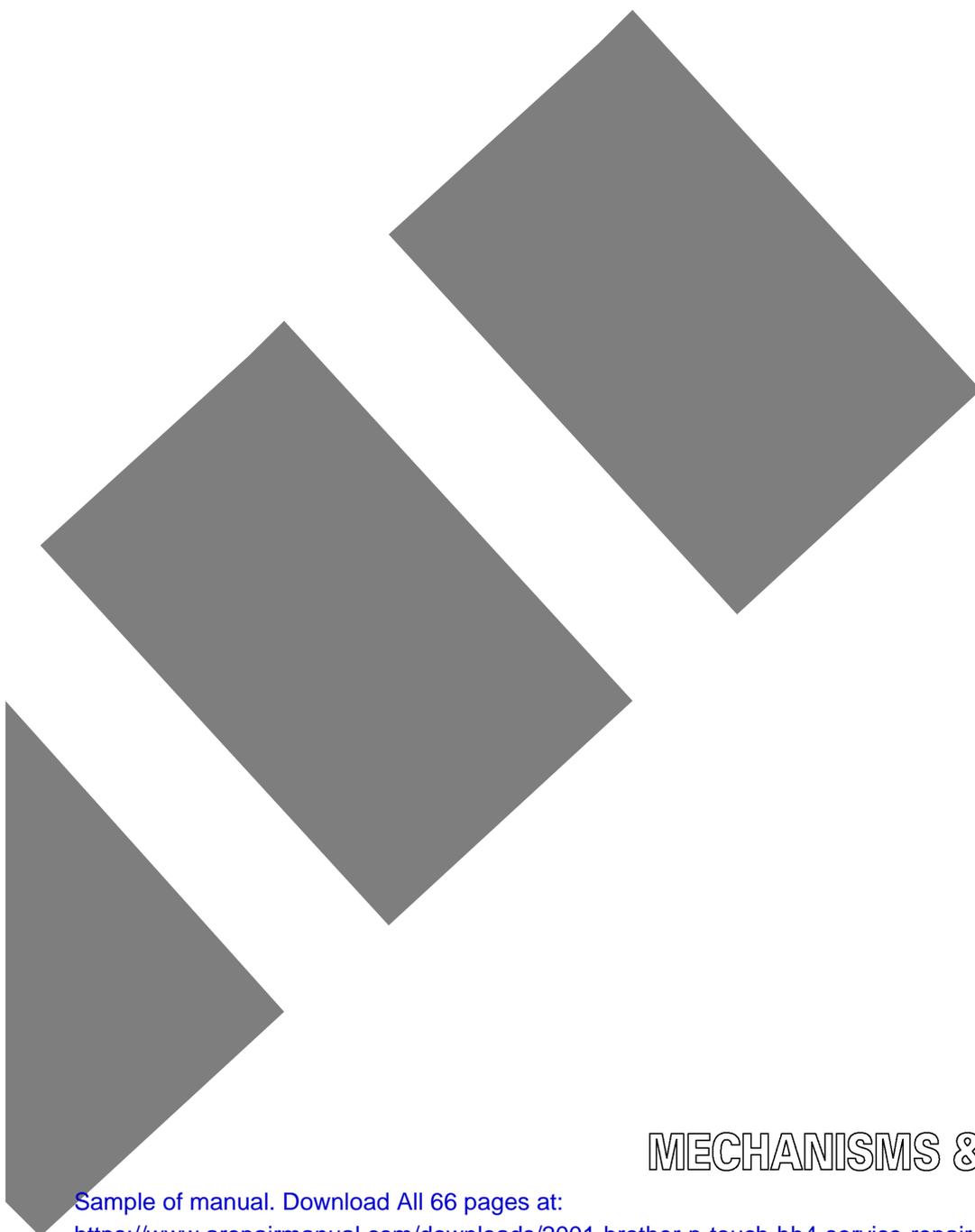


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SERVICE MANUAL

MODEL: P-touch BB4



MECHANISMS & ELECTRONICS

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Specifications are subject to change without notice.

PREFACE

This publication is a service manual covering the specifications, theory of operation, disassembly/reassembly procedure, and troubleshooting of the Brother P-touch BB4. It is intended for service personnel and other concerned persons to accurately and quickly provide after-sale service for our P-touch BB4.

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 MECHANISMS

CHAPTER III ELECTRONICS

CHAPTER IV TROUBLESHOOTING

APPENDIX CIRCUIT DIAGRAM

Chapter I.
SPECIFICATIONS

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CHAPTER I. SPECIFICATIONS

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1.1 MECHANICAL SPECIFICATIONS

1.1.1 External Appearance

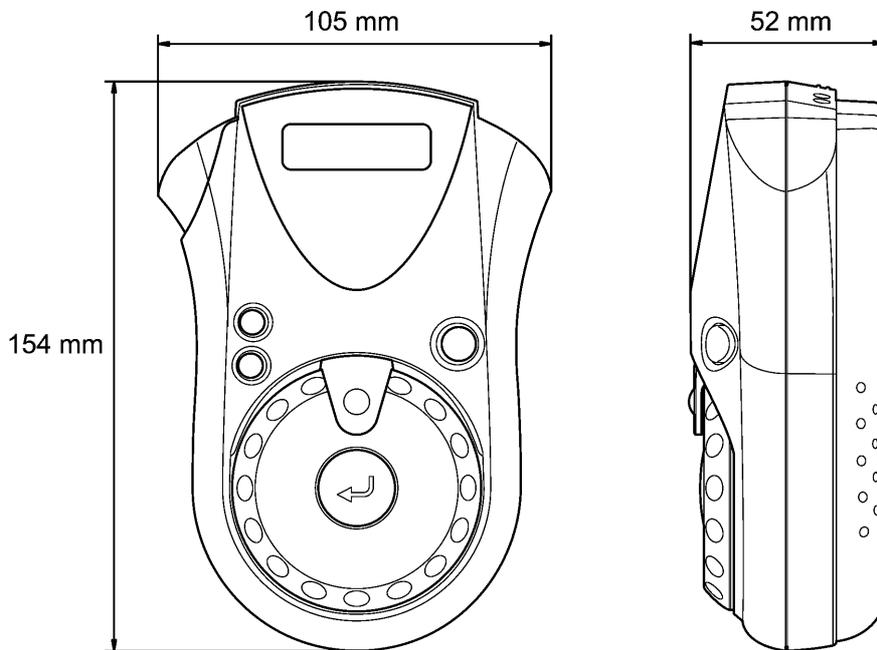


Figure 1.1-1 External Appearance

- | | |
|----------------------------|--|
| (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 | 4 (See Figure 1.1-2.) |

1.1.4 Printing Mechanism

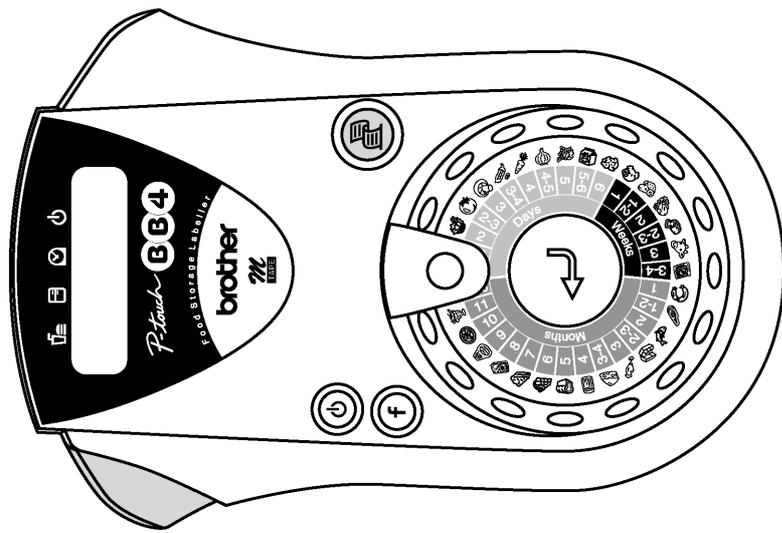
(1) Print system	Direct thermal printing (Fixed print head and tape feeding mechanism)
(2) Print speed	7.5 mm/second (Typical)
(3) Print head	
Type	Thermal print head
Heat generator	Consists of 64 heating elements vertically aligned
Size of a heating element	0.136 mm wide by 0.106 mm high

1.1.5 Tape Cassette

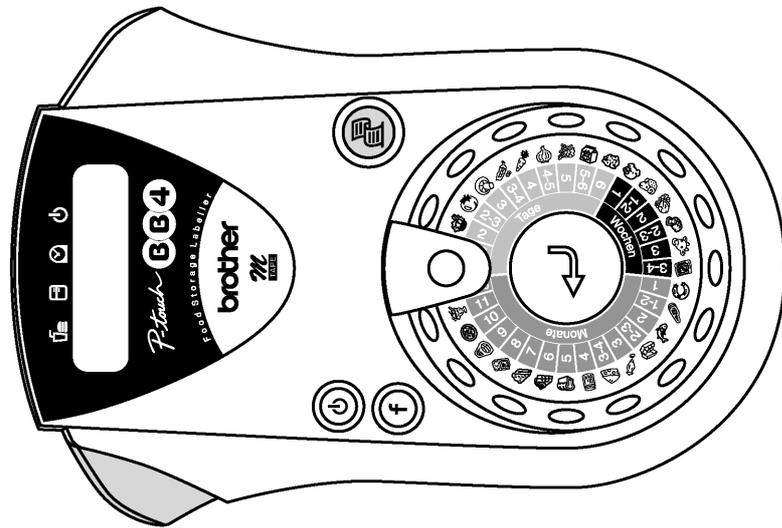
(1) Cassette	Cartridge type
(2) Tape type	Direct thermal print tape
(3) Tape size	Width: 9, 12 mm Length: 8 m
(4) Tape cassette packed with the machine	Character color: Black Tape color: White Tape width: 12 mm or 9 mm (EU) Tape length: 4 m

1.1.6 Tape Cutter

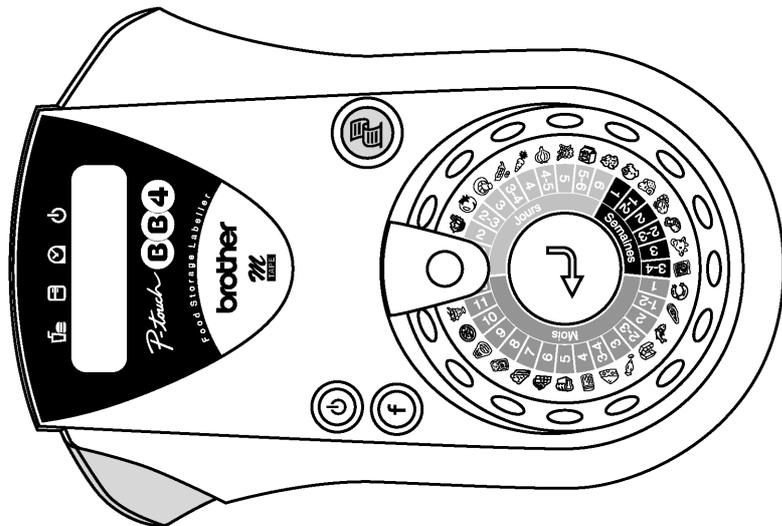
(1) Tape cutting	Manual cutting with the cutter lever
(2) Cutter unit	User-replaceable



U.K. version

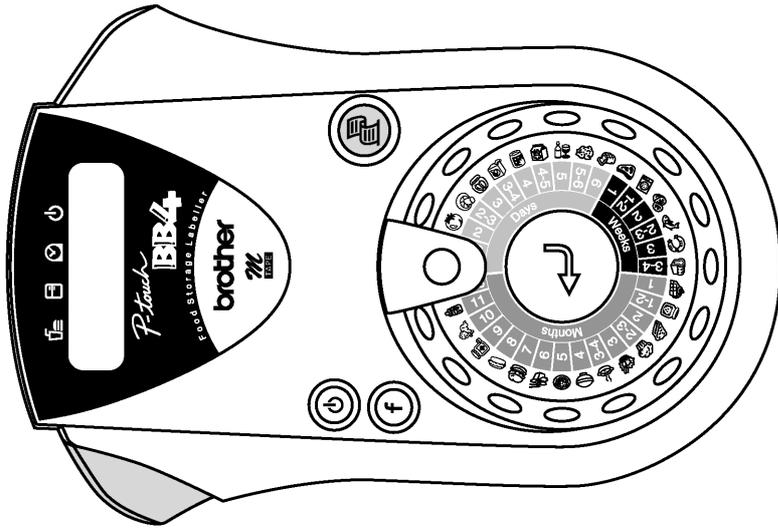


German version

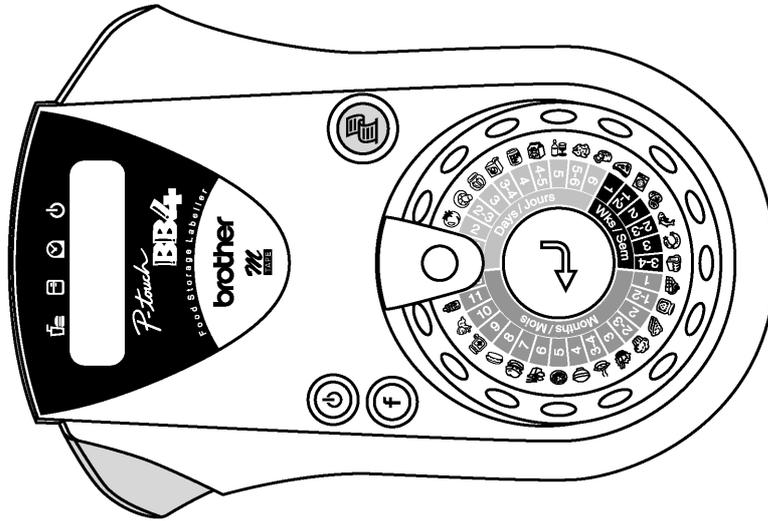


French version

Figure 1.1-2 Key Arrangement (1)



U.S.A. version



Canada version

Figure 1.1-2 Key Arrangement (2)

1.2 ELECTRONICS SPECIFICATIONS

1.2.1 Character Generator

- | | |
|------------------------------|----------|
| (1) No. of printable symbols | 31 |
| (2) Internal fonts | HELSINKI |
| (3) 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) Calendar clock (default) | Yes (If the machine remains unused for approx. 1 minute with its power on, then the LCD shows the calendar clock or goes off depending upon your choice.) |
| (5) Low voltage indication | |

If the voltage drops below the following level:

in entry mode or during printing		in clock mode	Then, the machine will:
approx. 5.86V	approx. 5.35V		
approx. 5.35V	approx. 4.94V		Turn the LCD off. (The internal clock remains on.)
	approx. 2.90V		Turn itself off. (The internal clock and other settings will be reset.)

Chapter II.
MECHANISMS

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CHAPTER II. MECHANISMS

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2.1 THEORY OF OPERATION

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.

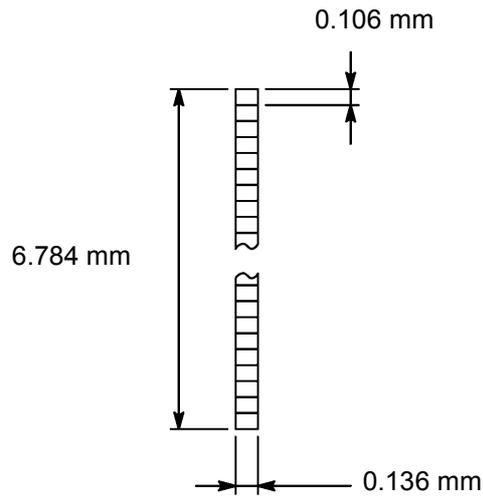


Figure 2.1-1 Heat Generator of Thermal Head

■ 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.

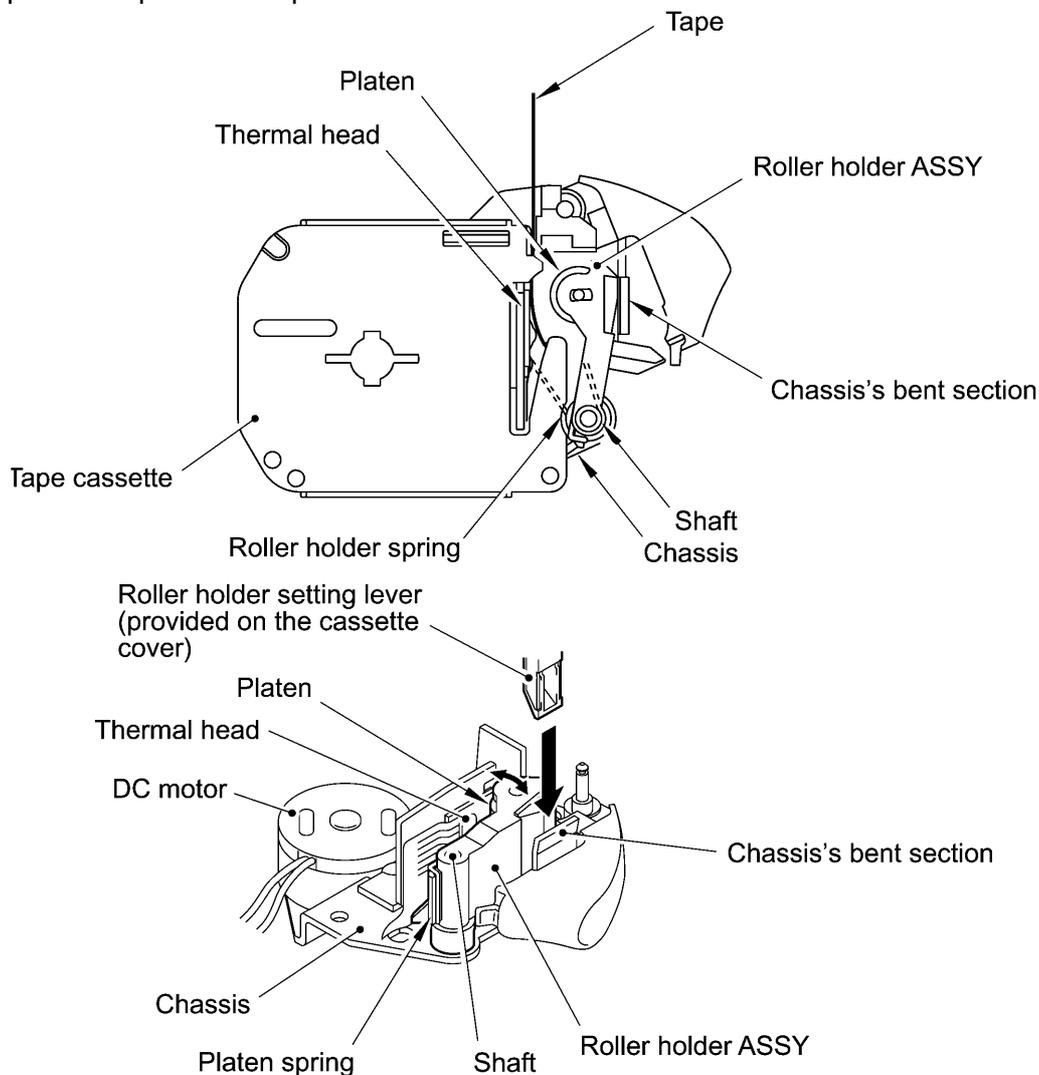


Figure 2.1-2 Platen Setting & Retracting Mechanism

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.

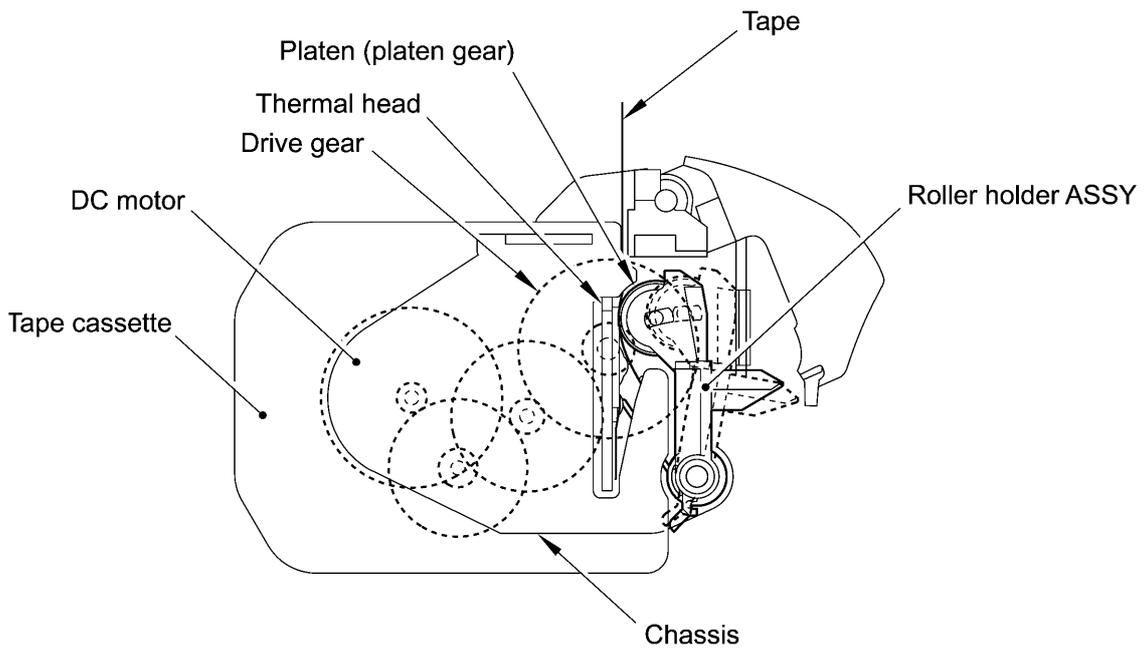


Figure 2.1-3 Tape Feed Mechanism

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.

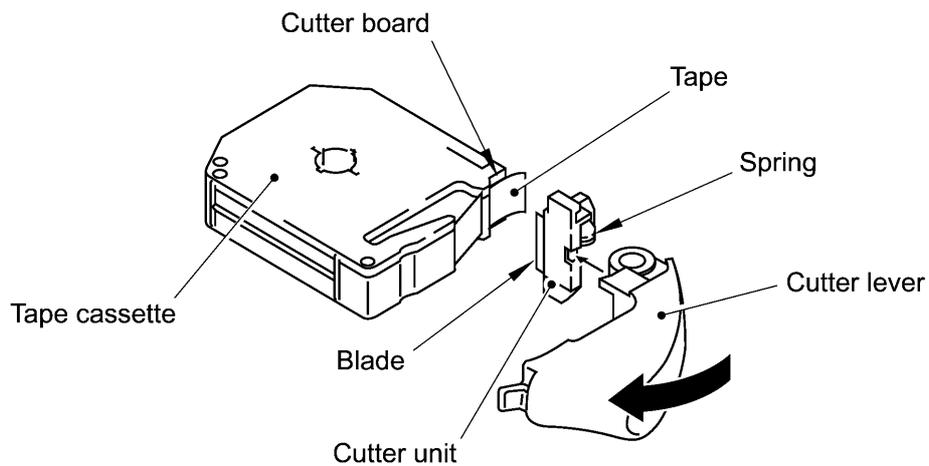


Figure 2.1-4 Tape Cutter Mechanism

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.

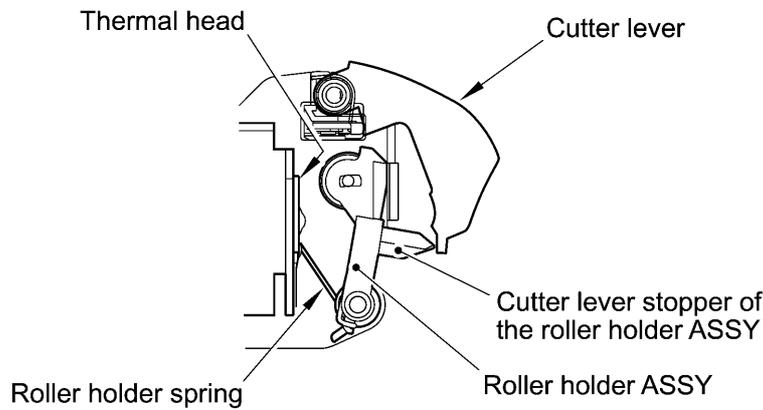


Figure 2.1-5 Cutter Safety Lock Mechanism

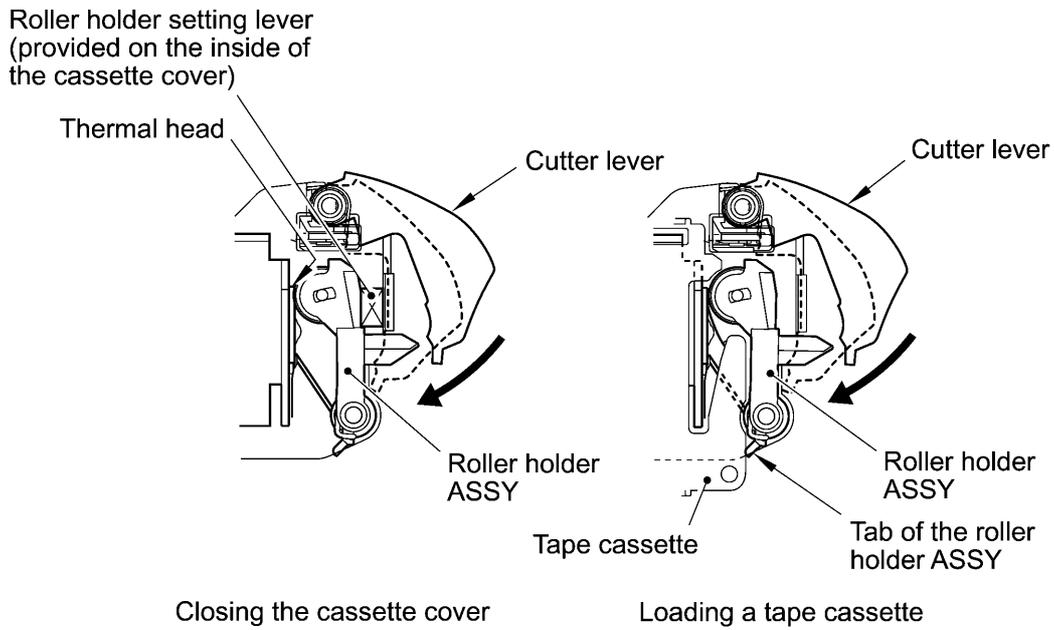


Figure 2.1-6 Releasing the Cutter Safety Lock Mechanism

2.2 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)

2.2.1 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.

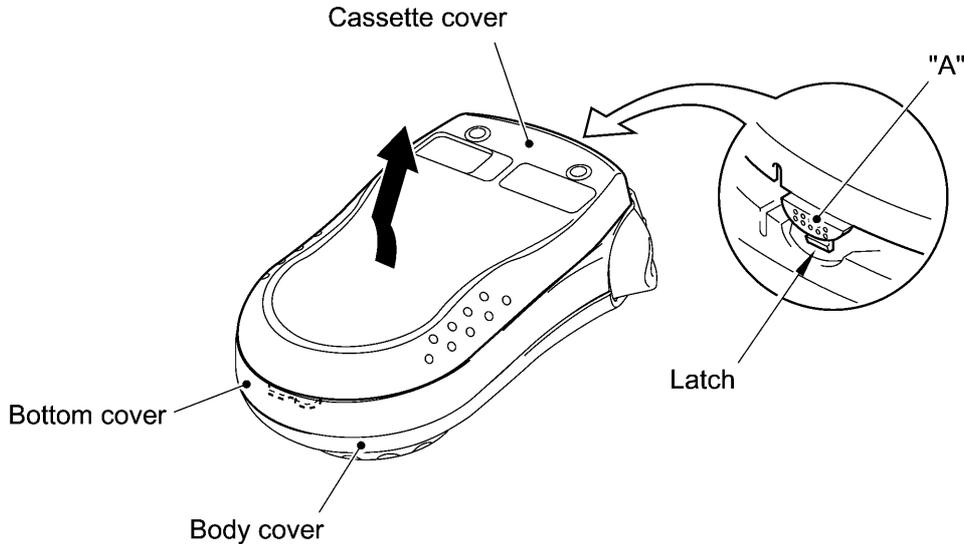


Figure 2.2-1 Removing the Cassette Cover

- (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.

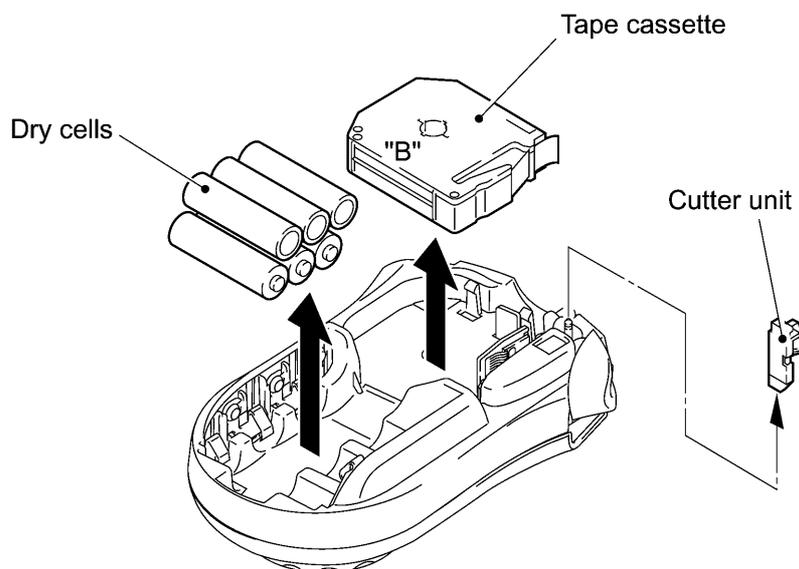


Figure 2.2-2 Removing the Dry Cells, Tape Cassette, and Cutter Unit

[2] Removing the Chassis ASSY

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

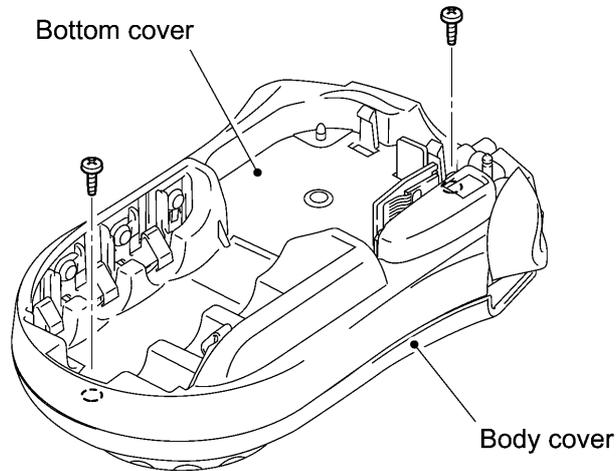


Figure 2.2-3 Unscrewing the Bottom Cover

- (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.

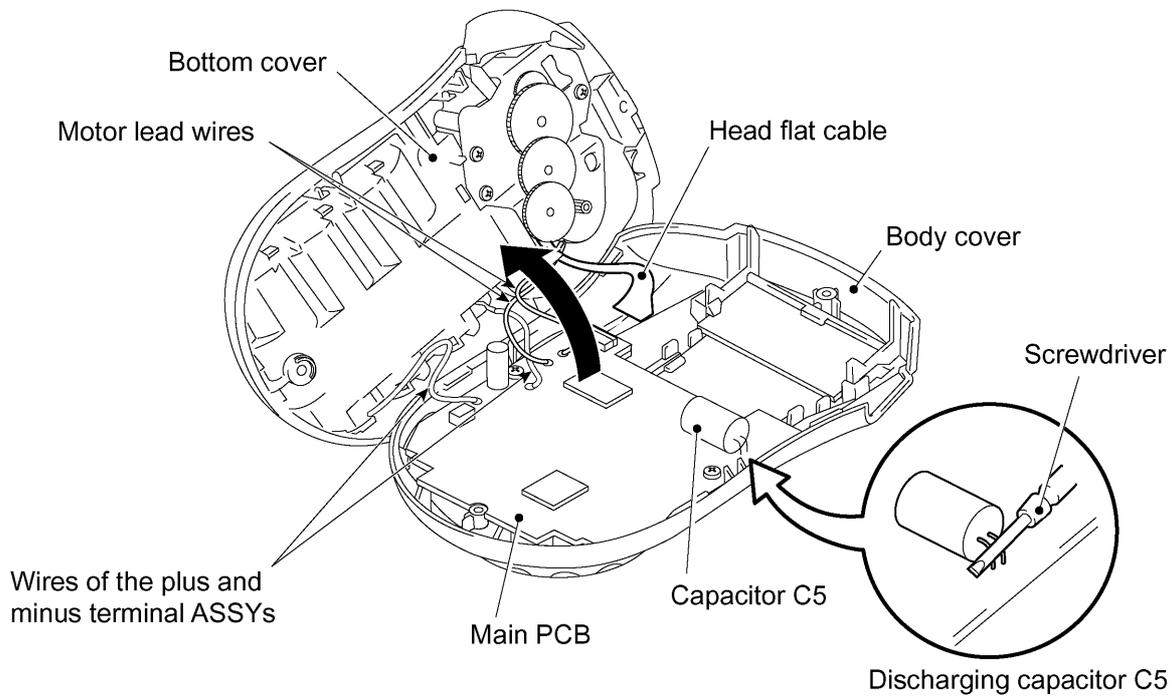


Figure 2.2-4 Discharging Capacitor C5 and Disconnecting the Head Flat Cable

(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.

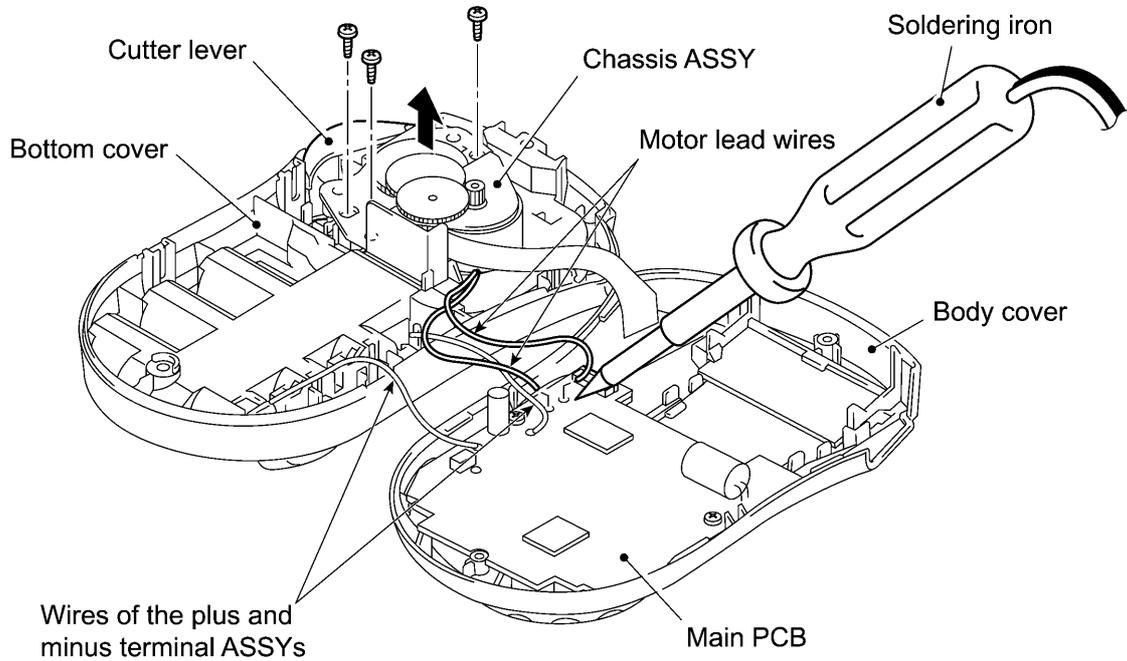


Figure 2.2-5 Unsoldering the Motor Lead Wires and Removing the Chassis ASSY

(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.

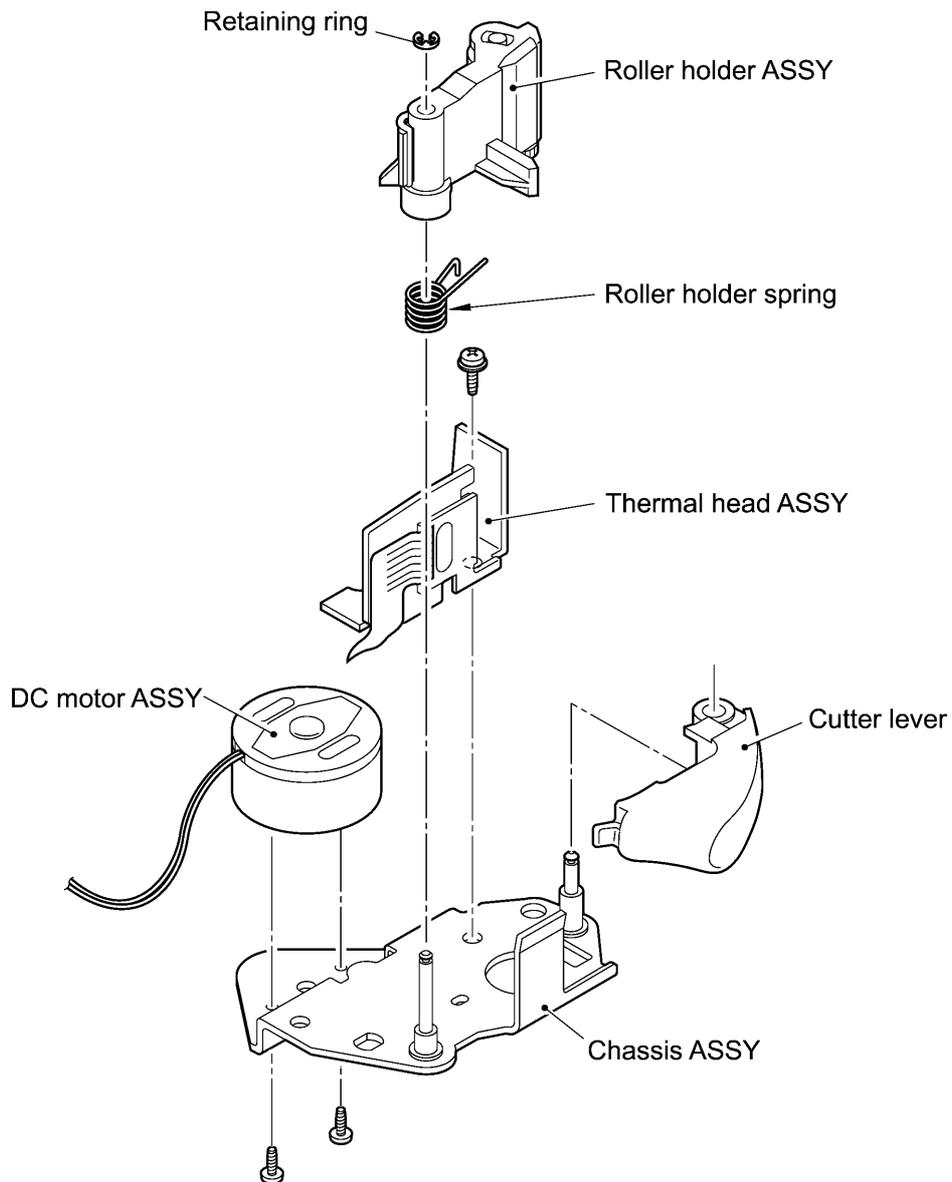


Figure 2.2-6 Disassembling the Chassis ASSY

[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.

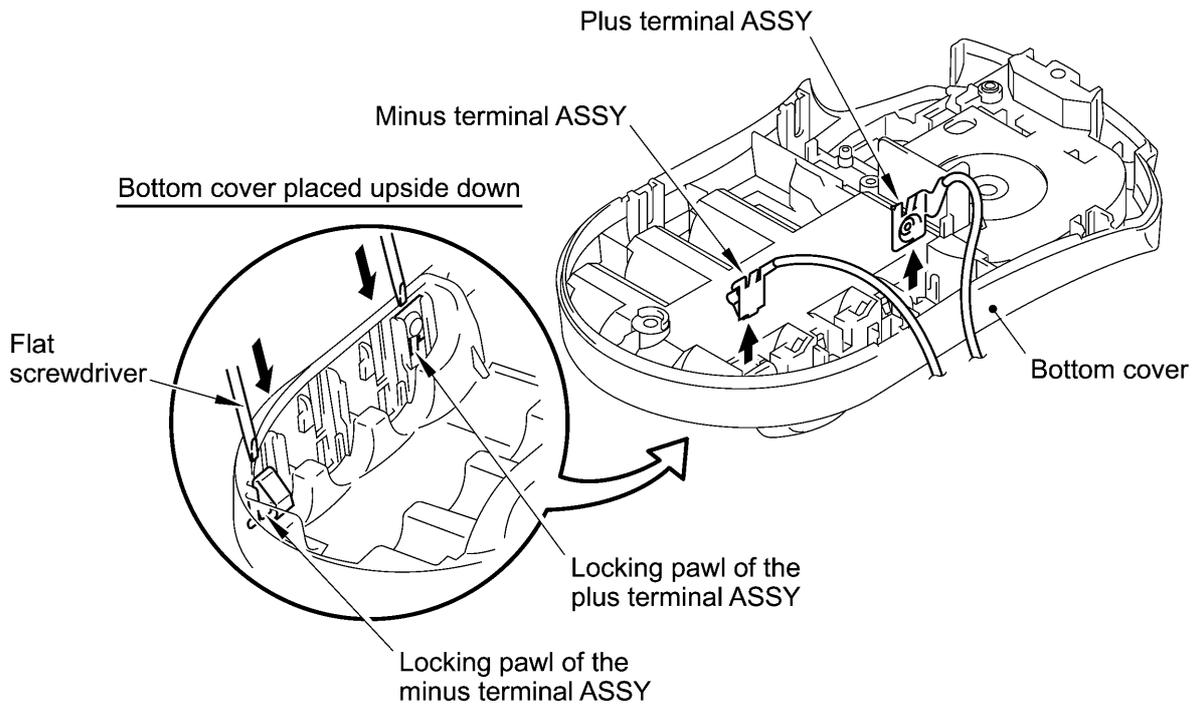


Figure 2.2-7 Pushing out the Plus and Minus Terminal ASSYs from the Bottom Cover

- (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.

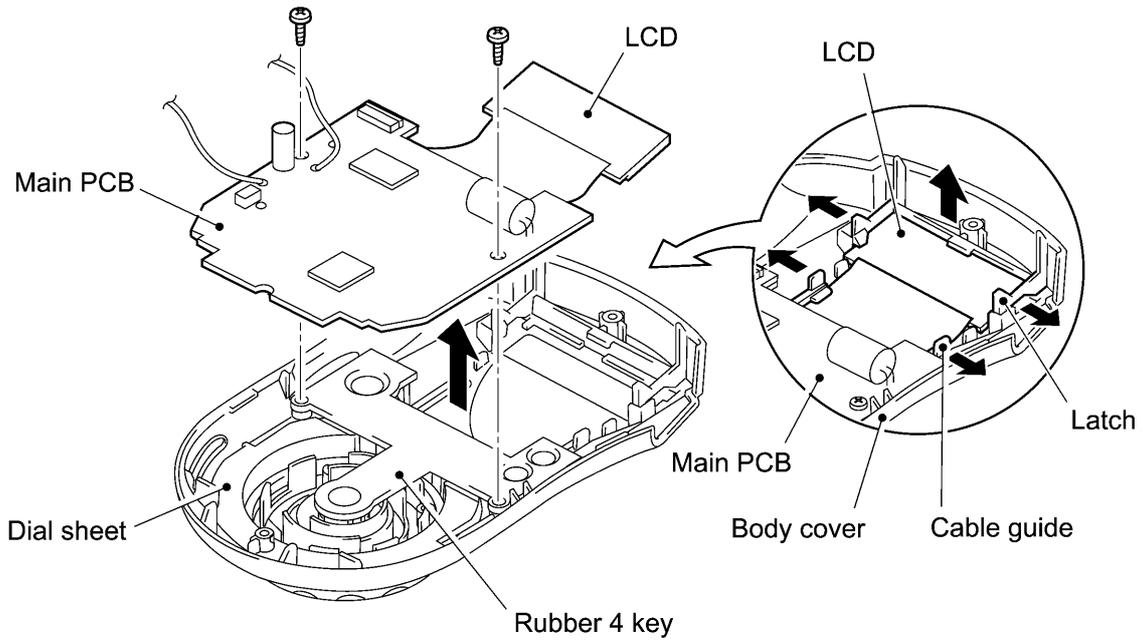


Figure 2.2-8 Taking out the Main PCB (with the LCD) from the Body Cover

[4] Removing Battery Terminals P1 and P2

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

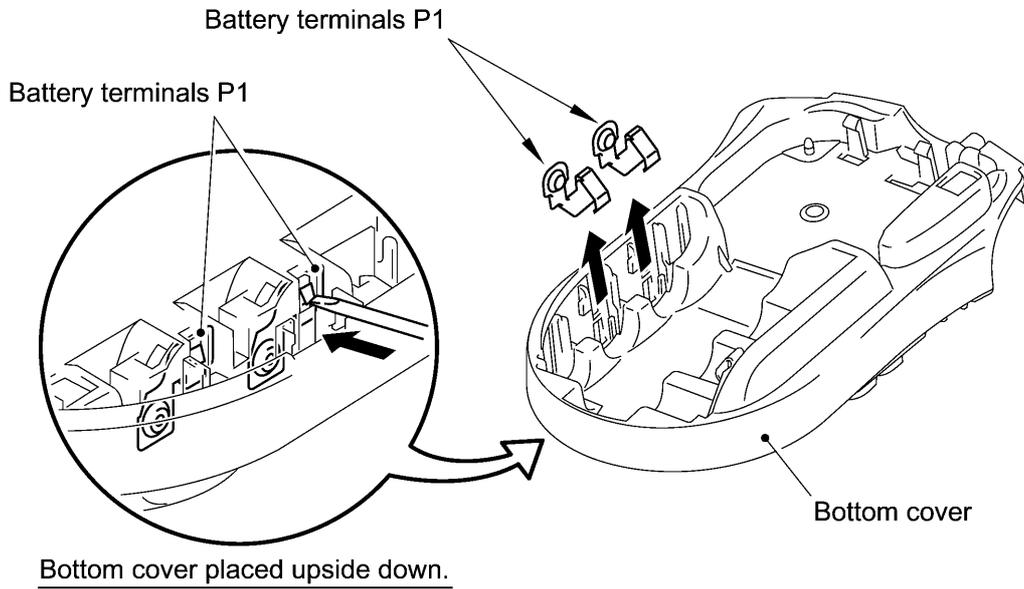


Figure 2.2-9 Taking out Battery Terminals P1 from the Bottom Cover

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

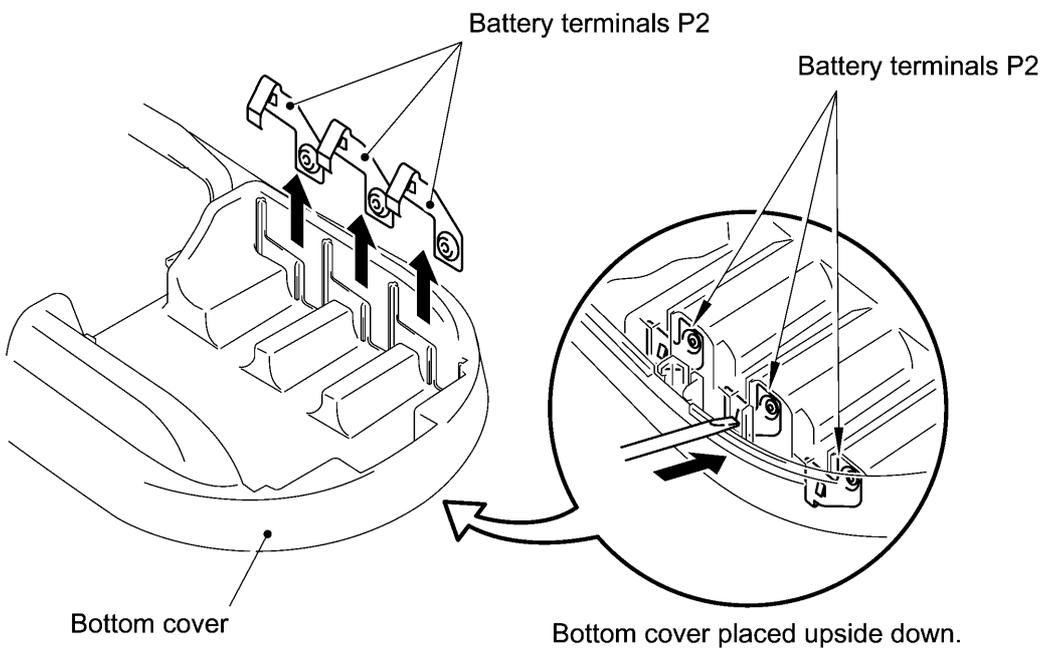


Figure 2.2-10 Taking out Battery Terminals P2 from the Bottom Cover

[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.

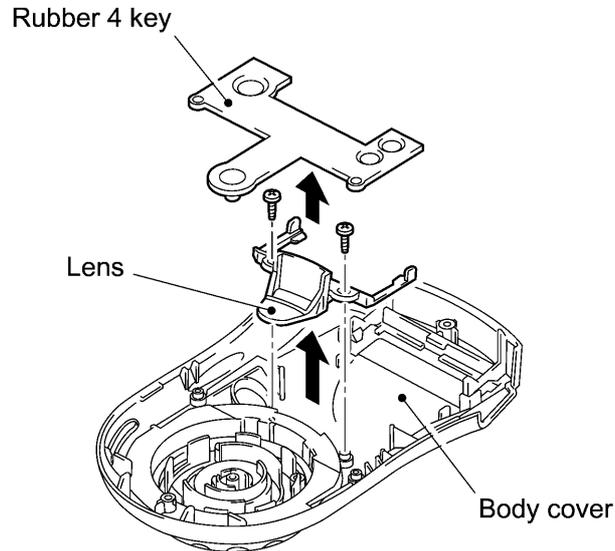


Figure 2.2-11 Removing the Rubber 4 Key and Lens

- (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.

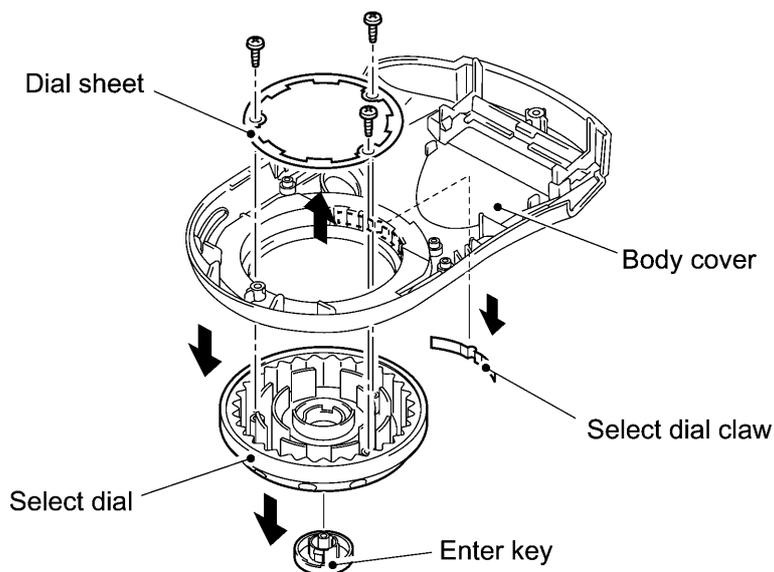


Figure 2.2-12 Removing the Dial Sheet, Select Dial, Select Dial Claw, and Enter key

2.2.2 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.

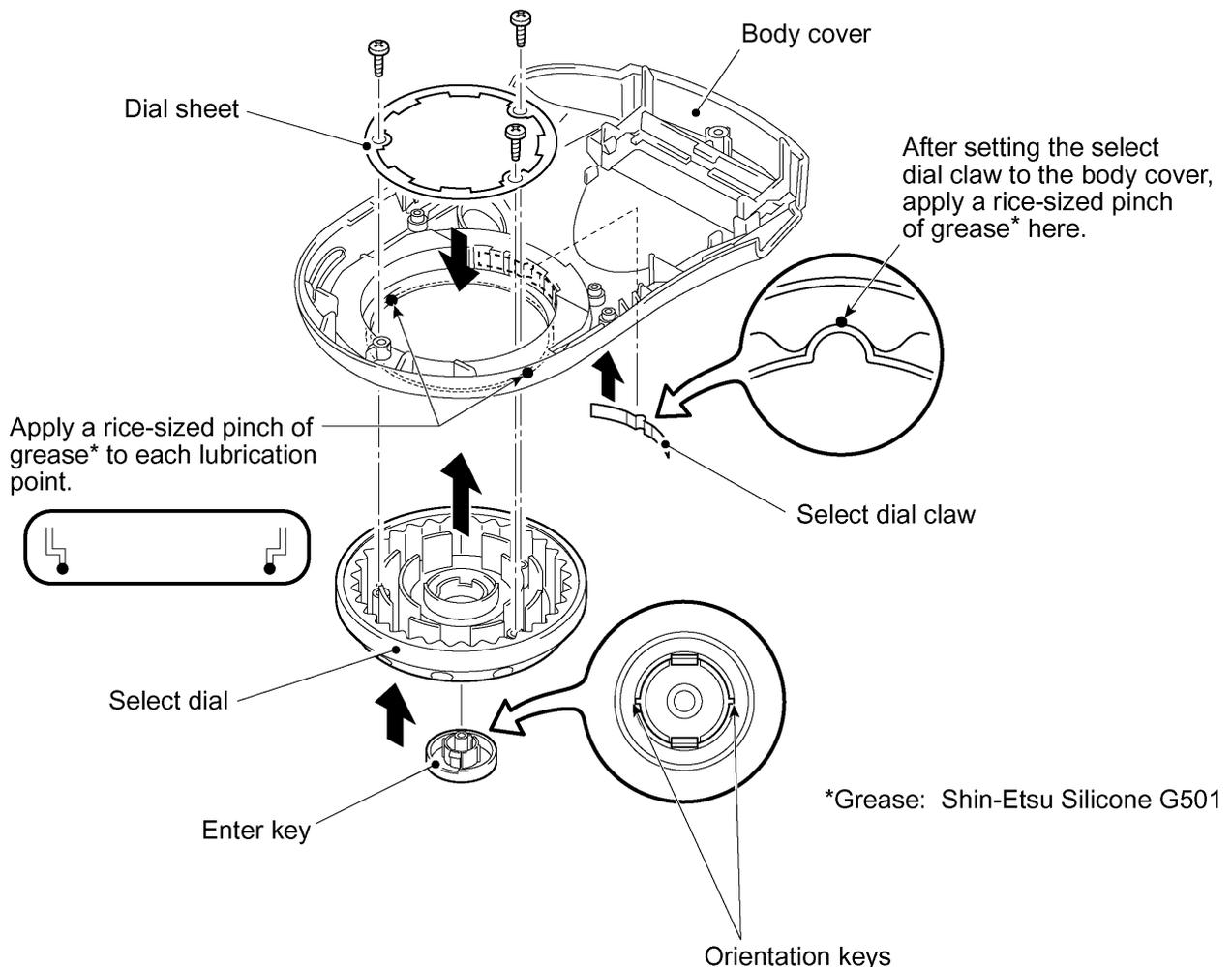


Figure 2.2-13 Reinstalling the Enter Key, Select Dial Claw, Select Dial, and Dial Sheet

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

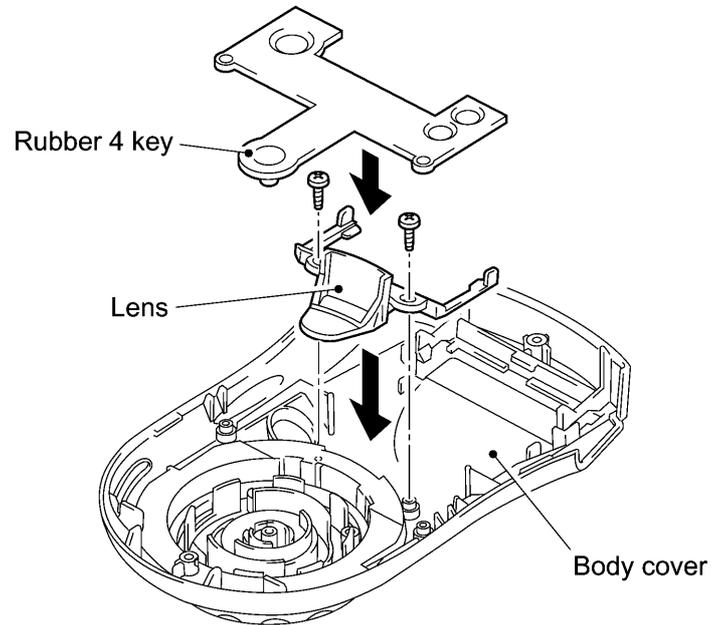


Figure 2.2-14 Reinstalling the Rubber 4 key and Lens

[2] Installing Battery Terminals P2 and P1

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

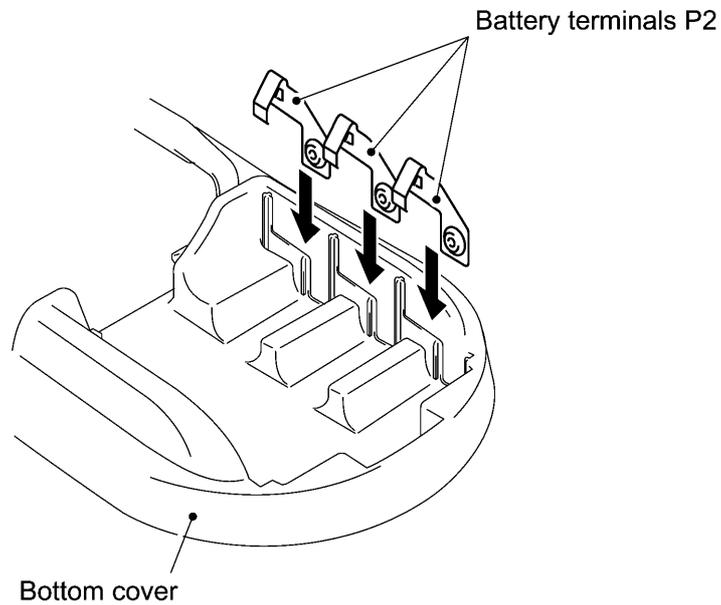


Figure 2.2-15 Setting Battery Terminals P2

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

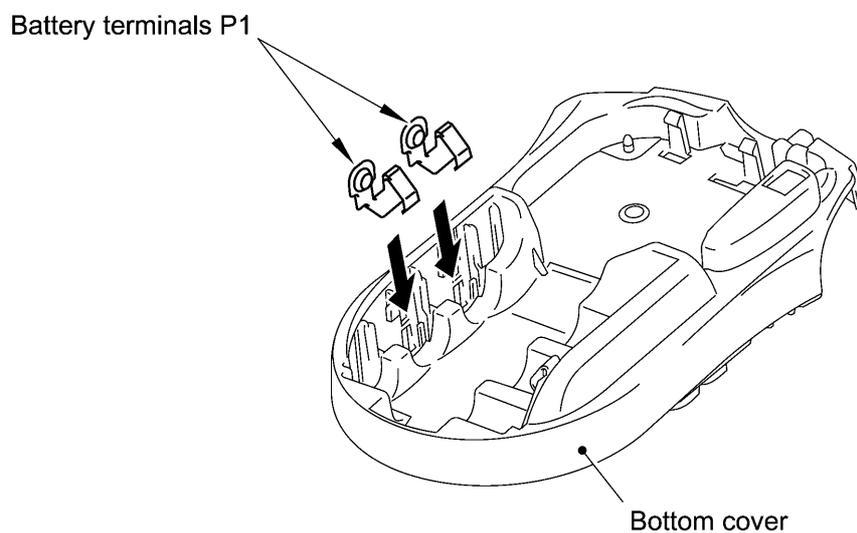


Figure 2.2-16 Setting Battery Terminals P1