# FAX800

# (IXO)

# **SERVICE MANUAL**

### 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. OVERALL MACHINE INFORMATION**

### **1.1. SPECIFICATIONS**

Туре

Desktop transceiver

Circuit PSTN, PBX

#### Connection

Direct couple

#### **Document Size**

Length:105 - 600 mm [4.1 - 23.6 ins]Width:148 - 220 mm [5.8 - 8.7 ins]Thickness:0.05 to 0.15 mm [2 to 6 mils]

#### Document Feed

Automatic feed, face down

ADF Capacity 10 sheets

Scanning Method Flat bed, with CCD

#### **Maximum Scan Width**

216 mm [8.5 ins]  $\pm$  1%

#### Scan Resolution

Main scan:8 dots per mmSub scan:3.85 dots per mmStandard3.85 dots per mmDetail7.7 dots per mmFine15.4 dots per mm

#### Memory Capacity

ECM: 64 kbytes (single buffer) SAF: 416 kbytes; max available for Tx: 128 kbytes, max available for Rx: 416 kbytes (288 kbytes if Tx document present)

#### Compression

MH, MR, EFC, MMR, SSC

### Modulation

V.29 (QAM), V.27ter (PHM), V.21 (FM)

#### **Protocol** Group 3 with ECM

Data Rate 9,600/7,200/4,800/2,400 bps; automatic fallback

#### **Transmission Time**

10 s at 9,600 bps (G3 ECM with MMR coding) for a CCITT #1 test document (Slerexe letter) using standard resolution

Printing System Ink jet printing

Paper Size N. America/Taiwan: Letter, Legal Other: A4 only

Maximum Printout Width 203 mm [8.0 ins]

#### Maximum Printer Resolution

Main scan:360 dpiSub scan:360 dpi

**Power Supply** 220 - 240 Vac, 50/60 Hz single phase 115 Vac, 60 Hz single phase

Power Consumption Standby: 6 W Transmit: 15 W Receive: 10 W Copying: 28 W

Recommended Operating Environment Temperature: 17 - 28 °C [63 - 82 °F] Humidity: 30 - 70 %Rh

**Dimensions (W x D x H)** 357 x 348 x 176 mm [14.1 x 13.7 x 6.9 ins] Excluding paper cassette

#### Weight

7.0 kg Excluding paper cassette

# Overall Machine Information

# **1.2. FEATURES**

**KEY:** O = Used, X = Not Used, S = Service mode in some countries

Equipment	
ADF (10 sheets)	0
Answering machine interface	0
Bar code reader	Х
Built-in handset (option)	Х
Cabinet	Х
Connection for handset	0
Cutter	Х
Handset (option)	0
Hard disk (option only)	Х
Magnetic card reader	Х
Manual feed mechanism	Х
Marker	Х
Microphone	Х
Monitor speaker	0
PC printer interface (IBM)	0
Remaining memory indicator (only when storing a document for memory tx)	0
Speakerphone	Х

Video Processing Features	
Contrast	0
Halftone (16 level, image/text separation)	Ο
MTF	0
Reduction	Х
Resolution	0

Communication Features - Auto	
Automatic fallback	0
Automatic redialing	0
Confidential reception	Х
Dual Access (Full)	Х
Dual Access (Semi)	0
EFC	0
Page retransmission	0
Substitute reception	0
Transmission Reserve	Х

#### OVERALL MACHINE INFORMATION FEATURES

Communication Features - User Selectable	
Action as a transfer broadcaster	Х
AI Redial	0
Alternative Destination	Х
Answering machine	0
Authorized Reception	0
Auto-answer delay time	Х
Auto dialing (pulse or DTMF)	0
Auto Document	Х
Automatic Voice Message	0
Auto-note	Х
Batch Transmission	Х
Broadcasting	0
Chain Dialing	Х
Communication Result Display	Х
Confidential ID Override	Х
Confidential Transmission	Х
Direct Fax Number Entry	0
Economy Transmission	Х
Economy Transmission Time	Х
Forwarding (1 station)	0
Free Polling	0
Groups (5 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	Х
Length Reduction (rx mode) -	
called Auto Reduction in this model	0
Magnification ratio adjustment (rx only)	0
Mailbox	Х
Memory transmission	0
Multi-step Transfer	Х
Next Transfer Station	Х
Notify	Х
On Hook Dial	0
Page Count	Х
PBX type	0
Personal Codes	X
Personal Codes with Conf ID	X
Polling Reception	0
Polling Transmission	0

# OVERALL MACHINE INFORMATION FEATURES

Communication Features - User Selectable	-
Polling tx file lifetime in the SAF	Х
Quick Dial (10 stations)	0
Reception modes (Fax, Tel, Auto, TAM)	0
Remote control features	Х
Remote Transfer	Х
Restricted Access	Х
Secured Polling	0
Secured Polling with Stored ID Override	х
Secure Transmission	Х
Send Later	0
Silent ringing detection	Х
Speed Dial (40 stations)	0
Telephone Directory	Х
Tonal Signal Transmission	0
Transfer Request	Х
Transmission Deadline	Х
Turnaround Polling	Х
Two-step Transfer	Х
Voice Request	Х

Communication Features - Service Selectable	-
AI Short Protocol	Х
Auto-reduction override option	Х
Busy tone detection (this may not work in all countries)	0
Closed Network (tx and rx)	0
Continuous Polling Reception	Х
Dedicated tx parameters	Х
ECM	0
Inch-mm conversion	Х
MV1200 compatibility	Х
Page separation mark (rx mode)	0
Protection against wrong conn.	Х
Resol'n stepdown override option	Х
Short Preamble	Х
Well log	Х

Other User Features		
Area Code Prefix	Х	n n
Auto Service Call	Х	ach tio
Center mark	Х	M; ma
Checkered mark	Х	for
Clearing a memory file	0	)ve In
Clearing a polling file	Х	0
Clock	0	
Confidential ID	Х	
Copy mode	0	
Counters	Х	
Country code	Х	
Destination Check	Х	
Direct entry of names	0	
Function Programs	Х	
ID Code	0	
Ink cartridge end detection on/off	0	
Key Touch Tone on/off	0	
Label Insertion	Х	
Language Selection	0	
LCD contrast control	Х	
Memory Lock	Х	
Memory Lock ID	Х	
Modifying a memory file	Х	
Multi Sort Document Reception	Х	
Multicopy mode	Х	
Night Timer	Х	
Own telephone number	Х	
Printing a memory file	Х	
RDS on/off	0	
Reception Mode Switching Timer	Х	
Reception Time	Х	
Remote ID	Х	
Reverse Order Printing	Х	
RTI, TTI, CSI	O (S)	
Secure ID	Х	
Speaker volume control	0	
Specified Cassette Selection	Х	
Substitute reception on/off	Х	
Telephone line type	O (S)	
TTI on/off	0	
User Function Keys	Х	
User Parameters	0	
Wild Cards	Х	ļ

#### April 10th, 1993

Reports - Automatic	
Charge Control Report	Х
Communication Failure Report	Х
Confidential File Report	Х
Error Report	0
Memory Storage Report	Х
Mode Change Report	Х
Polling Clear Report	Х
Polling Reserve Report	Х
Polling Result Report	Х
Power Failure Report	0
Rejected Call Report (Authorized Reception)	Ο
TCR/Journal	0
Transfer Result Report	Х
Transmission Deadline Report	Х
Transmission Report	0

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

Service Mode Features	
Back-to-back test	0
Bit switch programming	0
Buzzer test	Х
Cable equalizer (rx only)	0
Comm. parameter display	Х
Counter check (on the system parameter list)	0
DTMF tone test	0
Echo countermeasure	0
Error code display	Х
File Transfer	Х
LCD contrast adjustment	Х

#### OVERALL MACHINE INFORMATION FEATURES

Service Mode Features	
Memory file printout (all files)	Х
Modem test	0
NCU parameters	0
Operation panel test	0
Printer mechanism test	Х
Printer test patterns	0
Programmable attenuation	Х
Protocol dump list	Х
RAM display/rewrite	0
RAM dump	0
RAM test	0
Ringer test	Х
Scanner lamp test	0
Scanner mechanism test	0
Sensor initialization (ink end sensor)	Ο
Serial number	Х
Service monitor report	0
Service station number	Х
System parameter list	0
Technical data on TCR/Journal	Х
Thermal head parameters	Х
Transmission Status Report	Х

### **Memory Files**

Max. number of files: 1 (tx), 30 (rx) Max. number of stations/file: 9

# **1.3. COMPONENT LAYOUT**

#### 1.3.1. Mechanical Components



- 1. R2 Rollers
- 2. Document Feed Roller
- CCD (Charge Coupled 3. Device)
- 4. Ink Cartridge
- 5. Paper Feed Roller
- 6. Paper Pick-up Roller
- 7. Cassette

Feed the document through the scanner

- Feeds the document into the scanner.
- Converts the light reflected from the
- document into an analog video signal. Contains ink for the printer.
- Feeds the paper through the printer.
- Picks up a sheet of paper from the cassette and feeds it into the printer.
  - Contains paper for the printer.

# **1.3.2. Electrical Components**



Name PCBs	Description	No.
FCE	Facsimile Control Engine: This board controls the machine and contains the system ROMs.	1
FDU	Facsimile Driver Unit: This board contains power regulators and drivers.	3
IJC	Ink Jet Controller: This board controls the ink jet printer.	4
PSU	Power Supply Unit: This board supplies power to the machine.	5
NCU	Network Control Unit: This board contains relays and switches for interfacing the machine to the telephone network and the handset.	2
SBU	Scanner Board Unit: This board contains the CCD.	15
OPU	Operation Panel Unit: This board contains the operation panel keys and indicators.	11
Motors		
Tx Motor	This drives the scanner.	12
Rx Motor	This drives the printer's pick-up roller.	14
Carriage Motor	This drives the printer's carriage mechanism and purge unit.	6
Paper Feed Motor	This drives the printer's paper feed roller.	20
Sensors		

#### April 10th, 1993

# OVERALL MACHINE INFORMATION COMPONENT LAYOUT

Ink End Sensor	This detects when the ink in the cartridge has run out.	18 2
Paper End Sensor	This detects when the paper in the cassette has run out.	Machi Machi
Paper Feed Sensor	This detects the presence of paper in the ink jet printer unit.	erall 4
Carriage Home Position Sensor	This detects when the carriage is at the home position.	9 0
Cover Switch Others	This detects whether the cover is open or closed.	19
LED Array	This lamp illuminates the document.	13
Ink Cartridge	This contains the ink jet printer head and the ink.	8
Printer Head	This contains a row of nozzles that deliver ink to the paper.	10
Speaker	This allows the user to listen to the condition of the telephone line.	17

# **1.4. OVERALL SYSTEM CONTROL**



The cpu on the FCE board (called the KFCP chip) controls the machine. There is also a slave cpu on the IJC board, which controls the ink jet printer. System parameters are stored in an SRAM on the FCE board, backed up by a battery.

# OVERALL MACHINE INFORMATION VIDEO DATA PATH

# 1.5. VIDEO DATA PATH

#### 1.5.1. Transmission



#### 1.5.2. Reception



April 10th, 1993

Overall Machine Information

# **1.6. POWER DISTRIBUTION**



The regulator on the FDU board converts the +10V dc input into the various dc power supplies that are needed by the machine.

# **2. DETAILED SECTION DESCRIPTIONS**

### 2.1. SCANNER

#### 2.1.1. Integrated Scanner/Sensor Mechanism



White Reflector The document sensor (SB-1) and scan line sensor (SB-2) are integrated into the scanner mechanism. The basic composition of these sensors is similar to photointerrupters. However, instead of using discrete photodiode/phototransistor assemblies for each sensor, elements of the LED array and CCD are used.

On the left hand side of the LED array, there are red LEDs dedicated for the two scanner sensors. These LEDs are always on. Light from these LEDs passes through the lens to the right hand side of the CCD, where there are 112 elements specially provided to detect this light (the 4th bit is allocated to the scan line sensor [SB-2] and the 58th bit is allocated to the document sensor [SB-1]).

If a sensor actuator blocks the light path, the CCD waveform shows a dropout, then the CPU will detect it.

#### April 10th, 1993

#### **DETAILED SECTION DESCRIPTIONS** SCANNER

In standby mode, the CCD output is as shown on the right. The peak on the left side of the waveform indicates that the light path in both of the sensors is unblocked.



the document sensor actuator blocks the light path to the CCD. When the cpu detects this, it starts prefeeding the document and switches on the rest of the LED array.

When the document reaches the scan line sensor, the actuator blocks the light path through that sensor. Then prefeed stops to prepare for scanning.

The XVIDEO output while the machine is scanning the document is shown on the right. While scanning the document, the LED array flashes every 10 ms.



# DETAILED SECTION DESCRIPTIONS SCANNER

As the trailing edge of the page leaves the scan line sensor, the light path through that sensor becomes unblocked again. However, if there are some pages remaining in the feeder, the light path through the document sensor remains blocked.

After the transmission has ended, or after the copy has been printed, the LEDs for scanning the original switch off. The scanner is back in standby mode.

#### 2.1.2. ADF Mechanism



Detailed Section Descriptions

The ADF consists of the feed roller, R2 roller, document/scan line sensor actuators and separation rubber plate.

When a document is placed in the feeder, the document sensor detects it as explained in the previous section. Then, the CPU switches the LED array on and turns the feed roller until the document reaches the scan line position. After the handshake is completed or the Copy key is pressed, the feed roller feeds the document until the leading edge reaches the R2 roller (the machine scans the first 15 mm of the document). From this point, the R2 roller feeds the document until the trailing edge of the document passes the feed roller. Both the R2 roller and the feed roller are in contact with the document. However, the R2 roller turns a bit faster than the feed roller. After the trailing edge passes the feed roller, only the R2 roller feeds the document.

So, the document is fed into scanner slowly during the first 15 mm, at the normal speed when the document is fed by both rollers, then at a faster speed for the final 37 mm when the document is free from the feed roller. The magnification rate of the scanned image varies in these three parts.



### 2.2. PRINTER



The spring [A] bene that as it is used up, the paper is always raised to the pick-up roller [B].



The rx motor [A] drives the pick-up roller [B], which picks up the top sheet of paper from the cassette and feeds it into the printer. The pick-up cam [C] ensures that the roller only rotates once for each sheet of paper (see next page).

The paper feed motor [D] drives the feed roller [E], and the carriage motor [F] moves the ink cartridge [G] across the paper. The carriage home position sensor (obscured from view behind the cartridge in the above diagram) detects when the carriage is at its home position.

The paper end sensor [H] detects when the cassette is empty.

The paper feed sensor [I] detects the arrival of paper in the printer and determines whether a jam has occurred.

The ink end sensor [J] detects when the ink has run out by measuring the intensity of a spot that is printed on the paper at the bottom right hand corner.

#### 2.2.3. Pick-up Mechanism



In the standby position (above), the flat surface of the pick-up roller [A] faces the paper, and the pin [B] is lodged in the notch at the end of the inner track [C] on the pick-up cam [D].



Detailed Sectio Descriptions

At the start of paper feed, the rx motor reverses briefly. When the pin reaches the junction in the track, the spring [E] pulls the pin up into the outer track.



The rx motor starts to move in the forward direction. As the pick-up cam rotates, the pin rides around the outer track [F]. The paper feed motor starts at the same time that the rx motor starts to move in the forward direction, so that paper is pulled smoothly through the printer when it reaches the feed roller.



By the time that the pin has come back to the notch in the end of the inner track (see the top diagram), the paper's leading edge has been fed to the feed roller, and the rx motor stops until it is time to feed the next sheet of paper.

### 2.2.4. Ink Cartridge



The diagram shows an exploded view of the ink cartridge. The main components of the ink cartridge are:

**Ink Sponge [A]:** This contains about 20 grams of ink, which is enough for printing about 550 CCITT #1 charts (Slerexe letter).

**Printer Head [B]:** The printer head faceplate contains a row of 64 nozzles [C], spaced at a resolution of 360 dot-per-inch. Ink passes to these nozzles through a pipe [D], which contains a filter. Printing signals arrive at the printer head at the signal contacts [E].

### 2.2.5. Printer Head

#### 1. Mechanism



Detailed Section Descriptions

Ink from the sponge is filtered at [A] to remove dust, and passes to the nozzles through pipe [B]. When the head drive current flows through a nozzle's heater plate [C], the ink at the plate boils, and bubbles form [D], eventually joining up to form one large bubble [E]. The bubble forces a drop of ink [F] out of the nozzle; the drop is ejected at a speed of about 12 metres per second.

Head drive current switches off before the bubble is fully formed, and the remaining heat in the heating plate completes the bubble. The plate has cooled by the time that the ink drop has been ejected, and fresh ink arrives at the nozzle from the sponge.

The 64 nozzles are arranged in a line at intervals of 1/360 inch. However, the printer uses only the upper 60 nozzles (when printing from left to right across the paper [from right to left as viewed from the front of the machine], and when printing the ink end sensor mark) or 48 nozzles (when printing from right to left across the paper [from left to right as viewed from the front of the machine]).



#### 2. Drive Circuit



The 64 heater plates for these nozzles are controlled in a matrix circuit made up of COM1-8 and SEG1-8.



First, COM1 goes high. While COM1 is high, the signals on SEG1 to SEG8 determine the status of nozzles 1 to 8. For example, if SEG1 is low while COM1 is high, current will flow, and ink will be ejected from nozzle 1. If SEG1 is high, current will not flow, and no ink will be ejected from that nozzle.

# DETAILED SECTION DESCRIPTIONS PRINTER

After processing nozzles 1 to 8, COM1 goes back to low, and COM2 goes high. Then SEG1 to SEG8 determine the status of nozzles 9 to 16.

This process is repeated until nozzles 57 to 64 have been controlled. Then the print head moves across to the next printing position and the process starts again.



One of four heater voltage levels that determine the ink jet speed is selected to correct any manufacturing variations in the printer heads. The heater voltage can be determined from the pattern of contact points on the printer head.

3. Temperature Control



The optimum temperature for the best printing quality is about 23 °C [73 °F]. The machine determines the cartridge temperature from measurements of room temperature, which come from a thermistor on the IJC board. If the output from the thermistor is less than 3 Volts, the machine turns on the warm-up heaters [A] to warm up the printer head.

#### 2.2.6. Purge Unit





**Purge Unit Control Gear:** The carriage motor drives this gear [A] through the lead screw [B]. This gear functions as a cam that drives the purge unit wiper, cap, and pump, and controls the overall movement of the purge operations.

Wiper Arm: This contains a rubber wiper [C] and the maintenance jet absorber [D]. The rubber wiper cleans the cartridge's face plate from top to bottom every 60 seconds during printing and cleaning. The maintenance jet absorber absorbs the ink that is ejected from the nozzles when power is switched on, before the start of printing, and every 12 seconds during printing (this ink is ejected as a test to stabilize the nozzles). The ink absorber removes ink from the rubber wiper and the maintenance jet absorber when the wiper arm goes down.

**Cap:** The cap arm with its rubber cap [E] advances and caps the ink cartridge when the wiper arm goes down. The rubber cap connects to the ink pump, which sucks ink from the cartridge during cleaning.

Pump: The pipe-shaped pump unit [F] sucks ink from the rubber cap and passes it to the waste ink absorber [G] in the paper feed roller.

# DETAILED SECTION DESCRIPTIONS PRINTER

### 2. Capping

When printing does not occur for more than 5 seconds, or when the printer goes off line, the capping mechanism pushes the rubber cap [E on the previous page] of the purge unit against the face plate of the cartridge, to stop ink at the nozzles from drying up or leaking out.

### 3. Cleaning

Cleaning consists of two operations.

- Wiping: The face plate of the cartridge is wiped to remove paper fiber and ink.
- Pumping: The ink pump sucks about 0.1 cc from the capped cartridge and fills the nozzles with fresh ink.

The machine keeps a three-day timer to check when automatic cleaning is due. However, if printing occurs within 3 days of cleaning, a new three-day period begins. It is possible to extend the original three-day period without cleaning to up to 7 days without cleaning in this way. As a result, the software contains the following rules to determine when automatic cleaning is done:

- Immediately after the machine is switched on, or initialized (by resetting the cassette, opening/closing the cover), or just before printing:
  a) If there have been at least three full days since the last cleaning, and there has been no printing within this period
  b) If there have been at least three full days since printing
  c) If there have been at least seven full days since cleaning
- After the printer has been reset (by clearing the RAM)

In addition, there is an operation procedure for the user to initiate cleaning manually.

### 4. Maintenance Jet

The printer has a maintenance jet function that ejects ink from all nozzles of the cartridge to the purge unit to prevent the nozzles from clogging.

**Note:** The maintenance jet works automatically when the power is switched on, before printing starts, and after one line has been printed after an interval of 12 seconds or more during printing.

#### 2.2.7. Carriage



**Cartridge Mounting:** The hook, that is moved with the hooking lever [A], fixes the cartridge to the carriage. When the cartridge is on the carriage, the contacts from the ribbon cable [B] connect to the contacts [C] on the print head.



**Carriage Drive:** The carriage motor (dc stepper motor) [A] rotates the lead screw [B] through a drive belt [C]. The carriage [D] moves horizontally over the paper, driven by the lead pin [E], which rides in the groove of the lead screw. For the carriage position, the carriage home position sensor under the carriage detects the actuator (which is part of the guide shaft holder) at the left of the carriage guide shaft (the shaft is [F] in the above diagram). The position of the carriage across the carriage is determined by the number of pulses sent to the carriage motor.

# DETAILED SECTION DESCRIPTIONS PRINTER

**Head Gap Adjustment:** The eccentric carriage guide shaft can be adjusted with the head gap dial on the bottom of the printer to match the head gap to the paper thickness. The head gap is about 0.04 inch [1 mm] when the dial is turned fully in the direction of the cut sheet mark, and about 0.075 inch [1.9 mm] when turned fully in the direction of the envelope mark.

**Note:** This adjustment is not to be attempted in the field. Only adjust these three knobs in the factory or warehouse. See page 5-5 for the locations of the three knobs.

#### 2.2.8. Purge Unit



When the lead pin enters the left margin groove [A], the carriage pushes the clutch gear [B] to the purge unit. The clutch gear then transmits the carriage motor power to the purge unit control gear [C].

### 2.3. PCBS

### 2.3.1. FCE (Facsimile Control Engine)



This board performs all control tasks, image processing, and tx/rx data processing. It contains the following components:

- The KFCP chip, which contains the machine's cpu and a video processor. It also contains an A/D converter, real time clock, memory management, reset control, interrupt control, DMA controller, image processor, and other components.
- DSP/AFE chips (modem)
- ROM (2 Mbits)
- SRAM (32 kbytes)
- DRAM (512 kbytes: 64k for ECM, 416k for SAF memory, 32k for a printer buffer)
- I/O Port (EIO2) (Data compression and reconstruction, DRAM control, serial I/O)

etailed Section Descriptions

# DETAILED SECTION DESCRIPTIONS PCBS

#### 2.3.2. FDU (Facsimile Driver Unit)



This board interfaces the FCE board with the peripherals. It contains the following:

- LED array and motor drivers
- Data processing circuits
- A battery for FCE back-up
- Modem signal amplification and filtering circuits
- Printer control
- Power supply regulator
- AVM (Automatic Voice Message) generator
- Centronics interface driver

#### 2.3.3. IJC (Ink Jet Controller)



This board controls the ink jet printer mechanism. It contains:

- MPU chip (this contains a cpu, 8 kbytes of ROM, and 256 bytes of RAM). This controls the carriage home position and paper feed sensors, the paper feed and carriage motors, and the cleaning mechanism
- Gate array; this controls cartridge head drive, the Centronics interface, and the line buffer (DRAM).
- ROM (4 Mbits) for the fonts and for Centronics interface control
- DRAM x 2 (256 kbits)
- Thermistor for monitoring the temperature around the IJC board
- Maintenance jet timing circuit (HC133/HC4075)

#### 2.3.4. SBU (Scanner Board Unit)

• This board contains the CCD, which scans the document and detects light path blockage by the document sensor and scan line sensor actuators.

#### 2.3.5. OPU (Operation Panel Unit)

• This board contains the operation keys, indicators, and the LCD display panel.

etailed Sectior Descriptions

# DETAILED SECTION DESCRIPTIONS PCBS

#### 2.3.6. NCU



- RY2/3 OH relay (Fax/Tel mode selection)
- PC1 Di switch
- PC2 Ds relay
- PC3 Gs relay

# Jumper settings

Country	TB1	TB2	TB3	TB4	TB5	TB6
Switzerland	Open	Shorted	Fig 1	Shorted	Open	Open
Denmark	Open	Open	Fig 1	Shorted	Open	Open
Greece	Open	Shorted	Fig 2	Shorted	Shorted	Shorted
Austria	Shorted	Open	Fig 1	Shorted	Shorted	Shorted
Sweden	Shorted	Open	Fig 1	Shorted	Shorted	Shorted
Spain	Open	Open	Fig 3	Shorted	Shorted	Shorted
Italy	Open	Open	Fig 3	Shorted	Shorted	Shorted
Ireland	Open	Open	Fig 4	Shorted	Shorted	Shorted
Turkey	Open	Open	Fig 1	Open	Shorted	Shorted
Others	Open	Open	Fig 1	Shorted	Shorted	Shorted

The ways to configure TB3 are shown in the following diagram.

твз

		Fig 1					Fig 2		
1	0		0	6	1	0		Ο	6
2	0		0	5	2	0		ο	5
3	0		0	4	3	0		0	4
		Fig 3					Fig 4		
1	0		0	6	1	0		P	6
2	0		ο	5	2	0		0	5
3	0		0	4	3	0		0	4

# **3. INSTALLATION**

# **3.1. CONNECTING UP THE MACHINE**

#### **Power Source**

N. American/Taiwan models: 115Vac, 60 Hz Other Models: 220 - 240 Vac, 50/60 Hz



When installing the machine, first connect the power cord, then the

telephone line. When moving the machine, first disconnect the telephone line, then the power cord.

# **3.2. INITIAL PROGRAMMING**

Check the following:

- Are the country codes (bit switch 2) correct for the country of installation?
- Are the NCU jumper settings correct for the country of installation (see section 2-3-6).
- Do any bit switch or other settings have to be changed to match line conditions or user requirements?

The user should program the following items after installation: Telephone Line Type, RTI, TTI, CSI, ID Code, Date and Time, Cassette Size Selection, Language Selection

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

- Telephone Line Type (Function 32)
- CSI (Function 13)



# **4. SERVICE TABLES & PROCEDURES**

### 4.1. SERVICE LEVEL OPERATION

#### 4.1.1. Entering and Exiting Service Mode

#### TO ENTER SERVICE MODE: Do either of the following.

Press Start  $\rightarrow$  Stop  $\rightarrow$  Start  $\rightarrow$  Stop  $\rightarrow$  Start sequentially within 3 seconds. Simultaneously press the three keys below the LCD screen on the operation panel.

#### Important Notice for Back-to-Back Mode (Bit Switch 0, Bit 7)

When in back-to-back mode, you cannot enter service mode by pressing the Start - Stop key sequence. This is because the machine starts communication if you press Start - Stop - and so on while you are in back-to-back mode. Press the three keys below the LCD panel to enter service mode when in back-to-back mode.

No.	Function	Brief Explanation	
80	Factory Adjustment	Use to check the ROM version, to adjust the tx level and to clear the RAM.	oles ures
81	Scanner Adjustment Mode	Use to light the lamp in the scanner before adjusting the scanner.	ce Tał roced
82	RAM Test	Use to test the RAMs inside the fax machine.	l Pi
83	LCD and LED Test	Use to test the LCD and LEDs on the operation panel.	Se anc
84	Printer Test	Use to print a test pattern.	
85	PTT Test	Use to test the modem signals, DTMF tones, and transmission level.	
86	Burn-in Test	Do not use this function. If this function is used, the RAM will all be cleared.	
87	Ink End Sensor Reset	Use to initialize the ink end sensor.	
90	Bit Switch Programming	Use to change the bit switch settings.	
91	Display ROM/RAM Data	Use to display and change the ROM/RAM data.	
92	System Report	Use to print the system report.	
93	Print ROM/RAM Data	Use to print ROM/RAM data.	
94	Service Report	Use to print the service report.	
95	NCU Parameters	Use to adjust the NCU parameters.	

After entering service mode, the following service functions are available.

**EXITING SERVICE MODE:** The machine will automatically exit service mode 5 minutes after you stop operating it.

**Note:** New settings are not saved by pressing the Function key. To save new settings, you must press "SET" or "OK", then exit service mode.

The following conventions were used when writing the names of operation panel keys in this section of the manual.

#### **Keys with Fixed Function**

These are the keys on the operation panel that have names written on or beside them. In the manual, these have been written in boldface and enclosed by a box, and the first letter is a capital.

For example, **Function** means "Press the Function key."

The Start and Stop keys are represented by the icons that are printed on the operation panel.

#### Keys with Variable Function

Thes eare the three keys directly below the LCD display. The bottom line of the display shows the current function of these keys. In the manual, these keys have been printed in boldface in a box, all in capital letters.

For example, **REVIEW** means "Press the key that is directly below "RE-VIEW" on the display."

#### 4.1.2. Factory Adjustment (Function 80)

1. Enter service mode (see section 4-1-1).

2. Function 8 0 SET

VER 1.00 01.04.93 -RAMSET 0.LEV RAMCLR

The upper line on the LCD shows the ROM version "VER x.xx dd.mm.yy c" (x.xx = version, dd.mm.yy = date, c = country setting).

3. If you wish to clear the RAM: **RAMCLR** 

RAM CLEAR:PRESS STOP THEN SET COUNTRYCODE

Do not press either  $\ensuremath{\textbf{RAMSET}}$  or  $\ensuremath{\textbf{0.LEV}}$  . These functions are only for use in the factory.

RAM is all reset to the initial settings and the CPU is restarted.

4. 🛇

SET BITSW02 00000001 < > OK

5. Program the correct country code (see bit switch 2; section 4-2). Then press **Ο**κ . The machine returns to standby mode.

# 4.1.3. Scanner Adjustment (Function 81)

- 1. Enter service mode (see section 4-1-1).
- 2. Function 8 1 SET

```
81 SCANNER ADJUST
```

3. The LED array is switched on until **OK** is pressed.

Refer to section 5-5 for details on the scanner adjustments.

#### 4.1.4. RAM Test (Function 82)

- 1. Enter service mode (see section 4-1-1).
- 2. Function 8 2 SET

- RAM TESTING... RAM TEST AT 000000
- 3. The machine checks the SRAM and DRAM areas, without erasing data. If the RAM test succeeded, the machine goes on to Function 83. If the RAM test failed, the machine displays "RAM ERROR AT xxxxx (SRAM area: 3F00-3FFF, DRAM area: 4000 - 7FFF)

#### 4.1.5. Operation Panel Test (Function 83)

- 1. Enter service mode (see section 4-1-1).
- 2. **Function** 8 3 **SET** The LCD flashes and all LED indicators blink except the Power indicator.
- 3. To finish: 🚫

#### 4.1.6. Printer Test Pattern (Function 84)

- 1. Enter service mode (see section 4-1-1).
- 2. Function 8 4 SET

84	PRINT	TESTR	PATTERN
REV	IEW	PRINT	EXIT

- 3. PRINT
- 4. After printing, the machine automatically returns to standby mode. If you want to stop during printing, press  $\bigcirc$ .

OK.

and Procedure

#### 4.1.7. PTT Test (Function 85)

1. Enter service mode (see section 4-1-1).

2. Function 8 5 SET	PTT TEST MDM DTMF	LEV.
<ul> <li>3. Either:</li> <li>For a modem tone test: MDM.</li></ul>	PTT TEST	0000
Go to step 4.	<u>MDM</u> DTMF	Lev.
• For a DTMF tone test: <b>DTMF</b> .	PTT TEST	8
Go to step 6.	MDM <u>DTMF</u>	LEV.
<ul> <li>To adjust the Tx level: LEV.</li></ul>	PTT TEST	00
Go to step 8.	MDM DTMF	<u>LEV.</u>

- 4. Modem Test: The machine goes off hook but remains silent. Then, by pressing # consecutively, the signal changes to 9,600bps 7,200bps 4,800bps 2,400bps 300bps 1100Hz 2100Hz. (Press \* to go backwards through the sequence.)
- 5. After you have finished the test, press  $\overline{O}$  to go back to step 3.
- 6. **DTMF Test:** Press the key on the ten key pad (0 9, \* and #) corresponding to the tone that you wish to test.
- 7. After you have finished the test, press  $\bigcirc$  to go back to step 3.
- 8. Tx Level Adjustment: The current tx level setting is displayed in the upper right corner of the LCD. To change the setting, press # to increment or press \* to decrement.
- 9. After adjustment, press  $\bigcirc$  to save the setting. Go back to step 3.

#### 4.1.8. Burn-in Test (Function 86) - Do not use this function

#### 4.1.9. Ink End Sensor Reset (Function 87)

- 1. Enter service mode (see section 4-1-1).
- 2. Function 8 7 SET

SETTING

The machine initializes the ink end sensor.

- If OK is displayed, the sensor is in good condition.
- If NG is displayed and an alarm rings, there is a paper jam, there is no paper, or the sensor is defective.

#### SERVICE TABLES & PROCEDURES SERVICE LEVEL OPERATION

### 4.1.10. Bit Switch Programming (Function 90)

1. Enter service mode (see section 4-1-1).

2. Function 9 0 SET	SET BITSW00 00000000 < > 0K					
<ul> <li>3. To see a different bit switch:</li> <li>&gt; to increment</li> <li>&lt; to decrement</li> <li>Example: To see Bit Switch 1, press &gt; once.</li> </ul>	Bit 7 is displayed at the left, and bit 0 at the right. SET BITSW01 00000000 < > 0K					
<ol> <li>Adjust the bit switch.</li> <li>Example: To change the value of bit 5, press 5.</li> </ol>	SET BITSW01 00100000 < > 0K					
<ul> <li>5. To store the new setting: ΟΚ</li> <li>6. Either:</li> <li>Adjust more bit switches: go to step 3.</li> <li>Finish: </li> </ul>		ice Tables Procedures				
4.1.11. Display and Rewrite ROM/RAM Data (Function 91)						
<ol> <li>Enter service mode (see section 4-1-1).</li> <li>Function 9 1 SET</li> </ol>	ADD:0000 VAL:000/00H < > EDIT					
<ul> <li>3. Input the address where the data you want to display or change is stored, using keys 0 through 9 and Quick Dial keys A through F, or using the * key to decrement the address and the # key to increment the address.</li> <li>Example: Address 3E00, press 3 E 0 0</li> </ul>	ADD:3E00 VAL:010/0AH < > EDIT					

The upper right of the LCD shows VAL:xxx/yyH. xxx is the decimal value of the data, and yy is the hexadecimal value of the data.
- 4. Either:
  - Select another address: go to step 3.
  - Edit the data in the displayed address: **EDIT**

ADD:3E00	VAL	.:010/0AH
<	>	EDIT

5. Input a new hexadecimal value for the data.
Example: 64(H), press 6 4 0K

ADD:0000 VAL:000/00H

- 6. Either:
  - See another address: go to step 3.
  - Finish: 🚫

## 4.1.12. System Report (Function 92)

- 1. Enter service mode (see section 4-1-1).
- 2. Function 9 2 PRINT

## 4.1.13. Print ROM/RAM Data (Function 93)

- 1. Enter service mode (see section 4-1-1).
- 2. Function 9 3 PRINT START ADDRESS: 00000H C NOK
  3. Input the start address, then press OK END ADDRESS: 00100H C NOK

The address fields have 5 digits, as the first digit is used for bank identification and the following 4 digits are for the actual address. Use the bank identification number 0 for addresses 0000 - 3FFF(H) and C000 - FFFF(H), and 9 for addresses 4000 - 7FFF(H).

4. Input the end address, then press **OK** A list of the data in the selected address range is printed.

## 4.1.14. Service Report (Function 94)

- 1. Enter service mode (see section 4-1-1).
- 2. Function 9 4 PRINT

#### SERVICE TABLES & PROCEDURES SERVICE LEVEL OPERATION

### 4.1.15. NCU Parameter Programming (Function 95)

1. Enter service mode (see section 4-1-1).

2. Function 9 5 SET	ADD: 00 <	VAL:011/0BH > EDIT
---------------------	--------------	-----------------------

The upper line on the LCD shows "ADD: aa VAL: ddd/hh" (aa = parameter number, ddd = decimal value of the data, and hh = hexadecimal value of the data).

- 3. Select the required parameter number with keys 0 through 9, or press # or \* to scroll through the parameters. Example: Parameter 5, press 0 5 ADD: 05 VAL:011/0BH
- 4. Either:
  - See another parameter: go to step 3.
- Change the data: EDIT
   ADD: 05 VAL:011/0BH
   EDIT
   5. Rewrite the data in the decimal data field. (The < and > keys are used to switch the cursor between the address and data fields, and

the **\*** and **#** keys are used to decrement/increment the data value.) Refer to section 4-3 (addresses 037B - 037F [H]) for a definition of the NCU parameters.

## 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.

#### 4.2.1. Bit Switch Definitions

Bi	t Switch 0		
	FUNCTION	SETTINGS	COMMENTS
0	FTZ protocol	0: Disabled 1: Enabled	If this bit is 1, all FTZ requirements are implemented. This bit must be set to 1 in Germany.
1	Rx cable equalizer	0: Disabled 1: Enabled	Set this bit to 1 when there is a serious signal loss at higher frequencies during reception. The cable equalizer will amplify the signal in this range by +3 dBm.
2	DIS detections	0: Once 1: Twice	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.
3	TSI (RTI) printout on received copies	0: Disabled 1: Enabled	If this bit is 1, the TSI or RTI received from the sender will be printed on the top of each page.
4	Burst error threshold (lines)/ error line ratio (%)	0: 6 (12) [24] lines/ 10% 1: 3 (6) [12] lines/ 5%	If there are more consecutive error lines in the received page than the threshold specified by this bit, the page is rejected. Values in parenthesis () are for Detail resolution, and those in square brackets [] are for Fine resolution. Also, if the number of error lines divided by the total number of lines reaches the ratio determined by this bit, the machine will send RTN to the other end. If you want to receive messages with fewer error lines, set this bit to 1.
5	Training error threshold	0: 4 bits 1: 1 bit	If the machine detects more errors during training than the number set by this bit, training fails and the machine will send FTT to ask the other terminal for modem rate shift-down. Set this bit to 1 if you want to receive messages at a more reliable modem speed.

#### SERVICE TABLES & PROCEDURES BIT SWITCHES

Bi	Bit Switch 0						
	FUNCTION	SETTINGS	COMMENTS				
6	Initial Rx modem rate	0: 9,600 bps 1: 4,800 bps	The setting of this bit is used to inform the sending machine of the initial starting modem rate for the machine in receive mode. If 9,600 bps presents a problem during reception, use 4,800 bps.				
7	Back to back test	0: Disabled 1: Enabled	Set this bit to 1, when you want to test a back-to-back communication.				

#### Important Notice for Back-to-Back Mode

When in back-to-back mode, you cannot enter service mode unless you exit back-to-back mode first. This is because the machine starts communication if you press Start - Stop - and so on to enter service mode while you are still in back-to-back mode. Refer to the notice in section 4-1-1 for how to exit back-to-back mode.

Bi	t Switch 1		
	FUNCTION	SETTINGS	COMMENTS
0	Reconstruction time for the first line	0: 6 seconds 1: 10 seconds	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.
1	Substitute reception file forwarding	0: Normal operation 1: Forward all files	Set this bit to 1 if the printer is out of order. The machine will forward all files to the Forwarding terminal.
2	ECM transmission/ reception	0: Enabled 1: Disabled	Set this bit to 1 when you want to switch off ECM.
3	PSTN/PBX dial tone and busy tone detection	0: Enabled 1: Disabled	Set this bit to 1 when you wish to disable tone detection.
4	Closed network in reception	0: Disabled 1: Enabled	Set these bits to 1 to switch on Closed Network.
5	Closed network in transmission	0: Disabled 1: Enabled	With Closed Network, communication will not go ahead if the ID code of the other terminal does not match the ID code of this terminal. The ID code has to be programmed with function 10 before switching on these bits. This feature may not be reliable when communicating with another maker's machine.
6	Remote read/write request	0: Always enabled 1: User selectable	<ul> <li>0: RDS is always enabled. The user cannot switch it off.</li> <li>1: If a technician or RDS operator sets this to 1 after installation, the user can select either "ON for 24 hours" or "OFF".</li> </ul>

Bi	Bit Switch 1						
	FUNCTION	SETTINGS	COMMENTS				
7	Communication parameter display and line monitoring after handshaking	0: Disabled 1: Enabled	This is a fault-finding aid. If this bit is set to 1, the LCD shows the key parameters (see below) and the speaker is enabled during message transmission and reception. This should be normally disabled because it cancels the CSI/TSI (RTI) display for the user.				

Modem rate (bps)	Sub-scan resolution (lines/mm)	Coding	Width and reduction	Mode	I/O rate (ms/line)
96: 9,600 72: 7,200 48: 4,800 24: 2,400	S: 3.85 D: 7.7 F: 15.4	1D: MH 2D: MR 1E: MH/EFC 2E: MR/EFC 1F: MH/New EFC 2F: MR/New EFC 1S: MH/SSC 2S: MR/SSC 1C: MH/ECM 2C: MR/ECM MC: MMR/ECM	A: A4 N: No reduction	DCS: CCITT G3 NSS: Non- standard G3	0M: 0 5M: 5 10M: 10 20M: 20 40M: 40

Bi	Bit Switch 2						
	FUNCTION	SETTINGS	COMMENTS				
0	Country code						
1 2 3 4	Bit 4 3 2 1 0 Cou 0 0 0 0 0 Fran 0 0 0 0 1 Gen 0 0 0 1 0 Eng 0 0 1 1 Italy 0 0 1 0 0 Aus 0 0 1 0 1 Belo 0 0 1 1 0 Den 0 0 1 1 1 Finla	Intry       4       3       2       1       0         Ince       0       1       0       0       0         many       0       1       0       0       0         land       0       1       0       1       0         tria       0       1       1       0       0         gium       0       1       1       0       0         and       0       1       1       1       0	0 Country       4 3 2 1 0 Country         1 Ireland       1 0 0 0 1 USA         1 Norway       1 0 1 0 0 Hong Kong         0 Sweden       1 0 1 0 1 Australia         1 Switzerland       1 0 1 1 0 New Zealand         0 Portugal       1 0 1 1 1 Israel         1 Netherlands       1 1 0 0 1 Singapore         1 1 0 1 0 1 0 Indonesia				
	Set the country code	e after clearing the RA	M.				
5	TAM interface type	0: Normal 1: German type	<ul> <li>0: The normal type of TAM interface monitors the line current on the NCU, to detect whether the external TAM goes off- hook or on-hook.</li> <li>1: The German type of TAM interface does not monitor the line current on the NCU, because the TAM and the fax are connected in parallel to the line.</li> </ul>				

#### SERVICE TABLES & PROCEDURES BIT SWITCHES

Bi	Bit Switch 2						
	FUNCTION	SETTINGS	COMMENTS				
6	TAM (Telephone Answering Machine) interface	0: Enabled 1: Disabled	If this bit is 1, TAM mode cannot be selected with function 31 by the user.				
7	Not used		Do not change the factory setting.				

Bi	Bit Switch 3					
	FUNCTION	SETTINGS	COMMENTS			
0	Pulse dial/tone dial selection	0: User function 1: Service mode only	If this bit is at 1, the user cannot change the telephone line type setting.			
1	Adjustment of the Tx level to more than 0 dBm	0: Disabled 1: Enabled	This should only be set to 1 when required for PTT tests.			
2	Initial Tx modem rate	0: 9600 bps 1: 4800 bps	Set this bit to 1 if there are problems when using 9600 bps.			
3	Dialing when the external telephone is off hook	0: Enabled 1: Disabled	In Germany, this should be set to 1.			
4	CSI programming	0: User function 1: Service mode only	If this bit is at 1, the user cannot program the CSI.			
5	Remaining memory threshold value	0: 24 kb 1: 128 kb	In Germany, keep this at 1. In all other areas, keep it at 0.			
6	Off-hook detection when the dc loop is closed	0: Enabled 1: Disabled	This bit should be at 0 in N. America/Taiwan models.			
7	Length cut-off when automatic length reduction is disabled	0: 6 mm 1: 15 mm	The last 6 mm or 15 mm will be deleted if the received page is longer than the paper in the cassette.			

	Bi	t Switch 4	Switch 4							
		FUNCTION	SETTINGS	COMMENTS						
	0	Not used		Do not change the factory setting.						
	1	Printout of the image for failed receptions (in non- ECM mode)	0: Enabled 1: Disabled	<ul> <li>0: If a non-ECM reception fails, the data that was received will be printed.</li> <li>1: If a non-ECM reception fails, the data that was received will not be printed, and the data will be erased from the SAF memory.</li> </ul>						
<b>~</b>	2	Not used		Do not change the factory settings.						
	3									
	4									
	5									
	6									
	7									

## 4.2.2. Factory Settings

The following tables show the factory settings for each country code.

Bit Switch	Germany	UK	Italy	Austria	Belgium	Denmark	Finland	Ireland
0	09	00	00	00	00	00	00	00
1	00	00	00	00	00	00	00	00
2	21	02	03	04	05	06	07	08
3	6A	40	40	51	40	40	40	40
4	00	00	00	00	00	00	00	00

Bit Switch	Norway	Sweden	Switz.	Portugal	Holland	Spain	USA
0	00	00	00	00	00	00	00
1	00	00	00	00	00	00	00
2	09	0A	0B	0C	0D	0E	11
3	40	40	40	40	40	40	00
4	00	00	00	00	00	00	00

Bit Switch	Australia	H.K.	N.Z.	Israel	Thailand	Singapore	Indonesia	Taiwan
0	04	00	00	00	00	00	02	00
1	00	00	00	00	00	00	00	00
2	15	14	16	17	18	19	1A	1B
3	40	40	40	40	40	40	40	00
4	00	00	00	00	00	00	00	00

## 4.3. NCU PARAMETERS

In the equations that occur in the following tables, N represents the value stored in the RAM address (if the value is stored in hex code, N is the value when converted to decimal). Addresses 0300 to 038E are affected by the country code setting.

Address (Hex)	Function
003B	Exchanger type connected to the machine Bit 2 = 0: PSTN Bit 2 = 1: PBX
	0300 - 0302: Line current detection parameters
0300	Line current detection time [Time = $N \times 10$ (ms), detection disabled if $N = FF$ ]
0301	Line current reset time [Time = N x 20 (ms)]
0302	Line current dropout detection time [Time = N x 10 (ms)]
	0303 - 0320: PSTN tone detection parameters
0303 - 030E	Modem data for PSTN dial tone frequency range <b>Caution:</b> Do not adjust.
030F	PSTN dial tone detection time [Time = N x 20 (ms), detection disabled if N = $FF$ ]
0310	PSTN dial tone reset time [Time = N x 0.16 (s)]
0311	PSTN dial tone continuous tone time [Time = N x 20 (ms)]
0312	PSTN dial tone permissible dropout time [Time = N x 20 (ms)]
0313	PSTN pause time [Time = N x 0.16 (s)]
0314	PSTN ringback tone detection time [Time = N x 20 (ms), detection disabled if $N = FF$ ]
0315 - 0320	Modem data for PSTN busy tone frequency range <b>Caution:</b> Do not adjust.
	0321 - 033E: PBX tone detection parameters
0321 - 032C	Modem data for PBX dial tone frequency range <b>Caution:</b> Do not adjust.
032D	PBX dial tone detection time [Time = N x 20 (ms), detection disabled if N = $FF$ ]
032E	PBX dial tone reset time [Time = N x 0.16 (s)]
032F	PBX dial tone continuous tone time [Time = N x 20 (ms)]
0330	PBX dial tone permissible dropout time [Time = N x 20 (ms)]
0331	PBX pause time [Time = N x 0.16 (s)]
0332	PBX ringback tone detection time [Time = N x 20 (ms), detection disabled if N = FF]
0333 - 033E	Modem data for PBX busy tone frequency range <b>Caution:</b> Do not adjust.
	033F - 0348: Busy tone detection parameters
033F	Busy tone ON time (range 1) [Time = N x 10 (ms)]
0340	Busy tone OFF time (range 1) [Time = N x 10 (ms)]
0341	Busy tone ON time (range 2) [Time = N x 10 (ms)]
0342	Busy tone OFF time (range 2) [Time = N x 10 (ms)]
0343	Busy tone ON time (range 3) [Time = N x 10 (ms)]

L

Address (Hex)	Function
0344	Busy tone OFF time (range 3) [Time = N x 10 (ms)]
0345	Busy tone ON time (range 4) [Time = N x 10 (ms)]
0346	Busy tone OFF time (range 4) [Time = N x 10 (ms)]
0347	Continuous busy tone detection time [Time = N x 10 (ms)]
0348	Bits 0 to 3: Busy tone signal state time tolerance (for all ranges) Bit 3 2 1 0 Tolerance 0 0 0 1 $\pm 50\%$ 0 0 1 0 $\pm 25\%$ 0 0 1 1 $\pm 12\%$ Bits 4 to 7: Number of cycles required for detection
	0349 - 0359: International dial tone detection parameters
0349 - 0354	Modem data for international dial tone frequency range Caution: Do not adjust.
0355	International dial tone detection time [Time = N x 20 (ms), detection disabled if N = FF]
0356	International dial tone reset time [Time = N x 0.16 (s)]
0357	International dial tone continuous tone time [Time = N x 20 (ms)]
0358	International dial tone permissible dropout time [Time = N x 20 (ms)]
0359	International dial pause time [Time = $N \times 0.16$ (s)]
	035A - 036A: National dial tone detection parameters
035A - 0365	Modem data for national dial tone frequency range Caution: Do not adjust.
0366	National dial tone detection time [Time = N x 20 (ms), detection disabled if N = FF]
0367	National dial tone reset time [Time = $N \times 0.16$ (s)]
0368	National dial tone continuous tone time [Time = N x 20 (ms)]
0369	National dial tone permissible dropout time [Time = N x 20 (ms)]
036A	National dial pause time [Time = N x 0.16 (s)]
036B - 036C	International dial access number Example: If the number is 100, store F1 in address 036B, and 00 in address 036C. (Store F if there are less than four digits, as shown in the example.)
036D	PBX operator pause [Time = N x 20 (ms)]
036E	Pulse dialing method 00: Normal (P = N) 01: Sweden (P = N + 1) 02: Norway (P = 10 - N) P = Number of pulses sent out, N = Number dialed
036F	Ground start access time [Time = N x 20 (ms)]
0370	Flash start access time [Time = N (ms)]
0371	CCITT T1 time [Time = N x 2.56 (s)]
0372	Maximum number of dialing attempts to the same station in normal tx mode
0373	Redial interval in normal tx [Time = N (minutes)]
0374	Maximum number of dialing attempts to the same station in memory tx mode
0375	Interval between dialing to different stations [Time = N x 2.56 (s)]
0376	Dial tone detection level [Level = 0 - N x 0.375 (dBm)]
0377	Busy tone detection level [Level = 0 - N x 0.375 (dBm)]

#### SERVICE TABLES & PROCEDURES NCU PARAMETERS

Ē

Address (Hex)	Function
037B -	037F: Ringing signal detection parameters (Use function 95 to change)
037B	<b>NCU Parameter 00:</b> Acceptable ringing signal frequency, upper limit [Frequency = $1/(N \times 10^{-3})$ (Hz)]
037C	<b>NCU parameter 01:</b> Acceptable ringing signal frequency, lower limit [Frequency = $1/(N \times 10^{-3})$ (Hz)]
037D	NCU parameter 02: Number of rings until a call is detected [Number = N x 1]
037E	<b>NCU parameter 03:</b> Minimum required length of a ring [Length = 20 x N (ms)]
037F	<b>NCU parameter 04:</b> Minimum required length of an interval between rings [Length = 40 x N (ms)]
	0380 - 0385: Pulse dial parameters (Use function 98 to change)
0380	<b>NCU parameter 05:</b> Time between closing the Ds relay and opening the Di relay [Time = N (ms)]
0381	NCU parameter 06: Break time [Time = N (ms)]
0382	NCU parameter 07: Make time [Time = N (ms)]
0383	<b>NCU parameter 08:</b> Time between closing the Di relay and opening the Ds relay [Time = N (ms)]
0384	<b>NCU parameter 09:</b> Pause between dialed digits (pulse dial mode) [Time = N x 20 (ms)]
0385	<b>NCU parameter 10:</b> Time waited when a pause is entered at the operation panel [Time = N x 20 (ms)]
	0386 - 0388: Tone dial parameters (Use function 98 to change)
0386	NCU parameter 11: DTMF tone length [Time = N (ms)]
0387	<b>NCU parameter 12:</b> Time between dialed digits (DTMF dial mode) [Time = N (ms)]
0388	NCU parameter 13: DTMF tone transmission level [Level = - N (dBm)]
0389	Modem output level [Level = - N (dBm)]
038A	Ringback tone 0: Ringback tone setting disabled (Auto Voice Message mode) 1: The machine emits 40 ms on/off pulses while sending ringback tone 2: The ringback tone does not contain 40 ms on/off pulses
038B	Bits 0 to 2: Ringing detection threshold value Bits 3 to 5: Return loss
038C	Language (LCDs and reports) 0: English (Either British or American English, depending on the country code setting), 1: German, 2: Italian, 3: Spanish, 4: Swedish, 5: French
038D	First voice message language Type 1: 1: English, 2: German, 3: Italian, 4: Spanish, 5: French Type 2: 1: English, 2: Swedish, 3: Danish, 4: Norwegian, 5: Finnish
038E	Second voice message language Type 1: 1: English, 2: German, 3: Italian, 4: Spanish, 5: French, 0: '' (none) Type 2: 1: English, 2: Swedish, 3: Danish, 4: Norwegian, 5: Finnish, 0: '' (none)

## Factory Settings - Addresses 0300 to 038E

The following tables show factory settings in hex code for various countries.

#### Germany

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Е	F
0300	96	D1	6B	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	6E
0310	78	6E	04	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	FF	FF	FF
0330	FF	19	FF	18												
0340	18	30	30	0F	30	FF	FF	FF	31	FF						
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	00	FF	00	0F									
0370	5A	15	04	02	05	05	61	68			68	0F	31	01	0A	03
0380	35	39	27	C8	17	2E	5A	55	04	0B	01	1C	01	02	00	

#### France

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Е	F
0300																
0310																
0320																
0330																
0340																
0350																
0360																
0370																
0380																

#### UK

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	FF															
0310	FF	FF	FF	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	FF														
0330	FF	19	FF	26												
0340	26	28	23	17	35	FF	FF	C8	22	FF						
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	F0	10	32	00	0F									
0370	5A	15	03	02	05	05	61	68			68	0B	5A	01	0A	03
0380	FF	42	1F	C8	12	21	64	64	03	0A	01	3F	00	01	00	

#### SERVICE TABLES & PROCEDURES NCU PARAMETERS

Italy

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	FF	FF	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	11
0310	44	3C	64	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	64	3F	09
0330	04	19	FF	1E												
0340	1E	FF	41	FF												
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	00	FF	00	0F									
0370	5A	15	03	02	05	07	5D	5D			68	0B	5A	02	0A	03
0380	3D	39	26	50	26	96	46	41	00	0A	01	2B	02	03	00	

#### Austria

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	FF	FF	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	28
0310	3F	28	04	19	05	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	FF	FF	FF
0330	FF	19	FF	20												
0340	20	25	25	30	30	FF	FF	FF	32	FF						
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	00	FF	00	0F									
0370	5A	0E	0A	02	05	05	61	68			68	0C	34	01	0A	03
0380	35	3B	24	C8	20	2E	55	55	00	0A	01	2F	01	02	00	

#### Belgium

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Е	F
0300	FF	FF	FF	01	00	C0	C4	7A	96	C0	C4	78	DB	02	F4	1E
0310	13	1E	04	19	FF	01	00	C0	C4	7A	96	C0	C4	78	DB	02
0320	F4	01	00	C0	C4	7A	96	C0	C4	78	DB	02	F4	30	19	30
0330	04	19	FF	32												
0340	32	11	11	FF	FF	FF	FF	FF	42	00	F2	C0	C4	65	BB	C0
0350	C4	62	0A	00	F4	41	FA	10	05	00	FF	FF	FF	FF	FF	FF
0360	FF	00	FF	00	FF	00	64									
0370	5A	1F	03	06	05	7D	5D	5D			68	0B	5A	02	0A	03
0380	3D	41	21	C8	20	1A	46	41	00	0A	01	2F	00	01	00	

#### Denmark

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	FF	FF	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	41
0310	3F	41	04	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	65	63	65
0330	04	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	19
0340	19	11	2F	FF	FF	FF	FF	FF	41	FF						
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	F0	09	FF	00	0F									
0370	5A	15	03	01	05	05	4C	4C			68	0B	5A	01	0C	03
0380	35	41	21	C8	14	1A	4B	82	03	0A	01	2B	00	04	00	

#### Finland

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	FF	FF	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	CD
0310	3F	CD	04	19	FF											
0320	FF															
0330	FF	19	FF													
0340	FF															
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	F9	90	64	00	0F									
0370	5A	15	03	02	05	05	5D	5D			68	0B	5A	02	19	0A
0380	3D	3B	26	C8	24	3C	46	4B	03	0A	01	2F	00	03	00	

#### Ireland

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	6E	D1	6B	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	69
0310	40	69	04	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	FF														
0330	FF	19	FF	25												
0340	25	32	32	4B	4B	FF	FF	46	43	FF						
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	16	FF	00	0F									
0370	5A	15	03	02	05	05	5D	5D			68	0B	5A	01	0D	03
0380	FF	41	21	C8	12	21	46	41	03	0A	01	2F	00	01	00	

#### SERVICE TABLES & PROCEDURES NCU PARAMETERS

#### Norway

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	FF	FF	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	37
0310	5E	37	04	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	FF	FF	FF
0330	FF	19	FF	0D												
0340	00	14	00	30	00	FF	FF	FF	41	02	00	C2	8A	78	FA	C2
0350	8A	75	58	02	F4	FF	FF	FF	FF	00	FF	FF	FF	FF	FF	FF
0360	FF	00	F0	95	FF	02	19									
0370	5A	15	03	02	05	05	51	51			68	0B	5A	02	0F	03
0380	3D	38	28	C8	17	21	46	41	03	0A	01	3B	00	05	00	

#### Sweden

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Е	F
0300	FF	FF	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	2B
0310	20	2B	05	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	2B	20	2B
0330	03	19	FF	19												
0340	19	19	4B	FF	FF	FF	FF	FF	42	FF						
0350	FF	00	02	00	C2	8A	78	FA								
0360	C2	8A	75	58	02	F4	2B	20	2B	03	00	F0	09	FF	00	0F
0370	5A	15	03	02	05	05	32	4C			68	0F	31	01	0B	03
0380	64	39	26	C8	0F	1A	46	41	03	0A	01	2F	04	02	00	

#### Switzerland

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Е	F
0300	6E	CD	09	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	28
0310	44	28	04	19	05	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	28	3E	28
0330	04	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	18
0340	18	1E	2C	30	3D	11	3D	FF	31	FF						
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	00	FF	00	0F									
0370	5A	24	05	01	05	05	61	61			68	0F	33	02	09	0B
0380	3B	3B	26	C8	17	00	46	41	00	06	01	1F	01	02	00	

#### Portugal

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	FF	FF	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	69
0310	3E	69	04	19	FF											
0320	FF															
0330	FF	19	FF													
0340	FF															
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	00	FF	00	0F									
0370	5A	15	03	01	05	05	5D	5D			68	0B	5A	01	0D	03
0380	3D	41	21	C8	17	21	46	41	03	0A	01	2F	00	01	00	

#### Netherlands

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	FF	FF	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	4B
0310	78	37	04	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	37	FA	37
0330	04	19	FF	19												
0340	19	32	32	FF	FF	FF	FF	FF	41	02	00	C2	8A	78	FA	C2
0350	8A	75	58	02	F4	37	7D	37	04	00	FF	FF	FF	FF	FF	FF
0360	FF	00	FF	09	FF	00	0F									
0370	5A	15	03	02	05	05	36	5D			44	0B	2F	02	0C	03
0380	3D	3B	26	50	21	21	46	41	03	0A	01	2F	00	01	00	

#### Spain

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	FF	FF	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	34
0310	4A	34	05	13	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	FF														
0330	FF	13	FF	11												
0340	11	FF	41	04	75	C2	8A	73	E8	C2						
0350	8A	6A	73	0A	F4	34	4A	34	05	13	FF	FF	FF	FF	FF	FF
0360	FF	00	FF	07	FF	00	64									
0370	5A	10	03	01	05	13	61	68			68	0B	5A	02	28	03
0380	4B	41	21	C8	1C	64	46	8C	00	0A	01	2C	03	05	00	

## SERVICE TABLES & PROCEDURES NCU PARAMETERS

#### USA, Taiwan

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	FF															
0310	FF	FF	FF	19	FF											
0320	FF															
0330	FF	19	FF													
0340	FF															
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	FF	FF	00	0F									
0370	5A	15	03	02	05	05	5D	5D			68	0B	5A	01	0A	03
0380	3D	41	21	C8	22	65	64	6E	00	0A	01	2F	00	01	00	

#### Hong Kong

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Е	F
0300	6E	D1	6B	FF												
0310	FF	FF	FF	19	FF											
0320	FF															
0330	FF	19	FF													
0340	FF															
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	FF	FF	00	0F									
0370	5A	15	03	02	05	05	5D	5D			68	0B	5A	01	0A	03
0380	3D	41	21	C8	1D	65	64	6E	00	0A	01	2F	00	01	00	

#### Australia

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Е	F
0300	6E	D1	6B	FF												
0310	FF	FF	FF	19	FF											
0320	FF															
0330	FF	19	FF													
0340	FF															
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	FF	FF	00	0F									
0370	5A	15	03	02	03	05	5D	5D			68	0B	5A	03	0A	03
0380	3D	41	21	C8	22	65	64	6E	03	0A	01	1F	00	01	00	

## April 11th, 1993

#### SERVICE TABLES & PROCEDURES NCU PARAMETERS

#### New Zealand

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	6E	D1	6B	FF												
0310	FF	FF	FF	19	FF											
0320	FF															
0330	FF	19	FF													
0340	FF															
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	FF	FF	02	0F									
0370	5A	15	03	02	05	05	5D	5D			68	0B	5A	03	0A	03
0380	FF	41	21	C8	12	65	64	6E	03	0D	01	3F	00	01	00	

#### Israel

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Е	F
0300	6E	D1	6B	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	69
0310	7D	69	04	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02
0320	F4	02	00	C2	8A	78	FA	C2	8A	75	58	02	F4	69	7D	69
0330	04	19	FF	02	00	C2	8A	78	FA	C2	8A	75	58	02	FF	18
0340	18	30	30	FF	FF	FF	FF	FF	41	FF						
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	00	FF	00	0F									
0370	5A	17	03	02	05	05	5D	5D			68	0B	5A	02	0A	03
0380	3D	3D	27	C8	28	65	5A	5A	03	0A	01	2F	00	01	00	

#### Thailand

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	6E	D1	6B	FF												
0310	FF	FF	FF	19	FF											
0320	FF															
0330	FF	19	FF													
0340	FF															
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	FF	FF	00	0F									
0370	5A	15	03	02	05	05	5D	5D			68	0B	5A	01	0A	03
0380	3D	41	21	C8	22	65	64	6E	03	0A	01	2F	00	01	00	

#### SERVICE TABLES & PROCEDURES NCU PARAMETERS

#### Singapore

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Ε	F
0300	6E	D1	6B	FF												
0310	FF	FF	FF	19	FF											
0320	FF															
0330	FF	19	FF													
0340	FF															
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	FF	FF	00	0F									
0370	5A	15	03	02	05	05	5D	5D			68	0B	5A	01	0A	03
0380	3D	41	21	C8	22	65	64	6E	00	0A	02	2F	00	01	00	

#### Indonesia

	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	Е	F
0300	6E	D1	6B	FF												
0310	FF	FF	FF	19	FF											
0320	FF															
0330	FF	19	FF													
0340	FF															
0350	FF	00	FF	FF	FF	FF	FF	FF								
0360	FF	00	FF	FF	FF	00	0F									
0370	5A	15	03	02	05	05	5D	5D			68	0B	5A	01	0A	03
0380	3D	41	21	C8	22	65	64	6E	01	0A	01	2F	00	01	00	

## 4.4. SERVICE RAM ADDRESSES

In the equations that occur in the following tables, N represents the value stored in the RAM address (if the value is stored in hex code, N is the value when converted to decimal).

## WARNING Changing any RAM data that are not listed in this table may cause the machine to malfunction.

#### 4.4.1. Address Table

Use service function 91 to view or adjust the contents of a RAM address. See section 2-2-14 for details.

Address	Function							
0000 - 0004	Bit switches 00 to 04 (0000 = Bit switch 00, 0001 = Bit switch 01, and so on); refer to section 4-2 for details.							
000B	User function parametersBit 7: Transmission Report On/Off(1: On)Bit 6: TTI (Page Header) On/Off(1: On)Bit 5: Key Touch Tone On/Off(1: On)Bit 4: RDS On/Off(1: On)Bit 3: AM/PM Indication on LCD clock(1: On)Bit 2: Forwarding On/Off(1: On)Bit 1: Forwarding Mode(0: Now or Later, 1: Daily)Bit 0: Forwarding File Local Printing On/Off(1: On)							
000C	User function parameters Bit 7: Communication record listing on TCR (1: On) Bit 6: Authorized Reception On/Off (1: On) Bits 5 and 4: Not used Bit 3: Date format (0: D/M/Y, 1: M/D/Y) Bits 2, 1, 0: Not used							
00F2 - 00F3	CNG hysteresis         00F2         00F3         Value (dB)           00         01         -24           00         02         -18           00         04         -12           00         08         -6           00         10         0           00         20         6							
00F4	CNG detection level in TAM mode [Level = N x 0.375 dBm]							
00F5	CNG detection period [Time = N x 0.16 s]							
00F6	CNG silent detection period [Time = N x 0.16 s]							
0391	Redial interval for memory transmission [Time = N minutes, default = 5]							
03A5	Ringing time in Auto mode [Time = N seconds] N should be either 5, 10, 15, 20, or 25.							
03A9	Maximum acceptable CNG OFF-time [Time = N x 20 (ms)]							
03AA	Minimum acceptable CNG OFF-time [Time = N x 20 (ms)]							

Address	Function							
03AB	Maximum acceptable CNG ON-time [Time = N x 20 (ms)]							
03AC	Minimum acceptable CNG ON-time [Time = N x 20 (ms)]							
	Mode selection in Auto Select mode							
	Bit 3 2 1 0 Mode							
03D0	0 0 0 1 Auto Iel/Fax switch with AVM							
	0 0 1 0 Auto rel/Fax switch with ringback tone							
03D4	Continuous silent period detection time in TAM mode. [Time = $N \times 40$ (ms)].							
03D5	PSTN access code from behind Loop Start PBX (BCD)							
03DA	Number of rings until a call is detected in TAM mode [N (times)]							
20A1	Forwarding start date and time, Minute (BCD)							
20A2	Forwarding start date and time, Hour (BCD)							
20A3	Not used							
20A4	Forwarding start date and time, Day (BCD)							
20A5	Forwarding start date and time, Month (BCD)							
20A6	Forwarding start date and time, Year (BCD)							
20A7	Forwarding end date and time, Minute (BCD)							
20A8	Forwarding end date and time, Hour (BCD)							
20AA	Forwarding end date and time, Day (BCD)							
20AB	Forwarding end date and time, Month (BCD)							
20AC	Forwarding end date and time, Year (BCD)							
20AD - 255C	TCR generation area (30 bytes x 40 communications)							
2560 - 2721	Service report and error report generation area (45 bytes x 10 communications)							
2726 - 27E5	Error code memory (up to 32 codes x 6 bytes)							
2A24 - 2A25	ID code (Polling) Example: ABCD 2A24 (High) = A, (Low) = B 2A25 (High) = C, (Low) = D							
2D6B	Received page counter High: Tens digit Low: Units digit							
2D6C	(BCD) High: Thousands digit Low: Hundreds digit							
2D6D	High: Hundred thousands Low: Ten thousands							
2D6E -	Transmitted page counter (Refer to the received page counter)							
2D70								
2D71	Printed page counter High: Tens digit Low: Units digit							
2D72	(BCD) High: Thousands digit Low: Hundreds digit							
2D73	High. Hundred thousands Low. Ten thousands							
2D74 -	Scanned page counter (Refer to the printed page counter)							
2D76								
3A04	after picking up the paper [Time = N (minutes)]							
3A05	Waiting time until feeding out the paper if the machine does print something after picking up the paper [Time = N (minutes)]							
3D00	Printer interface kit: Emulation modeBit 7: Selected mode0: Canon BJ-10ex/IBM X24E, 1: Epson LQBit 0: Graphic image density0: High, 1: Normal							

Address	Function					
	Printer interface kit:					
	Canon BJ-10ex/IBM X24E emulation mode					
	Bit 7: Emulation mode 0: IBM X24E, 1: Canon BJ-10	ex				
	Bit 6: Code page 0: USA 437, 1: Multilingual 850	0				
	Bit 5: Receive buffer/download memory 0: 37 kb/0 kb, 1: 3 kb/34 kb					
	Bit 4: Alternate graphic mode 1: Enabled					
	Bit 3: Automatic carriage return 0: LF only, 1: CR/LF	0: LF only, 1: CR/LF				
	Bit 2: Character set 0: Set 1, 1: Set 2					
	Bit 1: Page length 0: 279 mm, 1: 305 mm					
	Bit 0: Automatic line feed 0: CR only, 1: CR/LF					
	Epson LQ emulation mode					
	Bits / and 6: Font selection Bit / Bit 6 Font					
	U U Roman					
3D01	I U Sails seili					
	Rits 5 to 3: International character sets					
	Bit 5 Bit 4 Bit 3 Character set					
	1 0 0 France					
	0 1 0 Germany					
	1 1 0 UK					
	0 0 1 Denmark					
	1 0 1 Sweden					
	0 1 1 Italy					
	1 1 1 Spain					
	Bit 2: Character set 0: Italics set, 1: Graphics set					
	Bit 1: Page length 0: 279 mm, 1: 305 mm					
	Bit 0: Automatic line feed 0: CR only, 1: CR/LF					
	Printer Interface KIT:					
	Canon BJ-TUEX/IBM X24E emulation mode					
	Bit 6: Double-boight mode 1: On					
	Bit 5: Double-width mode 1: On					
	Bit 4: Character used for zero 0: Unslashed zero. 1: Slashed zero					
	Bit 2: Type of self-test pattern 0: Ripple mode, 1: All characters					
	Bits 1 and 0: Character width (cpi - characters per inch)					
	Bit 1 Bit 0 Setting					
	0 0 10 cpi (pica)					
3002	0 1 12 cpi (elite)					
0002	1 0 17 cpi (condensed)					
	1 1 Proportional spacing					
	Epson LQ emulation mode					
	Bits 2 to 0: Character width (cpi - characters per inch)					
	Bit 2 Bit 1 Bit 0 Setting					
	0 $1$ $12$ cpl (elle)					
	0 1 $0$ 15 CPI (IIICIOII) 0 1 1 Proportional spacing					
	1 0 0 17 cni (condensed)					
	1 0 1 20 cpi					

Address	Function	n							
3D03	Printer settings Bit 7: Type quality (printer interface kit) Bit 1: Test pattern after head cleaning Bit 0: Ink end detection	0: HQ (High Quality), 1: Economy 0: Enabled 0: Enabled							
3D04	User function parameters Bit 7: Auto reduction Bits 6 to 4: Vertical reduction ratio	1: Enabled Bit 6 5 4 Setting 0 0 0 100 % 0 0 1 94 % 0 1 0 90 % 0 1 1 85 % 1 0 0 80 % 1 0 1 75 %							
3D05	Bits 6 to 4: Horizontal reduction ratio Bits 1 and 0: Cassette size	Bit       6       5       4       Setting         0       0       0       100 %         0       0       1       94 %         0       1       0       90 %         0       1       1       85 %         1       0       80 %         1       0       1       75 %         Bit       1       0       Setting         0       0       A4         0       1       Letter         1       x       Legal							
5002 - 5100	Modem rates used in the last five communications to the terminals programmed in the Quick/Speed dials and to the forwarding terminal. (5 bytes x 51 destinations) [0: No history, 1: 2400 bps, 2: 4800 bps, 3: 7200 bps, 4: 9600 bps]								
5101	Number of characters in the RTI - 14 (H)								
5102 - 5115	RTI (ASCII)								
5116	Number of characters in the CSI - 14 (H)								
5117 - 512A	CSI (ASCII)								
 512B 512C -	Number of characters in the TTI - 20(H)TTI(ASCII)								
514D 514C 514D -	Number of digits in the forwarding terminal Forwarding terminal's telephone number ( <i>i</i>	I's telephone number ASCII)							
5100	BOM Version								
The follow	ving addresses are ROM addresses. The da changed.	ta in these addresses cannot be							
C00F	Version (High)	(ASCII)							
C010	A period " . "	(ASCII)							
C011	Version (Low)	(ASCII)							
C012	Version (Low)	(ASCII)							
C013	A blank space " "	(ASCII)							
C014	Day (Tens digit)	(ASCII)							
C015	Day (Units digit)	(ASCII)							
C016	A period " . "	(ASCII)							

Address			Function
C017	Month	(Tens digit)	(ASCII)
C018	Month	(Units digit)	(ASCII)
C019	A period "."		(ASCII)
C01A	Year	(Tens digit)	(ASCII)
C01B	Year	(Units digit)	(ASCII)
C01C	A blank spac	е""	(ASCII)
C01D	Hour	(Tens digit)	(ASCII)
C01E	Hour	(Units digit)	(ASCII)
C01F	A colon ":"		(ASCII)
C020	Minute	(Tens digit)	(ASCII)
C021	Minute	(Units digit)	(ASCII)
C022	A blank spac	е""	(ASCII)
C023	Suffix		(ASCII)
C024	Machine cod	е	A0 (H) for this machine

## 4.4.2. Format of the TCR and Transmission Report Generation Areas

The TCR and the Transmission Report are generated in addresses 20AD - 255C (H). The record of each communication is stored in blocks of 30 bytes as explained in the following table.

Byte No.		Functions	5		
0	Header Bit 7: Transm Bit 6: TCR	ission Report	(1: Enabled) (1: Enabled)		
	Bits 5 through	1 0: Not used			
1	Communication start time	Month	(BCD)		
2	Communication start time	Day	(BCD)		
3	Communication start time	Hour	(BCD)		
4	Communication start time	Minute	(BCD)		
5 - 24	Remote terminal's RTI, TSI c	or CSI	(ASCII)		
25	Communication mode Bit 7: Resolution step down Bit 6: Reduction Bit 5: 0: Standard 4 0	(1: Yes) 0: Fine 1	(1: Yes) 1: Detail 0	1: Not used 1	
	Bit 3: Forwarding Bit 2: Memory tx/rx Bit 1: ECM Bit 0: Tx or Rx	(1: On) (1: Yes) (0: Non-EC (0: Rx, 1:	CM, 1: ECM) Tx)		
26	Communication time	Minutes	(BCD)		les
27	Communication time	Seconds	(BCD)		ab
28	Communication result and ca Bit 7: Result Bit 6: Document jam Bit 5: Authorized reception Bit 4: Not used Bit 3 - 0: Cause of error 7 (BCD): Not 6 (BCD): Not 5 (BCD): 8-m 4 (BCD): Bus 3 (BCD): T1 t 2 (BCD): T1 t 1 (BCD): Erro	auses of error (0: OK, 1: (1: Yes) (0: Not reje (BCD) used used inute close y ime over durir ime over durir ime over durir	Error) ected, 1: Rejea ng a telephone ng a fax call communication	cted) • call	Service T
29	Total page(s)	BCD)			_

#### 4.4.3. Format of the Service Report and Error Report Generation Area

The Service Report and the Error Report are generated in addresses 2560 - 2721 (H). The record of each error communication is stored in blocks of 45 bytes as explained in the following table. There can be up to 10 records.

Byte No.		Functions	
0	Header	Bit 7: Service Report or Error Report Bit 6 through 0: Not used	(1: Enabled)
1 - 29	Same as the T	CR memory	
30	Error page #1	(BCD)	
31	Error page #2	(BCD)	
32	Error page #3	(BCD)	
33	Error page #4	(BCD)	
34	Error page #5	(BCD)	
35	Error code #1	(High) (BCD)	
36	Error code #1	(Low) (BCD)	
37	Error code #2	(High) (BCD)	
38	Error code #2	(Low) (BCD)	
39	Error code #3	(High) (BCD)	
40	Error code #3	(Low) (BCD)	
41	Error code #4	(High) (BCD)	
42	Error code #4	(Low) (BCD)	
43	Error code #5	(High) (BCD)	
44	Error code #5	(Low) (BCD)	

#### 4.4.4. Format of the Error Code Memory

The error codes are stored in 2726 - 27E5 (H). Each error code is stored in blocks of 6 bytes as explained in the following table. The machine can store up to 32 error codes.

Byte No.		Functions	
0	Error code (High)	(BCD)	
1	Error code (Low)	(BCD)	
2	Month	(BCD)	
3	Day	(BCD)	
4	Hour	(BCD)	
5	Minute	(BCD)	

## 5. REMOVAL AND ADJUSTMENT

## CAUTION

Unplug the machine from the power outlet before removing any covers.

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

## 5.1. COVERS



## 5.1.1. Operation Panel Assembly [A] and ADF Base [B]

\_

## 5.1.2. Upper Cover [A]



Make sure that the upper cover is fitted onto the machine correctly when you put it back.

## 5.2. SCANNER

## 5.2.1. Separation Rubber Plate [A]



First, remove the operation panel assembly (see section 5-1-1).

## REMOVAL AND ADJUSTMENT SCANNER

## 5.2.2. LED Array [A] and Feed Roller [C]

First, remove the operation panel assembly, ADF base, and upper cover (see section 5-1).



## Note for Reassembly

Pin [D] on the document sensor actuator must be under the feed roller shaft.

## 5.3. PRINTER

## 5.3.1. Feed Roller [D] and Rx Motor [E]

First, remove the operation panel assembly, ADF base, and upper cover (see section 5-1). [A]



## 5.3.2. Ink Jet Printer Unit [G]

First, remove the upper cover (see section 5-1).



## Notes for replacement of the printer unit.



This dial must be turned fully to the right after replacement.

E

## 5.4. PCBs

## 5.4.1. FCE [A], IJC [B], and NCU [C]

Before removing the FCE: Print all reports and fax messages from the memory.



Caution: Program the clock (Function 34) after replacing all parts.



# REMOVAL AND ADJUSTMENT PCBs

## 5.4.2. PSU [A]

First:

- Raise the upper cover (see section 5-1-2).
- Remove the rear cover.
- Remove the FDU (3 screws; see section 5-4-3). Do not unplug the FCE board, or you will have to reprogram the items stored in the RAM.



[A]: 2 screws, 1 connector

## 5.4.3. FDU [A]

First, remove the rear and upper covers.

Before removing the FCE: Print all reports and fax messages from the memory.



nected properly; it

is easy to make a mistake when plugging them back in. See page 5-6 for a diagram. After replacing the FCE: All items such as RTI, TTI, Quick Dials, Groups, and so on must be reprogrammed. Also, make sure that you reprogram the bit switches and other items to the same settings as they were in the old FCE board, if required by the user.

## 5.5. SBU REPLACEMENT AND SCANNER/SENSOR ADJUSTMENT

### 5.5.1. SBU Adjustment Tools

1. Adjustment Kit	(P/No. H0809600)
2. Test PCB	(P/No. H0939600)

Additionally, the test chart which is included in the adjustment kit is available as part number H0809602.

#### 5.5.2. SBU Replacement

- 1. Unplug the machine from the wall outlet.
- 2. Remove the operation panel assembly, ADF base, upper cover (see section 5-1), and the rear cover (see section 5-3-2; item [B], 2 screws).
- 3. Remove the SBU (2 screws, 1 connector at CN7 on the FDU).

#### 5.5.3. Scanner/Sensor Adjustment

Every time you replace the SBU or when the machine has a document nonfeed or jam problem because of incorrect scanner/sensor adjustment, adjust the scanner/sensor mechanism as shown in the following pages.

As the scanner has two features, scanning the document and detecting sensor actuator movement, the scanner needs exact adjustment.

This section is divided into four parts:

- 1. Preparation
- 2. Horizontal Scan Line Adjustment
- 3. Vertical Scan Line Adjustment
- 4. Focusing

"**Preparation**" explains how to set up the SBU adjustment tools in the machine.

"Horizontal Scan Line Adjustment" explains how to adjust the horizontal position of the SBU with the tools.

This section is quite important because the machine cannot detect sensor movement unless the SBU is adjusted properly.

"Vertical Scan Line Adjustment" explains how to adjust the vertical position of the SBU with the tools.

The new test chart is designed so that the SBU can be adjusted vertically.

"**Focusing**" explains how to adjust focusing on the CCD. Adjusting the lens position is a bit more difficult than for other current models.

#### REMOVAL AND ADJUSTMENT SBU REPLACEMENT AND SCANNER/SENSOR

#### 1. Preparation

٠

base.

- 1. Install a new SBU in the machine. (Do not connect the harness to the FDU.)
- 2. Clamp the bracket to the scanner base. Set the left side of the bracket first as shown below.





Removal and Adjustment 3. Connect the harness from the FDU (CN7) to CN2 on the test PCB, then connect the harness from the test PCB to the SBU.



- Pin 3 (XVIDEO) Channel 2 (CH2) on the oscilloscope
- 5. Attach the test chart to the machine.



Test Chart attached to the Pressure Plate

- 6. Connect the operation panel to the machine.
- 7. Enter the service mode and switch the LED array on (see section 4-1-3).
- 8. Set up the oscilloscope as follows:

CH2 (XVIDEO) - 0.2 V/div. TIME - 1 ms/div. Then, select CH2 (XVIDEO) on the oscilloscope.
9. The XVIDEO signal shows one of the waveforms shown below. One, two or three dropouts should appear at "A" and "B" depending on the vertical scan line position, and moire should appear at "C". ("A", "B", and "C" correspond to the areas A, B, and C on the test chart; see the diagram on the previous page).



If this waveform cannot be seen on the oscilloscope screen, loosen the SBU securing screws and adjust the SBU position until this waveform appears on the screen.



The moire sometimes does not appear on the screen unless the lens is well focused. So, if the moire does not appear on the screen, go to the **"Focusing"** procedure first, then go to the **"Horizontal/Vertical Scan Line Adjustment"** procedures.

If this waveform appears on the screen, go to the "**Horizontal/Vertical Scan Line Adjustment**" procedures, then check that the moire at "C" satisfies the criterion in the "**Focusing**" section.

Removal and Adjustment

## 2. Horizontal Scan Line Adjustment

- 1. Set up the oscilloscope as follows: CH1 (DTVLD) - 5 V/div. CH2 (XVIDEO) - 0.2 V/div. TIME - 1 ms/div. Use ALT mode to display CH1 and CH2 at the same time.
- 2. Loosen the SBU securing screws.
- 3. The XVIDEO signal shows one of the waveforms shown below.



4. Enlarge the shaded part of the waveform above by changing the TIME scale to 50  $\mu$ s/div or 20  $\mu$ s/div.

The scan start line appears as the first sharp dropout from the left of the XVIDEO signal on the oscilloscope. The dropout of the waveform has to be within  $\pm 4$  bits from the rising edge of the DTVLD signal as shown below.



If the scan start line is not at the correct position, go to step 5 to adjust the horizontal scan line position.

5. Adjust the horizontal scan line position as shown below. If the scan start line is to the left of the rising edge of the DTVLD signal, move the SBU to the left.



If the scan start line is to the right of the rising edge of the DTVLD signal, move the SBU to the right.



6. After adjustment, be sure that the scan start line is within ± 4 bits from the rising edge of the DTVLD signal, then go to the "Vertical Scan Line Adjustment" procedure.



Removal and Adjustment

#### 3. Vertical Scan Line Adjustment

1. Set up the oscilloscope as follows:

CH1 (DTVLD) - 5 V/div. CH2 (XVIDEO) - 0.2 V/div., not inverted TIME - 1 ms/div. Use ALT mode to display CH1 and CH2 at the same time.

2. The XVIDEO signal shows one of the waveforms shown below. At "A" and "B" on the XVIDEO waveform, one, two or three dropouts are seen now.



Enlarge areas "A" and "B" by changing the time scale to 50 or  $20 \,\mu$ s/div. The ideal waveform should have only one dropout at each of "A" and "B". If the waveform has two or three dropouts there, go to step 3 to adjust the "A" part (scan start side) and/or step 4 to adjust the "B" part (scan end side).



3. Adjustment at the scan start side.

If the waveform has two dropouts at the scan start side, move down the left side of the SBU to make the distance between peaks narrower. The distance between peaks has to be within 50  $\mu$ s.



If the waveform has three dropouts at the scan start side, move up the left side of the SBU to make the distance between peaks narrower. The distance between peaks has to be within 50  $\mu$ s.





4. Adjustment at the scan end side.

If the waveform has two dropouts at the scan end side, move down the right side of the SBU to make the distance between peaks narrower. The distance between peaks has to be within 50  $\mu$ s.



If the waveform has three dropouts at the scan end side, move up the right side of the SBU to make the distance between peaks narrower. The distance between peaks has to be within 50  $\mu$ s.



5. After adjusting the scan end side, confirm that the scan start side is still adjusted properly, as the adjustment at one side often changes the waveform at the other side.

#### 4. Focusing

1. Loosen the lens securing screw [A] and pull out the lens 1 or 2 mm from the scanner base surface as shown below.



2. Move back the lens using a small (-) screwdriver so that the amplitude of each moire [A] becomes more than 20% of the white level output [B].



3. Tighten the lens securing screw.

After finishing the adjustments, switch off the power, take out the adjustment tools, bracket, test lead and the white pressure plate from the machine. Then reassemble the machine.

## 5.6. ROM REMOVAL

The following procedure explains the use of the ROM removal tool.

 Insert both tips of the tool into the socket frame [A], between the frame and the ROM [B].

- 2. Grip the tool until both sets of stoppers touch (see [C] and [D]). Then, pull up the frame.
  - **Note:** If either side of the frame is removed, move the frame horizontally slightly, then pull up the frame.







3. Remove the ROM [B].

Part Number of the ROM Removal Tool: H5029600

# 6. PRINTER INTERFACE KIT TYPE 50

# **6.1. INTERFACE SPECIFICATIONS**

Data transmission method:

Signal levels:

Input circuit:

8-bit parallel interface (IBM PC Compatible) Low: 0.0 to 0.8 Volt High: 2.4 to 5.0 Volts





Output circuit:



#### Pin assignments

No.	Signal	I/O	No.	Signal	I/O
1	STROBE	I	19	STROBE RET *1	
2	DATA 1	I	20	DATA 1 RET	
3	DATA 2	I	21	DATA 2 RET	
4	DATA 3	I	22	DATA 3 RET	
5	DATA 4	I	23	DATA 4 RET	
6	DATA 5	I	24	DATA 5 RET	
7	DATA 6	I	25	DATA 6 RET	
8	DATA 7	I	26	DATA 7 RET	
9	DATA 8	I	27	DATA 8 RET	
10	ACKNLG	0	28	ACKNLG RET	
11	BUSY	0	29	BUSY RET	
12	P.E.	0	30	P.E.RET	
13	SELECT	0	31	INIT	I
14	AUTO FEED XT *3	I	32	ERROR	0
15	No connection		33	GND	
16	GND		34	No connection	
17	FG		35	+5V *2	
18	NC		36	SELECT IN *3	

\*1: All RETs are connected to ground.

\*2: This level is raised to 5.0 V at 5.6 k.

\*3: This signal is valid in Epson LQ-510 emulation mode.

Timing charts

Epson LQ-510 emulation mode



#### IBM X24E and Canon BJ-10ex emulation modes



**Troubleshooting** 

# 7. TROUBLESHOOTING

# 7.1. COPY QUALITY PROBLEMS

## 7.1.1. Received Copies

If there is no fault in the receiving terminal or on the line, but the copy quality is bad, do the following:

- 1. Check the ink jet printing mechanism.
  - Clean the cartridge head (using Function 30) more than 5 times.
  - Replace the ink cartridge if necessary.
  - Replace the ink jet printer unit if necessary.
- 2. Replace the IJC board.

## 7.1.2. Printouts Made in Copy Mode

If printouts of received fax messages are OK but printouts made using copy mode are not, the following faults must be considered in addition to the printer faults mentioned above.

Symptom	Remedies
Blank or black copies	<ul> <li>Check the scanner/sensor mechanism and adjust or replace any defective parts.</li> <li>Replace the SBU or FDU.</li> </ul>
Vertical black lines on the copy	<ul> <li>Clean the scanner optics and LED array (soft cloth).</li> <li>Replace the SBU if there are any sharp peaks or dropouts in the CCD waveform.</li> </ul>
Uneven density	<ul> <li>Adjust the scan line position (see section 5-5-3).</li> <li>Clean the scanner optics and LED array (soft cloth).</li> <li>Replace the LED array if it is defective.</li> </ul>
Magnification	<ul> <li>Check that the mirrors are assembled correctly on the scanner base.</li> </ul>
Blurred characters	<ul> <li>Adjust the focusing (see section 5-5-3).</li> </ul>
Filled-in characters	<ul> <li>Adjust the focusing (see section 5-5-3).</li> </ul>
Side-to-side registration er- ror	• Adjust the scan start position (see section 5-5-3).
One side darker than the other	<ul> <li>Adjust the CCD waveform flatness (see section 5-5-3).</li> <li>Check the LED array; replace it if it is defective.</li> </ul>
Image only partially scanned	<ul> <li>Adjust the scan line position and/or scan start position (see section 5-5-3).</li> </ul>

# 7.2. MECHANICAL PROBLEMS

Use the following procedures while referring to the point-to-point diagram. The procedures may not be exhaustive, but they may help you to solve the problem.

## 7.2.1. Scanner/Document Feeder

#### 1. Non-feed

Test	Action if Yes	Action if No		
1. Is the scanner cover closed properly?				
2. Was the document placed in the feeder co recommended type?	rrectly? Was the docum	nent of a		
3. Is the document fed into scanner after you place it in the ADF ?	Finished.	Go to test 4.		
<ol> <li>Does the document sensor actuator move correctly.</li> </ol>	Go to test 5.	Reassemble or replace the actuator. Go back to test 3.		
5. Do the two red LEDs on the left hand side of the LED array light correctly, without a document in the feeder ?	Go to step 8.	Go to step 6.		
6. Check the +5V output from the FDU. Is the output correct ?	Replace the LED array, then go back to test 3	Go to step 7.		
7. Does the PSU output 7-15V correctly?	Check the PSU- FDU connection or replace the FDU.	If the wall socket is good, replace the PSU.		
8. Is the scan start line of the SBU adjusted properly?	Go to step 9.	Adjust the scan start position.		
<ul> <li>9. Check the connection to the tx motor. Does the FDU both:</li> <li>a) output +14.5V to the tx motor,</li> <li>b) output stepper motor drive phase signals to the motor?</li> </ul>	Replace the FCE.	Replace the FDU.		

#### 2. Double Feed

Test	Action if Yes	Action if No
1. Was the document placed in the feeder carefully and in the correct manner?		
2. Clean or replace the separation rubber plate.		
3. Is the operation panel closed at each side ?		

#### TROUBLESHOOTING MECHANICAL PROBLEMS

## 3. Jam

J. Jaili				
Test	Action if Yes	Action if No		
1. Check that the document is not curled seriously or not longer than 600 mm.				
2. Clean the rollers in the feeder/scanner with	n a soft cloth and water.			
3. Check for blockages in the document feed	path. Check the scanne	er drive mechanism.		
4. Does the scan line sensor actuator move correctly ?	Go to test 5.	Reassemble or replace the actuator.		
5. Do the two red LEDs on the left hand side of the LED array light correctly, without a document in the feeder ?	Go to step 8.	Go to step 6.		
6. Does the FDU output +5V output correctly ?	Replace the LED array.	Go to step 7.		
7. Does the PSU output 7-15V correctly?	Check the PSU- FDU connection or replace the FDU.	If the wall socket is good, replace the PSU.		
8. Does the CCD on the SBU have defective elements in the scan line sensor detection part ?	Replace the SBU.	Replace the FCE.		

## 4. Skew

Test	Action if Yes	Action if No
1. Clean the rollers in the feeder/scanner with a soft cloth and water.		
2. Clean or replace the separation rubber plate.		
3. Is the operation panel closed at each side ?		

# 5. Dirty Document

Test	Action if Yes	Action if No
1. Clean the rollers in the feeder/scanner with	n a soft cloth and water.	

## 7.2.2. Printer

## 1. Non Feed

C.

Symptom: Non feed				
Check	Action if Yes	Action if No		
1. Is the printer jammed with debris?	Clear the debris.	Go to step 2.		
2. Is the printer cover closed properly?	Go to step 3.	Close the cover.		
3. Are the connections between the IJC, FCE, FDU, and cover sensor loose?	Connect the cables properly.	Go to step 4.		
<ol> <li>Does the FDU generate +14.5 V correctly?</li> </ol>	Go to step 5.	Replace the FDU or PSU.		
5. Does the signal from the cover switch change when the cover is opened and closed?	If CLOSE COVER is not displayed when the cover is open, change the FCE. Go to step 6.	Change the cover switch and/or the actuator mechanism.		
6. Are the connections between the FDU, NCU, and telephone line loose?	Connect the cables properly.	Go to step 7.		
7. Are the connections between the FDU and the paper end sensor loose?	Connect the cables properly.	Go to step 8.		
8. Does the Add Paper indicator light when paper is present?	Go to step 11.	Go to step 9.		
9. Does the signal from the paper end sensor change in the correct way?	Change the FCE.	Replace the paper end sensor.		
10. Are the connections between the PSU, FDU, and the rx motor loose?	Connect the cables properly.	Go to step 11.		
11. Does the FDU output power and phase drive signals to the rx motor?	Replace the rx motor.	Replace the FDU.		

#### TROUBLESHOOTING MECHANICAL PROBLEMS

Symptom: Jam				
Check	Action if Yes	Action if No		
<ol> <li>Is the printer jammed with debris?</li> </ol>	Clear the debris.	Go to step 2.		
2. Are the sensors in the ink jet mechanism good?	Go to step 7.	Go to step 3.		
3. Are the connections between the paper feed sensor and the FDU loose?	Connect the cables properly. Go to step 5.	Go to step 4.		
4. Does the signal from the paper feed sensor change correctly?	Change the FDU or IJC.	Replace the ink jet printer mechanism.		
5. Are the connections between the carriage home position sensor and the FDU loose?	Connect the cable properly. Go to step 7.	Go to step 6.		
6. Does the signal from the home position sensor change correctly?	Change the FDU or IJC.	Replace the ink jet printer mechanism.		
7. Are the connections between the FDU and the paper end sensor loose?	Connect the cables properly.	Go to step 8.		
8. Does the Add Paper indicator light when paper is present?	Go to step 10.	Go to step 9.		
9. Does the signal from the paper end sensor change in the correct way?	Change the FCE.	Replace the paper end sensor.		
10. Are the connections between the PSU, FDU, IJC and the motors loose?	Connect the cables properly.	Go to step 11.		
11. Does the FDU output power and phase drive signals to the rx motor, carriage motor and paper feed motor?	Replace the rx motor or the ink jet printing mechanism.	Replace the FDU or IJC.		

Symptom: Abnormal noise				
Check	Action if Yes	Action if No		
1. Is the cover closed?	Go to step 2.	Close the cover.		
<ol> <li>Are the printer mechanisms assembled correctly?</li> </ol>	Replace the rx motor, FDU, IJC, or the ink jet printing mechanism.	Assemble the machine properly.		

# 7.3. 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 the T1 time	Check the line connection. Check the NCU - FDU - FCE connectors. The machine at other end may be incompatible. Replace the FDU or NCU. 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 other end	The other terminal is incompatible.
0-04	CFR or FTT not received after modem training	Check the line connection. Check the NCU - FDU - FCE connectors. Try changing the tx level (use function 85). Replace the FCE, FDU 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 FCE - NCU - FDU connectors. Try adjusting the tx level (use function 85). Replace the FCE, FDU or NCU. Check for line problems.
0-06	The other terminal did not reply to DCS	Check the line connection. Check the FCE - FDU - NCU connectors. Try adjusting the tx level (use function 85). Replace the FCE, NCU or FDU. 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 (3rd try failed)	Check the line connection. Check the FCE - FDU - NCU connectors. Replace the FCE, NCU or FDU. 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 FCE - FDU - NCU connectors.
	page, because there	Replace the FCE. NCU or FDU.
	were too many errors	The other end may have jammed or run out of paper
	word too many chord	or memory space
		Try adjusting the ty level (use function 85)
		The other and may have a defective
		modem/NCLL/ECLL: try conding to opethor modeling
		Check for line problems and points
<b>a</b> 4 <b>a</b>		
0-10	The other end did not	Check the line connection.
	send a reply to EOP,	Check the FCE - FDU - NCU connection.
	EOM or MPS	Replace the FCE, NCU or FDU.
		Try adjusting the tx level (use function 85).
		The other end may have a defective
		modem/NCU/FCU; try sending to another machine.
		Check for line problems and noise.
0-14	Non-standard post	Check the FCE - FDU - NCU connectors.
	message response code	Incompatible or defective remote terminal: try sending
	received	to another machine
		Noisy line: resend
		Try adjusting the ty level (use function 85)
		Poplace the ECE NCLL or EDU
0.00	Esseineile slete net	
0-20	Facsimile data not	Check the line connection.
	received within	Check the FCE - FDU - NCU connectors.
	6 s of retraining	Replace the FCE, NCU or FDU.
		Check for line problems.
		Try calling another fax machine.
		Change the reconstruction time from 6 s to 10 s (bit
		switch 01, bit 0).
		Switch the rx cable equalizer on (bit switch 00, bit 1).
0-21	EOL signal (end-of-line)	Check the connections between the FCE, FDU, NCU,
	from the other end not	& line.
	received within 5 s of the	Check for line noise or other line problems.
	previous EOL signal	Replace the FCE, NCU or FDU.
		The remote machine may be defective or may have
		disconnected.
0-22	The signal from the other	Check the line connection
5 <u>-</u> L	end was interrupted for	Check the ECE - EDU - NCU connectors
	more than	Benlace the ECE NOLL or EDU
		Defective remote terminal
	0.2 5	Charle for line point or other line problems
0.00	÷	
0-23	Ioo many errors during	Check the line connection.
	reception	Check the FCE - FDU - NCU connectors.
		Replace the FCE, NCU or FDU.
		Defective remote terminal.
		Check for line noise or other line problems.
		Switch the rx cable equalizer on (bit switch 00, bit 1).
		Ask the other end to adjust their tx level.

Code	Meaning	Suggested Cause/Action
0-24	The machine disconnected without doing substitute reception, because no RTI or CSI was received	Ask the other party to program their RTI or CSI. Change the setting of user function 23, so that the user can receive incoming faxes that do not have an RTI or CSI.
1-00	Document jam	Improperly inserted document or unsuitable document type. See "Mechanical Operation - Document Jam".
1-01	Document length exceeded the maximum	Divide the document into smaller pieces. See "Mechanical Operation - Document Jam".
1-10	Document in the scanning position at power-up	Clear debris from the sensor actuators. Check the SBU horizontal adjustment. Replace SBU, FCE or FDU.
1-17	Document jam in the feed-out area	
1-30	Paper ran out during printing	Add paper. If paper is present, clean the paper end sensor and
1-33	Paper end was detected when the machine was switched on	check the sensor circuit for defects. Replace the FCE, FDU or the paper end sensor.
1-71	The printer cover was opened during printing	Check whether the user opened the cover during printing. Check the cover lock mechanism. Check the cover switch position and actuation mechanism. Check connections between the cover switch and the FDU. Replace the cover switch, FCE or FDU.
2-12	Modem clock irregularity	Replace the FCE.
2-20	Abnormal coding/decoding (cpu not ready)	
3-90	File or job control problem	Replace the FCE.
4-00	One page took longer than 8 minutes to transmit	Check for a bad line. Try the communication at a lower resolution, or without halftone. Change the FCE.
4-01	Line current was cut	Check the line connector. Check the connection between the FDU and the NCU. Check for line problems. Replace the FDU, the FCE or the NCU.
4-02	The other end cut the received page as it was longer than the maximum limit.	Ask the other end to change their maximum receive length setting, then resend.

Code	Meaning	Suggested Cause/Action	
4-10	Communication failed because of ID Code mismatch (Closed Network) or TSI mismatch (Authorized Reception)	Get the ID Codes the same and/or the TSIs programmed correctly, then resend. The machine at the other end may be defective.	Troubleshooting
5-21	Memory overflow	Temporary memory shortage or the document takes up too much data. Use a lower resolution or do not use Halftone. Replace the FCE.	
6-01	Post message could not be received after a page was sent (G3 ECM)	Check the line connection. Check the connections between NCU - FDU - FCE. Try adjusting rx cable equalizer. The other end may have a defective Modem/FCU/NCU; try sending to another machine. Check for line problems and noise.	
6-02	EOR received (G3 ECM)	Check the line connection. Check the connections between NCU - FDU - FCE. Try adjusting rx cable equalizer. The other end may have a defective Modem/FCU/NCU; try sending to another machine. Check for line problems and noise.	
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 the connections from the FCE, FDU to the NCU. Check for a bad line or defective remote terminal. Replace the FCE or NCU. Switch the rx cable equalizer on (bit switch 00, bit 1).	_
6-06	Coding/decoding error (G3 ECM)	Defective FCE. Defective remote terminal.	
6-08	PIP/PIN was 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 function 85). Check the line connection. Defective remote terminal.	
9-07	Paper feed jam: the paper did not reach the paper feed sensor after the rx motor started	Check the connection between the FDU and the paper feed sensor. Replace the FDU, IJC, or the ink jet printing mechanism.	

Code	Meaning	Suggested Cause/Action
9-08	Printing jam: carriage not at home position	Remove any debris from the printing mechanism. Check the carriage and the lead screw. Check the connection between the carriage motor, carriage home position sensor, and the FDU. Replace the IJC or the FDU. Replace the ink jet printing mechanism. After curing the problem, reset the machine by switching it off/on, opening and closing the printer cover, or by resetting the cassette.
9-09	Feed out jam: carriage at home position	
9-10	Ink end detected	Replace the cartridge. If the error persists: Check the connection between the FDU and the ink end sensor. Initialize the ink end sensor (function 87). Replace the ink end sensor or the FCE.
9-70	When switching on the power, the printer failed to initialize itself correctly. If this happens twice, error 9-70 occurs.	See error codes 9-07, 9-08, and 9-09.