode (PPR x 1) **1:** ITU-T mode (PPR x 4)	When using ECM, the machine will choose a slower modem rate after receiving PPR once (Ricoh mode) or four times (ITU-T mode).
5	Modem rate for the next page after receiving a negative code (RTN or PIN) **0:** No change **1:** Fallback	**1:** The TX modem rate of the machine will fall back before sending the next page if it receives a negative code. This bit is ignored if ECM is in use.
6	Not used	Do not change this setting.
7	Polarity change after DIS/NSF detection **0:** Disabled **1:** Enabled	This bit should be set to ”1” only to deal with communication problems caused by certain types of exchanger.

G3 Switch 04		
No.	**FUNCTION**	**COMMENTS**
0-3	Training error detection threshold	0 - F (Hex): 0 - 15 bits If the number of error bits in the received TCF is below this threshold, the machine informs the sender that the training was successful.
4-7	Not used	Do not change these settings.

G3 Switch 05		
No.	**FUNCTION**	**COMMENTS**
0-3	Initial TX modem rate **Bit 3 2 1 0 Setting (bps)** 0 0 0 1 2.4 k 0 0 1 0 4.8 k 0 0 1 1 7.2 k 0 1 0 0 9.6 k 0 1 0 1 12.0 k 0 1 1 0 14.4 k Other settings - Not used	These bits set the initial starting modem rate for transmission. Use the dedicated transmission parameters if you need to change this for specific receivers.
4-5	Initial modem type for 9.6 k or 7.2 kbps **Bit 5 Bit 4 Setting** 0 0 V.29 0 1 V.17 1 0 Not used 1 1 Not used	These bits set the initial modem type for 9.6 k and 7.2 kbps, if the initial modem rate is set at these speeds.
6-7	Not used	Do not change these settings.

G3 Switch 06		
No.	**FUNCTION**	**COMMENTS**
0-3	Initial RX modem rate **Bit 3 2 1 0 Setting (bps)** 0 0 0 1 2.4 k 0 0 1 0 4.8 k 0 0 1 1 7.2 k 0 1 0 0 9.6 k 0 1 0 1 12.0 k 0 1 1 0 14.4 k Other settings - Not used	The settings of these bits inform the transmitting terminal of the available modem rate for the receiving machine. Use a lower setting if high speeds pose problems during reception.
4-7	Not used	Do not change these settings.

G3 Switch 07		
No.	**FUNCTION**	**COMMENTS**
0-1	PSTN cable equalizer (TX mode) **Bit 1 0 Setting** 0 0 None 0 1 Low 1 0 Medium 1 1 High	Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. Use the dedicated transmission parameters if you need to change this for specific receivers. Also, try using the cable equalizer if one or more of the following symptoms occurs: • Communication error • Modem rate fallback occurs frequently.

G3 Switch 07		
No.	**FUNCTION**	**COMMENTS**
2-3	PSTN cable equalizer (RX mode) **Bit 3 2 Setting** 0 0 None 0 1 Low 1 0 Medium 1 1 High	Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. Also, try using the cable equalizer if one or more of the following symptoms occurs: • Communication error with error codes such as 0-20, 0-23, etc. • Modem rate fallback occurs frequently.
4-7	Not used	Do not change these settings.

G3 Switch 08 - Not used (do not change any of these settings)
G3 Switch 09 - Not used (do not change any of these settings)

G3 Switch 0A		
No.	**FUNCTION**	**COMMENTS**
0-1	Maximum allowable carrier drop during image data reception **Bit 1 0 Value (ms)** 0 0 200 0 1 400 1 0 800 1 1 Not used	These bits set the acceptable modem carrier drop time. Try using a longer setting if error code 0-22 is frequent.
2	Non-ECM Rx: When a carrier drop is detected, the image data reception is: **0:** Continued **1:** Stopped	This bit switch determines whether the machine will continue receiving image data when a carrier drop is detected. Try changing this bit switch to 0 if error code 0-22 is frequent. If the bit switch is 0: If the carrier drop continues until the T2 timer runs out (Default 6.0 seconds), the protocol steps down to V.21. If the bit switch is 1: if a carrier drop is detected for more than the setting of bit 0-1 reception stops and the machine sends DCN.
3	Not used	Do not change this setting.
4	Maximum allowable frame interval during image data reception. **0:** 5 s **1:** 13 s	This bit determines the maximum interval between each EOL signal (end-of-line) or between each ECM frame from the other end. Try using a longer setting if error code 0-21 is frequent.
5	Not used	Do not change this setting.

G3 Switch 0A		
No.	**FUNCTION**	**COMMENTS**
6	Reconstruction time for the first line in receive mode **0:** 6 s **1:** 12 s	When a computer controls the sending terminal, there may be a delay in receiving page data after the local machine accepts set-up data and sends CFR. If this occurs, set this bit to 1 to give the sending machine more time to send data. Refer to error code 0-20.
7	Not used	Do not change this setting.

G3 Switch 0B		
No.	**FUNCTION**	**COMMENTS**
0	Protocol requirements: Europe **0:** Disabled **1:** Enabled	Program these bit switches manually to match local requirements.
1	Protocol requirements: Spain **0:** Disabled **1:** Enabled	
2-3	Not used	
4	PTT requirements: Germany **0:** Disabled **1:** Enabled	
5-7	Not used	

G3 Switch 0C		
No.	**FUNCTION**	**COMMENTS**
0-1	Pulse dialing method **Bit 1 0 Setting** 0 0 Normal (P=N) 0 1 Oslo (P=10 - N) 1 0 Sweden (N+1) 1 1 Not used	P = Number of pulses sent out, N = Number dialed.
2-7	Not used	Do not change these settings.

G3 Switch 0D - Not used (do not change any of these settings)
G3 Switch 0E - Not used (do not change any of these settings)
G3 Switch 0F - Not used (do not change any of these settings)

4.4 NCU PARAMETERS

The following tables give the RAM addresses and the parameter calculation units that the machine uses for ringing signal detection and automatic dialing. The factory settings for each country are also given. The RAM read/write (Function 06) must change most of these, but NCU Parameter programming (Function 08) can change some others; if Function 08 is in use, the Remarks column indicates it. The RAM is in hex code unless (BCD) is included in the Unit column.

<table>
<tr><th>Address</th><th>Function</th><th>Unit</th><th>Remarks</th></tr>
<tr><td>807F00</td><td>Country code for NCU parameters</td><td colspan="2">Use the Hex value to program the country code directly into this address, or use the decimal value to program it using Function 08 (parameter C.C.).

<table>
<tr><th>Country</th><th>Decimal</th><th>Hex</th></tr>
<tr><td>France</td><td>00</td><td>00</td></tr>
<tr><td>Germany</td><td>01</td><td>01</td></tr>
<tr><td>UK</td><td>02</td><td>02</td></tr>
<tr><td>Italy</td><td>03</td><td>03</td></tr>
<tr><td>Austria</td><td>04</td><td>04</td></tr>
<tr><td>Belgium</td><td>05</td><td>05</td></tr>
<tr><td>Denmark</td><td>06</td><td>06</td></tr>
<tr><td>Finland</td><td>07</td><td>07</td></tr>
<tr><td>Ireland</td><td>08</td><td>08</td></tr>
<tr><td>Norway</td><td>09</td><td>09</td></tr>
<tr><td>Sweden</td><td>10</td><td>0A</td></tr>
<tr><td>Switzerland</td><td>11</td><td>0B</td></tr>
<tr><td>Portugal</td><td>12</td><td>0C</td></tr>
<tr><td>Holland</td><td>13</td><td>0D</td></tr>
<tr><td>Spain</td><td>14</td><td>0E</td></tr>
<tr><td>Israel</td><td>15</td><td>0F</td></tr>
<tr><td>USA</td><td>17</td><td>11</td></tr>
<tr><td>Asia</td><td>18</td><td>12</td></tr>
<tr><td>Japan</td><td>19</td><td>13</td></tr>
<tr><td>Hong Kong</td><td>20</td><td>14</td></tr>
<tr><td>South Africa</td><td>21</td><td>15</td></tr>
<tr><td>Australia</td><td>22</td><td>16</td></tr>
<tr><td>New Zealand</td><td>23</td><td>17</td></tr>
<tr><td>Singapore</td><td>24</td><td>18</td></tr>
<tr><td>Malaysia</td><td>25</td><td>19</td></tr>
<tr><td>Turkey</td><td>32</td><td>20</td></tr>
<tr><td>Greek</td><td>33</td><td>21</td></tr>
<tr><td>Hungary</td><td>34</td><td>22</td></tr>
<tr><td>Czech</td><td>35</td><td>23</td></tr>
<tr><td>Poland</td><td>36</td><td>24</td></tr>
</table></td></tr>
<tr><td>807F01
to
807F03</td><td>Not used</td><td colspan="2">Do not change these settings.</td></tr>
<tr><td>807F04</td><td>PSTN dial tone frequency upper limit (high byte)</td><td>Hz
(BCD)</td><td>If both addresses contain FF (H), tone detection is disabled.</td></tr>
</table>

Address	Function	Unit	Remarks
807F05	PSTN dial tone frequency upper limit (low byte)	Hz (BCD)	If both addresses contain FF (H), tone detection is disabled.
807F06	PSTN dial tone frequency lower limit (high byte)		
807F07	PSTN dial tone frequency lower limit (low byte)		
807F08	PSTN dial tone detection time	20 ms	If 807F08 contains FF (H), the machine pauses for the pause time (address 807F0D/807F0E). See Note 3 (Italy).
807F09	PSTN dial tone reset time (low)		
807F0A	PSTN dial tone reset time (high)		
807F0B	PSTN dial tone continuous tone time		
807F0C	PSTN dial tone permissible drop time		
807F0D	PSTN wait interval (low)		
807F0E	PSTN wait interval (high)		
807F0F	PSTN ring-back tone detection time		Detection is disabled if this contains FF (H).
807F10	PSTN ring-back tone off detection time		
807F11	PSTN detection time for the silent period after ring-back tone detected (low)		
807F12	PSTN detection time for the silent period after ring-back tone detected (high)		
807F13	PSTN busy tone frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF (H), tone detection is disabled.
807F14	PSTN busy tone frequency upper limit (low byte)		
807F15	PSTN busy tone frequency lower limit (high byte)		If both addresses contain FF (H), tone detection is disabled.
807F16	PSTN busy tone frequency lower limit (low byte)		
807F17	PABX dial tone frequency range (high byte)		If both addresses contain FF (H), tone detection is disabled.
807F18	PABX dial tone frequency range (low byte)		
807F19	PABX dial tone frequency lower limit (high byte)		If both addresses contain FF (H), tone detection is disabled.
807F1A	PABX dial tone frequency lower limit (low byte)		
807F1B	PABX dial tone detection time	20 ms	If 807F1B contains FF, the machine pauses for the pause time (807F20/807F21).
807F1C	PABX dial tone reset time (low)		
807F1D	PABX dial tone reset time (high)		
807F1E	PABX dial tone continuous tone time		

Address	Function	Unit	Remarks
807F1F	PABX dial tone permissible drop time	20 ms	If 807F1B contains FF, the machine pauses for the pause time (807F20/807F21).
807F20	PABX wait interval (high)		
807F21	PABX wait interval (low)		
807F22	PABX ring-back tone detection time		If both addresses contain FF (H), tone detection is disabled.
807F23	PABX ring-back tone off detection time		
807F24	PABX detection time for the silent period after ring-back tone detected (low)		If both addresses contain FF (H), tone detection is disabled.
807F25	PABX detection time for the silent period after ring-back tone detected (high)		If both addresses contain FF (H), tone detection is disabled.
807F26	PABX busy tone frequency upper (high byte)	Hz (BCD)	If both addresses contain FF (H), tone detection is disabled.
807F27	PABX busy tone frequency lower (low byte)		
807F28	PABX busy tone frequency lower (high byte)		If both addresses contain FF (H), tone detection is disabled.
807F29	PABX busy tone frequency lower (low byte)		
807F2A	Busy tone ON time: range 1	20 ms	
807F2B	Busy tone OFF time: range 1		
807F2C	Busy tone ON time: range 2		
807F2D	Busy tone OFF time: range 2		
807F2E	Busy tone ON time: range 3		
807F2F	Busy tone OFF time: range 3		
807F30	Busy tone ON time: range 4		
807F31	Busy tone OFF time: range 4		
807F32	Busy tone-continuous tone detection time		
807F33	Busy tone signal state time tolerance for all ranges, and number of cycles required for detection (a setting of 4 cycles means that ON-OFF-ON or OFF-ON-OFF must be detected twice). Tolerance (±) Bit 1 0 0 0 75% Bits 2 and 3 must always be kept at 0. 0 1 50% 1 0 25% 1 1 12.5% Bits 7, 6, 5, 4 - number of cycles required for cadence detection		
807F34	International dial tone frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF (H), tone detection is disabled.

Address	Function	Unit	Remarks
807F35	International dial tone frequency upper limit (low byte)	Hz (BCD)	If both addresses contain FF (H), tone detection is disabled.
807F36	International dial tone frequency lower limit (high byte)		If both addresses contain FF (H), tone detection is disabled.
807F37	International dial tone frequency lower limit (low byte)		
807F38	International dial tone detection time	20 ms	If 807F38 contains FF, the machine pauses for the pause time (807F3D/807F3E). See Note 4 (Belgium).
807F39	International dial tone reset time (low)		
807F3A	International dial tone reset time (high)		
807F3B	International dial tone continuous tone time		
807F3C	International dial tone permissible drop time		
807F3D	International dial wait interval (low)		
807F3E	International dial wait interval (high)		
807F3F	Country dial tone upper frequency limit (high)	Hz (BCD)	If both addresses contain FF (H), tone detection is disabled.
807F40	Country dial tone upper frequency limit (low)		
807F41	Country dial tone lower frequency limit (high)		If both addresses contain FF (H), tone detection is disabled.
807F42	Country dial tone lower frequency limit (low)		
807F43	Country dial tone detection time	20 ms	If 807F43 contains FF, the machine pauses for the pause time (807F48/807F49).
807F44	Country dial tone reset time (low)		
807F45	Country dial tone reset time (high)		
807F46	Country dial tone continuous tone time		
807F47	Country dial tone permissible drop time		
807F48	Country dial wait interval (low)		
807F49	Country dial wait interval (high)		
807F4A	Time between opening or closing the Ds relay and opening the Di relay	1 ms	See Notes 5, 8, and 9. Function 08 (parameter 11).
807F4B	Break time for pulse dialing		See Note 4. Function 08 (parameter 12).
807F4C	Make time for pulse dialing		See Note 4. Function 08 (parameter 13).

Service Tables

Address	Function	Unit	Remarks
807F4D	Time between final Di relay closure and Ds relay opening or closing	1 ms	See Notes 5, 8, and 9. Function 08 (parameter 14).
807F4E	Minimum pause between dialed digits (pulse dial mode)	20 ms	See Notes 5 and 9. Function 08 (parameter 15).
807F4F	Time waited when a pause is entered at the operation panel		Function 08 (parameter 16). See Note 5.
807F50	DTMF tone on time	1 ms	Function 08 (parameter 17).
807F51	DTMF tone off time		Function 08 (parameter 18).
807F52	Tone attenuation level of DTMF signals while dialing (high frequency group)	- N x 0.5 - 3.5 (dBm)	Function 08 (parameter 19). See Note 7.
807F53	Tone attenuation value difference between high frequency tone and low frequency tone in DTMF signals	- N x 0.5 (dBm)	Function 08 (parameter 20). See Note 7.
807F54	PSTN: DTMF tone attenuation level after dialing (high frequency group)	- N x 0.5 - 3.5 (dBm)	Function 08 (parameter 21). See Note 7.
807F55 to 807F58	Not used	Do not change these settings.	
807F59	Grounding time (ground start mode)	20 ms	The Gs relay remains closed for this interval.
807F5A	Break time (flash start mode)	1 ms	The OHDI relay is open for this interval.
807F5B	International dial access code	BCD	For a code of 100: 807F5B - F1 807F5C - 00
807F5C			
807F5D	PSTN access pause time	20 ms	It waits this amount of time for each pause input after the PSTN access code. Up to 7 of these can be input. If this address contains FF [H], the pause time stored in address 807F4F is used.
807F5E	Progress tone detection level, and cadence detection enable flags	Bit 7 6 5 dBm 0 0 0 -25.0 0 0 1 -35.0 0 1 0 -30.0 1 0 0 -40.0 1 1 0 -49.0 Bits 2, 0 - See Note 4.	
807F5F to 807F64	Not used	Do not change these settings.	

Address	Function	Unit	Remarks
807F65	Inter-city dial prefix (high)	BCD	For a code of 0:
807F66	Inter-city dial prefix (low)		807F65 - FF 807F66 - F0
807F67 to 807F68	Not used	Do not change these settings.	
807F69	Distinctive ring	Hex	00(H): OFF, 01(H): ON
807F6A	Distinctive ring minimum off time	1 ms	
807F6B	Distinctive ring maximum one cycle time	20 ms ± 20 ms	
807F6C to 807F71	Not used	Do not change these settings.	
807F72	Acceptable ringing signal frequency: range 1, upper limit	1,000/N (Hz)	Function 08 (parameter 02).
807F73	Acceptable ringing signal frequency: range 1, lower limit		Function 08 (parameter 03).
807F74	Acceptable ringing signal frequency: range 2, upper limit		Function 08 (parameter 04).
807F75	Acceptable ringing signal frequency: range 2, lower limit		Function 08 (parameter 05).
807F76	Number or rings until a call is detected	1	Function 08 (parameter 06).
807F77	Minimum required length of the first ring	20 ms	See Note 6. Function 09 (parameter 07).
807F78	Minimum required length of the second and subsequent rings		Function 08 (parameter 08).
807F79	Ringing signal detection reset time (low)		Function 08 (parameter 09).
807F7A	Ringing signal detection reset time (high)		Function 08 (parameter 10).
807F7B to 807F80	Not used	Do not change these settings.	
807F81	Interval between dialing the last digit and switching the Oh relay over to the external telephone when dialing from the operation panel in handset mode.	20 ms	Factory setting: 500 ms

Address	Function	Unit	Remarks
807F82	Bits 0 and 1 - Handset off-hook detection time Bit 1 0 Setting 0 0 200 ms 0 1 800 ms Other Not used Bits 2 and 3 - Handset on-hook detection time Bit 3 2 Setting 0 0 200 ms 0 1 800 ms Other Not used Bits 4 to 7 - Not used		
807F83 to 807FA0	Not used	Do not change these settings.	
807FA1	Acceptable CED detection frequency upper limit (high byte)	BCD (Hz)	If both addresses contain FF (H), tone detection is disabled.
807FA2	Acceptable CED detection upper frequency upper limit (low byte)		
807FA3	Acceptable CED detection frequency lower limit (high byte)		If both addresses contain FF (H), tone detection is disabled.
807FA4	Acceptable CED detection upper frequency lower limit (low byte)		
807FA5	CED detection time	20 ms ± 20 ms	Factory setting: 200 ms
807FA6	Acceptable CNG detection frequency upper limit (high byte)	BCD (Hz)	If both addresses contain FF (H), tone detection is disabled.
807FA7	Acceptable CNG detection upper frequency upper limit (low byte)		
807FA8	Acceptable CNG detection frequency lower limit (high byte)		If both addresses contain FF (H), tone detection is disabled.
807FA9	Acceptable CNG detection upper frequency lower limit (low byte)		
807FAA	Not used	Do not change these settings.	
807FAB	CNG on time	20 ms	Factory setting: 500 ms
807FAC	CNG off time		Factory setting: 200 ms
807FAD	Number of CNG cycles required for detection		The data is coded in the same way as address 807F33. Factory setting: 23(H)
807FAE	Not used	Do not change this setting.	
807FAF	Acceptable AI short protocol tone (800Hz) detection frequency upper limit (high byte)	BCD (Hz)	If both addresses contain FF (H), tone detection is disabled.

Address	Function	Unit	Remarks
807FB0	Acceptable AI short protocol tone (800 Hz) detection upper frequency upper limit (low byte)	BCD (Hz)	If both addresses contain FF (H), tone detection is disabled.
807FB1	Acceptable AI short protocol tone (800 Hz) detection frequency lower limit (high byte)	BCD (Hz)	If both addresses contain FF (H), tone detection is disabled.
807FB2	Acceptable AI short protocol tone (800 Hz) detection upper frequency lower limit (low byte)		
807FB3	Detection time for 800 Hz AI short protocol tone	20 ms	Factory setting: 360 ms
807FB4	PSTN: Tx level from the modem	- N - 3 (dBm)	Function 08 (parameter 01).
807FB5	PSTN: 1,100 Hz tone transmission level	- N 807FB4 - 0.5N 807FB5 - 3.5 (dBm)	
807FB6	PSTN: 2,100 Hz tone transmission level	- N 807FB4 - 0.5N 807FB6 - 3 (dBm)	
807FB7	PABX: Tx level from the modem	- dBm	
807FB8	PABX: 1,100 Hz tone transmission level	- N 807FB7 - 0.5N 807FB8 (dB)	
807FB9	PABX: 2100 Hz tone transmission level	- N 807FB7 - 0.5N 807FB9 (dB)	
807FBA to 807FBC	Not used	Do not change these settings.	
807FBD	Modem turn-on level (incoming signal detection level)	- 37 - 0.5N (dBm)	The value must be between 00H (-37.0 dBm) and 14H (-47.0 dBm).
807FBE to 807FD9	Not used	Do not change these settings.	
807FDA	T.30 T1 timer	1 s	
807FDB to 807FDF	Not used	Do not change these settings.	
807FE0 bit 3	Maximum wait time for post message	1: Maximum wait time for post message (EOP/EOM/MPS) can be changed to 30 s. Change this bit to “1” if communication errors occur frequently during V.17 reception. 0: 18 s (ECM on) / 6 s (ECM off) 1: 30 s	

NOTES

1. If you change the NCU country code and exit the service mode, the bit switch country code (System Bit Switch 0F) will automatically be changed to the same country code.
2. If a setting is unnecessary, store FF in the address.
3. In, Europe, if the country code is not specified, set it to UK (02).
4. Italy and Belgium only
   RAM address 807F5E: the lower four bits have the following meaning.
   Bit 2 1: International dial tone cadence detection enabled (Belgium)
   Bit 1: Not used
   Bit 0 1: PSTN dial tone cadence detection enabled (Italy)

   If bit 0 or bit 2 is set to 1, the functions of the following RAM addresses change.
   807F08 (if bit 0 = 1) or 807F38 (if bit 2 = 1): tolerance for on or off state duration (%), and number of cycles required for detection, coded as in address 807F33.
   807F0B (if bit 0 = 1) or 807F3B (if bit 2 = 1): on time, hex code (unit = 20 ms)
   807F0C (if bit 0 = 1) or 807F3C(if bit 2 = 1): off time, hex code (unit = 20 ms)
5. Pulse dial parameters (addresses 807F4A to 807F4F) are the values for 10 PPS. If 20 PPS is used, the machine automatically compensates.
6. The first ring may remain undetected until 1 to 2.5 wavelengths after the time specified by this parameter.
7. The calculated level must be between 0 and 10.
   The attenuation levels calculated from RAM data are:
   High frequency tone: - 0.5 x N807F52/807F54 dBm
   Low frequency tone: - 0.5 x (N807F52/807F54 + N807F53) dBm
   Note: N807F52, for example, means the value stored in address 807F52(H)
8. 807F4A: Europe - Between Ds opening and Di opening, France - Between Ds closing and Di opening
   807F4D: Europe - Between Ds closing and Di closing, France - Between Ds opening and Di closing
9. The actual inter-digit pause (pulse dial mode) is the sum of the periods specified by the RAM addresses 807F4A, 807F4D, and 807F4E.

4.5 DEDICATED TRANSMISSION PARAMETERS

Each Quick Dial Key and Speed Dial Code has four bytes of programmable parameters allocated to it. If transmissions to a particular machine often experience problems, store that terminal's fax number as a Quick Dial or Speed Dial, and adjust the parameters allocated to that number.

The programming procedure will be explained first. Then, the four bytes will be described.

4.5.1 PROGRAMMING PROCEDURE

1. Set bit 3 of System Bit Switch 04 to 1.
2. Either use the programming Quick Dial number or Speed Dial number.

   Example: Change the Parameters in Quick Dial 10.

3. Function 3 1 Yes
4. Press the Quick Dial key 10.
5. Press Yes four times.
6. The settings for Tx Parameter 1 are now displayed. Press a number from 0 to 7 corresponding to the bit that you wish to change.

   Example: Change bit 7 to 1: Press 7

7. To scroll through the parameter bytes, either:
   Select the next byte:
   or
   Select the previous byte:
   until the correct byte is displayed. Then go back to step 6.
8. After the setting is changed, press Yes.
9. To finish, press Function.
10. After finishing, reset bit 3 of System Bit Switch 04 to 0.

4.5.2 PARAMETERS

The initial settings of the following parameters are all FF (H) - all the parameters are disabled.

Tx Parameter 1
FUNCTION AND COMMENTS
ITU-T T1 time If the connection time to a particular terminal is longer than the NCU parameter setting, adjust this byte. The T1 time is the value stored in this byte (in hex code), multiplied by 1 second. **Range:** 1 to 120 s (01h to 78h) 00h or FFh - The local NCU parameter factory setting is used. Do not program a value between 79h and FEh.

Tx Parameter 2		
No.	**FUNCTION**	**COMMENTS**
0-3	TX level **Bit 3 2 1 0 Setting (dBm)** 0 0 0 0 0 0 0 0 1 -1 : 1 1 1 1 -15	If communication with a particular remote terminal often contains errors, the signal level may be inappropriate. Adjust the TX level for communications with that terminal until the results are better.
4	TX level setting **0:** Enabled **1:** Disabled (bits 0 to 4 must all be at 1 to disable)	**0:** When enabling the TX level setting, change this bit to 0, then change the settings of bits 0 through 3 above. **1:** When disabling the TX level setting, change all of the bits 0 through 4 to 1.
5-6	Cable equalizer **Bit 6 5 Setting** 0 0 None 0 1 Low 1 0 Medium 1 1 High	Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange when calling the number stored in this Quick/Speed Dial. Also, try using the cable equalizer if one or more of the following symptoms occurs. • Communication error with error codes such as 0-20, 0-23, etc. • Modem rate fallback occurs frequently.
7	Cable equalizer setting **0:** Enabled **1:** Disabled (bits 5 to 7 must all be at 1 to disable)	**0:** When enabling the cable equalizer setting, change this bit to 0, then change the settings of bits 5 and 6 above. **1:** When disabling the cable equalizer setting, change all of the bits 5, 6 and 7 to 1.

Tx Parameter 3		
No.	**FUNCTION**	**COMMENTS**
0-3	Initial Tx modem rate **Bit 3 2 1 0 Setting (bps)** 0 0 0 0 Not used 0 0 0 1 2,400 0 0 1 0 4,800 0 0 1 1 7,200 0 1 0 0 9,600 0 1 0 1 12,000 0 1 1 0 14,400 0 1 1 1 Not used : 1 1 1 0 Not used 1 1 1 1 Setting disabled	If training with a particular remote terminal always takes too long, the initial modem rate may be too high. Reduce the initial Tx modem rate using these bits.
4-5	Not used	Do not change these settings.
6	AI short protocol **0:** Disabled **1:** Enabled	**0:** AI short protocol is disabled for transmission
7	Not used	Do not change this setting.

Tx Parameter 4		
No.	**FUNCTION**	**COMMENTS**
0-1	Not used	Do not change these settings.
2-3	DIS/NSF detection method **Bit 3 2 Setting** 0 0 First DIS or NSF 0 1 Second DIS or NSF 1 0 Not used 1 1 Setting disabled	**(0, 1):** Use this setting if echoes on the line are interfering with the set-up protocol at the start of transmission. The machine will then wait for the second DIS or NSF before sending DCS or NSS.
4	Not used	Do not change this setting.
5	Compression modes available in transmit mode **0:** MH only **1:** All available compression modes	This bit determines the capabilities that are informed to the other terminal during transmission.
6-7	ECM during transmission **Bit 7 6 Setting** 0 0 Disabled 0 1 Enabled 1 0 Not used 1 1 Setting disabled	For example, if ECM is switched on but is not wanted when sending to a particular terminal, use the (0, 0) setting.

4.6 SERVICE RAM ADDRESSES

⚠CAUTION
Do not change settings marked as "Not used" or "Read only."

800001 to 800004(H) - ROM version (Read only)
800001(H) - Revision number (BCD)
800002(H) - Year (BCD)
800003(H) - Month (BCD)
800004(H) - Day (BCD)

800005(H) - RAM Reset Level 1
Change the data at this address from 80(H) to FF (H), then switch the machine off and on to reset all the system settings.
CAUTION: Before using this RAM, print the settings of all the system parameters (System Parameter List).
The country code will be reset to UK when RAM reset level 1 is done.
Do the CIS shading adjustment after a Level 1 RAM reset. (Refer to section 4.)

800006 to 800016(H) - Machine's serial number (16 digits - ASCII) - Service function 14

800017(H) – Language code

800018(H) - Total program checksum (low)
800019(H) - Total program checksum (high)
80001A(H) - Boot program checksum (low)
80001B(H) - Boot program checksum (high)
80001C(H) - Main program checksum (low)
80001D(H) - Main program checksum (high)

80001E(H) - RDS program update counter (hex)

800020 to 80003F(H) - System bit switches
800040 to 80004F(H) - Scanner bit switches
800050 to 80005F(H) - Printer bit switches
800060 to 80007F(H) - Communication bit switches
800080 to 80008F(H) - G3 bit switches

8000A0(H) - User parameter switch 00
Bits 0 to 3: Not used
Bits 4 and 5: Scanning resolution home position

Bit 5	4	Setting
0	0	Standard
0	1	Detail
1	0	Fine
1	1	Halftone

Bit 6: Transmission mode home position 0: Memory TX, 1: Immediate TX
Bit 7: Not used

8000A1(H) - User parameter switch 01
Bits 0 to 6: Not used
Bit 7: Settings return to home position after transmission 0: Disabled, 1: Enabled

8000A2(H) - User parameter switch 02
Bits 0 to 7: Not used

8000A3(H) - User parameter switch 03 (Automatic report printout)
Bit 0: Communication result report (memory transmissions) 0: Off, 1: On
Bit 1: Not used
Bit 2: File reserve report 0: Off, 1: On
Bit 3: Not used
Bit 4: Communication result report (polling reception) 0: Off, 1: On
Bit 5: Transmission result report (immediate transmissions) 0: Off, 1: On
Bit 6: Not used
Bit 7: Journal 0: Off, 1: On

8000A4(H) - User parameter switch 04
Bits 0 to 6: Not used
Bit 7: Includes a sample image on reports 0: Off, 1: On

8000A5(H) - User parameter switch 05
Bit 0: Substitute reception 0: Off, 1: On
Bit 1: Memory reception if no RTI or CSI received 0: Possible, 1: Impossible
Bits 2 to 7: Not used

8000A6(H) - User parameter switch 06
Bit 0: TTI print 0: Off, 1: On
Bits 1 to 7: Not used

8000A7(H) - User parameter switch 07
Bits 0 to 7: Not used

8000A8(H) - User parameter switch 08
Bits 0 and 1: Not used
Bits 2 and 3: Authorized reception

Bit 3	2	Setting
X	0	Disabled
0	1	Faxes from senders whose RTIs/CSIs are specified for this feature are accepted.
1	1	Faxes from senders whose RTIs/CSIs are not specified for this feature are accepted.

Bits 4 to 7: Not used

8000A9(H) - User parameter switch 09
Bits 0 to 7: Net used

8000AA(H) - User parameter switch 10 (SWUSR_0A)
Bit 0: Reverse order printing 0: Disabled, 1: Enabled
Bits 1 to 6: Not used
Bit 7: Halftone type 0: Error diffusion, 1: Dither

8000AB(H) - User parameter switch 11 (SWUSR_0B)
Bits 0 to 7: Not used

8000AC(H) - User parameter switch 12 (SWUSR_0C)
Bit 0 to 7: Not used

8000AD(H) - User parameter switch 13 (SWUSR_0D)
Bits 0 and 1: PSTN access method from behind a PABX

Bit 1	0	Setting
0	0	PSTN
0	1	Loop start
1	0	Ground start
1	1	Flash start

Bits 2 to 7: Not used

8000B9(H) - User function 62 settings (SWUSR_19)
Bit 0: Night timer (Power saver) 0: Disabled, 1: Enabled
Bits 1 to 3: Not used
Bit 4: RDS operation 0: Not acceptable
1: Acceptable for the limit specified by system switch 03
Bits 5 and 6: Not used
Bit 7: Daylight saving time (Summer time) 0: Disabled, 1: Enabled

8000BA(H) - User function 62 setting (SWUSR_1A)
Bit 0: Not used
Bit 1: Dialing type 0: Pulse dialing (10 PPS), 1: Tone (DTMF) dialing
Bits 2 to 7: Not used

8000BB(H) - PSTN access number for loop start (SWUSR_1B) - User function 61

Access number	Hex value to program (BCD)
0	F0
↓	↓
0	F0
00	00
↓	↓
99	99

8000BC(H) - Number of rings in AUTO mode (SWUSR_1C) - User function 61

Number of rings	Hex value to program (BCD)
00	00
↓	↓
99	99

8000C8 to 8000DB(H) - RTI (Max. 20 characters - ASCII) - See the following note
8000DC to 8000EF(H) - CSI (Max. 20 characters - ASCII)
8000F0 to 80010F(H) - TTI (Max. 32 characters - ASCII) - See the following note
Note: If the number of characters are less than the maximum (20 for RTI, 32 for TTI), add a stop code (FF[H]) after the last character.
800110(H) - Number of CSI characters (Hex)

800111 to 80011F(H) - Service station's fax number -Service function 13

800140 to 800147(H) - Last power off time (Read only)

800140(H) - Clock
- 00(H) - 12-hour clock (AM)
- 01(H) - 24-hour clock
- 02(H) - 12-hour clock (PM)

800141(H) - Year (BCD)
800142(H) - Month (BCD)
800143(H) - Day (BCD)
800144(H) - Hour
800145(H) - Minute
800146(H) - Second
800147F(H) - 00: Monday, 01: Tuesday, 02: Wednesday, ……., 06: Sunday

800148 to 80014F(H) - Present time (Read only)

800148(H) - Clock
- 00(H) - 12-hour clock (AM)
- 01(H) - 24-hour clock
- 02(H) - 12-hour clock (PM)

800149(H) - Year (BCD)
80014A(H) - Month (BCD)
80014B(H) - Day (BCD)
80014C(H) - Hour
80014D(H) - Minute
80014E(H) - Second
80014F(H) - 00: Monday, 01: Tuesday, 02: Wednesday, ……., 06: Sunday

800150(H) - Optional equipment (Read only)

Bit 0: Memory card 0: Not installed, 1: Installed
Bits 1 to 7: Not used

800153(H) - Optional memory card (Read only)

01(H): 1MB memory card
02(H): 2MB memory card

The following counters are on the System Parameter List. The names used on the system parameter list are in brackets.

800158 to 80015A(H) - TX counter (TX)

Address	High	Low
800158(H)	Tens digit	Unit digit
800159(H)	Thousands digit	Hundreds digit
80015A(H)	Hundred thousands digit	Ten thousands digit

Note: The following counters have the same data format as above.

80015B to 80015D(H) - RX counter (RX)

80015E to 800160(H) - Scan counter (SCN)

800161 to 800163(H) - Print counter (PRT)

800164 to 800166(H) - Paper feed counter: standard cassette (MAIN TRAY)

800176 to 800178(H) - Printer total jam counter (COPY JAM)

800185 to 800187(H) - Scanner total jam counter (DOC. JAM)

800188 to 80018A(H) - Fusing exit jam counter (EJECT JAM)

80018B to 80018D(H) - Registration jam counter (PAPER JAM)

80018E to 800190(H) - PM counter (PM)

800191 to 800193(H) - PM call interval: default 30,000 (PM DEFAULT)

800194 to 800196(H) – Copy counter (COPY)

80019A to 80019C(H) – AIO counter (TONER)

8001DE to 8001ED(H) - Excessive jam call parameters

Parameters		Address (H)		Initial Setting	Sys. Para. List
		ADF	Printer		
DEC (1 - 255; 0 = Disabled)		8001DE	8001E2	10 (H)	X
CALL (3 – 15; 0 = Disabled)		8001DF	8001E3	06(H)	Y
CLR	(Low)	8001E0	8001E4	30(H)	—
	(High)	8001E1	8001E5	00(H)	

Counters	Address (H)		Sys. Para. List
	ADF	Printer	
JAM: Jam counter used to place a service call	8001E6	8001EA	Z
NO-JAM1: Counter used for JAM counter decrement	8001E7	8001EB	—
NO-JAM2: Counter used for clearing the JAM counter	8001E8 (Low) 8001E9 (High)	8001EC (Low) 8001ED (High)	—

8001FA to 800223(H) - Night timer period (User function 71)

8001FA to 8001FC(H) - Setting #1 for Monday
8001FD to 8001FF(H) - Setting #2 for Monday
800200 to 800202(H) - Setting #1 for Tuesday
800203 to 800205(H) - Setting #2 for Tuesday
800206 to 800208(H) - Setting #1 for Wednesday
800209 to 80020B(H) - Setting #2 for Wednesday
80020C to 80020E(H) - Setting #1 for Thursday
80020F to 800211(H) - Setting #2 for Thursday
800212 to 800214(H) - Setting #1 for Friday
800215 to 800217(H) - Setting #2 for Friday
800218 to 80021A(H) - Setting #1 for Saturday
80021B to 80021D(H) - Setting #2 for Saturday
80021E to 800220(H) - Setting #1 for Sunday
800221 to 800223(H) - Setting #2 for Sunday

Program format

First byte - Hour (BCD)
Second byte - Minute (BCD)
Third byte - 00(H): Timer start time, 01(H): Timer end time

80024E to 800255(H) - Last RDS operation (Read only)

80024E(H) - Clock
00(H): 12-hour clock (AM)
01(H): 24-hour clock
02(H): 12-hour clock (PM)
80024F(H) - Year (BCD)
800250(H) - Month (BCD)
800251(H) - Day (BCD)
800252(H) - 00: Monday, 01: Tuesday, 02: Wednesday, ... , 06: Sunday
800253(H) - Hour
800254(H) - Minute
800255(H) - Second

80025B(H) - Transmission monitor volume 00 - 07(H)
80025C(H) - Reception monitor volume 00 - 07(H)
80025D(H) - On-hook monitor volume 00 - 07(H)
80025E(H) - Dial monitor volume 00 - 07(H)
80025F(H) - Buzzer volume 00 - 07(H)
800260(H) - Key acknowledgment tone volume 00 - 07(H)

800261 to 800265(H) - Periodic service call parameters

Parameters		Address (H)
Call interval	01 through 15 month(s) (BCD) 00: Periodic service call disabled	**800261**
Next call	Year (Read only)	**800262**
	Month (Read only)	**800263**
	Day: 01 through 31 (BCD)	**800264**
	Hour: 01 through 24 (BCD)	**800265**

80026B(H) - Country code (same data as System bit switch 0F)

80026C to 80026E(H) - Effective term of automatic service calls

Parameters	Address (H)
Year: last two digits of the year (BCD)	**80026C**
Month: 01 through 12 (BCD)	**80026D**
Day: 01 through 31 (BCD)	**80026E**

80026F to 800270(H) - **Modem version (Read only)**

80026F(H) - Low (hex)
800270(H) - High (hex)

80219E to 80231D(H) - Latest 64 error codes (Read only)
One error record consists of 6 bytes of data.

First error record start address – 80219E(H)
Second error record start address – 8021A4(H)
Third error record start address – 8021AA(H)
: : :
64th error record start address - 802318(H)

The format is as follows:
1st byte - Minute (BCD)
2nd byte - Hour (BCD)
3rd byte - Day (BCD)
4th byte - Month (BCD)
5th byte - Error code (low) [If the error code is 1-23, 23 is stored here.
6th byte - Error code (high) [If the error code is 1-23, 01 is stored here.

8029A4 to 802BB5(H) - Latest 10 error communication records

One error communication record consists of 53 bytes. The format is as follows:

1st byte - Header
Bit 0: Communication result 0: OK, 1: NG
Bit 1: Document jam 1: Occurred
Bit 2: Power down 1: Occurred
Bit 3: Not used
Bit 4: Technical data printout instead of personal codes 0: No, 1: Yes
Bit 5: Type of technical data 0: Rx level, 1: Measure of error rate
Bit 6: Error report 0: Not printed, 1: Printed
Bit 7: Data validity 0: Not valid, 1: Valid

2nd to 5th bytes - Date and time when the communication started
2nd byte - Month (BCD)
3rd byte - Day (BCD)
4th byte - Hour (BCD)
5th byte - Minute (BCD)

6th and 7th bytes - Communication time
6th byte - Minutes (BCD)
7th byte - Seconds (BCD)

8th byte - Number of pages transmitted or received

9th byte - Number of total error lines

10th byte - Number of burst error lines

11th byte - File number (low - Hex)
12th byte - File number (high - Hex)

13th and 14th bytes - Rx level or measure of error rate
If bit 5 of the 1st byte is 0: 13th byte - Rx level (low - Hex)
14th byte - Rx level (high - Hex)
If bit 4 of the 1st byte is 1: 13th byte - Measure of error rate (low - Hex)
14th byte - Measure of error rate (high - Hex)

15th byte - Final modem rate
Bits 0 to 3: Final modem speed

Bit 3	2	1	0	Setting
0	0	0	1	2.4 k
0	0	1	0	4.8k
0	0	1	1	7.2k
0	1	0	0	9.6k
0	1	0	1	12.0k
0	1	1	0	14.4k

Other settings - Not used

Bits 4 to 7: Final modem type

Bit 7	6	5	4	Setting
0	0	0	1	V.27ter
0	0	1	0	V.27ter, V.29
0	0	1	1	Not used
0	1	0	0	V.27ter, V.29, V.17

Other settings - Not used

16th to 35th byte - Remote terminal's ID (RTI, TSI or CSI) (ASCII)

36th byte - Communication mode #1
Bits 0 - 1: Resolution used

Bit 1	0	Setting
0	0	Standard
1	0	Detail
1	1	Fine

Bit 2: Communication Protocol 0: G3
Bit 3: ECM 0: Off, 1: On
Bits 4 to 7: Communication mode used

Bit 7	6	5	4	Setting
0	0	0	0	Normal
0	0	1	0	Polling
0	1	0	1	Automatic Service Call

Other settings - Not used

37th byte - Communication mode #2
Bit 0: Tx or Rx 0: Tx, 1: Rx
Bit 1: Reduction in Tx 0: Not reduced, 1: Reduced
Bit 2: Not used
Bit 3: Send later transmission 0: Not used, 1: Used
Bit 4: Transmission from 0: ADF, 1: Memory
Bits 5 to 7: Not used

38th byte - Number of errors during communication (BCD)

39th to 41st bytes - 1st error code and page number where the error occurred
39th byte - Page number (BCD)
40th byte - Error code (low - BCD)
41st byte - Error code (high - BCD)

42nd to 44th bytes - 2nd error code and page number where the error occurred
45th to 47th bytes - 3rd error code and page number where the error occurred
48th to 50th bytes - 4th error code and page number where the error occurred
51st to 53rd bytes - 5th error code and page number where the error occurred

804A8F to 804BA6(H) - Dedicated Tx parameters for Quick Dial 01 - 20 and Speed Dial #00 - #49.

Each set of destination data consists of 32 bytes. Last 8bytes (23rd to 32nd bytes) are used.

804A8F to 804A92(H) - Dedicated tx parameters for Quick 01
804A93 to 804A96(H) - Dedicated tx parameters for Quick 02
804A97 to 804A9A(H) - Dedicated tx parameters for Quick 03
:
804ADB to 804ADE(H) - Dedicated tx parameters for Quick 20
804ADF to 804AE2(H) - Dedicated tx parameters for Speed #00
804AE3 to 804AE6(H) - Dedicated tx parameters for Speed #01
804AE7 to 804AEA(H) - Dedicated tx parameters for Speed #02
:
804BA3 to 804BA6(H) - Dedicated tx parameters for Speed #49

80764B(H) - Details of the service call (hardware error)
0X(H): Fusing unit failure
21(H): Laser power is out of the specified range
31(H): Polygonal mirror motor failure
5X(H): Power pack failure
6X(H): Video I/F failure

When a service call was caused by a fusing unit failure (codes 0X):
After fixing the problem, set printer switch 01 bit 0 to 1 and turn the power off/on. The machine resets this bit to 0, and restarts the machine to clear the service call.

When a service call occurred because of a different hardware failure:
If the problem remains after restarting the machine (power off/on), fix the hardware problem. The service call condition clears after power up.

5. PREVENTIVE MAINTENANCE

5.1 SPECIAL TOOLS AND LUBRICANTS

- Flash/SRAM data copy tool (P/N: H5479352)
- Flash ROM Memory Card (P/N: A2309352)
- CIS Shading Chart (P/N: H0689300)

5.2 PM PARTS

Preventive maintenance is not required on this products.

5.3 MAINTENANCE ITEMS AND METHODS

If the machine is serviced, do the following items.

Action Symbol: L: Lubricate I: Inspect C: Clean A: Adjust

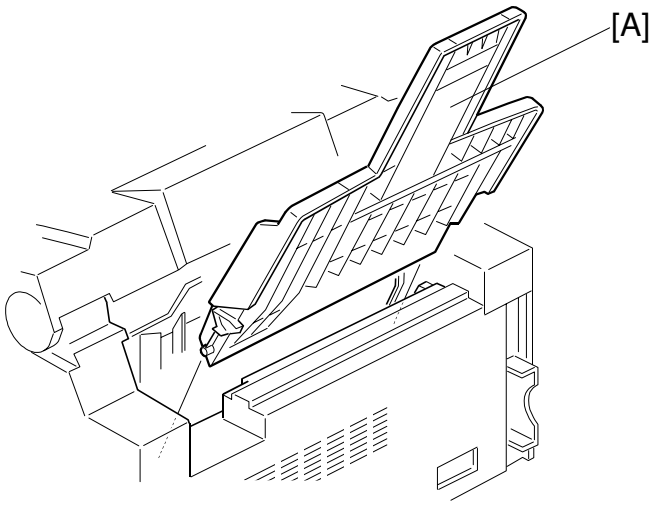
Item	Action	Notes
Scanner/ADF		
ADF Separation Pad	C	Soft cloth dampened with water
Exposure Glass	C	Soft cloth dampened with water
Shading Plate	C	Soft cloth dampened with water
Document Pick-up Roller	C	Soft cloth dampened with water
Document Feed Roller	C	Soft cloth dampened with water
R1 Roller	C	Soft cloth dampened with water
R2 Roller	C	Soft cloth dampened with water
Ground contact point of the R1 roller shaft	L	Grease - KS660
Ground contact point of the R2 roller shaft	L	Grease - KS660
Printer		
Paper Feed Roller	C	Soft cloth dampened with water
Ground contact point of the paper feed roller shaft	L	Grease - KS660
Transfer Roller	C	Blower Brush (Remove the roller and then blow off adhered toner.)
Transfer Roller Shaft	L	Grease - KS660
Cleaning Pad	I	Replace when the toner cartridge is changed.
Hot Roller Bushing (Left)	L	Grease - KS660
Gears	L	Grease - CPL501

6. REPLACEMENT AND ADJUSTMENT

6.1 EXTERIOR

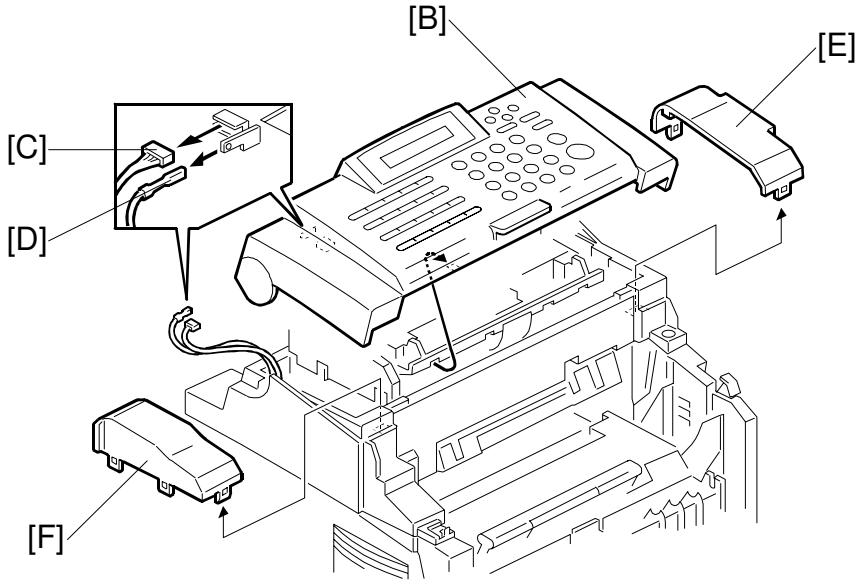
6.1.1 OPERATION PANEL REMOVAL

A: Upper paper tray



H538R007.WMF

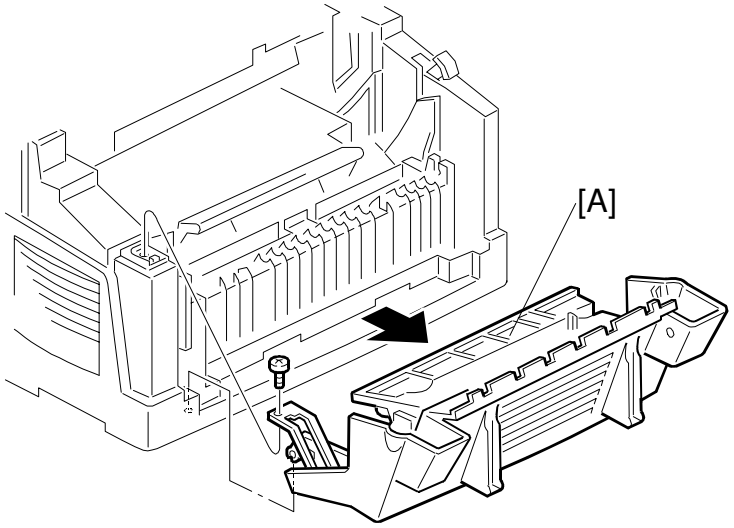
B: Operation panel (4 hooks)
C: 1 connector
D: 1 ground wire
E: ADF right cover (4 hooks)
F: ADF left cover (4 hooks)



H538R002.WMF

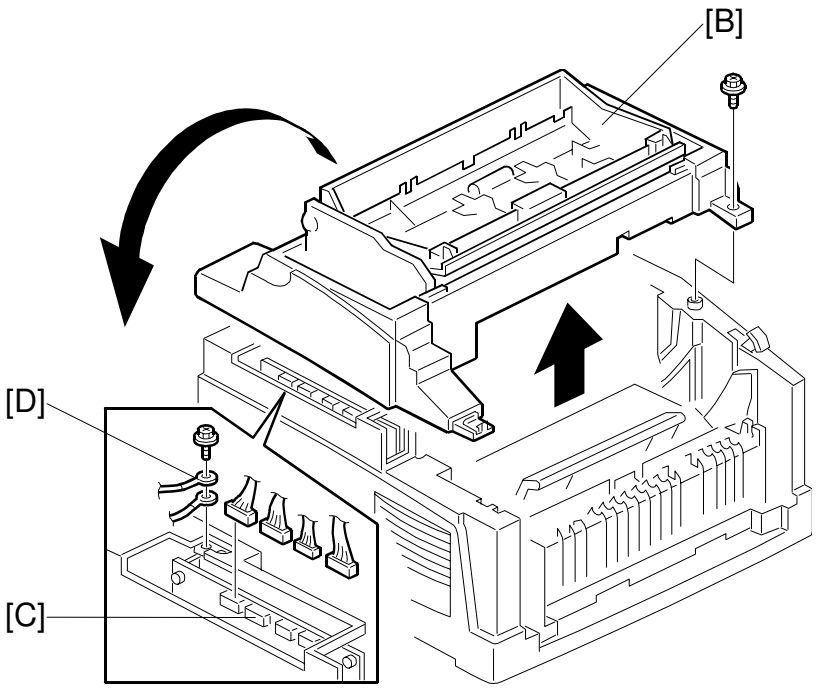
6.1.2 UPPER UNIT REMOVAL

A: Front cover (1 tapping screw)



H538R005.WMF

B: Upper unit (1 tapping screw, 2 hooks)
C: 4 connectors
D: 2 grounding wires (1 Phillips screw)



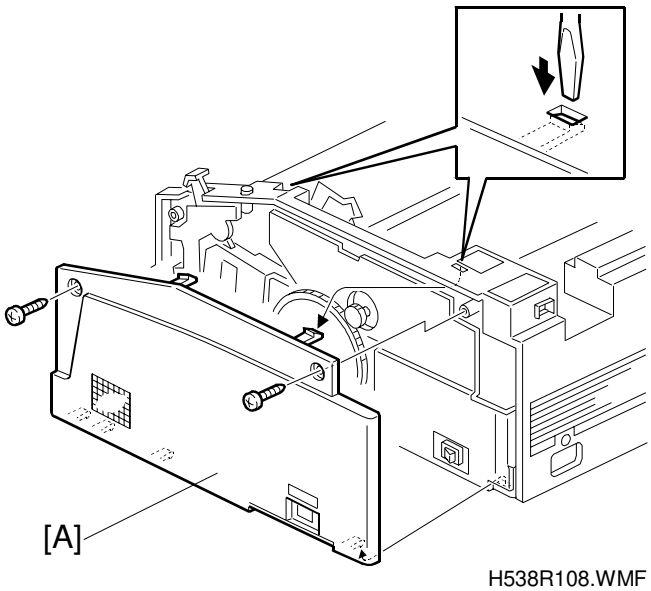
H538R004.WMF

6.1.3 RIGHT COVER REMOVAL

Preparation:

1) Remove the upper unit. (See Upper Unit Removal.)

A: Right cover (2 tapping screws and 7 hooks)



H538R108.WMF

NOTE: 1) To remove the right cover, unhook the upper 2 hooks after removing the 2 tapping screws. Then pull the right cover off gently.
2) The right cover holds the interlock switch actuator and drive gears in position. They can slip off easily when the right cover has been removed.

Reinstallation

Make sure the right cover does not pinch the cable.

6.2 OPTICS

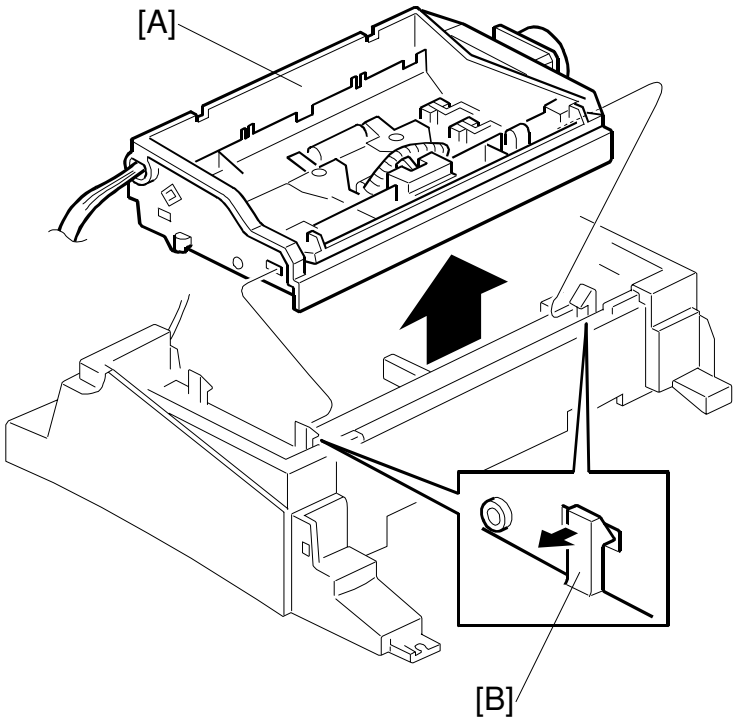
6.2.1 ADF UNIT REMOVAL

Preparation:

Remove the following parts. (See Operation Panel Removal and Upper Unit Removal.)

1) Upper paper tray
2) Operation panel
3) 1 connector and 1 ground wire
4) ADF right and left covers
5) Front cover
6) Upper unit
7) 4 connectors and 2 grounding wires

A: ADF unit (4 hooks)



H538R001.WMF

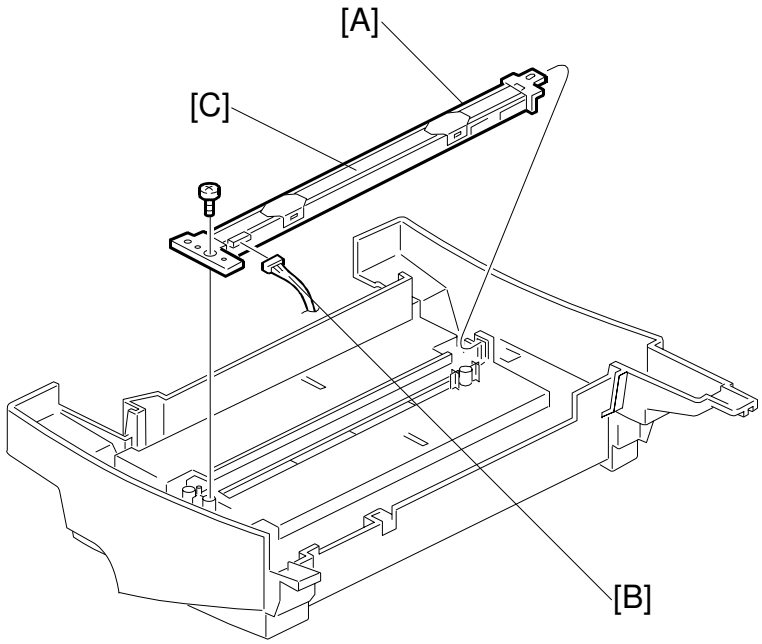
NOTE: Do not damage hooks [B]

6.2.2 CIS UNIT REMOVAL

Preparation:

1) Remove the upper unit. (See Upper Unit Removal)

A: CIS unit (1 tapping screw)
B: 1 connector



H538R003.WMF

NOTE: 1) Do not damage the mylar [C].
2) Do not disassemble the CIS unit because the CIS and both sides of brackets are fixed after adjustment at factory.

Reinstallation

Do the CIS shading adjustment. (Refer to section 4.)

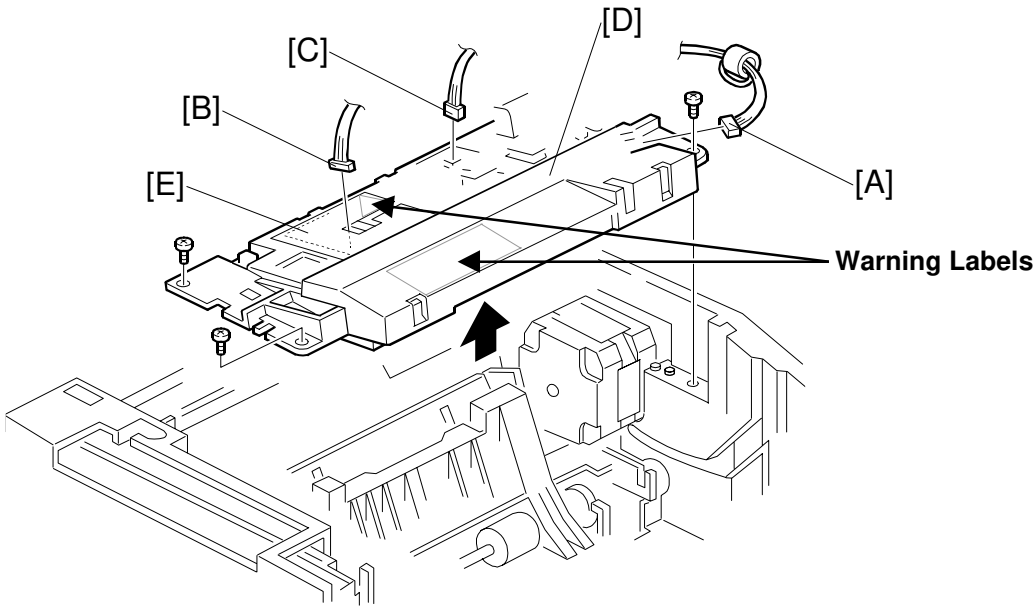
6.2.3 LASER UNIT REMOVAL

⚠WARNING FOR THE LASER UNIT
This machine contains a laser beam generator. Laser beams can cause permanent eye damage. Do not open the laser unit or look along the laser beam path while the main power is on.

Preparation:

1) Remove the upper unit. (See Upper Unit Removal.)

A: Laser diode connector
B: Polygon mirror motor connector
C: Paper end sensor connector
D: Laser unit (3 tapping screws: M3 x 10 mm)



H538R028.WMF

NOTE: Do not damage the mylar [E].
No components inside the laser unit [D] can be replaced. So the complete unit needs to be replaced.

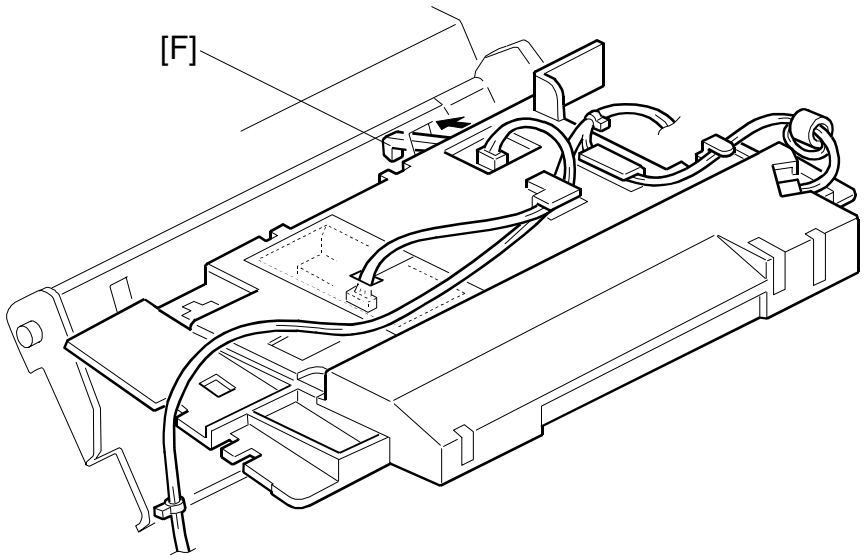
Warning Labels

LASER_PS1.WMF

LASER_PS4.WMF

Reinstallation

Route the cables as shown.



H538R018.WMF

NOTE: 1) Make sure the paper end sensor actuator [F] is positioned in the slit of the upper tray bottom plate correctly.
2) Do not damage the mylar.

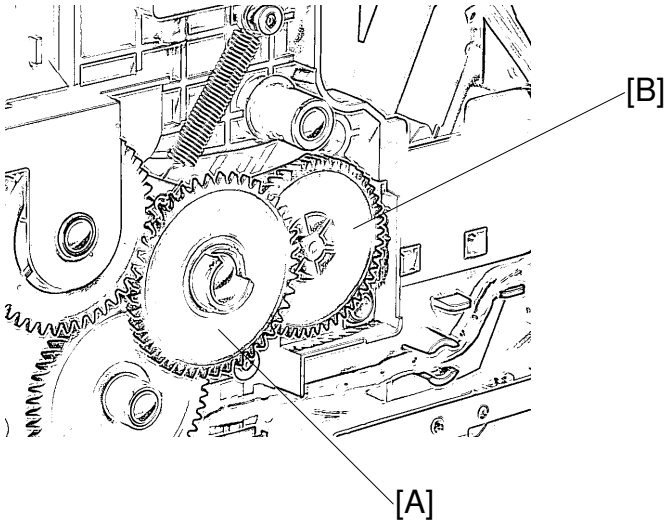
6.3 PAPER FEED

6.3.1 PAPER FEED ROLLER REMOVAL

Preparation:

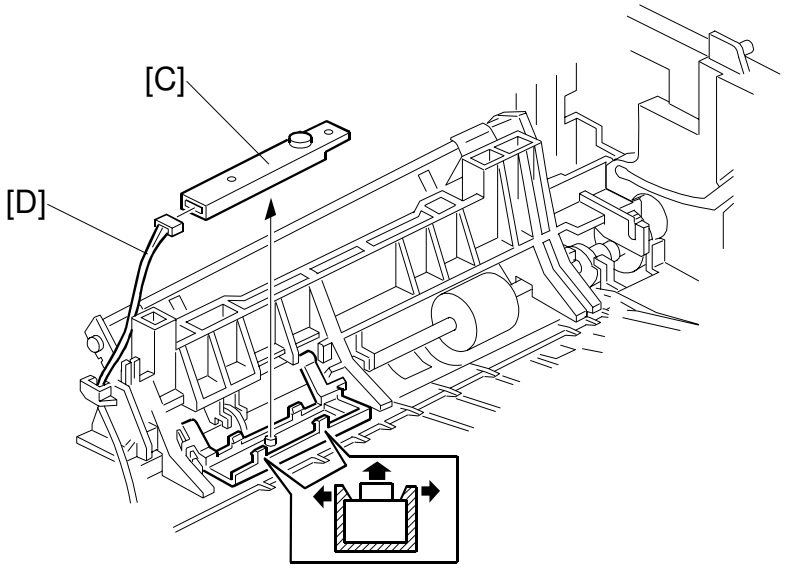
1) Remove the toner cartridge.
2) Remove the upper unit. (See Upper Unit Removal.)
3) Remove the laser unit. (See Laser Unit Removal.)
4) Remove the right cover. (See Right Cover Removal.)
5) Remove the main motor bracket. (See Main Motor Removal.)

A: Gear
B: Gear



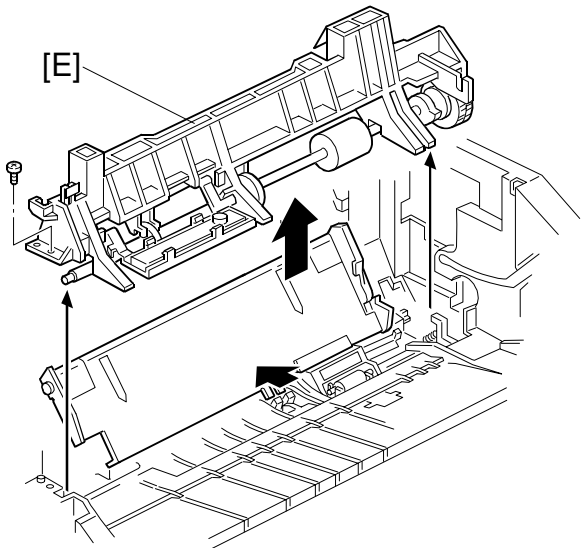
H538R524.PCX

C: Toner end sensor
D: Connector and cable.



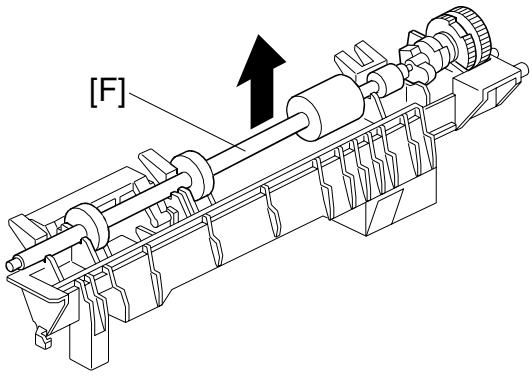
H538R574.WMF

E: Paper feed roller ass'y (1 tapping screw)



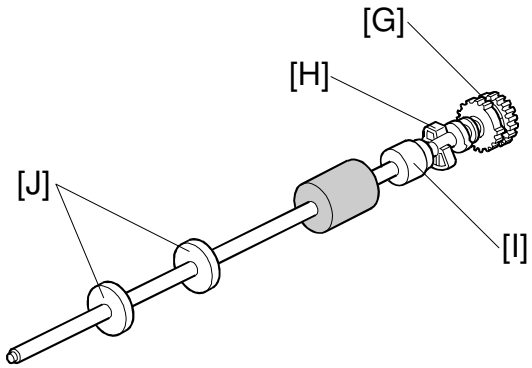
H538R015.WMF

F: Paper feed roller: Turn the paper feed roller ass'y upside down, and remove.



H538R513.WMF

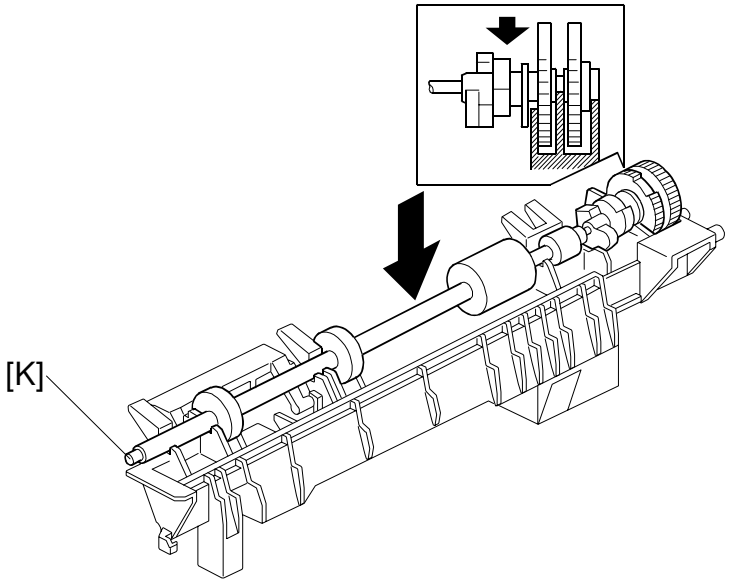
G: Gear
H: Pick up cam
I: Torque limiter
J: Two guide rollers



H538R506.WMF

Reinstallation

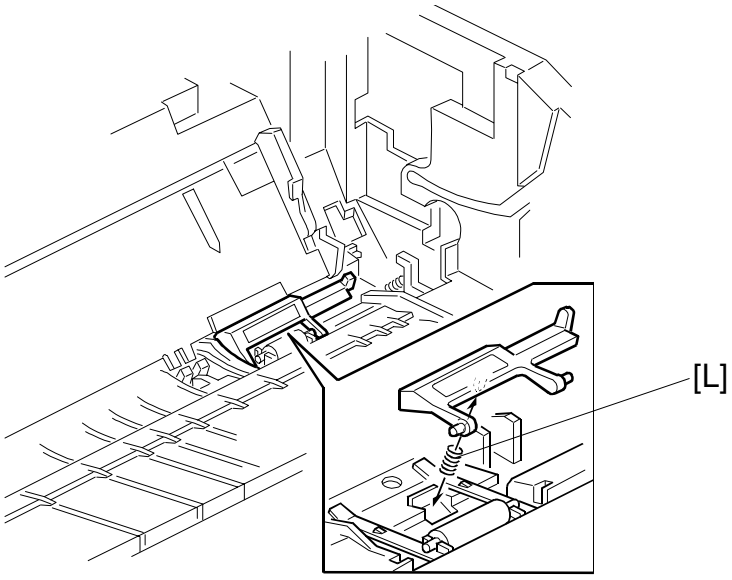
1) Make sure the guide rollers are positioned correctly as shown.



H538R013.WMF

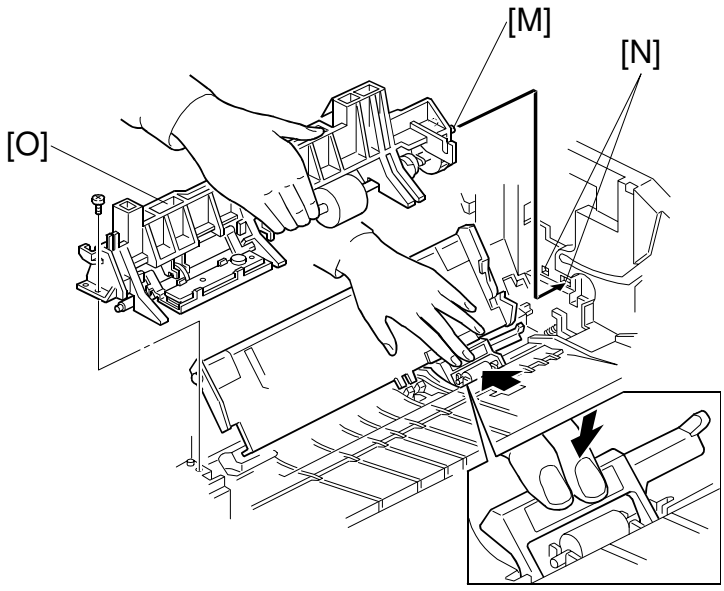
NOTE: Apply grease (KS-660) to the guide roller shaft [K] to ensure ground contact.

2) Make sure the friction pad spring [L] is set properly in the square notch as shown below.



H538R014.WMF

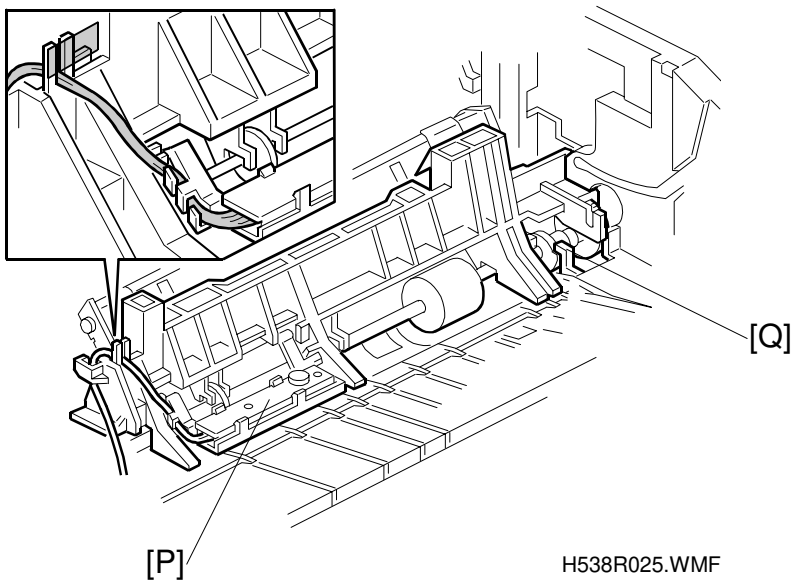
3) Install the paper feed roller assembly, so that the 2 pins [M] are set in the holes [N] in the frame, while pressing the friction pad.
4) Paper feed roller guide [O] (1 tapping screw)



H538R024.WMF

NOTE: Make sure the paper feed roller assembly does not pinch the cable.

5) Install the toner end sensor [P] and the cable as shown.



H538R025.WMF

6) Install the gears.

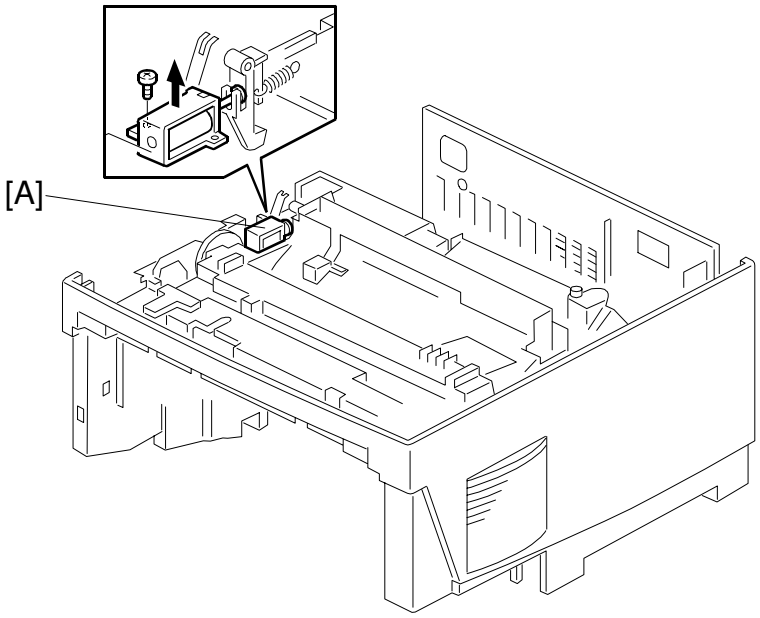
NOTE: Make sure that the pick-up cam stopper [Q] is positioned correctly.

6.3.2 PAPER PICK-UP SOLENOID REMOVAL

Preparation:

1) Remove the lower unit shell. (See Lower Unit Shell Removal)
2) Turn the lower unit shell upside down.

A: Paper pick-up solenoid (1 tapping screw)



H538R034.WMF

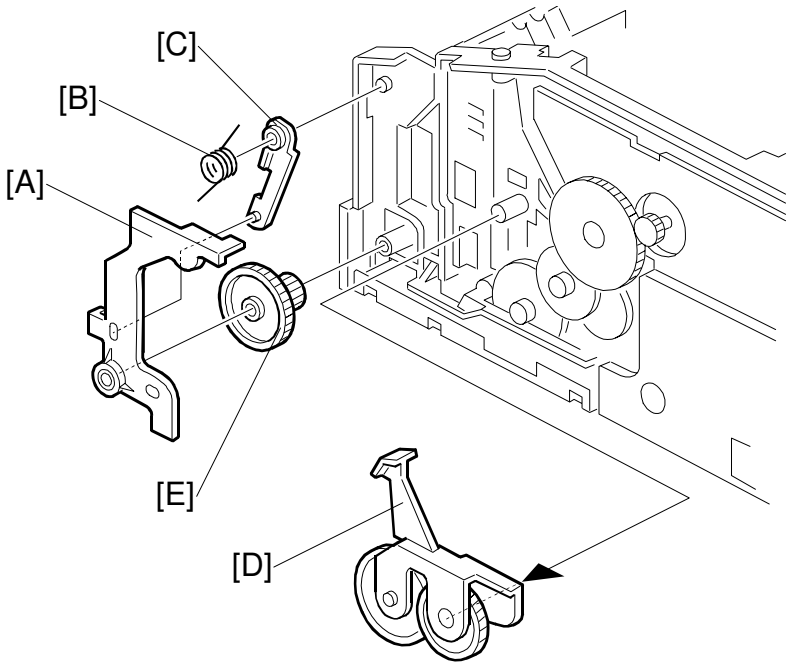
6.4 FUSING

6.4.1 FUSING UNIT REMOVAL

Preparation:

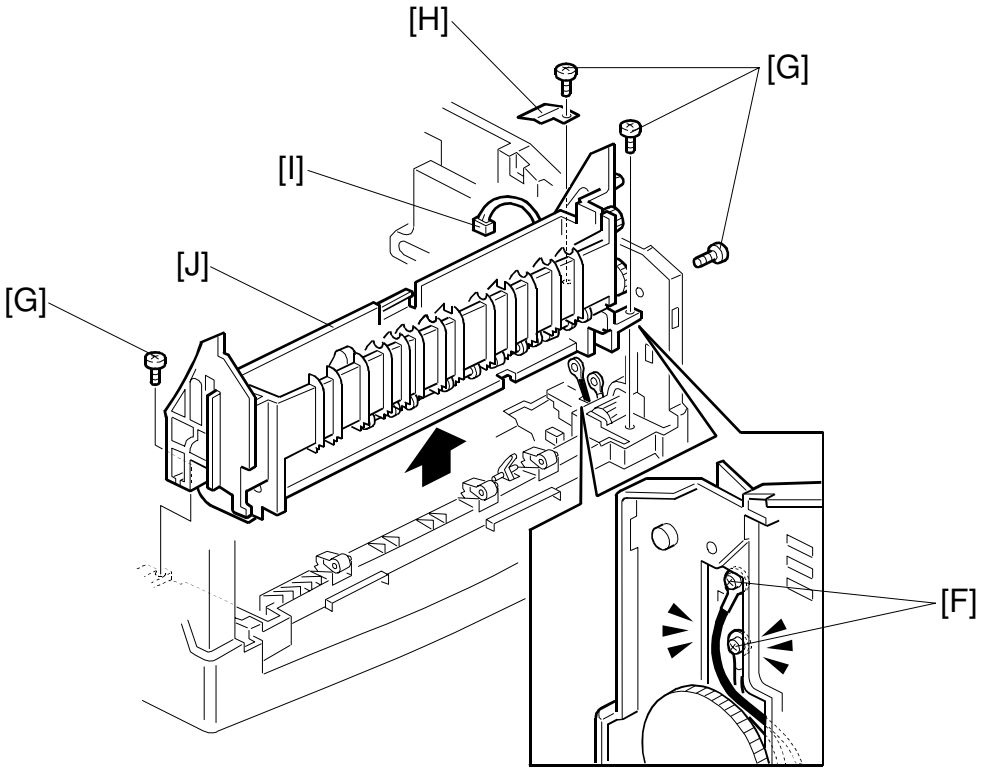
1) Remove the toner cartridge.
2) Remove the upper unit. (See Upper Unit Removal)
3) Remove the right cover. (See Right Cover Removal)

A: Interlock switch actuator
B: Spring
C: Actuator support bracket
D: Release lever and gears
E: Gear



H538R019.WMF

F: 2 fusing lead wires (2 Philips screws)
G: 4 tapping screws
H: Plastic plate
I: Thermistor connector
J: Fusing unit



H538R012.WMF

CAUTION: Do not remove the 2 white-painted screws that hold the upper and lower sections of the fusing unit together. Otherwise the fusing unit might be damaged.

Reinstallation

Make sure the black wire is connected to the upper terminal and the white wire is connected to the lower terminal as shown in the diagram.

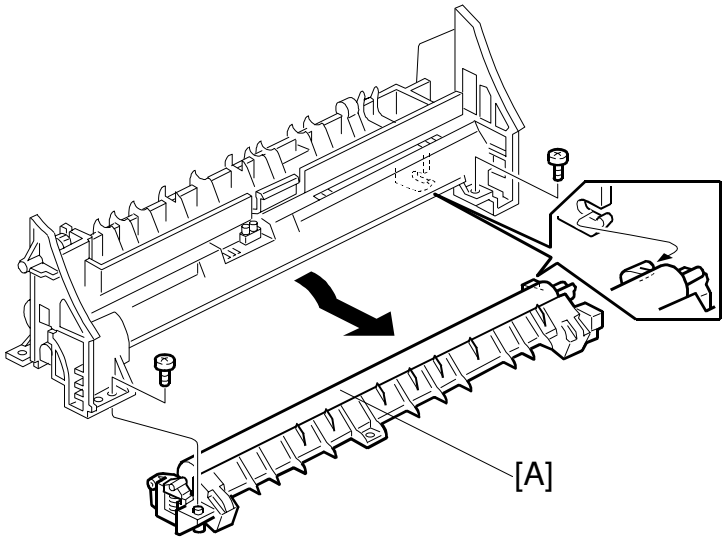
6.4.2 PRESSURE ROLLER REMOVAL

Preparation:

1) Remove the fusing unit. (See Fusing Unit Removal.)

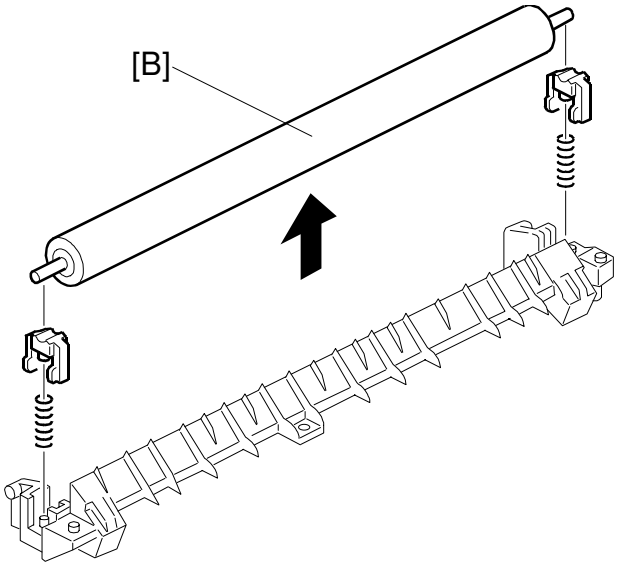
A: Fusing lower unit (2 white-painted tapping screws)

CAUTION: Hold the fusing unit's upper and lower sections securely together while removing the 2 screws. Otherwise the fusing unit might be damaged.



H538R011.WMF

B: Fusing pressure roller



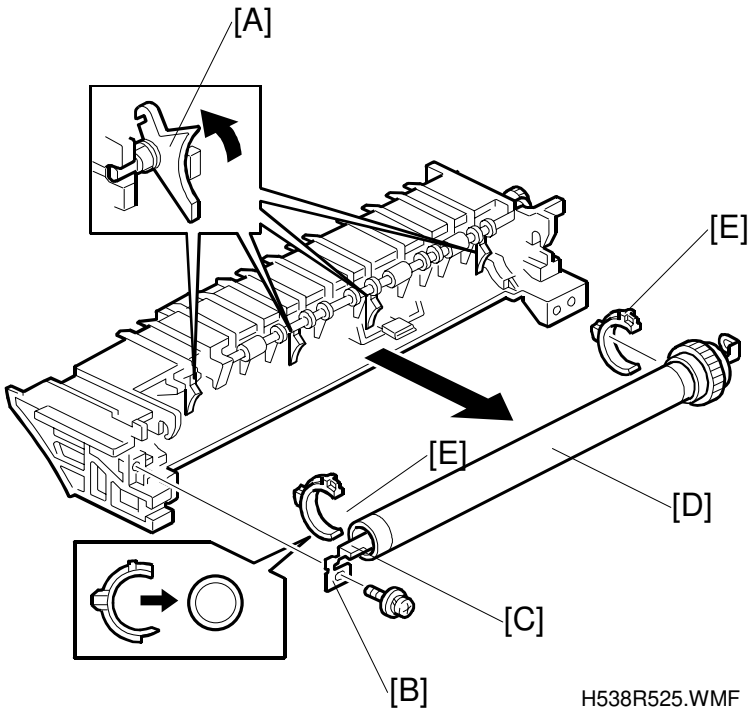
H538R124.WMF

6.4.3 HOT ROLLER AND LAMP REMOVAL

Preparation:

1) Remove the fusing unit. (See Fusing Unit Removal.)
2) Remove the fusing lower unit. (See Pressure Roller Removal.)

A: Rotate the stripper pawls away from the hot roller and secure them with tape.
B: Lamp terminal (1 Philips screw)
C: Fusing lamp
D: Hot roller
E: 2 bushings



Do not touch the surface of the hot roller or lamp with bare hands.

Reinstallation

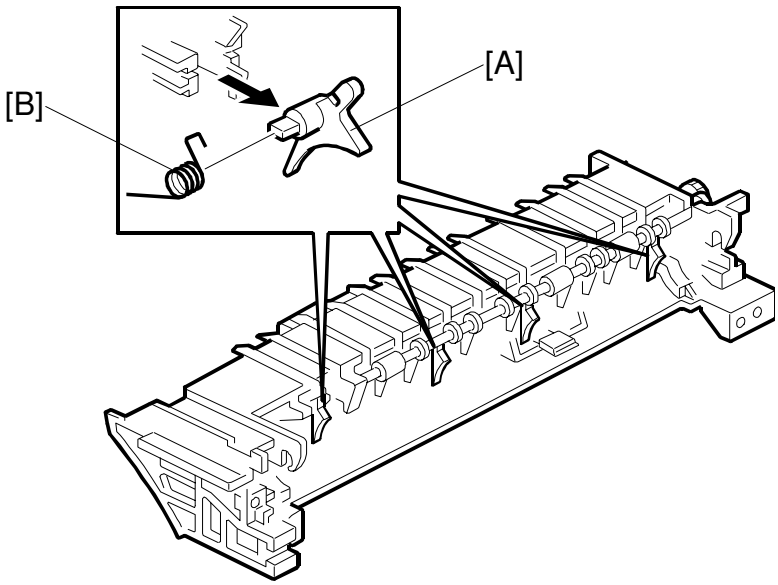
NOTE: 1) Make sure that the bushings are oriented correctly as shown.
2) Do not damage the fusing thermistor.
3) Apply grease (KS-660) to the left bushing [E] to ensure ground contact.

6.4.4 HOT ROLLER STRIPPER PAWL REMOVAL

Preparation:

1) Remove the fusing unit. (See Fusing Unit Removal.)
2) Remove the hot roller. (See Hot Roller and Lamp Removal.)

A: 4 hot roller stripper pawls
B: 4 springs



H538R526.WMF

Reinstallation

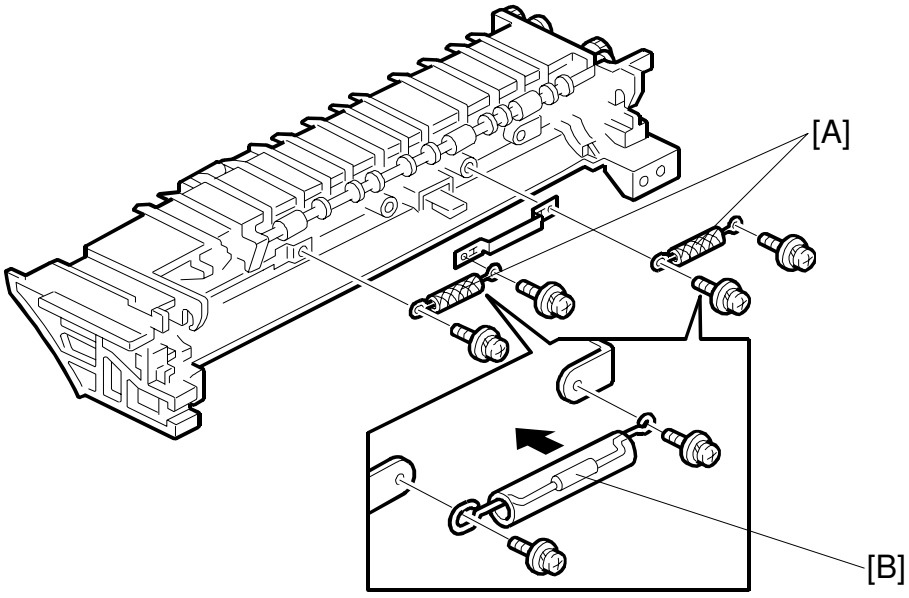
Do not deform the springs

6.4.5 FUSING THERMOFUSE REMOVAL

Preparation:

1) Remove the fusing unit. (See Fusing Unit Removal.)
2) Remove the hot roller. (See Hot Roller and Lamp Removal.)

A: 2 Fusing thermofuses (4 Philips screws)



H538R037.WMF

Reinstallation

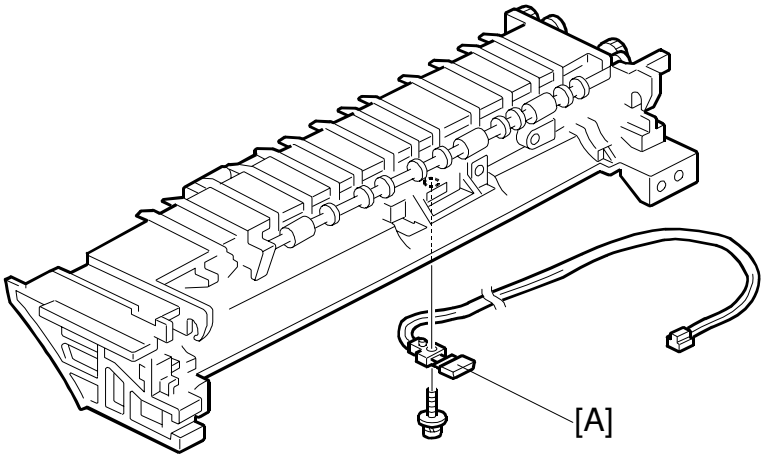
CAUTION: 1) Do not deform the thermofuse.
2) Do not install the thermofuse upside down (the centre [B] of the fuse is away from the machine).

6.4.6 FUSING THERMISTOR REMOVAL

Preparation:

1) Remove the fusing unit.

A: Fusing thermistor (1 Philips screw)



H538R528.WMF

Reinstallation

CAUTION: Do not deform the thermistor.

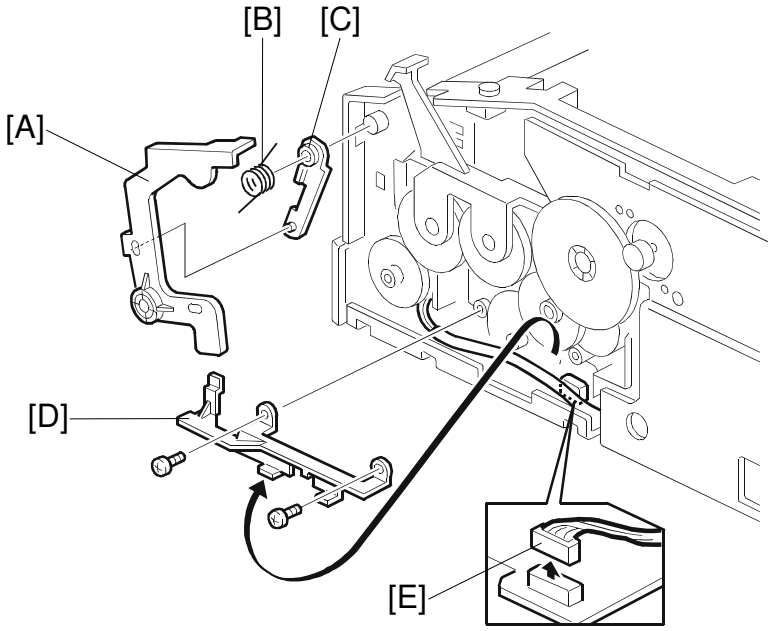
6.5 OTHERS

6.5.1 MAIN MOTOR REMOVAL

Preparation:

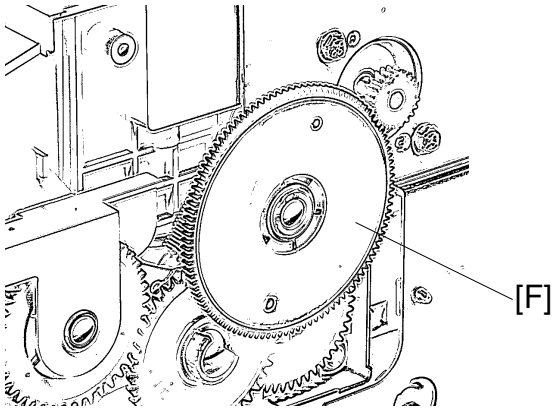
1) Remove the upper unit. (See Upper Unit Removal.)
2) Remove the right cover. (See Right Cover Removal.)

A: Interlock switch actuator
B: Spring
C: Actuator support bracket
D: AC Harness Cover (2 tapping screws)
E: Main motor connector



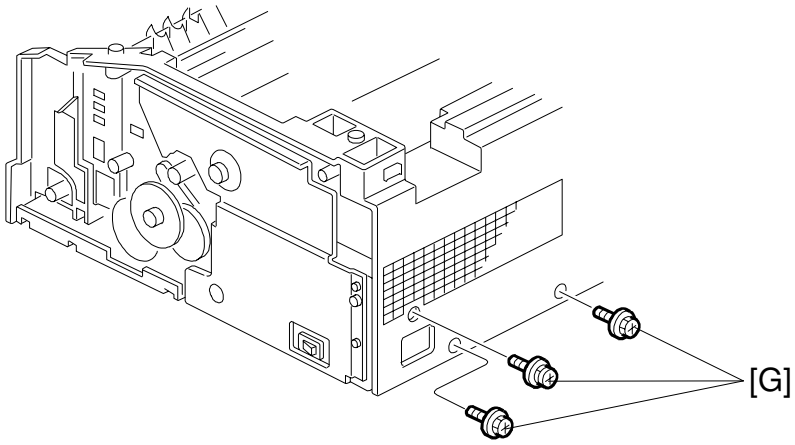
H538R016.WMF

F: Gear

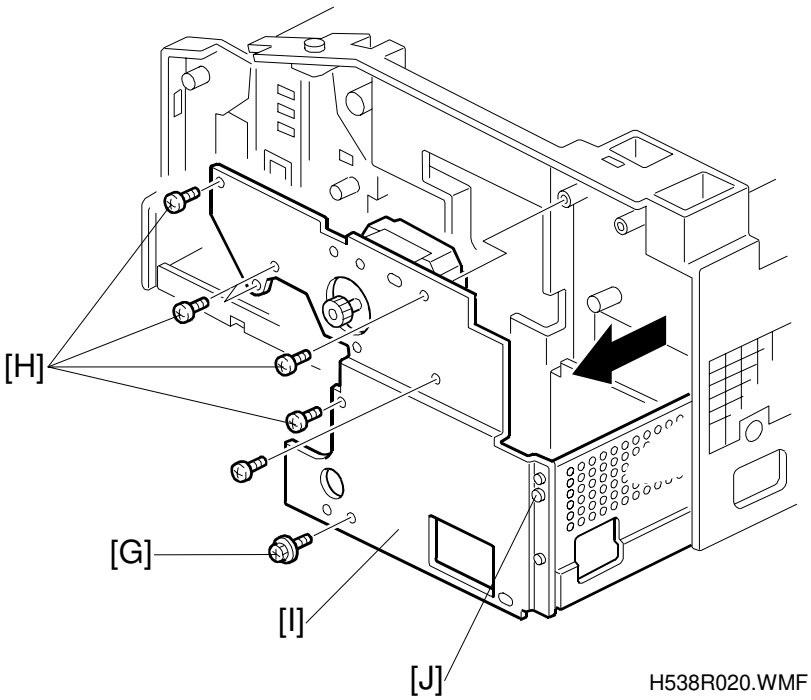


H538R551.PCX

G: 4 Philips screws
H: 6 tapping screws
I: Main motor bracket



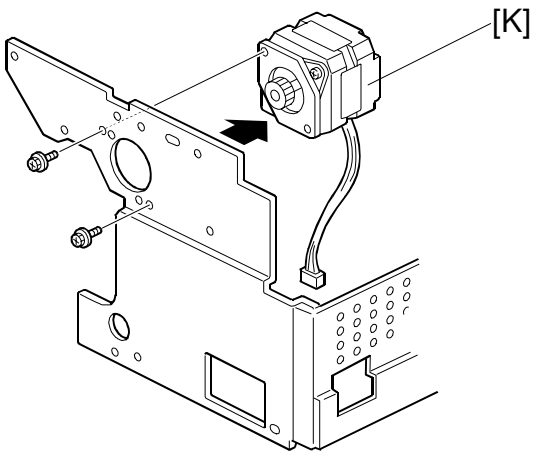
H538R021.WMF



H538R020.WMF

NOTE: Do not remove the bracket joining screw [J].

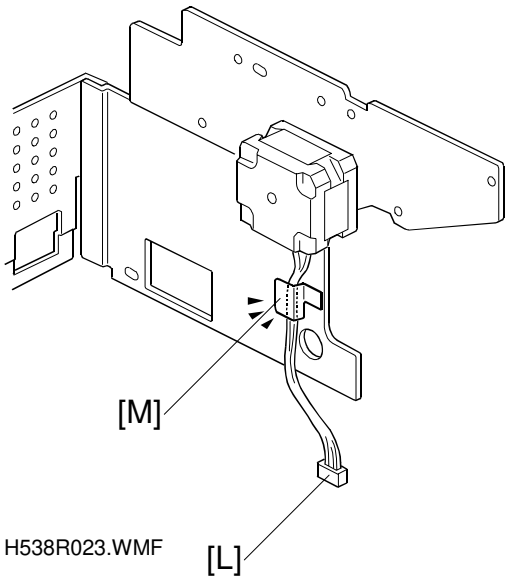
K: Main motor (2 Philips screws)



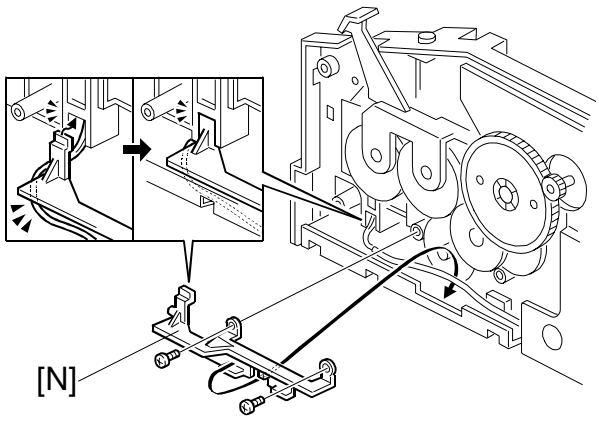
H538R022.WMF

Reinstallation

NOTE: 1) Install the main motor so that the cable [L] faces down as shown.
2) Make sure the main motor cable is secured under the cable cover [M].
3) Make sure no wires are pinched under the main motor bracket.
4) Make sure the AC harness cover [N] is set as shown.



H538R023.WMF



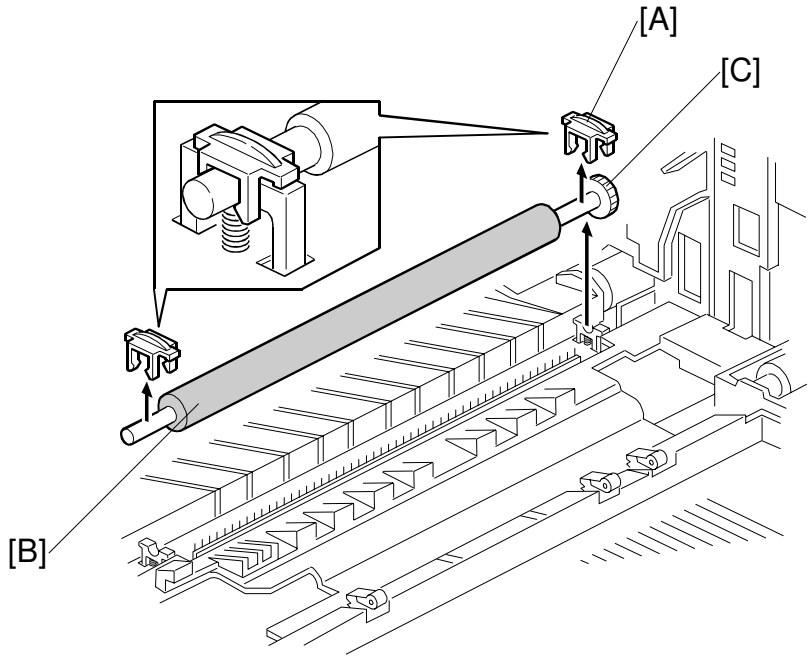
H538R035.WMF

6.5.2 TRANSFER ROLLER REMOVAL

Preparation:

1) Remove the toner cartridge.
2) Remove the upper unit. (See Upper Unit Removal.)
3) Remove the laser unit. (See Laser Unit Removal.)
4) Remove the fusing unit. (See Fusing Unit Removal.)

A: Transfer roller upper bushings
B: Transfer roller
C: Gear



H538R556.WMF

NOTE: 1) Do not touch the transfer roller surface with bare hands.
2) Be careful, because there is grease on both ends of the shaft.

Reinstallation

Make sure the upper bushings are set correctly as shown.

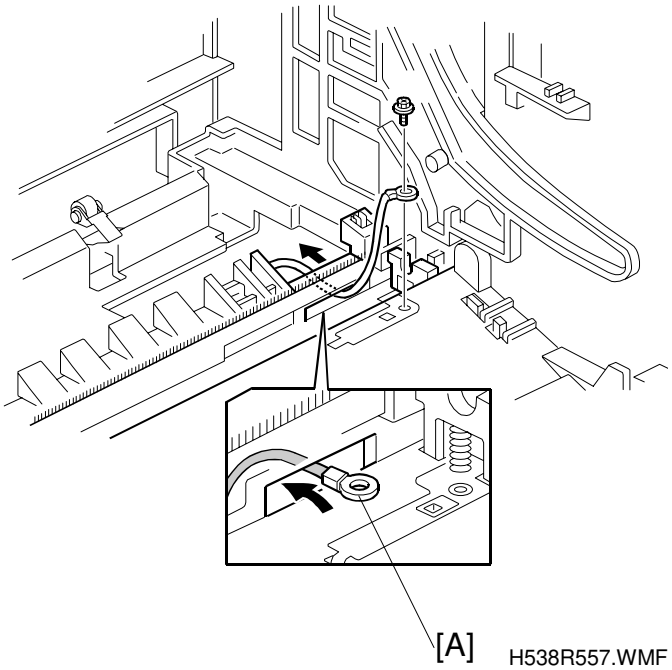
Apply grease (KS-660) to both ends of the roller shaft.

6.5.3 LOWER UNIT SHELL REMOVAL

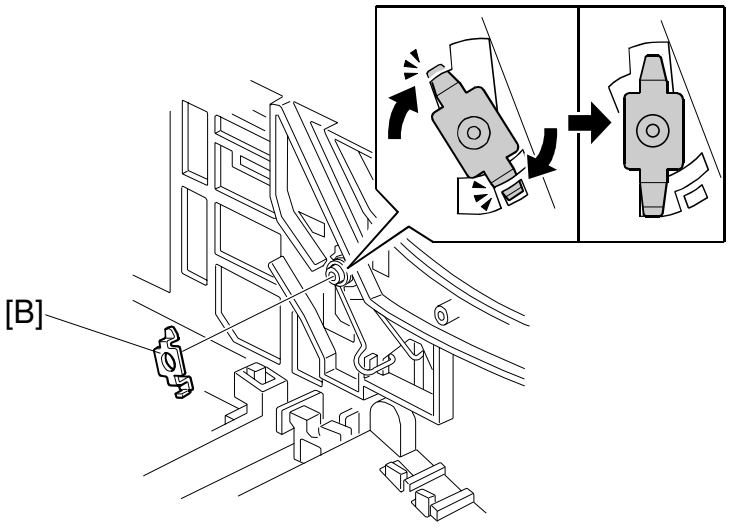
Preparation:

1) Remove the upper unit. (See Upper Unit Removal.)
2) Remove the laser unit. (See Laser Unit Removal.)
3) Remove the fusing unit. (See Fusing Unit Removal.)
4) Remove the main motor. (See Main Motor Removal.)
5) Remove the transfer roller. (See Transfer Roller Removal.)
6) Remove the toner end sensor connector. (See Paper Feed Roller Removal.)

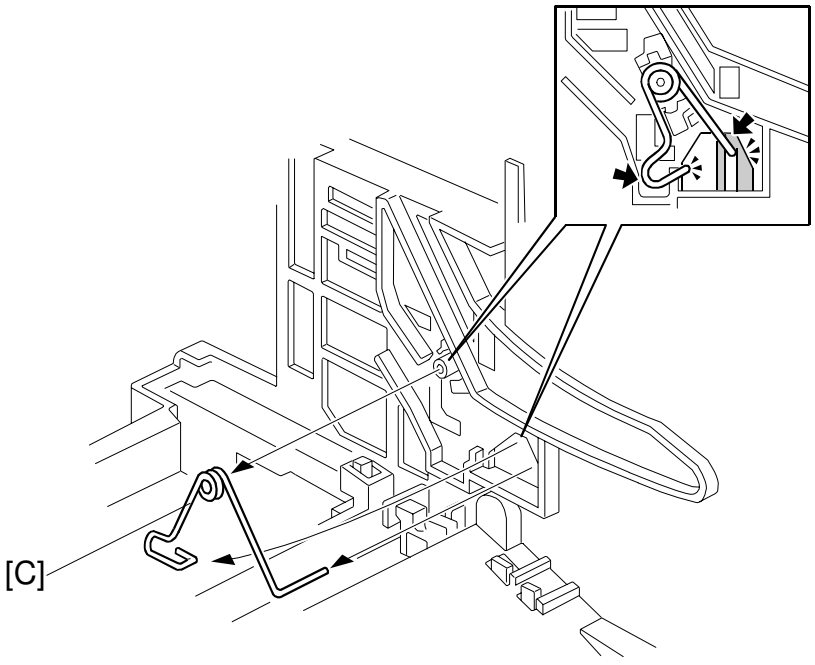
A: Transfer terminal (1 tapping screw)



B: Spring holder: Push the spring holder and turn it clockwise to remove it.
C: Toner cartridge stopper spring

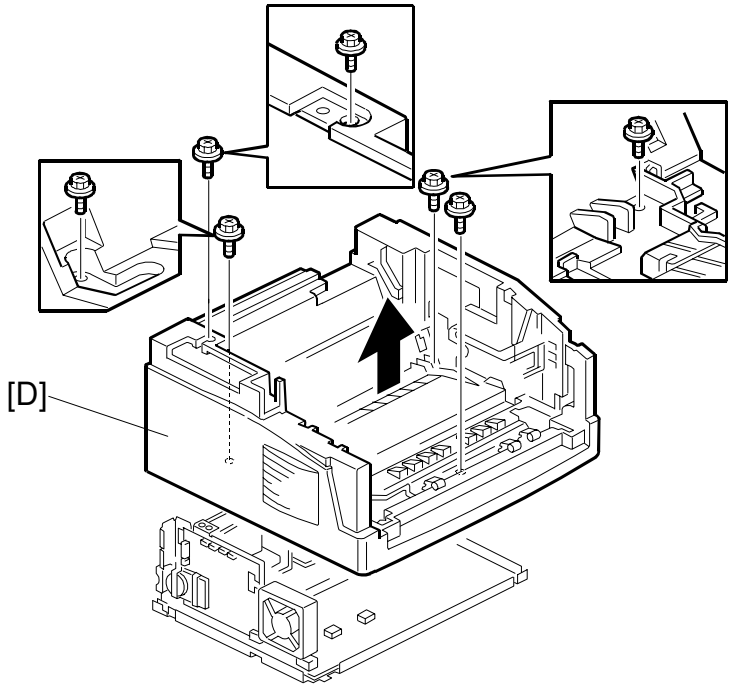


H538R026.WMF

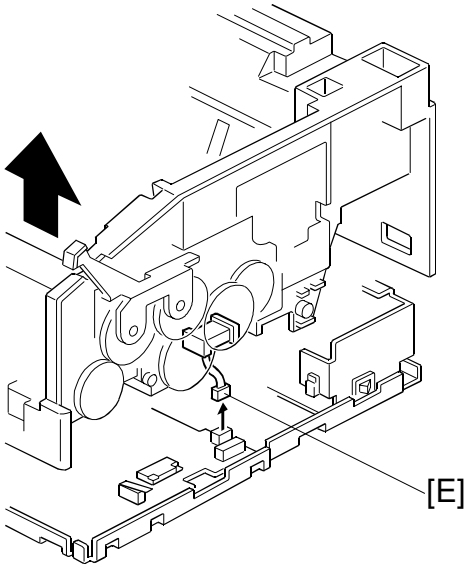


H538R027.WMF

D: Lower unit shell (4 Philips screws): Lift the lower unit shell slightly and remove the paper feed clutch solenoid connector [E].



H538R032.WMF



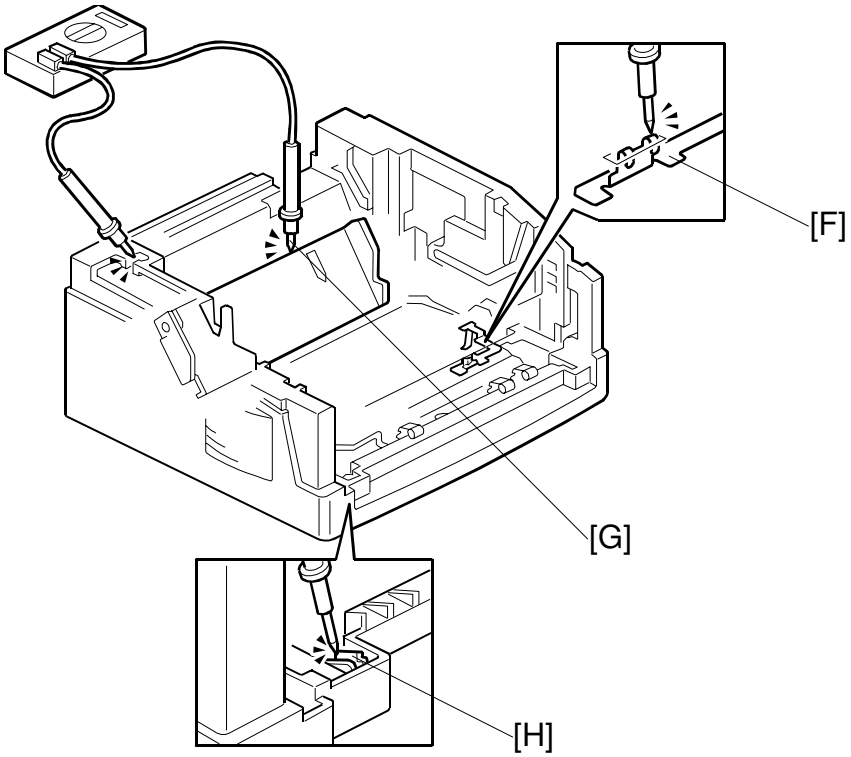
H538R040.WMF

Reinstallation

NOTE: 1) Make sure no wires are pinched under the frame unit.
2) Do not damage the terminal plates.

Confirm the following ground contacts:

F: Between paper pick-up solenoid and base frame.
G: Between the grounding terminal of the upper tray bottom plate and base frame.
H: Between the grounding terminal of the fusing unit and base frame.



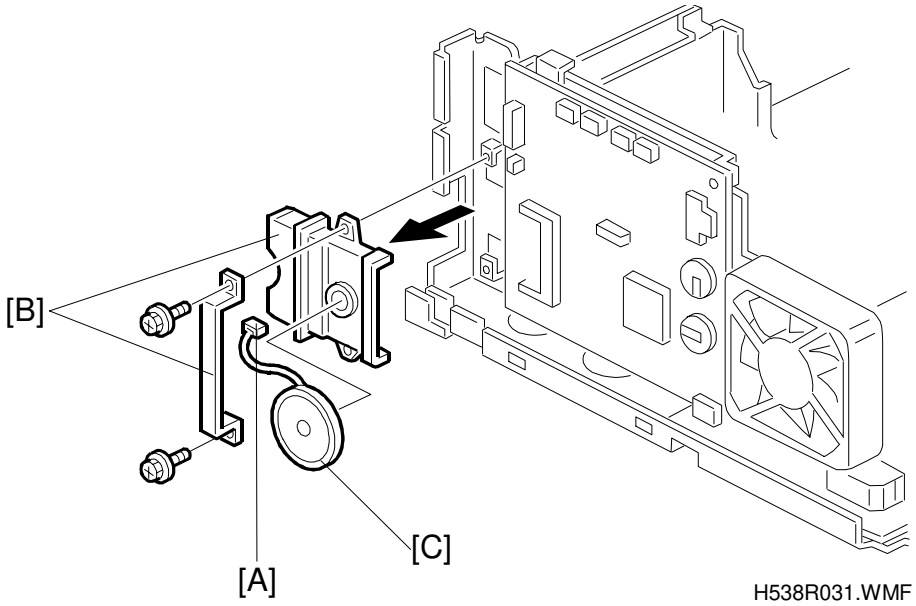
H538R033.WMF

6.5.4 MONITOR SPEAKER REMOVAL

Preparation:

1) Remove the lower unit shell. (See Lower Unit Shell Removal)

A: 1 connector
B: Speaker holders (2 Philips screws)
C: Monitor speaker

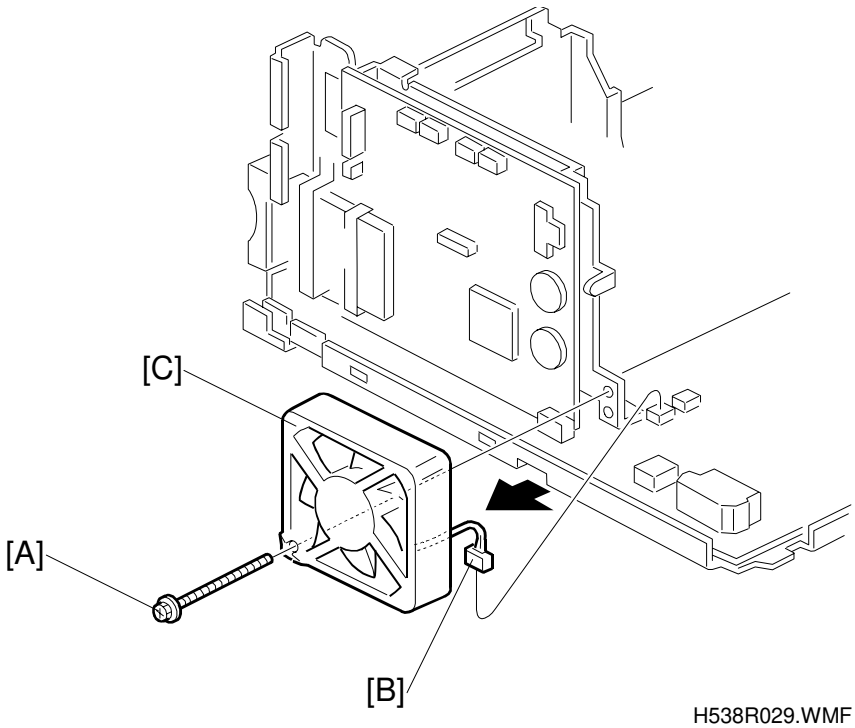


6.5.5 FAN MOTOR

Preparation:

1) Remove the lower unit shell. (See Lower Unit Shell Removal)

A: 1 Philips screw (M3 x 30 mm)
B: 1 connector
C: Fan motor



H538R029.WMF

6.6 PCBS

6.6.1 FCU (FACSIMILE CONTROL UNIT) REMOVAL

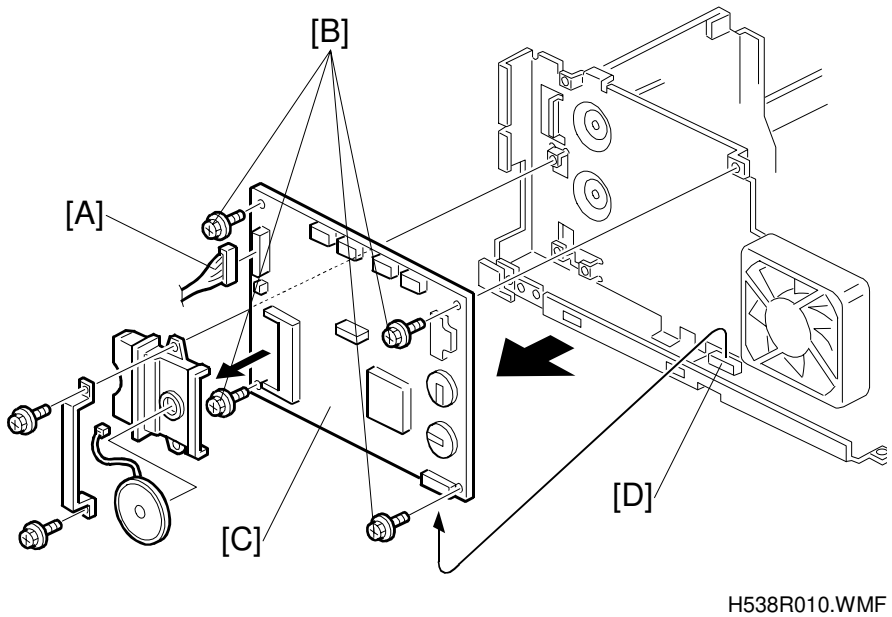
⚠CAUTION FOR LITHIUM BATTERY (MEMORY BACK-UP)
The danger of explosion exists if a battery of this type is incorrectly replaced. Replace only with the same or an equivalent type recommended by the manufacturer. Discard used batteries in accordance with the manufacture's instructions.

Preparation:

1) Remove the lower unit shell. (See Lower Unit Shell Removal)
2) Remove the monitor speaker. (See Monitor Speaker Removal)

A:1 connector
B: 4 Philips screws
C: FCU

Disconnect the FCU from the connector [D] on the mechanical control board.



H538R010.WMF

Reinstallation

Execute RAM clear. (Refer to section 4.)

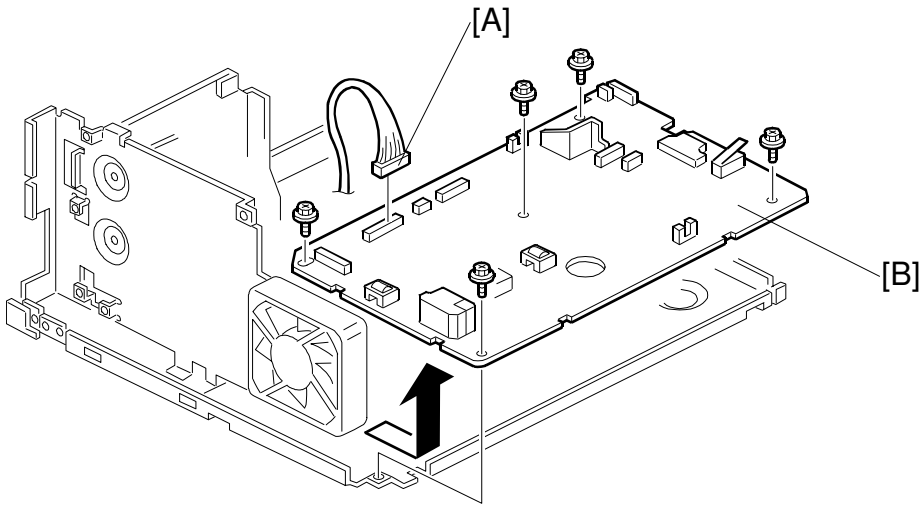
Do the CIS shading adjustment. (Refer to section 4.)

6.6.2 MCB (MECHANICAL CONTROL BOARD) REMOVAL

Preparation

1) Remove the FCU. (See FCU Removal)
2) Remove the fan motor. (See Fan Motor Removal)

A: 1 connector (CN8)
B: Mechanical control board (5 Philips screws)



H538R009.WMF

Reinstallation

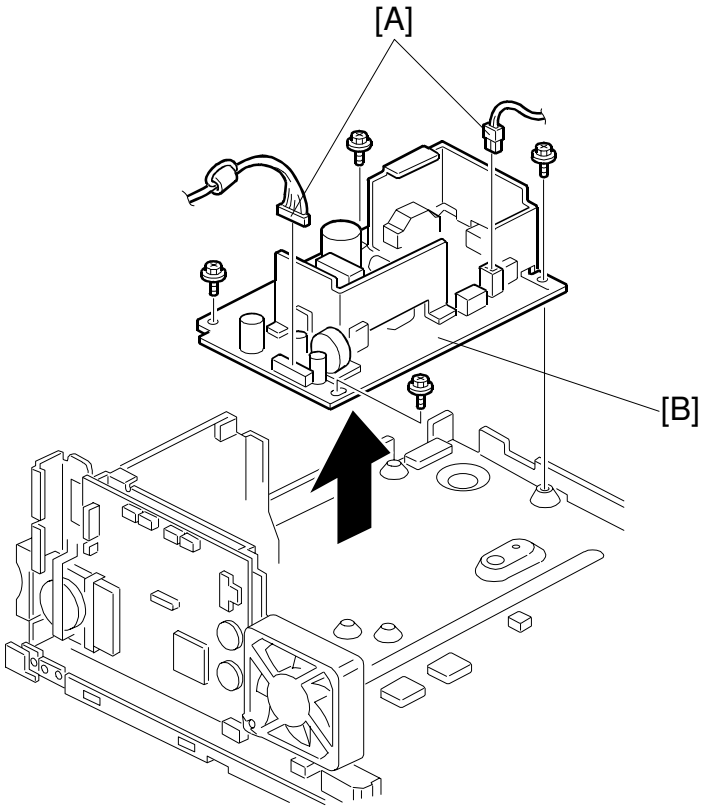
Make sure that the insulation sheet is placed under the mechanical control board.

6.6.3 PSU (POWER SUPPLY UNIT) REMOVAL

Preparation

1) Remove the lower unit shell. (See Lower Unit Shell Removal.)

A: 2 connectors (CN1, CN2)
B: PSU (4 Philips screws)



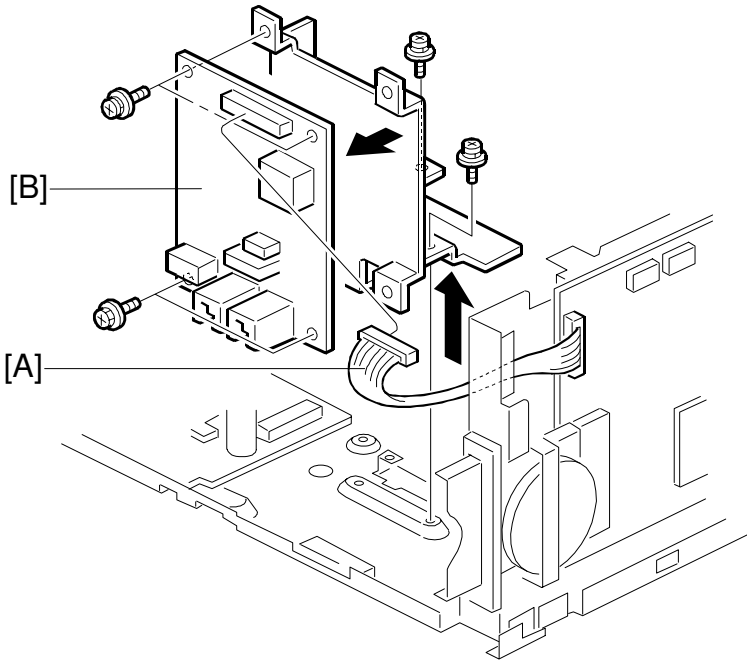
H538R008.WMF

6.6.4 NCU (NETWORK CONTROL UNIT) REMOVAL

Preparation

1) Remove the lower unit shell.

A: 1 connector
B: Network control board (4 Philips screws)



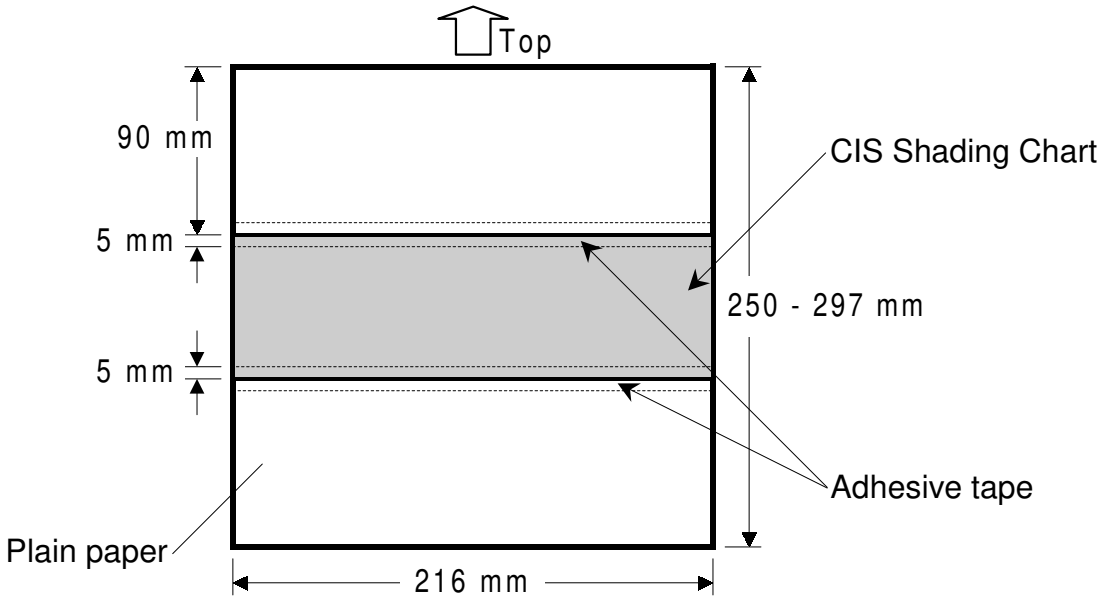
H538R030.WMF

6.7 ADJUSTMENT

6.7.1 CIS SHADING ADJUSTMENT

Do the following adjustment after replacing the CIS or the FCU (also after RAM reset level 1). Refer to section 4.2.15 for how to do the adjustment.

1. Provide the CIS shading chart (P/No. H0689300, refer to section 5-1) and a sheet of letter-width paper.
   NOTE: If no letter size paper is available, create a piece of letter size paper from A3 paper.
2. Attach a CIS shading chart to the provided paper in accordance with the following drawing.
   NOTE: 1) The paper width and the CIS shading chart position on the paper are very important, but the paper length is not; the paper length may be between 250 mm and A4 length (297mm).
   2) Do not use glue to attach the chart.



Shading Chart

H538R500.WMF

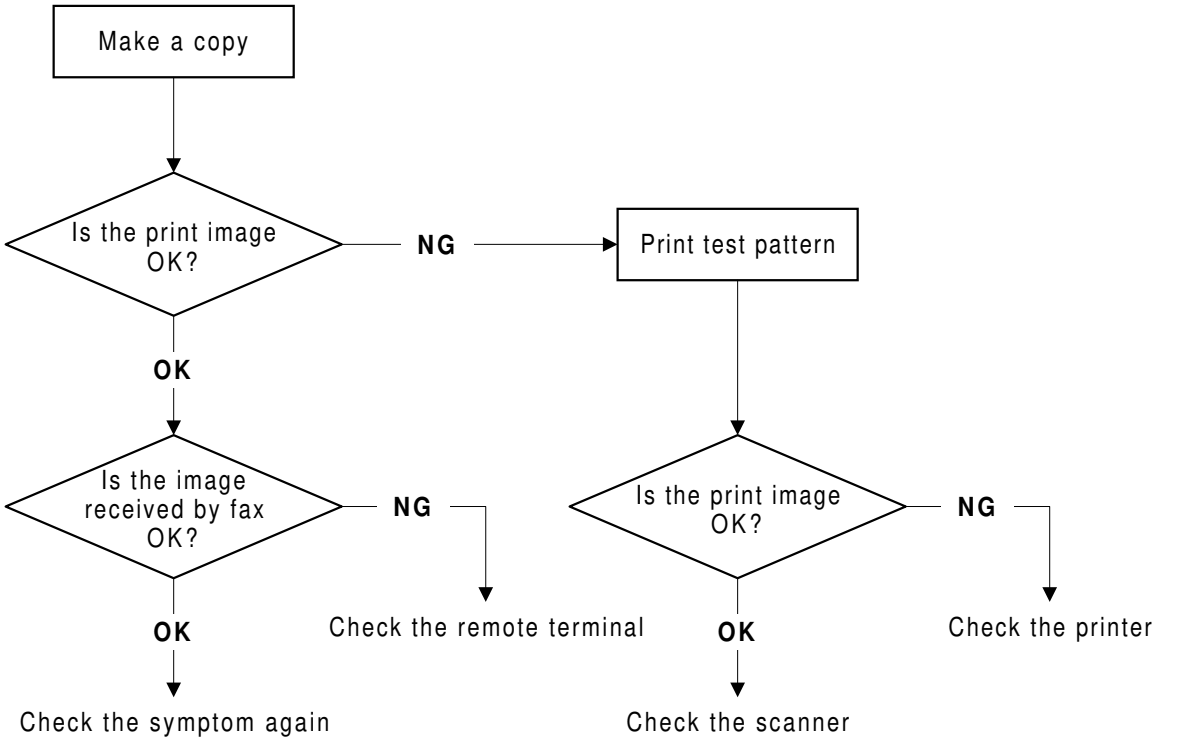
3. Place the chart in the ADF.
4. Enter the service mode, and select Function 10-2.
5. Press ◇
   The chart starts feeding and the shading value will be adjusted and stored in the FCU.

NOTE: With normal A4 paper instead of the above shading chart, the shading test is possible, but the adjustment level will not be perfect, so the image quality especially in halftone mode will be poor. Also, if the shading test is done using A4 width paper, some elements at the left side of the CIS cannot be adjusted, because the CIS is letter-width.

7. TROUBLESHOOTING

7.1 COPY QUALITY TROUBLESHOOTING

If there is a copy quality problem that cannot be solved easily, try using the following troubleshooting procedures, while referring to the point to point diagram. The procedures may not be exhaustive, but they may help you to find the problem.



H538T501.WMF

First, distinguish whether the problem is caused by the remote terminal or by your machine. If your machine causes the problem, determine whether it is due to a scanner or printer problem.

7.1.1 BLANK COPIES

Possible Cause (Printer):

- Defective toner cartridge
- Defective laser unit
- The proper bias voltages are not applied to the toner application roller and/or the development roller.
- The proper current is not applied to the transfer roller.
- Defective MCB (Mechanical Control Board)

Action:

1. Print a test pattern, and open the cover in the middle of printing.
2. Check to see if there is toner adhered to the drum surface.
   If there is, do the following. If not, go to step 3.
   - Check to see if the cartridge is correctly installed.
   - Check to see if the transfer roller is correctly positioned.
3. Check if there is toner on the surface of the development roller.
   If there is, do the following. If not, go to step 4.
   - Check to see if the laser optic components are properly positioned.
4. Check to see if the cartridge is empty. If it is, replace the cartridge.
   If not, do the following.
   - Check the connection between the MCB (CN3) and the toner end sensor.
   - Replace the toner end sensor.
5. Check to see if there is proper contact between the toner cartridge terminals and the MCB.
6. Check that the laser unit is properly positioned and that there are no obstructions in the laser path.

7.1.2 BLACK COPIES

Possible Causes (Scanner)

- Defective CIS unit

Action:

1. Check that the LED array is working properly in copy mode.
2. Check the connection between the FCU (CN5) and the CIS.
3. Replace the CIS.

Possible Causes (Printer)

- Defective toner cartridge
- Charge is not properly applied.
- Defective laser unit
- Defective MCB

Action:

1. Check the connections between the charge terminal and the terminal on the MCB.
2. Check the connectors for the laser unit.

7.1.3 DIRTY BACKGROUND

H538T502.WMF

H538T503.WMF

Possible Cause (Scanner)

- Scanner shading correction error or incorrect threshold level.

Action:

1. Clean the shading plate.
2. Adjust the threshold setting of CIS (Service Function 10)

Possible Causes (Printer)

- Poor drum sensitivity
- The charge voltage is not properly supplied.
- The hot roller is dirty.
- Defective MCB

Action:

1. Try replacing the cartridge.
2. Check to see if the hot roller surface or cleaning pad is dirty.
   - If it is, clean the roller or replace the cleaning pad.
   - If not, go to step 3.
3. Check the connections between the charge terminal and the terminal on the MCB.

7.1.4 UNEVEN IMAGE DENSITY

H538T504.WMF

H538T503.WMF

Possible Cause (Scanner)

- Dirty exposure glass
- Partial scanner lamp defect

Action

- Check that the LED array is working properly in copy mode.
- Clean the exposure glass of the image sensor.
- Replace the image sensor.

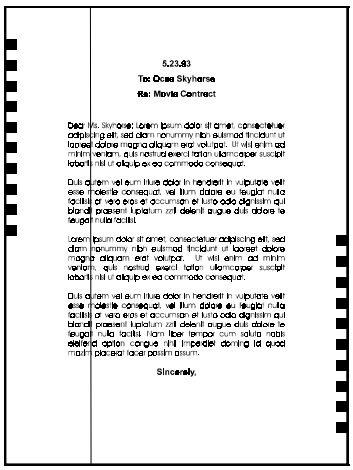
Possible Causes (Printer)

- Poor drum sensitivity
- Dirty or damaged transfer roller
- Dirty or defective laser unit
- Damp paper was used.

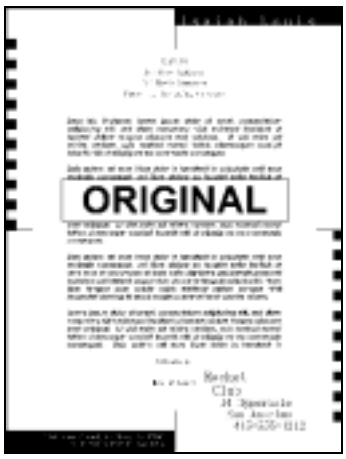
Action:

1. Print a solid black test pattern, and open the cover in the middle of printing.
2. If the image is lighter in the center of the image, the toner may be low. Replace the cartridge. If it is not, go to step 3.
3. Check to see if the toner is evenly distributed on the drum.
   - If it is not, check the cartridge and the laser optic components.
   - If it is, check if there is any dirt on the transfer roller surface.

7.1.5 VERTICAL BLACK LINES



H538T505.WMF



H538T503.WMF

Possible Causes (Scanner)

- Defective contact image sensor element(s).
- Dirt or dust on the exposure glass.
- Dirty shading plate

Action:

1. Clean the exposure glass and the shading plate.
2. Replace the contact image sensor.

Possible Cause (Printer)

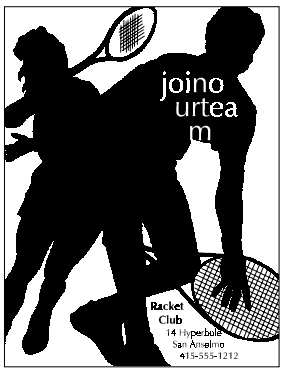
- Defective toner cartridge
- Dirt or scratches on the hot roller surface
- Dirty hot roller strippers

Action:

1. Replace the cartridge.
2. Clean or replace the hot roller
3. Clean or replace the hot roller strippers.

7.1.6 HORIZONTAL BLACK LINES

H538T506.WMF



H538T507.WMF

Possible Cause (Printer):

- Defective toner cartridge

Action:

- Check that the surface of the drum is not damaged.
- Replace the cartridge if damaged.

7.1.7 VERTICAL WHITE LINES

H538T508.WMF

H538T503.WMF

Possible Cause (Scanner)

- Defective image sensor element(s).

Action:

- Replace the image sensor.

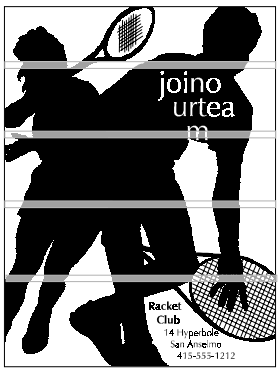
Possible Cause (Printer)

- Defective toner cartridge
- The laser optic components are dirty.
- The transfer roller surface is dirty or damaged.
- The hot roller stripper scrapes off toner from the print paper.
- Damaged cleaning blade.

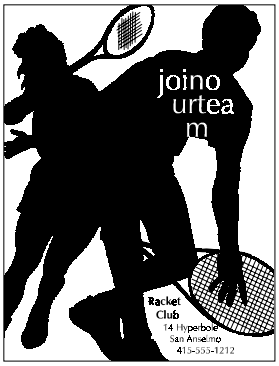
Action:

- Check the following components. Then clean or replace them if necessary.
  - Laser optic components
  - Transfer roller
  - Hot roller strippers
- Replace the cartridge

7.1.8 HORIZONTAL WHITE LINES



H538T509.WMF



H538T507.WMF

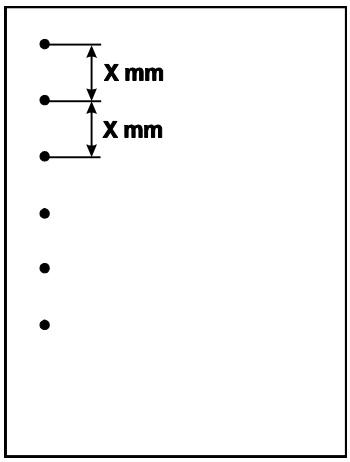
Possible Cause (Printer)

- A damaged or deformed development roller surface.
- The development bias is unstable.
- The transfer current is unstable.
- Defective MCB

Action:

1. Print a test pattern, and open the cover in the middle of printing.
2. Check to see if horizontal white lines (where toner is not adhered) appear on the drum surface or not.
   - If not, check the transfer roller is positioned correctly.
   - Check the connections between the development bias and charge terminals and the terminals on the MCB.
   - Change the cartridge.

7.1.9 BLACK DOTS/SPOTS



H538T510.WMF

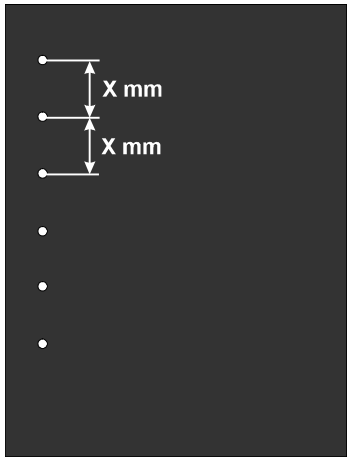
Possible Causes (Printer):

- The drum surface is damaged. (This is likely if the dots appear at 75.4 mm intervals.)
- The hot roller surface is damaged. (This is likely if the dots appear at 62.8 mm intervals.)

Action:

- Replace the defective component (hot roller or toner cartridge).

7.1.10 WHITE SPOTS IN BLACK IMAGE AREAS



H538T511.WMF

Possible Causes (Printer):

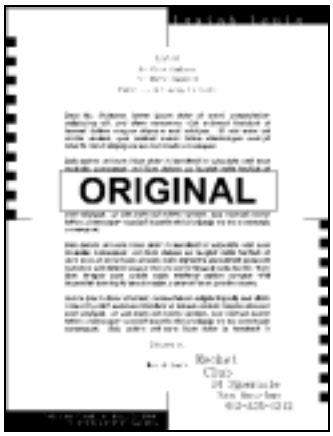
- The drum surface is damaged. (This is likely if the dots appear at 75.4 mm intervals.)
- The development roller surface is damaged (this is likely if the dots appear at 36.7 mm intervals).
- The toner application roller surface is damaged (this is likely if the dots appear at about 28.5 mm intervals).
- The transfer roller surface is damaged. (This is likely if the dots appear at 44 mm intervals.)

Action:

- Replace the defective component (transfer roller or toner cartridge).

7.1.11 FAINT COPIES

H538T512.WMF



H538T503.WMF

Possible Causes (Scanner):

- Dirty shading plate and/or exposure glass
- Incorrect scan threshold
- Defective contact image sensor

Action:

- Clean the shading plate and exposure glass.
- Adjust the threshold setting of the CIS (Service Function 10).
- Replace the image sensor.

Possible Causes (Printer):

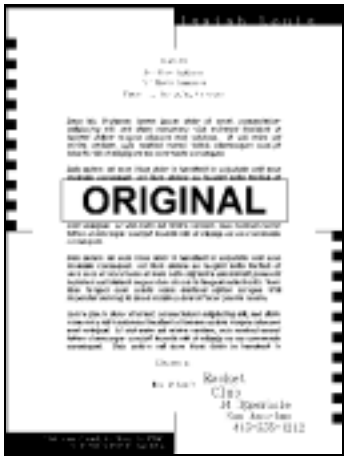
- Poor drum sensitivity
- Dirty laser optic components
- Incorrect development/transfer bias
- Low toner
- Low fusing temperature
- Damp paper was used.

Action:

1. Check if the laser optic components are dirty.
2. Print a test pattern, and open the cover in the middle of printing.
3. Check to see if toner on the paper at the entrance of the fusing unit appears faint.
   - If it does, check or replace the fusing lamp, thermistor, and PSU.
   - If it does not, go to step 4.
4. Check to see if toner on the drum looks faint.
   - If it does, go to step 5.
   - If it does not, check the contacts between the transfer bias terminals and MCB.
5. Check all the contacts between the bias terminals and MCB.
   - If it does not, try replacing the cartridge.

7.1.12 VERTICAL BLACK STREAKS

H538T513.WMF



H538T503.WMF

Possible Cause (Scanner):

- Dirty exposure glass

Action:

- Clean the exposure glass.

Possible Cause (Printer):

- A deformed, damaged, or incorrectly positioned toner metering blade

Action:

- Replace the toner cartridge.

7.1.13 UNFUSED COPIES

Possible Cause (Printer):

- The thermistor is defective.
- The fusing pressure roller spring mechanism is defective.
- The wrong type of toner is being used.
- A non-recommended type of paper is being used.

Action:

1. Check that the correct type of paper and toner are in use.
   - If it is, go to step 2.
   - If not, use recommended types of paper and toner.
2. Try replacing the fusing lamp and the hot and/or pressure roller.

7.1.14 GHOST IMAGE

Possible Causes (Printer):

- Dirty hot roller
- The cleaning blade is deformed or incorrectly positioned.
- Poor drum sensitivity

Action:

- Clean the hot roller surface and/or replace the cleaning pad.
- Replace the cartridge.

7.1.15 TONER ON THE BACK OF THE PRINTOUT

Possible Causes (printer):

- Dirty transfer roller
- Dirty fusing pressure roller

Action:

1. Check to see if the transfer roller is dirty with toner.
   - If it is, clean the roller surface by copying a sheet of white paper three times or more. (For better results, copy one sheet at a time)
   - If not, go to step 2.
2. Check to see if the fusing pressure roller is dirty with toner.
   - If it is, clean the fusing pressure roller.
   - If not, check for any other dirty rollers and clean them.

7.1.16 MISALIGNED OUTPUT (IMAGE SHIFTED TO THE RIGHT OR LEFT)

Possible Causes (Scanner):

- Incorrect setting of the document guide

Action:

- Set the document guide correctly.

Possible Cause (Printer):

- Incorrect setting of the paper guide

Action:

- Set the paper guide correctly.

7.1.17 MISALIGNED OUTPUT (IMAGE SHIFTED VERTICALLY)/ SHRUNKEN IMAGE

Possible Causes (Printer)

- Dirty paper feed roller

Action:

- Clean the paper feed roller.

7.2 MECHANICAL PROBLEMS

7.2.1 ADF/SCANNER

1. Non Feed

Possible Causes:

- An unsuitable document type or size, or curled document is used.
- The pick-up and feed rollers are dirty or worn out.
- Defective Tx motor
- Defective document sensor (S1)
- The ADF cover is not closed properly.

Action:

1. Check that a suitable type of document is used.
2. Check the following.
   - Clean the pick-up and feed rollers with a soft cloth and water. Replace them if they are damaged.
   - Check that the Tx motor works correctly.
   - Check the connection between the FCU (CN4) and the Tx motor.
   - Check that the S1 sensor is working properly and the connection between the FCU (CN11) and the sensor. Replace it if it is damaged.
   - Check that the ADF cover is securely closed.

2. Jam

Possible Causes:

- An unsuitable type or size of document is used.
- The document is too long.
- The ADF rollers (pick-up, feed, R1 and R2 rollers) are dirty.
- Obstruction in the document paper path.
- Defective Tx motor
- Defective document sensor (S1)
- Defective scan line sensor (S2)
- The ADF cover is not closed properly.

Action:

1. Check if a suitable type of document is used and that the document length is within the maximum limit.
2. Check for obstructions in the paper path.
3. If the problem still remains, do the following.
   - Clean the rollers with a soft cloth and water. Replace them if they are damaged.
   - Check that the Tx motor works correctly
   - Check that the S1 and S2 sensors are working properly. Replace them if they are damaged.
   - Check that the ADF cover is securely closed.

3. Skew

Possible Causes:

- An unsuitable document type or size is used.
- The ADF cover is not closed properly.
- The document guide is not set properly.
- The scanner rollers (pick-up, feed, R1 and R2 rollers) are dirty.
- Obstruction in the document paper path

Action:

1. Check that a suitable type of document is used.
2. Check that the ADF cover is securely closed, and check that the document guide is properly set. Also, check that the ADF roller assembly is properly installed.
3. Clean the rollers with a soft cloth and water, and replace them if they are damaged.
4. Check for obstructions in the paper path.

4. Multi-feed

Possible Causes:

- An unsuitable document type or size is used.
- The separation tab is worn or dirty.

Action:

- Clean or replace the separation tab.
- Check that the spring under the separation tab is properly installed.

7.2.2 PRINTER

1. Non Feed

Possible Causes:

- A non-recommended paper type is used.
- Malfunction in the paper pick-up cam and pick-up solenoid.
- Paper feed roller not properly set.
- The friction pad spring is not properly set.
- Obstructions in the paper path
- Defective paper pick-up drive mechanism
- Defective MCB (Mechanical Control Board)

Action:

1. Make sure that the correct type of paper is being used.
2. Make sure that the paper tray is correctly set.
3. Make sure that the paper pick-up mechanism works correctly.
4. Make sure that the paper feed roller is installed properly. Clean or replace if necessary.
5. Check if there are any obstructions in the paper feed path.
6. Make sure that all the gears are installed properly.
7. Check the connections between the MCB (CN13) and the paper pick up solenoid.

2. Paper Jam (Registration Area)

Possible Causes:

- A non-recommended type of paper is used.
- The paper feed roller is dirty.
- Defective registration sensor
- Obstruction in the paper path
- Defective MCB (Mechanical Control Board)

Action:

1. Make sure that the correct type of paper is being used, and that the paper tray and guide are positioned correctly.
2. Check for obstructions in the paper path.
3. Check the paper feed roller and its mechanism. Clean or replace if necessary.
4. Make sure that the registration sensor is working properly.
5. Check the fusing unit drive mechanism.

3. Paper Jam (Fusing Exit area)

Possible Causes:

- A non-recommended type of paper is used.
- Obstruction in the paper path
- Defective registration sensor
- Malfunctions in the fusing drive mechanism
- Defective paper exit sensor
- Malfunction in the hot roller stripper(s) mechanism
- Malfunction in the pressure mechanism in the fusing unit
- Defective MCB (Mechanical Control Board)

Action:

1. Make sure that the correct type of paper is being used.
2. Check for obstructions in the paper path.
3. Make sure that the registration sensor is working correctly.
4. Check all the gears in the fusing drive mechanism.
5. Make sure that the paper exit sensor is working correctly.
6. Check the hot roller strippers and the pressure mechanism in the fusing unit.

4. Skew

Possible Causes:

- A non-recommended type of paper is used.
- Incorrect positioning of the paper guide in the upper paper tray
- The paper feed roller is worn out or damaged.
- Obstruction in the paper path
- Malfunction of the registration or paper exit sensor actuators
- Malfunctions in the pressure mechanism of the fusing unit

Action:

1. Make sure that the correct type of paper is used.
2. Make sure that the paper guide on the upper paper tray is positioned correctly.
3. Make sure that the paper feed roller is installed correctly, and clean or replace it if necessary.
4. Check for obstructions in the paper path.
5. Check the registration and paper exit sensor actuators.
6. Check the fusing unit’s pressure mechanism.

5. Multi-feed

Possible Causes:

- A non-recommended type of paper is used.
- The friction pad is dirty
- Malfunctions in the paper pick-up mechanism

Action:

- Check if a correct type of paper is used.
- Make sure that the paper guide is positioned correctly.
- Check the friction pad, and clean or replace it if necessary.
- Make sure that the paper pick-up mechanism works correctly.

7.3 SERVICE CALL CONDITIONS

If the Call Service indicator is lit, one of the following conditions has occurred:

Symptom	Error Code	Sub-code	SC-code
Laser diode failure	9-20	21	2-21
Fusing unit failure (fusing lamp at high temperature during printing)	9-22	01	0-01
Fusing unit failure (fusing lamp not at printing temperature after warm-up)	9-22	02	0-02
Fusing unit failure (fusing lamp at high temperature in energy saver mode)	9-22	03	0-03
Fusing unit failure (fusing lamp at high temperature in standby mode)	9-22	04	0-04
Fusing unit failure (fusing lamp at low temperature in standby mode)	9-22	05	0-05
Fusing unit failure (fusing lamp at low temperature during printing)	9-22	06	0-06
Fusing unit failure (fusing lamp at low temperature during printing)	9-22	07	0-07
Fusing unit failure (fusing lamp at an extremely high temperature)	9-22	08	0-08
Fusing unit failure (thermistor error)	9-22	09	0-09
Fusing unit failure (fusing lamp at high temperature in standby mode)	9-22	0A	0-0A
Fusing unit failure (fusing lamp at high temperature during any condition except in energy saver mode)	9-22	0B	0-0B
Hexagonal mirror motor startup error	9-23	31	3-31
Power pack failure (development roller bias too high)	9-29	51	5-51
Power pack failure (charge brush roller bias too high)	9-29	52	5-52
Power pack failure (transfer roller bias too high)	9-29	53	5-53
Power pack failure (development roller too low)	9-29	54	5-54
Power pack failure (charge brush roller bias too low)	9-29	55	5-55
Power pack failure (transfer roller bias too low)	9-29	56	5-56
Power pack failure (incorrect bias for development and toner application rollers)	9-29	57	5-57
Power pack failure (incorrect bias for development and toner application rollers)	9-29	58	5-58
Unexpected printer error (a Printer Ready signal is not detected)	9-35	61	6-61
Unexpected printer error (a valid signal is not received)	9-35	62	6-62

To find out which problem has occurred, either:

- See the Auto Service Call report sent to the service station by the machine. This report lists a sub-code, as well as the error message; this sub-code may help you find the problem.
  Alternatively, check the sub-code stored at RAM address 80764B(H).
- Check the error code history using service function 03.
- Try to clear the service call condition (for failures which are not related to the fusing unit): switch the power off, wait 10 seconds, then switch it back on (for fusing unit errors, set printer switch 01 bit 0 to 1 before switching the machine off)
- The LCD panel displays an SC code when the error occurs.

After each troubleshooting attempt, reset the machine and try to operate it. If the machine still does not work, continue troubleshooting.

7.4 ERROR CODES

If an error code occurs, re-send the fax or have the end user send a fax back to you as the problem dictates. If the same problem occurs, try to fix the problem as suggested below. Note that error codes 4-01, 02, and 10 only appear in the error code display and the service report.

Code	Meaning	Suggested Cause/Action
0-00	DIS/NSF not detected within 40 seconds of pressing Start	Check the line connection. Check the NCU – FCU connectors. The machine at the other end may be incompatible. Replace the NCU or FCU. Check for DIS/NSF with an oscilloscope. If the RX signal is weak, it may be a bad line.
0-01	DCN received unexpectedly	The other party is out of paper or has a jammed printer. The other party pressed Stop key during communication.
0-03	Incompatible modem at the other end	The other terminal is incompatible.
0-04	CFR or FTT not received after modem training	Check the line connection. Check the NCU – FCU connectors. Try changing the TX level and/or cable equalizer settings. Replace the FCU or NCU. The other terminal may be faulty; try sending to another machine. If the RX signal is weak or defective, there may be a bad line. **Cross-reference** TX level - NCU Parameter 01 (PSTN), RAM 807FB7 (PABX) Cable equalizer - G3 Switch 07 (PSTN) Dedicated TX parameters - Section 4-5
0-05	Unsuccessful after modem training at 2400 bps	Check the line connection. Check the NCU – FCU connectors. Try adjusting the TX level and/or cable equalizer. Replace the FCU or NCU. Check for line problems. **Cross-reference** See error code 0-04.
0-06	The other terminal did not reply to DCS	Check the line connection. Check the FCU – NCU connectors. Try adjusting the TX level and/or cable equalizer settings. Replace the NCU or FCU. The other end may be defective or incompatible; try sending to another machine. Check for line problems. **Cross-reference** See error code 0-04.

Code	Meaning	Suggested Cause/Action
0-07	No post-message response from the other end after a page was sent	Check the line connection. Check the FCU – NCU connectors. Replace the NCU or FCU. The other end may have jammed or run out of paper. The other end user may have disconnected the call. Check for a bad line. The other end may be defective; try sending to another machine.
0-08	The other end sent an RTN or PIN after receiving a page, because there were too many errors	Check the line connection. Check the FCU – NCU connectors. Replace the NCU or FCU. The other end may have jammed, or run out of paper or memory space. Try adjusting the TX level and/or cable equalizer settings. The other end may have a defective modem/NCU/FCU; try sending to another machine. Check for line problems and noise. **Cross-reference** TX level - NCU Parameter 01 (PSTN), RAM 807FB7 (PABX) Cable equalizer - G3 Switch 07 (PSTN) Dedicated TX parameters - Section 4-5
0-14	Non-standard post-message response code received	Check the FCU – NCU connectors. Incompatible or defective remote terminal: try sending to another machine. Noisy line: re-send. Try adjusting the TX level and/or cable equalizer settings. Replace the NCU or FCU. **Cross-reference**: See error code 0-08.
0-15	The other terminal is not capable of a certain function	The other terminal does not have the SEP or SUB function.
0-17	Pressing the Stop key interrupts communication	If the Stop key was not pressed and this error keeps occurring, replace the operation panel or OPU.
0-20	Facsimile data not received within 6 seconds of retraining	Check the line connection. Check the FCU – NCU connectors. Replace the NCU or FCU. Check for line problems. Try calling another fax machine. Try adjusting the reconstruction time for the first line and/or RX cable equalizer setting. **Cross-reference** Reconstruction time - G3 Switch 0A, bit 6 RX cable equalizer - G3 Switch 07 (PSTN)

Code	Meaning	Suggested Cause/Action
0-21	EOL signal (end-of-line) from the other end not received within 5 seconds of the previous EOL signal	Check the connections between the FCU, NCU, & line. Check for line noise or other line problems. Replace the NCU or FCU. The remote machine may be defective or may have disconnected. **Cross-reference** Maximum interval between EOLs and ECM frames - G3 Bit Switch 0A, bit 4
0-22	The signal from the other end was interrupted for more than the acceptable modem carrier drop time (default: 0.2 seconds)	Check the line connection. Check the FCU – NCU connectors. Replace the NCU or FCU. Defective remote terminal. Check for line noise or other line problems. Try adjusting the acceptable modem carrier drop time. **Cross-reference** Acceptable modem carrier drop time - G3 Switch 0A, bits 0 and 1
0-23	Too many errors during reception	Check the line connection. Check the FCU – NCU connectors. Replace the NCU, FCU. Defective remote terminal. Check for line noise or other line problems. Try asking the other end to adjust their TX level. Try adjusting the RX cable equalizer setting and/or RX error criteria. **Cross-reference** RX cable equalizer - G3 Switch 07 (PSTN) RX error criteria - Communication Switch 02, bits 0 and 1
0-24	Printer failure occurred while the memory was full during non-ECM reception; negative response returned	There is no memory space available, or substitute reception is disabled. Try asking the user to add optional extra memory.
0-25	Memory filled up during reception, negative response returned	Check the amount of free memory. If necessary, make some space by outputting any messages still stored in the memory (either directly, or using forwarding if the printer is down) Try asking the user to add optional extra SAF memory. Defective optional memory card Defective FCU board
0-29	Data block format failure in ECM reception	Check for line noise or other line problems. Try receiving from another machine. Replace the FCU.

Code	Meaning	Suggested Cause/Action
0-30	The other terminal did not reply to NSS(A) in AI short protocol mode	Check the line connection. Check the FCU – NCU connectors. Try adjusting the TX level and/or cable equalizer settings. The other terminal may not be compatible. **Cross-reference** Dedicated TX parameters - Section 4-5
0-32	Incompatible capability command was received	The machine at the other end could not detect DIS/NSF signal correctly.
0-52	Polarity changed during communication	Check the line connection. Retry the communication.
0-79	Called terminal detected CI while waiting for a V.21 signal	Check for line noise or other line problems. If this error occurs, the called terminal falls back to T.30 mode.
0-86	The line was disconnected because the other terminal requested a data rate using MPh that was not available in the currently selected symbol rate	The other terminal was incompatible. Ask the other party to contact the manufacturer.
0-87	The control channel started after an unsuccessful primary channel	The receiving terminal restarted the control channel because data reception in the primary channel was not successful. This does not result in an error communication.
0-88	The line was disconnected because PPR was transmitted/received 9 (this is the default) times within the same ECM frame	Try using a lower data rate at the start. Try adjusting the cable equalizer setting.
1-00	Document jam	Incorrectly inserted document or unsuitable document type. Check the ADF drive components and sensors. **Cross-reference** ADF mechanical problems - Section 7-2-1
1-01	Document length exceeded the maximum	Try changing the maximum acceptable document length. Divide the document into smaller pieces. Check the ADF drive components and sensors. **Cross-reference** Max. document length - Scanner switch 00, bits 2 and 3 ADF mechanical problems - Section 7-2-1
1-02	Shading error (Interval of original documents is too short)	Check the ADF drive components and sensirs.

Code	Meaning	Suggested Cause/Action
1-10	Paper at the scan line when the power was turned on	Remove the document. Check the scan line sensor. **Cross-reference** ADF mechanical problems - Section 7-2-1
1-17	Document jam in the feed-out area	Clear any debris from the sensor actuator. Check the ADF drive components and sensors. **Cross-reference** ADF mechanical problems - Section 7-2-1
1-20	Paper did not reach the fusing exit at the end of printing	Remove the paper. Check the printer drive components and sensors. **Cross-reference** Printer mechanical problems - Section 7-2-2
1-21	Paper present at the fusing exit after printing	Remove the paper. Check the printer drive components and sensors. **Cross-reference** Printer mechanical problems - Section 7-2-2
1-30	Paper ran out during printing	Add paper in the upper paper tray.
1-34	Paper ran out after printing	Add paper in the upper paper tray.
1-71	The cover was opened during printing	Close the cover.
2-10	The modem cannot enter TX mode	Replace the FCU.
2-11	Only one V.21 connection flag was received	Change the FCU.
2-12	Modem clock irregularity	Replace the FCU.
2-13	Modem initialization error	Turn off the machine, then turn it back on.
2-20	Abnormal coding/decoding (CPU not ready)	Replace the FCU.
2-50	The machine reset itself	Replace the FCU.
4-01	Line current was cut	Check the line connection. Check the connection between FCU and NCU. Replace the FCU or the NCU.
4-02	The other end cut the received page, because it was longer than the maximum limit	Split the page into smaller pieces, or ask the other end to change their maximum receive length setting, then re-send.
4-10	Communication failed because of Tel. No./CSI mismatch (Protection against Wrong Connections)	Reprogram the CSI correctly, then re-send. The machine at the other end may be defective.

Code	Meaning	Suggested Cause/Action
5-00	Data reconstruction not possible	Replace the FCU.
5-10	DCR timer expired	Replace the FCU.
5-20	Storage impossible because of a lack of memory	Temporary memory shortage. Replace the FCU or optional memory card.
5-21	Memory overflow	
5-22	Mode table overflow after the second page of a scanned document	Wait for the messages that are currently in the memory to be sent, or delete some files from memory.
5-23	Print data error when printing a substitute RX or confidential RX message	Ask the other end to re-send the message. Replace the FCU or IC memory card.
5-24	Memory overflow after the second page of a scanned document	Try using a lower resolution setting. Wait for the messages that are currently in the memory to be sent, or delete some files from memory.
5-25	SAF file access error	Replace the FCU or IC memory card.
5-30	Mode table for the first page to be printed was not effective	Replace the FCU or IC memory card.
6-00	G3 ECM - T1 time out during reception of facsimile data	Try adjusting the RX cable equalizer. Replace the FCU or NCU. **Cross-reference** RX cable equalizer - G3 Switch 07 (PSTN)
6-01	G3 ECM - no V.21 signal was received	
6-02	G3 ECM - EOR was received	
6-03	G3 ECM – non-standard V.21 code received	The other terminal may be defective.
6-04	G3 ECM - RTC not detected	Check the line connection. Check connections from the NCU to the FCU. Check for a bad line or defective remote terminal. Replace the FCU or NCU.
6-05	G3 ECM – facsimile data frame not received within 18 seconds of CFR, but there was no line fail	Check the line connection. Check connections from the NCU to the FCU. Check for a bad line or defective remote terminal. Replace the FCU or NCU. Try adjusting the RX cable equalizer **Cross-reference** RX cable equalizer - G3 Switch 07 (PSTN)
6-06	G3 ECM - coding/ decoding error	Defective FCU. The other terminal may be defective.
6-08	G3 ECM - PIP/PIN received in reply to PPS.NULL	The other end pressed Stop during communication. The other terminal may be defective.

Code	Meaning	Suggested Cause/Action
6-09	G3 ECM – ERR received	Check for a noisy line. Adjust the TX levels of the communicating machines. See code 6-05.
6-10	G3 ECM - error frames still received at the other end after all communication attempts at 2400 bps	Check for line noise. Adjust the TX level (use NCU parameter 01 or the dedicated TX parameter for that address). Check the line connection. Defective remote terminal. **Cross-reference** Dedicated TX parameters - Section 4-5
6-11	G3 ECM – printing impossible because of a missing first line in the MMR coding	Check for problems in the printer mechanism.
6-21	V.21 flag detected during high speed modem communication	The other terminal may be defective or incompatible.
6-99	V.21 signal not stopped within 6 seconds	Replace the FCU.
9-07	Paper jam at the upper paper tray	If the problem persists, replace the FCU. **Cross-reference** Paper non-feed - Section 7-2-2
9-08	Paper jam inside the development area	If the problem persists, check the registration sensor, or replace the FCU or MCB. **Cross-reference** Paper jam - Section 7-2-2
9-09	Paper jam in the fusing exit area	If the problem persists, check the paper exit sensor , or replace the FCU or MCB. **Cross-reference** Paper jam - Section 7-2-2
9-10	Toner end detected	Replace the cartridge.
9-12	Cover open detected during printing	Close the cover, or check the interlock switch.
9-20	Laser diode failure	If the problem persists, replace the FCU or LDDR.
9-22	Fusing lamp failure	If the problem persists, replace the MCB, fusing lamp, thermistor, or PSU.
9-23	Hexagonal mirror motor failure	If the problem persists, replace the FCU or polygonal mirror motor.
9-29	Power pack failure	If the problem persists, replace the power pack or PSU.
9-35	Unexpected printer error	Check the connection between the FCU and MCB. If the problem persists, replace the FCU or MCB.
9-60	Printer error occurs during reception	If substitute reception is switched off and a paper jam or other printer error occurs, the machine will terminate the reception. Check the printer mechanism.
9-61	Memory overflow occurs during reception	Check the SAF.

7.5 ELECTRICAL COMPONENT DEFECTS

7.5.1 DEFECTIVE SENSOR TABLE

Sensor	Status	Symptoms if Defective
Document sensor (S1)	ON	The LCD displays “CLEAR ORIGINAL” or “DIAL FAX NUMBER” at power-up.
	OFF	The LCD still displays “SET DOC. OR DIAL NO.” after a document is placed in the feeder.
Scan line sensor (S2)	ON	The LCD displays “CLEAR ORIGINAL” at power-up.
	OFF	The LCD displays “CLEAR ORIGINAL” soon after the start of copying.
Interlock switches	ON	There is no alarm on opening the front cover, and the LCD does not display “CLOSE COVER”.
	OFF	The LCD displays “CLOSE COVER” at power-up.
Registration sensor	ON	The LCD displays “CLEAR COPY” at power-up.
Fusing exit sensor	ON	The LCD displays “CLEAR COPY” at power-up.
Toner end sensor	ON	The LCD displays “ADD TONER” at power-up.
Paper end sensor	ON	The LCD displays “ADD PAPER” even if paper is remaining.

7.5.2 BLOWN FUSE TABLE

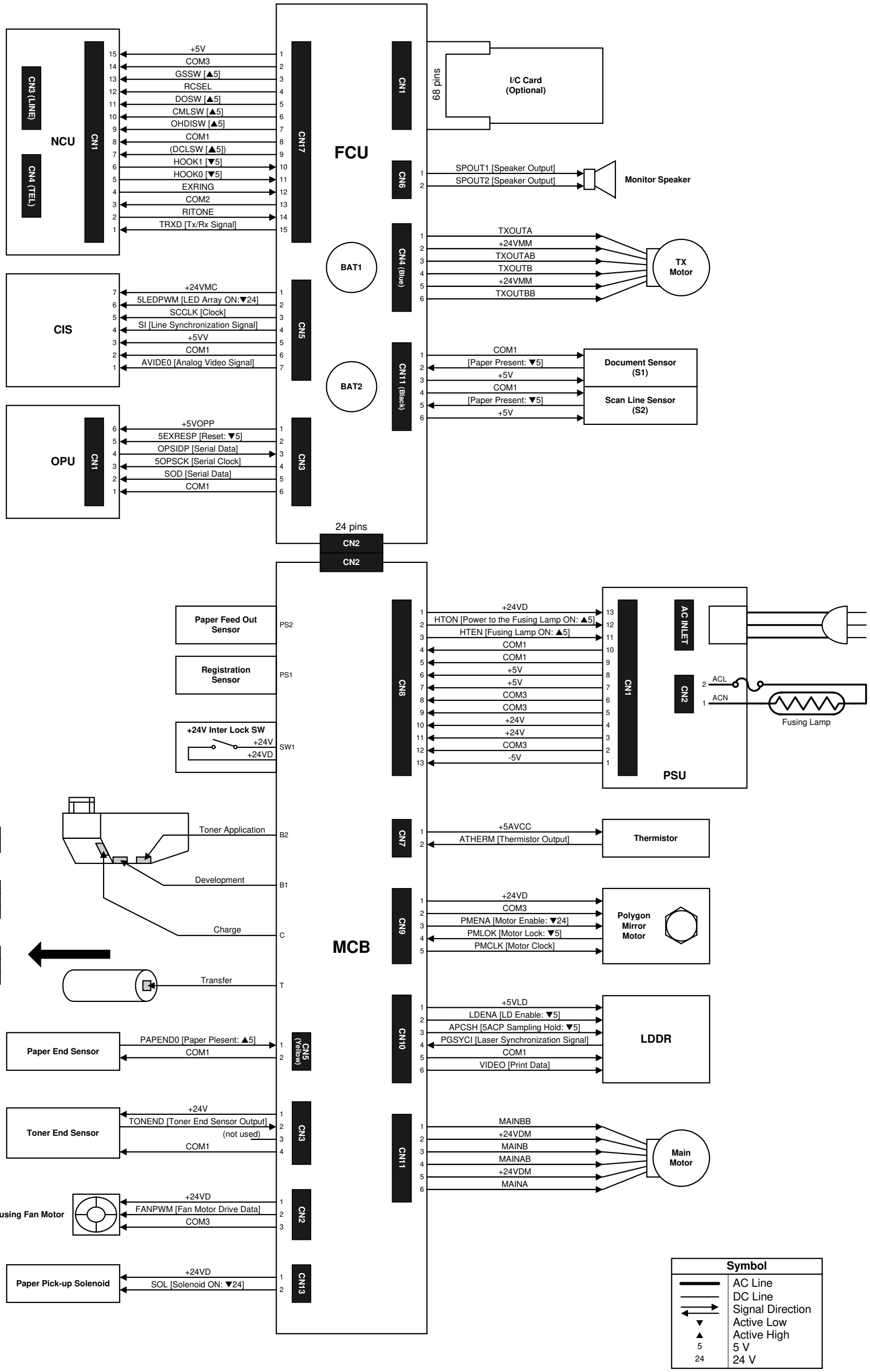
The only service-replaceable fuses are the following.

Fuse	Symptoms if Defective
PSU - F1, F2, F3, F4	The machine does not receive power.
Fusing unit - Thermofuse 1, 2	Fusing power is not supplied.

Point-to-Point Diagram

Model: H1 (H538)

Issued on 1 November, 2000
Revision 1.0
Subject to change



Charge (C)

CHPWM: ON	–1,200V
CHPWM: OFF	0V

Transfer (T)

	THTRG: ON	THTRG: OFF
TLPWM: OFF	X	–1,200V
TLPWM: OFF	5.0 µA	OFF

Development/Toner Application

	BIASCTL: H	BIASCTL: L
BIASPWM: OFF	250V/0V	–400V/–650V
BIASPWM: OFF	OFF	OFF

Symbol	
▬▬	AC Line
———	DC Line
⇄	Signal Direction
▼	Active Low
▲	Active High
5	5 V
24	24 V