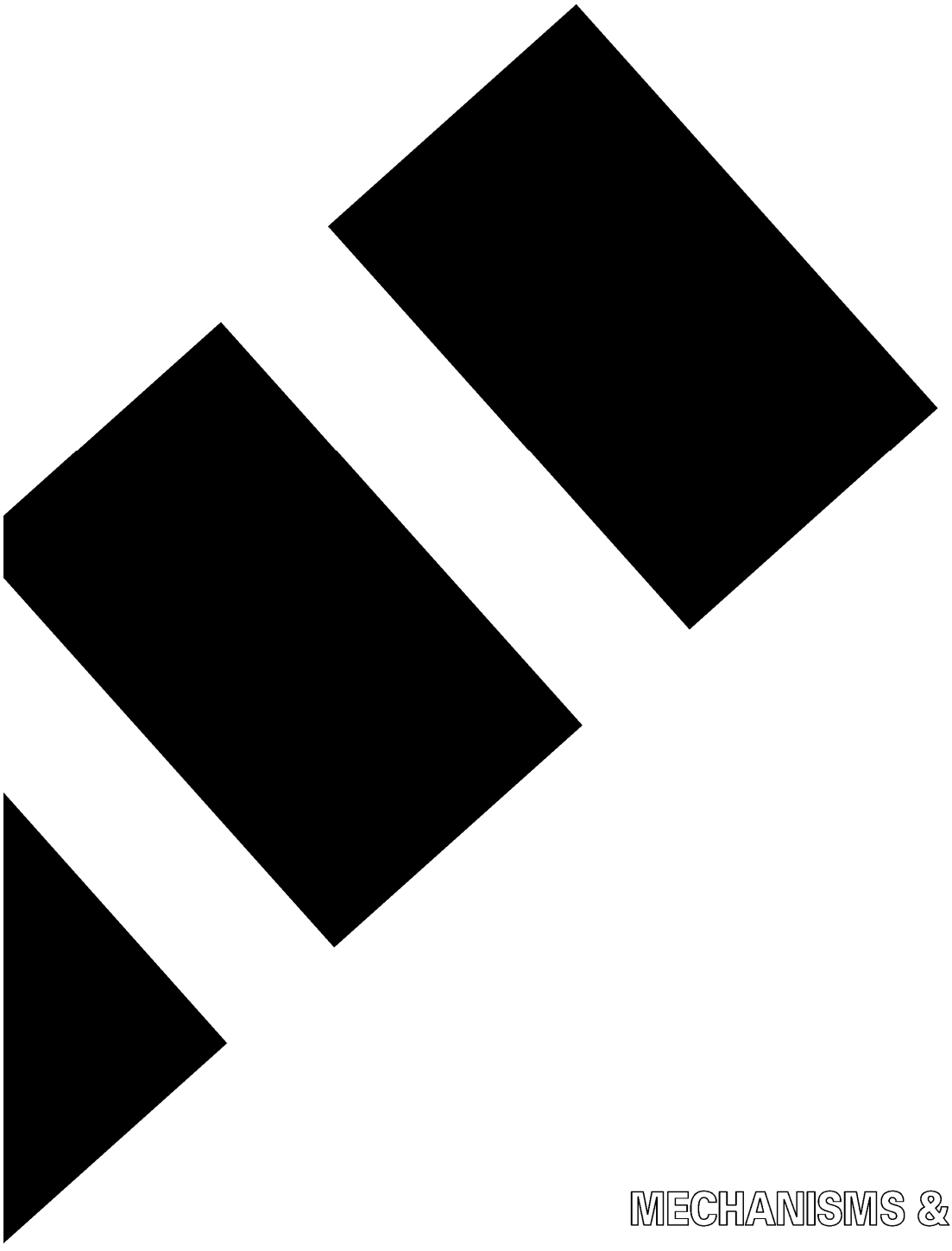
brother

SERVICE MANUAL

MODEL:PT-530/550



MECHANISMS & ELECTRONICS

brother

SERVICE MANUAL

MODEL: PT-530/550

PREFACE

This publication is a service manual covering the specifications, theory of operation, disassembly/reassembly procedure, and troubleshooting of the Brother PT-530/550. It is intended for service personnel and other concerned persons to accurately and quickly provide after-sale service for our PT-530/550.

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 appendices.

Chapter I.

SPECIFICATIONS

CONTENTS

1.1 MECHANICAL SPECIFICATIONS

1.1.1 External Appearance

(Unit: mm)

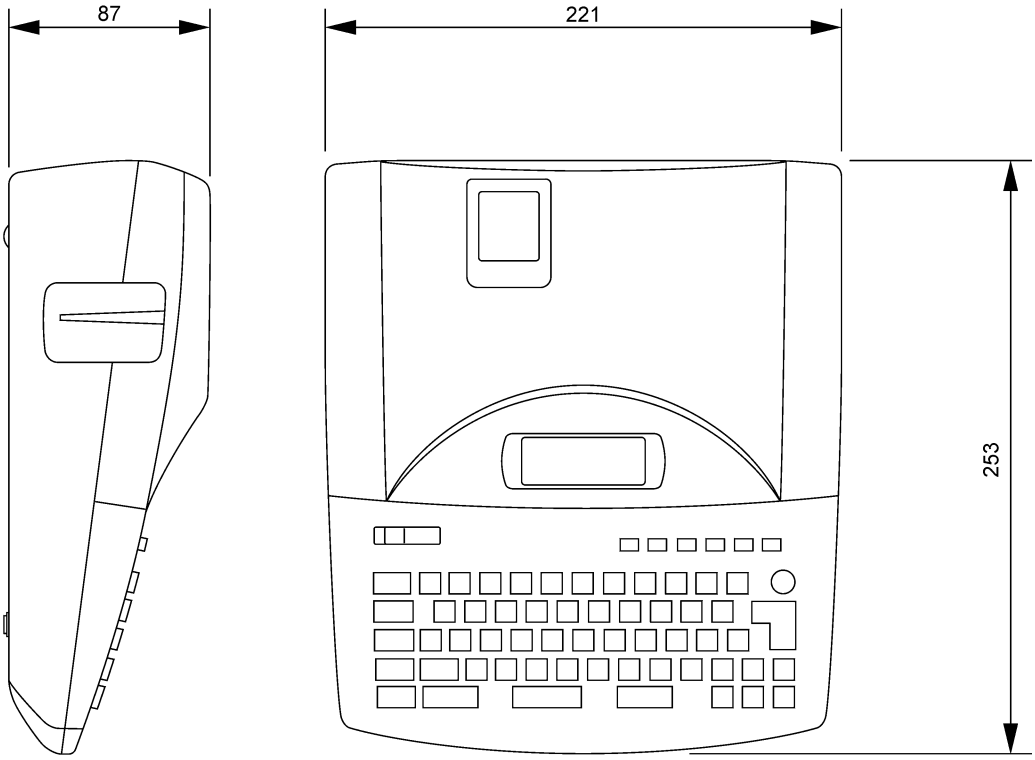


Figure 1.1-1 External Appearance

[1]	Dimensions (W x D x H)		221 x 253 x 87 mm	
[2]	Weight	Machine proper	Approx. 1.2 kg	
			Approx. 1.4 kg	(including batteries and a tape cassette)
		In package	Approx. 3.2 kg	

1.1.2 Keyboard

[1]	Entry system	Rubber keypad
[2]	Number of alphanumeric and symbol keys	39
[3]	Number of function keys	23 (excluding On/Off key)
[4]	Key arrangement	See Figure 1.1-2.

1.1.3 Display

[1] Display type — Liquid crystal display (LCD)

[2] Configuration (See Figure 1.1-2.) — 112 dots wide by 32 dots high

[3] Number of indicators (See Figure 1.1-2.)

PT-550	USA version:	23
	European versions:	24
PT-530	USA version:	20

[4] Display system — WYSIWYG (What you see is what you get)

1.1.4 Printing Mechanism

[1] Print method — Thermal transfer onto plastic tapes (laminate tape and non-laminated tape) or special tapes (instant lettering tape, non-laminated thermal film tape, iron-on transfer tape, and porous-stamp tape)

(Fixed print head and tape feeding mechanism)

[2] Print speed (max.) — 73 dots (10.3 mm) per second

[3] Print head

Type	Thermal print head
Heat generator	Consists of 128 heating elements vertically aligned
Size of heating element	0.195 mm wide by 0.141 mm high

[4] Character size (dots)

Height

Point size	6	9	12	18	24	36	48
No. of heating elements to be used	15	21	28	44	58	88	120

Width

- N (Narrow)
- M (Medium)
- W (Wide)

1.1.5 Tape Cassette

[1] Cassette — Cartridge type

[2] Types of tape cassettes

- Laminated tape cassette — Laminate tape, ink ribbon, and adhesive base tape
- Non-laminated tape cassette — Non-laminated tape and ink ribbon
- Non-laminated tape cassette, refill-type (YS-18) — - Non-laminated tape refill
- Ink ribbon refill
- Instant lettering tape cassette — Instant lettering tape and ink ribbon
- Non-laminated thermal film tape cassette — Non-laminated thermal film tape
- Iron-on transfer tape cassette — Iron-on transfer tape and ink ribbon
- Stamp tape cassette — Porous-stamp tape and base paper

[3] Tape size

		Width	Length
Laminate tape		6, 9, 12, 18, 24, 36 mm	8 m (5 m for fluorescent coating tapes)
Non-laminated tape		6, 9, 12, 18, 24 mm	8 m
Instant lettering tape		18 mm	8 m
Non-laminated thermal film tape		12, 18 mm	8 m
Iron-on transfer tape		18 mm	5 m
Refill type	Non-laminated tape refill	18 mm	8 m
	Ink ribbon refill	18 mm	8 m
Porous-stamp tape		18, 24 mm	8 m

[4] Tape cassette packed with the machine

Laminated tape cassette containing a 12-mm-wide black ink ribbon, laminate tape, and adhesive base tape

1.1.6 Tape Cutter

[1]	Tape cutting	Automatic cutter
[2]	Cutter unit	Not user-replaceable

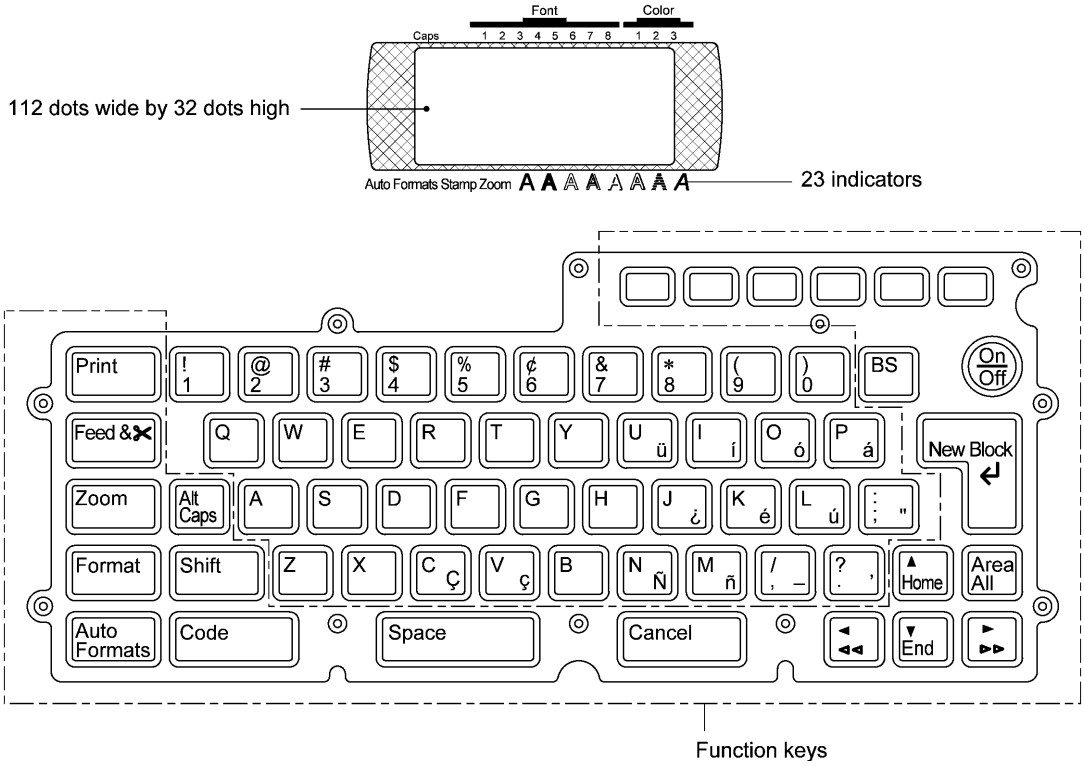
1.1.7 Lettering Stick

Mounted on the bottom of the machine

1.1.8 PC Interface (not provided on the PT-550/530 USA versions.)

[1]	Interface cable	Serial interface (RS-232C) cable for IBM AT/AT or clones
[2]	Interface programs	Editor and device driver for Windows version 3.1 and Windows 95 (which are provided in a floppy disk)

■ PT-550 USA



UK

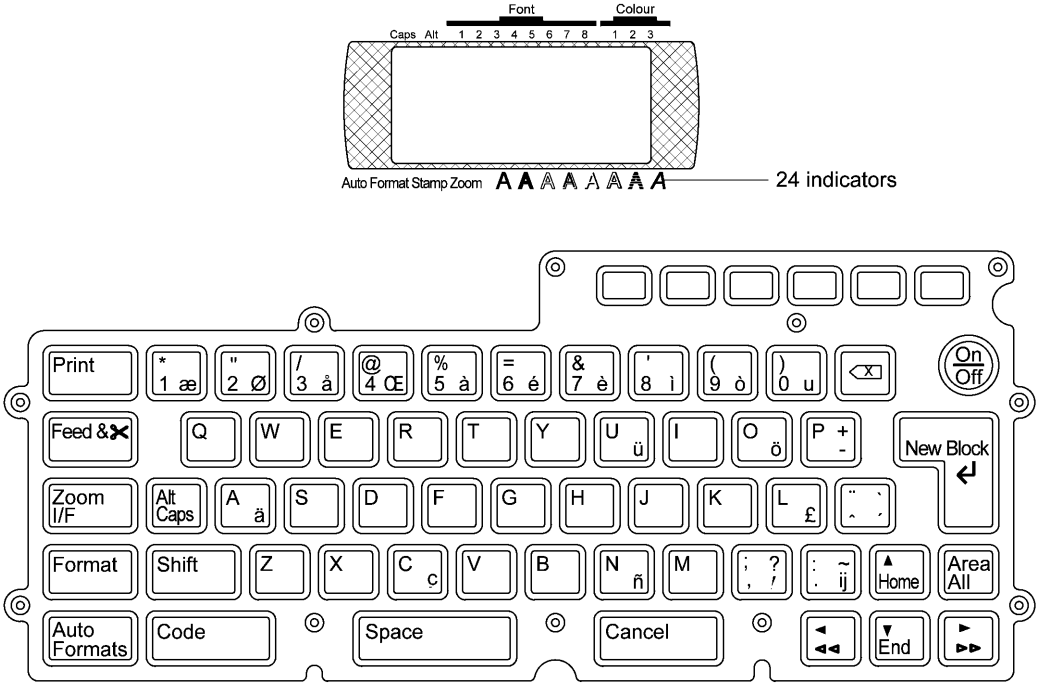
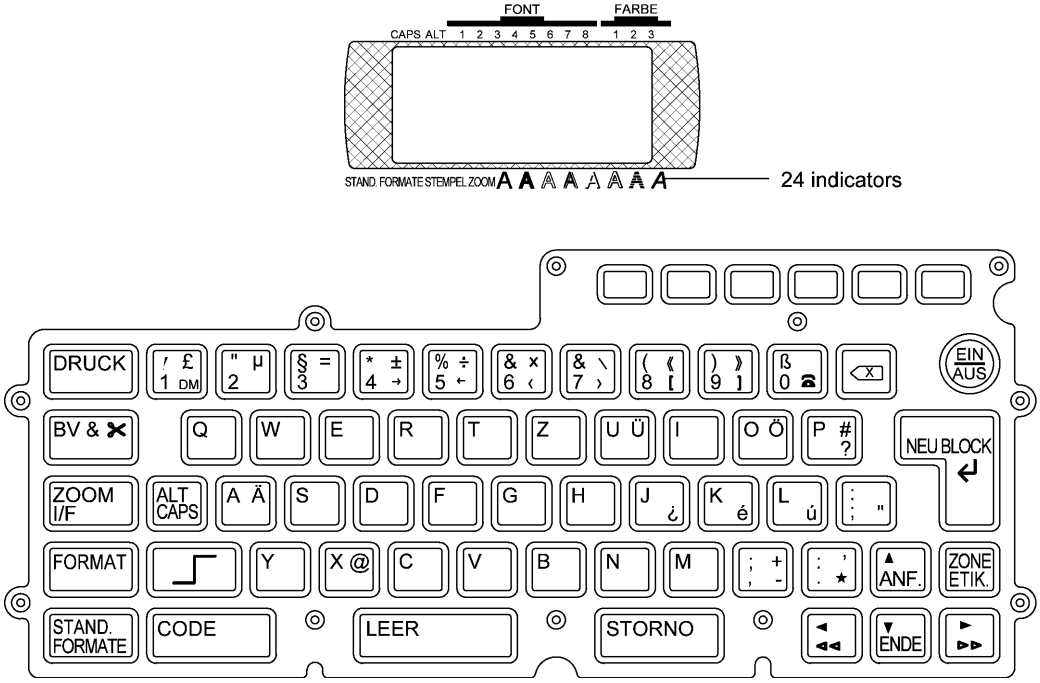


Figure 1.1-2 Key Arrangement (1)

Germany



France

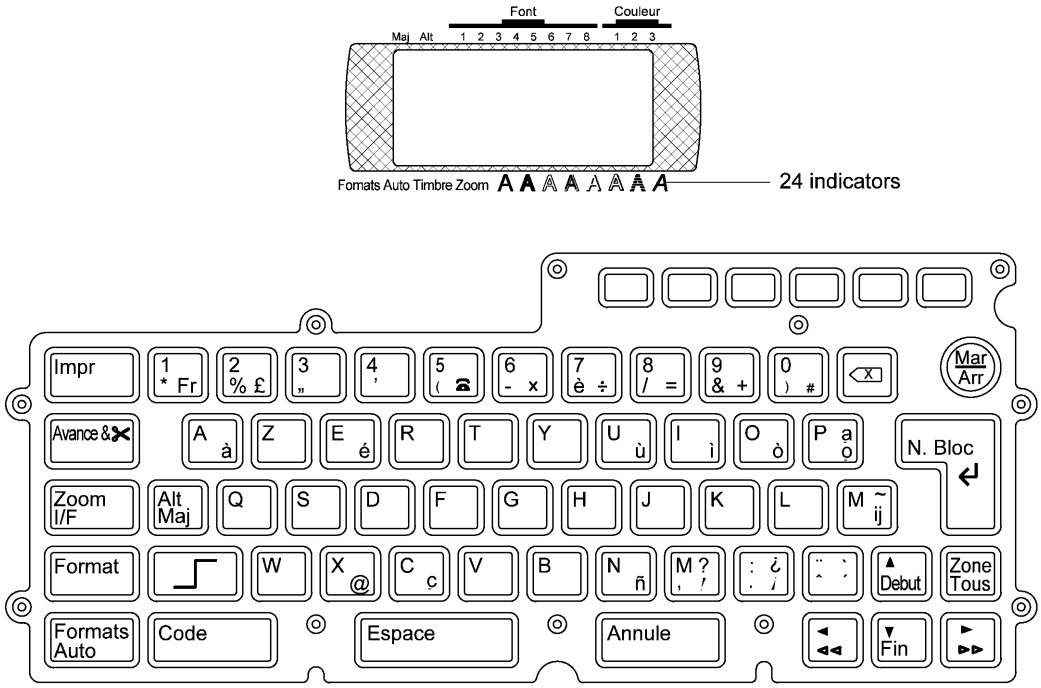
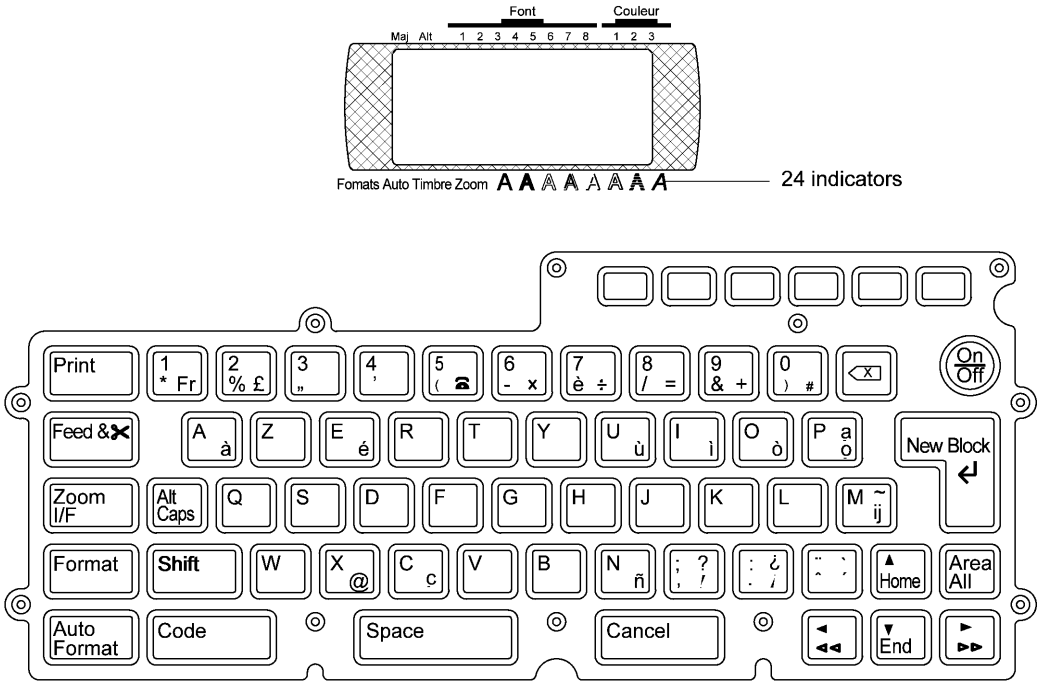


Figure 1.1-2 Key Arrangement (2)

Belgium



■ PT-530 USA

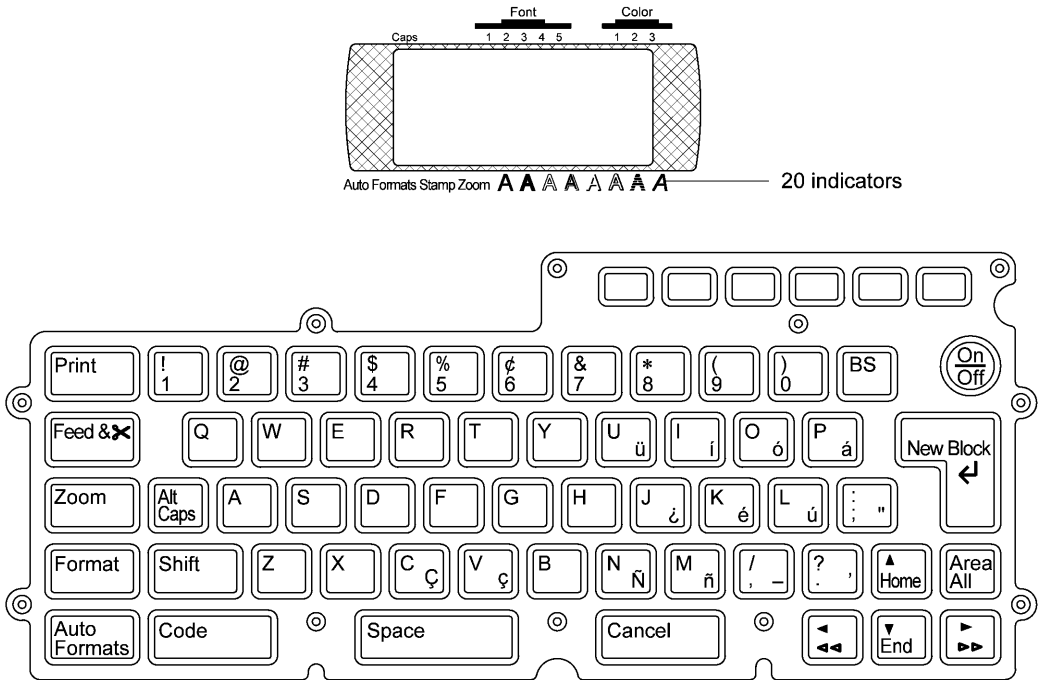


Figure 1.1-2 Key Arrangement (3)

1.2 ELECTRONICS SPECIFICATIONS

1.2.1 Character Generator

[1]	Internal characters	PT-550/530	USA version	: 398 (including symbols)
		PT-550	European versions	: 452 (including symbols)
[2]	Internal fonts	PT-550	USA version	: 8
			European versions	: 8
		PT-530	USA version	: 5

1.2.2 Power Supply

[1]	Power supply	Driven by 8 batteries Optional AC line adapter (9.5 VDC, 1.3A) available
[2]	Battery type	8 alkaline batteries (“AA” SIZE LR6/AM3)
[3]	Service life of batteries	Will last through one 24-mm wide tape cassette, and then some. (by the DEMO print, 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]	Low battery indication	When the voltage level drops below the specified level, the [BATTERIES WEAK] or [REPLACE BATTERIES!] message appears on the LCD.

Chapter II.

MECHANISMS

CONTENTS

2.1 THEORY OF OPERATION

2.1.1 Print Mechanism

■ Structure of Thermal Head

The machine uses thermal transfer printing. The thermal print head has a heat generator consisting of 128 heating elements which are vertically aligned as shown in Figure 2.1-1. Each heating element is 0.195 mm wide by 0.141 mm high.

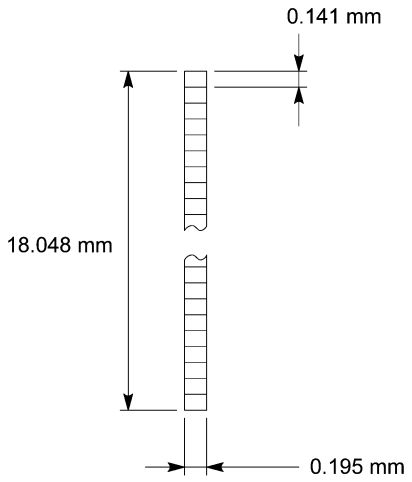


Figure 2.1-1 Heat Generator of Thermal Head

■ Printing Process

When the cylindrical rubber platen is pressed against the thermal print head with the tape and ink ribbon (the tape only when using non-laminated thermal film tape cassettes) sandwiched inbetween, the CPU applies electric power to the selected ones of those 128 heating elements.

[For tape cassettes 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(s) on the tape. The tape is advanced and the next heating cycle is repeated, thus forming a character on the tape.

[For stamp tape cassettes]

If the selected heating element(s) generates heat, the porous-stamp tape will be melted so that a pore(s) will be formed in the tape. The tape is advanced and the next heating cycle is repeated, thus forming a character of pores in the tape. The printed stamp tape can be used as the face of a stamp. When the stamp is pressed against the ink-pad, it will absorb ink through the pores.

For laminated tape cassettes, instant lettering tape cassettes, and iron-on transfer tape cassettes, the CPU processes the print data to generate a mirror image so that the printed character can be seen normally when viewed from the other side of the printed face of the tape.

■ Character Formation

While the main motor (stepping motor) feeds the tape and ink ribbon (tape only when using non-laminated thermal film tape cassettes or stamp tape cassettes) by 0.141 mm for 13.8 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 Roller Holder ASSY Setting & Retracting Mechanism

This mechanism consists of the roller release lever, roller release rod, and roller holder ASSY.

The roller holder ASSY incorporates the platen holder and the sub roller holder. These holders support the platen and the tape feed sub roller so that they can move perpendicularly to the thermal head and the tape feed roller, respectively, as well as rotating freely.

Closing the cassette cover pushes down the roller release lever which moves the roller release rod to the left (when viewed from the front of the machine). This pivots the roller holder ASSY around the shaft provided on the chassis so as to press the roller holder ASSY against the thermal head side.

The platen is pressed perpendicularly against the thermal head with the tape and ink ribbon (only the tape when using non-laminated thermal film tape cassettes or stamp tape cassettes) sandwiched inbetween under a uniform load by the platen spring. At the same time, the platen gear becomes engaged with the platen idle gear.

Also, the tape feed sub roller is pressed perpendicularly against the tape feed roller built in the tape cassette with the tape (and base paper when using laminated tape cassettes or stamp tape cassettes) sandwiched inbetween under a uniform load by the sub roller holder springs. At the same time, the sub roller gear becomes engaged with the tape feed gear.

If you open the cassette cover, the roller release lever pops up by pivoting around its center shaft since its bottom end is pulled down by the release lever spring. This retracts the roller holder ASSY from the thermal head, providing you with enough space to replace the tape cassette.

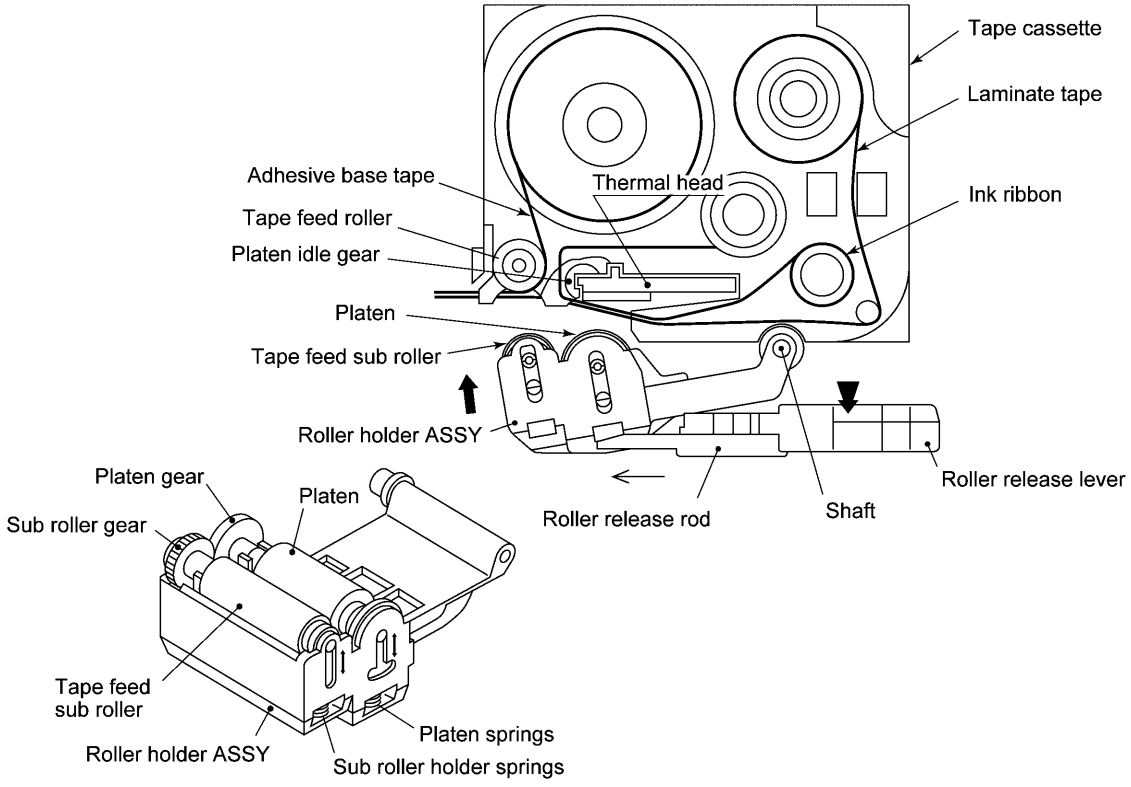


Figure 2.1-2 Roller Holder ASSY Setting & Retracting Mechanism

2.1.3 Regular Tape & Ribbon Feed Mechanism

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

■ Regular Tape Feeding

When you load a tape cassette and close the cassette cover, the platen and the thermal head sandwich the tape and ink ribbon (only the tape when using non-laminated thermal file tape cassettes or stamp tape cassettes) inbetween. Also, the tape feed sub roller in the roller holder ASSY and the tape feed roller inside the tape cassette sandwich the tape (and base paper when using laminated tape cassettes or stamp tape cassettes) inbetween, as described in Subsection 2.1.2.

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

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.

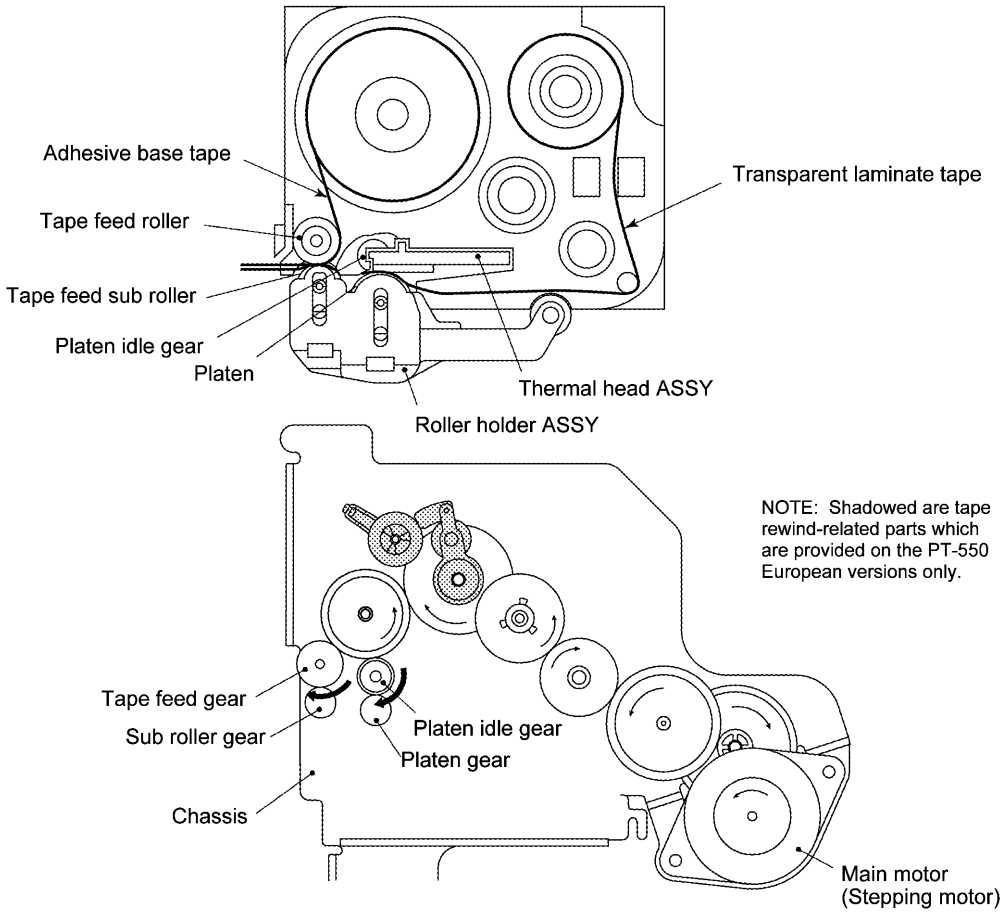


Figure 2.1-3 Tape Feeding Mechanism

■ 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.

■ Ink Ribbon Feeding (except for non-laminated thermal film tape cassettes and stamp tape cassettes)

As the main 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 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.

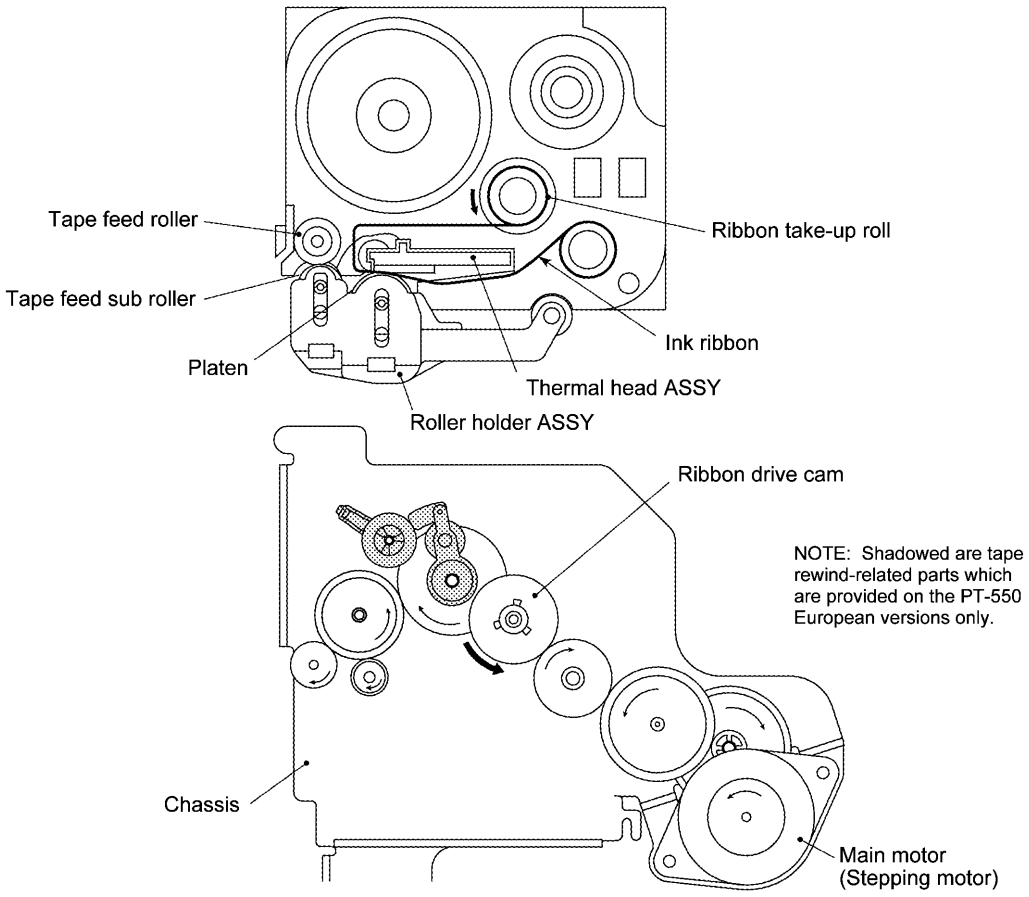


Figure 2.1-4 Ribbon Feeding Mechanism

2.1.4 Color Printing Mechanism (provided on the PT-550 European versions only)

The color printing mechanism allows you to print on a tape with up to three colors. You need to use a refill-type non-laminated tape cassette (YS-18), change the color ribbon and press the New Block switch to rewind the tape for color printing.

The color printing consists of two processes--printing process and tape rewinding process.

Printing process: This process is the same as for the regular printing (described in Subsection 2.1.3) except for the detection of the leading edge of the tape. If the tape leading-edge sensor signals that the leading edge of the tape passes through the light axis, the CPU further rotates the main motor by the specified number of pulses from that detection moment in order to feed the tape to the printing start position. Refer to Figure 2.1-5.

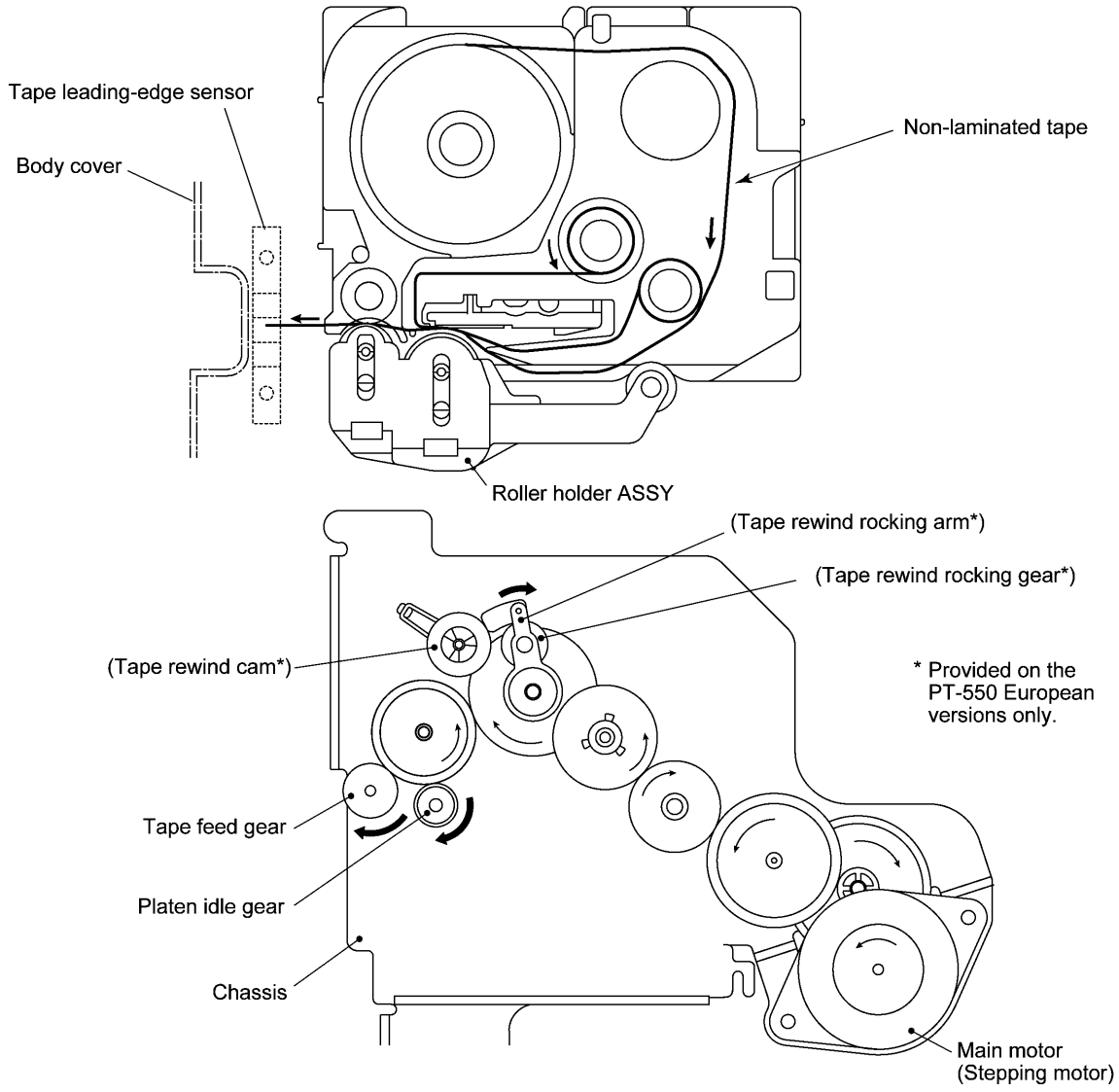


Figure 2.1-5 Printing Process in Color Printing

Tape rewinding process: After completion of the 1st printing sequence, you open the cassette cover, which retracts the roller holder ASSY from the thermal head providing you with enough space to access the ribbon (as described in Subsection 2.1.2). Then you take out the 1st color ribbon. To rewind the tape, you press the New Block switch.

The main motor rotates in the reverse direction (clockwise in Figure 2.1-6) and its rotation is transmitted via the gear train. The tape rewind rocking arm rotates counterclockwise so that its rocking gear engages with the tape rewind cam. Fitted over the cam which rotates counterclockwise, the tape rewind spool (in the refill-type non-laminated tape cassette, YS-18) also rotates to rewind the tape into the cassette.

If the leading edge of the rewound tape passes through the tape leading-edge sensor, the CPU further rotates the motor to rewind the tape by the specified number of pulses from that detection moment. This way, the tape rewinding process is completed.

To print with the 2nd color, you load the 2nd color ribbon and close the cassette cover. The same printing process as for the 1st color takes place for the 2nd color printing. After completion of printing, you open the cassette cover, take out the 2nd color ribbon, and rewind the tape. The same tape rewinding operation as described above takes place. To print with the 3rd color, the same processes as above are repeated.

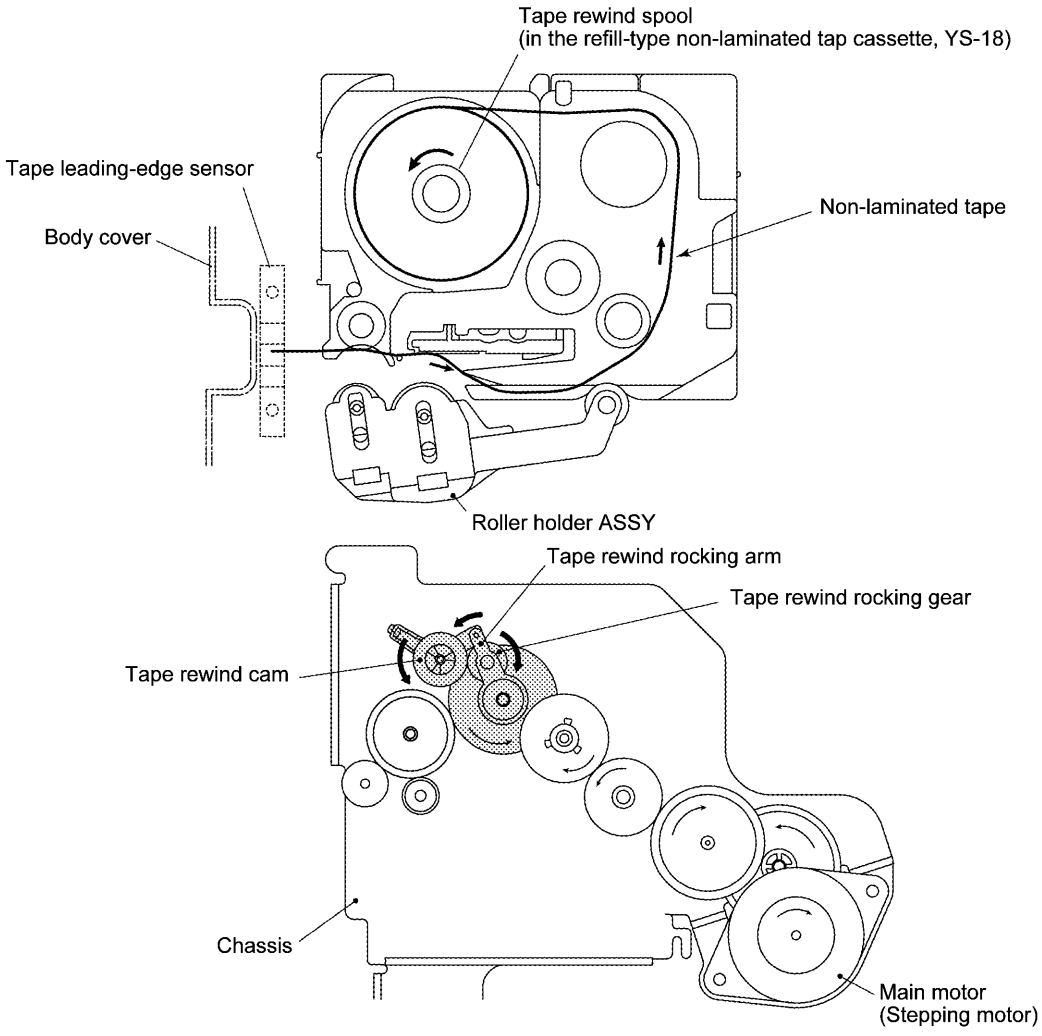


Figure 2.1-6 Tape Rewinding Process in Color Printing

2.1.5 Tape Cutter Mechanism

The tape cutter unit consists of a stationary blade and a movable blade driven by the cutter motor.

Upon completion of printing and tape feeding, the CPU activates the cutter motor (DC motor) whose clockwise rotation is transmitted via the idle gears to the cutter rocking gear.

As the cutter rocking gear rotates counterclockwise, its boss "X" (which is fitted in the opening of the movable blade) actuates the movable blade to pivot it around shaft "Y." Consequently, the cutter cuts the printed tape routing through the movable and stationary blades, just like a scissors.

After that, the CPU keeps the cutter motor on. When the movable blade comes back to the home position, its end "Z" activates the cutter sensor actuator which presses the cutter sensor switch provided on the main PCB. The moment the CPU receives the sensor signal, it stops the cutter motor.

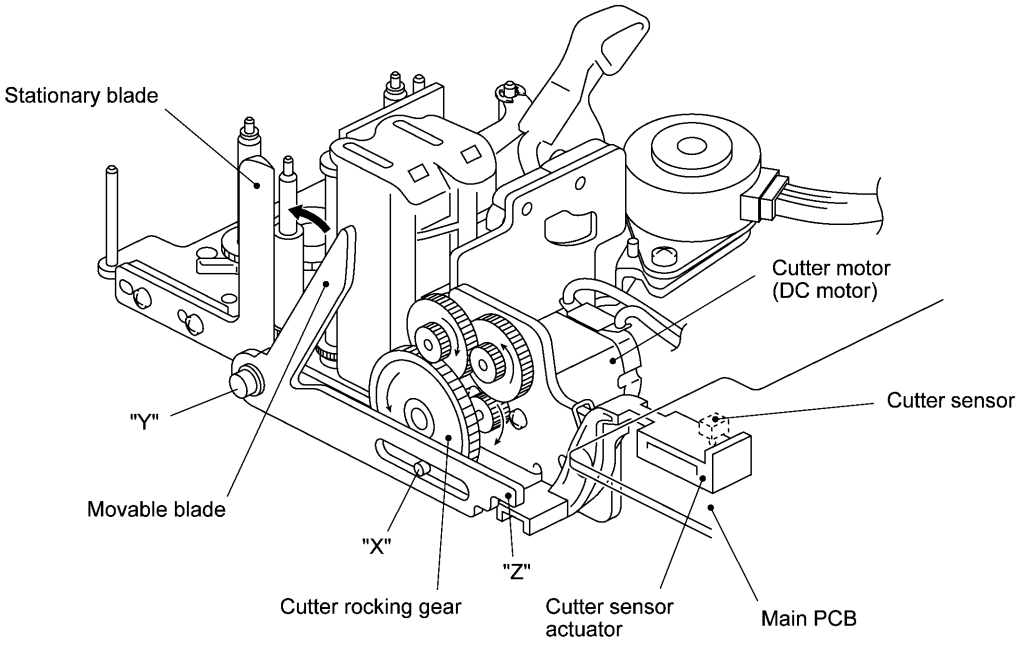


Figure 2.1-7 Tape Cutter Mechanism

2.1.6 Cover Open Switch

Sliding the cover open switch to the left turns the cover lock lever as illustrated below, releasing the cassette cover.

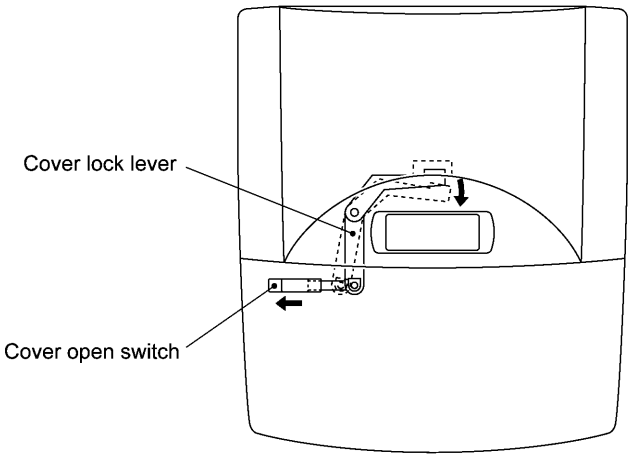


Figure 2.1-8 Cover Open Switch

2.1.7 Cassette Cover Sensor

The cassette cover sensor (photosensor PH1) is provided on the main PCB. Closing the cassette cover puts its sensor tab in the photosensor, signaling that the cassette cover is closed.

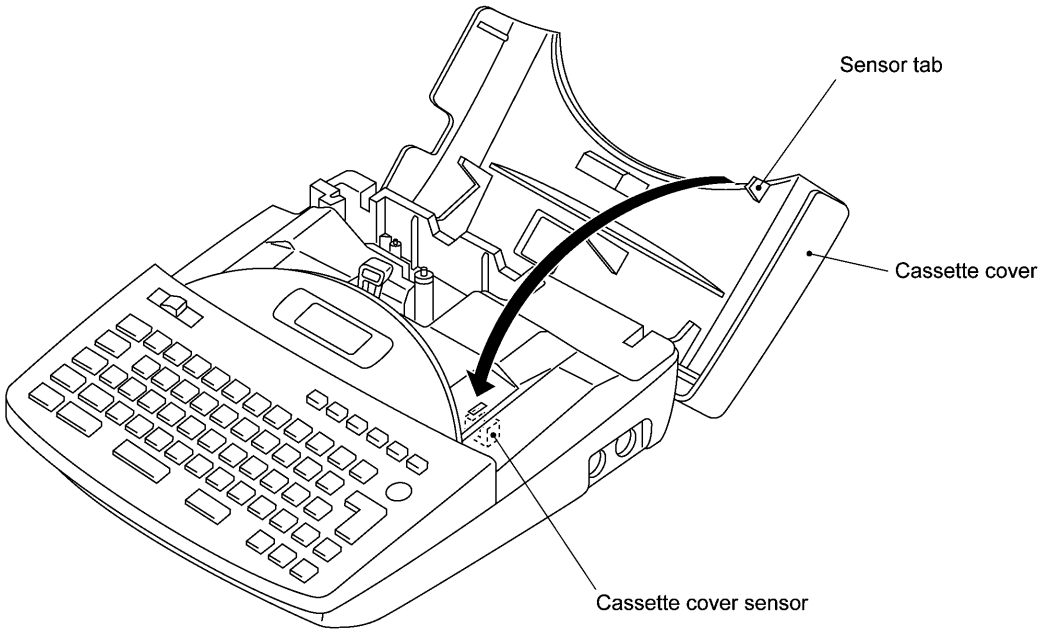


Figure 2.1-9 Cassette Cover Sensor

2.2 DISASSEMBLY & REASSEMBLY

■ Safety Precautions

(1) The disassembly or reassembly work should be carried out on a grounded antistatic sheet. Otherwise, the LSIs and electronic parts may 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 N•cm (kgf•cm)
Bottom cover	Taptite, bind 3 x 8	4	38.2 (4)
Power supply PCB	Taptite, bind 2.6 x 6	2	29.4 (3)
Cutter unit	Screw, bind 3 x 5	2	58.8 (6)
Cutter motor	Screw, pan cup 2.6 x 3.5	2	39.2 (4)
Thermal head ASSY	Screw, bind 3 x 5	2	58.8 (6)
Main motor ASSY	Screw, cup 2.6 x 3.5	2	39.2 (4)
Chassis ASSY	Taptite, bind 3 x 8	3	39.2 (4)
Main PCB	Taptite, bind 2.6 x 6	3	29.4 (3)
Leading-edge sensor PCB	Taptite, pan cup 2.6 x 8	2	29.4 (3)
LCD support	Taptite, bind 2.6 x 6	2	29.4 (3)

2.2.1 Disassembly Procedure

[1] Removing the Tape Cassette and Cassette Cover

(1) Slide the cover open switch to the left and open the cassette cover fully.
(2) Pull the tape cassette up and out of the machine.

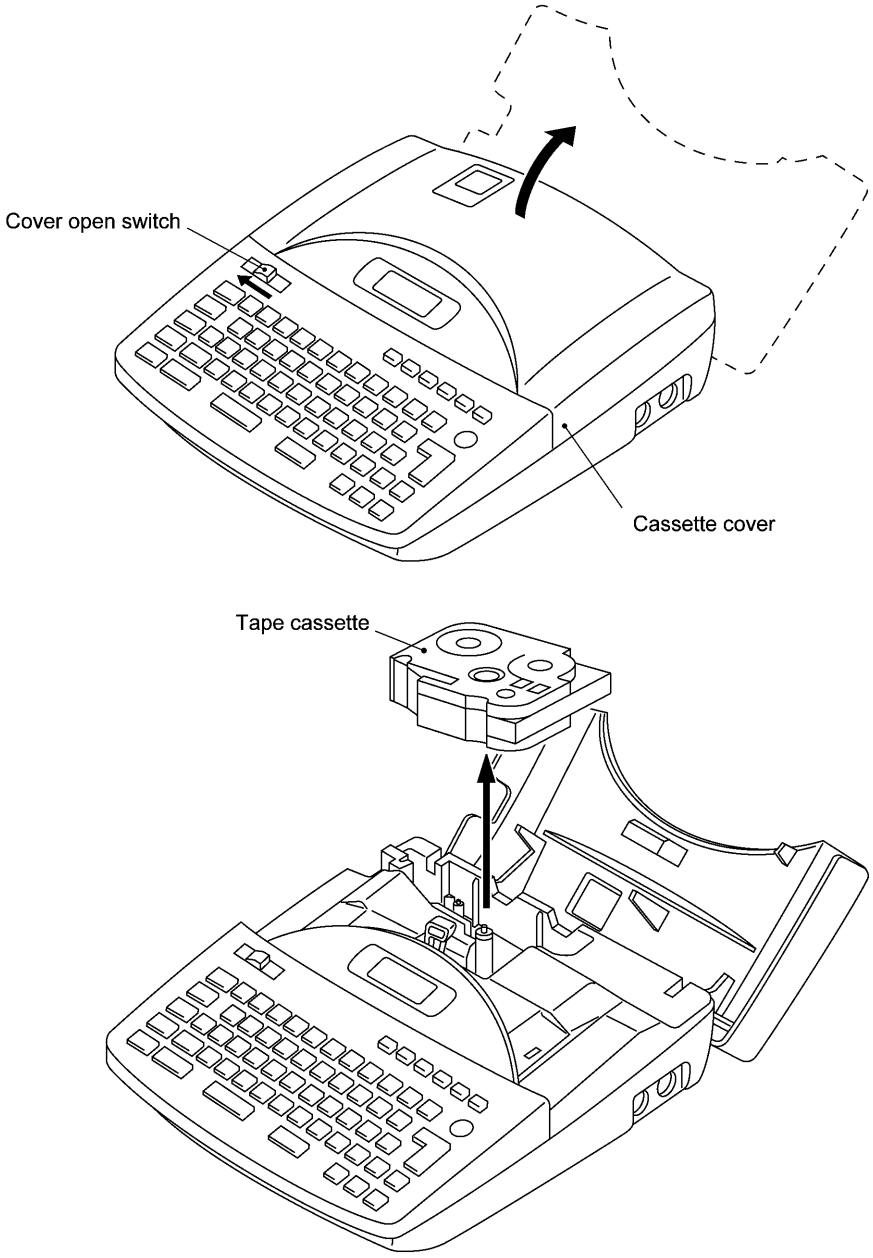


Figure 2.2-1 Removing the Tape Cassette

(3) Push the hinges of the cassette cover outwards and take off the cassette cover.

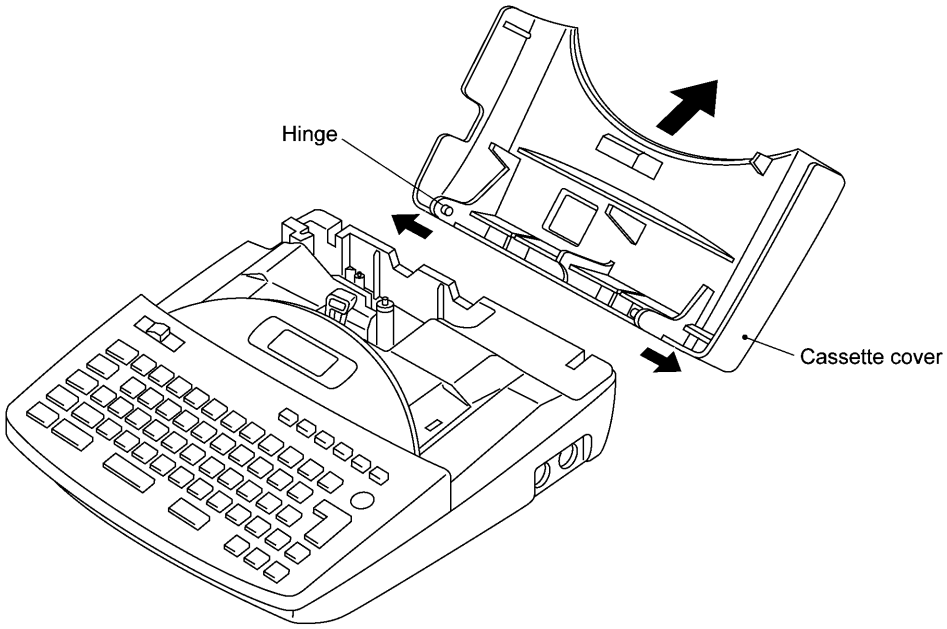


Figure 2.2-2 Removing the Cassette Cover

[2] Removing the Lettering Stick

(1) Turn the machine upside down.

(2) Pull out the lettering stick.

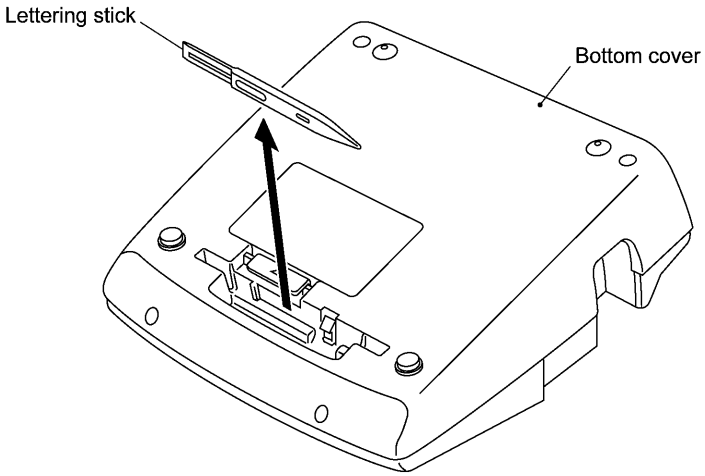


Figure 2.2-3 Removing the Lettering Stick

[3] Removing the Battery Lid and Batteries

(1) Press section "A" of the battery lid and remove it.

(2) Take out batteries.

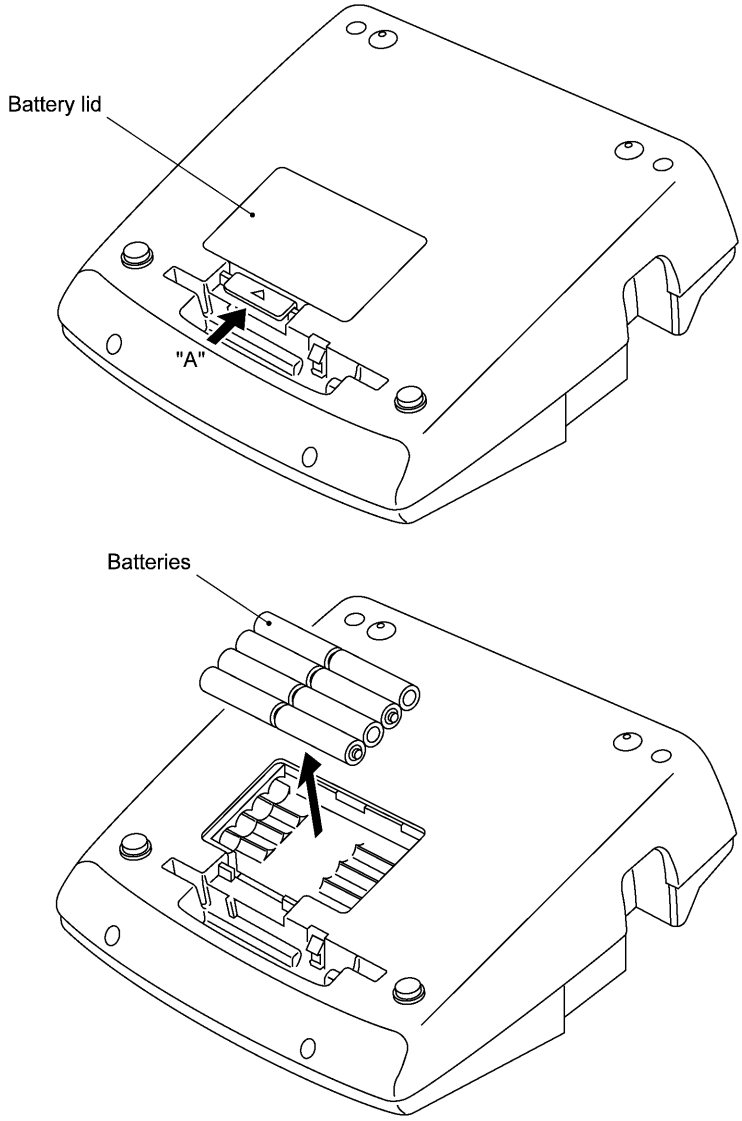


Figure 2.2-4 Removing the Battery Lid and Batteries

[4] Removing the Bottom Cover

(1) Turn the machine upside down.
(2) Remove four screws from the bottom cover.
(3) Apply your fingers to the rear end of the body cover and pull up the body cover.

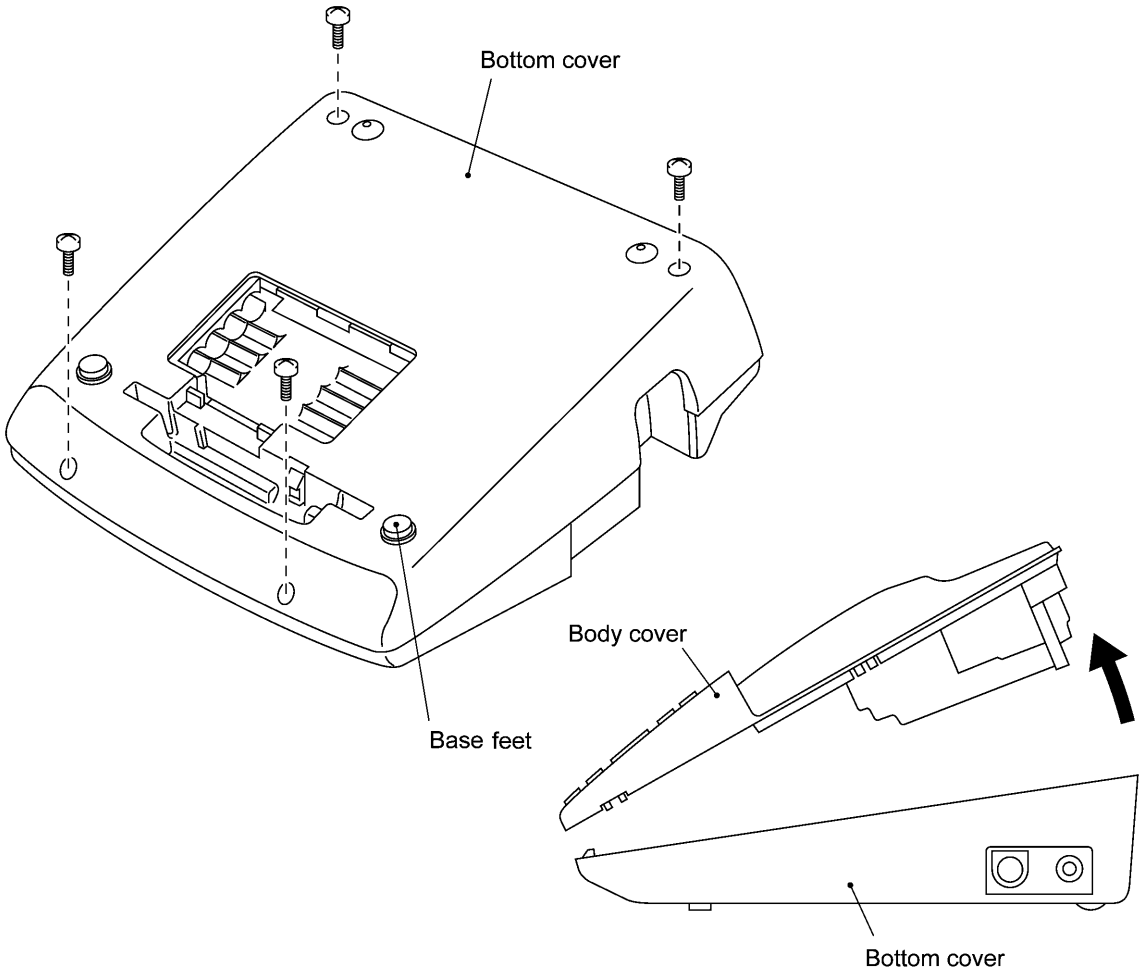


Figure 2.2-5 Removing the Body Cover (1)

(4) Open the body cover to the right as shown below.

(5) Disconnect the power supply harness and the PC interface harness (provided on the PT-550 European versions only) from the main PCB.

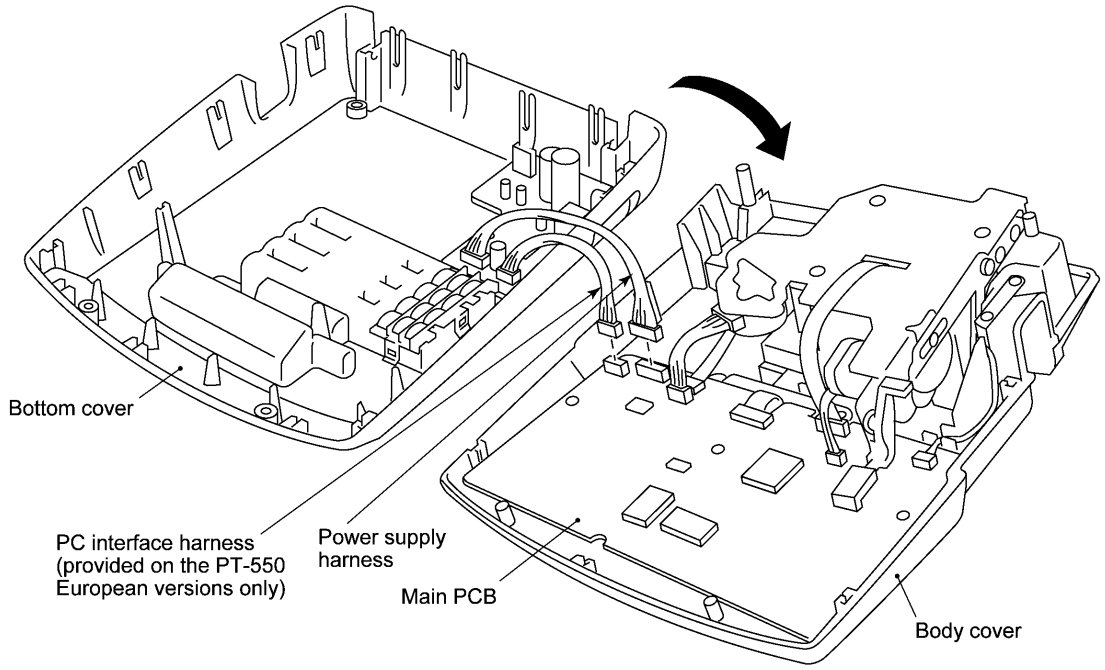


Figure 2.2-6 Removing the Body Cover (2)

NOTE: Check that the base feet (see Figure 2.2-5) are tightly attached to the bottom cover without gap, peeling-off, or overreaching.

[5] Removing the Blind Cover, Power Supply PCB, and Terminal Plates

(1) Remove the blind cover from the bottom cover by pulling the three pawls outwards with a pointed tool.

(2) Pull out the positive (+) and negative (–) terminals of the battery power cords.

- Use a pointed tool to release locking pawls "p" of the terminals from the bottom cover.
- When handling those terminals, do not grip the cords but the terminal plates.

(3) Remove two screws from the power supply PCB, and then take it out together with the grounding plate.

(4) Pull out terminal plate "a."

(5) Turn the bottom cover upside down and then remove terminal plates "b" with a pointed tool.

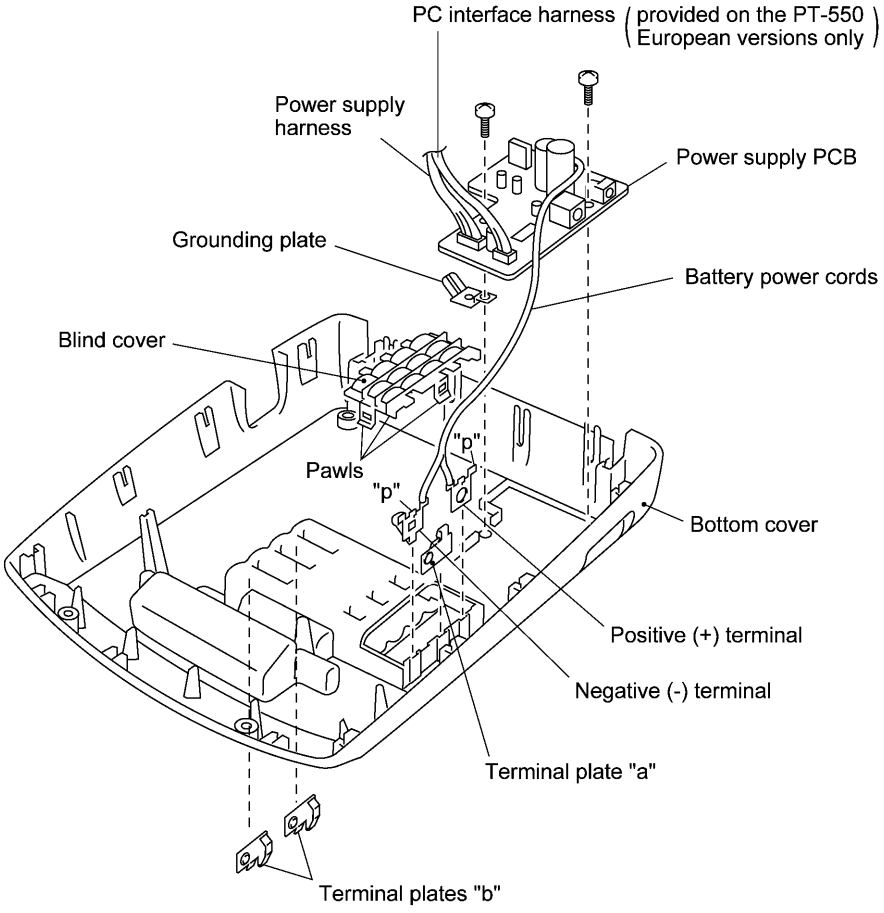


Figure 2.2-7 Removing the Blind Cover, Power Supply PCB, and Terminal Plates

[6] Removing the Chassis ASSY

During the following job, handle the connectors and harnesses gently not to damage them.

(1) Disconnect the main motor harness and cutter motor harness from the main PCB.

(2) Disconnect the thermal head cable.

- Before pulling the cable, be sure to unlock the connector on the main PCB.

(3) Remove three screws from the chassis.

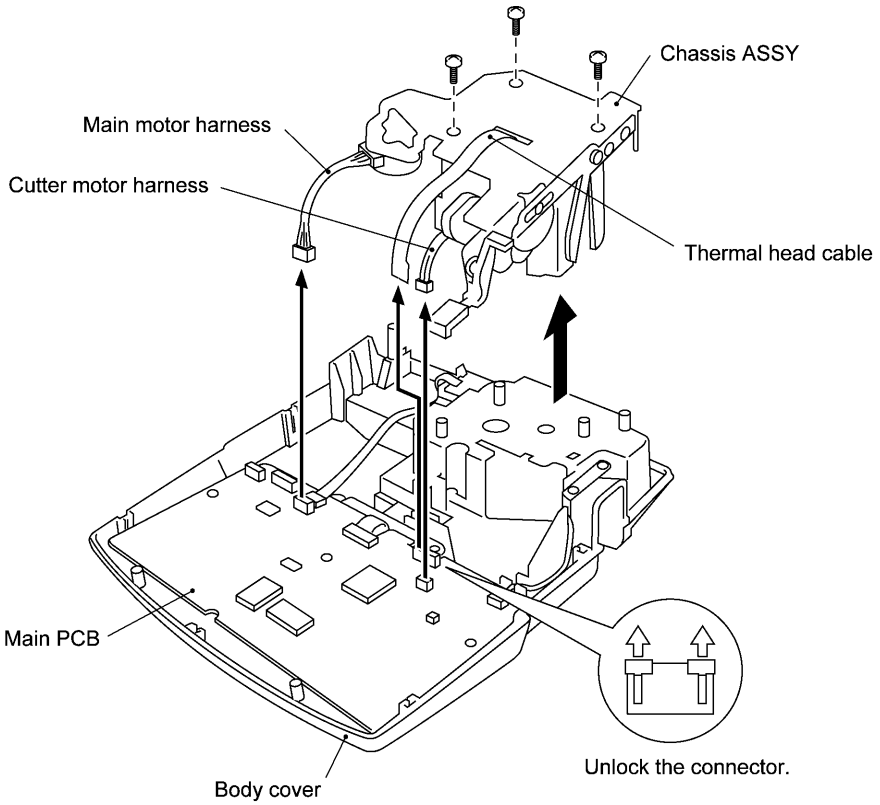


Figure 2.2-8 Removing the Chassis ASSY

(4) Lift the chassis ASSY up and out of the body cover.

- When placing the removed chassis ASSY on a table, put a tape cassette or the like under the chassis ASSY to prevent the cutter unit from coming into direct contact with the flat surface, as illustrated below.

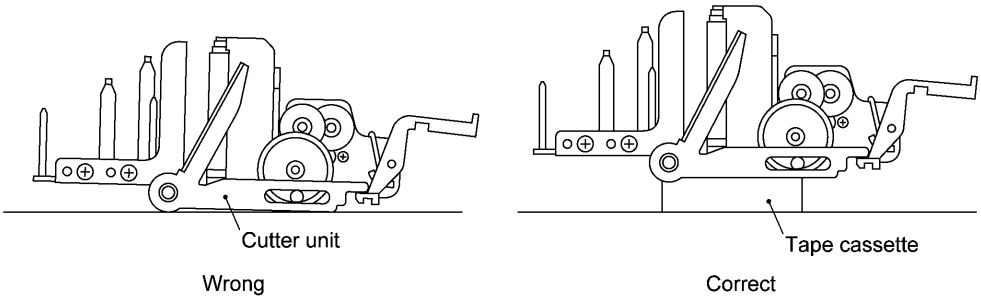


Figure 2.2-9 Protecting the Cutter Unit

■ Disassembling the Chassis ASSY

Removing the cutter unit and its related parts

1) Remove the cutter sensor actuator and spring from the chassis.
2) Remove two screws from the cutter unit and take it off.
3) Remove the cutter rocking gear and cutter double gears.

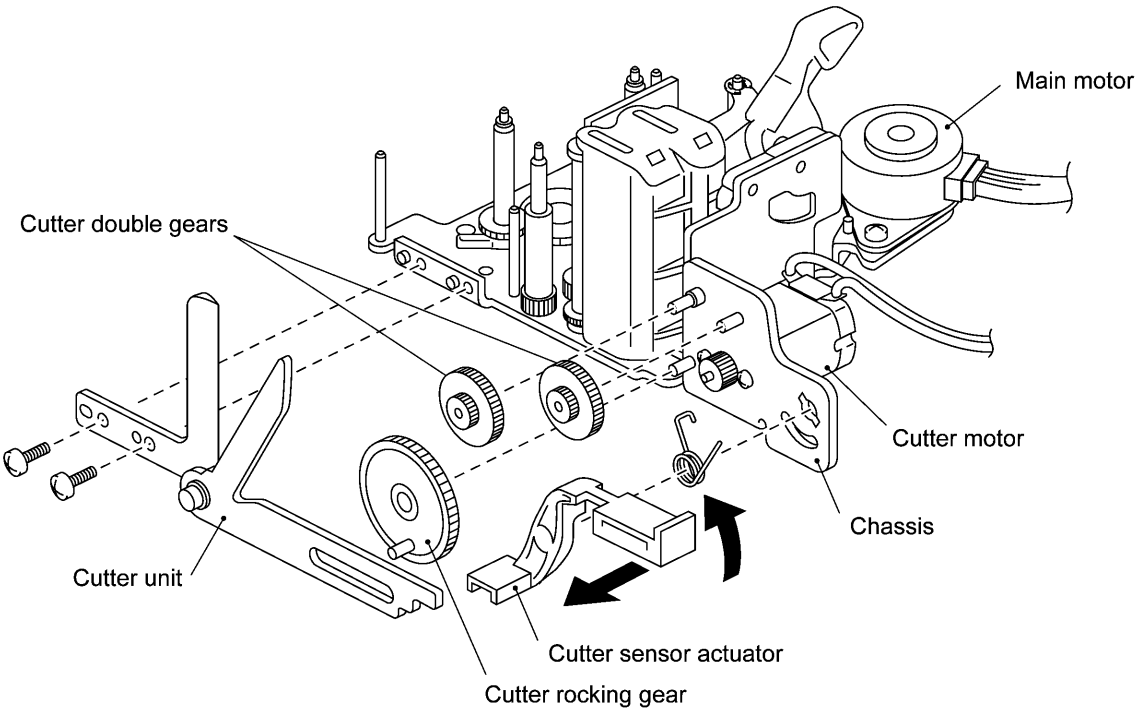


Figure 2.2-10 Removing the Cutter Unit and its Related Parts

Removing the cutter motor

1) Remove two screws from the cutter motor and take it off.

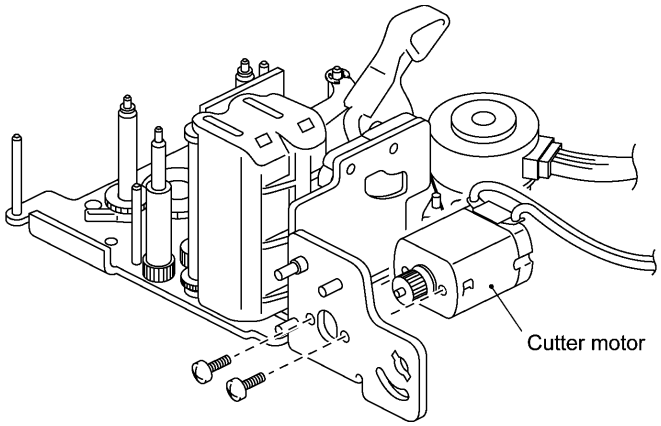


Figure 2.2-11 Removing the Cutter Motor

Removing the roller holder ASSY, thermal head ASSY, and roller release lever

1) Remove the retaining ring from the roller holder ASSY.
2) Unhook the release spring from the roller holder ASSY and take out the ASSY.
   - When unhooking the release spring, take care not to scratch the thermal print head and its cable.
3) Remove two screws "A" and take off the thermal head ASSY.
   CAUTION: Do not loosen or remove screws "B."
4) Remove the release lever spring.
5) Remove the retaining ring and take off the roller release lever.
6) Remove the roller release rod and its roller.

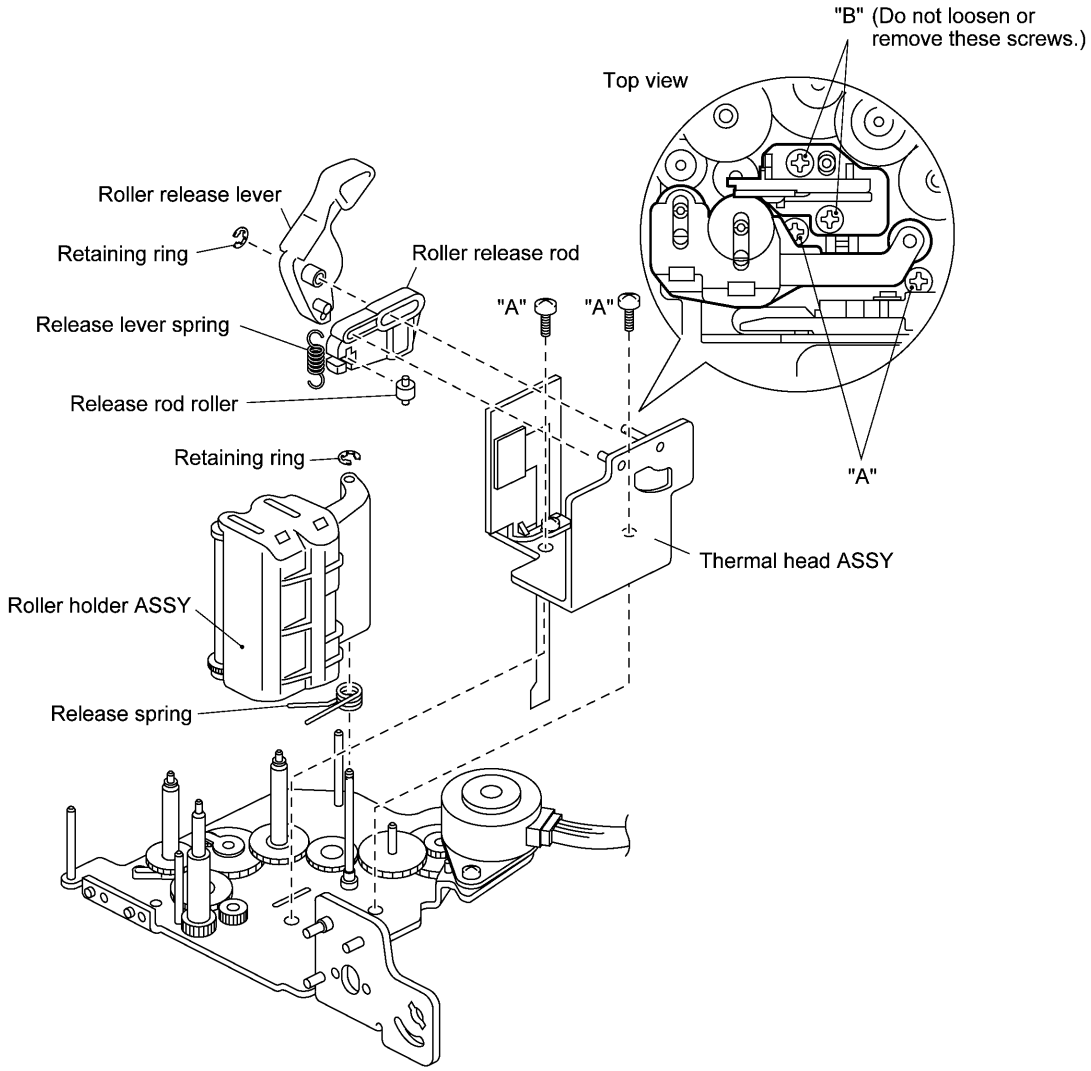


Figure 2.2-12 Removing the Roller Holder ASSY, Thermal Head ASSY, and Roller Release Lever

Removing the main motor ASSY

Remove two screws from the motor bracket and take out the main motor ASSY.

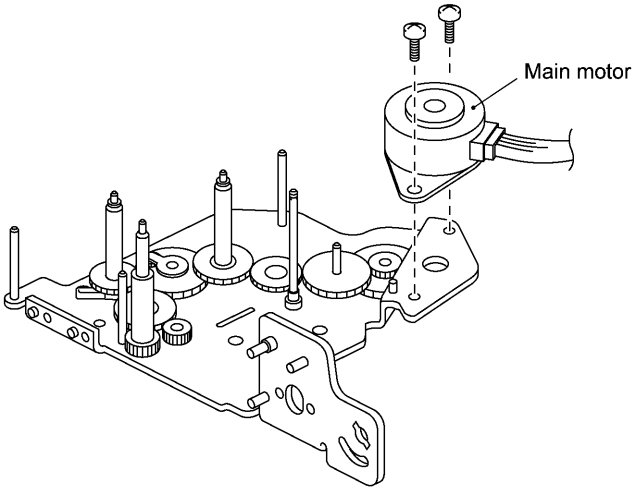


Figure 2.2-13 Removing the Main Motor ASSY

[7] Removing the Cassette Sensor PCB

(1) Disconnect the cassette sensor cable from the main PCB.
- Before pulling the cable, be sure to unlock the connector on the main PCB.

(2) Pull the three latches outwards and remove the cassette sensor PCB.

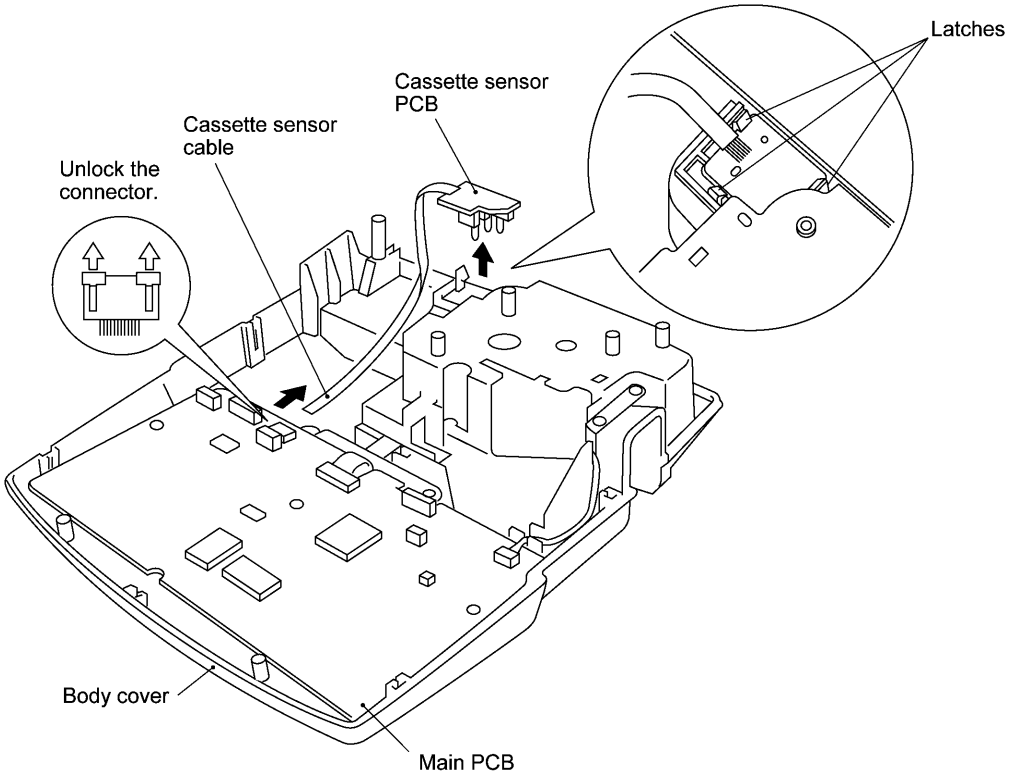


Figure 2.2-14 Removing the Cassette Sensor PCB

[8] Removing the Main PCB and Leading-edge Sensor PCB

(1) Remove three screws from the main PCB.

(2) Disconnect the leading-edge sensor harness.

(3) Disconnect the FPC cable of the LCD module.

- Before pulling the cable, be sure to unlock the connector on the main PCB.

(4) Lift up the main PCB.

(5) Remove two screws from the leading-edge sensor PCB and take off its harness routed through the body cover.

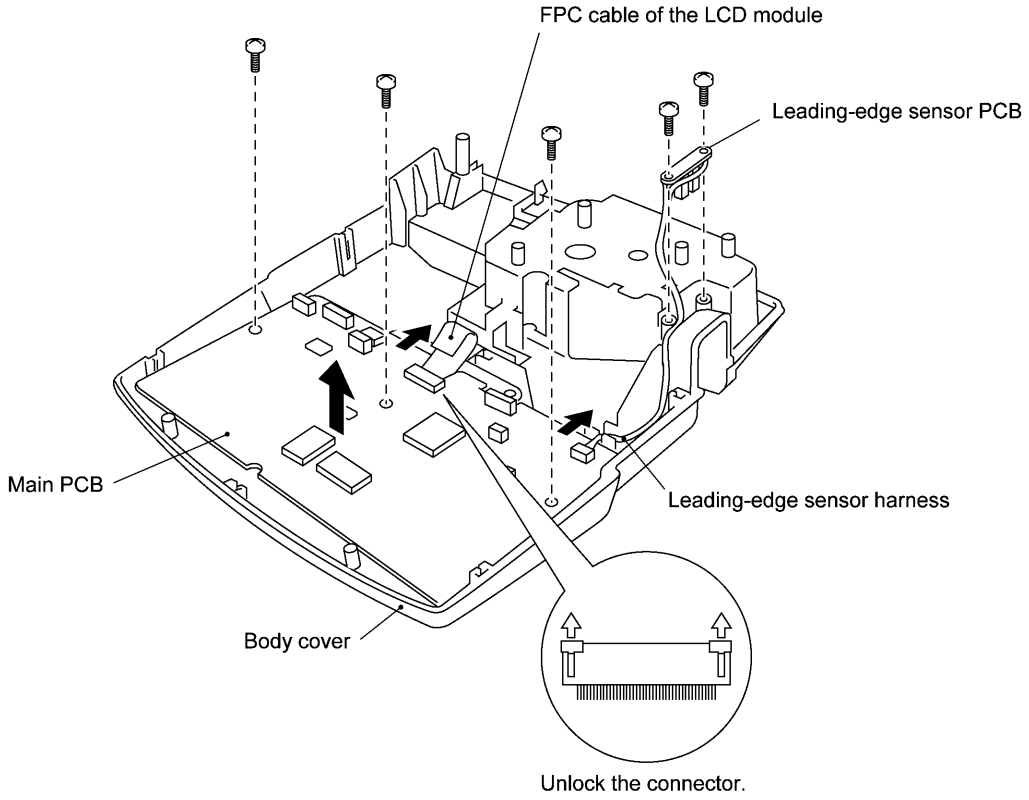


Figure 2.2-15 Removing the Main PCB and Leading-edge Sensor PCB

[9] Removing the Rubber Keypad and LCD Module

(1) Take out the rubber keypad from the body cover.
(2) Remove two screws from the LCD support and take it off.
(3) Remove the LCD module from its support by pulling one of two pawls with your fingers.

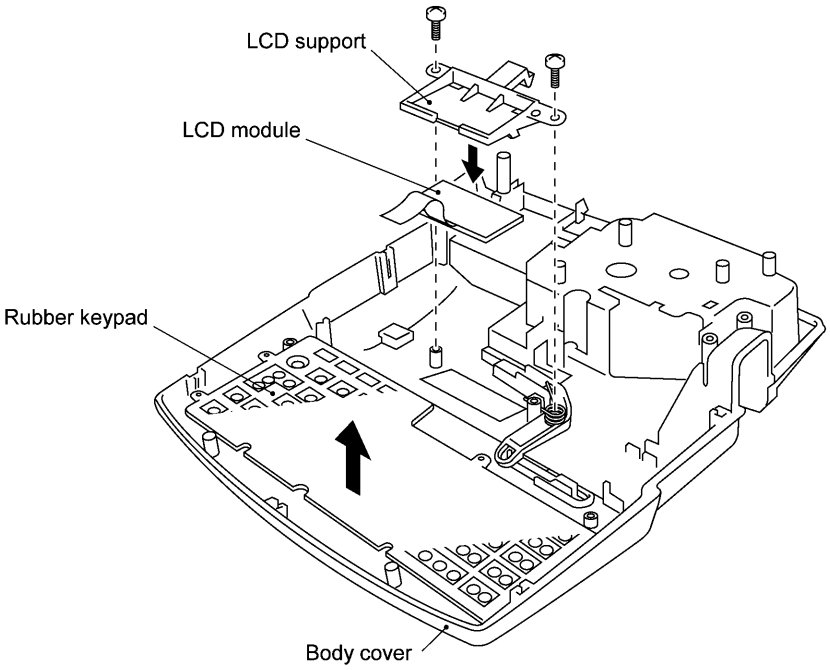


Figure 2.2-16 Removing the Rubber Keypad and LCD Module

[10] Removing the Cover Open Switch

(1) Remove the cover lock lever together with the spring from the body cover.
(2) Remove the spring from the cover lock lever.
(3) Press the locking pawls of the cover open switch inwards and take it off.

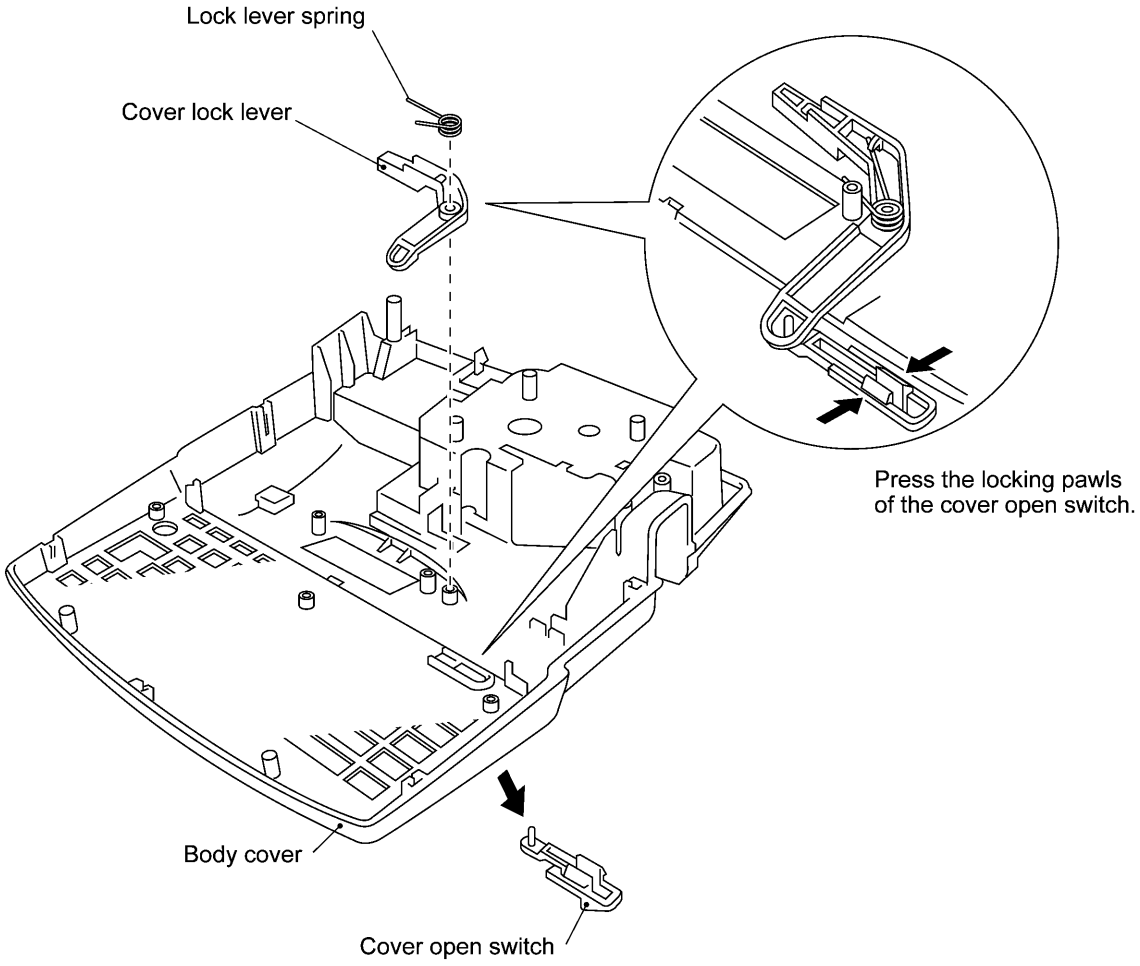


Figure 2.2-17 Removing the Cover Open Switch

2.2.2 Reassembly Procedure

[1] Installing the Cover Open Switch

(1) Snap the cover open switch into place and check that it moves smoothly.

(2) Fit the spring onto the cover lock lever and then set them to the body cover. Hook the shorter end of the spring on the boss of the body cover as illustrated below.

(3) Check that the cover lock lever moves smoothly.

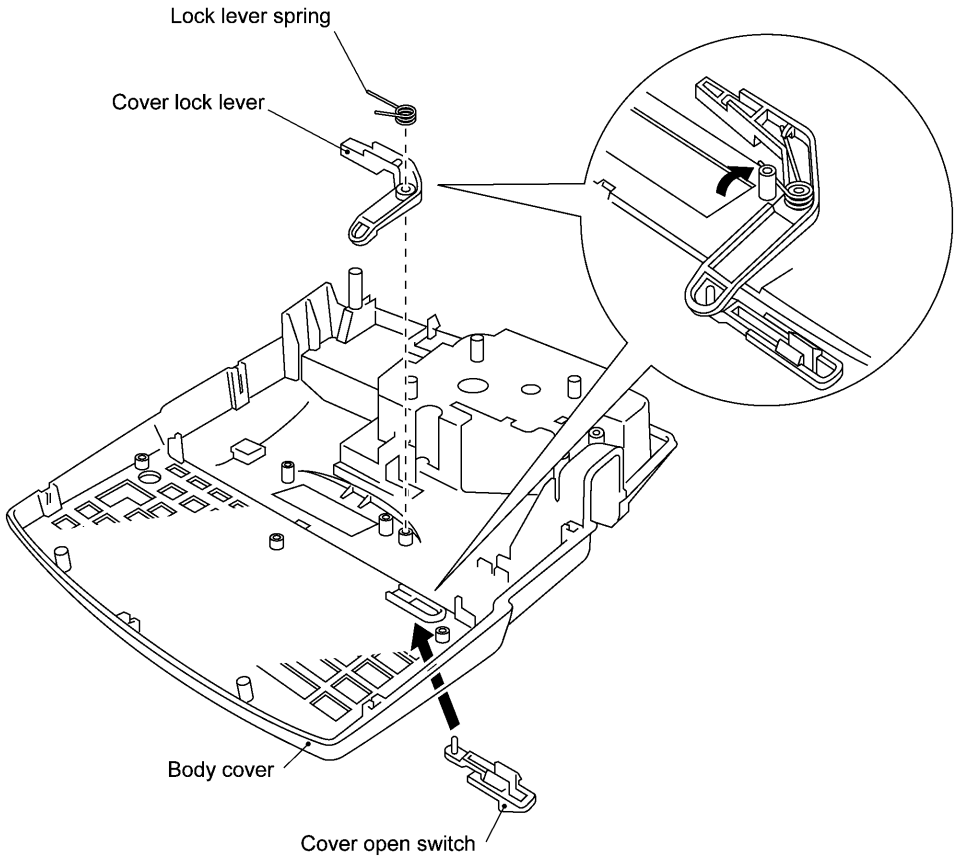


Figure 2.2-18 Installing the Cover Open Switch

[2] Installing the LCD Module and Rubber Keypad

(1) Secure the LCD module in the LCD support by bending the pawls with your fingers.
(2) Secure the LCD support to the body cover with two screws.
Tightening torque: 29.4 N•cm (3 kgf•cm)
(3) Place the rubber keypad on the body cover.

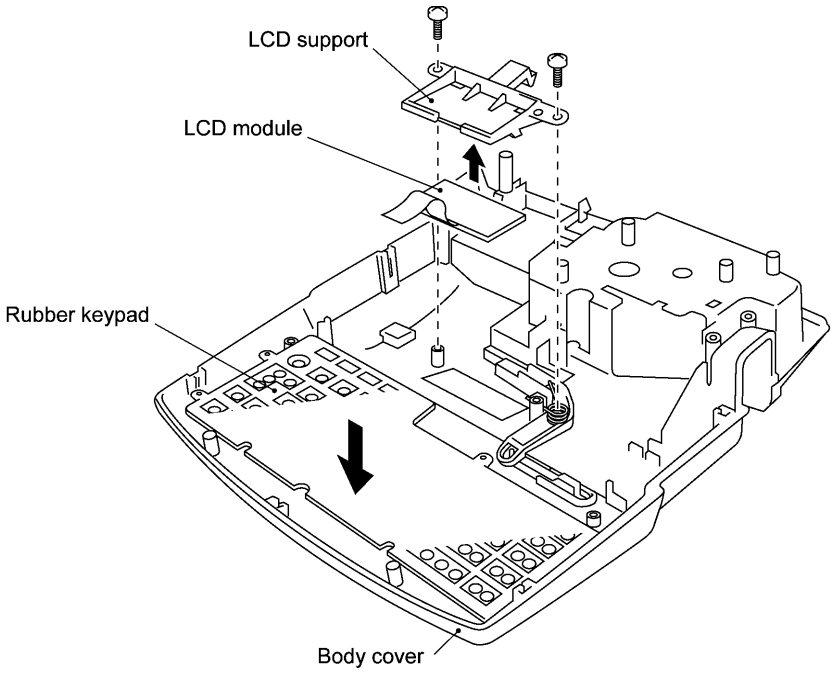


Figure 2.2-19 Installing the LCD Module and Rubber Keypad

[3] Installing the Leading-edge Sensor PCB and Main PCB

(1) Secure the leading-edge sensor PCB to the body cover with two screws .
Tightening torque: 29.4 N•cm (3 kgf•cm)

(2) Route the sensor harness as shown below.

(3) Check that there is no foreign materials or dust on the contacts of the rubber keypad, then place the main PCB.

(4) Secure the main PCB with three screws.
Tightening torque: 29.4 N•cm (3 kgf•cm)

(5) Connect the FPC cable of the LCD module to the main PCB and then lock the connector.

(6) Connect the leading-edge sensor harness to the main PCB.

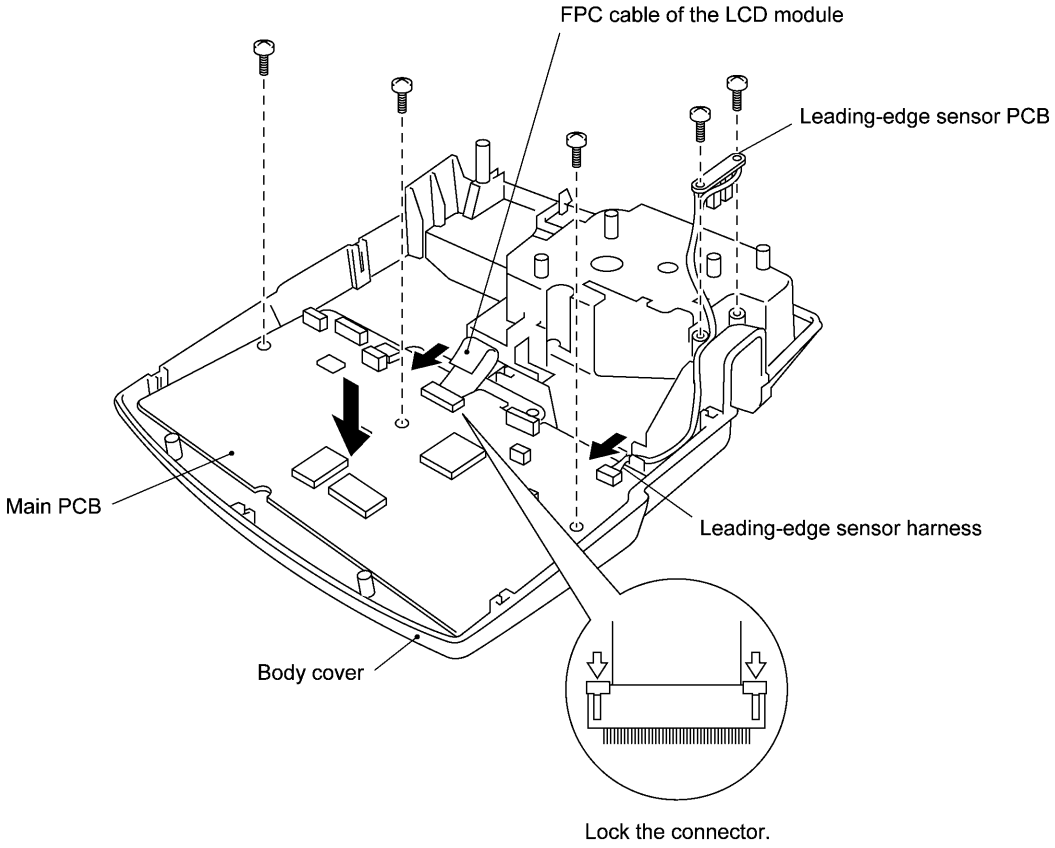


Figure 2.2-20 Installing the Leading-edge Sensor PCB and Main PCB

[4] Installing the Cassette Sensor PCB

(1) Check that the switch actuators are not deformed.

(2) Fit the switch actuators into the holes provided in the body cover and push down the cassette sensor PCB until the three latches catch the PCB.

(3) Connect the cassette sensor cable to the main PCB and then lock the connector.

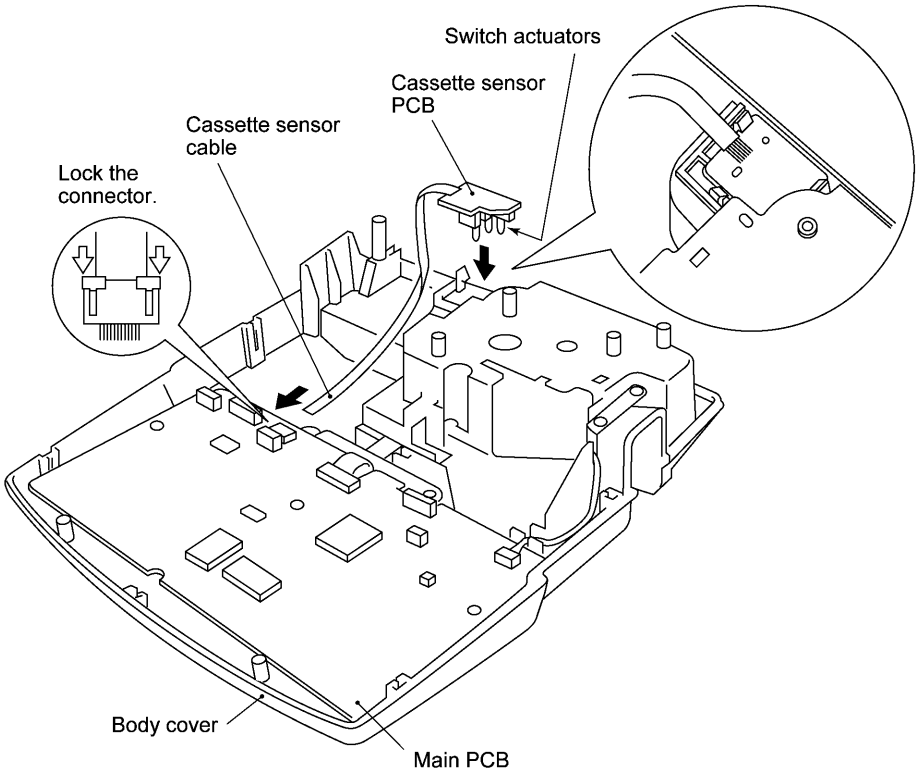


Figure 2.2-21 Installing the Cassette Sensor PCB

[5] Installing the Chassis ASSY

(1) If the chassis ASSY has been disassembled, assemble the components, referring to the following pages.

(2) Put the chassis ASSY on the body cover, taking care not to sandwich the harnesses between the body cover and the chassis ASSY. Then secure the chassis ASSY with three screws.

Tightening torque: 39.2 N•cm (4 kgf•cm)

(3) Connect the thermal head cable to the main PCB and lock the connector.

(4) Connect the cutter motor harness and main motor harness.

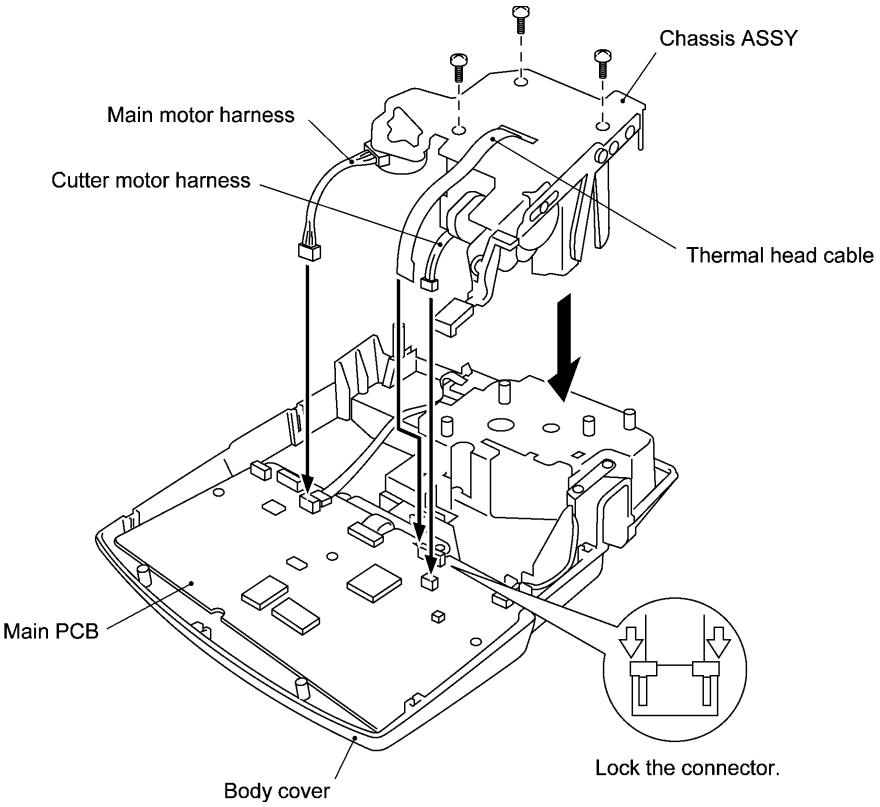


Figure 2.2-22 Installing the Chassis ASSY

■ Assembling the Components of the Chassis ASSY

Installing the main motor ASSY

1) Put the main motor ASSY on the chassis and bring its edge into contact with the boss provided on the chassis. Then secure the ASSY with two screws, in the order of ① and ②.
   Tightening torque: 39.2 N•cm (4 kgf•cm)

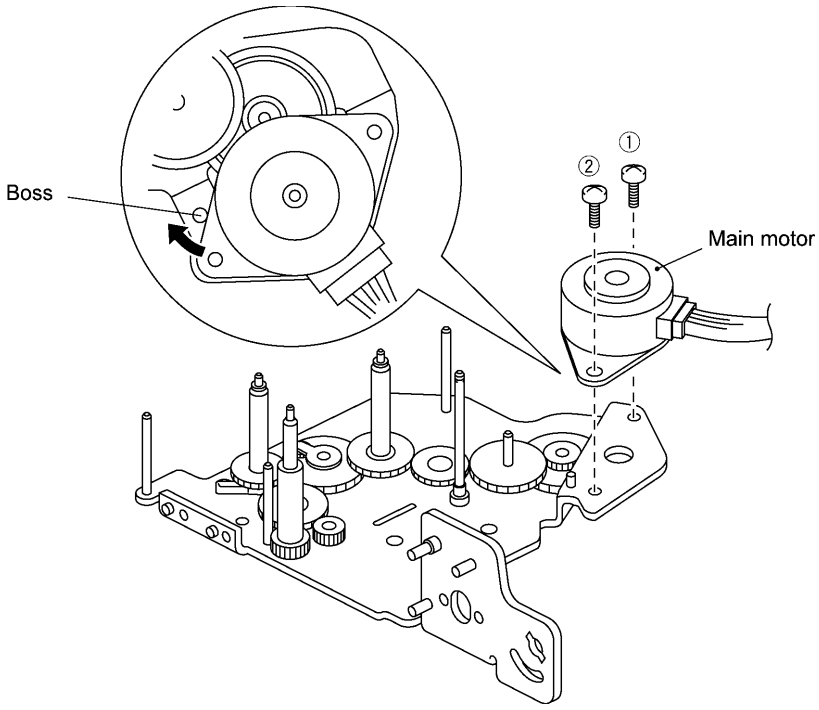


Figure 2.2-23 Installing the Main Motor ASSY

Installing the roller release lever, thermal head ASSY, and roller holder ASSY

1) Set the release rod roller in the roller release rod, and then install them to the thermal head ASSY.
2) Secure the roller release lever with the retaining ring.
3) Hook one end of the release lever spring on the roller release lever and the other end on the chassis.
4) Secure the thermal head ASSY to the chassis with two screws.

   Tightening torque: 58.8 N•cm (6 kgf•cm)
5) Set the release spring in the roller holder ASSY and secure them to the chassis with the retaining ring.
   - Take care not to let the release spring scratch the thermal head.

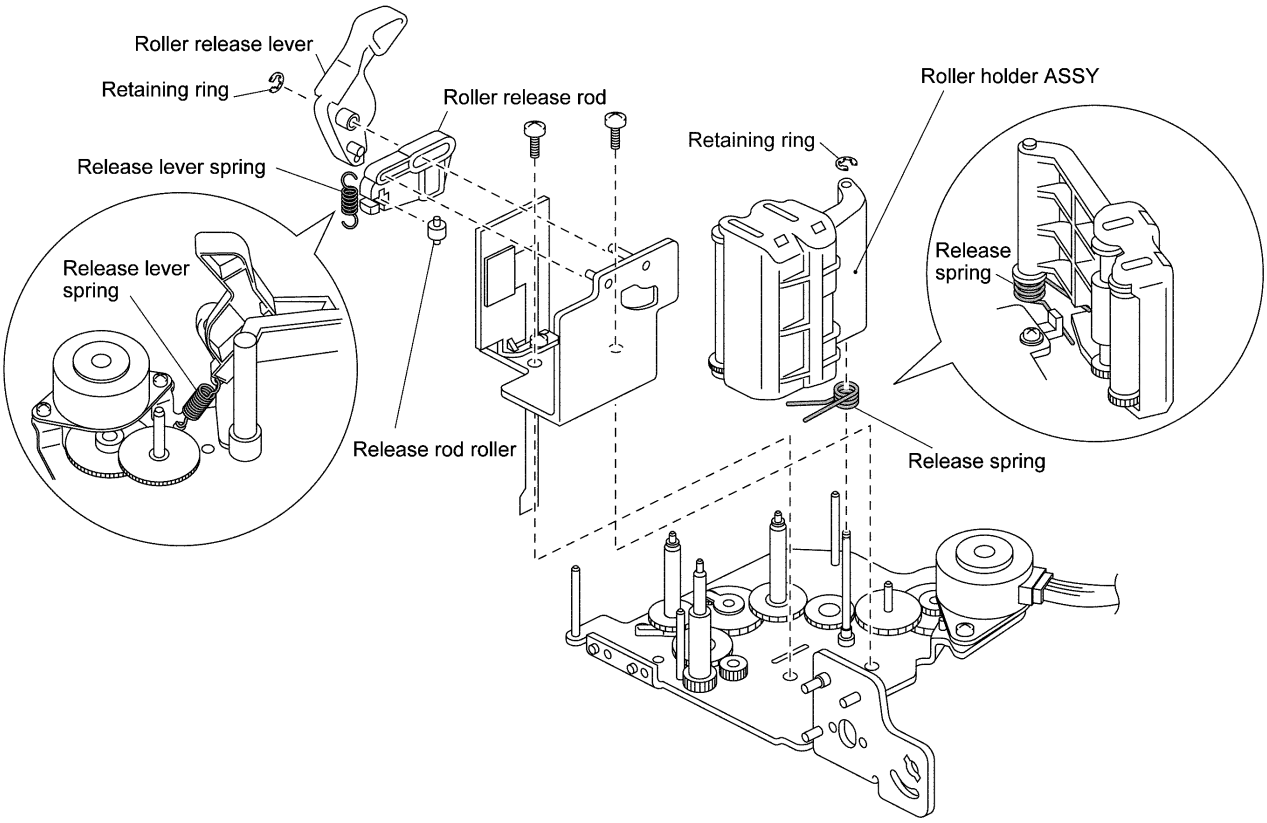


Figure 2.2-24 Installing the Roller Release Lever, Thermal Head ASSY, and Roller Holder ASSY

Installing the cutter motor

1) Secure the cutter motor to the chassis with two screws.
   Tightening torque: 39.2 N•cm (4 kgf•cm)

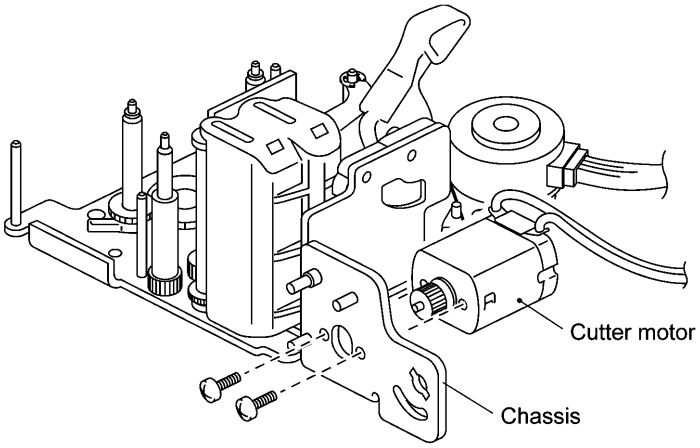


Figure 2.2-25 Installing the Cutter Motor

Installing the cutter unit and its related parts

1) Set the cutter sensor actuator and its spring on the chassis as illustrated below.
2) Install the cutter double gears and cutter rocking gear.
3) Secure the cutter unit with two screws.
   Tightening torque: 58.8 N•cm (6 kgf•cm)

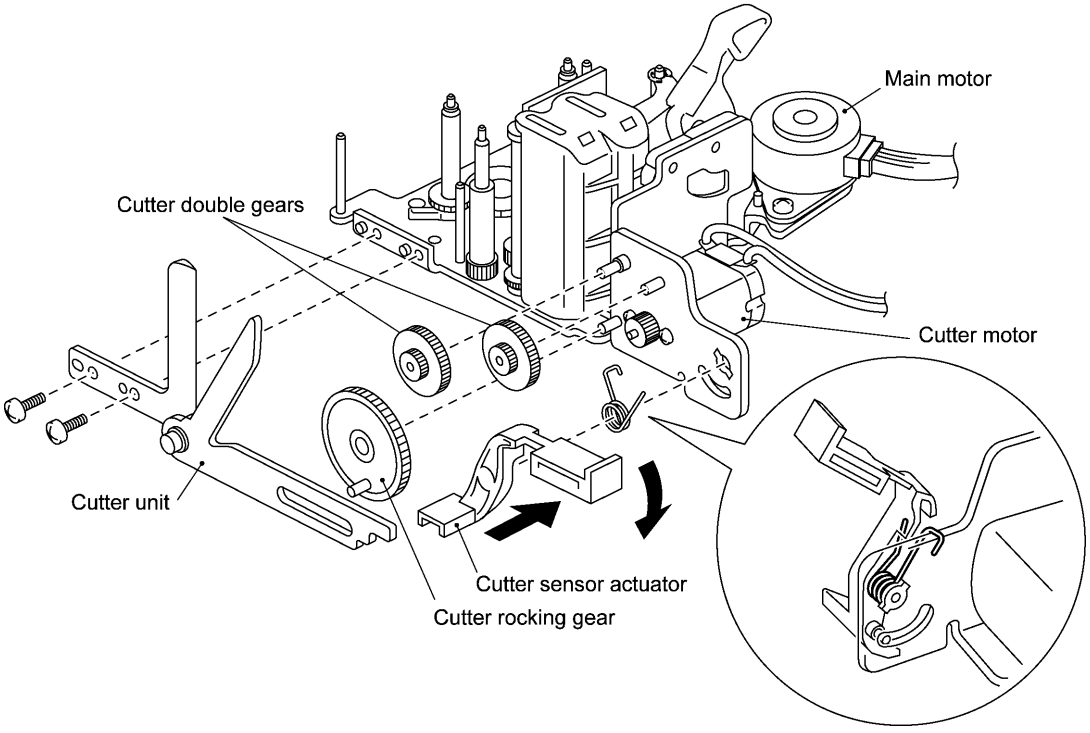


Figure 2.2-26 Installing the Cutter Unit and its Related Parts

[6] Installing the Terminal Plates, Power Supply PCB, and Blind Cover

(1) Place the bottom cover upside down and push terminals plates "b" into the bottom cover.

(2) Turn the bottom cover rightside up and push in terminal plate "a."

(3) Secure the power supply PCB with two screws together with the grounding plate. The grounding plate should be sandwiched between the PCB and bottom cover.

Tightening torque: 29.4 N•cm (3 kgf•cm)

(4) Push the positive (+) and negative (–) terminals of the battery power cords into the bottom cover until terminals' locking pawls "p" become fitted in the bottom cover.

- When handling those terminals, do not grip the cords but the terminal plates.
- Make sure that the convex side of the positive (+) terminal faces towards the battery mounting space.

(5) Push down the blind cover until the three pawls catch the bottom cover.

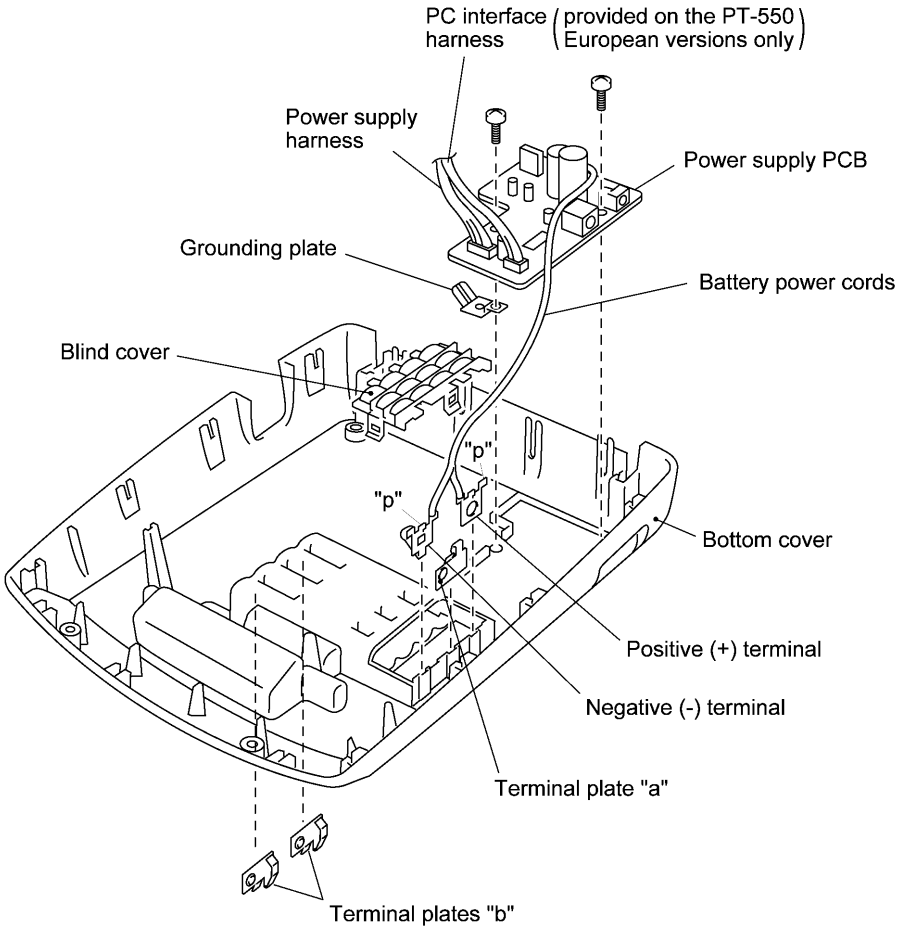


Figure 2.2-27 Installing the Terminal Plates, Power Supply PCB, and Blind Cover

[7] Installing the Bottom Cover

(1) Hold the body cover as shown below, then connect the power supply harness and the PC interface harness (provided on the PT-550 European versions only) to the main PCB.

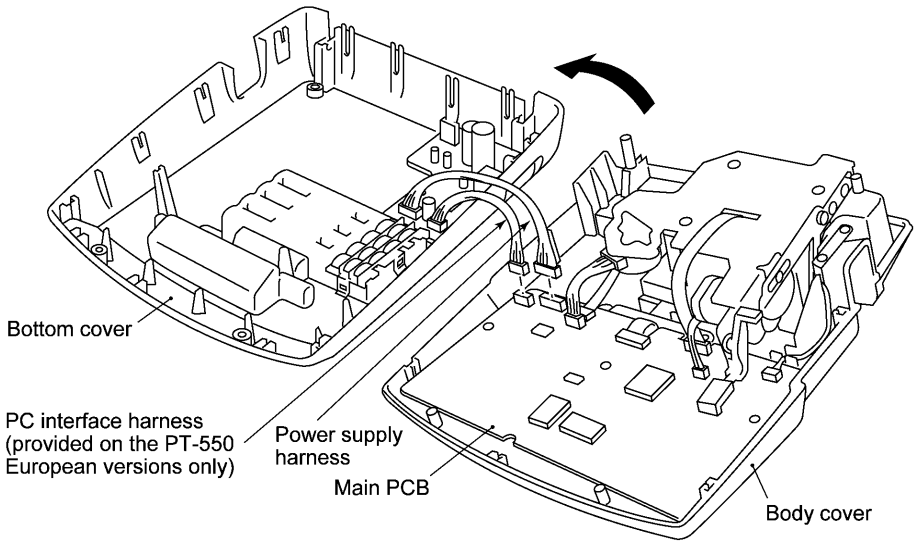


Figure 2.2-28 Installing the Body Cover (1)

(2) Align the front end of the body cover with that of the bottom cover, then fit those covers together.

- Take care not to pinch the cords between those covers.

(3) Place the machine upside down and secure the bottom cover with four screws.

Tightening torque: 38.2 N•cm (4 kgf•cm)

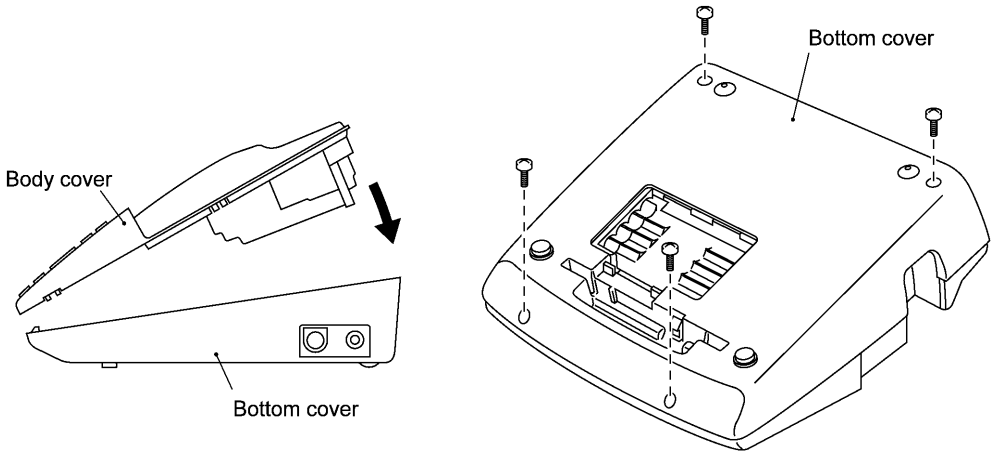


Figure 2.2-29 Installing the Body Cover (2)

[8] Installing the Batteries and Battery Lid

(1) Load batteries.

(2) Fit the rear end of the battery lid into the bottom cover and push it down.

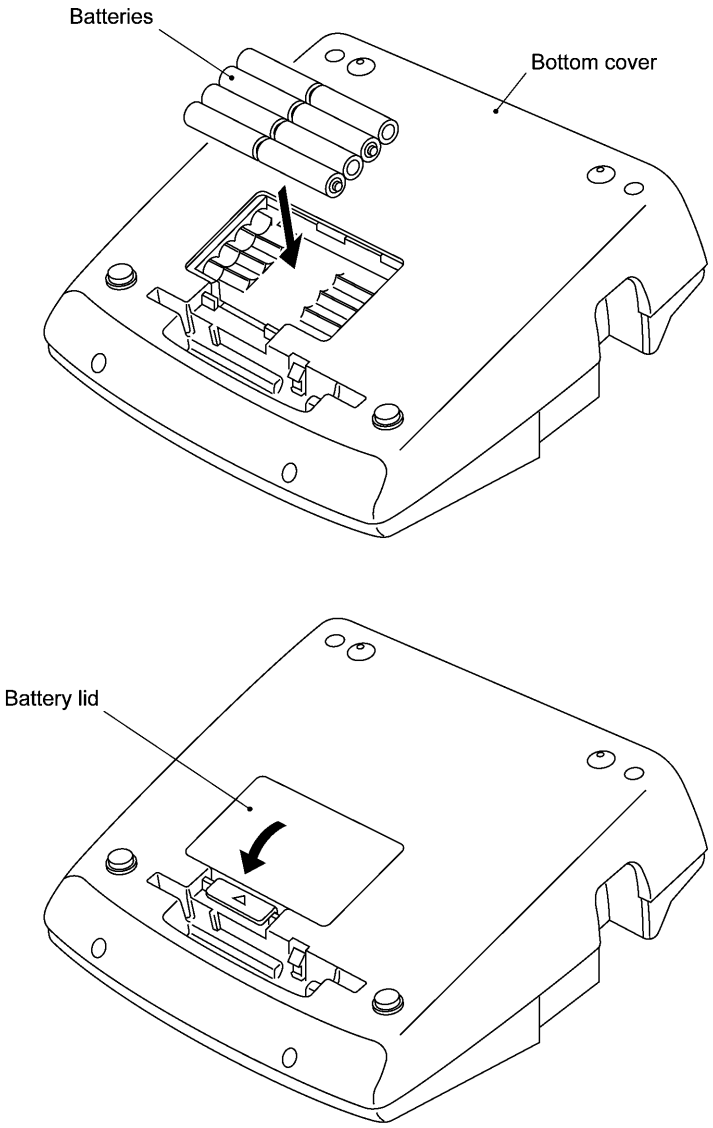


Figure 2.2-30 Installing the Batteries and Battery Lid

[9] Installing the Lettering Stick

(1) Snap the lettering stick into place.

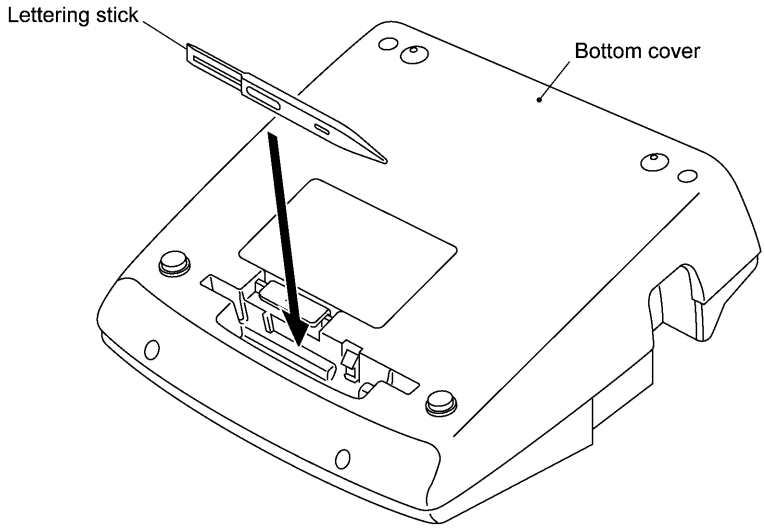


Figure 2.2-31 Installing the Lettering Stick

[10] Installing the Cassette Cover and Tape Cassette

(1) Push the hinges of cassette cover outwards and fit them in the body cover.

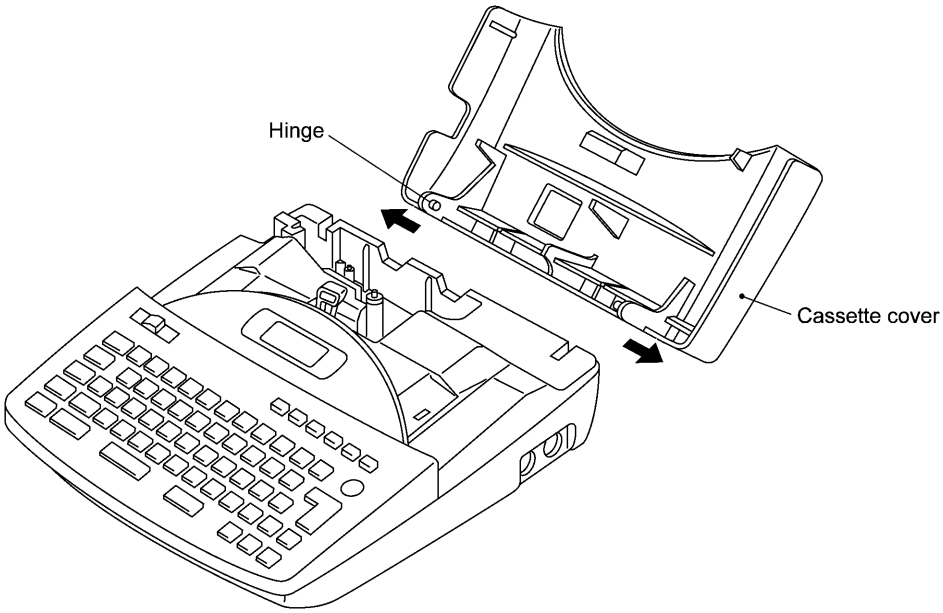


Figure 2.2-32 Installing the Cassette Cover

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

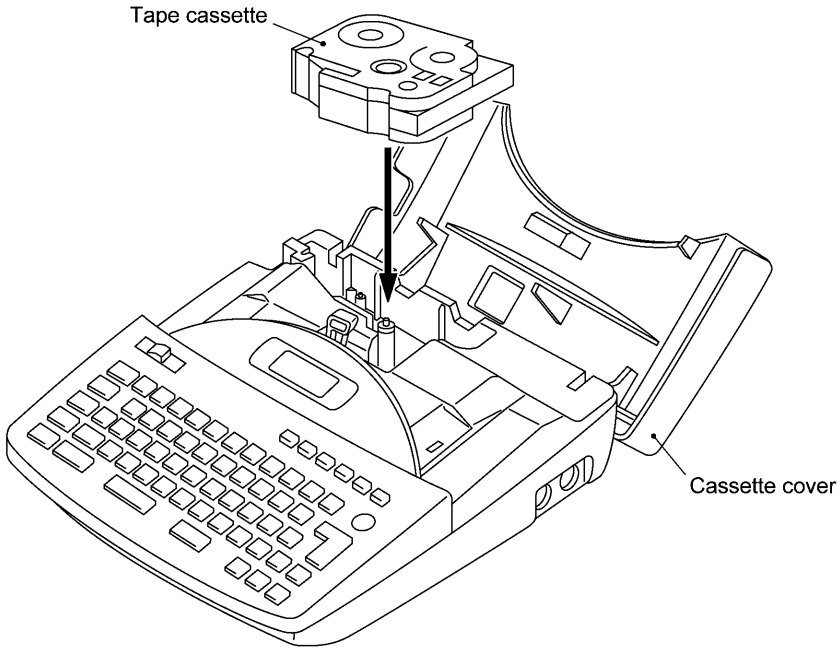


Figure 2.2-33 Installing a Tape Cassette

[11] Demonstration Print and Final Check

(1) Power on the machine. (Do not connect the AC adapter.)

(2) While holding down the Code key, press the BS key to cancel data previously entered.

(3) While holding down the Code key, press the D key to start the demonstration print.

(4) During the demonstration print, check that the machine prints data and then feeds and cuts the tape correctly.

If any problem is found, go to the troubleshooting in Chapter IV.

(5) Open the cassette cover to check that it retracts the roller holder ASSY from the thermal head. Close the cassette cover to check that it presses the roller holder ASSY against the thermal head.

(6) Check that pressing the keys causes correct operation.

(7) Check that the On/Off key operates correctly.

Chapter III.
ELECTRONICS

CONTENTS

3.1 OUTLINE OF CONTROL ELECTRONICS

Figure 3.1-1 shows a block diagram of the control electronics of this machine. The control electronics consists of four printed circuit boards (main PCB, cassette sensor PCB, leading-edge sensor PCB*, and power supply PCB), two motors, a thermal print head assembly, an LCD module, and an interface (RS-232C)*. (*Provided only on the PT-550 European versions)

■ PCBs

Main PCB:
This manages all the components, motors, keypad, and thermal print head.

Cassette Sensor PCB:
This PCB holds a cassette sensor that detects the tape width and ink ribbon type in the loaded tape cassette.

Leading-edge Sensor PCB (only on the PT-550 European versions):
This PCB holds a photo interrupter that detects the leading edge of the tape in the loaded tape cassette.

Power Supply PCB:
This PCB generates the +5V and +12V from the unstabilized DC voltage supplied from batteries (or the optional AC adapter), through the 3-terminal regulator and the switching regulator, respectively, to feed the stabilized power to the main PCB.

On this PCB is also an interface circuit (RS-232C).

■ Motors (Stepping motor and DC motor)

The stepping motor (ø30) is a power source to advance tape and ink ribbon. It operates on 12V and is driven by the bipolar excitation.

The DC motor drives the cutter unit to cut tape.

■ Thermal Print Head

This is a thick-film thermal print head which integrates a heat generator (consisting of 128 heating elements vertically aligned) and driver circuitry. When selectively energized by 12V, those heating elements produce characters.

■ LCD module

The LCD is 112 dots wide by 32 dots high, and it has also 24, 23, or 20 guidance indicators on the PT-550 European, PT-550 USA, or PT-530 USA version, respectively.

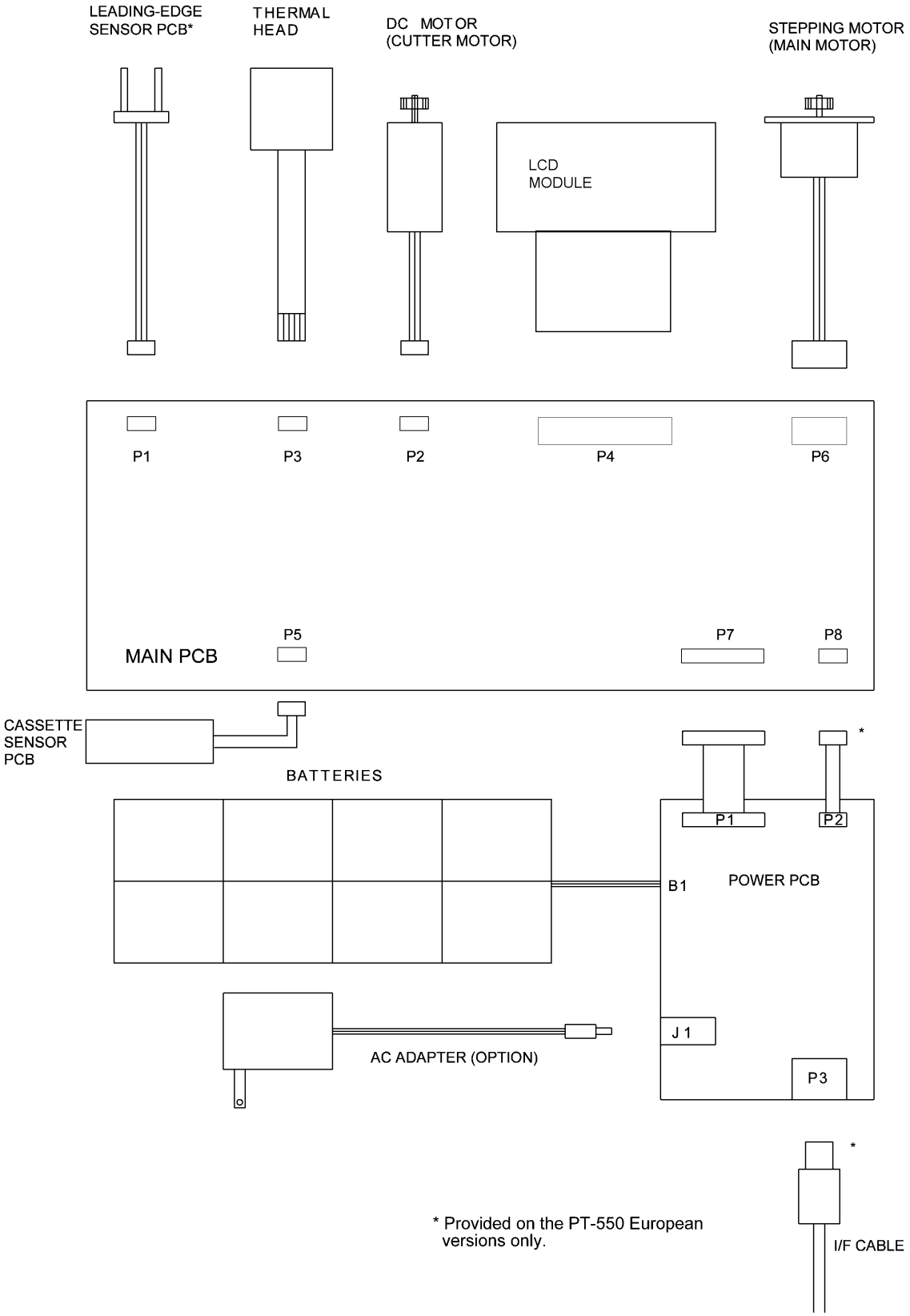


Figure 3.1-1 Control Electronics of PT-550

3.2 MAIN PCB

3.2.1 Block Diagram

Figure 3.2-1 shows a block diagram of the main PCB. The main PCB consists of the following:

(1) CPU
(2) ROM
(3) RAMs (SRAMs)
(4) Key contacts matrix
(5) Power ON/OFF circuit and automatic powering-off circuit
(6) Motor driver circuit
(7) Cassette sensor circuit
(8) Cover sensor circuit
(9) Leading-edge sensor circuit (PT-550 European versions only)
(10) Thermal print head control circuit
(11) Cutter sensor circuit
(12) Voltage detector circuit and temperature sensor circuit
(13) Oscillator circuit
(14) Reset circuit

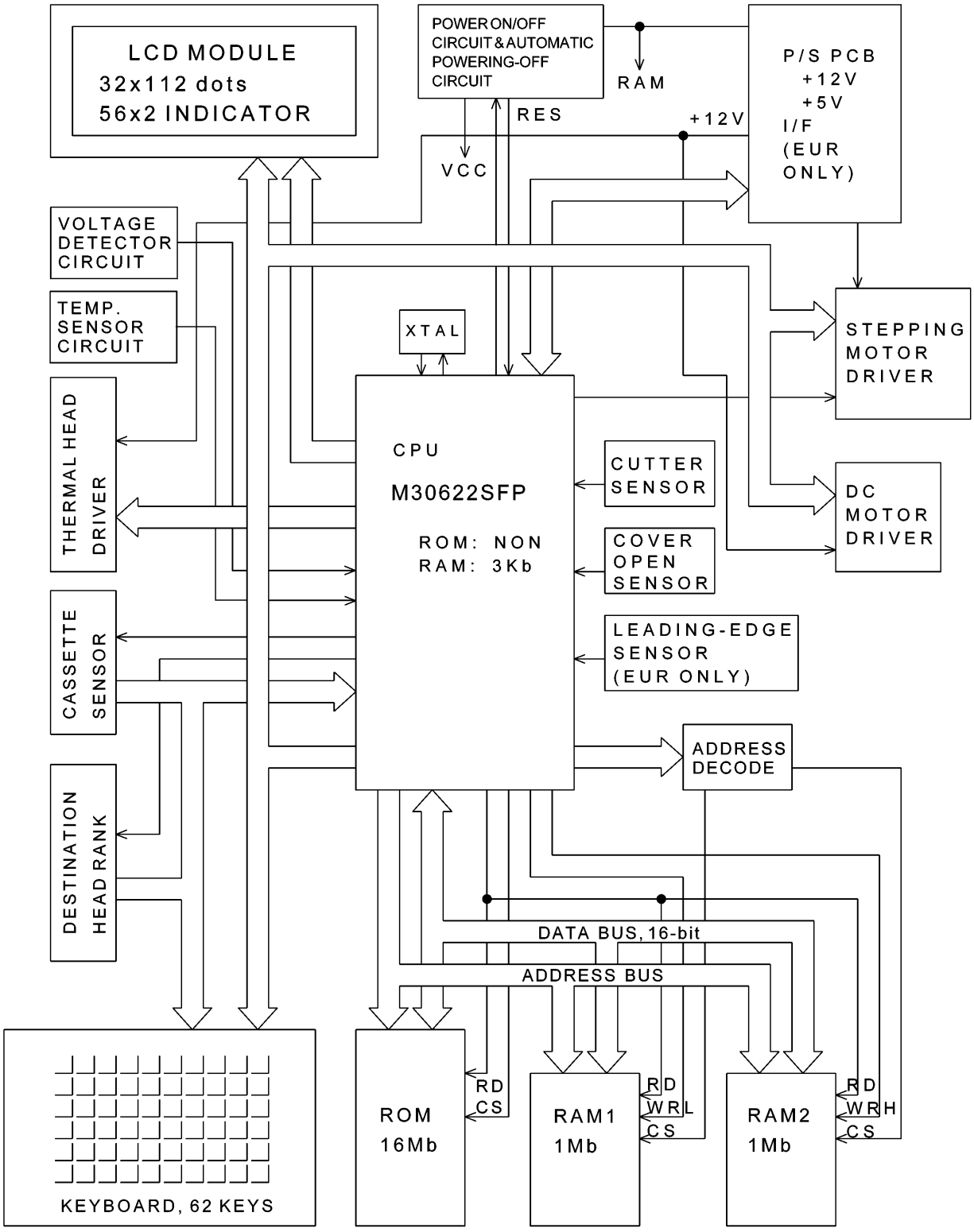


Figure 3.2-1 Block Diagram of Main PCB

3.2.2 CPU

The CPU (M30622) is a 16-bit CMOS microprocessor which integrates a 3-kilobyte RAM. The external data bus is 16 bits, through which the CPU controls the ROM and RAMs. The internal data bus is 16 bits.

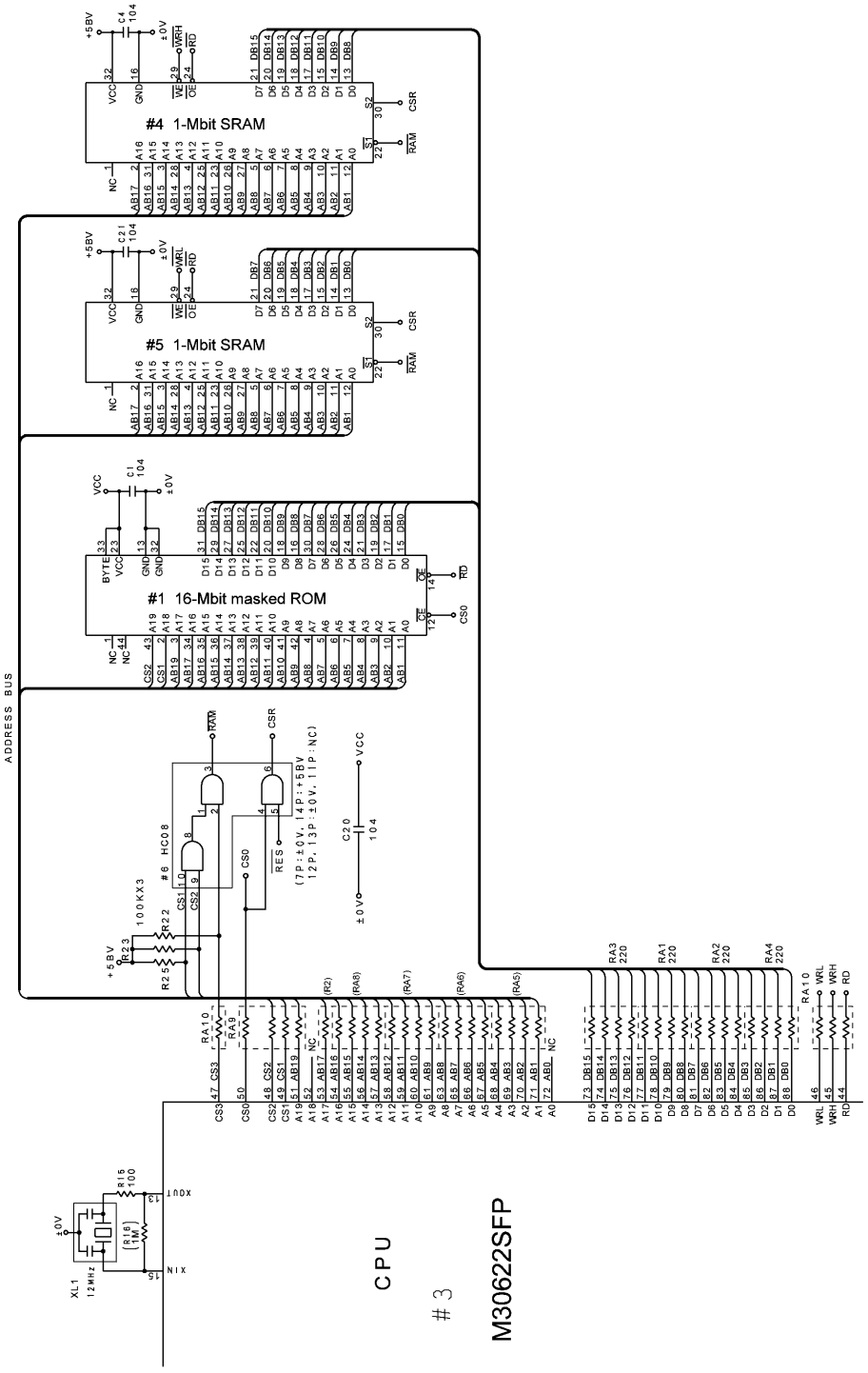


Figure 3.2-2 CPU, ROM, and SRAMs

3.2.3 **ROM** (See Figure 3.2-2.)

The ROM is a 16-megabit masked ROM which stores control programs and character patterns.

3.2.4 **RAMs** (See Figure 3.2-2.)

This machine uses two 1-megabit SRAMs which are used as a print buffer, program work area, and text memory.

The data stored in these SRAMs are backed up by the batteries driving this machine.

3.2.5 Key Contacts Matrix

[1] Key contacts matrix

On the main PCB is a key contacts matrix that is a set of 62 carbon-printed key contact patterns except for the On/Off key. (Refer to Figure 3.2-5.) Each contact pattern has a pair of electric nodes.

The rubber keypad is made of high-impedance silicon rubber. As shown in Figure 3.2-3, each key on the rubber keypad consists of a key top, return spring, and carbonic silicon rubber which functions as a switching element.

If a particular key is pressed, the carbonic silicon rubber of the key short-circuits the paired electric nodes carbon-printed on the main PCB.

Figure 3.2-4 shows a key scan timing scheme and K00-K07 scanning pulse outputs.

The CPU scans the key contacts matrix every 16 ms. If the CPU reads the same data on an input port four successive times, it interprets the state as the key being pressed; if the CPU reads the same data four successive times, it interprets the state as the key being released.

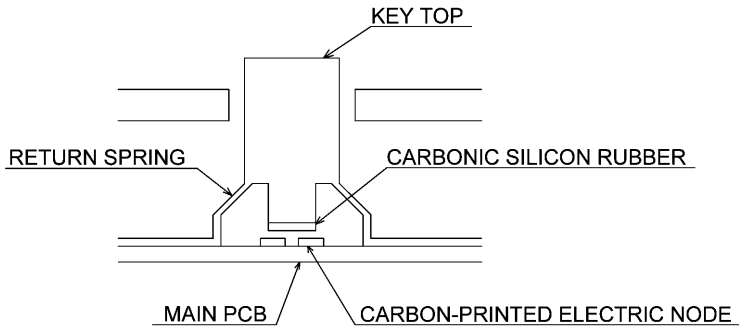


Figure 3.2-3 Structure of a Key

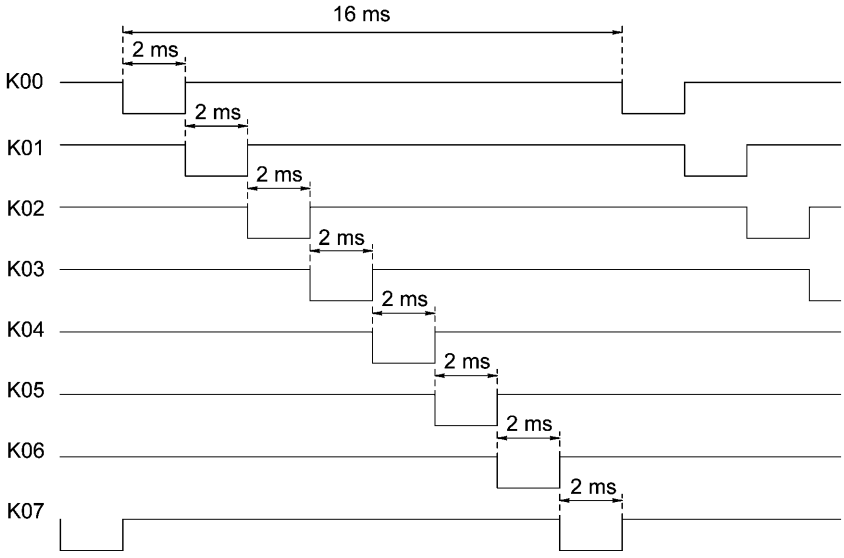


Figure 3.2-4 Key Scan Timing Scheme and Scanning Pulse Outputs

[2] Solder points

Figure 3.2-5 shows a circuit diagram relating to the keypad and solder points.

Solder points 1 through 4 customize the machine for the destination. Solder points A through D are reserved for the future use for the individual thermal head properties.

The CPU reads the solder point status once in the powering-on sequence to recognize the customization.

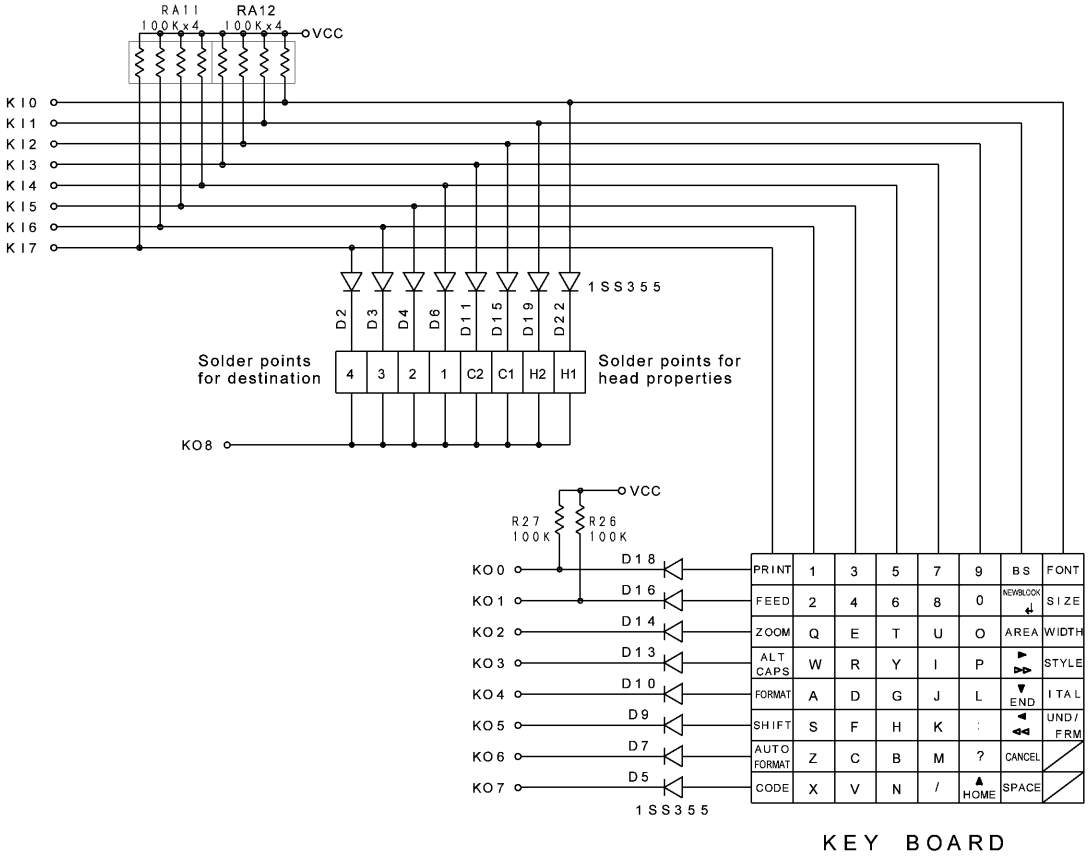


Figure 3.2-5 Keypad and Solder Points

3.2.6 Power ON/OFF Circuit and Automatic Powering-off Circuit

[1] Power ON/OFF circuit

Figure 3.2-6 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 keypad.

Pressing the On/Off key causes its bottom rubber contact to short-circuit a pair of the key contact patterns printed on the main PCB, making the base node input of transistor Q3 Low. Accordingly, Low signal is fed to pin 20 ($\overline{INT0}$) of the CPU, signaling that the On/Off key is pressed.

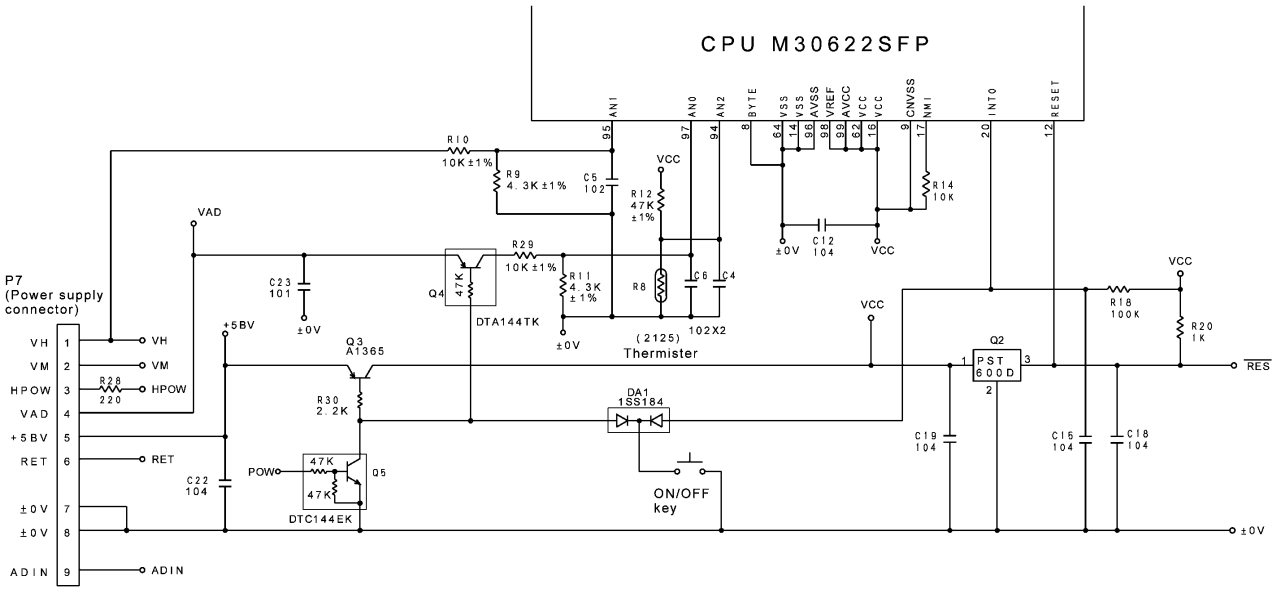


Figure 3.2-6 Power ON/OFF Circuit

Powering-on sequence (See Figure 3.2-7.)

When the CPU is supplied with no power and is in the reset status, pressing the On/Off key turns on Q3 so as to feed 5V power to the CPU. Getting started, the CPU first processes the $\overline{\text{INT0}}$ interrupt and reads the input from the On/Off key. To avoid malfunctioning due to chattering noises caused by accidental pressure to the key, the CPU reads the input level again after 10 ms from the first receipt of the $\overline{\text{INT0}}$. If the input is truly Low, the CPU interprets the On/Off key as being pressed and starts setting up the entire system.

The CPU turns the POW signal (P86) High, making the base node input of transistor Q5 High so as to keep supplying the Vcc power after the On/Off key is released.

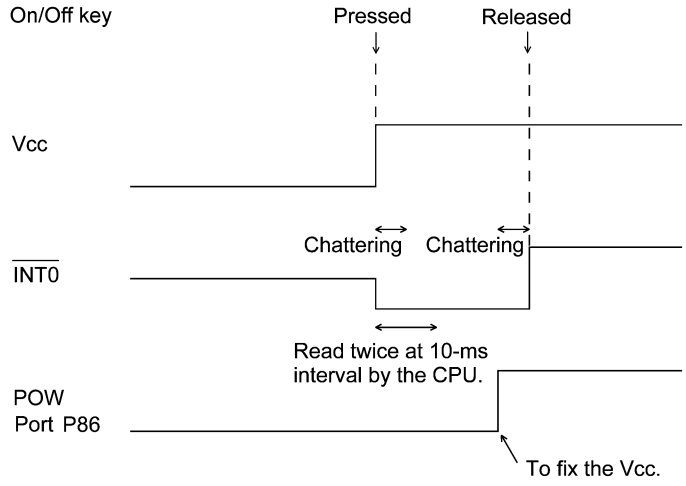


Figure 3.2-7 Powering-on Sequence

Powering-off sequence (See Figure 3.2-8.)

Pressing the On/Off key when the CPU is running causes the same process as in the above powering-on sequence until the CPU interprets the On/Off key as being pressed. Then, the CPU turns the POW signal (P86) Low to shut down the Vcc.

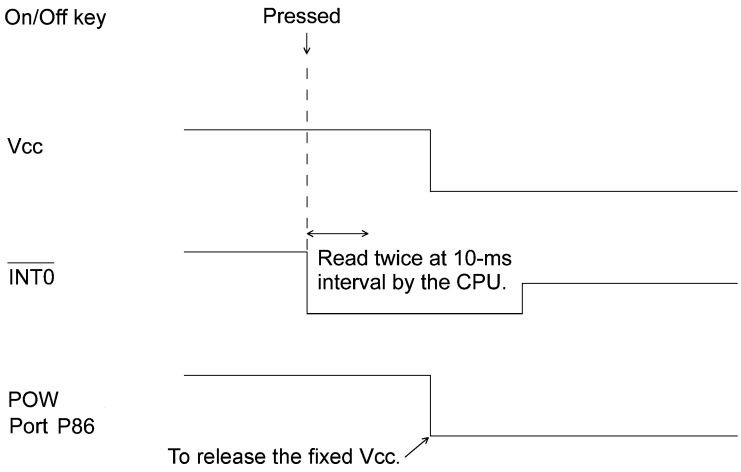


Figure 3.2-8 Powering-off Sequence

[2] Automatic powering-off circuit

The power automatic powering-off circuit is shown in Figure 3.2-6. If you power off the machine with the power On/Off key or you make no key entry for approx. 5 minutes (for approx. 30 minutes when the machine uses the RS-232C interface), the CPU turns the POW signal Low to shut down the Vcc (which would normally feed power to the logic circuits except the CPU). This way, oscillation stops so as to feed no clock to the CPU.

3.2.7 Motor Driver Circuit

[1] Stepping motor driver circuit

Figure 3.2-9 shows a driver circuit of the stepping motor which feeds tapes and ink ribbon. This circuit drives the motor with a bipolar 2-2 phase excitation. The motor is a 30-mm in diameter and has 24 poles with the exciting coils whose internal resistance is 108Ω each.

The CPU controls the motor rotation direction with the signals on P74 (pin 26) and P75 (pin 25) and turns on/off the motor with an activation signal of transistor array (TA7774F, #7) on P104 (pin 92). When P104 is High, the motor rotates in the direction defined by the signals on P74 and P75.

(1) Printing in a constant speed

For regular printing in a constant speed, the CPU drives the motor at the rate of 144 pps. To provide buffered starting and stopping for the motor, the gradual acceleration and deceleration are programmed to consume 8 and 3 pulses, respectively.

To rewind the tape of the color print cassette in color printing, the CPU drives the motor in the reverse direction at the rate of 182 pps.

(2) Print halt for saving tapes or at print buffer full

After completion of the current printing, the CPU brakes the motor with 3-pulse gradual deceleration and then counter-drives it by 20 pulses to stop the motor.

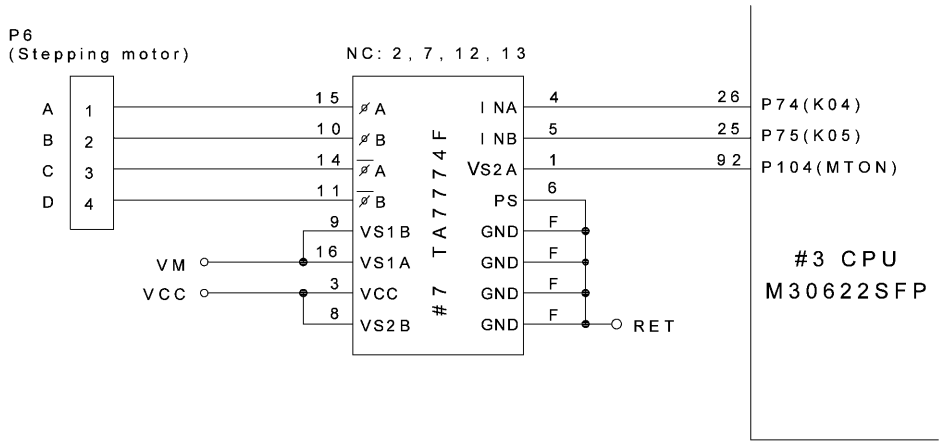


Figure 3.2-9 Stepping Motor Driver Circuit

[2] DC motor driver circuit

Figure 3.2-10 shows a driver circuit of the DC motor which cuts tape after a sequence of printing. Through its P72 (pin 28) and P73 (pin 27), the CPU activates the transistor array (TA7291F, #2) which drives the DC motor.

This circuit makes the motor rotate clockwise to cut tape and return the cutter to the home position. If the motor overruns or a tape jam occurs, the CPU makes the motor rotate counterclockwise. The cutter home position is detected by the cutter sensor.

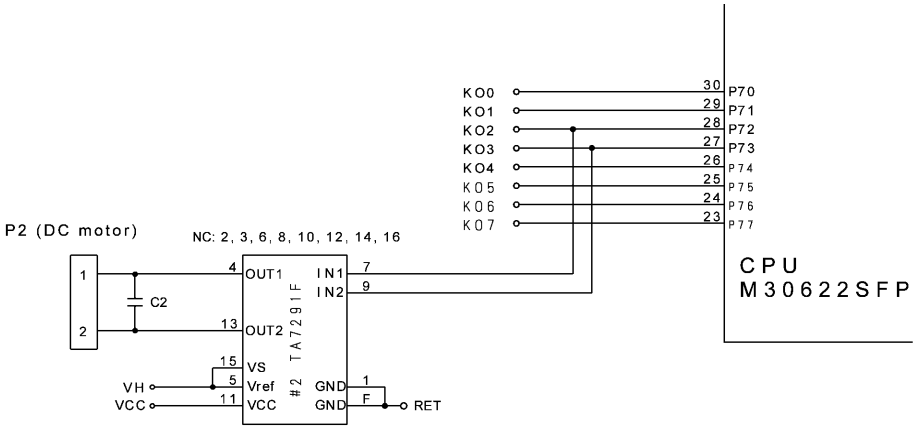


Figure 3.2-10 DC Motor Driver Circuit

3.2.8 Cassette Sensor Circuit

Figure 3.2-11 shows the cassette sensor circuit which reads the five sensor switches.

Loading a tape cassette turns on some of those five switches while keeping other switches off depending upon the ID holes provided in the tape cassette. If a certain ID hole is closed, the corresponding sensor switch goes on.

To read the cassette sensor information, the CPU turns its P81 (KO9) High to gate the cassette sensor signal on its P90 through P97 (KI0 through K7).

With the states of those sensor switches, the CPU identifies the tape width and ink ribbon type of the tape cassette, as listed in Table 3.2-1.

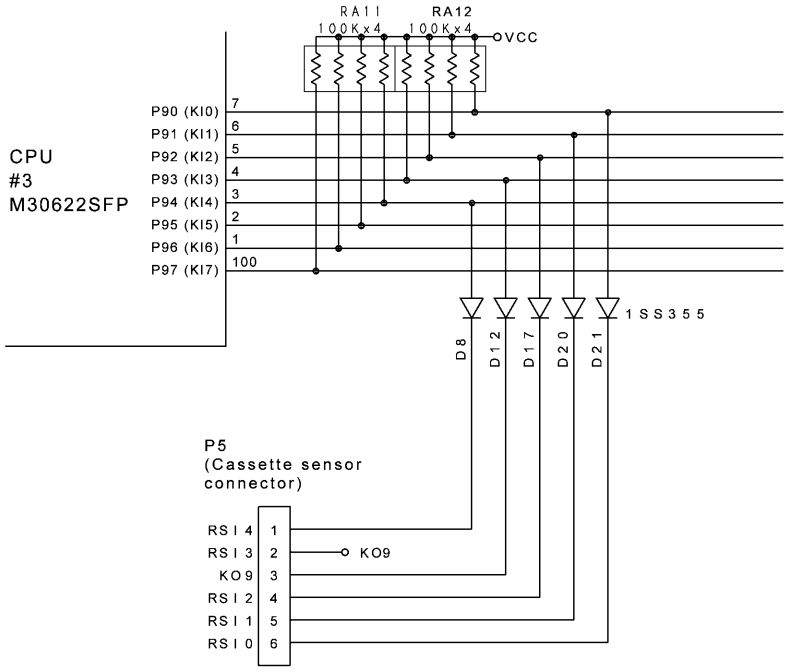


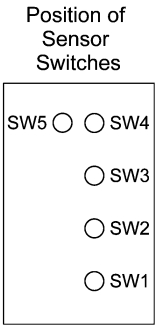
Figure 3.2-11 Cassette Sensor Circuit

Table 3.2-1 Coded Values for Identifying Tape Cassettes

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

Width	Cassette type	SW1	SW2	SW3	SW4	SW5
——	No tape cassette loaded	0	0	0	0	0
6 mm	Laminated tape cassette	0	0	1	0	0
	Non-laminated tape cassette	0	0	1	1	0
9 mm	Laminated tape cassette	1	1	1	0	0
	Non-laminated tape cassette	1	1	0	0	0
12 mm	Laminated tape cassette, Stamp tape cassette M	0	1	0	0	0
	Non-laminated tape cassette	0	1	1	1	0
18 mm	Laminated tape cassette, Stamp tape cassette L	1	0	1	1	0
	Non-laminated tape cassette *	1	0	0	0	0
	Instant lettering tape cassette, Iron-on transfer tape cassette	1	1	1	0	1
24 mm	Laminated tape cassette	1	0	1	1	1
	Non-laminated tape cassette	1	0	0	0	1
	Non-laminated thermal film tape cassette	1	0	0	1	1
36 mm	Laminated tape cassette	0	0	0	1	0
	Non-laminated tape cassette	0	0	0	0	1

* The refill tape cassette for color printing is also included in this type.



3.2.9 Cover Sensor Circuit

Figure 3.2-12 shows the cover sensor circuit. The cover sensor is a transparent photosensor. The CPU turns its P76 (KO6) High to gate the cover sensor signal on its P67 (COSENS). If the sensor signal is Low, the CPU interprets the cassette cover as being opened; if High, the CPU interprets it as being closed.

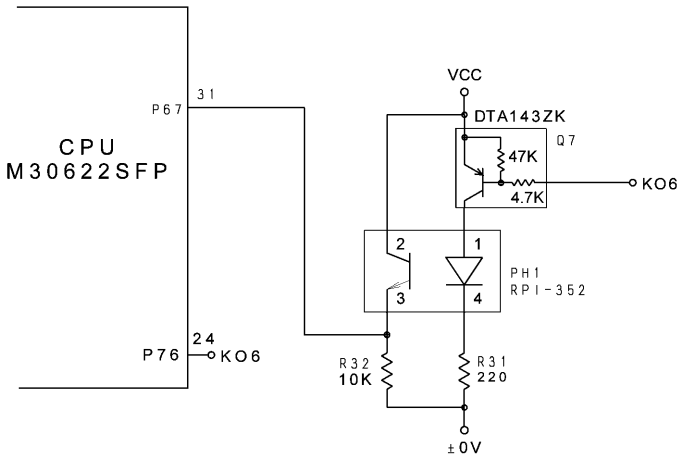


Figure 3.2-12 Cover Sensor Circuit

3.2.10 Leading-edge Sensor Circuit (PT-550 European versions only)

Figure 3.2-13 shows a circuit diagram of the tape leading-edge sensor which detects the leading edge of the tape in color printing.

The CPU checks whether the tape is present or not at the tape leading-edge sensor at three stages per issue of a motor drive pulse.

The CPU makes its P83 High to turn on the sensor LED and then reads the voltage level on P103. If the voltage level is Low, the CPU recognizes that the tape is present.

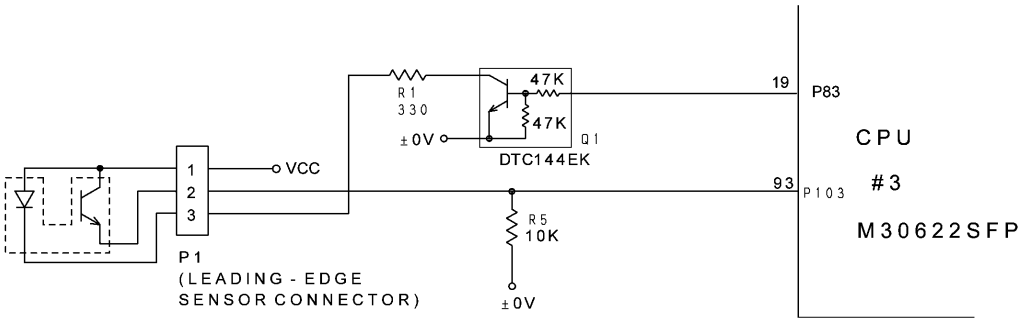


Figure 3.2-13 Leading-edge Sensor Circuit

3.2.11 Thermal Print Head Control Circuit

Figure 3.2-14 shows the thermal print head control circuit. The print head integrates a heat generator (consisting of 128 heating elements vertically aligned in 180 dpi) and a pair of built-in driver ICs which are designed for 64-element control and cascaded with each other.

Synchronizing with the 2 MHz clock on pin 37 (P61, CLK0), the CPU outputs serial print data containing 128-dot frame (8 x 16 bit map) through pin 35 (P63, TXD0) to the drivers, printing 96-dot data in practice.

If the CPU runs out of control, this circuit cuts off power to the thermal head after the specified time length by the CR time constant of C24•R37.

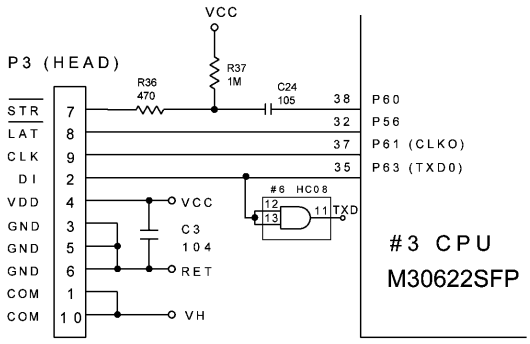


Figure 3.2-14 Thermal Print Head Control Circuit

3.2.12 Cutter Sensor Circuit

Figure 3.2-15 shows the cutter sensor circuit. When the cutter is opened, the movable blade activates the cutter sensor actuator which presses the cutter sensor switch to close the switch contact.

If the DC motor is driven, the linked movable blade moves to cut tape, releasing the cutter sensor to open the switch contact. The CPU continues to run the DC motor until the switch contact closes again.

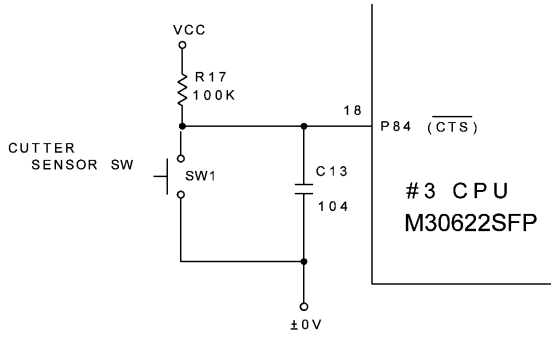


Figure 3.2-15 Cutter Sensor Circuit

3.2.13 Voltage Detector Circuit and Temperature Sensor Circuit

Figure 3.2-16 shows the voltage detector circuit and the ambient temperature sensor circuit, each of which is composed of a resistor network.

[1] Voltage detector circuit

This circuit, which is composed of divider resistors R29 and R11, steps down the power source VAD fed from batteries or the AC adapter output and then feeds the output to the analog input port AN0 of the CPU. According to the sensed drive voltage, the CPU operates as follows:

During non-printing:

- If the voltage level of the VAD drops below approx. 6.4V, pressing the Print key shows the message (“REPLACE BATTERIES!”) and does not allow printing.
- If it drops further below approx. 6.2V, pressing the Print key immediately shuts down the power.

During printing:

- If the voltage level of the VAD drops below approx. 4.0V, the CPU shows the “BATTERIES WEAK” message to warn you of a low battery after completion of printing.
- If it drops further below approx. 3.5V, the CPU immediately stops printing and shows the message (“REPLACE BATTERIES!”).

[2] Excessive high-voltage AC adapter detector circuit

When the AC adapter is plugged in this machine, the CPU checks the input voltage at the powering-on sequence and at the start of printing. If the input voltage level exceeds approx. 15.1V, the CPU shows the CHANGE ADAPTER message and shuts down the power.

[3] Ambient temperature sensor circuit

This circuit is composed of thermister R8 which is pulled up to Vcc through resistor R12. It converts the resistance of the thermister (which will vary depending upon the ambient temperature) to the voltage level and then feeds its output to the analog input pin AN2 of the CPU. According to those data, the CPU determines the optimum head drive power.

[4] Head voltage detection circuit

To read the current head drive source voltage, the CPU monitors its analog port AN1 whose voltage comes from the resistor network R9 and R10 dividing the print head drive voltage VH. According to the sensed voltage, the CPU optimizes the head drive pulse width.

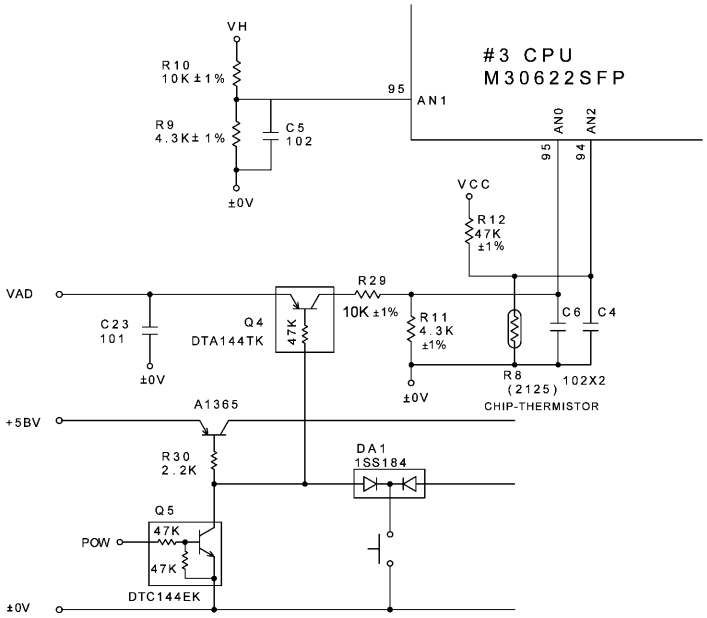


Figure 3.2-16 Voltage Detector Circuit and Temperature Sensor Circuit

3.2.14 Oscillator Circuit

Figure 3.2-17 shows the oscillator circuit. It generates 12 MHz source which acts as a CPU basic clock. The CPU divides this into half (6 MHz) to synchronize its internal operations.

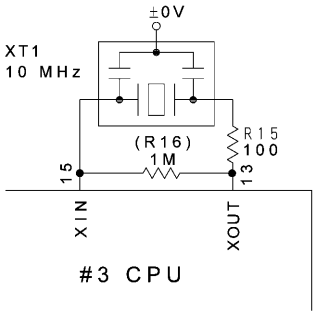


Figure 3.2-17 Oscillator Circuit

3.2.15 Reset Circuit

Figure 3.2-18 shows the reset circuit. This circuit prevents the CPU and logic circuitry from malfunctioning in powering-on and -off sequences or when the battery output drops abnormally.

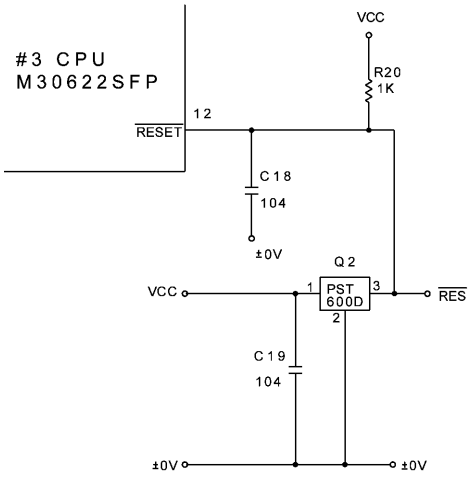


Figure 3.2-18 Reset Circuit

Figure 3.2-19 shows the reset timing when the power is first applied or cut off or when the battery output drops below the specified level.

When the machine is loaded with batteries or its AC adapter is plugged in, pressing the On/Off key raises the +5 source Vcc which feeds power to the logic circuitry. When the Vcc reaches approx. 4.2V (point "A" in Figure 3.2-19), the reset IC PST600D (Q2) operates to turn the $\overline{\text{RESET}}$ from Low to High.

When the power is cut off or the battery output drops so that the Vcc drops below approx. 4.2V (point "B"), the $\overline{\text{RESET}}$ turns from High to Low.

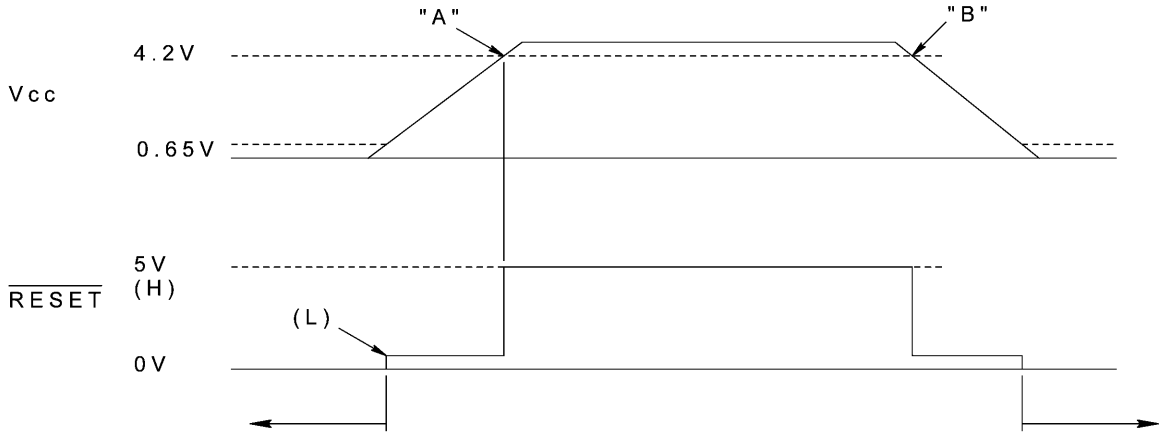


Figure 3.2-19 Reset Timing

3.3 LCD MODULE

Figure 3.3-1 shows the LCD module (COG-034) and its connector. In the LCD module is a driver chip which integrates a screen-data RAM designed for a dot-matrix LCD capable of displaying characters and graphics.

According to control signals CSX, R/WX, and A0, the driver chip temporarily stores bit-mapped screen data sent from the CPU into the integrated RAM via 8-bit data bus KO0-KO7, and then it edits LCD drive signals.

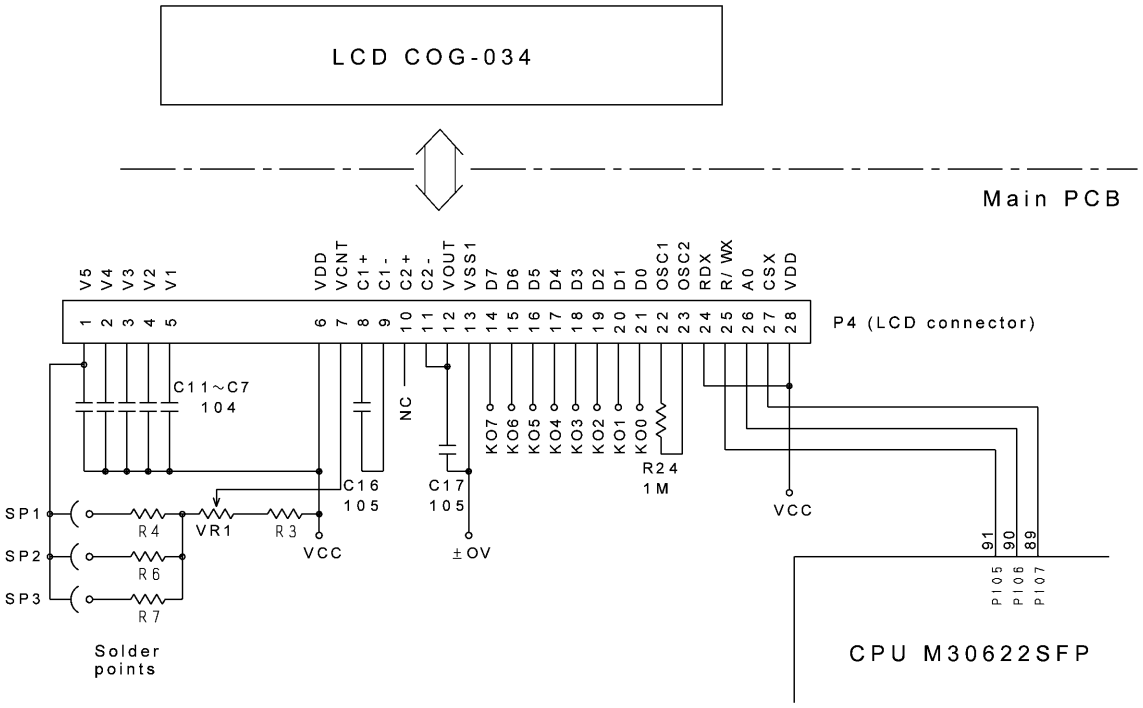


Figure 3.3-1 LCD Driver Circuit

3.4 POWER SUPPLY PCB

3.4.1 +12V Power Supply Circuit

Figure 3.4-1 shows the +12V power supply circuit. Acting as a DC stepping-up converter, this circuit steps up the VAD (fed by batteries or AD adapter output) to +12 VDC power supplies, VH and VM. The VH is fed to the thermal head and DC motor. The VM is fed to the stepping motor.

A closed loop comprising Q3, Q1, R1, R3, and C3 forms a self-running oscillator. Zener diode ZD1 and Q4 regulate the output voltage "A" around +12V.

The CPU turns the HPOW signal High to apply power to this circuit only when driving the mechanisms, thereby saving power. When no power is required for those mechanisms, the CPU cuts off Q5 by keeping the HPOW Low to protect them from unexpected powering.

Resistor R11 limits the current flowing into the stepping motor.

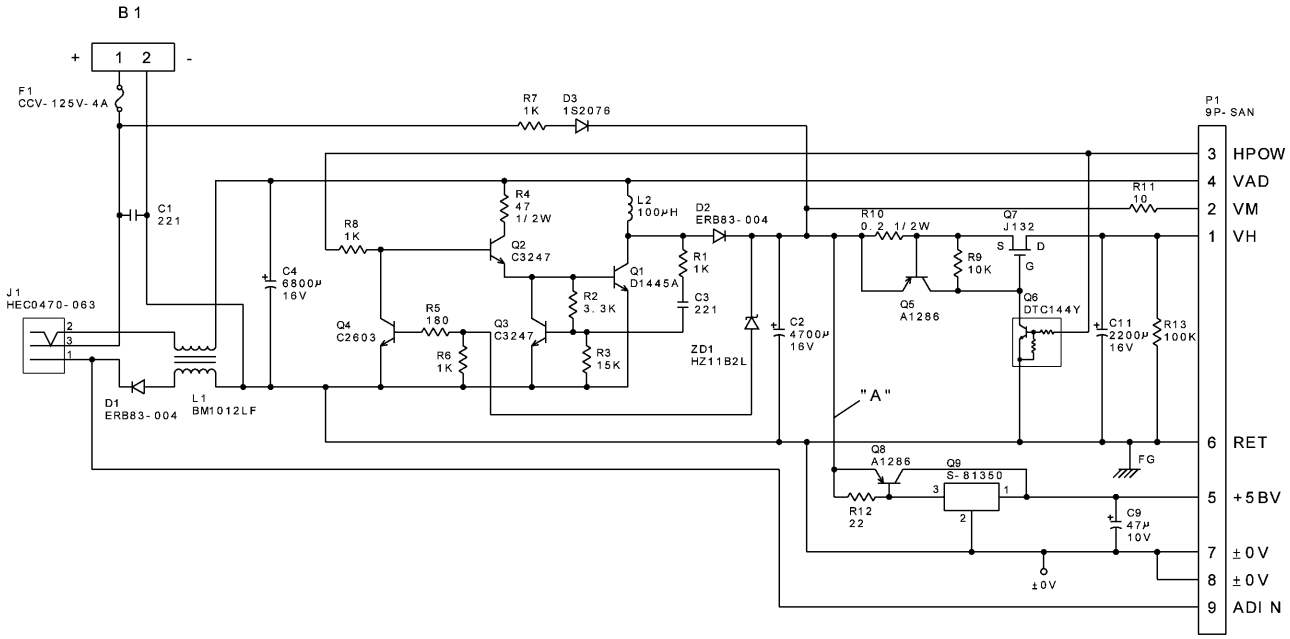


Figure 3.4-1 12V Power Supply Circuit

3.4.2 +5V Power Supply Circuit

Figure 3.4-2 shows the +5V power supply circuit. A 3-terminal regulator S-81350 stabilizes the +5BV source. During non-printing, the regulator is supplied with the VAD fed from the batteries or the AC adapter output. During printing, it is supplied with "A" (+12V) fed from the +12V source; this is to supply the stabilized power to the logic circuitry even when the VAD drops abnormally.

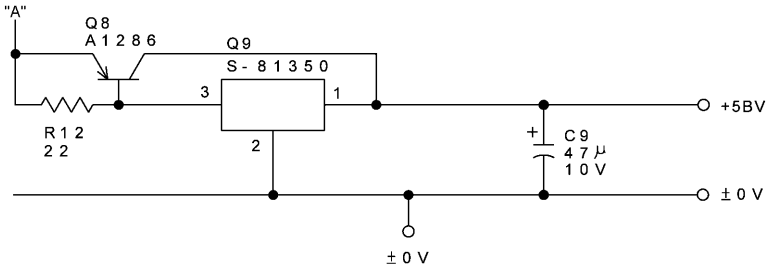


Figure 3.4-2 +5V Power Supply Circuit

3.4.3 AC Jack-related Circuit

Figure 3.4-3 shows the circuit around the AC jack. Connecting the AC adapter to the AC jack J1 cuts off the power fed from the batteries and feeds power from the AC adapter.

Diode D1 protects the machine when a wrong-polarity AC adapter is connected. For the right polarity of the AC adapter plug, refer to Figure 3.4-4.

Fuse 1 works as an overcurrent protector.

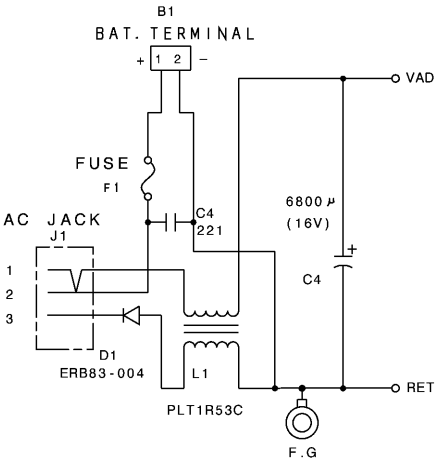


Figure 3.4-3 AC Jack-related Circuit

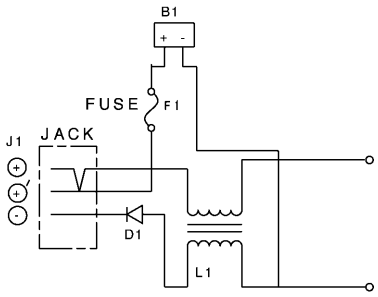


Figure 3.4-4 Polarity of AC Adapter Plug

3.4.4 Interface (RS-232C) Circuit (PT-550 European versions only)

Figure 3.4-5 shows a circuit diagram of the interface port (RS-232C). This interface port serially receives print data from the PC. The driver ADM202 (#1) converts the RS-232C signal level to the TTL logic level.

The baud rate is fixed to 9600 bps. The PC controls the data transfer by the dedicated driver program.

On the main PCB, transistor Q6 switches power to the ADM202 (#1). If the machine enters the interface port mode, the CPU turns pin 33 Low to feed power (+5V) to the ADM202 (#1).

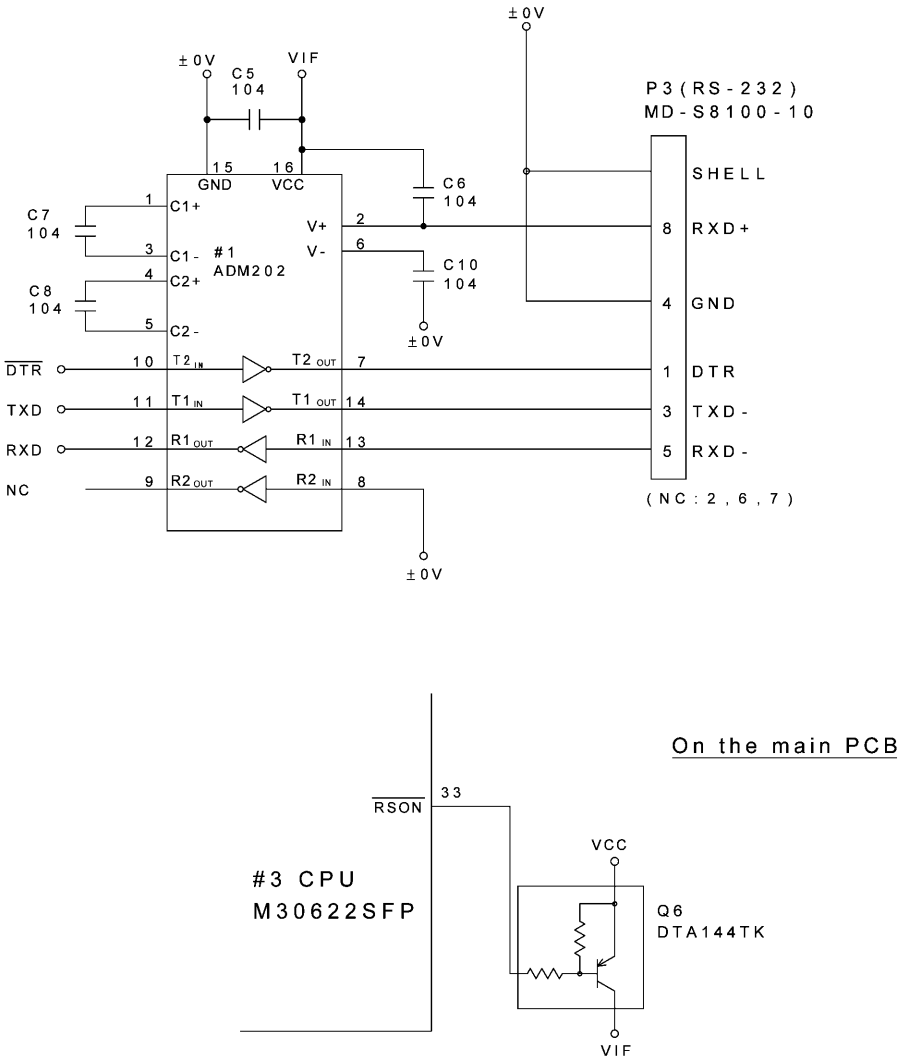


Figure 3.4-5 Interface (RS-232C) Circuit

Chapter IV.

TROUBLESHOOTING

CONTENTS

4.1 TROUBLESHOOTING

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

4.1.1 Precautions

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

(1) Get a good idea of what the trouble is. Whenever more than one trouble source is found, plan the most reasonable repairing procedure after reviewing the relationship between them.

(2) When supplying power to this machine having problems from either a set of batteries or the AC line adapter, make sure that its output voltage level is 11V to 13V 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 11V to 13V. When connecting it to this machine, be careful with the polarity.

(4) When using a circuit tester for testing the conductivity, remove all of the batteries and the AC line adapter from this machine.

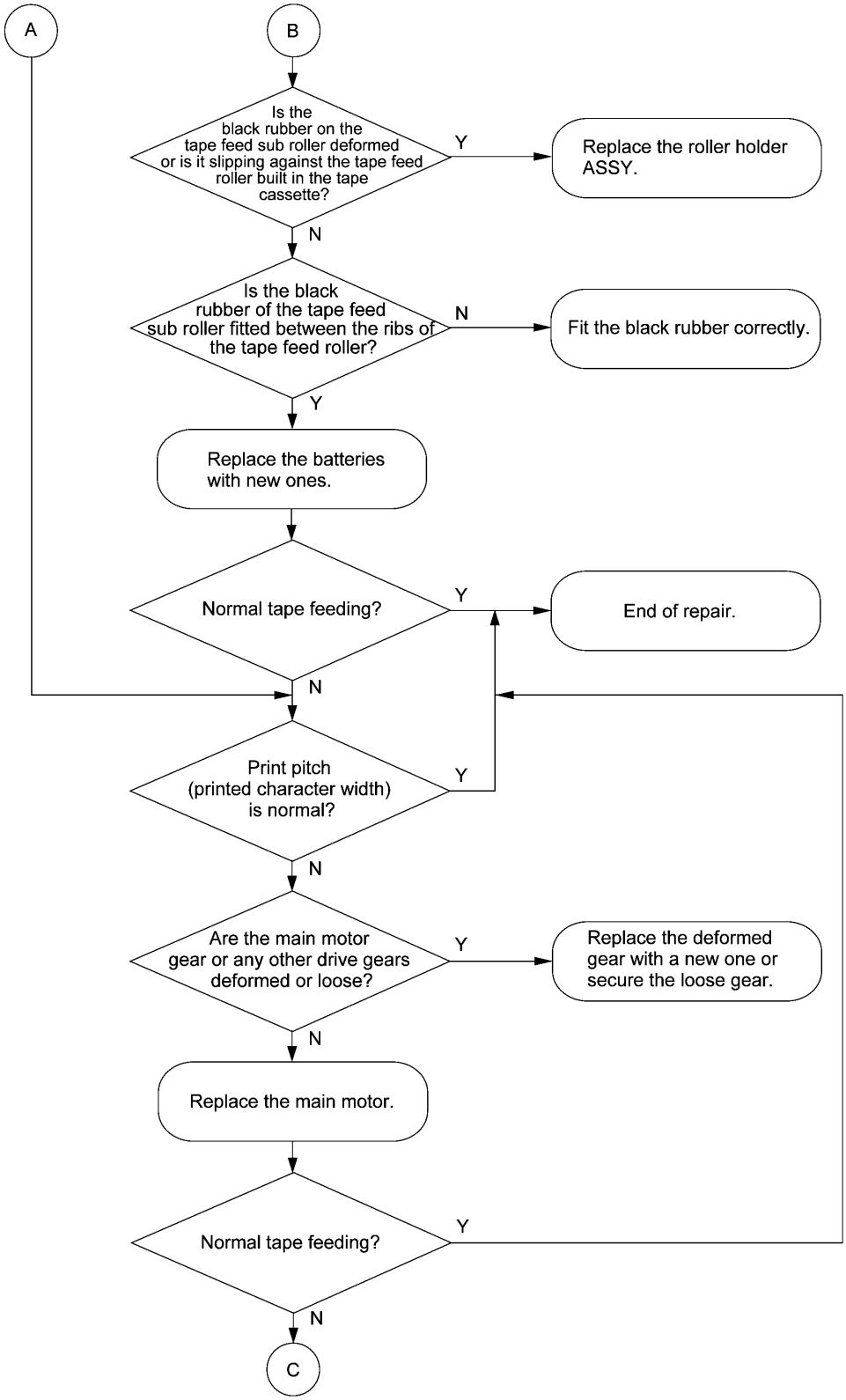
(5) To repair an error which occurred in the thermal print head and its related sections, disconnect the thermal head cable until repairs are finished.

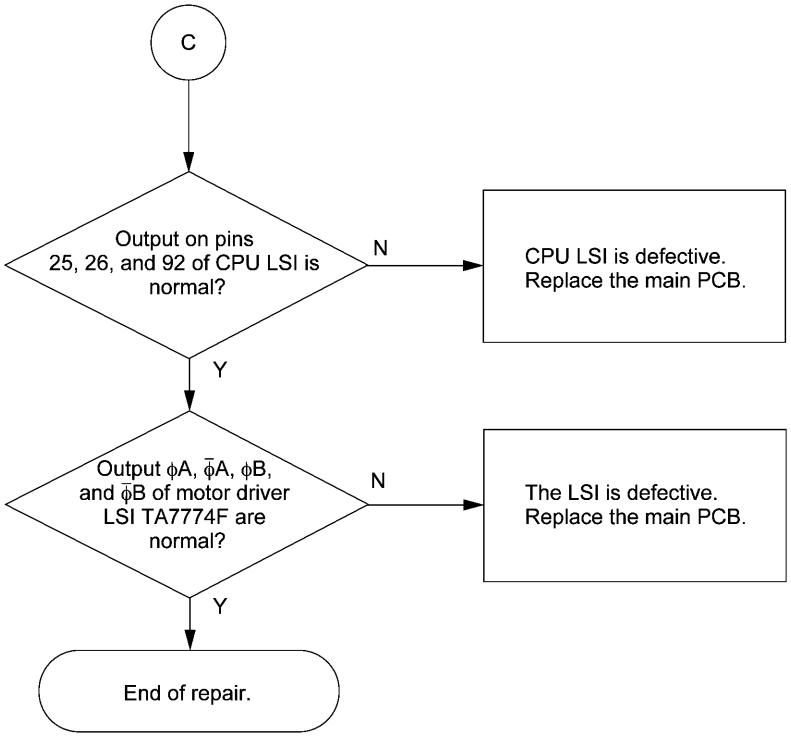
4.1.2 After Repairing

After repairing the defective section, be sure to check again to see if the repaired section works correctly. Also make a note of the troubleshooting procedure so that it will be handy should problems occur in the future.

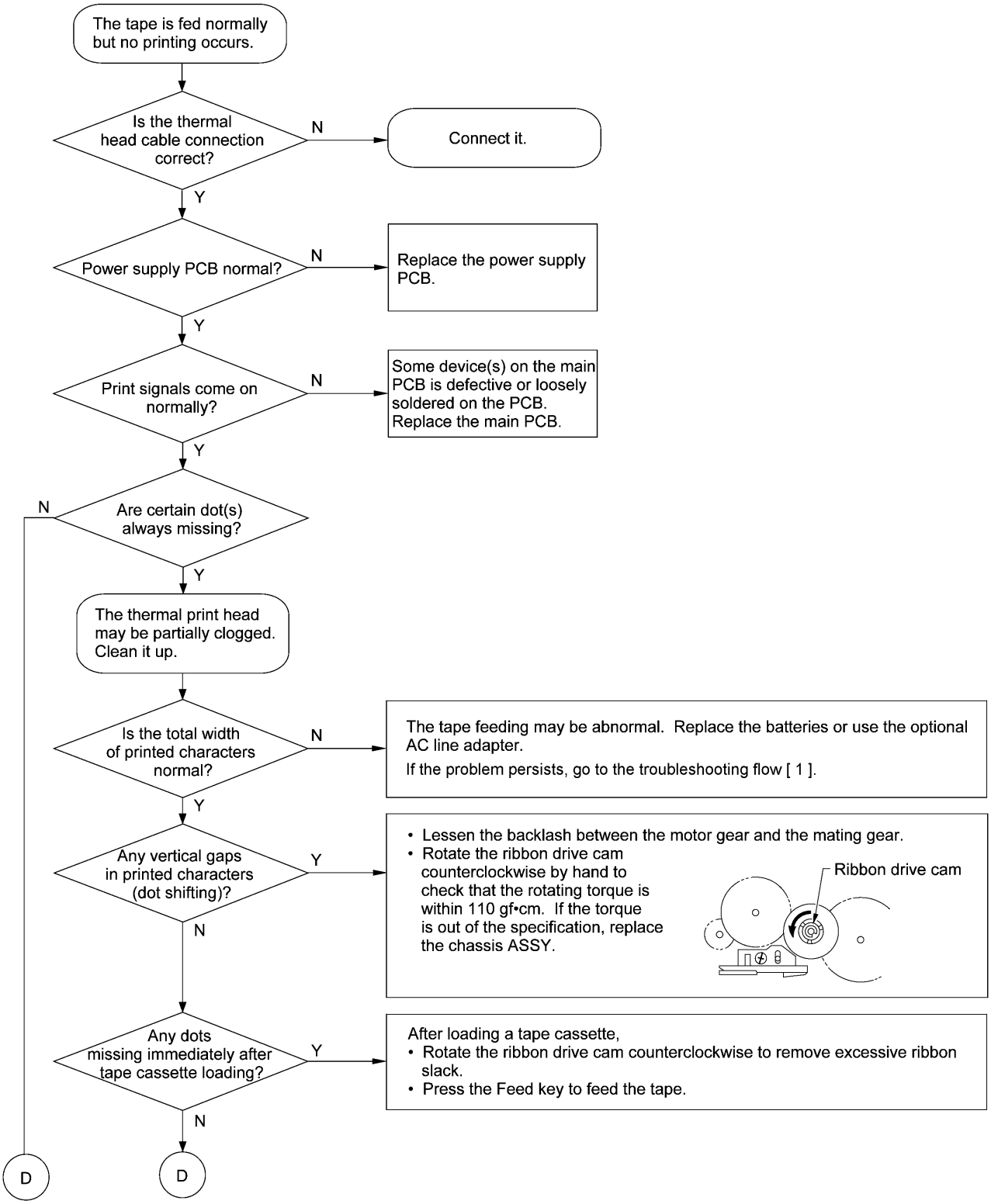
4.1.3 Troubleshooting Flows

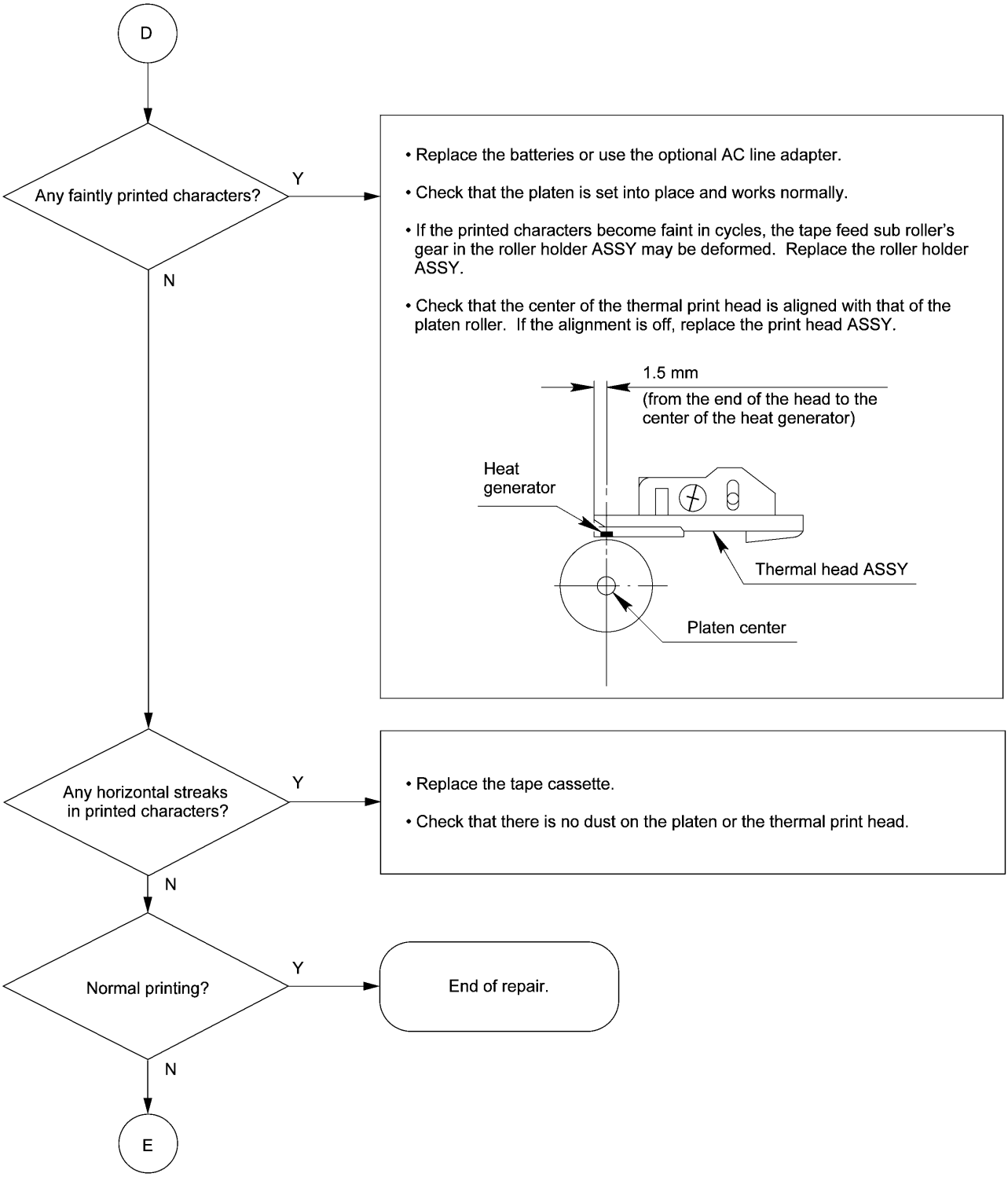
[1] Tape feeding failure

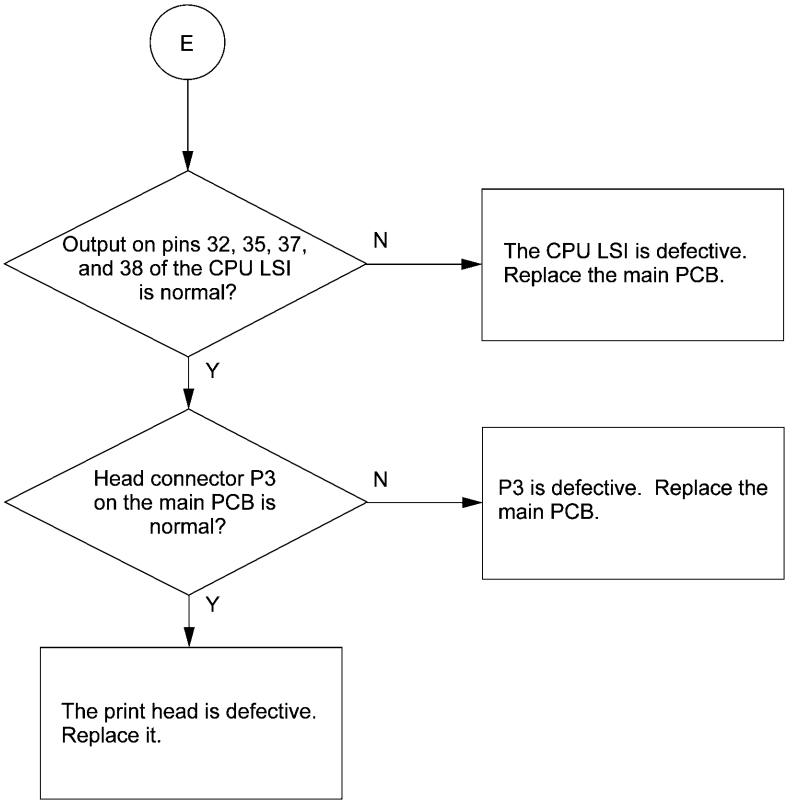

A
B
Is the black rubber on the tape feed sub roller deformed or is it slipping against the tape feed roller built in the tape cassette?
Y
Replace the roller holder ASSY.
N
Is the black rubber of the tape feed sub roller fitted between the ribs of the tape feed roller?
N
Fit the black rubber correctly.
Y
Replace the batteries with new ones.
Normal tape feeding?
Y
End of repair.
N
Print pitch (printed character width) is normal?
Y
N
Are the main motor gear or any other drive gears deformed or loose?
Y
Replace the deformed gear with a new one or secure the loose gear.
N
Replace the main motor.
Normal tape feeding?
Y
N
C


C
Output on pins 25, 26, and 92 of CPU LSI is normal?
N
CPU LSI is defective. Replace the main PCB.
Y
Output ϕA, ϕ̄A, ϕB, and ϕ̄B of motor driver LSI TA7774F are normal?
N
The LSI is defective. Replace the main PCB.
Y
End of repair.

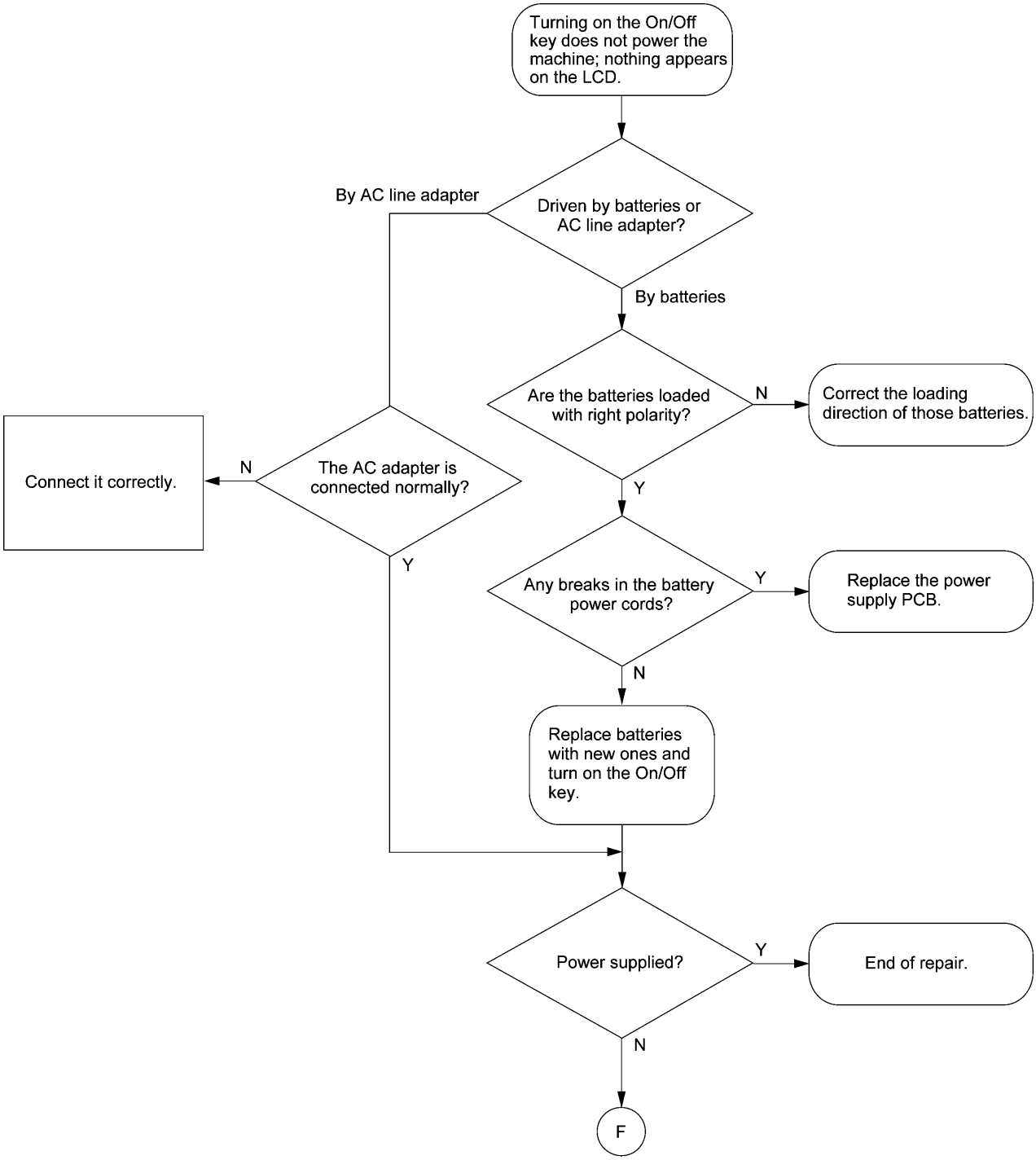
[2] Printing failure

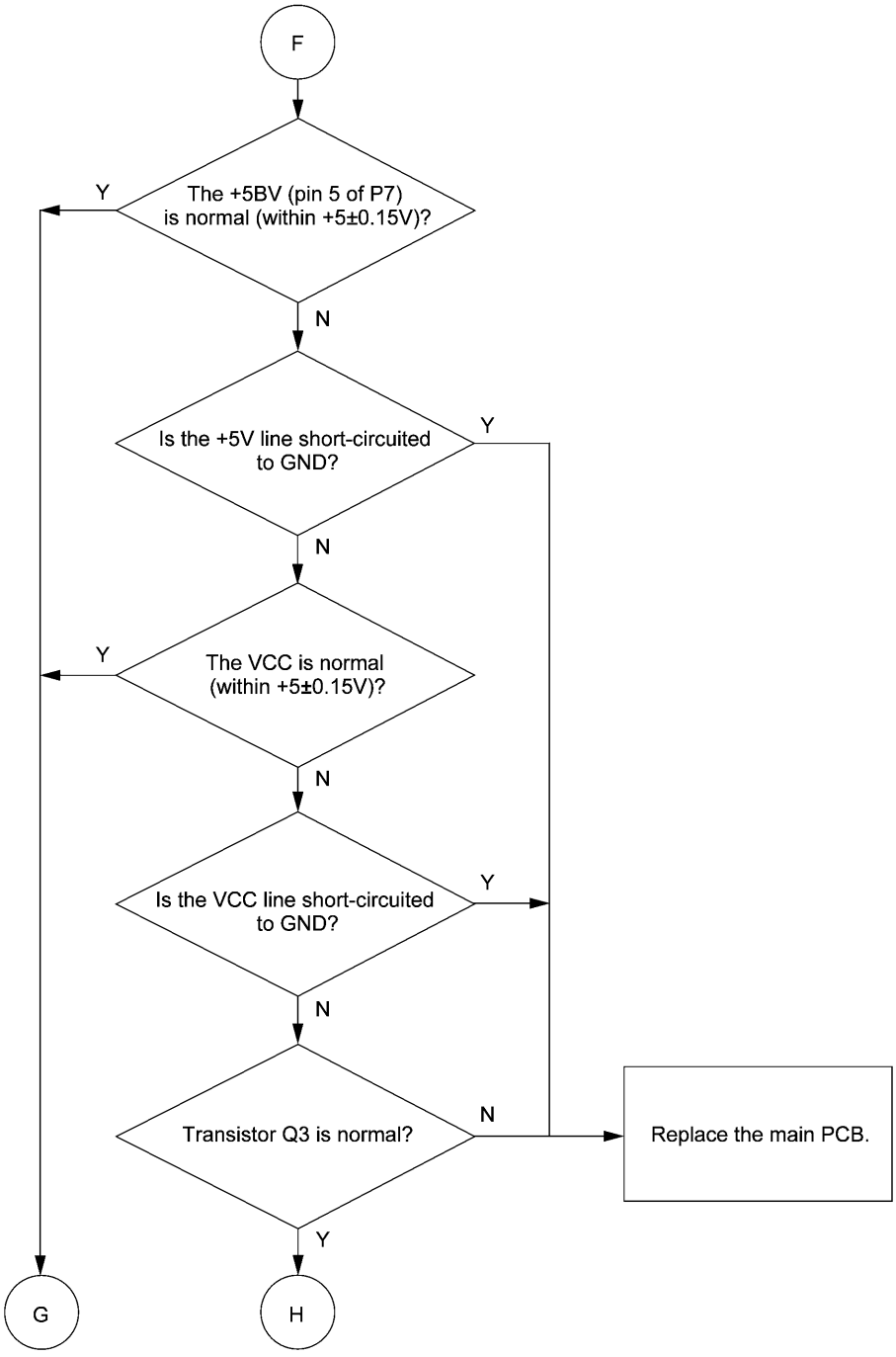


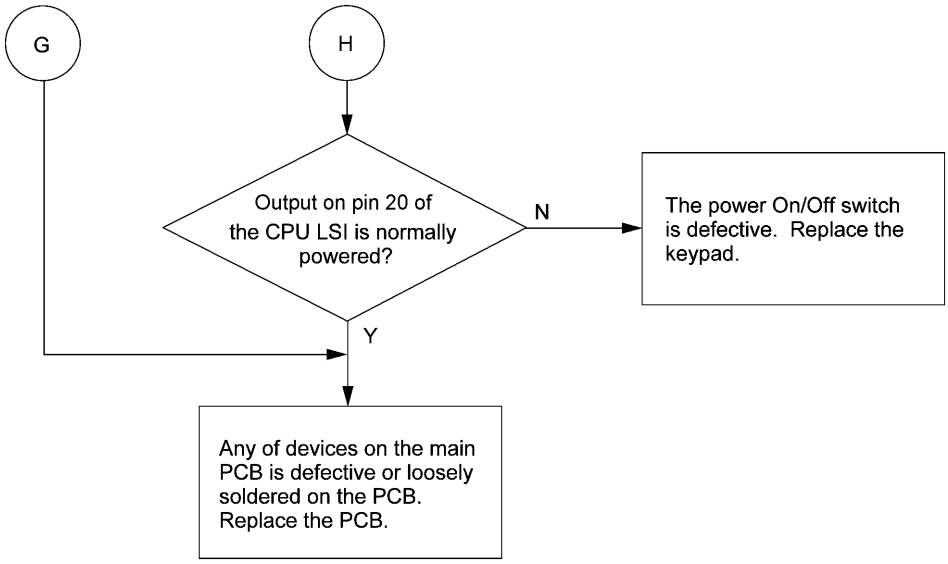

D
Any faintly printed characters?
Y
N
• Replace the batteries or use the optional AC line adapter.
• Check that the platen is set into place and works normally.
• If the printed characters become faint in cycles, the tape feed sub roller's gear in the roller holder ASSY may be deformed. Replace the roller holder ASSY.
• Check that the center of the thermal print head is aligned with that of the platen roller. If the alignment is off, replace the print head ASSY.
1.5 mm
(from the end of the head to the center of the heat generator)
Heat generator
Thermal head ASSY
Platen center
Any horizontal streaks in printed characters?
Y
N
• Replace the tape cassette.
• Check that there is no dust on the platen or the thermal print head.
Normal printing?
Y
N
End of repair.
E


E
Output on pins 32, 35, 37, and 38 of the CPU LSI is normal?
N
The CPU LSI is defective. Replace the main PCB.
Y
Head connector P3 on the main PCB is normal?
N
P3 is defective. Replace the main PCB.
Y
The print head is defective. Replace it.

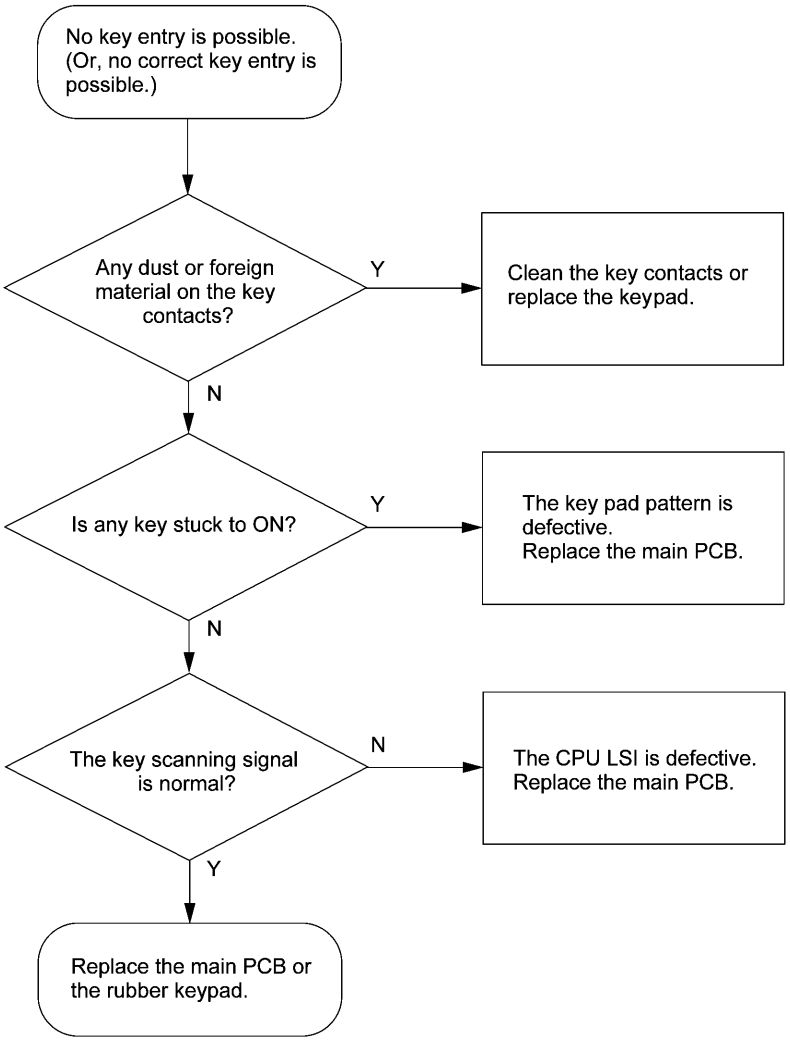
[3] Powering failure (Nothing appears on the LCD.)



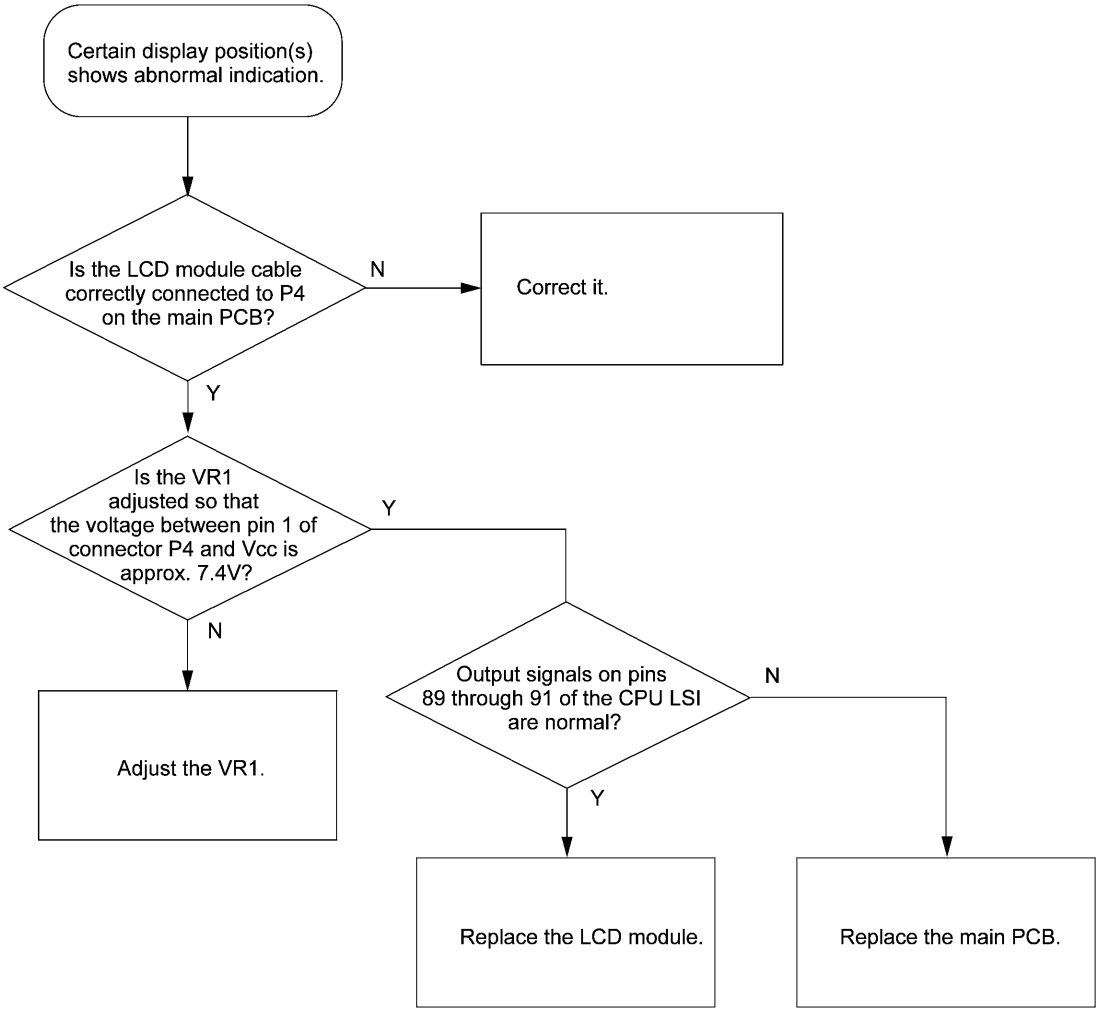

F
The +5BV (pin 5 of P7) is normal (within +5±0.15V)?
Y
N
Is the +5V line short-circuited to GND?
Y
N
The VCC is normal (within +5±0.15V)?
Y
N
Is the VCC line short-circuited to GND?
Y
N
Transistor Q3 is normal?
N
Replace the main PCB.
Y
G
H


G
H
Output on pin 20 of the CPU LSI is normally powered?
N
The power On/Off switch is defective. Replace the keypad.
Y
Any of devices on the main PCB is defective or loosely soldered on the PCB. Replace the PCB.

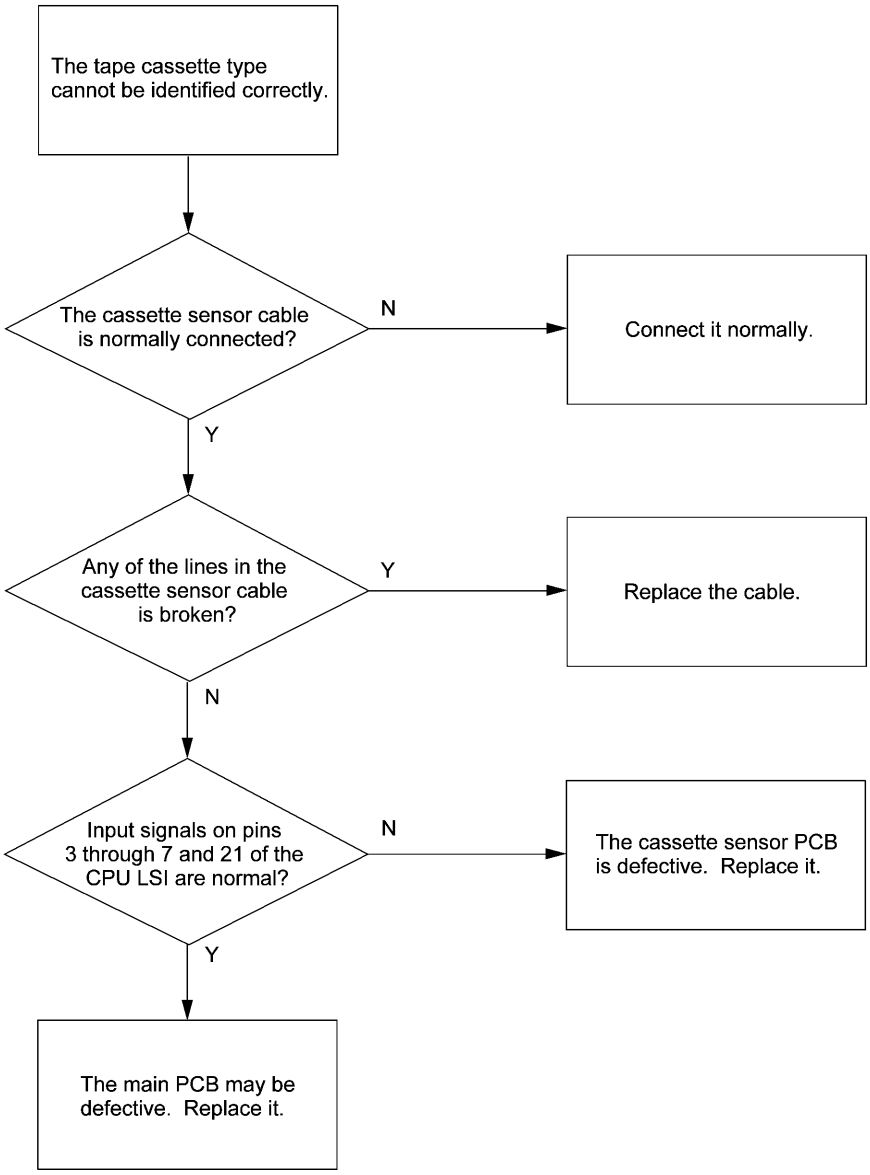
[4] No key entry possible



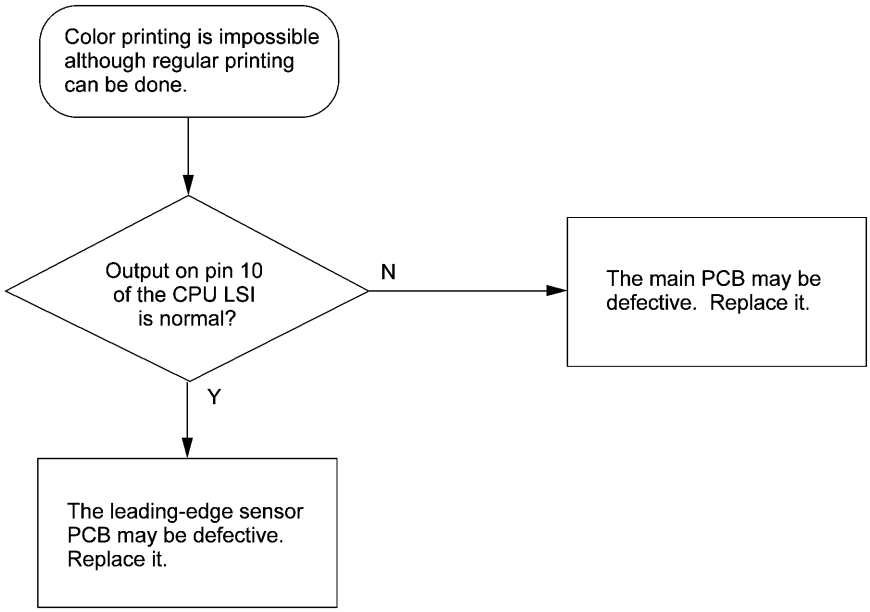
[5] Abnormal LCD indication



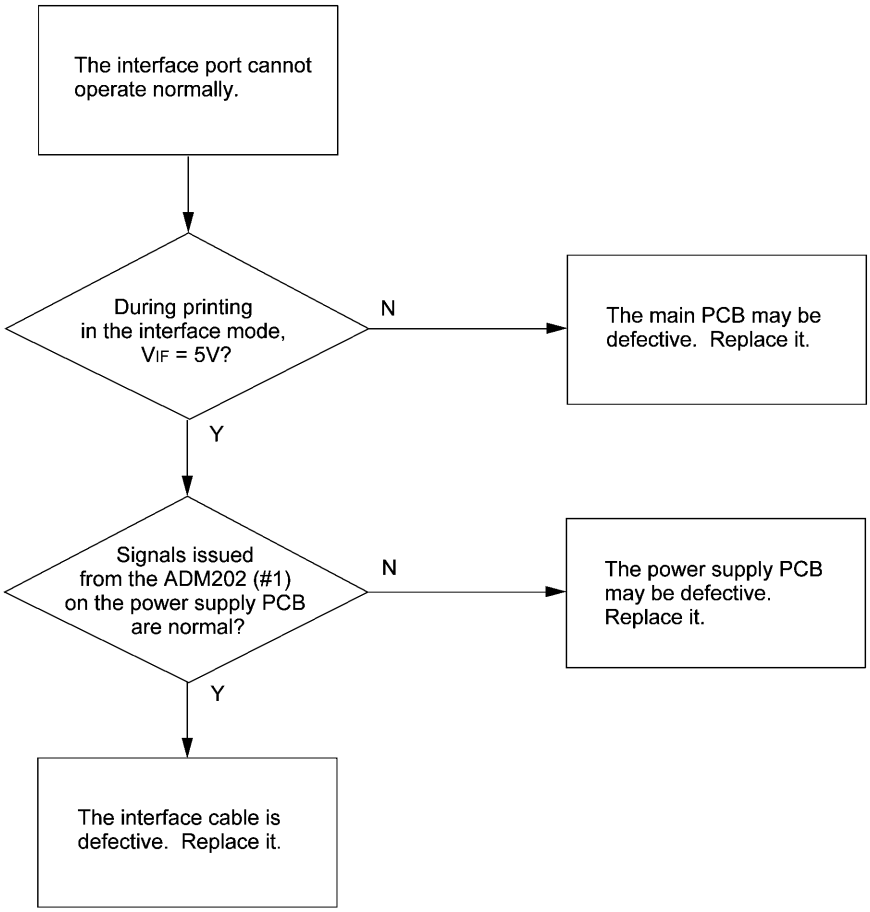
[6] Tape cassette type not identified



[7] No color printing (this applies to the PT-550 European versions only)



[8] Interface port failure (this applies to the PT-550 European versions only)

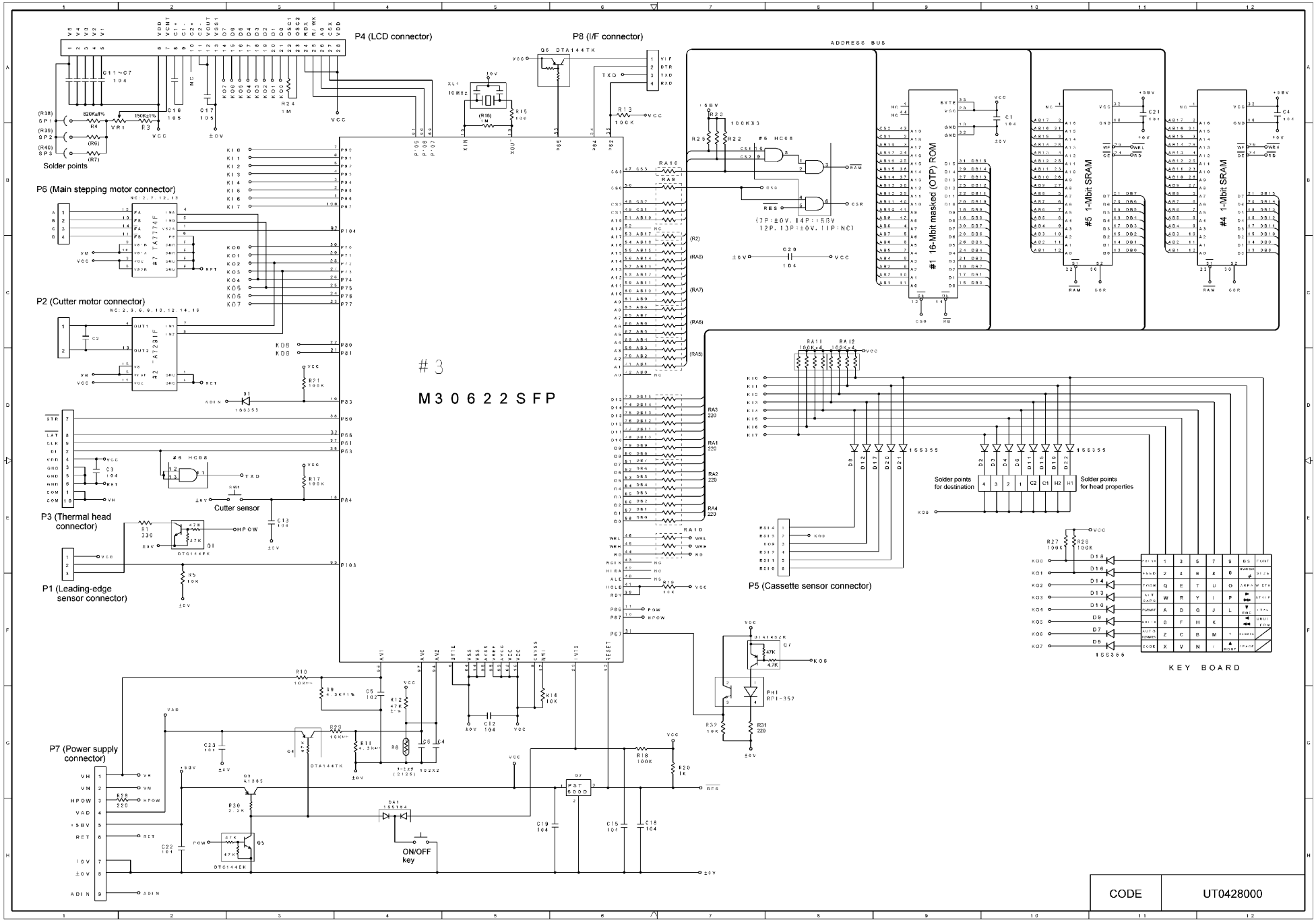


APPENDICES

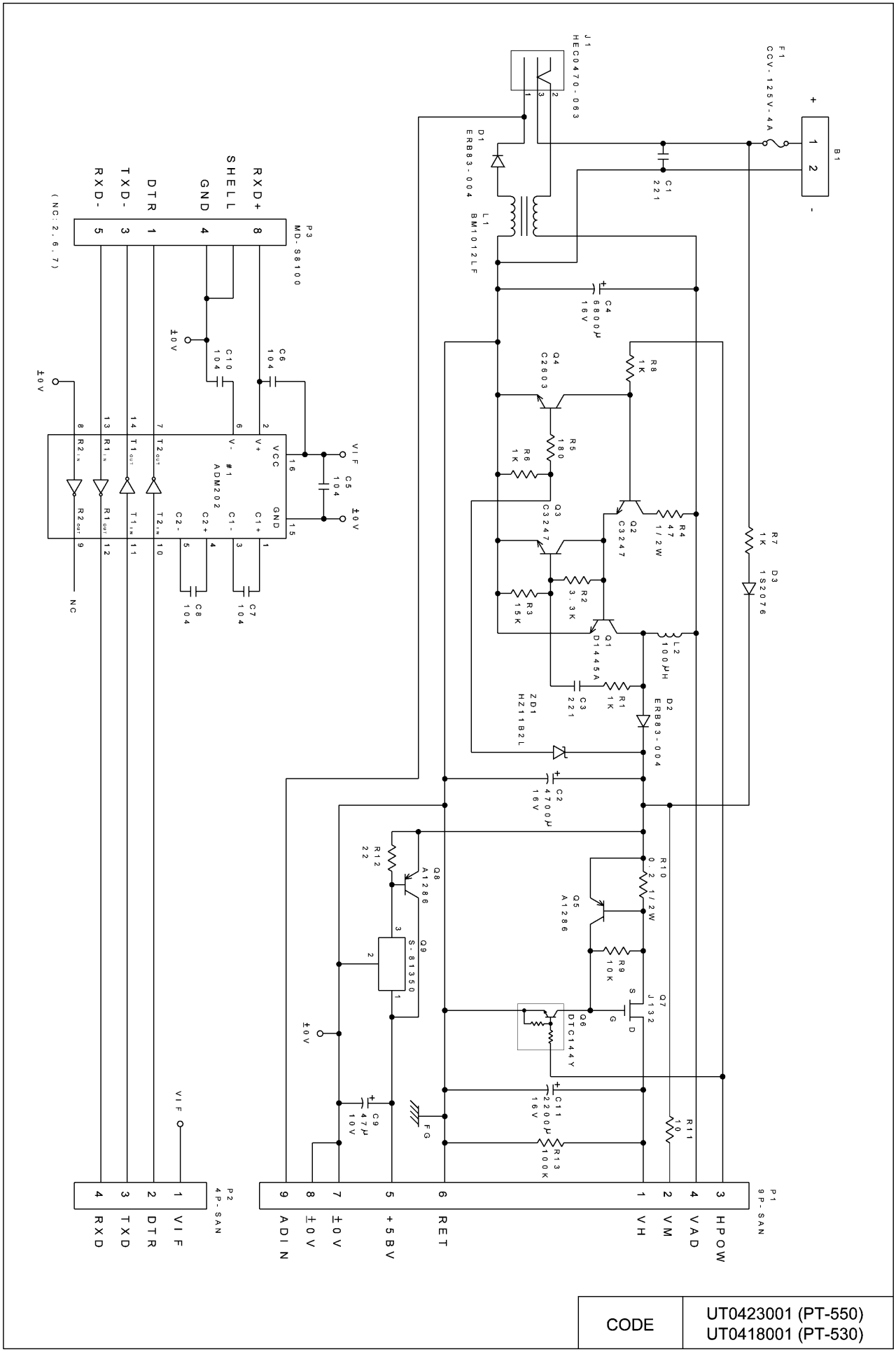
Circuit Diagrams

A. Main PCB
B. Power Supply PCB

A. Main PCB


P4 (LCD connector)
P8 (I/F connector)
ADDRESS BUS
#1 16-Mbit masked (OTP) ROM
#5 1-Mbit SRAM
#4 1-Mbit SRAM
P6 (Main stepping motor connector)
P2 (Cutter motor connector)
Solder points
#3
M30622SFP
Cutter sensor
P3 (Thermal head connector)
P1 (Leading-edge sensor connector)
P5 (Cassette sensor connector)
Solder points for destination
Solder points for head properties
KEY BOARD
P7 (Power supply connector)
ON/OFF key
CODE
UT0428000

B. Power Supply PCB



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