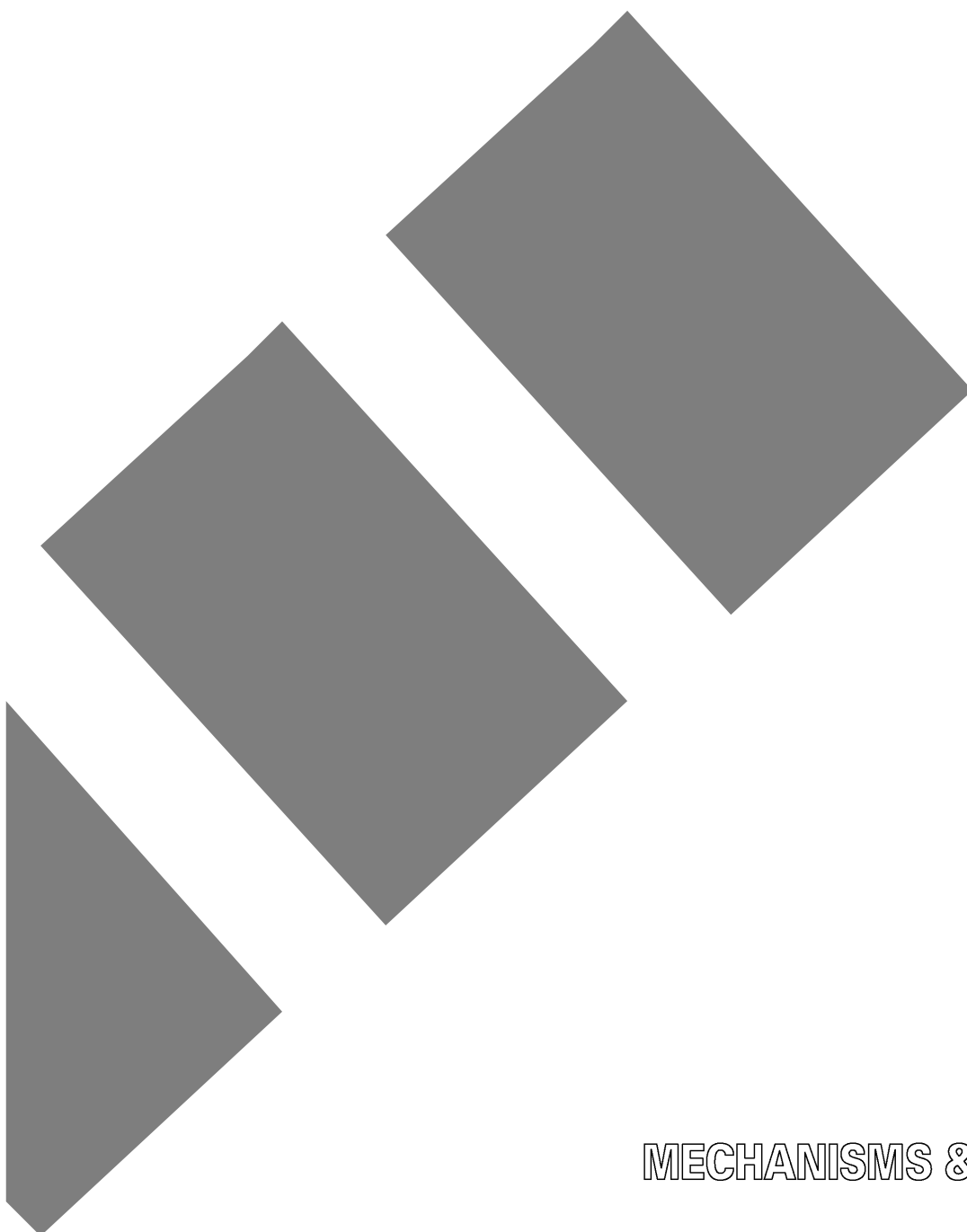




SERVICE MANUAL

MODEL: PT-MT (P-touch mini' tech)



MECHANISMS & ELECTRONICS

PREFACE

This publication is a service manual covering the specifications, outline of operating principles, disassembly/reassembly procedure, and troubleshooting of the Brother PT-MT. It is intended for service personnel and other concerned persons to accurately and quickly provide after-sale service for our PT-MT.

To perform appropriate maintenance so that the machine is always in best condition for the customer, the service personnel must adequately understand and apply this manual.

This manual is made up of four chapters and appendix.

CHAPTER I	SPECIFICATIONS
CHAPTER II	THEORY OF OPERATION
CHAPTER III	DISASSEMBLY/REASSEMBLY
CHAPTER IV	TROUBLESHOOTING
APPENDIX	MAIN PCB CIRCUIT DIAGRAM

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Specifications are subject to change without notice.

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CHAPTER I SPECIFICATIONS

1.1 Mechanical Specifications

1.1.1 External Appearance

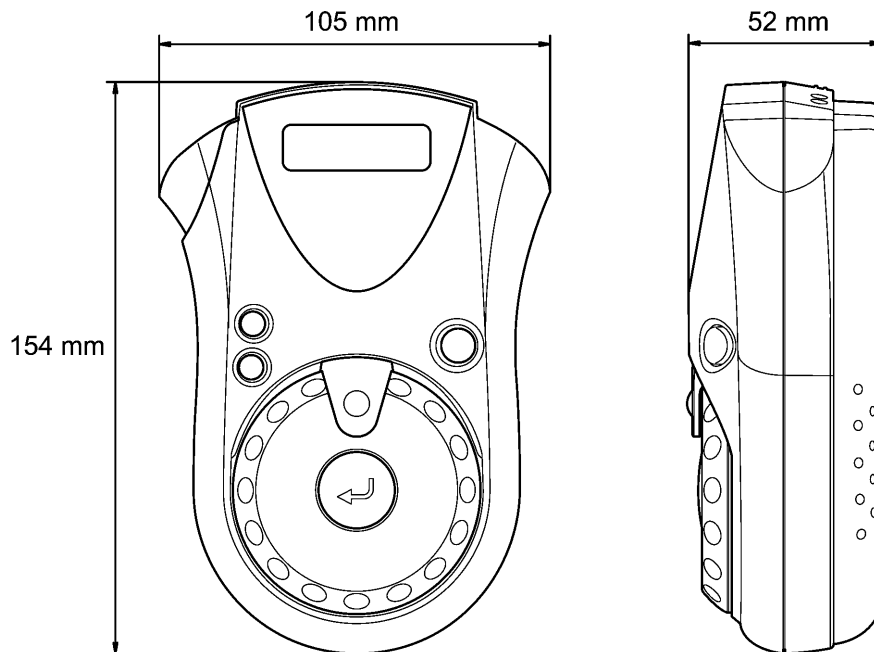


Figure 1.1-1 External Appearance

- | | |
|----------------------------|--|
| (1) Dimensions (W x D x H) | 105 mm x 154 mm x 52 mm |
| (2) Weight | |
| Machine proper | Approx. 250 g |
| In package | Approx. 500 g (incl. a tape cassette, excl. dry cells) |

1.1.2 Entry system

- | | |
|-------------------|--------------|
| (1) Rubber keypad | 4 keys |
| (2) Dial | 32 positions |

1.1.3 Display

- | | |
|--------------------------|--|
| (1) Display type | Liquid crystal display (LCD) |
| (2) Number of columns | 8 columns x 1 row
(See Figure 1.1-2.) |
| (3) Number of indicators | 7 (See Figure 1.1-2.) |

1.1.4 Printing Mechanism

- | | |
|---------------------------|--|
| (1) Print system | Direct thermal printing
(Fixed print head and tape feeding mechanism) |
| (2) Print speed | 7.5 mm/second (Typical) |
| (3) Print head | |
| Type | Thermal print head |
| Heat generator | Consists of 64 heating elements vertically aligned |
| Size of a heating element | 0.136 mm wide by 0.106 mm high |

1.1.5 Tape Cassette

- | | |
|---|---|
| (1) Cassette | Cartridge type |
| (2) Tape type | Direct thermal print tape |
| (3) Tape size | Width: 9, 12 mm
Length: 8 m |
| (4) Tape cassette packed with the machine | Character color: Black
Tape color: White
Tape width: 12 mm or 9 mm (EU)
Tape length: 4 m |

1.1.6 Tape Cutter

- | | |
|------------------|--------------------------------------|
| (1) Tape cutting | Manual cutting with the cutter lever |
| (2) Cutter unit | User-replaceable |

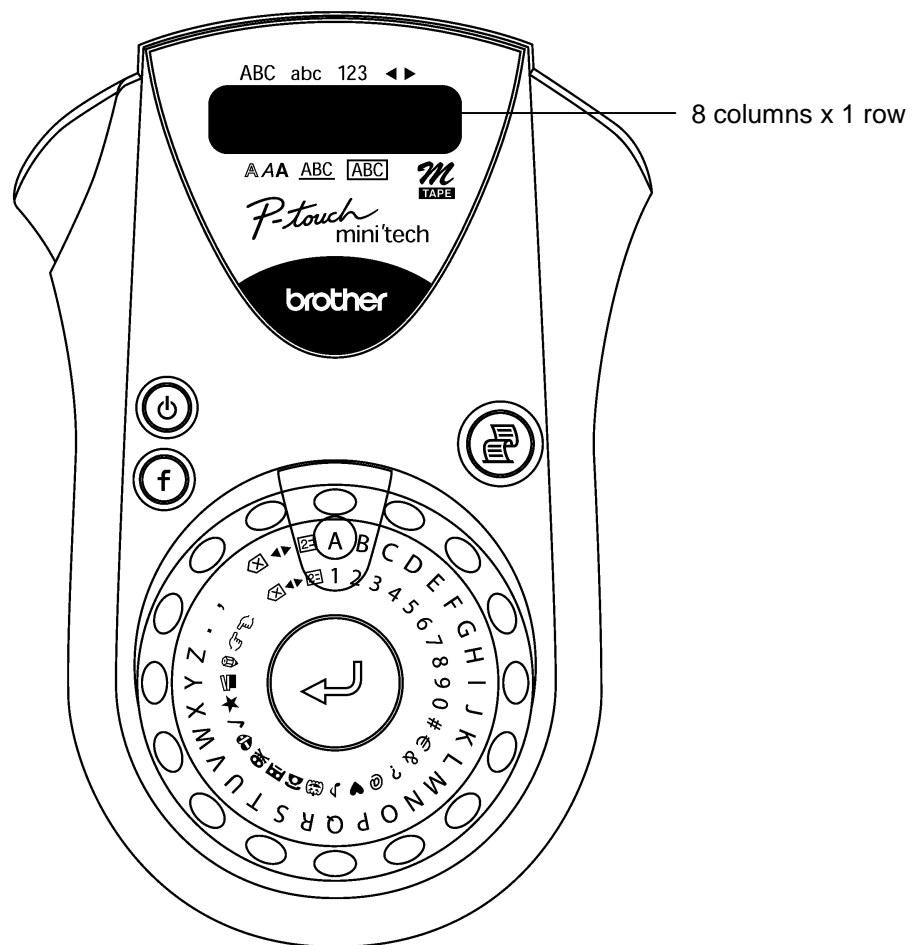


Figure 1.1-2 Key Arrangement

1.2 Electronics Specifications

1.2.1 Character Generator

(1) International character	German version	190 characters
	Other versions	182 characters
(2) Internal fonts	HELSINKI	
(3) Text buffer capacity	55 characters	
(4) Phrase memory capacity	None	

1.2.2 Power Supply

(1) Power supply	Driven by 6 dry cells
(2) Battery type	Alkaline dry cells (AM3/LR6)
(3) Service life of batteries	Will last through one tape cassette, and then some (at room temperature and normal humidity).
(4) Automatic powering-off	Yes (If the machine remains unused for approx. 5 minutes, it automatically turns itself off.)
(5) Low voltage indication	

If the voltage drops below the following level:

On standby in the entry mode	During printing	Then, the machine will:
approx. 6.96V	approx. 5.35V	Turn the power off.
----	approx. 5.86V	Display the "BATTERY" message on the LCD.

CHAPTER II THEORY OF OPERATION

2.1 Outline of Mechanisms

2.1.1 Print Mechanism

■ Structure of Thermal Head

This machine uses direct thermal printing. The thermal print head has a heat generator consisting of 64 heating elements which are vertically aligned as shown in Figure 2.1-1. Each heating element is 0.136 mm wide by 0.106 mm high.

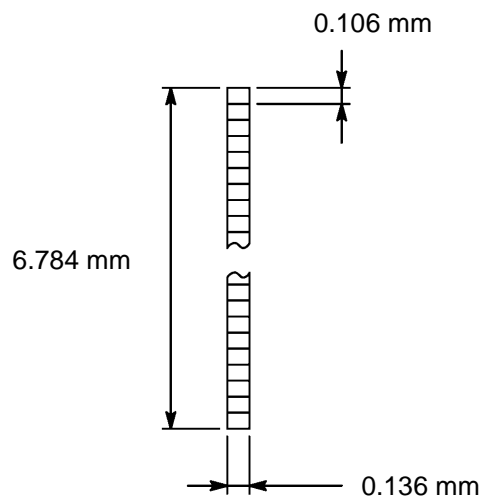


Figure 2.1-1 Heat Generator of Thermal Head

■ Printing Process

When the cylindrical rubber platen is pressed against the thermal print head with the thermal tape sandwiched inbetween, the CPU applies electric power to the selected ones of those 64 heating elements.

The selected heating element(s) generates heat that dissolves the metal deposit layer of the thermal tape so as to reveal the substrate layer, producing a dot on the tape. The tape is advanced and the next heating cycle is repeated, thus forming a character on the tape.

■ Character Formation

While the drive motor (DC motor) feeds the tape by 0.106 mm for 13.8 ms, the thermal head generates heat once. The feed amount of 0.106 mm is smaller than the width (0.136 mm) of the heating elements so that the heat generated at one heating cycle will overlap with the next heating cycle. This forms a character having no gap between adjacent printed dots.

2.1.2 Platen Setting & Retracting Mechanism

This mechanism consists of the roller holder ASSY and the roller holder setting lever (wedged lever) provided on the inside of the cassette cover.

The roller holder ASSY supports the platen so that the platen can move perpendicularly to the thermal head and rotate freely.

Closing the cassette cover fits its roller holder setting lever into the slot between the roller holder ASSY and the chassis's bent section. This pivots the roller holder ASSY around the shaft provided on the chassis so as to press the roller holder ASSY against the thermal head.

The platen is pressed perpendicularly against the thermal head with the tape sandwiched inbetween under a uniform load by the platen spring. At the same time, the platen gear becomes engaged with the drive gear of the gear train on the chassis (see Figure 2.1-3).

Opening the cassette cover pulls out its roller holder setting lever so that the roller holder spring retracts the roller holder ASSY from the thermal head, providing you with enough space to replace the tape cassette.

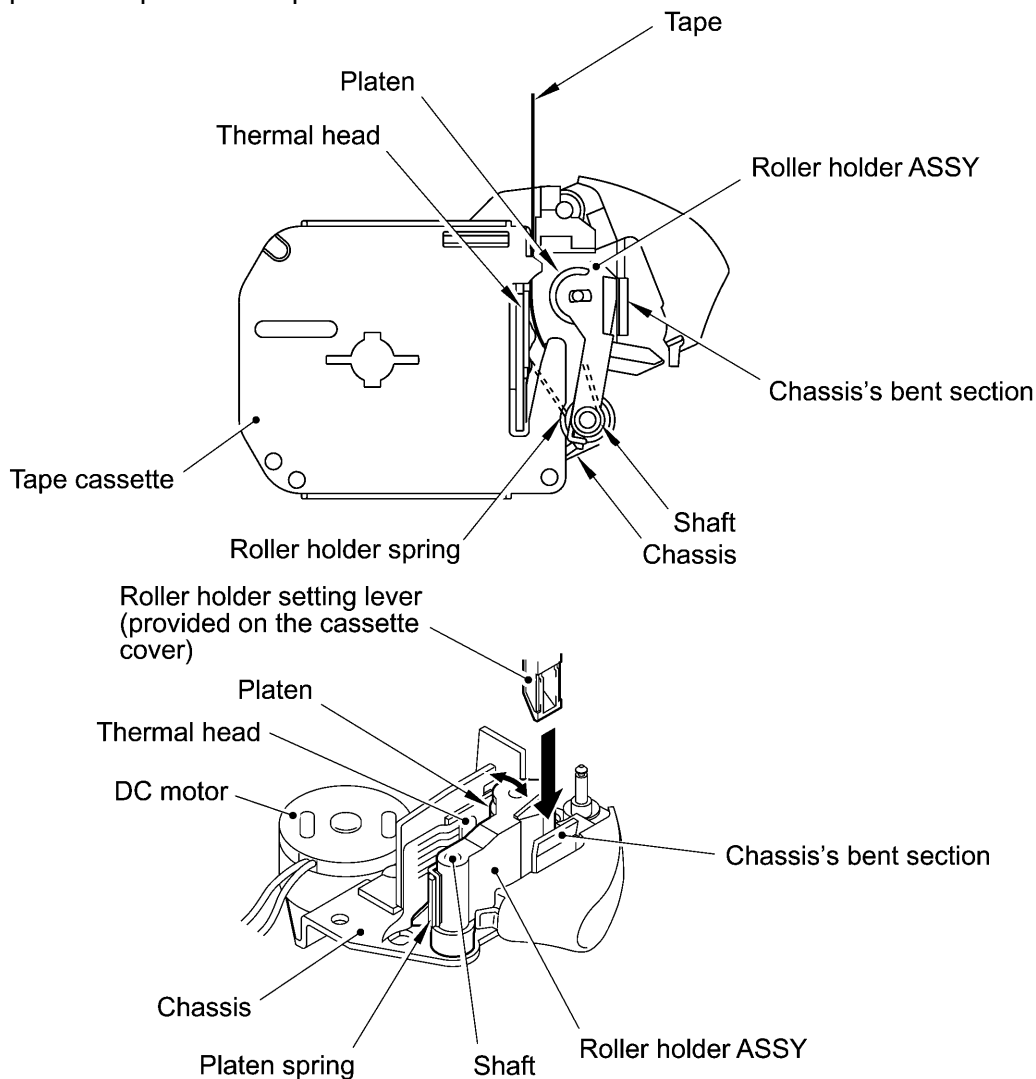


Figure 2.1-2 Platen Setting & Retracting Mechanism

2.1.3 Tape Feed Mechanism

This mechanism consists of a DC motor, gear train and roller holder ASSY.

When you load a tape cassette and close the cassette cover, the platen and the thermal head sandwich the tape inbetween and the platen gear becomes engaged with the gear train, as described in Subsection 2.1.2.

As the DC motor rotates, the rotation is transmitted via the gear train to the platen gear. Accordingly, the sandwiched tape will be advanced.

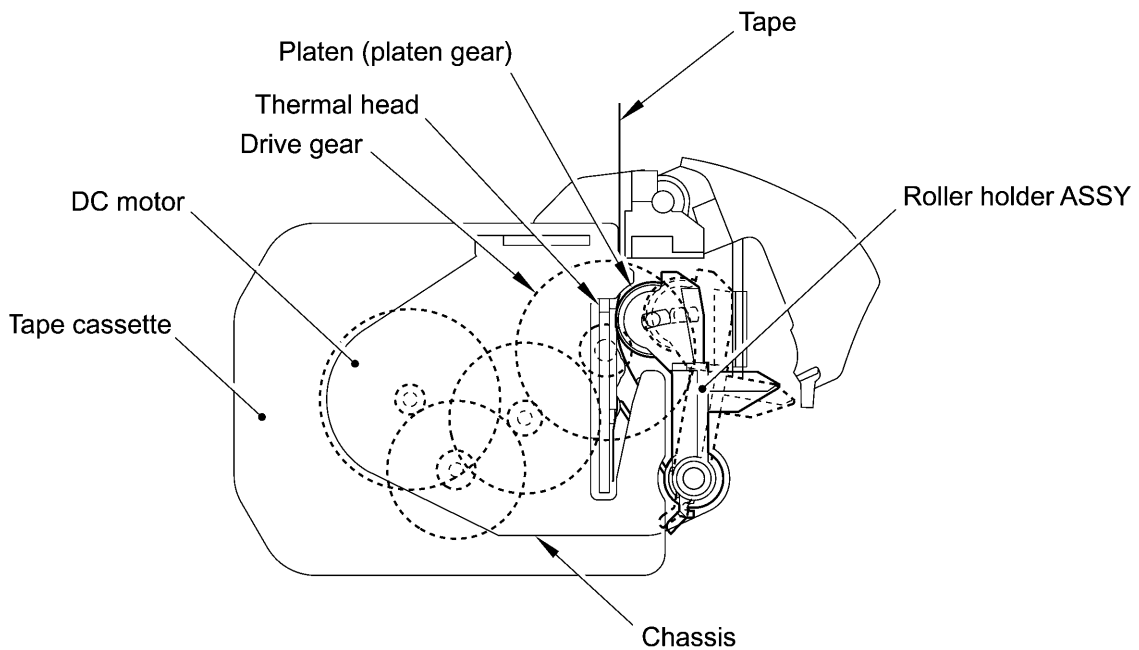


Figure 2.1-3 Tape Feed Mechanism

2.1.4 Tape Cutter Mechanism

The cutter mechanism consists of a cutter lever and a cutter unit in which a blade is retracted by a spring.

Pressing the cutter lever pushes out the blade from the cutter unit. The blade presses the printed tape against the cutter board of the tape cassette, cutting the tape coming through the cutter unit and the cutter board.

When the cassette cover is opened and no tape cassette is loaded, the cutter safety mechanism works to lock the cutter lever as described in Subsection 2.1.5.

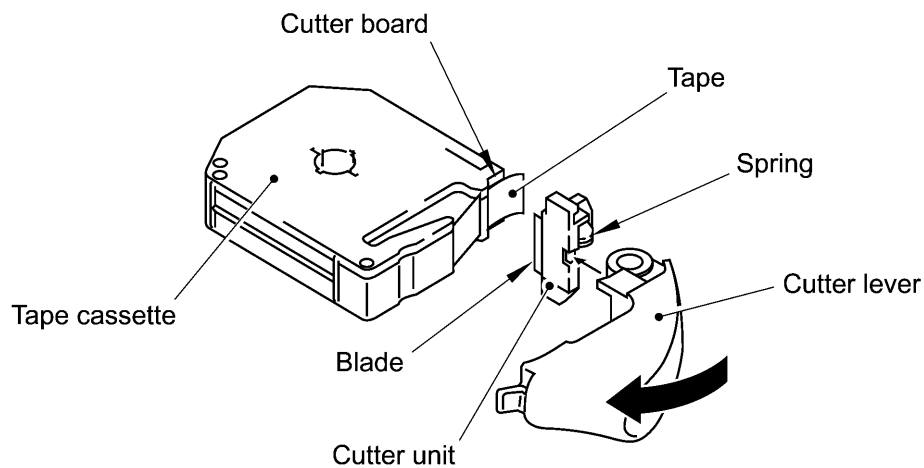


Figure 2.1-4 Tape Cutter Mechanism

2.1.5 Cutter Safety Lock Mechanism

When the cassette cover is opened and no tape cassette is loaded, the roller holder ASSY is retracted from the thermal head with the roller holder spring (as described in Subsection 2.1.2). In this retracted position, the cutter lever stopper of the roller holder ASSY blocks the end of the cutter lever, preventing the cutter lever from pushing the cutter blade out of the cutter unit for safety, as shown below.

Closing the cassette cover or loading a tape cassette releases the cutter safety lock mechanism. If you close the cassette cover, the roller holder ASSY pivots towards the thermal head so that the cutter lever stopper does not interfere with the cutter lever.

When a tape cassette is loaded, its outer edge pushes the tab of the roller holder ASSY to pivot the roller holder ASSY towards the thermal head so that the cutter lever stopper does not interfere with the cutter lever.

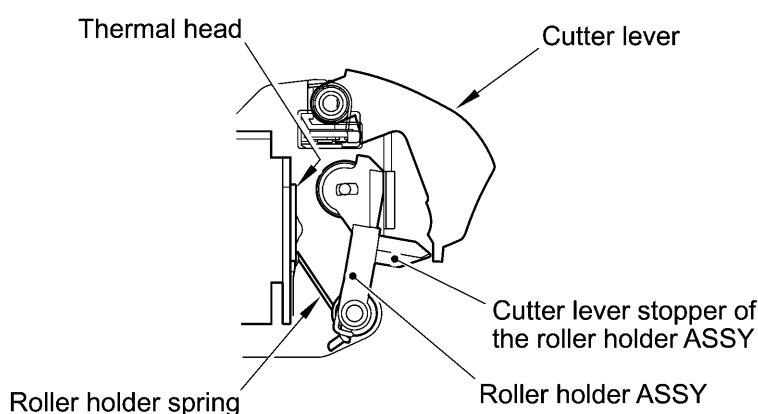


Figure 2.1-5 Cutter Safety Lock Mechanism

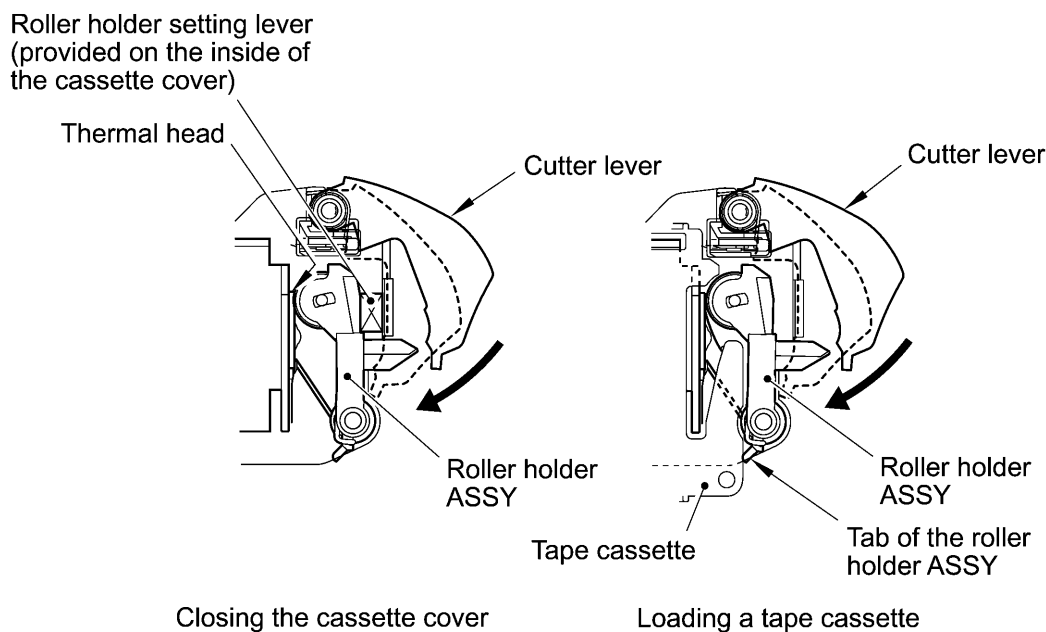


Figure 2.1-6 Releasing the Cutter Safety Lock Mechanism

2.2 Outline of Control Electronics

2.2.1 Configuration

Figure 2.2-1 shows a block diagram of the control electronics of this machine. The control electronics consists of a main PCB, DC motor, and thermal print head ASSY.

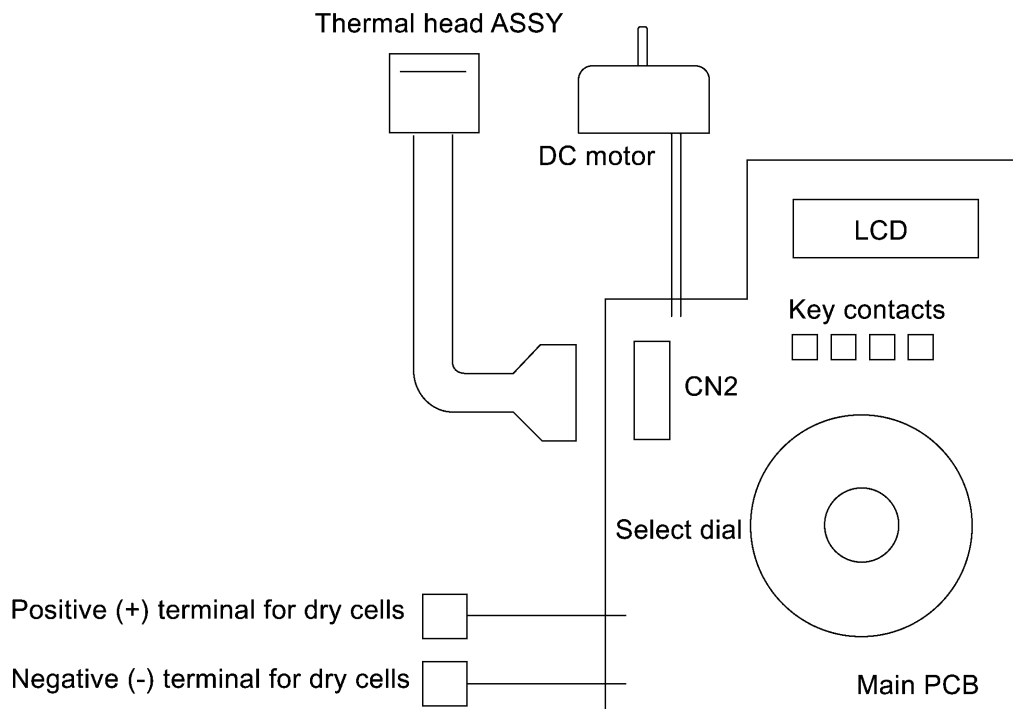


Figure 2.2-1 Configuration of the Electronic Part

■ Main PCB

This manages all the components including an LCD, DC motor, keypad, and thermal print head ASSY.

■ Motor

The DC motor is a power source to advance tape.

■ Thermal Print Head

This is a thick-film thermal print head which integrates a heat generator (consisting of 64 heating elements vertically aligned) and driver circuitry.

2.2.2 Main PCB

[1] Block Diagram

Figure 2.2-2 shows a block diagram of the main PCB.

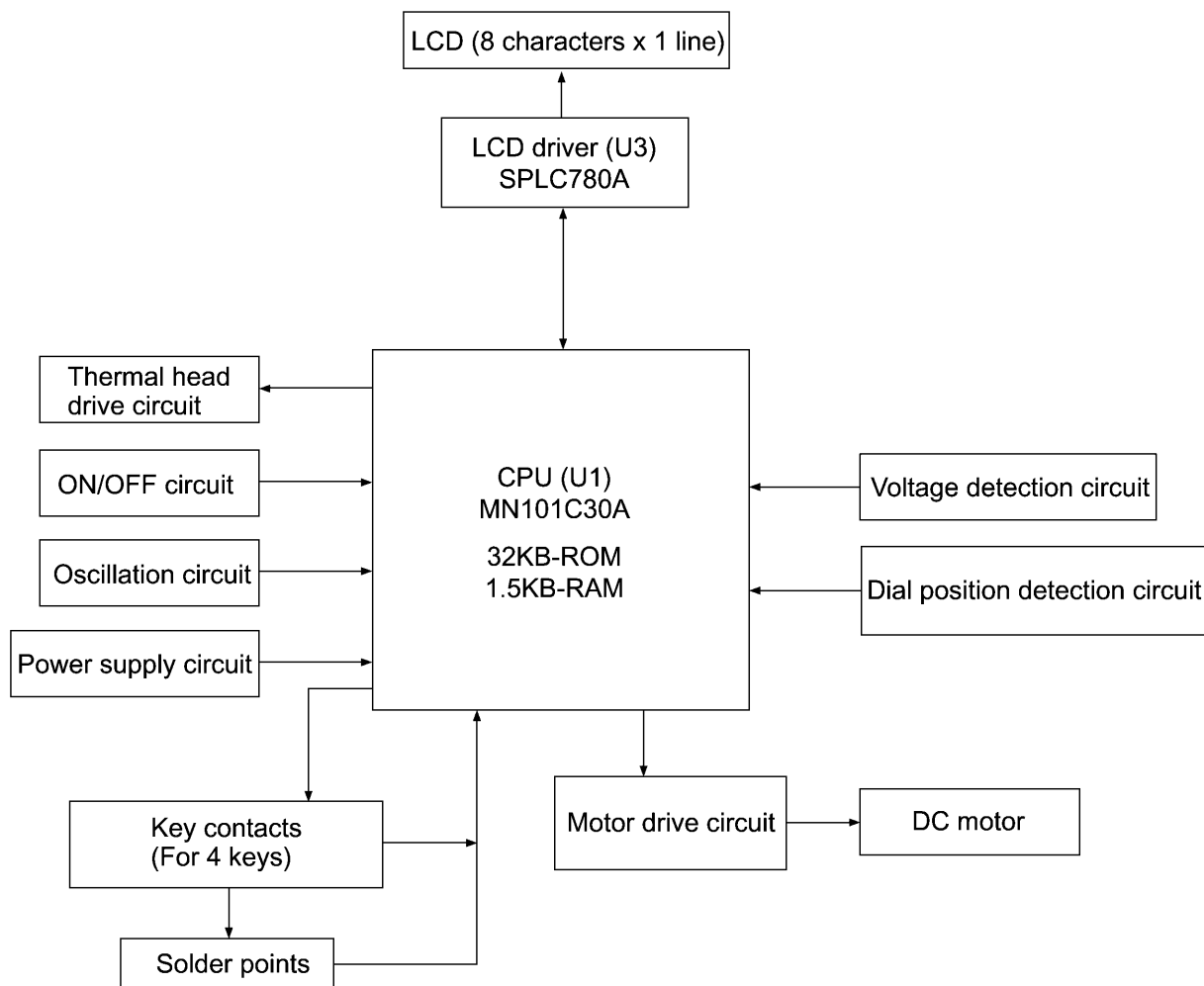


Figure 2.2-2 Block Diagram of Main PCB

The main PCB consists of the following:

- (1) CPU (including a ROM and RAM)
- (2) LCD driver
- (3) Key contacts and solder points
- (4) ON/OFF key and its circuit
- (5) Thermal head drive circuit
- (6) Oscillation circuit
- (7) Voltage detection circuit
- (8) Power supply circuit
- (9) Motor drive circuit
- (10) Dial position detection circuit

CHAPTER III DISASSEMBLY & REASSEMBLY

■ Safety Precautions

- (1) You should carry out disassembly & reassembly jobs on an anti-static sheet grounded correctly. Otherwise, the LSI and other electronic devices will be damaged due to the electricity charged in your body.
- (2) When transporting PCBs, be sure to wrap them in conductive sheets such as aluminum foil.
- (3) When using soldering irons and other heat-generating tools, take care not to damage the resin parts such as wires, PCBs, and covers.
- (4) Be careful not to lose screws, washers, or other parts removed for parts replacement.
- (5) Tighten screws to the torque values listed below.

■ Tightening Torque List

Location	Screw type	Q'ty	Tightening torque
Bottom cover	Taptite, bind B M2.6 x 6	2	0.39 N•m (4 kgf•cm)
Chassis ASSY	Taptite, bind B M2.6 x 4	3	0.196 N•m (2 kgf•cm)
Chassis ASSY (for DC motor)	Screw, pan M1.7 x 2.5	2	0.10 to 0.196 N•m (1 to 2 kgf•cm)
Thermal head ASSY	Screw, cup M2.6 x 4	1	0.49 N•m (5 kgf•cm)
Main PCB	Taptite, bind B M2.6 x 4	2	0.196 N•m (2 kgf•cm)
Lens	Taptite, bind B M2.6 x 4	2	0.196 N•m (2 kgf•cm)
Select dial	Taptite, bind B M2.6 x 4	3	0.196 N•m (2 kgf•cm)

3.1 Disassembly Procedure

[1] Removing the Cassette Cover, Dry Cells, Tape Cassette, and Cutter Unit

- (1) Turn the machine upside down.
- (2) Press section "A" of the cassette cover to release the latch, and then remove the cassette cover.

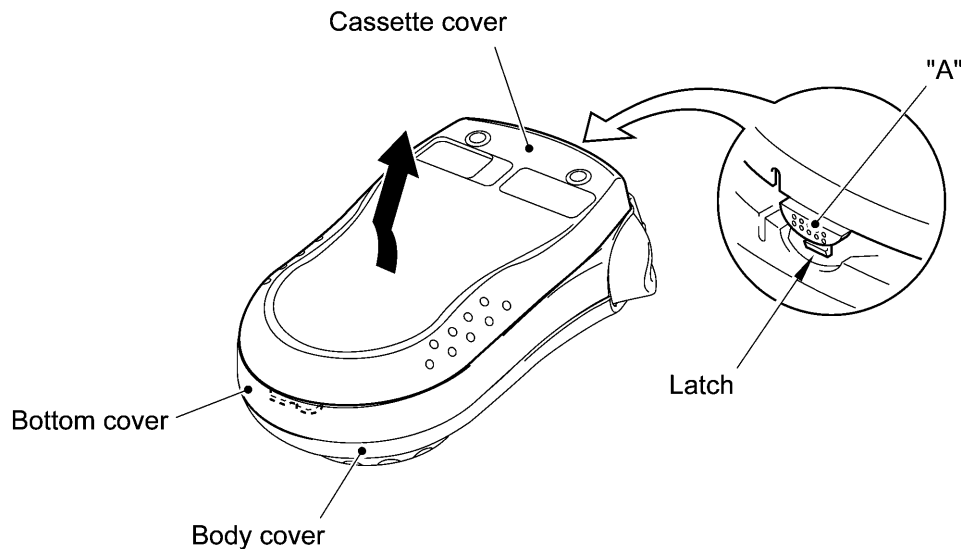


Figure 3.1-1 Removing the Cassette Cover

- (3) Remove six dry cells, tape cassette, and cutter unit. For easier removal of the tape cassette, first lift up edge "B" and then pull it out.

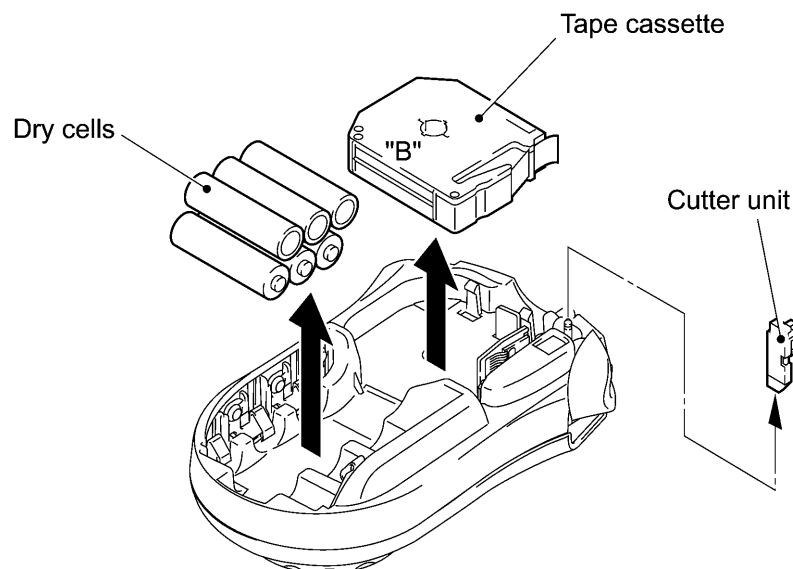


Figure 3.1-2 Removing the Dry Cells, Tape Cassette, and Cutter Unit

[2] Removing the Chassis ASSY

- (1) Remove the two screws from the bottom cover.

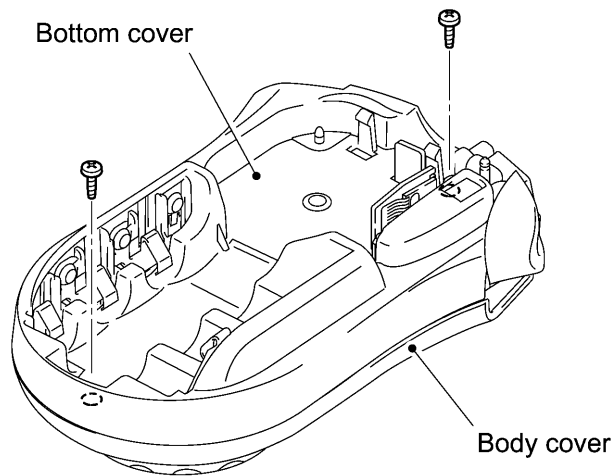


Figure 3.1-3 Unscrewing the Bottom Cover

- (2) Slightly open the bottom cover, discharge capacitor C5 with a screwdriver or the like, and then disconnect the head flat cable from the main PCB, as illustrated below.

NOTE: Take care not to bend the head flat cable.

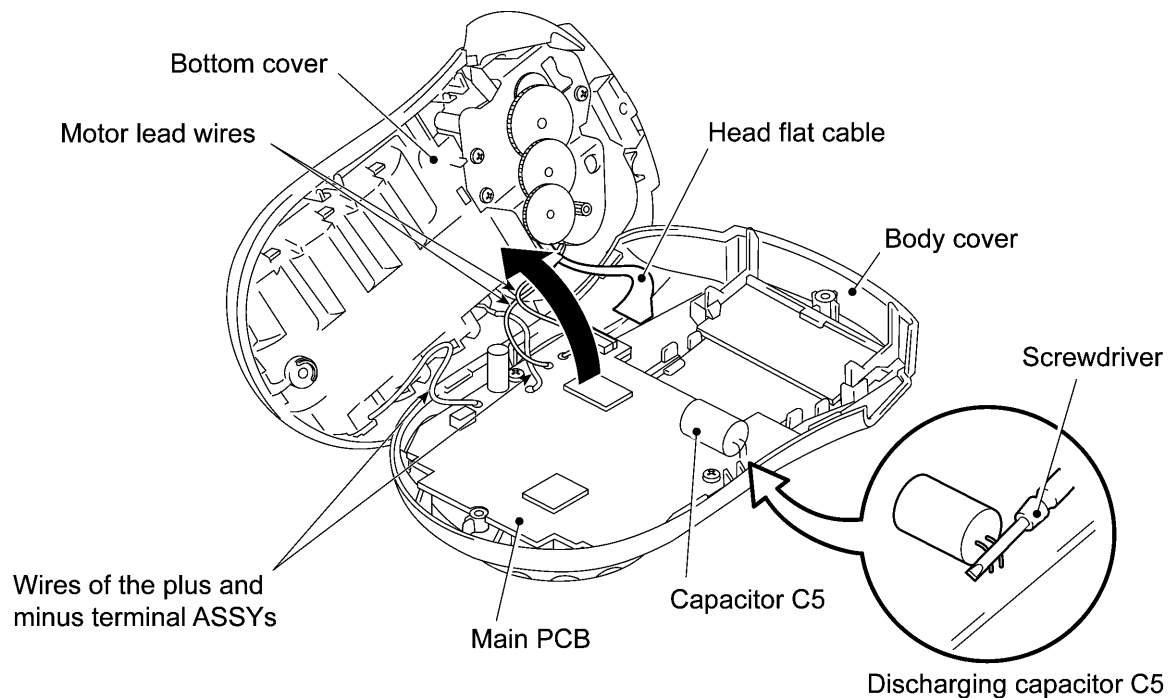


Figure 3.1-4 Discharging Capacitor C5 and Disconnecting the Head Flat Cable

- (3) Unsolder the motor lead wires from the main PCB.

NOTE: Do not unsolder the wires of the plus and minus terminal ASSYs.

- (4) Remove the three screws from the chassis ASSY.

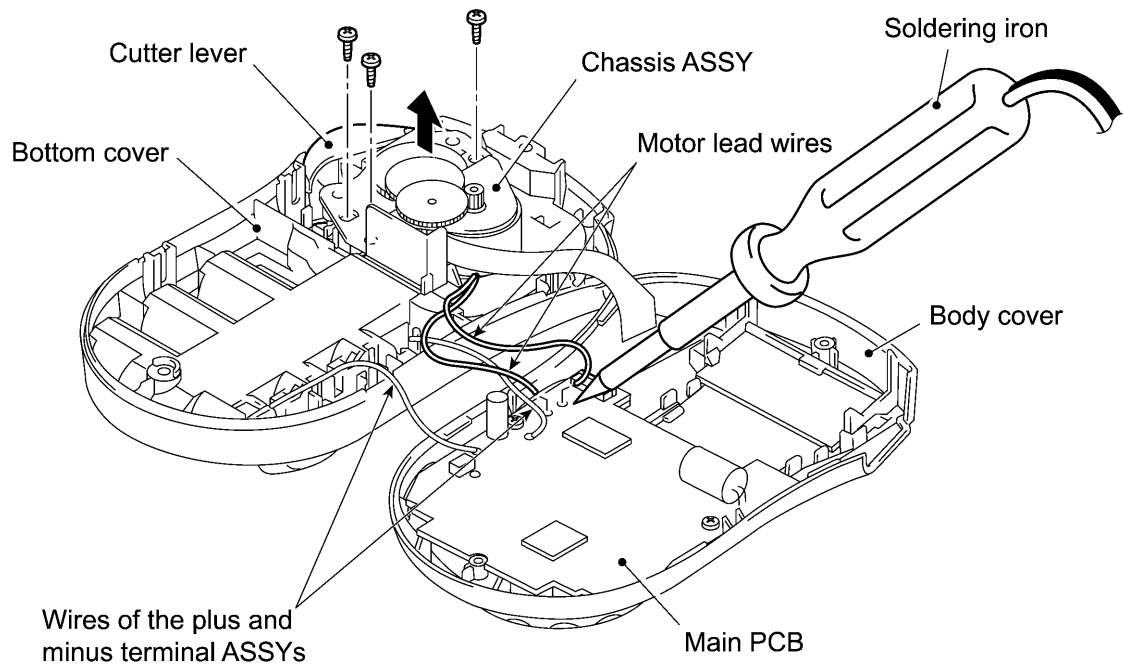


Figure 3.1-5 Unsoldering the Motor Lead Wires and Removing the Chassis ASSY

- (5) Lift the chassis ASSY up and out of the bottom cover. The cutter lever also comes off.

■ **Disassembling the Chassis ASSY**

When handling the thermal head ASSY, do not touch the thermal head by hand. It may be easily damaged due to the electricity charged in your body.

- (1) Remove the screw from the thermal head ASSY and take off the ASSY.
- (2) Remove the retaining ring from the shaft of the chassis ASSY.
- (3) Pull up the roller holder ASSY together with its spring.
- (4) Remove the two screws from the chassis ASSY and take off the DC motor ASSY.

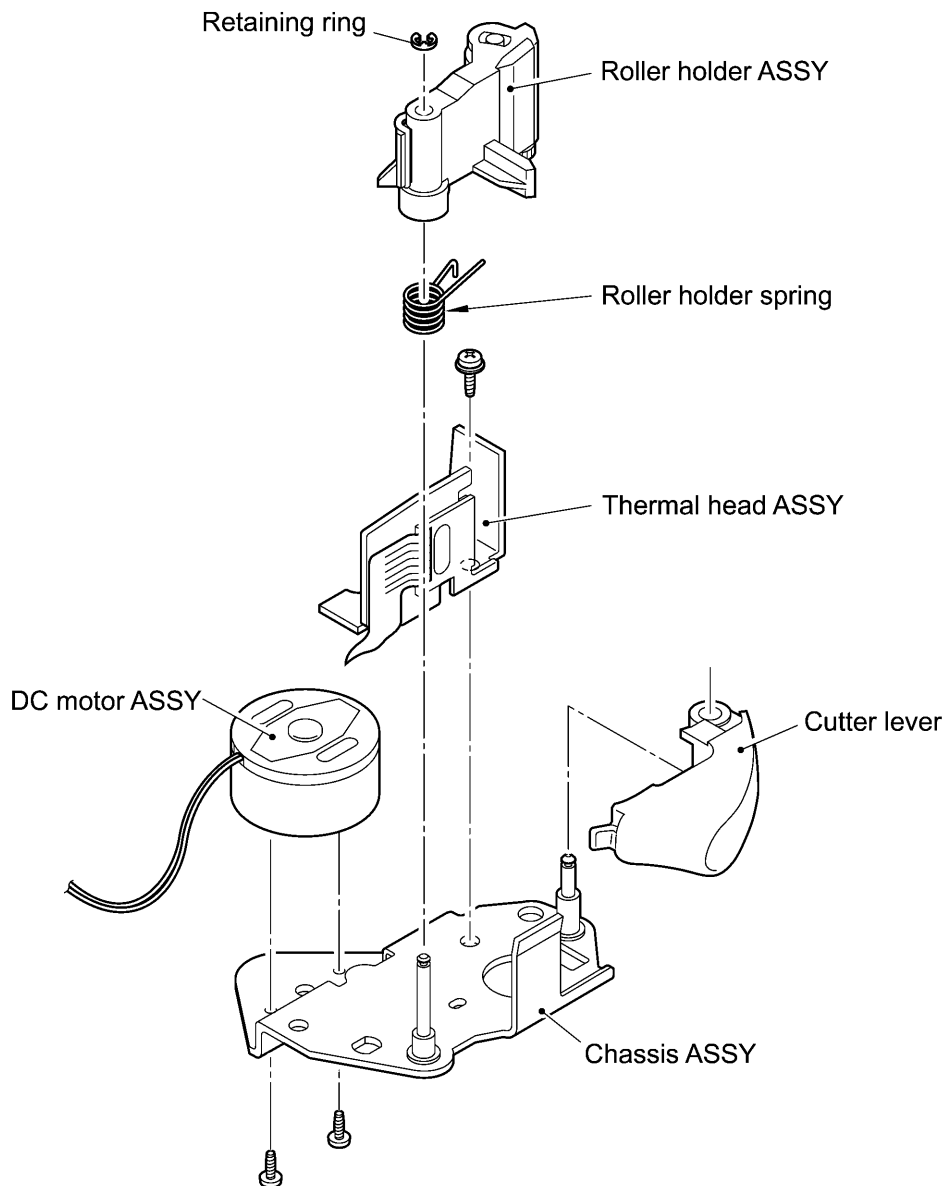


Figure 3.1-6 Disassembling the Chassis ASSY

[3] Removing the Main PCB

- (1) From the battery holder side of the bottom cover, unlatch the locking pawl of each of the plus and minus terminal ASSYs with the tip of a flat screwdriver, and then push them out of the bottom cover.

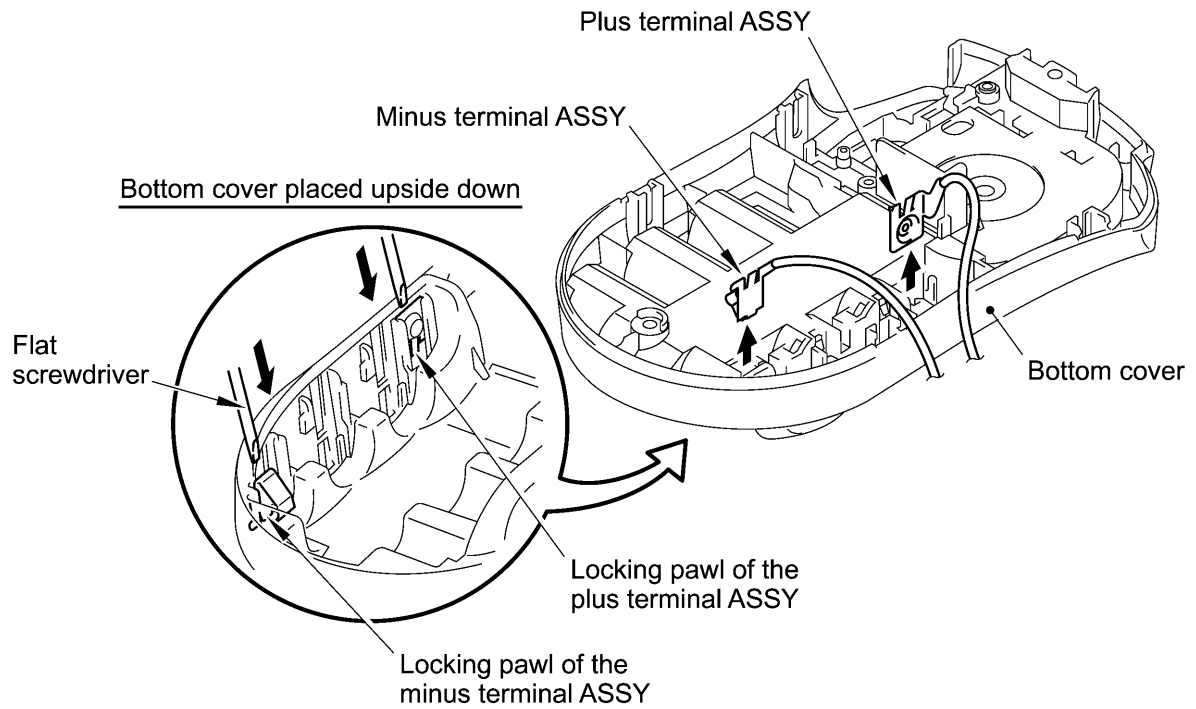


Figure 3.1-7 Pushing out the Plus and Minus Terminal ASSYs from the Bottom Cover

- (2) Remove two screws from the main PCB.
- (3) While pressing the guides of the LCD flat cable outwards, slightly slide the LCD flat cable to the right and left and release it.
NOTE: Take care not to bend the LCD flat cable.
- (4) Unlatch the LCD and take it out gently.

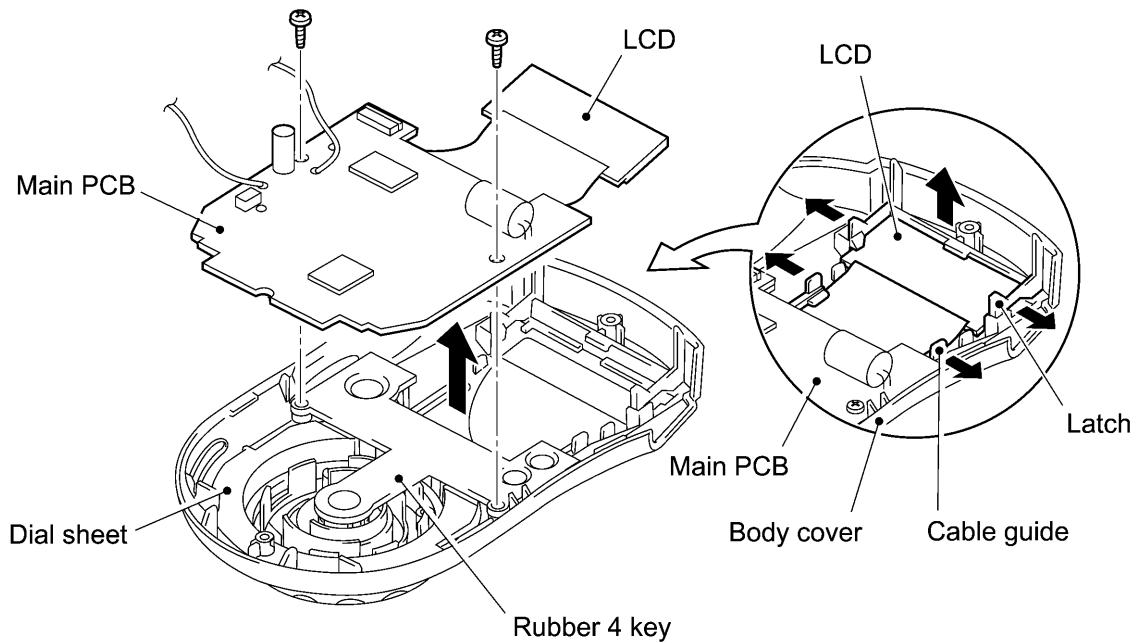


Figure 3.1-8 Taking out the Main PCB (with the LCD) from the Body Cover

[4] Removing Battery Terminals P1 and P2

- (1) As shown below, remove battery terminals P1 from the bottom cover with the flat screwdriver.

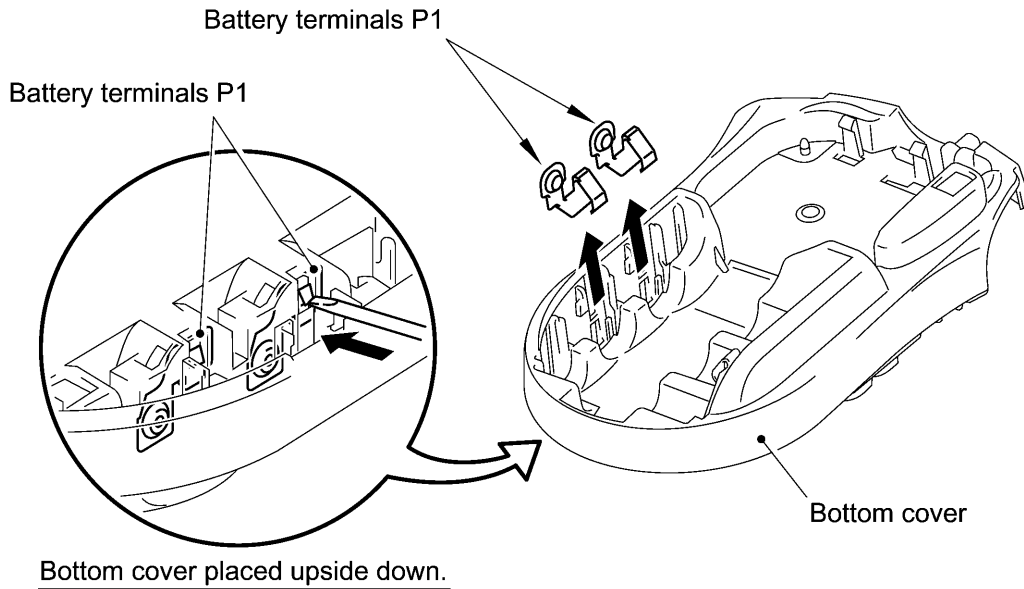


Figure 3.1-9 Taking out Battery Terminals P1 from the Bottom Cover

- (2) As shown below, remove battery terminals P2 with the flat screwdriver.

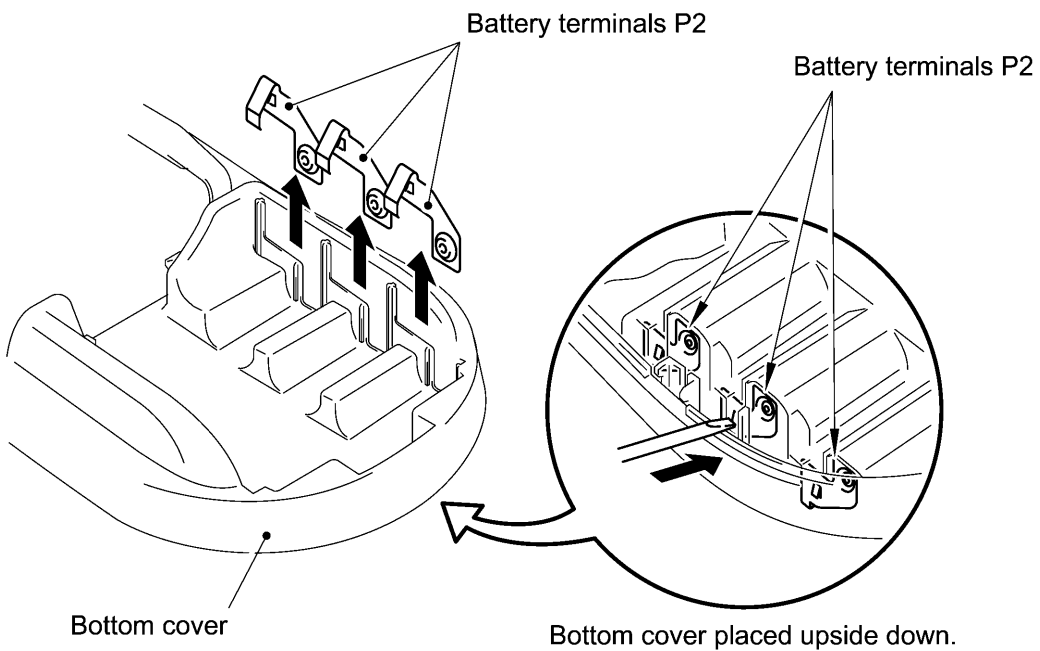


Figure 3.1-10 Taking out Battery Terminals P2 from the Bottom Cover

[5] Removing the Rubber 4 Key, Lens, Dial Sheet, Select Dial, Select Dial Claw, and Enter Key

- (1) Remove the rubber 4 key.
- (2) Remove the two screws from the lens and take it out.

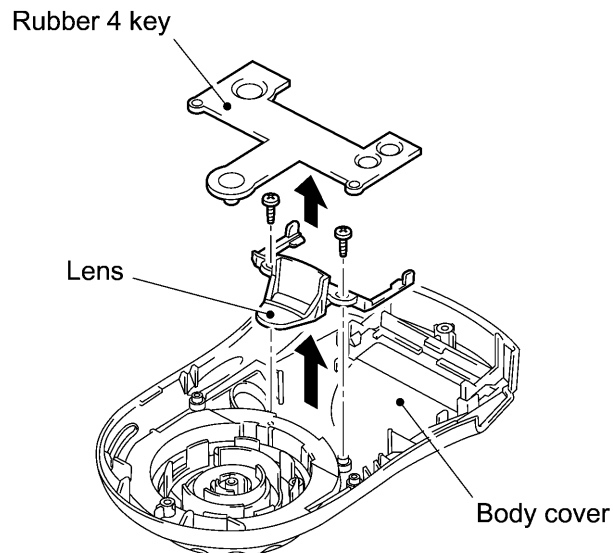


Figure 3.1-11 Removing the Rubber 4 Key and Lens

- (3) Remove the three screws and take out the dial sheet. The select dial also comes off.
- (4) Remove the select dial claw from the body cover.
- (5) Unlatch the Enter key from the select dial.

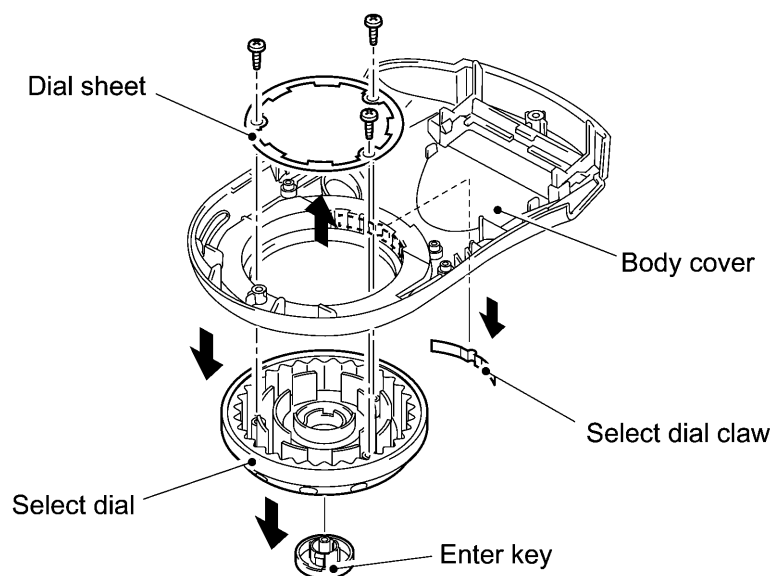


Figure 3.1-12 Removing the Dial Sheet, Select Dial, Select Dial Claw, and Enter key

3.2 Reassembly Procedure

[1] Installing the Enter Key, Select Dial Claw, Select Dial, Dial Sheet, Lens, and Rubber 4 Key

- (1) Apply a rice-sized pinch of grease (Shin-Etsu Silicone G501) to each of the two lubrication points on the end of the body cover which the inside of the select dial will come into contact with, as shown below.
- (2) Snap the Enter key into the select dial according to the orientation keys.
- (3) Set the select dial claw to the body cover.
After setting, apply a rice-sized pinch of grease (Shin-Etsu Silicone G501) to the top of the select dial claw, as shown below.
- (4) Place the body cover upside down.
- (5) Set the select dial to the body cover while aligning any low section of the inner dial face with the top of the select dial claw.
- (6) While pushing up the select dial, put the dial sheet. Secure the select dial and dial sheet with three screws.
- (7) Check that the select dial rotates smoothly.

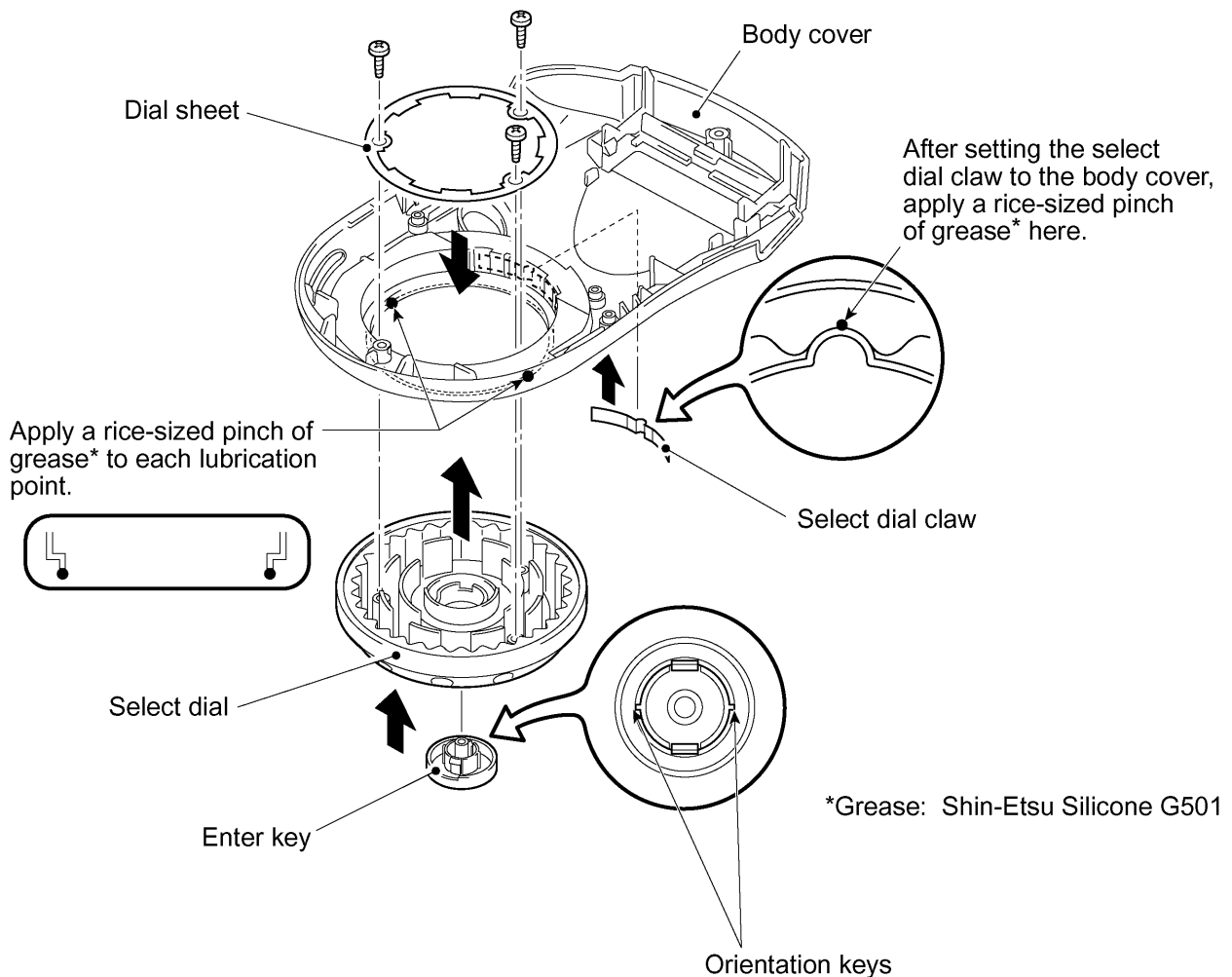


Figure 3.2-1 Reinstalling the Enter Key, Select Dial Claw, Select Dial, and Dial Sheet

- (8) Secure the lens with two screws.
- (9) Set the rubber 4 key into place.

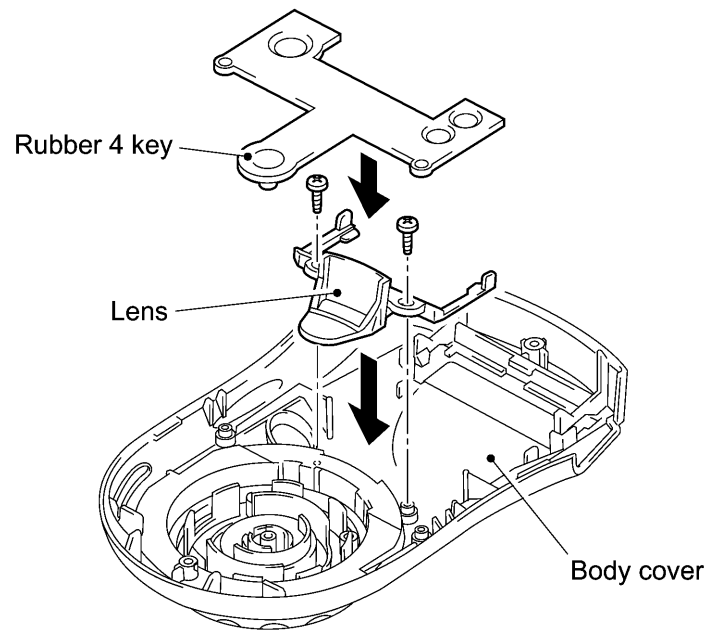


Figure 3.2-2 Reinstalling the Rubber 4 key and Lens

[2] Installing Battery Terminals P2 and P1

- (1) Snap battery terminals P2 into the bottom cover.

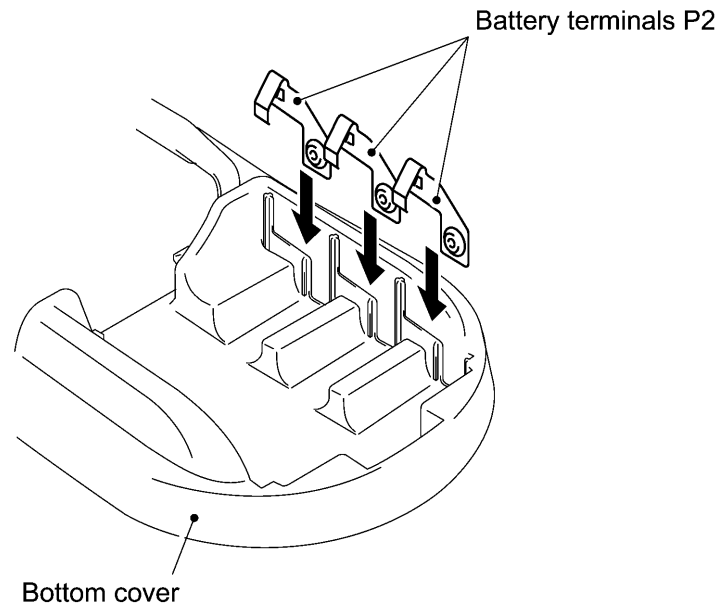


Figure 3.2-3 Setting Battery Terminals P2

- (2) Snap battery terminals P1 into the bottom cover.

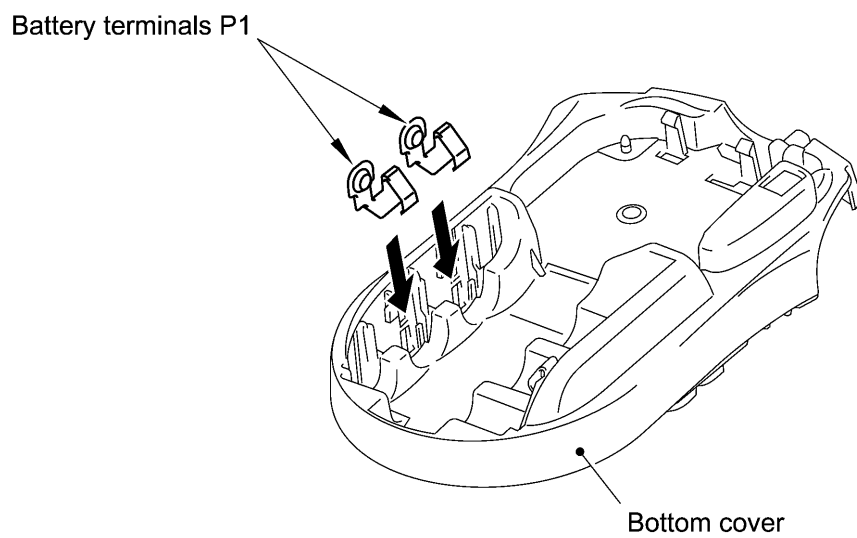


Figure 3.2-4 Setting Battery Terminals P1

[3] Installing the Main PCB

- (1) Secure the main PCB to the body cover with two screws.
- (2) Route the LCD flat cable through the cable guides while pressing them outwards.
- (3) Set the LCD into place while pressing the arms outwards.

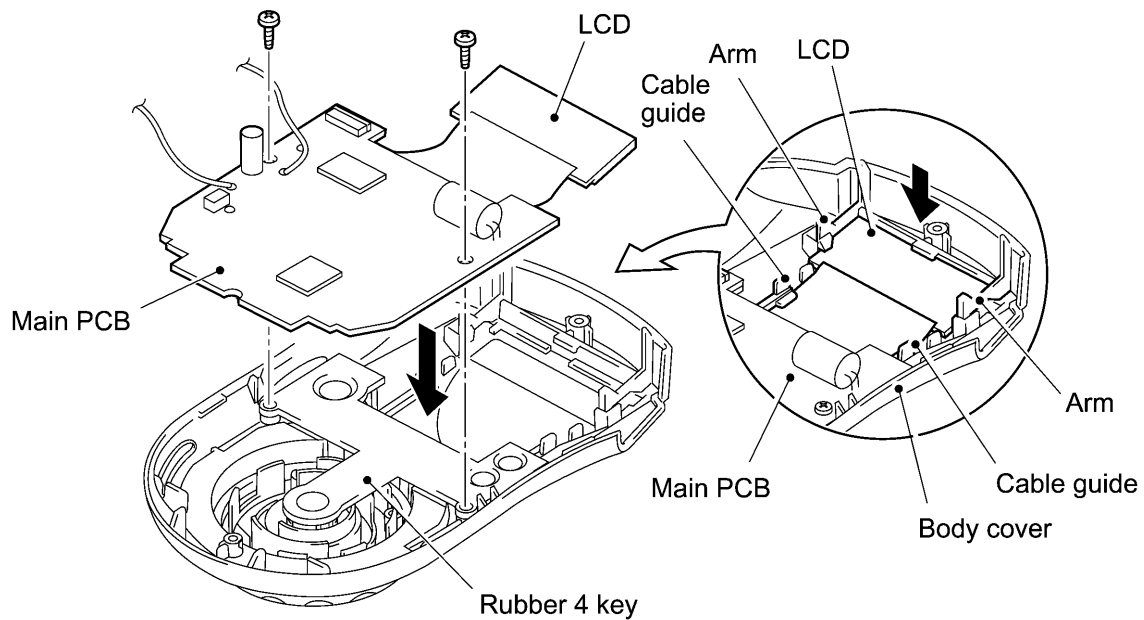


Figure 3.2-5 Reinstalling the Main PCB

- (4) Snap each of the plus and minus terminal ASSYs into the bottom cover.

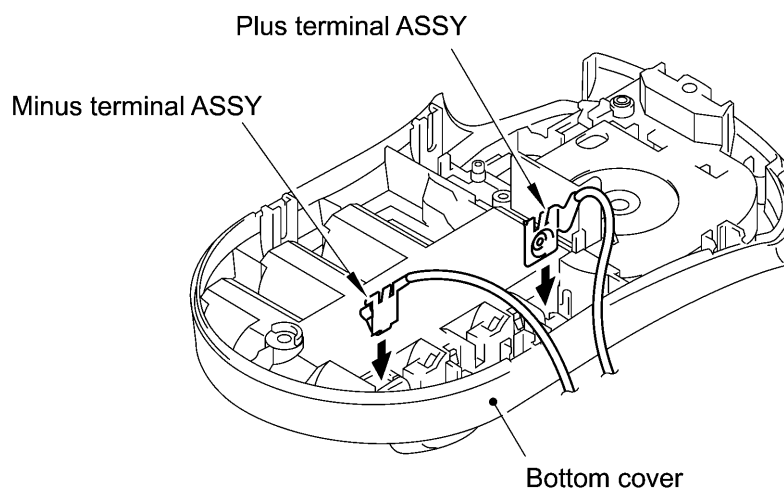


Figure 3.2-6 Setting the Plus and Minus Terminal ASSYs

[4] Installing the Chassis ASSY

- (1) If the chassis ASSY has been disassembled, assemble the components, referring to page III-16.
- (2) As shown in Figure 3.2-10, fit the cutter lever onto the shaft on the chassis ASSY.
- (3) Put the chassis ASSY together with the cutter lever back into the bottom cover.

NOTE: Route the head flat cable as illustrated below.

- (4) Secure the chassis ASSY with three screws.
- (5) Solder the motor lead wires to the main PCB as shown below.

NOTE: Check the wire ID colors, then solder the black and red wires to the BLACK (–) and RED (+) points, respectively.

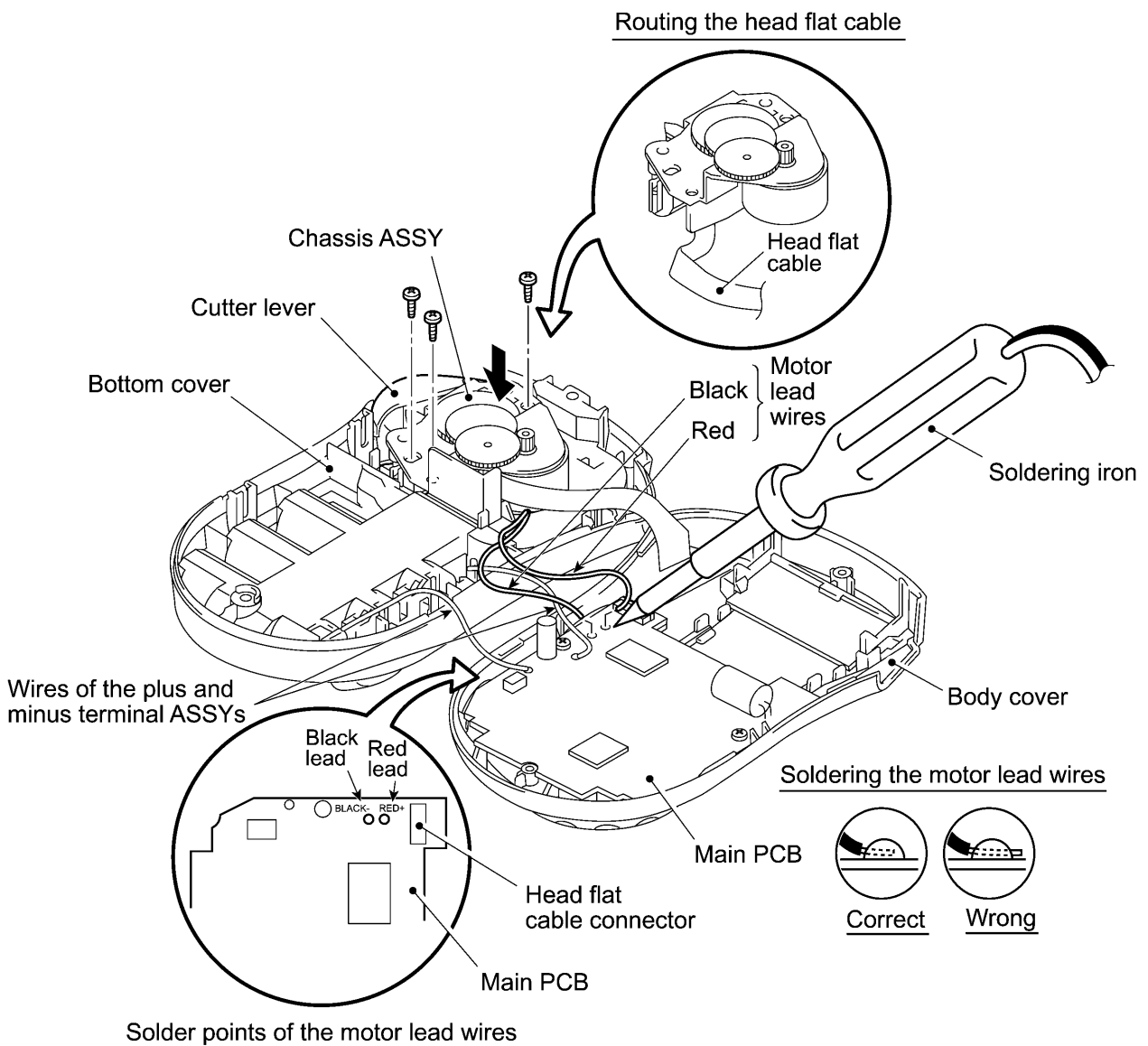


Figure 3.2-7 Installing the Chassis ASSY and Soldering the Motor Lead Wires

- (6) While holding the bottom cover in an angle shown below, connect the head flat cable to the main PCB.
- (7) Close the bottom cover.

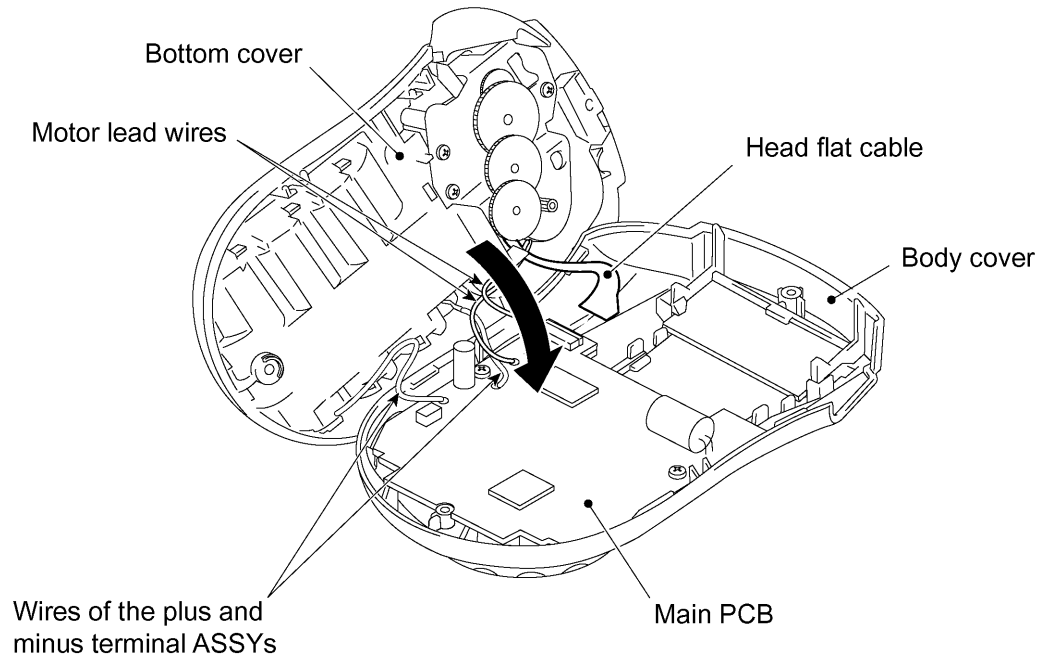


Figure 3.2-8 Connecting the Head Flat Cable

- (8) Secure the bottom cover to the body cover with two screws, taking care not to pinch the wires between those covers.

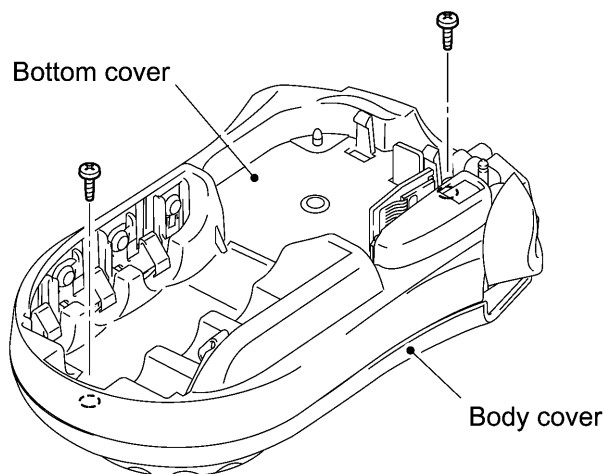


Figure 3.2-9 Securing the Bottom Cover to the Body Cover

■ Assembling the Components of the Chassis ASSY

- (1) Secure the DC motor ASSY to the chassis with two screws so that the motor lead wires face as shown below.
- (2) Set the roller holder spring onto the roller holder ASSY so that its straight end is fitted into section "A" on the ASSY, then install them to the chassis and secure the ASSY with the retaining ring.
- (3) As shown below, turn the bent end of the roller holder spring with a flat screwdriver and fit it into an oval hole provided in the chassis. Then secure the thermal head ASSY with a screw.

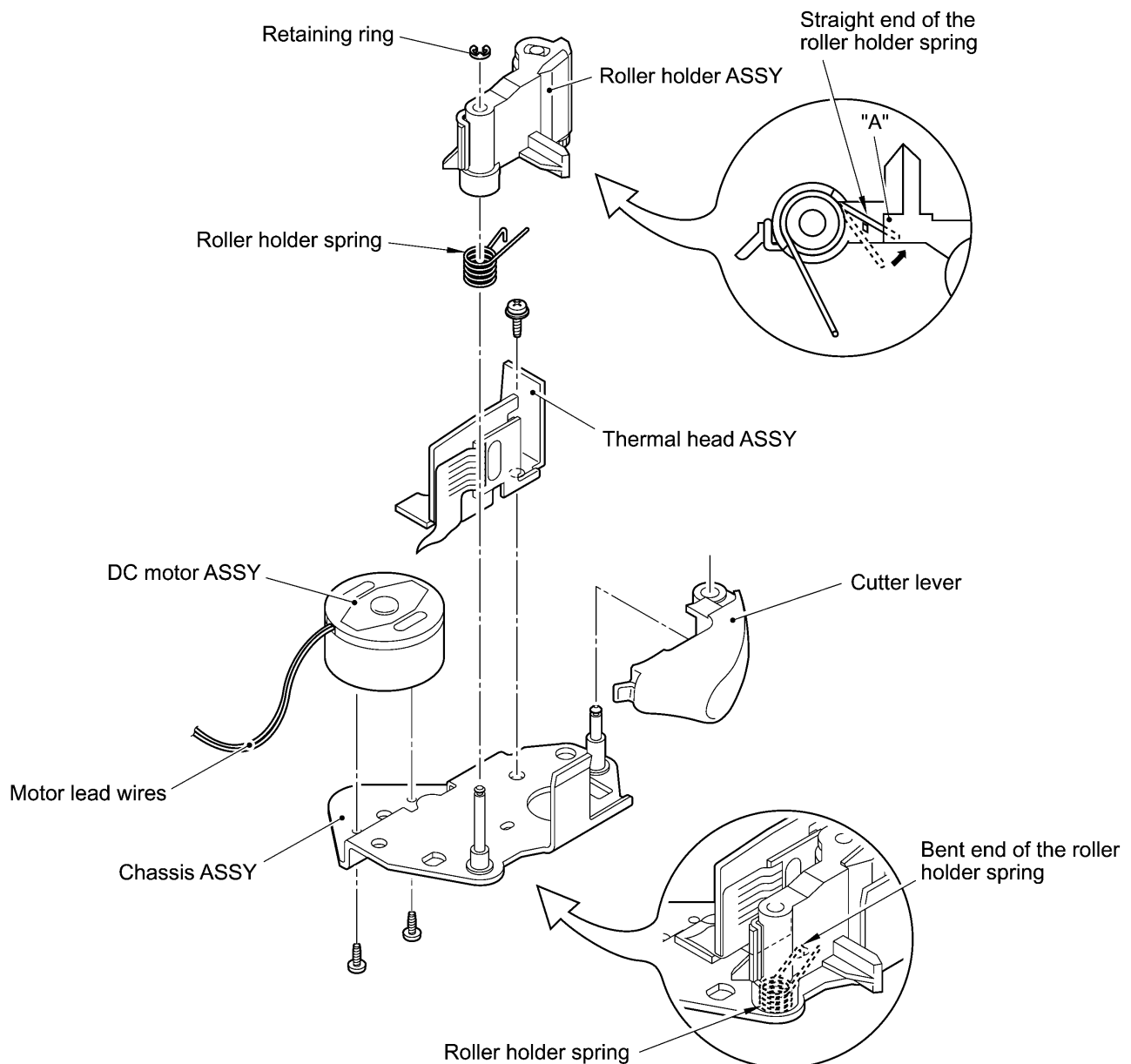


Figure 3.2-10 Assembling the Components of the Chassis ASSY

[5] Setting the Cutter Unit, Tape Cassette, Dry Cells, and Cassette Cover

- (1) Set the cutter unit into place.
- (2) Set a tape cassette.
- (3) Load six dry cells.
- (4) First fit the hook of the cassette cover and then snap the cover into place.

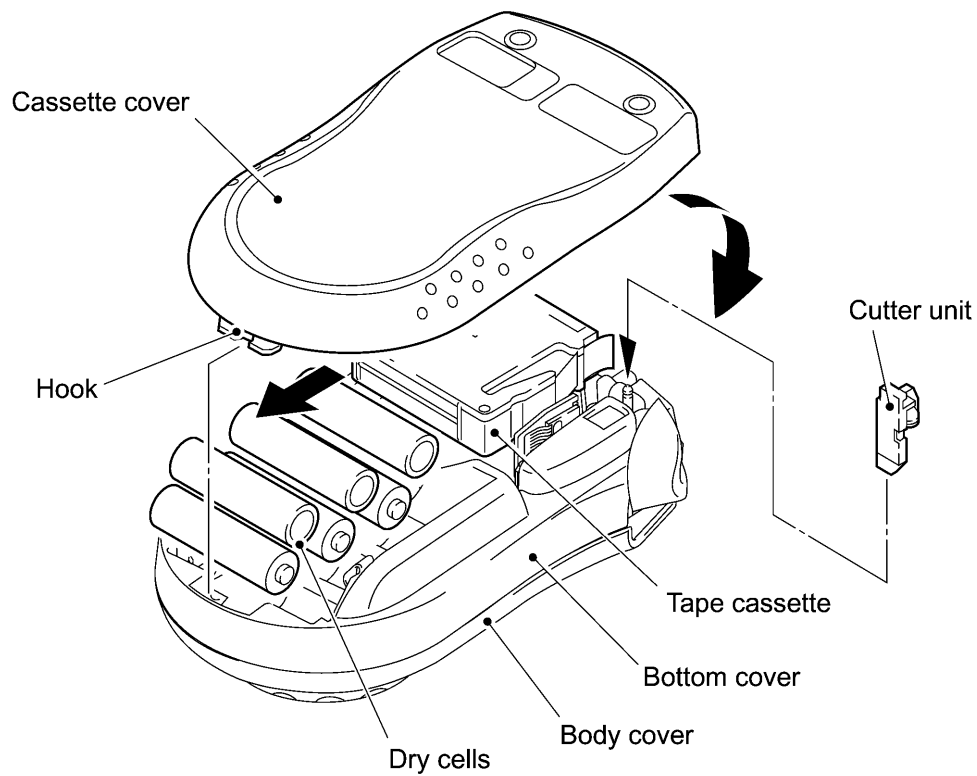


Figure 3.2-11 Setting the Cutter Unit, Tape Cassette, Dry Cells, and Cassette Cover

[6] Final Operation Check

After reassembling, do the following:

- (1) Load dry cells.
- (2) Press the ON/OFF key.
- (3) Turn the select dial to the desired position and press the Enter key. The selected symbol should be established.
- (4) Press the Print key. The selected item should be printed out.
- (5) Push the cutter lever. The cutter lever should work smoothly and cut off the tape.
- (6) Check that the printout is not faint.
- (7) Open the cassette cover and remove the tape cassette and dry cells.

The above final operation check should be usually made. For your reference, the inspection mode is described in [7].

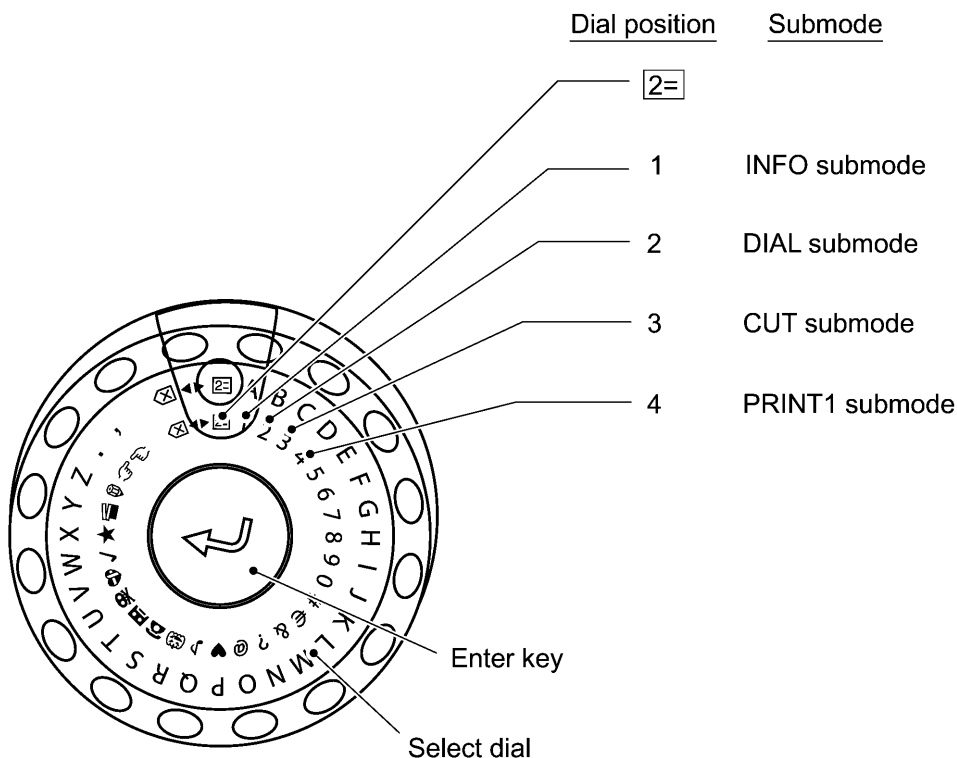
[7] Inspection Mode

According to the procedure given below, place the PT-MT in the inspection mode and make final operational checks.

In the inspection mode, you use four submodes--**INFO**, **DIAL**, **CUT**, and **PRINT1** submodes.

TIP: The inspection mode actually supports a total of nine submodes for checking at the factory. If any submode other than the above four is initiated, skip it by rotating the select dial to any of Dial positions 1 to 4 to proceed to the **INFO**, **KEY**, **CUT**, or **PRINT1** submode, respectively. Then press the Enter key.

- (1) Check that the PT-MT is turned off.
- (2) Set the select dial to Dial position **2=**.



- (3) While holding down the Print key, press the Function key ("f").

The machine enters the inspection mode and shows the following on the LCD:

INFO

NOTE: If the following message appears and the machine automatically turns itself off, then check the solder points on the main PCB. Some solder points may be incorrectly soldered.

SLD X

INFO submode (Dial position 1 and Enter key*)

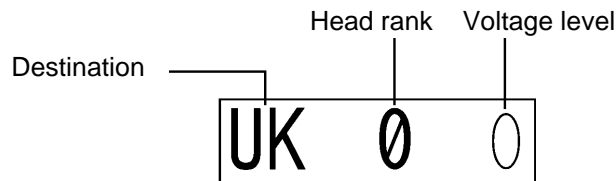
(*In any other submode, setting the select dial to Dial position 1 and pressing the Enter key will jump to INFO submode, except during checking in DIAL submode.)

The moment the machine enters the inspection mode, it shows "INFO," indicating that the machine is placed in INFO submode.

In INFO submode, you may check the destination, head rank, voltage level, and LCD operation.

- 1) Press the Enter key.

The following screen (sample) will appear where you may check the destination, head rank, and voltage level.



Destination

If the destination is UK, for example, "UK" will display.

(The destination is determined by solder points 1 through 5.)

ROM spec.	Destination	The LCD shows:	Solder points				
			1	2	3	4	5
GE	Germany	GE	H	H	H	H	H
EU	England	UK	H	H	H	H	H
	France	FR	L	H	H	H	H
	Netherlands (Holland)	HO	H	L	H	H	H
	Spain	SP	L	L	H	H	H
	Italy	IT	H	H	L	H	H
	Sweden	SW	L	H	L	H	H
	Norway	NO	H	L	L	H	H
	Switzerland	SZ	H	H	H	L	H
	Belgium	BE	L	H	H	L	H

H (High): Solder point opened, L (Low): Solder point closed

Head rank

Generally "0" will display.

Solder points A through C are reserved for future use for thermal head ranking. Unless otherwise specified, all of those solder points should be opened.

Voltage level

If the voltage level is within the specified range ($9.0 \pm 0.2V$), "0" will display. If not, "X" will display.

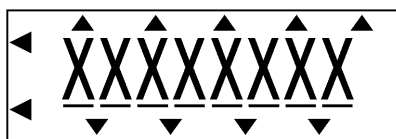
- 2) Press the Enter key.

LCD check screen 1 will appear as shown below.



- 3) Press the Enter key.

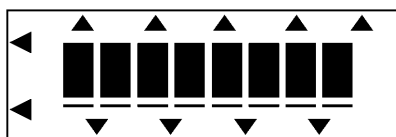
LCD check screen 2 will appear as shown below.



(All guidance indicators & cursors: ON)

- 4) Press the Enter key.

LCD check screen 3 will appear as shown below.



(All guidance indicators & cursors: ON)

DIAL submode (Dial position 2 and Enter key*)

(*In any other submode, setting the select dial to Dial position 2 and pressing the Enter key will jump to DIAL submode.)

- 1) When LCD check screen 3 is displayed, press the Enter key.

The machine shows the following and enters DIAL submode.



- 2) Make sure that the select dial is placed in Dial position 2=. If it is in any other position, turn the select dial to Dial position 2=.

- 3) Press the Enter key.

"0" will display as shown below.



- 4) Counterclockwise turn the select dial slowly and check that the correct dial position number will be displayed.

1

NOTE: Do not turn the select dial quickly or clockwise. Doing so cannot check the dial operation correctly. If the select dial is set to any wrong position, "X" will display as shown below. In the sample below, the select dial should be set to Dial position 2 but now it is set to any other position. Turn the select dial to Dial position 2 clockwise or counterclockwise.

2 X

- 5) After checking dial position 31, turn the select dial to the next position (Dial position 2=), then "OK" will appear and "OK" will be printed.

31

OK

- 6) Press the cutter lever and cut the tape.

CUT submode (Dial position 3 and Enter key*)

(*In any other submode, setting the select dial to Dial position 3 and pressing the Enter key will jump to CUT submode, except during checking in DIAL submode.)

TIP: The cutter operation may be checked in any other submode, so you may skip this CUT submode and proceed to PRINT1 submode. To skip the CUT submode, turn the select dial to Dial position 4 and press the Enter key.

- 1) When "OK" is displayed, press the Enter key.

The machine shows the following and enters the CUT submode.

CUT

- 2) Press the Enter key.

While displaying the following, the machine will feed tape.

FEED

After feeding tape, the machine will display the following:

1

- 3) Press the Enter key.

While displaying the following, the machine will feed tape.

FEED

After feeding tape, the machine will display the following:

2

- 4) Press the Enter key.

While displaying the following, the machine will feed tape.

FEED

After feeding tape, the machine will display the following:

3

PRINT1 submode (Dial position 4 and Enter key*)

(*In any other submode, setting the select dial to Dial position 4 and pressing the Enter key will jump to PRINT1 submode, except during checking in DIAL submode.)

- 1) When "3" is displayed, press the Enter key.

The machine shows the following and enters PRINT1 submode.

PRINT1

- 2) Press the Enter key.

The machine will print out the following print sample (442 dots, 46.8 ±5 mm in length):

(EEMMMMMM)

46.8 ±5 mm

After printing, the machine will automatically turn itself off.

If the machine remains in PRINT1 submode, press the Enter key.

CHAPTER IV TROUBLESHOOTING

4.1 Troubleshooting

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

4.1.1 Precautions

Be sure to observe the following precautions to prevent the secondary problems from happening during troubleshooting:

- (1) Get a good idea of what the trouble is. Whenever more than one trouble source is found, plan the most reasonable repairing procedure after reviewing the relationship between them.
- (2) When supplying power to this machine having problems, make sure that its output voltage level is 8 to 10V under no load.
- (3) When starting disassembly jobs, first remove dry cells and discharge electrolytic capacitor C5.
- (4) To repair an error which occurred in the thermal print head and its related sections, disconnect the thermal head cable until repairs are finished.

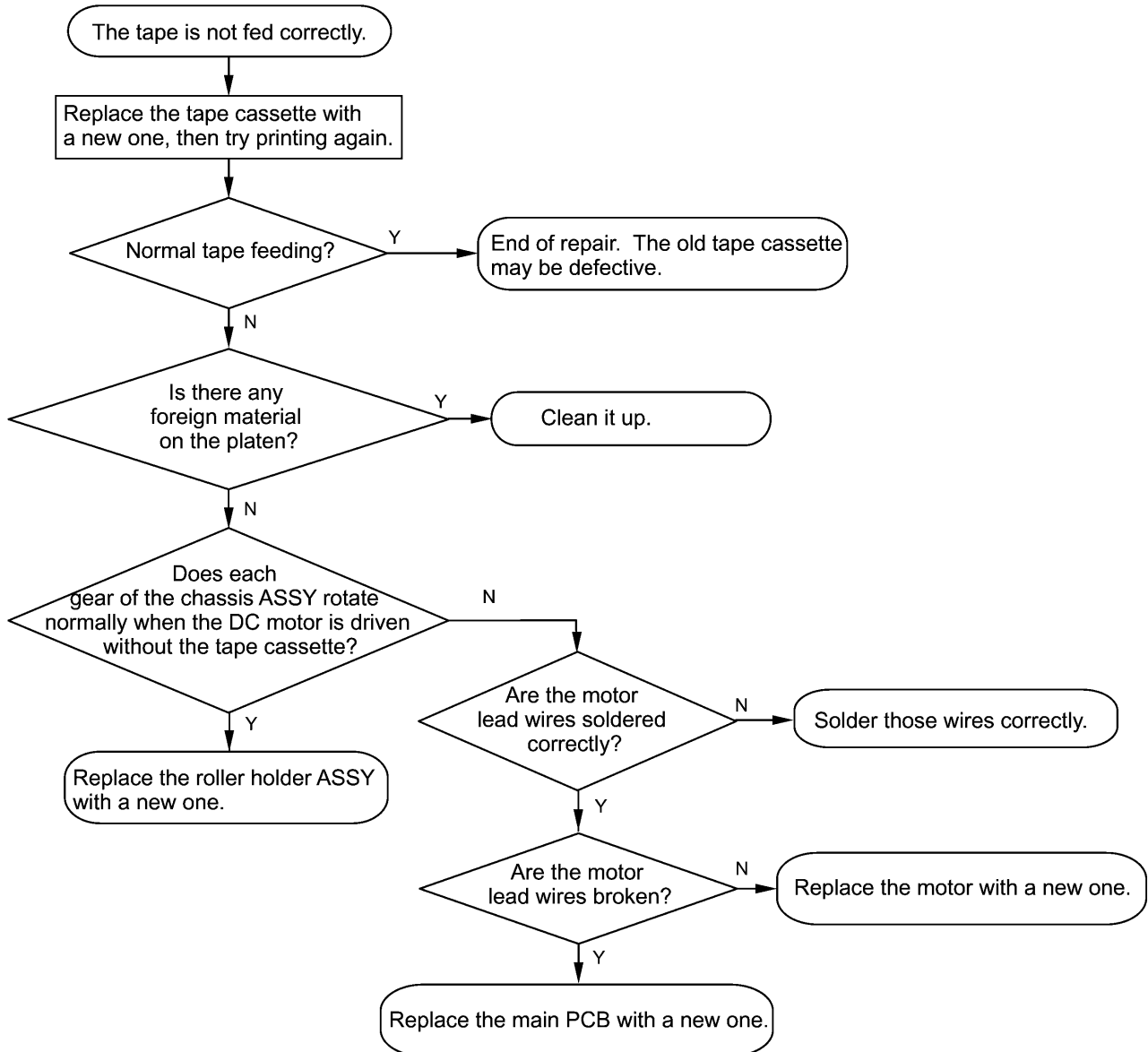
4.1.2 After Repairing

After repairing the defective section, be sure to check again to see if the repaired section works correctly. In particular, if you replace the main PCB, make a final operation check given in CHAPTER III, Section 3.2, [6].

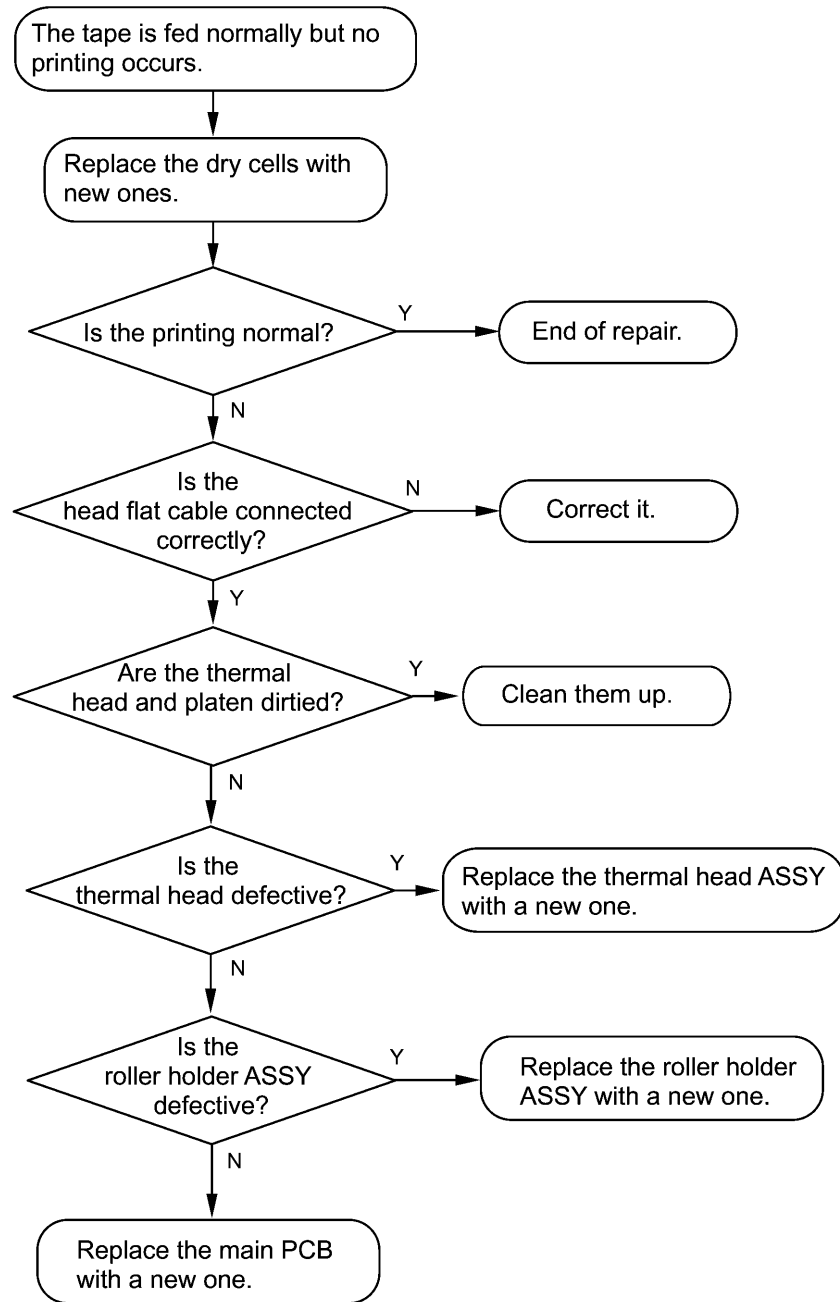
Make a note of the troubleshooting procedure so that it will be handy should problems occur in the future.

4.1.3 Troubleshooting Flows

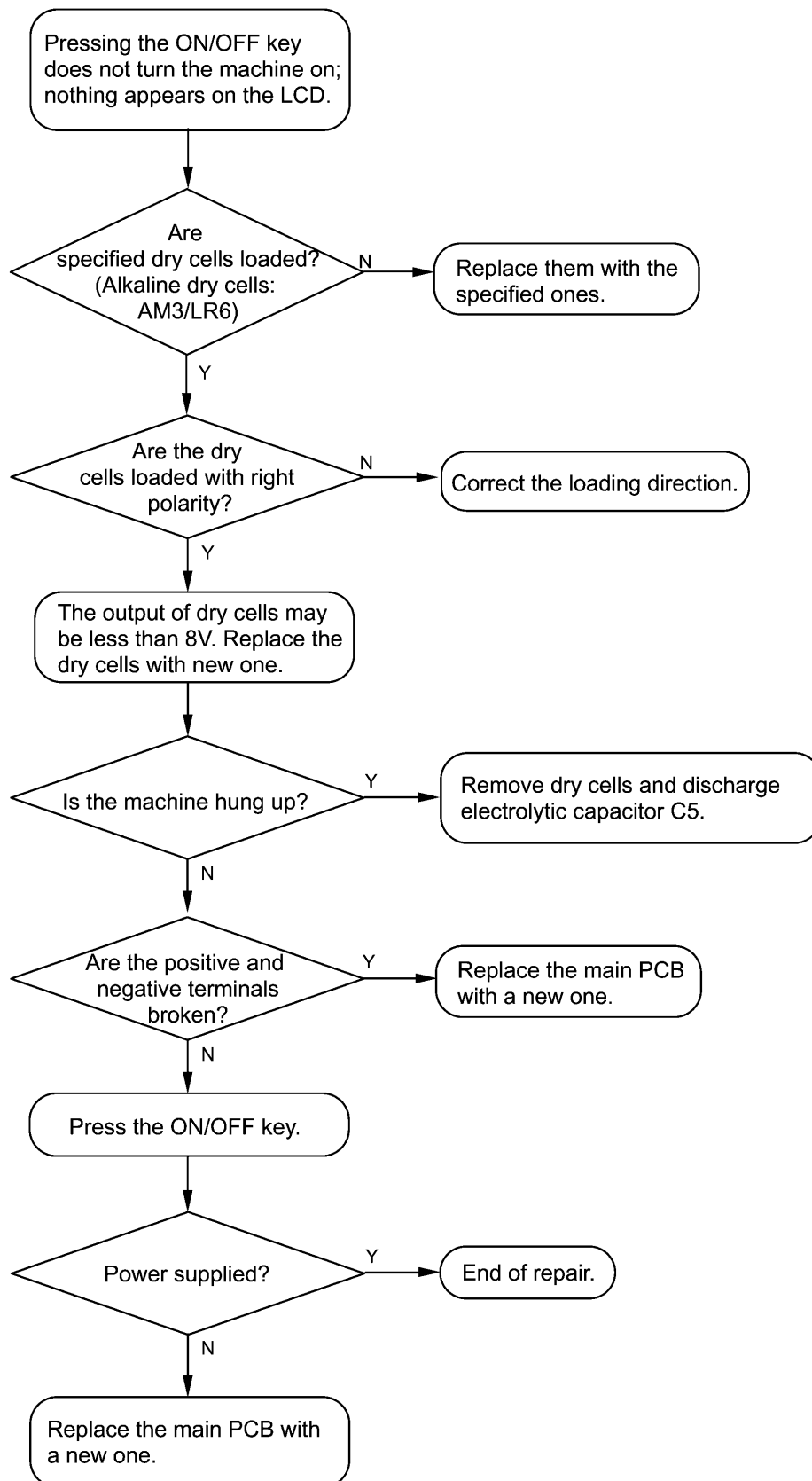
[1] Tape feeding failure



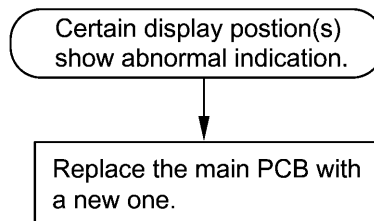
[2] Printing failure



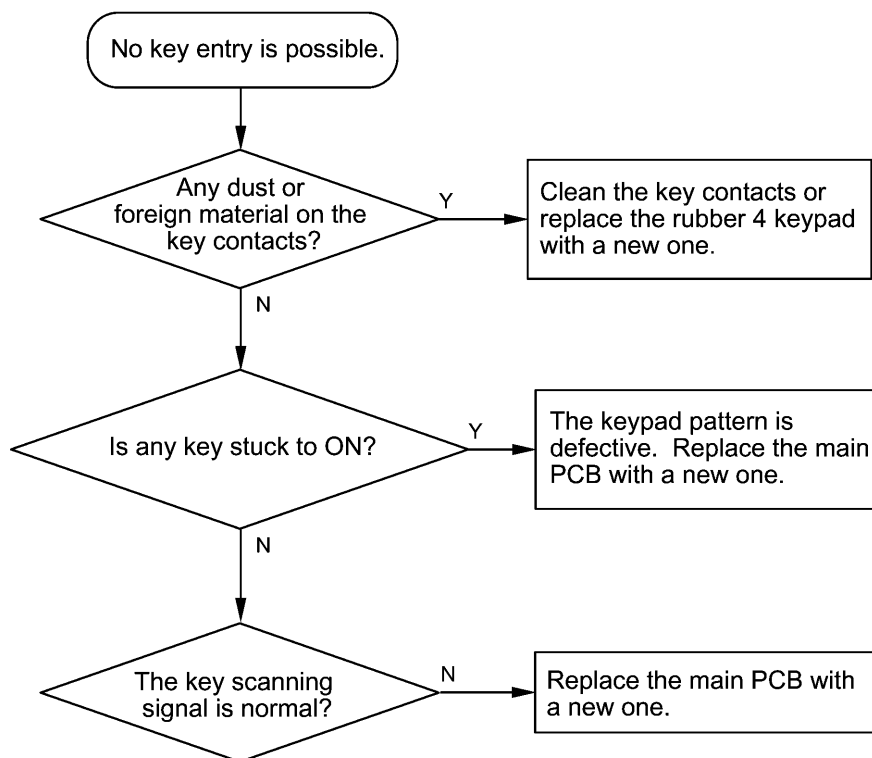
[3] Powering failure (Nothing appears on the LCD.)



[4] Abnormal LCD indication



[5] No key entry possible



The circuit diagram illustrates the internal components of the PT-MT device. Key components include:

- Power Supply:** A 3.3V regulator (U1) and a 1.8V regulator (U2) are used to provide stable power to the microcontroller and other components.
- Microcontroller (U1):** The central processing unit, which manages the device's operations.
- Display Driver (U2):** Controls the display panel (U3) to show information.
- Display Panel (U3):** A 128x64 pixel LCD display.
- Keyboard Matrix:** A 4x12 matrix of keys for user input.
- Speaker:** Provides audio feedback for the user.
- Resistors and Capacitors:** Various passive components are used for timing, signal conditioning, and power filtering.

The diagram is labeled with component values and pin numbers, providing a detailed view of the device's internal architecture.

NAME	CIRCUIT DIAGRAM
CODE	LA7463000

NAME	CIRCUIT DIAGRAM PT-MT
CODE	LA7463000

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