

FAX500/550

SERVICE MANUAL

Throughout this manual, the machines are referred to as follows.

Type A: FAX500

Type B: FAX550

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.

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1. OVERALL MACHINE INFORMATION

1

1.1. SPECIFICATIONS

Type

Desktop transceiver

Circuit

PSTN, PABX

Connection

Direct couple

Document Size

Length: 105 - 1200 mm
[4.13 - 47.2 ins]

Up to 100 m [328 ft] after adjustment

Width: 148 - 216 mm
[5.8 - 8.5 ins]

Thickness: 0.05 to 0.15 mm
[2 to 6 mils]

Document Feed

Automatic feed, face down

ADF Capacity

20 sheets (using 20 lb paper)

30 sheets (using 80 g/m² paper)

Scanning Method

Flat bed, with CCD

Maximum Scan Width

216 mm [8.5 ins] ± 1%

Scan Resolution

Main scan: 8 dots/mm [203 dpi]

Sub scan:

Standard - 3.85 lines/mm [98 lpi]

Detail - 7.7 lines/mm [196 lpi]

Fine - 15.4 lines/mm [392 lpi]

Memory Capacity

ECM: 128 kbytes (double buffer)

SAF: Type A - 128 kbytes (7 pages), shared
w/ ECM

Type B - 256 kbytes (14 pages), with
optional extra 1 Mbyte or
2 Mbytes (max 71 or 128
pages respectively)

Compression

MH, MR, EFC, MMR, SSC

Storage to SAF memory for tx: MH

MMR only with ECM

Modulation

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

Protocol

Group 3 with ECM

Data Rate

9600/7200/4800/2400 bps; automatic fallback

I/O Rate

With ECM: 0 ms/line

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

Transmission Time

10 s at 9600 bps (G3 ECM using memory)
for a CCITT # 1 test document (Slerexe let-
ter) using standard resolution

Printing System

Thermal printing, automatic cutter

Paper Size

216 mm (A4) x 100 m [8.5 ins x 328 ft]

Maximum Printout Width

210 mm [8.3 ins]

Maximum Printer Resolution

Main scan: 8 dots per mm [203 dpi]

Sub scan: 15.4 lines/mm [392 lpi]

Power Supply

115 ± 20 Vac, 60 ± 1 Hz

Power Consumption

(Without Optional Kits)

Standby: 13 ± 5 W

Transmit: 29 ± 5 W

Receive: 22 ± 5 W

Copying: 41 ± 7 W

Operating Environment

Temperature: 17 - 28 °C [63 - 82 °F]

Humidity: 30 - 85 %Rh

Dimensions (W x D x H)

325 x 388 x 174 mm [12.8 x 15.3 x 6.9 ins]

Excluding handset, trays, and optional units

Weight

10 kg [22 lbs]

1.2. FEATURES

KEY:

O = Used, X = Not Used,

A = Type A only,

B = Type B and Type B with optional memory only,

C = Type B with optional memory only

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

Video Processing Features	
Contrast	O
Halftone (Basic & Error Diffusion)	O
MTF	O
Reduction	O
Resolution	O
Smoothing - 8 x 3.85 to 8 x 7.7	O
Smoothing - 8 x 7.7 to 8 x 15.4	X

Communication Features - Auto	
Automatic fallback	O
Automatic redialing	O
Confidential reception	C
Dual Access	B
Substitute reception	O
Transmission Reserve	A

Communication Features - User Selectable	
Action as a transfer broadcaster	X
AI Redial	O
Alternative Destination	O
Answering machine	O
Authorized Reception	O
Auto-answer delay time	X
Auto dialing (pulse or DTMF)	O
Auto Document	B
Automatic Voice Message	X
Auto-note	X
Batch Transmission (max 5 files)	C
Broadcasting	O
Chain Dialing	O
Confidential ID Override	O
Confidential Transmission	O
Forwarding (4 stations)	C
Free Polling	O
Groups (7 groups)	O
Hold	O
Immediate Redialing	O
Immediate transmission (this is the default mode for Type A)	O
Keystroke Programs	O
Mailbox	C
Memory transmission (this is the default mode for Type B)	O
Notify	X
On Hook Dial	O
Page Count	O
Personal Codes	O
Personal Codes with Conf ID	C
Polling Reception	O
Polling Transmission	O
Quick Dial (Type A: 15, Type B: 30)	
Reception modes (Fax, Tel, Auto)	O
Reduction	X
Remote control features	O
Remote Transfer	B
Restricted Access (10 codes, without cards)	O
Secured Polling	O
Secured Polling with Stored ID Override	O

OVERALL MACHINE INFORMATION FEATURES

November 30th, 1991

1

Send Later	O
Silent ringing detection	O
Speed Dial (Type A: 50, Type B: 100)	
Telephone Directory	B
Tonal Signal Transmission	O
Transfer Request A: 19 stations (from memory), 20 stations (immediate) B: 30 stations	O
Transmission Deadline	X
Turnaround Polling	X
Voice Request	O

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

Other User Features	
Auto Service Call	X
Center mark	X
Checkered mark	X
Clearing a memory file	O
Clearing a polling file	O
Clock	O
Confidential ID	C
Copy mode	O
Counters	O
Dialed number check	X
Direct entry of names	O
Function Programs	O
ID Code	O
Label Insertion	O

Language Selection	O
LCD contrast control	Service
Memory Lock	C
Memory Lock ID	C
Modifying a memory file	X
Multi Sort Document Reception	X
Multicopy mode	X
Night Timer	X
Own telephone number	O
Printing a memory file	O
RDS on/off	O
Reception Mode Switching Timer	O
Reception Time (non-memory rx only)	O
Remote ID	O
Reverse Order Printing	X
RTI, TTI, CSI	O
Speaker volume control	O
Specified Cassette Selection	X
Substitute reception on/off	O
Telephone line type	O
TTI on/off	O
User Function Keys	X
User Parameters	O
Wild Cards	O

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

Reports - User-initiated	
Authorized Reception List	O
Charge Control Report	X
File List	O
Forwarding List	C
Group List	O

Reports - User-initiated	
Personal Code List	O
Program List	O
Quick Dial List	O
Specified Cassette Selection List	X
Speed Dial List	O
TCR	O
Transmission Status Report	X
User Function List	X
User Parameter List	O

Service Mode Features	
Back-to-back test	O
Bit switch programming	O
Buzzer test	O
Cable equalizer (rx only)	O
Comm. parameter display	O
DTMF tone test	O
Echo countermeasure	O
Error code display	O
LCD contrast control	O
Memory file forwarding	O
Memory file printout (all files)	O
Modem test	O
NCU parameters	O
Operation panel test	O
Printer mechanism test	X
Printer test patterns	O
Programmable attenuation	X
Protocol dump list	O
RAM display/rewrite	O
RAM dump	O
Ringer test	X
Scanner lamp test	O
Scanner mechanism test	O
Sensor initialization	O
Serial number programming	O
Service monitor report	O
Service station number	X
System parameter list	O
Technical data on the TCR	O
Thermal head parameters	O
Transmission Status Report	X

Memory Files

Type A Models

Max. number of files: 10

Max. number of stations/file: 20

Max. number of stations overall: 21

Max. number of pages overall: 64
(including pages stored as Auto Documents)

Type B Models

Max. number of files: 100

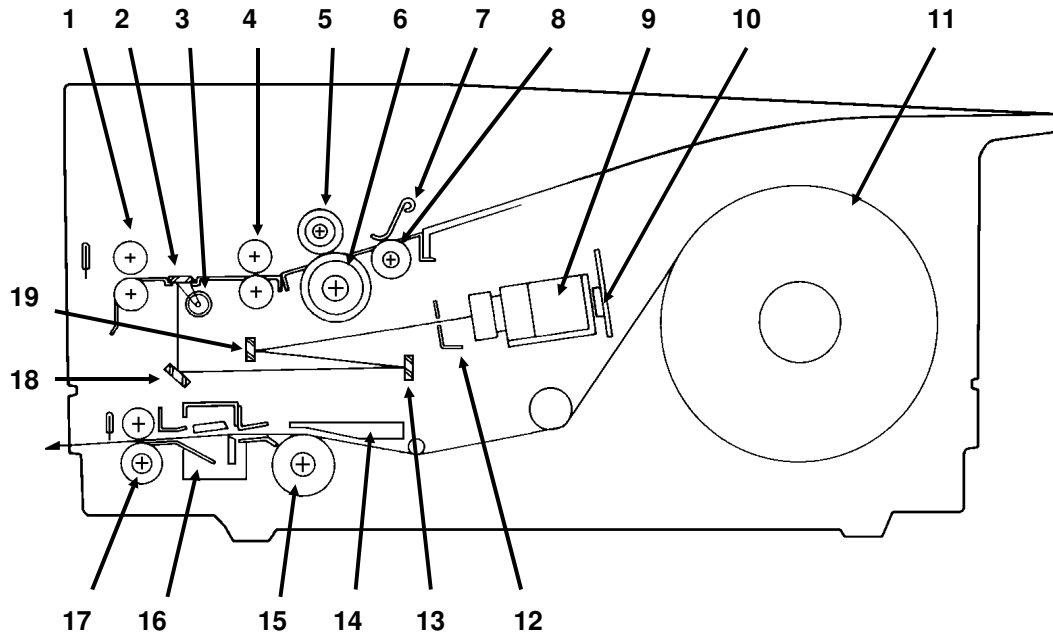
Max. number of stations/file: 142

Max. number of stations overall: 299

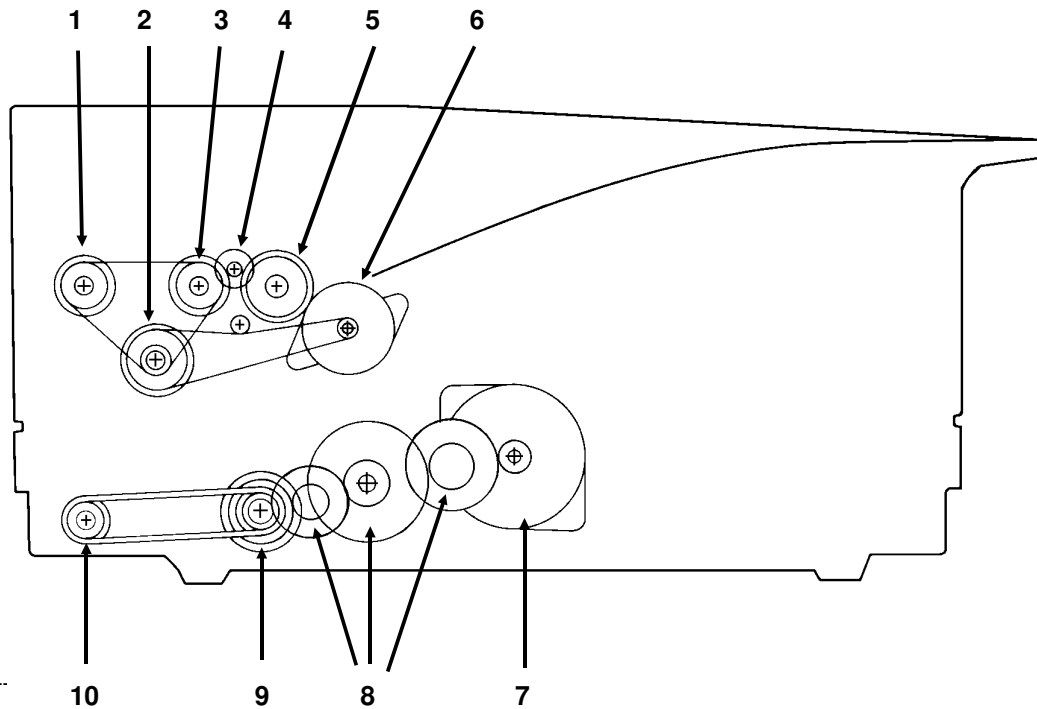
Max. number of pages overall: 200
(including pages stored as Auto Documents)

1.3. COMPONENT LAYOUT

1.3.1. Mechanical Components

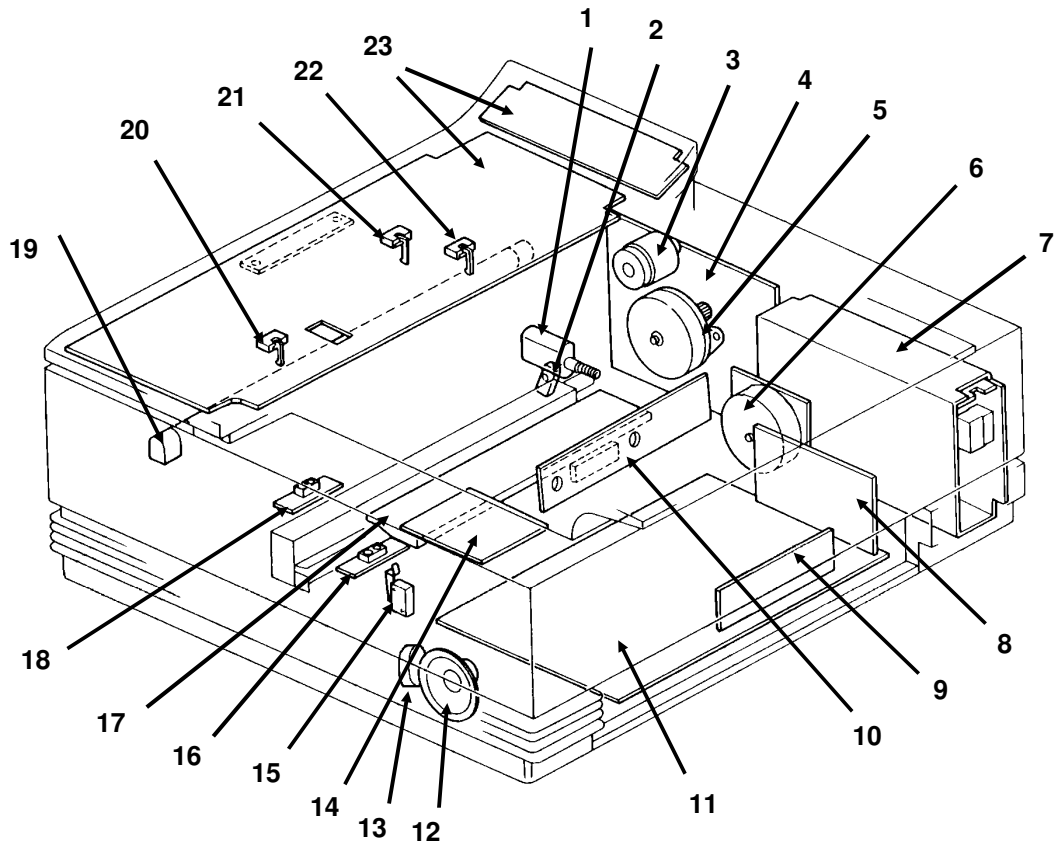


- | | | |
|-----|-----------------------------|---|
| 1. | R2 Rollers | Feed the document through the scanner. |
| 2. | Exposure Glass | Exposes the original to light from the xenon lamp. |
| 3. | Xenon Lamp | Illuminates the document. |
| 4. | R1 Rollers | Feed the document through the scanner. |
| 5. | Separation Roller | Allows one page into the scanner. |
| 6. | Document Feed Roller | Feeds the document into the scanner. |
| 7. | Separation Plate | Spreads out the leading edges of the pages fed into the scanner. |
| 8. | Pick-up Roller | Picks up pages of the document from the document table. |
| 9. | Lens Block | Focuses light reflected from the document onto the CCD. |
| 10. | CCD (Charge Coupled Device) | This converts the light reflected from the document into an analog video signal. |
| 11. | Thermal Paper Roll | Thermal paper for printing. |
| 12. | Shading Plate | Allows more light through from the ends of the xenon lamp than from the center, to counteract the relative dimness at the ends of the lamp. |
| 13. | Second Mirror | Reflects light from the document towards the CCD. |
| 14. | Thermal Head | Prints received data on the thermal paper. |
| 15. | Platen Roller | Feeds the paper through the printer. |
| 16. | Cutter | Cuts off the printed page. |
| 17. | Feed-out Rollers | Feed out the page which has been cut off. |
| 18. | First Mirror | Reflects light from the document towards the CCD. |
| 19. | Third Mirror | Reflects light from the document towards the CCD. |

1.3.2. Drive Components

- | | | |
|-----|-------------------------------------|--|
| 1. | R2 Roller Drive Gear | Drives the R2 roller. |
| 2. | Scanner Drive Gear | Transfers drive from the Tx motor to the scanner and ADF. |
| 3. | R1 Roller Drive Gear | Drives the R1 roller. |
| 4. | Document Feed Idle Gear | Transfers drive from the Tx motor to the document feed roller. |
| 5. | ADF Clutch/Document Feed Drive Gear | Drive the document feed roller, which feeds the document into the scanner. |
| 6. | Tx Motor | Drives the ADF and scanner. |
| 7. | Rx Motor | Drives the printer. |
| 8. | Printer Drive Gears | Transfer Rx motor drive to the printer. |
| 9. | Platen Roller Drive Gear | Drives the platen roller, which pulls the thermal paper through the printer |
| 10. | Feed-out Roller Drive Gear | Drives the feed-out roller, which feeds the printed copy out of the machine. |

1.3.3. Electrical Components



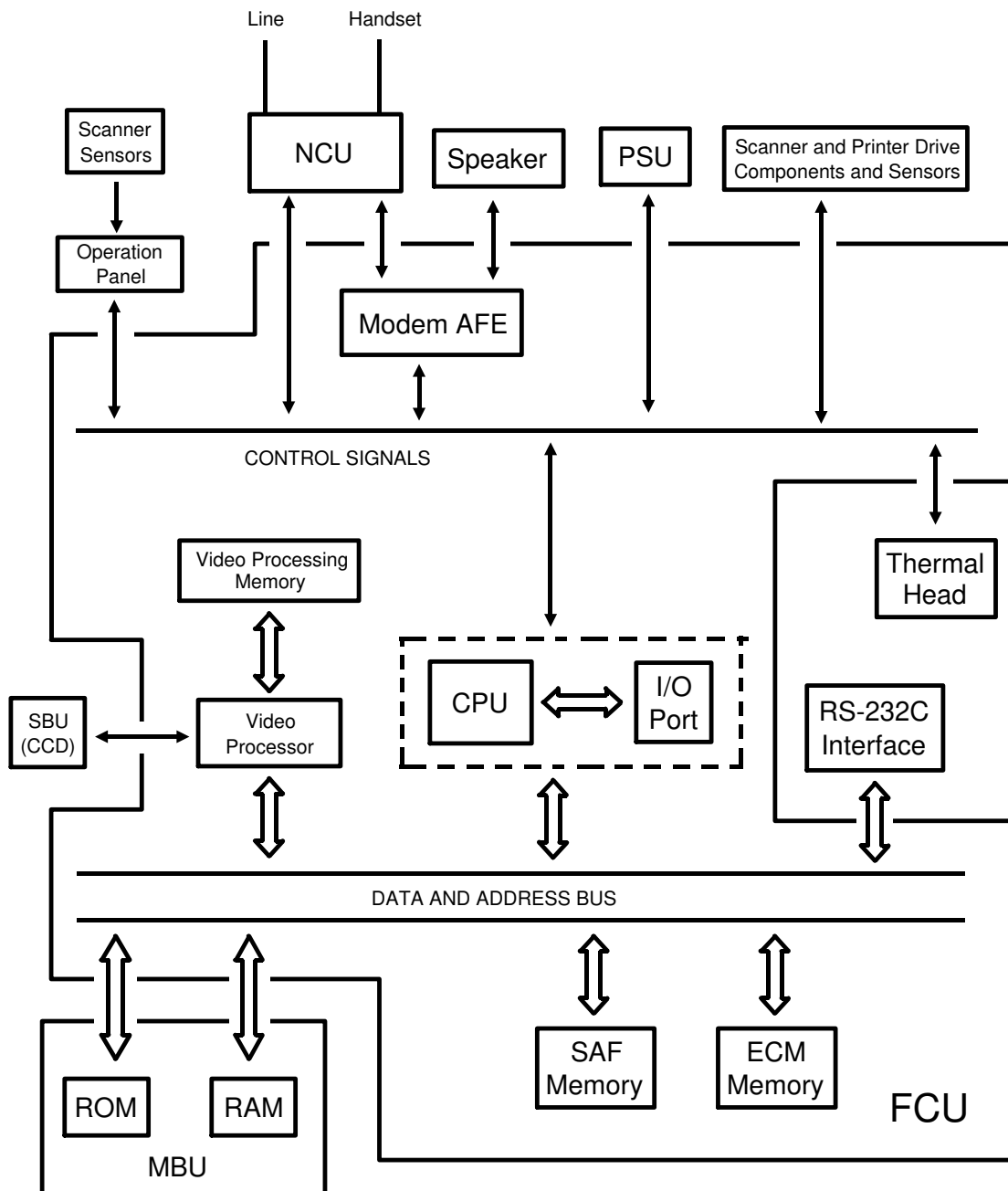
1

Name	Description	No.
PCBs		
FCU	This board controls the machine.	11
MBU	This board contains the system ROM and RAM for storing system parameters such as bit switch settings and programmed telephone numbers.	8
SBU	This board contains the CCD.	10
OP-PORT	This board controls the operation panel.	23
NCU	This board contains relays and switches for interfacing the machine to the telephone network and the handset.	4
PSU	This board supplies power to the machine.	7
Xenon Lamp Driver	This supplies power to the xenon lamp.	14
MOTORS		
Tx Motor	This drives the scanner.	5
Rx Motor	This drives the printer.	6
Cutter Motor	This drives the cutter.	1

Name	Description	No.
CLUTCHES		
ADF Clutch	This transfers drive from the tx motor to the document feed roller.	3
SENSORS		
Document Sensor	This detects the presence of a document in the feeder.	22
Scan Line Sensor	This detects when a page is approaching the auto shading position.	21
Trailing Edge Sensor	This detects when the trailing edge of the page is passing the scan line.	20
Paper End Sensor	This detects when the thermal paper has run out.	16
Printer Jam Sensor	This detects jams in the printer.	18
Cutter Sensor	This monitors the operation of the cutter.	2
Cover Switch	This detects whether the cover is open or closed.	15
OTHERS		
Thermal Head	This prints on the thermal paper.	17
SAF Memory Modules (Type B models only)	These memory modules each contain 1 Mbyte of memory for storing fax messages.	9
Speaker	This allows the user to listen to the condition of the telephone line.	12
Xenon Lamp	This lamp illuminates the document.	19
Battery (Type B models only)	This rechargeable battery backs up the SAF memory when the main power is switched off.	13

1.4. OVERALL SYSTEM CONTROL

1



The cpu on the FCU board controls the machine, as shown in the above drawing.

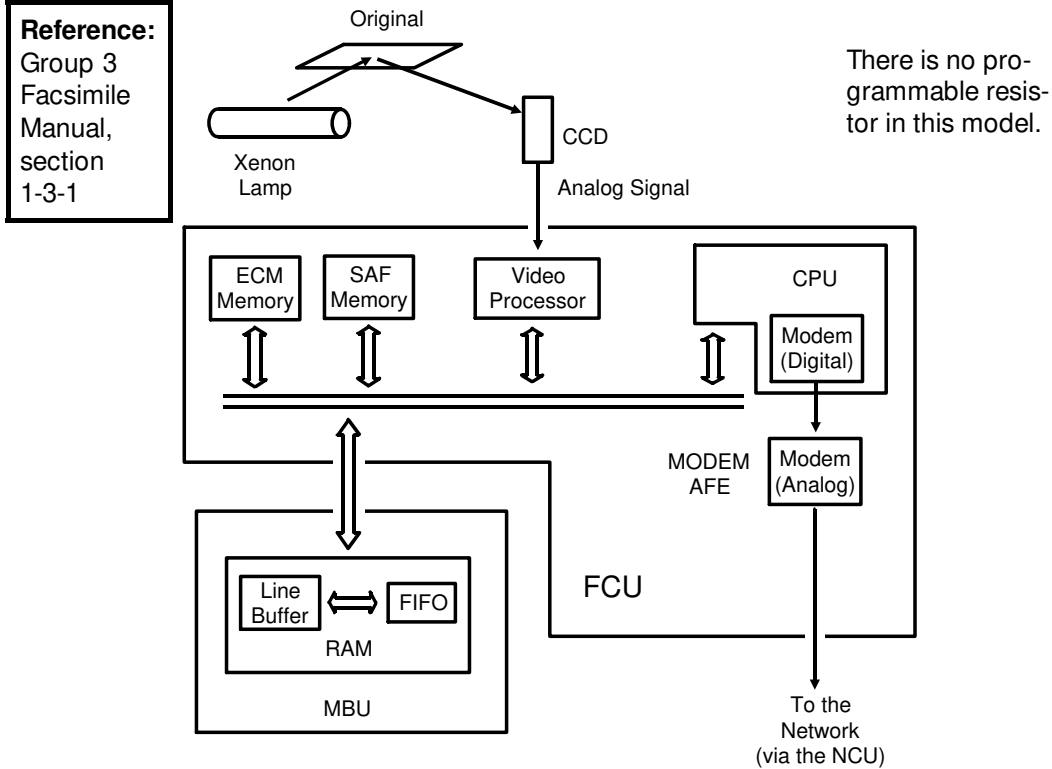
There is no modem board in the machine. The cpu performs the digital functions of a modem and carries out digital to analog conversion of facsimile data. There is a separate analog modem chip (called the Modem AFE) which does the rest of the modem operations.

Type A models - This machine does not contain SAF memory. The ECM memory doubles as a small SAF memory. Battery back-up for this memory is disabled when the memory contains ECM data.

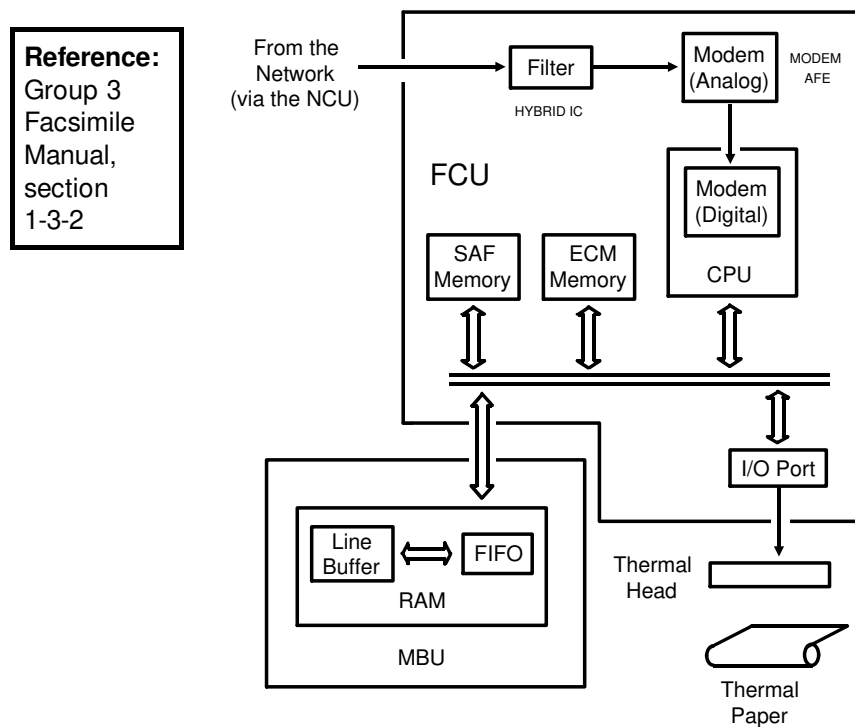
1.5. VIDEO DATA PATH

The following diagrams show the data path for this model.

1.5.1. Transmission



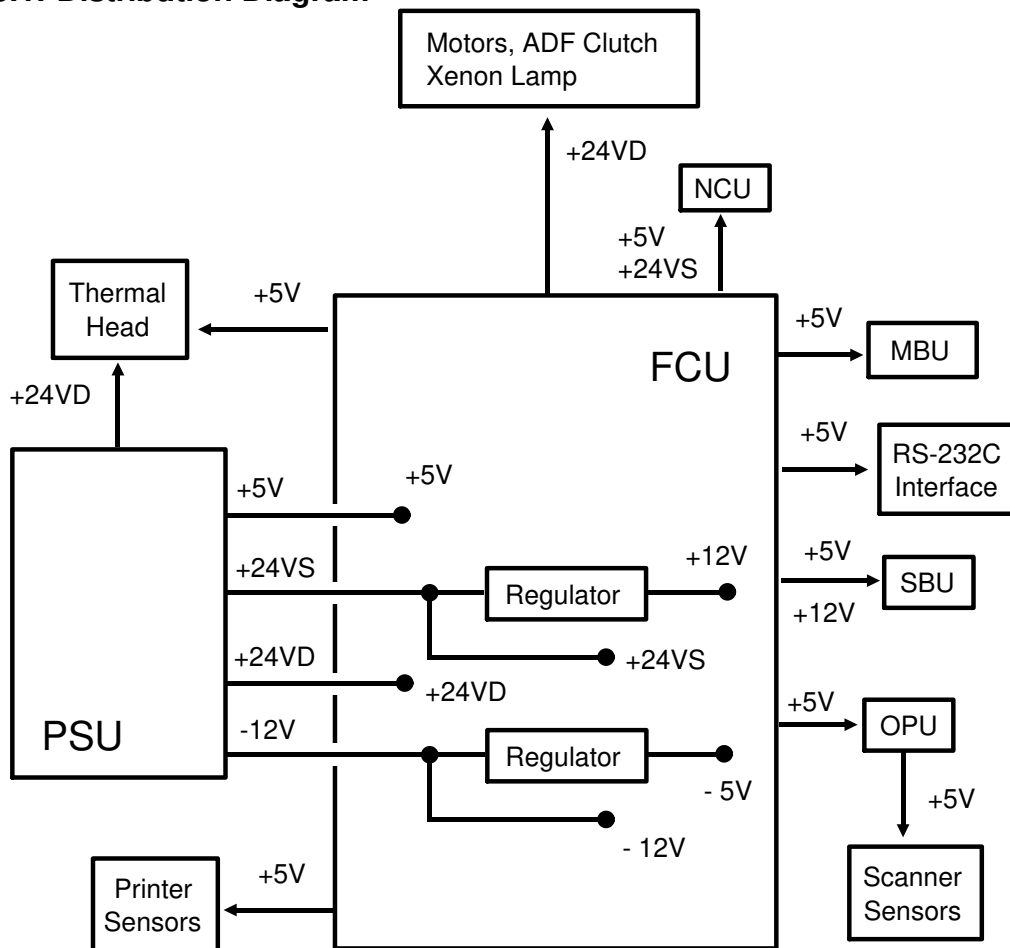
1.5.2. Reception



1.6. POWER DISTRIBUTION

1

1.6.1. Distribution Diagram



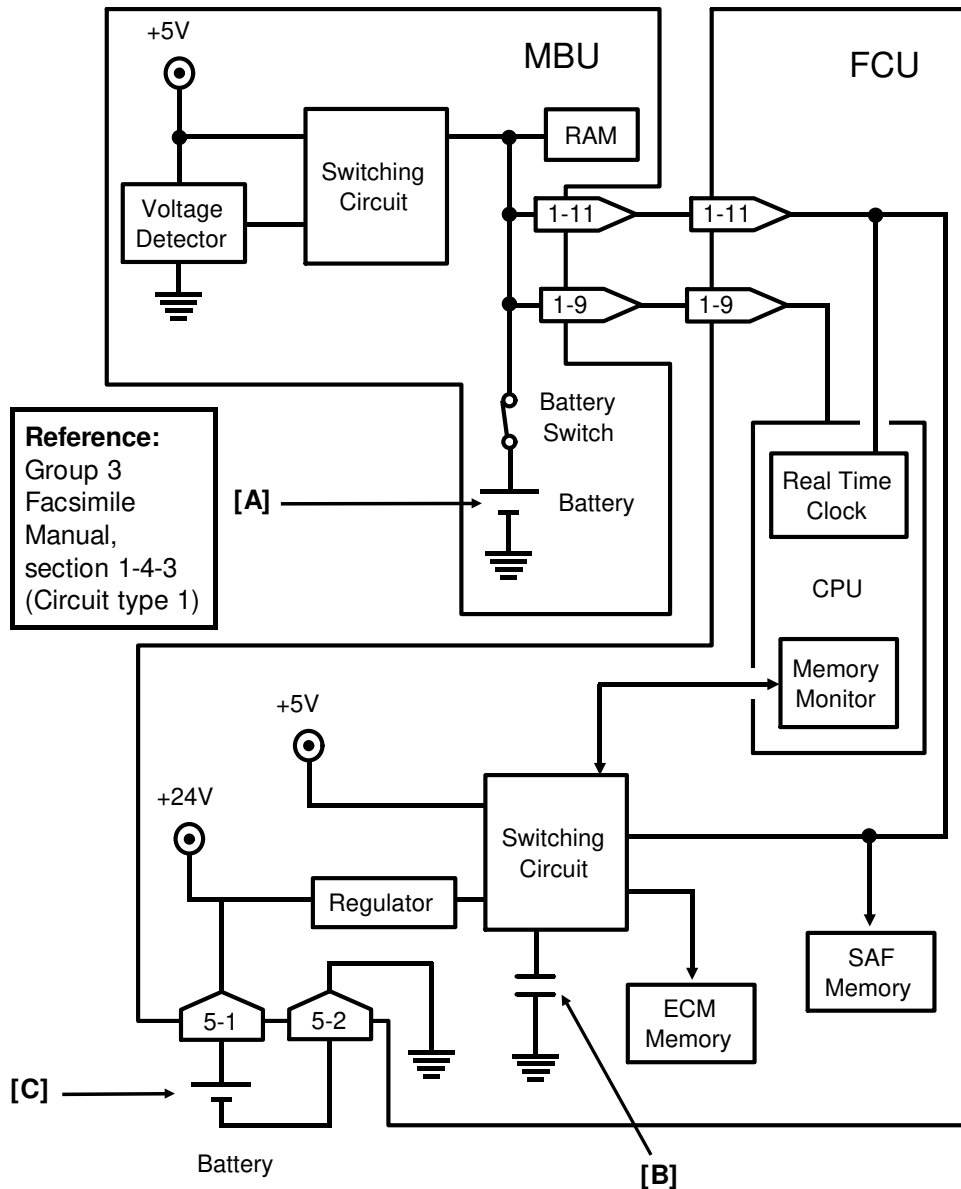
The PSU supplies power to the machine through the FCU, except for the thermal head power, which it supplies directly. The FCU contains regulators which generate other voltages needed by the machine.

There are two + 24V power supplies:

- + 24VS: This is always on when the main switch is on.
- + 24VD: This is switched on by the cpu when a ringing signal is detected, or when the user presses the Start or Copy key. It is not interrupted if the cover switch is opened; however, printing stops and the document is fed out.

In some documentation for this model, + 24VD may sometimes be referred to as + 24VA.

1.6.2. Memory Back-up Circuit



The battery [A] on the MBU backs up the RAM on the MBU, which contains system parameters. It also backs up the real time clock in the cpu. This battery is not rechargeable. CN1-9 tells the cpu whether the back-up power (CN1-11) comes from the battery or from the + 5V supply.

Type A models only - Power from a charged capacitor [B] backs up the ECM memory on the FCU, only if it is being used as a small SAF memory.

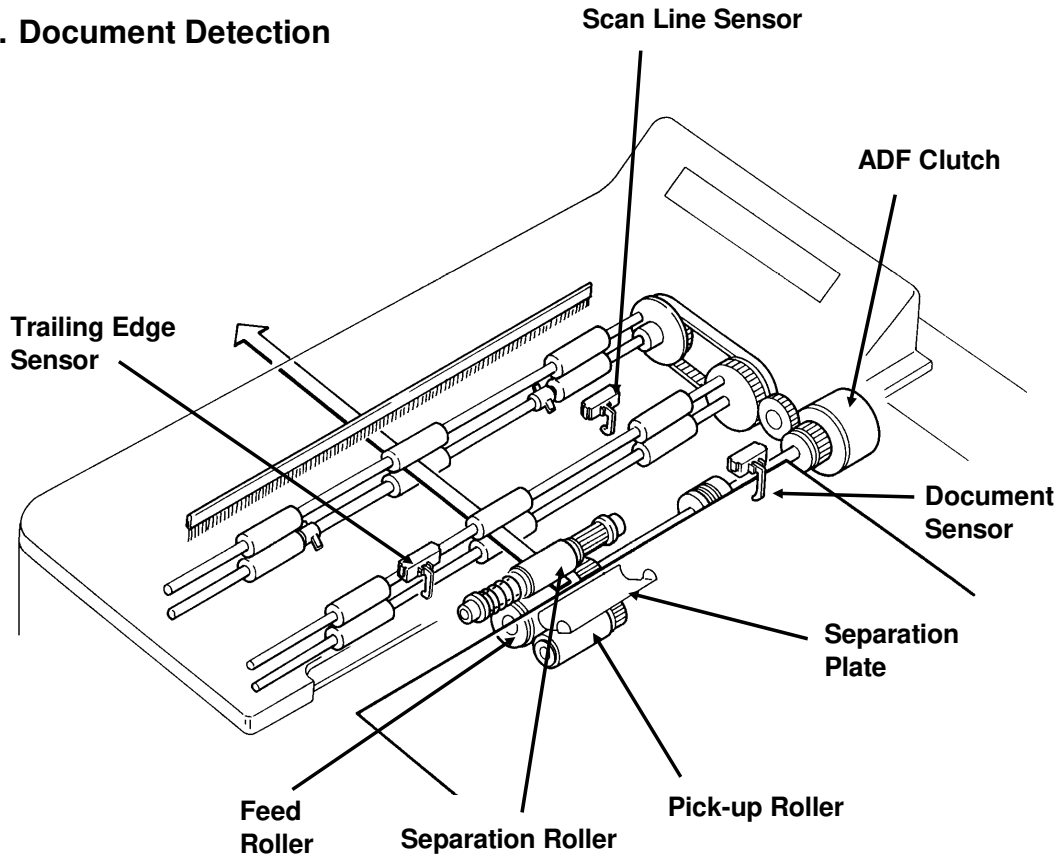
Type B models only - A rechargeable battery [C] backs up the SAF memory and the real time clock for 1 hour. When the main power is switched on, the + 24V supply charges the battery. If there is data in the SAF, the battery also backs up the real time clock, to preserve the MBU battery.

2. DETAILED SECTION DESCRIPTIONS

2.1. SCANNER

2.1.1. Mechanisms

1. Document Detection

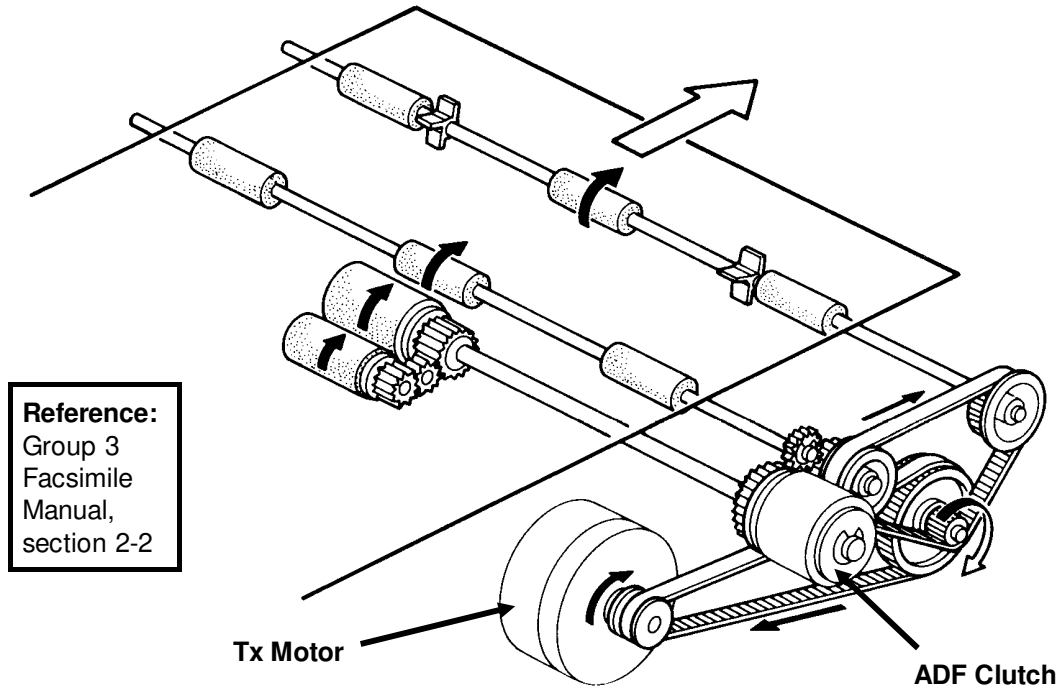


- The machines in this series have an A4-width [8.3"] scanner. There is no document width detector.
- The scanner contains a xenon lamp.
- There is no shutter mechanism.

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

2. Pick-up and Feed

Mechanism



- This machine uses an electrical clutch mechanism with trailing edge sensor.
- There is no manual feed.

Resolution

Standard - The tx motor feeds the document at 7.7 lines/mm. The video processor executes OR processing to convert the data into 3.85 lines/mm.

Detail - The tx motor feeds the document at 7.7 lines/mm. There is no OR processing, and the data is transmitted at 7.7 lines/mm

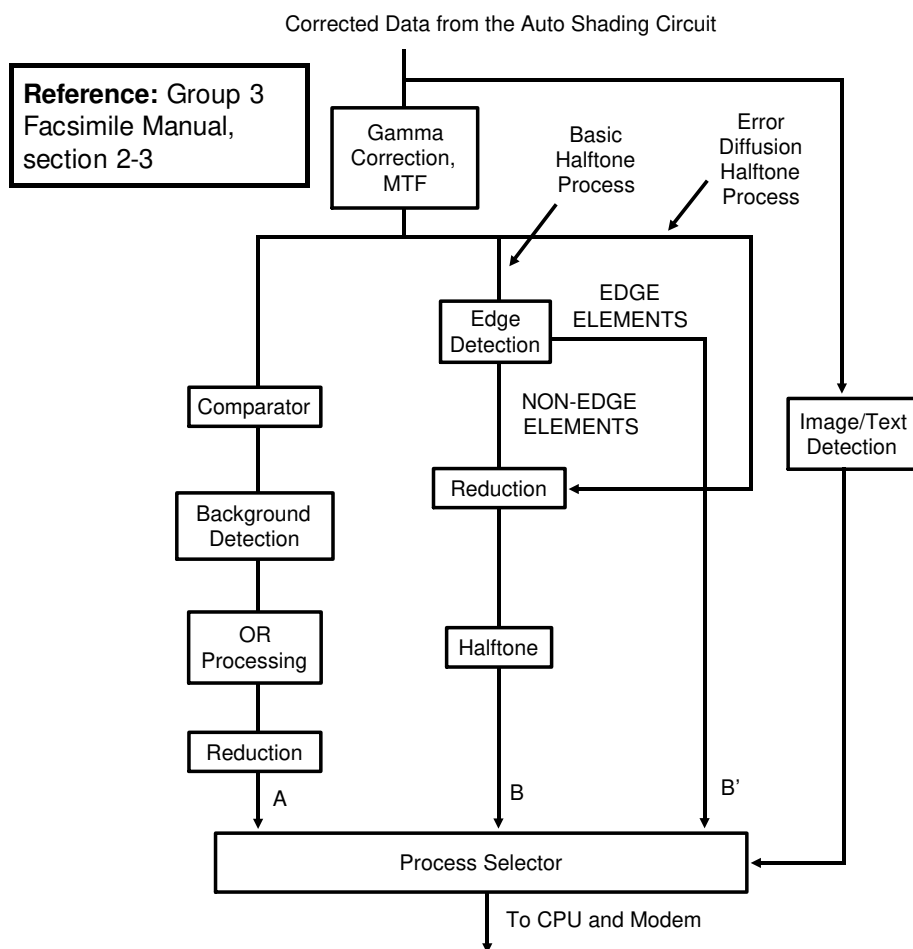
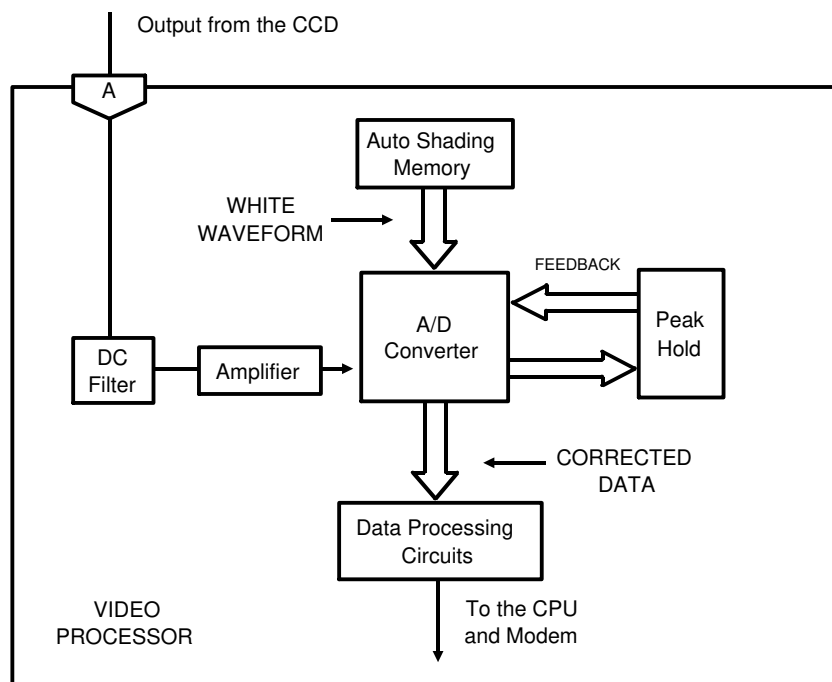
Fine - The tx motor feeds the document and transmits data at 15.4 lines/mm. If the other terminal cannot receive at this resolution, the tx motor feeds the paper at 7.7 lines/mm, and the data is transmitted using Detail resolution.

Jam Conditions

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

- The scan line sensor does not switch on within 3.5 s of the Start key being pressed.
- The scan line sensor does not turn off after the maximum document length has been fed since it turned on.
- The scan line sensor switches on while the document sensor is off.

2.1.2. Video Data Processing

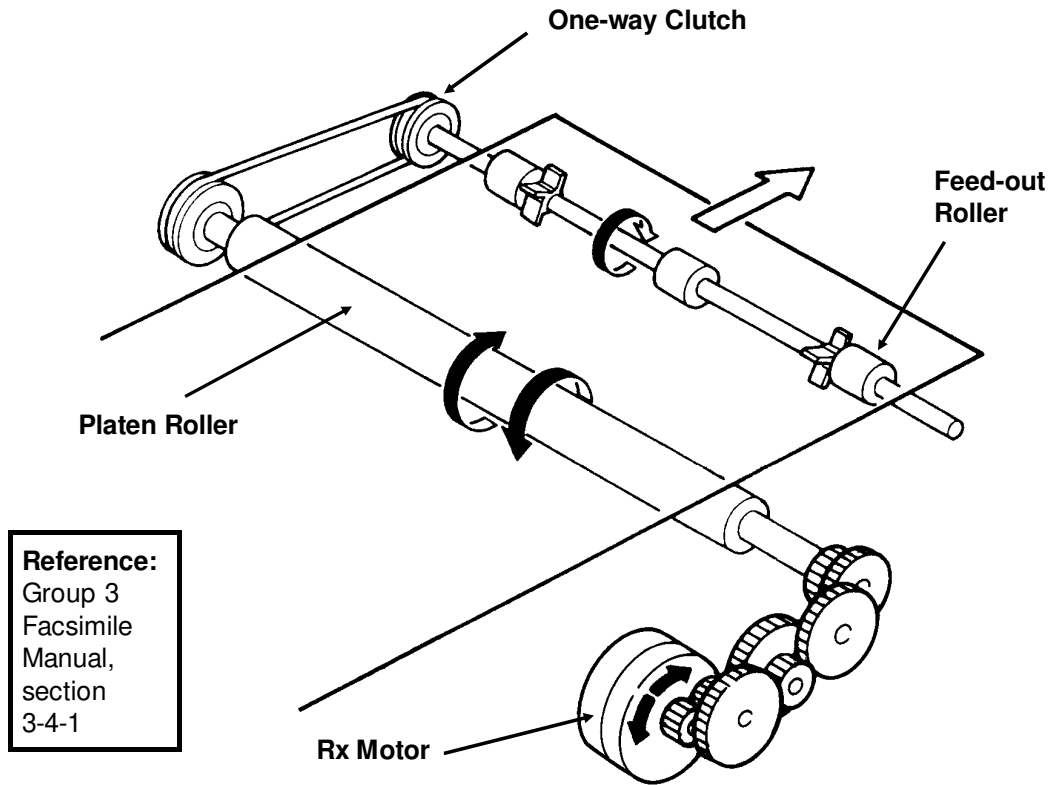


2.2. PRINTER

2.2.1. Mechanisms

1. Paper Feed

Mechanism



The printer is an A4-width [8.3"] printer.

Resolution

Standard - Each received line is printed 4 times

Detail - Each received line is printed twice

Fine - Each received line is printed once.

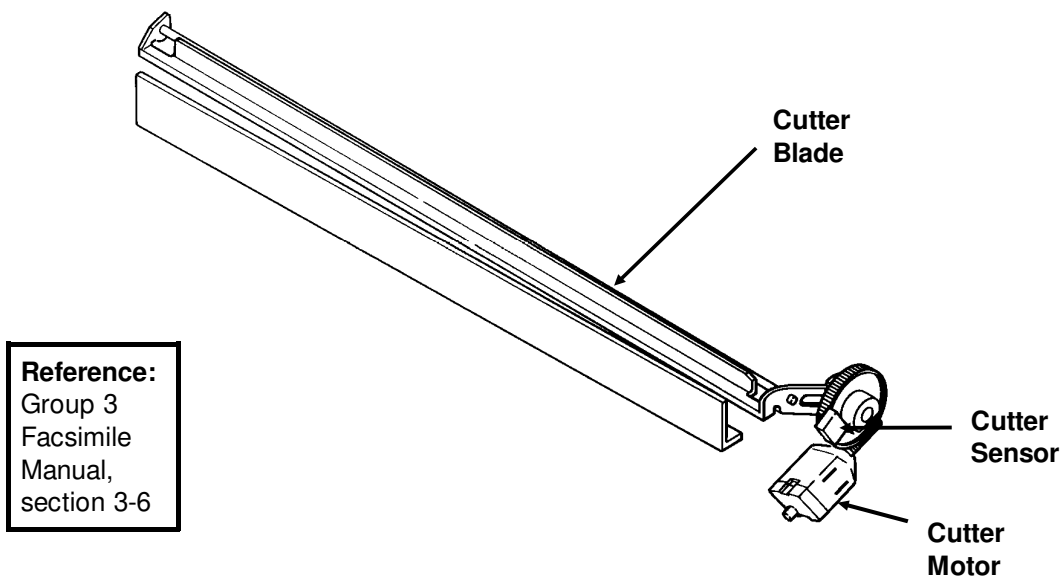
Jam Detection

The cpu detects a copy jam if one of the following conditions occurs:

- If the printer jam sensor still does not detect paper after the minimum copy length has been fed since the start of printing.
- Between pages of a multipage printout, the printer jam sensor switches off. A jam is detected if the sensor does not switch back on after the minimum copy length has been fed since it turned off.
- If the printer jam sensor still detects paper after the end of the feed-out procedure for the last page of a print run.

2

2. Cutting



The cutter mechanism is exactly as described in section 3-6 of the Group 3 Facsimile Manual.

3. Cutter Jam Detection

A cutter jam is detected if one of the following conditions occurs:

- If the cutter sensor does not open within 0.25 s after the cutter starts to move
- If the cutter sensor stays open for more than 1.0 s

If a cutter jam is detected, the cutter motor reverses to return the cutter to the standby position.

2.2.2. Circuits

1. Video Data Processing

- Smoothing is as described in section 3-5-1 of the Group 3 Facsimile Manual
- There is no reduction.

2. Thermal Head

Both machines use an A4-width [8.3"] thermal head. Refer to section 3-5-2 of the Group 3 Facsimile Manual for a circuit diagram.

The operation of the thermal head is as explained in the Group 3 Facsimile Manual, except that when printing a line, blocks 0 and 1 are printed together, then blocks 2 and 3 are printed together.

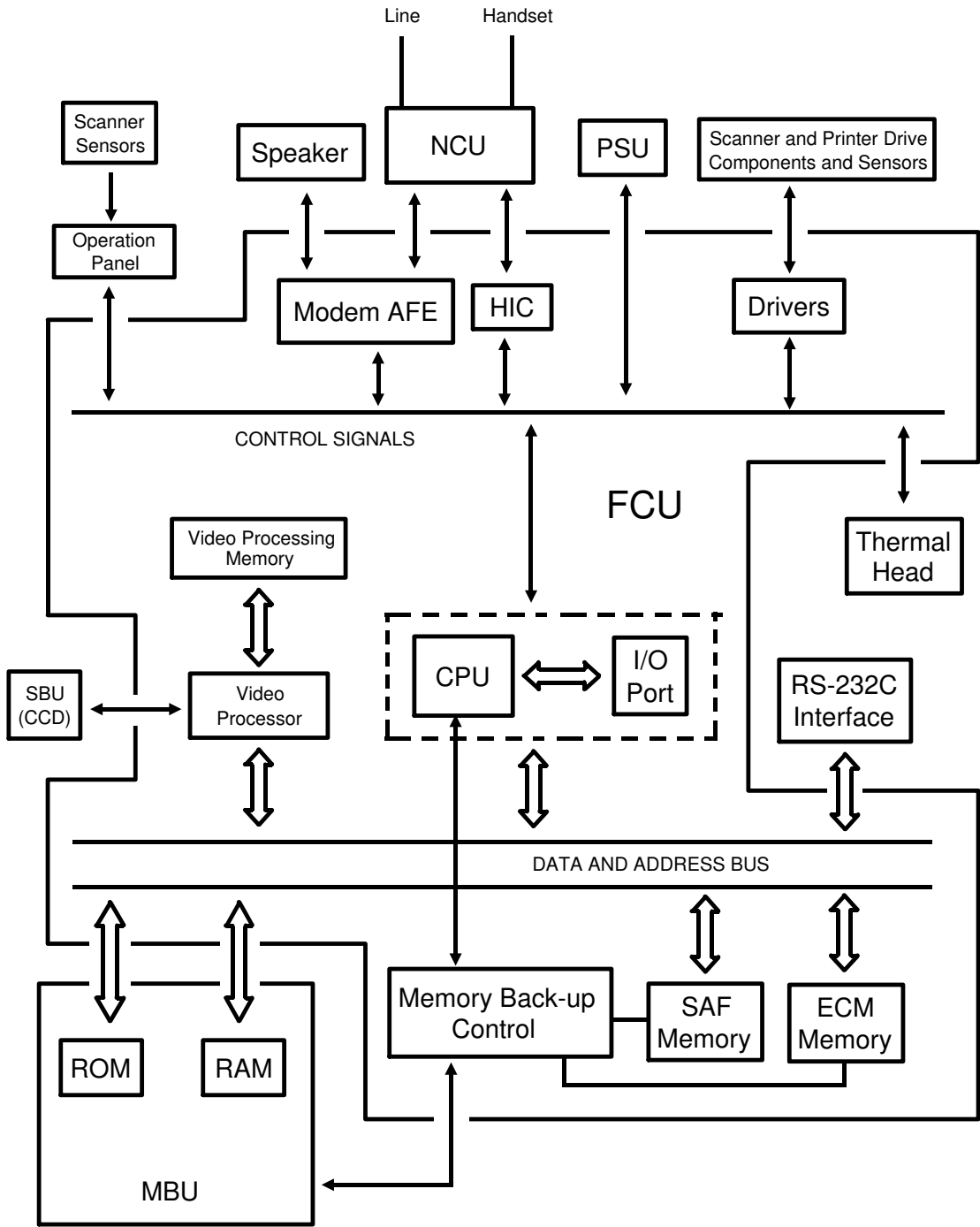
The data are printed as explained in section 3-5-3 of the Group 3 Facsimile Manual. In Fine mode, the pulse width is automatically increased by 50%.

The machine prevents overheat protection by adjusting the pulse width in accordance with the temperature measured by the thermistor on the thermal head.

Reference: Group 3 Facsimile Manual, sections 3-5-1, 3-5-2, and 3-5-3.

2.3. PCBs AND THEIR FUNCTIONS

2.3.1. FCU



2

1. CPU (AFSP)

- 65C02 compatible microprocessor
- Interrupt control
- DMA control
- Data compression and reconstruction (high speed MH coding for 4.5-second scanning)
- Modem (digital operations)
- Real time clock (battery backed-up)
- Memory control
- Control of all mechanisms (directly or through other chips)
- NCU control (through the I/O Port)

2. I/O Port (LIOP)

- Clock control
- Sensor monitoring (including A/D conversion where necessary)
- Tone detection
- Thermal head control
- Tx/Rx/cutter motor drive control
- Operation panel control

3. Modem Analog Front End (Modem AFE)

- Modem (analog operations)
- Attenuation

4. Video Processor (VPP)

- Analog/digital video signal processing

5. Driver (MFPD)

- Tx/Rx/cutter motor drive

6. Driver Array

- Xenon lamp/ADF clutch drive

7. Hybrid IC (HIC)

- Gain control for rx data
- Filters

8. RAM

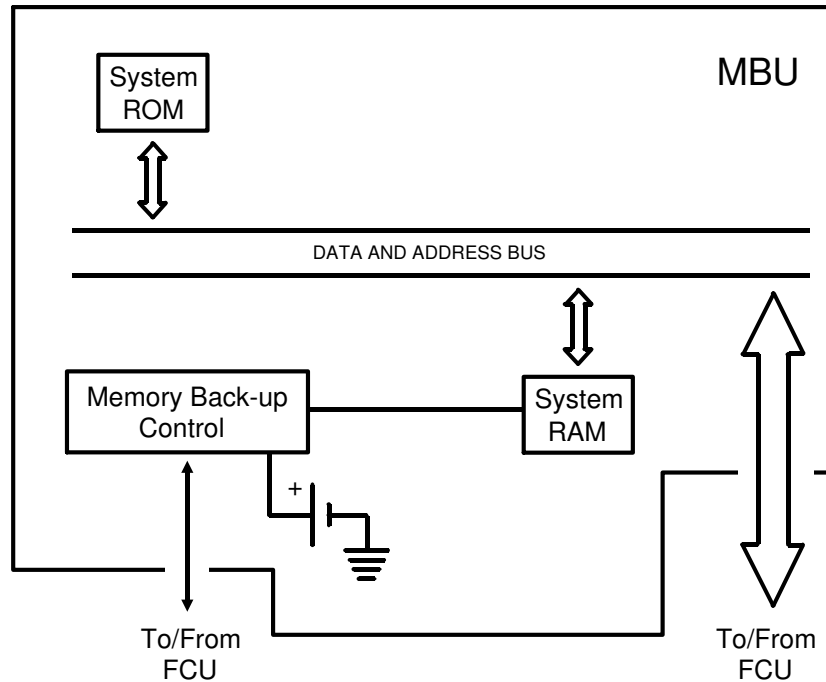
Type A Models

- 128k used for ECM (no back-up) or SAF (backed up by a capacitor)

Type B Models

- 128k for ECM (no back-up)
- 256k SAF memory (with battery back-up)

2.3.2. MBU



2

1. System ROM

- Contains the software to run the machine

2. System RAM

Type A Models

- 32k SRAM for parameter storage, line buffer, FIFO

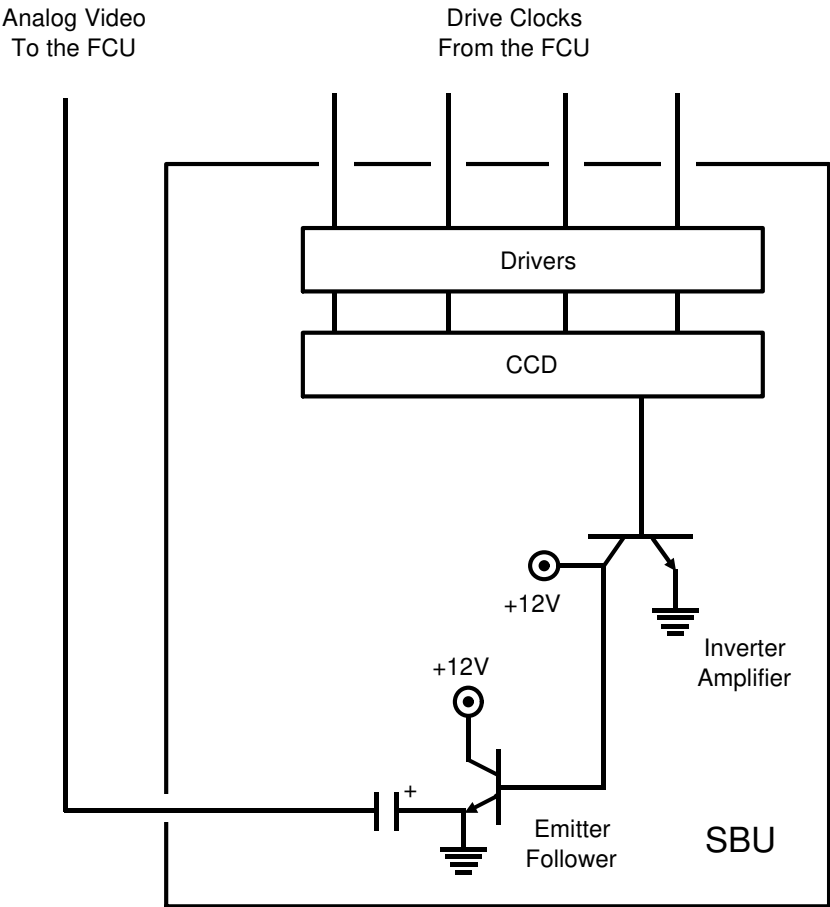
Type B Models

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

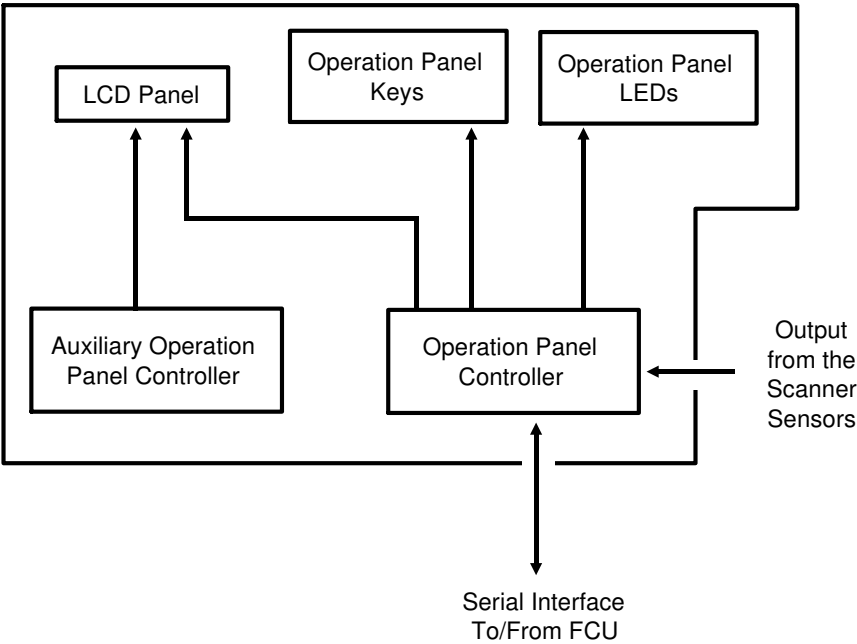
The SRAM is backed up by the battery on the MBU

Note: The MBU for the Type A model is not interchangeable with the MBU for the Type B model.

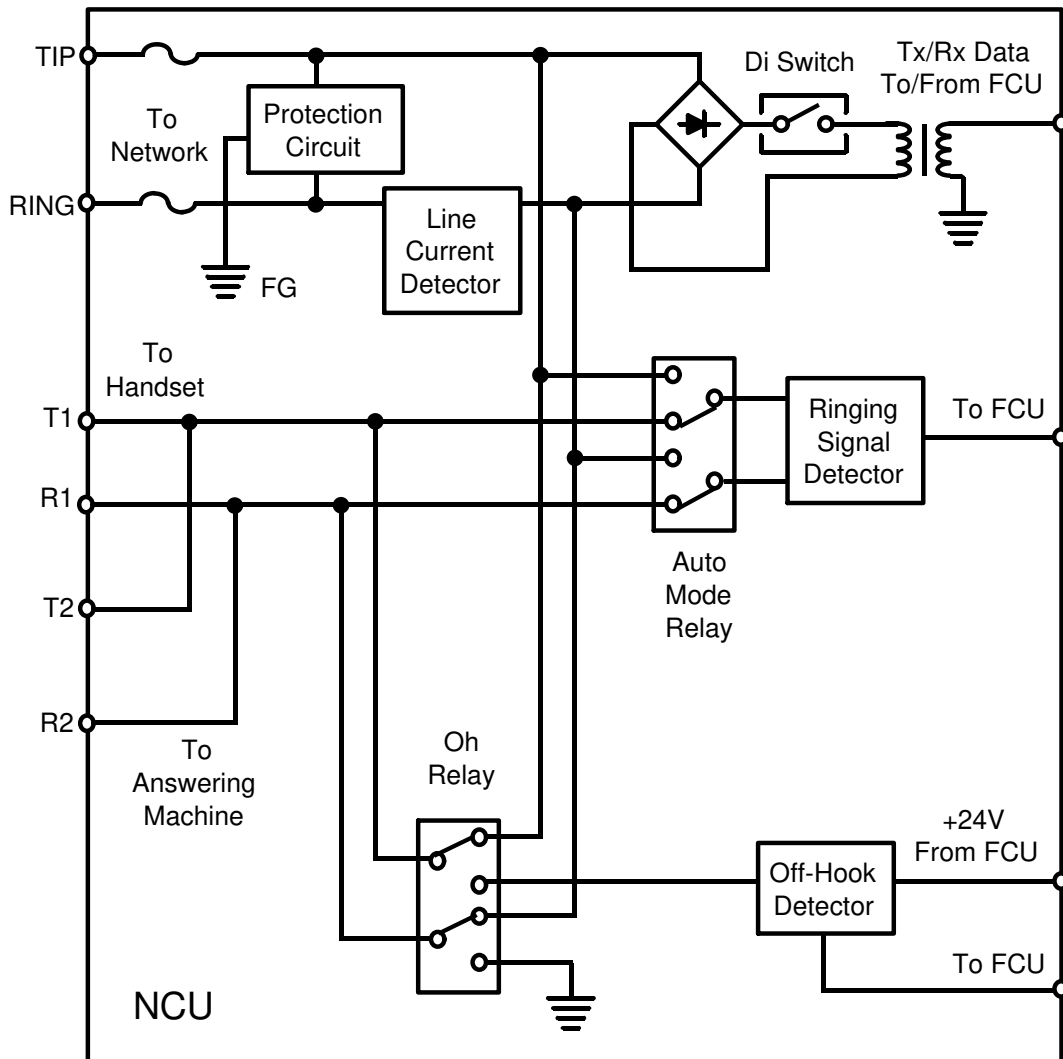
2.3.3. SBU



2.3.4. OPU

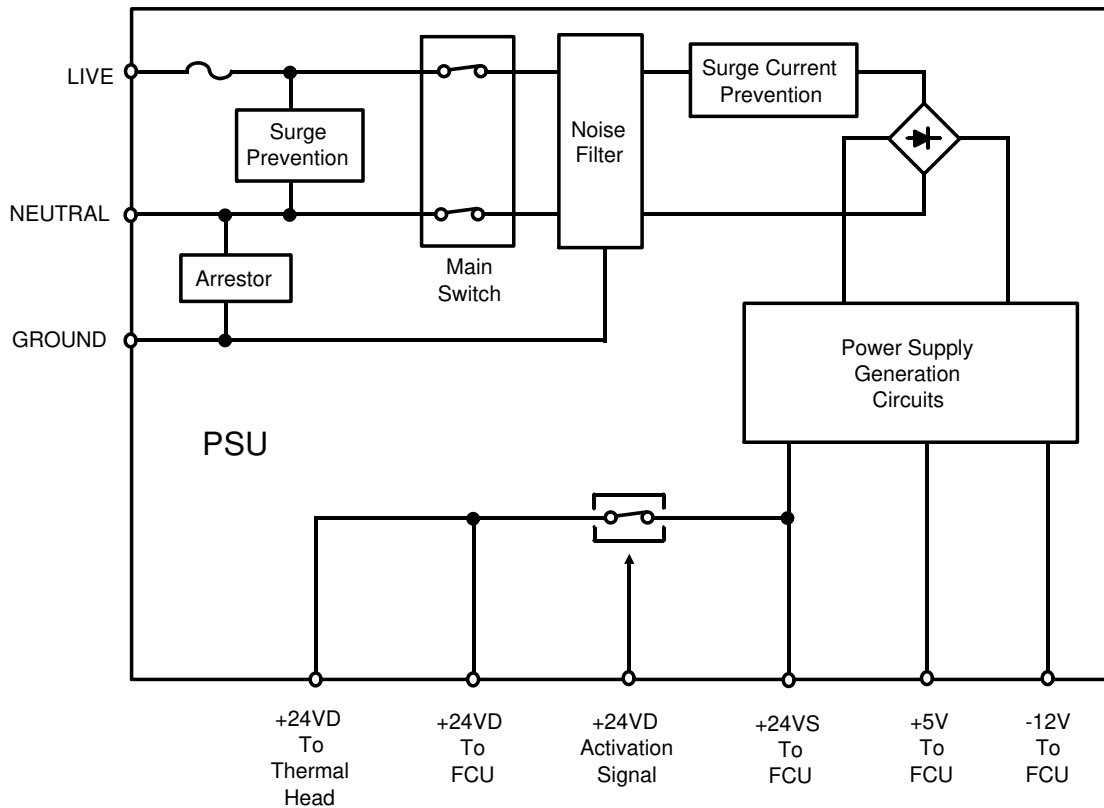


2.3.5. NCU



2

- For simplification, relay drive signals and detector outputs to/from the FCU are not shown on this diagram.
- In the above diagram, the relays are shown in the standby position for Auto Receive (Fax) Mode.

2.3.6. PSU**Overheat Protection in the PSU**

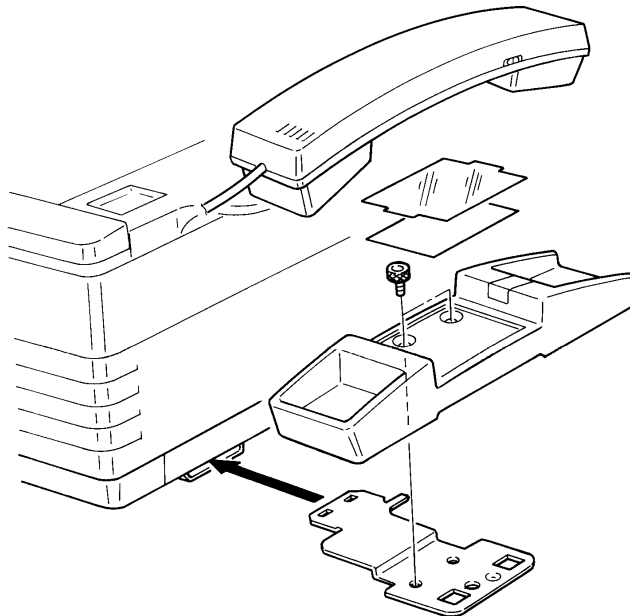
If the PSU thermistor temperature exceeds about 45 °C, the power supply outputs from the PSU are disabled.

If this happens:

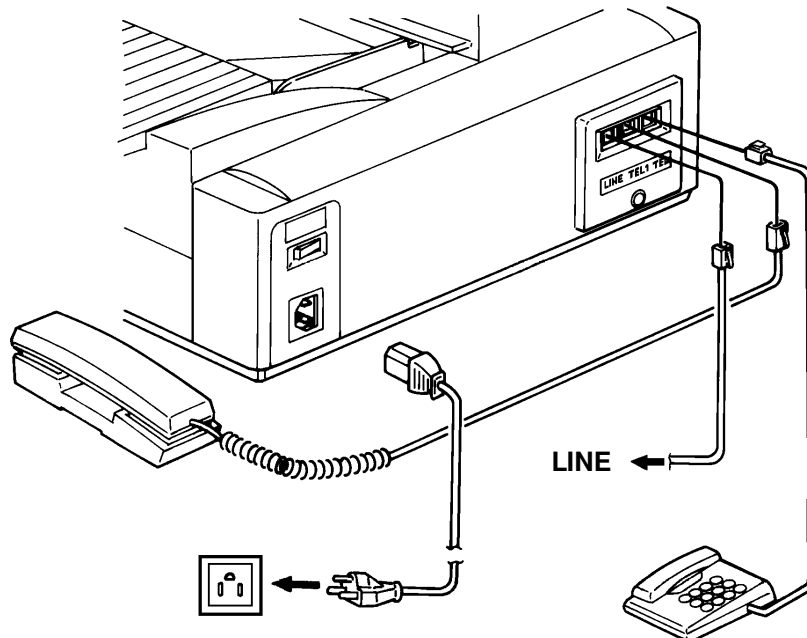
1. Switch off the machine.
2. Take out the PSU and examine it for damage. Take care because it may be hot.
3. Put back the PSU and switch the machine on. If the machine does not operate, change the PSU.

3. INSTALLATION

3.1. CONNECTING UP THE MACHINE



3



3.2. INITIAL PROGRAMMING

Check the following:

- Is the country code in the NCU parameters (Function 96, parameter 00) correct for the country of installation? In the USA, it should be 17.
- Do any bit switch or other settings have to be changed to match line conditions or user requirements?
- Have you programmed the serial number (Function 98, section 4-1-18)?

The user should program the following items after installation:

- Telephone Line Type
- RTI, TTI, and CSI
- ID Codes (ID Code, Remote ID, Confidential ID, Memory Lock ID)
- The fax machine's own telephone number
- Date and Time
- Language Selection

4. SERVICE TABLES AND PROCEDURES

4.1. SERVICE LEVEL FUNCTIONS

4.1.1. Bit Switch Programming (Function 91)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

FUNCTION	Y/▽
9 SERVICE FUNCTIONS	

2. **9** **1** **Yes**

DEFAULT:	0000 0000
BITSW 00:	0000 0000

Bit 7 is displayed at the left, and bit 0 at the right.

3. Increment bit switch: **#**

Decrement bit switch: *****

Example: Display bit switch 3: **#** x 3

DEFAULT:	0000 0000
BITSW03:	0000 0000

4. Adjust the bit switch.

Example: To change the value of bit 7, press **7**

DEFAULT:	0000 0000
BITSW03:	1000 0000

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

4

4.1.2. System Parameter List (Function 92)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

FUNCTION	Y/▽
9 SERVICE FUNCTIONS	

2. **9** **2** **Yes**

START SYSTEM REPORT	
------------------------	--

3. **Start**

After printing, press **Function**

4.1.3. Error Code Display (Function 93)

- 1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**
- 2. **9** **3** **Yes**
- 3. Either:
Scroll through the error codes - **#**
Finish - **Function**

FUNCTION	Y/▽
9 SERVICE FUNCTIONS	
ERROR CODE	#/▽
1-01 JAN 01 17:30	

4.1.4. Service Monitor (Function 93)

- 1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**
- 2. **9** **3** **Yes**
- 3. **No/▽** **Start**

FUNCTION	Y/▽
9 SERVICE FUNCTIONS	
ERROR CODE	#/▽
1-01 JAN 01 17:30	

4.1.5. Protocol Dump (Function 94)

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

FUNCTION	Y/▽
9 SERVICE FUNCTIONS	
START PROTOCOL DUMP LIST	

4.1.6. RAM Display/Rewrite (Function 95)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

FUNCTION Y/▽
9 SERVICE FUNCTIONS

2. **9** **5** **Yes**

Y/▽
DISPLAY MEMORY

3. **Yes**

ADDRESS = 2044C
DATA = 03

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

2 **0** **2** **0** **2**

ADDRESS = 20202
DATA = 00

Note: The first digit must always be 1 (Type A) or 2 (Type B).

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

Example: 80, press **8** **0**

ADDRESS = 20202
DATA = 80

Note: If you wish to move the cursor, press **→**

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

4.1.7. RAM Dump (Function 95)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

FUNCTION Y/▽
9 SERVICE FUNCTIONS

2. **9** **5** **Yes**

Y/▽
DISPLAY MEMORY

3. **▽** **Yes**

MEMORY DUMP START/N
B= 2, ST-0000,END-00FF

4. Input the bank number (B) and the start and end addresses. Max. range: 256 bytes
Example: Start at 1200, end at 12FF.

2 **1** **2** **0** **0** **1** **2** **F** **F** **Start**

The value of B is 1 for the Type A and 2 for the Type B.

MEMORY DUMP START
B= 2, ST-1200,END-12FF

4.1.8. NCU Parameters (Function 96)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

FUNCTION	Y/▽
9 SERVICE FUNCTIONS	

2. **9** **6** **Yes**

NCU PARAMETER	KPAD/Y
NO.00	001

3. Scroll through the parameters - **Yes**

Enter new values at the keypad.
Example: Set NCU parameter 04 to 005.

Yes **Yes** **Yes** **Yes** **0** **0** **5**

NCU PARAMETER	KPAD/Y
NO.04	005

4. To finish: **Function**

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

4.1.9. ADF Test (Function 97)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

FUNCTION	Y/▽
9 SERVICE FUNCTIONS	

2. **9** **7** **Yes**

SCN-1 DT-2 PL-3 LD-4 MDM-5 RI-6 CK-7 SN-8	
--	--

3. **1**

SCANNER TEST	KPAD
ADF-1 LAMP-2	

4. **1**

5. **Function** **Function**

6. Place a document in the feeder,
then press **Copy**

4.1.10. Xenon Lamp Test (Function 97)

- Function

5

1

9

9

1

then immediately

Yes
- 9

7

Yes
- 1
- 2

FUNCTION	Y/∇
9 SERVICE FUNCTIONS	
SCN-1 DT-2 PL-3 LD-4	
MDM-5 RI-6 CK-7 SN-8	
SCANNER TEST KPAD	
ADF-1 LAMP-2	
SCANNER LAMP TEST	

The xenon lamp lights up for 5 minutes.

4.1.11. DTMF Tone Test (Function 97)

- Function

5

1

9

9

1

then immediately

Yes
- 9

7

Yes
- 2
- Either:
 - Test dual tones -

1

 . Go to step 5.
 - Test single tones -

2

 . Go to step 8.
- The display is as shown opposite.

FUNCTION	Y/∇
9 SERVICE FUNCTIONS	
SCN-1 DT-2 PL-3 LD-4	
MDM-5 RI-6 CK-7 SN-8	
DTMF TEST	
DUAL-1 SINGLE-2	
DUAL TONE	
PRESS KEYPAD	

Press a key on the ten key pad.

Example:

1

Start

- To stop the test:

Stop

- Either:

Test another tone: Go to step 5.

Finish:

Function



8. The display is as shown opposite.

SINGLE TONE
PRESS KEYPAD

Press the required key.

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

Example: To test 1633 Hz, press **8** **Start**

9. To stop the test: **Stop**

10. Either:

Test another tone: Go to step 8.

Finish: **Function**

4.1.12. Printer Test Patterns (Function 97)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

2. **9** **7** **Yes**

3. **3**

FUNCTION Y/▽
9 SERVICE FUNCTIONS

SCN-1 DT-2 PL-3 LD-4
MDM-5 RI-6 CK-7 SN-8

PATTERN PRINT KPAD
1-7

4. Press a key from 1 to 7. A test pattern is printed.

4.1.13. Operation Panel Test (Function 97)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

2. **9** **7** **Yes**

3. **4**

FUNCTION Y/▽
9 SERVICE FUNCTIONS

SCN-1 DT-2 PL-3 LD-4
MDM-5 RI-6 CK-7 SN-8

4.1.14. Modem Test (Function 97)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

FUNCTION Y/▽
9 SERVICE FUNCTIONS

2. **9** **7** **Yes**

SCN-1 DT-2 PL-3 LD-4
MDM-5 RI-6 CK-7 SN-8

3. **5**

MODEM TEST
G3-1 TONE-2

4. Either:

Test G3 carrier signals - **1** . Go to step 5.

Test frequencies - **2** . Go to step 8.

5. The display is as shown opposite.

9600-1 7200-2
4800-3 2400-4 300-5

Press the required key.

Example: Test the 9600 bps carrier **1** **Start**

6. To stop the test: **Stop**

7. Either:

Test another tone: Go to step 5.

Finish: **Function**

8. The display is as shown opposite.

2100-1 1100-2 800-3
PRESS KEYPAD

Press the required key.

Example: To test 1100 Hz, press **2** **Start**

9. To stop the test: **Stop**

10. Either:

- Test another tone: Go to step 8.

- Finish: **Function**

4.1.15. Ringer Test (Function 97)

Not used; do not try to operate this function.

4.1.16. Buzzer Test (Function 97)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

FUNCTION Y/▽
9 SERVICE FUNCTIONS

2. **9** **7** **Yes**

SCN-1 DT-2 PL-3 LD-4
MDM-5 RI-6 CK-7 SN-8

3. **7**

Press the Stop key to stop the buzzer.

4.1.17. Sensor Initialization (Function 97)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

FUNCTION Y/▽
9 SERVICE FUNCTIONS

2. **9** **7** **Yes**

SCN-1 DT-2 PL-3 LD-4
MDM-5 RI-6 CK-7 SN-8

3. **8**

NOW SETTING SENSORS

The reflective photosensors in the printer are initialized. Any defective sensor will be indicated on the display.

SB4: Paper end sensor

SB5: Paper jam sensor

Do not switch the machine off and/or cover the sensors with paper before this test.

4.1.18. Serial Number (Function 98)

1. **Function** **5** **1** **9** **9** **1**
then immediately **Yes**

FUNCTION	Y/▽
9 SERVICE FUNCTIONS	

2. **9** **8** **Yes**

SERIAL #	KPAD
■■■■■■■■■■■■■■■■■■■■	

3. Enter the machine's serial number at the ten key pad.

SERIAL #	KPAD/Y/N
7940479186	

To correct a mistake: **No**

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

4.1.19. Pulse Width (Function 99)

1. **Function** **5** **1** **9** **9** **1**
them immediately **Yes**

FUNCTION	Y/▽
9 SERVICE FUNCTIONS	

2. **9** **9** **Yes**

PULSE WIDTH	HEAD
0.30MS	A

3. Enter the pulse width at the ten key pad. Do not adjust the head width; keep this at A at all times.
Example: 0.45 ms.

0 **4** **5** **Function**

4

4.1.20. Bypassing Restricted Access

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

1.
2. Immediately press Quick Dial key

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

4.1.21. Printing all Memory Files (Function 23 [Type A] or 24 [Type B])

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

1.
or

FILE NO

2. Press .

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

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

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

4.2. BIT SWITCHES

WARNING

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

Bit Switch 00		
	FUNCTION	COMMENTS
0	MTF process 0: Enabled 1: Disabled	0: The MTF process is used when required by the software. 1: The MTF process is never used.
1	RAM reset level 2 1: Reset	When this bit is set to 1, some items stored in the RAM are reset, and then this bit changes back to 0. All items are reset except the sensor data, pulse width, and the clock. Also, all image files in the SAF memory are erased.
2	RAM reset level 3 1: Reset Note: RAM reset level 1 is a RAM adjustment. It is not described in this manual.	When this bit is set to 1, some items stored in the RAM are reset, then this bit changes back to 0. All items are reset except the bit switch and NCU parameter settings, sensor data, pulse width, clock, own tel. no., CSI, RTI, TTI, Quick Dials, Speed Dials, Groups, and the TCR memory. Also, all image files in the SAF memory are erased. This bit switch is recommended for use when it is necessary to clear the SAF, as fewer RAMs will need reprogramming.
3	Memory file forwarding 1: Forward the files	Use this if the printer does not work, but the user wishes to print the files. First, change the fax machine's telephone number (Function 51) to the number to which you wish to forward the files, then set this bit to 1. All files in the memory will be forwarded. This bit resets to 0 automatically. However, you must return the fax machine's telephone number to the original setting. The files stay in memory.
4	Inclusion of technical data on the TCR 0: No 1: Yes	1: Instead of the personal code, the following data are listed on the TCR as a six-figure number. First two numbers: Final modem rate (for example, 96 means 9,600 bps) Second two numbers (Rx mode only): Rx signal level (Level = 0 - 0.375x, where x is the value on the report; accurate to 3 dB) Third two numbers (Rx mode only): Rx cable equalizer; 00 = Equalizer is Off, 01 = Equalizer is On
5	Monitor speaker during video data communication (tx and rx) 0: Disabled 1: Enabled	Used for testing. Set this bit to 1 to hear the fax data signal (phase C of CCITT T.30 protocol). Make sure that you reset this bit after testing.
6	Not used	Do not change the factory setting.
Continued on the next page		

Bit Switch 00		
	FUNCTION	COMMENTS
7	Communication parameter display 0: Disabled 1: Enabled	This is a fault-finding aid. The LCD shows the key parameters (see the next page). This is normally disabled because it cancels the CSI display for the user. Make sure that you reset this bit after testing. See below for information about this display.

Communication Parameter Display

Modem rate (bps)	Sub-scan Resolution	Coding	Width and reduction	Mode	I/O Rate (ms/line)
96: 9600 72: 7200 48: 4800 24: 2400	S: 3.85 l/mm D: 7.7 l/mm F: 15.4 l/mm	1D: MH 2D: MR 1E: MH+ EFC 2E: MR+ EFC 1C: MH+ ECM 2C: MR+ ECM MC: MMR+ ECM	A: A4 [8.3"] B: B4 [10.1"] C: A3 [11.7"] N: No reduction R: Reduction	DCS: CCITT G3 NSS: Non-standard G3	0M: 0 5M: 5 10M: 10 20M: 20 40M: 40

Bit Switch 01		
	FUNCTION	COMMENTS
0	LCD contrast	Use these bit switches to adjust the brightness of the LCD on the operation panel.
1	Bit 2 1 0 Contrast 0 0 0 Brightest	
2	0 0 1 ↓ 1 1 0 ↓ 1 1 1 Darkest	
3	Memory read/write by RDS Bit 4 3 Setting 0 0 Always enabled 0 1 User selectable	(0,0): At any time, an RDS system can read or write RAM data such as TTI, RTI, and bit switches. (0,1), (1,0): Normally, RDS systems are locked out, but the user can temporarily switch RDS on to allow an RDS operation to take place. RDS will automatically switch off again after a certain time, which is stored in a RAM address (see section 4-5). Note that, if an RDS operation takes place, RDS will not switch off until this time limit has expired. (1,1): All RDS systems are always locked out.
4	1 0 User selectable 1 1 Always disabled	
5	Dedication transmission parameter programming/printing all SAF files 0: Disabled 1: Enabled	This bit must be at 1 in order to program dedicated transmission parameters or to print all files stored in the SAF memory.
6	Not used	Do not change the factory settings.
7		

Bit Switch 02			
	FUNCTION	COMMENTS	
0	Not used	Do not change the factory settings.	
1			
2			
3	Near-end indication 0: Disabled 1: Enabled	When paper roll near-end has been detected, the Replace Paper indicator blinks to warn the user. If this bit is 1, this function is disabled.	
4	Minimum printout length 0: 75 mm 1: 150 mm	This bit switch determines the minimum length of paper that is always fed out after printing. If the received message is shorter than this, there will be a blank space after the message to make up the minimum length.	
5	Not used	Do not change the factory setting.	
6	Maximum transmittable document length	If the user wants to send very long documents such as well logs, use the 14 m or 100 m setting.	
	Bit 7 6 Setting		
	0 0 600 mm		
7	0 1 1200 mm		
	1 0 14 m		
	1 1 100 m		

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

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

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

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

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

Bit Switch 08 (Transmission)					
	FUNCTION				COMMENTS
0	Initial Tx modem rate				These bits set the initial starting modem rate for transmission. This rate may fall back to a slower rate depending on line conditions and the remote terminal's capabilities.
	Bit 2	Bit 1	Bit 0	Setting	
1	0	1	1	9,600 bps	
	0	1	0	7,200 bps	
2	0	0	1	4,800 bps	
	0	0	0	2,400 bps	
	Other settings: Not used				
3	Not used				Do not change the factory settings.
4					
5					
6					
7					

Bit Switch 09 (Transmission)		
	FUNCTION	COMMENTS
0	CNG signal transmission in manual transmission mode 0: Disabled 1: Enabled	CNG (calling tone) is normally used by auto-dial fax machines to alert a manual machine operator that an auto-transmitting machine is on the line waiting to transmit. This tone is not needed for manual operation (full number dialing).
1	Wrong connection prevention method	(0,1) - The machine will not transmit if the last 8 digits of the received CSI do not match the last 8 digits of the dialed telephone number. This does not work for manual dialing. (1,0) - The same as above, except that only the last 4 digits are compared. (1,1) - The machine will not transmit if the other end does not identify itself with an RTI or CSI. (0,0) - Nothing is checked; transmission will always go ahead.
2	Bit 2 Bit 1 Setting 0 0 None 0 1 8 digit CSI 1 0 4 digit CSI 1 1 CSI/RTI	
3	Closed network (transmission) 0: Disabled 1: Enabled	
4	Monitor speaker status during memory transmission 0: Off 1: On	
5	Not used	
6		Do not change the factory settings.
7		

Bit Switch 0A (Reception)					
	FUNCTION				COMMENTS
0	Initial Rx modem rate				The setting of these bits is used to inform the sending machine of the initial starting modem rate for the machine in receive mode. If 9,600 bps presents a problem during reception, use a lower setting.
	Bit 2	Bit 1	Bit 0	Setting	
1	0	1	1	9,600 bps	
	0	1	0	7,200 bps	
2	0	0	1	4,800 bps	
	0	0	0	2,400 bps	
	Other settings: Not used				
3	Not used				Do not change the factory settings.
4					
5					
6	Cable equalizer (rx mode) 0: Off 1: On				Set this bit to 1 if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. Also, try using the cable equalizer if one or more of the following symptoms occurs. <ul style="list-style-type: none">• Communication error with error codes such as 0-20, 0-23, etc.• Modem rate fallback occurs frequently.
7	Not used				Do not change the factory setting.

Bit Switch 0B (Reception)						
	FUNCTION				COMMENTS	
0	Closed network (reception) 0: Disabled 1: Enabled				1: Reception will not go ahead if the ID code of the other terminal does not match the ID code of this terminal. This feature may not be reliable when communicating with another maker's product.	
1	Training error tolerance 0: Type 1 1: Type 2				This bit determines the values available with bits 2 and 3.	
2	Training error tolerance				Type 1 can be used anywhere. Type 2 is normally used only in Europe. If the machine detects more errors during training than the number set by these bits, training fails and the machine will send FTT. The data will be resent at a lower rate.	
3	Bit	3	2	Type 1		Type 2
		0	0	15		14
		0	1	10		9
		1	0	2		4
	1	1	0	1		
4	Not used				Do not change the factory settings.	
5						
6						
7						

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

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

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

Bit switches 0F to 1F are not used. Do not change any of the factory settings.

Factory Settings

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

Switch	Setting	Switch	Setting	Switch	Setting	Switch	Setting
00	00	08	03	10	00	18	00
01	02	09	01	11	00	19	00
02	40	0A	03	12	00	1A	00
03	08	0B	00	13	00	1B	00
04	03	0C	00	14	00	1C	00
05	23	0D	00	15	00	1D	30
06	FF	0E	00	16	00	1E	01
07	06	0F	11	17	00	1F	85

4.3. NCU PARAMETERS

The following tables give the RAM addresses and units of calculation of the parameters that the machine uses for ringing signal detection and automatic dialing. The factory settings are also given. Most of these must be changed by RAM read/write (Function 95), but some can be changed using NCU Parameter programming (Function 96); if Function 96 can be used, this will be indicated in the Remarks column. The RAM is programmed in hex code unless (BCD) is included in the Unit column.

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

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

Address	Function	Unit	Remarks
414D	PABX dial tone upper frequency limit (HIGH)	Hz (BCD)	See Note 2.
414E	PABX dial tone upper frequency limit (LOW)		
414F	PABX dial tone lower frequency limit (HIGH)		
4150	PABX dial tone lower frequency limit (LOW)		
4151	PABX dial tone detection time	20 ms	If 4151 contains FF, the machine pauses for the pause time (4155).
4152	PABX dial tone reset time	160 ms	
4153	PABX dial tone continuous tone time	20 ms	
4154	PABX dial tone permissible drop time		
4155	PABX wait interval	160 ms	
4156	PABX ring back tone detection time	20 ms	Detection is disabled if this contains FF.
4157	PABX busy tone upper frequency limit (HIGH)	Hz (BCD)	If this is FF, detection is disabled. See Note 2. See Note 2.
4158	PABX busy tone upper frequency limit (LOW)		
4159	PABX busy tone lower frequency limit (HIGH)		
415A	PABX busy tone lower frequency limit (LOW)		
415B	Busy tone ON time: range 1	20 ms	
415C	Busy tone OFF time: range 1		
415D	Busy tone ON time: range 2		
415E	Busy tone OFF time: range 2		
415F	Busy tone ON time: range 3		
4160	Busy tone OFF time: range 3		
4161	Busy tone ON time: range 4		
4162	Busy tone OFF time: range 4		
4163	Busy tone continuous tone detection time		
4164	Busy tone signal state time tolerance for all ranges, and number of cycles required for detection (a setting of 4 cycles means that ON-OFF-ON or OFF-ON-OFF must be detected twice). <div>Tolerance (±) Bit 1 0 0 0 75% 0 1 50% 1 0 25% 1 1 12.5%</div> Bits 7, 6, 5, 4 - number of cycles required for detection		

Address	Function	Unit	Remarks
4165	International dial tone upper frequency limit (HIGH)	Hz (BCD)	See Note 2.
4166	International dial tone upper frequency limit (LOW)		
4167	International dial tone lower frequency limit (HIGH)		
4168	International dial tone lower frequency limit (LOW)		
4169	International dial tone detection time	20 ms	If 4169 contains FF, the machine pauses for the pause time (416D).
416A	International dial tone reset time	160 ms	
416B	International dial tone continuous tone time	20 ms	
416C	International dial tone permissible drop time		
416D	International dial wait interval	160 ms	
416E	Country dial tone upper frequency limit (HIGH)	Hz (BCD)	See Note 2.
416F	Country dial tone upper frequency limit (LOW)		
4170	Country dial tone lower frequency limit (HIGH)		
4171	Country dial tone lower frequency limit (LOW)		
4172	Country dial tone detection time	20 ms	If 4172 contains FF, the machine pauses for the pause time (4176).
4173	Country dial tone reset time	160 ms	
4174	Country dial tone continuous tone time	20 ms	
4175	Country dial tone permissible drop time		
4176	Country dial wait interval	160 ms	
4177	Grounding time (ground start mode)	20 ms	Not used in the USA.
4178	Break time (flash start mode)	1 ms	The Di relay is open for this interval.
4179	International dial access code	BCD	For a code of 100: 4179 - F1 417A - 00
417A			
417B	PABX pause time	20 ms	
417C	Progress tone detection level, and cadence detection enable flags	Bit 7 Bit 6 dBm 1 1 -53 1 0 -32.5 0 1 -40.5 0 0 -29 Bits 3, 2, 1, 0 - Europe only.	
417D	CCITT T1 time	2.56 s	

Address	Function	Unit	Remarks
417E	Max. number of dials per station (not using memory)	1	
417F	Redial interval (not using memory)	1 min	
4180	Interval between dialing to different stations	2.56 s	
4181	Tx level from modem	- dBm	Function 96 (parameter 01).
4182	Acceptable ringing signal frequency: range 1, upper limit	1000/.672N (Hz). N is the value stored using Function 96.	Function 96 (parameter 02).
4183	Acceptable ringing signal frequency: range 1, lower limit		Function 96 (parameter 03).
4184	Acceptable ringing signal frequency: range 2, upper limit		Function 96 (parameter 04).
4185	Acceptable ringing signal frequency: range 2, lower limit		Function 96 (parameter 05).
4186	Number or rings until a call is detected	1	Function 96 (parameter 06).
4187	Minimum required length of the first ring	20 ms	See Note 4. Function 98 (parameter 07).
4188	Minimum required length of the second and subsequent rings		Function 96 (parameter 08).
4189	Ringing signal detection reset time	40 ms	Function 96 (parameter 09).
418A	Time between opening or closing the Ds relay and opening the Di relay (Europe/Asia only)	1 ms	See Note 3. Function 96 (parameter 10).
418B	Break time for pulse dialing		See Note 3. Function 96 (parameter 11).
418C	Make time for pulse dialing		See Note 3. Function 96 (parameter 12).
418D	Time between final Di relay closure and Ds relay opening or closing (Europe/Asia only)		See Note 3. Function 96 (parameter 13).
418E	Pause between dialed digits (pulse dial mode)	20 ms	See Note 3. Function 96 (parameter 14).
418F	Time waited when a pause is entered at the operation panel		Function 96 (parameter 15).
4190	DTMF tone on time	1 ms	Function 96 (parameter 16).
4191	DTMF tone off time		Function 96 (parameter 17).
4192	DTMF tone attenuation value	- dBm	Function 96 (parameter 18). See Note 5.
41B3	Max. time limit to dial a number	2.56 s	All countries: 15[H] (53.76 s)
41B4	Max. no of consecutive pauses in a telephone number	Hex	Germany: 1, Others: 250

Notes

1. If a setting is not required, store FF in the address.
2. Tone frequencies are stored in BCD in the following format.
Examples:
a) 380 Hz HIGH 0 3 LOW 8 0
b) 1210 Hz HIGH 1 2 LOW 1 0
3. Pulse dial parameters (addresses 418A to 418F) are the values for 10 pps. If 20 pps is used, the machine automatically compensates.
4. The first ring may not be detected until 1 to 2.5 wavelengths after the time specified by this parameter.
5. N must be between 0 and 15.

The attenuation levels are as follows.

High frequency tone: - N dBm

Low frequency tone: - N - 3 dBm

On the following pages, there is a list of factory settings for those parameters that are programmed for the USA version of this machine.

For each RAM address, there are two columns.

- The left hand column shows the actual value of the parameter.
- The right hand column shows the value of the factory setting that is stored in the RAM. The factory settings are quoted either in hexadecimal code (the actual contents of the RAM address) if there is a H after the value in the table, or in decimal (converted from the actual hexadecimal contents of the RAM address) if there is no H after the value.
- Some RAMs must be programmed in BCD. See the NCU parameter definitions for details.

Address	4147		4155		416D		4176	
Value	2.08 s	13	4 s	25	0	0	0	0

Address	4177		4178		417C		417D		417E	
Value	0	0	0	0	-53	C0(H)	53.8 s	21	3	3

Address	417F		4180		4181		4182(Hz)		4183 (Hz)	
Value	5	5	12.8 s	5	-6 dB	6	23.3	64	11.7	127

Address	4184 (Hz)		4185 (Hz)		4186		4187		4188	
Value	74.4	20	22.2	67	1	1	0.2 s	10	0.2 s	10

Address	4189		418A		418B		418C		418D	
Value	8 s	200	80 ms	80	62 ms	62	41 ms	41	80 ms	80

Address	418E		418F		4190		4191		4192	
Value	0.8 s	40	2.02 s	101	0.1 s	100	0.1 s	100	8	8

Ringback Tone Detection Parameters for Auto Select Reception Mode

In Auto Select mode, the machine waits for CED if it receives a ringing signal. If it does not receive CED, it rings the buzzer and sends a ringback tone back through the network to the transmitter. The frequency and cadence of this generated ringback tone are determined by the following RAM addresses.

These RAMs are not changed by the country code. If the required values differ from the default values, they must be adjusted at installation if necessary. A table of default values and values for various countries follows the RAM address table.

Address	Function	Unit	Remarks
41CF	Ringback tone frequency (high byte)	65536F/9600 (Hex)	F is the required frequency in Hz. Convert the obtained value to hex code.
41D0	Ringback tone frequency (low byte)		
41D1	On time: range 1	20 ms	
41D2	Off time: range 1		
41D3	On time: range 2		
41D4	Off time: range 2		

Country	Frequency (Hz)	Cadence
Europe version defaults	430 (0B77 is stored in RAM)	0.4 s on/0.2 s off (RAM: On times, 14[H], Off times, 0A[H])
Asia version defaults	400 (0AAB is stored in RAM)	1 s on/2 s off (RAM: On times, 32[H], Off times, 64[H])
Austria	The Europe default value is acceptable.	1 s on/5 s off (RAM: On 32[H], Off FA[H])
Belgium		1 s on/3 s off (RAM: On 32[H], Off 96[H])
Denmark		1 s on/4 s off (RAM: On 32[H], Off C8[H])
Finland		1 s on/4 s off (RAM: On 32[H], Off C8[H])
France		1.5 s on/3.5 s off (RAM: On 4B[H], Off AF[H])
Germany		1 s on/4 s off (RAM: On 32[H], Off C8[H])
UK, Ireland		The Europe default value is acceptable.
Italy		1 s on/4 s off (RAM: On 32[H], Off C8[H])
Holland		1 s on/4 s off (RAM: On 32[H], Off C8[H])
Norway		1 s on/4 s off (RAM: On 32[H], Off C8[H])
Portugal		1 s on/5 s off (RAM: On 32[H], Off FA[H])
Spain		1.5 s on/3 s off (RAM: On 4B[H], Off 96[H])
Sweden		1 s on/5 s off (RAM: On 32[H], Off FA[H])
Switzerland		1 s on/4 s off (RAM: On 32[H], Off C8[H])
USA	The Asia default value is acceptable.	The Asia default value is acceptable.
Japan		

4.4. DEDICATED TRANSMISSION PARAMETERS

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

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

4.4.1. Programming Procedure

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

Example: Change the Parameters in Quick Dial 10.

3. **Function** **3** **2** **Yes**

QUICK ■	QUICK/▽
PRINT LIST ▽	

4. Press Quick Dial key **10**

QUICK 10	Y/N
SET PARAMETER?	

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

5. **Yes**

TX PARAMETER 1	Y
1111 1111	

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

Example: Change bit 7 to 0: **7**

TX PARAMETER 1	Y
0111 1111	

7. Either:

- Select another byte: **Yes** until the correct byte is displayed. Then go to step 6. If you press Yes while byte 3 is displayed, you can go back to step 4 and select another number.
- Finish: **Function**

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

4.4.2. Parameters

Byte 1					
	FUNCTION			COMMENTS	
0	Initial Tx modem rate			If training with a particular remote terminal always takes too long, the initial modem rate may be too high. Reduce the initial Tx modem rate using these bits.	
	Bit 1	Bit 0	Setting		
1	0	0	9,600 bps		
	0	1	7,200 bps		
	1	0	4,800 bps		
	1	1	2,400 bps		
2	Tx level			If communication with a particular remote terminal often contains errors, the signal level may be inappropriate. Adjust the Tx level for communications with that terminal until the results are better.	
	Bit 2	3	4	5	Level
3	(dBm)				
	0	0	0	0	0
4	0	0	0	1	-1
	0	0	1	0	-2
5	0	0	1	1	-3
	and so on until				
	1	1	1	1	-15
6	Not used			Do not change the factory setting.	
7	Dedicated transmission parameters for this Quick/Speed Dial number 0: Disabled 1: Enabled			<p>0: The parameters in these three bytes will be ignored. The current settings of the relevant bit switches, NCU parameters, and RAM addresses will be used.</p> <p>1: The parameters in these three bytes will be used when transmitting to the fax number stored in the Quick Dial Key or Speed Dial Code that these bytes are allocated to.</p>	

Byte 2		
	FUNCTION	COMMENTS
0	DIS/NSF detection method 0: First DIS or NSF 1: Second DIS or NSF	Set this bit to 1 if echoes on the line are interfering with the set-up protocol at the start of transmission. The machine will then wait for the second DIS or NSF before sending DCS or NSS.
1	ECM during transmission 0: Enabled 1: Disabled	For example, if ECM is switched on but is not wanted when sending to a particular terminal, set this bit to 1.
2	Not used	Do not change the factory settings.
3		
4		
Continued on the next page		

Byte 2				
	FUNCTION			COMMENTS
5	Bit 6	5	Modes	These bits determine the capabilities that are informed to the other terminal during transmission.
	0	0	MMR, MR, or MH	
6	0	1	MR or MH	
	1	0	MH only	
	1	1	MH only	
7	Short preamble 0: Disabled 1: Enabled			If this bit is 1, Short Preamble is always used when transmitting to this terminal.

Byte 3	
FUNCTION AND COMMENTS	
CCITT T1 timer If you wish to use a different T1 timer than the NCU parameter setting when sending to a particular terminal, adjust this byte. The T1 timer is the BCD value of this byte, multiplied by 2.56 seconds.	
Caution: Note that if the value of this byte is 0, the T1 timer will be 35 s.	



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

4.5. USEFUL RAM ADDRESSES

4044

Bit 0: Remote transfer	0: Enabled, 1: Disabled
Bit 2: Forwarding	0: Enabled, 1: Disabled
Bit 3: Authorized reception	0: Enabled, 1: Disabled
Bit 4: Connection to answering machine	0: Enabled, 1: Disabled
Bit 5: Remote control features	0: Enabled, 1: Disabled
Bit 6: Continuous polling	0: Disabled, 1: Enabled

4045

Bit 0: Display of both RTI and CSI on the LCD	0: Disabled, 1: Enabled
Bit 2: Printout of forwarded messages	0: Disabled, 1: Enabled

4047: Number of page retransmission attempts (Hex code)

4048

Bit 5: Stop key during memory transmission	0: Disabled, 1: Enabled
Bit 6: First page to be retransmitted (memory tx)	0: The page that was not sent correctly, 1: Page 1

4049

Bit 0: Keystroke Program execution method	0: Press the programmed Quick Dial Key 1: Press the programmed Quick Dial Key then the Start key
Bit 2: RDS	0: Enabled, 1: Disabled
Bit 3: On-hook dial	0: Enabled, 1: Disabled
Bit 4: Hold	0: Enabled, 1: Disabled

404B: Contrast threshold - Lighten (Hex code, from 00 to 1F) 00: All Black, 1F: All White

404C: Contrast threshold - Normal (Hex code, from 00 to 1F) 00: All Black, 1F: All White

404D: Contrast threshold - Darken (Hex code, from 00 to 1F) 00: All Black, 1F: All White

4053 Bit 0: Default resolution used for copy mode 0: As selected by the user, 1: Fine

4054 Bit 0: Reduction during printing 0: Disabled, 1: Enabled

4055

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

- One page is about 24 kbytes
- If this is kept at 0, the machine will detect ringing signals and go into receive mode even if there is no memory space left. This will result in communication failure.

4057

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

- 01: Almost all the data will be processed without halftone, even if the fax message contains photographs.
- The threshold increases with increments in the setting from 01 to 1F.
- 00, 1F: Almost all the data will be halftone processed, even if the fax message contains only text.

4058: Number of redialing attempts, including the first dialing attempt (memory tx)

Hex : 00 - FF

4059: Redialing interval (memory tx)

Hex: 00 - FF (minutes)

405D: Time for which RDS is enabled after the user has switched it on BCD: 00 - 99 (hours)

Factory Settings

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

RAM	Setting	RAM	Setting	RAM	Setting
4044	00	404B	12	4055	00
4045	00	404C	10	4057	08
4047	03	404D	0E	4058	05
4048	08	4053	00	4059	05
4049	02	4054	00	405D	24

Note: When programming a RAM address, you have to enter the bank number before the four-digit RAM address. In the Type A model, the bank number is 1; in the Type B model, it is 2. For example, to program RAM address 4044 in the Type B model using Function 95, you have to input 24044.

4.6. SPECIAL TOOLS AND LUBRICANTS

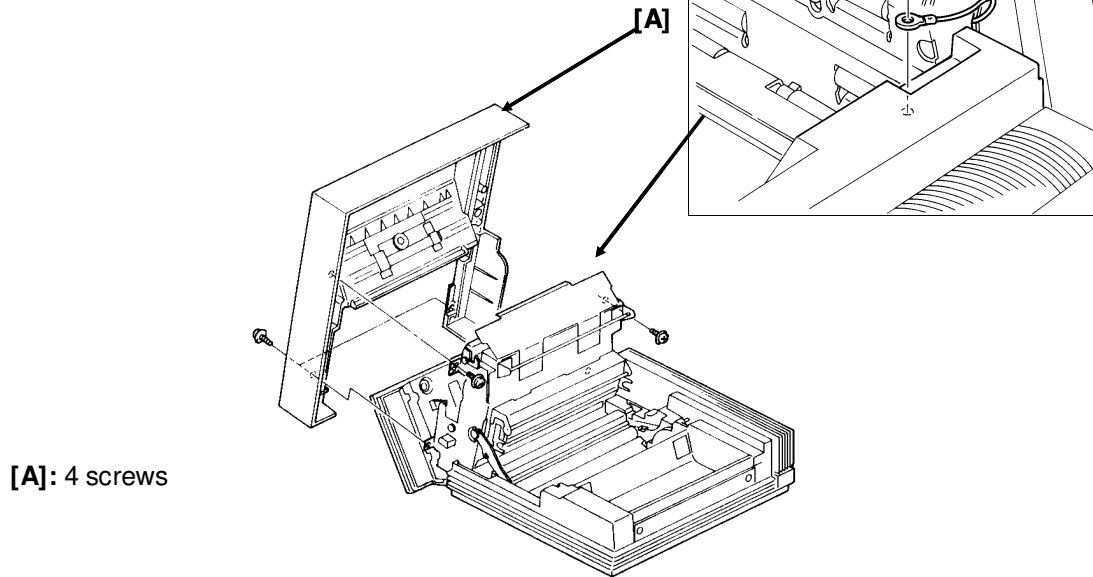
Scan line test chart and 8 line/mm test pattern:
Test lead:
SBU adjustment knobs:

P/N H0539500
P/N H0419002
P/N H0539501

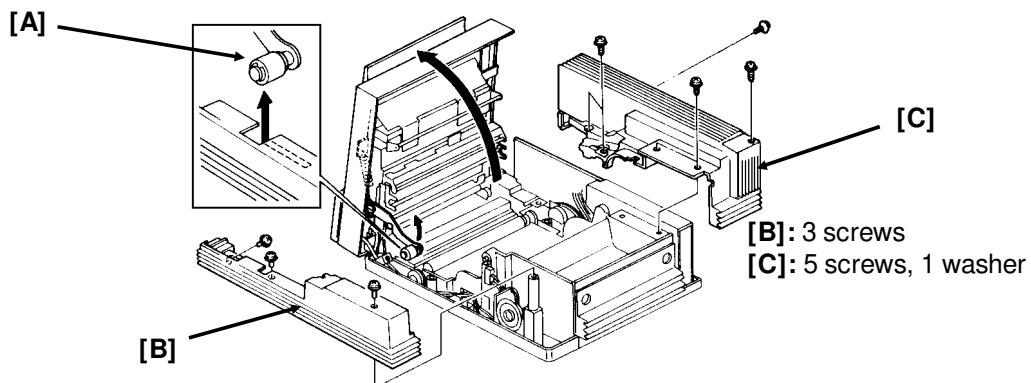
5. REPLACEMENT AND ADJUSTMENT

5.1. COVERS

5.1.1. Top Cover [A]



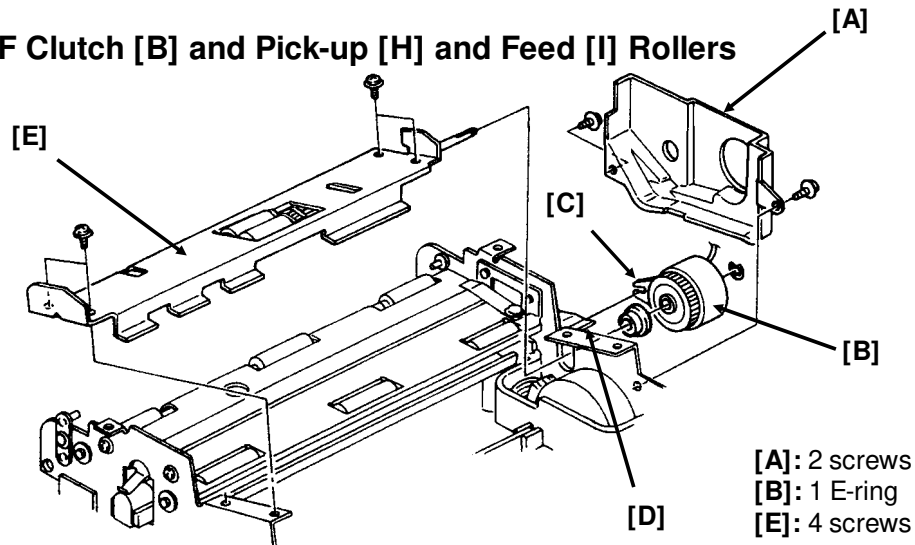
5.1.2. Front [B] and Rear [C] Covers



Caution: Do not damage the cable at the front left side of the machine.

5.2. SCANNER

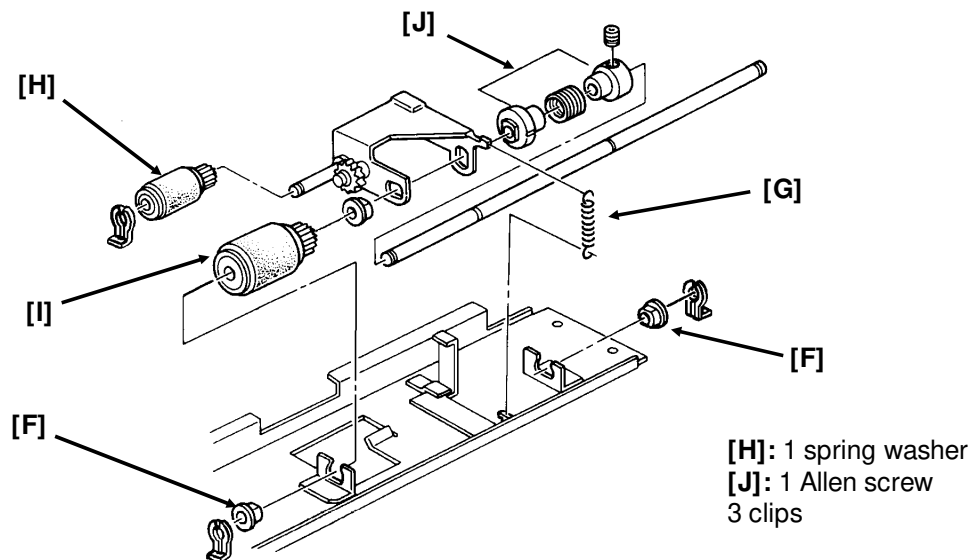
5.2.1. ADF Clutch [B] and Pick-up [H] and Feed [I] Rollers



- First, remove the front and rear covers (see section 5-1).

Reassembly

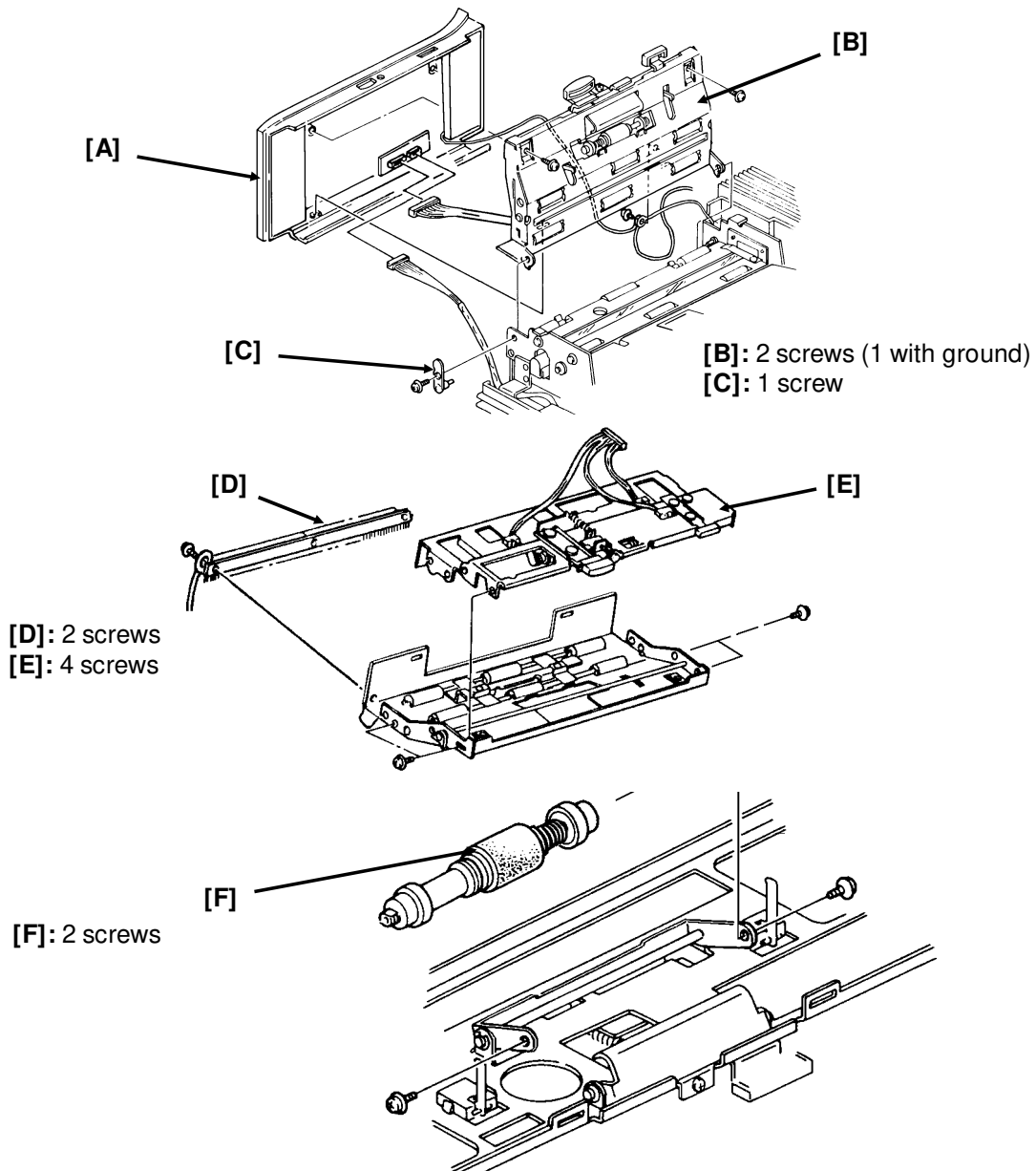
- Place stopper [C] astride bracket [D] as shown, so that rotation of the clutch body will be prevented.
- Hold the ADF clutch harness by the cord keep, to move it away from gears and timing belts.



- If you need to disassemble the one-way clutch [J], see the diagram.

Caution: Do not touch the rubber surface of the new rollers, or document feed problems will occur sooner than normal.

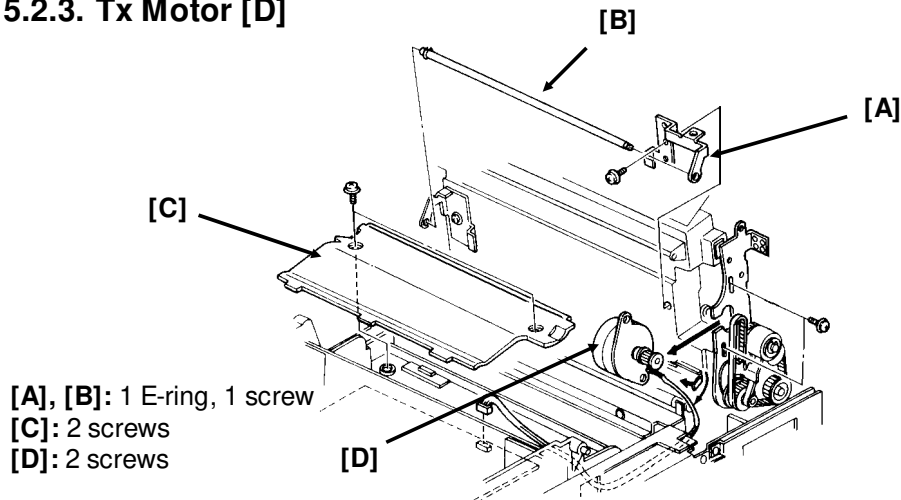
5.2.2. Separation Roller [F]



- When removing [A], lift it up by the part that hangs down just above the document feed area, and ease it off over the cover release button.
- When replacing [A], pull down the part of the cover that hangs above the document feed-out area, so that the pegs on the inside of the cover fit into the slots in the bracket above the document feed-out area.

Caution: Do not touch the rubber surface of the new rollers, or document feed problems will occur sooner than normal.

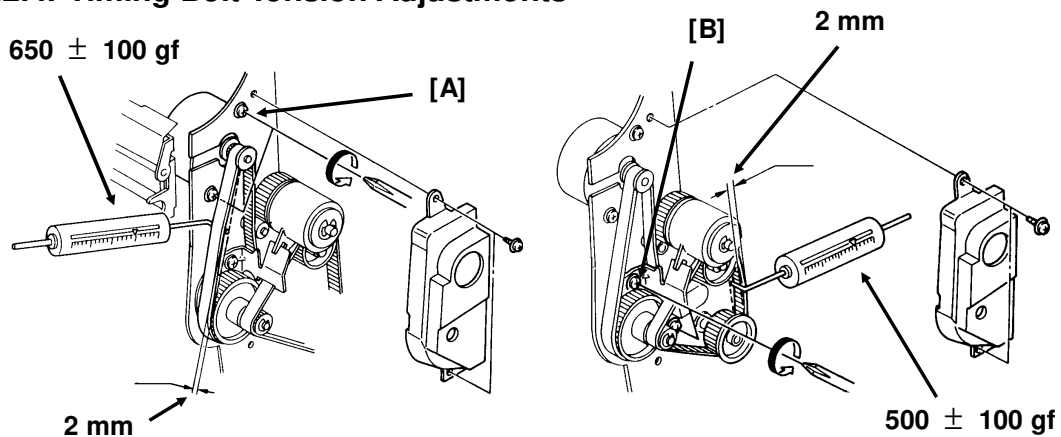
There are no separation roller adjustments in this model.

5.2.3. Tx Motor [D]

- First remove the top and rear covers (see section 5-1), the ADF clutch cover (see section 5-2-1, item [A]), and the thermal head (see section 5-3-2).

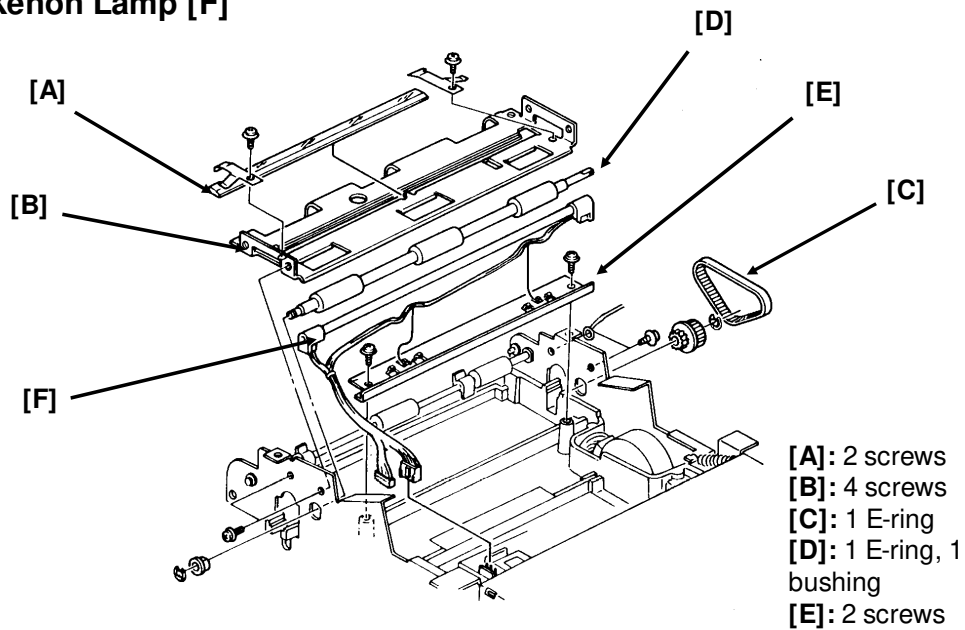
Reassembly

- Before replacing the ADF clutch cover, adjust the timing belts as shown below.

5.2.4. Timing Belt Tension Adjustments

- Loosen screw [A], adjust the belt, then tighten screw [A].
- Loosen screw [B], adjust the belt, then tighten screw [B].

5.2.5. Xenon Lamp [F]



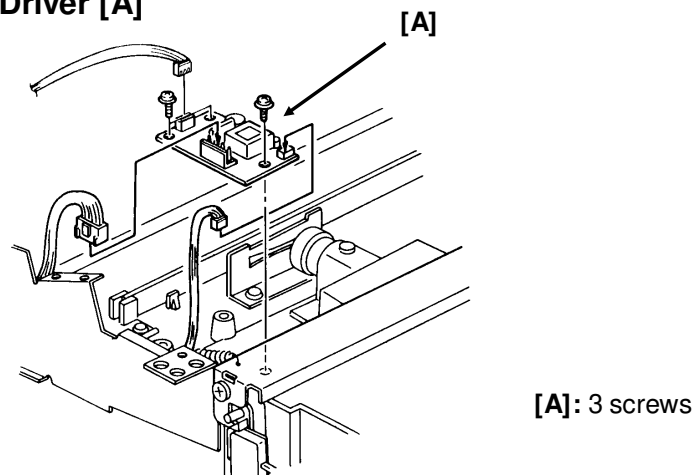
- First remove the top and rear covers (see section 5-1), the ADF clutch (see section 5-2-1), and the lower ADF guide plate ([E] in section 5-2-2).

Caution: Keep the exposure glass [A] in a safe place.

Reassembly

- Test the new lamp before reassembly.
- Clean the exposure glass with a soft cloth before putting it back. Do not get fingerprints on the exposure glass.
- After reassembly, check the tension of the tx motor timing belts (see section 5-2-4).

5.2.6. Xenon Lamp Driver [A]

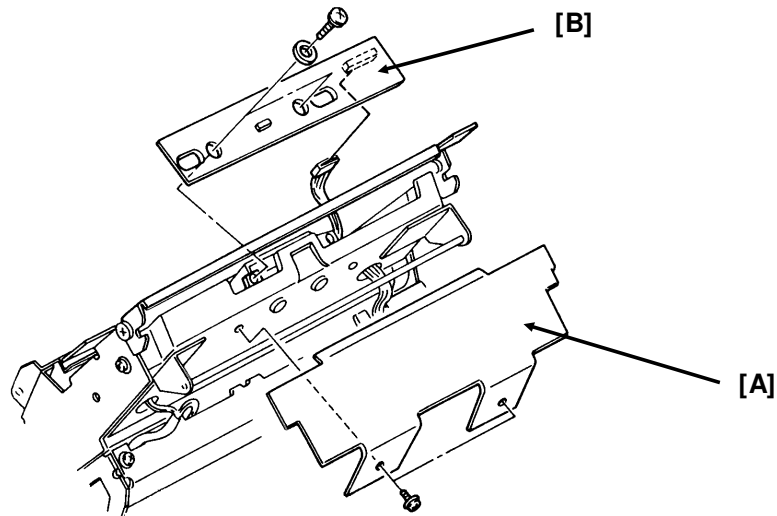


- First, remove the top cover (see section 5-1).

5.2.7. SBU [B]

[A]: 2 screws

[B]: 2 screws



- First, remove the top cover (see section 5-1).
- After installing a new SBU, do the following adjustments, in sequential order.

5.2.8. SBU Adjustments

Tools Required

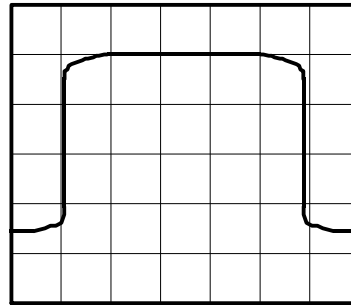
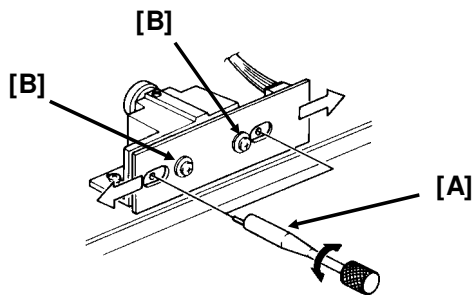
- Scan line test chart and 8 line/mm test pattern: P/N H0539500
- Test lead: P/N H0419002
- SBU adjustment knobs: P/N H0539501
- Allen wrench

Preparation

1. Remove the top cover (see section 5-1) and the SBU cover (see section 5-2-7, item [A]).
2. Set the oscilloscope scale to 0.2 V/unit (vertical) and 0.5 ms/unit (horizontal).
3. Connect the test lead to CN21 on the FCU.
4. Connect the oscilloscope probe to pin 1 (blue wire) and the ground to pin 4 (black wire).
5. Clean the white pressure plate with a soft cloth and alcohol.
6. Light the xenon lamp (see section 4-1-10).

Adjustments

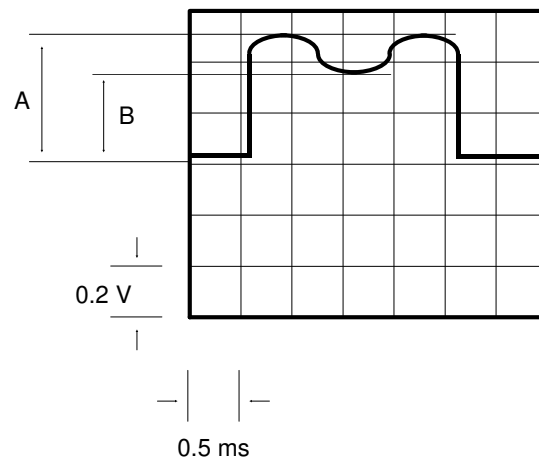
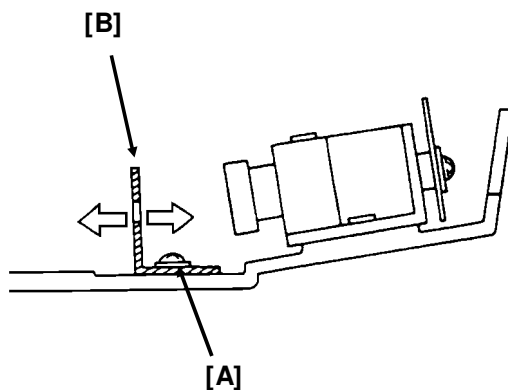
1. White Level



- Fit the adjustment knobs [A] through the slots in the SBU as shown.
- Loosen the SBU securing screws [B].
- Remove any test charts that are on the exposure glass.
- Check that the white level waveform can be seen fully across the oscilloscope. If it cannot be seen properly, turn the adjustment knobs.
- Carefully tighten the SBU securing screws.

If the waveform has irregular patches, the lens, mirror, exposure glass, white pressure plate, or CCD may be dirty.
 If the waveform is lower at the ends than in the middle, the xenon lamp may be wearing out.
 If the waveform has sharp peaks or dropouts, the CCD may be defective.

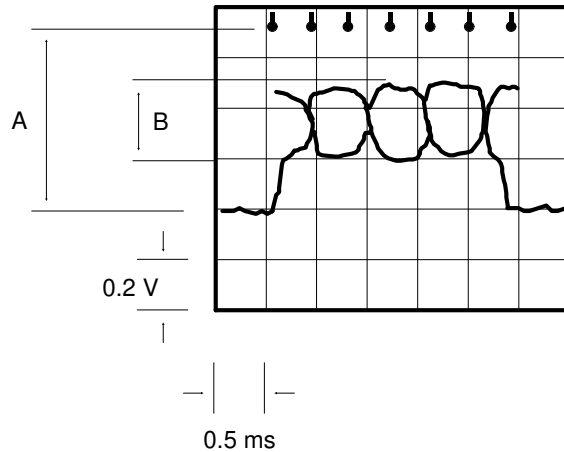
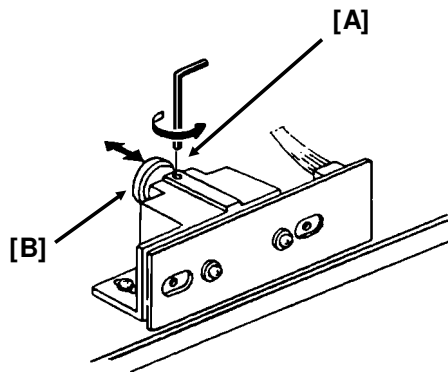
2. Flatness



In the oscilloscope waveform, $(A-B)/A$ must be less than 0.25. If it is not, do the following.

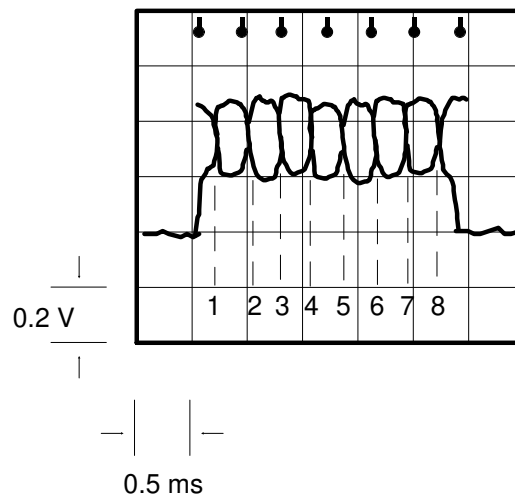
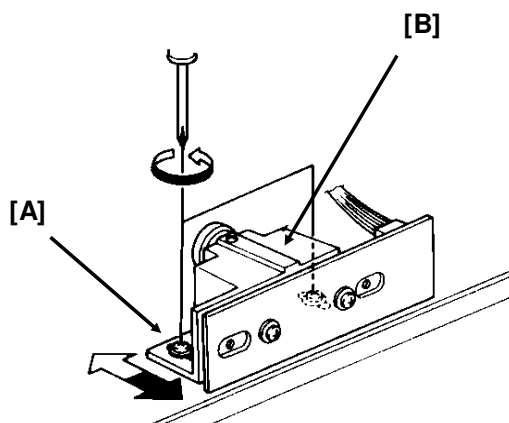
- Remove any test charts that are on the exposure glass.
- Loosen the shading plate securing screws [A].
- Move the shading plate [B] back and forth until the waveform meets the requirements.
- Tighten the shading plate securing screws.

3. Focusing (MTF)



- Place the 8 line/mm test pattern on the exposure glass.
- Loosen the lens securing screw [A] (Allen screw).
- Move the lens [B] back and forth until B is maximized (see the diagram on the right).
- Tighten the lens securing screw.

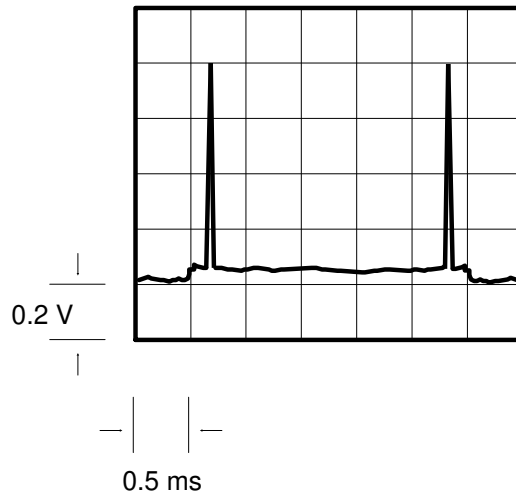
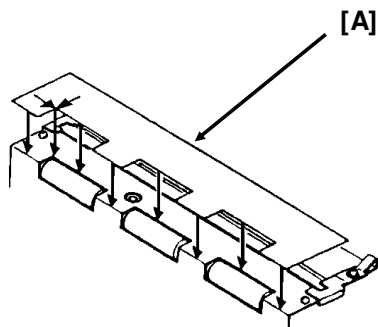
4. Reduction Rate



- Place the 8 line/mm test pattern on the exposure glass.
- Loosen the lens block securing screws [A].
- Move the lens block [B] back and forth until the signal has 8 or fewer crosspoints.
- Tighten the lens block securing screws.

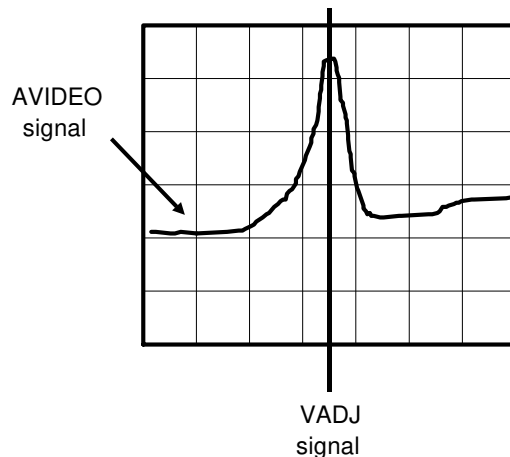
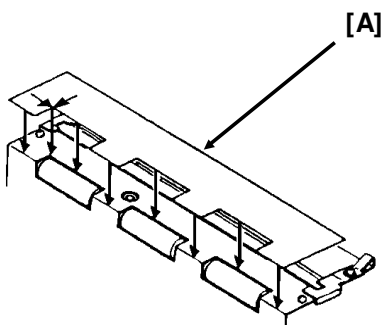
Note: Tighten each screw little by little alternately.

5. Scan Line



- Place the scan line test chart [A] on the exposure glass as shown.
- Loosen the SBU securing screws (see procedure 1).
- Adjust the waveform with the adjusting knobs until the waveform is as shown on the right.

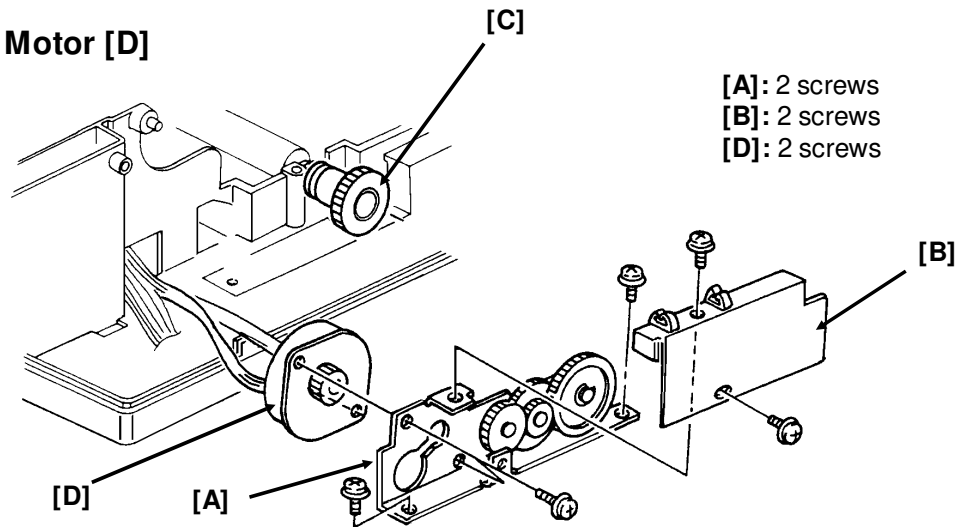
6. Scan Start Position



- Place the scan line test chart [A] on the exposure glass as shown.
- Connect the oscilloscope to the test lead as follows: Channel 1 to AVIDEO (pin 1 - blue wire), channel 2 to VADJ (pin 2 - red wire), and connect up the ground to pin 4 (black wire).
- Set the oscilloscope scales as follows:
Vertical - CH1 0.2 V/unit, CH2 2 V/unit; Horizontal - 2 μ s/unit.
- Gently tap the SBU until the waveform is as shown on the right.
The peak of AVIDEO must be within 4 bits of the peak of VADJ.
- Reset the oscilloscope to the original settings and repeat procedure 5 (Scan Line). It may be necessary to recheck procedures 5 and 6 until the scan line is perfectly positioned.
- Tighten the SBU securing screws.

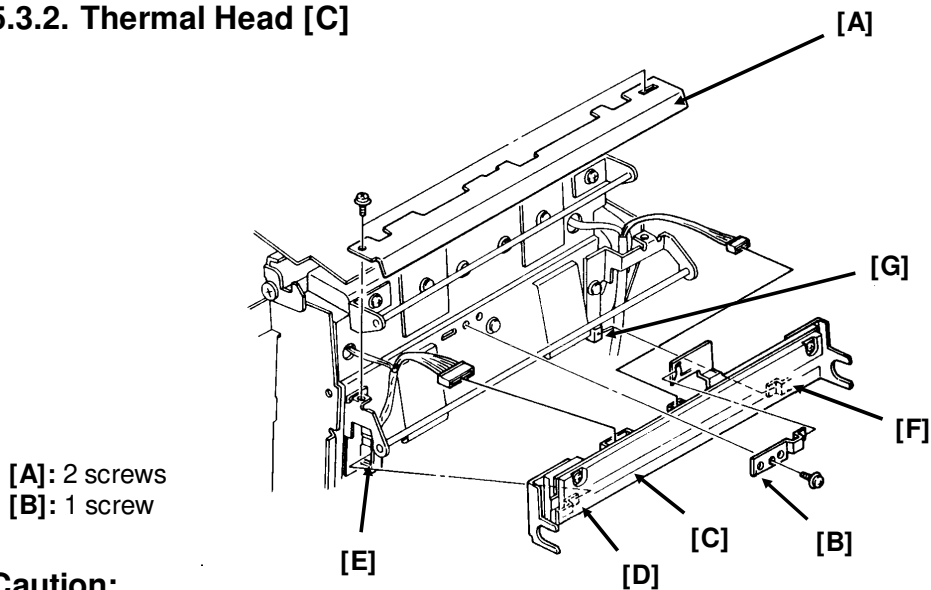
5.3. PRINTER

5.3.1. Rx Motor [D]



- First, remove the rear cover (see section 5-1), and the NCU and PSU (see section 5-4).

5.3.2. Thermal Head [C]



Caution:

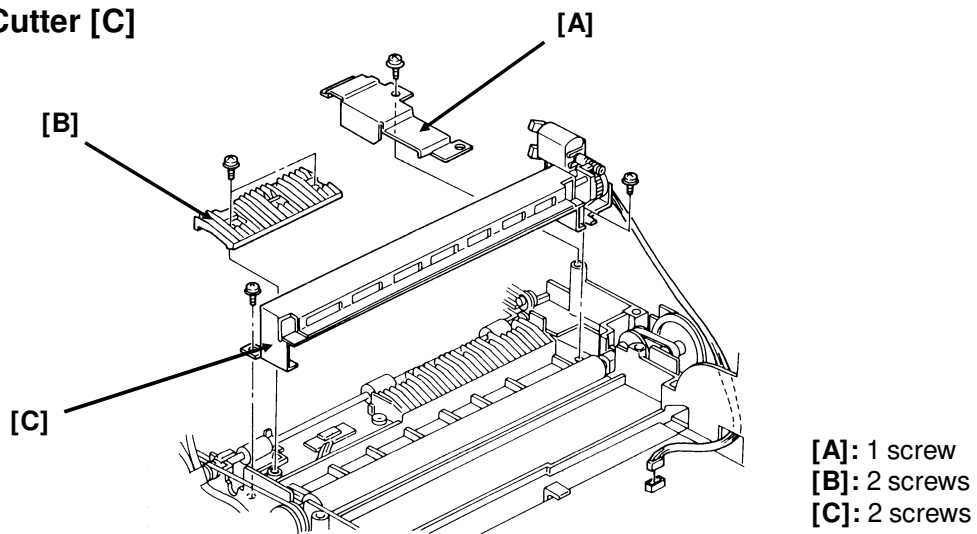
- Do not touch the heating elements of the new thermal head.
- Check that the new thermal head is properly positioned and that the springs pushing the head against the platen roller are in position.

Reassembly

- Fit pin [D] into slot [E] at the front, then fit pin [F] into slot [G] at the rear.
- When replacing plate [B], fit the pegs on the plate into the indents on the main body.
- Program the pulse width (Function 99; see section 4-1-19).

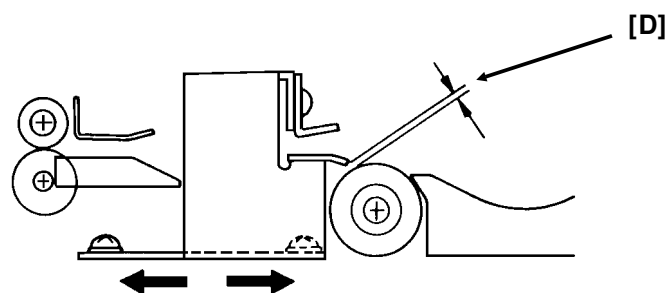


5.3.3. Cutter [C]



- First, remove the cover on the left side of the machine above the copy exit (2 screws). This allows the upper unit to be opened a little more than usual.
- Then remove the rear cover (see section 5-1).

Reassembly:



- Clearance [D] must be 0.3 mm. To adjust [D], loosen the screws that hold the cutter [C], and move the cutter back and forth until the clearance is correct.

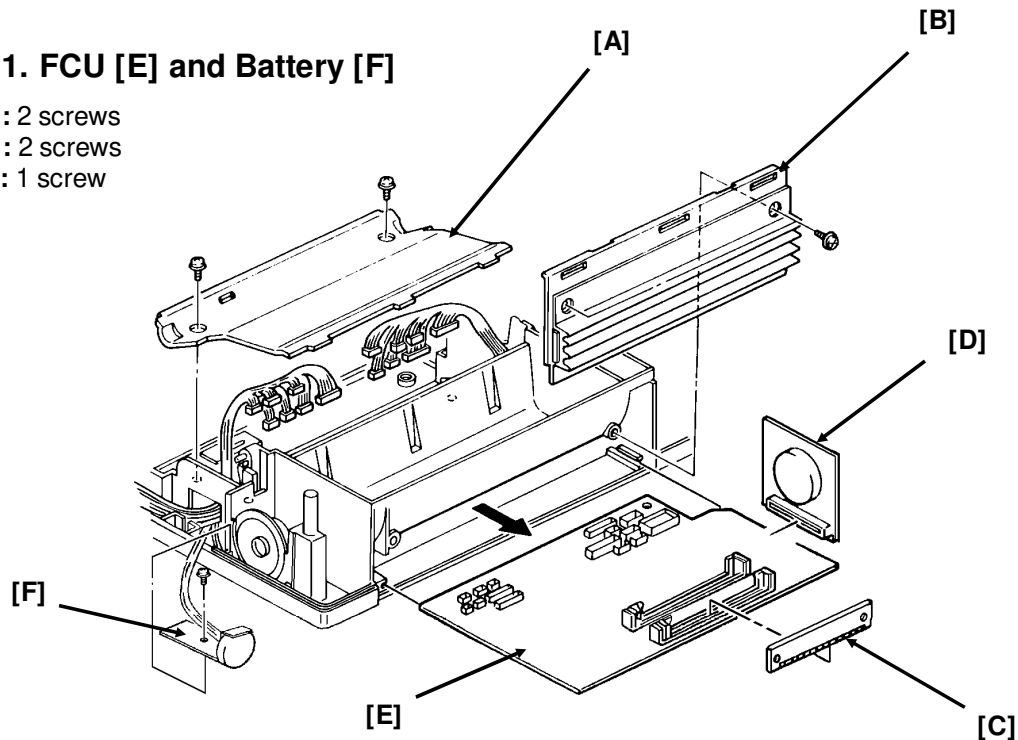
5.4. PCBs

5.4.1. FCU [E] and Battery [F]

[A]: 2 screws

[B]: 2 screws

[F]: 1 screw



Machines with SAF memory: If possible, print a File List and all the messages stored in the memory before starting.

Caution: Do not dislodge the jumper switch on the MBU board, or the machine will have to be reprogrammed.

Reassembly:

Machines with SAF memory: The SAF memory has been erased. The user must reprogram files for transmission that were erased, and must also contact the senders of messages that were received into memory and erased (see the File List). Polling transmission files have also been lost.

5.4.2. Memory

See the previous diagram; the memory is item [C].

5.4.3. MBU

See the previous diagram; the MBU is item [D].

Before removal, do the following.

- If possible, print all the user reports and give them to the user.
- If possible, make a note of the user's current on/off switch settings (Function 61) and ID codes (Function 52). Also, if the user has stored some Auto Documents and Function Programs (see the Quick Dial List), make a note of where each of these were stored.
- If possible, print the following reports and keep them for reference: System Report, Service Monitor Report, Telephone List (service mode, with dedicated tx parameters).

Reassembly:

- Reset the RAM on the new MBU board: to do this take out the battery jumper, then replace it after a few seconds. Make sure that the switch position is ON.
- On the old MBU board, turn the battery switch to OFF.

After reassembly:

- Make a few copy and communication tests.
- Program the thermal head pulse width (Function 99).
- Reprogram the following: RAM addresses that had been changed from the factory settings before the MBU failed, dedicated tx parameters, items listed on the System Report, serial number
- Instruct the user to reprogram the following items: Quick/Speed/Group Dial, date and time, keystroke programs, polling reception files, ID codes, Personal Codes, User Parameters, and other user functions.

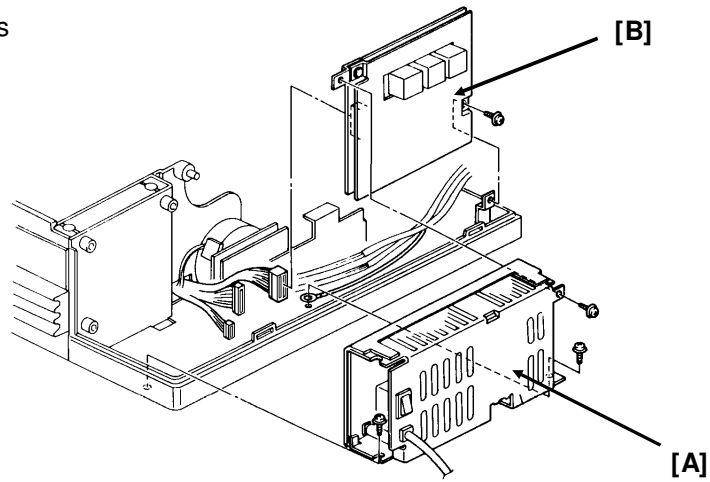


- **Machines with SAF memory:** The SAF memory has been erased. The user must reprogram files for transmission that were erased, and must also contact the senders of messages that were received into memory and erased (see the File List). Polling transmission files have also been lost.

Caution: The MBU for the Type A model is not interchangeable with the MBU for the Type B model.

5.4.4. PSU [A] and NCU [B]

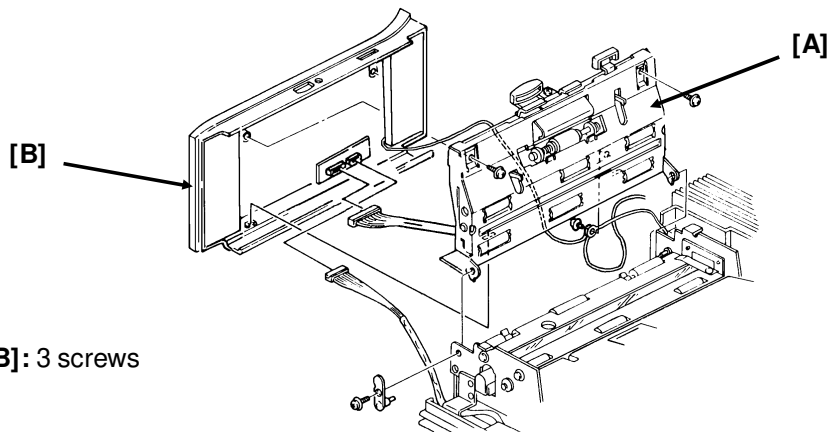
[A], [B]: 4 screws



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

Note: Do not touch the PSU components. They may be hot.

5.4.5. Operation Panel [B]



[A], [B]: 3 screws

6. TROUBLESHOOTING

6.1. COPY QUALITY TROUBLESHOOTING

6.1.1. Received Copies

If there is no fault in the transmitting terminal or on the line, but the copy quality is bad, either:

- Check that the printer cover is closed properly.
- Check the thermal head pulse width.
- Clean the thermal head (soft cloth, do not use water)
- Replace the thermal head or FCU.

If the output is always stretched: Check the printer mechanism.



6.1.2. Copies made in Copy Mode

The following faults must be considered in addition to the printer faults mentioned above.

Symptom	Causes	Remedies
Blank or black copies	Blocked optical path Scanner or PCB failure	Check the optical path. Replace FCU or SBU.
Vertical lines	Dirty mirror, lens, exposure glass, or xenon lamp Error bit in CCD	Clean with a soft cloth. Replace SBU.
Uneven density	Scan line out of position Dirty mirror, lens, exposure glass, or xenon lamp Old xenon lamp	See the SBU adjustments (section 5-2). Clean with a soft cloth. Replace.
Magnification	Check the reduction rate.	See the SBU adjustments (section 5-2).
Blurred characters	Adjust the focusing. Adjust the reduction rate.	
Filled-in characters	Adjust the reduction rate.	
Side-to-side registration error	Adjust the scan start position.	
One side darker than the other	Check the CCD waveform flatness.	
Partial scanning	Scan line is out of position	Replace.
Stretched output	Defective scanner timing belt	

6.2. MECHANICAL PROBLEMS

If there is a mechanical problem that cannot be solved easily, try using the following troubleshooting flow charts, while referring to the point-to-point diagram. The flow charts may not be comprehensive, but they may help you to find the problem.

6.2.1. ADF/Scanner

Symptom: Non feed		
Check	Action if Yes	Action if No
1. Are the covers closed properly?	Go to step 2.	Close the covers securely.
2. Are the rollers in the ADF entrance clean?	Go to step 3.	Clean the rollers with a soft cloth and water.
3. Are the gears and spring clutches clean and working properly?	Go to step 4.	Clean the gears and clutches. Remove any debris from the mechanism.
4. Are the connections between the PSU, FCU, and cover switch loose?	Connect the cables properly.	Go to step 5.
5. Does the FCU receive + 24VD from the PSU when a document is placed in the feeder?	Go to step 10.	Go to step 6.
6. 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 FCU or the operation panel drive PCB. Go to step 7.	Change the cover switch and/or the actuator mechanism.
7. Are the connections between the operation panel, FCU, and document sensor loose?	Connect the cables properly.	Go to step 8.
8. Does the LCD prompt change when a document is placed in the feeder?	Go to step 9.	Replace the document sensor, operation panel PCB, or FCU.
9. Does the FCU send the + 24VD activation signal to the PSU when a document is placed in the feeder?	Replace the PSU.	Replace the FCU.
10. Are the connections between the PSU, FCU, and the tx motor loose?	Connect the cables properly.	Go to step 11.
11. Does the tx motor work?	Go to step 13.	Go to step 12.
12. Does the FCU output power and phase drive signals to the tx motor?	Replace the tx motor.	Replace the FCU.

Symptom: Non feed		
Check	Action if Yes	Action if No
13. Are the connections between the PSU and the ADF clutch loose?	Connect the cables properly.	Go to step 14.
14. Does the FCU send the power and drive signals to the ADF clutch at the correct time?	Replace the ADF clutch.	Replace the FCU.

Symptom: Skew		
Check	Action if Yes	Action if No
1. Are the scanner rollers clean?	Replace the separation roller and or separation plate.	Clean the rollers: Metal - soft cloth and alcohol Rubber - soft cloth and water

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

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

Symptom: Double feed		
Check	Action if Yes	Action if No
1. Is the problem solved by cleaning or lubricating the separation roller?	Finished	Try cleaning or replacing the separation plate. If that does not help, go to step 2.
2. Replace the separation roller.		

Symptom: Dirty document		
Check	Action if Yes	Action if No
Clean the rollers and guide plates. Metal - soft cloth and alcohol Rubber - soft cloth and water		

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

6.2.2. Printer

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 PSU, FCU, and cover sensor loose?	Connect the cables properly.	Go to step 4.
4. Does the FCU receive + 24VD from the PSU when a ringing signal is detected or when Copy is pressed?	Go to step 8.	Go to step 5.
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 FCU or the operation panel drive PCB. Go to step 6.	Change the cover switch and/or the actuator mechanism.
6. Are the connections between the FCU, NCU, and telephone line loose?	Connect the cables properly.	Go to step 7.
7. Does the FCU send the + 24VD activation signal to the PSU when a ringing signal is detected or when Copy is pressed?	Replace the PSU.	Replace the FCU or NCU.
8. Are the connections between the FCU and the paper end sensor loose?	Connect the cables properly.	Go to step 9.
9. Does the Replace Paper indicator light when paper is present?	Initialize the sensors (see section 4-1-17). If a sensor is defective, replace it. Go to step 11.	Go to step 10.
10. Does the signal from the paper end sensor change in the correct way?	Change the FCU.	Replace the paper end sensor.
11. Are the connections between the PSU, FCU, and the rx motor loose?	Connect the cables properly.	Go to step 12.
12. Does the FCU output power and phase drive signals to the rx motor?	Replace the rx motor.	Replace the FCU.



Symptom: Jam		
Check	Action if Yes	Action if No
1. Is the printer jammed with debris?	Clear the debris.	Go to step 2.
2. Initialize the sensors. Is the printer jam sensor good?	Go to step 5.	Go to step 3.
3. Are the connections between the printer jam sensor and the FCU loose?	Connect the cables properly.	Go to step 4.
4. Does the signal from the printer jam sensor change correctly?	Change the FCU.	Replace the printer jam sensor.
5. Are the connections between the FCU and the paper end sensor loose?	Connect the cables properly.	Go to step 6.
6. Does the Replace Paper indicator light when paper is present?	Initialize the sensors (see section 4-1-17). If a sensor is defective, replace it. Go to step 8.	Go to step 7.
7. Does the signal from the paper end sensor change in the correct way?	Change the FCU.	Replace the paper end sensor.
8. Are the connections between the PSU, FCU, and the rx motor loose?	Connect the cables properly.	Go to step 9.
9. Does the rx motor work?	Go to step 11.	Go to step 10.
10. Does the FCU output power and phase drive signals to the rx motor?	Replace the rx motor.	Replace the FCU.
11. Does the cutter sensor mechanism work properly?	Go to step 12.	Correct the fault, then go to step 12.
12. Do a paper cycle. Does the cutter work properly? If not, go to step 13.		
13. Are the connections between the FCU and the cutter loose?	Connect the cables properly.	Replace the FCU and/or cutter motor and/or cutter sensor.

Symptom: Abnormal noise		
Check	Action if Yes	Action if No
1. Is the cover closed?	Go to step 2.	Close the cover.
2. Are the printer mechanisms assembled correctly?	Replace the rx motor or the FCU.	Assemble the machine properly.

6.3. ERROR CODES

If an error code occurs, retry the communication. If the same problem occurs, try to fix the problem as suggested below. Note that error codes 4-00, 01, 02, and 10 only appear in the error code display and on the service report.

Code	Meaning	Suggested Cause/Action
0-00	DIS/NSF not detected within 40 s of Start being pressed	Check the line connection. Check the NCU - FCU connectors. The machine at other end may be incompatible. Replace the FCU 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 - FCU connectors. Try changing the tx level (use NCU parameter 01 or a dedicated tx parameter for that address). Replace the FCU or NCU. The other terminal may be faulty; try sending to another machine. If the rx signal is weak or defective, there may be a bad line.
0-05	Unsuccessful after modem training at 2400 bps	Check the line connection. Check the NCU - FCU connectors. Try adjusting the tx level (use NCU parameter 01, or a dedicated tx parameter for that address). Replace the FCU or NCU. Check for line problems.
0-06	The other terminal did not reply to DCS	Check the line connection. Check the FCU - NCU connectors. Try adjusting the tx level (use NCU parameter 01, or a dedicated tx parameter for that address). Replace the NCU or FCU. The other end may be defective or incompatible; try sending to another machine. Check for line problems.

Code	Meaning	Suggested Cause/Action
0-07	No post-message response from the other end after a page was sent	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. The other end may have jammed or run out of paper. The other end user may have disconnected the call. Check for a bad line. The other end may be defective; try sending to another machine.
0-08	The other end sent RTN or PIN after receiving a page, because there were too many errors	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. The other end may have jammed, or run out of paper or memory space. Try adjusting the tx level (use NCU parameter 01, or a dedicated tx parameter for that address). The other end may have a defective modem/NCU/FCU; try sending to another machine. Check for line problems and noise.
0-14	Non-standard post message response code received	Check the FCU - NCU connectors. Incompatible or defective remote terminal; try sending to another machine. Noisy line: resend. Try adjusting the tx level (use NCU parameter 01 or a dedicated tx parameter for that address). Replace the NCU or FCU.
0-15	The other end does not have the confidential or transfer function	Incompatible remote terminal. Remote terminal memory full.
0-16	CFR or FTT not detected after modem training in confidential or transfer mode	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. Try adjusting the tx level (use NCU parameter 01, or a dedicated tx parameter for that address). The other end may have disconnected, or it may be defective; try calling another machine. If the rx signal level is too low, there may be a line problem.
0-20	Facsimile data not received within 6 s of retraining	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. Check for line problems. Try calling another fax machine. Change the reconstruction time from 6 s to 10 s (bit switch 03, bit 7). Switch the rx cable equalizer on (bit switch 0A, bit 6).
0-21	EOL signal (end-of-line) from the other end not received within 5 s of the previous EOL signal	Check the connections between the FCU, NCU, & line. Check for line noise or other line problems. Replace the NCU or FCU. The remote machine may be defective or may have disconnected.



Code	Meaning	Suggested Cause/Action
0-22	The signal from the other end was interrupted for more than 0.2 s	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. Defective remote terminal. Check for line noise or other line problems.
0-23	Too many errors during reception	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. Defective remote terminal. Check for line noise or other line problems. Ask the other end to adjust their tx level.
1-00	Document jam	Improperly inserted document or unsuitable document type. Clean the document jam sensor. See "Mechanical Operation - Document Jam".
1-01	Document length exceeded the maximum	Divide the document into smaller pieces. Clean the sensors in the ADF/scanner. See "Mechanical Operation - Document Jam".
1-10	Document in the scanning position at power-up	Clear debris from the sensor actuators. Clean the sensors in the ADF/scanner. Check the connections between the sensors and the FCU.
1-17	Document jam in the feed-out area	Replace defective sensor, operation panel board, or FCU.
1-20	Printer jam - paper did not reach the exit	Clear any debris from the sensors and the paper path. Clean the sensors in the printer.
1-21	Printer jam - paper stuck at the exit	Check that the copy tray is not overloaded. Check the paper feed mechanism and paper path for faults. Check the connections from the FCU to the rx motor and printer sensors. Replace the rx motor, printer jam sensor, or FCU.
1-23	Cutter jam	Clear any debris from the sensors and the paper path.
1-24	Cutter failed to initialize	Clean the cutter sensor. Check the cutter mechanism. Check the connections from the FCU to the cutter motor and cutter sensors. Replace the cutter motor, cutter sensor, or FCU.
1-30	Paper ran out during printing	Add paper.
1-33	Paper end was detected when the machine was switched on	If paper is present, clean the paper end sensor and check the sensor circuit for defects. Replace the FCU or the paper end sensor.
1-34	Paper end was detected at the end of printing	

Code	Meaning	Suggested Cause/Action
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. Check connections between the cover switch and the FCU. Replace the cover switch or the FCU.
2-00	An RST7.5 interrupt occurred while the modem was in use	Replace the FCU.
2-10	The modem cannot enter tx mode	
2-12	Modem clock irregularity	
2-20	Abnormal coding/decoding (cpu not ready)	Check the connections from the FCU to the MBU. Replace the FCU or MBU.
2-31	Line connection failure (dc loop cannot be closed)	Check the connections from the FCU to the NCU/line. Try the communication again. Replace the FCU or NCU.
2-32	Line connection failure (dc loop cannot be opened)	Check the connections from the FCU to the NCU and line. Replace the NCU or FCU.
2-40	Thermal head driver irregularity	Check the connections between the FCU, thermal head, and PSU. Replace the FCU, thermal head, or PSU.
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 FCU.
4-01	Line current was cut	Check the line connector. Check the connection between the FCU and the NCU. Check for line problems. Replace the FCU 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.
4-10	Communication failed because of ID Code mismatch (Closed Network) or Tel. No./CSI mismatch (Protection against Wrong Connections)	Get the ID Codes the same and/or the CSIs programmed correctly, then resend. The machine at the other end may be defective.

Code	Meaning	Suggested Cause/Action
5-20	Storage impossible because of a lack of memory	Temporary memory shortage; otherwise, replace the FCU or memory PCB.
5-21	Memory overflow	
5-22	The memory filled up while the second or later page of a document was being scanned	
5-23	The image quality of a confidential or substitute reception file was no good	Contact the sender and ask them to resend the message if necessary.
5-24	Same as code 5-22	
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 FCU to the NCU. Check for a bad line or defective remote terminal. Replace the FCU or NCU. Switch the rx cable equalizer on (bit switch 0A, bit 6).
6-06	Coding/decoding error (G3 ECM)	Defective FCU. 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 NCU parameter 01, or the dedicated tx parameter for that address). Check the line connection. Defective remote terminal.
6-11	Printer failed while receiving the second or later block of MMR coded ECM data (the reference line has already been erased from memory, so the data coming in after the printer error is not stored by substitute reception)	Return the printer to normal operation. Then contact the other end and ask them to resend the data. Check the copy feed-out sensor and the copy paper feed path. Replace the FCU.
6-99	V.21 signal not received at the expected time	Try again. The other end may be defective or the line may be bad. Otherwise, replace the NCU or FCU.
9-60	The machine sent PIN/DCN because of a mechanical error during reception, even though there was memory space available.	Repair the mechanical problem, then ask the other end to resend the message. Change the FCU.

Code	Meaning	Suggested Cause/Action
9-61	The machine sent PIN/DCN because the memory filled up, even though the mechanism was not defective	Check the paper feed path and printer for errors (if substitute reception has occurred). Make room in the memory, then ask the other end to resend the message. Change the FCU.

6.4. ELECTRICAL COMPONENT DEFECTS

6.4.1. Defective Sensor Table

Sensor	Symptoms if Defective
Document sensor	"TRANSMIT DIAL" is displayed at power-up.
	"READY SET DOCUMENT" is still displayed after a document is placed in the feeder.
Scan line sensor	"CLEAR ORIGINAL" is displayed at power-up.
	"CLEAR ORIGINAL" is displayed soon after the start of copying.
Trailing edge sensor	Copying a multipage original takes a slightly longer than usual.
Paper end sensor	The Replace Paper indicator lights even if paper is remaining.
	The Replace Paper indicator does not light when the paper has run out.
Printer jam sensor	No paper cycle at power-up, and "CLEAR COPY" is displayed soon after the start of copying.
	"CLEAR COPY" is displayed at power-up.
	Sensor initialization problems occur at power-up.
Cutter sensor	Cutter operation errors occur.
	Copy jam is detected during cutting.
Cover sensor	There is no alarm on opening the cover.
	"CLOSE COVER" is displayed at power-up.

There are no service-replaceable fuses, so there is no blown fuse table.