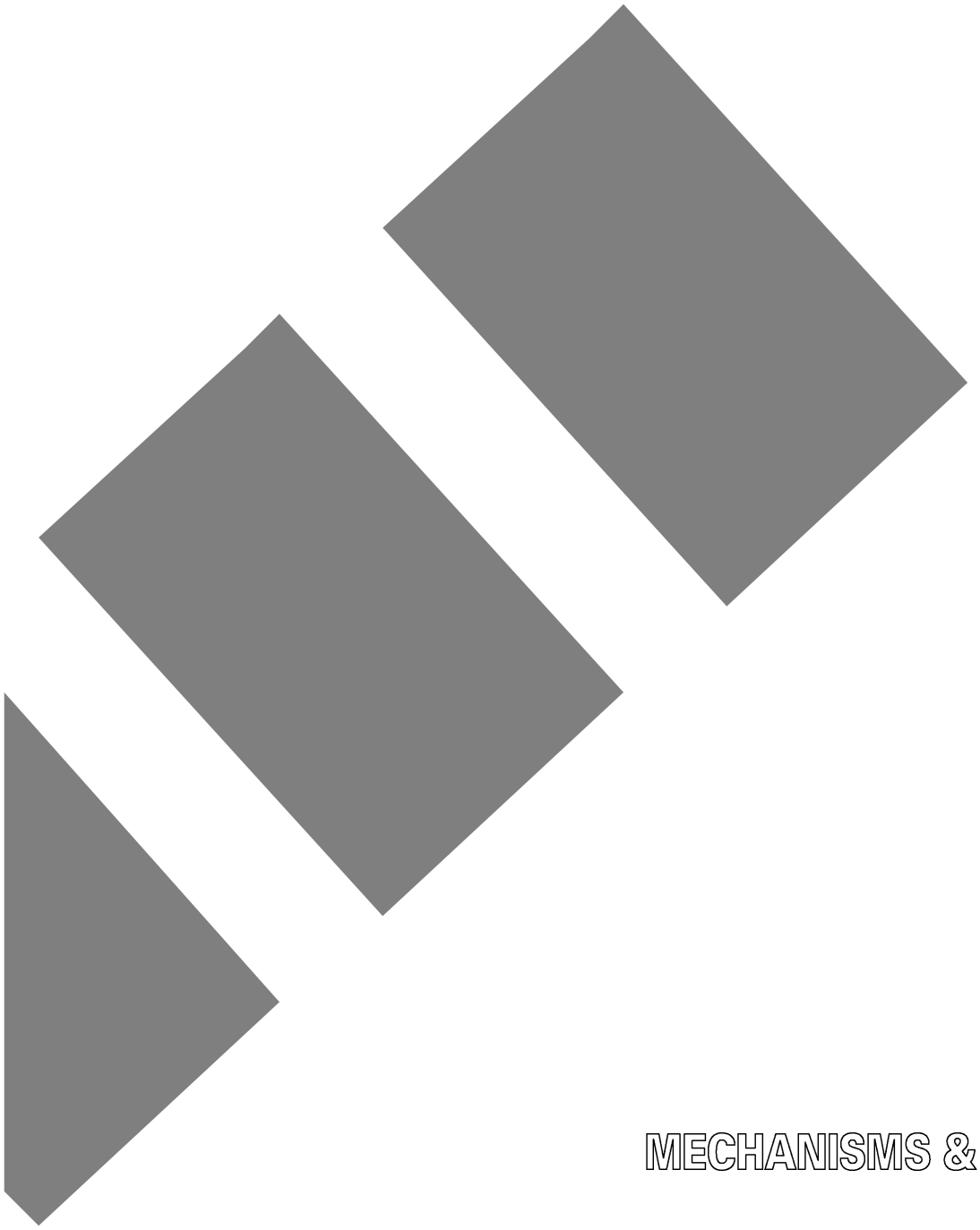
brother

SERVICE MANUAL

MODEL: PT-1000/1050/GL100



MECHANISMS & ELECTRONICS

PREFACE

This publication is a service manual covering the specifications, theory of operation, disassembly/reassembly procedure, and troubleshooting of the Brother PT-1000/1050. It is intended for service personnel and other concerned persons to accurately and quickly provide after-sale service for our PT-1000/1050.

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 appendixes.

CHAPTER I	**SPECIFICATIONS**
CHAPTER II	**THEORY OF OPERATION**
CHAPTER III	**DISASSEMBLY & REASSEMBLY**
CHAPTER IV	**TROUBLESHOOTING**
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Appendix A Main PCB Circuit Diagram
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CHAPTER I SPECIFICATIONS

1.1 Mechanical Specifications

1.1.1 External Appearance

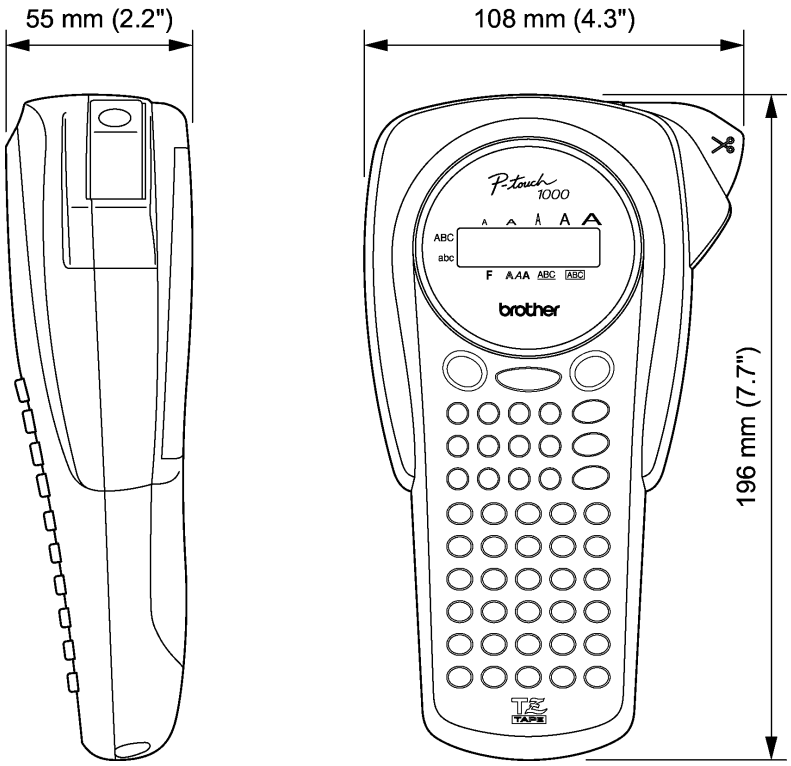


Figure 1.1-1 External Appearance

(1)	Dimensions (W x D x H)	108 x 196 x 55 mm (4.3 x 7.7 x 2.2 inches) (excl. keys, cutter lever and bottom feet)
(2)	Weight	
	Machine proper	Approx. 335 g

1.1.2 Keyboard

(1)	Entry system	49-rubber keypad
(2)	Key arrangement	See Figure 1.1-2.

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 guidance indicators	11 (See Figure 1.1-2.)

1.1.4 Printing Mechanism

(1) Print system — Thermal transfer onto plastic and fabric tapes (Fixed thermal print head and tape feed mechanism)

(2) Print speed — 10 mm/second

(3) Print head

Type	Thermal print head
Heat generator	Consists of 64 heating elements vertically aligned in 180 dpi
Size of a heating element	0.195 mm wide by 0.141 mm high

(4) Character size

Size	Width	High
1	28 dots	28 dots
2	56 dots	28 dots
3	28 dots	56 dots
4	56 dots	56 dots
5	112 dots	56 dots

1.1.5 Tape Cassette

(1) Cassette — Cartridge type (TZ cassette)

(2) Types of tape cassettes

- Laminate tape cassette
- Non-laminate tape cassette
- Fabric tape cassette

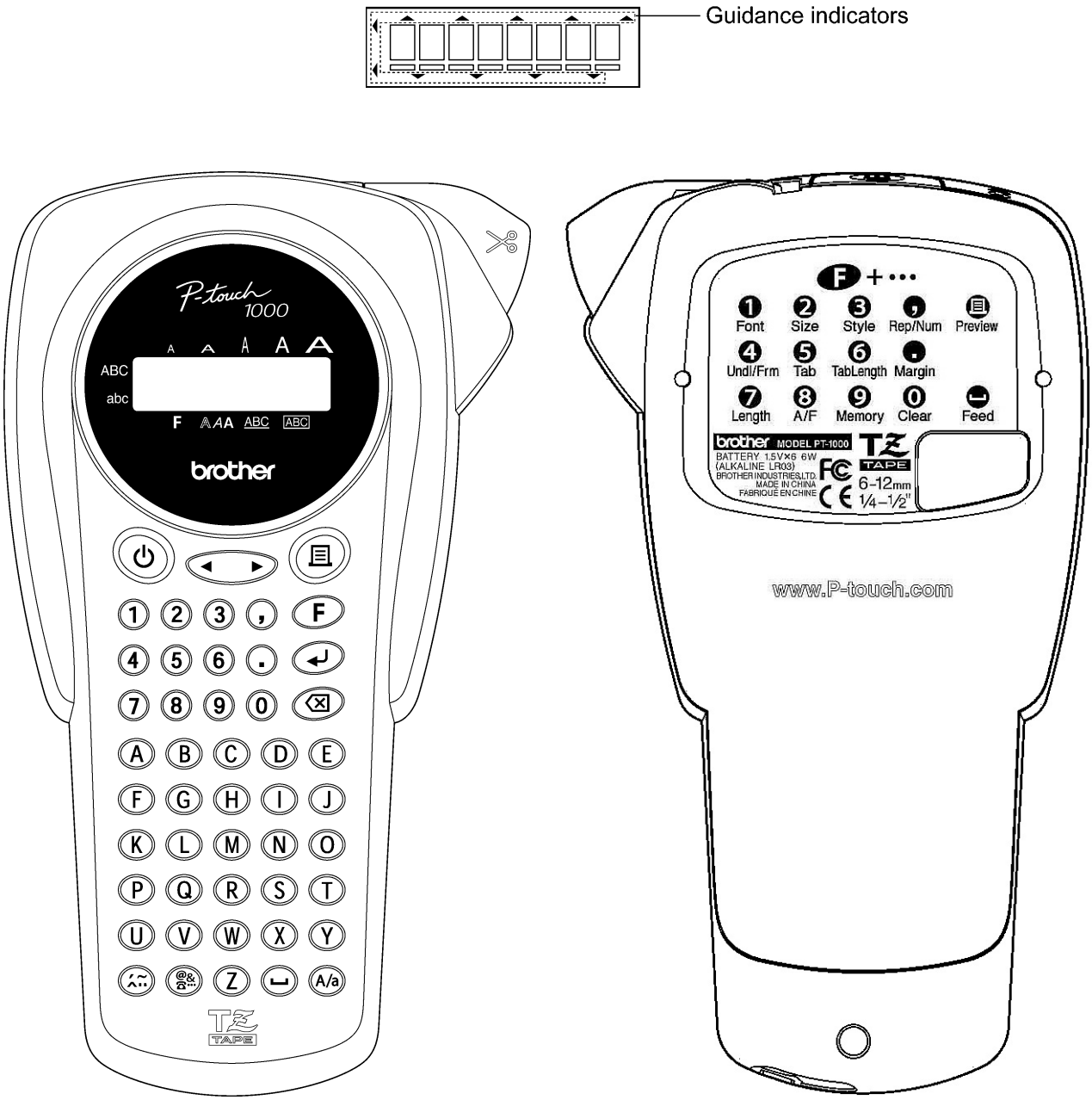
(3) Tape size

Types of tape	Width
Laminate tape	6, 9, 12 mm
Non-laminate tape	6, 9, 12 mm
Fabric tape	12 mm

1.1.6 Tape Cutter

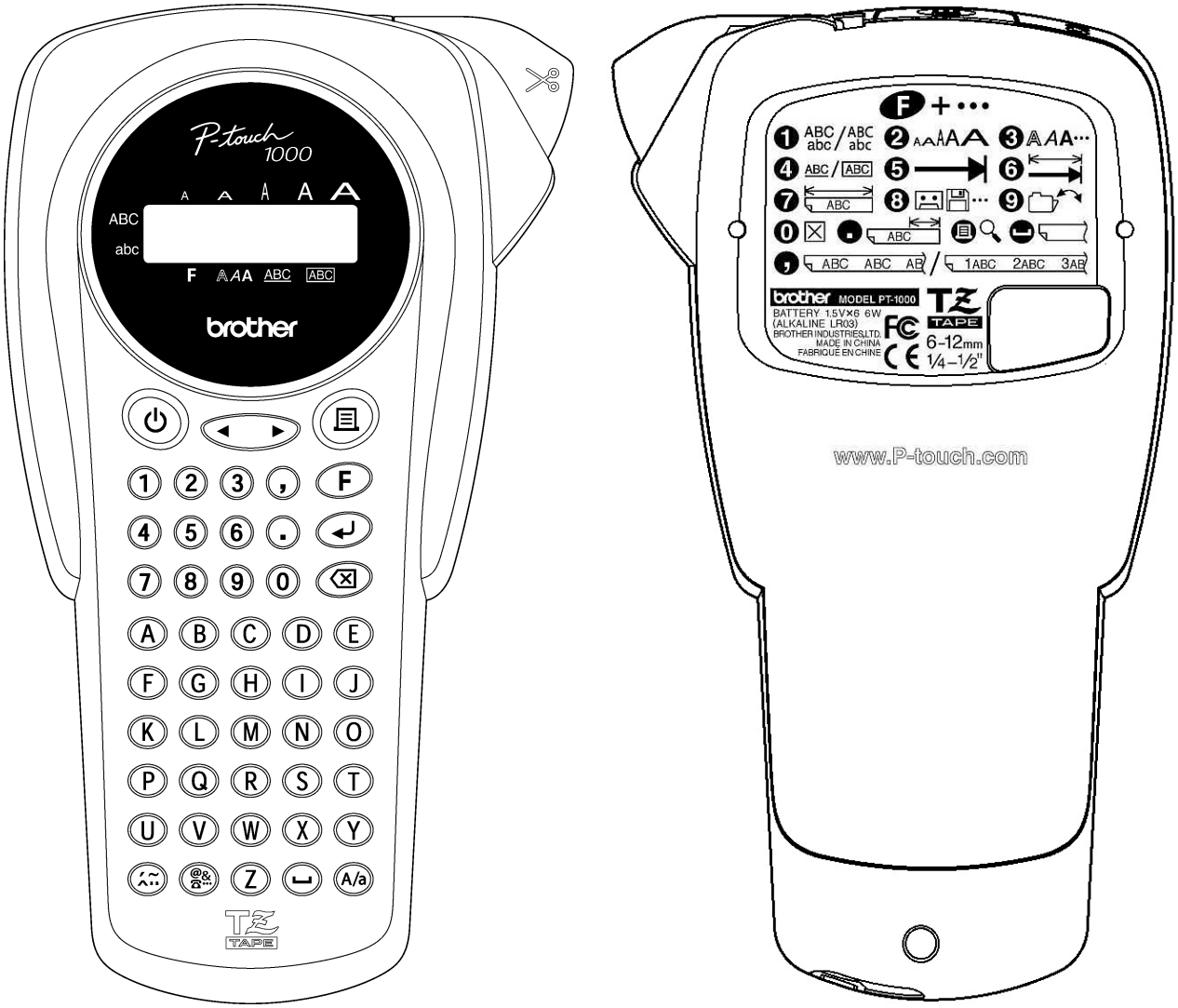
(1) Tape cutting — Manual cutting with the cutter lever

(2) Cutter unit — User-replaceable



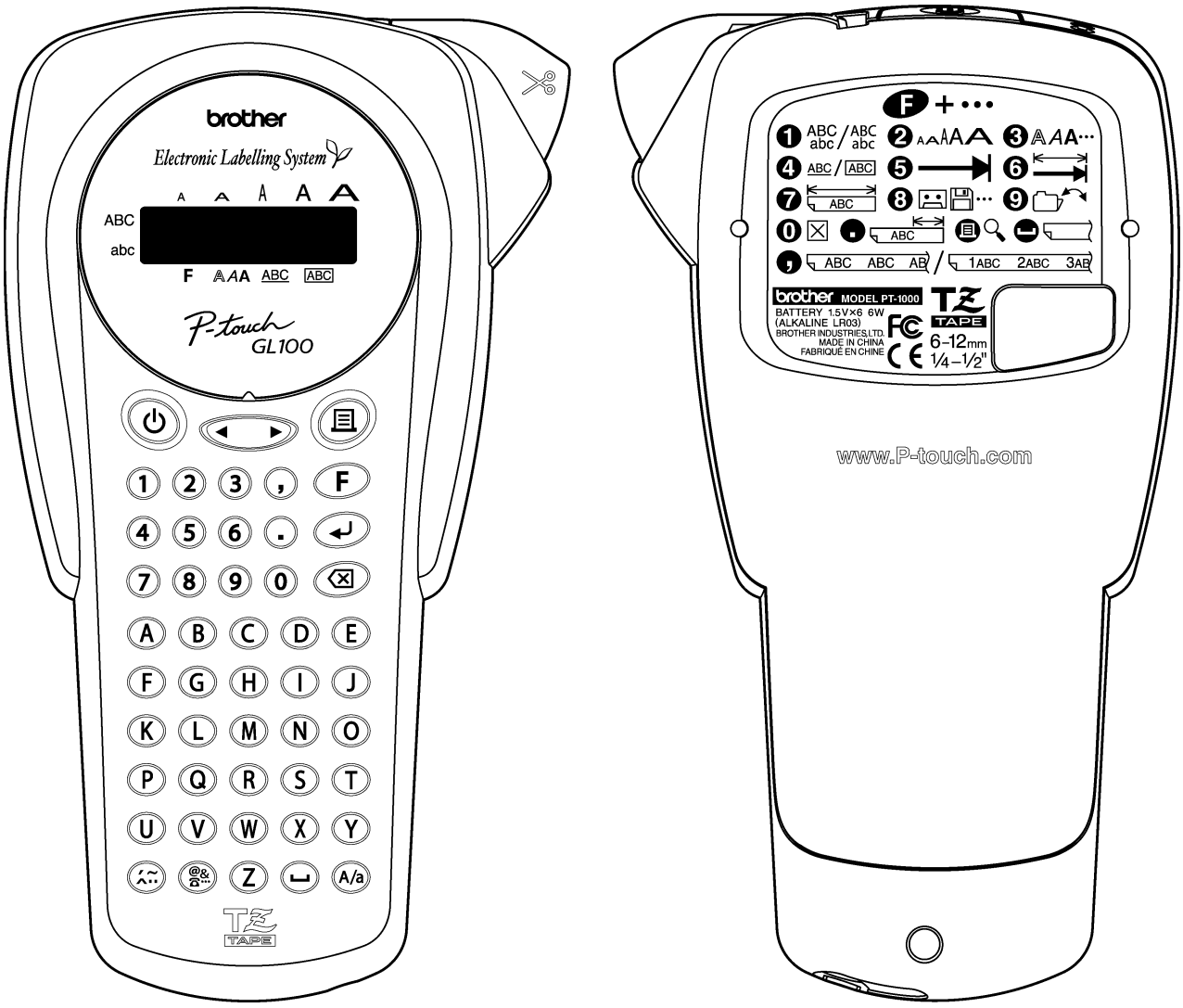
USA version

Figure 1.1-2 (1) Display and Key Arrangement



EUROPE version

Figure 1.1-2 (2) Display and Key Arrangement



UK version (GL-100)

Figure 1.1-2 (3) Display and Key Arrangement

1.2 Electronics Specifications

1.2.1 Character Generator

(1)	Internal characters	240
(2)	Internal fonts	HELSINKI and OKLAHOMA
(3)	Text buffer	Max. 55 characters
(4)	File memory	Max. 300 characters

(5) Memory backup

No dedicated backup battery is provided. However, the memory is backed up for 5 minutes even after:

1) you remove the dry cells (e.g., at the replacement time of dry cells) without connection of the optional AC adapter.

2) you unplug the optional AC adapter (being plugged in the AC jack of the machine) from the wall socket without dry cells loaded.

If the machine is loaded with dry cells when you unplug the AC adapter (being plugged in the AC jack of the machine) from the wall socket, the memory will be backed up by those dry cells.

1.2.2 Power Supply

(1)	Power supply	Driven by 6 dry cells Optional AC adapter available - AD-30 (U.S.A.) - Model G1 (Europe)
(2)	Battery type	Alkaline dry cells (LR03) that come with the machine.
(3)	Service life of batteries	Will last through one 12-mm wide 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 battery detection and indication

When the machine is driven by dry cells:

- If the voltage level exceeds 10.81 V or drops below 6.84 V when the machine is *on standby*, the machine automatically turns itself off.
- If the voltage level drops below 5.12 V, 4.85 V, or 4.31 V *during printing*, the machine displays the "BATTERY" message to warn the user of the low battery after completion of printing, stops printing, or shuts down the power immediately, respectively.

When the machine is driven via the AC adapter:

If the input voltage is out of the specified level range, the machine immediately shuts down the power.

1.3 Key Commands for Special Functions

1.3.1 Initializing

When the machine power is off, pressing the ⏻ key with both the **F**unction and **R** keys held down initializes the machine. When releasing those keys, be sure to first release the ⏻ key and then release the **F**unction and **R** keys.

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 in 180 dpi as shown in Figure 2.1-1. Each heating element is 0.195 mm wide by 0.141 mm high.

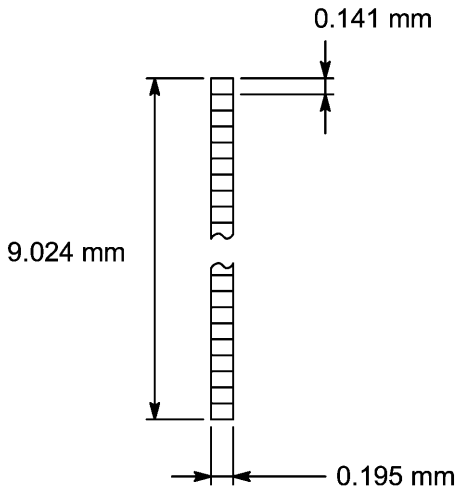


Figure 2.1-1 Heat Generator of Thermal Head

■ Printing Process

When the cylindrical rubber platen is pressed against the thermal print head with the tape and ink ribbon sandwiched inbetween, the CPU applies current to the selected ones out of the 64 heating elements.

If the selected heating element(s) generates heat, the ink on the sandwiched ribbon will be melted and transferred to the tape, producing a dot(s) on the tape. The ink ribbon and the tape are advanced and then the next heating cycle is repeated, thus forming a graphic pattern on the tape.

■ Graphic Pattern Formation

While the drive motor (DC motor) feeds the tape and ink ribbon by 0.141 mm for 14.1 ms, the thermal head generates heat once. The feed amount of 0.141 mm is smaller than the width (0.195 mm) of the heating elements so that the heat generated at one heating cycle will overlap with the next heating cycle. This forms a graphic pattern having no gap between adjacent printed dots.

2.1.2 Roller Holder ASSY Setting & Retracting Mechanism

This mechanism consists of the roller holder ASSY and the holder cam (provided on the cassette cover ASSY).

The cassette cover has a holder cam on the inside. Closing the cassette cover causes its holder cam to press section A of the roller holder ASSY as shown below. This pivots the roller holder ASSY around the shaft provided on the frame ASSY so as to press the roller holder ASSY against the thermal head side.

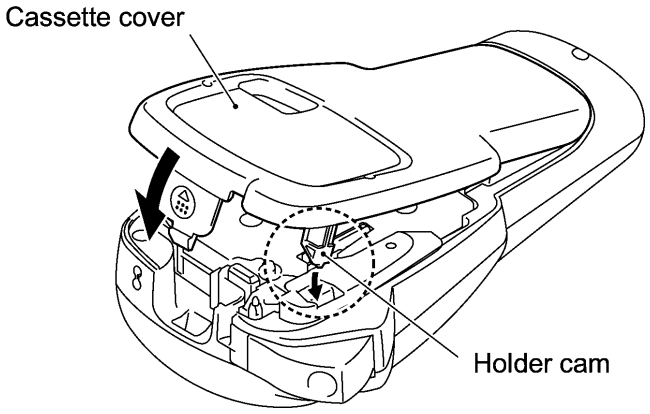


Figure 2.1-2 Holder Cam on the Cassette Cover

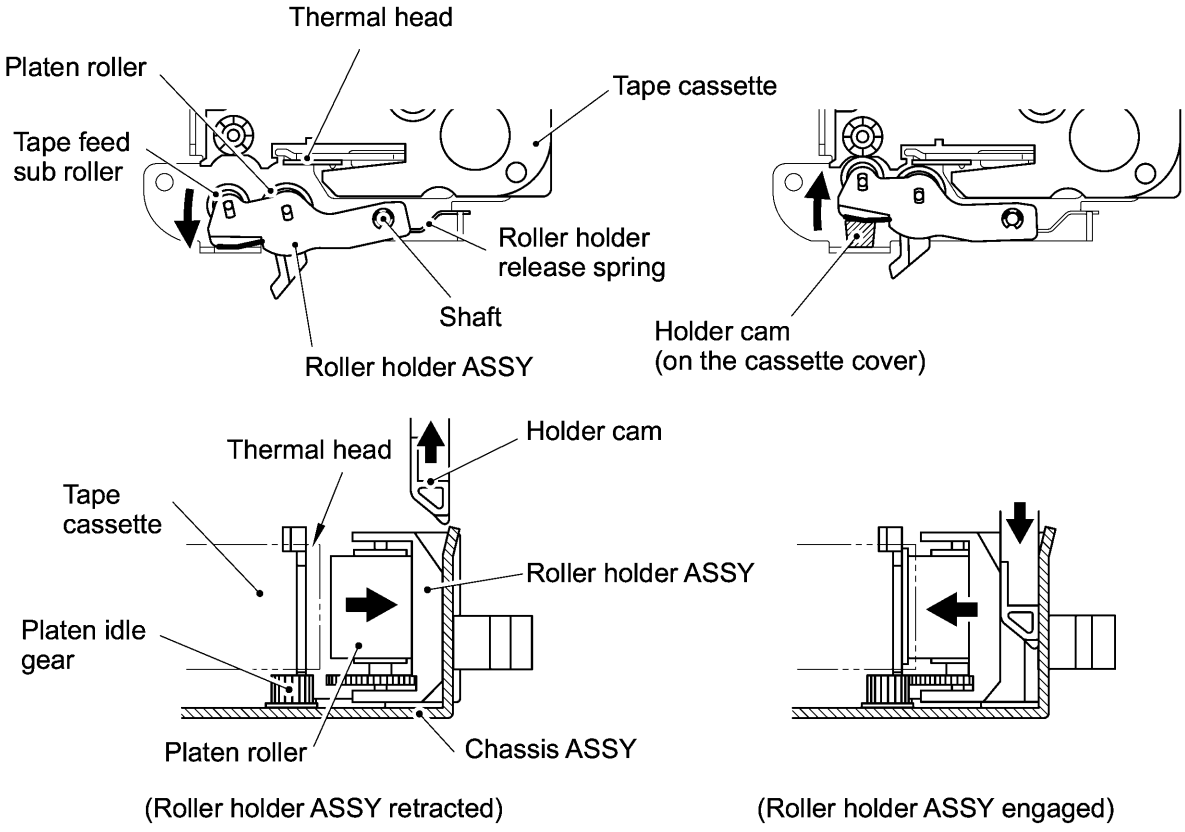


Figure 2.1-3 Holder Cam and Roller Holder ASSY

The roller holder ASSY supports the platen roller and tape feed sub roller so that they can move perpendicularly to the thermal head and tape feed roller built in a tape cassette, respectively, as well as rotating freely.

Closing the cassette cover presses the platen roller perpendicularly against the thermal head with the tape and ink ribbon sandwiched inbetween under a uniform load by the upper and lower roller holder springs. At the same time, the platen gear becomes engaged with the platen idle gear.

The tape feed sub roller is pressed perpendicularly against the tape feed roller built in the tape cassette with the tape (and adhesive base paper when using laminate tape cassettes) sandwiched inbetween under a uniform load by the upper and lower roller holder springs. At the same time, the sub roller gear becomes engaged with the tape idle gear.

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

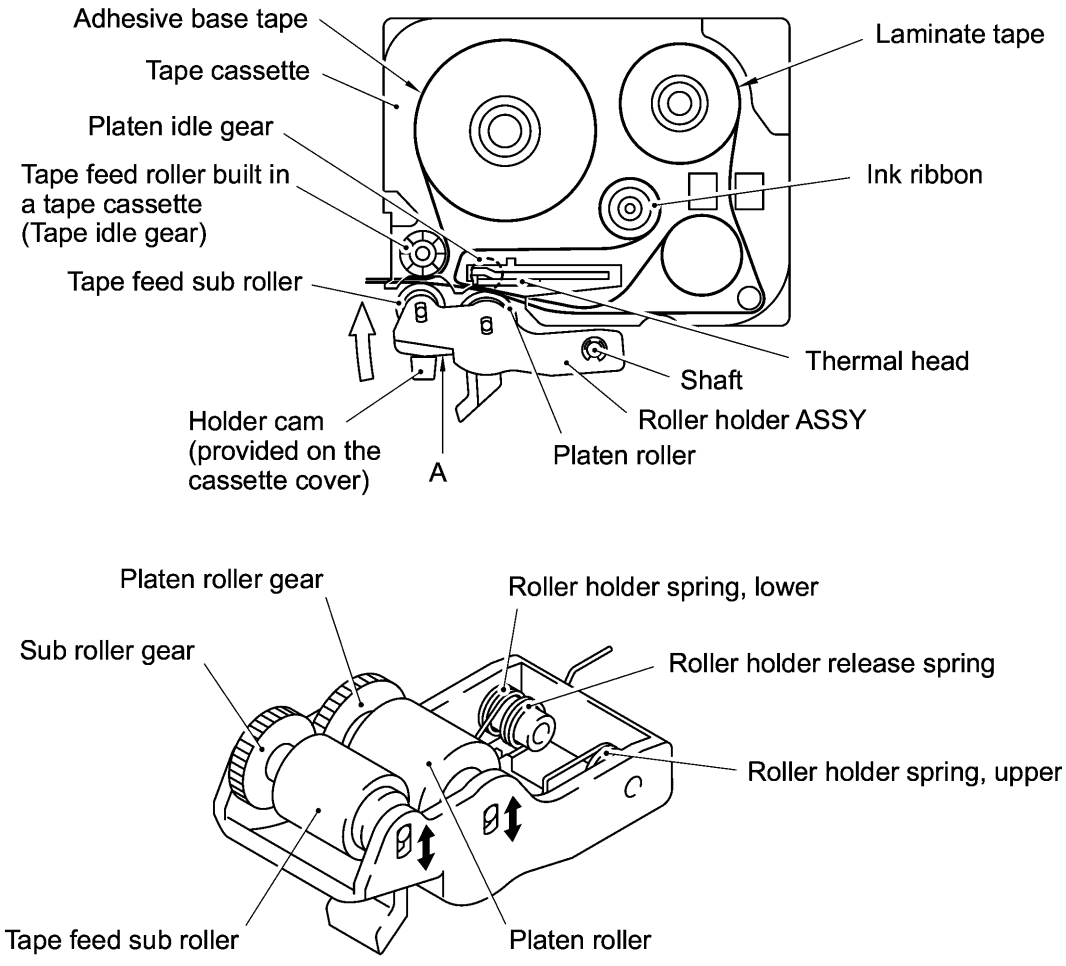


Figure 2.1-4 Roller Holder ASSY Setting & Retracting Mechanism

2.1.3 Tape & Ribbon Feed Mechanism

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

■ Tape Feeding

As the drive motor rotates, the rotation is transmitted via the gear train to the platen idle gear (which rotates the platen gear) and tape idle gear (which rotate the tape feed roller and its sub roller at the same rotation speed).

Accordingly, the sandwiched tape and ink ribbon will be advanced at the constant speed. (When a laminate tape cassette is mounted, the sandwiched laminate tape, ink ribbon and adhesive base tape will be advanced together).

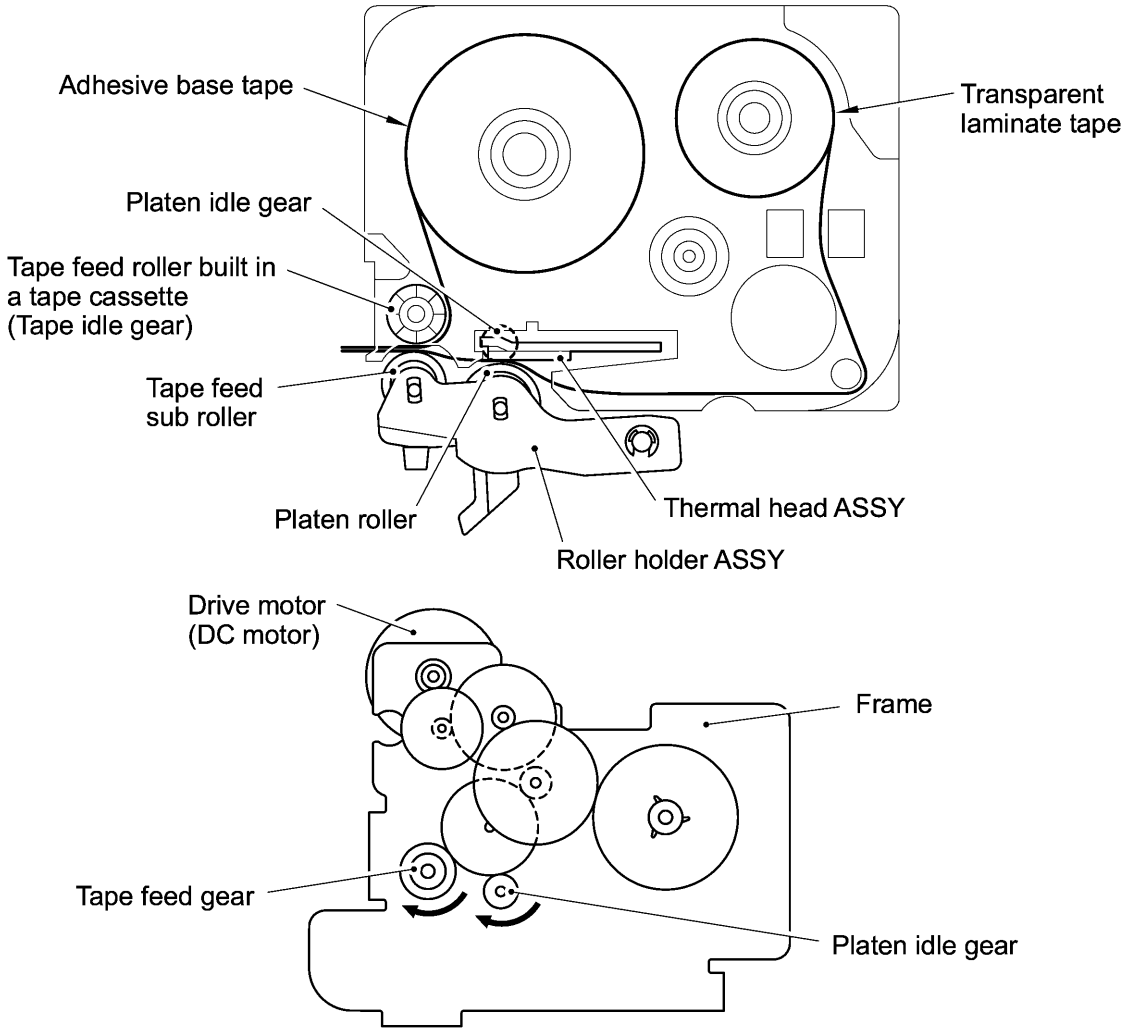


Figure 2.1-5 Tape Feeding Mechanism

■ Adhesive Base Tape Feeding (only for laminate tape cassettes)

A laminate tape cassette contains both a transparent laminate tape roll and a separate adhesive base tape roll.

When a transparent laminate tape and adhesive base tape pass through the contact point (between the tape feed roller and tape feed sub roller), they are then bonded together into a single, printed tape. The ink printed on the laminate tape is, therefore, sealed up with the adhesive base tape.

■ Ink Ribbon Feeding

As the drive motor rotates, the ribbon drive cam located at the middle of the gear train rotates counterclockwise. When fitted on the ribbon drive cam, the ribbon take-up roll in the tape cassette also rotates to take up the ink ribbon.

To apply proper tension to the ink ribbon between the platen and the ribbon drive cam, the feed amount of the ribbon drive cam is slightly greater than that of the tape feed gear. The difference between the feed speeds at the platen roller and at the ribbon drive cam is absorbed by the clutch spring which is integrated in the ribbon drive cam and allows the cam to slip.

This way, the ink ribbon is kept tense, which enables the ribbon to clearly separate from the tape at the stabilized angle after printing.

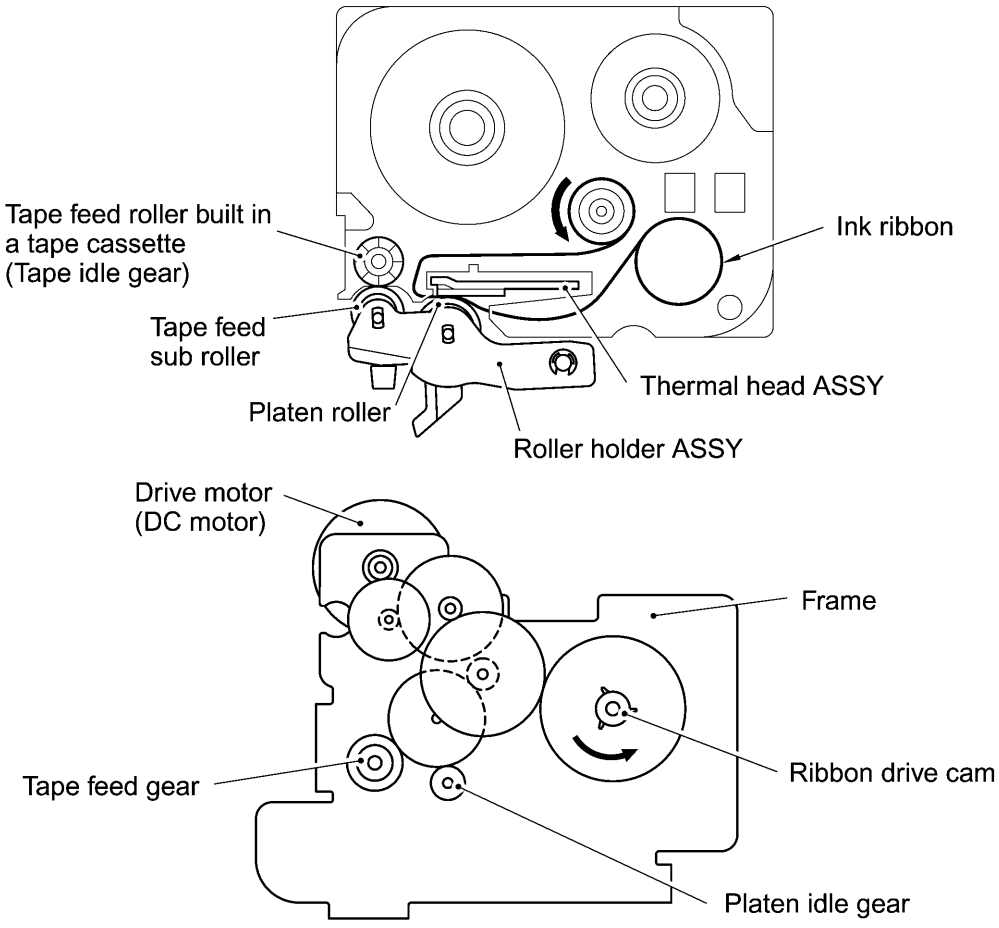


Figure 2.1-6 Ribbon Feeding Mechanism

2.1.4 Tape Cutter Mechanism

The tape cutter ASSY consists of a cutter case ASSY and cutter board.

Pressing the cutter lever pushes out the cutter blade against the cutter board, cutting the printed tape coming through the cutter case ASSY and cutter board.

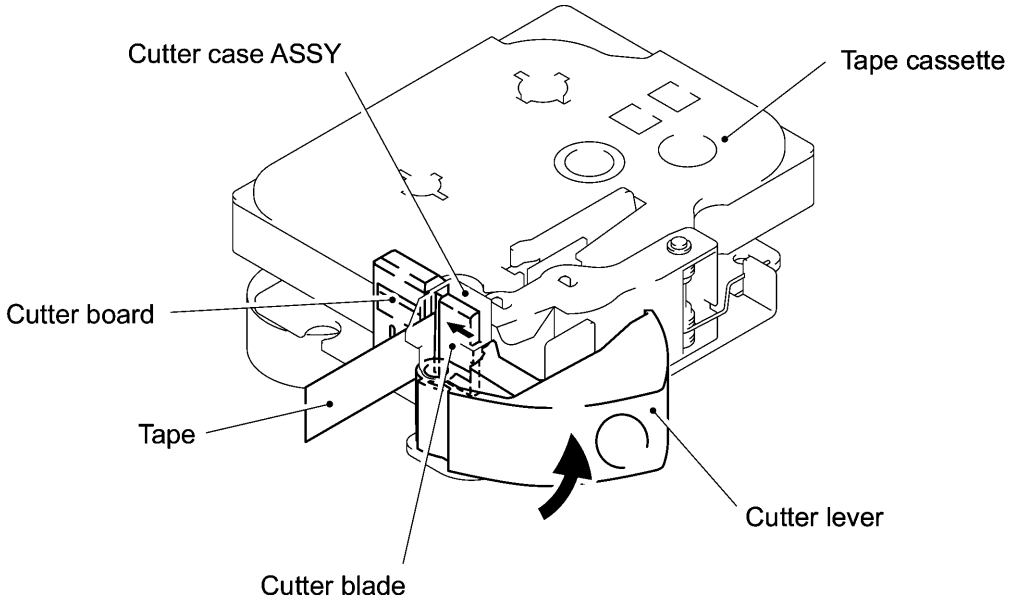


Figure 2.1-7 Tape Cutter Mechanism

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 release spring (as described in Section 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 blade from getting driven for safety, as shown below.

Closing the cassette cover 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.

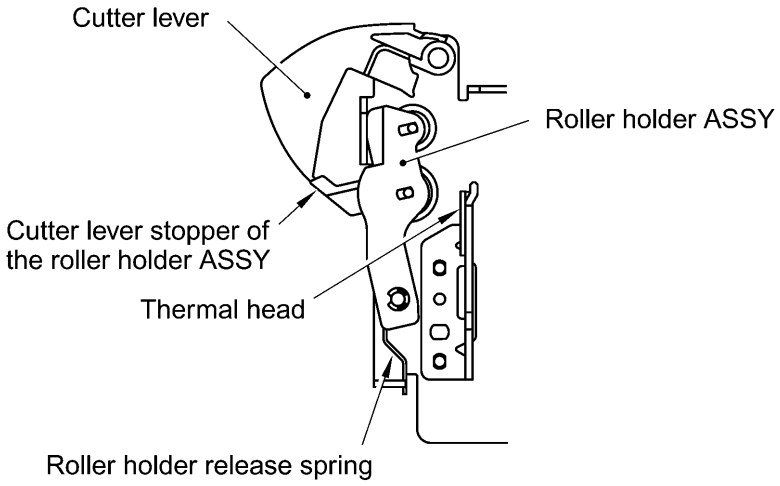


Figure 2.1-8 Cutter Safety Lock Mechanism

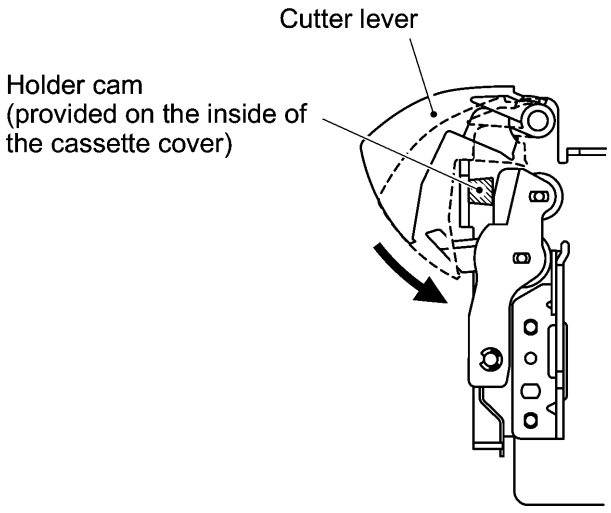


Figure 2.1-9 Releasing the Cutter Safety Lock Mechanism

2.1.6 Cutter Jam Prevention Mechanism

When the machine is printing or feeding tape, pressing the cutter lever turns on the cutter sensor switch via the cutter sensor arm and immediately stops the DC motor. This prevents the cutter blade from interrupting the tape being fed and causing a tape jam.

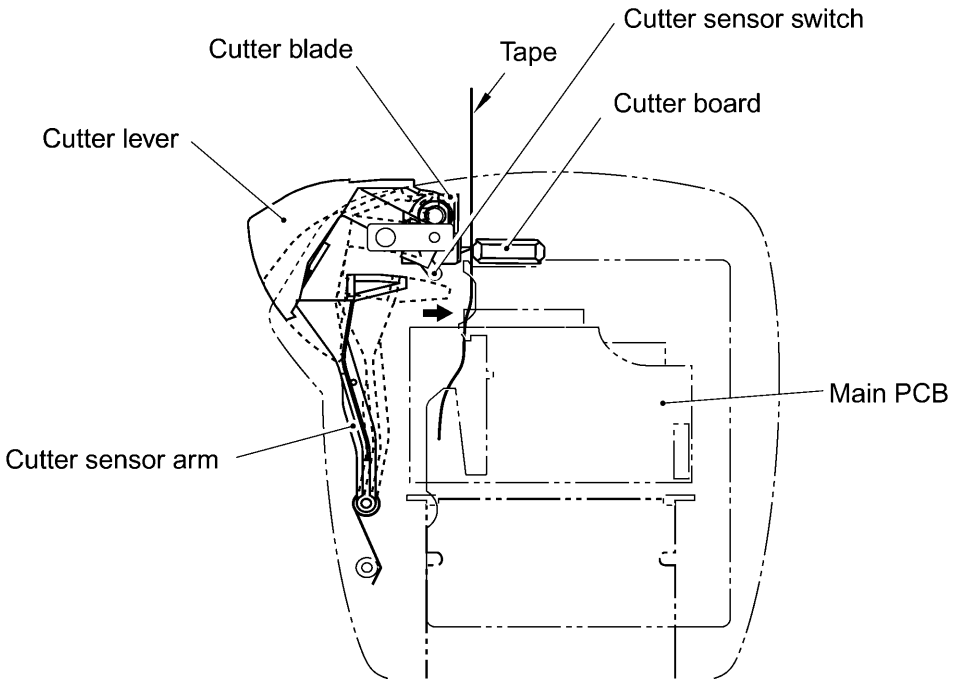


Figure 2.1-10 Cutter Jam Prevention Mechanism

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 two PCBs (main PCB and key PCB), an LCD, motor, thermal print head, tape cassette sensor (switch ASSY) and cutter sensor.

■ **Main PCB**

This PCB manages all the components including an LCD, motor and thermal print head. For electronic devices on the main PCB, refer to Section 2.2.2.

■ **Key PCB**

This PCB holds an AC jack.

■ **LCD**

The LCD is 8 characters wide by one row high and it has 11 guidance indicators.

■ **Motor**

The DC motor is a power source to advance tape and ink ribbon.

■ **Thermal print head**

This is a thick-film thermal print head which integrates a heat generator (consisting of 64 heating elements vertically aligned in 180 dpi) and driver circuitry.

■ **Tape cassette sensor (switch ASSY)**

According to the states of the three sensor switches on this sensor, the CPU can identify the tape width and type of the tape cassette loaded.

■ **Cutter sensor**

Pressing the cutter lever turns on this sensor, signaling that the cutter is driven. If this sensor is turned on during printing or tape feeding, the CPU immediately stops the motor to prevent tape jamming.

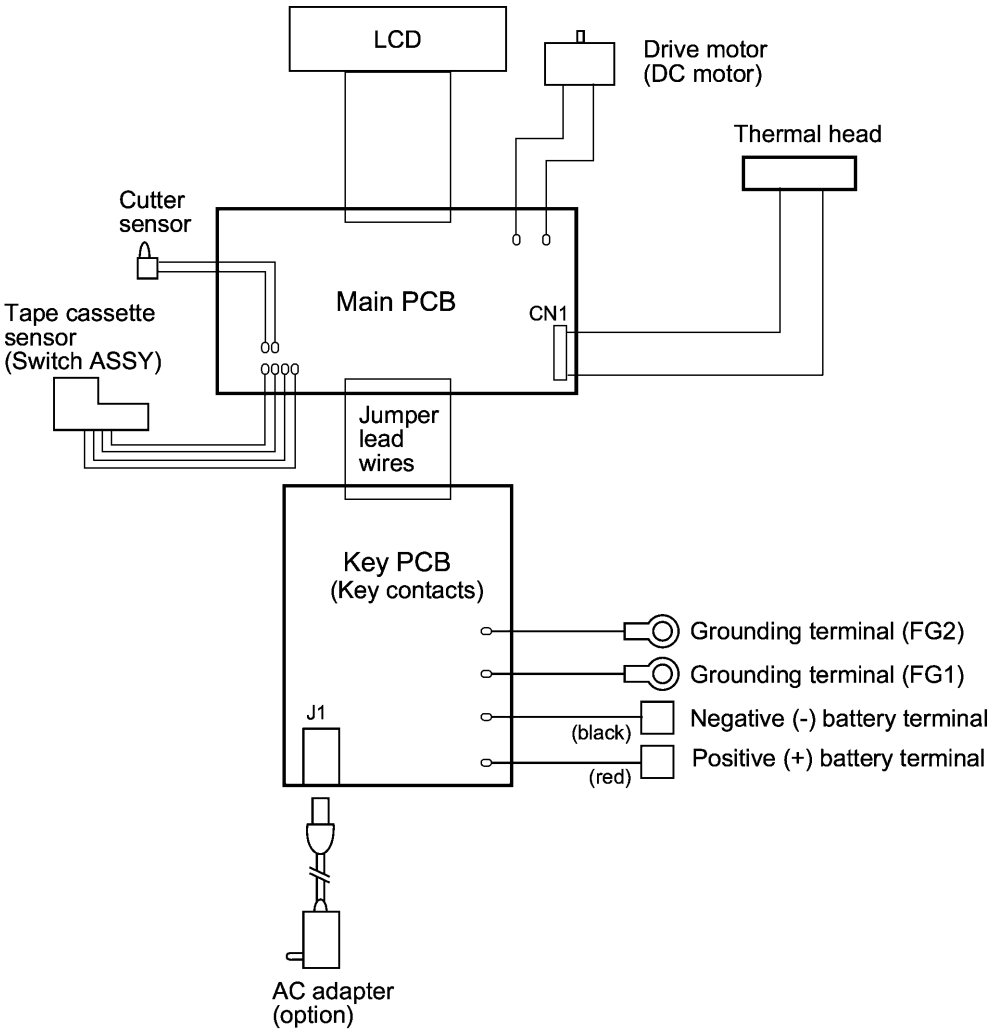


Figure 2.2-1 Configuration of the Electronic Part

2.2.2 Main PCB

[1] Block Diagram

Figure 2.2-2 shows a block diagram of the main PCB. The main PCB consists of the following:

(1) CPU
(2) DC motor driver
(3) Thermal head driver
(4) Oscillation circuit
(5) Solder points
(6) Power supply circuit
(7) Key detector circuit
(8) Voltage detector circuit
(9) Temperature sensor detector
(10) LCD driver

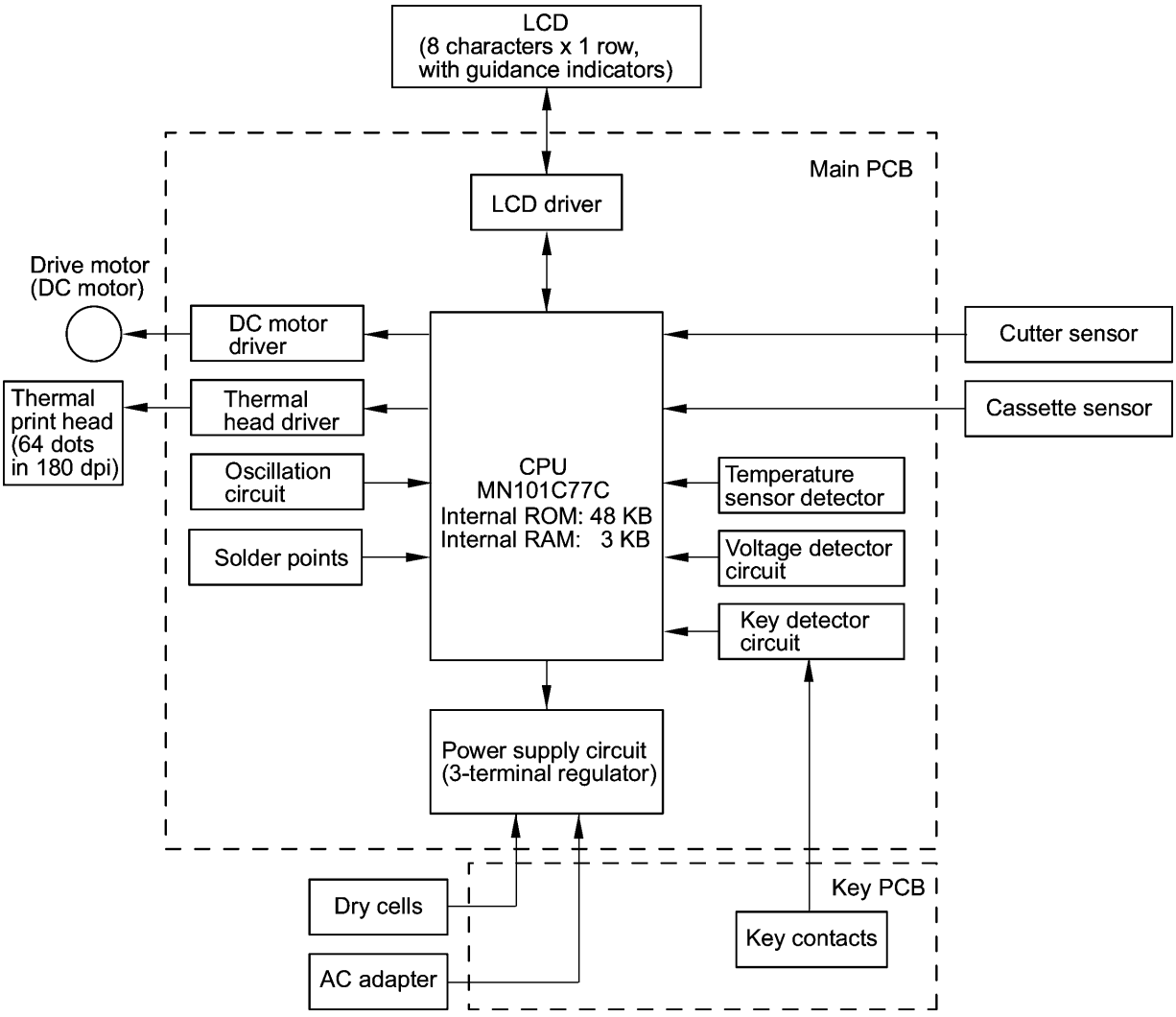


Figure 2.2-2 Block Diagram of Main PCB

[2] Solder Points

This machine has five solder points--1 through 3, A and C.

■ Destination

Solder points 1 through 3 customize the machine for destination. as listed in Table 2.2-1.

Table 2.2-1 Destination

Destination	Solder points		
	3	2	1
EUROPE/USA	High (Open)	High (Open)	High (Open)

■ Head rank

Solder points A and C determine the power feeding period to the thermal print head to customize the machine for the individual thermal head properties (head rank) as listed in Table 2.2-2.

If the print head unit is replaced with a new one, the soldered state may need to be changed according to the head rank code printed on the head flat cable of the new print head.

Table 2.2-2 Head Rank

Head rank code printed on the head flat cable	Solder points	
	A	C
A	Low (Closed)	High (Open)
B	High (Open)	High (Open)
C	High (Open)	Low (Closed)

[3] Identification of Tape Cassette Type

The cassette sensor (Switch ASSY) has three sensor switches (SW2, SW3 and SW7). Loading a tape cassette turns on some of those switches while keeping others off depending upon the ID encoding holes provided in the tape cassette currently loaded. If an encoding ID hole is closed, the corresponding sensor switch goes on.

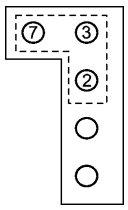
With the states of those sensor switches, the CPU identifies the tape width and tape cassette type, as listed below.

Table 2.2-3 Coded Value for Identifying Tape Cassette Type

0: Switch OFF (ID hole opened)
1: Switch ON (ID hole closed)

Tape width	Cassette type	SW2	SW3	SW7
---	No tape cassette loaded	0	0	0
6 mm	Laminate tape cassette	0	1	0
	Non-laminate tape cassette	0	1	1
9 mm	Laminate tape cassette	1	1	0
	Non-laminate tape cassette	1	0	1
12 mm	Laminate tape cassette	1	0	0
	Non-laminate tape cassette Fabric tape cassette	1	1	1

Position of sensor switches



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 10	5	0.39 ±0.10 N•m (4 ±1 kgf•cm)
Grounding wires	Screw, bind M3 x 4	2	0.59 ±0.10 N•m (6 ±1 kgf•cm)
Frame ASSY	Taptite, bind B M2.6 x 6	3	0.39 ±0.10 N•m (4 ±1 kgf•cm)
DC motor ASSY	Screw, pan 1.7 x 2.5	2	0.10 to 0.20 N•m (1 to 2 kgf•cm)
Head ASSY	Screw, bind M3 x 4	1	0.59 ±0.10 N•m (6 ±1 kgf•cm)
Main PCB ASSY	Taptite, bind B M2.6 x 6	2	0.29 ±0.10 N•m (3 ±1 kgf•cm)
SW holder plate	Taptite, bind B M2.6 x 5	1	0.29 ±0.10 N•m (3 ±1 kgf•cm)

■ Lubrication list

Lubricant type: Shin-Etsu Silicone G501

Lubrication points	Lubricant amount	Refer to:
	Half of a rice-sized pinch of grease (2 mm dia. ball)	
Cutter lever	√	page III-6
Shaft of double gear 1 on the frame ASSY	√	page III-7

3.1 Disassembly/Reassembly

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

(1) Turn the machine upside down.

(2) Press section "A" of the cassette cover to release the latch, then remove the cassette cover.

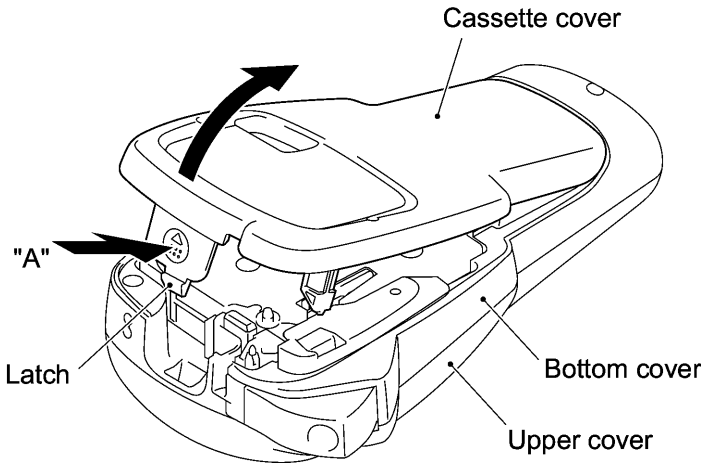


Figure 3.1-1 Removing the Cassette Cover

(3) Remove the tape cassette and six dry cells.

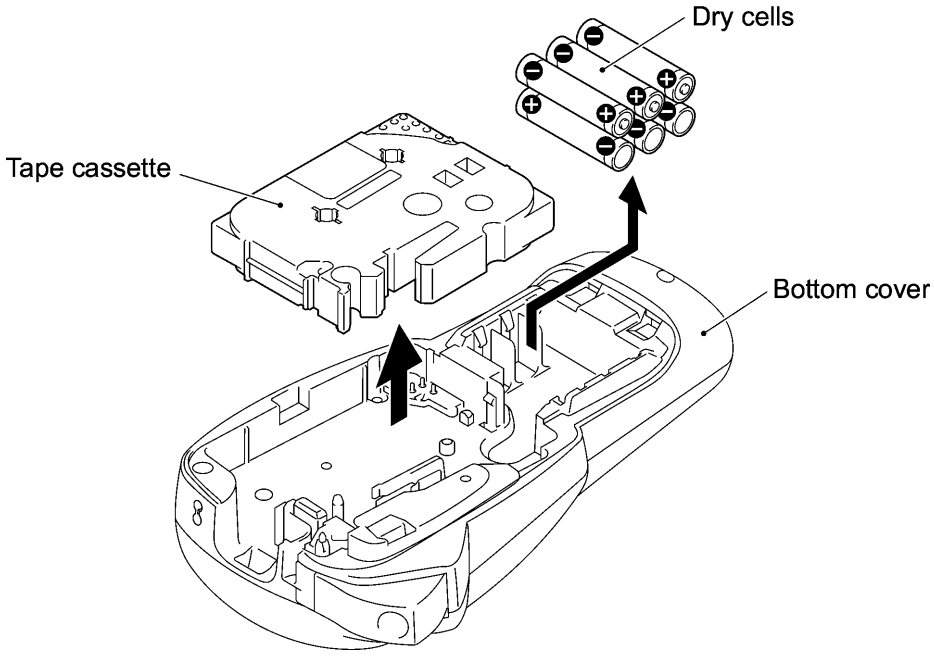


Figure 3.1-2 Removing the Tape Cassette and Dry Cells

■ **Reassembling notes**

- When setting the cassette cover back onto the bottom cover, first fit the two tabs into the holes provided in the bottom cover and snap the cassette cover into place.

[2] Removing the Cutter Case ASSY and Cutter Board and Separating the Bottom Cover from the Upper Cover

(1) Pull out the cutter case ASSY and cutter board.

(2) Remove the five screws from the bottom cover.

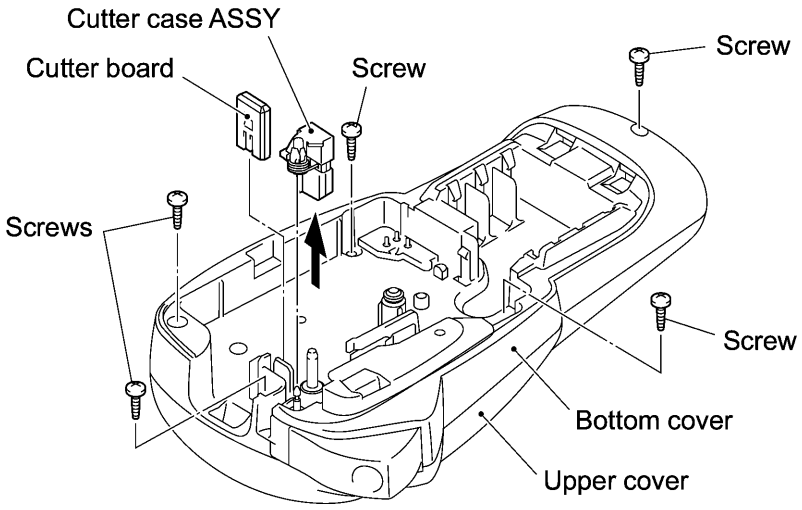


Figure 3.1-3 Removing the Cutter Case ASSY, Cutter Board and Screws from the Bottom Cover

(3) Discharge the capacitor mounted on the main PCB by touching both the + and - terminals (of the main PCB ASSY) with a tweezers. (See Figure 3.1-4 on the next page.)

(4) Open the bottom cover and disconnect the head flat cable from the main PCB.

(5) Remove the cutter sensor arm and its spring from the upper cover.

(6) Release the two grounding wires (that ground the key PCB) from the frame ASSY by removing the two screws.

(7) Remove the adhesive tape ("a") that secures the switch ASSY leads to the bottom cover. Then unhook the switch ASSY (cassette sensor switches) from the three latches and take it out of the bottom cover.

(8) To separate the bottom cover from the upper cover completely, you need to unsolder the motor leads from the main PCB (refer to "[3] Removing the Frame ASSY and Cutter Lever") and remove the + and - terminal ASSYs from the bottom cover (refer to "[4] Removing the Terminal Press Cover and Releasing the - Terminal ASSY").

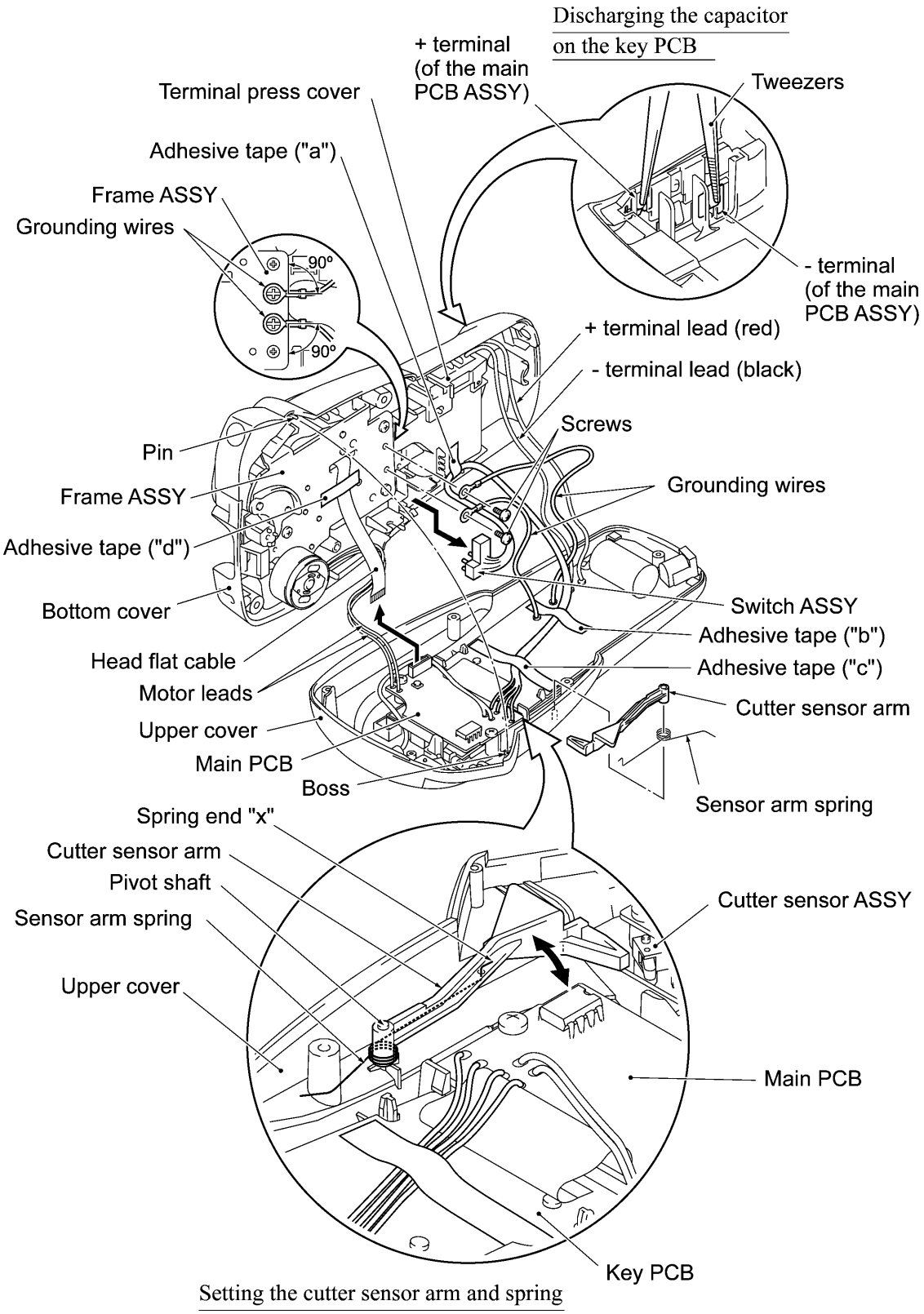


Figure 3.1-4 Separating the Bottom Cover from the Upper Cover

■ **Reassembling notes**

- When setting the cutter sensor arm and its spring back to the upper cover, first insert spring end "x" into the hole provided in the cutter sensor arm and then fit them over the pivot shaft as shown in Figure 3.1-4. Check that the cutter sensor arm moves smoothly.
- Before reassembling the bottom cover and upper cover, be sure to check that:
  - the switch ASSY leads are taped to the bottom cover (position "a") and key PCB (two positions "b" and "c") and that adhesive tape at position "a" prevents those leads from routing over the ribs,
  - the - terminal lead (black) is routed between the terminal press cover and bottom cover and that the grounding wire (FG1) is routed beneath the - terminal lead,
  - the motor loads are routed beneath the head flat cable,
  - the head flat cable is taped to the frame ASSY with a slight curve, and
  - the cutter lever is in the open position.

  Reassemble the bottom cover and upper cover, taking care not to crush the flat cable and lead wires between those covers.

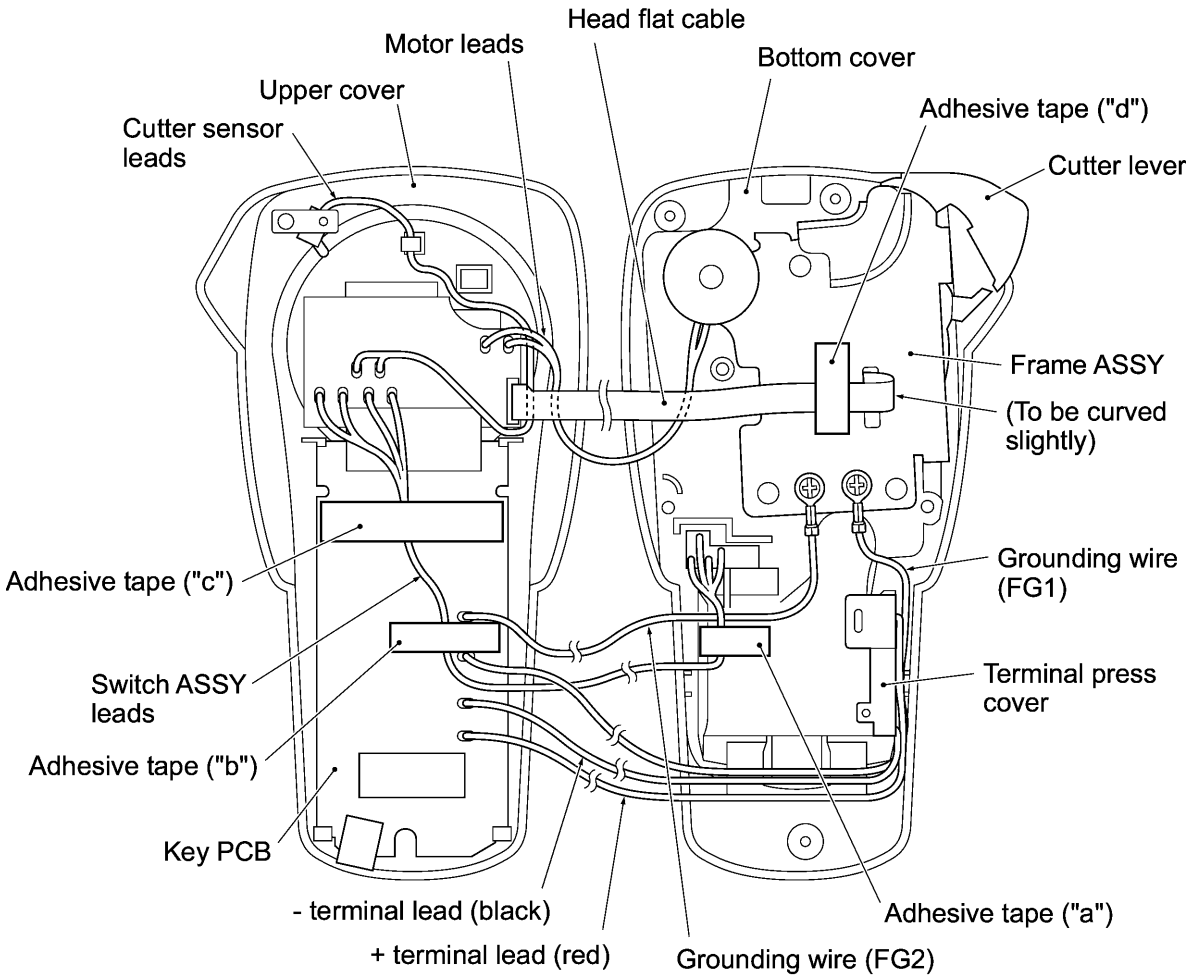


Figure 3.1-5 Routing the Flat Cable and Lead Wires

[3] Removing the Frame ASSY and Cutter Lever

(1) Unsolder the two motor leads from the main PCB.

(2) Remove the three screws from the frame ASSY.

(3) Take the frame ASSY up and out of the bottom cover. The cutter lever also comes off.

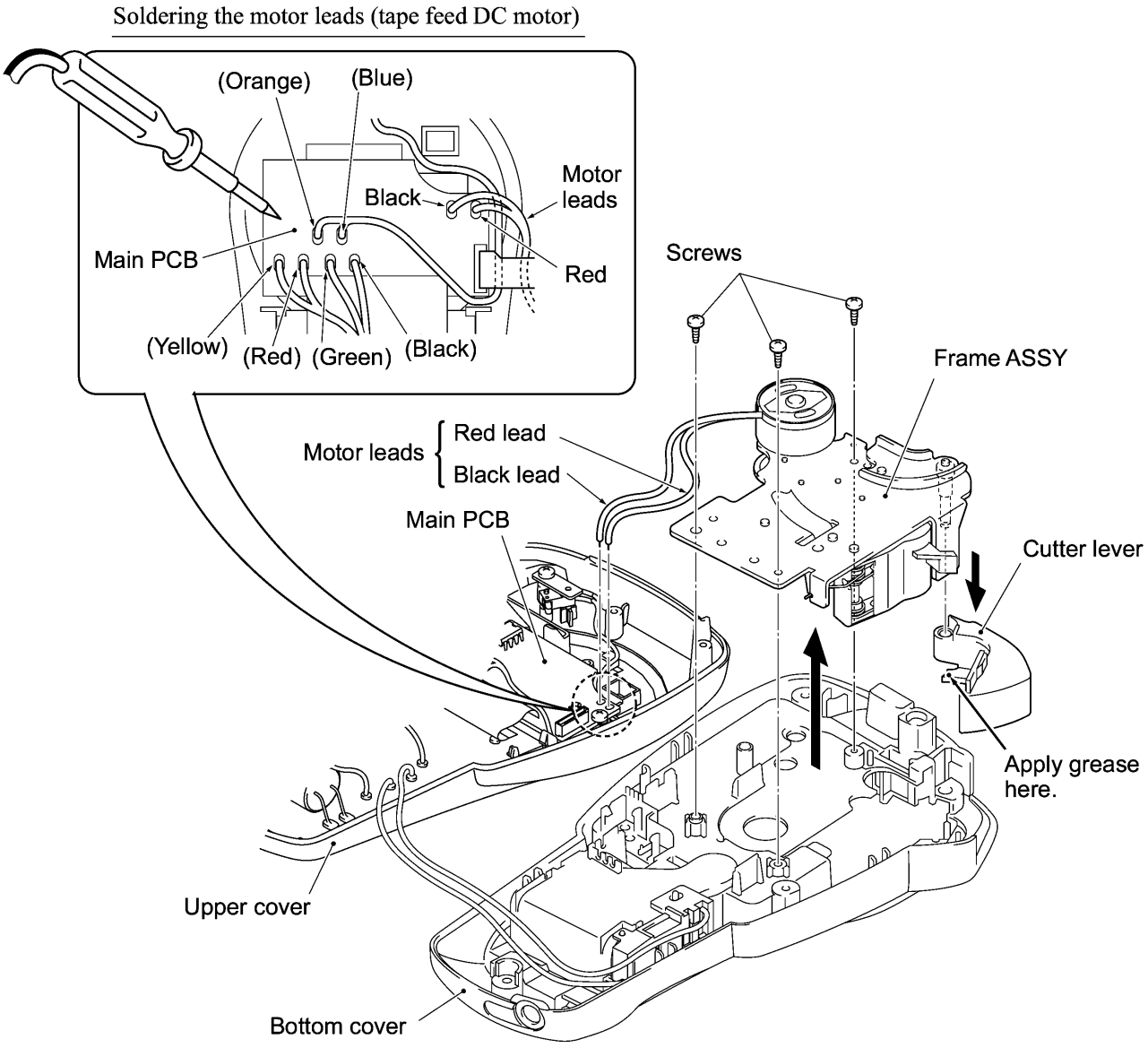


Figure 3.1-6 Removing the Frame ASSY and Cutter Lever

■ Reassembling notes

- Before setting the cutter lever back into place, be sure to apply a half of a rice-sized pinch of grease (Shin-Etsu Silicone G501) to the cutter lever as shown above.
- When soldering the motor leads to the main PCB, check the wire ID colors as shown above and keep solder within the specified soldering points.

Disassembling the Frame ASSY

1) DC motor ASSY

Remove the two screws and take the DC motor ASSY off the frame ASSY.

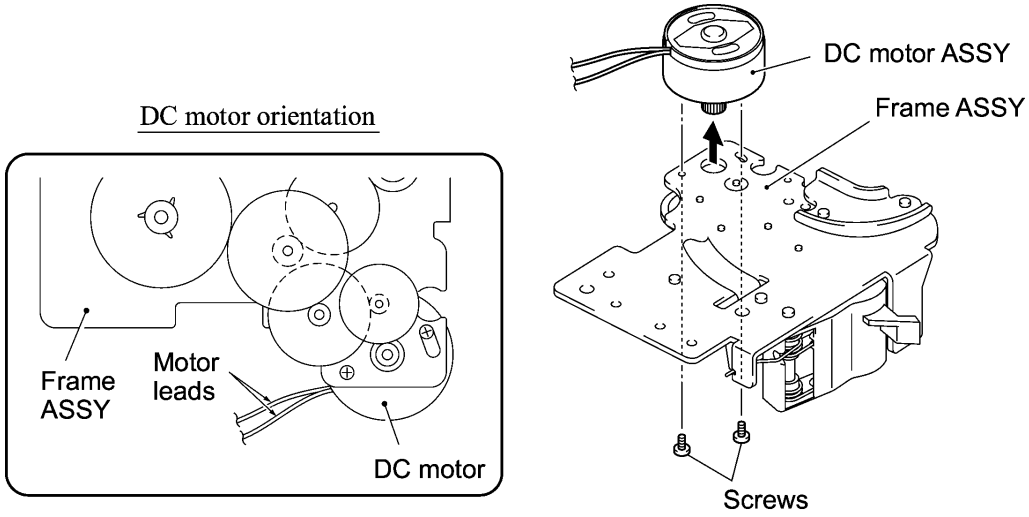


Figure 3.1-7 Removing the DC Motor ASSY

2) Roller holder ASSY

Remove the retaining ring and pull out the roller holder ASSY together with its release spring.

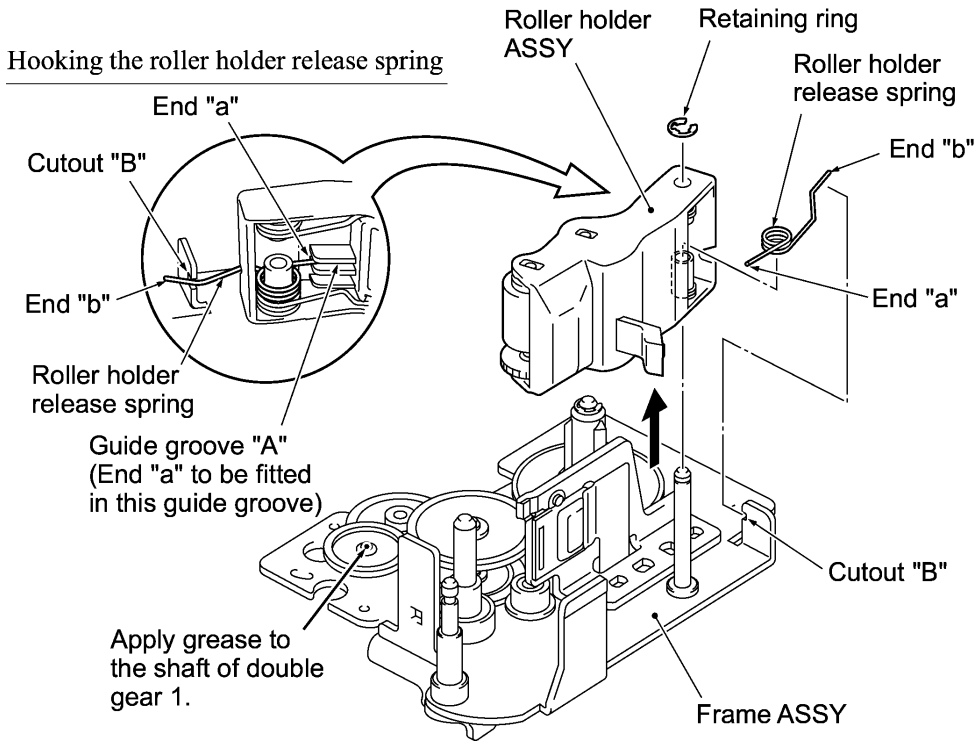


Figure 3.1-8 Removing the Roller Holder ASSY and Release Spring

3) Head ASSY

CAUTION: Before handling the head ASSY, take care not to touch it directly by hand. The head ASSY may be damaged due to the static electricity charged in your body.

Remove the screw and take the head ASSY off the frame ASSY.

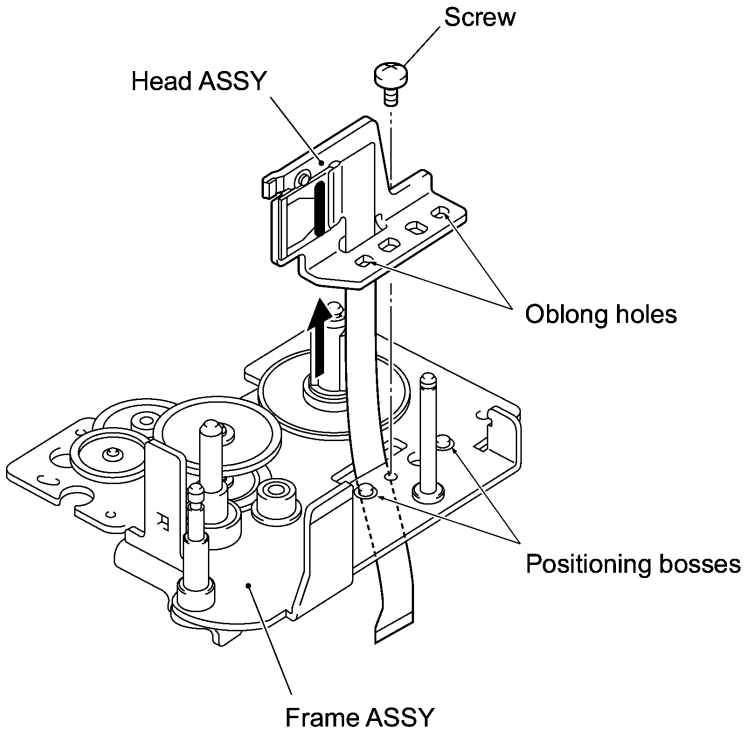
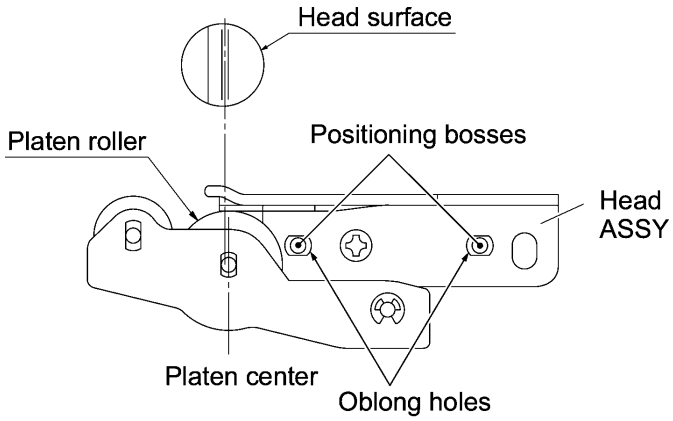


Figure 3.1-9 Removing the Head ASSY

■ **Reassembling notes**

- When setting the head ASSY to the frame ASSY, fit the two oblong holes provided in the head ASSY over two positioning bosses on the frame ASSY and center those bosses in those holes, as shown below.



- When setting the roller holder ASSY into place, first fit end "a" of the release spring in guide groove "A" of the roller holder ASSY. Set the roller holder ASSY to the frame ASSY and then hook end "b" of the release spring on cutout "B" as shown in Figure 3.1-8.
- When securing the DC motor to the frame ASSY, orient it so that the motor leads is routed in the direction shown in Figure 3.1-7.

[4] Removing the Terminal Press Cover and Releasing the - Terminal ASSY

(1) Turn the bottom cover upside down.

(2) Press the two latches on the terminal press cover inwards with the tip of a flat screwdriver and push down the terminal press cover.

(3) Release the - terminal ASSY from the terminal press cover.

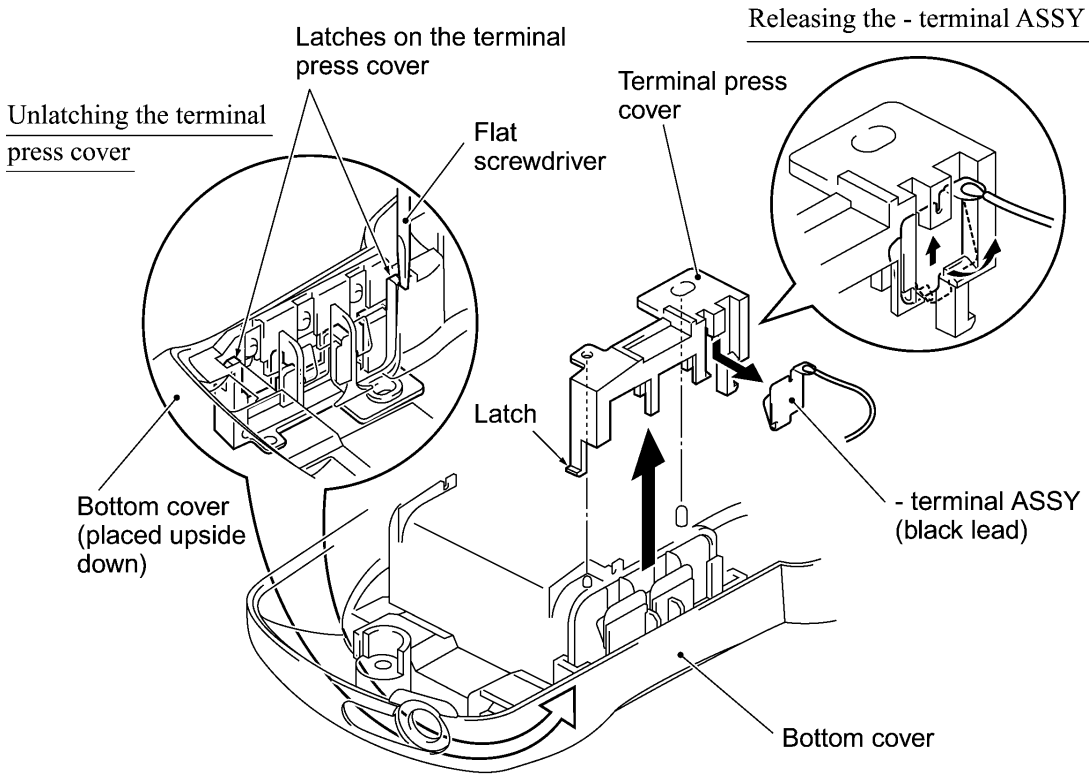


Figure 3.1-10 Removing the Terminal Press Cover and Releasing the - Terminal ASSY

■ Reassembling notes

- Make sure that the terminal press cover is latched on the bottom cover.

[5] Removing the Battery Terminals B and Releasing the + Terminal ASSY

(1) Remove two battery terminals B from the bottom cover.

(2) Unlatch the locking pawl of the + terminal ASSY with the tip of a flat screwdriver and release it from the bottom cover.

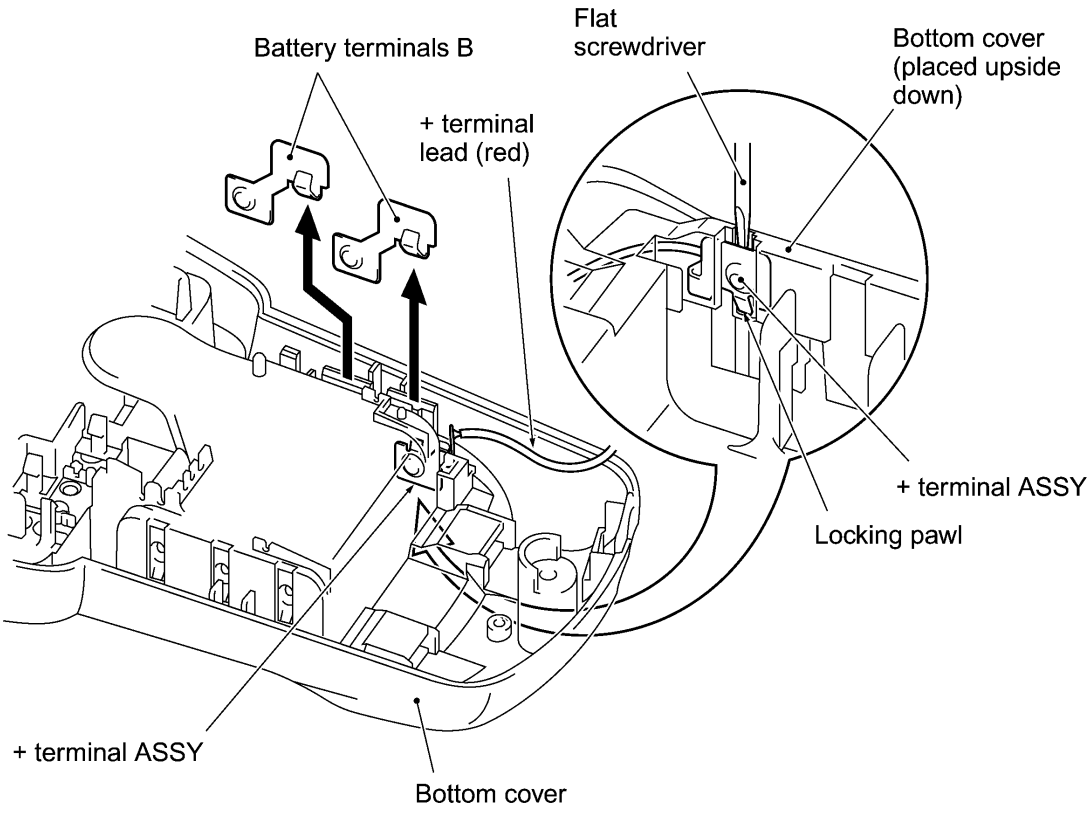


Figure 3.1-11 Removing the Battery Terminals B and Releasing the + Terminal ASSY

■ **Reassembling notes**

- Make sure that the + terminal ASSY is latched on the bottom cover.

[6] Removing the Battery Terminals A

(1) Press the locking pawl on each of three battery terminals A and push down each terminal A with the tip of a flat screwdriver.

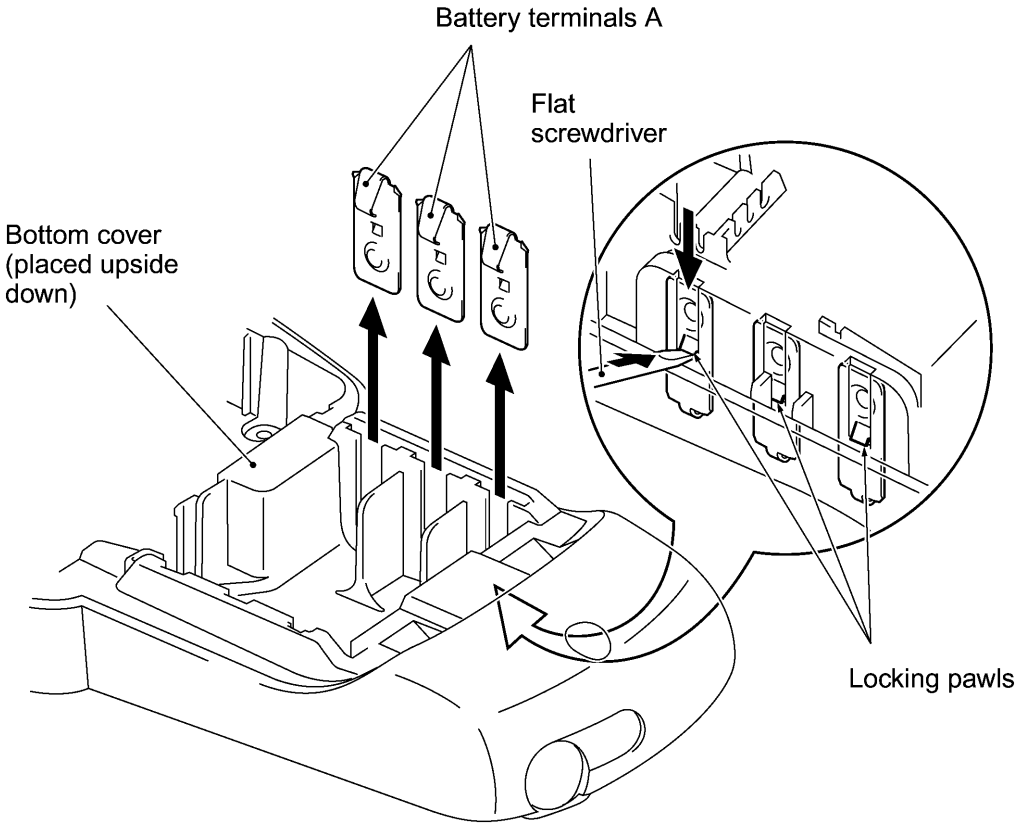


Figure 3.1-12 Removing the Battery Terminals A

■ Reassembling notes

- Make sure that the three battery terminals A are latched on the bottom cover.

[7] Removing the Switch ASSY, Cutter Sensor ASSY and Main PCB ASSY

CAUTION: When handling the PCBs, put on a grounding wrist band. Failure to do so might break LSIs and other electronic devices.

(1) Unsolder the four switch ASSY leads from the main PCB.

(2) Release the SW holder plate by removing the screw. Unsolder the two cutter sensor leads from the main PCB.

(3) Remove the two screws from the main PCB ASSY.

NOTE: The main PCB ASSY consists of a main PCB, key PCB and LCD.

(4) Release the key PCB from the upper cover: First pull the two locking arms towards the main PCB, lift up the top edge of the key PCB slightly and slide it towards the main PCB.

(5) Push the locking pawl and take the LCD out of the upper cover with a flat screwdriver, as shown below.

NOTE: Do not pull the LCD flat cable.

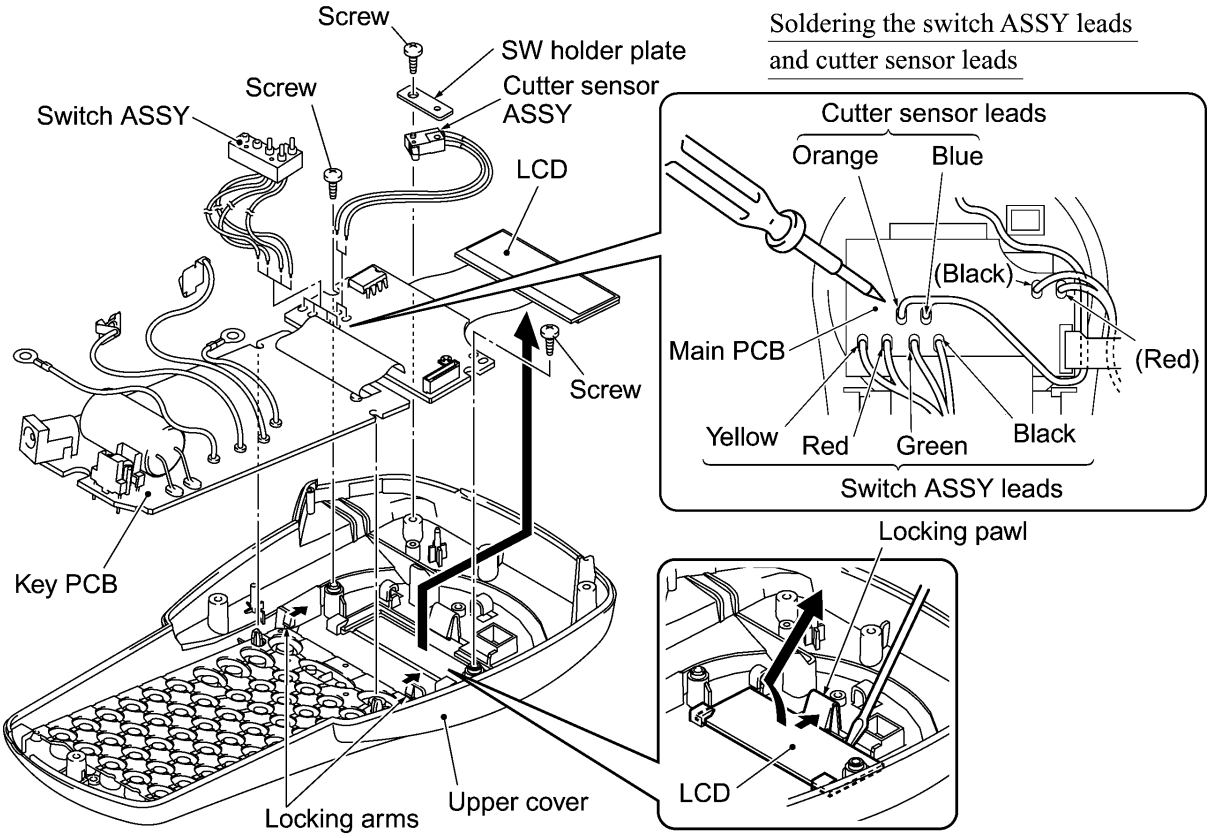


Figure 3.1-13 Unsoldering the Switch ASSY and Cutter Sensor ASSY and Removing Main PCB ASSY

■ Reassembling notes

- Before setting the main PCB ASSY into place, wipe any fingerprints or dust off the LCD surface with a soft cloth and make sure that the key contacts on the key PCB are free from dust or dirt.
- When soldering the cutter sensor leads and switch ASSY leads to the main PCB, check the wire ID colors as shown above and keep solder within the specified soldering points.
- Make sure that the cutter sensor leads are routed as shown in Figure 3.1-5.

[8] Removing the Rubber 49 Key

(1) Lift the rubber 49 key up and out of the upper cover.

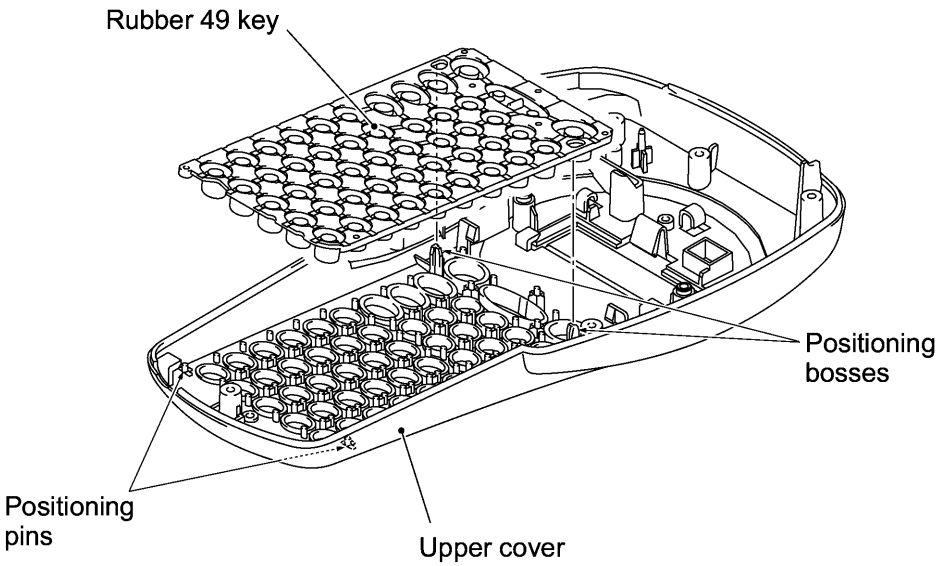


Figure 3.1-14 Removing the Rubber 49 Key

■ **Reassembling notes**

- Make sure that the rubber 49 key is fitted over the two positioning bosses and two positioning pins.

3.2 Final Check and Inspection Mode

■ **After completion of reassembling**

(1) Check that each rubber key works correctly with light touch.

(2) Check that the cutter lever works smoothly.

(3) To initialize the internal memory, press the ⏻ key with both the **F**unction and **R** keys held down. When releasing those keys, be sure to first release the ⏻ key and then release the **F**unction and **R** keys.

After initialization, press the ⏻ key to turn the machine off.

■ **Make operational checks of the machine in the inspection mode:**

The inspection mode allows you to make final operational checks. In this mode, you use five submodes--INFO, CASSETTE, KEY, CUT and PRINT1 submodes.

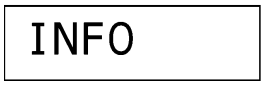
TIP: The inspection mode actually supports a total of ten submodes for checking at the factory. If any submode other than the above five is initiated, skip it by pressing the **1**, **2**, **3**, **4** or **5** key to proceed to the INFO, CASSETTE, KEY, CUT or PRINT1 submode, respectively.

(1) Load a tape cassette and close the cassette cover.

(2) Make sure that the internal memory has been initialized and the power is off. (For the initialization procedure, refer to "■ After completion of reassembly" above.)

(3) While holding down the **F**unction and **K** keys, press the ⏻ key to turn the machine on. When releasing those keys, be sure to first release the ⏻ key and then release the **F**unction and **K** keys.

The machine will enter the inspection mode and display the following on the LCD:



NOTE: If the following appears instead of the "INFO" and the machine automatically exits from the inspection mode, then check the solder points. Some solder points may be incorrectly soldered.

INFO submode (1 key*)

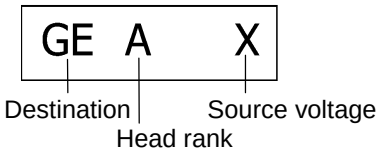
(*You may switch back to this INFO submode from any other submode by pressing the **1** key, except during the key depressing test in the KEY submode.)

The moment the machine enters the inspection mode, it displays the "INFO" and initiates the INFO submode.

In the INFO submode, you may check the current settings of the destination, head rank, source voltage, and LCD operation.

1) Press the ↵ key.

The destination, thermal head rank, and source voltage will display as shown in the following example.



Destination

If the destination is Germany, for example, "GE" will appear on the LCD.
(The destination is determined by solder points 1 through 3.)

Destination	The LCD shows:	Solder points		
		3	2	1
EUROPE/USA	GE	High (Open)	High (Open)	High (Open)

Head rank

Solder points A and C customize the machine for the individual thermal head properties. The LCD shows the current head rank as listed below.

If the print head unit is replaced with a new one, the soldered state may need to be changed according to the head rank code printed on the head flat cable of the new print head.

Head rank	The LCD shows:	Solder points	
		A	C
A	A	Low (Closed)	High (Open)
B	B	High (Open)	High (Open)
C	C	High (Open)	Low (Closed)

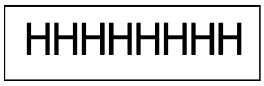
Source voltage

This machine shows "X" when driven by dry cells or via the AC adapter.

If the source voltage is within the specified range (7.5 ±0.1 VDC), "O" will be displayed; if out of the range, "X" will be displayed.

2) Press the ↵ key.

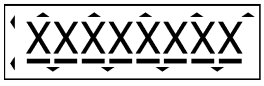
LCD check screen 1 will appear as shown below.



(All guidance indicators and cursors: OFF)

Press the ↵ key.

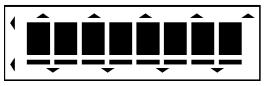
LCD check screen 2 will appear as shown below.



(All guidance indicators and cursors: ON)

Press the ↵ key.

LCD check screen 3 will appear as shown below.


(All guidance indicators and cursors: ON)

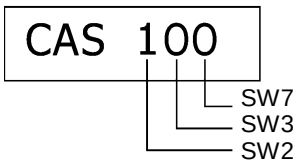
CASSETTE submode (2 key*)

(*You may switch back to this CASSETTE submode from any other submode by pressing the **2** key, except during the key depressing test in the KEY submode.)

With LCD check screen 2 displayed, press the ↵ key. The machine displays "CAST" and enters the CASSETTE submode.

Press the ↵ key.

The machine checks the current state of the three cassette sensor switches and displays the result as shown below.



If the state of each sensor switch is ON (Low) or OFF (High), "1" or "0" will be displayed. The above screen shows that a 12-mm laminate tape cassette is loaded. (For the relationship between the tape cassette type and switch status, refer to Chapter II, Section 2.2.2 [3], Table 2.2-3.)

KEY submode (3 key*)

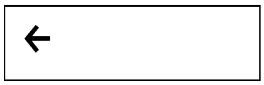
(*You may switch back to this KEY submode from any other submode by pressing the **3** key.)

With LCD check screen 3 displayed, press the ↵ key. The machine displays "KEY" and enters the KEY submode.

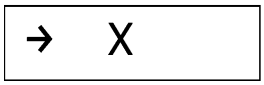
Press the ↵ key to start checking keys.

Press all keys (except ⏻ key), starting from the ◀ key on the 1st row. Press keys from left to right on the 1st row, from right to left on the 2nd row, from left to right on the 3rd row, ... from right to left on the 10th row.

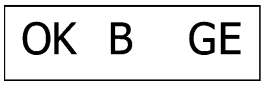
As shown below, a key to be pressed next will appear, so follow the indication. (In this example, you should press the ◀ key.)



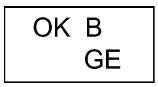
If the pressed key works normally, the key to be pressed next will appear. If any error is noted, the LCD shows the "X" together with the key to be pressed as shown below. Press the key displayed on the LCD to proceed. (If this error persists and the test no longer proceeds, then go to Chapter IV, TROUBLESHOOTING.)



After completion of checking of all keys, the machine displays "OK" together with the head rank and destination as shown below and prints the same information.



(Print)



When printing finishes, cut the tape. The machine displays "CUT" and enters the CUT submode.

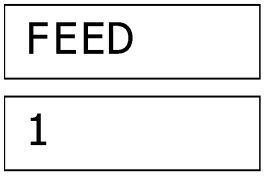
CUT submode (4 key*)

(*You may switch back to this CUT submode from any other submode by pressing the **4** key, except during the key depressing test in the KEY submode.)

NOTE: You may skip this submode since you may check the tape cutter in any other submode.

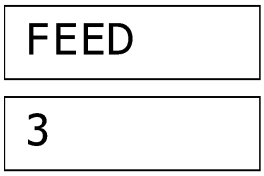
With the "CUT" displayed, the machine is in the CUT submode.

Press the ↵ key. The machine displays "FEED," feeds the tape and then displays "1."



Cut the tape. The machine displays "FEED," feeds the tape and then displays "2."

Cut the tape. The machine displays "FEED," feeds the tape and then displays "3."

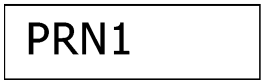


Cut the tape. The machine displays "PRN1" and enters the PRINT1 submode.

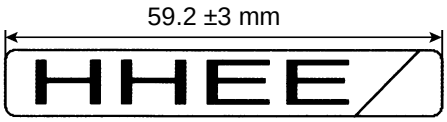
PRINT1 submode (5 key*)

(*You may switch back to this PRINT1 submode from any other submode by pressing the **5** key, except during the key depressing test in the KEY submode.)

With the "PRN1" displayed, the machine is in the PRINT1 submode.



Press the ↵ key. The machine prints the test pattern as given below.



The print length should be 59.2 ±3 mm.

After completion of printing, the machine automatically initializes the internal memory and then turns itself off.

If the print length is out of the specified range, adjust the variable resistor on the main PCB by using a flat screwdriver as shown below.

If the print length is longer or shorter, rotate the variable resistor for adjustment. After the adjustment, print a test pattern again in the PRINT1 submode and confirm the print length.

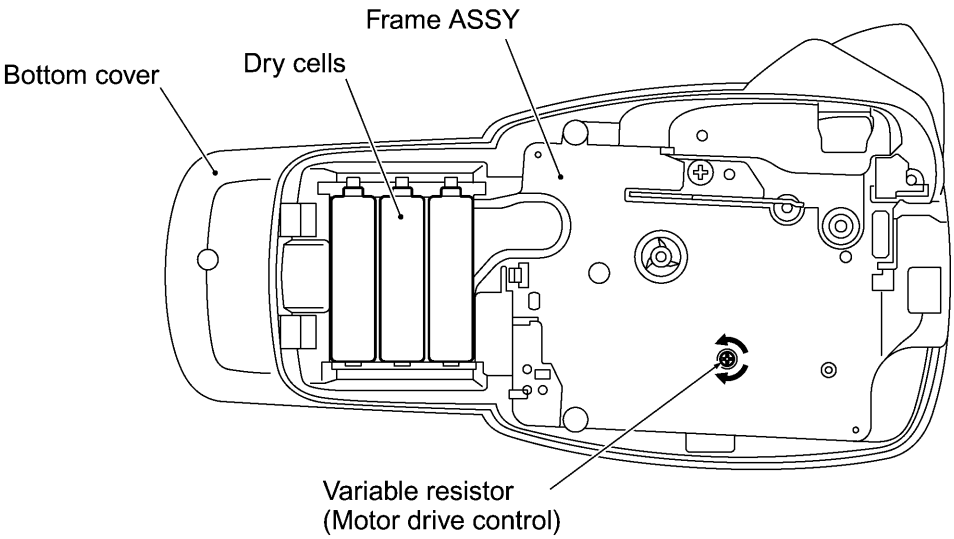


Figure 3.2-1 Adjusting the Print Length by Rotating the Variable Resistor

CHAPTER IV 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 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) Before starting disassembly jobs, first remove dry cells and discharge electrolytic capacitor C20 on the key PCB for at least 3 seconds with a resistor of 100Ω, 1 to 3W.

(4) To repair an error which occurred in the thermal print head and its related sections, disconnect the head flat cable until repairs are finished.

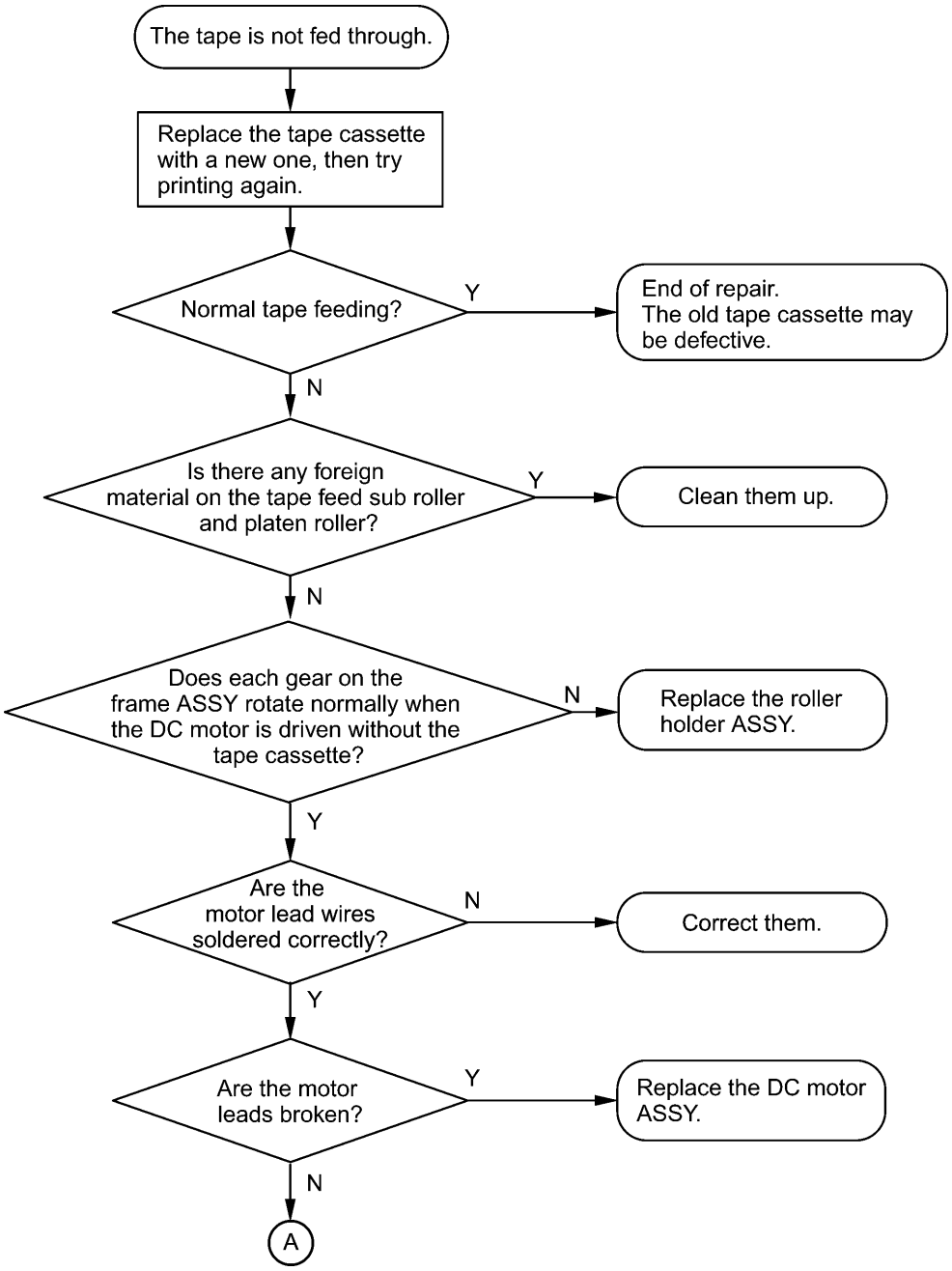
4.2 After Repairing

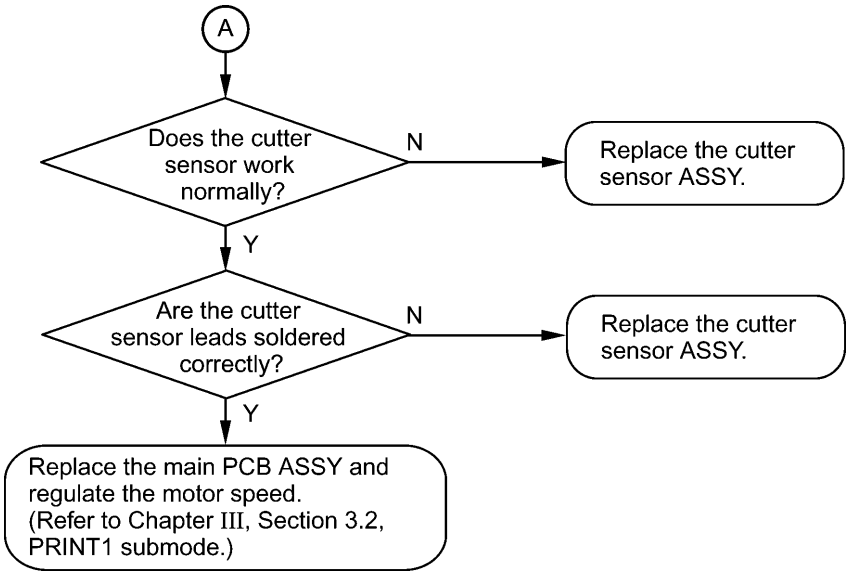
After repairing the defective section, be sure to check again to see if the repaired section works correctly. In particular, if you replace the main PCB ASSY, make a final check given in CHAPTER III, Section 3.2.

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

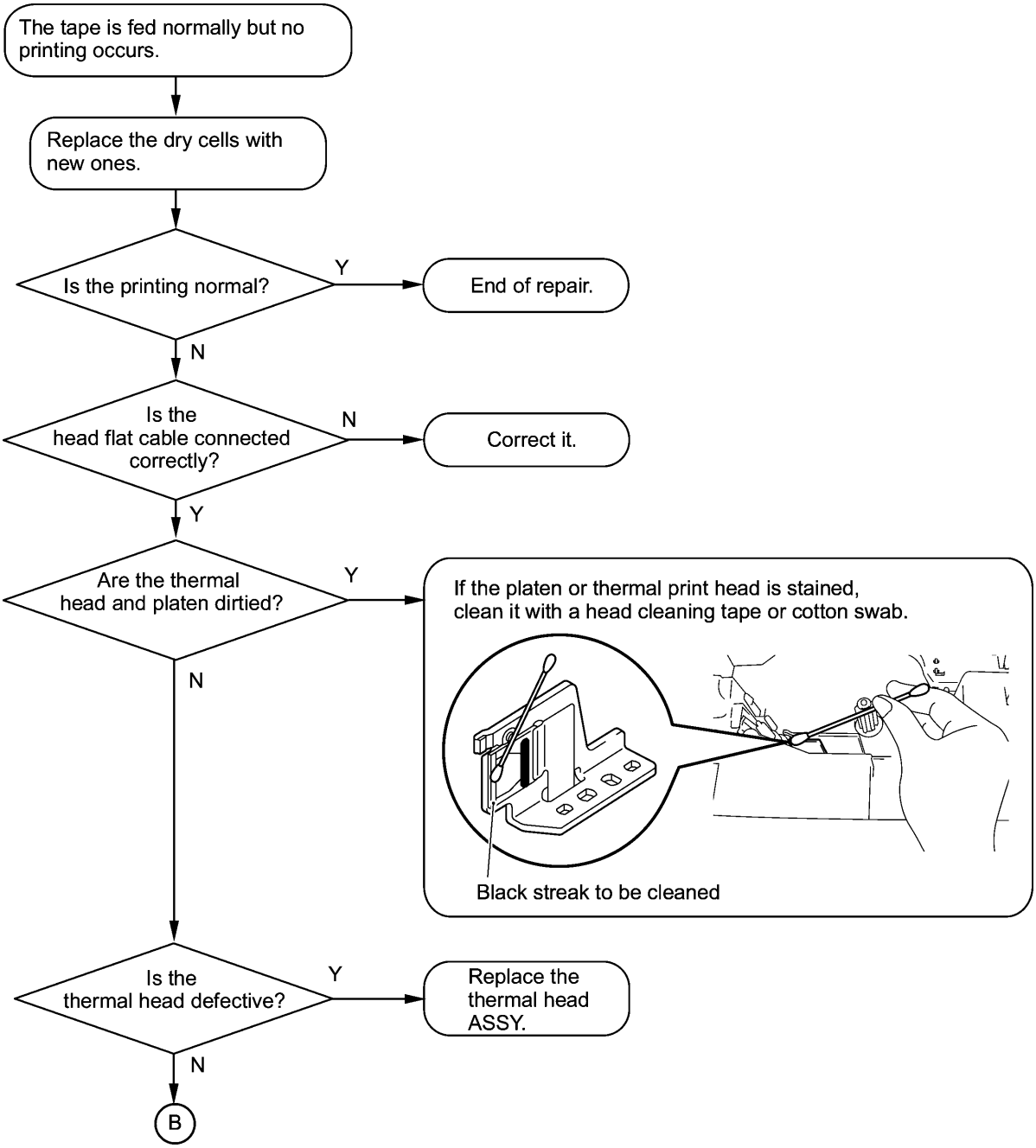
4.3 Troubleshooting Flows

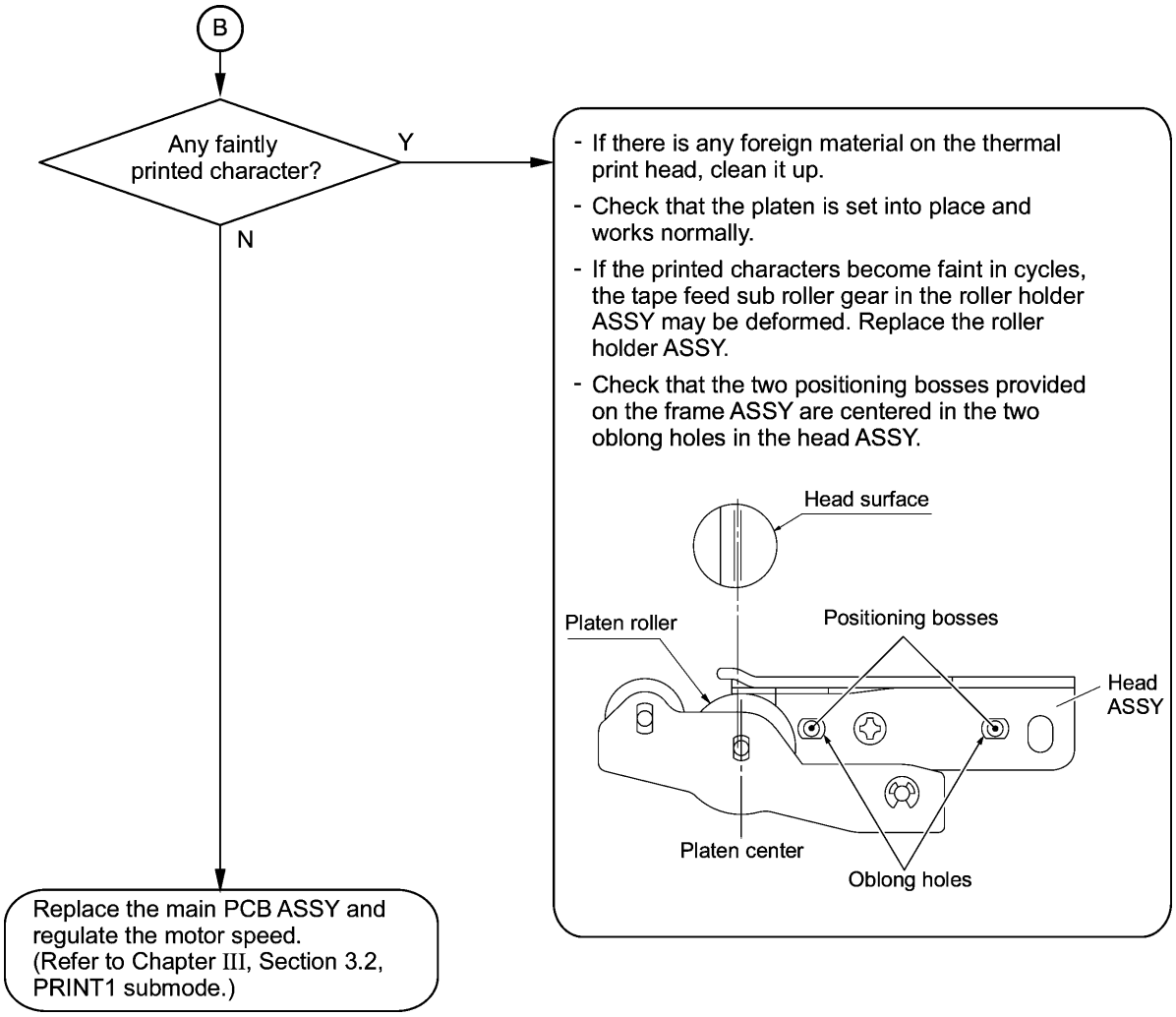
[1] Tape feeding failure



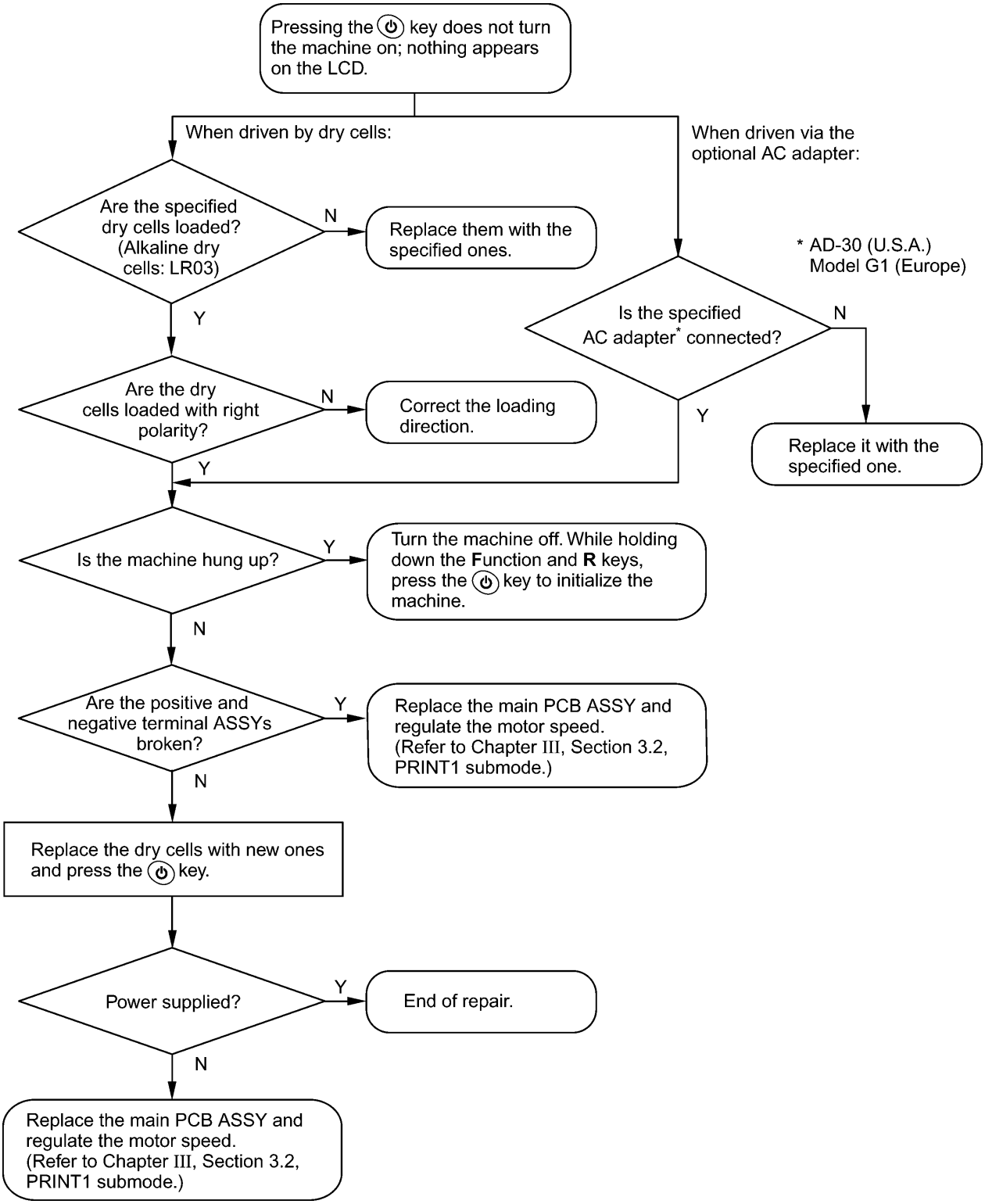

A
Does the cutter sensor work normally?
N
Replace the cutter sensor ASSY.
Y
Are the cutter sensor leads soldered correctly?
N
Replace the cutter sensor ASSY.
Y
Replace the main PCB ASSY and regulate the motor speed. (Refer to Chapter III, Section 3.2, PRINT1 submode.)

[2] Printing failure

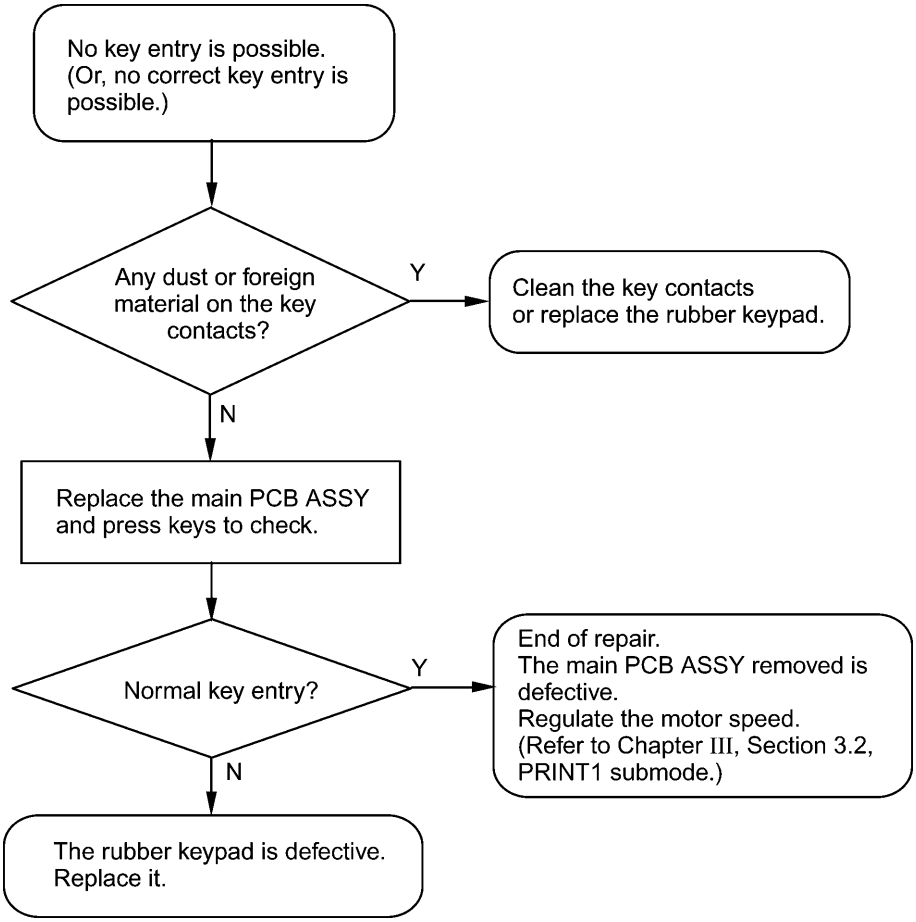



B
Any faintly printed character?
Y
N
- If there is any foreign material on the thermal print head, clean it up.
- Check that the platen is set into place and works normally.
- If the printed characters become faint in cycles, the tape feed sub roller gear in the roller holder ASSY may be deformed. Replace the roller holder ASSY.
- Check that the two positioning bosses provided on the frame ASSY are centered in the two oblong holes in the head ASSY.
Head surface
Platen roller
Positioning bosses
Head ASSY
Platen center
Oblong holes
Replace the main PCB ASSY and regulate the motor speed. (Refer to Chapter III, Section 3.2, PRINT1 submode.)

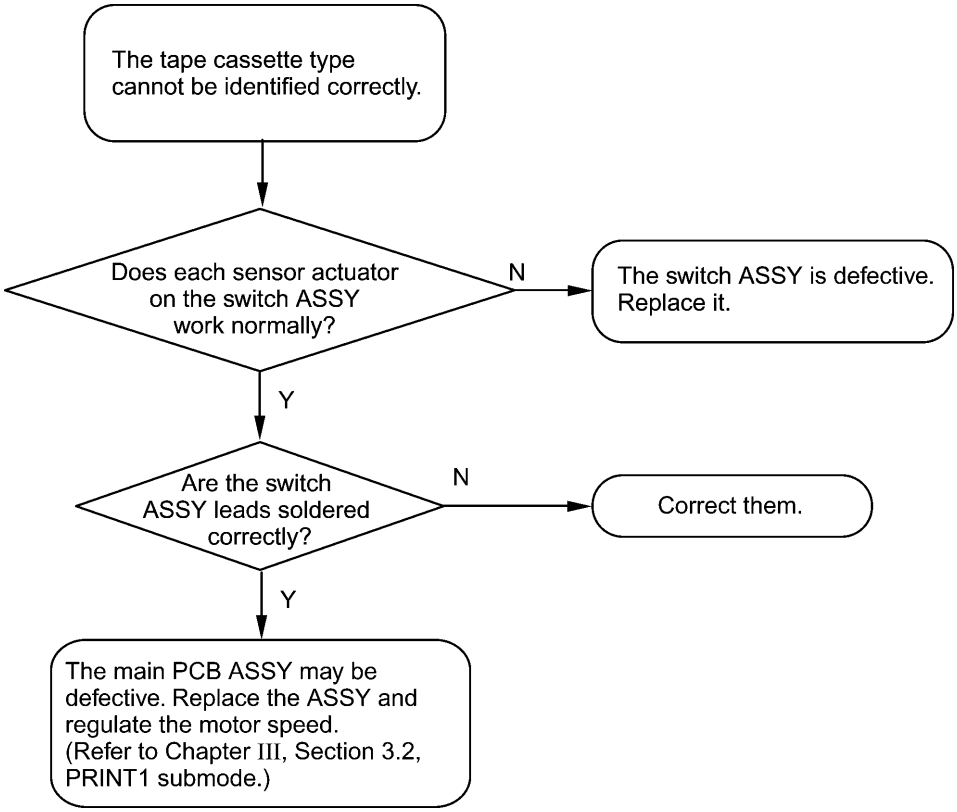
[3] Powering failure (Nothing appears on the LCD.)



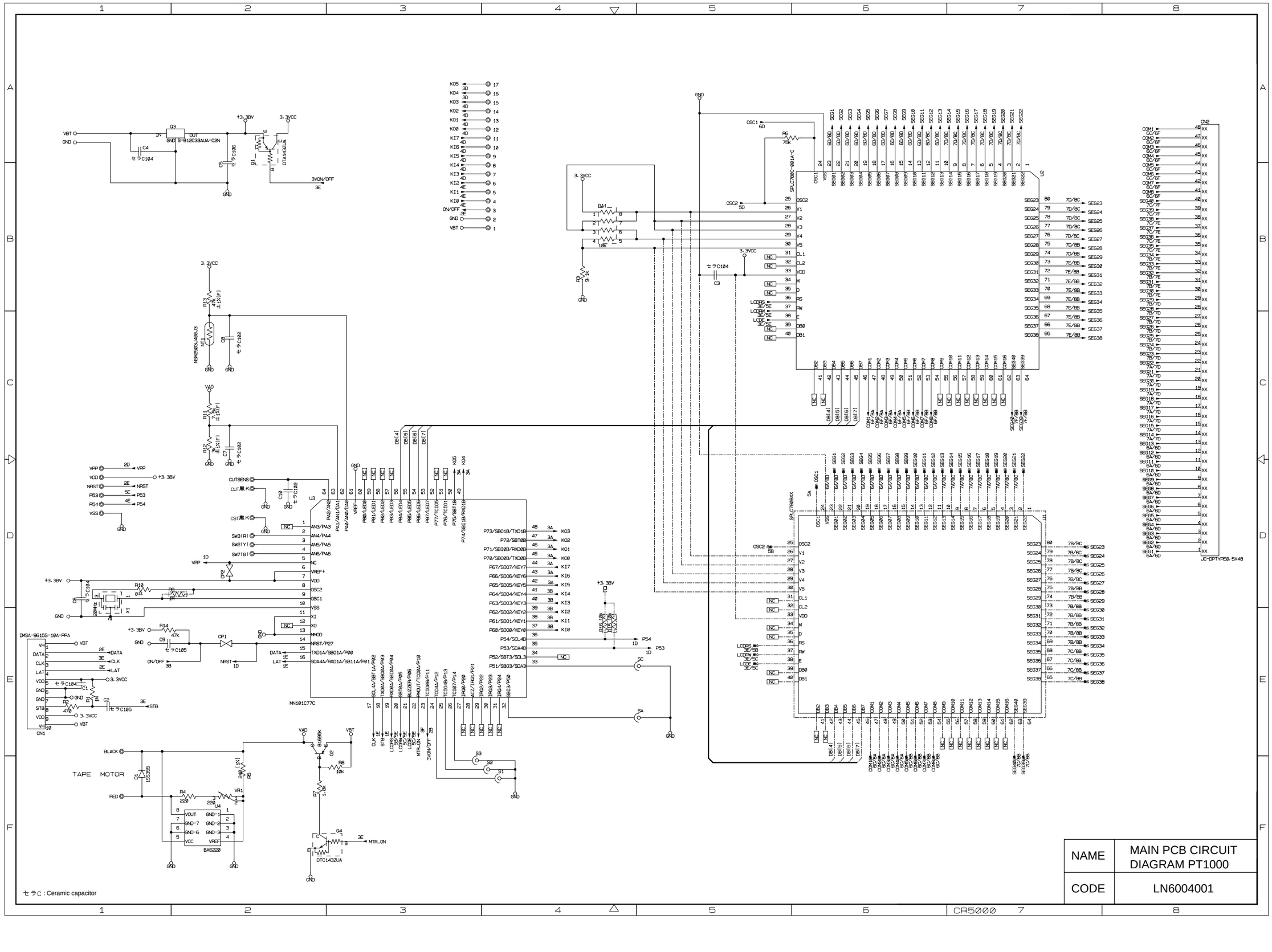
[4] No key entry possible



[5] Tape cassette type not identified



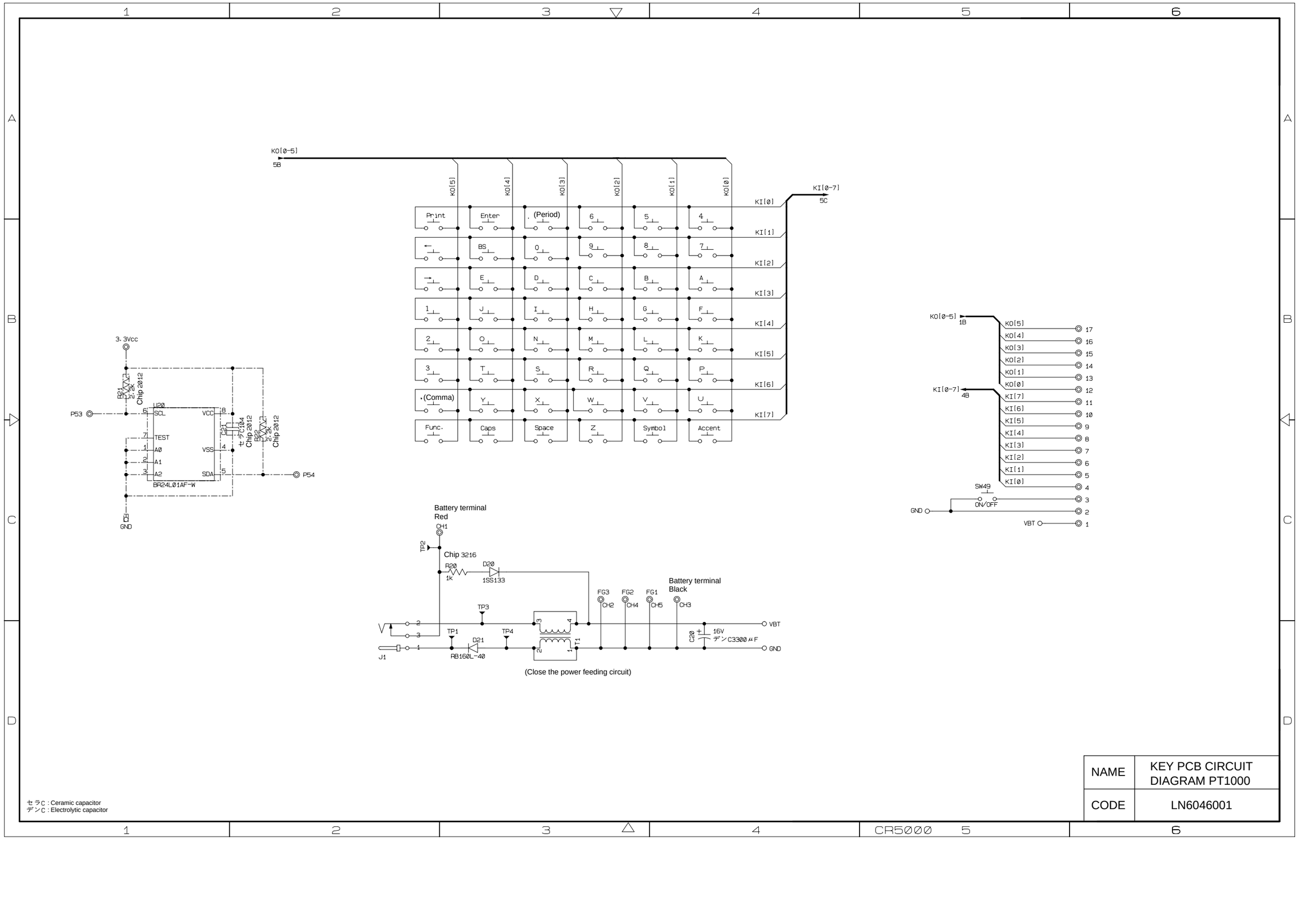
Appendix A. Main PCB Circuit Diagram



NAME	MAIN PCB CIRCUIT DIAGRAM PT1000
CODE	LN6004001

CR5000

Appendix B. Key PCB Circuit Diagram



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