brother®

FACSIMILE EQUIPMENT

SERVICE MANUAL

MODEL: FAX-170/190/510/
HOME FAX
FAX-270MC/290MC/
520DT/520MC
MFC370MC/390MC

CHAPTER I.

GENERAL DESCRIPTION

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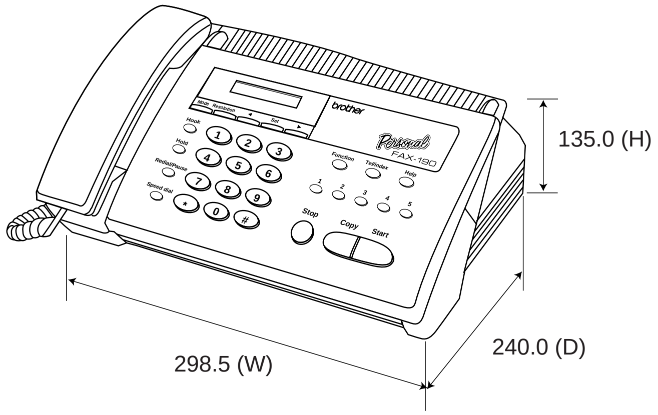
1. EQUIPMENT OUTLINE

1.1 External Appearance and Weight

The figure below shows the equipment appearance and approximate dimensions.

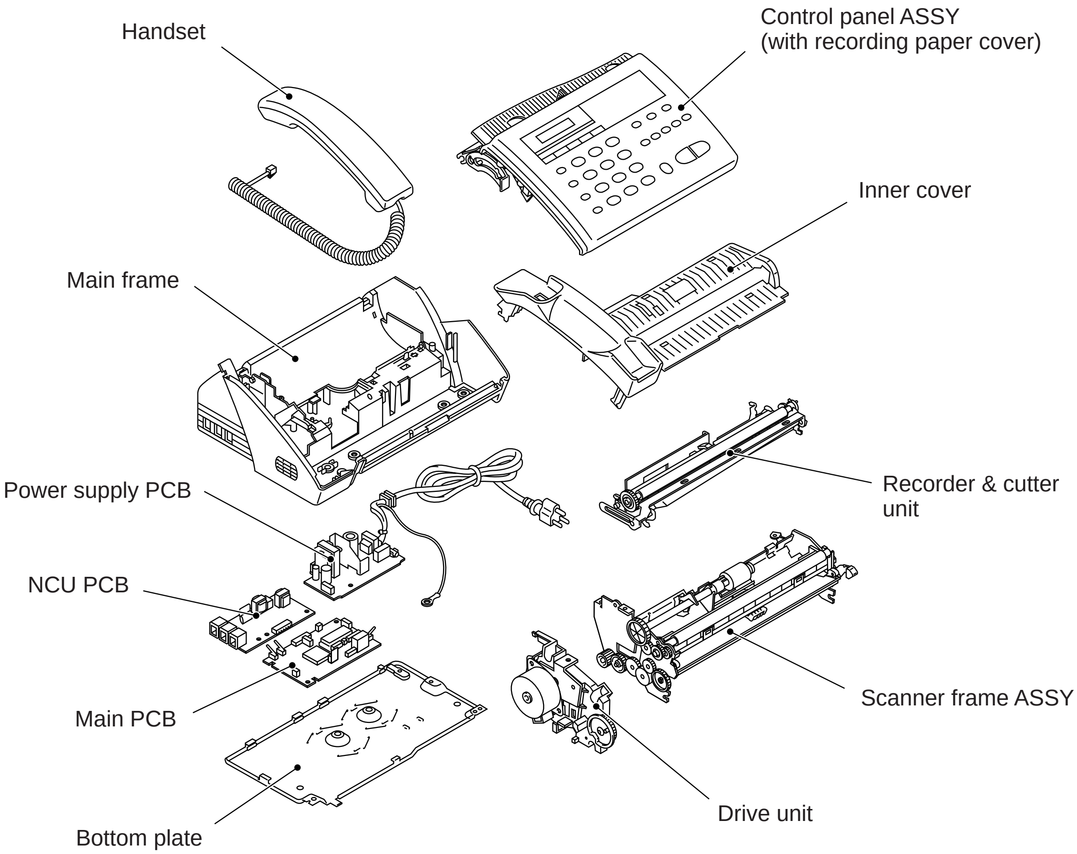

brother
Personal
FAX-190
Mode
Resolution
Set
Hook
Hold
Redial/Pause
Speed dial
Function
Tel/Index
Help
Stop
Copy
Start
135.0 (H)
240.0 (D)
298.5 (W)

(Unit: mm)

Weight:	Machine proper	Approx. 2.8 kg (excluding a paper roll)
	In package	Approx. 4.6 kg

1.2 Components

The equipment consists of the following major components:


Handset
Control panel ASSY
(with recording paper cover)
Inner cover
Main frame
Power supply PCB
Recorder & cutter
unit
NCU PCB
Scanner frame ASSY
Main PCB
Drive unit
Bottom plate

2. SPECIFICATIONS

Model	FAX-170	FAX-190
Color	Bluish-black (1395)	Bluish-white (1397)
Modem Speed	9600 bps	9600 bps
Coding Method	MH	MH
Transmission Speed	15 sec.	15 sec.
CCITT Group	G3	G3
Input/Output Width	Max. 8.5" x 8.5"	Max. 8.5" x 8.5"
Handset	Yes	Yes
Automatic Cutter	Yes	Yes
ADF Capacity (pages)	10	10
Anti-curl System	Yes	Yes
Roll Paper Size (Standard thermal/Therma PLUS)	98'	98'
LCD Size	16 x 1	16 x 1
On-screen Programming	Yes	Yes
Memory Capacity	No	No
Super Fine	Yes	Yes
Smoothing	Yes	Yes
Gray Scale (levels)	32	32
One-touch Dialing	5 locations	5 locations
Speed Dialing	15 locations	20 locations
Telephone Index	Yes	Yes
Super Telephone Index	No	No
Hook Key (TEL Key)	Yes	Yes
Fax/Tel Switch	Yes	Yes
TAD Interface	Yes	Yes
Enlargement/Reduction	No	No
Enhanced Remote Activation	Yes	Yes
Distinctive Ringing (FAX Ability)	Yes	Yes
Next-fax Reservation	No	Yes
Help	Yes, simple	Yes, simple
Caller ID (Caller Display)	Yes	Yes
Automatic Redialing	Yes	Yes
Auto Reduction	No	No
Multi-resolution Transmission	Yes	Yes
Polling	Yes	Yes
Delayed Transmission	Yes, 1 timer	Yes, 1 timer
Delayed Polling	Yes	Yes
Coverpage	Yes	Yes
Call Reservation	Yes	Yes
Call-back Message	Yes	Yes
Activity Report	Yes	Yes
Auto CNG Detection (New)	Yes	Yes
Transmission Verification Report	Yes	Yes
ECM	No	No
Broadcasting	No	No
Quick Scanning	No	No
Out-of-paper Reception	No	No
Multi Copy	No	No
Multi Transmission	No	No
PCI (Missing link)	No	No
Confidential Mailbox	No	No

Model	FAX-510	HOME FAX
Color	Bluish-black (1395), Bluish-white (1397)*	Bluish-white (1397)
Modem Speed	9600 bps	9600 bps
Coding Method	MH	MH
Transmission Speed	15 sec.	15 sec.
CCITT Group	G3	G3
Input/Output Width	Max. 8.5" x 8.5"	Max. 8.5" x 8.5"
Handset	Yes	Yes
Automatic Cutter	Yes	Yes
ADF Capacity (pages)	10	10
Anti-curl System	Yes	Yes
Roll Paper Size (Standard thermal/Therma PLUS)	98'	98'
LCD Size	16 x 1	16 x 1
On-screen Programming	Yes	Yes
Memory Capacity	No	No
Super Fine	Yes	Yes
Smoothing	Yes	Yes
Gray Scale (levels)	32	32
One-touch Dialing	5 locations	5 locations
Speed Dialing	(See Super Telephone Index.)	(See Super Telephone Index.)
Telephone Index	Yes	Yes
Super Telephone Index	Yes, 50 locations	Yes, 50 locations
Hook Key (TEL Key)	Yes	Yes
Fax/Tel Switch	Yes	Yes
TAD Interface	Yes	Yes
Enlargement/Reduction	No	No
Enhanced Remote Activation	Yes	Yes
Distinctive Ringing (FaxAbility)	Yes**	Yes
Next-fax Reservation	Yes	Yes
Help	Yes, simple	Yes, simple
Caller ID (Caller Display)	Yes***	Yes
Automatic Redialing	Yes	Yes
Auto Reduction	No	No
Multi-resolution Transmission	Yes	Yes
Polling	Yes	Yes
Delayed Transmission	Yes, 1 timer	Yes, 1 timer
Delayed Polling	Yes	Yes
Coverpage	Yes	Yes
Call Reservation	Yes	Yes
Call-back Message	Yes	Yes
Activity Report	Yes	Yes
Auto CNG Detection (New)	Yes	Yes
Transmission Verification Report	Yes	Yes
ECM	No	No
Broadcasting	No	No
Quick Scanning	No	No
Out-of-paper Reception	No	No
Multi Copy	No	No
Multi Transmission	No	No
PCI (Missing link)	No	No
Confidential Mailbox	No	No

* Bluish-white (1397) for the Australia versions
** Only for the Australia versions
*** Only for the U.K., Dutch, and Swedish versions

Model	FAX-270MC/290MC	MFC370MC	MFC390MC
Color	Black (1395)	White (1138)	White (1138)
Modem Speed	14400 bps	Same as left	Same as left
Coding Method	MH		
Transmission Speed	9 sec.		
CCITT Group	G3		
Input/Output Width	Max. 216/216 mm		
Hold Key	Yes		
Automatic Cutter	Yes		
ADF Capacity	10 pages		
Anti-curl System	Yes		
Roll Paper Size (Standard thermal/Therma PLUS)	98' (1" Core)		
LCD Size	16 x 1		
On-screen Programming	Yes		
Memory Capacity	512 KB		
Super Fine	Yes		
Smoothing	Yes		
Gray Scale (levels)	64 by Dithered Method		
One-touch Dialing	5 locations		
Speed Dialing	50		
Telephone Index	Yes		
Super Telephone Index	No		
Speaker Phone	Yes		
Fax/Tel Switch	Yes		
TAD Interface	Yes		
Enlargement/Reduction	No		
Enhanced Remote Activation	Yes		
Distinctive Ringing (FAX Ability)	Yes		
Next-fax Reservation	Yes		
Help	Yes, Simple		
Caller ID (Caller Display)	Yes		
Automatic Redialing	Yes		
Auto Reduction	No		
Multi-resolution Transmission	Yes		
Polling	Yes (No secure polling)		
Delayed Transmission	Yes, 3 timers		
Delayed Polling	Yes		
Coverpage	Yes		
Call Reservation	Yes		
Call-back Message	Yes		
Activity Report	Yes		
Auto CNG Detection (New)	Yes		
Transmission Verification Report	Yes		
ECM	Yes		
Broadcasting	Yes		
Quick Scanning	Yes		
Out-of-paper Reception	Yes, 20 pages		
Multi Copy	Yes		
Multi Transmission	No		
PCI (Missing link)	Yes	Yes, Included	Yes, Included w/OCR
Confidential Mailbox	No	Same as left	Same as left
Fax Forwarding	Yes		
Fax-on-demand	No		
Fax Retrieval	Yes		
ICM Recording Time	15 minutes		
Memo/2-way Recording	Yes		
Page Memory	Yes, 20 pages		
Paging	Yes		
Personal Fax Mail box (5)	Yes		
Personal Voice Mail Box (5)	Yes		
Remote Control	Yes		
TAD Type	DSP type		
Toll Saver	Yes		
Voice-on-demand	Yes		

Model	FAX-520DT/520MC
Color	Black (1395)/White (1397)*
Modem Speed	14400 bps
Coding Method	MH
Transmission Speed	9 sec.
CCITT Group	G3
Input/Output Width	Max. 216/216
Hold Key	Yes
Automatic Cutter	Yes
ADF Capacity	10 pages
Anti-curl System	Yes
Roll Paper Size (Standard thermal/Therma PLUS)	30 m (1" Core)
LCD Size	16 x 1
On-screen Programming	Yes
Memory Capacity	512 KB
Super Fine	Yes
Smoothing	Yes
Gray Scale (levels)	64 by Dithered Method
One-touch Dialing	5
Speed Dialing	50 locations
Telephone Index	Yes
Super Telephone Index	Yes, 50 locations
Speaker Phone	Yes (only for FAX-520MC)
Fax/Tel Switch	Yes
TAD Interface	Yes
Enlargement/Reduction	No
Enhanced Remote Activation	Yes
Distinctive Ringing (FaxAbility)	Yes (only for FAX-520MC)
Next-fax Reservation	Yes
Help	Yes, Simple
Caller ID (Caller Display)	Yes for UK/NLD/SWE/NZ
Automatic Redialing	Yes
Auto Reduction	No
Multi-resolution Transmission	Yes
Polling	Yes (w/ secure polling)
Delayed Transmission	Yes, 3 timers
Delayed Polling	Yes
Coverpage	Yes
Call Reservation	Yes
Call-back Message	Yes
Activity Report	Yes
Auto CNG Detection (New)	Yes
Transmission Verification Report	Yes
ECM	Yes
Broadcasting	Yes
Quick Scanning	Yes
Out-of-paper Reception	Yes, 20 pages
Multi Copy	Yes
Multi Transmission	No
PCI (Missing link)	Yes
Confidential Mailbox	No
Power Failure Dialing	Yes for UK/BEL
Fax Forwarding	Yes
Fax-on-demand	No
Fax Retrieval	Yes
ICM Recording Time	15 minutes
Memo/2-way Recording	Yes
Page Memory	Yes, 20 pages
Paging	Yes
Personal Fax Mail box (5)	Yes
Personal Voice Mail Box (5)	Yes
Remote Control	Yes
TAD Type	DSP type
Toll Saver	Yes
Voice-on-demand	Yes

* FAX-520DT: Black (1395)
FAX-520MC: White (1397)

2. MECHANISMS

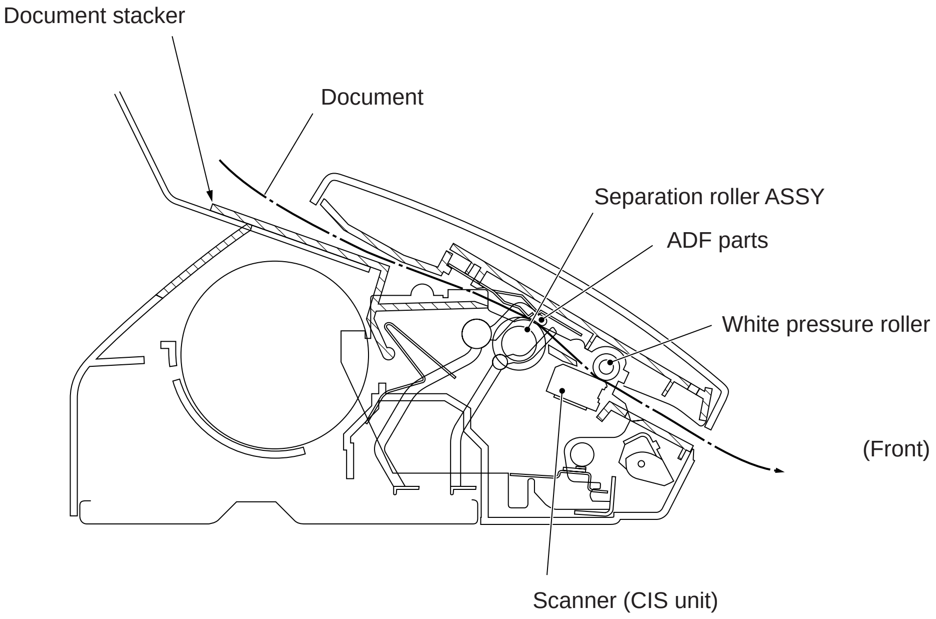
The equipment is classified into the following mechanisms:

■ Transmitting Mechanism	Feeding and scanning documents
■ Receiving Mechanism	Feeding recording paper and printing data
■ Power Transmission Mechanism	Switching the power transmission route
■ Sensors and Actuators	

2.1 Transmitting Mechanism (Feeding and scanning documents)

The transmitting mechanism consists of the document stacker, automatic document feeder (ADF), document feeding related rollers, scanner, and document sensors. (For details about the sensors, refer to Section 2.4.)

For the drive power source, refer to Section 2.3.



2.1.1 Automatic document feeder (ADF)

If the operator sets documents on the stacker and starts the transmitting operation, the ADF (consisting of the separation roller ASSY and ADF parts) feeds those documents into the equipment, starting from the bottom sheet to the top, page by page. Each document advances to the scanner, and then it is fed out of the equipment with the white pressure roller.

2.1.2 Scanner

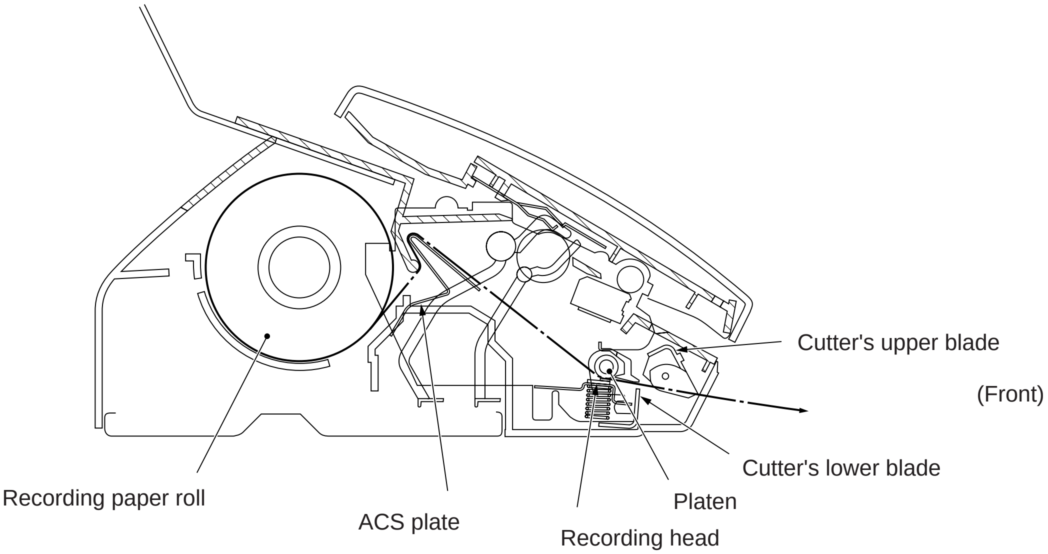
The scanner uses a contact image sensor (CIS) unit which consists of an LED array illuminating documents, a self-focus lens array collecting the reflected light, a CIS PCB carrying out photoelectric conversion to output picture element data, and a cover glass on which a document advances. When the document passes between the white pressure roller and the cover glass, it is scanned.

2.2 Receiving Mechanism (Feeding recording paper and printing data)

The receiving mechanism consists of the recording paper roll holder, anti-curl system (ACS) plate, platen, thermal recording head, automatic cutter, and sensors. (For details about the sensors, refer to Section 2.4.)

The recording paper is routed on the ACS plate to the recording head which prints onto the heat-sensitive recording paper pressed by the platen according to received image signals. The printed paper is further fed through the cutter chute and cut by the automatic cutter page by page.

For the drive power source, refer to Section 2.3.



2.2.1 Anti-curl system (ACS)

The ACS eliminates curl peculiar to rolled recording paper by curving the paper towards the opposite side of the curl with the ACS plate.

2.2.2 Automatic cutter

The automatic paper cutter consists of an upper blade (rotary) and a lower blade (stationary). As the upper blade rotates around the left end hub, the recording paper will be cut. Upon completion of cutting, the upper blade returns to its home position which is detected by the cutter HP sensor.

2.2.3 Recorder

The recorder, which is incorporated in the middle of the machine, consists of the recording head unit, coil spring, and platen. It prints according to received image signals.

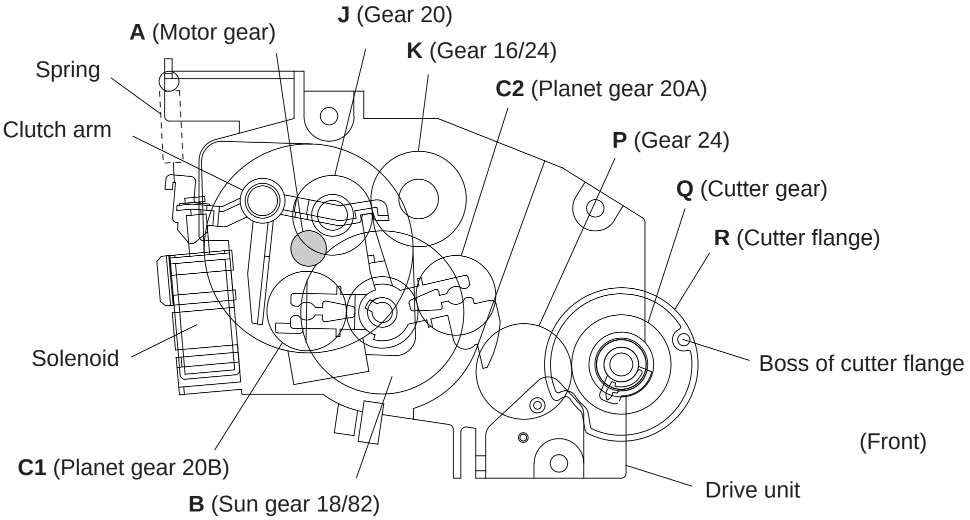
2.3 Power Transmission Mechanism

The equipment has a single drive motor whose power transmission route can be switched by the planetary gear train and the solenoid. This switching allows the equipment to function in four operation modes (recording, scanning, copying, and cutter driving modes).

2.3.1 Structure of the gear train

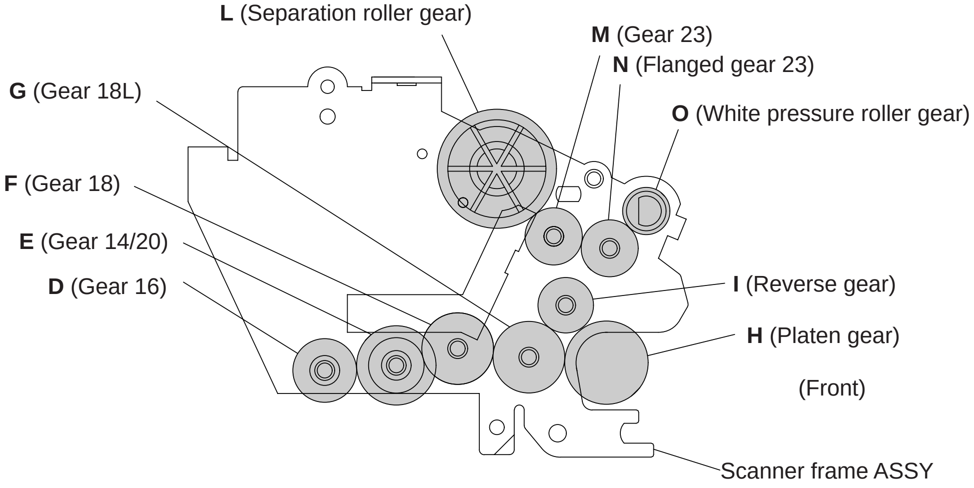
The gear train consists of two groups of gears: one group on the drive unit and the other on the scanner frame ASSY. Mounting the drive unit onto the scanner frame ASSY makes those two groups of gears engage with each other so that the rotation torque of the motor on the drive unit is transmitted to the separation roller, white pressure roller, and platen.

Shown below are a group of gears, the motor and solenoid on the drive unit. The cutter gear (Q) is integrated in the cutter flange (R) whose boss is placed in the hole provided in the cutter's upper blade.


J (Gear 20)
A (Motor gear)
K (Gear 16/24)
Spring
C2 (Planet gear 20A)
Clutch arm
P (Gear 24)
Q (Cutter gear)
R (Cutter flange)
Solenoid
Boss of cutter flange
(Front)
C1 (Planet gear 20B)
Drive unit
B (Sun gear 18/82)

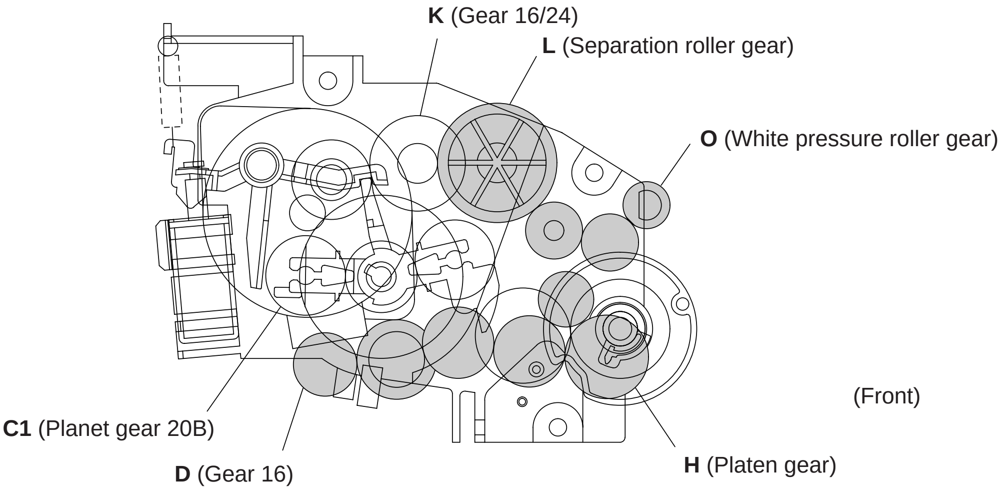
Drive Unit (viewed from the motor mounting side)

Shown below is a group of gears on the scanner frame ASSY.


L (Separation roller gear)
M (Gear 23)
N (Flanged gear 23)
G (Gear 18L)
O (White pressure roller gear)
F (Gear 18)
E (Gear 14/20)
D (Gear 16)
I (Reverse gear)
H (Platen gear)
(Front)
Scanner frame ASSY

Scanner Frame ASSY

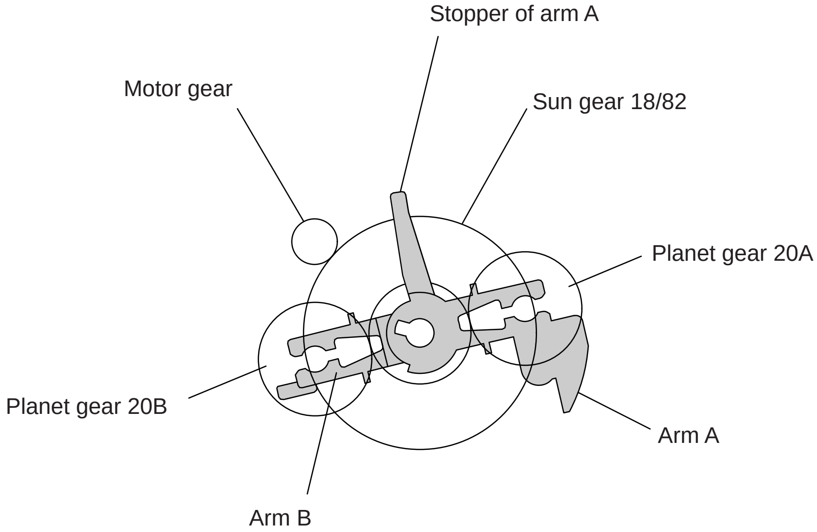
Shown below is a gear train constructed by combining the drive unit and scanner frame ASSY. The motor rotation is transmitted via the planet gear 20B (C1) to the gear 16 (D) and via the gear 16/24 (K) to the separation roller gear (L).


K (Gear 16/24)
L (Separation roller gear)
O (White pressure roller gear)
(Front)
C1 (Planet gear 20B)
D (Gear 16)
H (Platen gear)

Combination of Drive Unit and Scanner Frame ASSY

2.3.2 Description of planetary gear system

The planetary gear train consists of the sun gear 18/82, two planet gears 20, arm A, and arm B, as shown below.



Planetary Gear System

If the motor rotates, the sun gear 18/82 rotates so that the rotational torque is transmitted to the engagement between the sun gear and the planet gears 20. Since the arms and planet gears are so designed that the moment of the arms is less than that of the planet gears, the arms turn around the center shaft in the same direction as the sun gear 18/82.

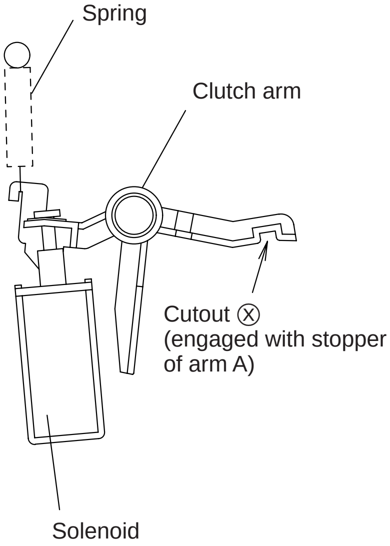
If the planet gear(s) becomes engaged with any other gear so that the arm cannot turn any more, the rotational torque of the sun gear 18/82 is transmitted to that planet gear. Accordingly, the planet gear starts rotation in the opposite direction of the sun gear 18/82.

2.3.3 Power transmission for four operation modes

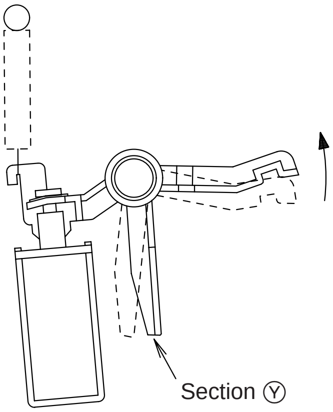
Depending upon the solenoid ON/OFF state and the motor rotation direction, the planetary gear train switches the power transmission route for the four operation modes.

Solenoid ON/OFF state

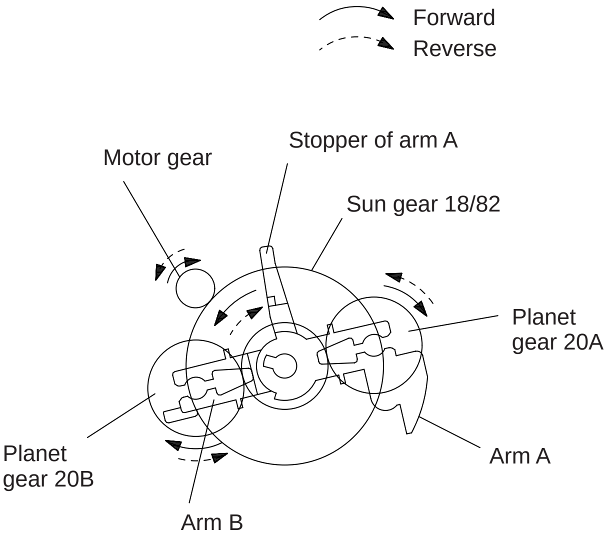
Solenoid: OFF


Spring
Clutch arm
Cutout Ⓧ
(engaged with stopper
of arm A)
Solenoid

Solenoid: ON



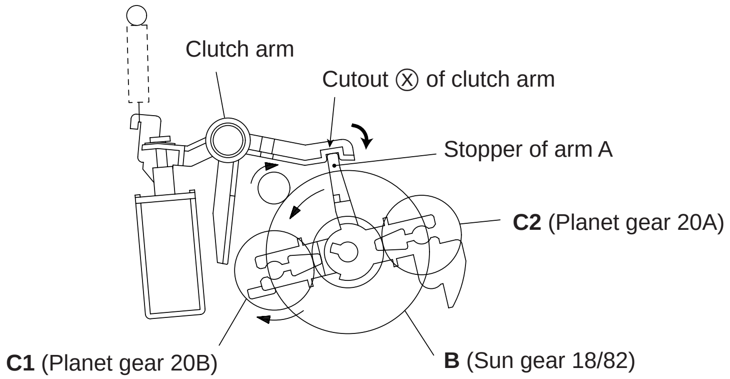
Motor rotation direction


Forward
Reverse
Motor gear
Stopper of arm A
Sun gear 18/82
Planet
gear 20A
Arm A
Planet
gear 20B
Arm B

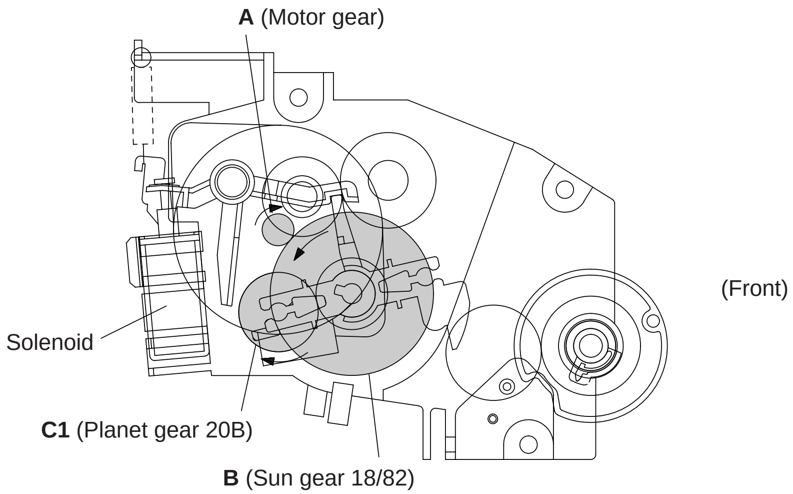
[1] Recording mode (Solenoid: OFF, Motor rotation: Forward)

In the recording mode, the control electronics deactivates the solenoid. When the motor rotates in the forward direction, the clutch arm turns clockwise with the spring and its cutout ⓧ becomes engaged with the stopper of arm A. Once arm A is locked, the planet gear 20A (C2) will not be engaged with any other gear but simply idle.

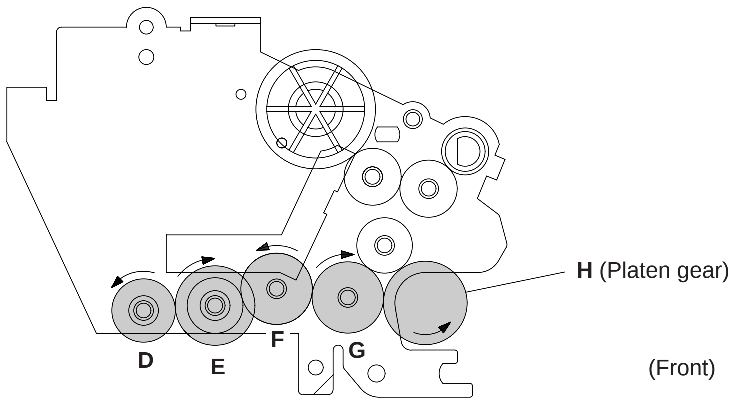
The motor rotation turns the sun gear 18/82 (B) counterclockwise so that the planet gear 20B (C1) transmits the rotation via the gears D through G to the platen gear (H).


Clutch arm
Cutout ⓧ of clutch arm
Stopper of arm A
C2 (Planet gear 20A)
C1 (Planet gear 20B)
B (Sun gear 18/82)

Arm A Locked by Cutout ⓧ of Clutch Arm


A (Motor gear)
(Front)
Solenoid
C1 (Planet gear 20B)
B (Sun gear 18/82)

Active Gears on the Drive Unit

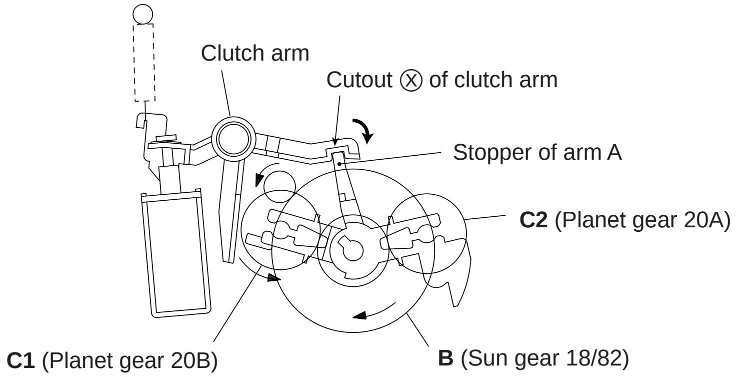

H (Platen gear)
D
E
F
G
(Front)

Active Gears on the Scanner Frame ASSY

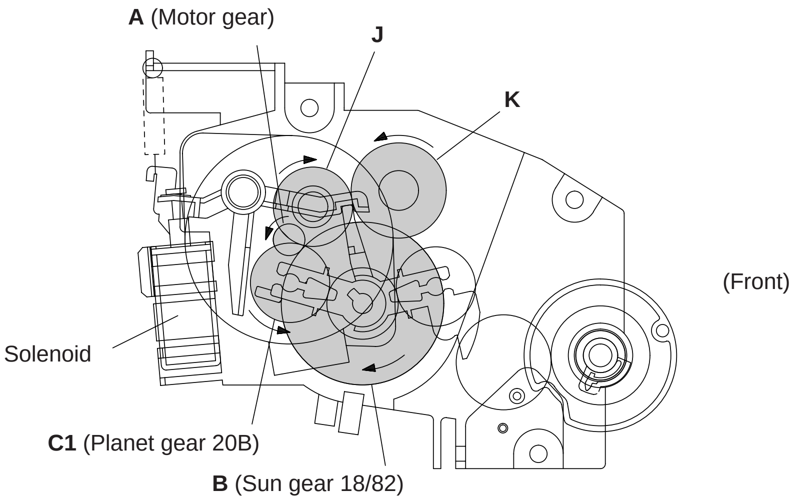
[2] Scanning mode (Solenoid: OFF, Motor rotation: Reverse)

Just as in the recording mode, the control electronics deactivates the solenoid in the scanning mode to lock arm A.

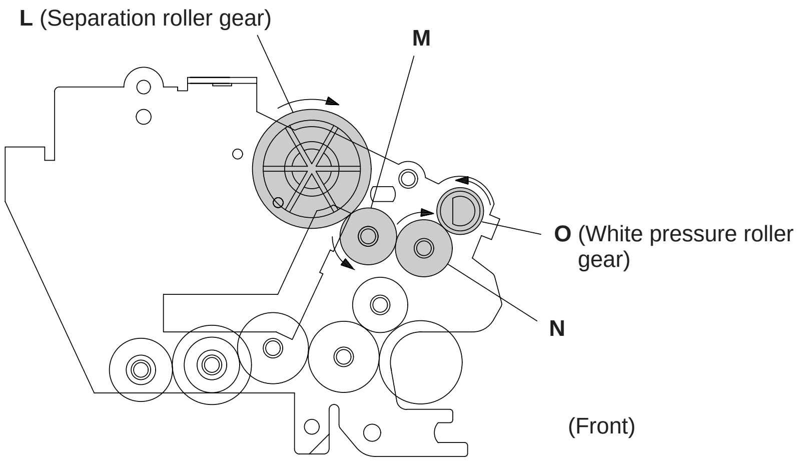
The motor rotates in the reverse direction and the sun gear 18/82 (B) rotates clockwise so that the planet gear 20B (C1) transmits the rotation to the separation roller gear (L) and white pressure roller gear (O) via the several gears.


Clutch arm
Cutout ⓧ of clutch arm
Stopper of arm A
C2 (Planet gear 20A)
C1 (Planet gear 20B)
B (Sun gear 18/82)

Arm A Locked by Cutout ⓧ of Clutch Arm


A (Motor gear)
J
K
(Front)
Solenoid
C1 (Planet gear 20B)
B (Sun gear 18/82)

Active Gears on the Drive Unit

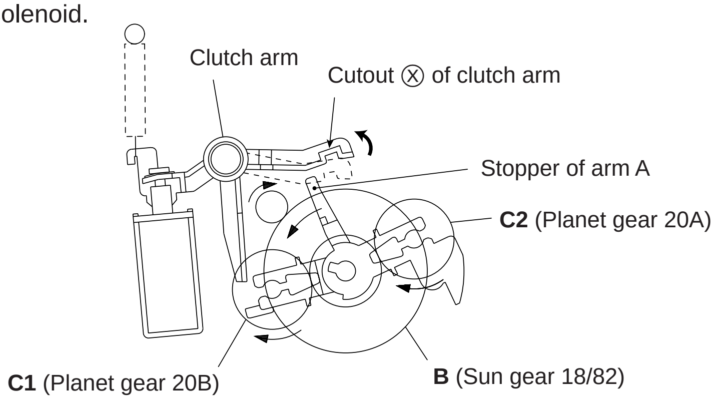

L (Separation roller gear)
M
O (White pressure roller gear)
N
(Front)

Active Gears on the Scanner Frame ASSY

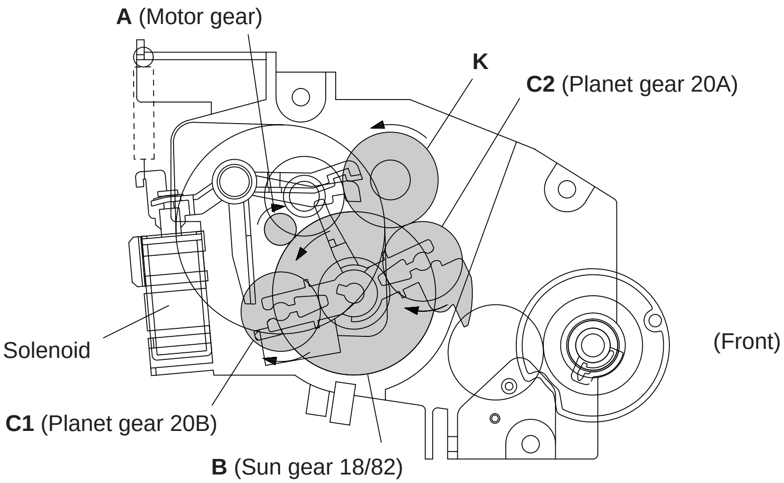
[3] Copying mode (Solenoid: ON→OFF, Motor rotation: Forward)

The control electronics at first activates the solenoid to release the stopper of arm A from the cutout ⓧ of the clutch arm while rotating the motor in the forward direction. Accordingly, the sun gear 18/82 (B) rotates counterclockwise so that both the planet gears 20B (C1) and 20A (C2) transmit the rotation; C1 rotation to the platen gear (H) and C2 rotation to the separation roller gear (L) and white pressure roller gear (O).

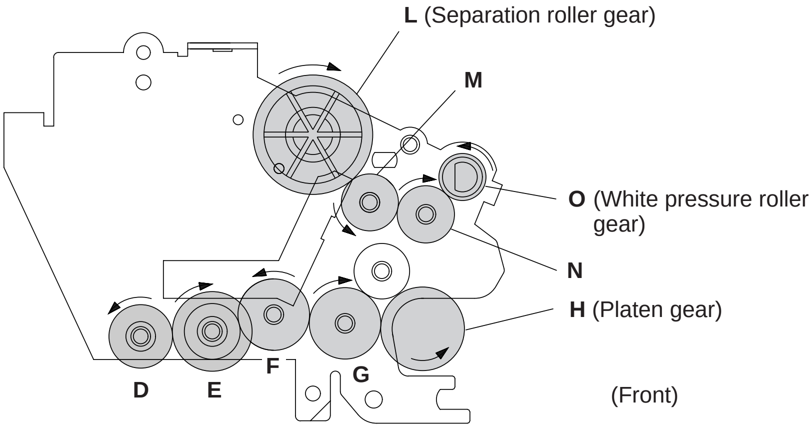
Once the planet gear 20A (C2) becomes engaged with gear K, the control electronics deactivates the solenoid.


Clutch arm
Cutout ⓧ of clutch arm
Stopper of arm A
C2 (Planet gear 20A)
C1 (Planet gear 20B)
B (Sun gear 18/82)

Arm A Released from Cutout ⓧ of Clutch Arm


A (Motor gear)
K
C2 (Planet gear 20A)
Solenoid
(Front)
C1 (Planet gear 20B)
B (Sun gear 18/82)

Active Gears on the Drive Unit

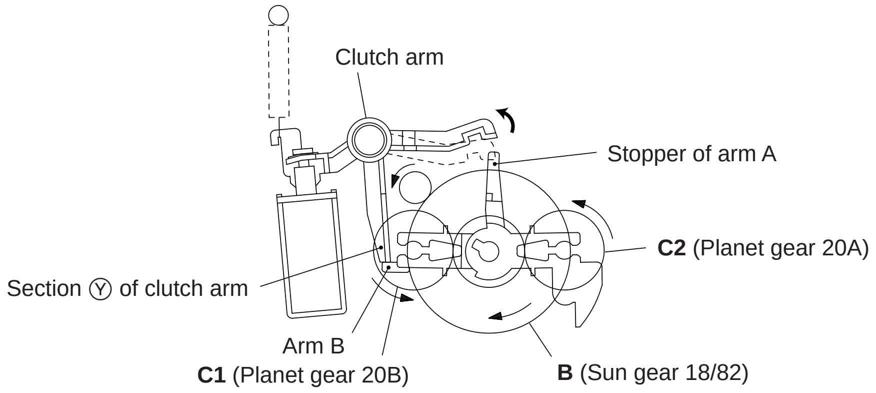

L (Separation roller gear)
M
O (White pressure roller gear)
N
H (Platen gear)
D
E
F
G
(Front)

Active Gears on the Scanner Frame ASSY

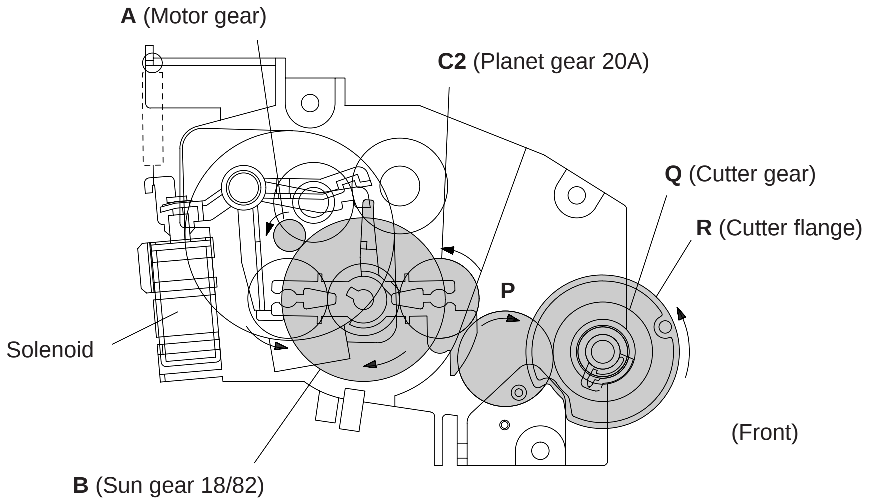
[4] Cutter driving mode (Solenoid: ON, Motor rotation: Reverse)

The control electronics activates the solenoid to release the stopper of arm A from the clutch arm. When the motor rotates in the reverse direction, the sun gear 18/82 (B) rotates clockwise so that the planet gear 20A (C2) transmits the rotation to the cutter gear (Q) via gear P.

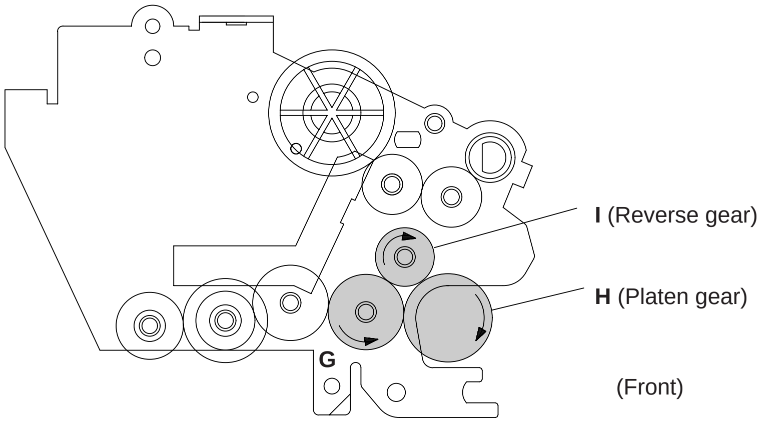
Since the planet gear 20B (C1) is blocked by the section Ⓨ of the clutch arm, it is merely idle without engaging with any other gear.


Clutch arm
Stopper of arm A
C2 (Planet gear 20A)
Section Ⓨ of clutch arm
Arm B
C1 (Planet gear 20B)
B (Sun gear 18/82)

Arm B Blocked by Section Ⓨ of Clutch Arm

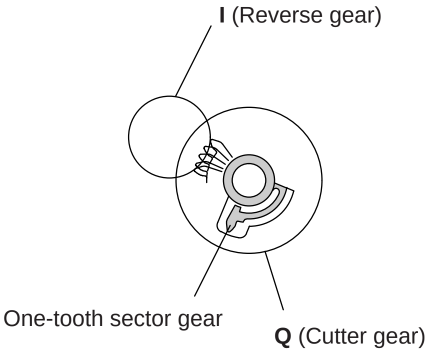

A (Motor gear)
C2 (Planet gear 20A)
Q (Cutter gear)
R (Cutter flange)
P
Solenoid
(Front)
B (Sun gear 18/82)

Active Gears on the Drive Unit


I (Reverse gear)
H (Platen gear)
G
(Front)

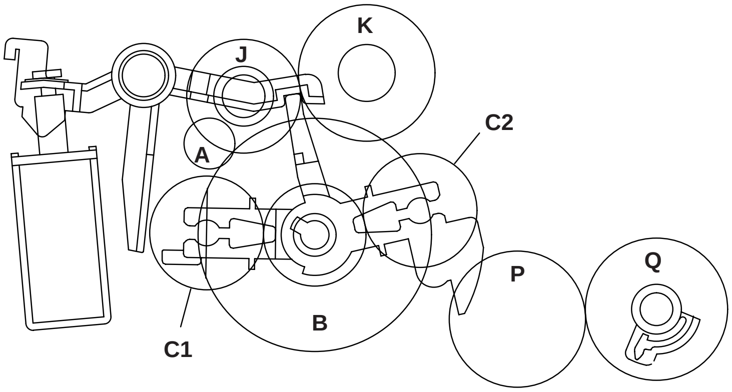
Active Gears on the Scanner Frame ASSY

The cutter gear (Q) is a two-stepped gear whose inside gear is a one-tooth sector gear. While the cutter gear (Q) rotates by one turn for one stroke of the upper blade of the cutter, the one-tooth sector gear slightly turns the platen gear (H) clockwise via the reverse gear (I) to feed the recording paper back into the equipment. This prevents the upper blade of the cutter from scratching the leading edge of the remaining paper.

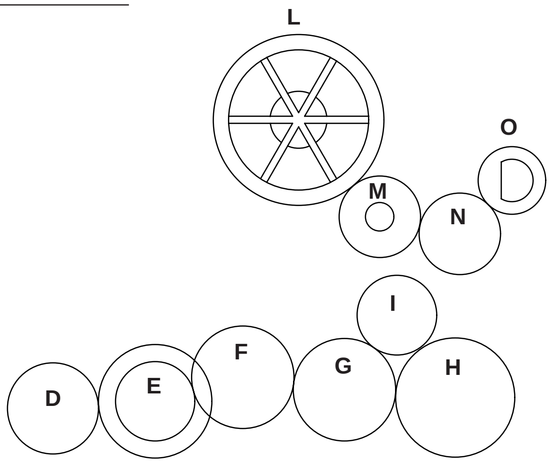

I (Reverse gear)
One-tooth sector gear
Q (Cutter gear)

2.3.4 Power transmission route

Rotation of the motor gear is transmitted as shown below.



Gears on the Drive Unit



Gears on the Scanner Frame ASSY

A: Motor gear
B: Sun gear 18/82
C1: Planet gear 20B
C2: Planet gear 20A
D: Gear 16
E: Gear 14/20
F: Gear 18
G: Gear 18L
H: Platen gear
I: Reverse gear
J: Gear 20
K: Gear 16/24
L: Separation roller gear
M: Gear 23
N: Flanged gear 23
O: White pressure roller gear
P: Gear 24
Q: Cutter gear

[1] Recording Mode (Solenoid: OFF, Motor rotation: forward)

A → B <
- C1 → D → E → F → G → H
- C2 (idling)

[2] Scanning Mode (Solenoid: OFF, Motor rotation: reverse)

A → B <
- C1 → J → K → L → M → N → O
- C2 (idling)

[3] Copying Mode (Solenoid: ON→OFF, Motor rotation: forward)

A → B <
- C1 → D → E → F → G → H
- C2 → K → L → M → N → O

[4] Cutter Driving Mode (Solenoid: ON, Motor rotation: reverse)

A → B <
- C1 (idling)
- C2 → P → Q (→ I → G → H)
  (Reverse-feeds recording paper)

2.4 Sensors and Actuators

This equipment has two photosensors and four mechanical switches as described below.

Sensor name	Type	Located on
Document front sensor	Photosensor (PH1)	Main PCB
Document rear sensor	Photosensor (PH2)	Main PCB
Paper empty (PE) sensor	Mechanical switch (SW1)	Main PCB
Cover sensor	Mechanical switch (SW2)	Main PCB
Hook switch sensor*	Mechanical switch (SW3)	Main PCB
Cutter home position (HP) sensor	Mechanical switch	Drive unit

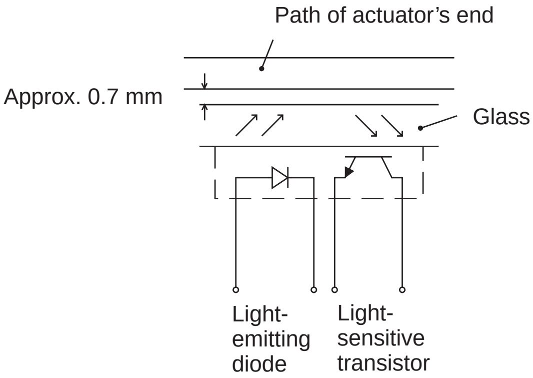
(*In those versions equipped with a Binatone handset, the hook switch sensor serves no function.)

- Document front sensor which detects the presence of documents.
- Document rear sensor which detects the leading and trailing edges of pages to tell the control circuitry when the leading edge of a new page has reached the starting position and when the scan for that page is over.

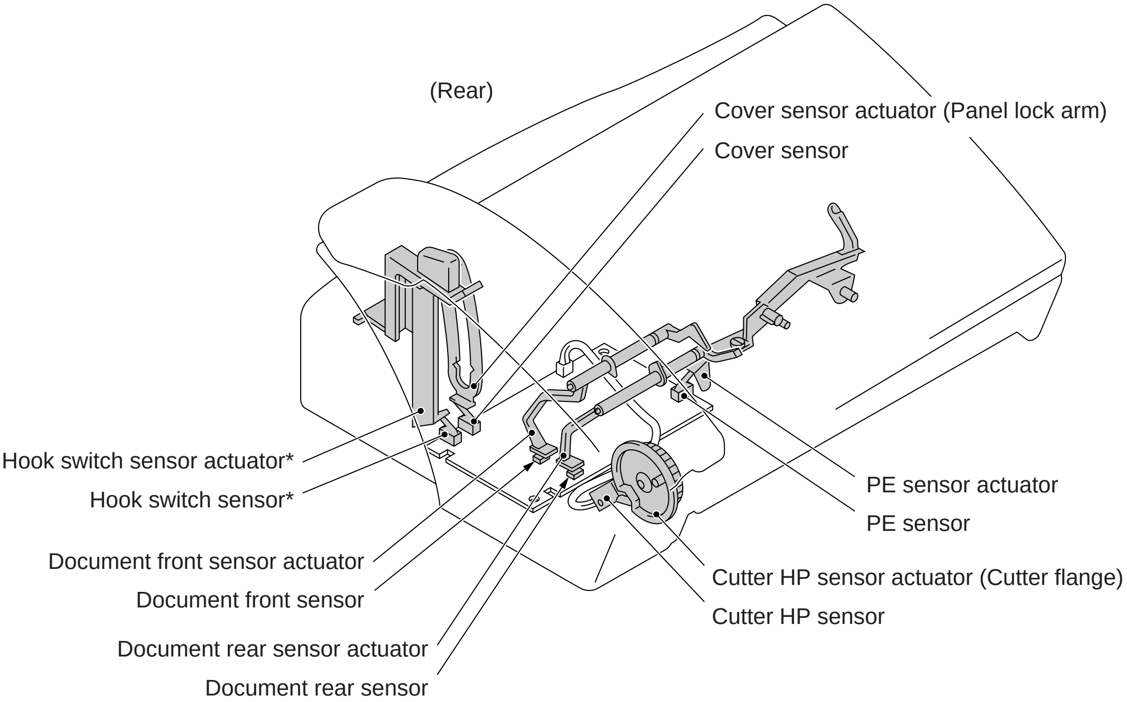
These photosensors are of a reflection type consisting of a light-emitting diode and a light-sensitive transistor. Each of them has an actuator separately arranged (see the next page). When an actuator is not activated, its white end lies in the path of light issued from the light-emitting diode and reflects its light into the light-sensitive transistor. If a document is fed in so as to activate the actuator, the actuator's white end goes out of the light path. With no reflected light to go into the light-sensitive transistor, the sensor detects the presence of documents.

- PE sensor which detects when the recording paper runs out.
- Cover sensor which detects whether the control panel is closed.
- Hook switch sensor which detects whether the handset is placed on the handset mount.
- Cutter HP sensor which detects the home position of the upper rotary blade of the automatic cutter.

Each of these four sensors has an actuator separately arranged (see the next page). If an actuator is activated, its lower end releases or pushes down the lever provided on the corresponding sensor so that the sensor signals the detection.



Photosensor


(Rear)
Cover sensor actuator (Panel lock arm)
Cover sensor
Hook switch sensor actuator*
Hook switch sensor*
Document front sensor actuator
Document front sensor
Document rear sensor actuator
Document rear sensor
PE sensor actuator
PE sensor
Cutter HP sensor actuator (Cutter flange)
Cutter HP sensor

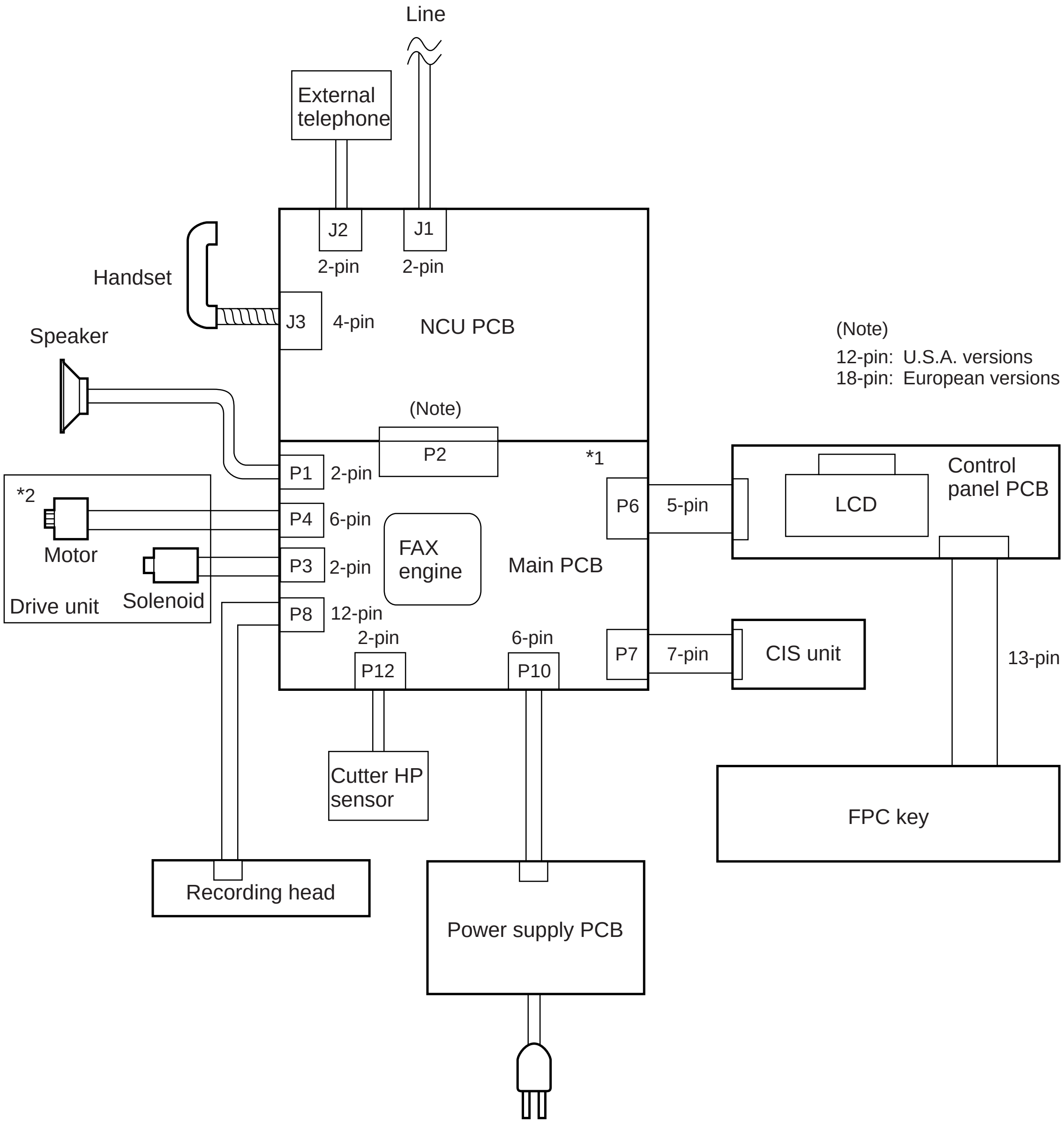
(*In those versions equipped with a Binatone handset, the hook switch sensor serves no function. Those versions have no hook switch sensor actuator.)

Location of Sensors and Actuators

3. CONTROL ELECTRONICS

3.1 Configuration

The hardware configuration of the facsimile equipment is shown below.


Line
External telephone
J2
2-pin
J1
2-pin
Handset
J3
4-pin
NCU PCB
Speaker
(Note)
12-pin: U.S.A. versions
18-pin: European versions
(Note)
P2
*1
P1
2-pin
*2
P4
6-pin
Motor
P3
2-pin
FAX engine
Main PCB
Drive unit
Solenoid
P8
12-pin
2-pin
6-pin
P12
P10
P6
5-pin
LCD
Control panel PCB
P7
7-pin
CIS unit
13-pin
Cutter HP sensor
FPC key
Recording head
Power supply PCB

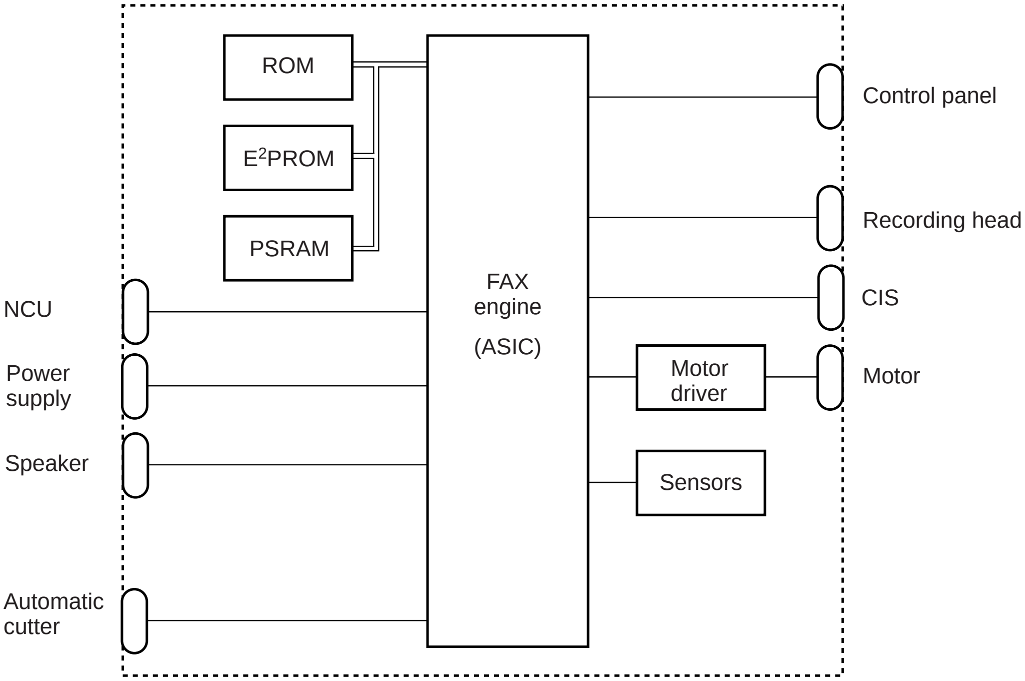
*1 On the main PCB are these sensors:
- PE sensor (SW1)
- Cover sensor (SW2)
- Hook switch sensor (SW3) (This sensor serves no function in those versions equipped with a Binatone handset.)
- Document front sensor (PH1)
- Document rear sensor (PH2)

*2 On the drive unit is the cutter HP sensor.

Configuration of Facsimile Equipment

3.2 Main PCB

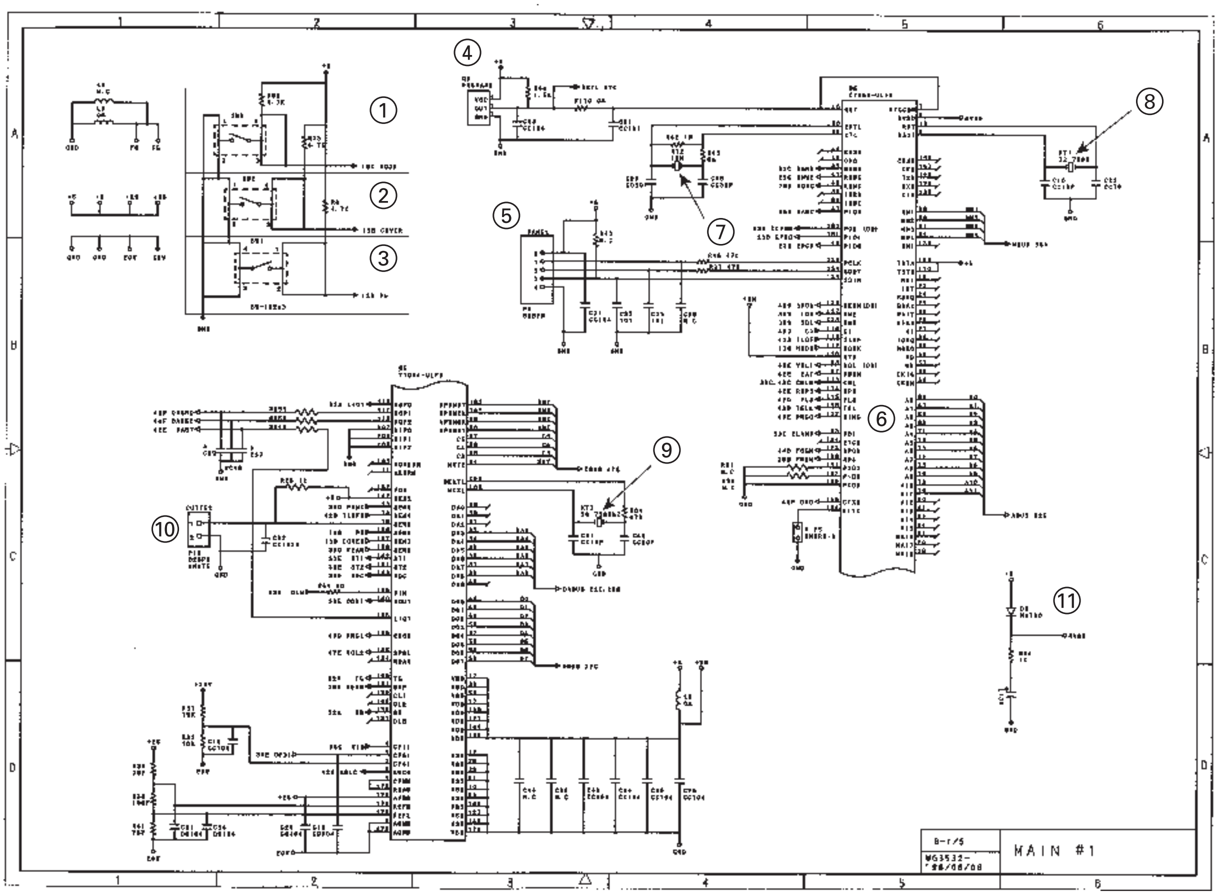
The main PCB, which is the nucleus controlling the entire operation of the equipment, consists of a FAX engine (ASIC), memories, MODEM, motor drive circuitry, sensor detection circuitry, and analog circuits for scanning, recording, and power transmission shifting.


ROM
E2PROM
PSRAM
FAX engine (ASIC)
Control panel
Recording head
CIS
Motor driver
Motor
Sensors
NCU
Power supply
Speaker
Automatic cutter

E^{2}PROM:	Electrically Erasable Programmable Read-only Memory
PSRAM:	Pseudo Static Random Access Memory

Block Diagram of Main PCB

FAX-170/190/510/HOME FAX



Main PCB Circuit Diagram 1/4

① SW3, hook switch sensor (microswitch) (This sensor serves no function in those versions equipped with a Binatone handset.)

② SW2, cover switch sensor (microswitch)

③ SW1, paper empty sensor (microswitch)

④ Reset IC which turns on at the powering-on sequence and at any of the reset operations.

⑤ Connector for the control panel

⑥ FAX engine (ASIC) which integrates a CPU, digital portion of a MODEM and gate array for managing the I/Os, memories, and drivers.

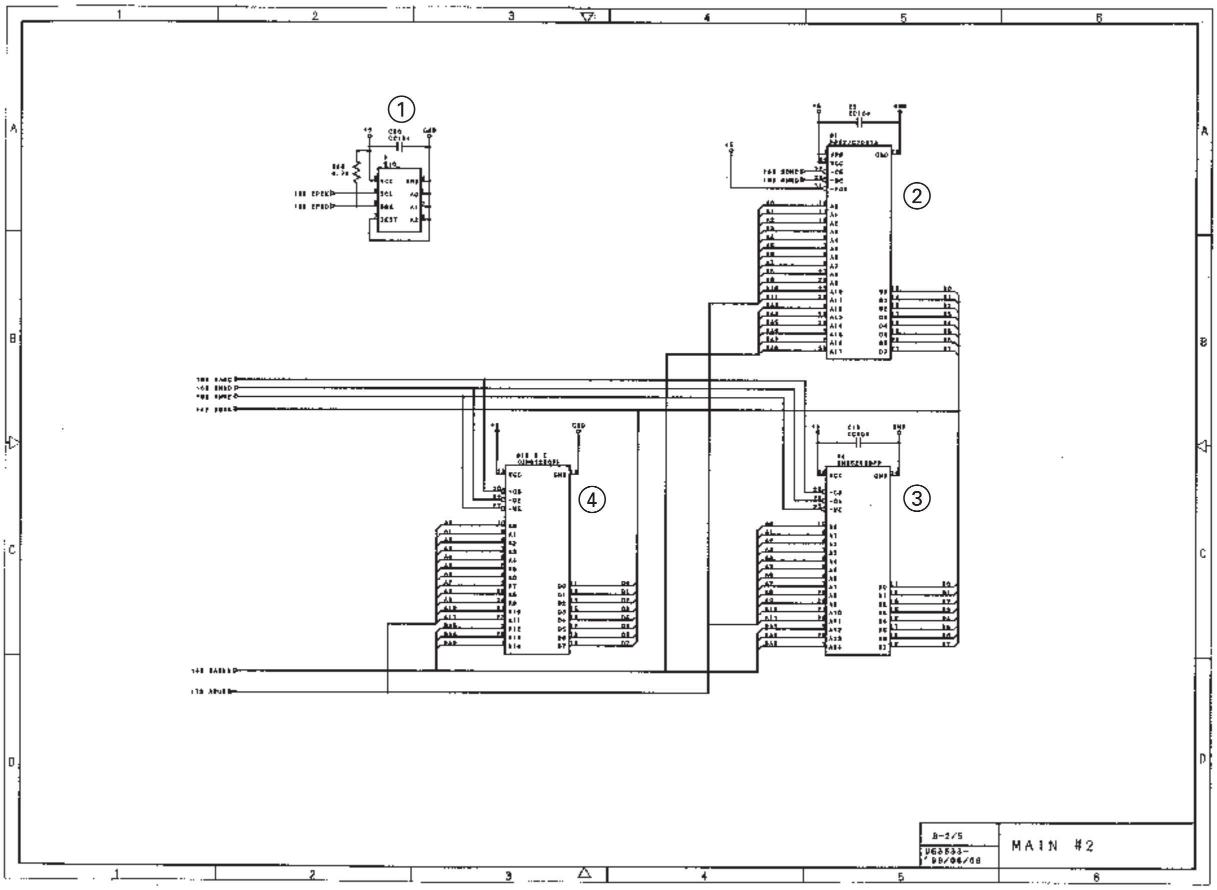
⑦ XT2, oscillator which oscillates at 16 MHz for the CPU.

⑧ XT1, oscillator which oscillates at 32.768 kHz for the calendar clock.

⑨ XT3, oscillator which oscillates at 20.736 MHz for the MODEM.

⑩ Connector for the cutter HP sensor

⑪ Backup circuit for the calendar clock of the control panel



①
②
③
④
1
2
3
4
5
6
A
B
C
D
B-2/5
MAIN #2

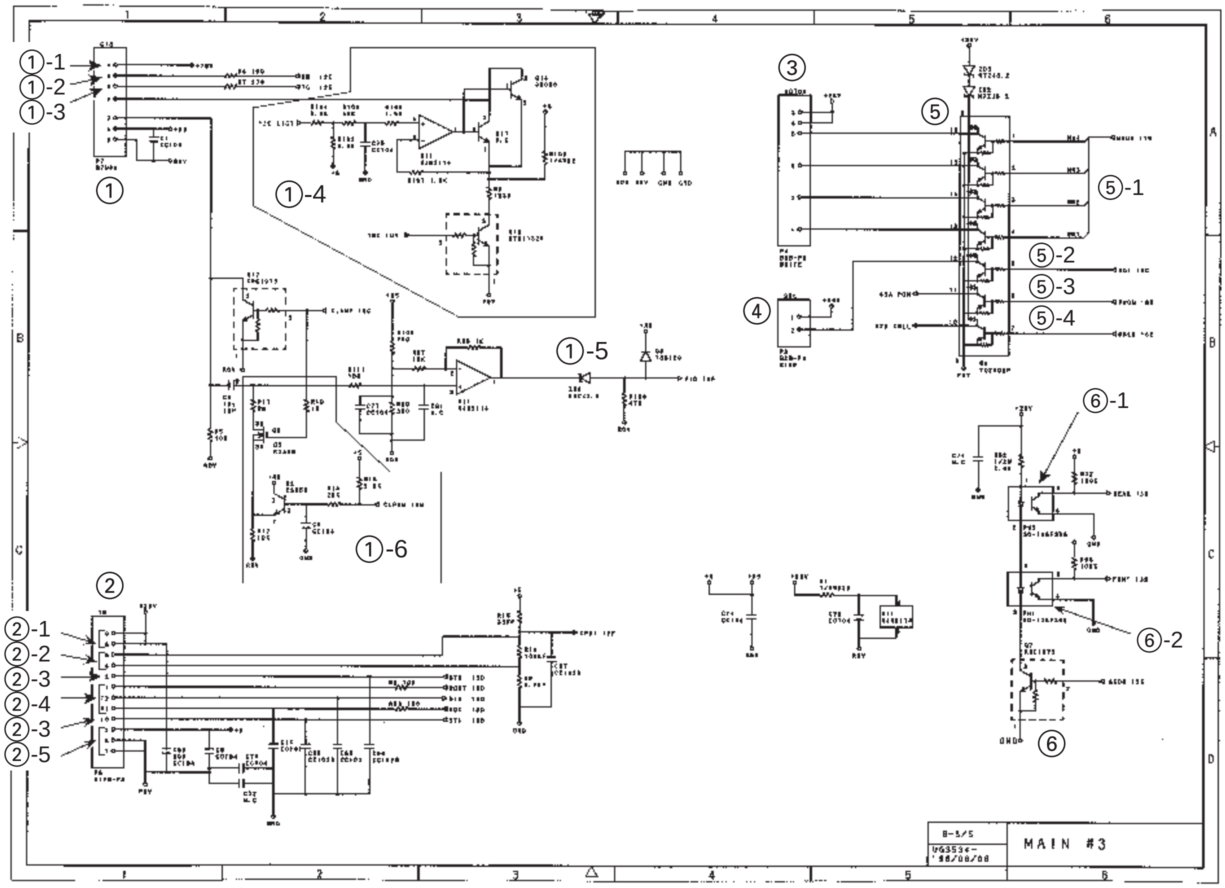
Main PCB Circuit Diagram 2/4

① E^{2}PROM (16k x 1 bit in the European versions, 8k x 1 bit in other versions)

② ROM (128k x 8 bits. Note that the qualification machines for demonstration have a 2-megabit ROM.)

③ PSRAM (32k x 8 bits)

④ Not mounted.



Main PCB Circuit Diagram 3/4

① Connector for the CIS

- ①-1: Power for the CIS LED array
- ①-2: Clock output
- ①-3: Trigger signal output. One shot of this signal triggers a line of scan.
- ①-4: LED control signal output circuit which controls the intensity of the CIS LED array.
- ①-5: Input of video data (VID) to the FAX engine
- ①-6: Clamp circuit that gives the bias level to the amplifier of the VID input circuit according to the CLAMP and CLPWM signals issued by the CPU (that monitors the current video data input) for compensating the DC component of video signals for the next scan line

② Connector for the thermal recording head

- ②-1: Power 26V for the thermal recording head
- ②-2: Thermister signals which are normalized by the resistor network and fed to the FAX engine
- ②-3: Strobe signals
- ②-4: Data signals
- ②-5: Power 5V for the logic circuit of the thermal recording head

③ Connector for the motor

④ Connector for the solenoid (that switches the power transmission)

⑤ Transistor array which consists of seven transistors

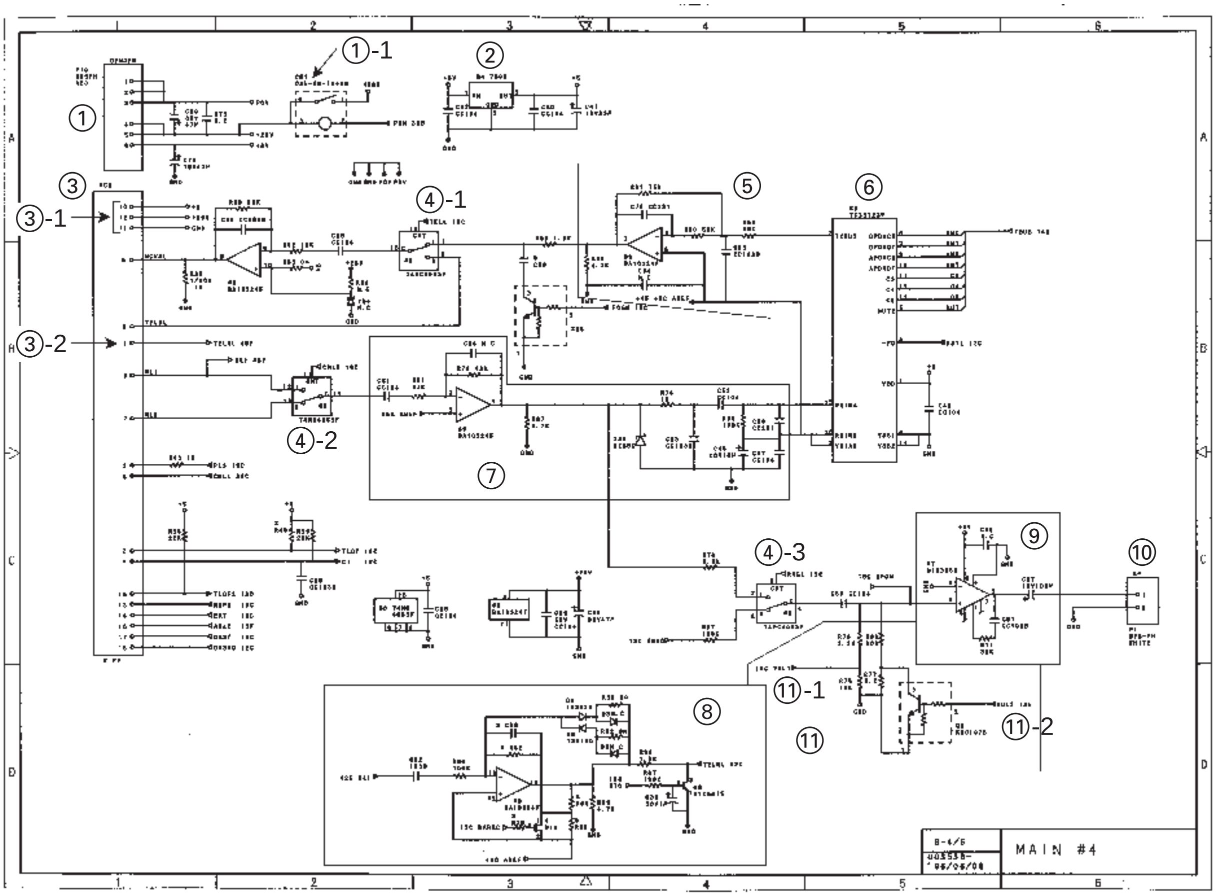
- ⑤-1: Transistors that control the rotation direction of the motor according to the MM4 through MM1 signals.
- ⑤-2: Transistor that turns on and off the solenoid.

  The combination of the solenoid state and the motor rotation direction determines to which the motor torque should be transmitted, the cutter, the document feeding mechanism, or the paper feeding mechanism.
- ⑤-3: Transistor that turns on and off the CR1 relay for switching on and off the +26V power source to the thermal recording head.
- ⑤-4: Transistor that turns on and off the CML relay.

⑥ Document front and rear sensor circuitry that is active only while the SEON signal is on.

The LEDs for the sensors are driven by the +26V source.

- ⑥-1: PH2, document rear sensor
- ⑥-2: PH1, document front sensor



Main PCB Circuit Diagram 4/4

① Connector for the power supply PCB
  ①-1: CR1, recording head on/off relay

② 3-terminal regulator which eliminates unstabilized components of the +8V source to generate stabilized 5V source.

③ Connector for the NCU
  ③-1: Power for the NCU
  ③-2: Signals from the telephone

④ Analog signal selectors
  ④-1: Selects either input signals from the handset or those from the MODEM.
  ④-2: Selects either RL1 or RL2 signals inputted from the communications network.
  ④-3: Selects either sound signals (e.g., alarm beeps, key clicks and ringer sounds) generated by the FAX engine or signals selected by ④-2.

⑤ Amplifier circuit for signals outputted from the MODEM.

⑥ Analog front end IC which processes the analog I/O signals from/to the MODEM.

⑦ Amplifier & shaper circuit for signals inputted from the communications network.

⑧ Telephone circuit for transmitting signals.

⑨ Speaker amplifier circuit which amplifies sounds issued from the above analog signal selector ④-3 and feeds them to the speaker.

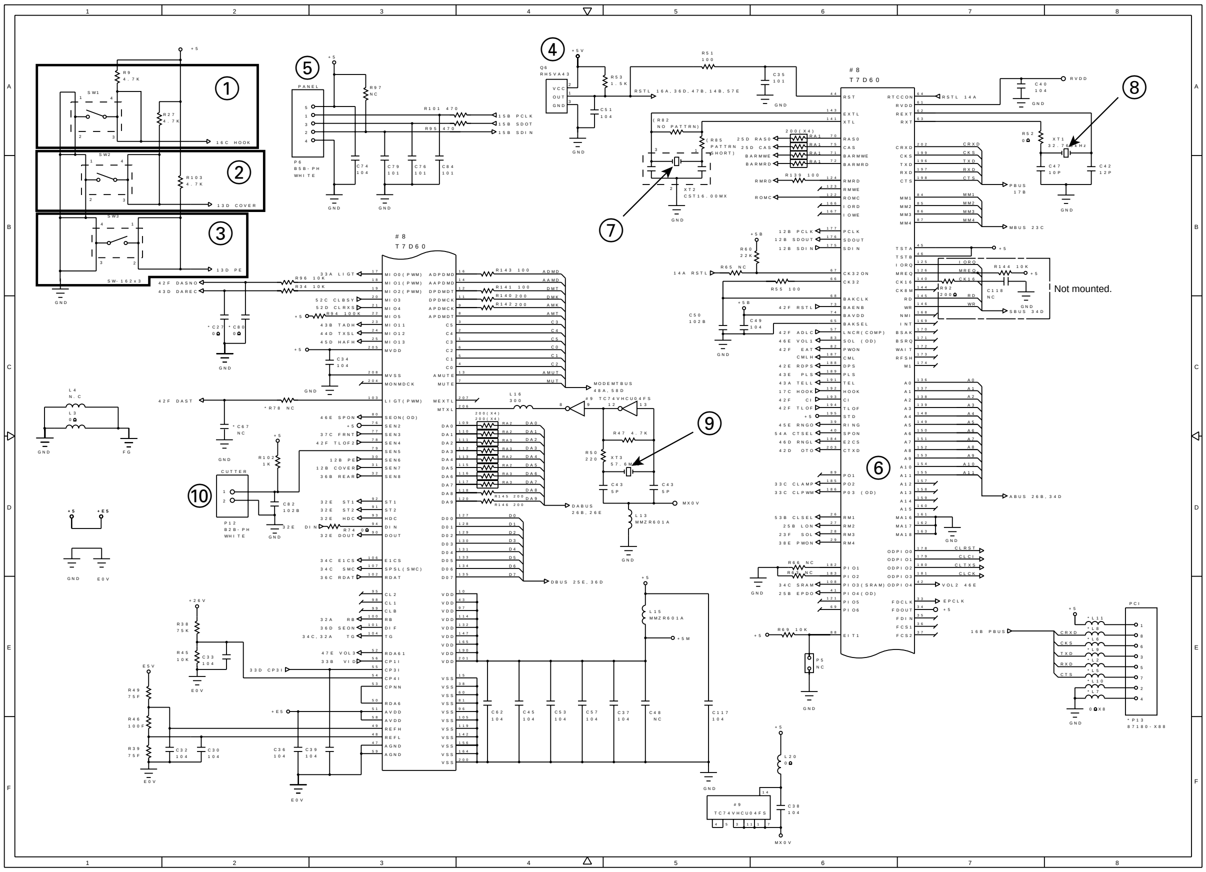
⑩ Connector for the speaker

⑪ Speaker volume control circuit

⑪-1: VOL1	OFF	ON	ON
⑪-2: VOL2	OFF	OFF	ON
Speaker volume	High	Medium	Low

(ON: Closed OFF: Opened)

FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC



Main PCB Circuit Diagram 1/5

① SW1, hook switch sensor (microswitch)

② SW2, cover switch sensor (microswitch)

③ SW3, paper empty sensor (microswitch)

④ Reset IC which turns on at the powering-on sequence and at any of the reset operations.

⑤ Connector for the control panel

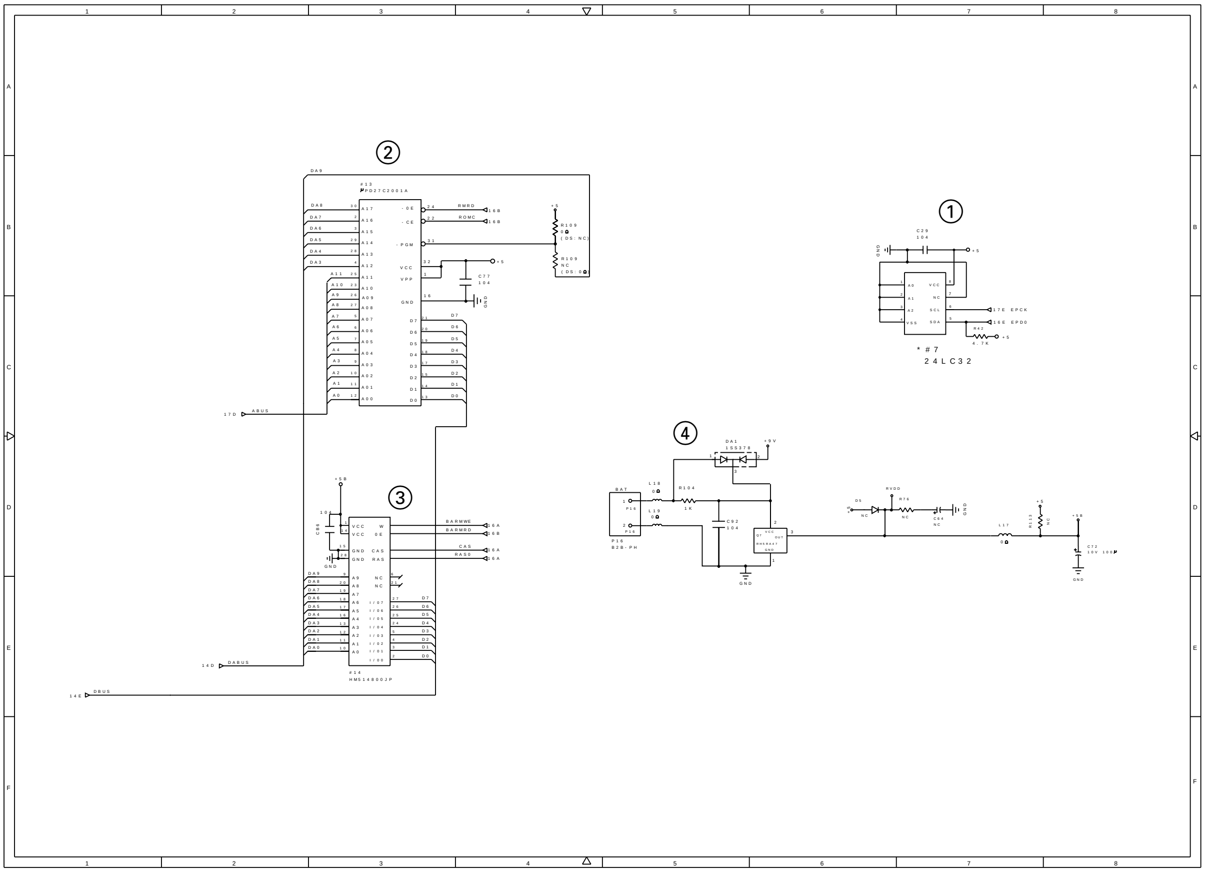
⑥ FAX engine (ASIC) which integrates a CPU, digital portion of a MODEM and gate array for managing the I/Os, memories, and drivers.

⑦ XT2, oscillator which oscillates at 16 MHz for the CPU.

⑧ XT1, oscillator which oscillates at 32.768 kHz for the calendar clock.

⑨ XT3, oscillator which oscillates at 57.6 MHz for the MODEM.

⑩ Connector for the cutter HP sensor


①
②
③
④
24LC32
HMS148002P
DA1 1SS376
BAT
ABUS
DABUS
DBUS
GND

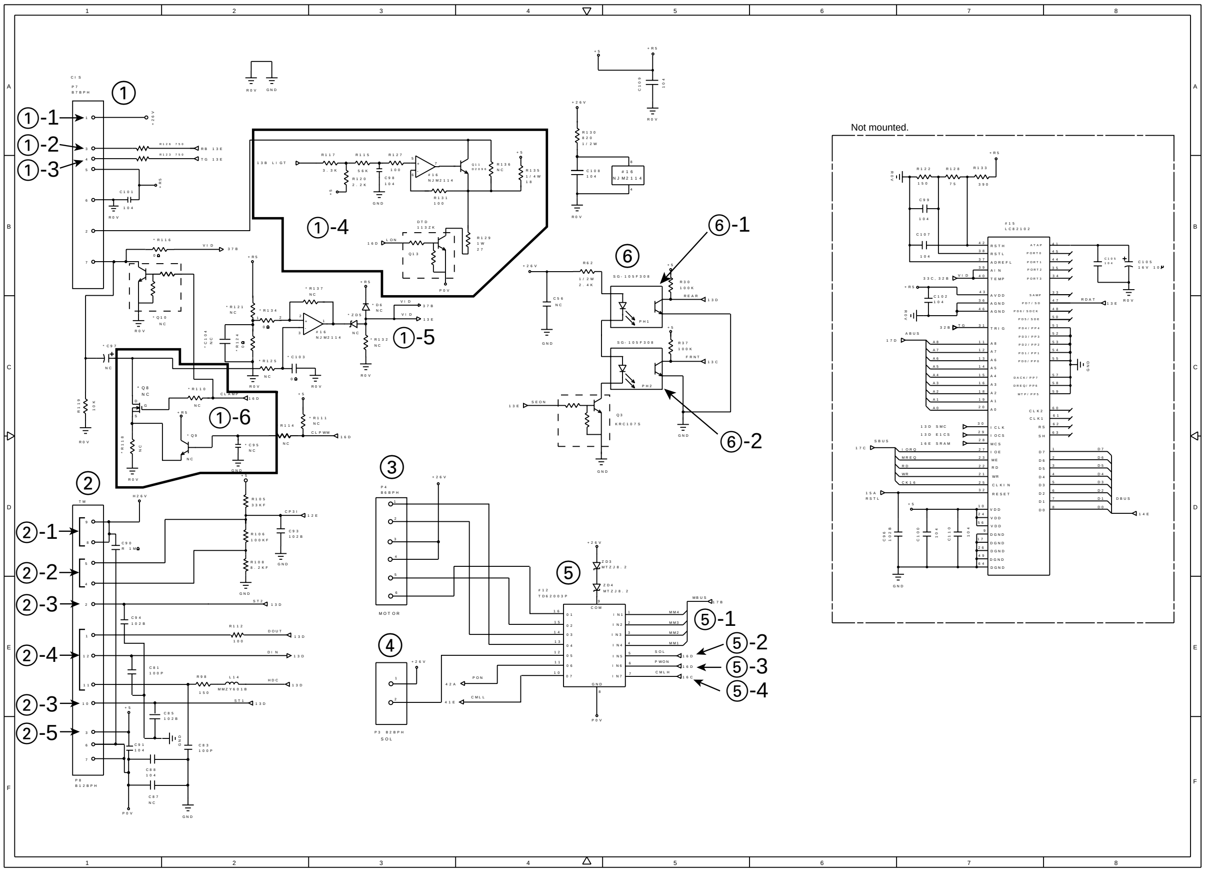
Main PCB Circuit Diagram 2/5

① E^{2}PROM (16k x 1 bit)

② ROM (256k x 8 bits. Note that the qualification machines for demonstration have a 2-megabit ROM.)

③ DRAM (512k x 8 bits)

④ Backup circuit for the calendar clock of the control panel and DRAM.



Main PCB Circuit Diagram 3/5

① Connector for the CIS

①-1: Power for the CIS LED array
①-2: Clock output
①-3: Trigger signal output. One shot of this signal triggers a line of scan.
①-4: LED control signal output circuit which controls the intensity of the CIS LED array.
①-5: Input of video data (VID) to the FAX engine
①-6: Clamp circuit that gives the bias level to the amplifier of the VID input circuit according to the CLAMP and CLPWM signals issued by the CPU (that monitors the current video data input) for compensating the DC component of video signals for the next scan line

② Connector for the thermal recording head

②-1: Power 26V for the thermal recording head
②-2: Thermister signals which are normalized by the resistor network and fed to the FAX engine
②-3: Strobe signals
②-4: Data signals
②-5: Power 5V for the logic circuit of the thermal recording head

③ Connector for the motor

④ Connector for the solenoid (that switches the power transmission)

⑤ Transistor array which consists of seven transistors

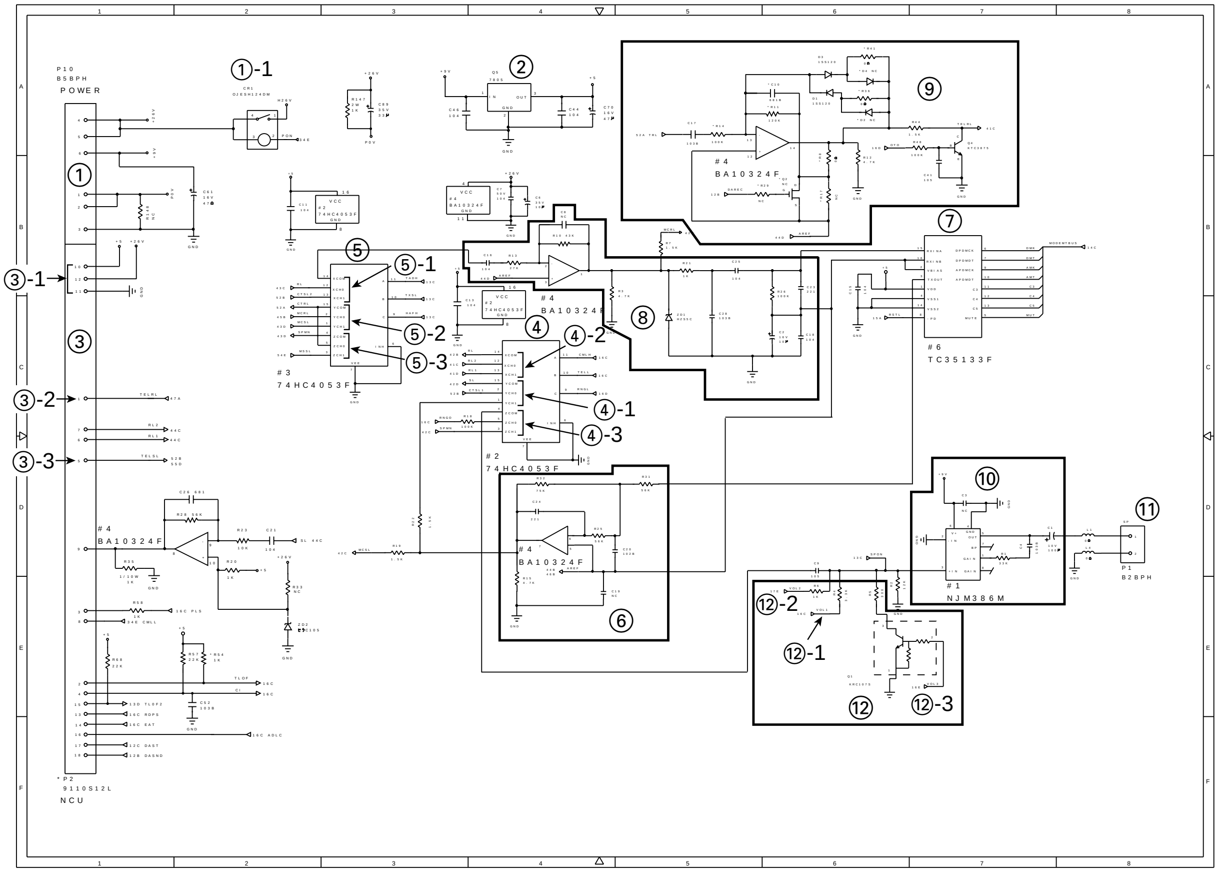
- ⑤-1: Transistors that control the rotation direction of the motor according to the MM4 through MM1 signals.
- ⑤-2: Transistor that turns on and off the solenoid.

  The combination of the solenoid state and the motor rotation direction determines to which the motor torque should be transmitted, the cutter, the document feeding mechanism, or the paper feeding mechanism.
- ⑤-3: Transistor that turns on and off the CR1 relay for switching on and off the +26V power source to the thermal recording head.
- ⑤-4: Transistor that turns on and off the CML relay.

⑥ Document front and rear sensor circuitry that is active only while the SEON signal is on.

The LEDs for the sensors are driven by the +26V source.

- ⑥-1: PH1, document rear sensor
- ⑥-2: PH2, document front sensor


①-1
②
⑨
①
③-1
③
③-2
③-3
⑤
⑤-1
⑤-2
⑤-3
④
④-1
④-2
④-3
⑦
⑧
⑥
⑩
⑪
⑫
⑫-1
⑫-2
⑫-3
P10
B5BPH
POWER
CR1
#4
BA10324F
#3
74HC4053F
#2
74HC4053F
#6
TC35133F
#1
NJM386M
P1
B2BPH
P2
9110S12L
NCU
GND

Main PCB Circuit Diagram 4/5

① Connector for the power supply PCB
- ①-1: CR1, recording head on/off relay

② 3-terminal regulator which eliminates unstabilized components of the +9V source to generate stabilized 5V source.

③ Connector for the NCU
- ③-1: Power for the NCU
- ③-2: Signals to the telephone
- ③-3: Signals from the telephone

④ Analog signal selectors
- ④-1: Selects either input signals from the handset or those from the MODEM.
- ④-2: Selects either RL1 or RL2 signals inputted from the communications network.
- ④-3: Selects sound signals (e.g., alarm beeps, key clicks and ringer sounds) generated by the FAX engine, hands-free monitor signals, or voice playback signals.

⑤ Analog signal selectors
- ⑤-1 Selects either signals gated by ④-2 or voice signals coming from the handset.
- ⑤-2 Selects either signals gated by ④-2 or voice playback signals.
- ⑤-3 Selects either signals gated by ④-2 or hands-free monitor signals.

⑥ Amplifier circuit for signals outputted from the MODEM

⑦ Analog front end IC which processes the analog I/O signals from/to the MODEM.

⑧ Amplifier & shaper circuit for signals inputted from the communications network.

⑨ Telephone circuit for transmitting signals.

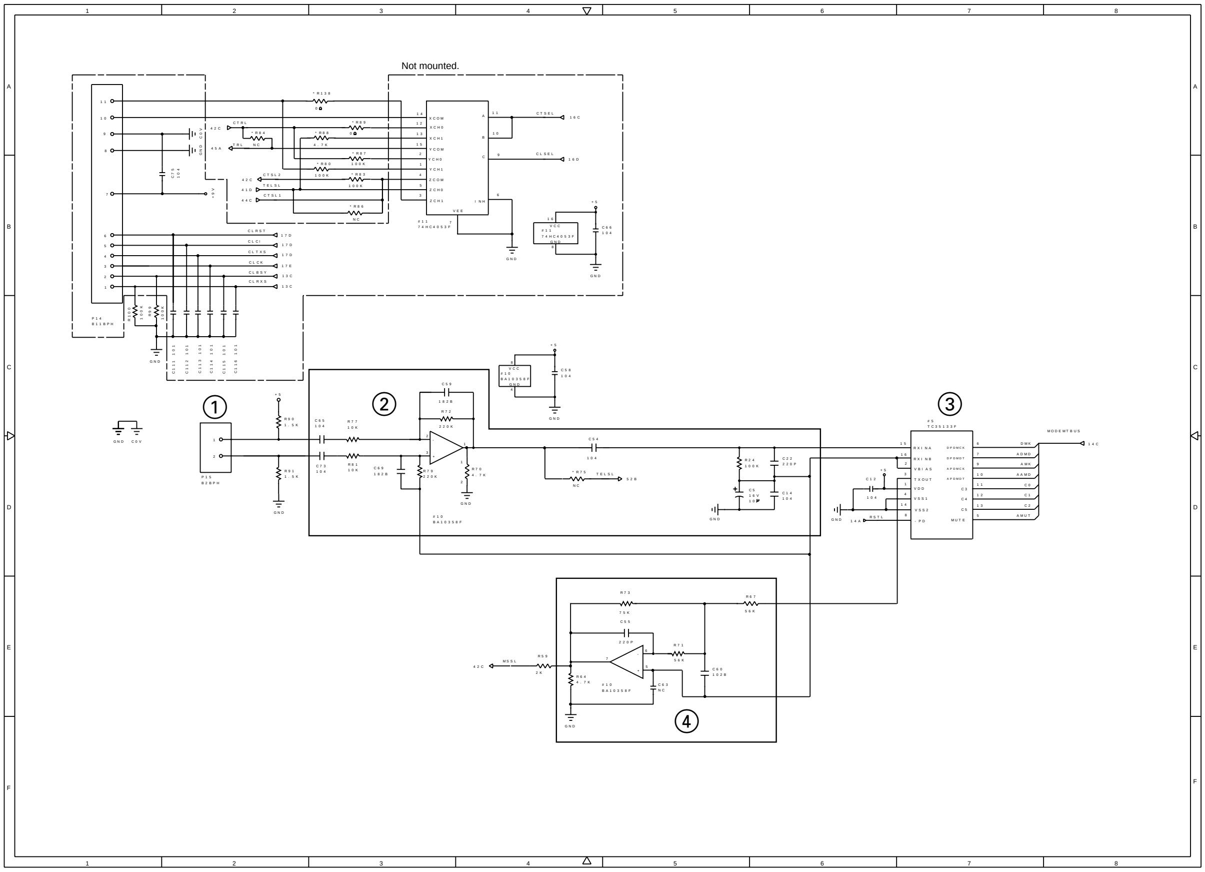
⑩ Speaker amplifier circuit which amplifies sounds issued from the above analog signal selector ④-3 and feeds them to the speaker.

⑪ Connector for the speaker

⑫ Speaker volume control circuit

⑫-1: VOL1	OFF	ON	ON
⑫-2: VOL2	OFF	OFF	ON
⑫-3: VOL3	OFF	OFF	ON
Speaker volume	High	Medium	Low

(ON: Closed OFF: Opened)


Not mounted.
①
②
③
④
MODEMTBUS
GND

Main PCB Circuit Diagram 5/5

① Microphone connector

② Amplifier and shaper circuit for signals inputted from the microphone.

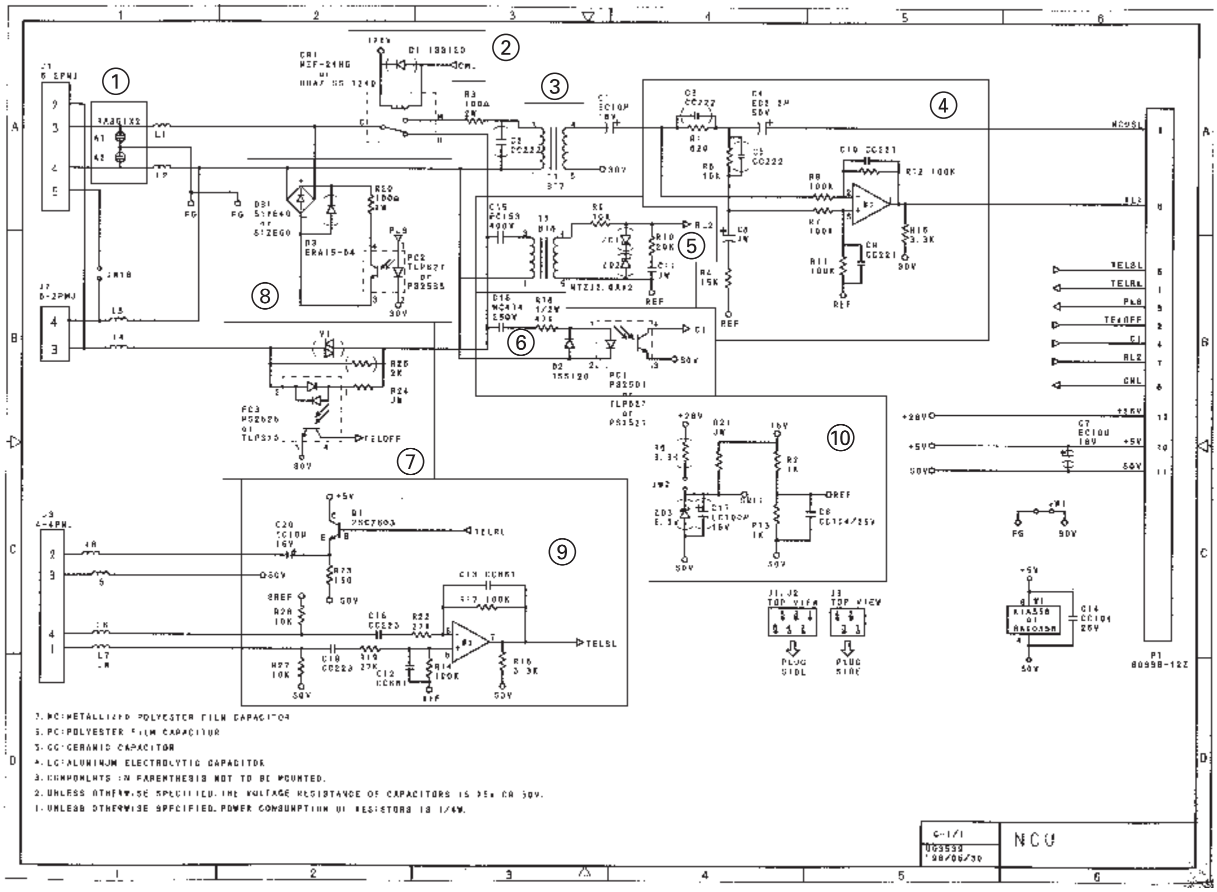
③ Analog front end IC which processes the analog I/O signals from/to the MODEM.

④ Amplifier circuit for signals outputted from the MODEM.

3.3 NCU PCB

The NCU PCB switches the communications line to telephone or built-in MODEM, under the control of the main PCB.

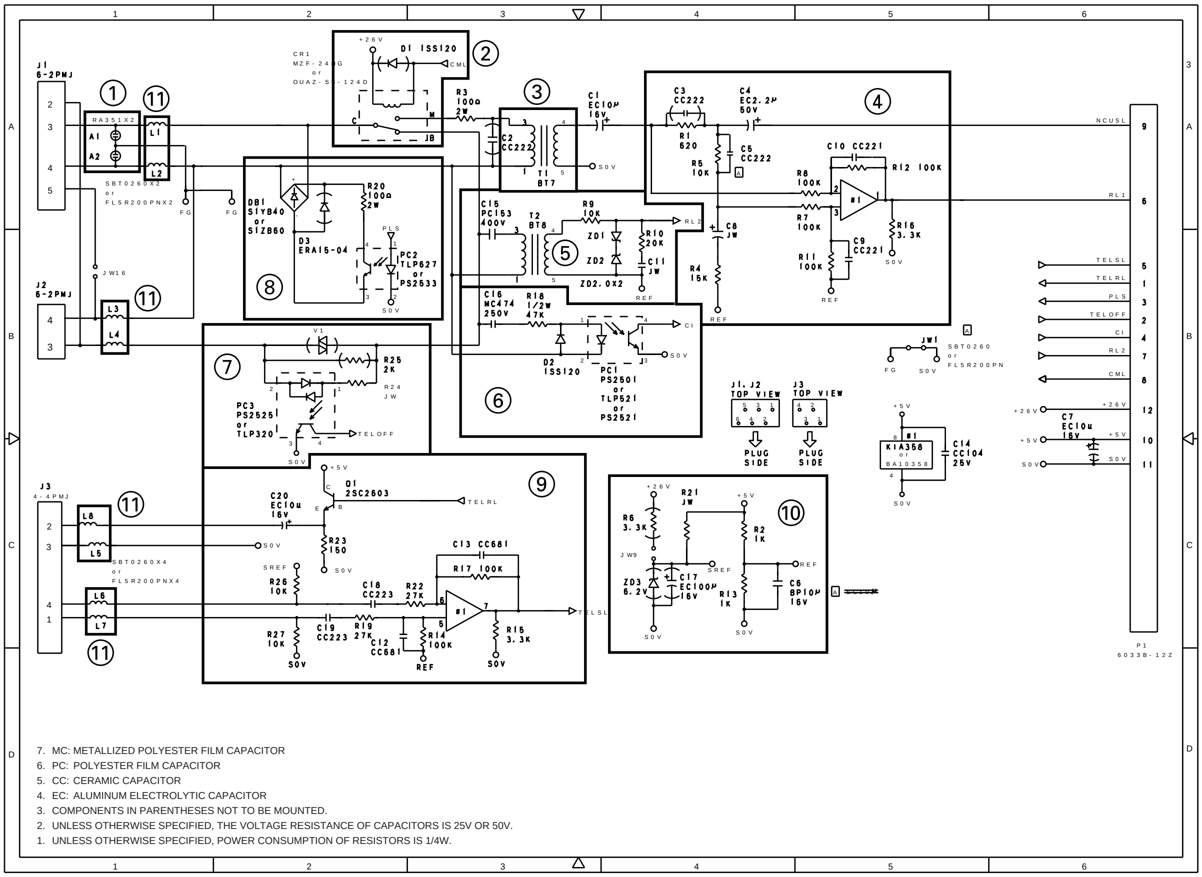
FAX-170/190/510/HOME FAX


①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
J1
6-2PMJ
J7
6-2PMJ
J3
4-4PM
L1
L2
L3
L4
L7
CR1
D1 1SS133
R3 100Ω
T1
R12 100K
R15 3.3K
PC1
PC2
PC3
Q1 2SC2603
IC1
RLS
TELSL
TELRL
RLS
TELOFF
CI
RL2
CML
+28V
+5V
SGV
REF
FG
P1
7. MC:METALLIZED POLYESTER FILM CAPACITOR
6. PC:POLYESTER FILM CAPACITOR
5. CC:CERAMIC CAPACITOR
4. LC:ALUMINUM ELECTROLYTIC CAPACITOR
3. COMPONENTS IN PARENTHESIS NOT TO BE MOUNTED.
2. UNLESS OTHERWISE SPECIFIED, THE VOLTAGE RESISTANCE OF CAPACITORS IS 25V OR 50V.
1. UNLESS OTHERWISE SPECIFIED, POWER CONSUMPTION OF RESISTORS IS 1/4W.
NCU

NCU PCB Circuit Diagram (U.S.A. versions)

① Surge absorber
② Line relay (CML relay)
③ Line transformer
④ Circuit related to the line transformer
⑤ High-impedance transformer circuit
⑥ Calling signal detector
⑦ Loop current detector
⑧ Dial pulse generator
⑨ Telephone circuit
⑩ Reference voltage generation circuit for the operational amplifier in ④

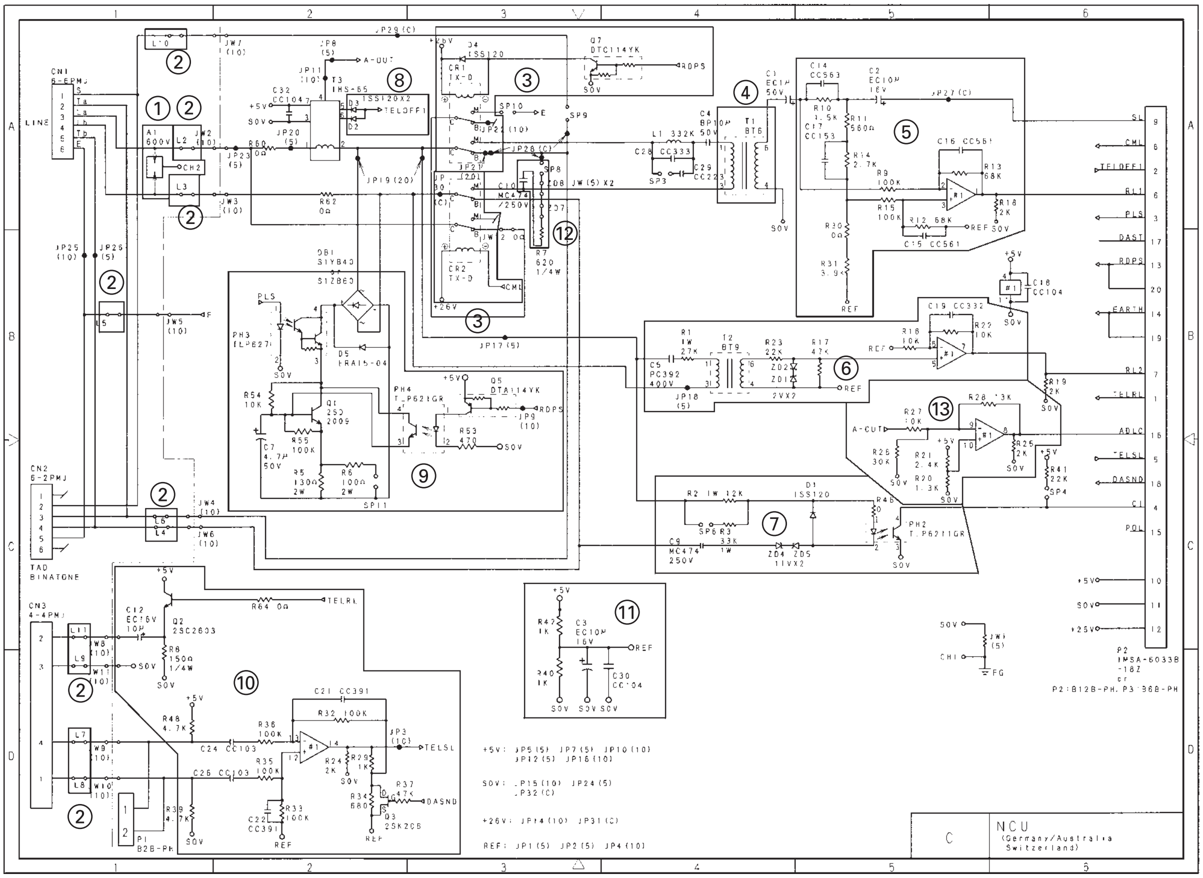
FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC


J1
6-2PMJ
RA351X2
A1
A2
L1
L2
SBT0260X2
or
FLS R200PNX2
FG
J W16
J2
6-2PMJ
L3
L4
CR1
MZF-240G
or
OUAZ-SS-124D
+26V
D1 1SS120
CML
J8
R3
100Ω
2W
C2
CC222
T1
BT7
C1
EC10μ
16V
S0V
C3
CC222
R1
620
C4
EC2.2μ
50V
R5
10K
C5
CC222
C10 CC221
R12 100K
R8
100K
R7
100K
#1
R16
3.3K
C9
CC221
R11
100K
C8
JW
R4
15K
REF
NCUSL
RL1
DB1
S1YB40
or
S1ZB60
D3
ERA15-04
R20
100Ω
2W
PLS
PC2
TLP627
or
PS2533
C15
PC153
400V
T2
BT8
R9
10K
ZD1
ZD2
R10
20K
C11
JW
ZD2.0X2
RL2
C16
MC474
250V
R18
1/2W
47K
D2
1SS120
PC1
PS2501
or
TLP521
or
PS2521
CI
V1
R25
2K
R24
JW
PC3
PS2525
or
TLP320
TELOFF
J1, J2
TOP VIEW
J3
TOP VIEW
PLUG
SIDE
JW1
SBT0260
or
FLS R200PN
#1
KIA358
or
BA10358
C14
CC104
25V
C7
EC10μ
16V
TELSL
TELRL
PLS
TELOFF
CI
RL2
CML
+26V
+5V
S0V
P1
6033B-12Z
J3
4-4PMJ
L8
L5
SBT0260X4
or
FLS R200PNX4
L6
L7
Q1
2SC2603
TELRL
C20
EC10μ
16V
R23
150
SREF
R26
10K
C13 CC681
R17 100K
C18
CC223
R22
27K
R27
10K
C19
CC223
R19
27K
C12
CC681
R14
100K
R15
3.3K
TELSL
R21
JW
R6
3.3K
JW9
ZD3
6.2V
C17
EC100μ
16V
R2
1K
R13
1K
C6
BP10μ
16V
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪

7. MC: METALLIZED POLYESTER FILM CAPACITOR
6. PC: POLYESTER FILM CAPACITOR
5. CC: CERAMIC CAPACITOR
4. EC: ALUMINUM ELECTROLYTIC CAPACITOR
3. COMPONENTS IN PARENTHESES NOT TO BE MOUNTED.
2. UNLESS OTHERWISE SPECIFIED, THE VOLTAGE RESISTANCE OF CAPACITORS IS 25V OR 50V.
1. UNLESS OTHERWISE SPECIFIED, POWER CONSUMPTION OF RESISTORS IS 1/4W.

NCU PCB Circuit Diagram (U.S.A. versions)

① Surge absorber
② Line relay (CML relay)
③ Line transformer
④ Circuit related to the line transformer
⑤ High-impedance transformer circuit
⑥ Calling signal detector
⑦ Loop current detector
⑧ Dial pulse generator
⑨ Telephone circuit
⑩ Reference voltage generation circuit for the operational amplifiers in ④ and ⑨.
⑪ Noise filters


CN1
LINE
L10
JW7 (10)
JP8 (5)
A-OUT
JP29 (C)
Q7 DTC114YK
RDPS
JP11 (10)
T3 IHS-65
1SS120X2
TELOFF1
D4 1SS120
CR1 TX-D
SP10
SP9
A1 600V
L2
L3
CH2
JW2 (10)
JP23 (5)
R60 0Ω
JP20 (5)
JP28 (C)
JP19 (20)
JW3 (10)
R62 0Ω
L1 332K CC333
C28
SP3
C29 CC223
C4 BP10μ 50V
T1 BT6
C1 EC1μ 50V
C14 CC563
R10 1.5K
R11 560Ω
C17 CC153
R14 2.7K
R9 100K
R15 100K
R12 68K
R13 68K
R18 2K
C16 CC561
C15 CC561
C2 EC10μ 16V
JP27 (C)
REF
SL
CML
TELOFF1
BL1
PLS
DAST
RDPS
EARTH
RL2
TELRL
ADLC
TELSL
DASND
CI
POL
+5V
S0V
+25V
P2 IMSA-6033B -18Z
P2:B12B-PH, P3:36B-PH
JP25 (10)
JP26 (5)
JW5 (10)
DB1 S1YB40
S1ZB60
PLS
PH3 TLP627
D5 ERA15-04
CR2 TX-D
C10 MC474 250V
ZD7
ZD8
SP8
JW (5) X2
R7 620 1/4W
CML
+26V
JP17 (5)
R1 1W 27K
T2 BT9
R23 22K
R17 47K
C5 PC392 400V
JP18 (5)
ZD2
ZD1
2VX2
R16 10K
R22 10K
C19 CC332
C18 CC104
R19 2K
R27 10K
R28 13K
A-CUT
R26 30K
R21 2.4K
R20 1.3K
R25 2K
R41 22K
SP4
Q1 2SD 2006
R54 10K
R55 100K
C7 4.7μ 50V
R5 130Ω 2W
R6 100Ω 2W
SP11
PH4 TLP621GR
Q5 DTA114YK
JP9 (10)
R53 470
CN2 6-2PMJ
TAD BINATONE
JW4 (10)
JW6 (10)
L5
L4
R2 1W 12K
D1 1SS120
R48
PH2 TLP621GR
C9 MC474 250V
SP6 R3 33K 1W
ZD4 ZD5 11VX2
CN3 4-4PMJ
L11
L9
W8 (10)
W11 (10)
C12 EC16V 10μ
Q2 2SC2603
R64 0Ω
TELRL
R6 150Ω 1/4W
R48 4.7K
R36 100K
R35 100K
C24 CC103
C25 CC103
C21 CC391
R32 100K
JP3 (10)
TELSL
R24 2K
R29 1K
R37 47K
R34 680
Q3 2SK205
DASND
R33 100K
C22 CC391
R39 4.7K
L7
L8
W9 (10)
W10 (10)
P1 B2B-PH
R47 1K
R40 1K
C3 EC10μ 16V
C30 CC104
REF
JW1 (5)
CH1
FG
+5V: JP5 (5) JP7 (5) JP10 (10) JP12 (5) JP16 (10)
S0V: JP15 (10) JP24 (5) JP32 (C)
+26V: JP14 (10) JP31 (C)
REF: JP1 (5) JP2 (5) JP4 (10)
NCU (Germany/Australia Switzerland)
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬

NCU PCB Circuit Diagram (European versions)

① Surge absorber

② Noise filters

③ Line relay (CML relay)

④ Line transformer

⑤ Circuit related to the line transformer

⑥ High-impedance transformer circuit

⑦ Calling signal detector

⑧ Loop current detector

⑨ Dial pulse generator & DC current loop circuit

⑩ Telephone circuit (Not included in the circuit diagram for power failure phone)

⑪ Reference voltage generation circuit for the operational amplifier in ⑤.

⑫ Pulse shaper

⑬ Line current detection input circuit

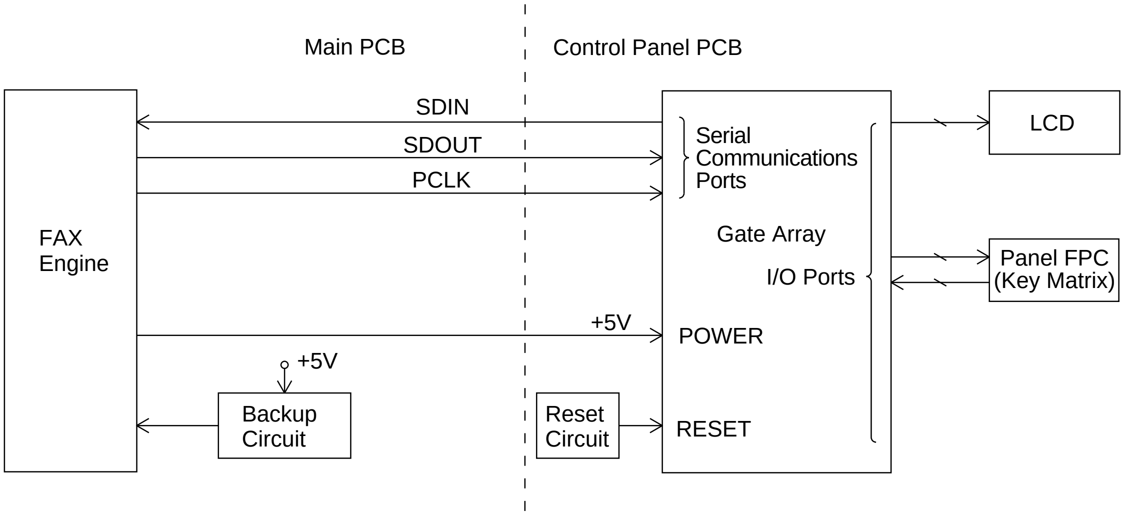
3.4 Control Panel PCB

The control panel PCB and the main PCB communicate with each other by serially transmitting commands and data.

The control panel unit consists of a gate array and LCD, which are controlled by the gate array according to commands issued from the FAX engine on the main PCB.

The calendar clock is backed up by the backup circuit on the main PCB.

The panel FPC is a flexible keyboard PCB which integrates the key matrix having rubber keytops.


Main PCB
Control Panel PCB
FAX Engine
SDIN
SDOUT
PCLK
+5V
+5V
Backup Circuit
Reset Circuit
Serial Communications Ports
Gate Array
I/O Ports
POWER
RESET
LCD
Panel FPC (Key Matrix)

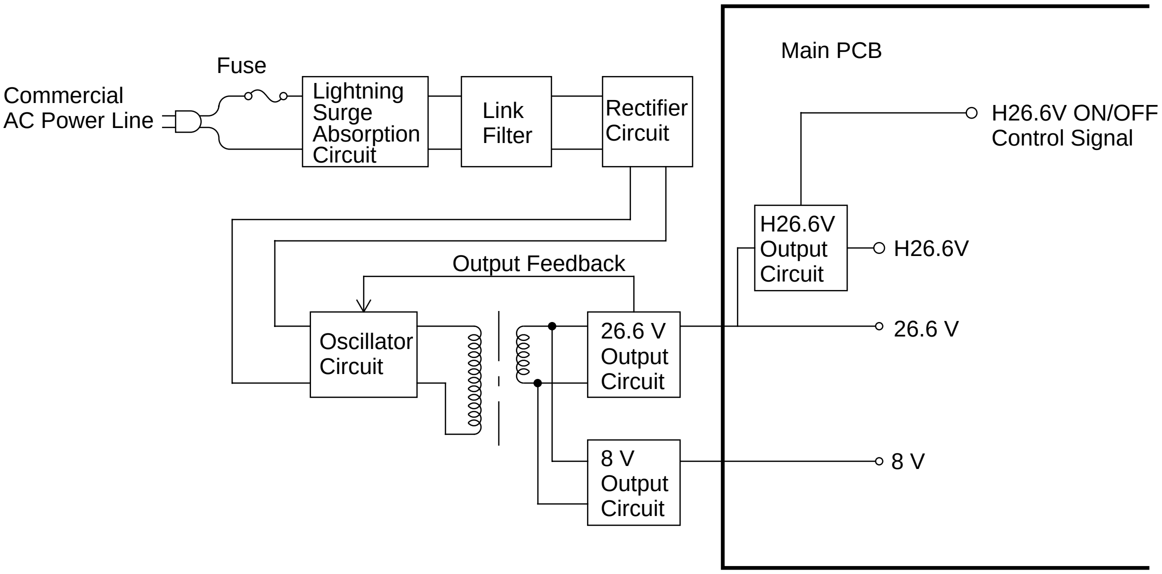
Control Panel PCB and its Related Circuit

3.5 Power Supply PCB

The power supply uses the switching regulation system to generate DC power (+26.6V and +8V) from a commercial AC power supply.

The +26.6V source is stabilized and fed to the motor and solenoid for feeding documents and recording paper or activating the automatic cutter, and also fed to the CIS LED array. It is also fed to the main PCB where the H26.6V source is generated. The H26.6V source outputs 26.6V only when the H26.6V ON/OFF control signal is High, for driving the recording head.

The +8V source is not stabilized and fed to the speaker. It is also fed to the main PCB where the 3-terminal regulator eliminates unstabilized components of the +8V source to generate stabilized +5V source. The +5V source is fed to the logic, control panel, and sensors.


Main PCB
Fuse
Commercial AC Power Line
Lightning Surge Absorption Circuit
Link Filter
Rectifier Circuit
H26.6V ON/OFF Control Signal
H26.6V Output Circuit
H26.6V
Output Feedback
Oscillator Circuit
26.6 V Output Circuit
26.6 V
8 V Output Circuit
8 V

Power Supply Circuit

CHAPTER IV.

DISASSEMBLY/REASSEMBLY AND LUBRICATION

CONTENTS

1. DISASSEMBLY/REASSEMBLY IV-1

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■ Preparation IV-3

■ How to Access the Object Component IV-3

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1.3 Inner Cover IV-8

1.4 Control Panel ASSY IV-9

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1.18 Main PCB, NCU PCB and Power Supply PCB IV-29

1.19 Paper Empty Sensor Actuator IV-33

2. LUBRICATION IV-34

1. DISASSEMBLY/REASSEMBLY

■ Safety Precautions

To prevent the creation of secondary problems by mishandling, observe the following precautions during maintenance work.

(1) Always turn off the power before replacing parts or units. When having access to the power supply, be sure to unplug the power cord from the power outlet.

(2) Be careful not to lose screws, washers, or other parts removed for parts replacement.

(3) When using soldering irons and other heat-generating tools, take care not to damage the resin parts such as wires, PCBs, and covers.

(4) Before handling the PCBs, touch a metal portion of the equipment to discharge static electricity; otherwise, the electronic parts may be damaged due to the electricity charged in your body.

(5) When transporting PCBs, be sure to wrap them in conductive sheets such as aluminum foil.

(6) Be sure to reinsert self-tapping screws correctly, if removed.

(7) Tighten screws to the torque values listed on the next page.

(8) When connecting or disconnecting cable connectors, hold the connector bodies not the cables. If the connector has a lock, always slide the connector lock to unlock it.

(9) Before reassembly, apply the specified lubricant to the specified points. (Refer to Section 2 in this chapter.)

(10) After repairs, check not only the repaired portion but also that the connectors and other related portions function properly before operation checks.

Tightening Torque List

Location	Screw type	Q'ty	Tightening torque (kgf•cm)
Recording paper cover	Taptite, cup B M3x8	2	5 ±2
Panel rear cover	Taptite, cup B M3x8	4	5 ±2
Scanner frame ASSY	Taptite, cup B M3x8	2	5 ±2
Drive unit	Taptite, cup S M3x6 Taptite, cup S M3x8	3 1	7 ±2 7 ±2
Motor	Taptite, cup S M3x6	1	6 ±2
Cutter HP sensor	Taptite, pan B M1.6x8	1	1 ±0.5
Recorder & cutter unit	Taptite, cup S M3x8	1	7 ±2
Bottom plate	Taptite, cup B M3x8	4	5 ±2
Grounding wire	Screw, pan (washer) 4x6DB	1	7 ±2

■ Preparation

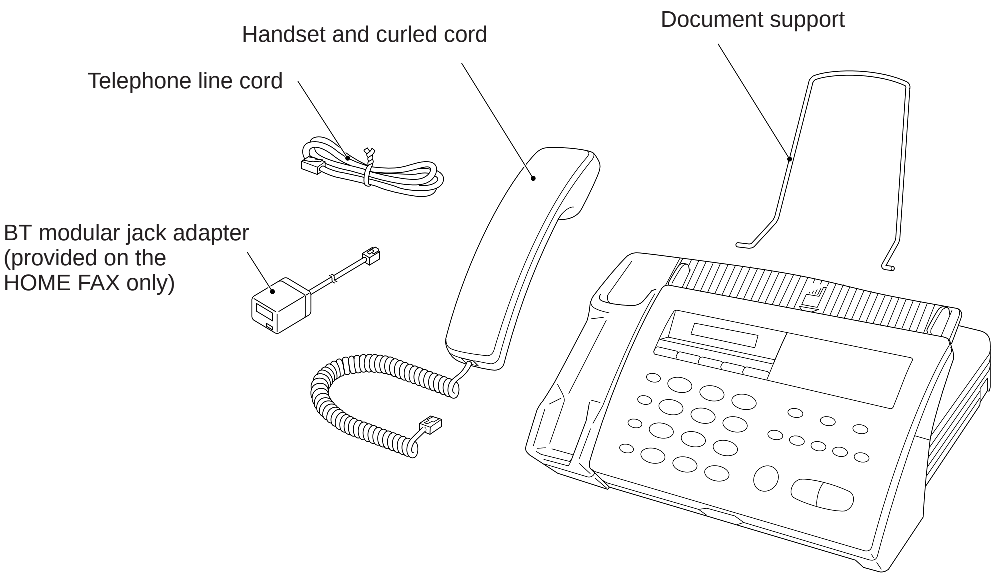
Prior to proceeding to the disassembly procedure,

(1) Unplug

- the modular jack of the telephone line,
- the modular jack of the curled cord (and remove the handset),
- the BT modular jack adapter if mounted, and
- the modular jack of an external telephone set if mounted. (Not shown below.)

(2) Remove

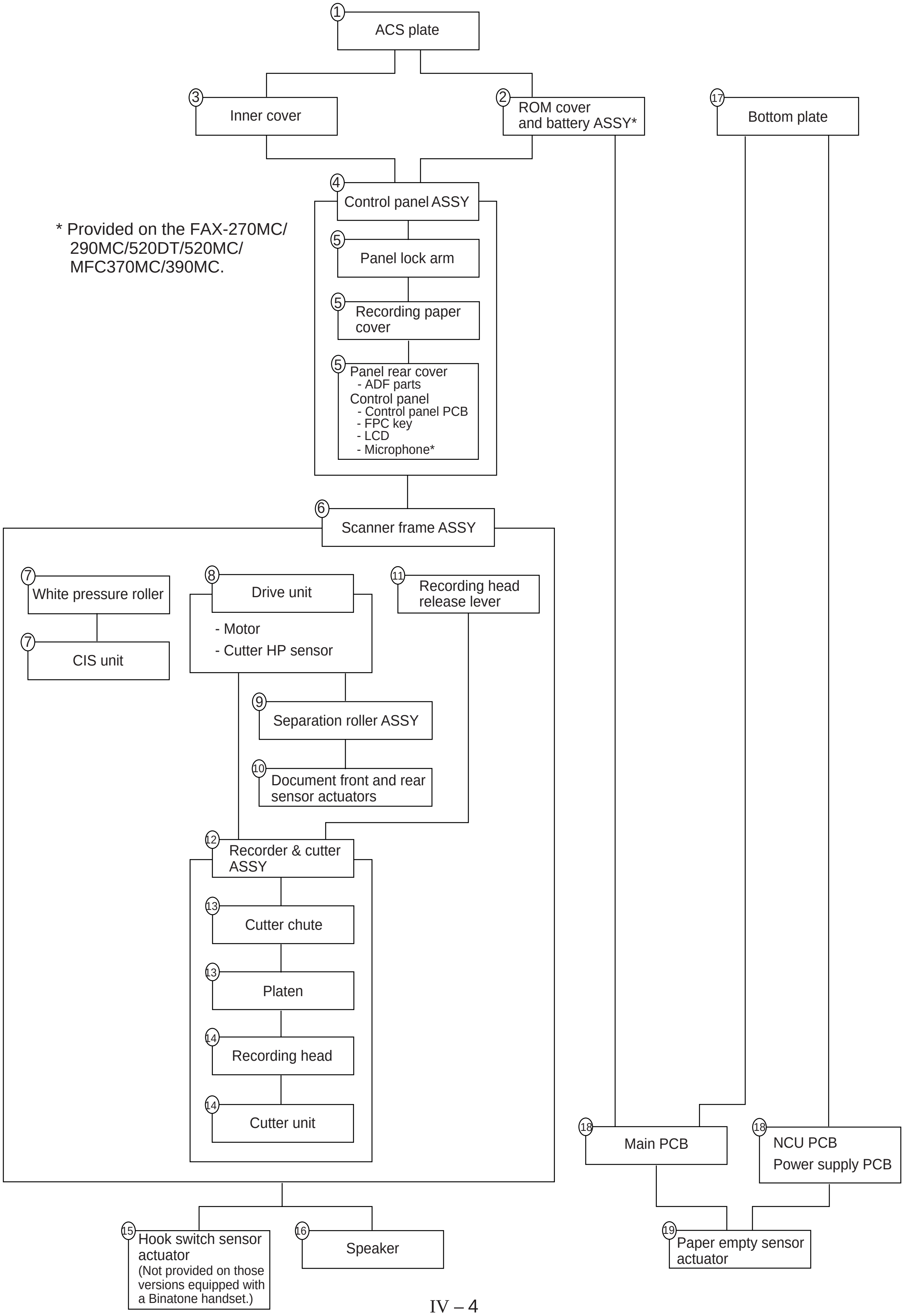
- the document support.


Handset and curled cord
Document support
Telephone line cord
BT modular jack adapter (provided on the HOME FAX only)

■ How to Access the Object Component

- On the next page is a disassembly order flow which helps you access the object component. To remove the recording head, for example, first find it on the flow and learn its number (⑭ in this case). You should remove parts numbered ① through ④, ⑥, ⑧, ⑪, ⑫, and ⑬ so as to access the recording head.
- Unless otherwise specified, the disassembled parts or components should be reassembled in the reverse order of removal.

■ Disassembly Order Flow

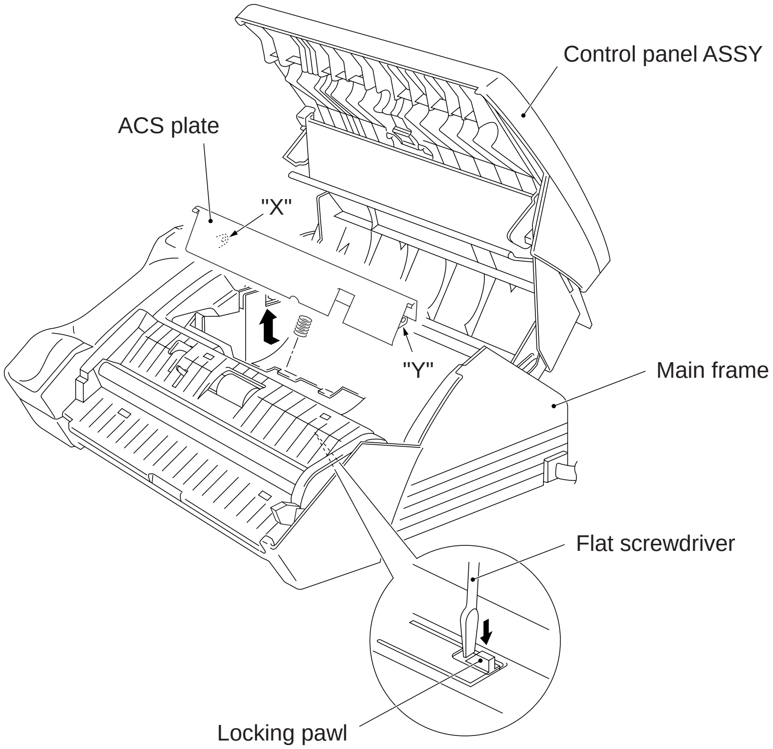

① ACS plate
③ Inner cover
② ROM cover and battery ASSY*
⑰ Bottom plate
④ Control panel ASSY
⑤ Panel lock arm
⑤ Recording paper cover
⑤ Panel rear cover
- ADF parts
Control panel
- Control panel PCB
- FPC key
- LCD
- Microphone*
⑥ Scanner frame ASSY
⑦ White pressure roller
⑦ CIS unit
⑧ Drive unit
- Motor
- Cutter HP sensor
⑪ Recording head release lever
⑨ Separation roller ASSY
⑩ Document front and rear sensor actuators
⑫ Recorder & cutter ASSY
⑬ Cutter chute
⑬ Platen
⑭ Recording head
⑭ Cutter unit
⑱ Main PCB
⑱ NCU PCB
Power supply PCB
⑮ Hook switch sensor actuator
(Not provided on those versions equipped with a Binatone handset.)
⑯ Speaker
⑲ Paper empty sensor actuator

* Provided on the FAX-270MC/
290MC/520DT/520MC/
MFC370MC/390MC.

1.1 ACS Plate

(1) Open the control panel ASSY.

(2) Push down the locking pawl of the main frame with the tip of a flat screwdriver and move the ACS plate to the left.


Control panel ASSY
ACS plate
"X"
"Y"
Main frame
Flat screwdriver
Locking pawl

■ Reassembling Notes

- When installing the ACS plate, first fit hole "X" at the left end of the ACS plate over the left-hand boss provided on the main frame and then fit hole "Y" at the right end over the right-hand boss.

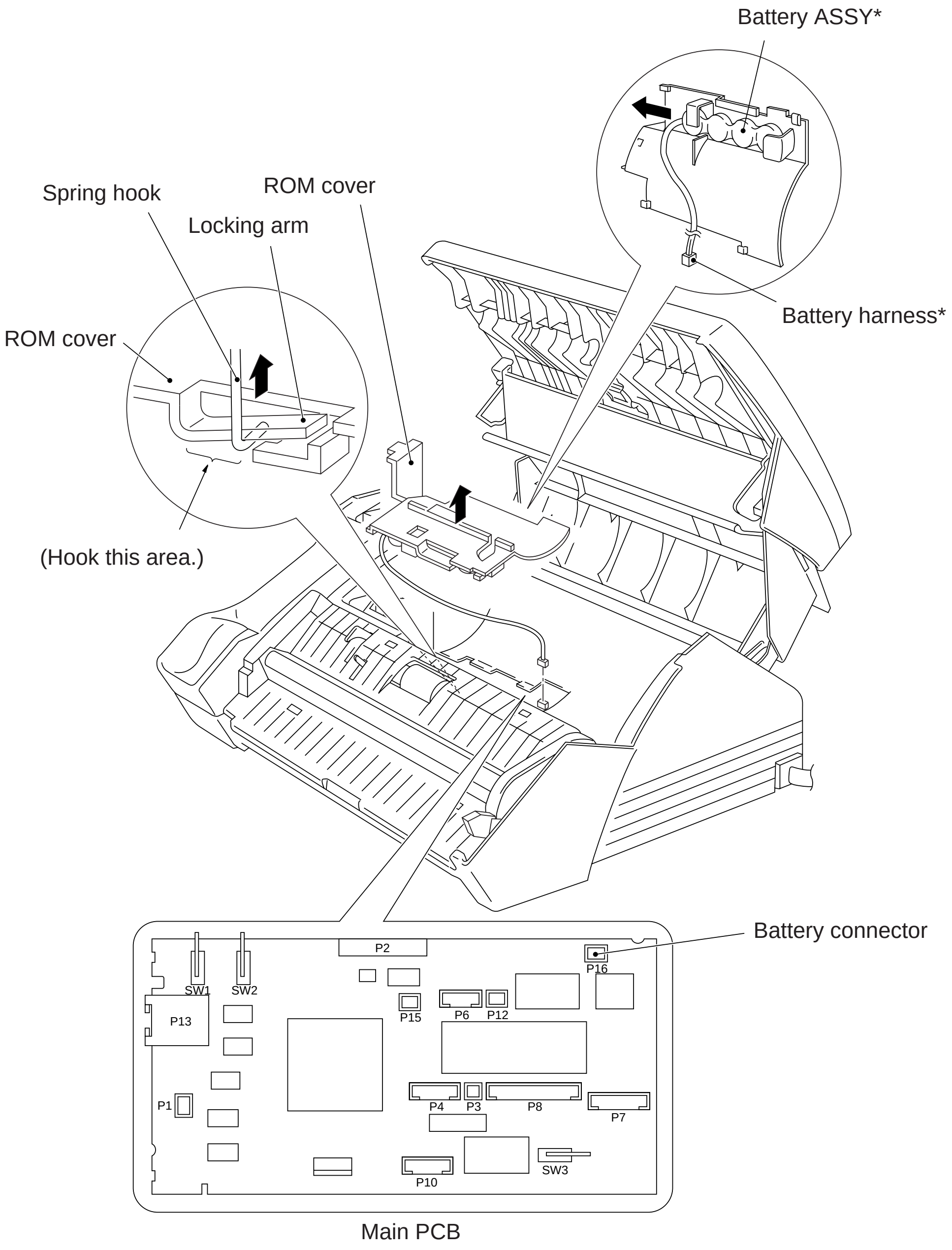
1.2 ROM Cover and Battery ASSY*

(*FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC)

(1) Insert the tip of the spring hook at the center or left half of the locking arm as shown below, then lift up the hook to release and move the ROM cover to the right.

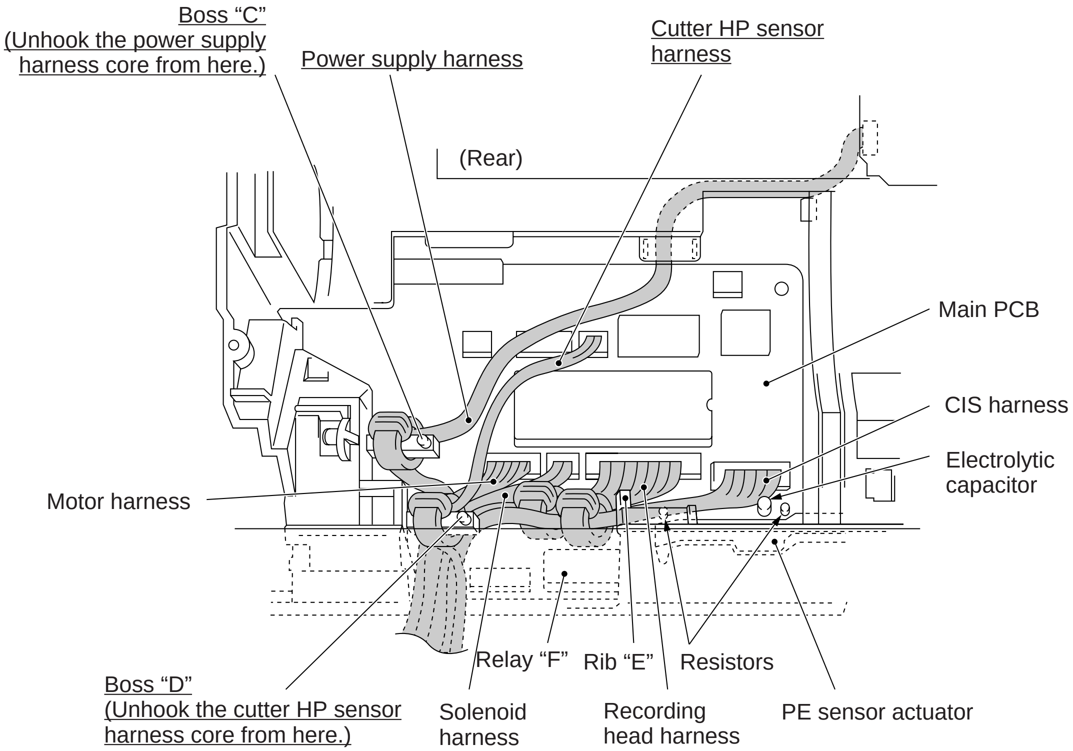
(2) For the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC: Slightly lift up the ROM cover and disconnect the battery harness from the main PCB, then take out the ROM cover together with the battery ASSY.

(3) For the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC: Remove the battery ASSY from the ROM cover.


Battery ASSY*
Spring hook
ROM cover
Locking arm
Battery harness*
ROM cover
(Hook this area.)
Battery connector
P2
P16
SW1
SW2
P15
P6
P12
P13
P1
P4
P3
P8
P7
P10
SW3
Main PCB

(FAX-270MC/290MC/520DT/520MC/
MFC370MC/390MC)

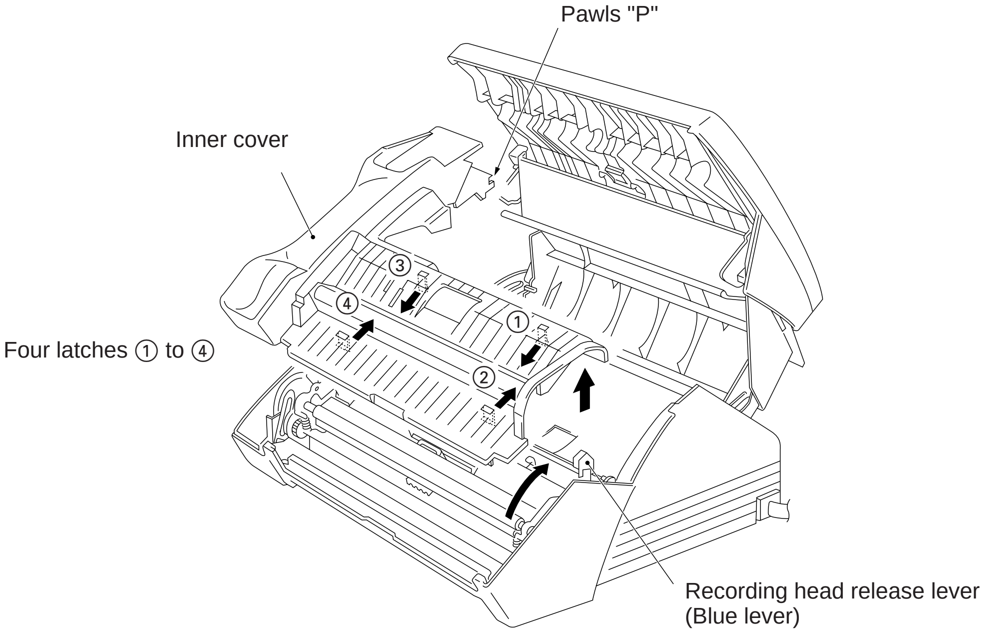
(4) For the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC: To take out the main PCB or the power supply PCB in Section 1.18, unhook the battery harness core and cutter HP sensor harness core from bosses "C" and "D," respectively, at this stage.


Boss "C"
(Unhook the power supply harness core from here.)
Power supply harness
Cutter HP sensor harness
(Rear)
Main PCB
CIS harness
Electrolytic capacitor
Motor harness
Boss "D"
(Unhook the cutter HP sensor harness core from here.)
Relay "F"
Rib "E"
Resistors
Solenoid harness
Recording head harness
PE sensor actuator

1.3 Inner Cover

(1) Swing the recording head release lever (blue lever) up to the head release position.

(2) While lifting up the inner cover slightly, release the four latches with the tip of a flat screwdriver in the order (① to ④) shown below.


Pawls "P"
Inner cover
Four latches ① to ④
③
④
①
②
Recording head release lever
(Blue lever)

■ Reassembling Notes

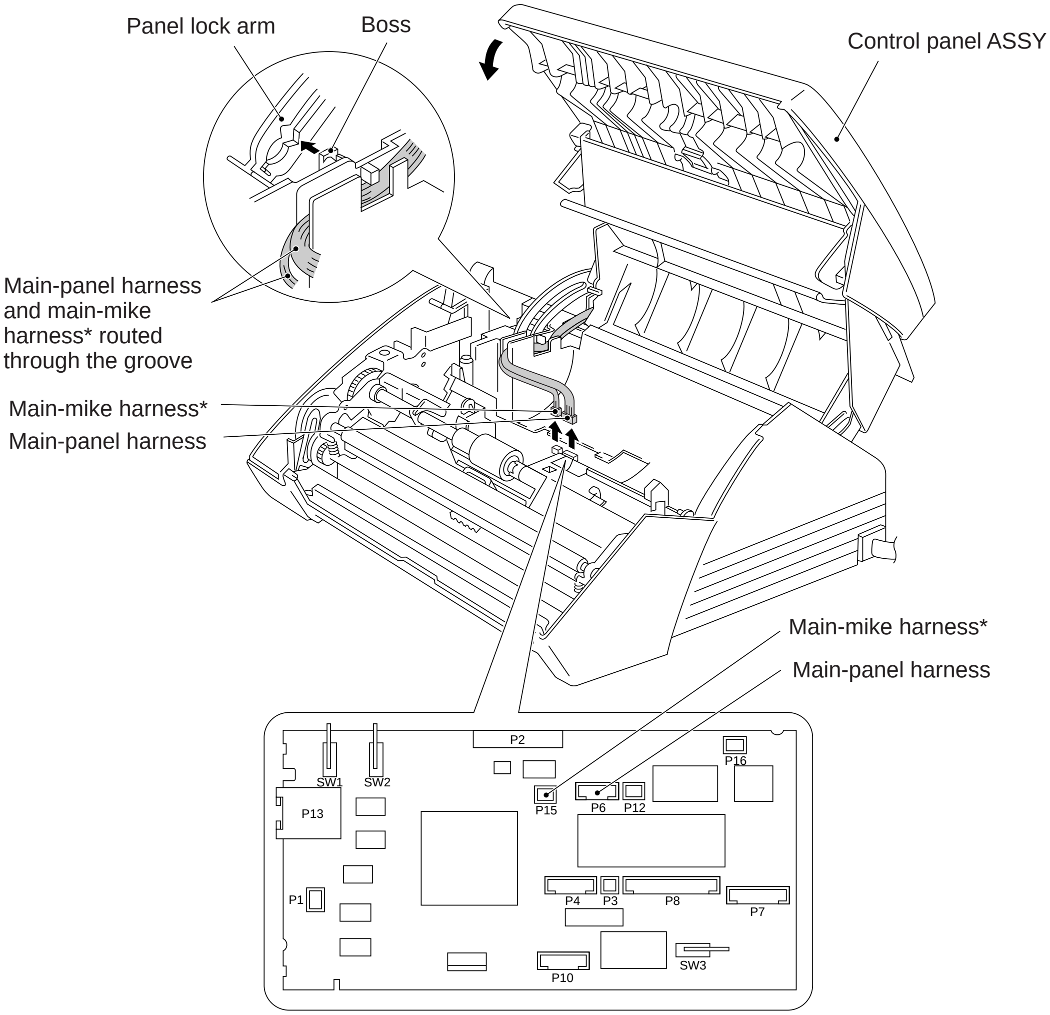
- Before installing the inner cover, swing the recording head release lever up for greater ease.
- Fit the pawls "P" of the inner cover into the square hole provided in the left rear corner of the main frame and then push the inner cover down into place.

1.4 Control Panel ASSY

(1) Disconnect the main-panel harness and the main-mike harness* from the main PCB, and then take out those harnesses from the groove of the main frame.

(2) Slightly bring the control panel ASSY back up towards you so that you can release the panel lock arm from the boss of the main frame. Pull out the panel lock arm to the left and fully open the control panel ASSY.

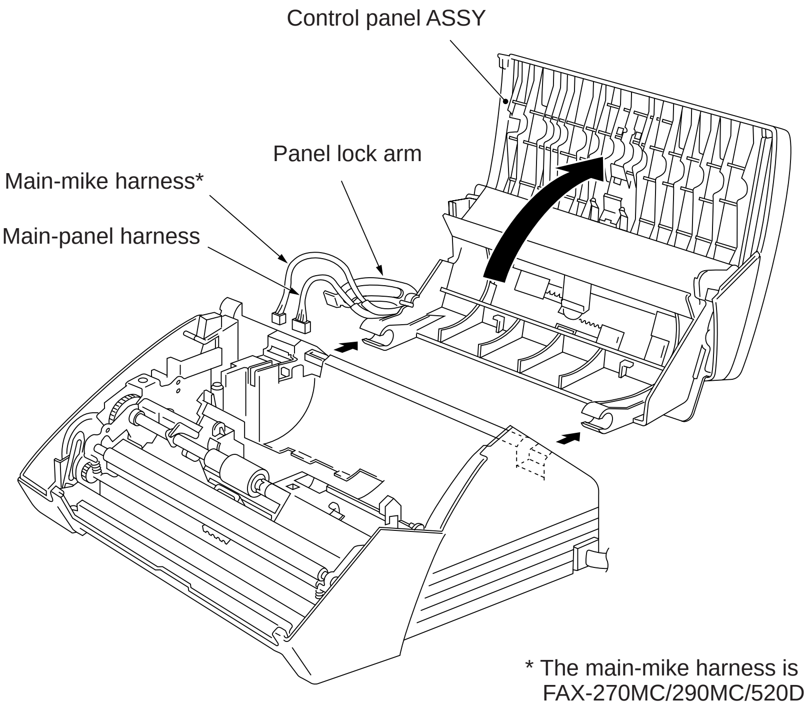
* The main-mike harness is provided on the FAX-270MC/290MC/520DT/520MC/ MFC370MC/390MC.


Panel lock arm
Boss
Control panel ASSY
Main-panel harness and main-mike harness* routed through the groove
Main-mike harness*
Main-panel harness
Main-mike harness*
Main-panel harness
P2
P16
SW1
SW2
P15
P6
P12
P13
P1
P4
P3
P8
P7
P10
SW3

(Main PCB)

(FAX-270MC/290MC/520DT/520MC/
MFC370MC/390MC)

(3) Push the control panel ASSY back and remove it.


Control panel ASSY
Panel lock arm
Main-mike harness*
Main-panel harness

* The main-mike harness is provided on the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC.

■ Reassembling Notes

- Make sure that the main-panel harness and main-mike harness* are routed through the groove provided on the recording paper cover and are kept in place with the panel lock arm, as illustrated on page IV-13.

1.5 Recording Paper Cover, Panel Rear Cover, Control Panel and Microphone*

(1) Place the control panel ASSY upside down.

(2) Turn the panel lock arm until the cutout provided in it becomes aligned with the boss of the arm support, then pull it out to the left.

(3) Remove the two screws "a" from the recording paper cover and lift up the rear edge of the cover.

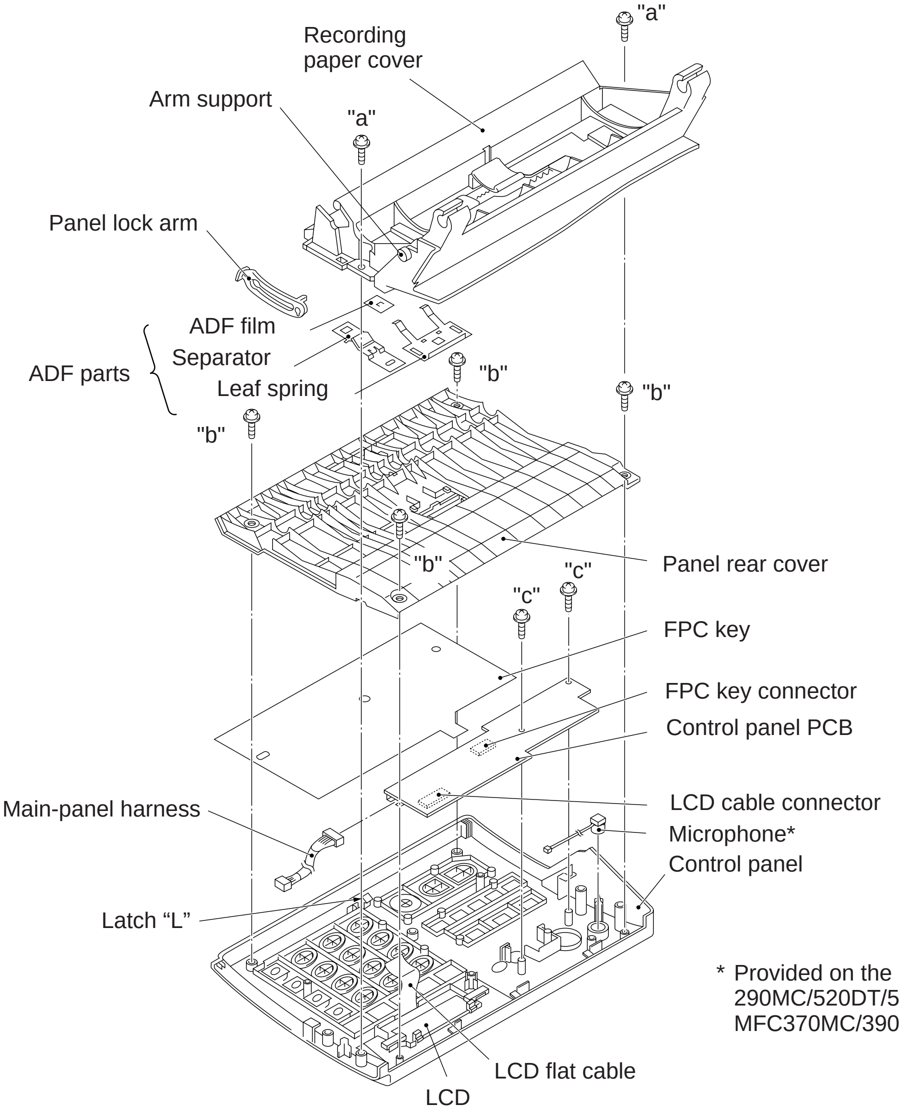
(4) Remove the ADF parts (ADF film, separator and leaf spring), using the spring hook and a flat screwdriver. Once removed, they will become unusable and new parts should have to be put back in.

(5) Remove the four screws "b" from the panel rear cover, then unhook the latch "L" and lift up the cover.

(6) For the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC: Remove the two screws "c" from the control panel PCB.

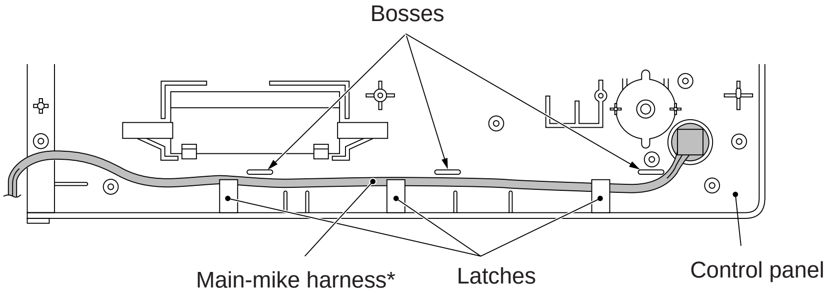
Unlock the LCD cable connector and disconnect the LCD flat cable to take out the control panel PCB and the FPC key.

(7) To separate the FPC key from the control panel PCB, unlock the FPC key connector and disconnect the FPC key.


"a"
Recording paper cover
Arm support
"a"
Panel lock arm
ADF film
Separator
ADF parts
Leaf spring
"b"
"b"
"b"
"b"
Panel rear cover
"c"
"c"
FPC key
FPC key connector
Control panel PCB
Main-panel harness
LCD cable connector
Microphone*
Control panel
Latch "L"
LCD flat cable
LCD

* Provided on the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC.

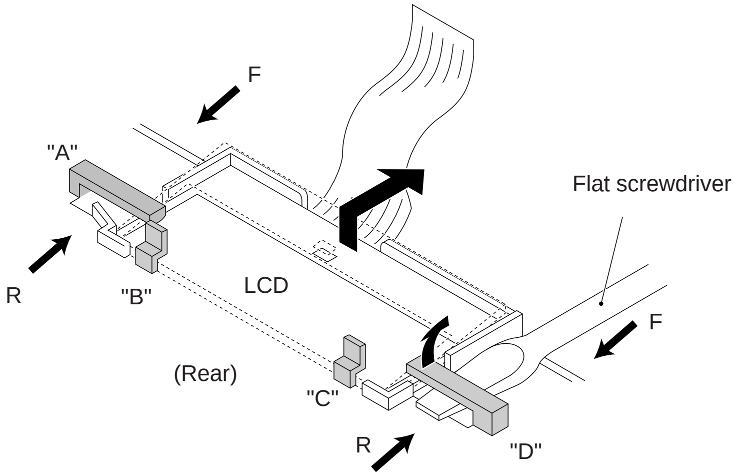
(8) For the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC: Take out the microphone* and its harness* from the control panel.



* Provided on the FAX-270MC/290MC/520DT/520MC/ MFC370MC/390MC.

(9) To take out the LCD, remove the control panel PCB and the FPC key in step (6). As shown below, insert the tip of a flat screwdriver under clamp "D" in the direction of arrow F and push up clamp "D" slightly to release the LCD from clamp "C." In the same way, insert the screwdriver under clamp "A" to release the LCD from clamp "B."

Then push out the LCD with your fingers in the direction of arrow R.

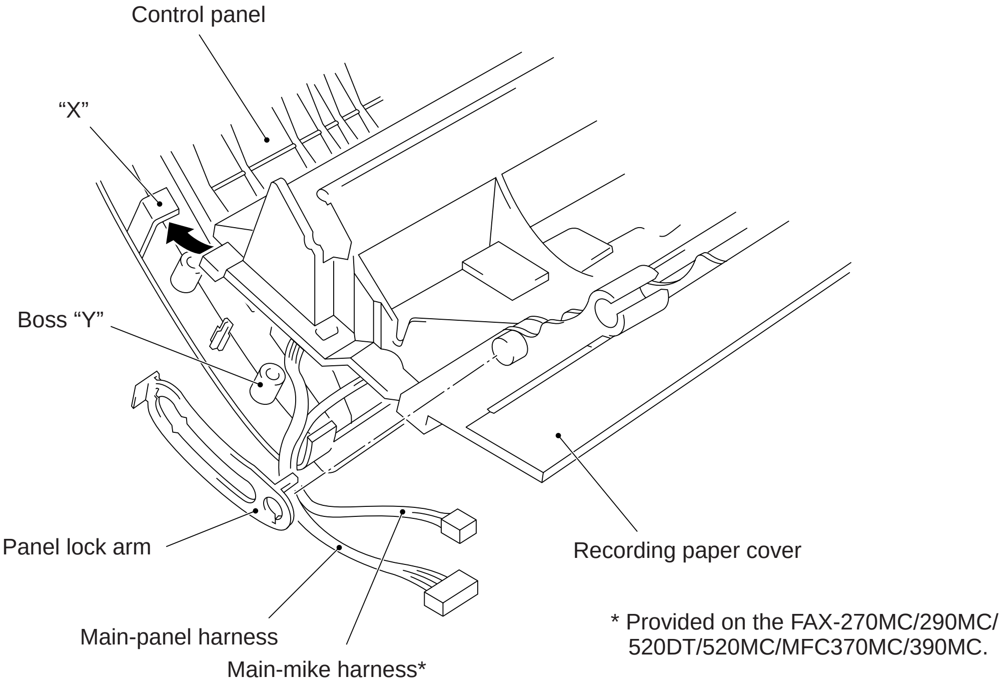


■ Reassembling Notes

- To put the LCD back into place, insert the tip of a flat screwdriver under clamp "D" (see the above illustration) in the direction of arrow R, push up clamp "D" slightly, and then put the right edge of the LCD under clamp "D." In the same way, insert the screwdriver under clamp "A" to put the left edge of the LCD under clamp "A."

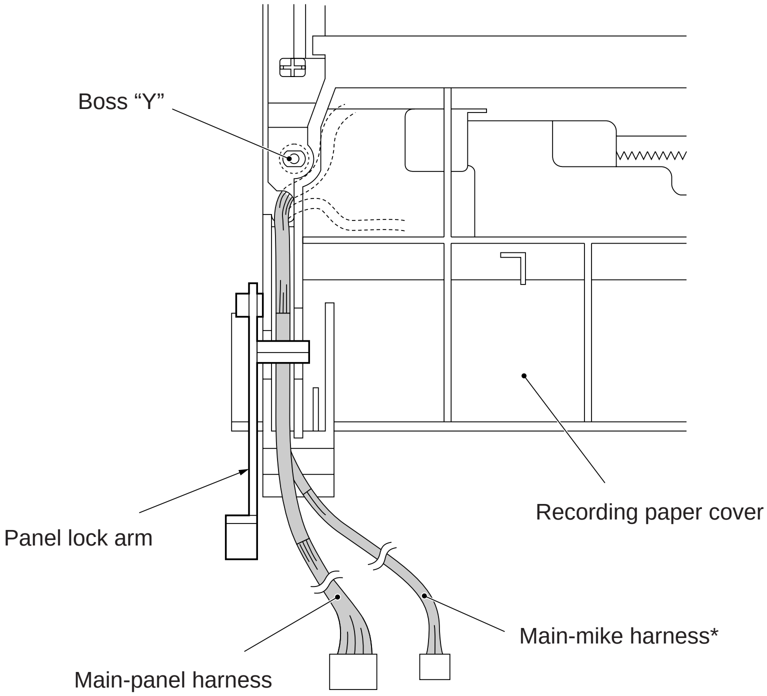
  Then push the LCD into place with your fingers in the direction of arrow F.
- When installing the LCD, take care not to scratch or damage the cover sheet. Replace it if scratched or damaged.
- A new LCD is covered with a protection sheet. Before installing it, remove the protection sheet.

- When setting the recording paper cover on the control panel, first insert the right and left front corners under sections "X" of the control panel and put the cover into place. Make sure that the main-panel harness and main-mike harness* are routed as shown below.


Control panel
"X"
Boss "Y"
Panel lock arm
Recording paper cover
Main-panel harness
Main-mike harness*

* Provided on the FAX-270MC/290MC/
520DT/520MC/MFC370MC/390MC.

- After securing the recording paper cover with the screws, be sure to route the main-panel harness and the main-mike harness* through the groove provided on the recording paper cover and then set the panel lock arm to keep those harnesses in place, as illustrated below.


Boss "Y"
Recording paper cover
Panel lock arm
Main-mike harness*
Main-panel harness

1.6 Scanner Frame ASSY

(1) Be sure to swing the recording head release lever (blue lever) down to the front position.

(2) Remove the two screws.

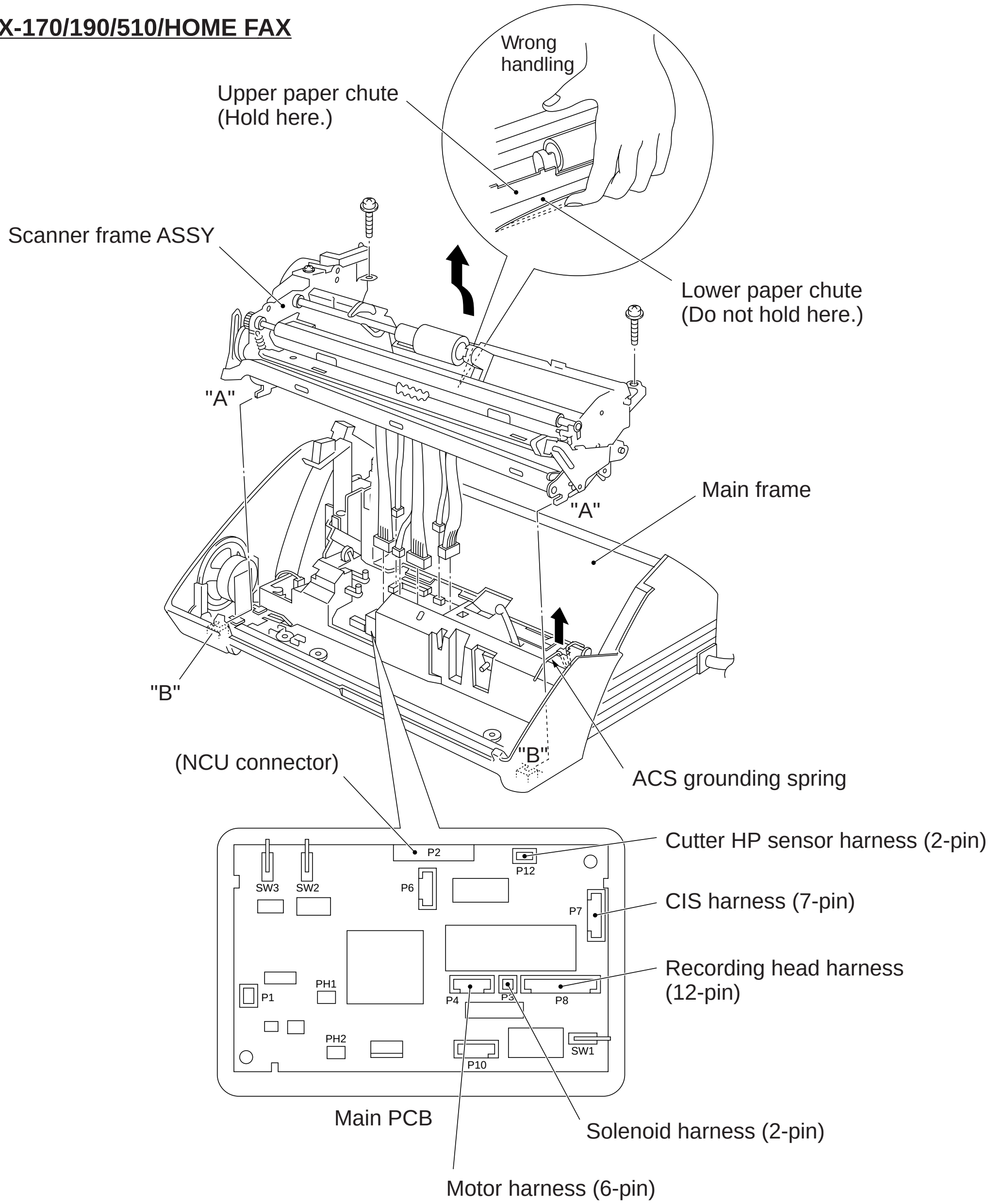
(3) Slightly lift up the rear edge of the scanner frame ASSY and disconnect the following five harnesses from the main PCB:

- Cutter home position (HP) sensor harness (2-pin)
- CIS harness (7-pin)
- Recording head harness (12-pin)
- Solenoid harness (2-pin)
- Motor harness (6-pin)

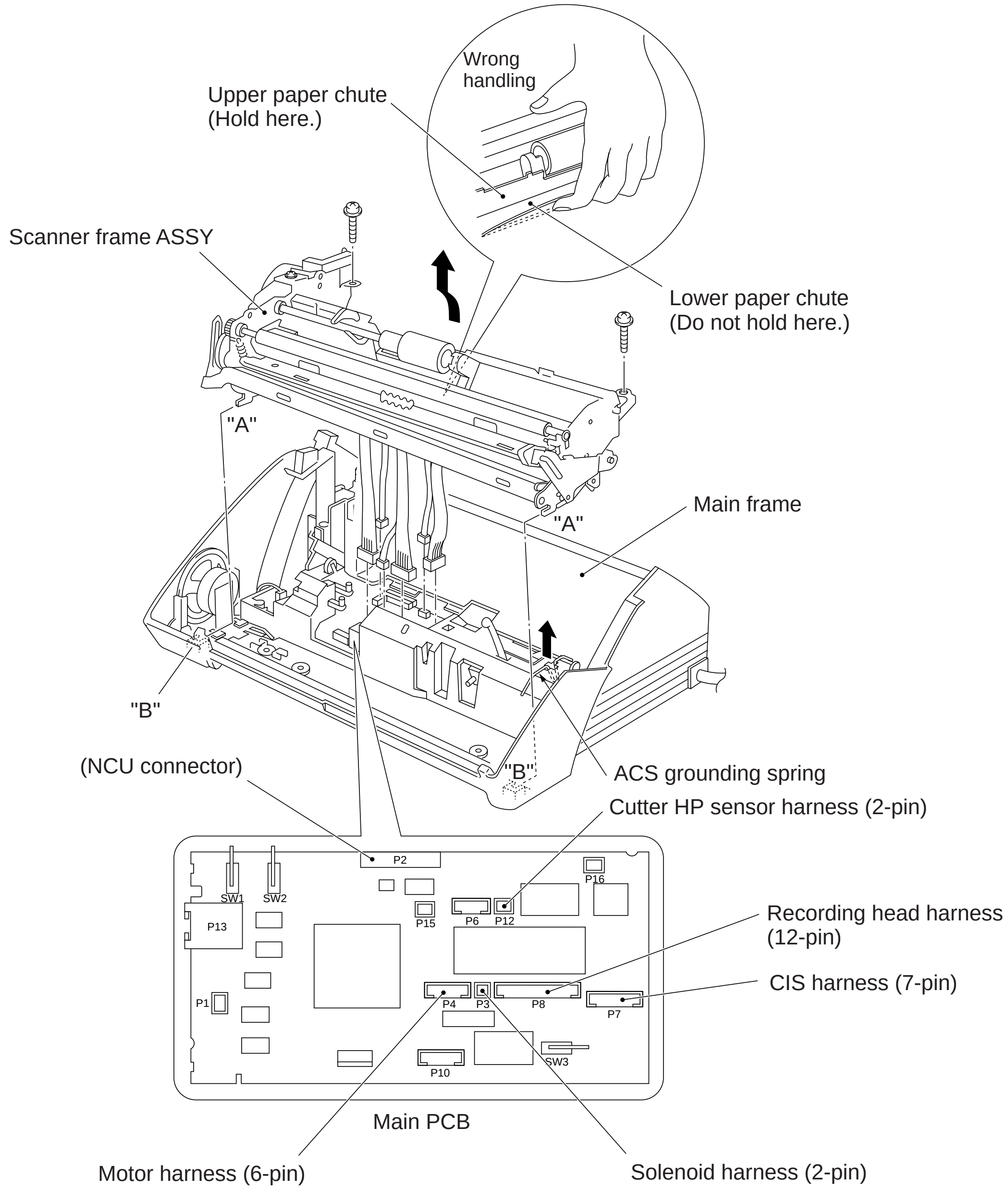
(4) Lift up the scanner frame ASSY from the rear and take it out from the main frame.

NOTE: Do not hold the lower paper chute but the upper paper chute. The lower paper chute is easily deformed.

FAX-170/190/510/HOME FAX


Wrong handling
Upper paper chute (Hold here.)
Scanner frame ASSY
Lower paper chute (Do not hold here.)
"A"
"A"
Main frame
"B"
"B"
(NCU connector)
ACS grounding spring
Cutter HP sensor harness (2-pin)
CIS harness (7-pin)
Recording head harness (12-pin)
P2
P12
SW3
SW2
P6
P7
P1
PH1
P4
P3
P8
PH2
P10
SW1
Main PCB
Solenoid harness (2-pin)
Motor harness (6-pin)

FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC

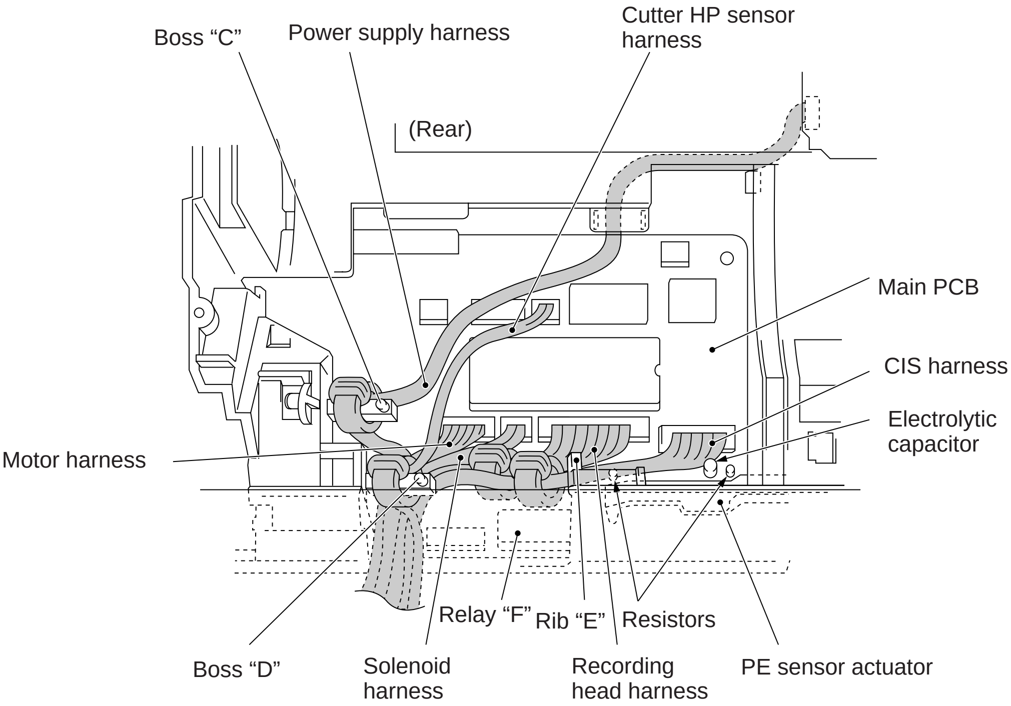

Wrong handling
Upper paper chute (Hold here.)
Scanner frame ASSY
Lower paper chute (Do not hold here.)
"A"
"A"
Main frame
"B"
(NCU connector)
"B"
ACS grounding spring
Cutter HP sensor harness (2-pin)
P2
SW1
SW2
P16
P13
P15
P6
P12
Recording head harness (12-pin)
P1
P4
P3
P8
P7
CIS harness (7-pin)
P10
SW3
Main PCB
Motor harness (6-pin)
Solenoid harness (2-pin)

(5) Lift up the ACS grounding spring.

■ Reassembling Notes

- Before putting the scanner frame ASSY back onto the main frame, be sure to set the ACS grounding spring as illustrated on the previous page.
- Make sure that tabs "A" of the scanner frame ASSY are fitted in cutouts "B" provided in the main frame. (See the illustration on the previous page.)
- For the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC: After putting the scanner frame ASSY back onto the main frame, route the harnesses and arrange the cores as follows, referring to the illustration below.
  - Hook the power supply harness core on boss "C."
  - Check that the cutter HP sensor harness runs through a core, and then hook the core on boss "D."
  - Push the CIS harness core and the recording head harness core into position, to the left of rib "E" and behind relay "F."
  - Route all these harnesses under boss "D."

  If any of these harnesses and cores are out of the specified position, the scanner frame ASSY or ROM cover may not be put back into place.
- For the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC: After connecting these harnesses, check that neither the electrolytic capacitor nor resistors are tilted towards the PE sensor actuator. If tilted, they may interfere with normal operation of the sensor actuator.

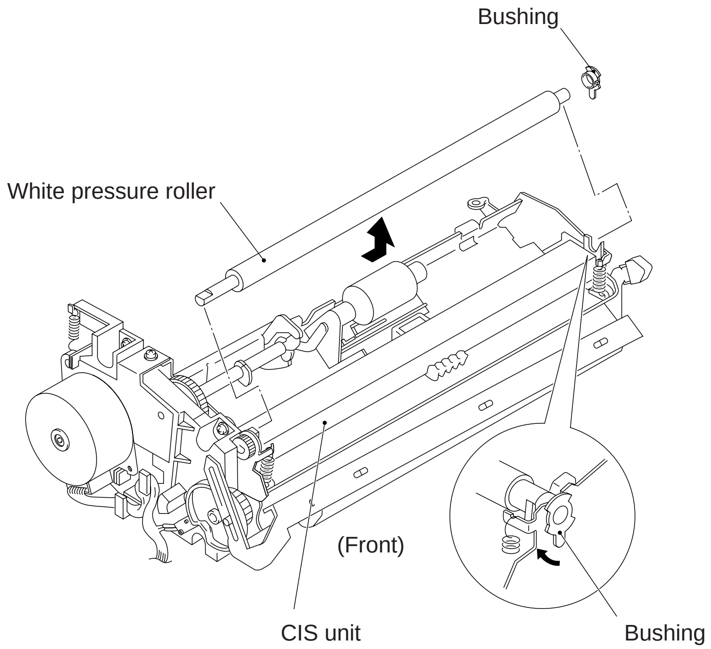

Boss "C"
Power supply harness
Cutter HP sensor harness
(Rear)
Main PCB
CIS harness
Electrolytic capacitor
Motor harness
Relay "F"
Rib "E"
Resistors
Boss "D"
Solenoid harness
Recording head harness
PE sensor actuator

(FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC)

1.7 White Pressure Roller and CIS Unit

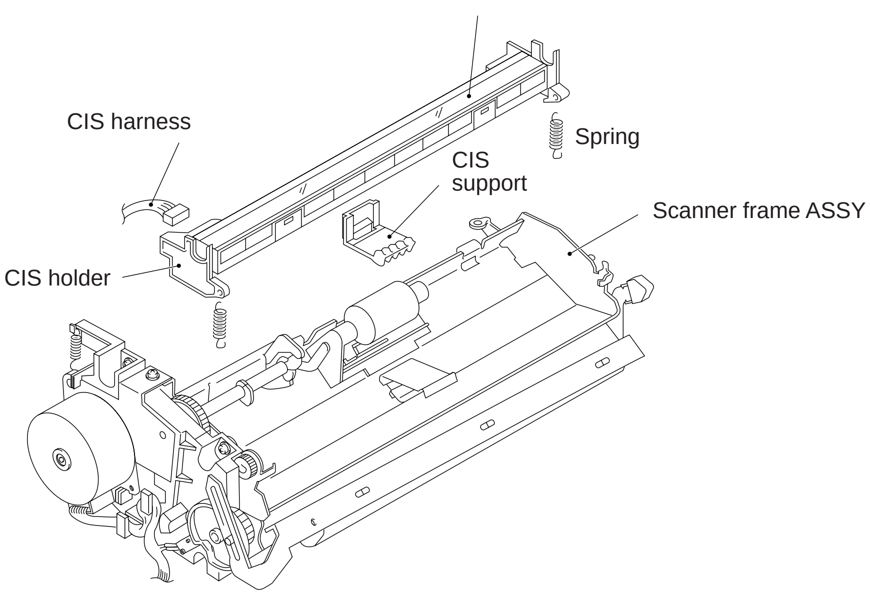
(1) Turn the bushing of the white pressure roller clockwise approx. 90° and pull it out to the right.

(2) Lift up the left end of the white pressure roller and push it to the right.


Bushing
White pressure roller
(Front)
CIS unit
Bushing

(3) Unhook the two springs, using the spring hook.

(4) Slightly lift up the CIS unit and disconnect the CIS harness. The CIS support also comes off.


CIS unit
CIS harness
Spring
CIS
support
Scanner frame ASSY
CIS holder

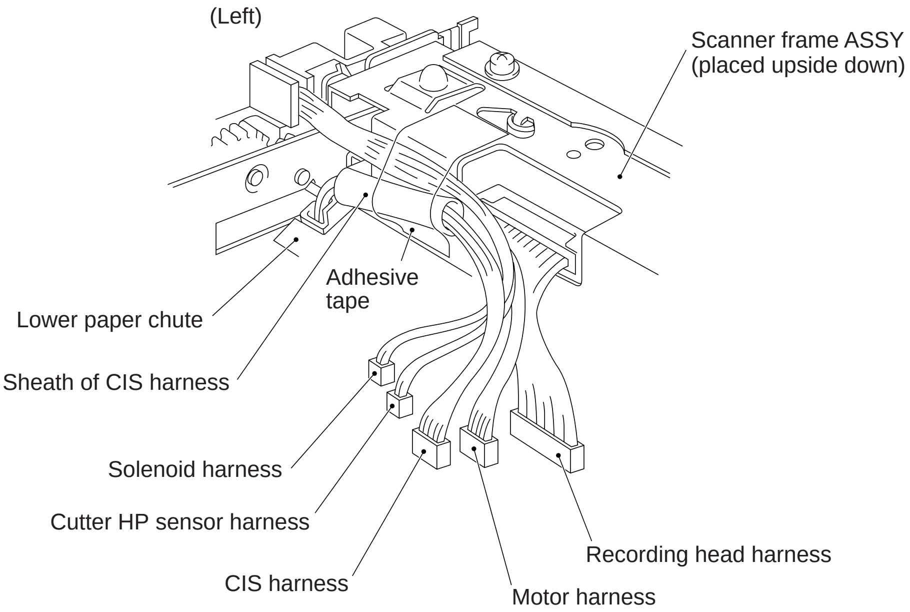
■ Reassembling Notes

- Before putting the white pressure roller back into place, wipe it with an alcohol-dampened cloth.
- When replacing the CIS unit, remove the CIS holders (secured with screws) from the old CIS unit and install them to a new CIS unit.

1.8 Drive Unit (Main Motor and Cutter HP Sensor)

(1) Turn the scanner frame ASSY upside down.

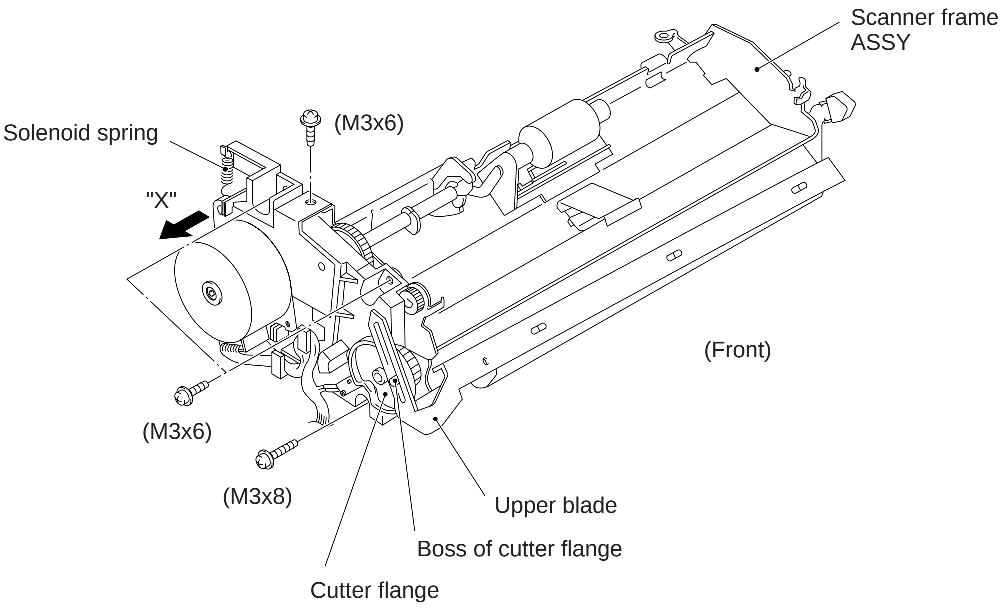
(2) Remove the adhesive tape to release the CIS harness, motor harness, solenoid harness, and cutter HP sensor harness.


(Left)
Scanner frame ASSY (placed upside down)
Adhesive tape
Lower paper chute
Sheath of CIS harness
Solenoid harness
Cutter HP sensor harness
CIS harness
Recording head harness
Motor harness

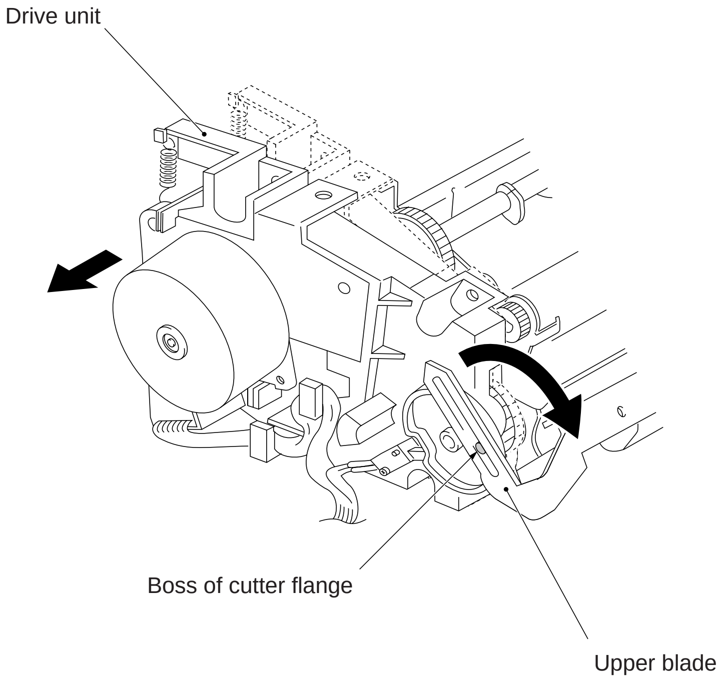
(3) Place the scanner frame ASSY rightside up.

(4) Remove the four screws.

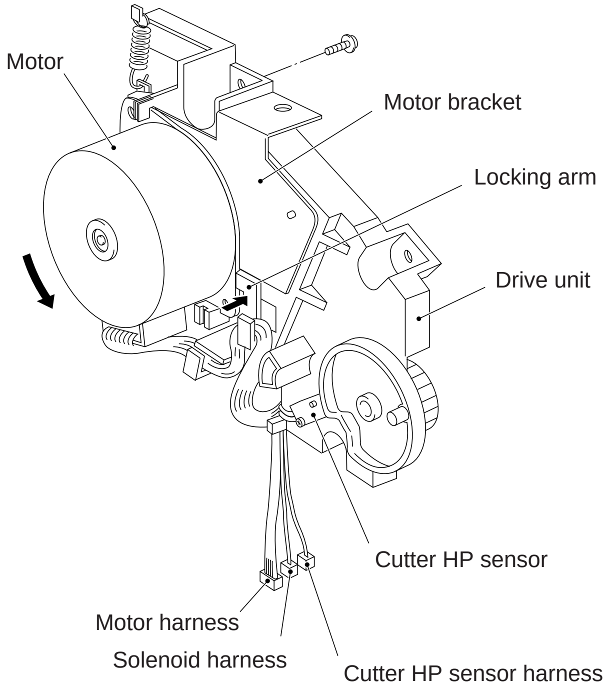
(5) Fully turn the cutter flange clockwise. Hold the drive unit with your left hand and then slightly separate its rear edge from the scanner frame ASSY in the direction of arrow "X" in order to release the boss of the cutter flange from the upper blade.


Scanner frame ASSY
Solenoid spring
(M3x6)
"X"
(Front)
(M3x6)
(M3x8)
Upper blade
Boss of cutter flange
Cutter flange

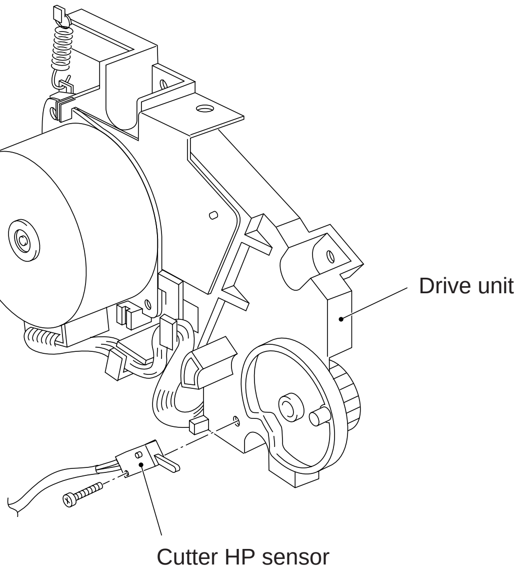
(6) After releasing the boss of the cutter flange from the upper blade, turn the upper blade clockwise as shown below and take the drive unit off from the scanner frame ASSY.


Drive unit
Boss of cutter flange
Upper blade

(7) To take out the motor, remove the screw, lightly press the locking arm and turn the motor counterclockwise. The motor bracket also comes off.

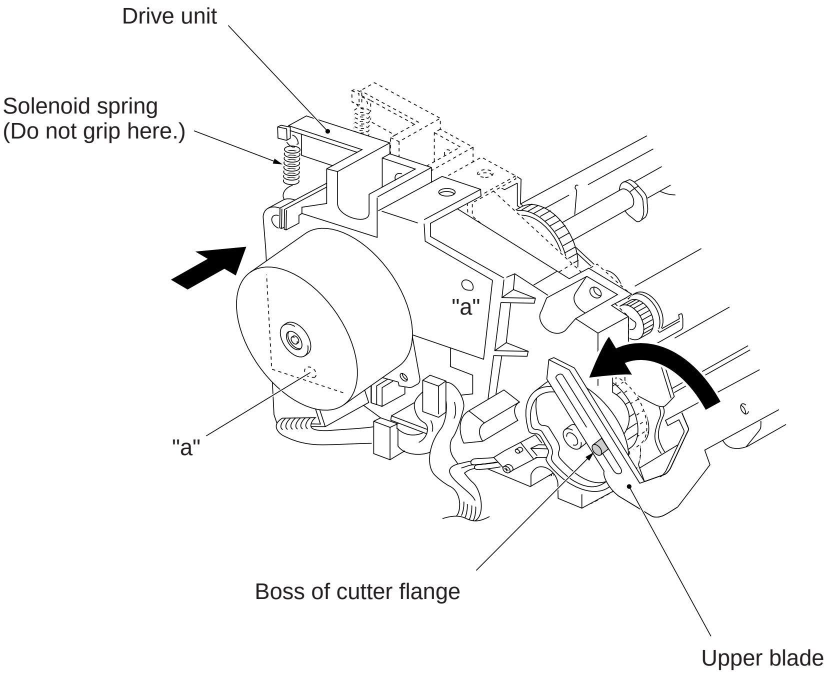

Motor
Motor bracket
Locking arm
Drive unit
Cutter HP sensor
Motor harness
Solenoid harness
Cutter HP sensor harness

(8) To take out the cutter HP sensor, remove the screw.


Drive unit
Cutter HP sensor

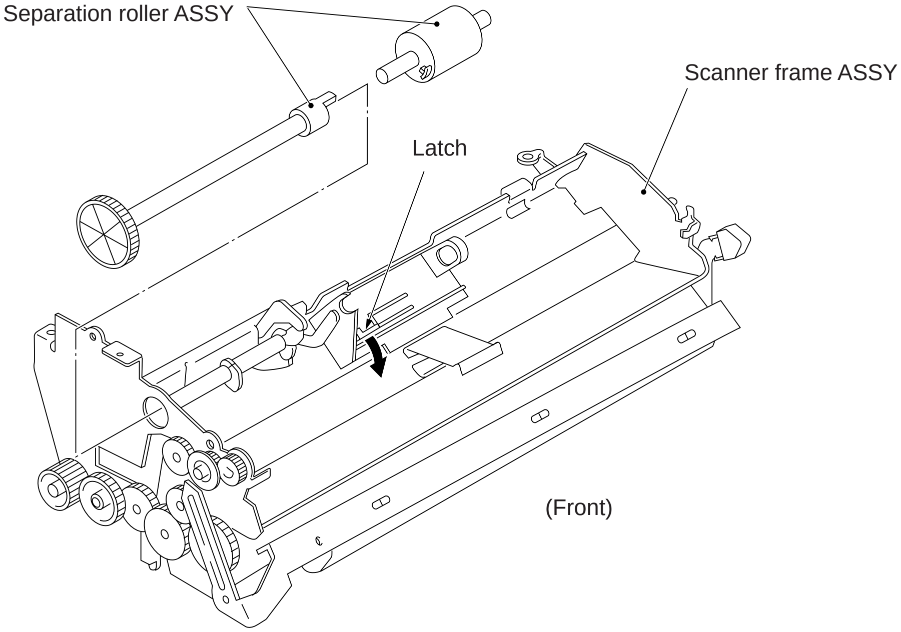
Reassembling Notes

- When installing the motor bracket, fit the two holes "a" over the positioning bosses provided on the drive unit.
- Make sure that the locking arm clamps the motor.
- When installing the drive unit to the scanner frame ASSY, hold the resin part of the drive unit, taking care not to grip the solenoid spring. Fully turn the cutter flange clockwise and turn the upper blade to the angle shown below, and then fit the boss of the cutter flange into the hole of the upper blade.


Drive unit
Solenoid spring
(Do not grip here.)
"a"
"a"
Boss of cutter flange
Upper blade

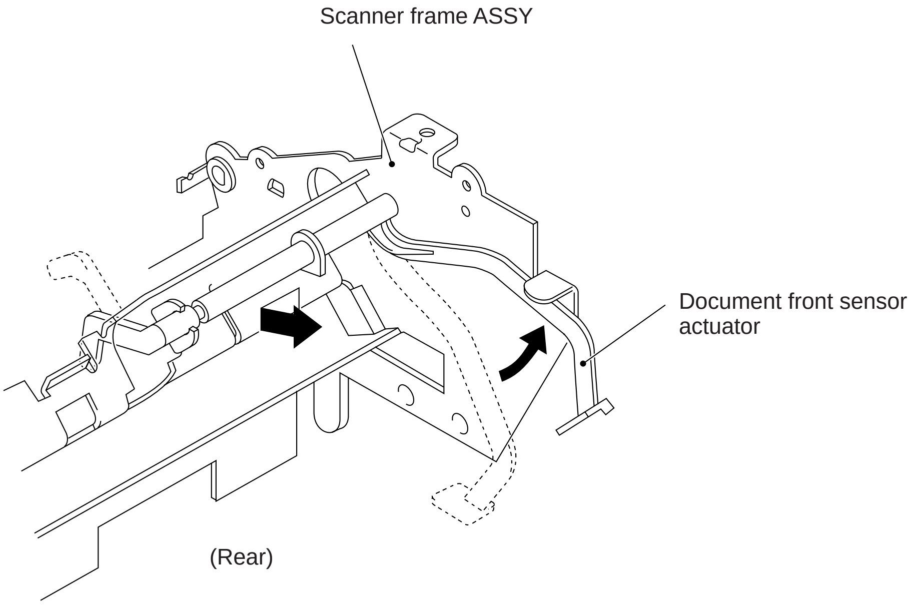
1.9 Separation Roller ASSY

(1) Push down the latch with the tip of a flat screwdriver and move the separation roller ASSY to the left. Then remove the roller to the right and pull out the roller shaft to the left.

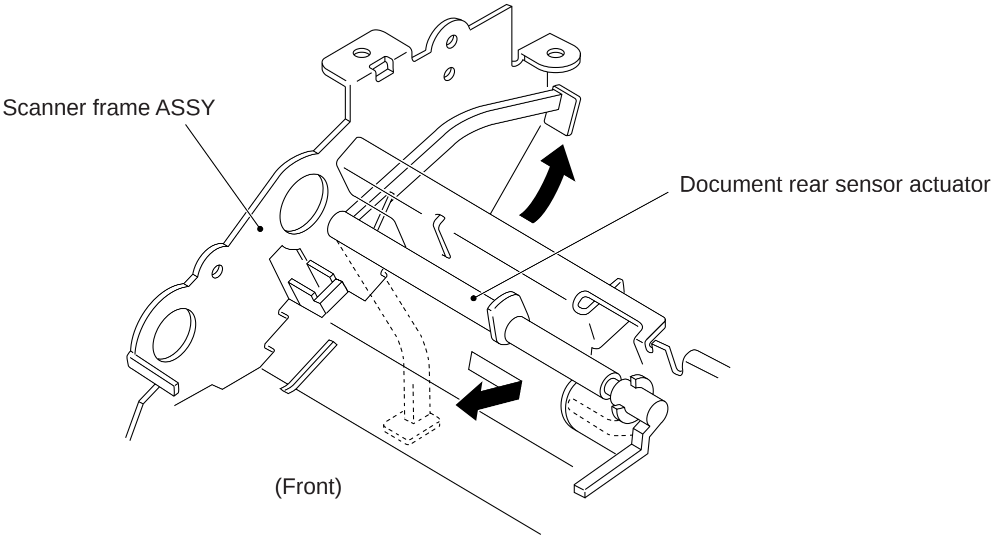

Separation roller ASSY
Scanner frame ASSY
Latch
(Front)

1.10 Document Front and Rear Sensor Actuators

(1) Turn the document front sensor actuator as shown below and move it to the left (viewed from the rear).


Scanner frame ASSY
Document front sensor actuator
(Rear)

(2) Turn the document rear sensor actuator as shown below and move it to the right (viewed from the front).

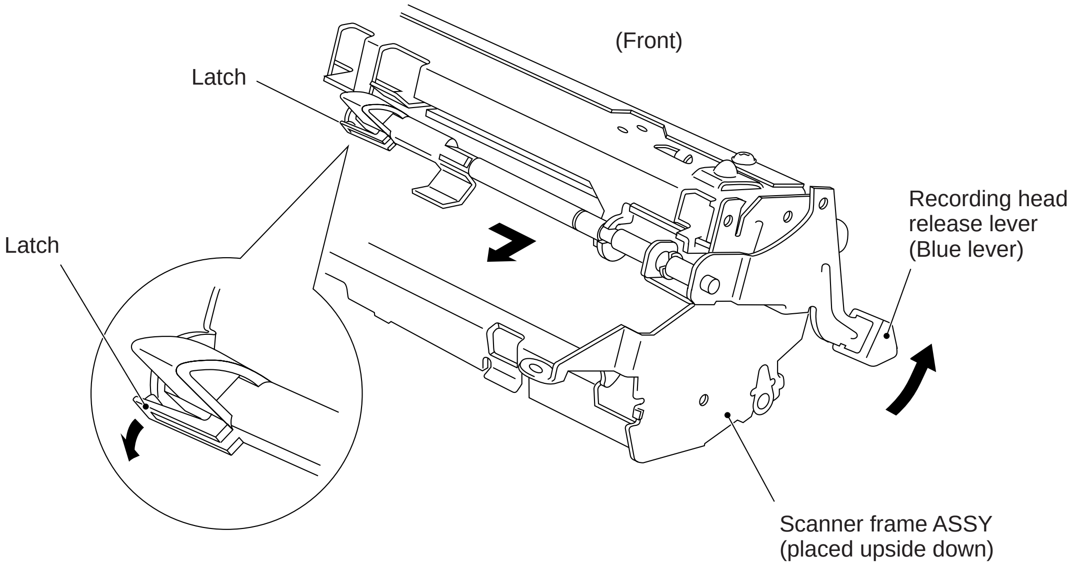

Scanner frame ASSY
Document rear sensor actuator
(Front)

1.11 Recording Head Release Lever

(1) Place the scanner frame ASSY upside down.

(2) Swing the recording head release lever as shown below.

(3) Release the latch and remove the recording head release lever.

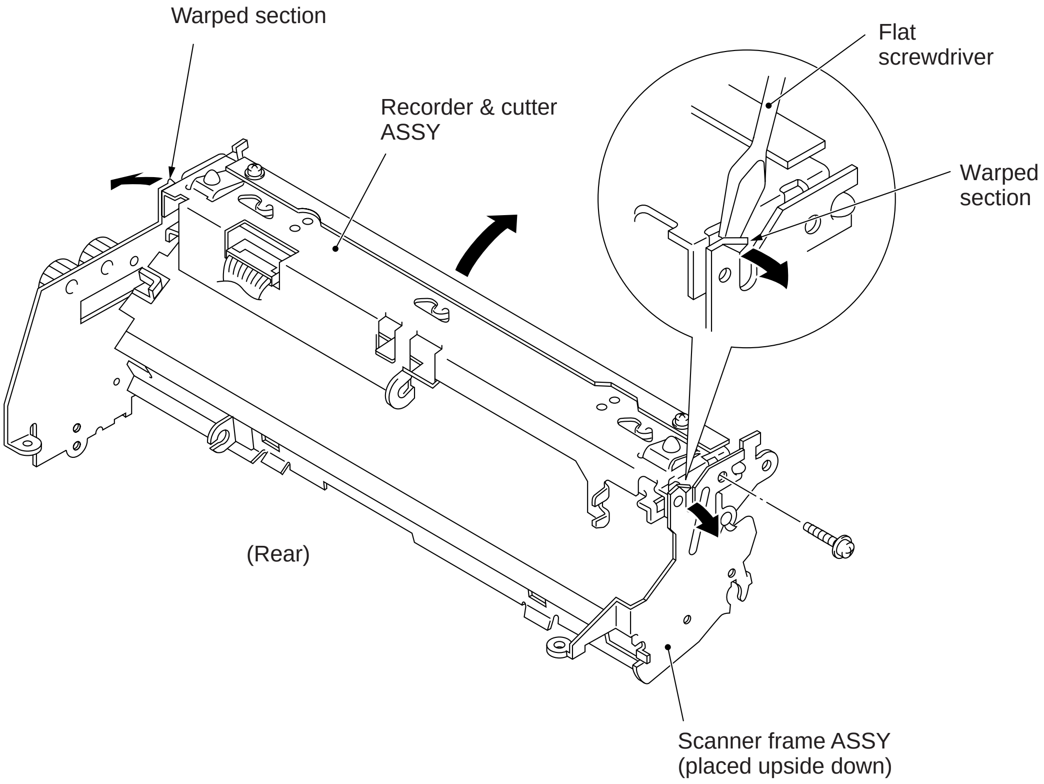

(Front)
Latch
Latch
Recording head
release lever
(Blue lever)
Scanner frame ASSY
(placed upside down)

1.12 Recorder & Cutter ASSY

(1) Place the scanner frame ASSY upside down.

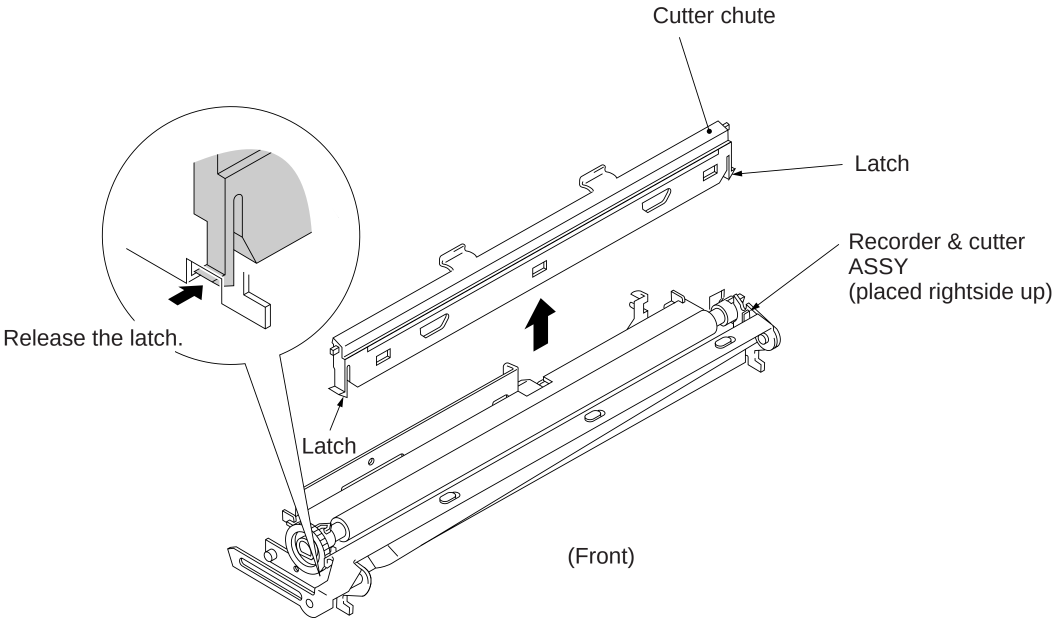
(2) Remove the screw.

(3) Press the warped sections of the scanner frame ASSY outwards at both sides with the tip of a flat screwdriver and take out the recorder & cutter ASSY.


Warped section
Flat screwdriver
Recorder & cutter ASSY
Warped section
(Rear)
Scanner frame ASSY (placed upside down)

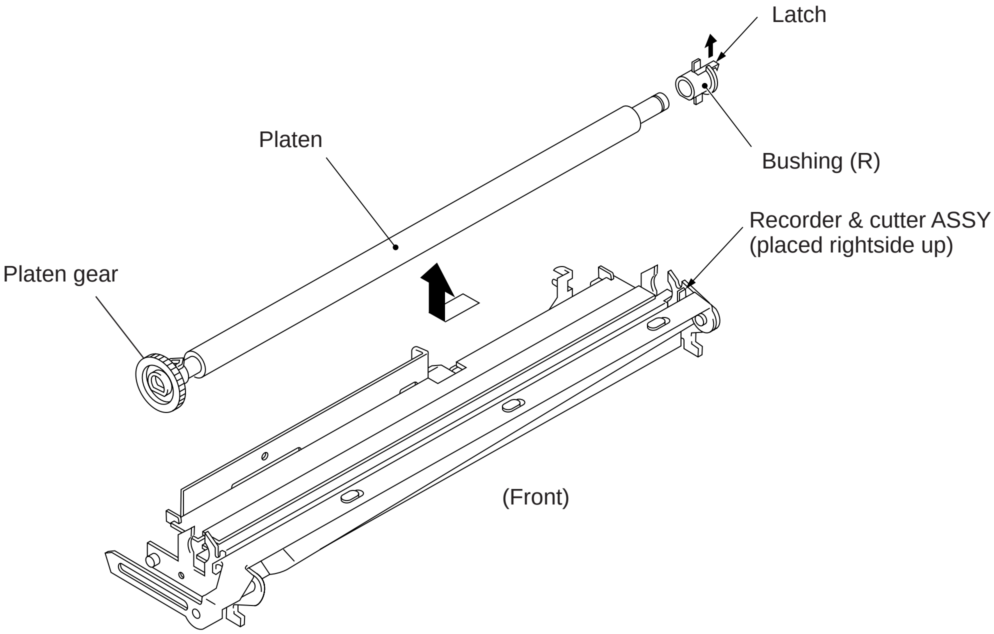
1.13 Cutter Chute and Platen

(1) Press the two latches of the cutter chute inwards to release and then lift up the cutter chute straight, taking care not to let it catch on other parts.


Cutter chute
Latch
Recorder & cutter ASSY (placed rightside up)
Release the latch.
Latch
(Front)

(2) Release the latch of the bushing (R) and pull out the bushing to the right.

(3) Pull out the platen gear to the left together with the platen and then lift up.

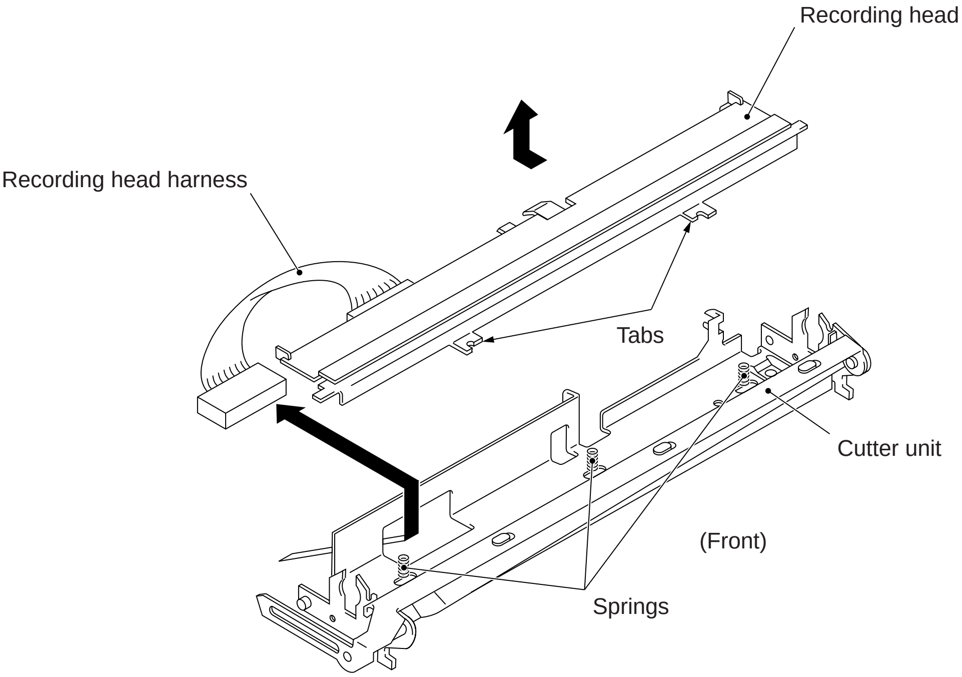

Latch
Platen
Bushing (R)
Recorder & cutter ASSY (placed rightside up)
Platen gear
(Front)

1.14 Recording Head and Cutter Unit

(1) Push down the front edge of the recording head and move it back to the rear to release the tabs from the cutter unit.

NOTE: Take care not to lose the three springs placed under the recording head.

NOTE: Never disassemble the cutter unit.



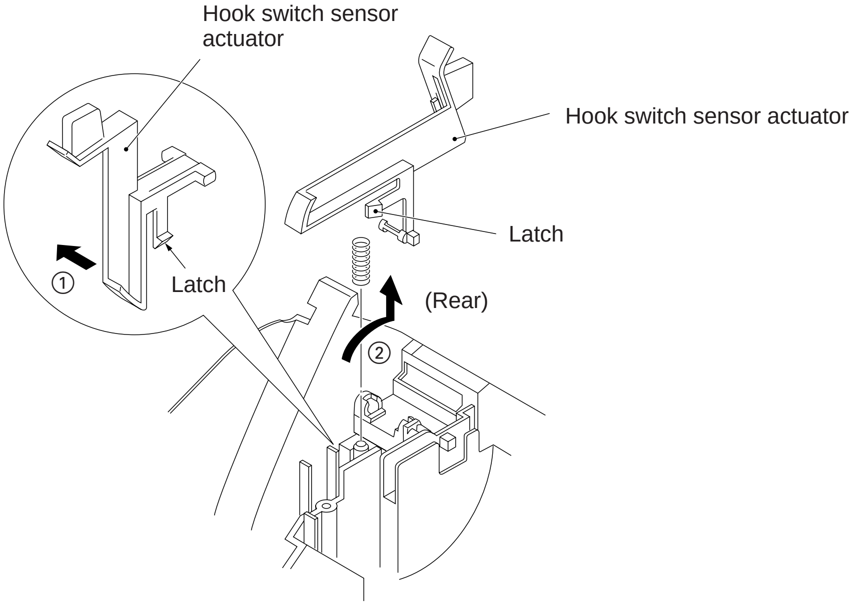
■ Reassembling Notes

- When installing the recording head, make sure that the three springs are set on the bosses of the cutter unit.
- Make sure the recording head harness goes through the cutout provided in the cutter unit.
- It is recommended that you install the platen right after putting the recording head back into place. If not secured by the platen, the recording head could easily come out with any impact.

1.15 Hook Switch Sensor Actuator (Not provided on those versions equipped with a Binatone handset.)

(1) Press the lower section of the hook switch sensor actuator to the left to release the latch from the main frame, then swing it upwards.

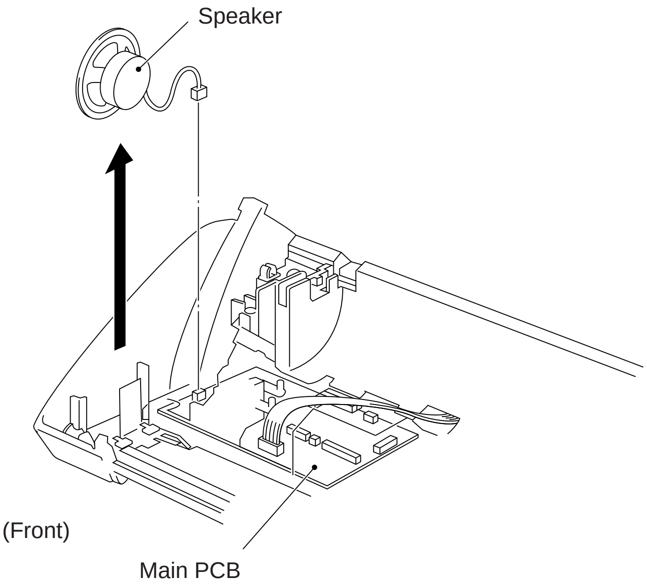
(2) Remove the spring.


Hook switch sensor actuator
Hook switch sensor actuator
Latch
①
Latch
(Rear)
②

1.16 Speaker

(1) Disconnect the speaker harness from the main PCB.

(2) Lift up the speaker.

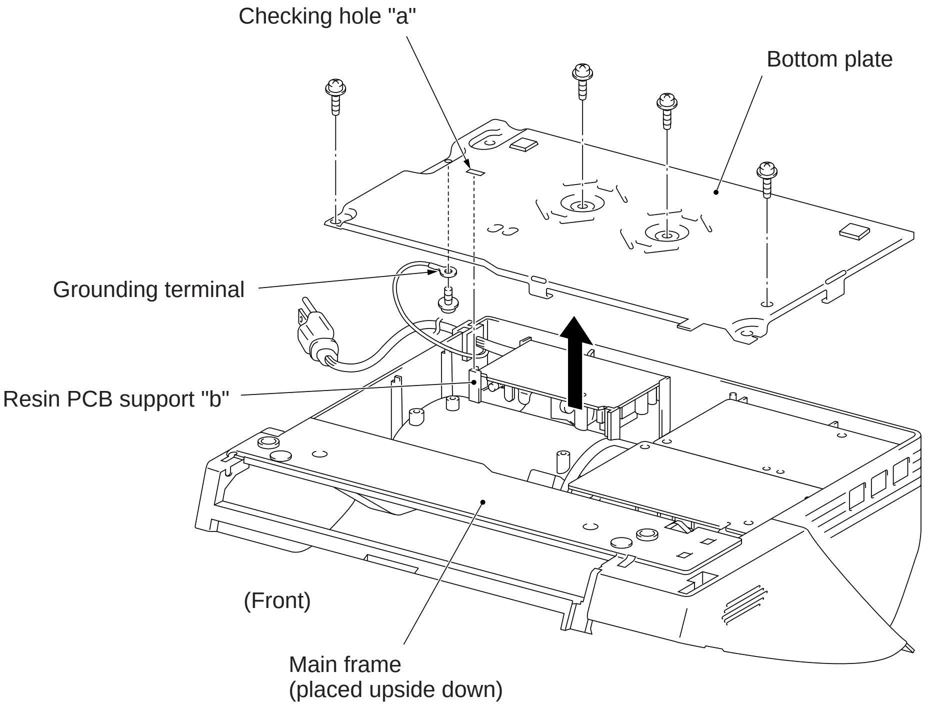

Speaker
(Front)
Main PCB

1.17 Bottom Plate

(1) Place the main frame upside down.

(2) Remove the four screws.

(3) Slightly lift up the bottom plate and disconnect the grounding terminal.


Checking hole "a"
Bottom plate
Grounding terminal
Resin PCB support "b"
(Front)
Main frame
(placed upside down)

■ Reassembling Notes

- Before putting the bottom plate back into place, make sure that the power supply PCB is completely fitted in the resin PCB supports without any gap.

  After installing the bottom plate, check that resin PCB support “b” of the main frame appears from the checking hole “a” provided in the bottom plate and that the bottom plate is fitted in the main frame without any gap.

  If the power supply PCB comes into contact with the bottom plate, a short circuit may occur.

1.18 Main PCB, NCU PCB and Power Supply PCB

If you have already removed the scanner frame ASSY and speaker, slightly lift up the main PCB together with the NCU PCB and then disconnect the power supply harness from the main PCB. If the scanner frame ASSY and speaker are not yet removed, follow the steps below:

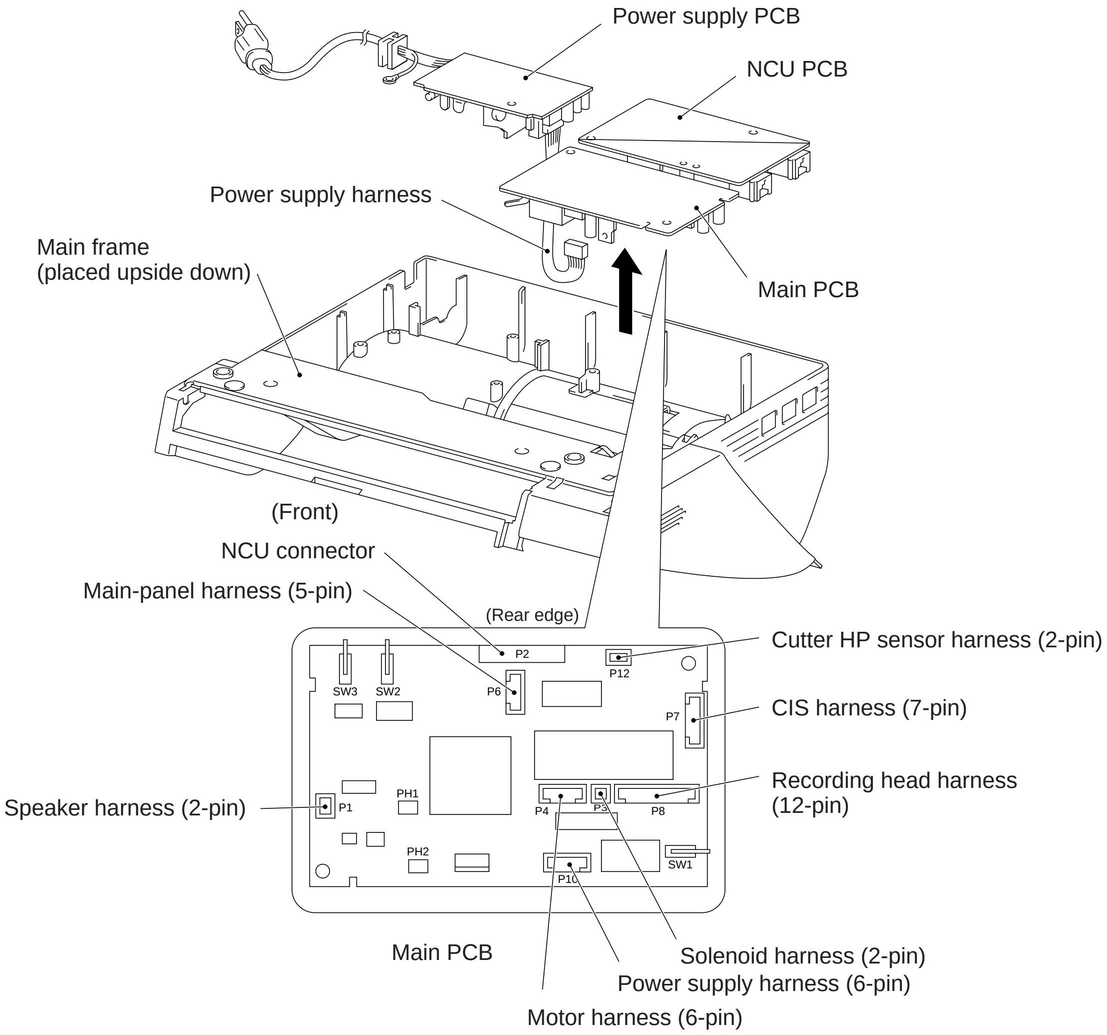
FAX-170/190/510/HOME FAX

(1) Slightly lift up the rear edge of the NCU PCB and disconnect it from the main PCB.

(2) Slightly lift up the rear edge of the main PCB and disconnect the following harnesses from the main PCB:

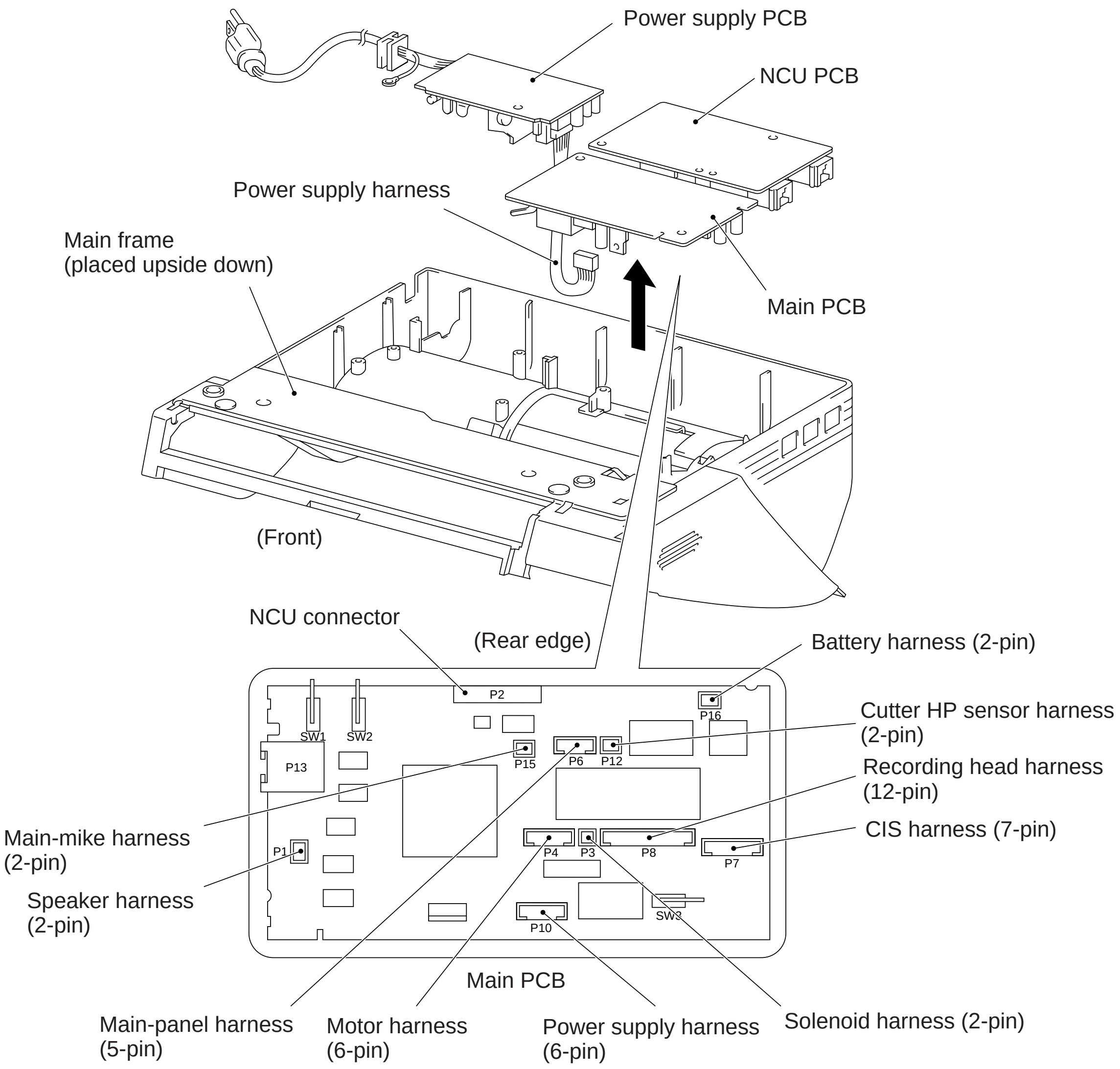
- Main-panel harness (5-pin)
- Cutter home position (HP) sensor harness (2-pin)
- CIS harness (7-pin)
- Recording head harness (12-pin)
- Solenoid harness (2-pin)
- Motor harness (6-pin)
- Speaker harness (2-pin)
- Power supply harness (6-pin)

(3) Lift up the power supply PCB.

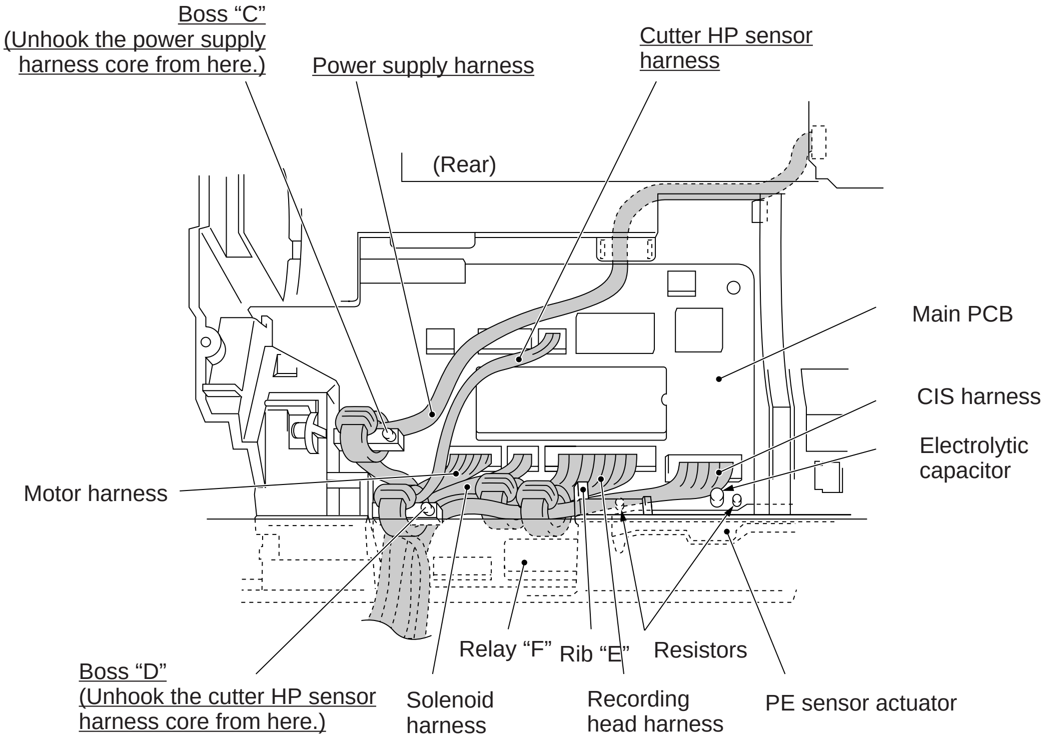

Power supply PCB
NCU PCB
Power supply harness
Main frame
(placed upside down)
Main PCB
(Front)
NCU connector
Main-panel harness (5-pin)
(Rear edge)
Cutter HP sensor harness (2-pin)
P2
P12
SW3
SW2
P6
P7
CIS harness (7-pin)
PH1
P1
P4
P3
P8
Recording head harness
(12-pin)
Speaker harness (2-pin)
PH2
P10
SW1
Main PCB
Solenoid harness (2-pin)
Power supply harness (6-pin)
Motor harness (6-pin)

FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC

(1) Slightly lift up the rear edge of the NCU PCB and disconnect it from the main PCB.


Power supply PCB
NCU PCB
Power supply harness
Main frame
(placed upside down)
Main PCB
(Front)
NCU connector
(Rear edge)
Battery harness (2-pin)
Cutter HP sensor harness
(2-pin)
Recording head harness
(12-pin)
CIS harness (7-pin)
Main-mike harness
(2-pin)
Speaker harness
(2-pin)
P2
P16
SW1
SW2
P13
P15
P6
P12
P1
P4
P3
P8
P7
P10
SW3
Main PCB
Main-panel harness
(5-pin)
Motor harness
(6-pin)
Power supply harness
(6-pin)
Solenoid harness (2-pin)

(2) Attempt to lift up the main PCB slightly. If it is impossible to lift up the PCB to an extent which allows you to disconnect the harnesses, you may not have unhooked the power supply harness core or cutter HP sensor harness core from bosses “C” or “D,” respectively. Remove the ROM cover (refer to Section 1.2) and unhook those cores from bosses “C” and “D” illustrated below.


Boss “C”
(Unhook the power supply harness core from here.)
Power supply harness
Cutter HP sensor harness
(Rear)
Main PCB
CIS harness
Electrolytic capacitor
Motor harness
Relay “F”
Rib “E”
Resistors
Boss “D”
(Unhook the cutter HP sensor harness core from here.)
Solenoid harness
Recording head harness
PE sensor actuator

(3) Slightly lift up the rear edge of the main PCB and disconnect the following harnesses from the main PCB:

- Cutter home position (HP) sensor harness (2-pin)
- Main-panel harness (5-pin)
- Main-mike harness (2-pin)
- Speaker harness (2-pin)
- Motor harness (6-pin)
- Power supply harness (6-pin)
- Solenoid harness (2-pin)
- Recording head harness (12-pin)
- CIS harness (7-pin)

(4) Lift up the power supply PCB.

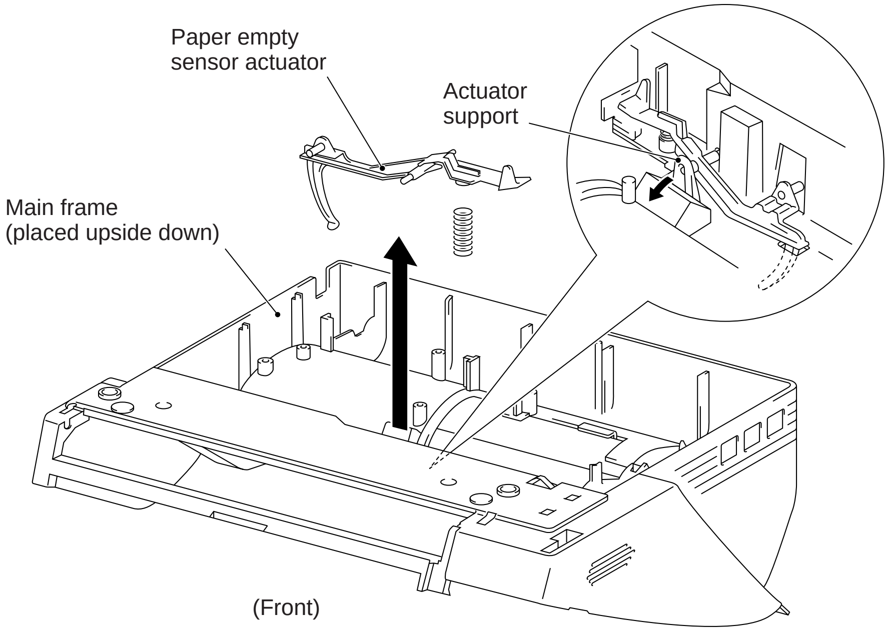
Reassembling Notes

- Make sure that the power supply PCB is completely fitted in the resin PCB supports of the main frame. If it is loosely mounted so that it comes into contact with the bottom plate, a short circuit may occur.
- For the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC: After putting the scanner frame ASSY back onto the main frame, route the harnesses and arrange the cores as follows, referring to the illustration given on the previous page.
  - Hook the power supply harness core on boss "C."
  - Check that the cutter HP sensor harness runs through a core, and then hook the core on boss "D."
  - Push the CIS harness core and the recording head harness core to the left of rib "E" and behind relay "F."
  - Route all these harnesses under boss "D."

  If any of these harnesses and cores are out of the specified position, the scanner frame ASSY or ROM cover may not be put back into place.
- For the FAX-270MC/290MC/520DT/520MC/MFC370MC/390MC: After connecting these harnesses, check that neither the electrolytic capacitor nor resistors are tilted towards the PE sensor actuator. If tilted, they may interfere with normal operation of the sensor actuator.

1.19 Paper Empty Sensor Actuator

(1) Press the actuator support outwards and lift up the paper empty sensor actuator. The spring also comes off.

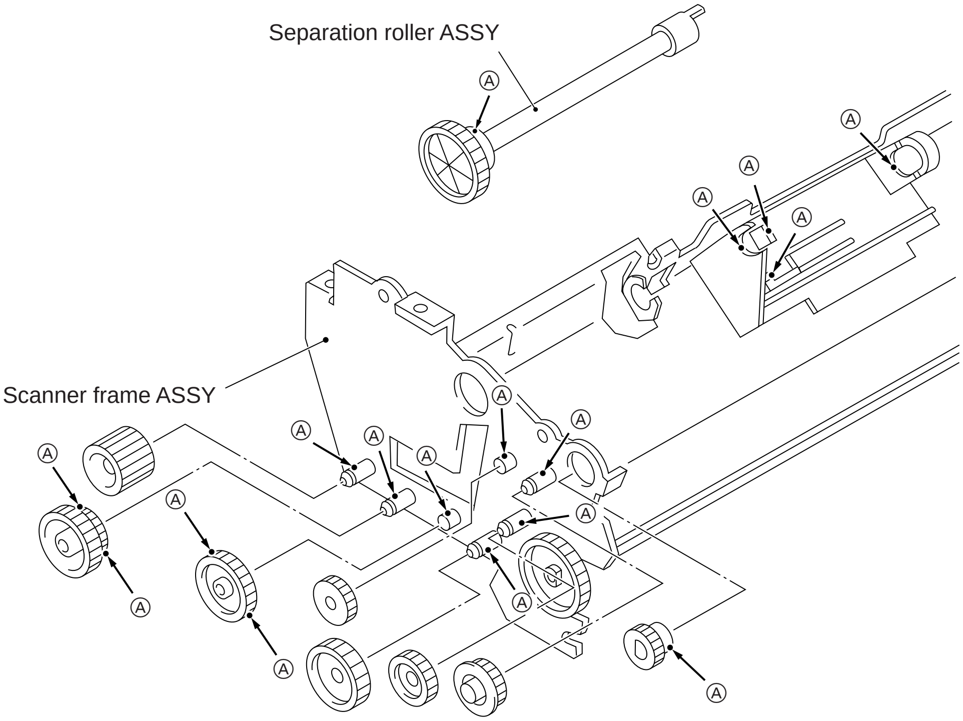

Paper empty sensor actuator
Actuator support
Main frame (placed upside down)
(Front)

2. LUBRICATION

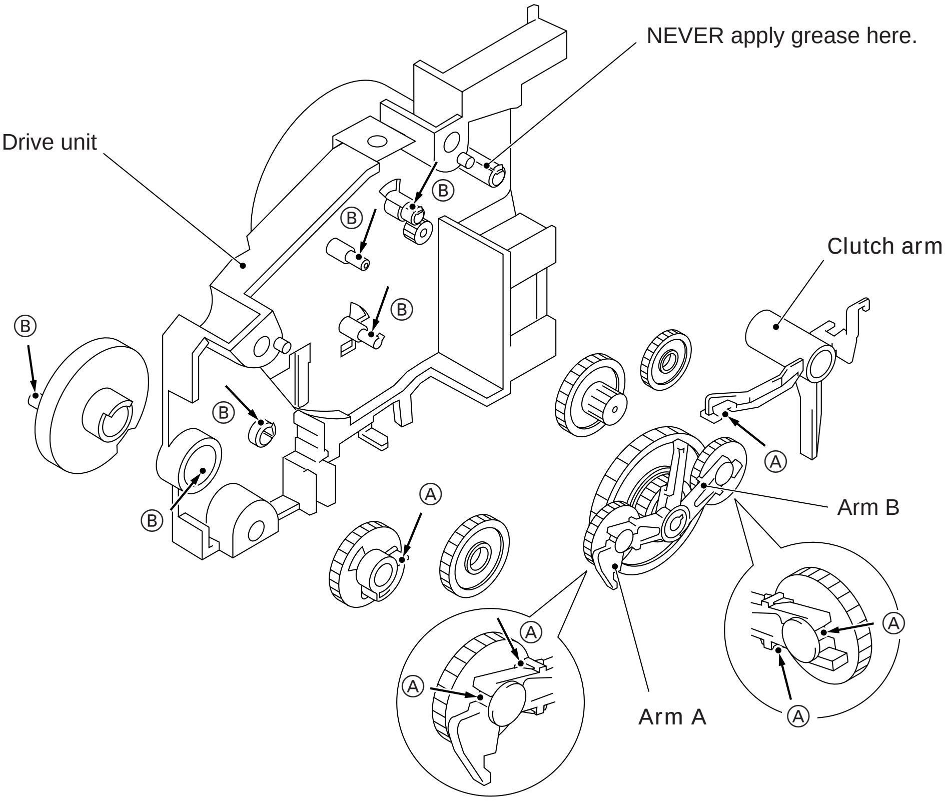
Apply Molykote EM-30L to the lubrication points as illustrated below.

For points Ⓐ, apply a rice-sized pinch of grease (6 mm^3).
For points Ⓑ, apply a bean-sized pinch of grease (12 mm^3).

[1] Scanner frame ASSY

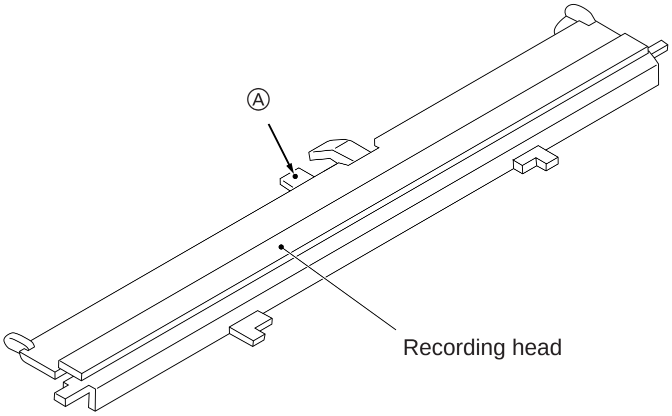

Separation roller ASSY
Scanner frame ASSY
Ⓐ

[2]   Drive unit



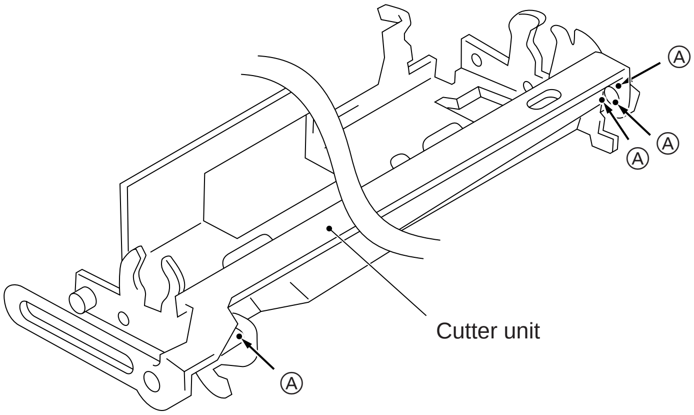
NEVER apply grease here.
Drive unit
Ⓑ
Ⓑ
Ⓑ
Ⓑ
Ⓑ
Ⓑ
Ⓑ
Clutch arm
Ⓐ
Ⓐ
Arm B
Ⓐ
Ⓐ
Ⓐ
Ⓐ
Ⓐ
Arm A

[3]   Recording head



Ⓐ
Recording head

[4] Cutter unit


Ⓐ
Ⓐ
Ⓐ
Cutter unit
Ⓐ

CHAPTER V.

MAINTENANCE MODE

CONTENTS

1. ENTRY INTO THE MAINTENANCE MODE V-1
2. LIST OF MAINTENANCE-MODE FUNCTIONS V-2
3. DETAILED DESCRIPTION OF MAINTENANCE-MODE FUNCTIONS V-4
   - 3.1 E^{2}PROM Parameter Initialization V-4
   - 3.2 Printout of Scanning Compensation Data V-5
   - 3.3 ADF Performance Test V-6
   - 3.4 Test Pattern 1 .... V-7
   - 3.5 Firmware Switch Setting and Printout V-8
   - 3.6 Operational Check of Control Panel PCB V-46
   - 3.7 Sensor Operational Check V-49
   - 3.8 CIS Scanner Area Setting V-50
   - 3.9 Equipment Error Code Indication V-50
   - 3.10 Document Draw Adjustment.. V-51

1. ENTRY INTO THE MAINTENANCE MODE

To make the facsimile equipment enter the maintenance mode, press the Function, *, 2, 8, 6, and 4 keys in this order.

|← Within 2 seconds →|

The equipment beeps for approx. 3 seconds and displays "MAINTENANCE" on the LCD, indicating that it is placed in the initial maintenance mode, a mode in which the equipment is ready to accept entry from the keys.

To select one of the maintenance-mode functions listed in Section 2, enter the corresponding 2-digit function code with the numerical keys on the control panel. (The details of each maintenance-mode function are described in Section 3.)

NOTES:
- Pressing the 9 key twice in the initial maintenance mode restores the equipment to the standby state.
- Pressing the Stop button after entering only one digit restores the equipment to the initial maintenance mode.
- If an invalid function code is entered, the equipment resumes the initial maintenance mode.

2. LIST OF MAINTENANCE-MODE FUNCTIONS

Maintenance-mode Functions

Function Code	Function	Reference Subsection (Page)
01	E^2PROM Parameter Initialization	3.1 (V-4)
02	————	——
03	————	——
04	————	——
05	Printout of Scanning Compensation Data	3.2 (V-5)
06	————	——
07	————	——
08	ADF* Performance Test	3.3 (V-6)
09	Test Pattern 1	3.4 (V-7)
10	Firmware Switch Setting	3.5 (V-8)
11	Printout of Firmware Switch Data	3.5 (V-45)
12	————	——
13	Operational Check of Control Panel PCB (Check of Keys and Buttons)	3.6 (V-46)
14	————	——
15	————	——
32	Sensor Operational Check	3.7 (V-47)
55	CIS Scanner Area Setting	3.8 (V-48)
82	Equipment Error Code Indication	3.9 (V-48)
91	E^2PROM Parameter Initialization (except the telephone number storage area)	3.1 (V-4)
—	Document Draw Adjustment	3.10 (V-51)

* ADF: Automatic document feeder

IMPORTANT

Basically, the maintenance-mode functions listed on the previous page should be accessed by service personnel only. However, you may allow end users to access some of these under the guidance of service personnel (e.g., by telephone).

The user-accessible functions (codes 10, 11, 82, and 91) are shaded in the above table. Function code 10 accesses the firmware switches WSW01 to WSW34, each of which has eight selectors. You should not allow end users to access all of those selectors, but you may allow them to access user-accessible selectors which are shaded in the firmware switch tables in Subsection 3.5.

The service personnel should instruct end users to follow the procedure given below.

(1) Press the Function key and the Mode key in this order.

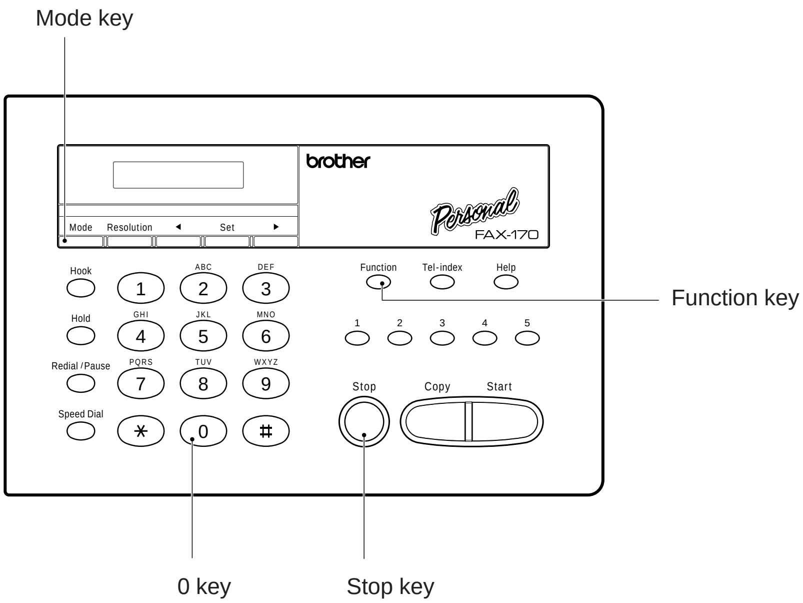
The LCD clears the current display.

NOTE: The Mode key is inoperable during standby for redialing and timer.

(2) Press the 0 key.

(3) Enter the desired function code (10, 11, 82, or 91) with the numerical keys.

For function code 10, access the desired firmware switch according to the operating procedure described in Subsection 3.5.


Mode key
brother
Personal
FAX-170
Mode
Resolution
◄
Set
►
Hook
Hold
Redial /Pause
Speed Dial
ABC
DEF
GHI
JKL
MNO
PQRS
TUV
WXYZ
1
2
3
4
5
6
7
8
9
∗
0
♯
Function
Tel-index
Help
1
2
3
4
5
Stop
Copy
Start
Function key
0 key
Stop key

(4) To make the equipment return to the standby state, press the Stop key.

3 DETAILED DESCRIPTION OF MAINTENANCE-MODE FUNCTIONS

3.1 E^2PROM Parameter Initialization

■ Function

The equipment initializes the parameters, user switches, and firmware switches registered in the E^2PROM, to the initial values. Entering the function code 01 initializes all of the E^2PROM areas, but entering 91 does not initialize some areas, as listed below.

Function code Data item	01	91
Maintenance-mode functions	All of these will be initialized.	These will be initialized.
User switches		
Firmware switches		
Remote activation code		
Activity report		
Distinctive ringing patterns registered (only for the U.S.A. versions)		
Station ID data		These will not be initialized.
Outside line number		
Telephone function registration		
One-touch dialing		
Speed dialing		

■ Operating Procedure

(1) Press the $\boxed{0}$ and $\boxed{1}$ keys (or the $\boxed{9}$ and $\boxed{1}$ keys according to your need) in this order in the initial maintenance mode.

The "PARAMETER INIT" will appear on the LCD.

(2) Upon completion of parameter initialization, the equipment returns to the initial maintenance mode.

3.2 Printout of Scanning Compensation Data

■ Function

The equipment prints out the white and black level data for scanning compensation.

■ Operating Procedure

Do not start this function merely after powering on the equipment but start it after carrying out a sequence of scanning operation. Unless the equipment has carried out any scanning operation, this function cannot print out correct scanning compensation data. This is because the equipment initializes white and black level data and takes in the scanning compensation reference data at the start of scanning operation.

(1) Press the 0 and 5 keys in this order in the initial maintenance mode.

The "MAINTENANCE 05" will appear on the LCD.

(2) The equipment prints out the scanning compensation data list containing the following:

a) White level data (208 bytes)
b) Black level data (1 byte)
c) Clamp PWM value (1 byte)
d) Compensation data for background color (1 byte)
e) LED light intensity value (1 byte)
f) LED light intensity value for compensation of background color and white level data (1 byte)

(3) Upon completion of recording of the compensation data list, the equipment returns to the initial maintenance mode.

NOTE: If any data is abnormal, its code will be printed in inline style, as shown below.

```
5F00 : 2D 2D 2D 30 30 2C 22 20  1E 1E 1C 13 19 17 17 0C
5F10 : 1A 1B 32 32 30 31 33 34  32 32 32 32 32 2E 31 2F
5F20 : 30 2D 2E 2C 2C 2B 2A 2A  2B 28 27 28 2A 28 28 2B
5F30 : 27 2A 2A 2A 2D 2A 2E 30  32 32 34 34 32 33 36 36
5F40 : 38 38 36 39 38 3A 3C 3E  3C 3C 3B 3B 39 34 36 38
5F50 : 34 34 34 30 30 2E 2D 2C  2C 2A 2B 2B 2C 2B 2C 2D
5F60 : 2E 2E 2C 2E 2F 2D 2C 2E  2F 2F 31 2D 2E 30 2F 30
5F70 : 33 32 34 36 28 2E 30 04  2D 30 34 33 35 2D 30 30
5F80 : 2F 01 00 0F 28 29 2A 01  02 11 2A 2B 2A 05 0A 20
5F90 : 24 25 26 26 2A 28 28 2A  28 26 26 22 22 23 1F 04
5FA0 : 1C 04 22 24 24 23 23 23  1F 20 26 25 24 22 2E 31
5FB0 : 33 32 30 2C 2D 2D 2D 2F  34 30 2F 30 31 32 2F 2E
5FC0 : 2E 2E 2D 2D 30 2C 2E 2F  2D 2C 2C 29 22 20 1E 1A

5F00 : 02

5F00 : 00

5F00 : 00

5F00 : 93

5F00 : 00
```

Scanning Compensation Data List

3.3 ADF Performance Test

■ Function

The equipment counts the documents fed by the automatic document feeder (ADF) and displays the count on the LCD for checking the ADF performance.

■ Operating Procedure

(1) Set documents. (Allowable up to the ADF capacity.)
The "DOC. READY" will appear on the LCD.

(2) Press the 0 and 8 keys in this order.
The equipment
  i) copies the 1st document and displays "P.01" on the LCD,
  ii) feeds in and out the 2nd through 4th documents while counting without copying them as the LCD shows the corresponding count,
  iii) copies the 5th document and displays "P.05" on the LCD,
  iv) feeds in and out the 6th through 9th documents while counting without copying them as the LCD shows the corresponding count, and
  v) copies the 10th document and displays "P.10" on the LCD.

(3) Upon completion of feeding in and out all of the documents, the final count appears on the LCD.

(4) Press the Stop key to return the equipment to the initial maintenance mode.

3.4 Test Pattern 1

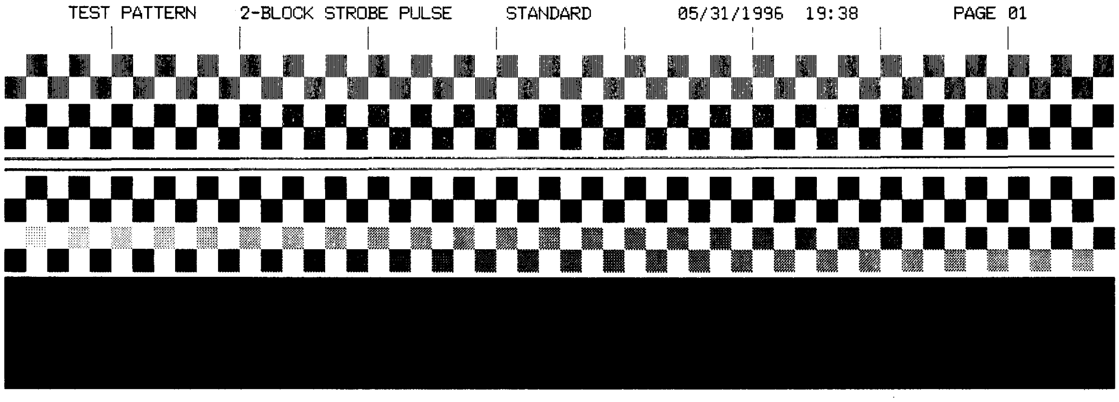
■ Function

This function, much like the copying function, prints out test pattern 1 to allow the service personnel to check for record data missing or print quality.

■ Operating Procedure

Press the 0 and 9 keys in this order in the initial maintenance mode.

The figure below shows test pattern 1.


TEST PATTERN
2-BLOCK STROBE PULSE
STANDARD
05/31/1996 19:38
PAGE 01

Test Pattern 1

3.5 Firmware Switch Setting and Printout

[A] Firmware switch setting

■ Function

The facsimile equipment incorporates the following firmware switch functions (WSW01 through WSW34) which may be activated with the procedures using the control panel keys and buttons.

The firmware switches have been set at the factory in conformity to the communications standards and codes of each country. Do not disturb them unless necessary. Some firmware switches may not be applicable in some versions. The firmware switch data list indicates "Not used." for those inapplicable switches.

Firmware Switches (WSW01 through WSW34)

WSW No.	Function	Reference Page
WSW01	Dial pulse setting	V-10
WSW02	Tone signal setting	V-11
WSW03	PABX mode setting	V-12
WSW04	TRANSFER facility setting	V-14
WSW05	1st dial tone and busy tone detection	V-15
WSW06	PAUSE key setting and 2nd dial tone detection	V-17
WSW07	Dial tone setting 1	V-19
WSW08	Dial tone setting 2	V-20
WSW09	Protocol definition 1	V-21
WSW10	Protocol definition 2	V-22
WSW11	Busy tone setting	V-23
WSW12	Signal detection condition setting	V-24
WSW13	Modem setting	V-25
WSW14	AUTO ANS facility setting	V-26
WSW15	REDIAL facility setting	V-27
WSW16	Function setting 1	V-28
WSW17	Function setting 2	V-29
WSW18	Function setting 3	V-30
WSW19	Transmission speed setting	V-31
WSW20	Overseas communications mode setting	V-32
WSW21	TAD setting 1	V-33
WSW22	Copy resolution setting	V-33
WSW23	Communications setting	V-34
WSW24	TAD setting 2	V-35
WSW25	TAD setting 3	V-36
WSW26	Function setting 4	V-37
WSW27	Function setting 5	V-38
WSW28	Function setting 6	V-39
WSW29	Function setting 7	V-40
WSW30	Function setting 8	V-41
WSW31	Function setting 9	V-42
WSW32	Function setting 10	V-42
WSW33	Function setting 11	V-43
WSW34	Function setting 12	V-44

■ Operating Procedure

(1) Press the 1 and 0 keys in this order in the initial maintenance mode.

The equipment displays the "WSW00" on the LCD and becomes ready to accept a firmware switch number.

(2) Enter the desired number from the firmware switch numbers (01 through 34).

The following appears on the LCD:

WSWXX = 0 0 0 0 0 0 0 0

(3) Use the ◀ and ▶ keys to move the cursor to the selector position to be modified.

(4) Enter the desired number using the 0 or 1 key.

(5) Press the Set key. This operation saves the newly entered selector values onto the E^2PROM and readies the equipment for accepting a firmware switch number.

(6) Repeat steps (2) through (5) until the modification for the desired firmware switches is completed.

(7) Press the Set or Stop key to return the equipment to the initial maintenance mode.

NOTES:
- To cancel this operation and return the equipment to the initial maintenance mode during the above procedure, press the Stop key.
- If there is a pause of more than one minute after a single-digit number is entered for double-digit firmware switch numbers, the equipment will automatically return to the initial maintenance mode.

■ Note

The user-accessible selectors of the firmware switches are shaded in the tables given on the following pages.

■ Detailed Description for the Firmware Switches

WSW01 (Dial pulse setting)

Selector No.	Function	Setting and Specifications
1 2	Dial pulse generation mode	No. 1 2 0 0 : N 0 1 : N+1 1 0 : 10-N 1 1 : N
3 4	Break time length in pulse dialing	No. 3 4 0 0 : 60 ms 0 1 : 67 ms 1 0 : 40 ms (for 16 PPS) 1 1 : 64 ms (at 106-ms intervals)
5 6	Inter-digit pause	No. 5 6 0 0 : 800 ms 0 1 : 850 ms 1 0 : 950 ms 1 1 : 600 ms
7	Switching between pulse (DP) and tone (PB) dialing, by the function switch	0: Yes 1: No
8	Default dialing mode, pulse (DP) or tone (PB) dialing	0: PB 1: DP

- **Selectors 1 and 2: Dial pulse generation mode**

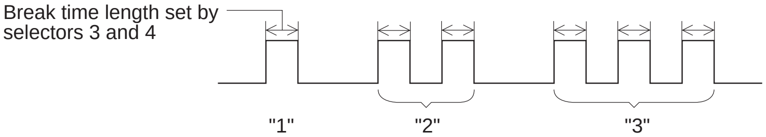
  These selectors set the number of pulses to be generated in pulse dialing.

  N: Dialing "N" generates "N" pulses. (Dialing "0" generates 10 pulses.)
  N + 1: Dialing "N" generates "N + 1" pulses.
  10 - N: Dialing "N" generates "10 - N" pulses.

- **Selectors 3 and 4: Break time length in pulse dialing**

  These selectors set the break time length in pulse dialing.

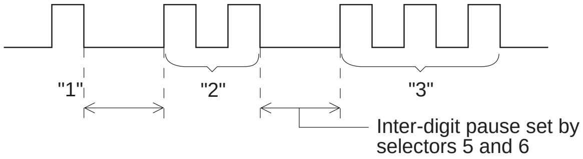
  (Example: If "1," "2," and "3" are dialled when N is set by selectors 1 and 2.)



- **Selectors 5 and 6: Inter-digit pause**

  These selectors set the inter-digit pause in pulse dialing.

  (Example: If "1," "2," and "3" are dialled when N is set by selectors 1 and 2.)



- **Selector 7: Switching between pulse (DP) and tone (PB) dialing, by the function switch**

  This selector determines whether or not the dialing mode may be switched between the pulse (DP) and tone (PB) dialing by using the function switch.

- **Selector 8: Default dialing mode, pulse (DP) or tone (PB) dialing**

  This selector sets the default dialing mode (pulse dialing or tone dialing) which may be changed by the function switch. If the user switches it with the function switch when selector 7 is set to "0," the setting specified by this selector will be also switched automatically.

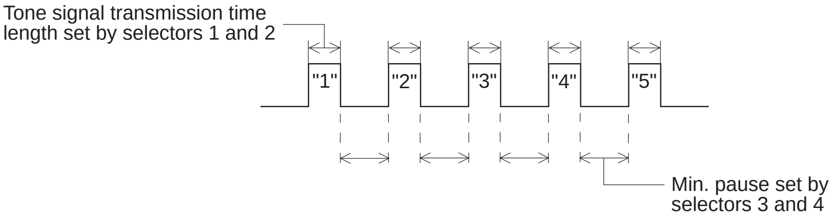
WSW02 (Tone signal setting)

Selector No.	Function	Setting and Specifications
1 2	Tone signal transmission time length	No. 1 2 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 100 ms
3 4	Min. pause in tone dialing	No. 3 4 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 140 ms
5 | 8	Attenuator for pseudo ring backtone to the line (selectable in the range of 0-15 dB)	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

- **Selectors 1 through 4: Tone signal transmission time length and Min. pause in tone dialing**

  These selectors set the tone signal transmission time length and minimum pause in tone dialing.

  (Example: If "1," "2," "3," "4," and "5" are dialled.)


Tone signal transmission time length set by selectors 1 and 2
"1"
"2"
"3"
"4"
"5"
Min. pause set by selectors 3 and 4

- **Selectors 5 through 8: Attenuator for pseudo ring backtone to the line**

  These selectors are used to adjust the sound level of beep generated as a ring backtone in the F/T mode or as a signal during remote control operation or at the start of ICM recording.

  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

  This setting will be limited if selector 8 of WSW23 is set to "0."

WSW03 (PABX* mode setting)

Selector No.	Function	Setting and Specifications
1	CNG detection when sharing a modular wall socket with a telephone	0: A 1: B
2 | 4	Min. detection time length of PABX* dial tone, required for starting dialing	No. 2 3 4 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
5	CNG detection when sharing a modular wall socket with a telephone	0: A 1: B
6 7	Dial tone detection in PABX*	No. 6 7 0 0 : No detection (3.5 sec. WAIT) 0 1 : No detection (5 sec. WAIT) 1 0 : No detection (7 sec. WAIT) 1 1 : Detection (Frequency only)
8	"R" key function	0: 1st dial tone detection add 1: No 1st dial tone detection

* PABX: Private automatic branch exchange

NOTE: Selectors 2 through 4 and 6 through 8 are not applicable where no PABX is installed.

- **Selectors 1 and 5: CNG detection when sharing a modular wall socket with a telephone**

  These selectors determine whether or not the equipment detects a CNG signal when a line is connected to a telephone sharing a modular wall socket with the equipment. If these selectors are set to “0,0,” the equipment does not detect CNG. If set to other selector values, the equipment interprets CNG as an effective signal upon detection of CNG signals by the number of cycles specified by these selectors and then starts FAX reception.

Selector		Cycle
No.1	No. 5	
0 (A)	0 (A)	No detection
0 (A)	1 (B)	One cycle
1 (B)	0 (A)	1.5 cycles
1 (B)	1 (B)	2 cycles

- **Selectors 2 through 4: Min. detection time length of PABX dial tone, required for starting dialing**

  Upon detection of the PABX dial tone for the time length set by these selectors, the equipment starts dialing.

  These selectors are effective only when both selectors 6 and 7 are set to "1" (Detection).

- **Selectors 6 and 7: Dial tone detection in PABX**

  These selectors activate or deactivate the dial tone detection function which detects a dial tone when a line is connected to the PABX.

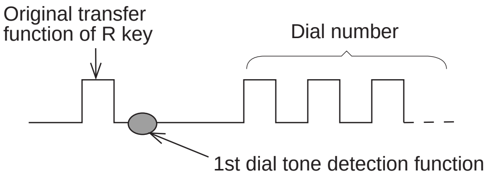
  Setting both of these selectors to "1" activates the dial tone detection function so that the equipment starts dialing upon detection of a dial tone when a line is connected.

  Other setting combinations deactivate the dial tone detection function so that the equipment starts dialing after the specified WAIT (3.5, 5.0, or 7.0 sec.) without detection of a dial tone when a line is connected.

- **Selector 8: "R" key function**

  This selector determines whether or not the 1st dial tone detection function (specified by selectors 1 through 3 of WSW05) is added to the R key.

  If this selector is set to "0," pressing the R key automatically activates the 1st dial tone detection function when the PABX and the automatic calling are selected by using the function switch. If you press the R key and a dial number in succession, the equipment will automatically carry out the 1st dial tone detection function following the original transfer function as shown below.



WSW04 (TRANSFER facility setting)

Selector No.	Function	Setting and Specifications
1	Earth function in transfer facility	0: Provided 1: Not provided
2 3	Dual tone detection frequency in ICM recording	No. 2 3 0 0 : 350 + 440 Hz (A) 0 1 : 440 + 480 Hz (B) 1 x : 480 + 620 Hz (C)
4	Tone detection level in ICM recording	0: OFF 1: High
5 6	Earth time length for earth function	No. 5 6 0 0 : 200 ms 0 1 : 300 ms 1 0 : 500 ms 1 1 : 700 ms
7 8	Break time length for flash function	No. 7 8 0 0 : 80 ms 0 1 : 110 ms 1 0 : 250 ms 1 1 : 500 ms

NOTE: Selectors 1 and 5 through 8 are not applicable in those countries where no transfer facility is supported.

- **Selector 1: Earth function in transfer facility**

  This selector determines whether or not the earth function is added to the transfer setting menu to be accessed by the function switch.

- **Selectors 5 and 6: Earth time length for earth function**

  These selectors set the short-circuiting time length of the telephone line (La or Lb) to ground.

  This setting is effective only when the earth function is selected for the R key by using the function switch.

- **Selectors 7 and 8: Break time length for flash function**

  These selectors set the break time length.

  This setting is effective only when the flash function is selected for the R key by using the function switch.

WSW05 (1st dial tone and busy tone detection)

Selector No.	Function	Setting and Specifications
1 | 3	1st dial tone detection	No. 1 2 3 0 0 0 : 3.5 sec. WAIT 0 0 1 : 7.0 sec. WAIT 0 1 0 : 10.5 sec. WAIT 0 1 1 : 14.0 sec. WAIT 1 0 0 : 17.5 sec. WAIT 1 0 1 : 21.0 sec. WAIT 1 1 0 : 24.5 sec. WAIT 1 1 1 : Detection (Without WAIT)
4	Max. pause time allowable for remote ID code detection	0: 2 seconds 1: 1 second
5 6	Busy tone detection in automatic sending mode	No. 5 6 0 0 : No detection 0 1 : Detection only after dialing 1 0 : No detection 1 1 : Detection before and after dialing
7	Busy tone detection in automatic receiving mode	0: Yes 1: No
8	Not used.	

NOTE: Selectors 5 through 7 are not applicable in those countries where no busy tone detection is supported, e.g., U.S.A.

- **Selectors 1 through 3: 1st dial tone detection**

  These selectors activate or deactivate the 1st dial tone detection function which detects the 1st dial tone issued from the PSTN when a line is connected to the PSTN.

  Setting all of these selectors to "1" activates the dial tone detection function so that the equipment starts dialing upon detection of a dial tone when a line is connected. (However, in those countries which support no dial tone detection function, e.g., in the U.S.A., setting these selectors to "1" makes the equipment start dialing after a WAIT of 3.5 seconds.) For the detecting conditions of the 1st dial tone, refer to WSW07 and WSW08.

  Other setting combinations deactivate the dial tone detection function so that the equipment starts dialing after the specified WAIT (3.5, 7.0, 10.5, 14.0, 17.5, 21.0, or 24.5 seconds) without detection of a dial tone when a line is connected to the PSTN.

- **Selector 4: Max. pause time allowable for remote ID code detection**

  This selector sets the maximum pause time allowable for detecting the second digit of a remote ID code after detection of the first digit in remote reception.

  If selector 4 is set to "0" (2 seconds), for instance, only a remote ID code whose second digit is detected within 2 seconds after detection of the first digit will become effective so as to activate the remote function.

- **Selectors 5 and 6: Busy tone detection in automatic sending mode**

  These selectors determine whether or not the equipment automatically disconnects a line upon detection of a busy tone in automatic sending mode.

  Setting selector 6 to "0" ignores a busy tone so that the equipment does not disconnect the line.

  Setting selectors 5 and 6 to "0" and "1," respectively, makes the equipment detect a busy tone only after dialing and disconnect the line.

  Setting both of selectors 5 and 6 to "1" makes the equipment detect a busy tone before and after dialing and then disconnect the line.

- **Selector 7: Busy tone detection in automatic receiving mode**

  This selector determines whether or not the equipment automatically disconnects a line upon detection of a busy tone in automatic receiving mode.

WSW06 (PAUSE key setting and 2nd dial tone detection)

Selector No.	Function	Setting and Specifications
1 | 3	PAUSE key setting and 2nd dial tone detection	No. 1 2 3 0 0 0 : No pause 0 0 1 : 3.5 sec. WAIT 0 1 0 : 7 sec. WAIT 0 1 1 : 10.5 sec. WAIT 1 0 0 : 14 sec. WAIT 1 0 1 : 17.5 sec. WAIT 1 1 0 : 2nd dial tone detection only in pulse dialing (DP) system 1 1 1 : 2nd dial tone detection both in DP and push-button (PB) dialing systems
4 | 6	Detection of international tone	No. 4 5 6 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
7	No. of dial tone detection times	0: Once 1: Twice
8	2nd dial tone interrupt detecting time	0: 30 ms 1: 50 ms

NOTE: Selectors 4 through 8 are not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

- **Selectors 1 through 3: PAUSE key setting and 2nd dial tone detection**

Selectors 1 2 3	
0 0 0	No WAIT is inserted even if the PAUSE key is pressed.
0 0 1 0 1 0 0 1 1 1 0 0 1 0 1	Pressing the PAUSE key inserts WAIT in pulse dialing, as defined in the above table. If the PAUSE key is pressed repeatedly, the equipment beeps a refusal sound and refuses the entry. In hook-up dialing, however, the equipment allows repeated pressing with an acceptance sound, but inserts WAIT only for the first pressing.
1 1 0 1 1 1	Each time the PAUSE key is pressed, the equipment detects a 2nd dial tone. If no 2nd dial tone is inputted within the specified time, the equipment disconnects the line in automatic dialing, or it starts transmitting the dial signal if given after depression of the PAUSE key in hook-up dialing. (In those countries where no dial tone detection function is supported, setting these selectors to "1, 1, 0" or "1, 1, 1" inserts a WAIT of 3.5 seconds.)

- **Selectors 4 through 6: Detection of international tone**

  Upon detection of the 2nd dial tone for the time length specified by these selectors, the equipment starts dialing.

  This setting is effective only when the 2nd dial tone detection function is activated by selectors 1 through 3 (Setting 1, 1, 0 or 1, 1, 1).

  This function does not apply in those countries where no dial tone detection function is supported.

- **Selector 7: No. of dial tone detection times**

  This selector sets the number of dial tone detection times required for starting dialing.

- **Selector 8: 2nd dial tone interrupt detecting time**

  This selector sets the allowable time length of an interrupt which should not be interpreted as an interrupt in the 2nd tone dialing.

WSW07 (Dial tone setting 1)

Selector No.	Function	Setting and Specifications
1 2	Frequency band range	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 X : Widens by 10 Hz
3	Line current detection	0: No 1: Yes
4 | 6	2nd dial tone detection level (Z = 600 Ω)	No. 4 5 6 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm
7	1st dial tone interrupt detecting time	0: 30 ms 1: 50 ms
8	Not used.	

NOTE: The WSW07 is not applicable in those countries where no dial tone or line current detection is supported, e.g., U.S.A.

- **Selectors 1 and 2: Frequency band range**

  These selectors set the frequency band for the 1st dial tone and the busy tone (before dialing) to be detected.

  This setting is effective only when selectors 1 through 3 of WSW05 are set to "1, 1, 1."

- **Selector 3: Line current detection**

  This selector determines whether or not the equipment should detect a line current before starting dialing.

- **Selectors 4 through 6: 2nd dial tone detection level**

  These selectors set the detection level of the 2nd dial tone.

- **Selector 7: 1st dial tone interrupt detecting time**

  This selector sets the allowable time length of an interrupt which should not be interpreted as an interrupt in the 1st dial tone dialing.

WSW08 (Dial tone setting 2)

Selector No.	Function	Setting and Specifications
1 | 3	1st dial tone detection time length	No. 1 2 3 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
4 5	Time-out length for 1st and 2nd dial tone detection	No. 4 5 0 0 : 10 sec. 0 1 : 20 sec. 1 0 : 6 sec. (in the U.S.A versions) 15 sec. (in other versions) 1 1 : 30 sec.
6 | 8	Detection level of 1st dial tone and busy tone before dialing	No. 6 7 8 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm

NOTE: The WSW08 is not applicable in those countries where no dial tone or line current detection is supported, e.g., U.S.A.

- **Selectors 1 through 3: 1st dial tone detection time length**

  Upon detection of the 1st dial tone for the time length set by these selectors, the equipment starts dialing.

  This setting is effective only when selectors 1 through 3 of WSW05 are set to "1, 1, 1."

- **Selectors 4 and 5: Time-out length for 1st and 2nd dial tone detection**

  These selectors set the time-out length for the 1st and 2nd dial tone detection so that the equipment waits dial tone input for the specified time length and disconnects itself from the line when no dial tone is inputted.

WSW09 (Protocol definition 1)

Selector No.	Function	Setting and Specifications
1	Frame length selection	0: 256 octets 1: 64 octets
2	Not used.	
3 | 4	No. of retries	No. 3 4 0 0 : 4 times 0 1 : 3 times 1 0 : 2 times 1 1 : 1 time
5	T5 timer	0: 300 sec. 1: 60 sec.
6	T1 timer	0: 35 sec. 1: 40 sec.
7 8	Elapsed time for time-out control for no response from the called station in automatic sending mode	No. 7 8 0 0 : 50 sec. 0 1 : 70 sec. 1 0 : 90 sec. 1 1 : 35 sec.

NOTE: Selectors 1 through 5 are not applicable in those models which do not support ECM.

- **Selector 1: Frame length selection**

  Usually a single frame consists of 256 octets (1 octet = 8 bits). For communications lines with higher bit error rate, however, set selector 1 to "1" so that the facsimile equipment can divide a message into 64-octet frames.

  Remarks: The error correction mode (ECM) is a facsimile transmission manner in which the equipment divides a message into frames for transmission so that if any data error occurs on the transmission line, the equipment retransmits only those frames containing the error data.

- **Selectors 3 and 4: No. of retries**

  These selectors set the number of retries in each specified modem transmission speed.

- **Selector 5: T5 timer**

  This selector sets the time length for the T5 timer.

- **Selector 6: T1 timer**

  This selector sets the time length for the T1 timer.

- **Selectors 7 and 8: Elapsed time for time-out control**

  If the equipment receives no response (no G3 command) from the called terminal in automatic sending during the time set by these selectors, it disconnects the line.

WSW10 (Protocol definition 2)

Selector No.	Function	Setting and Specifications
1	Switching of DPS, following the CML ON/OFF	0: No 1: Yes
2	Time length from transmission of the last dial digit to CML ON	0: 100 ms 1: 50 ms
3	Time length from CML ON to CNG transmission	0: 2 sec. 1: 4 sec.
4	Time length from CML ON to CED transmission (except for facsimile-to-telephone switching)	0: 0.5 sec. 1: 2 sec.
5 6	No. of training retries	No. 5 6 0 0 : 1 time 0 1 : 2 times 1 0 : 3 times 1 1 : 4 times
7 8	Not used.	

- **Selector 1: Switching of DPS, following the CML ON/OFF**

  Setting this selector to "1" automatically switches DPS following the CML ON/OFF operation. This function is provided to conform to the Swedish standard.

- **Selector 2: Time length from transmission of the last dial digit to CML ON**

  This selector sets the time length from when the equipment transmits the last dial digit until the CML relay comes on.

- **Selector 3: Time length from CML ON to CNG transmission**

  This selector sets the time length until the equipment transmits a CNG after it turns on the CML relay.

- **Selector 4: Time length from CML ON to CED transmission**

  This selector sets the time length until the equipment transmits a CED after it turns on the CML relay. This setting does not apply to switching between facsimile and telephone.

- **Selectors 5 and 6: No. of training retries**

  These selectors set the number of training retries to be repeated before automatic fallback.

WSW11 (Busy tone setting)

Selector No.	Function	Setting and Specifications
1 2	Frequency band range	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 x : Widens by 10 Hz
3	Not used.	
4	ON/OFF time length ranges (More than one setting allowed)	1: 400-600/400-600 ms
5		1: 175-440/175-440 ms
6		1: 700-800/700-800 ms
7		1: 110-410/320-550 ms
8		1: 100-660/100-660 ms

NOTE: The WSW11 is not applicable in those countries where no busy tone detection is supported, e.g., U.S.A.

The setting of WSW11 is effective only when selectors 5 and 6 of WSW05 are set to "0, 1" or "1, 1" (Busy tone detection).

- **Selectors 1 and 2: Frequency band range**

  These selectors set the frequency band for busy tone to be detected.

- **Selectors 4 through 8: ON/OFF time length ranges**

  These selectors set the ON and OFF time length ranges for busy tone to be detected. If more than one selector is set to "1," the ranges become wider. For example, if selectors 4 and 5 are set to "1," the ON and OFF time length ranges are from 175 to 600 ms.

WSW12 **(Signal detection condition setting)**

Selector No.	Function	Setting and Specifications
1 2	Min. OFF time length of calling signal (Ci)	No. 1 2 0 0 : 300 ms 0 1 : 500 ms 1 0 : 700 ms 1 1 : 900 ms
3 4	Max. OFF time length of calling signal (Ci)	No. 3 4 0 0 : 6 sec. 0 1 : 7 sec. 1 0 : 9 sec. 1 1 : 11 sec.
5 6	Detecting time setting	No. 5 6 0 0 : 800 ms (1000 ms*) 0 1 : 200 ms 1 0 : 250 ms 1 1 : 150 ms
7	Delay	0: Yes 1: No
8	Not used.	

* 1000 ms in Chinese or Hong Kong versions.

- **Selectors 1 through 4: Min. and max. OFF time length of calling signal (Ci)**

  If the equipment detects the OFF state of calling signal (Ci) for a time length which is greater than the value set by selectors 1 and 2 and less than the value set by selectors 3 and 4, it interprets the Ci signal as OFF.

- **Selectors 5 and 6: Detecting time setting**

  These selectors set the time length required to make the equipment acknowledge itself to be called. That is, if the equipment continuously detects calling signals with the frequency set by selectors 1 through 4 of WSW14 during the time length set by these selectors 5 and 6, it acknowledges the call.

- **Selector 7: Delay**

  Setting this selector to "0" allows the equipment to insert a 900 ms WAIT after acknowledgement of the call until the equipment turns on the CML relay to start receiving operation.

WSW13 (Modem setting)

Selector No.	Function	Setting and Specifications
1 2	Cable equalizer	No. 1 2 0 0 : 0 km 0 1 : 1.8 km 1 0 : 3.6 km 1 1 : 5.6 km
3 4	Reception level	No. 3 4 0 0 : -43 dBm 0 1 : -47 dBm 1 0 : -49 dBm 1 1 : -51 dBm
5 | 8	Modem attenuator	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

The modem should be adjusted according to the user’s line conditions.

- **Selectors 1 and 2: Cable equalizer**

  These selectors are used to improve the pass-band characteristics of analogue signals on a line. (Attenuation in the high-band frequency is greater than in the low-band frequency.)

  Set these selectors according to the distance from the telephone switchboard to the facsimile equipment.

- **Selectors 3 and 4: Reception level**

  These selectors set the optimum receive signal level.

- **Selectors 5 through 8: Modem attenuator**

  These selectors are used to adjust the transmitting level of the modem when the reception level at the remote station is improper due to line loss. This function applies for G3 protocol signals.

  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

  This setting will be limited if selector 8 of WSW23 is set to "0."

WSW14 **(AUTO ANS facility setting)**

Selector No.	Function	Setting and Specifications
1 2	Frequency band selection (Lower limit)	No. 1 2 0 0 : 13 Hz 0 1 : 15 Hz 1 0 : 23 Hz 1 1 : 20 Hz
3 4	Frequency band selection (Upper limit)	No. 3 4 0 0 : 30 Hz 0 1 : 55 Hz 1 0 : 70 Hz 1 1 : 70 Hz
5 | 8	No. of rings in AUTO ANS mode	No. 5 6 7 8 0 0 0 0 : Fixed to once 0 0 0 1 : Fixed to 2 times 0 0 1 0 : Fixed to 3 times 0 0 1 1 : Fixed to 4 times 0 1 0 0 : 1 to 2 times 0 1 0 1 : 1 to 3 times 0 1 1 0 : 1 to 4 times 0 1 1 1 : 1 to 5 times 1 0 0 0 : 2 to 3 times 1 0 0 1 : 2 to 4 times 1 0 1 0 : 2 to 5 times 1 0 1 1 : 2 to 6 times 1 1 0 0 : 1 to 10 times 1 1 0 1 : 2 to 10 times 1 1 1 0 : 3 to 5 times 1 1 1 1 : 4 to 10 times

- **Selectors 1 through 4: Frequency band selection**

  These selectors are used to select the frequency band of calling signals for activating the AUTO ANS facility.

- **Selectors 5 through 8: No. of rings in AUTO ANS mode**

  These selectors set the number of rings to initiate the AUTO ANS facility.

WSW15 (REDIAL facility setting)

Selector No.	Function	Setting and Specifications
1 2	Selection of redial interval	No. 1 2 0 0 : 5 minutes 0 1 : 1 minute 1 0 : 2 minutes 1 1 : 3 minutes
3 | 6	No. of redialings	No. 3 4 5 6 0 0 0 0 : 16 times 0 0 0 1 : 1 time 0 0 1 0 : 2 times 0 0 1 1 : 3 times | | 1 1 1 1 : 15 times
7 8	Not used.	

- **Selectors 1 through 6: Selection of redial interval and No. of redialings**

  The equipment redials by the number of times set by selectors 3 through 6 at intervals set by selectors 1 and 2.

WSW16 (Function setting 1)

Selector No.	Function	Setting and Specifications	
1	Automatic cutter	0: ON	1: OFF
2	CCITT superfine recommendation	0: OFF	1: ON
3	Remote reception	0: Only from the connected external telephone	1: From all telephones connected
4 5	Not used.		
6	Exclusive line mode	0: OFF	1: ON
7	Max. document length limitation	0: 400 cm	1: 90 cm
8	Not used.		

- **Selector 1: Automatic cutter**

  The selector activates or deactivates the automatic cutter.

- **Selector 2: CCITT superfine recommendation**

  If this selector is set to "1," the equipment communicates in CCITT recommended superfine mode (15.4 lines/mm). If it is set to "0," it communicates in native superfine mode.

- **Selector 3: Remote reception**

  Setting this selector to “0” allows the facsimile equipment to receive data from the directly connected external telephone only. Setting it to “1” allows the equipment to receive data from all telephones sharing a modular wall socket with the equipment, as well as from the directly connected external telephone.

  If any of the following problems occurs frequently, set this selector to “0”:

  - Dialing from any of the telephones sharing a modular wall socket starts the facsimile equipment.
  - Picking up the handset for any telephones sharing a modular wall socket while the equipment is in receiving operation disrupts the received image due to the superimposed noise.

- **Selector 6: Exclusive line mode**

  Setting this selector to "1" connects the equipment to the exclusive line, which enables transmission merely by pressing the Start key without dialing operation at both the calling and called terminals.

- **Selector 7: Max. document length limitation**

  This selector is used to select the maximum length of a document to be sent.

WSW17 (Function setting 2)

Selector No.	Function	Setting and Specifications
1 2	Off-hook alarm	No. 1 2 0 0 : No alarm 0 1 : Always valid 1 X : Valid except when 'call reservation' is selected.
3	Power failure report output	0: ON 1: OFF
4	Calendar clock/prompt alternate display	0: NO 1: YES
5	Calendar clock type	0: U.S.A. type 1: European type
6	Error indication in activity report	0: NO 1: YES
7	Non-ring reception	0: OFF 1: ON
8	Not used.	

- **Selectors 1 and 2: Off-hook alarm**

  These selectors activate or deactivate the alarm function which sounds an alarm when the communication is completed with the handset being off the hook.

- **Selector 3: Power failure report output**

  This selector determines whether or not the equipment outputs a power failure report when the power comes back on.

- **Selector 4: Calendar clock/prompt alternate display**

  If this selector is set to "1," the calendar clock and the prompt "INSERT DOCUMENT" appear alternately on the LCD while the equipment is on standby; if it is set to "0," only the calendar clock appears.

- **Selector 5: Calendar clock type**

  If this selector is set to "0" (U.S.A.), the MM/DD/YY hh:mm format applies; if it is set to "1" (Europe), the DD/MM/YY hh:mm format applies: DD is the day, MM is the month, YY is the last two digits of the year, hh is the hour, and mm is the minute.

- **Selector 6: Error indication in activity report**

  This selector determines whether or not a communications error code will be printed in the activity report.

- **Selector 7: Non-ring reception**

  Setting this selector to "1" makes the equipment receive calls without ringer sound if the ring delay is set to 0.

WSW18 (Function setting 3)

Selector No.	Function	Setting and Specifications
1	CCD manufacturer setting	Fixed to 1.
2 3	Detection enabled time for CNG and no tone	No. 2 3 0 0 : 40 sec. 0 1 : 0 sec. (No detection) 1 0 : 5 sec. 1 1 : 80 sec.
4	ACS* check sheet output function on/off key	0: Operative 1: Inoperative
5	ACS* check sheet output function	0: ON 1: OFF
6	Registration of station ID	0: Permitted 1: Prohibited
7 8	Tone sound monitoring	No. 7 8 0 X : No monitoring 1 0 : Up to phase B at the calling station only 1 1 : All transmission phases both at the calling and called stations

* ACS: Anti-curl system

- **Selector 1: CCD manufacturer setting**

  Reserved for future variation of CCD.

- **Selectors 2 and 3: Detection enabled time for CNG and no tone**

  After the line is connected via the external telephone, the equipment can detect a CNG signal or no tone for the time length specified by these selectors. The setting specified by these selectors becomes effective only when selector 8 of WSW20 is set to "1."

- **Selector 4: ACS check sheet output function on/off key**

  If this selector is set to "0" (Operative), the user can toggle the ACS check sheet output function on and off by pressing the 1 and 5 keys simultaneously. If it is set to "1" (Inoperative), the user cannot toggle the ACS check sheet output function from the control panel so that the setting specified by selector 5 becomes effective.

- **Selector 5: ACS check sheet output function**

  When selector 4 is set to "0," the setting specified by this selector becomes the default state of the ACS check sheet output function. When selector 4 is set to "1," the setting specified by this selector becomes permanently effective.

- **Selector 6: Registration of station ID**

  Setting this selector to "0" permits the registration of station ID for Austrian and Czecho versions.

- **Selectors 7 and 8: Tone sound monitoring**

  These selectors sets monitoring specifications of the tone sound inputted from the line.

WSW19 (Transmission speed setting)

Selector No.	Function	Setting and Specifications
1–3	First transmission speed choice for fallback	No. 1 2 3 No. 4 5 6 0 0 0 : 2,400 bps 0 0 1 : 4,800 bps 0 1 0 : 7,200 bps 0 1 1 : 9,600 bps 1 0 0 : 12,000 bps * 1 0 1 : 1 1 0 : 14,400 bps * 1 1 1 :
4–6	Last transmission speed choice for fallback	
7 8	Not used.	

* In those models with a maximum of 9600 bps capability, selection of 12,000 bps or 14,400 bps will still only produce a set speed automatically reduced to 9600 bps.

- **Selectors 1 through 6: First and last choices of transmission speed for fallback**

These selectors are used to set the MODEM speed range. With the first transmission speed choice specified by selectors 1 through 3, the equipment attempts to synchronize the data transmission via the MODEM. If the synchronization fails, the equipment automatically steps down to the next lowest speed and attempts to synchronize the data transmission again. The equipment repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 4 through 6.

If the MODEM always falls back to a low transmission speed (e.g., 4,800 bps), set the first transmission speed choice to the lower one (e.g., modify it from 12,000 bps to 7,200 bps) in order to deactivate the high-speed MODEM function and reduce the training time for shorter transmission time.

Generally, to save the transmission time, set the last transmission speed choice to a higher one.

WSW20 (Overseas communications mode setting)

Selector No.	Function	Setting and Specifications
1	EP* tone prefix	0: OFF 1: ON
2	Overseas communications mode (Reception)	0: 2100 Hz 1: 1100 Hz
3	Overseas communications mode (Transmission)	0: OFF 1: Ignores DIS once.
4 5	Min. time length from reception of CFR to start of transmission of video signals	No. 4 5 0 0 : 100 ms 0 1 : 200 ms 1 0 : 300 ms 1 1 : 400 ms
6 7	Chattering elimination for CNG detection	No. 6 7 0 0 : A (During CNG ON and OFF) 0 1 : B (During CNG OFF only) 1 X : C (No elimination)
8	CNG detection on/off	0: OFF 1: ON

* EP: Echo protection

- **Selector 1: EP tone prefix**

Setting this selector to "1" makes the equipment transmit a 1700 Hz echo protection (EP) tone immediately preceding training in V.29 modulation system to prevent omission of training signals.

Prefixing an EP tone is effective when the equipment fails to transmit at the V.29 modem speed and always has to fall back to 4800 bps transmission.

- **Selectors 2 and 3: Overseas communications mode**

These selectors should be used if the facsimile equipment malfunctions in overseas communications. According to the communications error state, select the signal specifications.

Setting selector 2 to "1" allows the equipment to use 1100 Hz CED signal instead of 2100 Hz in receiving operation. This prevents malfunctions resulting from echoes, since the 1100 Hz signal does not disable the echo suppressor (ES) while the 2100 Hz signal does.

Setting selector 3 to "1" allows the equipment to ignore a DIS signal sent from the called station once in sending operation. This operation suppresses echoes since the first DIS signal immediately follows a 2100 Hz CED (which disables the ES) so that it is likely to be affected by echoes in the disabled ES state. However, such a disabled ES state will be removed soon so that the second and the following DIS signals are not susceptible to data distortion due to echoes. Note that some models when called may cause error by receiving a self-outputted DIS.

- **Selector 8: CNG detection on/off**

If this selector is set to “1,” the equipment detects a CNG signal according to the condition preset by selectors 2 and 4 of WSW18 after a line is connected. If it is set to “0,” the equipment detects a CNG signal as long as a line is connected.

WSW21 (TAD setting 1)

Selector No.	Function	Setting and Specifications
1 | 5	Max. waiting time for voice signal	No. 1 2 3 4 5 0 0 0 0 0 : No detection 0 0 0 0 1 : 1 sec. 0 0 0 1 0 : 2 sec. 0 0 0 1 1 : 3 sec. | | 0 1 0 0 0 : 8 sec. | | 1 1 1 1 1 : 31 sec.
6 7	Two-way recording	No. 6 7 0 0 : For U.S.A. (A) 0 1 : Except for U.S.A. (B) 1 0 : Without beep (C) 1 1 : OFF (D)
8	Erasure of message stored in the memory after the message transfer	0: YES 1: NO

- **Selectors 1 through 5: Max. waiting time for voice signal**

  In the TAD mode, the equipment waits for voice signal for the time length specified by these selectors before it automatically shifts to the facsimile message receive mode or disconnects the line.

- **Selectors 6 and 7: Two-way recording (For those models equipped with a built-in TAD)**

  These selectors select the specifications of the two-way recording feature.

- **Selector 8: Erasure of message (For those models equipped with a built-in TAD)**

  Setting this selector to "0" will erase the message recorded in the memory after the document retrieval feature transfers the message.

WSW22 (Copy resolution setting)

Selector No.	Function	Setting and Specifications
1 | 3	Not used.	
4	Copy resolution	0: Fine 1: Superfine
5 | 8	Not used.	

- **Selector 4: Copy resolution**

  This selector determines whether the resolution for multi-copy should be Fine or Superfine.

WSW23 (Communications setting)

Selector No.	Function	Setting and Specifications
1	Starting point of training check (TCF)	0: From the head of a series of zeros 1: From any arbitrary point
2 3	Allowable training error rate	No. 2 3 0 0 : 0% 0 1 : 0.5% 1 0 : 1% 1 1 : 2%
4 5	Decoding error rate for transmission of RTN	No. 4 5 0 0 : 16% 0 1 : 14% 1 0 : 10% 1 1 : 8%
6 7	Not used.	
8	Limitation of attenuation level	0: YES 1: NO

- **Selector 1: Starting point of training check (TCF)**

  At the training phase of receiving operation, the called station detects for 1.0 second a training check (TCF) command, a series of zeros which is sent from the calling station for 1.5 seconds to verify training and give the first indication of the acceptability of the line.

  This selector sets the starting point from which the called station should start counting those zeros. If this selector is set to "0," the called station starts counting zeros 100 ms after the head of a series of zeros is detected.

  If it is set to "1," the called station starts counting zeros upon detection of 10-ms successive zeros 50 ms after the head of a series of zeros is detected. In this case, if the detection of 10-ms successive zeros is too late, the data counting period will become less than 1.0 second, making the called station judge the line condition unacceptable.

- **Selectors 2 and 3: Allowable training error rate**

  The called station checks a series of zeros gathered in training (as described in Selector 1) according to the allowable training error rate set by these selectors. If the called station judges the line condition to be accepted, it responds with CFR; if not, it responds with FTT.

- **Selectors 4 and 5: Decoding error rate for transmission of RTN**

  The facsimile equipment checks the actual decoding errors and then transmits an RTN according to the decoding error rate (Number of lines containing an error per page ÷ Total number of lines per page) set by these selectors.

- **Selector 8: Limitation of attenuation level**

  Setting this selector to "0" limits the transmitting level of the modem to 10 dB.

  This setting has priority over the settings selected by WSW02 (selectors 5 through 8) and WSW13 (selectors 5 through 8).

WSW24 (TAD setting 2)

Selector No.	Function	Setting and Specifications
1 2	Maximum OGM recording time	No. 1 2 0 0 : 15 sec. 0 1 : 20 sec. 1 0 : 30 sec. 1 1 : 50 sec.
3 4	Time length from CML ON to start of pseud ring backtone transmission	No. 3 4 0 0 : 4 sec. 0 1 : 3 sec. 1 0 : 2 sec. 1 1 : 1 sec.
5 | 8	Attenuator for playback of ICM/OGM to the line (Selectable from the range of 0-15 dB)	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

- **Selectors 1 and 2: Maximum OGM recording time (For those models equipped with a built-in TAD)**

  These selectors set the allowable maximum recording time for an OGM.

- **Selectors 3 and 4: Time length from CML ON to start of pseud ring backtone transmission**

  These selectors set the length of time from CML-ON up to the start of pseud ring backtone transmission.

  In those versions which have an OGM facility instead of pseud ring backtone, these selectors set the length of time from CML-ON up to the start of OGM transmission.

- **Selectors 5 through 8: Attenuator for playback of ICM/OGM to the line (For those models equipped with a built-in TAD)**

  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

  This setting will not be limited by selector 8 of WSW23.

WSW25 (TAD setting 3)

Selector No.	Function	Setting and Specifications
1–4	Not used.	
5–7	Pause between paging number and PIN	No. 5 6 7 0 0 0 : 2 sec. 0 0 1 : 0 1 0 : 0 1 1 : 1 0 0 : 4 sec. 1 0 1 : 1 1 0 : 1 1 1 : 16 sec.
8	Automatic shift to facsimile message receive mode in ICM recording mode	0: YES 1: NO

- **Selectors 5 and 7: Pause between paging number and PIN (For those models equipped with a built-in TAD)**

  These selectors set the pause time between a telephone number being paged and PIN (private identification number) for the paging feature.

- **Selector 8: Automatic shift to facsimile message receive mode in ICM recording mode (For those models equipped with a built-in TAD)**

  If this selector is set to "0," the equipment automatically shifts to the facsimile message receive mode after recording an ICM. If it is set to "1," the equipment automatically disconnects the line after the waiting time has passed.

WSW26 (Function setting 4)

Selector No.	Function	Setting and Specifications
1	Application of DC wetting pulse	0: OFF 1: ON
2	Overvoltage limiter at the applying time of a wetting pulse	0: ON 1: OFF
3	Not used.	
4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode)	No. 4 5 0 0 : No detection (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6 7	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the facsimile equipment in F/T mode)	No. 6 7 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
8	FAX reception after the time-out of pseudo ring backtones in F/T mode	0: YES 1: NO

- **Selectors 1 and 2: Application of DC wetting pulse and overvoltage limiter**

  These selectors take effect only when the UK version of the facsimile equipment is set up for the British Telecom's caller ID service or its equivalent.

  Selector 2 takes effect only when selector 1 is set to "1."

- **Selectors 4 and 5: No. of CNG cycles to be detected**

  The equipment interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone except in the external TAD mode.

- **Selectors 6 and 7: No. of CNG cycles to be detected (For those models not equipped with a built-in TAD)**

  The equipment interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode or via the facsimile equipment in F/T mode.

- **Selector 8: FAX reception after the time-out of pseudo ring backtones in F/T mode**

  If this selector is set to "0," the equipment enters the facsimile receive mode after issuing pseudo ring backtones. If it is set to "1," the equipment disconnects the line after issuing pseudo ring backtones.

WSW27 (Function setting 5)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Ringer OFF setting	0: YES 1: NO
3	Automatic playback of OGM at the start time of OGM ON mode	0: NO 1: YES
4	Detection of distinctive ringing pattern	0: NO 1: YES
5	Automatic erasure of voice alarm	0: YES 1: NO
6	Recording quality level	0: Normal 1: High
7	Not used.	
8	Motor overheating error indication	0: YES 1: NO

- **Selector 2: Ringer OFF setting**

  This selector determines whether or not the ringer can be set to OFF.

- **Selector 3: Automatic playback of OGM at the start time of OGM ON mode (For those models equipped with a built-in TAD)**

  This selector determines whether or not the equipment automatically plays back an OGM the moment it switches to the OGM ON mode in the MC mode.

- **Selector 4: Detection of distinctive ringing pattern**

  If this selector is set to "0," the equipment detects only the number of rings; if it is set to "1," the equipment detects the number of rings and the ringing time length to compare the detected ringing pattern with the registered distinctive one.

- **Selector 5: Automatic erasure of voice alarm**

  This selector determines whether or not the voice alarm should be erased from the memory after it is issued.

- **Selector 6: Recording quality level (For those models equipped with a built-in TAD)**

  This selector determines the recording quality level (this function can be accessed also by the user function 8-8). If it is set to "1" (High), the sampling rate by selector 7 of WSW27 takes effect; if it is set to "0" (Normal), the sampling rate specified by selector 4 of WSW30 takes effect.

- **Selector 8: Motor overheating error indication**

  If this selector is set to “0,” the equipment displays the message “PRINTER FAULT” on the LCD whenever a motor overheating error occurs so that any of the following happens and the equipment aborts recording:

  - The number of printed documents is five or less although the receiving operation continues for 15 minutes or more.
  - The number of printed documents is 10 or less although the receiving operation continues for 20 minutes or more.

WSW28 **(Function setting 6)**

Selector No.	Function	Setting and Specifications
1 | 3	Transmission level of DTMF high-band frequency signal	No. 1 2 3 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : –1 dB 1 1 0 : –2 dB 1 1 1 : –3 dB
4 | 6	Transmission level of DTMF low-band frequency signal	No. 4 5 6 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : –1 dB 1 1 0 : –2 dB 1 1 1 : –3 dB
7 8	Not used.	

- **Selectors 1 through 6: Transmission level of DTMF high-/low-band frequency signal**

  These selectors are intended for the manufacturer who tests the equipment for the Standard. Never access them.

WSW29 (Function setting 7)

Selector No.	Function	Setting and Specifications
1 | 3	Compression threshold level for voice signals inputted via the network in the built-in TAD operation	No. 1 2 3 0 0 0 : -47.0 dBm (A) 0 0 1 : -48.5 dBm (B) 0 1 0 : -50.0 dBm (C) 0 1 1 : -51.5 dBm (D) 1 0 0 : -53.0 dBm (E) 1 0 1 : -54.5 dBm (F) 1 1 0 : -56.0 dBm (G) 1 1 1 : OFF (H)
4 | 6	Compression threshold level for voice signals inputted via the handset in the built-in TAD operation	No. 4 5 6 0 0 0 : -44.0 dBm (A) 0 0 1 : -45.5 dBm (B) 0 1 0 : -47.0 dBm (C) 0 1 1 : -48.5 dBm (D) 1 0 0 : -50.0 dBm (E) 1 0 1 : -51.5 dBm (F) 1 1 0 : -53.0 dBm (G) 1 1 1 : OFF (H)
7	Automatic dialing by caller IDs stored in the memory	0: Yes 1: No
8	Beep at the time of full activity report data	0: No 1: Yes

- **Selectors 1 through 6: Compression threshold level for signals inputted via the network/ handset in the built-in TAD operation (For those models equipped with a built-in TAD)**

  If voice signals inputted via the network or handset are below the level specified by these selectors, the TAD interprets those received voice signals as no signal, compressing the recording time.

- **Selector 7: Automatic dialing by caller IDs stored in the memory (For those models equipped with a built-in TAD)**

  This selector determines whether or not the automatic dialing function by caller IDs stored in the memory (see the Note below) can be accessed.

  If it is set to "0," caller IDs stored in the memory can be called up on the LCD by the user function 6-7 and then pressing the Start key when the desired caller ID is displayed dials the caller automatically.

  (Note: The equipment can store a maximum of the latest 30 incoming caller IDs together with the reception date and time in the memory.)

- **Selector 8: Beep at the time of full activity report data (For the European versions only)**

  If this selector is set to "1," the equipment will beep when the activity report becomes full (as well as displaying a message on the LCD, prompting the output of the activity report).

WSW30 (Function setting 8)

Selector No.	Function	Setting and Specifications
1 | 3	Detection level of dial tone or busy tone for the built-in TAD operation	No. 1 2 3 0 0 0 : -38.0 dBm (A) 0 0 1 : -39.5 dBm (B) 0 1 0 : -41.0 dBm (C) 0 1 1 : -42.5 dBm (D) 1 0 0 : -44.0 dBm (E) 1 0 1 : -45.5 dBm (F) 1 1 0 : -47.0 dBm (G) 1 1 1 : -48.5 dBm (H)
4	Not used.	
5	Speaker output level	0: Higher 1: Lower
6 | 8	Not used.	

- **Selectors 1 through 3: Detection level of dial tone or busy tone for built-in TAD operation (For those models equipped with a built-in TAD)**

  If dial tone or busy tone inputted during ICM recording is below the level specified by these selectors, the TAD stops recording and disconnects the line.

- **Selector 5: Speaker output level (For those models equipped with a built-in TAD)**

  This selector determines the speaker output level when the speaker volume switch is set to HIGH or LOW, as listed below.

Selector 5 of WSW30 Speaker Volume Switch Position	0 (Higher)	1 (Lower)
HIGH	High	Medium-High
LOW	Medium-Low	Low

WSW31 (Function setting 9)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5	Minimum short-OFF duration in distinctive ringing	0: 130 ms 1: 90 ms
6 | 8	Not used.	

- **Selector 5: Minimum short-OFF duration in distinctive ringing**

  The ringer pattern consists of short and long rings, e.g., short-short-long rings. This selector sets the minimum OFF duration following a short ring in order to avoid missing ringer tones in distinctive ringing.

  If this selector is set to "1," when the short-OFF duration is a minimum of 90 ms long, then the equipment will interpret the short-OFF as OFF.

WSW32 (Function setting 10)

Selector No.	Function	Setting and Specifications
1 | 8	Not used.	

WSW33 (Function setting 11)

Selector No.	Function	Setting and Specifications
1 | 3	Detection threshold level for voice signals inputted via the network in the built-in TAD operation	No. 1 2 3 0 0 0 : -42.5 dBm (A) 0 0 1 : -44.0 dBm (B) 0 1 0 : -45.5 dBm (C) 0 1 1 : -47.0 dBm (D) 1 0 0 : -48.5 dBm (E) 1 0 1 : -50.0 dBm (F) 1 1 0 : -51.5 dBm (G) 1 1 1 : -53.0 dBm (H)
4 5	First communications speed choice for PCI	No. 4 5 0 0 : 14,400 bps 0 1 : 12,000 bps 1 0 : 9,600 bps 1 1 : 7,200 bps
6	Report output of polled transmission requests	0: YES 1: NO
7 8	Comfortable noise level	No. 7 8 0 0 : OFF 0 1 : Low (A) 1 0 : Medium (B) 1 1 : High (C)

NOTE: The WSW33 is applicable to those models equipped with a built-in TAD.

- **Selectors 4 and 5: First communications speed choice for PCI (For those models equipped with a built-in TAD)**

  These selectors are used to set the first communications speed choice with which the equipment attempts to synchronize the data transmission via the PC interface. If the synchronization fails, the equipment automatically steps down to the next lowest speed.

- **Selector 6: Report output of polled transmission requests**

  This function does not apply in the U.S.A. versions.

- **Selectors 7 and 8: Comfortable noise level**

  These selectors set the level of noise to be added during playing-back of voice signals recorded with no-signal compression.

  If they are set to "0, 0," no noise will be added.

WSW34 (Function setting 12)

Selector No.	Function	Setting and Specifications
1 | 3	ICM recording time to be erased preceding the tone detection when the equipment automatically disconnects the line because no voice signal has been received	No. 1 2 3 0 0 0 : 0 sec. 0 0 1 : 1 sec. 0 1 0 : 2 sec. 0 1 1 : 3 sec. 1 0 0 : 4 sec. 1 0 1 : 5 sec. 1 1 0 : 6 sec. 1 1 1 : 7 sec.
4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the facsimile equipment in F/T or TAD mode)	No. 4 5 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6 7	Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation	No. 6 7 0 0 : 3 0 1 : 2 1 0 : 1 1 1 : OFF
8	Not used.	

- **Selectors 4 and 5: No. of CNG cycles to be detected (For those models equipped with a built-in TAD)**

  The equipment interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors in any of the following cases:

  - when the line is connected via the external telephone in the external TAD mode.
  - when the line is connected via the facsimile equipment in F/T or TAD mode.

- **Selectors 6 and 7: Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation**

  If the equipment receives this specified number of DTMF tone signals during external TAD operation, it will not detect CNG afterwards.

  If these selectors are set to "1, 1," the CNG detection will not be inhibited.

[B] Printout of firmware switch data

■ Function

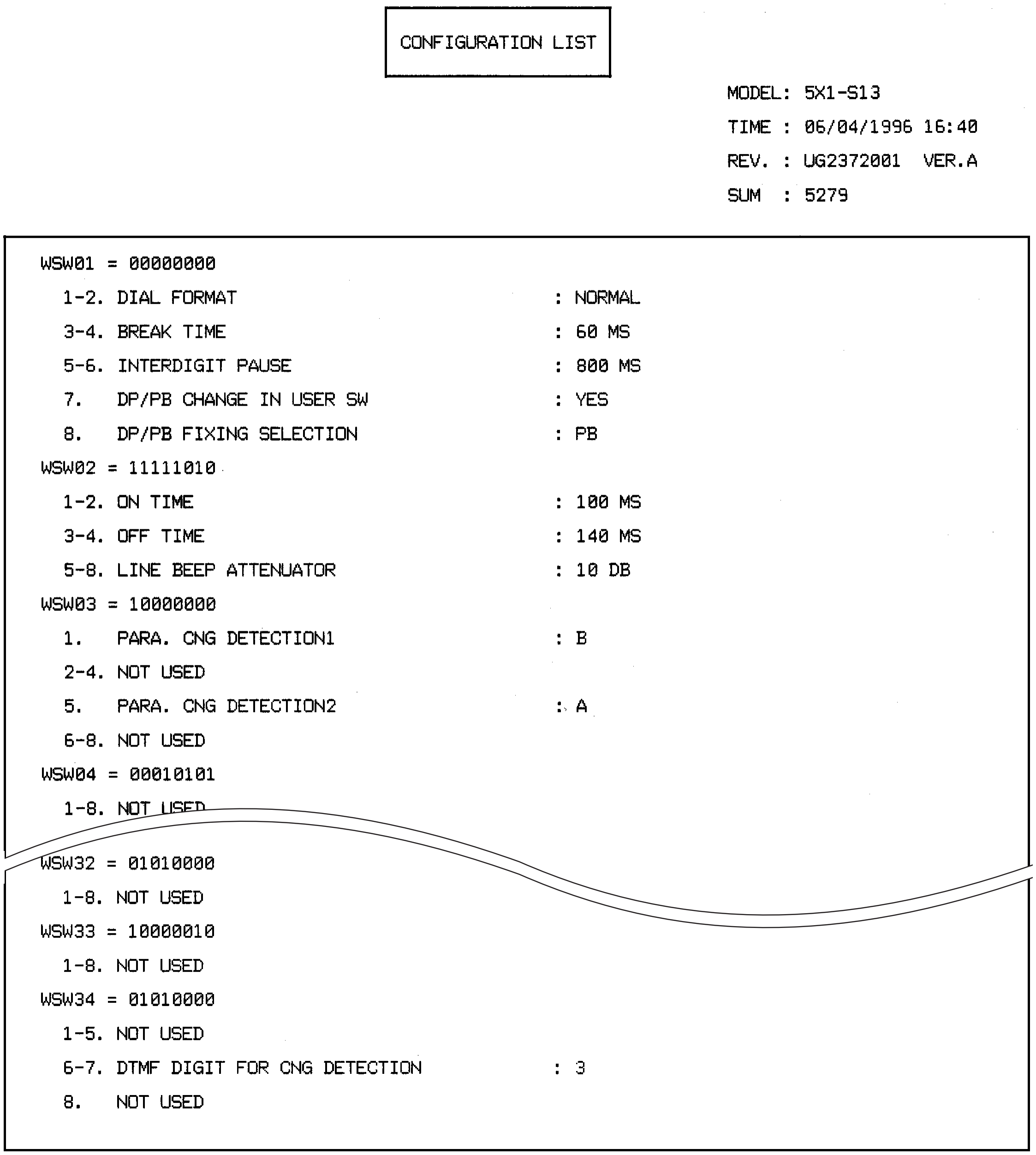
The equipment prints out the setting items and contents specified by the firmware switches.

■ Operating Procedure

(1) Press the 1 key twice in the initial maintenance mode.
The "PRINTING" will appear on the LCD.

(2) The equipment prints out the configuration list as shown in the figure below.

(3) Upon completion of printing, the equipment returns to the initial maintenance mode.



```
                         CONFIGURATION LIST

                                        MODEL: 5X1-S13
                                        TIME : 06/04/1996 16:40
                                        REV. : UG2372001  VER.A
                                        SUM  : 5279

WSW01 = 00000000
  1-2. DIAL FORMAT                      : NORMAL
  3-4. BREAK TIME                       : 60 MS
  5-6. INTERDIGIT PAUSE                 : 800 MS
  7.   DP/PB CHANGE IN USER SW          : YES
  8.   DP/PB FIXING SELECTION           : PB
WSW02 = 11111010
  1-2. ON TIME                          : 100 MS
  3-4. OFF TIME                         : 140 MS
  5-8. LINE BEEP ATTENUATOR             : 10 DB
WSW03 = 10000000
  1.   PARA. CNG DETECTION1             : B
  2-4. NOT USED
  5.   PARA. CNG DETECTION2             : A
  6-8. NOT USED
WSW04 = 00010101
  1-8. NOT USED

WSW32 = 01010000
  1-8. NOT USED
WSW33 = 10000010
  1-8. NOT USED
WSW34 = 01010000
  1-5. NOT USED
  6-7. DTMF DIGIT FOR CNG DETECTION     : 3
  8.   NOT USED
```

Configuration List

3.6 Operational Check of Control Panel PCB

■ Function

This function checks the control panel PCB for normal operation.

■ Operating Procedure

(1) Press the 1 and 3 keys in this order in the initial maintenance mode.

The "00 " will appear on the LCD.

(2) Press the keys and buttons in the order designated in the illustration shown below.

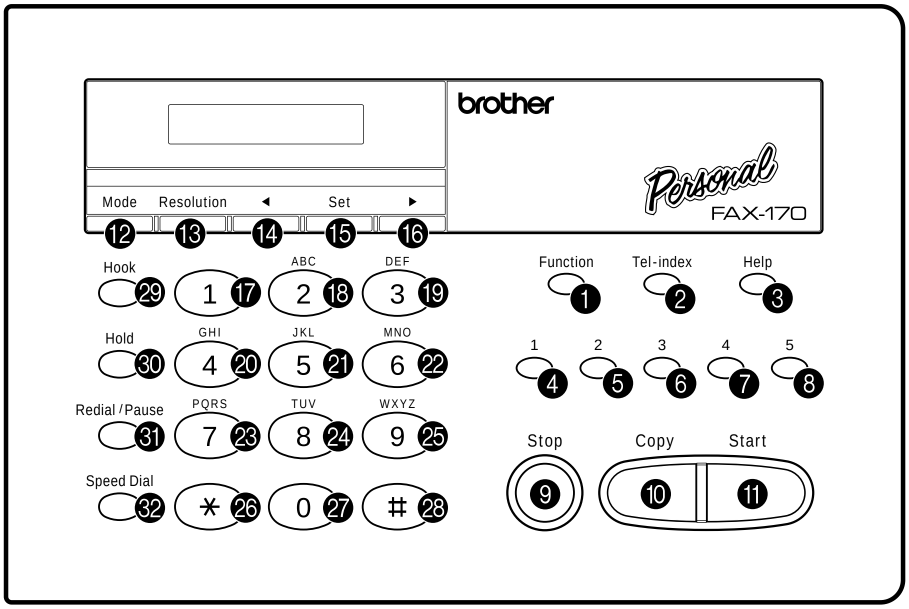
The LCD shows the corresponding number in decimal notation each time a key or button is pressed. Check that the displayed number is correct by referring to the illustration below.

If a key or button is pressed out of order, the equipment beeps and displays the "INVALID OPERATE" on the LCD. To return to the status ready to accept key & button entry for operational check, press the Stop key.

(3) After the last number key or button is pressed, the equipment beeps for 1 second.

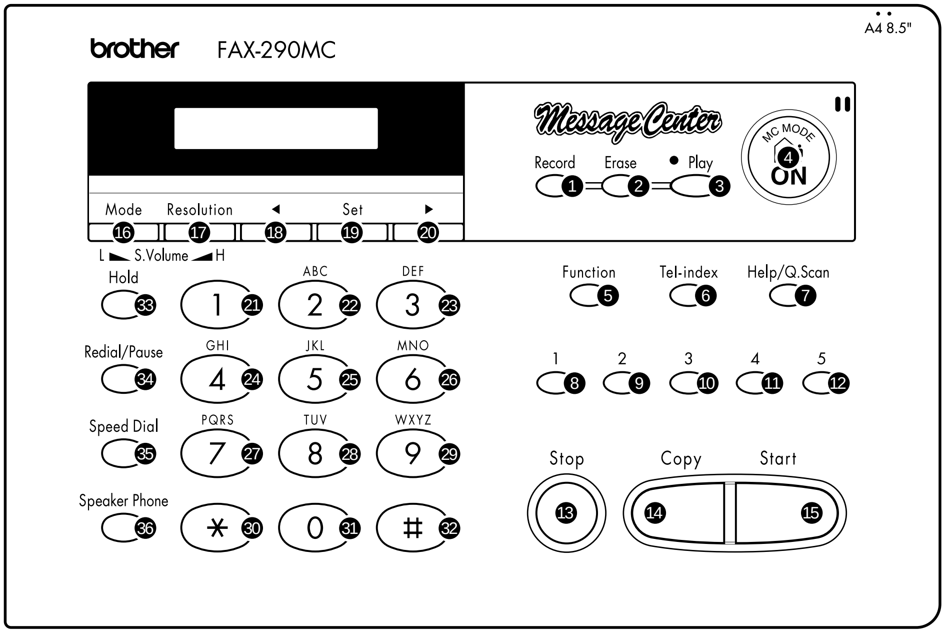
(4) To terminate this operation, press the Stop key. The equipment returns to the initial maintenance mode.

FAX170/190

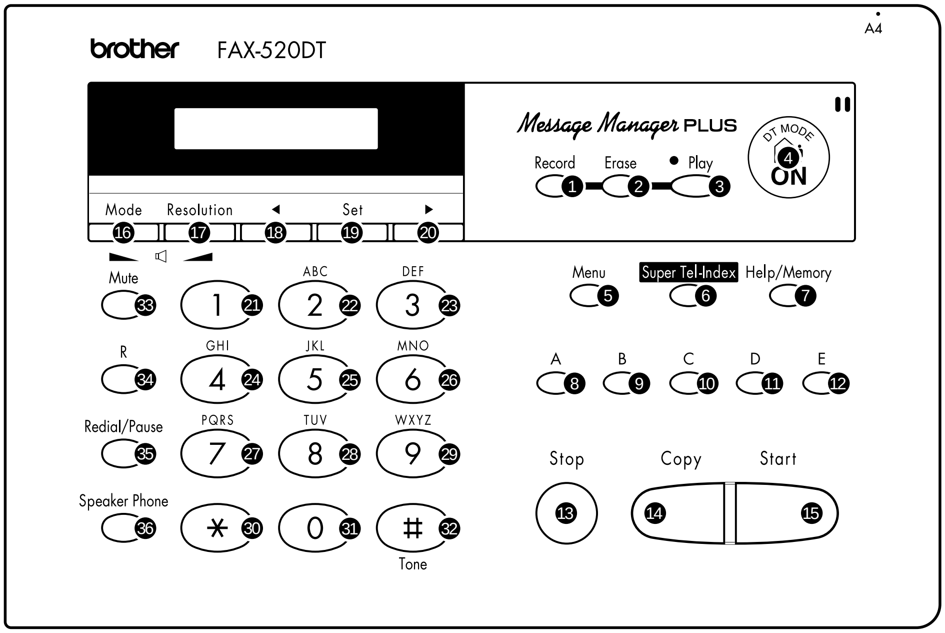

brother
Personal
FAX-170
Mode
Resolution
◄
Set
►
⑫
⑬
⑭
⑮
⑯
Hook
㉙
1 ⑰
ABC
2 ⑱
DEF
3 ⑲
Hold
㉚
GHI
4 ⑳
JKL
5 ㉑
MNO
6 ㉒
Redial / Pause
㉛
PQRS
7 ㉓
TUV
8 ㉔
WXYZ
9 ㉕
Speed Dial
㉜
* ㉖
0 ㉗
# ㉘
Function ①
Tel-index ②
Help ③
1 ④
2 ⑤
3 ⑥
4 ⑦
5 ⑧
Stop ⑨
Copy ⑩
Start ⑪

Key & Button Entry Order

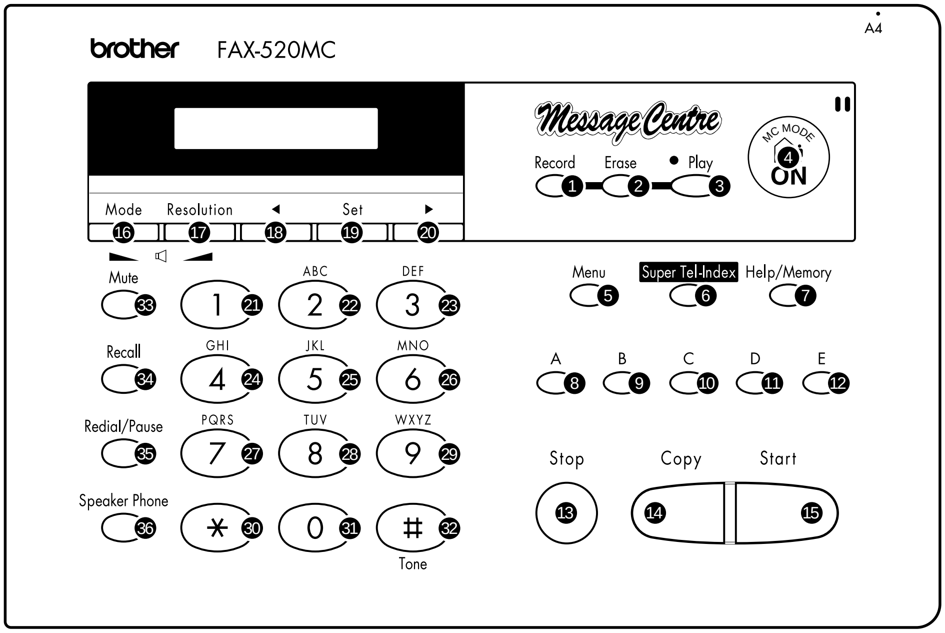
FAX-270MC/290MC


brother FAX-290MC
A4 8.5"
Message Center
Record ❶ Erase ❷ Play ❸
MC MODE ❹ ON
Mode ⑯ Resolution ⑰ ◄ ⑱ Set ⑲ ► ⑳
L S.Volume H
Hold ㉝
Redial/Pause ㉞
Speed Dial ㉟
Speaker Phone ㊱
1 ㉑ ABC 2 ㉒ DEF 3 ㉓
GHI 4 ㉔ JKL 5 ㉕ MNO 6 ㉖
PQRS 7 ㉗ TUV 8 ㉘ WXYZ 9 ㉙
* ㉚ 0 ㉛ # ㉜
Function ❺ Tel-index ❻ Help/Q.Scan ❼
1 ❽ 2 ❾ 3 ❿ 4 ⓫ 5 ⓬
Stop ⓭ Copy ⓮ Start ⓯

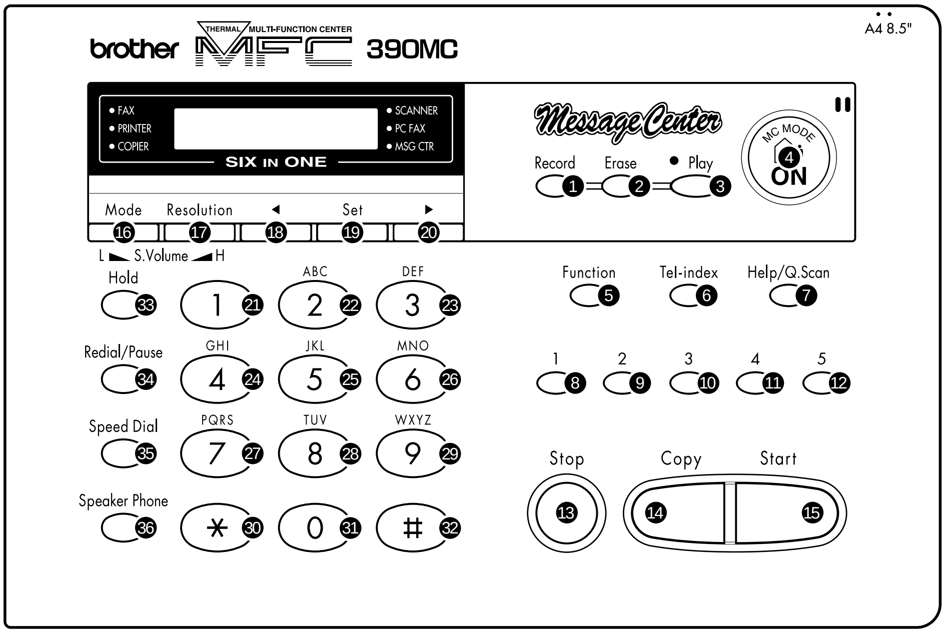
FAX-520DT


brother FAX-520DT
A4
Message Manager PLUS
Record ❶ Erase ❷ Play ❸
DT MODE ❹ ON
Mode ⑯ Resolution ⑰ ◄ ⑱ Set ⑲ ► ⑳
Mute ㉝
R ㉞
Redial/Pause ㉟
Speaker Phone ㊱
1 ㉑ ABC 2 ㉒ DEF 3 ㉓
GHI 4 ㉔ JKL 5 ㉕ MNO 6 ㉖
PQRS 7 ㉗ TUV 8 ㉘ WXYZ 9 ㉙
* ㉚ 0 ㉛ # ㉜
Tone
Menu ❺ Super Tel-Index ❻ Help/Memory ❼
A ❽ B ❾ C ❿ D ⓫ E ⓬
Stop ⓭ Copy ⓮ Start ⓯

FAX-520MC


A4
brother FAX-520MC
Message Centre
Record ① Erase ② Play ③
MC MODE ④ ON
Mode ⑯ Resolution ⑰ ◄ ⑱ Set ⑲ ► ⑳
Mute ㉝
1 ㉑ ABC 2 ㉒ DEF 3 ㉓
Recall ㉞
GHI 4 ㉔ JKL 5 ㉕ MNO 6 ㉖
Redial/Pause ㉟
PQRS 7 ㉗ TUV 8 ㉘ WXYZ 9 ㉙
Speaker Phone ㊱
* ㉚ 0 ㉛ # ㉜
Tone
Menu ⑤ Super Tel-Index ⑥ Help/Memory ⑦
A ⑧ B ⑨ C ⑩ D ⑪ E ⑫
Stop ⑬ Copy ⑭ Start ⑮

MFC370MC/390MC


A4 8.5"
brother THERMAL MULTI-FUNCTION CENTER MFC 390MC
FAX
PRINTER
COPIER
SCANNER
PC FAX
MSG CTR
SIX IN ONE
Message Center
Record ① Erase ② Play ③
MC MODE ④ ON
Mode ⑯ Resolution ⑰ ◄ ⑱ Set ⑲ ► ⑳
L S.Volume H
Hold ㉝
1 ㉑ ABC 2 ㉒ DEF 3 ㉓
Redial/Pause ㉞
GHI 4 ㉔ JKL 5 ㉕ MNO 6 ㉖
Speed Dial ㉟
PQRS 7 ㉗ TUV 8 ㉘ WXYZ 9 ㉙
Speaker Phone ㊱
* ㉚ 0 ㉛ # ㉜
Function ⑤ Tel-index ⑥ Help/Q.Scan ⑦
1 ⑧ 2 ⑨ 3 ⑩ 4 ⑪ 5 ⑫
Stop ⑬ Copy ⑭ Start ⑮

3.7 Sensor Operational Check

■ Function

This function allows you to check that the six sensors (document front sensor, document rear sensor, cover sensor, PE sensor, cutter HP sensor and hook switch sensor*) operate correctly.

(*In those versions equipped with a Binatone handset, the hook switch sensor serves no function.)

In those versions equipped with a non-Binatone handset, the LCD shows the “FRE RC PE CHK” when

- the document front and rear sensors detect no paper (FRE),
- the recording paper cover is closed (RC),
- the PE sensor detects paper loaded (PE), and
- the cutter HP sensor detects that the cutter is placed in the home position and the hook switch sensor detects the on-hook state (CHK).

In those versions equipped with a Binatone handset, the LCD shows the “FRE RC PE CH” when

- the document front and rear sensors detect no paper (FRE),
- the recording paper cover is closed (RC),
- the PE sensor detects paper loaded (PE), and
- the cutter HP sensor detects that the cutter is placed in the home position (CH).

■ Operating Procedure

(1) Press the 3 and 2 keys in this order in the initial maintenance mode.

In those versions equipped with a non-Binatone handset, the LCD should show “FRE RC PE CHK” if the detecting conditions of the six sensors are as defined above.

In those versions equipped with a Binatone handset, the LCD should show “FRE RC PE CH” if the detecting conditions of the five sensors are as defined above.

(2) Change the detecting conditions and check that the indication on the LCD changes as follows:

- Insert paper through the document front sensor, and the “F” of the FRE disappears.
- Insert paper through the document rear sensor, and the “E” of the FRE disappears.
- Open the control panel, and the “RC” disappears.
- Remove the recording paper, and the “PE” disappears.
- Shift the upper blade of the automatic cutter out of its home position, and the “C” of the CHK (CH) disappears.
- Lift up the handset, and the “K” of the CHK disappears. (Only on those versions with a non-Binatone handset)

(3) To stop this operation and return the equipment to the initial maintenance mode, press the Stop key.

3.8 CIS Scanner Area Setting

■ Function

The equipment sets the CIS scanner area and stores it into the E^2PROM.

■ Operating Procedure

(1) Press the $\boxed{5}$ key twice in the initial maintenance mode.

The "SCANNER AREA SET" will appear on the LCD.

The equipment checks and sets the area to be scanned.

If no error is noted, the equipment returns to the initial maintenance mode.

If any error is noted, the "SCANNER ERROR" will appear on the LCD. To return the equipment to the initial maintenance mode, press the $\boxed{\text{Stop}}$ key.

3.9 Equipment Error Code Indication

■ Function

This function displays an error code of the last error on the LCD.

■ Operating Procedure

(1) Press the $\boxed{8}$ and $\boxed{2}$ keys in this order in the initial maintenance mode.

The LCD shows "MACHINE ERROR XX."

(2) To stop this operation and return the equipment to the initial maintenance mode, press the $\boxed{\text{Stop}}$ key.

3.10 Document Draw Adjustment

After replacement of the main PCB or CIS, or if data stored in the E^{2}PROM is damaged, you need to carry out this procedure.

■ Function

This function adjusts how much the document is drawn in, starting at the point when the document rear sensor is turned on until the leading edge of the document reaches the scanning start position.

■ Operating Procedure

(1) In the initial maintenance mode, set the TC-025 chart on the document stacker.

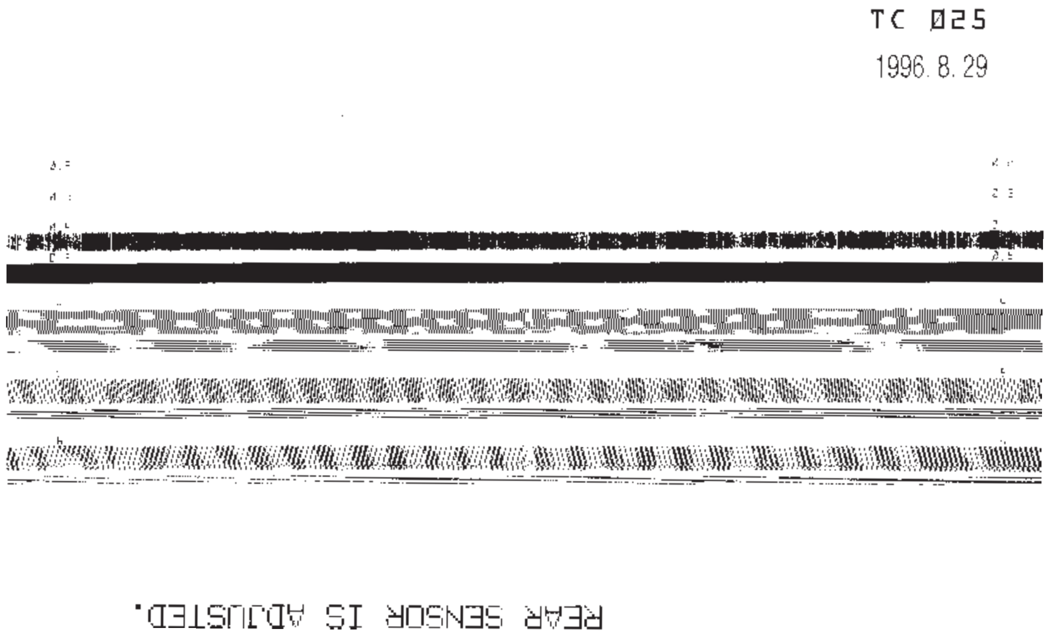
The message “DOC.READY” appears on the LCD.

(2) Press the Help key.

The equipment beeps and draws in the TC-025 chart to the scanning start position. While drawing it in, the equipment counts patterns on the chart to determine the amount of draw.

Upon completion of normal counting, the equipment shows the message “COPYING P.01” on the LCD and begins copying the TC-025 chart. The message “REAR SENSOR IS ADJUSTED” and the copied image will be printed out on recording paper as shown below.

If any error occurs during counting, the message “MACHINEERROR AB” appears on the LCD, with no copying of the TC-025 chart onto the recording paper taking place. However, only the message “REAR SENSOR IS ADJUSTED” will be printed out.



TC 025

1996. 8. 29

REAR SENSOR IS ADJUSTED.

Printout after Normal Completion of Document Draw Adjustment

CHAPTER **VI**.

ERROR INDICATION AND TROUBLESHOOTING

CONTENTS

1. ERROR INDICATION VI-1

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2. TROUBLESHOOTING.. VI-11

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2.2 Precautions VI-11

2.3 Checking prior to Troubleshooting VI-11

2.4 Troubleshooting Procedures VI-12

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[3] Communications related VI-13

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1. ERROR INDICATION

To help the user or the service personnel promptly locate the cause of a problem (if any), the facsimile equipment incorporates the self-diagnostic functions which display error messages for equipment errors and communications errors.

For the communications errors, the equipment also prints out the transmission verification report and the communications list.

1.1 Equipment Errors

If an equipment error occurs, the facsimile equipment emits an audible alarm (continuous beeping) for approximately 4 seconds and shows the error message on the LCD. For the error messages, see [1] below. As one of the error messages, “MACHINE ERROR XX” includes an error code which indicates the detailed error causes listed in [2]. To display an error code for the other latest error message, make the equipment enter the maintenance mode and press 8 and 2 keys (for details, refer to Chapter V, Section 3.9).

[1] Error messages on the LCD

Messages on the LCD	Probable Cause
PAPER ROLL EMPTY	The paper empty (PE) sensor detects that no recording paper is present.
PRINTER JAM	The recording paper failed to return to the printing position after it had been cut.
COVER OPEN	The cover sensor detects that the control panel ASSY is not closed.
DOCUMENT JAM	■ Document jam (1) The document length exceeds the limitation (400 or 90 cm) registered by firmware switch WSW16. (Refer to Chapter V, Section 3.5.) (Both the document front and rear sensors stay ON even after the document has been fed by the registered length.) (2) The document rear sensor detects no trailing edge of a document after the document has been fed by 400 cm. (The document rear sensor stays ON even after the document has been fed when the document front and rear sensors were OFF and ON, respectively.)

Messages on the LCD	Probable Cause
DOCUMENT JAM	■ Document loading error (1) The document rear sensor detects no leading edge of a document within 10 seconds from the start of document loading operation. (The document rear sensor stays OFF even after the document has been fed when the document front sensor was ON.) (2) The loaded document is too short. (Since the document is shorter than the distance between the document front and rear sensors, the document front sensor is turned OFF before the document rear sensor is turned ON.)
CUTTER JAM	The upper rotary blade of the automatic cutter failed to return to the home position within the specified time after cutting the recording paper.
CLEAN UP SCANNER	In the scanning compensation data list printed by the maintenance-mode function No. 05, less than fifty percent of the white level data is faulty.
SCANNER ERROR	In the scanning compensation data list printed by the maintenance-mode function No. 05, fifty percent or more of the white level data is faulty.
PRINTER FAULT	The thermistor in the recording head caused a heat error.
MACHINE ERROR XX	“XX” indicates an error code. Refer to Section [2] on the next page.

If only an alarm beep is heard without any message on the LCD when the equipment is powered up, the ROM or RAM will be defective.

[2] Error codes shown in the “MACHINE ERROR XX” message

Error Code xx (Hex.)	Error factor
82	Recording paper feeding error.
87	Fails to complete the sequence of recording operation.
(89	Cutter jam.)
8A	Wrong or weak contact of the recording head connectors.
(8B	Recording head overheat.)
(A1	Recording paper cover opened.)
(A2	Document too long to scan.)
(A3	Document not detected by the document rear sensor.)
(A4	50% or more faulty of white level data.)
A5	Faulty operation of DMA0 during scanning.
A6	Faulty operation of DMA1 during scanning.
A7	One-line feeding time-out error.
A8	One-line scanning time-out error.
A9	Abnormal scanning reference voltage.
AB	Document feed-in amount measuring error.
AC	Less than 50% faulty of white level data.
B1	CODEC LSI error.
(B9	Light emission intensity error of the LED array.)
(BA	Scanning error: The left-hand black reference line which is marked on the document pressure bar for scanning width setting is not detected.)
(BB	Scanning error: The right-hand black reference line which is marked on the document pressure bar for scanning width setting is not detected.)
(BC	Scanning error: Reduction miss)
(BD	Scanning error: Enlargement miss)
(BE	Abnormal clamp BWM value)
D1	The MODEM setup bit sticks to High.
D2	CTS stays OFF or ON if the MODEM RTS is turned ON or OFF, respectively.
D3	Bit B1A of the MODEM stays OFF.
D4	Bit RX of the MODEM stays OFF.
D5	The MODEM fails to complete the command transmission sequence.
D6	No MODEM interrupt for 60 seconds.
E1	Microprocessor (MPU) error on the control panel PCB.
(E4	Out of recording paper.)
(E5	Recording paper set error.)
E6	Write error in E^{2}PROM.
E8	Data scanning error during transmission.
(EA	Document removed at phase B.)
F3	Voice message recording or playing-back not started.
F5	EOL not found in page memory transmission mode.
FF	Interface error of page memory command.

Error codes in parentheses do not appear in the “MACHINE ERROR XX”, since those errors are displayed as messages described in "[1] Error messages on the LCD." Those error codes appear in the communications error list if an equipment error occurs during communications. Refer to Section 1.2, (13).

1.2 Communications Errors

If a communications error occurs, the facsimile equipment

(1) emits an audible alarm (intermittent beeping) for approximately 4 seconds,
(2) displays the corresponding error message, and
(3) prints out the transmission verification report if the equipment is in sending operation.

■ Definition of Error Codes on the Communications List

(1) Calling

Code 1	Code 2	Causes
10	08	Wrong number called.
11	01	No dial tone detected before start of dialing.
11	02	Busy tone detected before dialing.
11	03	2nd dial tone not detected.
11	05	No loop current detected. *
11	06	Busy tone detected after dialing or called.
11	07	No response from the remote station in sending.
11	10	No tone detected after dialing.
17	07	No response from the calling station in receiving.

* Available in Germany and Austria only.

(2) Command reception

Code 1	Code 2	Causes
20	01	Unable to detect a flag field.
20	02	Carrier was OFF for 200 ms or longer.
20	03	Abort detected (“1” in succession for 7 bits or more).
20	04	Overrun detected.
20	05	A frame for 3 seconds or more received.
20	06	CRC error in answer back.
20	07	Undefined command received.
20	08	Invalid command received.
20	09	Command ignored once for document setting or for dumping-out at turn-around transmission.
20	0A	T5 time-out error
20	0B	CRP received.
20	0C	EOR and NULL received.

(3) Compatibility [checking the NSF and DIS]

Code 1	Code 2	Causes
32	01	Remote terminal only with V.29 capability in 2400 or 4800 bps transmission.
32	02	Remote terminal not ready for polling.
32	10	Remote terminal not equipped with password function or its password switch OFF.
32	11	Remote terminal not equipped with or not ready for confidential mail box function.
32	12	Remote terminal not equipped with or not ready for relay broadcasting function.
32	13	No confidential mail in the remote terminal.
32	14	The available memory space of the remote terminal is less than that required for reception of the confidential or relay broadcasting instruction.

(4) Instructions received from the remote terminal [checking the NSC, DTC, NSS, and DCS]

Code 1	Code 2	Causes
40	02	Illegal coding system requested.
40	03	Illegal recording width requested.
40	05	ECM requested although not allowed.
40	06	Polled while not ready.
40	07	No document to send when polled.
40	10	Nation code or manufacturer code not coincident.
40	11	Unregistered group code entered for relay broadcasting function, or the specified number of broadcasting subscribers exceeding the limit.
40	12	Retrieval attempted when not ready for retrieval.
40	13	Polled by any other manufacturers' terminal while waiting for secure polling.
40	17	Invalid resolution selected.

(5) Command reception [checking the NSF and DIS after transmission of NSS and DCS]

Code 1	Code 2	Causes
50	01	Vertical resolution capability changed after compensation of background color.

(6) ID checking

Code 1	Code 2	Causes
63	01	Password plus "lower 4 digits of telephone number" not coincident.
63	02	Password not coincident.
63	03	Polling ID not coincident.
63	04	Entered confidential mail box ID uncoincident with the mail box ID.
63	05	Relay broadcasting ID not coincident.
63	06	Entered retrieval ID uncoincident with that of the mail box ID.

(7) DCN reception

Code 1	Code 2	Causes
74		DCN received.

(8) TCF transmission/reception

Code 1	Code 2	Causes
80	01	Fallback impossible.

(9) Signal isolation

Code 1	Code 2	Causes
90	01	Unable to detect video signals and commands within 6 seconds after CFR is transmitted.
90	02	Received PPS containing invalid page count or block count.

(10) Video signal reception

Code 1	Code 2	Causes
A0	03	Error correction sequence not terminated even at the final transmission speed for fallback.
A0	11	Receive buffer empty. (5-second time-out)
A0	12	Receive buffer full during operation except receiving into memory.
A0	13	Decoding error continued on 500 lines.
A0	14	Decoding error continued for 10 seconds.
A0	15	Time-out: Five seconds or more for one-line transmission.
A0	16	RTC not found and carrier OFF signal detected for 6 seconds.
A0	17	RTC found and command detected for 60 seconds.
A8	01	RTN, PIN, or ERR received at the calling terminal. *
A9	01	RTN, PIN, or ERR received at the called terminal. *
AA	18	Receive buffer full during receiving into memory.

* Available in Germany and Austria only.

(11) General communications-related

Code 1	Code 2	Causes
B0	01	Polarity inversion detected.
B0	02	Unable to receive the next-page data.
B0	03	Unable to receive polling even during turn-around transmission due to call reservation.
B0	04	PC interface error.

(12) Maintenance mode

Code 1	Code 2	Causes
E0	01	Failed to detect 1300 Hz signal in burn-in operation.
E0	02	Failed to detect PB signals in burn-in operation.
E0	03	Failed to detect any command from the RS-232C interface in burn-in operation.

(13) Equipment error

Code 1	Code 2	Causes
FF	XX	Equipment error (For XX, refer to Subsection 1.1 [2].)

2. TROUBLESHOOTING

2.1 Introduction

This section gives the service personnel some of the troubleshooting procedures to be followed if an error or malfunction occurs with the facsimile equipment. It is impossible to anticipate all of the possible problems which may occur in future and determine the troubleshooting procedures, so this section covers some sample problems. However, those samples will help service personnel pinpoint and repair other defective elements if he/she analyzes and examines them well.

2.2 Precautions

Be sure to observe the following to prevent the secondary troubles from happening:

(1) Always unplug the AC power cord from the outlet when removing the covers and PCBs, adjusting the mechanisms, or conducting continuity testing with a circuit tester.

(2) When disconnecting the connectors, do not pull the lead wires but hold the connector housings.

(3)
- Before handling the PCBs, touch a metal portion of the machine to discharge static electricity charged in your body.
- When repairing the PCBs, handle them with extra care.

After repairing the defective section, be sure to check again if the repaired section works correctly. Also record the troubleshooting procedure so that it would be of use for future trouble occurrence.

2.3 Checking prior to Troubleshooting

Prior to proceeding to the troubleshooting procedures, check that:

(1) Each voltage level on AC input lines and DC lines is correct.

(2) All cables and harnesses are firmly connected.

(3) None of the fuses are blown.

2.4 Troubleshooting Procedures

[1] Control panel related

Trouble	Check:
(1) LCD shows nothing.	• Main-panel harness between the main PCB and the control panel PCB • Interfaces between the main PCB, NCU PCB and power supply PCB • Control panel PCB • Power supply PCB • Main PCB
(2) Control panel inoperative.	• Main-panel harness between the main PCB and the control panel PCB • Interfaces between the main PCB, NCU PCB and power supply PCB • Control panel PCB • FPC key • Main PCB

[2] Telephone related

Trouble	Check:
(1) No phone call can be made.	• FPC key • Control panel PCB by using the maintenance-mode function No. 13. If any defective keys are found, replace them. (Refer to Chapter V, Section 3.6.) • NCU PCB • Main PCB
(2) Speed dialing or one-touch dialing will not work.	• Ordinary dialing function (other than the speed and one-touch dialing) If it works normally, check the main PCB; if not, refer to item (1) above.
(3) Speaker silent during on-hook dialing.	• Ordinary dialing function (other than the on-hook dialing with the hook key) If it works normally, proceed to the following checks; if not, refer to item (1) above.
(4) Dial does not switch between tone and pulse.	• Main PCB

Trouble	Check:
(5) Telephone does not ring.	• Speaker • NCU PCB • Main PCB

[3] Communications related

Trouble	Check:
(1) No tone is transmitted.	• Main PCB • NCU PCB

[4] Paper/document feeding related

Trouble	Check:
(1) Neither "COPY: PRESS COPY" nor "FAX: NO. & START" message appears although documents are set.	• Sensors by using the maintenance-mode function No. 32. (Refer to Chapter V, Section 3.7.) • Actuators of the document front and rear sensors • Main PCB
(2) Document not fed.	• ADF and its related sections • Drive motor and its harness • White pressure roller and its related gears • Solenoid and the planetary gear train • Main PCB
(3) Recording paper not fed.	• ADF and its related sections • Drive motor and its harness • Platen and its related gears • Solenoid and the planetary gear train • Main PCB
(4) The "CUTTER JAM" message cannot be removed.	• Drive motor and its harness • Cutter HP sensor and its position • Cutter gear • Solenoid and the planetary gear train • Main PCB

[5] Print-image related

If the received or sent image has any problem, first make a copy with the facsimile equipment.

If the copied image is normal, the problem may be due to the remote terminal; if it is abnormal, proceed to the following checks:

Trouble	Check:
(1) Completely blank	
At the scanner	• Main PCB
At the recorder	• Recording head harness • Compression springs beneath the recording head • Recording head • Main PCB
(2) White vertical streaks	
At the scanner	• CIS unit
At the recorder	• Recording head
(3) All black	
At the scanner	• CIS harness • CIS unit • Main PCB
At the recorder	• Recording head harness • Recording head • Main PCB
(4) Black vertical streaks	
At the scanner	• CIS unit
At the recorder	• Recording head
(5) Light or dark	
At the scanner	• CIS unit • Main PCB
At the recorder	• Compression springs beneath the recording head

Trouble	Check:
(6) Faulty image registration	
At the scanner	• CIS harness • CIS unit • Main PCB
At the recorder	• Recording head harness • Main PCB
(7) Image distortion	
In communications	• Error code displayed (Refer to Section 1, "ERROR INDICATION" in this chapter.) • NCU PCB • Main PCB
At the scanner	• Separation roller and its related sections • White pressure roller and its related gears • Solenoid and the planetary gear train • Drive motor and its harness • Main PCB
At the recorder	• Compression springs beneath the recording head • Platen and its related gears • Solenoid and the planetary gear train • Drive motor and its harness • Main PCB

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March '98
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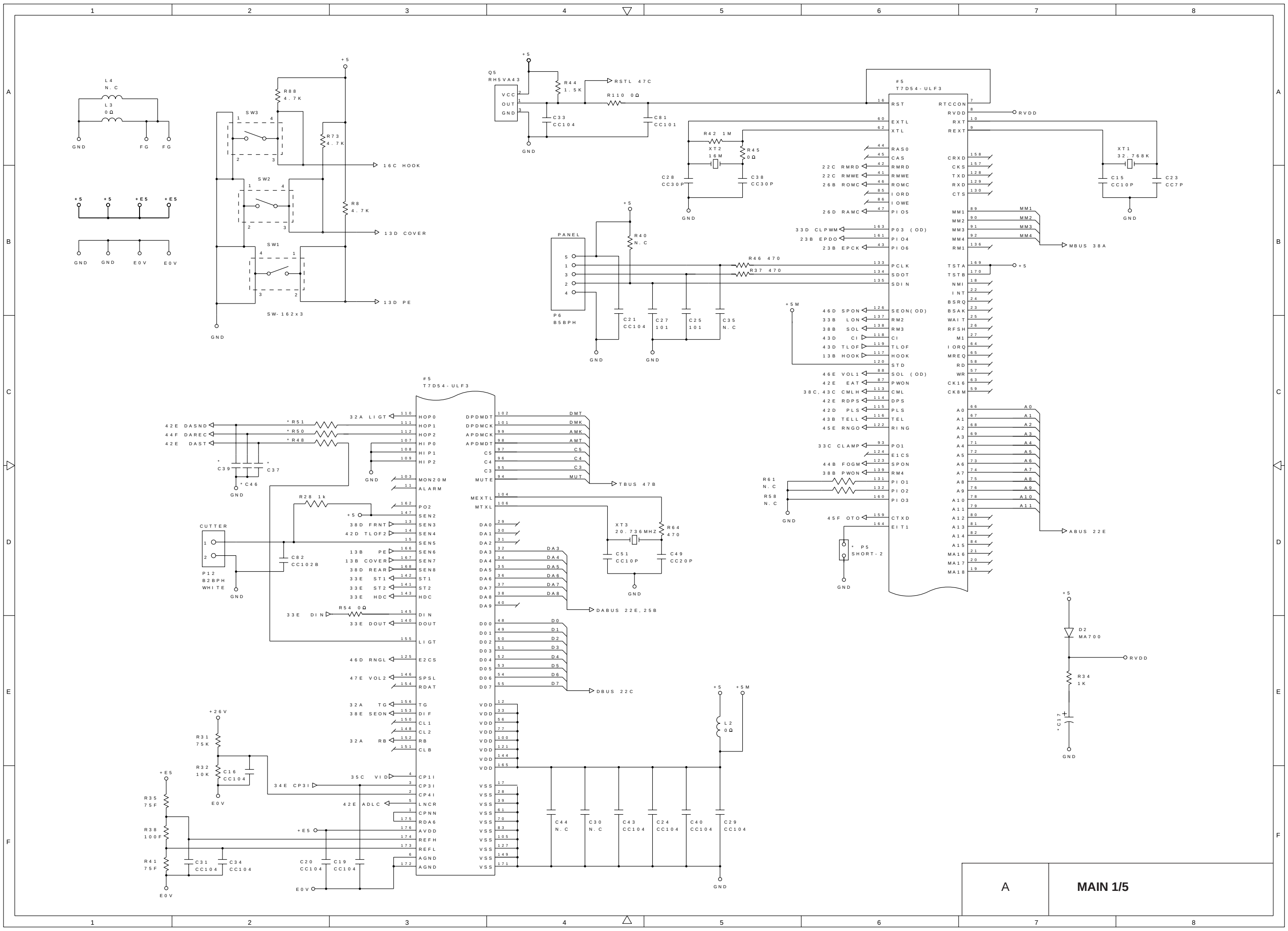
Printed in Japan

FAX-170/190/510/HOME FAX

APPENDICES

Circuit Diagrams

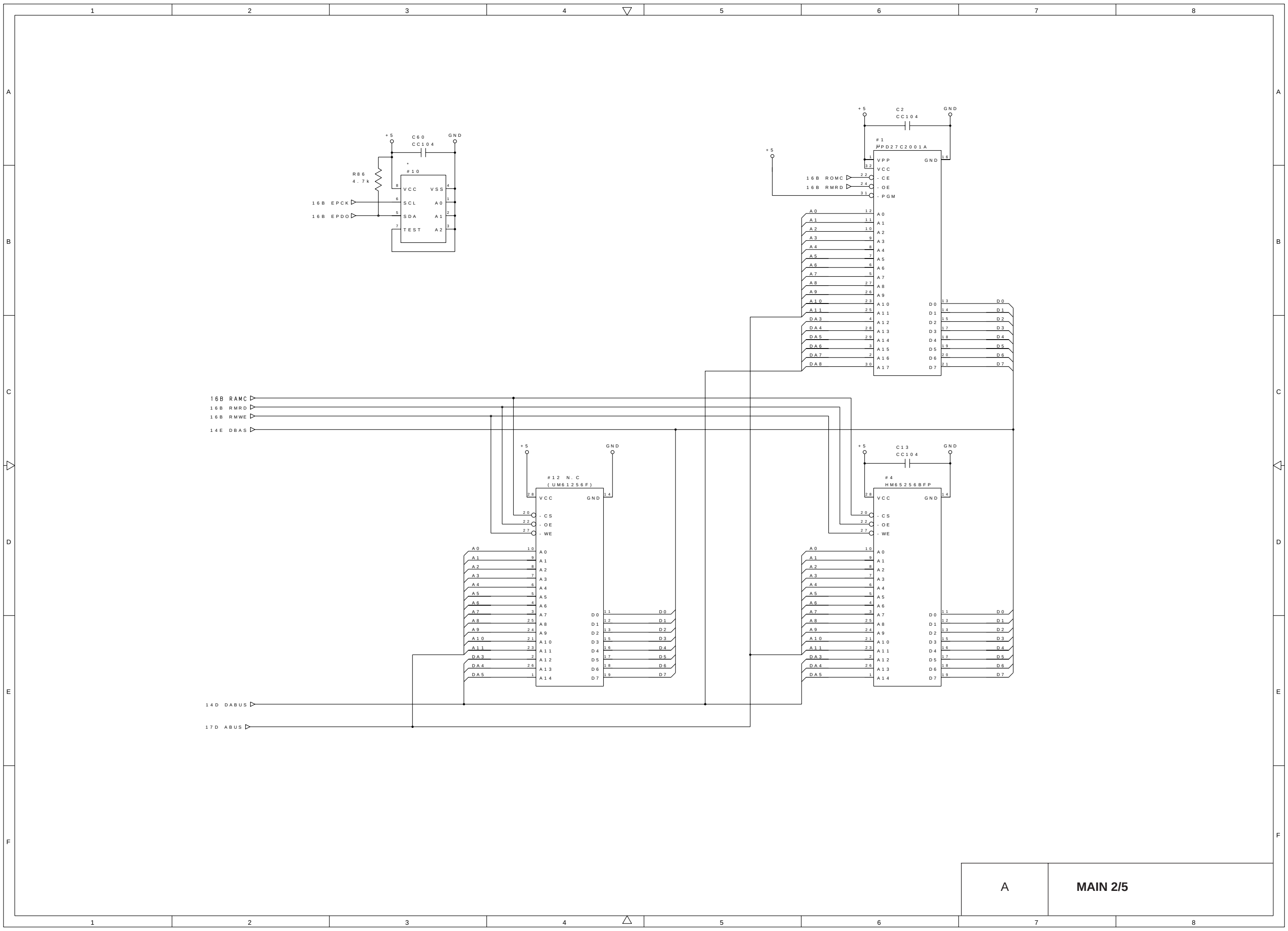
A. Main PCB
B. Network Control Unit (NCU) PCB
C. Control Panel PCB
D. Power Supply PCB


1
2
3
4
5
6
7
8
A
B
C
D
E
F
L4
N. C
L3
0Ω
GND
FG
FG
+5
+5
+E5
+E5
GND
GND
E0V
E0V
+5
R88
4.7K
SW3
1
4
2
3
R73
4.7K
16C HOOK
SW2
1
4
2
3
R8
4.7K
13D COVER
SW1
4
1
3
2
13D PE
SW-162x3
GND
+5
Q5
RH5VA43
VCC 2
OUT 1
GND 3
R44
1.5K
RSTL 47C
R110 0Ω
C33
CC104
C81
CC101
GND
R42 1M
XT2
16M
R45
0Ω
C28
CC30P
C38
CC30P
GND
+5
PANEL
R40
N. C
5
1
3
2
4
P6
B5BPH
R46 470
R37 470
C21
CC104
C27
101
C25
101
C35
N. C
GND
GND
+5M
#5
T7D54-ULF3
16 RST
60 EXTL
62 XTL
44 RAS0
45 CAS
22C RMRD 42 RMRD
22C RMWE 41 RMWE
26B ROMC 46 ROMC
85 IORD
86 IOWE
26D RAMC 47 PIO5
33D CLPWM 163 P03 (OD)
23B EPDO 161 PIO4
23B EPCK 43 PIO6
133 PCLK
134 SDOT
135 SDIN
46D SPON 126 SEON(OD)
33B LON 137 RM2
38B SOL 138 RM3
43D CI 118 CI
43D TLOF 119 TLOF
13B HOOK 117 HOOK
120 STD
46E VOL1 88 SOL (OD)
42E EAT 87 PWON
38C, 43C CMLH 113 CML
42E RDPS 114 DPS
42D PLS 115 PLS
43B TELL 116 TEL
45E RNGO 122 RING
33C CLAMP 93 PO1
124 E1CS
44B FOGM 123 SPON
38B PWON 139 RM4
R61
N. C
R58
N. C
131 PIO1
132 PIO2
160 PIO3
GND
45F OTO 159 CTXD
164 EIT1
* P5
SHORT-2
GND
RTCCON 7
RVDD 8
RVDD
RXT 10
REXT 9
XT1
32.768K
C15
CC10P
C23
CC7P
GND
CRXD 158
CKS 157
TXD 128
RXD 129
CTS 130
MM1 89
MM2 90
MM3 91
MM4 92
RM1 136
MM1
MM2
MM3
MM4
MBUS 38A
TSTA 169
TSTB 170
+5
NMI 18
INT 22
BSRQ 24
BSAK 23
WAIT 25
RFSH 26
M1 27
IORQ 64
MREQ 65
RD 58
WR 57
CK16 63
CK8M 59
A0 66
A1 67
A2 68
A3 69
A4 71
A5 72
A6 73
A7 74
A8 75
A9 76
A10 78
A11 79
A12 80
A13 81
A14 82
A15 84
MA16 21
MA17 20
MA18 19
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
ABUS 22E
+5
D2
MA700
RVDD
R34
1K
* C17
GND
#5
T7D54-ULF3
32A LIGT 110 HOP0
42E DASND
44F DAREC
42E DAST
* R51
* R50
* R48
111 HOP1
112 HOP2
107 HIP0
108 HIP1
109 HIP2
*
C39
* C46
*
C37
GND
GND
103 MON20M
11 ALARM
R28 1k
162 PO2
+5 147 SEN2
38D FRNT 13 SEN3
42D TLOF2 14 SEN4
15 SEN5
13B PE 166 SEN6
13B COVER 167 SEN7
38D REAR 168 SEN8
33E ST1 142 ST1
33E ST2 141 ST2
33E HDC 143 HDC
CUTTER
1
2
P12
B2BPH
WHITE
GND
C82
CC102B
R54 0Ω
33E DIN 145 DIN
33E DOUT 140 DOUT
155 LIGT
46D RNGL 125 E2CS
47E VOL2 146 SPSL
154 RDAT
32A TG 156 TG
38E SEON 153 DIF
150 CL1
148 CL2
32A RB 152 RB
151 CLB
+26V
R31
75K
R32
10K
C16
CC104
E0V
35C VID 4 CP1I
34E CP3I 3 CP3I
2 CP4I
42E ADLC 5 LNCR
1 CPNN
175 RDA6
+E5 176 AVDD
174 REFH
173 REFL
6 AGND
172 AGND
+E5
R35
75F
R38
100F
R41
75F
C31
CC104
C34
CC104
E0V
C20
CC104
C19
CC104
E0V
DPDMDT 102
DPDMCK 101
APDMCK 99
APDMDT 98
C5 97
C4 96
C3 95
MUTE 94
DMT
DMK
AMK
AMT
C5
C4
C3
MUT
TBUS 47B
MEXTL 104
MTXL 106
XT3
20.736MHZ
R64
470
C51
CC10P
C49
CC20P
GND
DA0 29
DA1 30
DA2 31
DA3 32
DA4 34
DA5 35
DA6 36
DA7 37
DA8 38
DA9 40
DA3
DA4
DA5
DA6
DA7
DA8
DABUS 22E, 25B
D00 48
D01 49
D02 50
D03 51
D04 52
D05 53
D06 54
D07 55
D0
D1
D2
D3
D4
D5
D6
D7
DBUS 22C
VDD 12
VDD 33
VDD 56
VDD 77
VDD 100
VDD 121
VDD 144
VDD 165
VSS 17
VSS 28
VSS 39
VSS 61
VSS 70
VSS 83
VSS 105
VSS 127
VSS 149
VSS 171
+5
+5M
L2
0Ω
C44
N. C
C30
N. C
C43
CC104
C24
CC104
C40
CC104
C29
CC104
GND

A

MAIN 1/5

`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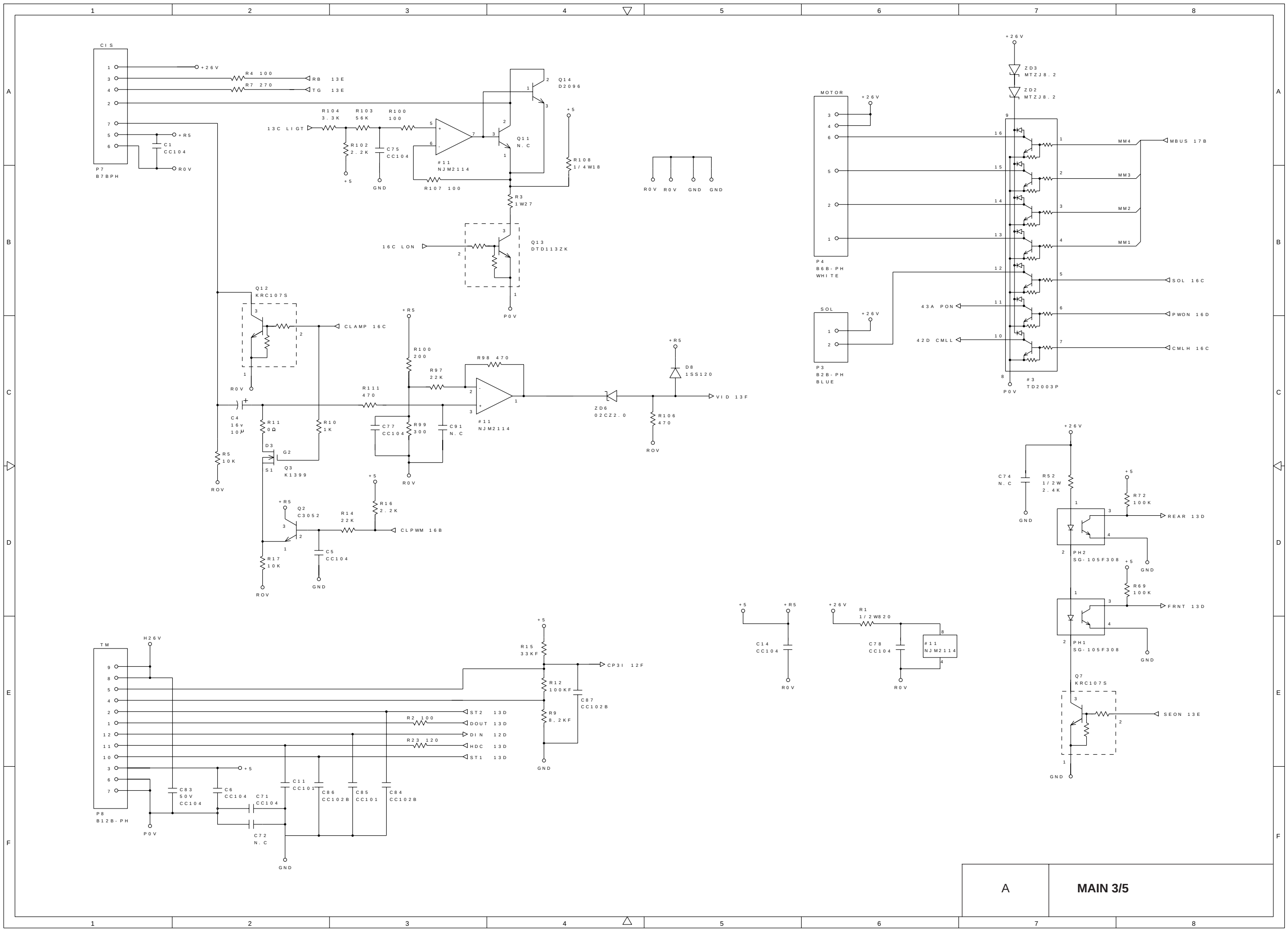
C
D
E
F
+5
C60
CC104
GND
R86
4.7k
*
#10
VCC
VSS
SCL
A0
SDA
A1
TEST
A2
16B EPCK
16B EPDO
C2
CC104
#1
μPD27C2001A
VPP
GND
VCC
-CE
-OE
-PGM
16B ROMC
16B RMRD
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
DA3
DA4
DA5
DA6
DA7
DA8
A12
A13
A14
A15
A16
A17
D0
D1
D2
D3
D4
D5
D6
D7
16B RAMC
16B RMRD
16B RMWE
14E DBAS
#12 N.C
(UM61256F)
-CS
-WE
C13
CC104
#4
HM65256BFP
14D DABUS
17D ABUS

A

MAIN 2/5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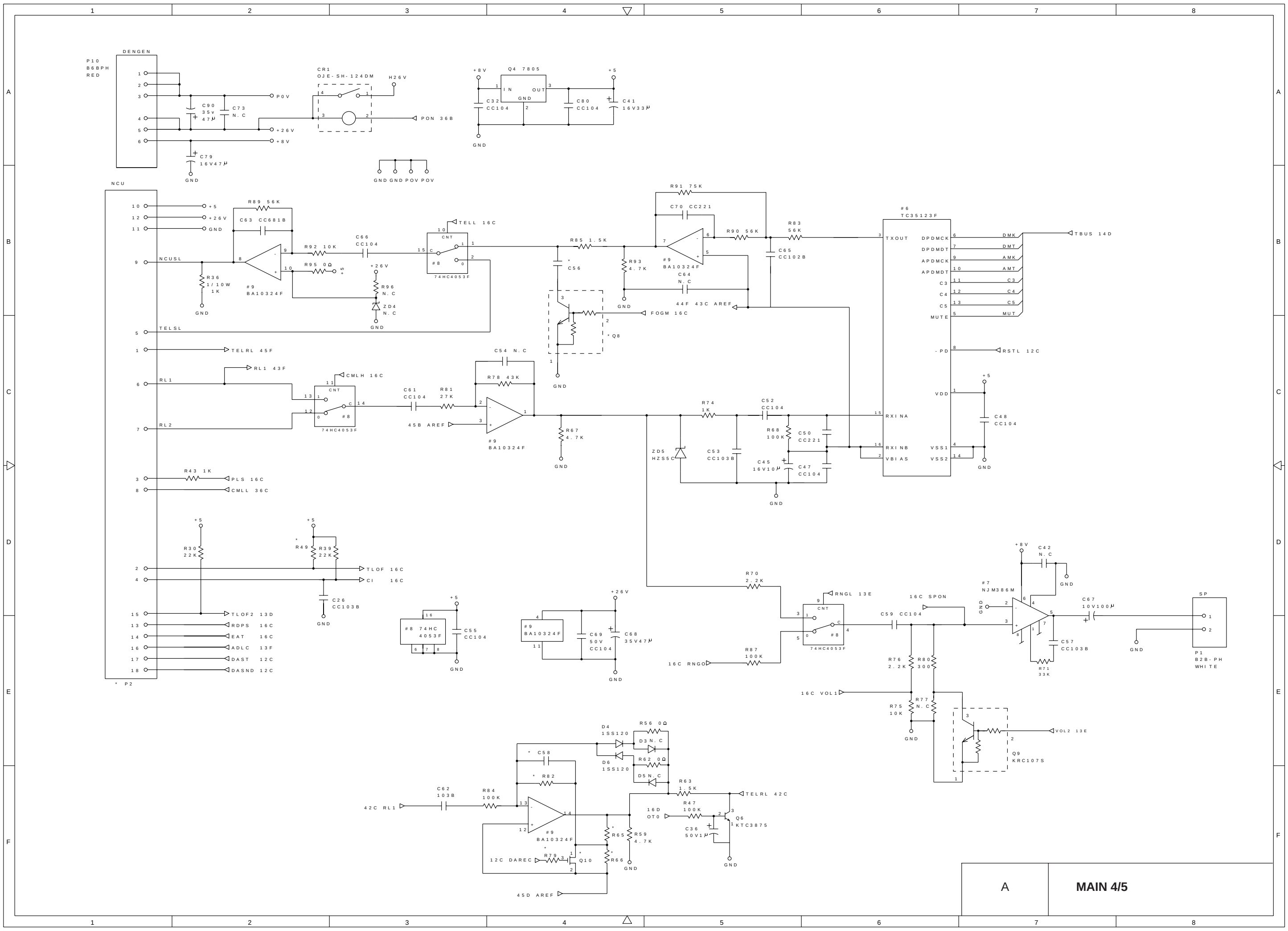
+26V
R4 100
R8 13E
R7 270
TG 13E
P7
B7BPH
+R5
C1
CC104
R0V
Q14
D2096
R104
3.3K
R103
56K
R100
100
13C LIGT
R102
2.2K
C75
CC104
#11
NJM2114
Q11
N.C
+5
R108
1/4W18
GND
R107 100
R3
1W27
16C LON
Q13
DTD113ZK
P0V
R0V
GND
Q12
KRC107S
CLAMP 16C
+R5
R100
200
R97
22K
R98 470
R111
470
C4
16v
10μ
R11
0Ω
R10
1K
C77
CC104
R99
300
C91
N.C
#11
NJM2114
D8
1SS120
ZD6
02CZ2.0
VID 13F
R106
470
D3
G2
S1
Q3
K1399
R5
10K
+R5
Q2
C3052
R16
2.2K
R14
22K
CLPWM 16B
R17
10K
C5
CC104
TM
H26V
P8
B12B-PH
R15
33KF
CP3I 12F
R12
100KF
C87
CC102B
R9
8.2KF
ST2 13D
R2 100
DOUT 13D
DIN 12D
R23 120
HDC 13D
ST1 13D
C83
50V
CC104
C6
CC104
C71
CC104
C11
CC101
C86
CC102B
C85
CC101
C84
CC102B
C72
N.C
MOTOR
P4
B6B-PH
WHITE
ZD3
MTZJ8.2
ZD2
MTZJ8.2
MBUS 17B
MM4
MM3
MM2
MM1
SOL 16C
PWON 16D
CMLH 16C
43A PON
42D CMLL
SOL
P3
B2B-PH
BLUE
#3
TD2003P
C14
CC104
R1
1/2W820
C78
CC104
#11
NJM2114
C74
N.C
R52
1/2W
2.4K
R72
100K
REAR 13D
PH2
SG-105F308
R69
100K
FRNT 13D
PH1
SG-105F308
Q7
KRC107S
SEON 13E
A
MAIN 3/5

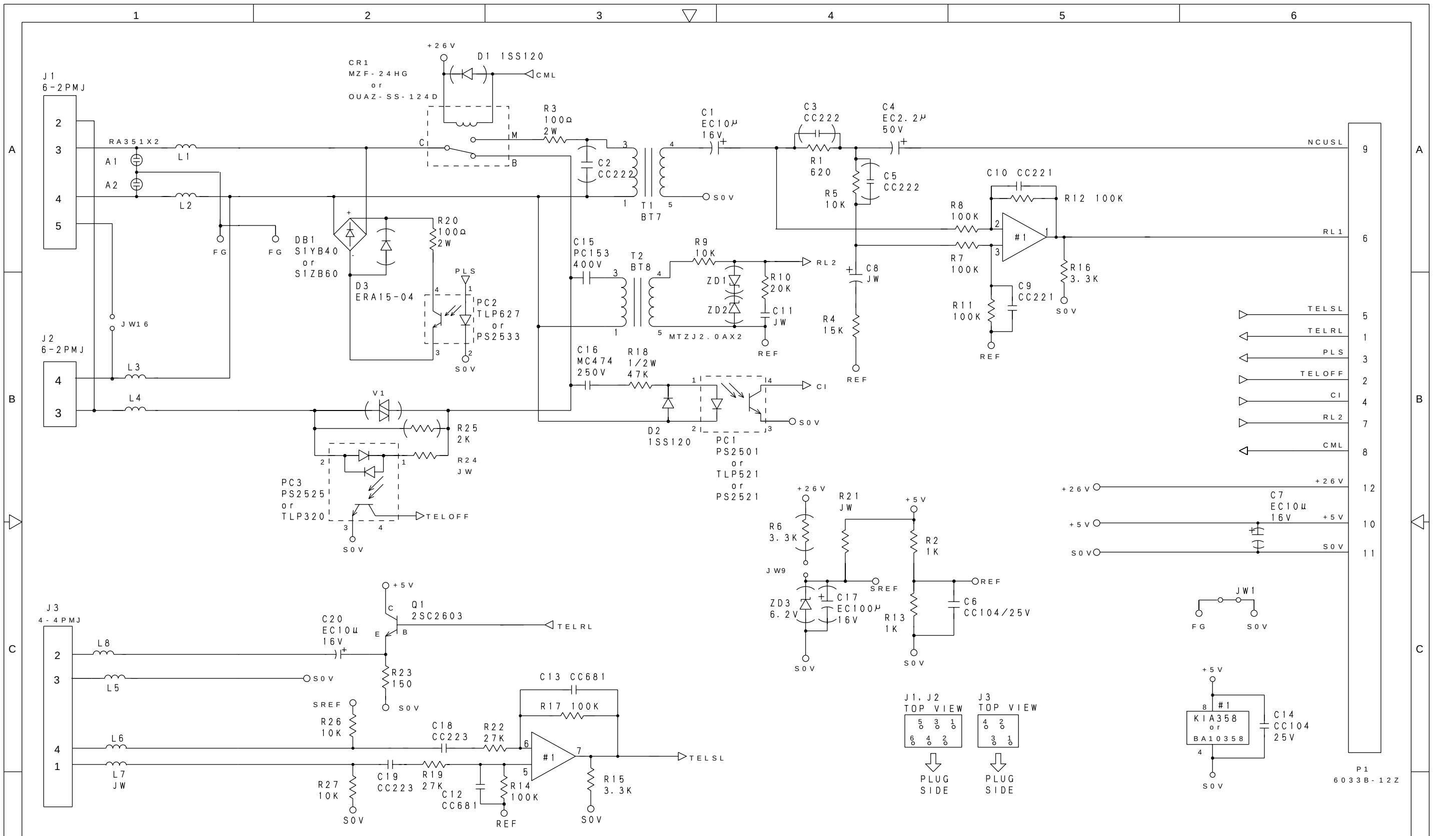


P10
B6BPH
RED
DENGEN
C90
35v
47μ
C73
N.C
P0V
+26V
+8V
C79
16V47μ
GND
CR1
OJE-SH-124DM
H26V
PON 36B
+8V
Q4 7805
IN
OUT
GND
C32
CC104
C80
CC104
+5
C41
16V33μ
GND GND P0V P0V
NCU
NCUSL
R89 56K
C63 CC681B
R36
1/10W
1K
#9
BA10324F
R92 10K
R95 0Ω
C66
CC104
+26V
R96
N.C
ZD4
N.C
TELL 16C
CNT
#8
74HC4053F
R85 1.5K
C56
R93
4.7K
R91 75K
C70 CC221
R90 56K
C64
N.C
44F 43C AREF
FOGM 16C
Q8
R83
56K
C65
CC102B
#6
TC35123F
TXOUT
DPDMCK
DPDMDT
APDMCK
APDMDT
C3
C4
C5
MUTE
DMK
DMT
AMK
AMT
TBUS 14D
-PD
RSTL 12C
VDD
RXINA
RXINB
VBIAS
VSS1
VSS2
C48
CC104
TELSL
TELRL 45F
RL1 43F
RL1
RL2
CMLH 16C
C61
CC104
R81
27K
C54 N.C
R78 43K
45B AREF
R67
4.7K
R74
1K
C52
CC104
R68
100K
C50
CC221
ZD5
HZS5C
C53
CC103B
C45
16V10μ
C47
CC104
R43 1K
PLS 16C
CMLL 36C
R30
22K
R49
R39
22K
TLOF 16C
CI 16C
C26
CC103B
TLOF2 13D
RDPS 16C
EAT 16C
ADLC 13F
DAST 12C
DASND 12C
P2
#8 74HC
4053F
C55
CC104
#9
BA10324F
C69
50V
CC104
C68
35V47μ
16C RNGO
R70
2.2K
RNGL 13E
R87
100K
16C SPON
C59 CC104
#7
NJM386M
C42
N.C
C67
10V100μ
C57
CC103B
R71
33K
SP
P1
B2B-PH
WHITE
R76
2.2K
R80
300
16C VOL1
R75
10K
R77
N.C
VOL2 13E
Q9
KRC107S
D4
1SS120
R56 0Ω
D3 N.C
D6
1SS120
R62 0Ω
D5 N.C
C58
R82
C62
103B
R84
100K
42C RL1
R63
1.5K
TELRL 42C
16D
OT0
R47
100K
Q6
KTC3875
C36
50V1μ
R65
R59
4.7K
R79
Q10
R66
12C DAREC
45D AREF

A

MAIN 4/5

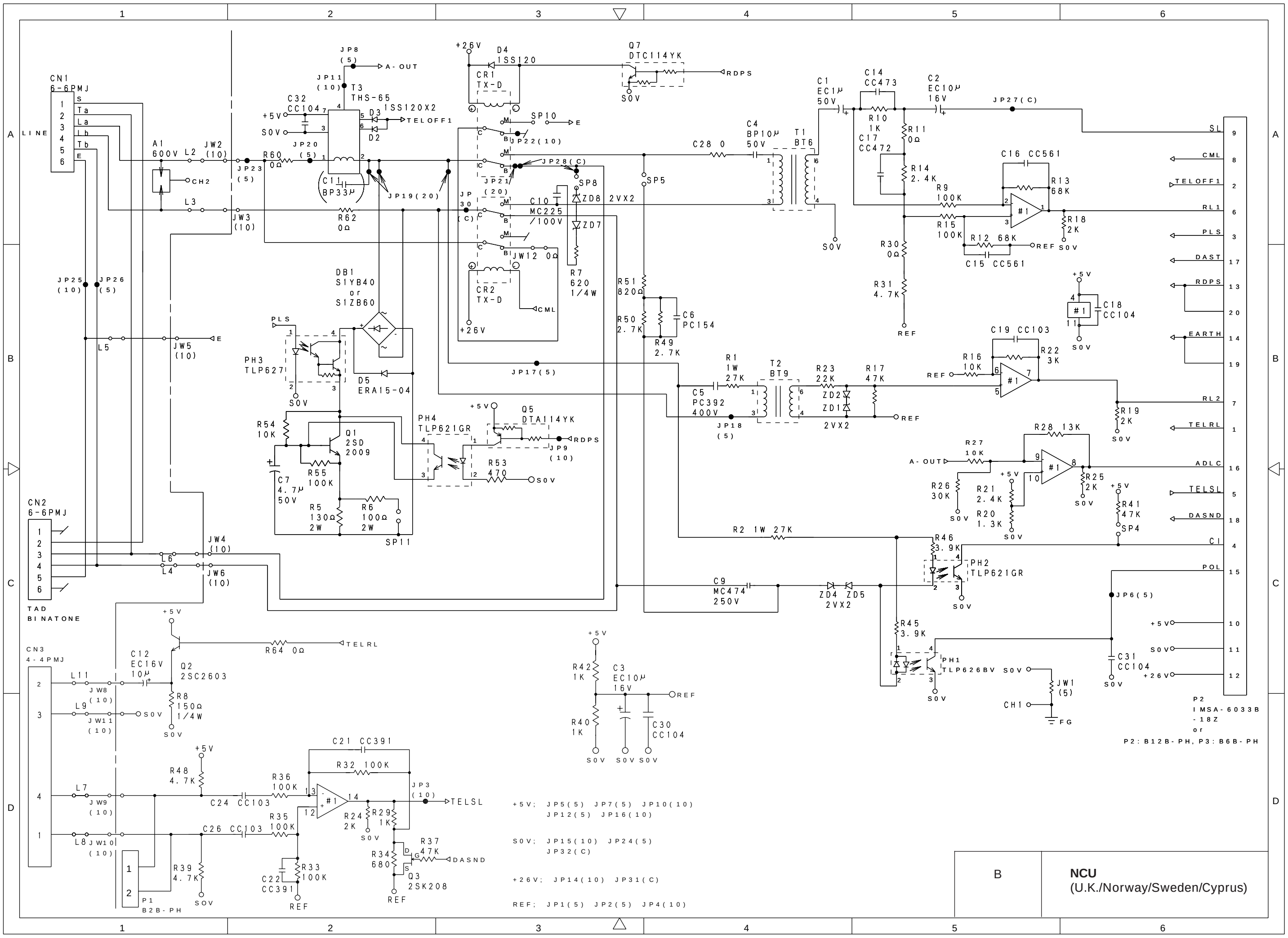
		FAX170/190	FAX510	FAX170/190	FAX510	FAX170/190/ HOME FAX	FAX170
		S.ASSY	S.ASSY 11	S.ASSY 12	S.ASSY 21	S.ASSY 22	S.ASSY 23
PAGE	NO.	UF6682001	UF6970001	UF6965012	UF6968021	UF6982001	Not fixed.
1	C37	—	CC104	CC104	—	—	—
	C39	—	CC104	CC104	—	—	—
	C46	—	CC104	CC104	—	—	—
	R48	—	10K	10K	—	—	—
	R50	—	10K	10K	—	—	—
	R51	—	10K	10K	—	—	—
	P5	—	—	RF-H022TD	—	—	—
	C17	5.5B473SG	5.5B473	5.5B104	5.5B104	5.5B473SG	5.5B473SG
2	#10	24C08	24C16	24C08	24C08	24C16	24C32
4	P2	9110S-12L	9110S-18L	9110S-18L	9110S-12L	9110S-12L	9110S-14L
	C56	—	CC105	—	—	—	—
	Q8	—	KRC107S	—	—	—	—
	C58	CC681	CC182B	CC182B	CC681	CC681	CC681
	Q10	—	2SK208	2SK208	—	—	—
	R65	0Ω	1K	1K	0Ω	0Ω	0Ω
	R66	—	680Ω	680Ω	—	—	—
	R79	—	47K	47K	—	—	—
	R82	100K	22K	22K	100K	100K	100K
	R49	1K	22K	22K	1K	1K	1K
	D3	—	1SS120	1SS120	—	—	—
	D5	—	1SS120	1SS120	—	—	—
	R56	0Ω	—	—	0Ω	0Ω	0Ω
	R62	0Ω	—	—	0Ω	0Ω	0Ω


1
2
3
4
5
6
A
B
C
D
J1
6-2PMJ
RA351X2
A1
A2
L1
L2
FG
FG
CR1
MZF-24HG
or
OUAZ-SS-124D
+26V
D1 1SS120
CML
C
M
B
R3
100Ω
2W
C2
CC222
T1
BT7
C1
EC10μ
16V
S0V
C3
CC222
R1
620
C4
EC2.2μ
50V
C5
CC222
R5
10K
NCUSL
C10 CC221
R12 100K
R8
100K
R7
100K
#1
RL1
R16
3.3K
R11
100K
C9
CC221
REF
DB1
S1YB40
or
S1ZB60
D3
ERA15-04
R20
100Ω
2W
PLS
PC2
TLP627
or
PS2533
C15
PC153
400V
T2
BT8
R9
10K
ZD1
ZD2
R10
20K
C11
JW
MTZJ2.0AX2
RL2
C8
JW
R4
15K
JW16
J2
6-2PMJ
L3
L4
C16
MC474
250V
R18
1/2W
47K
D2
1SS120
PC1
PS2501
or
TLP521
or
PS2521
CI
V1
R25
2K
R24
JW
PC3
PS2525
or
TLP320
TELOFF
TELSL
TELRL
PLS
TELOFF
CI
RL2
CML
+26V
+5V
S0V
C7
EC10μ
16V
P1
6033B-12Z
9
6
5
1
3
2
4
7
8
12
10
11
R6
3.3K
JW9
R21
JW
R2
1K
SREF
ZD3
6.2V
C17
EC100μ
16V
R13
1K
C6
CC104/25V
JW1
J3
4-4PMJ
L8
L5
L6
L7
JW
+5V
Q1
2SC2603
C20
EC10μ
16V
R23
150
SREF
R26
10K
C18
CC223
R22
27K
C13 CC681
R17 100K
C19
CC223
R19
27K
C12
CC681
R14
100K
R27
10K
R15
3.3K
J1, J2
TOP VIEW
J3
TOP VIEW
PLUG
SIDE
PLUG
SIDE
KIA358
or
BA10358
C14
CC104
25V

7. MC：メタライズフィルムコンデンサ（METALLIZED POLYESTER FILM CAPACITOR）
6. PC：ポリエステルフィルムコンデンサ（POLYESTER FILM CAPACITOR）
5. CC：セラミックコンデンサ（CERAMIC CAPACITOR）
4. EC：電解コンデンサ（ALUMINUM ELECTROLYTIC CAPACITOR）
3. COMPONENTS IN PARENTHESIS NOT TO BE MOUNTED.
3. （ ）内ノ部品ハ未実装トスル。
2. UNLESS OTHERWISE SPECIFIED, THE VOLTAGE RESISTANCE OF CAPACITORS IS 25V OR 50V.
2. 指示ナキコンデ゛ンサモノ耐圧ハ25V又ハ50Vトスル。
1. UNLESS OTHERWISE SPECIFIED, POWER CONSUMPTION OF RESISTORS IS 1/4W.
1. 指示ナキ抵抗ノ消費電力ハ1/4Wトスル。

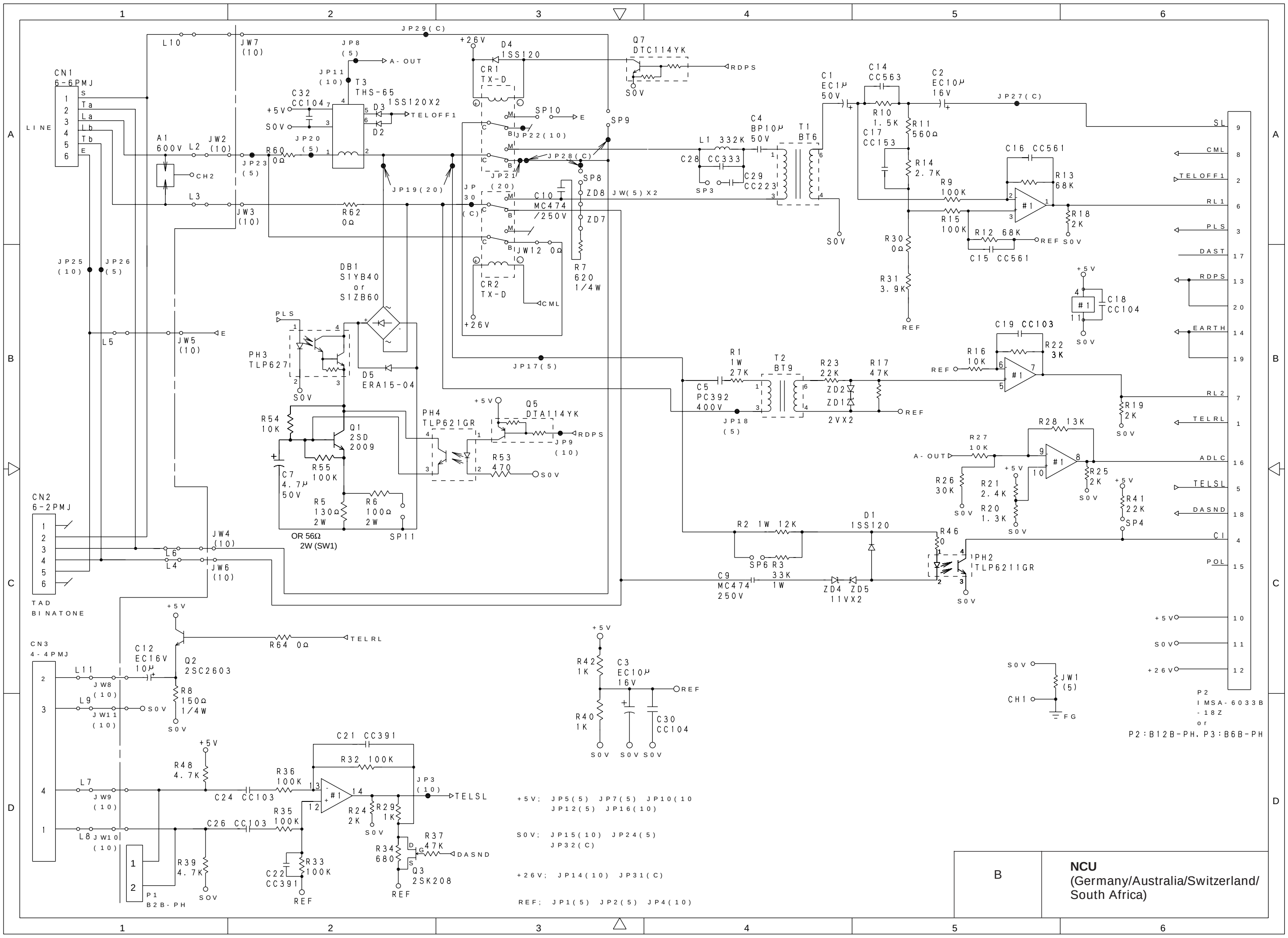
B	**NCU** (USA/Canada/South America/ Gulf/Israel)

1 2 3 4 5 6


CN1
6-6PMJ
LINE
S
Ta
La
Lb
Tb
E
A1
600V
CH2
L2
L3
JW2
(10)
JW3
(10)
JP23
(5)
R60
0Ω
JP20
(5)
JP8
(5)
A-OUT
JP11
(10)
T3
THS-65
C32
CC104
+5V
S0V
D3
D2
1SS120X2
TELOFF1
C11
BP33μ
JP19(20)
R62
0Ω
+26V
D4
1SS120
CR1
TX-D
SP10
E
JP22(10)
JP28(C)
JP21
(20)
JP
30
(C)
C10
MC225
/100V
SP8
ZD8 2VX2
ZD7
R7
620
1/4W
JW12 0Ω
CR2
TX-D
CML
Q7
DTC114YK
RDPS
SP5
C28 0
C4
BP10μ
50V
T1
BT6
S0V
C1
EC1μ
50V
C14
CC473
R10
1K
C17
CC472
R11
0Ω
R14
2.4K
C2
EC10μ
16V
JP27(C)
C16 CC561
R13
68K
R9
100K
R15
100K
R12 68K
C15 CC561
REF
R18
2K
R30
0Ω
R31
4.7K
REF
SL
CML
TELOFF1
RL1
PLS
DAST
RDPS
EARTH
RL2
TELRL
ADLC
TELSL
DASND
CI
POL
+5V
S0V
+26V
P2
IMSA-6033B
-18Z
or
P2: B12B-PH, P3: B6B-PH
#1
C18
CC104
JP25
(10)
JP26
(5)
L5
JW5
(10)
DB1
S1YB40
or
S1ZB60
PLS
PH3
TLP627
D5
ERA15-04
R51
820Ω
R50
2.7K
R49
2.7K
C6
PC154
JP17(5)
R1
1W
27K
C5
PC392
400V
JP18
(5)
T2
BT9
R23
22K
ZD2
ZD1
2VX2
R17
47K
C19 CC103
R16
10K
R22
3K
R19
2K
R28 13K
R27
10K
R26
30K
R21
2.4K
R20
1.3K
R25
2K
R41
47K
SP4
R54
10K
Q1
2SD
2009
C7
4.7μ
50V
R55
100K
R5
130Ω
2W
R6
100Ω
2W
SP11
PH4
TLP621GR
Q5
DTA114YK
JP9
(10)
R53
470
R2 1W 27K
R46
3.9K
PH2
TLP621GR
C9
MC474
250V
ZD4 ZD5
2VX2
JP6(5)
R45
3.9K
PH1
TLP626BV
JW1
(5)
CH1
FG
C31
CC104
CN2
6-6PMJ
JW4
(10)
L6
L4
JW6
(10)
TAD
BINATONE
CN3
4-4PMJ
C12
EC16V
10μ
Q2
2SC2603
R64 0Ω
TELRL
L11
JW8
(10)
L9
JW11
(10)
R8
150Ω
1/4W
R42
1K
C3
EC10μ
16V
R40
1K
C30
CC104
R48
4.7K
L7
JW9
(10)
C24 CC103
R36
100K
C21 CC391
R32 100K
JP3
(10)
TELSL
L8
JW10
(10)
C26 CC103
R35
100K
R24
2K
R29
1K
R37
47K
DASND
R34
680
Q3
2SK208
R33
100K
C22
CC391
R39
4.7K
P1
B2B-PH
+5V; JP5(5) JP7(5) JP10(10)
JP12(5) JP16(10)
S0V; JP15(10) JP24(5)
JP32(C)
+26V; JP14(10) JP31(C)
REF; JP1(5) JP2(5) JP4(10)
1
2
3
4
5
6
A
B
C
D

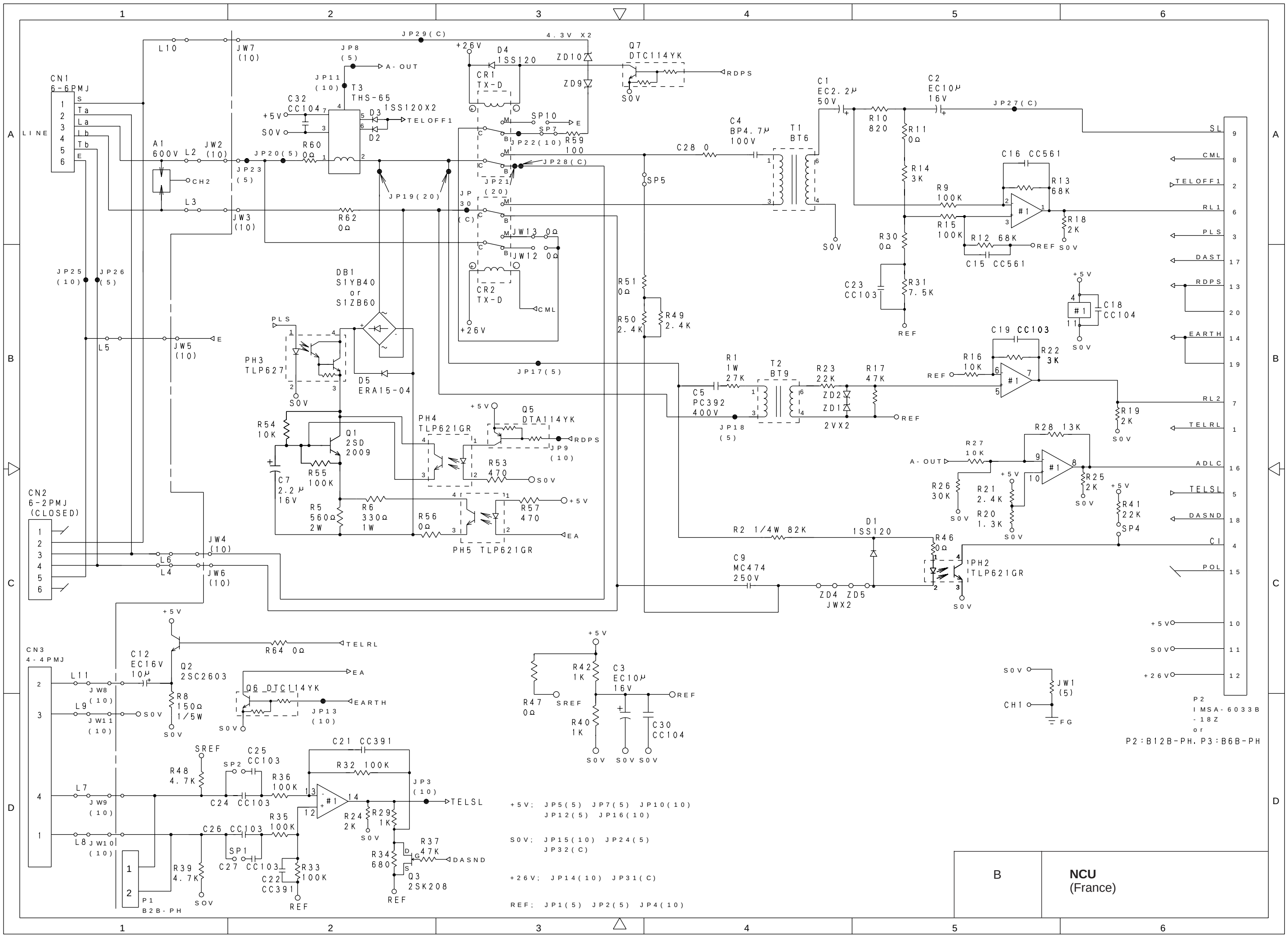
B

NCU
(U.K./Norway/Sweden/Cyprus)


CN1 6-6PMJ
LINE
S
Ta
La
Lb
Tb
E
L10
JW7 (10)
JP29(C)
JP8 (5)
A-OUT
JP11 (10)
T3 THS-65
C32 CC104
+5V
S0V
D3 1SS120X2
TELOFF1
D2
+26V
D4 1SS120
CR1 TX-D
SP10
E
SP9
JP22(10)
JP21 (20)
JP28(C)
SP8
ZD8
ZD7
JW(5)X2
JP30 (C)
C10 MC474 /250V
JW12 0Ω
R7 620 1/4W
CR2 TX-D
CML
Q7 DTC114YK
RDPS
A1 600V
L2
JW2 (10)
R60 0Ω
JP20 (5)
JP23 (5)
CH2
JP19(20)
L3
JW3 (10)
R62 0Ω
JP25 (10)
JP26 (5)
DB1 S1YB40 or S1ZB60
PLS
PH3 TLP627
D5 ERA15-04
L5
JW5 (10)
JP17(5)
R54 10K
Q1 2SD 2009
R55 100K
C7 4.7μ 50V
R5 130Ω 2W
R6 100Ω 2W
SP11
OR 56Ω 2W (SW1)
PH4 TLP621GR
Q5 DTA114YK
JP9 (10)
R53 470
CN2 6-2PMJ
TAD BINATONE
L6
L4
JW4 (10)
JW6 (10)
C1 EC1μ 50V
C14 CC563
R10 1.5K
C17 CC153
R11 560Ω
C2 EC10μ 16V
JP27(C)
L1 332K
C4 BP10μ 50V
T1 BT6
C28 CC333
C29 CC223
SP3
R14 2.7K
C16 CC561
R13 68K
R9 100K
R15 100K
R12 68K
R18 2K
REF
C15 CC561
R30 0Ω
R31 3.9K
C18 CC104
C19 CC103
R22 3K
R16 10K
R1 1W 27K
T2 BT9
R23 22K
R17 47K
ZD2
ZD1
2VX2
C5 PC392 400V
JP18 (5)
R19 2K
R28 13K
R27 10K
R26 30K
R21 2.4K
R20 1.3K
R25 2K
R41 22K
SP4
R2 1W 12K
D1 1SS120
R46 0
PH2 TLP621GR
SP6 R3 33K 1W
C9 MC474 250V
ZD4 ZD5 11VX2
SL
CML
TELOFF1
RL1
PLS
DAST
RDPS
EARTH
RL2
TELRL
ADLC
TELSL
DASND
CI
POL
P2 IMSA-6033B -18Z or
P2: B12B-PH, P3: B6B-PH
CN3 4-4PMJ
Q2 2SC2603
R64 0Ω
C12 EC16V 10μ
L11
JW8 (10)
L9
JW11 (10)
R8 150Ω 1/4W
L7
JW9 (10)
L8
JW10 (10)
R48 4.7K
C24 CC103
C26 CC103
R39 4.7K
P1 B2B-PH
C21 CC391
R32 100K
R36 100K
R35 100K
R33 100K
C22 CC391
R24 2K
R29 1K
JP3 (10)
TELSL
R34 680
R37 47K
Q3 2SK208
DASND
R42 1K
R40 1K
C3 EC10μ 16V
C30 CC104
JW1 (5)
CH1
FG
+5V; JP5(5) JP7(5) JP10(10) JP12(5) JP16(10)
S0V; JP15(10) JP24(5) JP32(C)
+26V; JP14(10) JP31(C)
REF; JP1(5) JP2(5) JP4(10)

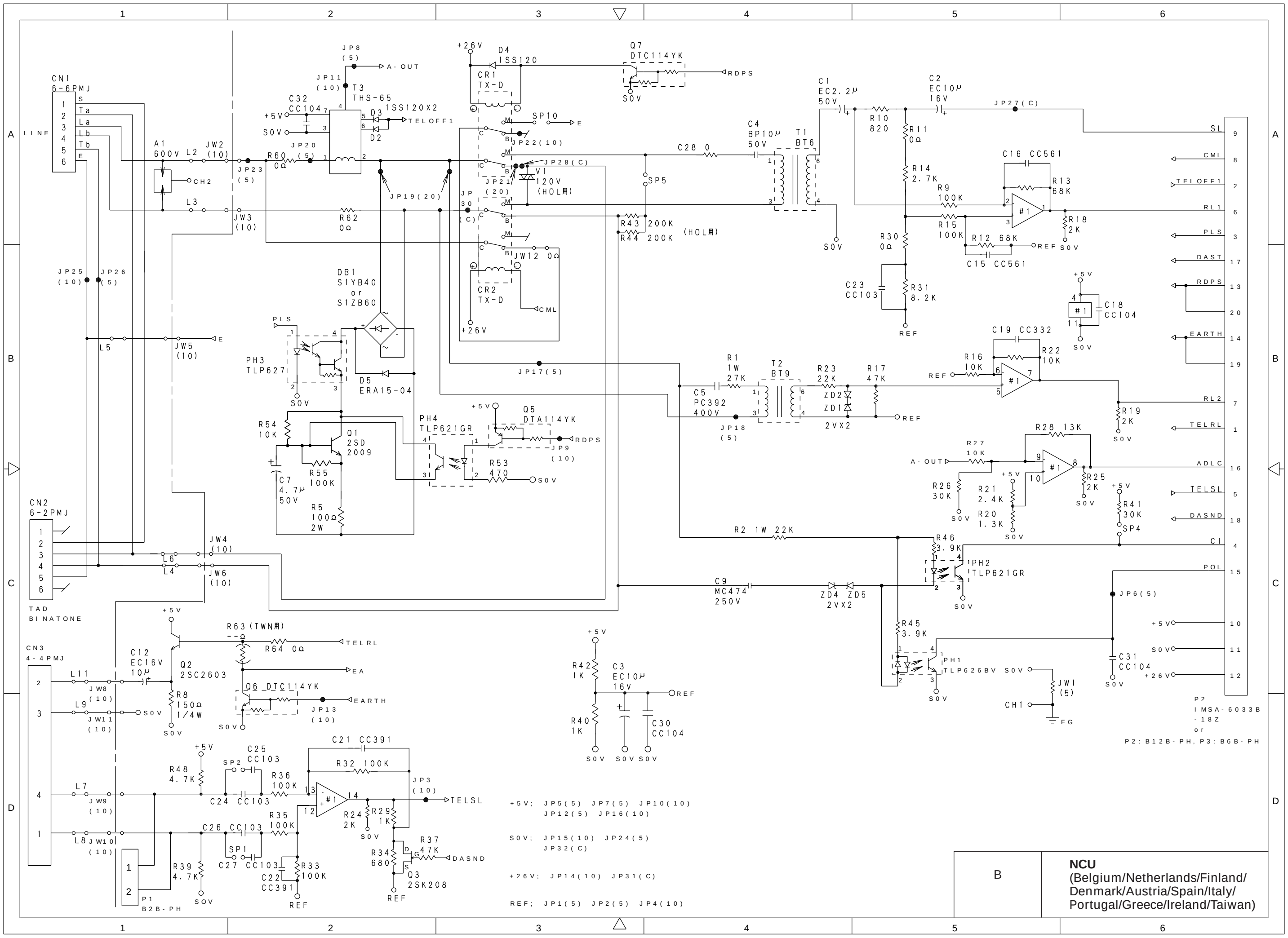
B

NCU
(Germany/Australia/Switzerland/South Africa)


CN1 6-6PMJ
LINE
S
Ta
La
Lb
Tb
E
L10
JW7 (10)
JP29(C)
JP8 (5)
A-OUT
JP11 (10)
T3 THS-65
+26V
D4 1SS120
4.3V X2
ZD10
ZD9
Q7 DTC114YK
RDPS
S0V
CR1 TX-D
C32 CC104
+5V
S0V
D3 1SS120X2
D2
TELOFF1
SP10
SP7
E
R59 100
JP22(10)
JP28(C)
A1 600V
L2
JW2 (10)
JP20(5)
R60 0Ω
JP23 (5)
CH2
L3
JW3 (10)
R62 0Ω
JP19(20)
JP 30 (C)
JP21 (20)
JW13 0Ω
JW12 0Ω
CR2 TX-D
CML
JP25 (10)
JP26 (5)
L5
JW5 (10)
DB1 S1YB40 or S1ZB60
PLS
PH3 TLP627
D5 ERA15-04
JP17(5)
R51 0Ω
R50 2.4K
R49 2.4K
SP5
C28 0
C4 BP4.7μ 100V
T1 BT6
C1 EC2.2μ 50V
R10 820
C2 EC10μ 16V
R11 0Ω
JP27(C)
R14 3K
C16 CC561
R13 68K
R9 100K
R15 100K
R12 68K
C15 CC561
R18 2K
R30 0Ω
R31 7.5K
C23 CC103
REF
C18 CC104
#1
R54 10K
Q1 2SD 2009
C7 2.2μ 16V
R55 100K
R5 560Ω 2W
R6 330Ω 1W
PH4 TLP621GR
Q5 DTA114YK
JP9 (10)
R53 470
R56 0Ω
R57 470
PH5 TLP621GR
EA
R1 1W 27K
T2 BT9
C5 PC392 400V
JP18 (5)
R23 22K
ZD2
ZD1
2VX2
R17 47K
C19 CC103
R16 10K
R22 3K
R19 2K
R28 13K
R27 10K
R26 30K
R21 2.4K
R20 1.3K
R25 2K
R41 22K
SP4
R2 1/4W 82K
D1 1SS120
R46 0Ω
PH2 TLP621GR
C9 MC474 250V
ZD4 ZD5 JWX2
CN2 6-2PMJ (CLOSED)
JW4 (10)
L6
L4
JW6 (10)
CN3 4-4PMJ
L11
JW8 (10)
C12 EC16V 10μ
Q2 2SC2603
R64 0Ω
TELRL
R8 150Ω 1/5W
Q6 DTC114YK
JP13 (10)
EARTH
L9
JW11 (10)
R48 4.7K
SREF
C25 CC103
SP2
R36 100K
C21 CC391
R32 100K
JP3 (10)
TELSL
L7
JW9 (10)
C24 CC103
R35 100K
R24 2K
R29 1K
R37 47K
DASND
C26 CC103
SP1
C27 CC103
R33 100K
C22 CC391
R34 680
Q3 2SK208
L8
JW10 (10)
R39 4.7K
P1 B2B-PH
R42 1K
R47 0Ω
C3 EC10μ 16V
R40 1K
C30 CC104
JW1 (5)
CH1
FG
SL
CML
TELOFF1
RL1
PLS
DAST
RDPS
EARTH
RL2
TELRL
ADLC
TELSL
DASND
CI
POL
+5V
S0V
+26V
P2 IMSA-6033B-18Z or
P2:B12B-PH, P3:B6B-PH
+5V; JP5(5) JP7(5) JP10(10) JP12(5) JP16(10)
S0V; JP15(10) JP24(5) JP32(C)
+26V; JP14(10) JP31(C)
REF; JP1(5) JP2(5) JP4(10)
1 2 3 4 5 6
A B C D

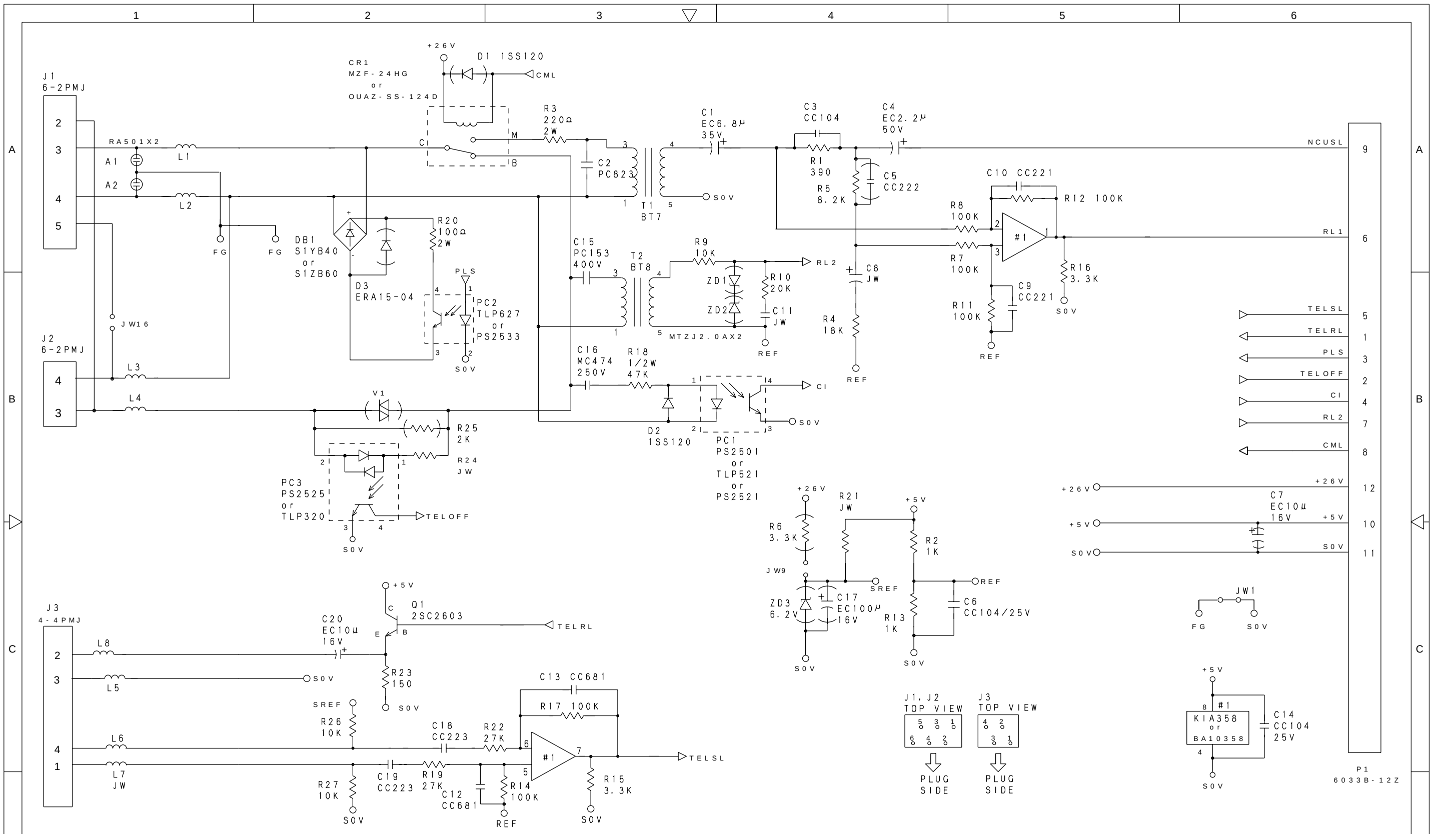
B

NCU
(France)


LINE
CN1 6-6PMJ
S
Ta
La
Lb
Tb
E
A1 600V
L2
JW2 (10)
JP23 (5)
CH2
L3
JW3 (10)
JP25 (10)
JP26 (5)
L5
JW5 (10)
CN2 6-2PMJ
TAD
BINATONE
JW4 (10)
L6
L4
JW6 (10)
CN3 4-4PMJ
L11
JW8 (10)
L9
JW11 (10)
L7
JW9 (10)
L8
JW10 (10)
P1 B2B-PH
C12 EC16V 10μ
Q2 2SC2603
R8 150Ω 1/4W
R63 (TWN用)
R64 0Ω
TELRL
EA
Q6 DTC114YK
EARTH
JP13 (10)
R48 4.7K
SP2
C25 CC103
C24 CC103
R36 100K
C21 CC391
R32 100K
JP3 (10)
TELSL
R35 100K
C26 CC103
SP1
C27 CC103
C22 CC391
R33 100K
R39 4.7K
R24 2K
R29 1K
R34 680
R37 47K
DASND
Q3 2SK208
REF
S0V
+5V
JP8 (5)
A-OUT
JP11 (10)
C32 CC104
T3 THS-65
D3 1SS120X2
D2
TELOFF1
JP20 (5)
R60 0Ω
JP19 (20)
R62 0Ω
DB1 S1YB40 or S1ZB60
PLS
PH3 TLP627
D5 ERA15-04
R54 10K
Q1 2SD2009
C7 4.7μ 50V
R55 100K
R5 100Ω 2W
PH4 TLP621GR
Q5 DTA114YK
RDPS
JP9 (10)
R53 470
+26V
D4 1SS120
CR1 TX-D
SP10
E
JP22 (10)
JP28 (C)
V1 120V (HOL用)
JP21 (20)
JP30 (C)
JW12 0Ω
CR2 TX-D
CML
JP17 (5)
Q7 DTC114YK
SP5
R43 200K
R44 200K
(HOL用)
C28 0
C4 BP10μ 50V
T1 BT6
C1 EC2.2μ 50V
R10 820
C2 EC10μ 16V
JP27 (C)
R11 0Ω
R14 2.7K
C16 CC561
R13 68K
R9 100K
R15 100K
R12 68K
C15 CC561
R18 2K
R30 0Ω
R31 8.2K
C23 CC103
C18 CC104
#1
C19 CC332
R22 10K
R16 10K
R1 1W 27K
C5 PC392 400V
JP18 (5)
T2 BT9
R23 22K
ZD2
ZD1
2VX2
R17 47K
R19 2K
R27 10K
R28 13K
R26 30K
R21 2.4K
R20 1.3K
R25 2K
R41 30K
SP4
R2 1W 22K
R46 3.9K
PH2 TLP621GR
C9 MC474 250V
ZD4 ZD5
2VX2
R45 3.9K
PH1 TLP626BV
JW1 (5)
CH1
FG
JP6 (5)
C31 CC104
R42 1K
C3 EC10μ 16V
R40 1K
C30 CC104
SL
CML
TELOFF1
RL1
PLS
DAST
RDPS
EARTH
RL2
TELRL
ADLC
TELSL
DASND
CI
POL
P2 IMSA-6033B-18Z or
P2: B12B-PH, P3: B6B-PH
+5V; JP5(5) JP7(5) JP10(10) JP12(5) JP16(10)
S0V; JP15(10) JP24(5) JP32(C)
+26V; JP14(10) JP31(C)
REF; JP1(5) JP2(5) JP4(10)
1
2
3
4
5
6
A
B
C
D

B

NCU
(Belgium/Netherlands/Finland/
Denmark/Austria/Spain/Italy/
Portugal/Greece/Ireland/Taiwan)


J1
6-2PMJ
RA501X2
A1
A2
L1
L2
FG
CR1
MZF-24HG
or
OUAZ-SS-124D
+26V
D1 1SS120
CML
R3
220Ω
2W
C2
PC823
T1
BT7
C1
EC6.8μ
35V
S0V
C3
CC104
R1
390
R5
8.2K
C4
EC2.2μ
50V
C5
CC222
NCUSL
C10 CC221
R12 100K
R8
100K
R7
100K
R16
3.3K
RL1
DB1
S1YB40
or
S1ZB60
D3
ERA15-04
R20
100Ω
2W
PLS
PC2
TLP627
or
PS2533
C15
PC153
400V
T2
BT8
R9
10K
ZD1
ZD2
MTZJ2.0AX2
R10
20K
C11
JW
RL2
REF
C8
JW
R4
18K
R11
100K
C9
CC221
J2
6-2PMJ
JW16
L3
L4
C16
MC474
250V
R18
1/2W
47K
D2
1SS120
PC1
PS2501
or
TLP521
or
PS2521
CI
V1
R25
2K
R24
JW
PC3
PS2525
or
TLP320
TELOFF
TELSL
TELRL
CML
+5V
C7
EC10μ
16V
P1
6033B-12Z
R6
3.3K
R21
JW
R2
1K
JW9
SREF
ZD3
6.2V
C17
EC100μ
16V
R13
1K
C6
CC104/25V
JW1
J3
4-4PMJ
L8
L5
L6
L7
JW
Q1
2SC2603
C20
EC10μ
16V
R23
150
R26
10K
R27
10K
C18
CC223
C19
CC223
R22
27K
R19
27K
C12
CC681
R14
100K
C13 CC681
R17 100K
R15
3.3K
J1, J2
TOP VIEW
J3
TOP VIEW
PLUG
SIDE
KIA358
or
BA10358
C14
CC104
25V

7. MC：メタライズフィルムコンデンサ（METALLIZED POLYESTER FILM CAPACITOR）

6. PC：ポリエステルフィルムコンデンサ（POLYESTER FILM CAPACITOR）

5. CC：セラミックコンデンサ（CERAMIC CAPACITOR）

4. EC：電解コンデンサ（ALUMINUM ELECTROLYTIC CAPACITOR）

3. COMPONENTS IN PARENTHESIS NOT TO BE MOUNTED.

3. （ ）内ノ部品ハ未実装トスル。

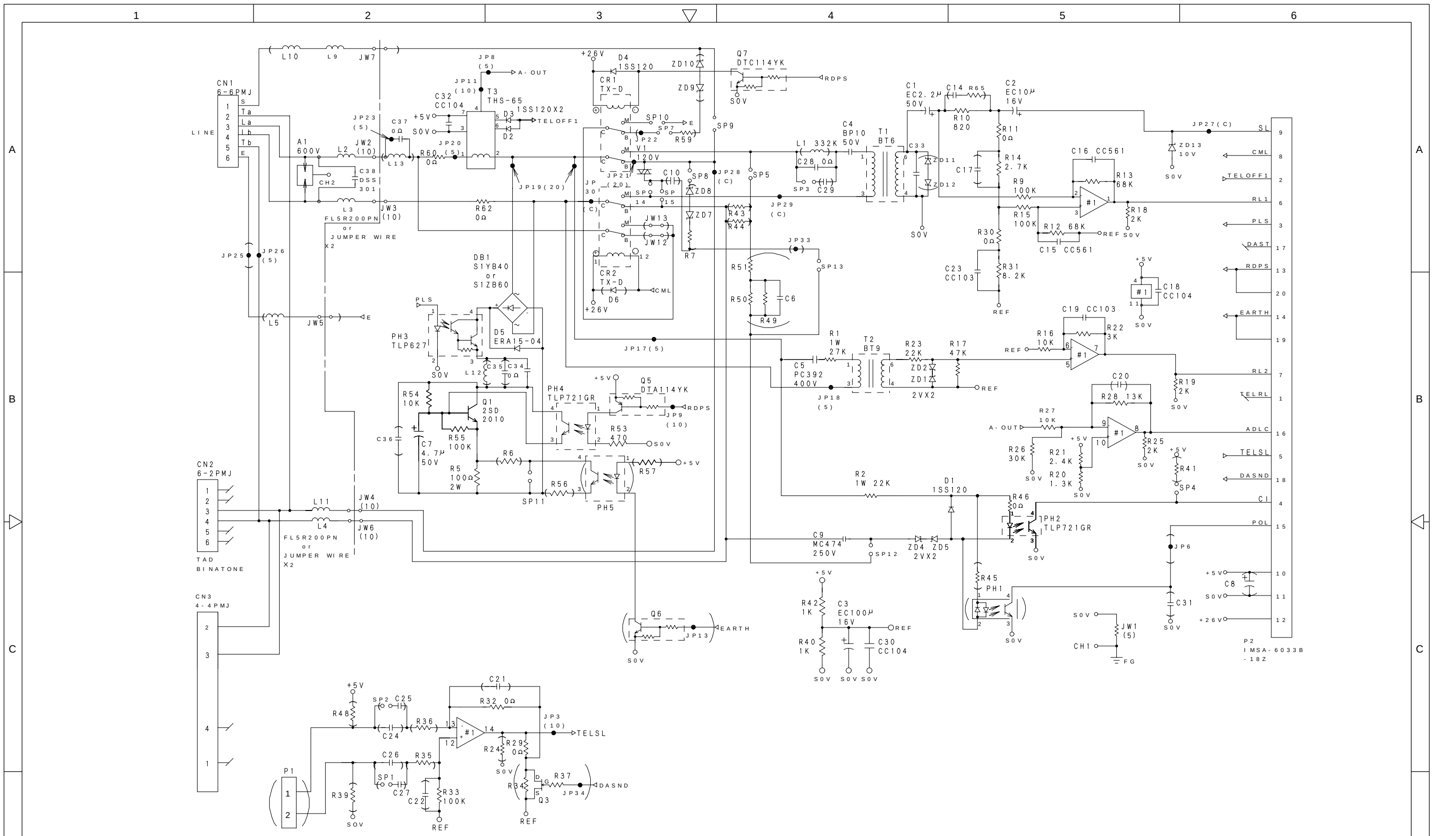
2. UNLESS OTHERWISE SPECIFIED, THE VOLTAGE RESISTANCE OF CAPACITORS IS 25V OR 50V.

2. 指示ナキコンデ゛ンサモノ耐圧ハ25V又ハ50Vトスル。

1. UNLESS OTHERWISE SPECIFIED, POWER CONSUMPTION OF RESISTORS IS 1/4W.

1. 指示ナキ抵抗ノ消費電力ハ1/4Wトスル。

B	**NCU** (New Zealand)


1
2
3
4
5
6
A
B
C
D
CN1
6-6PMJ
LINE
S
Ta
La
Lb
Tb
E
L10
L9
JW7
A1
600V
L2
JW2
(10)
L13
CH2
C38
DSS
301
L3
JW3
(10)
FL5R200PN
or
JUMPER WIRE
×2
JP25
JP26
(5)
L5
JW5
E
JP23
(5)
C37
0Ω
+5V
S0V
JP20
(5)
R60
0Ω
C32
CC104
JP11
(10)
JP8
(5)
A-OUT
T3
THS-65
D3
1SS120X2
TELOFF1
D2
JP19(20)
R62
0Ω
+26V
D4
1SS120
CR1
TX-D
ZD10
ZD9
Q7
DTC114YK
S0V
RDPS
SP10
SP7
E
JP22
R59
V1
120V
C10
SP8
ZD8
JP21
(20)
JP30
(C)
SP
JP28
(C)
SP9
SP5
JW13
JW12
ZD7
R43
R44
R7
CR2
TX-D
D6
CML
+26V
JP29
(C)
JP33
SP13
R51
R50
C6
R49
DB1
S1YB40
or
S1ZB60
PLS
PH3
TLP627
D5
ERA15-04
S0V
L12
C35
C34
0Ω
JP17(5)
R54
10K
Q1
2SD
2010
C36
C7
4.7μ
50V
R55
100K
R5
100Ω
2W
R6
PH4
TLP721GR
+5V
Q5
DTA114YK
RDPS
JP9
(10)
R53
470
S0V
+5V
R57
R56
SP11
PH5
L1 332K
C4
BP10
50V
T1
BT6
C28 0Ω
SP3
C29
C33
ZD11
ZD12
C1
EC2.2μ
50V
C14
R65
R10
820
C2
EC10μ
16V
R11
0Ω
C17
R14
2.7K
R9
100K
R15
100K
R12 68K
C15 CC561
R30
0Ω
R31
8.2K
C23
CC103
REF
C16 CC561
R13
68K
#1
R18
2K
REF
S0V
JP27(C)
ZD13
10V
S0V
+5V
C18
CC104
#1
S0V
R1
1W
27K
T2
BT9
C5
PC392
400V
JP18
(5)
R23
22K
ZD2
ZD1
2VX2
R17
47K
REF
R16
10K
R22
3K
REF
C19 CC103
#1
C20
R28 13K
R19
2K
S0V
R27
10K
A-OUT
#1
R25
2K
S0V
R26
30K
R21
2.4K
R20
1.3K
+5V
S0V
+5V
R41
SP4
R2
1W 22K
D1
1SS120
R46
0Ω
PH2
TLP721GR
S0V
C9
MC474
250V
SP12
ZD4
ZD5
2VX2
JP6
C31
R45
PH1
S0V
+5V
R42
1K
R40
1K
C3
EC100μ
16V
REF
C30
CC104
S0V
S0V
S0V
S0V
JW1
(5)
CH1
FG
S0V
SL
CML
TELOFF1
RL1
PLS
DAST
RDPS
EARTH
RL2
TELRL
ADLC
TELSL
DASND
CI
POL
+5V
C8
S0V
+26V
9
8
2
6
3
17
13
20
14
19
7
1
16
5
18
4
15
10
11
12
P2
IMSA-6033B
-18Z
CN2
6-2PMJ
1
2
3
4
5
6
TAD
BINATONE
L11
L4
JW4
(10)
JW6
(10)
FL5R200PN
or
JUMPER WIRE
×2
Q6
EARTH
JP13
S0V
CN3
4-4PMJ
2
3
4
1
+5V
R48
SP2
C25
C24
R36
C21
R32 0Ω
JP3
(10)
TELSL
#1
R24
R29
0Ω
S0V
C26
R35
P1
1
2
R39
S0V
SP1
C27
C22
R33
100K
REF
R34
D
G
S
R37
Q3
JP34
DASND
REF

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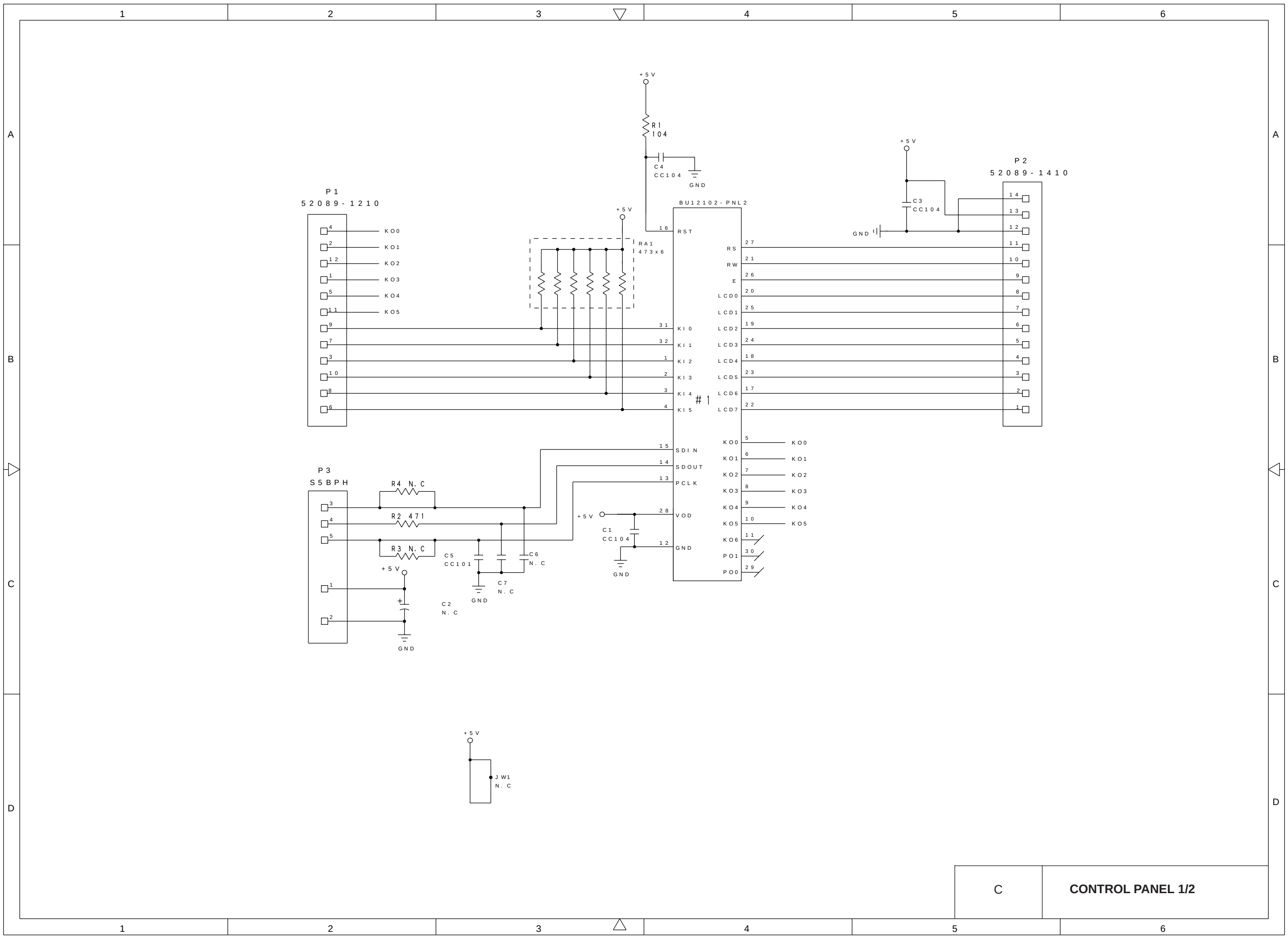
1. 指示ナキ抵抗ノ消費電力ハ1／4Wトスル。

B	**NCU** (F700(PFP)/FAX195/F2900(PFP)/ FAX295MC/FAX618/FAX628TD)

1 2 3 4 5 6


+5V
R1
104
C4
CC104
GND
BU12102-PNL2
#1
P1
52089-1210
P2
52089-1410
P3
S5BPH
RA1
473x6
RST
RS
RW
E
LCD0
LCD1
LCD2
LCD3
LCD4
LCD5
LCD6
LCD7
KI0
KI1
KI2
KI3
KI4
KI5
KO0
KO1
KO2
KO3
KO4
KO5
KO6
PO1
PO0
SDIN
SDOUT
PCLK
VDD
GND
C3
CC104
C1
CC104
R4 N.C
R2 471
R3 N.C
C5
CC101
C6
N.C
C7
N.C
C2
N.C
JW1
N.C
A
B
C
D
1
2
3
4
5
6

C

CONTROL PANEL 1/2

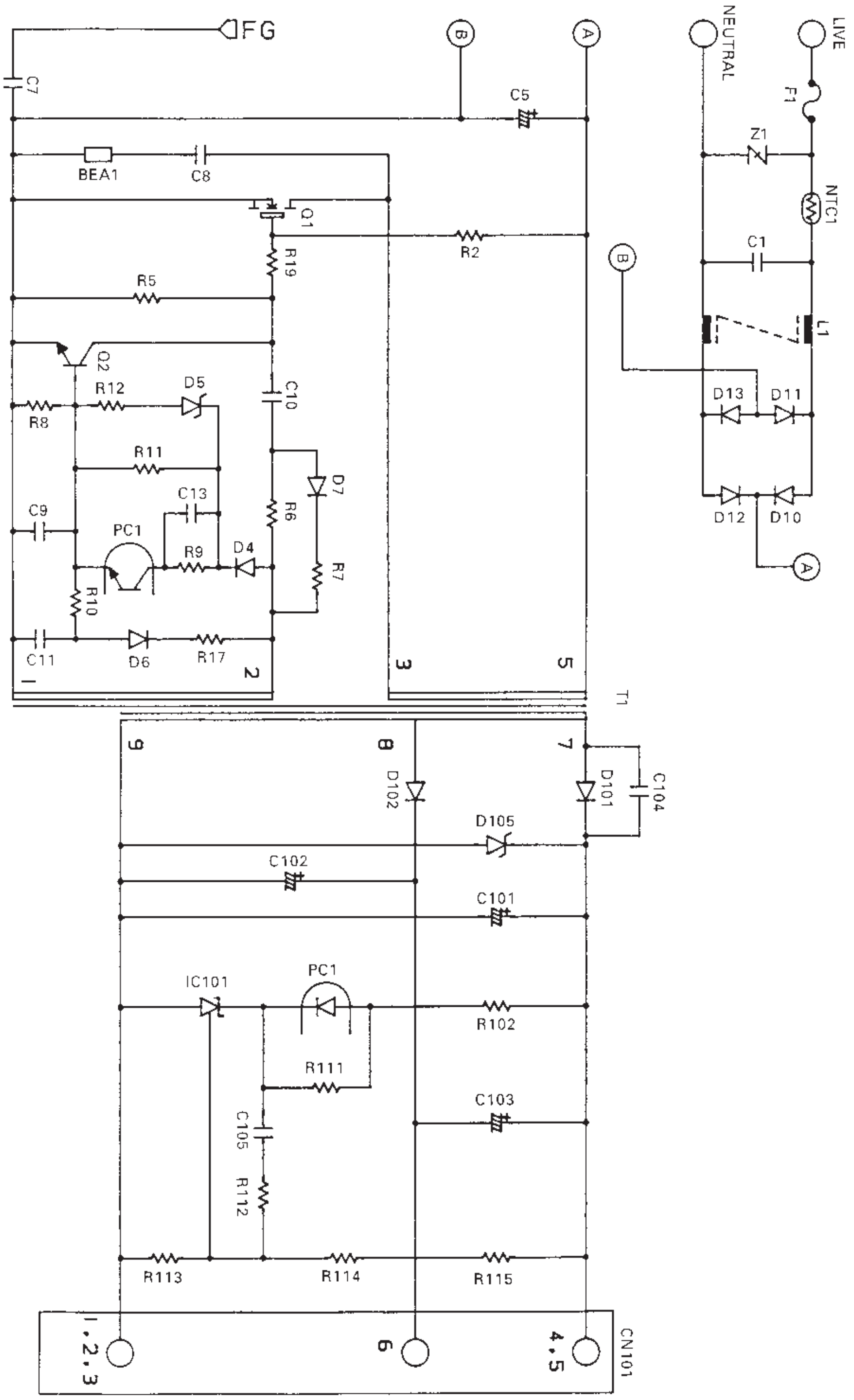
PF PANEL KEY MATRIX REFERENCE TABLE 1

KEY NO.	KEY NAME	KEY COE
1	MODE	1B
2	RESOLUTION	0B
3	←	0C
4	SET	04
5	→	03
6	HOOK	1E
7	10KEY-1	0E
8	10KEY-2	06
9	10KEY-3	26
10	HOLD	19
11	10KEY-4	09
12	10KEY-5	01
13	10KEY-6	21
14	REDIAL/PAUSE	1A
15	10KEY-7	0A
16	10KEY-8	02
17	10KEY-9	22
18	SPEAD DIAL	1D
19	10KEY-*	0D
20	10KEY-0	05
21	10KEY-#	25
22	TEL-INDEX	23
23	HELP	2B
24	1TOUCH-1	14
25	1TOUCH-2	24
26	1TOUCH-3	2C
27	1TOUCH-4	2E
28	1TOUCH-5	29
29	1TOUCH-6	16
30	STOP	2D
31	COPY	2A
32	START	15

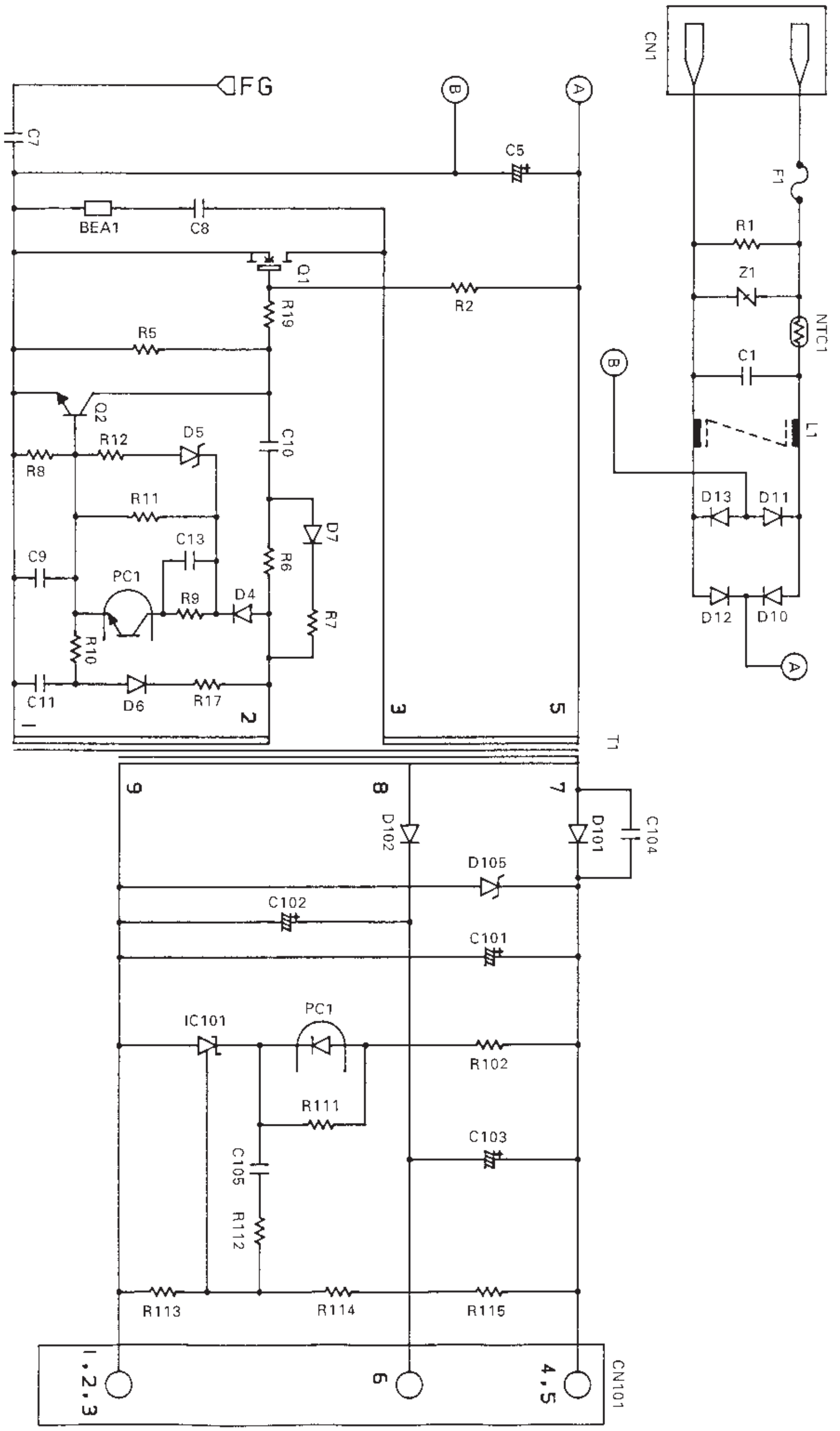
PF PANEL KEY MATRIX REFERENCE TABLE 2

	KO0 P1-4P	KO1 P1-2P	KO2 P1-12P	KO3 P1-1P	KO4 P1-5P	KO5 P1-11P	KO6 N.C
KI 0 P1-9P	12	11		10	13	28	
KI 1 P1-7P	16	15		14	17	31	
KI 2 P1-3P	5	2		1	22	23	
KI 3 P1-10P	4	3	24		25	26	
KI 4 P1-8P	20	19	32	18	21	30	
KI 5 P1-6P	8	7	29	6	9	27	

C	**CONTROL PANEL 2/2**


FG
C7
B
A
NEUTRAL
LIVE
F1
C5
Z1
BEA1
C8
Q1
NTC1
R2
R19
R5
C1
B
L1
Q2
R12
D5
C10
D13
D11
R8
R11
D7
C13
R6
C9
PC1
D12
D10
R9
D4
R7
A
R10
C11
D6
R17
1
2
3
5
T1
6
8
7
D102
D101
C104
D105
C102
C101
PC1
IC101
R102
R111
C103
C105
R112
R113
R114
R115
1, 2, 3
6
4, 5
CN101

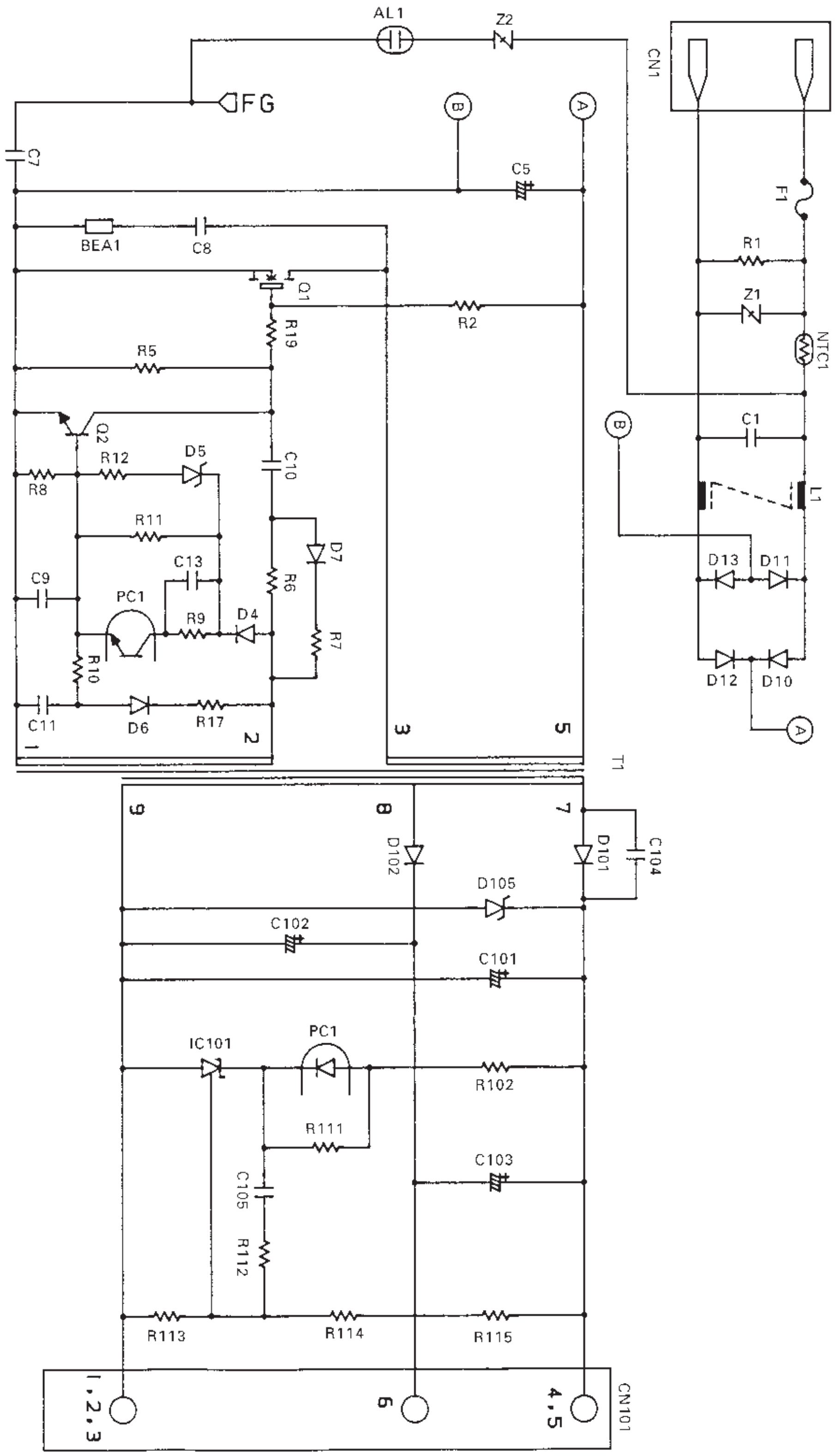
D	**POWER SUPPLY (100-120 V)** U.S.A., CANADA


FG
C7
B
A
C5
CN1
F1
R1
Z1
NTC1
C1
L1
D13
D11
D12
D10
BEA1
C8
Q1
R2
R19
R5
Q2
R12
D5
C10
R8
R11
D7
C13
C9
PC1
R6
R9
D4
R7
R10
C11
D6
R17
1
2
3
5
T1
9
8
7
D102
D101
C104
D105
C102
C101
IC101
R102
R111
C103
C105
R112
R113
R114
R115
1,2,3
6
4,5
CN101

D

POWER SUPPLY (200-240 V)

EUROPE, SOUTH AMERICA


AL1
Z2
CN1
FG
B
A
C7
C5
F1
BEA1
C8
Q1
R1
R2
Z1
R19
NTC1
R5
Q2
C1
B
R12
D5
C10
R8
L1
R11
D7
C13
D13
D11
C9
PC1
R6
R9
D4
R10
R7
D12
D10
A
C11
D6
R17
1
2
3
5
T1
9
8
7
D102
D101
C104
D105
C102
C101
IC101
PC1
R102
R111
C103
C105
R112
R113
R114
R115
1,2,3
6
4,5
CN101

D

POWER SUPPLY (200-240 V)
GULF, ASIA, CHINA