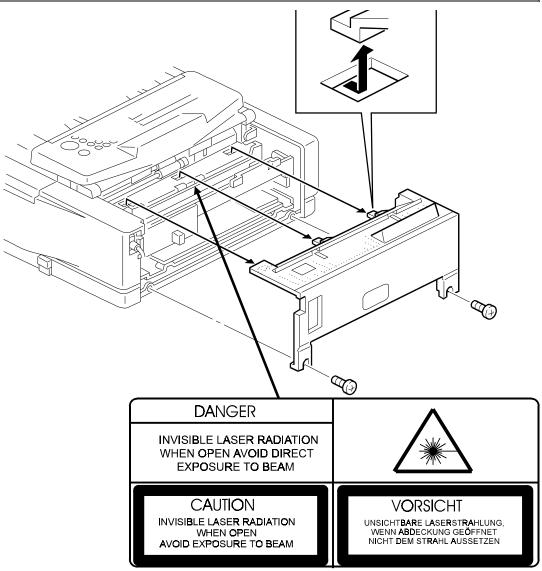
FX4

RICOH FAX4700L

SERVICE MANUAL

December 21st, 1995 Subject to change

▲ 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.



Lithium Batteries (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 manufacturer's instructions.

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1. OVERALL MACHINE INFORMATION

1.1. SPECIFICATIONS



Type Desktop type transceiver

Circuit PSTN, PABX, ISDN (optional)

Connection Direct couple

Document Size Length:

105 - 420 mm [4.1 - 16.5 ins] Up to 1.2 m [47.2 ins], manually assisted Up to 14 m [46 ft] after adjustment **Width:** 148 - 304 mm [5.8 - 12.0 ins] **Thickness:** 0.05 to 0.2 mm [2 to 8 mils]

0.05 to 0.2 mm [2 to 8 mils] (equivalent to 50 - 80 g/m²)

Document Feed

Automatic feed, face down

ADF Capacity

50 sheets (using Letter size 20 lb paper or A4 size 70 g/m² paper) 25 sheets (using Legal/Double Letter size 20 lb paper or B4/A3 size 70 g/m² paper)

Scanning Method

Flat bed, with CCD

Scan Width

219.5 mm [8.64 ins] ± 1% (A4/Letter) 260.1 mm [10.2 ins] ± 1% (B4) 308.9 mm [12.2 ins] ± 1% (A3/Double Letter)

Scan Resolutions

Main scan: 200 dpi Sub scan: Standard - 100 lpi Detail - 200 lpi Fine - 400 lpi Memory Capacity ECM: 128 kbytes

SAF:

Standard: 1 Mbytes: 73 pages With 2 Mbyte option: 219 pages With 4 Mbyte option: 365 pages With 80 Mbyte HDD option: 1200 pages With 80 Mbyte HDD plus Function Upgrade Card: 3000 pages Measured using ITU-T #1 test document (Slerexe letter)

Compression

MH, MR, EFC, MMR, SSC (MMR only with ECM and G4) SAF storage for memory tx: MMR and raw data

Protocol

Group 3 with ECM Group 4 (ISDN G4 option required)

Modulation

V.33/V.17(TCM), V.29 (QAM), V.27ter (PHM), V.21 (FM)

Data Rate (bps)

G3: 14400/12000/9600/7200/4800/2400, Automatic fallback **G4 (option):** 64 kbps/56 kbps

I/O Rate

With ECM: 0 ms/line Without ECM: 2.5, 5, 10, 20, or 40 ms/line

Transmission Time

G3: 6 s at 14400 bps; Measured with G3 ECM using memory for an ITU-T #1 test document (Slerexe letter) at standard resolution

G4 (option): 3 s at 64 kbps; Measured with an ITU-T #1 test document (Slerexe letter) at standard resolution

Printing System

Laser printing, plain paper, dry toner

OVERALL MACHINE INFORMATION FEATURES

Paper Size and Capacity



Standard Cassette: 250 sheets USA: Letter, Legal Europe: A4, A5 sideways Asia: A4, A5 sideways, F/F4 **100 Sheet Cassette (Optional):** 100 sheets USA: Letter, Legal Europe: A4, A5 sideways Asia: A4, A5 sideways, F, F4 Paper Feed Unit (Optional): 500 sheets USA: Letter, Legal Europe: A4, A5 sideways Asia: A4, A5 sideways Asia: A4, A5 sideways, F/F4 Note: Up to two PFUs can be installed.

Maximum Printing Width

208 mm [8.1 ins]

Print Resolutions

Fax and Copy Mode: Main scan: 400 dpi Sub scan: 400 dpi Printer Mode: 300 x 300 dpi

Power Supply

USA: 115 ± 20 Vac, 60 ± 1 Hz **Europe/Asia:** 187 - 276 Vac, 50 ± 3 Hz

Power Consumption (Base Machine Only) Standby:

Minimum 2 W (see Note) Normal 30 W Transmitting: 60 W Receiving: 220 W (Maximum: 900 W) Copying: 330 W (Maximum: 900 W)

Note: 2W mode is not available if one of the following options is installed.

- Printer interface unit
- G4
- RS232C interface

Operating Environment

Temperature: 17 - 28 °C [63 - 82 °F] **Humidity:** 40 - 70 %Rh

Dimensions (W x D x H)

475 x 520 x 260 mm [18.7 x 20.5 x 10.2 ins] Excluding handset, trays, and optional units

Weight

Approx. 19 kg [50.9 lbs] Excluding CTM, handset, trays, and optional units

1.2. FEATURES

1.2.1. Features List

KEY:

- O = Used, X = Not Used,
- A = With optional memory 2M/4M only
- B = With optional memory 80M (HDD) only
- C = With optional function upgrade card only
- D = With optional Fax On Demand kit only
- E = With optional 100 sheet cassette only
- F = With optional paper feed unit only
- G = With optional counter only
- H = With optional handset only (US only)
- I = With optional printer interface unit only
- J = With optional G4 kit only

Equipment	
ADF	0
Book scan	Х
Built-in handset	Х
Bypass feed: 1 sheet	0
Cabinet	Х
Counter	G
Cutter	Х
Handset	Н
Hard disk	В
Manual feed mechanism (ADF)	Х
Marker (Stamp)	0
Monitor speaker	0
Optional cassette: 100 sheets	Е
Optional Fax On Demand kit	D
Optional paper feed unit (up to 2 units)	F
Optional printer interface	Ι

Video Processing Features	
Contrast	0
Halftone (Basic & Error Diffusion)	0
MTF	0
Reduction before tx (B4 -> A4)	0
Reduction before tx (A3 -> B4)	0
Reduction before tx (A3 -> A4)	0
Scanning Resolution - Standard	0
Scanning Resolution - Detail	0
Scanning Resolution - Fine	0

OVERALL MACHINE INF	ORMATION
	FEATURES

Scanning Resolution - Superfine	Х
Smoothing to 400 x 400 dpi	0
when printing	0

Communication Features - Auto	
Automatic fallback	0
Automatic redialing	0
Confidential reception	A or B
Dual Access	0
Substitute reception	0

Communication Features - User Selectable	
Action as a transfer broadcaster	A or B
AI Redial (last ten numbers)	0
Answering machine interface	Х
Authorized Reception	0
Auto-answer delay time	Х
Auto dialing (pulse or DTMF)	0
Auto Document	0
Auto image density selection	Х
Auto paper size selection	Х
Automatic Voice Message	Х
Batch Transmission (max 6 files)	A or B
Broadcasting	0
Chain Dialing	0
Communication Result Display	Х
Confidential ID Override	0
Confidential Reception	A or B
Confidential Transmission	0
Direct Fax Number Entry	0
Economy Transmission	A or B
Fax on demand	D
Forwarding	A or B
Free Polling	0
Groups (7 groups)	0
Group Transfer Station	A or B
Hold	Х
ID Transmission	0
Immediate Redialing	0
Immediate transmission	0
Keystroke Programs	0
Length Reduction	Х
Memory transmission	0
Multi-step Transfer	A or B
Next Transfer Station	Х
OMR	0

Communication Features - User Selectable	
On Hook Dial	0
Ordering Toner	Х
Page Count	0
Page separation mark	0
Parallel memory transmission	0
Personal Codes	0
Personal Codes with Conf. ID	A or B
Partial Image Area Scanning	С
Polling Reception	0
Polling Transmission	0
Polling tx file lifetime in the SAF	0
Quick Dial (Standard: 64 stations)	О
Reception modes (Fax, Tel, Auto)	0
Remote control features	Х
Remote Transfer	A or B
Restricted Access	0
Secured Polling	0
Secured Polling with Stored ID Override	0
Secure Transmission	Х
Send Later	0
Silent ringing detection	Х
Speed Dial (Standard: 100 stations)	Ο
Telephone Directory	0
Tonal Signal Transmission	0
Transfer Request	0
Transmission Deadline (TRD)	Α
Turnaround Polling	Х
Two-step Transfer	Х
Two in one	0
Voice Request (immed. tx only)	Х

Communication Features - Service Selectable	
AI Short Protocol	0
Auto-reduction override option	0
Busy tone detection	0
Cable Equalizer	
PSTN	0
ISDN	J
Closed Network (tx and rx)	0
Continuous Polling Reception	0
Dedicated tx parameters	0
ECM	0

OVERALL MACHINE INFORMATION FEATURES

EFC	0
Inch-mm conversion before transmission	0
mm-inch conversion when print- ing	0
Page retransmission times	0
Protection against wrong conn.	0
Resolutions available for recep-	
tion	
200 x 100 dpi	0
200 x 200 dpi	0
200 x 400 dpi	Х
400 x 400 dpi	Х
Resol'n stepdown override option	Х
Short Preamble	Х
Well log	0

Other User Features	
Area code prefix	Х
Automatic service call	Service
Center mark	0
Checkered mark	0
Clearing a memory file	0
Clearing a polling file	0
Clock	0
Confidential ID	A or B
Copy editing (Erase Center/Mar- gin)	х
Copy mode	0
Copy Mode Restriction	0
Counters	0 0
Daylight Saving Time	0
Destination Check	Х
Direct entry of names	0
File Retention Time	0
File Retransmission	B, C
Function Programs	0
Hard Disk Filing System	B, C
ID Code	0
Label Insertion ("From xxx")	0
Language Selection	0
LCD contrast control	Service
Memory Lock	A or B
Memory Lock ID	A or B
Modifying a memory file	Х
Multi Sort Document Reception	A or B
Multicopy mode	0
Own telephone number	0

Other User Features	
Energy Saver (Night Timer and standby mode)	0
Print density control	0
Printing a memory file	0
RDS on/off	O X
Reception Mode Switching Timer	Х
Reception time printing	0
Reduction/Enlargement	Х
Remaining memory indicator	0
Remote ID	A , B, or D
Reverse Order Printing	A or B
RTI, TTI, CSI	0
Secure ID	Х
Service Report Transmission	0
Speaker volume control	0
Specified Cassette Selection	F
Substitute reception on/off	0
Telephone line type	0
Toner Saving Mode	0
TTI/CIL on/off	0
User Function Keys (5 keys)	0
User Parameters	0
Wild Cards	0

Reports - Automatic	
Charge Control Report	Х
Communication Failure Report	0
Confidential File Report	A or B
Error Report	0
Fax On Demand Report	D
Memory Storage Report	0
Mode Change Report	Х
Polling Clear Report	0
Polling Reserve Report	0
Polling Result Report	0
Power Failure Report	0
TCR (Journal)	0
Toner Cassette Order Form	Х
Transfer Result Report	A or B
Transmission Result Report	0

Reports - User-initiated		
Authorized Reception List	0	
Charge Control Report	Х	
File List	0	

OVERALL MACHINE INFORMATION
FEATURES

Reports - User-initiated		
Forwarding List	A or B	
Group List	0	
Hard Disk File List	B, C	
Personal Code List	0	
Program List	0	
Quick Dial List	0	
Specified Cassette Selection List	В	
Speed Dial List	0	
TCR	0	
Transmission Status Report	Х	
User Function List	0	
User Parameter List	0	

Service Mode Features	
Auto Paper Select test	Х
Back-to-back test	0
Bit switch programming	0 0
Book mode test	X O
Buzzer test	
Cable equalizer	0
Comm. parameter display	0
Counter check	0
Country code	0
DTMF tone test	0
Echo countermeasure	0
Effective term of service calls	0
Error code display	0
Excessive jam alarm	0
File Transfer	0
Hard Disk Utilities (Format etc.)	В
LCD contrast adjustment	0
Line error mark	0
Memory file printout (all files)	0
Modem test	0
NCU parameters	0 0
Operation panel test	
Periodic service call	0
PM Call	0
Printer mechanism test	0
Printer test patterns	0
Programmable attenuation	Х
Protocol dump list	0
RAM display/rewrite	0
RAM dump	0
RAM test	0
Ringer test	0

Service Mode Features		
Scanner lamp test	0	
Scanner mechanism test	0	
Sensor initialization	Х	
Serial number	0	
Service monitor report	0	
Service station number	0	
Software upload/download	0	
SRAM data download	0	
System parameter list	0	
Technical data on the TCR	0	
Thermal head parameters	Х	
Transmission Status Report	Х	
User data transfer	0	

OVERALL MACHINE INFORMATION FEATURES

1.2.2. Capabilities of Programmable Items

The following table shows how the capability of each programmable item changes after the optional function upgrade card is installed.

Item	Standard	With function upgrade card
Maximum number of memory files plus polling rx files	200	1000
Maximum number of memory files	200	1000
Maximum number of destinations per file	200	200
Maximum number of destinations overall	500	2000
Maximum number of pages overall	1200	3000
Number of Quick Dials	64	64
Number of Speed Dials	100	1000
Number of Groups	9	30
Maximum number of destinations per Group	200	200
Maximum number of destinations dialed from the ten-key pad overall	100	1000
Maximum number of programs	64 (programmed in 64 Quick Dial keys)	164 (programmed in 64 Quick Dial keys plus 100 Speed Dial codes)
Maximum number of destinations per program	200	200
Maximum number of destinations used for all programs	300	2000
Maximum number of Auto Documents	64 (programmed in 64 Quick Dial keys)	164 (programmed in 64 Quick Dial keys plus 100 Speed Dial codes)
Maximum number of communication records for the TCR (Journal) stored in the memory	256	1000
Maximum number of addresses specified for features such as Authorized Reception and Specified Cassette Selection	30	50
Maximum number of personal codes	50	500

1.2.3. Possible Combinations of Optional Equipment

The following table shows which items of optional equipment can be or cannot be installed at the same time.

" \checkmark " in the table indicates that the two items of optional equipment can be installed at the same time.

" \mathbf{X} " in the table indicates that the two items of optional equipment cannot be installed at the same time.

IC Cards

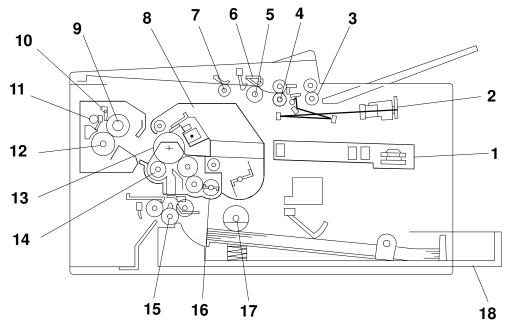
	Α	В	С	D	E
A: Feature Expander 2M/4M		X	~	~	4
B: Feature Expander 80M (HDD)	X		~	4	4
C: Function Upgrade Card	~	4		X	Х
D: Fax On Demand (FOD) Card	~	4	X		Х
E: Flash/SRAM Data Copy Tool (Service Tool)	~	4	x	X	

Other

	Α	В	С	D	E
A: Paper Feed Unit Type F	~	Х	~	4	4
B: Paper Feed Unit Type S	Х	~	4	4	4
C: 100 Sheet Cassette	~	4		~	4
D: Printer Interface	~	4	4		~
E: G4	~	4	4	4	

1.3. COMPONENT LAYOUT

1.3.1. Mechanical Components



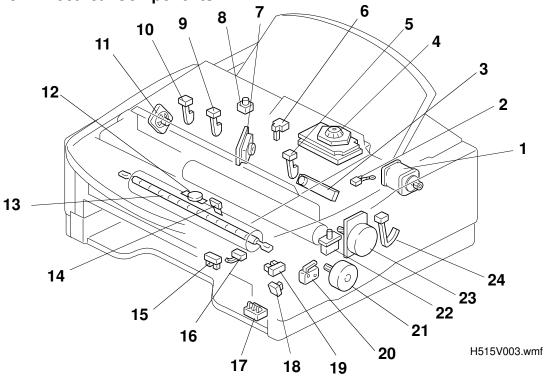
H515V001.wmf

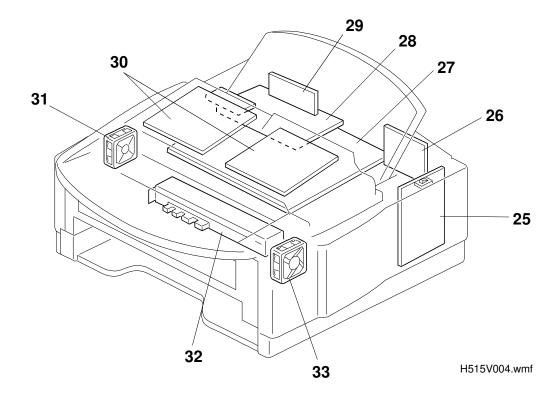
No.	Name	Description
1	Laser Unit	This consists of the LDDR (Laser Diode Driver), focusing lens, $F\theta$ Lenses, hexagonal mirror motor, and other laser optic components.
2	SBU	This scans the original.
3	R2 Roller	Feeds the document through the scanner.
4	R1 Roller	Feeds the document through the scanner.
5	Document Feed Roller	Feeds the document into the scanner.
6	Separation Pad	Allows one page into the scanner.
7	Pick-up Roller	Picks up pages of the document from the document table one at a time.
8	CTM (Cleaning Toner Magazine)	This consists of the toner cartridge, cleaning unit, used toner tank, charge corona unit, and quenching lamp.
9	Hot Roller	Heat from this roller fuses the toner to the copy paper.
10	Hot Roller Strippers	These take the paper off the hot roller after fusing.
11	Paper Feed-out Rollers	These feed the paper out of the printer.
12	Fusing Pressure Roller	This applies pressure to the paper during the fusing process.
13	OPC Drum	The latent image is written to this organic photoconductor drum.
14	Transfer Roller	This applies a charge to the paper to pull the toner off the drum and onto the copy paper.
15	Registration Roller	This carries out the registration process.

OVERALL MACHINE INFORMATION COMPONENT LAYOUT

No.	Name	Description	
16	Development Unit	This consists of the development roller, toner application roller, toner supply bar, and transfer roller.	
17	Paper Feed Rollers	These pick up the top sheet of paper from the stack in the cassette and feed it into the printer.	
18	Cassette (Standard)	This holds up to 250 sheets of paper.	

1.3.2. Electrical Components





1. PCBs

No.	Name	Description
27	MFDU (M-zone Facsimile Driver Unit)	This board contains drivers for the motors, a dc-dc converter, the energy saving mode cpu, and other drive electronics.
28	MFCE (M-zone Facsimile Control Engine)	This board controls the machine. It contains the main cpu, flash ROM, system RAM, and so on.
26	NCU (Network Control Unit)	This board contains a relay and switches for interfacing the machine to the network and the handset.
30	OPU (Operation Panel Unit)	This board controls the operation panel.
25	PSU (Power Supply Unit)	This board supplies power to the machine, and switches the fusing lamp on/off.
7	LDDR (Laser Diode Driver)	This board drives the laser diode.
32	Power Pack	This supplies high voltages to the corona wire, transfer roller, and development rollers.
29	SBU	The sensor on this board reads and converts the light reflected from the document into an analog video signal.

2. Motors

No.	Name	Description
1	Tx Motor	This stepper motor drives the scanner.
23	Main Motor	This brushless dc motor drives the drum, fusing unit, development unit, and CTM.
21	Paper Feed Motor	This stepper motor drives the registration roller and the paper feed mechanisms in the cassettes.
4	Hexagonal Mirror Motor	This high-speed dc motor drives the hexagonal mirror in the laser printer optics.
31	Ozone Fan Motor	This removes ozone-laden air from the vicinity of the drum, and filters out the ozone.
33	Fusing Fan Motor	This cools the interior of the machine.

OVERALL MACHINE INFORMATION COMPONENT LAYOUT

3. Sensors

No.	Name	Description		
5	Document Sensor	This detects the presence of a document in the feeder.		
9	B4-width Sensor	This detects the presence of a B4 width document (256mm, 10.1").		
10	A3-width Sensor	This detects the presence of an A3 width document (297mm, 11.7").		
6	Scan Line Sensor	This detects when a page is approaching the auto shading position.		
3	Toner End Sensor	This detects when the toner has run out.		
17	Paper Size Detector	This detects the paper size installed in the cassette. The user must install the correct size actuator.		
24	Paper End Sensor	This detects when the paper in the cassette has run out.		
16	Registration Sensor	This detects when paper has reached the registration roller.		
19	Fusing Exit Sensor	This detects when the paper has been fed out of the printer.		
18	Fusing Exit Cover Switch	This detects whether the fusing exit cover is open or closed.		
15	Bypass Feed Sensor	This detects when a sheet of paper has been inserted into the bypass feed slot. Then the registration roller feeds the paper a short distance into the machine to prepare for printing, and stops.		

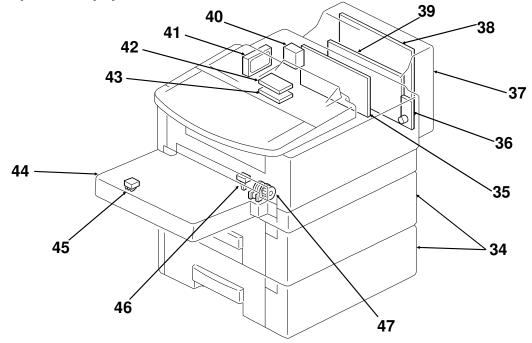
4. Interlock Switches

No.	Name	Description	
20 22	Interlock Switches: Fusing Unit Cover, Top/Front Cover	If the fusing unit cover is open, the +5VLD power supply for the laser diode is interrupted. If the top and/or front covers are open, the interlock switch interrupts the +5VLD power supply for the laser diode and the +24VD power supply for the power pack, motors, and other components.	

5. Others

No.	Name	Description		
8	Stamper Ass'y	This stamps a red circle on each page that is successfully fed through the scanner.		
12	Thermostat	This interrupts the ac power to the fusing lamp if the temperature of the thermostat surface exceeds 400°C.		
14	Thermistor	This monitors the temperature at the hot roller surface.		
13	Fusing Lamp	The heat from this lamp fuses the toner to the paper.		
11	Monitor Speaker	This allows the user to listen to the condition of the telephone line.		
2	Zener Diode	This ensures that the charge given to the drum by the charge corona wire does not exceed -750 volts.		

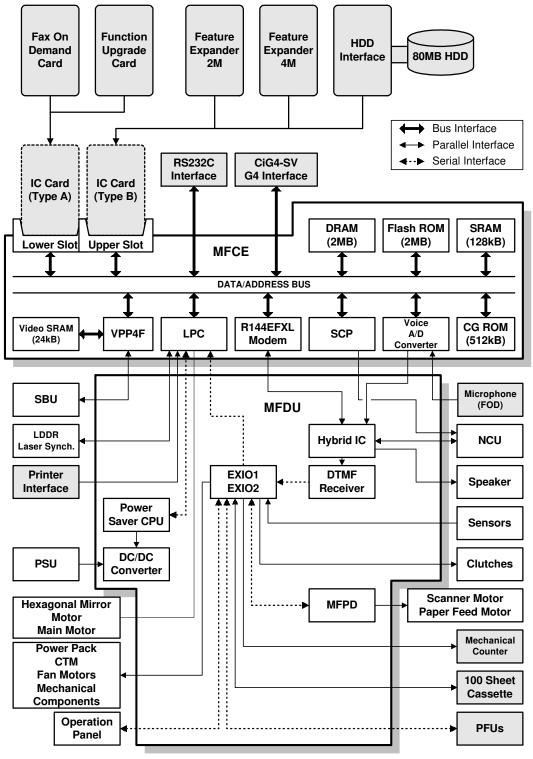
6. Optional Equipment



H515V510.wmf

No.	Name	Description			
40	Counter	This counts the number of prints.			
37	Printer Interface	This allows the machine to be connected to a computer as a laser printer. The following components belong to this unit. (Refer to the Printer Interface's service manual for details.) 38 - Controller Board 39 - Interface Board			
42	IC Card (Upper Slot)	The IC card connected to this slot increases the SAF memory capacity. Either a 2 MB or 4 MB DRAM card, or an 80 MB hard disk (41) can be used.			
43	IC Card (Lower Slot)	Either a Function Upgrade Card or a Fax On Demand Card can be used.			
44	100 Sheet Cassette	This increases the paper capacity by 100 sheets. The following components belong to this cassette. 45 - Paper Size Detector 46 - Paper End Sensor 47 - Paper Feed Clutch			
34	Paper Feed Units	The machine can have up to two paper feed units. One unit increases the paper capacity by 500 sheets.			
35	G4 Interface (CiG4)	This interfaces the machine with an ISDN network.			
36	Microphone jack for the Fax On Demand kit	This allows the users to record their own voice messages for Fax On Demand applications.			
	RS232C Interface Board	This allows the machine to be connected to a computer as an external fax device, for example. This option may not be available in some countries.			

1.4. OVERALL MACHINE CONTROL



H515V501.wmf

The MFCE (M-zone Facsimile Control Engine) contains most of the logical components for overall system control, and direct interfaces to the IC cards, an RS232C interface*, and a G4 interface (CiG4-SV). The MFDU (M-zone Facsimile Drive Unit) has interfaces to the power supply, sensors, drive components, and optional equipment.

* The RS232C interface may not be available in some countries.

There are two cpus in the machine: the main cpu (SCP) on the MFCE and the energy saver cpu on the MFDU. In energy saver mode, the main CPU switches off and the energy saver CPU takes over.

The 2 MB (16Mbit) flash ROM contains the system software, which can be updated through an IC card slot or from the remote control center using RDS. The CGROM (Character Generation ROM) contains all the character fonts used on the display and in reports.

The 2 MB DRAM is used for the SAF memory, ECM buffer memory, work area, and page memory. The SAF memory can be extended by 2, 4, or 80 MB with an IC memory card or a hard disk.

The 128 kB SRAM contains the user and system parameters. This can be upgraded by 512 kB with the function upgrade card. These SRAMs are battery backed-up.

The MFCE has two IC card slots.

The upper IC card slot can have one of the following:

- Feature Expander Type 140 2M (2 MB DRAM)
- Feature Expander Type 140 4M (4 MB DRAM)
- Feature Expander Type 140 80M (Hard disk interface with 1 MB DRAM and 32kB SRAM*)

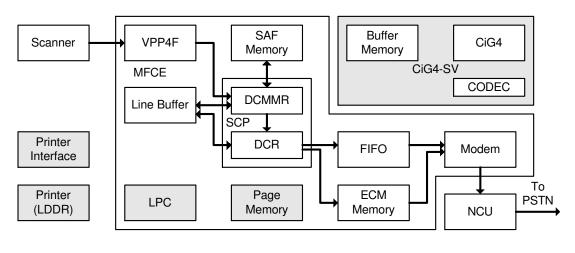
The lower IC card slot can have one of the following:

- Fax On Demand Card (512 kB SRAM*)
- Function Upgrade Card (256 kB Flash ROM and 512 kB SRAM*)
- Flash/SRAM Data Copy Tool (Service Tool)

* The SRAMs in the IC cards are battery backed up, in case the the machine is turned off or the machine goes into the 2-watt energy saver mode (referred to as Level 2 energy saver mode in section 2-3). However, the data in these SRAMs are not guaranteed if the card is disconnected from the machine. Whenever the Fax On Demand card or Function Upgrade Card needs to be removed for using the service tool, follow the instructions in section 4-1 to avoid any data loss.

1.5. VIDEO DATA PATH

1.5.1. Transmission (PSTN)



H515V502.wmf

Immediate Transmission:

Scanned data passes to the VPP4F, where the data undergoes analog/digital video processing, and is sent to the DCR block in the SCP through the DCMMR for compression.

The compressed data then passes either to the FIFO memory or to the ECM memory, before it is sent to the telephone line through the modem.

Memory Transmission:

The processed video data from the VPP4F passes to the DCMMR block in the SCP, where the data is compressed into MMR format or kept as raw data, then stored in the SAF memory.

At the time for transmission, the DCMMR block decompresses the data from the SAF memory, then the DCR block compresses it again for transmission. The compressed data then passes either to the FIFO memory or to the ECM memory, then it is sent to the telephone line through the modem.

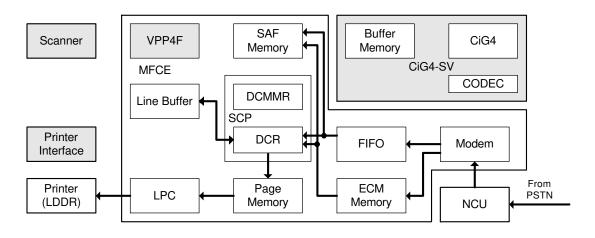
Parallel Memory Transmission:

This feature allows the machine to scan a document into the SAF memory and to send the same document simultaneously.

The machine stores the processed video data in the SAF memory and sends the data through the modem at the same time.

Refer to section 2.3.3 for more details about this feature.

1.5.2. Reception (PSTN)



H515V503.wmf

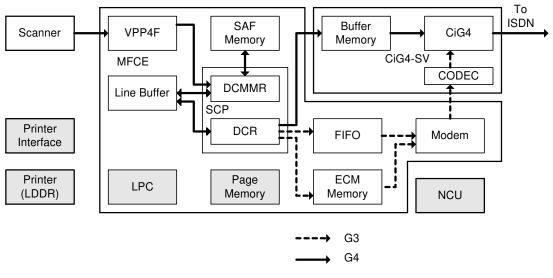
Data from the line passes to the modem through the NCU. After the modem demodulates the data, the DCR block in the SCP decompresses the data from either the FIFO or the ECM memory.

At the same time, the demodulated data is backed up in the SAF memory, in case of mechanical problems during printing (this is known as substitute reception).

The decompressed data is then passed to the page memory for printing. After a page of data has been stored in the page memory, the data is sent to the LDDR through the LCP for printing.

OVERALL MACHINE INFORMATION VIDEO DATA PATH

1.5.3. Transmission (ISDN)



H515V504.wmf

G4 Immediate Transmission:

Scanned data passes to the VPP4F, where the data undergoes analog/digital video processing, and is sent to the DCR block in the SCP through the DCMMR for compression.

The DCR block then compresses the data into MMR format, and passes it to the CiG4-SV board for G4 transmission.

G4 Memory Transmission:

The video processed data from the VPP4F passes to the DCMMR block in the SCP, where the data is compressed into MMR format or kept as raw data, then stored in the SAF memory.

At the time for transmission, the DCMMR block decompresses the data from the SAF memory, then the DCR block compresses it again into MMR format. The MMR compressed data then passes to the CiG4-SV board for transmission.

G3 Transmission over an ISDN:

The analog data is converted into PCM (Pulse Coded Modulation) format in the codec, then sent over the ISDN.

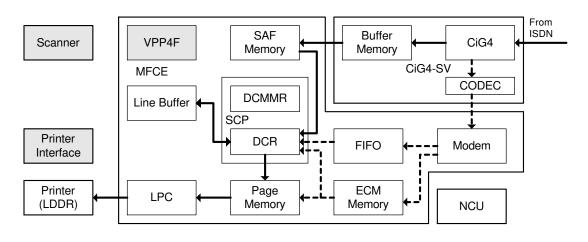
Parallel Memory Transmission:

This feature allows the machine to scan a document into the SAF memory and to send the same document simultaneously.

The machine stores the processed video data in the SAF memory and sends the data through the CiG4 board at the same time.

Refer to section 2.3.3 for more details about this feature.

1.5.4. Reception (ISDN)



H515V505.wmf

G4 Reception:

Data from the ISDN line passes to the SAF memory first. Then the data is decompressed at the DCR block in the SCP, and sent to the page memory. After a page of data has been stored in the page memory, the data is sent to the LDDR through the LCP for printing.

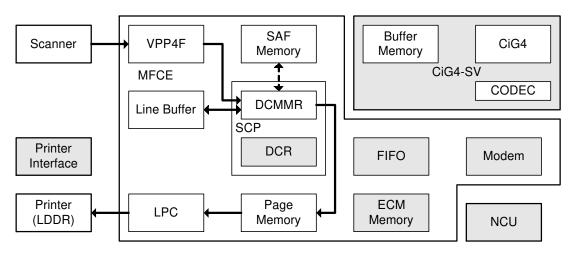
G3 Reception from the ISDN:

Data from the ISDN line first passes to the modem through the codec, where it is converted into an analog signal. After the modem demodulates the data, the DCR block in the SCP decompresses the data from either the FIFO or the ECM memory.

At the same time, the demodulated data is backed up in the SAF memory, in case of mechanical problems during printing (this is known as substitute reception).

The decompressed data is then passed to the page memory for printing. After a page of data has been stored in the page memory, the data is sent to the LDDR through the LCP for printing.

1.5.5. Copying



H515V506.wmf

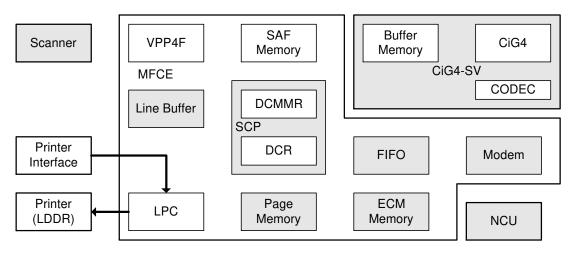
Single copy

The scanned data passes to the page memory after video processing in the VPP4F. After a page of data has been stored in the page memory, the data is sent to the LDDR through the LIF block.

Multi-page copy

The scanned data passes to the SAF memory after video processing (VPP4F) and compression (DCMMR). After all the pages have been stored in the SAF memory, the data passes to the DCMMR block again for decompression, then it passes to the page memory for printing.

1.5.6. Printing from the Optional Printer Interface

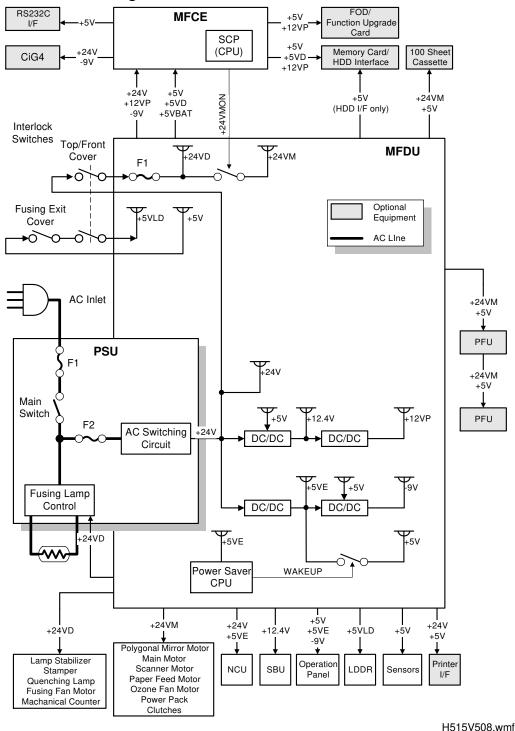


H515V507.wmf

After a page of data has been stored in the printer interface's page memory, the data is sent to the LDDR through the LCP. The page memory on the MFCE is not used for printing.

1.6. POWER DISTRIBUTION

1.6.1. Distribution Diagram



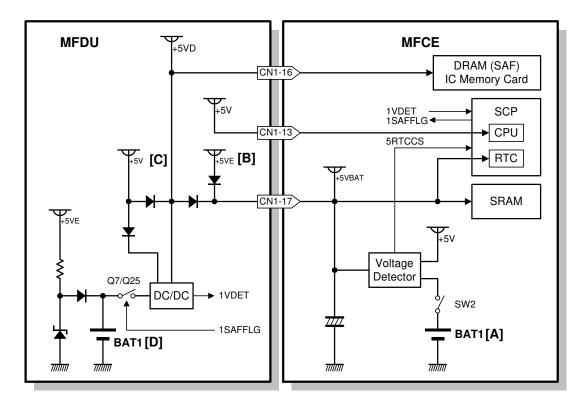
1-22

The PSU supplies +24V dc power to the FDU, and supplies ac power to the fusing lamp directly.

The FDU converts the +24V dc power supply to the following supplies.

Power Supply	Description			
+24V	This is normally on when the main switch is on.			
+24VD	This supplies +24V to the fusing unit on/off switching circuit. It is interrupted if the top/front cover interlock switch opens.			
+24VM	This supplies the motors and power pack. This is interrupted by the main cpu while the machine is in energy saver mode. It is also interrupted if the top/front cover interlock switch opens.			
+12.4V	This supplies the SBU. It is interrupted when the +5V supply is shut down by the energy saver cpu.			
+12VP	This is supplied to the Flash ROMs on the MFCE and the optional IC cards, and it is used only when rewriting the contents in the Flash ROM. It is interrupted when the +5V supply is shut down by the energy saver cpu.			
+5V	The is interrupted by the energy saver cpu when the machine is in Level 2 (2-watts) energy saver mode.			
+5VE	This is used when the machine is watching for activation signals from the NCU, document feeder, or operation panel when the machine is in energy saving mode.			
+5VLD	This supplies the laser diode. It is interrupted if the fusing exit cover interlock switch or the top/front cover interlock switch opens.			
+5VD	This supplies the DRAM and the optional SAF memory card on the MFCE to back up the stored data for one hour, if the power is switched off and some data is stored in them. A rechargeable battery on the MFDU is used to generate +5VD while the machine is turned off.			
+5VBAT	This supplies the system RAM and the real time clock inside the SCP on the MFCE while the machine is turned off. A lithium battery is used to generate +5VBAT while the machine is turned off. See section 1.6.2 for details.			
-9V	This supplies the CiG4 board through the MFCE. It is interrupted when the +5V supply is shut down by the energy saver cpu. See section 1.6.2 for details.			

1.6.2. Memory Back-up Circuit



H515V509.wmf

1. SRAM/Real Time Clock (RTC) Backup

+5VBAT supplies the SRAM, which contains system parameters and programmed telephone numbers, and the real time clock (RTC) inside the SCP.

While the machine is switched on, even in energy saver mode, the +5VBAT supply comes from the +5VE signal [B].

While the machine is turned off, the lithium battery (BAT1 on the MFCE [A]) is used for the +5VBAT supply.

The 5RTCCS signal tells the main cpu whether the back-up power (+5VBAT) is supplied from the battery or from the +5V power supply. If the power is coming from the battery, the main cpu is disabled.

2. DRAM Backup

While the machine is switched on, the +5VD supply, which comes from the +5V signal, supplies the DRAM.

In energy saver mode level 2, the energy saver cpu will disable the +5V supply if there is no data in the DRAM. However, if there is data in the DRAM, the +5V supply will not be disabled, and +5VD will continue to supply the DRAM. If the machine has a hard disk, the +5V supply will only be killed if there are no received fax messages or fax messages for transmission on the disk.

While the machine is turned off, the rechargeable battery ([D] BAT1 on the MFDU) supplies the SAF memory. It can back up the DRAM for an hour.

The battery [D] generates about 3 volts (max. 3.2 volts). The dc/dc converter pumps up this voltage to 5 volts so it can be used for DRAM backup. The CPU monitors the voltage of the +5VD supply with the 1VDET signal. When the battery has run down to 4.4 volts, the CPU stops the dc/dc converter by dropping 1SAFFG to low to stop DRAM backup.

Note that recharging the battery [D] takes one or two days after it has been discharged.

Cross-reference

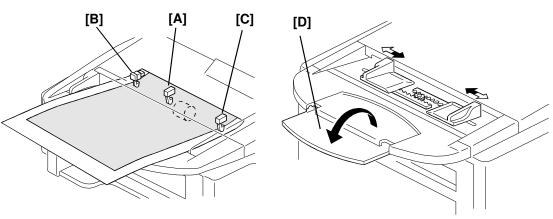
Energy Saver Modes: Section 2.3.1

2. DETAILED SECTION DESCRIPTIONS

2.1. SCANNER

2.1.1. Mechanisms

1. Document Detection



H515D002.wmf

H516D500.wmf

The machine detects when a document is placed in the ADF and the document's width by monitoring the document sensor [A], the B4 width sensor [B], and the A3 width sensor [C].

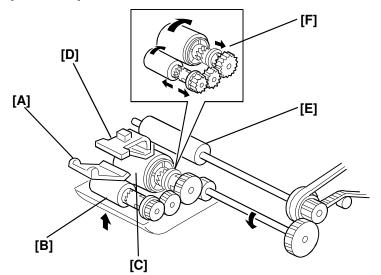
These sensors detect document width as shown in the table below.

Document Size	Document Sensor	B4-width Sensor	A3-width Sensor	Actual Document Width Range
A4/ Letter	On	Off	Off	Less than 235 mm (Less than 9.25")
B4	On	On	Off	235 mm to 268 mm (9.25" to 10.55")
A3/ Double Letter	On	On	On	More than 268 mm (More than 10.55")

The fold-down extension [D] helps to support longer documents.

DETAILED SECTION DESCRIPTIONS SCANNER

2. Pick-up and Separation



H515D003.wmf

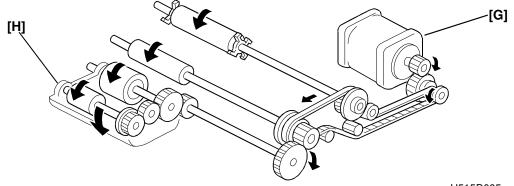
Plate [A] aligns the leading edges of the pages of the document. When the tx motor starts, the mechanical clutch mechanism in the ADF roller unit lifts up the pick-up roller [B] to feed the bottom sheet of the document. Then, the feed roller [C] feeds the sheet into the scanner. The separation rubber plate [D] prevents the feed roller from feeding more than one sheet at a time.

Because the line speed of the R1 roller [E] is 3 times faster than the feed and pick-up rollers, the release mechanism [F] releases the feed and pick-up rollers from the motor drive. This makes these rollers turn at the same speed as the R1 roller, because they are still gripping the paper.

Cross reference

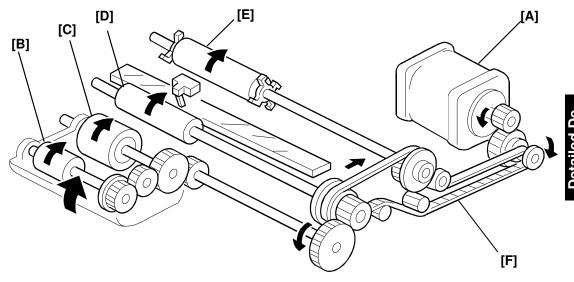
ADF mechanical clutch mechanism: Group 3 Facsimile Manual, page 2-2-8

After all the pages have been scanned, the tx motor [G] reverses to move the ADF roller unit [H] down to the standby position.



H515D005.wmf

3. Drive Mechanism



H515D004.wmf

The tx motor [A] drives the pick-up roller [B], feed roller [C], R1 roller [D], and R2 roller [E] through the timing belt [F].

The scanning speed for each resolution mode is as follows.

Resolution	Scan speed (/A4)
Standard - Storage to SAF (Memory Tx or Multi-copy mode)	1.47 s
Standard - Immediate Tx or Single copy mode	2.95 s
Detail	2.95 s
Fine	5.90 s

The maximum acceptable document width is 304 mm (12.0") wide.

The maximum acceptable document page length can be adjusted to 0.6 m (23.6"), 1.2 m (47.2"), or 14 m (46 ft). The default setting is 1.2 m.

Cross reference Maximum document length: Scanner Switch 00, bits 2 and 3.

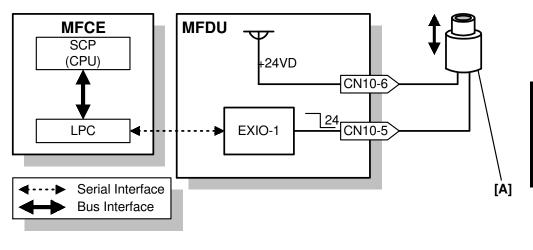
DETAILED SECTION DESCRIPTIONS SCANNER

Error Conditions

The machine detects a document jam if one of the following conditions occurs.

Jam Condition	Description	Error Code
Non-feed	The scan line sensor did not turn on within 3 s of the start of pre-feeding.	1-00
Incorrect sensor conditions	The scan line sensor switches on while the document sensor is off.	1-00
Maximum document length exceeded	The scan line sensor did not turn off after the maximum document length had been fed since it turned on.	1-01
Error at power on	The machine detected a document at power up.	1-10
Error during feed-out	The machine detected a document placed in the ADF while the machine was feeding out the final page of the document, or while attempting to feed a jammed document just after the machine was switched on.	1-17
Cover open	The ADF cover and/or printer cover were open while the machine is working.	No error code
Manual interruption	The machine detected that the Stop key was pressed during scanning.	No error code

4. Stamping



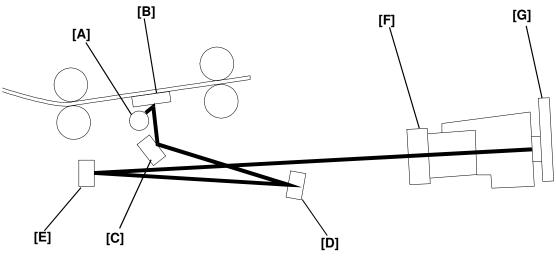
H515D501.wmf

The original always stops at the stamping position after the page was transmitted (immediate transmission) or scanned into memory (memory transmission) successfully.

If the Stamp LED is on, the cpu drops the voltage at CN10-5 for 500 ms to activate the stamper solenoid [A]. Then the original is fed out of the scanner.

If the Stamp LED is off, the machine feeds out the original without stamping.

2.1.2. Image Scanning *



H515D006.wmf

The scanner consists of a xenon lamp [A], exposure glass [B], mirrors ([C], [D] and [E]), lens [F], and SBU [G].

The light reflected from the document is focused onto the CCD (Charge Coupled Device) on the SBU [G] through mirrors ([C], [D] and [E]) and lens [F].

1. Sub Scan Resolution Conversion

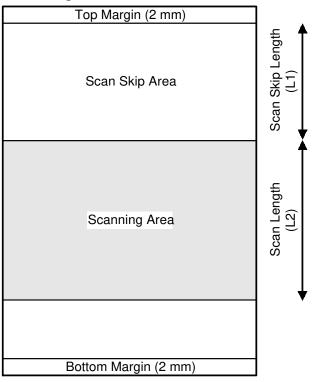
Standard: The machine feeds the document in 7.7 line/mm steps. In text mode, it scans in accordance with the setting of scanner bit switch 00 - bit 4. In halftone mode, it skips every other line.

	Scanner bit switch 00							
	Bit 4 = 0 Bit 4 = 1							
Immediate tx/ Copying	Scan - 3.85 l/mm Tx/Copy - 3.85 l/mm	Scan - 7.7 l/mm Tx/Copy - 3.85 l/mm (OR processed)						
Scanning to memory	(Every other line is skipped)	OR processing is always disabled.						

Detail: The machine feeds and scans the document in 7.7 line/mm steps. The scanned lines are transmitted without any conversion.

Fine: The machine feeds and scans the document in 15.4 line/mm steps. The scanned lines are transmitted without any conversion. In memory transmission, if the other terminal cannot receive a message at Fine resolution, alternate lines (even-numbered lines) are deleted before transmission.

2. Partial Image Scanning *



H515D504.wmf

When partial image scanning is enabled, the machine only scans L2 after the machine skips L1.

- L1 Scan skip length
- L2 Scan length

Error Condition (Error Code 1-00)

If the scan line sensor turns off before the machine starts scanning the document (the document is too short), the machine detects an error.

Note that this function cannot be used with copying, immediate transmission, or scanning an OMR sheet.

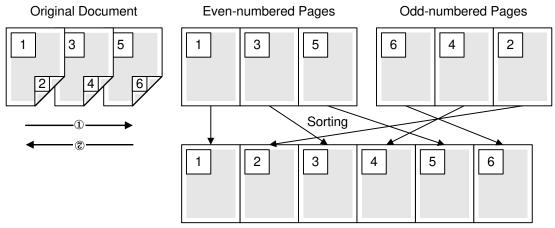
Cross Reference

Partial image scanning on/off - User parameter 06, bit 5 Programming the scan skip length and scan length - User function 74

DETAILED SECTION DESCRIPTIONS SCANNER

3. Scanning Double-sided Documents *

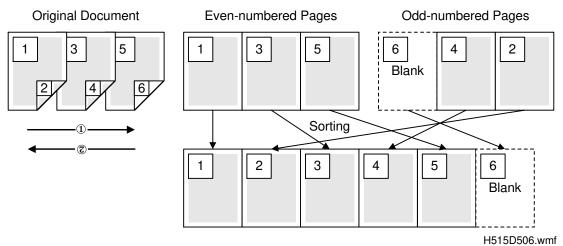
When this feature is enabled, the machine scans all odd-numbered pages first, then scans even-numbered pages. (The user has 60 s to prepare the even-numbered pages after the odd-numbered pages have been scanned.) After all pages have been scanned, the machine sorts the scanned pages into the correct sequence inside the SAF memory.



H515D505.wmf

If the last page of the original is a blank page, the machine sends 6 pages if the user scans the last page, or sends 5 pages if the user does not scan the last page (the machine will warn the user that the numbers of odd and even pages do not match in this case).

The transmitted page sequence is correct in each case.



The error conditions are listed below.

Condition	Machine's Action	Error Code
Memory overflows during scanning.	Asks the user whether the machine can send the scanned pages, or erase them.	5-21
60 s has passed after scanning all the odd-numbered pages.	Erases all the scanned pages and prints a File Reserve Report with an error message.	None
Numbers of odd and even-numbered pages were different.	Asks the user whether the machine can send the scanned pages, or erase them.	None
The Stop key was pressed during scanning.	Stops scanning and returns to standby mode.	None

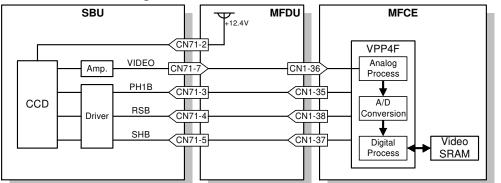
Note that this function cannot be used with copying or immediate transmission.

Note

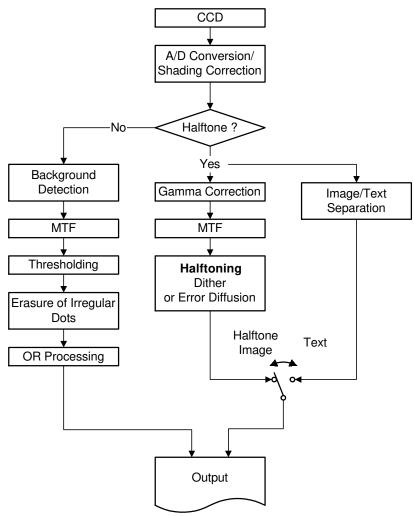
Scanning double-sided documents on/off can only be selected with a User Function Key.

DETAILED SECTION DESCRIPTIONS SCANNER

2.1.3. Video Processing *



h515d502.wmf



H515D503.wmf

2.1.4. Shading Correction and A/D Conversion *

Before scanning a page, the machine scans the shading plate and keeps the peak voltage for each pixel f the CCD. The VPP4F first converts the analog data into 8-bit digital data. At the same time, the VPP4F does the shading correction using the peak voltage detected when scanning the shading plate.

Cross-reference

Group 3 Facsimile Manual, section 2-3

2.1.5. Process without Halftone *

1. Background Detection

• Each pixel is tested in relation to its neighbours to determine whether it is background noise and should be deleted.

2. MTF

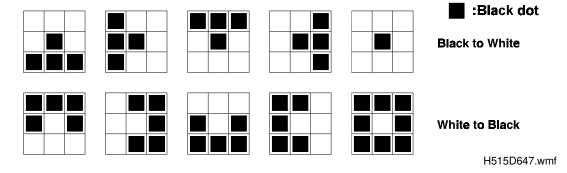
• MTF (Modulation Transfer Function) can reproduce details such as thin lines, points, and complex characters.

3. Thresholding

• Each video data element is compared against the threshold level, which depends on the contrast selected by the user.

4. Erasure of irregular dots

 If an element after being converted to white or black by the above thresholding is irregular against the surrounded pixels, it is output in the opposite color. The central pixel is compared with the surrounding eight pixels to determine whether this process is necessary. There are ten cases, as shown below, in which conversion is done. This results in a noise-free and clean image.



DETAILED SECTION DESCRIPTIONS SCANNER

5. OR processing

 When the user selects Standard or Detail resolution, the VPP4F will do OR processing to convert the scanned resolution into the resolution required for transmission.

2.1.6. Process with Halftone *

1. Gamma correction

Gamma correction corrects the response of the image sensor to the various shades in the gray scale from black to white. Also, it converts each pixel into 6-bit data (64 levels) for the halftone process.

2. MTF

• MTF (Modulation Transfer Function) can reproduce details such as thin lines, points, and complex characters.

3. Halftone process

- Each pixel is converted to six-bit data (0 63) using either the dither or the error diffusion formula. At the same time, if the pixel is on a edge of a image pattern, it is enhanced to get a sharp outline.
- Then, each pixel is thresholded with the corresponding threshold in a dither matrix or error diffusion matrix.

2.1.7. Data Switching *

When halftone is used and image/text separation is enabled, the VPP4F does both the halftoning procedure and the image/text separation procedure to each pixel in parallel. At the end of these processes, the VPP4F chooses the data from one of these processes.

Cross Reference Scanner switches 00 to 08 for video processing parameters

2.1.8. Inch-mm Conversion

Because the machine's scanner is designed in inch units, the machine can convert the scanned data into mm-format, if the other terminal does not have an inch-based printer.

The following tables show the actual transmitted data resolution units in various cases.

G3 Immediate Transmission

Rx terminal's resolution units		Unknown inch		mm	inch and mm		
inch-mm	ON	mm	inch	mm	inch		
conversion	conversion OFF		inch	inch	inch		

G3 Memory Transmission

If the message was scanned in inch resolution units

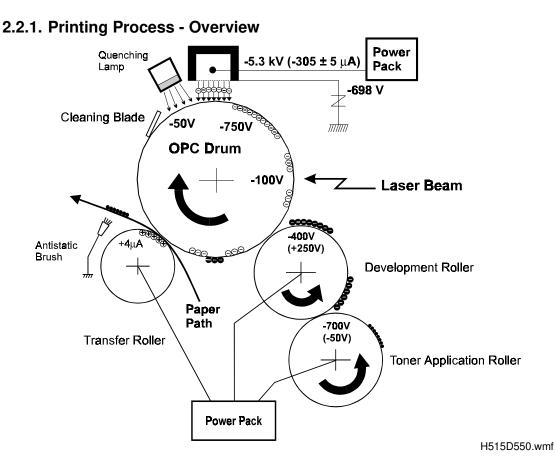
Rx terminal's resolution units		Unknown	inch	mm	inch and mm		
inch-mm	ON	mm	inch	mm	inch		
conversion OFF		inch	inch	inch	inch		

If the message was scanned in mm resolution units

(e.g., Messages for transfer and forwarding scanned by another terminal)

Rx terminal's resolution units		Unknown	Unknown inch		inch and mm		
inch-mm	ON	mm	inch	mm	mm		
conversion	conversion OFF		mm	mm	mm		

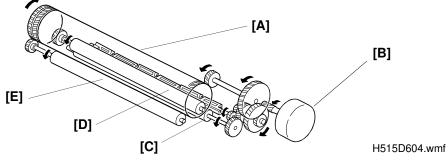
2.2. PRINTING



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

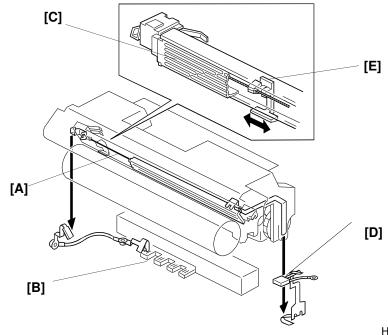
- The charge corona wire gives the drum surface a negative charge of about -750 V.
- The exposed area on the drum drops to about -100 V.
- The development roller carries toner to the latent image on the drum surface. The bias voltages during printing are as follows: Toner application roller : -700 V Development roller: -400 V
- The transfer roller pulls the toner from the drum onto the paper. A constant current of +4 μ A is applied. The antistatic brush helps to separate the paper from the drum.
- The cleaning blade removes any toner remaining on the drum after the image is transferred to the paper.
- The quenching lamp reduces the negative charge on the drum to about -50 V.

2.2.2. OPC Drum



An organic photoconductor drum [A] is used in this machine. The diameter of the drum is 30 mm. It is driven by the main motor [B] through a gear train. The toner application roller [C], development roller [D], and transfer roller [E] are also driven by the same gear train. The drum unit can be replaced by the user.

2.2.3. Charge *



H515D605.wmf

Deta

The CTM contains a charge corona unit. The corona wire [A] generates negative ions when the power pack [B] applies a constant current of $-305 \pm 5 \,\mu$ A (the voltage is about -5.3 kV). The grid plate [C] ensures that the charge is uniformly spread out. The zener diode [D] ensures that the charge on the drum does not exceed -750 ± 50 V.

The charge corona unit contains a wire cleaner [E] for user maintenanace.

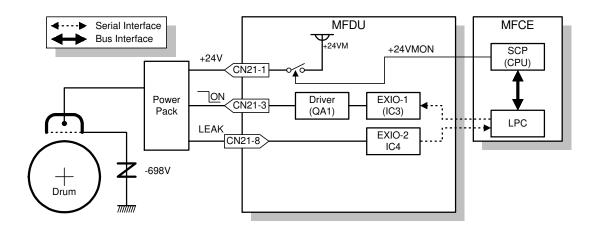
The ozone fan on the left hand side of the machine provides air flow to the charge corona unit, and the ozone filter (a paper filter coated with carbon) decomposes the ozone generated around the drum by the corona discharge.

DETAILED SECTION DESCRIPTIONS PRINTING

* Charger Leak Detection:

The machine detects a charger leak error when MFDU CN21-8 stays low for 3 seconds or more (6 seconds or more at power on) either while in standby mode or while the corona wire is being charged. When this occurs, the machine warns the customer by lighting the Call Service indicator (error code 9-17).

Charge Control

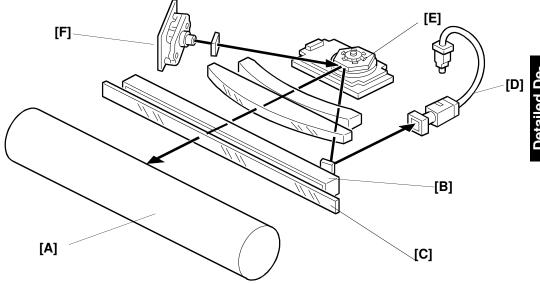


H515D510.wmf

In this machine, a higher corona wire current is used to counter black bands on copies. The charge on the drum exceeds the zener diode voltage because of this higher current.

2.2.4. Laser Exposure

1. Overview *



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H515D606.wmf
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The components of the laser section are the same as those described in the Group 3 Facsimile manual. The drum [A] is in the same plane as the laser unit, so there is no mirror to change the optical path.

- The focusing lens [B] is a barrel toroidal lens.
- The shield glass [C] prevents toner and dust from entering the laser optics area.
- An optical fiber [D] passes the reflected laser beam to the laser sychronization detector circuit in the FDU.
- The speed of the hexagonal mirror motor [E] depends on the printing resolution:

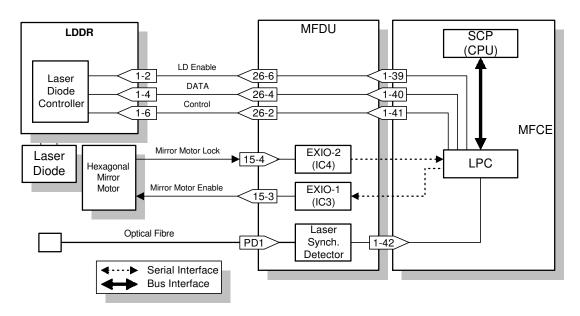
Mode	Speed
Fax - mm mode (16 x 15.4 dots/mm)	10436.45 rpm
Copy and fax - inch mode (400 x 400 dots/inch)	10636.45 rpm
Printer mode (300 dpi)	7977.8 rpm

- The strength of the beam emitted from the LD unit [F] is 5 mW at a wavelength of 780 nm.
- The dimensions of the dot on the drum are $85 \ \mu m$ by $85 \ \mu m$.

The charge on the exposed areas of the drum drops to about -100 V while non-exposed areas it remains at about -750 V.

Cross reference Group 3 Facsimile Manual: section 4-3-3

2. Block Diagram



H515D511.wmf

The LPC on the MFCE board monitors and controls the laser diode timing (MFDU CN26-2) and transfers data for printing to the laser diode (MFDU CN26-4).

Cross reference

Group 3 Facsimile Manual: page 4-3-13

3. Error Conditions *

LD Failure:

The machine detects LD failure when the Laser Synchronization signal is not detected within 10 ms of the LD ready signal. When this occurs, the machine warns the customer with the Call Service indicator (error code 9-20).

Mirror Motor Failure:

The machine detects a mirror motor error when MFDU CN15-4 does not go low within 10 seconds of the hexagonal mirror motor being turned on. The machine also detects a mirror motor error when MFDU CN15-4 goes back to high for 3 seconds or more during mirror motor operation. When either of these errors occurs, the machine warns the customer with the Call Service indicator (error code 9-23).

4. Print Density Adjustment

The FCIP controls print image density by changing the laser pulse width to adjust the width of the dots across the page. The beam strength is not adjusted in this model. The following table shows the relationship between the pulse width and the image density.

Mode		Print Image Dens	Print Image Density (User parameter 12, Bits 3 and 4)					
IVIC		Normal Lighten Darken						
Conv Modo	Normal	80 %	40 %	160 %				
Copy Mode	Halftone	80 %	40 %	160 %				
Eax Mada	Normal	100 %	40 %	160 %				
Fax Mode	Halftone	20 %	20 %	100 %				

To change the pulse width, the duty cycle of the laser pulse is changed. For example, to make the print density 40% of normal, the laser is only kept on for 40% of the normal duration for each pixel.

5. Toner Saving Mode

In this machine, toner saving is done by reducing the number of dots actually printed, not by varying the development bias. In toner saving mode, the image data is filtered through the following four-line matrix.

1st	line	1	0	1	0	1	0	1	0	1	0	•	•	•		•
2nd	line	0	0	0	0	0	0	0	0	0	0	•	•	•	•	•
3rd	line	0	1	0	1	0	1	0	1	0	1	•	•	•	•	•
4th	line	0	0	0	0	0	0	0	0	0	0	•	•	•	•	•

(1: Actual data printed, black or white; 0: Always a white pixel)

- **Note:** Toner saving mode only works when printing fax messages and reports. (However, toner saving is disabled when receiving a half-tone mode message in NSF/NSS mode.)
 - When toner saving mode is selected, the print image density is automatically set to "Normal"; in some cases, the image may become invisible if the Lighter setting is used.

Cross Reference

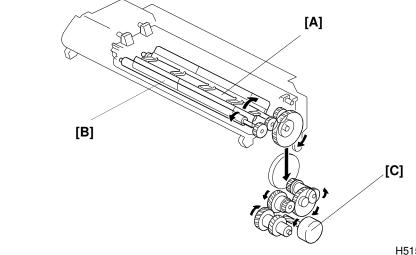
Toner Saving Mode: User parameter 12, bit 2

Edge Enhancement

In toner saving mode, the machine prints a black pixel whenever the data changes from white to black in the main scan direction. In this way, edges on the image are printed more clearly.

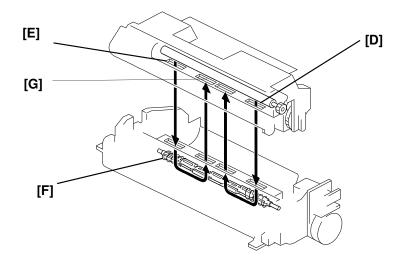
DETAILED SECTION DESCRIPTIONS PRINTING

2.2.5. Toner Supply



H515D617.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 supply roller [B]. The toner supply roller supplies toner to the development unit. The main motor [C] drives the toner supply mechanism through a gear train.



H515D649.wmf

Toner is supplied to the development unit from the outer openings [D, E] in the CTM. The spiral mechanism [F] on the toner supply bar distributes toner through the development unit.

Openings in the central area of the CTM [G] allow toner to circulate upwards from the development unit. This circulation prevents excessive toner supply to the development unit and ensures that the toner remains fresh (this helps to prevent blurred images).

Initial Toner Supply Mode *

When the first CTM is installed in a new machine, the machine automatically supplies toner to the development unit for 90 seconds. This will also be done automatically after a RAM reset level 1 or 2 is performed.

Initial toner supply mode must be executed by a technician when the development unit is replaced.

Cross Reference
Initial Toner Supply: RAM address 4805C8(H)
(See sections 4.5 and 5.6.4 for more details)

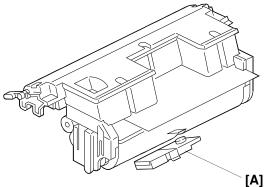
CTM Detection

At the following times, the machine detects if a CTM is installed by checking the power supply to the quenching lamp (this is part of the CTM).

- At power-up.
- When the machine comes back to normal mode from the Level 2 Power Saver Mode.
- When the cover is opened and then closed.

The machine disables all printing processes if a CTM is not installed.

Toner End Detection

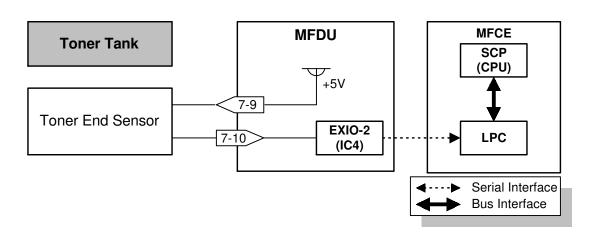


H515D624.wmf

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

While the main motor is rotating, the machine detects toner end by the voltage output from the toner end sensor . The voltage from the sensor is close to 5 V when the toner tank is full and becomes low when toner is almost empty.

DETAILED SECTION DESCRIPTIONS PRINTING



H515D512.wmf

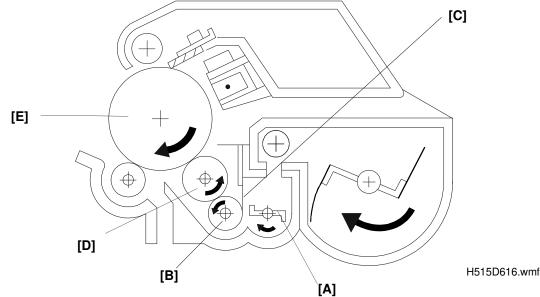
Toner near-end condition: When the cpu detects a low output from the toner end sensor for more than 30 s, the cpu starts to blink the Add Toner indicator. This is the toner near-end condition.

Toner end condition: After toner near-end is detected, the machine can print 100 more sheets, then the cpu disables printing (this is the toner end condition).

The machine clears the toner near-end or toner end condition when the power is switched off and back on or when the cover is opened and closed, if the output from the toner end sensor goes back high again.

However, when the machine is turned off/on or when the cover is opened and then closed, the machine requires about 30 s to check for a toner near-end condition again. So, if the user prints something within this 30 s period without changing the CTM, the machine will allow the printout to be made, but the print quality may be poor.

2.2.6. Development



There are two rollers in the development unit: the Toner Application Roller [B] and the Development Roller [D].

The toner supply bar [A] stirs and carries toner to the toner application roller [B]. Toner is attracted to the toner application roller because it has a magnetic layer. As the toner application roller turns past the toner metering blade [C], only a thin coating of negatively charged toner particles stays adhered. (Refer to section 4-4-2 of the Group 3 Facsimile manual.)

During printing, a bias voltage of -700 V is applied to the toner application roller and another bias voltage of -400 V is applied to the development roller. The toner is carried from the toner application roller to the development roller [D] by the potential difference between these two rollers.

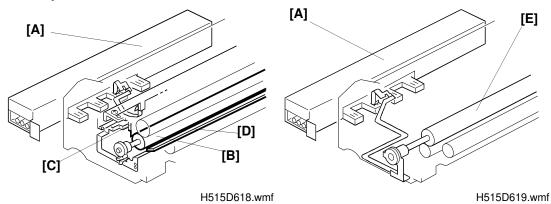
The exposed area on the drum [E] is at -100 V. The development roller applies toner to these areas of the latent image as they turn past the drum.

The development roller is made of a soft rubber so it does not damage the surface of the drum. The development roller is provided as a separate spare part because it always contacts the toner application roller, and so may become dented.

The speed ratio between the drum, development roller, and the toner application roller is about 1 : 1 : 3. The toner application roller rotates three times as fast as the development roller, so it deposits a layer of toner three times as thick on the development roller. This leads to a clearer image. Also, the toner application roller rotates in the opposite direction to the development roller, which helps to keep the toner level on the development roller.

DETAILED SECTION DESCRIPTIONS PRINTING

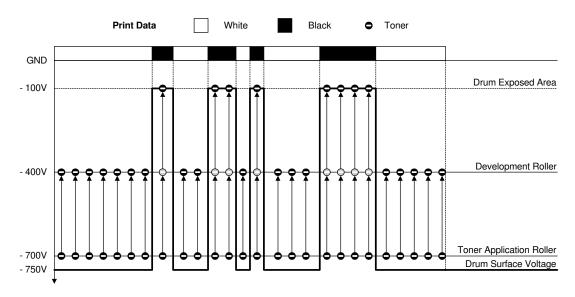
Development Bias



The power pack [A] applies one voltage to the toner application roller [B], toner metering blade [C], and bias brush [D], and a different voltage to the development roller [E].

Bias Control (During Printing)

A charge of -700 \pm 40 V is applied to the toner application roller, and -400 \pm 10 V is applied to the development roller. Toner transfers from the toner application roller to the development roller and on to the laser exposed areas on the drum as shown below.



H515D655.wmf

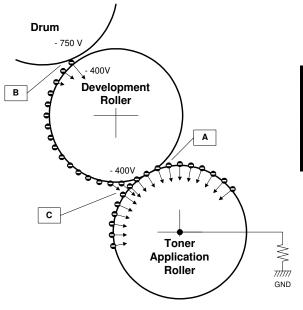
Bias Control (After Each Page)

After each page, the machine removes toner from the development roller and returns it to the development unit. To do this, -400V is applied to the development roller, but no bias is applied to the toner application roller.

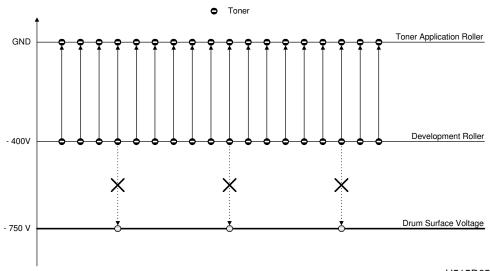
Toner does not transfer to the development roller at "A", but remains on the toner application roller when it passes between the two rollers.

The remaining toner on the develpment roller does not transfer to the drum at "B", but transfers to the toner application roller at "C".

In some cases, positively charged toner may transfer to the drum in this condition. So, a positive current is applied to the transfer roller after each page, so that the positively charged toner does not transfer to the transfer roller.



H515D651.wmf

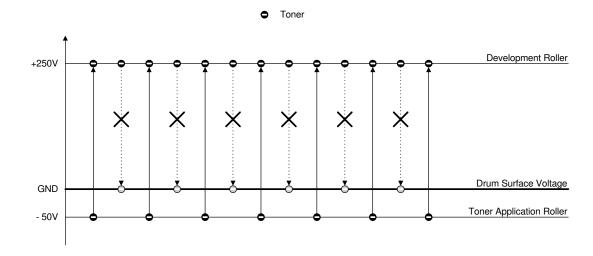


H515D656.wmf

DETAILED SECTION DESCRIPTIONS PRINTING

Bias Control (Other)

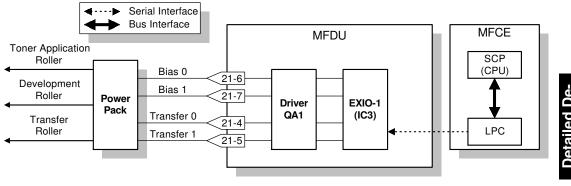
At the start and the end of any print process (including the cleaning and initial toner supply modes), -50 \pm 50 V is applied to the toner application roller, and +250 \pm 15 V is applied to the development roller. This is to prevent toner from transferring to the drum.



H515D650.wmf

Note that the voltage difference between the toner application and development rollers is kept the same as in printing, at 300 V. This keeps the same amount of toner on the development roller at all times during the print run.

Bias Control Circuit



H515D513.wmf

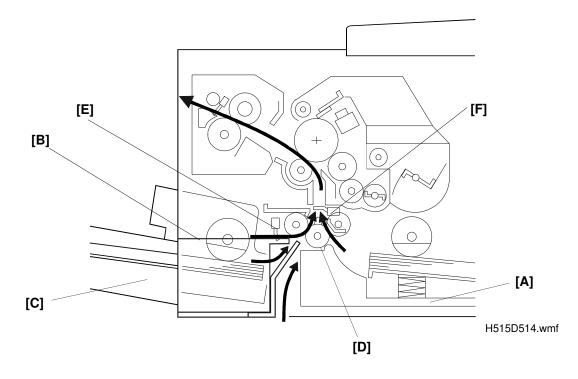
The cpu controls the voltages to the toner application and development rollers using the Bias 0 and Bias 1 signals as shown in the following table.

In	Bias 0	Low	High	Low	High
111	Bias 1	Low	Low	High	High
Out	Toner Application Roller	- 700 V	- 50 V	Off	Off
	Development Roller	-400 V	+ 250 V	-400 V	Off

DETAILED SECTION DESCRIPTIONS PRINTING

2.2.7. Paper Feed

1. Overview *



The standard cassette [A] holds 250 sheets and the bypass feed slot [B] feeds 1 sheet at a time. An optional 100 sheet cassette [C] and two types of optional paper feed unit are available.

This machine can have up to 2 optional paper feed units. Refer to the separate paper feed unit service manuals for details on the optional paper feed units.

The registration roller [D] rotates counter-clockwise when the standard cassette is used. It rotates clockwise when the bypass feed slot [B] or the 100 sheet cassette is used.

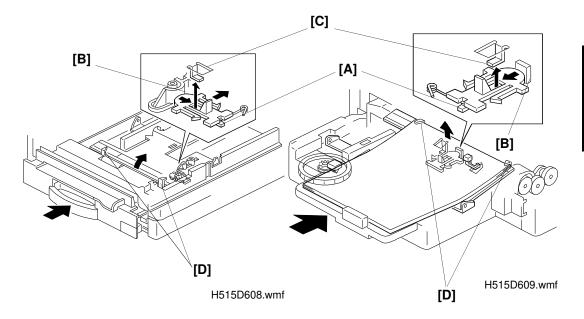
When a sheet of paper is placed in the bypass feed slot, the bypass feed sensor [E] is turned on, and the machine prefeeds the paper until the registration sensor [F] is turned on.

Note that the bypass feed slot can be used only for copying or for printing from the PC using the optional printer interface.



2. Paper Lift Mechanism

Standard and Optional 100 Sheet Cassette



When the cassette is closed after paper is loaded, the slide lock [A] is pushed by the projection [B] and comes off the bottom hook [C].

Once the slide lock comes off, the bottom plate is raised by the pressure springs and the top sheet pushes up against the corner separators [D]. This keeps the stack of paper at the correct height.

DETAILED SECTION DESCRIPTIONS PRINTING

3. Paper Size and Paper End Detection

Standard Cassette/Optional Universal Cassette *

The paper size detector [A] is located at the front of the cassette. The machine determines which size cassette is installed by monitoring the three microswitches in the detector. The machine informs the customer with the Add Paper indicator if the paper size cannot be detected.

When the cassette runs out of paper, the paper end sensor actuator [B] drops through a slot in the bottom plate.

Selectable cassette paper sizes:

- USA model: Letter, Legal
- Europe model: A4, A5 sideways
- Asia model: A4, A5 sideways, F/F4

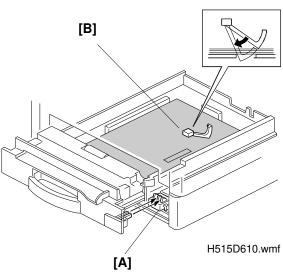
The following diagram shows the relationship between the activated microswitches and the selected paper size.

Microswitch	USA Model	Europe Model	Asia Model
000			
001	Legal		
010			
011	Letter		
100			F/F4
101		A4	A4
110			
111		A5 sideways	A5 sideways

Example: Legal size paper Microswitches

Note: "-----" indicates that the machine detects that a cassette is not installed.

H515D658.wmf



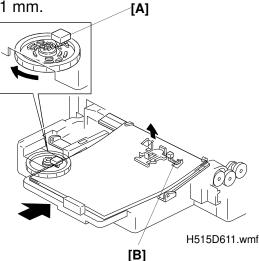
Bypass Feed Slot

This machine does not detect paper width when the bypass feed slot is used. The maximum feed length for bypass feed is 600 mm. The mimimum feedable paper width is 191 mm.

Optional 100 Sheet Cassette

The paper size detector [A] is located at the left hand side of the 100 sheet cassette. The microswitches work in the same way as in the standard cassette.

When the 100 sheet cassette runs out of paper, the paper end sensor actuator [B] drops through a slot.



MFDU Paper End MFCE Paper End Sensor 20-5 Standard Cassette SCP (CPU) 25-3 Paper Size Detector 25-4 Standard Cassette 25-6 EXIO-2 LPC (IC4) 7-1 Paper Size Detector 100 7-2 Sheet Cassette 7-4 Paper End Sensor 7-1 Serial Interface 100 Sheet Cassette **Bus Interface** Paper End 2nd Paper Feed Unit 1st Paper Feed Unit H515D515.wmf

Paper Size/Paper End Detection

DETAILED SECTION DESCRIPTIONS PRINTING

4. Pick-up and Separation

Standard and Optional 100 Sheet Cassettes

The pick-up and separation mechanism is a corner separator type. The corner separators and the paper feed rollers allow only one sheet to feed.

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Cross reference
Group 3 Facsimile Manual: section 4-5-4
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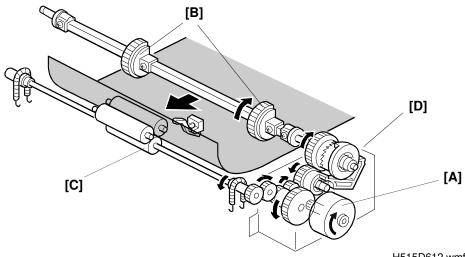
The paper feed motor starts to rotate when the printer is ready for printing.

By-pass Feed Slot

There is no pick-up or separation system in the by-pass feed slot. Only one sheet can be fed from this slot.

5. Drive Mechanism *

Standard Cassette



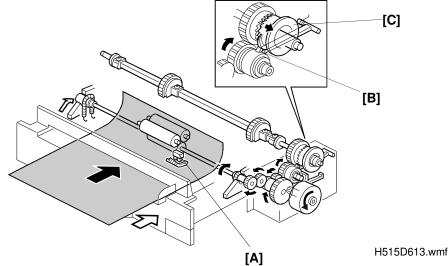
H515D612.wmf

The paper feed motor [A] drives the pick-up and feed mechanism. When the standard cassette is used, the paper feed motor turns clockwise, driving the paper feed rollers [B] and the registration roller [C], as shown in the diagram.

The clutch gear box assembly [D] only allows the paper feed roller to turn once for each sheet of paper.

While the registration roller turns counter-clockwise, paper cannot be fed into the machine from the optional 100 sheet cassette or bypass feed slot. This means that if a sheet of paper is placed in the bypass feed slot during printing from the standard cassette, this sheet will not be fed into the machine.

Bypass Feed Slot



When a sheet of paper is placed in the bypass feed slot, the bypass feed sensor [A] is turned on. The machine turns the paper feed motor counterclockwise to prefeed the paper until the registration sensor is turned on, or for 1 second, whichever is first. (See section 2-2-8 for a diagram of the registration sensor.)

When the paper feed motor turns counter-clockwise, the projection [B] disengages the gear [C] inside the clutch gear box assembly as shown in the diagram. This prevents any drive from being transmitted to the paper feed rollers for the standard cassette.

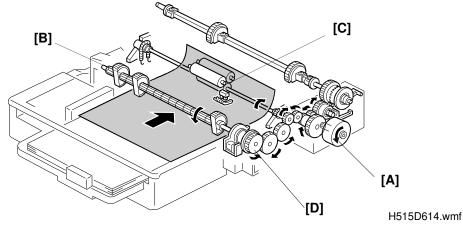
If a sheet of paper remains in the bypass feed slot for longer than the Auto Reset Time (System Switch 0B), the machine will automatically feed it out. The machine will not print incoming fax messages while there is a sheet of paper in the bypass feed slot, so feeding out the page after the Auto Reset time allows incoming faxes to be printed even if someone leaves paper in the bypass feed slot.

Sheets of paper longer than about 600 mm cannot be fed from the bypass feed slot, or a paper jam will occur (error code 9-81).

Note that the bypass feed slot can be used only for copying and for printing from the PC using the optional printer interface.

DETAILED SECTION DESCRIPTIONS PRINTING

Optional 100 Sheet Cassette



When the machine feeds a sheet of paper from the 100 sheet cassette, the paper feed motor [A] turns counter-clockwise to drive the paper feed rollers [B] and the registration roller [C] as shown in the diagram.

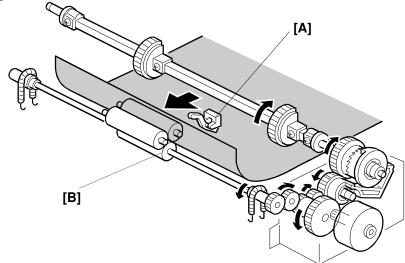
The paper feed clutch [D] in the optional 100 sheet cassette ensures that the paper feed roller rotates only once for each sheet of paper.

Paper Feed Priority *

If there is an optional cassette and/or paper feed unit installed in the machine, the priority for paper feed is decided in accordance with the following rules.

- The paper in the bypass feed slot has the first priority (for copying and printing from a PC only).
- If the machine has optional paper feed units and all the cassettes contain paper of the same size, the machine uses the lower paper feed unit first, the upper paper feed unit second, the paper in the optional 100 sheet cassette third, and the paper in the standard cassette last.
- If the cassettes contain different sizes, the machine selects the paper size as explained in section 2-2-13.

2.2.8. Registration



H515D615.wmf

The registration sensor [A] is positioned above the registration roller [B].

When a cassette (Standard, Paper Feed Unit, or 100 Sheet Cassette) is used, the machine stops the paper feed motor for a few moments when the registration sensor is turned on.

When the bypass feed slot is used, the machine prefeeds the paper until the registration sensor is turned on (or for 1 second, whichever comes first).

Then, the paper feed motor starts rotating immediately after laser scaninng starts.

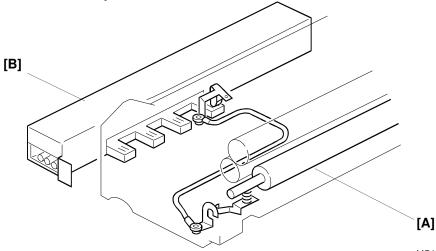
When the leading edge touches the pressure rollers, the momentum of the paper corrects any skew.

DETAILED SECTION DESCRIPTIONS PRINTING

Jam Detection *

	Condition	Error Code
When the standard cassette is used	When the registration sensor is not turned on within 2.0 seconds of the paper jam timing signal.	9-07
When any of the paper feed stations or the bypass feed slot is used.	When the paper feed-out sensor is not turned on within 2.6 seconds after the paper feed motor starts to feed paper for printing (not for prefeed).	9-08
	When the registration sensor is not turned off within X seconds after it turned on. X seconds = (paper length / 67.546) + 3 seconds (67.546 mm/ s : paper feed speed)	9-08
When the upper paper feed unit is used.	When the relay sensor in the upper paper feed unit is not turned on within 2.0 seconds after the paper feed clutch in the upper paper feed unit was switched on.	9-50
	When the registration sensor in the fax machine is not turned on within 2.0 seconds after the paper feed motor started.	9-51
When the lower paper feed unit is used.	When the relay sensor in the lower paper feed unit is not turned on within 2.0 seconds after the paper feed clutch in the lower paper feed unit was switched on.	9-52
	When the relay sensor in the upper paper feed unit is not turned on within 2.0 seconds after the paper feed motor in the lower paper feed unit started.	9-53
When the bypass feed slot is used	When the registration sensor is not turned on within 2 seconds after the paper feed motor starts rotating for printing. (This error is not generated during prefeed, to allow the users to change their minds after putting paper in this slot. When the bypass feed sensor is turned on, the machine prefeeds the paper for up to 1 second and stops feeding even if the registration sensor is not turned on. If the registration sensor did not turn on during prefeed, the machine starts.)	9-80
	When the bypass feed sensor is not turned off within 11.9 seconds after it is turned on. Using the same formula as above (error code 9-08), it works out that individual sheets cannot be longer than about 60 cm.	9-81
When the 100 sheet cassette is used.	When the registration sensor is not turned on within 2.0 seconds of the paper feed clutch turning on.	9-82

2.2.9. Transfer and Separation

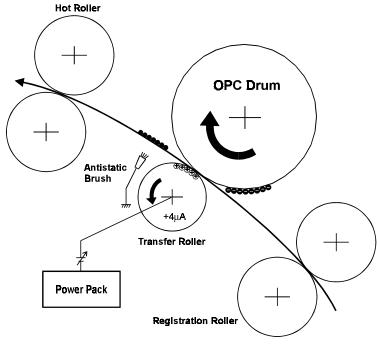


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Instead of using a transfer corona wire, this machine uses a transfer roller, which touches the drum surface.

A constant current of $+4 \pm 0.2 \,\mu$ A is applied to the transfer roller [A] from the power pack [B]. The positively biased transfer roller pulls negatively charged toner off the drum. The curvature of the drum and the antistatic brush helps the paper to drop away from the drum.

Temperature and humidity have less effect on the supply of ions when the transfer current is held constant. With a constant voltage, ions may dissipate in some conditions.



H515D653.wmf

Cleaning Mode

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

While the machine is in the cleaning mode, the power pack supplies -1000V \pm 50 V to the transfer roller, and charges the drum to -750 V. The negatively charged toner on the transfer roller is then transferred back to the drum.

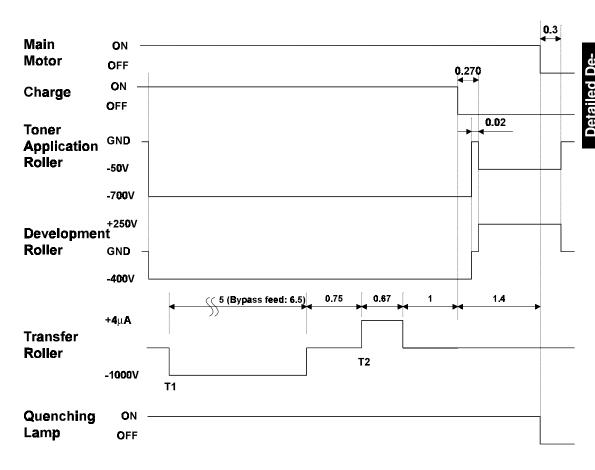
The machine goes through the cleaning mode in the following conditions:

- At power on (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.
- After the bypass feed slot has been used (each page): This is done only if printer switch 00 bit 3 is set to 1.

The cpu controls the transfer roller voltage through the power pack using the Transfer 0 and Transfer 1 signals as shown below (for a circuit diagram, see Bias Control Circuit in section 2-2-6).

In	Transfer 0	Low	High	Low	High
	Transfer 1	Low	Low	High	High
Out	Transfer Roller	+ 4 μA	- 1000 V	Off	Off

Timing Chart: Cleaning Mode



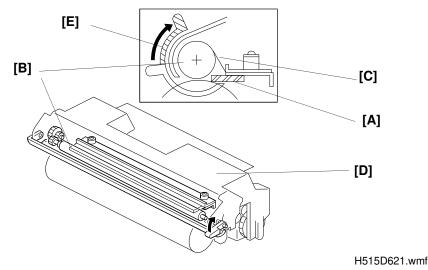
H515D663.wmf

Before cleaning starts, the main motor, charge corona, and quenching lamp turn on.

- T1. Cleaning bias is applied to the transfer roller.
- T2. A positive constant current of + $4 \pm 0.2 \,\mu$ A is applied to transfer back to the drum any toner which is positively charged by the transfer roller.

DETAILED SECTION DESCRIPTIONS PRINTING

2.2.10. Cleaning



The cleaning unit and the used toner tank are contained in the CTM.

The cleaning blade [A] removes any toner remaining on the drum after the image is transferred to the paper. A magnetic roller [B] then brings the toner into the used toner tank [D]. The mylar blade [C] scrapes the toner off the magnetic roller into the used toner tank [D].

When the CTM is removed from the machine, the cleaning roller cover [E] is closed by a spring. This prevents removed toner from falling out of the unit.

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

2.2.11. Fusing

Fusing Lamp Control

When the main switch is turned on, the machine turns on the fusing lamp and raises the fusing temperature to 80 °C in about 4 s. For printing, the machine raises the fusing temperature to 190 °C.

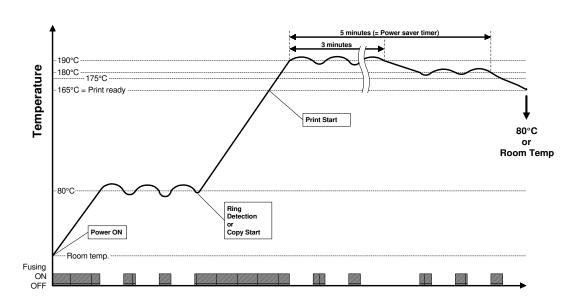
When the Energy Saver Key is pressed or the energy saver timer expires, the machine goes into a energy saver mode. In Level 2 Energy Saver Mode the fusing lamp is turned off. The user can select whether to keep the fusing lamp off or at 80°C during Energy Saver Mode Level 1.

Cross Reference: Energy Saver Modes: Section 2-3

If the printing operation continues for more than 3 minutes, the machine keeps the fusing temperature at 180°C.

Points to Note:

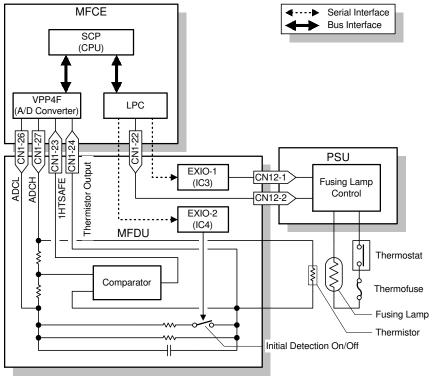
- Standby temperature: 80 °C
- Printing start temperature: 165 °C
- Printing temperature: 190 °C
- Thermistor maximum: 250 °C (monitored by a comparator)
- Thermostat maximum: 150 °C (the temperature of the hot roller would be about 400 °C)
- Thermofuse maximum: 169 °C (the temperature of the hot roller would be about 400 °C) The thermofuse is not used in USA models.



H515D654.wmf

DETAILED SECTION DESCRIPTIONS PRINTING

Fusing Control *



The Thermofuse is not installed in the 115V models.

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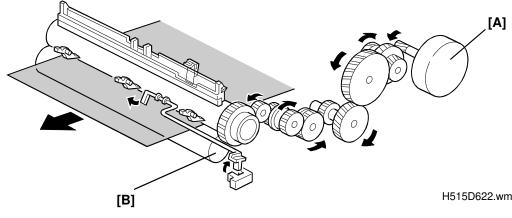
During normal operation, the cpu controls the fusing lamp based on input from the thermistor using the above circuit.

When the machine is turned on, or when it comes back from the Level 2 Energy Saver Mode, it checks whether the thermistor circuit is intact by temporarily closing the initial detect switch circuit on the MFDU. If the thermistor is connected properly, the machine begins normal operation. If it is not, an Auto Service Call (error code 9-22, sub-code 09) is generated.

As a backup safety measure, when the temperature of the hot roller reaches about 400 °C, the thermostat and/or the thermofuse open (the thermofuse is not installed in USA models).

The machine turns on the cooling fan when the fusing temperature reaches 120 °C. It is turned off when the fusing temperature drops below 120 °C.

Fusing Unit Drive *



The main motor [A] drives the fusing unit through a gear train. The paper feed-out sensor [B] detects when the paper is fed out of the unit.

Jam Detection - Paper Feed Out

The machine detects a paper jam when the paper feed-out sensor is not turned off within X seconds or more after it is turned on (Error Code 9-09).

X seconds = (paper length / 67.546) + 3 seconds (67.546 mm/s is the paper feed speed)

These conditions are the same for any of the cassettes.

Fusing Unit Service Call Conditions

	Conditions	Error Code (9-22)
At power on	If there is any problem with the thermistor. (This detection is also done when the machine comes back to the normal mode from Energy Saver Mode Level 2.)	Sub-code 09
Standby mode	If the fusing temperature stays below the standby temperature for more than 18 seconds when fusing lamp ON is selected in Energy Saver Mode Level 1.	Sub-code 05
	If the fusing temperature takes more than 40 seconds to reach 165°C from the standby temperature.	Sub-code 02
During printing	If the fusing temperature stays above 190°C for more than 60 seconds.	Sub-code 01
	If the fusing temperature stays below 140 °C for more than 1 s during printing.	Sub-code 07
After printing	If the fusing temperature takes more than 20 minutes to go down to 100°C when the machine goes into Energy Saver Mode Level 1.	
	 When fusing lamp OFF is selected for Energy Saver Mode Level 1. 	Sub-code 03
	 When fusing lamp ON is selected for Energy Saver Mode Level 1. 	Sub-code 04
At any time	If the fusing temperature reaches 250°C.	Sub-code 08

2.2.12. Page Separation and Data Reduction

Incoming pages that are only slightly longer than the copy paper may be reduced in the sub-scan direction. Whether or not this happens depends on the settings of printer switches 04 and 05.

Reduction Enabled

If bit 0 of printer switch 03 is at 1 (Enabled), the data will be reduced in the page memory to fit on the copy paper. However, data will only be reduced if the length of the incoming page is between 5 mm shorter and a certain maximum length. This maximum incoming page length that can be reduced depends on the copy paper size and on the reduction ratio stored in printer switches 04 and 05.

Each paper size can be programmed with a separate reduction ratio. In each of the two bit switches, there is one bit for each possible paper size. The combination of the bit settings determines the ratio for that paper size.

Bit No.	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Switch No.	Not used	Not used	Legal	F, F4	A4	Letter	Not used	A5 sideways
Sw 04	0: 4/3		1:4/3	0:	8/7	1:1	2/11	
Sw 05	0:	():	1:		1:		

The following table shows the maximum incoming page length that can be reduced for each copy paper size. All length are in millimeters. The factory setting of the reduction ratio is 4/3.

USA Model *

Lines/mm mode

	Printable	Maximum r	educible incoming p	age length.
Сору Туре	Page Length	Ratio = $4/3$	Ratio = $8/7$	Ratio= 12/11
Letter	279.2 mm	365.2 mm	313.0 mm	298.7 mm
Legal	355.6 mm	467.0 mm	400.3 mm	382.1 mm

Lines/inch mode

	Printable	Maximum r	educible incoming p	age length.
Paper Type	Page Length	Ratio = $4/3$	Ratio = $8/7$	Ratio= 12/11
Letter	279.4 mm	365.8 mm	313.4 mm	299.2 mm
Legal	355.6 mm	467.4 mm	400.6 mm	382.3 mm

DETAILED SECTION DESCRIPTIONS PRINTING

Europe/Asia Model *

Paper Type	Printable	Maximum reducible incoming page length.			
тарегтуре	Page Length	Ratio = $4/3$	Ratio = $8/7$	Ratio= 12/11	
A5 Sideways	147.8 mm	190.1 mm	162.9 mm	155.3 mm	
A4	296.9 mm	388.8 mm	333.2 mm	318.2 mm	
F, F4	330.1 mm	433.2 mm	371.2 mm	354.3 mm	

Lines/mm mode

Lines/inch mode

	Printable	Maximum reducible incoming page length.			
Paper Type	Page Length	Ratio = $4/3$	Ratio = 8/7	Ratio= 12/11	
A5 Sideways	147.8 mm	190.2 mm	163.4 mm	155.7 mm	
A4	296.9 mm	389.9 mm	333.5 mm	318.3 mm	
F, F4	330.2 mm	433.3 mm	371.3 mm	354.6 mm	

Incoming pages that are longer than the maximum length will not be reduced, but will be printed on two pages and treated in accordance with the setting of bit 1 of printer switch 00. If this bit is 1, the bottom few lines of the page will continue from where the first page left off.

Reduction Disabled

If bit 0 of printer switch 03 is at 0 (Disabled), the data will not be reduced. However, if the incoming page is up to x mm longer than the copy paper, the excess portion will not printed. The value of x can be from 0 to 15 mm. It is determined by the setting of bits 4 to 7 of printer switch 03.

Hex value	Value of X	
0	0	
0	1	
and so	on until	
F	15	

Messages more than x mm longer than the copy paper will be printed out on two pages in accordance with the setting of bit 1 of printer switch 00 as explained earlier.

2.2.13. Resolution Unit Selection for Printing *

The machine can use both inch and mm resolution units for printing. So, if the resolution unit detection is enabled, the machine choose a right resolution unit for printing as requested from the remote terminal in the protocol message as shown in the following table.

Tx terminal's resolution unit		Unknown	inch	mm
Resolution unit	ON	mm	inch	mm
detection	OFF	inch	inch	inch

Cross reference

Resolution unit detection on/off - Printer switch 00, bit 7

2.2.14. Paper Size Selection *

If the machine has an optional cassette and/or an optional paper feed unit installed, the paper size to use is decided using the following rules.

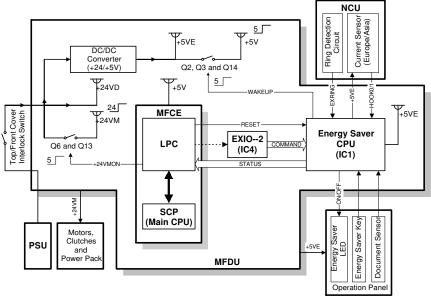
- If all the cassettes contain paper of the same size, the machine uses the paper in the lower paper feed unit first, the paper in the upper paper feed unit second, the paper in the 100 sheet cassette third, and the paper in the standard cassette last.
- If the received page has to be split up and printed on two pages, both pages will be the same size.
- If the cassettes contain different sizes, the paper size chosen for printing the received fax message is selected in accordance with the following table of priorities. The table assumes that reduction is enabled and that the reduction ratio is 4/3.

Received Fax		Se	lected Paper S	ize	
Message Size	A5 sideways	Letter	A4	F, F4	Legal
A5 Sideways	1	2	3	4	5
Letter	5(SR)	1	2	3	4
A4	5(SR)	4(R)	1	2	3
F, F4	5(SR)	4(R)	3(R)	1	2
Legal	5(SR)	4(R)	3(R)	2(R)	1

- The paper size priority is graded from 1 to 5.
- S: The data has to be separated and printed on more than one page.
- R: The data is reduced to fit on the printer paper.
- Some of the reports can be printed on A5 paper without page separation. However, if only A5 paper is in the cassettes, reports that need larger paper sizes will require page separation.

2.3. SYSTEM FEATURES

2.3.1. Energy Saver Modes *



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The machine has three levels of energy saver mode as shown below.

	Normal	Level 0	Level 1	Level 2
Main CPU	ON	ON	ON	OFF
Energy Saver CPU	OFF	OFF	OFF	ON
Energy Saver LED	OFF	ON	ON	ON
LCD/LED	ON	OFF	OFF	OFF
+5V Power Supply	ON	ON	ON	OFF
+24VM Power Supply	ON	ON	ON	OFF
Fusing Lamp	ON	80 °C or OFF	80 °C or OFF	OFF
+24VM Power Supply	ON	ON	ON	OFF

In energy saver mode levels 0 and 1, the main CPU monitors and controls the system. The fusing lamp is either turned off or kept at the standby temperature, depending on the setting of User Parameter Switch 05, bits 6.

In energy saver mode level 2 (also known as the 2-watt energy saver mode), the main CPU and dc power supplies are shut down. The energy saver CPU monitors the energy saver key, incoming calls, and the document sensor. When the energy saver CPU detects activity at one of these, it activates the +5V supply with the WAKEUP signal to start up the main CPU and other power supplies (+5VLD, +12.4V, +12VP, and -9V).

The following sections explain how the machine uses these three modes. Note that energy saver mode will not operate if a printer interface, a G4 interface, or an RS232C interface is installed.

1. Going into a Energy Saver Mode

The flow chart on the next page explains how the machine goes into a energy saver mode, depending on parameter settings and other machine conditions.

Entering Energy Saver Mode from Standby

- Energy Saver Timer -

When the energy saver timer expires since the last time a condition #1 operation was detected (see the flow chart), the machine automatically goes into a Energy Saver Mode. See the points marked 1 on the flow chart.

Cross Reference

Energy saver timer initial setting: System Switch 0B, bits 2 and 3 (1 minute, 3 minutes, 5 minutes, or Unlimited: Timer disabled)

- Energy Saver Key -

When this key is pressed, the machine checks if there are any background operations in progress (these are the condition #2 operations on the flow chart). If there are none, the machine will automatically go into a Energy Saver Mode. See point 2 on the flow chart.

Which Energy Saver Mode is Selected?

If User Switch 05, bit 6 is set to maintain the fusing lamp at the standby temperature during Energy Saver Mode, the machine enters Energy Saver Mode Level 1. See point 3 on the flow chart.

If User Switch 05, bit 6 is set to keep the fusing lamp off during Energy Saver Mode, the machine checks for events listed on the flow chart as condition #3 events (see point 4 on the flow chart). If none exist, the machine goes to Energy Saver Level 2. If one or more does exist, the machine enters Energy Saver Level 1 until the conditions are all cleared, then it goes to Energy Saver Level 2.

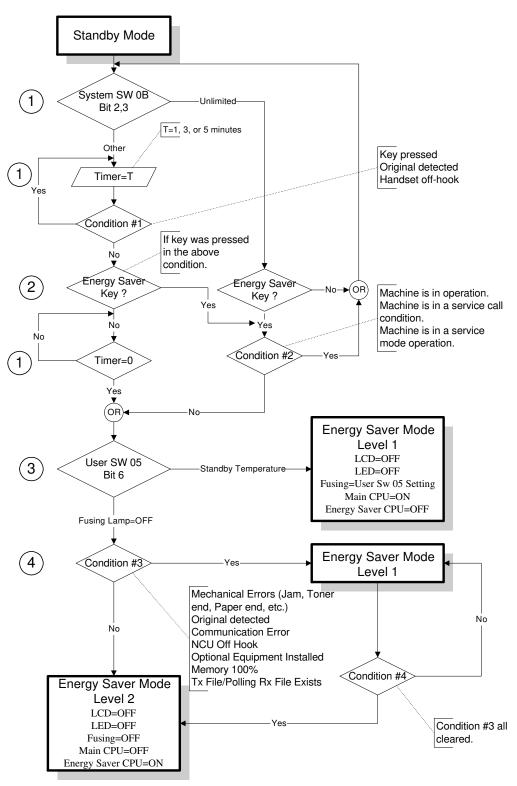
See the next flow chart for more details on how the machine changes from Level 1 to Level 2.

Cross Reference

Fusing lamp control during Energy Saver Mode: User Switch 05, bit 6 (On at standby temperature, or Off)

Note

The "optional equipment" in condition #3 is either a Printer Interface, a G4 interface, or a RS232C Interface.



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2. Going into Level 2 Mode from Level 1 Mode *

The flow chart on the next page shows in more detail how the machine goes from Energy Saver Mode Level 1 to Level 2.

The machine will not go into Level 2 energy saver mode if one of the following conditions exists.

- Either a tx/rx/polling file is stored in the memory.
- SAF memory not empty
- Mechanical error(s)
- NCU off-hook
- Optional equipment installed (a printer interface, a G4 interface, or an RS232C interface)

If there is a tx file in the memory

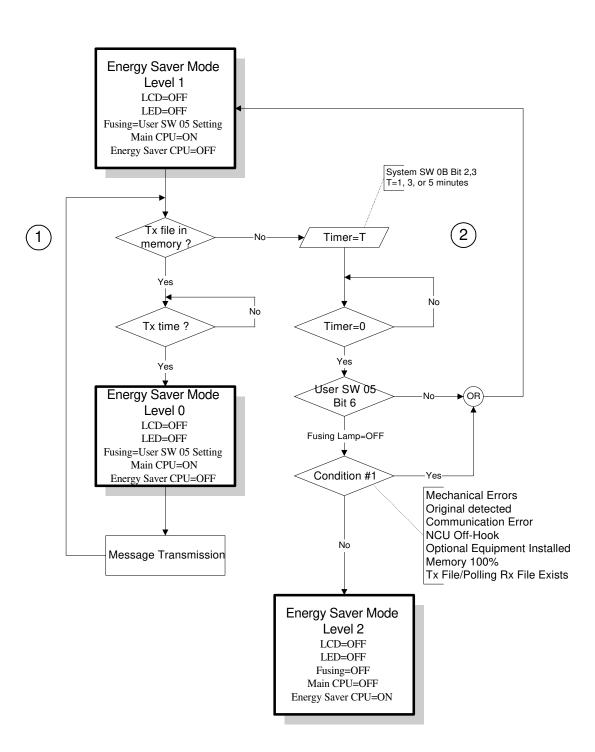
The machine stays in Energy Saver Mode Level 1 until it is time to send the message. The machine then enters Level 0 while the message is sent. See point 1 on the flow chart.

When the Energy Saver timer expires

When the energy saver timer expires after the machine entered Level 1 for the first time (or, if a tx file was present, after the message was transmitted), the machine will enter Level 2 if both of the following are met:

- User Switch 05, bit 6 specifies Fusing Lamp Off
- No condition #1 restrictions exist.

See point 2 on the flow chart.



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3. Receiving a Fax Message in Energy Saver Mode

The flow chart on the next page explains how the machine receives a fax message while it is in a energy saver mode.

Ring Detection

While the machine is in a Energy Saver mode, the energy saver CPU monitors ringing signals from the line. When the energy saver CPU has detected two ringing signals, it activates the +5V supply to the main CPU and passes the ring detection process to the main CPU.

After the main CPU has detected a ringing signal, the machine goes to Energy Saver Mode Level 0 and receives the fax into memory. Level 0 mode looks the same as the previous mode for users, but all the system components are active in the background for receiving a fax message.

See point 1 on the flow chart.

Printing

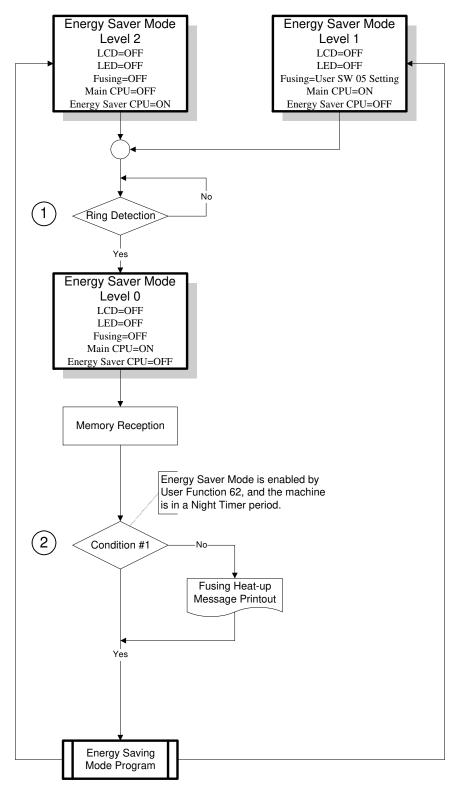
If either of the following conditions is not met (condition #1 on the flow chart), the machine will print out the fax message then return to Energy Saver Mode in the manner described in the previous two flow charts in this section.

- Energy Saver mode is activated during the Night Timer period
- The machine is currently in the Night Timer period.

If both conditions are met, the machine returns to Energy Saver Mode as described in the previous two flow charts in this section. It will print the fax message after the Night Timer expires.

See point 2 on the flow chart.

Cross Reference Night Timer On/Off: User Function 62 Programming the Night Timer period: User Function 72



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4. Sending a Fax Message or Copying in Energy Saver Mode

The flow chart on the next page explains how the machine wakes up from energy saver mode upon a manual operation, and how it comes back to a energy saver mode.

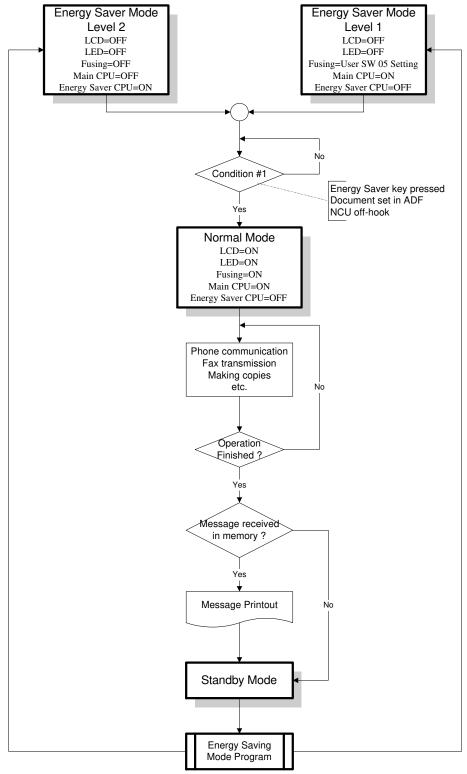
Manual Wakeup Conditions

While the machine is in a energy saver mode, either the energy saver CPU (Level 2) or the main CPU (Level 1) monitors signals from the following (condition #1 on the flow chart).

- Energy saver key
- Document sensor
- Off-hook detector on the NCU

When a signal from one of these has been detected, the CPU wakes up all the components and the machine enters normal operating mode, even during the Night Timer period.

After operations have been finished, the machine goes back to a energy saver mode as explained in the previous sections.



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2.3.2. Automatic Service Calls

1. Service Call Conditions

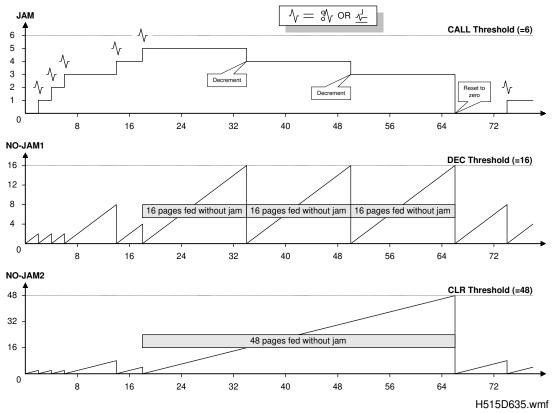
The machine makes an automatic service call when one of the following conditions occurs.

Service Call Conditions	Error Code	Sub-code (8003B5H)
Charge corona unit failure	9-17	11 or 12
Laser diode failure	9-20	21
Fusing lamp failure	9-22	01 to 09
Hexagonal mirror motor failure	9-23	31 or 32
Main motor failure	9-24	41 or 42
Excessive jams in the ADF/scanner	None	None
Excessive jams in the printer	None	None
The PM counter has reached the threshold (60,000 prints)	None	None
The PM interval has expired	None	None

Cross reference

Service station number: Service Function 13 Troubleshooting: Chapter 6

2. Excessive Jam Alarms *



The excessive jam alarm automatically notifies the service station when the machine's scanner or printer frequently has jam problems.

Each type of jam has three counters allocated to it (JAM, NO-JAM1, NO-JAM2). Each of these counters has a threshold value (CALL, DEC, and CLR respectively; these can be adjusted.) The machine uses these counters to monitor jams as follows.

Each time a jam occurs: The JAM counter is increased by 1, and NO-JAM1 and NO-JAM2 are both set to zero. When JAM reaches CALL (6 by default), the machine sends an Auto Service Report with a System Parameter List.

If a sheet of paper is fed without a jam occuring: NO-JAM1 and NO-JAM2 are both incremented by 1. When NO-JAM1 reaches DEC (16 by default), NO-JAM1 is set to zero, and JAM is decremented by 1. When NO-JAM2 reaches CLR (48 by default), NO-JAM2 and JAM are both reset to zero.

The CALL, DEC, and CLR thresholds can be adjusted for each type of jam by rewriting RAM data. The addresses of these thresholds are given on the next page.

Parameters		Addre	ess (H)	Initial	Sys. Para.
Falai	lielers	ADF	Printer	Settings	List
DEC (1 - 255; 0 =	Disabled)	48027E	480282	10 (H)	Х
CALL (3 - 15; 0 =	Disabled)	48027F	480283	06 (H)	Y
CLR	(Low)	480280	480284	30 (H)	
	(High)	480281	480285	00 (H)	

Counters	Addre	Svo Poro Liot	
Counters	ADF	Printer	Sys. Para. List
JAM: Jam counter used to place a service call	480277	48027B	Z
NO-JAM1: Counter used for JAM counter decrement	480276	48027A	—
NO-JAM2: Counter used for clear-	480278 (Low)	48027C (Low)	
ing the JAM counter	480279 (High)	48027D (High)	

The system parameter list gives the current DEC and CALL thresholds and JAM counter value as X, Y, and Z respectively.

The Call Service indicator does not light for an excessive jam alarm, and the machine can be operated normally after the automatic service call has been made. Also, the counters related to the jam location are reset to zero automatically after the call. Then, the alarm is disabled until either bit 3 (ADF jams) or bit 4 (printer jams) of address 4805B0(H) is reset to zero.

3. Periodic Service Call *

The periodic service call notifies the condition of the machine to the service station. The call is made periodically at a time interval programmed in the following RAM addresses.

Parameters		Address (H)
	nrough 15 month(s) (BCD) Service Call Disabled	480379
Date and time of	the next call	
	Year: last two digits of the year (BCD)	48037A
	Month: 01 through 12 (BCD)	48037B
	Day: 01 through 31 (BCD)	48037C
	Hour: 00 through 23 (BCD)	48037D

To change these settings after programming, change the call interval. The machine then automatically changes the remaining parameters by referring to the interval and the current date and time.

The Call Service indicator does not light for a periodic service call, so that the machine can be operated normally after it has sent the service call.

4. PM Call *

If PM call is enabled, the machine will make an automatic service call when the PM counter reaches the PM threshold.

Program the PM call interval at the following RAM addresses. (Default setting: 60,000 sheets)

Address (H)	Bits 7 - 4	Bits 3 - 0
48021C	Tens	Units
48021D	Thousands	Hundreds
48021E	Hundred thousands	Ten thousands

Cross reference

PM call enable/disable: System switch 01, bit 0

The Call Service indicator does not light for a PM service call, and the machine can be operated normally after it has made the service call.

5. Effective Term of Service Calls *

If a time limit for the effectiveness of service calls is programmed, the machine stops making automatic service calls after the time limit.

Program the time limit at the following addresses. This function is disabled when all of these addresses are 00(H).

	Address (H)
Year: last two digits of the year (BCD)	480383
Month: 01 through 12 (BCD)	480384
Day: 01 through 31 (BCD)	480385

2.3.3. Parallel Memory Transmission *

Using memory transmission, normally the machine starts dialing after the document has been completely scanned. Using Parallel Memory Transmission, the machine starts dialing at the same time the machine starts scanning. If the document has multiple pages, the machine scans them into memory and sends them at the same time.

The following table shows the differences between normal memory transmission and parallel memory transmission.

	Memory tx	Parallel memory tx
File Reserve Report	Printed, if automatic report printout is enabled.	Not printed.
If the other terminal is busy	Tries to resend the message later.	Continues scanning the document into memory, and tries to resend it later.
If transmission failed	Tries to resend the remaining pages later.	Tries to resend the remaining pages later.
If memory overflows during scanning	Stops scanning and erases all the scanned pages from memory, if the user agrees to erase them.	Stops scanning and hangs up the communication when memory overflow is detected. Then erases all the scanned pages from memory without notice.
If a document jam occurred during scanning	Stops scanning and deletes all the scanned pages from memory.	Stops scanning and hangs up the communication when a document jam is detected.
How and when the scanned message is erased from memory	The complete message is erased after all the pages have been sent.	Each page is erased after the page has been successfully sent.
Memory threshold to start scanning into memory	Depends on the setting of communication switch 0D. Default setting - 24kB	Depends on the setting of system switch 10. Default setting - 512 kB
Meaning of the stamp mark	Successfully scanned.	Successfully scanned.
Batch numbering (P. x/x)	Enabled	Not available unless the number of pages is programmed manually.

In the following cases, the machine uses normal memory transmission even if parallel memory transmission is enabled.

- Send later transmission
- Broadcasting
- Transmission of an Auto Document only
- File re-transmission from the hard disk filing system
- Double-sided document transmission
- Partial image transmission (if parallel memory tx is enabled, partial image scanning cannot be used)
- Transfer request transmission
- If the other terminal is busy
- If an external telephone connected to the machine is in use
- When communication switch 0A, bit 0 is set to 0
- When remaining memory space is less than the threshold (default = 512 kB)

Using G4 transmission, parallel memory transmission is normally disabled because the transmission speed is much faster than the scanning speed. Transmission using parallel memory transmission is about twice as long as normal memory transmission (using an ITU-T #1 test chart).

However, if the document contains pages with complicated images or when sending a photo document using halftone, using parallel memory transmission may be faster than normal memory transmission.

If the user commonly sends this type of fax message, enable parallel memory transmission for G4 transmission by changing system switch 11, bit 7 to 1.

Cross Reference	
Parallel memory tx (G3) On/Off	- User parameter 07, bit 2
Parallel memory tx (G4) On/Off	- System switch 11, bit 7
Memory threshold for enabling parallel memory tx	- System switch 10, bits 0 to 7
Point of resumption of memory transmission upon	redialing
	- Communication switch 0A, bit 0

2.3.4. Transfer Broadcasting *

This machine uses a new algorithm to identify the requester's fax number to send back the transfer result report, because the transfer result report sometimes did not reach the requester with the algorithm used in previous models.

In a transfer broadcasting operation, the transfer requester informs its own fax number to the transfer station. The transfer station uses that number to identify the requester's fax number, which the transfer station must dial to send the transfer result report back to the requester.

Transmission of the transfer result report and selection of the number to dial depends on the following three settings.

Setting	Switch
Conditions required for transfer result report transmission	Communication switch 0B, bit 3 0: Always
	1: If there is an error
Action when there is no fax number in the programmed Quick/Speed dials which matches the requester's own fax number	Communication switch 0B, bit 5 0: Transfer cancelled 1: Transfer continued
Number of digits compared to find the requester's fax number from the programmed Quick/Speed dials.	Communication switch 0C, bits 0 to 4 (default setting = 5 digits)

The requester's fax number format is normally as follows.

[International access code] [Country code] [Area code] - [Local tel. no.] A Pause ("-") must be programmed between area code and local tel. no.

Before the machine transfers the message, the machine compares the last few digits of the requester's own fax number with all the programmed Quick/Speed Dials as shown in the diagram on the next page, starting from Quick Dial 01 to the end of the Speed Dial codes. (The default setting for the number of digits compared is 5; see the above table.)

If the machine finds a number in which the compared digits match those of the requester's own fax number, the machine chooses the number as the destination for sending the report back. However, depending on the number of digits compared, the machine may choose the wrong destination, as shown in the example diagram on the next page.

Note that the machine does not compare the following:

- Pause ("-")
- ISDN sub-address ("/aaaa", "aaaa" is a sub-address number)

With a G4 transfer request, the G4 and G3 own fax numbers are informed from the requester, then the machine compares the G4 number first, and the G3 number second.

Detailed De-

Example

Requester's Own Fax No. 0111201-2223456		
No. of digits to compare	Result	
4	Q01	
5	Q05	
6	Q05	
7	Q05	
8	Q08	
9	Q08	
10	Q08	
11	S07	
12	No match	
13	No match	

Q01	3456	S00	1223456
Q02	020-4773456	S01	5413654
Q03	020-4776666	S02	00-4126567878
Q04	00-81454771748	S03	0454771748
Q05	2223456	S04	0634558989
Q06	00-4961969063456	S05	07474125899
Q07	0569723456	S06	00-85226356541
Q08	201-2223456	S07	00-12012223456
Q09	00-31204564569	S08	02212301564
Q10	013453456	S09	6524555
Q64	0875558888	S99	00-496158756452
		S100	2223456
Func	With tion Upgrade Card	S999	0454771759
			H515D521.wm

In the above example:

- If the requester is within the same area, Quick Dial 05 or Quick Dial 08 is the correct destination, depending on the required dialing method for numbers in the same country or area. The machine selects Quick Dial 05 if it compares from 5 to 7 digits, and selects Quick Dial 08 if it compares from 8 to 10 digits.
- Or, if the requester is in another country, Speed Dial 07 is the correct destination. The machine selects this number if it compares 11 digits. Any setting higher than this will result in no match, due to the different international access codes at the start of the numbers.
- If the machine compares less than 4 digits, it selects Quick Dial 01.
- If the number of digits to compare is set to zero, the machine sends the report to the first Quick or Speed Dial number which a fax number has been programmed in.

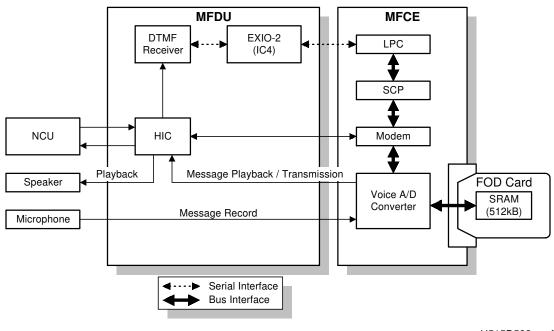
Note that the result can be changed depending on the locations where the candidates are programmed. For example, if "00-12012223456" is programmed in Quick Dial 01, the machine always selects this number for sending back the report, even if the transfer request is from within the same country.

So, when programming the machine to act as a Transfer Station, the combination of the communication switch 0C setting and the programmed location of the requester's fax number has to be considered carefully.

If the machine could not find the destination for the report, either:

- The machine stops the transfer operation and prints a report locally (if bit 5 of communication switch 0B is 0).
- The machine continues the transfer operation and prints a result report locally after finishing all the transfer operations (if bit 5 of communication switch 0B is 1).

2.3.5. Fax On Demand *



H515D522.wmf

Fax On Demand is a polling application with pre-recorded voice assistance.

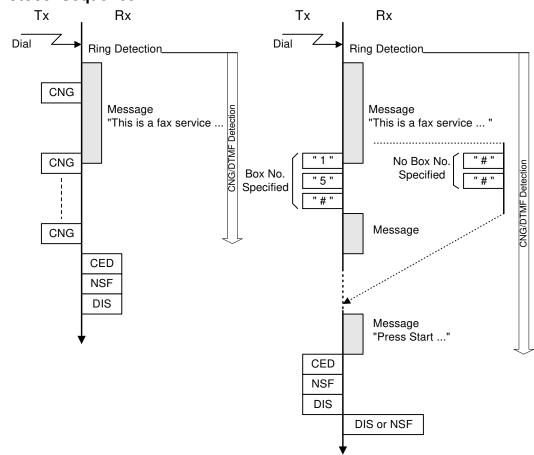
The machine can have up to 100 fax messages in the SAF memory for the Fax On Demand application. Anyone who can access the machine can get up to 5 fax messages in one polling operation using a DTMF tone sequence. A password (Remote ID) can be used to secure the information from unauthorized access.

The machine can have up to seven voice messages to instruct the caller about the procedure (each message must be shorter than 30 s). The voice messages are recorded using the microphone, then the Voice A/D Converter on the MFCE converts them into digital format and stores them in the SRAM inside the Fax On Demand card. When playing back a message or transmitting it to a caller, the Voice A/D Converter converts the digitized message back to an analog voice message and sends it to the speaker or the NCU through the HIC on the MFDU.

The SRAM on the Fax On Demand card is backed up by a battery in the card while the machine is turned off or it is in the 2-watt (level 2) energy saver mode.

Cross Reference

Fax On Demand On/Off - User parameter 07, bits 6 and 7 Storing Fax On Demand messages - User function 38 Voice message recording and playback - User function 75 Refer to the Operator's Manual for more details.



Protocol Sequence

H515D523.wmf

After ringing detection, the machine sends a pre-recorded message, and at the same time, starts to detect CNG signals or DTMF tones from the remote caller. The dedicated DTMF receiver on the MFDU is used to detect both CNG signals and DTMF tones.

If the machine detects CNG signals, the machine goes into fax reception mode. If the machine detects DTMF tone signals, the machine then sends some more messages to instruct the caller what to do. After the last message has been sent to the remote caller, the machine goes into fax transmission mode.

Sometimes the machine might not detect DTMF signals while the machine is transmitting a voice message. To avoid this, the messages should instruct the caller to send DTMF signals after the message has been finished.

While Fax On Demand is enabled, the machine disables receiving Transfer Request using DTMF tones, because it may use the same key sequence.

2.3.6. Hard Disk Filing System *

If the machine has the hard disk option and a function upgrade card, the hard disk can be used as a kind of document filing system.

The feature can be implemented in either ot two ways:

- Enable for specified parties only
- · Enable for all parties except those specified

The machine keeps fax messages that have been sent to enabled parties and fax messages received from those parties in the hard disk.

Each filed message is given a unique cabinet number. Using this number, the messages can be printed or resent later. Refer to the Operator's Manual for more details.

For transmission, the machine can file fax messages that were sent using normal memory transmission. Messages that were sent using the following features cannot be filed in the hard disk.

- Parallel memory transmission
 Immediate transmission
- Auto document

- Confidential transmission
- Messages sent from polling standby

Note that the machine cannot file messages that were sent using parallel memory transmission. So, parallel memory transmission should be disabled when using this function.

For reception, the machine can file any fax messages that were received, except the following.

- Messages with a confidential ID
- Messages received while Memory Lock was enabled
- Messages for Transfer

If the total amount of filed messages exceeds the threshold (40 MB is the default), if the total number of filed pages exceeds 3000, or if the number of files exceeds 500, the machine deletes the files, starting from the oldest one.

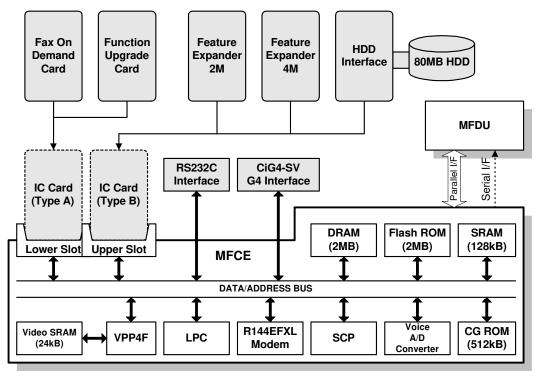
Also, if a message takes up more than the 95% of the threshold (40 MB x 95% = 38 MB at default), the machine does not file it.

Cross Reference

Hard disk filing system on/off - User function 62 Programming specified parties - User function 85 Usage of specified parties - User parameter 09, bits 2 and 3 Filed message retransmission on/off - System switch 13, bit 2 Threshold memory space for this function - System bit switch 13, bits 0 and 1 Printing filed messages - User function 58 Deleting filed messages - User function 24

2.4. PCBs

2.4.1. MFCE *



H515D530.wmf

Detailed De-

1. SCP (System Control Peripheral)

- CPU
- Data compression and reconstruction (DCR)
- MMR + raw data compression for SAF storage (DCMMR)
- DMA controller
- Clock generation
- Stepper motor control
- DRAM backup control
- Ringing signal/tone detection
- · Fusing lamp control

2. LPC (Laser Printer Controller)

- Laser interface (LIF)
- Voice A/D converter control
- Serial interface to MFDU (EXIO and energy saver CPU)
- Parallel interface to MFDU

3. Modem (Rockwell R144EFXL)

• V.21, V.27ter, V.29, V.17, and V.33 modems

4. VPP4F (Video Processing Peripheral 4F)

- Video signal and thermistor output A/D conversion
- Digital video processing

5. ROM

- 2MB (16 Mbit) flash ROM for system software storage
- 512 kB (4 Mbit) mask ROM for LCD and report font storage (CGROM)

6. DRAM

- 2 MB DRAM shared between the Line Buffer (32 kB), ECM Buffer (128 kB), Page Memory (768 kB), and SAF memory (1 MB)
- 1 MB SAF memory, backed up by the battery on the MFDU

7. SRAM

 128 kB SRAM for system and user parameter storage, backed up by the battery on the MFCE

8. Video SRAM

• 8 kB SRAM for video processing

9. Voice A/D converter

- Digital encoding of analog voice messages
- Analog voice generation

10. Oscillators

- 42.20545 MHz oscillator for system clock generation
- 32.768 MHz oscillator for the real time clock. This is backed up by the battery on the MFCE
- 38.00053 MHz oscillator for the VPP4F and R144EFXL modem

11. IC Card Slots

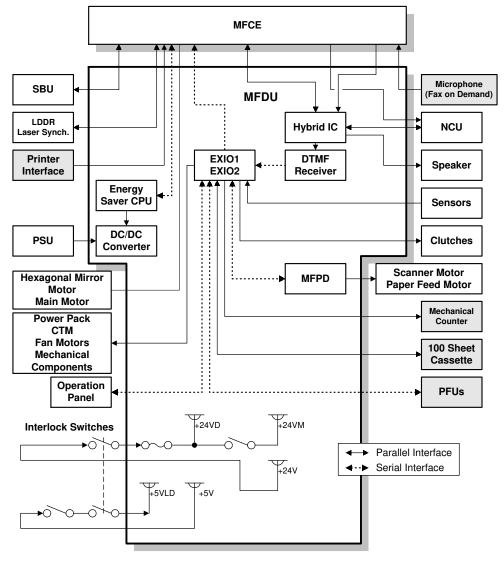
- Upper slot for an optional Feature Expander (SAF memory)
- Lower slot for an optional Function Upgrade Card or Fax On Demand Card

12. Jumpers, Switches, and Test Points

Item	Description	
SW2	Switches the backup battery ON/OFF	
CN6	Test connector for scanner adjustment Pin 1 - Data enable clock Pin 2 - Analog video signal Pin 3 - Line synchronization clock Pin 4 - Ground Refer to section 5.11 for how to adjust the scanner.	

DETAILED SECTION DESCRIPTIONS PCBs

2.4.2. MFDU



H515D531.wmf

1. Energy Saver CPU

• 4 bit CPU for controlling the machine during energy saver mode.

2. FPD (Facsimile Power Driver)

• Stepper motor driver.

3. EXIO1, EXIO2 (External I/O)

- Serial interface to the MFCE, operation panel, FPD, DTMF receiver, and optional paper feed units
- Parallel interface to the motors, clutches, sensors, and other electrical components

4. Analog circuit with HIC (Hybrid IC)

- 2-4 wire switching
- Filters and amplifiers
- Monitor speaker driver

5. DTMF Receiver

- DTMF signal detection for Transfer Request using DTMF and Fax On Demand operations
- Serial interface to the EXIO

6. DC/DC Converters

• +5V, +12.4V, +12V, and -9V generation

7. DRAM Backup

• +5VD generation for DRAM (SAF memory) backup

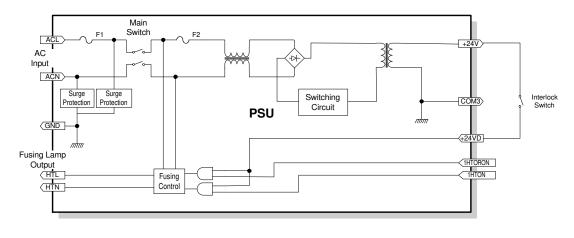
8. Interlock Switches

- The top/front cover interlock switch disables the power supply to the drive components, the laser diode, and the power pack.
- The fusing exit cover interlock switch disables the laser diode power only.

9. Fuse and Test Points

Item	Description
F1	250V/5A fuse for the +24VD power supply
TP1	-9V
TP3	COM1 ground
TP2	+5VE
TP4	+5VLD from both interlock switches
TP5	+24VD from the top/front cover interlock switch
TP6	Laser synchronization signal
TP7	+24V input from the PSU

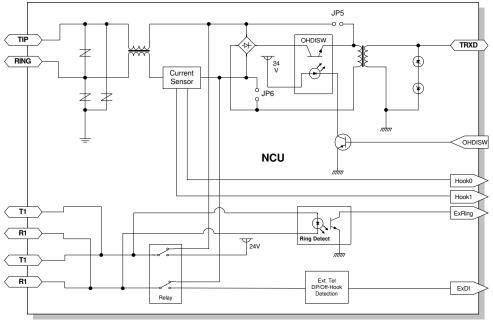
2.4.3. PSU



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- +24Vdc generation
- Fusing lamp ac power supply and control

2.4.4. NCU (USA)

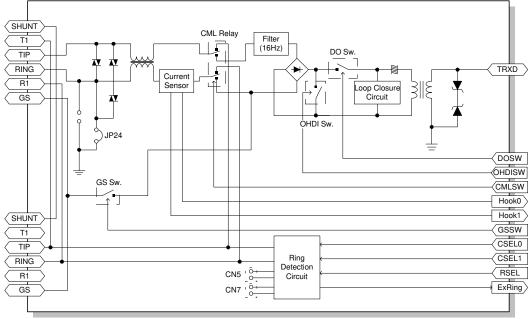


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1. Jumpers

Item	Description
JP5	These jumpers should be shorted when the machine is connected to a dry
JP6	line.

2.4.5. NCU (Europe/Asia)



H515D634.wmf

Detailed De-

1. Control Signals and Jumpers

	CSEL0	CSEL1	RSEL	JP24	CN5	CN7
Country	CN2-4	CN2-5	CN1-13	JF24	CNS	CN7
Germany	L	Н	Н	S	0	0
Holland	L	Н	Н	S	0	0
Austria	L	Н	Н	S	0	0
Italy	L	L	L	S	0	0
Spain	L	L	L	S	0	0
Ireland	Н	L	L	S	S	S
Finland	L	Н	L	0	0	0
Switzerland	L	Н	L	0	0	0
Other	L	Н	L	S	0	0
	L: Low, H:	High		S: Short, 0	D: Open	

3. INSTALLATION *

3.1. INSTALLING THE MACHINE

Refer to the Operator's Manual for the installation environment and how to install and set up the machine.

Refer to section 2.4.5 for how to set up the NCU hardware in each country.

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
PABX access code (RAM address 4800BB)	Function 06
PABX access method (RAM address 4800AD)	Function 06
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 480379)	Function 06

Items to Program (User Administrator Level)	Function No.
Clock	Function 91
Initial programming items (IDs)	Function 61
On/off switches	Function 62
Display/report language	Function 93
Fusing power control during energy saver mode (User parameter switch 05 - bit 6)	Function 63

3.3. INSTALLING OPTIONAL UNITS

Before installing optional units, do the following:

1. Print out all messages stored in the memory.

2. Print out the lists of user-programmed items and the system parameter list.

3. Turn off the main switch, and disconnect the power plug.

Notes

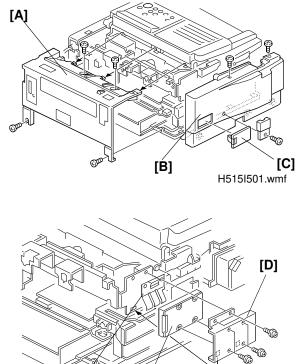
- For the installation procedure of the optional Paper Feed Units, refer to the Service Manual for the Paper Feed Units.
- Refer to the Operator's Manual for the user installable options.
- For the Function Upgrade Card and Fax On Demand Card, be sure to read section 3.3.6 after installation.

3.3.1. Feature Expander Type 140 (80MB Hard Disk) *

Note: If an optional Printer Interface is installed, remove it before doing the following procedure, and put it back afterwards.

Installation Procedure

- 1. Remove the rear cover [A] (4 screws), the left cover [B] (3 screws and the connector cover), and the IC card slot cover [C] as shown.
- 2. Attach the bracket [D] to the hard disk unit [E] (4 screws). Hook the grounding plate [F] onto the bracket [D] and secure the hard disk unit as shown.



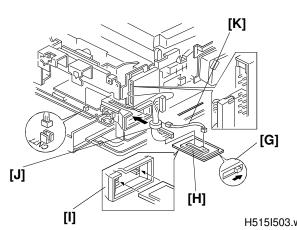
[E]

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[F]

INSTALLATION * INSTALLING OPTIONAL UNITS

- 3. Install the battery on the hard disk interface card, and turn on the battery switch [G].
- 4. Connect the harness [J] to the hard disk interface card [H] and to the hard disk unit [E]. Then plug the hard disk interface card into the upper card slot [I].
- 5. Connect the harness [K] (2 pins) from the hard disk interface card to CN77 on the MFDU as shown.



- 6. Put back the rear cover and the left cover.
- 7. Turn on the main switch and enter the service mode.
- 8. Set bit 4 of system switch 05 to "1", exit the service mode, then turn off the machine.
- 9. Turn the machine back on.
 - **Note:** There is no need to format the hard disk, as this was done at the factory.
- 10. Check the following.
 - a) Print the system parameter list and make sure that "HD" is listed as an option on the list.
 - b) Check that the memory indicator shows 100% in standby mode.
 - c) Print the memory dump list (service function 06) for addresses 700000(H) - 7000FF(H), and check the following addresses and data. 70001E(H) - 50(H) 700022(H) - 00(H)

70001F(H) - 00(H) 700020(H) - FF(H) 700021(H) - FF(H) 700022(H) - 00(H) 700023(H) - 50(H) 700024(H) - 00(H) 700025(H) - 80(H)

If the any of these addresses contain a different value, format the hard disk (service function 16).

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

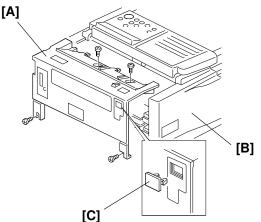
INSTALLATION * INSTALLING OPTIONAL UNITS

3.3.2. ISDN G4 Interface *

Note: If an optional Printer Interface Unit is installed, remove it before doing the following procedure, and put it back afterwards.

Installation Procedure

1. Remove the rear cover [A] (4 screws), and the left cover [B] (3 screws and the connector cover). Then, remove the small cover [C] from the rear cover as shown in Fig.1.

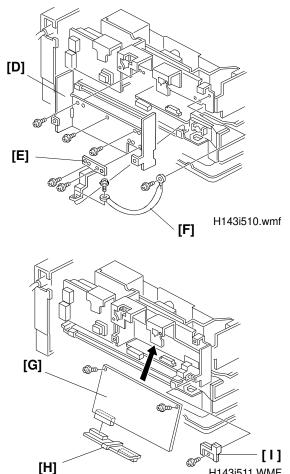


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H143i511.WMF

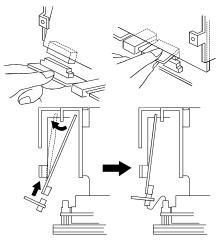
2. This step is necessary only for the Europe model. Attach the inner bracket [D] (3 screws) and the grounding plate [E] (3 screws) as shown.

- 3. Attach the grounding wire [F], and connect the ISDN board [G] to the FCE through the interface harness [H] as shown in Fig. 3. Install the ISDN board into the machine as shown in Fig.4 on the next page.
 - 4. Secure the ISDN board [G] to the machine with 2 screws and the support holder [1] (1 screw).

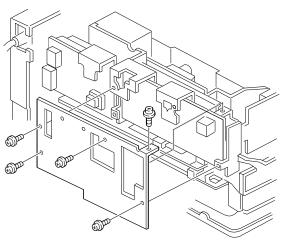


INSTALLATION * INSTALLING OPTIONAL UNITS

- 5. This step is necessary only for the Europe model. Attach the outer bracket [J] (5 screws).
- 6. Put back the rear cover and the left cover. Connect the phone line cable.
- 7. Plug in the machine and turn on the main switch.
- B. Do the initial setting with user function 61 and service function 17. Please refer to the ISDN option service manual for details.



H143i512.wmf



H143i513.wmf

3.3.3. Fax on Demand *

Notes:

1. If an optional Printer Interface is installed, remove it before doing the following procedure, and put it back afterwards.

[A]

2. Do the procedures in the section 3.3.6 after installation.

Installation Procedure

- 1. Remove the rear cover [A] (4 screws) and the IC card slot cover [B].
- 2. Remove the NCU cover (1 screw) and replace it with the cover for the Fax on Demand feature [C], then connect the harness [D] to CN73 on the MFDU as shown.
 - 3. Install the battery on the IC card and turn on the battery switch.
 - Install the IC card [E] into the lower slot, and put back the rear cover [A]. Then connect the microphone socket [F] to the NCU cover as shown.
 - 5. Plug in the machine and turn on the main switch. Then do the following.
- (C) (D) (B) H515I507.wmf
 - [F] [F] [F]
- a) Print the system paprameter list and make sure that "FOD" is listed as an option on the list.
- b) Check that the functions related to the Fax on Demand feature can be accessed. (Please refer to the operator's manual.)

The IC card contains a lithium battery. The danger of explosion exists if a battery of this type is incorrectly replaced. Replace only with the same or an equivalent type recommended by the manufacturer. Discard used batteries in accordance with the manufacturer's instructions. December 21st, 1995

3.3.4. Counter *

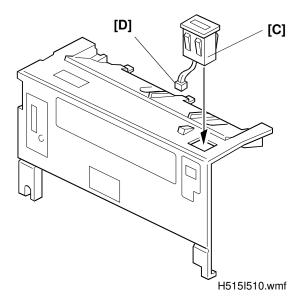
Note: If an optional Printer Interface Unit is installed, remove it before doing the following procedure, and put it back afterwards.

[B]

Installation Procedure

1. Remove the rear cover [A] (4 screws) and the small cover [B] as shown.

- 2. Install the counter [C] as shown.
- 3. Connect the harness [D] to the MFDU, then put back the rear cover [A] (2 screws).
- 4. Plug in the machine and turn on the main switch.
- 5. Make some copies and check whether the counter works or not. If it doesn't, check the harness connection from the counter to the MFDU.



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[A]

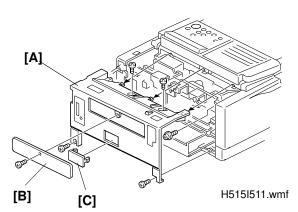
INSTALLATION * INSTALLING OPTIONAL UNITS

3.3.5. Printer Interface *

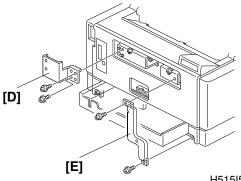
Note: If any other optional units will be installed, install them before doing the following procedure.

Installation Procedure

- 1. Remove the rear cover [A] (4 screws) and two small covers [B] (1 screw) and [C] as shown.
- 2. Put back the rear cover [A] (2 screws on top and 1 screw at the lower left corner).

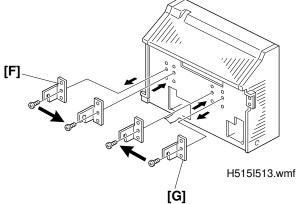


3. Install two brackets [D] (2 screws) and [E] (2 screws - one of these secures the rear cover as well) as shown.



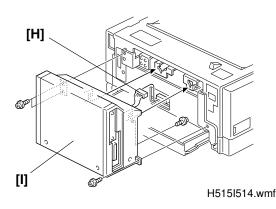
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4. Replace brackets [F] and [G] as shown (use the brackets included in the accessories).

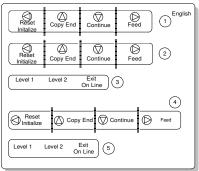


INSTALLATION * INSTALLING OPTIONAL UNITS

- 5. Connect the harness [H] to the MFDU through the lower window in the rear cover. Then, hook the printer interface unit onto the machine with brackets [F] and [G].
- 6. Secure the unit [I] to the machine (3 screws).



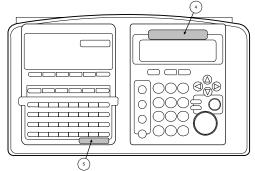
- 7. Connect a parallel printer cable to the printer interface unit.
- 8. Plug in the machine and turn on the main switch.
- Check whether the On Line indicator on the operation panel is lit. If it doesn't, check the harness connection from the printer interface unit to the MFDU.
- 10. Enter function 39 and print a status sheet.
- 11. Apply decals 4 and 5 from the decal sheet to the operation panel as shown.



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nstallation

Note: If installation of additional SIMM memory is desired, refer to the Printer Interface Service Manual (section 3.2).



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3.3.6. Important Notice for the Function Upgrade Card and Fax On Demand Card *

The Function Upgrade Card holds data that has been programmed by the user and the technician, and the Fax On Demand Card holds the voice messages that have been recorded by the user.

The following procedure must be avoided, because it initializes (erases) all the data stored in the card.

- 1. Turning off the machine with the card installed.
- 2. Disconnecting the card.
- 3. Turning on the machine without the card installed.

To prevent accidental data erasure, **change System Bit Switch 16 - bit 0 to 1** whenever a new card is installed.

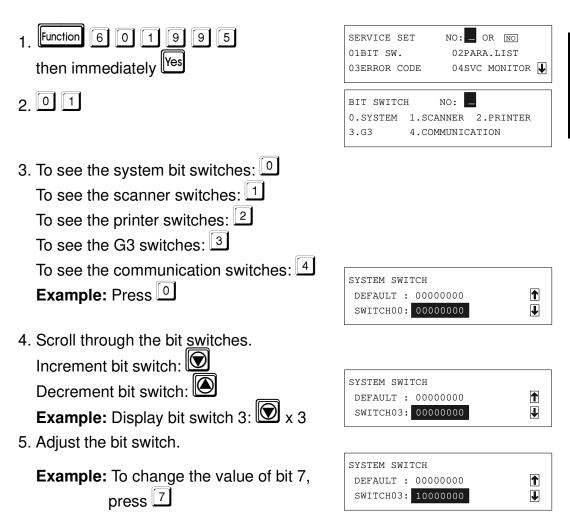
When this bit switch is enabled, the machine will not start up unless one of the following cards is detected at power up, so that the machine will not reinitialize itself to a "without-the-card" configuration.

- Function Upgrade Card
- Fax On Demand Card
- FCE Data Copy Tool (Service Tool)

4. SERVICE TABLES AND PROCEDURES

4.1. SERVICE LEVEL FUNCTIONS *

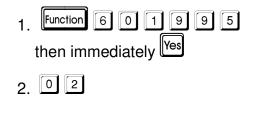
4.1.1. Bit Switch Programming (Function 01)



6. Either:

- Adjust more bit switches go to step 4.
- Finish Yes Function

4.1.2. Group 3 System Parameter List (Function 02)



SERVICE SET	NO: OR NO
01BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
G3 SYSTEM PARAM	METER LIST
PRESS	START



Refer to the following table for the meaning of each counter in the list.

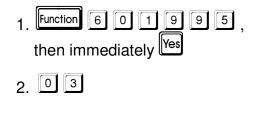
Name	Meaning	Name	Meaning
SCN	Scanned page counter	PRT	Printed page counter
ТХ	Transmitted page counter	RX	Received page counter
РМ	PM counter	PM Default	Default setting for the PM service call interval
PCU	Printed page counter using the current master drum	COPY	Copied page counter
ADF	Scanned page counter using the ADF	TONER	Printed page counter using the current CTM
MAIN Cassette	Paper feed counter (Standard cassette)	Cassette 2	Paper feed counter (First paper feed unit)
Cassette 3	Paper feed counter (Second paper feed unit)	OPEN Cassette	Paper feed counter (100 sheet cassette)
BY-PASS	Paper feed counter (By-pass feeder)	DOC. JAM	Document jam counter
COPY JAM	Paper jam counter (total)	EJECT JAM	Fusing exit jam counter
PAPER JAM	Paper jam counter (Jams at the registration area)	MAIN CST JAM	Paper jam counter (Standard cassette)
CST 2 JAM	Paper jam counter (First paper feed unit)	CST 3 JAM	Paper jam counter (Second paper feed unit)
OPEN CST JAM	Paper jam counter (100-sheet cassette)	BY-PASS JAM	Paper jam counter (By-pass feeder)
PRN	Printed page counter from the PC printer interface	PPC1	Reserved for future use.
PPC2	Reserved for future use.	PPC3	Reserved for future use.
PPC4	Reserved for future use.		

A sample system parameter list is given below.

```
* * SYSTEM PARAMETER LIST (Date and Time) *
                                                         TTI
SERIAL NO. - Serial number programmed by function 14)
ROM VER. [Version] [Software release no.] [Software release date]
ROM NO.
             [Software part no.] [Check sum values (total) (boot) (main)]
RTI
T T I
C S I
                                       CONFIDENTIAL ID
ID CODE
MEMORY LOCK ID
NUMBER
   OWN NUMBER
   OWN NUMBER (ISDN G4)
  OWN NUMBER (ISDN G3)
  SERVICE NUMBER
NCU PARAMETER
COUNTER
PARAMETER
   SCAN THRESHOLD
   2MB, 4MB or HD
                        - Optional memory card or Hard Disk installed
                        - Optional paper feed unit installed
- Optional paper feed unit installed
   CASSETTE 2
  CASSETTE 3
  FUNCTION CARD or FOD - Optional function upgrade card or Fax on demand kit
                          installed
                        - Optional printer interface installed
   PRINTER INTERFACE
                        - Optional ISDN G4 kit installed
   G4
SWITCH (UPPER:DEFAULT LOWER:CURRENT)
(SWUSR) - User Parameter Settings
SWITCH (UPPER:DEFAULT LOWER:CURRENT)
   (SWSYS) - System Bit Switch Settings
   (SWSCN) - Scanner Bit Switch Settings
   (SWPLT) - Printer Bit Switch Settings
   (SWCOM) - Communication Bit Switch Settings
    (SWG3) - G3 Bit Switch Settings
```

H515M550.wmf

4.1.3. Error Code Display (Function 03)



3. Either:

SERVICE SET NO: OR NO 01BIT SW. 02PARA.LIST 03ERROR CODE 04SVC MONITOR ERROR CODE CODE=0-14 JAN 1 3:15PM



4.1.4. Service Monitor Report (Function 04)

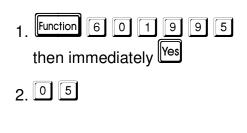


SERVICE SET	NO: OR NO
O1BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
SERVICE MONITOR	REPORT
PRESS	START

з. 🔯

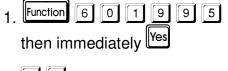
3.

4.1.5. Group 3 Protocol Dump (Function 05)



SERVICE SET	NO: _ OR NO
O1BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
G3 PROTOCOL DU	MP LIST
PRESS	START
	NO TO CANCEL
L	

4.1.6. RAM Display/Rewrite (Function 06)

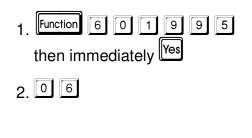


- 2.06
- 3. 🖸

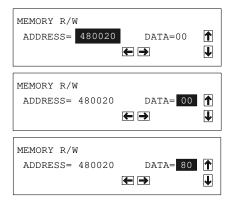
[
SERVICE SET	NO: _ OR NO
01BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
RAM	NO: -
0.MEMORY R/W	1.MEMORY DUMP
MEMORY R/W	
ADDRESS= 0000	00 DATA=2E
	← →

- 4. Input the address that you wish to see. **Example:** Address 480020 4 8 0 0 2 0
- 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
- 7. Either:
 - View the previous address press
 - View the next address press
 - Finish Yes Function

4.1.7. RAM Dump (Function 06)



3. 1



SERVICE SET	NO: _ OR NO
01BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
RAM	NO:
0.MEMORY R/W	1.MEMORY DUMP
MEMORY DUMP	
ADD. 0000 00H	- ADD. FFH

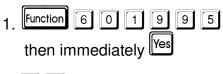
4. Enter the first four digits of the start and end addresses.

Example: Start at 480000, end at 4801FF.

MEMORY	DUMP				
ADD.	480000H	-	ADD.	4800FFH	

5. 🕥

4.1.8. Counter Display/Rewrite (Function 07)





02PARA.LIST
04SVC MONITOR 🕁
NO:
NO:

SERVICE SET

NO: OR NO

3. Either:

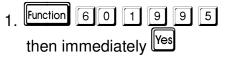
Check the transmitted, received, scanned and printed page counters, and the printer and scanner jam counters press Check the PM counter - press Check the CTM counter - press Check the OPU counter - press 3

- Example: Press
- To change the contents of a counter, input the new value, then press Yes.

5. To finish: Yes Function

COUNTER							
TX	:	000000		SCN:	000000		
RX	:	000000		PRT:	000000	↓	

4.1.9. Modem Test (Function 08)



- 2.08
- 3. 🖸
- 4. Scroll through the available tests using or or .
- 5. To start a test:
- 6. To stop the test:
- 7. To finish: No Function

4.1.10. DTMF Tone Test (Function 08)



- 3. 1
- 4. Scroll through the available tests using \bigcirc or \bigcirc .
- 5. To start a test:
- 6. To stop the test:

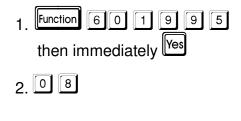
SERVI	CE SET	NO: _ OR [NO
01BIT	SW.	02PARA.LI	ST
03ERR0	OR CODE	04SVC MON	ITOR 🗸
NCU			NO:
0.MODE	ΞM	1.DTMF	_
2.NCU	PARA	3.RINGER	Ŧ
MODEM	TECT		
MODEM		200555	
	NO.01=V21	300BPS	Ť
	PRESS	"START"	Ť

NO: _ OR NO SERVICE SET O1BIT SW. 02PARA.LIST 03ERROR CODE 04SVC MONITOR 🗸 NCU NO: _ 0.MODEM 1.DTMF 2.NCU PARA ₽ 3.RINGER DTMF TEST 1 NO.01=TONE [0] PRESS "START" ₽

7. To finish: No F



4.1.11. NCU Parameters (Function 08)



3. 🙎

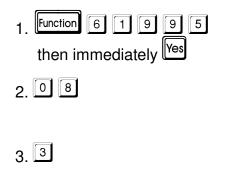
SERVICE SET	NO: _ OR NO	
01BIT SW.	02PARA.LIST	
03ERROR CODE	04SVC MONITOR 🖶	
NCU	NO:	
0.MODEM	1.DTMF	
2.NCU PARA	3.RINGER	
NCU PARAMETER S		
C.C =019		
PRESS "YES/NO"		

- 4. Scroll through the parameters using
 or
 If you want to change a value, enter the new value at the keypad, then press
- 5. To finish : No Function.

Note: Parameter CC is the Country Code, Parameter 01 is the Tx level. Refer to section 4.3 for full details on NCU parameters.

4.1.12. Modem Detection Test (Function 08)

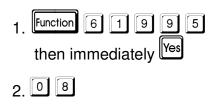
Note: This function can be used only when G3 bit switch 0B bit 5 (French PTT requirements) is 1 in European models. It cannot be used in USA models.



SERVICE SET	NO: OR NO	
O1BIT SW.	02PARA.LIST	
03ERROR CODE	04SVC MONITOR	Ţ
NCU	NO:	_
0.MODEM	1.DTMF	
2.NCU PARA	3.RINGER	Ť
DETECT TEST	READY	
NO.01=V29	9600BPS	↑
PRESS	START .	t

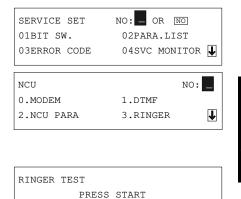
- 4. Scroll through the available tests using \bigcirc or \bigcirc .
- 5. To start a test:
- 6. To stop the test:
- 7. To finish: No Function

4.1.13. Ringer Test (Function 08)



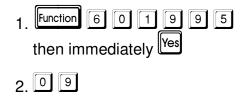
3. 3

- 4. To start the test:
- 6. To stop : 🖾
- 7. To finish: No Function



4-9

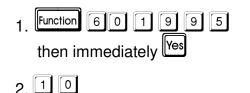
4.1.14. Operation Panel Test (Function 09)



SERVICE SET	NO: _ OR NO
01BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🗸
LED.LCD	
PRE	ESS START

- 3. To start the test, press . The screen should turn black.
- 4. To stop the test, press
- 5. To finish: No Function

4.1.15. Xenon Lamp Test (Function 10)



	If o	. 1
\mathbf{o}		
ວ.		_

4. To start the test, press
5. To stop the test, press 🕅
6. To finish: No Function

O1BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR
SCANNER	NO:
0.Xe LAMP	1.ADF TEST
Xe LAMP	
PRESS	START

NO: _ OR NO

SERVICE SET

4.1.16. ADF Test (Function 10)



- 2. 1 0
- 3. 1
- Place a document in the feeder, then press .
- 5. To stop the test, press $\overline{\mathbb{D}}$.
- 6. Finish: No Function

4.1.17. Printer Test Patterns (Function 11)

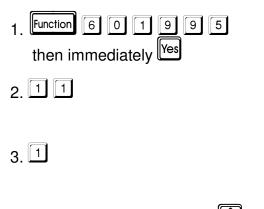
1. Function 6 0 1 9 9 5 then immediately Yes
2. 1 1
3. 0
4. Press a key from to 5.
5. Press 应 . A test pattern is printed.

6. To finish: No Function

SERVICE SET	NO: _ OR NO
O1BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
SCANNER	NO:
0.Xe LAMP	1.ADF TEST
ADF TEST	
PRESS	START

SERVICE S	et no:	OR NO
01BIT SW.	02PA	RA.LIST
03ERROR C	ODE 04SV	C MONITOR 🕁
PRINTER		NO:
0.PATTERN	1.AG	ING TEST
PATTERN	1	ENTER CODE
CODE:	NO TO CANCEL	SCROLL 🚹 🕹
PATTERN		_
CODE: 0	VERTICAL	1
	PRESS START	1 J.

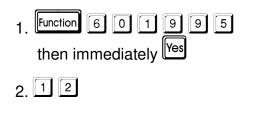
4.1.18. Scanner and Printer Mechanism Test - Free Run (Function 11)



SERVICE SET	NO: _ OR NO
O1BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
PRINTER	NO: _
0.PATTERN	1.AGING TEST
MECH. TEST	
PRESS	START

- 4. To start the free run, press .
- 5. To stop the test, press $\textcircled{\basis}$.
- 6. To finish: No Function

4.1.19. RAM Tests (Function 12)



SERVICE SET NO: OR NO 01BIT SW. 02PARA.LIST 03ERROR CODE 04SVC MONITOR RAM TEST NO: 0.SRAM 1.DRAM 2.COPY

3. Either:

Test the SRAM:

Test	the	DRAM:
1001	ui i C	

Press	0	\bigcirc
Press	1	\bigcirc

If test is successful, the display shows "OK!!". If test is unsuccessful, the display shows "ADDRESS=".

4. To finish: No Function



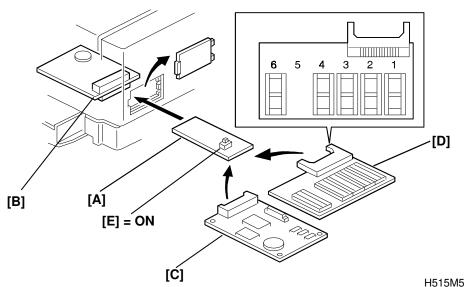
4.1.20. Software Download (Function 12)

Instead of replacing EPROMs to update the machine's software, use this procedure to update the software in the machine's Flash ROM.

This procedure copies software from an external medium to the Flash ROM on the machine's MFCE. The external medium for the new software can be an MFCE or an EPROM board.

- 1. Turn off the machine.
- Insert the Flash/SRAM Copy Tool [A] into the <u>lower</u> IC card slot [B], then connect the MFCE [C] or EPROM board [D] with new software to the opposite side of the tool.

If the machine has an optional Function Upgrade card or an optional Fax On Demand card, follow the instructions in section 4.1.23. Otherwise, the programmed data in the IC card may all be erased.

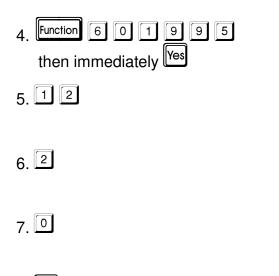


H515M551.wmf

Note: The switch [E] on the tool [A] must be at the ON position.

The EPROM board uses four 4Mbit EPROMs. Each EPROM must meet the following specifications.			
Size: 4 Mbits	Data width: 8 bits		
Number of pins: 32	Access speed: Faster than 150 ns		
Socket 1: ROM0, D15 - D8 Socket 3: ROM0, D7 - D0	Socket 2: ROM1, D15 - D8 Socket 4, ROM1, D7 - D0		

3. Turn on the machine.



SERVICE SET	NO: _ OR NO
O1BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🖳
RAM TEST	NO:
0.SRAM	1.DRAM
2.COPY	
COPY	NO:
0.ROM COPY	1.RAM COPY
COPY	
FLASH ROM ->	MACHINE
PRESS	START

8.

If the software is successfully downloaded, the bottom line of the display display shows " \mathbf{OK} ".

If the software download fails, the bottom line shows "NG".

- 9. To finish, press No Function
- 10. Turn off the machine, disconnect the tool, then turn the machine back on.
- 11. Print out the system parameter list and check the ROM version on it.
- **Note:** In rare cases, the boot block will have to be rewritten. In such cases, you must do the following in addition to the above procedure.
 - After step 3, set bit 5 of system switch 02 to 1.
 - After step 11, reset bit 5 of system switch 02 to 0.



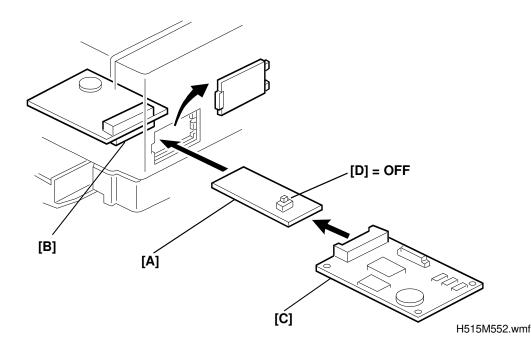


4.1.21. Software Upload (Function 12)

This procedure copies the software from the machine's built-in MFCE to an external MFCE.

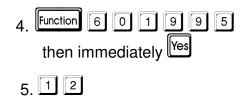
- 1. Turn off the machine.
- 2. Insert the Flash/SRAM Copy Tool [A] into the <u>lower</u> IC card slot [B], then connect the external MFCE [C] to the opposite side of the tool.

If the machine has an optional Function Upgrade card or an optional Fax On Demand card, follow the instructions in section 4.1.23. Otherwise, the programmed data in the IC card may all be erased.



Note: The switch [D] on the tool must be at the OFF position.

3. Turn on the machine.



SERVICE SET 01BIT SW.	NO: OR NO 02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
RAM TEST	NO:
0.SRAM	1.DRAM
2.COPY	

- 6. 2
- 7. 0

COPY		NO:
0.ROM COPY	1.RAM	COPY
COPY		
MACHINE -> FLAS	H ROM	
PRESS ST	ART	

8.

If the software is successfully uploaded, the bottom line of the display shows "**OK**".

If the software upload fails, the bottom line shows "NG".

- 9. Finish : No Function
- 10. Turn off the machine, disconnect the tool, then turn the machine on again.

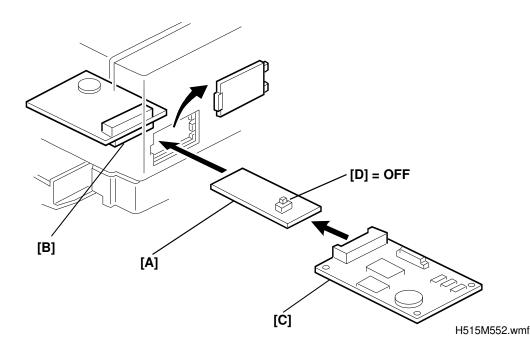


4.1.22. SRAM Data Download (Function 12)

This procedure copies all the data stored in the SRAM on an external MFCE to the machine's MFCE. Use this after replacing a damaged MFCE to save any previous settings that were programmed in the damaged MFCE.

- 1. Turn off the machine.
- 2. Insert the Flash/SRAM Copy Tool [A] into the <u>lower</u> IC card slot [B], then connect the damaged MFCE [C] to the opposite side of the tool.

If the machine has an optional Function Upgrade card or an optional Fax On Demand card, follow the instructions in section 4.1.23. Otherwise, the programmed data in the IC card may all be erased.



Note: The switch [D] on the tool must be at the OFF position.

3. Turn on the machine.

4 Function 6 0 1 9 9 5	SERVICE SET	NO: OR NO
	O1BIT SW.	02PARA.LIST
then immediately	03ERROR CODE	04SVC MONITOR 🕁

RAM TEST	NO:
0.SRAM	1.DRAM
2.COPY	
COPY	NO:
0.ROM COPY	1.RAM COPY
COPY	
MACHINE -> RA	M
PRESS	START

6. 2

7 1

8. If the SRAM data is successfully downloaded, the bottom line of the display shows "**OK**".

If the SRAM download fails, the bottom line of the display shows "NG".

9. Finish : No Function

10. Turn off the machine, disconnect the tool, then turn the machine back on.

4.1.23. Saving Data Programmed in IC Cards

If the machine has an optional Function Upgrade Card or Fax On Demand Card, the card has to be removed from the IC card slot before doing one of the following procedures:

- Downloading/uploading software
- Replacing the MFCE
- Replacing the MFDU or other components

Also in this case, System Switch 16 - bit 0 should have been set to 1 as explained in section 3.3.6, to prevent the data inside the IC card from being initialized accidentally.

So, do the procedures as explained below, to prevent data from being erased from the card.

- **Note:** Refer to section 1.2.2 for the type of data programmed in the Function Upgrade Card. The data in the Fax On Demand Card are voice messages.
 - The data in the SAF memory card or hard disk will be erased if the card or the hard disk interface is removed from the machine.

1. When downloading/uploading software

1. Make sure that System Switch 16 - bit 0 is set to 1, and that the battery switch on the IC card is at the ON position.

- 2. Turn off the machine, and remove the IC card.
- 3. Connect the data copy tool and ROM board or MFCE, and do the required procedure as explained in section 4.1.20 or 4.1.21.
- 4. After the downloading/uploading operation has been finished, turn off the machine and disconnect the tool.
- 5. Put back the IC card as it originally was, then turn on the machine.

If the machine is turned on without the card being put back in the lower IC card slot, the machine recognizes that the card has been removed and all the data programmed in the card will not be accessable any more.

6. Make sure that all the programmed data in the IC cards can still be used.

2. When replacing the MFCE

When replacing the a defective MFCE, the new MFCE installed in the machine must have the same SRAM data as the defective MFCE had, before the IC card is put back.

- 1. Make sure that System Switch 16 bit 0 is set to 1, and that the battery switch on the IC card is at the ON position.
- 2. Turn off the machine, remove the IC card, and replace the MFCE. <u>Do not turn on the machine at this point.</u>
- 3. Connect the data copy tool and the defective MFCE as explained in section 4.1.22, then turn on the machine.
- 4. Copy the SRAM data from the defective MFCE outside to the new MFCE inside, as explained in section 4.1.22.
- 5. After the SRAM data has been copied successfully, turn off the machine and disconnect the tool.
- Put back the IC card in its original position, and turn on the machine.
 Note: If the machine is accidentally turned on without the IC card at this point, go back to step 3 again.
- 7. Make sure that all the programmed data in the IC cards can still be used.

3. When replacing the MFDU or other components

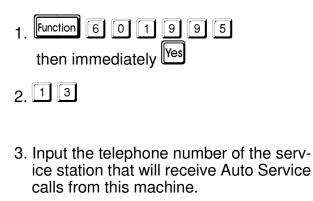
When the MFCE must be removed to access or remove other components inside the machine, follow the procedure below.

- 1. Make sure that System Switch 16 bit 0 is set to 1, and that the battery switch on the IC card is at the ON position.
- 2. Turn off the machine, remove the IC card, and replace the required components inside the machine.
- 3. After replacement has been completed, put back the MFCE and the IC card as they originally were, then turn on the machine.

If the machine is turned on without the card being put back in the lower IC card slot, the machine recognizes that the card has been removed and all the data programmed in the card will not be accessable any more.

4. Make sure that all the programmed data in the IC cards can still be used.

4.1.24. Service Station Fax Number (Function 13)

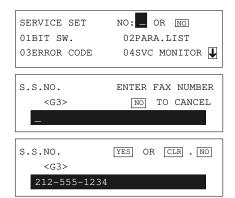


To use a G4 number, press the "G4" key. To erase the telephone number: press

4. If the display is correct: Yes Function

Cross Reference Using a User Function Key as ISDN Subaddress Input

- Function 36, Code No = 10



4.1.25. Serial Number (Function 14)



3. Enter the machine's serial number at the keypad.

To correct a mistake: No

4. If the display is correct: Yes Function

SERVICE SET	NO: _ OR NO
O1BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
SERIAL NO.	
_	
SERIAL NO.	
64997244292	

4.1.26. Hard Disk Initialization (Function 16)

1. Function 6 0 1 9 9 5	
then immediately Yes	
2. 1 6	
3. 0	

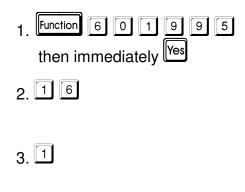
SERVICE SET	NO: OR NO
O1BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
HD	NO:
0.INITIAL	1.FORMAT
2.TEST	
FILE INITIAL	
PRES	S START

4.

If the initialization was completed without error, **OK!!** will be displayed. If there was an error, **NG!!** will be displayed.

4.1.27. Hard Disk Formatting (Function 16)

NOTE: This procedure is not necessary at hard disk installation.

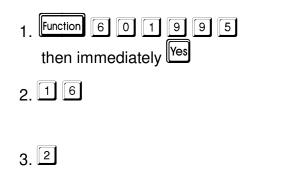


SERVICE SET	NO: - OR NO
O1BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR 🕁
HD	NO:
0.INITIAL	1.FORMAT
2.TEST	
HD FORMAT	
PRE	ISS START

4.

Formatting the hard disk takes more than 30 minutes. If the format was completed without error, **OK!!** will be displayed. If there was an error, **NG!!** will be displayed.

4.1.28. Hard Disk Test (Function 16)

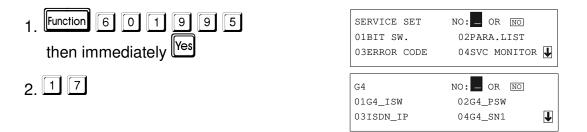


SERVICE SET	NO: OR NO
01BIT SW.	02PARA.LIST
03ERROR CODE	04SVC MONITOR
HD 0.INITIAL 2.TEST	NO:
HD TEST	
PRES	S START

4.

If the test was completed without error, **OK!!** will be displayed. If there was an error, **NG!!** will be displayed.

4.1.29. G4 Parameter Programming (Function 17)



Refer to the service manual for the ISDN G4 option for further details of the G4 parameter programming procedures.

4.1.30. Printing Confidential Files

If the customer forgot the confidential ID number, print the confidential messages which has been received in the machine's memory using the following procedure.

1. Function 5 5.

2. Enter $\#1 \times 2$ as confidential ID, then press $\forall es$. The machine will print all the confidential messages in the memory.

4.2. BIT SWITCHES

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

Note: Default settings for bit switches are not listed in this manual. Refer to the System Parameter List printed by the machine.

4.2.1. System Switches

Sy	System Switch 00				
No	FUNCTION			COMMENTS	
	RAM Reset			Reset Level 3: Erases all image data files stored in the SAF memory and communciation files (e.g. polling	
	Bit 1		Reset Level	rx file). This setting is recommended for use when it is	
	0	0	No reset	necessary to clear the SAF.	
	0 1	1 0	Reset Level 2 Reset Level 3	Always use this reset level after the software has been updated by a remote diagnostics system. (This reset is	
	1	1	Not used	not necessary after local software update.)	
				Reset Level 2: In addition to those items erased by Reset Level 3, the following items are erased: own telephone number, bit switches, RTI/TTI/CSI, report data, programmed telephone numbers (Quick/Speed/ Groups, service station, etc.), NCU parameters, personal codes.	
0				After erasing, the machine changes these two bits back to 0 automatically.	
				No reset: Normal operation	
				Cross reference RAM Reset Level 1 (Factory reset): Change the data in RAM address 480000(H) to FF(H), then turn the machine off and on. In addition to those items erased by Reset Level 2, the clock and scan/print registration settings are erased. Note After a RAM reset level 1 or 2, initial toner supply will	

Sy	System Switch 00				
No	FUNCTION	COMMENTS			
2	Technical data printout on TCR (Journal) 1: Instead of the personal code, the following data listed on the TCR for each analog G3 communic e.g. V33 14 01 03 00 02 1: Enabled First number: Final modem type used Second number: Final modem type used Second numbers: Line quality data. E measure of the error rate or the rx level is printed depending on the bit 3 setting below. (An M on the report indicates that it is error rate, and an L indicates that it is error rate, and an L indicates that it is error rate, and an L indicates that it is error rate; a larger number means more error Fifth number (rx mode only): Total number of lines that occurred during non-ECM reception. Sixth number (rx mode only): Total number of error lines that occurred during non-ECM reception. Sixth number (rx mode only): Total number of lines that occurred during non-ECM reception. Sixth number (rx mode only): Total number of the fifth and sixth numbers are fixed at 00 for transmission records and ECM reception record. How to calculate the rx level listed on the TCR (Journal) Example: V29 96 L 01 A0 00 00 The four-digit hexadeimal value (N) after "L" indicates the rx level. The high byte is given first, followed by the low byte. Divide the decimal value or -16 to get the rx level.				
3	So, the actual rx level is 416/- Line quality data output method 0: Measure of error rate (during image data transmission only) 1: Rx level	This bit determines the data type to be printed on the TCR (Journal) when technical data printout is enabled by bit 2 above.			
4	Line error marks on received pages 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 occured in the data. Such errors are caused by a noisy line, for example.			
5	G3/G4 Communication parameter display 0: Disabled 1: Enabled	This is a fault-finding aid. The LCD shows the key parameters (see the next 2 pages). This is normally disabled because it cancels the CSI display for the user. Be sure to reset this bit to 0 after testing.			
6	Protocol dump list output after each communication 0: Off 1: On	This is only used for communication troubleshooting. It shows the content of the transmitted facsimile protocol signals. Always reset this bit to 0 after finishing testing.			

Sy	System Switch 00		
No	FUNCTION	COMMENTS	
7	Amount of protocol dump data in one protocol dump list printout operation 0: Up to the limit of the memory area for protocol dumping 1: Last communication only	Change this bit to 1 if you want to have a protocol dump list of the last communication only.	

G3 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	S: Standard (8 x 3.85 dots per mm)	
	D: Detail (8 x 7.7 dots per mm)	
	F: Fine (8 x 15.4 dots per mm)	
	21: Standard (200 x 100 dpi)	
	22: Detail (200 x 200 dpi)	
Compression	MMR: MMR compression	
mode	MR: MR compression	
	MH: MH compression	
Communication	ECM: With ECM	
mode	SSC: Using SSC	
	EFC: Using EFC	
	NML: With no ECM, SSC, or EFC	
Width and	A4: A4 (8.3"), no reduction	
reduction	B4: B4 (10.1"), no reduction (tx only)
	A3: A3 (11.7"), no reduction (tx only))
I/O rate	0: 0 ms/line	
	25: 2.5 ms/line	
	5: 5 ms/line	
	10: 10 ms/line	
	20: 20 ms/line	
	40: 40 ms/line	

G4 Communication Parameters *

Compression mode	MMR: MMR compression MR: MR compression MH: MH compression		
Resolution	21: Standard (200 x 100 dpi) 22: Detail (200 x 200 dpi) 24: Fine (200 x 400 dpi)		
Width and reduction	A4: A4 (8.3"), no reduction B4: B4 (10.1"), no reduction (tx A3: A3 (11.7"), no reduction (tx		
Transfer	T: Transfer - : Other		
Confidential	C: Confidential - : Other		
Other The following information is shown in 6-bit format. Bit 1 is the firs from the left, and bit 6 is at the right end.			
Bit 1 - Smoothing 0: Enabled, 1 (Smoothing is disabled in halftone mode.)		0: Enabled, 1: Disabled halftone mode.)	
Bit 2 - CIL printing 0 Bit 3 - 1: Not used		0: Enabled, 1: Disabled	
	Bit 4 - mm/inch conversion Bit 5 - Engine type Bit 6 - Resolution unit	0: Disabled, 1: Enabled 0: mm, 1: inch 0: mm, 1: inch	

Sy	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. Cross reference Auto service calls: Section 2.3.2	
1-7	Not used	Do not change the settings.	

Sy	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 which is programmed as the service station. Always reset this bit to zero after transfer. Cross reference Service station number programming: Function 13 	

Sy	stem Switch 02	
No	FUNCTION	COMMENTS
1	Programmed data transfer (Back-to-back) 0: Disabled 1: Enabled	 Do the following steps to transfer the data. 1. Connect two machines of the same type back to back and enable back-to-back communication on both machines. (For this machine, set bit 7 of G3 bit switch 00 to 1.) 2. Set this switch (System Switch 02, bit 1) to 1 on the receiving machine. 3. Insert a sheet of paper in the ADF, and press Start on both machines. The data is transferred. 4. Disable back-to-back communication and return this bit to 0 after finishing.
2	Not used	Do not change the setting.
3		
4	Not used	Do not change the settings.
5	Software download area 0: All except the boot block 1: All areas, including the boot block Keep this bit at 0 except for the rare cases when the Flash ROM boot block has to be rewritten.	 0: This is the normal setting. For normal software downloads, do not change this bit switch. 1: Set this bit to 1 only when you need to rewrite the boot block in the Flash ROM using Function 12. Cross reference Software Download: Section 4.1.20
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.

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

No	FUNCTION	COMMENTS
0 1 2	LCD contrast Bit 2 1 0 Contrast 0 0 0 Brightest 0 0 1 \downarrow \downarrow \downarrow \downarrow 1 1 0 \downarrow 1 1 Darkest	Use these bit switches to adjust the contrast of the LCD on the operation panel.
3	Dedicated transmission parameter programming 0: Disabled 1: Enabled	This bit must be set to 1 before changing any dedicated transmission parameters.
4	Inclusion of the Start key in Keystroke Programs 0: Not needed 1: Needed	0: The user does not need to press the Start key when operating a keystroke program.
5	Master drum replacement level 0: User 1: Service	 0: The machine asks the user to replace the drum at 30,000 print intervals (default interval). After the user replaces the drum, the machine asks the user if the drum has been replaced or not. If the user answers yes, the machine resets the OPC counter to zero. The drum replacement interval is programmed at addresses 480228 to 48022A(H). Refer to section 4.5 for more details. 1: The machine will not ask the user to replace the drum.
6	G3 CSI/G4 Terminal ID programming level 0: User level 1: Service level	1: The CSI and Terminal ID can only be programmed using a service function. The Terminal ID can only be programmed if a Group 4 option is installed.
7	Telephone line type programming mode 0: User level 1: Service level	1: Telephone line type selection (tone dial or pulse dial can only be programmed using a service function.

Sy	System Switch 05		
No	FUNCTION	COMMENTS	
0	Not used	Do not change the settings.	
1	G4 Terminal ID length limit 0: No limit 1: Limited	1: The length of the terminal ID is limited to 7 characters.	
2	Display of both RTI and CSI on the LCD 0: Disabled 1: Enabled	 An RTI will be displayed until phase B of the protocol sequence, and a CSI will be displayed after phase C. 	
3	Not used	Do not change the settings.	
4	Hard disk option 0: Not installed 1: Installed	Change this bit to 1 when installing the hard disk option.	
5	Not used	Do not change the settings.	
6			
7			

Sy	System Switch 06		
No	FUNCTION	COMMENTS	
0	Use of the Stop key during memory transmission 0: Disabled 1: Enabled	1: Memory transmissions can be stopped by pressing the Stop key. However, users might accidentally cancel another person's memory transmission in progress.	
1-6	Not used	Do not change the settings.	
7	On-screen function list 0: Disabled 1: Enabled	If this feature is enabled, the most frequently used function numbers will be displayed for quick reference whenever the user presses the Function key.	

Sy	System Switch 07		
No	FUNCTION	COMMENTS	
0 to 7	Date of monthly Fax On Demand report printout	00 - 31 (BCD). [00 (BCD) - 1st day of the month (default setting)] [01 - 31 (BCD) - Programmed day of the month] This setting is only valid if bit 1 of User Parameter 04 is set to "1" (monthly FOD report printout enabled).	

Sy	System Switch 08		
No	FUNCTION	COMMENTS	
	Time of monthly Fax On	00 - 23 hours (BCD).	
0	Demand report printout	00 (BCD) - 0 am (default setting)	
		01 (BCD) - 1 am	
to		\downarrow	
		23 (BCD) - 11 pm	
7		This setting is only valid if bit 1 of User Parameter 04 is	
		set to "1" (monthly FOD report printout enabled).	

Sy	System Switch 09				
No	FUNCTION	COMMENTS			
0	Addition of part of the image data from confidential transmissions on the transmission result report 0: Disabled 1: Enabled	If this feature is enabled, the top half of the first page of confidential messages will be printed on transmission result reports.			
1	Inclusion of communications on the TCR when no image data was exchanged. 0: Disabled 1: Enabled	 0: Communications which reached phase C (message tx/rx) of the T.30 protocol are listed on the TCR (Journal). 1: Communications which reached phase A (call setup) of T.30 protocol are listed on the TCR (Journal). This will include telephone calls. 			
2	Automatic error report printout 0: Disabled 1: Enabled	 0: Error reports will not be printed. 1: Error reports will be printed automatically after failed communications. 			
3	Printing of the error code on the error report 0: No 1: Yes	1: Error codes are printed on the error reports.			
4	Listing of Confidential IDs on the Personal Code List 0: Disabled 1: Enabled	1: Confidential IDs registered with Personal Codes by the users will appear on the Personal Code List.			
5	Power failure report 0: Disabled 1: Enabled	1: A power failure report will be automatically printed after the power is switched on if a fax message disappeared from the memory when the power was turned off last.			
6	Not used	Do not change the settings.			
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.			

Sy	System Switch 0A			
No	FUNCTION	COMMENTS		
0	Default communication mode Bit 1 Bit 0 Setting 0 0 G3 0 1 Not used 1 0 G4 1 1 Not used	These bits determine the machine's standby default communication mode if a G4 option has been installed.		
2	Not used	Do not change the settings.		
3	Continuous polling reception 0: Disabled 1: Enabled	This feature allows a series of stations to be polled in a continuous cycle.		
4	Dialing on the ten-key pad when the external telephone is off-hook 0: Disabled 1: Enabled	 0: Prevents dialing from the ten-key pad while the external telephone is off-hook. Use this setting when the external telephone is not by the machine or a wireless telephone is connected as an external telephone. 1: The user can dial on the machine's ten-key pad when the handset is off-hook. 		
5	On hook dial 0: Disabled 1: Enabled	0: On hook dial is disabled.		
6	Line used for G3 transmission 0: PSTN 1: ISDN	If an ISDN kit has been installed, this bit determines whether G3 transmissions go out over the PSTN or the ISDN.		
7	Line used when the machine falls back to G3 from G4 if the other end is not a G4 machine 0: PSTN 1: ISDN	This bit switch has no effect if Communication Switch 07 bit 0 is set to 0.		

Sy	System Switch 0B				
No	FUNCTION			COMMENTS	
0	Automatic reset timerBit 1Bit 0Timer setting001 minute013 minutes105 minutes11No limit		Timer setting 1 minute 3 minutes 5 minutes	 (1, 1): Automatic reset is disabled. (Other): The machine returns to the standby mode when the timer expires after the last operation. 	
2 3	υ.		r mode timer Time Limit 1 minute 3 minutes 5 minutes No limit	 (1, 1): Automatic Energy Saver mode is disabled. (Other): The machine goes into an Energy Saver mode when the timer expires after the last operation. Cross reference Energy Saver modes: Section 2.3.1 	
4 to 7	Not us	ed		Do not change the settings.	

System Switch 0C - Not used (Do not change the factory settings.)		
System Switch 0D - Not used (Do not change the factory settings.)		
System Switch 0E - Not used (Do not change the factory settings.)		

Sy	System Switch 0F			
No	Fl	JNCTION	COMMENTS	
0 to 7	Country code fo (Hex) 00: France 01: Germany 02: UK 03: Italy 04: Austria 05: Belgium 06: Denmark 07: Finland 08: Ireland 09: Norway 0A: Sweden 0B: Switz. 0C: Portugal 0D: Holland 0E: Spain 0F: Israel	17: New Zealand 18: Singapore 19: Malaysia 1A: China 1B: Taiwan 20: Turkey	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 C.C.	

Sy	System Switch 10			
No	FUNCTION	COMMENTS		
0	Threshold memory level for	Threshold mount = N * 64 kbytes + 256 kbytes		
to	parallel memory	N can be between 00 - FF(H)		
7	transmission	Default setting: 04(H) = 512 kbytes		

Sy	System Switch 11				
No	FUNCTION	COMMENTS			
0	TTI printing position 0: Superimposed on the page data 1: Printed before the data leading edge	Change this bit to 1 if the TTI overprints information that the customer considers to be important (G3 transmissions).			
1	CIL printing position 0: Printed before the data leading edge 1: Superimposed on the page data	Change this bit to 1 if the CIL overprints information that the customer considers to be important (G4 transmissions).			
2	Label Insertion position 0: Left end 1: Right end	Change this bit to 1 if the inserted label overprints information that the customer considers to be important.			

Sy	System Switch 11			
No	FUNCTION	COMMENTS		
3 to 6	Not used	Do not change the factory settings.		
7	Use of parallel memory transmission with G4 transmission 0: Disabled 1: Enabled	This bit determines whether parallel transmission can be used with a G4 transmission or not. Refer to section 2.3.3 for details.		

System Switch 12			
No	FUNCTION	COMMENTS	
0 to 7	TTI/CIL printing position in the main scan direction CIL: Command Information Line (Group 4)	08 to 92 (BCD) mm. Input even numbers only. This setting determines the print start position for the TTI and CIL from the left edge of the paper. If the TTI is moved too far to the right, it may interfere with the file number which is on the top right of the page. On an A4 page, if the CIL is moved over by more than 60 mm, it may overwrite the page number.	

Sy	System Switch 13			
No		FUN	CTION	COMMENTS
0	Remaining memory threshold for activating the hard disk filing system Bit 1 Bit 0 Threshold 0 0 25% 0 1 50% (default) 1 0 75% 1 1 Not used		activating the g system Threshold 25% 50% (default) 75%	If the remaining hard disk space is below the threshold value, the hard disk filing system cannot be used. Adjust the threshold value to meet the customer's requirements.
2	Document retransmission from the hard disk filing system 0: Disabled 1: Enabled		l disk filing	1: Enables retransmission of filed documents from the hard disk.
3 to 7	Not used			Do not change the factory settings

Sy	System Switch 14			
No	FUNCTION	COMMENTS		
0 to 7	Wait time between pages in printer mode (with an optional printer interface unit)	05 to 64 (H) (5 to 100s) - This setting determines the machine's wait time between pages in printer mode. A longer setting forces the fax machine to wait until the end of printer interface output before printing any incoming fax message. A shorter setting allows the fax machine to print incoming fax messages while printing from a computer. If the controller takes more than the specfied time to process a page of data from the host computer, the fax machine releases the printer resources for fax output. Default setting: 0A(H) = 10 s		

System Switch 15 - Not used (do not change the settings)

Sy	System Switch 16				
No	FUNCTION	COMMENTS			
0	Function Upgrade Card or Fax On Demand Card 0: Not installed 1: Installed E	 Change this bit to 1 after installing a Function Upgrade Card or a Fax On Demand Card in the machine's lower IC card slot. 0: When either a Function Upgrade Card or a Fax On Demand Card is installed in the machine's lower IC card slot before power-off, all the data in these cards will be initialized if the machine does not detect the card at the next power-on. 1: When either a Function Upgrade Card or a Fax On Demand Card is installed in the machine's lower IC card slot before power-off. 1: When either a Function Upgrade Card or a Fax On Demand Card is installed in the machine's lower IC card slot before power-off, the machine does not start up unless the machine detects the IC card or the data copy tool at the next power-on. This prevents the data inside the card from being initialized while replacing PCBs or downloading software. 			
1 to 7	Not used.	Do not change the default setting.			

System Switch 17 - Not used (do not change the settings)
System Switch 18 - Not used (do not change the settings)
System Switch 19 - Not used (do not change the settings)
System Switch 1A - Not used (do not change the settings)
System Switch 1B - Not used (do not change the settings)
System Switch 1C - Not used (do not change the settings)
System Switch 1D - Not used (do not change the settings)
System Switch 1E - Not used (do not change the settings)
System Switch 1F - Not used (do not change the settings)

4.2.2. Scanner Switches

Sc	Scanner Switch 00		
No	FUNCTION	COMMENTS	
0	MTF 0: Disabled 1: Enabled		
1	Text/photo separation in halftone mode 0: Disabled 1: Enabled	Normally keep this bit at 1 to get a good halftone quality.	
2 3	Maximum transmittabledocument lengthBit 32Setting00600 mm011200 mm1014 m11Not used	If the user wants to send very long documents such as well logs, select 14 m or a higher setting.	
4	OR processing for 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 is OR processed before transmission or making copies. Toner may be used up earlier if OR processing is enabled. 	
5	OR processing for immediate tx and copying (Detail resolution) 0: Disabled 1 : Enabled	 0: The machine scans the document in 7.7 line/mm steps, then transmits or makes copies. 1: The machine scans the document in 15.4 line/mm steps. Each pair of lines is OR processed before transmission or making copies. Toner may be used up earlier if OR processing is enabled. 	
6 to 7	Not used	Do not change the settings.	

Scanner Switch 01 - Not used (do not change the settings)

Sc	Scanner Switch 02		
No	FUNCTION	COMMENTS	
0	Contrast threshold with	The value can be between 00 to FF. For a darker	
to	halftone disabled - Normal	threshold, input a lower value.	
7	setting	Default setting - 0E(H)	

Sc	Scanner Switch 03		
No	FUNCTION	COMMENTS	
0	Contrast threshold with	The value can be between 00 to 0F. For a darker	
to	halftone disabled - Lighten	threshold, input a lower value.	
7	setting	Default setting - 10(H)	

Sc	Scanner Switch 04		
No	FUNCTION	COMMENTS	
0 to 7	Contrast threshold with halftone disabled - Darken setting	The value can be between 00 to 0F. For a darker threshold, input a lower value. Default setting - 0C(H)	

Sc	Scanner Switch 05		
No	FUNCTION	COMMENTS	
0	Contrast threshold with	The value can be between 00 to 0F. For a darker	
to	halftone enabled - Normal	threshold, input a lower value.	
7	setting	Default setting - 09(H)	

Sc	Scanner Switch 06		
No	FUNCTION	COMMENTS	
0	Contrast threshold with	The value can be between 00 to 0F. For a darker	
to	halftone enabled - Lighten	threshold, input a lower value.	
7	setting	Default setting - 0D(H)	

Sc	Scanner Switch 07		
No	FUNCTION	COMMENTS	
0	Contrast threshold with	The value can be between 00 to 0F. For a darker	
to	halftone enabled - Darken	threshold, input a lower value.	
7	setting	Default setting - 02(H)	

Sc	Scanner Switch 08		
No	FUNCTION	COMMENTS	
0	Contrast threshold for text	The value can be between 00 to 0F.	
to	areas when halftone is	This setting is ignored if Scanner Switch 00 bit 1 is at 0.	
7	enabled	Default setting - 08H	

Scanner Switch 09 - Not used (do not change the settings)
Scanner Switch 0A - Not used (do not change the settings)
Scanner Switch 0B - Not used (do not change the settings)
Scanner Switch 0C - Not used (do not change the settings)
Scanner Switch 0D - Not used (do not change the settings)
Scanner Switch 0E - Not used (do not change the settings)
Scanner Switch 0F - Not used (do not change the settings)

4.2.3. Printer Switches

Pri	Printer Switch 00		
No	FUNCTION	COMMENTS	
0	Page separation mark 0: Disabled 1: Enabled	 0: No marks are printed. 1: If a received page has to be printed out on two sheets, an "x" inside a small box is printed at the bottom right hand corner of the first sheet, and a "2" inside a small box is printed at the top right hand corner of the second sheet. This helps the user to 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. See section 2.2.12 for details. 	
2	Not used	Do not change the settings.	
3	Cleaning mode after bypass feed 0: Disabled 1: After each page is fed from the bypass feed slot	 0: Cleaning mode is not done at all if bypass feed is used. 1: Cleaning mode is done every time after a sheet of paper is fed from the bypass feed slot. 	
4 to 6	Not used	Do not change the settings.	
7	mm-inch conversion when printing 0: Disabled 1: Enabled	 0: Printing is always done in inch format. 1: If the other end has scanned the document in mm format, the machine converts the data to inch format before printing. Refer to section 2.2.13 for details. 	

 Printer Switch 01 - Not used (do not change the settings)

 Printer Switch 02 - Not used (do not change the settings)

Pri	Printer Switch 03		
No	FUNCTION	COMMENTS	
0	Length reduction of received data 0: Disabled 1: Enabled	 0: Incoming pages are printed without length reduction. Cross reference Page separation threshold: Printer Sw. 03, bits 4 to 7. 1: Incoming pages are reduced in the length direction when printing. Cross reference Reduction ratio: Printer Switches 04/05 Page separation and data reduction: section 2-2-12 	
1	Not used	Do not change the settings.	
2			
3			

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

Pri	Printer Switches 04 and 05			
No	FUNCT	ION	С	OMMENTS
	Reduction ratios above)	s used for diffe	erent paper sizes (with re	eduction enabled in switch 03-0
			ta will be reduced in the maximum reduction rat	length direction before printing. tio for each paper size.
	Cross reference	e		
	Page separation	n and data red	luction: section 2.2.12.	
0	Switch 04/05 Bit 0	US Not used	Europe A5 sideways	Asia A5 sideways
to	Bit 1	Not used	Not used	Not used
10	Bit 2	LT lengthwis		Not used
7	Bit 3 Bit 4	Not used	A4 lengthwise Not used	
	Bit 5	Not used LG lengthwi		F/F4 lengthwise Not used
	Bit 6	Not used	Not used	Not used
	Bit 7	Not used	Not used	Not used
	The available p	aper sizes dep	pend on the machine's c	ountry version.
	$\left(\frac{Sw.04}{Sw.05}\right): \left(\frac{0}{0}\right) =$	$4_{3}, \left(\frac{1}{0}\right) = 4_{3}, \left(\frac{1}{2}\right)$	$\left(\frac{0}{1}\right) = \frac{8}{7}, \left(\frac{1}{1}\right) = \frac{12}{11}$	

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

Communication Switch 00 FUNCTION No COMMENTS Compression modes These bits determine the compression capabilities to available in receive mode be declared in phase B (handshaking) of the T.30 0 Bit 1 Modes protocol. 0 MH only 0 0 1 0 1 MH/MR 1 MH/MR/MMR 0 1 1 Not used Compression modes These bits determine the compression capabilities to available in transmit mode be used in the transmission and to be declared in 2 Bit 3 Modes phase B (handshaking) of the T.30 protocol. 2 MH only **Cross reference** 0 0 EFC compression during transmission: 3 0 1 MH/MR Communication Switch 01, bit 1. 1 0 MH/MR/MMR 1 Not used 1 4 Not used Do not change the settings. to 6 Closed network (reception) 1: Reception will not go ahead if the ID code of the 0: Disabled other terminal does not match the ID code of this 7 1: Enabled terminal. This function is only available in NSF/NSS mode.

4.2.4. Communication Switches

Со	Communication Switch 01		
No	FUNCTION	COMMENTS	
0	ECM 0: Off 1: On	If this bit is 0, ECM is switched off for all communications.	
1	EFC during transmission 0: Off 1: On	If this bit is 0, EFC is switched off during transmission.	
2 3	Wrong connection prevention method Bit 3 Bit 2 Setting 0 0 None 0 1 8 digit CSI 1 0 4 digit CSI 1 1 CSI/RTI	 (0,1) - 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. (1,0) - The same as above, except that only the last 4 digits are compared. (1,1) - The machine will not transmit if the other end does not identify itself with an RTI or CSI. (0,0) - Nothing is checked; transmission will always go ahead. 	
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 phone calls at the same number which the machine is connected to.	
5	Not used	Do not change the setting.	
6 7	Maximum printable pagelength availableBit 7 Bit 6Setting00No limit01B4 and A410A411Not used	The setting determined by these bits is informed to the transmitting terminal in the pre-message protocol exchange (in the DIS/NSF frames).	

Со	Communication Switch 02		
No	FUNCTION	COMMENTS	
0	Burst error threshold 0: Low 1: High	If there are more consecutive error lines in the received page than the threshold, the machine will send a negative response. The Low and High threshold values depend on the sub-scan resolution, and are as follows. Resolution 100 dpi 200 dpi Low settings 3 6 High settings 6 12	
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.	
2	Treatment of pages received with errors during G3 reception 0: Deleted from memory without printing 1: Printed	0: Pages received with errors are not printed.	
3	Hang-up decision when a negative code (RTN or PIN) is received during G3 immediate transmission 0: No hang-up, 1: Hang-up	 0: The next page will be sent 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 to 7	Not used	Do not change the settings.	

Co	Communication Switch 03		
No	FUNCTION	COMMENTS	
0	Maximum number of page	00 - FF (Hex) times.	
to	retransmissions in a G3	This setting is not used if ECM is switched on.	
7	memory transmission	Default setting - 03(H)	

Communication Switch 04 - Not used (do not change the settings)	
Communication Switch 05 - Not used (do not change the settings)	

Со	Communication Switch 06		
No	FUNCTION	COMMENTS	
0	Dialing requirements: Germany 0: Disabled 1: Enabled	These switches are automatically set to the settings required by each country after a country code (System Switch 0F) is programmed.	
1	Dialing requirements: Austria 0: Disabled 1: Enabled		
2	Dialing requirements: Norway 0: Disabled 1: Enabled		
3	Dialing requirements: Denmark 0: Disabled 1: Enabled		
4	Dialing requirements: France 0: Disabled 1: Enabled		
5	Dialing requirements: Switzerland 0: Disabled 1: Enabled		
6	Not used	Do not change the settings.	
7			

Со	Communication Switch 07		
No	FUNCTION	COMMENTS	
0	Fallback from G4 to G3 if the other terminal is not a G4 terminal 0: Disabled 1: Enabled	Also see System Switch 0A bit 7. Refer to the ISDN G4 option service manual (G4 Internal Switches 17, 18, 1A, 1B, and 1C) for the CPS code set (Cause Value set) to determine G4 to G3 fallback.	
1	Not used	Do not change the setting.	
2	Use of date and time provided from the network for the CIL 0: Disabled 1: Enabled	 0: The date and time programmed in the receiving terminal is used in the CIL. 1: The date and time informed in the document layer from the remote terminal (through the network) is used in the CIL 	
3 to 7	Not used	Do not change the settings.	

Communication Switch 08 - Not used (do not change the settings.)
Communication Switch 09 - Not used (do not change the settings)

Co	Communication Switch 0A		
No	FUNCTION	COMMENTS	
0	Point of resumption of memory transmission upon 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 to 6	Not used	Do not change the 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. This is a PTT requirement in the UK and some other countries.	

Со	Communication Switch 0B		
No	FUNCTION	COMMENTS	
0	Use of Economy Transmission during a Transfer operation to End Receivers 0: Disabled 1: Enabled	These bits determine whether the machine uses the Economy Transmission feature when it is carrying out a Transfer operation as a Transfer Station.	
1	Use of Economy Transmission during a Transfer operation to the Next Transfer Stations 0: Disabled 1: Enabled		
2	Use of Label Insertion for the End Receivers in a Transfer operation 0: Disabled 1: Enabled	This bit determines whether the machine uses the Label Insertion feature when it is carrying out a Transfer operation as a Transfer Station.	
3	Conditions required for Transfer Result Report transmission 0: Always transmitted 1: Only transmitted if there was an error	 0: When acting as a Transfer Station, the machine will always send a Transfer Result Report back to the Requesting Station after completing the Transfer Request, even if there were no problems. 1: The machine will only send back a Transfer Result Report if there were errors during communication so that one or more of the End Receivers could not be contacted. 	
4	Printout of the message when acting as a Transfer Station 0: Disabled 1: Enabled	When the machine is acting as a Transfer Station, this bit determines whether the machine prints the fax message coming in from the Requesting Terminal.	

Со	Communication Switch 0B					
No	FUNCTION COMMENTS					
5	Action when there is no fax number in the programmed Quick/Speed dials which meets the requesting terminal's own fax number. 0: Transfer is Disabled 1: Transfer is Enabled	After the machine receives a transfer request, the machine compares the last N digits of the requesting terminal's own fax number with all the Quick/Speed dials programmed in the machine. (N is the number programmed in communication switch 0C.) 0: If there is no matching number programmed in the machine, the machine rejects the transfer request. 1: Even if there is no matching number programmed in the machine, the machine accepts the transfer request. The result report will be printed at the transfer terminal, but will not be sent back to the requesting terminal. Refer to section 2.3.4 for more details.				
6	Not used	Do not change the settings.				
7						

Со	Communication Switch 0C				
No	FUNCTION	COMMENTS			
0 to 4	Number of digits comperad to find the requester's fax number from the programmed Quick/Speed Dials when acting as a Transfer Station	00 - 1F (0 to 31 digits) After the machine receives a transfer request, the machine compares the own telephone number sent from the Requesting Terminal with all Quick/Speed Dials programmed in the machine, starting from Quick Dial 01 to the end of the Speed Dials. This number determines how many digits from the end of the telephone numbers the machine compares. If it is set to 00, the machine will send the report to the first Quick/Speed Dial that the machine compared. If Quick Dial 01 is programmed, the machine will send the report to Quick 01. If Quick Dial 01 through 04 are not programmed and Quick Dial 05 is programmed, the machine will send the report to Quick 05. Default setting - 05(H) = 5 digits Refer to section 2.3.4 for more details.			
5 to 7	Not used	Do not change the settings.			

Co	Communication Switch 0D				
No	FUNCTION	COMMENTS			
0 to 7	The amount of remaining memory below which ringing detection (and therefore reception into memory) is disabled	00 to FF (Hex), unit = 2 kbytes (e.g., 0C(H) = 24 kbytes) One page is about 24 kbytes. If this setting is kept at 0, the machine will detect ringing signals and go into receive mode even if there is no memory space left. This will result in communication failure.			

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

Со	Communication Switch 0F			
No	FUNCTION	COMMENTS		
0 to 7	Minimum number of times that a destination will dialed when TRD is being used	01 - FF (Hex) times		

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

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

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

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

Со	Communication Switch 14				
No		FUN	CTION	COMMENTS	
0	during	g transr	conversion nission 1: Enabled	 0: Transmitting is always done in inch format. 1: If the other end only has mm-based resolution for printing, the machine converts the scanned data to mm-format before transmission. Refer to section 2.1.8 for details. 	
1 to 5	Not used			Do not change the factory settings.	
	in wh	Available unit of resolution in which fax messages are received		For the best performance, do not change the factory settings.	
6	Bit 7 0	Bit 6 0	Unit mm	The setting determined by these bits is informed to the transmitting terminal in the pre-message protocol	
7	0	1	inch	exchange (in the DIS/NSF frames).	
	1	0	mm and inch		
			(default)		
	1	1	Not used		

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

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

4.2.5. G3 Switches

G3	G3 Switch 00						
No	FUNCTION	COMMENTS					
0	Monitor speaker during communication (tx and rx)Bit 1 Bit 0 Setting0 0 Disabled0 1 Up to Phase B1 0 All the time1 1 Not used	 (0, 0): The monitor speaker is disabled all through the 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 all through the communication. Make sure that you reset these bits after testing. 					
2	Monitor speaker during memory transmission 0: Disabled 1: Enabled	1: The monitor speaker is enabled during memory transmission.					
3 to 6	Not used	Do not change the settings.					
7	Back to back test 0: Disabled 1: Enabled H515M553.wr	Set this bit to 1 when you wish to do a back to back test. 115 V model: Be sure to connect jumpers JP5 and JP6 on the NCU before doing the test. 220 V model: Be sure to apply dc voltage between wires L1 and L2 on the NCU. Back-to-Back Connection: The dc power supplies should be adjusted so that the line current to the NCU are about 30mA. 10 μ F 10 μ F 10 μ F FAX					

G3	G3 Switch 01				
No	FUNCTION	COMMENTS			
0 to 3	Not used	Do not change the settings.			
4	DIS frame length 0: 6 bytes 1: 4 bytes	1: The 5th and 6th bytes in the DIS frame will not be transmitted (set to 1 if there are communication problems with PC-based faxes which cannot receive the extended DIS frames).			
5	Not used	Do not change the settings.			
6					
7					

G3	G3 Switch 02				
No	FUNCTION	COMMENTS			
0	G3 protocol mode used 0: Standard and non-standard 1: Standard only	 Change this bit to 1 only when the other end can only communicate with machines that send T.30-standard frames only. 1: Disables NSF/NSS signals (these are used in non-standard mode communication) 			
1 to 4	Not used	Do not change the settings.			
5	Use of modem rate history for transmission using Quick/Speed Dials 0: Disabled 1: Enabled	 0: Communications using Quick/Speed Dials always start with the highest modem rate. 1: The machine refers to the modem rate history for communications with the same machine when determining the most suitable rate for the current communication. 			
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	Short preamble 0: Disabled 1: Enabled	Refer to Appendix B in the Group 3 Facsimile Manual for details about Short Preamble.			

G3	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 will wait for the second DIS which is caused by echo on the line. 			
1	Not used	Do not change the setting.			
2					
3	ECM frame size 0: 256 bytes 1: 64 bytes	1: ECM reception is disabled, which enlarges the SAF memory.			
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). ITU-T: New acronym for the CCITT.			
5	Modem rate used for the next page after receiving a negative code (RTN or PIN) 0: No change 1: Fallback	1: The machine's tx modem rate will fall back before sending the next page if a negative code is received. This bit is ignored if ECM is being used.			
6 7	Not used	Do not change the setting.			

G3	G3 Switch 04			
	FUNCTION	COMMENTS		
0 to 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 has succeeded.		
4 to 7	Not used	Do not change the settings.		

G	G3 Switch 05				
	FUNCTION	COMMENTS			
0 to 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 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 to 5	Initial modem type for 9.6 k or 7.2 kbps.Bit 1Bit 0Setting00V.2901V.1710Not used11Not used	These bits set the initial modem type for 9.6 and 7.2 kbps, if the initial modem rate is set at these speeds.			
6 to 7	Not used	Do not change the settings.			

G	G3 Switch 06				
	FUNCTION	COMMENTS			
0 to 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 k 0 1 1 0 14.4 k Other settings - Not used	The setting of these bits is used to inform the transmitting terminal of the available modem rate for the machine in receive mode. Use a lower setting if high speeds pose problems during reception. The machine automatically determines whether to use TCM or not.			
4 to 7	Modem types available for reception Bit 7 6 5 4 Setting 0 0 0 1 V.27ter 0 0 1 0 V.27ter, V.29 0 0 1 1 V.27ter, V.29, V.33 0 1 0 0 V.27ter, V.29, V.33, V.17 Other settings - Not used	The setting of these bits is used to inform the transmitting terminal of the available modem type for the machine in receive mode.			

G3	G3 Switch 07					
	FUNCTION			COMMENTS		
0	PSTN (tx mo Bit 1 0 0 1 1	cable e de) Bit 0 0 1 0 1	qualizer Setting None Low Medium 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 for specific receivers. Also, try using the cable equalizer if one or more of the		
			-	following symptoms occurs.Communication errorModem rate fallback occurs frequently.		
2	PSTN (rx mc Bit 3 0	cable e ode) Bit 2 0	qualizer Setting None	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.		
3	0 1	1 0	Low Medium	Also, try using the cable equalizer if one or more of the following symptoms occurs.		
	1	1	High	 Communication error with error codes such as 0-20, 0-23, etc. 		
				Modem rate fallback occurs frequently.		
4 to 7	Not used			Do not change the settings.		

G3 Switch 08 - Not used (do not change the settings)

Service

G3	G3 Switch 09				
		FUNC	TION	COMMENTS	
0	ISDN cable equalizer (tx mode) Bit 1 Bit 0 Setting 0 0 None 0 1 Low 1 0 Medium 1 1 High		Setting None Low Medium	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 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. 	
2	ISDN cable equalizer (rx mode) Bit 3 Bit 2 Setting 0 0 None			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.	
3	0 1	1 0	Low Medium	Also, try using the cable equalizer if one or more of the following symptoms occurs.	
	1	1	High	 Communication error with error codes such as 0-20, 0-23, etc. 	
				Modem rate fallback occurs frequently.	
4 to 7	Not used			Do not change the settings.	

G3	G3 Switch 0A				
		FUN	CTION	COMMENTS	
0	drop o recep			These bits set the acceptable modem carrier drop time. Try using a longer setting if error code 0-22 is frequent.	
	1	1	Not used		
2	Not us	sed		Do not change the settings.	
3					
4	Maximum allowable frame interval during image data reception. 0: 5 s 1: 13 s		g image data	This bit set the maximum intervals between each EOL signal (end-of-line) or intervals between each ECM frame from the other end. Try using a longer setting if error code 0-21 is frequent.	
5	Not us	sed		Do not change the settings.	

G3	G3 Switch 0A			
	FUNCTION	COMMENTS		
6	Reconstruction time for the first line in receive mode 0: 6 s 1: 12 s	When the sending terminal is controlled by a computer, there may be a delay in receiving page data after the local machine accepts set-up data and sends CFR. This is outside the T.30 recommendation. But, if this delay occurs, set this bit to 1 to give the sending machine more time to send data. Refer to error code 0-20. ITU-T T.30 recommendation: The first line should come within 5 s of CFR.		
7	Not used	Do not change the settings.		

G3	G3 Switch 0B				
	FUNCTION	COMMENTS			
0	Protocol requirements: Europe 0: Disabled 1: Enabled	The machine does not automatically reset these bits for each country after a country code (System Switch 0F) is programmed.			
1	Protocol requirements: Spain 0: Disabled 1: Enabled	Change the required bits manually at installation.			
2	Protocol requirements: Germany 0: Disabled 1: Enabled				
3	Protocol requirements: France 0: Disabled 1: Enabled				
4	PTT requirements: Germany 0: Disabled 1: Enabled				
5	PTT requirements: France 0: Disabled 1: Enabled				
6	Not used	Do not change the settings.			
7					

G3 Switch 0C						
	FUNCTION			COMMENTS		
	Pulse dialing method Bit 1 Bit 0 Setting			P = Number of pulses sent out, N = Number dialed.		
0	0	0	Normal (P=N)			
1	0	1	Oslo (P=10 - N)			
	1	0	Sweden (N+1)			
	1	1	Not used			
2	Not u	ised		Do not change the settings.		
to						
7						

G3 Switch 0D - Not used (do not change the settings)
G3 Switch 0E - Not used (do not change the settings)
G3 Switch 0F - Not used (do not change the settings)



The following tables give the RAM addresses and units of calculation of the parameters that the machine uses for ringing signal detection and automatic dialing. The factory settings for each country are also given. Most of these must be changed by RAM read/write (Function 06), but some can be changed using NCU Parameter programming (Function 08); if Function 08 can be used, this will be indicated in the Remarks column. The RAM is programmed in hex code unless (BCD) is included in the Unit column.

Address	Function	Unit	Remarks	
	Country code for NCU parameters	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 00). Country Decimal Hex France 00 00		
		Germany UK Italy Austria Belgium Denmark Finland	01 01 02 02 03 03 04 04 05 05 06 06 07 07	
480400		Ireland Ireland Norway Sweden Switzerlan Portugal Holland Spain Israel USA Asia Hong Kong South Afric Australia New Zeala	08 08 09 09 10 0A 12 0C 13 0D 14 0E 15 0F 17 11 18 12 g 20 14 ca 21 15 22 16	
		Singapore Malaysia		
480401	Line current detection time	20 ms	Line current is not detected	
480402	Line current wait time		if 480401 contains FF.	
480403	Line current drop detect time			
480404	PSTN dial tone frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is	
480405	PSTN dial tone frequency upper limit (low byte)		disabled.	

SERVICE TABLES AND PROCEDURES NCU PARAMETERS

Service

Address	Function	Unit	Remarks	
480406	PSTN dial tone frequency lower limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is	
480407	80407 PSTN dial tone frequency lower limit (low byte)		disabled.	
480408	PSTN dial tone detection time	20 ms	If 480408 contains FF, the	
480409	PSTN dial tone reset time (LOW)		machine pauses for the	
48040A	PSTN dial tone reset time (HIGH)		pause time (address	
48040B	PSTN dial tone continuous tone time		48040D / 48040E). See Note 2 (Italy).	
48040C	PSTN dial tone permissible drop time			
48040D	PSTN wait interval (LOW)			
48040E	PSTN wait interval (HIGH)			
48040F	PSTN ringback tone detection time	20 ms	Detection is disabled if this contains FF.	
480410	PSTN ringback tone off detection time	20 ms		
480411	PSTN detection time for silent period after ringback tone detected (LOW)	20 ms		
480412	PSTN detection time for silent period after ringback tone detected (HIGH)	20 ms		
480413	PSTN busy tone frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is	
480414	PSTN busy tone frequency upper limit (low byte)		disabled.	
480415	PSTN busy tone frequency lower limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is disabled.	
480416	PSTN busy tone frequency lower limit (low byte)			
480417	PABX dial tone frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is disabled.	
480418	PABX dial tone frequency upper limit (low byte)			
480419	PABX dial tone frequency lower limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is disabled.	
48041A	PABX dial tone frequency lower limit (low byte)			
48041B	PABX dial tone detection time	20 ms	If 48041B contains FF, the machine pauses for the pause time (480420 /	
48041C	PABX dial tone reset time (LOW)			
48041D	PABX dial tone reset time (HIGH)	1		
48041E	PABX dial tone continuous tone time		480421).	
48041F	PABX dial tone permissible drop time			
480420	PABX wait interval (HIGH)			
480421	PABX wait interval (LOW)			

SERVICE TABLES AND PROCEDURES NCU PARAMETERS

Address	Function	Unit	Remarks	
480422	PABX ringback tone detection time	20 ms	Detection is disabled if this contains FF.	
480423	PABX ringback tone off detection time	20 ms		
480424	PABX detection time for silent period after ringback tone detected (LOW)	20 ms		
480425	PABX detection time for silent period after ringback tone detected (HIGH)	20 ms		
480426	PABX busy tone frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is	
480427	PABX busy tone frequency upper limit (low byte)		disabled.	
480428	PABX busy tone frequency lower limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is	
480429	PABX busy tone frequency lower limit (low byte)		disabled.	
48042A	Busy tone ON time: range 1	20 ms		
48042B	Busy tone OFF time: range 1			
48042C	Busy tone ON time: range 2			
48042D	Busy tone OFF time: range 2			
48042E	Busy tone ON time: range 3			
48042F	Busy tone OFF time: range 3			
480430	Busy tone ON time: range 4			
480431	Busy tone OFF time: range 4			
480432	Busy tone continuous tone detection time			
480433	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). Bits 7, 6, 5, 4 - number of cycles required for cadence detection Bits 3 and 2 - Not used. Keep these bits at 0. Bits 1 and 0 - Tolerance (\pm) Bit 1 0 0 0 75% 0 1 50% 1 0 25%			
480434	1 1 12.5% International dial tone frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is	
480435	International dial tone frequency upper limit (low byte)		disabled.	
480436	International dial tone frequency lower limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is	
480437	International dial tone frequency lower limit (low byte)		disabled.	

SERVICE TABLES AND PROCEDURES NCU PARAMETERS

Service

Address	Function	Unit	Remarks
480438	International dial tone detection time	20 ms	If 480438 contains FF, the machine pauses for the pause time (48043D / 48043E).
480439	International dial tone reset time (LOW)		
48043A	International dial tone reset time (HIGH)		See Note 2 (Belgium).
48043B	International dial tone continuous tone time		
48043C	International dial tone permissible drop time		
48043D	International dial wait interval (HIGH)		
48043E	International dial wait interval (LOW)		
48043F	Country dial tone upper frequency limit (HIGH)	Hz (BCD)	If both addresses contain FF(F), tone detection is
480440	Country dial tone upper frequency limit (LOW)		disabled.
480441	Country dial tone lower frequency limit (HIGH)		If both addresses contain FF(F), tone detection is disabled.
480442	Country dial tone lower frequency limit (LOW)		
480443	Country dial tone detection time	20 ms	If 480443 contains FF, the
480444	Country dial tone reset time (LOW)		machine pauses for the
480445	Country dial tone reset time (HIGH)		pause time (480448 / 480449).
480446	Country dial tone continuous tone time		
480447	Country dial tone permissible drop time		
480448	Country dial wait interval (LOW)		
480449	Country dial wait interval (HIGH)		
48044A	Time between opening or closing the DO relay and opening the OHDI relay	1 ms	See Notes 3 and 6. Function 08 (parameter 11).
48044B	Break time for pulse dialling	1 ms	See Note 3. Function 08 (parameter 12).
48044C	Make time for pulse dialling	1 ms	See Note 3. Function 08 (parameter 13).
48044D	Time between final OHDI relay closure and DO relay opening or closing	1 ms	See Notes 6. Function 08 (parameter 14).
48044E	Minimum pause between dialled digits (pulse dial mode)	20 ms	See Note 3. Function 08 (parameter 15).
48044F	Time waited when a pause is entered at the operation panel		Function 08 (parameter 16).
480450	DTMF tone on time	1 ms	Function 08 (parameter 17).
480451	DTMF tone off time		Function 08 (parameter 18).

SERVICE TABLES AND PROCEDURES NCU PARAMETERS

Address	Function	Unit	Remarks
480452	Tone attenuation level of DTMF signals while dialing	-dBm x 0.5	Function 08 (parameter 19). See Note 5.
480453	Tone attenuation value difference between high frequency tone and low frequency tone in DTMF signals	-Nx0.5 (dB)	Function 08 (parameter 20). See Note 5.
480454	PSTN: DTMF tone attenuation level after dialling	-dBm x 0.5	Function 08 (parameter 21). See Note 5.
480455	ISDN: DTMF tone attenuation level after dialling	-dBm x 0.5	See Note 5
480456	Not used		Do not change the setting.
480457	Not used		Do not change the setting.
480458	Not used		Do not change the setting.
480459	Grounding time (ground start mode)	20 ms	The Gs relay is closed for this interval.
48045A	Break time (flash start mode)	1 ms	The OHDI relay is open for this interval.
48045B	International dial access code (High)	BCD	For a code of 100: 48045B - F1
48045C	International dial access code (Low)	48045C - 00	
48045D	PSTN access pause time	20 ms	This time is waited 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 48044F is used.
48045E	Bits 7 to 5 - Progress tone detection level Bit 7 Bit 6 Bit 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 4 and 3 - Not used Bit 2 - International dial tone detection method 0: Detect by time parameters 1: Detect by cadence parameters (Belgium - See Note 3) Bit 1 - Not used Bit 0 - PSTN dial tone detection method 0: Detect by time parameters 1: Detect by cadence parameters (Italy - See Note 3)		
48045F	Bit 7 and 6 - Not used Bit 5 1: Polarity detection enabled for rx (detection time = 500 ms) Bit 4 1: Polarity detection enabled for tx (detection time = 500 ms) Bits 3 to 0 - Not used		
480460	Not used		Do not change the setting.
480461	Not used		Do not change the setting.

SERVICE TABLES AND PROCEDURES NCU PARAMETERS

Address	Function	Unit	Remarks
480462	Not used		Do not change the setting.
480463	Not used		Do not change the setting.
480464	Not used		Do not change the setting.
480465	Intercity dial prefix (HIGH)	BCD	For a code of 0:
480466	Intercity dial prefix (LOW)	BCD	480465 - FF 480466 - F0
480467 to 480471	Not used		Do not change the settings.
480472	Acceptable ringing signal frequency: range 1, upper limit	1000/ N (Hz).	Function 08 (parameter 02).
480473	Acceptable ringing signal frequency: range 1, lower limit		Function 08 (parameter 03).
480474	Acceptable ringing signal frequency: range 2, upper limit		Function 08 (parameter 04).
480475	Acceptable ringing signal frequency: range 2, lower limit		Function 08 (parameter 05).
480476	Number or rings until a call is detected	1	Function 08 (parameter 06).
480477	Minimum required length of the first ring	20 ms	See Note 4. Function 09 (parameter 07).
480478	Minimum required length of the second and subsequent rings	20 ms	Function 08 (parameter 08).
480479	Ringing signal detection reset time (LOW)	20 ms	Function 08 (parameter 09).
48047A	Ringing signal detection reset time (HIGH)		Function 08 (parameter 10).
48047B to 480480	Not used		Do not change the settings.
480481	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.		Factory setting: 500 ms
400.400	Bits 0 and 1 - Handset off-hook dete Bit 1 0 Setting 0 0 200 ms 0 1 800 ms Other Not used		
480482	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		

Service

Address	Function	Unit	Remarks
480483	Bits 7 to 5 - Not used Bit 4 - DTMF detection 0: Disabled 1: Enabled Bits 3 to 0 - Not used		Do not change the setting. If bit 4 is set to 0, Fax On Demand and Transfer operation using DTMF are disabled.
480484	Bits 7 to 5 - DTMF On detection time Bit 7 Bit 6 Bit 5 Setting 0 0 0 0 0 1 40 ms 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 1 140 ms Bits 4 to 2 - DTMF Off detection time Bit 4 Bit 3 Bit 2 Setting 0 0 0 0 0 1 4 Bit 3 Bit 2 Setting 0 0 0 1 4 0 ms 0 1 0 1 1 140 ms 0 1 1 140 ms 0 1 1 140 ms Bits 1 and 0 - Not used.		
480485	Not used		Do not change the settings.
to 4804A0			
4804A1	Acceptable CED detection frequency upper limit (high byte)	BCD (Hz)	If both addresses contain FF(F), tone detection is disabled.
4804A2	Acceptable CED detection frequency upper limit (low byte)		uisableu.
4804A3	Acceptable CED detection frequency lower limit (high byte)	BCD (Hz)	If both addresses contain FF(F), tone detection is
4804A4	Acceptable CED detection frequency lower limit (low byte)		disabled.
4804A5	CED detection time	20 ms ± 20 ms	Factory setting: 200 ms
4804A6	Acceptable CNG detection frequency upper limit (high byte)	BCD (Hz)	If both addresses contain FF(F), tone detection is
4804A7	Acceptable CNG detection frequency upper limit (low byte)		disabled.
4804A8	Acceptable CNG detection frequency lower limit (high byte)	BCD (Hz)	If both addresses contain FF(F), tone detection is
4804A9	Acceptable CNG detection frequency lower limit (low byte)		disabled.
4804AA	CNG detection time	20 ms ± 20 ms	Factory setting: 200 ms
4804AB	CNG on time	20 ms	Factory setting: 500 ms
4804AC	CNG off time	20 ms	Factory setting: 200 ms

Address	Function	Unit	Remarks	
	CNG On/Off time tolerance, and nursetting of 4 cycles means that ON-C twice).			
4804AD	Bits 7, 6, 5, 4 - number of cycles red Bits 3 and 2 - Not used. Keep these Bits 1 and 0 - Tolerance (±)		lence detection	
	Bit 1 0 ON time toleran 0 0 150%		ne tolerance 5%	
	0 1 100% 1 0 50% 1 1 25%	2)% 5% 5%	
4804AE	Not used	12.	Do not change the settings.	
4804AF	Acceptable AI short protocol tone (800Hz) detection frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF(F), tone detection is disabled.	
4804B0	Acceptable AI short protocol tone (800Hz) detection frequency upper limit (low byte)		If both addresses contain FF(F), tone detection is disabled.	
4804B1	Acceptable AI short protocol tone (800Hz) detection frequency lower limit (high byte)	Hz(BCD) If both addresses contain FF(F), tone detection is disabled.		
4804B2	Acceptable AI short protocol tone (800Hz) detection frequency lower limit (low byte)		If both addresses contain FF(F), tone detection is disabled.	
4804B3	Detection time for 800 Hz AI short protocol tone	20 ms	Factory setting: 360 ms	
4804B4	PSTN: Tx level from the modem	- dBm Function 08 (parameter		
4804B5	PSTN: 1100 Hz tone transmission level	- N _{4804B4} - 0.5N _{4804B5} (dB)		
4804B6	PSTN: 2100 Hz tone transmission level	- N _{4804B4} - 0.5N _{4804B6} (dB)		
4804B7	PABX: Tx level from the modem	- dBm		
4804B8	PABX: 1100 Hz tone transmission level	- N 4804B7 ·	- 0.5N _{4804B8} (dB)	
4804B9	PABX: 2100 Hz tone transmission level	- N 4804B7 ·	- 0.5N _{4804B9} (dB)	
4804BA	ISDN: Tx level from the modem	- dBm The setting must be between -12dBm and -15dBm.		
4804BB	ISDN: 1100 Hz tone transmission level	- N 4804BA	- 0.5N _{4804BB} (dB)	
4804BC	ISDN: 2100 Hz tone transmission level	- N 4804BA	- 0.5N _{4804BC} (dB)	
4804BD	Modem turn-on level (incoming signal detection level)	-37-0.5N (dBm)	N must be between 0 (00(H)) to 31 (1F(H)). Modem turn-off level is automatically set at -3dBm from the turn-on level.	

Service

Address	Function	Unit	Remarks
4804BE	Not used		Do not change the settings.
to			
4804D9			
4804DA	T.30 T1 timer	1 s	

Notes

- 1. If a setting is not required, store FF in the address.
- 2. Italy and Belgium only

RAM address 48045E: the lower four bits have the following meaning. Bit 2 1: International dial tone cadence detection enabled (Belgium) Bit 1 Not used Bit 0 1: PSTN dial tone cadence detection enabled (Italy) If bit 0 or bit 2 is set to 1, the functions of the following RAM addresses are changed. 480408 (if bit 0 = 1) or 480438 (if bit 2 = 1): tolerance for on or off state duration (%), and number of cycles required for detection, coded as in address 480433. 48040B (if bit 0 = 1) or 48043B (if bit 2 = 1): on time, hex code (unit = 20 ms) 48040C (if bit 0 = 1) or 48043C(if bit 2 = 1): off time, hex code (unit = 20

48040C (if bit 0 = 1) or 48043C(if bit 2 = 1): off time, hex code (unit = 20 ms)

- 3. Pulse dial parameters (addresses 48044A to 48044F) are the values for 10 pps. If 20 pps is used, the machine automatically compensates.
- 4. The first ring may not be detected until 1 to 2.5 wavelengths after the time specified by this parameter.
- The calculated level must be between 0 and 10. The attenuation levels calculated from RAM data are: High frequency tone: - 0.5 x N480452/480454 dBm Low frequency tone: - 0.5 x (N480452/480454 + N480453) dBm Note: N480452, for example, means the value stored in address 480452(H)
- 48044A: Europe Between Ds opening and Di opening, France Between Ds closing and Di opening 48044D: Europe - Between Ds closing and Di closing, France - Between Ds opening and Di closing

Default Settings

The factory settings are quoted either in hexadecimal code (the actual contents of the RAM address) if there is a H after the value in the table, or in decimal (converted from the actual hex contents of the RAM address) if there is no H after the value.

Some RAMs must be stored using BCD; see the NCU Parameter definition table for details.

Note that the default settings may change after each country's PTT tests.

Address	480401	480402	480403	480404	480405
France	FFH	FFH	FFH	04H	80H
Germany	FFH	FFH	FFH	04H	98H
UK	FFH	FFH	FFH	FFH	FFH
Italy	FFH	FFH	FFH	04H	71H
Austria	FFH	FFH	FFH	05H	30H
Belgium	FFH	FFH	FFH	05H	20H
Denmark	FFH	FFH	FFH	05H	12H
Finland	FFH	FFH	FFH	05H	36H
Ireland	FFH	FFH	FFH	04H	50H
Norway	FFH	FFH	FFH	05H	12H
Sweden	FFH	FFH	FFH	05H	12H
Switzerland	FFH	FFH	FFH	06H	08H
Portugal	FFH	FFH	FFH	04H	60H
Holland	FFH	FFH	FFH	05H	63H
Spain	FFH	FFH	FFH	04H	90H
Israel	FFH	FFH	FFH	04H	98H
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	FFH	FFH	FFH	04H	50H
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	480406	480407	480408	480409	48040A
France	04H	00H	75	F4H	01H
Germany	03H	70H	105	E8H	03H
UK	FFH	FFH	FFH	FFH	FFH
Italy	03H	91H	21H	21H	02H
Austria	03H	70H	40	F4H	01H
Belgium	03H	00H	30	150	00H
Denmark	03H	40H	65	F4H	01H
Finland	03H	15H	205	F4H	01H
Ireland	02H	00H	105	F4H	1
Norway	03H	40H	55	E8H	03H
Sweden	03H	40H	40	00H	01H
Switzerland	03H	38H	40	21H	02H
Portugal	02H	90H	105	F4H	01H
Holland	00H	76H	55	EEH	02H
Spain	03H	10H	75	80H	02H
Israel	03H	40H	105	E8H	03H
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	01H	30H	150	2CH	01H
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	48040B	48040C	48040D	48040E	48040F
France	50	2	0	0	FFH
Germany	105	4	200	00H	FFH
UK	FFH	FFH	200	00H	FFH
Italy	30	50	200	00H	FFH
Austria	40	4	200	00H	FFH
Belgium	30	4	200	00H	FFH
Denmark	65	4	200	0	FFH
Finland	205	4	200	0	FFH
Ireland	105	4	200	0	FFH
Norway	55	4	200	0	FFH
Sweden	40	3	200	0	FFH
Switzerland	40	2	200	0	5
Portugal	105	4	200	0	FFH
Holland	55	4	200	0	FFH
Spain	36	5	150	0	FFH
Israel	105	4	200	0	FFH
USA	FFH	FFH	100	0	FFH
Asia	FFH	FFH	100	0	FFH
Hong Kong	FFH	FFH	100	0	FFH
South Africa	FFH	FFH	100	0	FFH
Australia	100	8	150	0	FFH
New Zealand	FFH	FFH	100	0	FFH
Singapore	FFH	FFH	100	0	FFH
Malaysia	FFH	FFH	100	0	FFH

Address	480410	480411	480412	480413	480414
France	FFH	FFH	FFH	04H	98H
Germany	FFH	FFH	FFH	05H	10H
UK	FFH	FFH	FFH	04H	30H
Italy	FFH	FFH	FFH	05H	29H
Austria	FFH	FFH	FFH	05H	12H
Belgium	FFH	FFH	FFH	04H	71H
Denmark	FFH	FFH	FFH	04H	60H
Finland	FFH	FFH	FFH	FFH	FFH
Ireland	FFH	FFH	FFH	04H	30H
Norway	FFH	FFH	FFH	05H	12H
Sweden	FFH	FFH	FFH	05H	12H
Switzerland	50	F4H	01H	06H	08H
Portugal	FFH	FFH	FFH	FFH	FFH
Holland	FFH	FFH	FFH	05H	63H
Spain	FFH	FFH	FFH	04H	60H
Israel	FFH	FFH	FFH	04H	98H
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	FFH	FFH	FFH	04H	50H
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	480415	480416	480417	480418	480419
France	03H	96H	09H	00H	03H
Germany	03H	50H	FFH	FFH	FFH
UK	03H	60H	FFH	FFH	FFH
Italy	03H	29H	05H	12H	03H
Austria	03H	80H	FFH	FFH	FFH
Belgium	04H	05H	05H	20H	03H
Denmark	03H	90H	05H	12H	03H
Finland	FFH	FFH	FFH	FFH	FFH
Ireland	03H	70H	FFH	FFH	FFH
Norway	03H	40H	FFH	FFH	FFH
Sweden	03H	40H	05H	12H	3
Switzerland	03H	38H	06H	08H	03H
Portugal	FFH	FFH	FFH	FFH	FFH
Holland	03H	20H	05H	63H	00H
Spain	03H	80H	FFH	FFH	FFH
Israel	03H	70H	05H	63H	03H
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	03H	90H	04H	50H	03H
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	48041A	48041B	48041C	48041D	48041E
France	00H	100	58H	02H	50
Germany	FFH	FFH	FFH	FFH	FFH
UK	FFH	FFH	FFH	FFH	FFH
Italy	91H	100	F9H	01H	9
Austria	FFH	FFH	FFH	FFH	FFH
Belgium	00	30	150	0	30
Denmark	40H	65	F4H	01H	65
Finland	FFH	FFH	FFH	FFH	FFH
Ireland	FFH	FFH	FFH	FFH	FFH
Norway	FFH	FFH	FFH	FFH	FFH
Sweden	40H	40	00	01H	40
Switzerland	38H	40	EFH	01H	40
Portugal	FFH	FFH	FFH	FFH	FFH
Holland	76H	55	EEH	02H	55
Spain	FFH	FFH	FFH	FFH	FFH
Israel	70H	105	E8H	03H	105
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	90H	150	2CH	01H	100
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	48041F	480420	480421	480422	480423
France	02H	00H	00H	FFH	FFH
Germany	FFH	200	00H	FFH	FFH
UK	FFH	200	00H	FFH	FFH
Italy	4	200	00H	FFH	FFH
Austria	FFH	200	00H	FFH	FFH
Belgium	4	200	00H	FFH	FFH
Denmark	4	200	00H	FFH	FFH
Finland	FFH	200	00H	FFH	FFH
Ireland	FFH	200	00H	FFH	FFH
Norway	FFH	200	00H	FFH	FFH
Sweden	3	200	00H	FFH	FFH
Switzerland	4	200	00H	FFH	FFH
Portugal	FFH	200	00H	FFH	FFH
Holland	4	200	00H	FFH	FFH
Spain	FFH	150	00H	FFH	FFH
Israel	4	200	00H	FFH	FFH
USA	FFH	200	00H	FFH	FFH
Asia	FFH	200	00H	FFH	FFH
Hong Kong	FFH	200	00H	FFH	FFH
South Africa	FFH	200	00H	FFH	FFH
Australia	1	150	00H	FFH	FFH
New Zealand	FFH	200	00H	FFH	FFH
Singapore	FFH	200	00H	FFH	FFH
Malaysia	FFH	200	00H	FFH	FFH

Address	480424	480425	480426	480427	480428
France	FFH	FFH	FFH	FFH	FFH
Germany	FFH	FFH	FFH	FFH	FFH
UK	FFH	FFH	FFH	FFH	FFH
Italy	FFH	FFH	06H	00	01H
Austria	FFH	FFH	05H	12H	03H
Belgium	FFH	FFH	FFH	FFH	FFH
Denmark	FFH	FFH	04H	60H	03H
Finland	FFH	FFH	FFH	FFH	FFH
Ireland	FFH	FFH	FFH	FFH	FFH
Norway	FFH	FFH	FFH	FFH	FFH
Sweden	FFH	FFH	FFH	FFH	FFH
Switzerland	FFH	FFH	06H	08H	03H
Portugal	FFH	FFH	FFH	FFH	FFH
Holland	FFH	FFH	FFH	FFH	FFH
Spain	FFH	FFH	FFH	FFH	FFH
Israel	FFH	FFH	05H	63H	03H
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	FFH	FFH	04H	50H	03H
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	480429	48042A	48042B	48042C	48042D
France	FFH	25	25	FFH	FFH
Germany	FFH	12	12	24	24
UK	FFH	19	19	20	17
Italy	00H	15	15	FFH	FFH
Austria	80H	10	10	15	15
Belgium	FFH	25	25	8	8
Denmark	90H	12	12	8	23
Finland	FFH	FFH	FFH	FFH	37
Ireland	FFH	25	25	27	37
Norway	FFH	10	0	25	0
Sweden	FFH	12	12	12	37
Switzerland	38H	24	30	15	22
Portugal	FFH	FFH	FFH	FFH	FFH
Holland	FFH	12	12	25	25
Spain	FFH	8	8	FFH	FFH
Israel	70H	12	12	24	24
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	90H	12	12	25	25
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	48042E	48042F	480430	480431	480432
France	FFH	FFH	FFH	FFH	FFH
Germany	7	24	FFH	FFH	FFH
UK	11	26	FFH	FFH	100
Italy	FFH	FFH	FFH	FFH	FFH
Austria	20	20	FFH	FFH	FFH
Belgium	FFH	FFH	FFH	FFH	FFH
Denmark	FFH	FFH	FFH	FFH	FFH
Finland	FFH	FFH	FFH	FFH	FFH
Ireland	18	18	FFH	FFH	35
Norway	FFH	FFH	FFH	FFH	FFH
Sweden	FFH	FFH	FFH	FFH	FFH
Switzerland	11	11	8	30	FFH
Portugal	FFH	FFH	FFH	FFH	FFH
Holland	FFH	FFH	FFH	FFH	FFH
Spain	FFH	FFH	FFH	FFH	FFH
Israel	FFH	FFH	FFH	FFH	FFH
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	FFH	FFH	FFH	FFH	FFH
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	480433	480434	480435	480436	480437
France	42H	04H	74H	04H	06H
Germany	31H	FFH	FFH	FFH	FFH
UK	42H	FFH	FFH	FFH	FFH
Italy	40H	FFH	FFH	FFH	FFH
Austria	41H	FFH	FFH	FFH	FFH
Belgium	43H	11H	60H	11H	10H
Denmark	42H	FFH	FFH	FFH	FFH
Finland	FFH	FFH	FFH	FFH	FFH
Ireland	43H	FFH	FFH	FFH	FFH
Norway	40H	FFH	FFH	FFH	FFH
Sweden	43H	FFH	FFH	FFH	FFH
Switzerland	51H	FFH	FFH	FFH	FFH
Portugal	FFH	FFH	FFH	FFH	FFH
Holland	41H	05H	63H	00H	76H
Spain	41H	06H	20H	05H	80H
Israel	41H	FFH	FFH	FFH	FFH
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	41H	FFH	FFH	FFH	FFH
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	480438	480439	48043A	48043B	48043C
France	75	58H	2	75	2
Germany	FFH	FFH	FFH	FFH	FFH
UK	FFH	FFH	FFH	FFH	FFH
Italy	FFH	FFH	FFH	FFH	FFH
Austria	FFH	FFH	FFH	FFH	FFH
Belgium	41H	E8H	03H	17	33
Denmark	FFH	FFH	FFH	FFH	FFH
Finland	FFH	FFH	FFH	FFH	FFH
Ireland	FFH	FFH	FFH	FFH	FFH
Norway	FFH	FFH	FFH	FFH	FFH
Sweden	FFH	FFH	FFH	FFH	FFH
Switzerland	FFH	FFH	FFH	FFH	FFH
Portugal	FFH	FFH	FFH	FFH	FFH
Holland	55	EEH	02H	55	4
Spain	75	80H	02H	36	5
Israel	FFH	FFH	FFH	FFH	FFH
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	FFH	FFH	FFH	FFH	FFH
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	48043D	48043E	48043F	480440	480441
France	0	0	FFH	FFH	FFH
Germany	00H	00H	FFH	FFH	FFH
UK	00H	00H	FFH	FFH	FFH
Italy	00H	00H	FFH	FFH	FFH
Austria	00H	00H	FFH	FFH	FFH
Belgium	00H	00H	FFH	FFH	FFH
Denmark	00H	00H	FFH	FFH	FFH
Finland	00H	00H	FFH	FFH	FFH
Ireland	00H	00H	FFH	FFH	FFH
Norway	00H	00H	FFH	FFH	FFH
Sweden	00H	00H	05H	12H	03H
Switzerland	00H	00H	FFH	FFH	FFH
Portugal	00H	00H	FFH	FFH	FFH
Holland	00H	00H	FFH	FFH	FFH
Spain	150	0	FFH	FFH	FFH
Israel	00H	00H	FFH	FFH	FFH
USA	00H	00H	FFH	FFH	FFH
Asia	00H	00H	FFH	FFH	FFH
Hong Kong	00H	00H	FFH	FFH	FFH
South Africa	00H	00H	FFH	FFH	FFH
Australia	00H	00H	FFH	FFH	FFH
New Zealand	00H	00H	FFH	FFH	FFH
Singapore	00H	00H	FFH	FFH	FFH
Malaysia	00H	00H	FFH	FFH	FFH

Address	480442	480443	480444	480445	480446
France	FFH	FFH	FFH	FFH	FFH
Germany	FFH	FFH	FFH	FFH	FFH
UK	FFH	FFH	FFH	FFH	FFH
Italy	FFH	FFH	FFH	FFH	FFH
Austria	FFH	FFH	FFH	FFH	FFH
Belgium	FFH	FFH	FFH	FFH	FFH
Denmark	FFH	FFH	FFH	FFH	FFH
Finland	FFH	FFH	FFH	FFH	FFH
Ireland	FFH	FFH	FFH	FFH	FFH
Norway	FFH	FFH	FFH	FFH	FFH
Sweden	40H	40	00H	01H	40
Switzerland	FFH	FFH	FFH	FFH	FFH
Portugal	FFH	FFH	FFH	FFH	FFH
Holland	FFH	FFH	FFH	FFH	FFH
Spain	FFH	FFH	FFH	FFH	FFH
Israel	FFH	FFH	FFH	FFH	FFH
USA	FFH	FFH	FFH	FFH	FFH
Asia	FFH	FFH	FFH	FFH	FFH
Hong Kong	FFH	FFH	FFH	FFH	FFH
South Africa	FFH	FFH	FFH	FFH	FFH
Australia	FFH	FFH	FFH	FFH	FFH
New Zealand	FFH	FFH	FFH	FFH	FFH
Singapore	FFH	FFH	FFH	FFH	FFH
Malaysia	FFH	FFH	FFH	FFH	FFH

Address	480447	480448	480449	48044A	48044B
France	FFH	0	0	67	65
Germany	FFH	00H	00H	50	60
UK	FFH	00H	00H	252	66
Italy	FFH	00H	00H	58	60
Austria	FFH	00H	00H	53	62
Belgium	FFH	00H	00H	61	67
Denmark	FFH	00H	00H	53	67
Finland	FFH	00H	00H	61	60
Ireland	FFH	00H	00H	255	67
Norway	FFH	00H	00H	61	59
Sweden	3	200	0	100	60
Switzerland	FFH	00H	00H	60	60
Portugal	FFH	00H	00H	61	66
Holland	FFH	00H	00H	58	62
Spain	FFH	00H	00H	75	60
Israel	FFH	00H	00H	61	61
USA	FFH	00H	00H	77	62
Asia	FFH	00H	00H	61	66
Hong Kong	FFH	00H	00H	61	66
South Africa	FFH	00H	00H	61	66
Australia	FFH	00H	00H	255	68
New Zealand	FFH	00H	00H	61	66
Singapore	FFH	00H	00H	61	66
Malaysia	FFH	00H	00H	61	66

Address	48044C	48044D	48044E	48044F	480450
France	35	50	40	0	70
Germany	41	44	46	46	90
UK	35	44	27	33	100
Italy	40	44	40	150	70
Austria	39	50	44	46	80
Belgium	33	50	43	26	70
Denmark	33	50	26	26	90
Finland	42	50	40	60	70
Ireland	33	50	30	33	70
Norway	41	50	33	33	70
Sweden	40	70	18	26	70
Switzerland	40	60	26	00H	70
Portugal	34	50	33	33	70
Holland	40	42	33	33	70
Spain	33	75	32	100	70
Israel	39	50	46	101	90
USA	40	74	46	101	100
Asia	34	50	36	101	100
Hong Kong	34	50	36	101	100
South Africa	34	50	36	101	100
Australia	32	70	36	101	100
New Zealand	34	50	36	101	100
Singapore	34	50	36	101	100
Malaysia	34	50	36	101	100

Address	480451	480452	480453	480454	480455
France	70	12	4	34	34
Germany	90	14	6	34	34
UK	100	18	4	34	34
Italy	70	12	4	34	34
Austria	80	7	4	34	34
Belgium	70	12	4	34	34
Denmark	90	18	4	34	34
Finland	75	18	4	34	34
Ireland	70	18	4	34	34
Norway	70	18	4	34	34
Sweden	70	18	4	34	34
Switzerland	70	12	4	34	34
Portugal	70	18	4	34	34
Holland	70	18	4	34	34
Spain	140	12	4	34	34
Israel	90	12	4	34	34
USA	100	14	4	34	34
Asia	110	12	4	34	34
Hong Kong	110	12	4	34	34
South Africa	110	12	4	34	34
Australia	110	20	4	34	34
New Zealand	110	12	4	34	34
Singapore	110	12	4	34	34
Malaysia	110	12	4	34	34

Address	480459	48045A	48045B	48045C	48045D
France	0	0	FFH	19H	FFH
Germany	15	90	FFH	00H	FFH
UK	15	90	FFH	00H	50
Italy	15	90	FFH	00H	FFH
Austria	15	100	FFH	00H	FFH
Belgium	100	90	FFH	00H	FFH
Denmark	15	90	F0H	09H	FFH
Finland	15	90	F9H	90H	100
Ireland	15	90	FFH	16H	FFH
Norway	25	90	FFH	00H	FFH
Sweden	15	90	F0H	09H	FFH
Switzerland	15	90	FFH	00H	FFH
Portugal	15	90	FFH	00H	FFH
Holland	15	90	FFH	00H	FFH
Spain	100	90	FFH	07H	FFH
Israel	15	90	FFH	00H	FFH
USA	00H	00H	FFH	FFH	FFH
Asia	00H	00H	FFH	FFH	FFH
Hong Kong	00H	00H	FFH	FFH	FFH
South Africa	00H	00H	FFH	FFH	FFH
Australia	00H	00H	FFH	FFH	FFH
New Zealand	00H	00H	FFH	FFH	FFH
Singapore	00H	00H	FFH	FFH	FFH
Malaysia	00H	00H	FFH	FFH	FFH

Address	48045E	48045F	480465	480466	480472
France	80H	10H	FFH	16H	17
Germany	COH	10H	FFH	FFH	17
UK	C0H	10H	FFH	FFH	20
Italy	D1H	10H	FFH	FFH	18
Austria	C0H	10H	FFH	FFH	13
Belgium	44H	10H	FFH	FFH	21
Denmark	40H	10H	FFH	FFH	33
Finland	40H	10H	FFH	FFH	16
Ireland	80H	10H	FFH	FFH	36
Norway	40H	10H	FFH	FFH	16
Sweden	40H	10H	FFH	FFH	17
Switzerland	80H	10H	FFH	FFH	16
Portugal	40H	10H	FFH	FFH	30
Holland	00	10H	FFH	FFH	16
Spain	80H	10H	FFH	FFH	25
Israel	C0H	10H	FFH	FFH	16
USA	C0H	10H	FFH	FFH	13
Asia	C0H	10H	FFH	FFH	17
Hong Kong	C0H	10H	FFH	FFH	17
South Africa	COH	10H	FFH	FFH	17
Australia	COH	10H	FFH	FFH	14
New Zealand	C0H	10H	FFH	FFH	17
Singapore	C0H	10H	FFH	FFH	17
Malaysia	C0H	10H	FFH	FFH	17

Address	480473	480474	480475	480476	480477
France	23	FFH	00H	2	15
Germany	48	FFH	00H	01H	10
UK	84	FFH	00H	1	10
Italy	77	FFH	00H	2	10
Austria	54	FFH	00H	1	9
Belgium	72	FFH	00H	2	5
Denmark	50	16	24	1	10
Finland	56	FFH	00H	2	25
Ireland	67	FFH	00H	1	10
Norway	56	FFH	00H	1	10
Sweden	51	FFH	00H	1	5
Switzerland	51	FFH	00H	3	1
Portugal	78	16	24	1	10
Holland	52	FFH	00H	2	15
Spain	50	FFH	00H	2	10
Israel	83	FFH	00H	2	5
USA	83	FFH	00H	1	10
Asia	83	FFH	00H	1	10
Hong Kong	83	FFH	00H	1	10
South Africa	83	FFH	00H	1	10
Australia	83	FFH	00H	3	10
New Zealand	83	FFH	00H	3	10
Singapore	83	FFH	00H	1	10
Malaysia	83	FFH	00H	1	10

Address	480478	480479	48047A	480481	480482
France	5	04H	01H	25	00H
Germany	10	90H	01H	25	00H
UK	10	90H	01H	25	00H
Italy	10	90H	01H	25	00H
Austria	10	90H	01H	25	00H
Belgium	10	90H	01H	25	00H
Denmark	10	90H	01H	25	00H
Finland	25	90H	01H	25	00H
Ireland	10	90H	01H	25	00H
Norway	10	90H	01H	25	00H
Sweden	5	90H	01H	25	00H
Switzerland	1	90H	01H	25	00H
Portugal	10	90H	01H	25	00H
Holland	15	90H	01H	25	00H
Spain	10	2CH	01H	25	00H
Israel	5	90H	01H	25	00H
USA	10	90H	01H	25	00H
Asia	10	90H	01H	25	00H
Hong Kong	10	90H	01H	25	00H
South Africa	10	90H	01H	25	00H
Australia	10	90H	01H	25	00H
New Zealand	10	90H	01H	25	00H
Singapore	10	90H	01H	25	00H
Malaysia	10	90H	01H	25	00H

Address	480483	480484	4804A1	4804A2	4804A3	
France	11H	24H	22H	00	20H	
Germany	11H	24H	22H	00	20H	
UK	11H	24H	22H	00	20H	
Italy	11H	24H	22H	00	20H	
Austria	11H	24H	22H	00	20H	
Belgium	11H	24H	22H	00	20H	
Denmark	11H	24H	22H	00	20H	
Finland	11H	24H	22H	00	20H	
Ireland	11H	24H	22H	00	20H	
Norway	11H	24H	22H	00	20H	
Sweden	11H	24H	22H	00	20H	
Switzerland	11H	24H	22H	00	20H	
Portugal	11H	24H	22H	00	20H	
Holland	11H	24H	22H	00	20H	
Spain	11H	24H	22H	00	20H	
Israel	11H	24H	22H	00	20H	
USA	31H	24H	22H	00	20H	
Asia	11H	24H	22H	00	20H	
Hong Kong	11H	24H	22H	00	20H	
South Africa	11H	24H	22H	00	20H	
Australia	11H	24H	22H	00	20H	
New Zealand	11H	24H	22H	00	20H	
Singapore	11H	24H	22H	00	20H	
Malaysia	11H	24H	22H	00	20H	

Address	4804A4	4804A5	4804A6	4804A7	4804A8	
France	00H	30	12H	00H	10H	
Germany	00H	10	12H	00H	10H	
UK	00H	10	12H	00H	10H	
Italy	00H	10	12H	00H	10H	
Austria	00H	10	12H	00H	10H	
Belgium	00H	10	12H	00H	10H	
Denmark	00H	10	12H	00H	10H	
Finland	00H	10	12H	00H	10H	
Ireland	00H	10	12H	00H	10H	
Norway	00H	10	12H	00H	10H	
Sweden	00H	10	12H	00H	10H	
Switzerland	00H	10	12H	00H	10H	
Portugal	00H	10	12H	00H	10H	
Holland	00H	10	12H	00H	10H	
Spain	00H	10	12H	00H	10H	
Israel	00H	10	12H	00H	10H	
USA	00H	10	12H	00H	10H	
Asia	00H	10	12H	00H	10H	
Hong Kong	00H	10	12H	00H	10H	
South Africa	00H	10	12H	00H	10H	
Australia	00H	10	12H	00H	10H	
New Zealand	00H	10	12H	00H	10H	
Singapore	00H	10	12H	00H	10H	
Malaysia	00H	10	12H	00H	10H	

Address	4804A9	4804AA	4804AB	4804AC	4804AD	
France	00H	10	19H	96H	32H	
Germany	00H	10	19H	96H	32H	
UK	00H	10	19H	96H	32H	
Italy	00H	10	19H	96H	32H	
Austria	00H	10	19H	96H	32H	
Belgium	00H	10	19H	96H	32H	
Denmark	00H	10	19H	96H	32H	
Finland	00H	10	19H	96H	32H	
Ireland	00H	10	19H	96H	32H	
Norway	00H	10	19H	96H	32H	
Sweden	00H	10	19H	96H	32H	
Switzerland	00H	10	19H	96H	32H	
Portugal	00H	10	19H	96H	32H	
Holland	00H	10	19H	96H	32H	
Spain	00H	10	19H	96H	32H	
Israel	00H	10	19H	96H	32H	
USA	00H	10	19H	96H	32H	
Asia	00H	10	19H	96H	32H	
Hong Kong	00H	10	19H	96H	32H	
South Africa	00H	10	19H	96H	32H	
Australia	00H	10	19H	96H	32H	
New Zealand	00H	10	19H	96H	32H	
Singapore	00H	10	19H	96H	32H	
Malaysia	00H	10	19H	96H	32H	

Address	4804AF	4804B0	4804B1	4804B2	4804B3
France	08H	80H	07H	20H	10
Germany	08H	80H	07H	20H	10
UK	08H	80H	07H	20H	10
Italy	08H	80H	07H	20H	10
Austria	08H	80H	07H	20H	10
Belgium	08H	80H	07H	20H	10
Denmark	08H	80H	07H	20H	10
Finland	08H	80H	07H	20H	10
Ireland	08H	80H	07H	20H	10
Norway	08H	80H	07H	20H	10
Sweden	08H	80H	07H	20H	10
Switzerland	08H	80H	07H	20H	10
Portugal	08H	80H	07H	20H	10
Holland	08H	80H	07H	20H	10
Spain	08H	80H	07H	20H	10
Israel	08H	80H	07H	20H	10
USA	08H	80H	07H	20H	10
Asia	08H	80H	07H	20H	10
Hong Kong	08H	80H	07H	20H	10
South Africa	08H	80H	07H	20H	10
Australia	08H	80H	07H	20H	10
New Zealand	08H	80H	07H	20H	10
Singapore	08H	80H	07H	20H	10
Malaysia	08H	80H	07H	20H	10

Address	4804B4	4804B5	4804B6	4804B7	4804B8
France	10	0	0	10	0
Germany	6	3	FEH	6	3
UK	8	2	0	8	2
Italy	6	0	0	6	0
Austria	6	0	0	6	0
Belgium	6	0	0	6	0
Denmark	10	0	0	10	0
Finland	10	0	0	10	0
Ireland	10	0	0	10	0
Norway	9	02H	0	9	02H
Sweden	10	0	0	10	0
Switzerland	5	1	FFH	5	1
Portugal	6	0	0	6	0
Holland	7	0	0	7	0
Spain	10	0	0	10	0
Israel	6	0	0	6	0
USA	9	0	0	9	0
Asia	6	0	0	6	0
Hong Kong	6	0	0	6	0
South Africa	6	0	0	6	0
Australia	11	2	0	11	2
New Zealand	8	0	0	8	0
Singapore	6	0	0	6	0
Malaysia	6	0	0	6	0

Address	4804B9	4804BA	4804BB	4804BC	4804BD
France	0	15	0	0	0BH
Germany	FEH	15	0	0	18H
UK	0	15	0	0	0BH
Italy	0	15	0	0	0BH
Austria	0	15	0	0	0BH
Belgium	0	15	0	0	0BH
Denmark	0	15	0	0	0BH
Finland	0	15	0	0	0BH
Ireland	0	15	0	0	0BH
Norway	0	15	0	0	0BH
Sweden	0	15	0	0	0BH
Switzerland	FFH	15	0	0	0BH
Portugal	0	15	0	0	0BH
Holland	0	15	0	0	0BH
Spain	0	15	0	0	0BH
Israel	0	15	0	0	0BH
USA	0	15	0	0	0DH
Asia	0	15	0	0	0DH
Hong Kong	0	15	0	0	0BH
South Africa	0	15	0	0	0BH
Australia	0	15	0	0	0BH
New Zealand	0	15	0	0	0BH
Singapore	0	15	0	0	0BH
Malaysia	0	15	0	0	0BH

Address	4804DA	
France	53	
Germany	53	
UK	53	
Italy	53	
Austria	59	
Belgium	59	
Denmark	53	
Finland	53	
Ireland	53	
Norway	53	
Sweden	53	
Switzerland	92	
Portugal	53	
Holland	53	
Spain	80	
Israel	59	
USA	53	
Asia	47	
Hong Kong	53	
South Africa	53	
Australia	53	
New Zealand	53	
Singapore	53	
Malaysia	53	

4.4. 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.

4.4.1. Programming Procedure

- 1. Set bit 3 of System Bit Switch 04 to 1.
- 2. Either use Function 31 (for a Quick Dial number) or Function 32 (for a Speed Dial number)

Example: Change the Parameters in Quick Dial 10.



4. Press Quick Dial key 10.

Note: When selecting Speed Dial 10 with Function 32, press 1 0 at the ten key pad.

- 5. Press Yes four times.
- 6. The settings for byte 0 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:

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
- 10. After finishing, reset bit 3 of System Bit Switch 04 to 0.

SERVICE TABLES AND PROCEDURES DEDICATED TRANSMISSION PARAMETERS

4.4.2. Parameters

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

Switch 01	
	FUNCTION AND COMMENTS

CCITT T1 time (for PSTN G3 mode)

If the connection time to a particular terminal is longer than the NCU parameter setting , adjust this byte. The T1 time is the value stored in this byte (in hex code), multiplied by 1 second.

Range:

1 to 127 s (01h to 7Fh) 00h or FFh - The local NCU parameter factory setting is used. Do not program a value between 80h and FEh.

Sv	vitch	02						
				FU	NC	ΓΙΟΙ	N	COMMENTS
0 to 4	Tx le Bit	4 0 0 0 0	3 0 0 0 0	2 0 0 0 1 :	1 0 1 1 0	1 0	Setting 0 -1 -2 -3 -4	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. When disabled, NCU parameter 01 setting is used.
		0 1	1 1	1 1	1 1	1 1	-15 Disabled	Note: Do not use settings other than listed on the left.
5 to 7	Cab Bit	7 0 0 0	6 0	5 0 1 0		Lo Me Hig	one w edium	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.
								Note: Do not use settings other than listed on the left.

SERVICE TABLES AND PROCEDURES DEDICATED TRANSMISSION PARAMETERS

Service

S	witch	03					
					FL	INCTION	COMMENTS
0 to 3	,					Setting (bps) Not used 2,400 4,800 7,200	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. Note: Do not use settings other than listed on the left.
		0 1 Ot	1 1 her	1 1 sett	0 1 ings	14,400 Disabled	
4 to 7	Not	use	ed				Do not change the settings.

Sv	Switch 04									
		FUNCTION	COMMENTS							
	Inch-mm of Bit 1 Bit	conversion before tx 0 Setting	The machine uses inch-based resolutions for scanning. If "inch only" is selected, the printed							
0	0 0	Inch-mm conversion available	copy may be slightly distorted at the other end if that machine uses mm-based resolutions.							
1	0 1 1 0 1 1	Inch only Not used Disabled								
2	DIS/NSF 0 Bit 3 Bit 0 0 0 1	detection method 2 Setting First DIS or NSF Second DIS or NSF	(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							
3	1 0 1 1	Not used Disabled	NSS.							
4	Not used		Do not change the settings.							
5	transmit n 0: MH on		This bit determines the capabilities that are informed to the other terminal during transmission.							
6 7	ECM durin Bit 7 Bit 0 0 1 1 0 1 1	ng transmission 6 Setting Disabled Enabled Not used Disabled	For example, if ECM is switched on but is not wanted when sending to a particular terminal, use the setting of (0, 0).							

SERVICE TABLES AND PROCEDURES DEDICATED TRANSMISSION PARAMETERS

S	Switch 05 - Optional ISDN G4 kit required										
				F	UNC	CTION	COMMENTS				
	Data	rate					When disabled, the setting of G4				
0	Bits	3	2	1	0	Setting	parameter switch 2 (bits 0 and 1) setting				
to		0	0		0	64 kbps	is used.				
3		0	0	0	1	56 kbps					
		1	1	1	1	Disabled					
4	Not u	sed					Do not change the settings.				
to											
7											

S	Switch 06 - Optional ISDN G4 kit required							
				F	-UNG	CTION	COMMENTS	
	Link N	Nod	ules	5			When disabled, the setting of G4	
0	Bits	3	2	1	0	Setting	parameter switch 3 (bit 0) setting is	
to		0	0	0	0	Modulo 8	used.	
3		0	0	0	1	Modulo 128		
		1	1	1	1	Disabled		
4	Not used						Do not change the settings.	
to								
7								

Switch 07 - Optional ISDN G4 kit required								
				F	UN	CTION	COMMENTS	
	Layer	3 p	roto	col			When disabled, the setting of G4	
0	Bits	3	2	1	0	Setting	parameter switch 6 (bit 0) setting is	
to		0	0	0	0	ISO 8208	used.	
3		0	0	0	1	T.70 NULL		
		1	1	1	1	Disabled		
	Packet modules						When disabled, the setting of G4	
4	Bits	3	2	1	0	Setting	parameter switch 6 (bit 4) setting is	
to		0	0	0	0	Modulo 9	used.	
7		0	0	0	1	Modulo 128		
		1	1	1	1	Disabled		

Switch 08 - Not used



4.5. SERVICE RAM ADDRESSES

Do not change the settings which are marked as "Not used" or "Read only."

004003 to 00400B(H) - ROM part number and suffix (ASCII)

Example: The part number is H5157210A

004003(H) - 48(H) 004004(H) - 35(H) 004005(H) - 31(H) 004006(H) - 35(H) 004007(H) - 37(H) 004007(H) - 32(H) 004008(H) - 32(H) 004009(H) - 31(H) 00400A(H) - 30(H) 00400B(H) - 41(H)

344F28 to 346B47(H) - Dedicated tx parameters for Speed Dial #100 - #999, when a Function Upgrade Card is used.

As explained in section 4.4, each set of dedicated tx parameters consists of 8 bytes.

344F28 to 344F2F(H) - Dedicated tx parameters for Speed #100

344F30 to 344F37(H) - Dedicated tx parameters for Speed #101

344F38 to 344F3F(H) - Dedicated tx parameters for Speed #102

346B40 to 346B47(H) - Dedicated tx parameters for Speed #999

480000(H) - RAM Reset Level 1

Change the data at this address 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) and RAM settings (RAM dump list) for scanner/printer registration settings. **Note:** Initial toner supply will be carried out automatically after the reset. This should take about 90 s.

480001 to 480004(H) - ROM version (Read only)

480001(H) - Revision number (BCD) 480002(H) - Year (BCD) 480003(H) - Month (BCD) 480004(H) - Day (BCD)

480006 to 480015(H) - Machine's serial number (16 digits - ASCII)

480018(H) - Total program checksum (low)

480019(H) - Total program checksum (high)

48001A(H) - Boot program checksum (low)

48001B(H) - Boot program checksum (high)

48001C(H) - Main program checksum (low)

48001D(H) - Main program checksum (high)

48001E(H) - RDS program update counter

480020 to 48003F(H) -	System bit switches
480040 to 48004F(H) -	Scanner bit switches
480050 to 48005F(H) -	Printer bit switches
480060 to 48007F(H) -	Communication bit switches
480080 to 48008F(H) -	

4800A0(H) - User parameter switch 00 (SWUER_00) 0: Disabled, 1: Enabled

Bit 0: Stamp home position

Bits 1 and 2: Scanning contrast home position Bit

- 2 Settina 1
 - 0 0 Normal
 - 0 1 Lighten
 - 1 0 Darken
- Bit 3: Do not adjust

Bit

Bits 4 and 5: Scanning resolution home position

- 5 4 Setting
 - Standard 0 0
 - 0 1 Detail
 - 1 0 Fine

Bit 6: Transmission mode home position

Bit 7: Halftone home position

0: Memory tx, 1: Immediate tx

0: Disabled, 1: Enabled

4800A1(H) - User parameter switch 01 (SWUSR 01)

Bits 0 to 6: Not used Bit 7: Settings return to home position after transmission 0: Disabled, 1: Enabled

4800A2(H) - User parameter switch 02 (SWUSR 02)

Bit 0: Forwarding mark printing on forwarded messages 0: Disabled, 1: Enabled Bit 1: Center mark printing on received copies 0: Disabled, 1: Enabled Bit 2: Reception time printing 0: Disabled, 1: Enabled Bit 3: TSI included in transmitted messages 0: Disabled, 1: Enabled Bit 4: Checkered mark printing 0: Disabled, 1: Enabled Bit 5: CIL printing (G4) 0: Disabled, 1: Enabled Bit 6: TID printing (G4) 0: Disabled, 1: Enabled Bit 7: Not used

4800A3(H) - User parameter switch 03 (SWUSB_03: Automatic report printout)

Bit 0: Transmission result report (memory transmissions)	0: Off, 1: On
Bit 1: Not used	
Bit 2: Memory storage report	0: Off, 1: On
Bit 3: Polling reserve report (polling reception)	0: Off, 1: On
Bit 4: Polling result report (polling reception)	0: Off, 1: On
Bit 5: Transmission result report (immediate transmissions)	0: Off, 1: On
Bit 6: Polling clear report	0: Off, 1: On
Bit 7: TCR (Journal)	0: Off, 1: On
4800A4(H) - User parameter switch 04 (SWUSR04: Automatic re	port printout)
Bit 0: Automatic confidential reception report output	0: Off, 1: On
Bit 1: Fax On Demand report output	0: Off, 1: On
Bits 2 to 6: Not used	
Bit 7: Inclusion of a sample image on reports	0. Off 1. Ou

4800A5(H) - User parameter switch 05 (SWUS Bit 0: Substitute reception Bit 1: Memory reception if no RTI or CSI receive Bits 2 and 3: Not used Bits 4 and 5: Restricted Access Bit 5 4 Setting 0 0 Disabled 0 1 Enabled at all times 1 0 Enabled during Night Time 1 1 Not used Bit 6: Fusing lamp control during energy saver m	0: Off, 1: On d 0: Possible, 1: Impossible
Dit of a using lamp control during chergy saver in	0: Lamp off, 1: Standby temperature (80 °C)
Bit 7: Not used	
4800A6(H) - User parameter switch 06 (SWUS Bit 0: TTI/CIL printing Bit 1: Not used Bit 2: Closed network for transmission Bit 3: Not used Bit 4: Batch transmission (memory card required Bit 5: Partial image scanning during memory tx Bits 6 to 7: Not used	0: Off, 1: On 0: Off, 1: On
4800A7(H) - User parameter switch 07 (SWUSBits 0 and 1: Not usedBit 2: Parallel memory transmissionBit 3: Reduction before transmissionBits 4 and 5: Not usedBits 6 and 7: Fax On DemandBit 76Setting00Disabled01Enabled without password	0: Off, 1: On 0: Off, 1: On

- Enabled with password (Remote ID) Not used 1 0 1 1

4800A8(H) - User parameter switch 08 (SWUSR_08)

Bit 0 and 1: Multi-copy reception (optional memory card required)

1 0 Setting

Bit

Bit

Bit

Bit

Bit

Bit

- X 0 Disabled
- 0 1 Faxes from senders whose RTIs/CSIs are specified for this feature are multicopied.
- 1 1 Faxes from senders whose RTIs/CSIs are not specified for this feature are multicopied.
- Bits 2 and 3: Authorized reception

1

- 3 2 Setting
 - X 0 Disabled
 - 0 1 Only faxes from senders whose RTIs/CSIs are specified for this feature are accepted.
 - 1 Only faxes from senders whose RTIs/CSIs are not specified for this feature are accepted.
- Bits 4 and 5: Specified cassette selection
 - 5 4 Setting
 - X 0 Disabled
 - 0 1 Faxes from senders whose RTIs/CSIs are specified for this feature are printed on paper from a specified cassette.
 - 1 1 Faxes from senders whose RTIs/CSIs are not specified for this feature are printed on paper from a specified cassette.
- Bits 6 and 7: Forwarding (optional memory card required)
 - 1 0 Setting
 - X 0 Disabled
 - 0 1 Faxes from senders whose RTIs/CSIs are specified for this feature are forwarded.
 - 1 1 Faxes from senders whose RTIs/CSIs are not specified for this feature are forwarded.

4800A9(H) - User parameter switch 09 (SWUSR_09)

Bits 0 and 1: Memory lock (optional memory card required)

- 1 0 Setting
 - X 0 Disabled
 - 0 1 Faxes from senders whose RTIs/CSIs are specified for this feature are kept in the memory until a memory lock ID is entered.
 - 1 1 Faxes from senders whose RTIs/CSIs are not specified for this feature are kept in the memory until a memory lock ID is entered.
- Bits 2 and 3: Hard disk filing system
 - (optional hard disk and the function upgrade card required)
 - 3 2 Setting
 - X 0 Disabled
 - 0 1 Faxes from senders whose RTIs/CSIs are specified are for this feature kept in the hard disk for filing.
 - 1 1 Faxes from senders whose RTIs/CSIs are not specified for this feature are kept in the hard disk for filing.

Bits 4 to 7: Not used

4800AA(H) - User parameter switch 10 (SWUSR_0A)

Bit 0: Reverse order printing Bit 1: 2 into 1 Bits 2 to 6: Not used Bit 7: Halftone type

- 0: Disabled, 1: Enabled 0: Disabled, 1: Enabled
- 0: Error diffusion, 1: Dither

4800AB(H) - User parameter switch 11 (SWUSR_0B)

Bit 0: Transfer request using DTMF tone signals 0: Not accepted, 1: Accepted Bit 1: Method of transmitting numbers after the "Tone" mark over an ISDN line 0: UUI. 1: Tone

Bits 2 to 5: Not used

Bit 6: Printout of messages received while acting as a forwarding station0: Off, 1: OnBit 7: Polling Standby duration0: Once, 1: No limit

4800AC(H) - User parameter switch 12 (SWUSR_0C)

Bits 0 and 1: Not used

Bit 2: Toner saving mode 0: Disabled, 1: Enabled Bits 3 and 4: Printout image density (Fax mode)

- 4 3 Setting
- 0 0 Normal
- 0 1 Lighten
- 1 0 Darken
- 1 1 Not used

Bits 5 to 6: Not used

Bit

Bit

Bit

Bit 7: Copy operation

- - 0: Possible. 1: Prohibited

4800AD(H) - PSTN access method (SWUSR_0D)

Bits 0 and 1: PSTN access method from behind a PABX

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

4800B8(H) - User function 62 settings (SWUSR_18)

Bits 0 and 1: File retention time

- 1 0 Setting
 - 0 0 Disabled
 - 0 1 24 hours
 - 1 0 Disabled
 - 1 1 72 hours

Bits 2 to 7: Not used

4800B9(H) - User function 62 settings (SWUSR_19)

Bit 0: Night timer Bits 1 to 3: Not used Bit 4: RDS operation 0: Disabled, 1: Enabled

0: Not acceptable

1: Acceptable for the limit specified by system switch 03

Bits 5 and 6: Not used Bit 7: Daylight saving time

0: Disabled, 1: Enabled

4800BA(H) - User function 62 settings (SWUSR_1A) Bit 0: Not used Bit 1: Dialing type 0: Pulse diali Bits 2 to 7: Not used

0: Pulse dialing (10 pps), 1: Tone (DTMF) dialing

4800BB(H) - PSTN access number for loop start (SWUSR 1B) Access number Hex value to program (BCD) 0 F0 Û Û 0 F0 00 00 Û ΰ 99 99 4800C0 to 4800CF(H) - G4 Parameter Switches (Refer to the ISDN G4 option service manual for details.) 4800D0 to 4800EF(H) - G4 Internal Switches (Refer to the ISDN G4 option service manual for details.) 4800F0 to 480103(H) - RTI (Max. 20 characters - ASCII) - See the following note. 480104 to 480117(H) - CSI (Max. 20 characters - ASCII) 480118 to 800137(H) - TTI (Max. 32 characters - ASCII) - See the following note. **480138(H)** - Number of CSI characters (Hex) 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. 480139 to 480147(H) - Service station's fax number (Service function 13) See 48018F(H) for the type of network used for this number. 480157 to 480165(H) - Own fax number (PSTN) (User function 61) 480166 to 480174(H) - Own fax number (ISDN G4) (Ueer function 61) 480175 to 480183(H) - Own fax number (ISDN G3) (User function 61) 480184(H) - ID code (low - Hex) 480185(H) - ID code (high - Hex) 480186(H) - Confidential ID (low - BCD) 480187(H) - Confidential ID (high - BCD) 480188(H) - Memory lock ID (low - Hex) 480189(H) - Memory lock ID (high - Hex) 48018C(H) - Remote ID (low - BCD) 48018D(H) - Remote ID (high - BCD) 48018F(H) - Network type used for the service station number 00(H) - G3 (PSTN) 01(H) - G4 (ISDN) 480198 to 48019F(H) - Last power off time (Read only) 480198(H) - 01(H) - 24-hour clock, 00(H) - 12-hour clock (AM), 02(H) - 12-hour clock (PM) 480199(H) - Year (BCD) 48019A(H) - Month (BCD) 48019B(H) - Day (BCD) 48019C(H) - Hour 48019D(H) - Minute 48019E(H) - Second 48019F(H) - 00: Monday, 01: Tuesday, 02: Wednesday,, 06: Sunday

4801AC(H) - Optional equipment (Read only)

Bit 0: Memory card	0: Not installed, 1: Installed						
Bit 1: Hard disk	0: Not installed, 1: Installed						
Bit 2: Function upgrade card	0: Not installed, 1: Installed						
Bit 3: Not used							
Bit 4: 100 sheet cassette	0: Not installed, 1: Installed						
Bit 5: 1st paper feed unit (type F)	0: Not installed, 1: Installed						
Bit 6: 2nd paper feed unit (type F)	0: Not installed, 1: Installed						
Bit 7: Not used							
4801AD(H) - Optional equipment (Read only)							
Bit 0: 1st paper feed unit (type S)	0: Not installed, 1: Installed						
Bit 1: 2nd paper feed unit (type S)	0: Not installed, 1: Installed						
Bit 2: Not used							
Bit 3: Not used							
Bit 4: Printer interface	0: Not installed, 1: Installed						
Bit 5: Not used							
Bit 6: G4	0: Not installed, 1: Installed						
Bit 7: Fax On Demand	0: Not installed, 1: Installed						

4801C0 to 4801C2(H) - Tx counter

Address	High	Low
4801C0(H)	Tens digit	Unit digit
4801C1(H)	Thousands digit	Hundrets digit
4801C2(H)	Hundred thousands digit	Ten thousands digit

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

4801C4 to 4801C6(H) - Rx counter

4801C8 to 4801CA(H) - Scan counter

4801CC to 4801CE(H) - Print counter

4801D0 to 4801D2(H) - Printer interface output counter

4801D4 to 4801D6(H) - ADF counter

4801D8 to 4801DA(H) - Paper feed counter (standard cassette)

4801DC to 4801DE(H) - Paper feed counter (1st optional paper feed unit)

4801E0 to 4801E2(H) - Paper feed counter (2nd optional paper feed unit)

4801E4 to 4801E6H) - Paper feed counter (optional 100 sheet cassette)

4801E8 to 4801EA(H) - Paper feed counter (bypass feed)

4801F0 to 4801F2(H) - Scanner total jam counter

4801F4 to 4801F6(H) - Printer total jam counter

4801F8 to 4801FA(H) - Paper jam counter (standard cassette)

4801FC to 4801FE(H) - Paper jam counter (1st optional paper feed unit)

480200 to 480202(H) - Paper jam counter (2nd optional paper feed unit)

480204 to 480206(H) - Paper jam counter (optional 100 sheet cassette)

480208 to 48020A(H) - Paper jam counter (bypass feed)

480210 to 480212(H) - Fusing exit jam counter

480214 to 480216(H) - Registration jam counter

480218 to 48021A(H) - PM counter

48021C to 48021E(H) - PM call interval (default 60,000)

480220 to 480222(H) - Copy counter

480224 to 480226(H) - OPC (master drum) counter

480228 to 48022A(H) - OPC (master drum) replacement interval (default: 30,000 prints) If bit 5 of system bit switch 04 is 0, the machine asks the user to replace the drum at this interval.

48022C to 48022E(H) - CTM counter

480276 to 480285(H) - Excessive jam call parameters (Refer to section 2.3.2 for details.)

4802A2 to 4802AD(H) - G4 NSC code

4802AE to 4802C5(H) - G4 terminal ID (ASCII - Max. 24 characters)

4802C6 to 4802D9(H) - ISDN G3 CSI (ASCII - Max. 20 digits)

4802DA(H) - Number of digits programmed in the ISDN G3 CSI (Hex)

4802DB to 4802DE(H) - ISDN IP

4802DF to 4802E2(H) - ISDN G3 sub-address

4802E3 to 4802E6(H) - ISDN G4 sub-address

4802E7 to 4802EB(H) - CiG4 board ROM information

4802E7(H) - Suffix 4802E8(H) - Version (BCD) 4802E9(H) - Year (BCD) 4802EA(H) - Month (BCD) 4802EB(H) - Day (BCD)

480300(H) - Number of copies for multi-sort document reception (User function 83)

480301(H) - Daylight saving time settings (User function 62)

480302 to 48032B(H) - Night timer period (User function 72)

480302 to 480304(H) - Setting #1 for Monday 480305 to 480307(H) - Setting #2 for Monday 480308 to 48030A(H) - Setting #1 for Tuesday 48030B to 48030D(H) - Setting #2 for Tuesday 48030E to 480310(H) - Setting #1 for Wednesday 480311 to 480313(H) - Setting #2 for Wednesday 480314 to 480316(H) - Setting #1 for Thursday 480317 to 480319(H) - Setting #2 for Thursday 48031A to 48031C(H) - Setting #1 for Friday 48031D to 48031F(H) - Setting #2 for Friday 480320 to 480322(H) - Setting #1 for Saturday 480323 to 480325(H) - Setting #2 for Saturday 480326 to 480328(H) - Setting #1 for Sunday 480329 to 48032B(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

480356(H) - Time for economy transmission (hour in 24h clock format - BCD) **480357(H)** - Time for economy transmission (minute - BCD)

480358 to 48035C(H) - Last RDS operation (Read only)

480358(H) - 01(H): 24-hour clock, 00(H): 12-hour clock (AM), 02(H): 12-hour clock (PM) 480359(H) - Year (BCD) 48035A(H) - Month (BCD) 48035B(H) - Day (BCD) 48035C(H) - Hour 48035D(H) - Minute 48035E(H) - Second 48035F(H) - 00: Monday, 01: Tuesday, 02: Wednesday,, 06: Sunday 480364 to 48036B(H) - Last Fax On Demand report printout (Read only)

480364(H) - 01(H): 24-hour clock, 00(H): 12-hour clock (AM), 02(H): 12-hour clock (PM) 480365(H) - Year (BCD)

- 480366(H) Month (BCD)
- 480367(H) Day (BCD)
- 480368(H) Hour
- 480369(H) Minute
- 48036A(H) Second

48036B(H) - 00: Monday, 01: Tuesday, 02: Wednesday,, 06: Sunday

48036E to 48036F(H) - Length (mm) of the non-scanning area from the leading edge for partial image scanning

48036E(H) - Low byte (BCD)

48036F(H) - High byte (BCD)

In the US, the user input value is in inch format. The machine converts this into mm format and stores the converted value here.

480370 to 480371(H) - Length (mm) of the scanning area for partial image scanning

480370(H) - Low byte (BCD) 480371(H) - High byte (BCD)

480372(H) - Transmission monitor volume	00 - 07(H)
480373(H) - Reception monitor volume	00 - 07(H)
480374(H) - On-hook monitor volume	00 - 07(H)
480376(H) - Buzzer volume	00 - 07(H)
480377(H) - Key acknowledgement tone volume	00 - 07(H)

480379 to 48037D(H) - Periodic service call parameters (Refer to section 2.3.2 for details)

480383 to 480385(H) - Effective term of automatic service calls (Refer to section 2.3.2 for details)

480400 to 4804DA(H) - NCU parameters (Refer to section 4.3 for details)

4804EA(H) - Print top margin (standard cassette)
4804EB(H) - Print top margin (1st optional paper feed unit)
4804EC(H) - Print top margin (2nd optional paper feed unit)
4804EF(H) - Print top margin (optional 100 sheet cassette)
4804F0(H) - Print top margin (bypass feeder)
Refer to section 5.12 for details about these parameters.

4804F5(H) - Print left margin (standard cassette)
4804F6(H) - Print left margin (1st optional paper feed unit)
4804F7(H) - Print top margin (2nd optional paper feed unit)
4804FA(H) - Print left margin (optional 100 sheet cassette)
4804FB(H) - Print left margin (bypass feeder)
Refer to section 5.12 for details about these parameters.

480586(H) - Print bottom margin when bypass feeder is used. Refer to section 5.12 for details about these parameters.

4805AF(H) - Fusing unit failure details

01(H) - The fusing lamp temperature stayed above 175 °C while printing.

02(H) - The fusing lamp temperature did not reach 150 °C before starting printing.

03(H) - The fusing lamp temperature did not go down to 80 °C while in standby mode (when fusing lamp OFF was selected for energy saver mode)

04(H) - The fusing lamp temperature did not go down to 80 °C while in standby mode (when fusing lamp Standby [80 °C] was selected for energy saver mode)

05(H) - The fusing lamp temperature stayed below 80 °C while in standby mode (when fusing lamp Standby [80 °C] was selected for energy saver mode)

07(H) - The fusing lamp temperature came below 140 °C during printing

08(H) - The fusing lamp temperature exceeded 250 °C

09(H) - A fusing thermistor error was detected

When a service call was caused by a fusing unit failure (codes 01 - 09):

After fixing the problem, reset the data at this address to 00(H), then restart the machine to clear the service call. (Refer to address 4805B1(H) for other hardware failures.)

4805B0(H) - Excessive jam alarm

Bit 3: Scanner excessive jam alarm

1: An alarm has occurred

Bit 4: Printer excessive jam alarm

1: An alarm has occurred

Either or both of these bits will change to 1 when an excessive jam alarm occurs. Reset each bit to 0 when you have solved the problem. The machine will not be able to detect excessive jams in future if you do not reset these bits.

4805B1(H) - Details of the service call (hardware error)

01(H) - The fusing lamp temperature stayed above 175 °C while printing.

02(H) - The fusing lamp temperature did not reach 150 °C before starting printing.

03(H) - The fusing lamp temperature did not go down to 80 °C while in standby mode (when fusing lamp OFF was selected for energy saver mode)

04(H) - The fusing lamp temperature did not go down to 80 °C while in standby mode (when fusing lamp Standby [80 °C] was selected for energy saver mode)

05(H) - The fusing lamp temperature stayed below 80 °C while in standby mode (when fusing lamp Standby [80 °C] was selected for energy saver mode)

07(H) - The fusing lamp temperature came below 140 °C while printing

- 08(H) The fusing lamp temperature exceeded 250 °C
- 09(H) A fusing thermistor error was detected
- 11(H) Charge leak current was detected while the charge corona unit was activated
- 12(H) Charge leak current was detected while the charge corona unit was not activated
- 21(H) The laser synchronization signal was not detected during printing
- 31(H) Polygonal mirror motor startup error
- 32(H) Polygonal mirror motor error during printing
- 41(H) Main motor startup error
- 42(H) Main motor error during printing

When a service call was caused by a fusing lamp failure (codes 01 - 09):

The same code is stored at address 4805AF(H).

After fixing the problem, reset the data at address 4805AF(H) to 00(H), then restart the machine to clear the service call.

When a service call was caused by another hardware failure (codes 11 - 42):

If the problem remains after restarting the machine (power off/on), fix the hardware problem. The service call condition is cleared after power up.

4805C8(H) - Initial Toner Supply

Bit 3: Initial toner supply 0: Off, 1: On

Whenever the development unit is replaced, do the following procedure.

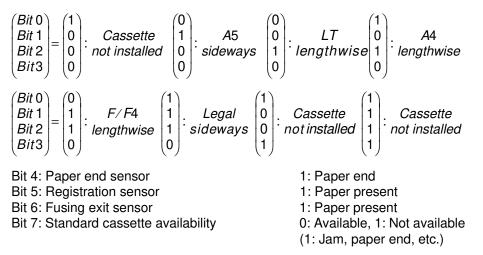
- 1. Make sure that the drum, CTM, and the new development unit are correctly installed.
- 2. Turn on the machine and change this bit to 1.
- 3. Turn off the machine.

4. Turn on the machine. The machine starts filling up the empty development unit hopper with new toner. (This bit is reset to zero automatically.)

5. Make test copies or test patterns to check the print quality.

4805E5(H) - Sensor status (standard cassette and internal printer mechanism) Bit 0 to 3: Paper size sensor

(Note: Available paper sizes depend on the country for which the machine is designed.)



4805E6(H) - Sensor status (1st Optional Paper Feed Unit)

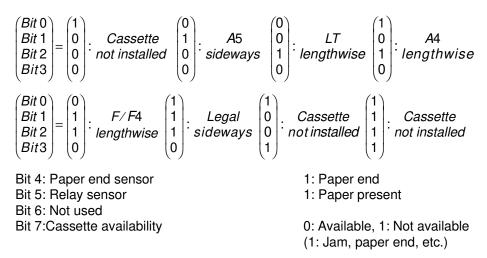
Bit 0 to 3: Paper size sensor

(Note: Available paper sizes depend on the country for which the machine is designed.)

4805E7(H) - Sensor status (2nd optional Paper Feed Unit)

Bit 0 to 3: Paper size sensor

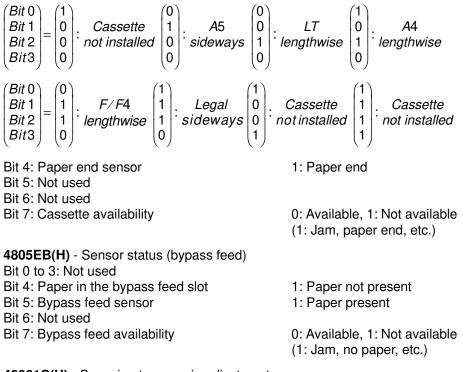
(Note: Available paper sizes depend on the country for which the machine is designed.)



4805EA(H) - Sensor status (optional 100 sheet cassette)

Bit 0 to 3: Paper size sensor

(Note: Available paper sizes depend on the country for which the machine is designed.)



48061C(H) - Scanning top margin adjustment **480620(H) to 480624(H)** - Scanning bottom margin adjustment Refer to section 5.12 for details.

SERVICE TABLES AND PROCEDURES SERVICE RAM ADDRESSES

492716 to 492C35(H) - Dedicated tx parameters for Quick Dial 01 - 64 and Speed Dial #00 - #99.

As explained in section 4.4, each set of dedicated tx parameters consists of 8 bytes.

492716 to 49271D(H) - Dedicated tx parameters for Quick 01

49271E to 492725(H) - Dedicated tx parameters for Quick 02

492726 to 49272D(H) - Dedicated tx parameters for Quick 03 π

49290E to 492915(H) - Dedicated tx parameters for Quick 64 492916 to 49291D(H) - Dedicated tx parameters for Speed #00 49291E to 492925H) - Dedicated tx parameters for Speed #01 492926 to 49292D(H) - Dedicated tx parameters for Speed #03

492C2E to 492C35(H) - Dedicated tx parameters for Speed #99

49461A to 494695 (H) - ISDN subscriber numbers (Read only)

49461A (H): Number of digits programmed for ISDN G3 Subscriber Number (Main)
49461B - 494620 (H): ISDN G3 Subscriber Number (Main)
49463E (H): Number of digits programmed for ISDN G3 Subscriber Number (Sub)
49463F - 49464D (H): ISDN G3 Subscriber Number (Sub)
494662 (H): Number of digits programmed for ISDN G4 Subscriber Number (Main)
494663 - 494671 (H): ISDN G4 Subscriber Number (Main)
494686 (H): Number of digits programmed for ISDN G4 Subscriber Number (Sub)

494687 - 494695 (H): ISDN G4 Subscriber Number (Sub)

49A709(H) - Selection of the other cassette for printer interface output (User Function 62)

01(H) - 1st optional paper feed unit

02(H) - 2nd optional paper feed unit

03(H) - Optional 100 sheet cassette

Note: The standard cassette and the cassette selected using function 62 are used for printer interface output.

49A79C to 49A91B(H) - Latest 64 error codes (Read only)

One error record consists of 6 bytes of data.

First error record start address - 49A79C(H) Second error record start address - 49A7A2(H) Third error record start address - 49A7A8(H)

64th error record start address - 49A916(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.]

49D71C to 49DDFB(H) - Latest 20 error communication records (Read only)

One error communication record consists of 88 bytes. The format is as follows:

1st byte - Header 0: OK, 1: NG Bit 0: Communication result 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 byte - Not used 3rd to 6th bytes - Date and time when the communication started 3rd byte - Month (BCD) 4th byte - Day (BCD) 5th byte - Hour (BCD) 6th byte - Minute (BCD) 7th and 8th bytes - Communication time 7th byte - Minutes (BCD) 8th byte - Seconds (BCD) 9th and 10th byte - Number of pages transmitted or received 9th byte - Low byte (Hex) 10th byte - High byte (Hex) 11th and 12th bytes - Personal code or number of total/burst error lines If bit 4 of the 1st byte is 0: 11th byte - Personal code (low - BCD) 12th byte - Personal code (high - BCD) If bit 4 of the 1st byte is 1: 11th byte - Number of total error lines (Hex) 12th byte - Number of burst error lines (Hex) 13th byte - File number (low - Hex) 14th byte - File number (high - Hex) 15th and 16th bytes - Rx level or measure of error rate If bit 5 of the 1st byte is 0: 15th byte - Rx level (low - Hex) 16th byte - Rx level (high - Hex) If bit 4 of the 1st byte is 1: 15th byte - Measure of error rate (low - Hex) 16th byte - Measure of error rate (high - Hex)

SERVICE TABLES AND PROCEDURES SERVICE RAM ADDRESSES

17th byte - Final modem rate Bits 0 to 2: Final modem speed $\begin{bmatrix} Bit \ 0 \\ Bit \ 1 \\ Bit \ 2 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} : 2.4k \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} : 4.8k \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} : 7.2k \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} : 9.6k \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} : 12.0k \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} : 14.4k$ Bit 3: Not used Bits 4 to 6: Final modem type $\begin{bmatrix} Bit \ 4\\ Bit \ 5\\ Bit \ 6\\ \end{bmatrix} = \begin{pmatrix} 1\\ 0\\ 0 \end{bmatrix} : V.27ter \begin{pmatrix} 0\\ 1\\ 0\\ \end{bmatrix} : V.29 \begin{pmatrix} 1\\ 1\\ 0\\ \end{bmatrix} : V.33 \begin{pmatrix} 0\\ 0\\ 1\\ \end{bmatrix} : \frac{V.17}{(Long)} \begin{pmatrix} 1\\ 0\\ 1\\ \end{bmatrix} : \frac{V.17}{(Short)}$ Bit 7: Not used 18th to 20th byte - Not used 21st to 44th byte - Remote terminal's ID (RTI, TSI or CSI) (ASCII) 45th byte - Communication mode #1 Bits 0 - 1: Resolution used $\begin{bmatrix} Bit & 0\\ Bit & 1 \end{bmatrix} = \begin{pmatrix} 1\\ 0 \end{bmatrix}$: Standard $\begin{pmatrix} 0\\ 1 \end{pmatrix}$: Detail, $\begin{pmatrix} 1\\ 1 \end{pmatrix}$: Fine Bit 2: Communication Protocol 0: G3, 1: G4 Bit 3: ECM 0: Off, 1: On Bits 4 to 7: Communication mode used $\begin{bmatrix} Bit \, 4\\ Bit \, 5\\ Bit \, 6\\ Bit \, 7 \end{bmatrix} = \begin{pmatrix} 0\\ 0\\ 0\\ 0 \end{pmatrix} : Normal \begin{pmatrix} 1\\ 0\\ 0\\ 0 \end{pmatrix} : Confidential \begin{pmatrix} 0\\ 1\\ 0\\ 0 \end{pmatrix} : Polling \begin{pmatrix} 1\\ 1\\ 0\\ 0 \end{pmatrix} : Transfer$ $\begin{array}{c} Bit \, 4\\ Bit \, 5\\ Bit \, 6\\ Bit \, 7\\ \end{array} = \begin{pmatrix} 0\\ 1\\ 0\\ \end{array} : Forwarding \begin{pmatrix} 1\\ 0\\ 1\\ 0\\ \end{array} : Automatic \\ Service \ Call \begin{pmatrix} 1\\ 1\\ 1\\ 0\\ \end{array} : Transfer \begin{pmatrix} 0\\ 0\\ 0\\ DTMF_{/UUI} \end{pmatrix} : Fax \\ On \ Demand \end{array}$ 46th 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: Batch transmission 0: Not used, 1: Used Bit 3: Send later transmission 0: Not used, 1: Used Bit 4: Transmission from 0: ADF, 1: Memory Bit 5: Not used Bits 6 and 7: Network type used $\begin{bmatrix} Bit \ 6\\ Bit \ 7 \end{bmatrix} = \begin{bmatrix} 1\\ 0 \end{bmatrix}$: PSTN, $\begin{bmatrix} 0\\ 1 \end{bmatrix}$: ISDN

47th byte - Not used

48th byte - Number of errors duing communication (Hex)

SERVICE TABLES AND PROCEDURES SPECIAL TOOLS AND LUBRICANTS

49th to 52nd byte - 1st error code and page number where the error occurred

- 49th byte Page number where the error occurred (low Hex)
 - 50th byte Page number where the error occurred (high Hex)
 - 51th byte Error code (low BCD)
 - 52st byte Error code (high BCD)

53th to 56th byte - 2nd error code and page number where the error occurred 57th to 60th byte - 3rd error code and page number where the error occurred 61st to 64th byte - 4th error code and page number where the error occurred 65th to 68th byte - 5th error code and page number where the error occurred 69th to 72nd byte - 6th error code and page number where the error occurred 73rd to 76th byte - 7th error code and page number where the error occurred 77th to 80th byte - 8th error code and page number where the error occurred 81st to 84th byte - 9th error code and page number where the error occurred 85th to 88th byte - 10th error code and page number where the error occurred

70001E to 700025(H) - Hard disk information

If the data in these addresses do not match the following values after installing an optional hard disk, format the hard disk and check these addresses again.

70001E(H) - 50(H) 70001F(H) - 00(H) 700020(H) - FF(H) 700021(H) - FF(H) 700022(H) - 00(H) 700023(H) - 50(H) 700025(H) - 00(H) 700026(H) - 80(H)

4.6. SPECIAL TOOLS AND LUBRICANTS

- Flash/SRAM data copy harness (P/N: H5159100)
- Scan line adjustment chart (P/N: H5159300)
- 200 dpi test chart (P/N: H0829020)
- Test harness (P/N: H5159301)
- SBU adjustment knobs (P/N: H0129300)



SERVICE TABLES AND PROCEDURES PM TABLE

4.7. PM TABLE

Scanner

C: Clean, R: Replace

Item	30K	60K	90K	1 year	Notes
Exposure Glass	C (user)	C (user)	C (user)	C (user)	Soft cloth and water
R1 and R2 Rollers	C (user)	C (user)	C (user)	C (user)	Soft cloth and water
White Shading Plate	C (user)	C (user)	C (user)	C (user)	Soft cloth and water
Mirrors		С		С	
ADF Roller Assy	R (user)	R (user)	R (user)	C (user)	Soft cloth and water
Separation Pad	R (user)	R (user)	R (user)	C (user)	Soft cloth and water

Printer

III

ltem	30K	60K	90K	1 year	Notes
Paper Feed Roller				C (user)	Soft cloth and water
Registration Roller		C (user)		C (user)	Soft cloth and water
Thermistor		R			
Hot Roller Strippers		R			
Hot Roller		R			
Pressure Roller (Fusing)		R			
Cleaning Pad	R (user)			A cleaning pad is	
	Replaced when a new CTM is installed.			enclosed in the CTM.	
Transfer Roller		R		C (user)	Dry paper
Development Unit		R			

100 Sheet Cassette (Optional)

Item	10K	30K	60K	1 year	Notes
Feed Roller				C (user)	Soft cloth and water

Paper Feed Unit (Optional)

Item	10K	30K	60K	1 year	Notes
Relay Roller	C (user)	C (user)	C (user)	C (user)	Soft cloth and water
Feed Roller				C (user)	Soft cloth and water

5. REPLACEMENT AND ADJUSTMENT

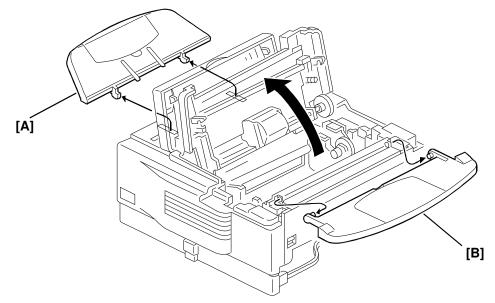
The machine contains a laser beam generator. Laser beams can cause permanent eye damage. Do not open the laser unit or look along the laser beam path while the main power is on.

Before starting disassembly, be sure to print all message files in the SAF memory. Then, turn off the main switch and disconnect the power cord for safety.

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

5.1. COVERS

5.1.1. Document Table and Tray

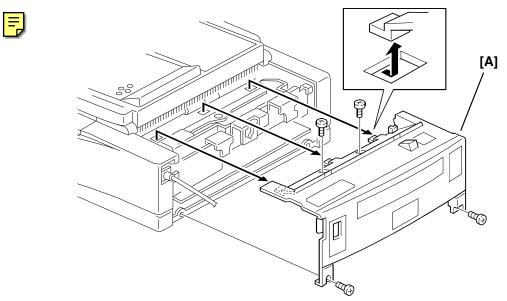


H515R601.wmf

A: Document Table B: Document Tray

REPLACEMENT AND ADJUSTMENT COVERS

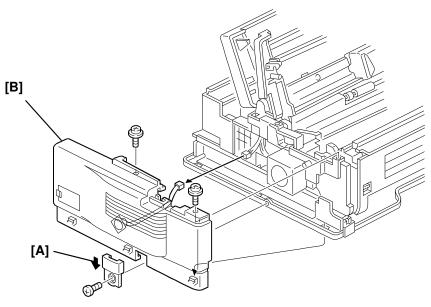
5.1.2. Rear Cover Assembly



H515R008.wmf

A: Rear Cover (4 screws, 3 hooks)

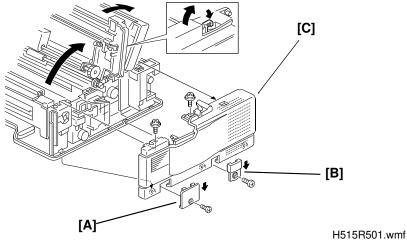
5.1.3. Left Cover



H515R603.wmf

A: Cover (1 screw) B: Left Cover (2 screws, 3 hooks, 1 connector)

5.1.4. Right Cover



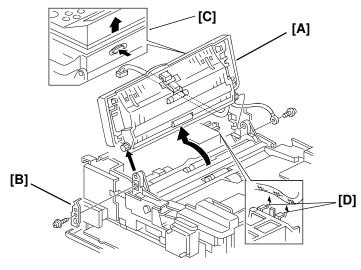
A: Small Cover A (1 screw) B: Small Cover B (1 screw) C: Right Cover (2 screws, 3 hooks)

5.1.5. Operation Panel Assembly

First, remove the operation panel from the assembly by pushing the operation panel release button [C], then remove the assembly.

Note:

- It is not necessary to remove the connectors.
- During reassembly, ensure the harness is replaced in the hooks [D] as shown.

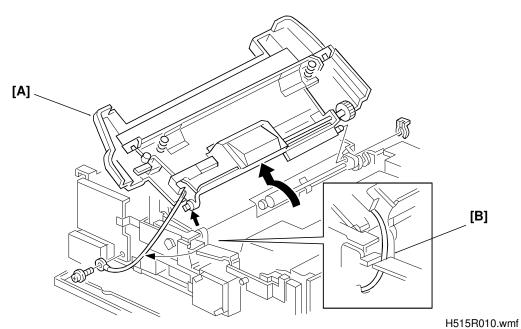


H515R009.wmf

A: Operation Panel Assembly (1 screw with grounding wire, 1 connector) B: Bracket (1 tapping screw)

5.1.6. Top Cover

Note for reassembly: Thread the ground wire through the recess [B], as shown.



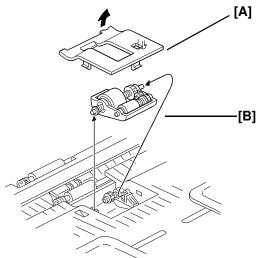
A: Top Cover (1 tapping screw with grounding wire, 1 white clip)

5-4

December 21st, 1995

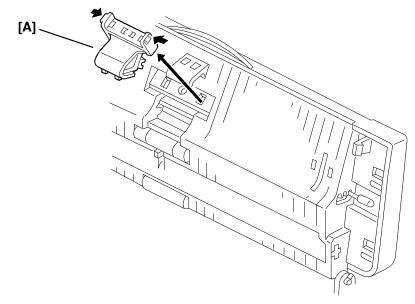
5.2. ADF

5.2.1. ADF Roller Assembly



A: ADF Roller Cover B: ADF Roller Assembly

5.2.2. Separation Rubber Plate



A: Separation Rubber Plate

H515R610.wmf

H515R609.wmf

REPLACEMENT AND ADJUSTMENT ADF

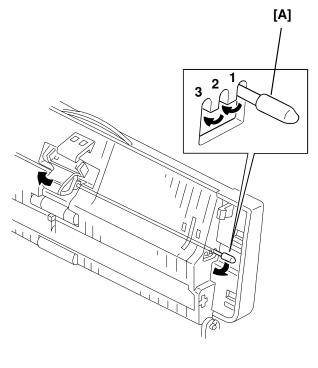
5.2.3. Separation Pressure Adjustment

To suit the paper type that the user will be scanning, adjust the position of lever [A] as shown in the following table.

Paper Thickness	Pressure	Position
Thin	Low	1
Normal	Normal	2
Thick	High	3

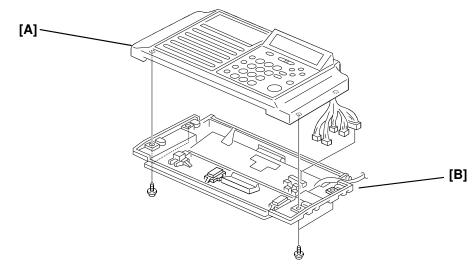
To correct document feed problems, adjust the position of lever [A] as shown in the following table.

Problem	Position
Multi-feed - Thin pages	1
Multi-feed - Thick pages	3
Jam	1
Non-feed	3

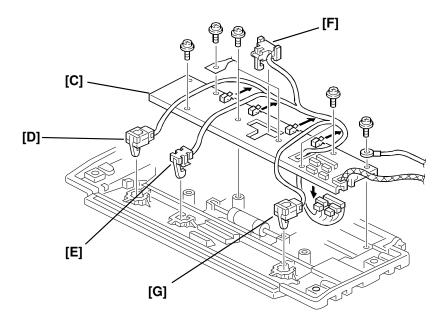


H515R611.wmf A: Separation Pressure Adjustment Lever

5.2.4. ADF Sensors



A: Operation Panel (4 tapping screws, 5 connectors) B: ADF Upper Unit H515R504.wmf

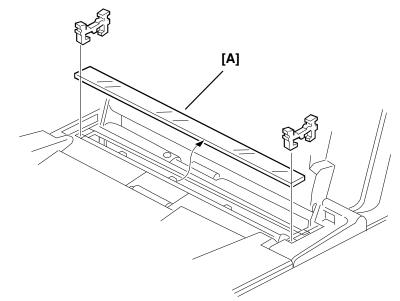


H515R508.wmf

- C: Bracket (7 tapping screws, 1 grounding wire) D: Document Width Sensor (B4)
- **E: Document Sensor**
- F: Scan Line Sensor
- G: Document Width Sensor (A3)

5.3. SCANNER

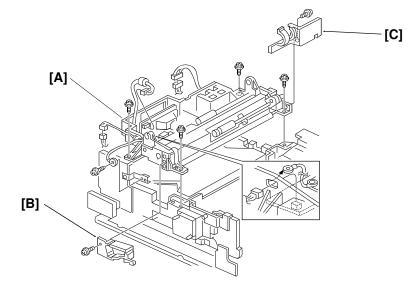
5.3.1. Exposure Glass



H515R003.wmf

A: Exposure Glass (2 white clips)

5.3.2. R1/R2 Rollers



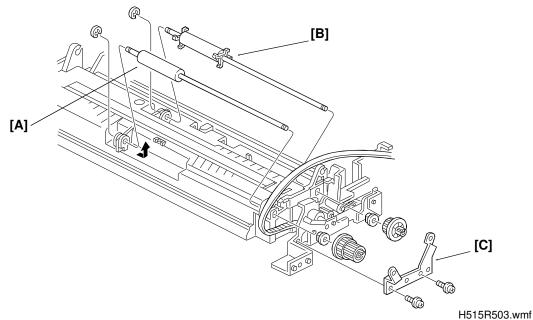
H515R016.wmf

Remove the scanner lower unit first.

A: Scanner Lower Unit (5 screws, 1 grounding wire, 3 connectors)

B: Scanner Side Cover A (1 screw)

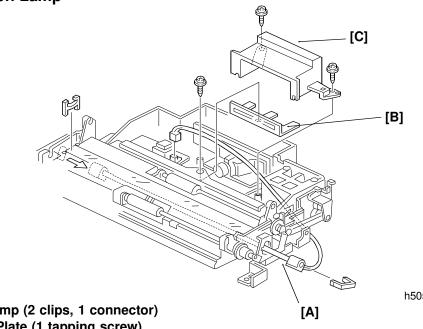
C: Scanner Side Cover B (1 screw)



A: R1 Roller (1 E-ring) B: R2 Roller (1 E-ring) C: Plate (2 screws)

Note: If the rollers are removed, the gears and the belt will come off easily.

5.3.3. Xenon Lamp

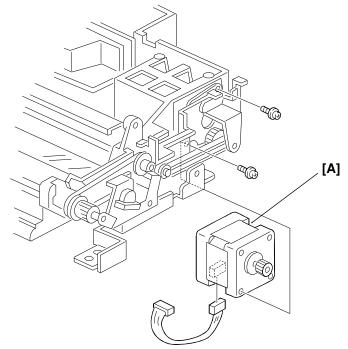


h505r506.wmf

Benlacemen

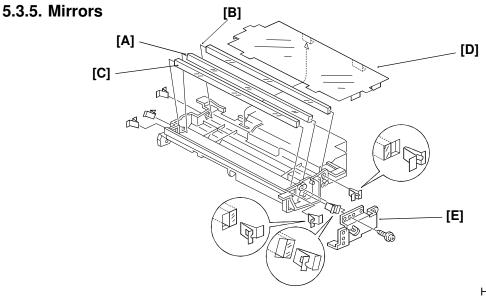
- A: Xenon Lamp (2 clips, 1 connector)
- B: Shading Plate (1 tapping screw)
- C: Lens Cover (2 screws)

5.3.4. Tx Motor



H515R505.wmf

First, remove the scanner lower unit (refer to section 5.3.2), then remove the motor. A: Tx Motor (2 screws, 1 connector)

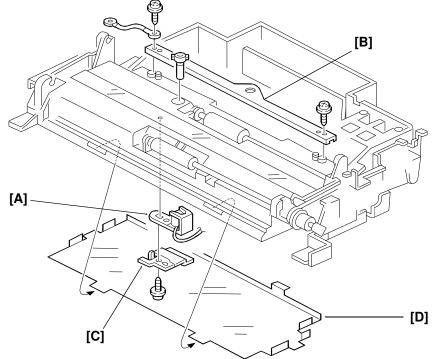


H515R017.wmf

First, remove the scanner lower unit (refer to section 5.3.2), then turn it over.A: 1st Mirror (2 clips)B: 2nd Mirror (2 clips)C: 3rd Mirror (2 clips)D: Lower Scanner Unit Cover

E: Bracket (1 tapping screw)

5.3.6. Stamper



H515R018.wmf

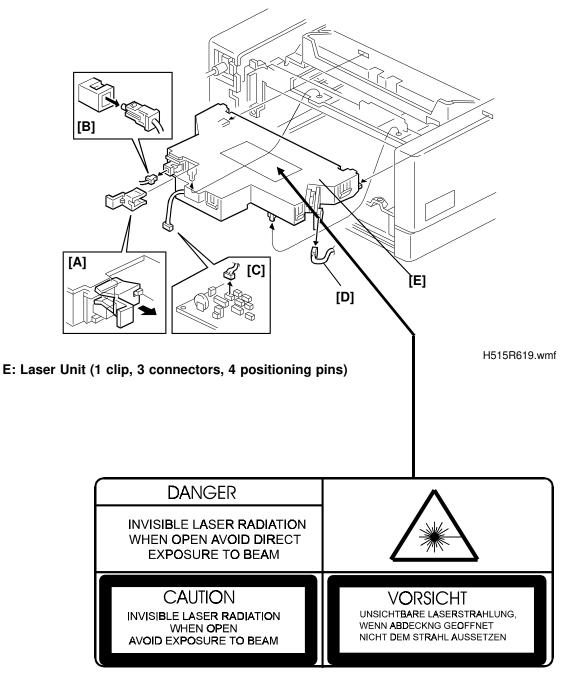
- First, remove the scanner lower unit (refer to section 5.3.2). A: Stamper
- B: Bracket A (2 tapping screws with grounding wire)
- C: Bracket B (1 tapping screw)
- **D: Lower Scanner Unit Cover**

REPLACEMENT AND ADJUSTMENT LASER PRINTING COMPONENTS

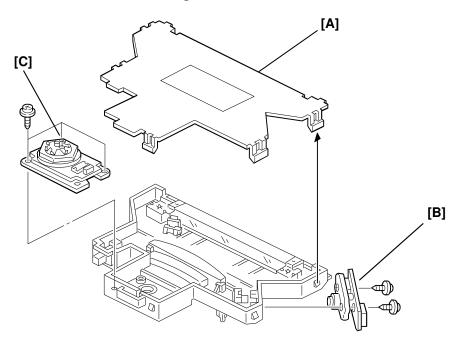
5.4. LASER PRINTING COMPONENTS

5.4.1. Laser Unit

First, remove the clip [A] and disconnect harnesses [B], [C], and [D], then remove the Laser Unit [E].



5.4.2. Laser Diode Unit and Hexagonal Mirror Motor



A: Laser Unit Cover

B: Laser Diode (LD) Unit (2 tapping screws)

C: Hexagonal Mirror Motor (3 tapping screws)

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.

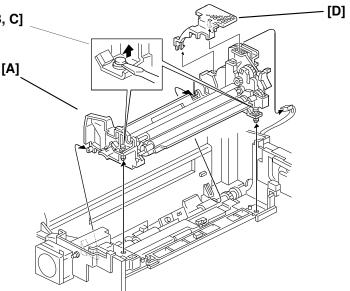
H515R620.wmf

5.5. DEVELOPMENT

5.5.1. Development Unit



[B, C]

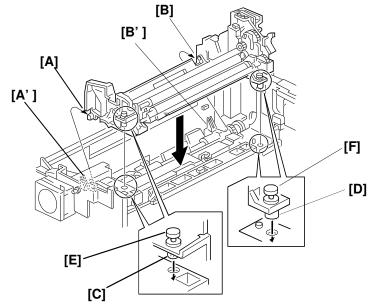


H515R621.wmf

Release the clips [B] and [C] and remove the main motor cover [D], then remove the development unit [A].

A: Development Unit (2 clips, 1 connector)

Note for reassembly

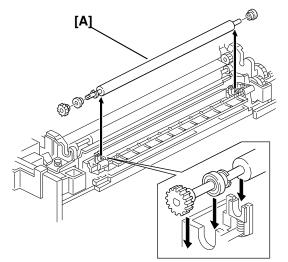


H515R655.wmf

1. Place the pins [A] and [B] under the hooks [A'] and [B'].

2. Insert the pins [C] and [D] into the openings in the base, then push [E] and [F] down to lock the development unit onto the base.

5.5.2. Transfer Roller

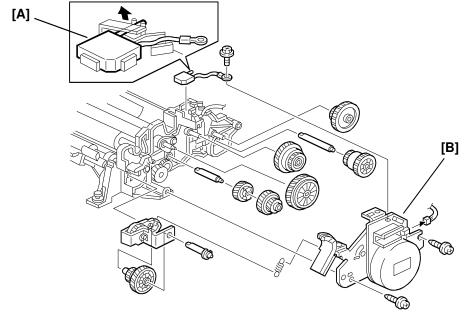


H515R622.wmf

A: Transfer Roller (1 gear, 2 spacers)

5.5.3. Main Motor and Gears

First, remove the zener diode [A], then remove the main motor assembly [B]. **Note:** Once the main motor assembly is removed, the gears and the shafts will come off the unit easily.



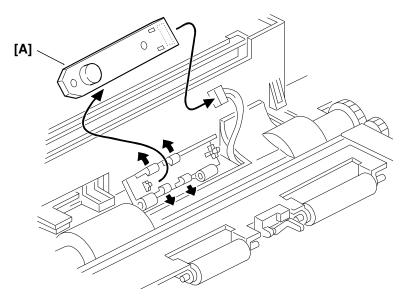
H515R623.wmf

A: Zener Diode (1 screw)

B: Main Motor Assembly (2 tapping screws, 1 connector, 1 spring)

REPLACEMENT AND ADJUSTMENT DEVELOPMENT

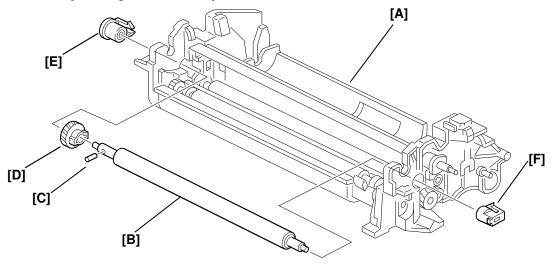
5.5.4. Toner End Sensor



A: Toner End Sensor (1 connector)

H515R507.wmf

5.5.5. Replacing the Development Unit



H515R646.wmf

- A: Development Unit
- **B: Development Roller (Rubber)**
- C: Pin
- **D: Development Roller Gear**
- E, F: Bushings

After every 60,000 prints, the following parts have to be replaced.

- Development unit [A]
- Development roller [B] (A development roller comes with the parts [C] through [F]. Check for the assembly part number of [B] through [F] in the parts catalog.)
- Transfer roller (refer to section 5.5.2)
- Zener diode (refer to section 5.5.3)

The transfer roller unit, main motor and gears, development roller [B], and the parts labelled [C] to [F] in the above illustration are not included with a new development unit [A].

To install a new development unit, do the following:

- 1. Install a new development roller as shown in the above illustration.
- 2. Install a new transfer roller, a new zener diode, a main motor, and gears as described in sections 5.5.2 and 5.5.3.

Continued on the next page

REPLACEMENT AND ADJUSTMENT DEVELOPMENT

3. Check the electrical resistance of the following.

Charge bias terminals/Zener diode

H515R656.wmf

- A: Bias terminal to the CTM
- B: Bias terminal from the power pack
- C, D: Zener diode terminals

Criteria

A - Β: 0 Ω

C - D: The resistance varies depending on the voltage applied between the terminals.

Toner application roller bias terminals

H515R657.wmf

- A: Bias terminal from the power pack
- **B:** Toner application roller shaft
- C: Toner metering blade
- D: Bias brush

Criteria

A - B: Less than 1 k Ω A - C: Less than 1 k Ω

A - D: Less than 1 k Ω

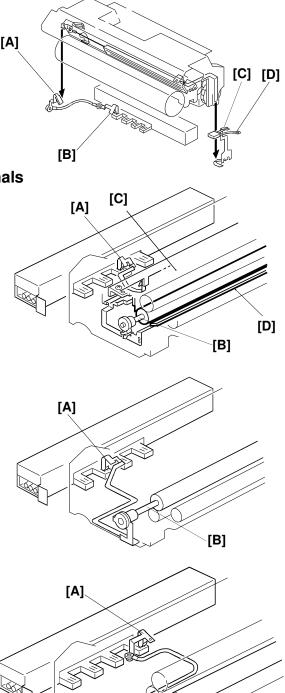
Development roller bias terminals

H515R658.wmf A: Bias terminal from the power pack

B: Development roller shaft

Criteria

A - B: Less than 1 k Ω



[B]

Transfer roller bias terminals

H515R659.wmf

A: Bias terminal from the power pack B: Transfer roller shaft

Criteria A - B: Less than 10 k Ω

Note:

Check the resistance while pushing the roller shaft down onto the roller holder.

Continued on the next page

- 4. Install the new development unit into the machine.
- 5. Install the drum and CTM, and check that the following points are connected to the frame ground.
 - Drum shaft
 - Main motor bracket
 - · Antistatic brush on the transfer roller unit

Initial Toner Supply

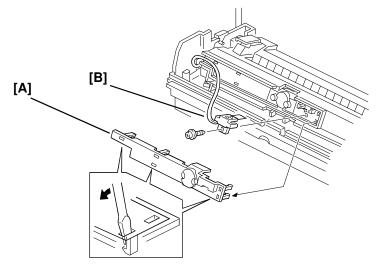
After installing a new development unit, do the following:

- 1. Set bit 3 of RAM address 4805C8 to 1.
- 2. Turn off the machine and wait for 10 s.
- 3. Turn on the machine.
- 4. The machine will supply new toner to the development unit.

Bit 3 automatically resets to zero at the end of the procedure, which takes about 90 s.

5.6. FUSING

5.6.1. Thermistor



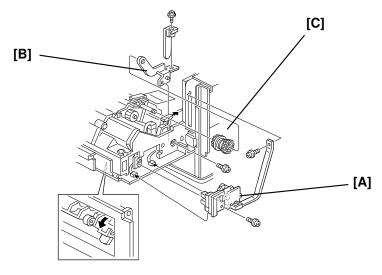
H515R624.wmf

A: Thermistor Cover (6 hooks) B: Thermistor (1 tapping screw, 1 connector)

5.6.2. Fusing Unit

Preparation - Right hand side

First, open the fusing exit cover, then remove the sensor assembly [A], bracket [B], and gear [C].

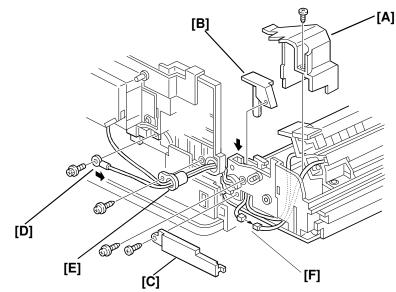


H515R625.wmf

A: Feed-out Sensor/Exit Cover Switch Assembly (2 tapping screws, 2 connectors) B: Bracket (1 screw)

Preparation - Left hand side

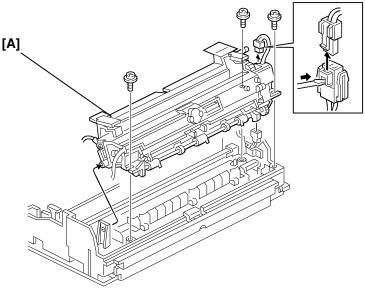
Note: Put back the bracket [D] after removing the ground wire [A].



A: Fusing Left Cover (1 tapping screw)

- B: Harness Cover A (1 tapping screw)
- C: Harness Cover B (1 tapping screw)
- D: Ground Wire (1 screw)
- E: Fusing Unit Fulcrum (1 tapping screw)
- F: Thermistor Harness

Fusing Unit Removal

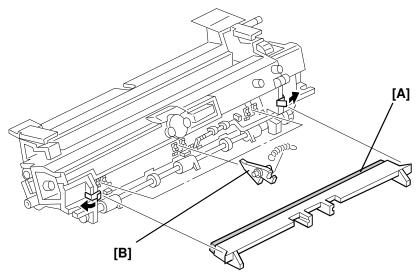


A: Fusing Unit (3 screws, 1 connector)

H515R626.wmf

REPLACEMENT AND ADJUSTMENT FUSING

5.6.3. Hot Roller Strippers



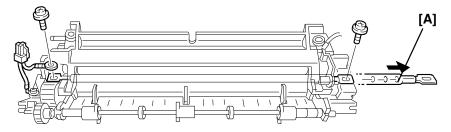
H515R628.wmf

A: Cleaning Felt B: Hot Roller Strippers (1 spring each)

Remove the cleaning felt if it is still in the unit, then remove the strippers.

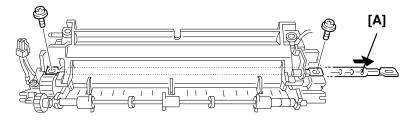
▲ CAUTION Be careful not to lose the springs.

5.6.4. Fusing Lamp



115V Models

A: Fusing Lamp (2 screws)



H515R652.wmf

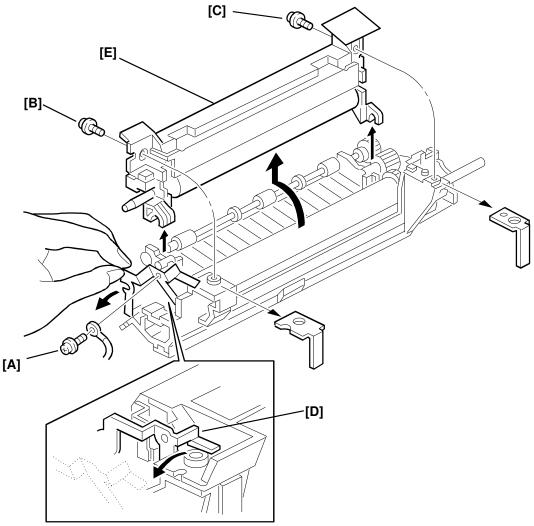
H515R629.wmf

220V Models

A: Fusing Lamp (2 screws)

▲CAUTION Be careful not to touch the glass surface.

5.6.5. Hot Roller



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H515R630.wmf

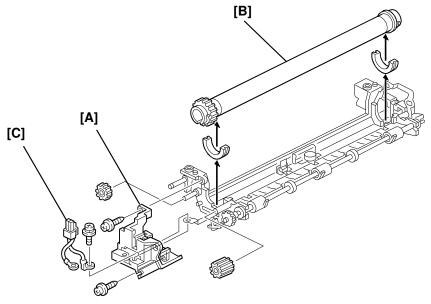
First, remove the tapping screw [A], then remove the tapping screws [B] and [C]. The fusing upper and lower units come apart after the ground plate [D] is released from the upper unit [E].

CAUTIONDo not bend the ground plate too much.

Continued on the next page

REPLACEMENT AND ADJUSTMENT FUSING

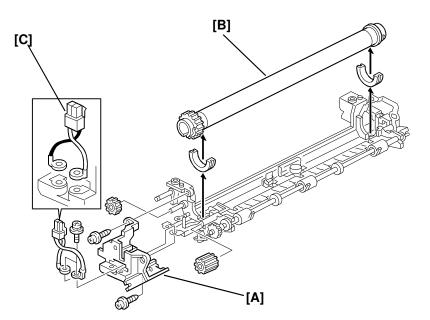
Remove the bracket [A], then remove the hot roller [B].



H515R631.wmf

115V Models A: Bracket (3 screws) B: Hot Roller

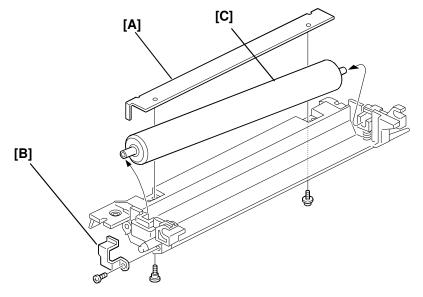
C: Fusing Lamp Connector (1 screw)



H515R653.wmf

220V Models A: Bracket (3 screws) B: Hot Roller

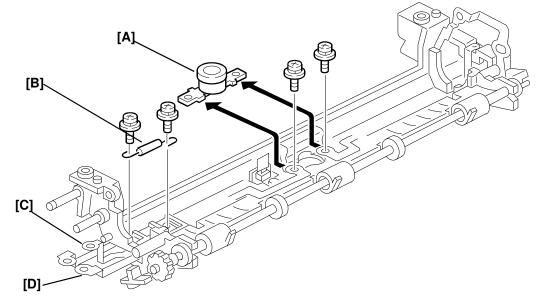
5.6.6. Pressure Roller



H515R632.wmf

- A: Bracket (2 screws)
- B: Bracket (1 tapping screw)
- C: Pressure Roller

5.6.7. Thermostat and Thermofuse



H515R654.wmf

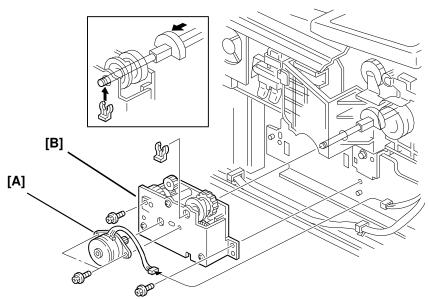
A: Thermostat (2 screws)

B: Thermofuse (2 screws) - 220V models only

C,D: Terminal Plates for the Thermofuse - 220V models only

5.7. PAPER FEED

5.7.1. Paper Feed Motor and Clutch Box

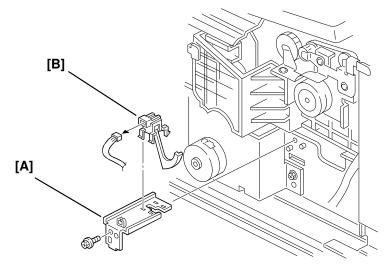


H515R634.wmf

A: Paper Feed Motor (2 screws) B: Paper Feed Clutch Box (1 clip, 2 screws)

5.7.2. Paper End Sensor

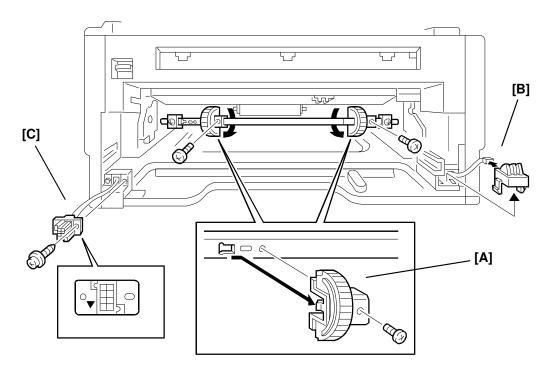
First, remove the bracket [A], then remove the sensor [B].



H515R635.wmf

A: Bracket (1 screw) B: Paper End Sensor

5.7.3. Paper Feed Rollers, Paper Size Sensor, By-pass Feed Sensor, and Relay Connector

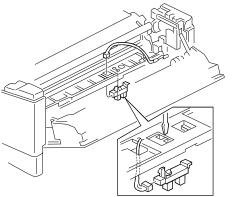


H515R636.wmf

- A: Feed rollers (1 screw each)
- B: Paper size sensor (2 hooks, 1 connector)
- C: Relay connector to the optional 100 sheet cassette (1 screw, 1 connector)

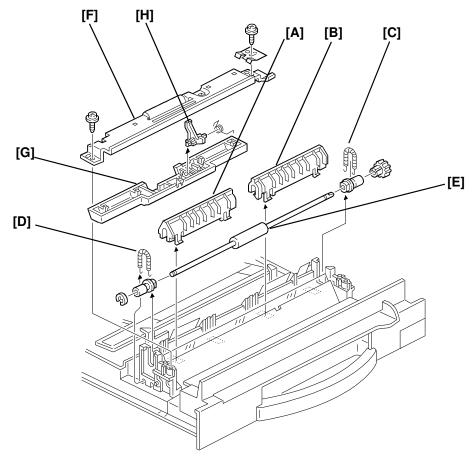
Paper feed rollers [A]: Turn the roller shaft as shown in the diagram, so that the screw heads can seen from the front. Then remove the rollers. The relay connector to the optional 100 sheet cassette [C] should be installed as shown in the diagram (the triangle mark has to be at the left hand side of the connector.

By-pass feed sensor: See below.



h515r022.wmf

5.7.4. Registration Roller and Bypass Feed Sensor Actuator



H515R637.wmf

A: Paper Guide A (4 hooks) B: Paper Guide B (4 hooks) C,D: Springs E: Registration Roller (1 E-ring, 1 gear) F: Bracket (2 tapping screws) G: Guide Plate (5 hooks) H: Bypass Feed Sensor Actuator

Registration Roller

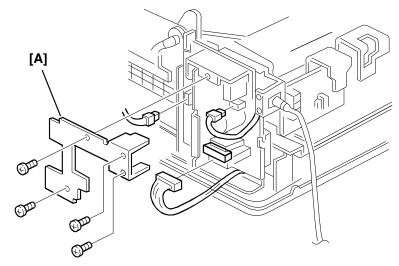
Remove the guides ([A], [B]) and springs ([C], [D]) first, then remove the roller [E].

Bypass Feed Sensor Actuator

Remove the bracket [F] and the guide plate [G], then remove the actuator [H].

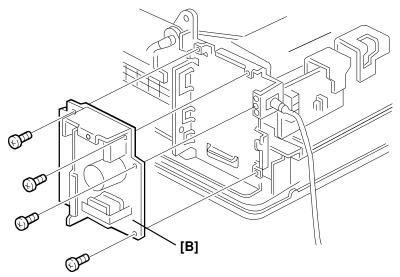
5.8. PCBs

5.8.1. PSU



A: Heat Sink (4 screws)

H515R026.wmf



Ren acement

B: PSU (4 screws, 2 connectors)

H515R027.wmf

H515R639.wmf

REPLACEMENT AND ADJUSTMENT PCBs

5.8.2. NCU, MFDU, and MFCE

A: NCU (3 screws) B: MFDU (2 screws) C: MFCE (2 screws) If the machine has a Function Upgrade Card or a Fax On Demand Card installed, the SRAM data in the defective MFCE has to be copied to the new MFCE. Otherwise, all the data stored in the card will be initialized the first time that the power is switched on after replacement. In such a case, do the following procedure.

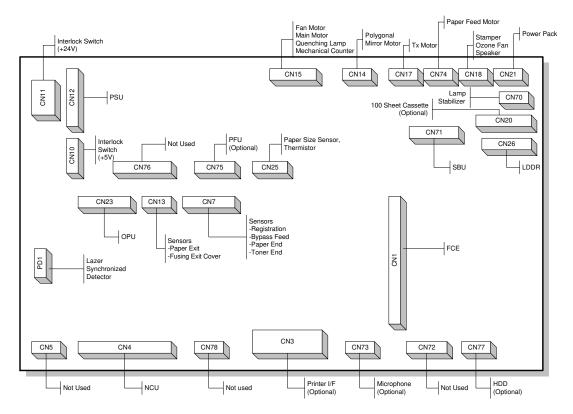
- 1. Make sure that System Switch 16 bit 0 is 1, and the battery switch of the card is ON, before removing the IC card from the MFCE. Then, turn off the machine.
- 2. Disconnect the optional IC cards.
- 3. Replace the old MFCE with the new MFCE (make sure that the battery switch in the new MFCE is on).

Do not turn on the machine at this point.

- 4. Connect the Flash/SRAM Copy Tool into the lower slot of the new MFCE, then connect the old MFCE to the Copy Tool (refer to section 4.1.22).
- 5. Turn on the machine.
- 6. Transfer the SRAM data from the old MFCE using service function 12 (refer to section 4.1.22).
- 7. After finishing the data transfer, turn off the machine and disconnect the tool.
- 8. Put back the optional IC card(s).
- 9. Turn on the machine and check if the IC cards can be used as before.

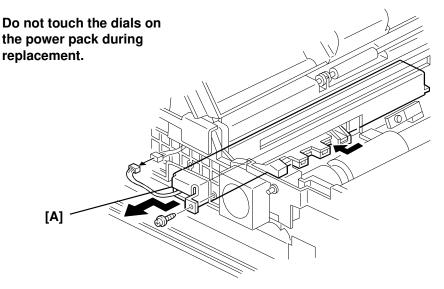
REPLACEMENT AND ADJUSTMENT PCBs

Harness Connections from the MFDU



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5.8.3. Power Pack

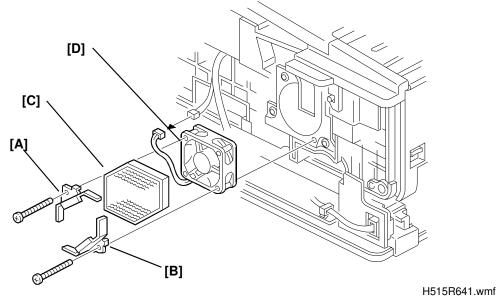


A: Power Pack (1 tapping screw, 1 connector)

H515R640.wmf

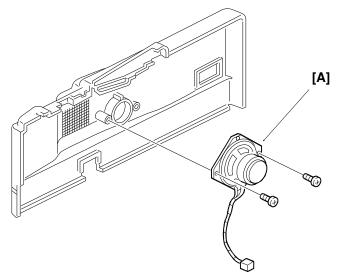
5.9. OTHERS

5.9.1. Ozone Filter and Fan Motor



A,B: Ozone Filter Holder (2 screws) C: Ozone Filter D: Fan Motor (1 connector)

5.9.2. Speaker

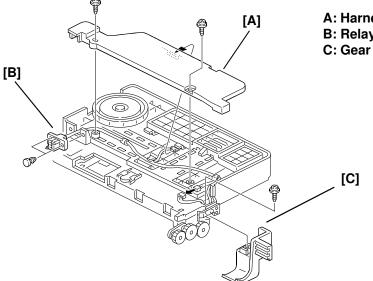


H515R050.wmf

A: Speaker (2 screws)

5.10. 100 SHEET PAPER CASSETTE (OPTIONAL)

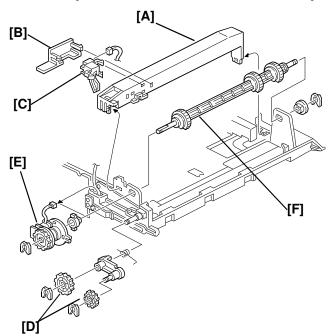
5.10.1. Relay Connector and Gear Cover



H515R642.wmf

- A: Harness Cover (2 screws)
- **B: Relay Connector (2 clips)**
- C: Gear Cover (1 screw)

5.10.2. Paper End Sensor and Drive Components



H515R643.wmf

- A: Sensor Stay (1 hook)
- B: Sensor Cover (2 hooks)
- C: Paper End Sensor (3 hooks)
- E: Paper Feed Clutch (1 clip)
- F: Feed Rollers (2 bushings, 1 clip)

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Paper End Sensor

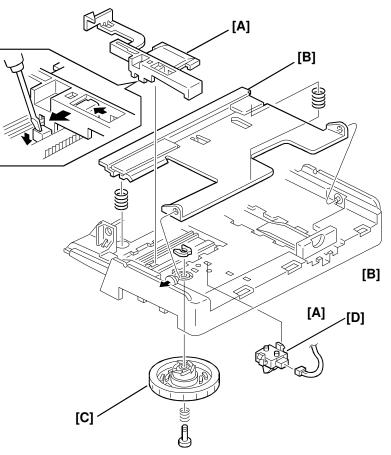
First, remove the stay [A] and the cover [B], then remove the sensor [C].

Paper Feed Clutch and Rollers

First, remove the gears [D], then remove the clutch [E] and rollers [F].

REPLACEMENT AND ADJUSTMENT 100 SHEET PAPER CASSETTE (OPTIONAL)

5.10.3. Paper Size Sensor



H515R644.wmf

A: Paper Guide

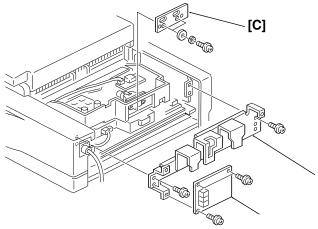
B: Bottom Plate (2 springs)

- C: Paper Size Dial (1 clip, 1 spring)
- D: Paper Size Sensor (2 hooks)

5.11. SBU ADJUSTMENT

5.11.1. Replacement

First, remove the rear cover, then remove the NCU [A], the rear bracket [B], and the SBU [C].



H515R509.wmf

A: NCU (3 screws) B: Rear Bracket (3 screws) C: SBU (2 screws)

Note: After SBU replacement, the following adjustment procedure must be done.

5.11.2. Tools Required

- Scan line adjustment chart: P/N H5159300
- 200 dot-per-inch test pattern: P/N H0829020
- Test lead: P/N H5159301
- SBU adjustment knobs: P/N H0129300

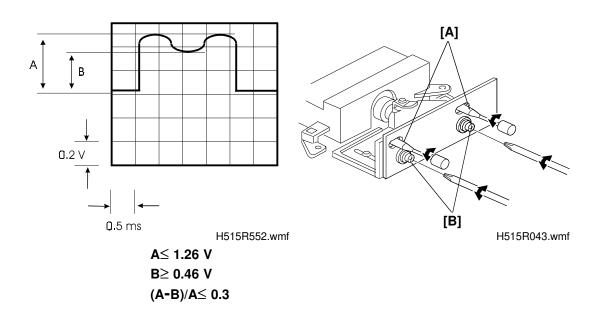
5.11.3. Preparation

- 1. Set the oscilloscope scale to 0.2 V/unit (vertical) and 0.5 ms/unit (horizontal).
- 2. Connect the test lead to CN 6 on the MFCE.
- 3. Connect the oscilloscope probe to pin 2 (blue wire) and the ground to pin 4 (black wire)
- 4. Clean the white pressure plate with a soft cloth and alcohol.
- 5. Light the xenon lamp (see section 4.1.15)

REPLACEMENT AND ADJUSTMENT SBU ADJUSTMENT

5.11.4. Adjustment

1. White Level



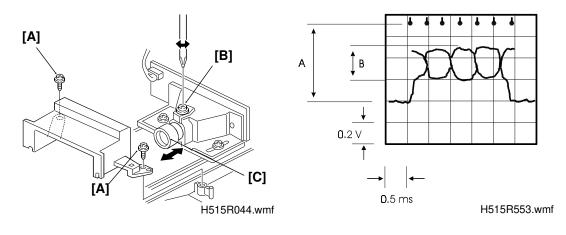
- Fit the adjustment knobs [A] through the SBU slots as shown.
- Loosen the SBU securing screws [B].
- Remove any test charts that are on the exposure glass.
- Ensure that the complete white level waveform can be seen on the oscilloscope.
- Adjust the waveforms so that A and B in the oscilloscope display meet the requirements.
- Carefully tighten the SBU securing screws.

The waveform may have irregular patches if the lens, mirror, exposure glass, white pressure plate, or CCD is dirty.

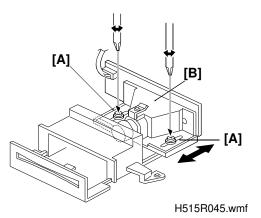
The xenon lamp may be wearing out if the waveform level is lower at the ends than in the middle.

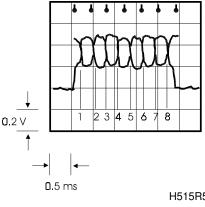
The CCD may be defective if the waveform has sharp peaks or dropouts.

2. Focusing (MTF)



- Place the 200 dpi test pattern on the exposure glass.
- Remove the lens cover [A] (2 screws).
- Loosen the lens securing screw [B].
- Focus the lens [C] so that B in the oscilloscope display is maximized (see the diagram on the upper right)
- Tighten the lens securing screw.
- 3. Reduction



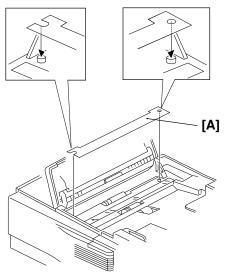


H515R554.wmf

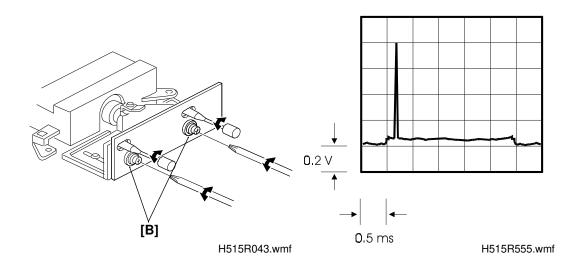
- Place the 200 dpi test pattern on the exposure glass.
- Loosen the lens block securing the screws [A].
- Focus the lens block [B] until the signal has 8 or fewer crosspoints (see the diagram on the right.
- Tighten the lens block securing screws.
 Note: Alternately tighten each screw a little at a time.

REPLACEMENT AND ADJUSTMENT SBU ADJUSTMENT

4. Scan Line

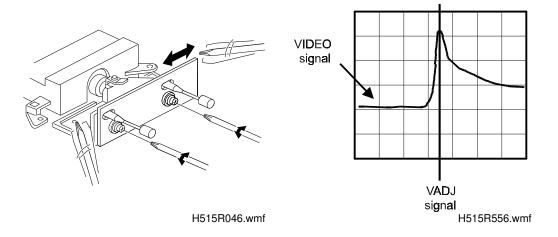


H515R047.wmf



- Place the scan line test chart [A] on the exposure glass as shown.
- Loosen the SBU securing screws [B].
- Adjust the waveform with the adjusting knobs until it appears as shown in the diagram on the right.

5. Scan Start Position



- Place the scan line test chart on the exposure glass as shown on the previous page.
- Connect the oscilloscope to the test leads as follows: Channel 1 to VIDEO (pin 2 - blue wire), channel 2 to VADJ (pin 1 - red wire), and connect the ground to pin 4 (black wire)
- Set the oscilloscope scales as follows: Vertical - CH 1: 0.2 V/unit, CH 2: 2 V/unit; Horizontal - 20 μs/unit.
- Adjust the waveform until it appears as shown in the right-hand diagram. Do this by gently tapping the SBU as shown in the left-hand diagram.

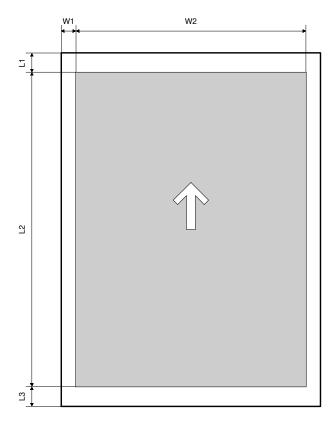
The peak of the VIDEO signal must be within 4 bits of the peak VADJ signal.

- Reset the oscilloscope to the original settings and repeat procedure 4 (Scan Line) on the previous page. It may be necessary to recheck procedures 4 and 5 until the scan line is perfectly positioned.
- Tighten the SBU securing screws.

5.12. IMAGE ADJUSTMENT

5.12.1. Overview

This section explains how to adjust various scanning and printing parameters. Among these are the margin parameters shown in the diagram below, which are named in accordance with the table below the diagram.



H515R650.wmf

Parameters	Description	Adjustable by			
Farameters		Fax - Tx	Fax - Rx	Copying	
W1	Left margin	Not adjustable	Printer	Printer	
W2	Print/Scan width	Not adjustable	Not adjustable	Not adjustable	
L1	Top margin	Scanner	Printer	Scanner/Printer	
L2	Print/Scan length	Not adjustable	Not adjustable	Not adjustable	
L3	Bottom margin	Scanner	Not adjustable	Scanner	

The factory settings may not be the same as the "Initial settings" described in the following procedures. RAM reset level 0 will reset all the scan and print margin parameters to the "Initial settings."

5.12.2. Scanner Parameters

1. Contrast

	Text Mode		Halftone Mode	
	Bit Switch	Initial Setting	Bit Switch	Initial Setting
Normal	Scanner 02	0E(H)	Scanner 05	09(H)
Lighten	Scanner 03	10(H)	Scanner 06	0D(H)
Darken	Scanner 04	0C(H)	Scanner 07	02(H)
Text Area	-	-	Scanner 08	08(H)

2. Margins

Parameter	Formula	RAM Address	Unit	Initial Setting
W1, W2	Not adjustable			
L1	H515R651.wmf	48061C(H)	<u>1</u> 15.4 <i>mm</i>	9A(H) [154(D)]
L2	Not adjustable (Original length - L1 - L3)			
L3	This parameter changes the number of tx motor steps after the scan line sensor is deactivated.	480620(H) (standard)		79(H) [121(D)]
	To increase the margin by x mm: New setting = Current setting - 15.4x To decrease the margin by x mm:	480622(H) (detail)	1 15.4 ^{mm}	
	New setting = Current setting + 15.4x Initial setting of L3: 2 mm	480624(H) (fine)		AF(H) [175(D)]

Replacement

REPLACEMENT AND ADJUSTMENT IMAGE ADJUSTMENT

5.12.3. Printer Parameters

1. Margins (Main Scan Direction)

Parameter	Formula	RAM Address	Unit	Initial Setting
W1	<image/>	Standard cassette: 4804F5(H) 1st paper feed unit: 4804F6(H) 2nd paper feed unit: 4804F7(H) 100 sheet cassette: 4804FA(H) Bypass feed: 4804FB(H)	0.5 mm	0A(H)
W2	Not adjustable			

REPLACEMENT AND ADJUSTMENT IMAGE ADJUSTMENT

Renlacement

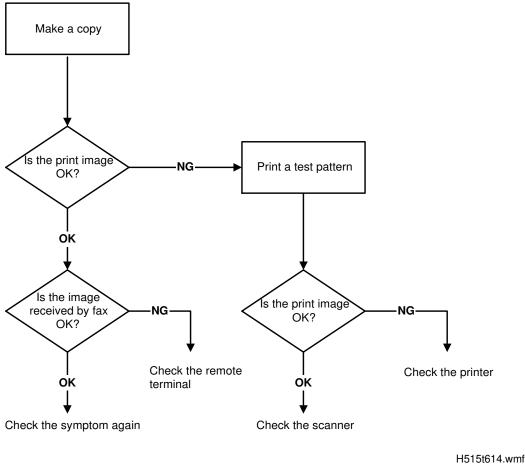
2. Margins (Sub Scan Direction)

Parameter	Formula	RAM Address	Unit	Initial Setting
	H515R651.wmf			
L1	Standard and 100 sheet cassette: To increase the margin by x mm: New setting = Current setting + x/0.68 Initial setting of L1: 2 mm Other: To increase the margin by x mm: New setting = Current setting + x/0.68 Initial setting of L1: 2 mm Subsetting = Current setting + x/0.68 Initial setting of L1: 2 mm Subsetting = Current setting + x/0.68 Initial setting of L1: 2 mm Subsetting = Current setting + x/0.68 Initial setting of L1: 2 mm Subsetting = Current setting + x/0.34 Indecrease the margin by x mm: New setting = Current setting + x/0.34 Indecrease the margin by x mm New setting = Current setting + x/0.34 Indecrease the margin by x mm New setting = Current setting + x/0.34	Standard cassette: 4804EA(H) 1st paper feed unit: 4804EB(H) 2nd paper feed unit: 4804EC(H) 100 sheet cassette: 4804EF(H) Bypass feeder: 4804F0(H)	0.68 mm 0.34 mm 0.34 mm 0.68 mm 0.34 mm	00(H) 0D(H) 0D(H) 05(H) 00(H)
10	Initial setting of L1: 2 mm			
L2	Not adjustable This is only adjustable in bypass feed mode.			
L3	To increase the margin by x mm: New setting = Current setting - x/0.34 To decrease the margin by x mm: New setting = Current setting + x/0.34	480586(H)	0.34 mm	4A(H)
	Example: To increase the margin by 5 mm. $5/0.34 \approx 14.7 \approx 15(D) = F(H)$ New setting = 3B - F = 2C(H)			

6. TROUBLESHOOTING

6.1. 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.



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

6.1.1. Blank Copies

Possible Cause (Printer):

- Poor drum sensitivity.
- Laser optic components are out of position.
- 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.

Action:

- 1. Print a test pattern, and open the cover in the middle of printing.
- 2. Check if there is toner adhered to the drum surface.
 - If there is, do the following. If not, go to step 3.
 - Check if the transfer roller is installed correctly or not.
 - Check if the development unit is installed correctly or not.
 - Check if the resistance between the transfer bias terminal on the development unit and the transfer roller shaft is less than 10 kOhm or not, while pushing the roller shaft down to the roller holder.
 - If the resistance is OK, check the connections behind the power pack and the power pack itself.
- 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 if all the laser optic components are properly positioned.
 - Try replacing the drum.
- 4. Check if the toner cartridge is empty or not. If it is, do the following. If not, go to step 5.
 - Check or replace the toner end sensor.

5. Do the following.

- Check that the development unit is correctly installed or not.
- Check if the resistance between the development roller bias terminal on the development unit and the development roller shaft, the toner metering plate, and the bias brush are less than 1 kOhm or not.
- Check if the resistance between the toner application roller bias terminal on the development unit and the toner application roller shaft is less than 1 kOhm or not.
- If all the resistances are OK, check the connections behind the power pack and the power pack itself.

6.1.2. Black Copies *

Possible Cause (Scanner)

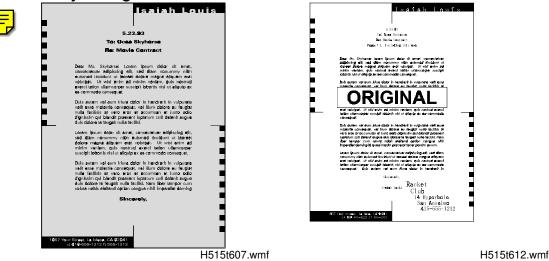
- The scanner lamp, lamp stabilizer, or SBU is not connected or defective. Action:
 - 1. Check if the scanner lamp is connected properly.
 - 2. Check if the scanner lamp or lamp stabilizer is not defective. If one or both of them is (are) found defective, replace it (them).
 - 3. Check if the SBU is connected properly, or it is not defective.

Possible Cause (Printer)

• The charge is not properly applied.

- 1. Check if all the charge bias terminals on the development unit and the CTM, and the charge wire are properly connected or not.
 - If they are, go to step 2.
 - If not, fix the connections.
- 2. Check if the zener diode is not shorted.
 - If the zener diode is shorted, replace the zener diode.
 - If not, go to step 3.
- 3. Check the connections behind the power pack.

6.1.3. Dirty Background



Possible Cause (Scanner)

• Scanner shading correction error or wrong threshold.

Action:

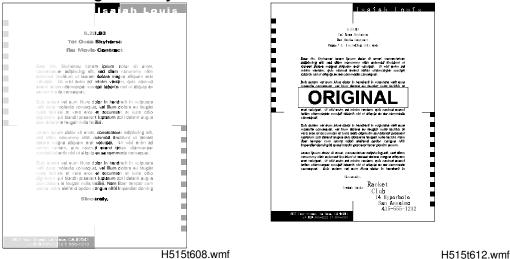
- 1. Clean the shading plate.
- 2. Adjust the scanner contrast threshold settings.

Possible Cause (Printer)

- Poor drum sensitivity.
- The charge is not properly applied.
- The hot roller is dirty.

- 1. Try replacing the drum.
- 2. Check if the hot roller surface is dirty or not.
 - If it is, clean the roller or replace the cleaning pad.
 - If not, go to step 3.
- 3. Check if all the charge bias terminals on the development unit and the CTM, and the charge wire are properly connected or not.
 - If they are, check or replace the power pack.
 - If not, fix the connections.

6.1.4. Uneven Image Density *



Possible Cause (Scanner)

- Dirty exposure glass or mirrors
- SBU position is not aligned to the scan line properly.

Action

- Clean the scanner exposure glass or mirrors.
- Adjust the SBU position (refer to section 5.11 for details).

Possible Cause (Printer)

- Poor drum sensitivity.
- Dirty laser optic components.
- The toner metering blade is deformed, or incorrectly positioned.
- Uneven toner supply in the development toner hopper.
- Quenching lamp defect.

Action:

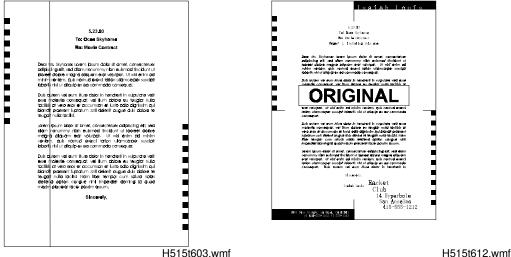
- 1. Print a solid black test pattern, and open the cover in the middle of printing.
- 2. Check if the toner is evenly distributed on the development roller.
 - If it is not, check the toner metering blade, and the toner supply mechanism in the toner hopper. If it is, go to step 3.
 - If the image is lighter in the center of the image, toner may be low. Replace the CTM and supply more toner.

3. Check if the toner is evenly distributed on the drum.

- If it is not, check the drum sensitivity, the laser optic components, and the quenching lamp on the CTM.
- If it is, check if there is any dirt on the transfer roller surface.

TROUBLESHOOTING COPY QUALITY TROUBLESHOOTING

6.1.5. Vertical Black Lines *



Possible Cause (Scanner)

- Dirt or dust on the exposure glass or mirrors.
- Defective CCD element(s) on the SBU.
- Dirty shading plate.

Action:

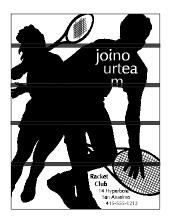
- 1. Clean the exposure glass, the mirrors, or the shading plate.
- 2. Replace the SBU.

Possible Cause (Printer)

- Damaged cleaning blade.
- Dirty hot roller stripper(s).

- 1. Replace the CTM.
- 2. Clean the hot roller strippers.

6.1.6. Horizontal Black Lines





H515t610.wmf

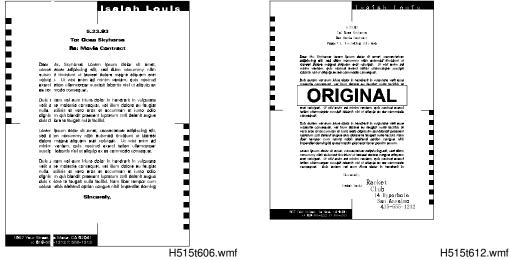
Possible Cause (Printer)

- The drum surface is scratched or damaged.
- Charge corona leak failure.

- 1. Check that the surface of the drum is not damaged.
 - Change the drum if it is damaged.
- 2. If the problem still remains, do the following.
 - Clean the charge wire.
 - Change the CTM.

TROUBLESHOOTING COPY QUALITY TROUBLESHOOTING

6.1.7. Vertical White Lines

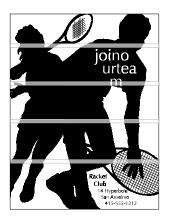


Possible Cause (Printer)

- The laser optic components are dirty.
- The hot roller stripper scrapes off toner from the print paper.

- Clean the laser optic components.
- Check the hot roller stripper mechanism. Clean the strippers and replace them if they are damaged.

6.1.8. Horizontal White Lines





H515t609.wmf

H515t611.wmf

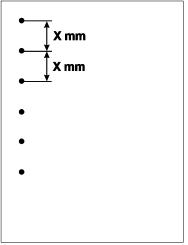
Possible Cause (Printer)

- The surface of the development roller is damaged or deformed.
- The development bias is not stable.
- Transfer current is not stable.

- 1. Print a test pattern, and open the cover in the middle of printing.
- 2. Check if horizontal white lines (where toner is not adhered) appear on the drum surface or not.
 - If they do, go to step 3.
 - If not, check the transfer roller surface and the transfer bias terminals connections. If they are OK, check or replace the power pack.
- Check if horizontal white lines (where toner is not adhered) appear on the development roller surface or not.
 - If they do, check if the development roller surface is not deformed. If it is OK, check or replace the power pack.
 - If not, check for damage on the drum surface.

TROUBLESHOOTING COPY QUALITY TROUBLESHOOTING

6.1.9. Black Dots/Spots *



H515t602.wmf

Possible Cause (Scanner)

• Dust on the exposure glass.

Action:

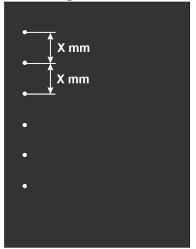
- Clean the exposure glass.
- Try disabling MTF.

Possible Cause (Printer)

- The drum surface is damaged (the interval X = approx. 94.2 mm).
- Toner on the hot roller (the interval X = approx. 63 mm).

- Replace the drum.
- Clean the hot roller surface.

6.1.10. White Spots in Black Image Areas



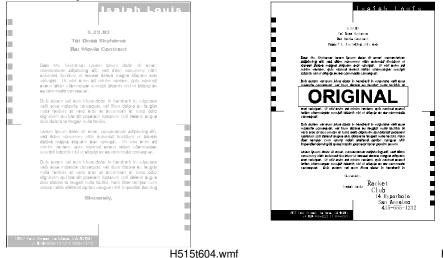
H515t601.wmf

Possible Cause (Printer)

- The drum surface is damaged (this is likely if the dots appear at 94.2 mm intervals).
- The development roller surface is damaged (this is likely if the dots appear at 62.8 mm intervals).
- The toner application roller surface is damaged (this is likely if the dots appear at about 16.75 mm intervals).

- Replace the drum.
- Clean the surface of the development roller and change the roller if it is damaged.
- Change the development unit.

6.1.11. Faint Copies *



Possible Causes (Scanner)

- Dirty shading plate and/or exposure glass
- Incorrect scan threshold setting
- Defective scanner lamp or SBU

Action:

- Clean shading plate.
- Adjust the scan threshold settings.
- Replace the scanner lamp or the SBU.

Possible Causes (Printer)

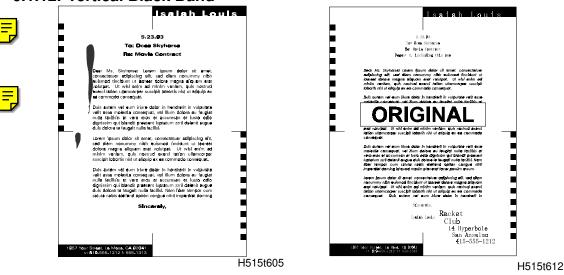
- Poor drum sensitivity.
- Dirty laser optic components.
- Incorrect development/ transfer bias
- Defective quenching lamp
- Low toner
- · Low fusing temperature

H515t612.wmf

- 1. Check whether the toner saving feature has not been selected with the user parameters. (If it has been selected, there is no problem.)
- 2. Print a test pattern, and open the cover in the middle of printing.
- 3. Check if the toner on the paper at the entrance of the fusing unit looks faint or not.
 - If it does, check or replace the fusing lamp, thermistor, and PSU.
 - If it does not, go to step 4.
- 4. Check if the toner on the drum looks faint or not.
 - If it does, go to step 5.
 - If it does not, check the contacts between the transfer bias terminals and power pack.
- 5. Check if the toner on the development roller looks faint or not.
 - If it does, check all the contacts between the development and toner application rollers' bias terminals.
 - If it does not, try replacing the CTM and drum.

TROUBLESHOOTING COPY QUALITY TROUBLESHOOTING

6.1.12. Vertical Black Band



Possible Cause (Printer)

- Dirty charge corona wire.
- The toner metering blade is deformed, damaged, or incorrectly positioned.

- Clean the charge corona wire. The wire cleaner is on the CTM.
- Replace the CTM.
- Check the toner metering blade and replace if it is damaged.

TROUBLESHOOTING COPY QUALITY TROUBLESHOOTING

6.1.13. 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 if the correct type of paper and toner are being used.

- If it is, go to step 2.
- If not, use recommended types of paper and toner.
- 2. Try replacing the fusing lamp and the roller.

6.1.14. Ghost Image

Possible Cause (Printer)

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

- Clean the cleaning blade.
- Replace the CTM.
- Clean the hot roller surface and/or replace the cleaning pad.
- Replace the drum.

6.1.15. Toner on the Back of the Printer Paper

Possible Cause (Printer)

- Dirty transfer roller
- Dirty fusing pressure roller

- 1. Check if the transfer roller is dirty with toner or not.
 - If it is, clean the roller surface.
 - 1) Take the roller off the machine.
 - 2) Gently tap the roller shaft to remove the toner.
 - 3) Turn the roller against a clean sheet of paper to let the toner transfer onto the paper.
 - If not, go to step 2.
- 2. Check if the fusing pressure roller is dirty with toner or not.
 - If it is, clean the fusing pressure roller.
 - If not, check for any other dirty rollers and clean them.

6.1.16. Misaligned Output (Data shifted to the right or left)

Possible Cause (Scanner)

• Incorrect setting of the document guide.

Action:

• Align each side of the document to the document guides.

Possible Cause (Printer)

- The laser optics are misaligned.
- Improper print margin setting (main scan direction).

Action:

- Adjust the main scan print margin. (Refer to Section 5-12.)
- Check that the laser optics are aligned correctly.

6.1.17. Misaligned Output (Image shifted vertically)/Reduced Image

Possible Cause:

- Improper print margin (sub scan direction).
- Dirty registration roller.

- Adjust the sub scan print margin. (Refer to Section 5-12.)
- Clean the registration roller.

6.2. MECHANICAL PROBLEMS

6.2.1. ADF/Scanner

1. Non Feed *

Possible Cause:

- An incorrect type or size of document is used.
 - The operation panel is not properly closed.
 - The pick-up and feed rollers are dirty or worn out.
 - The mechanical clutch mechanism for document pick-up is defective.
 - Incorrect positioning of the separation pad, or the pad is missing.
 - Inappropriate separation pressure setting.
 - The Tx motor is defective.

Action:

1. Check that a correct type of document is being used.

2. Check that the operation panel is securely closed.

3. If the problem still remains, do the following.

- Clean the pick-up and feed rollers with a soft cloth and water, and replace them if they are damaged.
- Check the spring mechanism of the pick-up roller and replace it if it is damaged.
- Adjust the separation pressure to the appropriate setting.
- Check the connection between the MFDU (CN17) and the Tx motor.
- Replace the Tx motor.

2. Jam

Possible Cause:

- An incorrect type or size of document is used.
 - The document is too long.
 - The scanner rollers (pick-up, feed, R1, and R2 rollers) are dirty.
 - Obstruction in the document paper path.
 - The scan line sensor is defective.
 - Defective tx motor

- 1. Check that a correct type of document is being used, and that the document length is within the maximum setting.
- 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, and replace them if they are damaged.
 - Check that the scan line sensor is working correctly.
 - Replace the Tx motor.

3. Skew

Possible Cause:

- An incorrect type or size of document is used.
- The document guide is not properly set.
- The operation panel is not properly closed.
- The scanner rollers (pick-up, feed, R1, and R2 rollers) are dirty.
- Obstruction in the document paper path.
- The separation pad is out of position.

Action:

- 1. Check that a correct type of document is being used.
- 2. Check that the operation panel is securely closed and also check that the document guide is properly set.
- 3. Check for obstructions in the paper path.
- 4. If the problem still remains, do the following.
 - Check that the separation pad is properly set. Replace it if it is damaged.
 - Clean the rollers with a soft cloth and water, and replace them if they are damaged.

4. Multi-feed

- Adjust the separation pressure to the proper setting.
- Clean or replace the separation pad.

6.2.2. Printer

1. Non-feed *

Possible Cause:

- A non-recommended type of paper is being used.
- The paper cassette end fence is not properly set.
- The paper lift mechaninsm (slide lock) is not working properly.
- Malfunction in the paper feed clutch.
- The paper feed roller(s) is not properly set.
- The paper feed motor is defective.
- The registration sensor is defective.

- 1. Check that a correct type of paper is being used.
- 2. Check that the paper cassette end fence is correctly set and check the paper lift mechanism (slide lock and the springs).
- 3. Check that the feed clutch for the cassette that was used is working properly.
- 4. Check that the paper feed roller(s) is properly installed. Clean or replace if necessary.
- 5. Check the registration roller and its mechanism. Clean or replace if necessary.
- 6. Check that the registration sensor is correctly working.
- 7. If the problem still remains, do the following.
 - Check the connections between the MFDU (CN74) and the paper feed motor.
 - Replace the paper feed motor.



2. Paper Jam - Inside the Printer *

Possible Cause:

- A non-recommended type of paper is being used.
- The paper end fence and/or the paper guides in the cassette is not properly set.
- The registraton roller is dirty.
- The registration sensor is defective.
- Obstruction in the paper path.
- The main motor is defective.

Action:

- 1. Check if a correct type of paper is being used, and check that the paper end fence and the paper guides are correctly set.
- 2. Check for obstructions in the paper path.
- 3. Check the registration roller and its mechanism. Clean or replace if necessary.
- 4. Check that the registration sensor is working properly.

5. If the problem still remains, do the following.

- Check the connections between the MFDU (CN15) and the main motor.
- Replace the main motor.
- Check the MFDU output of power and drive signals to the main motor (CN15-1, 3). If signals are not output, replace the MFDU or MFCE.
- Check the fusing unit drive mechanism. Check that all the gears are properly installed.

3. Jam - Fusing Exit

Possible Cause:

- A non-recommended type of paper is being used.
- Obstruction in the paper path.
- The registration sensor is defective.
- Malfunction in the fusing drive mechanism.
- The paper feed out sensor is defective.
- Malfunction in the hot roller stripper(s) mechanism.
- Malfunction in the pressure mechanism in the fusing unit.

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

Ξ

4. Skew

Possible Cause:

- A non-recommended type of paper is being used.
- Incorrect positioning of the paper guides in the paper cassette.
- The corner separators are out of position.
- The paper feed rollers are worn out or damaged.
- Obstruction in the paper path.
- Malfunction in the registration mechanism.

- 1. Check if a correct type of paper is being used.
- 2. Check that the paper guides and the corner separators in the paper cassette are correctly set.
- 3. Check that the paper feed rollers are correctly installed and clean or replace them if necessary.
- 4. Check for obstructions in the paper path.
- 5. Check the registration mechanism and clean or replace the rollers if necessary.

5. Multi-feed



Possible Cause:

- A non-recommended type of paper is being used.
- Incorrect positioning of the paper guides and/or end fence in the paper cassette.

Action:

- Check if a correct type of paper is being used.
- Check that the paper guides and the end fence are correctly set.

6.3. SERVICE CALL CONDITIONS *

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

Symptom	Error Code	Sub-code	SC-code
Charge leak current detected while the charge corona unit was activated.	9-17	11	1-11
Charge leak current detected while the charge corona unit was not activated.	9-17	12	1-12
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 power saver mode)	9-22	03	0-03
Fusing unit failure (fusing lamp at high temperature in power saver mode)	9-22	04	0-04
Fusing unit failure (fusing lamp at low temperature in power saver mode)	9-22	05	0-05
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
Hexagonal mirror motor startup error	9-23	31	3-31
Hexagonal mirror motor error while printing	9-23	32	3-32
Main motor startup error	9-24	41	4-41
Main motor error while printing	9-24	42	4-42

To find out which problem has occurred, either:

- See the Auto Service Call report that was 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.
 Or, check the sub-code stored at RAM addresses 4805AF(H) and 4805B1(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 back on.
- An SC-code is displayed on the LCD panel when the error occurs.

If the problem remains, work through the appropriate troubleshooting procedure from the following pages.

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

Symptom: Charger Leak (Error Code 9-17) *

- This error occurs in either of the following conditions:
- If MFDU CN21-8 stayed low for 3 s or more while the charge corona is on (sub-code 11)
- If MFDU CN21-8 stayed low for 3 s or more while the charge corona is off (sub-code 12)

• II MI DO CIVE 1-0 Stayed low for 5 S of more write the charge corona is on (sub-code 12)		
Check	Action if Yes	Action if No
1. Clean the charge corona wire and unit. Check the if the charge wire is cut off and replace the CTM if it is broken.		
2. If the sub-code is 11, do the	e following. If the sub-code is 1	2, go to step 5.
3. Are all of the charge bias terminals connected ?	Go to step 4.	Secure the connections and/or replace the CTM or development unit.
4. Replace the power pack. Does the problem still remain?	Replace the MFDU or MFCE.	
5. If the sub-code is 12, do the following.		
6. Does CN21-3 stay low while in standby mode ?	Replace the MFDU or MFCE.	Go to step 7.
7. Does CN21-8 stay low while in standby mode ?	Replace the power pack.	

Symptom: LD Failure (Error Code 9-20) *

This error occurs in the following condition:

- The laser synchronization signal was not detected within 10 ms of the start of printing (sub-code 21)
- CheckAction if YesAction if NoCheck that all the laser optic components are aligned correctly and clean them if
necessary.

Check that the optical fibre is properly set.

Check the connection between the MFDU (CN26) and the LDDR.

Check that the polygonal mirror motor and LDDR are correctly positioned.

If the problem still remains, replace the LDDR, MFDU or MFCE.

Symptom: Fusing Unit Failure (Error Code 9-22) *

This error occurs in any of the following conditions:

- During printing: If the fusing lamp stays above 190 °C for more than 60 s (sub-code 01)
- Before start printing: If the fusing lamp takes more than 40 s to reach 165 °C (sub-code 02)
- Power saver mode (fusing lamp OFF selected): If the fusing lamp takes more than 20 minutes to fall back to 100 °C. (sub-code 03)
- Power saver mode (fusing lamp Standby selected): If the fusing lamp takes more than 20 minutes to fall back to 100 °C. (sub-code 04)
- Power saver mode (fusing lamp Standby selected): If the fusing lamp stays below 80 °C for more than 18 s (sub-code 05)
- During printing: If the fusing lamp stays below 140 °C for more than 1 s (sub-code 07)
- At any time: If the fusing lamp temperature reaches 250 °C (sub-code 08)

• At power on: If a thermistor defect (disconnection) is detected (sub-code 09)

Check Action if Yes Action if No

Before checking anything, do the following. Reset the RAM address $\underline{4805AF(H)}$ to 00(H), then switch the power off, wait for a few seconds, then switch back on. If the problem remains, check the following points.

Sub-code 01, 03, 04:

1. Replace the fusing lamp, thermistor, PSU, MFDU and/or MFCE.

Sub-code 02, 05, 07:

1. Check if the fusing lamp, thermostat, and/or the thermofuse is(are) open or not.

- If yes, replace the defective component(s).
- If no, go to step 2.
- 2. Check if ac power is supplied to the lamp from the PSU or not.
 - If yes, go to step 3.
 - If no, replace the PSU.
- 3. Check if MFDU CN12-1 and/or MFDU CN12-2 stays low during printing.
 - If yes, replace the MFDU, or MFCE.
 - If no, check the connection from the PSU to the lamp.

Sub-code 08:

- 1. Check for any defects in the machine, and replace the defective parts. If any damage could not be found, go to step 2.
- 2. Check if the thermistor is shorted or not.
 - If yes, replace the thermistor.
 - If no, try replacing the MFDU and/or MFCE

Sub-code 09:

1. Check the connection between the MFDU (CN25) and the thermistor.

Symptom: Polygonal Mirror Motor Failure (Error Code 9-23) *

This error occurs in either of the following conditions:

- If MFDU CN14-4 does not go low within 10 s of the polygonal mirror motor being switched on (sub-code 31)
- If MFDU CN14-4 goes back to high for 3 s or more during polygonal mirror motor operation (sub-code 32)

Check	Action if Yes	Action if No	
1. Check the connection between the MFDU (CN14) and the polygonal mirror motor.			
2. Check that +24VM from the MFDU (CN14-1) is supplied to the polygonal mirror motor.	Replace the polygonal mirror motor.	Replace the MFDU. If the problem still remains, replace the MFCE.	

Symptom: Main Motor Failure (Error Code 9-24)

This error occurs in either of the following conditions:

- If MFDU CN15-4 does not go low within 10 s of the main motor being switched on (subcode 41)
- If MFDU CN15-4 goes back to high for 3 s or more during main motor operation (subcode 42)

Check	Action if Yes	Action if No	
1. Check that the main motor drive mechanism is not obstructed.			
Check that all the main motor drive gears are correctly installed.			
3. Replace the main motor. Replace the MFDU.			
Does the problem still re-	the problem still re- If the problem still occurs,		
main?	replace the MFCE.		

6.4. ERROR CODES *

If an error code occurs, retry the communication. If the same problem occurs, try to fix the problem as suggested below. Note that error codes 4-00, 01, 02, and 10 only appear in the error code display and on the service report.

Code	Meaning	Suggested Cause/Action
0-00	DIS/NSF not detected within 40 s of Start being pressed	Check the line connection. Check the NCU - MFDU connectors. The machine at the other end may be incompatible. Replace the NCU or MFCE. Check for DIS/NSF with an oscilloscope. If the rx signal is weak, there may be a bad line.
0-01	DCN received unexpectedly	The other party is out of paper or has a jammed printer. The other party pressed Stop during communication.
0-03	Incompatible modem at the other end	The other terminal is incompatible.
0-04	CFR or FTT not received after modem training	Check the line connection. Check the NCU - MFDU connectors. Try changing the tx level and/or cable equalizer settings. Replace the MFCE 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), G3 Switch 08 (PABX) Dedicated Tx parameters - Section 4-4
0-05	Unsuccessful after modem training at 2400 bps	Check the line connection. Check the NCU - MFDU connectors. Try adjusting the tx level and/or cable equalizer. Replace the MFCE 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 MFDU - NCU connectors. Try adjusting the tx level and/or cable equalizer settings. Replace the NCU or MFCE. The other end may be defective or incompatible; try sending to another machine. Check for line problems. Cross reference See error code 0-04.

Trouble-

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 MFDU - NCU connectors. Replace the NCU or MFCE. 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 RTN or PIN after receiving a page, because there were too many errors	Check the line connection. Check the MFDU - NCU connectors. Replace the NCU or MFCE. 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/MFDU; try sending to another machine. Check for line problems and noise. Cross reference Tx level - NCU Parameter 01 (PSTN), RAM 4804B4 (PABX) Cable equalizer - G3 Switch 07 (PSTN), G3 Switch 08 (PABX) Dedicated Tx parameters - Section 4-4
0-14	Non-standard post message response code received	Check the MFDU - NCU connectors. Incompatible or defective remote terminal; try sending to another machine. Noisy line: resend. Try adjusting the tx level and/or cable equalizer settings. Replace the NCU or MFCE. Cross reference See error code 0-08.
0-15	The other end does not have the confidential or transfer function	The other terminal does not have the confidential rx or transfer function, or the other terminal's memory is full.
0-16	CFR or FTT not detected after modem training in confidential or transfer mode	Check the line connection. Check the MFDU - NCU connectors. Replace the NCU or MFCE. Try adjusting the tx level and/or cable equalizer settings. The other end may have disconnected, or it may be defective; try calling another machine. If the rx signal level is too low, there may be a line problem. Cross reference See error code 0-08.
0-17	Communication was interrupted by pressing the Stop key.	If the Stop key was not pressed and this error keeps occurring, replace the operation panel or OPU.

Code	Meaning	Suggested Cause/Action
0-20	Facsimile data not received within 6 s of retraining	Check the line connection. Check the MFDU - NCU connectors. Replace the NCU or MFCE. 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), G3 Switch 08 (PABX)
0-21	EOL signal (end-of-line) from the other end not received within 5 s of the previous EOL signal	Check the connections between the MFDU, NCU, & line. Check for line noise or other line problems. Replace the NCU or MFCE. 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 s)	Check the line connection. Check the MFDU - NCU connectors. Replace the NCU or MFCE. 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 MFDU - NCU connectors. Replace the NCU, MFDU or MFCE. 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), G3 Switch 08 (PABX) 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.

Code	Meaning	Suggested Cause/Action
0-30	The other terminal did not reply to NSS(A) in Al	Check the line connection. Check the MFDU - NCU connectors.
	short protocol mode	Try adjusting the tx level and/or cable equalizer settings.
		The other terminal may not be compatible. Cross reference
		Dedicated tx parameters - Section 4-4
0-52	Polarity changed during communication	Check the line connection. Retry communication.
1-00	Document jam	Incorrectly inserted document or unsuitable document type. Check the ADF drive components and sensors. Cross reference
1-01	Document length exceeded the maximum	ADF mechanical problems - Section 6-2-1 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 6-2-1
1-10	Paper at the scan line when the power was turned on.	Remove the paper. Check the scan line sensor. Cross reference ADF mechanical problems - Section 6-2-1
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 6-2-1
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 6-2-2
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 6-2-2
1-30	Paper ran out during printing	Add paper in the cassette.
1-34	Paper ran out after printing	Add paper in the cassette.
1-71	The cover was opened or the cassette was pulled out during printing	Close the cover or put back the cassette.
2-10	The modem cannot enter tx mode	Replace the MFCE.
2-11	Only one V.21 connection flag was received	Change the MFCE.

Code	Meaning	Suggested Cause/Action
2-12	Modem clock irregularity	Replace the MFCE.
2-20	Abnormal coding/decoding (cpu not ready)	Replace the MFCE.
2-50	The machine reset itself	If this is frequent, replace the MFCE.
3-00	G4 interface board reset	Replace the G4 interface board or MFCE.
3-10	Disconnection during ISDN G3 communication	Check the other terminal and the ISDN line. The other terminal may dialed a wrong number.
3-11	Disconnection during ISDN G4 communication	Check the other terminal and the ISDN line.
3-20	A SAC signal was received during ISDN G4 communication	The operator at the other terminal may have interrupted the communication.
3-21	A CSA was sent during ISDN G4 communication, because the Stop key was pressed	The local operator has interrupted the communication.
3-30	Mismatched specifications (rx capability)	Check the receive capabilities requested from the other terminal.
4-00	One page took longer than 8 minutes to transmit	Check for a bad line. Try the communication at a lower resolution, or without halftone. Change the MFCE.
4-01	Line current was cut	Check the line connector. Check the connection between MFDU and NCU. Check for line problems. Replace the MFDU or the NCU.
4-02	The other end cut the received page as 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 resend.
4-10	Communication failed because of ID Code mismatch (Closed Network) or Tel. No./CSI mismatch (Protection against Wrong Connections)	Get the ID Codes the same and/or the CSIs programmed correctly, then resend. The machine at the other end may be defective.
4-80	Start mark not detected at the top of the OMR sheet	Check the ADF/scanner mechanisms. Check if a photocopy of the sheet was used. Check if a cut-off portion of the sheet was used. Check if the document guide was not adjuted correctly. Check if the sheet was dirty. Check if any adhesive tapes on the sheet.
4-81	OMR sheet placed in the ADF the wrong way	Place the sheet in the correct way.
4-82	Skew detection mark not detected	Same as 4-80.

Code	Meaning	Suggested Cause/Action
4-83	Skew was detected before scanning the OMR data field	Check the ADF mechanisms. Check if a photocopy of the sheet was used. Check if a cut-off portion of the sheet was used. Check if any adhesive tapes on the sheet.
4-84	Guide mark not detected while scanning an OMR sheet	Same as 4-80.
4-85	Skew was detected while scanning the OMR data field	Same as 4-83
4-89	End mark not detected at the bottom of the OMR sheet	Same as 4-80.
4-90	Reduction rate in the main scan direction not acceptable while scanning an OMR sheet	Check if a reduced photocopy was used. Adjust the scanner correctly (refer to section 5.11).
5-00	Data reconstruction not possible	Replace the MFCE.
5-10	DCR timer expired	Replace the MFCE.
5-20	Storage impossible because of a lack of memory	Temporary memory shortage. Test the SAF memory.
5-21	Memory overflow	Replace the MFCE or optional IC card.
5-22	Mode table overflow after the second page of a scanned document	Wait for the messages which are currently in the memory to be sent or delete some files from memory.
5-23	Print data error when printing a substitute rx or confidential rx message	Test the SAF memory. Ask the other end to resend the message. Replace the MFCE 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 which are currently in the memory to be sent or delete some files from memory.
5-25	SAF file access error	Replace the MFCE, the IC memory card, or the hard disk.
5-30	Mode table for the first page to be printed was not effective	Replace the MFCE, the IC memory card, the function upgrade card, or the hard disk.
6-01	G3 ECM - no V.21 signal was received	Try adjusting the rx cable equalizer. Replace the MFCE, MFDU or NCU.
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 MFDU. Check for a bad line or defective remote terminal. Replace the MFCE, MFDU or NCU.

Code	Meaning	Suggested Cause/Action
6-05	G3 ECM - facsimile data frame not received within 18 s of CFR, but there was no line fail	Check the line connection. Check connections from the NCU to the MFDU. Check for a bad line or defective remote terminal. Replace the MFCE, MFDU or NCU. Try adjusting the rx cable equalizer
		Cross reference Rx cable equalizer - G3 Switch 07 (PSTN), G3 Switch 08 (PABX)
6-06	G3 ECM - coding/decoding error	Defective MFDU. 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.
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.
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.
6-39	V.21 signal not stopped within 6 s	Replace the MFCE.
9-07	Paper non-feed or jam at the cassette entrance	If the problem persists, replace the MFDU. Cross reference Paper non-feed - Section 6-2-2 Jam at the cassette entrance - Section 6-2-2
9-08	Paper jam inside the development area	If the problem persists, replace the MFDU. Cross reference Paper jam - Section 6-2-2
9-09	Paper jam in the fusing exit area	If the problem persists, replace the MFDU. Cross reference Paper jam - Section 6-2-2
9-10	Toner end detected	Replace the CTM.
9-12	Cover open detected during printing	Close the cover, or check the cover sensors.
9-17	Charge corona unit failure	If the problem persists, replace the MFDU. Cross reference Charge corona failure - Section 6-3
9-20	Laser diode failure	If the problem persists, replace the MFDU. Cross reference LD failure - Section 6-3

Code	Meaning	Suggested Cause/Action
9-22	Fusing lamp failure	If the problem persists, replace the MFDU.
		Cross reference
		Fusing lamp failure - Section 6-3
9-23	Hexagonal mirror motor	If the problem persists, replace the MFDU.
	failure	Cross reference
		Mirror motor failure - Section 6-3
9-24	Main motor failure	If the problem persists, replace the MFDU.
		Cross reference
		Main motor failure - Section 6-3
9-40	CRC error while	Check and adjust the host PC's RS232C port setting
0.44	receiveing a frame	Check if a proper cable is used and connected
9-41	Command 3rd try failed	securely.
9-42	DCN received	Check if the application is working correctly. If the problem persists, replace teh MFCE.
0.40	unexpectedly	
9-43	Unexpected frame	Note: The optional RS232C interface may not be
0.44	received	available in some countries.
9-44	Response time over	
9-45	Frame transmission error	
9-50	Paper non-feed or jam	Check if the recommended types of paper is used.
	inside the upper paper feed unit	Check if the paper guides are aligned to the paper correctly.
		Check the paper feed mechanism in the unit.
9-51	Jam at the paper exit of	Check if any blockage in the paper feed path.
5-51	the upper paper feed unit.	Check the paper feed mechanisms inside the unit.
		Check if the sensor is defective.
9-52	Paper non-feed or jam	Check if the recommended types of paper is used.
	inside the lower paper	Check if the paper guides are aligned to the paper
	feed unit	correctly.
		Check the paper feed mechanism in the unit.
9-53	Jam at the paper exit	Check if any blockage in the paper feed path.
	from the lower paper	Check the paper feed mechanisms inside the unit.
	feed unit.	Check if the sensor is defective.
9-80	Bypass feed - paper non-	Check the registration roller and sensor.
	feed or jam at the	Cross reference
	entrance	Printer mechanical problems - Section 6-2-2
9-81	Bypass feed - paper	Check the paper feed mechanism and sensors.
	length exceeds the	Cross reference
	maximum limit (600 mm)	Printer mechanical problems - Section 6-2-2
9-82	Optional 100 sheet	Check the paper feed mechanism and sensors.
	cassette - paper non-	Cross reference
	feed or jam at the	Printer mechanical problems - Section 6-2-2
	cassette entrance	
9-83	Optional 100 sheet	Check the paper feed mechanism and sensors.
	cassette - paper length	Cross reference
	exceeds the maximum	Printer mechanical problems - Section 6-2-2
	limit (600 mm)	

6.5. ELECTRICAL COMPONENT DEFECTS

6.5.1. Defective Sensor Table *

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Sensor	Symptoms if Defective
Document sensor	"CLEAR ORIGINAL" or "DIAL FAX NO" is
	displayed at power-up.
	"SET DOCUMENT" is still displayed after a
	document is placed in the feeder.
Scan line sensor	"CLEAR ORIGINAL" is displayed at power- up.
	"CLEAR ORIGINAL" is displayed soon after the start of copying.
B4-width sensor *	The machine cannot scan B4 width.
A3-width sensor *	The machine cannot scan A3 width.
Interlock switches	There is no alarm on opening the cover, and "CLOSE COVER" is not displayed. "CLOSE COVER" is displayed at power-up.
Registration sensor	"CLEAR COPY" is displayed at power-up.
Fusing exit sensor	"CLEAR COPY" is displayed soon after the start of copying.
Bypass feed sensor	Bypass feed cannot be used.
Toner end sensor	Toner end is not indicated.
Paper size sensor - Standard cassette	"ADD PAPER" is displayed at power-up.
	Page separation may be done even if the original is the same size as the copy paper.
Paper end sensor - Standard cassette	The Add Paper indicator lights even if paper is remaining.
	The Add Paper indicator does not light when the paper has run out.
Paper size sensor - 100 sheet cassette	"ADD PAPER" is displayed at power-up.
	Page separation may be done even if the original is the same size as the copy paper.
Paper end sensor - 100 sheet cassette	The Add Paper indicator on the lower cassette's operation panel lights even if paper is remaining.
	The Add Paper indicator on the lower cassette's operation panel does not light when the paper has run out.
Paper size sensor - Paper feed unit	"ADD PAPER" is displayed at power-up.
	Page separation may be done even if the original is the same size as the copy paper.
Paper end sensor - Paper feed unit	The Add Paper indicator lights even if paper is remaining.
	The Add Paper indicator does not light when the paper has run out.
Relay sensor - Paper feed unit	"CLEAR COPY" is displayed at power-up. "CLEAR COPY" is displayed soon after the
	start of copying.

TROUBLESHOOTING ELECTRICAL COMPONENT DEFECTS

Sensor	Symptoms if Defective
Jam release cover switch - Paper feed unit	Cover open is not detected.
type S	"CLOSE COVER" is displayed.

6.5.2. Fuses

The only service-replaceable fuses are the following.

Fuse	Symptoms if Defective
PSU - F1/ F2/F3	No power to the machine
	(F3 - 220V PSU only)
MFDU - F1	No power to the drive components and
	lamps.
Thermofuse (Not installed in the US model.)	Fusing power is not supplied.

