



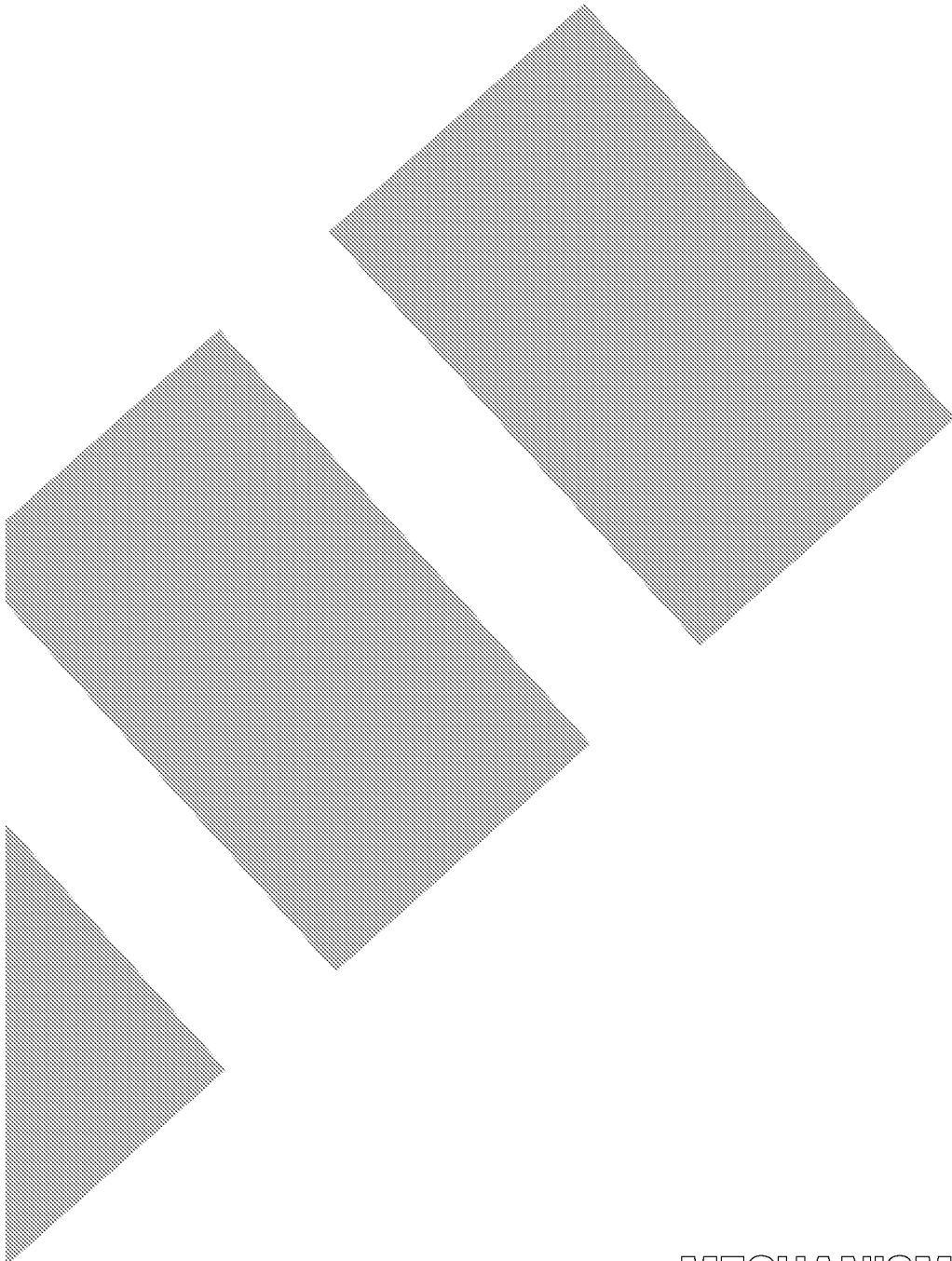
P-touch

SERVICE MANUAL

MODEL: PT-1100/1130/1170/1180/11Q

PT-1250/1160

ST-1150(Heavy Duty Labeler™)



REVISED 1

MECHANISMS & ELECTRONICS



SERVICE MANUAL

MODEL: PT-1100/1130/1170/1180/11Q

PT-1250/1160

ST-1150(Heavy Duty Labeler™)

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PREFACE

This publication is a service manual covering the specifications, theory of operation, disassembly/reassembly procedure, and troubleshooting of the Brother PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150.

It is intended for service personnel and other concerned persons to accurately and quickly provide after-sale service for our PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150.

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 three chapters and appendices.

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CHAPTER I

SPECIFICATIONS

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CHAPTER I SPECIFICATIONS

1.1 MECHANICAL SPECIFICATIONS

1.1.1 External Appearance

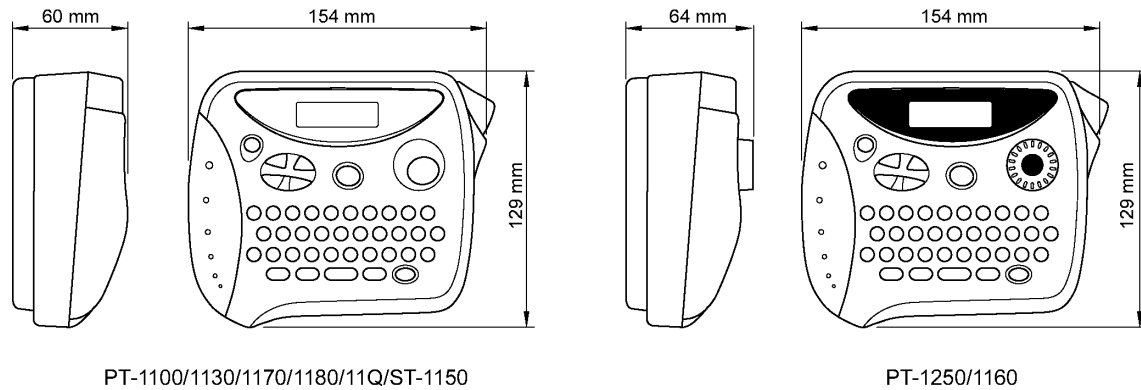


Fig. 1.1-1 External Appearance

- (1) Dimensions (W x D x H) 154 x 129 x 60 mm
(PT-1100/1130/1170/1180/11Q/ST-1150)
154 x 129 x 64 mm (PT-1250/1160)

- (2) Weight
Machine proper only Approx. 400 g
In package

Packaging	Weight (g)
Carton with One Unit	670g
Clamshell	650g
Carrying Case	1300g

(including the machine, packing materials and packaged standard components)

1.1.2 Keyboard

- (1) Entry system Rubber 41 key (PT-1100/1130/1170/1180/11Q/ST-1150)
Rubber 40 key and tact switch (PT-1250/1160)
- (2) Number of alphanumeric and symbol keys 30
- (3) Number of function keys 11 (PT-1100/1130/1170/1180/11Q/ST-1150)
10 (PT-1250/1160)
(including On/Off key, L/R pointing keys must be counted as one.)
- (4) Key arrangement See Fig. 1.1-2.

1.1.3 Display

- | | | |
|-----|--------------------------------|-------------------------------------|
| (1) | Display type | Liquid crystal display (LCD) |
| (2) | Number of columns | 8 columns x 1 row (See Fig. 1.1-2.) |
| (3) | Number of indicators | 10 (See Fig. 1.1-2.) |
| (4) | Character size | 5 dots wide by 7 dots high |
| (5) | Field-of-view angle adjustment | Fixed by a resistor |

1.1.4 Printing Mechanism

- | | | | |
|-----|-----------------------------------|--|----------------------------|
| (1) | Print method | Thermal transfer onto plastic tapes (laminated tape and non-laminated tape)
(Fixed print head and tape feeding mechanism) | |
| (2) | Print speed | 10 mm/second (Typical) | |
| (3) | Print head | | |
| | Type | Thermal print head | |
| | Heat generator | Consists of 64 heating elements vertically aligned | |
| | Size of heating element | 0.195 mm wide by 0.141 mm high | |
| (4) | Character size | Ratio | Width x height |
| | Standard (Small) size | (1) | 2.26 x 2.96 mm 16 x 21 dot |
| | Double width | (W2) | 4.37 x 2.96 mm 31 x 21 dot |
| | Double height | (H2) | 2.26 x 5.92 mm 16 x 42 dot |
| | Double width and double height | (4) | 4.37 x 5.92 mm 31 x 42 dot |
| | Quadruple width and double height | (8) | 8.74 x 5.92 mm 62 x 42 dot |

This part explains the dot size of "H" character as an example in the table above, because the character size is different by the width of the tape and the character.

1.1.5 Tape Cassette

- | | | |
|-----|-----------------------------|--|
| (1) | Cassette | Cartridge type (TZ-cassette) |
| (2) | Types of tape cassettes | |
| | Laminated tape cassette | Laminated tape, ink ribbon, and adhesive base tape |
| | Non-laminated tape cassette | Non-laminated tape and ink ribbon |
| | Cloth tape cassette | Cloth tape and ink ribbon |
| (3) | Tape size | |

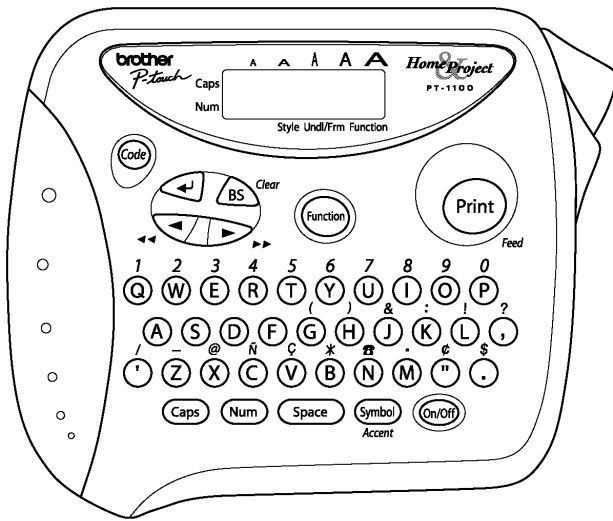
	Width	Length
Laminated tape	6, 9, 12 mm	8 m
Non-laminated tape	6, 9, 12 mm	8 m
Cloth tape	12 mm	4 m

- | | | |
|-----|---------------------------------------|---|
| (4) | Tape cassette packed with the machine | Laminated tape cassette containing a 12-mm-wide back ink ribbon, laminated tape, and adhesive base tape |
|-----|---------------------------------------|---|

1.1.6 Tape Cutter

- | | | |
|-----|--------------|--------------------------------------|
| (1) | Tape cutting | Manual cutting with the cutter lever |
| (2) | Cutter unit | Replaceable by the customer |

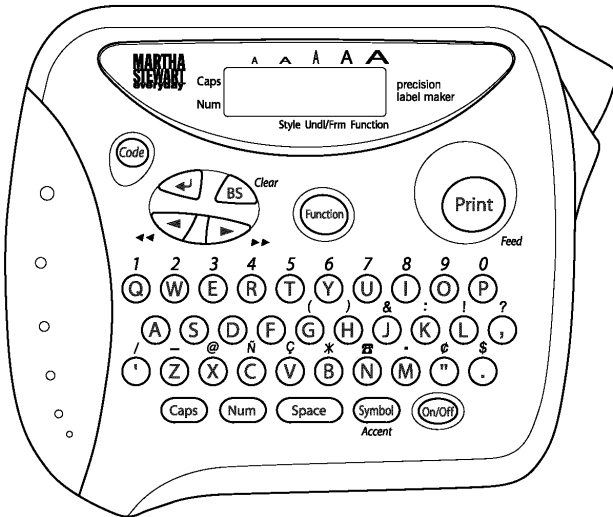
PT-1100 U.S.A.



PT-1100 AUSTRALIA



PT-1130 U.S.A.



ST-1150 U.S.A./CANADA

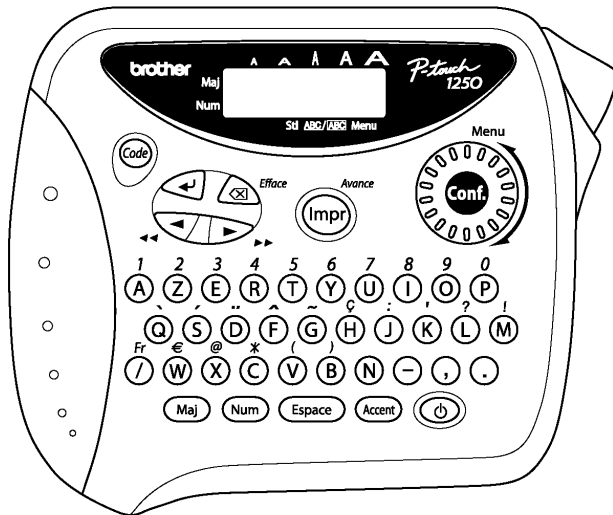


Fig. 1.1-2 Key Arrangement (1)

The diagram shows the front panel of the Brother P-touch 11Q. At the top, the 'brother' logo is on the left, and 'P-touch 11Q' is on the right. Below the logo are four arrow icons pointing up, and below that are the labels 'Caps' and 'Num' next to a rectangular display area. Below the display is the text 'Style Undr/Frm Function'. To the left of the display is a 'Code' button. Below the display is a circular navigation pad with a 'BS' (Backspace) button at the top, a 'Clear' button at the top right, and four arrow buttons (left, right, up, down) around the perimeter. To the right of the navigation pad is a 'Function' button. Further right is a large 'Print' button with the word 'Feed' written below it. Below these buttons is a numeric keypad with letters: 1 (Q), 2 (W), 3 (E), 4 (R), 5 (T), 6 (Y), 7 (U), 8 (I), 9 (O), 0 (P), and a question mark. The second row includes a slash/apostrophe, a hyphen/underscore, an at-sign, a number 2, a number 3, an asterisk, a hash, a dollar sign, and a percent sign. The third row includes a single quote, a double quote, and a period. Below the keypad are five function buttons: 'Caps', 'Num', 'Space', 'Symbol', and 'On/Off'. The 'Symbol' button has 'Accent' written below it.

1-4

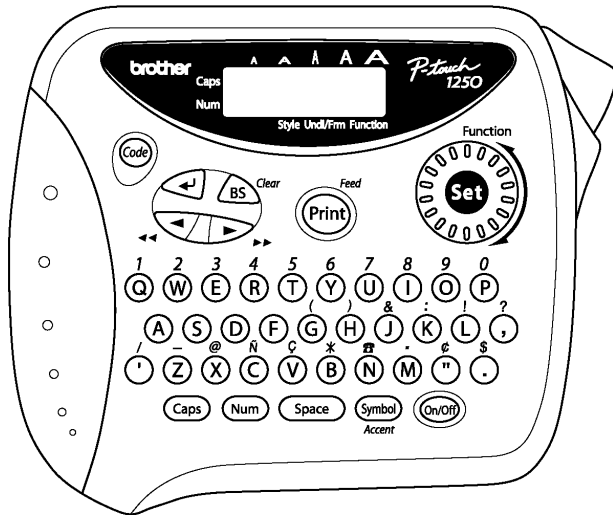
PT-1250 FRENCH



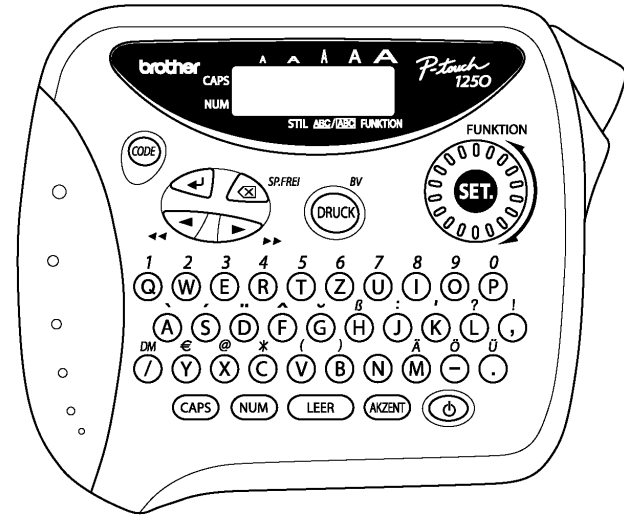
PT-1250 BELGIUM



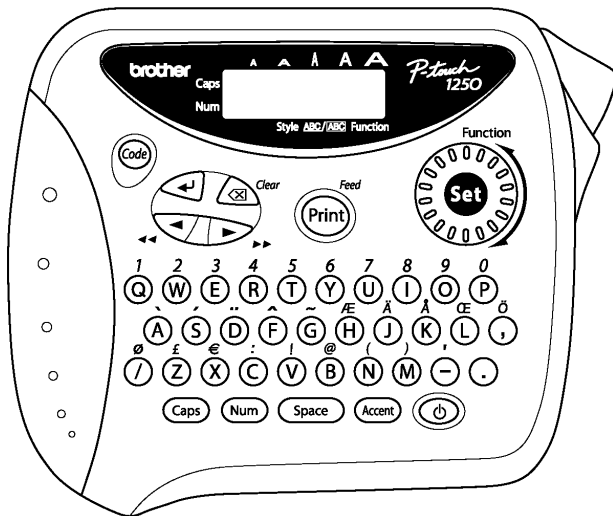
PT-1250 CANADA



PT-1250 GERMAN



PT-1250 U.K.



PT-1160 U.S.A.

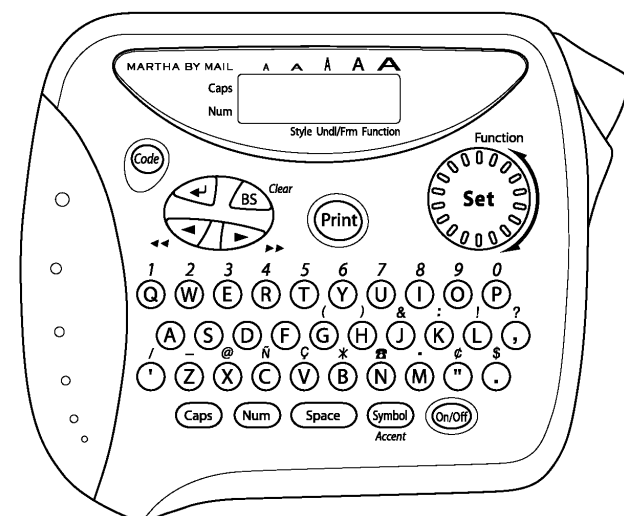


Fig. 1.1-2 Key Arrangement (3)

1.2 ELECTRONICS SPECIFICATIONS

1.2.1 Character Generator

- | | | | |
|-----|------------------------|---|-----|
| (1) | Internal characters | U.K./ FRA/ BEL (PT-1250) | 205 |
| | | GER (PT-1250) | 213 |
| | | U.S.A./ CAN./AUS. | 176 |
| | | (PT-1100/1130/1170/1180/11Q/ST-1150, and PT-1160/1250 for CAN.) | |
| (2) | Internal font | HELSINKI | |
| (3) | Print buffer capacity | 55 characters | |
| (4) | Phrase memory capacity | 300 characters | |

1.2.2 Power Supply



- | | | |
|-----|---------------------------|---|
| (1) | Power supply | Driven by 6 batteries
Optional AC adapter (7VDC, 1.2A) available
* For PT-1180, the power supply is batteries only.
The optional AC adapter is not available. |
| (2) | Battery type | 6 alkaline batteries (AM4/ LR03) |
| (3) | Service life of batteries | Will last through one tape cassette, and then some.
(at room temperature and normal humidity) |
| (4) | Automatic power off | Yes (If the machine remains unused for approx. 5 minutes, it automatically powers itself off.) |
| (5) | Battery indication | <p>1) If the voltage level of the VAD rises over approx. 10.8V, the CPU immediately shuts down the power.</p> <p>2) If it drops even more below approx. 5.3V, the CPU displays the message to warn you of a low battery after completion of printing.</p> <p>3) If it drops even more below approx. 5.0V, the CPU interrupts the printing and displays the message to warn you of a very low battery.</p> <p>4) If it drops below approx. 4.8V, the CPU immediately shuts down the power.</p> <p>* Displays different for each country when the battery is weak or when the battery became empty are indicated below.</p> <p>* Displays of specification for U.S.A. and for Canada can be switched.</p> |

		UK/BELGIUM	FRENCH	GERMAN	U.S.A./AUSTRALIA	CANADA
Battery weak	5.3V	BATTERY	B:V	BATTERIE	BATTERY	PILE!
Battery empty	5.0V	<u>BATTERY •</u>	<u>B:V • • • • •</u>	<u>BATTERIE</u>	<u>BATTERY •</u>	<u>PILE! • • •</u>


The underline of eight (8) characters length is drawn for display when the Battery Empty.

1.3 SPECIAL KEY

1.3.1 Format

Push the "Code" key + "BS()" key + "On/Off ()" key, when the power is off.

1.3.2 Demonstration Print

Push "Code" key + "D" key. (PT-1100/1130/1170/1180/11Q/ST-1150, and PT-1160/1250 for CAN.)
Push "Code" key + "D" key+ "On/Off ()" key. (PT-1250 not only for CAN.)
(It is effective when there is not any data in the text.)

CHAPTER II

MECHANISMS

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CHAPTER II MECHANISM

2.1 THEORY OF OPERATION

2.1.1 Print Mechanism

(1) Structure of Thermal Head

This machine uses thermal transfer printing. The thermal print head has a heat generator consisting of 64 heating elements which are vertically aligned as shown in Fig. 2.1-1. Each heating element is 0.195 mm wide by 0.141 mm high.

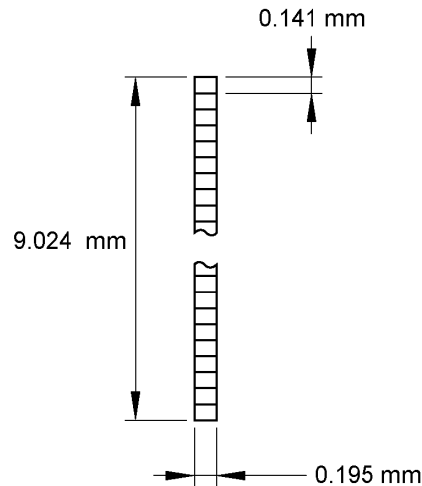


Fig. 2.1-1 Heat Generator of Thermal Head

(2) Printing process

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

- * Laminated tape when using laminated tape cassettes.
- Non-laminated tape when using non-laminated cassettes.

[For tape cassette except non-laminated thermal film tape cassettes]

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 character on the tape.

[For non-laminated thermal film tape cassettes]

If the selected heating element(s) generates heat, the thermal film tape develops itself to produce a dot on the tape. The tape is advanced and the next heating cycle is repeated, thus forming a character on the tape.

(3) Character Formation

While the drive motor (DC motor) feeds the tape and ink ribbon by 0.141 mm for approx 14.0 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 character having no gap between adjacent printed dots.

2.1.2 Platen Roller, (Tape Feed) Sub Roller Setting & Retracting Mechanism

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

The roller holder ASSY supports the platen roller and the sub roller so that :

- the platen roller can move perpendicularly to the thermal head and rotate freely and
- the sub roller can move perpendicularly to the tape feed roller and rotate freely.

By closing the cassette cover ASSY, the holder cam of cassette cover ASSY pushes the roller holder ASSY toward thermal head side by pushing A face of the roller holder ASSY.

The platen roller is pressed perpendicularly against the thermal head with the tape and ink ribbon (only the tape when using non-laminated thermal film tape cassettes) sandwiched inbetween under a uniform load by the roller holder springs (upper and lower). Also, the (tape feed) sub roller is pressed perpendicularly against the tape feed roller built in the tape cassette with the tape (the laminate tape and adhesive base tape when using laminated tape cassettes) sandwiched inbetween by the roller holder springs (upper and lower) and at the same time the (tape feed) sub roller gear becomes engaged with the tape idle gear.

Opening the cassette cover ASSY, (the holder cam of the cassette cover ASSY is released from the roller holder ASSY), retracts the roller holder ASSY from the thermal head, providing you with enough space to replace the tape cassette.

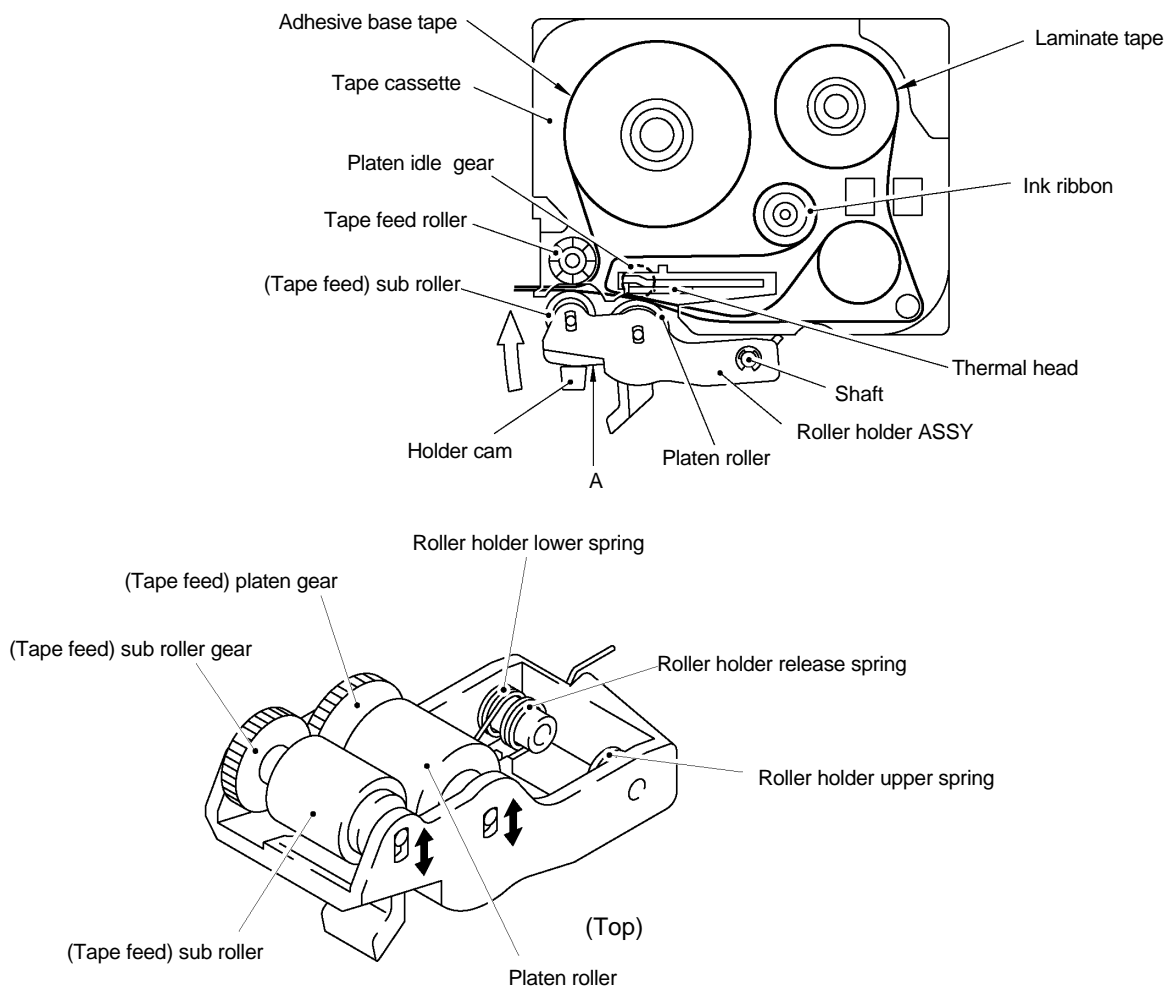


Fig. 2.1-2 Platen and (Tape Feed) Sub Roller Setting & Retracting Mechanism

2.1.3 Tape & Ribbon Feed Mechanism

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

(1) Tape Feeding

As the tape feed motor (DC motor) rotates, the rotation is transmitted via the gear train to the platen idle gear (which rotates both the platen gear) and the tape idle gear (which rotates the tape feed sub roller).

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

The feeding amount of the platen is slightly less than that of the tape feed sub roller.

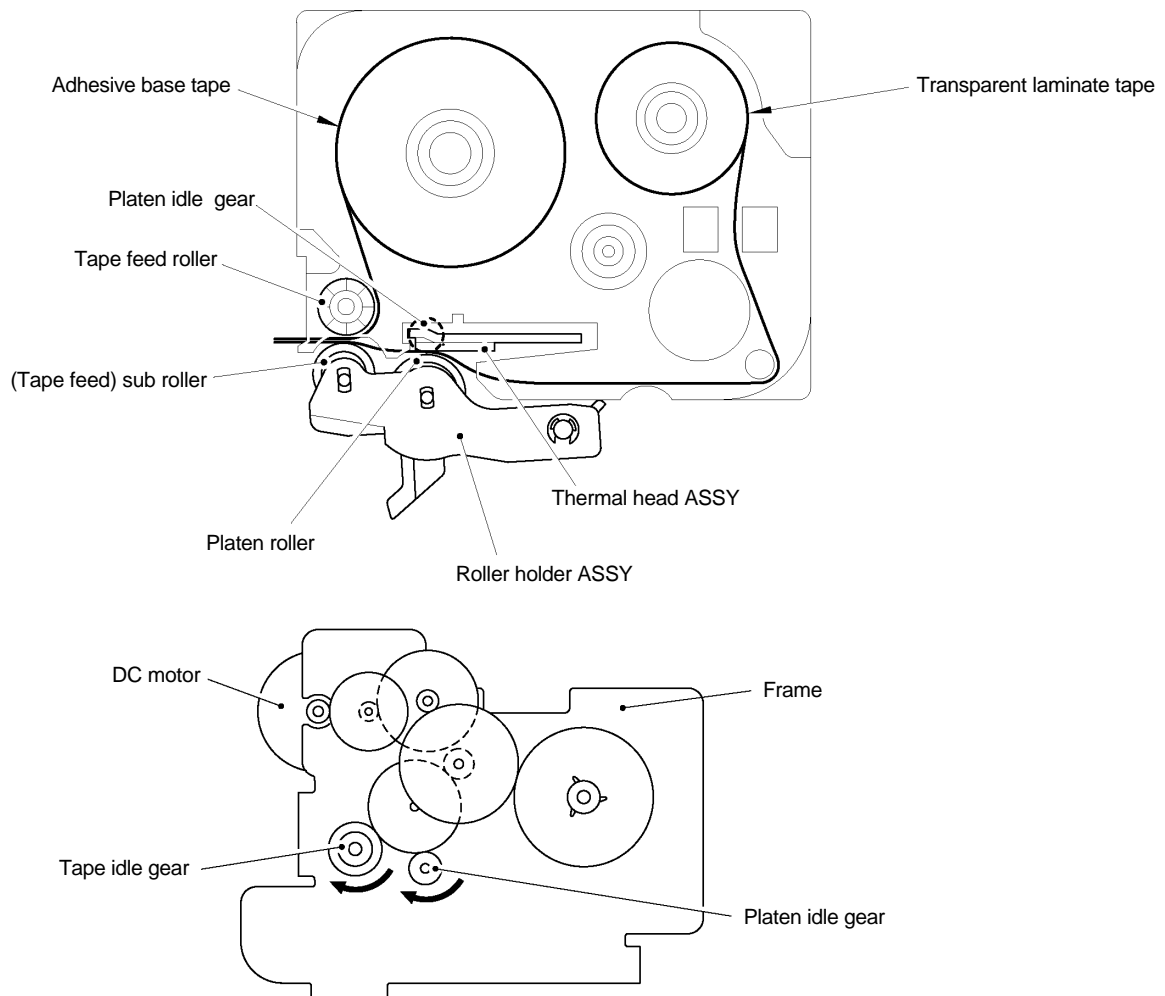


Fig. 2.1-3 Tape Feeding Mechanism

(2) Adhesive Base Tape Feeding (only for laminated tape cassettes)

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

When a transparent laminate tape and an 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.

(3) Ink Ribbon Feeding

As the DC 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 roller and the ribbon drive cam, the feed amount of the ribbon drive cam is slightly greater than that of the platen idle gear. The difference between the tape 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.

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

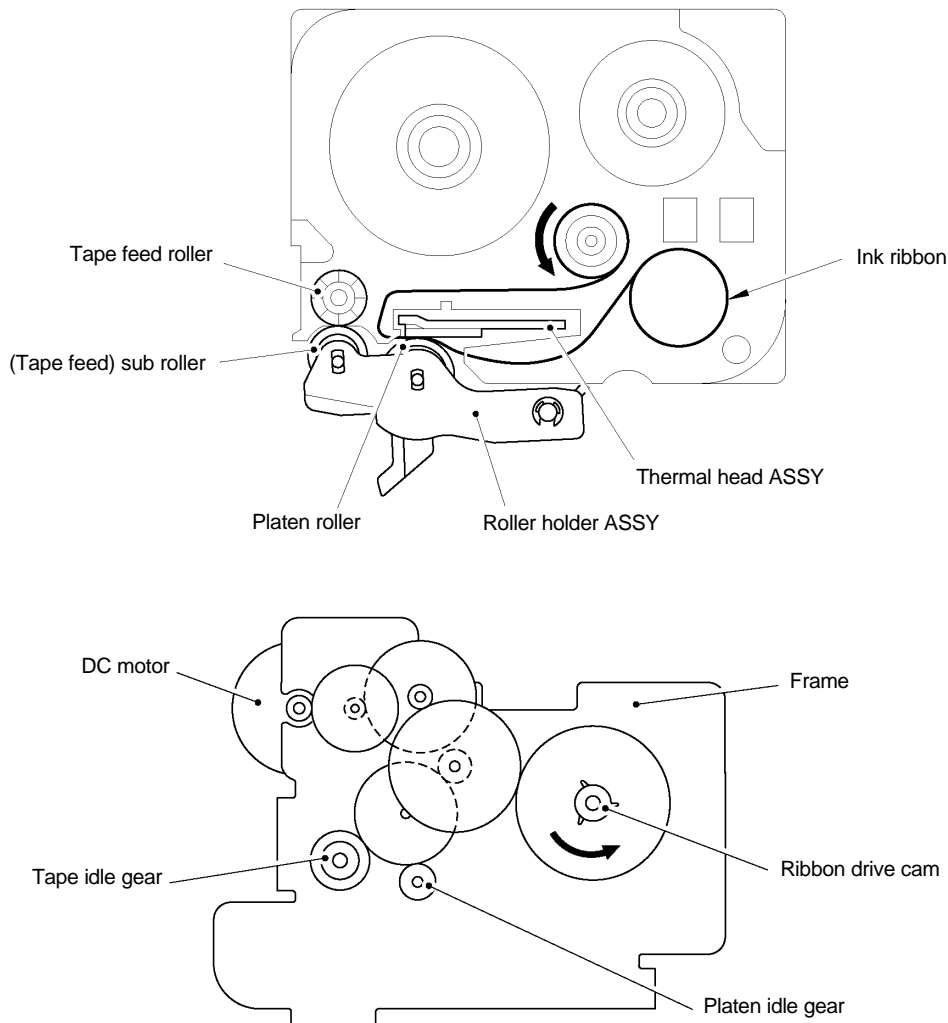


Fig. 2.1-4 Ribbon Feeding Mechanism

2.1.4 Tape Cutter Mechanism

The tape cut unit consists from the cutter case ASSY and the board.

Tape that finished printing is fed out from the tape cassette and stops at a point passed between the cutter case ASSY and the board.

When the cutter lever is pushed at this point, then, the cutter case ASSY (cutter blade) is operated to cut tape.

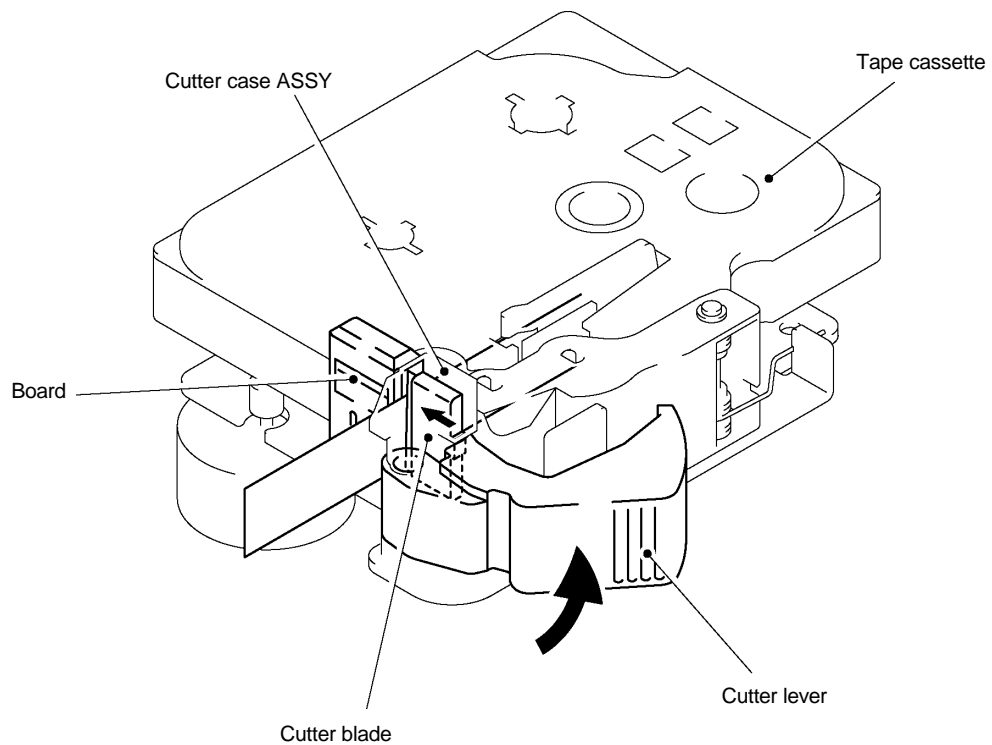


Fig. 2.1-5 Tape Cutter Mechanism

2.1.5 Cutter Safety Lock Mechanism

When the cassette cover ASSY 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 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 blade from coming out of the cutter case ASSY for safety, as shown below.

Closing the cassette cover ASSY or loading a tape cassette release the cutter safety lock mechanism as follows.

Closing the cassette cover ASSY pivots the roller holder ASSY 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.

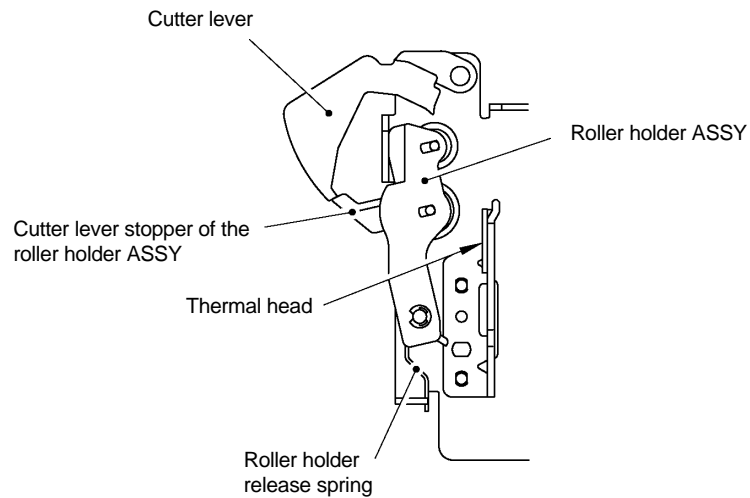
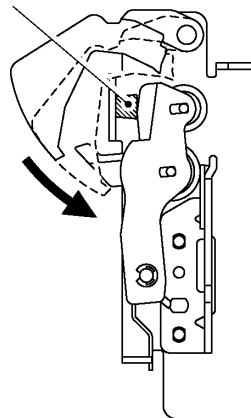
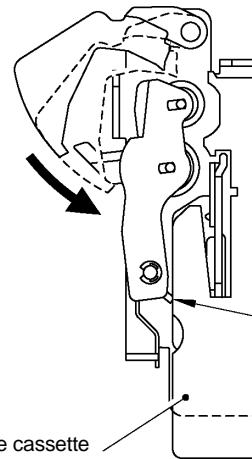


Fig. 2.1-6 Cutter Safety lock Mechanism

Holder cam (provided on the inside of the cassette cover ASSY)



Closing the cassette cover



Loading the cassette cover

Fig. 2.1-7 Releasing the Cutter Safety Lock Mechanism

2.1.6 Interlock Mechanism of the Roller Holder

- (1) When the cassette case ASSY is opened, then the holder cam attached at back side of cassette cover is released from surface A. Following to that, the roller holder ASSY is retracted from the thermal head side with tension of the roller release spring.
- (2) When the cassette cover ASSY is closed, then the holder cam located at backside pushes the thermal head at roller holder ASSY by pressing A surface of the roller holder ASSY.

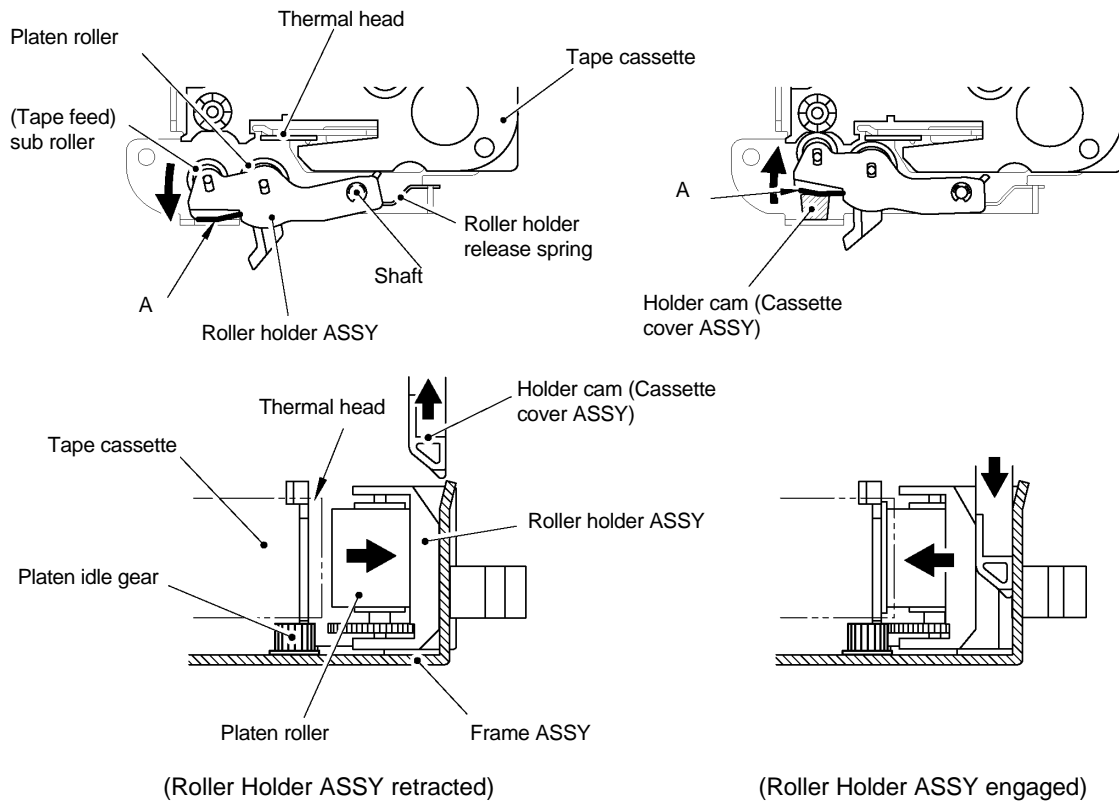


Fig. 2.1-8 Holder Cam (Cassette Cover ASSY) and Roller Holder ASSY

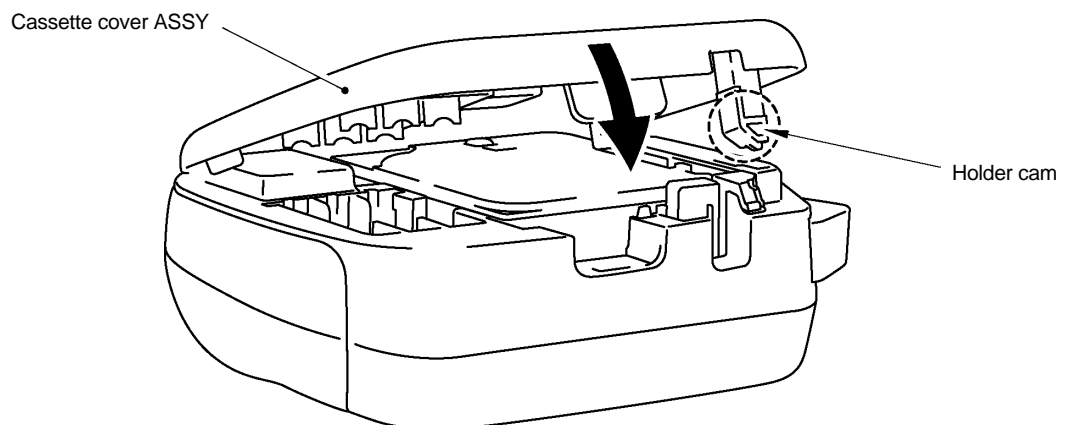


Fig. 2.1-9 Interlock Mechanism of the Roller Holder

2.2 DISASSEMBLY & REASSEMBLY

PT2002008

2.2.1 Disassembly Procedure

[1] Removing the cassette cover ASSY, the tape cassette and the batteries

- (1) Turn the machine upside down.
- (2) Open the cassette cover ASSY by applying the force toward "A" direction.
- (3) Push the rib "B" on the holder cam assembled on the cassette cover ASSY to the direction of the arrow to remove the holder cam from the cassette cover ASSY.

Caution: Never draw out the holder cam. The rib "B" on the holder cam may be damaged.

- (4) The cassette cover is removed by applying a force toward "D" direction of the arrow by pushing the "C" section outward.
- (5) Remove the tape cassette.
- (6) Remove the batteries.

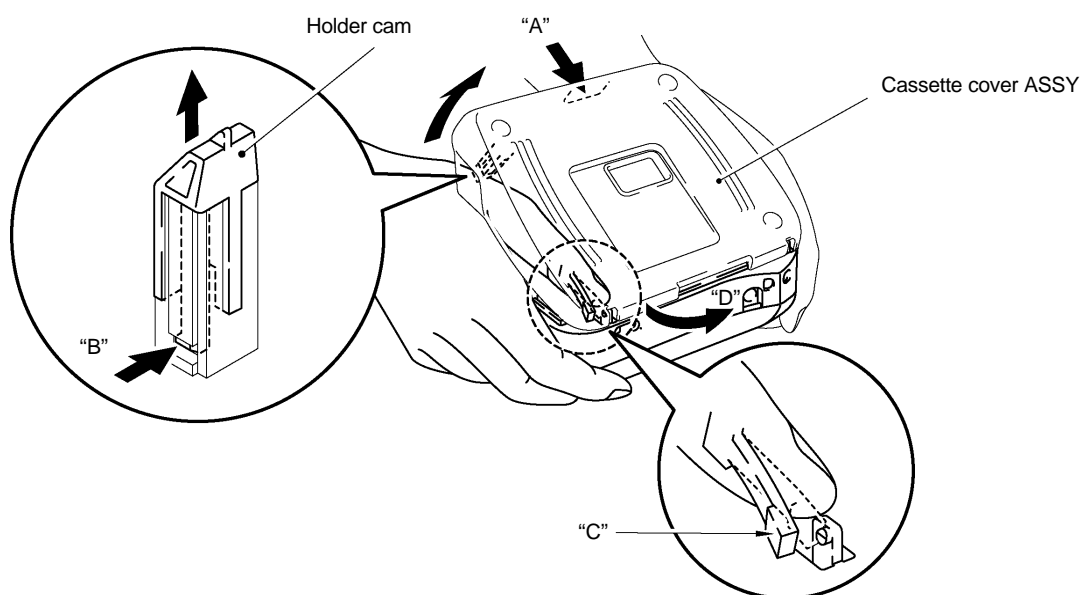


Fig. 2.2-1 Removing the Cassette Cover

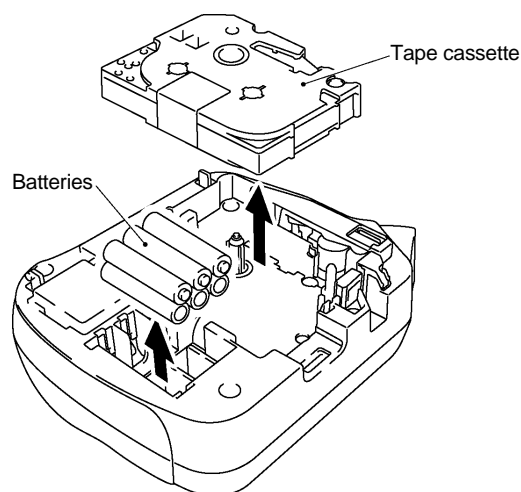


Fig. 2.2-2 Removing the Tape Cassette and Batteries

[2] Removing the bottom cover, the cutter case ASSY and the board

- (1) Place the machine upside down.
- (2) Pull out the cutter case ASSY and the board from the frame.
- (3) Remove the four screws, then the bottom cover and the upper cover are able to be separated.

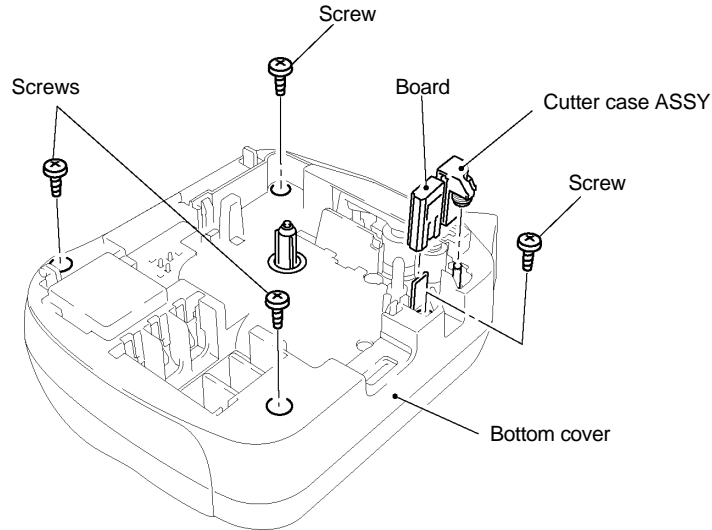


Fig. 2.2-3 Removing the Bottom Cover, Cutter Case ASSY and the Board (1)

- (4) Open the upper cover to the left as shown below.
- (5) Discharge the condenser (C1) on the sub PCB ASSY with tool like a screwdriver.
- (6) Disconnect the thermal head flat cable from the main PCB.

Note: Discharge without fail before disconnecting the thermal flat cable, otherwise the electronic part such as LSI or others should be damaged.

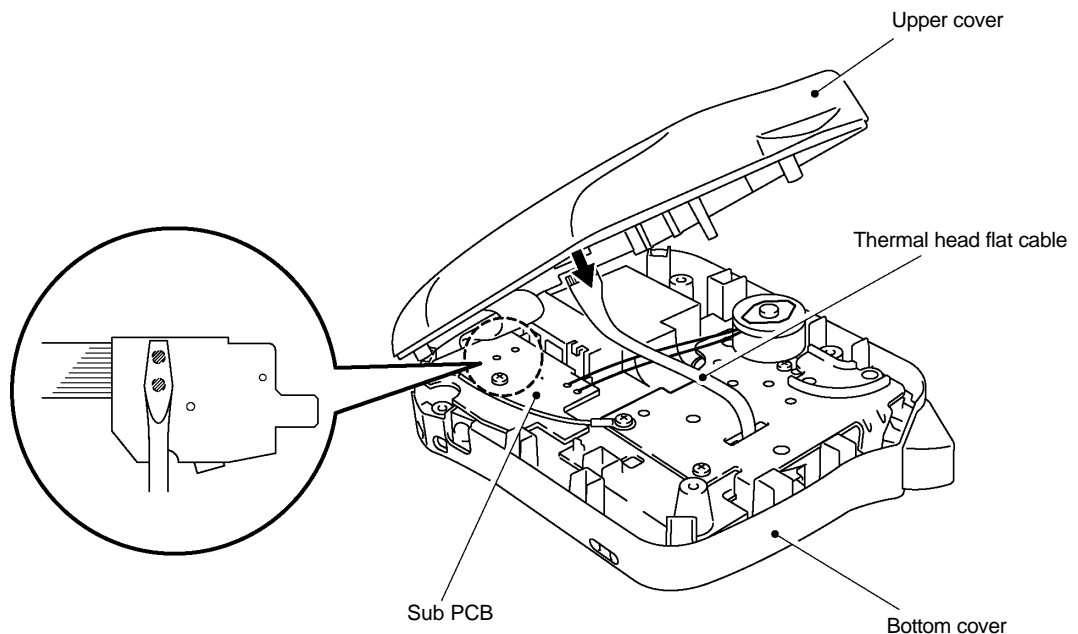


Fig. 2.2-4 Removing the Bottom Cover, Cutter Case ASSY and the Board (2)

[3] Removing the frame ASSY

- (1) Remove the two motor harnesses from the sub PCB by melting the solder.
- (2) Remove the three screws and remove the frame ASSY from the bottom cover.

Note: The cutter lever will be disconnected from the cutter lever shaft of the frame Assy at this point.

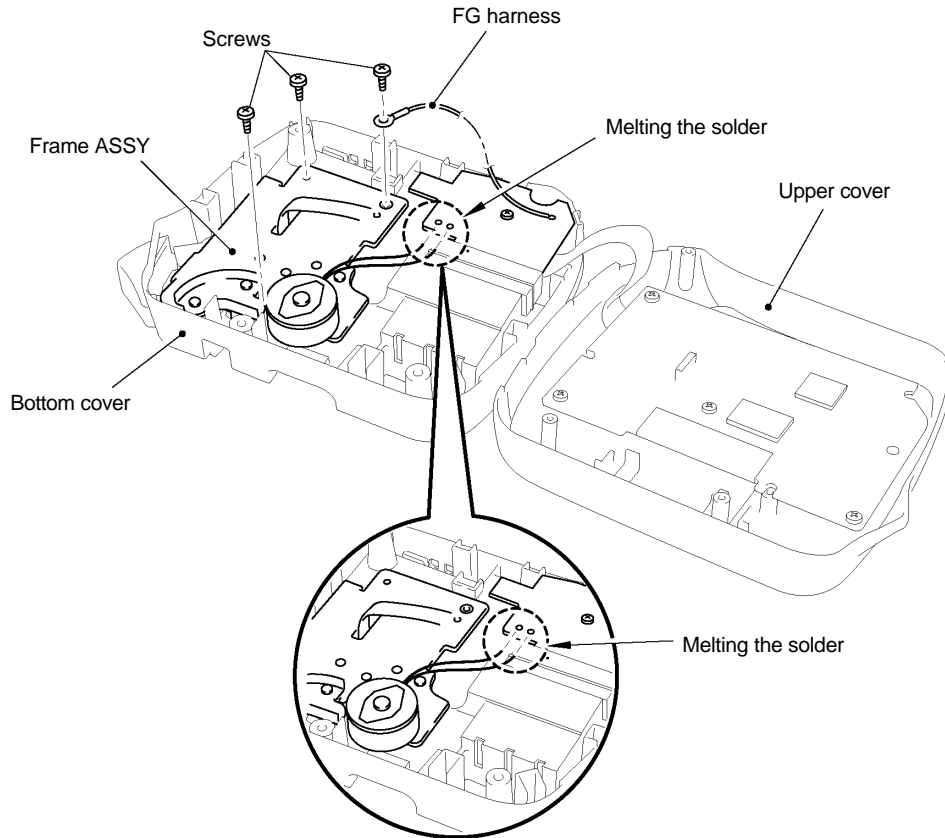


Fig. 2.2-5 Removing the Frame ASSY

■ Disassembling the Frame ASSY

Removing the DC motor ASSY

- (1) Remove the two screws from the frame ASSY and take out the motor ASSY.

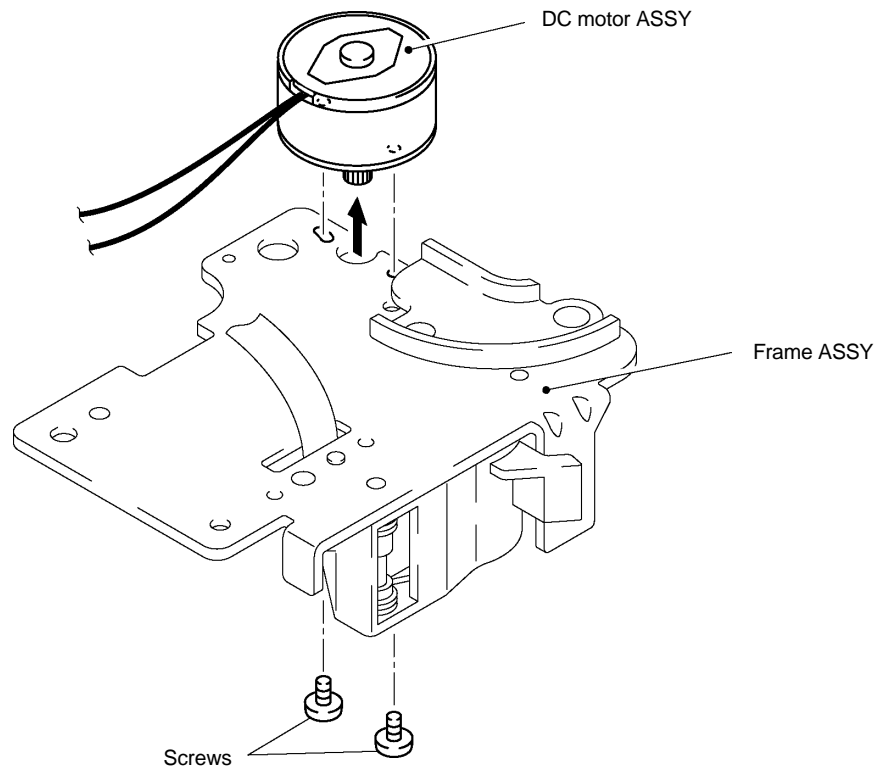


Fig. 2.2-6 Removing the DC Motor ASSY

Removing the roller holder ASSY and thermal head ASSY

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

- (1) After taking off the retaining ring, remove the roller holder ASSY and the roller holder return spring from the frame ASSY.
- (2) Remove a screw which secures the thermal head ASSY to the frame ASSY, then take out the thermal head ASSY.

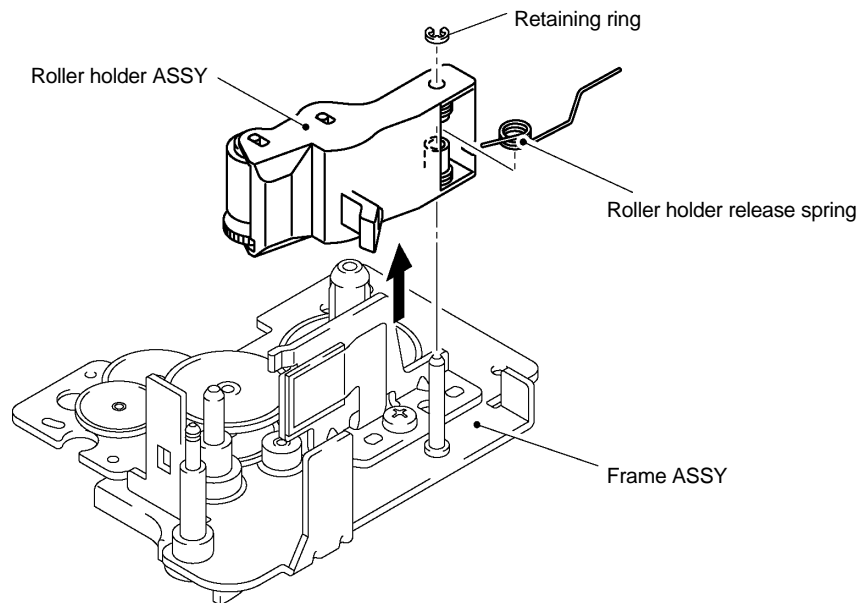


Fig. 2.2-7 Removing the Roller Holder ASSY

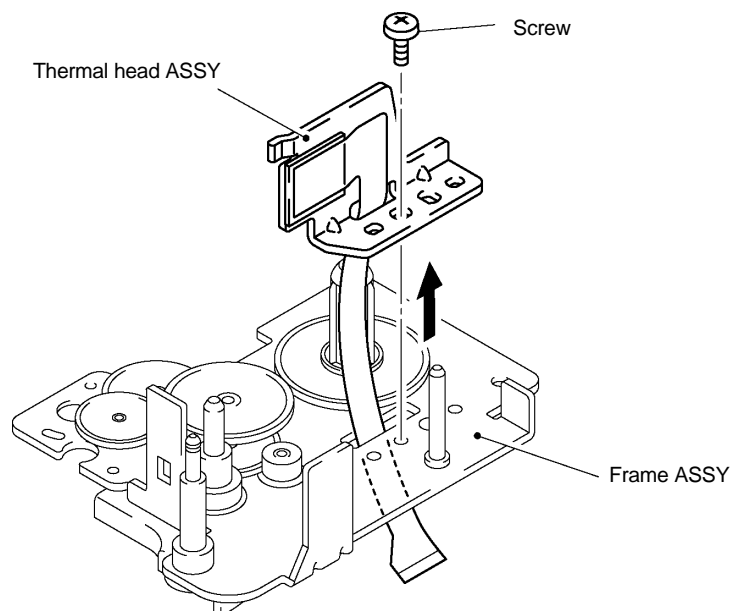


Fig. 2.2-8 Removing the Thermal Head

[4] Removing the terminal press cover

- (1) Remove the terminal press cover by releasing the hooks from the grooves of the bottom cover.

You can remove the terminal press cover by releasing the two hooks from the back side of the bottom cover by using tool like a flat screwdriver.

- (2) Remove the battery terminal (-) from the terminal press cover.

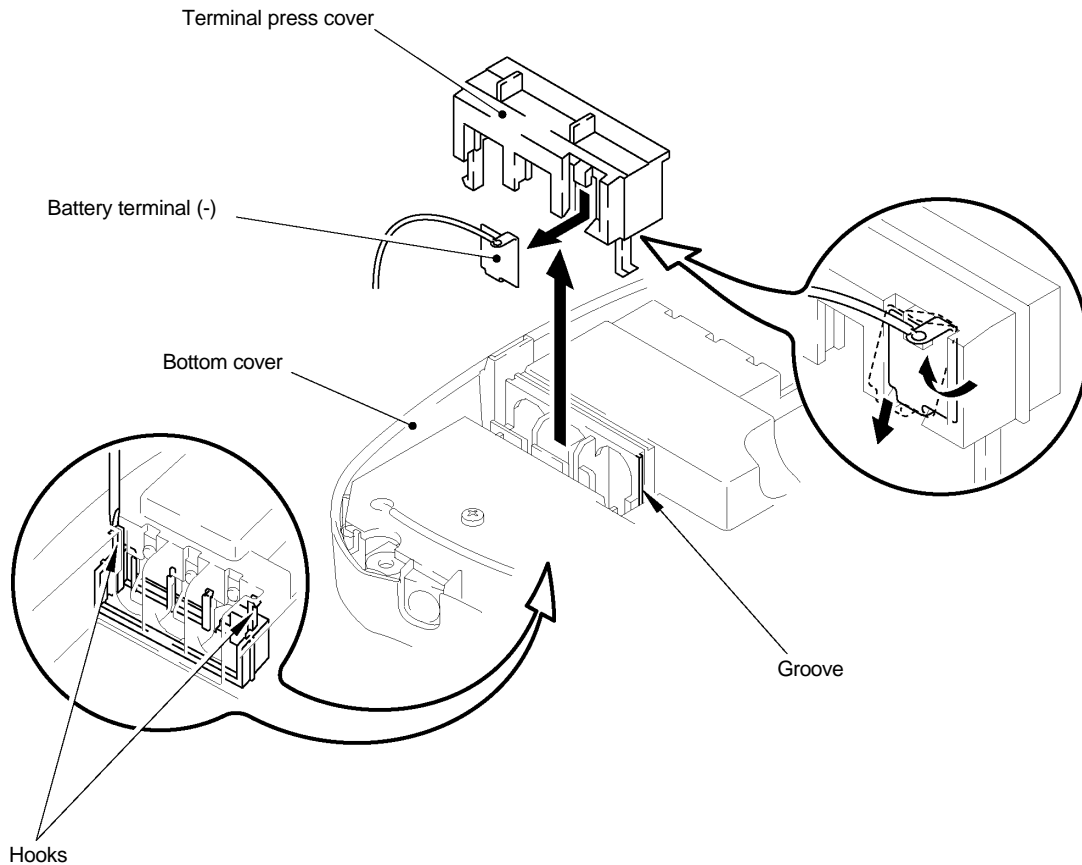


Fig. 2.2-9 Removing the Terminal Press Cover

[5] Removing the battery terminals

- (1) Remove the battery terminal B (+,-) from the bottom cover.
- (2) After disengaging the hook of the battery terminal (+) by tool like a flat screwdriver, remove the battery terminal (+) from the bottom cover.

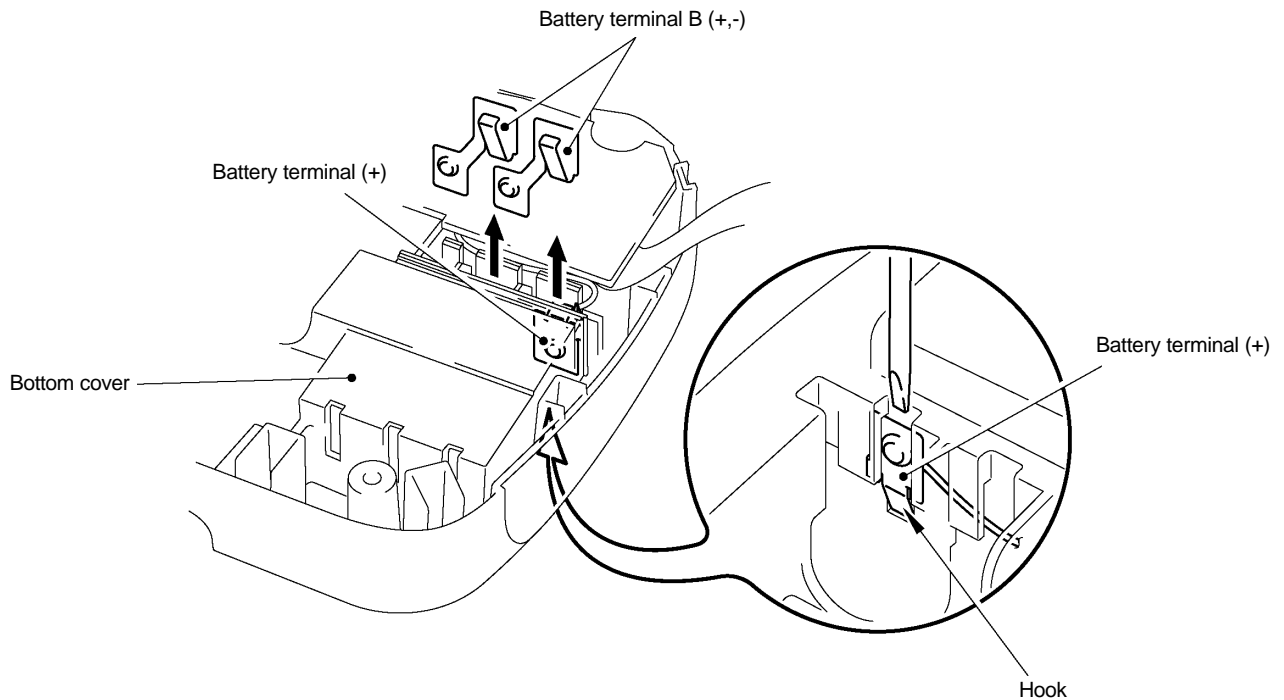


Fig. 2.2-10 Removing the Battery Terminals (1)

- (3) Place the bottom cover upside down. After disengaging the hooks in "A" section of the battery terminal A (+,-) by using tool like a flat screwdriver, remove the battery terminal A (+,-) from the bottom cover.

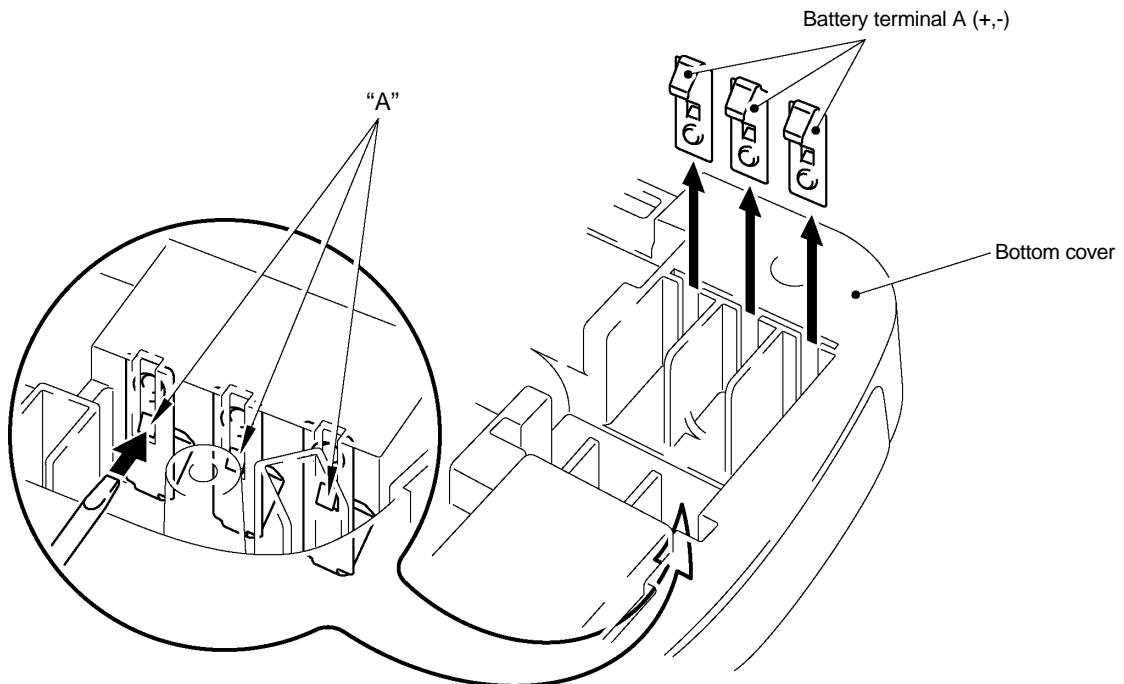


Fig. 2.2-11 Removing the Battery Terminals (2)

[6] Removing the sub PCB

- (1) After removing the battery terminal (+), the battery terminal (-), take off a screw and remove the sub PCB.

Note: The AC jack is not provided on the sub PCB for PT-1180. Therefore the form of the bottom cover is slightly different from the figure below.

- (2) The relay harness soldered to the sub PCB is removed.

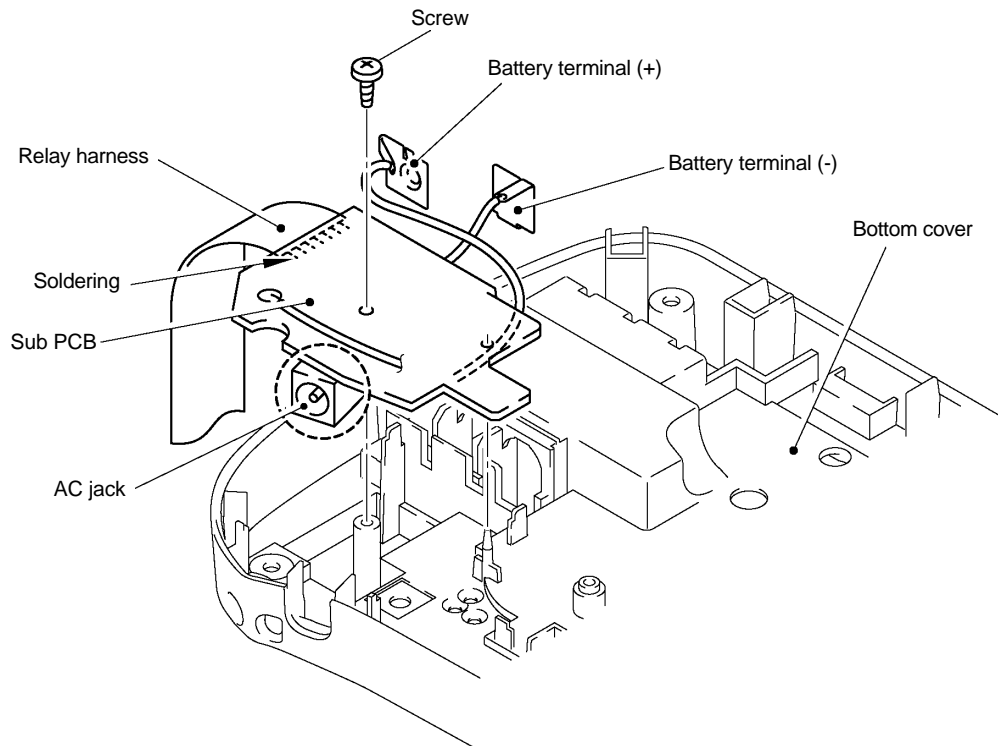


Fig. 2.2-12 Removing the Sub PCB

[7] Removing the main PCB and the rubber 41 key (PT-1100/1130/1170/S1180/11QI-1150)

Remove the four screws, then take off the main PCB and the rubber 41 key.

Note1: Before handling the main PCB, touch a metal portion of the machine to discharge static electricity, or the LSI and other electronic devices should be damaged due to the electricity charged in your body.

Note2: The LCD is removed by opening the hook section wide toward direction indicated by arrow "A".

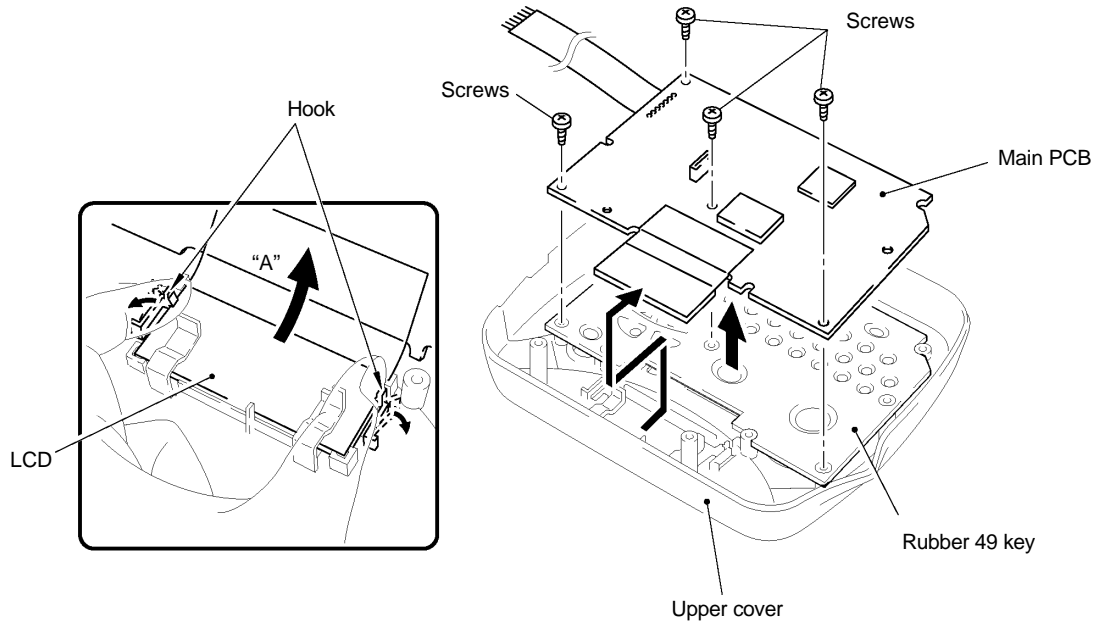


Fig. 2.2-13 Removing the Main PCB

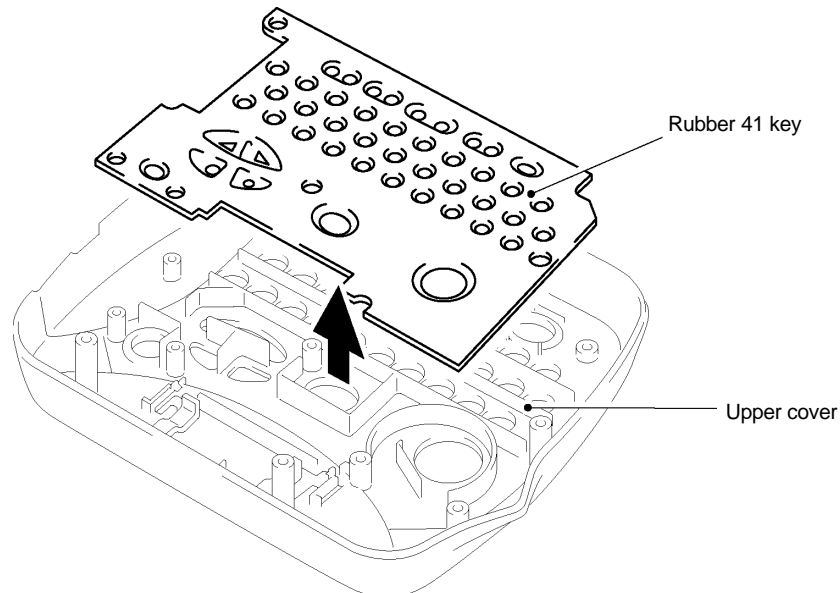


Fig. 2.2-14 Removing the Rubber 41 Key

[8] Removing the main PCB, the rubber 40 key and the jog dial (PT-1250/1160)

Remove the four screws, then take off the main PCB, the rubber 40 key and the jog dial.

Note1: Before handling the main PCB, touch a metal portion of the machine to discharge static electricity, or the LSI and other electronic devices should be damaged due to the electricity charged in your body.

Note2: The LCD is removed by opening the hook section wide toward direction indicated by arrow "A".

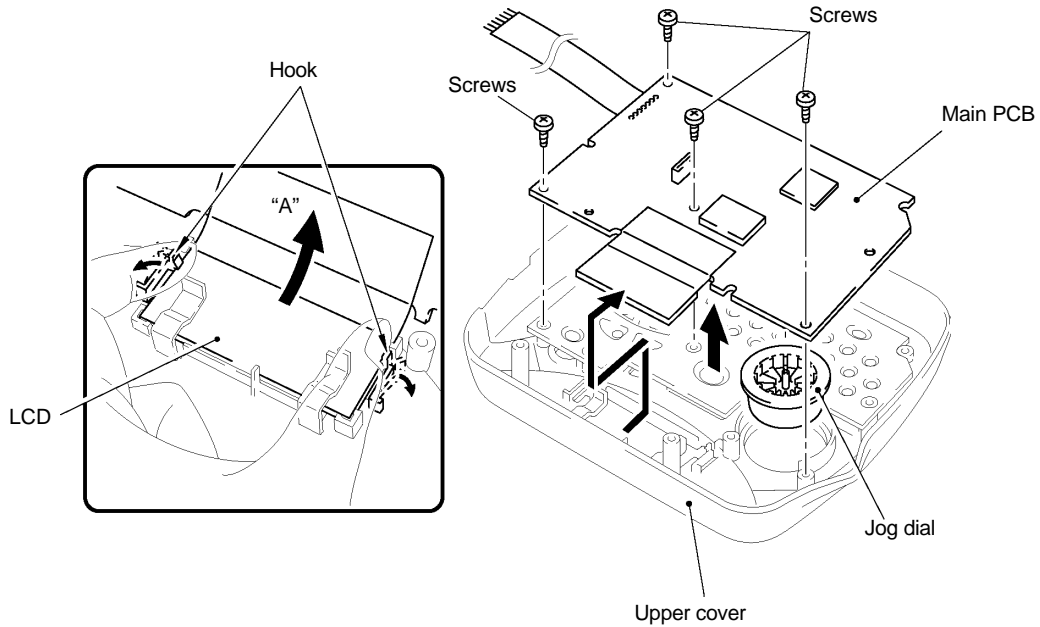


Fig. 2.2-15 Removing the Main PCB and the Jog Dial

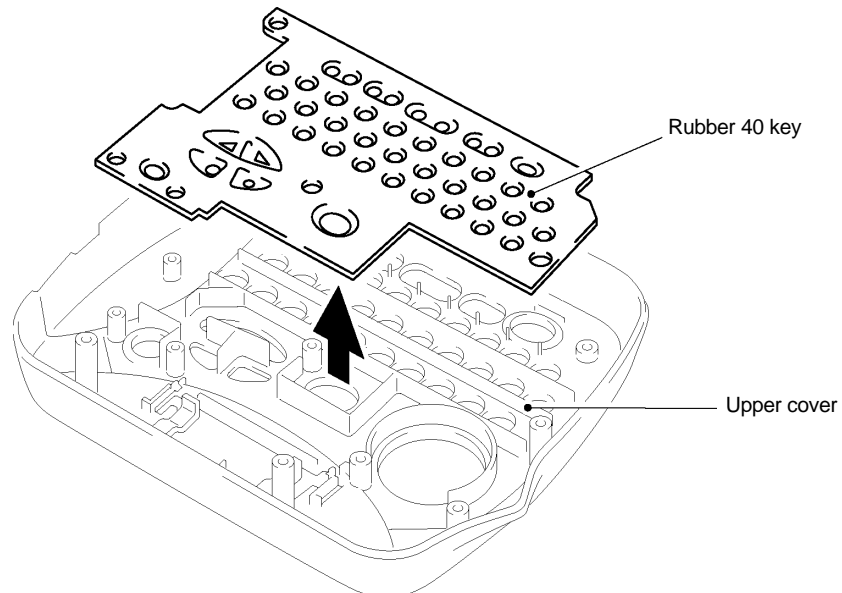


Fig. 2.2-16 Removing the Rubber 40 Key

2.2.2 Reassembly Procedure

[1] Installing the rubber 41 key and main PCB (PT-1100/1130/1170/1180/11Q/ST-1150)

- (1) Turn the upper cover upside down and place the rubber 41 key so that it is fitted into the nine boss provided on the upper cover.
- (2) Check that there is no foreign material or dust on the key contacts of the main PCB, then install the PCB. (The LCD is installed first on the upper cover.)
- (3) Tighten the four screws for securing the PCB.
Tightening torque: 0.29 N·m (3 kg·cm)

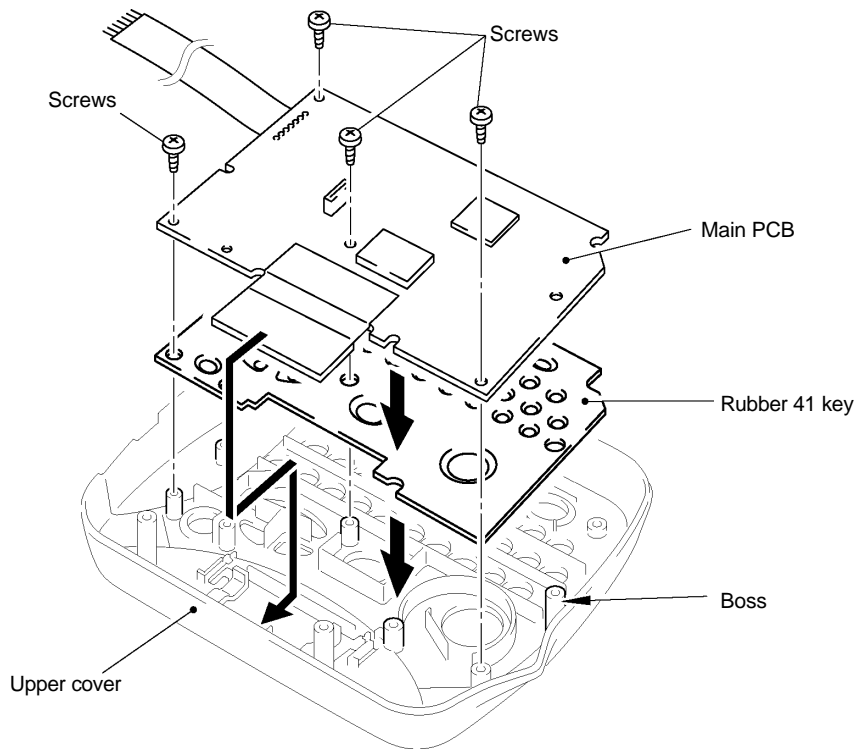


Fig. 2.2-17 Installing the Rubber 41 Key and Main PCB

[2] Installing the jog dial, the rubber 40 key and the main PCB (PT-1250/1160)

- (1) Turn the upper cover upside down and place the rubber 40 key so that it is fitted into the seven bosses provided on the upper cover.
- (2) The jog dial set on the upper cover.
- (3) Check that there is no foreign material or dust on the key contacts of the main PCB, then install the PCB. (The LCD is installed first on the upper cover.)
- (4) After matched the jog dial and the main PCB, tighten the four screws for securing the PCB. Tightening torque: 0.29 N·m (3 kg·cm)

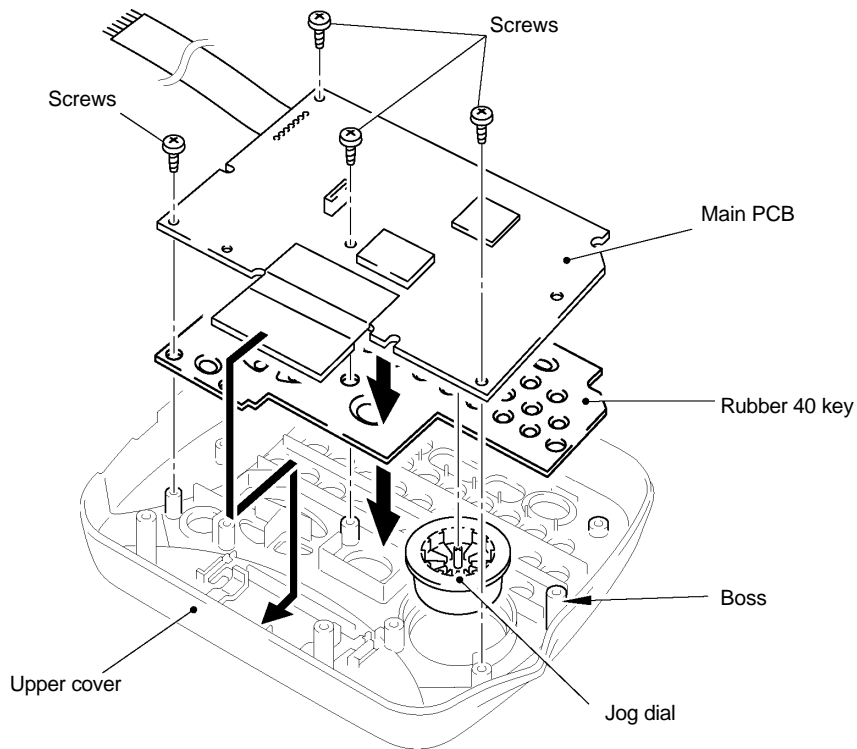


Fig. 2.2-18 Installing the Rubber 40 Key and the Main PCB

[3] Installing the sub PCB

- (1) Relay harness is solder connected to the sub PCB.
- (2) After pushing the "A" section of battery terminal (+) of sub PCB ASSY, perform the wiring. (Refer to Fig. 2.2-20)
- (3) Set the sub PCB into the locating pin and AC jack groove, and tighten the screw, confirming that each of the sensor switch actuators is fitted into the hole of the bottom cover certainly and moves up and down freely.
Tightening torque: 0.29 N·m (3 kg·cm)

Note1: Make sure that the battery terminal does not run on the VR1.

Note2: The AC jack is not provided for PT-1180. Therefore the form of the bottom cover is slightly different from the figure below, and the AC jack groove is also not provided.

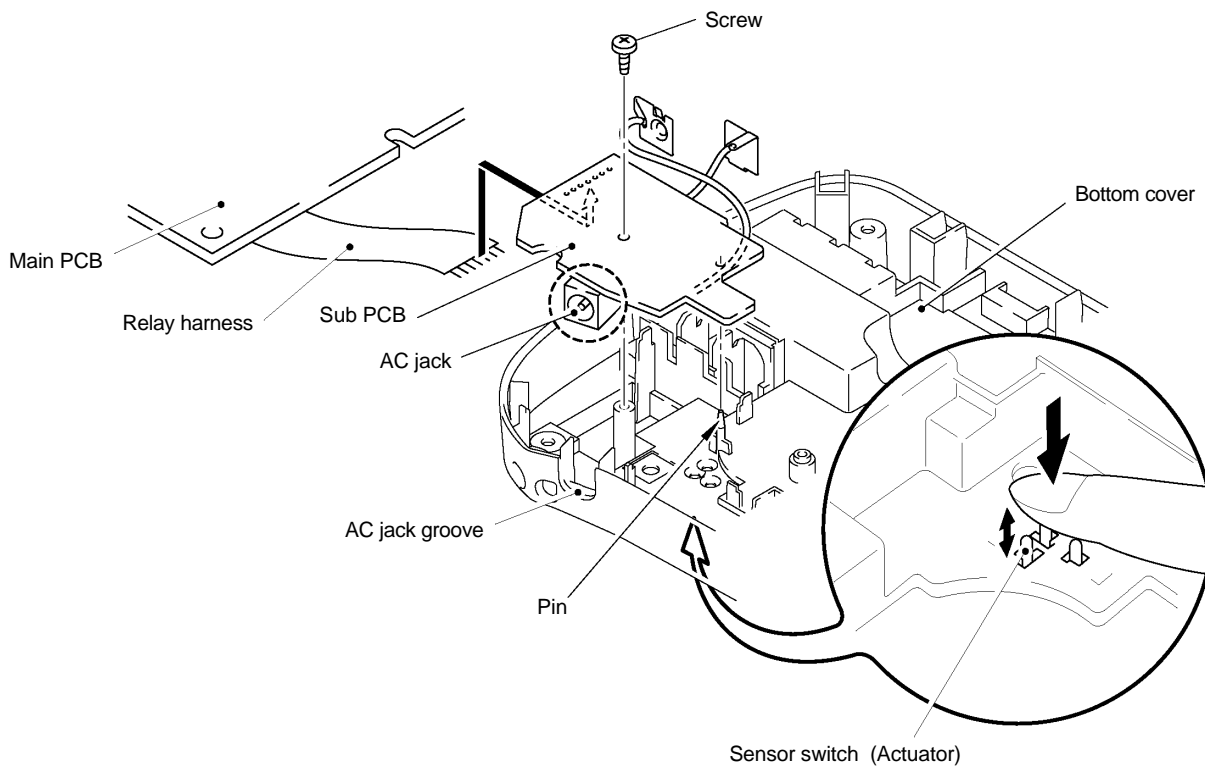


Fig. 2.2-19 Installing the Sub PCB

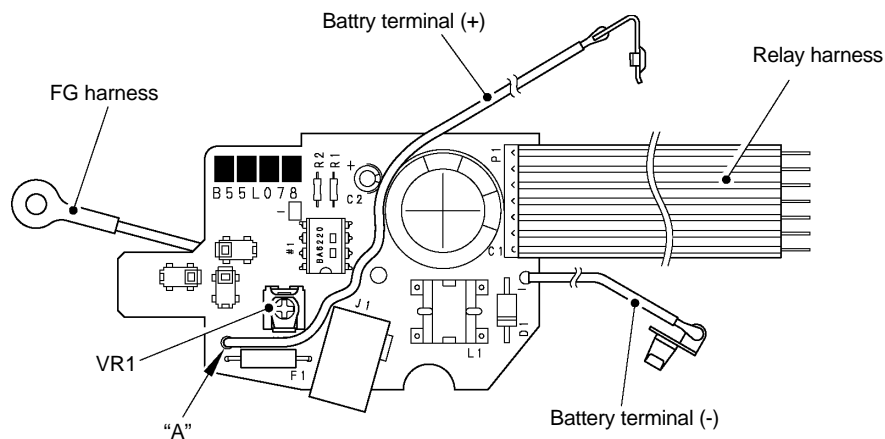


Fig. 2.2-20 Details of Battery Terminal (+)

[4] Installing the battery terminals

- (1) Put three battery terminals A (+,-) into the bottom cover from the direction of arrow.
- (2) Turn the bottom cover upside down and fit the battery terminal (+) of the battery harness ASSY into the bottom cover.
- (3) Put two battery terminals B (+,-) into the bottom cover from the same direction.

Note1: When installing the battery terminals, set them into the grooves certainly.
Make sure to fit the all terminals completely.

Note2: Fit the battery terminal (+) firmly at the bottom. Further, make sure that the battery terminal (+) does not contact with the battery terminals B (+,-).

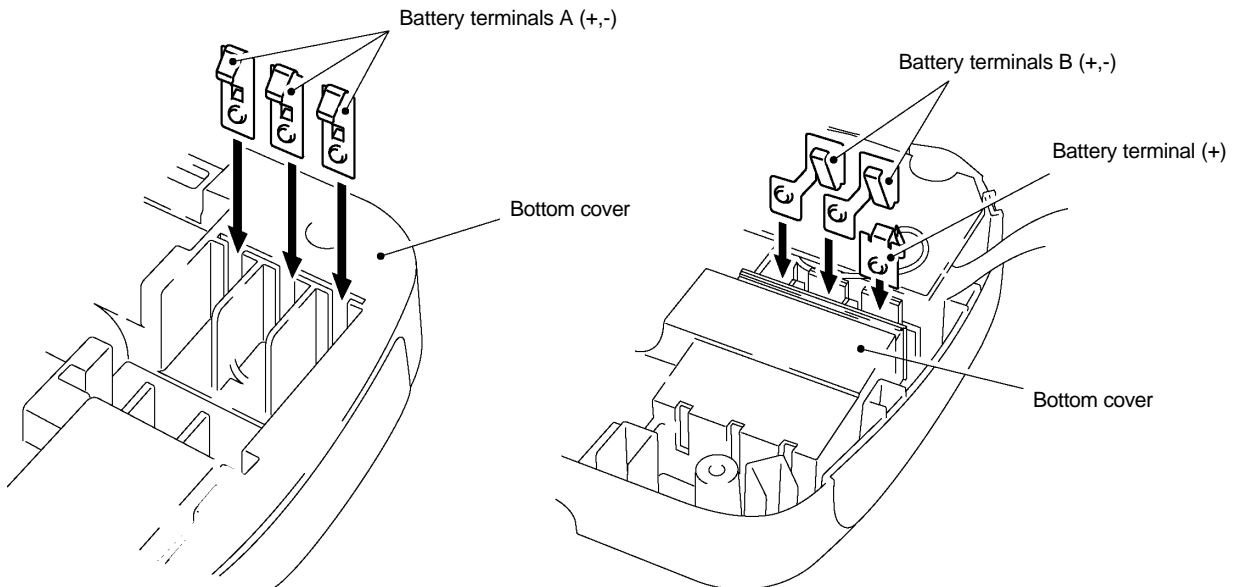


Fig. 2.2-21 Installing the Battery Terminals

[5] Installing the terminal press cover

- (1) Install the battery terminal (-) to the terminal press cover as shown below.
- (2) Push the terminal press cover along the groove of the bottom cover, until the two hooks are locked certainly.

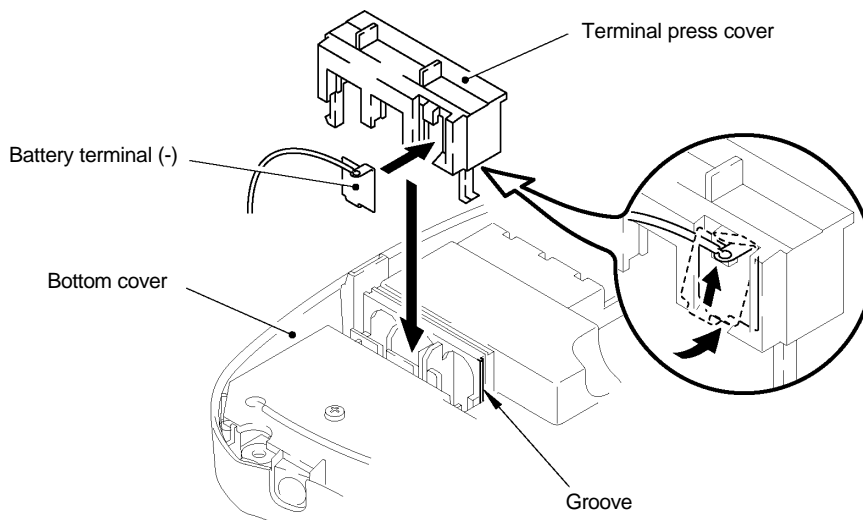


Fig. 2.2-22 Installing the Terminal Pressure Cover

[6] Installing the frame ASSY

- (1) Install the cutter lever into the bottom cover.
- (2) If the frame ASSY has been disassembled, assemble the components by referring to the next page.
- (3) The frame ASSY is set by matching the locating pin and the locating boss of the bottom cover.
- (4) The main frame is installed on the bottom cover with 3 screws. The FG harness of sub PCB Assy is secured to the frame Assy, at this point, with screws of "A".

Note: Install the frame ASSY so that the FG harness terminal (metallic section) does not contact with sub PCB.

- (5) Solder the motor harness to the sub PCB.

Note: Be careful to the direction of the motor harness (+), (-) and not to stick out from the designated place when soldering.

Tightening torque: 0.39 N·m (4 kg·cm)

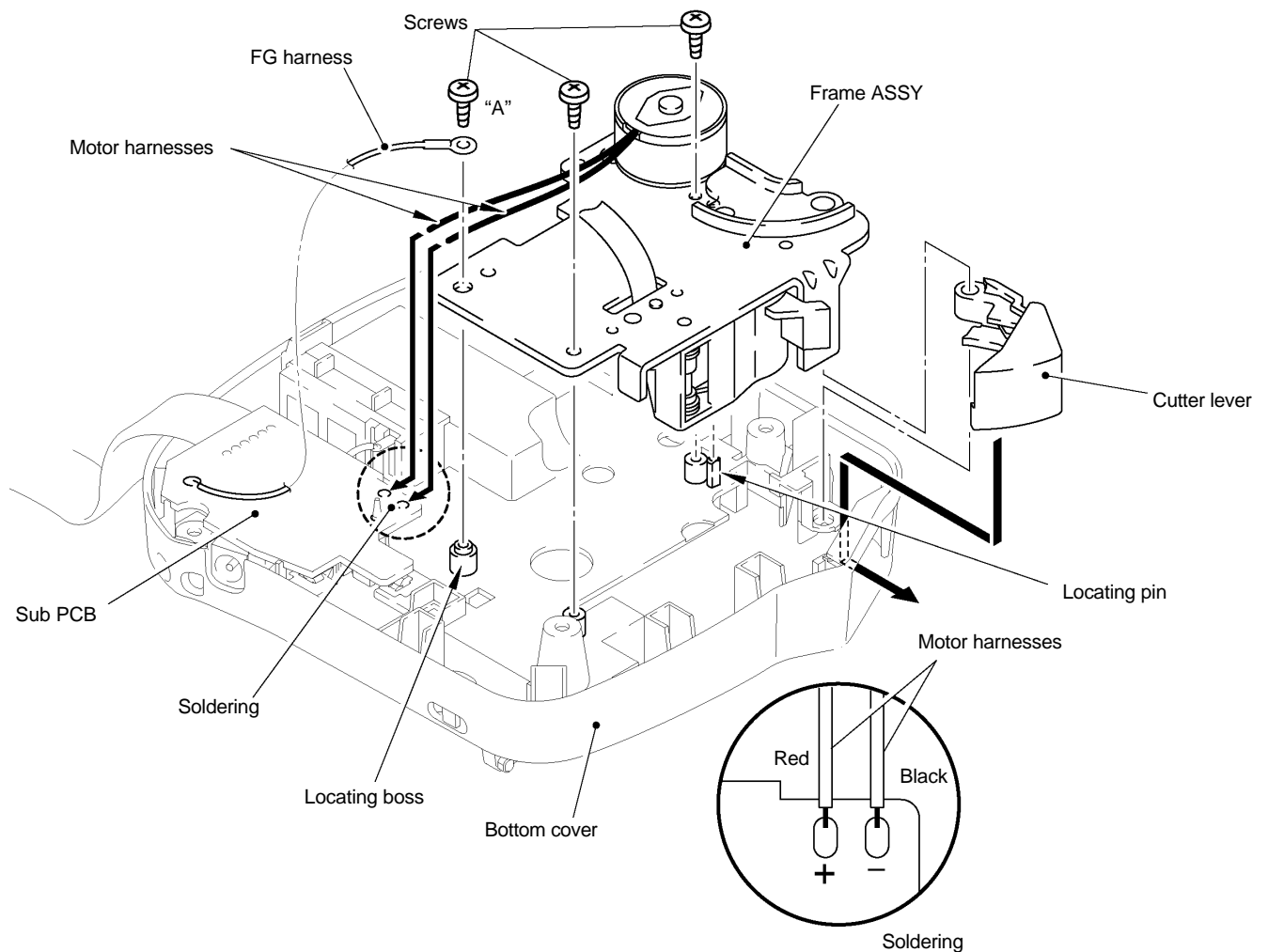


Fig. 2.2-23 Installing the Cutter Lever and the Frame ASSY

■ Assembling the components of the motor holder ASSY

Installing the thermal head ASSY and the roller holder ASSY

- (1) Install the thermal head to the frame ASSY, and tighten the screw.
Tightening torque: 0.59 N·m (6 kg·cm)

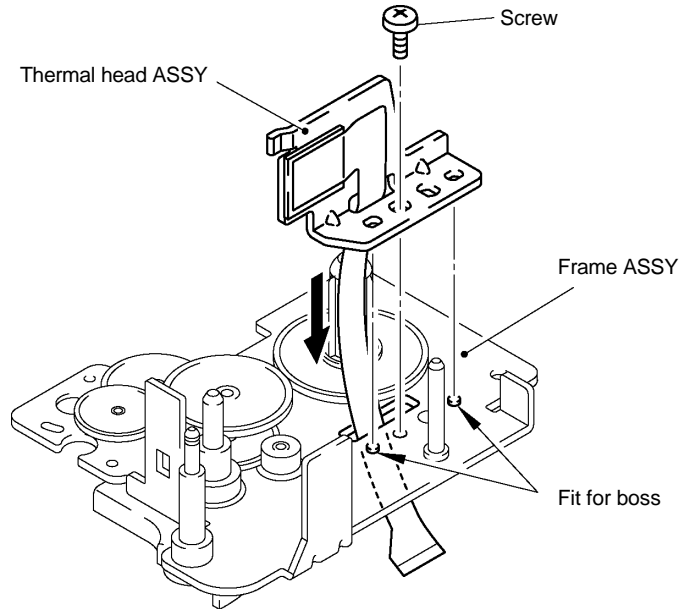


Fig. 2.2-24 Installing the Thermal Head ASSY

- (2) Set the release spring onto the frame ASSY so that its straight end "a" is fitted to the section "A" on the roller holder ASSY, then install them to the frame so that the spring bent end "b" becomes hooked on the section "B". And then set the retaining ring securely.

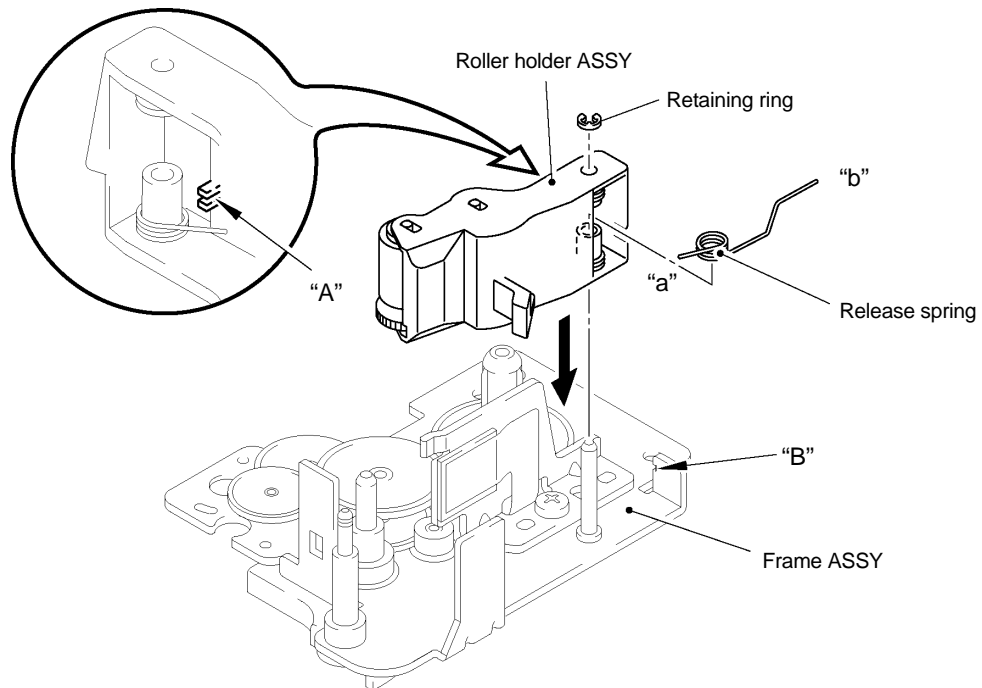


Fig. 2.2-25 Installing the Roller Holder ASSY

Installing the DC motor ASSY

- (6) Tighten the DC motor to the frame ASSY with the two screws. Be careful to the direction of the motor harnesses.

Tightening torque: 0.10 ~ 0.20 N·m (1 ~ 2 kg·cm)

Backlash of DC motor = 0.05 ~ 0.2 mm

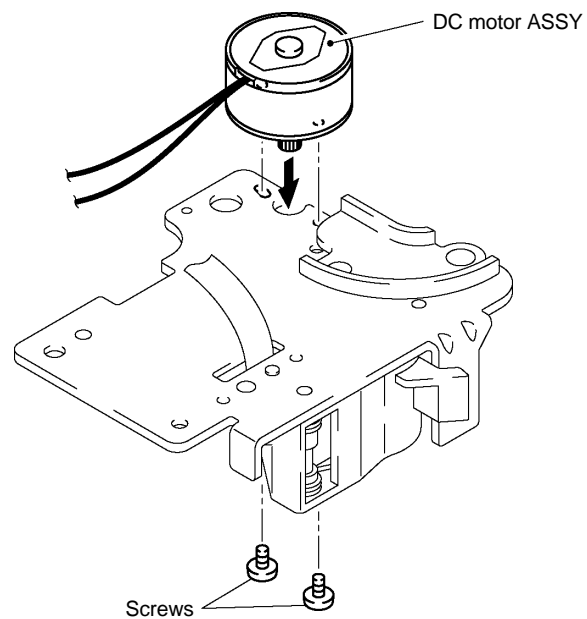


Fig. 2.2-26 Installing the DC Motor ASSY

[7] Installing the cutter case ASSY, board and the bottom cover

- (1) Hold the bottom cover as shown below, then connect the thermal head flat cable to the main PCB through under the motor harness and the power supply harness connector.

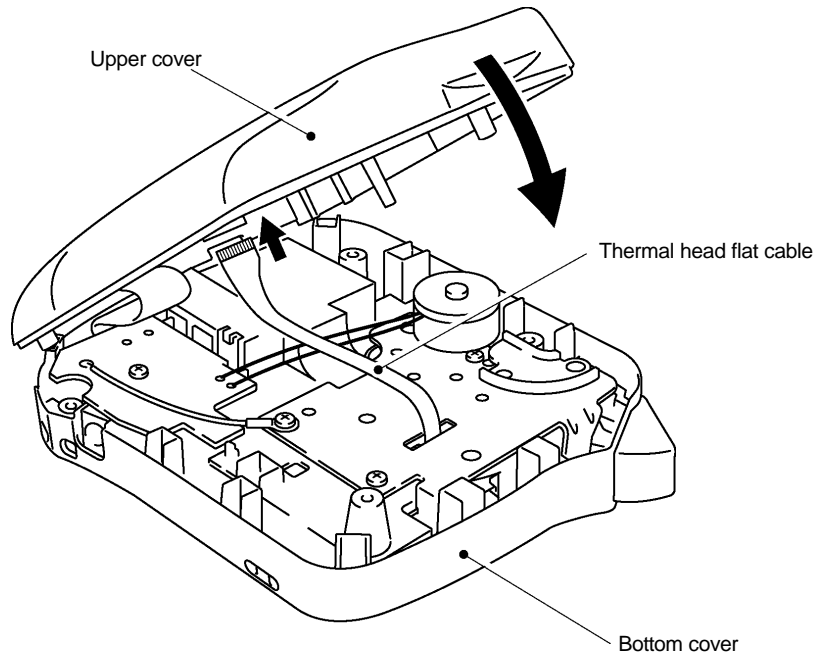


Fig. 2.2-27 Installing the Bottom Cover (1)

- (2) Place the upper and bottom cover upside down. And secure the bottom cover by four screws.
Tightening torque: 0.39 N·m (4 kg·cm)
- (3) The cutter case ASSY and board are inserted into the frame ASSY.

Note: When setting the bottom cover with upper cover, care must be taken so that the cable and harness are not caught between them.

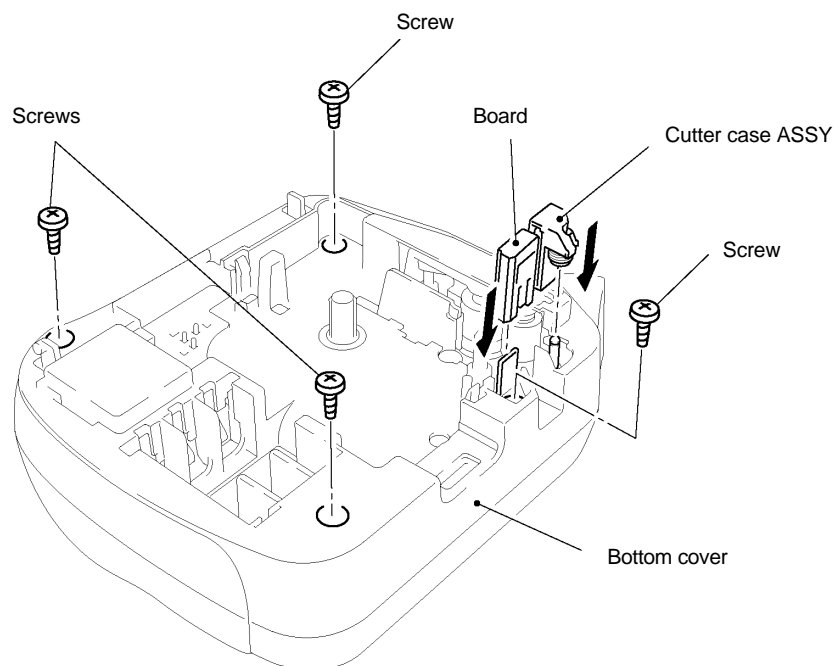


Fig. 2.2-28 Installing the Bottom Cover (2)

[8] Installing the tape cassette, the batteries, and the cassette cover ASSY

- (1) Hook "A" of the cassette cover is set at the boss of bottom cover. The cassette is installed, thereafter, at the "B" section by applying a force (sliding torque) toward "C".

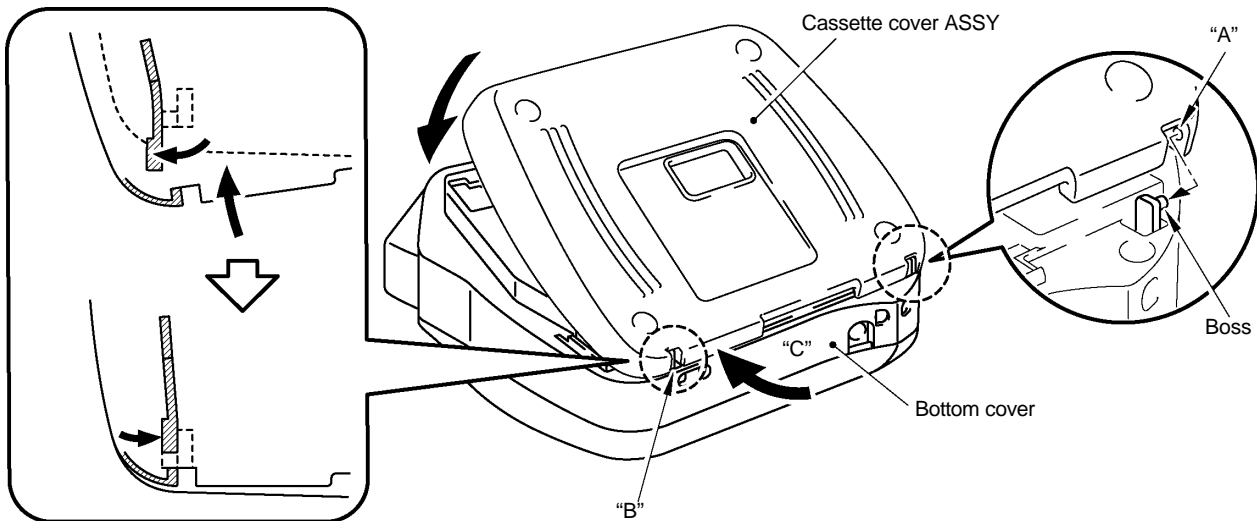


Fig. 2.2-29 Installing the Cassette Cover

- (2) Install the holder cam to the cassette cover.

Caution1: Insert the holder cam into the cassette cover correctly. Check that the holder cam is not removed easily.

Caution2: After checking that the "D" section on the cassette cover is not deteriorated or damaged, install the holder cam into the cassette cover.

- (3) Load the tape cassette.
(4) Put the batteries in the bottom cover.

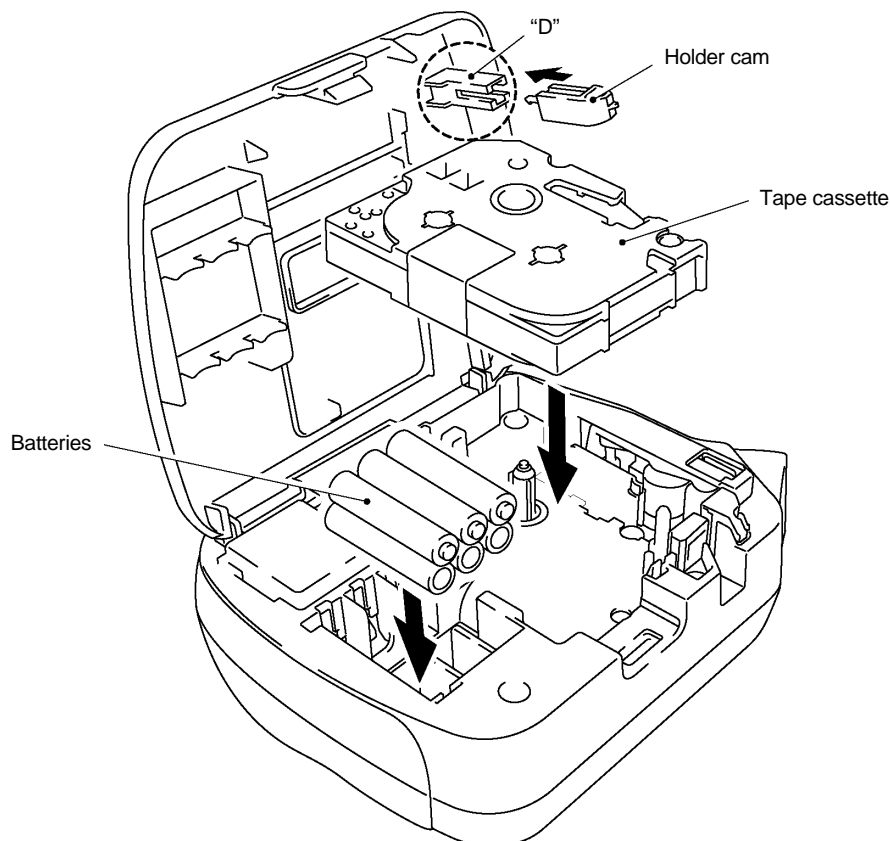








Fig. 2.2-30 Installing the Tape Cassette, the Batteries and the Holder Cam

[9] Demonstration Print and Final Check

Following items are verified lastly after completed the assembly.

1. Press the "On/Off ()" key.
2. While holding down the "Code" key, press the "BS ()" key to cancel data previously entered.
3. Return the "Caps", "Size", "Style", "UNDL/FRM", "Function", and "NUMBER" to the initial state.
4. The laminate cassette tape of 12 mm width is installed.
5. While holding down the "Code" key, press the "D" key (PT-1250/1160: "Code" key + "D" key + "On/Off ()" key) to start the demonstration print.
6. During the demonstration print, check that the machine feeds the tape and the prints data correctly. Then cut the tape. (Printing length of the 6mm tape is different from those of the 9/12mm tape.) If any problem is found, go to the trouble shooting in Section 2.3 and 3.3.
7. Open the cassette cover ASSY to check that it retracts the roller holder ASSY from the thermal head. Thereafter, the cutter safety lock mechanism is verified no problem after removed the laminate cassette tape.
8. Remove the batteries, and set the AC adapter (excluding PT-1180). After that, confirm the "On/Off ()" key.
9. At last, no problem is verified by conducting the following inspections.

9.1. Inspection Mode Starting Procedure

The inspection mode is initiated by pressing the "CODE" key, "K" key, and "On/Off ()" key simultaneously when internal RAM is cleared while electrical power OFF. (Displays will become as shown in Fig. 2.) * First, release the "On/Off ()" key.

However, Error processing will be started when occurred the following error. When such is the case, please repair by referencing to the Section 2.3 and 3.3 trouble shooting.

9.1.1. Soldering Checks

Checks are performed for the solder points.

Operation is finished by displaying as shown in Fig. 1 when the solder is ON for more than 2 points, or when the soldering made to inappropriate position.

S L D X

Fig. 1

Display shown in Fig. 1 appears only when there is an error at the solder point.

9.2. Modes for Inspection "1" ~ "7" Key


This mode is a mode to perform the final inspection after completed the assembly.

I N F O

Fig. 2

9.2.1. Information Mode

Displays as shown in Fig. 2 when entered into the inspection mode, or when depressed "1" key (excluding when in the key inspection mode).

The information mode performs, by pressing " " key, the country display, head rank display, and the input electrical power checks.

9.2.1.1. Country Display

The country display displays the country specifications as designated by the solder points (1 ~ 3.)

[UK, GER, FRE, BEL, USA/CAN/AUS]

ROM Specification	MODEL	Country Specification	LCD Display	Solder Points		
				1	2	3
US	PT-1100/1130/1170 /1180/11Q/ST-1150	USA/CAN/AUS	US	H	H	H
	PT-1250/1160	CANADA	CA	L	H	H
UK	PT-1250	UK	UK	H	H	H
		French	FR	L	H	H
		Belgium	BE	H	L	H
GER		German	GE	H	H	H

("L" indicates the soldering.)

9.2.1.2. Head Rank Display

The head rank displays the rank as designated by the solder points (A ~ C).

The rank "B" is defined as the setting for no soldering.

Country Specification	LCD Display	Solder Points		
		A	B	C
B	0	H	H	H
	B	H	L	H
A	A	L	H	H
C	C	H	H	L

("L" indicates the soldering.)

9.2.1.3. Power Supply Voltage Check Display (Inspection voltage: 7.5 ± 0.2 V)

Displays "O" when within the required input voltage range.

Displays "X" when out of the range.

Country Specification	Voltage Display	
US	0	○
Head Rank		

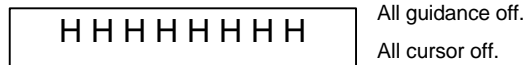
Country Display: USA/CAN/AUS
 Head Rank Display: B rank
 Voltage Display: No problem

Fig. 3 An Example of INFO Mode Display

9.2.1.4. LCD Check Display

Here, check for missing dots and the display function of the LCD.

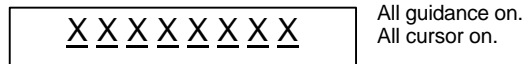
The LCD check 1 <Fig. 4> is displayed when depressed “↵” key.



All guidance off.
All cursor off.

Fig. 4

The LCD check 2 <Fig. 5> is displayed when depressed “↵” key.



All guidance on.
All cursor on.

Fig. 5

Shifts to “28.2.2 Cassette Inspection Mode” when depressed “↵” key. (Fig. 7 Display)



All guidance on.
All cursor on.

Fig. 6

9.2.2. Cassette Sensor Inspection Mode “2” Key

Here, check the cassette sensor function.

Display of Fig. 7 is indicated when depressed “↵” key or depressed “2” key in the display of Fig. 6 (except while in the Key Inspection Mode).

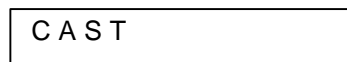


Fig. 7

Shifts to the Key Inspection Mode when depressed “↵” key. (Fig. 8 Display)

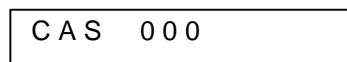


Fig. 8

Displays the three sensor SW states. ON: 1, OFF: 0

Touch the sensor switch with the finger tip while checking ON/OFF display.

Shifts to the Key Inspection Mode when depressed “↵” key. (Fig. 9 Display)

9.2.3. Key Inspection Mode “3” Key

Here, check the key input function.

Display of Fig. 9 is indicated when depressed “↵” key or depressed “3” key in the display of Fig. 8 (except while in the Key Inspection Mode).

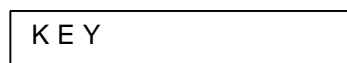


Fig. 9

Shifts to the Key Inspection Mode when depressed “↵” key. (Fig. 10 Display)

The “CODE” key, “(↵)” key, “BS(⊗)” key, “←”, “→” key (1st row) L → R, (2nd row) R → L, (3rd row) L → R, 4th row) R → L, (5th row) L → R are depressed sequentially. The key to depress is displayed (refer to Fig. 10) and the key to depress next is displayed when depressed correctly while the key to depress next and “X” are displayed when depressed erroneously. (Fig. 11 Display)

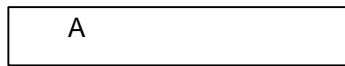


Fig. 10

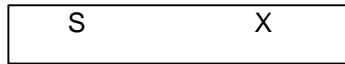


Fig. 11

When all key checks were completed, then displays Fig. 12 and cut the tape by printing <<OK>>.

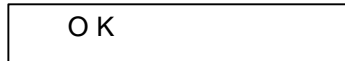


Fig. 12

Shifts to "9.2.4 CUT Mode" when depressed "↵" key. (Fig. 14 Display)

* PT-1250/1160, however, shifts to the "JOG Dial Check Mode".

Enters into the JOG Dial Check Mode after printed that all key had been completed without displaying OK. The cursor moves toward direction of the rotation.

After confirmation was made, shifts to "9.2.4 CUT Mode" when depressed "↵" key. (Fig. 13 Display)



Fig. 13

9.2.4. Cut Mode "4" Key

Here, check the cutter function.

Display of Fig. 12 is indicated when depressed "↵" key or depressed "4" key in the display of Fig. 13 (except while in the Key Inspection Mode).

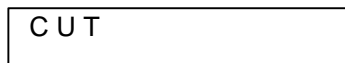


Fig. 14

Fig. 15 is displayed when depressed "↵" key to feed the tape. "1" is displayed after completed the feed.

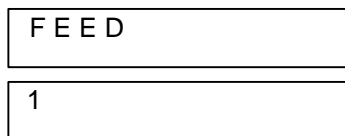


Fig. 15

Fig. 16 is displayed when depressed "↵" key to feed the tape. "2" is displayed after completed the feed.

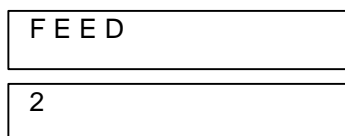



Fig. 16

Fig. 17 is displayed when depressed “” key to feed the tape. “3” is displayed after completed the feed.

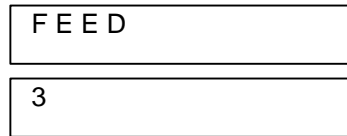



Fig. 17

Shifts to “28.2.5 PRINT 1 Mode” when depressed “” key. (Fig. 18 Display)

9.2.5. PRINT 1 Mode “5” Key

Here, check the print quality, tape length accuracy and print length accuracy.


Display of Fig. 18 is indicated when depressed “” key or depressed “5” key in the display of Fig. 17 (except while in the Key Inspection Mode).

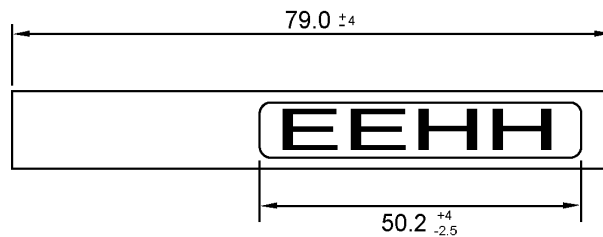


Fig. 18

The printing is started when depressed “” key. (Fig. 18 Display)

Initialize all memory after completed the printing and turns the electrical power to off.

<A Printing Sample>



After finishing to print, cut the printed tape and check that it is 79 ± 4 mm (tape length) and $50.2 +4, -2.5$ mm (printed letter length)

9.2.6. PRINT 2 Mode “6” Key

Performs the same printing as PRINT 1.

My be omitted when PRINT 1 is confirmed being correct.

Fig. 19 is displayed when depressed “6” key (except while in the Key Inspection Mode).

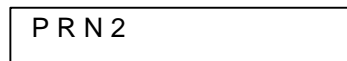



Fig. 19

The function is started when depressed “” key. The electrical power will not be turned to off in this case.

9.2.7. MOTOR Mode “7” Key: Used for the DC motor speed adjustment.

This mode is used only when the print length accuracy or tape feed length accuracy deviates from the specification.

Display of Fig. 20 is indicated when depressed “7” key.

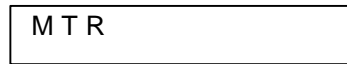


Fig. 20

The function (MOTOR rotation) is started when depressed “↵” key. The electrical power will not be turned to off in this case. The “On/Off (⏻)” key is depressed to stop.

When you failed, peel off the yellow “+” volume (VR1) by the cassette sensor switch actuators as shown below. And insert a screwdriver to adjust the length of the tape by rotating a trimmer.

If rotating the trimmer to the right (CW), the length becomes short.

If rotating to the left (CCW), it becomes long.

After the adjustment, verify the tape length and printed letter length by performing the PRINT 1 or PRINT 2 functions.

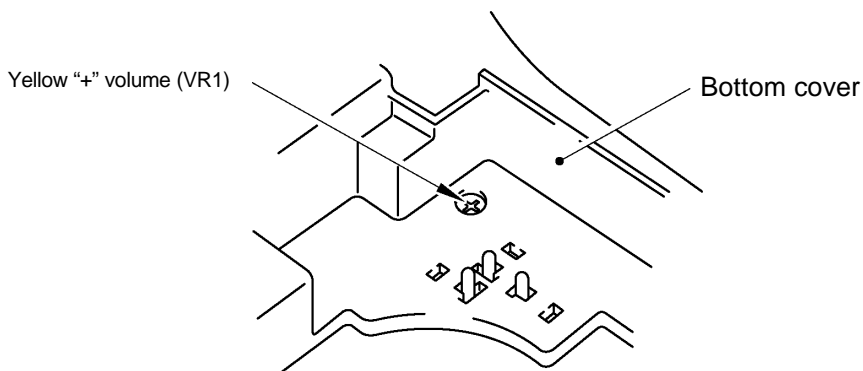


Fig. 21

- 10 This machine becomes formatted, if you discharge the electricity after removing the AC adapter and the batteries. (Refer to Format in the 1.3.1)

2.3 TROUBLESHOOTING

This section gives the service personnel some of the troubleshooting procedures to be followed if an error or malfunction occurs with the PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150. 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.

2.3.1 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 the PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150 having problems from either a set of batteries or the AC adapter (excluding PT-1180), make sure that its output voltage level is 8 to 10V under no load.
- (3) When supplying power from a stabilized power unit, use the power unit with approx. 3A capacity and choose the output level of 7 to 10V. When connecting it to the PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150, be careful with the polarity.
- (4) When using a circuit tester for testing the conductivity, remove all of the batteries and the AC adapter (models except PT-1180) from the PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150.
- (5) To repair an error which occurred in the thermal print head and its related sections, disconnect the thermal head cable until repairs are finished.

2.3.2 After Repairing

After troubleshooting, be sure to check the failure to make sure that the failure has been completely remedied. Note and keep the troubleshooting procedure actually followed for later troubleshooting.

2.3.3 Error Message Display

Error is displayed when the troubles as shown below happen. "ERROR" display for each country will be displayed as follows.

U.S.A./U.K./BELGIUM: ERROR

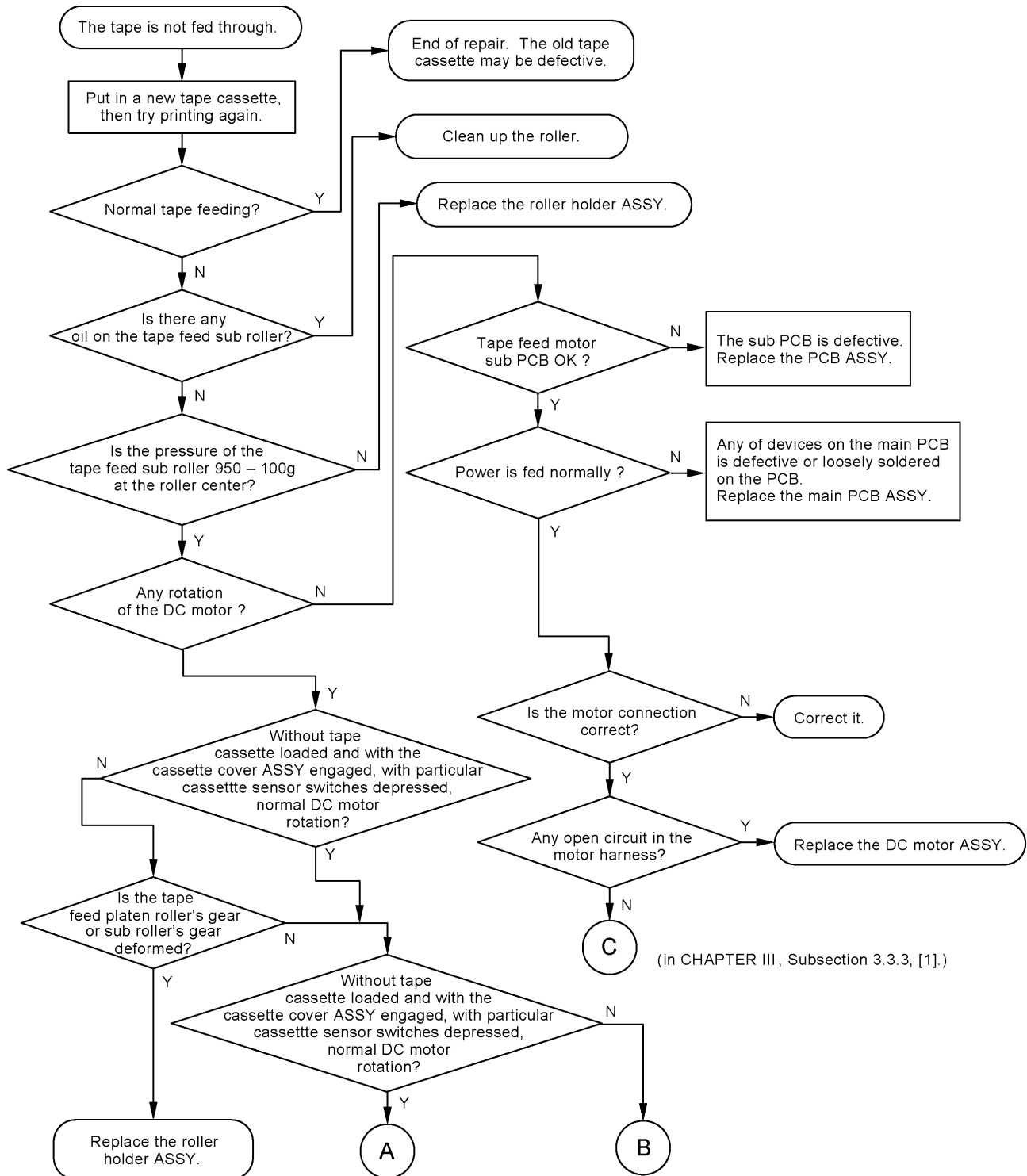
FRENCH/CANADA: ERREUR

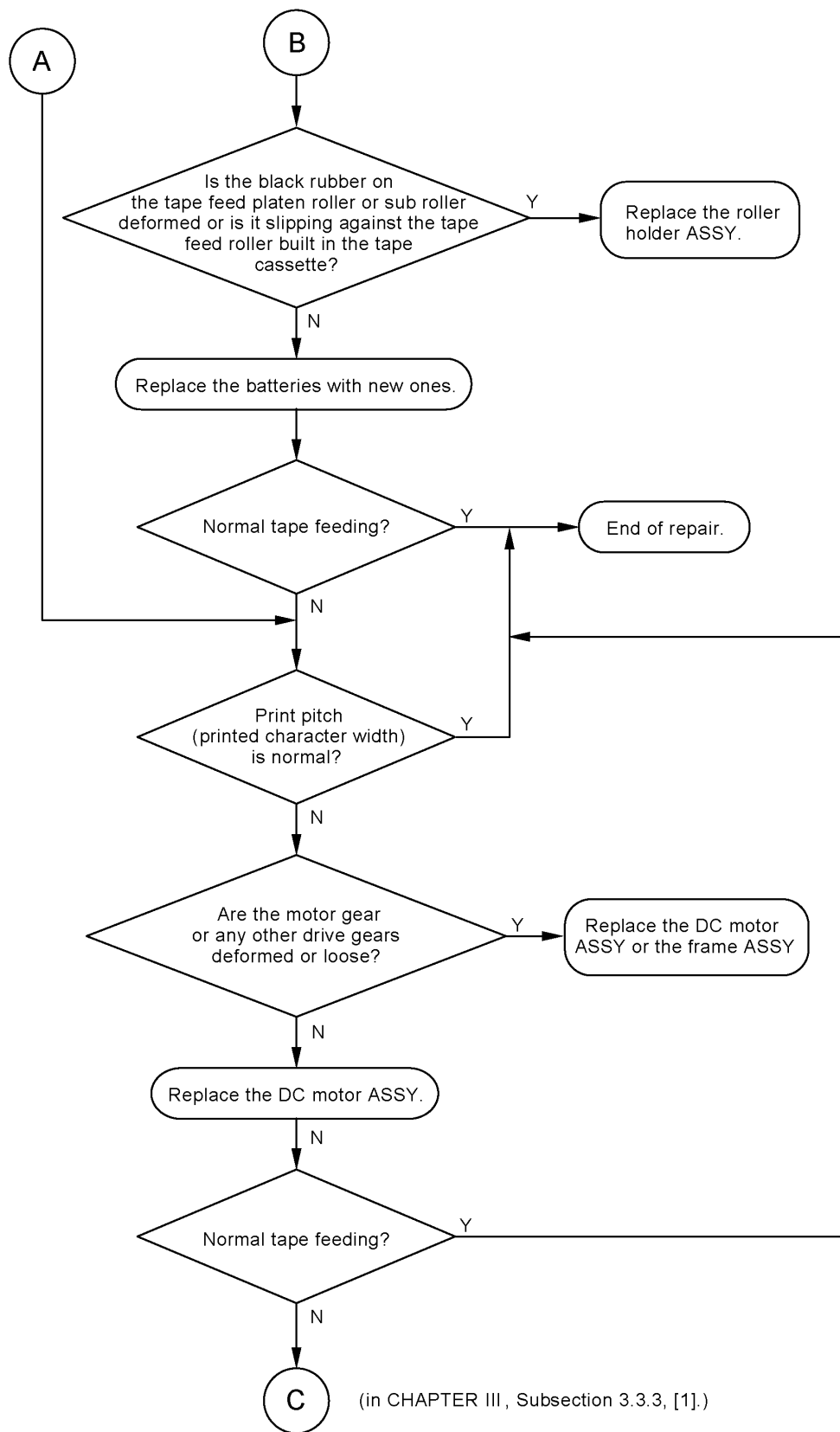
GERMAN: FEHLER

Input Mode	Error Conditions	Remarks
Text Input Mode	"SET (↵)" key depressed when exceeded 2. lines	
	"PRINT" key depressed when no data in the text buffer.	French: "Impr" key/German "Druck" key.
	"PRINT" key depressed when no cassette installed.	French: "Impr" key/German "Druck" key.
	"PRINT" key depressed when text vertical size is larger than the installed tape width.	French: "Impr" key/German "Druck" key.
	"PRINT" key depressed when 2 line-print 6 mm tape installed.	French: "Impr" key/German "Druck" key.
	"FEED" key depressed when no cassette installed.	French: "Avance" key/German "BV" key.
Dead Letter Input Mode	"SET (↵)" key depressed when exceeded 2 lines	Resumes to the previous mode after erased the message.
Function Selection Mode	"SET (↵)" key depressed when selected repeat or numbering while no data in the text buffer.	
	"SET (↵)" key depressed when no letter on the cursor or when tried numbering while no numeral on the cursor.	
Number of Copy Setting Mode	"SET (↵)" key depressed when no cassette installed.	
	"SET (↵)" key depressed when text vertical size is larger than the installed tape width.	
	"SET (↵)" key depressed when 2 line-print 6 mm tape installed.	
Final Numbering Value Setting Mode	"SET (↵)" key depressed when no cassette installed.	
	"SET (↵)" key depressed when text vertical size is larger than the installed tape width.	
	"SET (↵)" key depressed when 2 line-print 6 mm tape installed.	
	"SET (↵)" key depressed when the selected final value is smaller than those subject to numbering.	
Memory Selection Mode	"SET (↵)" key depressed when tried to register to memory while no data in the text buffer.	
	"SET (↵)" key depressed when tried to call-out to memory while no file registered.	
File Display Mode	"SET (↵)" key depressed when tried to call-out the file with no data.	Resumes to the previous mode after erased the message.

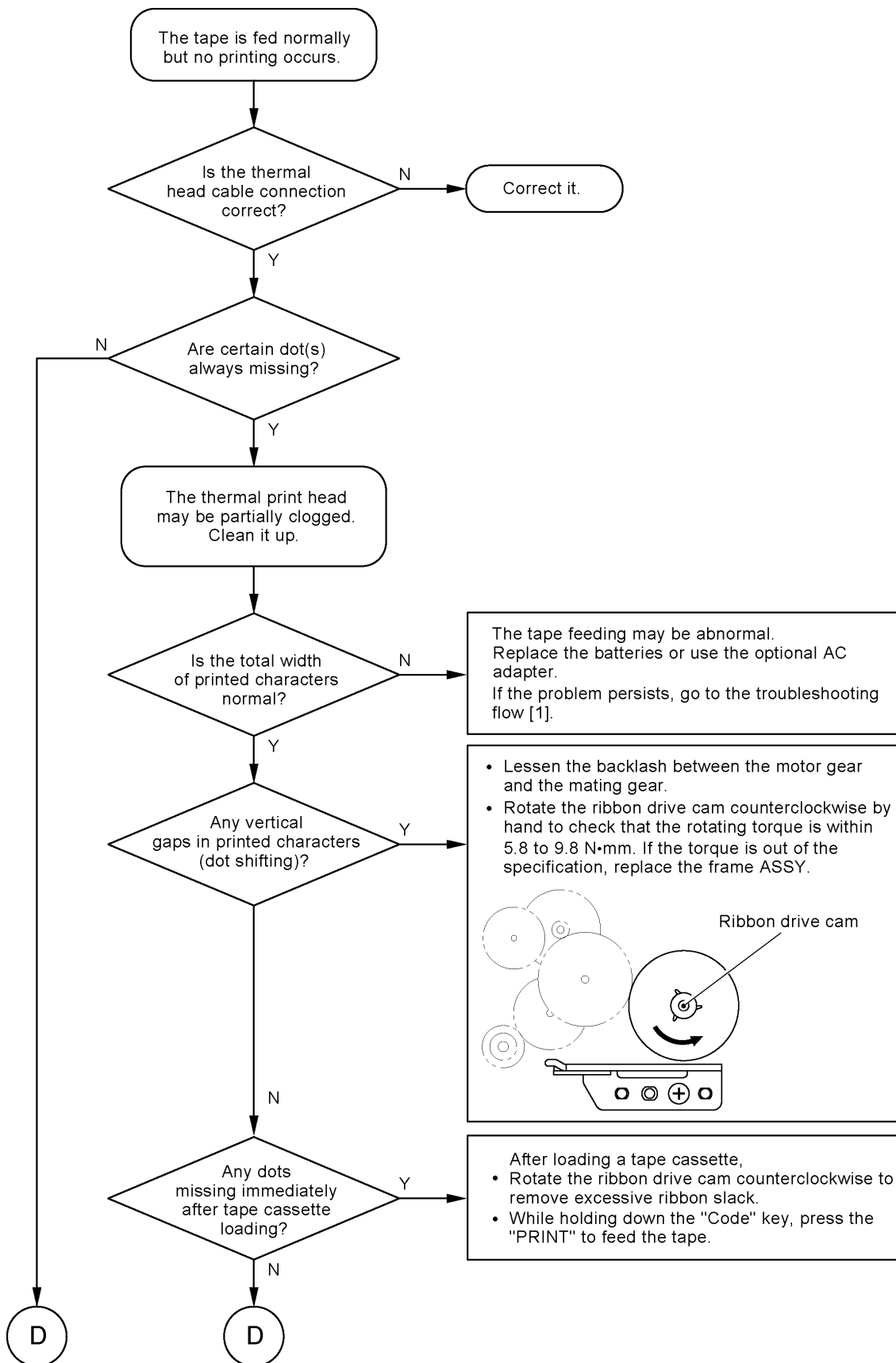
2.3.4 Troubleshooting Flows

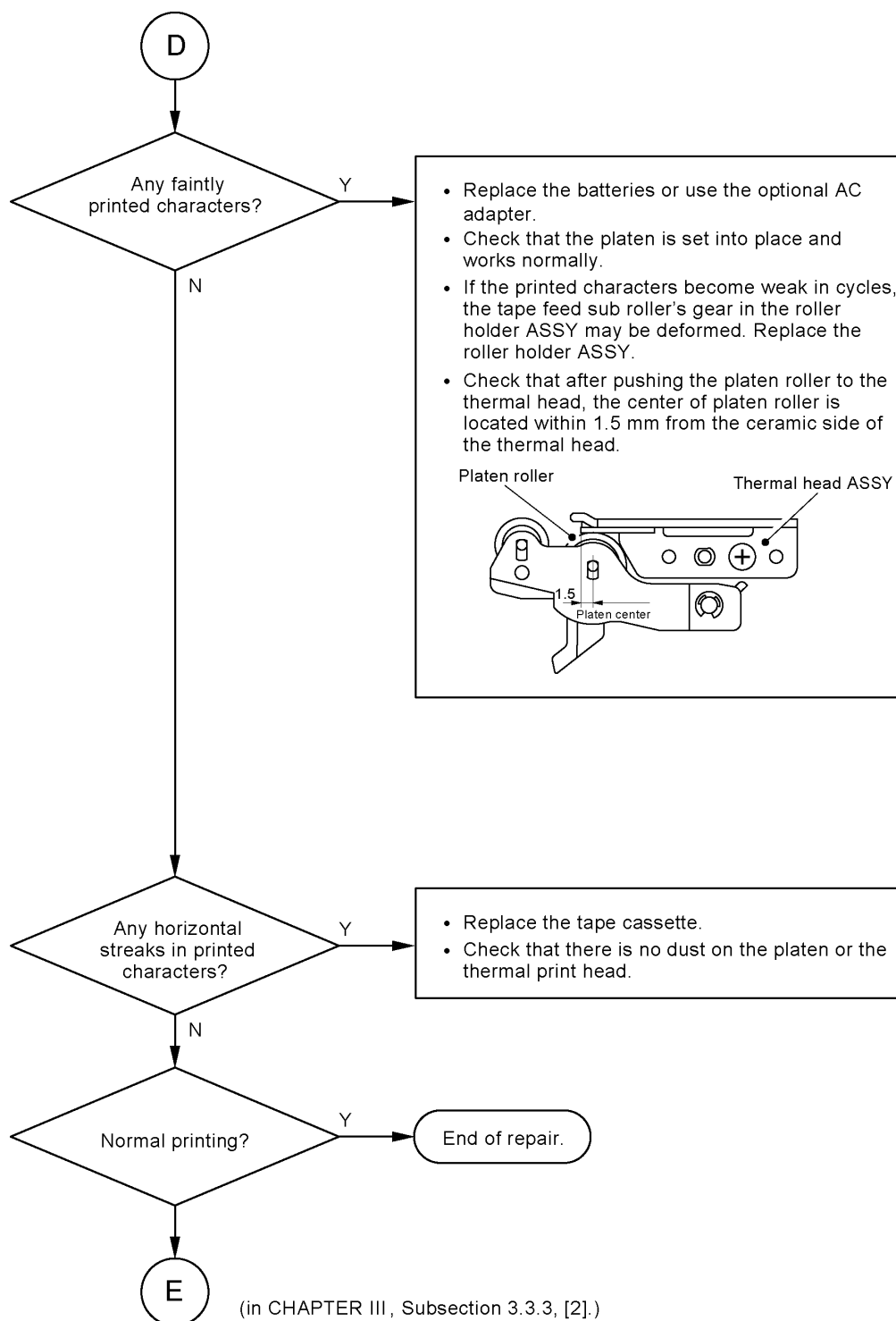
[1] Tape feeding failure



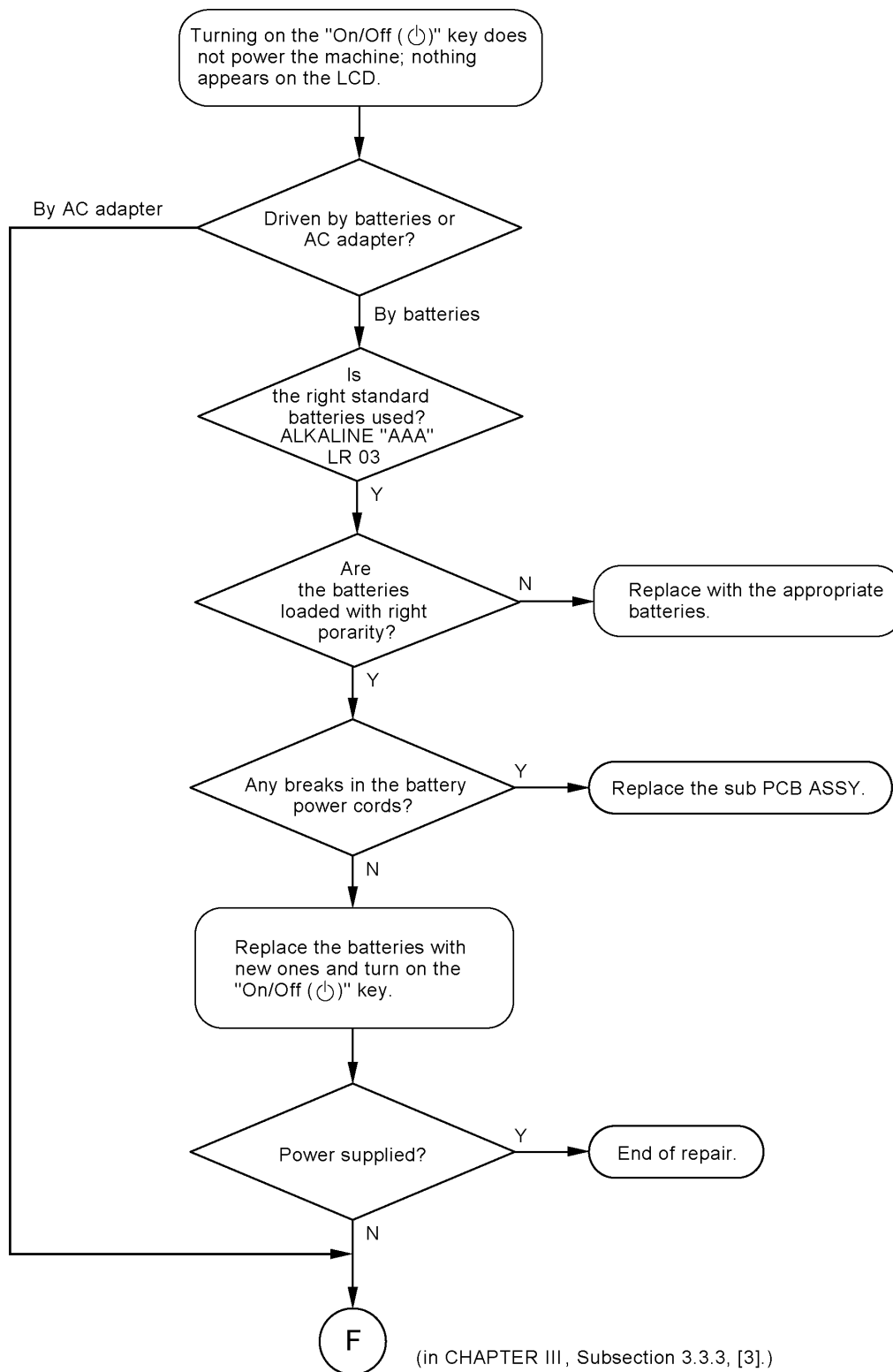


[2] Printing failure

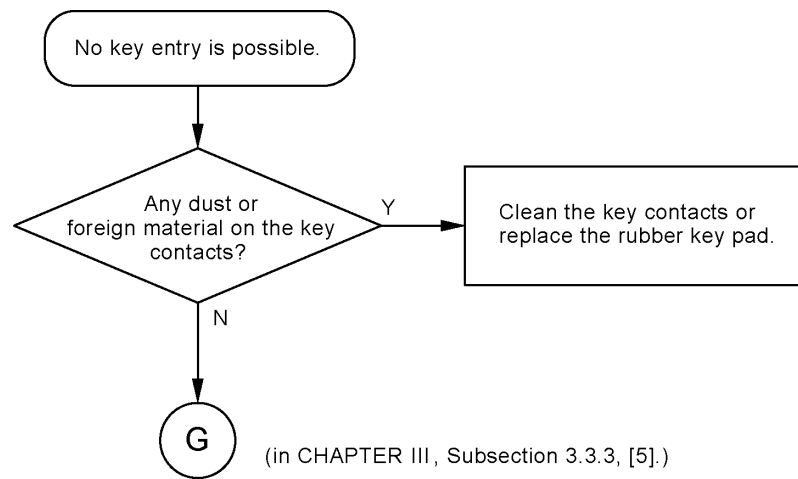




[3] **Powering failure (Nothing appears on the LCD)**



[4] No key entry possible



CHAPTER III

ELECTRONICS

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CHAPTER III ELECTRONICS

3.1 OVERVIEW

3.1.1 Configuration of the Electronic Part

Fig. 3.1-1 shows a block diagram of the control electronics of the PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150. The control electronics consists of a printed circuit board (main PCB + Sub PCB), a motor, and a thermal head assembly.

3.1.2 Main PCB

This manages all the components including an LCD, keyboard, (Jog dial :PT-1250/1160 only) and thermal head.

3.1.3 Sub PCB

Sub PCB consists of the sensor switches which identify the tape cassette type, governor circuit which controls the rotation of DC motor, AC adapter jack and battery terminal. (The AC jack is not provided for PT-1180.)

3.1.4 Motor

DC motor feeds tape.

3.1.5 Thermal Head

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

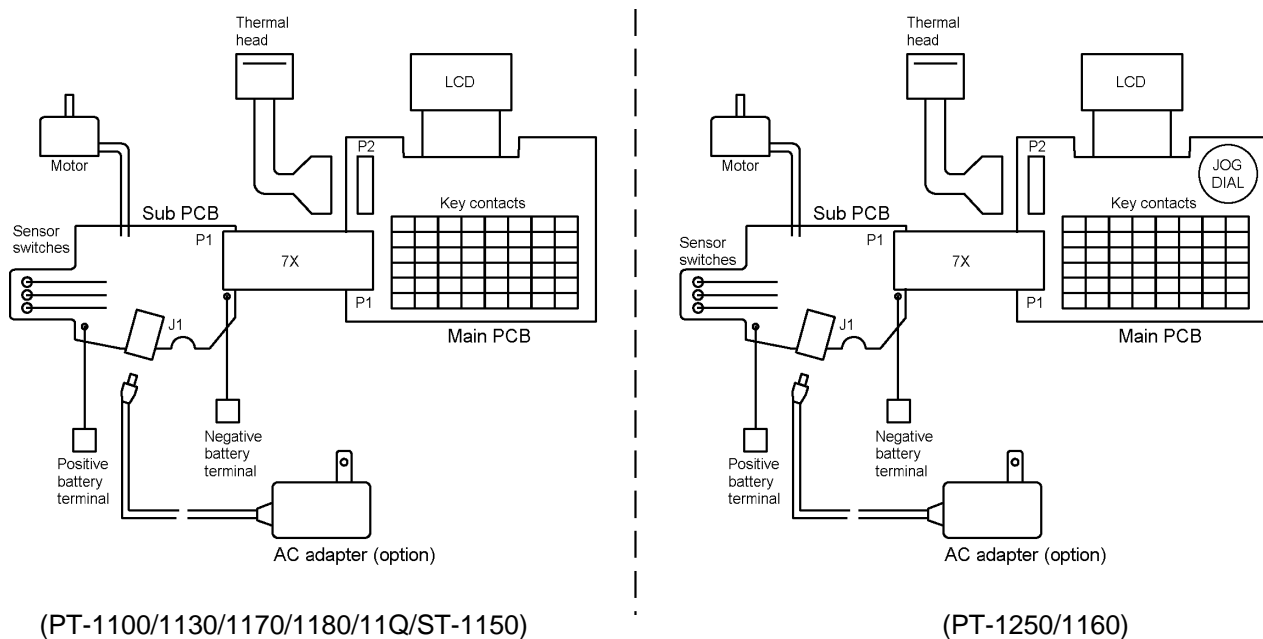


Fig. 3.1-1 Configuration of the Electronic Part

3.2 MAIN PCB

3.2.1 Main PCB Block Diagram

Fig. 3.2-1 shows the Main PCB block diagram. The PCB consists of the following:

- (1) CPU (including a ROM, RAM, and LCD control)
- (2) Key contacts matrix, solder points (specification switching-over circuit) and jog dial (PT-1250/1160 only).
- (3) Power On/Off circuit and power saving circuit
- (4) Motor control circuit
- (5) Thermal head drive circuit
- (6) Voltage detection circuit and temperature sensor circuit
- (7) Oscillation circuit
- (8) Reset circuit
- (9) Power supply circuit
- (10) Cassette sensor circuit

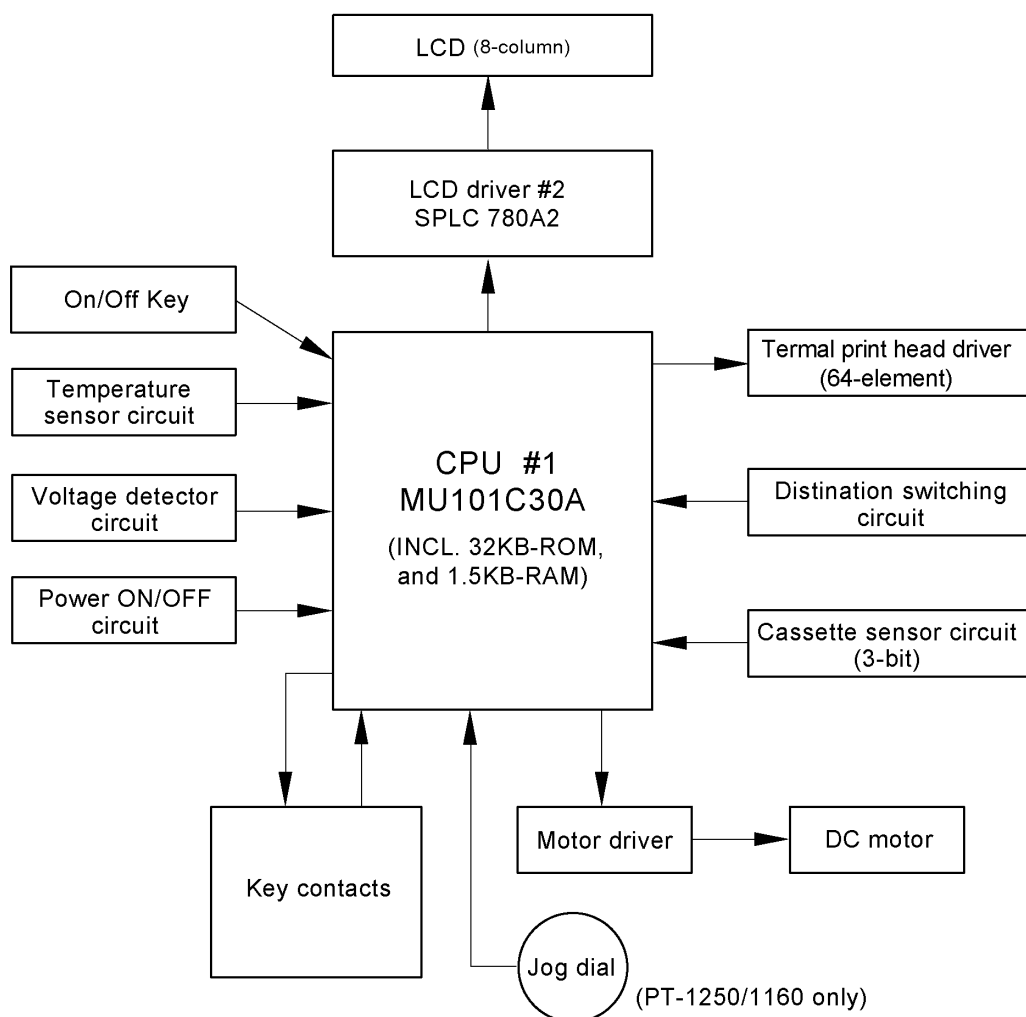


Fig. 3.2-1 Main PCB Block Diagram

3.2.2 CPU and LCD Driver

The CPU (MU101C30A) is a 8bit microprocessor produced by CMOS silicon gate process, which integrates a 32 kilobyte-ROM and a 1.5 kilobyte-RAM.

The LCD driver (SPLC 780 A2) is a LSI that drives the LCD in 1/8 duty and 1/4 bias level.

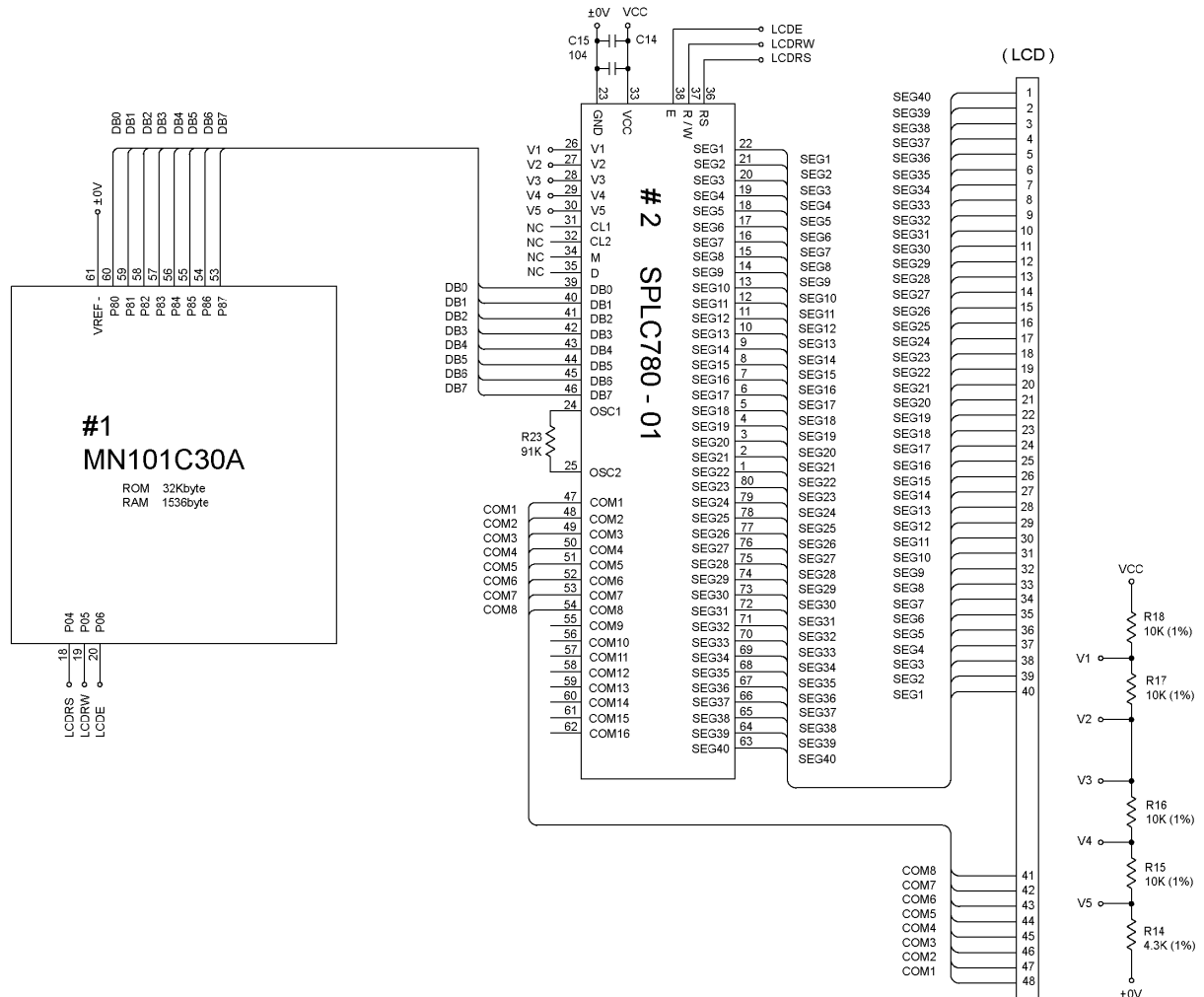


Fig. 3.2-2 CPU, CG ROM and LCD Drive

3.2.3 Key Contacts Matrix

[1] Key contacts matrix

On the main PCB is a key contacts matrix that is a set of carbon-printed 41 key (PT-1250/1160: 40 key + tact switch) contact patterns. Each contact pattern has a pair of electrodes.

The rubber 42 key (PT-1250/1160: 41 key) is made of high-impedance silicon rubber. As shown in Fig. 3.2-3, each key on the rubber 42 key (PT-1250/1160: 41 key) consists of a key top, rubber spring, and conductive paint which functions as a switching element.

If a particular key is pressed, the conductive paint of the key short-circuits the paired electrodes carbon-printed on the main PCB.

Fig. 3.2-4 shows a timing chart and waveforms of key scanning by the CPU. Ports P71 through P76 on the CPU produce a series of key scanning pulses. Every scanning pulse is in low impedance for 1 ms while active and in high impedance while inactive. Ports P60 through P67 act as input ports which receive key status.

The CPU scans the key contacts matrix every 10 ms. If the CPU reads the same data on an input port two successive times, it interprets the state as the key being pressed; if the CPU reads the same data six successive times, it interprets the state as the key being released. The input mode of this keying system is 2-key roll-over and 3-key lock-out.

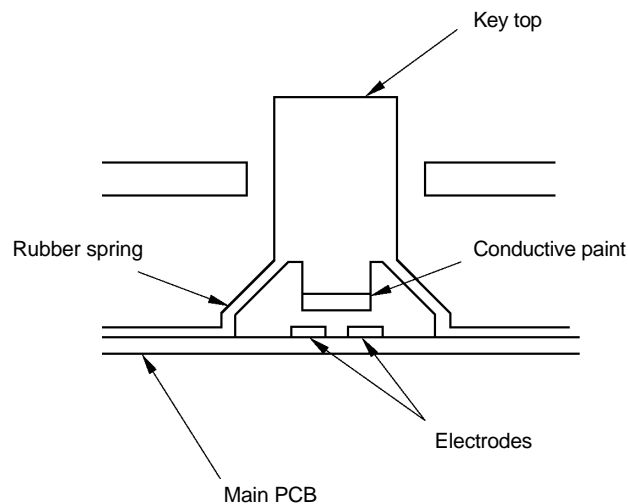


Fig. 3.2-3 Detailed Mechanism of a Key

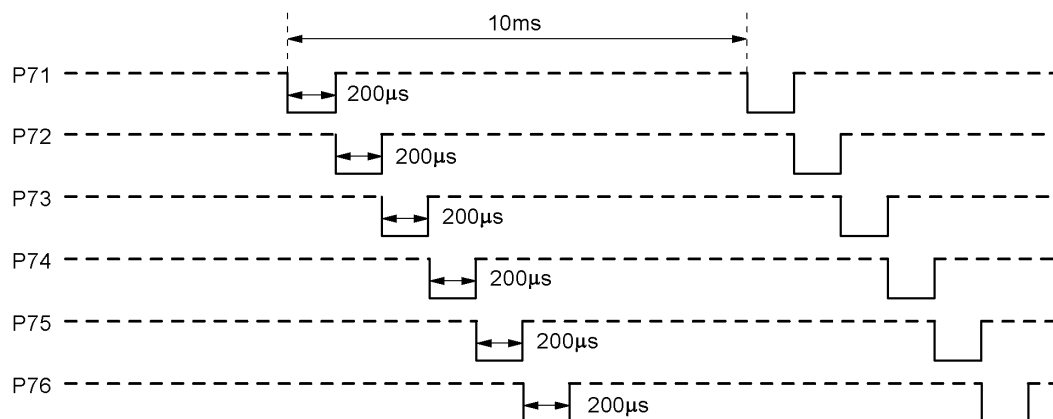


Fig. 3.2-4 Timing Chart and Waveforms of Key Scanning by the CPU

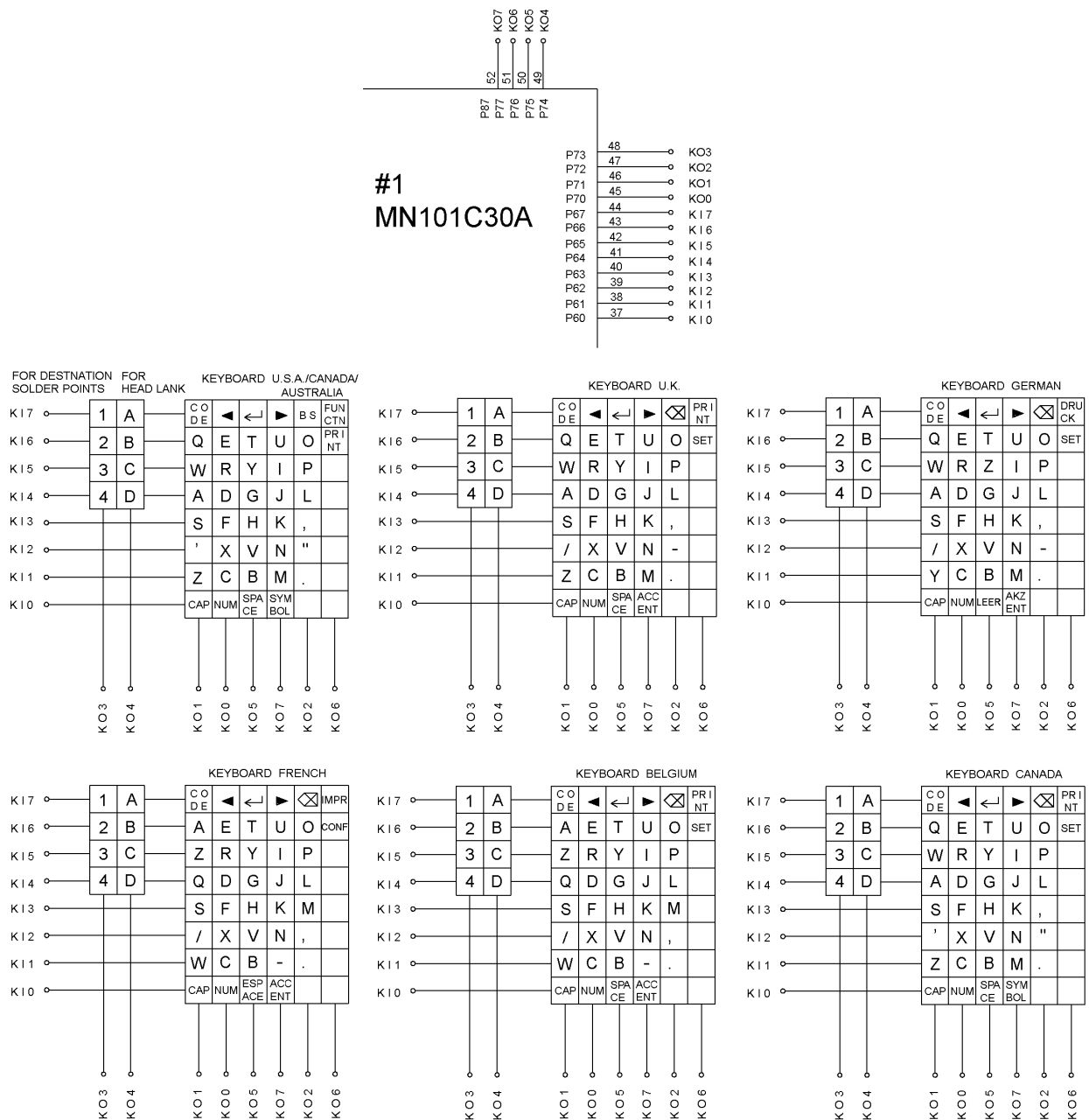
[2] Solder points

Fig. 3.2-5 shows a circuit diagram relating to the keyboard and solder points. Solder points 1 through 4 are connected to satisfy the specification of PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150.

Solder point	Specification			
	PT-1250		PT-1160	PT-1100/1130/1170/1180 11Q/ST-1150
	MN101C30ABE	MN101C30ABF1	MN101C30ABD	
No point solder	UK	German	_____	U.S.A., Canada, Australia
Point 1 solder	French	_____	Canada	_____
Point 2 solder	Belgium	_____	_____	_____

Solder points A through D are reserved for the future use for the thermal head ranking.

The CPU reads the solder point status once in the powering-on to confirm the specification.



[3] Jog dial (Only for PT-1250/1160)

The two input signal (JOG0, JOG1) waveforms are varied by rotating the JOG dial. The rotational directions are determined from the variation pattern of this two input signal waveforms.

<JOG Switching Dial Signal>

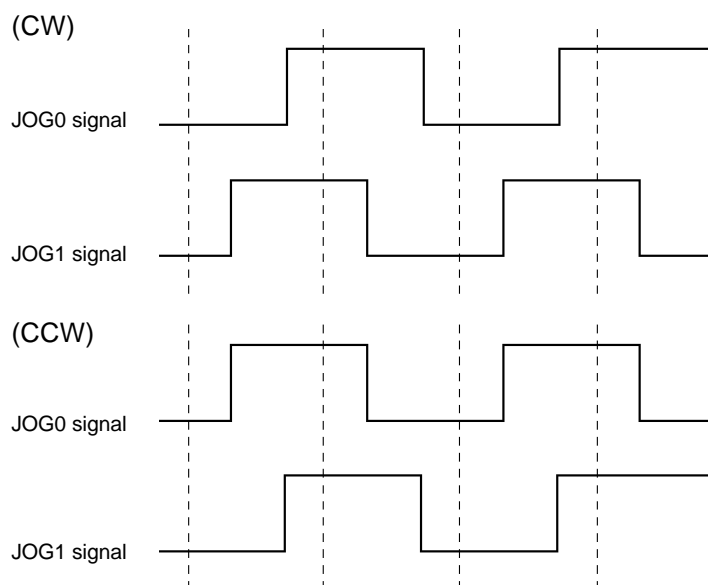


Fig. 3.2-6

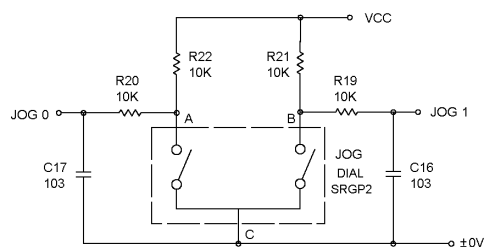


Fig. 3.2-7 Jog Dial Circuit

3.2.4 On/Off Key/Reset Circuit and Power Saving Circuit

[1] Power On/Off circuit

Fig. 3.2-8 shows a circuit diagram of the power On/Off key. The CPU processes the On/Off key state in a sequence quite different from other keys although the On/Off key is on the same key pad.

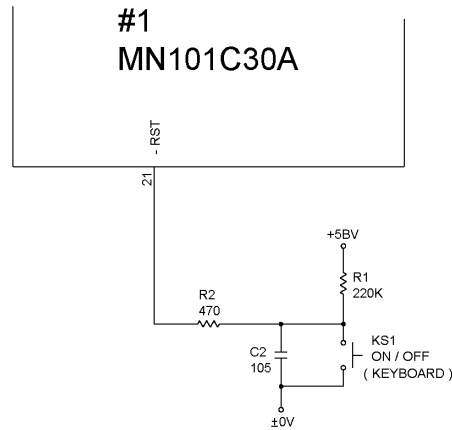
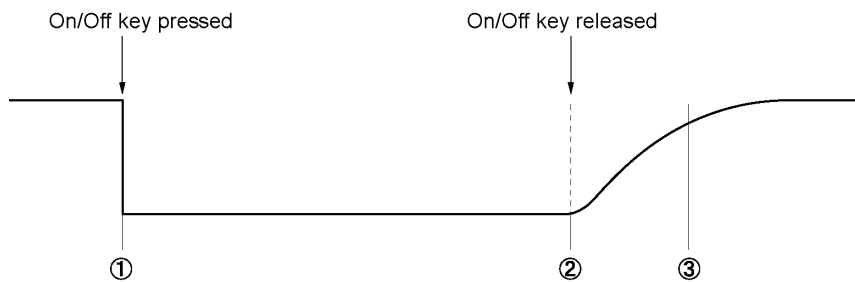


Fig. 3.2-8 On/Off Key Circuit



- ① - ② The On/Off key is held down, during which the CPU is inactive.
- ② - ③ Reset operation by the reset circuit.
- ③ In the powering-on sequence: The reset signal is canceled and the program starts.
- ③ In the powering-off sequence: The reset signal is canceled and the program stops.

Fig. 3.2-9 Powering-On/Off sequence

[2] Power saving circuit

Fig. 3.2-10 shows a circuit diagram of the power saving circuit. If you power off the machine with the power On/Off key or you make no key entry for approx. 5 minutes, the CPU turns P11 high to cut off the Vcc (which normally would feed power to the logic circuits except the CPU). In this way, the CPU enters the sleep mode where oscillation stops so as to feed no clock to the CPU.

In the sleep mode, the +5BV feeds power only to the CPU.

To cancel the power saving mode (automatic powering-off mode) and resume the normal operation mode, press the power On/Off key.

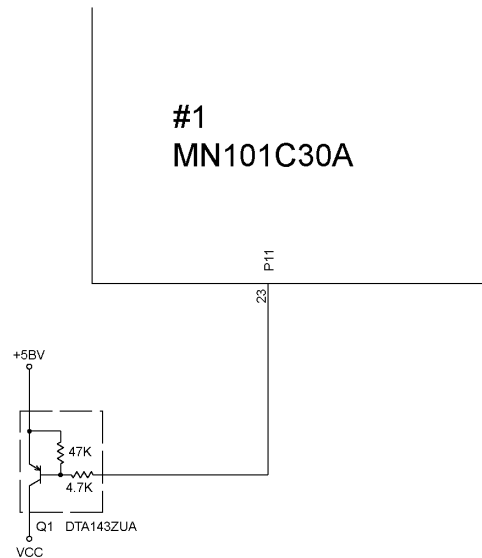


Fig. 3.2-10 Power Saving Circuit

3.2.5 Motor Control Circuit

Fig. 3.2-11 shows the motor drive control of the DC motor which feeds tape.

Through P10, the CPU produces a start/stop control signal to the motor control circuit. Fig. 3.2-12 shows the part of motor waveforms.

#1 (BA6220) is electronic governor IC and controls to keep the rotation speed of motor constant even if the power source voltage (VBT) varies.

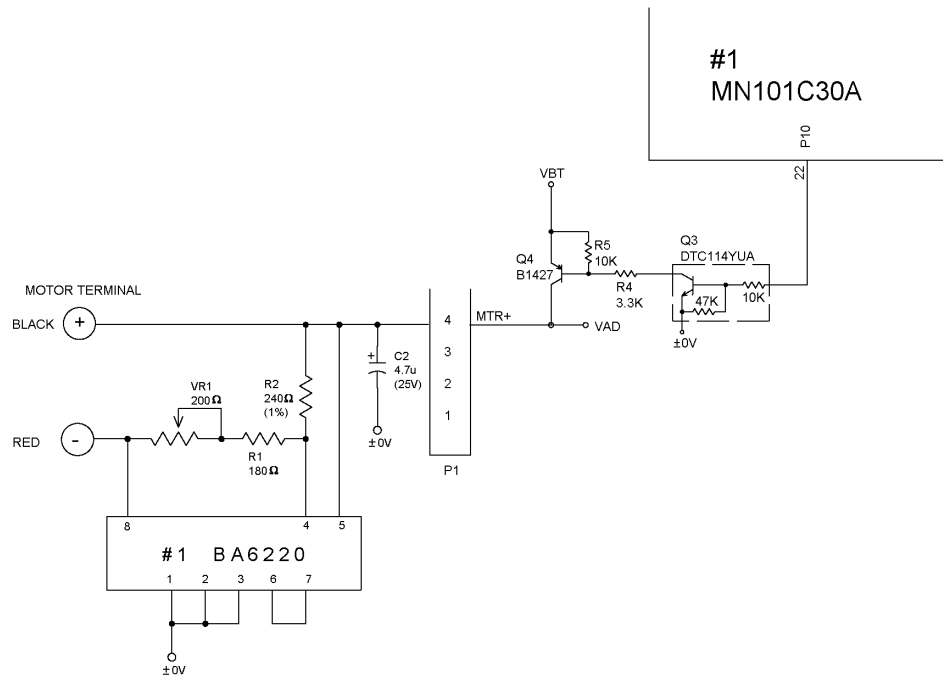


Fig. 3.2-11 Motor Control Circuit

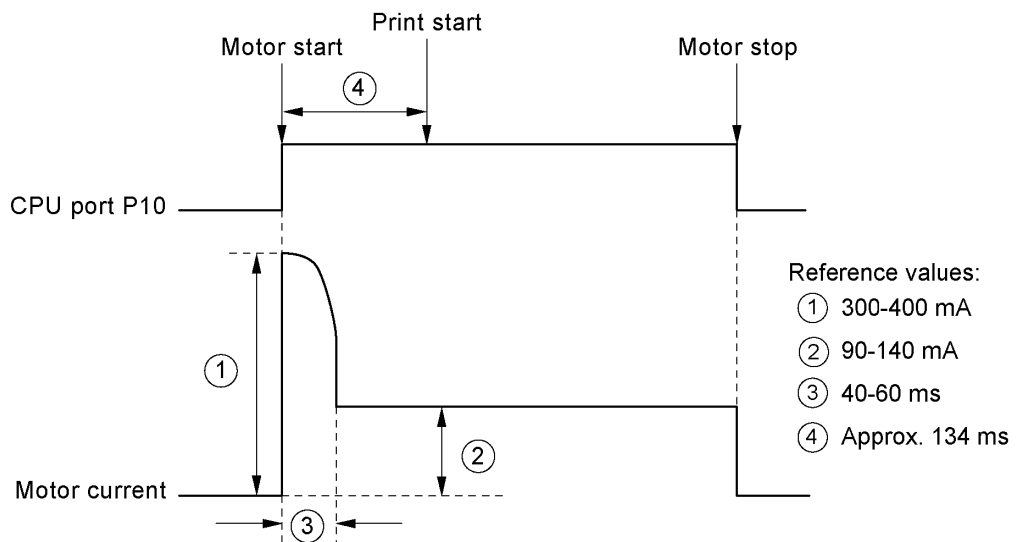


Fig. 3.2-12 Part of Motor Waveforms

3.2.6 Thermal Head Drive Circuit

Fig. 3.2-13 shows the thermal head drive circuit.

The print head used in the integrator has a heat generator (consisting of 64 heating elements vertically aligned in 180 dpi) and a built-in driver IC.

Synchronizing with the clock on P02, the CPU outputs print data on P00 in the serial waveform. Upon receipt of P01 signal produced by the CPU, the thermal head control circuit latches the print data and drives the heating elements of the thermal head according to the signal produced from P03. Fig. 3.2-14 shows the timing chart of the thermal head drive.

Capacitor C12 works as a thermal head overheat protector. It cuts off the P03 signal to shut down invalid drive current if the signal sticks to the low level due to any malfunctions of the programs or the CPU.

Since the thermal head is very sensitive to heat and the head drive source is not stabilized, the CPU determines the ON-time length of the P03 signal while monitoring the head drive source voltage and the ambient temperature (refer to Subsection 3.2.7).

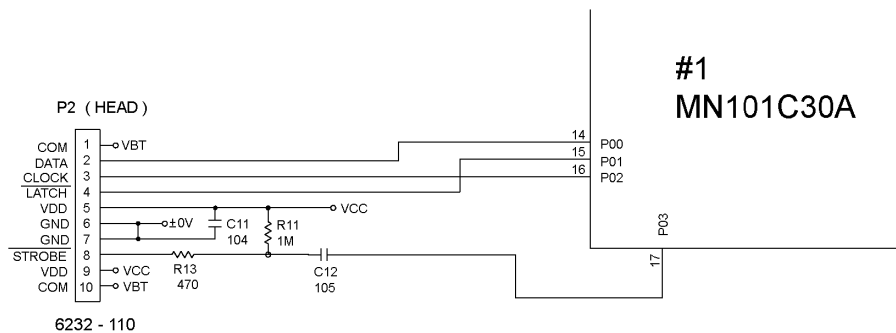


Fig. 3.2-13 Thermal Head Drive Circuit

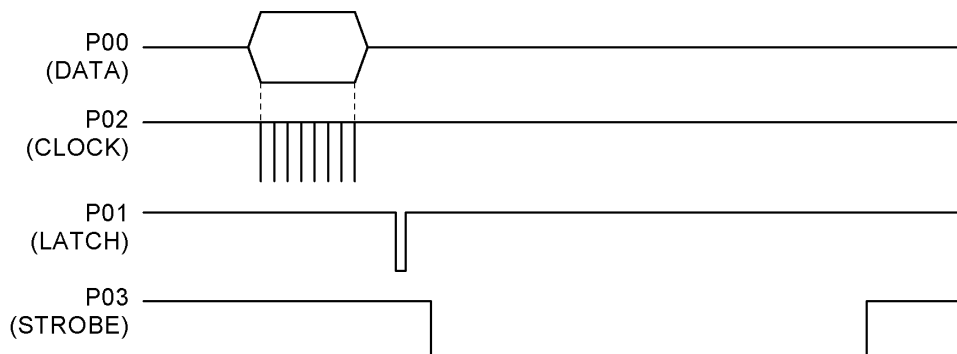


Fig. 3.2-14 Timing Chart of Thermal Head Drive

3.2.7 Voltage Detection Circuit and Temperature Sensor circuit

Fig. 3.2-15 and Fig. 3.2-16 (See next page) show the voltage detection circuit and the ambient sensor circuit which are composed of a resistor combination.

[1] Voltage detection circuit

This circuit, which is composed of divider resistors R8 and R10, steps down the power source VAD fed from batteries or the AC adapter output and feeds the output to the A/D input port PA1 on the CPU.

During non-printing:

If the voltage level of the VAD drops below approx. 6.8V, the CPU immediately shuts down the power.

During printing:

- If the voltage level of the VAD rises over approx. 10.8V, the CPU immediately shuts down the power.
- If it drops even more below approx. 5.3V, the CPU displays the message to warn you of a low battery after completion of printing.
- If it drops even more below approx. 5.0V, the CPU interrupts the printing and displays the message to warn you of a very low battery.
- If it drops below approx. 4.8V, the CPU immediately shuts down the power.

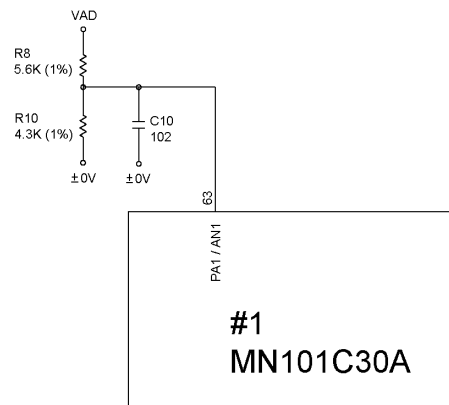


Fig. 3.2-15 Voltage Detection Circuit

[2] Ambient temperature sensor circuit

This circuit is composed of resistors R12 and a thermistor TH2. It converts the resistance of the TH2 (whose internal resistance varies depending upon the ambient temperature) to the voltage variation, and then feeds its output to the A/D input port PA0 on the CPU. According to the Ambient temperature data, the CPU determines the optimum head drive power.

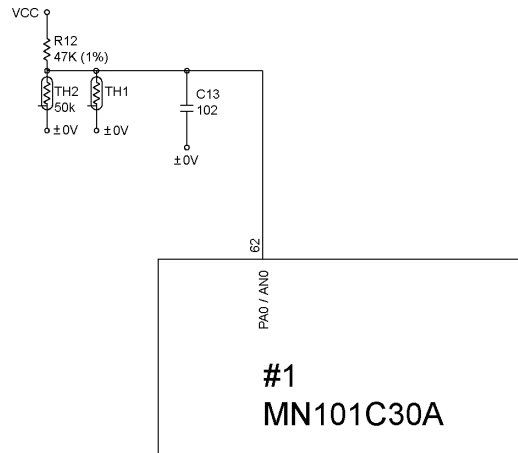


Fig. 3.2-16 Ambient Temperature Sensor Circuit

3.2.8 Oscillation Circuit

Fig. 3.2-17 shows the oscillation circuit.

This circuit contains an oscillator and generates an oscillation at 8 MHz which act as the CPU basic clock. The CPU divides this into half (4 MHz) to synchronize its internal operations.

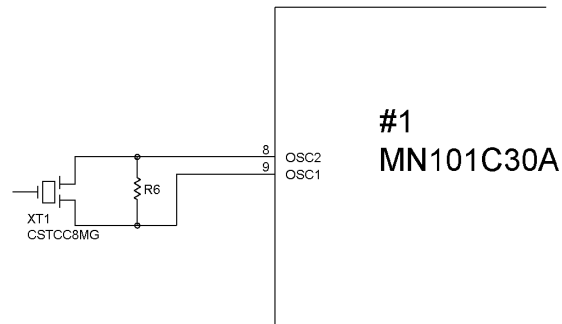


Fig. 3.2-17 Oscillation Circuit

3.2.9 Power Supply Circuit

Fig. 3.2-18 shows the power supply circuit. A 3-terminal regulator RH5RL50A stabilizes the battery output or the AC adapter output, producing the +5BV power source within the variation of $\pm 0.15\text{V}$.

Capacitor C4 is for the logic circuit; capacitor C1 is for the thermal head and DC motor drive sources.

Connecting the AC adapter plug with the AC jack J1 cuts off the power fed from the batteries and feeds power from the AC adapter. (However, the power for memory backup is fed from the battery.)

Note1: The AC jack is not provided for PT-1180.

Fig. 3.2-19 shows the polarity of the AC adapter plug.

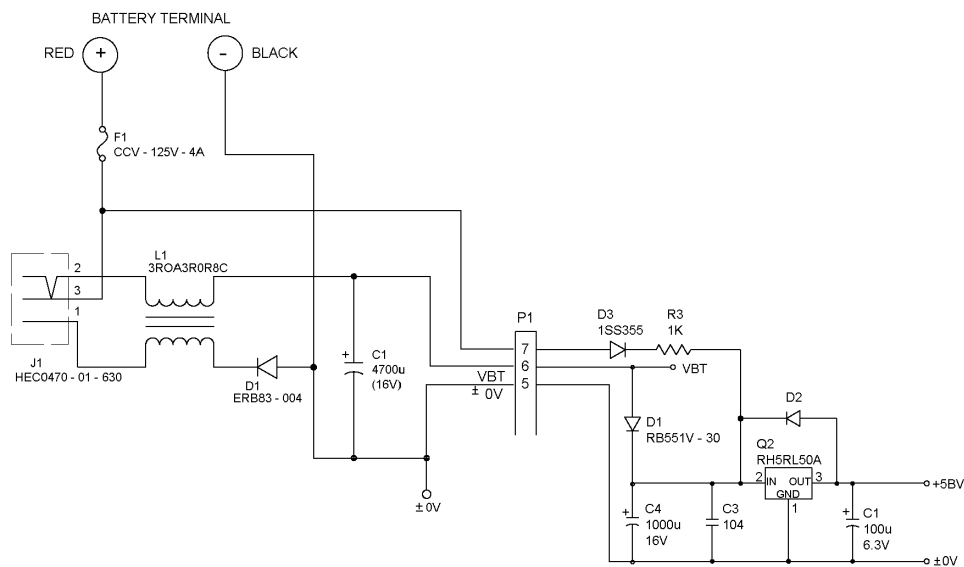


Fig. 3.2-18 Power Supply Circuit

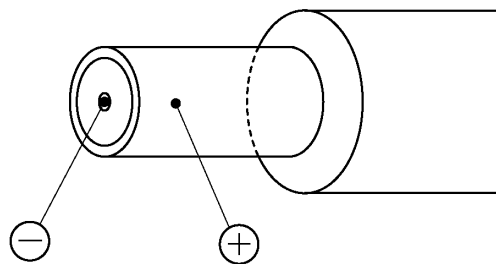


Fig. 3.2-19 AC Adapter Plug

3.2.10 Cassette Sensor Circuit

Fig. 3.2-20 shows the cassette sensor circuit. This circuit detects each of the five sensor switches which is pushed or not depending upon the ID holes provided on a tape cassette currently mounted.

By perceiving the states of those sensor switches, the CPU identifies the tape cassette type (the varieties and the widths).

If an ID hole is open, the sensor switch is not pushed.

Table 3.2-1 lists the coded values for identifying the tape cassette type.

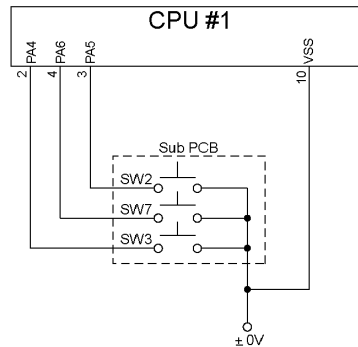


Fig. 3.2-20 Cassette Sensor Circuit

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

Cassette type	SW2	SW3	SW7
Laminated tape cassette, 6-mm width	1	0	0
Non-laminated tape cassette, 6-mm width	1	0	1
Laminated tape cassette, 9-mm width	0	0	0
Non-laminated tape cassette, 9-mm width	0	1	1
Laminated tape cassette, 12-mm width	0	1	0
Non-laminated tape cassette, 12-mm width	0	0	1

Position of
Sensor Switches

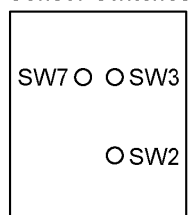


Table 3.2-1 Coded Values for Identifying Tape Cassette Type

3.3 TROUBLESHOOTING

This section gives the service personnel some of the troubleshooting procedures to be followed if an error or malfunction occurs with the PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150. 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.

3.3.1 Precautions

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

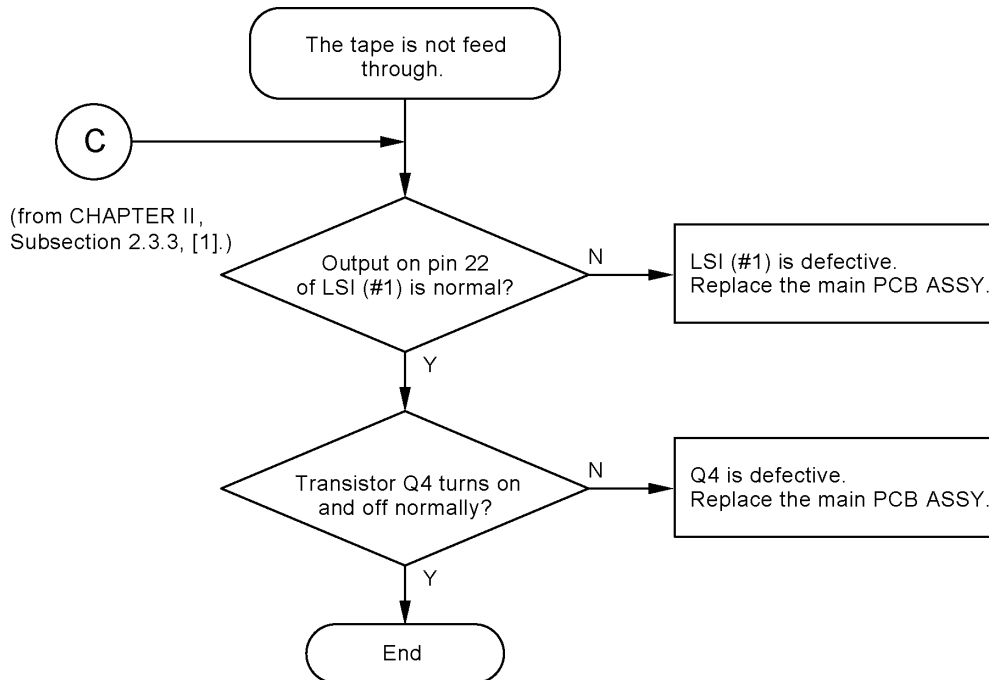
- (1) Get a good idea of what the trouble is. Whenever more than one trouble source is found, plan the most reasonable repairing procedure after reviewing the relationship between them.
- (2) When supplying power to the PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150 having problems from either a set of batteries or the AC adapter, make sure that its output voltage level is 8 to 10V under no load.
- (3) When supplying power from a stabilized power unit, use the power unit with approx. 3A capacity and choose the output level of 7 to 9V.
When connecting it to the PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150, be careful with the polarity.
- (4) When using a circuit tester for testing the conductivity, remove all of the batteries and the AC adapter from the PT-1100/1130/1170/1180/11Q, PT-1250/1160 and ST-1150.
- (5) To repair an error which occurred in the thermal head and its related sections, disconnect the thermal head cable until repairs are finished.

3.3.2 After Repairing

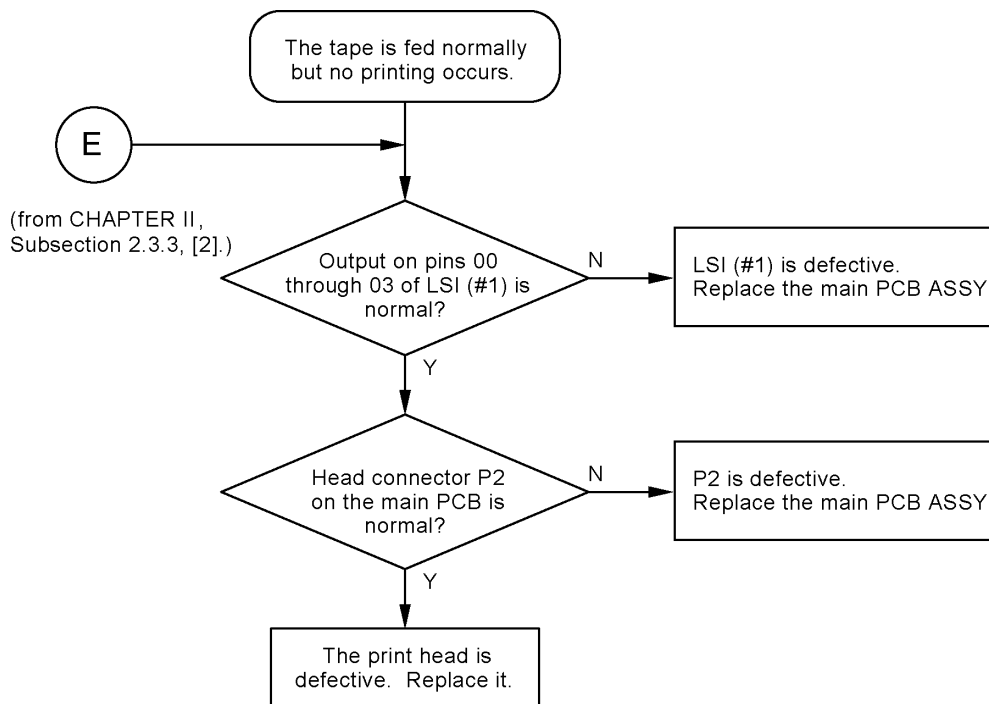
After troubleshooting, be sure to check the failure to make sure that the failure has been completely remedied. Note and keep the troubleshooting procedure actually followed for later troubleshooting.

3.3.3 Troubleshooting Flows

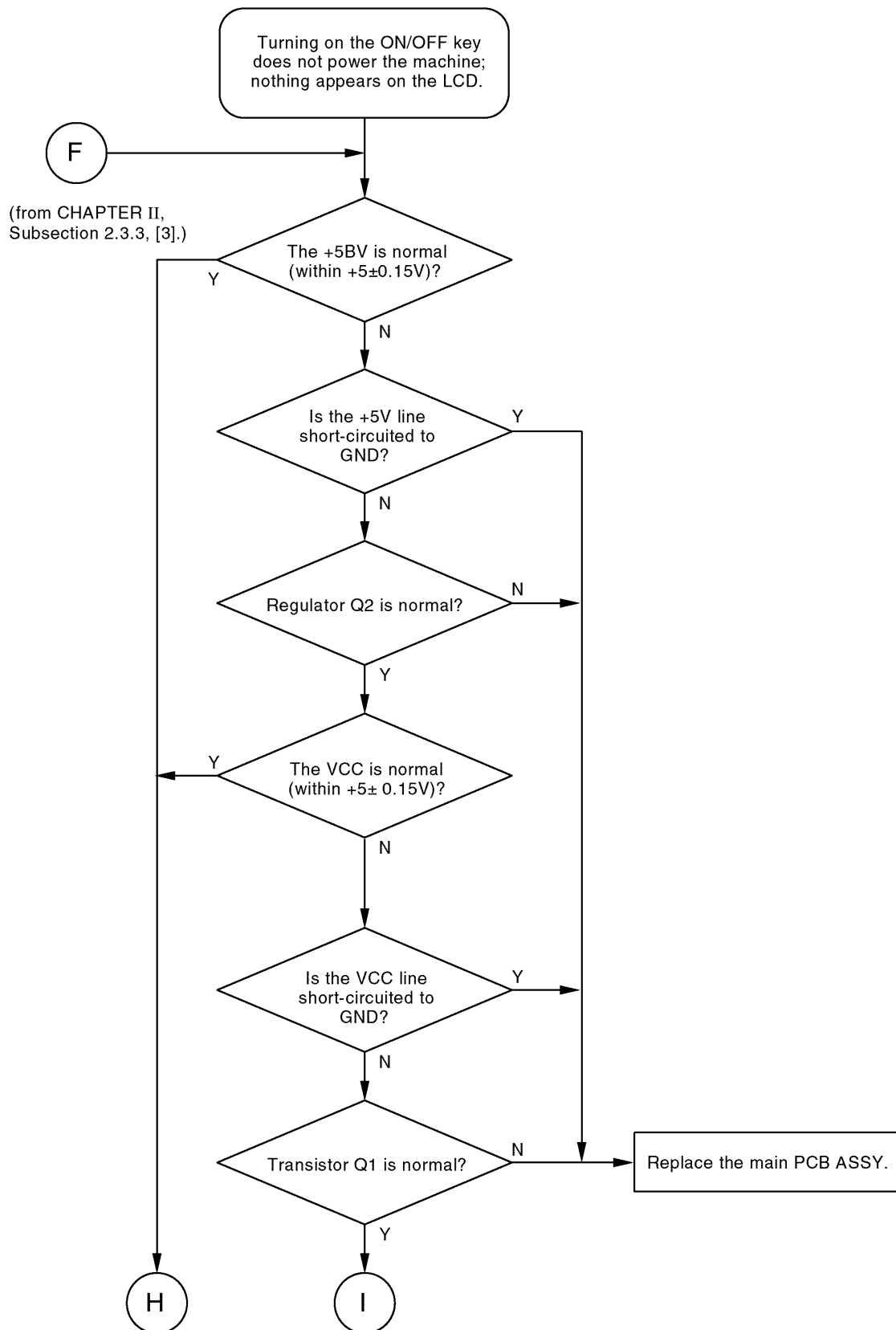
[1] Tape feeding failure

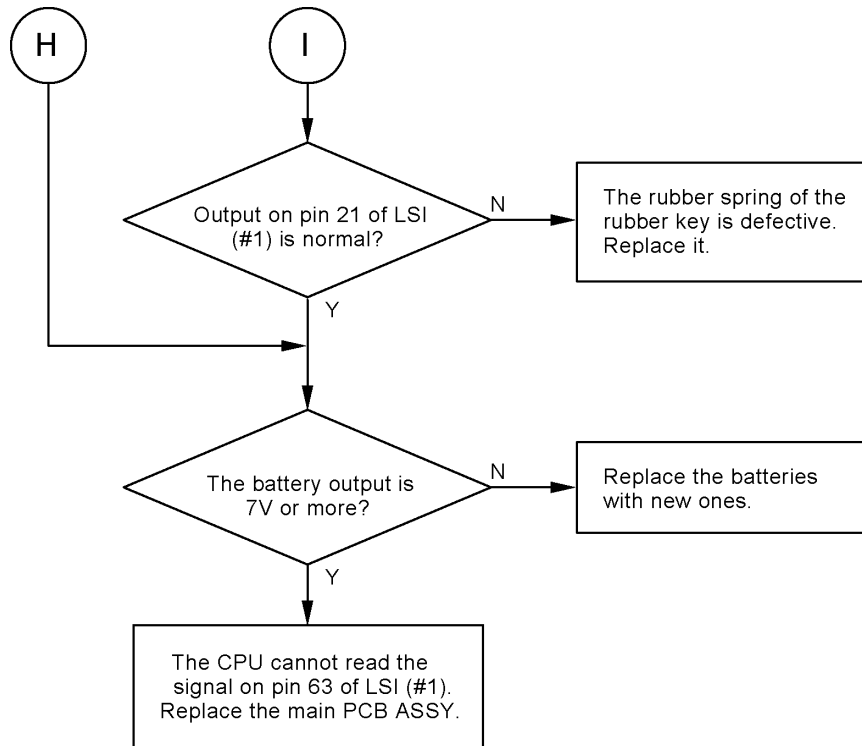


[2] Printing failure

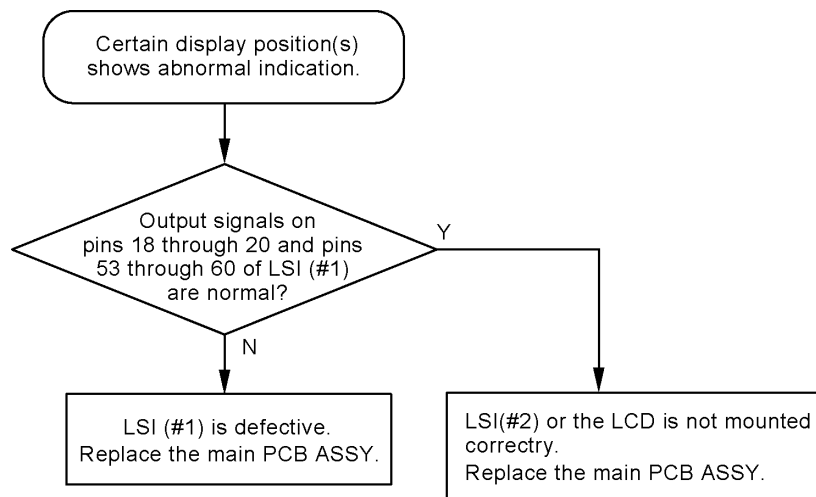


[3] Powering failure (Nothing appears on the LCD.)

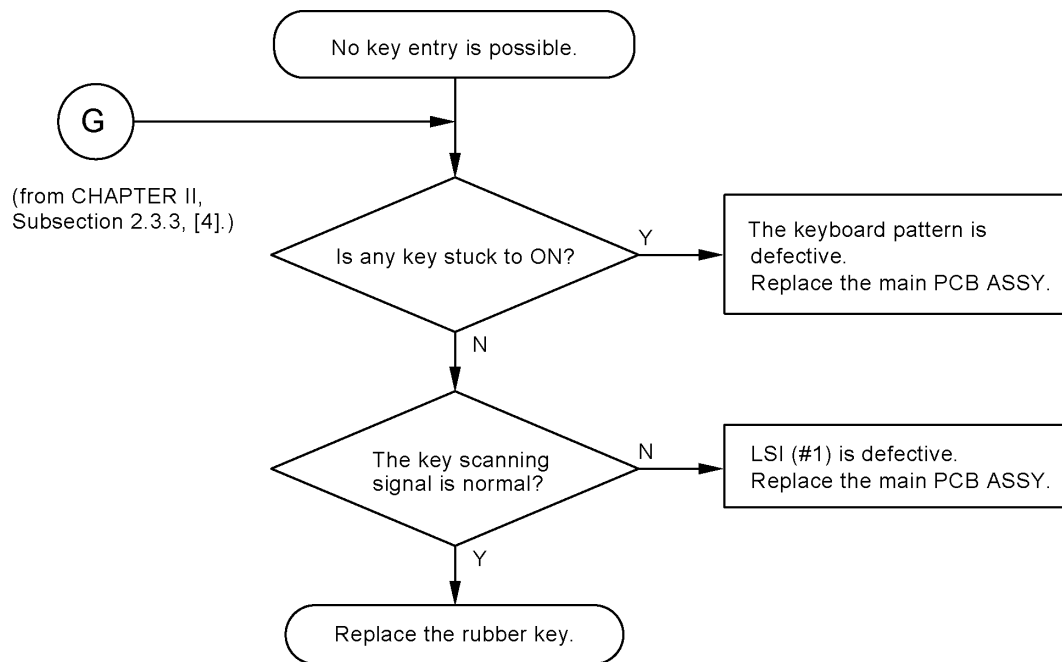




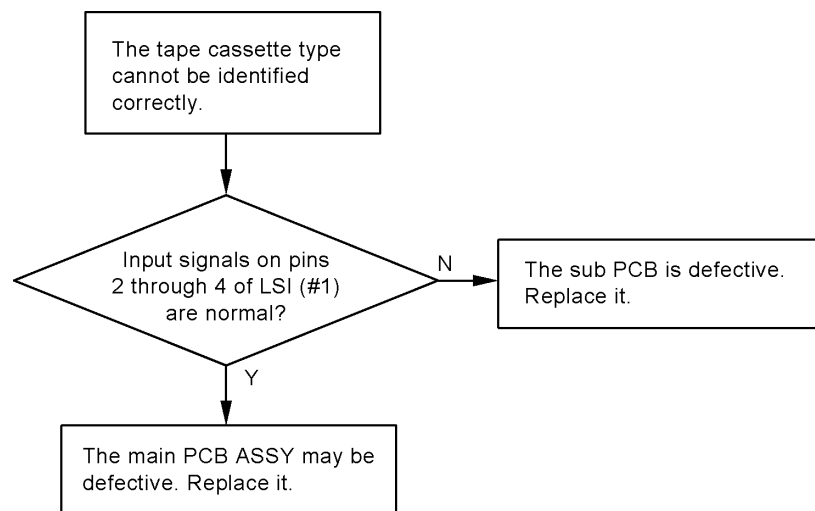
[4] Abnormal LCD indication



[5] No key entry possible



[6] Tape cassette type not identified



APPENDICES

Circuit Diagrams

- A: MAIN PCB CIR 1100
(PT-1100/1130/1170/1180/11Q/ST-1150)
- B: MAIN PCB CIR 1250
(PT-1250/1160)
- C: SUB PCB CIR 1250

POWER

VBT ±0V
MTR+
SW3
SW2
SW7

D3 1SS355
R3 1K
D1 RB551V - 30
Q2 RH5RL50A
C4 1000u 16V
C3 104
C1 100u 6.3V
+5BV
±0V

VCC
R12 47K (1%)
TH2 50K
TH1
C13 102
±0V

VAD
R8 5.6K (1%)
R10 4.3K (1%)
C10 102
±0V

#1 MN101C30A
ROM 32Kbyte
RAM 1536byte

PA3 PA4 PA5 PA6 PA7
PA1/AN1 PA0/AN0 VREF -
P67 P66 P65 P64 P63 P62 P61 P60 P54 P53 P52 P51
P73 P72 P71 P70 P74 P75 P76 P77 P78 P79 P80 P81 P82 P83 P84 P85 P86 P87

DB0 DB1 DB2 DB3 DB4 DB5 DB6 DB7
V1 V2 V3 V4 V5 NC NC NC NC NC NC NC NC
OSC1 OSC2
COM1 COM2 COM3 COM4 COM5 COM6 COM7 COM8

#2 S1C780 - 01

±0V VCC
C15 104
C14
LCDE LCDRW LCDRS
E R/W
RS
SEG1 SEG2 SEG3 SEG4 SEG5 SEG6 SEG7 SEG8 SEG9 SEG10 SEG11 SEG12 SEG13 SEG14 SEG15 SEG16 SEG17 SEG18 SEG19 SEG20 SEG21 SEG22 SEG23 SEG24 SEG25 SEG26 SEG27 SEG28 SEG29 SEG30 SEG31 SEG32 SEG33 SEG34 SEG35 SEG36 SEG37 SEG38 SEG39 SEG40

(LCD)

COM8 COM7 COM6 COM5 COM4 COM3 COM2 COM1

6232 - 110

COM 1
DATA 2
CLOCK 3
LATCH 4
VDD 5
GND 6
STROBE 7
VDD 8
COM 9
COM 10

VBT
VCC
±0V
R11 104
R13 470
C12 105

Q5
+5BV
R9
C7
Q1 DTA143ZUA
VCC
Q4 B1427
R5 10K
R4 3.3K
Q3 DTC114YUA
47K 10K
±0V

VCC
R1 220K
C2 105
KS1 ON / OFF (KEYBOARD)
±0V

VCC
R18 10K (1%)
R17 10K (1%)
R16 10K (1%)
R15 10K (1%)
R14 4.3K (1%)
±0V

V1 V2 V3 V4 V5

FOR DESTINATION SOLDER POINTS

FOR HEAD LANK

KEYBOARD U.S.A/CANADA

AUSTRALIA

KI7
KI6
KI5
KI4
KI3
KI2
KI1
KI0

1 A
2 B
3 C
4 D

CO DE
Q E
W R
A D
S F
' X
Z C
CAP NUM

← →
T U
Y I
G J
H K
V N
B M
SYM BOL

BS
FUN CTN
PR1 NT

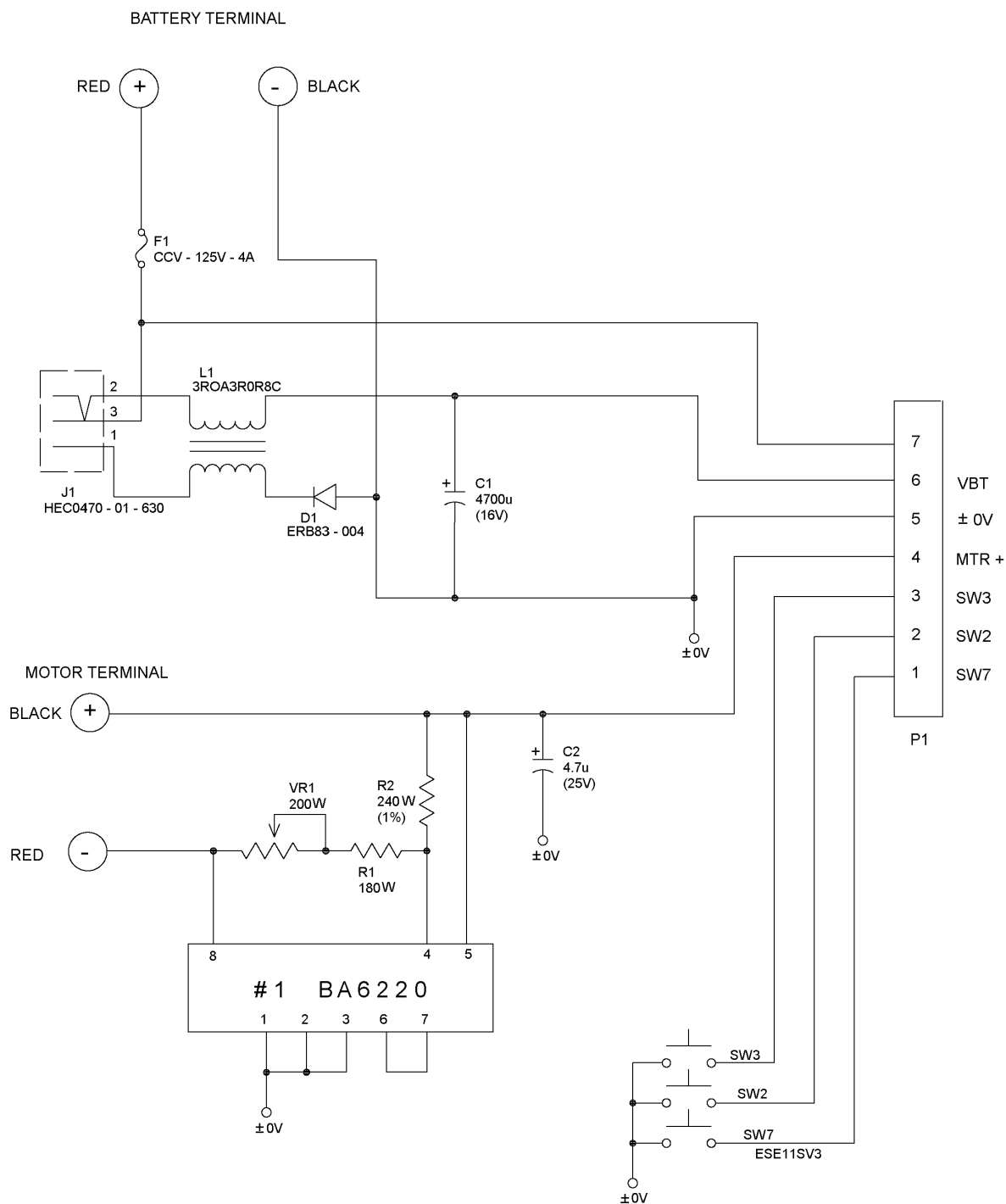
KO3 KO4
KO0 KO5
KO7 KO2
KO6

CODE	LA3656001
NAME	MAIN PCB CIR 1100

CODE	LA3656001
NAME	MAIN PCB CIR 1100

[illegible]

Appendix C . Sub PCB



CODE	LA3666001
NAME	SUB PCB CIR 1250

brother®