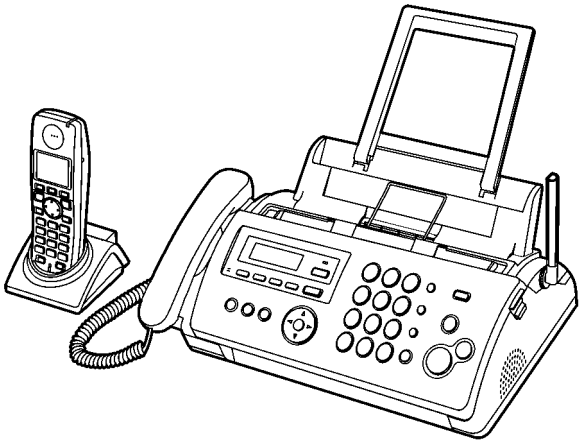
ORDER NO. KMF0610062CE

Service Manual

Compact Plain Paper FAX with DECT

KX-FC255CX-S

Silver version
(for Asia and Middle Near East)



⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF. Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.

When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

When you note the serial number,write down all 11 digits. The serial number may be found on the bottom of the unit.

Panasonic

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1 Safety Precaution

1. Before servicing, unplug the AC power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer's recommended components.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

1.1. For Service Technicians

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.

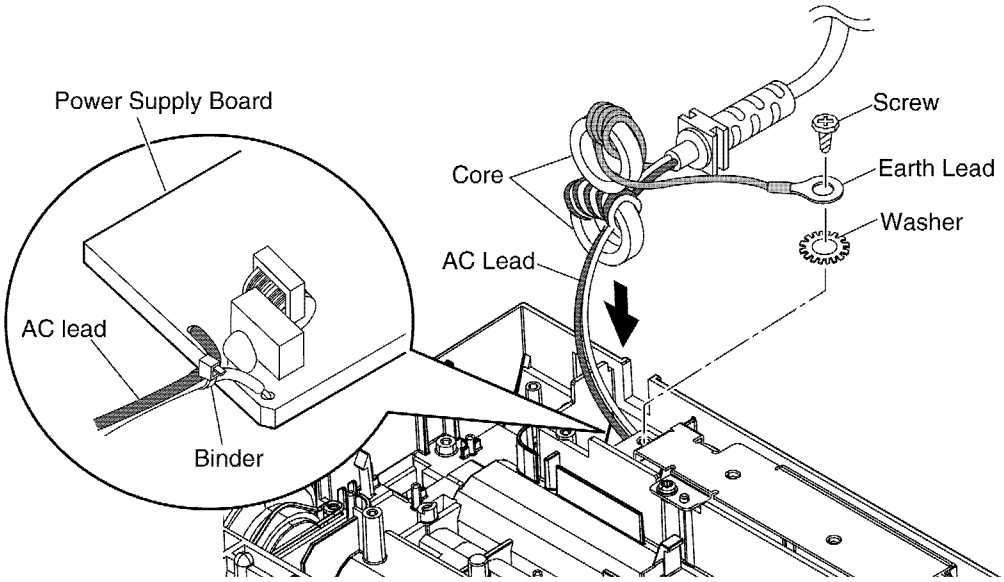
1. Cover the plastic part's boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the worktable.
4. Do not touch the IC or LSI pins with bare fingers.

1.2. AC Caution

For safety, before closing the lower cabinet, please make sure of the following precautions.

1. The earth lead is fixed with the screw.
2. The AC lead is connected properly to power supply board.
3. Wrap the earth lead around the core 5 times.
4. Wrap the AC lead around the core 5 times.

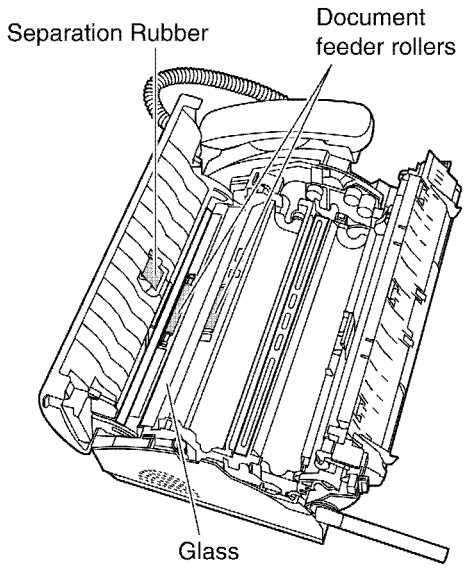
(Bottom View)

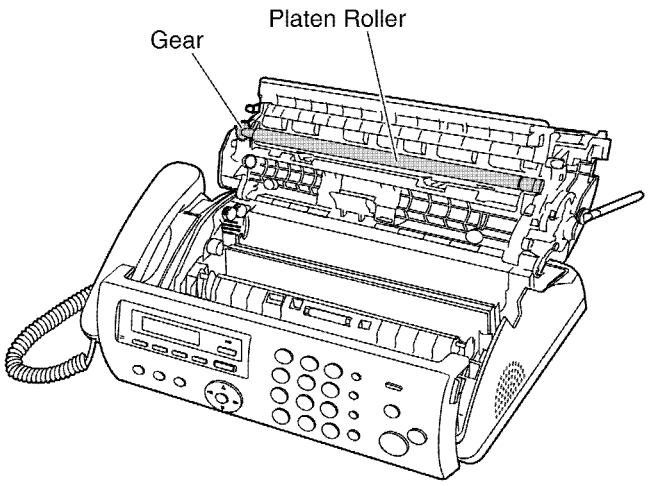


1.3. Personal Safety Precautions

1.3.1. Moving Sections of the Unit

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit.
The moving sections of the unit are the rollers and a gear. There is a separation roller and a document feed roller which are rotated by the document feed motor. A gear rotates the two rollers. Be careful not to touch them with your hands, especially when the unit is operating.





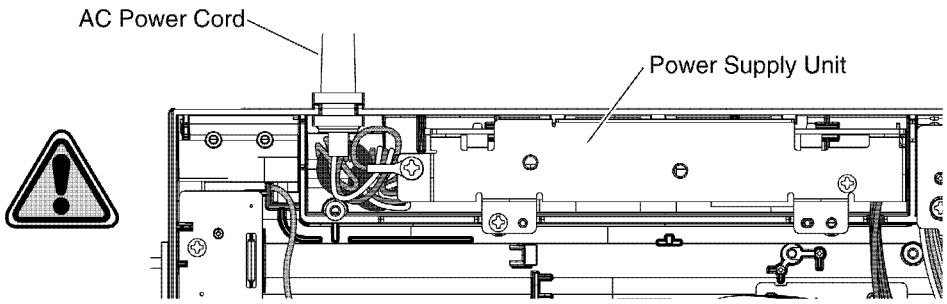
1.3.2. Live Electrical Sections

All the electrical sections of the unit supplied with AC power by the AC power cord are live.
Never disassemble the unit for service with the AC power supply plugged in.

CAUTION:

AC voltage is supplied to the primary side of the power supply unit. Therefore, always unplug the AC power cord before disassembling for service.

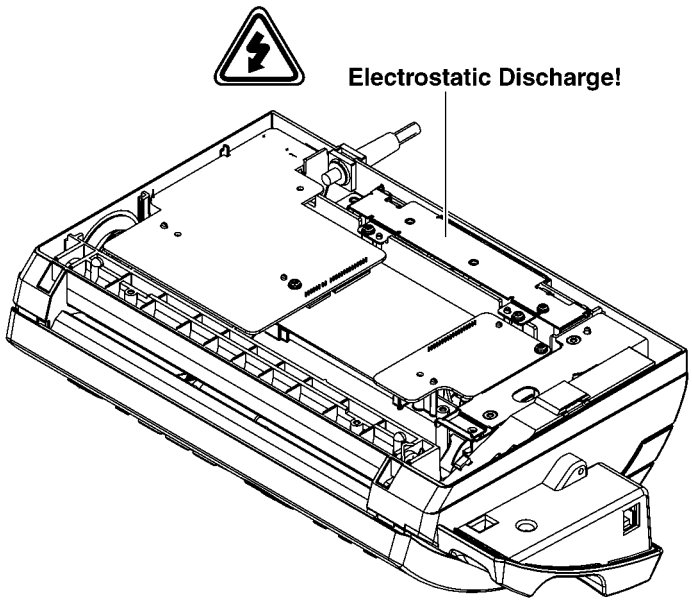
(Bottom View)



1.4. Service Precautions

1.4.1. Precautions to Prevent Damage from Static Electricity

Electrical charges accumulate on a person. For instance, clothes rubbing together can damage electric elements or change their electrical characteristics. In order to prevent static electricity, touch a metallic part that is grounded to release the static electricity. Never touch the electrical sections such as the power supply unit, etc.



2 Warning

2.1. About Lead Free Solder (PbF: Pb free)

Note:

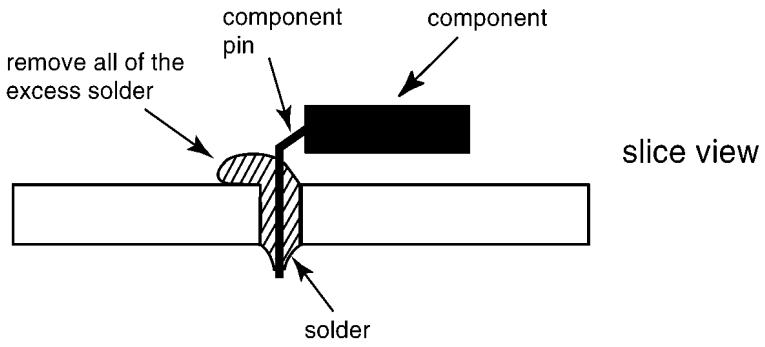
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin (Sn), Silver, (Ag), and Copper, (Cu).

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder.

Caution

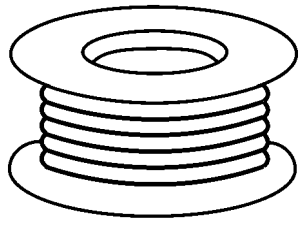
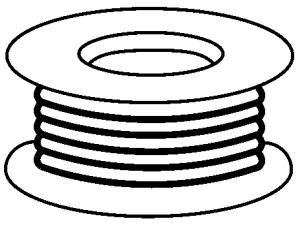
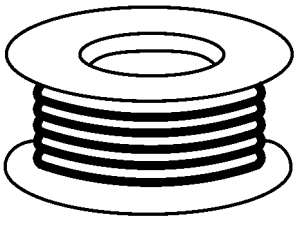
- PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° ± 20° F, (370° ± 10°C).
- Exercise care while using higher temperature soldering irons.: Do not heat the PCB for too long time in order to prevent solder splash or damage to the PCB
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).



2.1.1. Suggested PbF Solder

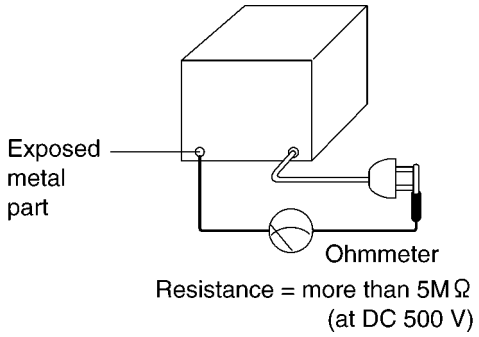
There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper, (Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials.

The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

2.2. Insulation Resistance Test

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screw heads, control shafts, bottom frame, etc.).
   Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard.



2.3. Battery Caution

1. Danger of explosion if battery is incorrectly replaced.
2. Replace only with the same or equivalent type recommended by the manufacturer.
3. Dispose of used batteries according to the manufacturer's Instructions.

3 Specifications

Any details given in these instructions are subject to change without notice.

3.1. Base Unit

Applicable Lines:	Public Switched Telephone Network
Document Size:	Max. 216 mm in width, Max. 600 mm in length
Effective Scanning Width:	208 mm
Recording Paper Size:	A4: 210 mm × 297 mm
Effective Printing Width:	A4: 202 mm
Recording Paper Weight:	64 g/m^2 to 80 g/m^2
Transmission Time*1:	Approx. 12 s/page (ECM-MMR)*2
Scanning Density:	Horizontal: 8 pels/mm Vertical: 3.85 lines/mm - in standard resolution 7.7 lines/mm - in fine/photo resolution 15.4 lines/mm - in super fine resolution
Photo Resolution:	64 levels
Scanner Type:	Contact Image Sensor
Printer Type:	Thermal Transfer on Plain Paper
Data Compression System:	Modified Huffman (MH), Modified READ (MR), Modified Modified READ (MMR)
Modem Speed:	9,600 / 7,200 / 4,800 / 2,400 bps; Automatic Fallback
Operating Environment:	5—35°C, 20—80 % RH (Relative Humidity)
Dimensions:	Approx. height 106 mm × width 367 mm × depth 200 mm
Mass (Weight):	Approx. 2.8 kg
Power Consumption:	Standby: Approx. 2.5 W Transmission: Approx. 15 W Reception: Approx. 40 W (When receiving a 20% black document) Copy: Approx. 40 W (When copying a 20% black document) Maximum: Approx. 135 W (When copying a 100% black document)
Power Supply:	220 V - 240 V AC, 50 / 60 Hz
Fax Memory Capacity*3:	Approx. 25 pages of memory transmission Approx. 28 pages of memory reception (Based on the ITU-T No. 1 Test Chart in standard resolution, without using the Error Correction Mode.)
Voice Memory Capacity*4:	Approx. 15 minutes of recording time
Copy Memory Capacity:	Approx. 10 pages (Based on the ITU-T No. 1 Test Chart in fine resolution.)

*1 Transmission speed depends on the contents of the pages, resolution, telephone line conditions and capability of the other party's machine.

*2 Transmission speed is based on the ITU-T No. 1 Test Chart with original mode. If the capability of the other party's machine is inferior to your unit, the transmission time may be longer. (Refer to **ITU-T No.1 Test Chart** (P.202).)

*3 If an error occurs during fax reception, such as a paper jam or if the recording paper runs out, the fax and subsequent faxes will be retained in memory.

*4 Recording time may be reduced by the calling party's background noise.

3.2. Cordless Handset

Standard:	DECT (Digital Enhanced Cordless Telecommunications) GAP (Generic Access Profile)
Number of Channels:	120 Duplex channels
Frequency Range:	1.88 GHz to 1.9 GHz
Duplex Procedure:	TDMA (Time Division Multiple Access)
Channel Spacing:	1,728 kHz
Bit Rate:	1,152 kbit/s
Modulation:	GFSK (Gaussian Frequency Shift Keying)
RF Transmission Power:	Approx. 250 mW
Voice Coding:	ADPCM 32 kbit/s
Operating Environment:	5°C - 40°C, 20 % - 80 % RH (Relative Humidity)
Operation Range:	Up to 300 m outdoors, Up to 50 m indoors
Dimensions:	Approx. height 155 mm × width 48 mm × depth 34 mm
Mass (Weight):	Approx. 140 g

3.3. Charger Unit

Operating Environment:	5°C - 40°C, 20 - 80% RH (Relative Humidity)
Dimensions:	Approx. height 61 mm × width 87 mm × depth 95 mm
Mass (Weight):	Approx. 90 g
Power Consumption:	Standby: Approx. 1.5 W Maximum: Approx. 3 W
Power Supply:	AC adaptor (220 V-240 V AC, 50 / 60 Hz)

4 General/Introduction

4.1. Optional Accessories

Model No.	Description	Specification
KX-FA52A / KX-FA52E	Replacement film*1	30 m × 2 rolls (Each roll will print about 90 A4-sized pages)
HHR-4EPT	Recharageable batteries*2	2 rechargeable nickel metal hydride (Ni-MH) batteries, AAA (R03) size.
KX-TGA810CX	Additional digital cordless handset	----------
KX-TCA94EX	Headset	Allows hands-free telephone conversations.
KX-TCA718EX	Belt clip	----------
KX-A272	DECT repeater	----------

*1 To ensure the unit operates properly, we recommend the use of a Panasonic replacement film.
The ink film is not reusable. Do not rewind and use the ink film again.

*2 Maximum capacity of 750mAh.

5 Features

General
- LCD (Liquid Crystal Display) readout

Plain Paper Facsimile Machine
- 12 second transmission speed *
- A4, G3 compatible
- Automatic document feeder (up to 10 sheets)
- Quick scan
- Resolution: Standard/Fine/Super fine/Photo (64 level)
- Broadcast
- 20-sheet recording paper capacity
- Automatic fax/phone switching

  * The 12 second speed is based upon the ITU-T No. 1 Test Chart on the condition that memory transmission is performed.

Large Memory... Performed by DRAM

Approx. 25 pages of memory transmission
Approx. 28 pages of memory reception

Integrated Telephone System
- On-hook dialing
- Digital speakerphone
- Voice muting
- Redialing function
- The Base unit provide a phonebook (100 items)
- The cordless handset provide a phonebook (200 items)
- Caller ID

  The calling party's name or telephone number will be displayed after the 1st ring. You have the option of whether or not to answer the call.

  The unit will automatically store caller information (name, telephone number, date and time of the call) from the 50 most recent callers.

  It is possible to view caller information one at a time on the display or print the entire Caller ID list.

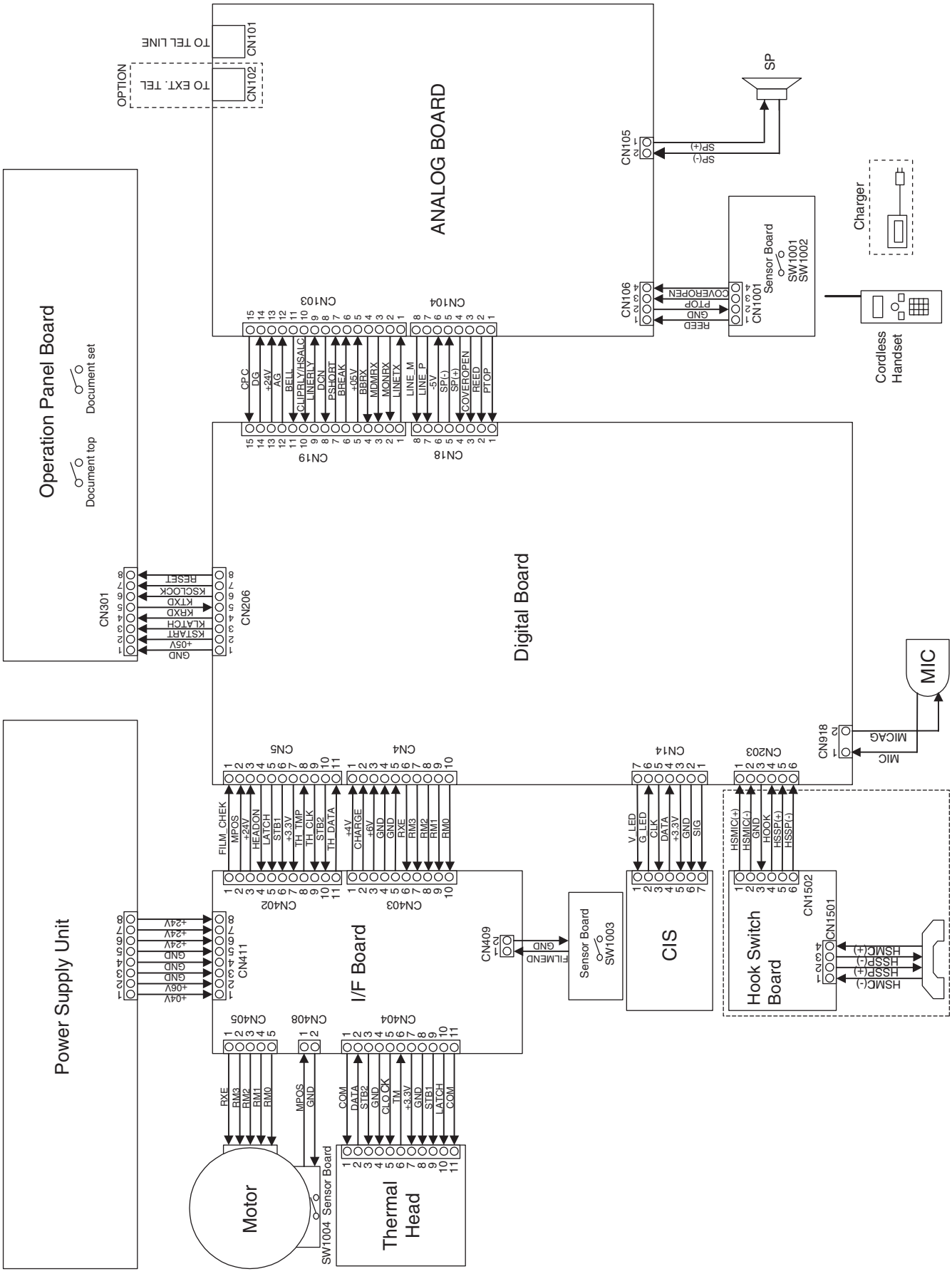
Enhanced Copier Function
- Multi-copy function (up to 20 copies)
- Enlargement and reduction
- Collate
- 64-Level halftone

Digital Answering System
- Voice Time / Day Stamp
- 15-Minutes recording time

DECT Cordless
- Fax activation from cordless handset
- Battery performance:
  150 hours max. (In continuous standby mode)

6 Technical Descriptions

6.1. Connection Diagram

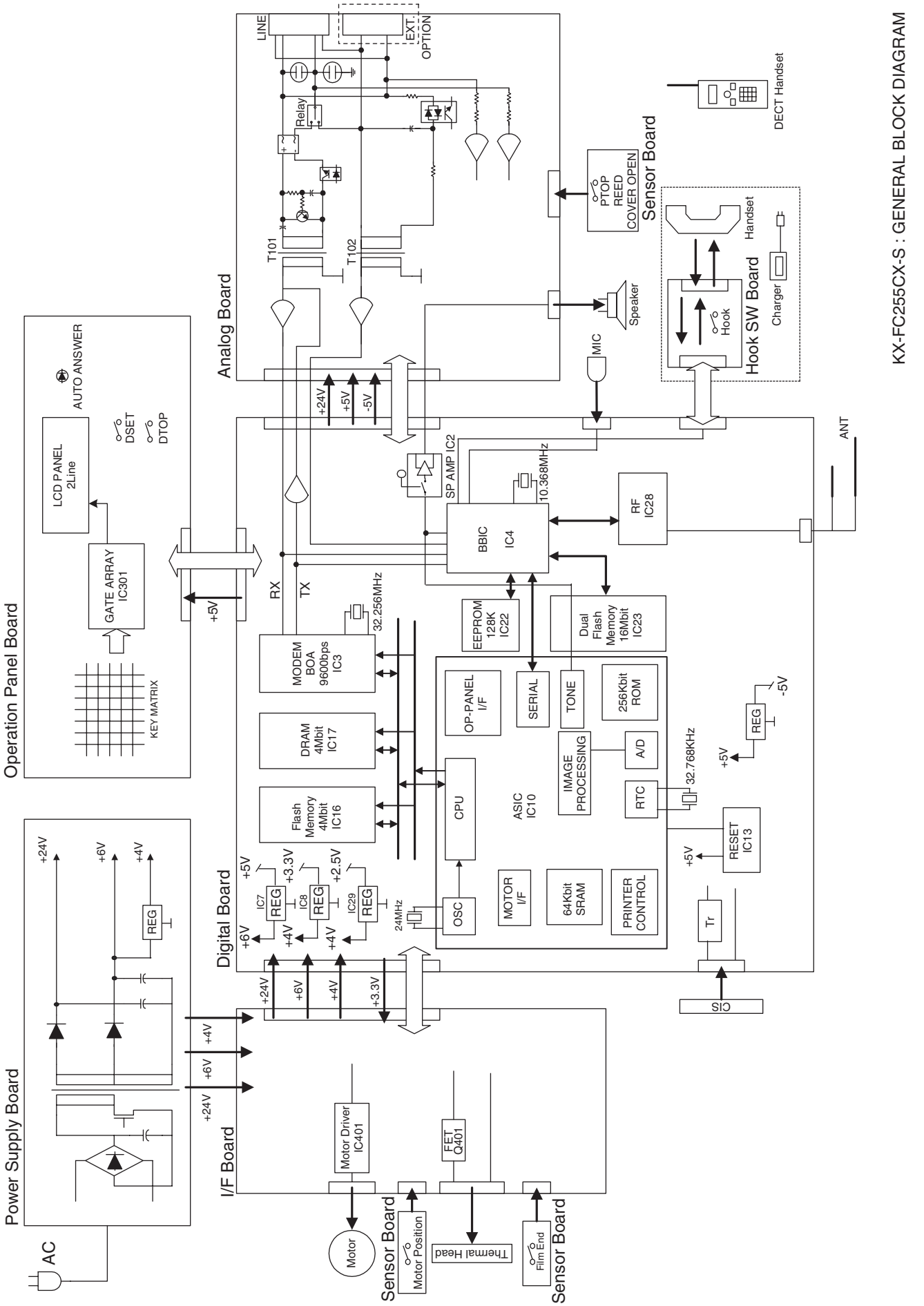


6.2. General Block

The following is an outline of each device IC on the digital board. (Refer to **General Block Diagram** (P.13).).

1. ASIC (IC10)
   Composed mainly of an address decoder and a modem control.
   Controls the general FAX operations.
   Controls the operation panel I/F.
   Controls the thermal head I/F and CIS I/F.
   Performs the image processing.
   CPU and Real time clock
   Provides the reset pulse for each of the major ICs.
2. Flash ROM (IC16)
   Contains all of the program instructions on the unit operations.
   This memory is used mainly for the parameter working in the storage area.
3. Dynamic RAM (IC17)
   This memory is used mainly for the parameter working in the storage area.
4. MODEM (IC3)
   Performs the modulation and the demodulation for FAX communication.
5. Read Section
   CIS image sensor to read transmitted documents.
6. Motor Driver (IC401)
   Drives the transmission motor and the reception motor.
7. Thermal Head
   Contains heat-emitting elements for dot matrix image printing.
8. BBIC (**B**ase **B**and IC): IC4
   Handling all the audio, signal and data processing needed in a DECT base unit
   Controlling the DECT specific physical layer and radio section (**B**urst **M**odule **C**ontroller section)
   ADPCM codec filter for speech encoding and speech decoding (DSP section)
   Echo-cancellation and Echo-suppression (DSP section)
   Any tones (tone, sidetone, ringing tone, etc.) generation (DSP section)
   DTMF receiver (DSP section)
   Clock Generation for RF Module
   ADC, DAC, timer, and power control circuitry
   All interfaces (ex: RF module, EEPROM, LED, Analog Front End, etc.)
9. RF Module: IC28
   PLL Oscillator
   Detector
   Compress/Expander
   First/Second Mixer
   Amplifier for transmission and reception
10. FLASH MEMORY: IC23
    Voice Prompt (TAM) D/L (**D**own**L**oad) Area
    Programming for BBIC (IC4)
11. EEPROM: IC22
    Temporary operating parameters (for RF, etc.)
12. Sensor Section
    Composed of a cover open and film end switch, a document set switch, a document top switch, a paper top sensor and a motor position switch.
13. Power Supply Board Switching Section
    Supplies +4V, +6V and +24V to the unit.

6.2.1. General Block Diagram



6.3. Control (Facsimile) Section

6.3.1. ASIC (IC10)

This custom IC is used for the general FAX operations.

1. CPU:
   This model uses a Z80 equivalent to the CPU operating at 12 MHz. Most of the peripheral functions are performed by custom-designed LSIs. Therefore, the CPU only works for processing the results.
2. RTC:
   Real Time Clock
3. DECODER:
   Decodes the address.
4. ROM/RAM I/F:
   Controls the SELECT signal of ROM or RAM and the bank switching.
5. CIS I/F:
   Controls the document reading.
6. IMAGE DATA RAM:
   This memory is programmed into the ASIC and uses 8 KB for the image processing.
7. THERMAL HEAD I/F:
   Transmits the recorded data to the thermal head.
8. MOTOR I/F:
   Controls the transmission motor which feeds the document.
   Controls the receiving motor which feeds the recording paper.
9. OPERATION PANEL I/F:
   Serial interface with Operation Panel.
10. I/O PORT:
    I/O Port Interface.

Note*:

This memory is incorporated into the ASIC (IC10) and used for the image processing.
Fig. A shows the memory map of the Image Data RAM.

6.3.2. Flash Memory (IC16)

This 512KB ROM (FLASH MEMORY) carries a common area of 32KB and bank areas which each have 8KB (BK4~BK63). The addresses from 0000H to 7FFFH are for the common area and from 8000H to 9FFFH are for the bank areas.

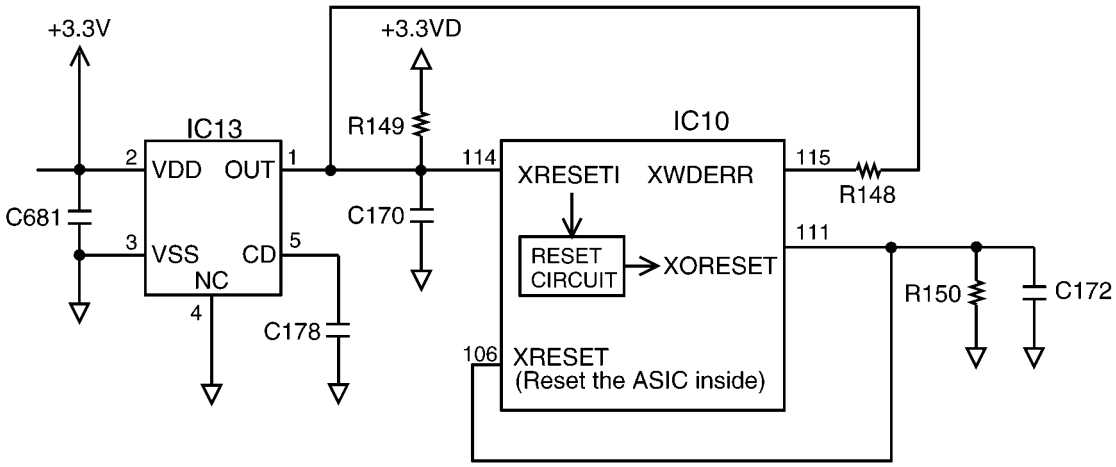
6.3.3. Dynamic RAM (IC17)

The DRAM serves as CPU and receives memory.
The address is F200H~F3FFH (DRAM access window 1) and F600H~F7FFH (DRAM access window 2).

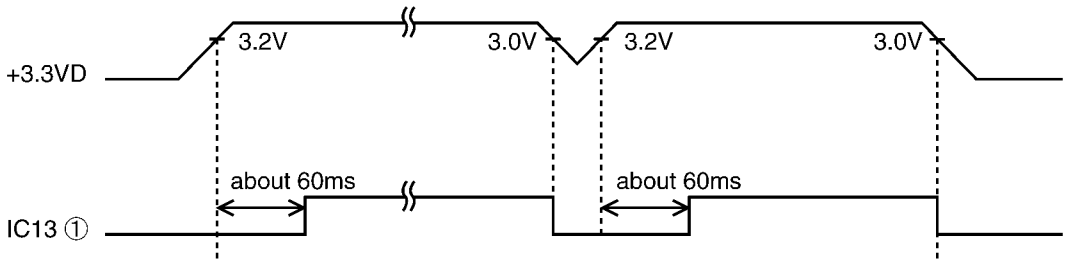
6.3.4. Reset Circuit (Watch Dog Timer)

The output signal (reset) from pin 2 of the voltage detect IC (IC10) is input to the ASIC (IC10) 114 pin.

Circuit Diagram



1. During a momentary power interruption, a positive reset pulse of 60 msec is generated and the system is reset completely.



2. The watch dog timer, built-in the ASIC (IC10), is initialized by the CPU about every 1.5 ms.
   When a watch dog error occurs, pin 115 of the ASIC (IC10) becomes low level.
   The terminal of the 'WDERR' signal is connected to the reset line, so the 'WDERR' signal works as the reset signal.

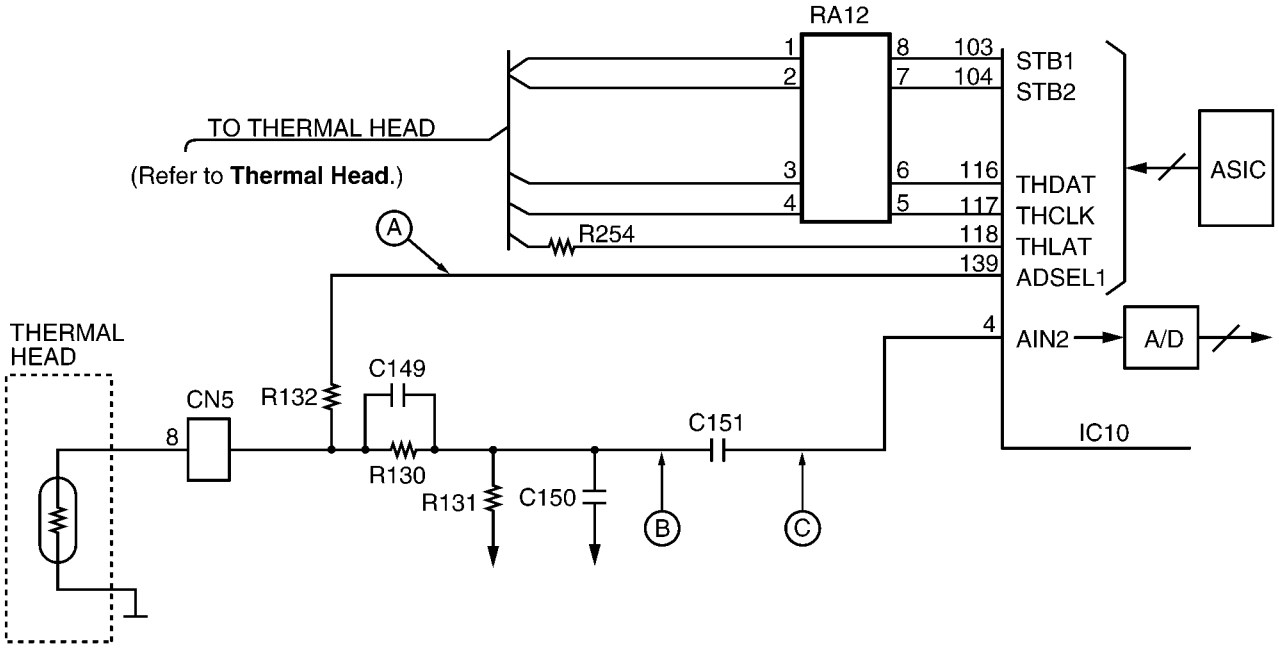
6.3.5. Supervision Circuit for the Thermal Head Temperature

1. **Function**

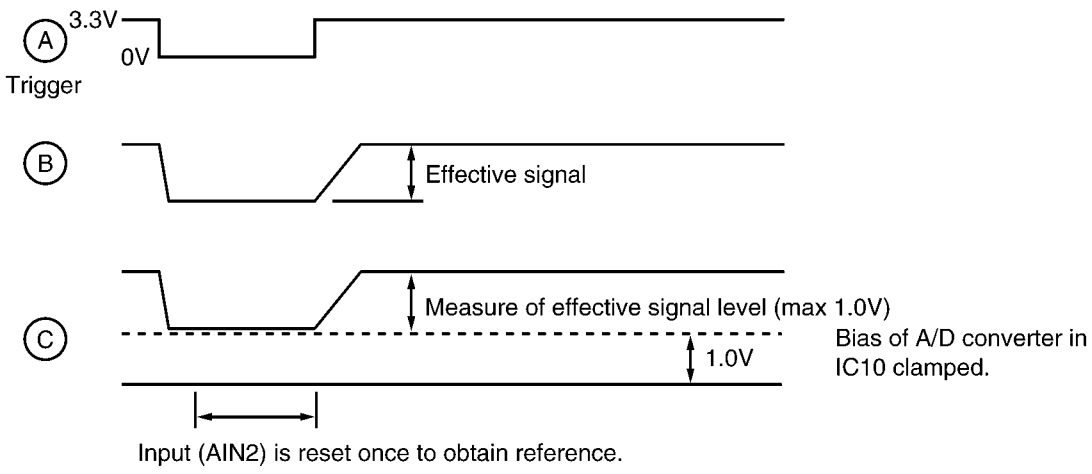
The thermistor changes the resistor according to the temperature and uses the thermistor's characteristics. The output of pin 139 of IC10 becomes a low level. Then when it becomes a high level, it triggers point A In point C, according to the voltage output time, the thermal head's temperature is detected.

After the thermal head temperature is converted to voltage in B, it is then changed to digital data in the A/D converter inside IC10. The CPU decides the strobe width of the thermal head according to this value. Therefore, this circuit can keep the thermal head at an even temperature in order to stabilize the printing density and prevent the head from being overheated.

Circuit Diagram



Timing Chart



CROSS REFERENCE:

Thermal Head (P.19)

6.4. Facsimile Section

6.4.1. Image Data Flow During Facsimile Operation

Copy (Fine, Super-Fine, Half Tone)

1. Line information is read by CIS (to be used as the reference white level) via route1, and is input to IC10. Refer to **Block Diagram** (P.18)
2. In IC10, the data is adjusted to a suitable level for A/D conversion in the Analogue Signal Processing Section, and via route2 it is input to A/D conversion (8 bit). After finishing A/D conversion, the data is input to the Image Processing Section via route3. Then via route4 and route5, it is stored in RAM as shading data.
3. The draft's information that is read by CIS is input to IC10 via route1. After it is adjusted to a suitable level for A/D conversion via route2, the draft's information is converted to A/D (8 bit), and it is input to the Image Processing Section. The other side, the shading data which flows from RAM via route6 and route7, is input to the Image Processing Section. After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1". Then via routes4 and 5, they are stored in RAM.
4. The white/black data stored as above via routes6 and8 is input to the P/S converter. The white/black data converted to serial data in the P/S converter is input to the Thermal Head via route9 and is printed out on recording paper.

   Note:

   Standard: Reads 3.85 lines/mm
   Fine/Photo: Reads 7.7 lines/mm
   Super-Fine: Reads 15.4 lines/mm

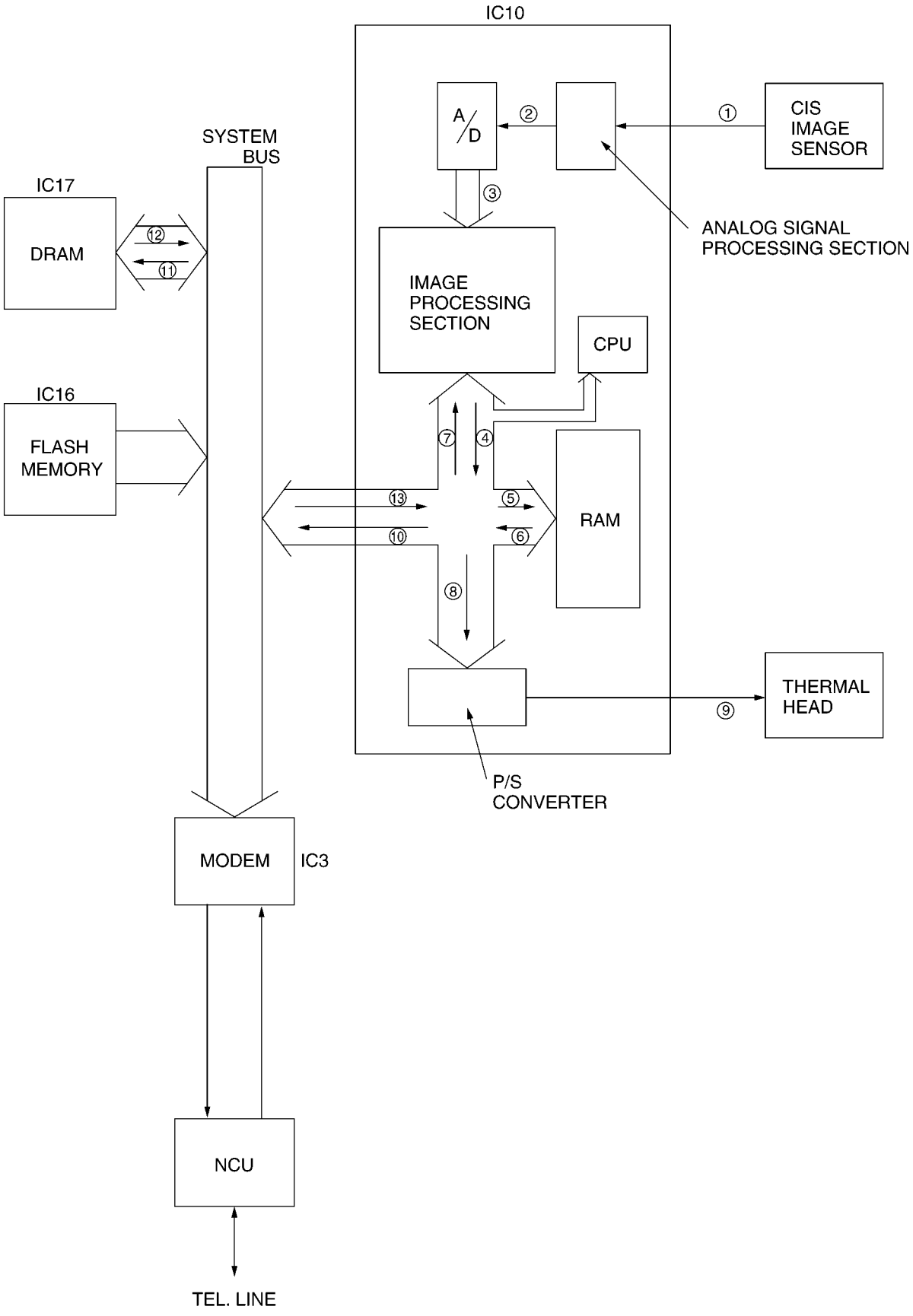
Transmission

1. Same processing as **Copy** items 1 - 3.
2. The data stored in the RAM of IC10 is output from IC10 via routes6 and 10, and is stored in the system bus. Via route11, it is stored in the communication buffer inside DRAM (IC17).
3. While retrieving data stored in the communication buffer synchronous with the modem, the CPU (inside IC10) inputs the data to the modem along route12, where it is converted to serial analogue data and forwarded over the telephone lines via the NCU Section.

Reception

1. The serial analogue image data is received over the telephone lines and input to the modem via the NCU section, where it is demodulated to parallel digital data. Then the CPU (IC10) stores the data in the communication buffer DRAM (IC17) along route12.
2. The data stored in DRAM (IC17) is decoded by the CPU (IC10) via route12, and is stored in DRAM (IC17) via routes13 and 5.
3. Same processing as **Copy** item 4.

6.4.2. Block Diagram



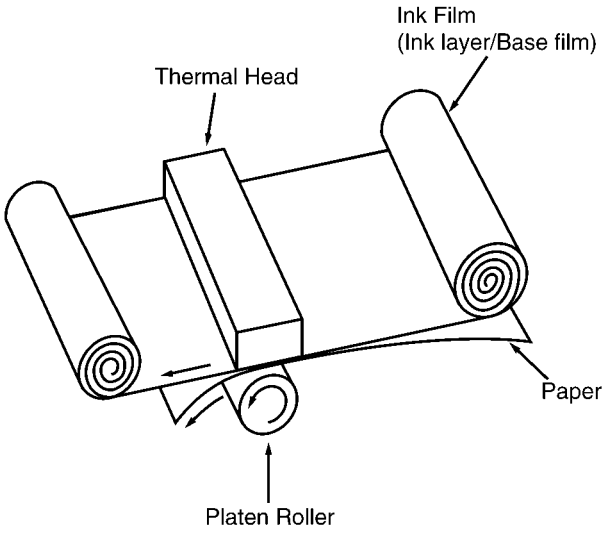
6.4.3. Thermal Head

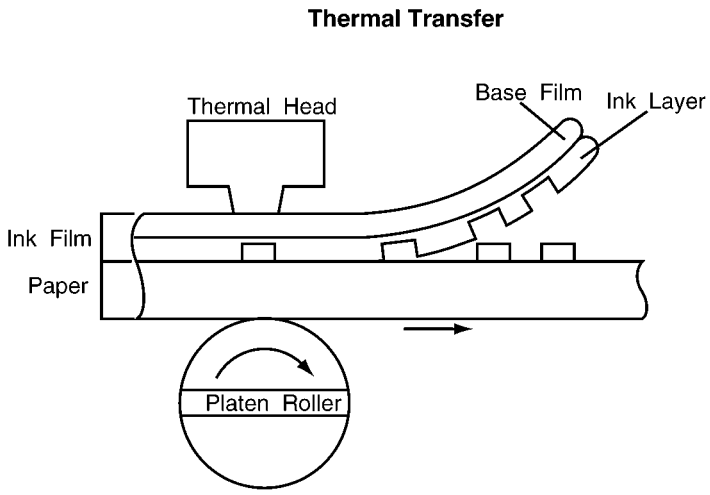
1. **Function**

This unit utilizes the state of the art thermal printer technology.

The ink film is chemically processed. The ink film is comprised of two parts: an ink layer and a base film. When the thermal head contacts this ink film, it emits heat momentarily, and the ink layer is melted and transferred to the paper. If this continues, letters and/or diagrams appear, and the original document is reproduced.

Composition of the receive record section (Thermal recording format)





2. **Circuit Operation**

Refer to the block diagram and the timing chart on the following page.

There are 9 driver ICs aligned horizontally on the thermal head and each one of these ICs can drive 192 heat-emitting registers. This means that one line is at a density of 192×9=1728 dots=(8 dots/mm).

White/Black (white=0, black=1) data in one line increment is synchronized at IC10 pin 117 (THCLK), and sent from IC10 pin 116 (THDAT) to the shift register of the ICs. The shift registers of the 9 ICs are connected in series, and upon the shift of the 1728 dot increment, the shift register becomes filled with data, and a latch pulse is emitted to each IC from IC10 pin 118 (THLAT).

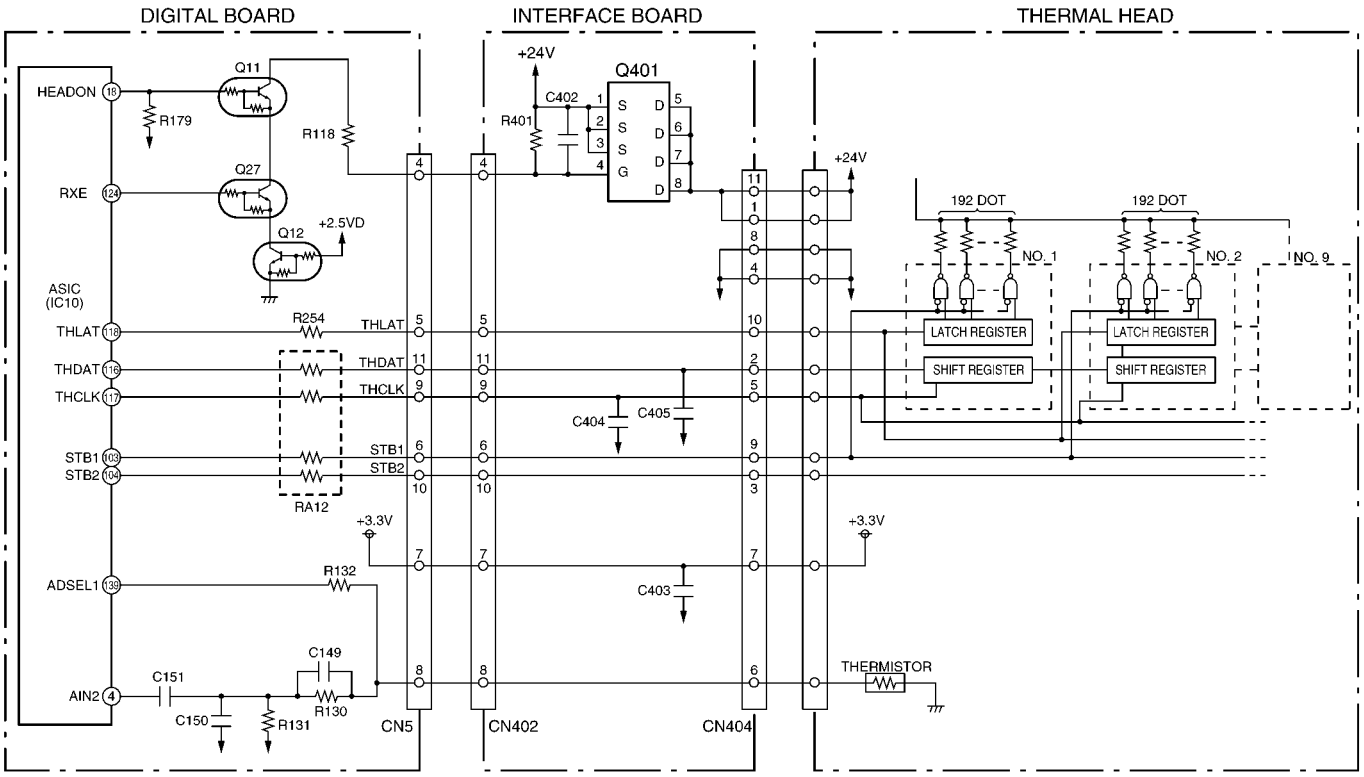
With this latch pulse, all the contents of the shift registers are latched to the latch registers. Thereafter, through the addition of strobes from the IC10 pins (103, 104), only the dot location of black (=1) among latched data activates the driver, and the current passes to heat the emitting body to cause heat emission.

Here, the two line strobes, STB1 and STB2, impress at intervals of 9.216 msec, as required for one-line printout.

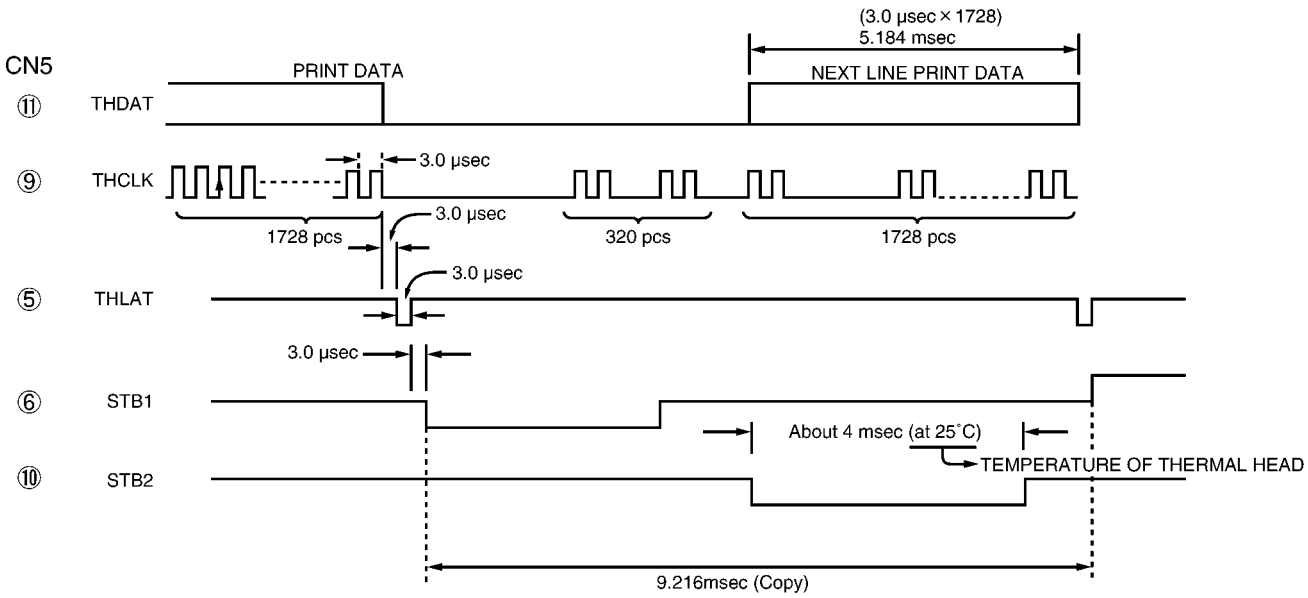
The sequence is shown on the next page. [Moreover, for the strobe width, the thermistor value inside the thermal head is detected according to IC10 pin 4. Depending on that value, the strobe width is recorded in FLASH ROM (IC16). Accordingly, the strobe width is determined.]

When the thermal head is not used, the IC10 (17, THON) becomes low, Q603 turns OFF, Q401 turns OFF, and the +24V power supply for the thermal head driver is not impressed to protect the IC.

Circuit Diagram



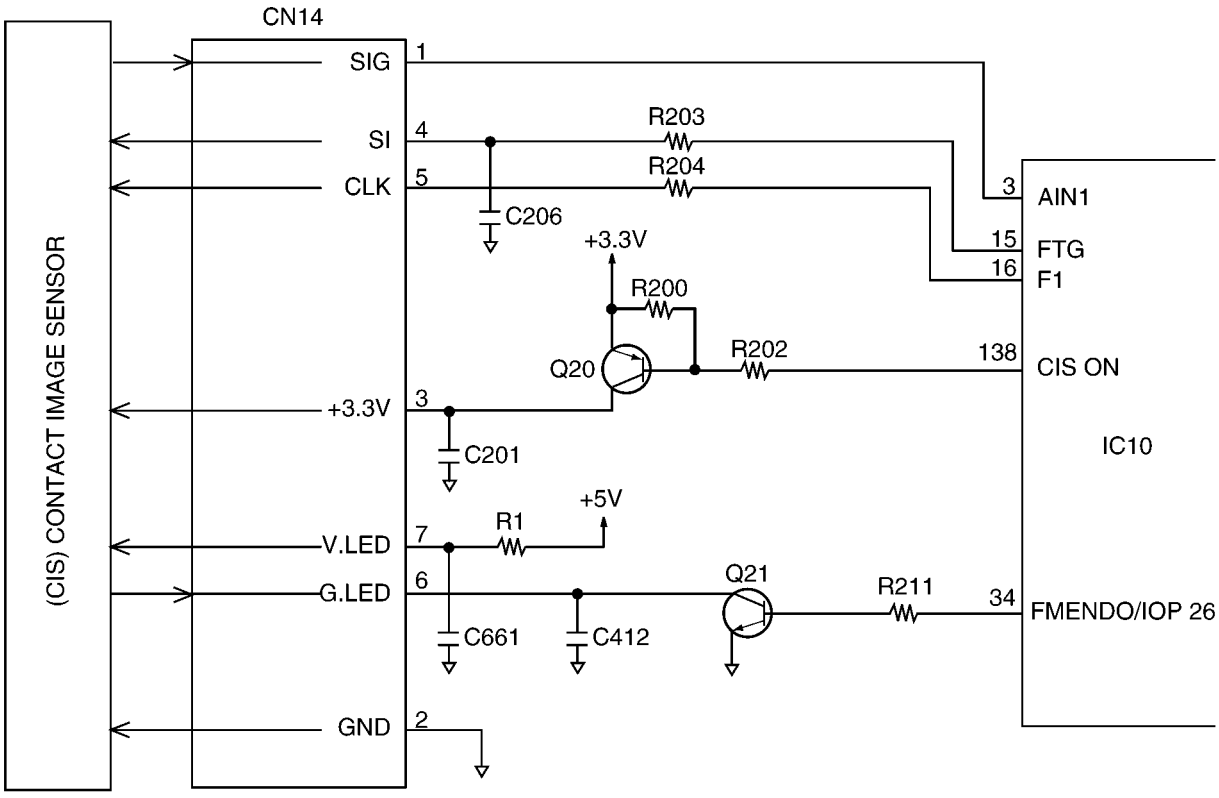
Timing Chart



6.4.4. Scanning Block

The scanning block of this device consists of a control circuit and a contact image sensor made up of a celfoc lens array, an LED array, and photoelectric conversion elements.

Circuit Diagram



When an original document is inserted and the start button pressed, pin 138 of IC10 goes to a low level and Q20 are turned ON, pin 34 of IC10 goes to a high level and the transistor Q21 turns on.This applies voltage to the LED array to light it. The contact image sensor is driven by each of the FTG-F1 signals output from IC10, and the original image illuminated by the LED array undergoes photoelectric conversion to output an analog image signal (SIG). The analog image signal is input to the system ASIC on AIN1 (pin 3 of IC10) and converted into 8-bit data by the A/D converter inside IC10. Then this signal undergoes digital processing in order to obtain a high-quality image.

6.4.5. Stepping Motor Drive Circuit

1. **Function**

   One individual stepping motor is used for transmission and reception. It feeds the document or recording paper synchronized for reading or printing.

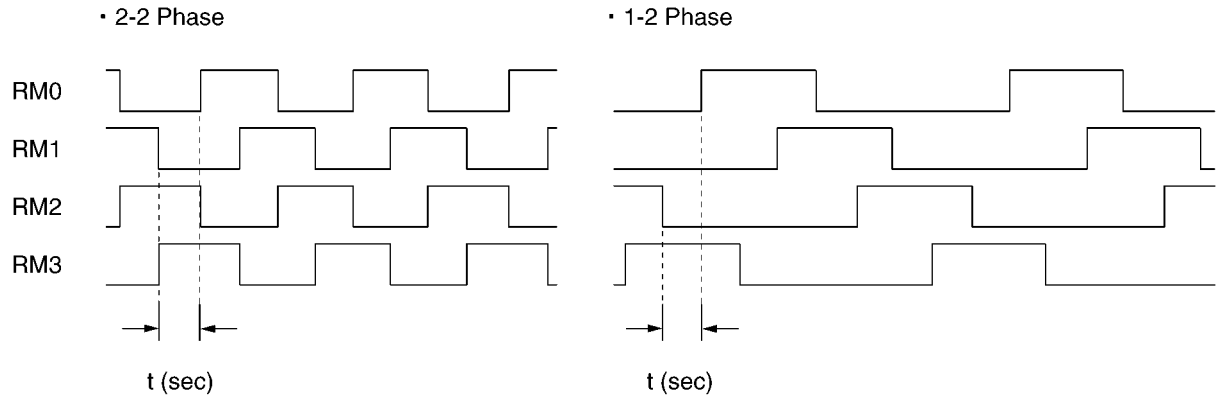
2. **Circuit Operation**

   During motor driving, pin 124 of ASIC IC10 becomes a high level, and Q403, Q402 turns ON. As a result, +24V is supplied to the motor coil.

   Stepping pulses are output from ASIC IC10 pins, 120~123, causing driver IC401 pins, 11~14 to drive the Motor Coil. The motor coil is energized sequentially in 2 phase increments, which causes a 1-step rotation. A 1-step rotation feeds 0.13 mm of recording paper.

   The timing chart is below.

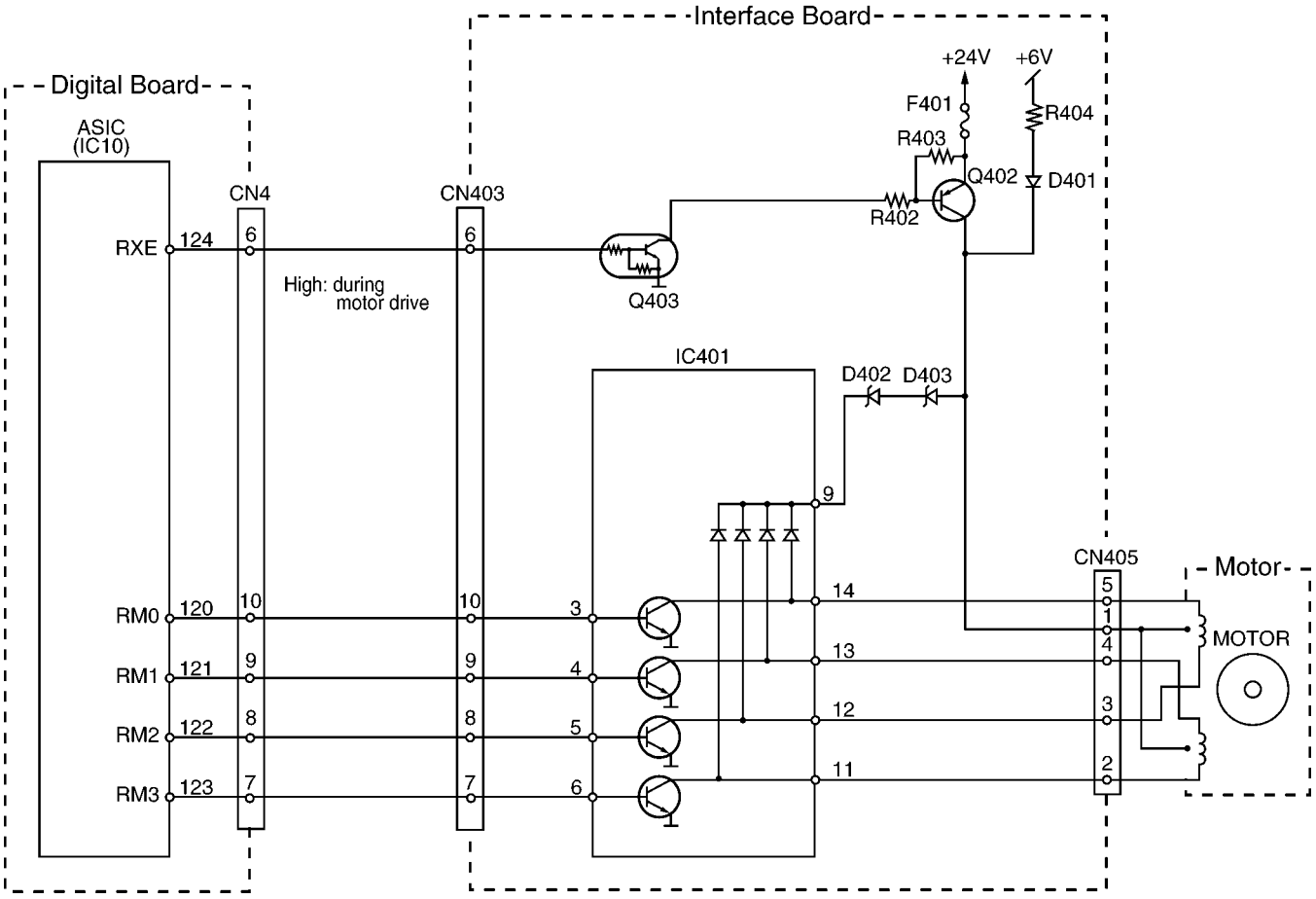
Stepping Monitor Timing Chart



Stepping Motor Drive Mode

Function	Mode	Phase Pattern	Speed
Copy	Fine, Photo	1-2	432 pps (t=1/432)
	Super Fine	1-2	216 pps (t=1/216)
FAX Sending	Standard	2-2	432 pps (t=1/432)
	Fine, Photo	1-2	432 pps (t=1/432)
	Super Fine	1-2	216 pps (t=1/216)
FAX Receiving	Standard, Fine, Photo	1-2	432 pps (t=1/432)
	Super Fine	1-2	216 pps (t=1/216)
Paper Feed	———	1-2	432 pps (t=1/432)
Document Feed	———	1-2	432 pps (t=1/432)
Stand-by	———	All phases are currently off.	None

Circuit Diagram



When the motor suspends while it is in the receive mode (about 70~80 msec), pin 124 of ASIC IC10 becomes a low level and Q403 turns OFF. Then Q402 also turns OFF, and instead of +24 V, +6 V is supplied through D401 so that the motor is held in place. When the system is in the stand-by mode, all of the motor drive transistors turn OFF. Consequently, the motor current stops.

6.5. Sensor and Switches

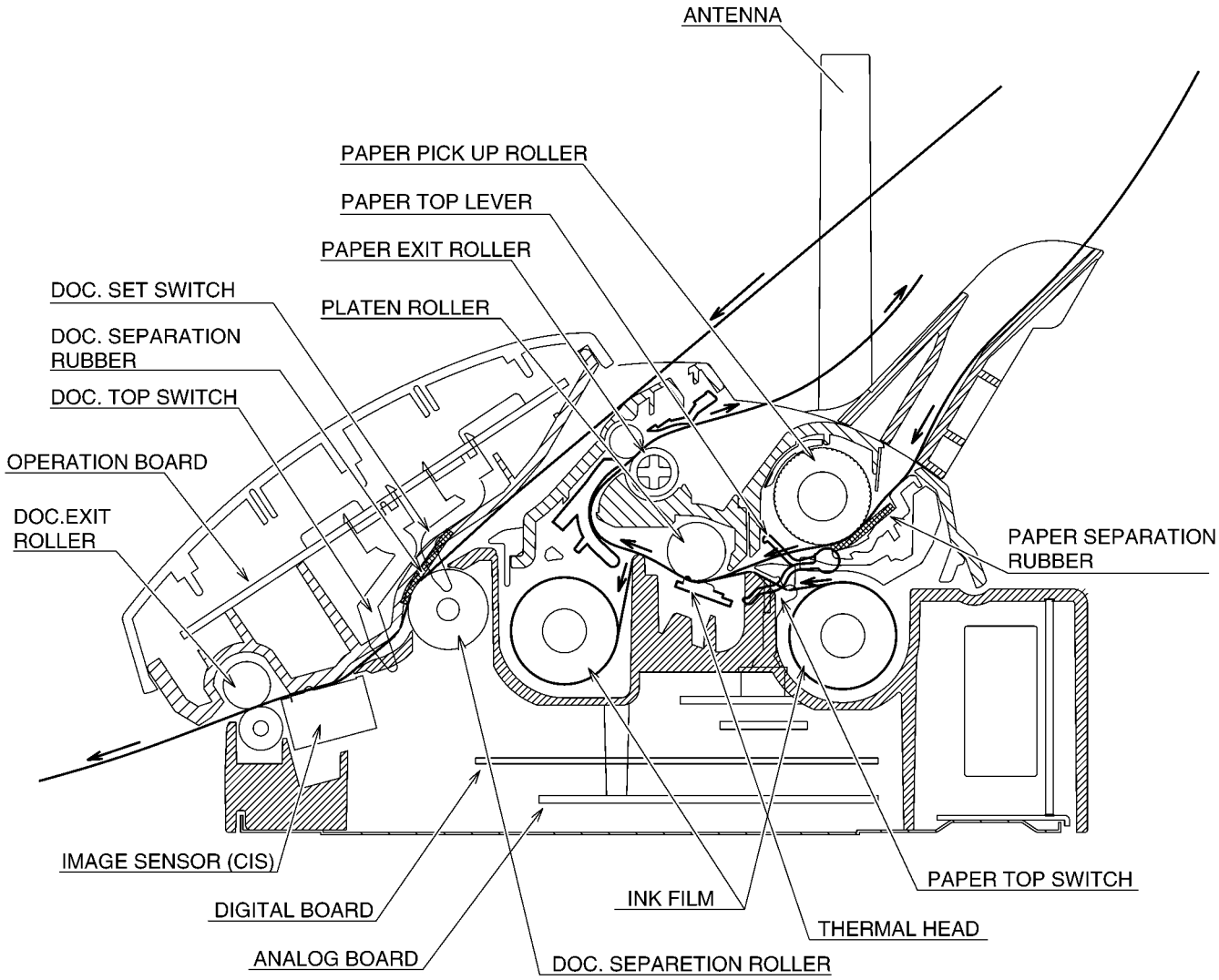
All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Error Message
Operation Panel	SW351	Document top sensor	[REMOVE DOCUMENT]
	SW352	Document set sensor	[CHECK DOCUMENT]
Sensor P.C.Board	SW1001	Cover Open sensor Paper Top sensor	[CHECK COVER] [PAPER JAMMED]
	SW1002	Film Detection sensor	[FILM EMPTY]
Film End Sensor P.C.Board	SW1003	Film End sensor	[CHECK FILM]
Gear Block	SW1004	Motor Position sensor	[CALL SERVICE2]
Hook Switch P.C.Board	SW1501	Hook switch	———

Note:

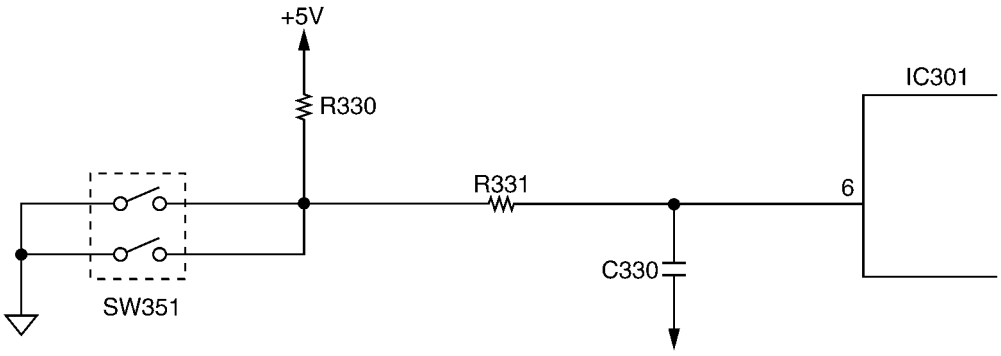
See **Test Mode** (P.58). (#815: Sensor Check)

Sensor Locations



6.5.1. Document Top Sensor (SW351)

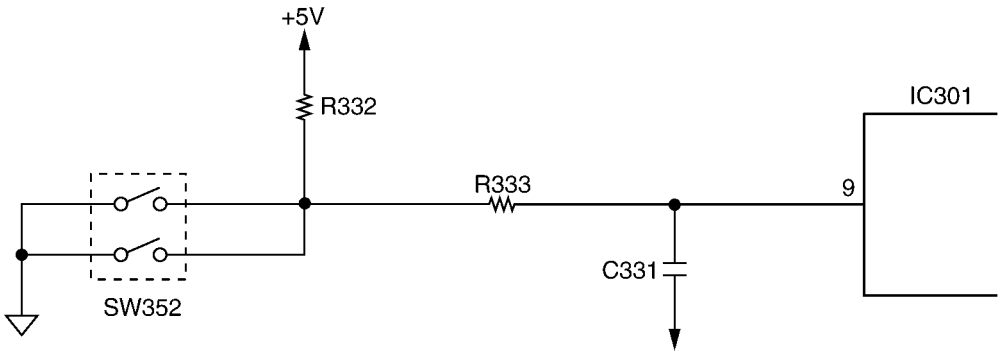
When a document is brought to the read position, the SW turns ON, and the input signal of IC301-6 pin (Operation Board) becomes a low level. When there is no document at the read position, the SW turns OFF, and the input signal of IC301-6 pin (Operation Board) becomes a high level.



	SW	Signal (IC301-6 pin)
Out of the Read Position	OFF	High level
At the Read Position	ON	Low level

6.5.2. Document Set Sensor (SW352)

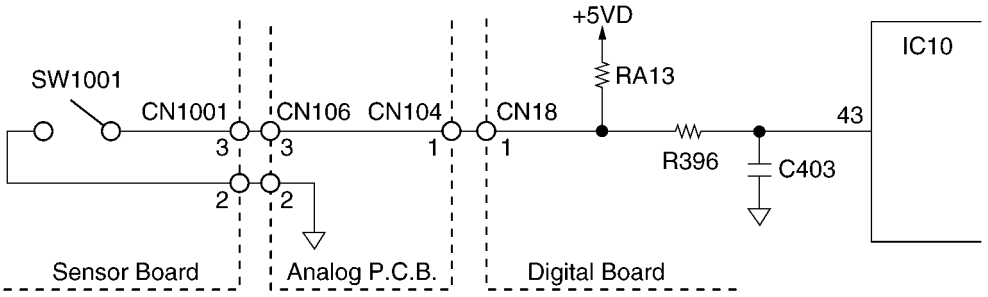
When a document is set, the SW turns ON, and the input signal of IC301-9 pin (Operation Board) becomes a low level. When there is no document, the SW turns ON, and the input signal of IC301-9 pin (Operation Board) becomes a high level.



	SW	Signal (IC301-9 pin)
No document	OFF	High level
Set document	ON	Low level

6.5.3. Paper Top Sensor (SW1001)

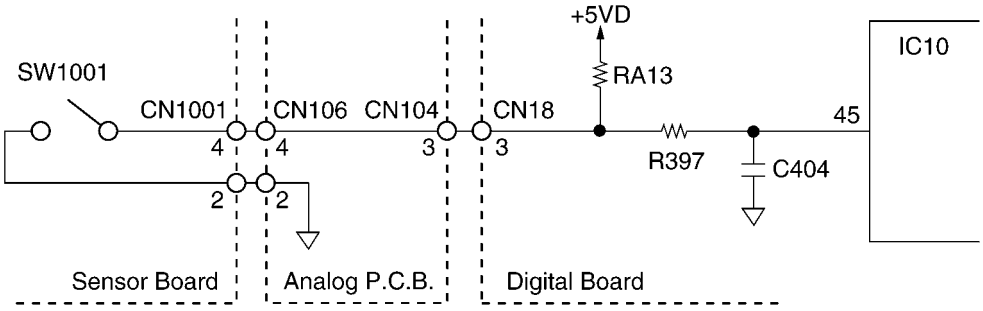
When the recording paper is loaded on the print head or the recording paper cover is opened, the paper top sensor SW turns ON, and the input signal of IC10-43 pin (Digital Board) becomes a low level. Usually, the SW turns OFF, and the input signal of IC10-43 pin (Digital Board) becomes a high level.



	SW	Signal (IC10-43 pin)
Set recording paper or paper cover is opened	ON	Low level
No recording paper or paper cover is closed	OFF	High level

6.5.4. Cover Open Sensor (SW1001)

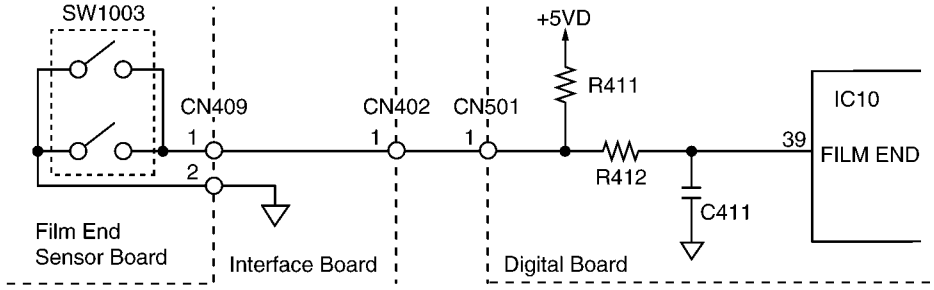
When the u-TURN BLOCK is closed, the SW becomes ON, and the input signal of IC10-45 pin (Digital Board) becomes a low level. When the cover is opened, the SW becomes OFF, and the input signal of IC10-45 (Digital Board) pin becomes a high level.



	SW	Signal (IC10-45 pin)
Cover is opened	OFF	High level
Cover is closed	ON	Low level

6.5.5. Film End Sensor (SW1003)

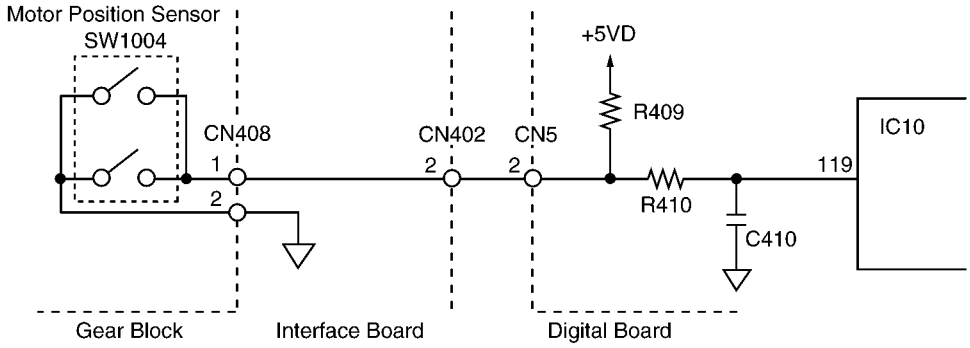
When the operation panel cover is closed and a film is set, the SW turns ON, and the input signal of IC10-39 pin (Digital) becomes a low level. When the cover is opened, the SW turns OFF, and the input signal of IC10-39 pin (Digital) becomes a high level.



	SW	Signal (IC10-39 pin)
Cover open or no film	OFF	High level
Cover closed and set a film	ON	Low level

6.5.6. Motor Position Sensor (SW1004)

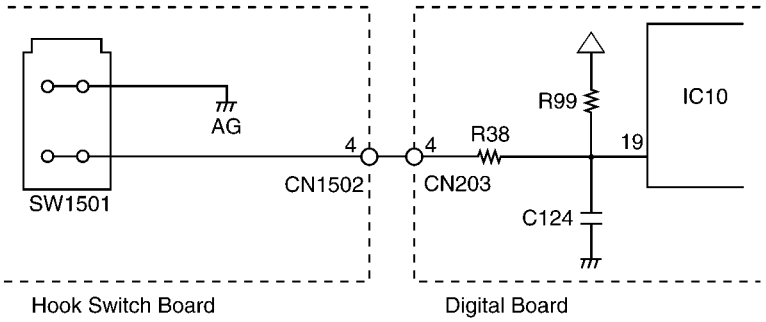
When the recording paper is loaded on the print head, the SW turns ON, and the input signal of IC10-119 pin (Digital Board) becomes a low level. When the recording paper is not loaded on the print head, the SW turns OFF, and the input signal of IC10-119 pin (Digital Board) becomes a high level.



	Signal (IC10-119 pin)
Home position	Low level
Other	High level

6.5.7. Hook Switch (SW1501)

When the handset is lifted, the switch turns ON, and the signal at pin 19 of IC10 becomes low.
When the handset is returned, the switch turns OFF, and the signal at pin 19 of IC10 becomes high.



	SW	Signal
ON-Hook	OFF	High level (IC10-19 pin)
OFF-Hook	ON	Low level

6.6. Modem Section

6.6.1. Function

The unit uses a 1 chip modem (IC3) that serves as an interface between the control section for FAX transmission and reception and the telephone line. During a transmitting operation, the digital image signals are modulated and sent to the telephone line. During a receiving operation, the analogue image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by ITU-T.
This 1 chip modem (IC3) has hardware which sends and detects all of the necessary signals for FAX communication.
It can be controlled by writing commands from the CPU (IC10: inside ASIC) to the register in the modem (IC3).
This modem (IC3) also sends DTMF signals, generates a call tone (from the speaker), and detects a busy tone and dial tones.

Overview of Facsimile Communication Procedures (ITU-T Recommendation):

1. ON CCIT (International Telegraph and Telephone Consultative Committee)

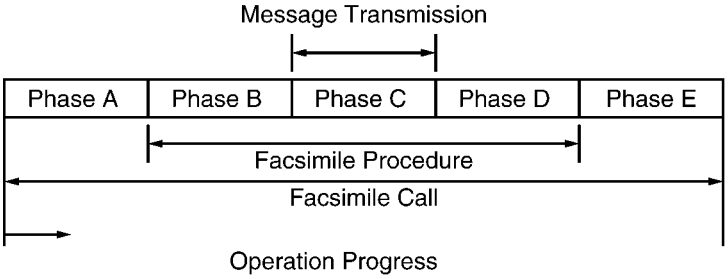
The No. XIV Group of CCITT, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international standards for facsimiles.

2. Definition of Each Group

- Group I (G1)
  Official A-4 size documents without using formats which reduce the band width of a signal are sent over telephone lines.Determined in 1968.
  Transmission for about 6 minutes at a scanning line density of 3.85 lines/mm.
- Group II (G2)
  Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes.
  Methods to suppress redundancy are not used.
  Determined in 1976.
- Group III (G3)
  Method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent within about one minute.
  Determined in 1980.
- Group IV (G4)
  Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible.
  The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3. Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A: Call setting

Call setting can be manual/automatic.

Phase B: Pre-message procedure

Phase B is a pre-processing procedure and sequence for confirming the status of the terminal, transmission route, etc., and for terminal control. It implements terminal preparation status, determines and displays terminal constants, confirms synchronization status, etc. and prepares for transmission of facsimile messages.

Phase C: Message transmission

Phase C is the procedure for the transmitting facsimile messages.

Phase D: Post message procedure

Phase D is the procedure for confirming that the message is completed and received. For continuous transmission, phase B or phase C is repeated for transmission.

Phase E: Call retrieval

Phase E is the procedure for call retrieval, that is for circuit disconnection.

4. Concerning Transmission Time

$$\overline{\text{Transmission Time}} = \overline{\text{Control Time}} + \overline{\text{Image Transmission Time}} + \overline{\text{Hold Time}}$$

Transmission time consists of the following.

Control time:

This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:

This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.

Hold time:

This is the time required after the document contents have been sent to confirm that the document was actually sent, and to check for telephone reservations and/or the existence of continuous transmission.

5. Facsimile Standards

Item	Telephone Network Facsimile
	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension : MH Mode 2 dimension : MR Mode (K=2.4)
Resolution	Main Scan : 8 pel/mm Sub Scan : 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value : 10, 20 Can be recognized in 40ms.

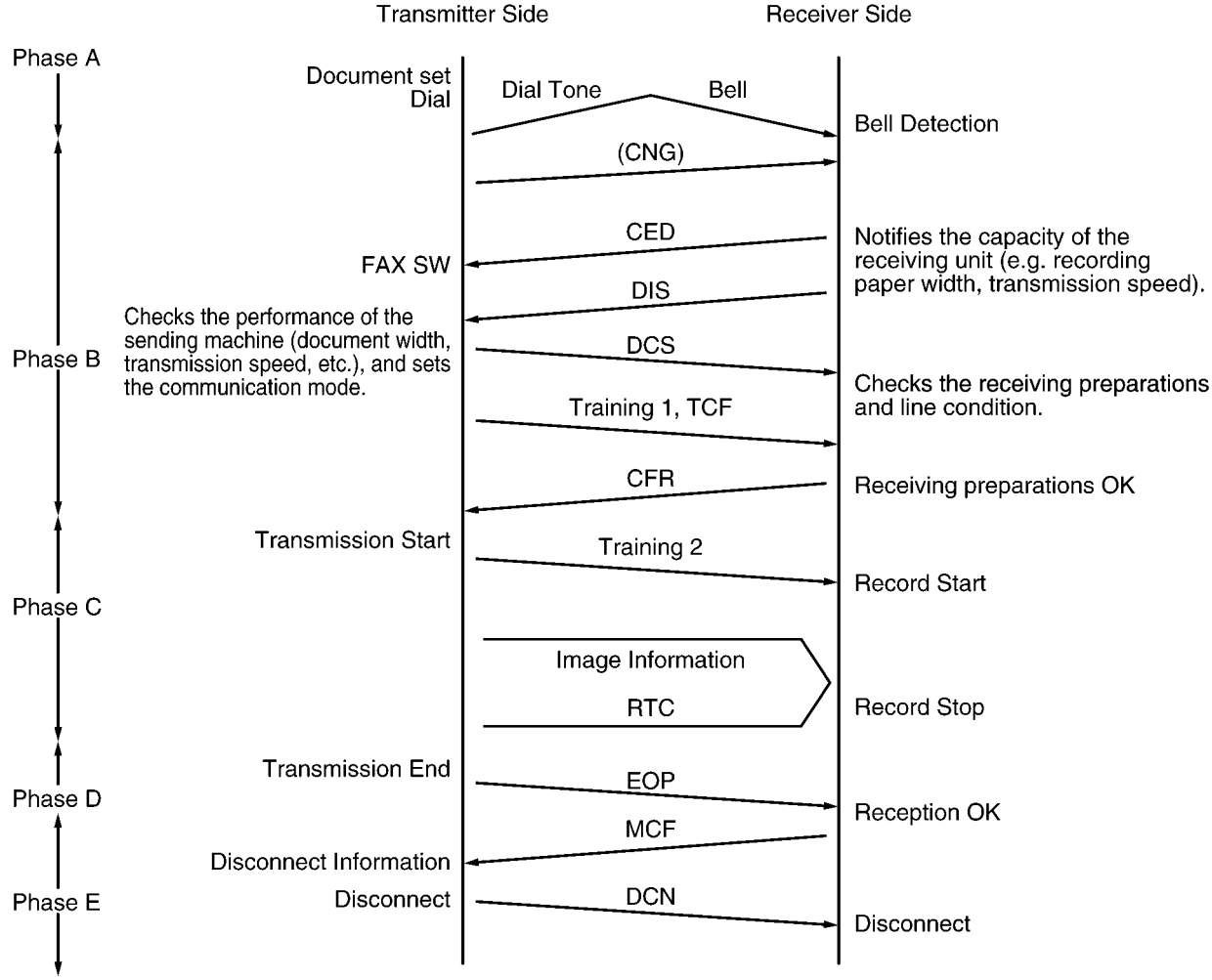
6. Explanation of Communication and Compression Technology

a. G3 Communication Signals (T. 30 Binary Process)

For G3 Facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals.

Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1.

An example of a binary process in G3 communication is shown below.



Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal)

Identification Signal Format.....00000001

Function:

Notifies the capacity of the receiving unit. The added data signals are as follows.

Signal.....DCS (Digital Command Signal)

Identification Signal Format.....X1000001

Example (Some models do not support the following items.):

Bit No.	DIS/DTC	DCS
1	Transmitter --- T.2 operation	
2	Receiver --- T.2 operation	Receiver --- T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter --- T.3 operation	
5	Receiver --- T.3 operation	Receiver --- T.3 operation
6	Reserved for future T.3 operation features	
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	
9	Transmitter --- T.4 operation	
10	Receiver --- T.4 operation	Receiver --- T.4 operation

Bit No.	DIS/DTC	DCS
11,12,13,14	Data signaling rate	Data signaling rate
0,0,0,0	V.27 ter fall back mode	2400 bit/s, V.27 ter
0,1,0,0	V.27 ter	4800 bit/s, V.27 ter
1,0,0,0	V.29	9600 bit/s, V.29
1,1,0,0	V.27 ter and V.29	7200 bit/s, V.29
0,0,1,0	Not used	14400 bit/s, V.33
0,1,1,0	Reserved	12000 bit/s, V.33
1,0,1,0	Not used	Reserved
1,1,1,0	V.27 ter and V.29 and V.33	Reserved
0,0,0,1	Not used	14400 bit/s, V.17
0,1,0,1	Reserved	12000 bit/s, V.17
1,0,0,1	Not used	9600 bit/s, V.17
1,1,0,1	V.27 ter and V.29 and V.33 and V.17	7200 bit/s, V.17
0,0,1,1	Not used	Reserved
0,1,1,1	Reserved	Reserved
1,0,1,1	Not used	Reserved
1,1,1,1	Reserved	Reserved
15	R8×7.7 lines/mm and/or 200×200 pels/25.4mm	R8×7.7 lines/mm and/or 200×200 pels/25.4mm
16	Two-dimensional coding capability	Two-dimensional coding capability
17, 18	Recording width capabilities	Recording width
(0, 0)	1728 picture elements along scan line length of 215 mm ± 1%	1728 picture elements along scan line length of 215 mm ± 1%
(0, 1)	1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1% 2432 picture elements along scan line length of 303 mm ± 1%	2432 picture elements along scan line length of 303 mm ± 1%
(1, 0)	1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1%	2048 picture elements along scan line length of 255 mm ± 1%
(1, 1)	Invalid	Invalid
19, 20	Maximum recording length capability	Maximum recording length
(0, 0)	A4 (297 mm)	A4 (297 mm)
(0, 1)	Unlimited	Unlimited
(1, 0)	A4 (297 mm) and B4 (364 mm)	B4 (364 mm)
(1, 1)	Invalid	Invalid
21, 22, 23	Minimum scan line time capability of the receiver	Minimum scan line time
(0, 0, 0)	20 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	20 ms
(0, 0, 1)	40 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	40 ms
(0, 1, 0)	10 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	10 ms
(1, 0, 0)	5 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	5 ms
(0, 1, 1)	10 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 1, 0)	20 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 0, 1)	40 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 1, 1)	0 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	0 ms
24	Extend field	Extend field
25	2400 bit/s handshaking	2400 bit/s handshaking
26	Uncompressed mode	Uncompressed mode
27	Error correction mode	Error correction mode
28	Reserved for G4 capability on PSTN	Frame size 0 = 256 octets 1 = 64 octets
29	T.6 coding capability	Error limiting mode
30	Reserved for G4 capability on PSTN	Reserved for G4 capability on PSTN
31	T.6 coding capability	T.6 coding enabled
32	Extend field	Extend field
33	Validity of bits 17, 18	Recording width
(0)	Bits 17, 18 are valid	Recording width indicated by bits 17, 18
(1)	Bits 17, 18 are invalid	Recording width indicated by this field bit information
34	Recording width capability 1216 picture elements along scan line length of 151 ± mm 1%	Middle 1216 elements of 1728 picture elements
35	Recording width capability 864 picture elements along scan line length of 107 ± mm 1%	Middle 864 elements of 1728 picture elements
36	Recording width capability 1728 picture elements along scan line length of 151 ± mm 1%	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 ± mm 1%	Invalid
38	Reserved for future recording width capability.	
39	Reserved for future recording width capability.	

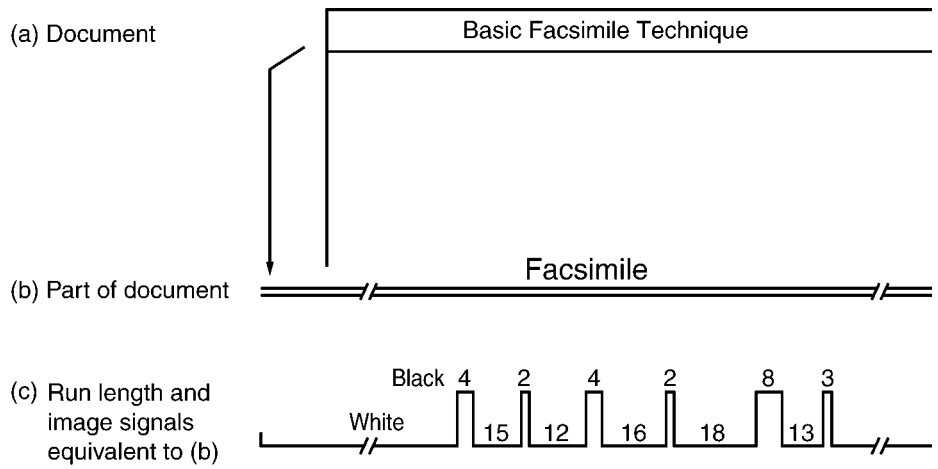
Bit No.	DIS/DTC	DCS
40	Extend field	Extend field
41	R8×15.4 lines/mm	R8×15.4 lines/mm
42	300×300 pels/25.4 mm	300×300 pels/25.4 mm
43	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm
44	Inch based resolution preferred	Resolution type selection "0": neritic based resolution "1": inch based resolution
45	Metric based resolution preferred	Don't care
46	Minimum scan line time capability for higher resolutions "0": $T_{15.4} = T_{7.7}$ "1": $T_{15.4} = 1/2T_{7.7}$	Don't care
47	Selective Polling capability	Set to "0".
48	Extend field	Extend field

Note 1 - Standard facsimile units conforming to T.2 must have the following capability : Index of cooperation (IOC)=264.
Note 2 - Standard facsimile units conforming to T.3 must have the following capability : Index of cooperation (IOC)=264.
Note 3 - Standard facsimile units conforming to T.4 must have the following capability : Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	————————	A fixed pattern is transmitted to the receiving side at a speed (2400 to 9600 bps) designated by DCS, and the receiving side optimizes the automatic equalizer, etc., according to this signal.
TCF (Training Check)	————————	Sends 0 continuously for 1.5 seconds at the same speed as the training signal.
CFR (Confirmation to Receive)	X0100001	Notifies the sending side that TCF has been properly received. If TCF is not properly received, FTT (Failure To Train) X0100010 is relayed to the sender. The sender then reduces the transmission speed by one stage and initiates training once again.
Training 2	————————	Used for reconfirming the receiving side like training 1.
Image Signal	Refer to the next page.	————————
RTC (Return to Control)	————————	Sends 12 bits (0...01 × 6 times) to the receiver at the same speed as the image signal and notifies completion of transmission of the first sheet.
EOP (End of Procedure)	X1110100	End of one communication
MCF (Message Confirmation)	X0110001	End of 1 page reception
DCN (Disconnect)	X1011111	Phase E starts.
MPS (Multi-Page Signal)	X1110010	Completion of transmission of 1 page. If there are still more documents to be sent, they are output instead of EOP. After MCF reception, the sender transmits an image signal of the second sheet.
PRI-EOP (Procedural Interrupt-EOP)	X1111100	If there is an operator call from the sender, it is output after RTC.
PIP (Procedural Interrupt Positive)	X0110101	This is output when an operator call is received.

b. Redundancy Compression Process Coding Mode

This unit uses one-dimensional MH format.



Modified Huffman (MH) Code		
Run length	Code for White Line	Code for Black Line
0	00110101	000011011
1	000111	010
2	0111	11
3	1000	10
4	1011	011
5	1100	0011
6	1110	0010
7	1111	00011
8	10011	000101
9	10100	000100
10	00111	0000100
11	01000	0000101
12	001000	0000111
13	000011	00000100
14	110100	00000111
15	110101	000011000
16	101010	0000010111
17	101011	0000011000
18	0100111	0000001000

(d) Codification of (c) according to MH formula

00110111101010 (White 400) 011 (Black 4) 110101 (White 15) 11 (Black 2) 001000 (White 12) 011 (Black 4) 101010 (White 16)

11 (Black 2) 0100111 (White 18) 000101 (Black 8) 000011 (White 13) 10 (Black 3)

(c) Total bit number before MH codification (497 bit)
(d) Total bit number after MH codification (63 bit)

6.6.2. Modem Circuit Operation

The modem (IC3) has all the hardware satisfying the CCITT standards mentioned previously.
When the ASIC IC10 (61) is brought to a low level, the modem (IC3) is chip-selected and the resistors inside IC are selected by the select signals from ASIC (IC10) ADR0-ADR4. The commands are written through the data bus, and all the processing is controlled by the ASIC (IC10) according to CCITT procedures. The INT signal dispatched from IRQ (pins 100 of IC3) to ASIC (IC10) when the transmission data is accepted and the received data is demodulated, the ASIC (IC10) implements post processing. This modem (IC3) has an automatic application equalizer.
With training signal 1 or 2 during G3 reception, it can automatically establish the optimum equalizer. The modem (IC3) operates using the 32.256 MHz clock (X1).

1. **Facsimile Transmission**
   The digital image data on the data bus is modulated in the modem (IC3), and sent from pin 56 via, amplifier IC102 and the NCU section to the telephone line.
   Refer to **Check Sheet for Signal Route** (P.123).

2. **Facsimile Reception**
   The analog image data which is received from the telephone line passes through the NCU section and enters pin 47 of the modem (IC3). The signals that enter pin 47 of the modem (IC3) are demodulated in the board to digital image signals, then placed on the data bus.
   In this case, the image signals from the telephone line are transmitted serially. Hence, they are placed on the bus in 8 bit units. Here, the internal equalizer circuit reduces the image signals to a long-distance receiving level.
   This is designed to correct the characteristics of the frequency band centered around 3 kHz and maintain a constant receiving sensitivity.
   It can be set in the service mode.
   Refer to **Check Sheet for Signal Route** (P.123).

6.7. NCU Section

6.7.1. General

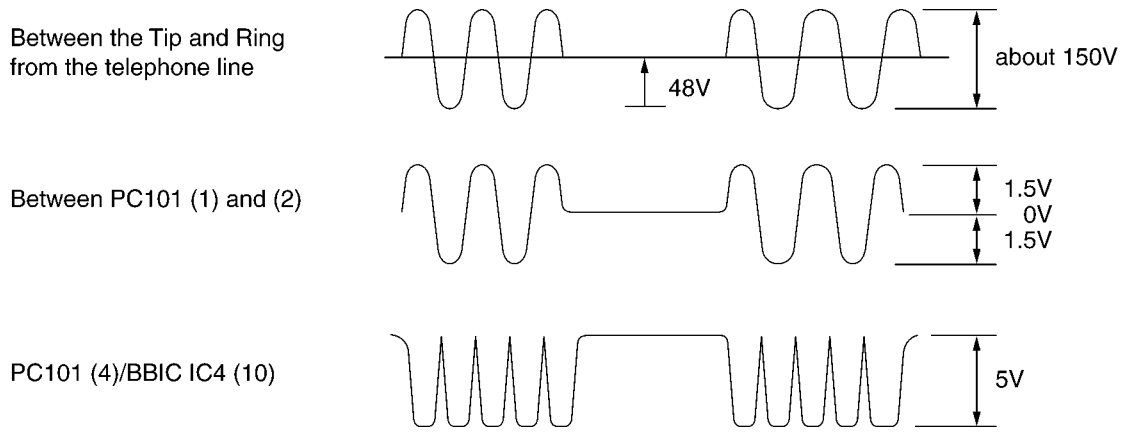
It is composed of bell detection circuit, pulse dial circuit, line amplifier, sidetone circuits.

6.7.2. Bell Detection Circuit

1. **Circuit Operation**

The signal waveform for each point is indicated below. The signal (low level section) input to pin 10 of BBIC IC4 on the digital board.

TEL LINE → PC101 (1, 2 → 4) → IC4 (10)



6.7.3. On/Off Hook Circuit

Normally (ON-HOOK condition), LINE RELAY (RL101) and Opt Isorator (PC102) is OFF. While OFF-HOOK, RL101 and PC102 turns ON. This LINE RELAY is controlled by pin 83 of IC4 through the Q101. PC102 is controlled by pin 12 of IC4 through the Q104.

ON-HOOK:

IC4 (83) Low Level → Q101 OFF → RL101 OFF

IC4 (12) Low Level → Q104 OFF → PC102 OFF

OFF-HOOK:

IC4 (83) High Level → Q101 ON → RL101 ON

IC4 (12) High Level → Q104 ON → PC102 ON

6.7.4. Pulse Dial Circuit

The pulse dial is generated by operating the transistor PC102 while OFF-HOOK (RL101 ON) condition.

Make state:

IC4 (12) High Level → Q104 ON → PC102 ON

Break state:

IC4 (12) Low Level → Q104 OFF → PC102 OFF

6.7.5. Line Amplifier and Side Tone Circuit

1. **Circuit Operation**

The reception signal output from the line transformer T101 is input to pin (2) of IC101 via C130, R138 and then the signal is amplified at pin (1) of IC101 and sent to the reception system at through the LPF.

Side Tone Circuit

Transmission Signal:

IC104(100) → C607 → R604 → IC102(6-7) → CN19(1) → CN103(1) → C169 → R132 → R131 → T101 → TEL LINE

C169 → R133 → R134 → R135 → C134 → R140

R135 → R136 → C128 → AG

Reception Signal:

TEL LINE → T101 → C130 → R138 → IC101(3-1) → CN103(4)

6.7.6. Calling Line Identification Circuit

1. **Function**

   This unit is compatible with the Caller ID service offered by your local telephone company. To use this feature, you must subscribe to a Caller ID service. The data for the caller ID from the telephone exchange is sent during the interval between the first and second rings of the bell signal. The data from the telephone exchange is a modem signal which is modulated in an FSK (Frequency Shift Keying) format. Data "0" is a 1200 Hz sine wave, and data 1 a 2200 Hz sine wave.

   There are two type of the message format which can be received:i.e.the single data message format and multiple data message format.

   The multiple data format allows to transmit the name and data code information in addition to the time and telephone number data.

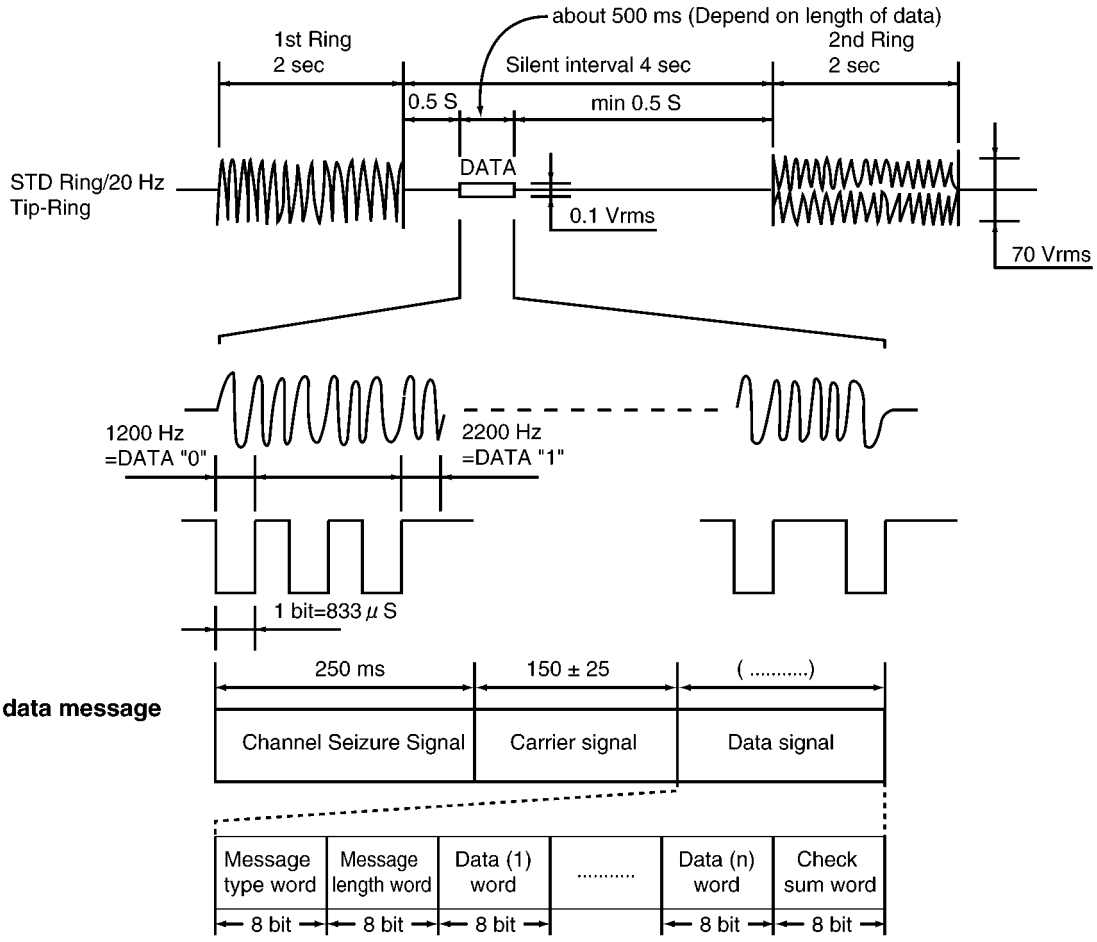
   When there is multiple data in the unit, the name or telephone number are displayed.

2. **Circuit Operation:**

   The caller ID signal input from TEL LINE is processed with BBIC (IC4).

   Refer to **Check Sheet for Signal Route** (P.123) for the route of caller ID signal.

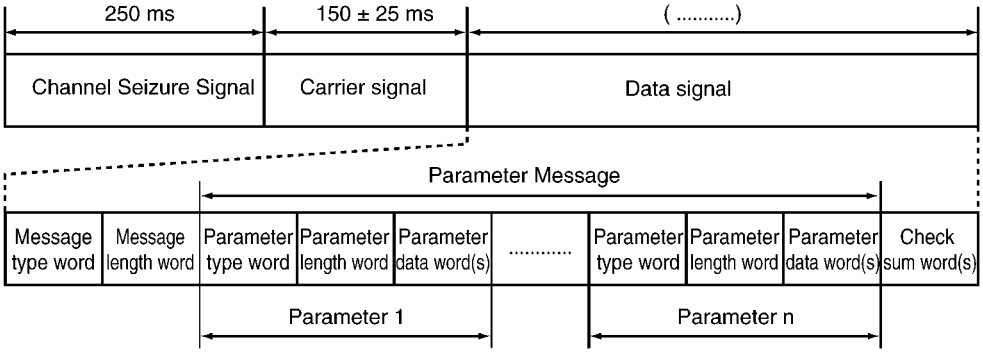
Timing Chart



• Single data message

•1 word = All 8 bit data
•Message Type Word = Fixed value "00000100"
•Message Length Word = number of the data word
•Data word = The data value (month, day, hour, minute, telephone number)

· **Multiple data message**



·1 word = All 8 bit data
·Message Type = Fixed value "10000000"
·Message Length Word = number of the Parameter Message word
·Parameter Type Word = Kind of data (ex. the time, phone number)
·Parameter Length Word = number of the Parameter data word
·Parameter Word (s) = the data value

6.8. ITS (Integrated Telephone System) and Monitor Section

6.8.1. Speakerphone Circuit

Function

This circuit controls the automatic switching of the transmitted and received signals, to and from the telephone line, when the unit is used in the hands-free mode.

Circuit Operation

The speakerphone can only provide a one-way communication path.

In order words, it can either transmit an outgoing signal or receive an incoming signal at a given time, but cannot do both simultaneously. Therefore, a switching function is necessary to control the flow of the outgoing and incoming signals.

This switching function is contained in IC4 and consists of voice detector, TX attenuator, RX attenuator, comparator and attenuator control. The function analyzes whether the TX (Transmit) or the RX (receiver) signal is louder, and then it processed the signal such that the louder signal is given precedence. The vice detector provides the attenuator control corresponding to the TX signal. The comparator receives a TX and RX signals to the attenuator control corresponding to the RX signal. The attenuator control provides a control signal to the TX and the RX attenuator to switch the appropriate signals ON and OFF. The attenuator control also detects the level of the volume control to automatically adjust for changing ambient conditions.

6.9. Transmitter / Receiver (Cordless)

Base Unit and Cordless Handset mainly consist of RF Module and DECT BBIC.

Base Unit and Cordless Handset transmit/receive voice signal and data signal through the antenna on carrier frequency.

6.9.1. Transmitter Block

The voice signal input from the TEL LINE interface goes to RF Module (IC28) through DECT BBIC (IC4).

The voice signal passes through the analog part of IC4 where it is amplified and converted to a digital audio stream signal. The burst switch controller processes this stream performing encryption and scrambling, adding the various other fields to produce the GAP (**G**eneric **A**ccess **P**rofile) standard DECT frame, assigning to a time slot and channel etc.

In IC28, the carrier frequency is changing, and frequency modulated RF signal is generated and amplified, and radiated from antenna. Cordless Handset detects the voice signal or data signal in the circuit same as the following explanation of Receiver Block.

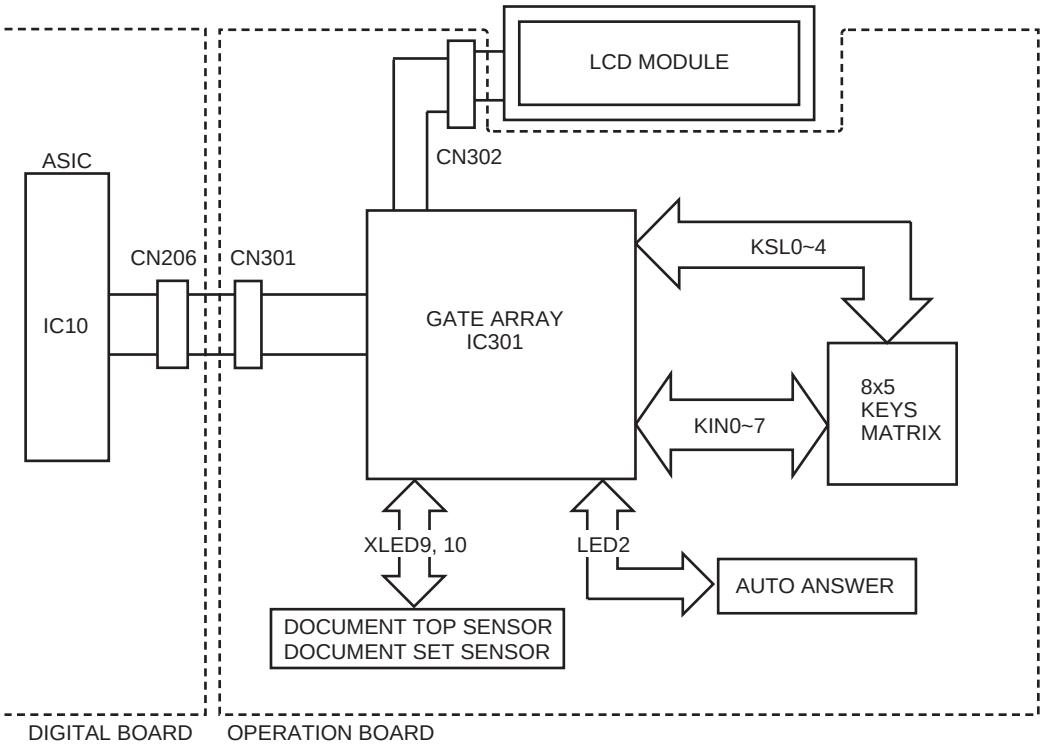
6.9.2. Receiver Block

The signal of 19.2 MHz band (18.81792 MHz ~ 18.97344 MHz) which is input from antenna is input to IC28.

In IC28, the signal of 19.2 MHz band is down converted to 864 kHz signal and demodulated, and goes to IC4 as GAP (**G**eneric **A**ccess **P**rofile) standard DECT frames. It passes through the decoding section burst switch controller where it separates out the frame information and performs de-encryption and de-scrambling as required. It then goes to the DSP section where it is turned back into analog audio. This is amplified by the analog front end, and goes to the TEL LINE Interface.

6.10. Operation Board Section

The unit consists of a LCD (Liquid crystal display), KEYs and LEDs (light-emitting diodes). They are controlled by the Gate Array (IC301) and ASIC (IC10: on the DIGITAL BOARD). The key matrix table is shown below.



KX-FC255CX-S : OPERATION BOARD BLOCK DIAGRAM

	KIN0	KIN1	KIN2	KIN3	KIN4	KIN5	KIN6	KIN7
KSL0	SW327 REDIAL / PAUSE	SW331 CALLER ID	SW323 3	SW319 2	SW315 1	SW311 →	SW306 ERASE	SW301 ←
KSL1	SW328 R (FLASH)	SW332 STOP	SW324 6	SW320 5	SW316 4	SW312 ↑	SW307 MEMO	SW302 LOCATOR/ INTERCOM
KSL2	SW329 MUTE	SW333 COPY	SW325 9	SW321 8	SW317 7	SW313 SET	SW308 CHECK	SW303 PRINT REPORT
KSL3							SW310 PLAYBACK	SW305 AUTO ANSWER
KSL4	SW330 SP-PHONE	SW334 FAX/START	SW326 #	SW322 0	SW318 *	SW314 ↓	SW309 REC	SW304 MENU

XLED

	XLED10	XLED9
	DOCUMENT SET	DOCUMENT TOP

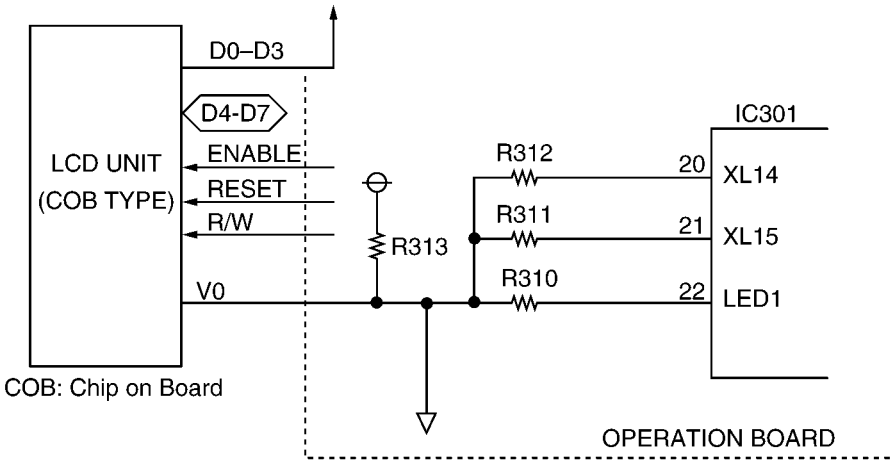
LED

	LED2	LED3	LED4	LED5
	AUTO ANSWER			

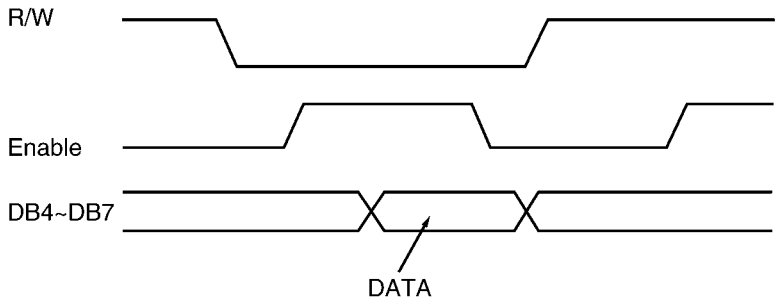
6.11. LCD Section

The Gate Array (IC301) works only for writing the ASCII code from the data bus (D4~D7). V0 is supplied for the crystal drive.
R310, R311 and R312 are density control resistors.
Consequently, in this unit, the timing (positive clock) is generated by the LCD interface circuitry in the gate array (IC301).

Circuit Diagram



Timing Chart

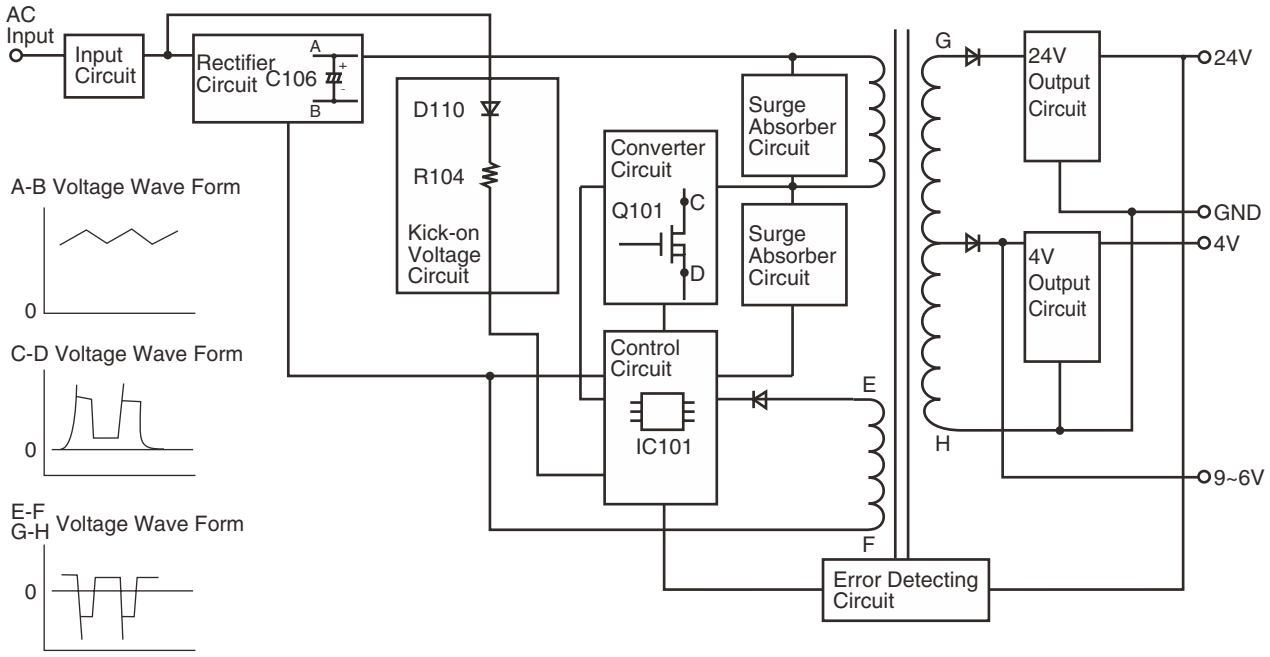


DIsplay mode	Density	Normal	Dark
2 lines (X1.0)	LED1 (IC301-22pin)	H	L
	XL14 (IC301-20pin)	Hi-Z	L
	XL15 (IC301-21pin)	L	L
1 line (X1.5)	LED1	H	H
	XL14	Hi-Z	Hi-Z
	XL15	Hi-Z	L

6.12. Power Supply Board Section

This power supply board uses the switching regulator method.

Block Diagram



[Input Circuit]

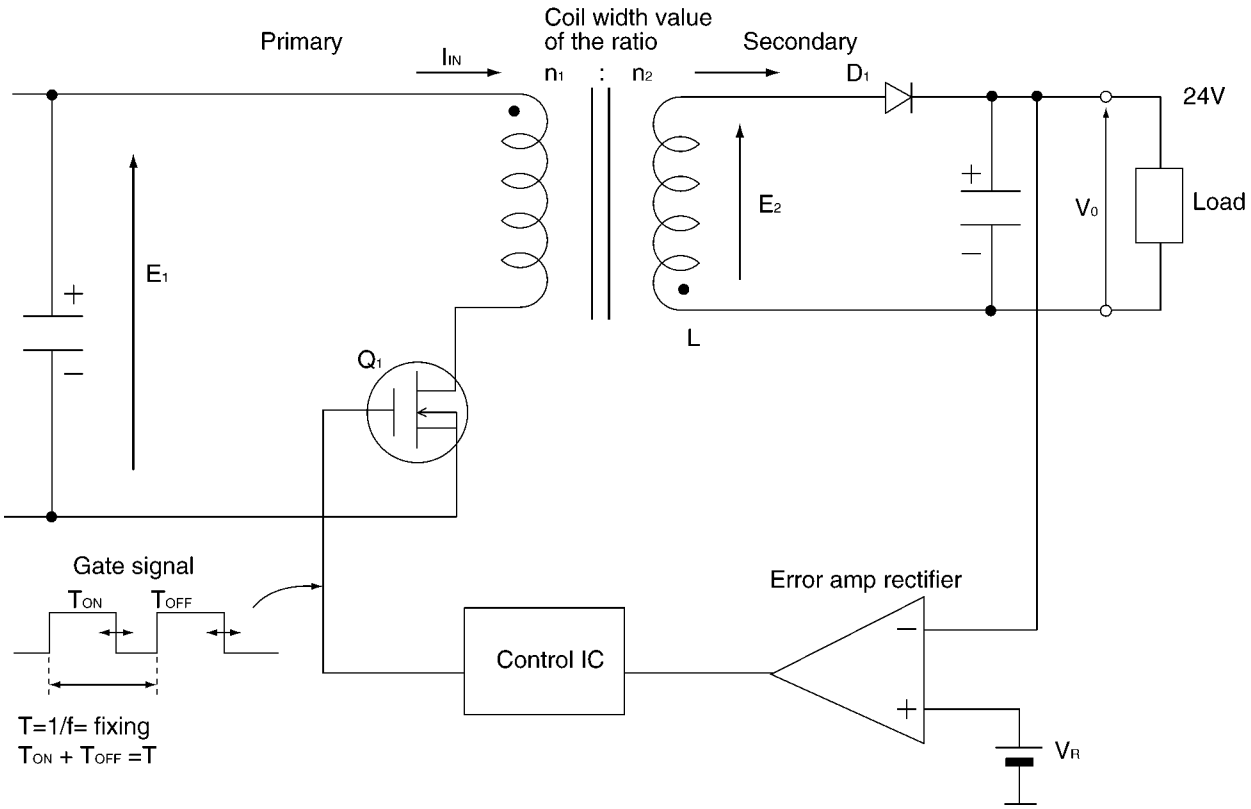
The input current goes into the input rectifier circuit through the filter circuit. The filter circuit decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]

The input current is rectified by D101, D102, D103 and D104 and charges C106 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on voltage circuit]

Bias is applied to the Q101 gate via this circuit when the AC power is turned on and Q101 begins operating.

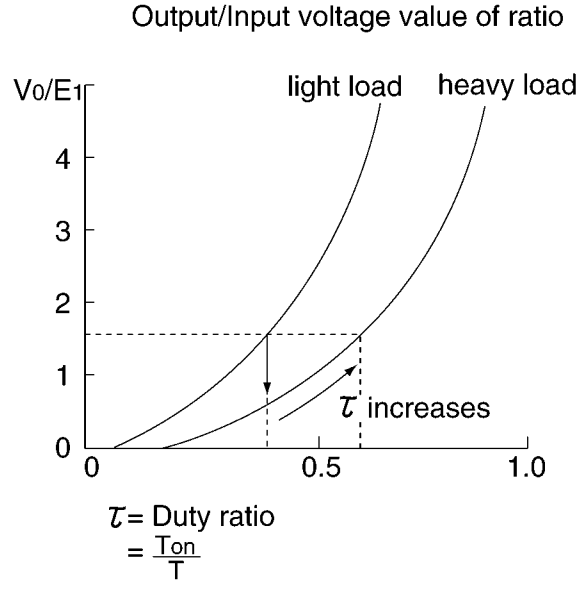


The following is an overview of how the power supply unit is controlled.
The control method of this power supply unit is pulse width modulation.

When Q_1 is ON, the energy is charged in the transfer primary coil according to E_1. When Q_1 is OFF, the energy is output from the secondary transfer as follows.

$L \rightarrow D_1 \rightarrow$ Load $\rightarrow L$

Then the power is supplied to the Load. When Q_1 is ON, power is not output from the secondary side. The output voltage is fed back in the control IC according to the error amp rectifier. Then depending on how T_{ON} is controlled, stabilization occurs. Also, when the current load becomes too large, in order to decrease the voltage output, the increase in τ is controlled and the output voltage is stabilized.
Therefore, basically the timing: Ton/Toff of Q1 controls the output voltage.



[Surge Absorber Circuit]

This circuit is for absorbing surge voltage generated by the transformer.

[Control Circuit and Detecting Circuit]

The control circuit amplifies the output with increased voltage detected in the error detecting circuit. Then it drives the main transistor.

In this power supply, the duty ratio is defined by changing the ON period of the main transistor.

This is shown as follows.

When the output voltage of the 24V circuit increases, the current of the photo coupler PC101 increases, the pulse width of the output control IC becomes narrower and the ON period of Q101 becomes shorter.

[Over Current Limiter (O.C.L)]

The highest drain current (Q101) is limited by a limiter circuit (IC101) of 24V. The 24V output is limited by this circuit.

[Over Voltage Circuit]

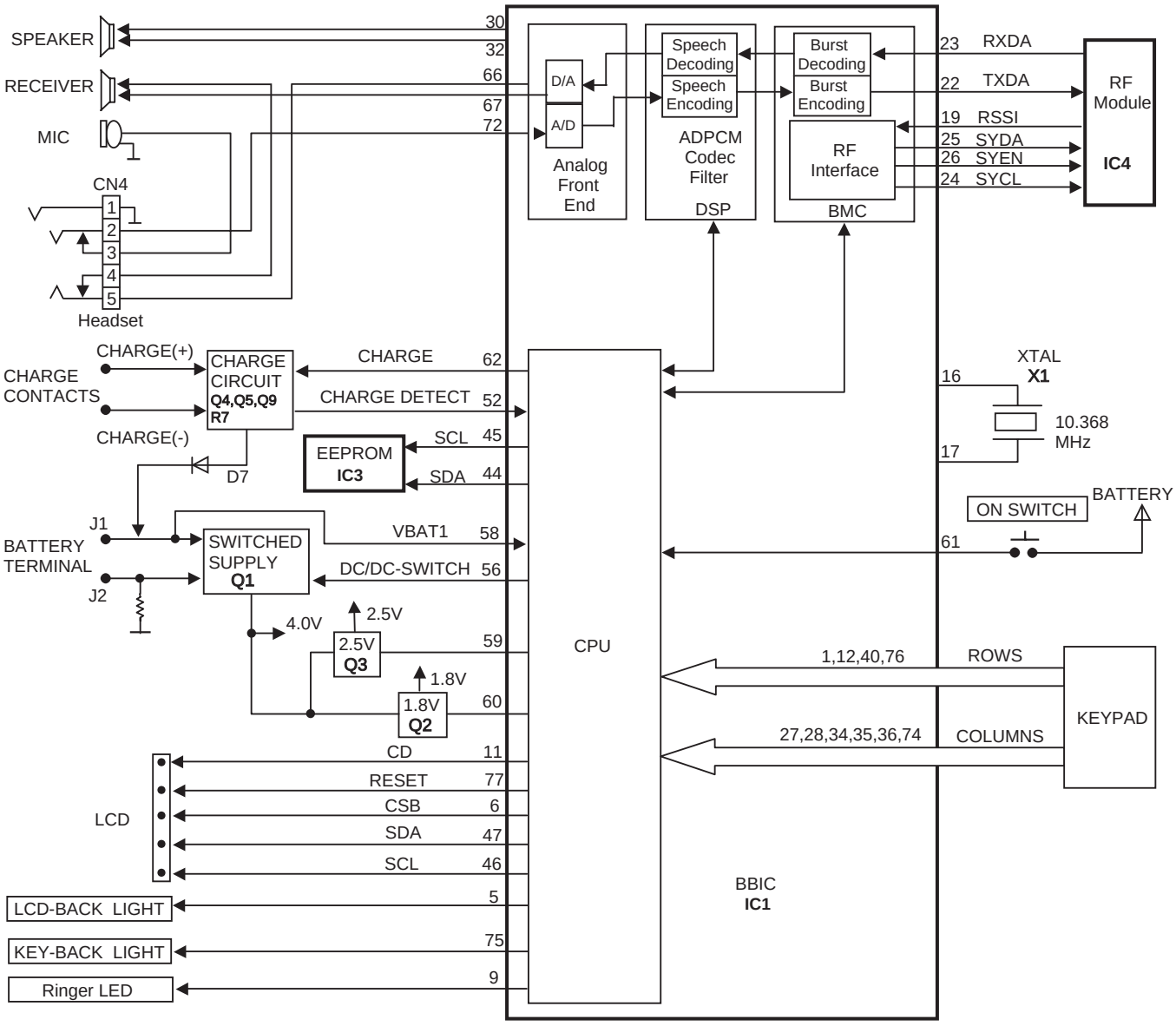
If the 24V output increases because the error detecting circuit or control circuit is broken, IC101 will recognize this signal and output becomes 0V.

Dummy load method (to quickly check the power supply output)

Refer to **Power Supply Board Section** (P.125).

6.13. Cordless Handset

6.13.1. Block Diagram



KX-FC255CX-S: CORDLESS HANDSET BLOCK DIAGRAM

6.13.2. Circuit Operation (Cordless Handset)

6.13.2.1. Outline

Handset consists of the following ICs as shown in **Block Diagram** (P.45).

- DECT BBIC (**B**ase **B**and IC): IC1
  - All data signals (forming/analyzing ACK or CMD signal)
  - All interfaces (ex: Key, Detector Circuit, Charge, DC/DC Converter, EEPROM, LCD)
- RF Module: IC4
  - PLL Oscillator
  - Detector
  - Compress/Expander
  - Amplifier for transmission and reception
- EEPROM: IC3
  - Temporary operating parameters (for RF, etc.)

6.13.2.2. Power Supply Circuit/Reset Circuit

Circuit Operation:

When power on the Handset, the voltage is as follows;
BATTERY(2.2 V ~ 2.6 V: J1) → F1, L1, D1 → Q2 (1.8 V), Q3 (2.5 V), Q1 (4.2 V)
The Reset signal generates IC1 (53 pin) and 1.8 V.

6.13.2.3. Charge Circuit

Circuit Operation:

When charging the handset on the Base Unit, the charge current is as follows;
DC+(6.5V) → R55, R56 → CHARGE+(Base) → CHARGE+(Handset) → L4 → Q4 → D7→ F1 → BATTERY+ ... Battery ...
BATTERY- → R45 → GND → CHARGE-(Handset)→ CHARGE-(Base) → GND → DC-(GND)
In this way, the BBIC on Handset detects the fact that the battery is charged.
The charge current is controlled by switching Q5 of Handset.

6.13.2.4. Battery Low/Power Down Detector

Circuit Operation:

"Battery Low" and "Power Down" are detected by BBIC which check the voltage from battery.
The detected voltage is as follows;

- Battery Low

Battery voltage: V(Batt) ≦ 2.25V ± 50mV
The BBIC detects this level and "▭" starts flashing.

- Power Down

Battery voltage: V(Batt) ≦ 2.00V ~ 2.05V
The BBIC detects this level and power down.

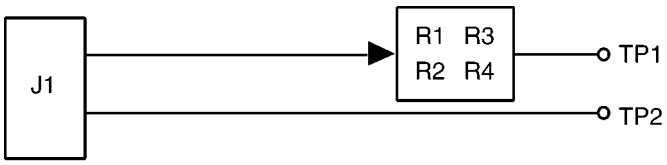
6.13.2.5. Speakerphone

The hands-free loudspeaker at SP+ and SP- works as a ringer/alarm as well.

6.13.3. Circuit Operation (Charger Unit)

6.13.3.1. Power Supply Circuit

The power supply is as shown.

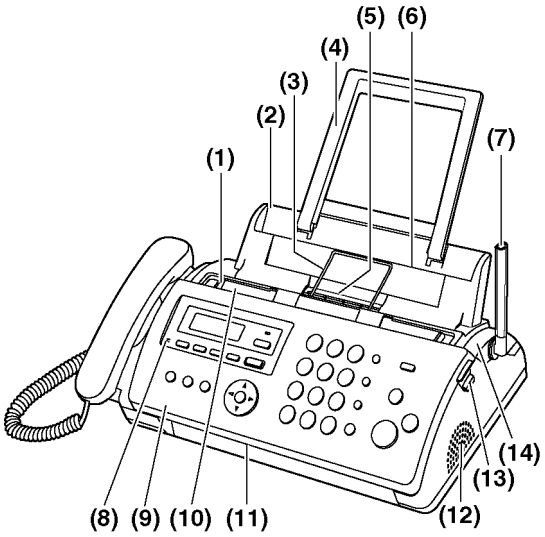


AC Adaptor

7 Location of Controls and Components

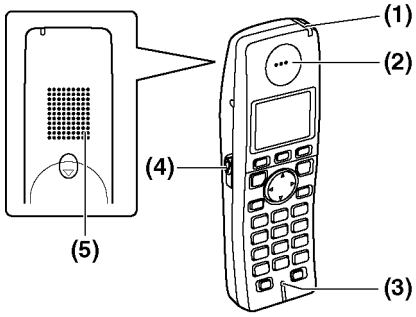
7.1. Overview

7.1.1. Base Unit



(1) Document guides
(2) Paper tray
(3) Metal recording paper guide
(4) Paper support
(5) Recording paper exit
(6) Recording paper entrance
(7) Antenna
(8) Microphone
(9) Front cover
(10) Document entrance
(11) Document exit
(12) Speaker
(13) Green button (Back cover release button)
(14) Back cover

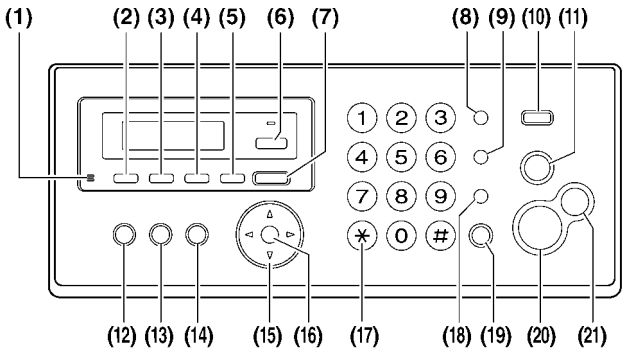
7.1.2. Cordless Handset



(1) Charge indicator
Ringer indicator
Message indicator
(2) Receiver
(3) Microphone
(4) Headset socket
(5) Speaker

7.2. Control Panel

7.2.1. Base Unit



(1) [MIC] (Microphone)
- The built-in microphone.

(2) [GREETING REC]
- To record a greeting message.

(3) [GREETING CHECK]
- To check a greeting message.

(4) [MEMO]
- To record a memo message.

(5) [ERASE]
- To erase messages.

(6) [AUTO ANSWER]
- To turn the auto answer setting ON/OFF.

(7) [PLAYBACK]
- To play messages.

(8) [REDIAL] [PAUSE]
- To redial the last number dialed from the base unit.
- To insert a pause during dialing.

(9) [R (FLASH)]
- To access special telephone services or for transferring extension calls.
- The recall/flash time can be changed (feature #72). (Refer to **Program Mode Table** (P.98).)

(10) [CALLER ID]
- To use Caller ID features.

(11) [STOP]
- To stop an operation or programming session.
- To erase a character/number. Press and hold to erase all characters/numbers.

(12) [LOCATOR] [INTERCOM]
- To make/answer intercom calls.
- To page or locate a cordless handset.

(13) [PRINT REPORT]
- To print lists and reports for reference purposes.

(14) [MENU]
- To start or exit programming.

(15) [PHONEBOOK] [VOLUME]
- To adjust volume.
- To search for a stored item.

(16) [SET]
- To store a setting during programming.

(17) [TONE]
- To change from pulse to tone temporarily during dialling when your line has rotary pulse service. You can also use tone dial service by changing feature #13 on **Program Mode Table** (P.98).

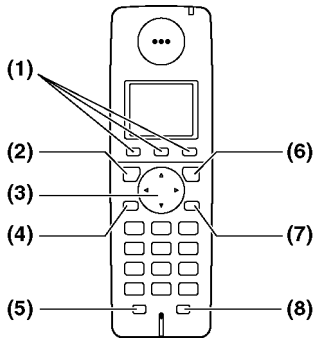
(18) [MUTE]
- To mute your voice during a conversation. Press again to resume the conversation.

(19) [SP-PHONE]
- For speakerphone operation.

(20) [FAX START]
- To send or receive a fax.

(21) [COPY]
- To copy a document.

7.2.2. Cordless Handset



(1) Soft keys
- To select the features or operations displayed directly above each key.

(2) [ ] (TALK)
- To make/answer calls.

(3) Navigator
- To adjust volume.
- To search for a stored item.
- To select features or feature settings during programming.
- To navigate to the next operation.

(4) [ ] (Speakerphone)
- For speakerphone operation.

(5) [R] (Flash)
- To access special telephone services or for transferring extension calls.
- The recall/flash time can be changed (feature #72). (Refer to **Cordless Handset Programming** (P.56).)

(6) [ ] (Off/Power)
- To turn power ON/OFF.
- To hang up.
- To stop an operation or programming.

(7) [C/] (Clear/Mute)
- To mute your voice during a conversation. Press again to resume the conversation.
- To erase a character/number. Press and hold to erase all characters/numbers.

(8) [INT] (Intercom)
- To page or locate the base unit or another cordless handset.

Display Icons

Display icon	Meaning
	Within range of a base unit ● When flashing: Cordless handset is searching for base unit (out of range of base unit, cordless handset is not registered to base unit, no power on base unit)
	Cordless handset is accessing base unit (intercom, paging, changing base unit settings, etc.)
	Cordless handset is on an outside call
	Missed call*1
	Answering machine is ON and/or new messages have been recorded
	Answering machine is full.
	Answering machine answers calls with a greeting message but does not record any incoming messages.
	Batteries are charging
	Battery strength
	Alarm is ON
	Voice enhancer is set to high or low tone
	Ringer volume is OFF
	Night mode is ON
"[2]"	Cordless handset number
"-2-"	Base unit number
	New SMS message received*2
	Your written SMS message is over 160 characters*2
	SMS memory is full*2
IN USE	● Line is being used by the base unit or another cordless handset ● Answering machine is being used by another cordless handset or the base unit

*1 Caller ID subscribers only
*2 SMS users only

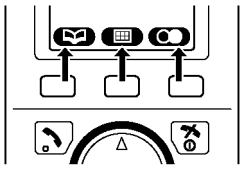
Menu Icons

When in standby mode, pressing the middle soft key reveals the cordless handset's main menu. From here you can access various features and settings.

Menu icon	Menu/feature
	"Caller List"
	"SMS" (Short Message Service)
	"Answer System"
	"Handset Setup"
	"Base Unit Setup"
	"Display Setup"

Soft Keys

The cordless handset features 3 soft keys. By pressing a soft key, you can select the feature or operation indicated by the soft key icon shown directly above it.



Soft Key Icons

Soft key icon	Action
	Returns to the previous screen
	Displays the menu
OK	Accepts the current selection
	Displays a previously dialled phone number
	Opens the cordless handset phonebook
	Displays the phonebook search menu
	Turns the key lock feature OFF
1/A/?	Displayed when adding or editing a phonebook item, or when writing an SMS message
	Stops recording or playback
P	Inserts a pause during dialling
	Erases the selected item
	Displayed when the soft key has no function

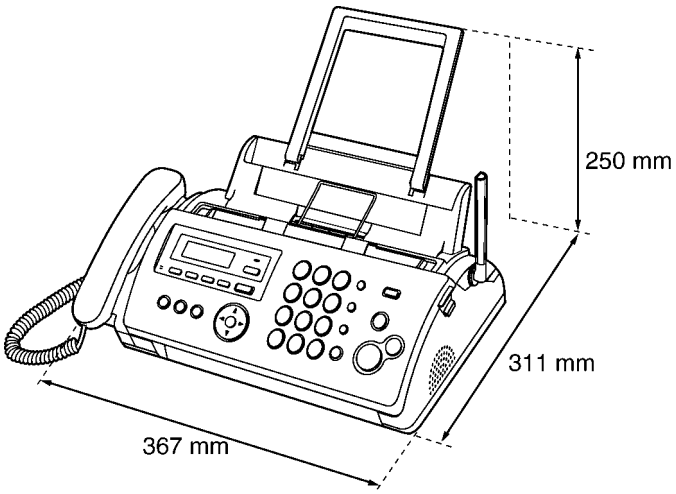
Symbols used in these operating instructions

Display icon	Meaning
" "	Select the words in quotations shown on the display (e.g., "Time Settings") by pressing 【▲】 or 【▼】.

8 Installation Instructions

8.1. Installation Space

The space required to install the unit is shown below.
The dimensions given are necessary for the unit to operate efficiently. (The recording paper is not inserted to the unit.)



Note:

- Avoid excessive heat or humidity.
- Use the unit within the following ranges of temperature and humidity.
- Ambient temperature: 5°C to 35°C
- Relative humidity: 20% to 80% (without condensation)
- Avoid direct sunlight.
- Do not install near devices which contain magnets or generate magnetic fields.
- Do not subject the unit to strong physical shock or vibration.
- Keep the unit clean. Dust accumulation can prevent the unit from functioning properly.
- To protect the unit from damage, hold both sides when you move it.

8.2. Connections

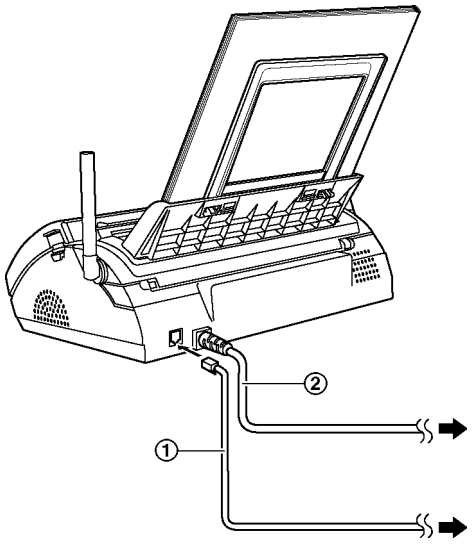
Important:

- **The unit will not function when there is a power failure. To make calls in emergency situations, you should connect a telephone that can function during a power failure to the telephone line.**

8.2.1. Base Unit

① Telephone line cord
•Connect to a single telephone line jack.

② Power cord
•Connect to a power outlet (220 V - 240 V, 50 / 60 Hz).

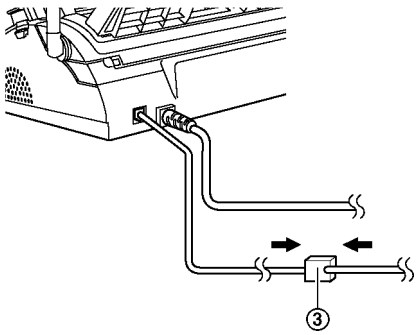


Caution:

- **When you operate this product, the power outlet should be near the product and easily accessible.**
- **Be sure to use the telephone line cord included in this unit.**
- **Do not extend the telephone line cord.**

Note:

- If any other device is connected to the same telephone line, this unit may disturb the network condition of the device.
- If you use the unit with a computer and your internet provider instructs you to install a filter (③), please connect the telephone line cord of the unit.

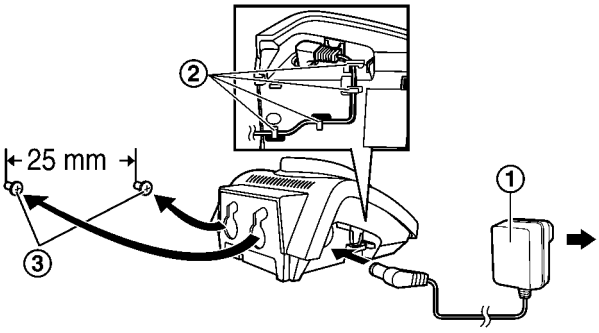


8.2.2. Charger Unit

① AC adaptor
- Connect to a power outlet (220 V - 240 V, 50 / 60 Hz).

② Hooks
- Fasten the AC adaptor cord to prevent it from being disconnected.

③ Screws (not included)
- The charger can be mounted on the wall, if required.



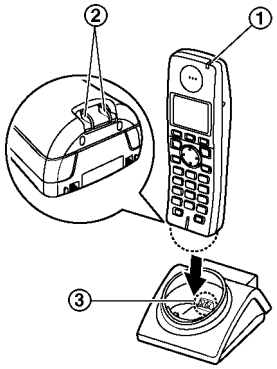
Caution:
- **USE ONLY WITH the included Panasonic AC adaptor.**
- **The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)**
- **The AC adaptor should be connected to a vertically oriented or floor-mounted AC outlet. Do not connect the AC adaptor to a ceiling-mounted AC outlet, as the weight of the adaptor may cause it to become disconnected.**

8.3. Battery Charge

Place the cordless handset on the charger for about **7 hours** before initial use.

When charging, and battery strength icon are alternately shown on the display.

When the batteries are fully charged, remains on the display.
- The charge indicator (①) lights up when the cordless handset is placed on the charger.



Note:
- To ensure the battery charges properly, clean the charge contacts of the cordless handset (②) and the charger (③) with a soft, dry cloth once a month. Clean more often if the unit is subject to grease, dust or high humidity.

Battery strength

Battery icon	Battery strength
	High
	Medium
	Low When flashing: Needs to be charged.

Panasonic Ni-MH battery performance (included batteries)

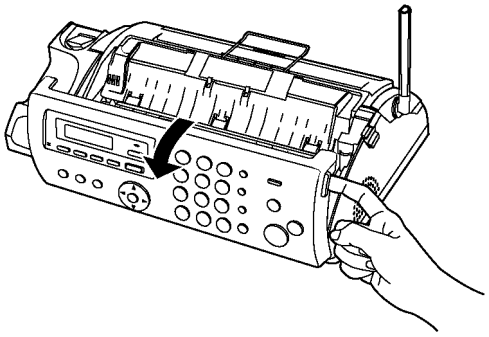
Operation	Operating time
In continuous use	12 hours max.
In continuous standby mode	150 hours max.

Note:
- It is normal for batteries not to reach full capacity at the initial charge. Maximum battery performance is reached after a few complete cycles of charge/discharge (use).
- Actual battery performance depends on a combination of how often the cordless handset is in use and how often it is not in use (standby).
- Battery operating time may be shortened over time depending on usage conditions and ambient temperature.
- Even after the cordless handset is fully charged, the cordless handset can be left on the charger without any ill effect on the batteries.
- The battery strength may not be displayed correctly after you replace the batteries. In this case, place the cordless handset on the charger and charge for at least 7 hours.

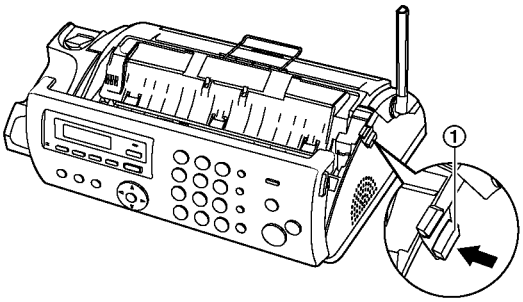
8.4. Installing the Ink film

The included film roll is a starter ink film.

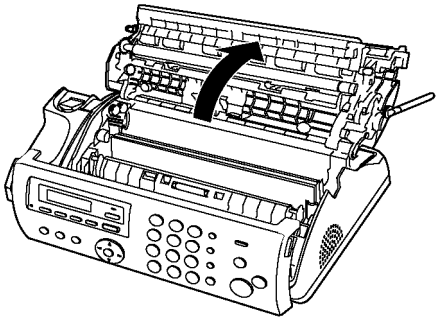
1. Open the front cover.



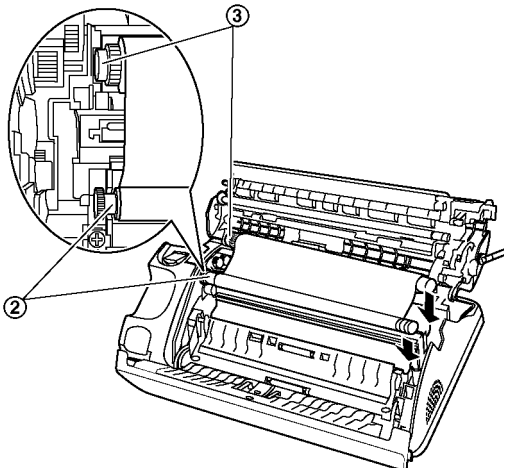
2. Release the back cover by pushing the green button (①).



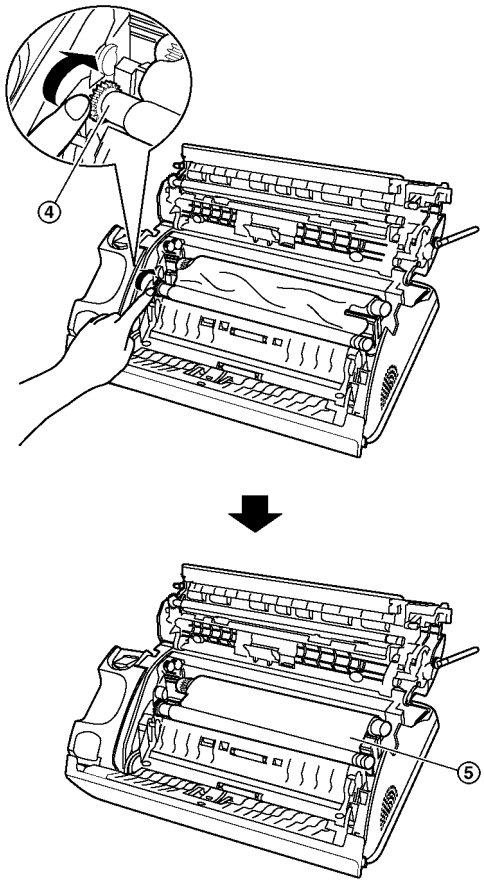
3. Open the back cover.



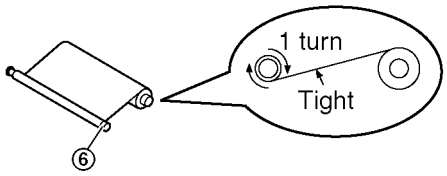
4. Insert the blue gear of the ink film roll into the front left slot of the unit (②) and the white gear of the ink film roll into the rear left slot of the unit (③).
   - The ink film is safe to touch and will not rub off on your hands like carbon paper.
   - Make sure the blue gear (②) and white gear (③) are installed as shown.



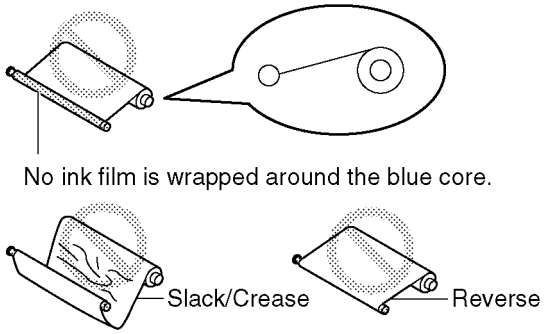
5. Turn the blue gear (④) in the direction of the arrow until the ink film is tight (⑤) and at least one layer of ink film is wrapped around the blue core (⑥).



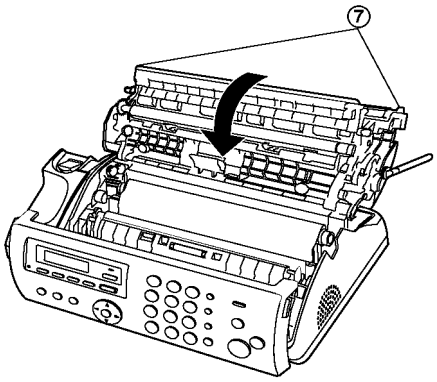
Correct



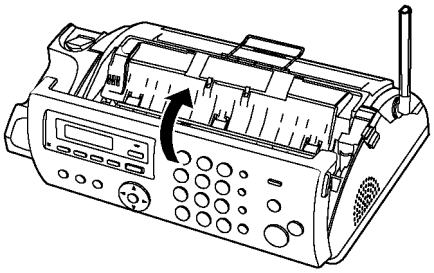
Incorrect



6. Close the back cover securely by pushing down on the dotted area at both ends (⑦).

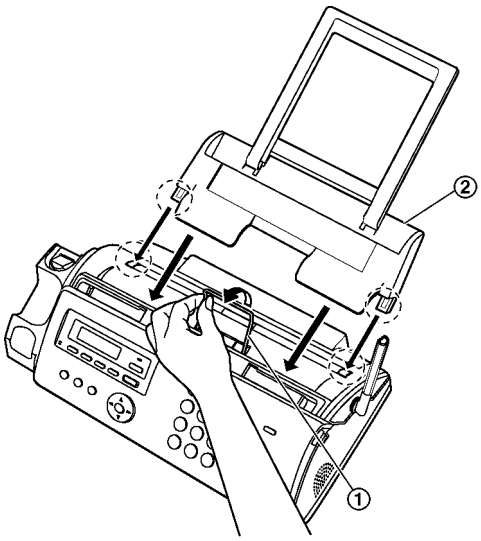


7. Close the front cover securely.

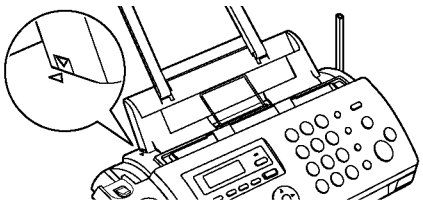


8.5. Installing the Paper Tray

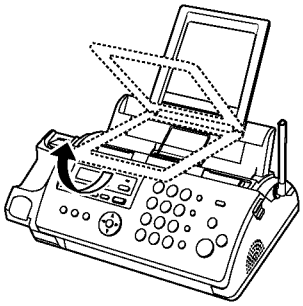
Pull up the metal recording paper guide (①), then install the paper tray (②).



• Make sure the arrows on the paper tray and the unit match.



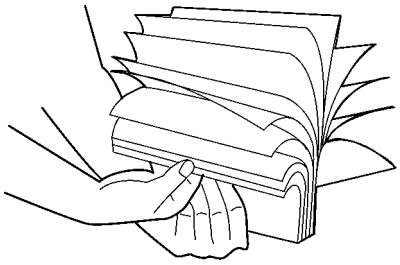
• If the paper support is folded, unfold it.



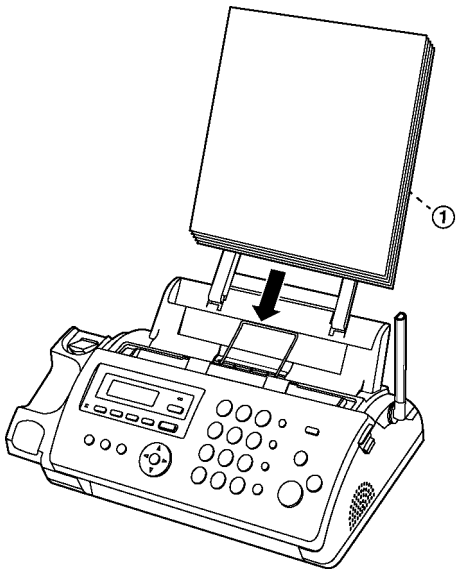
8.6. Installing the Recording Paper

The unit can hold up to 20 sheets of 64 g/m^2 to 80 g/m^2 paper.

1. Fan the paper to prevent paper jams.



2. Insert the paper gently, print-side down (①).
   • Do not force the paper into the paper tray.



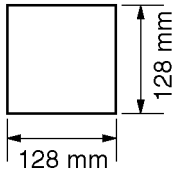
• If the paper is not inserted correctly, remove all of the installed paper, and re-install it gently. Otherwise the paper may jam.

Correct **Incorrect**

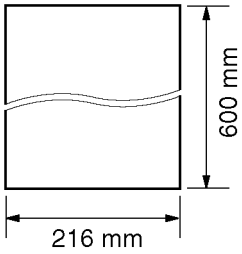
Note:
• Remove all of the installed paper before adding paper.

Document requirements

Minimum document size

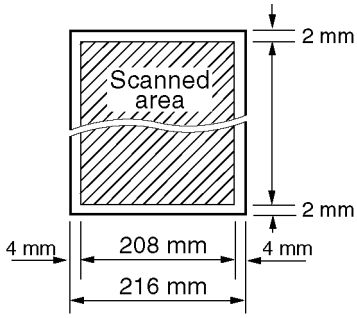


Maximum document size



Effective scanning area

●Shaded area will be scanned.



Document weight
• When faxing a single sheet:
  45 g/m^2 to 90 g/m^2
• When faxing a multiple sheet:
  60 g/m^2 to 80 g/m^2

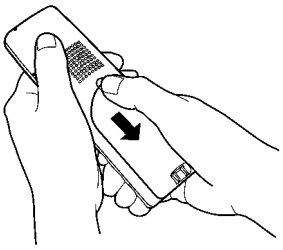
Note:
• Remove chips, staples or other fasteners.
• Do not send the following types of documents. (Make a copy of the document and send the copy.)
  — Chemically treated paper such as carbon or carbonless duplicating paper
  — Electrostatically charged paper
  — Badly curled, creased or torn paper
  — Paper with a coated surface
  — Paper with a faint image
  — Paper with printing on the opposite side that can be seen through the other side, such as newsprint
• Check that ink, paste or correction fluid has dried completely.
• To transmit a document with a width of less than 210 mm, we recommend using a copy machine to copy the original document onto A4 or letter-sized paper, than sending the copied document.

8.7. Battery Installation / Replacement

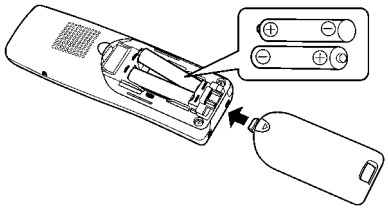
Important:

- **Use only the included rechargeable batteries noted on Optional Accessories** (P.10).
- **When replacing batteries, we recommend using the Panasonic rechargeable batteries noted on Optional Accessories** (P.10).
- **Wipe the battery ends (⊕, ⊖) with a dry cloth.**
- **Install the batteries without touching the battery ends (⊕, ⊖) or the unit contacts.**

1. Press the notch on the cordless handset cover firmly, and slide the cover.
   - When replacing batteries, remove the old batteries positive (⊕) terminal first.



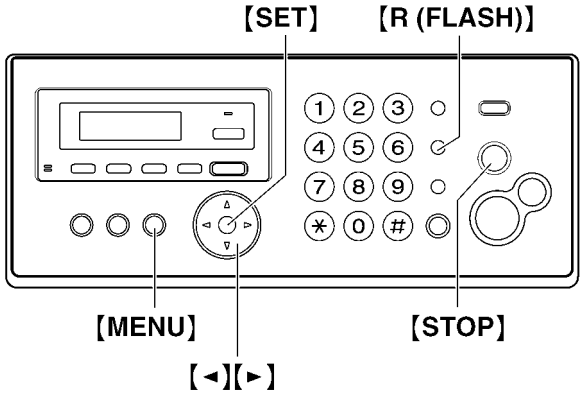
2. Insert the batteries negative (⊖) terminal first. Close the cordless handset cover.



9 Operation Instructions

9.1. Setting Your Logo

You can program your logo (name, company name, etc.) so that it appears on the top of each page sent.



1. **[MENU]** → **[#][0][2]** → **[SET]**

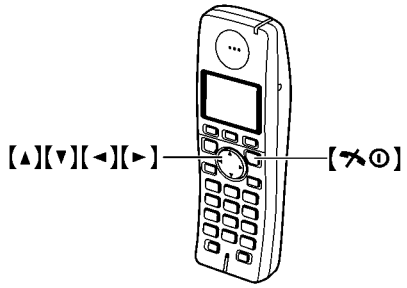
2. Enter your logo, up to 30 characters. (See the **Operation Instruction** for character entry.)
   - To enter a hyphen, press **[R (FLASH)]**.
3. **[SET]**
4. Press **[MENU]** to exit.

To correct a mistake

Press **[◄]** or **[►]** to move the cursor to the incorrect character, and make the correction.

- To erase all of the characters, press and hold **[STOP]**.

9.2. Cordless Handset Programming



1. [MENU]
2. Select [SETTINGS] by pressing [▲], [▼], [◄], or [►]. → [OK]
3. Press [▲] or [▼] to select the desired item in the cordless handset settings menu. → [OK]
4. Press [▲] or [▼] to select the desired item in the sub-menu. → [OK]
   - In some cases, you may need to select from a second sub menu. → [OK]
5. Press [▲] or [▼] to select the desired setting then press [OK] or follow the instruction in the rightmost column of the chart.
   - To exit the operation, press [OFF].

9.2.1. Cordless Handset Features

Cordless handset settings menu	Sub-menu	Sub-menu 2	Feature (default setting)
"Time Settings"	"Set Date & Time"*1	—	Date and time
	"Alarm"	—	Set the alarm
"Ringer Setup"	"Ringer Volume"*2	—	Cordless handset ringer volume*1
	"Ext. Ringtone"*2	—	Ringtones for outside calls ("Ringtone 1")*3
	"Int. Ringtone"	—	Ringtones for intercom calls ("Ringtone 3")*4
	"Night Mode"*2	"Start/End"	*(23:00/06:00)*
		"On/Off"	("Off")
		"Ring Delay"	("60 sec.")
		"Select Category"	—
"Display Setup"	"Wallpaper"	—	("Wallpaper1")
	"Display Colour"	—	("Colour1")
	"Standby Display"	—	Standby mode display ("Off")*5
	"Select Language"	—	Display language ("English")
	"Contrast"*2	—	LCD display contrast ("Contrast 3")
"Registration"	"Register H.set"	—	—
"Select Base"	—	—	Select a base unit ("Auto")
"Other Options"	"New Msg. Alert"	—	New message alert ("Off")*6
	"Keytones"	—	Keytones ON/OFF ("On")
	"Auto Talk"	—	Auto talk ON/OFF ("Off")*7

*1 When this setting is changed using the cordless handset, the setting for the base unit will also be changed, and vice versa.

*2 This setting can be changed individually for the base unit and the cordless handset.
- To set the base unit ringer volume.
- To set the base unit ringtone for outside calls, see feature #17.
- To set the base unit night mode, see feature #35.
- To set the base unit LCD display contrast, see feature #39.

*3 If you select one of the melody ringtones, the ringtone will continue to sound for several seconds if the caller hangs up before you answer. You may hear a dial tone or no one on the line when you answer a call.
The preset melodies in this product are used with permission of © 2006 Copyrights Vision Inc.

*4 The preset melodies in this product are used with permission of © 2006 Copyrights Vision Inc.

*5 If "`Off`" is selected, only current date and time are displayed.
If "`Handset Number`" is selected and the current cordless handset number is 2, "`[2]`" is displayed.
If "`Base Number`" is selected and the current base unit number is 2, "`-2-`" is displayed.

*6 This feature alerts you when new messages have been received or recorded:
- SMS
- Telephone answering machine

The message indicator on the cordless handset flashes until you have read or listened to all new messages. While message alert is ON, battery operating time is shortened.

*7 Auto talk feature allows you to answer calls simply by lifting the cordless handset OFF the charger. You do not need to press 【】.

Note:

Refer to **Program Mode Table** (P.98).

10 Test Mode

10.1. Facsimile Section

The codes listed below can be used to perform simple checks for some of the unit's functions. When complaints are received from customers, they provide an effective tool for identifying the locations and causes of malfunctions. To do this, you set the Service mode (Refer to **Operation** (P.61).) first, then operate the below test items.

Test Mode	Type of Mode	Code Operation after code input	Function
MEMORY CLEAR	Service Mode	"5" "5" "0" SET	Refer to **Memory Clear Specification** (P.64).
FLASH MEMORY CHECK	Service Mode	"5" "5" "1" SET	Indicates the version and checks the sum of the FLASH MEMORY.
MODEM TEST	Service Mode	"5" "5" "4" SET	Telephone line circuit is connected automatically, output the following signals on the circuit line. 1) OFF 2) 9600bps 3)7200bps 4) 4800bps 5) 2400bps 6) 300bps 7) 2100Hz 8)1100Hz
SCAN CHECK	Service Mode	"5" "5" "5" -------	Turns on the LEDs of the CIS and operates the read systems.
MOTOR TEST	Service Mode	"5" "5" "6" SET	Rotates the transmission and reception motor to check the operation of the motor. 00: Stop 02: TX 05: Pickup 08: Rx 10: Copy 11: Assist 13: Home position Press **[STOP]** button to quit.
LED CHECK	Service Mode	"5" "5" "7" -------	All LEDs above the operation panel board flash on and off, or are illuminated.
LCD CHECK	Service Mode	"5" "5" "8" SET	Checks the LCD indication. (except "STOP" key) Illuminates all the dots to check if they are normal.
KEY CHECK	Service Mode	"5" "6" "1" SET (any key)	Checks the button operation. Indicates the button code on the LCD while the button is pressed. Refer to **Button Code Table** (P.59).
MEMORY CLEAR (except History data)	Service Mode	"7" "1" "0" SET	Refer to **Memory Clear Specification** (P.64).
VOICE PROMPT CHECK	Service Mode	"7" "8" "4" SET	You can hear the voice prompt from speaker after pressing .SET. key.
SENSOR CHECK	Service Mode	"8" "1" "5" -------	If you enter this mode and operate sensor levers with your hands, the LCD display of the related sensor (or switch) turns ON / OFF. Also, when copying a document, the related sensor will turn ON / OFF. (Do, Sn, Co, Mo, Pt, Ri) For each sensor's operation, refer to **Sensor and Switches** (P.24). Do Sn Co Mo Pt Ri : LCD DISPLAY **Do: Document set sensor** :Turns on when the front cover us opened and a document is inserted. **Sn: Read position sensor.** :Turned on when the front cover is opened and the starts to read a document. **Co: Cover open sensor** :Turned off when the cover is opened. **Mo: Motor home position sensor** :A home position detection sensor that is used when shifting the motor mode. **Pt: Paper top sensor** :Turned on when the cover is opened and the detects a recording paper on the right side end. **Ri: Film sensor** :Turned off when the film are run out. • Press **[STOP]** button to quit.
PRINT TEST PATTERN	Service Mode	"8" "5" "2" -------	Prints out the test pattern. Used mainly at the factory to test the print quality. You can select 1~4. (See **Print Test Pattern** (P.60))

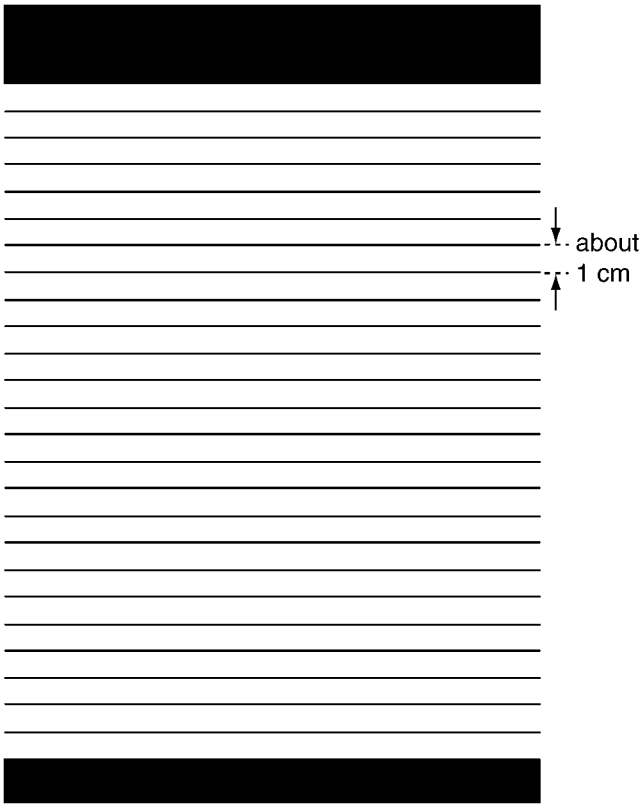
Note: The numbers in the boxes (XXX) indicate the keys to be input for the various test modes.

10.1.1. Button Code Table

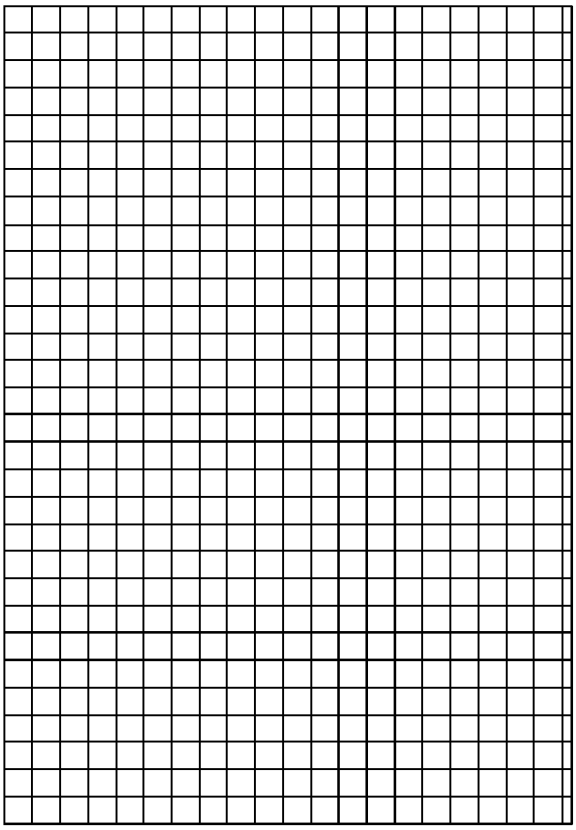
Code	Button Name	Code		Code	Button Name
00	NO INPUT	12	GREETING RECORD	31	1
----	STOP	14	MEMO	32	2
04	FAX START	15	GREETING CHECK	33	3
06	COPY	16	ERASE	34	4
08	SP-PHONE	18	PLAY BACK	35	5
09	LOCATOR / INTERCOM			36	6
0A	MUTE			37	7
0C	AUTO ANSWER	20	MENU	38	8
0D	SET	22	PRINT REPORT	39	9
		25	**[+]** VOLUME	3A	0
		26	**[—]** VOLUME	3B	*
1E	[▶]			3C	#
1F	[◀]			3D	REDIAL / PAUSE
				3E	R (FLASH)
				47	CALLER ID

10.1.2. Print Test Pattern

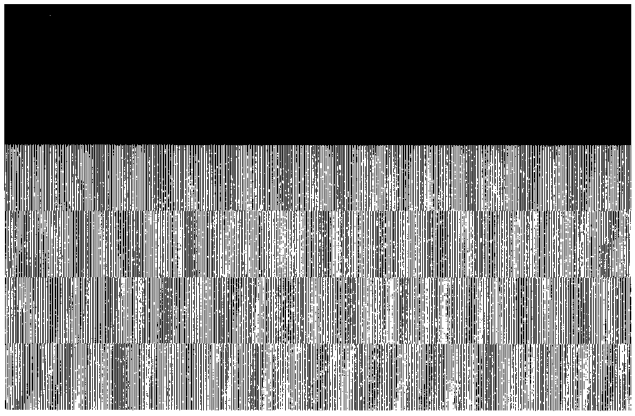
1. Platen roller



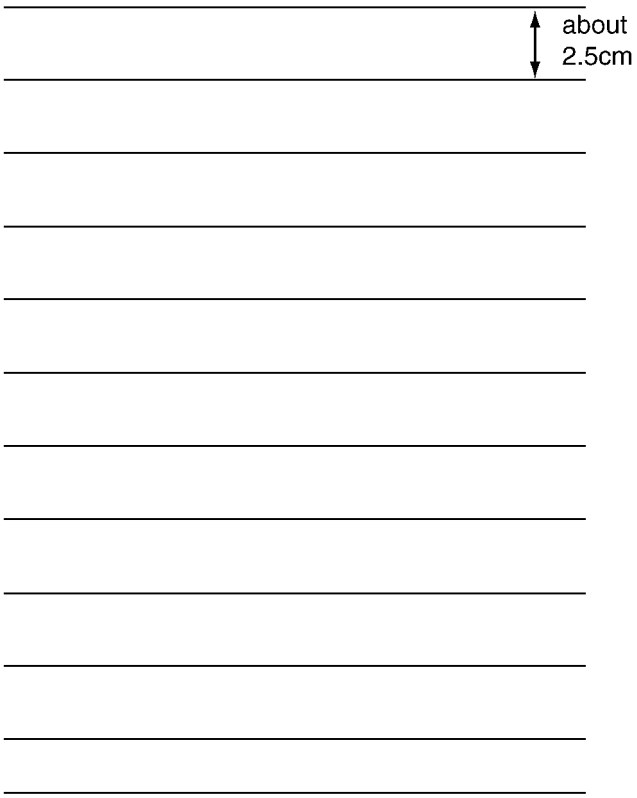
2. Left margin / Top margin



3. Thermal head 1 dot



4. Use this test pattern to confirm the torque limiter for Ink film and platen roller timing.



11 Service Mode

The programming functions are used to program the various features and functions of the machine, and to test the machine. This facilitates communication between the user and the service man while programming the unit.

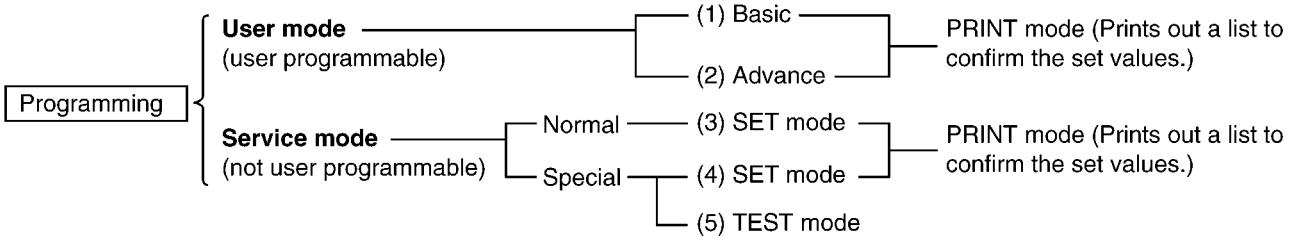
11.1. Base Unit

11.1.1. Programming and Lists

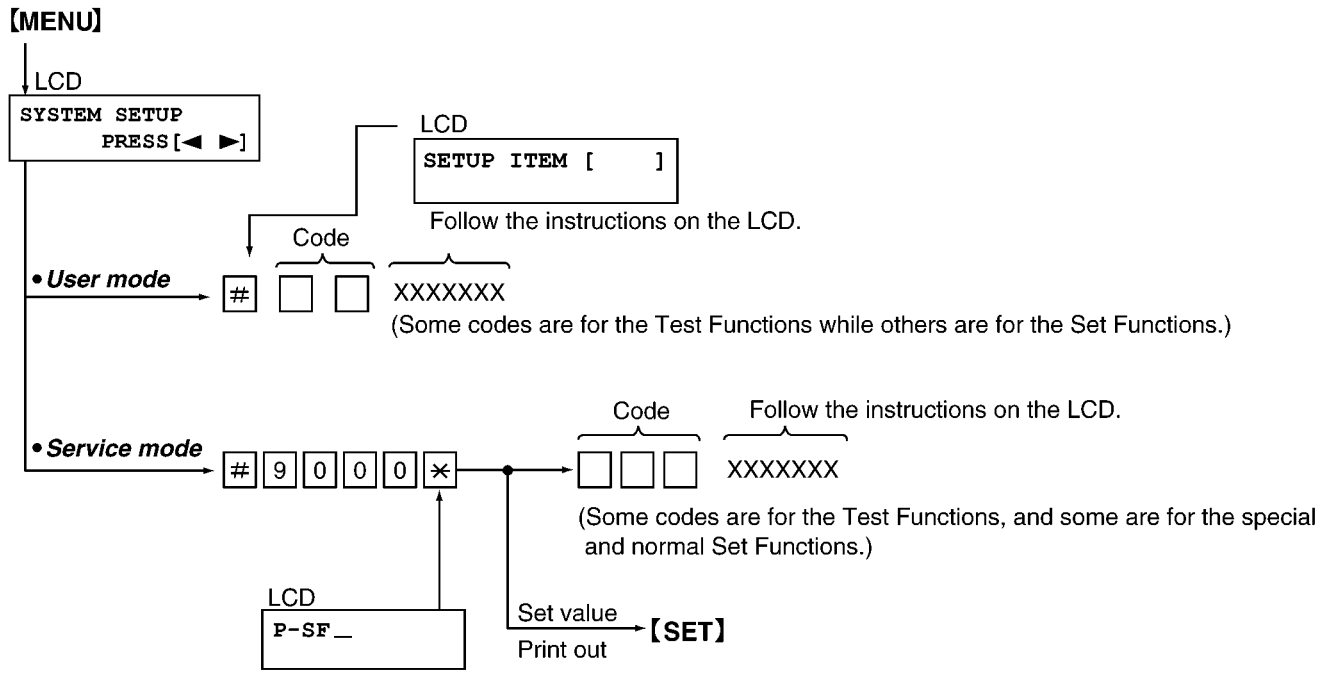
11.1.1.1. Operation

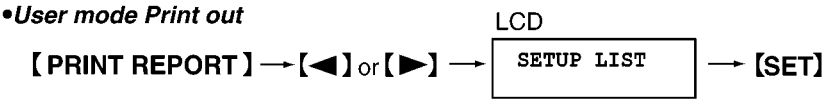
There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and special programs. The normal programs are those listed in the Operating Instructions and are available to the user. The special programs are only those listed here and not displayed to the user. In both the User and Service Modes, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test the various functions. The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. The Test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.

11.1.1.2. Operation Flow



■Operating Procedure





11.1.1.3. Service Function Table

Code	Function	Set Value	Effective Range	Default	Remarks
501	Pause time set	1: 3s (Short) 2: 5s (Long)	1, 2	1	----------
511	VOX sense	1:High 2:Low	1, 2	1	When the TAM (or EXT TAM) does not stop recording the ICM because noise is detected on the telephone line, change this setting to "LOW".
514	Bell detection time	X 10 msec	10~90	60	----------
520	CED frequency select	1:2100 Hz 2:1100 Hz	1, 2	1	See Symptom/Countermeasure Table for long distance and international calls in **The unit can copy, but cannot either transmit/receive long distance or international communications** (P.93).
521	International mode select	1:ON 2:OFF	1, 2	1	See Symptom/Countermeasure Table for long distance and international calls in **The unit can copy, but cannot either transmit/receive long distance or international communications** (P.93).
522	Auto standby select	1:ON 2:OFF	1, 2	1	The resolution reverts to the default when transmission is complete.
523	Receive equalizer select	1: 0 km 2: 1.8 km 3: 3.6 km 4: 7.2 km	1~4	1	When the telephone station is far from the unit or reception cannot be performed correctly, adjust accordingly.
524	Transmission equalizer select	1: 0 km 2: 1.8 km 3: 3.6 km 4: 7.2 km	1~4	1	When the telephone station is far from the unit or transmission cannot be performed correctly, adjust accordingly.
544	Document feed position adjustment value set	1: -2.0mm 2: -1.5mm 3: -1.0mm 4: -0.5mm 5: 0.0mm 6: 0.5mm 7: 1.0mm 8: 1.5mm 9: 2.0mm	1~9	5	When the ADF function is in correct, adjust the feed position.
550	Memory clear				See **Memory Clear Specification** (P.64).
551	Flash memory check				See **Test Mode** (P.58).
553	Monitor on FAX communication select	1:OFF 2:PHASE B 3:ALL	1~3	1	Sets whether to monitor the line signal with the unit's speaker during FAX communication or not.
554	Modem test				See **Test Mode** (P.58).
555	Scan check				See **Test Mode** (P.58).
556	Motor test				See **Test Mode** (P.58).
557	LED test				See **Test Mode** (P.58).
558	LCD test				See **Test Mode** (P.58).
559	Document jam detection select	1:ON 2:OFF	1, 2	1	Sets whether or not to detect a paper jam. If a document with a length longer than 600 mm is copied or transmitted, the unit stops copying or transmitting as a paper jamming because a document over 600 mm is not normal. In the factory, transmitting or copying a document longer than 600 mm is done as an aging test. In this case, OFF is selected.
561	KEY test				See **Test Mode** (P.58).
567	T0 timer	X second	001~255	046	Sets a higher value when the response from the other party needs more time during automatic FAX transmission.
570	Break % select	1: 61% 2: 67%	1, 2	1	Sets the % break of pulse dialing according PBX.
571	ITS auto redial time set	X number of times	00~99	10	Selects the number of times that ITS is redialed (not including the first dial).
572	ITS auto redial line disconnection time set	X second	001~999	065	Sets the interval of ITS redialing.
573	Remote turn-on ring number set	X number of rings	00~99	10	Sets the number of rings before the unit starts to receive a document in the TEL mode.
590	FAX auto redial time set	X number of times	00~99	05	Selects the number of redial times during FAX communication (not including the first dial).

Code	Function	Set Value	Effective Range	Default	Remarks
591	FAX auto redial time disconnection time set	X second	001~999	065	Sets the FAX redial interval during FAX communication.
592	CNG transmit select	1:OFF 2:ALL 3:AUTO	1~3	2	Lets you select the CNG output during FAX transmission. ALL: CNG is output at phase A. AUTO: CNG id output only when automatic dialing is performed. OFF: CNG id not output at phase A. Refer to **Sometime There is a Transmit Problem** (P.90).
593	Time between CED and 300bps	1:75 msec 2:500 msec 3:1 sec	1~3	1	See **Symptom/Countermeasure Table** for long distance and international calls in **The unit can copy, but cannot either transmit/receive long distance or international communications** (P.93). Refer to **Receive Problem** (P.91) .
594	Overseas DIS detection select	1:detects at the 1st time 2:detects at the 2st time	1, 2	1	See **Symptom/Countermeasure Table** for long distance and international calls in **The unit can copy, but cannot either transmit/receive long distance or international communications** (P.93). Refer to **Sometime There is a Transmit Problem** (P.90).
595	Receive error limit value set	1:5 % 2:10 % 3:15 % 4:20%	1~4	2	Refer to **Receive Problem** (P.91).
596	Transmit level set	X -1dbm (10 = -10 dbm)	00~15	10	Selects the FAX transmission level. Refer to **Sometime There is a Transmit Problem** (P.90) and **Receive Problem** (P.91).
598	Receiving sensitivity	X -1dbm (40 = -40 dbm)	20~48	44	Used when there is an error problem. Refer to **The unit can copy, but cannot either transmit/receive long distance or international communications** (P.93). Power is OFF/ON after changing this set value.
599	ECM frame size	1: 256 byte 2: 64 byte	1, 2	1	----------
710	Memory clear except History data				See **Memory Clear Specification** (P.64).
717	Transmit speed selection	1:9600BPS 2:7200BPS 3:4800BPS 4:2400BPS	1~4	1	Adjusts the speed to start training during FAX transmission. Refer to **Sometime There is a Transmit Problem** (P.90) and **The unit can copy, but the transmission and reception image are incorrect** (P.95).
718	Receive speed selection	1:9600BPS 2:7200BPS 3:4800BPS 4:2400BPS	1~4	1	Adjusts the speed to start training during FAX reception. Refer to **Receive Problem** (P.91) and **The unit can copy, but the transmission and reception image are incorrect** (P.95).
722	Redial tone detect	1:ON 2:OFF	1, 2	1	Sets the tone detection mode after redialing.
745	Power ON film feed	1:ON 2:OFF	1, 2	1	When the power is turned on, the film is wound to take up any slack.
763	CNG detect time for friendly reception	1:10 sec 2:20 sec 3:30 sec	1~3	3	Selects the CNG detection tone of friendly reception.
773	DIS-DIC interval	1: 500msec 2: 200msec	1, 2	2	This is similar to #594. The time interval from receiving DIS to sending DCS can be changed to wait for the echo canceler to recover.
774	T4 timer	X 100 msec	00~99	0	Use this function when delay occurs in the line and communication (ex. Mobile comm) does not work well.
784	Voice prompt test				You can hear the voice prompt from speaker after pressing “SET” key.
815	Sensor check				See **Test Mode** (P.58).
852	Print test pattern				See **Test Mode** (P.58).
853	Top margin	X mm	1~9	5	----------
861	Paper size	1: A4 2: Letter	1, 2	1	----------
874	DTMF ON time	X 10 msec	006~020	10	----------
875	DTMF OFF time	X 10 msec	006~020	10	----------
880	History list				See **History** (P.69).
881	Journal 2 list				See **Printout Example** (P.86).
882	Journal 3 list				See **Printout Example** (P.86).
961	The time transmitting the false ring back tone	X sec	01~10	07	Set the time transmitting the false ring back tone to the line in TEL/FAX mode.
962	The operator calling time	X sec	05~30	10	Set the operator calling time through the speaker in TEL/Fax mode.

11.1.1.4. Memory Clear Specification

Item	Status after Memory Clear	
	Service Mode **#550**[*1]	Service Mode **#710**[*2]
Date and time (user mode #001)	–	Default
Your logo (user mode #002)	–	Default
Your Fax Number (user mode #003)	–	Default
One touch dial and Phonebook	–	Default
History	–	–
Top margin (service mode #853)	–	–
Other Setting data (User setting and Service setting data)	Default	Default

– : Not changed

*1 Execute Service Mode #550 when you want to reset the all setting data keeping the user information.

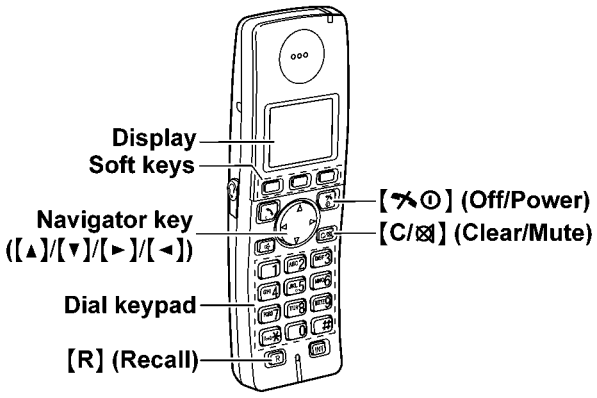
*2 Execute Service Mode #710 to clear the user information in case that Main Unit is recycled.

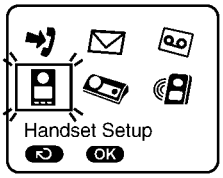
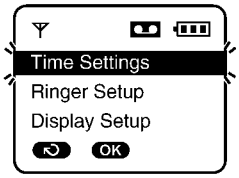
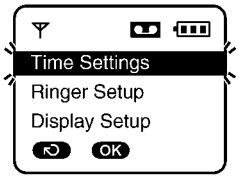
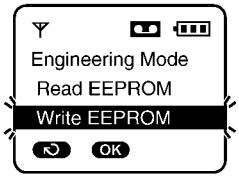
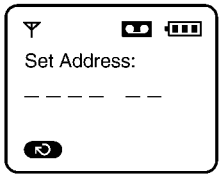
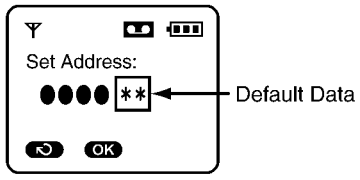
Note:

• Please restart a power supply after clearing a memory.

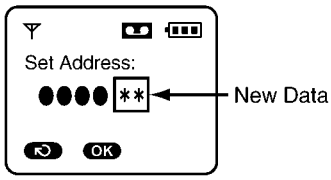
11.2. Handset

Important:
Make sure the address on LCD is correct when entering new data. Otherwise, you may ruin the unit.

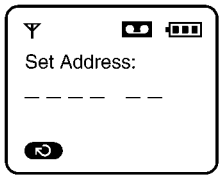


H/S key operation	H/S LCD
1). Press "▦" (middle soft key), then select "Handset Setup" by Navigator key.	
2). Press "OK" (middle soft key).	
3). Enter "7", "2", "6", "2", "7", "6", "6", "4". **Note:** 7262 7664 = PANA SONI (see alphabets printed on dial keys)	
4). Select "Write EEPROM" by Navigator key.	
5). Press "OK" (middle soft key).	
6). Enter "●", "●", "●", "●" (Address). (*1)	

7). Enter "＊", "＊" (New Data). (*1)



8). Press "OK" (middle soft key).
A long confirmation beep will be heard.



9). Press "⏻" (off) to return to standby mode.
After that, remove and reinsert the batteries.
Press the Power button for about 1 second
if the power is not turned on.

Frequently Used Items (Cordless Handset)

ex.)

Items (*2)	Address	Default Data	New Data	Possible Adjusted Value MAX (hex)	Possible Adjusted Value MIN (hex)	Remarks
Sending level	00 06	Adjusted value	Given value	6F	00	(*3)
Receiving level	00 07	Adjusted value	Given value	00	3F	(*4)
Battery Low	00 04	25	-	-	-	(*5)
Frequency	00 01	75	-	-	-	
ID	00 10~00 14	Given value	-	-	-	

Note:

(*1) When you enter the address or New Data, please refer to the table below.

Desired Number (hex.)	Input Keys	Desired Number (hex.)	Input Keys
0	0	A	[R] + 0
1	1	B	[R] + 1
.	.	C	[R] + 2
.	.	D	[R] + 3
.	.	E	[R] + 4
9	9	F	[R] + 5

(*2)

Items	Description
Sending level	Analog Front End MIC Setting for Handset Mode
Receiving level	Analog Front End LSR Setting for Handset Mode
Battery Low	ADC value for battery low detection
Frequency	Setting value of FREQ_TRIM_REG
ID	International Portable Part Equipment Identities

(*3) When adding “01” (hex) to default value, sending level increases by 1.0dB.

ex.)

Item	Default Data	New Data	
	3A	3E	36
Sending level	-8.5dBm	-7.5dBm	-9.5dBm

(*4) When reducing “01” (hex) from default value, receiving level increases by 1.0dB.

ex.)

Item	Default Data	New Data	
	14	18	10
Receiving level	-21dBm	-22dBm	-20dBm

(*5) Use these items in a READ-ONLY mode to confirm the contents. Careless rewriting may cause serious damage to the handset.

11.3. The Example of the Printed List

11.3.1. User Mode

SETUP LIST

[BASIC FEATURE LIST]

NO.	FEATURE	CURRENT SETTING	
#01	SET DATE & TIME	1 Jan. 2006 0:00	
#02	YOUR LOGO		
#03	YOUR FAX NUMBER		
#04	PRINT SENDING REPORT	ERROR	[ERROR,ON,OFF]
#06	TAM/FAX RING COUNT	2	[2...7,AUTO]
#10	RECORDING TIME	3 MINUTES	[1 MINUTE,GREETING ONLY,3 MINUTES]
#11	REMOTE TAM ID		
#13	DIAL MODE	TONE	[TONE,PULSE]
#17	EXT. RINGTONE	RINGTONE 1	[RINGTONE 1...6]

Code: #01, #02
Set Value: RINGTONE 1

[ADVANCED FEATURE LIST]

NO.	FEATURE	CURRENT SETTING	
#22	JOURNAL AUTO PRINT	ON	[ON,OFF]
#23	OVERSEAS MODE	ERROR	[NEXT FAX,ERROR,OFF]
#25	DELAYED TRANSMISSION	OFF	[ON,OFF]
	DESTINATION =		
	START TIME = 0:00		
#26	AUTO CALLER ID LIST	OFF	[ON,OFF]
#34	QUICK SCAN	OFF	[ON,OFF]
#35	NIGHT MODE	OFF	[ON,OFF]
	START TIME = 23:00		
	END TIME = 6:00		
	RING DELAY = 60sec.		[30sec., 60sec., 90sec., 120sec., NO RINGING]
#36	RCV REDUCTION	92%	[72,86,92,100]
#39	LCD CONTRAST	NORMAL	[NORMAL,DARKER]
#41	FAX ACTIVATION CODE	ON	[ON,OFF]
	CODE = *#9		
#44	MEMORY RECEIVE ALERT	ON	[ON,OFF]
#46	FRIENDLY RECEPTION	ON	[ON,OFF]
#49	AUTO DISCONNECT	ON	[ON,OFF]
	CODE = *0		
#54	GREETING MSG. RECORDING TIME	16s	[16s,60s]

NOTE : If you change from 60sec. to 16sec.,
your-greeting will be erased and your new greeting will be limited to 16 seconds.

#58	SCAN CONTRAST	NORMAL	[NORMAL,LIGHT,DARKER]
#59	COPY PHONEBOOK	1 ITEM	[1 ITEM,ALL ITEMS]
#67	CALL SCREENING	ON	[ON,OFF]
#68	ECM SELECTION	ON	[ON,OFF]

NOTE : You cannot change the setting of this feature,
if there are stored documents in memory.

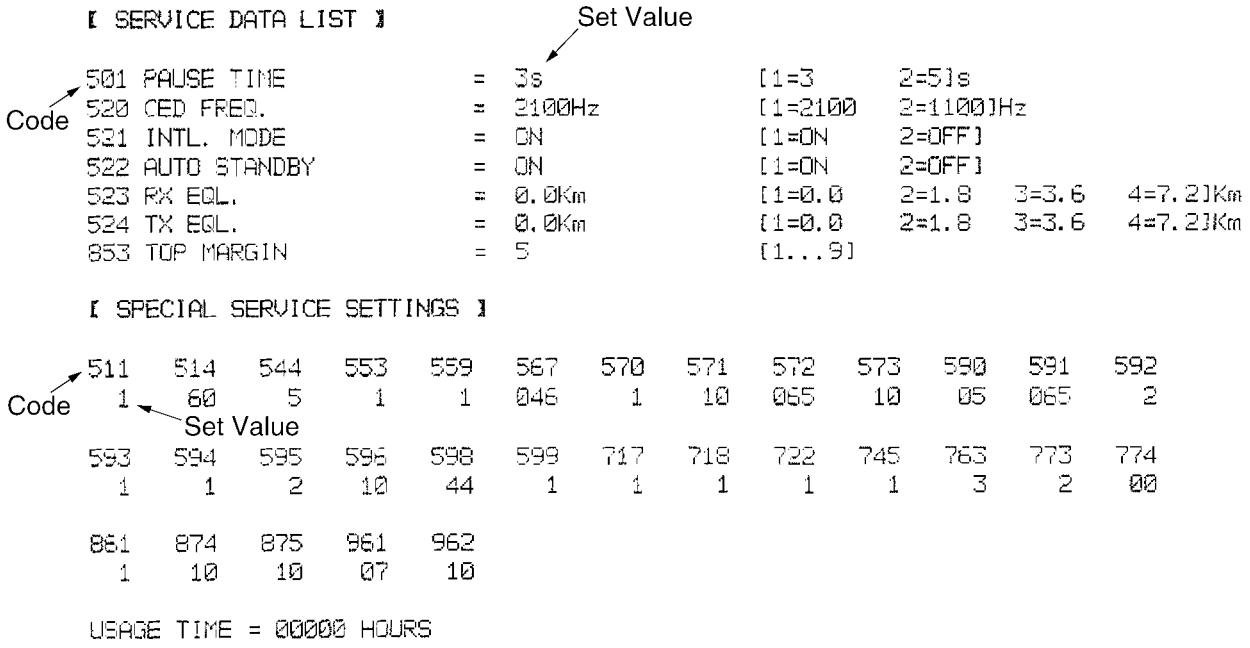
#72	RECALL/FLASH	600msec.	[80,90,100,110,160,200, 250,300,400,600,700,900]
#73	MANUAL ANSWER MODE	TEL	[TEL,TEL/FAX]
#76	CONNECTING TONE	ON	[ON,OFF]
#77	AUTO ANSWER MODE	TAM/FAX	[TAM/FAX,FAX ONLY]
#78	TEL/FAX DELAYED RING	2	[1...9]
#80	SET DEFAULT (EXCEPT #68)		

Code: #22, #23
Set Value: 2

Note:

The above values are the default values.

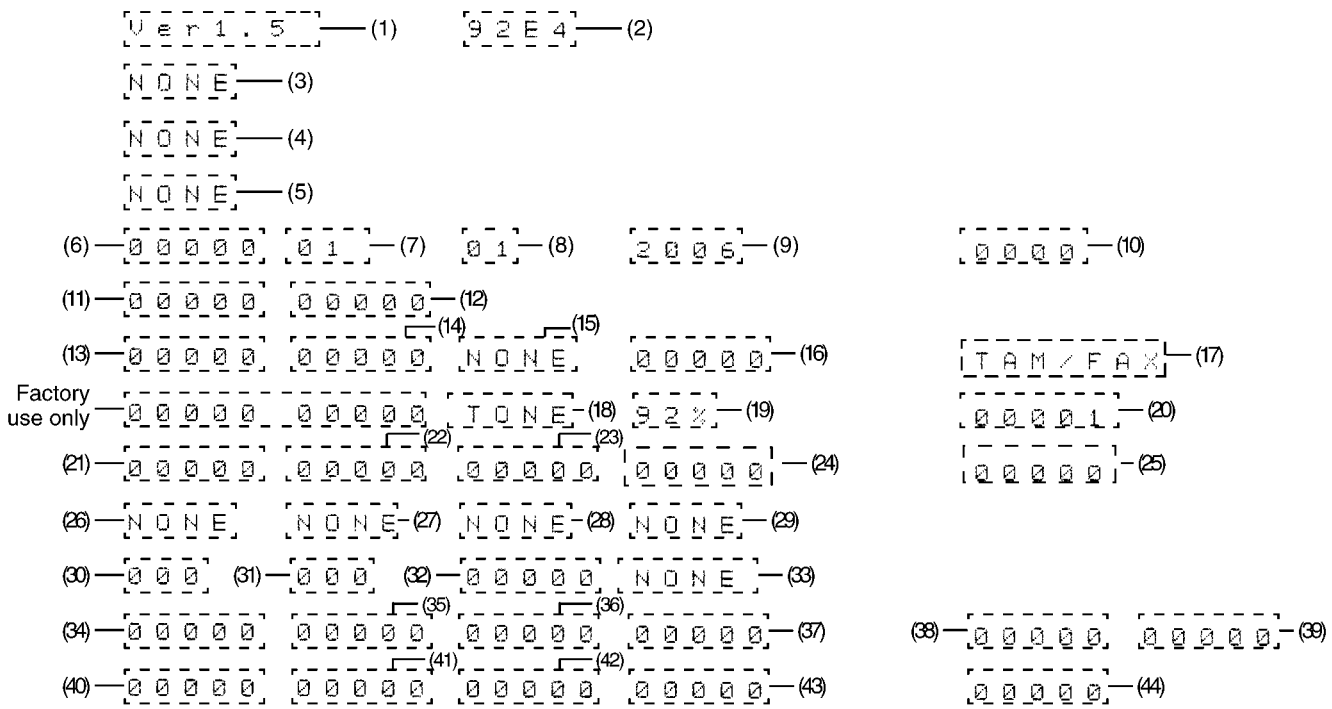
11.3.2. Service Mode Settings



Note:
The above values are the default values.

11.3.3. History

【 HISTORY 】



NAME _____ DATE _____ DEALER _____ FILM _____

CUSTOMER COMPLAINT

SURVEY RESULT : CKOK (UNKNOWN/DESIGN/EDUC) DEFECT (PART/WORKER/DESIGN)
ABUSE (CUST/DEALER/SHIP) NEW (OPEN/NOT)
PHONE SURVEY RESULT.

Note:

See the following descriptions of this report. Item No. (1) ~ (44) are corresponding to the listed items in **Descriptions of the History Report** (P.70).

11.3.3.1. Descriptions of the History Report

(1) SOFTWARE VERSION
FLASH ROM version
(2) SUM
FLASH ROM internal data calculation.
(3) YOUR LOGO
The user logo recorded in the unit. If it is not recorded, NONE will be displayed.
(4) YOUR TELEPHONE NUMBER
The user telephone number recorded in the unit. If it is not recorded, NONE will be displayed.
(5) FAX PAGER NUMBER
If you program a pager number into the unit, the pager number will be displayed here.
(6) FACTORY - CUSTOMER
This shows how many days from factory production until the user turns ON the unit.
(7) MONTH
The shows the very first month, date, year and time set by the user after they purchased the unit.
(8) DAY
The shows the very first month, date, year and time set by the user after they purchased the unit.
(9) YEAR
The shows the very first month, date, year and time set by the user after they purchased the unit.
(10) TIME
The shows the very first month, date, year and time set by the user after they purchased the unit.
(11) USAGE TIME
The amount of time the unit has been powered ON.
(12) FACTORY - NOW
This shows how many days from factory production until the user prints out this history list.
(13) TEL MODE
The amount of time the TEL mode setting was used.
(14) FAX MODE
The amount of time the FAX mode setting was used.
(15) TEL/FAX MODE
The amount of time the TEL/FAX mode setting was used.
(16) ANS/FAX MODE
The amount of time the ANS/FAX mode setting was used.
(17) FINAL RECEIVE MODE
The last set receiving mode by the user.
(18) TONE/PULSE SELECTION
The most recently used setting used, either TONE or PULSE.
(19) RECEIVE REDUCTION
The compression rate when receiving.
(20) SETTING NO. OF DIRECTORY
The recorded directory stations.
(21) NUMBER OF COPY
The number of pages copied.
(22) NUMBER OF RECEIVE
The number of pages received.
(23) NUMBER OF SENDING
The number of pages sent.
(24) NUMBER OF CALLER ID
The number of times Caller ID was received.
(25) NUMBER OF RECORDING MESSAGE
The number of messages recorded in TAM.
(26)~(29) Not Used
(30) NUMBER OF PRINTING WARNING LIST
The number of warning lists printed until now.
(31) NUMBER OF PRINTING HELP
The number of help lists printed until now.
(32) NUMBER OF DIVIDED PRINTING IN FAX RECEPTION
The number of faxes received that were divided into more than one sheet since the unit was purchased.
(33) Not used
(34) FAX MODE
Means the unit received a fax message in the FAX mode.
(35) MAN RCV
Means the unit received a fax message by manual operation.
(36) FRN RCV
Means the unit received a fax message by friendly signal detection.
(37) VOX
Means the unit detected silence or no voice.
(38) RMT DTMF
Means the unit detected DTMF (Remote Fax activation code) entered remotely.
(39) PAL DTMF
Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
(40) TURN-ON
Means the unit started to receive after 10 rings. (Remote Turn On: Service Code #573)
(41) TIME OUT
Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.
(42) IDENT
Means the unit detected Ring Detection.
(43) CNG OGM
Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FAX mode, or while answering a call in the EXT-TAM mode. Or means the unit detected the CNG while it was sending the OGM in the ANS/FAX mode.
(44) CNG ICM
Means the unit detected the CNG while it was recording the ICM in the ANS/FAX mode.

12 Troubleshooting Guide

12.1. Troubleshooting Summary

After confirming the problem by asking the user, troubleshoot according to the instructions and observe the following precautions.

12.1.1. Precautions

1. If there is a problem with the print quality or the paper feed, first check if the installation space and the print paper meets the specifications, the paper selection lever/paper thickness lever is set correctly, and the paper is set correctly without any slack.
2. Before troubleshooting, first check that the connectors and cables are connected correctly (not loose).
   If the problem occurs randomly, check it very carefully.
3. When connecting the AC power cord with the unit case and checking the operation, exercise utmost care when handling electric parts in order to avoid electric shocks and short-circuits.
4. After troubleshooting, double check that you have not forgotten any connectors, left any loose screws, etc.
5. Always test to verify that the unit is working normally.

12.2. Error Messages-Display

If the unit detects a problem, one or more of the following messages will appear on the display.
The explanations given in the [ ] are for servicemen only.

12.2.1. Base Unit

"BACK COVER OPEN"

- The back cover is open. Close the back cover firmly.

"BUSY"

- The cordless handset you tried to call is in use.
  The cordless handset you are calling is too far from the base unit.

"CALL SERVICE"

- [This error is displayed when the thermal head does not warm up. Check the thermistor on the thermal head and connector lead.]

"CALL SERVICE 2"

- [This error is displayed when the gear is not in an idle state. Check the GEAR BLOCK.]
  (Refer to **Gear Section** (P.186).)

"CHECK DOCUMENT"

- The document was not fed into the unit properly. Re-insert the document. If misfeeding occurs frequently, clean the document feeder rollers and try again.
  (Refer to **Document feeder/recording paper feeder/scanner glass cleaning** (P.195).)
- The document is longer than 600 mm. Press **[STOP]** to remove the document. Divide the document into two or more sheets, and try again.
  [Alternately, turn off service code #559 to enable sending of documents longer than 600 mm] (Refer to **Service Function Table** (P.62).)

"CHECK FILM"

- The ink film is empty. Replace the ink film with a new one.
- The ink film is not installed. Install it.
- The ink film is slack or creased. Tighten it.
  (Refer to step 5 on **Installing the Ink film** (P.52).)

"CHECK PAPER"

- The recording paper is not installed or the unit has run out of paper. Install paper and **[SET]** to clear the message.
- The recording paper was not fed into the unit properly. (Refer to **When the recording paper was not fed into the unit properly** (P.194).) Reinstall paper and press **[SET]** to clear the message.
  (Refer to **Installing the Recording Paper** (P.54).)
- The recording paper has jammed near the recording paper entrance. Remove the jammed paper and press **[SET]** to clear the message. (Refer to **Recording Paper Jams** (P.193).)

"FAX IN MEMORY"

- See the other displayed message instructions to print out the document.
  Received documents are stored in memory due to a lack of recording paper, a lack of ink film or a recording paper jam. Install paper, install ink film or remove the jammed paper. You will lose all faxes in memory if the power is removed. Check with power connected. (Refer to **Installing the Recording Paper** (P.54) and **Installing the Ink film** (P.52) and **Recording Paper Jams** (P.193).)

"FAX MEMORY FULL"

- The memory is full of received documents due to a lack of recording paper, a lack of ink film or a recording paper jam. Install paper, install ink film or remove the jammed paper. You will lose all faxes in memory if the power is removed. Check with power connected. (Refer to **Installing the Recording Paper** (P.54) and **Installing the Ink film** (P.52) and **Recording Paper Jams** (P.193).)
- When performing memory transmission, the document being stored exceeded the memory capacity of the unit. Send the entire document manually.

"FILM EMPTY"

- The ink film is empty. Replace the ink film with a new one.
- The ink film is slack. Tighten it (See step 5 on **Installing the Ink film** (P.52).) and install again.
- The fax machine is positioned near appliances such as TVs or speakers which generate an intense magnetic field.

"FILM NEAR EMPTY"

- The remaining ink film is low. Prepare a new ink film. (Refer to **Optional Accessories** (P.10).)

"MEMORY FULL"

- The base unit's phonebook memory is full. Erase unnecessary items.
- When making a copy, the document being stored exceeded the memory capacity of the unit. Press **[STOP]** to clear the message. Divide the document into sections.

"MESSAGE FULL"

- There is no room left in memory to record voice messages. Erase unnecessary messages.

"MODEM ERROR"

- There is something wrong with the unit's modem. (Refer to **Test Mode** (P.58) and **Digital Block Diagram** (P.117).)

"NO FAX REPLY"

- The other party's fax machine is busy or has run out of recording paper. Try again.

"OPEN CABINET CHECK FILM SLACK" "OPEN CABINET CHECK FILM TYPE"

- Please use genuine Panasonic replacement film. (Refer to **Optional Accessories** (P.10).)
- The ink film is slack. Tighten it (See step 5 on **Installing the Ink film** (P.52)).
- The fax machine is positioned near appliances such as TVs or speakers which generate an intense magnetic field.

"PAPER JAMMED"

- A recording paper jam occurred. Remove the jammed paper. (Refer to **Recording Paper Jams** (P.193).)
- You forced the recording paper into the paper tray too strongly. Remove all of the installed paper, and re-install it gently.

"PLEASE WAIT"

- The unit is checking that there is no slack or crease in the ink film. Wait for a moment while the check is completed.

"POLLING ERROR"

- The other party's fax machine does not support polling. Check with the other party.

"RECORDING ERROR"

- The greeting message you recorded was under 1 second long. Record a longer message.

"REDIAL TIME OUT"

- The other party's fax machine is busy or has run out of recording paper. Try again.

"REMOVE DOCUMENT"

- The document is jammed. Remove the jammed document. (Refer to **Document Jams** (P.194).)
- Press **[STOP]** to eject the jammed paper.

"SERIAL ERROR"

- There is something wrong with the unit and the base unit will not work. (Refer to **Digital Block Diagram** (P.117).)

"TRANSMIT ERROR"

- A transmission error occurred. Try again.
- If you send a fax overseas, try the following:
  —Use the overseas transmission mode (feature #23 on **Program Mode Table** (P.98)).
  —Add 2 pauses at the end of the telephone number or dial manually.

"UNIT OVERHEATED"

- The unit is too hot. Stop using the unit for a while and let the unit cool down.

12.2.2. Cordless Handset

"**Answer Sys. Full**"

- Erase unnecessary messages.

"**Error**"

- Recording was too short. Try again.

"**Failed**"

- Phonebook copy failed. Confirm the destination unit is in standby mode and try again.

"**Incomplete**"

- The destination unit's phonebook memory is full. Erase the unnecessary phonebook items from the destination unit and try again.

"**Invalid Number**"

- You tried to send an SMS message to a phone number saved in the base unit phonebook, cordless handset phonebook, Caller ID list, or redial list that is over 20 digits long.

"**Memory Full**"

- The cordless handset's phonebook memory is full. Erase unnecessary items.
- There is no room left in memory to record voice messages. Erase unnecessary messages.

"**SMS Full**"

- Erase unnecessary messages.

"**You must first subscribe to Caller ID**"

- You must subscribe to Caller ID service. Once you receive caller information after subscribing to Caller ID service, this message will not be displayed.

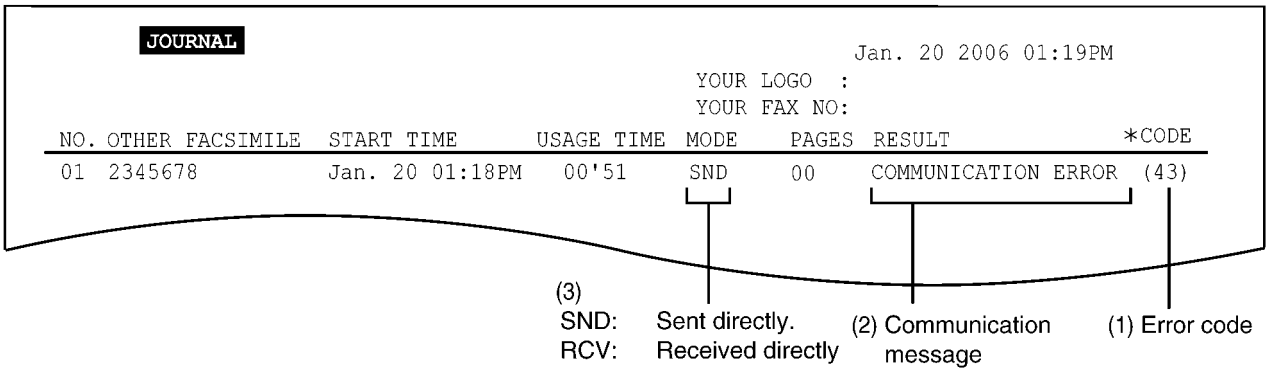
12.3. Error Messages-Report

12.3.1. Journal Report

If a problem occurs during fax transmission or reception, one of the following messages will be printed on the sending and journal reports.

How to output the Journal Report

1. Press **[PRINT REPORT]**.
2. Press **[◀]** or **[▶]** repeatedly to display " JOURNAL REPORT ".
3. Press **[SET]**.
4. The report is printed out.



Error code table:

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Counter-measure*
	PRESSED THE STOP KEY	SND & RCV	Communication was interrupted by the STOP button.	
	DOCUMENT JAMMED	SND	The document paper is jammed.	
	NO DOCUMENT	SND	No document paper.	
	THE COVER WAS OPENED	SND & RCV	The cover is open.	
	OTHER FAX NOT RESPONDING	SND	Transmission is finished when the T1 TIMER expires.	1
28	COMMUNICATION ERROR	SND & RCV		
41	COMMUNICATION ERROR	SND	DCN is received after DCS transmission.	2
42	COMMUNICATION ERROR	SND	FTT is received after transmission of a 2400BPS training signal.	3
43	COMMUNICATION ERROR	SND	No response after post message is transmitted three times.	4
44	COMMUNICATION ERROR	SND	RTN and PIN are received.	5
46	COMMUNICATION ERROR	RCV	No response after FTT is transmitted.	6
48	COMMUNICATION ERROR	RCV	No post message.	7
49	COMMUNICATION ERROR	RCV	RTN is transmitted.	8
50	COMMUNICATION ERROR	RCV	PIN is transmitted (to PRI-Q).	8
51	COMMUNICATION ERROR	RCV	PIN is transmitted.	8
	OTHER FAX NOT RESPONDING	RCV	Reception is finished when the T1 TIMER expires.	9
54	ERROR-NOT YOUR UNIT	RCV	DCN is received after DIS transmission.	11
58	COMMUNICATION ERROR	RCV	DCN is received after FTT transmission.	13
59	ERROR-NOT YOUR UNIT	SND	DCN responds to the post message.	14
65	COMMUNICATION ERROR	SND	DCN is received before DIS reception.	2
65	COMMUNICATION ERROR	RCV	Reception is not EOP, EOM PIP, PIN, RTP or RTN.	2
68	COMMUNICATION ERROR	RCV	No response at the other party after MCF or CFR is transmitted.	13
70	ERROR-NOT YOUR UNIT	RCV	DCN is received after CFR transmission.	13
72	COMMUNICATION ERROR	RCV	Carrier is cut when the image signal is received.	16
	MEMORY FULL	RCV	The document was not received due to memory full.	
	JUNK FAX PROH. REJECT	RCV	The fax was rejected by the junk fax prohibitor feature.	
	CANCELED	SND	The multi-station transmission was rejected by the user.	
FF	COMMUNICATION ERROR	SND & RCV	Modem error. For the DCN, DCN, etc. abbreviations, refer to **Modem Section** (P.29).	12

SND=TRANSMISSION RCV=RECEPTION

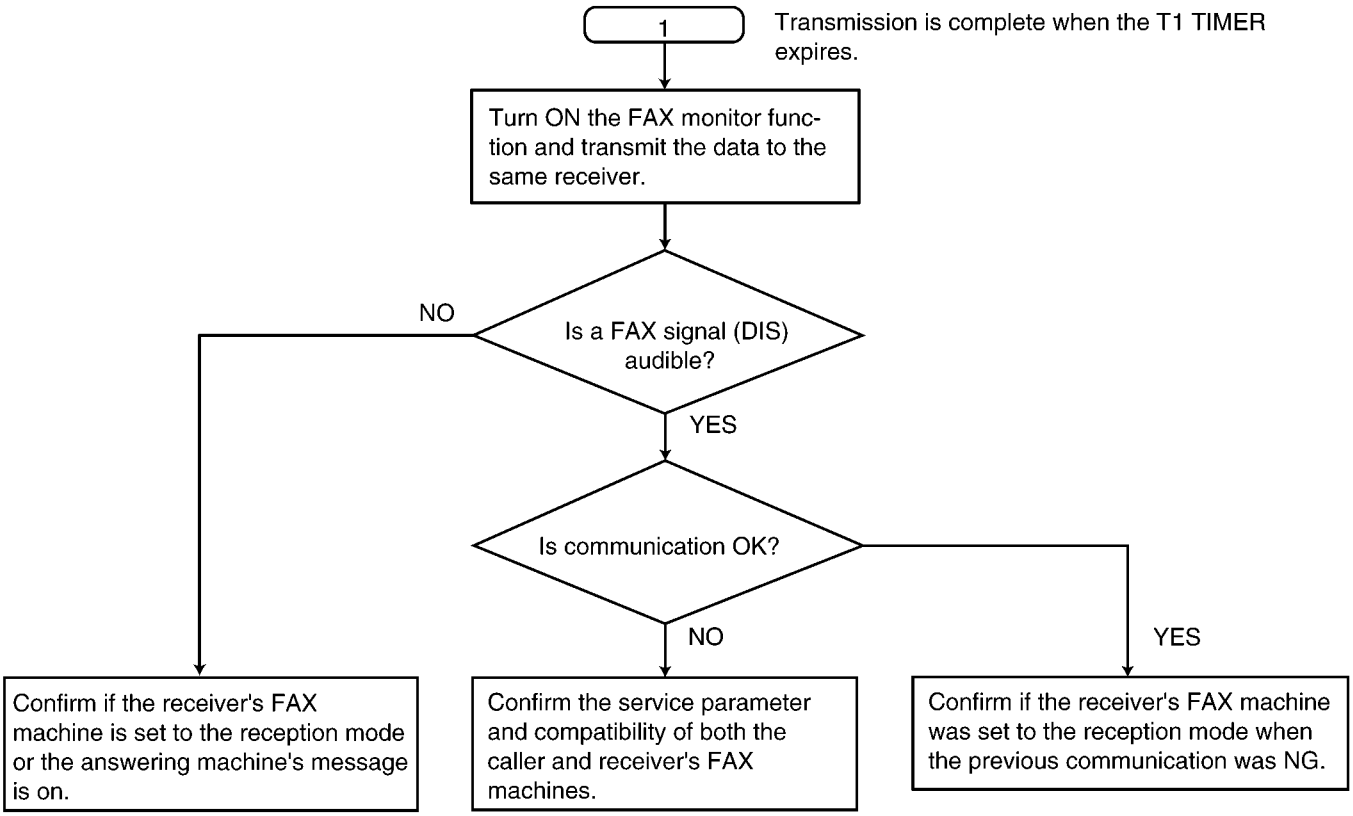
Most fax communication problems can be resolved by the following steps.

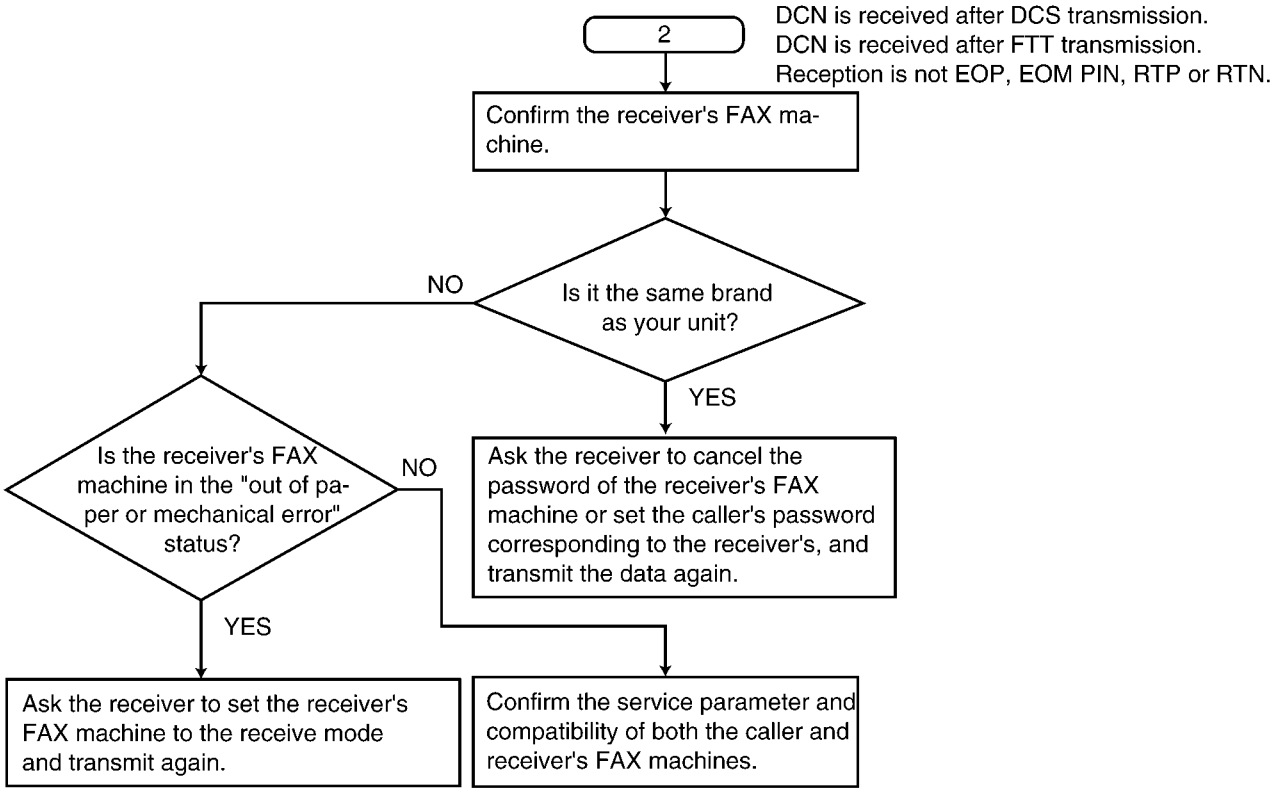
1. Change the transmit level. (Service code: 596, refer to **Service Function Table** (P.62).)
2. Change the TX speed/RX speed. (Service code: 717/718, refer to **Service Function Table** (P.62).)

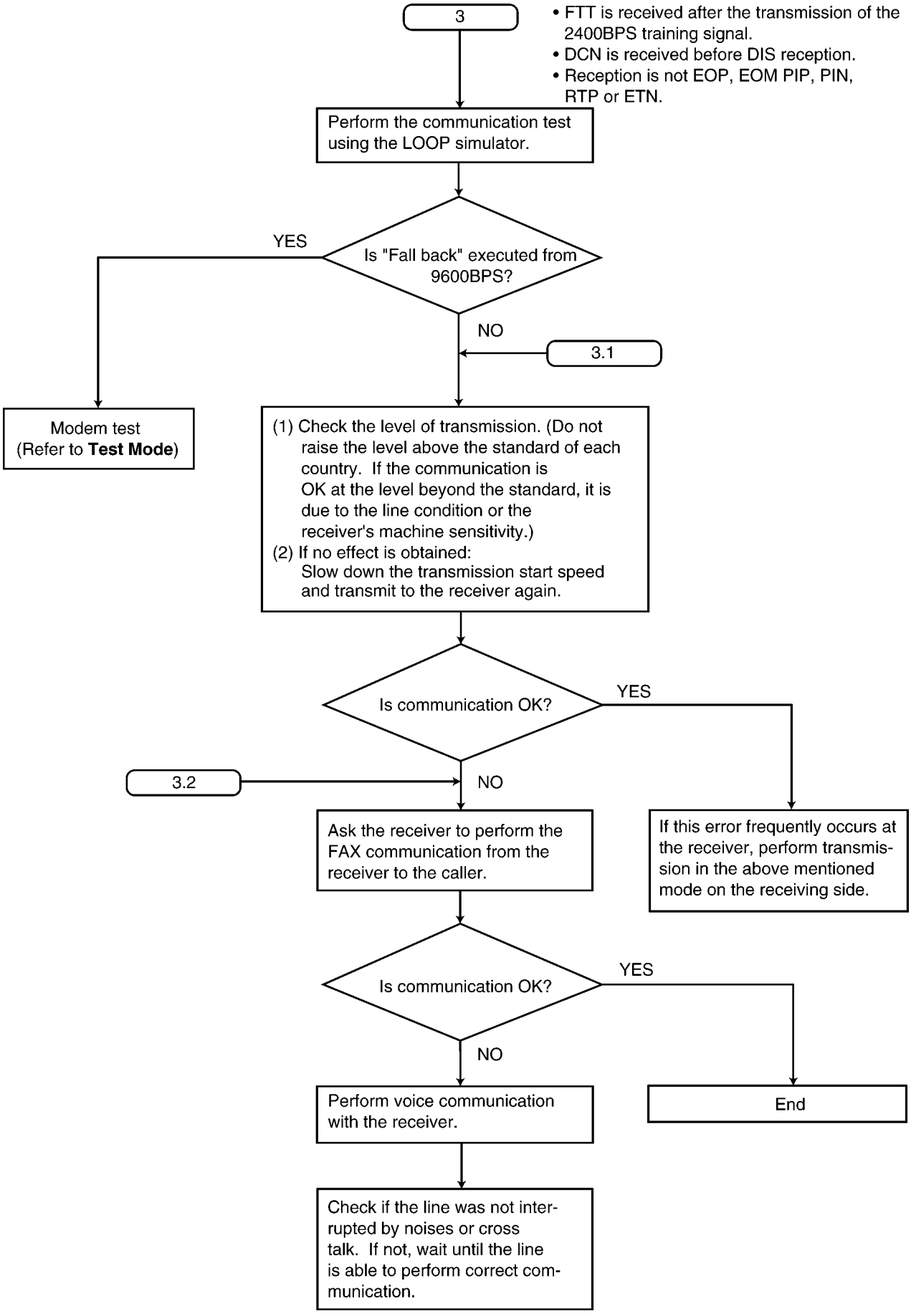
Note:

If the problem remains, see the following **"Countermeasure"** flow chart.

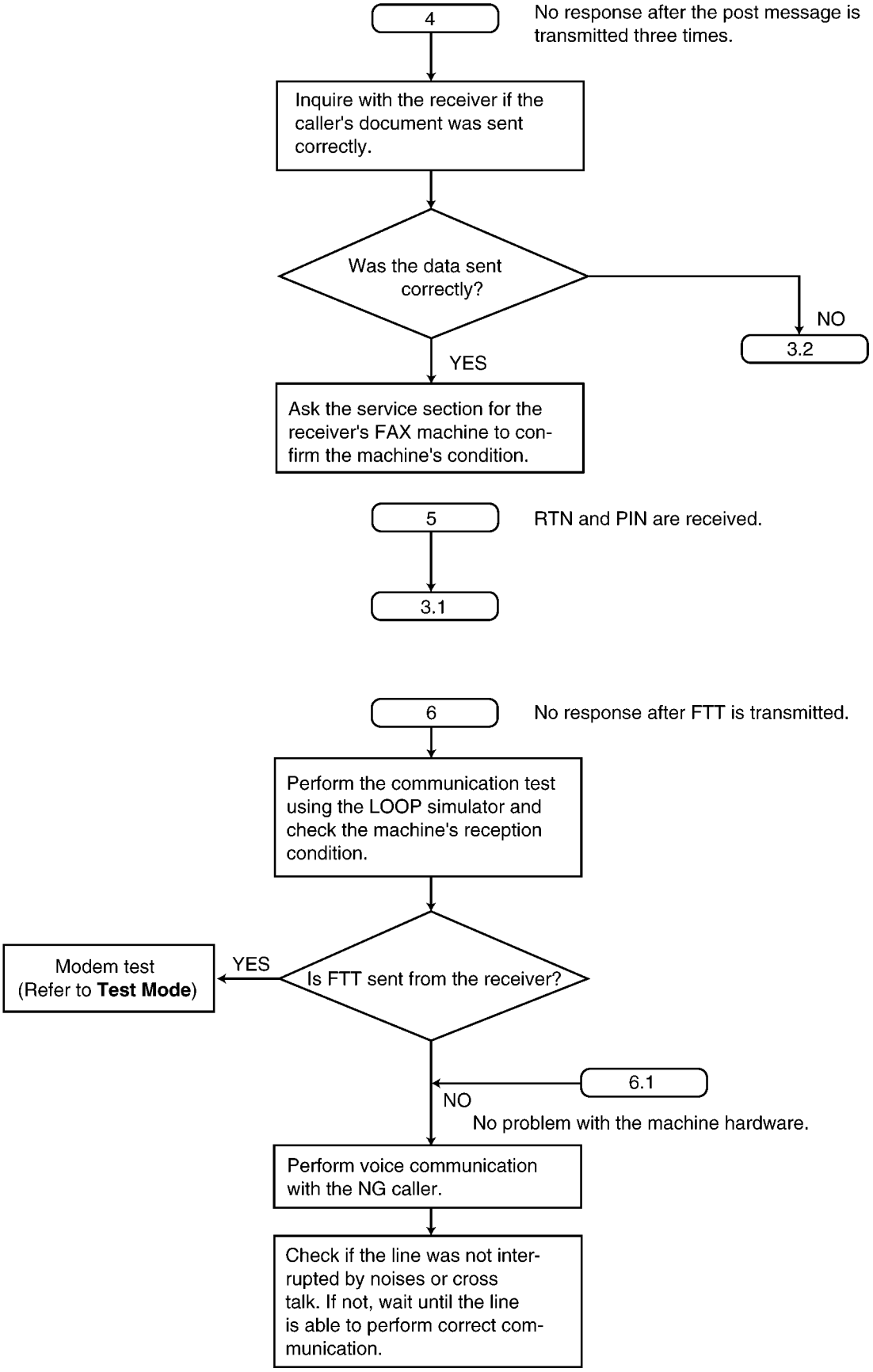
Countermeasure



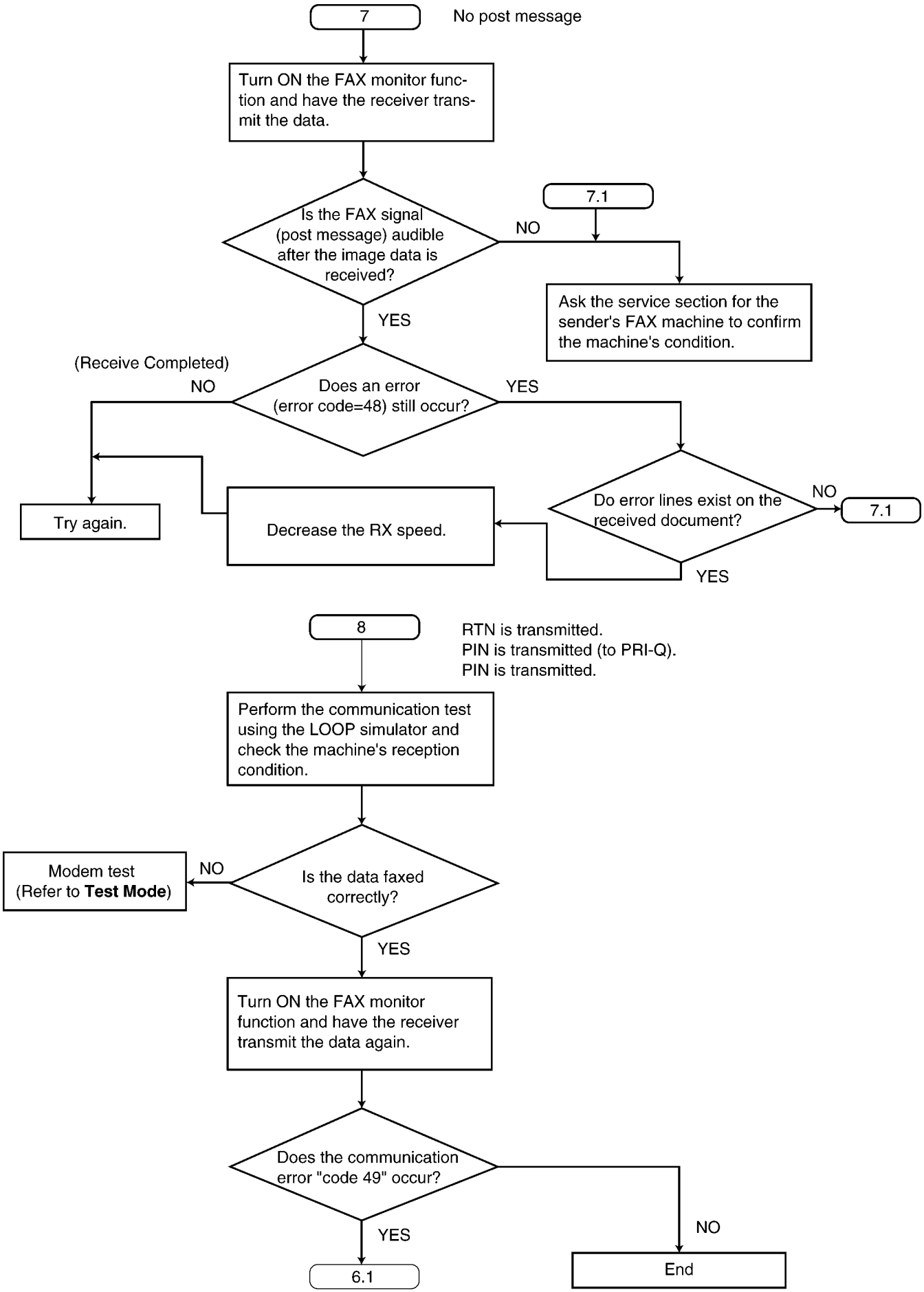




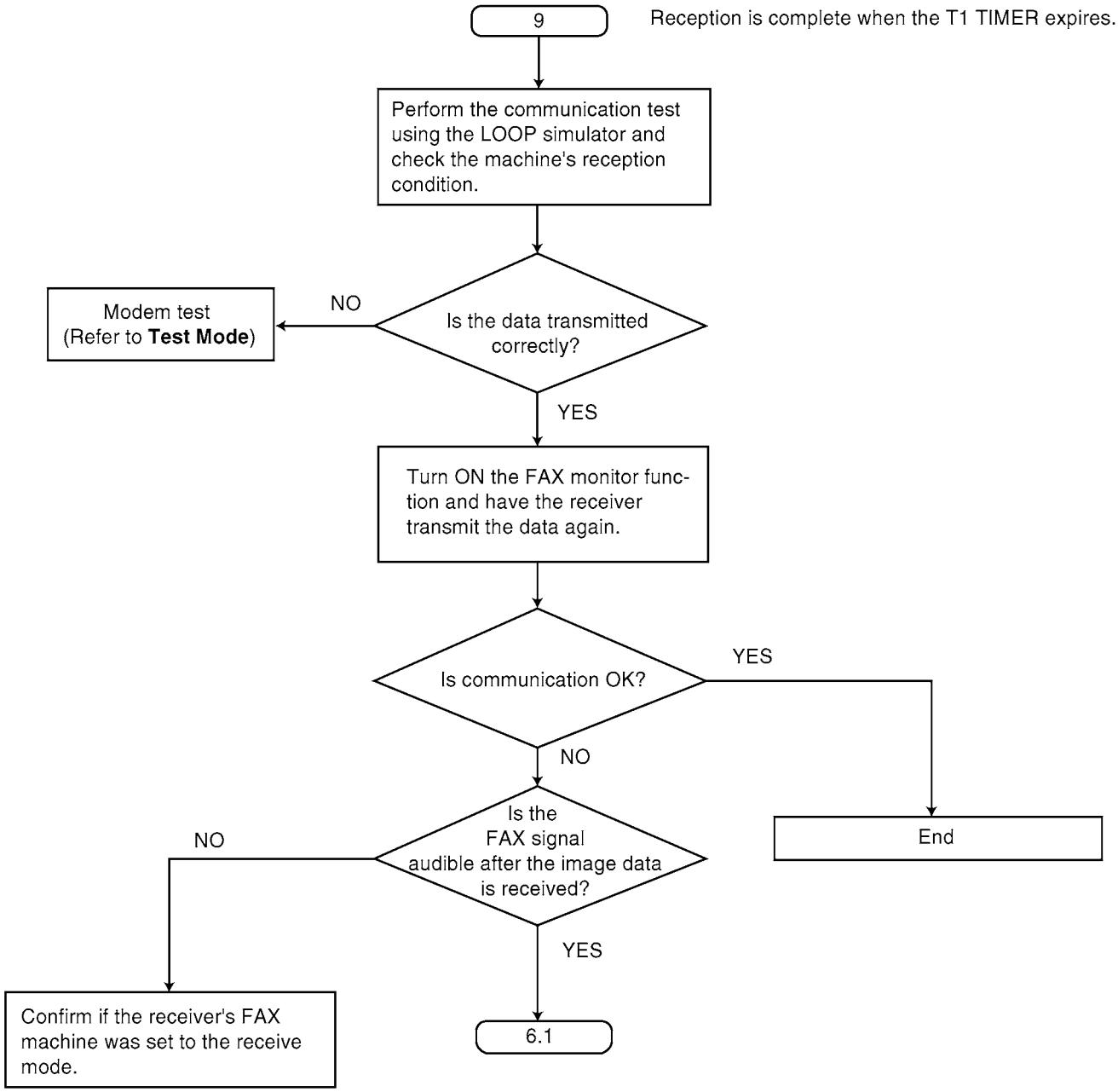
REFERENCE:
Test Mode (P.58)



REFERENCE:
Test Mode (P.58)

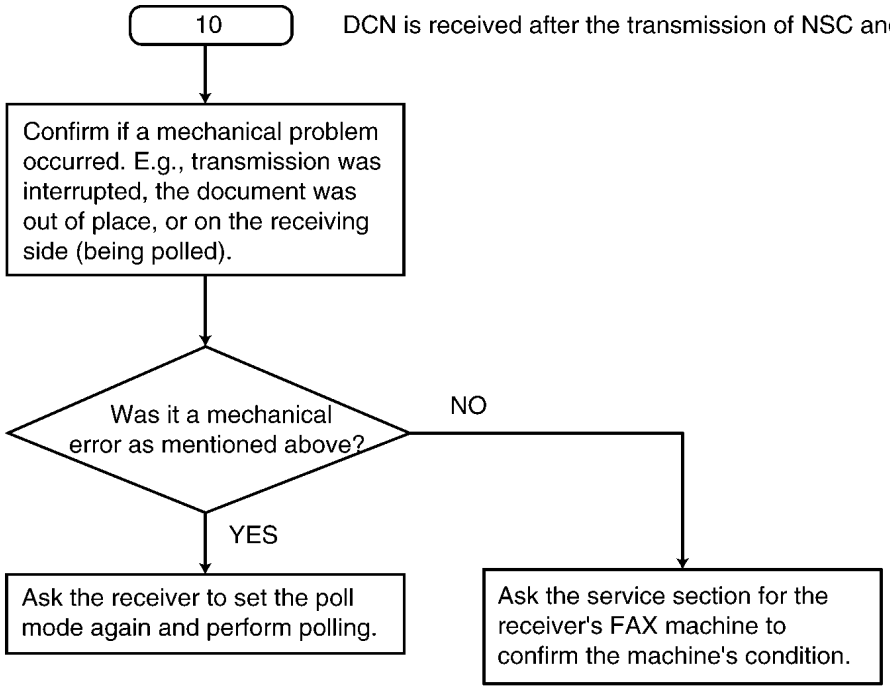


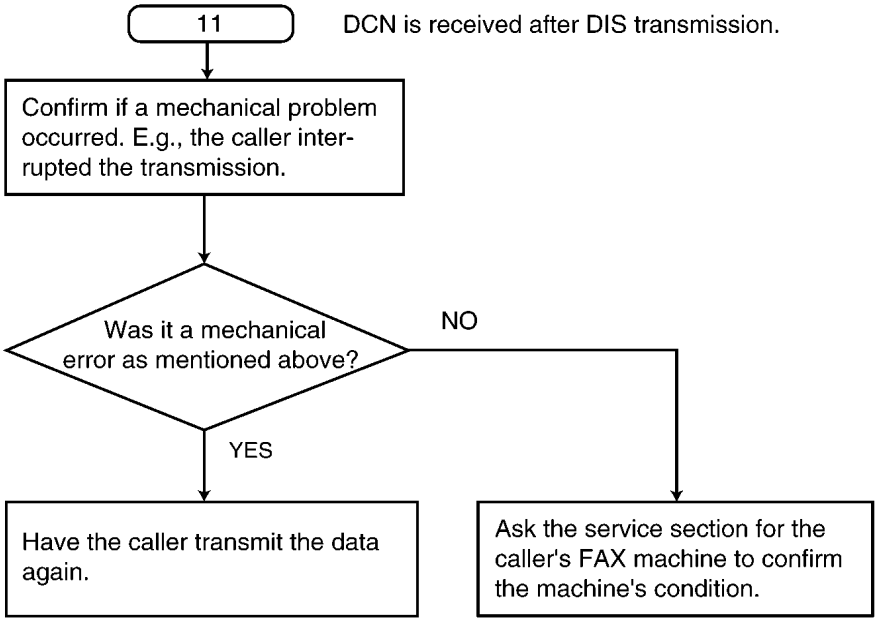
REFERENCE:
Test Mode (P.58)

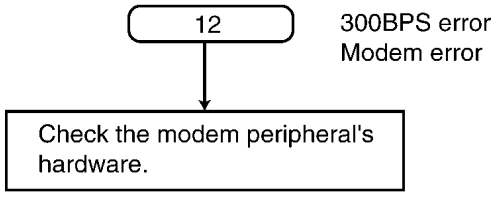


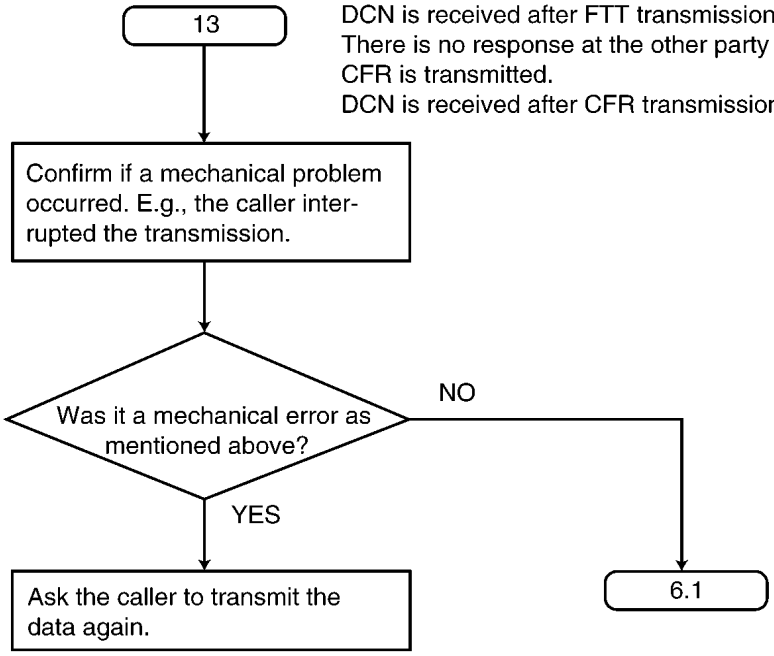
REFERENCE:

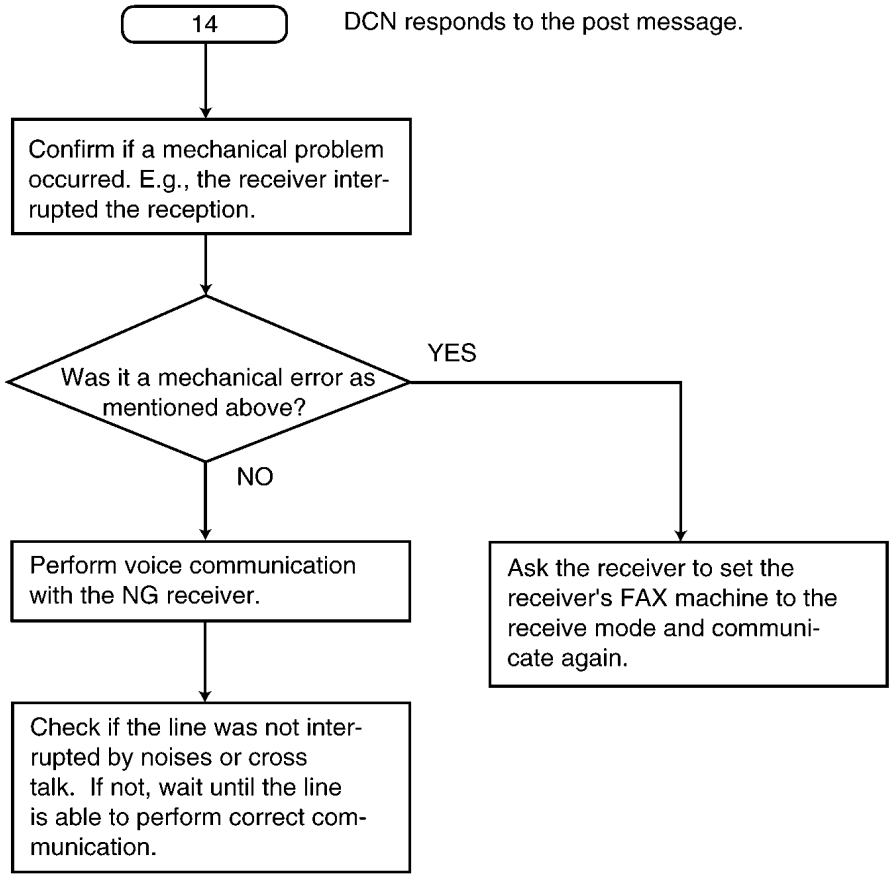
Test Mode (P.58)


10
DCN is received after the transmission of NSC and DTC.
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.

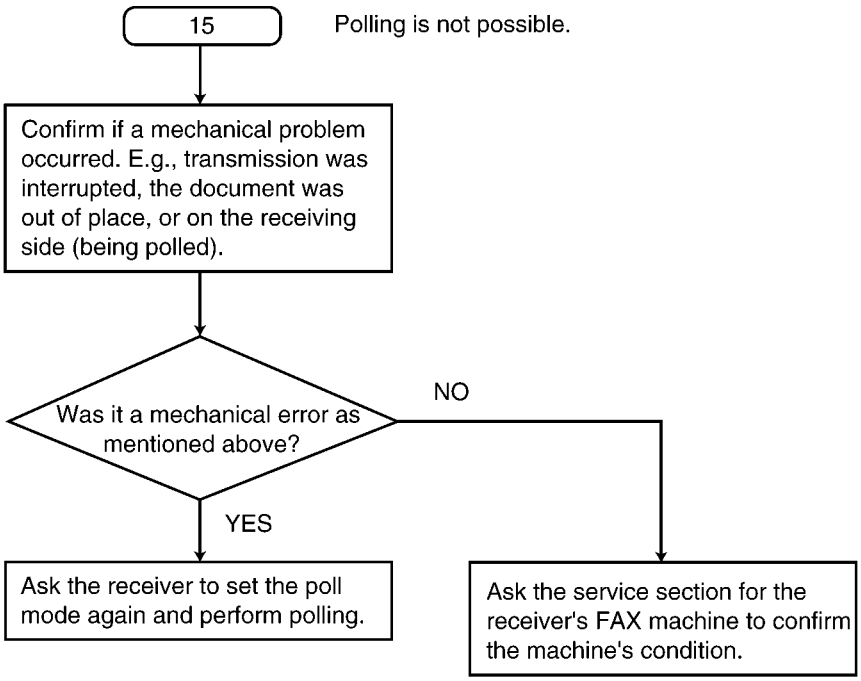

11
DCN is received after DIS transmission.
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Have the caller transmit the data again.
Ask the service section for the caller's FAX machine to confirm the machine's condition.

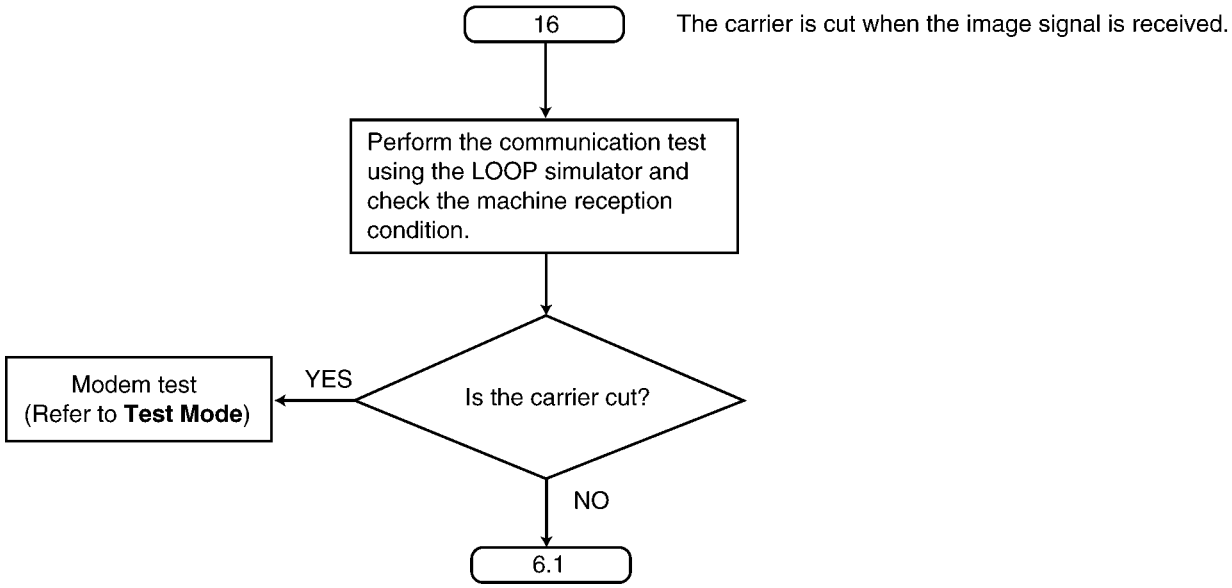

12
300BPS error
Modem error
Check the modem peripheral's hardware.





REFERENCE:
Test Mode (P.58)



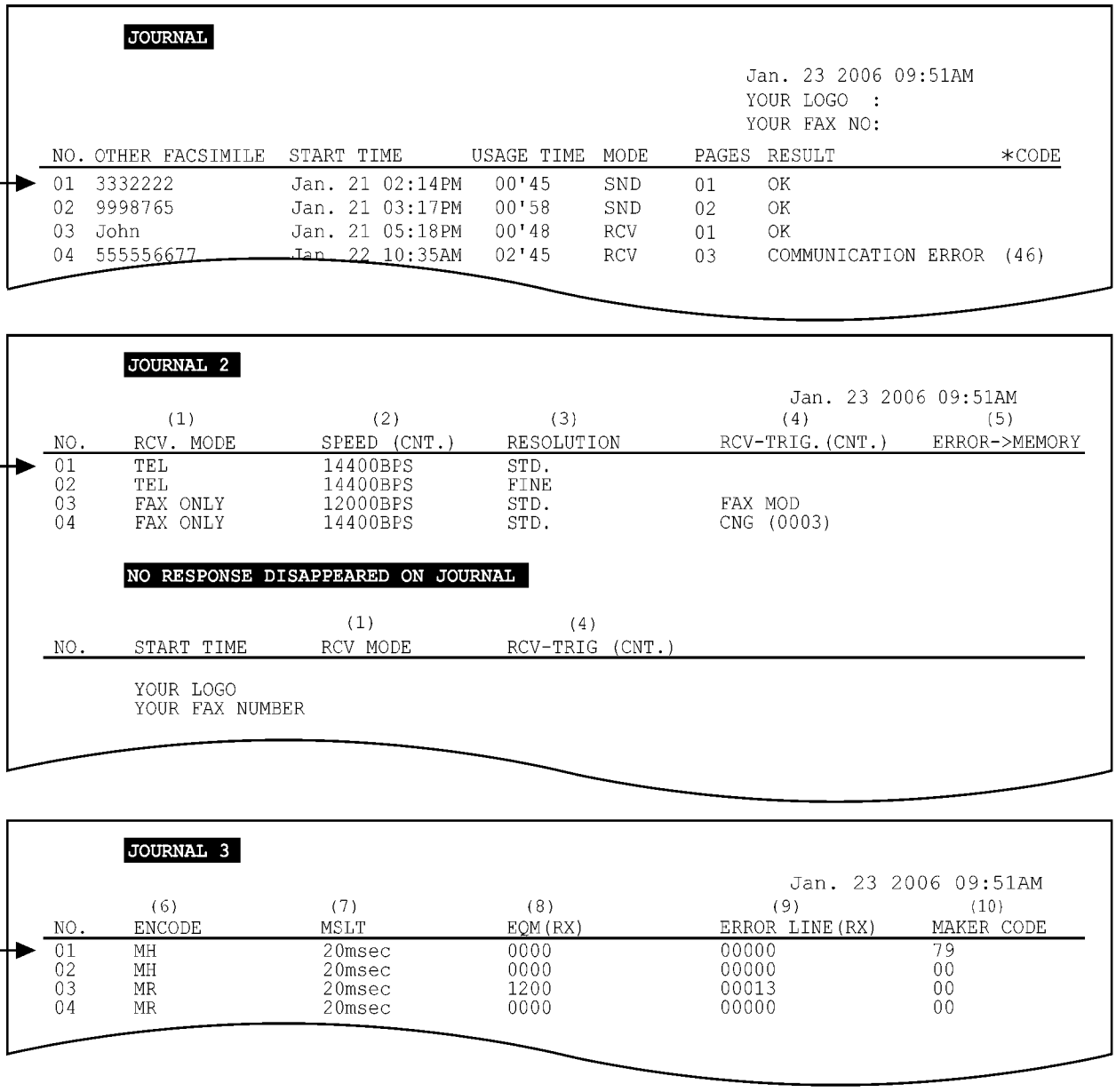


REFERENCE:

Test Mode (P.58)

12.3.2. Special Service Journal Reports

Journal 2 and Journal 3 shown below, which are special journals giving the additional detailed information about the latest 35 communications, can be printed by Service Code 881 or 882. Remote printing function for the journal reports (JOURNAL, JOURNAL 2 and JOURNAL 3) is also available for service technicians. (Refer to **Remote Programming** (P.97).) The JOURNAL report only gives you basic information about a communication, but the other two journal reports provide different information on the same item (communication).



JOURNAL

Jan. 23 2006 09:51AM
YOUR LOGO :
YOUR FAX NO:

NO.	OTHER FACSIMILE	START TIME	USAGE TIME	MODE	PAGES	RESULT	*CODE
01	3332222	Jan. 21 02:14PM	00'45	SND	01	OK	
02	9998765	Jan. 21 03:17PM	00'58	SND	02	OK	
03	John	Jan. 21 05:18PM	00'48	RCV	01	OK	
04	555556677	Jan. 22 10:35AM	02'45	RCV	03	COMMUNICATION ERROR	(46)

JOURNAL 2

Jan. 23 2006 09:51AM

NO.	(1) RCV. MODE	(2) SPEED (CNT.)	(3) RESOLUTION	(4) RCV-TRIG.(CNT.)	(5) ERROR->MEMORY
01	TEL	14400BPS	STD.		
02	TEL	14400BPS	FINE		
03	FAX ONLY	12000BPS	STD.	FAX MOD	
04	FAX ONLY	14400BPS	STD.	CNG (0003)	

NO RESPONSE DISAPPEARED ON JOURNAL

NO.	START TIME	(1) RCV MODE	(4) RCV-TRIG (CNT.)

YOUR LOGO
YOUR FAX NUMBER

JOURNAL 3

Jan. 23 2006 09:51AM

NO.	(6) ENCODE	(7) MSLT	(8) EQM(RX)	(9) ERROR LINE(RX)	(10) MAKER CODE
01	MH	20msec	0000	00000	79
02	MH	20msec	0000	00000	00
03	MR	20msec	1200	00013	00
04	MR	20msec	0000	00000	00

HOW TO READ JOURNAL REPORTS:

Example:

1. Look at **NO. 01** in the JOURNAL. If you want to know about the details about that item, see **NO. 01** in the JOURNAL 2 and the JOURNAL 3. You can get the following information.
   * MODE: Fax transmission
   * RCV. MODE: TEL
   * TX SPEED: 9.6 kbps
   * RESOLUTION: standard
   * ENCODE: MH
   * MAKER CODE: 79
2. Look at **NO. 04** in the JOURNAL 2. CNG (0003) indicates that the CNG signal has been received three times since the purchase date.

For further details, see **Journal 2** (P.85) and **Journal 3** (P.86).

12.3.2.1. Journal 2

Refer to JOURNAL 2 in **Printout Example** (P.86).
Journal 2 displays the additional detailed information about the last 35 communications.

Descriptions:

(1) RCV. MODE

Indicates which receive mode the unit was in when the unit received a fax message.
This information is also displayed when the unit transmitted a fax message.

(2) SPEED

Indicates the speed of the communication. If multiple pages are transmitted or received, it indicates the last page's communication speed. If there is a communication error, "?" is displayed.

(3) RESOLUTION

Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page's resolution. If there is a communication error, "?" is displayed.

(4) RCV-TRIG. (CNT.)

Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in JOURNAL 2 in **Printout Example** (P.86). The values in parentheses indicate how many times the trigger has been used. (For example, "0003" means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode.
2	MAN RCV	Means the unit received a fax message by manual operation.
3	FRN RCV	Means the unit received a fax message by friendly signal detection.
4	VOX	Means the unit detected silence or no voice.
5	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
6	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
7	TURN-ON	Means the unit started to receive after 10 rings. (Remote Turn On: Service Code #573)
8	TIME OUT	Means the unit started to receive after Ring Time Out.
9	IDENT	Means the unit detected Ring Detection.
10	CNG OGM	Means the unit detected the CNG while it was sending the OGM in the TAM/FAX mode.
11	CNG ICM	Means the unit detected the CNG while it was recording the ICM in the TAM/FAX mode.

(5) ERROR→MEMORY

Indicates the reason why the unit received a fax message in memory.
If you look at No.11 in the JOURNAL 2 in **Printout Example** (P.86), it shows the fax message was received in memory due to "PAPER OUT" error.

NO RESPONSE DISAPPEARED ON JOURNAL

The "**NO RESPONSE DISAPPEARED ON JOURNAL**" displays the information about the last 10 communications terminated by "No Response". (Some of the communications terminated by "No Response" were not displayed in the JOURNAL.)
When a fax transmission cannot be performed because the other party's unit is set to the TEL mode, "No response" will be printed.

12.3.2.2. Journal 3

Refer to JOURNAL 3 in **Printout Example** (P.86).

Descriptions:

(6) ENCODE
Compression Code: MH/MR

(7) MSLT
MSLT means Minimum Scan Line Time. Used only at the factory.

(8) EQM
EQM means Eye Quality Monitor. Used only at the factory.

(9) ERROR LINE(RX)
When an error occurs while receiving a fax, this shows the number of error lines.

(10) MAKER CODE
This shows a 2 digit code of the other party's fax machine brand.

0E: "KX" model
00: Unknown
79: "UF" model
19: "Xerox" model

12.3.2.3. Printout Example

JOURNAL2

Mar. 25 2006 01:59PM

NO.	RCV. MODE	SPEED (CNT.)	RESOLUTION	RCV-TRIG. (CNT.)	ERROR->MEMORY
01	FAX ONLY	9600BPS	FINE.	FAX MOD	
02	FAX ONLY	9600BPS	STD.	FAX MOD	
03	FAX ONLY	9600BPS	FINE.		
04	FAX ONLY	9600BPS	FINE.	FAX MOD	
05	FAX ONLY	9600BPS	FINE.	FAX MOD	
06	FAX ONLY	9600BPS	FINE.	FAX MOD	
07	FAX ONLY	9600BPS	FINE.		
08	FAX ONLY	9600BPS	FINE.		
09	FAX ONLY	9600BPS	FINE.		
10	FAX ONLY	9600BPS	STD.	FAX MOD	
11	FAX ONLY	9600BPS	FINE.	FAX MOD	PAPER OUT
12	FAX ONLY	9600BPS	STD.	FAX MOD	
13	FAX ONLY	9600BPS	STD.		
14	FAX ONLY	?	?		
15	FAX ONLY	?	?		
16	FAX ONLY	?	?		
17	FAX ONLY	9600BPS	STD.		
18	FAX ONLY	9600BPS	FINE.	FAX MOD	
19	FAX ONLY	9600BPS	STD.	FAX MOD	
20	FAX ONLY	9600BPS	S-FINE.		
21	FAX ONLY	9600BPS	FINE.		
22	FAX ONLY	9600BPS	FINE.	FAX MOD	
23	FAX ONLY	?	?	FAX MOD	
24	FAX ONLY	9600BPS	STD.	FAX MOD	
25	FAX ONLY	9600BPS	STD.	FAX MOD	
26	FAX ONLY	9600BPS	FINE.	FAX MOD	
27	FAX ONLY	9600BPS	FINE.		
28	FAX ONLY	9600BPS	STD.	FAX MOD	
29	FAX ONLY	9600BPS	FINE.	FAX MOD	
30	FAX ONLY	9600BPS	S-FINE.	FAX MOD	
31	FAX ONLY	9600BPS	STD.	FAX MOD	
32	FAX ONLY	9600BPS	STD.	FAX MOD	
33	FAX ONLY	?	?	FAX MOD	
34	FAX ONLY	9600BPS	STD.	FAX MOD	
35	FAX ONLY	9600BPS	STD.	FAX MOD	

NO RESPONSE DISAPPEARED ON JOURNAL

NO.	START TIME	RCV MODE	RCV-TRIG. (CNT.)

JOURNAL3

Mar. 25 2006 01:58PM

NO.	ENCODE	MSLT	EQM(RX)	ERROR LINE(RX)	MAKER CODE
01	MR	10msec	007A	00000	0E
02	MR	20msec	016B	00000	00
03	MH	10msec	0000	00000	00
04	MR	20msec	019B	00003	00
05	MR	20msec	0156	00011	00
06	MR	20msec	0113	00000	00
07	MR	5msec	0000	00000	79
08	MR	5msec	0000	00000	79
09	MR	0msec	0000	00000	19
10	MR	20msec	0100	00000	00
11	MR	10msec	0073	00000	0E
12	MR	20msec	012B	00000	00
13	MH	20msec	0000	00000	79
14	MH	20msec	0000	00000	00
15	MH	20msec	0000	00000	00
16	MH	20msec	0000	00000	00
17	MR	5msec	0000	00000	79
18	MR	10msec	00AB	00004	0E
19	MR	20msec	0124	00000	00
20	MR	20msec	0000	00000	00
21	MR	20msec	0000	00000	00
22	MR	20msec	0135	00000	00
23	MR	20msec	0000	00000	00
24	MR	20msec	01BC	00000	00
25	MR	20msec	01AC	00000	00
26	MR	20msec	020F	00000	00
27	MR	10msec	0000	00000	0E
28	MR	20msec	01DF	00000	00
29	MR	20msec	01EA	00000	00
30	MR	20msec	00CD	00000	00
31	MR	20msec	02F8	00000	0E
32	MR	10msec	04F8	00000	0E
33	MR	10msec	0000	00000	00
34	MR	20msec	03B6	00000	0E
35	MH	20msec	00E0	00000	00

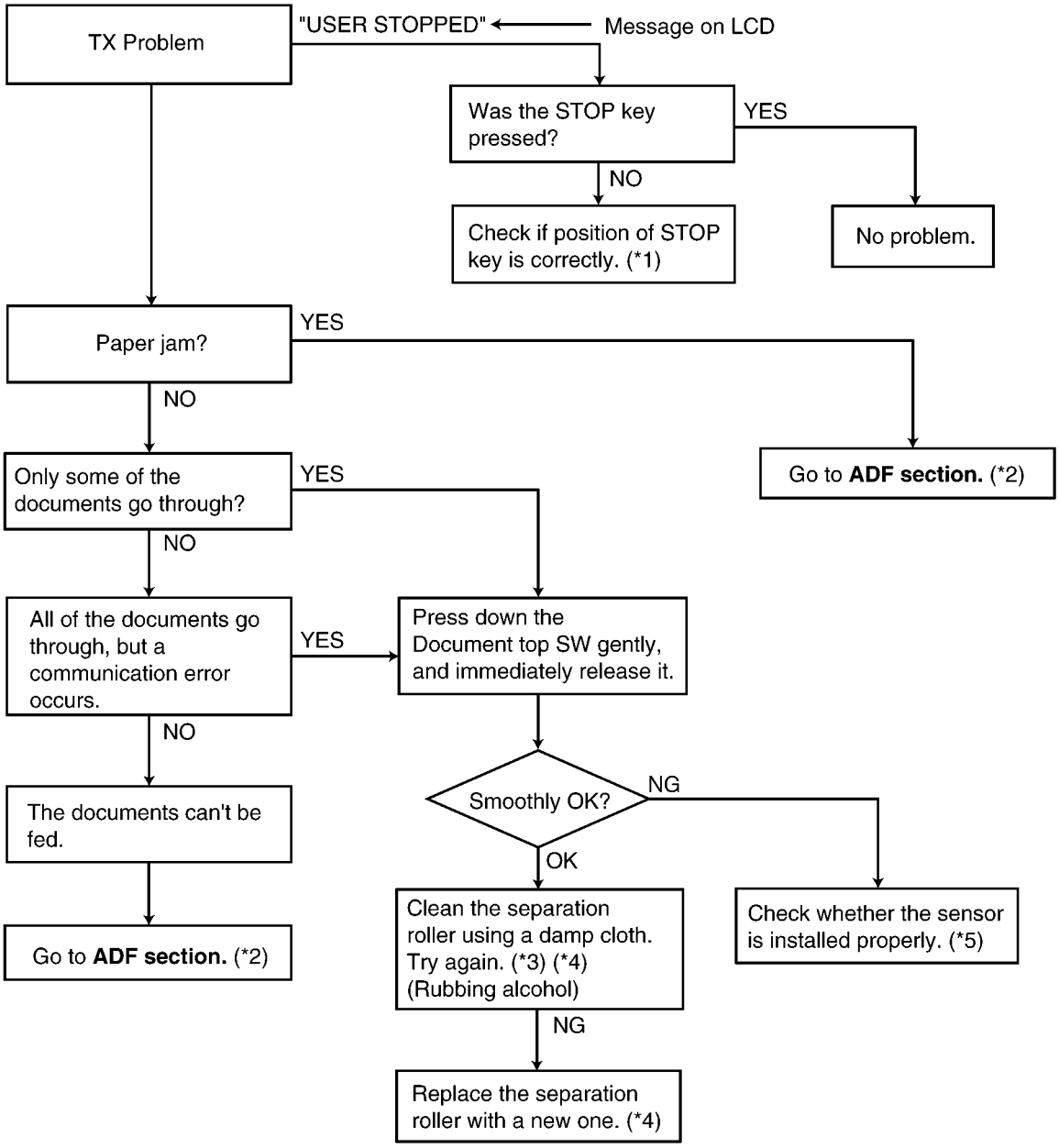
12.3.3. Communication Section

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in **Defective Facsimile Section** (P.89).

No.	Symptom	Reference Content	Possible cause
1	The paper is not fed properly when faxing. (Not in the copy mode.)	**Transmit Problem** (P.89)	Problem with the feeding mechanism. Refer to **ADF (Auto Document Feed) Section** (P.103).
2	The fax usually transmits successfully but sometimes fails. (The unit can copy documents.)	**Sometime There is a Transmit Problem** (P.90)	Problem with the service line or with the receiver's fax.
3	The fax usually receives successfully but sometimes fails. (The unit can copy documents.)	**Receive Problem** (P.91)	Problem with the service line or with the transmitter's fax.
4	The fax completely fails to transmit or receive. (The unit can copy documents.)	**The Unit can copy, but cannot Transmit / Receive** (P.92)	Problem with the electric circuit.
5	The fax fails either to transmit or receive when making a long distance or an international call. (The unit can copy documents.)	**The unit can copy, but cannot either transmit/receive long distance or international communications** (P.93)	Problem with the service line.
6	The fax image is poor when transmitting or receiving during a long distance or an international call.	**The unit can copy, but the transmission and reception image are incorrect** (P.95)	
7	No.1~No.5	• The troubleshooting procedure for each error code will be printed on the communication result report. • **Error Messages-Report** (P.75)	

12.3.3.1. Defective Facsimile Section

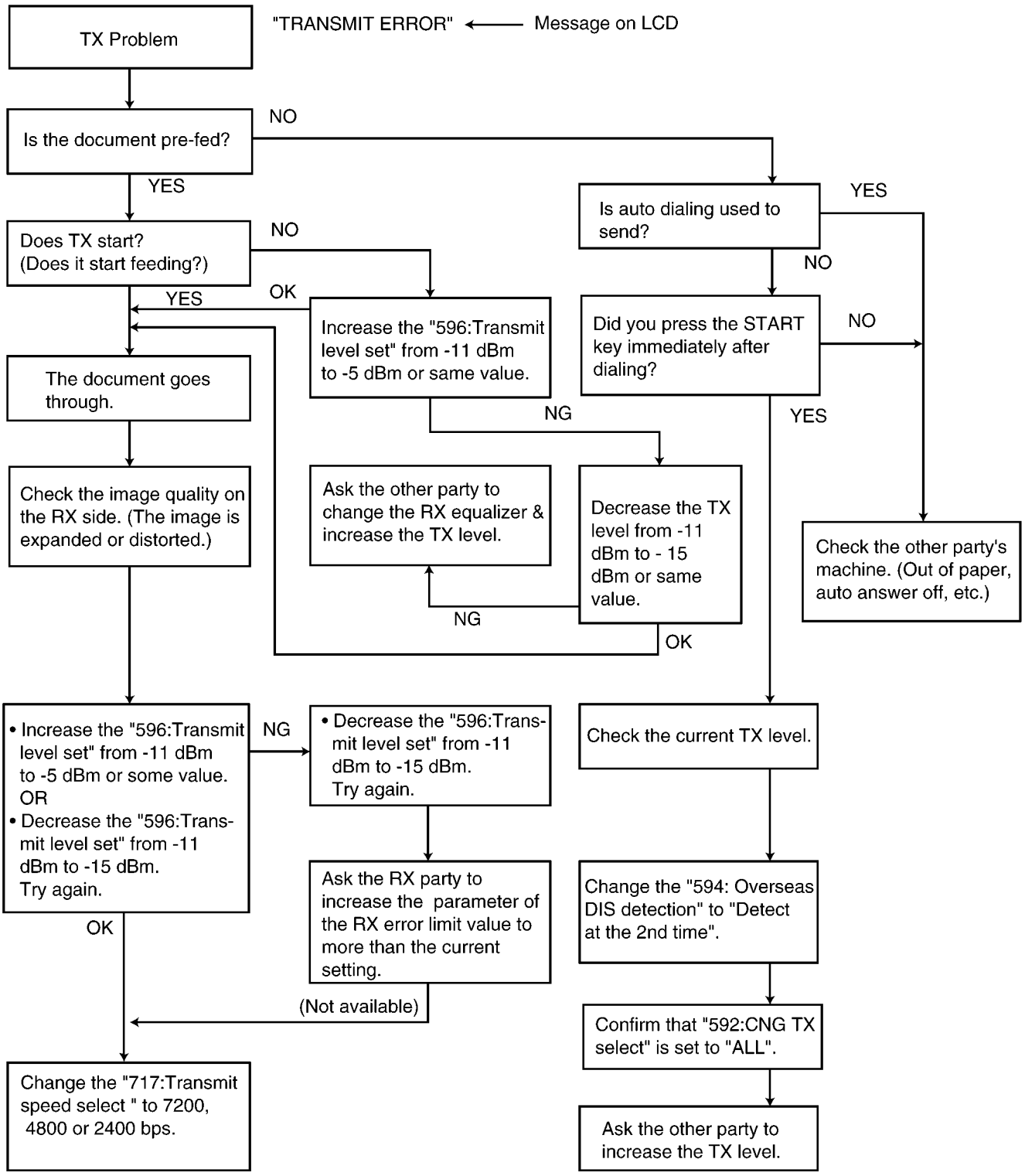
12.3.3.1.1. Transmit Problem



REFERENCE:

(*1): **Operation Panel Section** (P.128)
(*2): **ADF (Auto Document Feed) Section** (P.103)
(*3): **Maintenace** (P.184)
(*4): **How to Remove the Gear Block and Separation Roller** (P.151)
(*5): **How to Remove the Operation Board, MIC Board and LCD** (P.160)

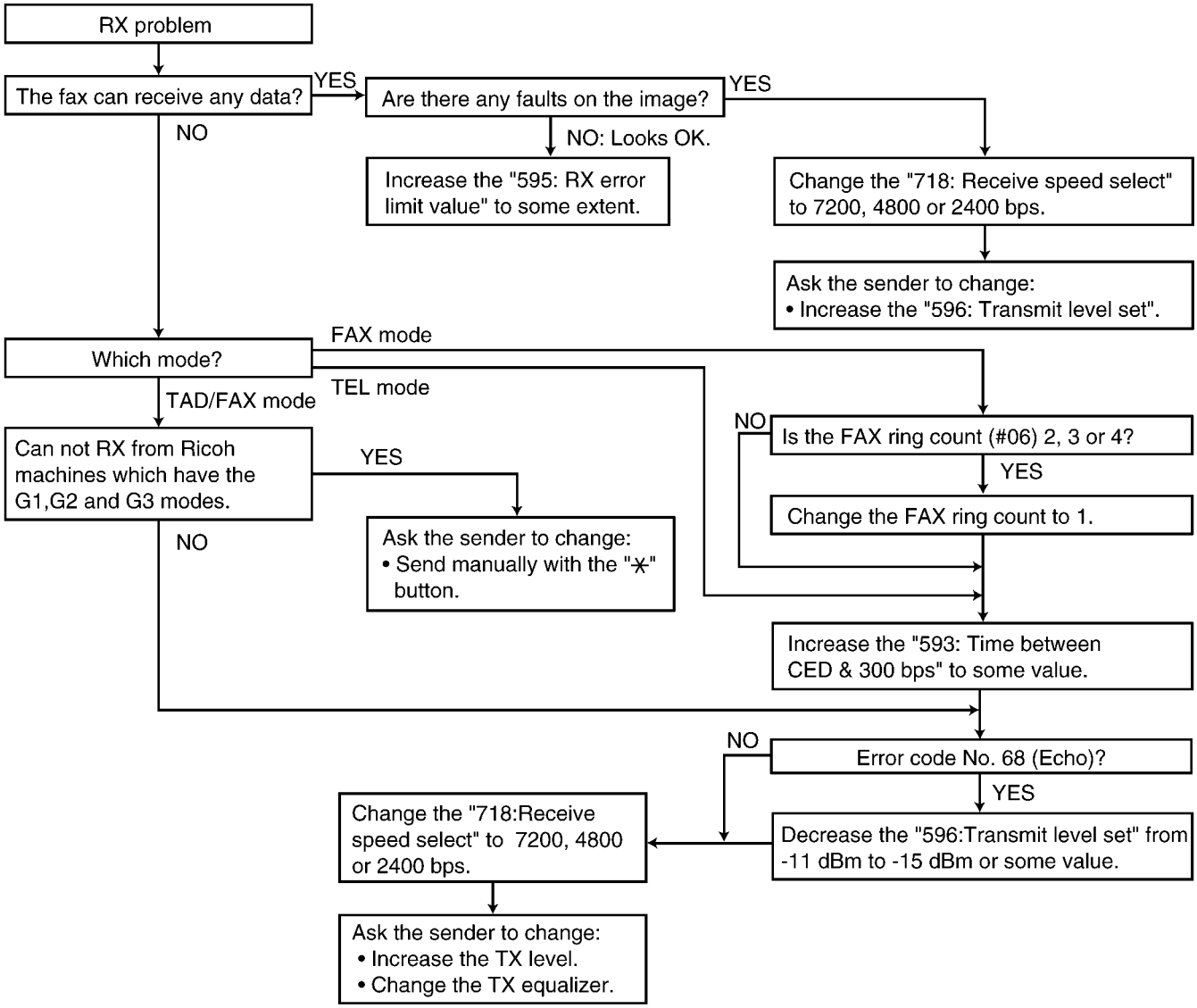
12.3.3.1.2. Sometime There is a Transmit Problem



Note:
"596: Transmit level set" represents a service code. (Refer to **Service Function Table** (P.62).)

12.3.3.1.3. Receive Problem

First confirm whether the recording paper is installed properly or not before starting troubleshooting. (Refer to "**Remarks**".)



Note:

- "596: Transmit level set" represents a service code. (Refer to **Service Function Table** (P.62).)
- #06 : Refer to for **Program Mode Table** (P.98) Fax ring count.

Remarks:

Regarding the reception problem, we have investigated the conceivable causes in the flow chart except for the software-related errors. However, some troubles may occur due to the software-related problems such as "OUT OF PAPER" when the fax switches to the memory receiving mode and the memory capacity becomes full of the unprintable data. In this case, error messages [MEMORY FULL] and its main cause, for example "CHECK PAPER" are displayed on the LCD. Once you solve the main problem, [MEMORY FULL] will be cancelled and the reception problem will be resolved.

LCD display messages indicating the error causes are shown below.

CHECK PAPER

COVER OPEN

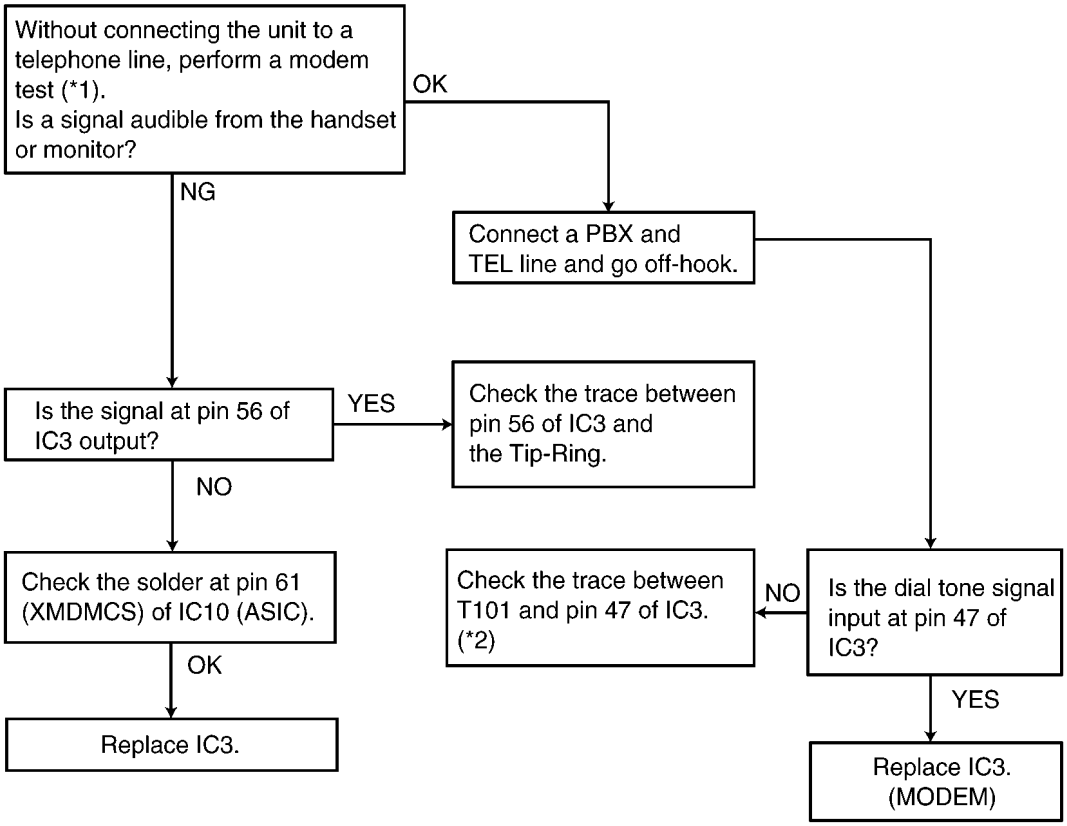
UNIT OVERHEATED (COVER OPEN, etc.)...Reset the unit.

PAPER JAMMED

CHECK FILM

Please refer to **Error Messages-Display** (P.72) for the above items. If it turns out to be a hardware deformity, please check each sensor. (Refer to **Test Mode** (P.58).)

12.3.3.1.4. The Unit can copy, but cannot Transmit / Receive



REFERENCE:

(*1): **Test Mode** (P.58)

(*2): **Analog Board Section** (P.123)

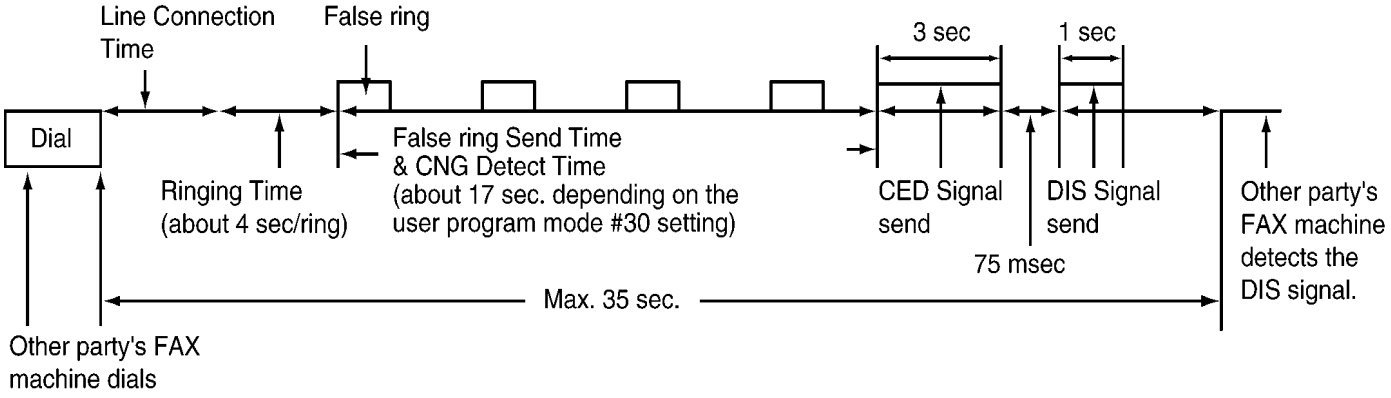
12.3.3.1.5. The unit can copy, but cannot either transmit/receive long distance or international communications

The following two causes can be considered for this symptom.

Cause 1:

The other party is executing automatic dialing, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and can respond to CED or DIS.) (According to the ITU-T standard, the communication procedure is cancelled when there is no response from the other party within 35 sec, so that the other party releases the line.)

(Response Time)

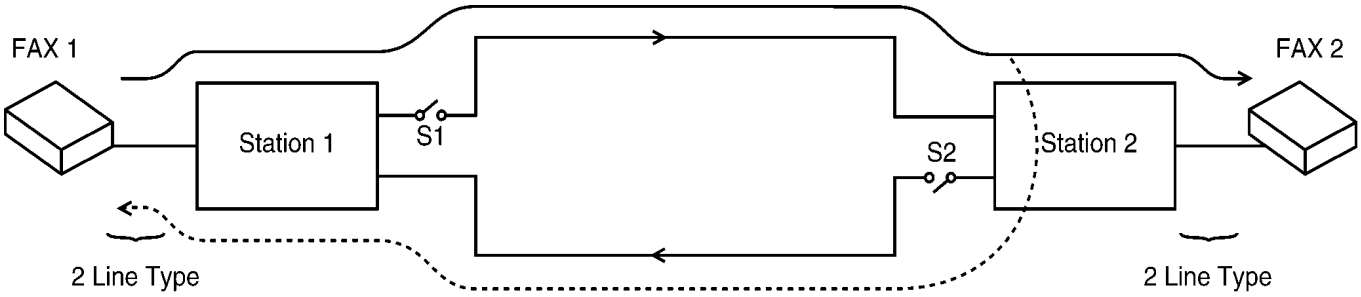


(Cause and Countermeasure)

As shown in the chart above, the total handshaking time must be reduced, but because of the long distance connection and linking of several stations, the line connection time cannot be reduced. Accordingly, the following countermeasures should be tried. (A)... As the 35 sec. count is started directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible. Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time can be delayed for 2 pauses (about 10 sec.).

Cause 2:

Erroneous detection because of an echo or an echo canceler.



(Echo/Echo Canceler)

The signal from FAX1 reaches FAX2 via stations 1 and 2, but the reflection signal at station 2 also returns via station 1 (echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 at a max of 600 msec after transmission. There is a possibility that this signal is detected erroneously as the signal from FAX2. For a normal call, there is also a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1 and station 2) attaches echo cancelers (S1 and S2) for international lines or long distance lines. For the echo canceler, the level of the transmission signal from FAX 1 is compared with the level of the reception signal from FAX2. When the transmission signal is larger, S1 is closed while S2 is opened when it is smaller. In other words, for transmission from FAX1, S1 is closed and S2 is open, so that the echo does not return to FAX1.

(Causes and Countermeasures)

No.	Countermeasure Side	Echo Communication Problem Example	Countermeasure	Service Code
1	Sending side	Some time is needed to compare the level of the receiving and sending signals for the echo canceler. The header of the training signal lacks due to a switching delay to close S1.	Add a dummy signal to the beginning of the training signal.	Service code (521) (International mode select) This countermeasure becomes the default value.
2	Receiving side	The echo canceler function stops according to a CED signal frequency of 2100Hz (S1 and S2 are both ON), a DIS signal is returned as an echo, and a DCS signal from the sending side overlaps the DIS echo. Then the receiving side FAX cannot retrieve the DCS signal. (Refer to Fig. a)	Change to a 1100Hz CED signal frequency. (Refer to Fig. b)	Service code (520) (CED frequency select)
	Receiving side		Change the regular rime of 75 msec between the CED signal and DIS signal to 500 msec. This will give at least 250 msec to recover the echo canceler operation. (Refer to Fig. c)	Service code (593) (Time between CED and 300 bps)
	Sending side		The sending side FAX sends a DCS signal not after receiving the 1st DIS signal but after receiving the 2nd DIS signal. (Refer to Fig. d)	Service code (594) (Overseas DIS detection select)
3	Sending side	Communication failure occurs in a long distance communication on the telephone line without an echo canceler.	Decrease the transmission level from -10 dBm to -15 dBm and the echo level will decrease.	Service code (596) (Transmit level set)
4	Sending side Receiving side	or	Decrease the receiving sensitivity from -13 dBm to about -32 dBm so an echo signal will not received.	Service code (598) (Receiving sensitivity)
5	Sending side Receiving side	There are some cases (e.g. Mobil comms.) which cause the collision of TX / RX signals due to the delay / echo and noise of the network / terminal. (Refer to Fig. e)	Set additional Pause time (Service mode: code No. 774) in between the original and its repeated signals, to prevent the collision of the signals at both end.	Service code (774) (T4 timer)

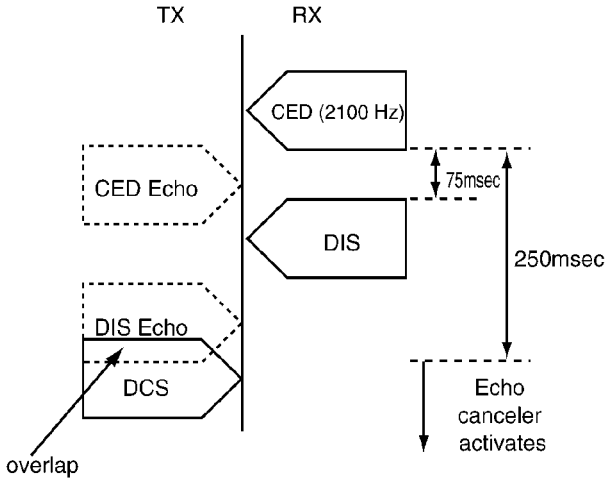


Fig. a
(Overlapping the Echo of the DIS signal and DCS signal)

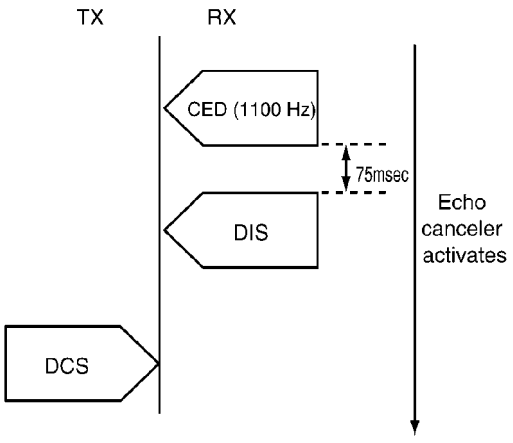


Fig. b
(Countermeasure by Changing the CED Frequency)

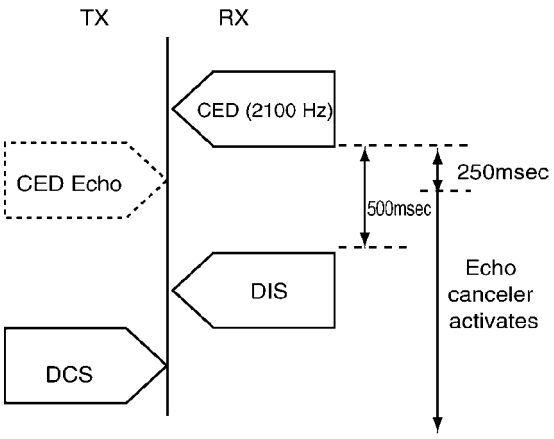


Fig. c
(Countermeasure by Changing the Interval Between CED and DIS)

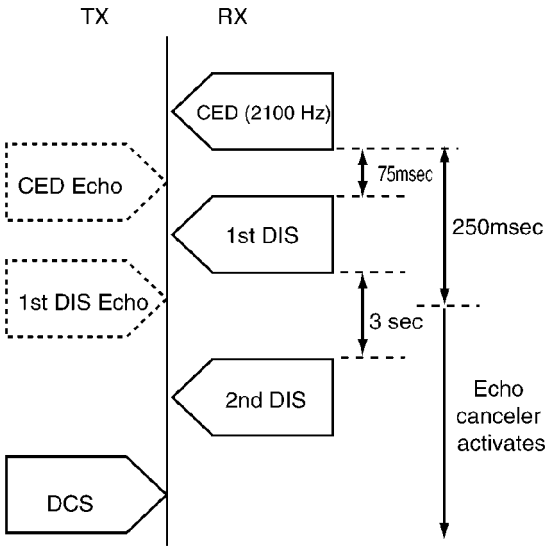
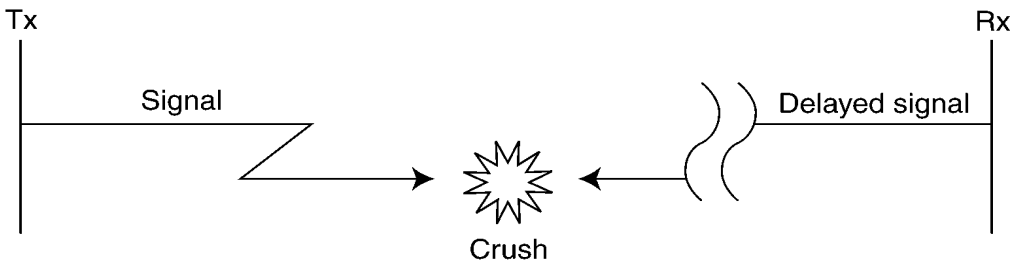


Fig. d
(Countermeasure by Ignoring the 1st DIS)

<TX side signal>	<RX side signal>	<Countermeasure>
2nd / 3rd DCS / Training	& delayed CFR / FTT	at TX side
2nd / 3rd EOP / EOM / MPS	& delayed MCF / PIP / PIN / RTP / RTN	at TX side
delayed DCS	& 2nd / 3rd / --- DIS	at RX side



(Fig. e)

12.3.3.1.6. The unit can copy, but the transmission and reception image are incorrect

(Long distance or international communication operation)

This symptom highly depends on the transmission and reception capability of the other FAX unit and the line conditions. The countermeasures for this unit are shown below.

Transmission Operation:

Set the transmitting speed to 4800BPS (service mode: code No. 717) or select the overseas mode.

Reception Operation:

If 80% or more of the reception is incorrect, set the receiving speed to 4800BPS. (Service mode: code No. 718)

• Refer to **Service Function Table** (P.62).

12.3.3.1.7. How To Record Fax Signal by Using PC

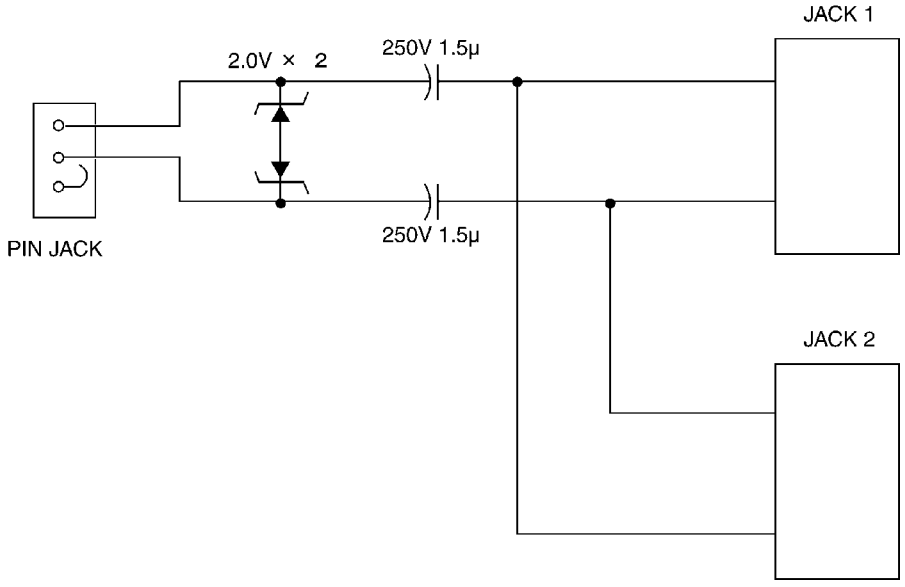
Recording FAX signal is one of the useful analysis measures to solve communication problems.
The way of recording easily by using PC is shown as follows.

1. Equipment

- 1 jig
- 1 PC (with LINE IN)
- 1 audio cord (mini jack supported)
- 2 tel cords

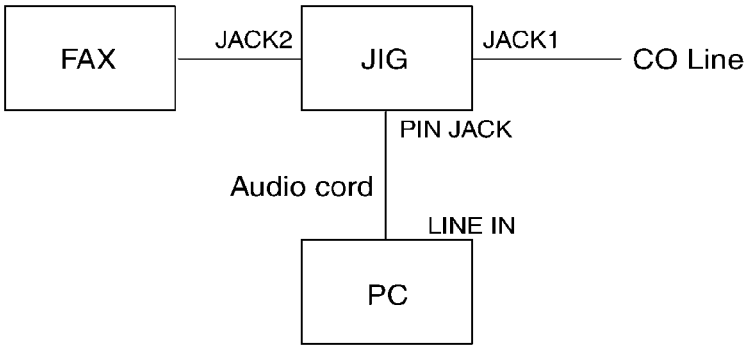
Parts No.	Parts Name & Description	Qt'y
PQJJ1T004Z	JACK1, JACK2	2
PQJJ1D010Z	PIN JACK	1
ECQE2155KF or ECQE2E155KC	CAPACITOR	2
MA4020	DIODE	2

2. Setting up



FAX SIGNAL RECORDING JIG

3. Connecting PC and JIG



4. PC setting and recording

1. Set LINE IN to be valid in the volume control setting.
   Refer to the PC instruction book.
2. Start up the PC software " SOUND RECORDER". (This software is bundled to Windows OS, which can create WAV file.)
   Set the audio format " PCM 22.050kHz, 8bit, mono".
3. Click the record button and start recording after acquisition the signal.

Note:

- Not to be wind wave patterns on the wave monitor.
- Please compress the recording data when you send attaching to E-Mail because the data size will be so heavy.
- Any software which can create WAV files is available.

12.4. Remote Programming

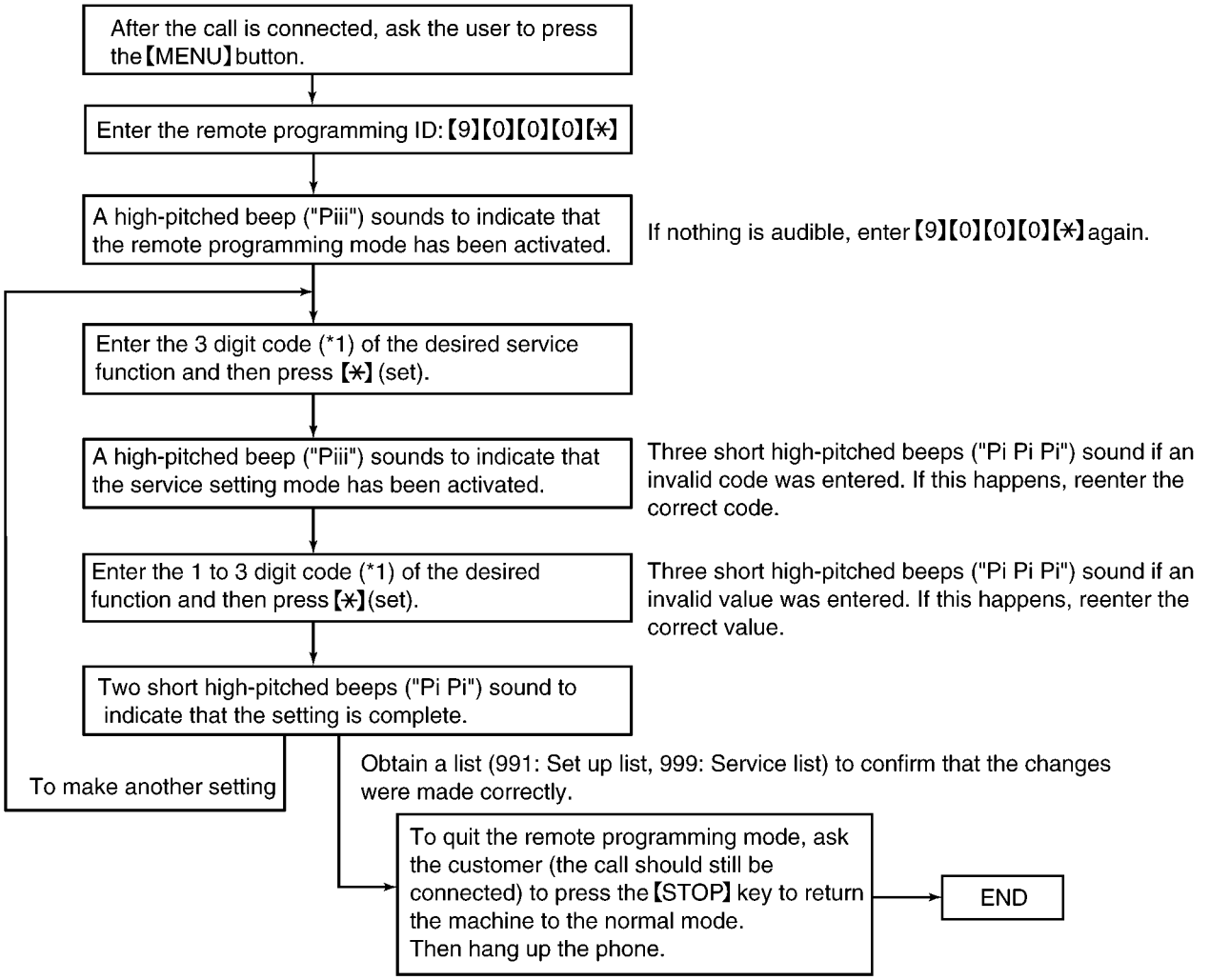
If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (**Program Mode Table** (P.98)). The function used to accomplish this is remote programming.

First, in order to check the current status of the service code parameter, print out the setup list (code: 991) and the service list (code: 999) from the customer's fax machine.
Based on this, the parameters for the desired codes can be changed.
The procedure for changing and listing parameters is described on **Entering the Remote Programming Mode and Changing Service Codes** (P.97). Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that the changes were made correctly.

Hint:

Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone. This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

12.4.1. Entering the Remote Programming Mode and Changing Service Codes



Note:

(*1): Refer to **Program Mode Table** (P.98)

12.4.2. Program Mode Table

Code	Function	Set Value	Default	Remote Setting
001	Set date and time	dd/mm/yy hh:mm	01/Jan/2006	NG
002	Your logo	---------	None	NG
003	Your FAX number	---------	None	NG
004	Print sending report	1:ERROR / 2:ON / 3:OFF	ERROR	OK
006	FAX ring count	1~9	2	OK
	TAM/FAX ring count	2~7 / 0:AUTO	2	OK
010	Recording time	1: 1 MINUTE / 2:GREETING ONLY / 3: 3 MINUTES	3 MINUTES	OK
011	Remote TAM ID	---------	------	NG
013	Dialing Mode	1:PULSE / 2:TONE	TONE	OK
017	EXT. Ringtone	RINGTONE 1~6	RINGTONE 1	NG
022	Journal auto print	1:ON / 2:OFF	ON	OK
023	Overseas mode	1:NEXT FAX / 2:ERROR / 3:OFF	ERROR	OK
025	Delayed transmission	ON / OFF	OFF	NG
026	Auto caller ID list	1:ON / 2:OFF	OFF	OK
034	Quick scan	1:ON / 2:OFF	OFF	OK
035	Night mode	ON / OFF	OFF	NG
036	RCV reduction	1:72% / 2:86% / 3:92% / 4:100%	92%	OK
039	LCD contrast	NORMAL / DARKER	NORMAL	NG
041	FAX activation code	ON / OFF	ON ID=✱#9	NG
044	Memory receive alert	1:ON / 2:OFF	ON	OK
046	Friendly reception	1:ON / 2:OFF	ON	OK
049	Auto disconnect	ON / OFF	ON CODE=✱0	NG
054	Greeting MSG. REC. time	1:16s / 2:60s	16s	OK
058	Scan contrast	1: Normal / 2: Light / 3: Darker	Normal	OK
059	Copy phonebook	1 ITEM / ALL ITEMS	1 ITEM	NG
067	Call screening	1:ON / 2:OFF	ON	OK
068	ECM selection	1:ON / 2:OFF	ON	OK
072	Set flash mode	0: 80ms / 1:90ms / 2:100ms / 3: 110ms 4:160ms / 5:200ms / 6:250ms / 7:300ms 8: 400ms / 9: 600ms / ✱:700ms / #:900ms	600ms	OK
073	Manual answer mode	1:TEL / 2:TEL/FAX	TEL	OK
076	Connecting tone	1:ON / 2:OFF	ON	OK
077	Auto answer mode	2: FAX Only / 3:TAM/FAX	TAM/FAX	OK
078	TEL/FAX delayed ring	1~9	2	OK
080	Set default	YES / NO	NO	NG
501	Pause time set	1: 3s (Short) / 2: 5s (Long)	3s	OK
511	Vox sense	1:High / 2:Low	High	OK
514	Bell detection time	10~90 × 10msec	60 × 10msec	OK
520	CED frequency select	1:2100Hz / 2:1100Hz	2100Hz	OK
521	International mode select	1:ON / 2:OFF	ON	OK
522	Auto standby select	1:ON / 2:OFF	ON	OK
523	Receive equalizer select	1:0km / 2:1.8km / 3:3.6km / 4:7.2km	0km	OK
524	Transmission equalizer select	1:0km / 2:1.8km / 3:3.6km / 4:7.2km	0km	OK
544	Document feed position adjustment value set	1:-2.0mm / 2:-1.5mm / 3: -1.0mm / 4:-0.5mm 5:0.0mm / 6:0.5mm / 7:1.0mm / 8:1.5mm 9: 2.0mm	0.0mm	OK
550	Memory clear	---------	---------	NG
551	Flash memory check	---------	---------	NG
553	Monitor on FAX communication	1:OFF / 2:Phase B / 3:ALL	OFF	OK
554	Modem test	---------	---------	NG
555	Scan test	---------	---------	NG
556	Motor test	---------	---------	NG
557	LED test	---------	---------	NG
558	LCD test	---------	---------	NG
559	Document jam detection	1:ON / 2:OFF	ON	OK
561	Key test	---------	---------	NG
567	T0 timer	001~255sec	046sec	OK

Code	Function	Set Value	Default	Remote Set-ting
570	Break % select	1: 61% / 2: 67%	61%	OK
571	ITS auto redial time set	00~99	10	OK
572	ITS auto redial line disconnection time set	001~999sec	065sec	OK
573	Remote turn-on ring number	00~99	10	OK
590	FAX auto redial time set	00~99	05	OK
591	FAX auto redial line disconnection time set	001~999sec	065sec	OK
592	CNG transmit select	1:OFF / 2:ALL / 3:AUTO	ALL	OK
593	Time between CED and 300 bps	1:75ms / 2:500ms / 3:1sec	75ms	OK
594	Overseas DIS detection	1:1st / 2:2nd	1st	OK
595	Receive error limit value	1:5% / 2:10% / 3:15% / 4:20%	10%	OK
596	Transmit level set	00~15 x -1dbm	10 x -1dbm	OK
598*1	Receiving Sensitivity	20~48 x -1dbm	44 x -1dbm	OK
599	ECM frame size	1:256 byte / 2:64 byte	256 byte	OK
710	Memory clear except history data	---------	---------	NG
717	Transmit speed select	1:9600/ 2:7200/ 3:4800/ 4:2400	9600bps	OK
718	Receive speed select	1:9600/ 2:7200/ 3:4800/ 4:2400	9600bps	OK
722	Redial tone detect	1:ON / 2:OFF	ON	OK
745	Power on film feed	1:ON / 2:OFF	ON	OK
763	CNG detect time for friendly reception	1:10s / 2:20s / 3:30s	30s	OK
773	DIS-DCS interval	1:500msec / 2:200msec	200ms	OK
774	T4 timer	00~99 x 100ms	00ms	OK
784	Voice prompt	---------	---------	NG
815	Sensor test	---------	---------	NG
852	Print test pattern	---------	---------	NG
853	Top margin	1~9 mm	5 mm	OK
861	Paper size	1:A4 / 2:Letter	A4	OK
874	DTMF ON time	006~020 × 10msec	10 × 10msec	OK
875	DTMF OFF time	006~020 × 10msec	10 × 10msec	OK
880	History list	“Set” Key	---------	NG
881	Journal 2	Set	---------	NG
882	Journal 3	Set	---------	NG
961	The time transmitting the false ring back tone	01~10 sec	07 sec	OK
962	The operator calling time	05~30 sec	10 sec	OK
991	Remote Setup list	1: Print start	---------	OK
994	Remote Journal list	1: Print start	---------	OK
995	Remote Journal 2 list	1: Print start	---------	OK
996	Remote Journal 3 list	1: Print start	---------	OK
998	Remote History list	1: Print start	---------	OK
999	Remote Service list	1: Print start	---------	OK

OK means "can set".
NG means "can not set".

Note:

Refer to **Service Function Table** (P.62) for descriptions of the individual codes.

Example:

If you want to set value in the "004 Print sending report", press the dial key number 1,2 or 3 corresponding to the Set Value you want to select. (1:ERROR / 2:ON / 3:OFF)

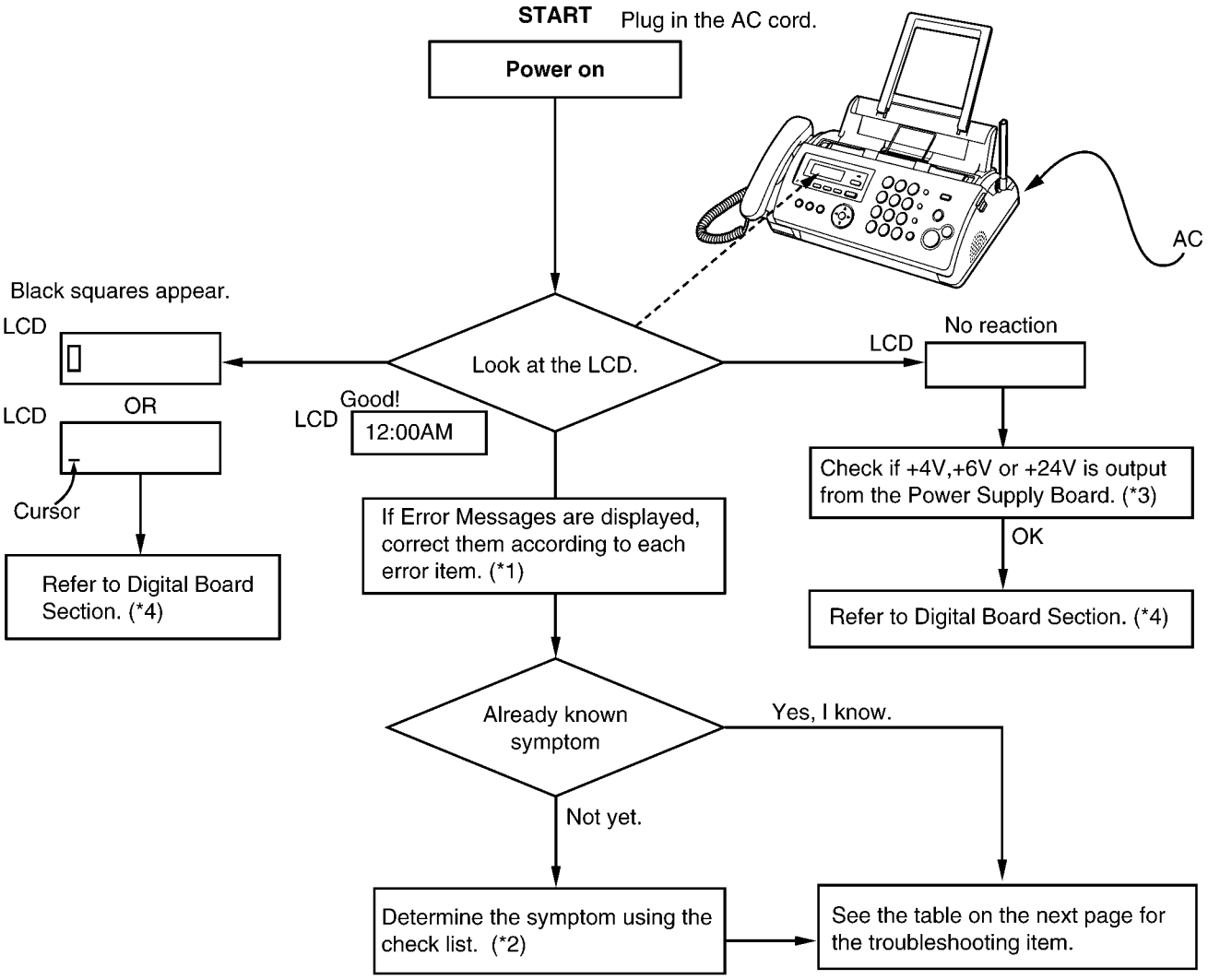
12.5. Troubleshooting Details

12.5.1. Outline

Troubleshooting is for recovering quality and reliability by determining the broken component and replacing, adjusting or cleaning it as required. First, determine the problem then decide the troubleshooting method. If you have difficulty finding the broken part, determine which board is broken. (For example: the Digital PCB, Analog PCB, etc.) The claim tag from a customer or dealer may use different expressions for the same problem, as they are not a technician or engineer. Using your experience, test the problem area corresponding to the claim. Also, returns from a customer or dealer often have a claim tag. For these cases as well, you need to determine the problem. Test the unit using the simple check list on **Simple Check List** (P.102). Difficult problems may be hard to determine, so repeated testing is necessary.

12.5.2. Starting Troubleshooting

Determine the symptom and the troubleshooting method.



REFERENCE:

(*1): **Error Messages-Display** (P.72)
(*2): **Simple Check List** (P.102)
(*3): **Power Supply Board Section** (P.125)
(*4): **Digital Board Section** (P.116)

12.5.3. Troubleshooting Items Table

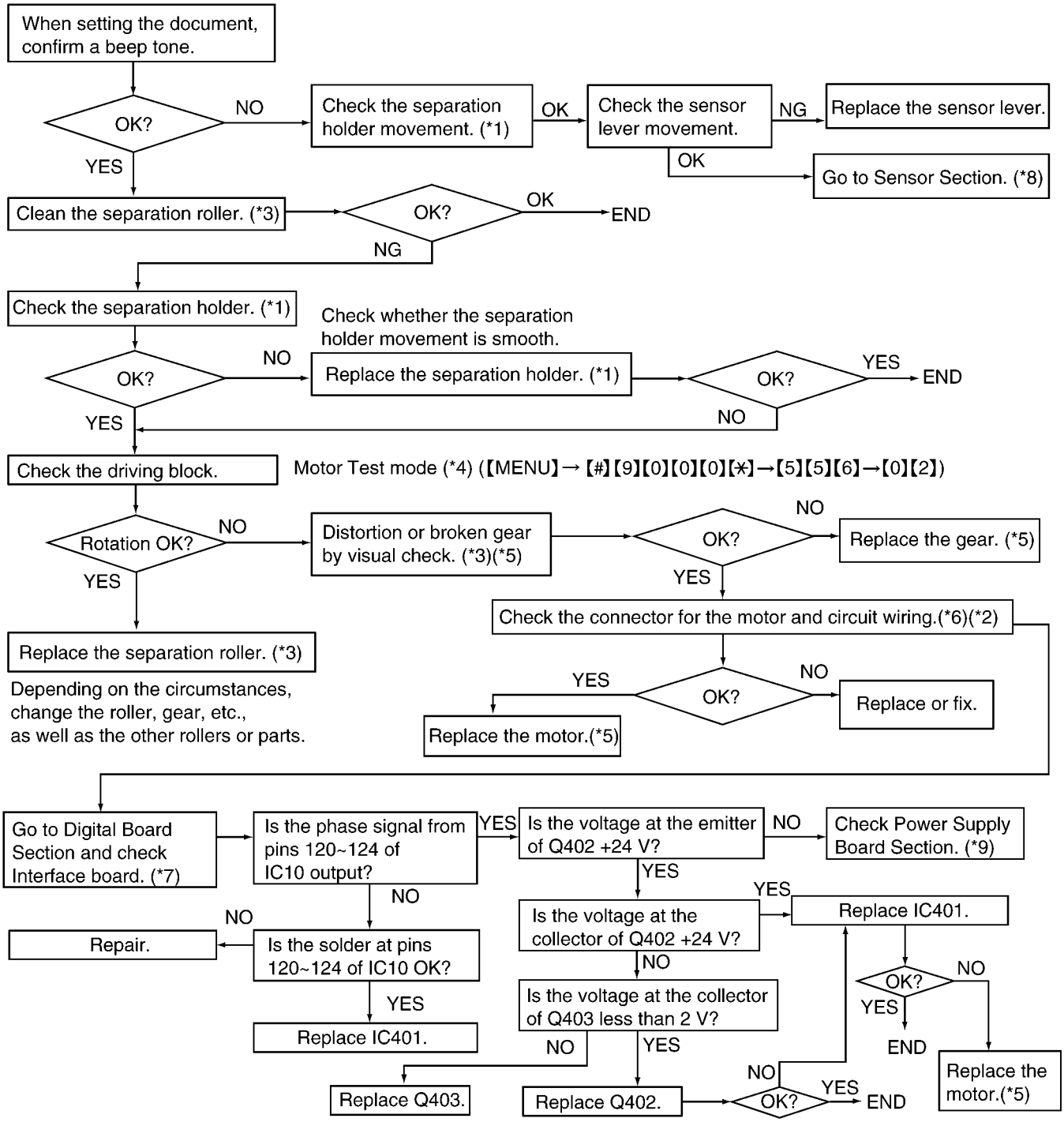
ITEM	SYMPTOM	REFERENCE
ADF (Auto Document Feeder)	The document does not feed.	See **No Document Feed** (P.103)
	Document jam	See **Document Jam** (P.104)
	Multiple feed	See **Multiple Document Feed** (P.105)
	Skew	See **Document Skew** (P.106)
Recording paper feed	The recording paper does not feed.	See **The Recording Paper does not Feed** (P.107)
	Paper jam	See **Paper Jam** (P.108)
	Multiple feed and skew	See **Recording Paper Multiple Feed and Skew** (P.109)
Printing	The sent fax data is skewed.	See **The Sent Fax Data is Skewed** (P.109)
	The received fax data is skewed.	See **The Received Fax Data is Skewed** (P.109)
	The received or copied data is expanded.	See **Received or Copied Data is Expanded** (P.110)
	A black page is copied.	See **A Blank Page is Copied** (P.111)
	A blank page is received.	See **A Blank Page is Received** (P.113)
	Black or white vertical line	See **Black or White Vertical Line** (P.113)
	Black or white lateral line on print out	See **Black or White Lateral Line on Print Out** (P.114)
	An abnormal image is printed	See **An Abnormal Image is Printed** (P.115)
Communication FAX, TEL (Analog board)	Cannot communicate by fax. An error code is displayed.	See **Communication Section** (P.88) and **Journal Report** (P.75)
	Cannot talk. The DTMF tone doesn't work. The handset / monitor doesn't work, etc.	See **Analog Board Section** (P.123)
Operation panel	Keys are not accepted.	See **Operation Panel Section** (P.128)
Sensor	If the electric circuit is the cause, the error message corresponding to the sensor will be displayed.	See **Sensor Section** (P.129)
Cordless (handset)	Cordless Handset does not work.	See **Check Power (Cordless Handset)** (P.133)
	No link	See **Check Link (Cordless Handset)** (P.134)
	Battery won't charge	See **Check Battery Charge (Cordless Handset)** (P.133) and **Check Battery Charge (Charger Unit)** (P.133)
	No voice reception	See **Check Cordless Handset Reception** (P.135)
	No voice transmission	See **Check Cordless Handset Transmission** (P.135)
	Bell does not sound	See **Bell Reception (Cordless Handset)** (P.136)

12.5.3.1. Simple Check List

SERIAL NO.		DATE	
FUNCTION		JUDGEMENT	REFERENCE
FAX operation	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation		OK / NG	
Telephone operation	Handset transceiver / receiver	OK / NG	
	SP-PHONE sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
Operation Panel	Key check	OK / NG	Service code #561 (Refer to **Test Mode** (P.58).)
	LED check	OK / NG	Service code #557 (Refer to **Test Mode** (P.58).)
	LCD check	OK / NG	Service code #558 (Refer to **Test Mode** (P.58).)
Sensor	Sensor check	OK / NG	Service code #815 (Refer to **Test Mode** (P.58).)
Clock	Display changing	OK / NG	Is the time kept correctly? Check with another clock.
Digital TAM	Greeting REC / PLAY	OK / NG	
	Incoming message REC / PLAY	OK / NG	
	Memo REC / PLAY	OK / NG	
Voice prompt		OK / NG	Service code #784 (Refer to **Test Mode** (P.58).) Check whether voice prompt is play or not.
Cordless Operation	Cordless handset	OK / NG	
	Link	OK / NG	
	Battery charge	OK / NG	

12.5.4. ADF (Auto Document Feed) Section

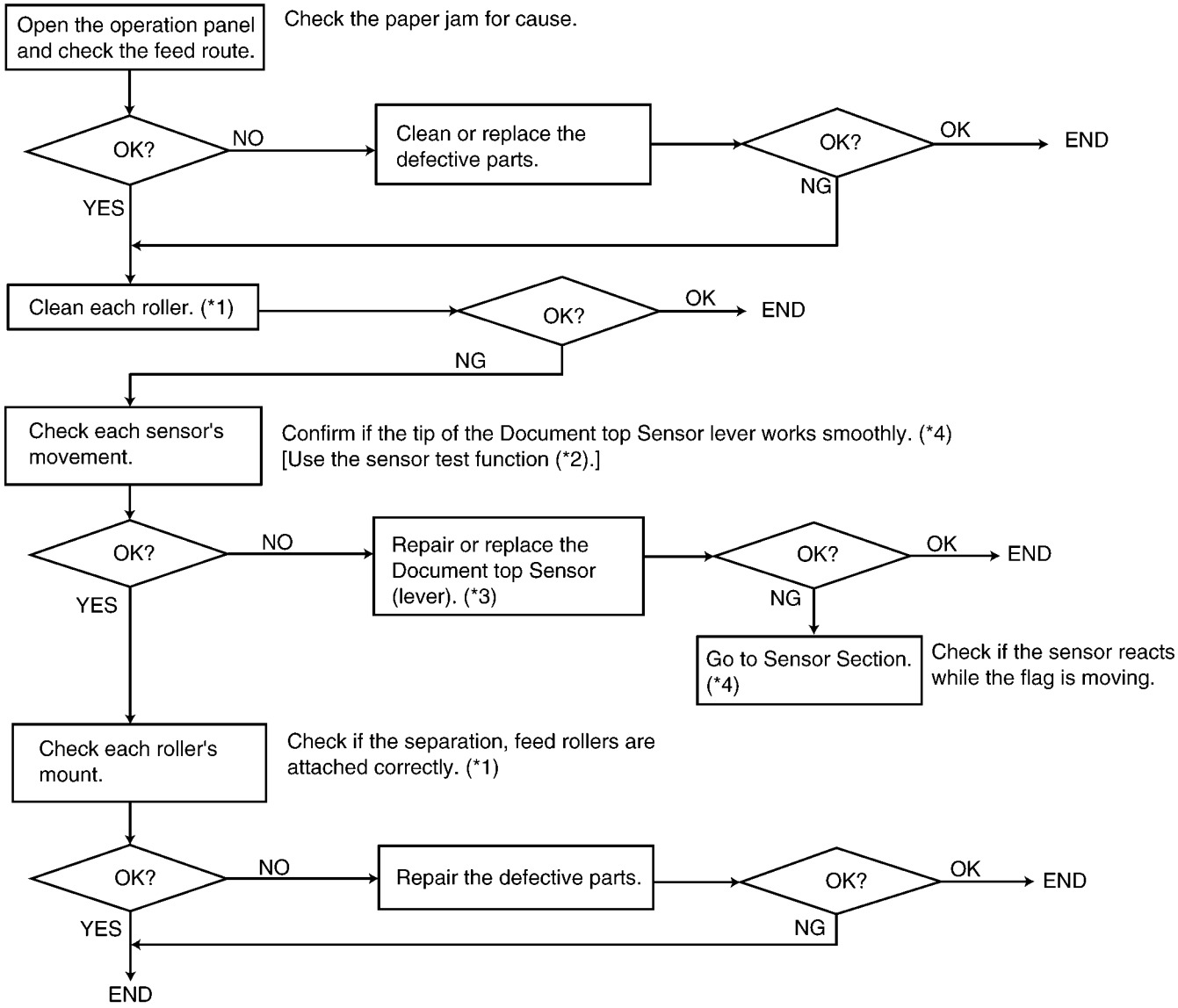
12.5.4.1. No Document Feed



REFERENCE:

(*1): **How to Remove the Separation Holder and Exit Roller** (P.161)
(*2): **Installation Position of the Lead Wires** (P.162)
(*3): **How to Remove the Gear Block and Separation Roller** (P.151)
(*4): **Test Mode** (P.58)
(*5): **How to Remove the Gears, Motors and Arms of the Gear Block** (P.152)
(*6): **Thermal Head** (P.19)
(*7): **Digital Board Section** (P.116)
(*8): **Sensor Section** (P.129)
(*9): **Power Supply Board Section** (P.125)

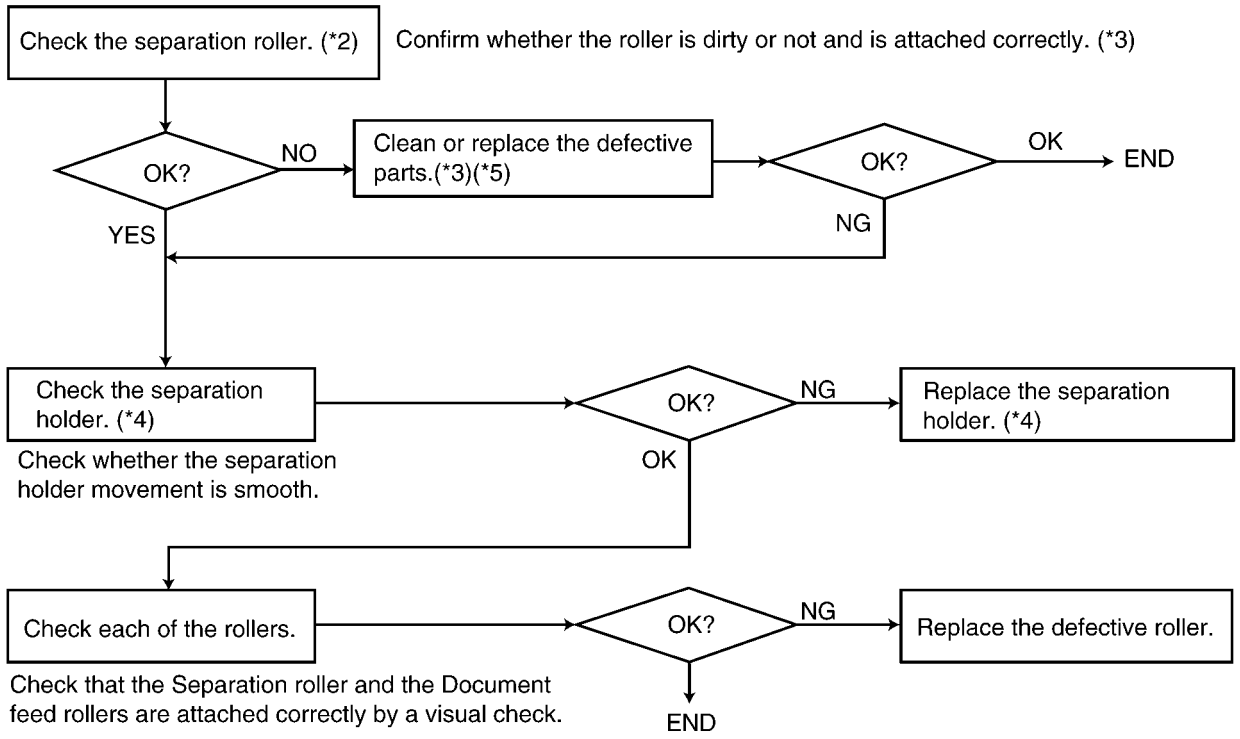
12.5.4.2. Document Jam



REFERENCE:
(*1): **Disassembly and Assembly Instructions** (P.141)
(*2): **Test Mode** (P.58)
(*3): **How to Remove the Separation Holder and Exit Roller** (P.161)
(*4): **Sensor Section** (P.129)

12.5.4.3. Multiple Document Feed

• When using thick paper etc., sometimes the document will not be fed. (*1)



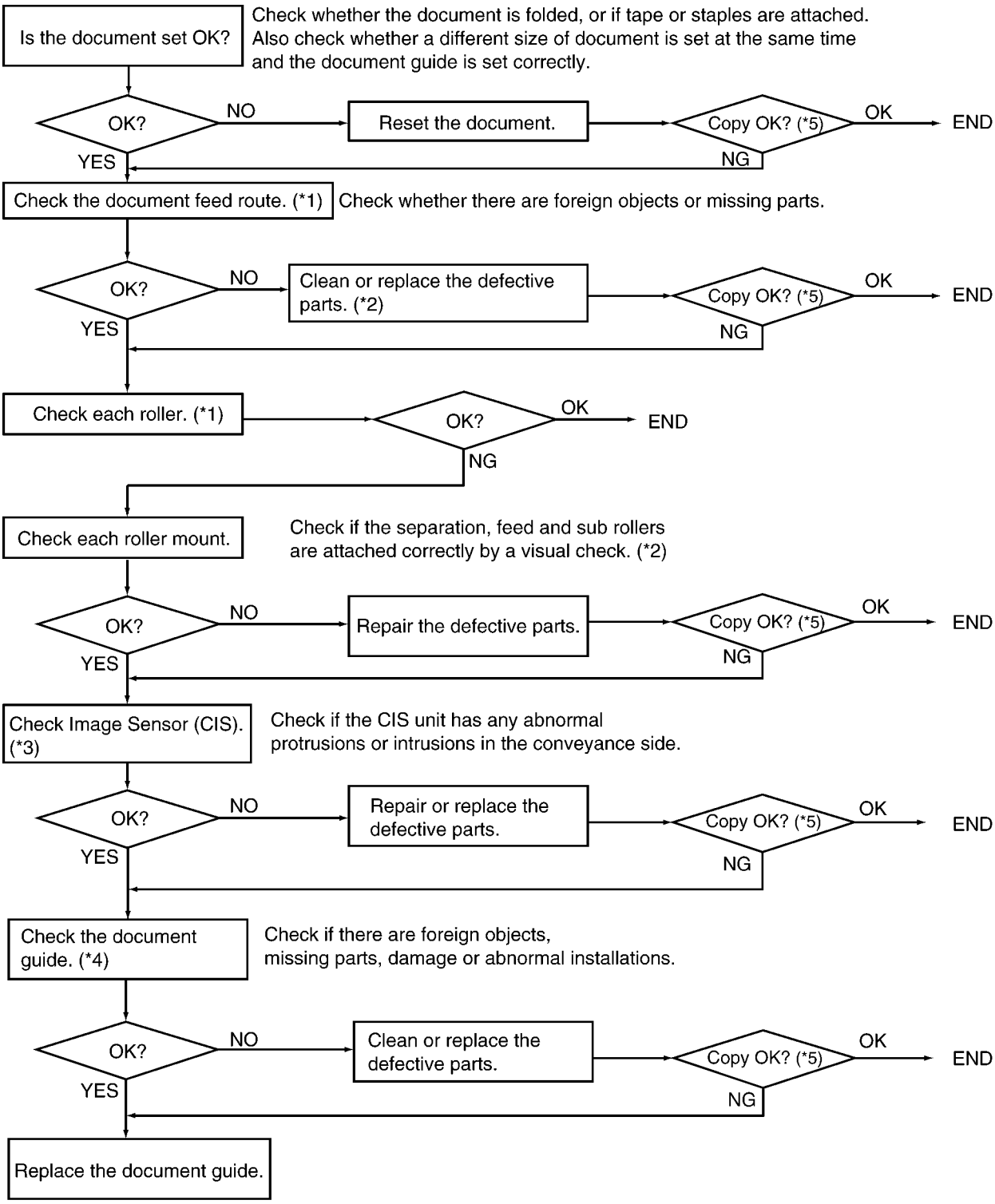
REFERENCE:

(*1): **Installing the Recording Paper** (P.54)
(*2): **How to Remove the Gear Block and Separation Roller** (P.151)
(*3): **Disassembly and Assembly Instructions** (P.141)
(*4): **How to Remove the Separation Holder and Exit Roller** (P.161)
(*5): **Maintenace** (P.184)

Note:

When confirming if the characters are extended or distorted, or if the feed problem is occurred, use this test chart format. (Refer to **Test Chart** (P.204).)

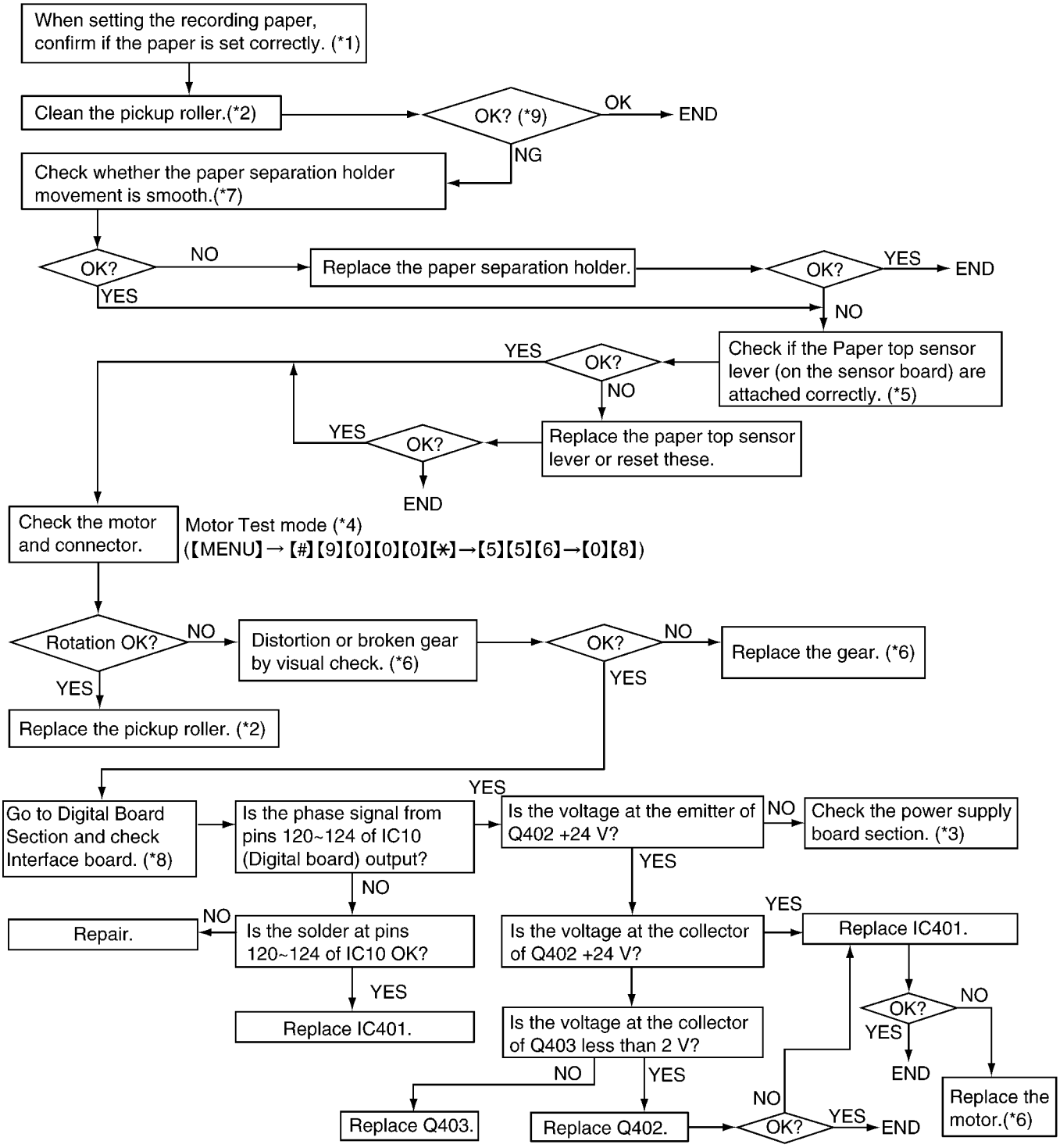
12.5.4.4. Document Skew



REFERENCE:

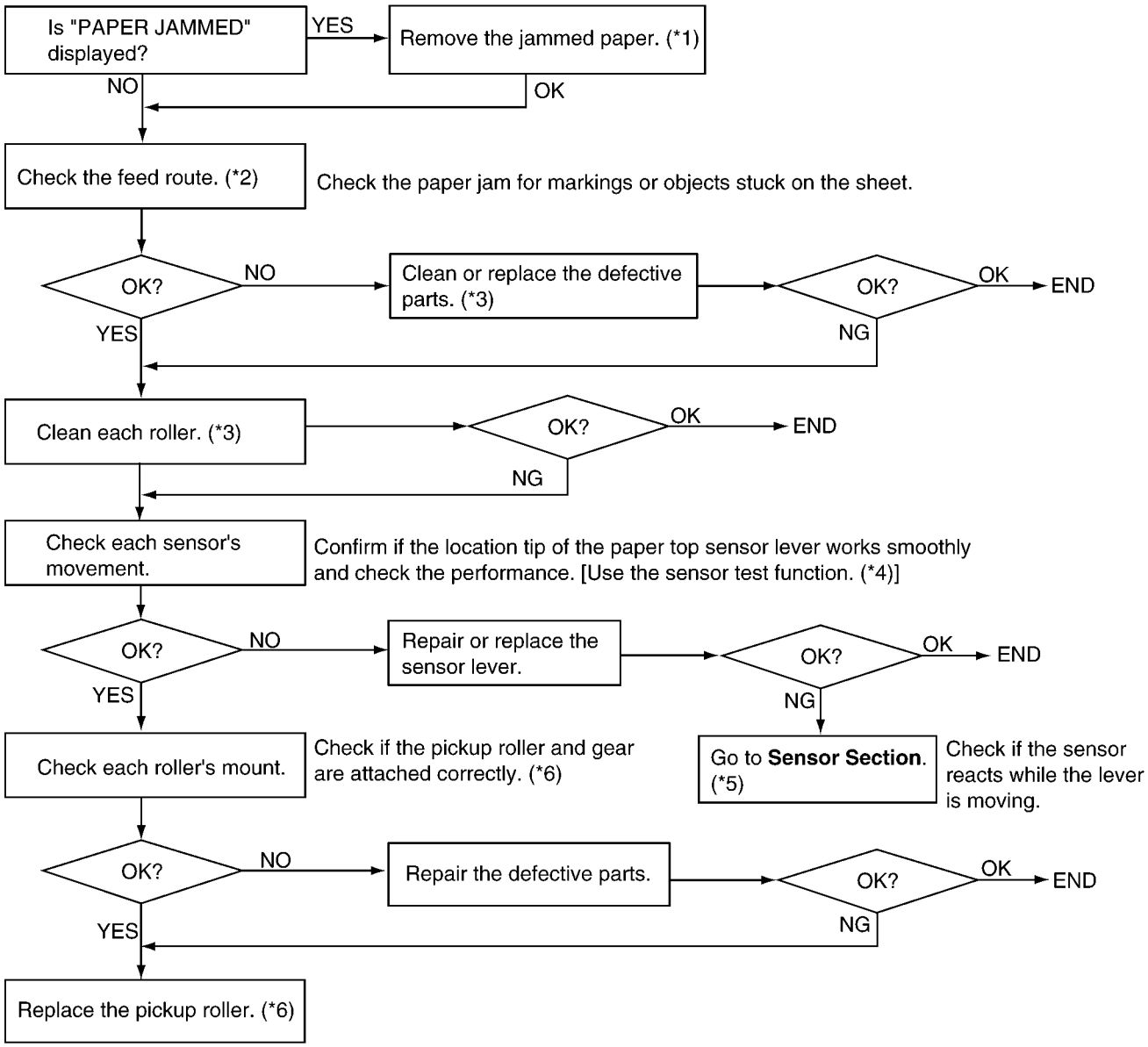
(*1): **Maintenance Check Items/Component Locations** (P.184)
(*2): **Disassembly and Assembly Instructions** (P.141)
(*3): **How to Remove the Image Sensor (CIS)** (P.145)
(*4): **Overview** (P.47)
(*5): We recommend making a copy of the test chart in **Test Chart** (P.204) and using it.

12.5.4.5. The Recording Paper does not Feed



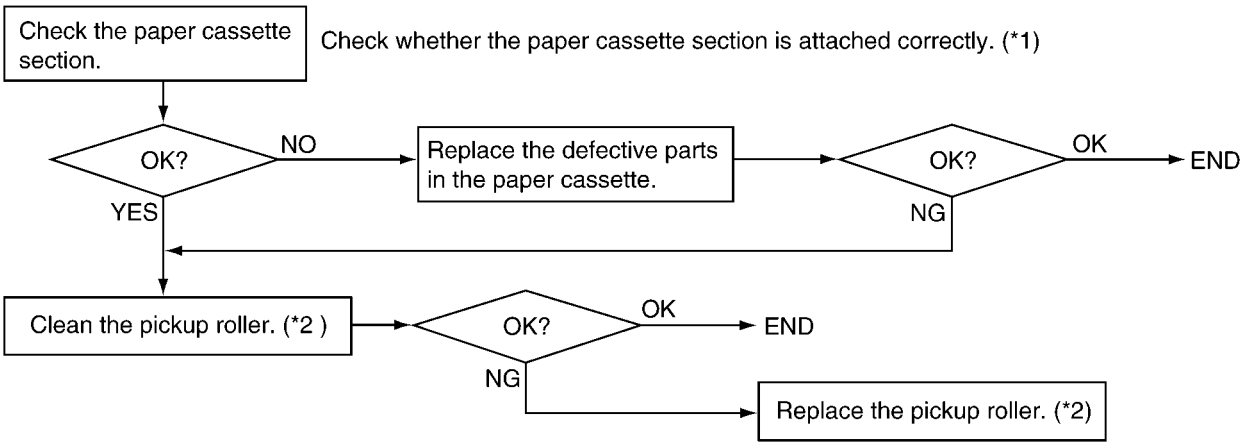
REFERENCE:
(*1): **Installing the Recording Paper** (P.54)
(*2): **How to Remove the Pickup Roller and Antenna** (P.158)
(*3): **Power Supply Board Section** (P.125)
(*4): **Test Mode** (P.58)
(*5): **How to Remove the P.C. Boards and Speaker** (P.149)
(*6): **How to Remove the Gears, Motors and Arms of the Gear Block** (P.152)
(*7): **How to Remove the Platen Roller and Lock Lever** (P.156)
(*8): **Digital Board Section** (P.116)
(*9): We recommend making a copy of the test chart in **Test Chart** (P.204) and using it.

12.5.4.6. Paper Jam



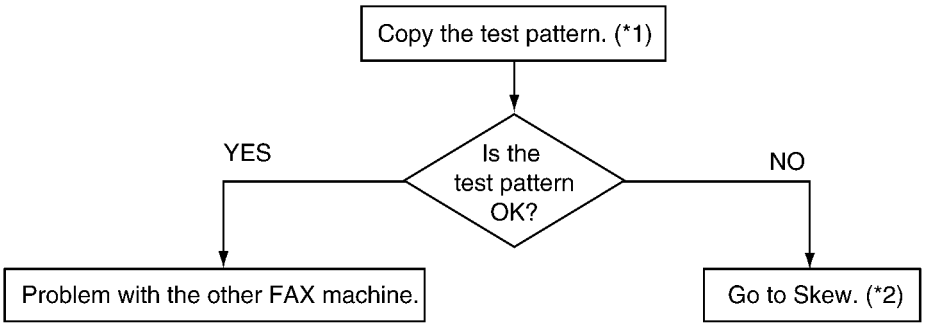
REFERENCE:
(*1): **Jams** (P.193)
(*2): **Maintenance Check Items/Component Locations** (P.184)
(*3): **Disassembly and Assembly Instructions**(P.141)
(*4): **Test Mode** (P.58)
(*5): **Sensor and Switches** (P.24)
(*6): **How to Remove the Pickup Roller and Antenna** (P.158)

12.5.4.7. Recording Paper Multiple Feed and Skew



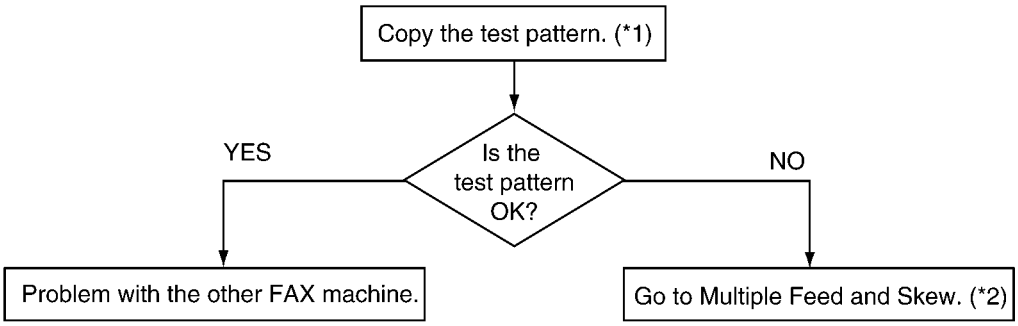
REFERENCE:
(*1): **How to Remove the Platen Roller and Lock Lever** (P.156)
(*2): **How to Remove the Pickup Roller and Antenna** (P.158)

12.5.4.8. The Sent Fax Data is Skewed



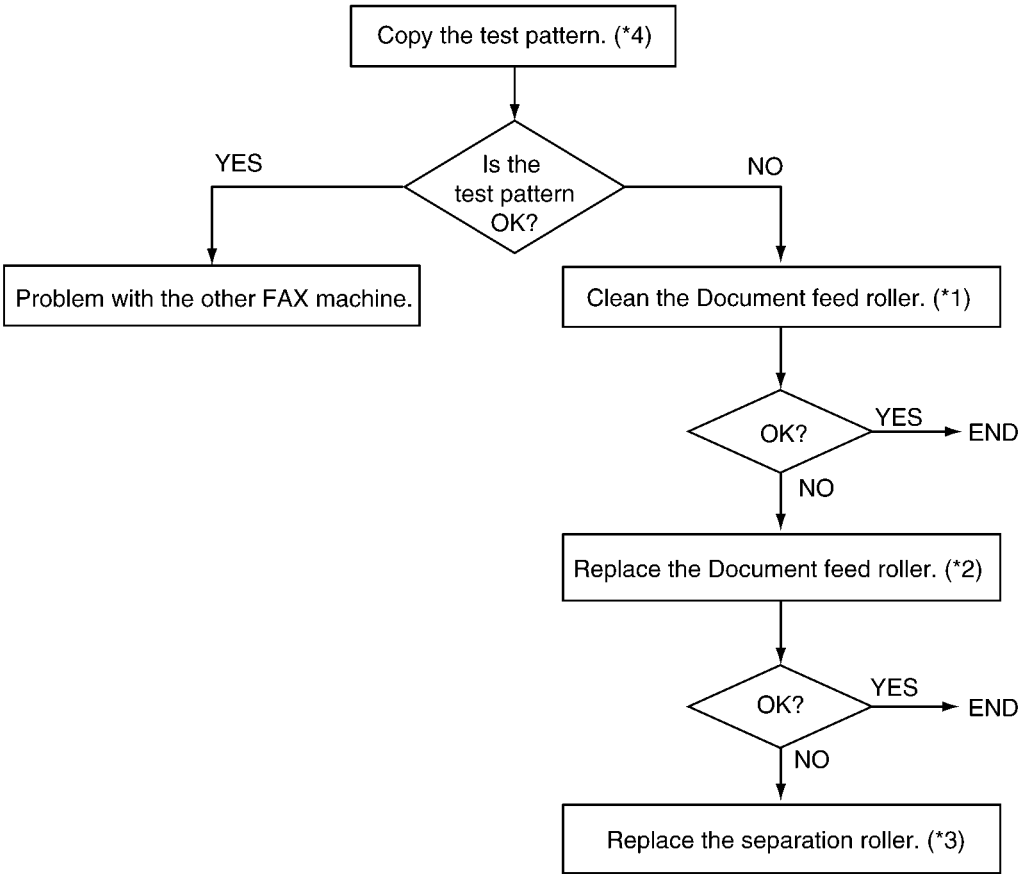
REFERENCE:
(*1): We recommend making a copy of the test chart in **Test Chart** (P.204) and using it.
(*2): **Document Skew** (P.106)

12.5.4.9. The Received Fax Data is Skewed



REFERENCE:
(*1): We recommend making a copy of the test chart in **Test Chart** (P.204) and using it.
(*2): **Recording Paper Multiple Feed and Skew** (P.109)

12.5.4.10. Received or Copied Data is Expanded



REFERENCE:

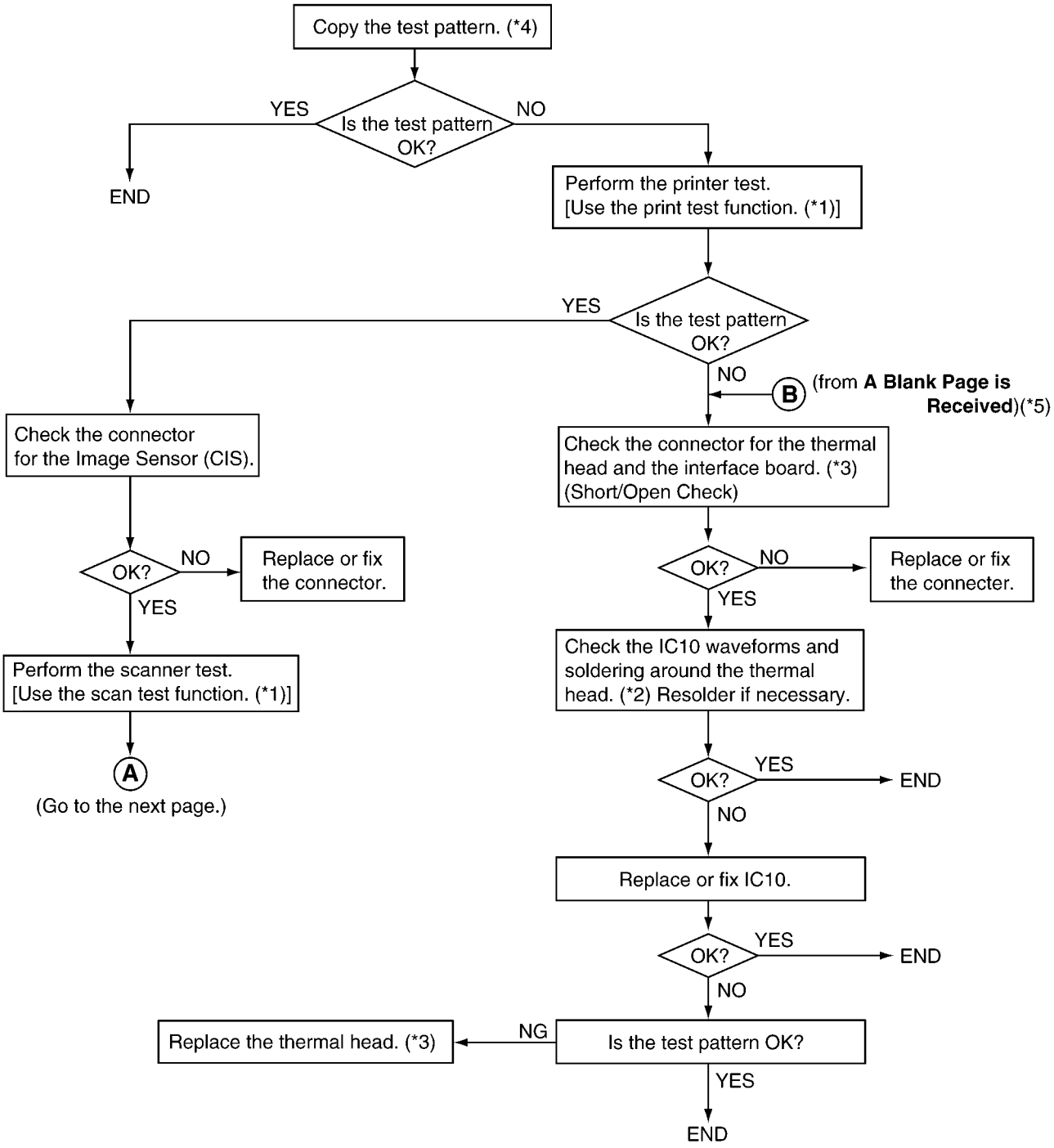
(*1): **Document feeder/recording paper feeder/scanner glass cleaning** (P.195)

(*2): **Disassembly and Assembly Instructions** (P.141)

(*3): **How to Remove the Separation Holder and Exit Roller** (P.161)

(*4): We recommend making a copy of the test chart in **Test Chart** (P.204) and using it.

12.5.4.11. A Blank Page is Copied



REFERENCE:
(*1): **Test Mode** (P.58)
(*2): **Thermal Head** (P.19)
(*3): **How to Remove the Thermal Head** (P.146)
(*4): We recommend making a copy of the test chart in **Test Chart** (P.204) and using it.
(*5): **A Blank Page is Received** (P.113)

(From the previous)

A

Is the pin 3 of CN14 (Digital Board) at 3V?

NO

Is the pin 138 of IC10 at 0V?

NO

Check the solder of IC10.

YES

Check Q20, R202 and R200.

YES

Is the amplitude at pins 4, 5 of CN 01 (CIS) 3.3 Vp-p?

NO

Take out CN01 (CIS), and check the amplitude at pins 4, 5 CN14 (Digital board). (3.3 Vp-p)

OK

Replace the CIS.

NG

Check the solder at pins 15,16 of IC10 (Digital board).

OK

Replace IC10.

YES

Check the waveform at pin 1 of CN01 (CIS). (Refer to Fig. C.)

OK

END

NG

Check whether the LED on the CIS turns on.

YES

Replace the CIS.

NO

Check the voltage at pin 6 CN14 (Digital board). Less than 2V?

OK

Replace the CIS.

NG

Check the voltage Q20 (B). More than 1V.

OK

Replace Q20.

NG

Check the solder at pin 110 of IC3 (Digital board).

OK

Replace IC3.

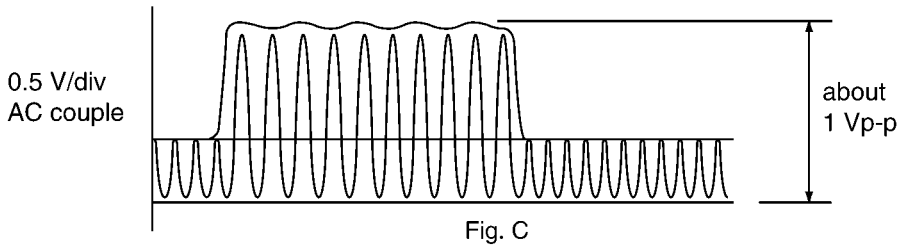
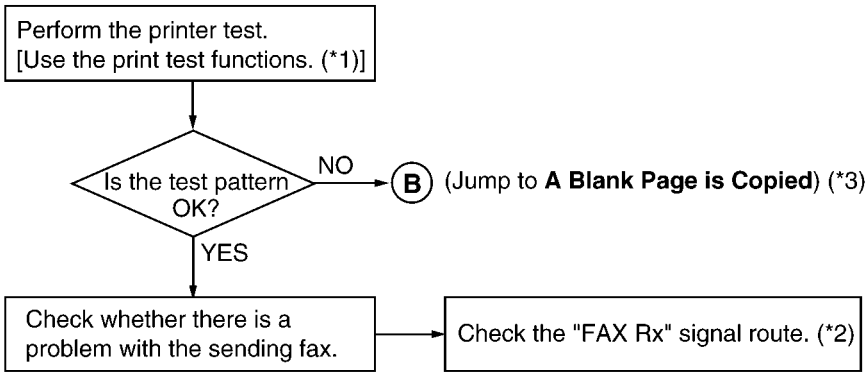


Fig. C

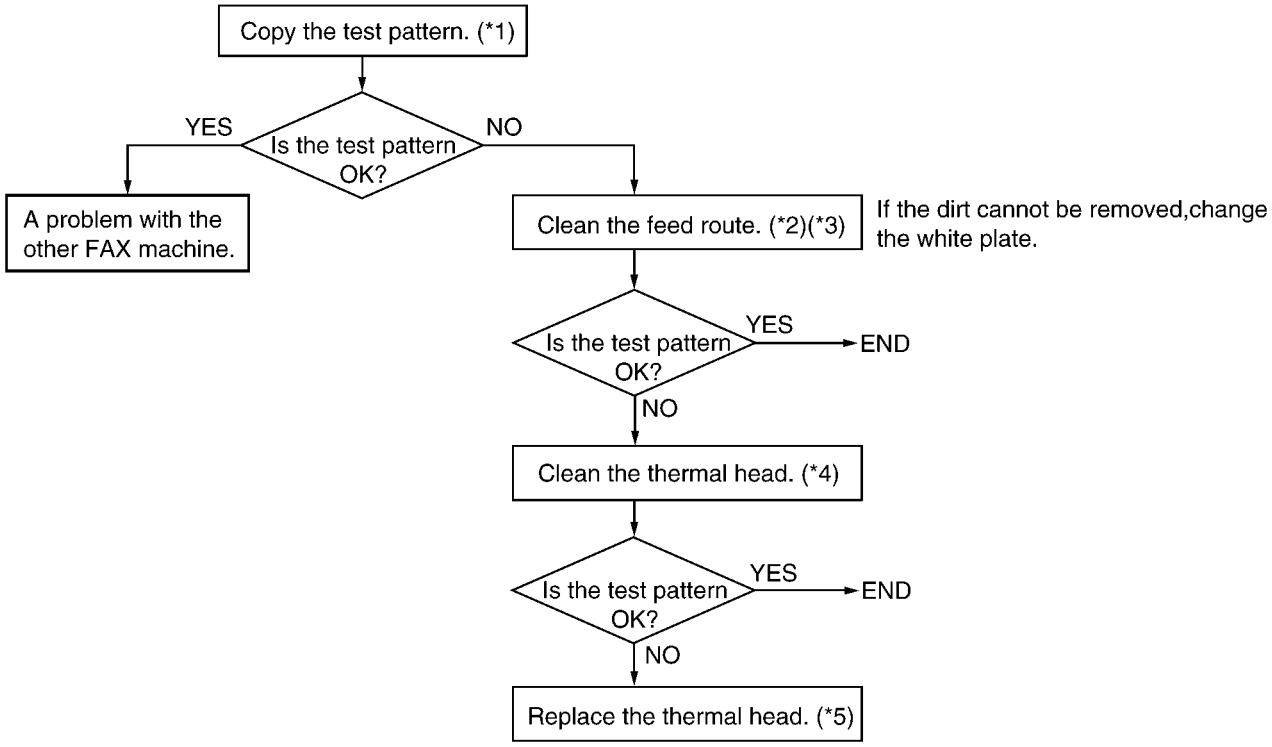
12.5.4.12. A Blank Page is Received



REFERENCE:

(*1): **Test Mode** (P.58)
(*2): **Check Sheet for Signal Route** (P.123)
(*3): **A Blank Page is Copied** (P.111)

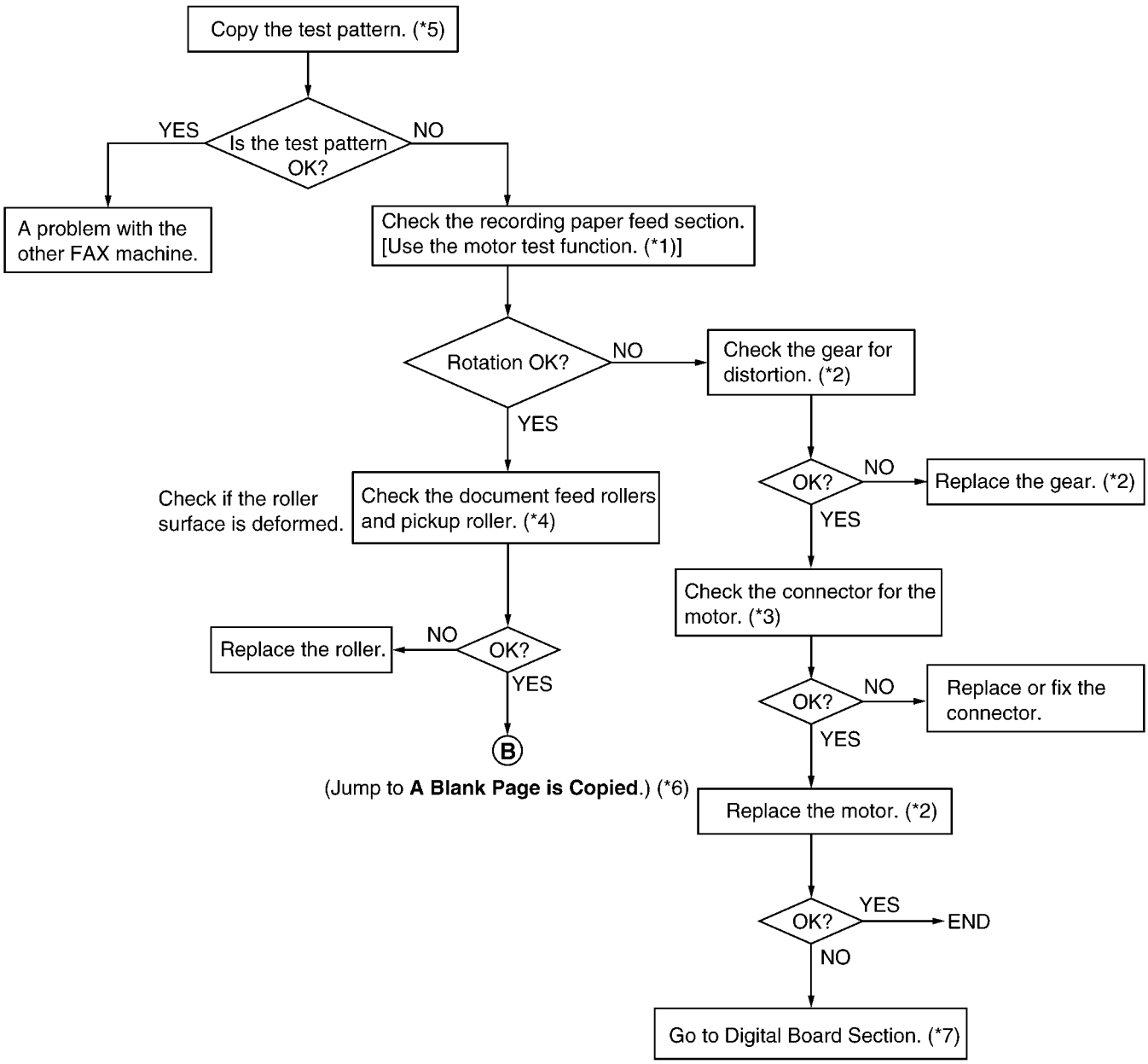
12.5.4.13. Black or White Vertical Line



REFERENCE:

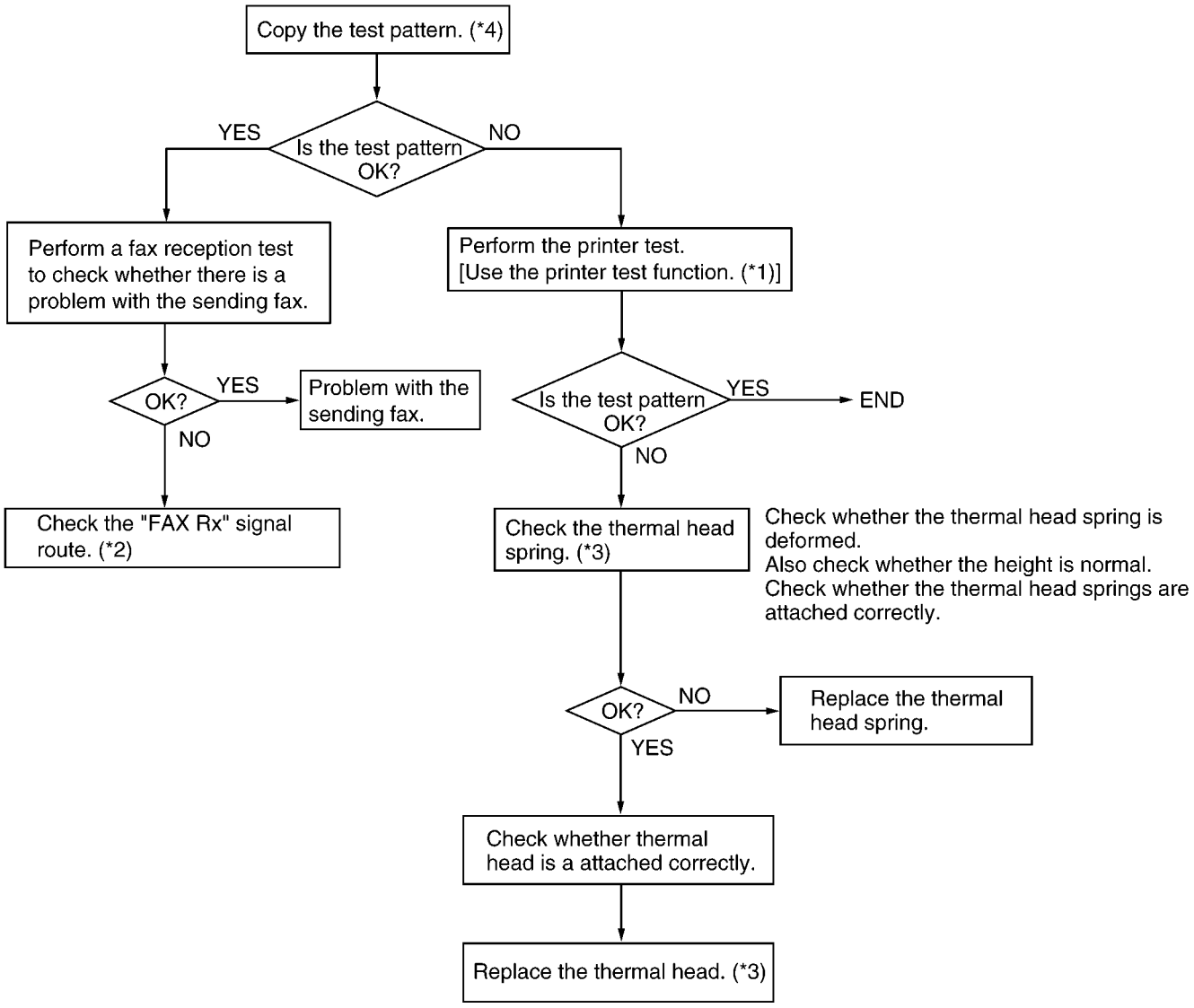
(*1): We recommend making a copy of the test chart in **Test Chart** (P.204) and using it.
(*2): **Maintenance Check Items/Component Locations** (P.184)
(*3): **Document feeder/recording paper feeder/scanner glass cleaning** (P.195)
(*4): **Thermal Head Cleaning** (P.196)
(*5): **How to Remove the Thermal Head** (P.146)

12.5.4.14. Black or White Lateral Line on Print Out



REFERENCE:
(*1): **Test Mode** (P.58)
(*2): **How to Remove the Gears, Motors and Arms of the Gear Block** (P.152)
(*3): **Installation Position of the Lead Wires** (P.162)
(*4): **Disassembly and Assembly Instructions** (P.141)
(*5): We recommend making a copy of the test chart in **Test Chart** (P.204) and using it.
(*6): **A Blank Page is Copied** (P.111)
(*7): **Digital Board Section** (P.116)

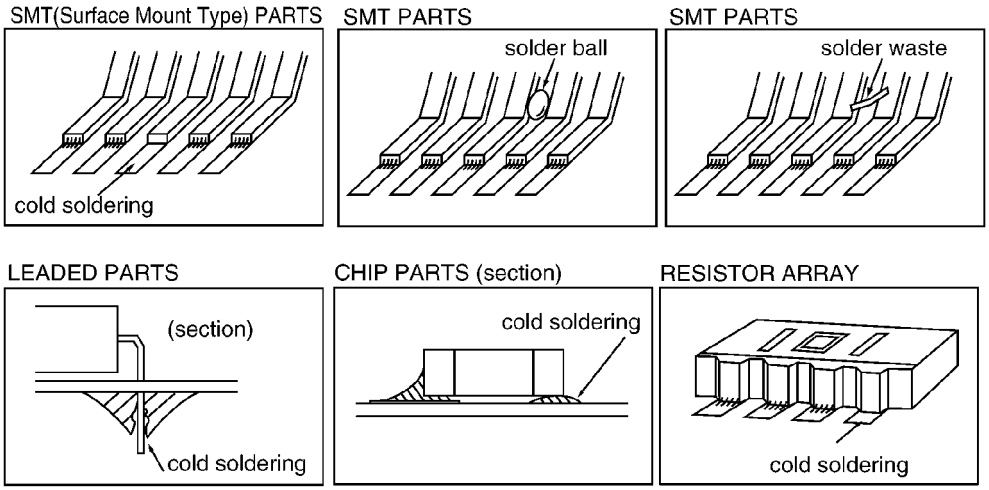
12.5.4.15. An Abnormal Image is Printed



REFERENCE:
(*1): **Test Mode** (P.58)
(*2): **Check Sheet for Signal Route** (P.123)
(*3): **How to Remove the Thermal Head** (P.146)
(*4): We recommend making a copy of the test chart in **Test Chart** (P.204) and using it.

12.5.5. Digital Board Section

When the unit fails to boot up the system, take the troubleshooting procedures very carefully. It may have a serious problem.
The symptom: No response when the power is turned on. (No LCD display, and keys are not accepted.)
The first step is to check the power source. If there is no problem with the power supply unit, the problem may lie in the digital unit (main board).
As there are many potential causes in this case (ASIC, DRAM, etc.), it may be difficult to specify what you should check first. If a mistake is made in the order of checks, a normal part may be determined faulty, wasting both time and money.
Although the tendency is to regard the problem as a serious one (IC malfunction, etc.), usually most cases are caused by solder faults (poor contact due to a tunnel in the solder, signal short circuit due to solder waste).



Note:

1. Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.
2. Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.

Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially DRAM and FLASH ROM) malfunctions are extremely rare after installation in the product.)
This may be repaired by replacing the IC, (DRAM etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead.
Soldering faults difficult to detect with the naked eye are common, particularly for ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines.
Even if you don't have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved.
An explanation of the main signals (for booting up the unit) is presented below.

Don't replace ICs or stop repairing until checking the signal lines.
An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

What are the main signals for booting up the unit?

Please refer to **Digital Block Diagram** (P.117).
The ASIC (IC10) controls all the other digital ICs. When the power is turned on, the ASIC retrieves the operation code stored in the FLASH ROM (IC16), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address.
It is the address bus by which the ASIC designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC to the ICs.
These signal lines are all controlled by voltages of 3.3V (H) or 0V (L).

12.5.5.1. Digital Block Diagram

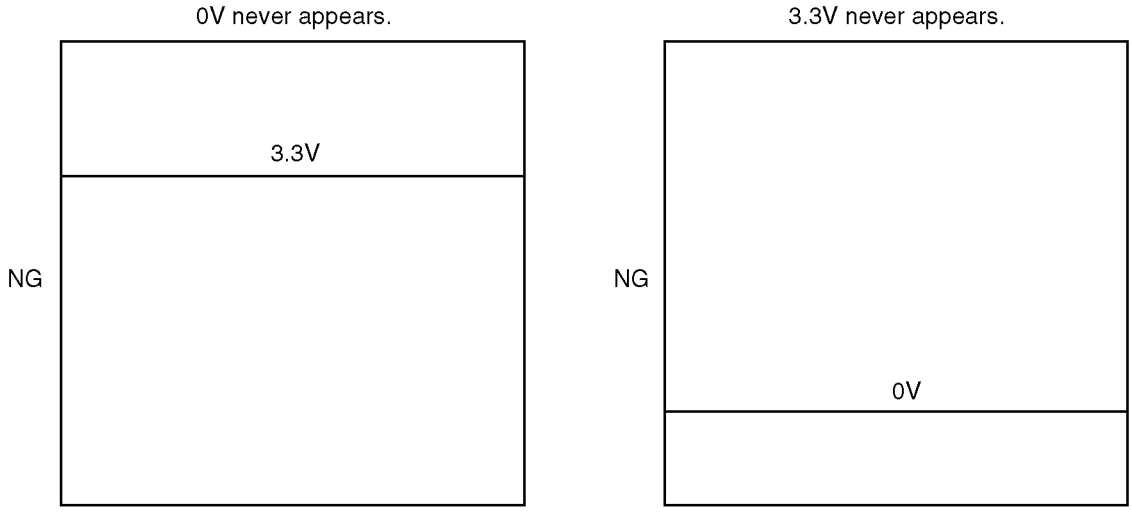
You also need to check the signal lines listed here [List 1] when the unit fails to boot up the system. Those signal lines should remain normal. Other signal lines are not directly related to that failure even if they have faults or troubles.

[List 1]

①	D0～D7	(Data Bus)
②	A0～A15	(Address Bus)
③	$\overline{RD}$	(Read Signal)
	$\overline{ROMCS}$	(ROM Select Signal)
	$\overline{WR}$	(Write Signal)
④	RBA0～RBA5	(Bank Address Signal)
⑤	$\overline{RAS}$	(DRAM Row Address Strobe Signal)
	$\overline{CAS}$	(DRAM Column Address Strobe Signal)
⑥	$\overline{MDMCS}$	(Modem Select Signal)

As long as these signals remain normal, once the power is turned on, each IC can repeatedly output 3.3V (H) and 0V (L). The following shows NG and normal wave patterns.

NG Wave pattern

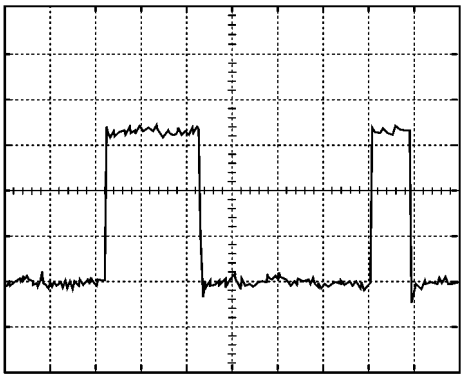


Note:

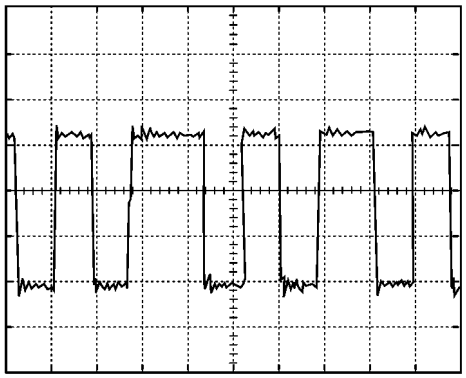
Refer to **NG Example** (P.122).

Normal Wave Patterns

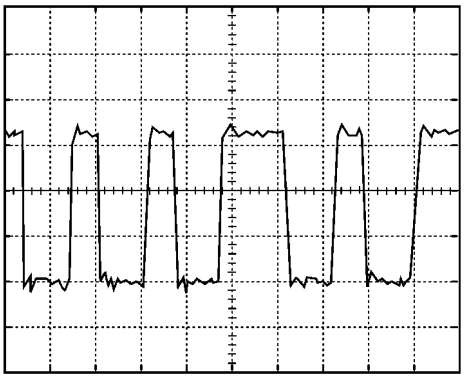
① D0~D7 200ns/div, 1V/div



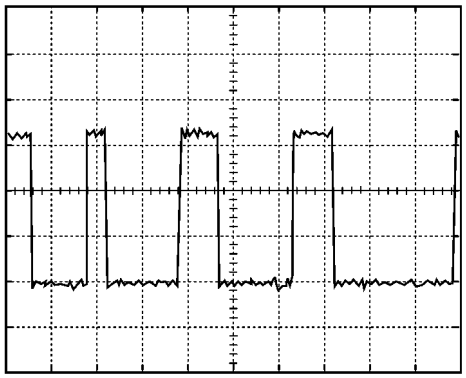
② A0~A5 200ns/div, 1V/div



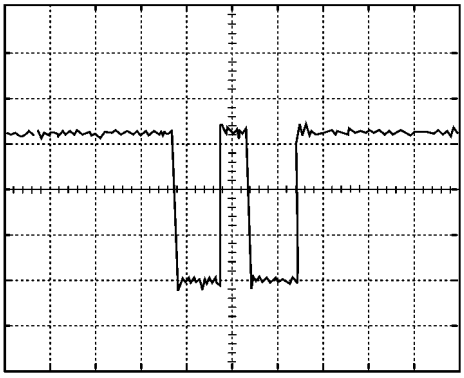
③ $\overline{RD}$ 100ns/div, 1V/div



③ $\overline{ROMCS}$ 400ns/div, 1V/div



⑤ $\overline{RAS}$, $\overline{CAS}$ 100ns/div, 1V/div



Remarks:

When you use an oscilloscope to judge whether a signal to be tested is normal or NG, perform the signal check in exactly the same order as in [List 1]. (If the ASIC fails to access the FLASH ROM, the ASIC cannot access DRAM normally.)

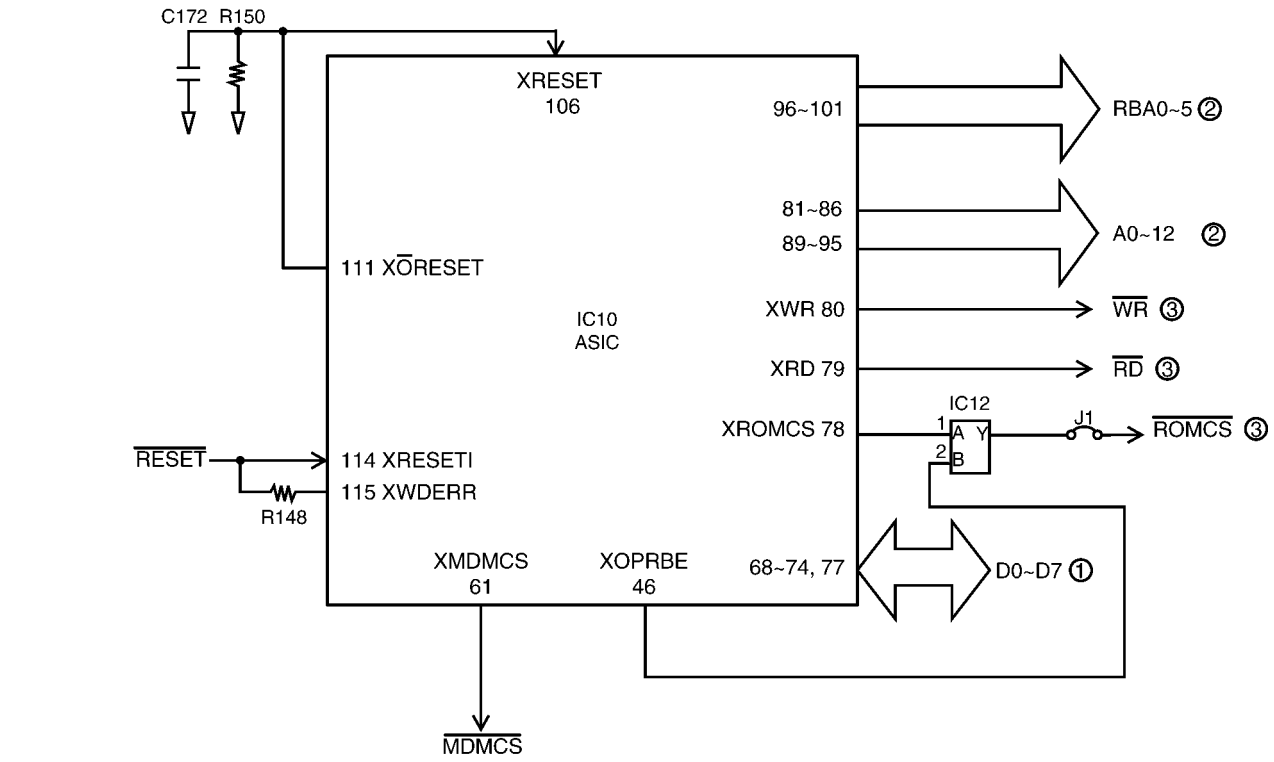
The digital circuit actually operates according to the timing combinations of these signals. If the timing of these signals is even slightly delayed, the circuit will not work. Nor will it if the IC is defective and the output voltage level is not normal although the timing of these signals is accurate enough to meet the specifications. (Make sure that your oscilloscope is calibrated before starting a test.)

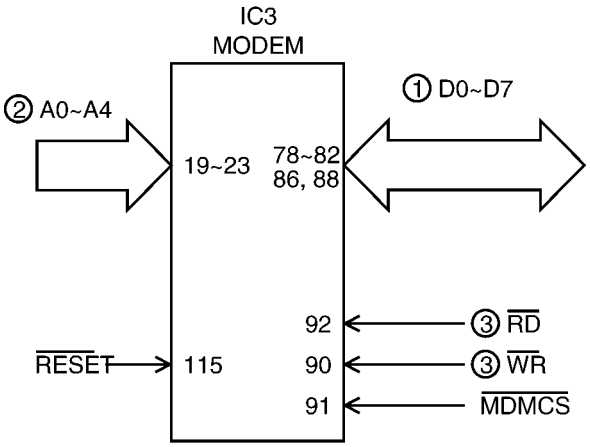
Therefore, it is imperative to confirm whether each IC outputs the signal at the correct level. (See the **I/O Pin No. Diagram**.) The signal level should be constantly output at between 3.3V (H) and 0V (L) as described earlier.

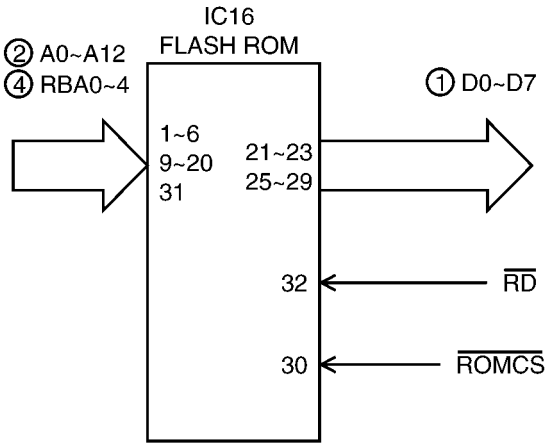
Note:

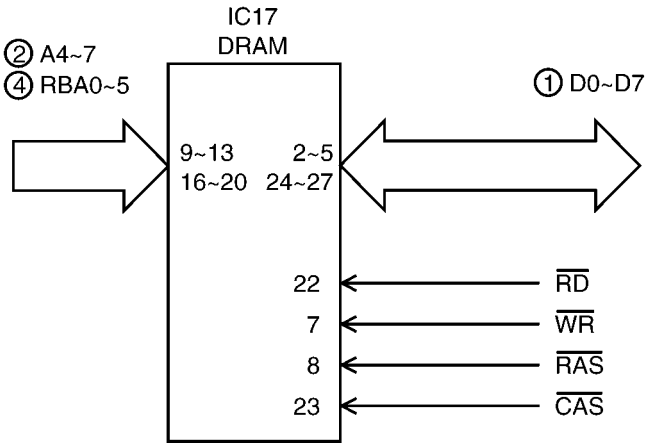
Simply check the output level and make sure if the IC repeatedly outputs the signal at between 3.3V (H) and 0V (L).

I/O and Pin No. Diagram

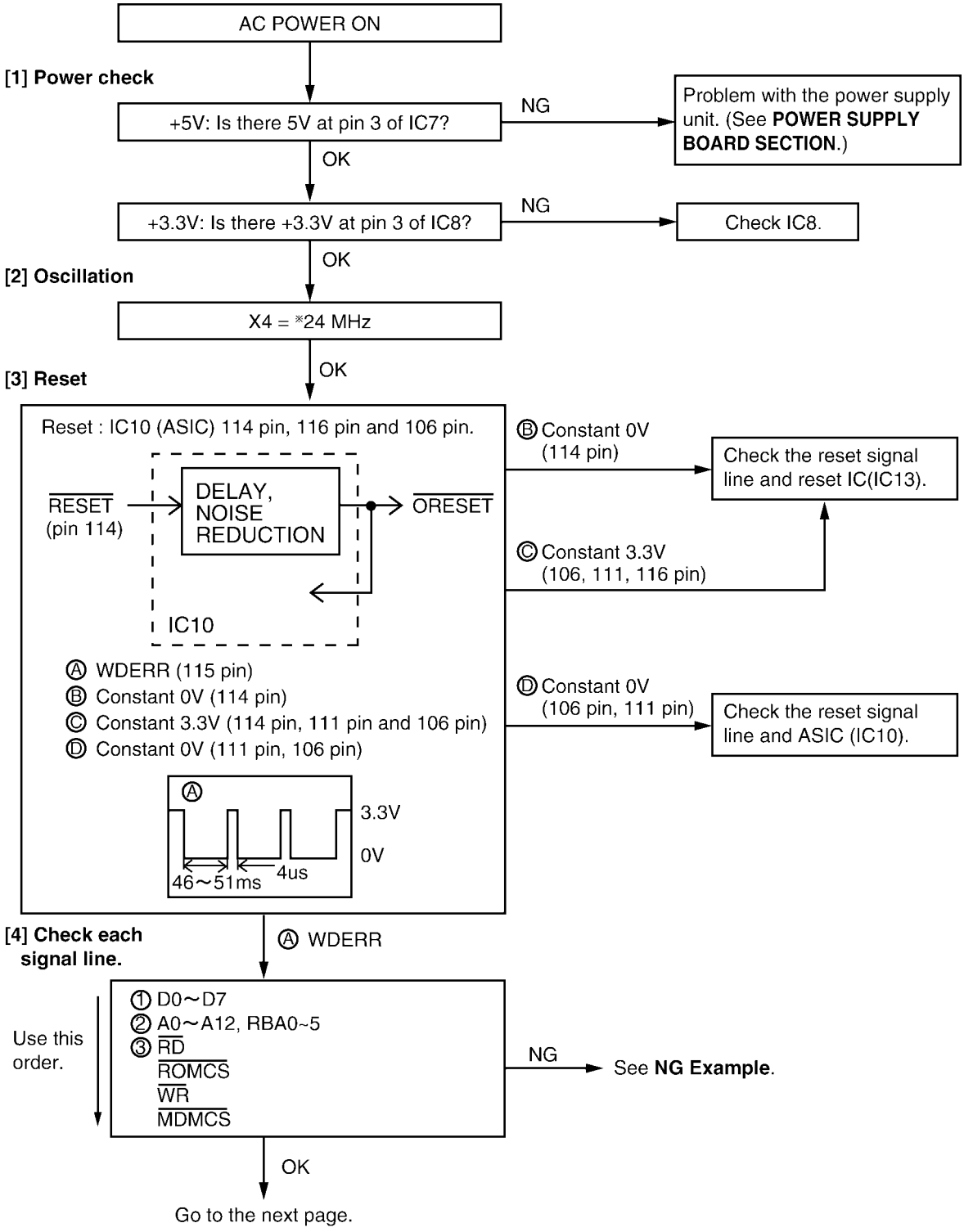








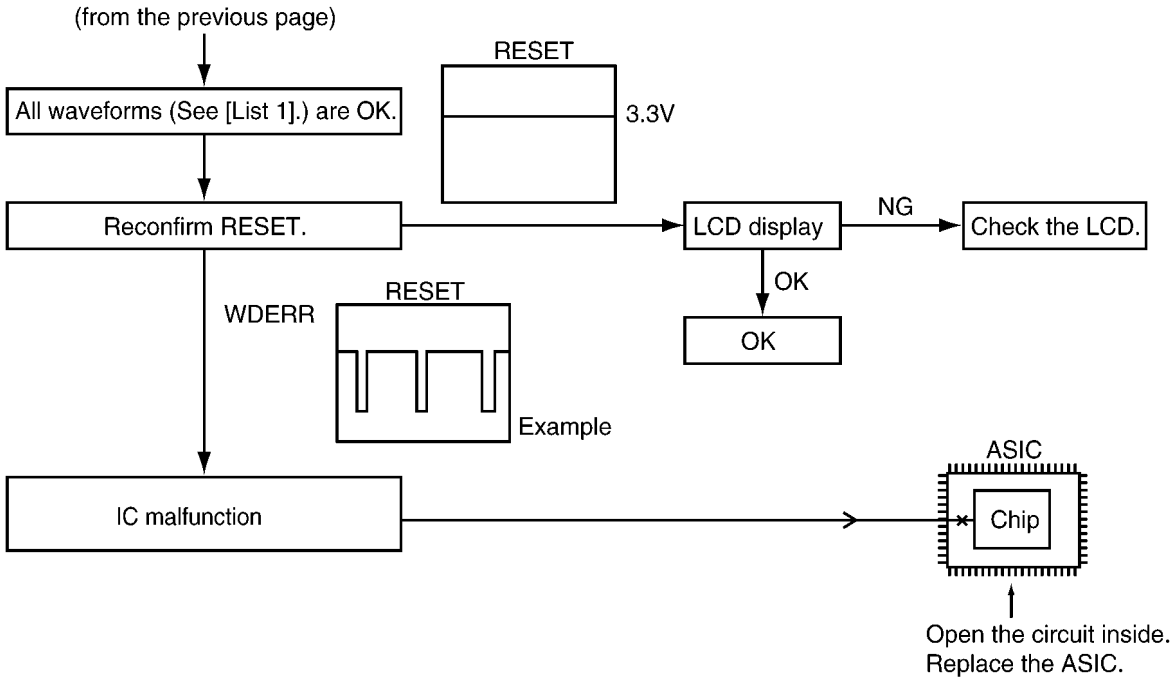
After the power is turned on, the ASIC initializes and checks each IC.
The ROM, DRAM, and modem are checked.
If initialization fails for the ICs, the system will not boot up.
In this case, please find the cause as follows.



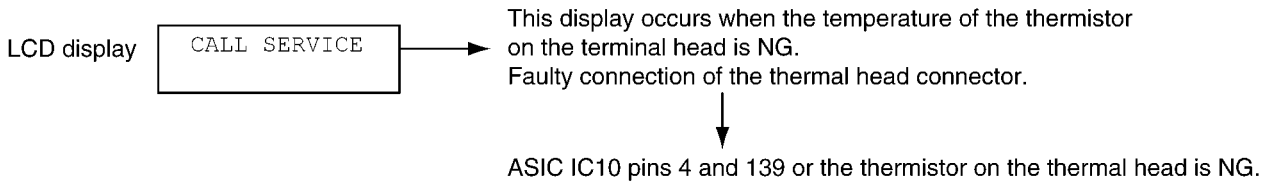
REFERENCE:

NG Example (P.122)

Power Supply Board Section (P.125)

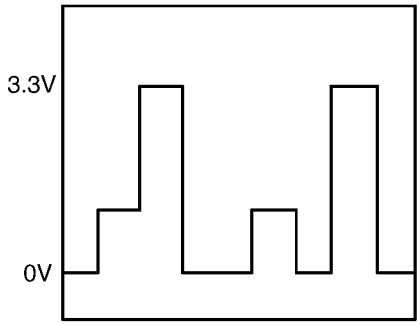


Other NG example while the power is ON and the LCD displays the following.

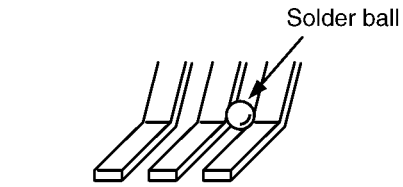


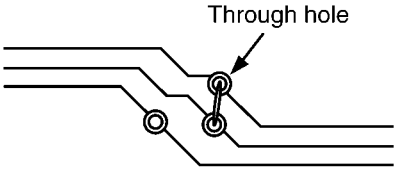
12.5.5.2. NG Example

1.

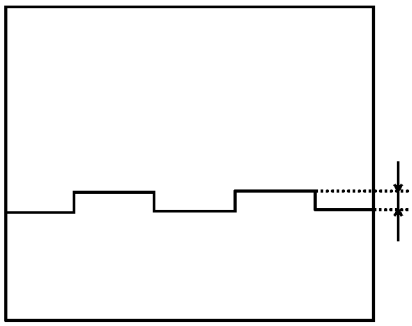


Short circuit from the adjacent signal wires.
Check for a short circuit in the IC leads and the signal wire at the through hole.

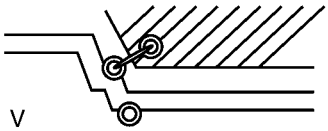




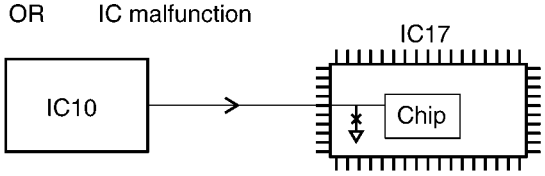
2.



Short between the signal line and GND.



OR IC malfunction



12.5.6. Analog Board Section

This chapter provides the testing procedures required for the analog parts. A signal route to be tested is determined depending upon purposes. For example, the handset TX route begins at the handset microphone and the signal is output to the telephone line. The signal mainly flowing on this route is analog. You can trace the signal with an oscilloscope. The signal flow on each route is shown in the Check Sheet here. If you find a specific problem in the unit, for example if you cannot communicate with the H/S, trace that signal route locally with the following Check Sheet and locate the faulty point.

12.5.6.1. Check Sheet for Signal Route

(SYMPTOM) ITEMS TO CHECK	IN signal → ROUTE → OUT
SP-PHONE Tx	MIC → {CN918(1) → C363 → R337 → IC4(112-113) → C361 → R366 → IC4(114-100) → C607 → R604 → IC102(6-7) → CN19(1)} → CN103(1) → C169 → R132 → R131 → T101 → TEL LINE
SP-PHONE Rx	TEL LINE → T101 → C130 → R138 → IC101(2-1) → CN103(4) → {CN19(4) → R230 → C98-R75 → IC4(102-110) → C11 → R11 → IC2(4-5,8) → (L1,L2) → CN18(4,5)} → CN104(4,5) → CN105(1,2) → Speaker
HANDSET Tx	HSMIC → [CN1501(1,4) → (L1501,L1504) → CN1502(1,2)] → {CN203(1,2) → (C385,C386) → (R383,R384) → IC31(6-7) → R367 → C278 → R303 → IC4(118-100) → C607 → R604 → IC102(6-7) → CN19(1)} → CN103(1) → C169 → R132 → R131 → T101 → TEL LINE
HANDSET Rx	TEL LINE → T101 → C130 → R138 → IC101(2-1) → CN103(4) → {CN19(4) → R230 → C98 → R75 → IC4(102-110,111) → (R299,R300) → CN203(5,6)} → [CN1502(5,6) → (L1502,L1503) → CN1501(2,3)]
DTMF for HSSP	{IC4(110) → (R299,R300) → CN203(5,6)} → [CN1502(5,6) → (L1502,L1503) → CN1501(2,3)]
DTMF for SP	{IC4(110) → C11 → R11 → IC2(4-5,8) → (L1,L2) → CN18(4,5)} → CN104(4,5) → CN105(1,2) → Speaker
FAX Tx	IC3(56) → C247 → R262 → C603 → R603 → IC102(6-7) → CN19(1)} → CN103(1) → C169 → R132 → R131 → T101 → TEL LINE
DTMF/OGM/BEEP for TEL LINE	{IC4(100) → C607 → R604 → IC102(6-7) → CN19(1)} → CN103(1) → C169 → R132 → R131 → T101 → TEL LINE
FAX Rx	TEL LINE → T101 → C130 → R138 → IC101(2-1) → J107 → CN103(3) → {CN19(3) → C18 → R17 → R22 → C20 → IC3(47)}
CNG/DTMF/ VOX Detection/ ICM Record	TEL LINE → T101 → C130 → R138 → IC101(2-1) → CN103(4) → {CN19(4) → R230 → C98 → R75 → IC4(102)}
OGM/ MEMO Record	{MIC → {CN918(1) → C363 → R337 → IC4(112)
Ringing/BEEP/ Alarm/Key Tones	{IC4(110) → C11 → R11 → IC2(4-5,8) → (L1,L2) → CN18(4,5)} → CN104(4,5) → CN105(1,2) → Speaker
Caller ID	TEL LINE → T102 → C157 → R153 → IC101(6-7) → CN103(2) → {CN19(2) → C292 → R63 → IC4(101)}
Cordless Handset Tx	On the Air 1.9GHz Radio Frequency → Antenna → {(ANT-1,ANT-2) → (C354,C355) → (R360,R361) → (L46,L47) → IC28(2,21-18) → R343 → IC4(28-100) → C607 → R604 → IC102(6-7) → CN19(1) → CN103(1) → C169 → R132 → R131 → T101 → TEL LINE
Cordless Handset Rx	TEL LINE → T101 → C130 → R138 → IC101(2-1) → CN103(4) → {CN19(4) → R230 → C98 → R75 → IC4(102-26) → R344 → IC28(16-2,21) → (L46,L47) → (R360,R361) → (C354,C355) → (ANT-1,ANT-2)} → Antenna → On the Air 1.9GHz Radio Frequency

Note:

{ }: Inside the Digital board

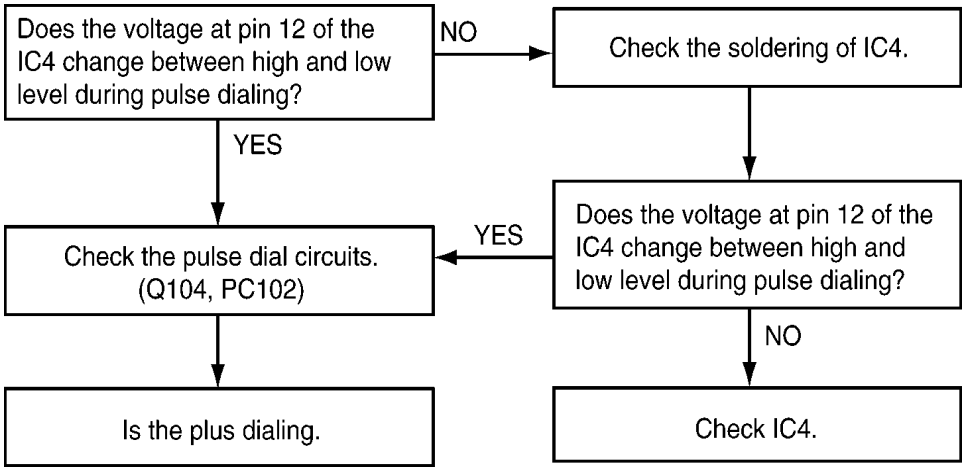
[ ]: Inside the Hook Switch board

12.5.6.2. Defective fax NCU section

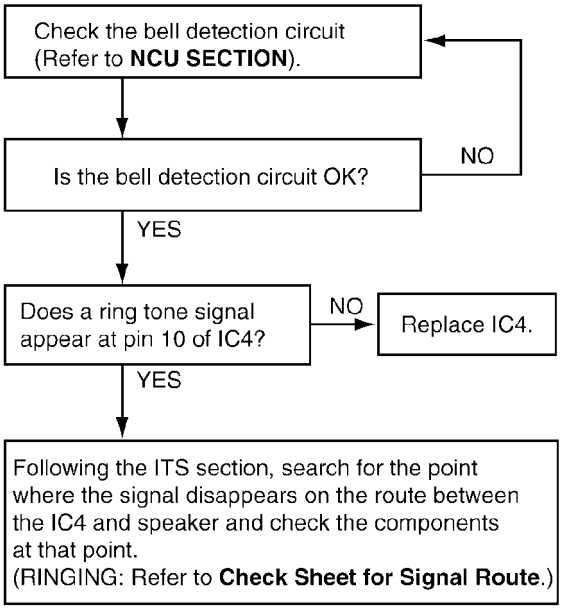
1. No Speakerphone and no monitor reception

Perform a signal test in the **FAX NCU section** and locate a defective point (where the signal disappears) on each route between the microphone and the telephone line (sending), or between the telephone line and the speaker (receiving). Check the components at that point. **Check Sheet for Signal Route** (P.123) is useful for this investigation.

2. No pulse dialing



3. No ring tone (or No bell)

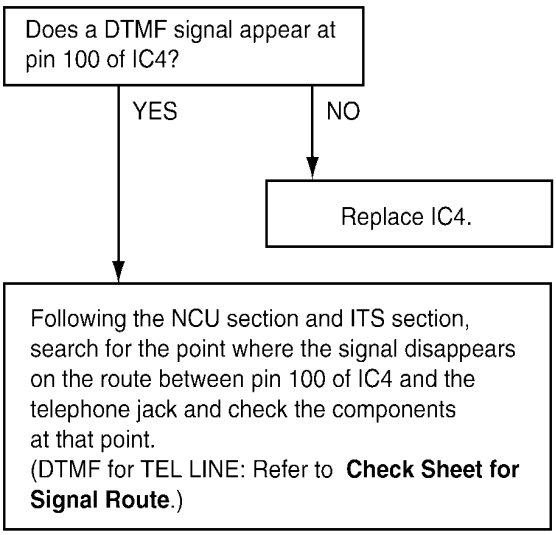


REFERENCE:

Check Sheet for Signal Route (P.123)

NCU Section (P.36)

4. No tone dialing



REFERENCE:

Check Sheet for Signal Route (P.123)

12.5.7. Power Supply Board Section

12.5.7.1. Key Components for Troubleshooting

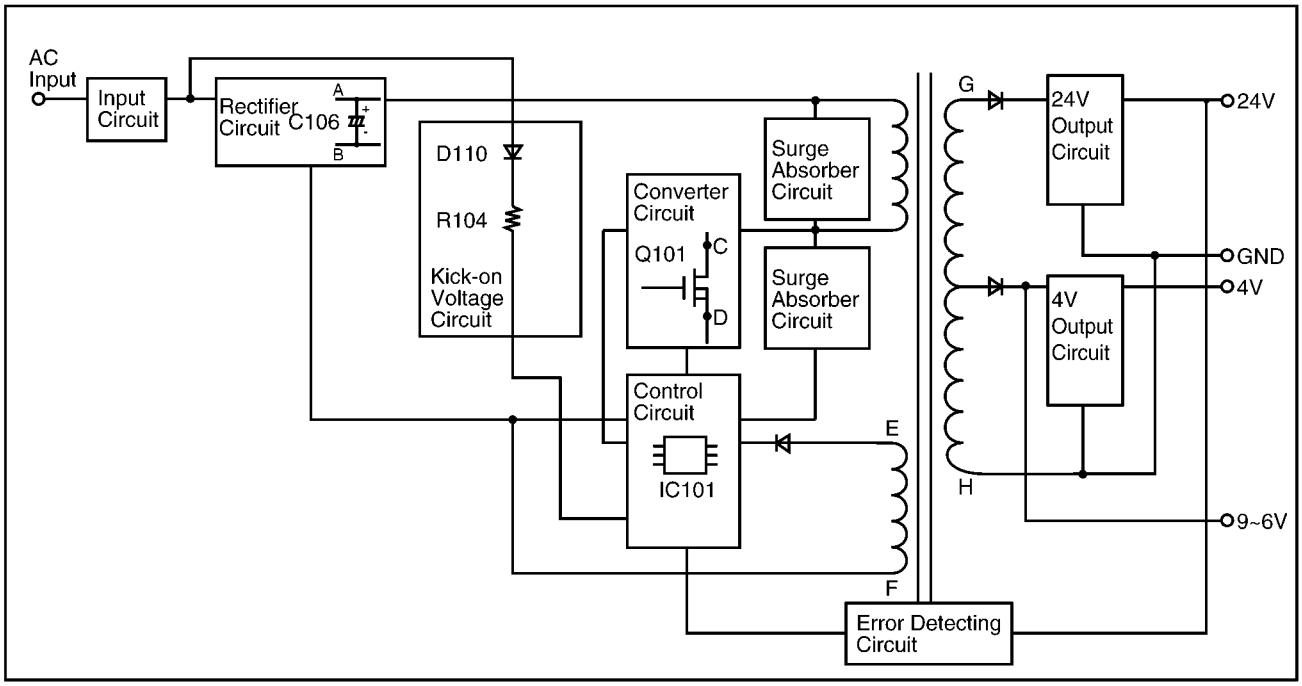
Check the following parts first: F101, D101-D104, C106, Q101and IC101.
This comes from our experience with experimental tests. For example: power supply and lightning surge voltage test, withstanding voltage test, intentional short circuit test, etc.

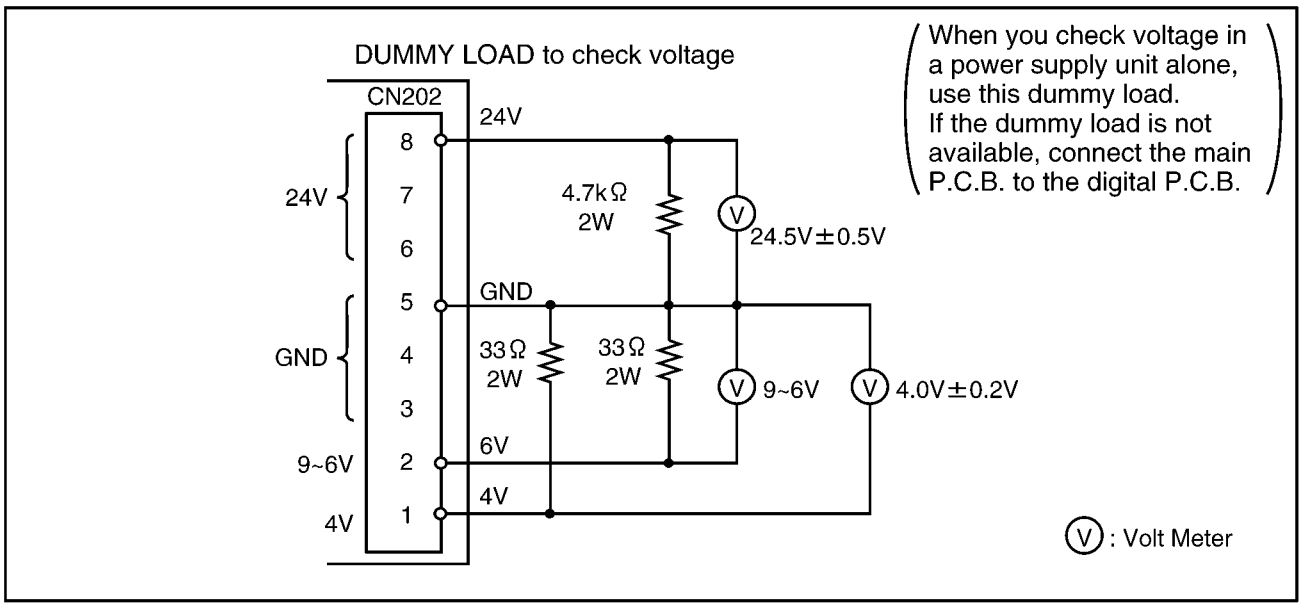
Caution:

If you find a melted fuse in the unit, do not turn on the power until you locate and repair the faulty parts (except for the fuse); otherwise the fuse will melt again and you cannot pinpoint the faulty point.

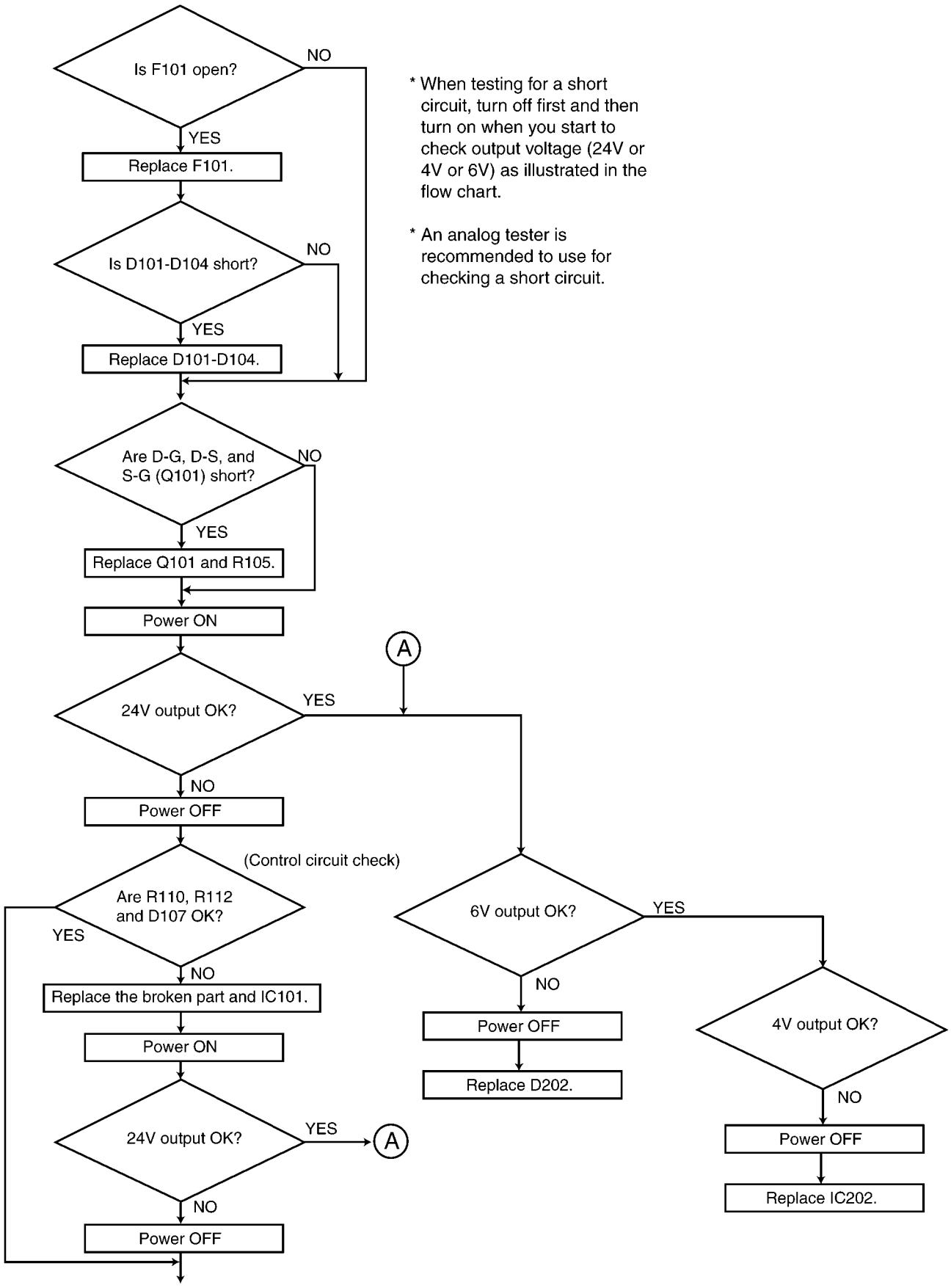
In most cases, the symptom is that nothing is output. It is more likely that the fault is in the primary side rather than the secondary side. Check the primary side first.

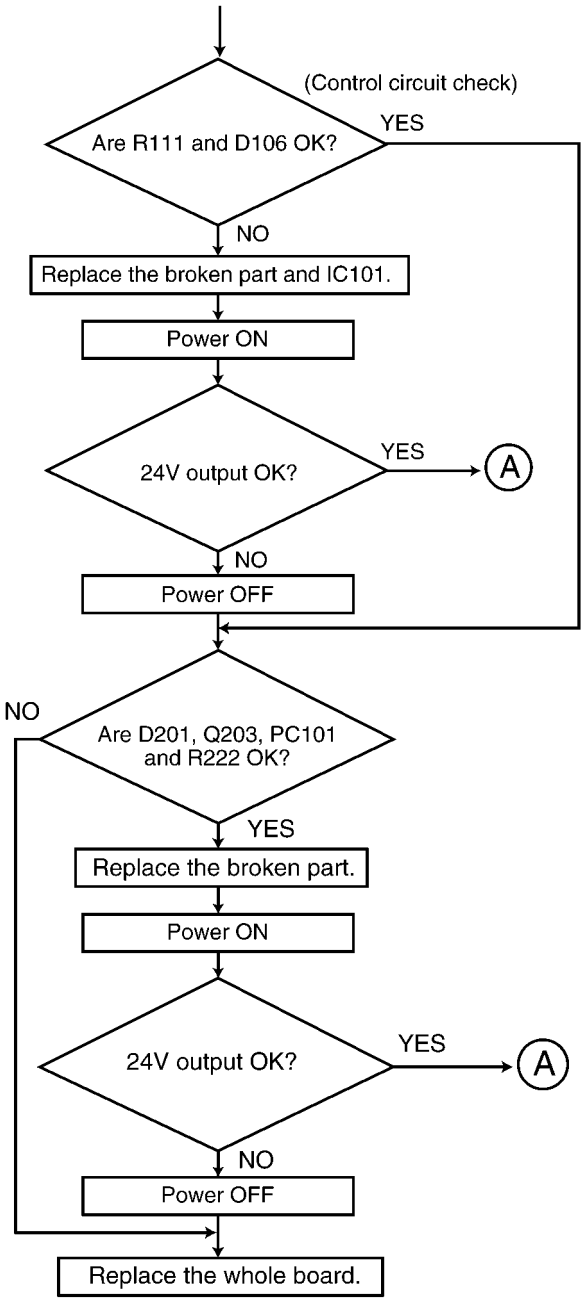
POWER SUPPLY BLOCK DIAGRAM





12.5.7.2. Troubleshooting Flow Chart





12.5.7.3. Broken Parts Repair Details

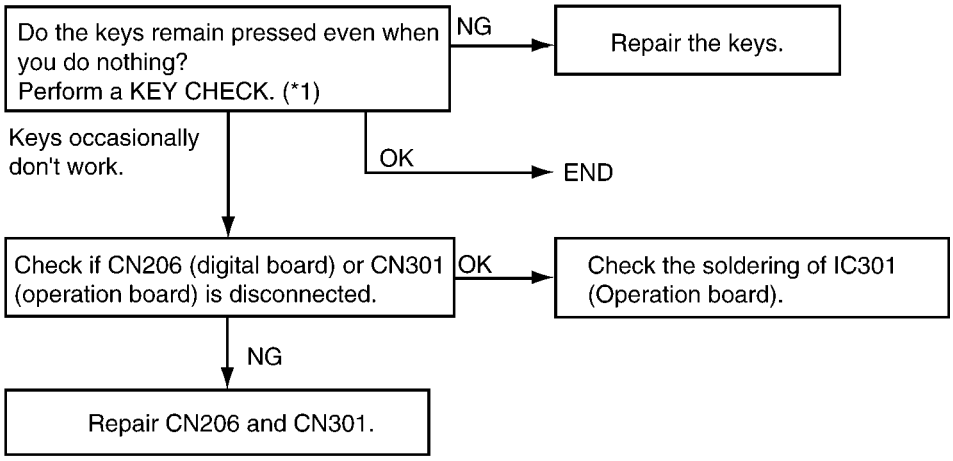
(D101, D102, D103, D104)
Check for a short-circuit in terminal 4. If D101, D102, D103 and D104 are short-circuits, F101 will melt (open).
In this case, replace all of the parts (D101, D102, D103, D104, F101).

(Q101)
The worst case of Q101 is a short-circuit between the Drain and Gate because damage expands to the peripheral circuit of Q101.
This is due to a very high voltage through the Gate circuit which is composed of R110, R112, D107 and IC101.
You should change all of the parts listed as follows.
F101, Q101, R110, R112, D107, IC101

(D201)
If D201 is broken, the oscillation circuit in the power supply cannot operate. Check it with an electric tester.

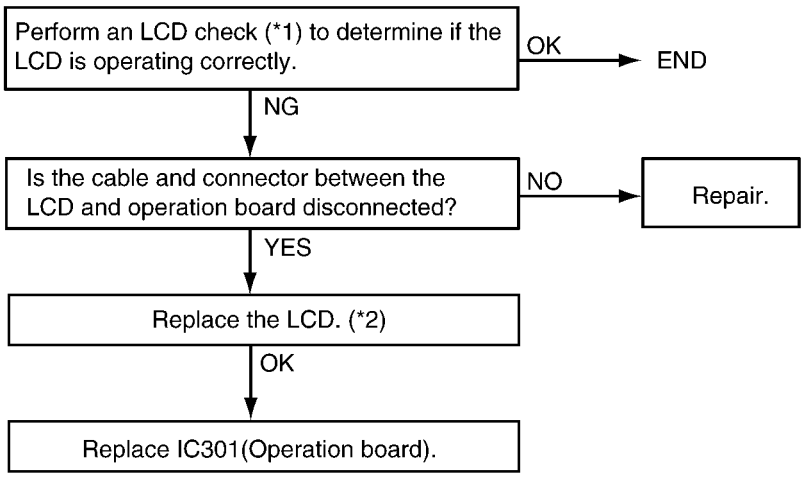
12.5.8. Operation Panel Section

12.5.8.1. No Key Operation



REFERENCE:
(*1): **Test Mode** (P.58)

12.5.8.2. No LCD Indication

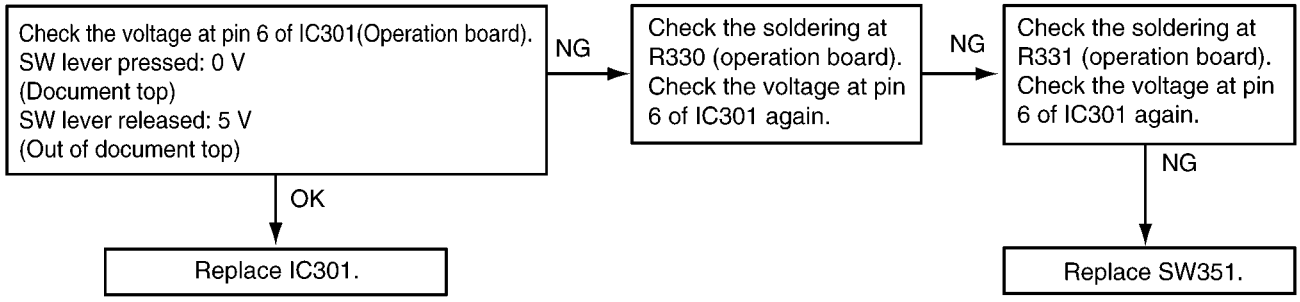


REFERENCE:
(*1): **Test Mode** (P.58)
(*2): **How to Remove the Operation Board, MIC Board and LCD** (P.160)

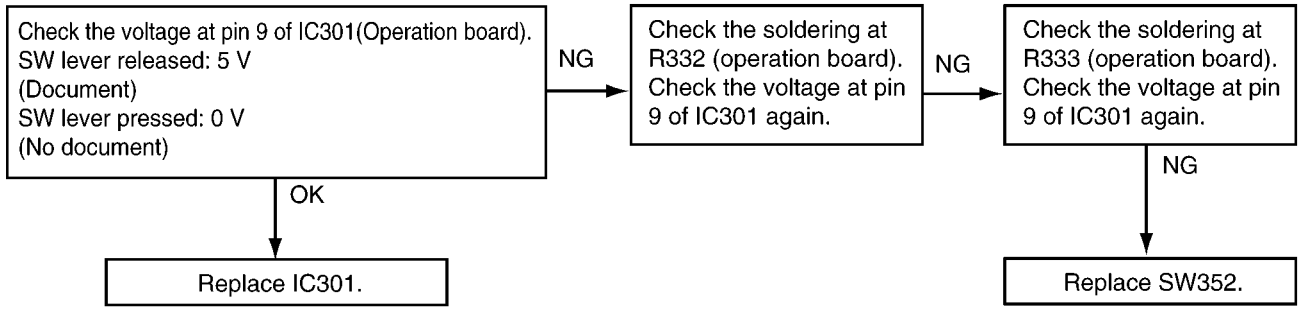
12.5.9. Sensor Section

Refer to **Sensor and Switches** (P.24) for the circuit descriptions.
The Test Function makes the sensor circuit check easier. (Refer to **Test Mode** (P.58).)
For example, as for "FILM END/COVER OPEN SENSOR", "CO" is turned ON/OFF on the display when you open or close the cover. Also, document sensor, read position sensor, recording paper sensor are turned ON/OFF by the copy operation. Therefore, each sensor can be checked for proper mechanical operation.
As for the electric check, check whether each voltage is right or not with following flowchart turning each sensor lever ON/OFF manually.

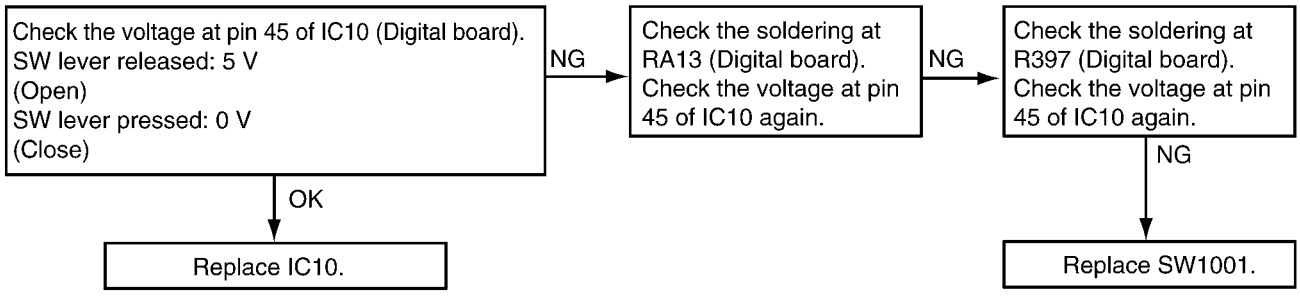
12.5.9.1. Check the Document Top Sensor (SW351)....."REMOVE DOCUMENT"



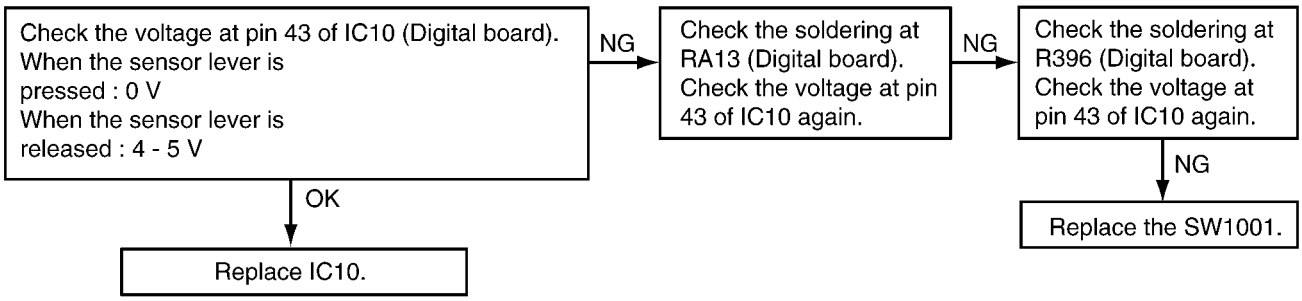
12.5.9.2. Check the Document Set Sensor (SW352)....."CHECK DOCUMENT"



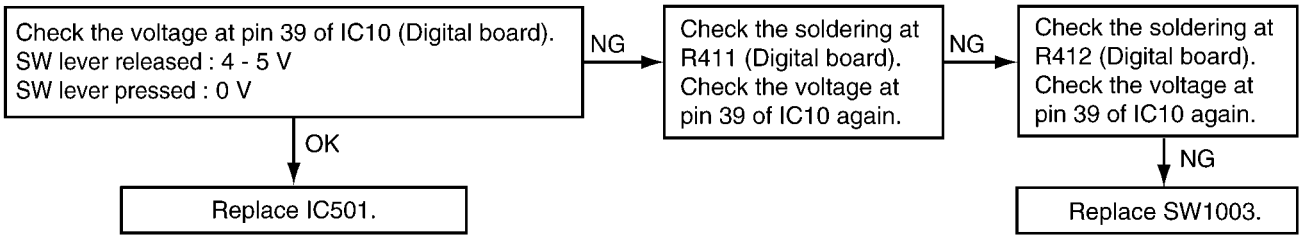
12.5.9.3. Check the Cover Open Sensor (SW1001)....."COVER OPEN"



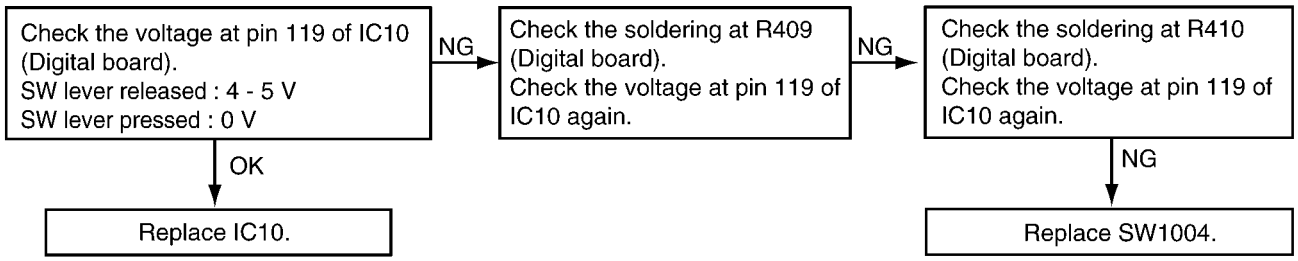
12.5.9.4. Check the Paper Top Sensor (SW1001)....."PAPER JAMMED"



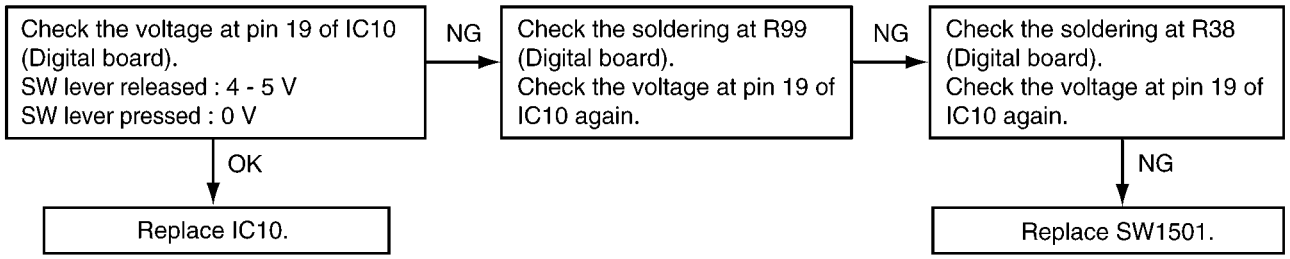
12.5.9.5. Check the Film End Sensor (SW1003)....."CHECK FILM"



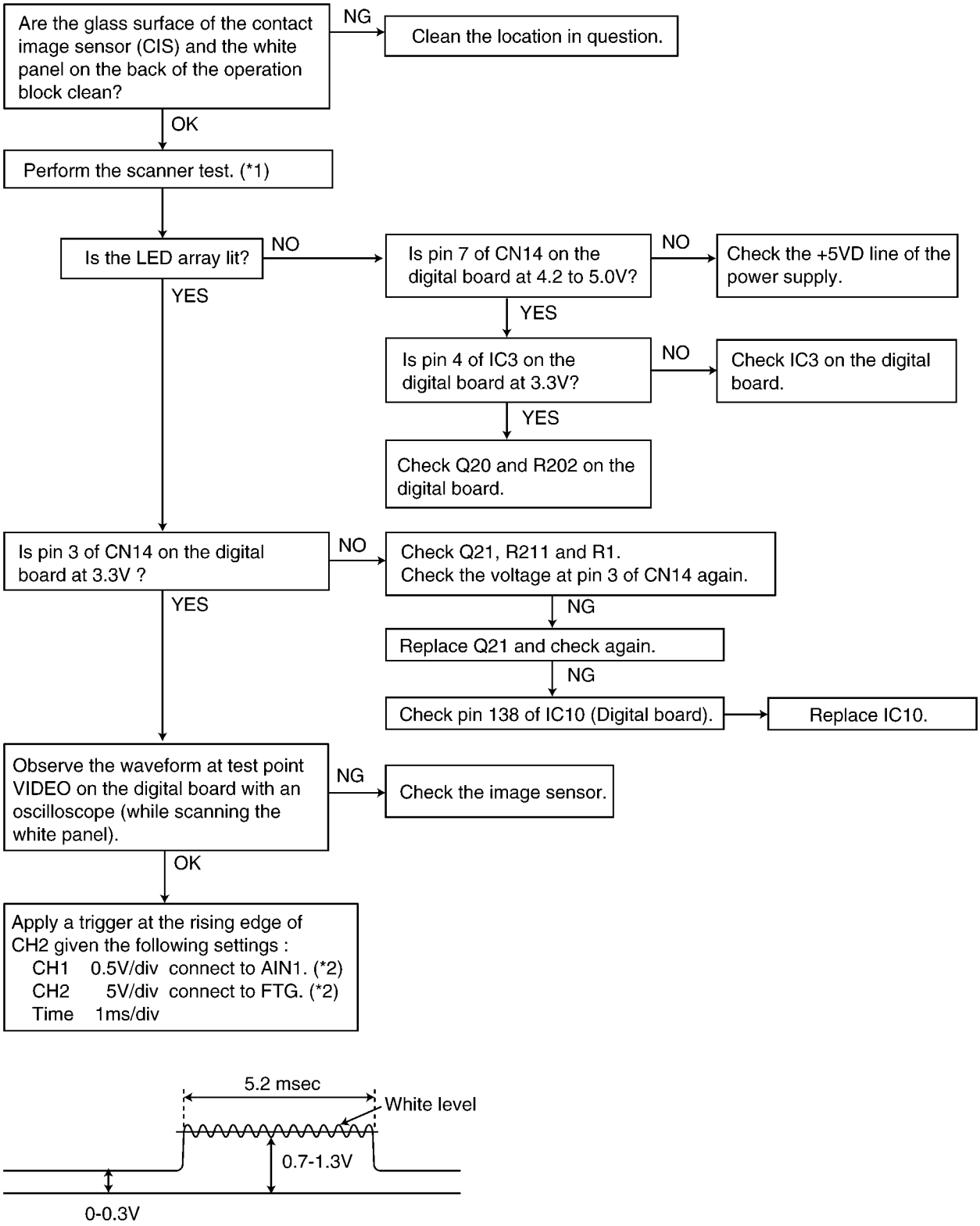
12.5.9.6. Check the Motor Position Sensor (SW1004)....."CALL SERVICE 2"



12.5.9.7. Check the Hook Switch (SW1501)



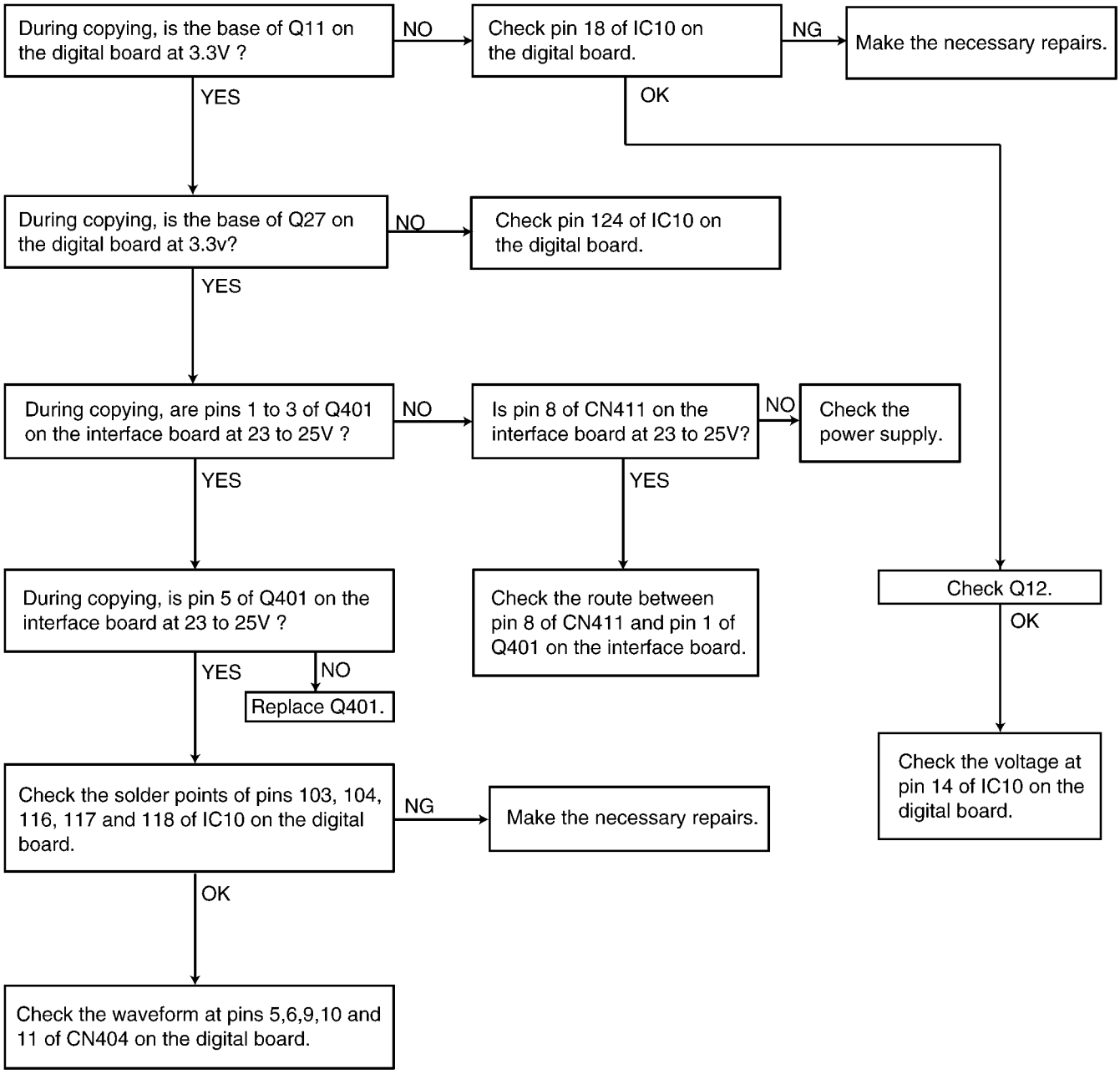
12.5.10. CIS (Contact Image Sensor) Section



Note:

- (*1): **Test Mode** (P.58)
- (*2): **Digital Board (PCB1)** (P.219)
- Refer to **Block Diagram**(P.18).

12.5.11. Thermal Head Section

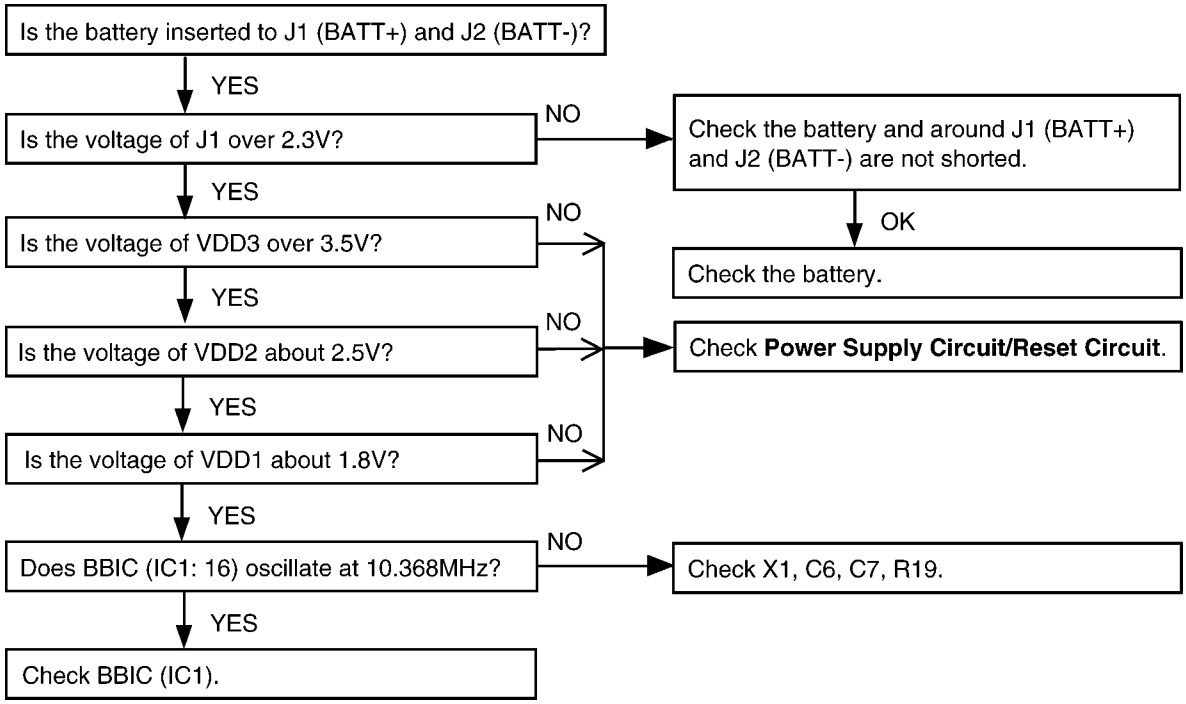


Note:

Refer to **Thermal Head** (P.19).

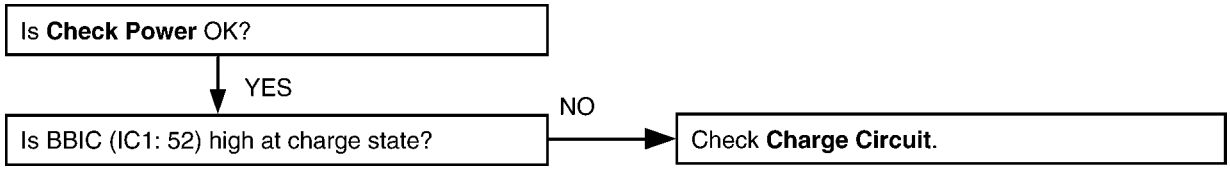
12.5.12. Cordless Section

12.5.12.1. Check Power (Cordless Handset)



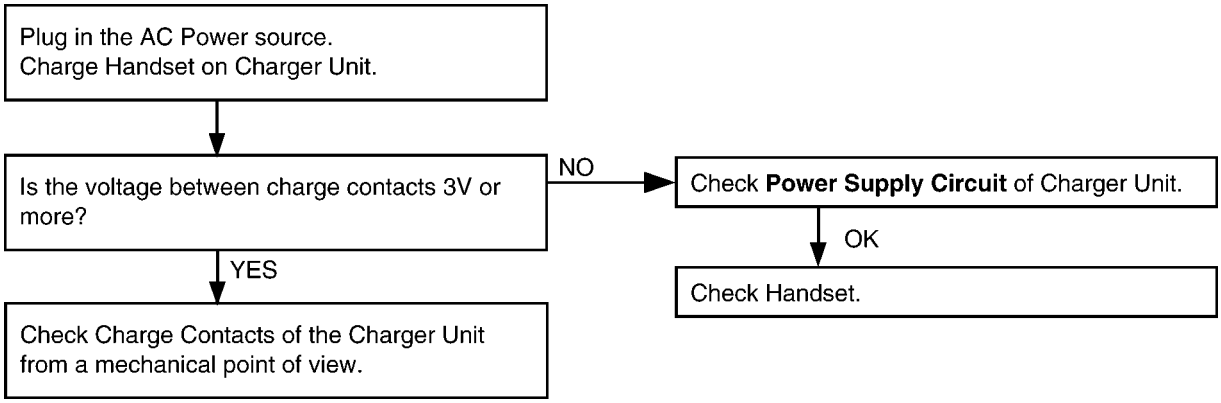
Cross Reference:
Power Supply Circuit/Reset Circuit (P.46)

12.5.12.2. Check Battery Charge (Cordless Handset)



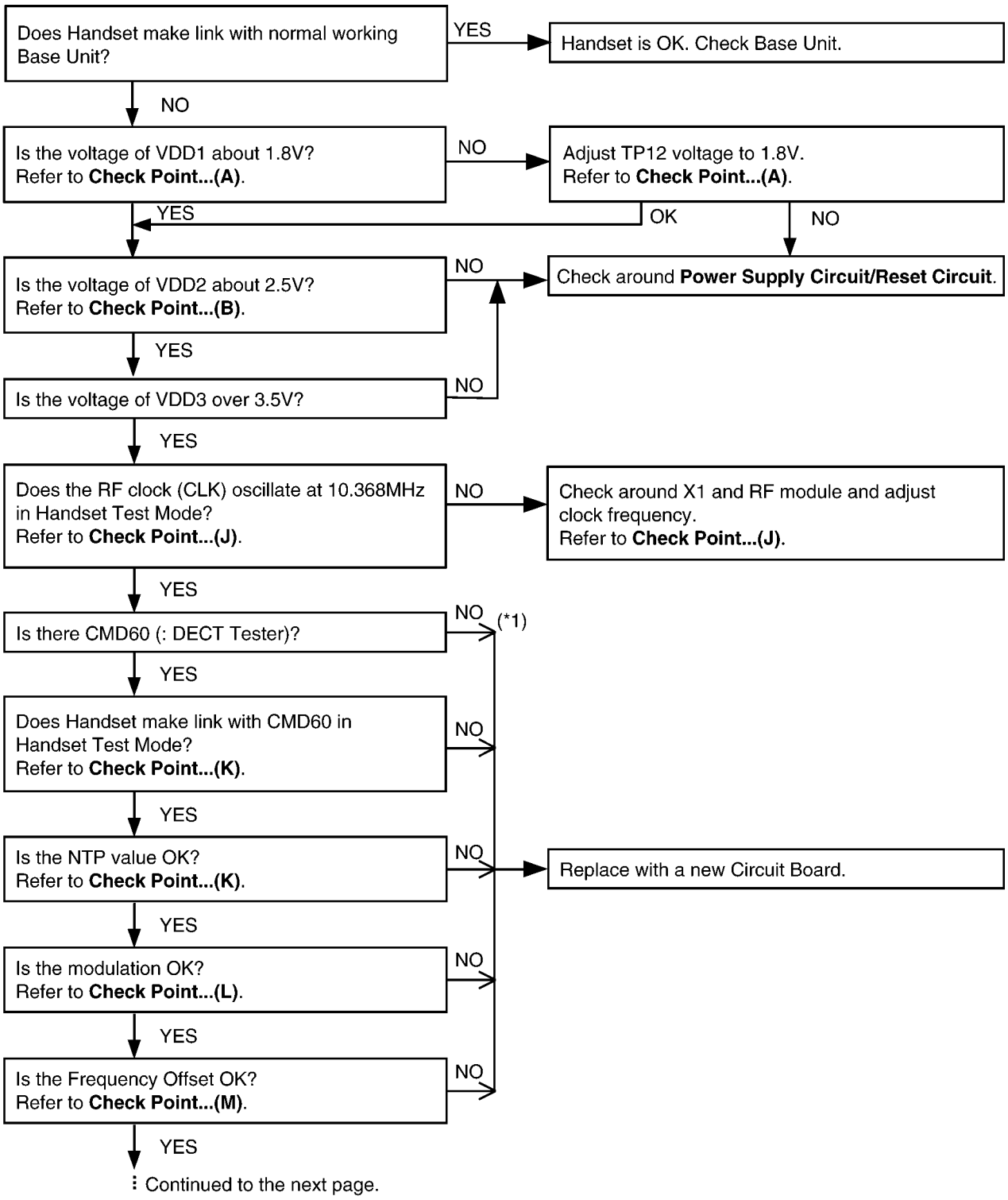
Cross Reference:
Check Power (Cordless Handset) (P.133)
Charge Circuit (P.46)

12.5.12.3. Check Battery Charge (Charger Unit)



Cross Reference:
Power Supply Circuit (P.46)

12.5.12.4. Check Link (Cordless Handset)



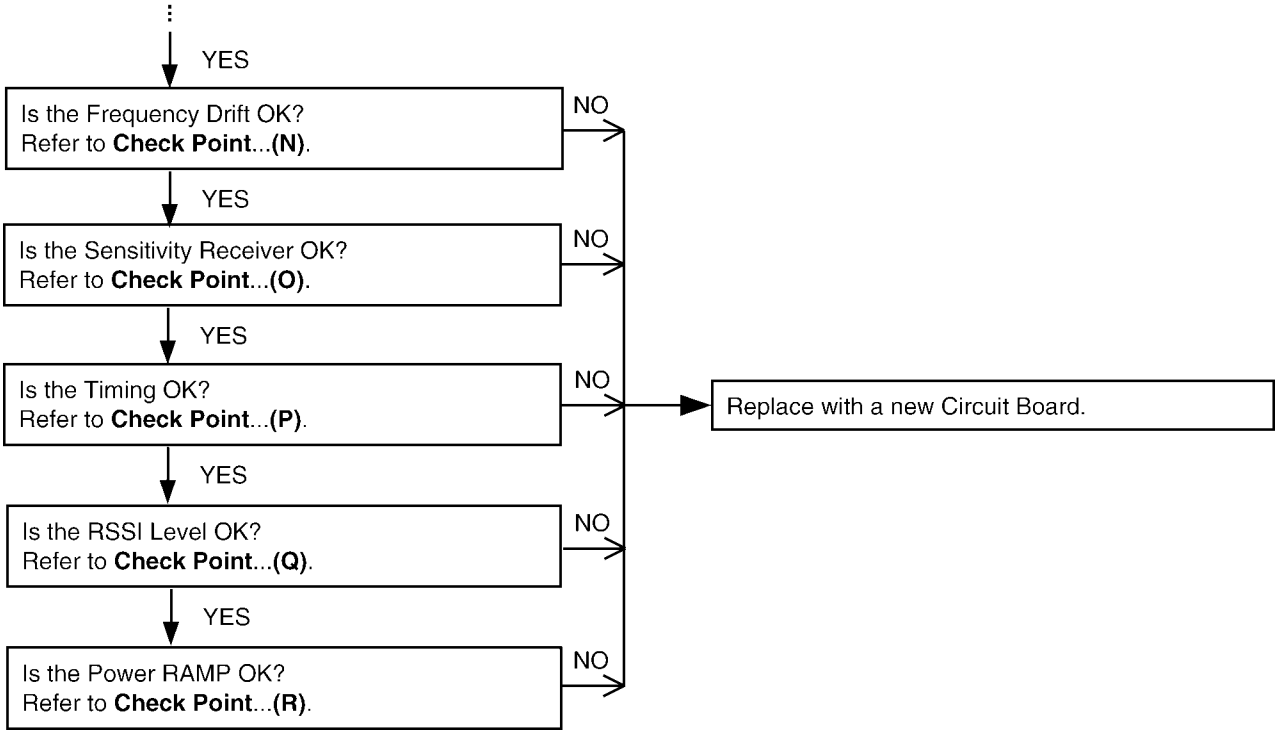
Cross Reference:

Power Supply Circuit/Reset Circuit (P.46)

Check Point (Cordless Handset) (P.137)

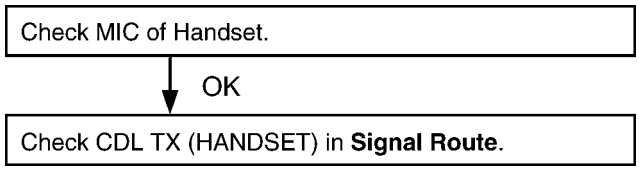
Note:

(*1) Refer to **Troubleshooting by Symptom (Cordless Handset)** (P.137).



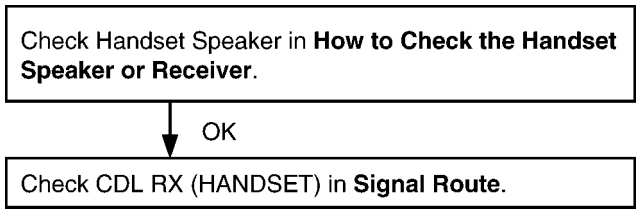
Cross Reference:
Check Point (Cordless Handset) (P.137)

12.5.12.5. Check Cordless Handset Transmission



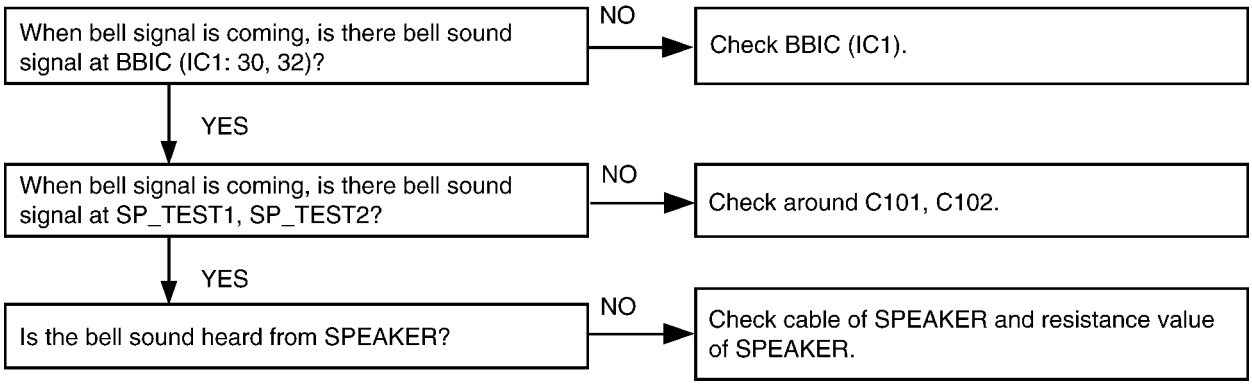
Cross Reference:
Check Sheet for Signal Route (P.123)

12.5.12.6. Check Cordless Handset Reception



Cross Reference:
How to Check the Cordless Handset Speaker or Receiver (P.183).
Check Sheet for Signal Route (P.123)

12.5.12.7. Bell Reception (Cordless Handset)



Cross Reference:

Check Link (Cordless Handset) (P.134)

How to Check the Cordless Handset Speaker or Receiver (P.183)

12.5.13. Troubleshooting by Symptom (Cordless Handset)

If your unit has below symptoms, follow the instructions in remedy column. Remedies depend on whether you have DECT tester (*1) or not.

Symptom	Remedy (*2)	
	You don't have DECT Tester.	You have DECT Tester. (Model Number : CMD60)
Battery strength is not indicated correctly by Battery icon.	Check item (**A**)-(**D**), (**H**), (**I**).	Check item (**A**)-(**D**), (**H**)-(**I**).
You cannot hear the caller's voice.	Check item (**A**)-(**E**), (**J**), (**S**).	Check item (**A**)-(**E**), (**J**)-(**S**).
You cannot use handset a little away from base unit even if the handset is within range of the base unit.	Check item (**J**).	Check item (**J**)-(**R**).
Base unit and handset do not link each other.	Check item (**A**)-(**E**), (**J**).	Check item (**A**)-(**E**), (**J**)-(**R**).
The Audio level is high or low.	Check item (**S**).	Check item (**S**).
The SP-Phone level is high or low.	Check item (**T**).	Check item (**T**).

Note:

(*1) A general repair is possible even if you don't have the DECT tester because it is for confirming the levels, such as Acoustic level in detail.

(*2) Refer to **Check Point (Cordless Handset)** (P.137)

12.5.13.1. Check Point (Cordless Handset)

Please follow the items below when BBIC or EEPROM is replaced.

Note:

After the measuring, suck up the solder of TP.

*: **PC Setting** (P.178) is required beforehand.

The connections of simulator equipments are as shown in **Adjustment Standard (Cordless Handset)** (P.180).

	Items	Check Point	Procedure	Check or Replace Parts
(**A**)*	1.8V Supply Adjustment	VDD1	1. Confirm that the voltage between test point VDD1 and GND is 1.8V ± 0.02V. 2. Execute the command "bandgap", then check the current Value. 3. Adjust the 1.8V voltage of VDD1 executing command "bandgap XX" (XX is the value).	IC1, Q2, C10
(**B**)	DC/DC Supply Confirmation	VDD3	1. Confirm that the voltage between test point VDD3 and GND is 3.6V ± 0.3V (Backlight is OFF)/4.2V ± 0.3V (Backlight is ON).	IC1, F1, C1, C2, C3, R1, Q1, D1, L1, D2
(**C**)	2.5V Supply Confirmation	VDD2	1. Confirm that the voltage between test point VDD2 and GND is 2.5V ± 0.1V.	IC1, Q3, C4, C5
(**D**)*	BBIC Confirmation	-	1. BBIC Confirmation (Execute the command "getchk"). 2. Confirm the returned checksum value. Connection of checksum value and program number is shown below. ex.) checksum value: EA93 / program number: D852ZA	IC1, X1, C7, C6, R19
(**E**)*	EEPROM Confirmation	-	1. EEPROM Confirmation (Execute the command "ChkTGA810XXrevYY.bat"). XX: country code YY: revision number 2. Confirm the returned checksum value. 3. The checksum is displayed in the last output line. **Note:** "XX", "YY", and "checksum" vary depending on the country version. You can find them in the batch file, PQZZ- mentioned in **JIG and PC** (P.178).	IC1, IC3, R40, R41, R42, Q10, Q11, R43, R44, C37
(**F**)	Charge Control Check & Charge Current Monitor Check	-	1. Apply 3.5V between J3(+) and TP21 with DC power supply and set current limit to 250mA. 2. Confirm that the current limit LED of DC power supply is ON/OFF. 3. Decrease current limit of DC power supply to 100mA. 4. Confirm that the current limit LED of DC power supply is stable. (Current limiter is ON.) (If charge control cannot be confirmed by this procedure, please use battery to handset power supply and try again.)	IC1, Q4, Q5, Q9, D6, L4, L5, R5, R6, F1, R8, D7, D8, R7

	Items	Check Point	Procedure	Check or Replace Parts
(**G**)*	Charge Detection (OFF) Check	-	1. Stop supplying 3.5V to TP20(+) and TP21(-). 2. Execute the command “Backloff” then “charge”. 3. Confirm that the returned value is 00 (hex).	IC1, Q4, Q5, Q9, D6, L4, L5, R5, R6, F1, R8, D7, D8, R7
(**H**)*	Battery Monitor Check	-	1. Apply 2.25V between BATT and GND. 2. Execute the command “readbatt”. It assumes that the return value is XX. a) 1E ≦ XX ≦ 2C: No need to adjust b) XX: 18 ~ 1D: Need to adjust XX: 2D ~ 32: Need to adjust Write AD value of 2.25V to FLASH. ex) read data: XX = 1C, write data: YY = 1C read data: XX = 2D, write data: YY = 2D FLASH = 0004(Low Voltage) write “YY” Execute the command “wreeprom 00 04 01 YY”. FLASH = 0005(No Voltage) write “YY - 1D” Execute the command “wreeprom 00 05 01 ZZ”. FLASH = 000A(Low Voltage BL) write “YY - 06” Execute the command “wreeprom 00 0A 01 WW”. **Note:** ZZ = YY - 1D, WW = YY - 06 No Voltage writing data limit is ‘00’. c) XX: 00 ~ 17: Reject XX: 33 ~ FF: Reject	IC1, F1, C1, C3, R12
(**I**)	Battery Low Confirmation	-	1. Apply 2.40V between J1 (BATT+) and J2 (BATT-). 2. Confirm that there is no flashing of Battery Icon. 3. Apply 2.25V ± 0.08V between J1 (BATT+) and J2 (BATT-). 4. Confirm that there is flashing of Battery Icon.	IC1, F1, C1, C3, R12
(**J**)*	BBIC Clock Adjustment	CLK	1. Apply 2.5V between BATTERY(+) and BATTERY(-) with DC power. 2. Execute the command “conttx”. 3. Input Command “rdeeprom 00 01 01”, then you can confirm the current value. 4. Adjust the frequency of CLK executing the command “setfreq 00 xx (where xx is the value)” so that the reading of the frequency counter is 10.368000MHz ± 10Hz. Note: CLK is displayed only for a few seconds when executing the command “conttx” after battery is inserted.	IC1, X1, C6, C7, R19, IC4, C57
(**K**)*	Transmitted Power Confirmation	-	Remove the Antenna before starting step from 1 to 4. 1. Configure the DECT tester (CMD60) as follows; <Setting> • Test mode: PP • RFPI: 0102030405 • Traffic Carrier: 5 • Traffic Slot: 4 • Mode: Loopback • RF LEVEL = -70dBm 2. Execute the command “regcmd60 01 02 03 04 05”. 3. Initiate connection from DECT tester. 4. Confirm that the NTP value at ANT is 20dBm ~ 25dBm.	IC1, IC4, C66, C58, C57, C50, C53, C52, R52, C60, C61
(**L**)*	Modulation Check and Adjustment	-	Follow steps 1 to 3 of **(K)**. 4.Confirm that the B-Field Modulation is -350 ~ -400/+320 ~ +370kHz/div using data type Fig 31. 5.Adjust the B-Field Modulation if required. (Execute the command “Readmod” and “wrtmod xx”, where xx is the value.)	IC1, IC4, C66, C58, C57, C50, C53, C52, R52, C60, C61
(**M**)	Frequency Offset Confirmation	-	Follow steps 1 to 3 of **(K)**. 4.Confirm that the frequency Offset is < ± 45kHz.	IC1, IC4, C66, C58, C57, C50, C53, C52, R52, C60, C61
(**N**)	Frequency Drift Confirmation	-	Follow steps 1 to 3 of **(K)**. 4.Confirm that the frequency Drift is < ± 30kHz/ms.	IC1, IC4, C66, C58, C57, C50, C53, C52, R52, C60, C61
(**O**)	Sensitivity Receiver Confirmation	-	Follow steps 1 to 3 of **(K)**. 4.Set DECT tester power to -90dBm. 5.Confirm that the BER is < 1000ppm.	IC1, IC4, C66, C58, C57, C50, C53, C52, R52, C60, C61

	Items	Check Point	Procedure	Check or Replace Parts
(**P**)	Timing Confirmation	-	Follow steps 1 to 3 of **(K)**. 4.Confirm that the Timing accuracy is < ± 2.0ppm.	IC1, IC4, C66, C58, C57, C50, C53, C52, R52, C60, C61
(**Q**)*	RSSI Level Confirmation	-	Follow steps 1 to 3 of **(K)**. 4.Set DECT tester power to -81dBm. 5.Execute the command “readrssi”. 6.Confirm that the returned value is 1B ± 8 (hex). 7.Set DECT tester power to -63dBm. 8.Execute the command “readrssi”. 9.Confirm that the returned value is 23 ± 8 (hex).	IC1, IC4, C66, C58, C57, C50, C53, C52, R52, C60, C61
(**R**)	Power RAMP Confirmation	-	Follow steps 1 to 3 of **(K)**. 4.Confirm that Power RAMP is matching.	IC1, IC4, C66, C58, C57, C50, C53, C52, R52, C60, C61
(**S**)	Audio Check and Confirmation	-	1. Link to BASE which is connected to Line Simulator. 2. Set line voltage to 48V and line current to 40mA. 3. Input -45dBm/1KHz to MIC and measure Line output level. 4. Confirm that the level is -8.5dBm ± 2dBm and that the distortion level is < 5% at TEL Line (600Ω Load). 5. Input -20dBm/1KHz to Line I/F and measure Receiving level at REV-TEST1 and REV-TEST2. 6. Confirm that the level is -21dBm ± 2dBm and that the distortion level is < 5% at Receiver. (vol = 2)	IC1, R21, R22, L9, R93, C11, R24, R23, R25, C12, C95, R94, C98, C112, C86, R31, C108, D4, D5
(**T**)	SP phone Audio Check and Confirmation	-	1. Link to Base which is connected to Line Simulator. 2. Set line voltage to 48V and line current to 40mA. 3. Set the handset off-hook using SP-Phone key. 4. Input -25dBm/1KHz to Line I/F and measure Receiving level at SP_TEST1 and SP_TEST2. 5. Confirm that the level is -14dBm ± 2dBm and that the distortion level is < 5%. (vol = 3)	IC1, R21, R22, L9, R93, C11, R24, R23, R25, C12, C39, C101, C102

12.5.13.2. Troubleshooting for Speakerphone

When the customer’s telephone line corresponds to the following conditions and transmission signal of SP-Phone is interrupted, performing the next set up to a cordless handset will improve it to some extent.

Conditions

1. When customer’s line has less line loss.
   ex.) The customer is using optical fiber, ISDN terminal adaptor, or PBX.
   In this case, receiving signal is strong and it may affect transmission signal.
2. When the other party is talking from noisy place.
   ex.) The other party is using cellular phone. The background noise is very loud.
   In this case, the noise from the other party (i.e. surrounding noise) may affect transmission signal.

Setting Method

• Change the address of EEPROM (0144) from 0×00 to 0×01.

12.5.14. Troubleshooting by Symptom (Charger Unit)

12.5.14.1. Check Point (Charge Unit)

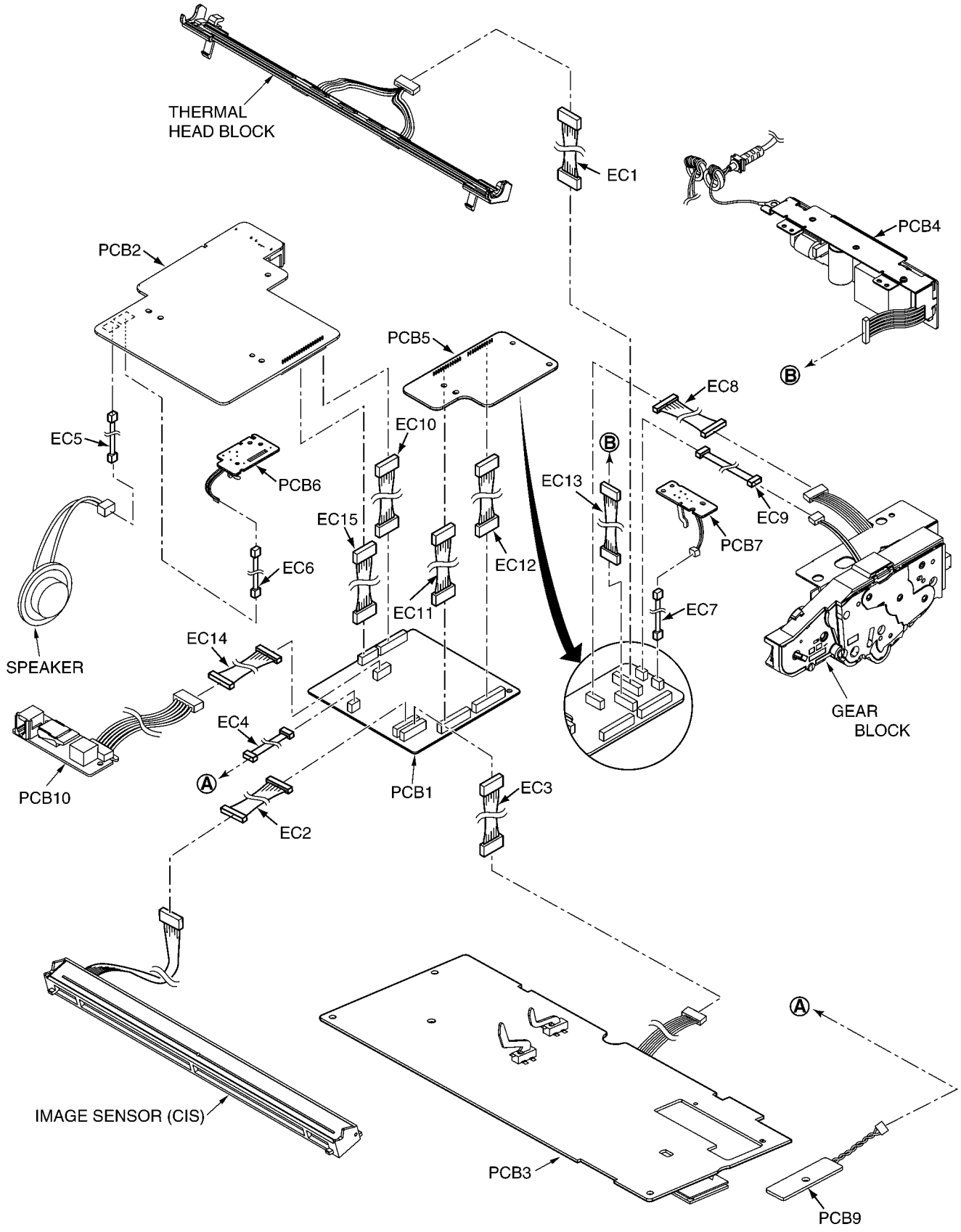
	Items	Check Point	Procedure	Check or Replace Parts
(**A**)	Charging Check	-	1. Connect Charge Contact 12Ω/2W resistor between charge+ and charge-. 2. Measure and confirm voltage across the resistor is 3.3V ± 0.2V.	R2, R1

Note:

After the measuring, suck up the solder of TP.

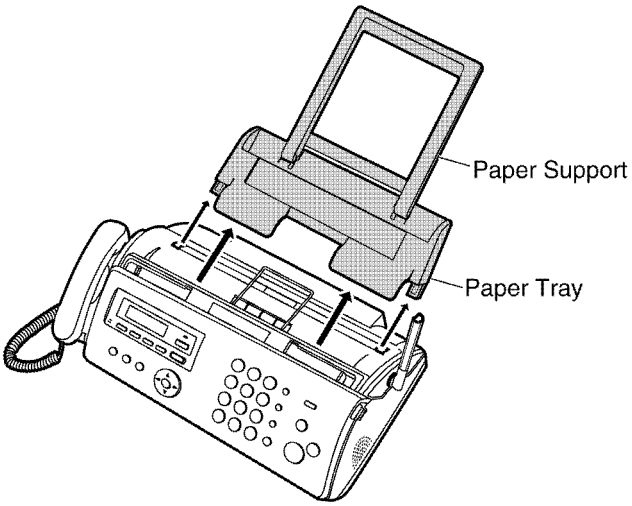
The connection of adjustment equipment is as shown in **Adjustment Standard (Charger Unit)** (P.177).

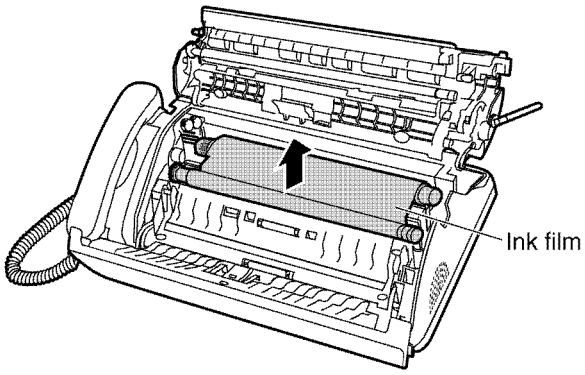
13 Service Fixture & Tools



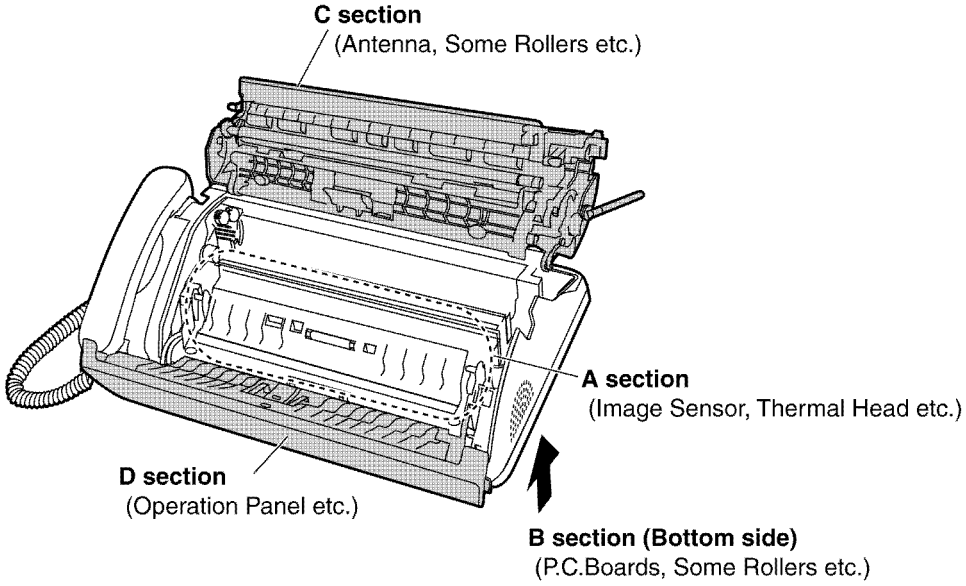
14 Disassembly and Assembly Instructions

Please remove the Paper Support, Paper Tray and Ink Film before disassembling.



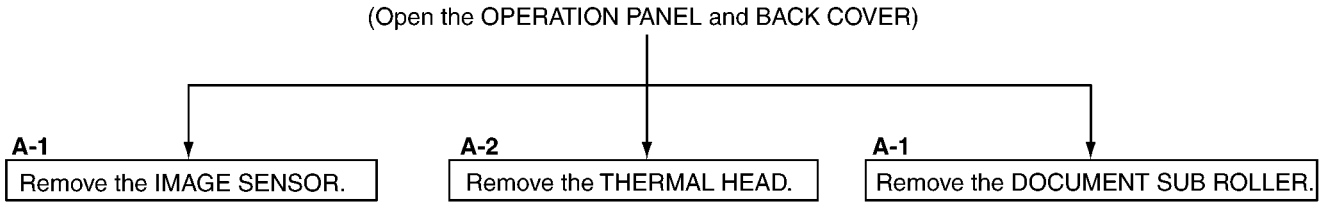


14.1. General Section



14.2. Disassembly Flowchart

14.2.1. Upper Cabinet Section

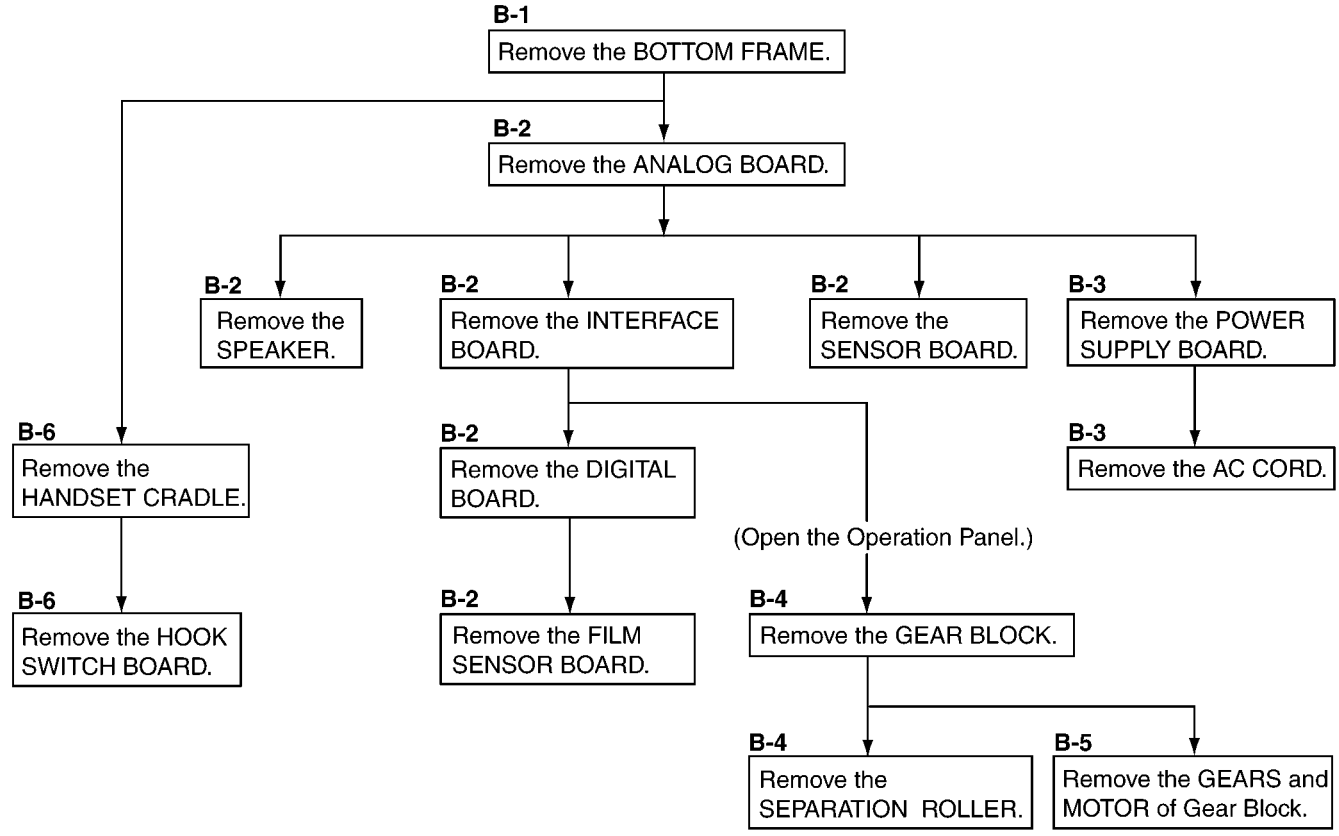


REFERENCE:

A-1: How to Remove the Image Sensor (CIS) (P.145)

A-2: How to Remove the Thermal Head (P.146)

14.2.2. Lower Cabinet Section



REFERENCE:

B-1: How to Remove the Bottom Frame (P.148)

B-2: How to Remove the P.C. Boards and Speaker (P.149)

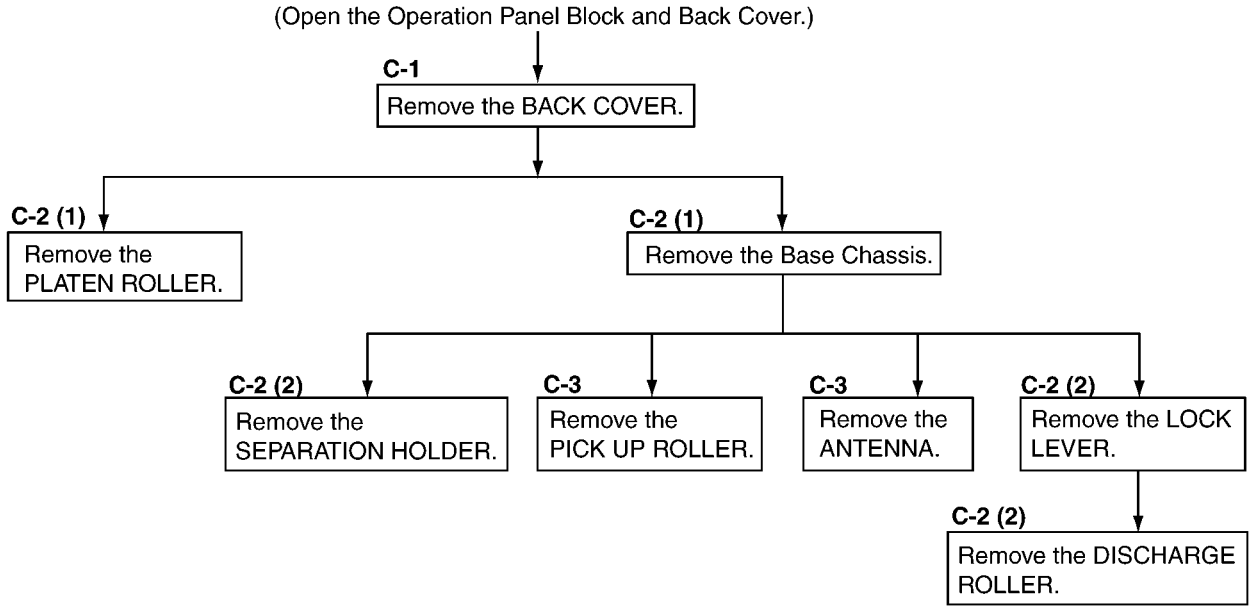
B-3: How to Remove the Power Supply Board and AC Cord (P.150)

B-4: How to Remove the Gear Block and Separation Roller (P.151)

B-5: How to Remove the Gears, Motors and Arms of the Gear Block (P.152)

B-6: How to Remove the Cradle and Hook Switch Board (P.154)

14.2.3. Back Cover Section



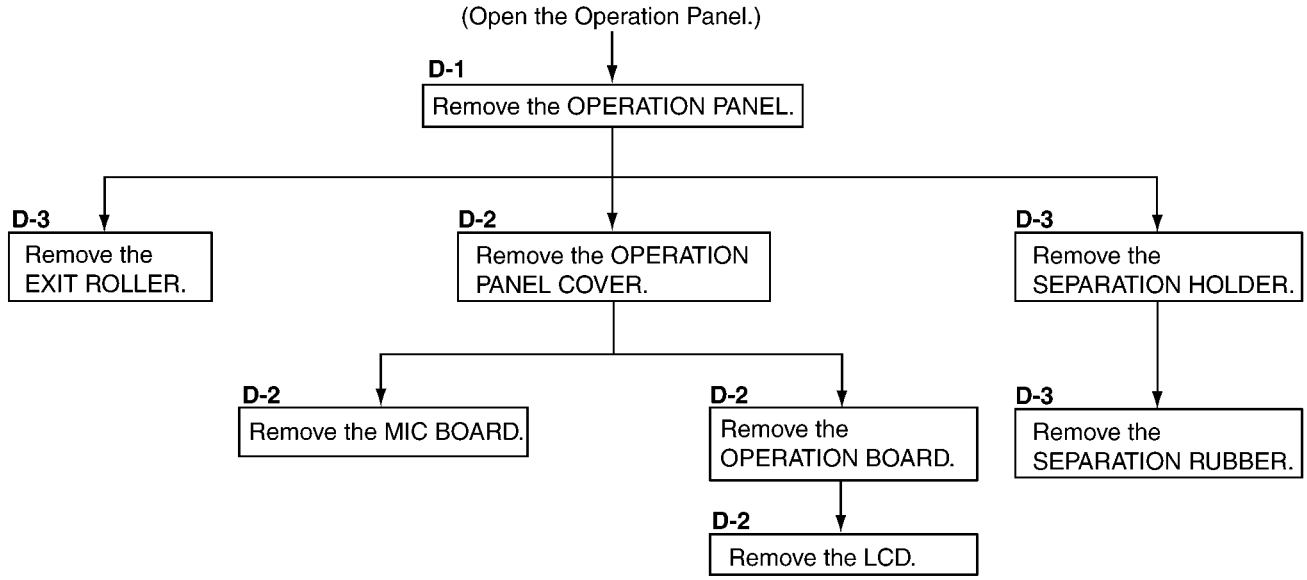
REFERENCE:

C-1: How to Remove the Back Cover (P.155)

C-2: How to Remove the Platen Roller and Lock Lever (P.156)

C-3: How to Remove the Pickup Roller and Antenna (P.158)

14.2.4. Operation Panel Section



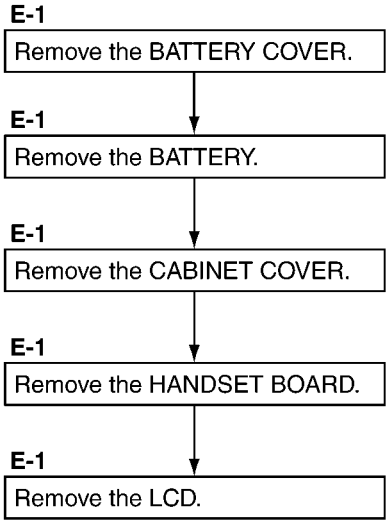
REFERENCE:

D-1: How to Remove the Operation Panel (P.159)

D-2: How to Remove the Operation Board, MIC Board and LCD (P.160)

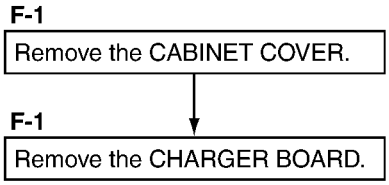
D-3: How to Remove the Separation Holder and Exit Roller (P.161)

14.2.5. Cordless Handset Section



REFERENCE:
E-1: How to Remove the Cordless Handset Board (P.168)

14.2.6. Charger Section



REFERENCE:
F-1: How to Remove the Charger Board (P.170)

14.3. Disassembly Procedure

14.3.1. How to Remove the Image Sensor (CIS)

PROCEDURE: A-1

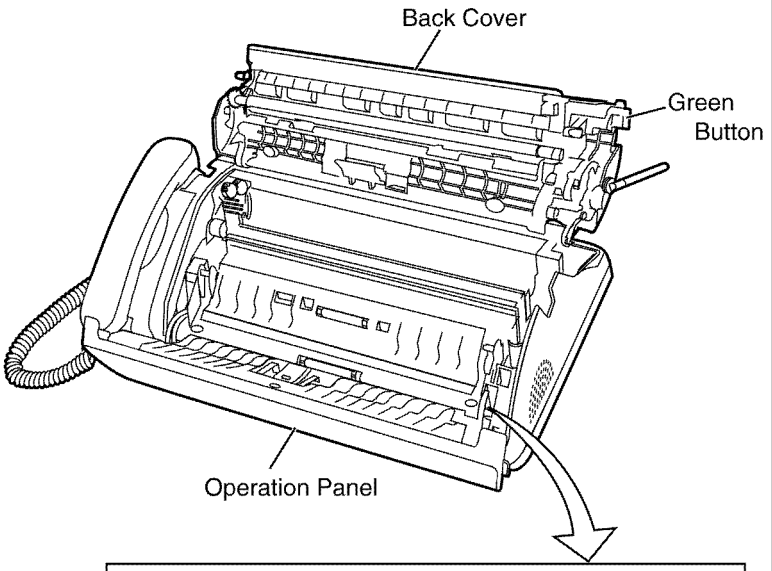
Ref. No. A-1

IMAGE SENSOR

1) Push the Green Button to open the Operation Panel and Back Cover.
2) Remove the 2 screws (D).
3) Remove the IMAGE SENSOR from the Main Cabinet, as shown in a Fig. A.
4) Disconnect the Connector.

DOCUMENT SUB ROLLER

1) Push the Green Button to open the Operation Panel and Back Cover.
2) Remove the DOCUMENT SUB ROLLER, as shown in a Fig. B.



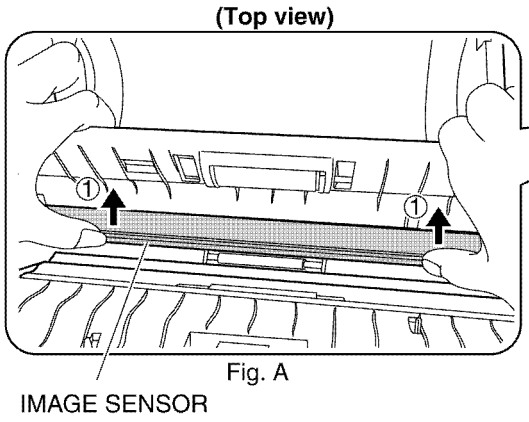


Fig. A

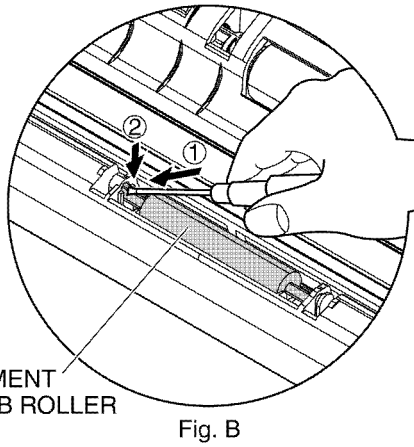
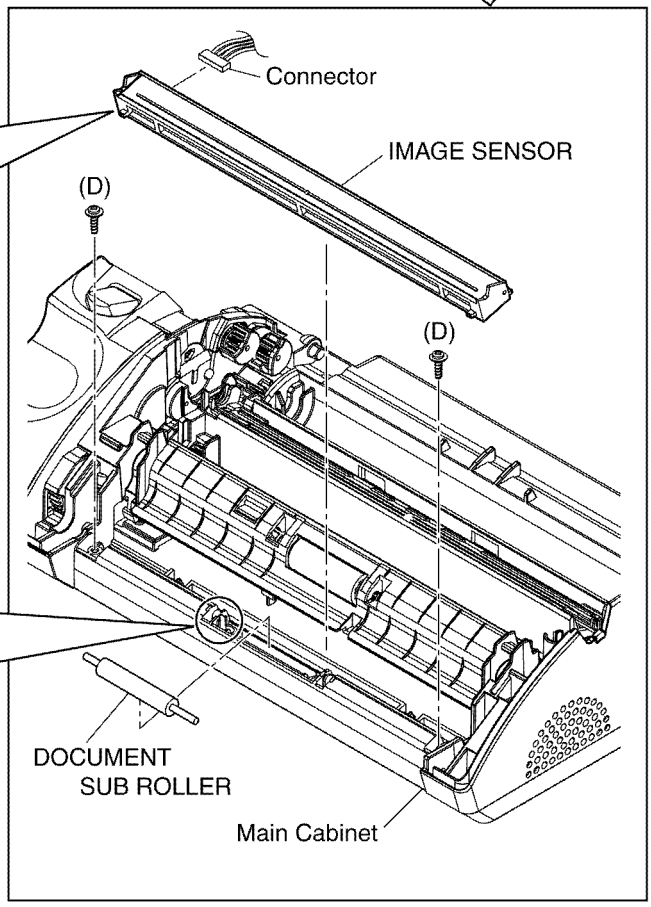


Fig. B



14.3.2. How to Remove the Thermal Head

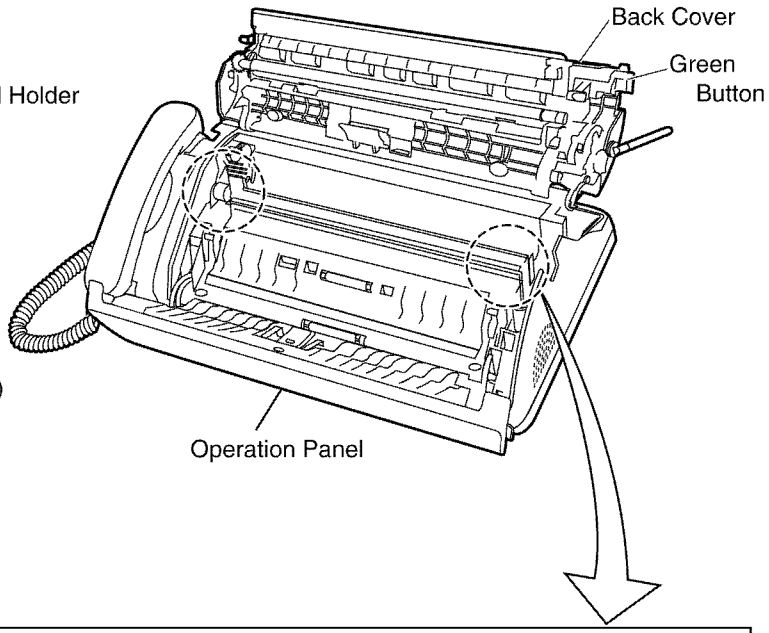
PROCEDURE: A-2

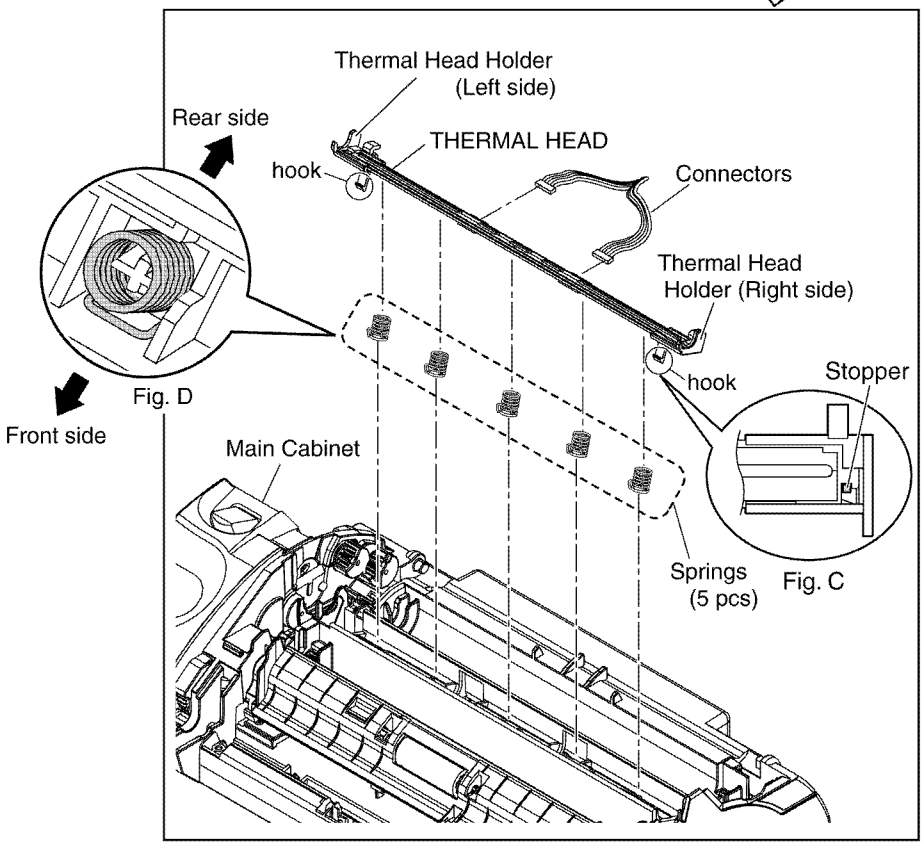
Ref. No. A-2 (1)

1) Push the Green Button to open the Operation Panel and Back Cover.
2) Release the both-side hooks of Thermal Head Holder from Main Cabinet. (Refer to next page.) Remove the holder from thermal head after releasing this stopper. (Fig. C)
3) Disconnect the Connectors.
4) Remove the THERMAL HEAD.

Note for Assembly:

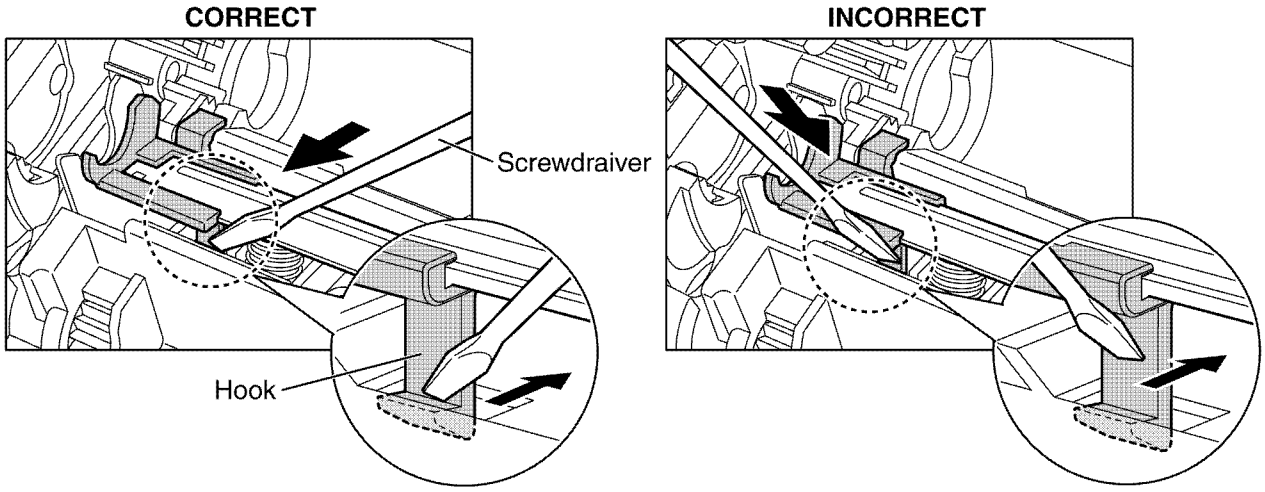
- When springs are inserted in the Main Cabinet, be careful in the direction of springs. (See Fig. D)



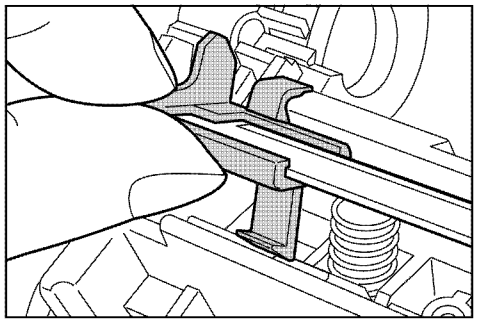


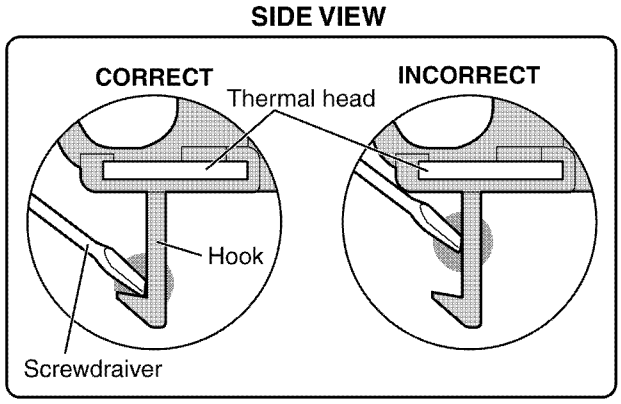
Ref. No. A-2 (2)

① Push the left side hook first, as shown in a figure.

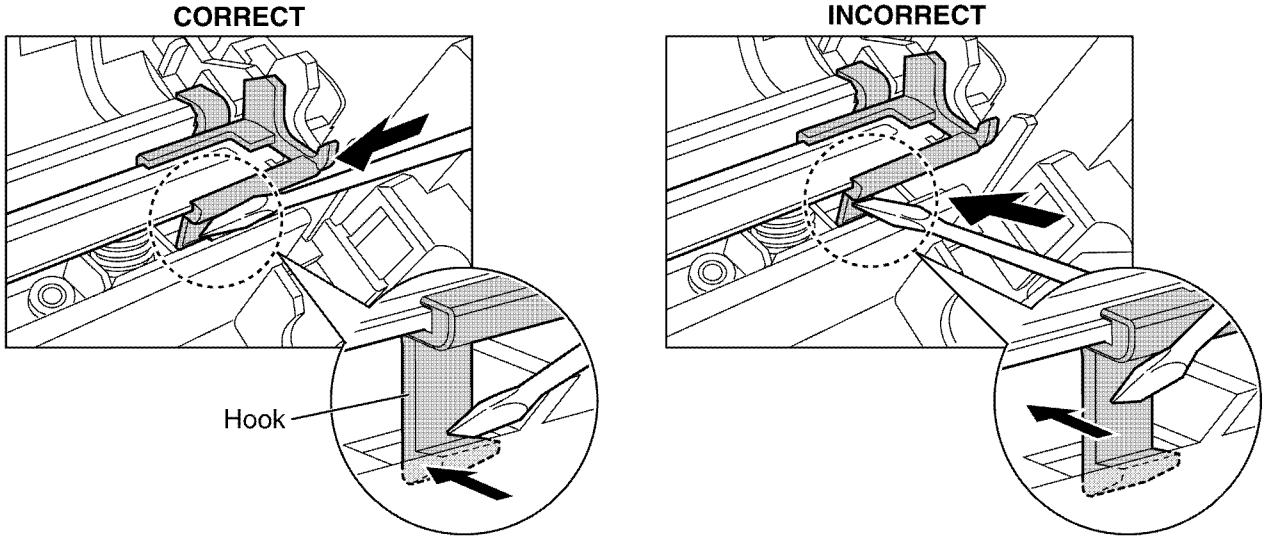


② Keep a left side hook situation and push the right side hook, as shown in a figure.





③ Push the rignt side hook, as shown in a figure. The both side hooks release from Main Cabinet.



14.3.3. How to Remove the Bottom Frame

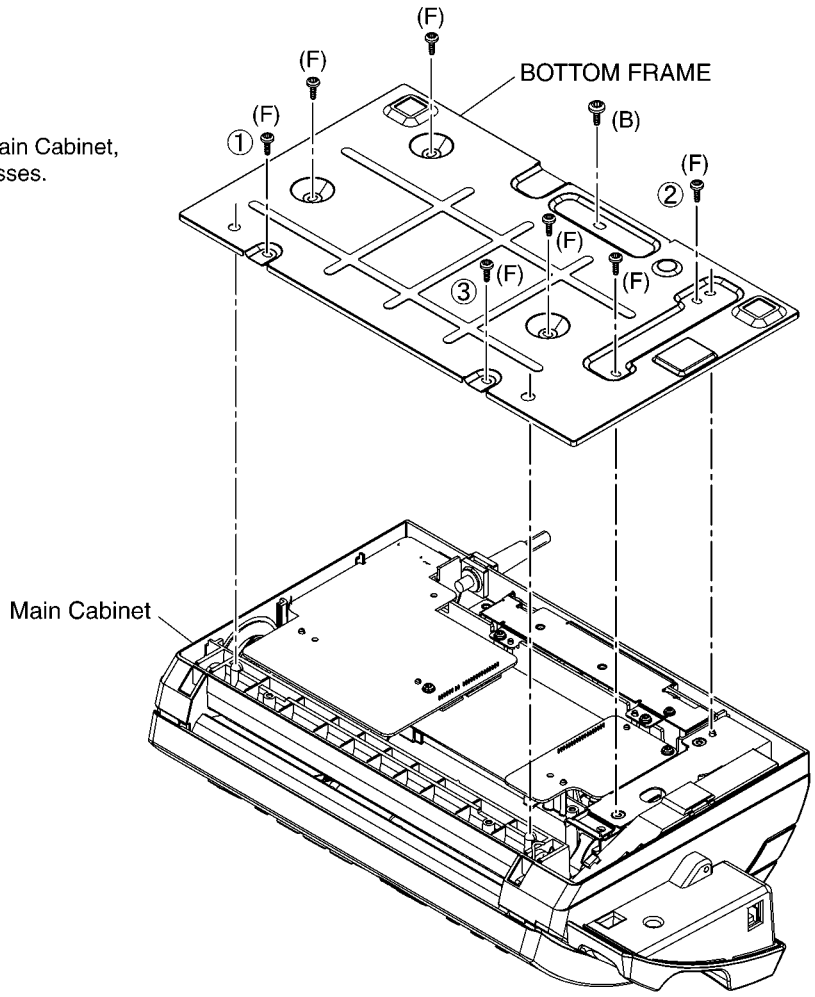
PROCEDURE: B-1

Ref. No. B-1

1) Remove the 7 screws (F) and 1 screw (B).
2) Remove the BOTTOM FRAME.

Note for Assembly:

- Fasten ①, ② and ③ screws first. (Order is ①→②→③.)
- When Bottom Frame is installed in the Main Cabinet, be careful not to run aground into the bosses.



14.3.4. How to Remove the P.C. Boards and Speaker

PROCEDURE: B-1→B-2

Ref. No. B-2

ANALOG BOARD
1) Remove the 1 screw (F)-a.
2) Disconnect the Connector on the Analog Board.
3) Remove the ANALOG BOARD.

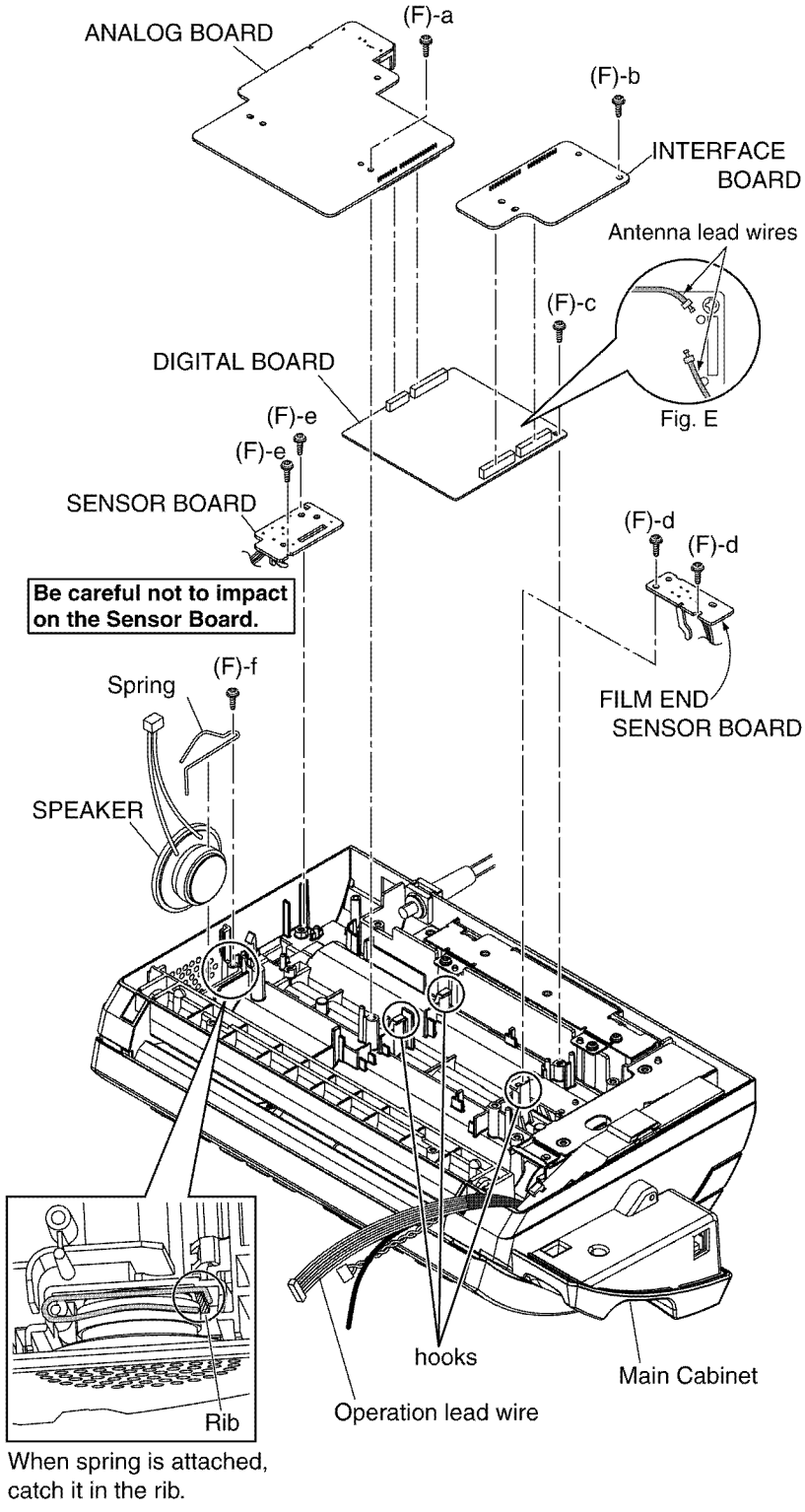
INTERFACE BOARD
1) Remove the 1 screw (F)-b.
2) Disconnect the Connectors on the Interface Board.
3) Remove the INTERFACE BOARD.

DIGITAL BOARD
1) Remove the Analog Board.
2) Remove the Interface Board.
3) Remove the 1 screw (F)-c.
4) Disconnect the Connectors on the Digital Board.
5) Unsolder the Antenna lead wires. (See Fig. E)
6) Release the hooks of the Main Cabinet.
7) Remove the DIGITAL BOARD.

FILM END SENSOR BOARD
1) Remove the Analog Board.
2) Remove the Interface Board.
3) Remove the Digital Board.
4) Remove the 2 screws (F)-d.
5) Disconnect the Connectors on the Film End Sensor Board.
6) Remove the FILM END SENSOR BOARD.

SENSOR BOARD
1) Remove the Analog Board.
2) Remove the 2 screws (F)-e.
3) Remove the SENSOR BOARD.

SPEAKER
1) Remove the Analog Board.
2) Remove the 1 screw (F)-f.
3) Remove the SPEAKER.



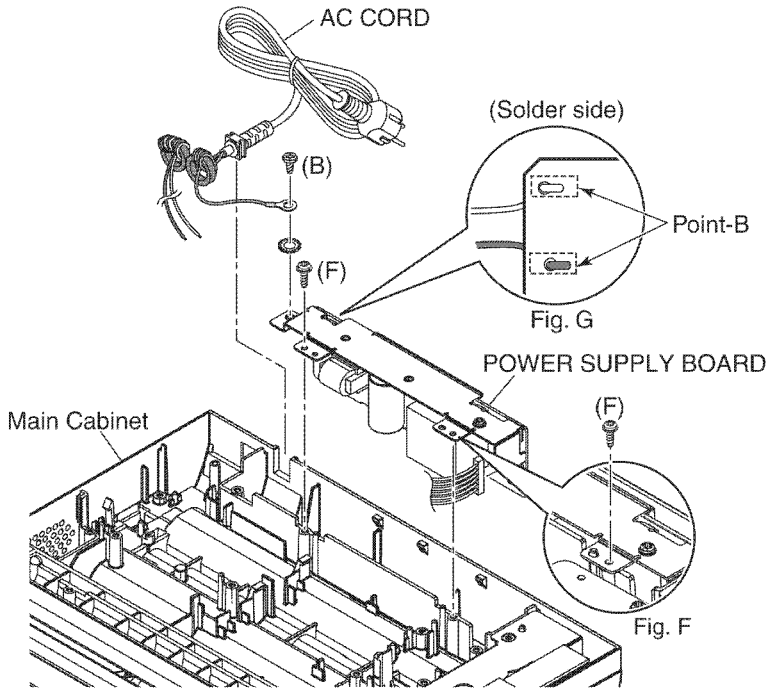
When spring is attached, catch it in the rib.

14.3.5. How to Remove the Power Supply Board and AC Cord

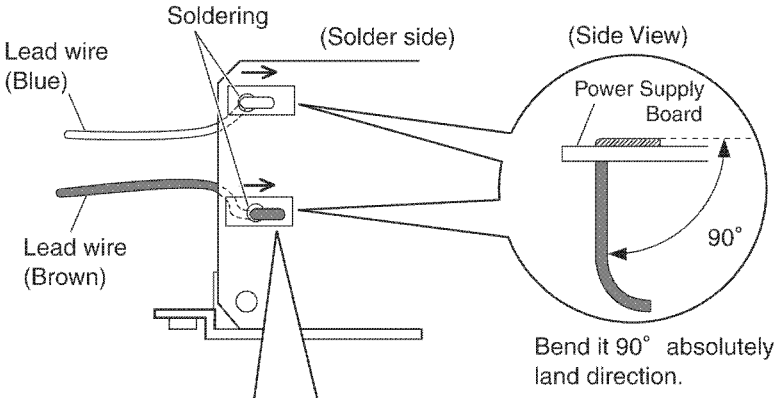
PROCEDURE: B-1→B-2→B-3

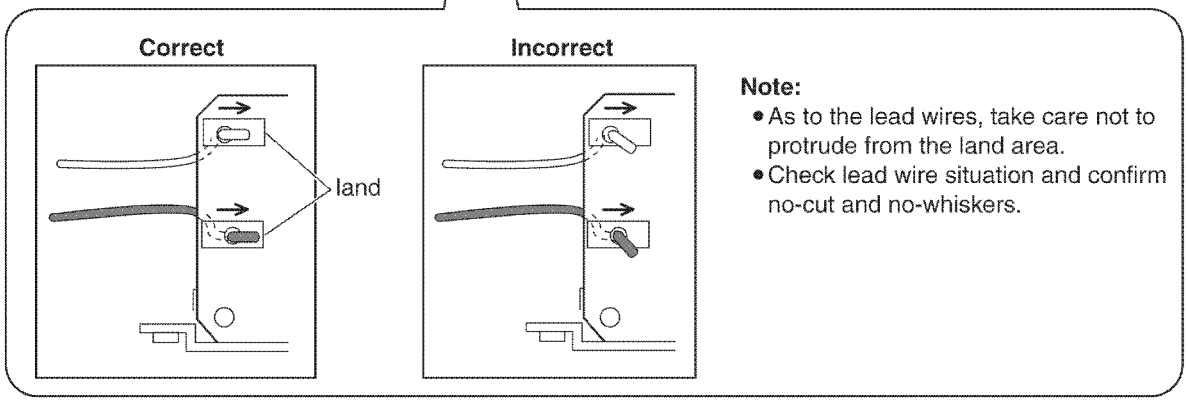
Ref. No. B-3

1) Remove the Analog Board. (Refer to **B-2**.)
2) Remove the 2 screws (F). (See Fig. F)
3) Remove the Power Supply Board with AC Cord from Main Cabinet.
4) Remove the 1 screw (B).
5) Unsolder the Point-B. (See Fig. G)
6) Remove the POWER SUPPLY BOARD and AC CORD.



The soldering of AC Cord





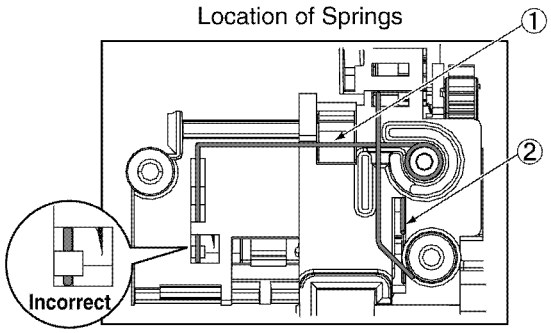
Note:
- As to the lead wires, take care not to protrude from the land area.
- Check lead wire situation and confirm no-cut and no-whiskers.

14.3.6. How to Remove the Gear Block and Separation Roller

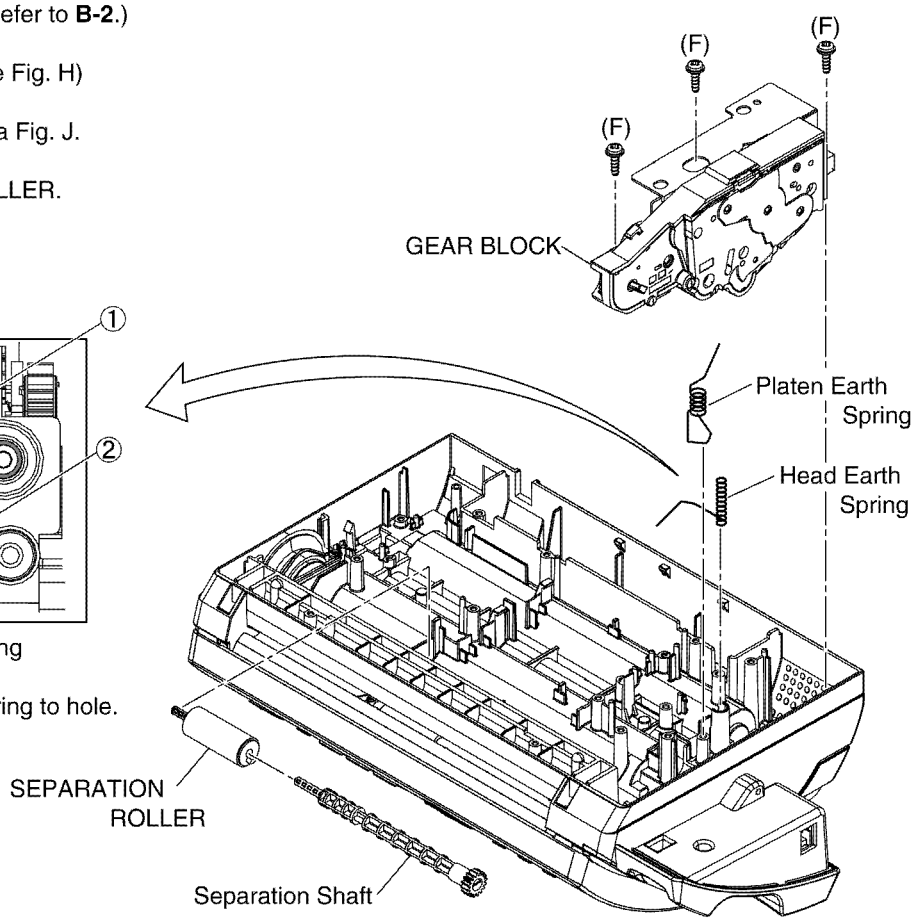
PROCEDURE: B-1→B-2→B-4

Ref. No. B-4

1) Remove the Interface Board. (Refer to **B-2**.)
2) Remove the 3 screws (F).
3) Open the Operation Panel. (See Fig. H)
4) Remove the GEAR BLOCK.
5) Release the hook, as shown in a Fig. J.
6) Pull out the Separation Shaft.
7) Remove the SEPARATION ROLLER.



① Insert the Head Earth Spring along rib.
② Insert the Platen Earth Spring to hole.



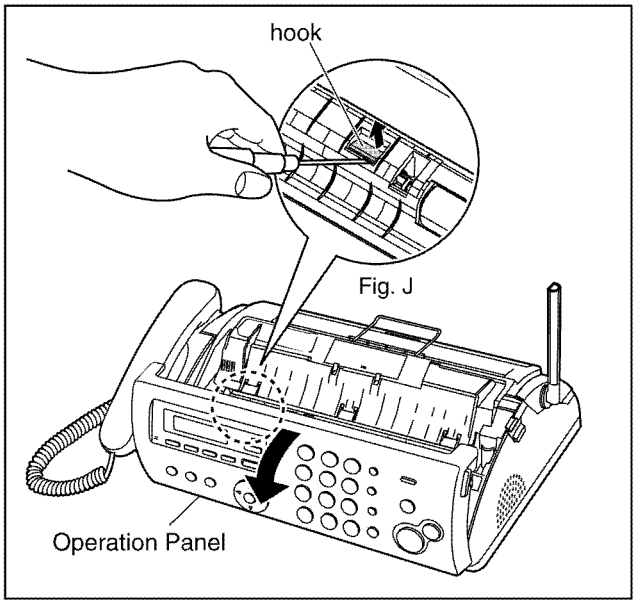


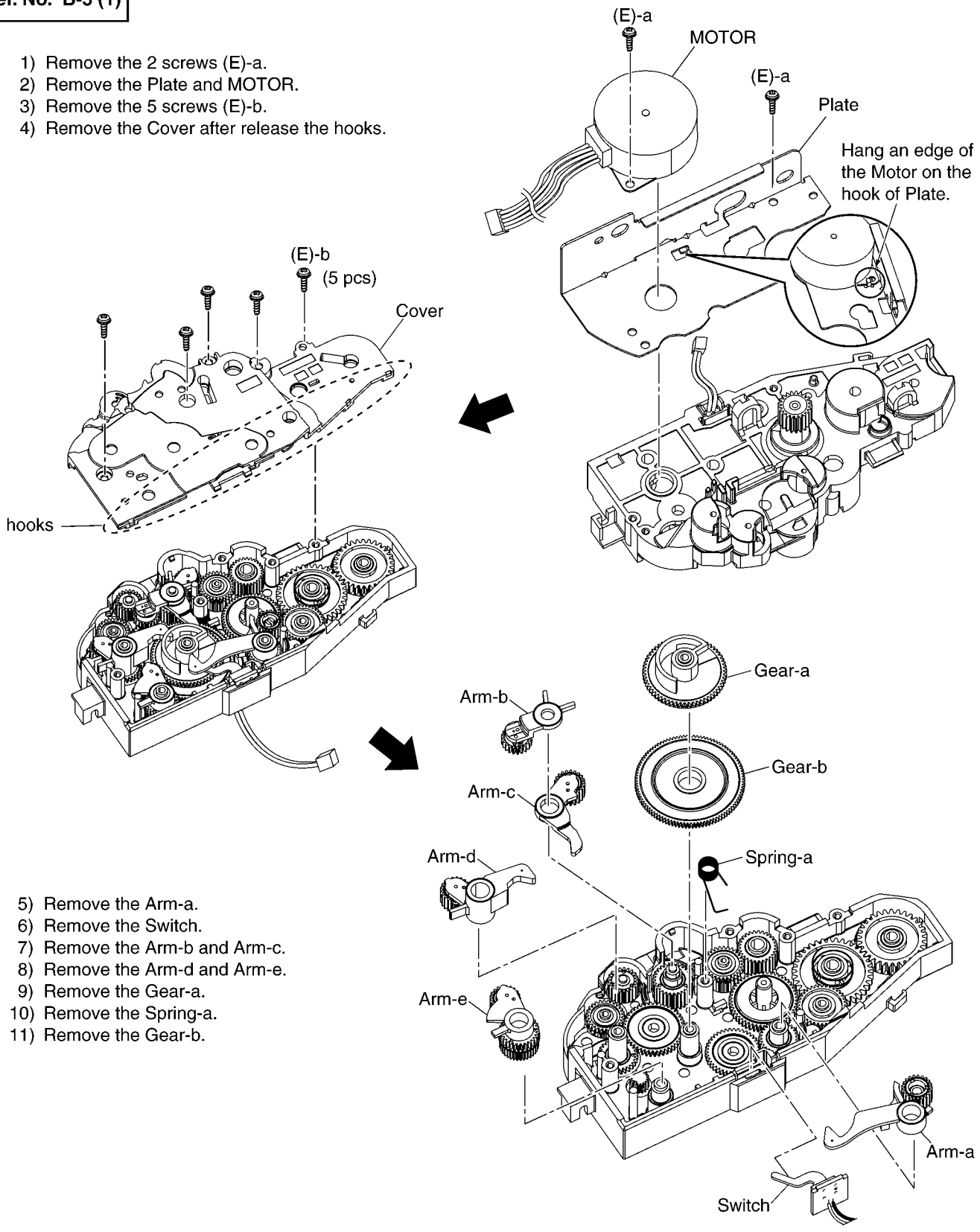
Fig. H

14.3.7. How to Remove the Gears, Motors and Arms of the Gear Block

PROCEDURE: B-1→B-2→B-4→B-5

Ref. No. B-5 (1)

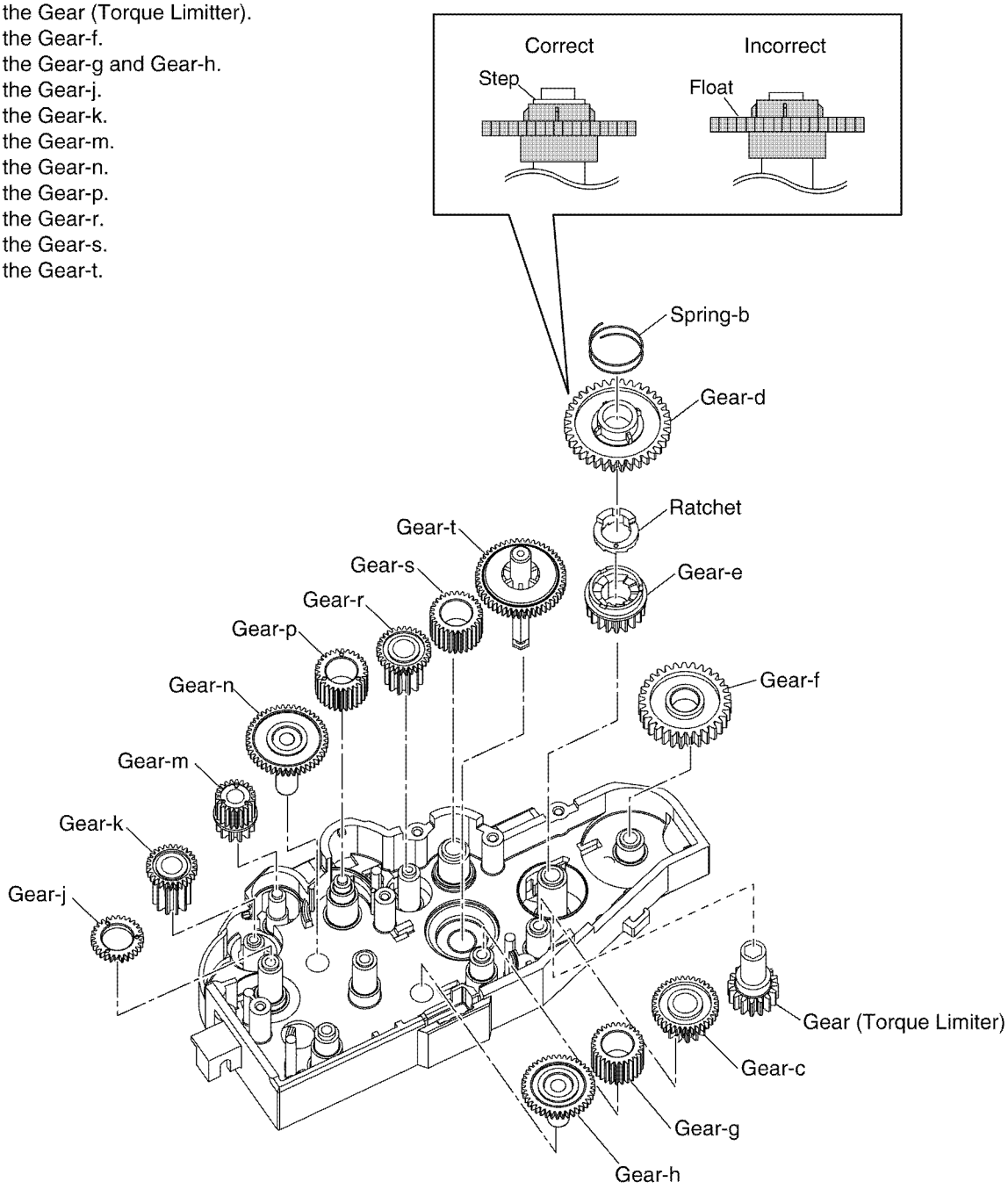
1) Remove the 2 screws (E)-a.
2) Remove the Plate and MOTOR.
3) Remove the 5 screws (E)-b.
4) Remove the Cover after release the hooks.



5) Remove the Arm-a.
6) Remove the Switch.
7) Remove the Arm-b and Arm-c.
8) Remove the Arm-d and Arm-e.
9) Remove the Gear-a.
10) Remove the Spring-a.
11) Remove the Gear-b.

Ref. No. B-5 (2)

12) Remove the Gear-c.
13) Remove the Spring-b.
14) Remove the Gear-d.
15) Remove the Ratchet and Gear-e.
16) Remove the Gear (Torque Limitter).
17) Remove the Gear-f.
18) Remove the Gear-g and Gear-h.
19) Remove the Gear-j.
20) Remove the Gear-k.
21) Remove the Gear-m.
22) Remove the Gear-n.
23) Remove the Gear-p.
24) Remove the Gear-r.
25) Remove the Gear-s.
26) Remove the Gear-t.

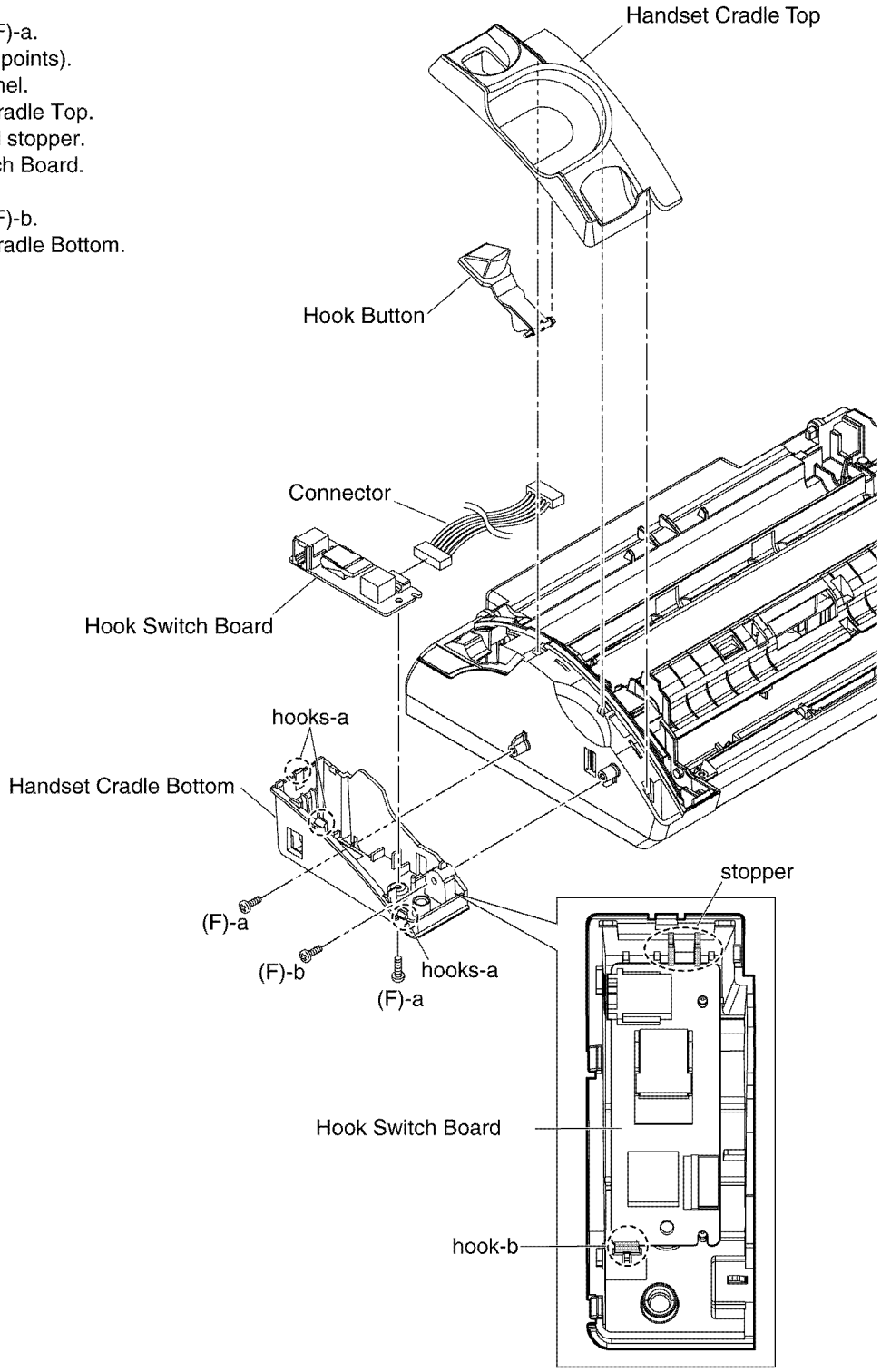


14.3.8. How to Remove the Cradle and Hook Switch Board

PROCEDURE: B-6

Ref. No. B-6

1) Remove the 2 screws (F)-a.
2) Release the hooks-a (3 points).
3) Open the Operation Panel.
4) Remove the Handset Cradle Top.
5) Release the hook-b and stopper.
6) Remove the Hook Switch Board.
7) Remove the Connector.
8) Remove the 1 screws (F)-b.
9) Remove the Handset Cradle Bottom.

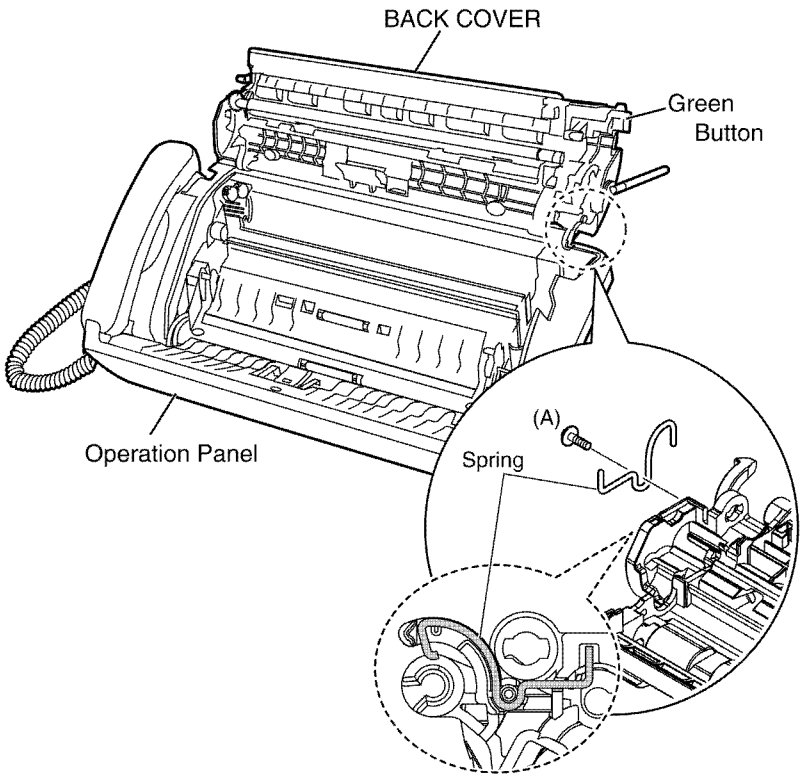


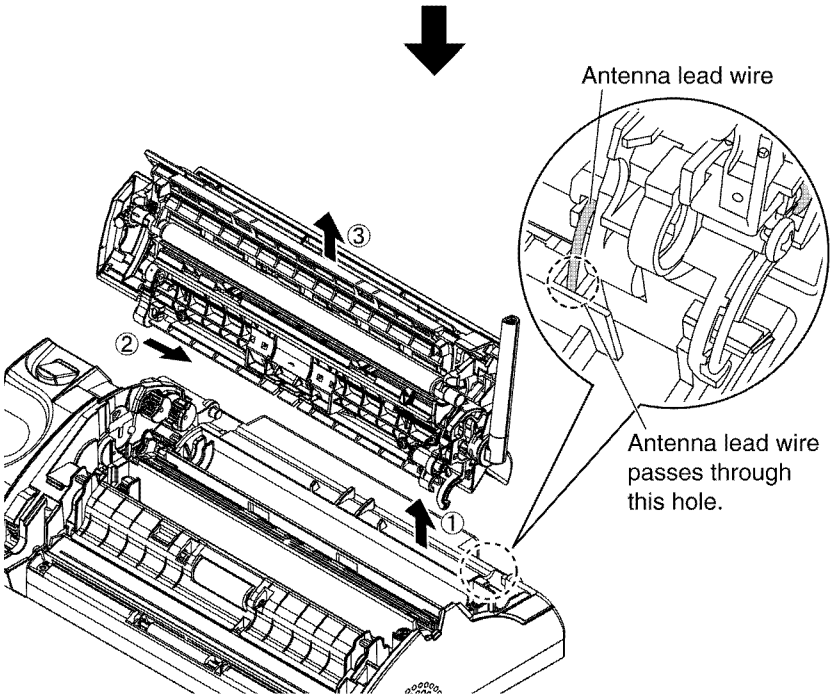
14.3.9. How to Remove the Back Cover

PROCEDURE: B-1→B-2→C-1

Ref. No. C-1

1) Unsolder the Antenna lead wire on the Digital Board. (Refer to **B-2**.)
2) Push the Green Button to open the Operation Panel and Back Cover.
3) Remove the 1 screw (A).
4) Remove the Spring.
5) Remove the BACK COVER.





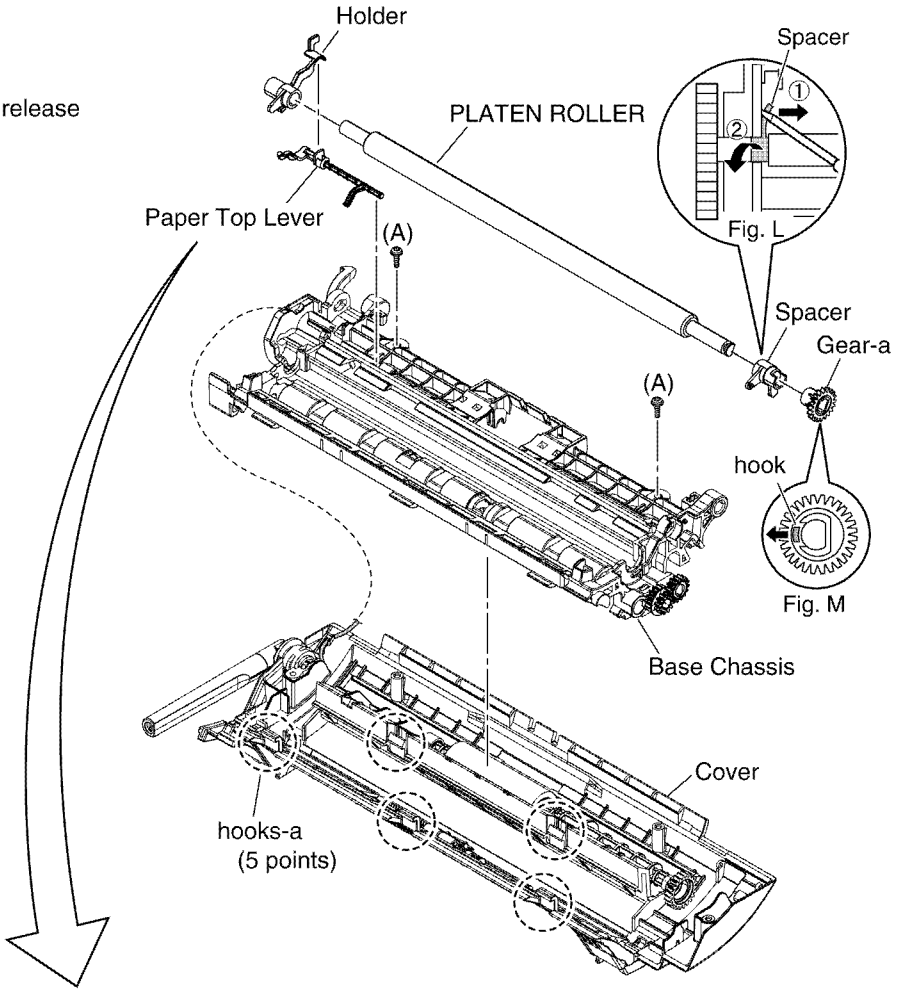
14.3.10. How to Remove the Platen Roller and Lock Lever

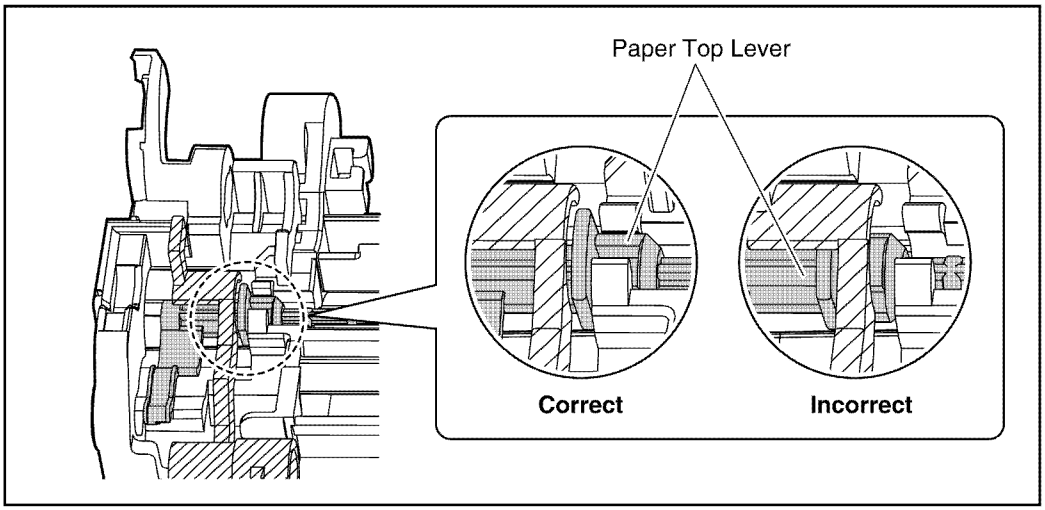
PROCEDURE: B-1→B-2→C-1→C-2

Ref. No. C-2 (1)

1) Release the Spacer, as shown in a Fig. L.
2) Release the hook of Gear-a, as shown in a Fig. M.
3) Remove the Gear-a.
4) Remove the PLATEN ROLLER.
5) Remove the 2 screws (A).
6) Remove the Base Chassis after release the 5 hooks-a.

(Lower Side View)



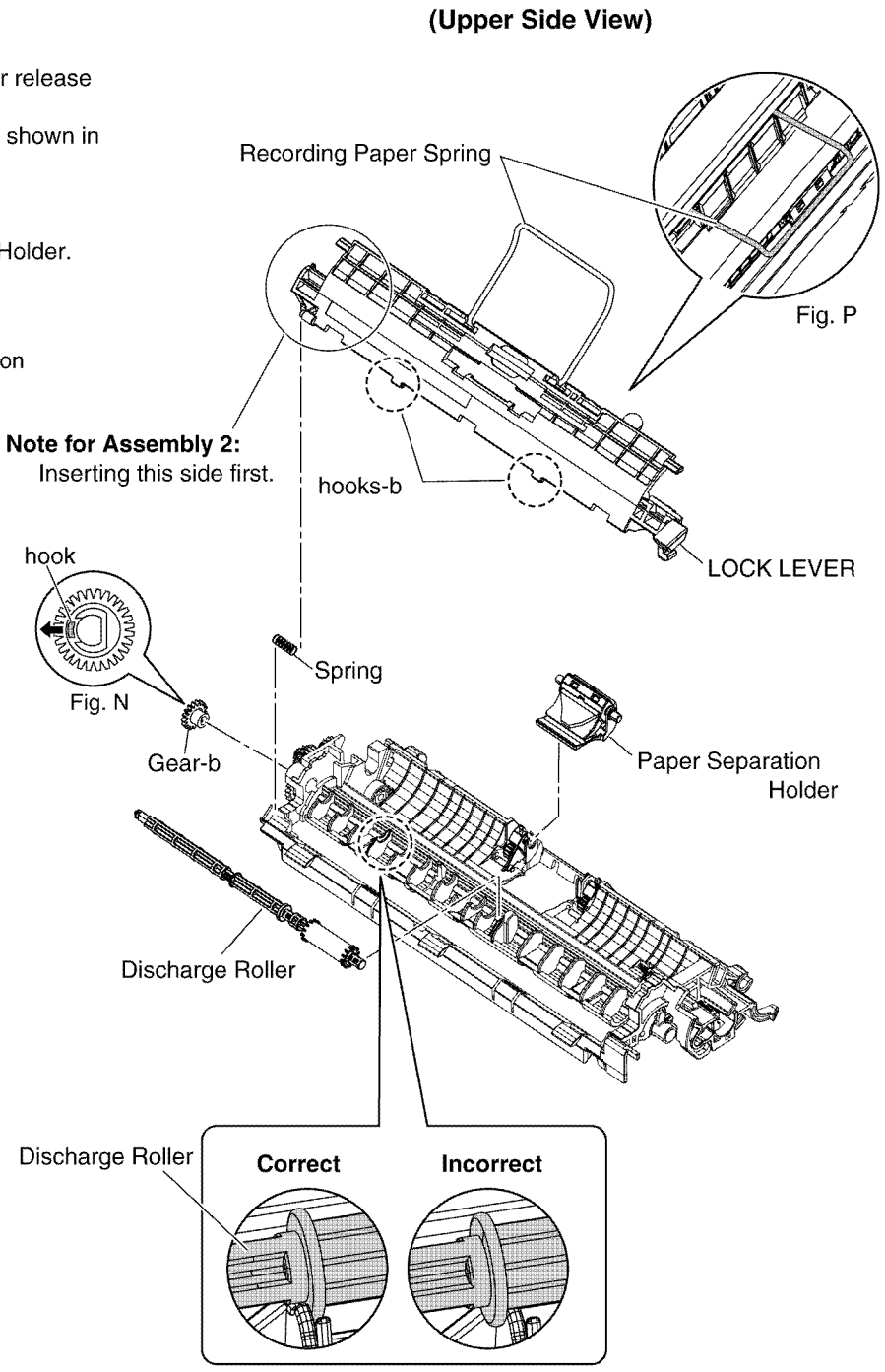


Ref. No. C-2 (2)

7) Remove the Spring.
8) Remove the LOCK LEVER after release the 2 hooks-b.
9) Release the hook of Gear-b, as shown in a Fig. N.
10) Remove the Gear-b.
11) Remove the Discharge Roller.
12) Remove the Paper Separation Holder.

Note for Assembly 1:

- When Base Chassis is inserted in the Cover, be careful of the insertion of Recording paper spring. (See Fig. P)



14.3.11. How to Remove the Pickup Roller and Antenna

PROCEDURE: B-1→B-2→C-1→C-2→C-3

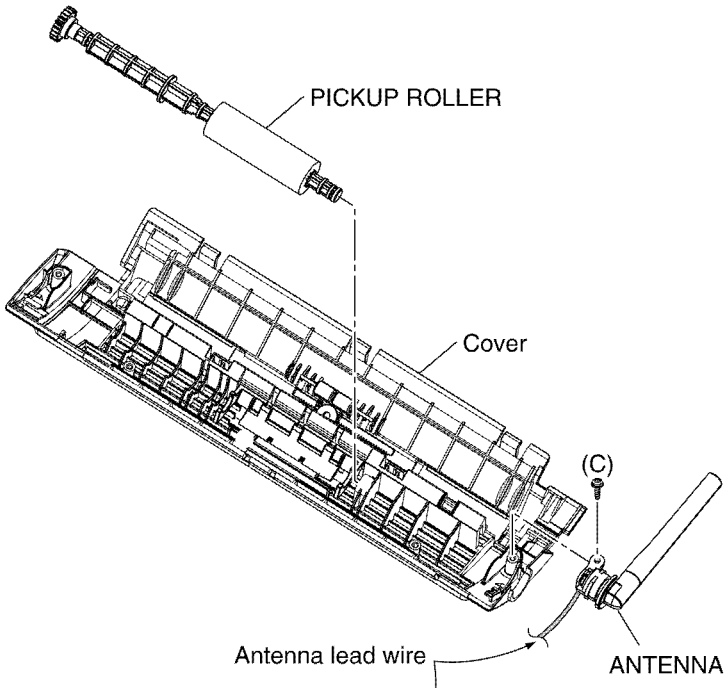
Ref. No. C-3

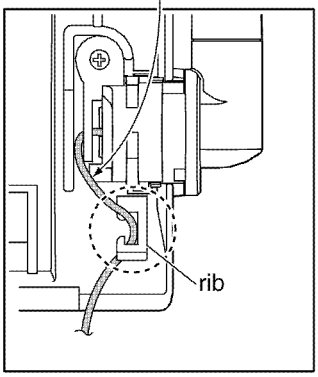
PICK UP ROLLER

1) Remove the PICK UP ROLLER.

ANTENNA

1) Remove the 1 screw (C).
2) Remove the ANTENNA.





•Hook an Antenna lead wire on the rib, as shown in a figure.

14.3.12. How to Remove the Operation Panel

PROCEDURE: B-1→B-2→D-1

Ref. No. D-1

1) Disconnect the Operation lead wire and Mic lead wire on the Digital Board. (Refer to **B-2**.)
2) Open the Operation Panel.
3) Release the both Arms, as shown in a Fig. Q.
4) **Release the Earth Spring from the Main Cabinet certainly.**
5) Remove the OPERATION PANEL from Main Cabinet.

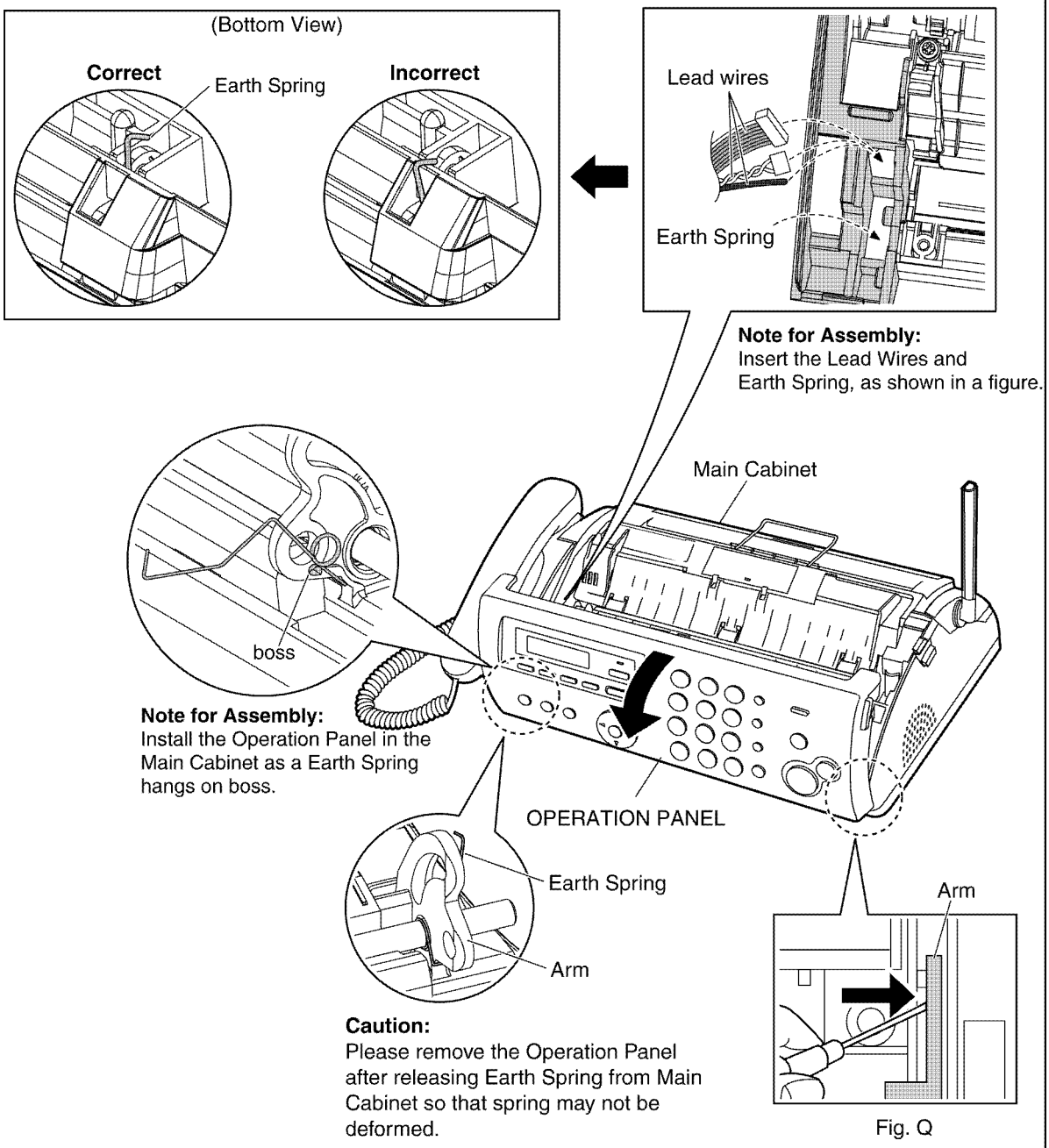


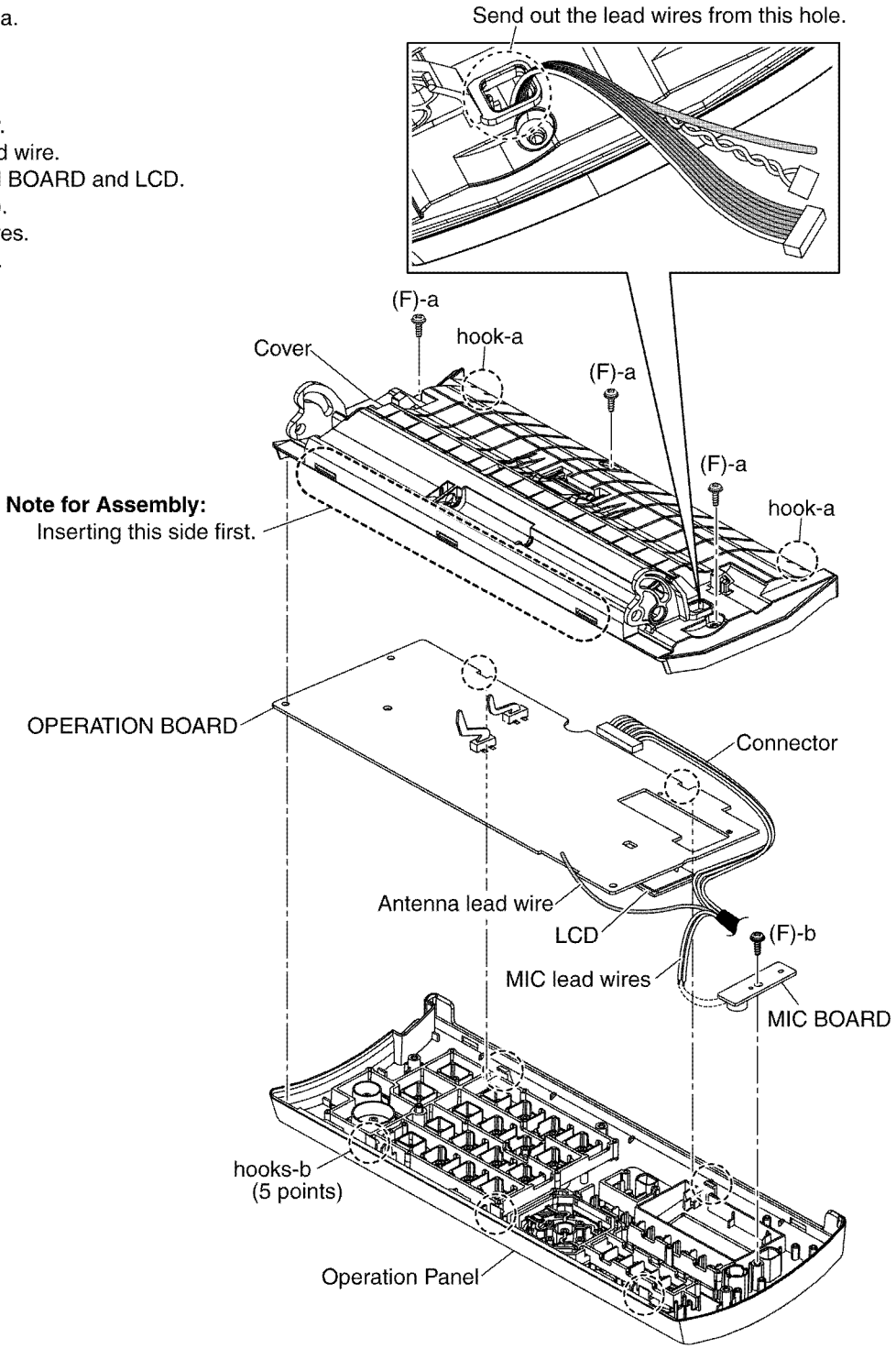
Fig. Q

14.3.13. How to Remove the Operation Board, MIC Board and LCD

PROCEDURE: B-1→B-2→D-1→D-2

Ref. No. D-2

1) Remove the 3 screws (F)-a.
2) Release the 2 hooks-a.
3) Remove the Cover.
4) Release the 5 hooks-b.
5) Disconnect the Connector.
6) Unsolder the Antenna lead wire.
7) Remove the OPERATION BOARD and LCD.
8) Remove the 1 screw (F)-b.
9) Unsolder the MIC lead wires.
10) Remove the MIC BOARD.



14.3.14. How to Remove the Separation Holder and Exit Roller

PROCEDURE: B-1→B-2→D-1→D-3

Ref. No. D-3

SEPARATION HOLDER

1) Release the hook. (See Fig. R)
2) Remove the Document Feed Support. (See Fig. R)
3) Remove the SEPARATION HOLDER.

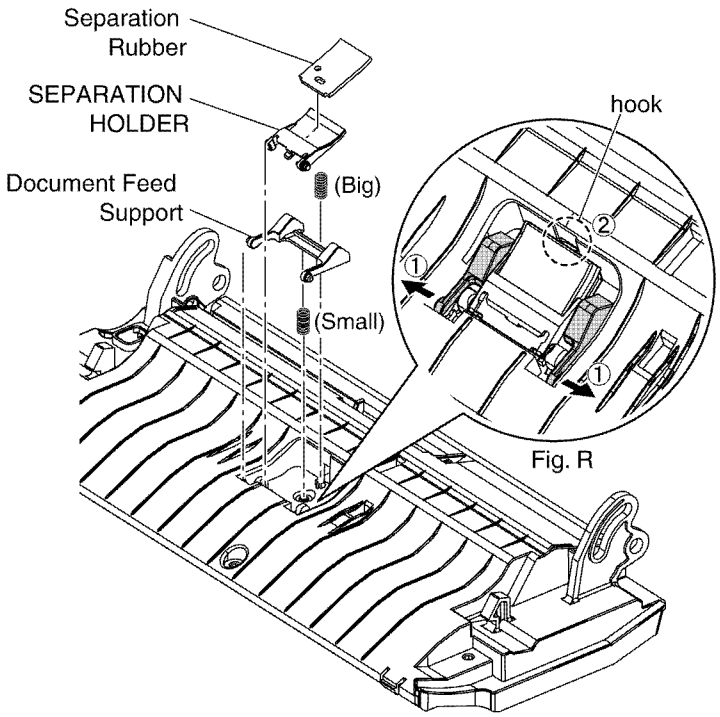


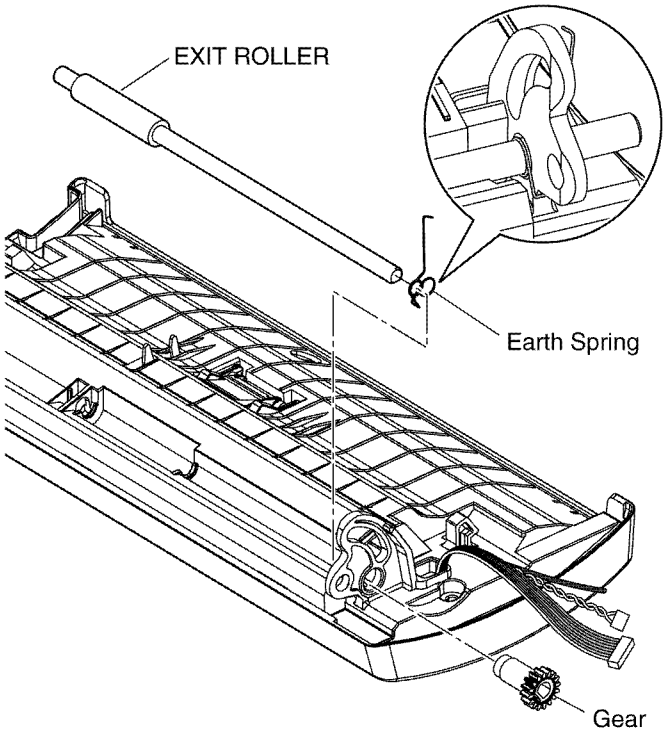
Fig. R

EXIT ROLLER

1) Pull out the Gear from Exit Roller.
2) Remove the EXIT ROLLER.

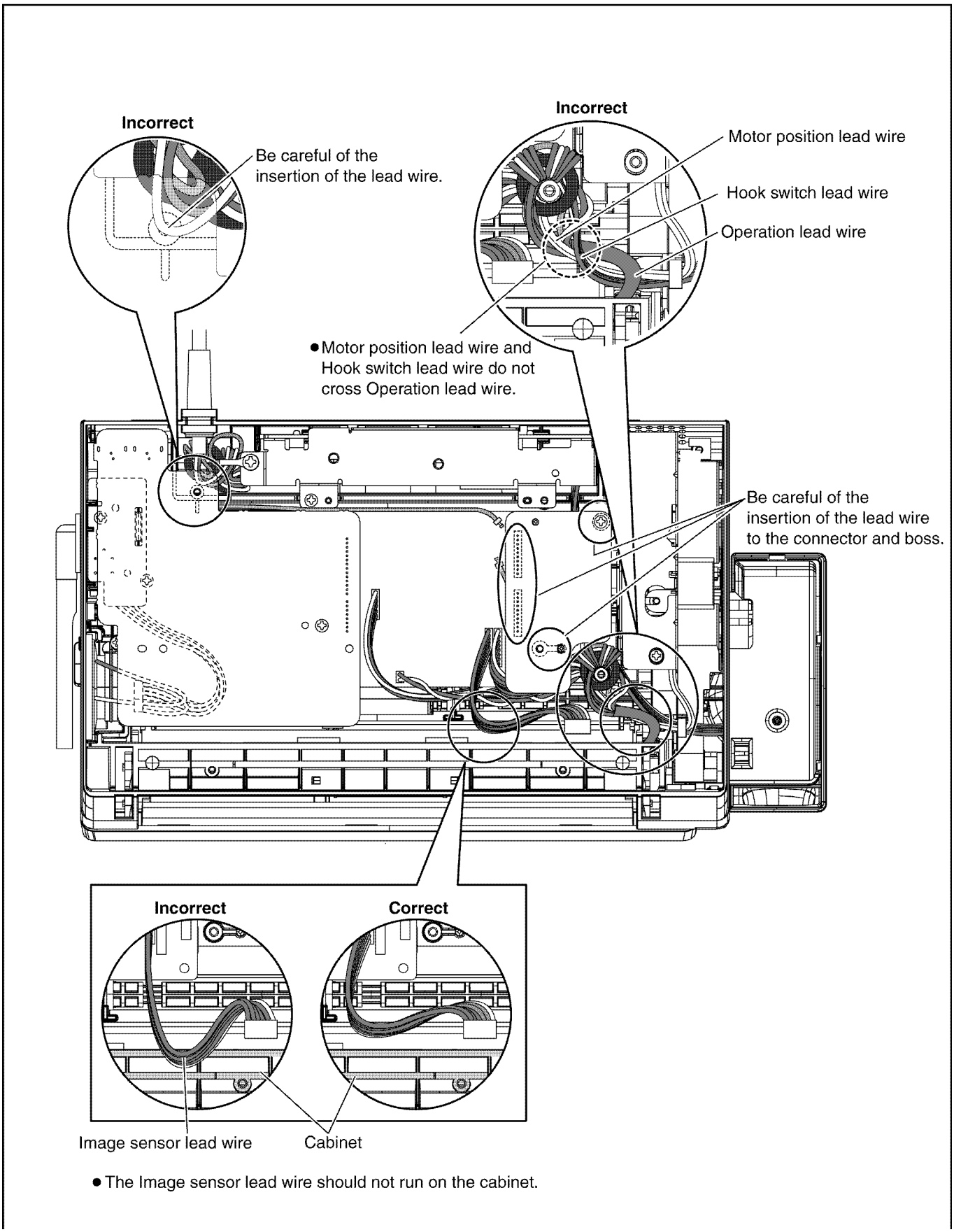
Caution:

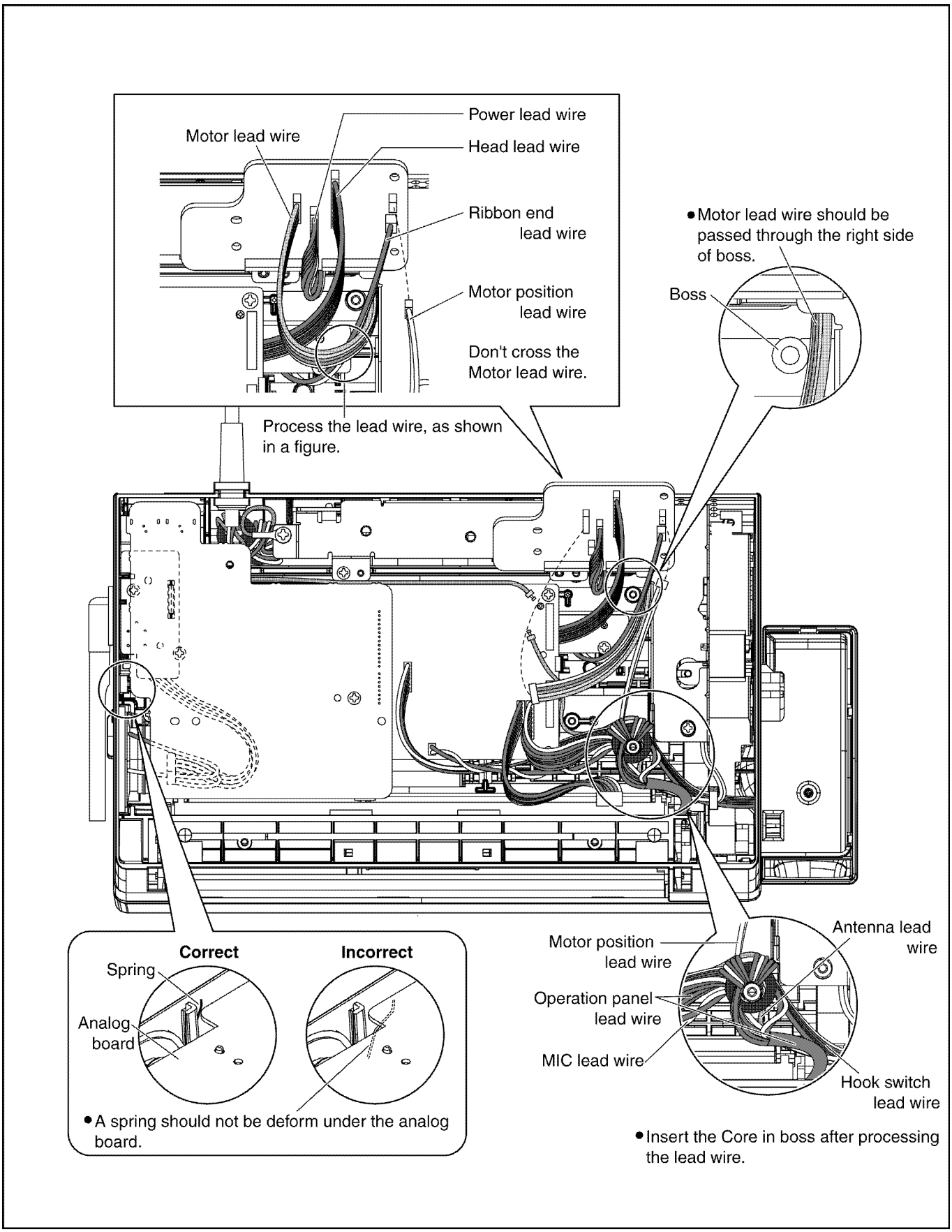
Be careful not to deform the Earth Spring.

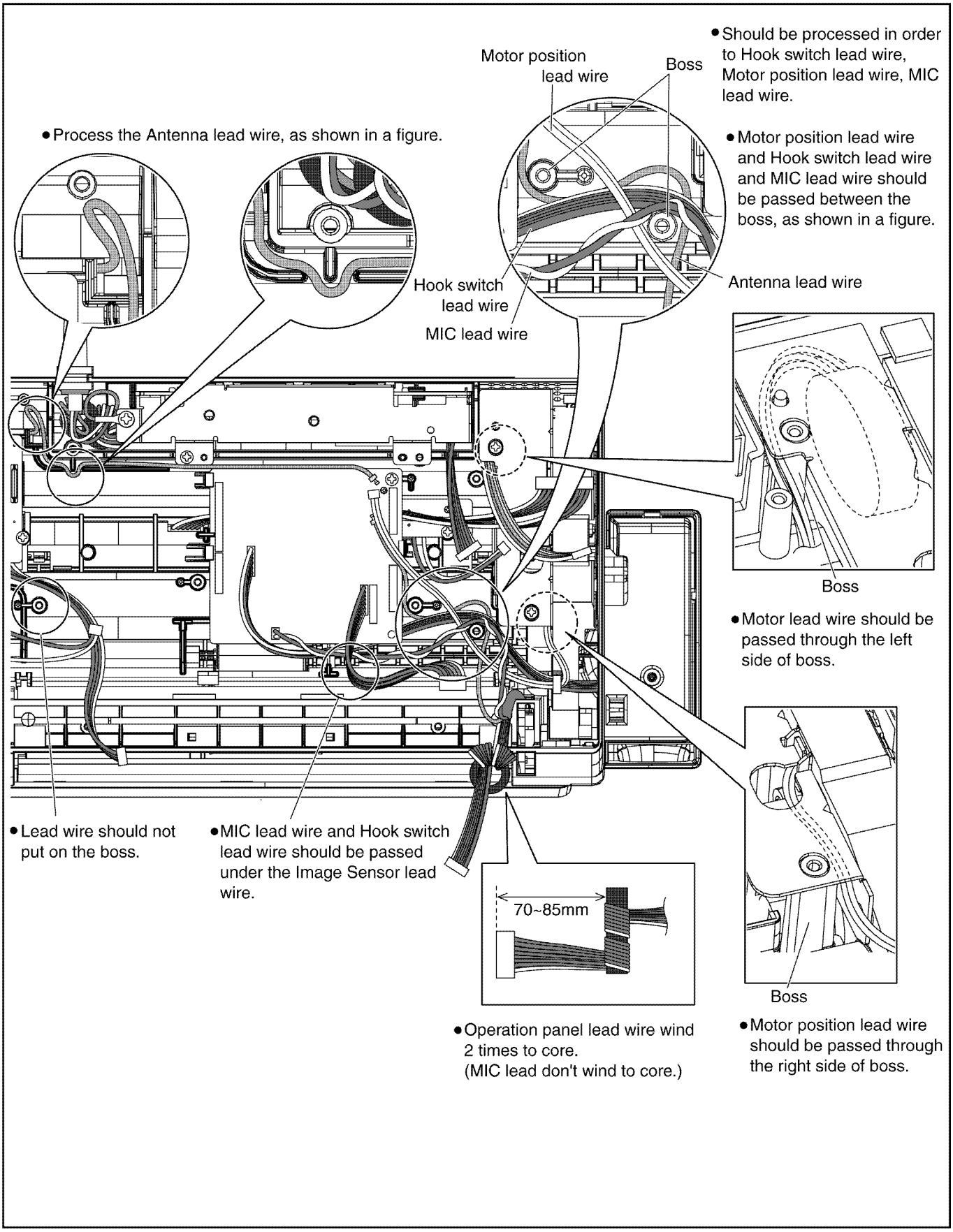


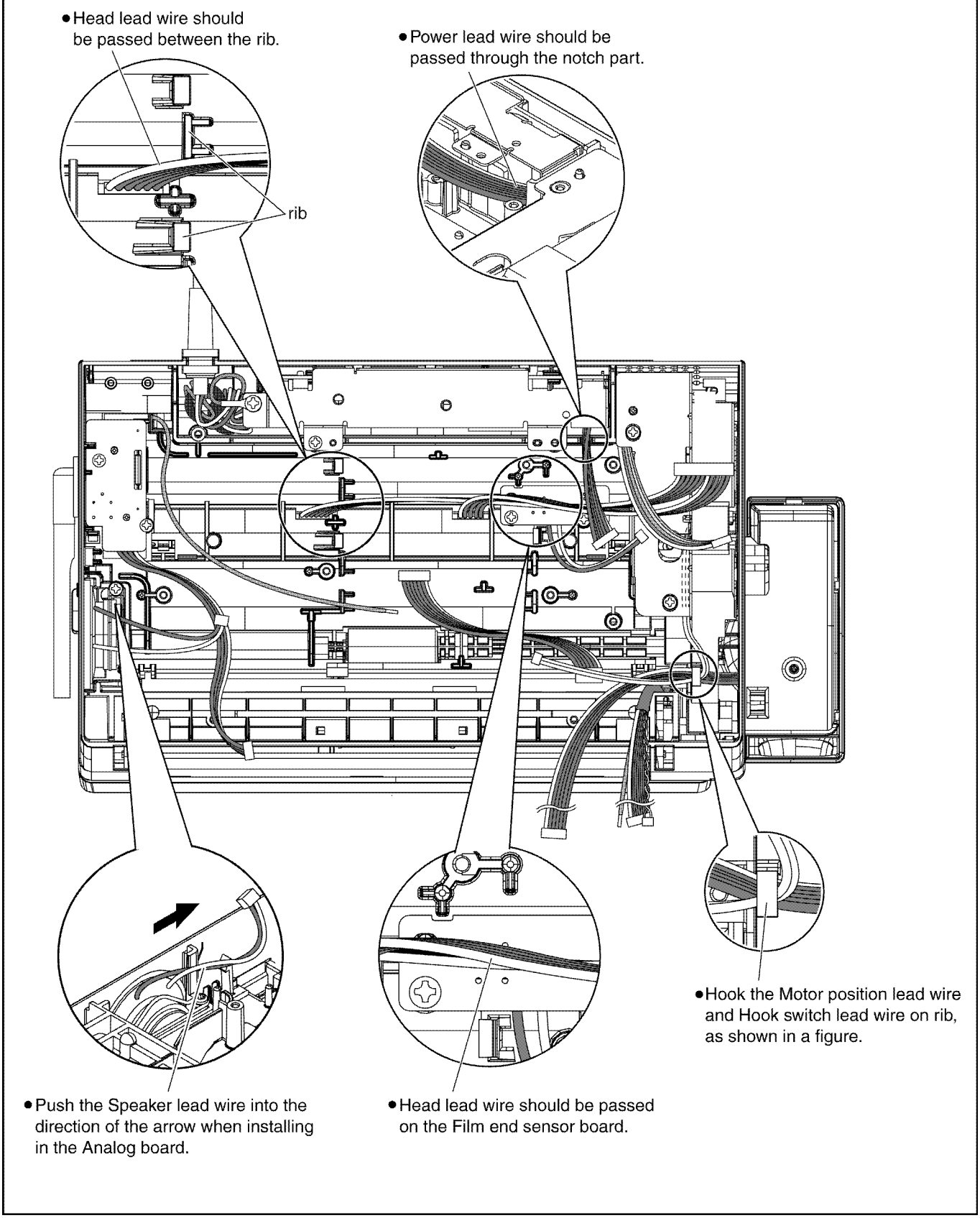
14.3.15. Installation Position of the Lead Wires

14.3.15.1. Lower Section

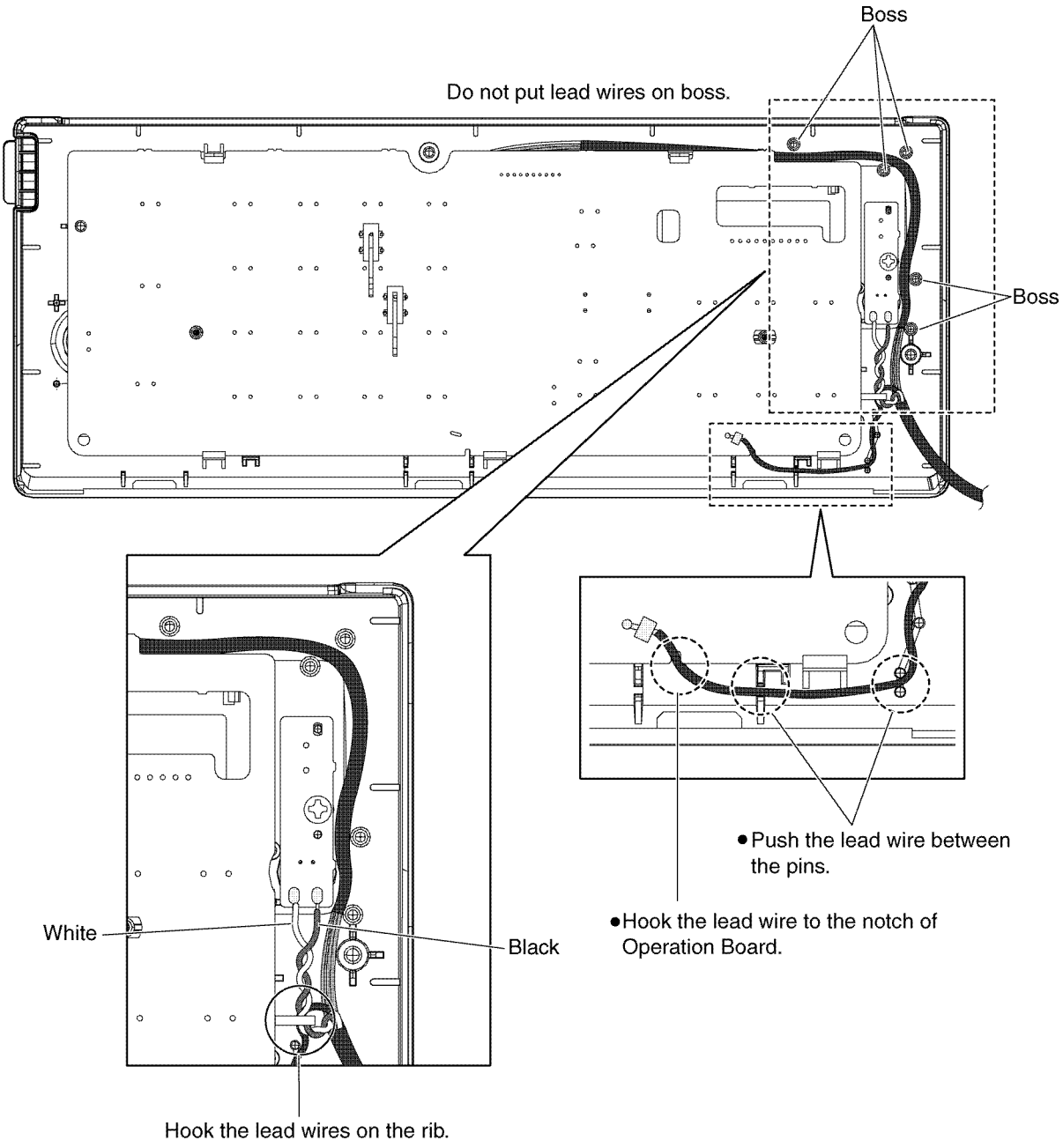



Motor lead wire
Power lead wire
Head lead wire
Ribbon end lead wire
Motor position lead wire
Don't cross the Motor lead wire.
Process the lead wire, as shown in a figure.
• Motor lead wire should be passed through the right side of boss.
Boss
Correct
Incorrect
Spring
Analog board
• A spring should not be deform under the analog board.
Motor position lead wire
Antenna lead wire
Operation panel lead wire
MIC lead wire
Hook switch lead wire
• Insert the Core in boss after processing the lead wire.

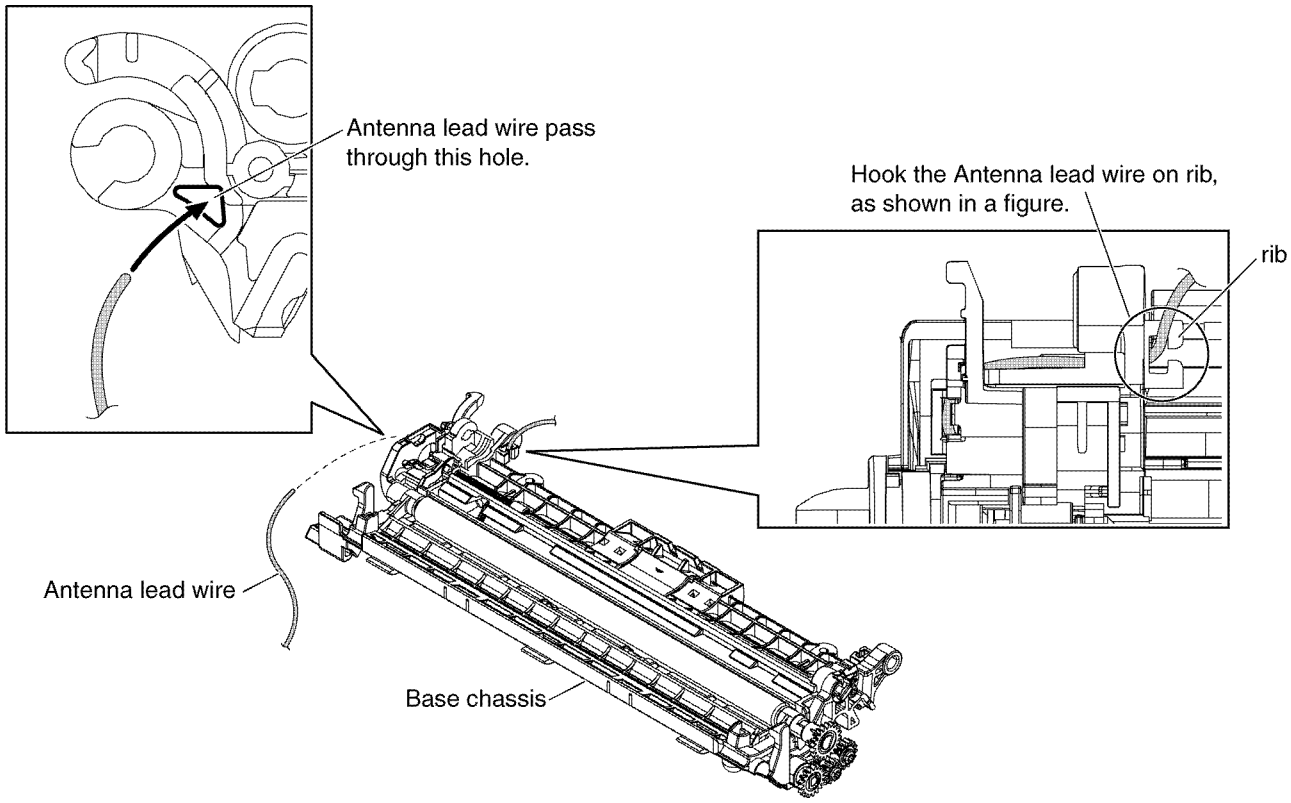

● Should be processed in order to Hook switch lead wire, Motor position lead wire, MIC lead wire.
Motor position lead wire
Boss
● Process the Antenna lead wire, as shown in a figure.
● Motor position lead wire and Hook switch lead wire and MIC lead wire should be passed between the boss, as shown in a figure.
Hook switch lead wire
MIC lead wire
Antenna lead wire
Boss
● Motor lead wire should be passed through the left side of boss.
● Lead wire should not put on the boss.
● MIC lead wire and Hook switch lead wire should be passed under the Image Sensor lead wire.
70~85mm
Boss
● Operation panel lead wire wind 2 times to core.
(MIC lead don't wind to core.)
● Motor position lead wire should be passed through the right side of boss.


● Head lead wire should be passed between the rib.
rib
● Power lead wire should be passed through the notch part.
● Hook the Motor position lead wire and Hook switch lead wire on rib, as shown in a figure.
● Push the Speaker lead wire into the direction of the arrow when installing in the Analog board.
● Head lead wire should be passed on the Film end sensor board.

14.3.15.2. Operation Panel Section



14.3.15.3. Back Cover Section

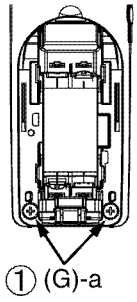


14.3.16. How to Remove the Cordless Handset Board

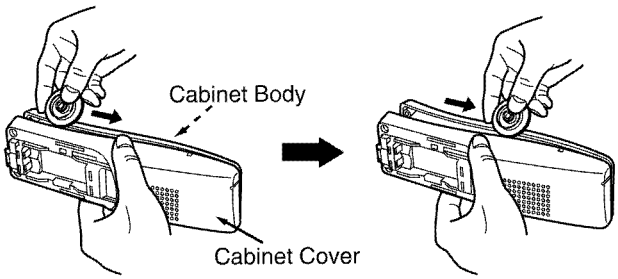
PROCEDURE: E-1

Ref. No. E-1

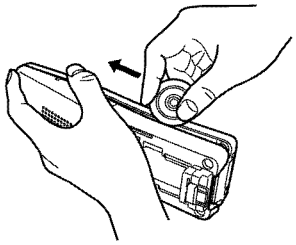
① Remove the 2 screws (G)-a.



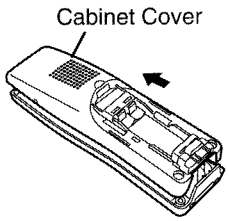
② Insert a JIG (PQDJ10006Y) between the Cabinet Body and the Cabinet Cover, then pull it along the gap to open the Cabinet.



③ Likewise, open the other side of the Cabinet.



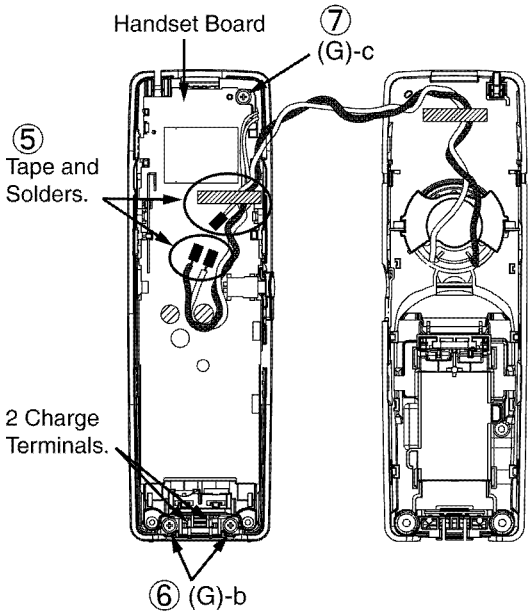
④ Remove the Cabinet Cover by pushing it upward.



⑤ Remove the Tape and Solders.

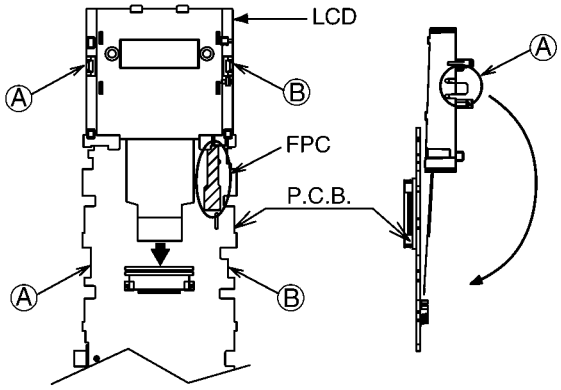
⑥ Remove the 2 screws (G)-b to remove the 2 Charge Terminals.

⑦ Remove the screw (G)-c to remove the Main P. C. Board.

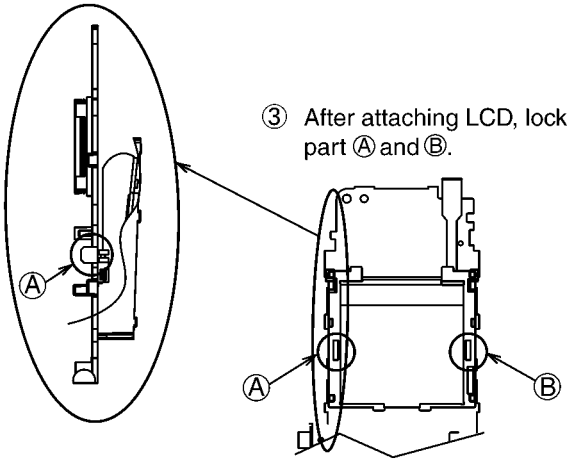


14.3.16.1. Fix the LCD to the Cordless Handset Board

① Attach LCD to P.C.B.
*When attaching the LCD holder, don't pull the FPC (Flexible Print Circuit).

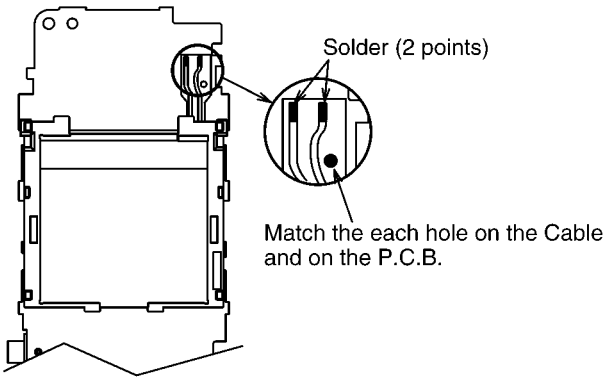


② Locate the Flat Cable inside as shown.

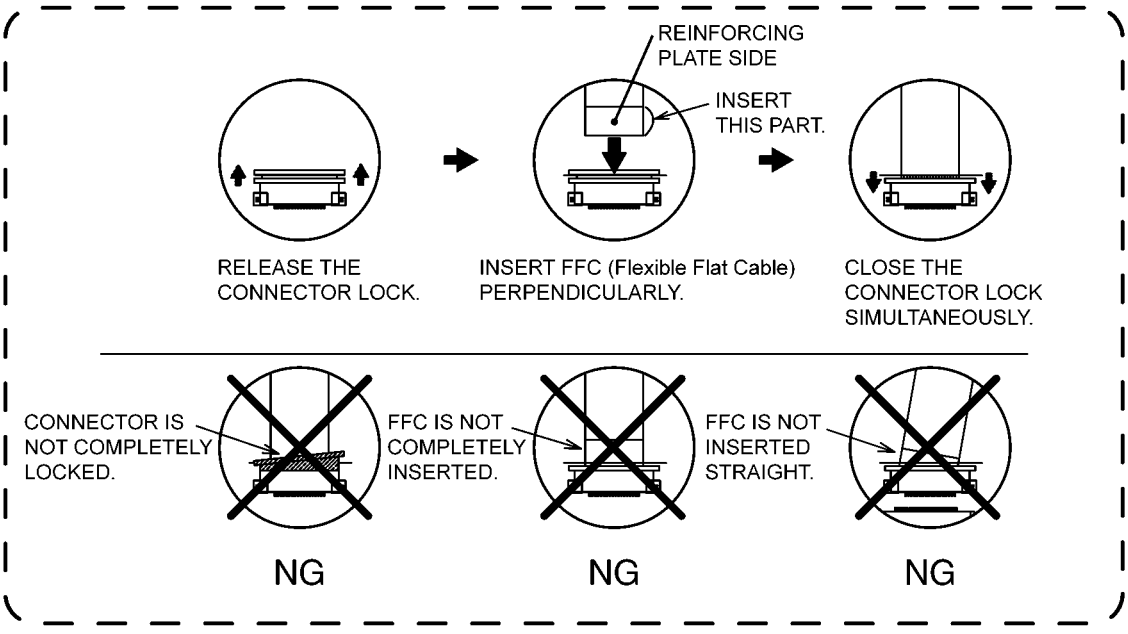


③ After attaching LCD, lock it with part Ⓐ and Ⓑ.

④ Solder the narrow Cable to the P.C.B.
*When soldering, don't give the load to the FPC.



<Details of step ① above>

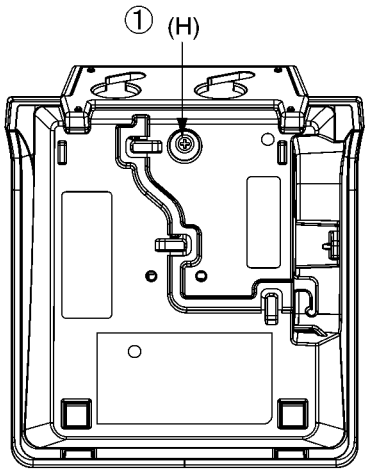


14.3.17. How to Remove the Charger Board

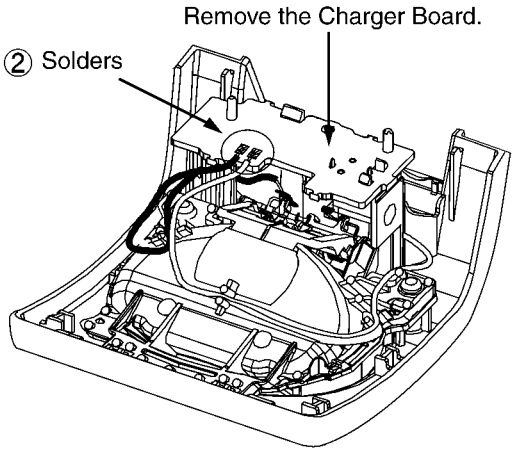
PROCEDURE: F-1

Ref. No. F-1

① Remove the screw (H) to remove the Cabinet Cover.



② Remove the Solders to remove the Charger Board.



15 Measurements and Adjustments

15.1. Cordless Base Section (Digital Board) Adjustment

When you have replaced EEPROM or BBIC or X'tal, adjustment is necessary.
This supplement will explain further details for adjustment.

15.1.1. Equipment Required

1. PQZZ1CD300E*
3 wire cable: It connect the Digital Board and PC.

2. PFZZFC255CX
Batch Files: it's executed on PC.
Please copy "Base" folder in PFZZFC255CX (CD-ROM) folder including Batch files to your PC.

3. PC
Input a command for adjustment.

4. Frequency Counter
It's to adjust frequncy(10.368000MHz) of BBIC.
It requires an accuracy that can measure 1Hz. (precise; ±1ppm)

5. Digital multimeter
It's to adjust voltage (1.8V) of BBIC.

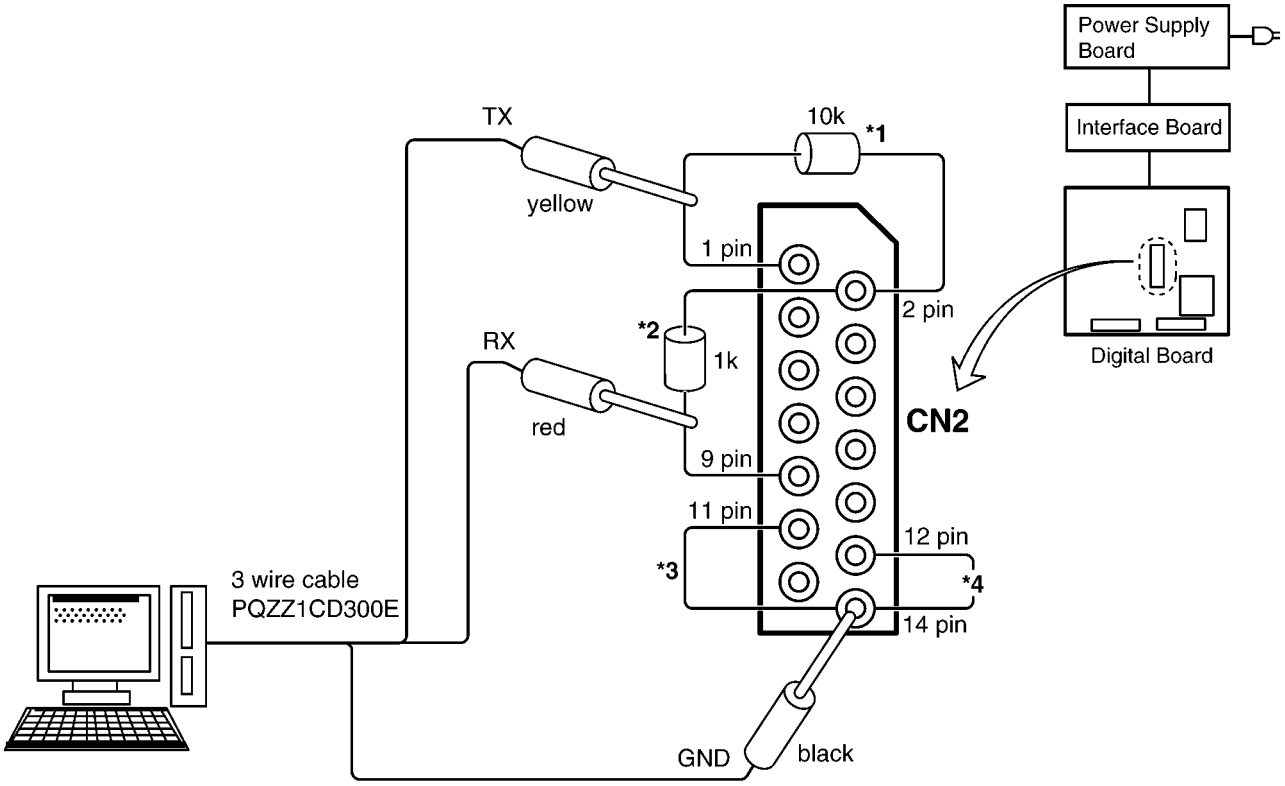
Note:
*: If you have the JIG Cable for FC245 series (TCD500 series) [PQZZ1CD505E], change the following values of resistance. Then you can use it as a JIG Cable for both this model and FC245 series (TG8100 and TCD500 series). (It is an upper compatible JIG Cable.)

Resistor	Old value (kΩ)	New value (kΩ)
R2	22	3.3
R3	22	3.3
R4	22	4.7
R7	4.7	10

15.1.2. PC Setting

15.1.2.1. Connections

At pins of CN2 on the back side of the digital board
Please connect the component and the cable as follows:



Refer to **Adjustment Standard (Base Unit)** (P.175).
***1: 10k resistor**: Please put it between 1pin and 2pin and connect TX cable from PC. (ERDS2TJ103T or ERDS1TJ103T)
***2: 1k resistor**: Please put it between 9pin and 2pin and connect RX cable from PC. (ERDS2TJ102T or ERDS1TJ102T)
***3: wire**: Please put it between 11pin and 14pin (shorted) and connect GND cable from PC. (This makes a board 3 wire mode.)
***4: 2 wires**: Please put it 12pin and 14pin. **Please connect 2 wires after turning power on. (this makes reset)**

15.1.2.2. Batch Files Settings

Please copy "Base" folder in PFZZFC***** (CD-ROM) folder including Batch files to your PC.

How to use it:
1. Open COMMAND PROMPT window
2. Change directly to PFZZFC***** refer to Figure-1.
   This is an example for there is a folder in D drive.
3. Type "set_com 1" and push Enter key.
   (When com port 1 is used for the connection)
4. Type "doskey" and push Enter key.

It is just ready to input a command for adjustment item.

```
Microsoft WindowsXP [Version]
(C) Copyright 1985 - 2001

C: ¥WINDOWS>d:
D: ¥>cd D:¥PFZZFC*****
D: ¥PFZZFC***** >set_com 1
D: ¥PFZZFC***** >doskey
D: ¥PFZZFC***** >
```

<Figure-1>

Here is the screen that appears when batch file is copied into the D drive.

Note:
- "*****" varies depending on the country.
- See the **Command** (P.172) for frequently used commands.

15.1.2.3. Command

command	function and how to use
readid	read ID number of Base unit
writeid ** ** ** ** **	write ID number of Base unit **: ID number, example if ID number is 007B700000, input 00 7B 70 00 00
rdeeprom ** ** **	read EEPROM with address 1st, 2nd **: Address you want: example: if you want to read address 0010, input 00 10. 3rd ** data length: example: if you want to read 10 datas from address ** **, input 10.
wreeprom ** ** ** **	write EEPROM with address 1st, 2nd **: Address you want: example: if you want to write to address 0010, input 00 10. 3rd ** data length: example: if you want to write 2 datas from address ** **, input 2. 4th ** data example: if you want to write datas "01" from address ** **, input 01.
eeprom_fc_init	initialize EEPROM: default vales are written to EEPROM
getver	get Version of BBIC software: you can check Version.
conttx	output RF CLK continuously

15.1.3. How to Adjust

15.1.3.1. In Case of EEPROM Replacement

When you replace EEPROM, you need to adjust **Frequency** and **Voltage**.
ID number has been already written to the EEPROM that you take from service center.

1. Initilize please input initialzing command "eeprom_fc_init"
2. Adjust **Frequency** and **Voltage**.
   --> Refer to "**Frequency and Voltage Adjustment**"
3. Confirm ID of Base unit.
   Please check ID number with "readid" command.
   If ID is 00 00 00 00 00, please replace again.
4. Re-register CDL Handsets <-- Don't forget please.

```
Microsoft WindowsXP [Version]
(C) Copyright 1985 - 2001

C: ¥WINDOWS>d:
D: ¥>cd D:¥PFZZFC*****
D: ¥PFZZFC***** >set_com 1
D: ¥PFZZFC***** >doskey
D: ¥PFZZFC***** >eeprom_fc_init
D: ¥PFZZFC***** >
```

Here is the screen that appears when batch file is copied into the D drive.

Note:
- "*****" varies depending on the country.
- See the **Frequency and Voltage Adjustment** (P.173).

15.1.3.2. In Case of BBIC Replacement

When you replace BBIC, you need to adjust **Frequency** and **Voltage**. --> Refer to **Frequency and Voltage Adjustment** (P.173).

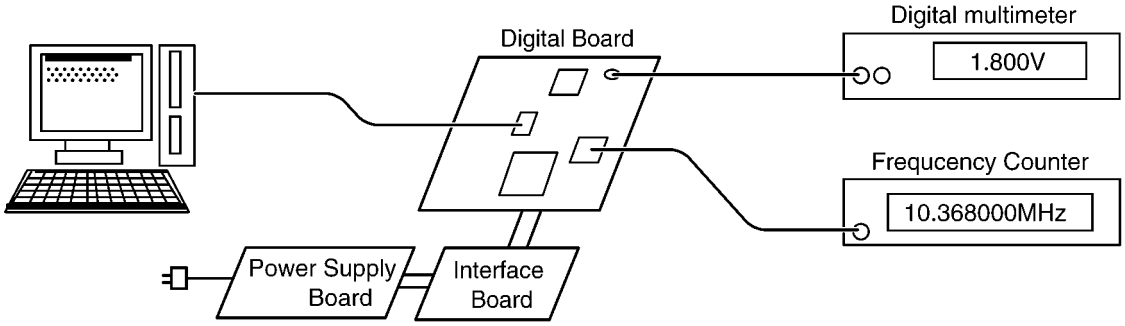
15.1.3.3. In Case of X'tal (X5) Replacement

When you replace X'tal, you need to adjust **Frequency**. --> Refer to **Frequency Adjustment** (P.173).

15.1.4. Frequency and Voltage Adjustment

15.1.4.1. Settings and Connectings

Please connect a Frequency counter to "RFCLK" point on the Digital Board located near the RF unit.
Please connect a Digital multimeter to "1.8V_A" or "1.8V_B" point on the Digital Board located near the BBIC.
See the **Adjustment Standard (Base Unit)** (P.175).



15.1.4.2. Frequency Adjustment

Adjustment value of frequency is at address "00 01" of EEPROM. (default value: 75)

After typing "eeprom_fc_init", please type "conttx" to output RFCLK. (In order to be continuously output RFCLK, it is necessary to type "conttx".)

If Frequency displayed on the frequency counter is lower than 10.368000MHz, please increase the value at 00 01.
In order to do it, please write a value with "**wreeprom 00 01 01 ∗∗**" command.
If you increase 1, input "wreeprom 00 00 01 76".
If frequency is higher, please write decreased value to.

Frequency should be
10.367990MHz < frequency < 10.368010MHz

```
Microsoft WindowsXP [Version]
(C) Copyright 1985 - 2001

C: ¥WINDOWS>d:
D: ¥>cd D:¥PFZZFC*****
D: ¥PFZZFC***** >set_com 1
D: ¥PFZZFC***** >doskey
D: ¥PFZZFC***** >eeprom_fc_init
D: ¥PFZZFC***** >conttx
D: ¥PFZZFC***** >wreeprom 00 01 01 76
```

Here is the screen that appears when batch file is copied into the D drive.

Note:
"****" varies depending on the country.

15.1.4.3. Voltage Adjustment

Adjustment value of voltage is at address 00 02 of EEPROM. (default value: 08)

If 1.8V_voltage displayed on the Digital multimeter is higher than 1.85v, please decrease the value at 00 02.

Please write a value with "**wreeprom 00 02 01 ＊＊**" command.
If you decrease 1, input "wreeprom 00 02 01 07".
If voltage is lower, please write increased value to.

Voltage should be
1.75V < Voltage < 1.85V

```
Microsoft WindowsXP [Version]
(C) Copyright 1985 - 2001

D: ¥>cd D:¥PFZZFC*****
D: ¥PFZZFC***** >set_com 1
D: ¥PFZZFC***** >doskey
D: ¥PFZZFC***** >eeprom_fc_init
D: ¥PFZZFC***** >wreeprom 00 01 01 76
D: ¥PFZZFC***** >wreeprom 00 02 01 07
D: ¥PFZZFC***** >
```

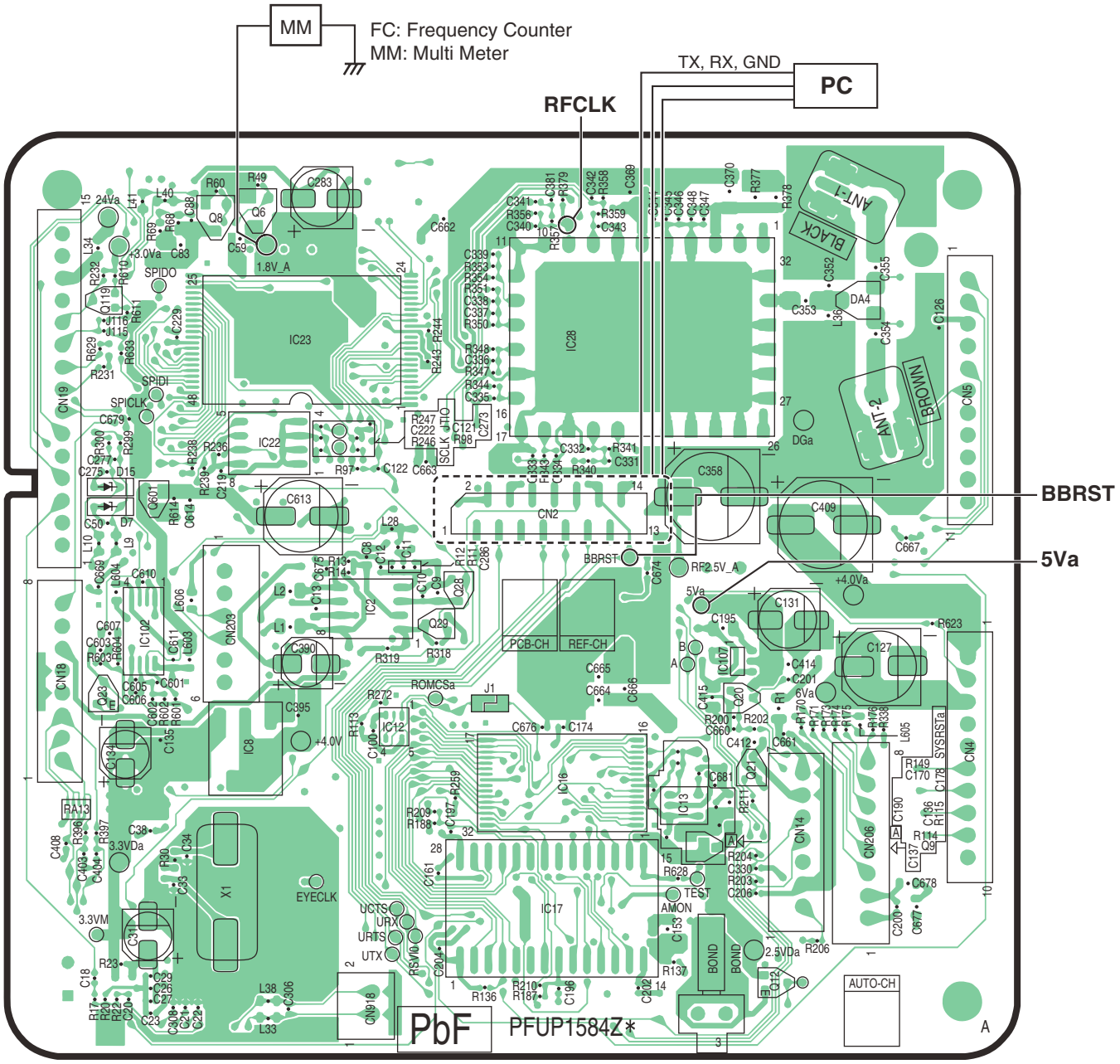
Here is the screen that appears when batch file is copied into the D drive.

Note:

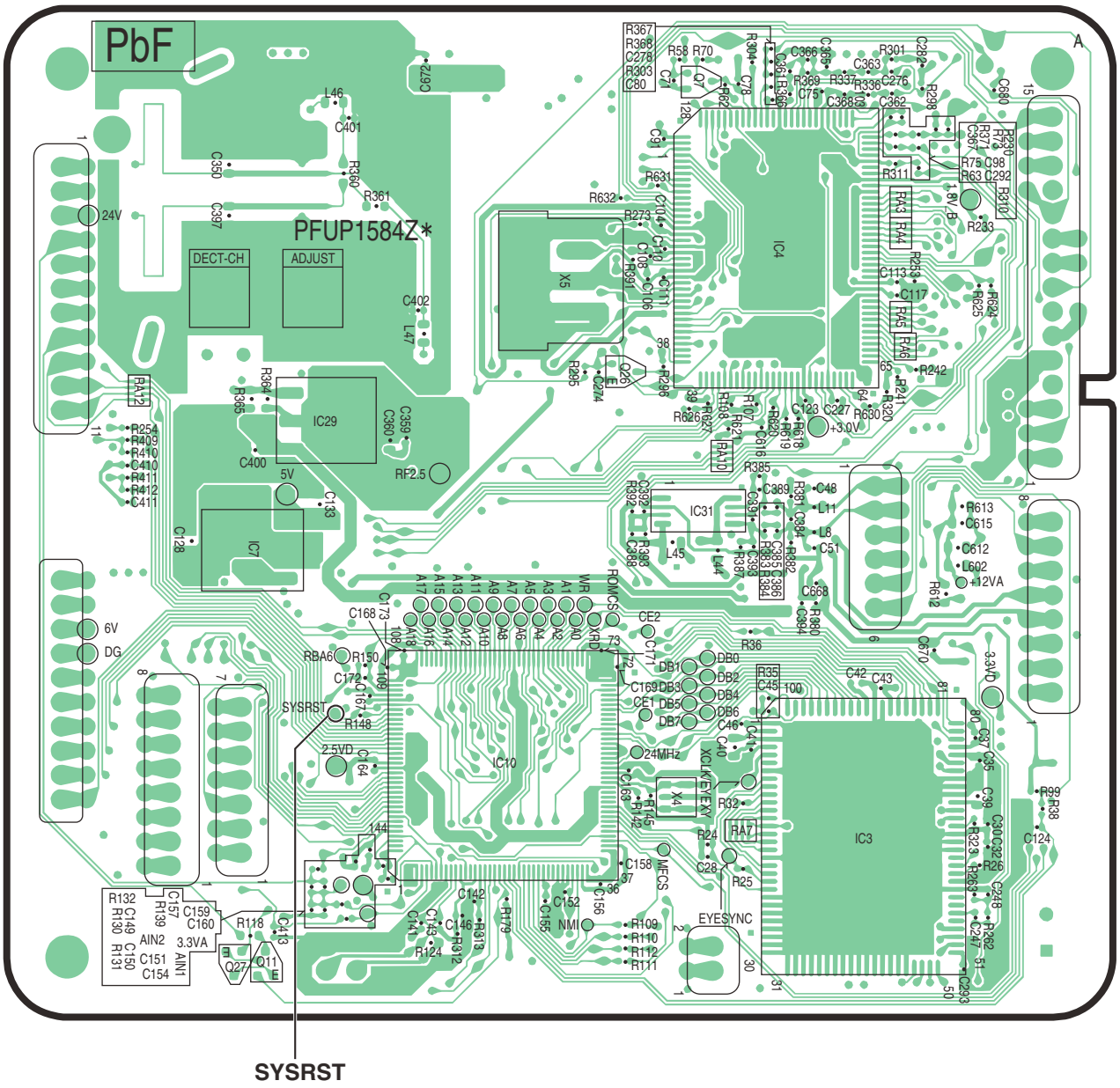
- "*****" varies depending on the country.
- **When you write new value to the EEPROM, it is necessary to turn the power off and then power on again. After power on again, Board works with new value you wrote.**

15.2. Adjustment Standard (Base Unit)

15.2.1. Component View



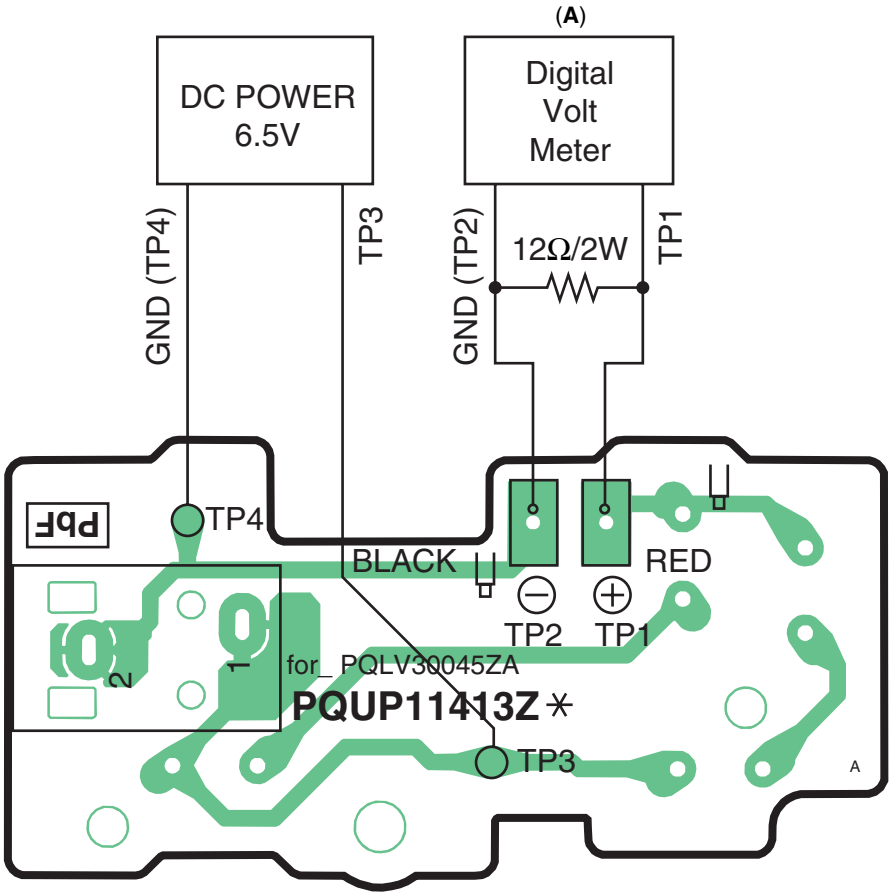
15.2.2. Bottom view



15.3. Adjustment Standard (Charger Unit)

When connecting the Simulator Equipments for checking, please refer to below.

15.3.1. Flow Solder Side View



Note:

(**A**) is referred to **Check Point (Charge Unit)** (P.139)

15.4. The Setting Method of JIG (Cordless Handset)

15.4.1. Preparation

15.4.1.1. Equipment Required

- DECT tester: Rohde & Schwarz, CMD 60 is recommended.
- Frequency counter: it must be precise to be able to measure 1Hz (precision; ±4ppm). Hewlett Packard, 53131A is recommended.
- DC power: it must be able to output at least 1A current under 2.4V for Handset.
- Digital multi-meter (DMM): it must be able to measure voltage and current.
- Oscilloscope

15.4.1.2. JIG and PC

- Serial JIG
  JIG Cable: PQZZ1CD300E*
- PC which runs in DOS mode.
- **Batch file CD-ROM** for setting: PFZZFC255CX

Note:

*: If you have the JIG Cable for TCD500 series (PQZZ1CD505E), change the following values of resistance. Then you can use it as a JIG Cable for both TCD300 and TCD500 series. (It is an upper compatible JIG Cable.)

Resistor	Old value (kΩ)	New value (kΩ)
R2	22	3.3
R3	22	3.3
R4	22	4.7
R7	4.7	10

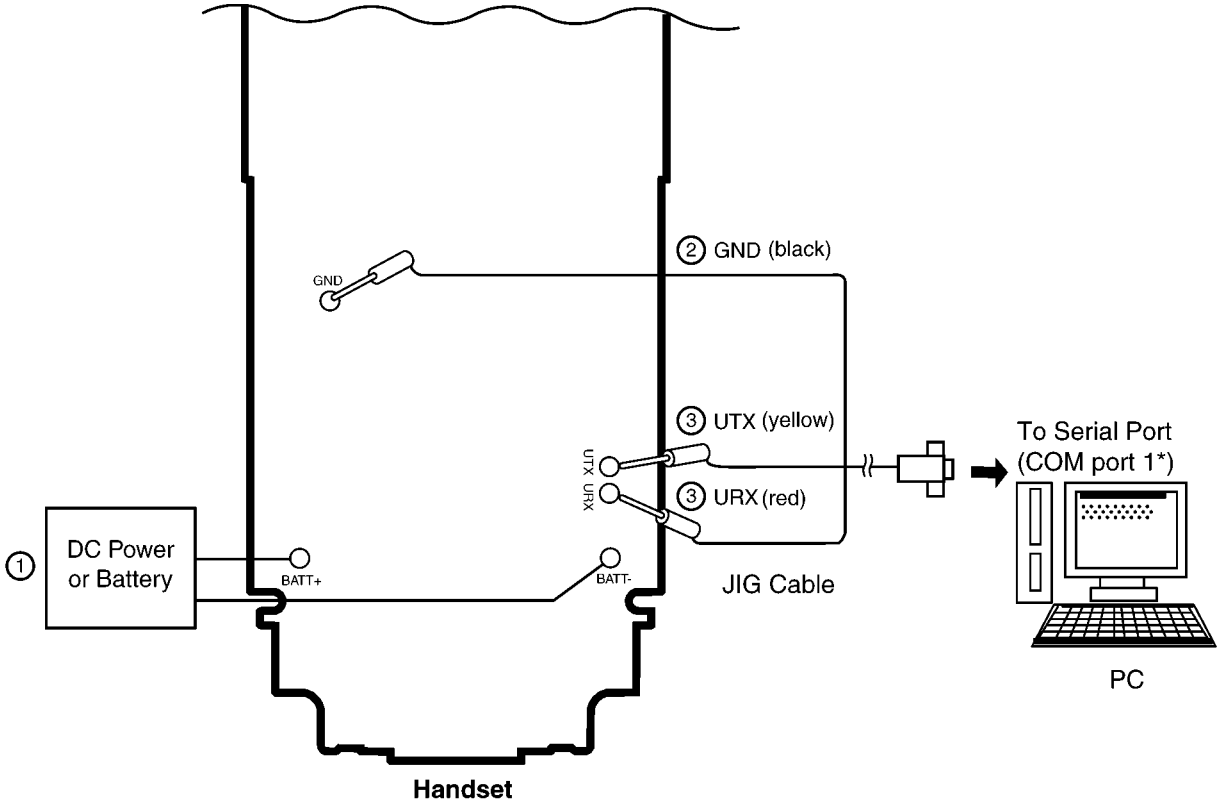
15.4.2. PC Setting

15.4.2.1. Connections

① Connect the DC Power or Battery to BATT+ and BATT- (Handset).

② Connect the JIG Cable GND (black).

③ Connect the JIG Cable UTX (yellow) and URX (red).



Note:

*: COM port names may vary depending on what your PC calls it.

15.4.2.2. Batch Files Setting

1. Insert the Batch file CD-ROM into CD-ROM drive and copy PFZZFC**** folder to your PC (example: D drive).

2. Open a window of MS-DOS mode.

<Example for Windows>

On your computer, click **[Start]**, select **Programs** (**All Programs** for Windows XP/Windows Server 2003), then click
MS-DOS Prompt. (for Windows 95/Windows 98)
Or
Accessories-MS-DOS Prompt. (for Windows Me)
Or
Command Prompt. (for Windows NT 4.0)
Or
Accessories-Command Prompt.
(for Windows 2000/Windows XP/Windows Server 2003)

3. At the DOS prompt, type "**D:**" (for example) to select the drive, then press the **Enter** key.

4. Type "**CD ¥PFZZFC****"**, then press the **Enter** key.

5. Type "**SET_COM=X**", then press the **Enter** key
(**X**: COM port number used for the serial connection on your PC).

6. Type "**READID**", then press the **Enter** key.
- If any error messages appear, change the port number or check the cable connection.
- If any value appear, go to next step.

7. Type "**DOSKEY**", then press the **Enter** key.

<Example: correct setting>

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PFZZFC****
D: ¥PFZZFC**** >SET_COM=X
D: ¥PFZZFC****>READID
00 52 4F A8 A8
D: ¥PFZZFC****>DOSKEY
D: ¥PFZZFC****>
```

<Example: incorrect setting>

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PFZZFC****
D: ¥PFZZFC**** >SET_COM=X
D: ¥PFZZFC****>READID
  CreateFile error
ERROR 10: Can't open serial port
D: ¥PFZZFC ****>
```

Note:
- "****" varies depending on the country.
- See the **Commands** (P.179) for frequently used commands.

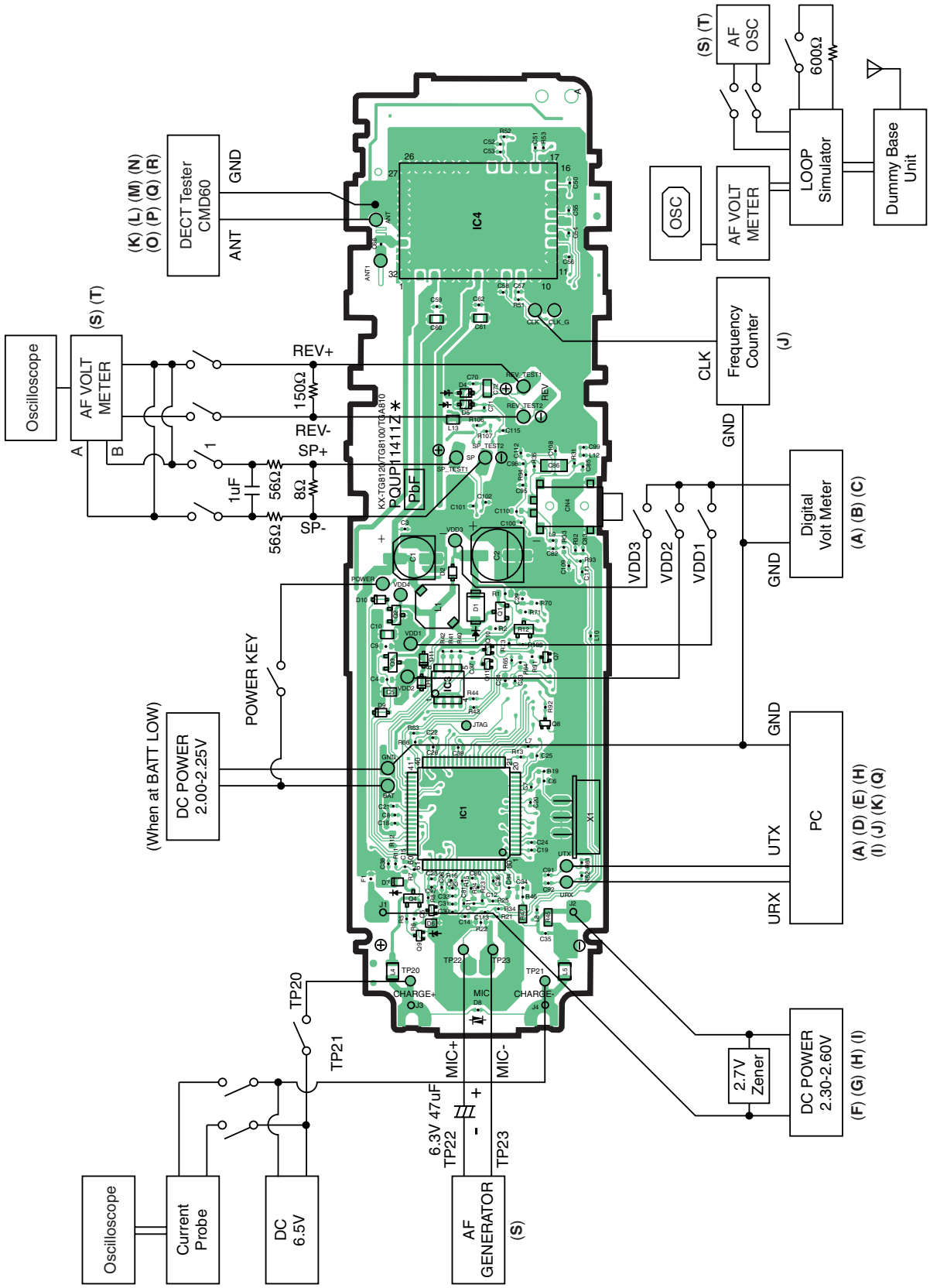
15.4.2.2.1. Commands

Command name	Function	Example
rdeeprom	Read the data of FLASH	Type "rdeeprom 00 00 FF", and the data from address "00 00" to "FF" is read out.
readid	Read ID (RFPI)	Type "readid", and the registered ID is read out.
writeid	Write ID (RFPI)	Type "writeid 00 18 E0 0E 98", and the ID "0018 E0 0E 98" is written.
setfreq	Adjust Frequency of RFIC	Type "setfreq nn".
getchk	Read checksum	Type "getchk".
wreeprom	Write the data of FLASH	Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written.

15.5. Adjustment Standard (Cordless Handset)

When connecting the Simulator Equipments for checking, please refer to below.

15.5.1. Component View



Note:

(**A**) - (**T**) is referred to **Check Point (Cordless Handset)** (P.137)

15.6. Things to Do after Replacing IC

Cautions:

Since this page is common to each country, it may not apply to some models in your country. The contents below are the minimum adjustments required for operation.

15.6.1. Base Unit

Before doing the following adjustment, be sure to do **PC Setting** (P.171) in **Cordless Base Section (Digital Board) Adjustment** (P.171).

IC		Necessary Adjustment
BBIC (IC4)	Programs for Voice processing, interface for RF and EEPROM	1. Default batch file: Execute the command “default.bat”. 2. Country version batch file (*2) : Execute the command “FC255XXrevYY.bat”. (*1) 3. Model code batch file : Excute the command “FC255XXmip.bat” . (*1) 4. Clock adjustment: Refer to **Frequency Adjustment** (P.173).
EEPROM (IC22)	Adjustment parameter data (country version batch file, default batch file, etc.)	1. Default batch file: Execute the command “default.bat”. 2. Country version batch file (*2) : Execute the command “FC255XXrevYY.bat”. (*1) 3. Model code batch file : Excute the command “FC255XXmip.bat” . (*1) 4. Clock adjustment: Refer to **Frequency Adjustment** (P.173).

Note:

(*1) XX: country code, YY: revision number

“XX” and “YY” vary depending on the country version. You can find them in the batch file, PFZZ- mentioned in **Equipment Required** (P.171).

(*2) XX= “NZ”, “SA”, “HK”, “ML” model only

15.6.2. Cordless Handset

Before doing the following adjustment, be sure to do **PC Setting** (P.178) in **The Setting Method of JIG (Cordless Handset)**.

IC		Necessary Adjustment
BBIC (IC1)	Programs for Voice processing, interface for RF and EEPROM	1. Default batch file: Execute the command “default.bat”. 2. Default batch file (remaining); Execute the command “TGA810 DEFrevYY.bat”. (*3) 3. Country version batch file: Execute the command “TGA810XXrevYY”. (*3) 4. Clock adjustment: Refer to Check Point (J). (*4) 5. 1.8 V setting and battery low detection: Refer to Check Point (A), (H) and (I). (*4)
EEPROM (IC3)	Adjustment parameter data (country version batch file, default batch file, etc.)	1. Change the address “0015” of EEPROM to “55”. 2. Default batch file: Execute the command “default.bat”. 3. Default batch file (remaining); Execute the command “TGA810 DEFrevYY.bat”. (*3) 4. Country version batch file: Execute the command “TGA810XXrevYY”. (*3) 5. Clock adjustment: Refer to Check Point (J). (*4) 6. 1.8 V setting and battery low detection: Refer to Check Point (A), (H) and (I). (*4)

Note:

(*3) XX: country code, YY: revision number

“XX” and “YY” vary depending on the country version. You can find them in the batch file, PQZZ- mentioned in **JIG and PC** (P.178).

(*4) Refer to **Check Point (Cordless Handset)** (P.137)

15.7. RF Specification

15.7.1. Base Unit

Item	Value
TX Power	20 dBm ~ 25 dBm
Modulation	-350 ~ -400/+320 ~ +370 kHz/div
Frequency Offset	-45 kHz ~ +45 kHz
Frequency Drift	< ± 30 kHz / ms
RX Sensitivity	< 1000 ppm
Timing Accuracy	< ± 2.0 ppm
RSSI Level	22 hex ± A hex
Power RAMP	Power RAMP is matching

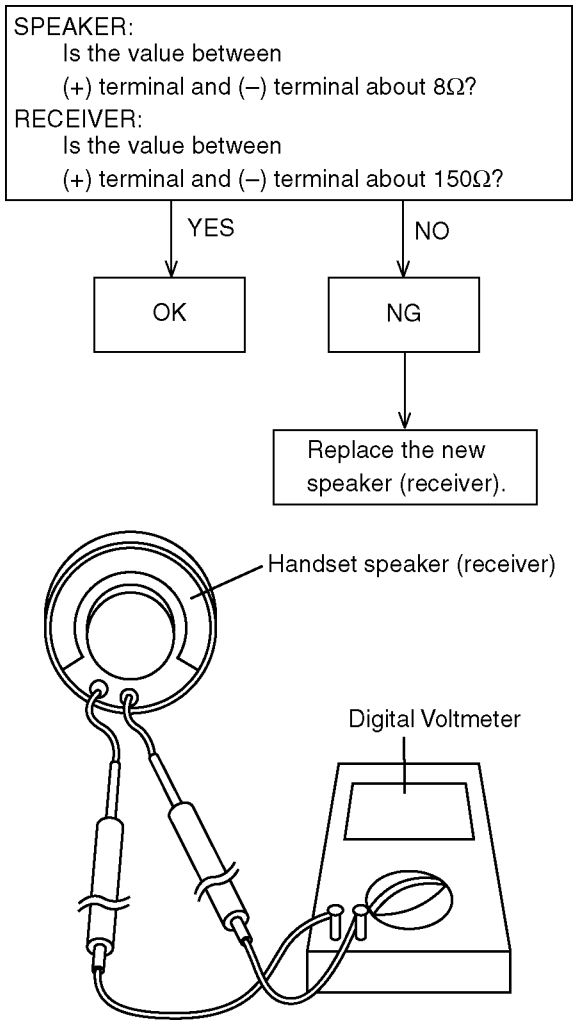
15.7.2. Cordless Handset

Item	Value	Refer to -. **
TX Power	19 dBm ~ 25 dBm	**Check Point (Cordless Handset) (K)**
Modulation	-350 ~ -400/+320 ~ +370 kHz/div	**Check Point (Cordless Handset) (L)**
Frequency Offset	-45 kHz ~ +45 kHz	**Check Point (Cordless Handset) (M)**
Frequency Drift	< ± 30 kHz / ms	**Check Point (Cordless Handset) (N)**
RX Sensitivity	< 1000 ppm	**Check Point (Cordless Handset) (O)**
Timing Accuracy	< ± 2.0 ppm	**Check Point (Cordless Handset) (P)**
RSSI Level	1B hex ± 8 hex (at -81dBm) 23 hex ± 8 hex (at -63dBm)	**Check Point (Cordless Handset) (Q)**
Power RAMP	Power RAMP is matching	**Check Point (Cordless Handset) (R)**

: Refer to **Check Point (Cordless Handset) (P.137)

15.8. How to Check the Cordless Handset Speaker or Receiver

1. Prepare the digital voltmeter, and set the selector knob to ohm meter.
2. Put the probes at the speaker terminals as shown below.



15.9. Frequency Table (MHz)

	BASE UNIT		CORDLESS HANDSET	
Channel No	**Transmit Frequency**	Receive Frequency	**Transmit Frequency**	**Receive Frequency**
1	1897.344	1897.344	1897.344	1897.344
2	1895.616	1895.616	1895.616	1895.616
3	1893.888	1893.888	1893.888	1893.888
4	1892.160	1892.160	1892.160	1892.160
5	1890.432	1890.432	1890.432	1890.432
6	1888.704	1888.704	1888.704	1888.704
7	1886.976	1886.976	1886.976	1886.976
8	1885.248	1885.248	1885.248	1885.248
9	1883.520	1883.520	1883.520	1883.520
10	**1881.792**	**1881.792**	**1881.792**	**1881.792**

Note:

Channel No. 10: In the Test Mode on Base Unit and Cordless Handset.

16 Maintenace

16.1. Maintenance Items and Component Locations

16.1.1. Outline

Maintenance and repairs are reformed using the following steps.

1. Periodic maintenance
Inspect the equipment periodically and if necessary, clean any contaminated parts.

2. Check for breakdowns
Look for problems and consider how they arose.
If the equipment can be still used, perform copying, self testing or communication testing.

3. Check equipment
Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, receiver or the telephone line.

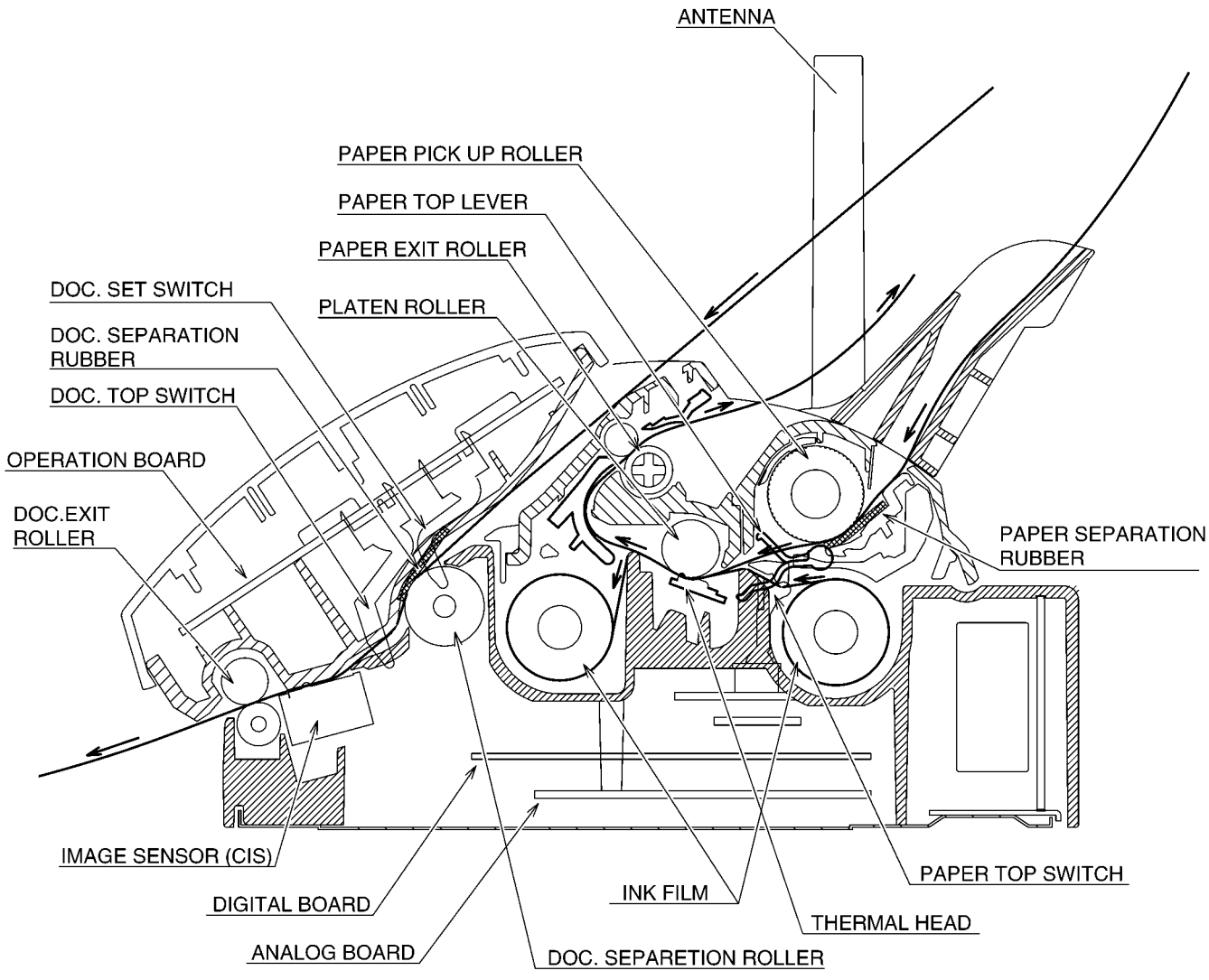
4. Determine causes
Determine the causes of the equipment problem by trouble-shooting.

5. Equipment repairs
Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem will not recur

6. Confirm normal operation of the equipment
After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.

7. Record keeping
Make a record of the measures taken to rectify the problem for future reference.

16.1.2. Maintenance Check Items/Component Locations



16.1.2.1. Maintenance List

No.	OPERATION	CHECK	REMARKS
1	Document Path	Remove any foreign matter such as paper.	—
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	Refer to **Document feeder/recording paper feeder/scanner glass cleaning** (P.195).
3	Platen Roller	If the platen is dirty, clean it with a damp cloth then dry thoroughly. Remove the paper and film cartridge before cleaning.	—
4	Thermal Head	If the thermal head is dirty, clean the printing surface with a cloth moistened with denatured alcohol (alcohol without water), then dry thoroughly.	Refer to **Thermal Head Cleaning** (P.196).
5	Sensors	Document top sensor (SW351), Document set sensor (SW352), Cover open sensor (SW1001), Paper top sensor (SW1001), Film detection sensor (SW1002), Film end sensor (SW1003) . Confirm the operation of the sensors.	See **Maintenance Check Items/Component Locations** (P.184) and **How to Remove the P.C. Boards and Speaker** (P.149).
6	Glass	If the glass is dirty, clean them with a dry soft cloth.	Refer to **Document feeder/recording paper feeder/scanner glass cleaning** (P.195).
7	Abnormal, wear and tear or loose parts	Replace the part. Check if the screws are tight on all parts.	—

16.1.2.2. Maintenance Cycle

No.	Item	Cleaning Cycle	Replacement	
			Cycle	Procedure
1	Separation Roller (Ref. No. 145)*2	3 months	7 years*1 (31,500 documents)	Refer to **How to Remove the Gear Block and Separation Roller** (P.151).
2	Separation Rubber (Ref. No. 13)*2	3 months	7 years (31,500 documents)	Refer to **Document feeder/recording paper feeder/scanner glass cleaning** (P.195).
3	Feed Rollers (Ref. No. 11, 56, 94)*2	3 months	7 years (31,500 documents)	Refer to **Disassembly and Assembly Instructions** (P.141).
4	Thermal Head (Ref. No. 40)*2	3 months	7 years (31,500 documents)	Refer to **How to Remove the Thermal Head** (P.146).
5	Platen Roller (Ref. No. 70)*2	3 months	7 years (31,500 documents)	Refer to **How to Remove the Platen Roller and Lock Lever** (P.156).
6	Pickup Roller (Ref. No. 96)*2	3 months	7 years (31,500 documents)	Refer to **How to Remove the Pickup Roller and Antenna** (P.158).

Note:

*1 These values are standard and may vary depending on usage conditions.

*2 Refer to **Cabinet, Mechanical and Electrical Parts Location** (P.235).

16.2. Gear Section

This model provides a motor-driven gear mechanism for transmitting/copying documents and printing fax data. In this chapter, you will see how the gears work to select and operate a mode and how the gear section, sensors and rollers mechanically work during the main operations (FAX transmission, FAX reception and Copy).

16.2.1. Mode Selection

When a motor with Drive Motor Gear attached rotates clockwise (CW), Swing Gear E engages CAM Gear to rotate clockwise (CW). This operation provide five mode options (**A:** Transmit mode, **B:** Paper-Pickup mode, **C:** Assist mode **D:** Receive mode and **E:** Copy mode) selected by the Sensor Switch. (The Sensor Switch Lever's position in the CAM Gear controlled by the software selects a specific mode.) You can see which mode is selected by confirming the Mode Marker's position as shown in Fig. 1.

(Ex. If the Mode Marker is in position **A**, a transmit mode is selected.)

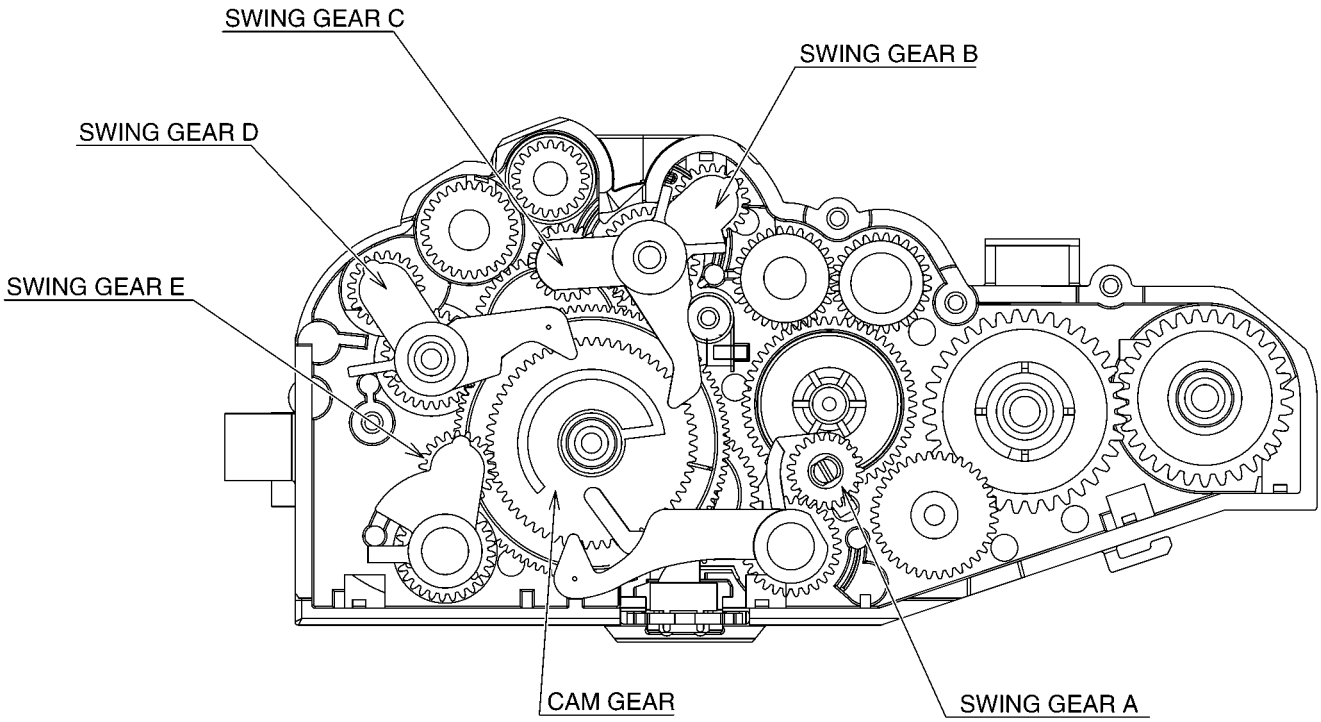


Fig. 1: Mode Selection

16.2.2. Mode Operation

Once a mode is selected, the Drive Motor Gear rotates counterclockwise (CCW) and then the controlling positions of Swing Gears A, B and C, D, E determine which gears convey their drive power in each mode. See "**Sensor Location**" in **Sensor and Switches** (P.24).

A. Transmit mode (See Fig. A.):

The Swing Gear A engages with the next gear to drive Document Separation Roller and Document Exit Roller.
The Swing Gear C engages with the next gear to drive Paper Exit Roller.

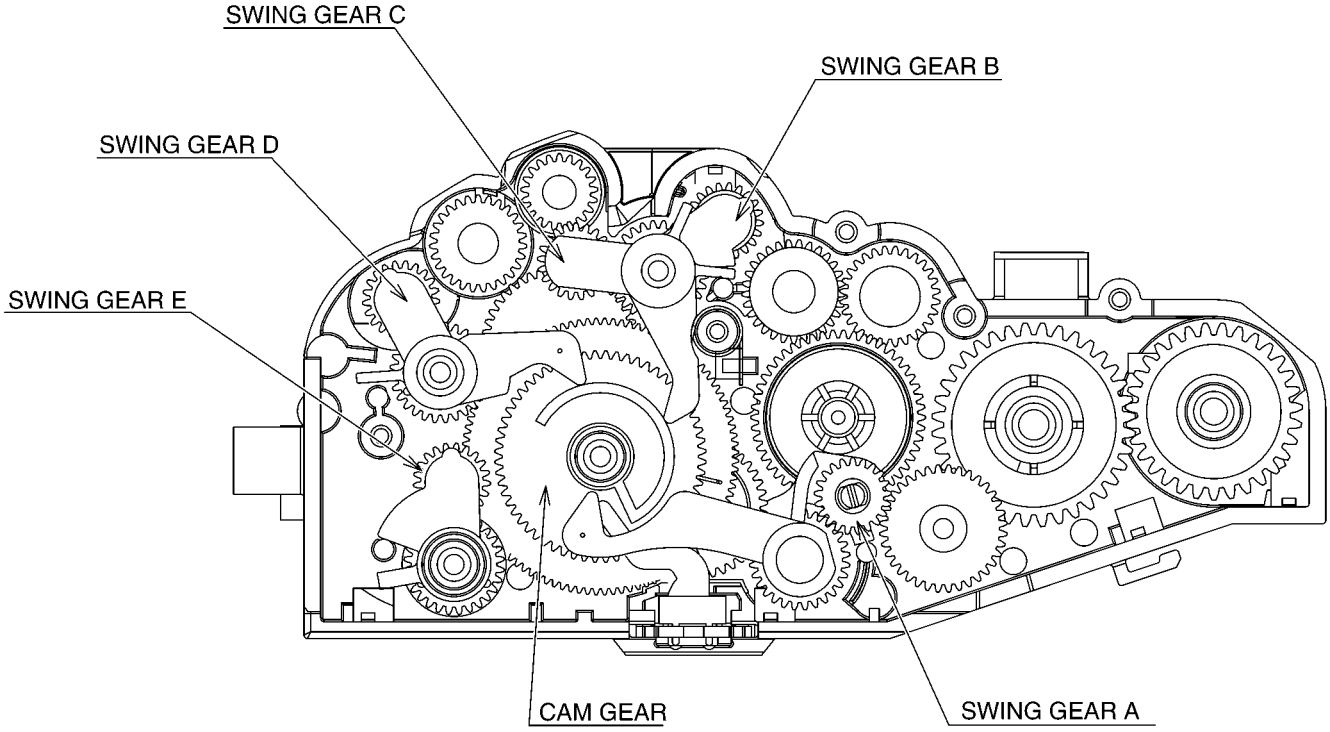


Fig. A: Transmit mode

B. Paper-Pickup mode (See Fig. B):

The Swing Gear C engages with the next gear to drive Paper Exit Roller.
The Swing Gear D engages with the next gear to drive Pickup Roller.

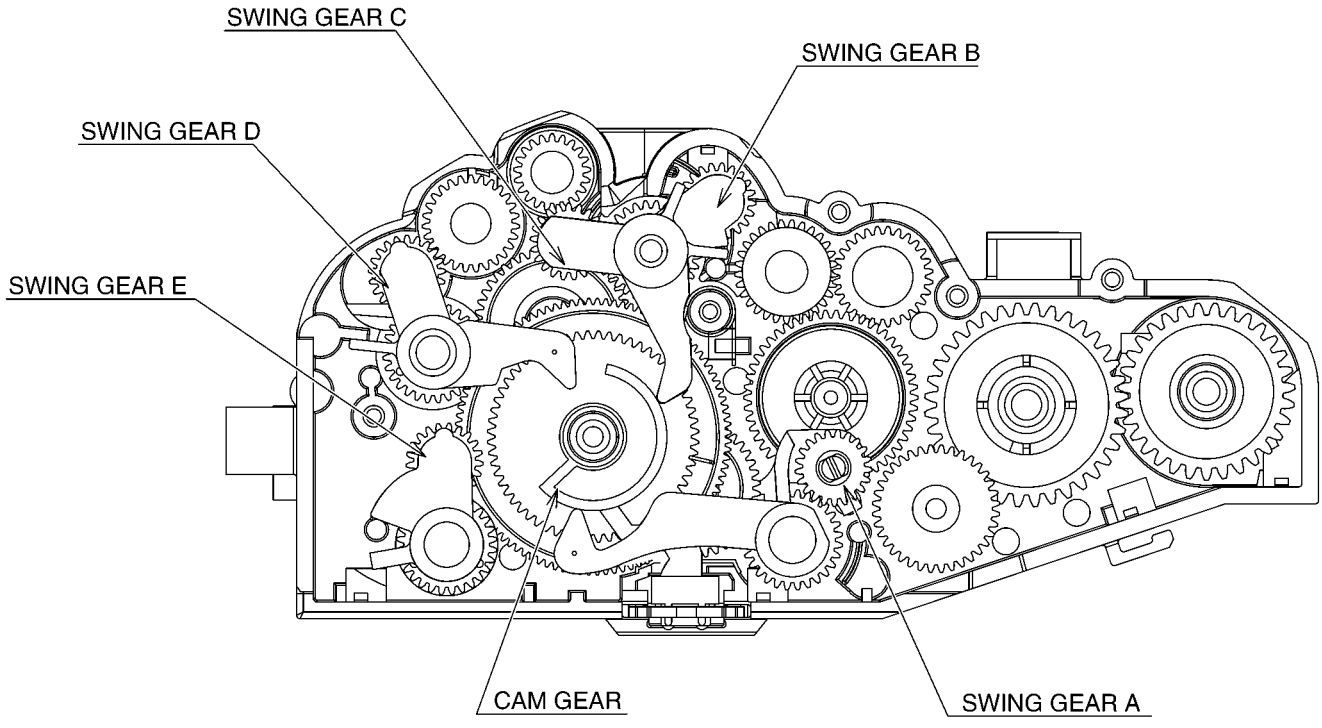


Fig. B: Paper-Pickup mode

C. Assist mode (See Fig. C.):

The Swing Gear D engages with the next gear to drive Pickup Roller.
The Swing Gear B engages with the next gear to drive Platen Roller gear and Ribbon Drive Gear.
The Swing Gear C engages with the next gear to drive Paper Exit Roller Gear.

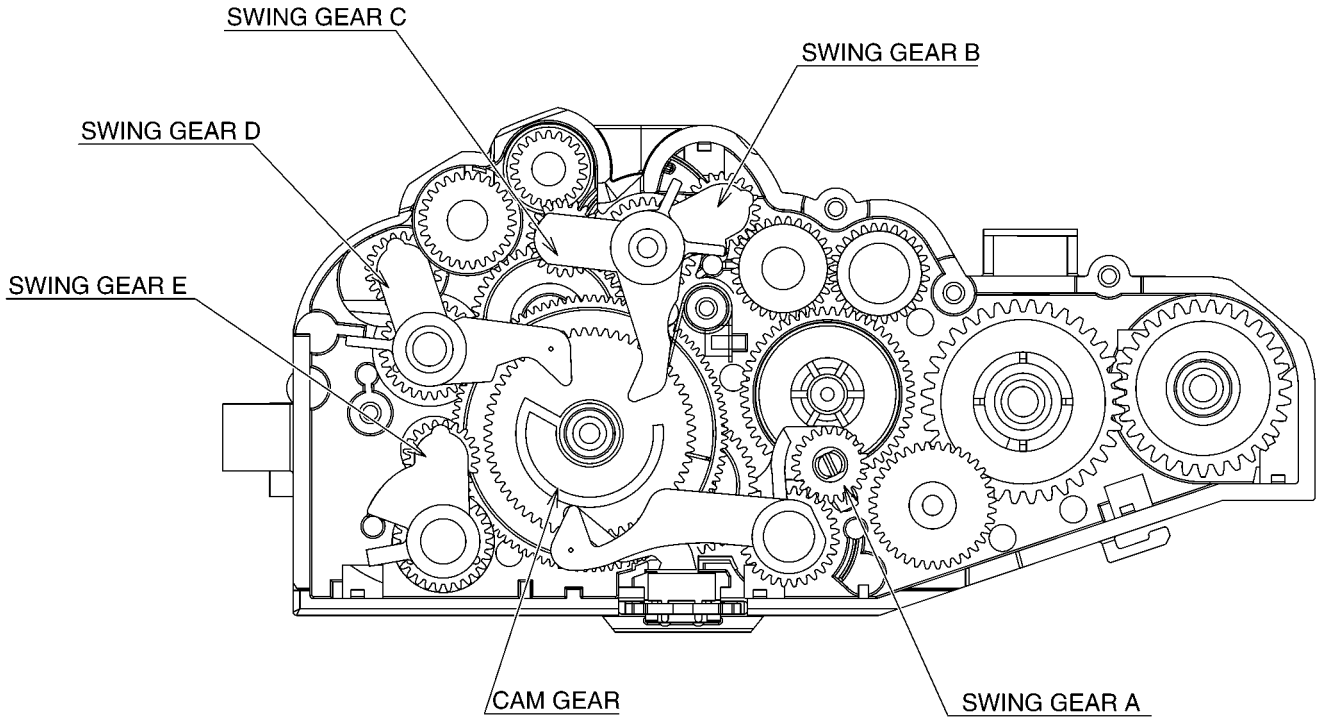


Fig. C: Assist mode

D. Receive mode (See Fig. D.):

The Swing Gear B engages with the next gear to drive Platen Roller gear and Ribbon Drive Gear.
The Swing Gear C engages with the next gear to drive Paper Exit Roller Gear.

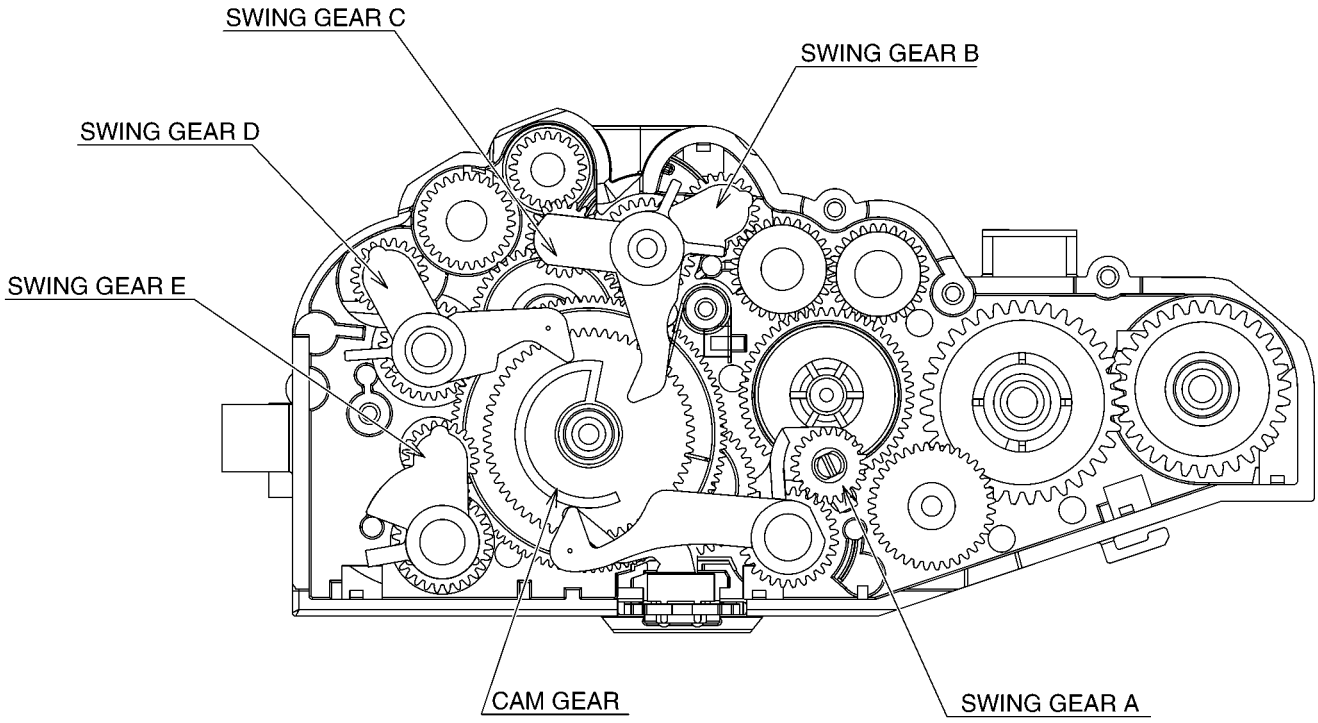


Fig. D: Receive mode

E. Copy mode (See Fig. E.):

"Copy mode" = "Transmit mode" + "Receive mode"

The Swing Gear A engages with the next gear to drive Document Separation Roller and Document Exit Roller.

The Swing Gear B engages with the next gear to drive Platen Roller gear and Ribbon Drive Gear.

The Swing Gear C engages with the next gear to drive Paper Exit Roller.

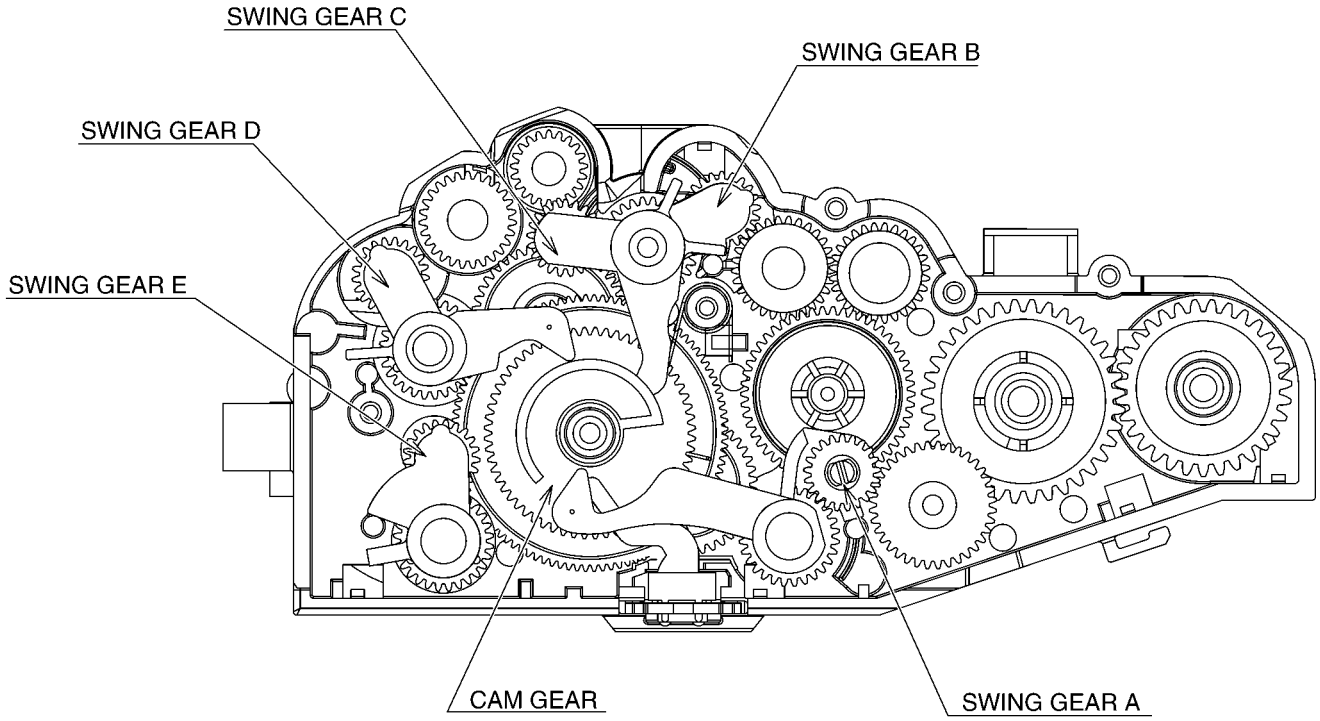
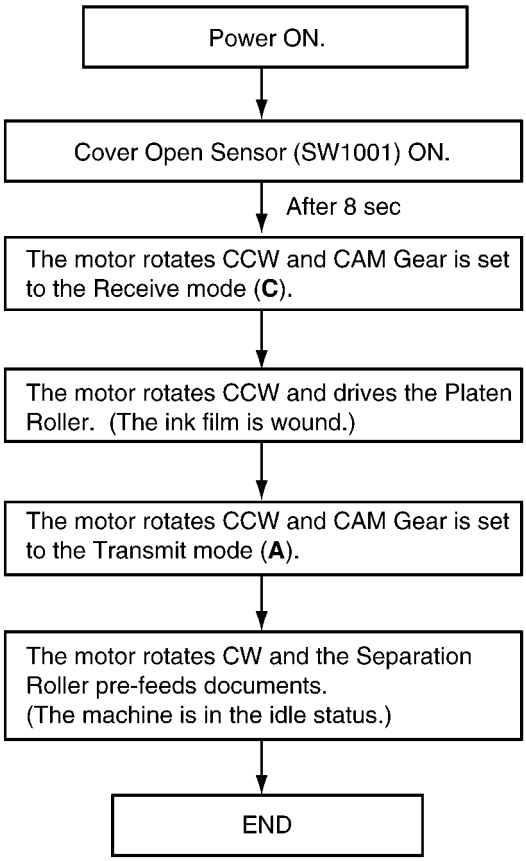


Fig. E: Copy mode

16.2.3. Mechanical Movements in the Main Operations (transmitting documents, receiving faxes and copying)

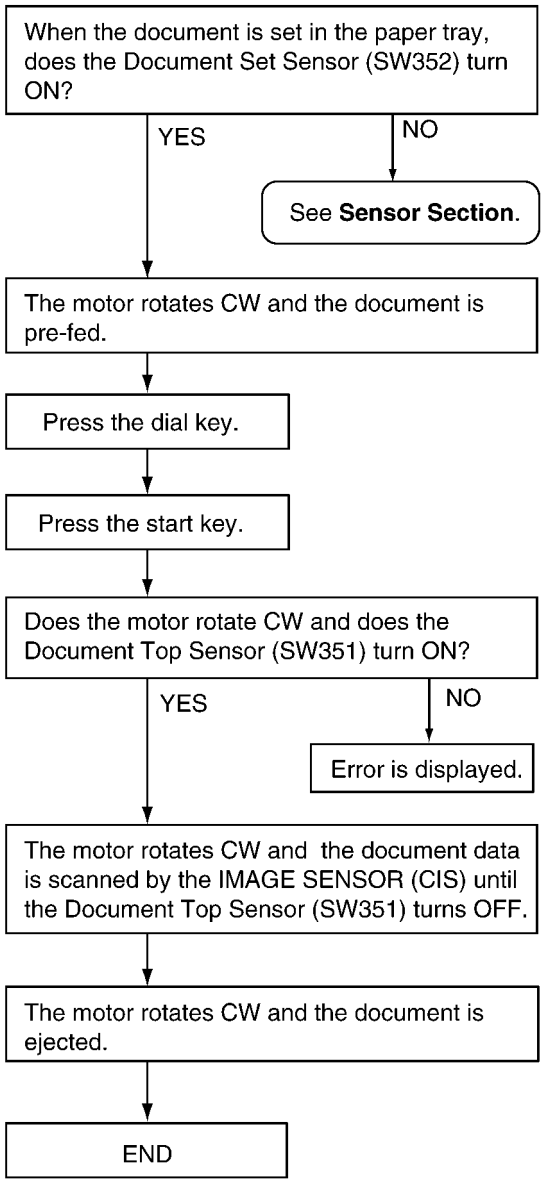
16.2.3.1. Idle Status



Note:

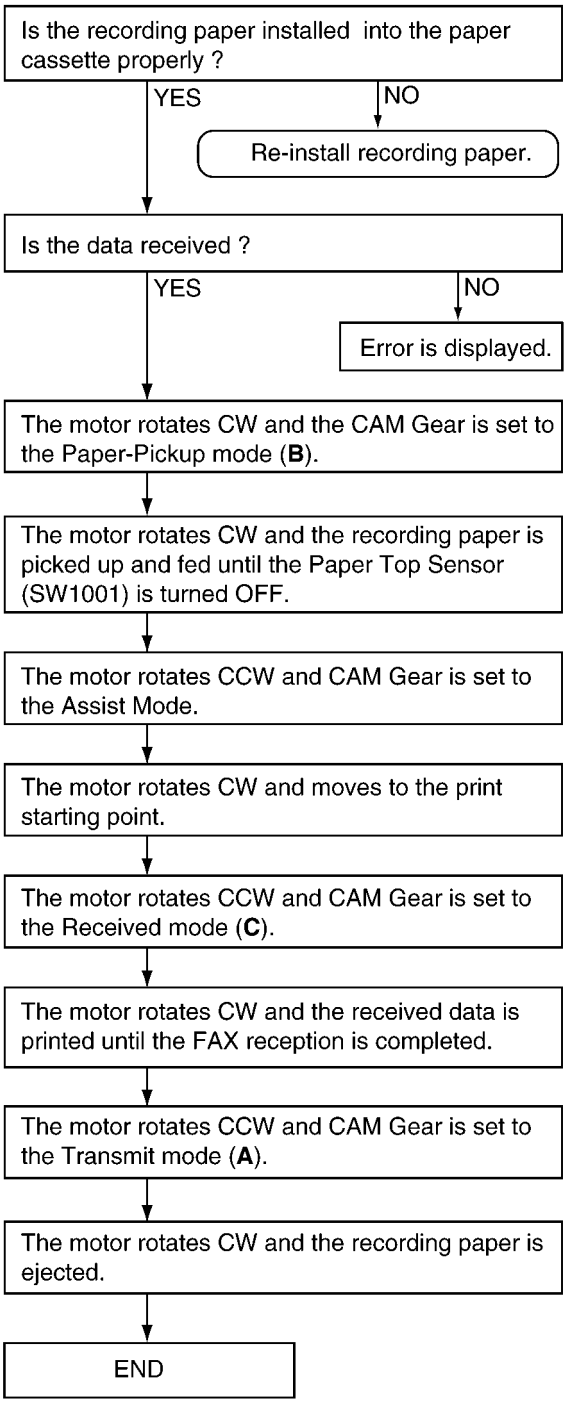
- See "**Sensor Locations**" in **Sensor and Switches** (P.24).
- CW.....clockwise
- CCW....counterclockwise

16.2.3.2. Transmitting Documents



REFERENCE:
Sensor Section (P.129).

16.2.3.3. Receiving Fax



Note:
See "**Sensor Locations**" in **Sensor and Switches** (P.24).

16.2.3.4. Copying

(a) Document detection

When the document is set in the paper tray, does the Document Set Sensor (SW352) turn ON?

NO → See **Sensor Section.**

YES

(b) Pre-feeding documents

The motor rotates CW and the Separation Roller pre-feeds the document.

Press the start key.

The motor rotates CW and does the Document Top Sensor (SW351) turn ON?

NO → See **Sensor Section.**

YES

The motor rotates CCW and CAM Gear is set to the Paper-Pickup mode (**B**).

The motor rotates CW and the recording paper is picked up and fed until the Paper Top Sensor (SW1001) is Turned OFF.

The motor rotates CCW and set to the Assist Mode.

The motor rotates CW and moves to the print starting point.

The motor rotates CCW and CAM Gear is set to the Copy mode (**D**).

(c) Feeding recording paper
Feeding document paper

The motor rotates CW and the Platen Roller feeds the recording paper. Document Feed Roller feeds the document.

(d) Copying

The motor rotates CW and the document data is scanned by the IMAGE SENSOR (CIS). Then, the recording paper is printed until the Document Top Sensor (SW351) is turned OFF.

The motor rotates CCW and CAM Gear is set to the Receive mode (**C**).

(e) Ejecting recording paper

The motor rotates CW and the recording paper is ejected.

The motor rotates CCW and CAM Gear is set to the Transmit mode (**A**).

(f) Ejecting documents

The motor roates CW. The document and recording paper are ejected.

END

Note:

See "**Sensor Locations**" in **Sensor and Switches** (P.24).

REFERENCE:

Sensor Section (P.129)

16.3. Jams

16.3.1. Recording Paper Jams

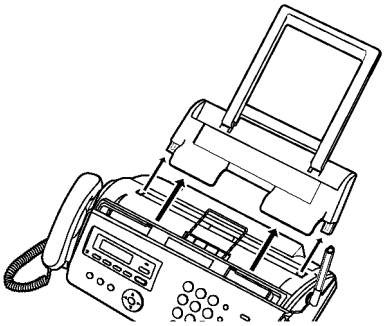
16.3.1.1. When the recording paper has jammed in the unit

The display will show the following.

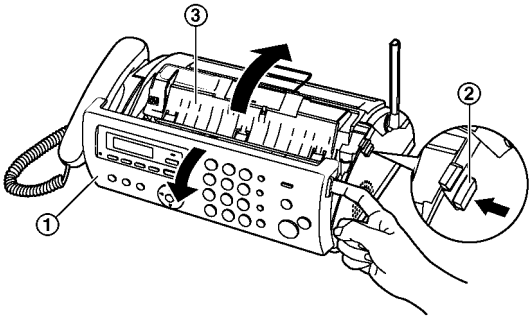
PAPER JAMMED

Important:

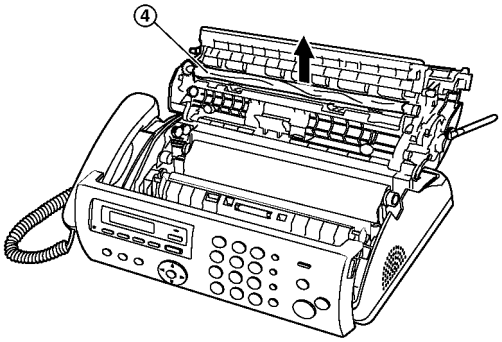
- **Remove the recording paper, then remove the paper tray beforehand, otherwise the paper may misfeed or jam.**



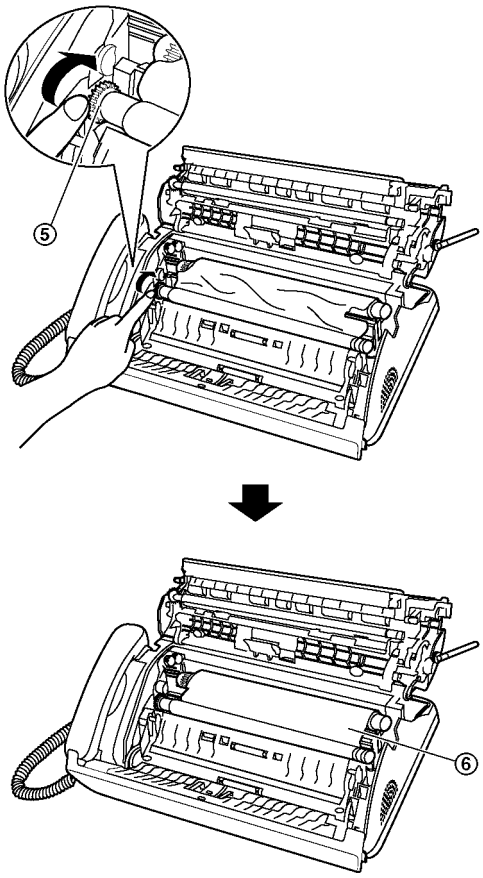
1. Open the front cover (①), push the green lever (②), then open the back cover (③).



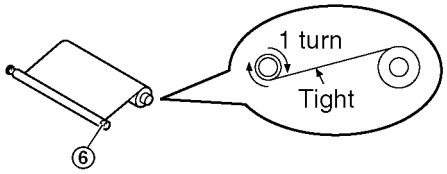
2. Remove the jammed recording paper (④).



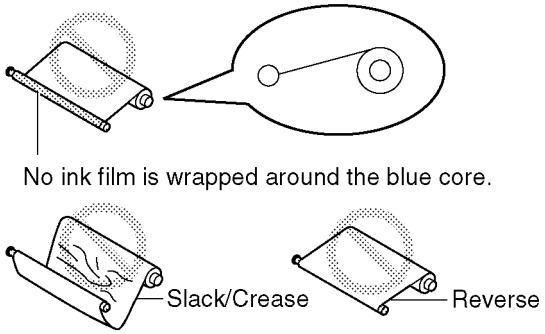
3. Turn the gear of the blue core (⑤) in the direction of the arrow until the ink film is tight (⑥) and at least one layer of ink film is wrapped around the blue core (⑦).



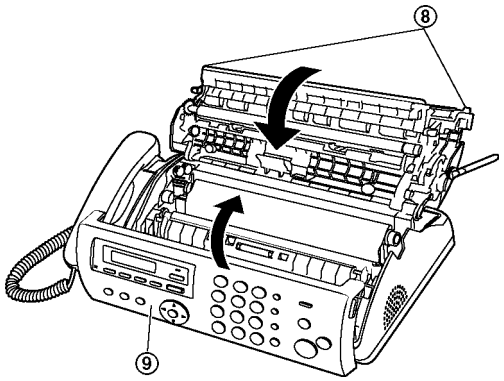
Correct



Incorrect



4. Close the back cover securely by pushing down on the dotted area at both ends (⑧), then close the front cover securely (⑨).



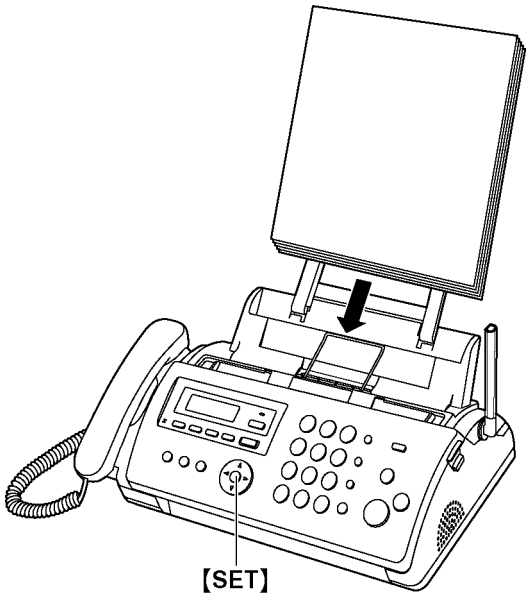
5. Install the paper tray, then insert the recording paper gently.
(See **Installing the Paper Tray** (P.53) and **Installing the Recording Paper** (P.54))

16.3.1.2. When the recording paper was not fed into the unit properly

The display will show the following.

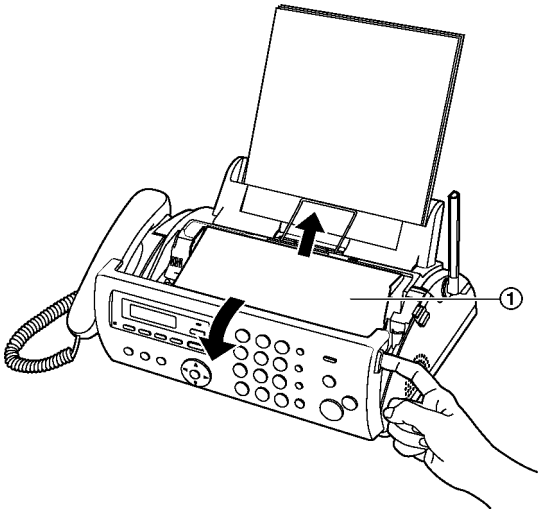
CHECK PAPER

Remove the recording paper and straighten. Insert the paper, then press **[SET]** to clear the message.



16.3.2. Document Jams

1. Open the front cover. Remove the jammed document carefully (①).



2. Close the front cover securely.

Note:
- Do not pull out the jammed paper forcibly before opening the front cover.

16.4. Cleaning

16.4.1. Document feeder/recording paper feeder/scanner glass cleaning

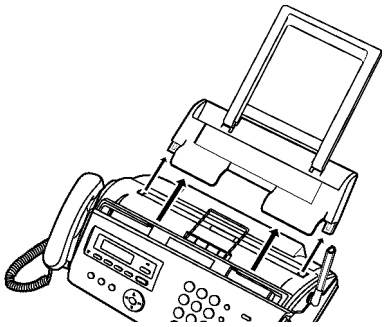
Clean the document feeder/recording paper feeder/scanner glass when:

— Documents or recording paper frequently misfeed.

— Smudges or black/white lines appear on the original document when sending or copying.

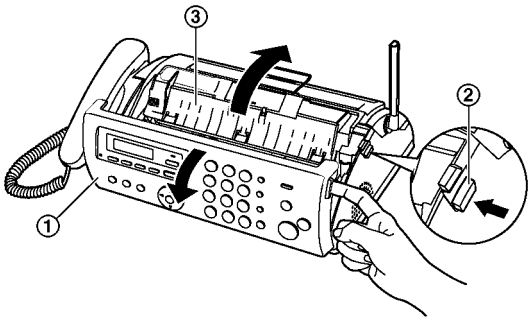
Important:

- **Remove the recording paper, then remove the paper tray beforehand, otherwise the paper may misfeed or jam.**



1. Disconnect the power cord and the telephone line cord.

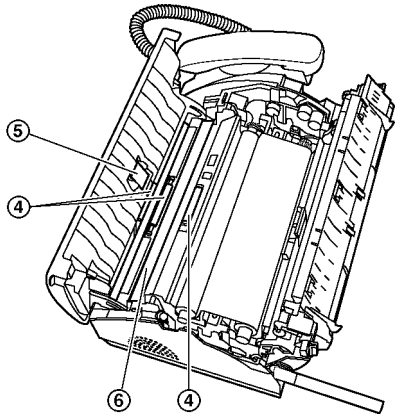
2. Open the front cover (①), push the green button (②), then open the back cover (③).



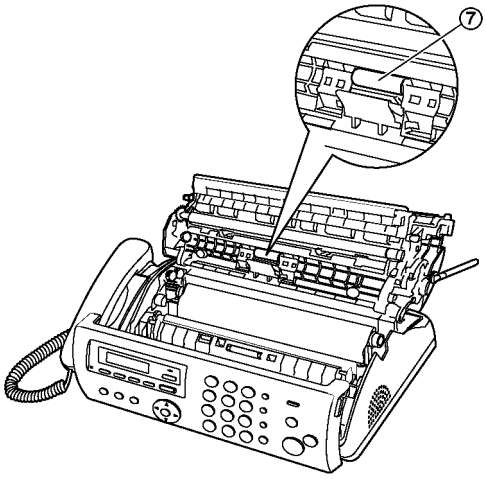
3. Clean the document feeder rollers (④) and rubber flap (⑤) with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly. Clean the scanner glass (⑥) with a soft, dry cloth.

Caution:

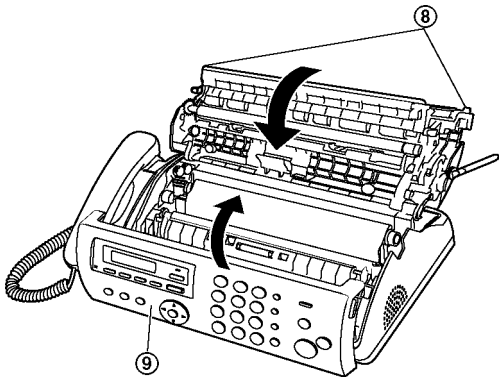
- **Do not use paper products, such as paper towels or tissues.**



4. Clean the recording paper feeder roller (⑦) with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly.



5. Close the back cover securely by pushing down on the dotted area at both ends (⑧), then close the front cover securely (⑨).



6. Install the paper tray, then insert the recording paper gently.
(See **Installing the Paper Tray** (P.53) and **Installing the Recording Paper** (P.54))

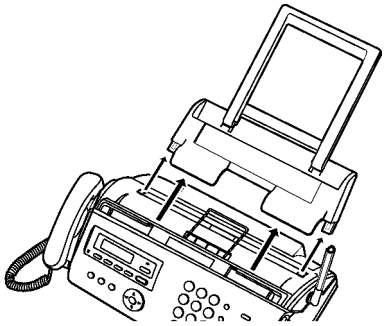
7. Connect the power cord and the telephone line cord.

16.4.2. Thermal Head Cleaning

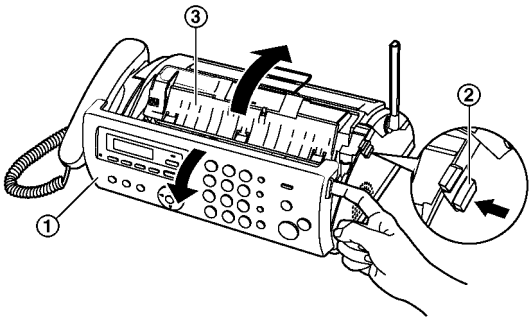
If smudges or black/white lines appear on a copied/received document, check whether there is dust on the thermal head. Clean the thermal head to remove the dust.

Important:

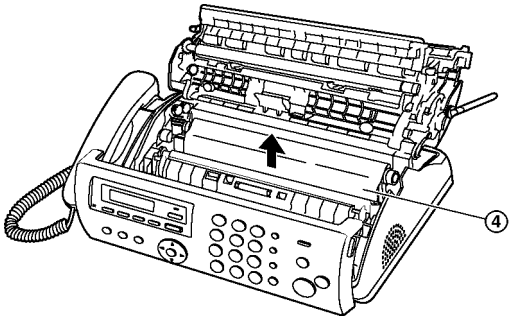
- **Remove the recording paper, then remove the paper tray beforehand, otherwise the paper may misfeed or jam.**



1. Disconnect the power cord and the telephone line cord.
2. Open the front cover (①), push the green button (②), then open the back cover (③).



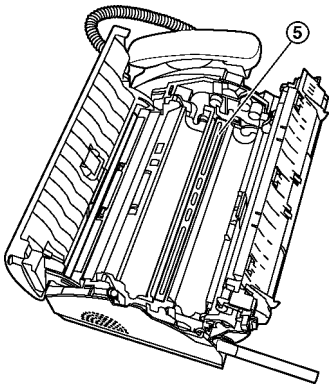
3. Remove the ink film (④).



4. Clean the thermal head (⑤) with a cloth moistened with isopropyl rubbing alcohol, and let it dry thoroughly.

Caution:

- **To prevent a malfunction due to static electricity, do not use a dry cloth and do not touch the thermal head directly.**

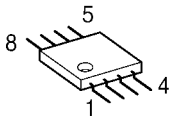
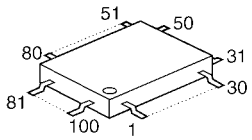
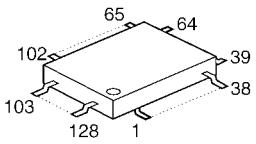
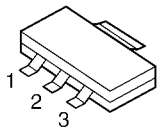
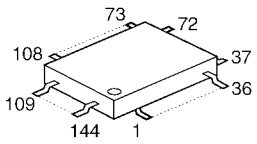
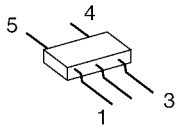
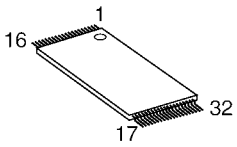
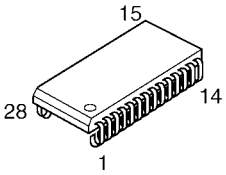
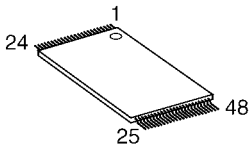
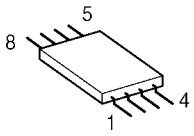
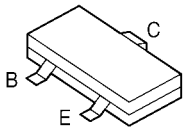
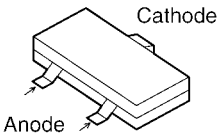
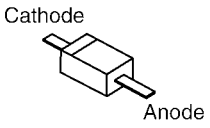


5. Re-install the ink film and close the covers (see step 4 to 7 on **Installing the Ink film** (P.52)).
6. Install the paper tray, then insert the recording paper gently.
   (See **Installing the Paper Tray** (P.53) and **Installing the Recording Paper** (P.54))
7. Connect the power cord and the telephone line cord.

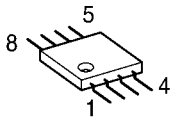
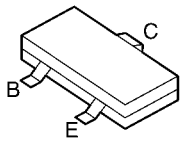
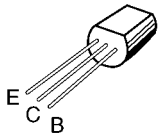
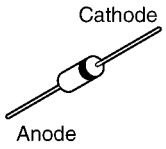
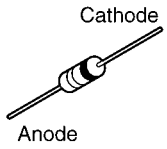
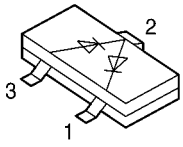
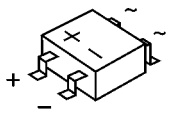
17 Miscellaneous

17.1. Terminal Guide of the ICs, Transistors and Diodes

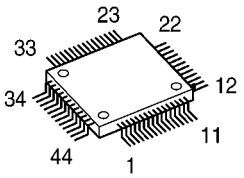
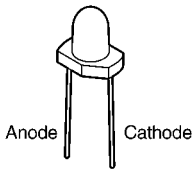
17.1.1. Digital Board

 C1AB00002556 PFWI3FC255E	 C1CB00001959	 C1CB00001879	 C0CBADD00010 C0CBABD00017 C0CBAYF00016	 C1ZBZ0003300
 C0JBAA000393 C0EBF0000419	 PFWI1FC255CX	 C3ABKC000034	 PFWI2FC255CX	 C0ABEB000062 C0ABEB000064
 PQVTDTC143E, B1ABDF000025 B1ADGE000004, B1ABDF000026, 2SB1218ARL	 B0DDCM000001	 B0BC2R1A0006		

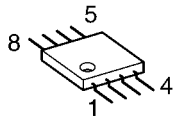
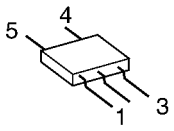
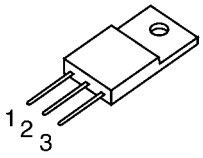
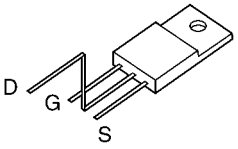
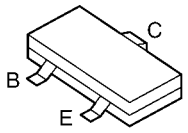
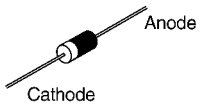
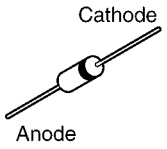
17.1.2. Analog Board

 C0ABEB000083	 PQVTDTC143E	 B1AAKL000006	 B0EAAD000001	 MA4056, MA4240
 MA143	 B0EDER000009			

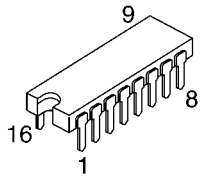
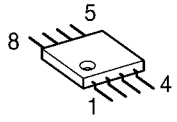
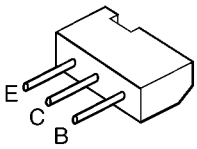
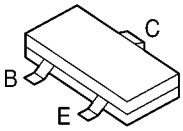
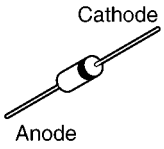
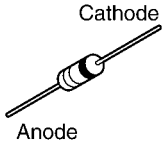
17.1.3. Operation Board / Microphone Board

 C1ZBZ0002089	 B3AAA0000534			

17.1.4. Power Supply Board

 PFVIFA5518N	 TL431CDBVR	 TA7804	 FQPF4N90C	 2SC3928
 PFVD1N4005 PFVDD1NL20U PR1007, HER503	 MA165, HZS6R2NB2			

17.1.5. Interface Board

 B1HAGFF00015	 B1DHDD000026	 2SB1322	 PQVTDTC143E PQVTDTC144TU	 B0BA7R900004
 PFVDRMRLS245				

17.1.6. Cordless Handset Board

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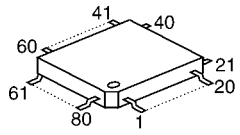
<td> 

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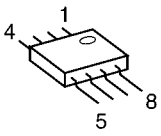
<td> 

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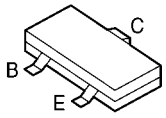
<td> 

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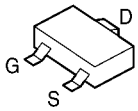
<td> 

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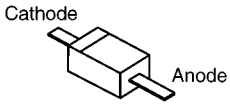
<td colspan="2"> 

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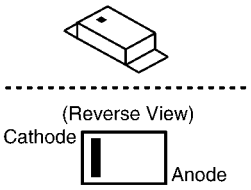
<td> 

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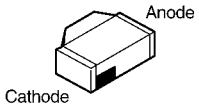
<td> 

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17.2. How to Replace the Flat Package IC

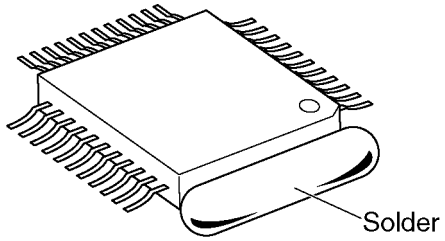
Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

17.2.1. Preparation

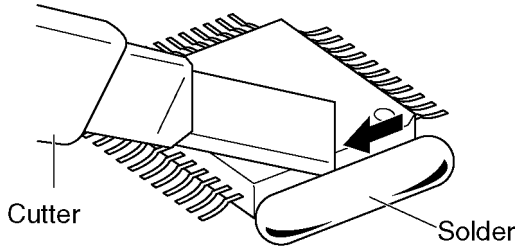
- PbF (: Pb free) Solder
- Soldering Iron
  Tip Temperature of 662°F ± 50°F (350°C ± 10°C)
  Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Flux
  Recommended Flux: Specific Gravity → 0.82.
  Type → RMA (lower residue, non-cleaning type)
  Note: See **About Lead Free Solder (PbF: Pb free)** (P.6).

17.2.2. Flat Package IC Removal Procedure

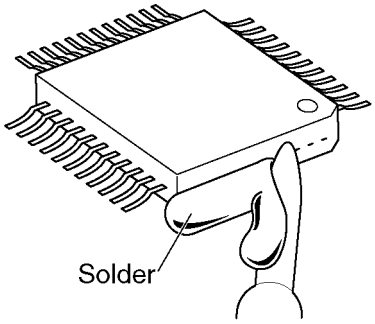
1. Put plenty of solder on the IC pins so that the pins can be completely covered.
   Note:
   If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



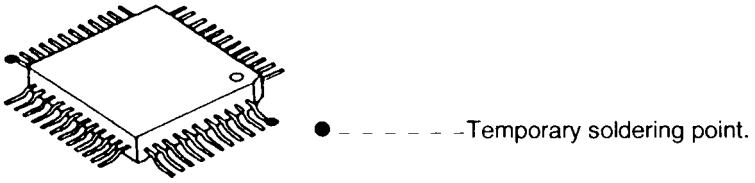
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the land with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

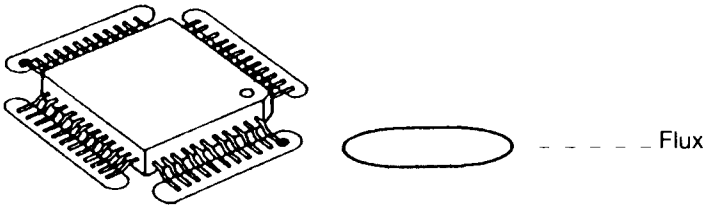
17.2.3. Flat Package IC Installation Procedure

1. Temporarily fix the FLAT PACKAGE IC, soldering the two marked pins.

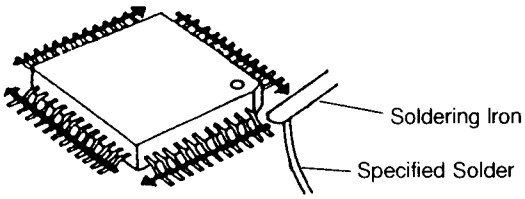


*Check the accuracy of the IC setting with the corresponding soldering foil.

2. Apply flux to all pins of the FLAT PACKAGE IC.

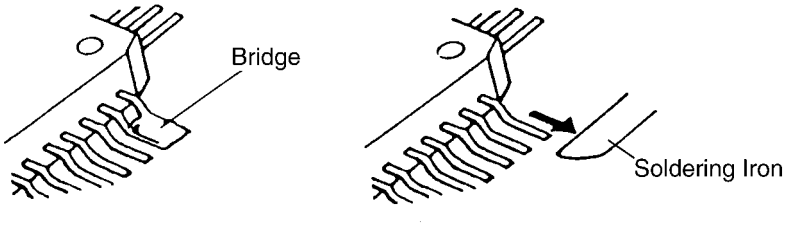


3. Solder the pins, sliding the soldering iron in the direction of the arrow.



17.2.4. Bridge Modification Procedure

1. Lightly resolder the bridged portion.
2. Remove the remaining solder along the pins using a soldering iron as shown in the figure below.



17.3. Test Chart

17.3.1. ITU-T No.1 Test Chart

THE SLEREXE COMPANY LIMITED

SAPORS LANE - BOOLE - DORSET - BH 25 8 ER

TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC 18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

Probably you have uses for this facility in your organisation.

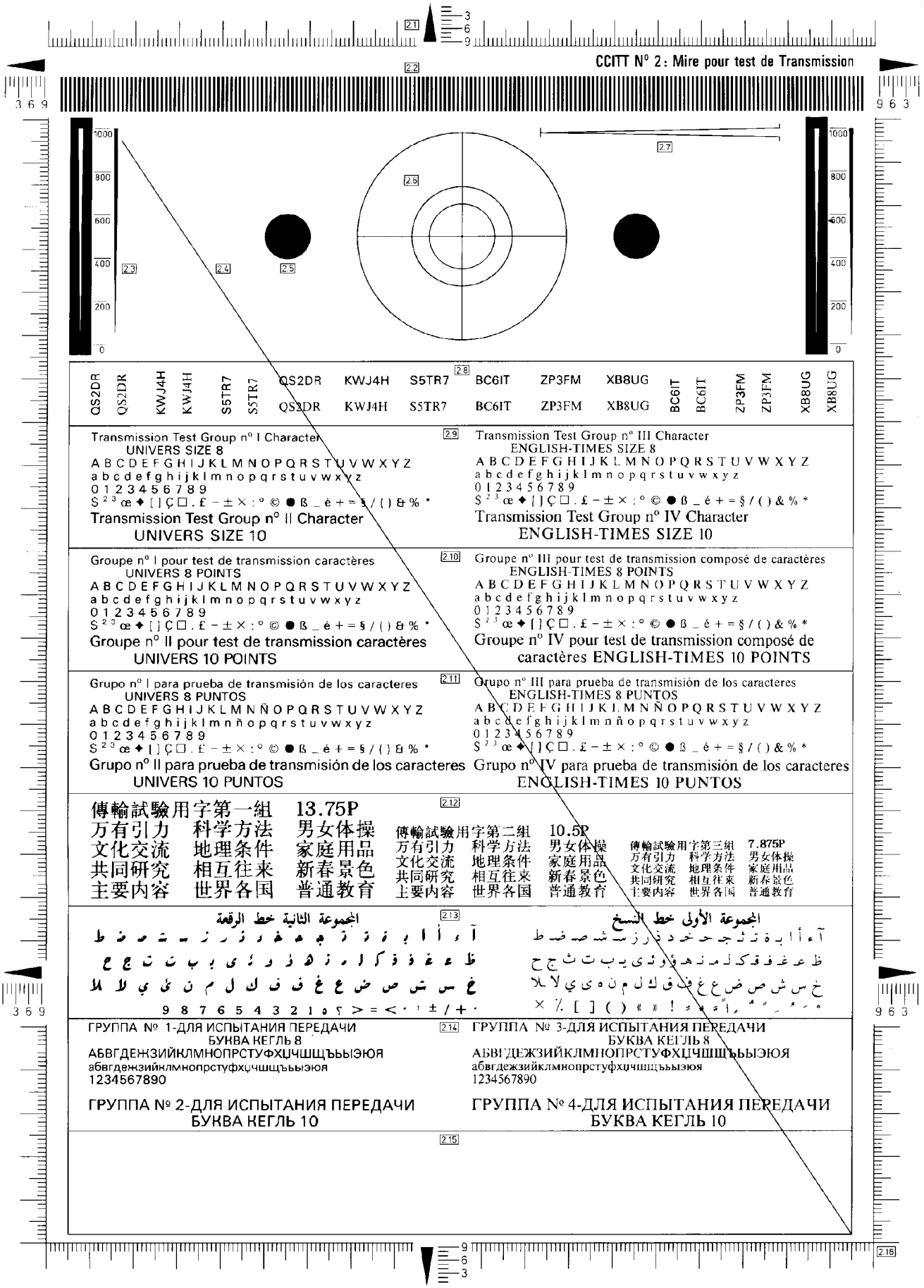
Yours sincerely,

Phil.

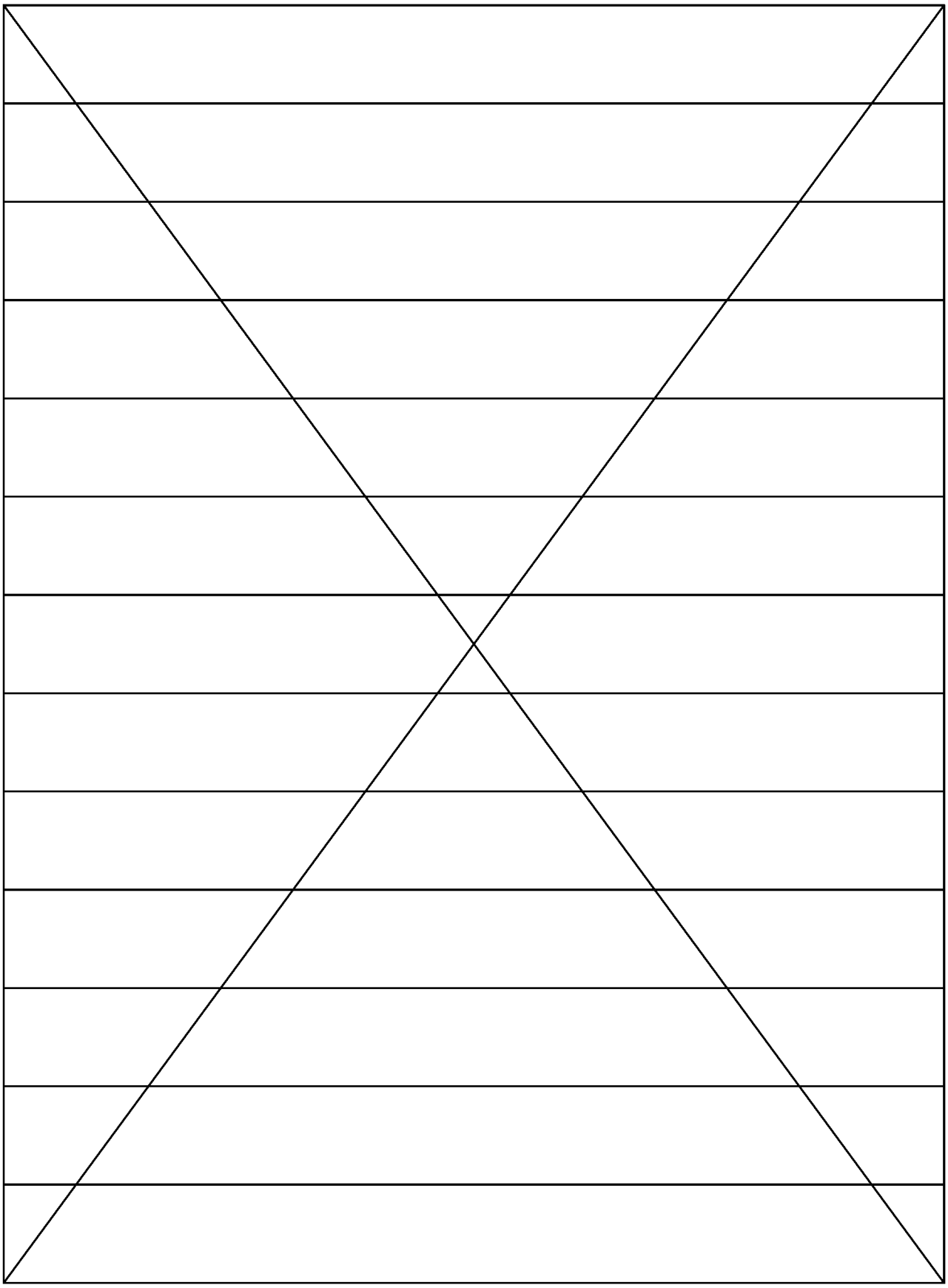
P.J. CROSS
Group Leader - Facsimile Research

Registered in England: No. 2038
Registered Office: 60 Vicara Lane, Ilford. Essex.

17.3.2. ITU-T No.2 Test Chart



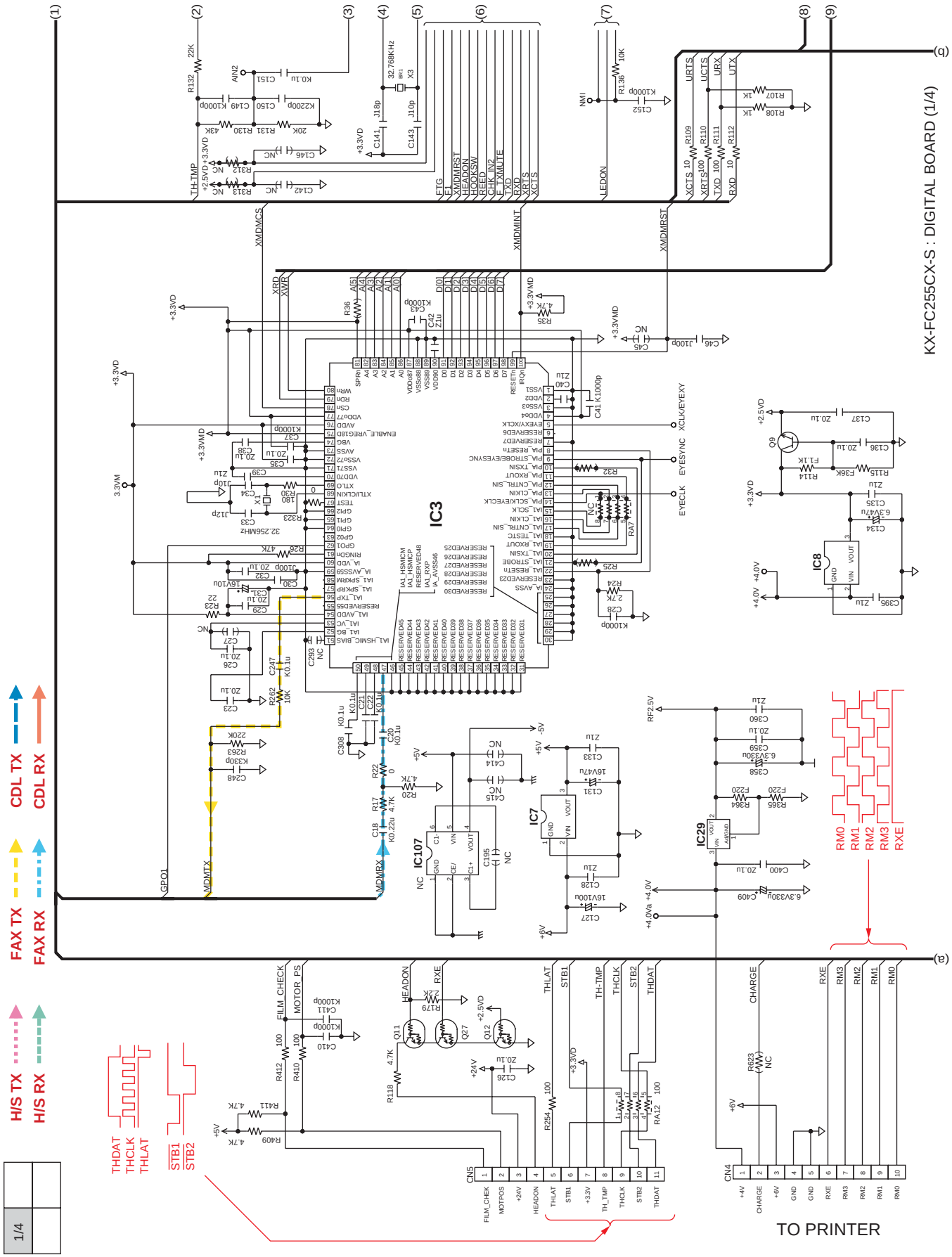
17.3.3. Test Chart

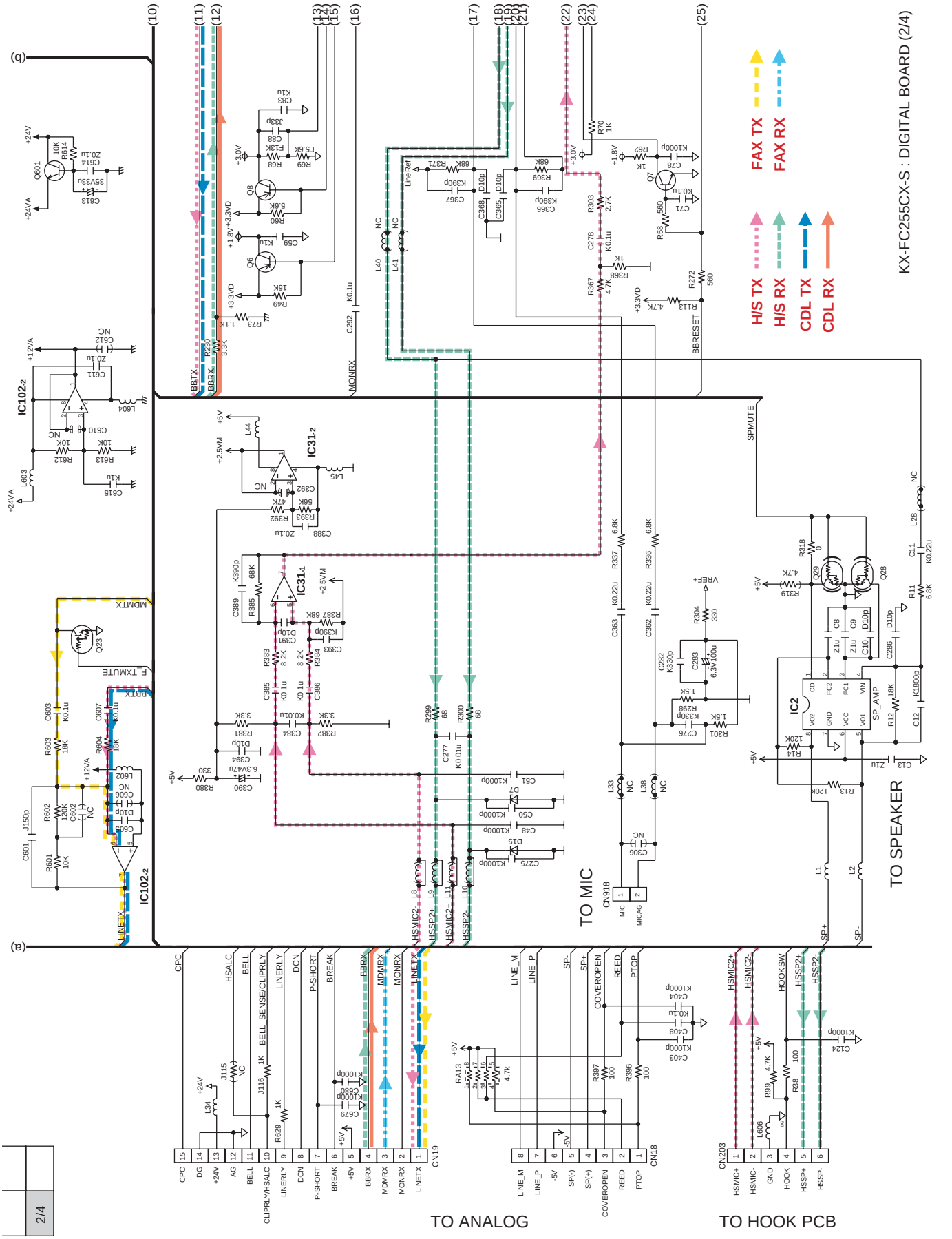


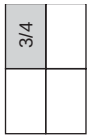
MEMO:

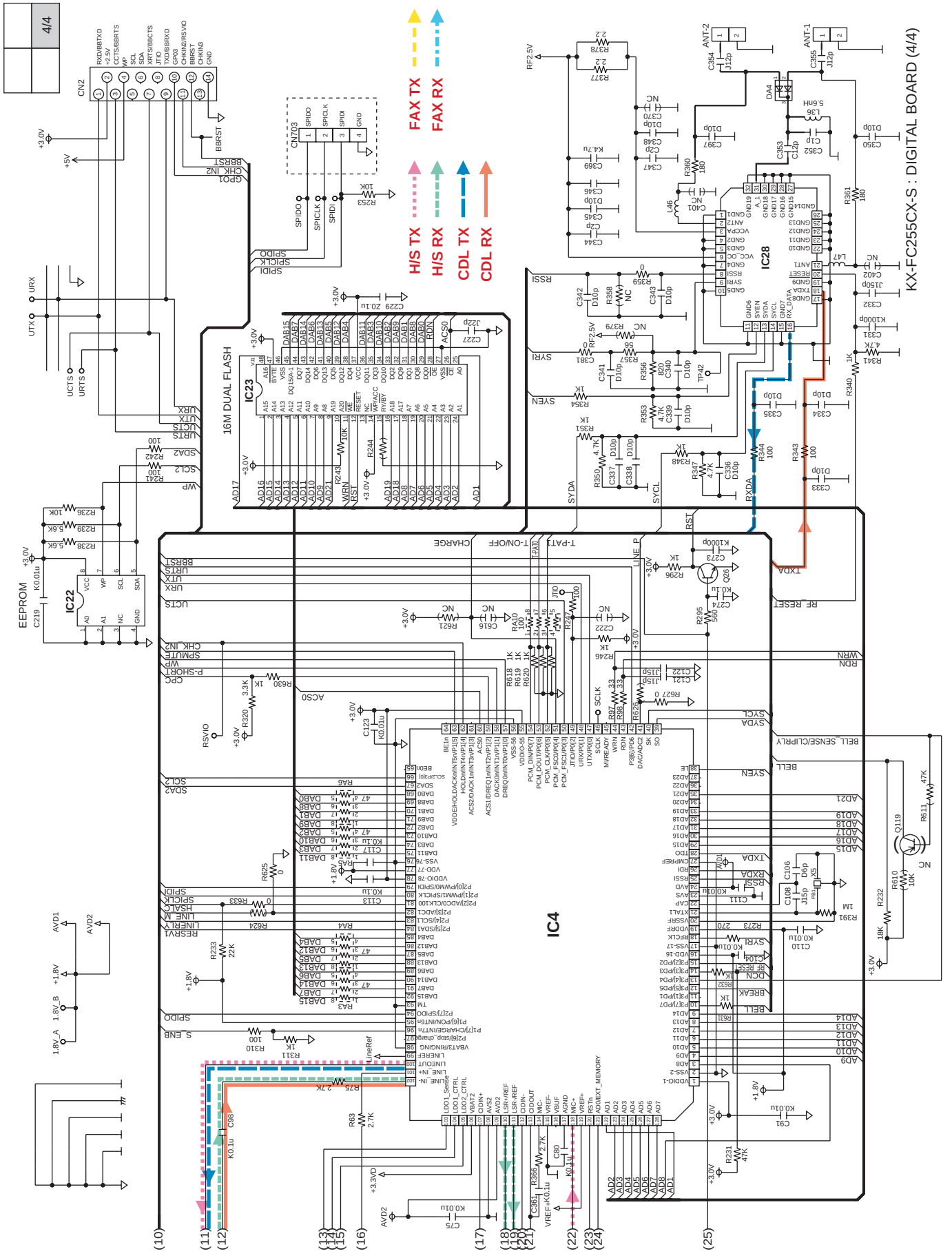
18 Schematic Diagram

18.1. Digital Board (PCB1)

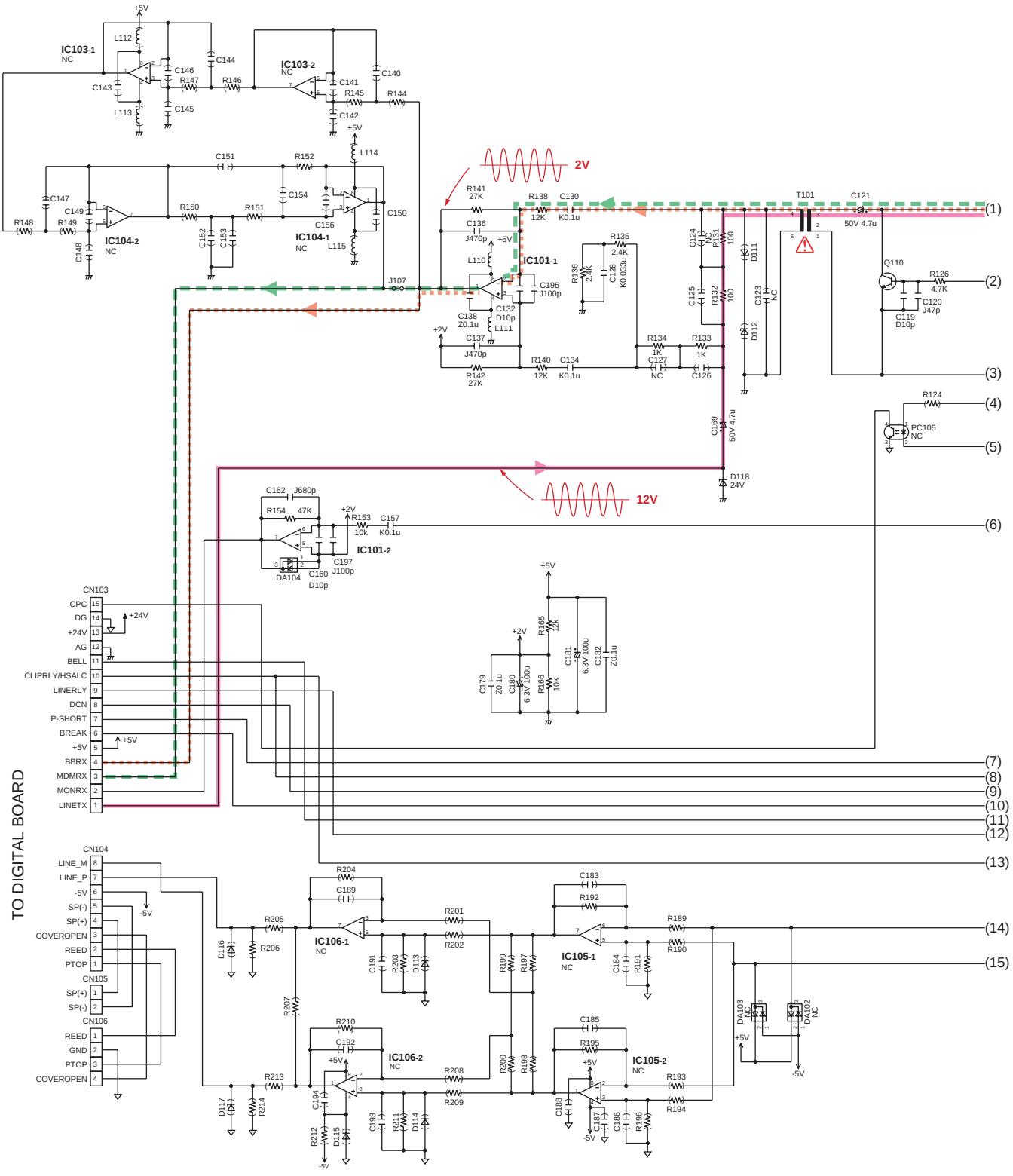


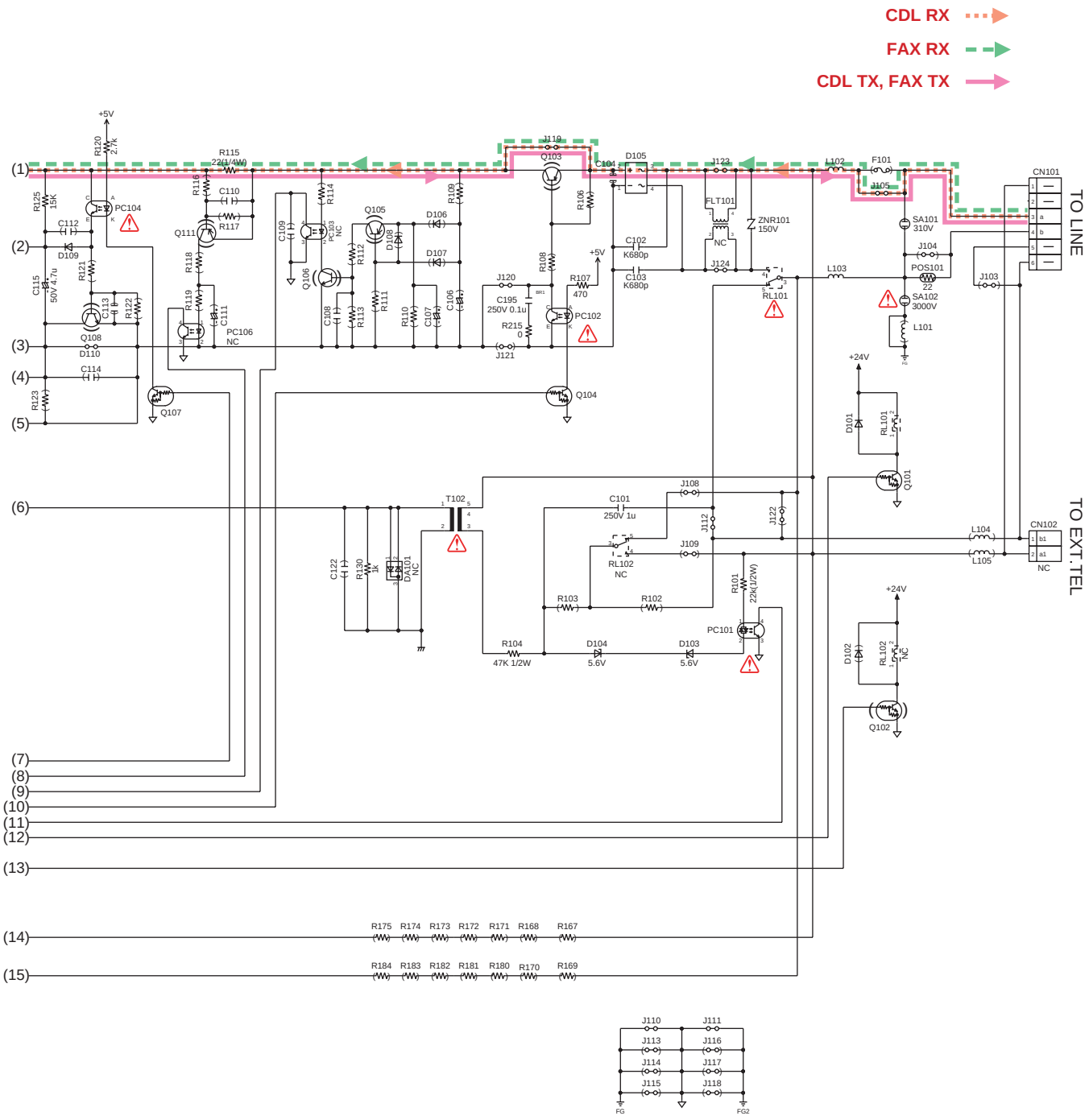

KX-FC255CX-S : DIGITAL BOARD (2/4)
FAX TX
FAX RX
H/S TX
H/S RX
CDL TX
CDL RX
TO SPEAKER
TO MIC
TO ANALOG
TO HOOK PCB
IC102-2
IC31-2
IC31-1
IC2
SP_AMP
CN19
CN18
CN203
CN918
SPMUTE
BBRESET
MDMTX
F_TXMUTE
BBTX
UNETX
BBRX
MDMRX
MONRX
UNERX
HSMIC2-
HSSP2-
HSMIC2+
HSSP2+
CPC
HSALC
BELL
BELL_SENSE/CLIPRLY
LINERLY
DCN
P-SHORT
BREAK
LINE_M
LINE_P
SP-
SP+
COVEROPEN
REED
PTOP
HOOKSW
GND
HOOK
HSSP+
HSSP-
HSMIC+
HSMIC-


3/4


KX-FC255CX-S : DIGITAL BOARD (4/4)
4/4
FAX TX
FAX RX
H/S TX
H/S RX
CDL TX
CDL RX
IC4
IC22
EEPROM
IC23
16M DUAL FLASH
IC28

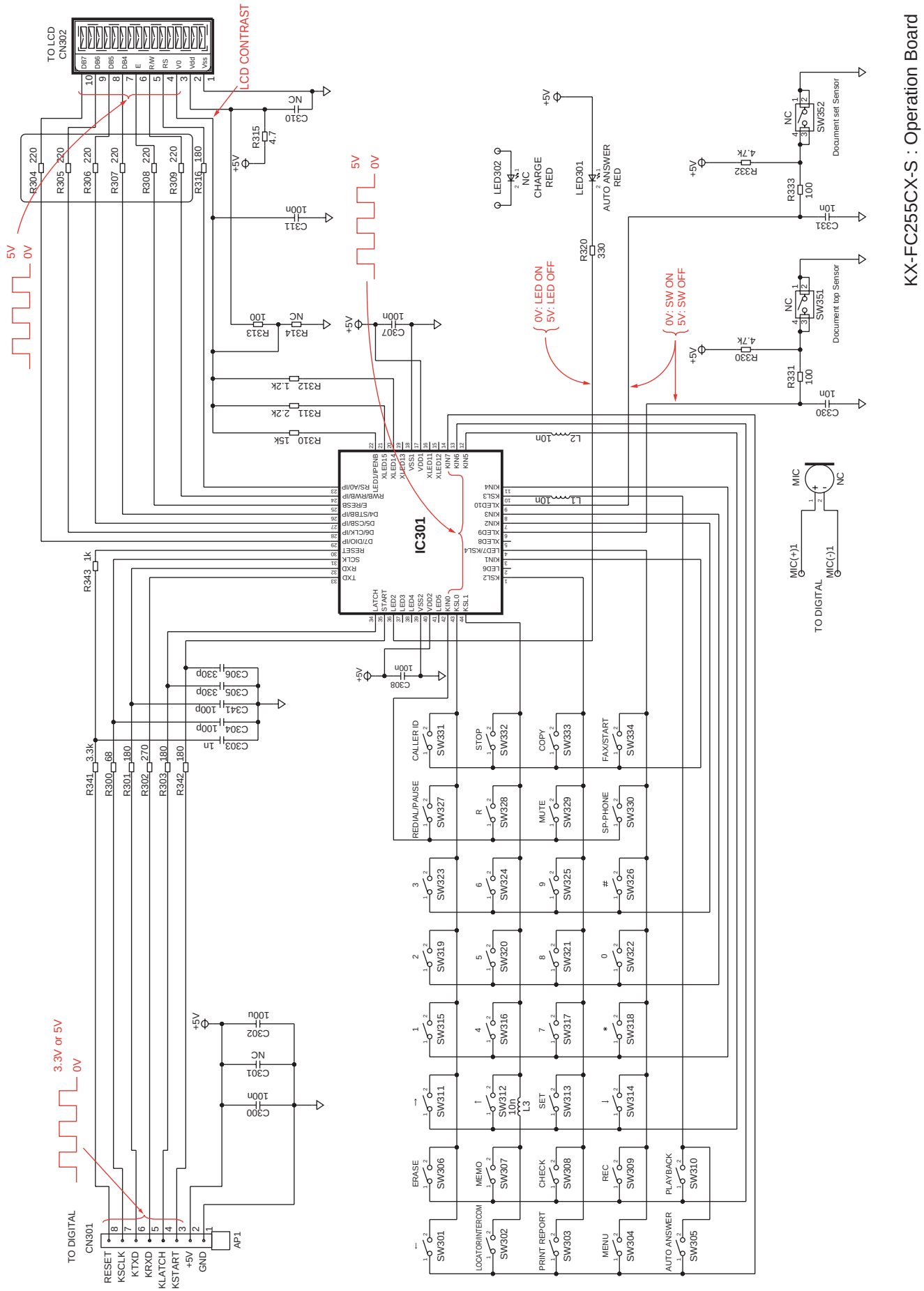
18.2. Analog Board (PCB2)





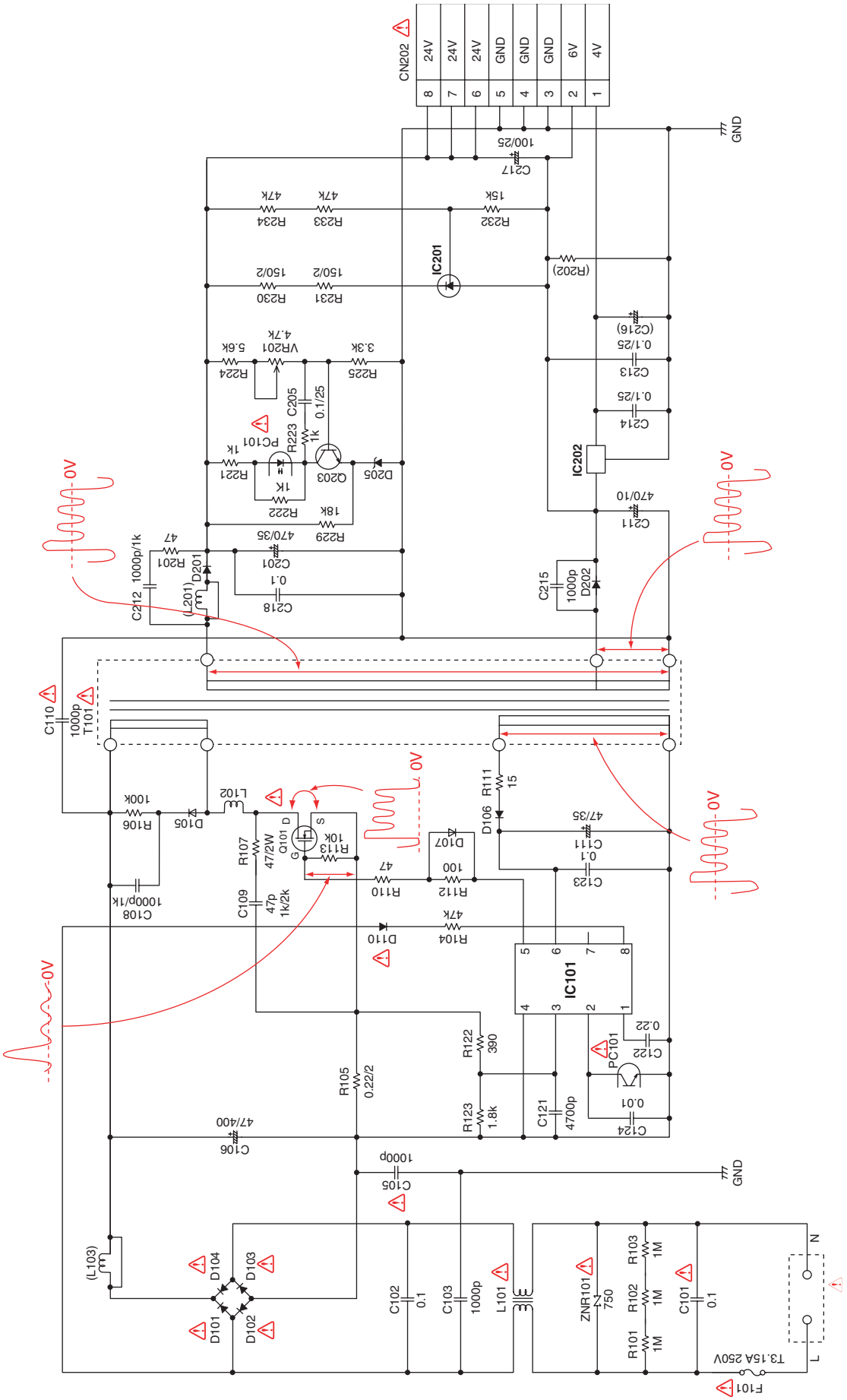
KX-FC255CX-S : Analog Board

18.3. Operation Board (PCB3) / MIC Board (PCB9)

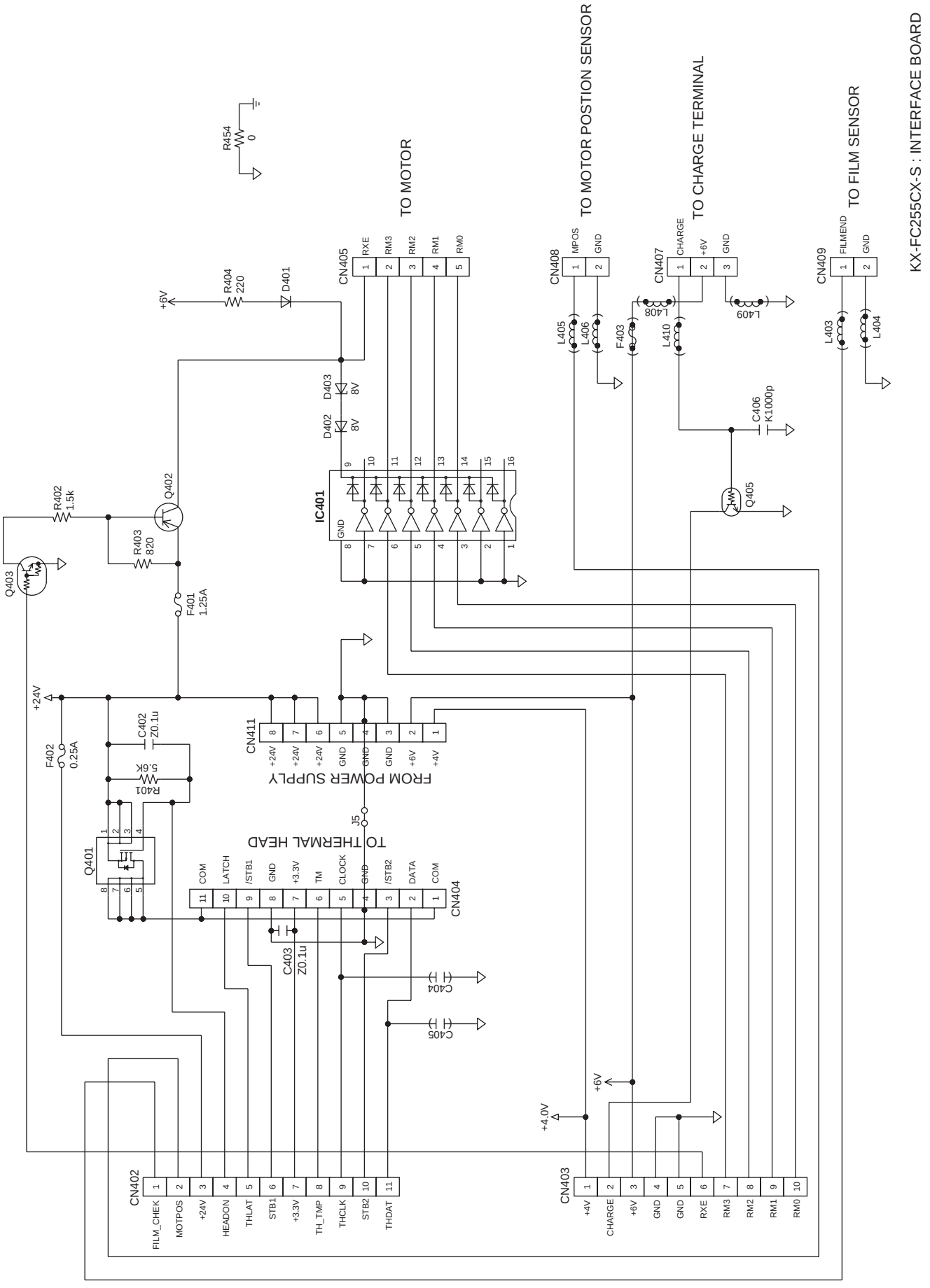


18.4. Power Supply Board (PCB4)

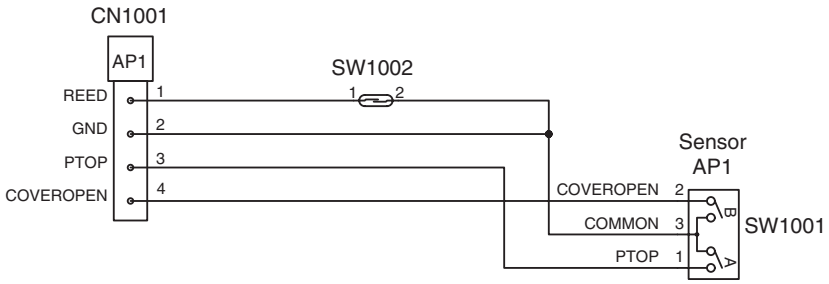
KX-FC255CX-S : POWER SUPPLY BOARD



18.5. Interface Board (PCB5)

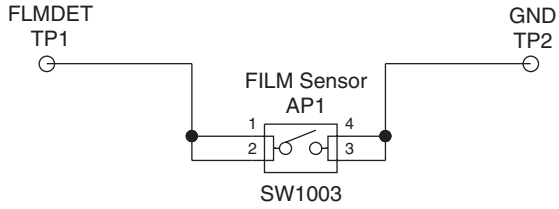


18.6. Sensor Board (PCB6)



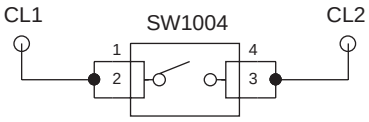
KX-FC255CX-S : Sensor Board

18.7. Film End Sensor Board (PCB7)



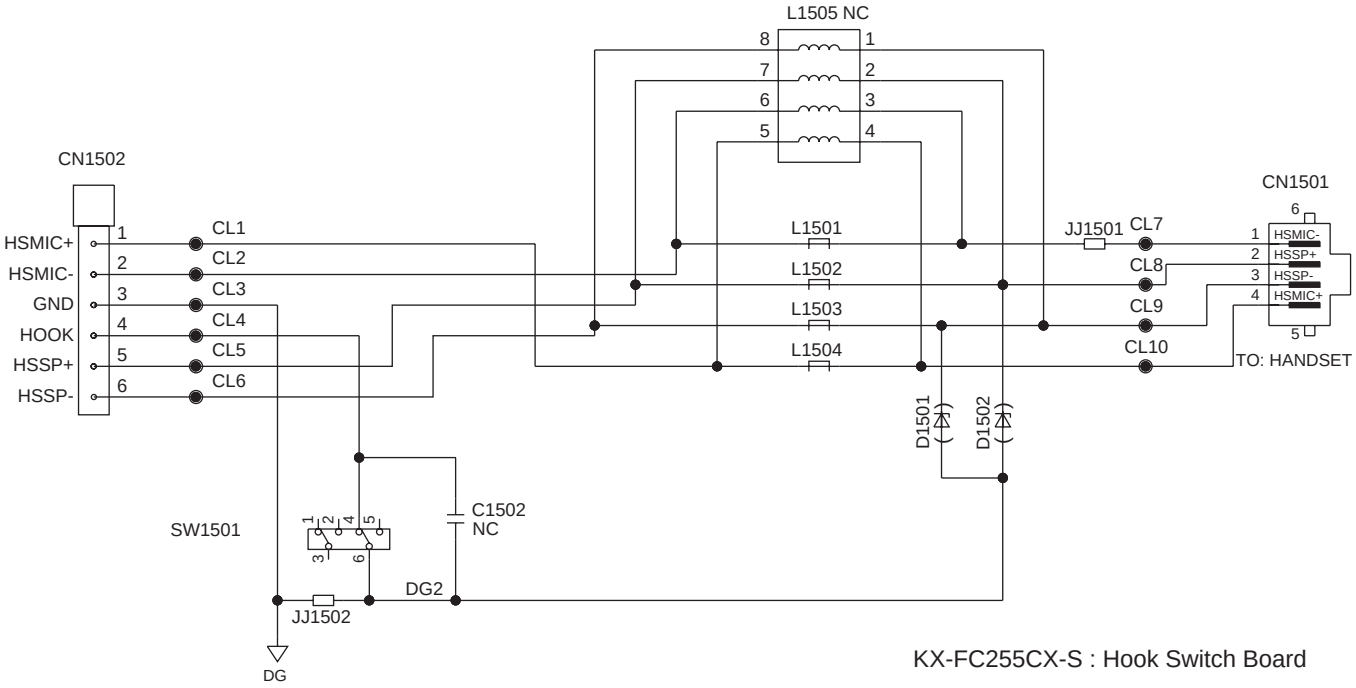
KX-FC255CX-S : Film End Sensor Board

18.8. Motor Position Sensor Board (PCB8)



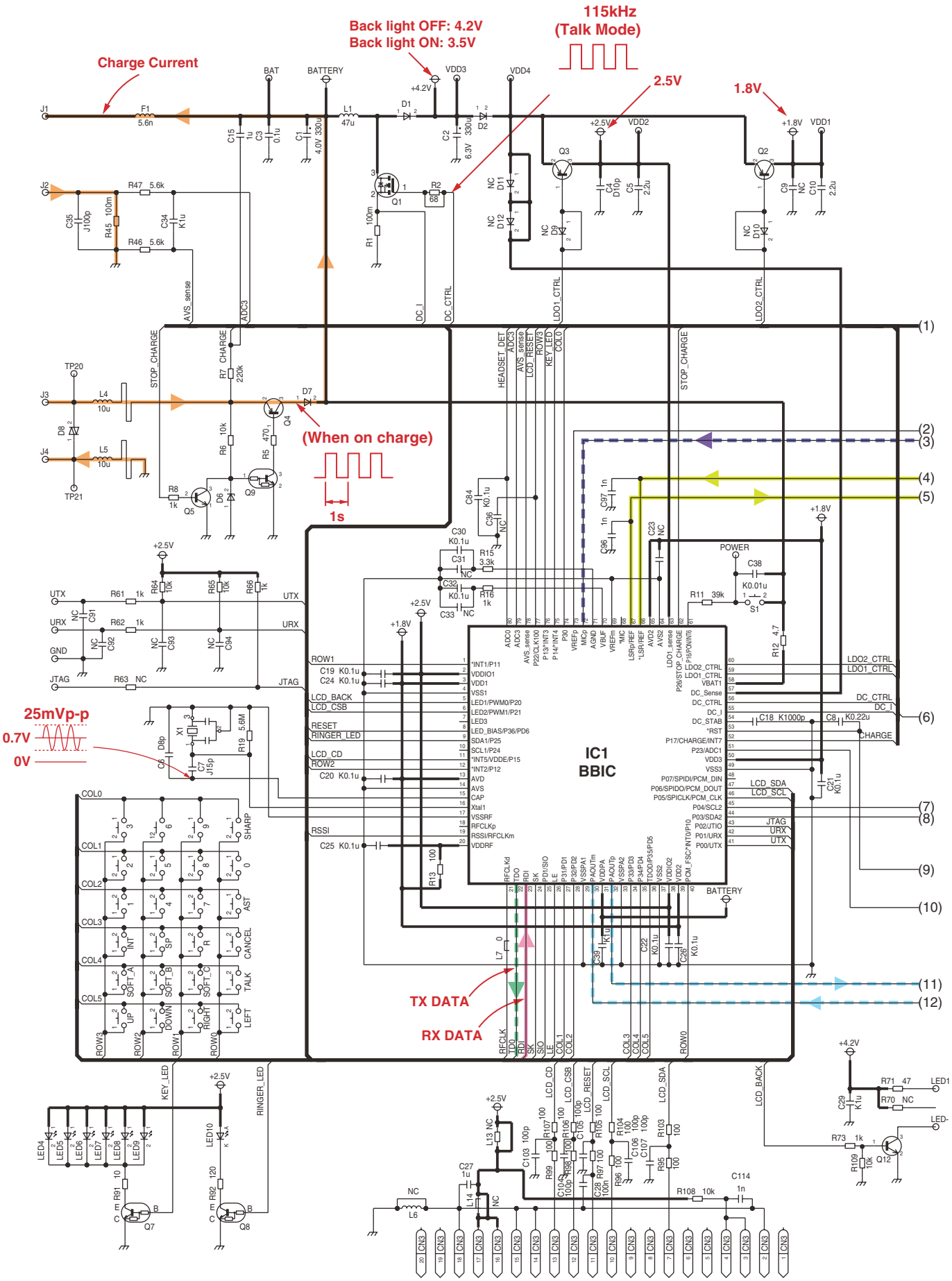
KX-FC255CX-S : Motor Position Sensor Board

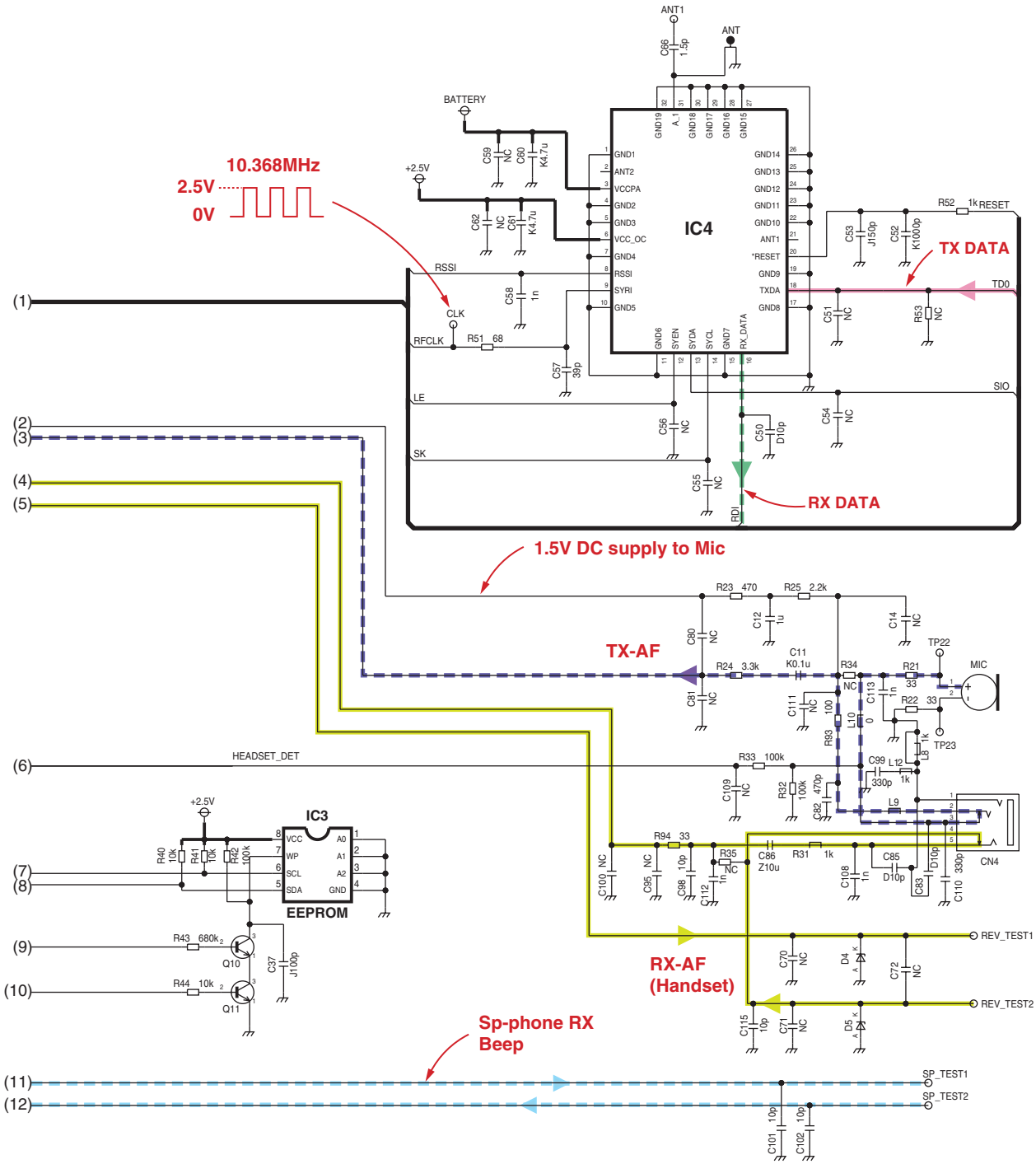
18.9. Hook Switch Board (PCB10)



KX-FC255CX-S : Hook Switch Board

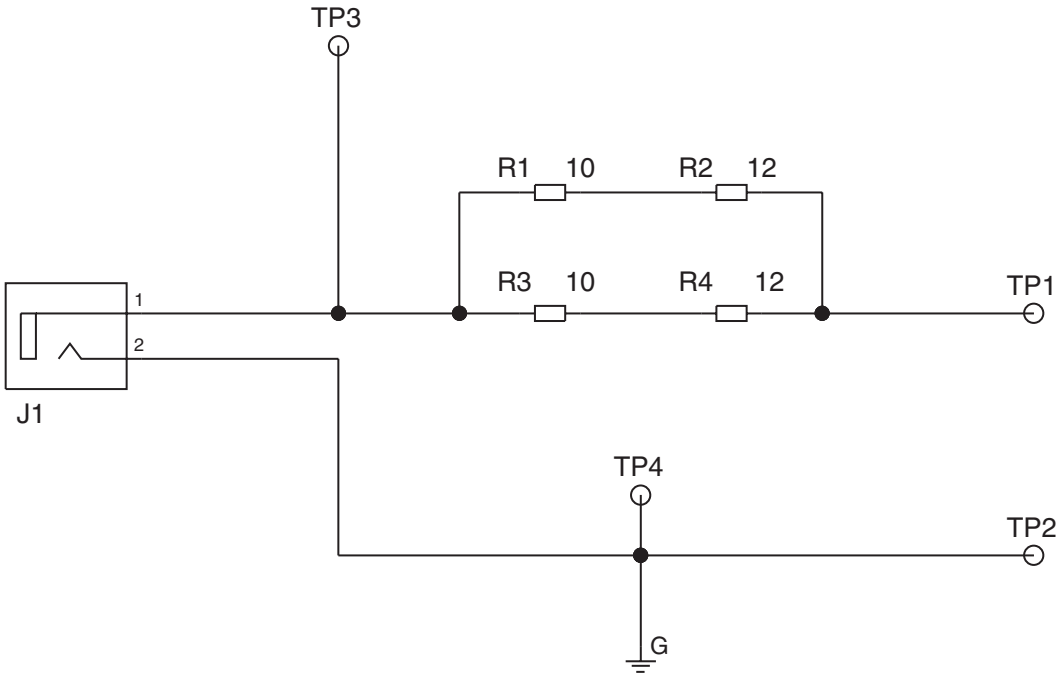
18.10. Cordless Handset Board (PCB100)





NC: No Components
KX-FC255CX-S : Cordless Handset Board

18.11. Charger Board (PCB200)

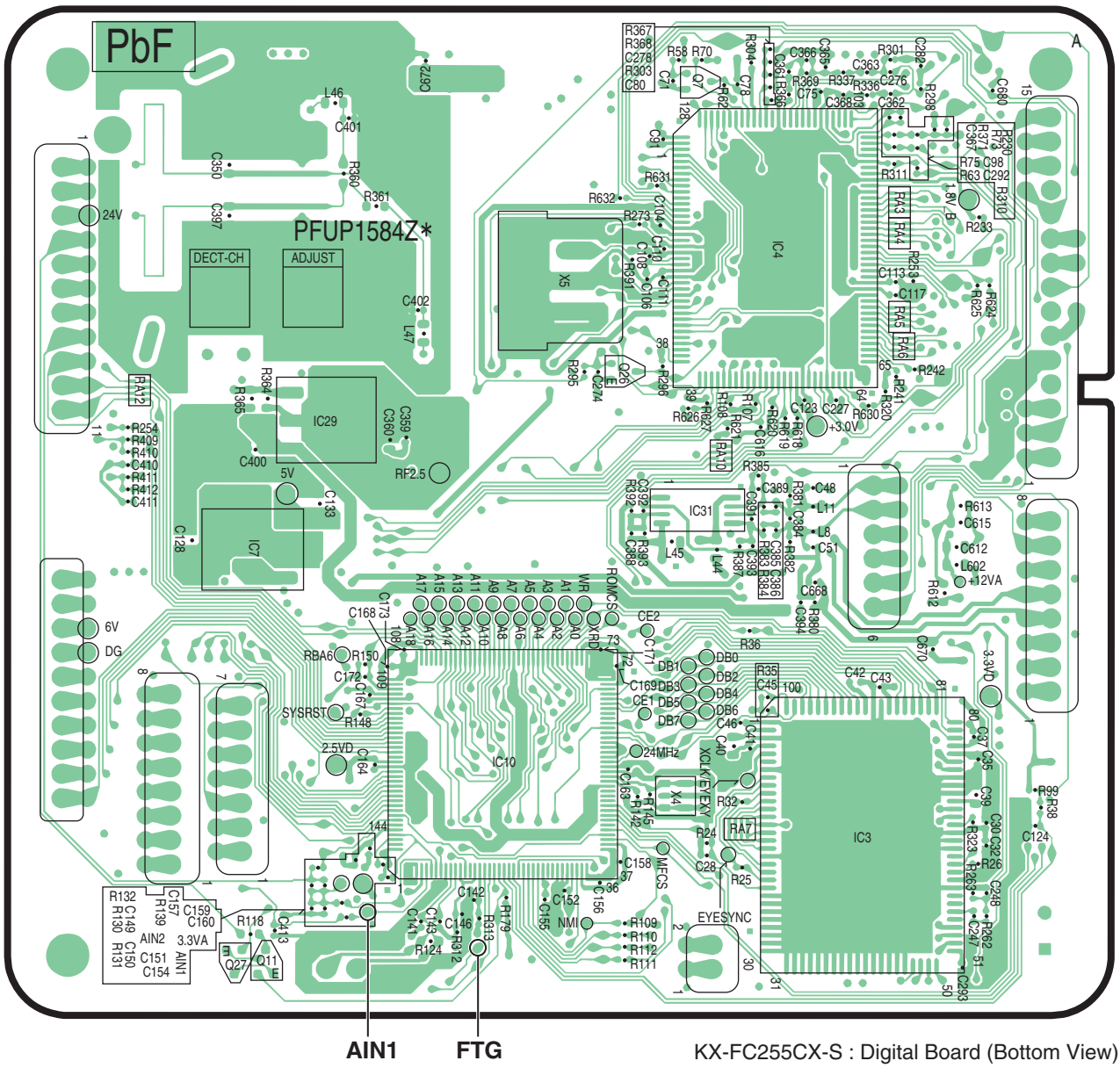


KX-FC255CX-S : Charger Board

19 Printed Circuit Board

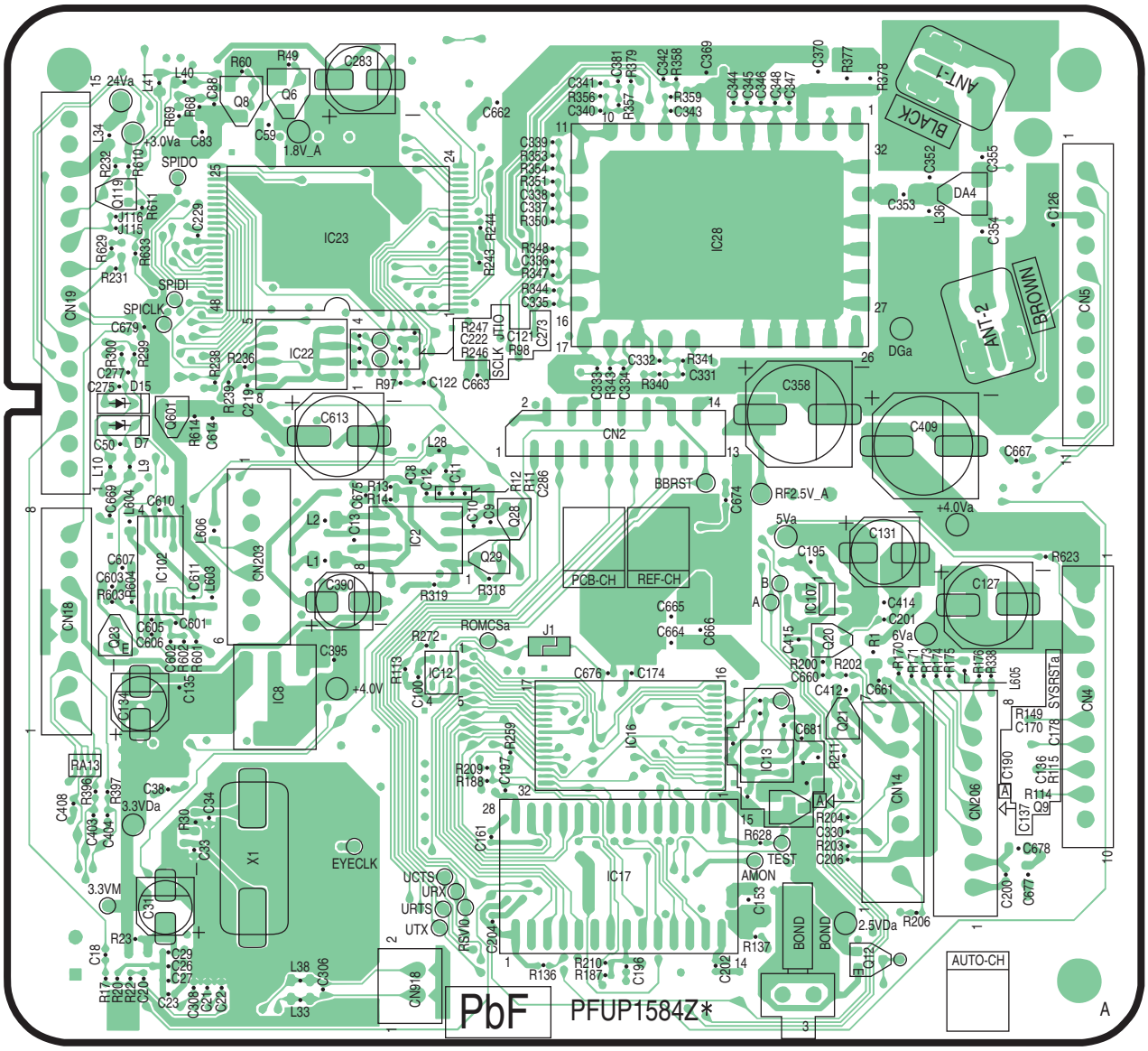
19.1. Digital Board (PCB1)

19.1.1. Bottom View



KX-FC255CX-S : Digital Board (Bottom View)

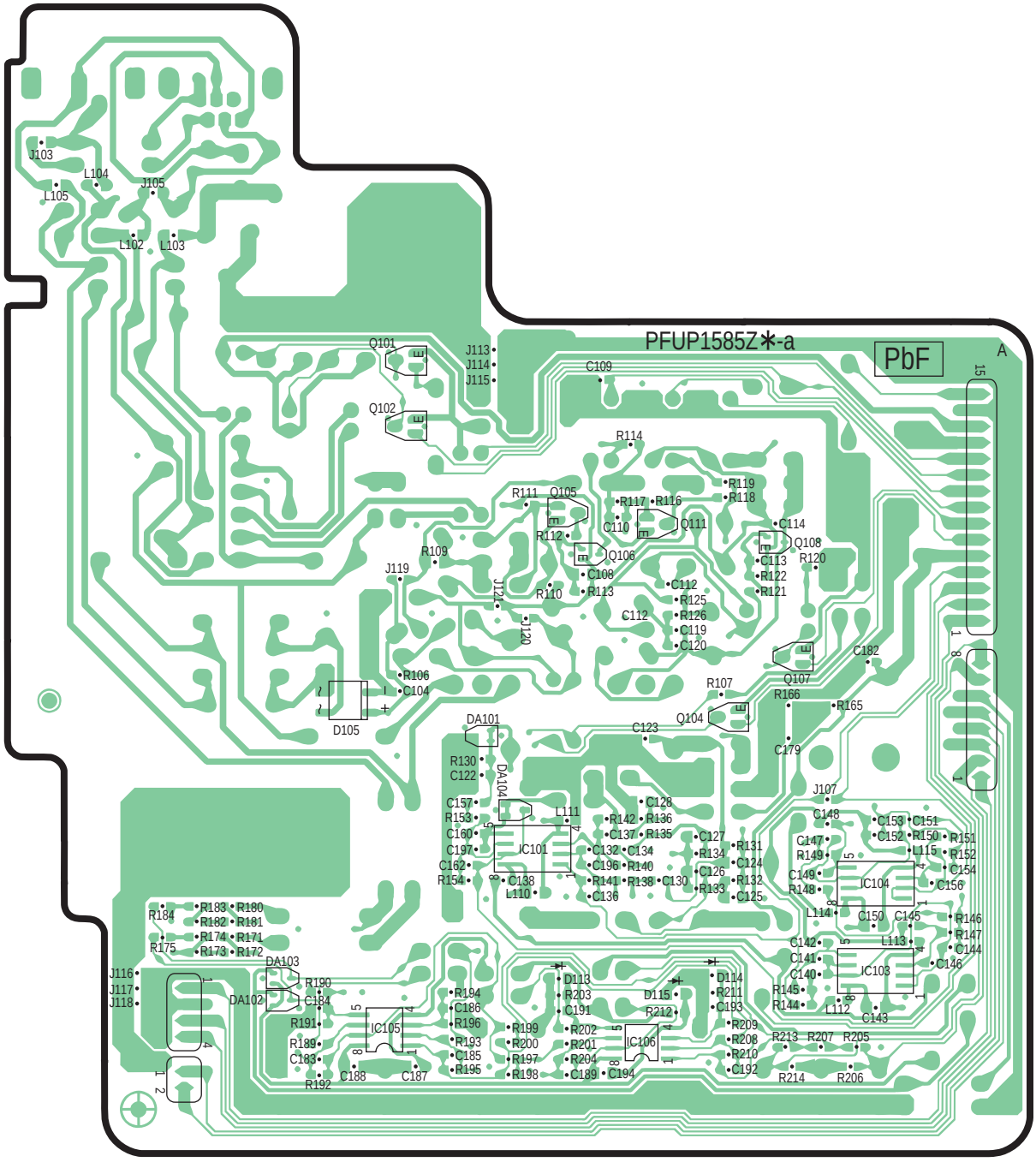
19.1.2. Component View



KX-FC255CX-S : Digital Board (Component View)

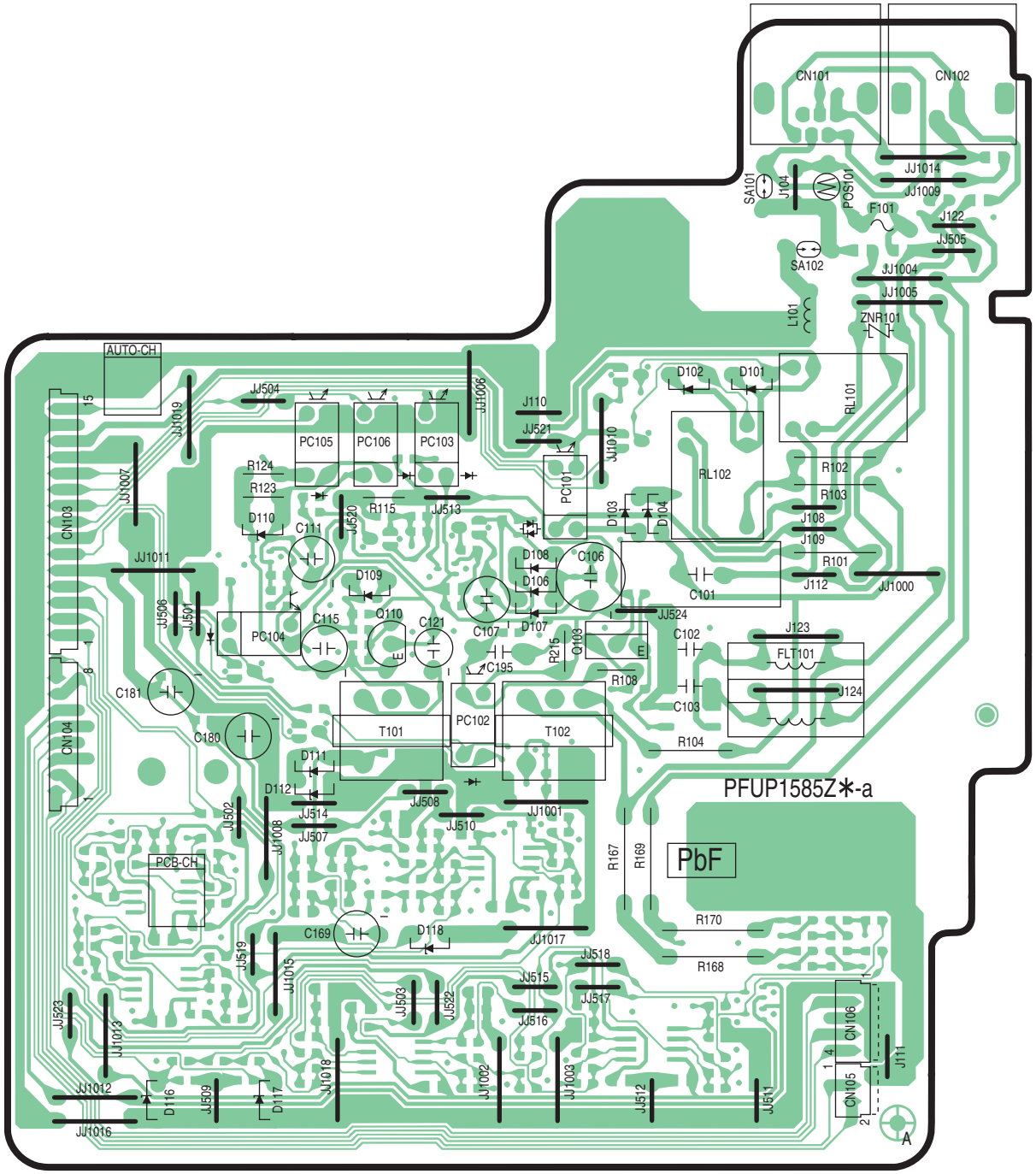
19.2. Analog Board (PCB2)

19.2.1. Bottom View



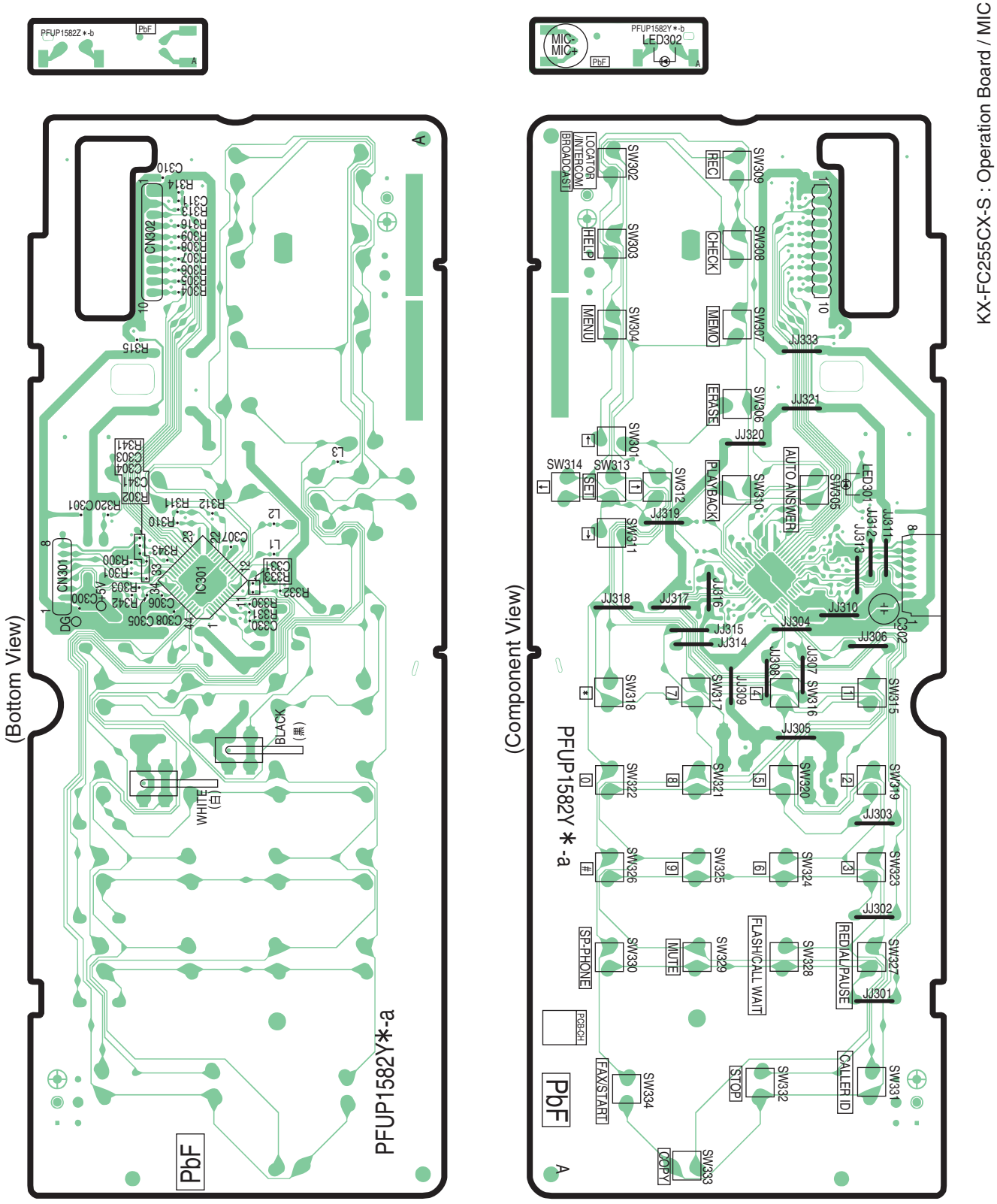
KX-FC255CX-S : Analog Board (Bottom View)

19.2.2. Component View

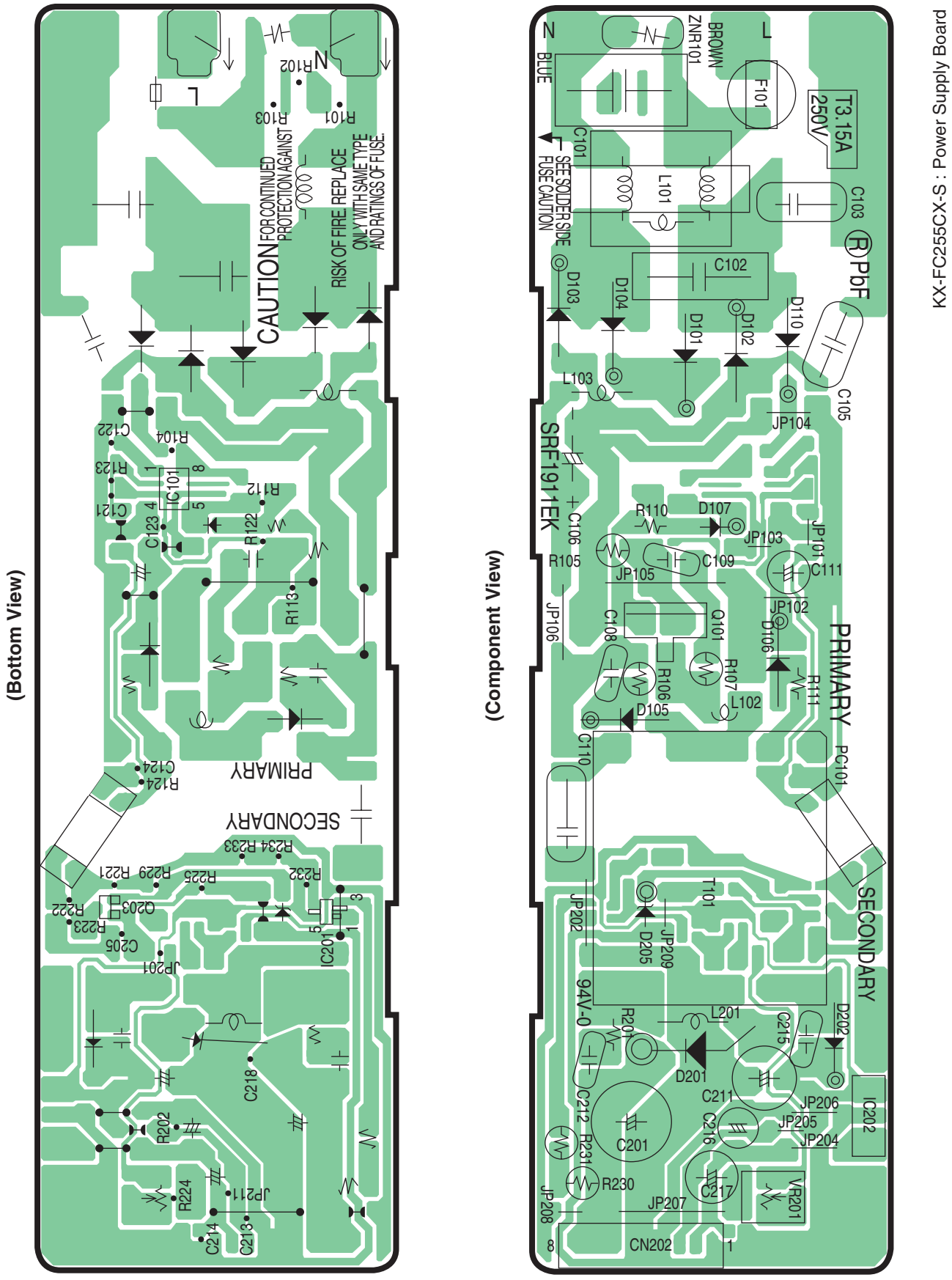


KX-FC255CX-S : Analog Board (Component View)

19.3. Operation Board (PCB3) / MIC Board (PCB9)

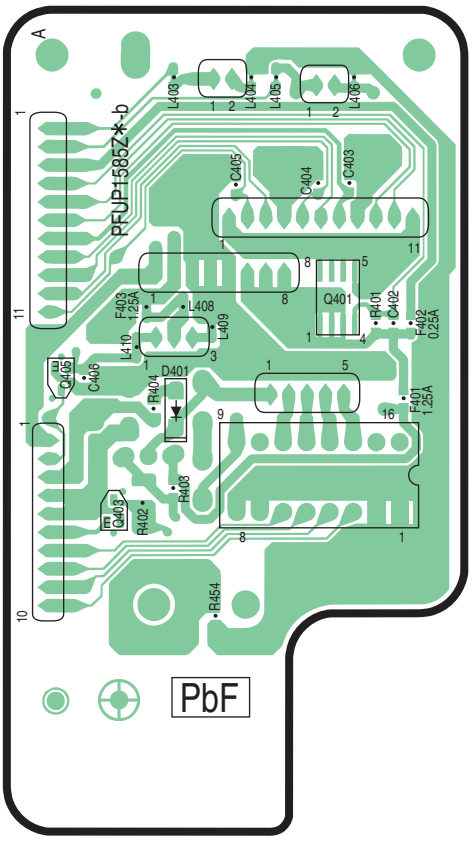


19.4. Power Supply Board (PCB4)

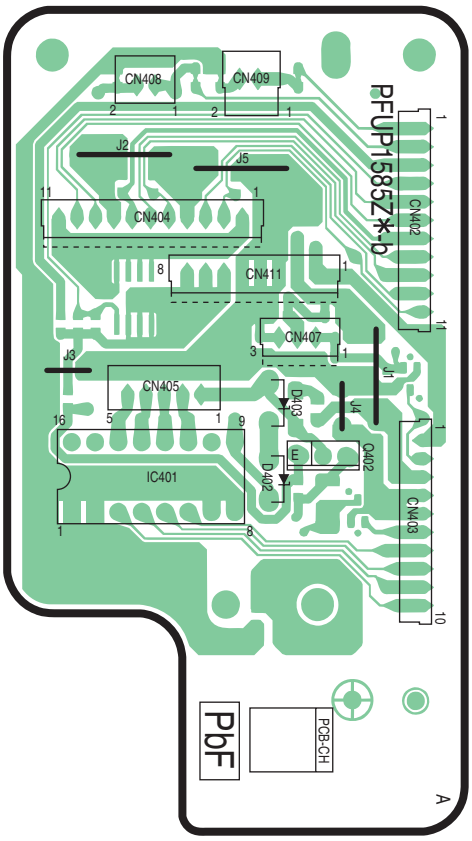


19.5. Interface Board (PCB5)

(Bottom View)

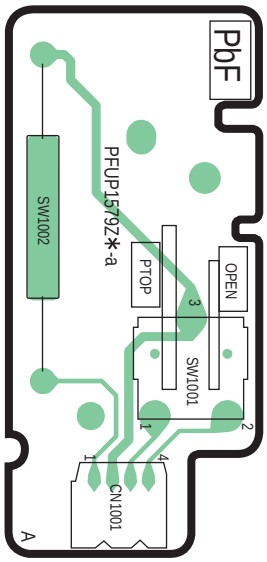


(Component View)



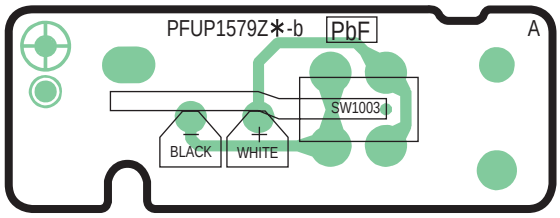
KX-FC255CX-S : Interface Board

19.6. Sensor Board (PCB6)



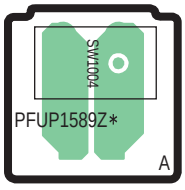
KX-FC255CX-S : Sensor Board

19.7. Film End Sensor Board (PCB7)



KX-FC255CX-S : Film End Sensor Board

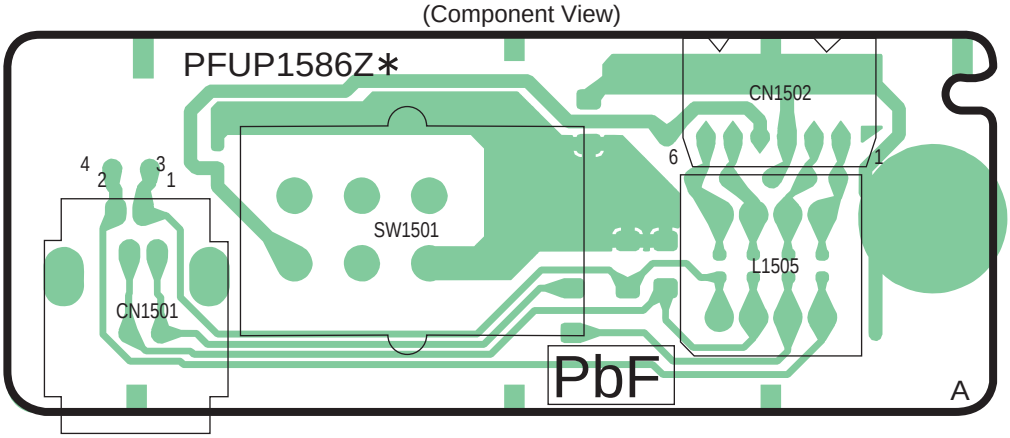
19.8. Motor Position Sensor Board (PCB8)



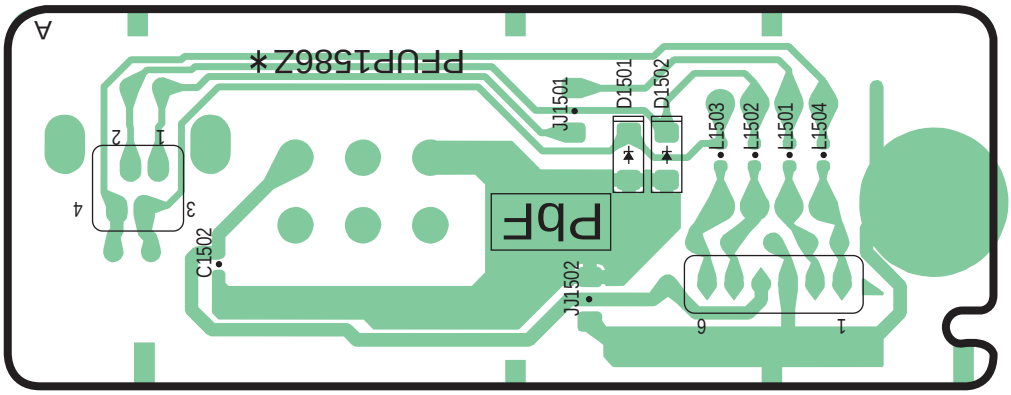
KX-FC255CX-S : Motor position Board

19.9. Hook Switch Board (PCB10)

(Component View)



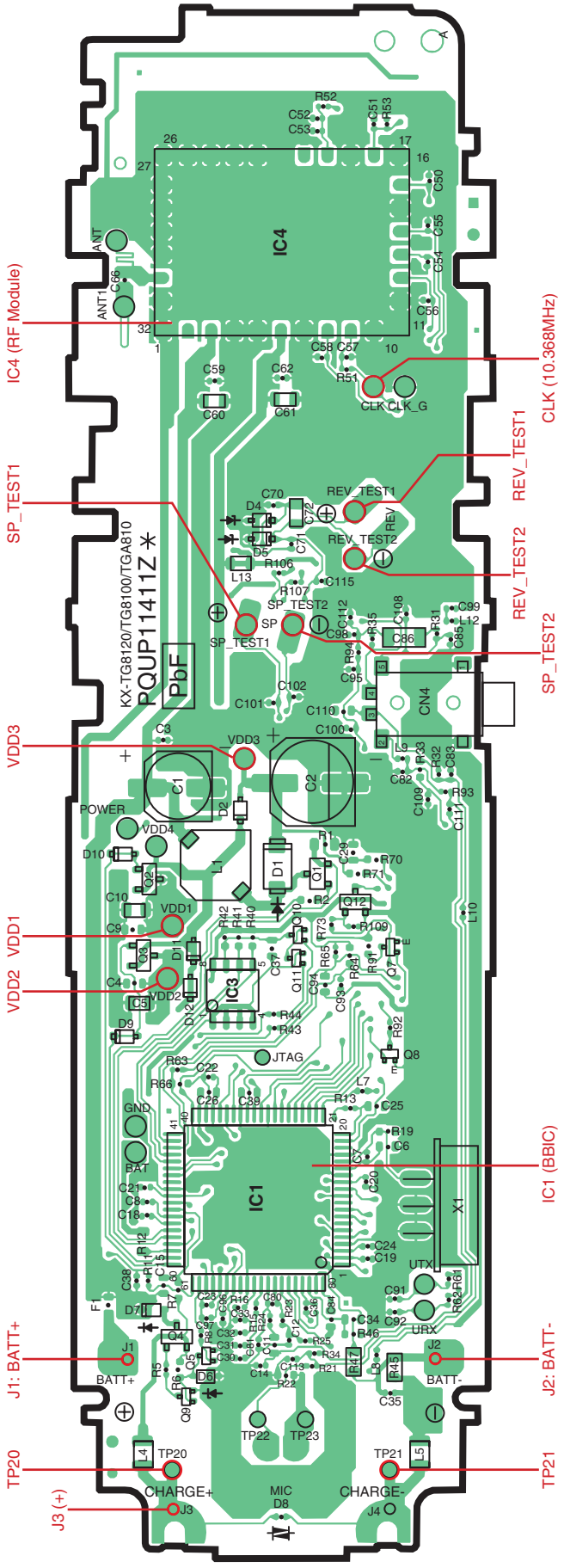
(Bottom View)



KX-FC255CX-S : Hook Switch Board

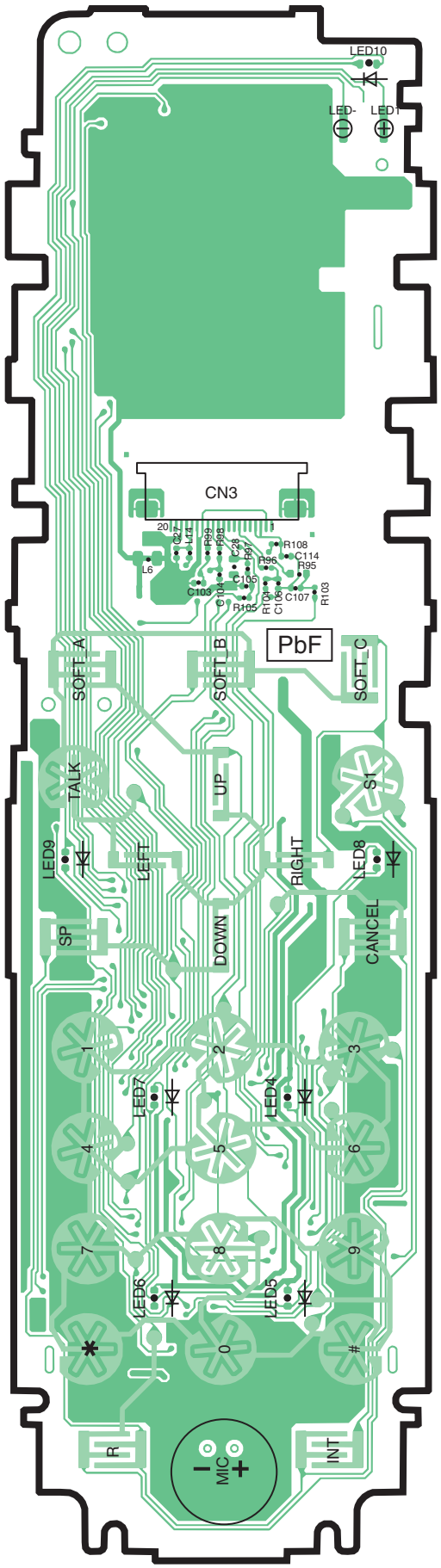
19.10. Cordless Handset Board (PCB100)

19.10.1. Component View



KX-FC255CX-S : Cordless Handset Board (Component View)

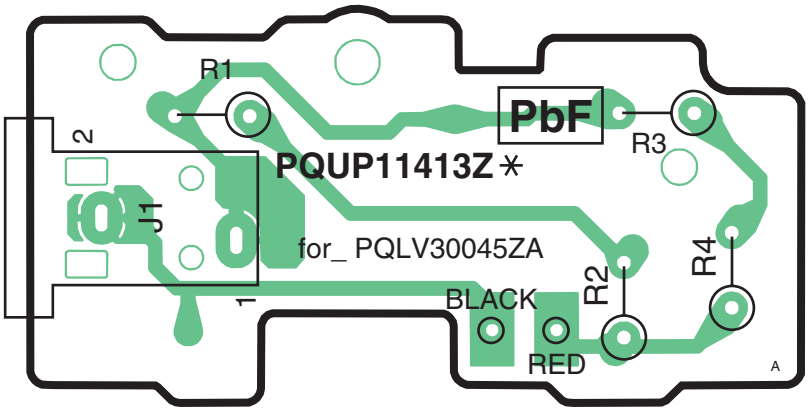
19.10.2. Flow Solder Side View



KX-FC255CX-S : Cordless Handset Board (Flow Solder Side View))

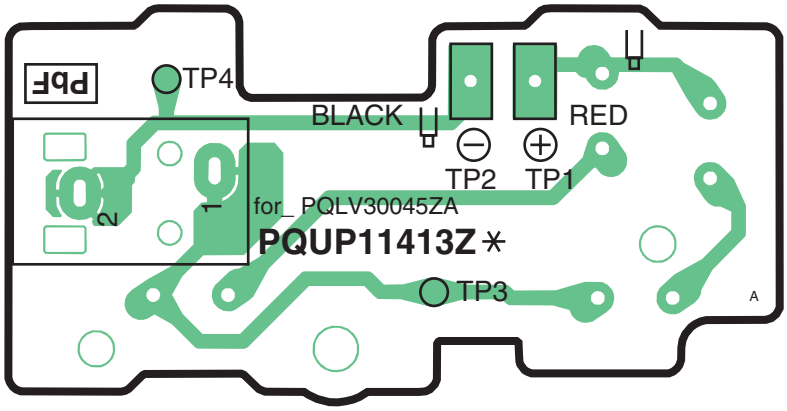
19.11. Charger Board (PCB200)

19.11.1. Component View



KX-FC255CX-S : Charger Board (Component View)

19.11.2. Flow Solder Side View



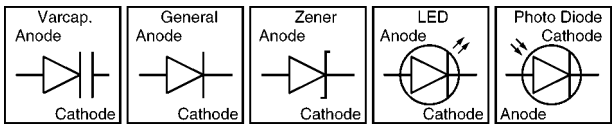
KX-FC255CX-S : Charger Board (Flow Solder Side View)

20 Appendix Information of Schematic Diagram

20.1. For Schematic Diagram

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.



Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

20.2. CPU Data

20.2.1. IC4: BBIC (Digital Board)

PIN NO.	PIN NAME				DESCRIPTION		PIN STATEMENT		ASSIGNMENT		
	1	2	3	4	1	2	Pull up or down	Reset state	PIN NAME	DIR	Connection
10	P3[7]	PD7			General purpose I/O port			O_HiZ	BELL/DCN	I	external 33k pullup to 3.0V
42	P3[6]	PD6			General purpose I/O port			O_HiZ	URTS	O	directly connect to ASIC
12	P3[5]	PD5			General purpose I/O port			O_HiZ	BREAK	O	
13	P3[4]	PD4			General purpose I/O port			O_HiZ	BELL SENSE/ CLIP RLY	O	
14	P3[3]	PD3			General purpose I/O port			O_HiZ	DCN	O	
15	P3[2]	PD2			General purpose I/O port			O_HiZ	RF RESET	O	RF
11	P3[1]	PD1			General purpose I/O port			O_HiZ	OPEN	I	external 10k pullup to 3.0V
66	P3[0]	SCL2			General purpose I/O port	Access bus2 fixed clk out-put		O_1	SCL2	O	external 5.6k pullup to 3.0V
94	P2[7]	SPIDO			General purpose Output	SPI Data out		O_HiZ	SPIDO	O	directly to connect CN703
97	P2[6]	stop_charge			-	-		O_0	Do not use.		OPEN
84	P2[5]	SDA1			General purpose I/O port	Access bus1 serial clk out-put		I	RESRV1	O	
83	P2[4]	SCL1			General purpose I/O port	Access bus1 serial Data output		I	LINERLY	O	
82	P2[3]	ADC1			General purpose Output	ADC1 input		I	LINE M	O	
81	P2[2]	ADC0	CLK100		General purpose Output	ADC0 input		I	HSALC	O	connect to Digital Tr
80	P2[1]	PWM1	SPICLK			SPI CLK		I	SPICLK	O	directly to connect CN703
79	P2[0]	PWM0	SPIDI			SPI DATA in		I	SPIDI	I	external pull down
96	P1[7]	CHARGE	INT7n		General purpose I/O port		160k pull down	I_PD	S ENB	I	voltage convert with R/R ,, 3.3V->3.0V
95	P1[6]	PON	INT6n		General purpose I/O port	power on	160k pull down	I_PD			directly connect to 1.8V
63	P1[5]	INT5n	HOLD-ACKn	VDDE	General purpose I/O port		selectable pullup	O_1	SPMUTE	O	directly connect to SP AMP CD
62	P1[4]	INT4n	HOLDn		General purpose I/O port		selectable pullup	I_PU	CHK IN2	I	connect to CHK_IN2
61	P1[3]	INT3n	DACK1n	ACS2	General purpose I/O port	Auxiliary Chip Select2	selectable pullup	I_PU		O	OPEN
59	P1[2]	INT2n	DREQ1n	ACS1	General purpose I/O port	Auxiliary Chip Select1	selectable pullup	I_PU	CPC	I	voltage convert with R/R ,, 3.3V->3.0V
58	P1[1]	INT1n	DACK0n		General purpose I/O port		selectable pullup	I_PU	P-SHORT	I	external 3.3k pullup to 3.0V
57	P1[0]	INT0n	DREQ0n		General purpose I/O port		selectable pullup	I_PU	WP	O	external 10k pullup to 3.0V
54	P0[7]	PCM_DIN			General purpose I/O port	PCM_DIN	selectable pullup	I_PU	T-ON/OFF	O	connect to Digital Tr
53	P0[6]	PCM_DOUT			General purpose I/O port	PCM_DOUT	selectable pullup	I_PU	T-PAT0	O	directly to connect CN917
52	P0[5]	PCM_CLK			General purpose I/O port	PCM_CLK	selectable pullup	I_PU	T-PAT1	O	directly to connect CN917
51	P0[4]	PCM_FSC0			General purpose I/O port	PCM_FSC0	selectable pullup	I_PU	CHARGE	O	directly to connect CN917
50	P0[3]	PCM_FSC1			General purpose I/O port	PCM_FSC1	selectable pullup	I_PU	UCTS	I	voltage convert with R/R,, 3.3V->3.0V
49	P0[2]	JTIO			General purpose I/O port	JTAG INPUT/ OUTPUT	selectable pullup	I_PU	JTIO	I/O	external 1k pullup to 3.0V

PIN NO.	PIN NAME				DESCRIPTION		PIN STATEMENT		ASSIGNMENT		
	1	2	3	4	1	2	Pull up or down	Reset state	PIN NAME	DIR	Connection
48	P0[1]	URX			General purpose I/O port	input Data to UART	pull down	I	URX	I	voltage convert with R/R ,, 3.3V->3.0V
47	P0[0]	UTX			General purpose I/O port	UART DATA output	selectable pullup	I_PU	UTX	O	connect to ASIC UART RXD

20.2.2. IC10: ASIC (Digital Board)

INPUT PORT

PIN NO.	SIGNAL	RESET STATE		533	I/O
19	CPC		I	HOOK	I
20	RVN		I	PDET	I
43	XWAIT/IP60		I	PTOP	I
119	STBNP		I	FLMDET	I
136	KRXD/IP	KRXD	I	KRXD	I

SWITCHING OUTPUT PIN/INPUT PORT

PIN NO.	SIGNAL	RESET STATE		533	I/O
124	RXE/IP04		HIGH	RXE	O
131	TXE/IP14		HIGH	TXE	O

OUTPUT PORT

PIN NO.	SIGNAL	RESET STATE		533	I/O
17	F2/OP50	F2	LOW	XMDMRST	O
18	FR/OP51	FR	LOW	HEADON	O
46	XOPRBE/MUX/OP53	XOPRBE	HIGH	XOPRBE	O
47	ADR13/OP	ADR13			
48	ADR14/OP	ADR14			
49	ADR15/OP	ADR15			
65	XRESCS2/OP71	XRESCS2	HIGH	—	O
101	RBA5/OP	RBA5		A18	
133	KLATCH	KLATCH		KLATCH	O

PORT ENABLE TO SWITHING INPUT/OUTPUT

PIN NO.	SIGNAL	RESET STATE		533	I/O
21	IRDATXD/IOP81	TXD	LOW	CHK_IN2	I/O
22	IRDARXD/IOP80	RXD	INPUT	F_TXMUTE	O
23	TXD/IOP30	IOP	INPUT	TXD	O
24	RXD/IOP31	IOP	INPUT	RXD	I
25	XRTS/IOP32	IOP	INPUT	XRTS	O
26	XCTS/IOP33	IOP	INPUT	XCTS	I
34	FMEMDO/IOP26	IOP	INPUT	LEDON	O
39	MIDAT/IOP45	IOP	INPUT	PWRCNT	O
40	MICLK/IOP46	IOP	INPUT	OPERST	O
41	MILAT/IOP47	IOP	INPUT	NISHI1	I
42	20KOSC/IOP56	IOP	INPUT	CCONT	O
44	XHSTRD/IOP40	IOP	INPUT	MURA1	O
45	XHSTWR/IOP41	IOP	INPUT	TX2-2	O
62	XRAS/IOP42	IOP	INPUT	RAS	O
63	XCAS1/IOP43	IOP	INPUT	CAS	O
64	XCAS2/IOP44	IOP	INPUT	RCONT	O
102	RBA6/IOP	RBA6		A19	
120	RM0/IOP00	RM0	LOW	RM0	
121	RM1/IOP01	RM1	LOW	RM1	
122	RM2/IOP02	RM2	LOW	RM2	
123	RM3/IOP03	RM3	LOW	RM3	
125	TM0/IOP10	TM0	LOW	TM0	O
128	TM1/IOP11	TM1	LOW	TM1	O
129	TM2/IOP12	TM2	LOW	TM2	O
130	TM3/IOP13	TM3	LOW	TM3	O

PIN NO.	SIGNAL	RESET STATE		533	I/O
137	FMEMCLK/IOP24	IOP	INPUT	BBRST	O
138	FMEMDI/IOP25	IOP	INPUT	CISON	O

[MODEM GPIO]: 100

PIN NO.	SIGNAL	RESET STATE		533	I/O
93	GPI2	GPI2	INPUT	-	I
94	GPI3	GPI3	INPUT	-	I
95	GPI4	GPI4	INPUT	-	I
96	GPI5	GPI5	INPUT	-	I
97	GPI6	GPI6	INPUT	CHK_IN2	I
98	GPI7	GPI7	INPUT	CHK_IN3	I
99	GPO7	GPO7	LOW	-	O
101	GPO6	GPO6	LOW	-	O
102	GPO5	GPO5	LOW	-	O
104	GPO4	GPO4	LOW	-	O
105	GPO3	GPO3	LOW	GPO3	O
109	GPO2	GPO2	LOW	-	O
110	GPO1	GPO1	LOW	-	O

20.2.3. IC1: BBIC (Cordless Handset Board)

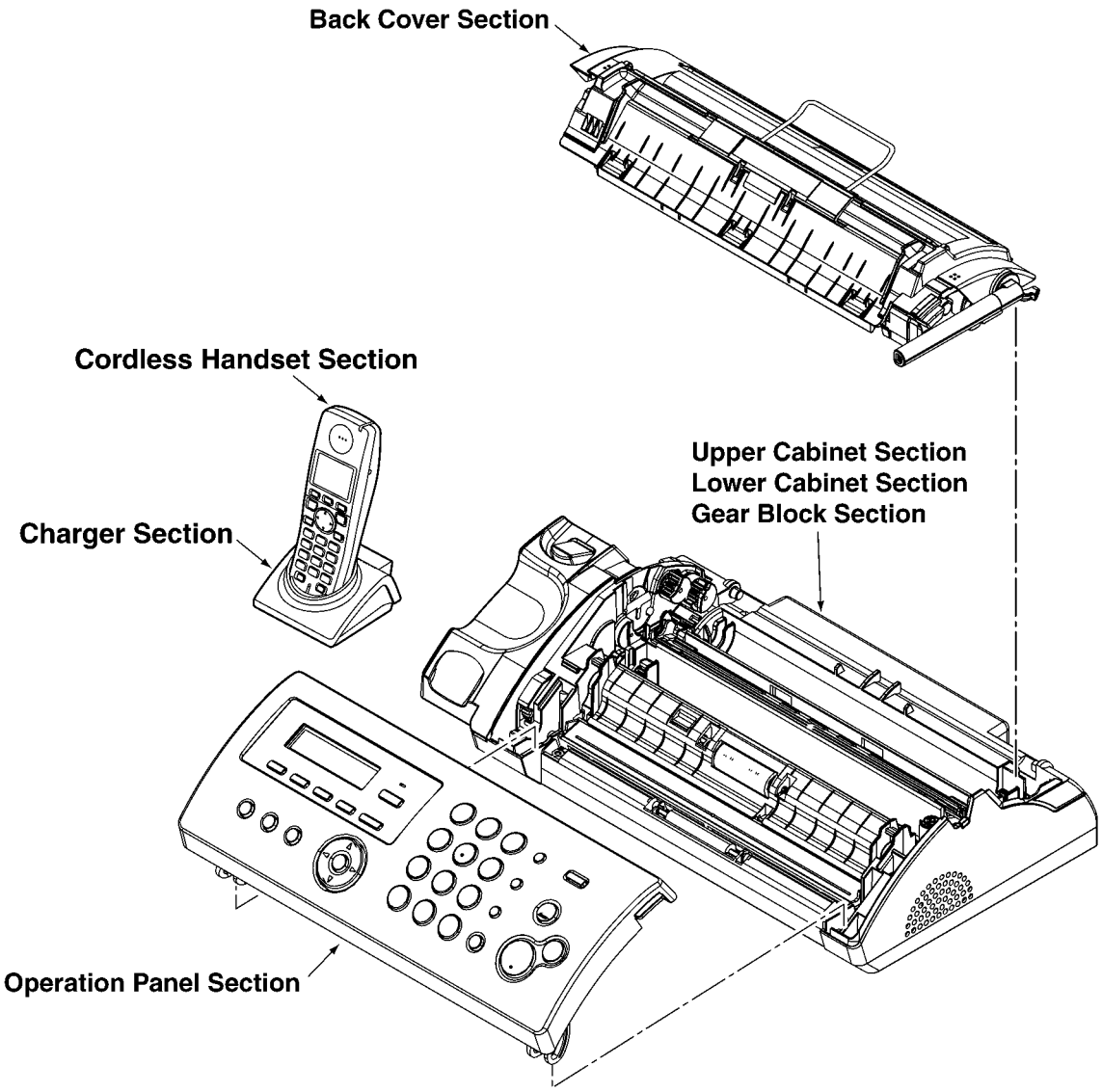
Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
1	INT1n/P1[1]	D,I	ROW1	I	I-PU
2	VDDIO	S	VDDIO	S	-
3	VDD	S	VDD	S	-
4	VSS	S	VSS	S	-
5	LED1/PWM0/P2[0]	D,O	LCD_BACKLIGHT	O	I-PU
6	LED2/PWM1/P2[1]	D,O	LCD_CSB	O	I-PU
7	LED3	A,I	NC	I	I
8	LED_BIAS/P3[6]/PD6	D,O	RF_RESET	O	I-PD
9	SDA1/P2[5]	D,O	RINGER_LED	O	I
10	SCL1/P2[4]	D,O	NC	O	I
11	INT5n/VDDE/P1[5]	D,O	LCD_CD/LCD_RS	O	O-H
12	INT2n/P1[2]	A,I	ROW2	I	I-PU
13	AVD	S	AVD	S	-
14	AVS	S	AVS	S	-
15	CAP	A,I	CAP	I	I
16	Xtal1	A,I	Xtal1	I	I
17	VSSRF	S	VSSRF	S	-
18	RFCLKp	A,O	NC	O	O-HiZ
19	RSSI/RFCLKm	I	RSSI	I	O-HiZ
20	VDDRF	S	VDDRF	S	-
21	RFCLKd	D,O	RFCLK	O	O-H
22	TDO	A,O	TDO	O	O
23	RDI	D,I	RDI	I	I
24	SK	D,IO	SK	O	O-L
25	SIO	D,IO	SIO	I	I-PD
26	LE	D,IO	LE	I	O-H
27	P3[1]/PD1	D,IO	COL1	I/O	I-PD
28	P3[2]/PD2	D,IO	COL2	I/O	I-PD
29	VSSPA	S	VSSPA	S	-
30	PAOUTp	A,O	PAOUTp	O	I-PD
31	VDDPA	S	VDDPA	S	-
32	PAOUTp	A,O	PAOUTp	O	I-PD
33	VSSPA	S	VSSPA	S	-
34	P3[3]/PD3	D,IO	COL3	I/O	I-PD
35	P3[4]/PD4	D,IO	COL4	I/O	I-PD
36	TDOD/P3[5]/PD5	D,IO	COL5	I/O	I-PD
37	VSS	S	VSS	S	-
38	VDDIO	S	VDDIO	S	-
39	VDD	S	VDD	S	A|
40	PCM_FSC/INT0n/P1[0]	D,IO	ROW0	I	I-PU
41	P0[0]/UTX	D,O	UTX	O	I-PU
42	P0[1]/URX	D,I	URX	I	I-PU
43	P0[2]/JTIO	D,IO	JTAG	I/O	I-PU
44	P0[3]/SDA2	D,IO	EEP_SDA	I/O	I-PU
45	P0[4]SCL2	D,IO	EEP_SCL	O	I-PU
46	P0[5]/SPICLK/PCM_CLK	D,O	LCD_SCL	O	I-PU
47	P0[6]/SPIDO/PCM_DOUT	D,O	LCD_SDA	O	I-PU
48	P0[7]/SPIDI/PCM_DIN	D,O	NC	O	I-PU
49	VSS	S	VSS	S	-
50	VDD	S	VDD	S	-
51	P2[3]/ADC1	D,O	EEP_WP	O	I
52	P1[7]/CHARGE/INT7	D,I	CHARGE	I	I-PD
53	RSTn	A,IO	RSTn	O	I-PU
54	DC_stab	A,O	DC_stab	O	O
55	DC_I	A,I	DC_I	I	I
56	DC_CTRL	D,O	DC_CTRL	O	I-PU
57	DC_Sence	A,I	DC_Sence	I	I
58	VBAT1	A,I	VBAT1	I	I
59	LDO1_CTRL	A,I	LDO1_CTRL	I	I
60	LDO2_CTRL	A,I	LDO2_CTRL	I	I
61	P1[6]/PON/INT6	D,I	POWER_KEY	I	I-PD
62	P2[6]/stop_charge	A,O	stop_charge	O	O-L
63	LDO1_Sence	A,I	LDO1_Sence	I	I
64	AVS2	S	AVS2	S	-

Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
65	AVD2	S	AVD2	S	-
66	LSRn/REF	A,O	LSRn	O	O
67	LSRp/REF	A,O	LSRp	O	O
68	MICn	A,I	MICn	I	I
69	VREFm	S	VREFm	S	-
70	VBUF	A,O	VBUF	O	O
71	AGND	S	AGND	S	-
72	MICp	A,I	MICp	I	I
73	VREFp	A,O	VREFp	O	O
74	P3[0]	D,O	COL0	I/O	I-PD
75	P1[4]/INT4n	D,O	KEY_LED	O	I
76	P1[3]/INT3n	D,I	ROW3	I	I
77	P2[2]/CLK100	D,O	LCD_RESET	O	I-PD
78	AVS_Sence	A,I	AVS_Sence	I	I
79	ADC3	A,I	ADC3	I	I
80	ADC0	A,I	Headset_detect	I	I

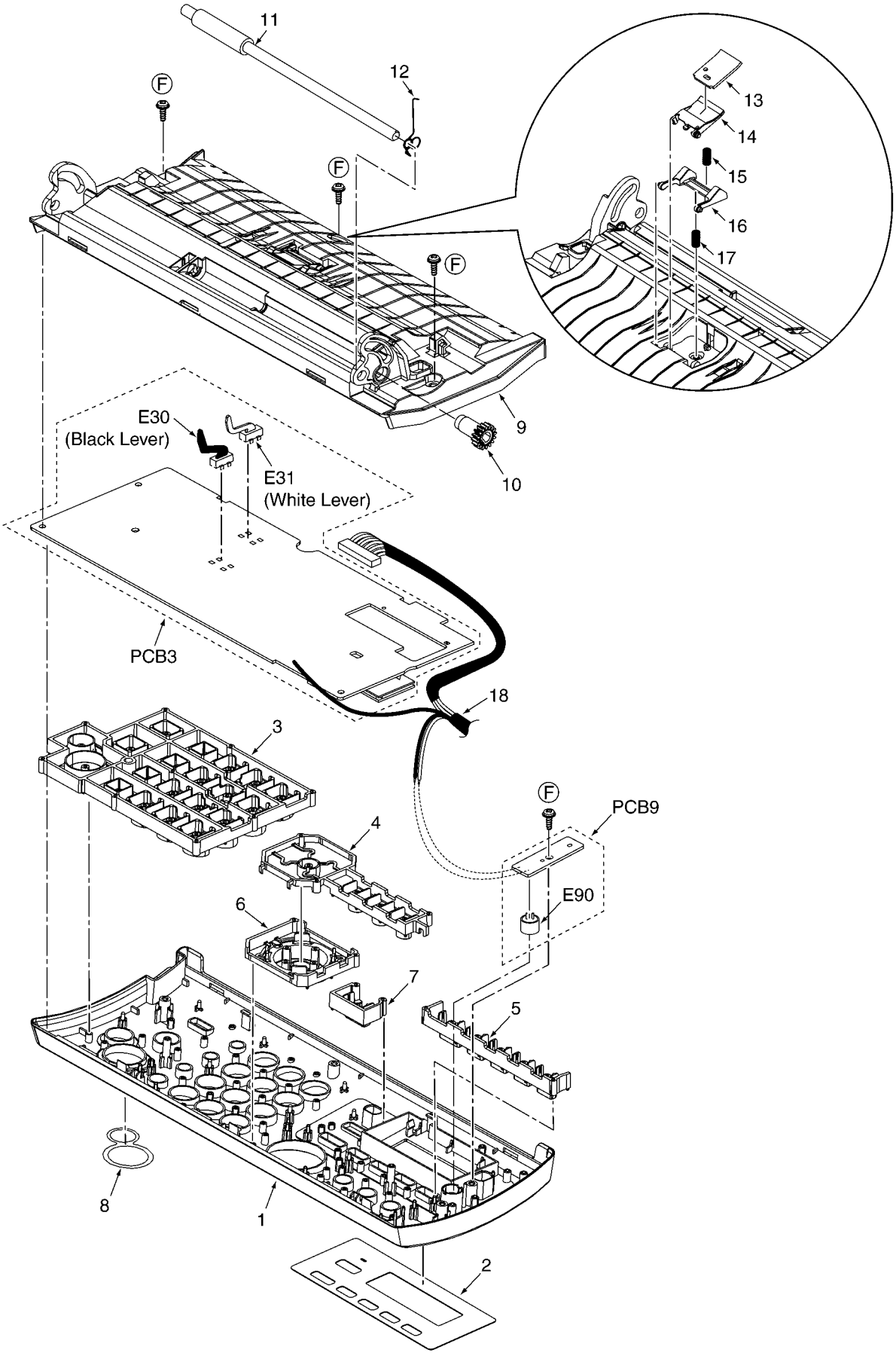
21 Exploded View and Replacement Parts List

21.1. Cabinet, Mechanical and Electrical Parts Location

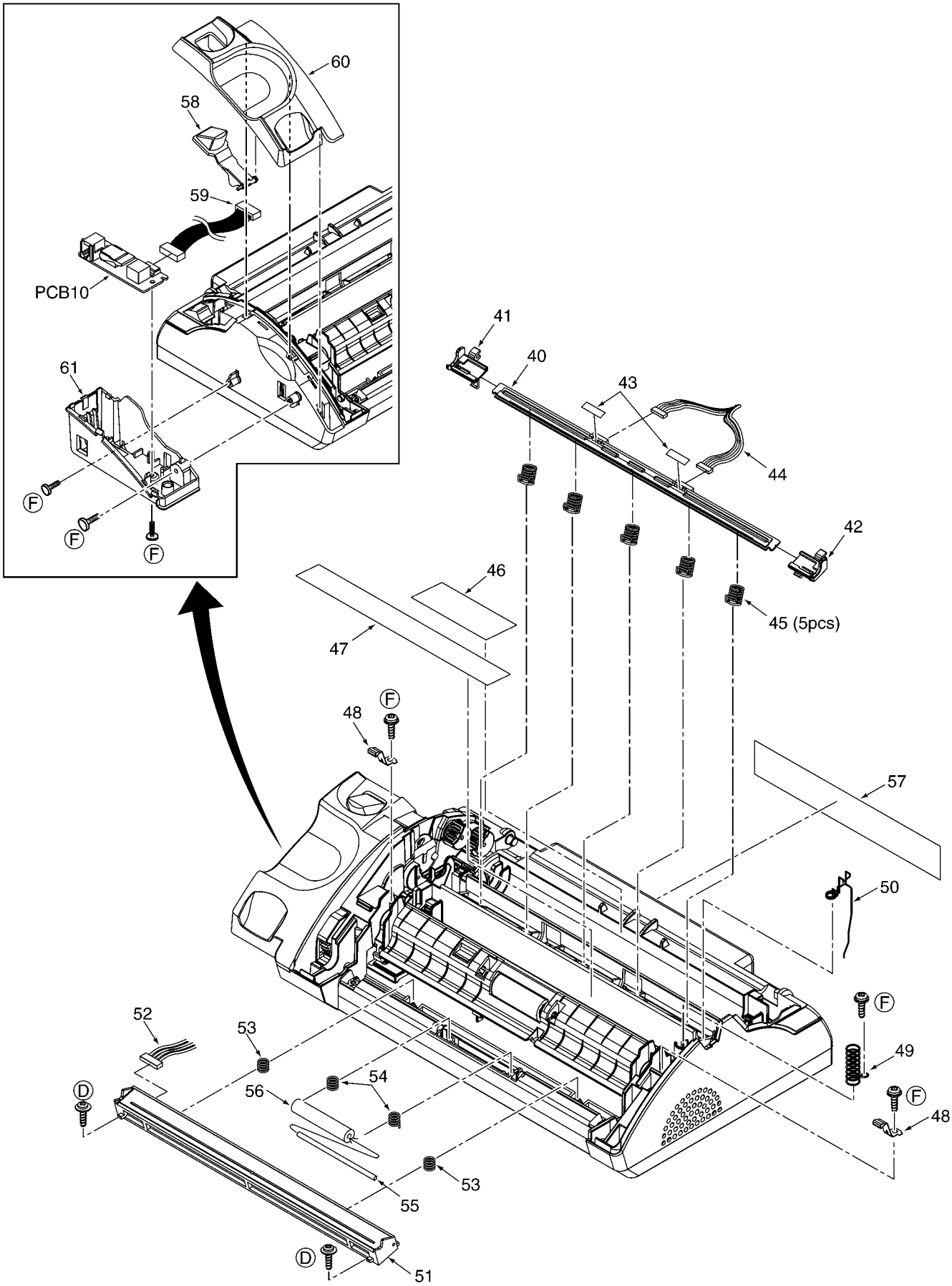
21.1.1. General Section



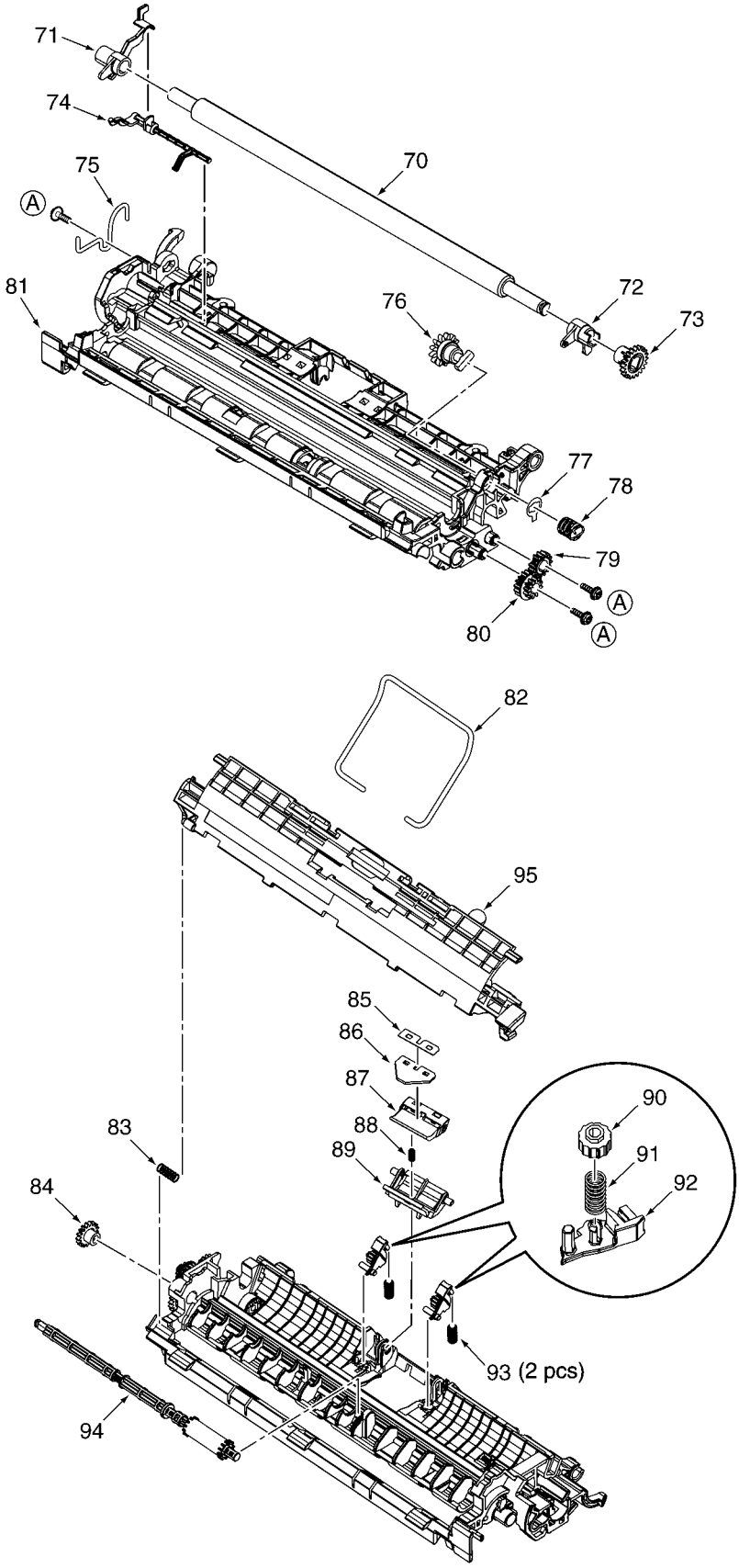
21.1.2. Operation Panel Section

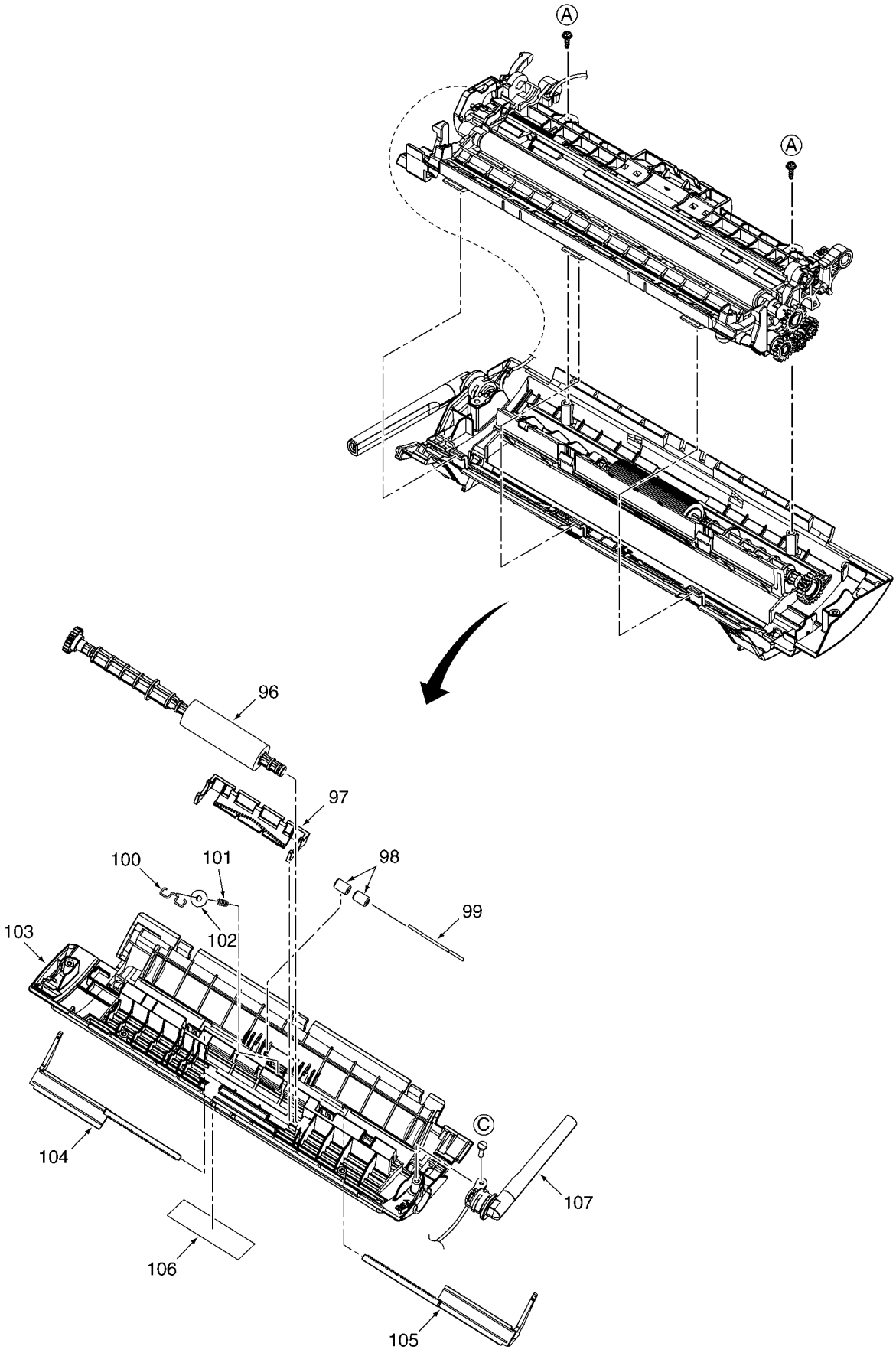


21.1.3. Upper Cabinet Section



21.1.4. Back Cover Section

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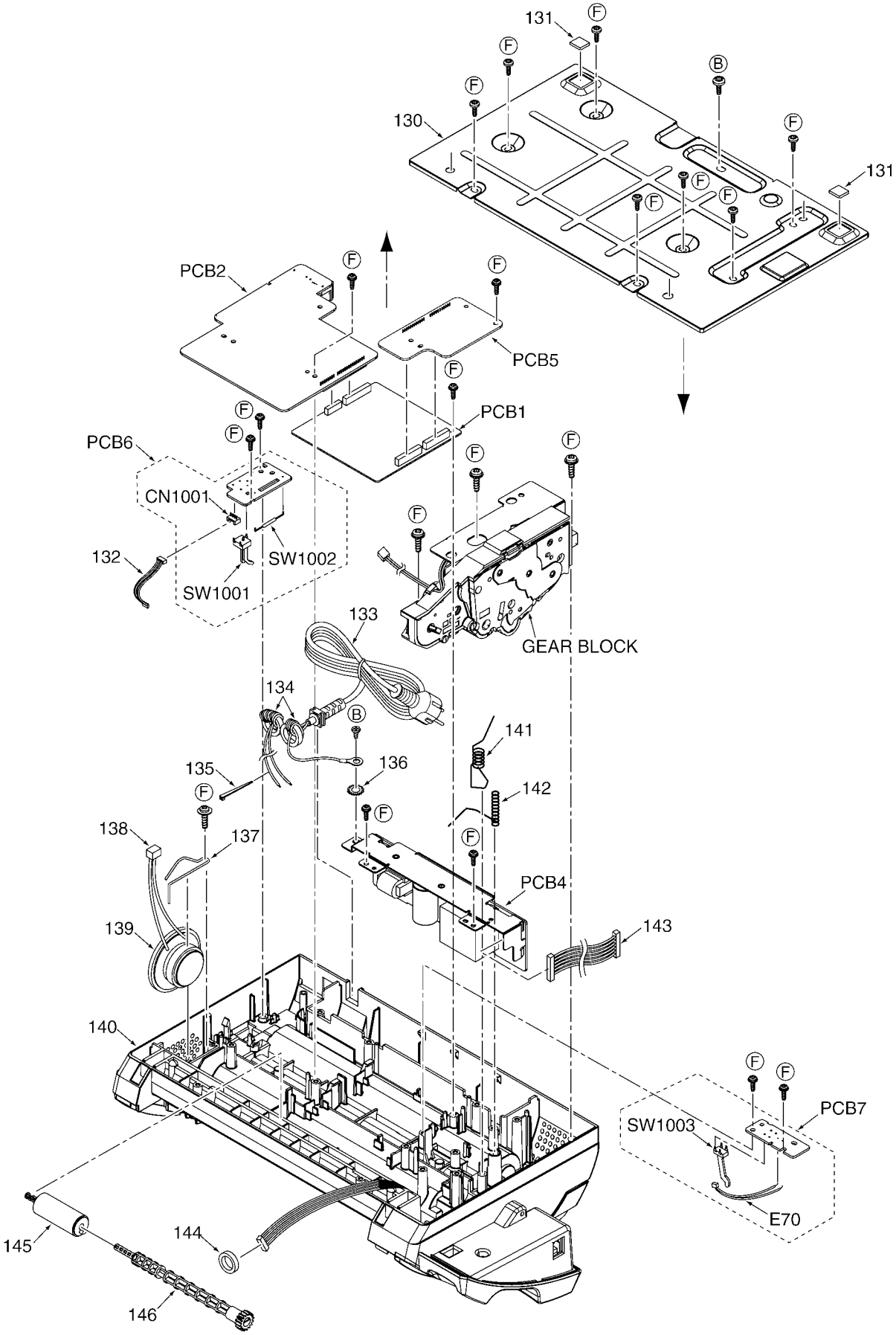
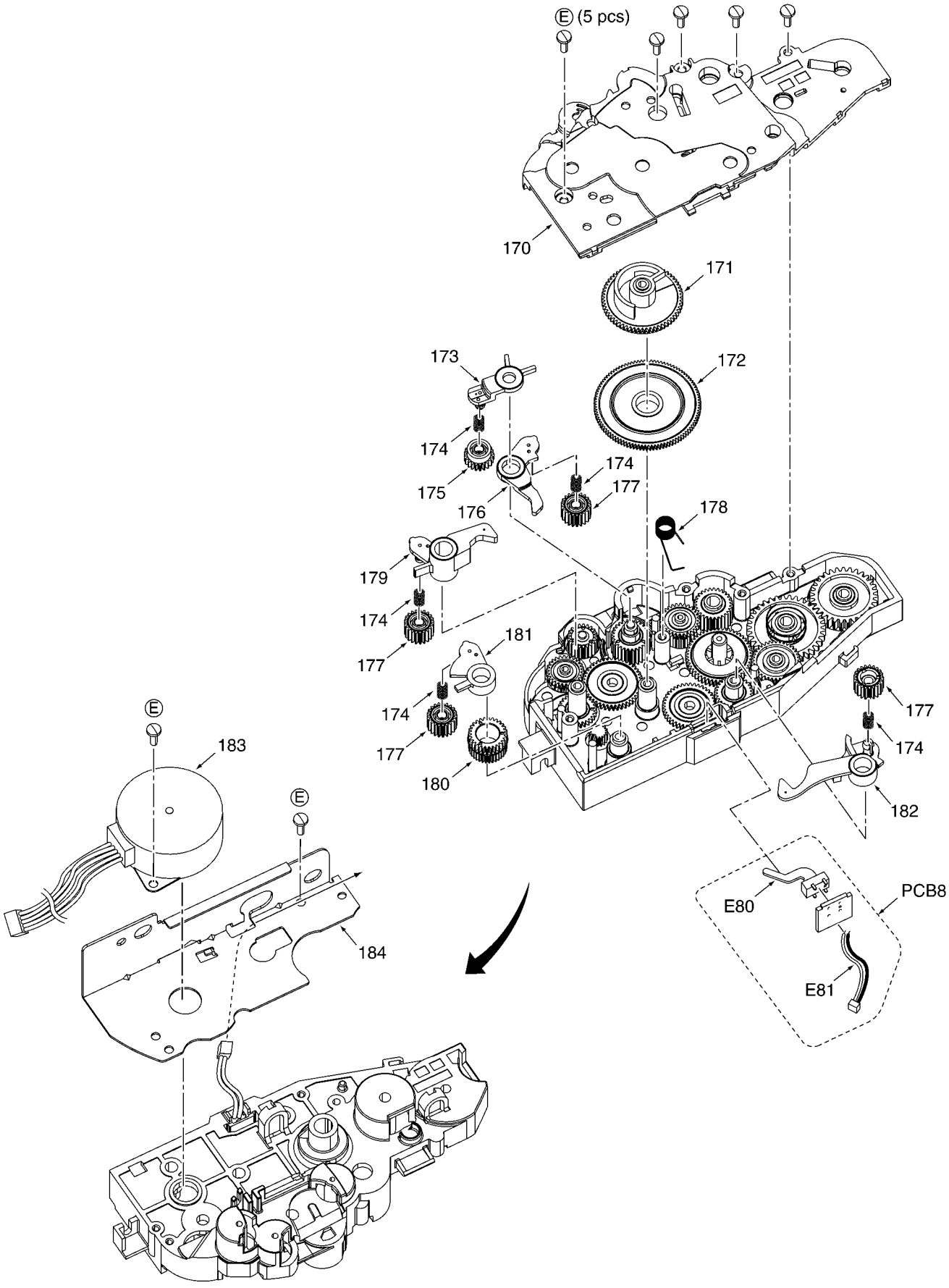
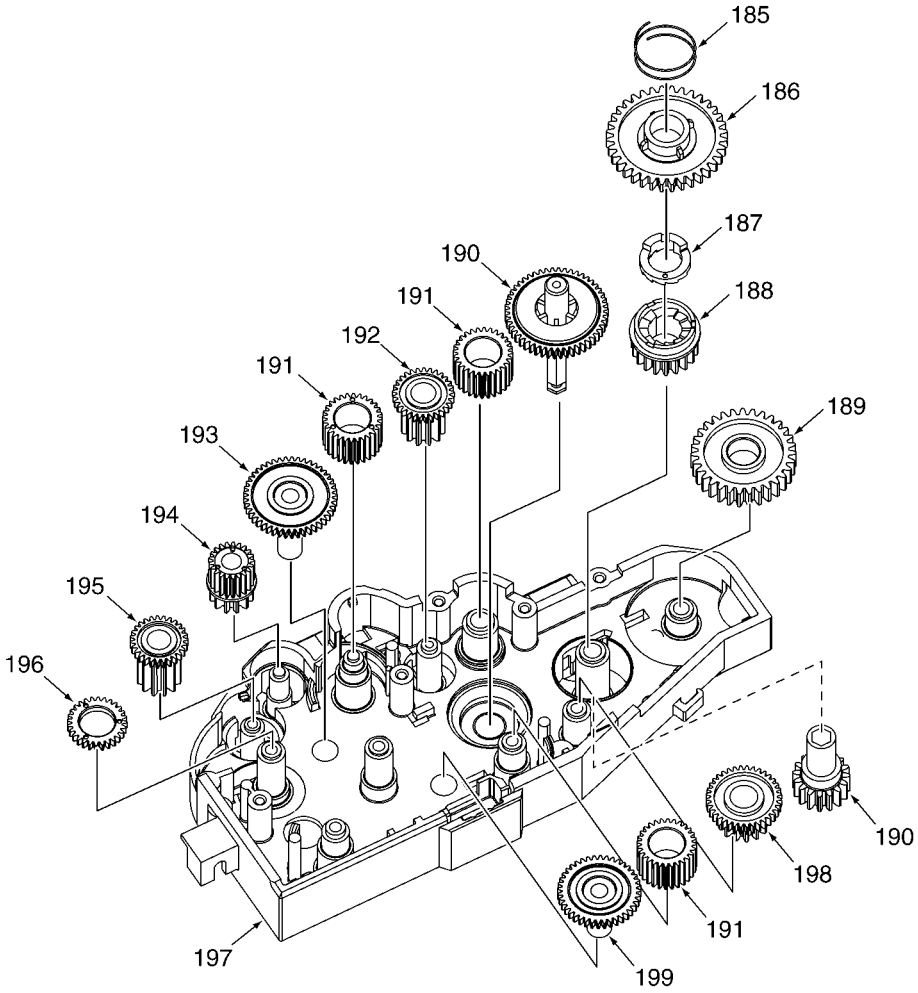
21.1.5. Lower Cabinet Section



21.1.6. Gear Block Section

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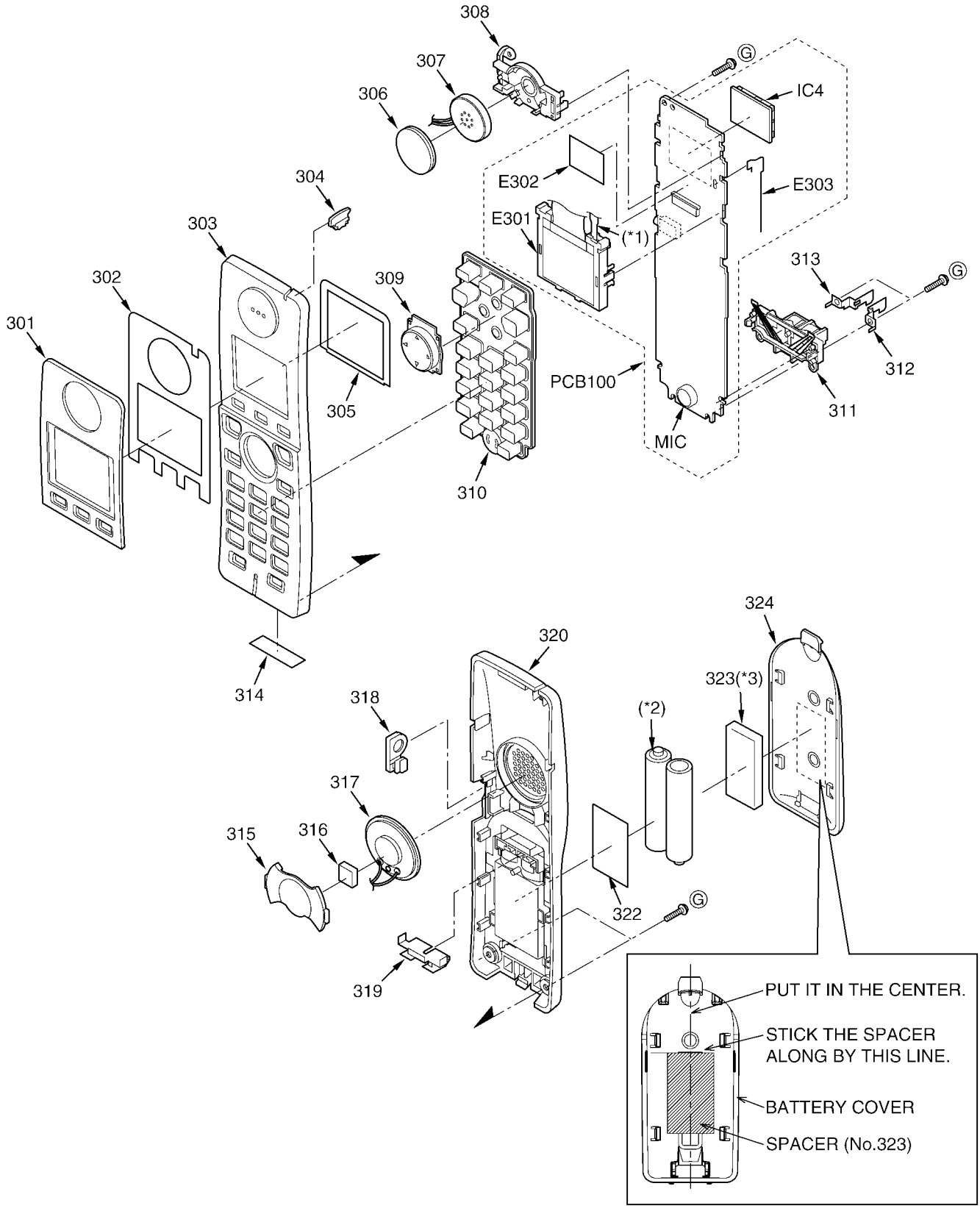
21.1.7. Cordless Handset Section



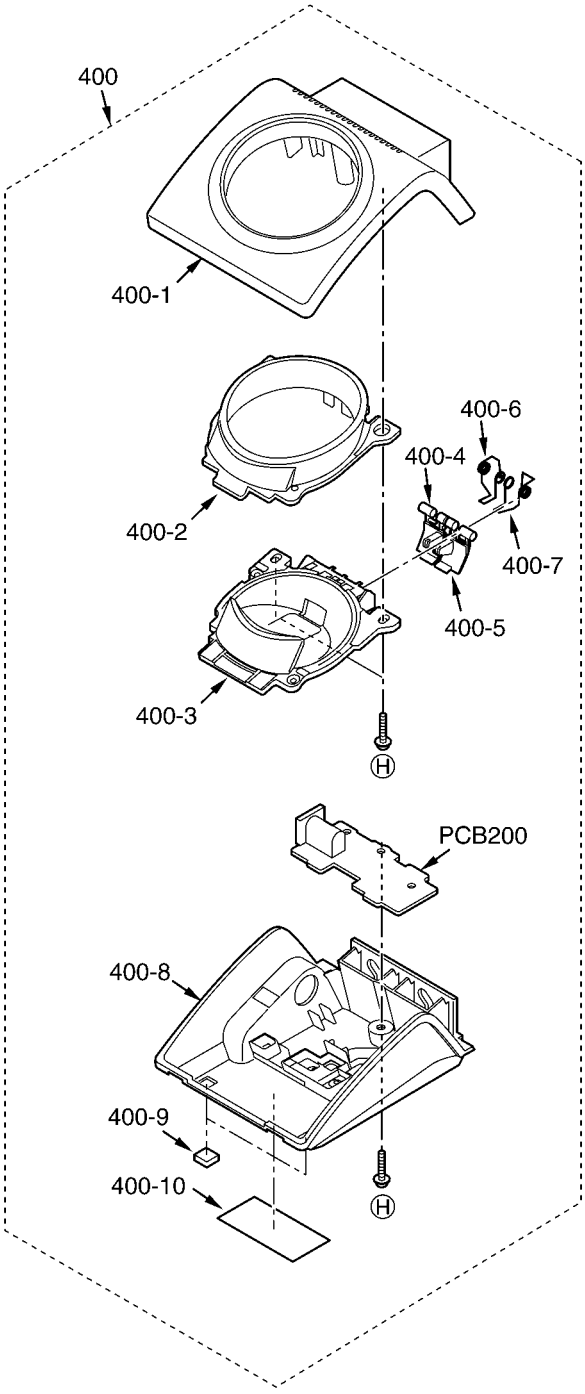
Note:

(*1) This cable is fixed by soldering. Refer to **Fix the LCD to the Cordless Handset Board** (P.169).

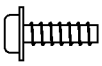
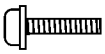
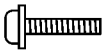
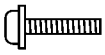
(*2) The rechargeable Ni-MH battery (HHR-4EPT, Capacity: up to 750 mAh) is available through sales route of Panasonic.

(*3) Attach the spacer (No. 323) to the exact location described above.

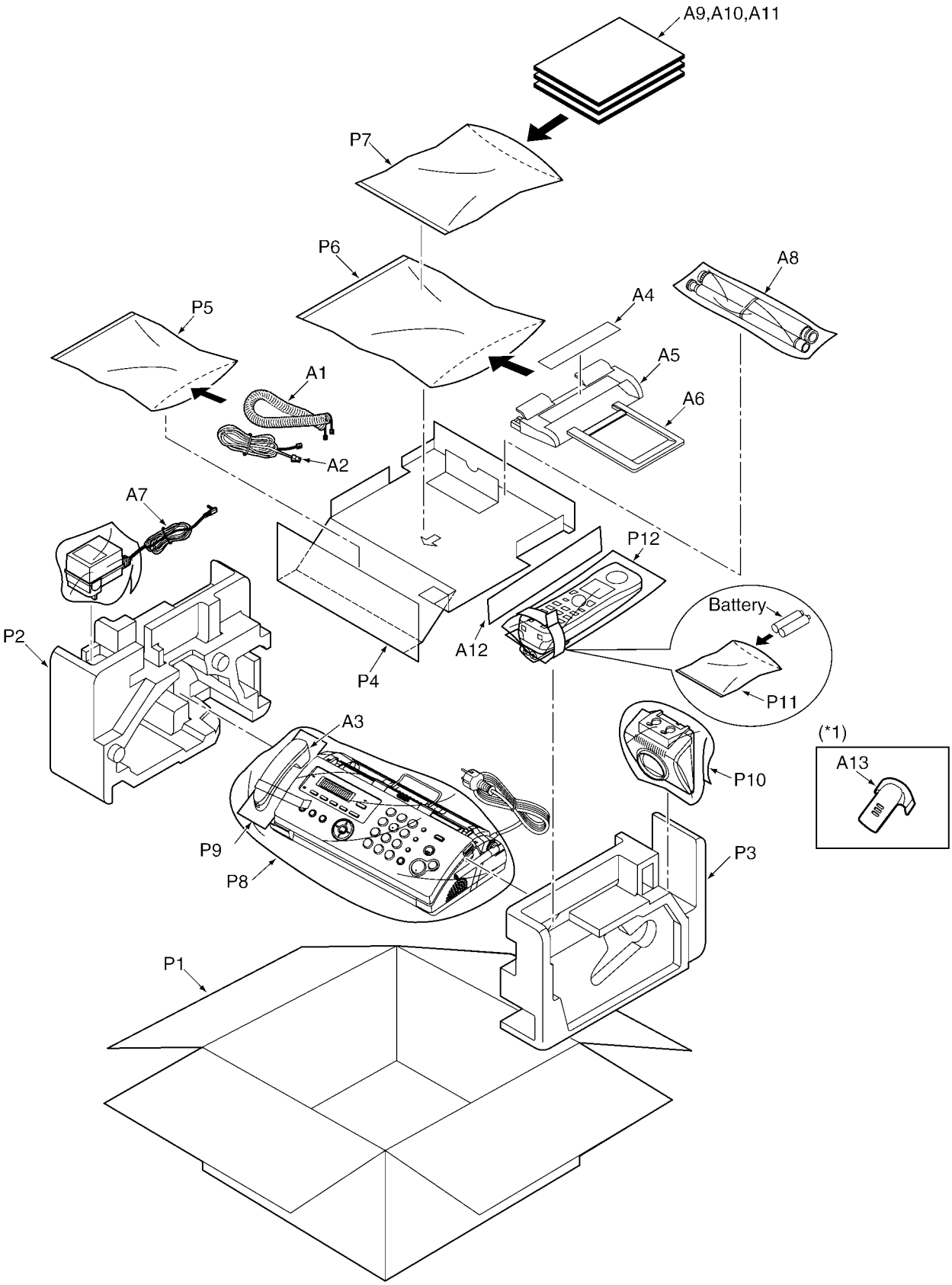
21.1.8. Charger Section



21.1.9. Screws

	Part No.	Figure
Ⓐ	XTW3+10PFJ7	 ϕ3 × 10 mm
Ⓑ	XSB4+6FJ	 ϕ4 × 6 mm
Ⓒ	XTW26+14PFJ7	 ϕ2.6 × 14 mm
Ⓓ	XTW3+W8PFJ	 ϕ3 × 8 mm
Ⓔ	XTB26+8GFJ	 ϕ2.6 × 8 mm
Ⓕ	XTB3+10GFJ	 ϕ3 × 10 mm
Ⓖ	XTW2+R10PFJ	 ϕ2 × 10mm
Ⓗ	XTW26+T10PFJ	 ϕ2.6 × 10mm

21.1.10. Accessories and Packing Materials



Note:

(*1) for Service

Model No. for A13 (BELT CLIP) through sales route of Panasonic is KX-TCA718EX.

21.2. Replacement Parts List

1. RTL (Retention Time Limited)
   Note:
   The marking (RTL) indicates that the Retention Time is limited for this item.
   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing parts and product retention.
   After the end of this period, the assembly will no longer be available.
2. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.
3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.
4. ISO code (Example: ABS-HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.
5. RESISTORS & CAPACITORS
   Unless otherwise specified;
   All resistors are in ohms (Ω) K=1000Ω, M=1000kΩ
   All capacitors are in MICRO FARADS (μF) P=μμF
   *Type & Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

21.2.1. Cabinet and Mechanical Parts

21.2.1.1. Operation Panel Section

Ref. No.	Part No.	Part Name & Description	Remarks
1	PFGG1296F4	GRILLE	PS-HB
2	PFGP1355Z	PANEL, LCD	PC
3	PFBX1255Y3	BUTTON, 20 KEY	ABS-HB
4	PFBX1256Y3	BUTTON, 4 KEY	ABS-HB
5	PFBX1257Z3	BUTTON, 5 KEY	ABS-HB
6	PFBC1168Z1	BUTTON	ABS-HB
7	PFBC1169Z3	BUTTON	ABS-HB
8	PFHX1957Z5	SPACER, SHEET	PC
9	PFUV1103Z	COVER, OPERATION	PS-HB
10	PFDG1494Z	GEAR, DOC. EXIT	POM-HB
11	PFDR1089Y	ROLLER, EXIT	
12	PFUS1717Z	SPRING, DOC. EXIT EARTH	SUS
13	PFHG1249Z	SPACER, PAD (RUBBER)	
14	PFHR1573Z	COVER, SEPARATION HOLDER	ABS-HB
15	PFUS1712Z	COIL SPRING	SUS
16	PFHR1575Z	SPACER, DOC. FEED SUPPORT	POM-HB
17	PFUS1713Z	COIL SPRING, DOC. FEED	SUS
18	PFJS11M38Z	CONNECTOR, 11 PIN	

21.2.1.2. Upper Cabinet Section

Ref. No.	Part No.	Part Name & Description	Remarks
40	L1CC00000063	PRINTER UNITS, THERMAL HEAD	
41	PFHR1569X	GUIDE, HOLDER (LEFT)	POM-HB
42	PFHR1570Z	GUIDE, HOLDER (RIGHT)	POM-HB
43	PFHX1350Z	SPACER, SHEET	
44	PFJS11M16Z	CONNECTOR, 11 PIN	
45	PFUS1710Z	COIL SPRING	SUS
46	PFQT2701Z	LABEL, INK RIBBON	
47	PFQT2708Z	LABEL, INK RIBBON SET	
48	PFUS1699Z	LEAF SPRING	SUS
49	PFUS1708Z	COIL SPRING	SUS
50	PFUS1716Z	SPRING, LOCK EARTH	SUS
51	N2GZBE000013	IMAGE SENSOR (CIS)	
52	PFJS07M18Z	CONNECTOR, 7 PIN	
53	PFUS1494Z	SPRING, CIS	SUS
54	PFUS1756Z	COIL SPRING	SUS
55	PFDF1017Z	SHAFT	SUS
56	PFDR1045Z	ROLLER, DOC. SUB	POM-HB
57	PFGT2980Z-M	NAME PLATE	
58	PFBH1034Z1	BUTTON, HOOK SWITCH	ABS-HB
59	PFJS06M21Z	CONNECTOR, 6 PIN	
60	PFKE1058Z1	CABINET COVER, HANDSET CRADLE (Top)	PS-HB
61	PFKF1092Y1	CABINET COVER, HANDSET CRADLE (Bottom)	PS-HB

21.2.1.3. Back Cover Section

Ref. No.	Part No.	Part Name & Description	Remarks
70	PFDN1082Z	ROLLER, PLATEN	
71	PFHR1572Z	SPACER, HOLDER (RIGHT)	POM-HB
72	PFHR1571Z	SPACER, HOLDER (LEFT)	POM-HB
73	PFDG1368Z	GEAR	POM-HB
74	PFHR1574Z	LEVER, PAPER TOP	POM-HB
75	PFUS1743Z	TORSION SPRING	SUS
76	PFDG1518Z	GEAR	POM-HB
77	PFHX1968Z	SPACER, SHEET	
78	PFUS1740Z	COIL SPRING	SUS
79	PFDG1496Z	GEAR	POM-HB
80	PFDG1497Z	GEAR	POM-HB
81	PFUA1082Y	CHASSIS	PS-HB
82	PFUS1703Y	SPRING, RECORDING PAPER	SUS
83	PFUS1705Z	COIL SPRING	SUS
84	PFDG1365Z	GEAR	POM-HB
85	PFHX1757Z	COVER, SHEET	
86	PFHG1263Z	SPACER, SEPARATION RUBBER	
87	PFHR1446Z	COVER, SEPARATION HOLDER	ABS
88	PFUS1746Z	COIL SPRING	SUS
89	PFHR1567Z	CASE	PS-HB
90	PFDR1056Z	ROLLER	POM-HB
91	PFUS1540Z	COIL SPRING	SUS
92	PFHR1447Z	LEVER	POM-HB
93	PFUS1539Z	COIL SPRING	SUS
94	PFDR1088Z	ROLLER, DISCHARGE	POM-HB/ EPDM
95	PFKE1057Y2	LEVER, LOCK	ABS+GF20-HB
96	PFDR1087Z	ROLLER, PICKUP	POM/ EPDM

Ref. No.	Part No.	Part Name & Description	Remarks
97	PFKV1142Z1	COVER, ROLLER	PS-HB
98	PFDR1057Z	ROLLER, SUPPORT	POM
99	PFUS1706Z	BAR SPRING	SUS
100	PFUS1750Z	TORSION SPRING	SUS
101	PFUS1792Z	COIL SPRING	PS-HB
102	PFDG1015X	SPACER	POM-HB
103	PFKV1143W1	COVER	PS-HB
104	PFKR1100Z1	GUIDE, RIGHT	ABS-HB
105	PFKR1099Z1	GUIDE, LEFT	ABS-HB
106	PFQT2670Z	LABEL, SENDING	
107	PFSA1052Z	ANTENNA	

21.2.1.4. Lower Cabinet Section

Ref. No.	Part No.	Part Name & Description	Remarks
130	PFMD1102Z	FRAME, BOTTOM	SECC
131	PFHG1050Z	RUBBER PART, LEG	PORON
132	PFJS04M36Z	CONNECTOR, 4 PIN	
133	PFJA03A016Z	POWER CORD	⚠
134	PQLB1E1	INSULATOR	S
135	PQHR945Z	BAND	
136	XWC4BFJ	WASHER	
137	PFUS1707Z	TORSION SPRING	SUS
138	PFJS02M17Z	CONNECTOR, 2 PIN	
139	L0AA05A00048	SPEAKER	S
140	PFKM1194X1	CABINET BODY	PS-VO
141	PFUS1715Z	SPRING,PLATEN EARTH	SUS
142	PFUS1709Z	SPRING, HEAD EARTH	SUS
143	PFJS08M14Z	CONNECTOR, 8 PIN	
144	PQLB1E1	INSULATOR	S
145	PFDR1086Z	ROLLER, DOC. SEPARATION	POM-HB/ EPDM
146	PFDF1151Z	SHAFT, SEPARATION	POM-HB

21.2.1.5. Gear Block Section

Ref. No.	Part No.	Part Name & Description	Remarks
170	PFUV1102Z	COVER	POM-HB
171	PFDG1491Z	GEAR	POM-HB
172	PFDG1478Z	GEAR	POM-HB
173	PFHR1578Z	ARM	POM-HB
174	PFUS1545Z	BAR SPRING	SUS
175	PFDG1485Z	GEAR	POM-HB
176	PFHR1579Z	ARM	POM-HB
177	PFDG1484Z	GEAR	POM-HB
178	PFUS1718Z	COIL SPRING	SUS
179	PFHR1577Z	ARM	POM-HB
180	PFDG1483Z	GEAR	POM-HB
181	PFHR1576Z	ARM	POM-HB
182	PFHR1580Z	ARM	POM-HB
183	L6HAYYYK0006	DC MOTOR	
184	PFMH1199Z	FRAME	SECC
185	PFUS1714Z	COIL SPRING	SUS
186	PFDG1492Z	GEAR	POM-HB
187	PFDE1289Z	SPACER	POM-HB
188	PFDG1493Z	GEAR	POM-HB
189	PFDG1490Z	GEAR	POM-HB
190	PFDX1075Z	GEAR	POM+SUS
191	PFDG1482Z	GEAR	POM-HB
192	PFDG1486Z	GEAR	POM-HB
193	PFDG1480Z	GEAR	POM-HB
194	PFDG1488Z	GEAR	POM-HB
195	PFDG1487Z	GEAR	POM-HB
196	PFDG1481Z	GEAR	POM-HB
197	PFUA1081Z	CHASSIS	ABS+PBT -V0
198	PFDG1489Z	GEAR	POM-HB
199	PFDG1479Z	GEAR	POM-HB

Ref. No.	Part No.	Part Name & Description	Remarks

21.2.1.6. Cordless Handset Section

Ref. No.	Part No.	Part Name & Description	Remarks
301	PQGP10303Z1	PANEL	AS-HB
302	PQHS10721Y	TAPE, DOUBLE SIDED (LCD)	
303	PQKM10708X3	CABINET BODY	ABS-HB
304	PQHR11196Z	OPTIC CONDUCTIVE PARTS, LED LENS	PS-HB
305	PQHS10730Z	SPACER, LCD	
306	PQHS10467Z	COVER, SP NET	
307	L0AD02A00028	RECEIVER	
308	PQHR11197Z	GUIDE, RECEIVER	ABS-HB
309	PQBC10458Y2	BUTTON, NAVIGATOR KEY	ABS-HB
310	PQSX10315Z	KEYBOARD SWITCH	
311	PQWE10045Y	BATTERY TERMINAL	
312	PQJT10239Z	CHARGE TERMINAL (L)	
313	PQJT10240Z	CHARGE TERMINAL (R)	
314	PFGT3104Z-M	NAME PLATE	
315	PQHR11198Z	GUIDE, SPEAKER	ABS-HB
316	PQHG10729Z	RUBBER PARTS, SPEAKER	
317	L0AD02A00026	SPEAKER	
318	PQKE10439Z2	COVER, E/P	
319	PQJC10056Y	BATTERY TERMINAL	
320	PQKF10701Z1	CABINET COVER	ABS-HB
321	Not Used		
322	PFHX1867Z	BATTERY LABEL	
323	PQHS10561Y	SPACER, BATTERY COVER	
324	PQKK10595X3	LID, BATTERY COVER	ABS-HB

21.2.1.7. Charger Section

Ref. No.	Part No.	Part Name & Description	Remarks
400	PQLV30045ZS	CHARGER UNIT	
400-1	PQKM10721Z3	CABINET BODY	PS-HB
400-2	PQGG10410Y1	GRILLE	ABS-HB
400-3	PQKE10436Y2	CASE, CHARGE TERMINAL	PS-HB
400-4	PQKE10454Z1	HOLDER, CHARGE TERMINAL (L)	POM-HB
400-5	PQKE10455Z1	HOLDER, CHARGE TERMINAL (R)	POM-HB
400-6	PQJT10241Y	CHARGE TERMINAL (L)	
400-7	PQJT10242Y	CHARGE TERMINAL (R)	
400-8	PQKF10709X1	CABINET COVER	ABS-HB
400-9	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	
400-10	PFGT3283Z-M	NAME PLATE	

21.2.1.8. Accessories and Packing Materials

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PFJA04C003Z	CORD, HANDSET	
A2	PFJA02B002Y	CORD, TELEPHONE	
A3	PFJXN0532Y	HANDSET ASS'Y	
A4	PFQT2825Z	LABEL, PAPER SET	
A5	PFKS1145Z1	TRAY, PAPER	
A6	PFKS1148Z1	TRAY, PAPER SUPPORT	
A7	PQLV209BXZ	AC ADAPTOR	⚠
A8	PFPE1490Z	INK FILM (10M)	
A9	PFQW2549Z	INSTRUCTION BOOK (Quick Reference Guide for Arabic)	
A10	PFQX2661Z	INSTRUCTION BOOK	
A11	PFQW2550Z	INSTRUCTION BOOK (Quick Reference Guide for Farsi)	
A12	PFQW2538Z	LEAFLET for BATTERY	

Ref. No.	Part No.	Part Name & Description	Remarks
A13	PQKE10456Z1	HANGER, BELT CLIP (for Service)	PC+ABS-HB
P1	PFZE1574Z-M	GIFT BOX	
P2	PFPN1437Z	CUSHION, LEFT	
P3	PFPN1438Z	CUSHION, RIGHT	
P4	PFPD1293Z	CUSHION	
P5	XZB20X35A04	PROTECTION COVER (for Cord)	
P6	XZB32X45A04	PROTECTION COVER (for Tray)	
P7	PQPP10005Z	PROTECTION COVER (for Printed)	
P8	PFPH1085Z	PACKING SHEET	
P9	PFPH1067Z	PACKING SHEET	
P10	PFPH1018Z	PROTECTION COVER (for Charger Unit)	
P11	XZB05X10A03	PROTECTION COVER (for Battery)	
P12	PQPP10084Z	PROTECTION COVER (for Cordless Handset)	

21.2.2. Digital Board Parts

Note:

- (*1) When replacing IC4 or IC22, data need to be written to them with PFZZFC255CX. Refer to **Base Unit** (P.181) of **Things to Do after Replacing IC**.
- (*2) Refer to **In Case of X'tal (X5) Replacement** (P.173).

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWP1FC255CX	DIGITAL BOARD ASS'Y (RTL)	
		(ICs)	
IC2	C1AB00002556	IC	
IC3	C1CB00001959	IC	
IC4	C1CB00001879	IC (BBIC) (*1)	
IC7	C0CBADD00010	IC	
IC8	C0CBABD00017	IC	
IC10	C1ZBZ0003300	IC	
IC12	C0JBAA000393	IC	
IC13	C0EBF0000419	IC	
IC16	PFWI1FC255CX	IC (FLASH MEMORY)	
IC17	C3ABKC000034	IC	
IC22	PFWI3FC255E	IC (EEPROM) (*1)	
IC23	PFWI2FC255CX	IC (FLASH MEMORY)	
IC29	C0CBAYF00016	IC	
IC31	C0ABEB000062	IC	
IC102	C0ABEB000064	IC	
		(TRANSISTORS)	
Q6	B1ADGE000004	TRANSISTOR(SI)	
Q7	B1ABDF000025	TRANSISTOR(SI)	
Q8	B1ADGE000004	TRANSISTOR(SI)	
Q9	B1ABDF000025	TRANSISTOR(SI)	
Q11	PQVTDTC143E	TRANSISTOR(SI)	S
Q12	PQVTDTC143E	TRANSISTOR(SI)	S
Q20	2SB1218ARL	TRANSISTOR(SI)	
Q21	B1ABDF000026	TRANSISTOR(SI)	
Q23	PQVTDTC143E	TRANSISTOR(SI)	S
Q26	B1ABDF000025	TRANSISTOR(SI)	
Q27	PQVTDTC143E	TRANSISTOR(SI)	S
Q601	B1ABDF000025	TRANSISTOR(SI)	
		(DIODES)	
D7	B0BC2R1A0006	DIODE(SI)	
D15	B0BC2R1A0006	DIODE(SI)	
DA4	B0DDCM000001	DIODE(SI)	
		(RF UNIT)	
IC28	PFLP1714Z	RF UNIT	S
		(CONNECTORS)	
CN2	K1MY14AA0080	CONNECTOR, 14 PIN	
CN4	K1KA10A00441	CONNECTOR, 10 PIN	
CN5	K1KA11A00170	CONNECTOR, 11 PIN	
CN14	K1KA07A00257	CONNECTOR, 7 PIN	
CN18	K1KA05A00413	CONNECTOR, 5 PIN	
CN19	K1KA15A00163	CONNECTOR, 15 PIN	
CN203	K1KA06A00428	CONNECTOR, 6 PIN	
CN206	K1KA08A00440	CONNECTOR, 8 PIN	
CN918	K1KA02A00587	CONNECTOR, 2 PIN	
		(COILS)	
L34	PQLQR2KB20T	COIL	S
L36	G1C5N6Z00011	COIL	
L44	PQLQR2KA113	COIL	S
L45	PQLQR2KA113	COIL	S
L46	PQLQR2KA113	COIL	S
L47	PQLQR2KA113	COIL	S
L602	PQLQR2KB113T	COIL	S
L603	PQLQR2KA113	COIL	S
L604	PQLQR2KA113	COIL	S
L605	PQLQR2KA20T	COIL	S
L606	PQLQR2KA113	COIL	S
		(CERAMIC FILTERS)	
L1	J0JHC0000035	CERAMIC FILTER	
L2	J0JHC0000035	CERAMIC FILTER	
		(COMPONENTS PARTS)	
RA3	EXB28V470JX	RESISTOR ARRAY	
RA4	EXB28V470JX	RESISTOR ARRAY	
RA5	EXB28V470JX	RESISTOR ARRAY	
RA6	EXB28V470JX	RESISTOR ARRAY	
RA12	EXB28V101JX	RESISTOR ARRAY	
RA13	D1H84724A013	RESISTOR ARRAY	S
RA10	EXB28V101JX	RESISTOR ARRAY	
		(CRYSTAL OSCILLATORS)	
X1	H0J322500006	CRYSTAL OSCILLATOR	
X3	H0A327200147	CRYSTAL OSCILLATOR	
X4	H2C240500006	CRYSTAL OSCILLATOR	
X5	H0D103500003	CRYSTAL OSCILLATOR (*2)	
		(RESISTORS)	
J116	ERJ2GEJ102	1k	
C381	ERJ2GE0R00	0	
R1	PQ4R10XJ100	10	S
R11	ERJ2GEJ682	6.8k	
R12	ERJ2GEJ183	18k	
R13	ERJ2GEJ124	120k	
R14	ERJ2GEJ124	120k	
R17	ERJ2GEJ472X	4.7k	
R20	ERJ2GEJ472X	4.7k	
R22	ERJ2GE0R00	0	
R23	ERJ2GEJ220	22	
R24	ERJ2GEJ272	2.7k	
R26	ERJ2GEJ473	47k	
R30	ERJ3GEYJ181	180	
R35	ERJ2GEJ472X	4.7k	
R38	ERJ2GEJ101	100	
R49	ERJ2GEJ153	15k	
R58	ERJ2GEJ561	560	
R60	ERJ2GEJ562X	5.6k	
R62	ERJ2GEJ102	1k	
R63	ERJ2GEJ272	2.7k	
R68	ERJ3GEYF133	13k	S
R69	ERJ3EKF5601	5.6k	
R70	ERJ2GEJ102	1k	
R73	ERJ2GEJ112X	1.1k	
R75	ERJ2GEJ272	2.7k	
R97	ERJ2GEJ330	33	
R98	ERJ2GEJ330	33	
R99	ERJ2GEJ472X	4.7k	
R107	ERJ2GEJ102	1k	

Ref. No.	Part No.	Part Name & Description	Remarks
R108	ERJ2GEJ102	1k	
R109	ERJ2GEJ100	10	
R110	ERJ2GEJ101	100	
R111	ERJ2GEJ101	100	
R112	ERJ2GEJ100	10	
R113	ERJ2GEJ472X	4.7k	
R114	ERJ3EKF1101	1.1k	
R115	ERJ3EKF3602	36k	
R118	ERJ3GEYJ472	4.7k	
R130	ERJ2GEJ433	43k	
R131	ERJ2GEJ203	20k	
R132	ERJ2GEJ223	22k	
R136	ERJ2GEJ103	10k	
R137	ERJ2GEJ100	10	
R142	ERJ2GE0R00	0	
R145	ERJ2GEJ105X	1M	
R148	ERJ2GEJ182	1.8k	
R149	ERJ2GEJ103	10k	
R150	ERJ2GEJ222	2.2k	
R175	ERJ2GEJ101	100	
R176	ERJ2GE0R00	0	
R179	ERJ2GEJ222	2.2k	
R187	ERJ2GEJ103	10k	
R188	ERJ2GEJ103	10k	
R200	ERJ2GEJ223	22k	
R202	ERJ2GEJ472X	4.7k	
R203	ERJ2GEJ221	220	
R204	ERJ2GEJ221	220	
R209	ERJ2GEJ100	10	
R210	ERJ2GEJ100	10	
R211	ERJ2GEJ332	3.3k	
R230	ERJ2GEJ332	3.3k	
R231	ERJ2GEJ473	47k	
R232	ERJ2GEJ183	18k	
R233	ERJ2GEJ223	22k	
R236	ERJ2GEJ103	10k	
R238	ERJ2GEJ562X	5.6k	
R239	ERJ2GEJ562X	5.6k	
R241	ERJ2GEJ101	100	
R242	ERJ2GEJ101	100	
R243	ERJ2GEJ103	10k	
R246	ERJ2GEJ102	1k	
R247	ERJ2GEJ101	100	
R253	ERJ2GEJ103	10k	
R254	ERJ2GEJ101	100	
R259	ERJ2GEJ103	10k	
R262	ERJ2GEJ103	10k	
R263	ERJ2GEJ224	220k	
R272	ERJ2GEJ561	560	
R273	ERJ2GEJ271	270	
R295	ERJ2GEJ561	560	
R296	ERJ2GEJ102	1k	
R298	ERJ2GEJ152	1.5k	
R299	ERJ2GEJ680	68	
R300	ERJ2GEJ680	68	
R301	ERJ2GEJ152	1.5k	
R303	ERJ2GEJ272	2.7k	
R304	ERJ2GEJ331	330	
R310	ERJ2GEJ101	100	
R311	ERJ2GEJ102	1k	
R318	ERJ2GE0R00	0	
R320	ERJ2GEJ332	3.3k	
R323	ERJ2GE0R00	0	
R336	ERJ2GEJ682	6.8k	
R337	ERJ2GEJ682	6.8k	
R338	ERJ2GEJ472X	4.7k	
R340	ERJ2GEJ102	1k	
R341	ERJ2GEJ472X	4.7k	
R343	ERJ2GEJ101	100	
R344	ERJ2GEJ101	100	
R347	ERJ2GEJ472X	4.7k	
R348	ERJ2GEJ102	1k	
R350	ERJ2GEJ472X	4.7k	

Ref. No.	Part No.	Part Name & Description	Remarks
R351	ERJ2GEJ102	1k	
R353	ERJ2GEJ472X	4.7k	
R354	ERJ2GEJ102	1k	
R356	ERJ2GEJ821	820	
R357	ERJ2GEJ560X	56	
R359	ERJ2GE0R00	0	
R360	ERJ3GEYJ181	180	
R361	ERJ3GEYJ181	180	
R364	ERJ3EKF2200	220	
R365	ERJ3EKF2200	220	
R366	ERJ2GEJ272	2.7k	
R367	ERJ2GEJ472X	4.7k	
R368	ERJ2GEJ102	1k	
R369	ERJ2GEJ683	68k	
R371	ERJ2GEJ683	68k	
R377	PQ4R10XJ2R2	2.2	S
R378	PQ4R10XJ2R2	2.2	S
R380	ERJ2GEJ331	330	
R381	ERJ2GEJ332	3.3k	
R382	ERJ2GEJ332	3.3k	
R383	ERJ2GEJ822	8.2k	
R384	ERJ2GEJ822	8.2k	
R385	ERJ2GEJ683	68k	
R387	ERJ2GEJ683	68k	
R391	ERJ3GEYJ105	1M	
R392	ERJ2GEJ473	47k	
R393	ERJ2GEJ563	56k	
R396	ERJ2GEJ101	100	
R397	ERJ2GEJ101	100	
R409	ERJ2GEJ472X	4.7k	
R410	ERJ2GEJ101	100	
R411	ERJ2GEJ472X	4.7k	
R412	ERJ2GEJ101	100	
R601	ERJ2GEJ103	10k	
R602	ERJ2GEJ124	120k	
R603	ERJ2GEJ183	18k	
R604	ERJ2GEJ183	18k	
R610	ERJ2GEJ103	10k	
R611	ERJ2GEJ473	47k	
R612	ERJ3GEYJ103	10k	
R613	ERJ3GEYJ103	10k	
R614	ERJ3GEYJ103	10k	
R618	ERJ2GEJ102	1k	
R619	ERJ2GEJ102	1k	
R620	ERJ2GEJ102	1k	
R625	ERJ2GE0R00	0	
R627	ERJ2GE0R00	0	
R628	ERJ2GEJ103	10k	
R629	ERJ2GEJ102	1k	
R630	ERJ2GEJ102	1k	
R631	ERJ2GEJ102	1k	
R632	ERJ2GEJ102	1k	
R633	ERJ2GE0R00	0	
		(CAPACITORS)	
C8	ECUV1A105ZFV	1	
C9	ECUV1A105ZFV	1	
C10	ECJ0EC1H100D	10P	
C11	ECJ0EB0J224K	0.22	
C12	ECJ0EB1H182K	0.0018	
C13	ECUV1A105ZFV	1	
C18	ECJ0EB0J224K	0.22	
C20	ECJ0EB1A104K	0.1	
C21	ECJ0EB1A104K	0.1	
C22	ECJ0EB1A104K	0.1	
C23	ECJ0EF1C104Z	0.1	
C26	ECJ0EF1C104Z	0.1	
C28	ECJ0EB1H102K	0.001	
C29	ECJ0EF1C104Z	0.1	
C30	ECJ0EC1H101J	100P	
C31	F2G1C1000014	10	
C32	ECJ0EF1C104Z	0.1	
C33	ECJ0EC1H120J	12P	

Ref. No.	Part No.	Part Name & Description	Remarks
C34	ECUE1H100DCQ	10P	S
C35	ECJ0EF1C104Z	0.1	
C37	ECJ0EB1H102K	0.001	
C38	ECJ0EF1C104Z	0.1	
C39	ECUV1A105ZFV	1	
C40	ECUV1A105ZFV	1	
C41	ECJ0EB1H102K	0.001	
C42	F1G0J1050003	1	
C43	ECJ0EB1H102K	0.001	
C46	ECJ0EC1H101J	100P	
C48	ECJ0EB1H102K	0.001	
C50	ECJ0EB1H102K	0.001	
C51	ECJ0EB1H102K	0.001	
C59	ECJ1VB1C105K	1	
C71	ECJ0EB1A104K	0.1	
C75	ECJ0EB1C103K	0.01	
C78	ECJ0EB1H102K	0.001	
C80	ECJ0EB1A104K	0.1	
C83	ECJ1VB1C105K	1	
C88	ECJ0EC1H330J	33P	
C91	ECJ0EB1C103K	0.01	
C98	ECJ0EB1A104K	0.1	
C100	ECJ0EF1C104Z	0.1	
C104	ECJ0EB1C103K	0.01	
C106	ECJ0EC1H060D	6P	
C108	ECJ0EC1H150J	15P	
C110	ECJ0EB1C103K	0.01	
C111	ECJ0EB1C103K	0.01	
C113	ECJ0EB1A104K	0.1	
C117	ECJ0EB1A104K	0.1	
C121	ECJ0EC1H150J	15P	
C122	ECJ0EC1H150J	15P	
C123	ECJ0EB1C103K	0.01	
C124	ECJ0EB1H102K	0.001	
C126	ECUV1H104ZFV	0.1	
C127	EEE1CA101WP	100	S
C128	ECUV1A105ZFV	1	
C131	F2G1C4700026	47	
C133	ECUV1A105ZFV	1	
C134	F2G0J4700032	47	
C135	ECUV1A105ZFV	1	
C136	ECJ0EF1C104Z	0.1	
C137	ECJ0EF1C104Z	0.1	
C141	F1G1H180A422	18P	
C143	ECUE1H100DCQ	10P	S
C149	ECJ0EB1H102K	0.001	
C150	ECJ0EB1H222K	0.0022	
C151	ECJ0EB1A104K	0.1	
C152	ECJ0EB1H102K	0.001	
C153	PQCUV1A475ZF	4.7	
C154	ECJ0EB1A104K	0.1	
C155	ECJ0EF1C104Z	0.1	
C156	ECJ0EB1H102K	0.001	
C157	ECJ0EF1C104Z	0.1	
C159	ECJ0EF1C104Z	0.1	
C160	ECJ0EF1C104Z	0.1	
C161	ECJ0EC1H101J	100P	
C163	ECJ0EB1H102K	0.001	
C164	ECJ0EC1H101J	100P	
C167	ECJ0EF1C104Z	0.1	
C168	ECJ0EB1H102K	0.001	
C170	ECJ0EB1H102K	0.001	
C171	ECJ0EB1H102K	0.001	
C172	ECJ0EC1H101J	100P	
C174	ECJ0EC1H101J	100P	
C178	ECJ0EB1C103K	0.01	
C190	ECJ0EF1C104Z	0.1	
C200	ECJ0EF1C104Z	0.1	
C201	ECJ0EF1C104Z	0.1	
C202	ECJ0EF1C104Z	0.1	
C204	ECJ0EF1C104Z	0.1	
C206	ECJ0EC1H101J	100P	
C219	ECJ0EB1C103K	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C227	ECJ0EC1H220J	22P	
C229	ECJ0EF1C104Z	0.1	
C247	ECJ0EB1A104K	0.1	
C248	ECJ0EB1H331K	330P	
C273	ECJ0EB1H102K	0.001	
C274	ECJ0EB1A104K	0.1	
C275	ECJ0EB1H102K	0.001	
C276	ECJ0EB1H331K	330P	
C277	ECJ0EB1C103K	0.01	
C278	ECJ0EB1A104K	0.1	
C282	ECJ0EB1H331K	330P	
C283	F2G0J1010042	100	
C286	ECJ0EC1H100D	10P	
C292	ECJ0EB1A104K	0.1	
C308	ECJ0EB1A104K	0.1	
C331	ECJ0EB1H102K	0.001	
C332	ECJ0EC1H151J	150P	
C333	ECJ0EC1H100D	10P	
C334	ECJ0EC1H100D	10P	
C335	ECJ0EC1H100D	10P	
C336	ECJ0EC1H100D	10P	
C337	ECJ0EC1H100D	10P	
C338	ECJ0EC1H100D	10P	
C339	ECJ0EC1H100D	10P	
C340	ECJ0EC1H100D	10P	
C341	ECJ0EC1H100D	10P	
C342	ECJ0EC1H100D	10P	
C343	ECJ0EC1H100D	10P	
C344	ECJ0EC1H020C	2P	
C345	ECJ0EC1H100D	10P	
C346	ECJ0EC1H100D	10P	
C347	ECJ0EC1H020C	2P	
C348	ECJ0EC1H100D	10P	
C350	ECJ1VC1H100D	10P	
C352	ECJ1VC1H010C	1P	
C353	ECJ1VC1H120J	12P	
C354	ECJ1VC1H120J	12P	
C355	ECJ1VC1H120J	12P	
C358	F2G0J3310015	330	
C359	ECJ0EF1C104Z	0.1	
C360	ECUV1A105ZFV	1	
C361	ECJ0EB1A104K	0.1	
C362	ECJ0EB0J224K	0.22	
C363	ECJ0EB0J224K	0.22	
C365	ECJ0EC1H100D	10P	
C366	F1G1H391A571	390P	
C367	F1G1H391A571	390P	
C368	ECJ0EC1H100D	10P	
C369	ECUV1A475KB	4.7	
C384	ECJ0EB1C103K	0.01	
C385	ECJ0EB1A104K	0.1	
C386	ECJ0EB1A104K	0.1	
C388	ECJ0EF1C104Z	0.1	
C389	F1G1H391A571	390P	
C390	F2G0J4700032	47	
C391	ECJ0EC1H100D	10P	
C393	F1G1H391A571	390P	
C394	ECJ0EC1H100D	10P	
C395	ECUV1A105ZFV	1	
C397	ECJ1VC1H100D	10P	
C400	ECJ0EF1C104Z	0.1	
C403	ECJ0EB1H102K	0.001	
C404	ECJ0EB1H102K	0.001	
C408	ECJ0EB1A104K	0.1	
C409	F2G0J3310015	330	
C410	ECJ0EB1H102K	0.001	
C411	ECJ0EB1H102K	0.001	
C412	ECUV1H103KBV	0.01	
C601	ECJ0EC1H151J	150P	
C603	ECUV1C104KBV	0.1	
C605	ECJ0EC1H100D	10P	
C607	ECUV1C104KBV	0.1	
C611	ECUV1H104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C613	F2G1V3300012	33	
C614	ECUV1H104ZFV	0.1	
C615	ECJ1VB1C105K	1	
C660	ECJ0EF1C104Z	0.1	
C661	ECJ0EF1C104Z	0.1	
C679	ECJ0EB1H102K	0.001	
C680	ECJ0EB1H102K	0.001	
C681	ECJ0EF1C104Z	0.1	

21.2.3. Analog Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFLP1801PD-A	ANALOG BOARD ASS'Y (RTL)	⚠
		(IC)	
IC101	C0ABEB000083	IC	
		(TRANSISTORS)	
Q101	PQVTDTC143E	TRANSISTOR(SI)	S
Q104	PQVTDTC143E	TRANSISTOR(SI)	S
Q107	PQVTDTC143E	TRANSISTOR(SI)	S
Q110	B1AAKL000006	TRANSISTOR(SI)	
		(DIODES)	
D101	B0EAAD000001	DIODE(SI)	
D103	MA4056	DIODE(SI)	S
D104	MA4056	DIODE(SI)	S
D105	B0EDER000009	DIODE(SI)	
D109	B0EAAD000001	DIODE(SI)	
D118	MA4240	DIODE(SI)	S
DA104	MA143	DIODE(SI)	S
		(JACK AND CONNECTORS)	
CN101	K2LB1YYB0002	JACK	
CN103	K3E032C00040	CONNECTOR, 15 PIN	
CN104	PQJS05A10Z	CONNECTOR, 5 PIN	S
CN105	K1KA02A00587	CONNECTOR, 2 PIN	
CN106	K1KA04A00527	CONNECTOR, 4 PIN	
		(CERAMIC FILTERS)	
L102	PFVF2B272ST	CERAMIC FILTER	S
L103	PFVF2B272ST	CERAMIC FILTER	S
		(COILS)	
L110	PQLQR2KB20T	COIL	S
L111	PQLQR2KB20T	COIL	S
		(PHOTO ELECTRIC TRANSDUCERS)	
PC101	B3PAA0000330	PHOTO COUPLER	⚠
PC102	B3PAB0000058	PHOTO COUPLER	⚠
PC104	B3PAB0000058	PHOTO COUPLER	⚠
		(RELAY)	
RL101	PFSL003Z	RELAY	⚠ S
		(THERMISTOR)	
POS101	PFRT002	THERMISTOR	S
		(TRANSFORMERS)	
T101	G4A1A0000170	TRANSFORMER	⚠
T102	G4A1A0000172	TRANSFORMER	⚠
		(VARISTORS)	
SA101	PFRZRA311P6T	VARISTOR (Surge Absorber)	S
SA102	J0LS00000024	VARISTOR (Surge Absorber)	⚠
ZNR101	ERZVA7D151	VARISTOR	
		(RESISTORS)	

Ref. No.	Part No.	Part Name & Description	Remarks
J105	ERJ6GEY0R00	0	
J107	ERJ3GEY0R00	0	
J119	ERJ3GEY0R00	0	
J120	ERJ3GEY0R00	0	
R101	ERDS1TJ223	22k	S
R104	ERDS1TJ473	47k	
R107	ERJ3GEYJ471	470	
R115	ERDS2TJ220	22	
R120	ERJ3GEYJ272	2.7k	
R125	ERJ3GEYJ153	15k	
R126	ERJ3GEYJ472	4.7k	
R130	ERJ3GEYJ102	1k	
R131	ERJ3GEYJ101	100	
R132	ERJ3GEYJ101	100	
R133	ERJ3GEYJ102	1k	
R134	ERJ3GEYJ102	1k	
R135	ERJ3GEYJ242	2.4k	
R136	ERJ3GEYJ242	2.4k	
R138	ERJ3GEYJ123	12k	
R140	ERJ3GEYJ123	12k	
R141	ERJ3GEYJ273	27k	
R142	ERJ3GEYJ273	27k	
R153	ERJ3GEYJ103	10k	
R154	ERJ3GEYJ473	47k	
R165	ERJ3GEYJ123	12k	
R166	ERJ3GEYJ103	10k	
		(CAPACITORS)	
C101	F0C2E1050005	1	S
C102	ECKD2H681KB	680P	S
C103	ECKD2H681KB	680P	
C115	F2A1H4R70014	4.7	
C119	ECUV1H100DCV	10P	
C120	ECUV1H470JCV	47P	
C121	F2A1H4R70014	4.7	S
C128	PQCUV1H333JC	0.033	S
C130	ECUV1C104KBV	0.1	
C132	ECUV1H100DCV	10P	
C134	ECUV1C104KBV	0.1	
C136	ECUV1H471JCV	470P	
C137	ECUV1H471JCV	470P	
C138	PQCUV1E104MD	0.1	S
C157	ECUV1C104KBV	0.1	
C160	ECUV1H100DCV	10P	
C162	ECUV1H681JCV	680P	
C169	F2A1H4R70014	4.7	
C179	ECUV1C104ZFV	0.1	
C180	ECEA1CK101	100	S
C181	ECEA1CK101	100	S
C182	ECUV1C104ZFV	0.1	
C195	ECQE2104KF	0.1	
C196	ECUV1H101JCV	100P	
C197	ECUV1H101JCV	100P	

21.2.4. Operation Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PFWP2FC255E	OPERATION BOARD ASS'Y (RTL)	
		(IC)	
IC301	C1ZBZ0002089	IC	
		(DIODE)	
LED301	B3AAA0000534	LED	
		(LIQUID CRYSTAL DISPLAY)	
CN302	L5DAAYY00002	LIQUID CRYSTAL DISPLAY	
		(CONNECTOR)	
CN301	K1KA08B00243	CONNECTOR, 8 PIN	

Ref. No.	Part No.	Part Name & Description	Remarks
		(COILS)	
L1	PQLQR2M10NJ	COIL	S
L2	PQLQR2M10NJ	COIL	S
L3	PQLQR2M10NJ	COIL	S
		(SWITCHES)	
SW301	K0H1BA000259	SWITCH	
SW302	K0H1BA000259	SWITCH	
SW303	K0H1BA000259	SWITCH	
SW304	K0H1BA000259	SWITCH	
SW305	K0H1BA000259	SWITCH	
SW306	K0H1BA000259	SWITCH	
SW307	K0H1BA000259	SWITCH	
SW308	K0H1BA000259	SWITCH	
SW309	K0H1BA000259	SWITCH	
SW310	K0H1BA000259	SWITCH	
SW311	K0H1BA000259	SWITCH	
SW312	K0H1BA000259	SWITCH	
SW313	K0H1BA000259	SWITCH	
SW314	K0H1BA000259	SWITCH	
SW315	K0H1BA000259	SWITCH	
SW316	K0H1BA000259	SWITCH	
SW317	K0H1BA000259	SWITCH	
SW318	K0H1BA000259	SWITCH	
SW319	K0H1BA000259	SWITCH	
SW320	K0H1BA000259	SWITCH	
SW321	K0H1BA000259	SWITCH	
SW322	K0H1BA000259	SWITCH	
SW323	K0H1BA000259	SWITCH	
SW324	K0H1BA000259	SWITCH	
SW325	K0H1BA000259	SWITCH	
SW326	K0H1BA000259	SWITCH	
SW327	K0H1BA000259	SWITCH	
SW328	K0H1BA000259	SWITCH	
SW329	K0H1BA000259	SWITCH	
SW330	K0H1BA000259	SWITCH	
SW331	K0H1BA000259	SWITCH	
SW332	K0H1BA000259	SWITCH	
SW333	K0H1BA000259	SWITCH	
SW334	K0H1BA000259	SWITCH	
		(RESISTORS)	
R300	ERJ3GEYJ680	68	
R301	ERJ3GEYJ181	180	
R302	ERJ3GEYJ271	270	
R303	ERJ3GEYJ181	180	
R304	ERJ3GEYJ221	220	
R305	ERJ3GEYJ221	220	
R306	ERJ3GEYJ221	220	
R307	ERJ3GEYJ221	220	
R308	ERJ3GEYJ221	220	
R309	ERJ3GEYJ221	220	
R310	ERJ3GEYJ153	15k	
R311	ERJ3GEYJ222	2.2k	
R312	ERJ3GEYJ122	1.2k	
R313	ERJ3GEYJ101	100	
R315	ERJ3GEYJ4R7	4.7	
R316	ERJ3GEYJ181	180	
R320	ERJ3GEYJ331	330	
R330	ERJ3GEYJ472	4.7k	
R331	ERJ3GEYJ101	100	
R332	ERJ3GEYJ472	4.7k	
R333	ERJ3GEYJ101	100	
R341	ERJ3GEYJ332	3.3k	
R342	ERJ3GEYJ181	180	
R343	ERJ3GEYJ102	1k	
		(CAPACITORS)	
C300	ECUV1C104ZFV	0.1	
C302	ECEA0JKS101	100	S
C303	ECUV1H102KBV	0.001	
C304	ECUV1H101JCV	0.001	
C305	ECUV1H331JCV	330P	
C306	ECUV1H331JCV	330P	
C307	ECUV1C104ZFV	0.1	
C308	ECUV1C104ZFV	0.1	
C311	ECUV1C104ZFV	0.1	
C330	ECUV1H103KBV	0.01	
C331	ECUV1H103KBV	0.01	
C341	ECUV1H101JCV	100P	
		(OTHERS)	
E30	K0L1BA000126	SWITCH, SENSOR LEVER	
E31	K0L1BA000127	SWITCH, SENSOR LEVER	

21.2.5. Power Supply Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	N0AC3GJ00012	POWER SUPPLY BOARD ASS'Y (RTL)	⚠
		(ICs)	
IC101	PFVIFA5518N	IC	S
IC201	TL431CDBVR	IC	
IC202	TA7804	IC	
		(TRANSISTORS)	
Q101	FQPF4N90C	TRANSISTOR(SI)	⚠
Q203	2SC3928	TRANSISTOR(SI)	
		(DIODES)	
D101	PFVD1N4005	DIODE(SI)	S ⚠
D102	PFVD1N4005	DIODE(SI)	S ⚠
D103	PFVD1N4005	DIODE(SI)	S ⚠
D104	PFVD1N4005	DIODE(SI)	S ⚠
D105	PQVDPR1007	DIODE(SI)	S
D106	PFVDD1NL20U	DIODE(SI)	S
D107	MA165	DIODE(SI)	S
D110	PFVD1N4005	DIODE(SI)	S
D201	SF50DG	DIODE(SI)	
D202	PFVDD1NL20U	DIODE(SI)	S
D205	MTZJ6R2B	DIODE(SI)	S
		(CONNECTOR)	
CN202	2921618	CONNECTOR, 8 PIN	S ⚠
		(COIL)	
L101	ELF15N004A	COIL	⚠
		(COMPONENTS PARTS)	
L102	EXCELDR35	COMPONENTS PARTS	
		(FUSE)	
F101	PFBAST250315	FUSE	S ⚠
		(PHOTO ELECTRIC TRANSDUCER)	
PC101	PFVIPC123	PHOTO COUPLER	S ⚠
		(TRANSFORMER)	
T101	A044A2801	TRANSFORMER	S ⚠
		(VARIABLE RESISTOR)	
VR201	EVNCYAA03B53	VARIABLE RESISTOR	S
		(VARISTOR)	
ZNR101	ERZV10D751	VARISTOR	⚠
		(RESISTORS)	
JP201	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
R101	ERJ8GEYJ105	1M	
R102	ERJ8GEYJ105	1M	
R103	ERJ8GEYJ105	1M	
R104	ERJ3GEYJ473	47k	
R105	ERX2SJR22E	0.22	
R106	ERG2SJ104	100k	
R107	ERG2SJ470	47	
R110	ERDS2TJ470	47	
R111	ERDS2TJ150	15	
R112	ERJ3GEYJ101	100	
R113	ERJ3GEYJ103	10k	
R122	ERJ3GEYJ391	390	
R123	ERJ3GEYJ182	1.8k	
R201	ERDS2TJ470	47	
R221	ERJ3GEYJ102	1k	
R222	ERJ3GEYJ102	1k	
R223	ERJ3GEYJ102	1k	
R224	ERJ3GEYJ562	5.6k	
R225	ERJ3GEYJ332	3.3k	
R229	ERJ3GEYJ183	18k	
R230	ERG2SJ151	150	
R231	ERG2SJ151	150	
R232	ERJ3GENF153	15k	
R233	ERJ3GENF473	47k	
R234	ERJ3GENF473	47k	
		(CAPACITORS)	
C101	ECQU2A104MLA	0.1	
C102	ECQU2A104MLA	0.1	⚠
C103	DE1E102MN4AL	0.001	S ⚠
C105	DE1E102MN4AL	0.001	S
C106	400SXW47MM71	47	
C108	PFKDD3AD102K	0.001	S
C109	PFKDD3DD470J	47P	S
C110	DE1E102MN4AL	0.001	S
C111	35YXA47M71TA	47	S
C121	ECJ1VB1H472K	0.0047	
C122	ECJ1VB1A224K	0.22	
C123	ECJ1VB1H104K	0.1	
C124	ECJ1VB1H103K	0.01	
C201	KY35VB470M	470	
C205	ECJ1VB1E104K	0.1	
C211	KY10VB470M	470	
C212	PFKDD3AD102K	0.001	S
C213	ECJ1VB1E104K	0.1	
C214	ECJ1VB1E104K	0.1	
C215	PFKDD3AD102K	0.001	S
C217	KY25VB100M	100	
C218	ECJ1VB1H104K	0.1	

21.2.6. Interface Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB5	PFLP1801EZ-B	INTERFACE BOARD ASS'Y (RTL)	
		(TRANSISTORS)	
Q401	B1DHDD000026	TRANSISTOR(SI)	
Q402	2SB1322	TRANSISTOR(SI)	
Q403	PQVTDTC143E	TRANSISTOR(SI)	S
Q405	PQVTDTC144TU	TRANSISTOR(SI)	S
IC401	B1HAGFF00015	TRANSISTOR(SI)	
		(DIODES)	
D401	PFVDRMRLS245	DIODE(SI)	S
D402	B0BA7R900004	DIODE(SI)	
D403	B0BA7R900004	DIODE(SI)	
		(CONNECTORS)	
CN402	PQJS11A10Z	CONNECTOR, 11 PIN	S
CN403	PQJS10A10Z	CONNECTOR, 10 PIN	S
CN404	K1KA11A00158	CONNECTOR, 11 PIN	
CN405	K1KA05AA0193	CONNECTOR, 5 PIN	
CN407	K1KA03A00495	CONNECTOR, 3 PIN	
CN408	K1KA02AA0193	CONNECTOR, 2 PIN	
CN409	K1KA02A00585	CONNECTOR, 2 PIN	
CN411	K1KA08A00440	CONNECTOR, 8 PIN	
		(FUSES)	
F401	K5H122200005	FUSE	
F402	K5H251200003	FUSE	
		(RESISTORS)	
R401	ERJ3GEYJ562	5.6k	
R402	D0GN152JA016	1	
R403	ERJ3GEYJ821	820	
R404	PQ4R10XJ221	220	S
R454	ERJ3GEY0R00	0	
		(CAPACITORS)	
C402	ECJ1VF1H104Z	0.1	
C403	ECUV1C104ZFV	0.1	
C406	ECUV1H102KBV	0.001	

21.2.7. Sensor Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB6	PFWP4FG2451M	SENSOR BOARD ASS'Y (RTL)	
CN1001	K1KA04B00225	CONNECTOR, 4 PIN	
SW1001	K0L2BA000001	SWITCH, SENSOR LEVER	
SW1002	K0MA11000041	REED SWITCH	

21.2.8. Film End Sensor Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB7	PFWP5FG2451M	FILM END SENSOR BOARD ASS'Y (RTL)	
E70	PFJS02M17Z	CONNECTOR, 2 PIN	
SW1003	K0L1BA000111	SWITCH, SENSOR LEVER	

21.2.9. Motor Position Sensor Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB8	PFWP6FG2451M	MOTOR POSITION SENSOR BOARD ASS'Y (RTL)	
E80	K0L1BA000128	SWITCH, SENSOR LEVER	
E81	PFJS02M15Z	CONNECTOR, 2 PIN	

21.2.10. Microphone Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB9	PFWP3FC255E	MICROPHONE BOARD ASS'Y (RTL)	
E90	L0CBAB000052	MICROPHONE	

21.2.11. Hook Swicth Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB10	PFLP1799MZ	HOOK SWITCH BOARD ASS'Y (RTL)	
		(JACK AND CONNECTOR)	
CN1501	K2LA1YYB0001	JACK	
CN1502	K1KA06B00185	CONNECTOR, 6 PIN	
		(SWITCH)	
SW1501	PQSH2B105Z	PUSH SWITCH	
		(COILS)	
L1501	PQLQR2KB113T	COIL	S
L1502	PQLQR2KB113T	COIL	S
L1503	PQLQR2KB113T	COIL	S
L1504	PQLQR2KB113T	COIL	S
		(RESISTORS)	
JJ1501	ERJ8GEY0R00	0	
JJ1502	ERJ8GEY0R00	0	

21.2.12. Cordless Handset Board Parts

Note:

(*3) When replacing IC1 or IC3, data need to be written to them with PFZZFC255CX. Refer to **Cordless Handset** (P.181) of **Things to Do after Replacing IC** (P.181).

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWPGA810CXR	HANDSET BOARD ASS'Y (RTL)	
		(ICs)	
IC1	C1CB00002320	IC (BBIC) (*3)	
IC3	PQWIA130EXRR	IC (EEPROM) (*3)	
		(TRANSISTORS)	
Q1	PQVTFDN335N	TRANSISTOR(SI)	S
Q2	B1ADGE000004	TRANSISTOR(SI)	
Q3	B1ADGE000004	TRANSISTOR(SI)	
Q4	B1ADGE000004	TRANSISTOR(SI)	
Q5	B1ABCF000103	TRANSISTOR(SI)	
Q7	UN9219J	TRANSISTOR(SI)	S
Q8	UN9219J	TRANSISTOR(SI)	S
Q9	UN9219J	TRANSISTOR(SI)	S
Q10	B1ABCF000103	TRANSISTOR(SI)	
Q11	B1ABCF000103	TRANSISTOR(SI)	
Q12	B1ABGE000006	TRANSISTOR(SI)	
		(DIODES)	
D1	B0JCME000035	DIODE(SI)	
D2	MA112	DIODE(SI)	S
D4	MA8047	DIODE(SI)	S
D5	MA8047	DIODE(SI)	S
D6	B0BC2R1A0006	DIODE(SI)	
D7	MA2Z72000	DIODE(SI)	
LED4	B3ACB0000133	LED	
LED5	B3ACB0000133	LED	
LED6	B3ACB0000133	LED	
LED7	B3ACB0000133	LED	
LED8	B3ACB0000133	LED	
LED9	B3ACB0000133	LED	
LED10	B3ACB0000134	LED	
		(COILS)	
L1	G1C470M00025	COIL	
L4	G1C100MA0072	COIL	
L5	G1C100MA0072	COIL	
L7	J0JCC0000275	COIL	
F1	PQLQR2M5N6K	COIL	S

Ref. No.	Part No.	Part Name & Description	Remarks
		(CONNECTOR AND JACK)	
CN3	K1MY20BA0112	CONNECTOR	
CN4	K2HD103D0001	JACK	
		(LCR FILTERS)	
L8	J0JCC0000286	LCR FILTER	
L9	J0JCC0000286	LCR FILTER	
L12	J0JCC0000286	LCR FILTER	
R31	J0JCC0000286	LCR FILTER	
		(RESISTORS)	
R1	ERJ6RSJR10V	0.1	
R2	ERJ3GEYJ680	68	
R5	ERJ2GEJ471	470	
R6	ERJ3GEYJ103	10k	
R7	ERJ3GEYJ224	220k	
R8	ERJ2GEJ102	1k	
R11	ERJ2GEJ393X	39k	
R12	PQ4R10XJ4R7	4.7	S
R13	ERJ2GEJ101	100	
R15	ERJ2GEJ332	3.3k	
R16	ERJ2GEJ102	1k	
R19	ERJ3GEYJ565	5.6M	
R21	ERJ2GEJ330	33	
R22	ERJ3GEYJ330	33	
R23	ERJ2GEJ471	470	
R24	ERJ2GEJ332	3.3k	
R25	ERJ2GEJ222	2.2k	
R32	ERJ2GEJ104	100k	
R33	ERJ3GEYJ104	100k	
R40	ERJ3GEYJ103	10k	
R41	ERJ3GEYJ103	10k	
R42	ERJ3GEYJ104	100k	
R43	ERJ2GEJ684	680k	
R44	ERJ2GEJ103	10k	
R45	ERJ6RSJR10V	0.1	
R46	ERJ3GEYJ562	5.6k	
R47	PQ4R10XJ562	5.6k	S
R51	ERJ2GEJ680	68	
R52	ERJ2GEJ102	1k	
R61	ERJ2GEJ102	1k	
R62	ERJ2GEJ102	1k	
R64	ERJ3GEYJ103	10k	
R65	ERJ2GEJ103	10k	
R66	ERJ3GEYJ102	1k	
R71	ERJ3GEYJ470	47	
R73	ERJ2GEJ102	1k	
R91	ERJ3GEYJ100	10	
R92	ERJ2GEJ121	120	
R93	ERJ2GEJ101	100	
R94	ERJ2GEJ330	33	
R95	ERJ3GEYJ101	100	
R96	ERJ2GEJ101	100	
R97	ERJ2GEJ101	100	
R98	ERJ2GEJ101	100	
R99	ERJ2GEJ101	100	
R103	ERJ2GEJ101	100	
R104	ERJ2GEJ101	100	
R105	ERJ2GEJ101	100	
R106	ERJ2GEJ101	100	
R107	ERJ2GEJ101	100	
R108	ERJ2GEJ103	10k	
R109	ERJ2GEJ103	10k	
L10	ERJ2GE0R00	0	
		(CAPACITORS)	
C1	EEE0GA331WP	330	
C2	EEE0JA331P	330	
C3	ECJ0EB1A104K	0.1	
C4	ECUV1H100DCV	10P	
C5	PQCUV1A225KB	2.2	S
C6	ECUV1H080DCV	8P	
C7	ECJ0EC1H150J	15P	

Ref. No.	Part No.	Part Name & Description	Remarks
C8	F1G1A2240008	0.22	
C10	PQCUV1A225KB	2.2	S
C11	ECUV1C104KBV	0.1	
C12	ECJ0EB0J105K	1	
C15	ECUV1A105KBV	1	
C18	ECJ0EB1H102K	0.001	
C19	ECJ0EB1A104K	0.1	
C20	ECJ0EB1A104K	0.1	
C21	ECJ0EB1A104K	0.1	
C22	ECJ0EB1A104K	0.1	
C24	ECJ0EB1A104K	0.1	
C25	ECUV1C104KBV	0.1	
C26	ECUV1C104KBV	0.1	
C27	ECJ0EB0J105K	1	
C28	ECUV1C104KBV	0.1	
C29	ECUV1A105KBV	1	
C30	ECJ0EB1A104K	0.1	
C32	ECJ0EB1A104K	0.1	
C34	ECUV1A105KBV	1	
C35	ECJ0EC1H101J	100P	
C37	ECUV1H101JCV	100P	
C38	ECJ0EB1C103K	0.01	
C39	ECUV1A105KBV	1	
C50	ECJ0EC1H100D	10P	
C52	ECJ0EB1H102K	0.001	
C53	F1G1H151A541	150P	S
C57	ECJ0EC1H390J	39P	
C58	ECJ0EB1H102K	0.001	
C60	F1J0J4750005	4.7	
C61	F1J0J4750005	4.7	
C66	ECJ0EC1H1R5C	1.5	
C82	ECJ0EB1H471K	470P	
C83	ECJ0EC1H100D	10P	
C84	ECUV1C104KBV	0.1	
C85	ECJ0EC1H100D	10P	
C86	ECUV1A106ZF	10	S
C96	ECJ0EB1H102K	0.001	
C97	ECJ0EB1H102K	0.001	
C98	ECJ0EC1H100D	10P	
C99	ECJ0EB1H331K	330P	
C101	ECJ0EC1H100D	10P	
C102	ECJ0EC1H100D	10P	
C103	ECJ0EC1H101J	100P	
C104	ECJ0EC1H101J	100P	
C105	ECJ0EC1H101J	100P	
C106	ECJ0EC1H101J	100P	
C107	ECJ0EC1H101J	100P	
C108	ECJ0EB1H102K	0.001	
C110	ECUV1H331JCV	330P	
C112	ECJ0EB1H102K	0.001	
C113	ECJ0EB1H102K	0.001	
C114	ECJ0EB1H102K	0.001	
C115	ECJ0EC1H100D	10P	
		(OTHERS)	
E301	PQLP10276Z	LIQUID CRYSTAL DISPLAY	
E302	PQHX11300Z	PLASTIC PARTS, PET SHEET	
E303	PQSA10197Z	ANTENNA	
IC4	PQLP10263Z	RF UNIT	
MIC	L0CBAB000052	MICROPHONE	
D8	D4ED1270A014	VARISTOR	
X1	H0D103500005	CRYSTAL OSCILLATOR	

21.2.13. Charger Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB200	PQWPA810ESCH	CHARGER BOARD ASS'Y (RTL)	
		(JACK)	
J1	K2ECYB000001	JACK	S

Ref. No.	Part No.	Part Name & Description	Remarks
		(RESISTORS)	
R1	ERDS1VJ100	10	S
R2	ERDS1TJ120	12	S
R3	ERDS1VJ100	10	S
R4	ERDS1TJ120	12	S

21.2.14. Service Fixture and Tools

Note:

- (*4) See **Cordless Base Section (Digital Board) Adjustment** (P.171) and **The Setting Method of JIG (Cordless Handset)** (P.178).
- Tools and Extension Cords are useful for servicing. (They make servicing easy.)

Ref. No.	Part No.	Part Name & Description	Remarks
EC1	PFZZ11K13Z	EXTENSION CORD, 11 PIN	
EC2	PQZZ7K11Z	EXTENSION CORD, 7 PIN	
EC3	PQZZ8K15Z	EXTENSION CORD, 8 PIN	
EC4	PQZZ2K12Z	EXTENSION CORD, 2 PIN	
EC5	PQZZ2K12Z	EXTENSION CORD, 2 PIN	
EC6	PQZZ4K7Z	EXTENSION CORD, 4 PIN	
EC7	PQZZ2K12Z	EXTENSION CORD, 2 PIN	
EC8	PFZZ5K13Z	EXTENSION CORD, 5 PIN	
EC9	PQZZ2K6Z	EXTENSION CORD, 2 PIN	
EC10	PFZZ15K1Z	EXTENSION CORD, 15 PIN	
EC11	PFZZ10K3Z	EXTENSION CORD, 10 PIN	
EC12	PQZZ11K8Z	EXTENSION CORD, 11 PIN	
EC13	PQZZ8K15Z	EXTENSION CORD, 8 PIN	
EC14	PQZZ6K14Z	EXTENSION CORD, 6 PIN	
EC15	PQZZ5K6Z	EXTENSION CORD, 5 PIN	
	PFZZFC255CX	BATCH FILE CD-ROM (*4)	
	PQZZ1CD300E	JIG CABLE (*4)	
	KM79811245C0	BASIC FACSIMILE TECHNIQUE (for training service technicians)	