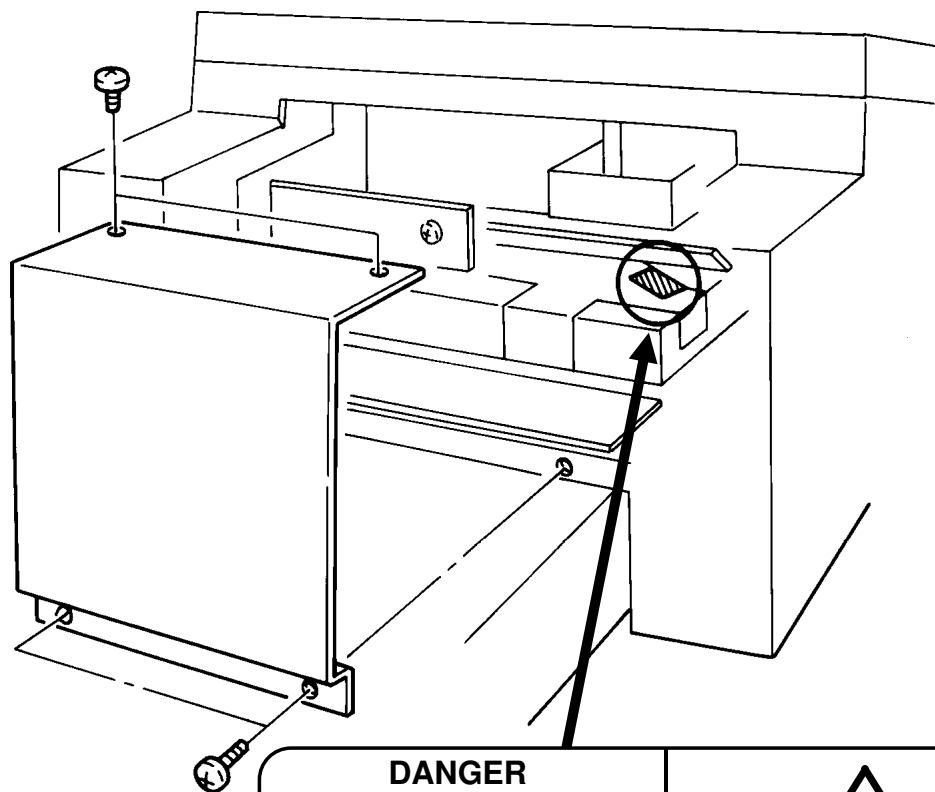
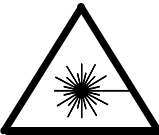


RICOH FAX 4500L

SERVICE MANUAL



DANGER INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM	
CAUTION LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM	VORSICHT UNSIHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEOFFNET NICHT DEM STRAHL AUSSETZEN

Lithium Batteries (Memory Back-up)

CAUTION:

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.

CONTENTS

1. OVERALL MACHINE INFORMATION

1.1. SPECIFICATIONS	1-1
1.2. FEATURES	1-2
1.3. COMPONENT LAYOUT	1-5
1.4. OVERALL MACHINE CONTROL	1-5
1.5. VIDEO DATA PATH	1-6
1.5.1. Transmission	1-6
1.5.2. Reception	1-6
1.6. Power Distribution	1-7
1.6.1. Memory Back-up Circuit	1-7

2. DETAILED SECTION DESCRIPTIONS

2.1. SCANNER	2-1
2.2. PRINTER	2-3
1. Laser Optics	2-3
2. Paper Feed	2-3
3. Fusing Unit	2-5
2.3. PCBs AND THEIR FUNCTIONS	2-7
2.3.1. FCU	2-7
2.3.2. NCU	2-9

3. INSTALLATION

3.1. INSTALLING OPTIONAL UNITS	3-1
3.1.1. Lower Cassette	3-1
3.1.2. Hard.Disk.	3-2
3.2. INITIAL PROGRAMMING	3-4

4. SERVICE TABLES AND PROCEDURES

4.1. SERVICE LEVEL FUNCTIONS	4-1
4.1.1. Bit Switch Programming (Function 01)	4-1
4.1.2. System Parameter List (Function 02)	4-2
4.1.3. Error Code Display (Function 03)	4-2
4.1.4. Service Monitor Report (Function 04)	4-2
4.1.5. Protocol Dump (Function 05)	4-2
4.1.6. RAM Display/Rewrite/Printout (Function 06)	4-3
4.1.7. Checking the Counters (Function 07)	4-4
4.1.8. Clearing the Counters (Function 08)	4-4
4.1.9. NCU Parameters (Function 09)	4-4
4.1.10. Modem/DTMF Tone Tests (Function 09)	4-5
4.1.11. Operation Panel Tests (Function 10)	4-5
4.1.12. Scanner Tests (Function 11)	4-6
4.1.13. Printer Tests (Function 12)	4-6
4.1.14. RAM Tests (Function 13)	4-7
4.1.15. Service Station Telephone Number (Function 14)	4-7
4.1.16. Serial Number (Function 15)	4-8
4.1.17. File Transfer (Function 16)	4-8
4.1.18. Hard Disk Initialization (Function 17)	4-8
4.1.19. Group 4 Communication Parameters (Function 18)	4-8
4.1.20. Programming the CSI (Function 19)	4-9
4.1.21. Setting the Telephone Line Type (Function 20)	4-9
 4.2. BIT SWITCHES	 4-10
 4.3. NCU PARAMETERS	 4-27
 4.4. DEDICATED TRANSMISSION PARAMETERS	 4-43
4.4.1. Programming Procedure	4-43
4.4.2. Parameters	4-44
 4.5. SERVICE RAM ADDRESSES	 4-47
 4.6. SPECIAL TOOLS AND LUBRICANTS	 4-51
 4.7. PM TABLE	 4-52

5. REPLACEMENT AND ADJUSTMENT

5.1. SCANNER 5-1
5.1.1. Xenon Lamp 5-1

5.2. DEVELOPMENT 5-1
5.2.1. Development Unit 5-1

5.3. PCBs 5-1
5.3.1. Operation Panel PCB [D] 5-1

6. TROUBLESHOOTING

6.1. SERVICE CALL CONDITIONS 6-1

6.2. ERROR CODES 6-3

1. OVERALL MACHINE INFORMATION

Overall Machine
Information

1.1. SPECIFICATIONS

Type

Desktop transceiver

Circuit

PSTN, PABX

Connection

Direct couple

Document Size

Length: 105 - 1200 mm [4.1 - 47.2 ins]

Up to 100 m [328 ft] after adjustment

Width: 148 - 304 mm [5.8 - 12.0 ins]

Thickness: ADF 0.05 to 0.2 mm
Manual Feed 0.04 to 0.4 mm

Document Feed

Automatic feed, face down

ADF Capacity

50 sheets (using 80 g/m² paper)

Scanning Method

Flat bed, with CCD

Maximum Scan Width

256 mm [10.1 ins] ± 1%

Scan Resolution

Main scan: 200 dpi

Sub scan:

Standard 100 dpi

Detail 200 dpi

Fine 400 dpi

Memory Capacity

ECM: 128 kbytes (double buffer)

SAF: Base machine - 1 Mbyte (62 pages),
with optional extra 1 Mbyte or 2 Mbytes (max
123 or 185 pages respectively), or 20 Mbyte
hard disk (1,200 pages total)

Compression

MH, MR, EFC, MMR, SSC

Storage to SAF memory for tx: MH

MMR only with ECM

Modulation

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

Protocol

Group 3 with ECM, Group 4 kit available

Data Rate

14,400/12,000/9,600/7,200/4,800/2,400 bps;
automatic fallback

I/O Rate

With ECM: 0 ms/line

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

Transmission Time

6 s at 14,400 bps (G3 ECM) for a CCITT # 1
test document (Slerexe letter) using stand-
ard resolution

Printing System

Laser printing, using the Ricoh CS (Compact
Seamless) Engine, plain paper, dry toner

Paper Size

Standard Cassette

Europe: A4, A5, B4

Asia: A4, A5, F, F4, B4

Lower Cassette

Europe: A4, A5, B4

Asia: A4, A5, F, F4, B4

Maximum Printout Width

210 mm [8.3 ins]

250 mm [9.8 ins] if a lower cassette is in-
stalled

Maximum Printer Resolution

Main scan: 400 dpi

Sub scan: 400 dpi

Power Supply

220 - 240 Vac, 50 Hz

Power Consumption (Base Machine Only)

Standby: 25 W **Transmit:** 35 W

Receive: 250 W **Copying:** 290 W

Operating Environment

Temperature: 17 - 28 °C [63 - 82 °F]

Humidity: 40 - 70 %Rh

Dimensions (W x D x H)

496 x 477 x 305 mm [19.5 x 18.8 x 12.0 ins]

Excluding handset, trays, and optional units

Weight

19 kg [41.8 lbs]

Excluding handset, trays, and optional units



1.2. FEATURES

KEY: O = Used, X = Not Used,
 A = With optional memory or hard disk only,
 B = With lower cassette only,
 C = With Group 4 kit only,
 G = Not used in Germany,
 S = Service mode in some countries

Equipment	
ADF	O
Bar code reader	X
Built-in handset	X
Cabinet	X
Connection for ans. machine	X
Connection for handset	O
Cutter	X
Handset (option only in Europe)	O
Hard disk (option only)	O
Magnetic card reader	X
Manual feed mechanism	O
Marker	O
Microphone	X
Monitor speaker	O
Remaining memory indicator	O
Speakerphone	X

Video Processing Features	
Contrast	O
Halftone (Basic & Error Diffusion)	O
MTF	O
Reduction	O
Resolution	O
Smoothing to 16 x 15.4 l/mm	O

Communication Features - Auto	
Automatic fallback	O
Automatic redialling	O
Confidential reception	A
Dual Access	O
Substitute reception	O
Transmission Reserve	X

Communication Features - User Selectable	
Action as a transfer broadcaster	A
AI Redial	O
Alternative Destination	X
Answering machine	X
Authorized Reception	O
Auto-answer delay time	X
Auto dialling (pulse or DTMF)	O
Auto Document	X
Automatic Voice Message	X
Auto-note	X
Batch Transmission (max 200 batches)	O
Broadcasting	O
Chain Dialling	O
Communication Result Display	O
Confidential ID Override	O
Confidential Transmission	O
Direct Fax Number Entry	O
Economy Transmission	O
Economy Transmission Time	O
Forwarding (5 stations)	A
Free Polling	O
Groups (10 groups)	O
Group Transfer Station	O
Hold	X
ID Transmission Option	O
Immediate Redialling	O
Immediate transmission	O
Keystroke Programs	O
Mailbox	X
Memory transmission (this is the default mode)	O
Multi-step Transfer	O
Next Transfer Station	C
Notify	X
On Hook Dial	O (G)
Page Count	O
Personal Codes	O
Personal Codes with Conf ID	O
Polling Reception	O
Polling Transmission	O
Polling tx file lifetime in the SAF	O
Quick Dial (32 stations)	O

OVERALL MACHINE INFORMATION FEATURES

August 19th, 1992

Overall Machine
Information

Communication Features - User Selectable	
Reception modes (Fax, Tel, Auto)	O
Reduction	O
Remote control features	X
Remote Transfer	X
Restricted Access (50 codes, without cards)	O
Secured Polling	O
Secured Polling with Stored ID Override	O
Secure Transmission	O
Send Later	O
Silent ringing detection	X
Speed Dial (100 stations)	O
Telephone Directory	O
Tonal Signal Transmission	O
Transfer Request	O
Transmission Deadline	O
Turnaround Polling	X
Two-step Transfer	C
Voice Request (immed. tx only)	O

Communication Features - Service Selectable	
AI Short Protocol	O
Auto-reduction override option	O
Busy tone detection	O
Closed Network (tx and rx)	O
Continuous Polling Reception	O
Dedicated tx parameters	O
ECM	O
EFC	O
Inch-mm conversion	O
MV1200 compatibility	X
Page retransmission	O
Page separation mark	O
Protection against wrong conn.	O
Resol'n stepdown override option	X
Short Preamble	O
Well log	O

Other User Features	
Area Code Prefix	O
Auto Service Call	O
Center mark	O
Chequered mark	O
Clearing a memory file	O
Clearing a polling file	O
Clock	O
Confidential ID	O
Copy mode	O
Counters	O
Country code	O
Destination Check	O
Direct entry of names	O
Function Programs	O
ID Code	O
Label Insertion	O
Language Selection	O
LCD contrast control	Service
Memory Lock	A
Memory Lock ID	A
Modifying a memory file	X
Multi Sort Document Reception	A
Multicopy mode	A
Night Timer	O
Own telephone number	O
Printing a memory file	O
RDS on/off	O
Reception Mode Switching Timer	X
Reception Time (non-memory rx only)	O
Remote ID	X
Reverse Order Printing	A
RTI, TTI, CSI	O (S)
Secure ID	O
Speaker volume control	O
Specified Cassette Selection	B
Substitute reception on/off	O
Telephone line type	O (S)
TTI on/off	O
User Function Keys	O
User Parameters	O
Wild Cards	O

August 19th, 1992

**OVERALL MACHINE INFORMATION
FEATURES**

Reports - Automatic	
Charge Control Report	X
Communication Failure Report	O
Confidential File Report	O
Error Report	O
Memory Storage Report	O
Mode Change Report	X
Polling Clear Report	O
Polling Reserve Report	O
Polling Result Report	O
Power Failure Report	O
Journal	O
Transfer Result Report	O
Transmission Deadline Report	O
Transmission Result Report	O

Reports - User-initiated	
Authorized Reception List	O
Charge Control Report	X
File List	O
Forwarding List	A
Group List	O
Personal Code List	O
Program List	O
Quick Dial List	O
Specified Cassette Selection List	B
Speed Dial List	O
Journal	O
Transmission Status Report	X
User Function List	O
User Parameter List	O

Service Mode Features	
Back-to-back test	O
Bit switch programming	O
Buzzer test	O
Cable equalizer	O
Comm. parameter display	O
Counter check	O
DTMF tone test	O
Echo countermeasure	O
Error code display	O
File Transfer	O
LCD contrast adjustment	O
Memory file printout (all files)	O
Modem test	O
NCU parameters	O

Service Mode Features	
Operation panel test	O
Printer mechanism test	X
Printer test patterns	O
Programmable attenuation	X
Protocol dump list	O
RAM display/rewrite	O
RAM dump	O
RAM test	O
Ringer test	X
Scanner lamp test	O
Scanner mechanism test	O
Sensor initialization	X
Serial number	O
Service monitor report	O
Service station number	O
System parameter list	O
Technical data on the Journal	O
Thermal head parameters	X
Transmission Status Report	X

Memory Files

Max. number of files: 200

Max. number of stations/file: 200

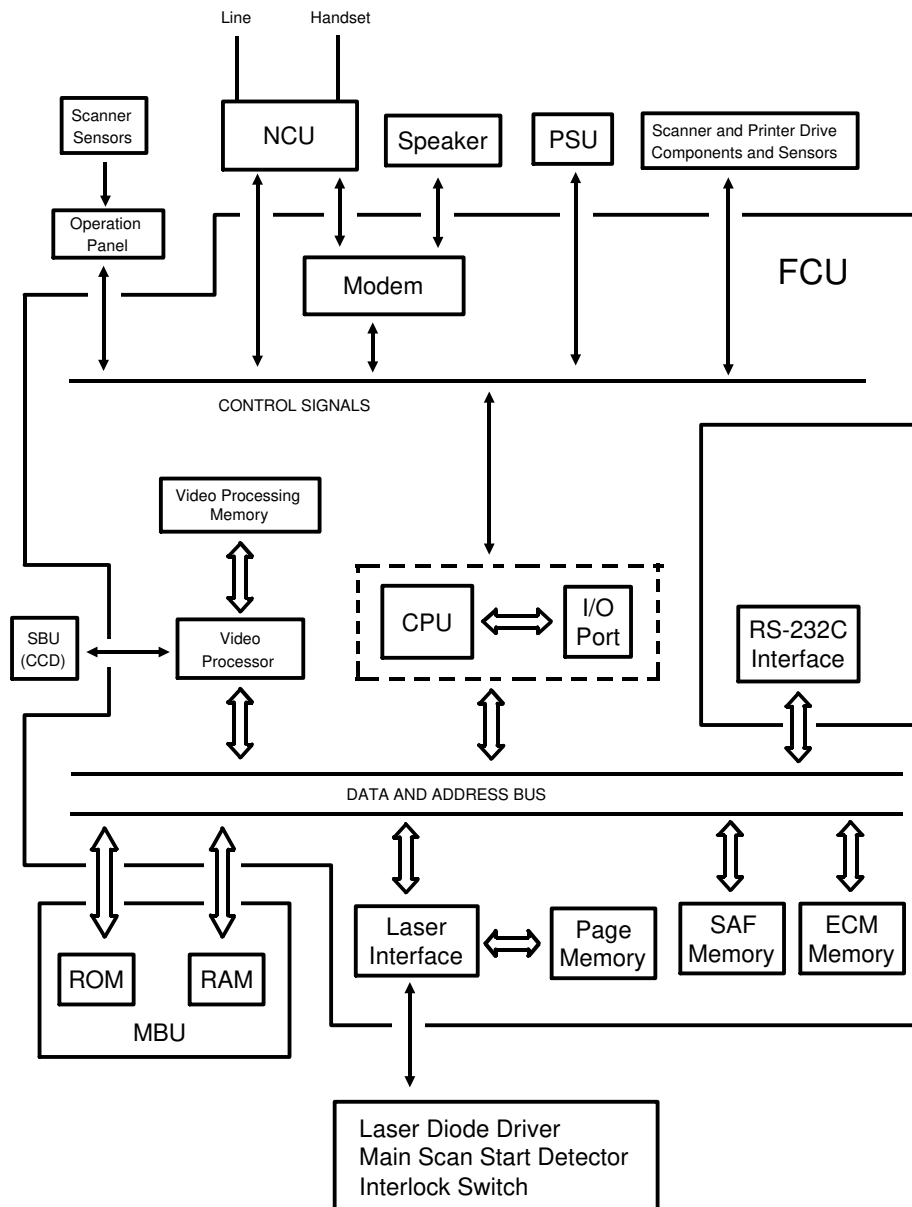
Max. number of stations overall: 500

Max. number of pages overall: 1,200

1.3. COMPONENT LAYOUT

The only difference is in the document width sensor, which has an A3-width sensor and a B4-width sensor. See section 2 for a drawing.

1.4. OVERALL MACHINE CONTROL

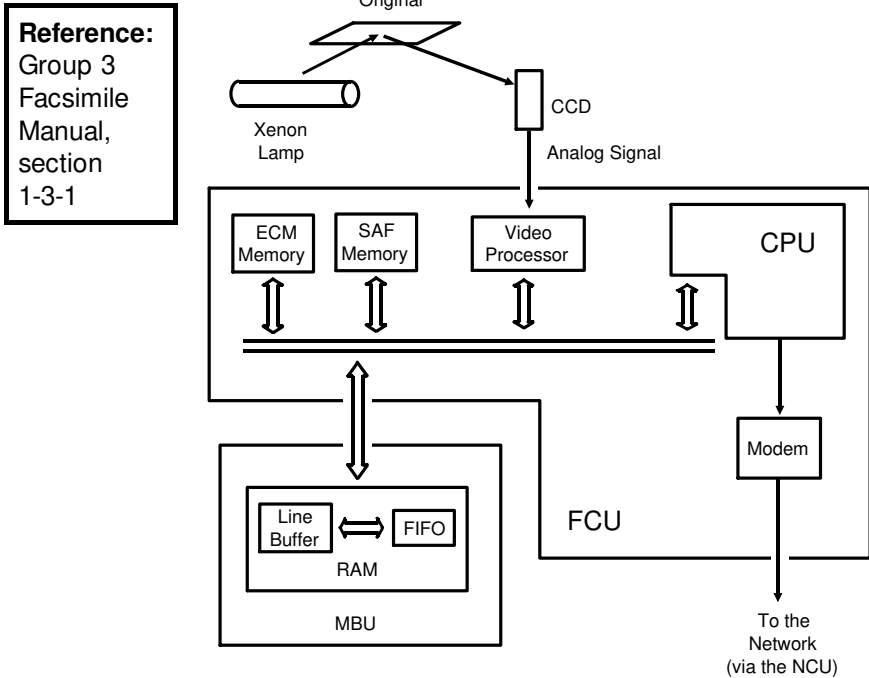


The cpu on the FCU board controls the machine, as shown in the above drawing. There is no modem board in the machine; the modem consists of a chip on the FCU board that carries out all the analog and digital functions of a fax modem.

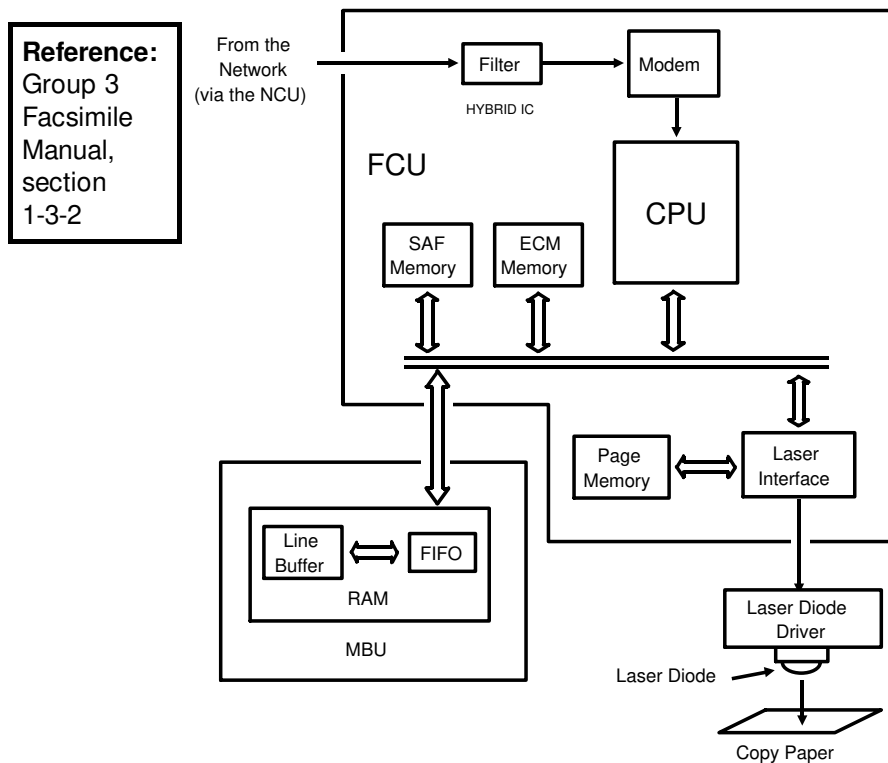
1.5. VIDEO DATA PATH

The following diagrams show the data path for this model.

1.5.1. Transmission

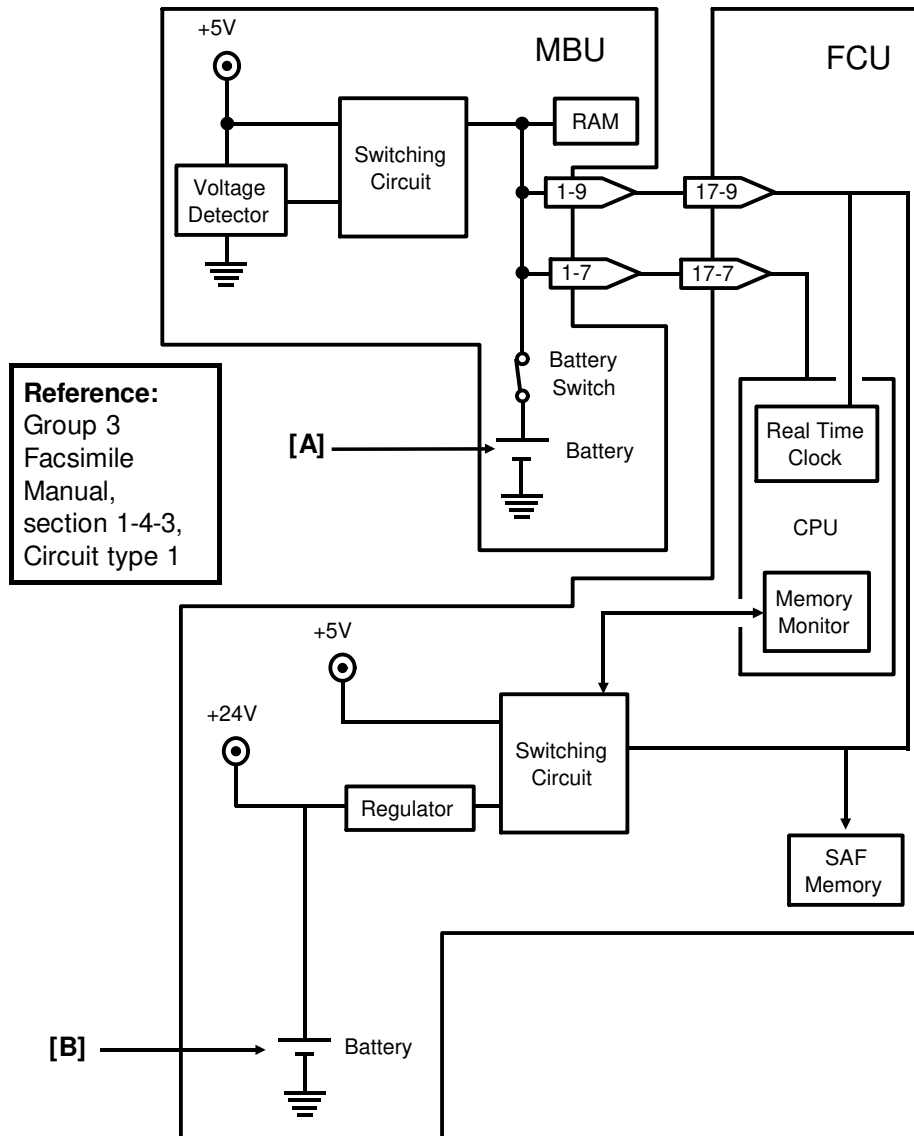


1.5.2. Reception



1.6. Power Distribution

1.6.1. Memory Back-up Circuit



The battery [A] on the MBU backs up the RAM on the MBU, which contains system parameters. It also backs up the real time clock in the cpu. This battery is not rechargeable. CN1-7 tells the cpu whether the back-up power (CN1-9) comes from the battery or from the + 5V power supply.

A rechargeable battery [B] on the FCU board backs up the SAF memory and the real time clock for 1 hour. While the main power is on, the + 24V supply recharges the battery. There is no battery switch.

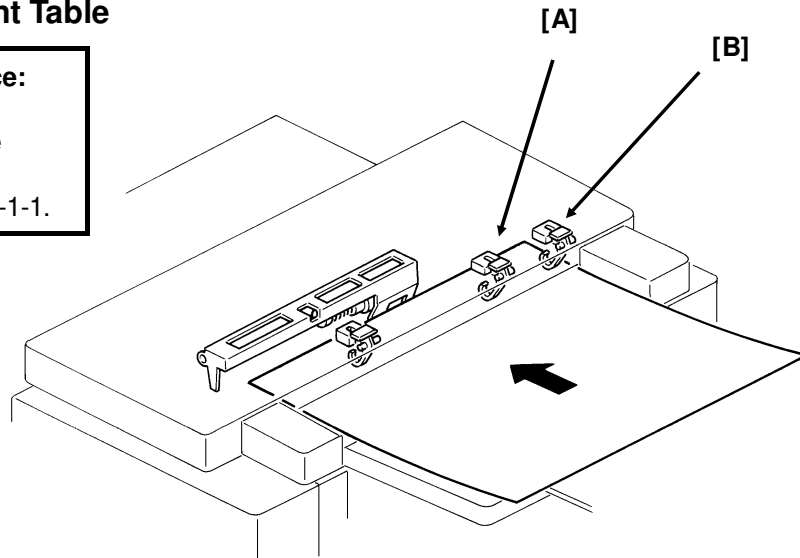
If there is data in the SAF memory, the rechargeable battery [B] also backs up the real time clock, to preserve the MBU battery.

2. DETAILED SECTION DESCRIPTIONS

2.1. SCANNER

Document Table

Reference:
Group 3
Facsimile
Manual,
section 2-1-1.



Detailed Section
Descriptions

- The scanner is A3-width [11.7"], with a B4 document width detector [A] and an A3 document width sensor [B].

Resolution

This machine scans in dots per inch, to meet Group 4 standards. The various scan resolutions are achieved as follows.

Standard - Immediate transmission: The tx motor feeds the document at 200 lines per inch. The video processor executes OR processing to convert the data into 100 lines per inch.

Memory transmission: The motor feeds the document at 100 lines per inch, and no OR processing is needed.

Detail - The tx motor feeds the document at 200 lines per inch. There is no OR processing, and the data is transmitted at 200 lines per inch.

Fine - The tx motor feeds the document and transmits data at 400 lines per inch. If the other terminal cannot receive at this resolution, alternate lines of data are deleted, so the effective resolution of the transmitted data is 200 lines per inch.

Document Jam Conditions

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

- The scan line sensor does not switch on within 5 s of the tx motor starting.
- The scan line sensor does not turn off after the maximum document length has been fed since it turned on; this is 12 s (standard resolution), 24 s (detail), or 48 s (fine) for a 1.2 m long document.
- The scan line sensor switches on while the document sensor is off.
- The document width sensor switches on while the document sensor is off.
- The scan line sensor does not turn on within 2 s of the end of stamping, if the document sensor is on.

2.2. PRINTER

1. Laser Optics

Hexagonal mirror motor speed: 9,267.7 rpm (G3 and G4 l/mm mode), 9448.8 rpm (G4 dpi mode)

2. Paper Feed

Page Separation and Data Reduction

Incoming pages that are similar in length to the copy paper may be reduced in the sub-scan direction to fit on the paper. Whether or not this happens depends on the settings of bits 1 and 2 of bit switch 02.

Reduction Enabled

If bit 2 of bit switch 02 is at 0, 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 RAM addresses 00014F and 000150.

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

Bit 7:	Not used	Bit 5:	Legal	Bit 3:	A4	Bit 1:	B5
Bit 6:	B4	Bit 4:	F4	Bit 2:	Letter	Bit 0:	A5

The ratio is determined in accordance with the following table.

Bit in 00014F	0: Not used	1: 4/3	0: 8/7	1: 12/11
Bit in 000150	0	0	1	1

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

Copy Paper Type	Copy Paper Length	Maximum reducable incoming page lengths		
		Ratio = 4/3	Ratio = 8/7	Ratio = 12/11
A5	148	190.7	163.4	156
B5	182	236	202.3	193.1
Letter	279.4	365.9	313.6	299.3
A4	297	389.3	333.7	318.5
F4, F	330.2	433.6	371.7	354.8
Legal	355.6	467.5	400.7	382.5
B4	364	478.7	410	391.6

The values are calculated as follows.

Maximum incoming page length that can be reduced =
(Copy Paper Length - 5) x Reduction Ratio

For example, for A5 with a reduction ratio of 4/3

$$\text{Max incoming data length} = (148 - 5) \times 4/3 = 190.7$$

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 bit switch 02. If this bit is 1, the bottom few lines of the page will be repeated at the top of the next page. If this bit is 0, the next page will continue from where the first page left off.

Reduction Disabled

If bit 2 of bit switch 02 is at 1, 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 be printed. The value of x can be from 0 to 15 mm. It is determined by the setting of RAM address 000151 (copy mode: bits 3 to 0, receive mode: bits 7 to 4; bits 3 and 7 are the most significant bits).

Hex value	Value of x
0	0
1	1
and so on until	
15	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 bit switch 02, as explained above.

3. Fusing Unit

Fusing Unit Control Temperatures

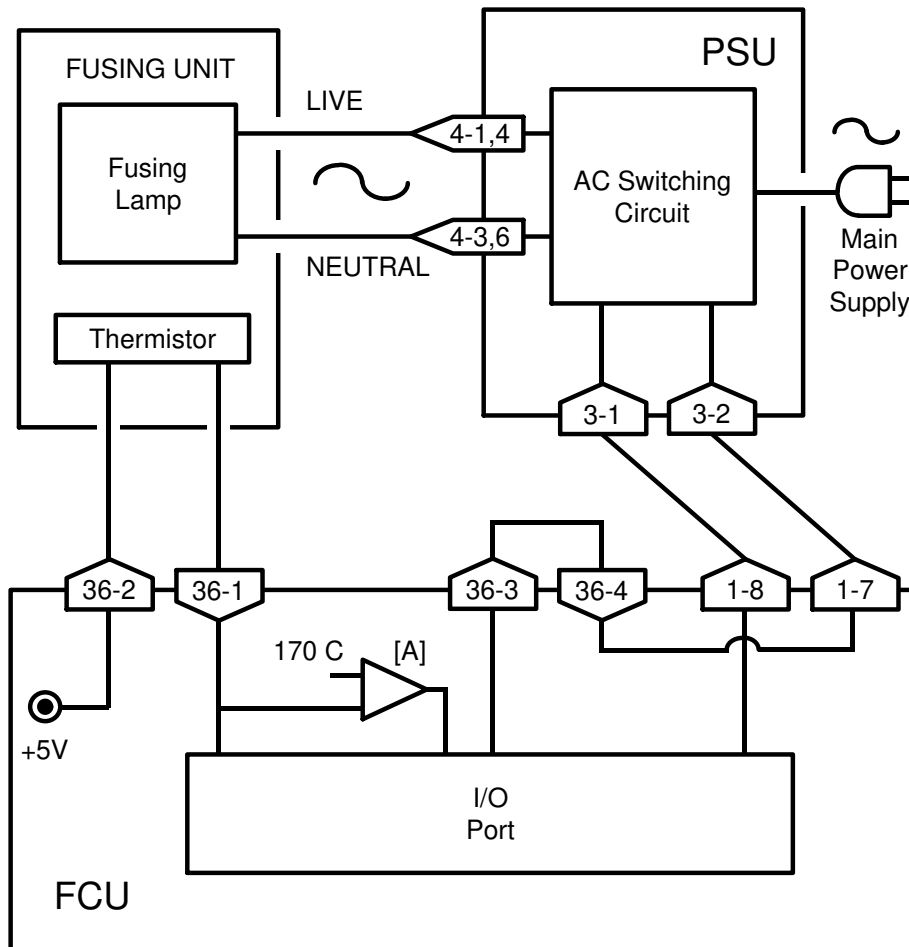
Standby temperature: 80 °C

Printing start temperature: 150 °C

Maximum printing temperature: 170 °C (monitored by a comparator)

Thermistor maximum: 280 °C

Thermostat maximum: 400 °C



Detailed Section
Descriptions

The circuit shown in the above diagram controls the fusing unit.

- The I/O Port monitors the fusing unit temperature at CN36-1.
- The signal from the comparator [A] remains high if the fusing unit temperature is below 170 °C.
- The I/O Port switches the fusing unit on/off using the signal on CN1-8.
- If the thermistor is accidentally disconnected, the link between CN36-3 and CN36-4 will also be broken. When the cpu detects this, an Auto Service Call will be sent.

Standby mode

- If the fusing lamp is below 80 °C, the I/O Port makes CN1-8 go high. This switches on the fusing lamp.
- If the fusing lamp goes above 80 °C, CN1-8 goes low, which switches off the fusing lamp.

Printing

- When a ringing signal is detected, CN1-8 goes high, to switch on the fusing lamp. Also, the ozone fan switches on.
- During printing, the temperature is kept at 170 °C. If the temperature rises above 170 °C, the output from the comparator changes state. This causes CN1-8 to go low, which switches off the fusing lamp.
- If the comparator fails, there are additional safety cutoffs at 280 °C (thermistor) and at 400 °C (thermostat).

After printing

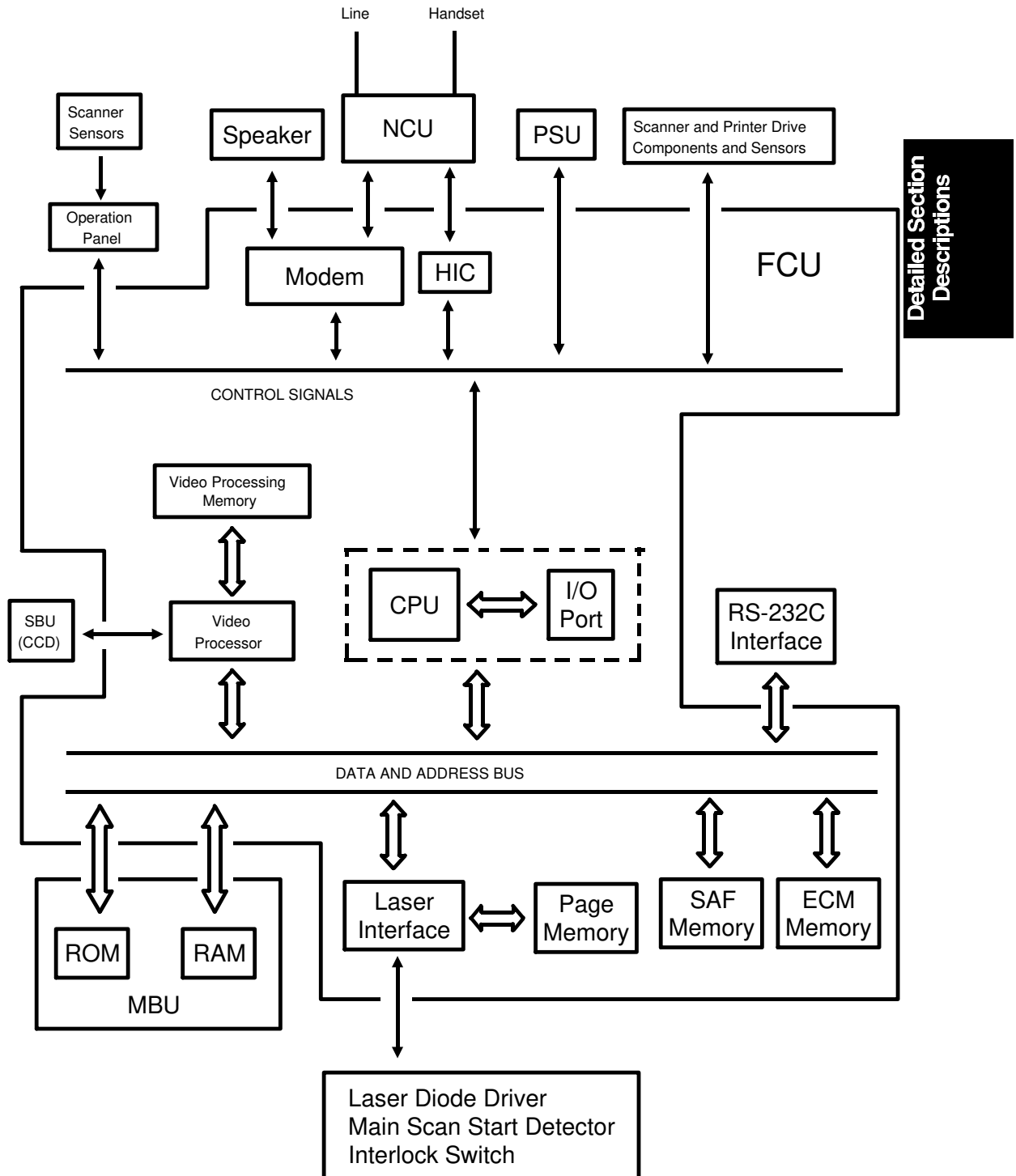
- When the fusing lamp temperature falls back below 150 °C, the ozone fan switches off.

Service Note

When an error occurs, the I/O Port switches off the fusing lamp by raising CN1-7 to high. The printer will be disabled, and an Auto Service Call will be sent to the service station (the message will be HOT ROLLER DOWN). Details concerning these errors are given in section 6-1 (Service Call Conditions).

2.3. PCBs AND THEIR FUNCTIONS

2.3.1. FCU



1. CPU (MFCP)

- 65C02 compatible microprocessor
- Interrupt control
- DMA control
- Data compression and reconstruction (high speed MH coding for 2.8-second scanning)
- Real time clock (battery backed-up)
- Memory control
- Control of all mechanisms (directly or through other chips)
- NCU control (through the I/O Port)

2. I/O Port (MIOP)

- Clock control
- Sensor monitoring (including A/D conversion where necessary)
- Tone detection
- Motor drive
- Operation panel control
- Laser Interface control

3. Laser Interface (LIF)

- Page memory control
- Laser diode control
- Smoothing

4. Modem

- Modulation/demodulation (analog and digital operations)

5. Video Processor (VPP)

- Analog/digital video signal processing

6. Hybrid IC (HIC)

- Filters
- Amplifiers

7. RAM

- 256k for ECM and system RAM (no back-up)
- 1 Mbyte SAF memory (with battery back-up)
- 1 Mbyte page memory
- 24 kbyte image memory for the VPP

2.3.2. NCU

Signal and Jumper Settings

The following table shows the jumper positions for each country, and the status of the relay control signals (CN3-A7, B7, and A8). The country is selected by the Country Code for NCU Parameters (NCU Parameter 00; use Function 09).

	Standby Mode			After Ringing Detection			Jumpers								
	CN3-A7	CN3-B7	CN3-A8	CN3-A7	CN3-B7	CN3-A8	TB 3	TB 4	TB 5	TB 7	TB 8	TB 9	TB 10	TB 11	TP2-TP3
Germany	X	X	X	O	O	X	X	X	X	O	X	O	O	O	O
UK	X	O	X	O	O	X	X	X	X	O	X	O	O	O	O
Italy	O	O	X	O	O	X	X	X	X	O	X	O	O	O	O
Austria	O	O	X	X	X	X	X	O	X	O	X	O	O	O	O
Belgium	O	O	X	X	X	X	X	X	X	O	X	O	O	O	O
Denmark	O	O	X	X	X	X	X	X	X	O	X	O	O	O	O
Finland	O	O	O	O	O	X	X	X	X	O	X	O	O	O	O
Ireland	O	O	X	X	X	O	X	X	X	O	X	O	O	O	O
Norway	X	O	X	X	X	O	X	X	X	O	X	O	O	O	O
Sweden	O	X	X	X	X	X	X	X	X	O	X	O	O	O	O
Switz.	X	O	X	X	X	X	O	X	X	O	O	O	O	X	X
Portugal	O	O	X	X	X	X	X	X	X	O	X	O	O	O	O
Holland	O	O	X	X	X	O	X	X	O	O	X	O	O	O	O
Hg Kong	X	O	X	O	O	X	X	X	X	O	X	O	O	O	O
S. Africa	O	O	O	O	O	X	X	X	X	O	X	O	O	O	O
Australia	X	O	X	O	O	X	X	X	X	O	X	O	X	O	O
N. Z'land	X	O	X	O	O	X	X	X	X	O	X	O	O	O	O
Israel	O	O	X	O	O	X	X	X	X	O	X	O	O	O	O
Spain	O	O	X	X	X	X	X	X	X	O	X	O	O	O	O
Singapore	O	O	X	O	O	X	X	X	X	O	X	O	O	O	O
Malaysia	X	O	X	O	O	X	X	X	X	O	X	O	O	O	O
Turkey	X	O	X	O	O	X	X	X	X	X	X	O	O	O	O

Detailed Section
Descriptions

Key

Signal Status: O = High, X = Low

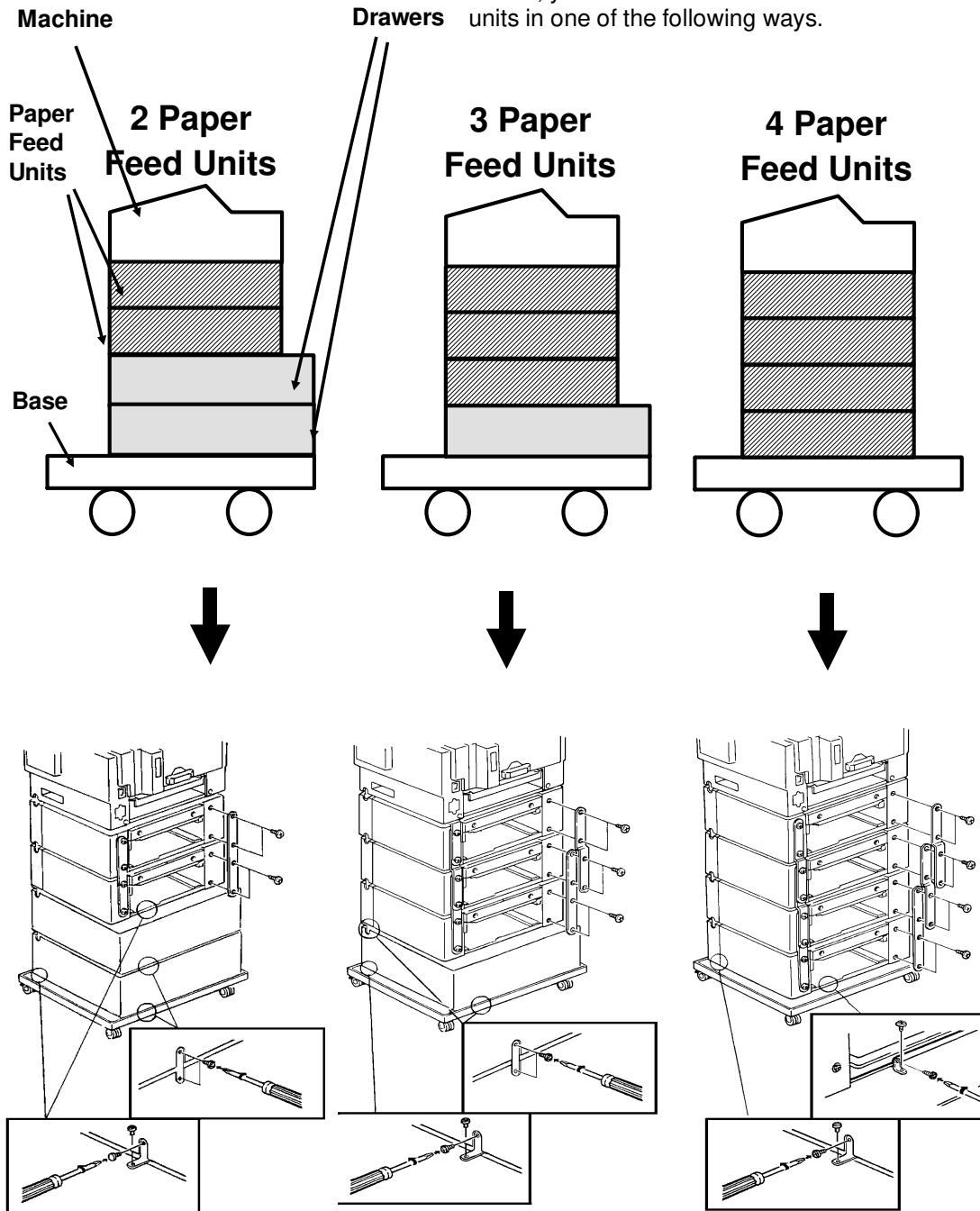
Jumper Settings: O = Closed, X = Open

3. INSTALLATION

3.1. INSTALLING OPTIONAL UNITS

3.1.1. Lower Cassette

Up to 4 of these paper feed units can be added to the machine. However, if more than one is installed, you have to install drawer and base units in one of the following ways.



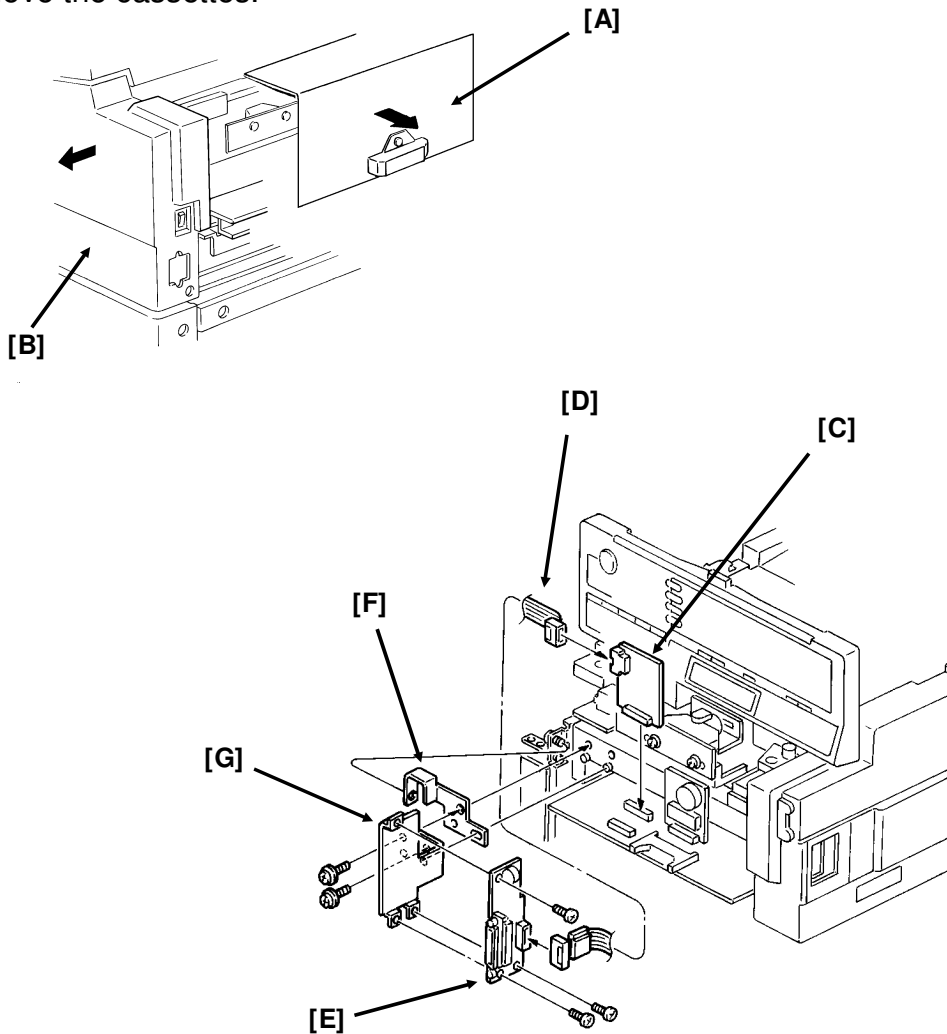
3.1.2. Hard Disk

SAF Memory Initialization

1. **Function** **6** **0** **1** **9** **9** **1** then immediately **Yes**
2. **0** **1**
3. Set bit 2 of bit switch 00 to 1.
4. **Yes** **Function**

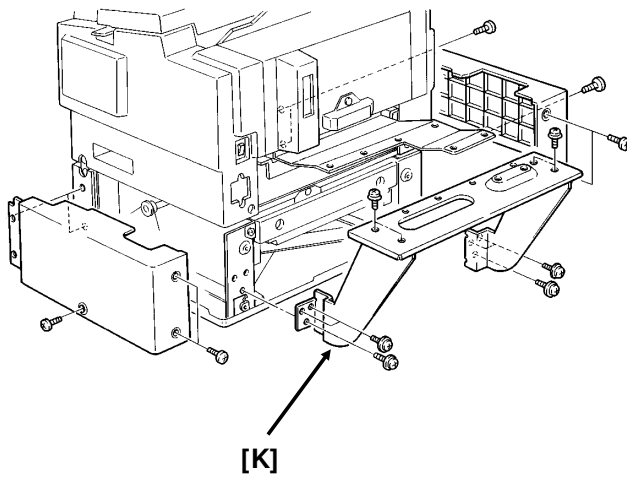
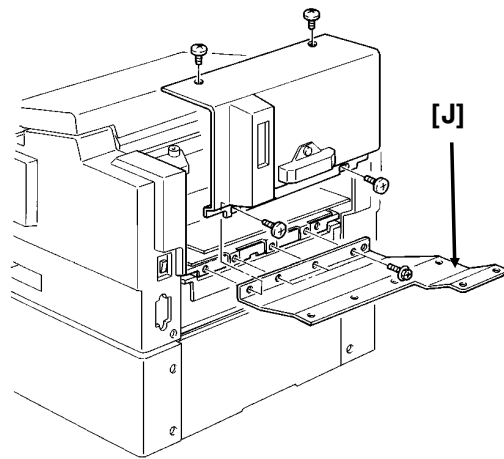
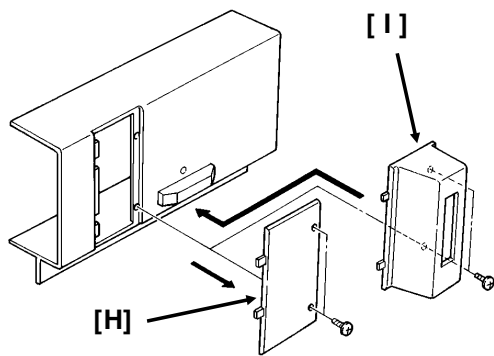
Installation Procedure

Switch off the power and unplug the machine from the wall socket. Then remove the cassettes.

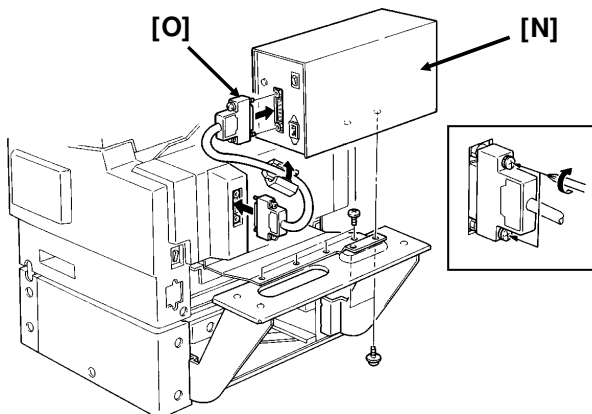
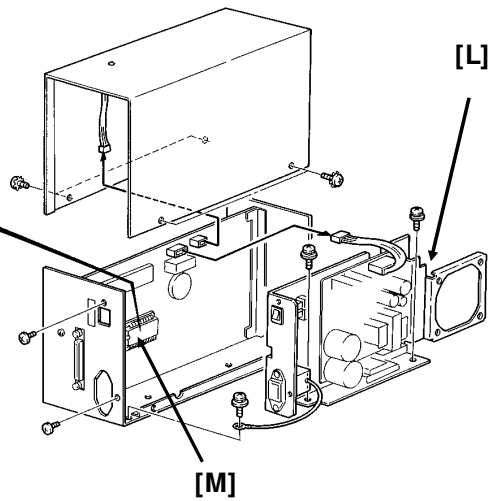
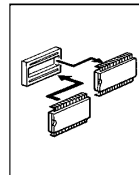


INSTALLATION INSTALLING OPTIONAL UNITS

August 19th, 1992



Before attaching [K], remove the side covers of the paper feed unit. Then, after attaching [K], put the covers back.



Change the ROM [M] on the HDIF board before reassembling the hard disk unit.

Caution: Do not plug in or switch on until everything is connected up.

Software Initialization

1. **Function** **6** **0** **1** **9** **9** **1** , then immediately **Yes**
2. **0** **1**
3. Set bit 0 of bit switch 0D to 1.
4. **Yes** **Function**
5. Turn off the power, then turn on the power after a few seconds.

3.2. INITIAL PROGRAMMING

Check the following:

- Are the country codes for NCU parameters (Function 09, parameter 00) and bit switch settings (bit switch 0F) correct for the country of installation?
- Are the NCU jumper settings correct for the country of installation?
- Do any bit switch or other settings have to be changed to match line conditions or user requirements?
- Have the correct operation panel decals and Quick Dial sheets been installed from the language kit?
- Have you programmed the serial number (Function 15, section 4-1-18)?



In some countries, the user cannot program the following items, so program them before you leave the machine.

- Telephone Line Type (Function 19, section 4-1-23)
- CSI (Function 20, section 4-1-22)

The user should program the following items after installation:

- Telephone Line Type (in some countries, this is not a user adjustment)
- RTI, TTI, and CSI (in some countries, CSI is not a user adjustment)
- ID Codes (ID Code, Confidential ID, Memory Lock ID)
- The fax machine's own telephone number
- Country code
- Area code prefix (if applicable)
- Date and Time
- Language Selection

4. SERVICE TABLES AND PROCEDURES

4.1. SERVICE LEVEL FUNCTIONS

To enter service mode, press the following sequence of keys:

Function **6** **0** **1** **9** **9** **1**

then immediately **Yes**

SERVICE FUNCTION		NO.	
01BIT SW.	02	PARA LIST	
03ERROR CODE	04	SVC MONITOR	↓

4.1.1. Bit Switch Programming (Function 01)

1. After entering service mode,
press **0** **1**

BIT SWITCH		
DF:	00000000	↑
SW:00	00000000	↓

Bit 7 is displayed at the left, and bit 0 at the right. The default settings are shown on the top line, and the current settings on the bottom.

2. • Increment bit switch: ↓
• Decrement bit switch: ↑

Example:

Display bit switch 3: ↓ x 3

BIT SWITCH		
DF:	00000000	↑
SW:03	00000000	↓

Service Tables
and Procedures

3. Adjust the bit switch.
Example: To change the value of
bit 7, press **7**

BIT SWITCH		
DF:	00000000	↑
SW:03	10000000	↓

4. Either:
- Adjust more bit switches - go to step 2.
 - Finish - **Yes**

4.1.2. System Parameter List (Function 02)

1. After entering service mode,
press **0** **2**

G3 SYSTEM PARAMETER LIST
PRESS START

2. **Start**
3. After printing, press **Function**

4.1.3. Error Code Display (Function 03)

1. After entering service mode,
press **0** **3**

ERROR CODE
CODE= 0-14 JUL 10 15:15 **↑**
↓

2. Either:
 - Scroll through the error codes using **↑** and **↓**
 - Finish - **Yes**

4.1.4. Service Monitor Report (Function 04)

1. After entering service mode,
press **0** **4**

SERVICE MONITOR REPORT
PRESS START

2. **Start**

4.1.5. Protocol Dump (Function 05)

1. After entering service mode,
press **0** **5**

G3 PROTOCOL DUMP LIST
PRESS START

2. **Start**

4.1.6. RAM Display/Rewrite/Printout (Function 06)

1. After entering service mode,
press **0** **6**

RAM	NO. —
0.MEMORY R/W	1. MEMORY DUMP

2. Either:

- Display or rewrite RAM data: **0**
Go to step 3.

MEMORY R/W	
ADDRESS=	000000 DATA= FF ↑
← →	↓

- Print a RAM dump list: **1** . Go to step 6.

MEMORY DUMP	
ADD. — H - ADD.	FFH

3. Input the address that you wish to see.

Example: **0** **0** **1** **1** **2** **2**

If necessary, use **↑** and **↓**
to increment or decrement the
RAM address.

MEMORY R/W	
ADDRESS=	001122 DATA= 00 ↑
← →	↓

4. If you wish to change the contents
of the RAM address, press **→** to
move the cursor to the data side.
Then input the new data.

Example: **F** **F**

MEMORY R/W	
ADDRESS=	001122 DATA= FF ↑
← →	↓

5. Either:

- View more addresses - **←** then go to step 3.
- Finish - **Yes** . Go to step 2.

6. Input the range of addresses that you wish to print.

Example: Addresses 22AA00 to 22BBFF

2 **2** **A** **A** **2** **2** **B** **B** **Start**

4.1.7. Checking the Counters (Function 07)

1. After entering service mode,
press **0** **7**

COUNTER R/W	NO.	—
0 COUNTER	1 PM COUNTER	
2 CTM COUNTER	3 OPU COUNTER	

2. Either:
- Check the scanned, printed, transmitted, and received page counters, and the printer and scanner jam counters: **0** . (To see the jam counters, press **0** then **↓** .)
 - Check the PM counter: **1**
 - Check the CTM counter: **2**
 - Check the OPU counter: **3**
3. To change the contents of a counter, press **→** until the required counter is highlighted on the screen, then input the new value.

4.1.8. Clearing the Counters (Function 08)

1. After entering service mode,
press **0** **8**

COUNTER CLEAR	NO.	—
0 PM COUNTER	1 CTM COUNTER	
2 OPU COUNTER		

2. Either:
- Clear the PM counter: **0**
 - Clear the CTM counter: **1**
 - Clear the OPU counter: **2**

4.1.9. NCU Parameters (Function 09)

1. After entering service mode,
press **0** **9**

NCU	NO.	—
0 NCU	1 MODEM/DTMF	

2. **0**

NCU		
NO.00=	019	↑
PRESS YES/NO		↓

3. Scroll through the parameters using and .

Enter new values at the keypad where necessary.

Example: Set NCU parameter 04 to 005.

4. To go to the next parameter:

5. To finish:

Note: Parameter 00 is the Country Code, and Parameter 01 is the Tx Level (Input the value of the Tx level x -1; for example, if the Tx level should be -9 dB, input 9).

4.1.10. Modem/DTMF Tone Tests (Function 09)

1. After entering service mode, press then

MODEM/DTMF	
NO.01= V29 9600 BPS	<input type="button" value="↑"/>
PRESS START	<input type="button" value="↓"/>

2. Scroll through the available tests using and .

Example: To do an 1100 Hz tone test.

To finish a test:

3. To finish: x 2

4.1.11. Operation Panel Tests (Function 10)

1. After entering service mode, press

OP.PANEL	NO. <input type="button" value="0"/>
0 LED	1 ALARM
2 RINGER	3 LCD

2. Either:

- Test the LEDs on the operation panel:
- Test the alarm tone:
- Test the ringer: This test is not used in this machine.
- Test the LCD:

3. To finish a test: **Stop**

4. To finish: **Yes** x 2

4.1.12. Scanner Tests (Function 11)

1. After entering service mode,
press **1** **1**

SCANNER	NO. 1
0 XE LAMP	1 ADF

2. Either:

- Switch on the xenon lamp: **0** **Start**
- Test the auto document feeder: Place a sheet of paper in the document feeder, then **1** **Start**

3. To finish a test: **Stop**

4. To finish: **Yes** x 2

4.1.13. Printer Tests (Function 12)

1. After entering service mode,
press **1** **2**

PRINTER	NO. 1
0 PATTERN	1 MECH TEST
2 FAN MOTOR	3 CTM MOTOR



2. Either:

- Print a test pattern: **0** . Go to step 3.

PATTERN	NO. 1
0 DIAGONAL 1	1 DIAGONAL 2
2 VERTICAL	3 GRAND PRIX 1

- Test the printer mechanism: **1** **Start**
- Test the fan motor: **2** **Start**
- Test the CTM motor: First, remove the CTM, then press **3** **Start**

To finish a test: **Stop**

3. Press a key from 0 to 5, depending on the required pattern. Use  and  to see what patterns are available.


4. **Start**

A test pattern is printed.

5. To finish: **Yes** x 2

4.1.14. RAM Tests (Function 13)

1. After entering service mode, press **1** **3**

RAM TEST	NO.	
0 SRAM	1 SAF	
2 PAGE MEMORY		

2. Either:

- Test the SRAM: **0** **Start**
- Test the SAF: **1** **Start**
- Test the page memory: **2** **Start**



If there is a problem, a display of the following type will occur.


SAF
PRESS START
ADDRESS= 300002 W= 55 R= 00

Keep a note of the information on the display, then press **Start** to resume testing.

3. When the test has finished, "OK" is displayed. Press **Yes** to finish.

4.1.15. Service Station Telephone Number (Function 14)

1. After entering service mode, press **1** **4**

S.S.NO	ENTER FAX NUMBER
	NO TO CANCEL

2. Input the telephone number of the service station that will receive Auto Service calls from this machine.

Then press **Yes**.

If the ISDN Option kit has been installed, press the Line Selector key to select either G3 or G4 before inputting the number.

4.1.16. Serial Number (Function 15)

1. After entering service mode,
press **1** **5**

SERIAL NO.



2. Enter the machine's serial no at the keypad.

To correct a mistake: **No**

3. If the display is correct: **Yes**

4.1.17. File Transfer (Function 16)

1. After entering service mode,
press **1** **6**

FILE TRANSFER ENTER FAX NUMBER

NO TO CANCEL



2. Input the telephone number of the fax machine to which you wish to transfer all the files. Then press **Yes** **Start** .
If the ISDN Option kit has been installed, press the Line Selector key to select either G3 or G4 before inputting the number.

4.1.18. Hard Disk Initialization (Function 17)

1. After entering service mode,
press **1** **7**

HD

NO.



0 INITIAL

2. **0**

The hard disk is initialized.

4.1.19. Group 4 Communication Parameters (Function 18)

This function is described in the service manual for the optional ISDN kit.

4.1.20. Programming the CSI (Function 19)

This procedure is for use in countries where CSI programming is a service mode.

1. After entering service mode,
press **1** **9**

CSI	YES TO END
<div></div>	

2. Input the CSI (not more than 20 dig-
its)

CSI	YES OR CLR • NO
<div>+ 44712121234</div>	

Note: If you wish to input a '+' sign to signify the international dial access code, press **31** then **1**

4. **Yes** **Function**

4.1.21. Setting the Telephone Line Type (Function 20)

This procedure is for use in countries where telephone line type selection is a service mode.

1. After entering service mode,
press **2** **0**

PSTN LINE TYPE	SELECT	←	→
PD	TT	↑	↓
YES TO END			

2. If the setting needs changing,
press **←** or **→** until the re-
quired setting is highlighted in re-
verse video.
3. **Yes** **Function**

Service Tables
and Procedures

4.2. BIT SWITCHES**WARNING**

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.

Bit Switch 00		
	FUNCTION	COMMENTS
0	MTF process 0: Enabled 1: Disabled	0: The MTF process is used when required by the software. 1: The MTF process is never used.
1	RAM reset level 2 1: Reset	When this bit is set to 1, all items stored in the RAM are reset except the clock, and then this bit changes back to 0 automatically. Also, all image files in the SAF memory are erased.
2	RAM reset level 3 1: Reset Note: RAM reset level 1 is a RAM adjustment. It is not described in this manual.	When this bit is set to 1, some items stored in the RAM are reset, then this bit changes back to 0. All items are reset except the bit switch and NCU parameter settings, clock, own tel. no., CSI, RTI, TTI, Quick Dials, Speed Dials, Groups, and the TCR memory. Also, all image files in the SAF memory are erased. This bit switch is recommended for use when it is necessary to clear the SAF, as fewer RAMs will need reprogramming.
3	Not used	Do not change the factory setting.
4	Inclusion of technical data on the TCR 0: No 1: Yes	1: Instead of the personal code, the following data are listed on the TCR. First number: Final modem rate (for example, 14.4K means 14,400 bps) Second and third numbers (Rx mode only): These are a measure of the errorrate. The left hand figure is the low byte and the right hand figure is the high byte. In general, a larger number means more errors. These numbers are fixed at 0 for tx mode. Fourth number: Cable equalizer; 00 = Equalizer is Off, 01 = Low, 10 = Medium, 11 = High
5	Monitor speaker during video data communication (tx and rx) 0: Disabled 1: Enabled	Used for testing. Set this bit to 1 to hear the fax data signal (phase C of CCITT T.30 protocol). Make sure that you reset this bit after testing.
6	Not used	Do not change the factory setting.
7	Communication parameter display 0: Disabled 1: Enabled	This is a fault-finding aid. The LCD shows the key parameters (see the next page). This is normally disabled because it cancels the CSI display for the user. Make sure that you reset this bit after testing.

Communication parameter display

Mode	DCS: CCITT G3 NSS: Non-standard G3
Modem rate	144S: 14,400 bps with short trainng (V.17) 144L: 14,400 bps with long trainng (V.33) 120S: 12,000 bps with short trainng (V.17) 120L: 12,000 bps with long trainng (V.33) 96TS: 9,600 bps using TCM, with short training (V.17) 96TL: 9,600 bps using TCM, with long training (V.33) 72TS: 7,200 bps using TCM, with short training (V.17) 72TL: 7,200 bps using TCM, with long training (V.33) 96: 9600 bps 72: 7200 bps 48: 4800 bps 24: 2400 bps
Communica- tion mode	ECM: With ECM SSC: Using SSC EFC: Using EFC NML: With no ECM, SSC, or EFC
Compres- sion mode	MMR: MMR compression MR: MR compression MH: MH compression
Resolution	SSF: Fine, transmitted at 8 x 15.4 dots per mm PSF: Fine, transmitted at 8 x 7.7 dots per mm and smoothed at the rx side DTL: Detail STD: Standard
I/O Rate	0M: 0 ms/line 2/M: 2.5 ms/line 5M: 5 ms/line 10M: 10 ms/line 20M: 20 ms/line 40M: 40 ms/line
Width and reduction	= A4: A4 (8.3"), no reduction = B4: B4 (10.1"), no reduction = A3: A3 (11.7"), no reduction > A4: Reduced to A4 (8.3") before transmission > B4: Reduced to B4 (10.1") before transmission

Bit Switch 01		
	FUNCTION	COMMENTS
0	LCD contrast	Use these bit switches to adjust the brightness of the LCD on the operation panel.
	Bit 2 1 0 Contrast	
1	0 0 0 Brightest	
	0 0 1 ↓	
2	↓	
	1 1 0 ↓	
	1 1 1 Darkest	
3	Memory read/write by RDS	(0,0): At any time, an RDS system can read or write RAM data such as TTI and bit switches. (0,1), (1,0): Normally, RDS systems are locked out, but the user can temporarily switch RDS on to allow an RDS operation to take place. RDS will automatically switch off again after a certain time, which is stored in a RAM address (see section 4-5). Note that, if an RDS operation takes place, RDS will not switch off until this time limit has expired. (1,1): All RDS systems are always locked out.
	Bit 4 3 Setting	
	0 0 Always enabled	
	0 1 User selectable	
4	1 0 User selectable	
	1 1 Always disabled	
5	Dedicated transmission parameter programming/printing all SAF files/erasing all SAF files 0: Disabled 1: Enabled	This bit must be set to 1 before attempting to program dedicated transmission parameters (using Function 31 or 32), or printing all files stored in the SAF memory (using Function 24) or erasing all files stored in the SAF memory (using Function 21). After finishing with these operations, return this bit to 0.
6	Not used	Do not change the factory setting.
7	Auto Service Call for PM 0: Enabled 1: Disabled	0: The machine will send an Auto Service Call when the PM interval has expired. This interval is adjustable by RAM address. The default setting is every 30,000 copies (based on the Print counter). 1: The user will do maintenance as explained in the Operator's Manual whenever problems occur.

Bit Switch 02			
	FUNCTION		COMMENTS
0	Page separation mark 0: Enabled 1: Disabled		0: 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: No marks are printed.
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 for details.
2	Reduction of the length of received data 0: Enabled 1: Disabled		This bit determines whether incoming pages are reduced to fit on the copy paper if they are almost the same length as the copy paper in the cassette. See section 2-2 for details.
3	Not used		Do not change the factory settings.
4			
5	Text/photo determination during scanning 0: Enabled 1: Disabled		If this is set at 0, the scanner will detect whether a pixel is part of a photograph or part of a text area, and process it accordingly.
6	Maximum transmittable document length Bit 7 6 Setting 0 0 600 mm 7 0 1 1200 mm 1 0 14 m 1 1 100 m		If the user wants to send very long documents such as well logs, use the 14 m or 100 m setting.

Bit Switch 03		
	FUNCTION	COMMENTS
0	Dialing with the handset off-hook 0: Enabled 1: Disabled	If this bit is 1, the user will not be able to dial if the handset is off hook.
1	Lifetime of polling standby files in the memory 0: Erased after being polled 1: Kept until user erases	0: Messages stored for polling transmission will be erased immediately after polling. 1: This setting allows the user to keep messages in the memory to be polled by more than one station.
2	Inclusion of communications on the TCR when no image data was exchanged. 0: No 1: Yes	If communication did not reach phase 3 of CCITT T.30 protocol (such as for a telephone call), this communication can be listed on the TCR if this bit is at 1.
3	Printing of the error code on the error report 0: No 1: Yes	If this bit is 1, error codes are printed on the error reports for the user.
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 occurred in the data. Such errors are caused by a noisy line, for example.
5	Printing the TTI in copy mode 0: No 1: Yes	If this bit is 1, the TTI stored in the machine is printed at the top of the copy.
6	Printing the received RTI/CSI 0: No 1: Yes	In addition to the TTI, the other end's RTI or CSI will be printed on top of the pages that the machine receives.
7	Reconstruction time for the first line in receive mode 0: 6 s 1: 10 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. If this occurs, set this bit to 1 to give the sending machine more time to send data.

SERVICE TABLES AND PROCEDURES
BIT SWITCHES

August 19th, 1992

Bit Switch 04						
	FUNCTION			COMMENTS		
0	Compression modes available in receive mode			These bits determine what capabilities are informed to the transmitting side in the protocol exchange.		
	Bit 1	0	Modes			
	0	0	MH only			
	0	1	MR or MH			
	1	0	MR or MH, with EFC			
1	1	1	MMR, MR, or MH, with EFC			
2	Error counting method 0: 10 (20) [40] 1: In accordance with the settings of bits 3 to 7			The machine counts data errors caused by a noisy line or defective machine. 0: If the count reaches 10 (Standard mode), 20 (Detail mode), or 40 (Fine mode), the machine sends RTN to the other end in reply to the post-message command. As 10 (or 20 or 40) good lines cause the count to decrement, RTN will only occur in bad conditions.		
3	Burst error threshold			If there are more consecutive error lines in the received page than the threshold specified by these bits, the page is rejected. Values in parenthesis are for Detail resolution, and those in square brackets are for Fine resolution.		
4	Bit 4	3	Threshold			
	0	0	3 (6) [12]			
	0	1	4 (8) [16]			
	1	0	5 (10) [20]			
	1	1	6 (12) [24]			
5	Error line ratio			If the number of error lines divided by the total number of lines reaches the value determined by the settings of these bits, RTN will be sent to the other end.		
6	Bit	7	6		5	Value
	0	0	0			5%
	0	0	1			6%
7	0	1	0			7%
	0	1	1			8%
	1	0	0			9%
	1	0	1		10%	

**Service Tables
and Procedures**

Bit Switch 05			
	FUNCTION		COMMENTS
0	Compression modes available in transmit mode		These bits determine what capabilities are informed to the receiving side in the protocol exchange.
	Bit 1	0 Modes	
	0	0 MH only	
1	0	1 MR or MH	
	1	0 MR or MH, with EFC	
	1	1 MMR, MR, or MH, with EFC	
2	PABX dial tone detection 0: Enabled 1: Disabled		0: PABX dial tone is detected in accordance with the parameters programmed in RAM. The machine will wait for the dial tone before trying to gain access to the PSTN.
3	PSTN dial tone detection 0: Enabled 1: Disabled		0: PSTN dial tone is detected in accordance with the parameters programmed in RAM. The machine will wait for the dial tone before dialing out.
4	Busy tone detection 0: Enabled 1: Disabled		0: Busy tone is detected in accordance with the parameters programmed in RAM. The machine will not have to wait out the CCITT T1 time before hanging up if the line is busy.
5	Not used		Do not change the factory setting.
6	PSTN access method through PABX		Set these bits to match the type of signal accepted by the PABX. If there is no PABX between the machine and the network, set both bits to 0.
	Bit 7	6 Method	
7	0	0 No PABX	
	0	1 Loop Start	
	1	0 Not used	
	1	1 Flash Start	

Bit Switch 06			
	FUNCTION		COMMENTS
0	PSTN access number		Program this bit switch if the machine is behind a PABX. The access number is the number the user must dial to get an outside line. If the machine detects the access number at the start of a telephone number, it will connect with the PABX, pause for a few seconds, then dial the number. Example: If the access number for the PABX is 9, the bit switch must be F9. To do this, set all bits to 1 except bits 1 and 2. If there is no PABX, set all bits to 1.
1	Access No.	Hex value of bit switch	
	0	F0	
2	↓	↓	
	9	F9	
3			
	00	00	
4	↓	↓	
	99	99	
5			
6			
7			



Bit Switch 07		
	FUNCTION	COMMENTS
0	Back to back test 0: Disabled 1: Enabled	Set this bit to 1 when you wish to do a back to back test. Note that this machine has jumpers on the NCU for supplying line voltage during a back to back test.
1	Short preamble 0: Enabled 1: Disabled	If this bit is 0, the Short Preamble feature is switched on.
2	AI short protocol (transmission and reception) 0: Enabled 1: Disabled	If this bit is 0, the AI Short Protocol feature is switched on.
3	Echo countermeasure 0: Enabled 1: Disabled	If the setting is 1, the machine will hang up if it receives the same signal twice. If the setting is 0, the machine will ignore echoes from the line.
4	DIS detection number 0: 1 1: 2	The machine will send DCS (G3 set-up signal) if it receives DIS. If echoes are frequent, setting this bit to 1 will allow the machine to wait for the second DIS before sending DCS.
5	ECM 0: On 1: Off	If this bit is 0, ECM is switched on.
6	Post-message response timing (rx) 0: After feed-out 1: When the leading edge reaches the copy feed-out sensor	0: Data cannot be stored in the SAF during reception if the memory is full, so, if this bit is set to 0, the machine will wait until the page has been fed out. However, communication will take longer to complete. 1: The post message response is sent earlier, but the paper has not been fed out yet, so if there is a jam after this, data may be lost. This bit is ignored during memory reception.
7	FTZ protocol 0: Disabled 1: Enabled	Set this bit to 1 in Germany.

Bit Switch 08 (Transmission)						
	FUNCTION					COMMENTS
0	Initial Tx modem rate					These bits set the initial starting modem rate for transmission. This rate may fall back to a slower rate depending on line conditions and the remote terminal's capabilities.
	Bit 3	Bit 2	Bit 1	Bit 0	Setting (bps)	
1	1	1	0	1	14,400	
	1	1	0	0	12,000	
2	1	0	1	1	9,600 TCM	
	0	0	1	1	9,600	
3	1	0	1	0	7,200 TCM	
	0	0	1	0	7,200	
	0	0	0	1	4,800	
	0	0	0	0	2,400	
4	Modem training type when sending at 12,000 or 14,400 bps 0: V.17 (short) 1: V.33 (long)					0: Training is shorter so communication costs are reduced. However, the communication is not so reliable. 1: The longer training time ensures a higher reliability for the communication.
5	Not used					Do not change the factory setting.
6	Cable equalizer (tx mode)					Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. Also, try using the cable equalizer if one or more of the following symptoms occurs. <ul style="list-style-type: none">• Communication error• Modem rate fallback occurs frequently.
	Bit 7	Bit 6	Setting			
7	0	0	None			
	0	1	Low			
	1	0	Medium			
	1	1	High			

SERVICE TABLES AND PROCEDURES
BIT SWITCHES

August 19th, 1992

Bit Switch 09 (Transmission)			
	FUNCTION		COMMENTS
0	CNG signal transmission in manual transmission mode 0: Disabled 1: Enabled		CNG (calling tone) is normally used by auto-dial fax machines to alert a manual machine operator that an auto-transmitting machine is on the line waiting to transmit. This tone is not needed for manual operation (full number dialing).
1	Wrong connection prevention method		(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.
2	Bit 2	Bit 1 Setting	
	0	0 None	
	0	1 8 digit CSI	
	1	0 4 digit CSI	
	1	1 CSI/RTI	
3	Closed network (transmission) 0: Disabled 1: Enabled		1: Transmission will not go ahead if the ID code of the other terminal does not match the ID code of this terminal. This feature may not be reliable when communicating with another maker's product.
4	Monitor speaker status during memory transmission 0: Off 1: On		If this bit is 1, the speaker will operate during memory transmission. Keep this bit at 0 if the user complains about the noise from the speaker.
5	Not used		Do not change the factory settings.
6			
7			

Bit Switch 0A (Reception)						
	FUNCTION					COMMENTS
0	Initial Rx modem rate					The setting of these bits is used to inform the sending machine of the initial starting modem rate for the machine in receive mode. If 9,600 bps presents a problem during reception, use a lower setting.
	Bit 3	Bit 2	Bit 1	Bit 0	Setting (bps)	
1	1	1	0	1	14,400	
	1	1	0	0	12,000	
2	1	0	1	1	9,600 TCM	
	0	0	1	1	9,600	
3	1	0	1	0	7,200 TCM	
	0	0	1	0	7,200	
	0	0	0	1	4,800	
	0	0	0	0	2,400	
4	Modem training type when receiving at 12,000 or 14,400 bps 0: V.17 (short) 1: V.33 (long)					0: Training is shorter so communication costs are reduced. However, the communication is not so reliable. 1: The longer training time ensures a higher reliability for the communication.
5	Hardware equalizer (rx mode) 0: On 1: Off					The effects of this equalizer are similar to a cable equalizer. However, the machine may experience problems during ISDN G3 communications if this equalizer is kept on.
6	Cable equalizer (rx mode)					Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. Also, try using the cable equalizer if one or more of the following symptoms occurs. <ul style="list-style-type: none">• Communication error with error codes such as 0-20, 0-23, etc.• Modem rate fallback occurs frequently.
	Bit 7	Bit 6	Setting			
7	0	0	None			
	0	1	Low			
	1	0	Medium			
	1	1	High			

The setting of these bits is used to inform the sending machine of the initial starting modem rate for the machine in receive mode. If 9,600 bps presents a problem during reception, use a lower setting.

0: Training is shorter so communication costs are reduced. However, the communication is not so reliable.
1: The longer training time ensures a higher reliability for the communication.

The effects of this equalizer are similar to a cable equalizer. However, the machine may experience problems during ISDN G3 communications if this equalizer is kept on.

Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange.

Also, try using the cable equalizer if one or more of the following symptoms occurs.

- Communication error with error codes such as 0-20, 0-23, etc.
- Modem rate fallback occurs frequently.

SERVICE TABLES AND PROCEDURES
BIT SWITCHES

August 19th, 1992

Bit Switch 0B (Reception)				
	FUNCTION		COMMENTS	
0	Closed network (reception) 0: Disabled 1: Enabled		1: Reception will not go ahead if the ID code of the other terminal does not match the ID code of this terminal. This feature may not be reliable when communicating with another maker's product.	
1	Training error tolerance 0: Type 1 1: Type 2		This bit determines the values available with bits 2 and 3.	
2	Training error tolerance		Type 1 can be used anywhere. Type 2 is normally used only in Europe.	
3	Bit	3 2	Type 1	Type 2
		0 0	15	14
		0 1	10	9
		1 0	2	4
		1 1	0	1
4	Not used		Do not change the factory settings.	
5				
6	Printout of the message when acting as a transfer broadcasting station 0: No 1: Yes			
7	Transmission of the Transfer Result Report to the transfer requesting station 0: Always 1: Only if an error occurred			

Bit Switch 0C		
	FUNCTION	COMMENTS
0	European protocol requirements 0: Disabled 1: Enabled	Adjust these bits in accordance with the country of installation.
1	German dialling requirements 0: Disabled 1: Enabled	
2	Austrian dialling requirements 0: Disabled 1: Enabled	
3	Norwegian dialling and protocol requirements 0: Disabled 1: Enabled	
4	Danish dialling requirements 0: Disabled 1: Enabled	
5	French requirements 0: Disabled 1: Enabled	
6	Swiss requirements 0: Disabled 1: Enabled	
7	Not used	Do not change the factory setting.

Bit Switch 0D		
	FUNCTION	COMMENTS
0	Hard disk 0: Not installed 1: Installed	Set this bit to 1 if you install a hard disk in the machine.
1	Not used	Do not change the factory settings.
2		
3		
4		
5		
6		
7		

Bit switch 0E is not used. Do not change any of the factory settings.

SERVICE TABLES AND PROCEDURES
BIT SWITCHES

August 19th, 1992

Bit Switch 0F		
	FUNCTION	COMMENTS
0 to 7	Country Code	This country code determines the factory settings of a wide range of bit switches and RAM addresses. However, it has no effect on the NCU parameter settings and communication parameter RAM addresses; these are determined by the setting of NCU parameter 00 (function 09).
	00: France 10: Not used	
	01: Germany 11: USA	
	02: UK 12: Asia	
	03: Italy 13: Japan	
	04: Austria 14: Hong Kong	
	05: Belgium 15: South Africa	
	06: Denmark 16: Australia	
	07: Finland 17: New Zealand	
	08: Ireland 18: Singapore	
	09: Norway 19: Malaysia	
	0A: Sweden	
	0B: Switzerland	
	0C: Portugal	
	0D: Holland	
	0E: Spain	
	0F: Israel	

Bit Switch 10		
	FUNCTION	COMMENTS
0	Pulse dialling method	P= Number of pulses sent out, N= Number dialled. Do not change the factory settings.
1	Bit 1 Bit 0 Setting	
	0 0 Normal (P= N)	
	0 1 Oslo (P= 10 - N)	
	1 0 Sweden (N+ 1)	
	1 1 Not used	Do not change the factory settings.
2	Not used	
3		
4		
5		
6		
7		

Service Tables
and Procedures

Bit switch 11 to 1A are not used. Do not change the factory settings.

Bit Switch 1B		
	FUNCTION	COMMENTS
0	Not used	Do not change the factory setting.
1	Default reception mode for G4 reception 0: Memory 1: Immediate	0: Incoming messages are stored to memory, printed, and then erased if there were no problems. 1: Messages are not stored to memory during reception.
2	Not used	Do not change the factory settings.
3		
4		
5		
6		
7		

Bit switch 1C is not used. Do not change the factory settings.

Bit Switch 1D		
	FUNCTION	COMMENTS
0	Emergency calls using 999 0: Enabled 1: Disabled	This bit is only used in the UK. If this bit is at 1, the machine cannot dial 999.
1	Not used	Do not change the factory settings.
2		
3		
4		
5		
6		
7		

SERVICE TABLES AND PROCEDURES
BIT SWITCHES

August 19th, 1992

Bit Switch 1E		
	FUNCTION	COMMENTS
0	Operator call if no response is received in reply to NSF/DIS 0: Yes 1: No	Set this bit to 1 if the user complains about the operator call tone from the buzzer when no reply is received to NSF or DIS.
1	Scrambling method used for secure transmission	There are three types of scrambling algorithm available for use with this feature. They are all of about the same complexity. The type used is informed in the NSF signal.
2	Bit 2 1 Method 0 0 Type 1 1 0 Type 2 0 1 Type 3 1 1 Type 3	
3	Secure transmission demonstration 0: Off 1: On	
4	Not used	
5		Do not change the factory settings.
6		
7	Error report printout 0: On 1: Off	If this bit is at 1, the error report will not be printed when an error occurs.

Bit switch 1F is not used. Do not change the factory settings.

Factory Settings

Switch	Settings	Switch	Settings
00	0 0 0 0 0 0 0 0	10	0 0 0 0 0 0 0 0
01	0 0 0 0 0 1 0 0	11	0 0 0 0 0 0 0 0
02	0 1 0 0 0 0 1 0	12	0 0 0 0 0 0 0 0
03	0 1 0 0 0 0 0 0	13	0 0 0 0 0 0 0 0
04	0 0 0 0 0 0 1 1	14	0 0 0 0 0 0 0 0
05	0 0 1 0 0 0 1 1	15	0 0 0 0 0 0 0 0
06	1 1 1 1 1 1 1 1	16	0 0 0 0 0 0 0 0
07	0 1 0 0 0 0 1 0	17	0 0 0 0 0 0 0 0
08	0 1 0 0 1 1 0 1	18	0 0 0 0 0 0 0 0
09	0 0 0 0 0 0 0 1	19	0 0 0 0 0 0 0 0
0A	0 0 0 0 1 1 0 1	1A	0 0 0 0 0 0 0 0
0B	0 1 0 0 0 0 0 0	1B	0 0 0 0 0 0 0 0
0C	0 0 0 0 0 0 0 1	1C	0 0 0 0 0 0 0 0
0D	0 0 0 0 0 0 0 0	1D	0 0 0 0 0 0 0 0
0E	0 0 0 0 0 0 0 0	1E	0 0 0 0 0 0 0 1
0F	0 0 0 0 0 0 1 0	1F	0 0 0 0 0 0 0 0

When you change the country code to the code for one of the following countries, the following values will change automatically.

Germany

Bit Switch 02: 01000110
 Bit Switch 03: 01000001
 Bit Switch 05: 00100111

Bit Switch 07: 11000110
 Bit Switch 0C: 00000011
 Bit Switch 1D: 00001000

UK

Bit Switch 1D: 00000001

Austria

Bit Switch 0C: 00000101

Denmark

Bit Switch 0C: 00010001

Norway

Bit Switch 0C: 00001001

Sweden

Bit Switch 10: 00000010

Switzerland

Bit Switch 0C: 01000001

4.3. NCU PARAMETERS

The following tables give the RAM addresses and units of calculation of the parameters that the machine uses for ringing signal detection and automatic dialling. 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 09); if Function 09 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.

The RAM addresses are quoted as three-figure numbers. When using Function 09, add three zeroes. For example, for address 36D, input 00036D

Address	Function	Unit	Remarks
369	Country code [NCU parameters only]	Hex	Function 09 (parameter 00).
36D	Line current detection time	20 ms	Line current is not detected if 36D contains FF.
36E	Line current wait time		
36F	Line current drop detect time		
370	PSTN dial tone upper frequency limit (HIGH)	Hz (BCD)	See Note 2.
371	PSTN dial tone upper frequency limit (LOW)		
372	PSTN dial tone lower frequency limit (HIGH)		
373	PSTN dial tone lower frequency limit (LOW)		
374	PSTN dial tone detection time	20 ms	If 374 contains FF, the machine pauses for the pause time (address 379/37A).
375	PSTN dial tone reset time (HIGH)		
376	PSTN dial tone reset time (LOW)		
377	PSTN dial tone continuous tone time		
378	PSTN dial tone permissible drop time		
379	PSTN wait interval (HIGH)		
37A	PSTN wait interval (LOW)		
37B	Ringback tone detection time	20 ms	Detection is disabled if this contains FF.
37C	PSTN busy tone upper frequency limit (HIGH)	Hz (BCD)	If 37C is FF, detection is disabled. See Note 2.
37D	PSTN busy tone upper frequency limit (LOW)		
37E	PSTN busy tone lower frequency limit (HIGH)		
37F	PSTN busy tone lower frequency limit (LOW)		

**Service Tables
and Procedures**

Address	Function	Unit	Remarks
380	PABX dial tone upper frequency limit (HIGH)	Hz (BCD)	See Note 2.
381	PABX dial tone upper frequency limit (LOW)		
382	PABX dial tone lower frequency limit (HIGH)		
383	PABX dial tone lower frequency limit (LOW)		
384	PABX dial tone detection time	20 ms	If 384 contains FF, the machine pauses for the pause time (389/38A).
385	PABX dial tone reset time (HIGH)		
386	PABX dial tone reset time (LOW)		
387	PABX dial tone continuous tone time		
388	PABX dial tone permissible drop time		
389	PABX wait interval (HIGH)		
38A	PABX wait interval (LOW)		
38B	PABX ring back tone detection time	20 ms	Detection is disabled if this contains FF.
38C	PABX busy tone upper frequency limit (HIGH)	Hz (BCD)	If this is FF, detection is disabled. See Note 2.
38D	PABX busy tone upper frequency limit (LOW)		
38E	PABX busy tone lower frequency limit (HIGH)		
38F	PABX busy tone lower frequency limit (LOW)		
390	Busy tone ON time: range 1	20 ms	
391	Busy tone OFF time: range 1		
392	Busy tone ON time: range 2		
393	Busy tone OFF time: range 2		
394	Busy tone ON time: range 3		
395	Busy tone OFF time: range 3		
396	Busy tone ON time: range 4		
397	Busy tone OFF time: range 4		
398	Busy tone continuous tone detection time		
399	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). <div>Tolerance (±) Bit 1 0 0 0 75% 0 1 50% 1 0 25% 1 1 12.5%</div> Bits 7, 6, 5, 4 - number of cycles required for detection		

SERVICE TABLES AND PROCEDURES
NCU PARAMETERS

August 19th, 1992

Address	Function	Unit	Remarks
39A	International dial tone upper frequency limit (HIGH)	Hz (BCD)	See Note 2.
39B	International dial tone upper frequency limit (LOW)		
39C	International dial tone lower frequency limit (HIGH)		
39D	International dial tone lower frequency limit (LOW)		
39E	International dial tone detection time	20 ms	If 39E contains FF, the machine pauses for the pause time (3A3/3A4).
39F	International dial tone reset time (HIGH)		
3A0	International dial tone reset time (LOW)		
3A1	International dial tone continuous tone time		
3A2	International dial tone permissible drop time		
3A3	International dial wait interval (HIGH)		
3A4	International dial wait interval (LOW)		
3A5	Country dial tone upper frequency limit (HIGH)	Hz (BCD)	See Note 2.
3A6	Country dial tone upper frequency limit (LOW)		
3A7	Country dial tone lower frequency limit (HIGH)		
3A8	Country dial tone lower frequency limit (LOW)		
3A9	Country dial tone detection time	20 ms	If 3A9 contains FF, the machine pauses for the pause time (3AE/3AF).
3AA	Country dial tone reset time (HIGH)		
3AB	Country dial tone reset time (LOW)		
3AC	Country dial tone continuous tone time		
3AD	Country dial tone permissible drop time		
3AE	Country dial wait interval (HIGH)		
3AF	Country dial wait interval (LOW)		
3B0	Grounding time (ground start mode)	20 ms	The Gs relay is closed for this interval.
3B1	Break time (flash start mode)	1 ms	The Di relay is open for this interval.
3B2	International dial access code	BCD	For a code of 100: 3B2 - F1 3B3 - 00
3B3			

Service Tables
and Procedures

Address	Function	Unit	Remarks
3B4	PABX 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 3C9 is used.
3B5	Progress tone detection level, and cadence detection enable flags	Bit 7 Bit 6 dBm 1 1 -49.5 1 0 -40.5 0 1 -32.5 0 0 -26.5 Bits 3, 2, 1, 0 - See Note 3.	
3B6	CCITT T1 time	2.56 s	
3B7	Max. number of dials per station (not using memory)	1	
3B8	Redial interval (not using memory)	1 min	
3B9	Interval between dialling to different stations	2.56 s	
3BB	Acceptable ringing signal frequency: range 1, upper limit	1000/ N (Hz). N is the value stored using Function 09.	Function 09 (parameter 02).
3BC	Acceptable ringing signal frequency: range 1, lower limit		Function 09 (parameter 03).
3BD	Acceptable ringing signal frequency: range 2, upper limit		Function 09 (parameter 04).
3BE	Acceptable ringing signal frequency: range 2, lower limit		Function 09 (parameter 05).
3BF	Number or rings until a call is detected	1	Function 09 (parameter 06).
3C0	Minimum required length of the first ring	20 ms	See Note 6. Function 09 (parameter 07).
3C1	Minimum required length of the second and subsequent rings		Function 09 (parameter 08).
3C2	Ringing signal detection reset time (HIGH)		Function 09 (parameter 09).
3C3	Ringing signal detection reset time (LOW)		Function 09 (parameter 10).
3C4	Time between opening or closing the Ds relay and opening the Di relay	1 ms	See Notes 5 and 8. Function 09 (parameter 11).
3C5	Break time for pulse dialling		See Note 5. Function 09 (parameter 12).
3C6	Make time for pulse dialling		See Note 5. Function 09 (parameter 13).
3C7	Time between final Di relay closure and Ds relay opening or closing		See Notes 5 and 8. Function 09 (parameter 14).

SERVICE TABLES AND PROCEDURES
NCU PARAMETERS

August 19th, 1992

Address	Function	Unit	Remarks
3C8	Minimum pause between dialled digits (pulse dial mode)	10 ms	See Note 5. Function 09 (parameter 15).
3C9	Time waited when a pause is entered at the operation panel		Function 09 (parameter 16).
3CA	DTMF tone on time	1 ms	Function 09 (parameter 17).
3CB	DTMF tone off time		Function 09 (parameter 18).
3CC	DTMF tone attenuation value	-dBm x 0.5	Function 09 (parameter 19). See Note 7.
3CD	Tx level from the modem	- dBm	Function 09 (parameter 01).
3CE	2100 Hz tone detection level	-1 x 3CD - 0.5N (dB)	N is the value stored in the RAM address.
3CF	1100 Hz tone detection level		
3D0	800 Hz tone detection level		
3D1	Modem turn-on level	-38 - 0.5N (dBm)	All countries: -43.5 dBm (0B[H]), except for Germany (-48 dBm, 18[H]) USA (-43 dBm, 0C[H]) N is the value stored in the RAM address.
3D9	Acceptable CED detection range; upper frequency (HIGH)	BCD (Hz)	Factory setting: 2200 Hz
3DA	Acceptable CED detection range; upper frequency (LOW)		
3DB	Acceptable CED detection range; lower frequency (HIGH)		Factory setting: 2000 Hz
3DC	Acceptable CED detection range; lower frequency (LOW)		
3DD	CED detection time	20 ms ± 20 ms	Factory setting: 200 ms
3DE	Acceptable CNG detection range; upper frequency (HIGH)	BCD (Hz)	Factory setting: 1200 Hz
3DF	Acceptable CNG detection range; upper frequency (LOW)		
3E0	Acceptable CNG detection range; lower frequency (HIGH)		Factory setting: 1000 Hz
3E1	Acceptable CNG detection range; lower frequency (LOW)		
3E2	CNG detection time	20 ms ± 20 ms	Factory setting: 200 ms
3F2	Modem tx level for image data on the ISDN	- dBm	Function 09 (parameter 20).

Service Tables
and Procedures



Notes

1. If a setting is not required, store FF in the address.
2. Tone frequencies are stored in BCD in the following format.
Examples:
 - a) 380 Hz HIGH 0 3 LOW 8 0
 - b) 1210 Hz HIGH 1 2 LOW 1 0
3. Italy and Belgium only

RAM address 3B5: the lower four bits have the following meaning.

Bit 3 1: Country dial tone cadence detection enabled

Bit 2 1: International dial tone cadence detection enabled

Bit 1 1: PABX dial tone cadence detection enabled

Bit 0 1: PSTN dial tone cadence detection enabled

If bit 3 is 1, the functions of the following RAM addresses are changed.

3A9: tolerance for on or off state duration (%), coded as in address 399.

3AC: on time, hex code (unit = 10 ms)

3AD: off time, hex code (unit = 10 ms)

If bits 2, 1, or 0 are 1, the functions of the following addresses are changed in a similar way to that described for bit 3 = 1.

Bit 2 = 1: 39E, 3A1, 3A2; Bit 1 = 1: 384, 387, 388;

Bit 0 = 1: 374, 377, 378

4. Belgium only:
Address 375/376 for DTMF dialling is 3 s. This can be adjusted by RAM read/write. However, if pulse dial mode is selected, a value of 20 ms from the ROM is used, and this cannot be adjusted.
5. Pulse dial parameters (addresses 3C4 to 3C9) are the values for 10 pps. If 20 pps is used, the machine automatically compensates.
6. The first ring may not be detected until 1 to 2.5 wavelengths after the time specified by this parameter.
7. The level must be between 0 and 15. The attenuation levels are as follows.
High frequency tone: - N dBm
Low frequency tone: - N - 3 dBm
RAM address 3CC is stored in units of -dBm x 0.5, but if this parameter is stored using Function 09 as parameter 19, the value is in units of -dBm.
8. 3C4: Europe - Between Ds opening and Di opening, France - Between Ds closing and Di opening
3C7: Europe - Between Ds closing and Di closing, France - Between Ds opening and Di closing

On the following pages, there are tables of factory settings for each country. To enable the factory settings for a particular nation, program the Country Code (RAM address 000369 [use hex codes] or use Function 09 [input the decimal value]) to the appropriate setting. The country code also affects the NCU signal status (see section 2-3-7).

- For each RAM address, there are two columns. The left hand column shows the actual value of the parameter. The right hand column shows the value of the factory setting that is stored in the RAM. 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.
- If the table entry is blank, this means that the value is not used.
- The settings for Asia are also used for Hong Kong, South Africa, New Zealand, Singapore, and Malaysia.

Country Code for NCU Parameters [or RAM Address 000369, in hex code]:

France: 00, Germany: 01, UK: 02, Italy: 03, Austria: 04, Belgium: 05, Denmark: 06, Finland: 07, Ireland: 08, Norway: 09, Sweden: 10 [0A], Switzerland: 11 [0B], Portugal: 12 [0C], Holland: 13 [0D], Spain: 14 [0E], Israel: 15 [0F], USA: 17 [11], Asia: 18 [12], Japan: 19 [13], Hong Kong: 20 [14], South Africa: 21 [15], Australia: 22 [16], New Zealand: 23 [17], Singapore: 24 [18], Malaysia: 25 [19]

Tx Level (RAM Address 0003CD): All countries 6 (- 6dB), except the UK (10 [-10dB]), USA (9[-9dB]), and Australia (12[-12dB]).

August 19th, 1992

**SERVICE TABLES AND PROCEDURES
NCU PARAMETERS**

Country	36D		36E		36F		370/371		
France							480 Hz	04(H)	80(H)
Germany	1.1 s	55	4.1 s	205	1.08 s	54	498 Hz	04(H)	98(H)
UK/Univ									
Italy							471 Hz	04(H)	71(H)
Austria							530 Hz	05(H)	30(H)
Belgium							520 Hz	05(H)	20(H)
Denmark							512 Hz	05(H)	12(H)
Finland							536 Hz	05(H)	36(H)
Ireland	1.1 s	55	4.1 s	205	1.08 s	54	450 Hz	04(H)	50(H)
Norway							512 Hz	05(H)	12(H)
Sweden							512 Hz	05(H)	12(H)
Switz.	1.1 s	55	4.1 s	205	5.1 s	255	608 Hz	06(H)	08(H)
Portugal							460 Hz	04(H)	60(H)
Holland							563 Hz	05(H)	63(H)
Spain							490 Hz	04(H)	90(H)
Israel	1.1 s	55	4.1 s	205	1.08 s	54	498 Hz	04(H)	98(H)
USA									
Asia									
Australia							450 Hz	04(H)	50(H)

Country	372/373			374		375/376		377	
France	400 Hz	04(H)	00(H)	2 s	100	12 s	600	1 s	50
Germany	370 Hz	03(H)	70(H)	2.1 s	105	20 s	1000	2.1 s	105
UK									
Italy	391 Hz	03(H)	91(H)	2, 50%	21(H)	10.9 s	545	0.6 s	30
Austria	370 Hz	03(H)	70(H)	2.1 s	105	10 s	500	0.8 s	40
Belgium	300 Hz	03(H)	00(H)	0.6 s	30	3 s	150	0.6 s	30
Denmark	340 Hz	03(H)	40(H)	1.3 s	65	10 s	500	1.3 s	65
Finland	315 Hz	03(H)	15(H)	4.1 s	205	10 s	500	4.1 s	205
Ireland	200 Hz	02(H)	00(H)	2.1 s	105	10 s	500	2.1 s	105
Norway	340 Hz	03(H)	40(H)	1.1 s	55	20 s	1000	1.1 s	55
Sweden	340 Hz	03(H)	40(H)	0.8 s	40	5.12 s	256	0.8 s	40
Switz.	338 Hz	03(H)	38(H)	0.8 s	40	10.9 s	545	0.8 s	40
Portugal	290 Hz	02(H)	90(H)	2.1 s	105	10 s	500	2.1 s	105
Holland	76 Hz	00(H)	76(H)	1.1 s	55	15 s	750	1.1 s	55
Spain	310 Hz	03(H)	10(H)	1.5 s	75	12.8 s	640	0.72 s	36
Israel	340 Hz	03(H)	40(H)	2.1 s	105	20 s	1000	2.1 s	105
USA									
Asia									
Australia	130 Hz	01(H)	30(H)	3.0 s	150	6 s	300	2 s	100

SERVICE TABLES AND PROCEDURES
NCU PARAMETERS

August 19th, 1992

Country	378		379/37A		37B		37C/37D		
France	0.04 s	2	0 s	0			498 Hz	04 (H)	98 (H)
Germany	0.08 s	4	4 s	200			510 Hz	05 (H)	10 (H)
UK/Univ			4 s	200			430 Hz	04 (H)	30 (H)
Italy	1 s	50	4 s	200			529 Hz	05 (H)	29 (H)
Austria	0.08 s	4	4 s	200			512 Hz	05 (H)	12 (H)
Belgium	0.08 s	4	4 s	200			471 Hz	04 (H)	71 (H)
Denmark	0.08 s	4	4 s	200			460 Hz	04 (H)	60 (H)
Finland	0.08 s	4	4 s	200					
Ireland	0.08 s	4	4 s	200			430 Hz	04 (H)	30 (H)
Norway	0.08 s	4	4 s	200			512 Hz	05 (H)	12 (H)
Sweden	0.06 s	3	4 s	200			512 Hz	05 (H)	12 (H)
Switz.	0.04 s	2	4 s	200	0.1 s	5	608 Hz	06 (H)	08 (H)
Portugal	0.08 s	4	4 s	200					
Holland	0.08 s	4	4 s	200			563 Hz	05 (H)	63 (H)
Spain	0.08 s	4	3 s	150			460 Hz	04 (H)	60 (H)
Israel	0.08 s	4	4 s	200			498 Hz	04 (H)	98 (H)
USA			2 s	100					
Asia			2 s	100					
Australia	0.16 s	8	3 s	150			450 Hz	04 (H)	50 (H)

Country	37E/37F			380/381			382/383		
France	396 Hz	03(H)	96(H)	900 Hz	09(H)	00(H)	300 Hz	03(H)	00(H)
Germany	350 Hz	03(H)	50(H)						
UK/Univ	360 Hz	03(H)	60(H)						
Italy	329 Hz	03(H)	29(H)	512 Hz	05(H)	12(H)	391 Hz	03(H)	91(H)
Austria	380 Hz	03(H)	80(H)						
Belgium	405 Hz	04(H)	05(H)	520 Hz	05(H)	20(H)	300 Hz	03(H)	00(H)
Denmark	390 Hz	03(H)	90(H)	512 Hz	05(H)	12(H)	340 Hz	03(H)	40(H)
Finland									
Ireland	370 Hz	03(H)	70(H)						
Norway	340 Hz	03(H)	40(H)						
Sweden	340 Hz	03(H)	40(H)	512 Hz	05(H)	12(H)	340 Hz	03(H)	40(H)
Switz.	338 Hz	03(H)	38(H)	608 Hz	06(H)	08(H)	338 Hz	03(H)	38(H)
Portugal									
Holland	320 Hz	03(H)	20(H)	563 Hz	05(H)	63(H)	76 Hz	00(H)	76(H)
Spain	380 Hz	03(H)	80(H)						
Israel	370 Hz	03(H)	70(H)	563 Hz	05(H)	63(H)	370 Hz	03(H)	70(H)
USA									
Asia									
Australia	390 Hz	03(H)	90(H)	450 Hz	04(H)	50(H)	390 Hz	03(H)	90(H)

**Service Tables
and Procedures**

August 19th, 1992

**SERVICE TABLES AND PROCEDURES
NCU PARAMETERS**

Country	384		385/386		387		388		389/38A	
France	2 s	100	12 s	600	1 s	50	40 ms	2	0 s	0
Germany									4 s	200
UK/Univ									4 s	200
Italy	2 s	100	10.1 s	505	0.18 s	9	80 ms	4	4 s	200
Austria									4 s	200
Belgium	0.6 s	30	3 s	150	0.6 s	30	80 ms	4	4 s	200
Denmark	1.3 s	65	10 s	500	1.3 s	65	80 ms	4	4 s	200
Finland									4 s	200
Ireland									4 s	200
Norway									4 s	200
Sweden	0.8 s	40	5.12s	256	0.8 s	40	60 ms	3	4 s	200
Switz.	0.8 s	40	9.9 s	495	0.8 s	40	80 ms	4	4 s	200
Portugal									4 s	200
Holland	1.1 s	55	15 s	750	1.1 s	55	80 ms	4	4 s	200
Spain									3 s	150
Israel	2.1 s	105	20 s	1000	2.1 s	105	80 ms	4	4 s	200
USA									4 s	200
Asia									4 s	200
Australia	3 s	150	6 s	300	2 s	100	20 ms	1	3 s	150

Country	38B		38C/38D			38E/38F		
France								
Germany								
UK/Univ								
Italy			600 Hz	06(H)	00(H)	100 Hz	01(H)	00(H)
Austria								
Belgium								
Denmark			460 Hz	04(H)	60(H)	390 Hz	03(H)	90(H)
Finland								
Ireland								
Norway								
Sweden								
Switz.			608 Hz	06(H)	08(H)	338 Hz	03(H)	38(H)
Portugal								
Holland								
Spain								
Israel			563 Hz	05(H)	63(H)	370 Hz	03(H)	70(H)
USA								
Asia								
Australia			450 Hz	04(H)	50(H)	390 Hz	03(H)	90(H)

SERVICE TABLES AND PROCEDURES
NCU PARAMETERS

August 19th, 1992

Country	390		391		392		393		394	
France	0.5 s	25	0.5 s	25						
Germany	0.24 s	12	0.24 s	12	0.48 s	24	0.48 s	24	0.14 s	7
UK/Univ	0.38 s	19	0.38 s	19	0.4 s	20	0.34 s	17	0.22 s	11
Italy	0.3 s	15	0.3 s	15						
Austria	0.2 s	10	0.2 s	10	0.3 s	15	0.3 s	15	0.4 s	20
Belgium	0.5 s	25	0.5 s	25	0.16 s	8	0.16 s	8		
Denmark	0.24 s	12	0.24 s	12	0.16 s	8	0.46 s	23		
Finland										
Ireland	0.5 s	25	0.5 s	25	0.74 s	37	0.74 s	37	0.36 s	18
Norway	0.2 s	10	0 s	0	0.5 s	25	0 s	0		
Sweden	0.24 s	12	0.24 s	12	0.24 s	12	0.74 s	37		
Switz.	0.48 s	24	0.6 s	30	0.3 s	15	0.44 s	22	0.22 s	11
Portugal										
Holland	0.24 s	12	0.24 s	12	0.5 s	25	0.5 s	25		
Spain	0.16 s	8	0.16 s	8						
Israel	0.24 s	12	0.24 s	12	0.48 s	24	0.48 s	24		
USA										
Asia										
Australia	0.24 s	12	0.24 s	12	0.5 s	25	0.5 s	25		

Country	395		396		397		398		399	
France									4, 12.5	43(H)
Germany	0.48 s	24							3, 50	31(H)
UK/Univ	0.52 s	26					2 s	100	4, 12.5	43(H)
Italy									4, 75	40(H)
Austria	0.4 s	20							4, 25	42(H)
Belgium									4, 12.5	43(H)
Denmark									4, 25	42(H)
Finland										
Ireland	0.36 s	18					0.7 s	35	4, 12.5	43(H)
Norway									4, 75	40(H)
Sweden									4, 12.5	43(H)
Switz.	0.22 s	11	0.16 s	8	0.6 s	30			5, 50	51(H)
Portugal										
Holland									4, 50	41(H)
Spain									4, 50	41(H)
Israel									4, 50	41(H)
USA										
Asia										
Australia									4. 50	41(H)

**Service Tables
and Procedures**

August 19th, 1992

**SERVICE TABLES AND PROCEDURES
NCU PARAMETERS**

Country	39A/39B			39C/39D			39E	
France	474 Hz	04(H)	74(H)	406 Hz	04(H)	06(H)	1.5 s	75
Germany								
UK/Univ								
Italy								
Austria								
Belgium	1160Hz	11(H)	60(H)	1110Hz	11(H)	10(H)	4, 50%	41(H)
Denmark								
Finland								
Ireland								
Norway								
Sweden								
Switz.								
Portugal								
Holland	563 Hz	05(H)	63(H)	76 Hz	00(H)	76(H)	1.1 s	55
Spain	620 Hz	06(H)	20(H)	580 Hz	05(H)	80(H)	1.5 s	75
Israel								
USA								
Asia								
Australia								

Country	39F/3A0		3A1		3A2		3A3/3A4		3A5/3A6
France	12 s	600	1.5 s	75	0.04 s	2	0	0	Only used by Sweden: 512 Hz 3A5: 05(H) 3A6: 12(H)
Germany							0	0	
UK/Univ							0	0	
Italy							0	0	
Austria							0	0	
Belgium	20 s	1000	0.32 s	16	0.68 s	34	0	0	
Denmark							0	0	
Finland							0	0	
Ireland							0	0	
Norway							0	0	
Sweden							0	0	
Switz.							0	0	
Portugal							0	0	
Holland	15 s	750	1.1 s	55	0.08 s	4	0	0	
Spain	12.8 s	640	0.72 s	36	0.1 s	5	3 s	150	
Israel							0	0	
USA							0	0	
Asia							0	0	
Australia							0	0	

SERVICE TABLES AND PROCEDURES
NCU PARAMETERS

August 19th, 1992

Country	3A7/3A8			3A9		3AA/3AB		3AC	
France									
Germany									
UK/Univ									
Italy									
Austria									
Belgium									
Denmark									
Finland									
Ireland									
Norway									
Sweden	340 Hz	03(H)	40(H)	0.8 s	40	5.12 s	256	0.8 s	40
Switz.									
Portugal									
Holland									
Spain									
Israel									
USA									
Asia									
Australia									

Country	3AD		3AE/3AF		3B0		3B1	
France			0	0	0	0	0	0
Germany			0	0	0.3 s	15	90 ms	90
UK/Univ			0	0	0.3 s	15	90 ms	90
Italy			0	0	0.3 s	15	90 ms	90
Austria			0	0	0.3 s	15	90 ms	90
Belgium			0	0	2 s	100	90 ms	90
Denmark			0	0	0.3 s	15	90 ms	90
Finland			0	0	0.3 s	15	90 ms	90
Ireland			0	0	0.3 s	15	90 ms	90
Norway			0	0	0.5 s	25	90 ms	90
Sweden	0.06 s	3	4 s	200	0.3 s	15	90 ms	90
Switz.			0	0	0.3 s	15	90 ms	90
Portugal			0	0	0.3 s	15	90 ms	90
Holland			0	0	0.3 s	15	90 ms	90
Spain			0	0	2 s	100	90 ms	90
Israel			0	0	0.3 s	15	90 ms	90
USA			0	0	0	0	0	0
Asia			0	0	0	0	0	0
Australia			0	0	0	0	0	0

**Service Tables
and Procedures**

August 19th, 1992

SERVICE TABLES AND PROCEDURES
NCU PARAMETERS

Country	3B2/3B3			3B4		3B5		3B6	
France	19	FF(H)	19(H)			-32.5	40(H)	53 s	53
Germany	00	FF(H)	00(H)			-49.5	C0(H)	53 s	53
UK/Univ	010	F0(H)	10(H)	1 s	50	-49.5	C0(H)	53 s	53
Italy	00	FF(H)	00(H)			-49.5	D1(H)	53 s	53
Austria	00	FF(H)	00(H)			-49.5	C0(H)	53 s	53
Belgium	00	FF(H)	00(H)			-32.5	44(H)	59 s	59
Denmark	009	F0(H)	09(H)			-32.5	40(H)	53 s	53
Finland	990	F9(H)	90(H)	2 s	100	-32.5	40(H)	53 s	53
Ireland	16	FF(H)	16(H)			-40.5	80(H)	53 s	53
Norway	095	F0(H)	95(H)			-32.5	40(H)	53 s	53
Sweden	009	F0(H)	09(H)			-32.5	40(H)	53 s	53
Switz.	00	FF(H)	00(H)			-40.5	80(H)	92 s	92
Portugal	00	FF(H)	00(H)			-32.5	40(H)	53 s	53
Holland	09	FF(H)	09(H)			-26.5	00(H)	53 s	53
Spain	07	FF(H)	07(H)			-40.5	80(H)	80 s	80
Israel	00	FF(H)	00(H)			-49.5	C0(H)	59 s	59
USA						-49	C0(H)	53 s	53
Asia						-49.5	C0(H)	53 s	53
Australia						-49.5	C0(H)	53 s	53

Country	3B7		3B8		3B9				3BB (Hz)	
France	6	6	5	5	8 s	4			58.8	17
Germany	4	4	2	2	12 s	6			58.8	17
UK/Univ	3	3	2	2	12 s	6			50	20
Italy	3	3	2	2	18 s	9			55.5	18
Austria	3	3	2	2	12 s	6			66.7	15
Belgium	4	4	6	6	16 s	8			47.6	21
Denmark	3	3	1	1	12 s	6			30.3	33
Finland	3	3	2	2	12 s	6			62.5	16
Ireland	3	3	2	2	12 s	6			27.8	36
Norway	3	3	2	2	12 s	6			62.5	16
Sweden	3	3	2	2	12 s	6			58.8	17
Switz.	5	5	1	1	12 s	6			62.5	16
Portugal	3	3	1	1	12 s	6			33.3	30
Holland	3	3	2	2	12 s	6			62.5	16
Spain	3	3	1	1	48 s	24			40	25
Israel	14	14	1	1	12 s	6			62.5	16
USA	3	3	5	5	12 s	6			76.9	13
Asia	3	3	5	5	12 s	6			58.8	17
Australia	3	3	5	5	16 s	8			71.4	14

SERVICE TABLES AND PROCEDURES
NCU PARAMETERS

August 19th, 1992



Country	3BC (Hz)		3BD (Hz)		3BE (Hz)		3BF		3C0	
France	43.5	23					2	2	0.1 s	5
Germany	20.8	48					1	1	0.2 s	10
UK/Univ	11.9	84					1	1	0.2 s	10
Italy	13.0	77					2	2	0.2 s	10
Austria	41.7	24					1	1	0.2 s	10
Belgium	13.9	72					2	2	0.1 s	5
Denmark	20	50	62.5	16	41.7	24	1	1	0.2 s	10
Finland	17.9	56					2	2	0.5 s	25
Ireland	14.9	67					1	1	0.2 s	10
Norway	17.9	56					1	1	0.2 s	10
Sweden	19.6	51					1	1	0.1 s	5
Switz.	19.6	51					3	3	0.02s	1
Portugal	12.8	78	62.5	16	41.7	24	1	1	0.2 s	10
Holland	19.2	52					2	2	0.2 s	10
Spain	20	50					2	2	0.2 s	10
Israel	12	83					2	2	0.1 s	5
USA	12	83					1	1	0.2 s	10
Asia	12	83					1	1	0.2 s	10
Australia	12	83					3	3	0.2 s	10

Country	3C1		3C2/3C3		3C4		3C5		3C6	
France	0.1 s	5	5.2 s	260	67 ms	67	65 ms	65	35 ms	35
Germany	0.2 s	10	8 s	400	50 ms	50	60 ms	60	41 ms	41
UK/Univ	0.2 s	10	8 s	400	252ms	252	66 ms	66	35 ms	35
Italy	0.2 s	10	8 s	400	58 ms	58	60 ms	60	40 ms	40
Austria	0.2 s	10	8 s	400	53 ms	53	62 ms	62	39 ms	39
Belgium	0.2 s	10	8 s	400	61 ms	61	67 ms	67	33 ms	33
Denmark	0.2 s	10	8 s	400	53 ms	53	67 ms	67	33 ms	33
Finland	0.5 s	25	8 s	400	61 ms	61	60 ms	60	42 ms	42
Ireland	0.2 s	10	8 s	400	255ms	255	67 ms	67	33 ms	33
Norway	0.2 s	10	8 s	400	61 ms	61	59 ms	59	41 ms	41
Sweden	0.1 s	5	8 s	400	100ms	100	60 ms	60	40 ms	40
Switz.	0.02s	1	8 s	400	60 ms	60	60 ms	60	40 ms	40
Portugal	0.2 s	10	8 s	400	61 ms	61	66 ms	66	34 ms	34
Holland	0.2 s	10	8 s	400	58 ms	58	62 ms	62	40 ms	40
Spain	0.2 s	10	6 s	300	75 ms	75	60 ms	60	33 ms	33
Israel	0.1 s	5	8 s	400	61 ms	61	61 ms	61	39 ms	39
USA	0.2 s	10	8 s	400	77 ms	77	64 ms	64	38 ms	38
Asia	0.2 s	10	8 s	400	61 ms	61	66 ms	66	34 ms	34
Australia	0.2 s	10	8 s	400	255ms	255	68 ms	68	32 ms	32

**Service Tables
and Procedures**

August 19th, 1992

SERVICE TABLES AND PROCEDURES
NCU PARAMETERS

Country	3C7		3C8		3C9		3CA		3CB	
France	50 ms	50	0.8 s	80	0	0	70 ms	70	70 ms	70
Germany	44 ms	44	0.92 s	92	0.92 s	92	90 ms	90	90 ms	90
UK/Univ	44 ms	44	0.54 s	54	0.66 s	66	0.1 s	100	0.1 s	100
Italy	44 ms	44	0.8 s	80	3 s	150	70 ms	70	70 ms	70
Austria	50 ms	50	0.88 s	88	0.92 s	92	70 ms	70	70 ms	70
Belgium	50 ms	50	0.86 s	86	0.52 s	52	70 ms	70	70 ms	70
Denmark	50 ms	50	0.52 s	52	0.52 s	52	90 ms	90	90 ms	90
Finland	50 ms	50	0.8 s	80	1.2 s	120	70 ms	70	75 ms	75
Ireland	50 ms	50	0.6 s	60	0.66 s	66	70 ms	70	70 ms	70
Norway	50 ms	50	0.66 s	66	0.66 s	66	70 ms	70	70 ms	70
Sweden	70 ms	70	0.36 s	36	0.52 s	52	70 ms	70	70 ms	70
Switz.	60 ms	60	0.52 s	52	0	0	70 ms	70	70 ms	70
Portugal	50 ms	50	0.66 s	66	0.66 s	66	70 ms	70	70 ms	70
Holland	42 ms	42	0.66 s	66	0.66 s	66	70 ms	70	70 ms	70
Spain	75 ms	75	0.64 s	64	2 s	200	70 ms	70	0.14 s	140
Israel	50 ms	50	0.92 s	92	2.02 s	202	90 ms	90	90 ms	90
USA	74 ms	74	0.92 s	92	2.02 s	202	0.1 s	100	0.1 s	100
Asia	50 ms	50	0.72 s	72	2.02 s	202	0.1 s	100	0.11 s	110
Australia	70 ms	70	0.72 s	72	2.02 s	202	0.1 s	100	0.11 s	110

Country	3CC		3CD		3CE		3CF		3D0	
France	12	6	10	10	10	0	10	0	10	0
Germany	14	7	6	6	8	4	7.5	3	7	2
UK/Univ	18	9	8	8	9	2	9	2	8	0
Italy	12	6	6	6	6	0	6	0	6	0
Austria	12	6	6	6	6	0	6	0	6	0
Belgium	12	6	6	6	6	0	6	0	6	0
Denmark	18	9	10	10	10	0	10	0	10	0
Finland	18	9	10	10	10	0	10	0	10	0
Ireland	18	9	10	10	10	0	10	0	10	0
Norway	18	9	9	9	10	2	10	2	9	0
Sweden	18	9	10	10	10	0	10	0	10	0
Switz.	12	6	5	5	6	2	5.5	1	4.5	1
Portugal	18	9	6	6	6	0	6	0	6	0
Holland	18	9	7	7	7	0	7	0	7	0
Spain	12	6	10	10	10	0	10	0	10	0
Israel	12	6	6	6	6	0	6	0	6	0
USA	16	8	9	9	9	0	9	0	9	0
Asia	12	6	6	6	6	0	6	0	6	0
Australia	20	10	11	11	12	2	12	2	11	0

Additional NCU Parameters

V21 detection level (RAM Address 4193, hex code): Always 73(H), except Germany, 7B(H).

Rx data detection level (RAM Address 4194, hex): Always 73(H), except Germany, 7B(H).

800 Hz tx level (RAM Address 4195/4196, hex): Always 31BF(H), except Germany, 2641(H).

1100 Hz tx level (RAM Address 4197/4198, hex): Always 31BF(H), except Germany, 2917(H).

2100 Hz tx level (RAM Address 4199/419A, hex): Always 31BF(H), except Germany, 3774(H).

4.4. DEDICATED TRANSMISSION PARAMETERS

Each Quick Dial Key and Speed Dial Code has seven 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 seven bytes will be described.

4.4.1. Programming Procedure

1. Set bit 5 of bit switch 01 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.

3. **Function** **3** **1** **Yes**

QUICK DIAL	CHOOSE KEY
<input type="checkbox"/> 3	PRINT LIST <input type="checkbox"/>
<input type="checkbox"/> NO TO CANCEL	

4. Press Quick Dial key **10**

QUICK DIAL	<input type="checkbox"/> YES OR <input type="checkbox"/> NO
<input type="checkbox"/> 10	XYZ CO. NEW YORK
2125551234	
<input type="checkbox"/>	<input type="checkbox"/>

Service Tables
and Procedures

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

5. **Yes** four times.

QUICK DIAL
<input type="checkbox"/> 10
SW01: 00000000 <input type="checkbox"/> YES TO END <input type="checkbox"/>

6. The settings for byte 1 are now displayed. Press a number from 0 to 7 corresponding to the bit that you wish to change.

Example: Change bit 7 to 1: **7**

QUICK DIAL	
<input checked="" type="checkbox"/> 10	<input type="button" value="↑"/>
SW01: 10000000	<input type="button" value="YES"/> TO END <input type="button" value="↓"/>

7. Either:

- Select another byte: or until the correct byte is displayed. Then go to step 6.
- Select another Quick Dial Code: **Yes** . Go to step 4.
- Finish: **Function**

8. After finishing, set bit 5 of bit switch 01 to 0.

4.4.2. Parameters

Byte 1							
	FUNCTION					COMMENTS	
0	Initial Tx modem rate					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.	
	Bit	3	2	1	0		Setting (bps)
1		0	0	0	0		2,400
		0	0	0	1		4,800
2		0	0	1	0		7,200 (V.29)
		0	0	1	1		9,600 (V.29)
3		1	0	1	0		7,200 (TCM)
		1	0	1	1		9,600 (TCM)
		1	1	0	0		12,000
		1	1	0	1		14,400
	Other settings: Not used						
4	Modem training type when sending at 12,000 or 14,400 bps 0: V.17 (short) 1: V.33 (long)					0: Training is shorter so communication costs are reduced. However, the communication is not so reliable. 1: The longer training time ensures a higher reliability for the communication.	
	Compression modes available in transmit mode					These bits determine the capabilities that are informed to the other terminal during transmission.	
5	Bit	6	5	Modes			
		0	0	MMR, MR, or MH			
6		0	1	MR or MH			
		1	0	MH only			
		1	1	MH only			

SERVICE TABLES AND PROCEDURES
DEDICATED TRANSMISSION PARAMETERS

August 19th, 1992

Byte 1		
	FUNCTION	COMMENTS
7	Dedicated transmission parameters for this Quick/Speed Dial number 0: Disabled 1: Enabled	0: The parameters in these seven bytes will be ignored. The current settings of the relevant bit switches, NCU parameters, and RAM addresses will be used. 1: The parameters in these seven bytes will be used when transmitting to the fax number stored in the Quick Dial Key or Speed Dial Code that these bytes are allocated to.

Byte 2			
	FUNCTION		COMMENTS
0	DIS/NSF detection method 0: First DIS or NSF 1: Second DIS or NSF		Set this bit to 1 if echoes on the line are interfering with the set-up protocol at the start of transmission. The machine will then wait for the second DIS or NSF before sending DCS or NSS.
1	ECM during transmission 0: Enabled 1: Disabled		For example, if ECM is switched on but is not wanted when sending to a particular terminal, set this bit to 1.
2	Not used		Do not change the factory setting.
3	Short preamble 0: Enabled 1: Disabled		If this bit is 0, Short Preamble is always used when transmitting to this terminal.
4	AI short protocol 0: Enabled 1: Disabled		If this bit is 0, AI Short Protocol is always used when transmitting to this terminal.
5	Secure transmission 0: Disabled 1: Enabled		If this bit is at 1, secure transmission will always be used when communicating with the number stored in this Quick/Speed Dial.
6	Cable equalizer		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. <ul style="list-style-type: none"> • Communication error with error codes such as 0-20, 0-23, etc. • Modem rate fallback occurs frequently.
7	Bit 7	Bit 6	
	0	0	
	0	1	
	1	0	
	1	1	
	Setting		
	None		
	Low		
	Medium		
	High		

**Service Tables
and Procedures**

Byte 3
FUNCTION AND COMMENTS
<p>Tx level 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.</p> <p>The Tx level is the value stored in this byte (in hex code) multiplied by -1.</p>

Byte 4
FUNCTION AND COMMENTS
<p>CCITT T1 timer If you wish to use a different T1 timer than the NCU parameter setting when sending to a particular terminal, adjust this byte. The T1 timer is the value stored in this byte (in hex code), multiplied by 1 second.</p> <p>Caution: Note that if the value of this byte is 0, the T1 timer will be 0 s.</p>

Caution: If the value of byte 4 is 0, the CCITT T1 timer is 0 s. Therefore, every time you program a set of dedicated transmission parameters, be sure to input the correct T1 timer into byte 4.

Bytes 5 to 7 are only used if the ISDN kit has been installed. These bytes are explained in the service manual for the ISDN kit.

4.5. SERVICE RAM ADDRESSES

000140 (Service Switch 00)

TTI printing position (from the left side)

BCD: 00 - 98 (mm) [Even numbers only]

000144 (Service Switch 04)

Bit 2: Forwarding

0: Enabled, 1: Disabled

Bit 3: Authorized reception

0: Enabled, 1: Disabled

Bit 6: Continuous polling

0: Disabled, 1: Enabled

000145 (Service Switch 05)

Bit 0: Display of both RTI and CSI on the LCD

0: Disabled, 1: Enabled

Bit 1: Secure reception

0: Disabled, 1: Enabled

Bit 2: Printout of forwarded messages

0: Disabled, 1: Enabled

Bit 3, 4: Recognition of the remote terminal's paper length

Bit 3	Bit 4	Setting
0	0	No limit
1	0	B4
0	1	A4
1	1	Not used

Bit 5: Action when the remaining memory is less than the remaining memory threshold (address 000155) if forwarding is on 0: Disconnection, 1: Normal reception without forwarding

000146 (Service Switch 06)

Maximum number of dialling attempts for TRD

Hex: 00 - FF

000147 (Service Switch 07): Number of page retransmission attempts (Hex code)

000148 (Service Switch 08)

Bit 0: Secure transmission

0: Disabled, 1: Enabled

Bit 1: Modem rate after receiving a negative code (RTN or PIN) 0: No change, 1: Fallback

Bit 2: Hang-up decision when a negative code (RTN or PIN) is received

0: No hang-up, 1: Hang-up

Bit 4: Addition of TCF when AI short protocol is used

0: No, 1: Yes

Bit 5: Stop key during memory transmission

0: Disabled, 1: Enabled

Bit 6: First page to be retransmitted (memory tx)

0: The page that was not sent correctly, 1: Page 1

000149 (Service Switch 09)

Bit 0: Keystroke Program execution method

0: Press the programmed Quick Dial Key

1: Press the programmed Quick Dial Key then the Start key

Bit 2: RDS

0: Enabled, 1: Disabled

Bit 3: On-hook dial

0: Enabled, 1: Disabled

Bit 6: Input of consecutive pauses

0: Enabled, 1: Disabled

Bit 7: G4 Terminal Identification length limit

0: No limit, 1: Up to 7 characters

00014A (Service Switch 0A)

Bit 2: mm-to-inch conversion (transmission)

0: Disabled 1: Enabled

Bit 3: mm-to-inch conversion (printing the contents of a file)

0: Always printed in inch format

1: Depending on the type of paper, mm or inch format is selected

Bit 4: Addition of part of the image data from confidential transmissions on the transmission result report

0: Disabled, 1: Enabled

Bit 5: Addition of Confidential ID to the Personal Code List

0: Disabled, 1: Enabled

Bit 6: CSI programming

0: User level, 1: Service level

Bit 7: Telephone line type selection

0: User level, 1: Service level



- 00014B (Service Switch 0B):** Contrast threshold - Lighten (Hex code, from 00 to 1F)
00: All Black, 1F: All White
- 00014C (Service Switch 0C):** Contrast threshold - Normal (Hex code, from 00 to 1F)
00: All Black, 1F: All White
- 00014D (Service Switch 0D):** Contrast threshold - Darken (Hex code, from 00 to 1F)
00: All Black, 1F: All White

00014E (Service Switch 0E)

After the registration sensor turns on, the machine feeds the paper by this amount before stopping the paper feed motor
Hex: 00 - FF (unit = 0.6 mm)

00014F - 000151 (Service Switches 0F to 11): Page separation and data reduction parameters: see section 2-2, "Paper Feed"

000152 (Service Switch 12)

Gap at left margin of printed page
Hex: 00 - FF (unit = 0.5 mm)

000153 (Service Switch 13)

Bit 0: Default resolution used for copy mode
0: As selected by the user, 1: Fine

Bits 1, 2: Default network type setting

Bit 1	Bit 2	Default
0	0	Group 3
0	1	Group 4
Other settings		Not used

Bit 3: Port used for Group 3 communication

0: PSTN, 1: ISDN

Bit 4: Addition of TTI during transmission

0: Enabled, 1: Disabled

000154 (Service Switch 14)

Bit 0: Reduction during printing
0: Disabled, 1: Enabled

000155 (Service Switch 15)

The amount of remaining memory below which ringing detection (and therefore substitute reception) is disabled if the printer is out of action (hex code, from 00 to FF, unit = 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.

000157 (Service Switch 17)

Image/Text detection threshold in halftone mode (Hex: 00 - 1F)

01: Almost all the data will be processed without halftone, even if the fax message contains photographs.

The threshold increases with increments in the setting from 01 to 1F.

00, 1F: Almost all the data will be halftone processed, even if the fax message contains only text.

000158 (Service Switch 18): Number of redialling attempts, including the first dialling attempt (memory tx)

Hex : 00 - FF

000159 (Service Switch 19): Redialling interval (memory tx)

Hex: 00 - FF (minutes)

SERVICE TABLES AND PROCEDURES
SERVICE RAM ADDRESSES

August 19th, 1992

00015B (Service Switch 1B): Transfer Broadcasting

Bit 0: Acceptance of transfer request from abroad

0: Enabled, 1: Disabled

Bit 1: USA network numbering requirements

0: Disabled, 1: Enabled

Bit 2: French network numbering requirements

0: Disabled, 1: Enabled

Bit 3: Spanish network numbering requirements

0: Disabled, 1: Enabled

Bit 4: Area code processing when sending the transfer result report

0: Enabled (the machine adjusts the telephone number of the transfer requester before dialling it, to take account of differences in area codes and similar factors)

1: Disabled

00015C (Service Switch 1C): Group 4 mode

Bit 0: Automatic fallback (Group 4 to Group 3)

0: Enabled, 1: Disabled

Bit 1: Specified two-step transfer

0: Disabled, 1: Enabled

Bit 3: Call Identification Line (CID) On/Off Selection

0: Disabled; CID always printed

1: Enabled; the user can switch this on or off with a User Parameter setting

CID: This is like the TTI. It contains the Rx Terminal ID, Tx Terminal ID, Date, Time, and any Label Insertions.

Bit 4: Terminal ID Verification

0: Disabled, 1: Enabled

Bit 5: Addition of date information to CSS

0: Disabled, 1: Enabled

00015D (Service Switch 1D): Time for which RDS is enabled after the user has switched it on

BCD: 00 - 99 (hours)

00015E (Service Switch 1E)

Bit 5: Transmission of a blank CSI (all spaces) if no CSI is programmed

0: Disabled, 1: Enabled

00045D - 00045F: PM interval

	Bits 7 - 4	Bits 3 - 0
00045D	Tens	Units
00045E	Thousands	Hundreds
00045F	Hundred thousands	Ten thousands

Service Tables
and Procedures

Factory Settings of Service Switches 00 to 1F (000140 to 00015F)

The factory settings are shown below in hexadecimal code. The first digit represents bits 7 to 4, and the second digit represents bits 3 to 0.

RAM	Settings	RAM	Settings	RAM	Settings
000140	18	00014B	12	000156	02
000141	01	00014C	0F	000157	0F
000142	00	00014D	0D	000158	05
000143	01	00014E	10	000159	05
000144	00	00014F	FF	00015A	02
000145	02	000150	00	00015B	00
000146	05	000151	AF	00015C	40
000147	03	000152	06	00015D	24
000148	09	000153	01	00015E	20
000149	06	000154	00	00015F	00
00014A	28	000155	40		

The following list shows the changes in the factory settings with the different country code settings.

Germany

000145: 03 (H)
000149: 0E (H)
00014A: 68 (H)

Austria

000149: 07 (H)
00014A: E8 (H)

Spain

00014A: A8 (H)
00015B: 08 (H)

Italy, Ireland, Norway, Portugal

00014A: E8 (H)

Denmark, Finland, Switzerland

00014A: A8 (H)

4.6. SPECIAL TOOLS AND LUBRICANTS

- Scan line test chart: P/N H0829502
- 200 dot-per-inch test pattern: P/N A0129110
- Test lead: P/N H0419002
- SBU adjustment knobs: P/N H0129300
- Allen wrench
- Lens block positioning tool: P/N H0829503

4.7. PM TABLE**Scanner**

Item	10K	30K	60K	1 year	Notes
Exposure Glass	C	C	C	C	Soft cloth and alcohol
R1 and R2 Rollers	C	C	C	C	Soft cloth and alcohol
Pick-up Torque Limiter		L	L		Use Mobil Temp 78.
White Plate	C	C	C	C	Soft cloth and water
Feed Roller	C	R	R	C	Soft cloth and water
Pick-up Roller	C	R	R	C	Soft cloth and water
Separation Roller	C	R	R	C	Soft cloth and water
Shutter Torque Limiter		L	L		Use Mobil Temp 78.

**Printer and Upper Cassette**

Item	10K	30K	60K	1 year	Notes
Paper Feed Roller	C	C	R	C	Soft cloth and alcohol
Relay Roller	C	C	C	C	Soft cloth and alcohol
Registration Rollers	C	C	C	C	Soft cloth and alcohol
Thermistor		C	C		Soft cloth and alcohol
Hot Roller Strippers		C	C		Cotton swab and alcohol
Feed-out Roller	C	C	C	C	Soft cloth and alcohol
Hot Roller			R		Soft cloth and alcohol
Pressure Roller (Fusing)			R		
Thermostat		C	C		Soft cloth and alcohol
Cleaning Pad	R	R	R		
Transfer Corona Unit	C	C	R	C	Soft cloth/cotton swab and alcohol
Charge Corona Unit	C	C	R		
Corona Wires	C	C		C	
Quenching Lamp	C	C	C	C	
Laser Optics Shield Glass	C	C	C	C	
Development Unit			R		
Ozone Filter	R	R	R		

Lower Cassette

Item	10K	30K	60K	1 year	Notes
Pick-up and Feed Rollers	C	R	R	C	Soft cloth and alcohol
Separation Roller	C	R	R	C	Soft cloth and alcohol
Relay Rollers	C	C	C	C	Soft cloth and alcohol
Separation Torque Limiter		L	R		Use Mobil Temp 78.
Pick-up Torque Limiter		L	R		

Other

Item	10K	30K	60K	1 year	Notes
Exterior and Covers	C	C	C	C	Soft cloth and water

5. REPLACEMENT AND ADJUSTMENT

5.1. SCANNER

5.1.1. Xenon Lamp

In this machine, the xenon lamp has only one connector.

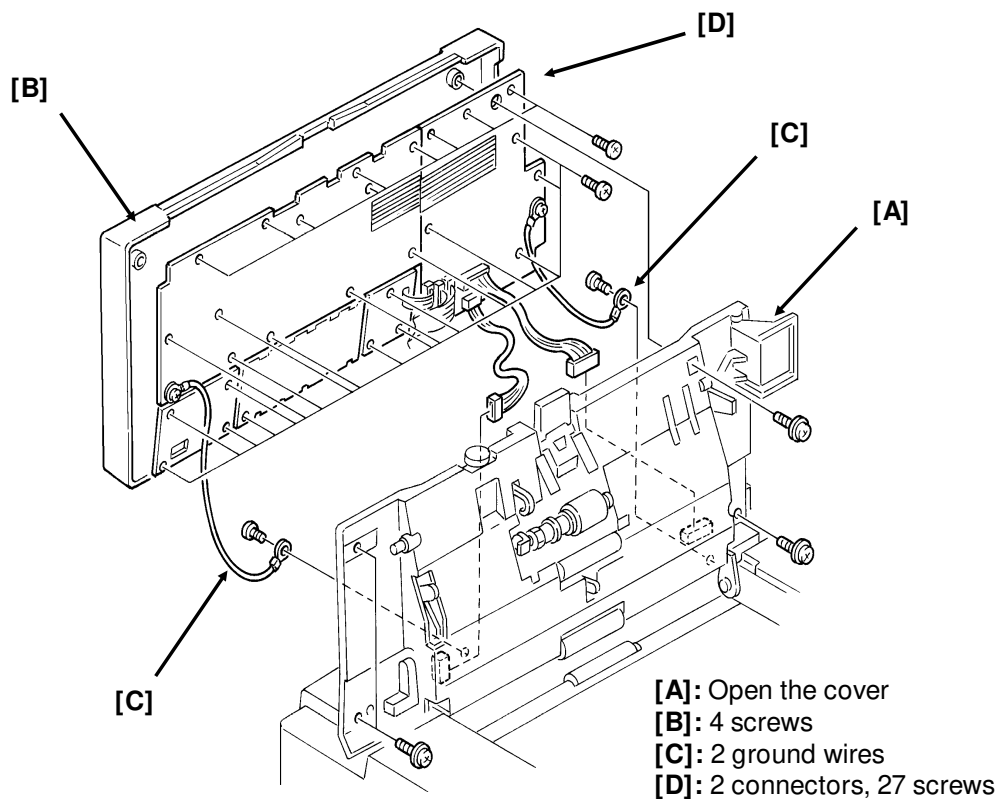
5.2. DEVELOPMENT

5.2.1. Development Unit

For this machine, the RAM address to adjust after replacing the development unit is 000418; change the value in this address to 40[H].

5.3. PCBs

5.3.1. Operation Panel PCB [D]



Replacement and
Adjustment

6. TROUBLESHOOTING

6.1. SERVICE CALL CONDITIONS

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

- Mirror Motor Locked (hexagonal mirror motor lock failure)
- Hot Roller Down (fusing lamp failure)
- LD Power Control Failure (laser diode power control failure)
- Main Motor Locked (main motor lock failure)
- Charger Leak (transfer corona charge leak)

To find out which problem has occurred, either:

- See the Auto Service Call report that was sent to the service station for the problem with the machine. This report lists a sub-code, as well as the error message; this sub-code may help you find the problem.
- Check the error code history.
- Try to clear the service call condition: switch the power off, wait 10 seconds, then switch back on.

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 if FCU CN23-3 stays high for 3 s or more while the transfer corona is on (sub-code 31)		
Check	Action if Yes	Action if No
Clean the transfer corona wire and unit. Check that the FCU outputs the power and trigger signals to the power pack. If not, replace the FCU. Replace the FCU, power pack or transfer corona unit if the problem still occurs.		

Symptom: LD Power Control Failure (Error Code 9-20) This error occurs in either of the following conditions: <ul style="list-style-type: none">• Error in the Laser Interface (LIF) chip on the FCU (sub-code 41 or 42)• Laser power failure (sub-code 43)		
Check	Action if Yes	Action if No
1. Do the front cover interlock switch and front cover microswitch both pass + 5V?	Replace the FCU or laser diode drive board.	Replace the defective switch or actuator mechanism.

Symptom: Hot Roller Down (Error Code 9-22)

This error occurs in any of the following conditions:

Standby mode: If the fusing lamp takes more than 40 s to reach 80 °C (sub-code 01)

During printing: If the fusing lamp takes more than 30 s to rise to 150 °C from 80 °C (sub-code 02)

During printing: If the fusing lamp stays below 150 °C for more than 10 s (sub-code 04)

During printing: If the thermistor is accidentally disconnected (sub-code 07)

After printing: If the fusing lamp takes more than 10 minutes to fall back to 150 °C (sub-code 03)

After printing: If the thermistor is accidentally disconnected for more than 15 s (sub-code 06)

At any time: If the fusing lamp temperature reaches 280 °C (sub-code 05)

Check	Action if Yes	Action if No
Is the fusing unit thermistor disconnected (FCU CN36)? Is the thermistor open or shorted? If so replace it. Otherwise clean it. Replace the fusing lamp if it is open circuit. Replace the thermostat if it is broken. Replace the FCU or PSU. Replace the front cover interlock switch if it does not pass + 24V from the PSU to the FCU.		

Symptom: Mirror Motor Locked (Error Code 9-23)

This error occurs in either of the following conditions:

- If FCU CN2-1 does not go low within 10 s of the hexagonal mirror motor being switched on (sub-code 21)
- If FCU CN2-1 goes back to high for 10 s or more during hexagonal mirror motor operation (sub-code 22)

Check	Action if Yes	Action if No
1. Check the connections through the machine between the PSU, FCU, interlock switches, hexagonal mirror motor and laser diode unit.		
2. Does the FCU receive + 24V from the PSU?	Go to step 3.	Change the PSU or the front cover interlock switch.
3. Does the FCU send + 24V to the motor?	Replace the motor and driver.	Replace the FCU.

Symptom: Main Motor Locked (Error Code 9-24)

This error occurs in either of the following conditions:

- If FCU CN22-4 does not go low within 10 s of the main motor being switched on (sub-code 11)
- If FCU CN22-4 goes back to high for 10 s or more during main motor operation (sub-code 12)

Check	Action if Yes	Action if No
1. Check that the mechanism is not obstructed.		
2. Does the front cover interlock switch pass + 24V?	Replace the FCU or the main motor.	Replace the defective switch mechanism.

6.2. ERROR CODES

The following error codes have been introduced.



Code	Meaning	Suggested Cause/Action
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 the following: Change bit 6 of bit switch 07 to 1. Ask the user to change bit 0 of user parameter 05 to 1.
0-70	A 'disc' signal was received during ISDN G3 reception	Network or remote terminal error.
2-11	Only one V.21 connection flag was received	Change the FCU.
2-50	The machine reset itself	Change the FCU.
5-25	SAF file access error	Change the FCU, memory card, or hard disk.
5-30	Mode table for the first page to be printed was not effective	Change the FCU.
6-01	ECM - no V.21 signal was received	Try adjusting the rx cable equalizer. Replace the FCU or NCU.
6-02	ECM - EOR was received	