# FAX550

# 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. 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**
30 sheets (using 80 g/m$^2$ paper)

**Scanning Method**
Flat bed, with CCD

**Maximum Scan Width**
216 mm [8.5 ins] $\pm$ 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:** 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 letter) 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**
220 - 240 Vac, 50 Hz

**Power Consumption (Base Machine Only)**
**Standby:** 13 $\pm$ 5 W
**Transmit:** 29 $\pm$ 5 W
**Receive:** 22 $\pm$ 5 W
**Copying:** 41 $\pm$ 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 = With optional memory only,
G = Not used in Germany,
S = Service mode in some countries

| Equipment | |
|---|---|
| ADF | O |
| Bar code reader | X |
| Built-in handset | X |
| Cabinet | X |
| Connection for ans. machine | X |
| Connection for handset | O |
| Cutter | 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 redialling | O |
| Confidential reception | A |
| Dual Access | O |
| Substitute reception | O |
| Transmission Reserve | O |

| Communication Features - User Selectable | |
|---|---|
| Action as a transfer broadcaster | X |
| AI Redial | O |
| Alternative Destination | O |
| Answering machine | X |
| Authorized Reception | O |
| Auto-answer delay time | X |
| Auto dialling (pulse or DTMF) | O |
| Auto Document | O |
| Automatic Voice Message | X |
| Auto-note | X |
| Batch Transmission (max 5 files) | A |
| Broadcasting | O |
| Chain Dialling | O |
| Confidential ID Override | O |
| Confidential Transmission | O |
| Forwarding (4 stations) | A |
| Free Polling | O |
| Groups (7 groups) | O |
| Hold | O (G) |
| Immediate Redialling | O |
| Immediate transmission | O |
| Keystroke Programs | O |
| Mailbox | C |
| Memory transmission | O |
| Notify | X |
| On Hook Dial | O (G) |
| Page Count | O |
| Personal Codes | O |
| Personal Codes with Conf ID | A |
| Polling Reception | O |
| Polling Transmission | O |
| Quick Dial (30) | |
| Reception modes (Fax, Tel, Auto) | O |
| Reduction | X |
| Remote control features | O |
| Remote Transfer | O |
| Restricted Access (10 codes, without cards) | O |
| Secured Polling | O |
| Secured Polling with Stored ID Override | O |
| Send Later | O |
| Silent ringing detection | X |

| Speed Dial (100) | |
| --- | --- |
| Telephone Directory | O |
| Tonal Signal Transmission | O |
| Transfer Request: 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 | O |
| 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 |
| Chequered mark | X |
| Clearing a memory file | O |
| Clearing a polling file | O |
| Clock | O |
| Confidential ID | A |
| Copy mode | O |
| Counters | O |
| Dialled 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 | A |
| Memory Lock ID | A |
| 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 (S) |
| Speaker volume control | O |
| Specified Cassette Selection | X |
| Substitute reception on/off | O |
| Telephone line type | O (S) |
| 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 | A |
| Error Report | O |
| Memory Storage Report | O |
| Mode Change Report | X |
| Polling Clear Report | O |
| Polling Reserve Report | O |
| Polling Result Report | O |
| Power Failure Report | O |
| Journal | O |
| Transfer Result Report | X |
| Transmission Result Report | O |

| Reports - User-initiated | |
| --- | --- |
| Authorized Reception List | O |
| Charge Control Report | X |
| File List | O |
| Forwarding List | O |
| Group List | O |
| Personal Code List | O |
| Program List | O |
| Quick Dial List | O |
| Specified Cassette Selection List | X |
| Speed Dial List | O |

| Reports - User-initiated | |
|---|---|
| Journal | 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 Journal | O |
| Thermal head parameters | O |
| Transmission Status Report | X |

## Memory Files

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
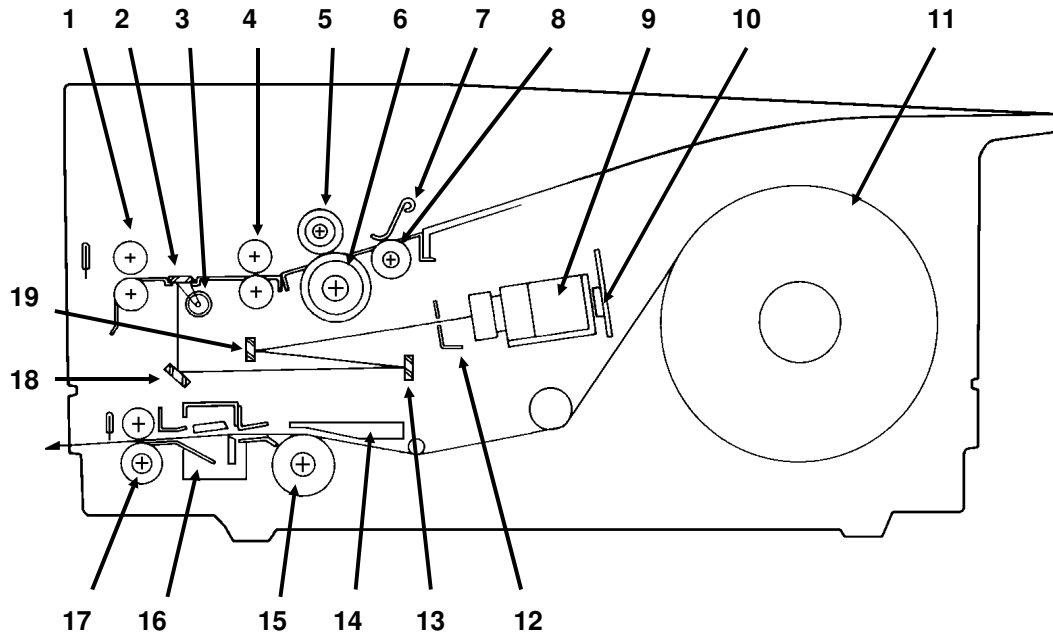


| 1. | R2 Rollers | Feed the document through the scanner. |
|---|---|---|
| 2. | Exposure Glass | Exposes the original to light from the xenon lamp. |
| 3. | Xenon Lamp | Illuminates the document. |
| 4. | R1 Rollers | Feed the document through the scanner. |
| 5. | Separation Roller | Allows one page 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 centre, 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
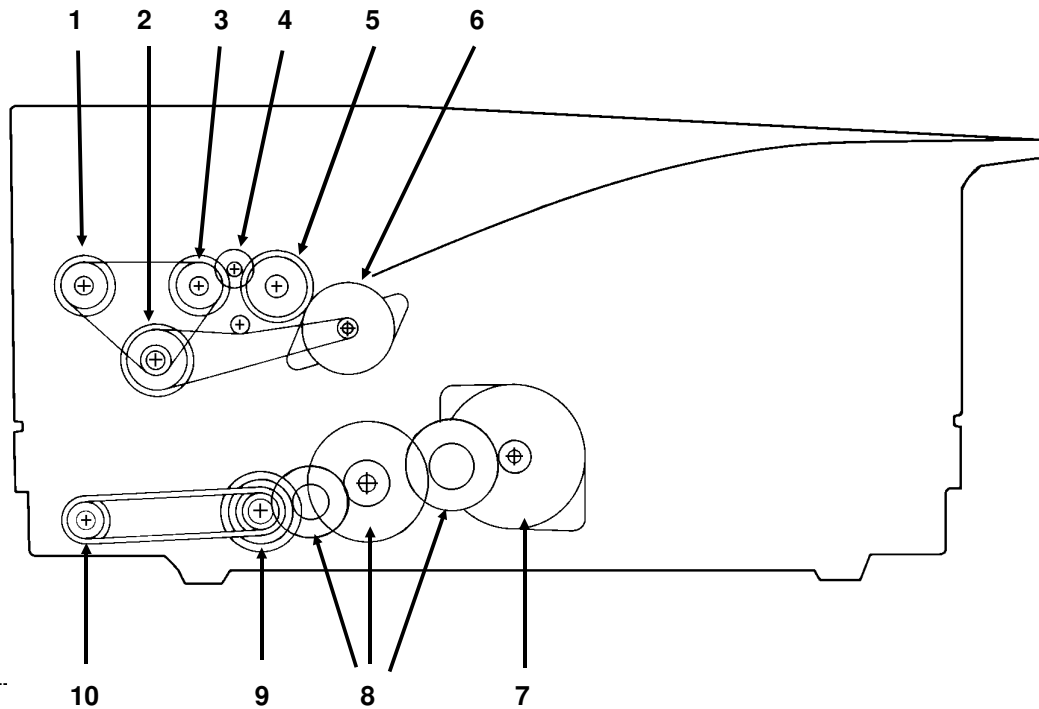


1. R2 Roller Drive Gear — Drives the R2 roller.
2. Scanner Drive Gear — Transfers drive from the Tx motor to the scanner and ADF.
3. R1 Roller Drive Gear — Drives the R1 roller.
4. Document Feed Idle Gear — Transfers drive from the Tx motor to the document feed roller.
5. ADF Clutch/Document Feed Drive 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
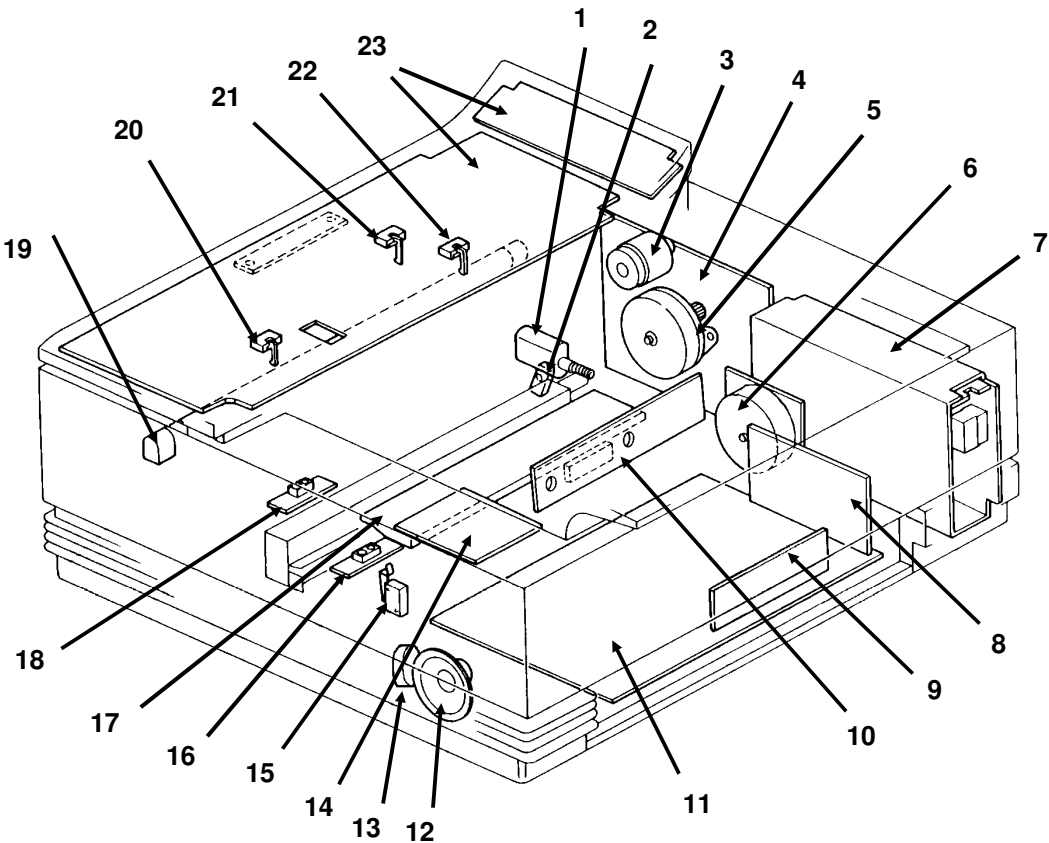


| Name | Description | No. |
|---|---|---|
| **PCBs** | | |
| FCU | This board controls the machine. | 11 |
| MBU | This board contains the system ROM and RAM for storing system parameters such as bit switch settings and programmed telephone numbers. | 8 |
| SBU | This board contains the CCD. | 10 |
| 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 | 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 | This rechargeable battery backs up the SAF memory when the main power is switched off. | 13 |

## 1.4. OVERALL SYSTEM CONTROL

1

```
                    Line        Handset

  ┌─────────┐    ┌──────────┐  ┌─────────┐  ┌──────┐  ┌──────────────────────┐
  │ Scanner │    │   NCU    │  │ Speaker │  │ PSU  │  │ Scanner and Printer  │
  │ Sensors │    │          │  │         │  │      │  │ Drive Components     │
  └─────────┘    └──────────┘  └─────────┘  └──────┘  │ and Sensors          │
       │                                               └──────────────────────┘
  ┌─────────┐              ┌──────────────┐
  │Operation│              │  Modem AFE   │
  │  Panel  │              └──────────────┘
  └─────────┘

                    CONTROL SIGNALS

       ┌──────────────────┐                      ┌──────────┐
       │ Video Processing │                      │ Thermal  │
       │     Memory       │                      │  Head    │
       └──────────────────┘                      └──────────┘
  ┌──────┐   ┌──────────┐    ┌─────┐  ┌──────┐   ┌──────────┐
  │ SBU  │   │  Video   │    │ CPU │  │ I/O  │   │ RS-232C  │
  │(CCD) │   │Processor │    │     │  │ Port │   │Interface │
  └──────┘   └──────────┘    └─────┘  └──────┘   └──────────┘

                    DATA AND ADDRESS BUS

  ┌──────────────────┐      ┌────────┐  ┌────────┐
  │  ┌─────┐ ┌─────┐ │      │  SAF   │  │  ECM   │
  │  │ ROM │ │ RAM │ │      │ Memory │  │ Memory │     FCU
  │  └─────┘ └─────┘ │      └────────┘  └────────┘
  │       MBU        │
  └──────────────────┘
```
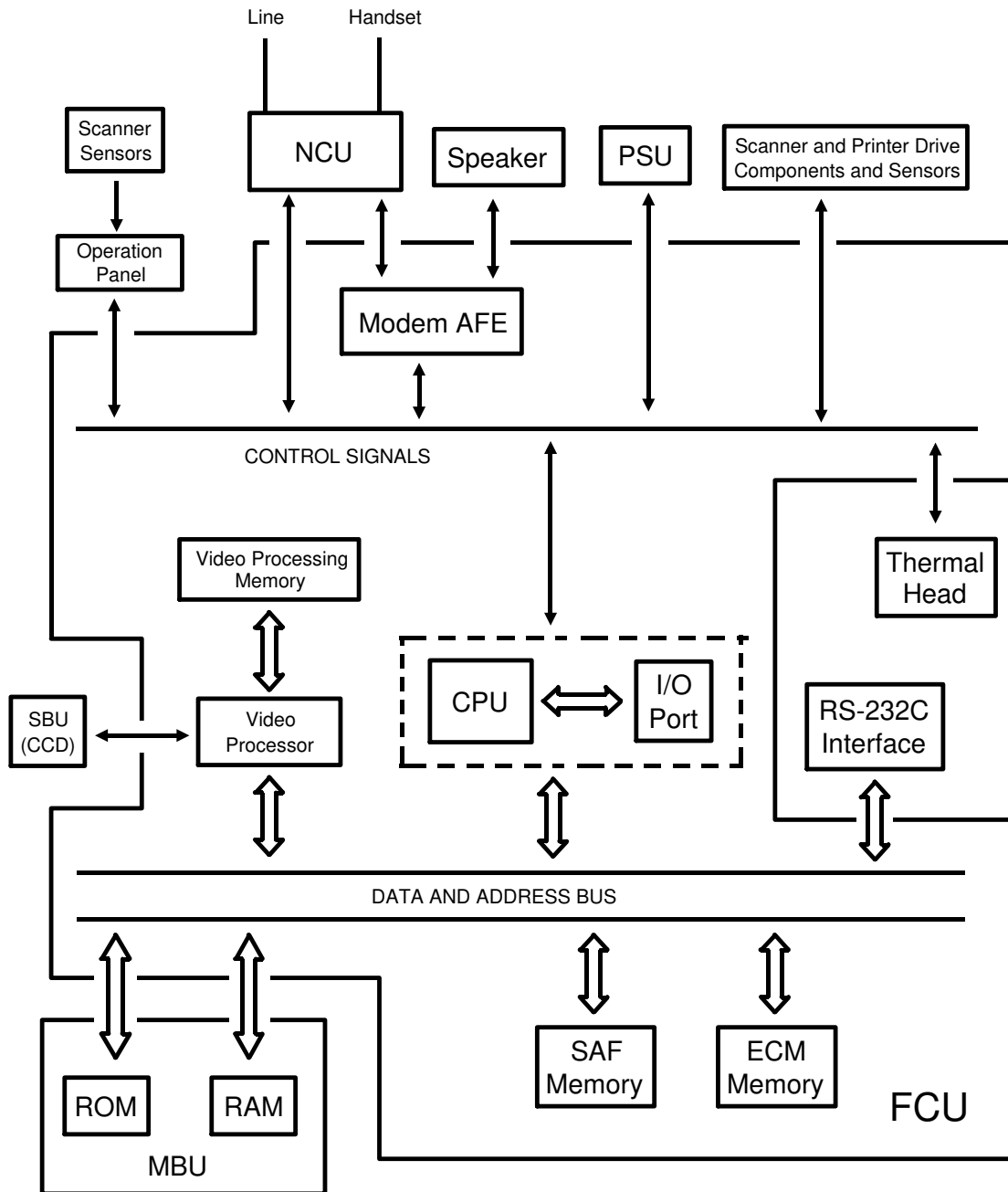
The cpu on the FCU board controls the machine, as shown in the above drawing.

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.

# 1.5. VIDEO DATA PATH

The following diagrams show the data path for this model.

## 1.5.1. Transmission

**Reference:** Group 3 Facsimile Manual, section 1-3-1

Original

Xenon Lamp

CCD

Analog Signal

ECM Memory

SAF Memory

Video Processor

CPU

Modem (Digital)

MODEM AFE

Modem (Analog)

Line Buffer

FIFO

RAM

MBU

FCU

To the Network (via the NCU)

## 1.5.2. Reception

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

From the Network (via the NCU)

Filter

HYBRID IC

Modem (Analog)

MODEM AFE

FCU

Modem (Digital)

CPU

SAF Memory

ECM Memory

Line Buffer

FIFO

RAM

MBU

I/O Port

Thermal Head

Thermal Paper

# 1.6. POWER DISTRIBUTION

### 1.6.1. Distribution Diagram
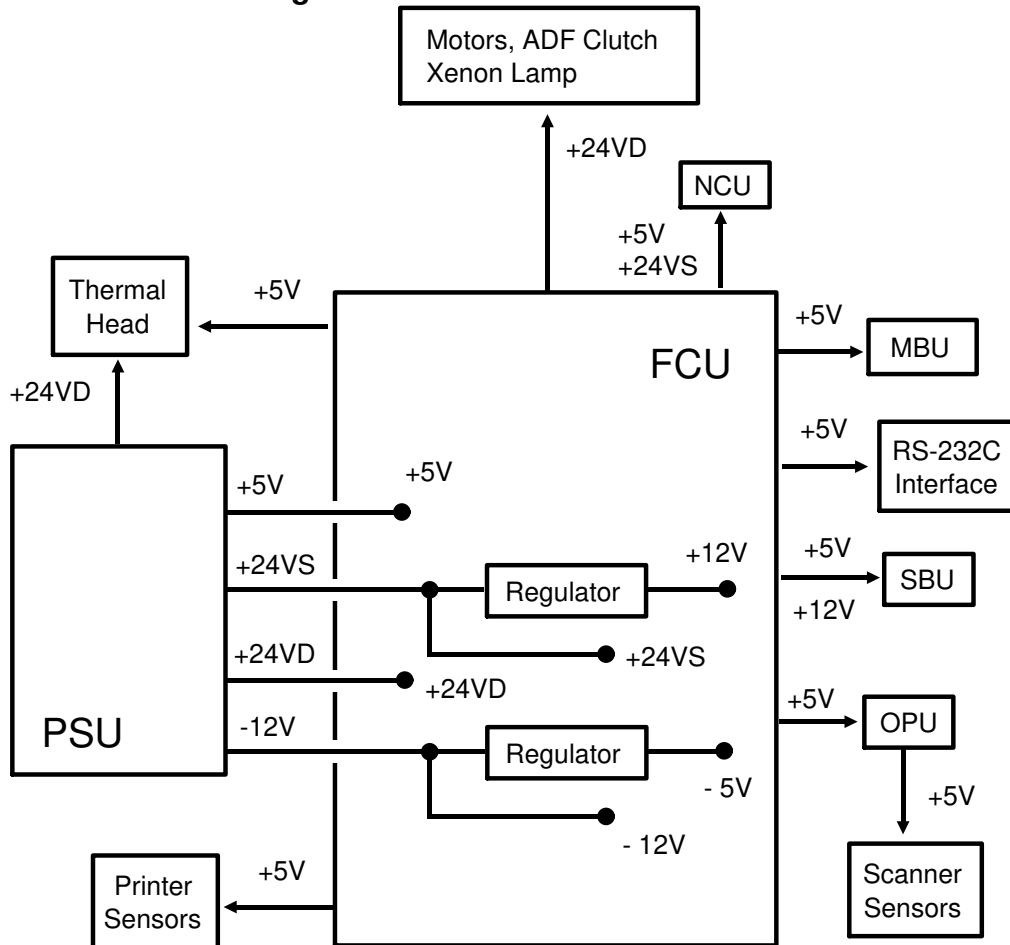


The PSU supplies power to the machine through the FCU, except for the thermal head power, which it supplies directly. The FCU contains regulators which generate other voltages needed by the machine.

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
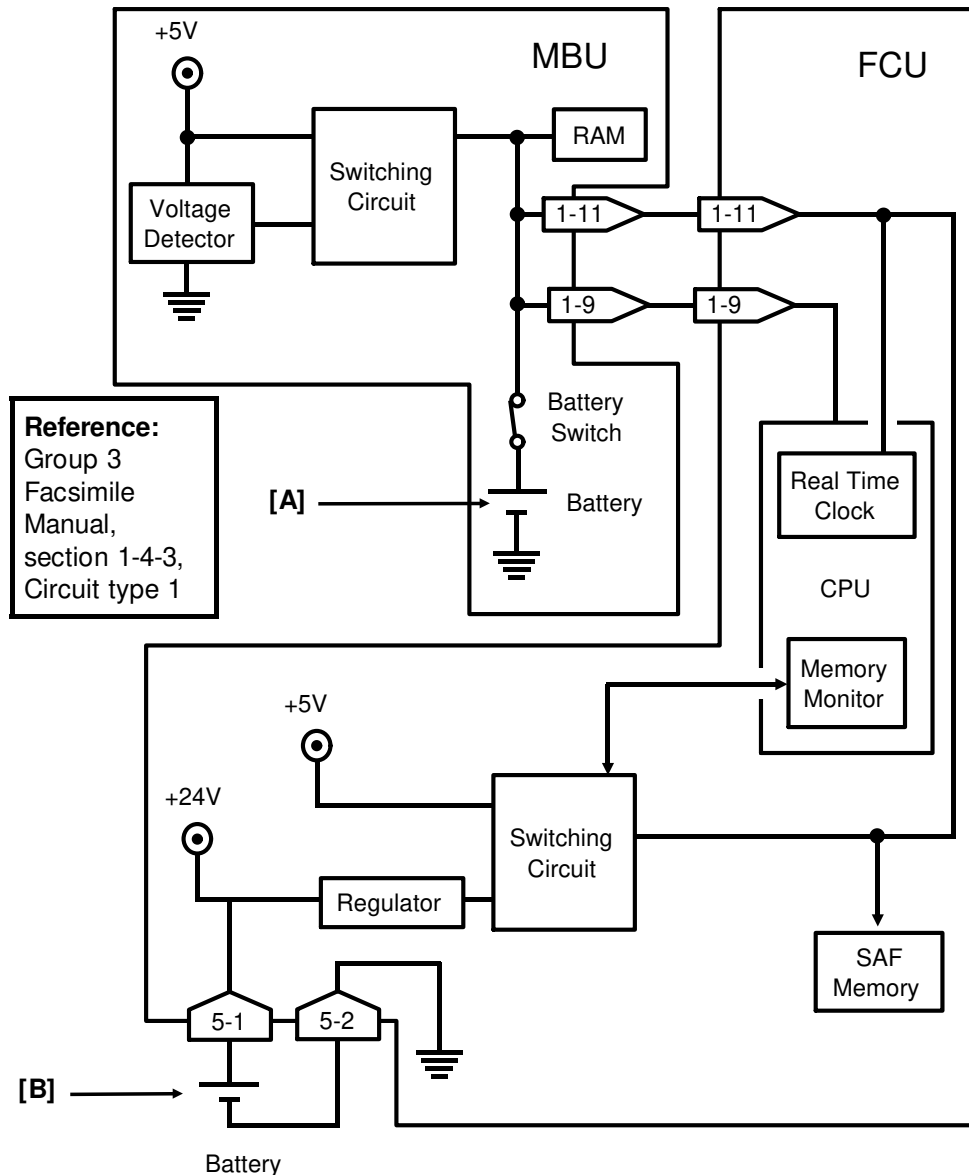


The battery [A] on the MBU backs up the RAM on the MBU, which contains system parameters. It also backs up the real time clock in the cpu. This battery is not rechargeable. CN1-9 tells the cpu whether the back-up power (CN1-11) comes from the battery or from the + 5V supply.

A rechargeable battery [B] 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

**2**

Scan Line Sensor

ADF Clutch

Trailing Edge
Sensor

Document
Sensor

Separation
Plate

Feed
Roller

Separation Roller

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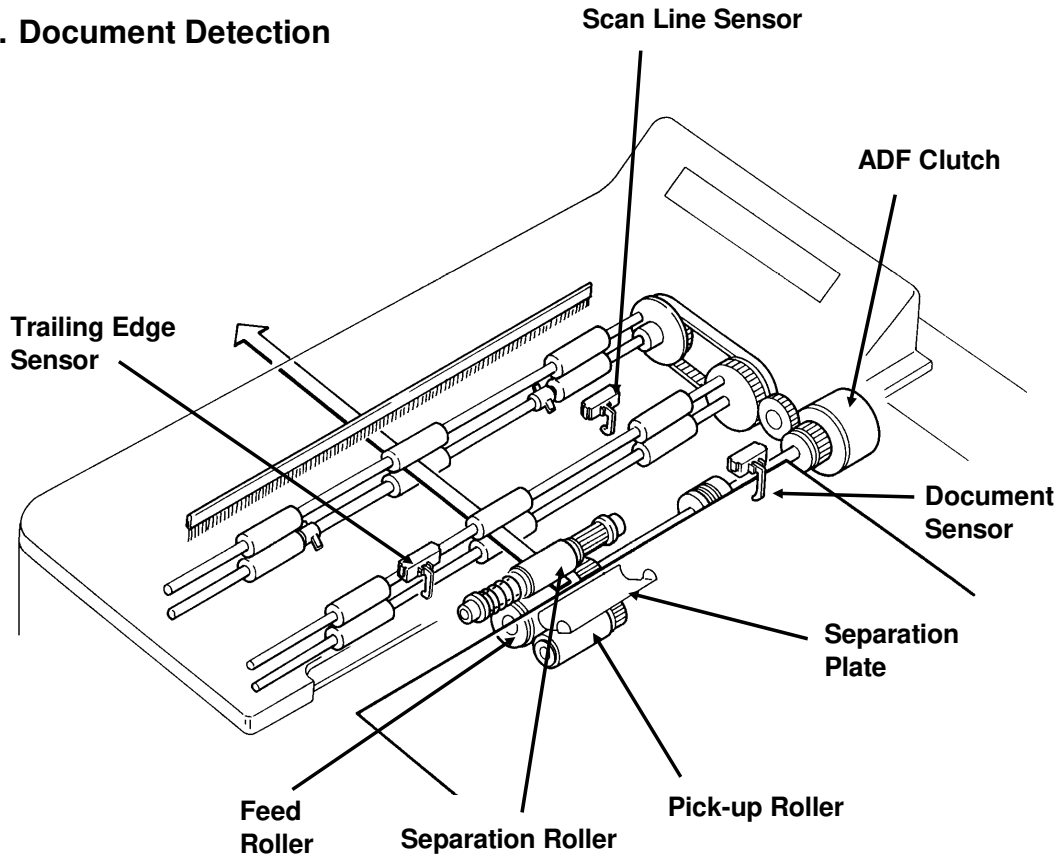
- The machines in this series have an A4-width [8.3"] scanner. There is no document width detector.
- The scanner contains a xenon lamp.
- There is no shutter mechanism.

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

## 2. Pick-up and Feed

### Mechanism



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

**Tx Motor**

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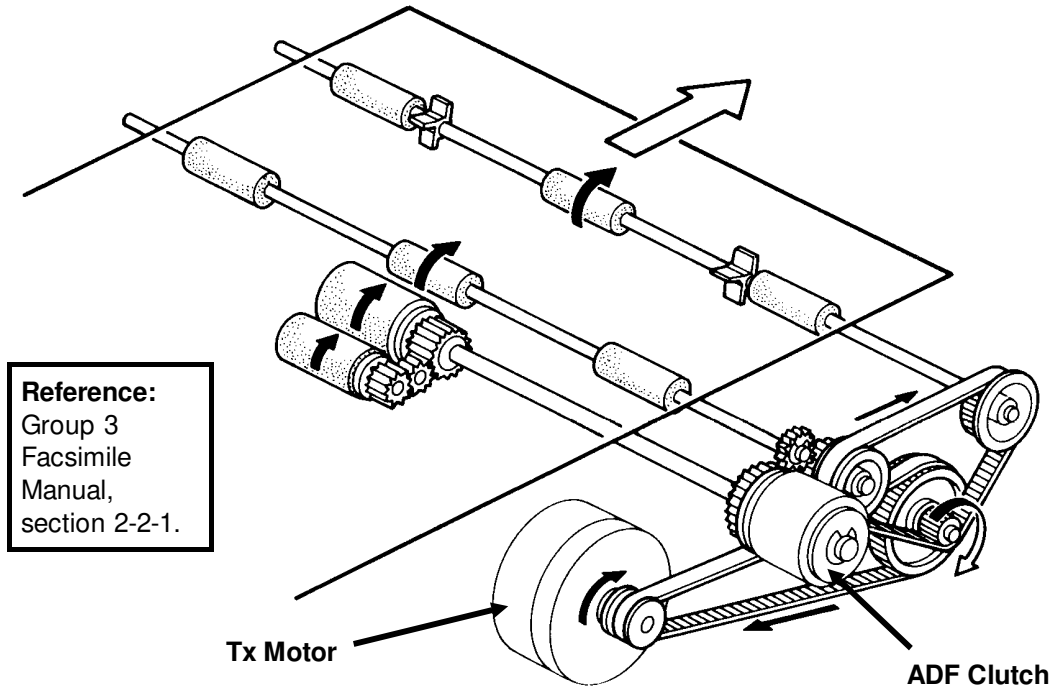
- This machine uses an electrical clutch mechanism with trailing edge sensor.
- There is no manual feed.

### 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

Output from the CCD

```
          A

                        Auto Shading
                        Memory

        WHITE
        WAVEFORM                        FEEDBACK

                        A/D          Peak
                        Converter    Hold
    DC        Amplifier
    Filter
                                    CORRECTED
                                    DATA

                        Data Processing
                        Circuits

    VIDEO                       To the CPU
    PROCESSOR                   and Modem
```

**2**

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

Corrected Data from the Auto Shading Circuit

```
                                            Error
                        Basic               Diffusion
    Gamma               Halftone            Halftone
    Correction,         Process             Process
    MTF

                                EDGE
                                ELEMENTS
                        Edge
                        Detection
    Comparator                                      Image/Text
                        NON-EDGE                    Detection
                        ELEMENTS
    Background
    Detection           Reduction

    OR
    Processing

                        Halftone
    Reduction
              A                 B            B'

              Process Selector

                    To CPU and Modem
```

## 2.2. PRINTER

### 2.2.1. Mechanisms

### 1. Paper Feed

**Mechanism**

**One-way Clutch**

**Feed-out Roller**

**Platen Roller**

**Reference:**
Group 3
Facsimile
Manual,
section 3-4-1.

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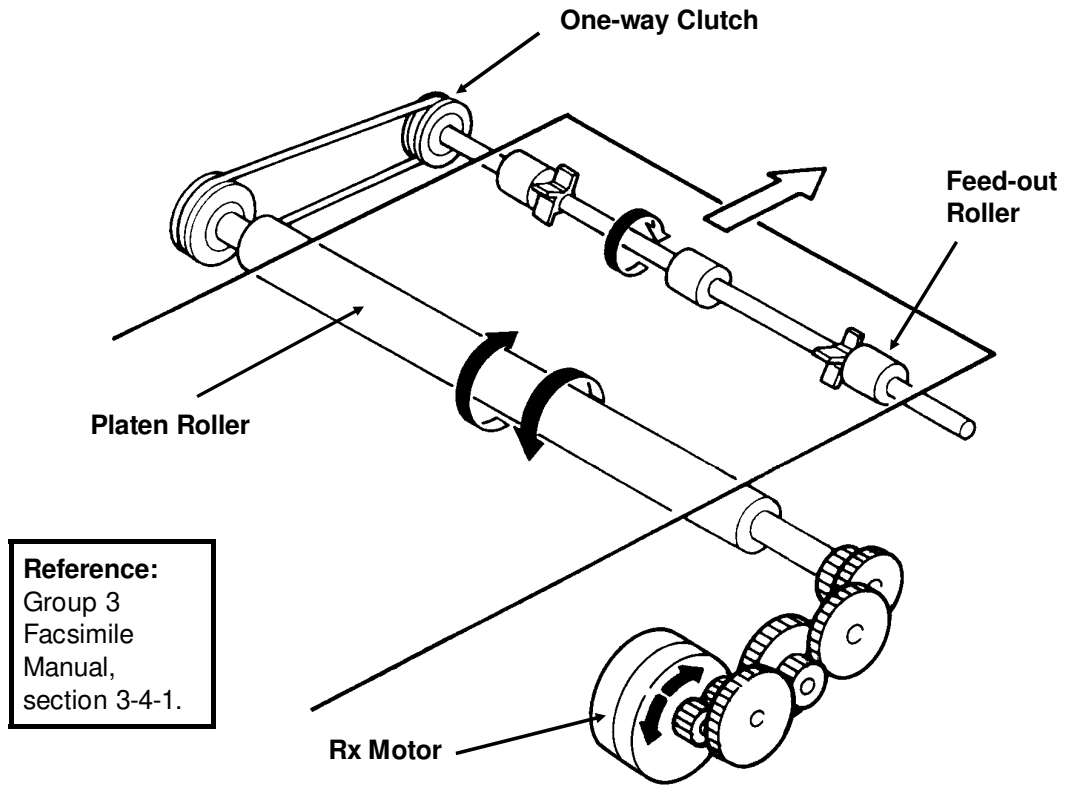
The printer is an A4-width [8.3"] printer.

**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. Cutting



**Cutter Blade**

**Reference:**
Group 3
Facsimile
Manual,
section 3-6.

**Cutter Sensor**

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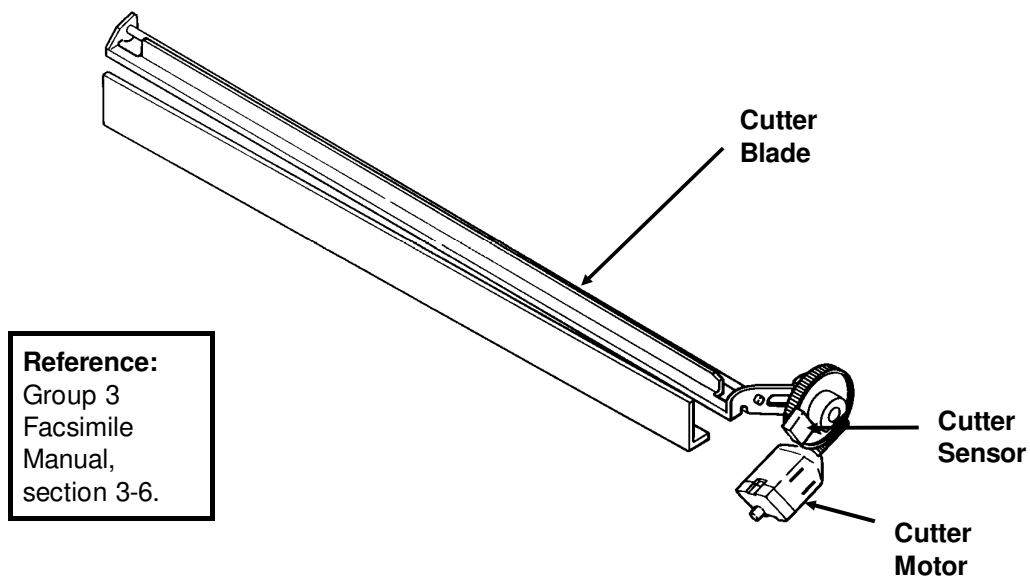
The cutter mechanism is exactly as described in section 3-6 of the Group 3 Facsimile Manual.

### 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**
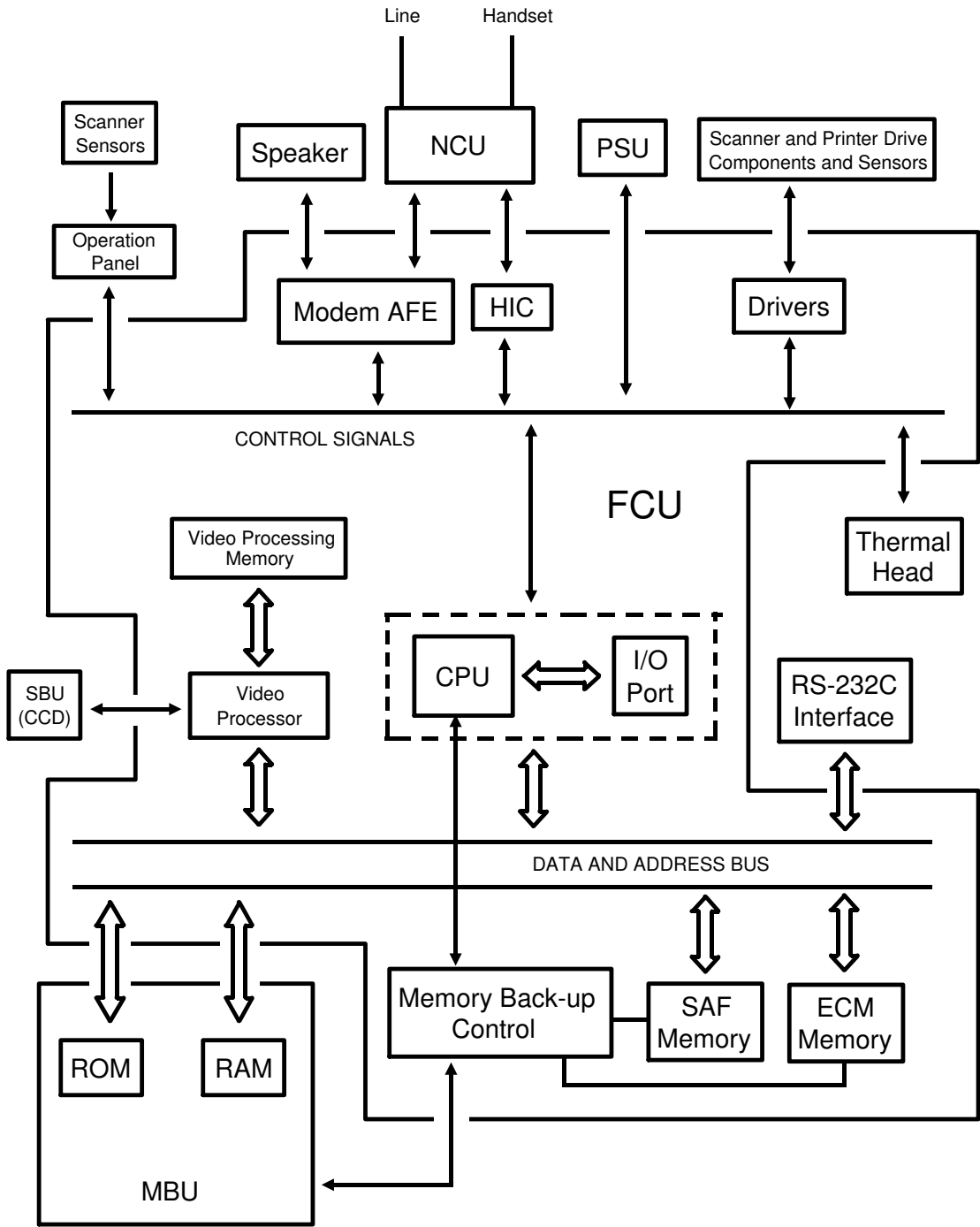
## 1. CPU (AFSP)

- 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

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

### 2.3.2. MBU
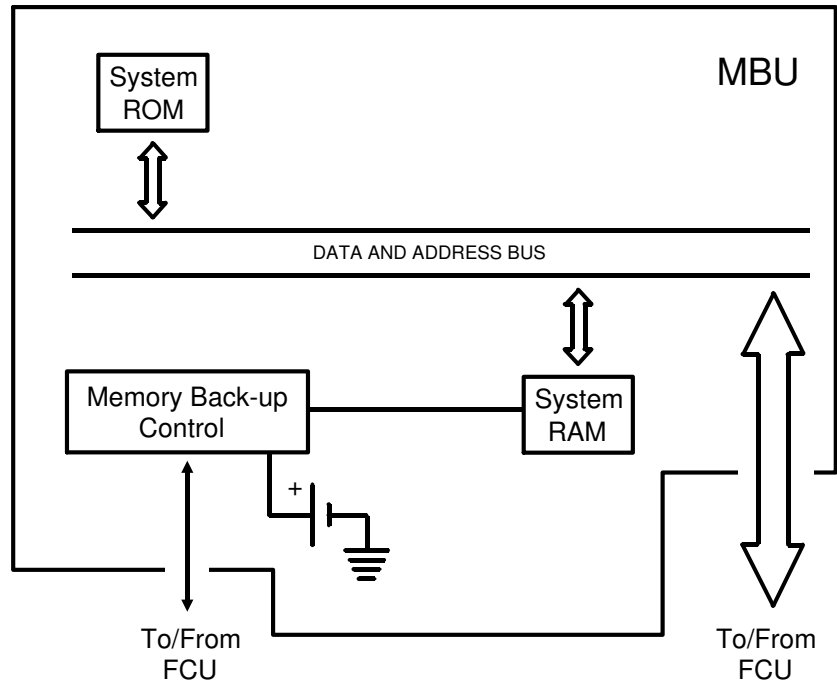
**2**



### 1. System ROM
- Contains the software to run the machine

### 2. System RAM
- 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

### 2.3.3. SBU

Analog Video
To the FCU

Drive Clocks
From the FCU

Drivers

CCD

+12V

+12V

Inverter
Amplifier

Emitter
Follower

SBU

### 2.3.4. OPU

LCD Panel

Operation Panel
Keys

Operation Panel
LEDs

Auxiliary Operation
Panel Controller

Operation Panel
Controller

Output
from the
Scanner
Sensors

Serial Interface
To/From FCU

## 2.3.5. NCU

## 1. PCB Block Diagram



- 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. Signal and Jumper Settings

The following table shows the jumper positions for each country, and the status of the relay control signals (CN3-A7, B7, and A8). The country is selected by the Country Code for NCU Parameters (NCU Parameter 00; use Function 96).

| | Standby Mode | | | After Ringing Detection | | | Jumpers | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CN3-A7 | CN3-B7 | CN3-A8 | CN3-A7 | CN3-B7 | CN3-A8 | TB1 & 2 | TB 3 | TB 8 | TB 4 | TB 5 | TB 6 | JP 1 |
| Germany | X | X | X | O | O | X | O | X | X | X | X | X | X |
| UK | X | O | X | O | O | X | O | X | X | X | X | X | X |
| Italy | O | O | X | O | O | X | O | X | X | X | X | X | X |
| Austria | O | O | X | X | X | X | O | X | X | O | X | X | X |
| Belgium | O | O | X | X | X | X | O | X | X | X | X | X | X |
| Denmark | O | O | X | X | X | X | O | X | X | X | X | O | X |
| Finland | O | O | O | O | O | X | O | X | X | X | X | X | X |
| Ireland | O | O | X | X | X | O | O | X | X | X | X | X | X |
| Norway | X | O | X | X | X | O | O | X | X | X | X | X | O |
| Sweden | X | X | X | X | X | X | O | X | X | X | X | X | X |
| Switz. | X | O | X | X | X | X | O | O | O | X | X | X | X |
| Portugal | O | O | X | X | X | X | O | X | X | X | X | O | X |
| Holland | O | O | X | X | X | O | O | X | X | X | O | X | X |
| Hg Kong | X | O | X | O | O | X | O | X | X | X | X | X | X |
| S. Africa | O | O | O | O | O | X | O | X | X | X | X | X | X |
| Australia | X | O | X | O | O | X | O | X | X | X | X | X | X |
| N. Z'land | X | O | X | O | O | X | O | X | X | X | X | X | X |
| Israel | O | O | X | O | O | X | O | X | X | X | X | X | X |
| Spain | O | O | X | X | X | X | O | X | X | X | X | O | X |
| Singapore | O | O | X | O | O | X | O | X | X | X | X | X | X |
| Malaysia | X | O | X | O | O | X | O | X | X | X | X | X | X |

## Key
Signal Status: O =  High, X =  Low
Jumper Settings: O =  Closed, X =  Open

### 2.3.6. PSU

**2**

| | | | | | |
|---|---|---|---|---|---|
| +24VD To Thermal Head | +24VD To FCU | +24VD Activation Signal | +24VS To FCU | +5V To FCU | -12V To FCU |

Diagram labels: LIVE, NEUTRAL, GROUND, Surge Prevention, Main Switch, Noise Filter, Surge Current Prevention, Surge Prevention, Power Supply Generation Circuits, PSU
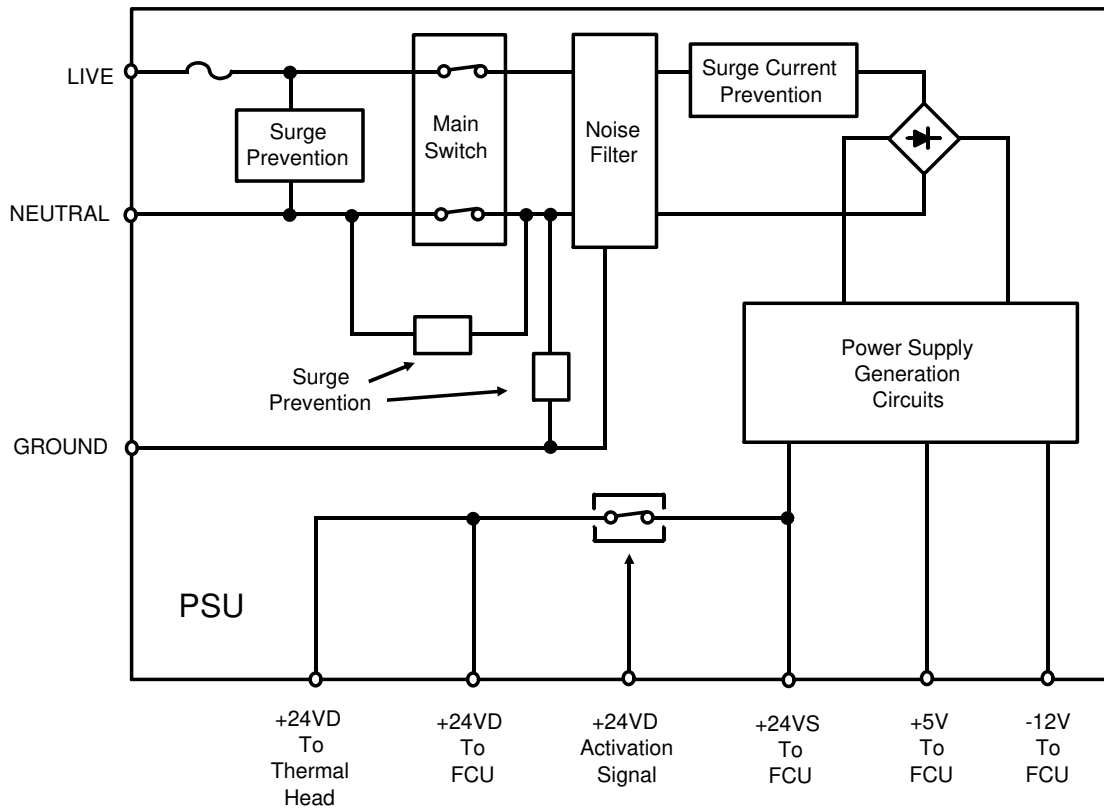
### Overheat Protection in the PSU

If the PSU thermostat temperature exceeds about 90 °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.

   **Note:**   Do not switch the machine back on until at least 2 minutes after you switched it off.

# 3. INSTALLATION

## 3.1. CONNECTING UP THE MACHINE



**LINE**
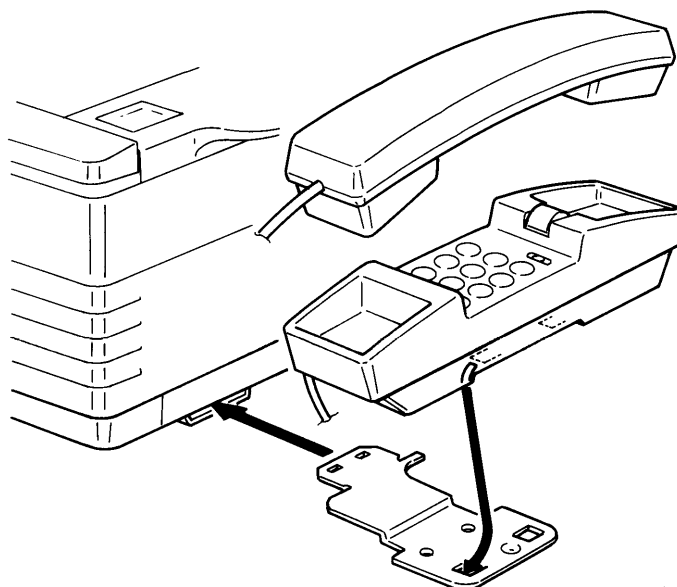
**3**
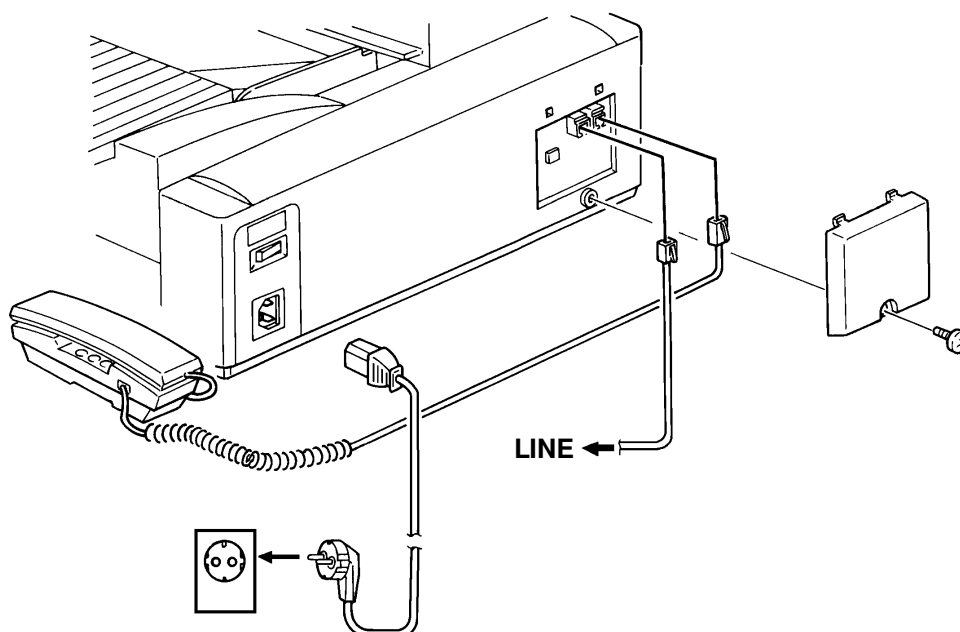
## 3.2. INITIAL PROGRAMMING

Check the following:
- Are the country codes for NCU parameters (Function 96, parameter 00) and bit switch settings (bit switch 0F) correct for the country of installation? Also check the ringback tone generation parameter settings at the end of section 4-3. If the default settings are inadequate, reprogram them (these values are not affected by the country code).
- Are the NCU jumper settings correct for the country of installation (see section 2-3-5)?
- 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)?

In some countries, the user cannot program the following items, so program them before you leave the machine.
- Telephone Line Type (Function 71, section 4-1-23)
- CSI (Function 53, section 4-1-22)

The user should program the following items after installation:
- Telephone Line Type (in some countries, this is not a user adjustment)
- RTI, TTI, and CSI (in some countries, CSI is not a user adjustment)
- ID Codes (ID Code, Remote ID, Confidential ID, Memory Lock ID)
- The fax machine's own telephone number
- Date and Time
- Language Selection

## 3.3. LANGUAGE ROM SELECTION

The standard ROM contains the following languages: English, German, Italian, Swedish, Spanish. The user can select one of these languages with a user programming function.

If the user wishes to use French, install the French language ROM. This ROM contains the following languages: English, German, Italian, Swedish, French. In the same way as for the standard ROM, the user can select one of these languages with a user programming function.

**Note:** • Switch the machine off before changing the ROM.
- Make sure that there are no messages in the memory before you change the ROM, or data will be lost.

# 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
    ```

**4**

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

### 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**

   | FUNCTION            Y/▽ |
   | 9 SERVICE FUNCTIONS |

2. 9 3 **Yes**

   | ERROR CODE         # /▽ |
   | 1-01   JAN 01    17:30 |

3. Either:

   Scroll through the error codes - **#**

   Finish - **Function**

### 4.1.4. Service Monitor (Function 93)

1. **Function** 5 1 9 9 1

   then immediately **Yes**

   | FUNCTION            Y/▽ |
   | 9 SERVICE FUNCTIONS |

2. 9 3 **Yes**

   | ERROR CODE         # /▽ |
   | 1-01   JAN 01    17:30 |

3. **No/▽** **Start**

### 4.1.5. Protocol Dump (Function 94)

1. **Function** 5 1 9 9 1

   then immediately **Yes**

   | FUNCTION            Y/▽ |
   | 9 SERVICE FUNCTIONS |

2. 9 4 **Yes** **Start**

### 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 2.

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.

   **The value of B is 2.**

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

   | |
   |---|
   | 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 about 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 and
   press **Copy**

## 4.1.10. Xenon Lamp 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. | 2 |

   | SCANNER LAMP TEST |

   The xenon lamp lights up for 5 minutes.

## 4.1.11. DTMF Tone 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. | 2 |

   | DTMF TEST |
   | DUAL-1    SINGLE-2 |

4. Either:

   - Test dual tones - | 1 | . Go to step 5.

   - Test single tones - | 2 | . Go to step 8.

5. The display is as shown opposite.

   | DUAL TONE |
   | PRESS KEYPAD |

   Press a key on the ten key pad.

   Example: | 1 | **Start** |

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

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

   Finish: | **Function** |

**4**

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**

```
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. **3**

```
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**

```
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. **4**

### 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**

## 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
```

**4**

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]

## 4.1.20. 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` `2` `2` `2`

2. Immediately press Quick Dial key `11`

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

## 4.1.21. Printing all Memory Files (Function 24)

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

1. `Function` `2` `3` `Yes`
   or `Function` `2` `4` `Yes`

```
FILE NO

```

2. Press `No/∇` `Yes` `Start` .

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

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

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

## 4.1.22. CSI Programming

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

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

1. `Function` `5` `2` `2` `2` `2`
   `5` `3` `Yes`

| | Y/∇ |
|---|---|
| **SET RTI** | |

2. Press `No` twice.

| | Y/∇ |
|---|---|
| **SET CSI** | |

3. Press `Yes` .

| **CSI** | **KPAD** |
|---|---|
| ■■■■■■■■■■ | |

4. Input the CSI (not more than 20 digits).

| **CSI** | **KPAD/Y/N** |
|---|---|
| **2015559456** | |

5. Press `Yes` `Function` .

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

## 4.1.23. Telephone Line Type Selection

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

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

1. `Function` `5` `2` `2` `2` `2`
   `7` `1` `Yes`

| | Y/∇ |
|---|---|
| **SELECT TT/DP** | |

2. Press `Yes` .

| **LINE = TT** | **Y** |
|---|---|
| **TT= 1  DP= 2** | |

3. Either:

   Select tone dialling - `1` .

   Select pulse dialling - `2` .

   Finish: `Function`

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

## 4.2. BIT SWITCHES

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

| Bit Switch 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 Journal 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 Journal **0:** No **1:** Yes | **1:** Instead of the personal code, the following data are listed on the Journal 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** **1** **2** | LCD contrast **Bit  2  1  0    Contrast**     0  0  0    Brightest     0  0  1      ↓     ↓          ↓     1  1  0      ↓     1  1  1    Darkest | Use these bit switches to adjust the brightness of the LCD on the operation panel. |
| **3** **4** | Memory read/write by RDS **Bit 4    3    Setting**   0    0    Always enabled   0    1    User selectable   1    0    User selectable   1    1    Always disabled | **(0,0):** At any time, an RDS system can read or write RAM data such as TTI, 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. |
| **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. Also, if CSI and/or telephone line type is a service mode in your area, this bit must be at 1 before programming. |
| **6** **7** | Not used | Do not change the factory settings. |

**4**

| Bit Switch 02 | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| **0** | Not used | Do not change the factory settings. |
| **1** | | |
| **2** | | |
| **3** | Near-end indication<br>**0:** Disabled<br>**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<br>**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**<br><br>**7** | Maximum transmittable document length<br>**Bit 7  6  Setting**<br>0  0  600 mm<br>0  1  1200 mm<br>1  0  14 m<br>1  1  100 m | If the user wants to send very long documents such as well logs, use the 14 m or 100 m setting. |

| Bit Switch 03 | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| **0** | Dialling with the handset off-hook<br>**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<br>**0:** Erased after being polled<br>**1:** Kept until user erases | **0:** Messages stored for polling transmission will be erased immediately after polling.<br>**1:** This allows the user to keep messages in memory to be polled by more than one station. |
| **2** | Inclusion of communications on the Journal when no image data was exchanged.<br>**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 Journal if this bit is at 1. |
| **3** | Printing of the error code on the error report<br>**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<br>**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<br>**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<br>**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**<br><br>**1** | Compression modes available in receive mode<br>**Bit 1    0    Modes**<br>  0    0    MH only<br>  0    1    MR or MH<br>  1    0    MR or MH, with EFC<br>  1    1    MMR, MR, or MH, with EFC | These bits determine what capabilities are informed to the transmitting side in the protocol exchange. |
| **2** | Error counting method<br>**0:** 10 (20) [40]<br>**1:** In accordance with the settings of bits 3 to 7 | The machine counts data errors caused by a noisy line or defective machine.<br>**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**<br><br>**4** | Burst error threshold<br>**Bit  4    3      Threshold**<br>  0    0    3  (6)  [12]<br>  0    1    4  (8)  [16]<br>  1    0    5 (10) [20]<br>  1    1    6 (12) [24] | If there are more consecutive error lines in the received page than the threshold specified by these bits, the page is rejected. Values in parenthesis are for Detail resolution, and those in square brackets are for Fine resolution. |
| **5**<br><br>**6**<br><br>**7** | Error line ratio<br>**Bit  7  6  5      Value**<br>  0  0  0      5%<br>  0  0  1      6%<br>  0  1  0      7%<br>  0  1  1      8%<br>  1  0  0      9%<br>  1  0  1     10% | If the number of error lines divided by the total number of lines reaches the value determined by the settings of these bits, RTN will be sent to the other end. |

**4**

| Bit Switch 05 | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| **0**<br><br>**1** | Compression modes available in transmit mode<br>**Bit 1　0　Modes**<br>　0　0　MH only<br>　0　1　MR or MH<br>　1　0　MR or MH, with EFC<br>　1　1　MMR, MR, or MH, with EFC | These bits determine what capabilities are informed to the receiving side in the protocol exchange. |
| **2** | PABX dial tone detection<br>**0:** Enabled<br>**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<br>**0:** Enabled<br>**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 dialling out. |
| **4** | Busy tone detection<br>**0:** Enabled<br>**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**<br><br>**7** | PSTN access method through PABX<br>**Bit 7　6　Method**<br>　0　0　No PABX<br>　0　1　Loop Start<br>　1　0　Ground Start<br>　1　1　Flash Start | Set these bits to match the type of signal accepted by the PABX. If there is no PABX between the machine and the network, set both bits to 0. |

| Bit Switch 06 | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| **0**<br><br>**1**<br><br>**2**<br><br>**3**<br><br>**4**<br><br>**5**<br><br>**6**<br><br>**7** | PSTN access number<br><br>Access No.　Hex value of bit switch<br>　0　　　　　　F0<br>　↓　　　　　　↓<br>　9　　　　　　F9<br><br>　00　　　　　　00<br>　↓　　　　　　↓<br>　99　　　　　　99 | 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.<br>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.<br>If there is no PABX, set all bits to 1. |

| **Bit Switch 07** | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| **0** | Back to back test<br>**0:** Disabled<br>**1:** Enabled | Set this bit to 1 when you wish to do a back-to-back test. |
| **1** | Short preamble<br>**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<br>**0:** Enabled<br>**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<br>**0:** 1<br>**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<br>**0:** On  **1:** Off | If this is 0, ECM is switched on. |
| **6** | Post message response timing (rx)<br>**0:** After feed-out<br>**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.<br>**1:** The post message response is sent earlier, but the paper has not been fed out yet, so if there is a jam after this, data may be lost. This bit is ignored during memory reception. |
| **7** | FTZ protocol<br>**0:** Disabled       **1:** Enabled | This bit must be set to 1 in Germany. |

| **Bit Switch 08 (Transmission)** | | | | |
|---|---|---|---|---|
| | **FUNCTION** | | | **COMMENTS** |
| **0** | Initial Tx modem rate | | | These bits set the initial starting modem rate for transmission. This rate may fall back to a slower rate depending on line conditions and the remote terminal's capabilities. |
| **1** | **Bit 2  Bit 1  Bit 0**       **Setting** | | | |
| | 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** | | | | |

**4**

| **Bit Switch 09 (Transmission)** | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| **0** | CNG signal transmission in manual transmission mode<br>**0:** Disabled<br>**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 dialling). |
| **1**<br><br>**2** | Wrong connection prevention method<br>**Bit 2  Bit 1      Setting**<br>  0        0        None<br>  0        1        8 digit CSI<br>  1        0        4 digit CSI<br>  1        1        CSI/RTI | **(0,1) -** The machine will not transmit if the last 8 digits of the received CSI do not match the last 8 digits of the dialled telephone number. This does not work for manual dialling.<br>**(1,0) -** The same as above, except that only the last 4 digits are compared.<br>**(1,1) -** The machine will not transmit if the other end does not identify itself with an RTI or CSI.<br>**(0,0) -** Nothing is checked; transmission will always go ahead. |
| **3** | Closed network (transmission)<br>**0:** Disabled<br>**1:** Enabled | **1:** Transmission will not go ahead if the ID code of the other terminal does not match the ID code of this terminal. This feature may not be reliable when communicating with another maker's product. |
| **4** | Monitor speaker status during memory transmission<br>**0:** Off    **1:** On | If this is 1, the speaker will operate during memory transmission. Keep this bit at 0 if the user complains about noise from the speaker. |
| **5** | Not used | Do not change the factory settings. |
| **6** | | |
| **7** | | |

| **Bit Switch 0A (Reception)** | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| **0** **1** **2** | Initial Rx modem rate<br>**Bit 2  Bit 1  Bit 0        Setting**<br>0      1      1          9,600 bps<br>0      1      0          7,200 bps<br>0      0      1          4,800 bps<br>0      0      0          2,400 bps<br>Other settings: Not used | 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. |
| **3** **4** **5** | Not used | Do not change the factory settings. |
| **6** | Cable equalizer (rx mode)<br>**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.<br><br>Also, try using the cable equalizer if one or more of the following symptoms occurs.<br>• Communication error with error codes such as 0-20, 0-23, etc.<br>• Modem rate fallback occurs frequently. |
| **7** | Not used | Do not change the factory setting. |

| **Bit Switch 0B (Reception)** | | | | |
|---|---|---|---|---|
| | **FUNCTION** | | | **COMMENTS** |
| **0** | Closed network (reception)<br>**0:** Disabled<br>**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<br>**0:** Type 1<br>**1:** Type 2 | | | This bit determines the values available with bits 2 and 3. |
| **2** **3** | Training error tolerance<br>**Bit    3    2    Type 1    Type 2**<br>0    0        15          14<br>0    1        10          9<br>1    0        2          4<br>1    1        0          1 | | | Type 1 can be used anywhere. Type 2 is normally used only in Europe.<br><br>If the machine detects more errors during training than the number set by these bits, training fails and the machine will send FTT. The data will be resent at a lower rate. |
| **4** **5** **6** **7** | Not used | | | Do not change the factory settings. |

**4**

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

| Bit Switch 0D | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| **0 to 5** | Not used | Do not change the factory settings. |
| **6** | Contents of the top line of the LCD when handset mode is in use<br>**0:** Telephone number dialled<br>**1:** HANDSET MODE | **0:** The telephone number being dialled is displayed.<br>**1:** Only HANDSET MODE is displayed. |
| **7** | Not used | Do not change the factory setting. |

| Bit Switch 0E | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| **0** | Not used | Do not change the factory settings. |
| **1** | | |
| **2** | | |
| **3** | | |
| **4** | | |
| **5** | Conditions for reception<br>**0:** Normal<br>**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 Switch 0F | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| 0 to 7 | Country Code<br><br>00: France     10: Not used<br>01: Germany   11: USA<br>02: UK          12: Asia<br>03: Italy       13: Japan<br>04: Austria    14: Hong Kong<br>05: Belgium   15: South Africa<br>06: Denmark  16: Australia<br>07: Finland   17: New Zealand<br>08: Ireland    18: Singapore<br>09: Norway   19: Malaysia<br>0A: Sweden<br>0B: Switzerland<br>0C: Portugal<br>0D: Holland<br>0E: Spain<br>0F: Israel | This country code determines the factory settings of a wide range of bit switches and RAM addresses. However, it has no effect on the NCU parameter settings and communication parameter RAM addresses; these are determined by the setting of NCU parameter 00 (function 96). |

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

**4**

Bit switches 11 to 1F are not used.

## 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.

Universal version

| 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 | 50 | 0A | 03 | 12 | 08 | 1A | 00 |
| 03 | 40 | 0B | 02 | 13 | 00 | 1B | 00 |
| 04 | 03 | 0C | 01 | 14 | 00 | 1C | 00 |
| 05 | 23 | 0D | 00 | 15 | 00 | 1D | 30 |
| 06 | FF | 0E | 00 | 16 | 00 | 1E | 01 |
| 07 | 06 | 0F | 02 | 17 | 00 | 1F | 85 |

Asia version

| 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 | 08 | 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 | 12 | 17 | 00 | 1F | 85 |

The following tables show the changes in the factory settings for each country. The settings depend on the country code (bit switch 0F).

**Note:**    Changes to the country code (bit switch 0F) are not included in the following tables.

Table 1: Based on the Universal version

| Country | Code | Differences (switch settings given in Hex code) |
|---|---|---|
| France | 00 | Switch 0C: 21 |
| Germany | 01 | Switch 03: 41, Switch 05: 27, Switch 07: 86, Switch 0C: 03, Switch 12: 28, Switch 1D: 38 |
| UK | 02 | None (the settings for the Universal version are based on those required for the UK) |
| Italy | 03 | None |
| Austria | 04 | Switch 0C: 05 |
| Belgium | 05 | None |
| Denmark | 06 | Switch 0C: 11 |
| Finland | 07 | None |
| Ireland | 08 | None |
| Norway | 09 | Switch 0C: 09 |
| Sweden | 0A | Switch 10: 02 |
| Switzerland | 0B | Switch 0C: 41 |
| Portugal | 0C | None |
| Holland | 0D | None |
| Spain | 0E | None |

Table 2: Based on the Asia version (Country code 12)

| Country | Code | Differences (switch settings given in Hex code) |
|---|---|---|
| Israel | 0F | None |
| Hong Kong | 14 | |
| South Africa | 15 | |
| Australia | 16 | |
| New Zealand | 17 | |
| Singapore | 18 | |
| Malaysia | 19 | |

**4**

## 4.3. NCU PARAMETERS

The following tables give the RAM addresses and units of calculation of the parameters that the machine uses for ringing signal detection and automatic dialling. The factory settings for each country are also given. Most of these must be changed by RAM read/write (Function 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. |
| 4158 | PABX busy tone upper frequency limit (LOW) | | See Note 2. |
| 4159 | PABX busy tone lower frequency limit (HIGH) | | |
| 415A | PABX busy tone lower frequency limit (LOW) | | |
| 415B | Busy tone ON time: range 1 | 20 ms | |
| 415C | Busy tone OFF time: range 1 | | |
| 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).<br><br>Tolerance ($\pm$)<br>Bit 1  0<br>    0   0   75%<br>    0   1   50%<br>    1   0   25%<br>    1   1   12.5%<br><br>Bits 7, 6, 5, 4 - number of cycles required for detection | | |

**4**

| 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 | The Gs relay is closed for this interval. |
| 4178 | Break time (flash start mode) | 1 ms | The Di relay is open for this interval. |
| 4179 | International dial access code | BCD | For a code of 100:  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<br>  1     1    -53<br>  1     0   -32.5<br>  0     1   -40.5<br>  0     0   -29<br><br>Bits 3, 2, 1, 0 - See Note 3. | |
| 417D | CCITT T1 time | 2.56 s | |

| Address | Function | Unit | Remarks |
|---|---|---|---|
| 417E | Max. number of dials per station (not using memory) | 1 | |
| 417F | Redial interval (not using memory) | 1 min | |
| 4180 | Interval between dialling 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 with 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 6. Function 98 (parameter 07). |
| 4188 | Minimum required length of the second and subsequent rings | | Function 96 (parameter 08). |
| 4189 | Ringing signal detection reset time | 40 ms | Function 96 (parameter 09). |
| 418A | Time between opening or closing the Ds relay and opening the Di relay | 1 ms | See Notes 5 and 8. Function 96 (parameter 10). |
| 418B | Break time for pulse dialling | | See Note 5. Function 96 (parameter 11). |
| 418C | Make time for pulse dialling | | See Note 5. Function 96 (parameter 12). |
| 418D | Time between final Di relay closure and Ds relay closing or opening | | See Notes 5 and 8. Function 96 (parameter 13). |
| 418E | Pause between dialled digits (pulse dial mode) | 20 ms | See Note 5. Function 96 (parameter 14). |
| 418F | Time waited when a pause is entered at the operation panel | | Function 96 (parameter 15). |
| 4190 | DTMF tone on time | 1 ms | Function 96 (parameter 16). |
| 4191 | DTMF tone off time | | Function 96 (parameter 17). |
| 4192 | DTMF tone attenuation value | - dBm | Function 96 (parameter 18). See Note 7. |
| 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 |

**4**

## Notes

1. If a setting is not required, store FF in the address.

2. Tone frequencies are stored in BCD in the following format.
   Examples:
   a) 380 Hz  HIGH 0 3  LOW  8 0
   b) 1210 Hz  HIGH 1 2  LOW  1 0

3. Italy and Belgium only

   RAM address 417C: the lower four bits have the following meaning.
   Bit 3  1: Country dial tone cadence detection enabled
   Bit 2  1: International dial tone cadence detection enabled
   Bit 1  1: PABX dial tone cadence detection enabled
   Bit 0  1: PSTN dial tone cadence detection enabled

   If bit 3 is 1, the functions of the following RAM addresses are changed.
   4172: tolerance for on or off state duration (%), coded as in 4164.
   4174: on time, hex code (unit =  10 ms)
   4175: off time, hex code (unit =  10 ms)

   If bits 2, 1, or 0 are 1, the functions of the following addresses are
   changed in a similar way to that described for bit 3 =  1.
   Bit 2 =  1: 4169, 416B, 416C
   Bit 1 =  1: 4151, 4153, 4154
   Bit 0 =  1: 4143, 4145, 4146

4. Belgium only

   Address 4144 for DTMF dialling is 3.04 s. This can be adjusted by RAM
   read/write. However, if pulse dial mode is selected, a value of 20 ms from
   the ROM is used, and this cannot be adjusted.

5. Pulse dial parameters (addresses 418A to 418F) are the values for 10
   pps. If 20 pps is used, the machine automatically compensates.

6. The first ring may not be detected until 1 to 2.5 wavelengths after the time
   specified by this parameter.

7. N must be between 0 and 15. The attenuation levels are as follows.
   High frequency tone: - N dBm
   Low frequency tone: - N - 3 dBm

8. 418A: Europe - Between Ds opening and Di opening, France - Between
   Ds closing and Di opening
   418D: Europe - Between Ds closing and Di closing, France - Between Ds
   opening and Di closing

On the following pages, there are tables of factory settings for each country. To enable the factory settings for a particular nation, program the Country Code (RAM address 413B [use hex codes] or use Function 96 [input the decimal value]) to the appropriate setting. The country code also affects the NCU signal status (see section 2-3-5).

For each RAM address, there are two columns.
- The left hand column shows the actual value of the parameter.
- The right hand column shows the value of the factory setting that is stored in the RAM. The factory settings are quoted either in hexadecimal code (the actual contents of the RAM address) if there is a H after the value in the table, or in decimal (converted from the actual hex contents of the RAM address) if there is no H after the value.
- Some RAMs must be programmed in BCD; see the NCU Parameter definition table for details.
- If the table entry is blank, this means that the value is not used.

**Country Code for NCU Parameters [or RAM Address 413B, in hex code]:**
France: 00, Germany: 01, UK: 02, Italy: 03, Austria: 04, Belgium: 05, Denmark: 06, Finland: 07, Ireland: 08, Norway: 09, Sweden: 10 [0A], Switzerland: 11 [0B], Portugal: 12 [0C], Holland: 13 [0D], Spain: 14 [0E], Israel: 15 [0F], USA: 17 [11], Asia: 18 [12], Japan: 19 [13]

**Tx Level (RAM Address 4181):** All countries 6 (- 6dB), except the UK (10 [-10dB]), USA (9 [-9dB]), and Australia (12 [-12dB]).

| Country | 413C | | 413D | | 413E | | 413F/4140 | | |
|---------|------|------|------|------|------|------|--------|-------|-------|
| France | | | | | | | 474 Hz | 04(H) | 74(H) |
| Germany | 1.1 s | 55 | 4.1 s | 205 | 1.06 s | 53 | 498 Hz | 04(H) | 98(H) |
| UK/Univ | | | | | | | | | |
| Italy | | | | | | | 471 Hz | 04(H) | 71(H) |
| Austria | | | | | | | 512 Hz | 05(H) | 12(H) |
| Belgium | | | | | | | 471 Hz | 04(H) | 71(H) |
| Denmark | | | | | | | 512 Hz | 05(H) | 12(H) |
| Finland | | | | | | | 536 Hz | 05(H) | 36(H) |
| Ireland | 1.1 s | 55 | 4.1 s | 205 | 1.06 s | 53 | 450 Hz | 04(H) | 50(H) |
| Norway | | | | | | | 512 Hz | 05(H) | 12(H) |
| Sweden | | | | | | | 512 Hz | 05(H) | 12(H) |
| Switz. | 1.1 s | 55 | 4.1 s | 205 | | | 608 Hz | 06(H) | 08(H) |
| Portugal | | | | | | | 450 Hz | 04(H) | 50(H) |
| Holland | | | | | | | 563 Hz | 05(H) | 63(H) |
| Spain | | | | | | | 480 Hz | 04(H) | 80(H) |
| Israel | 1.1 s | 55 | 4.1 s | 205 | 1.06 s | 53 | 498 Hz | 04(H) | 98(H) |
| USA | | | | | | | | | |
| Asia | | | | | | | | | |
| Australia | | | | | | | 450 Hz | 04(H) | 50(H) |

| Country | 4141/4142 | | | 4143 | | 4144 | | 4145 | |
|---------|-----------|------|-------|-------|-------|--------|-----|--------|-----|
| France | 406 Hz | 04(H) | 06(H) | 2 s | 100 | 12 s | 75 | 1 s | 50 |
| Germany | 370 Hz | 03(H) | 70(H) | 2.1 s | 105 | 20 s | 125 | 2.1 s | 105 |
| UK | | | | | | | | | |
| Italy | 391 Hz | 03(H) | 91(H) | 2, 50% | 21(H) | 10.9 s | 68 | 0.6 s | 60 |
| Austria | 380 Hz | 03(H) | 80(H) | 2.1 s | 105 | 10.1 s | 63 | 0.8 s | 40 |
| Belgium | 405 Hz | 04(H) | 05(H) | 0.6 s | 30 | 3.04 s | 19 | 0.6 s | 30 |
| Denmark | 340 Hz | 03(H) | 40(H) | 1.3 s | 65 | 10.1 s | 63 | 1.3 s | 65 |
| Finland | 315 Hz | 03(H) | 15(H) | 4.1 s | 205 | 10.1 s | 63 | 4.1 s | 205 |
| Ireland | 200 Hz | 02(H) | 00(H) | 2.1 s | 105 | 10.2 s | 64 | 2.1 s | 105 |
| Norway | 340 Hz | 03(H) | 40(H) | 1.1 s | 55 | 20 s | 125 | 1.1 s | 55 |
| Sweden | 340 Hz | 03(H) | 40(H) | 1.92 s | 96 | 5.12 s | 32 | 1.92 s | 96 |
| Switz. | 338 Hz | 03(H) | 38(H) | 1.92 s | 96 | 10.9 s | 68 | 1.92 s | 96 |
| Portugal | 300 Hz | 03(H) | 00(H) | 2.1 s | 105 | 9.9 s | 62 | 2.1 s | 105 |
| Holland | 76 Hz | 00(H) | 76(H) | 1.1 s | 55 | 20 s | 125 | 1.1 s | 55 |
| Spain | 320 Hz | 03(H) | 20(H) | 1.5 s | 75 | 12.8 s | 80 | 0.72 s | 36 |
| Israel | 340 Hz | 03(H) | 40(H) | 2.1 s | 105 | 20 s | 125 | 2.1 s | 105 |
| USA | | | | | | | | | |
| Asia | | | | | | | | | |
| Australia | 390 Hz | 03(H) | 90(H) | 3 s | 150 | 6 s | 38 | 2 s | 100 |

| Country | 4146 | | 4147 | | 4148 | | 4149/414A | | |
|---------|--------|-----|--------|-----|-------|---|-----------|-------|-------|
| France | 0.04 s | 2 | 0 s | 0 | | | 474 Hz | 04 (H) | 74 (H) |
| Germany | 0.08 s | 4 | 4 s | 25 | | | 510 Hz | 05 (H) | 10 (H) |
| UK/Univ | | | 4 s | 25 | | | 430 Hz | 04 (H) | 30 (H) |
| Italy | 1 s | 100 | 4 s | 25 | | | 529 Hz | 05 (H) | 29 (H) |
| Austria | 0.08 s | 4 | 4 s | 25 | 0.1 s | 5 | 512 Hz | 05 (H) | 12 (H) |
| Belgium | 0.08 s | 4 | 4 s | 25 | | | 471 Hz | 04 (H) | 71 (H) |
| Denmark | 0.08 s | 4 | 4 s | 25 | | | | | |
| Finland | 0.08 s | 4 | 4 s | 25 | | | | | |
| Ireland | 0.08 s | 4 | 4 s | 25 | | | 430 Hz | 04 (H) | 30 (H) |
| Norway | 0.08 s | 4 | 4 s | 25 | | | 512 Hz | 05 (H) | 12 (H) |
| Sweden | 0.04 s | 2 | 4 s | 25 | | | 512 Hz | 05 (H) | 12 (H) |
| Switz. | 0.04 s | 2 | 4 s | 25 | 0.1 s | 5 | 608 Hz | 06 (H) | 08 (H) |
| Portugal | 0.08 s | 4 | 4 s | 25 | | | | | |
| Holland | 0.08 s | 4 | 4 s | 25 | | | 563 Hz | 05 (H) | 63 (H) |
| Spain | 0.1 s | 5 | 3.04 s | 19 | | | 460 Hz | 04 (H) | 60 (H) |
| Israel | 0.08 s | 4 | 4 s | 25 | | | 498 Hz | 04 (H) | 98 (H) |
| USA | | | 2.08 s | 13 | | | | | |
| Asia | | | 2.08 s | 13 | | | | | |
| Australia | 0.02 s | 1 | 3.04 s | 19 | | | 450 Hz | 04 (H) | 50 (H) |

| Country | 414B/414C | | | 414D/414E | | | 414F/4150 | | |
|---|---|---|---|---|---|---|---|---|---|
| France | 406 Hz | 04(H) | 06(H) | 900 Hz | 09(H) | 00(H) | 300 Hz | 03(H) | 00(H) |
| Germany | 350 Hz | 03(H) | 50(H) | | | | | | |
| UK/Univ | 360 Hz | 03(H) | 60(H) | | | | | | |
| Italy | 329 Hz | 03(H) | 29(H) | 512 Hz | 05(H) | 12(H) | 391 Hz | 03(H) | 91(H) |
| Austria | 380 Hz | 03(H) | 80(H) | | | | | | |
| Belgium | 405 Hz | 04(H) | 05(H) | | | | | | |
| Denmark | | | | | | | | | |
| Finland | | | | | | | | | |
| Ireland | 370 Hz | 03(H) | 70(H) | | | | | | |
| Norway | 340 Hz | 03(H) | 40(H) | | | | | | |
| Sweden | 340 Hz | 03(H) | 40(H) | | | | | | |
| Switz. | 338 Hz | 03(H) | 38(H) | 608 Hz | 06(H) | 08(H) | 338 Hz | 03(H) | 38(H) |
| Portugal | | | | | | | | | |
| Holland | 320 Hz | 03(H) | 20(H) | 563 Hz | 05(H) | 63(H) | 76 Hz | 00(H) | 76(H) |
| Spain | 380 Hz | 03(H) | 80(H) | | | | | | |
| Israel | 370 Hz | 03(H) | 70(H) | 563 Hz | 05(H) | 63(H) | 370 Hz | 03(H) | 70(H) |
| USA | | | | | | | | | |
| Asia | | | | | | | | | |
| Australia | 390 Hz | 03(H) | 90(H) | 450 Hz | 04(H) | 50(H) | 390 Hz | 03(H) | 90(H) |

| Country | 4151 | | 4152 | | 4153 | | 4154 | | 4155 | |
|---|---|---|---|---|---|---|---|---|---|---|
| France | 2 s | 100 | 12 s | 75 | 1 s | 50 | 40 ms | 2 | 0 s | 0 |
| Germany | | | | | | | | | 4 s | 25 |
| UK/Univ | | | | | | | | | 4 s | 25 |
| Italy | 2 s | 100 | 10.1 s | 63 | 0.18 s | 9 | 80 ms | 4 | 4 s | 25 |
| Austria | | | | | | | | | 4 s | 25 |
| Belgium | | | | | | | | | 4 s | 25 |
| Denmark | | | | | | | | | 4 s | 25 |
| Finland | | | | | | | | | 4 s | 25 |
| Ireland | | | | | | | | | 4 s | 25 |
| Norway | | | | | | | | | 4 s | 25 |
| Sweden | | | | | | | | | 4 s | 25 |
| Switz. | 0.8 s | 40 | 9.9 s | 62 | 0.8 s | 40 | 80 ms | 4 | 4 s | 25 |
| Portugal | | | | | | | | | 4 s | 25 |
| Holland | 1.1 s | 55 | 20 s | 125 | 1.1 s | 55 | 80 ms | 4 | 4 s | 25 |
| Spain | | | | | | | | | 3.04 s | 19 |
| Israel | 2.1 s | 105 | 20 s | 125 | 2.1 s | 105 | 80 ms | 4 | 4 s | 25 |
| USA | | | | | | | | | 4 s | 25 |
| Asia | | | | | | | | | 4 s | 25 |
| Australia | 3 s | 150 | 6 s | 38 | 2 s | 100 | 20 ms | 1 | 3.04 s | 19 |

**4**

| Country | 4156 | | 4157/4158 | | | 4159/415A | | |
|---|---|---|---|---|---|---|---|---|
| France | | | | | | | | |
| Germany | | | | | | | | |
| UK/Univ | | | | | | | | |
| Italy | | | | | | | | |
| Austria | | | | | | | | |
| Belgium | | | | | | | | |
| Denmark | | | | | | | | |
| Finland | | | | | | | | |
| Ireland | | | | | | | | |
| Norway | | | | | | | | |
| Sweden | | | | | | | | |
| Switz. | | | 608 Hz | 06(H) | 08(H) | 338 Hz | 03(H) | 38(H) |
| Portugal | | | | | | | | |
| Holland | | | | | | | | |
| Spain | | | | | | | | |
| Israel | | | 563 Hz | 05(H) | 63(H) | 370 Hz | 03(H) | 70(H) |
| USA | | | | | | | | |
| Asia | | | | | | | | |
| Australia | | | 450 Hz | 04(H) | 50(H) | 390 Hz | 03(H) | 90(H) |

| Country | 415B | | 415C | | 415D | | 415E | | 415F | |
|---|---|---|---|---|---|---|---|---|---|---|
| France | 0.5 s | 25 | 0.5 s | 25 | | | | | | |
| Germany | 0.24 s | 12 | 0.24 s | 12 | 0.48 s | 24 | 0.48 s | 24 | 0.14 s | 7 |
| UK/Univ | 0.38 s | 19 | 0.38 s | 19 | 0.4 s | 20 | 0.34 s | 17 | 0.22 s | 11 |
| Italy | 0.2 s | 10 | 0.2 s | 10 | | | | | | |
| Austria | 0.2 s | 10 | 0.2 s | 10 | 0.3 s | 15 | 0.3 s | 15 | 0.4 s | 20 |
| Belgium | 0.5 s | 25 | 0.5 s | 25 | 0.16 s | 8 | 0.16 s | 8 | | |
| Denmark | | | | | | | | | | |
| Finland | | | | | | | | | | |
| Ireland | 0.5 s | 25 | 0.5 s | 25 | 0.74 s | 37 | 0.74 s | 37 | 0.36 s | 18 |
| Norway | 0.34 s | 17 | 0 s | 0 | | | | | | |
| Sweden | 0.24 s | 12 | 0.24 s | 12 | 0.24 s | 12 | 0.74 s | 37 | | |
| Switz. | 0.22 s | 11 | 0.24 s | 12 | 0.3 s | 15 | 0.44 s | 22 | 0.48 s | 24 |
| Portugal | | | | | | | | | | |
| Holland | 0.24 s | 12 | 0.24 s | 12 | 0.5 s | 25 | 0.5 s | 25 | | |
| Spain | 0.16 s | 8 | 0.16 s | 8 | 0.16 s | 8 | 0.16 s | 8 | | |
| Israel | 0.24 s | 12 | 0.24 s | 12 | 0.48 s | 24 | 0.48 s | 24 | | |
| USA | | | | | | | | | | |
| Asia | | | | | | | | | | |
| Australia | 0.36 s | 18 | 0.36 s | 18 | 0.38 s | 19 | 0.38 s | 19 | 0.24 s | 12 |

| Country | 4160 | | 4161 | | 4162 | | 4163 | | 4164 | |
|---|---|---|---|---|---|---|---|---|---|---|
| France | | | | | | | | | 4, 12.5 | 43(H) |
| Germany | 0.48 s | 24 | | | | | | | 3, 50 | 31(H) |
| UK/Univ | 0.52 s | 26 | | | | | 2 s | 100 | 4, 12.5 | 43(H) |
| Italy | | | | | | | | | 4, 50 | 41(H) |
| Austria | 0.4 s | 20 | | | | | | | 4, 25 | 42(H) |
| Belgium | | | | | | | | | 4, 12.5 | 43(H) |
| Denmark | | | | | | | | | | |
| Finland | | | | | | | | | | |
| Ireland | 0.36 s | 18 | | | | | 0.7 s | 35 | 4, 12.5 | 43(H) |
| Norway | | | | | | | | | 4, 75 | 40(H) |
| Sweden | | | | | | | | | 4, 12.5 | 43(H) |
| Switz. | 0.6 s | 30 | 0.16 s | 8 | 0.6 s | 30 | | | 3, 50 | 31(H) |
| Portugal | | | | | | | | | | |
| Holland | | | | | | | | | 4, 50 | 41(H) |
| Spain | | | | | | | | | 4, 50 | 41(H) |
| Israel | | | | | | | | | 4, 50 | 41(H) |
| USA | | | | | | | | | | |
| Asia | | | | | | | | | | |
| Australia | 0.24 s | 12 | 0.5 s | 25 | 0.5 s | 25 | | | 4, 50 | 41(H) |

| Country | 4165/4166 | | | 4167/4168 | | | 4169 | |
|---|---|---|---|---|---|---|---|---|
| France | 474 Hz | 04(H) | 74(H) | 406 Hz | 04(H) | 06(H) | 2 s | 100 |
| Germany | | | | | | | | |
| UK/Univ | | | | | | | | |
| Italy | | | | | | | | |
| Austria | | | | | | | | |
| Belgium | 1160Hz | 11(H) | 60(H) | 1110Hz | 11(H) | 10(H) | 4, 50% | 41(H) |
| Denmark | | | | | | | | |
| Finland | | | | | | | | |
| Ireland | | | | | | | | |
| Norway | | | | | | | | |
| Sweden | | | | | | | | |
| Switz. | | | | | | | | |
| Portugal | | | | | | | | |
| Holland | 563 Hz | 05(H) | 63(H) | 76 Hz | 00(H) | 76(H) | 1.1 s | 55 |
| Spain | 620 Hz | 06(H) | 20(H) | 580 Hz | 05(H) | 80(H) | 1.5 s | 75 |
| Israel | | | | | | | | |
| USA | | | | | | | | |
| Asia | | | | | | | | |
| Australia | | | | | | | | |

**4**

| Country | 416A | | 416B | | 416C | | 416D | | 416E/416F |
|---|---|---|---|---|---|---|---|---|---|
| France | 12 s | 75 | 1 s | 50 | 0.04 s | 2 | 0 | 0 | |
| Germany | | | | | | | 0 | 0 | |
| UK/Univ | | | | | | | 0 | 0 | |
| Italy | | | | | | | 0 | 0 | |
| Austria | | | | | | | 0 | 0 | |
| Belgium | 20 s | 125 | 0.33 s | 33 | 0.69 s | 69 | 0 | 0 | Only used by Sweden: 512 Hz 416E: 05(H) 416F: 12(H) |
| Denmark | | | | | | | 0 | 0 | |
| Finland | | | | | | | 0 | 0 | |
| Ireland | | | | | | | 0 | 0 | |
| Norway | | | | | | | 0 | 0 | |
| Sweden | | | | | | | 0 | 0 | |
| Switz. | | | | | | | 0 | 0 | |
| Portugal | | | | | | | 0 | 0 | |
| Holland | 20 s | 125 | 1.1 s | 55 | 0.08 s | 4 | 0 | 0 | |
| Spain | 12.8 s | 80 | 0.72 s | 36 | 0.1 s | 5 | 3.04 s | 19 | |
| Israel | | | | | | | 0 | 0 | |
| USA | | | | | | | 0 | 0 | |
| Asia | | | | | | | 0 | 0 | |
| Australia | | | | | | | 0 | 0 | |

| Country | 4170/4171 | | | 4172 | | 4173 | | 4174 | |
|---|---|---|---|---|---|---|---|---|---|
| France | | | | | | | | | |
| Germany | | | | | | | | | |
| UK/Univ | | | | | | | | | |
| Italy | | | | | | | | | |
| Austria | | | | | | | | | |
| Belgium | | | | | | | | | |
| Denmark | | | | | | | | | |
| Finland | | | | | | | | | |
| Ireland | | | | | | | | | |
| Norway | | | | | | | | | |
| Sweden | 340 Hz | 03(H) | 40(H) | 1.02 s | 51 | 20 s | 125 | 0.26 s | 13 |
| Switz. | | | | | | | | | |
| Portugal | | | | | | | | | |
| Holland | | | | | | | | | |
| Spain | | | | | | | | | |
| Israel | | | | | | | | | |
| USA | | | | | | | | | |
| Asia | | | | | | | | | |
| Australia | | | | | | | | | |

| Country | 4175 | | 4176 | | 4177 | | 4178 | |
|---|---|---|---|---|---|---|---|---|
| France | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Germany | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| UK/Univ | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| Italy | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| Austria | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| Belgium | | | 0 | 0 | 2 s | 100 | 90 ms | 90 |
| Denmark | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| Finland | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| Ireland | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| Norway | | | 0 | 0 | 0.5 s | 25 | 90 ms | 90 |
| Sweden | 0.08 s | 4 | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| Switz. | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| Portugal | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| Holland | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| Spain | | | 0 | 0 | 2 s | 100 | 90 ms | 90 |
| Israel | | | 0 | 0 | 0.3 s | 15 | 90 ms | 90 |
| USA | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Asia | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Australia | | | 0 | 0 | 0 | 0 | 0 | 0 |

| Country | 4179/417A | | | 417B | | 417C | | 417D | |
|---|---|---|---|---|---|---|---|---|---|
| France | 19 | FF(H) | 19(H) | | | -53 | C0(H) | 53.8 s | 21 |
| Germany | 00 | FF(H) | 00(H) | | | -53 | C0(H) | 53.8 s | 21 |
| UK/Univ | 010 | F0(H) | 10(H) | 1 s | 50 | -53 | C0(H) | 53.8 s | 21 |
| Italy | 00 | FF(H) | 00(H) | | | -53 | C1(H) | 53.8 s | 21 |
| Austria | 00 | FF(H) | 00(H) | | | -53 | C0(H) | 53.8 s | 21 |
| Belgium | 00 | FF(H) | 00(H) | | | -32.5 | 84(H) | 58.9 s | 23 |
| Denmark | 009 | F0(H) | 09(H) | | | -32.5 | 80(H) | 53.8 s | 21 |
| Finland | 990 | F9(H) | 90(H) | 2 s | 100 | -32.5 | 80(H) | 53.8 s | 21 |
| Ireland | 16 | FF(H) | 16(H) | | | -40.5 | 40(H) | 53.8 s | 21 |
| Norway | 095 | F0(H) | 95(H) | | | -32.5 | 80(H) | 53.8 s | 21 |
| Sweden | 009 | F0(H) | 09(H) | | | -32.5 | 80(H) | 53.8 s | 21 |
| Switz. | 00 | FF(H) | 00(H) | | | -40.5 | 40(H) | 92.2 s | 36 |
| Portugal | 00 | FF(H) | 00(H) | | | -32.5 | 80(H) | 53.8 s | 21 |
| Holland | 09 | FF(H) | 09(H) | | | -29 | 00(H) | 53.8 s | 21 |
| Spain | 07 | FF(H) | 07(H) | | | -40.5 | 40(H) | 79.4 s | 31 |
| Israel | 00 | FF(H) | 00(H) | | | -53 | C0(H) | 58.9 s | 23 |
| USA | | | | | | -53 | C0(H) | 53.8 s | 21 |
| Asia | | | | | | -53 | C0(H) | 53.8 s | 21 |
| Australia | | | | | | -53 | C0(H) | 53.8 s | 21 |

**4**

| **Country** | 417E | | 417F | | 4180 | | 4182 (Hz) | | 4183 (Hz) | |
|---|---|---|---|---|---|---|---|---|---|---|
| France | 5 | 5 | 5 | 5 | 7.68 s | 3 | 53.1 | 28 | 43.8 | 34 |
| Germany | 4 | 4 | 2 | 2 | 12.8 s | 5 | 64.7 | 23 | 20.7 | 72 |
| UK/Univ | 3 | 3 | 2 | 2 | 12.8 s | 5 | 19.8 | 75 | 11.6 | 128 |
| Italy | 3 | 3 | 2 | 2 | 17.92s | 7 | 55.1 | 27 | 12.7 | 117 |
| Austria | 3 | 3 | 2 | 2 | 12.8 s | 5 | 70.9 | 21 | 40.2 | 37 |
| Belgium | 4 | 4 | 6 | 6 | 15.36s | 6 | 29.8 | 50 | 13.5 | 110 |
| Denmark | 3 | 3 | 1 | 1 | 12.8 s | 5 | 29.8 | 50 | 19.6 | 76 |
| Finland | 3 | 3 | 2 | 2 | 12.8 s | 5 | 32.3 | 46 | 17.3 | 86 |
| Ireland | 3 | 3 | 2 | 2 | 12.8 s | 5 | 27.1 | 55 | 14.4 | 103 |
| Norway | 3 | 3 | 2 | 2 | 12.8 s | 5 | 64.7 | 23 | 17.3 | 86 |
| Sweden | 3 | 3 | 2 | 2 | 12.8 s | 5 | 30.3 | 49 | 19.1 | 78 |
| Switz. | 5 | 5 | 1 | 1 | 12.8 s | 5 | 59.5 | 25 | 19.1 | 78 |
| Portugal | 3 | 3 | 1 | 1 | 12.8 s | 5 | 64.7 | 23 | 12.5 | 119 |
| Holland | 3 | 3 | 1 | 1 | 12.8 s | 5 | 29.2 | 51 | 20.1 | 74 |
| Spain | 3 | 3 | 1 | 1 | 48.64s | 19 | 29.2 | 51 | 19.6 | 76 |
| Israel | 14 | 14 | 1 | 1 | 12.8 s | 5 | 59.5 | 25 | 11.7 | 127 |
| USA | 3 | 3 | 5 | 5 | 12.8 s | 5 | 23.3 | 64 | 11.7 | 127 |
| Asia | 3 | 3 | 5 | 5 | 12.8 s | 5 | 23.3 | 64 | 11.7 | 127 |
| Australia | 10 | 10 | 5 | 5 | 15.36s | 6 | 73.2 | 21 | 9.7 | 154 |

| **Country** | 4184 (Hz) | | 4185 (Hz) | | 4186 | | 4187 | | 4188 | |
|---|---|---|---|---|---|---|---|---|---|---|
| France | | | | | 1 | 1 | 0.1 s | 5 | 0.1 s | 5 |
| Germany | | | | | 1 | 1 | 0.2 s | 10 | 0.2 s | 10 |
| UK/Univ | 49.6 | 30 | 17.3 | 86 | 1 | 1 | 0.2 s | 10 | 0.2 s | 10 |
| Italy | | | | | 2 | 2 | 0.2 s | 10 | 0.2 s | 10 |
| Austria | | | | | 1 | 1 | 0.2 s | 10 | 0.2 s | 10 |
| Belgium | | | | | 2 | 2 | 0.1 s | 5 | 0.2 s | 10 |
| Denmark | 59.5 | 25 | 40.2 | 37 | 1 | 1 | 0.2 s | 10 | 0.2 s | 10 |
| Finland | 62.0 | 24 | 19.3 | 77 | 2 | 2 | 0.5 s | 25 | 0.5 s | 25 |
| Ireland | | | | | 1 | 1 | 0.2 s | 10 | 0.2 s | 10 |
| Norway | | | | | 1 | 1 | 0.3 s | 15 | 0.3 s | 15 |
| Sweden | 55.1 | 27 | 24.0 | 62 | 1 | 1 | 0.1 s | 5 | 0.1 s | 5 |
| Switz. | | | | | 3 | 3 | 0 | 0 | 0 | 0 |
| Portugal | 59.5 | 25 | 40.2 | 37 | 1 | 1 | 0.2 s | 10 | 0.2 s | 10 |
| Holland | 59.5 | 25 | 40.2 | 37 | 1 | 1 | 0.2 s | 10 | 0.2 s | 10 |
| Spain | 39.2 | 38 | 19.3 | 77 | 2 | 2 | 0.2 s | 10 | 0.2 s | 10 |
| Israel | | | | | 2 | 2 | 0.1 s | 5 | 0.1 s | 5 |
| USA | 74.4 | 20 | 22.2 | 67 | 1 | 1 | 0.2 s | 10 | 0.2 s | 10 |
| Asia | 57.2 | 26 | 22.2 | 67 | 1 | 1 | 0.2 s | 10 | 0.2 s | 10 |
| Australia | | | | | 3 | 3 | 0.2 s | 10 | 0.2 s | 10 |

| Country | 4189 | | 418A | | 418B | | 418C | | 418D | |
|---|---|---|---|---|---|---|---|---|---|---|
| France | 3.8 s | 95 | 67 ms | 67 | 67 ms | 67 | 33 ms | 33 | 50 ms | 50 |
| Germany | 8 s | 200 | 53 ms | 53 | 57 ms | 57 | 41 ms | 41 | 50 ms | 50 |
| UK/Univ | 8 s | 200 | 255ms | 255 | 61 ms | 61 | 33 ms | 33 | 50 ms | 50 |
| Italy | 8 s | 200 | 61 ms | 61 | 60 ms | 60 | 40 ms | 40 | 50 ms | 50 |
| Austria | 8 s | 200 | 53 ms | 53 | 61 ms | 61 | 39 ms | 39 | 50 ms | 50 |
| Belgium | 8 s | 200 | 61 ms | 61 | 67 ms | 67 | 33 ms | 33 | 50 ms | 50 |
| Denmark | 8 s | 200 | 53 ms | 53 | 67 ms | 67 | 33 ms | 33 | 50 ms | 50 |
| Finland | 8 s | 200 | 61 ms | 61 | 56 ms | 56 | 42 ms | 42 | 50 ms | 50 |
| Ireland | 8 s | 200 | 255ms | 255 | 67 ms | 67 | 33 ms | 33 | 50 ms | 50 |
| Norway | 8 s | 200 | 61 ms | 61 | 59 ms | 59 | 41 ms | 41 | 50 ms | 50 |
| Sweden | 8 s | 200 | 100ms | 100 | 60 ms | 60 | 40 ms | 40 | 70 ms | 70 |
| Switz. | 8 s | 200 | 60 ms | 60 | 60 ms | 60 | 40 ms | 40 | 60 ms | 60 |
| Portugal | 8 s | 200 | 61 ms | 61 | 66 ms | 66 | 34 ms | 34 | 50 ms | 50 |
| Holland | 8 s | 200 | 61 ms | 61 | 61 ms | 61 | 39 ms | 39 | 50 ms | 50 |
| Spain | 6 s | 150 | 75 ms | 75 | 60 ms | 60 | 33 ms | 33 | 75 ms | 75 |
| Israel | 8 s | 200 | 61 ms | 61 | 61 ms | 61 | 39 ms | 39 | 50 ms | 50 |
| USA | 8 s | 200 | 80 ms | 80 | 62 ms | 62 | 41 ms | 41 | 80 ms | 80 |
| Asia | 8 s | 200 | 61 ms | 61 | 66 ms | 66 | 34 ms | 34 | 50 ms | 50 |
| Australia | 8 s | 200 | 255ms | 255 | 66 ms | 66 | 34 ms | 34 | 70 ms | 70 |

| Country | 418E | | 418F | | 4190 | | 4191 | | 4192 | |
|---|---|---|---|---|---|---|---|---|---|---|
| France | 0.8 s | 40 | 0 | 0 | 70 ms | 70 | 70 ms | 70 | 15 | 15 |
| Germany | 0.92 s | 46 | 0.92 s | 46 | 90 ms | 90 | 90 ms | 90 | 7 | 7 |
| UK/Univ | 0.54 s | 27 | 0.66 s | 33 | 0.1 s | 100 | 0.1 s | 100 | 9 | 9 |
| Italy | 0.8 s | 40 | 3 s | 150 | 70 ms | 70 | 70 ms | 70 | 6 | 6 |
| Austria | 0.88 s | 44 | 0.92 s | 46 | 70 ms | 70 | 70 ms | 70 | 6 | 6 |
| Belgium | 0.86 s | 43 | 0.52 s | 26 | 70 ms | 70 | 70 ms | 70 | 6 | 6 |
| Denmark | 0.52 s | 26 | 0.52 s | 26 | 90 ms | 90 | 90 ms | 90 | 9 | 9 |
| Finland | 0.8 s | 40 | 1.2 s | 60 | 70 ms | 70 | 75 ms | 75 | 9 | 9 |
| Ireland | 0.6 s | 30 | 0.66 s | 33 | 70 ms | 70 | 70 ms | 70 | 9 | 9 |
| Norway | 0.66 s | 33 | 0.66 s | 33 | 70 ms | 70 | 70 ms | 70 | 9 | 9 |
| Sweden | 0.8 s | 40 | 0.52 s | 26 | 70 ms | 70 | 70 ms | 70 | 9 | 9 |
| Switz. | 0.52 s | 26 | 0 | 0 | 70 ms | 70 | 70 ms | 70 | 6 | 6 |
| Portugal | 0.66 s | 33 | 0.66 s | 33 | 70 ms | 70 | 70 ms | 70 | 9 | 9 |
| Holland | 0.66 s | 33 | 0.66 s | 33 | 70 ms | 70 | 70 ms | 70 | 9 | 9 |
| Spain | 0.64 s | 32 | 2 s | 100 | 70 ms | 70 | 0.14 s | 140 | 6 | 6 |
| Israel | 0.92 s | 46 | 2.02 s | 101 | 90 ms | 90 | 90 ms | 90 | 6 | 6 |
| USA | 0.8 s | 40 | 2.02 s | 101 | 0.1 s | 100 | 0.1 s | 100 | 8 | 8 |
| Asia | 0.72 s | 36 | 2.02 s | 101 | 0.1 s | 100 | 0.11 s | 110 | 6 | 6 |
| Australia | 0.8 s | 40 | 2.02 s | 101 | 0.1 s | 100 | 0.11 s | 110 | 10 | 10 |

**4**

## Additional NCU Parameters

**V.21 detection level (RAM Address 4193, hex code):** All 73(H), except Germany [7B(H)].
**Rx data detection level (RAM Address 4194, hex code):** All 73(H), except Germany [7B(H)].
**800 Hz tx level (RAM Address 4195/4196, hex):** All 31BF(H), except Germany [2641(H)].
**1100 Hz tx level (RAM Address 4197/4198, hex):** All 31BF(H), except Germany [2917(H)].
**2100 Hz tx level (RAM Address 4199/419A, hex):** All 31BF(H), except Germany [3774(H)].

## 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 | at 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**

## 4.4.2. Parameters

| Byte 1 | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| 0<br><br>1 | Initial Tx modem rate<br>**Bit 1  Bit 0        Setting**<br>0        0              9,600 bps<br>0        1              7,200 bps<br>1        0              4,800 bps<br>1        1              2,400 bps | If training with a particular remote terminal always takes too long, the initial modem rate may be too high. Reduce the initial Tx modem rate using these bits. |
| 2<br><br>3<br><br>4<br><br>5 | Tx level<br>**Bit  2    3    4    5      Level<br>(dBm)**<br>        0    0    0    0      0<br>        0    0    0    1      -1<br>        0    0    1    0      -2<br>        0    0    1    1      -3<br>        and so on until<br>        1    1    1    1      -15 | 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. |
| 6 | Not used | Do not change the factory setting. |
| 7 | Dedicated transmission parameters for this Quick/Speed Dial number<br>**0:** Disabled    **1:** Enabled | **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.<br>**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. |

| Byte 2 | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| 0 | DIS/NSF detection method<br>**0:** First DIS or NSF<br>**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<br>**0:** Enabled<br>**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<br><br>3<br><br>4 | Not used | Do not change the factory settings. |
| Continued on the next page | | |

| Byte 2 | | |
|---|---|---|
| | **FUNCTION** | **COMMENTS** |
| **5** **6** | Compression modes available in transmit mode<br>**Bit 6    5    Modes**<br>  0    0    MMR, MR, or MH<br>  0    1    MR or MH<br>  1    0    MH only<br>  1    1    MH only | These bits determine the capabilities that are informed to the other terminal during transmission. |
| **7** | Short preamble<br>**0:** Disabled<br>**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<br>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.<br><br>**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**

# 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 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 redialling attempts, including the first dialling attempt (memory tx)
                                          Hex : 00 - FF

**4059:** Redialling 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.

Universal version

| RAM | Setting | RAM | Setting | RAM | Setting |
|-----|---------|-----|---------|-----|---------|
| 4044 | 00 | 404B | 12 | 4055 | 40 |
| 4045 | 00 | 404C | 10 | 4057 | 08 |
| 4047 | 03 | 404D | 0E | 4058 | 05 |
| 4048 | 08 | 4053 | 00 | 4059 | 05 |
| 4049 | 0A | 4054 | 00 | 405D | 24 |

Asia version

| 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 |

The following tables show the changes in the factory settings with the different country code settings.

Table 1: Based on the Universal version

| Country | Code | Differences (switch settings given in Hex code) |
|---------|------|--------------------------------------------------|
| France | 00 | None |
| Germany | 01 | 4044: 20, 4045: 01, 4049: 18 |
| UK | 02 | None (the settings for the Universal version are based on those required for the UK) |
| Italy | 03 | None |
| Austria | 04 | 4049: 0B |
| Belgium | 05 | None |
| Denmark | 06 | None |
| Finland | 07 | None |
| Ireland | 08 | None |
| Norway | 09 | None |
| Sweden | 0A | None |
| Switzerland | 0B | None |
| Portugal | 0C | None |
| Holland | 0D | None |
| Spain | 0E | None |

**4**

Table 2: Based on the Asia version (Country code 12)

| Country | Code | Differences (switch settings given in Hex code) |
|---|---|---|
| Israel | 0F | None |
| Hong Kong | 14 | |
| South Africa | 15 | |
| Australia | 16 | |
| New Zealand | 17 | |
| Singapore | 18 | |
| Malaysia | 19 | |

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

## 4.6.  SPECIAL TOOLS AND LUBRICANTS

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

# 5. REPLACEMENT AND ADJUSTMENT

## 5.1. COVERS

### 5.1.1. Top Cover [A]

**[A]**

**[A]:** 4 screws
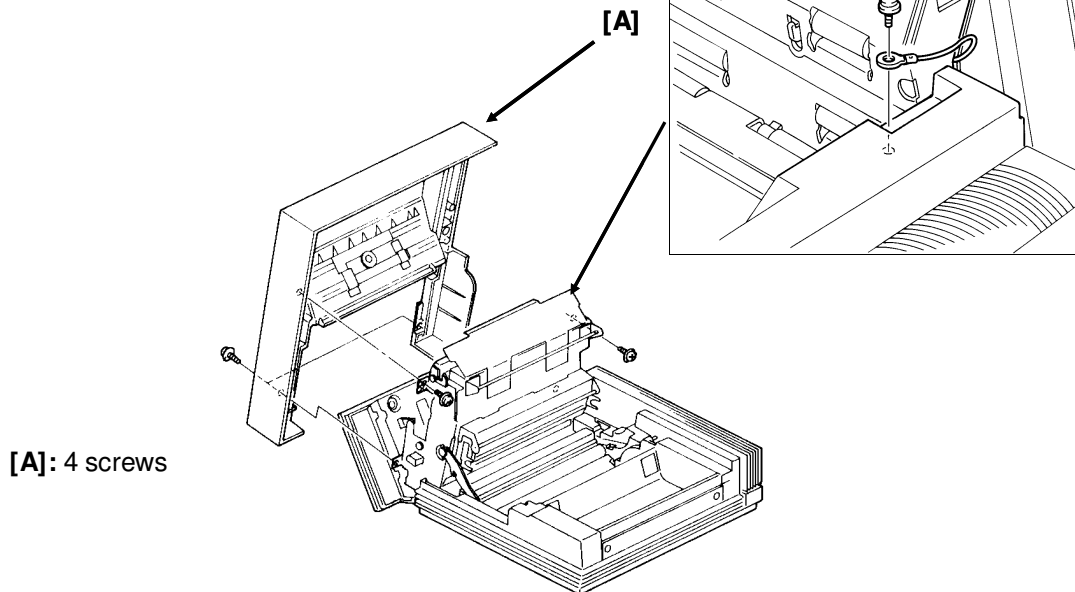
### 5.1.2. Front [B] and Rear [C] Covers

**[A]**

**[C]**

**[B]:** 3 screws
**[C]:** 5 screws, 1 washer

**[B]**

**5**
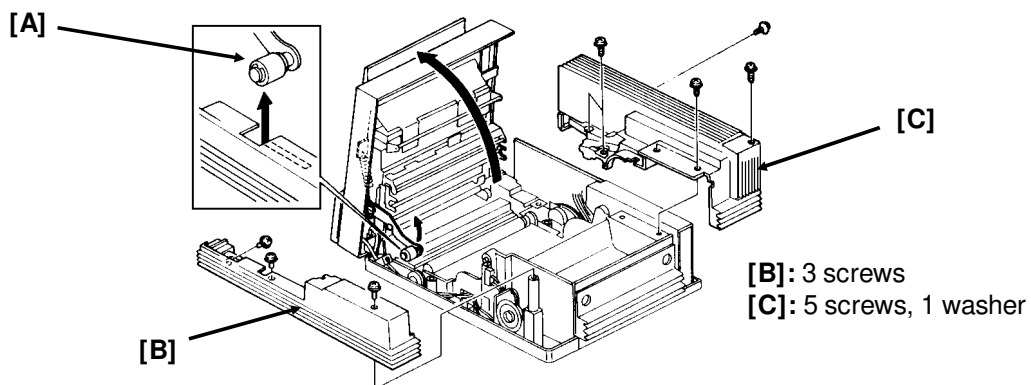
**Caution:** Do not damage the cable at the front left side of the machine.

## 5.2. SCANNER

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

**[A]:** 2 screws
**[B]:** 1 E-ring
**[E]:** 4 screws
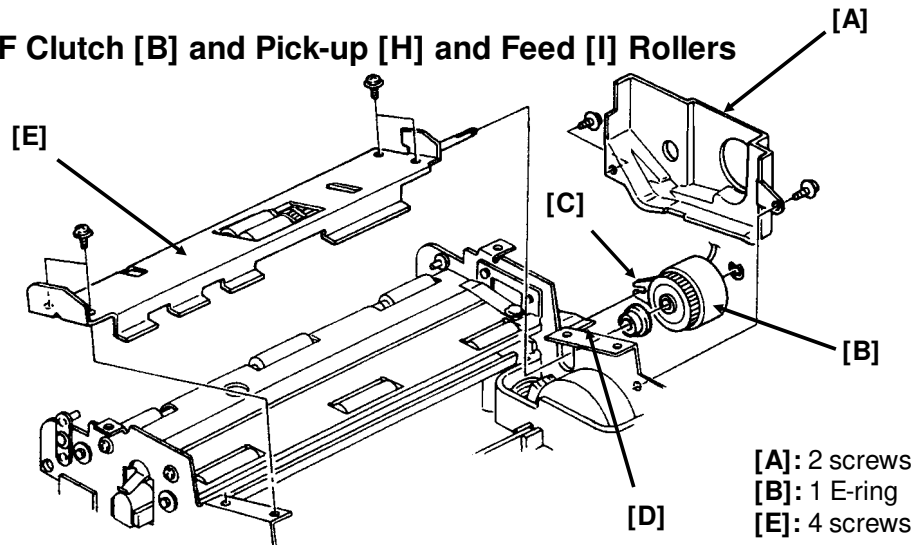
- First, remove the front and rear covers (see section 5-1).

**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.

**[H]:** 1 spring washer
**[J]:** 1 Allen screw
3 clips
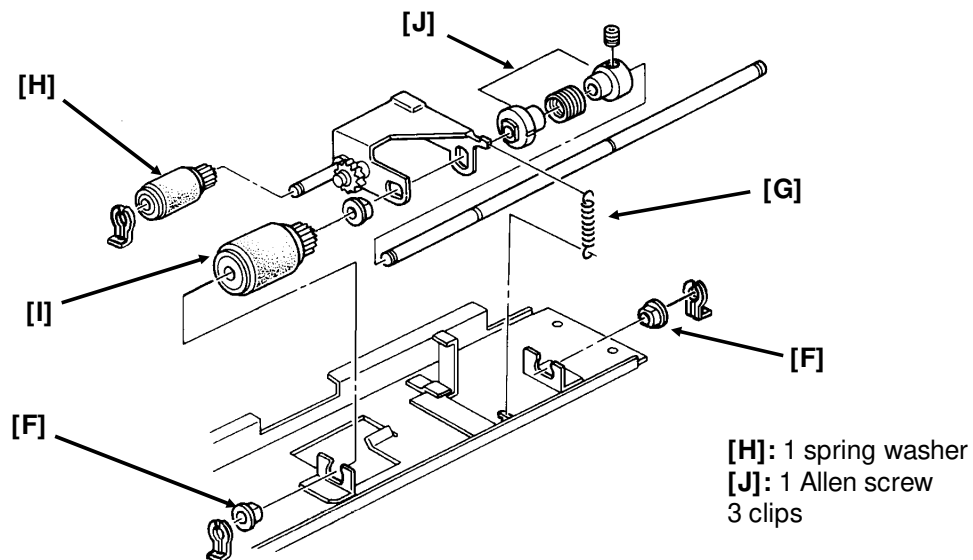
- If you need to disassemble the one-way clutch [J], see the diagram.

**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]



**[B]:** 2 screws (1 with ground)
**[C]:** 1 screw

**[D]:** 2 screws
**[E]:** 4 screws

**[F]:** 2 screws
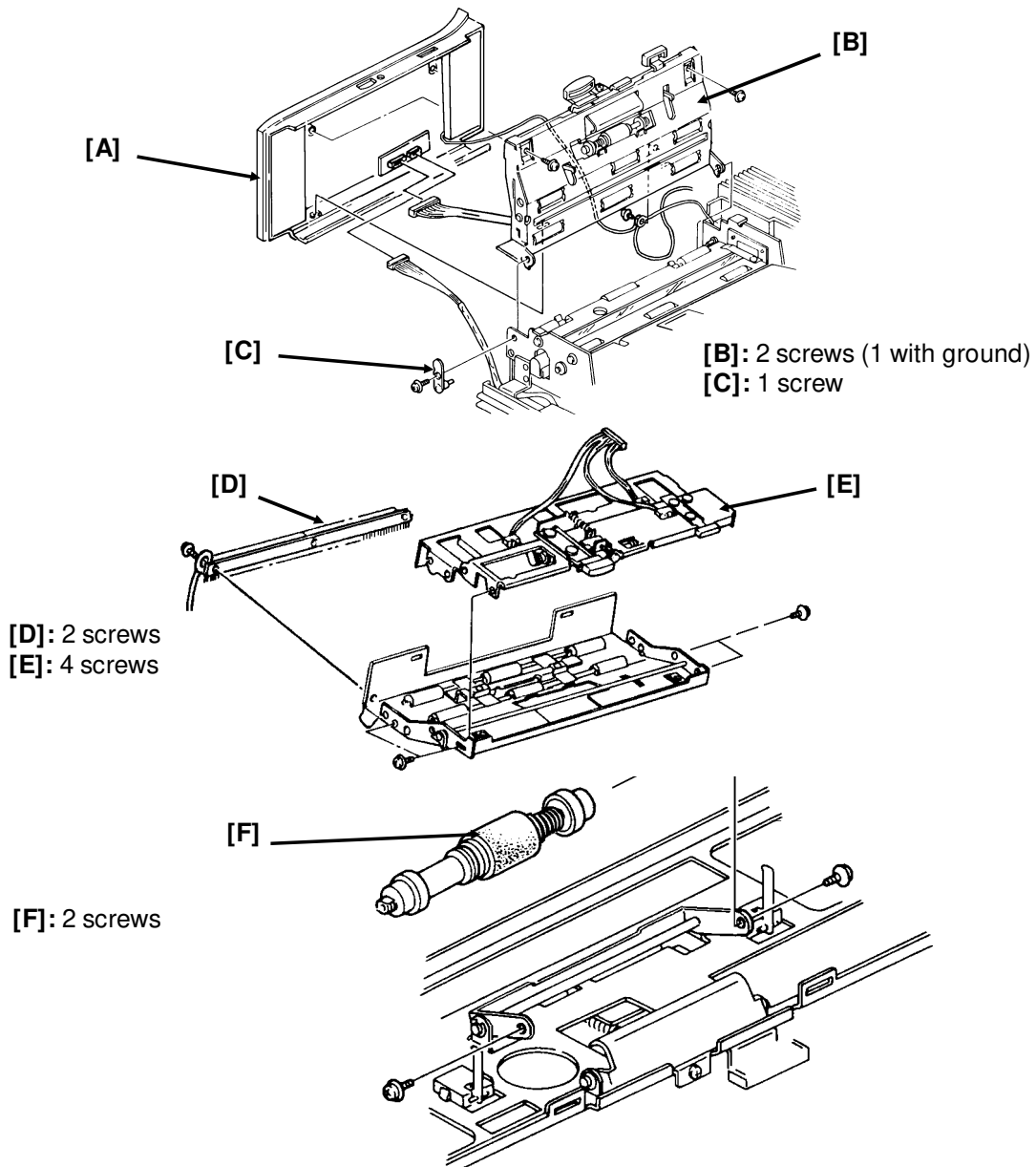
- When removing [A], lift it up by the part that hangs down just above the document feed area, and ease it off over the cover release button.
- When replacing [A], pull down the part of the cover that hangs above the document feed-out area, so that the pegs on the inside of the cover fit into the slots in the bracket above the document feed-out area.

**5**

**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]



**[A], [B]:** 1 E-ring, 1 screw
**[C]:** 2 screws
**[D]:** 2 screws
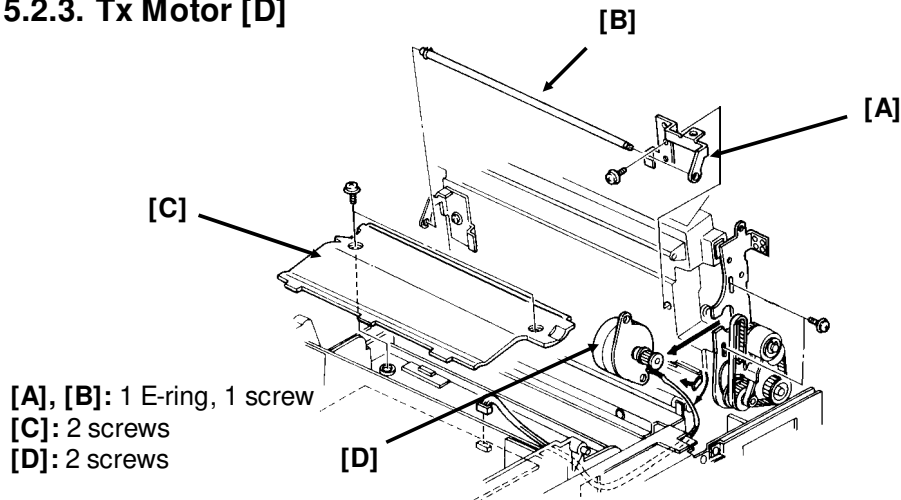
- First remove the top and rear covers (see section 5-1), the ADF clutch cover (see section 5-2-1, item [A]), and the thermal head (see section 5-3-2).

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

### 5.2.4. Timing Belt Tension Adjustments
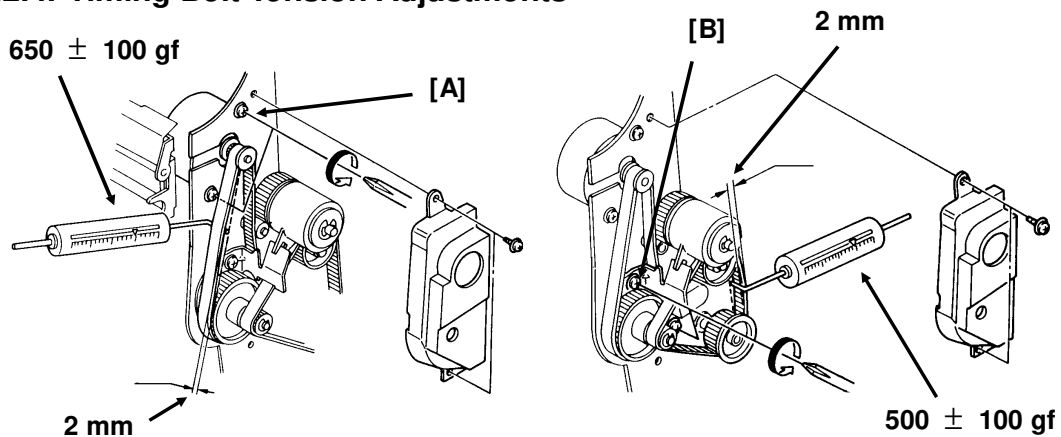


- Loosen screw [A], adjust the belt, then tighten screw [A].
- Loosen screw [B], adjust the belt, then tighten screw [B].

### 5.2.5. Xenon Lamp [F]

**[A]:** 2 screws
**[B]:** 4 screws
**[C]:** 1 E-ring
**[D]:** 1 E-ring, 1 bushing
**[E]:** 2 screws
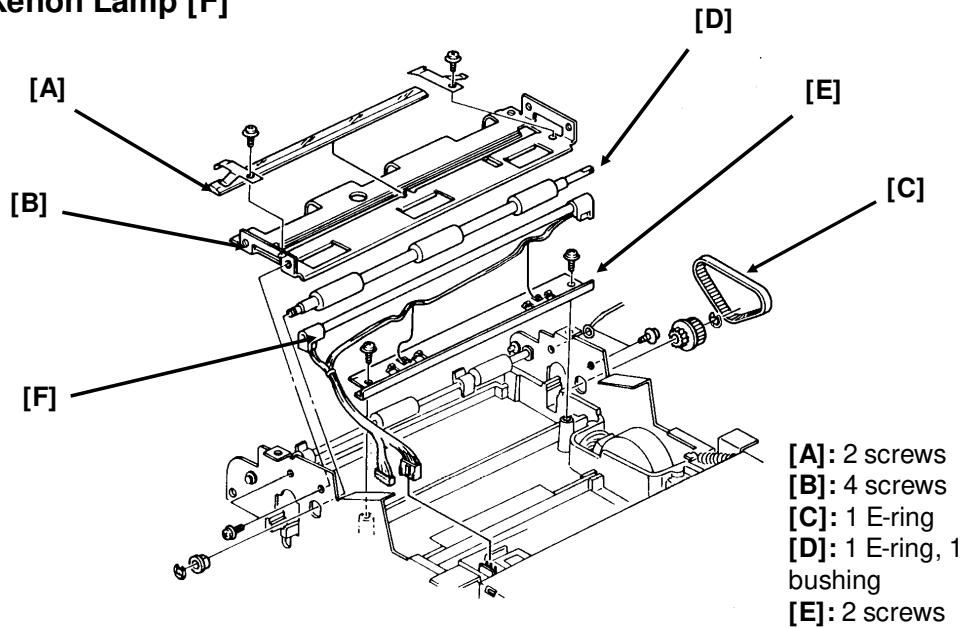
- First remove the top and rear covers (see section 5-1), the ADF clutch (see section 5-2-1), and the lower ADF guide plate ([E] in section 5-2-2).

**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]

**[A]:** 3 screws

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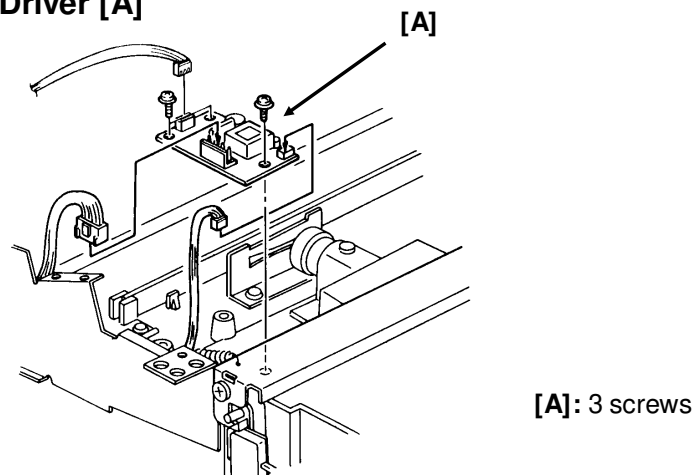
- First, remove the top cover (see section 5-1).

## 5.2.7. SBU [B]

**[A]:** 2 screws
**[B]:** 2 screws
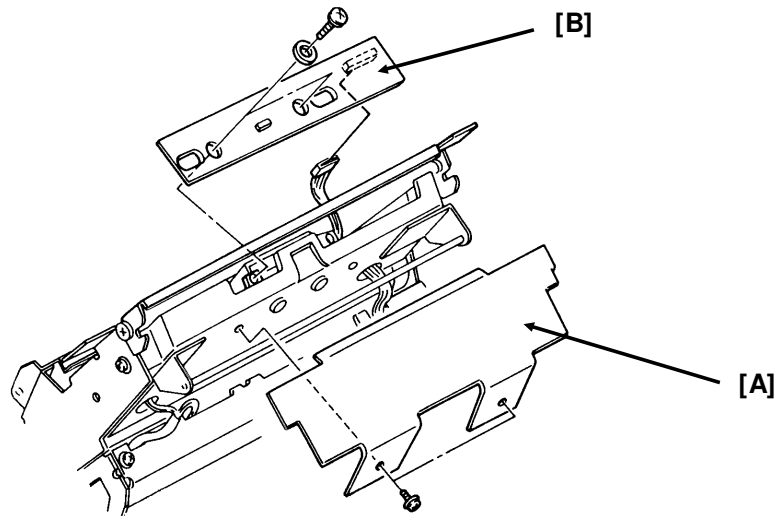
- First, remove the top cover (see section 5-1).
- After installing a new SBU, do the following adjustments, in sequential order.

## 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
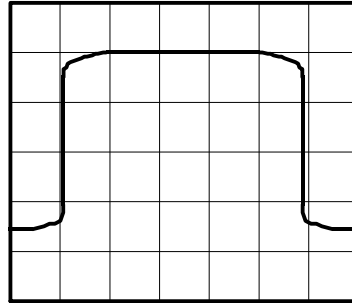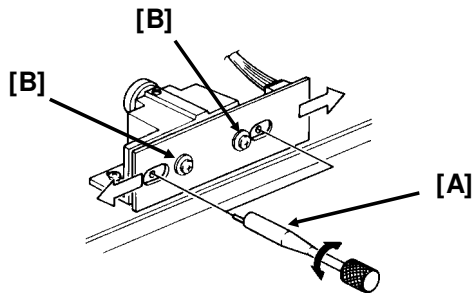
- Fit the adjustment knobs [A] through the slots in the SBU as shown.
- Loosen the SBU securing screws [B].
- Remove any test charts that are on the exposure glass.
- Check that the white level waveform can be seen fully across the oscilloscope. If it cannot be seen properly, turn the adjustment knobs.
- 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
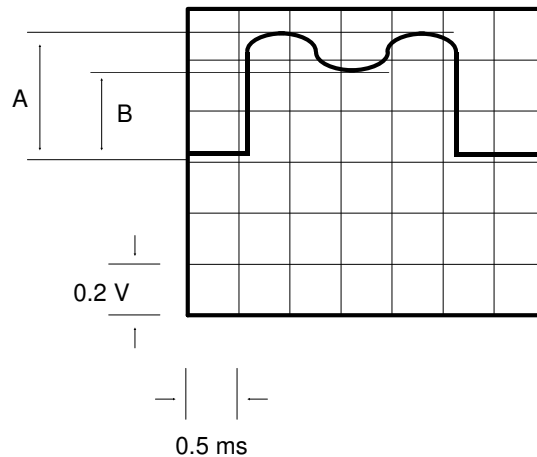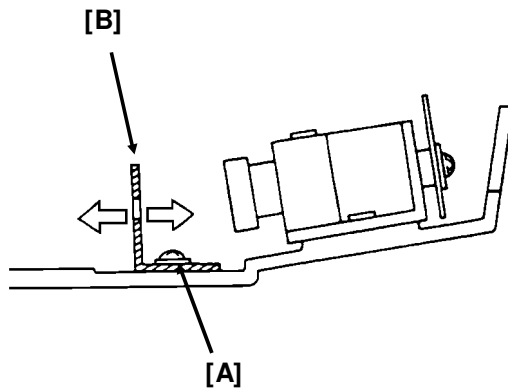
In the oscilloscope waveform, (A-B)/A must be less than 0.25. If it is not, do the following.
- Remove any test charts that are on the exposure glass.
- Loosen the shading plate securing screws [A].
- Move the shading plate [B] back and forth until the waveform meets the requirements.
- Tighten the shading plate securing screws.

**5**

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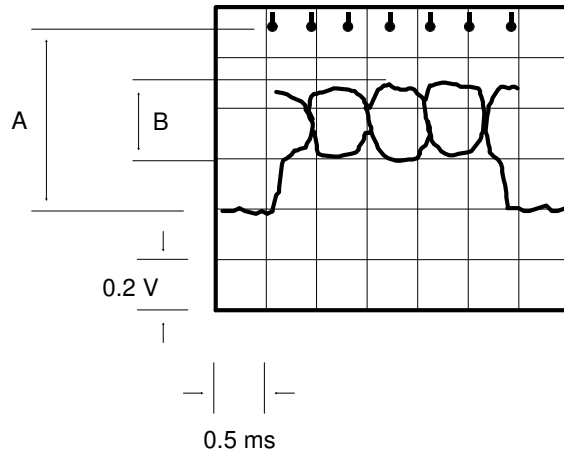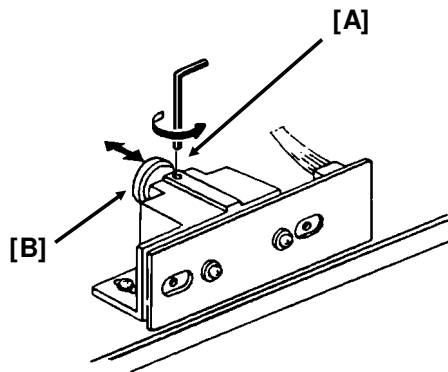
- Place the 8 line/mm test pattern on the exposure glass.
- Loosen the lens securing screw [A] (Allen screw).
- Move the lens [B] back and forth until B is maximized (see the diagram on the right).
- Tighten the lens securing screw.

## 4. Reduction Rate
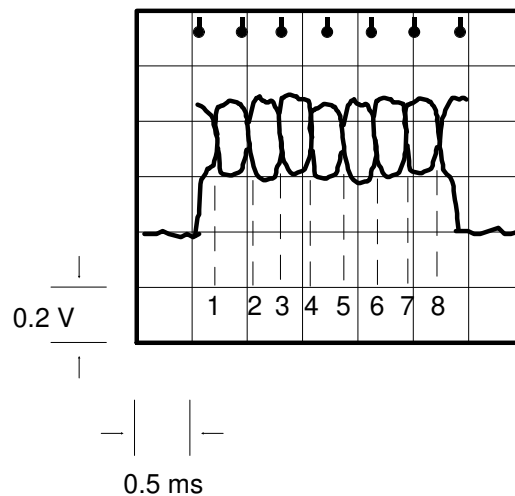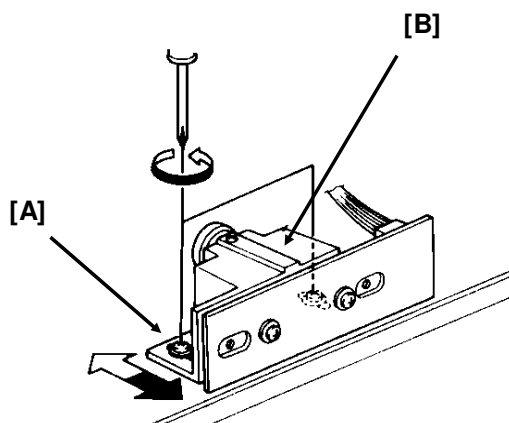
- Place the 8 line/mm test pattern on the exposure glass.
- Loosen the lens block securing screws [A].
- Move the lens block [B] back and forth until the signal has 8 or fewer crosspoints.
- Tighten the lens block securing screws.
  **Note:** Tighten each screw little by little alternately.

### 5. Scan Line



**[A]**

0.2 V

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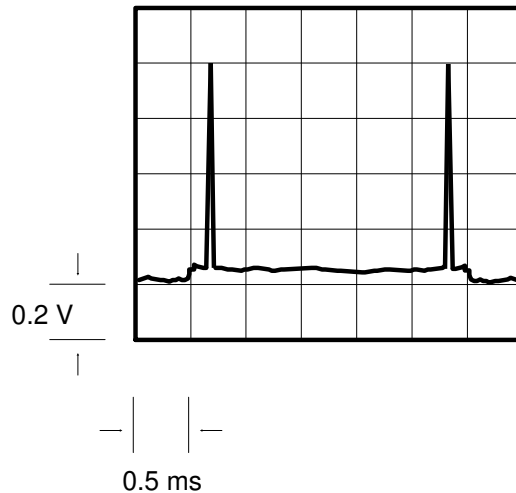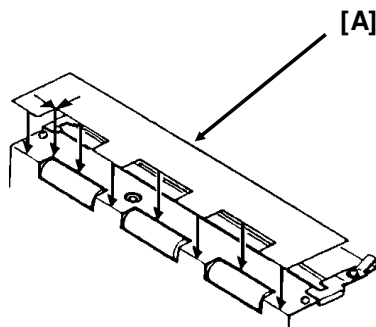
- Place the scan line test chart
  [A] on the exposure glass as shown.
- Loosen the SBU securing screws (see procedure 1).
- Adjust the waveform with the adjusting knobs until the waveform is as shown on the right.

### 6. Scan Start Position



**[A]**

AVIDEO
signal
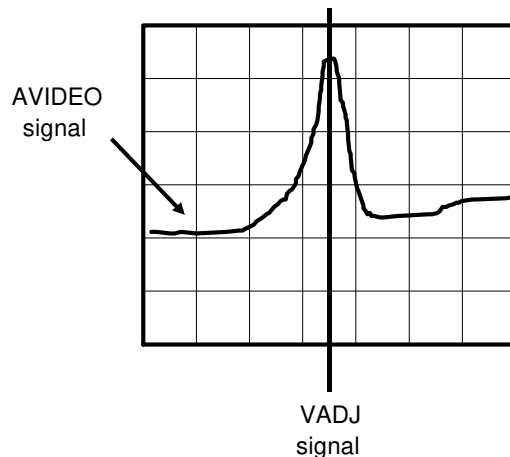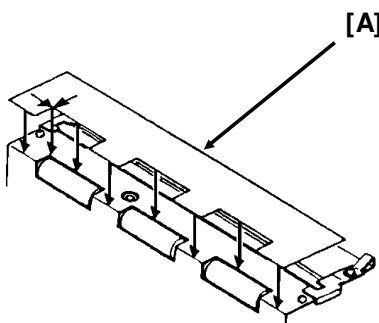
VADJ
signal

- 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 μs/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**

# 5.3. PRINTER

## 5.3.1. Rx Motor [D]

**[A]:** 2 screws
**[B]:** 2 screws
**[D]:** 2 screws
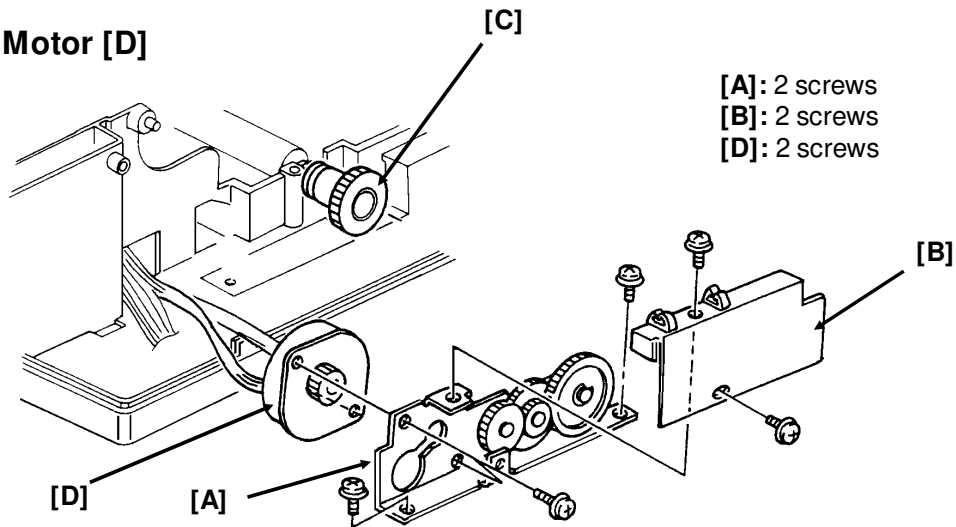
- First, remove the rear cover (see section 5-1), and the NCU and PSU (see section 5-4).

## 5.3.2. Thermal Head [C]

**[A]:** 2 screws
**[B]:** 1 screw
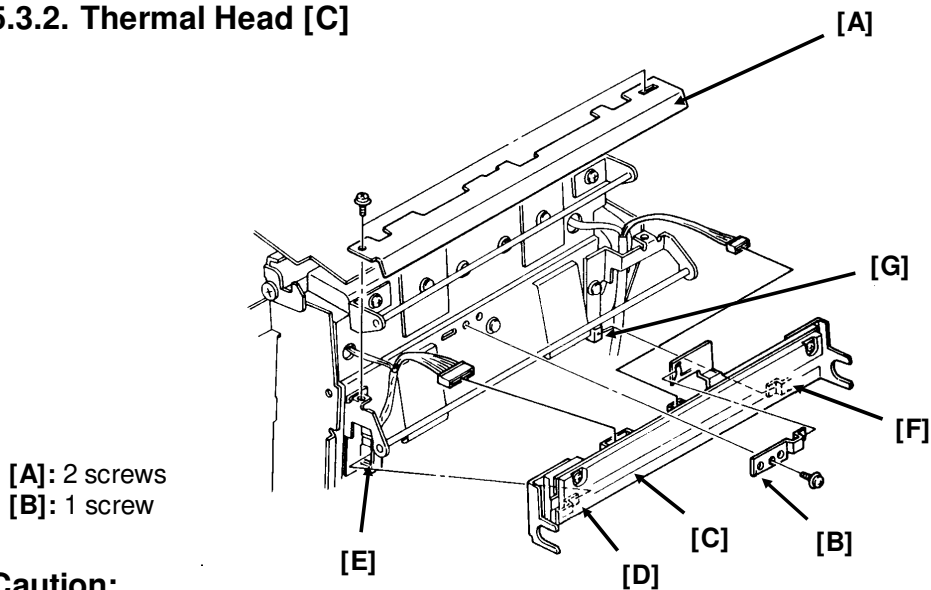
**Caution:**
- Do not touch the heating elements of the new thermal head.
- Check that the new thermal head is properly positioned and that the springs pushing the head against the platen roller are in position.

**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]



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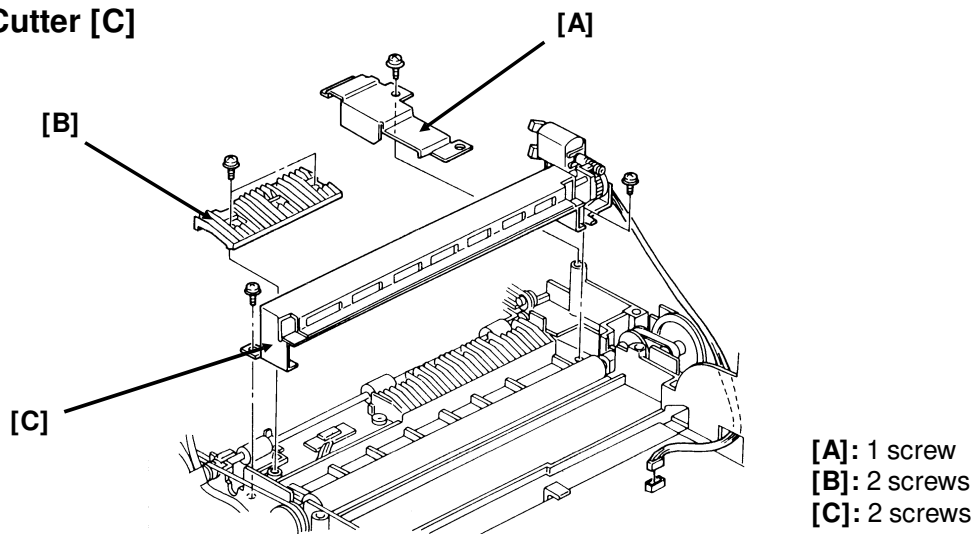
- First, remove the cover on the left side of the machine above the copy exit (2 screws). This allows the upper unit to be opened a little more than usual.
- Then remove the rear cover (see section 5-1).

### Reassembly:
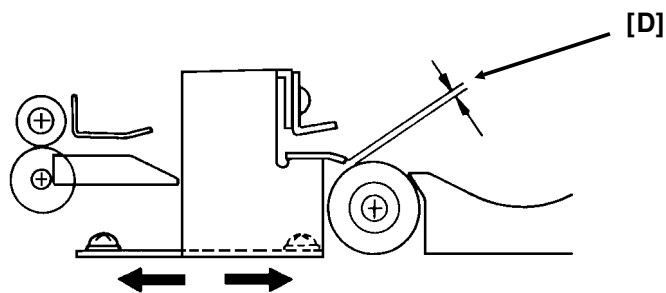


- Clearance [D] must be 0.3 mm. To adjust [D], loosen the screws that hold the cutter [C], and move the cutter back and forth until the clearance is correct.
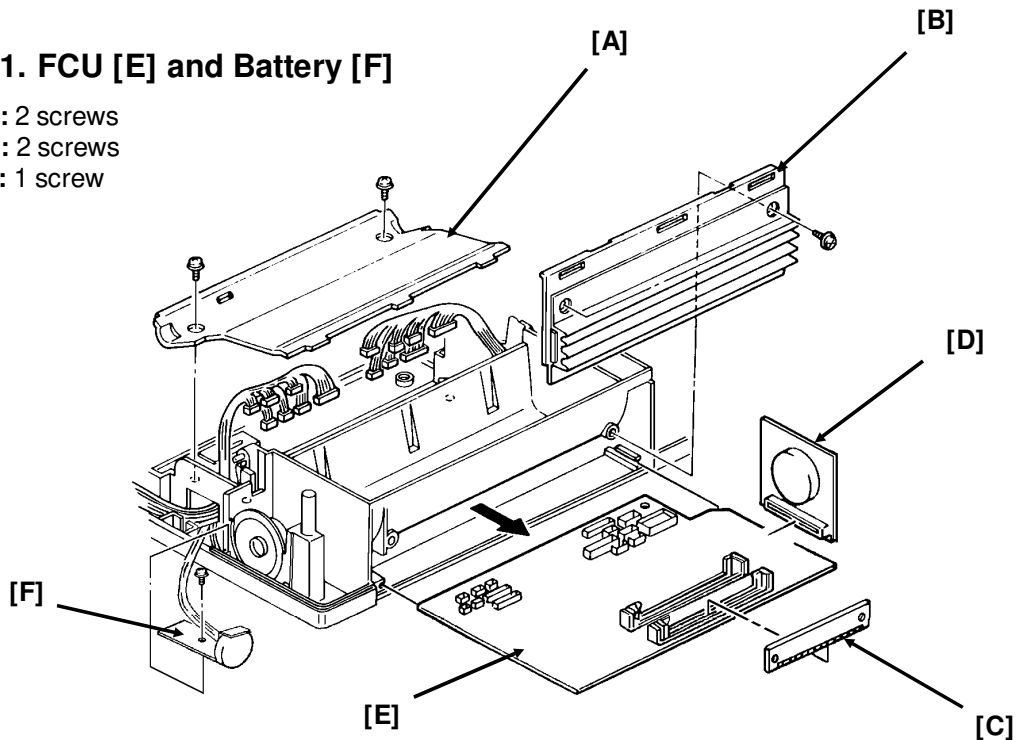
**5**

## 5.4. PCBs

### 5.4.1. FCU [E] and Battery [F]

**[A]:** 2 screws
**[B]:** 2 screws
**[F]:** 1 screw

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:

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.

- 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**

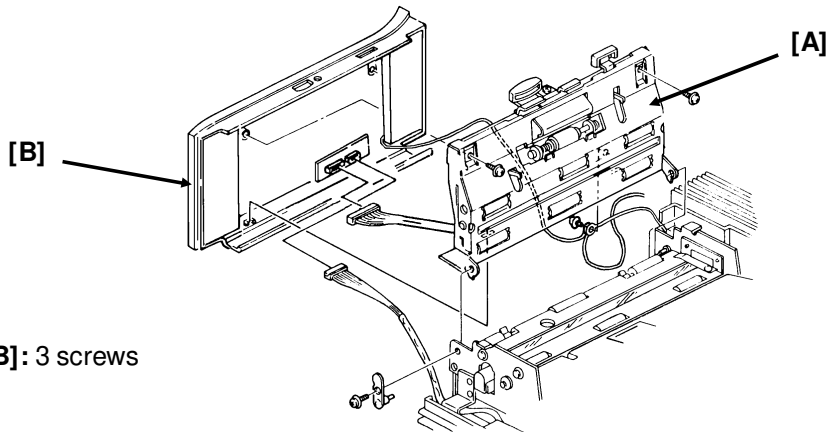## 5.4.4. PSU [A] and NCU [B]

**[A], [B]:** 4 screws
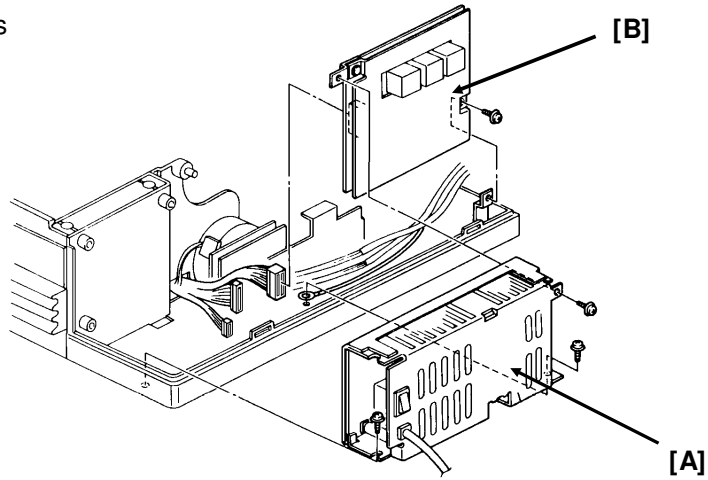


• First, remove the rear cover (see section 5-1).

**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 <br> Scanner or PCB failure | Check the optical path. <br> Replace FCU or SBU. |
| Vertical lines | Dirty mirror, lens, exposure glass, or xenon lamp <br> Error bit in CCD | Clean with a soft cloth. <br><br> Replace SBU. |
| Uneven density | Scan line out of position <br><br> Dirty mirror, lens, exposure glass, or xenon lamp <br> Old xenon lamp | See the SBU adjustments (section 5-2). <br> Clean with a soft cloth. <br><br> Replace. |
| Magnification | Check the reduction rate. | See the SBU adjustments (section 5-2). |
| Blurred characters | Adjust the focusing. <br> 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 | |
| Stretched output | Defective scanner timing belt | Replace. |

**6**

## 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. |

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**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. |

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**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.<br>Check the NCU - FCU connectors.<br>The machine at other end may be incompatible.<br>Replace the FCU or NCU.<br>Check for DIS/NSF with an oscilloscope.<br>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.<br>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.<br>Check the NCU - FCU connectors.<br>Try changing the tx level (use NCU parameter 01 or a dedicated tx parameter for that address).<br>Replace the FCU or NCU.<br>The other terminal may be faulty; try sending to another machine.<br>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.<br>Check the NCU - FCU connectors.<br>Try adjusting the tx level (use NCU parameter 01, or a dedicated tx parameter for that address).<br>Replace the FCU or NCU.<br>Check for line problems. |
| 0-06 | The other terminal did not reply to DCS | Check the line connection.<br>Check the FCU - NCU connectors.<br>Try adjusting the tx level (use NCU parameter 01, or a dedicated tx parameter for that address).<br>Replace the NCU or FCU.<br>The other end may be defective or incompatible; try sending to another machine.<br>Check for line problems. |

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

**6**

| Code | Meaning | Suggested Cause/Action |
|------|---------|------------------------|
| 1-71 | The printer cover was opened during printing | Check whether the user opened the cover during printing.<br>Check the cover lock mechanism.<br>Check the cover switch position and actuation.<br>Check connections between the cover switch and the FCU.<br>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.<br>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.<br>Try the communication again.<br>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.<br>Replace the NCU or FCU. |
| 2-40 | Thermal head driver irregularity | Check the connections between the FCU, thermal head, and PSU.<br>Replace the FCU, thermal head, or PSU. |
| 4-00 | One page took longer than 8 minutes to transmit | Check for a bad line.<br>Try the communication at a lower resolution, or without halftone.<br>Change the FCU. |
| 4-01 | Line current was cut | Check the line connector.<br>Check the connection between the FCU and the NCU.<br>Check for line problems.<br>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.<br>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. |

**6**

| 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.

**6**