FAX 2500L/2600L/3500L

SERVICE MANUAL

Throughout this manual, the machines are referred to as follows: CRO: FAX2500L CS1: FAX3500L New CRO: FAX2600L



NRG 9650/9665

SERVICE MANUAL

Throughout this manual, the machines are referred to as follows: CRO: NRG 9650 CS1: NRG 9665

SAVINFAX 3630/3670

SERVICE MANUAL

Throughout this manual, the machines are referred to as follows: CRO: SAVINFAX 3630 CS1: SAVINFAX 3670

OMNIFAX L42/L46

SERVICE MANUAL

Throughout this manual, the machines are referred to as follows: CRO: OMNIFAX L42 CS1: OMNIFAX L46

WARNING

THIS MACHINE CONTAINS A LASER BEAM GENERATOR. LASER BEAMS CAN CAUSE PERMANENT EYE DAMAGE. DO NOT OPEN THE LASER UNIT OR LOOK ALONG THE LASER BEAM PATH WHILE THE MAIN POWER IS ON.



Lithium Batteries (Memory Back-up)

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.

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: 0.05 to 0.2 mm [2 to 8 mils]

Document Feed

Automatic feed, face down

ADF Capacity

CRO: 30 sheets (using 20 lb paper) CS1: 50 sheets (using 20 lb paper)

Scanning Method

Flat bed, with CCD

Maximum Scan Width

256 mm [10.1 ins] ± 1%

Scan Resolution

Main scan: 8 dots/mm [203 dpi] Sub scan: Standard - 3.85 lines/mm [98 lpi] Detail - 7.7 lines/mm [196 lpi] Fine - 15.4 lines/mm [392 lpi]

Memory Capacity

ECM: 128 kbytes (double buffer)

SAF: CRO - 128 kbytes (7 pages), with optional extra 1 Mbyte or 2 Mbytes (max 64 or 121 pages respectively) CS1 - 384 kbytes (21 pages), with optional extra 1 Mbyte or 2 Mbytes (max 78 or 135 pages respectively)

Compression

MH, MR, EFC, MMR, SSC Storage to SAF memory for tx: MH MMR only with ECM

Protocol

Group 3 with ECM

Modulation

Machine CRO: V.29 (QAM), V.27ter (PHM), V.21 (FM) CS1: V.33/V.17 (TCM), V.29 (QAM), V.27ter (PHM), V.21 (FM)

Data Rate (bps)

CRO: 9600/7200/4800/2400 CS1: 14400/12000/9600/7200/4800/2400 Automatic fallback

I/O Rate

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

Transmission Time

CRO: 10 s at 9600 bps, CS1: 6 s at 14400 bps; Measured with G3 ECM using memory for a CCITT #1 test document (Slerexe letter) using standard resolution

Printing System

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

Paper Size

Standard Cassette: CRO - Letter, CS1 - Letter, Legal Lower Cassette (CS1 only): Letter, Legal, A4, B4

Maximum Printout Width

210 mm [8.3 ins]; 250 mm [9.8 ins] with optional paper feed unit (CS1 only)

Maximum Printer Resolution

Main scan: 16 dots per mm [406 dpi] Sub scan: 15.4 lines/mm [392 lpi]

Power Supply

 115 ± 20 Vac, 60 ± 1 Hz

Power Consumption (Base Machine Only) Standby: 41 W, Transmit: 46 W Receive: 176 W, Copying: 269 W

Operating Environment

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

Dimensions (W x D x H)

496 x 475 x 293 mm [19.5 x 18.7 x 11.5 ins] Excluding handset, trays, and optional units

Weight

19 kg [41.8 lbs] Excluding handset, trays, and optional units

1-1

Information

Overall

1.2. FEATURES

KEY: O = Used by both CRO and CS1

- CS1: Used in CS1 only, X = Not used, A = With optional memory only,
- B = With lower cassette only,
- C = With printer interface kit only

Equipment		
ADF	0	
Bar code reader	Х	
Built-in handset	Х	
Cabinet	Х	
Connection for ans. machine	Х	
Connection for handset	0	
Counter (optional)	0	
Cutter	Х	
Handset (optional)	0	
Hard disk	Х	
Magnetic card reader	Х	
Manual feed mechanism	CS1	
Microphone	Х	
Monitor speaker	CS1	
Printer interface kit (optional)	0	
Remaining memory indicator	0	
Speakerphone	Х	
Stamp	CS1	

Video Processing Features		
Contrast	0	
Halftone (Basic & Error Diffusion)	0	
MTF	0	
Reduction	0	
Resolution	0	
Smoothing to 16 x 15.4 l/mm	0	

Communication Features - Auto		
Automatic fallback	0	
Automatic redialing	0	
Confidential reception	Α	
Dual Access	0	
Substitute reception	0	
Transmission Reserve	0	

OVERALL MACHINE INFORMATION FEATURES

Communication Features - User Selectable	-
Action as a transfer broadcaster	Х
AI Redial (CRO: Last one	0
number, CS1: last ten numbers)	0
Alternative Destination	0
Answering machine	Х
Authorized Reception	CS1
Auto-answer delay time	X
Auto dialing (pulse or DTMF)	0
Auto Document	CS1
Automatic Voice Message	X
Auto-note	Х
Batch Transmission (max 5 batches)	А
Broadcasting	0
Chain Dialing	0
Communication Result Display	Х
Confidential ID Override	0
Confidential Transmission	0
Direct Fax Number Entry	0
Economy Transmission	CS1
Economy Transmission Time	CS1
Forwarding (5 stations)	CS1, A
Free Polling	0
Groups (7 groups)	0
Group Transfer Station	Х
Hold	Х
ID Transmission Option	Х
Immediate Redialing	0
Immediate transmission (this is the default mode)	0
Keystroke Programs	0
Mailbox	X
Memory transmission	0
Multi-step Transfer	Х
Next Transfer Station	Х
Notify	Х
On Hook Dial	CS1
Page Count	0
Personal Codes	0
Personal Codes with Conf ID	0
Polling Reception	0
Polling Transmission	0
Polling tx file lifetime in the SAF	CS1
Quick Dial (CRO: 16 stations, CS1: 32 stations)	0
Reception modes (Fax. Tel)	0

OVERALL MACHINE INFORMATION FEATURES

Communication Features - User Selectable		
Reduction	0	
Remote control features	Х	
Remote Transfer	Х	
Restricted Access (30 codes, without cards)	CS1	
Secured Polling	0	
Secured Polling with Stored ID Override	0	
Secure Transmission	CS1	
Send Later	0	
Silent ringing detection	CS1	
Speed Dial (CRO: 50 stations, CS1: 100 stations)	0	
Telephone Directory	CS1	
Tonal Signal Transmission	0	
Transfer Request	0	
Transmission Deadline	CS1	
Turnaround Polling	Х	
Two in One	CS1	
Two-step Transfer	Х	
Voice Request (immed. tx only)	0	

Communication Features - Service Selectable		
Al Short Protocol	0	
Auto-reduction override option	0	
Busy tone detection	0	
Closed Network (tx and rx)	0	
Continuous Polling Reception	0	
Dedicated tx parameters	0	
ECM	0	
EFC	0	
Inch-mm conversion	Х	
MV1200 compatibility	Х	
Page retransmission	0	
Page separation mark	0	
Protection against wrong conn.	0	
Resol'n stepdown override option	Х	
Short Preamble	0	
Well log	0	

Area Code PrefixXAuto Service CallOCenter markOCheckered markCS1Clearing a memory fileOClearing a polling fileO	
Auto Service CallOCenter markOCheckered markCS1Clearing a memory fileOClearing a polling fileO	
Center markOCheckered markCS1Clearing a memory fileOClearing a polling fileO	
Checkered markCS1Clearing a memory fileOClearing a polling fileO	
Clearing a memory file O Clearing a polling file O	
Clearing a polling file O	
UIOCK U	
Confidential ID O	
Copy mode O	
Counters O	
Country code X	
Daylight Saving Time O	
Destination Check X	
Direct entry of names O	
Function Programs O	
ID Code O	
Label Insertion CS1	
Language Selection O	
LCD contrast control Service	
Memory Lock A	
Memory Lock ID A	
Modifying a memory file X	
Multi Sort Document Reception CS1, A	
Multicopy mode A	
Night Timer O	
OMR Sheet CS1	
Ordering Toner 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) CS1	
Remote ID X	
Reverse Order Printing CS1, A	
RTI, TTI, CSI O	
Secure ID CS1	
Speaker volume control CS1	
Specified Cassette Selection CS1, B	
Substitute reception on/off O	
Telephone line type O	
TTI on/off O	
User Function Keys X	
User Parameters O	

Reports - Automatic	
Charge Control Report	Х
Communication Failure Report	0
Confidential File Report	Α
Error Report	0
Memory Storage Report	0
Mode Change Report	Х
Polling Clear Report	CS1
Polling Confirmation List	CS1
Polling Reserve Report	0
Polling Result Report	0
Power Failure Report	0
TCR	0
Transfer Result Report	Х
Transmission Deadline Report	CS1
Transmission Result Report	0

Reports - User-initiated		
Authorized Reception List	CS1	
Charge Control Report	Х	
File List	0	
Forwarding List	CS1, A	
Group List	0	
Personal Code List	0	
Program List	0	
Quick Dial List	0	
Specified Cassette Selection List	CS1, B	
Speed Dial List	0	
TCR	0	
Transmission Status Report	Х	
User Function List	Х	
User Parameter List	0	

Service Mode Features	
Back-to-back test	0
Bit switch programming	0
Buzzer test	0
Cable equalizer	0
Comm. parameter display	0
Counter check	Х
DTMF tone test	0
Echo countermeasure	0
Effective term of service calls	0
Error code display	0
Excessive jam calls	0
File Transfer	0
Fusing lamp test	0

OVERALL MACHINE INFORMATION FEATURES

Service Mode Features		
LCD contrast adjustment	0	
Memory file printout (all files)	0	
Modem test	0	
NCU parameters	0	
Operation panel test	0	
Ozone fan test	0	
Periodic service call	0	
PM call	0	
Printer mechanism test	Х	
Printer test patterns	0	
Programmable attenuation	Х	
Protocol dump list	0	
RAM display/rewrite	0	
RAM dump	0	
RAM test	0	
Ringer test	Х	
Scanner lamp test	0	
Scanner mechanism test	0	
Sensor initialization	Х	
Serial number	0	
Service monitor report	0	
Service station number	0	
System parameter list	0	
Technical data on the TCR	0	
Thermal head parameters	Х	
Transmission Status Report	Х	

Memory Files

CRO

Max. number of files: 20 Max. number of stations/file: 20 Max. number of stations overall: 21

Max. number of pages overall: 128

CS1

Max. number of files: 100 Max. number of stations/file: 142 Max. number of stations overall: 298 Max. number of pages overall: 200 (including pages stored as Auto Documents)

2. DETAILED SECTION DESCRIPTIONS

2.1. PCBs AND THEIR FUNCTIONS

- 2.1.1. FCU
- 1. CRO



1. CPU (AFSP)

- 65C02 compatible microprocessor
- Interrupt and DMA control
- Data compression and reconstruction (high speed MH coding for 4.5second scanning)
- Modem (digital operations)
- 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 (LIOP)

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

3. Laser Interface (ALIF)

- Page memory control
- Laser diode control
- Smoothing
- Hexagonal mirror motor control
- Printer interface control

4. Modem Analog Front End (AFE2)

- Modem (analog operations)
- Attenuation

5. Video Processor (VPP4A)

• Analog/digital video signal processing

6. Hybrid IC (LHIC)

• Filters

7. RAM

- 256k ECM/SAF memory (no battery back-up)
- 768k page memory
- 32k SRAM and 32k PSRAM for parameter storage, line buffer, FIFO, SAF memory administration

8. ROM

• 256k system ROM for the machine's software

2. CS1



1. CPU (VFSP)

- 65C02 compatible microprocessor
- Interrupt and DMA control
- Data compression and reconstruction (high speed MH coding for 4.5second 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 (LIOP)

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

3. Laser Interface (ALIF)

- Page memory control
- Laser diode control
- Smoothing
- Hexagonal mirror motor control
- Printer interface control

4. Modem (Rockwell R144EFX)

• Modem

5. Analog Circuit

- Attenuation
- Speaker volume control
- Circuit for extra Rx equalizer

6. Video Processor (VPP4A)

Analog/digital video signal processing

7. Hybrid IC (MHIC)

- Filters
- Amplifiers

8. RAM

- 128k for ECM (no back-up)
- 384k SAF memory (with battery back-up)
- 768k page memory

2.1.2. MBU (CS1 only)



1. System ROM

• 256k for the software to run the machine

2. System RAM

• 32k SRAM and 32k PSRAM for parameter storage, line buffer, FIFO, SAF memory administration

The SRAM is backed up by the battery on the MBU.

3. INSTALLATION

3.1. CONNECTING UP THE MACHINE



3.2. INSTALLING ADDITIONAL UNITS

3.2.1. Lower Cassette (CS1 only)

Check whether there are any messages in the memory. If there are, you must install the lower cassette and turn the power back on within an hour.









INSTALLATION INSTALLING ADDITIONAL UNITS

3.2.2. Memory Card

- Turn off the power before installing or removing a memory card.
- Make sure that 100% is displayed on the operation panel before installing or removing a memory card, or data will be lost.



3.2.3. Cassette (250 Sheets)



3.2.4. Cassette (500 Sheets; CS1 only)



3.2.5. Handset



Installing the Interface Kit

- 1. First, print any messages still stored in the SAF.
- 2. Turn off the power, and unplug the machine from the wall socket.
- 3. Slide out the cassettes.
- 4. Take off the rear cover [A] and disconnect the monitor speaker [B].
- If a memory card [C] is installed on the machine, remove it.
 Note for CRO: Go to step 8.
- 6. Take off the monitor speaker [D] from the rear cover.

[A]



Installation



 Attach the monitor speaker [E] to the printer interface unit [F]. Then reconnect the monitor speaker [G].





May 7th, 1993

 Hold the printer interface unit [H] near the machine with one hand, and plug the flat cable [I] into the connecter on the FCU board.

9. Attach the printer interface unit [J].

- 10. Remove the memory option cover [K].
- 11. Attach the memory card guide [L]. Then install the memory card if necessary.
- 12. Put back the option memory cover.
- 13. Put back the cassettes.
- 14. Plug in the machine, then turn on the power.



[J]

INSTALLATION

INSTALLING ADDITIONAL UNITS

CAUTION

If an optional memory card is used with the printer interface unit and you wish to disassemble the machine, be sure to remove the memory card first, before removing the printer interface unit. Removing the printer interface unit without removing the memory card will cause the card or the connector on the FCU to be physically damaged.

INSTALLATION INSTALLING ADDITIONAL UNITS

Installing the Memory Expansion Board

- 1. Print any messages still stored in the SAF.
- 2. Turn off the power and unplug the machine from the wall socket.
- 3. Remove the memory option cover [M] and the memory board cover [N].



4. Insert the memory expansion board [O].
5. Put back the memory board cover [P] and the memory option cover [Q].
6. Plug in the machine, then turn on the power.

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

3.2.7. Counter

Turn off the power before beginning this procedure.



Make sure that the harness is fed through the machine without getting entangled around components.

Test the counter before reassembling the machine.

- 1. Carefully turn on the power. **Caution:** Do not touch the PSU.
- 2. Copy a few sheets.
- 3. Check that the counter increments correctly. Then turn off the power, put back the covers, and switch on the machine.

3.3. INITIAL PROGRAMMING

Check the following:

- Is the country code in the NCU parameters (Function 96, parameter 00) correct for the country of installation? In the USA, it should be 17.
- Do any bit switch or other settings have to be changed to match line conditions or user requirements?
- Have you programmed the serial number (Function 98, section 4-1-19)

The user should program the following items after installation:

- Telephone Line Type (Europe only)
- RTI, TTI, and CSI
- ID Codes (ID Code, Secure ID [CS1 only], Confidential ID, Memory Lock ID)
- The fax machine's own telephone number
- Date and Time
- Daylight Saving Time On/Off
- Language Selection

Installation

and Procedures

Tables

4. SERVICE TABLES AND PROCEDURES

4.1. SERVICE LEVEL FUNCTIONS

4.1.1. Bit Switch Programming (Function 91)

1.	Function 5 1 9 9 1		
	then immediately Yes	FUNCTION 9 SERVICE	Y/⊽ FUNCTIONS
2.	9 1 Yes	DEFAULT: BITSW 00:	0000 0000 0000 0000
	Bit 7 is displayed at the left, and bit 0 at the right.		
3.	Increment bit switch:		
	Decrement bit switch: *		
	Example: Display bit switch 3: # x 3	DEFAULT: BITSW03:	0000 0000 0000 0000
4.	Adjust the bit switch.		
	Example: To change the value of bit		
	7, press 7	DEFAULT: BITSW03:	0000 0000 1000 0000
5	Fither:		

- 5. Elther:
 - Adjust more bit switches go to step 3.
 - Finish Function

4.1.2. System Parameter List (Function 92)



4.1.6. RAM Display/Rewrite (Function 95)



- 2. 9 5 Yes
- 3. **Yes**

FUNCTION Y/∇ 9SERVICE FUNCTIONSY/ ∇ Y/ ∇ DISPLAY MEMORYY/ ∇ ADDRESS = 2044CDATA = 03

4. Input the address that you wish to see. Example: Address 20202



ADDRESS = 20202	
DATA = 00	

Note: The first digit must always be 2.

5. If you wish to change the data, type in the new data.

Example: 80, press **8 0**



Note: If you wish to move the cursor, press

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

4.1.7. RAM Dump (Function 95)

- 1. Function 5 1 9 9 1 then immediately Yes
- 2. 9 5 Yes
- 3. V Yes

FUNCTION 9 SERVICE FUNCTION	Y/⊽ ONS
	\mathbf{Y}/∇
DISPLAY MEMORY	-,.
MEMORY DUMP STA B-02 S-0000 E-00E	RT/N

SERVICE TABLES AND PROCEDURES SERVICE LEVEL FUNCTIONS

4. Input the bank number. The value of parameter "B" is always "02". Then, input the first two digits of start and end addresses at "S=" and "E=" prompts. For example, enter "12" for start address 1200(H), and enter 13 for end address 13FF(H). Then, press Start to print the dump list. **Example:** Start at 1200, end at 13FF.



MEMORY DUMP START B=02, S=1200,E=13FF

4.1.8. SAF/ECM Memory Test (Function 95)

- 1. Function 5 1 9 9 1 then immediately Yes
- 2. 9 5 Yes

FUNCTION	Y/⊽
9 SERVICE FUNC	TIONS
DISPLAY MEMORY	¥/∇ 1

3. ∇ ∇ **Yes** . The machine starts to check the DRAMs used as ECM and SAF memory.

BUSY CHECK DRAM

4. After the test, either "PASS" or "ERR (Error)" will be displayed. If "ERR: B=nnH ADR=mmmm" is displayed, replace the FCU ("nn" and "mmmm" represents the bank number and the address of the defective portion of the memory.

> PASS CHECK DRAM

5. **Stop**

4.1.9. Page Memory Test (Function 95)

- 1. Function 5 1 9 9 1 then immediately Yes
- 2. 9 5 Yes

SERVICE TABLES AND PROCEDURES SERVICE LEVEL FUNCTIONS

3. ∇ ∇ ∇ **Yes** . The machine starts to check the DRAMs used as page memory.

BUSY CHECK PAGE MEMORY

4. After the test, either "PASS" or "ERR (Error)" will be displayed. If "ERR: B=nnH ADR=mmmm" is displayed, replace the FCU ("nn" and "mmmm" represents the bank number and the address of the defective portion of the memory.

> PASS CHECK PAGE MEMORY

5. **Stop**

4.1.10. NCU Parameters (Function 96)



Note: Parameter 00 is the Country Code, and Parameter 01 is the Tx Level (if the Tx level should be -9 dB, input 9). Refer to section 4-3 for full details on NCU parameters.

4.1.11. ADF Test (Function 97)

Yes

2.

9

7

- 1. Function 5 1 9 9 1 then immediately Yes
- FUNCTION Y/⊽ 9 SERVICE FUNCTIONS SCN-1 DT-2 PL-3 LD-4 MDM-5 RI-6 CK-7

3. **1**

SCANNER TEST KPAD ADF-1 LAMP-2

- 4. **1**
- 5. Function Function
- 6. Place a document in the feeder, then press **Copy Start**

4.1.12. Xenon Lamp and Fusing Lamp Test (Function 97)

- 1. Function 5 1 9 9 1 then immediately Yes
- 2. 9 7 Yes
- 3. **1**
- 4. **2**

FUNCTION	Y/⊽
9 SERVICE FUNC	CTIONS
SCN-1 DT-2 PL-3 MDM-5 BI-6 CK-7	LD-4

SCANNER TEST KPAD

ADF-1 LAMP-2

SCANNER LAMP TEST

The xenon lamp lights up for 5 minutes, and the fusing lamp is switched on.

4.1.13. DTMF Tone Test (Function 97)

1. Function 5 9 9 1 1 then immediately **Yes FUNCTION** \mathbf{Y}/∇ **9 SERVICE FUNCTIONS** Yes 2. 9 7 SCN-1 DT-2 PL-3 LD-4 MDM-5 RI-6 CK-7 3. **2** DTMF TEST DUAL-1 SINGLE-2

July 16th, 1993

- 4. Either:
 - Test dual tones **1** . Go to step 5.
 - Test single tones **2** . Go to step 8.
- 5. The display is as shown opposite.

DUAL TONE	
PRESS KEYPAD	

SINGLE TONE PRESS KEYPAD

Press a key on the ten key pad.

- 6. To stop the test: **Stop**
- 7. Either: Test another tone: Go to step 5.

8. The display is as shown opposite.

Press the required key.

697 Hz	1	852 Hz	3	1209 Hz	5	1477 Hz	7
770 Hz	2	941 Hz	4	1336 Hz	6	1633 Hz	8

Example: To test 1633 Hz, press 8 Start

- 9. To stop the test: **Stop**
- 10. Either:

Test another tone: Go to step 8.

Finish: Function

4.1.14. Printer Test Patterns (Function 97)

- 1. Function 5 1 9 9 1 then immediately Yes
- 2. 9 7 Yes

FUNCTION	Y/⊽
9 SERVICE	FUNCTIONS
SCN-1 DT-2	PL-3 LD-4
MDM-5 RI-6	CK-7

3. **3**

PATTERN PRINT KPAD 1-7

5. Press a key from 1 to 7, excluding 5 and 6. (Patterns 5 and 6 are not used in this model.) A test pattern is printed.

4.1.15. Operation Panel and Ozone Fan Test (Function 97)



July 16th, 1993

7. Either: Test another tone: Go to step 5.

Finish: Function

8. The display is as shown opposite.

Press the required key. Example: To test 1100 Hz, press 2 Start

- 9. To stop the test: **Stop**
- 10. Either:
 - Test another tone: Go to step 8.
 - Finish: Function

4.1.17. Ringer Test (Function 97)

Not used; do not try to use this function.

4.1.18. Buzzer Test (Function 97)

- 1. Function 5 1 9 9 1 then immediately Yes
- 2. 9 7 Yes
- 3. **7**

Press the Stop key to stop the buzzer.

FUNCTION Y/V 9 SERVICE FUNCTIONS	

2100-1 1100-2 800-3 PRESS KEYPAD

SCN-1 DT-2 PL-3 LD-4 MDM-5 RI-6 CK-7 Service Tables Ind Procedures
4.1.19. Serial Number (Function 98)

- 1. Function 5 1 9 9 1 then immediately Yes
- 2. 9 8 Yes
- 3. Enter the machine's serial no at the keypad.

FUNCTION	Y/⊽
9 SERVICE FU	JNCTIONS
SERIAL # KPAD	

SERIAL # KPAD/Y/N 7940479186

To correct a mistake:	No	
-----------------------	----	--

- 4. If the display is correct: Yes
- 4.1.20. Service Station Telephone Number (Function 99)
 - 1. Function 5 1 9 9 1 then immediately Yes
 - 2. 9 9 Yes

9 SERVICE FUNCTIONS	FUNCTION	\mathbf{Y}/∇
	SERVICE FUNCT	IONS

TEL NUMBER KEYPAD

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

TEL NUMBER KPAD/Y/N 2125555242

4. Yes Function

4.1.21. Bypassing Restricted Access

Use this procedure if the user has switched on Restricted Access. This enables you to use the machine without having to input a Personal Code. It is also useful if the user cannot operate the machine because they cannot remember any of the Personal Codes.

2. Immediately press Quick Dial key **11**

Then operate the machine as you wish. When the machine is returned to standby mode, Restricted Access is reimposed immediately.

4.1.22. Printing all Memory Files (Function 24)

First, set bit 5 of bit switch 01 to 1.

1. Function 2 4 Yes

FILE	NO	

2. Press No/V Yes Start

All files in the memory, including confidential messages, will be printed one by one. The files will not be erased.

After you have finished, set bit 5 of bit switch 01 back to 0.

Note: To erase memory files, set bit 2 of bit switch 00 to 1. All files will be erased, and some RAM addresses will also be cleared.

4.1.23. CSI Programming

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

First, set bit 5 of bit switch 01 to 1.



After you have finished, set bit 5 of bit switch 01 back to 0.

4.1.24. Telephone Line Type Selection

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

First, set bit 5 of bit switch 01 to 1.

1. Function 2 2 2 2 2 5 Yes 7 1 2. Press Yes 3. Either:



SELECT TT/DP	Y /∇
LINE = TT TT=1 DP=2	Y

After you have finished, set bit 5 of bit switch 01 back to 0.

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 UU				
	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	Memory file forwarding 1: Forward the files	Use this if the printer does not work, but the user wishes to print the files. First, change the fax machine's telephone number (Function 51) to the number to which you wish to forward the files, then set this bit to 1. All files in the memory will be forwarded. This bit resets to 0 automatically. However, you must return the fax machine's telephone number to the original setting. The files stay in memory.		

Bit	Switch 00	
	FUNCTION	COMMENTS
4	Inclusion of technical data on the Journal 0: No 1: Yes	 (CRO) 1: Instead of the personal code, the following data are listed on the TCR as a six-figure number. First two numbers: Final modem rate (for example, 96 means 9,600 bps) Second two numbers (Rx mode only): Rx signal level (Level = 0 - 0.375x, where x is the value on the report; accurate to 3 dB) Third two numbers (Rx mode only): Rx cable equalizer; 00 = Equalizer is Off, 01 = Equalizer is On (CS1) 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 error rate. 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) (CS1 only) 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 below). 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 training (V.17)	
	144L: 14,400 bps with long training (V.33)	
	120S: 12,000 bps with short training (V.17)	
	120L: 12,000 bps with long training (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	
Communication	ECM: With ECM	
mode	SSC: Using SSC	
	EFC: Using EFC	
	NML: With no ECM, SSC, or EFC	
Compression	MMR: MMR compression	
mode	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	les
	2/M: 2.5 ms/line	ab
	5M: 5 ms/line	L B
	10M: 10 ms/line	, ic
	20M: 20 ms/line	er
	40M: 40 ms/line	S
Width and	=A4: A4 (8.3"), no reduction	
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	

Bi	Bit Switch 01			
	FUNCTION	COMMENTS		
0 1	LCD contrastBit10Contrast00Brightest01 \downarrow 10 \downarrow 11Darkest	Use these bit switches to adjust the brightness of the LCD on the operation panel.		
2	Not used	Do not change the factory setting.		
3	Memory read/write by RDS Bit 4 3 Setting 0 0 Always enabled 0 1 User selectable 1 0 User selectable 1 1 Always disabled	 (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. 		
5	Dedicated transmission parameter programming/printing all SAF files 0: Disabled 1: Enabled	This bit must be set to 1 before attempting to program dedicated transmission parameters or printing all files stored in the SAF memory. If CSI and /or telephone line type is a service mode in your area, this bit must also be at 1 before programming.		
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. 		

Bi	Bit Switch 02			
		F	UNCTION	COMMENTS
0	Page s 0: Enat	epara bled	ation mark 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	Repetit receive printer 0: Disa	ion o d pa pape bled	f data when the ge is longer than the r 1: Enabled	 0: The next page continues from where the previous page left off 1: The final few mm of the previous page are printed at the top of the next page.
2	Reduction of the length of received data 0: Enabled 1: Disabled		f the length of ta 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.
3 4 5	Not use	ed		Do not change the factory settings.
6 7	Maximu length Bit 7 0 0 1 1	um tr 6 0 1 0 1	ansmittable document Setting 600 mm 1200 mm 14 m 100 m	If the user wants to send very long documents such as well logs, use the 14 m or 100 m setting.

Bi	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	Not used	Do not change the factory setting.		
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	Not used	Do not change the factory setting.		
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.		

IF.

Bi	t Switch 04	
	FUNCTION	COMMENTS
0 1	Compression modes available in receive mode Bit 1 0 Modes 0 0 MH only 0 1 MR or MH 1 0 MR or MH, with EFC 1 1 MMR, MR, or MH with EFC	These bits determine what capabilities are informed to the transmitting side in the protocol exchange.
2	Error counting method 0: 10 (20) [40] 1: In accordance with the setting of bits 3 to 7	 The machine counts data errors caused by a noisy line or defective machine. S 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 postmessage command. As 10 (or 20 or 40) good lines cause the count to decrement, RTN will only occur in bad conditions. The number of good lines for counter decrement and the value of error threshold can be changed by rewriting the RAM addresses 40CB(H) and 40CC(H).
3 4	Burst error threshold Bit 4 3 Threshold 0 0 3 (6) [12] 0 1 4 (8) [16] 1 0 5 (10) [20] 1 1 6 (12) [24]	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.
5 6 7	Error line ratio Bit 7 6 5 Value 0 0 0 5% 0 0 1 6% 0 1 0 7% 0 1 1 8% 1 0 0 9% 1 0 1 10%	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.

Bi	t Switch	n 05		
			FUNCTION	COMMENTS
	Compr transm	ressio nit mo	on modes available in de	These bits determine what capabilities are informed to the receiving side in the protocol
0	Bit 1 0 0 1	0 1 0	Modes MH only MR or MH MR or MH, with EFC MMR, MR, or MH, with EFC	exchange.
2	PABX 0: Ena 1: Disa	dial te bled abled	one detection	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 0: Ena 1: Disa	dial t bled abled	one detection	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 te 0: Ena 1: Disa	one c bled abled	letection	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 us	ed		Do not change the factory setting.
6 7	PSTN PABX Bit 7 0 0 1	acce 6 0 1 0	ss method through Method No PABX Loop Start Ground Start	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.
	1	1	Flash Start	

В	it Switch 06		
		FUNCTION	COMMENTS
0	PSTN acces	ss number	Program this bit switch if the machine is behind a PABX. The access number is
1	Access No.	Hex value of bit switch	the number the user must dial to get an
2	\downarrow	F0 ↓	access number at the start of a
2	9	F9	telephone number, it will connect with
3	00	00	then dial the number.
4	↓ 00	↓ 00	Example: If the access number for the
5	35	33	do this, set all bits to 1 except bits 1 and 2.
6			If there is no PABX, set all bits to 1.
7			

Bi	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.			
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 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. 			
7	FTZ protocol	This bit is ignored during memory reception. This bit must be set to 1 in Germany.			
	U: Disabled 1: Enabled				

В	it Switc	:h 08 (1	F rans	missio	n)	
			FU	NCTIOI	N	COMMENTS
0	Initial	Tx mod	dem r	ate		These bits set the initial starting modem
	Bit 3	Bit 2	Bit 1	Bit 0	Setting (bps)	rate for transmission. This rate may fall
1	1	1	0	1	* 14,400	back to a slower rate depending on line
	1	1	0	0	* 12,000	conditions and the remote terminal's
2	1	0	1	1	* 9,600 TCM	capabilities.
2	1	0	1	0	* 7,200 TCM	Notes
3	0	0	1	1	9,600	1. The settings with an asterisk (*) can
	0	0	1	0	7,200	only be used with CS1.
	0	0	0	1	4,800	2. CR0: Do not change the factory settings
	0	0	0	0	2,400	of bits 2 and 3.
4	Mode	m train	ing ty	pe whe	en sending at	0: Training is shorter so communication
	12,00	0 or 14	,400	bps (C S	61 only)	costs are reduced. However, the
	0: V.1	7 (shor	t) 1	: V.33 (long)	communication is not so reliable.
						1: The longer training time ensures a
						higher reliability for the communication.
5	Not us	sed.				Do not change the factory setting.
6	Cable	equali	zer (t	x mode)	Use a higher setting if there is signal loss
	(CRO)				at higher frequencies because of the
7	Bit 7	Bit 6	S	etting		length of wire between the modem and the
	0	0	N	one		telephone exchange.
	0	1	N	ledium		
	1	0	Н	igh		Also, try using the cable equalizer if one or
	1	1	N	ot used	l	more of the following symptoms occurs.
	(CS1)		_	_		•Communication error
	Bit 7	Bit 6	S	etting		 Modem rate fallback occurs frequently.
	0	0	N	one		
	0	1	L	ow (1.8	km)	
	1	0	N	ledium	(3.6 km)	
	1	1	H	igh (7.2	2 KM)	

Bi	3it 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 2	Wrong connection prevention method Bit 2 Bit 1 Setting 0 0 None 0 1 8 digit CSI 1 0 4 digit CSI 1 1 CSI/RTI	 (0,1) - The machine will not transmit if the last 8 digits of the received CSI do not match the last 8 digits of the dialed telephone number. This does not work for manual dialing. (1,0) - The same as above, except that only the last 4 digits are compared. (1,1) - The machine will not transmit if the other end does not identify itself with an RTI or CSI. (0,0) - Nothing is checked; transmission will always go ahead. 				
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 (CS1 only) 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 6 7	Not used	Do not change the factory settings.				

В	it Switc	h 0A (R	eception)		
			FUNCTIO	N	COMMENTS
0	Initial	Rx mod	em rate		The setting of these bits is used to inform
	Bit 3	Bit 2 B	Sit 1 Bit 0	Setting	the sending machine of the initial starting
1	(bps)				modem rate for the machine in receive
_	1	1	0 1	* 14,400	mode. If 9,600 bps presents a problem
2	1	1	0 0	* 12,000	during reception, use a lower setting.
•	1	0	1 1	* 9,600 TCM	Notes
3	1	0	1 0	* 7,200 TCM	 The settings with an asterisk (*) can
	0	0	1 1	9,600	only be used with CS1.
	0	0	1 0	7,200	2. CR0: Do not change the factory settings
	0	0	0 1	4,800	of bits 2 and 3.
	0	0	0 0	2,400	
4	Mode	m trainir	ng type whe	n receiving at	0: Training is shorter so communication
	12,00	0 or 14,4	400 bps (C \$	S1 only)	costs are reduced. However, the
	0: V.1	7 (short) 1: V.33 ((long)	communication is not so reliable.
					 The longer training time ensures a
					higher reliability for the communication.
5	Not us	sed.			Do not change the factory setting.
6	Cable	equaliz	er (rx mode	e)	Use a higher setting if there is signal loss
	(CRO)	,	,	at higher frequencies because of the
7	Bit 7	Bit 6	Setting		length of wire between the modem and the
	0	0	None		telephone exchange.
	0	1	Medium		
	1	0	High		Also, try using the cable equalizer if one or
	1	1	Not used	ł	more of the following symptoms occurs.
	(CS1)				 Communication error with error codes
	Bit 7	Bit 6	Setting		such as 0-20, 0-23, etc.
	0	0	None		 Modem rate fallback occurs frequently.
	0	1	Low (1.8	km)	
	1	0	Medium	(3.6 km)	
	1	1	High (7.2	2 km)	

Bi	it Swit	ch 0	3 (Re	ception)		
			F	UNCTION		COMMENTS
0	Clos 0: D 1: E	ed ne isable nable	etwork ed d	(reception	n)	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	Trair 0: Ty 1: Ty	Training error tolerance 0: Type 1 1: Type 2				This bit determines the values available with bits 2 and 3.
0	Trair Bit	ning e 3	error to 2	olerance Type 1	Type 2	Type 1 can be used anywhere. Type 2 is normally used only in Europe.
3		0 1 1	1 0 1	10 2 0	9 4 1	If the machine detects more errors during training than the number set by these bits, training fails and the machine will send FTT. The data will be resent at a lower rate.
4 5	Not	used				Do not change the factory settings.
6 7						

B	it Switch 0C		
	FUNCTION	COMMENTS	
0	European protocol requirements 0: Disabled 1: Enabled	Adjust these bits in accordance with the country of installation.	ω ų
1	German dialing requirements 0: Disabled 1: Enabled		Table edure
2	Austrian dialing requirements 0: Disabled 1: Enabled		rvice d Proc
3	Norwegian dialing and protocol requirements 0: Disabled 1: Enabled		Se anc
4	Danish dialing 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.	

B	it Switch 0D	
	FUNCTION	COMMENTS
0	Not used	Do not change the factory settings.
1		
2		
3		
4		
5		
6	Contents of the top line of the LCD when handset mode is in use	0: The telephone number being dialed is displayed.
0	0: Telephone number dialed 1: HANDSET MODE	1: Only HANDSET MODE is displayed.
7	Not used	Do not change the factory setting.

В	it Switch 0E	
	FUNCTION	COMMENTS
0	Not used	Do not change the factory settings.
1	-	
2	-	
3		
4		
_	Conditions for reception	1: If the sending machine does not transmit
5	0: Normal	an RTI or CSI, the call will be rejected, and
	1: RII or CSI needed	the machine will send DCN.
6	Not used	Do not change the factory settings.
7		

Bi	it Switch 0F		
	F	UNCTION	COMMENTS
0 to 7	Country Code 00: France 01: Germany 02: UK 03: Italy 04: Austria 05: Belgium 06: Denmark 07: Finland 08: Ireland 09: Norway 0A: Sweden 0B: Switzerlar 0C: Portugal 0D: Holland 0E: Spain 0F: Israel	10: Not used 11: USA 12: Asia 13: Japan 14: Hong Kong 15: South Africa 16: Australia 17: New Zealand 18: Singapore 19: Malaysia	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 96).

Bi	t Swit	ch 10			
			FUNCTION	COMMENTS	
0	Puls Bit 1	e dialing Bit 0	method Setting	P=Number of pulses sent out, N=Number dialed.	
1	0 0 1 1	0 1 0 1	Normal (P=N) Oslo (P=10 - N) Sweden (N+1) Sweden (N+1)	Do not change the factory settings.	ce Tables rocedures
2	Not u	used		Do not change the factory settings.	servi nd P
3					al
4					
5					
6					
7					

Bit switch 11 is not used

Bi	it Switch 12	
	FUNCTION	COMMENTS
0	Automatic transmission report printout after transmission operated with an OMR sheet (CS1 only) 0: As defined by user parameter setting 1: Automatically printed	
1	Not used	Do not change the factory settings.
3	Item displayed if a Quick Dial key is pressed to dial the other party 0: Name stored in the Quick Dial 1: Telephone number	
4 5 6	Not used	Do not change the factory setting.

Bit switches 13 to 1C are not used.

Bi	it Switch 1D						
	FUNCTION	COMMENTS					
0	Not used	Do not change the factory setting.					
1							
2							
R	8-minute close						
5	0: Disabled 1: Enabled						
4	Not used	Do not change the factory settings.					
5							
6							
7							

Bi	t Switch 1E	
	FUNCTION	COMMENTS
0	Use of the buzzer to call the user to the machine if there is no reply to NSF/DIS 0: Enabled 1: Disabled	Set this bit to 1 if the user complains about the tone from the buzzer when no reply is received to NSF or DIS.
1 2	Scrambling method used for secure transmission (CS1 only) Bit 2 1 Method 0 0 Type 1 0 1 Type 2 1 0 Type 3 1 1 Type 3	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.
3	Secure transmission demonstration (CS1 only) 0: Off 1: On	If this bit is at 1 and if secure transmission is switched on, received images will be printed out without being unscrambled. This demonstrates what anyone intercepting the signal can expect to pick up.
4	Not used	Do not change the factory setting.
5	RTI or CSI display selection 0: RTI 1: CSI	This bit determines which of the other party's identifiers is shown on the display during communication. If the other terminal is by another manufacturer, the RTI is not shown even if this bit is at 0; the CSI will appear.
6	Not used	Do not change the factory setting.
7	Error report output 0: Enabled 1: Disabled	If this bit is at 1, the error report will not be printed when an error occurs.

Bi	t Swi	tch	1F			13
				FUNCTION	COMMENTS	ice
	V.21	sig	gnal	detection method		Serv
	(CR	0 0	only)		
0	Bit	1	0	Method		
		0	0	Six consecutive 1's		
1		0	1	A one-byte flag		
		1	0	A two-byte flag		
		1	1	A two-byte flag		
2	Not	use	ed		Do not change the factory setting.	
3						
4						
5						
6						
7						

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 dialing. The factory settings for each country are also given. Most of these must be changed by RAM read/write (Function 95), but some can be changed using NCU Parameter programming (Function 96); if Function 96 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.

When using RAM read/write, you must add the bank number before the fourdigit RAM address number. See section 4-1-6 for details.

Address	Function	Unit	Remarks		
413B	Country code [NCU parameters only]	Hex	Function 96 (parameter 00).		
413C	Line current detection time	20 ms	Line current is not detected		
413D	Line current wait time	_	if 413C contains FF.		
413E	Line current drop detect time				
413F	PSTN dial tone upper frequency limit (HIGH)	Hz (BCD)	See Note 2.		
4140	PSTN dial tone upper frequency limit (LOW)				
4141	PSTN dial tone lower frequency limit (HIGH)				
4142	PSTN dial tone lower frequency limit (LOW)				
4143	PSTN dial tone detection time	20 ms	If 4143 contains FF, the		
4144	PSTN dial tone reset time	160 ms	machine pauses for the		
4145	PSTN dial tone continuous tone time	20 ms	pause time (4147).		
4146	PSTN dial tone permissible drop time				
4147	PSTN wait interval	160 ms			
4148	Ringback tone detection time	20 ms	Detection is disabled if this contains FF.		
4149	PSTN busy tone upper frequency limit (HIGH)	Hz (BCD)	If 4149 is FF, detection is disabled. See Note 2.		
414A	PSTN busy tone upper frequency limit (LOW)				
414B	PSTN busy tone lower frequency limit (HIGH)				
414C	PSTN busy tone lower frequency limit (LOW)				

Address	Function	Unit	Remarks	
414D	PABX dial tone upper frequency	Hz (BCD)	See Note 2.	
	limit (HIGH)	, ,		
414E	PABX dial tone upper frequency	_		
	limit (LOW)			
414F	PABX dial tone lower frequency			
	limit (HIGH)			
4150	PABX dial tone lower frequency			
	limit (LOW)			
4151	PABX dial tone detection time	20 ms	If 4151 contains FF, the	
4152	PABX dial tone reset time	160 ms	machine pauses for the	
4153	PABX dial tone continuous tone	20 ms	pause time (4155).	
	time			
4154	PABX dial tone permissible drop			
4455		100		_
4155	PADX Walt Interval	160 ms	Detection is disclosed for the	_
4156	time	20 ms	contains FF.	_
4157	PABX busy tone upper frequency limit (HIGH)	Hz (BCD)	If this is FF, detection is disabled. See Note 2.	
4158	PABX busy tone upper frequency limit (LOW)		See Note 2.	
4159	PABX busy tone lower frequency limit (HIGH)	-		
415A	PABX busy tone lower frequency limit (LOW)	-		
415B	Busy tone ON time: range 1	20 ms		
415C	Busy tone OFF time: range 1			es es
415D	Busy tone ON time: range 2	-		able dur
415E	Busy tone OFF time: range 2	_		e Ta
415F	Busy tone ON time: range 3	-		ice Pro
4160	Busy tone OFF time: range 3	-		erv id F
4161	Busy tone ON time: range 4	_		S an
4162	Busy tone OFF time: range 4	_		
4163	Busy tone continuous tone detection time			
4164	Busy tone signal state time tolerand required for detection (a setting of 4 ON-OFF must be detected twice).	ce for all rang I cycles mear	es, and number of cycles ns that ON-OFF-ON or OFF-	_
	Tolerance (+)			
	Bit 1 0			
	0 0 75%			
	0 1 50%			
	1 0 25%			
	1 1 12.5%			
	Bits 7, 6, 5, 4 - number of cycles re	quired for det	ection	

Address	Function	Unit	Remarks
4165	International dial tone upper	Hz (BCD)	See Note 2.
	frequency limit (HIGH)		
4166	International dial tone upper		
	frequency limit (LOW)		
4167	International dial tone lower		
	frequency limit (HIGH)		
4168	International dial tone lower		
	frequency limit (LOW)		
4169	International dial tone detection	20 ms	If 4169 contains FF, the
	time		machine pauses for the
416A	International dial tone reset time	160 ms	pause time (416D).
416B	International dial tone continuous	20 ms	
4100	tone time		
4160	drop time		
416D	International dial wait interval	160 ms	
416E	Country dial tone upper frequency	Hz (BCD)	See Note 2.
	limit (HIGH)		
416F	Country dial tone upper frequency		
	limit (LOW)		
4170	Country dial tone lower frequency		
	limit (HIGH)		
4171	Country dial tone lower frequency		
4170	limit (LOVV)	00	
4172	Country dial tone detection time	20 ms	If 41/2 contains FF, the
4173	Country dial tone reset time	160 ms	nause time (4176)
4174	Country dial tone continuous tone	20 ms	
	time	20 113	
4175	Country dial tone permissible drop		
	time		
4176	Country dial wait interval	160 ms	
4177	Grounding time (ground start	20 ms	The Gs relay is closed for
	mode)		this interval.
4178	Break time (flash start mode)	1 ms	The Di relay is open for this
			interval.
4179	International dial access code	BCD	For a code of 100:
417A			4179 - F1
			41/A-00
417B	PABX pause time	20 ms	
417C	Progress tone detection level, and	Bit 7 Bit 6	dBm
	cadence detection enable flags	1 1	-52.7
			-32.7
		0 0	-28.7
		Bits 3, 2, 1	, 0 - See Note 3.
417D	CCITT T1 time	2.56 s	

Address	Function	Unit	Remarks		
417E	Max. number of dials per station	1			
	(not using memory)				
417F	Redial interval (not using memory)	1 min			
4180	Interval between dialing to different stations	2.56 s			
4181	Tx level from modem	- dBm	Function 96 (parameter 01).		
4182	Acceptable ringing signal frequency: range 1, upper limit	1000/ .672N	Function 96 (parameter 02).		
4183	Acceptable ringing signal frequency: range 1, lower limit	(Hz). N is the value	Function 96 (parameter 03).		
4184	Acceptable ringing signal frequency: range 2, upper limit	stored using	Function 96 (parameter 04).		
4185	Acceptable ringing signal frequency: range 2, lower limit	Function 96.	Function 96 (parameter 05).		
4186	Number or rings until a call is detected	1	Function 96 (parameter 06).		
4187	Minimum required length of the first ring	20 ms	See Note 6. Function 98 (parameter 07).		
4188	Minimum required length of the second and subsequent rings		Function 96 (parameter 08).		
4189	Ringing signal detection reset time	40 ms	Function 96 (parameter 09).		
418A	Time between opening or closing the Ds relay and opening the Di relay	1 ms	See Notes 5 and 8. Function 96 (parameter 10).		
418B	Break time for pulse dialing	-	See Note 5. Function 96 (parameter 11).		
418C	Make time for pulse dialing		See Note 5. Function 96 (parameter 12).		
418D	Time between final Di relay closure and Ds relay opening or closing		See Notes 5 and 8. Function 96 (parameter 13).		
418E	Pause between dialed digits (pulse dial mode)	20 ms	See Note 5. Function 96 (parameter 14).		
418F	Time waited when a pause is entered at the operation panel		Function 96 (parameter 15).		
4190	DTMF tone on time	1 ms	Function 96 (parameter 16).		
4191	DTMF tone off time		Function 96 (parameter 17).		
4192	DTMF tone attenuation value	-dBm (C60) -dBm/2 (C31)	Function 96 (parameter 18). See Note 7.		
41A0	CED detection interval	20 ms	Factory setting: 11 x 20 ms		
41A1	CNG detection interval		Factory setting: 11 x 20 ms		
41A2	800 Hz detection interval		Factory setting: 10 x 20 ms		
41A3	CED detection frequency: upper limit	10 ⁶ /4.873N Hz	Factory setting: 94 [2183 Hz]		
41A4	CED detection frequency: lower limit		Factory setting: 102 [2012 Hz]		

Address	Function	Unit	Remarks
41A5	CCITT T4 timer	160 ms	Factory setting: 20 x 160 ms
41A6	Monitor speaker volume during communication (CS1 only)	See Note 10.	Factory setting: 90
41A7	Monitor speaker volume during dialing (CS1 only)	See Note 11.	Factory setting: 90
41AA	CNG detection frequency: upper limit	10 ⁶ /4.873N Hz	Factory setting: 169 [1214 Hz]
41AB	CNG detection frequency: lower limit		Factory setting: 207 [991 Hz]
41AC	800 Hz signal detection frequency: upper limit		Factory setting: 233 [881 Hz]
41AD	800 Hz signal detection frequency: lower limit	See Note 9.	Factory setting: 29 [720 Hz]
41B3	Max. time limit to dial a number	2.56 s	All countries: 15[H] (53.76 s)
41B4	Max. no of consecutive pauses in a telephone number	Hex	Germany: 1, Others: 250

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 417C: 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. 4172: tolerance for on or off state duration (%), coded as in 4164.

4174: on time, hex code (unit = 10 ms)

4175: 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: 4169, 416B, 416C Bit 1 = 1: 4151, 4153, 4154 Bit 0 = 1: 4143, 4145, 4146 4. Belgium only

Address 4144 for DTMF dialing is 3.04 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 418A to 418F) 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. N must be between 0 and 15. The attenuation levels are as follows.
 High frequency tone: N dBm
 Low frequency tone: N 2 dBm
- 418A: Europe Between Ds opening and Di opening, France Between Ds closing and Di opening 418D: Europe - Between Ds closing and Di closing, France - Between Ds opening and Di closing
- 9. For address 41AD, the formula is slightly different. Frequency = $1,000,000/(4.873 \times [N+256])$ Hz
- 10. Bits 7, 6, and 5 are for the volume during transmissionBits 4, 3, and 2 are for the volume during receptionThe three bit values range from 0 (off), 1 (minimum), to 7 (maximum)
- 11. Bits 7, 6, and 5 are for the volume during on-hook dialBits 4, 3, and 2 are for the volume during dialingThe three bit values range from 0 (off), 1 (minimum), to 7 (maximum)

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 413B [use hex codes] or use Function 96 [input the decimal value]) to the appropriate setting. The country code also affects the NCU signal status.

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.

Country Code, NCU Parameter 00 [or RAM Address 413B, 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], S. Africa: 21 [15], Australia: 22 [16], New Zealand: 23 [17], Portugal: 24 [18], Malaysia: 25 [19]

Country	41	3C	41	3D	41	3E	413F/4140		
France							480 Hz	04(H)	80(H)
Germany	1.1 s	55	4.1 s	205	1.06 s	53	498 Hz	04(H)	98(H)
UK/Univ									
Italy							471 Hz	04(H)	71(H)
Austria							512 Hz	05(H)	12(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	1.06 s	53	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			608 Hz	06(H)	08(H)
Portugal							450 Hz	04(H)	50(H)
Holland							563 Hz	05(H)	63(H)
Spain							480 Hz	04(H)	80(H)
Israel	1.1 s	55	4.1 s	205	1.06 s	53	498 Hz	04(H)	98(H)
USA									
Asia									
Australia							450 Hz	04(H)	50(H)
N. Zealand									

Country	4141/4142			4143		4144		4145	
France	400 Hz	04(H)	00(H)	2 s	100	12 s	75	1 s	50
Germany	370 Hz	03(H)	70(H)	2.1 s	105	20 s	125	2.1 s	105
UK									
Italy	391 Hz	03(H)	91(H)	2, 50%	21(H)	10.9 s	68	0.6 s	30
Austria	380 Hz	03(H)	80(H)	0.8 s	40	10.1 s	63	0.8 s	40
Belgium	300 Hz	03(H)	00(H)	0.6 s	30	3.04 s	19	0.6 s	30
Denmark	340 Hz	03(H)	40(H)	1.3 s	65	10.1 s	63	1.3 s	65
Finland	315 Hz	03(H)	15(H)	4.1 s	205	10.1 s	63	4.1 s	205
Ireland	200 Hz	02(H)	00(H)	2.1 s	105	10.2 s	64	2.1 s	105
Norway	340 Hz	03(H)	40(H)	1.1 s	55	20 s	125	1.1 s	55
Sweden	340 Hz	03(H)	40(H)	0.8 s	40	5.12 s	32	0.8 s	40
Switz.	338 Hz	03(H)	38(H)	0.8 s	40	10.9 s	68	0.8 s	40
Portugal	300 Hz	03(H)	00(H)	2.1 s	105	9.9 s	62	2.1 s	105
Holland	76 Hz	00(H)	76(H)	1.1 s	55	15.04 s	94	1.1 s	55
Spain	320 Hz	03(H)	20(H)	1.5 s	75	12.8 s	80	0.72 s	36
Israel	340 Hz	03(H)	40(H)	2.1 s	105	20 s	125	2.1 s	105
USA									
Asia									
Australia	130 Hz	01(H)	30(H)	3.0 s	150	6 s	38	2 s	100
N. Zealand									

4144: The actually used value for Belgium comes from the ROM; it is 125.

Country	4146		41	47	41	4148 4149/414A			A	
France	0.04 s	2	0.16 s	1			488 Hz	04 (H)	88 (H)	
Germany	0.08 s	4	4 s	25			510 Hz	05 (H)	10 (H)	se Se
UK/Univ			4 s	25			430 Hz	04 (H)	30 (H)	able
Italy	1 s	50	4 s	25			529 Hz	05 (H)	29 (H)	è T ^e
Austria	0.08 s	4	4 s	25	0.1 s	5	512 Hz	05 (H)	12 (H)	vice Pro
Belgium	0.08 s	4	4 s	25			471 Hz	04 (H)	71 (H)	ier I d
Denmark	0.08 s	4	4 s	25			460 Hz	04 (H)	60 (H)	Sar
Finland	0.08 s	4	4 s	25						
Ireland	0.08 s	4	4 s	25			430 Hz	04 (H)	30 (H)	
Norway	0.08 s	4	4 s	25			512 Hz	05 (H)	12 (H)	
Sweden	0.06 s	3	4 s	25			512 Hz	05 (H)	12 (H)	
Switz.	0.04 s	2	4 s	25	0.1 s	5	608 Hz	06 (H)	08 (H)	
Portugal	0.08 s	4	4 s	25						
Holland	0.08 s	4	4 s	25			563 Hz	05 (H)	63 (H)	
Spain	0.1 s	5	3.04 s	19			460 Hz	04 (H)	60 (H)	
Israel	0.08 s	4	4 s	25			498 Hz	04 (H)	98 (H)	
USA			2.08 s	13						
Asia			2.08 s	13						
Australia	0.16 s	8	3.04 s	19			450 Hz	04 (H)	50 (H)	
N. Zealand			2.08 s	13						

Country	4	14B/414	С	4	14D/414	E	414F/4150			
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)	
N. Zealand										

Country	41	51	4152		41	53	41	54	4155	
France	2 s	100	12 s	75	1 s	50	40 ms	2	0 s	0
Germany									4 s	25
UK/Univ									4 s	25
Italy	2 s	100	10.1 s	63	0.18 s	9	80 ms	4	4 s	25
Austria									4 s	25
Belgium	0.6 s	30	3.04 s	19	0.6 s	30	80 ms	4	4 s	25
Denmark	1.3 s	65	10.8 s	63	1.3s	65	80 ms	4	4 s	25
Finland									4 s	25
Ireland									4 s	25
Norway									4 s	25
Sweden	0.8 s	40	5.12 s	32	1.92s	96	60 ms	3	4 s	25
Switz.	0.8 s	40	9.9 s	62	0.8 s	40	80 ms	4	4 s	25
Portugal									4 s	25
Holland	1.1 s	55	15.04s	94	1.1 s	55	80 ms	4	4 s	25
Spain									3.04 s	19
Israel	2.1 s	105	20 s	125	2.1 s	105	80 ms	4	4 s	25
USA									4 s	25
Asia									4 s	25
Australia	3 s	150	6 s	38	2 s	100	20 ms	1	3.04 s	19
N. Zealand									4 s	25

Country	41	56		4157/4158	3	4159/415A			
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)	
N. Zealand									

Country	415B		415C		415D		41	5E	415F	
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								
Israel	0.24 s	12	0.24 s	12	0.48 s	24	0.48 s	24		
USA										
Asia										
Australia	0.36 s	18	0.36 s	18	0.38 s	19	0.38 s	19	0.24 s	12
N. Zealand										

Country	41	60	41	61	41	62	41	63	41	64
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, 25	42(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
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	0.24 s	12	0.5 s	25	0.5 s	25			4. 50	41(H)
N. Zealand										

Country	4	4165/4166	6		4167/4168	}	4169		
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									
N. Zealand									

Country	416	6 A	41	6B	41	6C	41	6D	416	E/416F	
France	12 s	75	1.5 s	75	0.04 s	2	0	0		,	
Germany							0	0	-		
UK/Univ							0	0			
Italy							0	0			
Austria							0	0			
Belaium	20 s	125	0.32 s	16	0.68 s	34	0	0			
Denmark		-					0	0	Only ı	used by	
Finland							0	0	Sw	eden:	
Ireland							0	0	51	2 Hz	
Norway							0	0	416E	: 05(H)	
Sweden							0	0	416	: 12(H)	
Switz.							0	0			
Portugal							0	0			
Holland	15.04s	94	1.1 s	55	0.08 s	4	0	0			
Spain	12.8 s	80	0.72 s	36	0.1 s	5	3.04 s	19			
Israel							0	0			
USA							0	0			
Asia							0	0			
Australia							0	0			
N. Zealand							0	0			
											-
Country		4170/4-	171		4470						7
			171		41/2		41/3	}	41	74	
France		<u>+170/+</u>			41/2		41/3	}	41	74	
France Germany					4172		41/3	}	41	74	
France Germany UK/Univ					4172		41/3	}	41	74	-
France Germany UK/Univ Italy					4172		41/3	}	41	74	les res
France Germany UK/Univ Italy Austria							41/3	}	41	74	ables edures
France Germany UK/Univ Italy Austria Belgium								}	41	74	e Tables ocedures
France Germany UK/Univ Italy Austria Belgium Denmark								<u>}</u>	41	74	vice Tables Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland									41		Service Tables nd Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland									41	74	Service Tables and Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway											Service Tables and Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden	340 Hz	03(H) 40(H) 0.8	<u>4172</u>	0 5	.12 s	32	41	40	Service Tables and Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz.	340 Hz	03(H) 40(H) 0.8	3 s 4	0 5	.12 s	32	41	40	Service Tables and Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal	340 Hz	03(H) 40(H) 0.8	<u>4172</u>	0 5	.12 s	32	41	40	Service Tables and Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal Holland	340 Hz	03(H) 40(H) 0.8	<u>4172</u>	0 5	.12 s	32		40	Service Tables and Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal Holland Spain	340 Hz	03(H) 40(H) 0.8	3 s 4	0 5	.12 s	32	41	40	Service Tables and Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Ireland Norway Sweden Switz. Portugal Holland Spain Israel	340 Hz	03(H) 40(H) 0.8	3 s 4	0 5	.12 s	32		40	Service Tables and Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Ireland Norway Sweden Switz. Portugal Holland Spain Israel USA	340 Hz	03(H) 40(H) 0.8	3 s 4		.12 s	32		40	Service Tables and Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal Holland Spain Israel USA Asia	340 Hz	03(H) 40(H) 0.8	3 s 4		.12 s	32	<u>41</u>	40	Service Tables and Procedures
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal Holland Spain Israel USA Asia Australia	340 Hz	03(H) 40(H		<u>4172</u>		.12 s	32	0.8 s	40	Service Tables and Procedures

Country	4175			4176			4177				4178		
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	100 ms	100	
Belgium			0		0		2	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		25	;	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	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	
N. Zealand			0		0			0		0	0	0	
Country	4	179/417/	A		417	7B			41	7C	4	17D	
France	19	FF(H)	19(H)					-40.	2	40(H)) 53.8 s	21	
Germany	00	FF(H)	00(H)					-52.	7	C0(H) 53.8 s	21	
UK/Univ	010	F0(H)	10(H)	1	s	5	0	-52.	7	C0(H) 53.8 s	21	
Italy	00	FF(H)	00(H)					-52.	7	C1(H) 53.8 s	21	
Austria	00	FF(H)	00(H)					-52.	7	C0(H) 35.8 s	14	
Belgium	00	FF(H)	00(H)					-32.	2	84(H)) 58.9 s	23	
Denmark	009	F0(H)	09(H)					-32.	2	80(H)) 53.8 s	21	
Finland	990	F9(H)	90(H)	2	S	10)0	-32.	2	80(H)) 53.8 s	21	
Ireland	16	FF(H)	16(H)					-40.	2	40(H)) 53.8 s	21	
Norway	095	F0(H)	95(H)					-32.	2	80(H)) 53.8 s	21	
Sweden	009	F0(H)	09(H)					-32.	2	80(H)) 53.8 s	21	
Switz.	00	FF(H)	00(H)					-40.	2	40(H)) 92.2 s	36	
Portugal	00	FF(H)	00(H)					-32.	2	80(H)) 53.8 s	21	
Holland	09	FF(H)	09(H)					-28.	7	00(H)) 53.8 s	21	
Spain	07	FF(H)	07(H)					-40.	2	40(H)) 79.4 s	31	
Israel	00	FF(H)	00(H)					-52.	7	C0(H) 58.9 s	23	
USA								-52.	7	C0(H) 53.8 s	21	
Asia								-52.	7	C0(H) 53.8 s	21	
Australia								-52.	7	C0(H) 53.8 s	21	
N. Zealand								-52.	7	C0(H) 53.8 s	21	

Norway: 417C =- 52.7 for busy tone detection

Country	41	7E	41	7F	4180	4180		4181 (-dB)		4182 (Hz)		4183 (Hz)	
France	6	6	5	5	7.68 s	3	10	10	57.2	26	42.5	35	
Germany	4	4	2	2	12.8 s	5	6	6	57.2	26	20.1	74	
UK/Univ	3	3	3	3	12.8 s	5	10	10	19.8	75	11.6	128	
Italy	3	3	2	2	17.92s	7	6	6	55.1	27	12.7	117	
Austria	10	10	1	1	12.8 s	5	6	6	74.4	20	18.6	80	
Belgium	4	4	6	6	15.36s	6	6	6	29.8	50	13.5	110	
Denmark	3	3	1	1	12.8 s	5	10	10	29.8	50	19.6	76	
Finland	3	3	2	2	12.8 s	5	10	10	32.3	46	17.3	86	
Ireland	3	3	2	2	12.8 s	5	10	10	27.1	55	14.4	103	
Norway	3	3	2	2	12.8 s	5	10	10	59.5	25	17.3	86	
Sweden	3	3	2	2	12.8 s	5	10	10	30.3	49	19.1	78	
Switz.	5	5	1	1	12.8 s	5	5	5	59.5	25	19.1	78	
Portugal	3	3	1	1	12.8 s	5	6	6	64.7	23	12.5	119	
Holland	3	3	2	2	12.8 s	5	6	6	74.4	20	18.6	80	
Spain	3	3	1	1	48.64s	19	10	10	29.2	51	19.6	76	
Israel	14	14	1	1	12.8 s	5	6	6	59.5	25	11.7	127	
USA	3	3	5	5	12.8 s	5	11	11	23.3	64	11.7	127	
Asia	3	3	5	5	12.8 s	5	6	6	23.3	64	11.7	127	
Australia	10	10	5	5	15.36s	6	12	12	73.2	21	9.9	154	
N. Zealand	3	3	5	5	12.8 s	5	6	6	23.3	64	11.7	127	
1	1										1		
Country		404	/11		4185 (Hz)								
Country	4	184	(HZ)	4185 ((Hz)		4186	4	187	41	88	
France	4	184	(Hz)	4185 ((<u>Hz)</u>	2	4186 2	4 ⁻ 0.1 s	187 5	41 0.1 s	88 5	
France Germany	4	184	<u>(Hz</u>)	4185 ((<u>Hz)</u>	2	4186 2 1	4 ⁻ 0.1 s 0.2 s	187 5 10	41 0.1 s 0.2 s	88 5 10	
France Germany UK/Univ	4 49	0.6	<u>(Hz</u> 3()))	<u>4185 (</u> 17.3	(<u>Hz)</u> 86	2 1 1	4186 2 1 1	4 0.1 s 0.2 s 0.2 s	187 5 10 10	41 0.1 s 0.2 s 0.2 s	88 5 10 10	
France Germany UK/Univ Italy	49	0.6	<u>(Hz</u> 3()))	<u>4185 (</u> 17.3	(<u>Hz)</u> 86	2 1 1 2 2	4186 2 1 1 2	4 ⁻ 0.1 s 0.2 s 0.2 s 0.2 s	187 5 10 10 10	41 0.1 s 0.2 s 0.2 s 0.2 s	88 5 10 10 10	
France Germany UK/Univ Italy Austria	49	0.6	<u>(Hz</u> 3())	4185 ((<u>Hz)</u> 86	2 1 1 2 1 2 1 1	4186 2 1 1 2 1 2 1	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s	187 5 10 10 10 10 9	41 0.1 s 0.2 s 0.2 s 0.2 s 0.2 s	88 5 10 10 10 10	
France Germany UK/Univ Italy Austria Belgium	49	1.6	<u>(Hz</u> 3()	4185 ((<u>Hz)</u> 86	2 1 1 2 1 2 1 2	4186 2 1 1 2 1 2 1 2	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s	187 5 10 10 10 9 5	41 0.1 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s	88 5 10 10 10 10 10	
France Germany UK/Univ Italy Austria Belgium Denmark	49	0.6	<u>(Hz</u> 3() D 5	4185 ((<u>Hz)</u> 86 37	2 1 1 2 1 2 1 2 1 2 1	4186 2 1 2 1 2 1 2 1 2 1 2 1 2 1	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s	187 5 10 10 9 5 10	41 0.1 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s	88 5 10 10 10 10 10 10 10	
France Germany UK/Univ Italy Austria Belgium Denmark Finland	49	0.6 0.5 2.0	<u>(Hz</u> 3() D 5 4	4185 (17.3 40.2 19.3	(<u>Hz)</u> 86 37 77	2 1 1 2 1 2 1 2 1 2 1 2 2	4186 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s 0.5 s	187 5 10 10 9 5 10 25	41 0.1 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.5 s	88 5 10 10 10 10 10 10 25	
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland	49 49 59 62	0.6 0.5 2.0	(Hz 3(2(24) D 5 4	4185 (17.3 40.2 19.3	(<u>Hz)</u> 86 37 77	2 1 1 2 1 2 1 2 1 2 1 2 1 1	4186 2 1 2 1 2 1 2 1 2 1 2 1 2 1 1 2 1	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s 0.5 s 0.2 s	187 5 10 10 10 9 5 10 25 10 10	41 0.1 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.5 s 0.2 s	88 5 10 10 10 10 10 10 25 10	
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway	49	0.6	(Hz 3(2(2() D 5 4	4185 (17.3 40.2 19.3	(<u>Hz)</u> 86 37 77	2 1 1 2 1 2 1 2 1 2 1 2 1 1 2 1 1 1	4186 2 1 2 1 2 1 2 1 2 1 2 1 1 2 1 1 1 1	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s 0.5 s 0.2 s 0.2 s 0.2 s 0.2 s	187 5 10 10 9 5 10 25 10 10	41 0.1 s 0.2 s	88 5 10 10 10 10 10 10 25 10 10	
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden	49 49 59 62 55	0.6	<u>(Hz</u> 30 21 24 22) D 5 4 7	4185 (17.3 40.2 19.3 24.0	(Hz) 86 37 77 62	2 1 1 2 1 2 1 2 1 2 1 2 1 1 2 1 1 1 2 1 1 2 2 1 1 2 2 1 1 2 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 1 2 1 1 1 1 1 2 1	4186 2 1 2 1 2 1 2 1 2 1 2 1 1 2 1 1 1 1 2	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s 0.5 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s	187 5 10 10 10 9 5 10 25 10 10 10 5 10 5 0 5 0	41 0.1 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.5 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s	88 5 10 10 10 10 10 10 25 10 10 5 0	
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal	49 49 59 62 55 55	184 .6 .5 .0	(Hz 3) 2 2 2 2) D 5 4 7	4185 (17.3 40.2 19.3 24.0	(<u>Hz</u>) 86 37 77 62	2 1 1 2 1 2 1 2 1 2 1 1 2 1 1 1 1 3 1	4186 2 1 2 1 2 1 2 1 2 1 2 1 1 2 1 1 3 1	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s 0.5 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.1 s 0.2 s 0.2 s	187 5 10 10 9 5 10 25 10 10 25 10 10 25 10 10 10 10 10 10 10 10 10 10 10 10 10 10	41 0.1 s 0.2 s	88 5 10 10 10 10 10 10 25 10 10 5 0 10	
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal Holland	49 49 59 62 555 59 74	0.6 0.5 0.0 0.5	(Hz 30 22 24 24 24 22 24 24 20) D 5 4 7 7 5 5	4185 (17.3 17.3 40.2 19.3 24.0 40.2 18.6	(Hz) 86 37 77 62 37 80	2 1 1 2 1 2 1 2 1 2 1 1 2 1 1 1 1 3 1 2 2 1 1 2 1 2	4186 2 1 2 1 2 1 2 1 2 1 2 1 1 1 1 1 1 3 1 2	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s 0.5 s 0.2 s 0.2 s 0.2 s 0.1 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s	187 5 10 10 9 5 10 25 10 10 10 25 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10	41 0.1 s 0.2 s	88 5 10 10 10 10 10 10 10 10 10 10 5 0 10 10	
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal Holland Spain	49 49 59 62 55 55 59 74	184 1.6 1.5 1.0 1.5 1.1 1.5 1.4	(Hz 30 24 24 24 24 24 20 39)))))))))))))))))))	4185 (17.3 17.3 40.2 19.3 24.0 40.2 18.6 19.3	(Hz) 86 37 77 62 37 80 77	2 1 1 2 1 2 1 2 1 2 1 1 2 1 1 1 1 3 1 2 2 2 2	4186 2 1 2 1 2 1 2 1 2 1 2 1 1 1 1 1 1 2 1 2 2 1 2 2 2 2 2 2 2 2	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s 0.5 s 0.2 s 0.2 s 0.2 s 0.1 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s	187 5 10 10 10 9 5 10 25 10	41 0.1 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.2 s 0.5 s 0.2 s	88 5 10 10 10 10 10 10 25 10 10 5 0 10 10 10	
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal Holland Spain	49 49 59 62 555 559 74 39	0.6 0.5 0.0 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.2	(Hz 3(2(24 22 2(2(38))))))))))))))	4185 (17.3 17.3 40.2 19.3 24.0 40.2 18.6 19.3	(Hz) 86 37 77 62 37 80 77	2 1 1 2 1 2 1 2 1 1 2 1 1 1 1 1 1 2 1 1 2 1 2 2 2 2 2 2	4186 2 1 2 1 2 1 2 1 2 1 2 1 1 1 1 1 1 2 1 2	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s	187 5 10 10 9 5 10 25 10 10 25 10 10 10 10 10 10 10 10 10 10 10 5 0 10 10 5 0 10 10 5	41 0.1 s 0.2 s	88 5 10 5 0 10 5 5	
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal Holland Spain Israel USA	49 49 59 62 555 59 74 39 74	0.6 0.5 0.1 0.5 0.1 0.5 0.1 0.5 0.2 0.4	(Hz 3(2) 22 22 22 20 38)) 5 4 7 5 0 3 0	4185 (17.3 17.3 40.2 19.3 24.0 40.2 18.6 19.3 22.2	(Hz) 86 37 77 62 37 80 77 67	2 1 1 2 1 2 1 2 1 1 2 1 1 1 1 1 3 1 2 2 2 2	4186 2 1 2 1 2 1 2 1 2 1 2 1 1 1 1 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 1 1 1 2 2 2 1 1 1 1 1 1 1 1 1 <tb< td=""><td>4 0.1 s 0.2 s 0.2 s 0.2 s 0.1 s 0.1 s 0.2 s 0.1 s 0.2 s 0.1 s 0.2 s 0.2 s 0.1 s 0.2 s</td><td>187 5 10 10 10 9 5 10 25 10 10 10 5 10 5 10</td><td>41 0.1 s 0.2 s</td><td>88 5 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 5 0 10 5 10 5 10</td></tb<>	4 0.1 s 0.2 s 0.2 s 0.2 s 0.1 s 0.1 s 0.2 s 0.1 s 0.2 s 0.1 s 0.2 s 0.2 s 0.1 s 0.2 s	187 5 10 10 10 9 5 10 25 10 10 10 5 10 5 10	41 0.1 s 0.2 s	88 5 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 5 0 10 5 10 5 10	
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Norway Sweden Switz. Portugal Holland Spain Israel USA Asia	49 49 59 62 555 59 74 39 74	184 .6 .5 .0 .1 .2 .4 .2	(Hz 3(2(2(2(3) 3(3) 2(2(2) 2(2) 2(2)))))))))))))))	4185 (17.3 17.3 40.2 19.3 24.0 40.2 19.3 22.2 22.2 22.2 22.2	(Hz) 86 37 77 62 37 80 77 67 67	2 1 1 2 1 2 1 2 1 2 1 1 2 1 1 1 2 2 2 2	4186 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 2 2 2 2 2 2 2 2 2 2 1 1 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 <	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s	187 5 10 10 9 5 10 25 10 10 25 10 10	41 0.1 s 0.2 s	88 5 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 5 0 10 10 5 10 10 10 10 10 10 10 10 10 10 10 10 10 10	
France Germany UK/Univ Italy Austria Belgium Denmark Finland Ireland Ireland Norway Sweden Switz. Portugal Holland Spain Israel USA Asia Australia	49 49 59 62 55 55 74 39 74 39 74	0.6 0.5 0.0 0.5 0.1 0.5 0.5 0.5 0.5 0.5 0.2 0.2 0.2	(Hz 30 21 22 22 20 38 20 20 20 20 20 20 20 20 20 20 20 20 20))))))))))))))	4185 (17.3 17.3 40.2 19.3 24.0 40.2 18.6 19.3 22.2 22.2 22.2	(Hz) 86 37 77 62 37 80 77 67 67	2 1 1 2 1 2 1 2 1 1 2 1 1 1 2 1 1 2 2 2 2 2 2 1 1 1 3	4186 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 2 2 2 2 2 2 2 2 2 1 3	4 0.1 s 0.2 s 0.2 s 0.2 s 0.18 s 0.1 s 0.2 s	187 5 10 10 9 5 10 25 10 10 25 10 10 10 5 0 10 5 0 10 5 0 10 10 10 10	41 0.1 s 0.2 s	88 5 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 5 0 10 5 10 10 5 10 10 10 10 10 10 10 10 10 10	

Country	41	89 418A 418B 418C		BC	418D					
France	5.2 s	130	67 ms	67	65 ms	65	35 ms	35	50 ms	50
Germany	8 s	200	53 ms	53	57 ms	57	41 ms	41	50 ms	50
UK/Univ	8 s	200	255ms	255	61 ms	61	33 ms	33	50 ms	50
Italy	8 s	200	61 ms	61	60 ms	60	40 ms	40	50 ms	50
Austria	8 s	200	53 ms	53	61 ms	61	39 ms	39	50 ms	50
Belgium	8 s	200	61 ms	61	67 ms	67	33 ms	33	50 ms	50
Denmark	8 s	200	53 ms	53	67 ms	67	33 ms	33	50 ms	50
Finland	8 s	200	61 ms	61	56 ms	56	42 ms	42	50 ms	50
Ireland	8 s	200	255ms	255	67 ms	67	33 ms	33	50 ms	50
Norway	8 s	200	61 ms	61	59 ms	59	41 ms	41	50 ms	50
Sweden	8 s	200	100ms	100	60 ms	60	40 ms	40	70 ms	70
Switz.	8 s	200	60 ms	60	60 ms	60	40 ms	40	60 ms	60
Portugal	8 s	200	61 ms	61	66 ms	66	34 ms	34	50 ms	50
Holland	8 s	200	58 ms	58	58 ms	58	42 ms	42	42 ms	42
Spain	6 s	150	75 ms	75	60 ms	60	33 ms	33	75 ms	75
Israel	8 s	200	61 ms	61	61 ms	61	39 ms	39	50 ms	50
USA	8 s	200	80 ms	80	62 ms	62	41 ms	41	80 ms	80
Asia	8 s	200	61 ms	61	66 ms	66	34 ms	34	50 ms	50
Australia	8 s	200	255ms	255	66 ms	66	32 ms	32	70 ms	70
N. Zealand	8 s	200	61 ms	61	66 ms	66	34 ms	34	50 ms	50
Country	41	8E	41	8F	41	90	41	91	41	92
France	0.8 s	40	0	0	70 ms	70	70 ms	70	6	6
Germany	0.92 s	46	0.92 s	46	90 ms	90	90 ms	90	7	7
UK/Univ	0.54 s	27	0.66 s	33	0.1 s	100	0.1 s	100	9	9
Italy	0.8 s	40	3 s	150	70 ms	70	70 ms	70	6	6
Austria	0.88 s	44	0.92 s	46	80 ms	80	80 ms	80	7	7
Belgium	0.86 s	43	0.52 s	26	70 ms	70	70 ms	70	6	6
Denmark	0.52 s	26	0.52 s	26	90 ms	90	90 ms	90	9	9
Finland	0.8 s	40	1.2 s	60	70 ms	70	75 ms	75	9	9
Ireland	0.6 s	30	0.66 s	33	70 ms	70	70 ms	70	9	9
Norway	0.66 s	33	0.66 s	33	70 ms	70	70 ms	70	9	9
Sweden	0.36 s	18	0.52 s	26	70 ms	70	70 ms	70	9	9
Switz.	0.52 s	26	0	0	70 ms	70	70 ms	70	6	6
Portugal	0.66 s	33	0.66 s	33	70 ms	70	70 ms	70	9	9
Holland	0.66 s	33	0.66 s	33	70 ms	70	70 ms	70	9	9
Spain	0.64 s	32	2 s	100	70 ms	70	0.14 s	140	6	6
Israel	0.92 s	46	2.02 s	101	90 ms	90	90 ms	90	6	6
USA	0.8 s	40	2.02 s	101	0.1 s	100	0.1 s	100	8	8
Asia	0720	26	2020	101	010	100	0 11 0	110	6	6
	0.725	30	2.02 5	101	0.15	100	0.115	110	0	0
Australia	0.72 s	36	2.02 s 2.02 s	101	0.1 s 0.1 s	100	0.11 s	110	10	10

USA: 4192 - The value stored in the RAM is 16 for the C60, and 8 for the C31.

Additional NCU Parameters

CS1

4193: 800 Hz tone detection level (-dB) [-1 x address 4181 - 0.5 x N] USA: N = 0, Value = -9 dB

4194: 1100 Hz tone detection level (-dB) [-1 x address 4181 - 0.5 x N] USA: N = 0, Value = -9 dB

4195: 2100 Hz tone detection level (-dB) [-1 x address 4181 - 0.5 x N] USA: N = 0, Value = -9 dB

4196: Modem tone detection level (-dBm) [-37 -.5N] USA: N = 0C (H), Value = 43

4197: DTMF tone tx level: high tone USA: N = 4 (D), Value = 2 dB

CR0

4193: V.21 detection level All countries 73(H), except Germany, which is 7B(H).

4194: Rx data detection level All countries 73(H), except Germany, which is 7B(H).

4195/4196: 800 Hz tx level All countries 31BF(H), except Germany, which is 2641(H).

4197/4198: 1100 Hz tx level All countries 31BF(H), except Germany, which is 2917(H).

4199/419A: 2100 Hz tx level All countries 31BF(H), except Germany, which is 3774(H).
4.4. DEDICATED TRANSMISSION PARAMETERS

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

4.4.1. Programming Procedure

- 1. Set bit 5 of bit switch 01 to 1.
- 2. Either use Function 32 (for a Quick Dial number) or Function 33 (for a Speed Dial number)

Example: Change the Parameters in Quick Dial 10.

- 3. **Function** 3 2 Yes
- 4. Press Quick Dial key **10**

QUICK ■ PRINT LIST ∇	QUICK/V
QUICK 10	Y/N
SET PARAMET	TER?

Note: When selecting Speed Dial 10 with Function 33: 1 0 at the ten key pad

5. **Yes**

TX PARAMETER 1	Υ
1111 1111	

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 0: 7

TX PARAMETER	1	Υ
0111	1111	

- 7. Either:
 - Select another byte: **Yes** until the correct byte is displayed. Then go to step 6. If you press Yes while the byte 4 is displayed, you can go back to step 4 and select another number.
 - Finish: **Function**

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

4.4.2. Parameters

1. CRO

Г

Ву	Byte 1								
		F	UNC			COMMENTS			
0 1	Initial T> Bit 1 B 0 (0 - 1 (1 -	(moo i t 0 0 1 0 1	dem r	ate Settir 9,600 7,200 4,800 2,400	Ig bps bps bps bps	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.			
	Tx level					If communication with a particular remote			
2	Bit 5	4	3	2	Level	terminal often contains errors, the signal level			
					(dBm)	may be inappropriate. Adjust the Tx level for			
3	0	0	0	0	0	communications with that terminal until the			
_	0	0	0	1	-1	results are better.			
4	0	0	1	0	-2				
_	0	0.	1	1	-3				
5		and	so or	n unti					
	1	1	1	1	-15				
6	Not use	d				Do not change the factory setting.			
7	Dedicate for this (0: Disate	ed tra Quick bled	ansmi (/Spe 1: E	issior ed Di inable	n parameters al number ed	 0: The parameters in these three 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 three 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 allocated to be the store of the store bytes. 			

Service Tables and Procedures

By	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 settings.						
3	Al short protocol 0: Disabled 1: Enabled	If this bit is 1, AI short protocol is always used when transmitting to this terminal.						
4	TCF transmission after NSS(A) 0: Disabled 1: Enabled	Set this bit to 1, if line condition is not stabilized and the modem rate should be updated in each transmission, when AI short protocol is enabled.						
Сс	ontinued on the next page							

SERVICE TABLES AND PROCEDURES DEDICATED TRANSMISSION PARAMETERS

By	Byte 2									
			FUNCTION	COMMENTS						
	Compr transm	essio iit mo	on modes available in ode	These bits determine the capabilities that are informed to the other terminal during						
	Bit 6	5	Modes	transmission.						
5	0	0	MMR, MR, or MH							
	0	1	MR or MH							
6	1	0	MH only							
	1	1	MH only							
	Short p	orean	nble	If this bit is 1, Short Preamble is always used						
7	0: Disa	abled		when transmitting to this terminal.						
	1: Ena	bled								

Byte 3

FUNCTION AND COMMENTS

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 BCD value of this byte, multiplied by 2.56 seconds.

Caution: Note that if the value of this byte is 0, the T1 timer will be 35 s.

Caution: If the value of byte 3 is 0, the CCITT T1 timer is 35 s, which may not be appropriate for your area. Therefore, every time you program a set of dedicated transmission parameters, be sure to check the contents of byte 3 and adjust if necessary.

By	Byte 4								
			FUNCTION	COMMENTS					
0	Not us	ed		Do not change the factory settings.					
1									
2									
3									
4									
5									
	Tx cab	le eq	ualizer	Use a higher setting if there is signal loss at					
	Bit 6	5	Setting	higher frequencies because of the length of					
	0	0	Off	wire between the modem and the telephone					
6	0	1	Middle	exchange.					
0	1	0	High	Also, try using the cable equalizer if one or					
7	1	1	Not used	more of the following symptoms occurs.					
'				 Communication error 					
				 Modem rate fallback occurs frequently. 					

SERVICE TABLES AND PROCEDURES **DEDICATED TRANSMISSION PARAMETERS**

2. CS1

By	Byte 1								
		F	UNC		N	COMMENTS			
0	Not use	ed				Do not change the factory setting.			
1									
	Tx leve	l				If communication with a particular remote			
2	Bit 5 4 3 2 Level (dBm)					terminal often contains errors, the signal level may be inappropriate. Adjust the Tx level for			
3	0	0	0	0	0	communications with that terminal until the			
	0	0	0	1	-1	results are better.			
4	0	0	1	0	-2				
	0	0	1	1	-3				
5		and	SO 01	n unt	il				
	1	1	1	1	-15				
6	Not use	ed				Do not change the factory setting.			
	Dedica for this 0: Disa	ted tra Quick bled	ansm /Spe 1: E	issio ed D nabl	n parameters ial number ed	0: The parameters in these three bytes will be ignored. The current settings of the relevant bit switches, NCU parameters, and RAM			
7						addresses will be used.			
						used when transmitting to the fax number			
						stored in the Quick Dial Key or Speed Dial			
						Code that these bytes are allocated to.			

B	/te 2			
	FUNCTION	COMMENTS	s S	
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.	Service Table and Procedure	
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	ed Do not change the factory settings.		
3	Al short protocol 0: Disabled 1: Enabled	If this bit is 1, AI short protocol is always used when transmitting to this terminal.		
4	TCF transmission after NSS(A) 0: Disabled 1: Enabled	Set this bit to 1, if line condition is not stabilized and the modem rate should be updated in each transmission, with AI short protocol.		
	Compression modes available in transmit mode Bit 6 5 Modes	These bits determine the capabilities that are informed to the other terminal during transmission.		
5	0 0 MMR, MR, or MH			
6	1 0 MH only 1 1 MH only			

SERVICE TABLES AND PROCEDURES DEDICATED TRANSMISSION PARAMETERS

By	Byte 2								
	FUNCTION	COMMENTS							
7	Short preamble 0: Disabled 1: Enabled	If this bit is 1, Short Preamble is always used when transmitting to this terminal.							

Byte 3

FUNCTION AND COMMENTS

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 BCD value of this byte, multiplied by 2.56 seconds.

Caution: Note that if the value of this byte is 0, the T1 timer will be 35 s.

Caution: If the value of byte 3 is 0, the CCITT T1 timer is 35 s, which may not be appropriate for your area. Therefore, every time you program a set of dedicated transmission parameters, be sure to check the contents of byte 3 and adjust if necessary.

Byte 4								
			FU	NCTI	ON	COMMENTS		
	Initial	Tx mo	odem i	rate		If training with a particular remote terminal		
	Bit 3	Bit 2	Bit 1	Bit 0	Setting (bps)	always takes too long, the initial modem		
n	0	0	0	0	14,400 (V.17)	rate may be too high. Reduce the initial Tx		
v	0	0	0	1	14,400 (V.33)	modem rate using these bits.		
1	0	0	1	0	12,000 (V.17)			
•	0	0	1	1	12,000 (V.33)			
2	0	1	0	0	9,600 TCM (V.17)			
-	0	1	0	1	9,600 (V.29)			
3	0	1	1	0	7,200 TCM (V.17)			
-	0	1	1	1	7,200 (V.29)			
	1	0	0	0	4,800 (V.27)			
	1	0	0	1	2,400 (V.27)			
4	Not u	sed				Do not change the factory settings.		
5								
	Тх са	lble ec	qualize	r		Use a higher setting if there is signal loss		
	Bit 6	5	Set	ting		at higher frequencies because of the		
	0	0	Off			length of wire between the modem and the		
6	0	1	Low	/ (1.8	km)	telephone exchange.		
U	1	0	Mid	dle (3	.6 km)	Also, try using the cable equalizer if one or		
7	1	1	Hig	h (7.2	km)	more of the following symptoms occurs.		
						Communication error Madam rate fallback accure frequently		
						• wodem rate railback occurs frequently.		

4.5. SERVICE CALLS

4.5.1. Excessive Jam Calls

There are two types of excessive jam call, one is the excessive scanner jam call and the other is the excessive printer jam call. The excessive jam call automatically notifies the service station programmed with function 99 when the machine's scanner or printer frequently has jam problems.

The excessive jam call algorithm uses three parameters and three counters for the scanner and for the printer, as shown in the following table.

Devemetere	Addre	ess (H)	Initial	Sys. Para.
Parameters	Scanner	Printer	Settings	List
DEC: Number of fed pages used to decrease the JAM counter. (1 - 255; 0 = Disabled)	4B6D	4B75	10 (H)	х
CALL: Threshold number for service call (3 - 15; 0 = Disabled)	4B6E	4B76	06 (H)	Υ
CLR: Number of fed pages used to clear the JAM counter to zero.	4B6F (Low) 4B70 (High)	4B77 (Low) 4B78 (High)	30 (H) 00 (H)	

Countara	Addre	Sve Para Liet	
Codiners	Scanner	Printer	Sys. Fala. List
A: Counter used for JAM counter decrement	4B71	4B79	_
JAM: Jam counter used to place a service call	4B72	4B7A	Z
B: Counter used for clearing JAM	4B73 (Low)	4B7B (Low)	
counter	4B74 (High)	4B7C (High)	_

Service Tables and Procedures

The excessive jam call for scanner and printer work individually, but the algorithms are the same.

The JAM counter increases when a jam occurs, and the counters A and B increases when a page is fed successfully.

When the JAM counter reaches the value stored in the CALL parameter (with the initial setting, when it reaches 6), the machine places a service call to the service station and sends three reports (auto service report, service monitor report, and system parameter list). Either "document jam monitor" or "copy jam monitor" is printed on the auto service report as an error message.

However, the JAM counter will be decreased when counter A reaches the value stored as DEC (with the initial setting, when 16 pages have been fed successfully), and the JAM counter will be cleared when counter B reaches the value stored as CLR (with the initial setting, when 48 pages have been fed successfully).

So, this algorithm will alert the service station only when jams frequently occur within a short period.

These parameters can be changed by rewriting RAM data with function 95 in the following range.

DEC: 1 through 255 (01(H) - FF(H)) **CALL:** 3 through 15 **CLR:** 1 through 65535 (0001(H) - FFFF(H)) (Usually, CLR should be three times the value of DEC.)

If either DEC or CALL is zero, the excessive jam call is disabled. The parameters DEC, CALL and the JAM counter are listed on the system parameter list as X, Y and Z.

The Call Service indicator does not light with an excessive jam call, so that the machine can be operated normally after the call. However, the following RAM address should be reset to zero after the call, in order to reactivate the excessive jam call.

4B6C

Bit 0: Scanner Excessive Jam Call	1: A call has occurred.	0: Standby (Initial setting)
Bit 1: Printer Excessive Jam Call	1: A call has occurred.	0: Standby (Initial setting)

4.5.2. Periodic Service Call

The periodic service call notifies the condition of the machine to the service station programmed with function 99. The call is made periodically at a time interval programmed in the following RAM addresses.

	Address (H)	
Call interval: 01 th	4B7F	
Date and time of		
	Year: last two digits of the year (BCD)	4B80
Month: 01 through 12 (BCD)		4B81
Day: 01 through 31 (BCD)		4B82
	Hour: 00 through 23 (BCD)	4B83

Caution: Data stored in these addresses have to be within the specified range and in BCD format. Otherwise, the service call will not work correctly.

SERVICE TABLES AND PROCEDURES SERVICE CALLS

When the date and time programmed at these addresses has passed, the machine automatically places a service call to the service station and sends three reports (auto service report, service monitor report, and system parameter list). "EM manual call" is printed on the auto service report as an error message.

The default setting for this feature is off. To switch periodic service call on, just program the Call Interval at address 4B7F(H). Then, the date and time of the next call are automatically programmed. For example, if the call interval is programmed as 03 (BCD) months and the current date and time is Dec. 24, 1993; 03:10PM, the following data are stored:

94 at 4B80(H) for 1994 03 at 4B81(H) for March 24 at 4B82(H) for 24th 15 at 4B83(H) for 3PM

To change these settings after programming, change the interval first with function 95, exit the function, then change the remaining parameters one by one if the settings are not the expected ones.

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

4.5.3. PM Call

If bit 7 of Bit Switch 01 is set to 0, the PM call will notify the service station that the time for PM has come. To switch on the call, program the counter interval at the following RAM addresses in BCD format. The initial setting is 30,000 sheets.

Address	Bits 7 - 4	Bits 3 - 0
410E	Tens	Units
410F	Thousands	Hundreds
4110	Hundred thousands	Ten thousands

When the date and time programmed at these addresses has passed, the machine automatically places a service call to the service station and sends three reports (auto service report, service monitor report, and system parameter list). "PM call" is printed on the auto service report as an error message.

The Call Service indicator does not light with a PM service call, so that the machine can be operated normally after the call.

4.5.4. Effective Term of Service Calls

A time limit for the effectiveness of service calls can be programmed at the following addresses.

	Address (H)
Year: last two digits of the year (BCD)	4B91
Month: 01 through 12 (BCD)	4B92
Day: 01 through 31 (BCD)	4B93

After the date programmed in these addresses has passed, all types of service call are disabled. This function is disabled when all of these addresses are 00(H).

4.6. SERVICE RAM ADDRESSES

4040 TTI printing posit	tion (from the le	ft side)	BCD: 00 - 98 (r	nm) [Even numbers only]
4044 Bit 2: Forwarding Bit 3: Authorized Bit 6: Continuous	g (CS1 only) reception (CS1 s polling (CS1 o		0: Enabled, 1: Disabled 0: Enabled, 1: Disabled 0: Disabled, 1: Enabled	
4045 Bit 0: Display of Bit 1: Secure rec Bit 2: Printout of Bit 3, 4: Printable	both RTI and CS eption (CS1 on forwarded mess e paper length n Bit 3 0 1 0 1	SI on the LCD ly) sages notification to ser Bit 4 0 0 1 1	nding terminal Setting No limit B4 A4 Not used	0: Disabled, 1: Enabled 0: Disabled, 1: Enabled 0: Disabled, 1: Enabled
4046 Maximum numbe	er of dialing atte	empts for TRD (C	CS1 only)	Hex: 00 - FF
4047 Number of page	retransmission	attempts (Hex c	code)	
4048 Bit 0: Secure trai Bit 1: Modem rat Bit 2: Hang-up d Bit 3: Polarity rev Bit 4: Addition of Bit 5: Stop key d Bit 6: First page	0: Disabled, 1: Enabled 0: No change, 1: Fallback eceived 0: No hang-up, 1; Hang-up 0: Yes, 1: No 0: No, 1: Yes 0: Disabled, 1: Enabled			
4049 Bit 0: Keystroke Bit 2: RDS Bit 3: On-hook d	Program execut 0: Press the pro 1: Press the pro ial (CS1 only)	tion method grammed Quick grammed Quick	c Dial Key c Dial Key then t	he Start key 0: Enabled, 1: Disabled 0: Enabled, 1: Disabled
404A Bit 0, 1: Modem CR0 - Bit 0 = 0, CS1 -	eye pattern out Error vector, Bit Bit 1 0 1 0 1	out 0 = 1, Eye patte Bit 0 0 1 1	ern Output Not used Eye pattern Error vector Not used	

Service Tables and Procedures

July 16th, 1993	SERVICE TABLES AND PROCEDURES SERVICE RAM ADDRESSES
404B Contrast threshold - Lighten (Hex code, from 00 to 404C	1F) 00: All Black, 1F: All White
Contrast threshold - Normal (Hex code, from 00 to -	1F) 00: All Black, 1F: All White
Contrast threshold - Darken (Hex code, from 00 to	1F) 00: All Black, 1F: All White
404F - 4051 Page separation and data reduction parameters	
4052 Bit 1: Error Diffusion Halftone	0: Disabled, 1: Enabled
4053 Bit 0: Default resolution used for copy mode0: A	As selected by the user, 1: Fine
4054 Bit 0: Reduction during printing	0: Disabled, 1: Enabled
 4055 The amount of remaining memory below which ring ception) is disabled if the printer is out of action (here) One page is about 24 kbytes. If this setting is kept at 0, the machine will detect reven if there is no memory space left. This will restrict the setting is kept at 0 and the setting is kept at 0. 	ing detection (and therefore substitute re- x code, from 00 to FF, unit = 2 kbytes) inging signals and go into receive mode ult in communication failure.
 4057 Image/Text detection threshold in halftone mode (H 01: Almost all the data will be processed without h photographs. The threshold increases with increments in the set 00, 1F: Almost all the data will be halftone process only text. 	ex: 00 - 1F) halftone, even if the fax message contains tting from 01 to 1F. sed, even if the fax message contains
4058Number of redialing attempts, including the first dial4059Redialing interval (memory tx)He	ling attempt (memory tx) Hex : 00 - FF x: 00 - FF (minutes)
405D Time for which RDS is enabled after the user has se	witched it on BCD: 00 - 99 (hours)
405E - For use only in France Bit 0, 1: Handshake modem rate for transmission Bit 0 0 300 bps 1 2400 bp Bit 1 0 0 Bit 2, 3: Handshake modem rate for reception	os 0 1 300 and 2400 bps 1 1
Bit 2 0 300 bps 1 2400 bp Bit 3 0 0	os 0 1 300 and 2400 bps 1 1
Bit 4: Deletion of a Speed or Quick Dial when the st not a fax machine Bit 5: Tranmission of a blank CSI (all spaces) if no 0	ored number reaches a destination that is 0: Disabled, 1: Enabled CSI is programmed
Bit 6: 3-minute close Bit 7: Action after 3-minute close	0: Disabled, 1: Enabled 0: Enabled, 1: Disabled 0: Disconnect, 1: Continue with MPS

405F - For use only in France

Bit 1: NCU parameter values0: Adjustable, 1: FixedBit 2: Action upon PRI-Q after DIS0: CCITT standard procedure, 1: The buzzerringsBit 4: NSF (CSI) transmission0: Normal (sent if CSI has been programmed, 1: Not sentBit 5: Action when sending out a post-message response0: Standard

1: French PTT special action

Bit 7: French requirements (DCR timer 5 s, carrier drop detection based on rx level, redialing from 1 to 12 minutes) 0: Disabled, 1: Enabled

40CB

Number of good lines for error line counter decrement (Hex: 01 - FF)

• The setting of 00(H) is equal to the initial setting 0A(H).

40CC

Error line threshold (Hex: 01 - FF)

• The setting of 00(H) is equal to the initial setting 0A(H).

40CD

Acceptable reconstruction time for 1 line (Hex; unit 160 ms)

41DF

Acceptable modem carrier drop time (Hex; unit 20 ms)

- If communication errors with the error code 0-22 are frequent, increase the drop time.
- Only settings below 1 s (32[H]) are effective. Settings below 500 ms (19[H]) are recommended.
- Using longer settings with a line that has a higher noise level might cause the modem to hang-up. In such cases, try using shorter settings.

4B8B

Wait time after the last page has been printed, when printing from optional printer interface. (Hex; unit 2.56 s)

Service Tables and Procedures

Factory Settings

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

RAM	Set	ting	RAM	Set	ting
Address	CRO	CS1	Address	CRO	CS1
4040	18	18	4053	00	00
4044	BD	B1	4054	00	00
4045	00	02	4055	0C	0C
4046	00	05	4057	06	06
4047	03	03	4058	05	05
4048	08	09	4059	05	05
4049	1E	16	405D	24	24
404A	00	00	405E	00	00
404B	10	10	405F	00	00
404C	0E	0E	40CB	0A	0A
404D	0C	0C	40CC	0A	0A
404F	FF	FF	40CD	1F	1F
4050	00	00	41DF	0A	0A
4051	4F	4F	4B8B	05	05
4052	03	03			

Note: When programming a RAM address, you have to enter the bank number before the four-digit RAM address. In this machine, the bank number is always 2. For example, to program RAM address 4044 using function 95, you have to input 24044.

SERVICE TABLES AND PROCEDURES SPECIAL TOOLS AND LUBRICANTS

4.7. SPECIAL TOOLS AND LUBRICANTS

- Scan line test chart: P/N H0819502
- 8 line/mm test pattern: P/N H0419001
- Test lead: P/N H0419002
- SBU adjustment knobs: P/N H0129300
- Allen wrench
- Lens block positioning tool: P/N H0819503 For how to use, see the following diagram



4.8. PM TABLE

Scanner

O Olaan Li Likkingta D Danlaga							
C: Clean, L: Lubricate, R: Replace							
Item	10K	30K	60K	1 year	Notes		
Exposure Glass	С	С	С	С	Soft cloth and alcohol		
R1 and R2 Rollers	С	С	С	С	Soft cloth and alcohol		
Pick-up Torque Limiter		L	L		Use Mobil Temp 78.		
White Plate	С	С	С	С	Soft cloth and water		
Feed Roller	С	R	R	С	Soft cloth and water		
Pick-up Roller	С	R	R	С	Soft cloth and water		
Separation Roller	С	R	R	С	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	С	С	R	С	Soft cloth and alcohol
Relay Roller	С	С	С	С	Soft cloth and alcohol
Registration Rollers	С	С	С	С	Soft cloth and alcohol
Thermistor		С	С		Soft cloth and alcohol
Hot Roller Strippers		С	С		Cotton swab and alcohol
Feed-out Roller	С	С	С	С	Soft cloth and alcohol
Hot Roller			R		Soft cloth and alcohol
Pressure Roller (Fusing)			R		
Thermostat		С	С		Soft cloth and alcohol
Cleaning Pad	R	R	R		
Transfer Corona Unit	С	С	R	С	Soft cloth/cotton swab
Charge Corona Unit	С	С	R		and alcohol
Corona Wires	С	С		С	
Quenching Lamp	С	С	С	С	
Laser Shield Glass	С	С	С	С	
Development Unit			R		
Ozone Filter	R	R	R		

Lower Cassette (CS1 only)

Item	10K	30K	60K	1 year	Notes
Pick-up and Feed Rollers	С	R	R	С	Soft cloth and alcohol
Separation Roller	С	R	R	С	Soft cloth and alcohol
Relay Rollers	С	С	С	С	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	С	С	С	С	Soft cloth and water

5. TROUBLESHOOTING

5.1. COPY QUALITY TROUBLESHOOTING

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

Symptom: Blank copie	S		
Check	Action if Yes	Action if No	
1. Make a printer test (see section 4.1.14). Is it OK?	There may be a scanner problem; go to step 15.	Go to step 2.	
2. Is the master installed correctly?	Go to step 3.	Install it properly.	
 Does the master rotate correctly during the copy cycle? 	Go to step 4.	Correct any problems with the mechanism.	
4. Is the master grounded properly?	Go to step 5.	Check the grounding wire, terminals and plates. Clean or replace if necessary.	
 Are any of the laser opti- cal components broken, blocked, or misaligned? 	Correct the problem.	Go to step 6.	
 Are the transfer corona unit and wire correctly in- stalled? 	Check the connections between the corona wire and the FCU. Go to step 7.	Correct the problem.	
7. Does the FCU output the power and corona trigger signal to the power pack?	Clean the transfer corona unit. Go to step 8.	Change the FCU.	
8. Does the problem go away if you change the power pack?	Finished.	Go to step 9.	
9. Does the development bias terminal reach the correct voltage (about -530 Vdc)?	Go to step 12.	Go to step 10. Do not adjust the variable resistors on the power pack.	leshooting
10. Does the FCU output the power and bias trigger signal to the power pack?	Clean the area around the bias terminal. Go to step 11.	Change the FCU.	Troub
11. Does the problem go away if you change the power pack?	Finished.	Clean the development roller. Go to step 12.	
12. Does the development roller attract toner?	Check all LDDR - FCU - interlock switch connections. Go to step 13.	Replace the roller.	

Symptom: Blank copies	6	
Check	Action if Yes	Action if No
13. Is the laser diode unit screwed in properly?	Go to step 14.	Install it properly.
14. Do the interlock switches close when the cover is closed, and do they pass power to the LDDR?	Change the LD unit, FCU, master unit, or varistor.	Change them.
15. Check the FCU - SBU connection. Is there a signal from the SBU (AVIDEO)?	Go to step 16.	Light the xenon lamp. Align the SBU; replace the FCU or SBU if impossible.
16. Does the problem only occur when printing from memory?	Check the connection to the memory card. Change the memory card, FCU, or MBU.	Go to step 17.
17. If the problem only occurs connections. Check for sev the NCU or FCU.	during communication, check th rere line problems. If the problem	e FCU - NCU - line m cannot be found, replace

Symptom: Black copies		
Check	Action if Yes	Action if No
1. Make a printer test (see section 4.1.14). Is it OK?	There may be a scanner problem; go to step 10.	Go to step 2.
Are the charge corona unit and wire correctly installed?	Check the connections between the corona wire and the FCU. Go to step 3.	Correct the problem.
3. Does the FCU output the power and corona trigger signal to the power pack?	Clean the charge corona unit. Go to step 4.	Change the FCU.
 Does the problem go away if you change the power pack? 	Finished.	Go to step 5.
5. Is the varistor shorted?	Change the varistor.	Go to step 6.
6. Is the master grounded properly?	Go to step 7.	Check the grounding wire, terminal and plate. Clean or replace if necessary.
7. Does the development bias terminal reach the correct voltage (about -530 Vdc)?	Go to step 10.	Go to step 8. Do not adjust the variable resistors on the power pack.
8. Does the FCU output the power and bias trigger signal to the power pack?	Clean the area around the bias terminal. Go to step 9.	Change the FCU.
Does the problem go away if you change the power pack?	The laser beam may always be on. Change the FCU or LD unit.	Clean the development roller. Go to step 10.
10. Check the connections from the FCU to the xenon lamp. Does the lamp work?	Go to step 12.	Go to step 11.

Symptom: Black copies		
Check	Action if Yes	Action if No
11. Does the FCU output the power and drive signals to the lamp driver?	Change the xenon lamp or the drive board.	Change the FCU.
12. Check the FCU - SBU connection. Is there a signal from the SBU (AVIDEO)?	Go to step 13.	Light the xenon lamp. Align the SBU; replace the FCU or SBU if impossible.
13. Does the problem only occur when printing from memory?	Check the connection to the memory card. Change the memory card, FCU, or MBU.	Go to step 14.
14. If the problem only occurs connections. Check for sev the NCU or FCU.	during communication, check the vere line problems. If the problem	ne FCU - NCU - line m cannot be found, replace

CheckAction if Yes1. Make a printer test (see section 4.1.14). Is it OK?There may be a scanner problem; go to step 7.2. Try the following steps (a to f) to solve the problem. If they through the machine between the FCU, toner near-end se Then go to step 3. a) Replace the master. b) If the Add Toner indicator is lit, add toner. c) Clean or replace the corona wires.d) Clean the toner matering blade (soft cloth and alcohol)	Action if No Go to step 2. fail, check the connections nsor, and toner supply motor.
 Make a printer test (see section 4.1.14). Is it OK? Try the following steps (a to f) to solve the problem. If they through the machine between the FCU, toner near-end se Then go to step 3. a) Replace the master. b) If the Add Toner indicator is lit, add toner. c) Clean or replace the corona wires. d) Clean the toner matering blade (soft cleth and alcohol). 	Go to step 2. fail, check the connections nsor, and toner supply motor.
 2. Try the following steps (a to f) to solve the problem. If they through the machine between the FCU, toner near-end se Then go to step 3. a) Replace the master. b) If the Add Toner indicator is lit, add toner. c) Clean or replace the corona wires. d) Clean the toner matering blade (soft cloth and alcohol). 	fail, check the connections nsor, and toner supply motor.
e) If the copy paper is damp, replace it.f) If the toner contains dirt or paper particles, replace it.	
3. Has the toner run out even though the Add Toner indicator is not lit?Check the sensor actuator mechanism. Change the sensor if necessary.	Go to step 4.
4. Does the toner supply motor turn just after the main power is switched on?	Change the toner supply motor or the FCU.
5. Work through steps 4 to 12 of "Blank copies".	
6. Change the varistor, FCU, or LD unit .	
7. Clean the exposure glass and the white plate in the scann	er.

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5. Work through steps 4 to 12	2 of "Blank copies".	
6. Change the varistor, FCU,	or LD unit .	
7. Clean the exposure glass	and the white plate in the scanne	er.
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Symptom: Faint copy a	t leading or trailing edge	
Check	Action if Yes	Action if No
The paper in the cassette	may be curled at the leading edg	le
The paper in the cassette	may be damp.	
The paper may be too thic	k or too thin.	
Instruct the user how to ste	pre paper, and instruct them to us	se recommended types and

Symptom: Dirty backgro	ound all over the copy	
Check	Action if Yes	Action if No
1. Make a printer test (see section 4.1.14). Is it OK?	There may be a scanner problem; go to step 13.	Go to step 2.
 2. Try the following steps (a to a) Clean the quenching lan b) Tighten the toner metering due 	o f) to solve the problem. If they np and cleaning blade. ng blade securing screws.	fail, go to step 3.
 d) Clean the area around the other contains dust d) Clean the area around the other contains clean or replace the corona 	ne bias terminal of the developr down the page, clean the laser a wires.	nent unit. r optics with a blower brush, or
3. Is the master grounded properly?	Go to step 4.	Check the grounding wire, terminals and plates. Clean or replace if necessary.
4. Is the varistor shorted?	Change the varistor.	Go to step 5.
5. Does the development bias terminal give a constant correct voltage (about -530 Vdc)?	Go to step 8.	Go to step 6. Do not adjust the variable resistors on the power pack.
6. Does the FCU output constant power and bias trigger signals to the power pack?	Clean the area around the bias terminal. Go to step 7.	Change the FCU.
Does the problem go away if you change the power pack?	Finished.	Go to step 8.
8. Are the charge corona unit and wire correctly installed?	Check the connections between the corona wire and the FCU. Go to step 9.	Correct the problem.
9. Does the FCU output constant power and corona trigger signals to the power pack?	Clean the charge corona unit. Go to step 10.	Change the FCU.
10. Does the problem go away if you change the power pack?	Finished.	Go to step 11.
11. Does the quenching lamp operate correctly?	Go to step 13.	Check the connections between the FCU and lamp. Go to step 12.
12. Does the FCU send constant power and drive signals to the lamp?	Replace the quenching lamp.	Replace the FCU.
13. Try replacing the master ur	nit.	
14. Clean the scanner optics, e Check the SBU white wave SBU or FCU if such wave p Adjust the RAM addresses	exposure glass, and white plate eform for peaks, dropouts, or no patterns are present. containing contrast threshold le	bise in the signal. Change the evels.

Symptom: Stray toner fl	ecks fused into the copy	
Check	Action if Yes	Action if No
1. Clean the inside of the mac	chine, especially around the dev	velopment and transfer unit.
Clean the rollers in the fusi	ng unit.	
2. Replace the master unit or	CTM.	

Symptom: Previous cop	y shows faintly	
Check	Action if Yes	Action if No
1. Does the quenching lamp operate correctly?	Clean or replace the master.	Check the connections between the FCU and lamp. Go to step 2.
2. Does the FCU send constant power and drive signals to the lamp?	Replace the quenching lamp.	Replace the FCU.



Symptom: Density chan	ges gradually across the p	printout
Check	Action if Yes	Action if No
1. Make a printer test (see section 4.1.14). Is it OK?	There may be a scanner problem; go to step 3.	Go to step 2.
 Check that the charge cord Check that none of the lase Check that toner is being d change the CTM, developen Try changing the master up 	na wire is clean and that it is in er optic components are out of p istributed evenly across the dev nent unit, or toner supply motor. hit, quenching lamp, or the charg	stalled correctly. position. velopment unit. If it is not, ge corona wire.
3. The xenon lamp may need	to be changed.	
4. Is the SBU scan line alignment is correct ?	Change the FCU.	Change the SBU.

Symptom: Uneven dens	sity in vertical bands		
Check	Action if Yes	Action if No	
1. Make a printer test (see section 4.1.14). Is it OK?	There may be a scanner problem; go to step 3.	Go to step 2.	
 2. Clean or change the charge corona wire. Clean or change the quenching lamp. Clean the laser optic components with a blower brush or dry cloth. Check that toner is being distributed evenly across the development unit. If it is not, change the CTM, development unit, or toner supply motor. 		eshooting	
 Clean the exposure glass, white plate, and scanner optics. Change the xenon lamp, especially if bands appear on the sides of copies made using copy mode. 		Troub	
4. Are there any bands in the SBU white waveform ?	Change the SBU.	Change the FCU.	

Symptom: Uneven density in horizontal bands		
Check	Action if Yes	Action if No
 Does the xenon lamp flicker? 	Change the lamp.	Go to step 2.
2. Is there a clear boundary between the bands?	Clean the charge and transfer corona units (there could be a leak, so check if any Auto Service Calls were made).	Clean the development unit, its bearings, and drive mechanism. or replace the master unit and/or development unit.

Symptom: Thin vertical white lines		
Check	Action if Yes	Action if No
1. Make a printer test (see section 4.1.14). Is it OK?	There may be a scanner problem; go to step 5.	Go to step 2.
 Clean the grid plate, toner metering blade, and laser optics. Clean or replace the corona wires. Add toner if the toner supply is getting low. Check for foreign objects around the master that could cause leakage of charge form the belt. 		
3. Is the surface of the hot roller scratched?	Replace the component that is damaging the hot roller, then replace the hot roller. If the hot roller strippers are badly stained with toner, replace them, and the thermistor (or FCU or PSU).	Go to step 4.
4. Is the master scratched?	Replace the component that is doing the damage, then replace the master.	Finished
5. Clean the white pressure plate above the exposure glass.		
6. Are there any peaks in the SBU white waveform ?	Change the SBU.	Change the FCU.

Symptom: Fuzzy vertical white lines			
Check	Action if Yes	Action if No	
Clean or replace the corona wires.			

Symptom: Wavy vertical black lines or bands			
Check	Action if Yes	Action if No	
The cleaning blade or toner metering blade may be dirty or damaged.			
Replace the hexagonal mirror motor.			

Symptom: Vertical dotted lines		
Check	Action if Yes	Action if No
1. If the master is scratched, replace the master, and the component that is scratching it.		
2. If the development roller is scratched, replace the roller, and the component that is scratching it.		
3. Clean the corona wires.		

Symptom: Vertical black band at the left or right edge of the printout			
Check	Action if Yes	Action if No	
1. Make a printer test (see section 4.1.14). Is it OK?	There may be a scanner problem; go to step 3.	Go to step 2.	
2. Make sure that the charge corona wire cleaner is at home position. Clean the laser optics with a blower brush or soft dry cloth.			
3. Clean the scanner optics. Replace the xenon lamp.			

Check	Action if Yes	Action if No
1. Make a printer test (see section 4.1.14). Is it OK?	There may be a scanner problem; go to step 5.	Go to step 2.
 Clean the thermistor, hot and pressure rollers, and hot roller strippers. Change the cleaning pad if it is dirty. Is the surface of the hot roller scratched? 	Replace the component that is damaging the hot roller, then replace the hot roller. If the hot roller strippers are badly stained with toner, replace them, and the thermistor (or FCU or PSU).	Go to step 3.
3. Is the master scratched?	Replace the component that is doing the damage, then replace the master.	Go to step 4.
4. Clean the corona wires and Clean the quenching lamp. Replace the toner metering Clean the laser optics caref If the problem remains, cha	l guide plates in the paper feed blade if it is damaged. fully with a blower brush or soft nge the FCU or LD unit.	path. dry cloth.
5. Clean the white pressure pl	ate above the exposure glass.	
6. Are there any peaks in the SBU white waveform	Change the SBU.	Change the FCU.

Symptom: Black stripes at the left and right edges of printouts		
Check	Action if Yes	Action if No
Clean the following components, or change them if the problem remains:		
Master unit, quenching lamp, xenon lamp, development roller.		



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Symptom: Defects at repeating intervals on the printout			
Check	Action if Yes	Action if No	
There is a defect on the master belt or on one of the rollers (the most likely ones are the			
hot roller, pressure roller, or development roller			

Symptom: Black streaks at the leading edge			
Check	Action if Yes	Action if No	
Clean the hot roller strippers or change the master unit.			

Symptom: Black spots at the leading edge		
Check	Action if Yes	Action if No
Clean inside the machine, especially around the fusing unit and transfer unit entrances.		
Clean the transfer corona wire and check that it is installed properly.		
If the problem remains, change the transfer corona wire or the power pack.		

Symptom: Horizontal white lines or stripes across printouts		
Check	Action if Yes	Action if No
1. Make sure that the user is place.	using the correct type of copy p	aper, and storing it in a dry
2. Does the printout have a crease mark where the white band appears?	Check the paper feed mechanism and path from paper feed through transfer; correct any faults.	Go to step 3.
3. Does the development bias terminal stay at a constant voltage (about -530 Vdc)?	Go to step 6.	Go to step 4. Do not adjust the variable resistors on the power pack.
4. Does the FCU output the power and bias trigger signal to the power pack?	Clean the area around the bias terminal. Go to step 5.	Change the FCU.
Does the problem go away if you change the power pack?	Finished.	Clean the development roller. Go to step 6.
Clean the transfer corona unit (wire, endblocks, casing).Check and replace any parts that may be causing the corona charge to leak.		
 7. Check that the development the start and stop at the sa a) Check the roller, master such as gears. b) Try changing the main main main main main main main main	nt roller and master unit are bot me time. If there are any proble unit, and drive mechanism for a	h rotating smoothly, and that ems, do the following: any defective components,

Symptom: Black page with horizontal white stripes			
Check Action if Yes Action if No			
Replace the optic fiber cable from the main scan start detector.			
If the problem remains, change the LD unit or FCU.			

Symptom: Random black spots on the printout		
Check	Action if Yes	Action if No
The grid plate may not be grounded properly. If the problem cannot be corrected, try		
changing the charge corona unit, which contains the grid plate.		
If the surface of the development roller is dirty, clean it.		
The laser diode may be out of control. Change the LDDR or FCU.		

Symptom: Horizontal black stripes			
Check	Action if Yes	Action if No	
1. Is the Call Service indicator lit?	Replace the LD unit or FCU.	Go to step 2.	
 Check that the master unit is installed properly and correctly grounded. Change the master unit if it is damaged. If the problem only occurs in copy mode, the xenon lamp may be flickering: change the lamp, driver, or FCU. If the problem remains, go to step 3 			
3. Does the development bias terminal stay at a constant voltage (about -530 Vdc)?	Go to step 6.	Go to step 4. Do not adjust the variable resistors on the power pack.	
4. Does the FCU output the power and bias trigger signal to the power pack?	Clean the area around the bias terminal. Go to step 5.	Change the FCU.	
Does the problem go away if you change the power pack?	Finished.	Clean the development roller. Go to step 6.	
6. Check that the toner metering blade is screwed in securely.			

Symptom: White spots in black areas			
Action if Yes	Action if No		
Clean the development roller (soft cloth and alcohol).			
Clean the corona wires.			
If the problem cannot be solved, change the development unit, master, or power pack.			
	Action if Yes oft cloth and alcohol). change the development		

Symptom: Data missing at the leading edge			
Check	Action if Yes	Action if No	
1. Does the problem only occur during copying?	Go to step 2.	Go to step 3.	
 Check that the scan line sensor is in the correct position. Try changing the FCU. 			
 3. Is the correct type of copy paper being used, and is it curled at the leading edge? Check for dust on the rollers in the paper feed path. Lower cassette: Is the registration mechanism working correctly? 			

Symptom: Part of the copy missing at the left or right edges			
Check	Action if Yes	Action if No	
 Does the problem only occur during copying? 	Go to step 2.	Go to step 3.	
2. Check the scanner optic path. Change the SBU or FCU.			
3. Check the laser optic path. Change the FCU.			

Symptom: Distorted printout			
Check	Action if Yes	Action if No	
 Does the problem only occur during copying? 	Go to step 2.	Go to step 3.	
2. Check that the document feed mechanism is operating smoothly.			
3. Poorly installed or defective hexagonal mirror motor.			
Blockage in the paper path.			
Check that the main motor, gears, rollers, and drive belts are moving smoothly.			

Symptom: Fuzzy copy			
Check	Action if Yes	Action if No	
1. Does the problem only occur during copying?	Go to step 8.	Check the connections between the ozone fan and the FCU. Go to step 2.	
Does the ozone fan turn on?	Go to step 4.	Go to step 3.	
3. Does the fan receive the power and drive signals?	Replace the fan.	Replace the FCU (or PSU).	
 4. Change the ozone filter. Check for obstructions between the transfer unit and the fusing unit. Check that the master is grounded properly. Change the master unit. Clean or replace the corona wires. Clean the laser optics carefully with a blower brush or soft dry cloth. If the problem remains, go to step 5. 			
5. Does the development bias terminal stay at a constant voltage (about -530 Vdc)?	Go to step 8.	Go to step 6. Do not adjust the variable resistors on the power pack.	
6. Does the FCU output the power and bias trigger signal to the power pack?	Clean the area around the bias terminal. Go to step 7.	Change the FCU.	
7. Does the problem go away if you change the power pack?	Finished.	Clean the development roller.	
8. Clean the scanner optics and the xenon lamp. Check the SBU waveforms, especially MTF and reduction rate (section 5-2-9).			

Symptom: Unfused copy		
Check	Action if Yes	Action if No
Clean the thermistor in the fusing unit.		
Check the pressure roller spring mechanism.		
Change the thermistor, fusing unit, FCU, or PSU.		

Symptom: Jitter, image stretched down the page			
Check	Action if Yes	Action if No	
1. Does the problem only	Go to step 3.	Go to step 2.	
occur during copying?			
2. Check the paper feed drive mechanism (motors, gears, timing belts).			
Check for obstructions in the paper feed path.			
Jitter: Try changing the LD unit or FCU.			
3. Check the document feed drive mechanism (motors, gears, timing belts).			
Check the tx motor timing belt tension.			
Replace the FCU or tx motor if the motor is making abnormal noise.			

Symptom: Magnification or reduction, filled-in characters			
Check Action if Yes Action if No			
Adjust the SBU reduction rate.			
If the problem only occurs in copy mode, check the paper size sensors. Replace the			
sensors or the FCU (or the PFU for the lower cassette).			

Symptom: Misaligned output - data shifted to the left or right		
Check	Action if Yes	Action if No
1. Check that the laser diode	unit is screwed in properly.	
Check that the laser optics are not misaligned.		
Try changing the LD unit or FCU.		
2. Adjust the SBU scan start position.		
Check that the scanner optics are not misaligned.		
Check that the document table is aligned properly.		
Try changing the LD unit or FCU.		

5.2. MECHANICAL PROBLEMS

The following flow charts may help you find the problem. They do not include such obvious steps as checking the power connection or changing the PSU or FCU if nothing appears on the operation panel.

5.2.1. ADF/Scanner

Symptom: Non feed		
Check	Action if Yes	Action if No
1. Are the covers closed properly?	Go to step 2.	Close the covers securely.
2. Are the pick-up and feed rollers clean?	Go to step 3.	Clean the rollers with a soft cloth and water. Replace them if they are damaged.
3. Is the shutter mechanism blocked? (If the shutter does not lift up after pressing Start, the tx motor may be defective; see step 10.)	Free the mechanism.	Go to step 4.
4. Is the problem corrected by adjusting the separation roller ?	Finished	Put the separation roller adjustment back to the original setting. Try replacing the separation roller. If that does not help, go to step 5.
 Are the gears and spring clutches clean and working properly? 	Go to step 6.	Clean the gears and clutches. Remove any debris from the mechanism.
6. Are the connections between the operation panel, FCU, and document sensor loose?	Connect the cables properly.	Go to step 7.
7. Does the LCD prompt change when a document is placed in the feeder?	Go to step 8.	Replace the document sensor, operation panel PCB, or FCU.
8. Are the connections between the PSU and FCU and the tx motor loose?	Connect the cables properly.	Go to step 9.
9. Does the tx motor work?	This troubleshooting procedure has finished.	Go to step 10.
10. Does the FCU receive +24V from the PSU?	Go to step 11.	Change the PSU.
11. Does the FCU output power and phase drive signals to the tx motor?	Replace the tx motor.	Replace the FCU.

TROUBLESHOOTING MECHANICAL PROBLEMS

Symptom: Skew caused by the scanner mechanism		
Check	Action if Yes	Action if No
1. Are the scanner rollers clean?	Replace the separation roller and or separation plate.	Clean the rollers using a oft cloth and water

Symptom: Jam		
Check	Action if Yes	Action if No
1. Are the scanner rollers clean?	Go to step 2.	Clean the rollers using a soft cloth and water
2. Is the document feed path blocked?	Go to step 3.	Remove any debris.
 Is the scanner mechanism in good shape, and is the tx motor timing belt tension correct? 	Go to step 4.	Correct the problem.
4. Are the connections between the operation panel, FCU, document width sensor, and scan line sensor loose?	Connect the cables properly.	Go to step 5.
5. Does the operation panel PCB receive signals from the scan line sensor and the document width sensor?	Replace the operation panel PCB or FCU.	Replace the document width sensor and/or scan line sensor.

Symptom: Abnormal noise		
Check	Action if Yes	Action if No
 Is the machine assembled properly. 	Go to step 2.	Correct the problem.
2. Are the springs and clutches in the feed/pick- up mechanism clean?	Replace the tx motor or the FCU.	Clean them.

Symptom: Double feed		
Check	Action if Yes	Action if No
1. Is the problem solved by cleaning or lubricating the separation roller?	Finished	Try cleaning or replacing the separation plate. If that does not help, go to step 2.
2. Does adjusting the separation roller solve the problem ?	Finished	Put the adjustment back to the original position, and replace the separation roller.

Ibleshooting

Symptom: Dirty docume	ent		
Check Action if Yes Action if No			
Clean the rollers and guide plates using a soft cloth and water.			

Symptom: Second page not fed in			
Check	Action if Yes	Action if No	
1. Clean the rollers using a so	1. Clean the rollers using a soft cloth and water.		
2. Are the connections between the operation panel, FCU, and scan line sensor loose?	Connect the cables properly.	Go to step 3.	
3. Does the operation panel PCB receive signals from the scan line sensor?	Replace the operation panel PCB or FCU.	Replace the scan line sensor.	

5.2.2. Printer

Symptom: Non-feed		
Check	Action if Yes	Action if No
 Check that non-feed is not the power cord not being p Check that the feed-in area Check that the covers are Clean or replace the pick-u mechanisms are working p Lower cassette: Check the necessary. If the problem only happer FCU, NCU, and telephone 	due to another problem, such a plugged in. a is not jammed with debris. closed properly. up and feed rollers, and check th properly. e separation roller and spring clu as during communication, check line.	as "Call Service" being lit, or nat the paper lift and feed ntch. Clean/replace if the connections between the
2. Are the connections between the FCU and the upper paper size and end sensors loose? If the problem is in the lower cassette, check the connections from the FCU to the PFU and lower paper size and end sensors.	Connect the cables properly.	Go to step 3.
3. Do the upper or lower cassettes' Add Paper indicators light even if paper is present?	Go to step 4.	Go to step 7.
4. Do the upper or lower cassettes' Add Paper indicators light when the cassettes are installed in the machine?	Go to step 5.	Go to step 6.
5. Do the signals from the paper size sensor change when the cassette is installed? (CS1 with optional PFU)	Change the PFU (lower cassette only) or FCU.	Change the sensor and/or the actuator mechanism.
6. Does the signal from the paper end sensor change when paper is added? (CS1 with optional PFU)	Change the PFU (lower cassette only) or FCU.	Change the sensor and/or the actuator mechanism.
7. Are the connections between the PSU, FCU, front cover switch and front cover interlock switch cover loose?	Connect the cables properly.	Go to step 8.
8. Does the signal from the front cover switch change when the cover is closed?	Go to step 9.	Change the switch and/or the actuator mechanism.

Action if Yes	Action if No
Co to stop 10	
Go to step To.	Change the switch and/or the actuator mechanism.
Go to step 15	Go to step 11 (motors) or 13 (clutches).
Connect the cables properly.	Go to step 12.
Replace the defective motor.	Replace the FCU.
Connect the cables properly.	Go to step 14.
Replace the defective clutch.	Replace the FCU.
motors do not turn on but are in ing may not have been met. The t the correct temperature. See " or must have reached the correct ocked". stored in the page memory. Ch	n good condition, the basic e conditions are as follows: Service Call Conditions: Hot et speed. See "Service Call eck the connections between
	Go to step 15 Go to step 15 Connect the cables properly. Replace the defective motor. Connect the cables properly. Replace the defective clutch. motors do not turn on but are ir ing may not have been met. The t the correct temperature. See " or must have reached the correct ocked". stored in the page memory. Ch eo data path and replace any de

Symptom: Copy Jam - General		
Check	Action if Yes	Action if No
 Is the printer jammed with debris? 	Clear the debris.	Go to step 2.
2. Is the correct type of paper	being used, and is it correctly I	oaded in the cassette?
3. Is a paper jam indicated when the power is switched on, even if there is no jam.	Go to step 4.	Go to step 5.
4. Does the FCU receive the correct signals from the registration, lower paper feed, and copy feed-out sensors? (CS1 with optional PFU)	Change the PFU (lower cassette only) and/or FCU.	Change the defective sensor.
5. Is the correct paper size sensor actuator being used?	Go to step 6.	Install the correct actuator.

TROUBLESHOOTING MECHANICAL PROBLEMS

Symptom: Copy Jam - General		
Check	Action if Yes	Action if No
6. Is the paper size sensor (upper/lower) outputting the correct signals for the installed actuator? The signals that should be seen are shown in the following table.	If you suspect that the FCU or PFU is processing the sensor signals wrongly, change the FCU and/or PFU.	Change the sensor.
FCU Connector (Upper Ca PFU Connector (Lower Ca A5 Letter A4 F, F4 Legal B4	ssette) 29-4 29-3 ssette) 4-6 4-5 L L H L L H L H H H H H H L	29-2 4-4 L L H L H
7. Are the connections between the FCU and the main motor loose?	Connect the cables properly.	Go to step 8.
8. Does the main motor work?	Go to step 10.	Go to step 9.
9. Does the FCU output power and drive signals to the main motor?	Replace the main motor.	Replace the FCU.
10. Do the upper/lower paper feed motors and clutches work? See steps 10 to 14 of "Non-feed".		

Symptom: Copy jam in the paper feed entrance (error code 9-07)		
Check	Action if Yes	Action if No
1. Clean the rollers in the paper feed entrance. Replace any defective rollers		
2. Check the registration sensor and lower paper feed sensor (see steps 3 and 4 of "Copy		
jam - General").		
3. Do the upper/lower paper feed motors and clutches work? See steps 10 to 14 of "Non-		
feed".		

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Symptom: Copy jam inside the machine (error code 9-08)			
Check	Action if Yes	Action if No	
 Clean the registration rollers (metal rollers - soft cloth and alcohol, rubber rollers - soft cloth and water). Check the paper feed path and mechanism, especially the area around the entrance to the transfer/fusing unit. Check the fusing unit drive mechanism. Replace the pressure springs or fusing unit 			
O Charle the verification concern and complete devit concern (acceptered 0, and 4 of "Complete devite concern")			
 Check the registration sensor and copy feed-out sensor (see steps 3 and 4 of "Copy jam - General"). 			

TROUBLESHOOTING MECHANICAL PROBLEMS

Symptom: Copy jam at the feed-out area (error code 9-09)			
Check Action if Yes Action if No			
1. Clean the rollers in the copy feed-out area.			
2. Check the copy feed-out sensor (see steps 3 and 4 of "Copy jam - General").			

Symptom: Double feed		
Check	Action if Yes	Action if No
Upper cassette: Check the corner separator mechanism and side fences, and replace if		
necessary.		
Lower cassette: Clean, lubricate, or replace the separation roller.		

Symptom: Dog-eared co	pies	
Check	Action if Yes	Action if No
Excessive copy paper curl		
Defective hot roller stripper		
Incorrect corner separator/side fence position		

Symptom: Wrinkled copies			
Check	Action if Yes	Action if No	
Check whether the problem can be solved by using another stack of paper.			
Replace the fusing unit pressure springs, or the entire fusing unit.			

Symptom: Soiled copy	oaper	
Check	Action if Yes	Action if No
Clean the rollers in the printer. If the dirt is part of the image, then clean the ADF and scanner rollers. Also, see Copy Quality Troubleshooting (section 6-1).		
scarmer rollers. Also, see (sopy Quality Houbleshooting (s	

Symptom: Dirt along the leading edge on the reverse side		
Check	Action if Yes	Action if No
See "Soiled Copy Paper" above. Clean the following components: transfer corona unit and vicinity, paper feed path, registration rollers (soft dry cloth), feed-out rollers.		

Symptom: Skew caused by the printer mechanism			
Check Action if Yes Action if No			
Clean the rollers in the cassettes and paper feed path. Replace any defective rollers.			

Symptom: Ozone odor		
Check	Action if Yes	Action if No
1. Is the ozone fan working?	Change the ozone filter.	Go to step 2.
Does the FCU send power and drive signals to the fan?	Change the ozone fan.	Change the FCU.

5.3. 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)

If the Call Service indicator is not lit, one of the following conditions has occurred.

- Excessive scanner jam call scanner has jam problems frequently. (see section 4.5.1)
- Excessive printer jam call printer has jam problems frequently. (Sub-code: 51; see section 4.5.1)
- Periodic service call (see section 4.5.2)
- PM call (see section 4.5.3)

To find out which problem has occurred, either:

- See the Auto Service Report, System Parameter List, and Service Monitor Report that were sent to the service station for the problem with the machine.
- Check the error code history using function 93.
- Try to clear the service call condition: switch the power off, wait 10 seconds, then switch back on.
- Check the sub-code which is stored at RAM address 4B7E(H). Note that the sub-codes do not appear on the reports that were sent to the service station, but they are stored in the above mentioned RAM.

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.

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:

- 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 (subcode 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 $^{\circ}\text{C}$ (subcode 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 thermisto		

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 CN2-2 does not go low within 10 s of the hexagonal mirror motor being switched on (sub-code 21)
- If FCU CN2-2 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 thro	ough the machine between the	PSU, FCU, interlock switches,	
hexagonal mirror motor and	d laser diode unit.		

Symptom: Mirror Motor Locked (Error Code 9-23)				
2. Does the FCU receive	Go to step 3.	Change the PSU or the		
+24V from the PSU?		front cover interlock switch.		
3. Does the FCU send	Replace the motor and	Replace the FCU.		
+24V to the motor?	driver.			

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 (subcode 11)
- If FCU CN22-4 goes back to high for 10 s or more during main motor operation (subcode 12)

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

6.4. OMR SHEET (CS1)

6.4.1. Possible Errors with OMR Sheet

If one of the following errors occurs while scanning an OMR sheet, the scanned data are not stored and an error code is stored in the memory.

Symptom	Action	Error Code	
Start mark not detected	Check the ADF/scanner mechanisms.	7-00	
Skew detection mark not detected	Check if a photocopy of the sheet was used. Check if a cut-off portion of the sheet was used. Check if the document guides are adjusted correctly. Check if the sheet is dirty. Check for any adhesive tapes on the sheet.	7-02	
Guide mark not detected while scanning the data field		7-04	
End mark not detected after the data field		7-09	ting
OMR sheet placed in the ADF the wrong way	Place the sheet correctly in the ADF.	7-01	shool
Skew detected at the skew detection mark	Check the ADF mechanisms. Check if a photocopy of the sheet was used.	7-03	ouble
Skew detected while scanning the data field	Check for any adhesive tapes on the sheet. Check if the document guides are adjusted correctly.	7-05	Ţ
Reduction rate not acceptable	Check if a reduced photocopy was used. Adjust the scanner correctly.	7-10	
6.4.2. Sample OMR Sheet Format

The following marks on the OMR sheet are used to detect errors. Refer to the next page for the locations of these marks.

	Name	Usage
Α	Start mark	Used to detect the start of an OMR sheet.
В	Skew detection marks	Used to detect skew before scanning the data field.
С	End mark	Used to detect the end of the data field.
D	Guide marks	Used to detect lines in the data field, and to detect skew while scanning the data field.
E	Wrong way insertion detection mark	Used to detect wrong way insertion. On the transfer request program sheet, this mark is also used as the end mark.



5.5. ERROR CODES

If an error code occurs, retry the communication. If the same problem occurs, try to fix the problem as suggested below.

Code	Meaning	Suggested Cause/Action
0-00	DIS/NSF not detected within 40 s of Start being pressed	Check the line connection Check the NCU - FCU connectors. The machine at the other end may be incompatible. Replace the NCU or FCU. Check for DIS/NSF with an oscilloscope. If the rx signal is weak, there may be a bad line.
0-01	DCN received unexpectedly	The other party is out of paper or has a jammed printer. The other party pressed Stop during communication.
0-03	Incompatible modem at the other end	The other terminal is incompatible.
0-04	CFR or FTT not received after modem training	Check the line connection. Check the NCU - FCU connectors. Try changing the tx level (use NCU parameter 01 or a dedicated tx parameter for that address). Replace the FCU or NCU. The other terminal may be faulty; try sending to another machine. If the rx signal is weak or defective, there may be a bad line.
0-05	Unsuccessful after modem training at 2400 bps	Check the line connection. Check the NCU - FCU connectors. Try adjusting the tx level (use NCU parameter 01 or a dedicated tx parameter for that address). Replace the FCU or NCU. Check for line problems.
0-06	The other terminal did not reply to DCS	Check the line connection. Check the FCU - NCU connectors. Try adjusting the tx level (use NCU parameter 01 or a dedicated tx parameter for that address). Replace the NCU or FCU. The other end may be defective or incompatible; try sending to another machine. Check for line problems.
0-07	No post-message response from the other end after a page was sent	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. The other end may have jammed or run out of paper. The other end user may have disconnected the call. Check for a bad line. The other end may be defective; try sending to another machine.

Code	Meaning	Suggested Cause/Action
0-08	The other end sent RTN	Check the line connection.
	or PIN after receiving a	Check the FCU - NCU connectors.
	page, because there	Replace the NCU or FCU.
	were too many errors	or memory space
		Try adjusting the tx level (use NCU parameter 01 or a
		dedicated tx parameter for that address).
		The other end may have a defective
		modem/NCU/FCU; try sending to another machine.
0-14	Non-standard post	Check for line problems and holse.
0-14	message response code	Incompatible or defective remote terminal: try
	received	sending to another machine.
		Noisy line: resend.
		Try adjusting the tx level (use NCU parameter 01 or a
		dedicated tx parameter for that address).
0-15	The other end does not	Incompatible remote terminal
0.0	have the confidential or	Remote terminal memory full.
	transfer function	
0-16	CFR or FTT not detected	Check the line connection.
	after modem training in	Check the FCU - NCU connectors.
	mode	Try adjusting the tx level (use NCU parameter 01 or a
		dedicated tx parameter for that address).
		The other end may have disconnected, or it may be
		defective; try calling another machine.
		If the rx signal level is too low, there may be a line
0-20	Facsimile data not	Check the line connection.
	received within	Check the FCU - NCU connectors.
	6 s of retraining	Replace the NCU or FCU.
		Check for line problems.
		Try calling another fax machine.
		switch 03. bit 7).
		Switch the rx cable equalizer on (bit switch 0A, bit 6).
0-21	EOL signal (end-of-line)	Check the connections between the FCU, NCU, &
	from the other end not	line.
	received within 5 s of the	Check for line holse or other line problems.
	providuo EOE orginal	The remote machine may be defective or may have
		disconnected.
0-22	The signal from the other	Check the line connection.
	end was interrupted for	Check the FCU - NCU connectors.
	more than 0.2 s	Replace the NGU of FGU.
		Check for line noise or other line problems.

Code	Meaning	Suggested Cause/Action	
0-23	Too many errors during	Check the line connection.	
	reception	Check the FCU - NCU connectors.	
		Replace the NCU or FCU.	
		Defective remote terminal.	
		Check for line noise or other line problems.	
		Ask the other end to adjust their tx level.	
0-24	Printer failure occurred	There is no memory space available, or substitute	
	while the memory was	reception is disabled. Try the following:	
	full during non-ECM	Change bit 6 of bit switch 07 to 1.	
	reception; negative	Ask the user to change bit 0 of user parameter 05 to	
	response returned	1.	
0-52	Polarity has changed		
0 0 -	during communication		
1-00	Document jam	Improperly inserted document or unsuitable	
1 00	Doodinent jam	document type	
		Clean the document iam sensor	
		See "Mechanical Operation - Document Jam"	
1_01	Document length	Divide the document into smaller pieces	
1-01	exceeded the maximum	Clean the sensors in the ADE/scanner	
		See "Mechanical Operation - Document Jam"	
1 17	Desumant ism in the	Clear debrie from the geneer actuator	
1-17	food out area	Clean the concers in the ADE/cooppor	
	leed-out area	Check the connections between the concern and	
		Poplace defective concer exercise panel beard, or	
		FCII	
1-71	Cover has been opened	100.	
	or cassette has been		
	pulled out during printing		
2-12	Modem clock irregularity	Beplace the ECU	
2-20	Abnormal	Check the connections from the FCU to the MBU	
2 20	coding/decoding (cpu not	Benlace the FCI or MBU	
	ready)		
4-00	One page took longer	Check for a bad line	
1.00	than 8 minutes to transmit	Try the communication at a lower resolution or	
		without halftone	
		Change the ECU	ļ
4-01	Line current was cut	Check the line connector	e
4 01	Line current was cut	Check the connection between the FCU and the NCU	L v
		Check for line problems	4
		Benlace the FCU or the NCU	
4-10	Communication failed	Get the ID Codes the same and/or the CSIs	Ľ
	because of ID Codo	programmed correctly then record	
	mismatch (Closed	The machine at the other and may be defective	
	Network) or Tel No /CSI	The machine at the other end may be delective.	
	mismatch (Protection		
	against Wrong		
	Connections)		
5-00	Data reconstruction not	Beplace the FCU	
0.00	naasibla		

Code	Meaning	Suggested Cause/Action
5-20	Storage impossible because of a lack of memory	Temporary memory shortage; otherwise, replace the FCU or memory PCB.
5-21	Memory overflow	
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	
6-05	Facsimile data frame not received within 18 s of CFR, but there was no line fail (G3 ECM)	Check the line connection. Check connections from the FCU to the NCU. Check for a bad line or defective remote terminal. Replace the FCU, NCU or MBU. Switch the rx cable equalizer on (bit switch 0A, bit 6).
6-06	Coding/decoding error (G3 ECM)	Defective FCU. The other terminal may be defective.
6-08	PIP/PIN received in reply to PPS.NULL (G3 ECM)	The other end pressed Stop during communication. The other terminal may be defective.
6-09	ERR received (G3 ECM)	Check for a noisy line. Adjust the tx levels of the communicating machines. See code 6-05.
6-10	Error frames still received at the other end after all communication attempts at 2400 bps (G3 ECM)	Check for line noise. Adjust the tx level (use NCU parameter 01or the dedicated tx parameter for that address). Check the line connection. Defective remote terminal.
7-00	Start mark not detected at the top of OMR sheet (CS1 only)	See section 5.4.1. If problem remains, replace the FCU.
7-01	OMR sheet placed in the ADF in a wrong way (CS1 only)	
7-02	Skew detection mark not detected (CS1 only)	
7-03	Skew has detected before scanning OMR data field (CS1 only)	
7-04	Guide mark not detected while scanning an OMR sheet (CS1 only)	
7-05	Skew has detected while scanning OMR data field (CS1 only)	
7-09	End mark not detected at the bottom of OMR sheet (CS1 only)	
7-10	Reduction rate in the main scan direction not acceptable while scanning an OMR sheet (CS1 only)	

TROUBLESHOOTING ERROR CODES

Code	Meaning	Suggested Cause/Action
9-07	Copy jam at the cassette	See section 5-2-2.
	entrance	If the problem remains, replace the FCU.
9-08	Copy jam inside the	See section 5-2-2.
	machine	If the problem remains, replace the FCU.
9-09	Copy jam in the copy	See section 5-2-2.
	feed-out area	If the problem remains, replace the FCU.
9-17	Transfer corona power	See section 5-3 (Charger Leak).
	leak	If the problem remains, replace the FCU.
9-20	Laser diode power	See section 5-3 (LD Power Control Failure).
	control failed	If the problem remains, replace the FCU.
9-22	Fusing lamp failure	See section 5-3 (Hot Roller Down).
		If the problem remains, replace the FCU.
9-23	Hexagonal mirror motor	See section 5-3 (Mirror Motor Locked).
	lock failure, or laser main	If the problem remains, replace the FCU.
	scan synch failure	
9-24	Main motor lock failed	See section 5-3 (Main Motor Locked).
		If the problem remains, replace the FCU.
9-50	Copy jam in the PFU	See section 5-2-2.
		If the problem remains, replace the FCU.

5.6. ELECTRICAL COMPONENT DEFECTS

5.6.1. Defective Sensor Table

Sensor	Symptoms if Defective
Document sensor	"CLEAR ORIGINAL" or "TRANSMIT DIAL" is
	displayed at power-up.
	"READY SET DOCUMENT" is still displayed
	after a document is placed in the feeder.
Document width sensor	Reduction should take place if the original is
	wide enough to actuate the sensor and the copy
	paper is not wide enough to. However, there is
	no reduction.
	"CLEAR ORIGINAL" is displayed at power-up.
Scan line sensor	"CLEAR ORIGINAL" is displayed at power-up.
	"CLEAR ORIGINAL" is displayed soon after the
	start of copying.
Front cover sensor	There is no alarm on opening the cover, and
	"CLOSE COVER" is not displayed.
	"CLOSE COVER" is displayed at power-up.
CTM sensor	"ADD TONER" is displayed at power-up.
Toner near-end sensor	Toner is never transferred from the CTM to the
	development unit.
Upper paper size sensor	"ADD PAPER" is displayed at power-up.
	Page separation may be done even if the
	original is the same size as the copy paper.
Upper paper end sensor	The Replace Paper indicator lights even if paper is remaining.
	The Replace Paper indicator does not light when
	the paper has run out.
Lower paper size sensor	"ADD PAPER" is displayed at power-up.
	Page separation may be done even if the
	original is the same size as the copy paper.
	If the original and the paper in the two cassettes
	are all of the same size, paper will be fed from
	the upper cassette.
Lower paper end sensor	The Replace Paper indicator on the lower
	cassette's operation panel lights even if paper is
	remaining.
	The Replace Paper indicator on the lower
	cassette's operation panel does not light when
Desistentia estat	the paper has run out.
Registration sensor	CLEAR COPY" is displayed at power-up.
Copy reea-out sensor	"CLEAR COPY" is displayed soon after the start
	of copying.

Sensor	Symptoms if Defective
Lower paper feed sensor (CS1 only)	The Copy Jam indicator on the lower cassette's operation panel lights at power-up.
	The Copy Jam indicator on the lower cassette's operation panel lights soon after the start of copying.

5.6.2. Blown Fuse Table

The only service-replaceable fuse is the following.

Fuse	Symptoms if Defective
PSU - F1	No power to the machine



PRINTER INTERFACE KIT TYPE 60

SERVICE MANUAL

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1. OVERALL INFORMATION

1.1. SPECIFICATIONS

Items	Specifications			
Printing Resolution	300 dpi			
Printing Speed	10 ppm (LT / A4)			
First Page Printout TIme	Less than 20 s			
Paper Size	Letter, Legal, A4			
Controller CPU	68000 (16.6 MHz)			
RAM Capacity	Standard - 1.0 MB			
	Upgradable to 5.0 MB with an optional memory board			
ROM	Font - 6.5 MB, Program - 0.5 MB			
Host PC Interface	1 Serial Port - RS232C			
	1 Parallel Port - Centronics			
Emulation Modes	HP LaserJet III (PCL5)			
	EPSON LQ, FX (ESC/P)			
Printable Area	IBM Proprinter			
Fililable Area	(64 mm) (64 mm)			
	1/4 inch			
	(6.4 mm)			
	Printable Area			
	1/4 inch			
	(6.4 mm)			
Otherwa				
Others	IC Card Slot - 1			
	Font Cartridge Slot - I			

1.2. OVERALL SYSTEM CONTROL



The printer interface kit consists of two PCBs, the printer controller board (Controller) and the printer interface board (PIF).

1.2.1. Printer Data Path

Through the serial and/or parallel interface(s), the Controller handshakes with the host(s) and receives print data, using one of the available emulation modes. Then the CPU creates an imaginary page in the memory using the fonts stored in the font ROM and the font cartridge. After one page of print data has been created, the Controller sends the video data through the video interface to the LIF on the FCU for printing. The PIF supplies the 24.1 MHz clock signal to the LIF for 300 dpi printing.

1.2.2. LCD/LED Data Path

The three LEDs on the operation panel are always dedicated to the Controller. They indicate the status during printing, and are directly controlled by the Controller.

In Printer Mode (Function 35), the LCD display and four one-touch dial keys are dedicated to the Controller to access SelecType functions. Within the SelecType functions, some settings are not available because of limitations to the machine's hardware. So, the CPU on the PIF monitors the function status and the settings to indicate on the LCD, and modifies the data if necessary (e.g., Half Letter size paper will not be displayed as a possible paper size).



1.3. POWER DISTRIBUTION

The PIF generates +5VD for the Controller. The +5VD line is returned to the FCU as +5VDMON, so that the FCU can detect whether the printer interface is installed or not.

+5V for the PIF CPU, and \pm 12V for the serial interface on the Controller are directly supplied by the FCU.

2. INSTALLATION

Throughout this chapter, the machine types are referred to as model codes H510 and H511. This installation must only be done by qualified service personnel.

Note: The H510 does not have a monitor speaker. Ignore the steps regarding the monitor speaker.

2.1. PRINTER INTERFACE UNIT

- 1. First, print any messages still stored in the SAF.
- 2. Turn off the power, and unplug the machine from the wall socket.
- 3. Slide out the cassettes.
- 4. Take off the rear cover [A] and disconnect the monitor speaker [B].



5. If a memory card [C] is installed, remove it.



INSTALLATION PRINTER INTERFACE UNIT

- 6. Take off the monitor speaker [D] from the rear cover.
- 7. Attach the monitor speaker [E] to the printer interface unit [F]. Then reconnect the monitor speaker [G].



8. Hold the printer interface unit [H] near the machine with one hand, and plug the flat cable [I] into the connector on the FCU board.



9. Attach the printer interface unit [J].



INSTALLATION PRINTER INTERFACE UNIT

10. Remove the memory option cover [K].

11. Attach the memory card guide [L]. Then install the memory card if necessary.



Caution: To avoid damaging the memory card, always remove the memory card first before removing the printer interface unit.

- 12. Put back the memory option cover.
- 13. Put back the cassettes.
- 14. Plug in the machine, then turn on the power.

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2.2. MEMORY EXPANSION BOARD (OPTIONAL)

- 1. Print any messages still stored in the SAF.
- 2. Turn off the power and unplug the machine from the wall socket.
- 3. Remove the memory option cover [M] and the memory board cover [N].
- 4. Insert the memory expansion board [O].
- 5. Put back the memory board cover [P] and the memory option cover [Q].
- 6. Plug in the machine, then turn on the power.





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

3. SERVICE TABLES AND PROCEDURES

3.1. SERVICE LEVEL FUNCTIONS

There are no special service operations. Refer to the operation manual for all printer operation procedures.

3.2. SERVICE RAM ADDRESSES

4**B**8**B**

Data wait time after the last page has been printed, when printing from the printer interface. (Hex; unit 2.56 s)

4. PRINTER INTERFACE KIT

4.1. INTERFACE SPECIFICATIONS

4.1.1. Parallel Interface

1. Pin Assignments

The printer has an 8-bit parallel interface. The pin assignments are as follows.

Signal Pin	Return Pin	Signal	Direct- ion	Description
1	19	STROBE	IN	The strobe pulse from the host to read data in. The received pulse width must be more than 0.5 μ s. Normally HIGH; data reception starts when the signal goes LOW.
2 - 9	20 - 27	DATA1-8	IN	Parallel data bits 1 to 8. A HIGH represents a '1'.
10	28	ACKNLG	OUT	A 10 μs pulse. LOW indicates that data has been received and the printer is ready to receive more data. This signal is output as a pair with BUSY.
11	29	BUSY	OUT	A HIGH indicates that the printer cannot receive data. The signal is high when data is entering, when the printer is off line, and when there is a printer error.
12	30	PE	OUT	A HIGH indicates that the printer is out of paper.
13	-	SLCOUT	OUT	Pulled up to 5 V through a 3.3 k Ω resistance.
14	-	Autofeed	IN	When LOW, paper is automatically fed when CR is received (the active signal level can be selected by a user adjustment). Sampling is carried out when power is on or when the printer is initialized at the operation panel.
16	-	GND	-	Logic ground
17	-	CH-GND	-	Printer's chassis ground
19 - 30	-	GND	-	Twisted pair return signal ground level
31	-	INIT	IN	When this goes low, the printer controller ignores the STROBE signal.
32	-	ERROR	OUT	This becomes low when the printer is out of paper, off line, or in an error condition.
33	-	GND	-	Logical ground
35	-	+5V	-	Pulled up to 5 V through a 3.3 k Ω resistance.
36	-	SLCIN	in	The DC1/DC3 control codes are valid only when this signal is HIGH (SLCIN is OFF). This setting can be changed with a user adjustment. Sampling is only done when the power is on.

Pins 15, 18, and 34 are not used.

PRINTER INTERFACE KIT INTERFACE SPECIFICATIONS

- **Notes:** All interface conditions are based on TTL level. Both the rise and fall of each signal must be less than 0.2 μs.
 - Data transfer must be carried out by observing the ACKNLG or BUSY signal. (Data transfer to the printer can be carried out only after the receipt of the ACKNLG signal or when BUSY is LOW.)
 - The "Direction" column refers to the direction of signal flow as viewed from the printer.
 - "Return" denotes the twisted-pair return to be connected at signal ground level. For then interface wiring, a twisted-pair cable should be used for each signal and the connection should be completed on the return side. These cables should be shielded and connected to the chassis of the host computer and the printer.

2. Interface Timing

The following diagram shows the timing for the parallel interface. $\begin{vmatrix} A & A \end{vmatrix}$



E: Always zero or greater

Signal Level: TTL Compatible

4.1.2. Serial Interface

1. Data Format

Word Length:	7 or 8 bits
Parity:	None, odd, or even
Stop Bits:	1 or 2
Printer Ready Protocol:	Enabled (DTR and XON/XOFF protocol set to ON)
The data format settings c	an be adjusted by user level features.
Baud Rate:	300, 600, 1200, 2400, 4800, 9600, 19200 bps
Signal Level:	RS-232C; conforms to EIA
Connector:	D-sub 25-pin connector

2. Pin Assignments

The serial interface pin assignments are described below. The direction of the signal is given relative to the printer.

Signal Pin	Signal	Direct- ion	Description
1	FG	-	Connected to the printer chassis.
2	TXD	OUT	Serial data from printer to computer.
3	RXD	IN	Serial data from computer to printer.
4	RTS	OUT	Request To Send. Held HIGH by the printer.
5	стѕ	IN	Clear To Send. The computer is ready to receive from the printer. The printer will not proceed unless the signal is HIGH. The active signal level can be changed with a user adjustment.
6	DSR	IN	Data Set Ready. The computer is ready to receive from the printer. The active signal level can be changed with a user adjustment.
7	SG	-	Signal ground. Provides a ground for all signal lines.
20	DTR	OUT	Data Terminal Ready. Indicates whether the printer is ready to receive data. If the printer ready protocol is not selected, DTR is always HIGH (always ready to receive). If printer ready protocol is selected, the printer can only accept data when DTR is HIGH. When DTR goes LOW, the computer must stop sending data within 128 characters. The active signal level can be changed with a user adjustment.

3. Handshaking

The serial interface can use DTR signal levels and XON/XOFF communication protocols either separately or in combination.

XON/XOFF Protocol

When the vacant area for data in the input buffer drops to 128 bytes, the printer outputs an XOFF code, indicating that the printer cannot receive more data. Once the vacant area for data in the buffer recovers to 256 bytes, the printer outputs an XON code, indicating that the printer is again ready to receive data. XON/XOFF protocol can be selected with a user adjustment. The factory setting is ENABLED.

DTR/DSR Protocol

When the printer can receive data, the printer sets STR to HIGH. When the printer cannot receive data, it sets DTR to LOW. If the user's DTR on/off adjustment is set to OFF, the DTR signal is always treated as HIGH. The printer sends data on TXD only when DSR is HIGH, unless the user's DSR on/off adjustment is set to OFF, in which case the DSR signal is always treated as HIGH.

4.2. TROUBLESHOOTING

4.2.1. Error Codes

The following error messages may appear on the screen while the printer interface is in operation.

Code	Cause	Required Action
C0002	Bus error	Switch the printer off, wait a
C0003	Address error	few seconds, and switch back
C0004	Illegal instruction	on. If the error occurs again, change the FCU or the printer interface board.
C0005	Division by zero	
C0006	CHK instruction execution	
C0007	TRAPV instruction execution	
C0008	Privilege violation	
C0009	Trace mode execution	
C0010	Implemented instruction	
C0011	Implemented instruction	
C0015	Unitialized interrupt	
C0024	Spurious interrupt	
C1110	ROM error (0 - 80 KH)	
C1130	ROM error (100 - 180 KH)	
C1140	ROM error (100 - 200 KH)	
C1200	EEPROM write error	
C1300	No ready task	
C1310	Re-generation of existing task	
C1400	Auto vector interrupt level 7	
C9999	Undefined area emancipation	

5. TROUBLESHOOTING

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