



SERVICE MANUAL

MODEL: PT-9200PC



MECHANISMS & ELECTRONICS

brother®

SERVICE MANUAL

MODEL: PT-9200PC

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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 label printer PT-9200PC. It is intended for service personnel and other concerned persons to accurately and quickly provide after-sale service for our PT-9200PC.

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 an appendix.

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CHAPTER II	MECHANISMS
CHAPTER III	ELECTRONICS
CHAPTER IV	TROUBLESHOOTING
APPENDIX	CIRCUIT DIAGRAM

CHAPTER I

SPECIFICATIONS

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1.1 MECHANICAL SPECIFICATIONS

1.1.1 External View

- | | |
|----------------------------|------------------------------------|
| (1) Dimensions (W × D × H) | 115 mm × 245 mm × 145 mm |
| (2) Weight | |
| Machine proper | Approx. 1.5 kgf (only the machine) |
| Machine and package | Approx. 2.4 kgf |

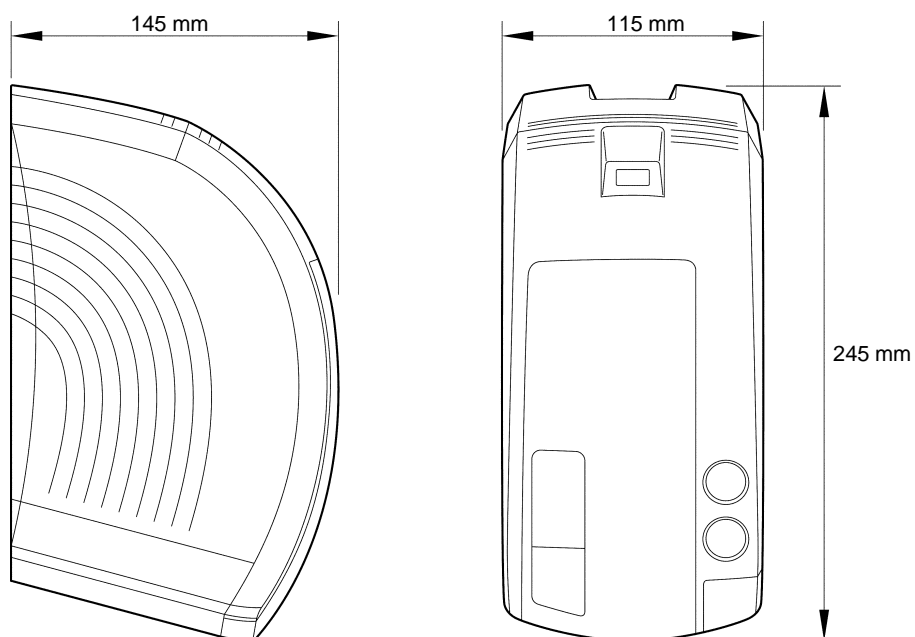


Fig. 1.1-1 External View

1.1.2 Input Specifications

- | | |
|--------------------|--------------------------------------|
| (1) Number of keys | 2 (ON/OFF (⏻) and FEED/CUT (✂) keys) |
| (2) Key layout | See Fig. 1.1-2. |

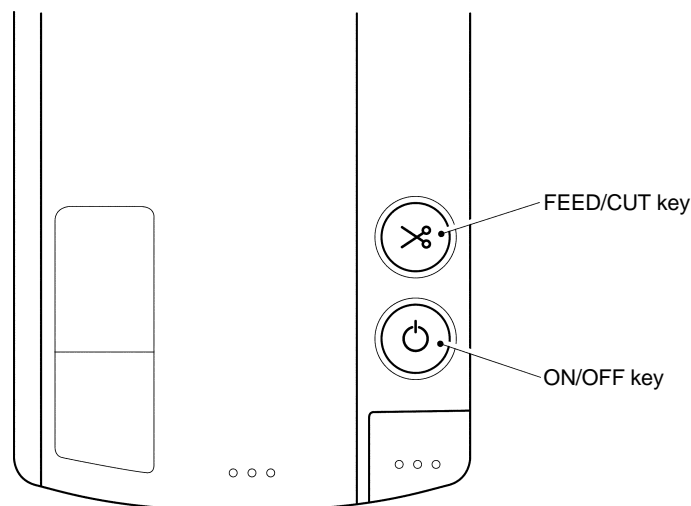


Fig. 1.1-2 Key Layout

1.1.3 Display Specifications

- | | |
|--------------------|-----------------|
| (1) Display method | LED (green/red) |
|--------------------|-----------------|

1.1.4 Printing Specifications

- | | |
|---------------------------------|---|
| (1) Printing method | Thermal transfer or heat sensitizing method by thermal head
Printing on plastic tapes (laminated and non-laminated tapes) or special tapes (instant lettering tape, non-laminated thermal film tape, and fabric printing tape)
(Fixed print head and tape feed mechanism) |
| (2) Printing speed | 20 mm/sec |
| (3) Print head | |
| Type | Thin film thermal head
384 dots × 1 dot |
| Dimensions of a heating element | 0.08 mm wide by 0.0545 mm high |

1.1.5 Tape Cassette Specifications

- (1) Cassette Cartridge type
- (2) Types of cassettes
- | | |
|---------------------------------|--|
| Laminated tape cassette | Laminated tape, ink ribbon, and adhesive base tape |
| Non-laminated tape cassette | Non-laminated tape and ink ribbon |
| Instant lettering tape cassette | Instant lettering tape and ink ribbon |
| Fabric printing tape cassette | Fabric printing tape and ink ribbon |
| Stamp tape cassette | Porous-stamp tape and mount |
- (3) Tape size

	Width	Length
Laminated 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
Fabric printing tape	18 mm	8 m
Stamp tape	18 mm	8 m

1.1.6 Tape Cutter Specifications

- (1) Tape cutting method
- Automatic full cutting method
(not user-replaceable)
- Automatic half cutting method
(not user-replaceable)

1.1.7 PC Interface Specifications

- (1) Method
- | | |
|------------------|--------------|
| Serial (RS-232C) | |
| Baud rate | Max. 115.2 K |
- (2) Attachments
- | | |
|-----------|------------------|
| I/F cable | Dedicated cable |
| Editor | Dedicated editor |

1.2 ELECTRONIC SPECIFICATIONS

1.2.1 Power Supply Specifications

(1) Power supply method

Commercially available power (120V AC, 60 Hz for North America, and 230V AC, 50 Hz for Europe) is input and stabilized to generate DC voltage by the switching regulator in the machine.

The power supply cord is inserted into an inlet.

CHAPTER II

MECHANISMS

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2.1 THEORY OF MECHANISM OPERATION

2.1.1 Printing Mechanism

(1) Construction of thermal head

This machine uses thermal transfer printing. The thermal head contains 384 heating elements vertically arranged. The size of one heating element is 0.08 mm wide by 0.0705 mm (pitch) high, as shown in Fig. 2.1-1.

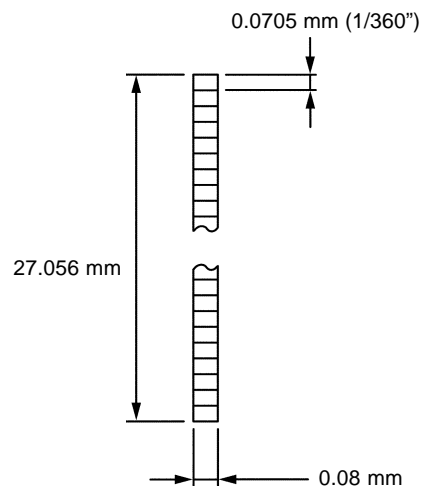


Fig. 2.1-1 Heating Elements of the Thermal Head

(2) Theory of printing

During printing operation, the cylindrical rubber platen crimps the tape* and the ink ribbon** on the thermal head. At this time, the CPU selects the required heating elements out of the 384 heating elements to energize them. The theory of printing depends on the use of non-laminated thermal film tape cassettes or other tape cassettes:

(*) Laminated tape when using laminated tape cassettes.

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

Instant lettering tape when using instant lettering tape cassettes.

Fabric printing tape when using fabric printing tape cassettes.

Stamp tape when using stamp tape cassettes.

(**) When using non-laminated thermal film tape cassettes, no ink ribbon is present.

[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 printing cycle is repeated, thus forming a character and graphics on the tape.

When using laminated tape cassettes, instant lettering tape cassettes, or fabric printing tape cassettes, print data is processed so that a character and graphics read correctly when viewed from the opposite side of the printing surface of the tape. (In other words, the mirror image of the character and graphics is printed.)

[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.

(3) 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 0.0705 mm for 3.5 ms, the thermal head generates heat once. The feed amount of 0.0705 mm is smaller than the width (0.08 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 and Retracting Mechanism

This mechanism consists of the release cam, roller release rod, and roller holder/head 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.

The platen is pressed perpendicularly against the thermal head under a uniform load regardless of the thickness of the tape, so that the tape is fed.

Closing the cassette cover pushes down the release cam 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 secured on the thermal head assy so as to press the roller holder assy against the thermal head.

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.

Opening the cassette cover causes the release lever spring to slide the roller release rod in the direction of the arrow. This retracts the roller holder assy from the thermal head, providing you with enough space to replace the tape cassette.

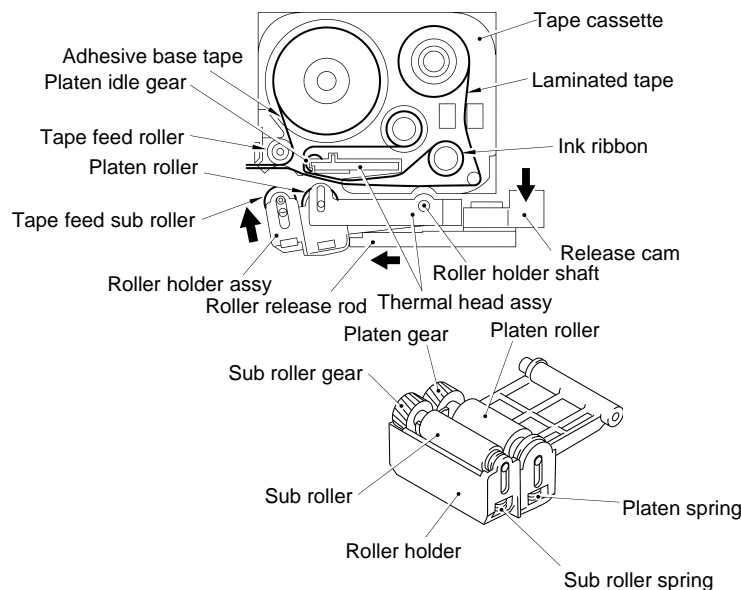


Fig. 2.1-2 Roller Holder Assy Setting and Retracting Mechanism

2.1.3 Regular Tape and Ribbon Feed Mechanism

This mechanism consists of the tape feed motor, the gear train, and the roller holder assy.

(1) 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 film 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 tape feed 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 laminated tape, adhesive base tape, and ink ribbon will be advanced together.)

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

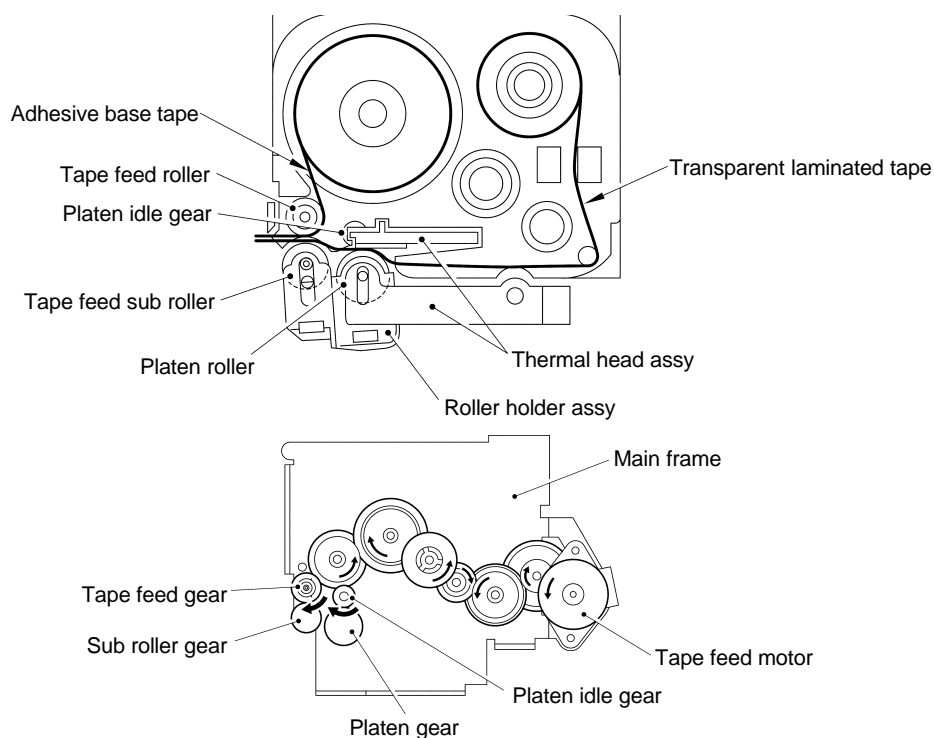


Fig. 2.1-3 Tape Feed Mechanism

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

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

When a transparent laminated 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 laminated tape is, therefore, sealed up with the adhesive base tape.

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

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

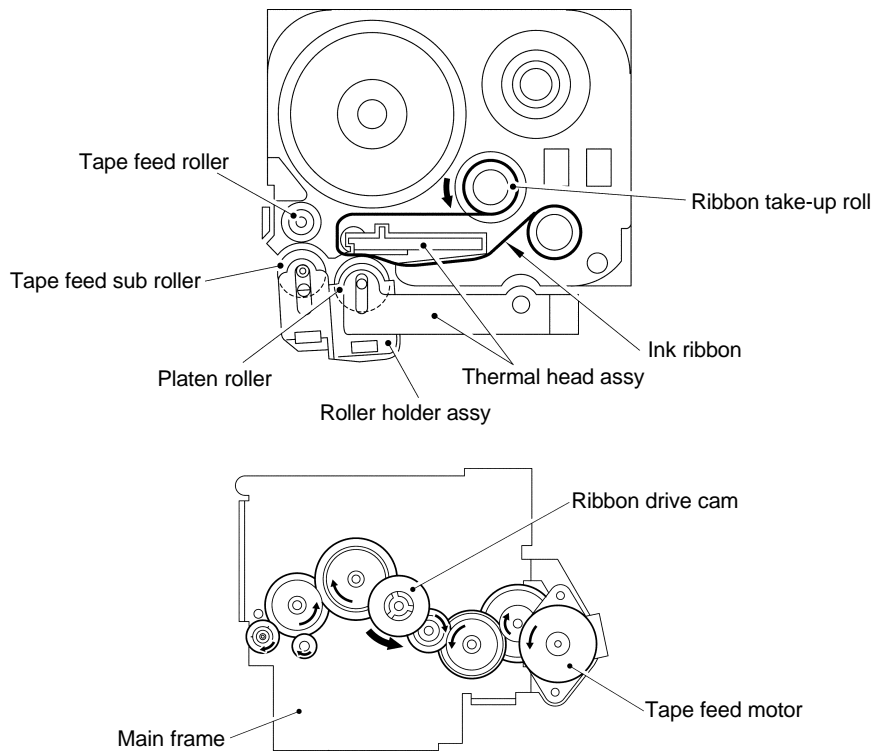


Fig. 2.1-4 Ribbon Feed Mechanism

2.1.4 Tape Automatic Full Cutter Mechanism

The tape automatic full cutter mechanism consists of a stationary blade and a movable blade driven by the full cutter motor.

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

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

Subsequently, the CPU keeps the full cutter motor on. When the movable blade returns to the home position, part "C" of the cutter helical gear presses the full cutter sensor switch secured on the half frame. The moment the CPU receives the sensor signal, it stops the full cutter motor.

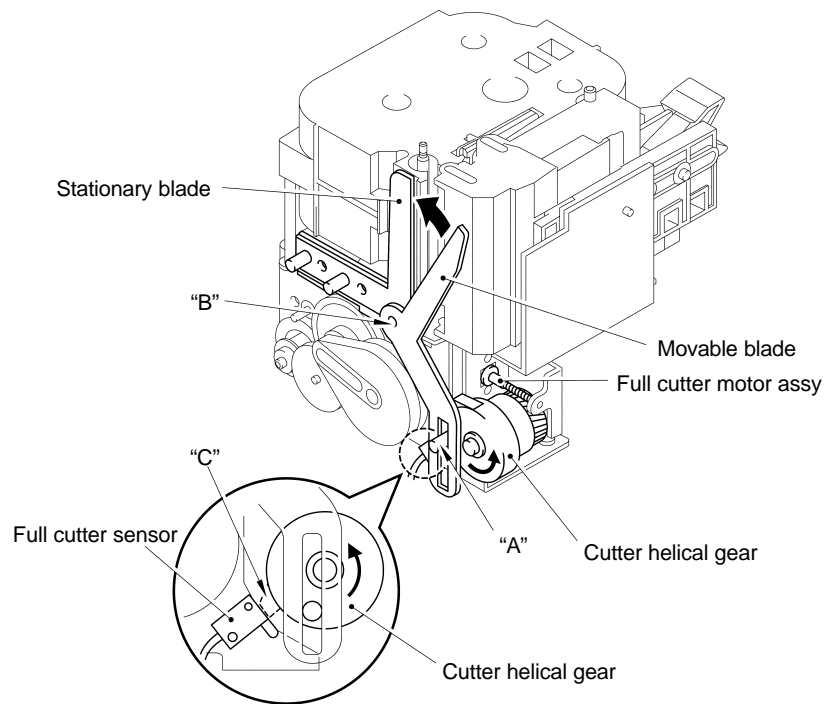


Fig. 2.1-5 Tape Automatic Full Cutter Mechanism

2.1.5 Tape Automatic Half Cutter Mechanism

The tape automatic half cutter mechanism consists of a stationary plate and a half cutter holder (equipped with a cutter blade) which is operated by the half cutter motor.

Half cutting is performed only for laminated tapes.

Upon completion of printing and tape feeding, the CPU activates the half cutter motor (DC motor) whose counterclockwise rotation is transmitted to the half rock gear by the clutch gear and the three idle gears.

As the half rock gear rotates counterclockwise, its groove "D" (into which the projection on the half cutter holder is inserted) operates the half cutter holder to pivot it around shaft "E". The stationary plate is provided with space as wide as the separator of a laminated tape. A laminated tape is pressed against the stationary plate by the half cutter holder for half cutting.

Half cutting refers to cutting a tape except its separator.

Subsequently, the CPU rotates the half cutter motor counterclockwise to return the half cutter holder to the home position. Part "F" of the half rock gear presses the half cutter sensor switch provided on the half frame. The moment the CPU receives the sensor signal, it stops the half cutter motor.

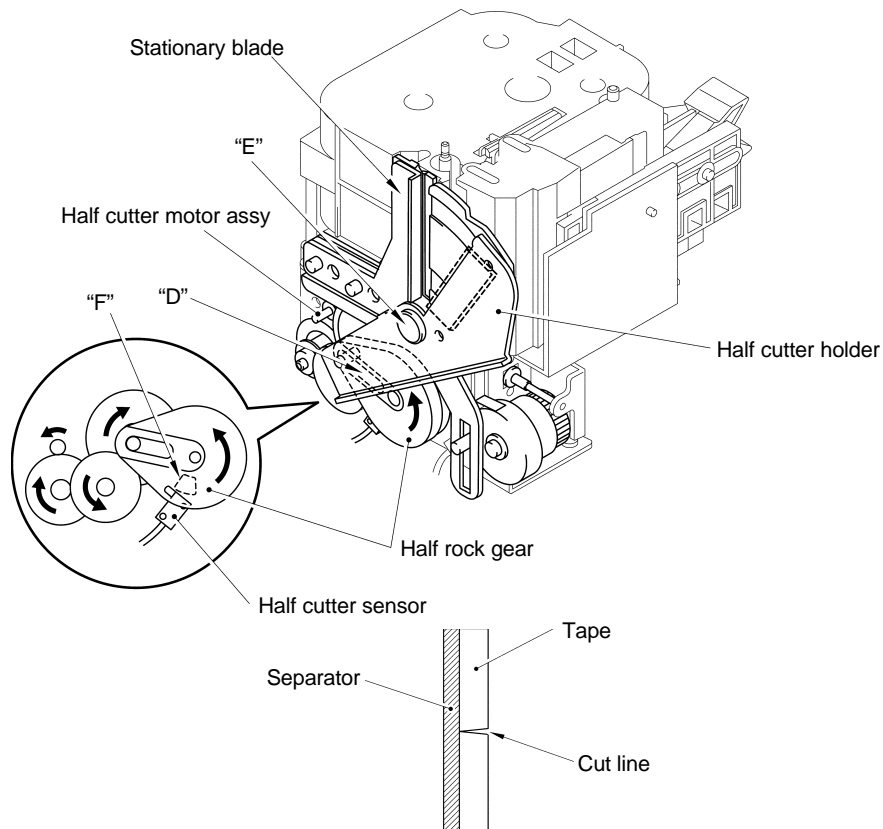


Fig. 2.1-6 Tape Automatic Half Cutter Mechanism

2.1.6 Forced Tape Eject Mechanism

The forced tape eject mechanism consists of the stationary roller unit and the eject roller unit interlocked with the cutter mechanism.

Upon completion of printing and tape feeding to operate the cutter mechanism, the cutter helical gear rotates counterclockwise, as described in Subsection 2.1.4. Projection "A" (which is fitted on cam "G" of the eject roller unit) operates the eject roller unit to pivot it around shaft "H". Immediately before the cutter starts cutting the printed tape, the tape is pressed against the stationary roller by the eject roller and held in place until the cutter completes cutting the tape. These operations of the cutter and the eject roller unit are controlled by cam "G".

Upon completion of the cutting of the tape by the cutter, released cam "G" causes the spring to slide the eject roller unit in direction "J". At this time, the two cams and springs below the eject roller rotate the eject roller in direction "K" to eject the tape that has been held in place.

Subsequently, the eject roller unit stops at stopper "L" of the stationary roller unit.

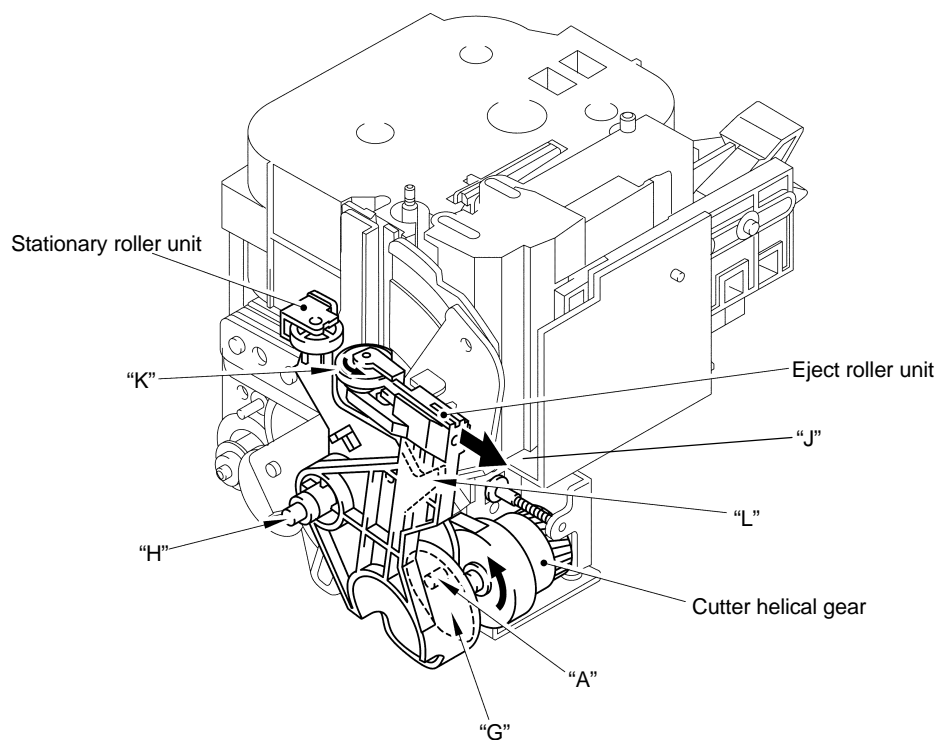


Fig. 2.1-7 Forced Tape Eject Mechanism

2.1.7 Cover Open Button (Cover Lock Button)

Pressing the cover open button (cover lock button) slides the cover button actuator to the left. This presses the cover lock actuator of the cassette cover, releasing the hook to open the cassette cover.

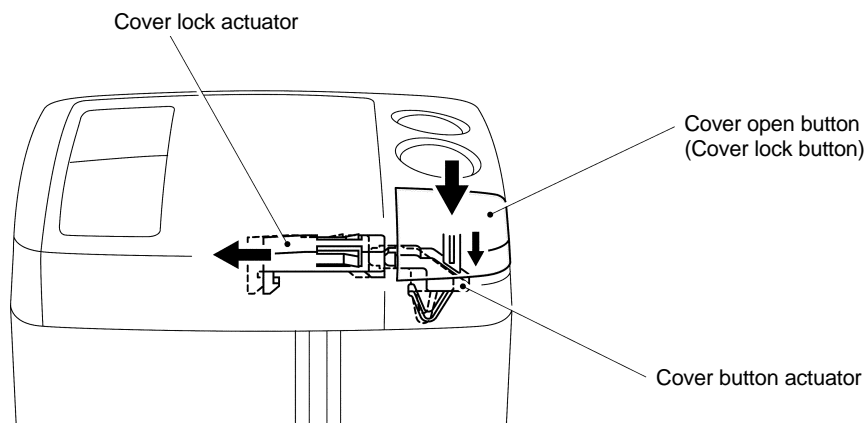


Fig. 2.1-8 Cover Open Button

2.1.8 Cover Open (Cover Lock) Sensor

The cover open (cover lock) sensor (push switch) is provided on the cassette sensor PCB. Closing the cassette cover puts its sensor tab on the cover open (cover lock) sensor (push switch), signaling that the cassette cover is closed.

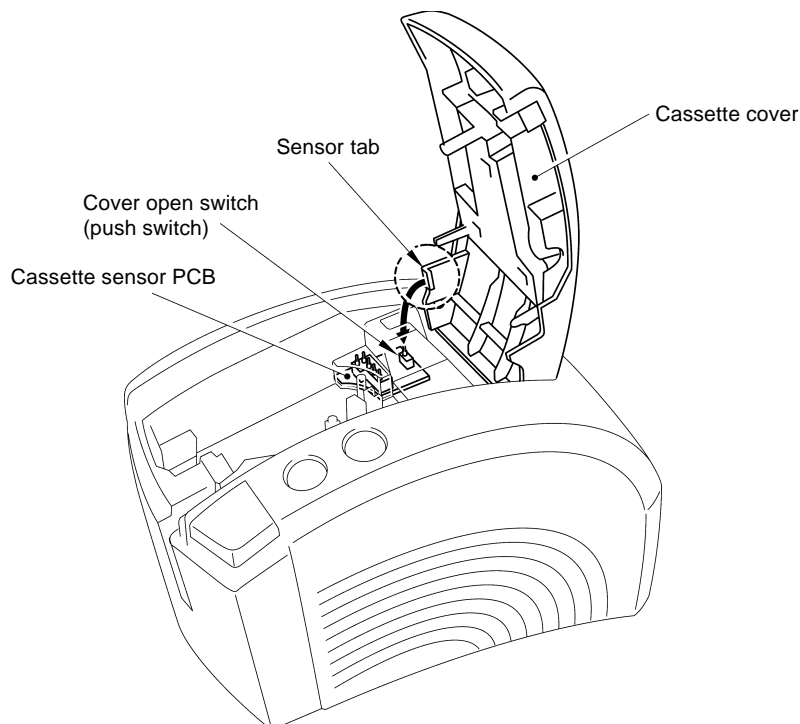


Fig. 2.1-9 Cover Open Sensor

2.2 DISASSEMBLY AND REASSEMBLY

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Precautions on Safety

- (1) Disassemble and reassemble the machine on a grounded antistatic sheet. Touching electronic components such as an LSI with an electrified hand will break them, as they are easily affected by static electricity.
- (2) Wrap the machine in an electrically conductive aluminum sheet before carrying it.
- (3) When using heating tools such as soldering iron, take care not to thermally break resin components such as a wire, a PCB, and a cover.
- (4) Take care not to lose small components, such as a screw and a washer, which have been removed to replace other components.
- (5) Tighten screws according to the list of tightening torque below.

List of Tightening Torque

Position	Screw	Qty.	Tightening torque [kgf·cm]
Head/roller holder unit	Screw, pan (S/P washer) M3×10	2	59±10 N·cm (6±1 kgf·cm)
Eject unit	Screw, pan (S/P washer) M4×12	2	88±10 N·cm (9±1 kgf·cm)
Half frame	Screw, pan (S/P washer) M3×6	2	59±10 N·cm (6±1 kgf·cm)
Tape feed motor	Screw, pan M2.6×3.5	2	39±10 N·cm (4±1 kgf·cm)
Full cutter motor		2	
Half cutter motor		2	
Full cutter sensor	Screw, pan M1.7×6	1	15±5 N·cm (1.5±0.5 kgf·cm)
Half cutter sensor		1	
Main frame	Taptite, bind B M2.6×8	2	39±10 N·cm (4±1 kgf·cm)
Tape end sensor		2	
Main PCB		3	
Cassette cover bracket		2	
Sub PCB		2	
Inlet bracket		2	
Power supply PCB		2	
Bottom cover	Taptite, bind B M2.6×10	3	39±10 N·cm (4±1 kgf·cm)
Lower cover		1	
Inlet	Screw, flat B M3×10	2	39±10 N·cm (4±1 kgf·cm)
Shield plate B	Screw, pan (S/P washer) M4×8	1	59±10 N·cm (6±1 kgf·cm)
Ground wire		1	

2.2.1 Disassembly Procedures

[1] Removing the Tape Cassette

- (1) Pressing the cover open button (cover lock button) releases the hook to open the cassette cover.
- (2) Opening the cassette cover releases the platen from the thermal head simultaneously. Hold both sides of the tape cassette and lift it to remove it.

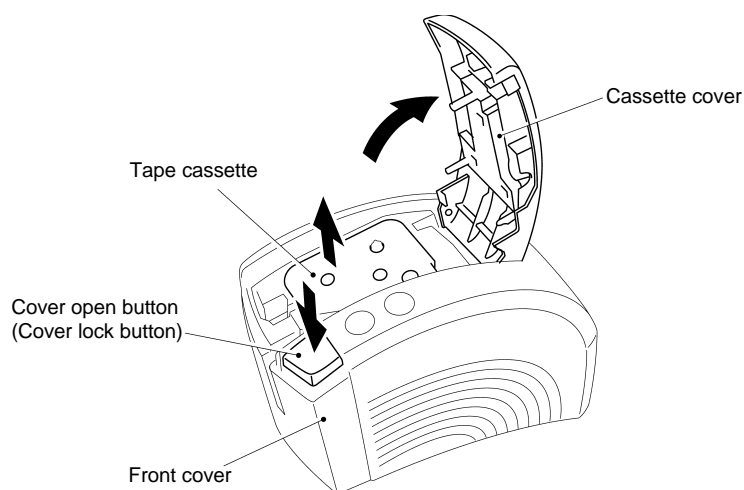


Fig. 2.2-1 Removing the Tape Cassette

<Disassembly of the Covers>

[2] Removing the Cassette Cover

While pressing part "A" with the end of a screwdriver, slightly tilt the cassette cover with side "B" turned upwards, and lift the cassette cover to remove it.

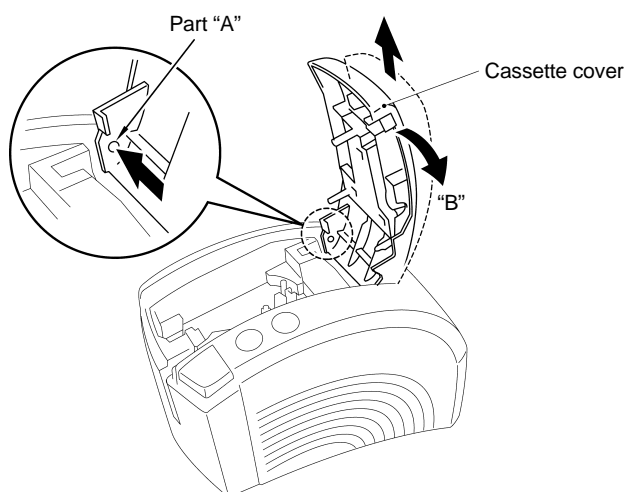


Fig. 2.2-2 Removing the Cassette Cover

[3] Disassembly of the Cassette Cover Components

- (1) Release each of the three hooks of the cassette cover securing the cassette presser with the end of a screwdriver to remove the cassette presser. Removing the cassette presser removes the cassette spring.

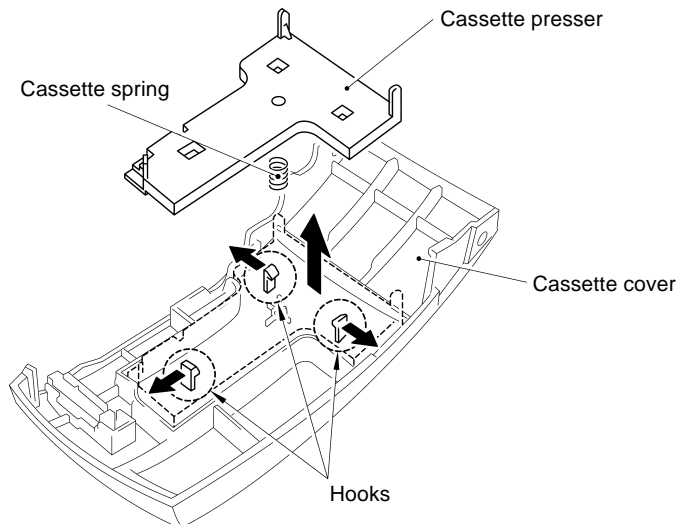


Fig. 2.2-3 Removing the Cassette Presser and Spring

- (2) Release the hooks on both sides of the cover lock actuator with the end of a screwdriver to remove the cover lock actuator. Removing the cover lock actuator removes the cover lock spring.

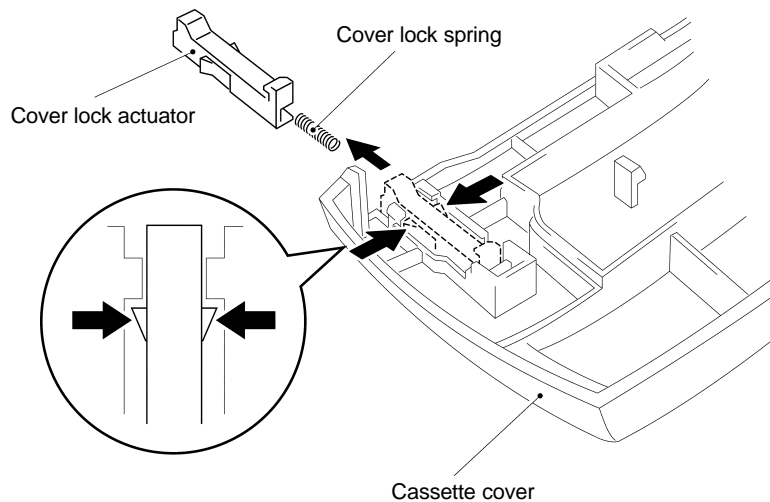


Fig. 2.2-4 Removing the Cover Lock Actuator and Spring

[4] Removing the Lower Cover

Turn the machine over, and remove the screw from the lower cover to remove the lower cover.

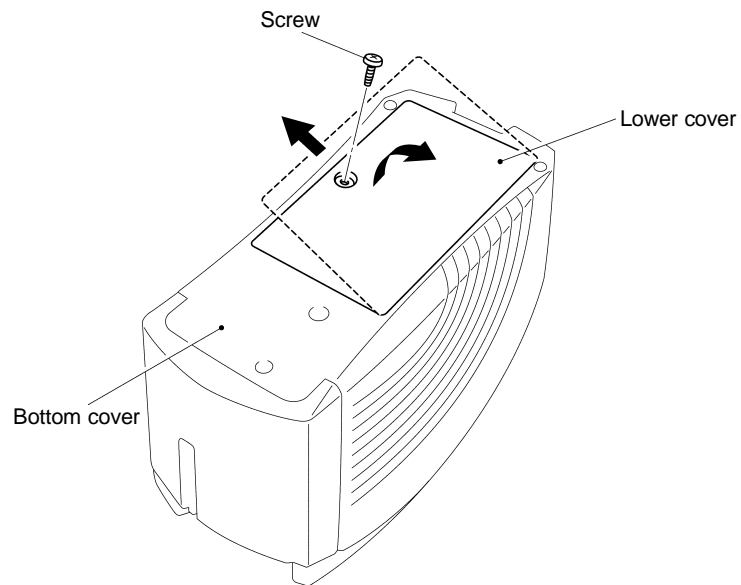


Fig. 2.2-5 Removing the Lower Cover

[5] Removing the Bottom Cover and the Front Cover

- (1) Remove screws "A" and "B" securing the ground wire.

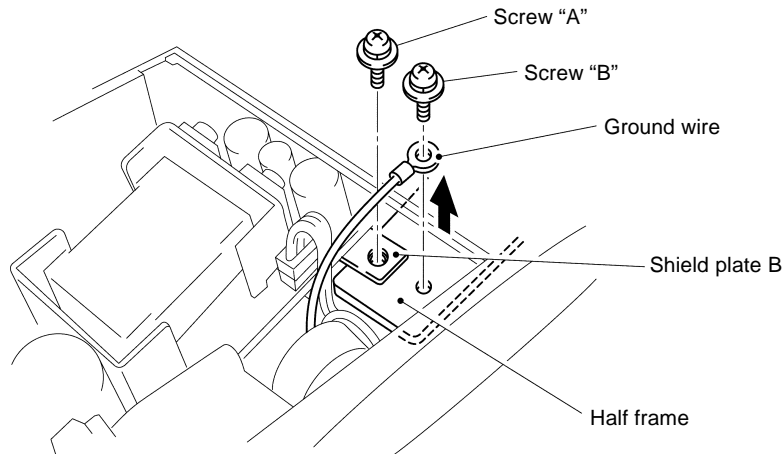


Fig. 2.2-6 Removing the Screws Securing the Ground Wire

- (2) Remove screws "C" and "D" securing the bottom cover.

Then, remove the core of the inlet bracket unit from the storage space in the bottom cover, before removing screw "E" securing the bottom cover.

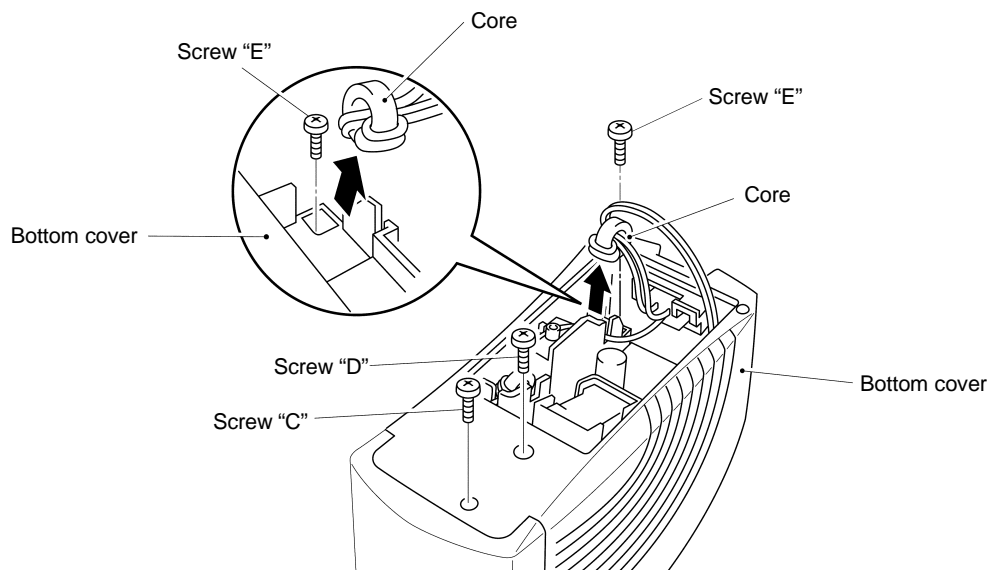


Fig. 2.2-7 Removing the Screws Securing the Bottom Cover

- (3) While pressing the body cover, lift both sides of the bottom cover to remove it.
- (4) Pull out the power supply harness and connector from the main PCB.

Caution: Do not pull the harness; hold the connector to pull it out.

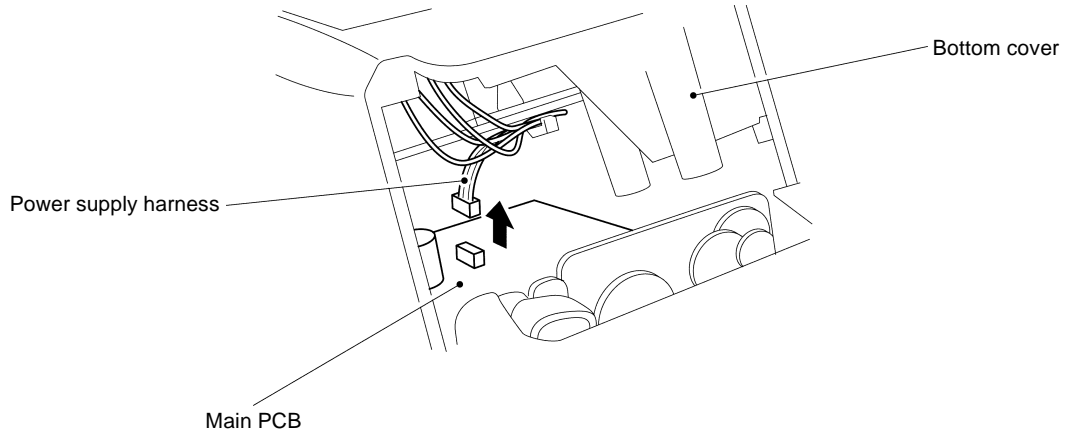


Fig. 2.2-8 Removing the Power Supply Harness and Connector

- (5) While pressing the body cover, lift the front cover diagonally to remove it.

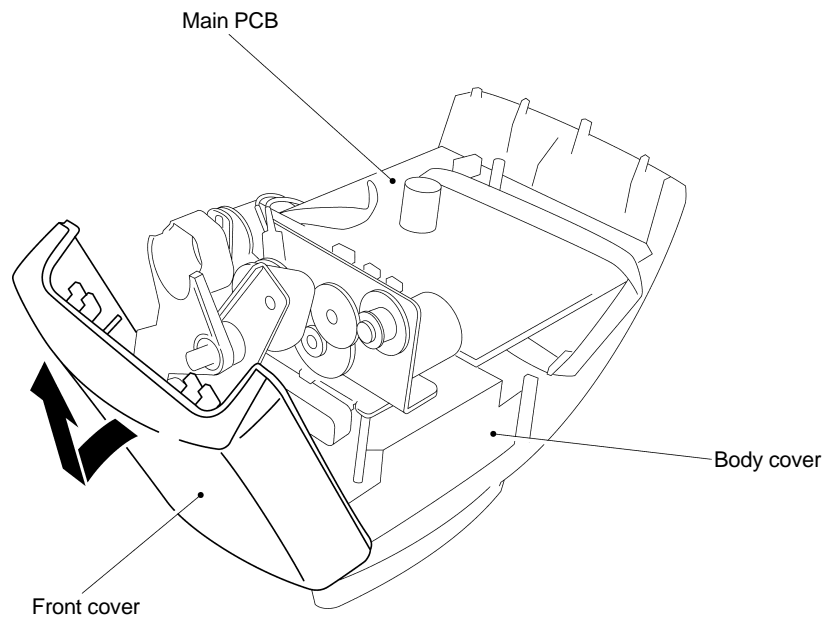


Fig. 2.2-9 Removing the Front Cover

[6] Removing the Power Supply PCB Assy

- (1) Remove the two screws securing the inlet bracket.
- (2) Turn the bottom cover over and remove the inlet unit.

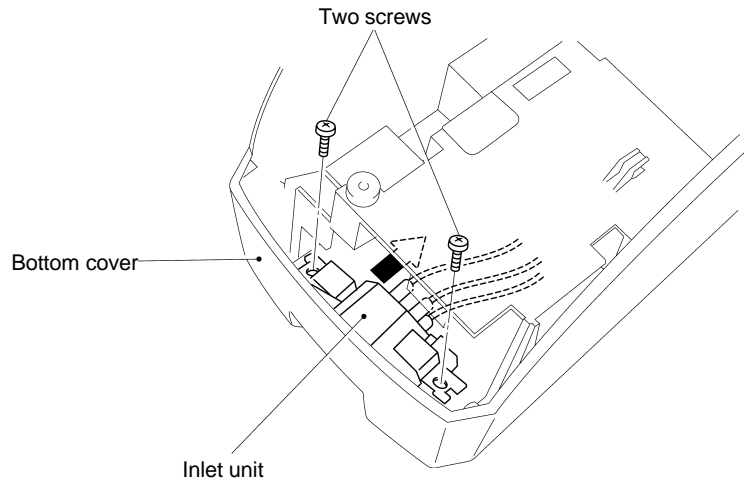


Fig. 2.2-10 Removing the Inlet Unit

- (3) Remove the two screws securing the power supply PCB assy.
- (4) Release the power supply harness from the hook of the bottom cover, and lift the power supply PCB assy to remove it.
- (5) Lift shield plate B to remove it.

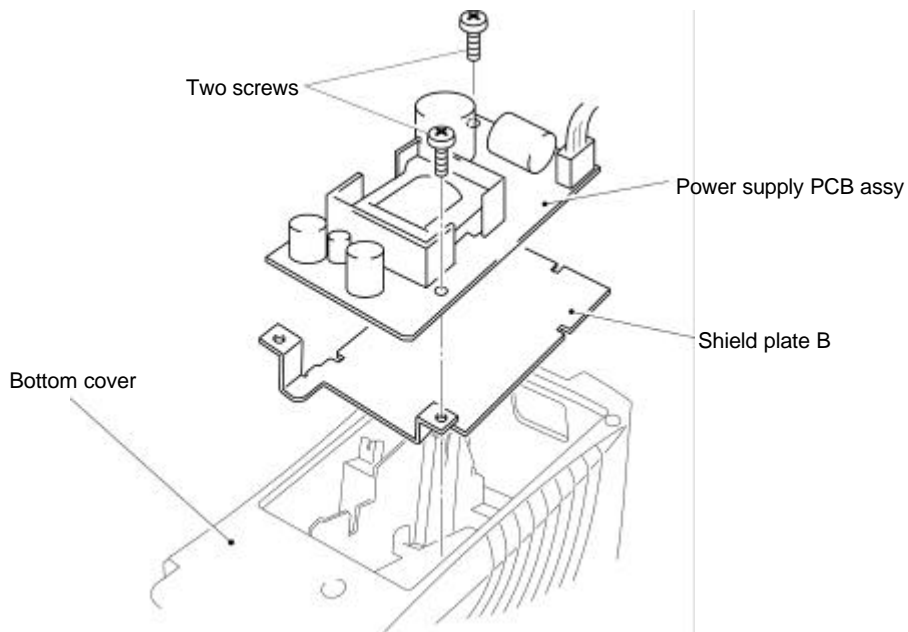


Fig. 2.2-11 Removing the Power Supply PCB Assy and Shield Plate B

- (6) Remove the two screws securing the inlet assy to remove the inlet assy from the inlet bracket.

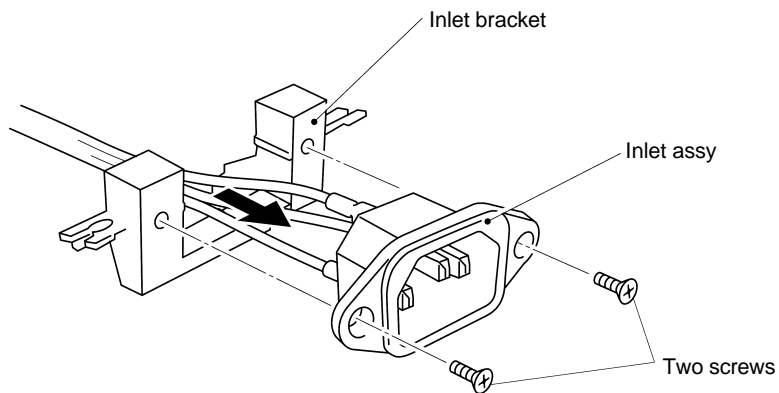


Fig. 2.2-12 Removing the Inlet Assy

- (7) Remove the inlet assy and power supply harnesses from the power supply PCB assy.

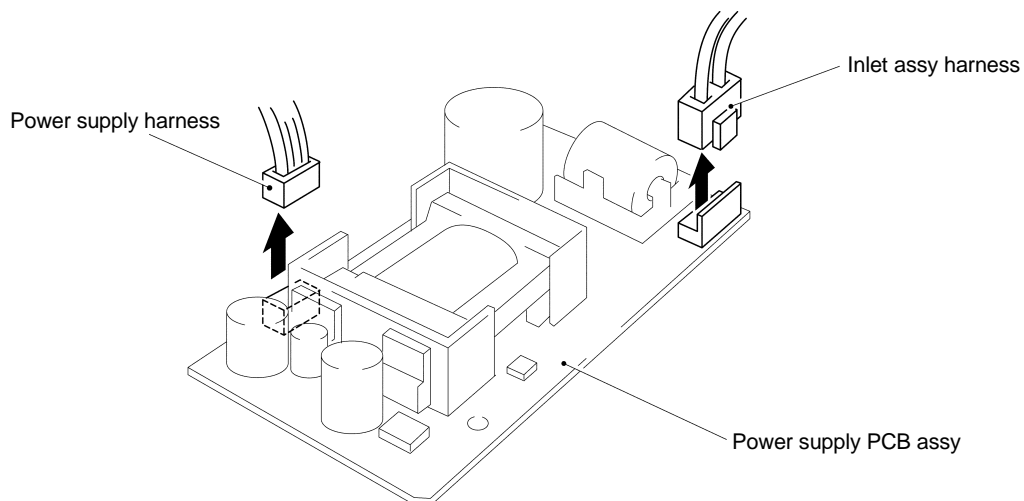


Fig. 2.2-13 Removing the Inlet Assy and Power Supply Harnesses

[7] Removing the Main PCB Assy and the Mechanical Printing Unit

- (1) Unplug the following connectors and cables.

Caution 1: Be sure to unlock the connector before removing the head flexible cable.

Caution 2: Take care not to damage the connectors and cables.

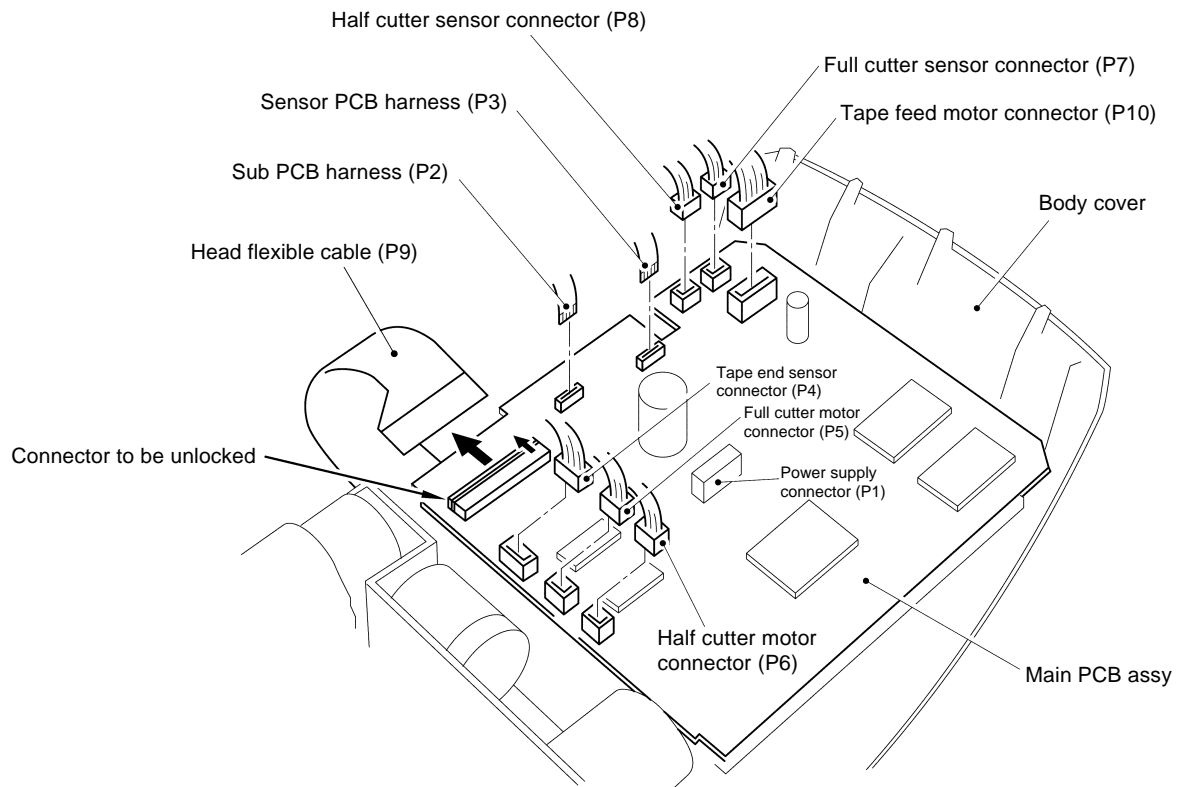


Fig. 2.2-14 Removing the Connectors and Cables

- (2) Remove the three screws securing the main PCB, and lift the top of the main PCB assy to remove it.

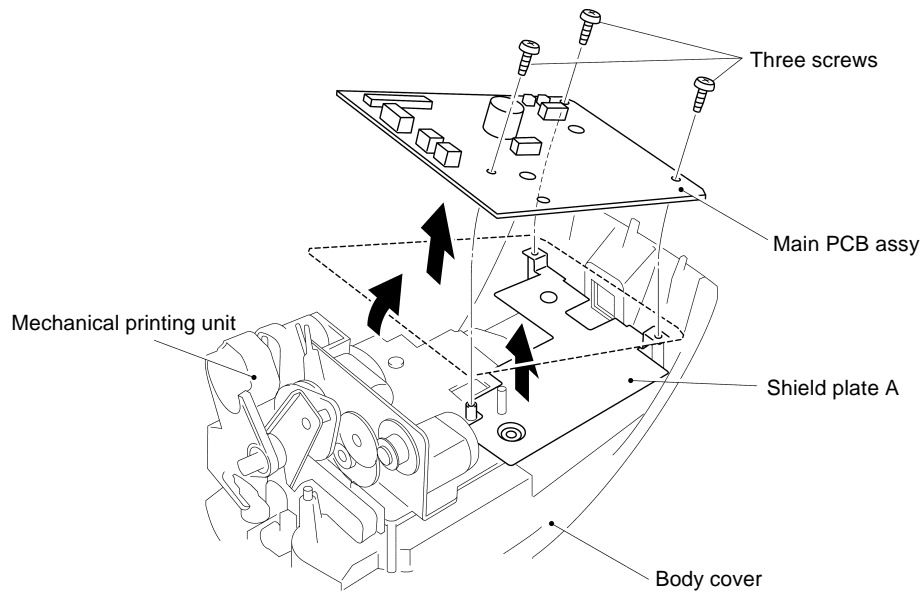


Fig. 2.2-15 Removing the Main PCB Assy

- (3) Remove the two screws securing shield plate A and the mechanical printing unit to remove them.

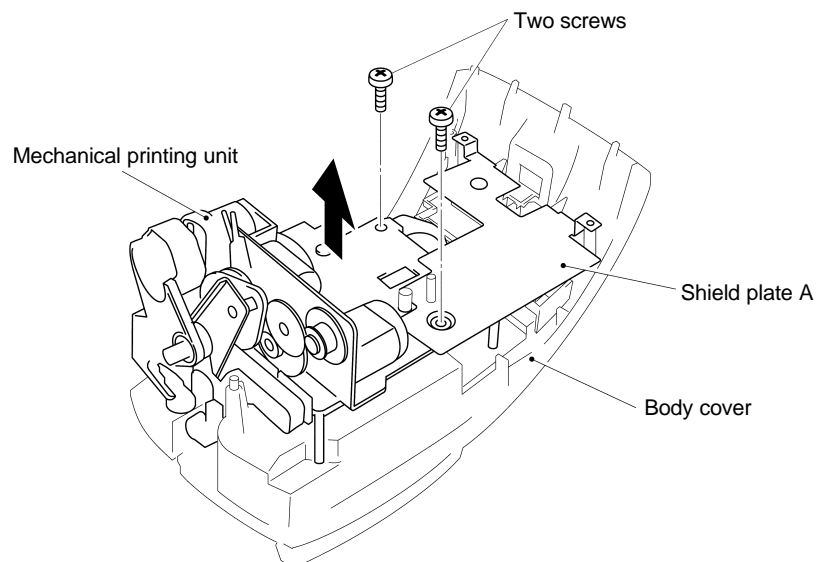


Fig. 2.2-16 Removing the Mechanical Printing Unit

[8] Disassembly of the Body Cover

- (1) Remove the two screws from the cassette cover bracket, and lift the cassette cover bracket to remove it.

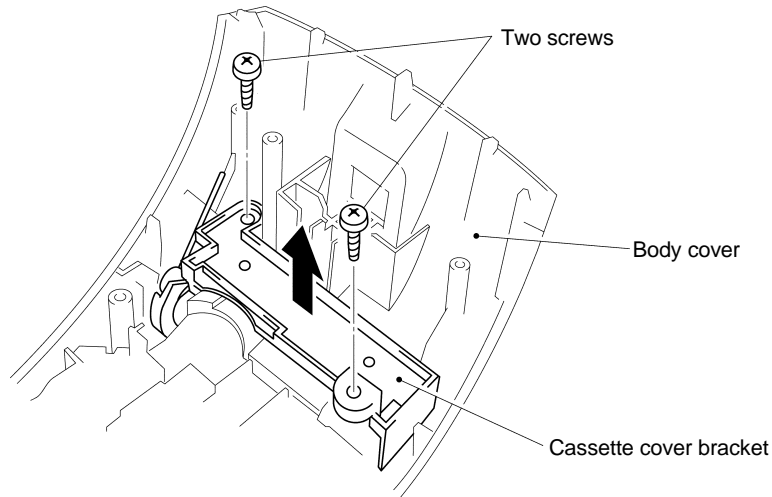


Fig. 2.2-17 Removing the Cassette Cover Bracket

- (2) Rotate the cover open cam in direction "A" until it stops and then remove it.

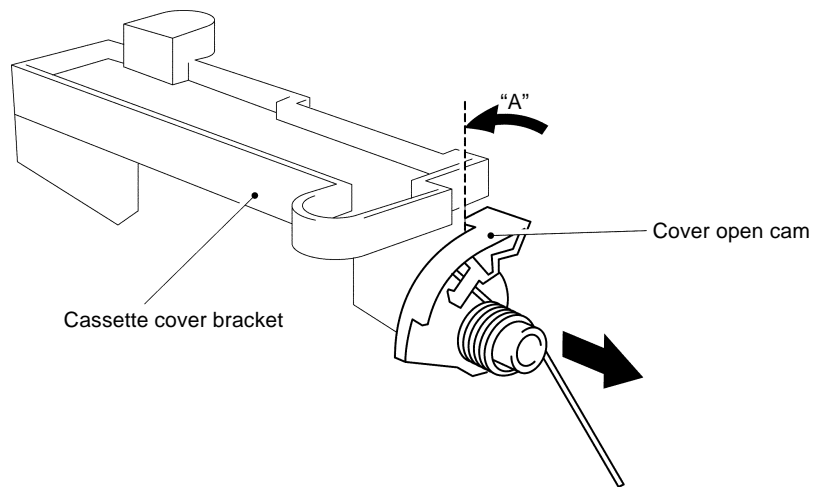


Fig. 2.2-18 Removing the Cover Open Cam

- (3) Remove the damper rubber from the cassette cover bracket, and release the hook of the cover open cam to remove the cover open spring.

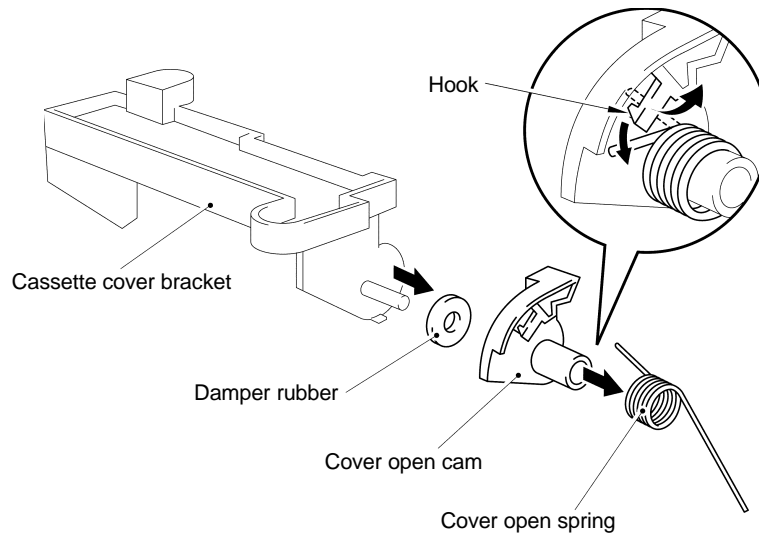


Fig. 2.2-19 Removing the Damper Rubber and the Cover Open Spring

- (4) Remove the two screws to remove the tape end sensor assy.
- (5) Release the two hooks of the body cover to the outside of the sensor PCB to remove the sensor PCB assy.

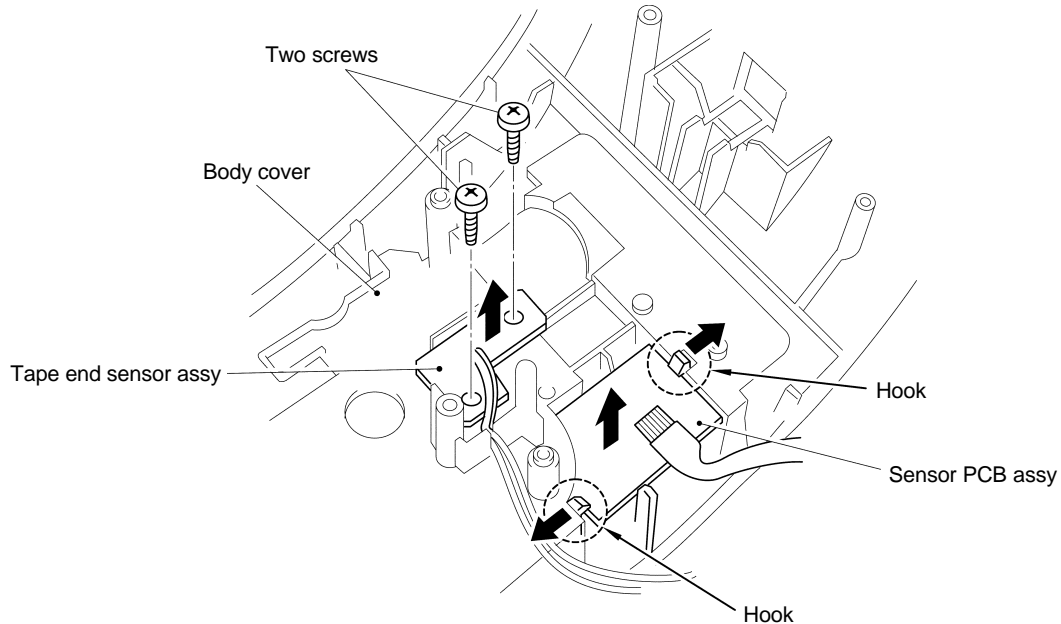


Fig. 2.2-20 Removing the Tape End Sensor Assy and the Sensor PCB Assy

- (6) Remove the two screws to remove the sub PCB assy.
- (7) Press the cut feed button, the power supply actuator, and the power supply switch button secured on the sub PCB assy from the front of the body cover to remove them.

Remove the power supply switch button from the power supply actuator.

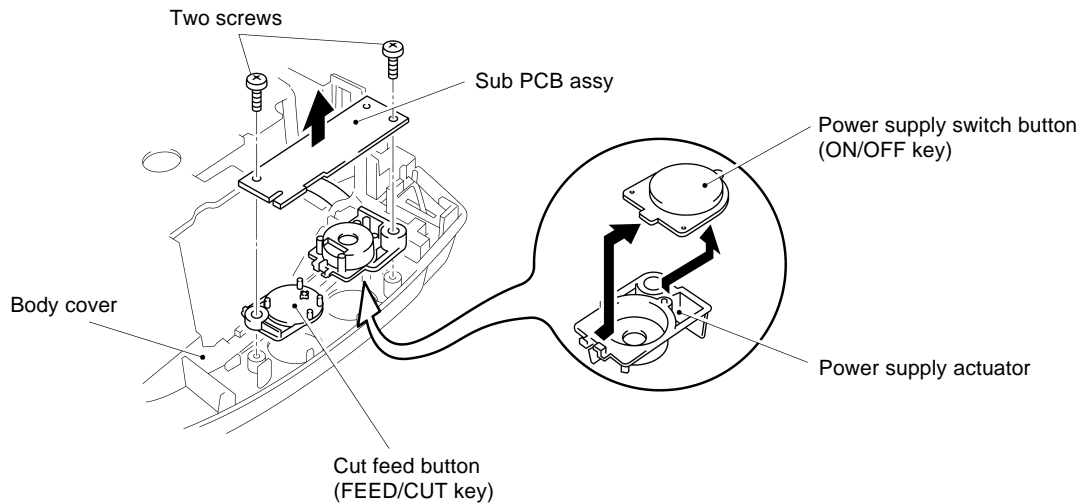


Fig. 2.2-21 Removing the Sub PCB Assy and the Button

- (8) Release the two hooks on the back of the cover lock button to remove the cover lock button from the body cover.
- (9) Remove the cover lock spring.

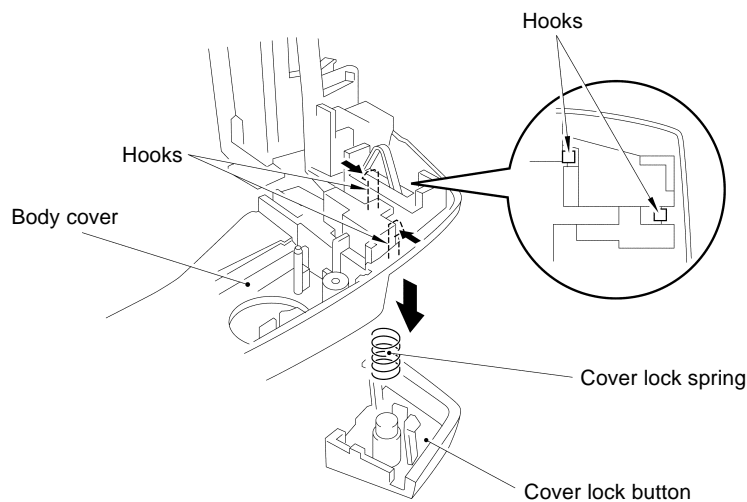


Fig. 2.2-22 Removing the Cover Lock Button and Spring

- (10) Press the resin spring on the back of the cover lock actuator to remove the cover lock actuator from the body cover.

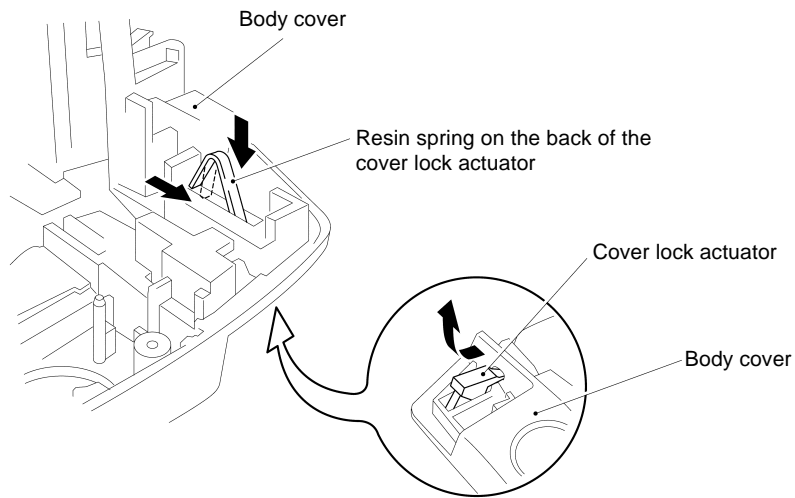


Fig. 2.2-23 Removing the Cover Lock Actuator

<Disassembly of the Mechanical Printing Unit>

[9] Removing the Eject Unit Assy, the Half Cutter Assy, the Half Spacer, and the Cutter Assy

Remove the two screws on the side of the mechanical unit to remove the eject unit assy, the half cutter assy, the half spacer, and the cutter assy.

Warning: Take care not to be injured by the blades of the cutter assy and the half cutter assy.

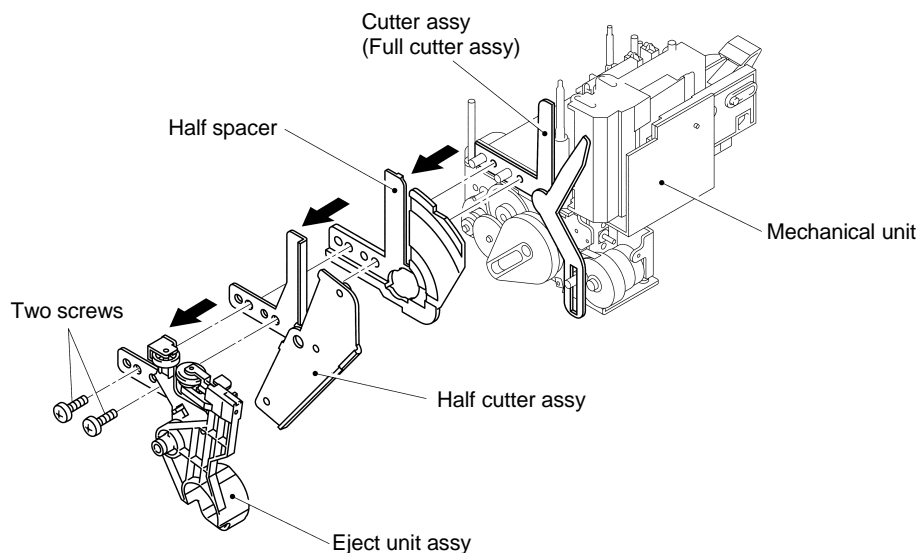


Fig. 2.2-24 Removing the Eject Unit Assy, the Half Cutter Assy, the Half Spacer, and the Cutter Assy

[10] Removing the Half Frame Assy

- (1) Remove the half rock gear.
- (2) Remove the retaining ring from the cutter helical gear to remove the cutter helical gear.

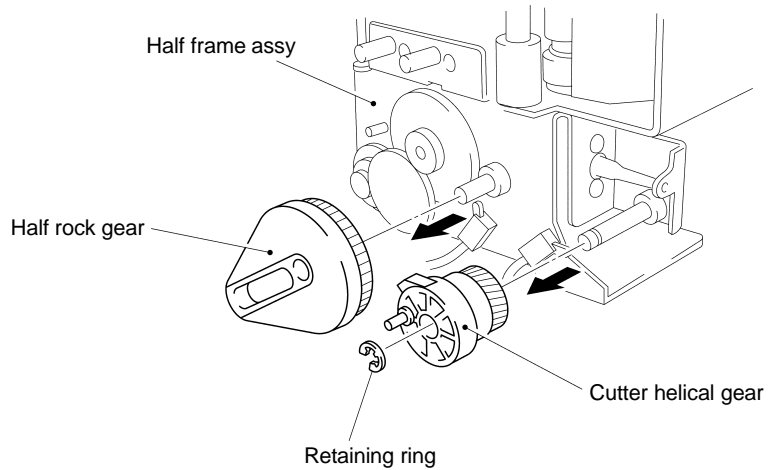


Fig. 2.2-25 Removing the Half Rock Gear and the Cutter Helical Gear

- (3) Remove the two screws to remove the half cutter sensor assy and the full cutter sensor assy.

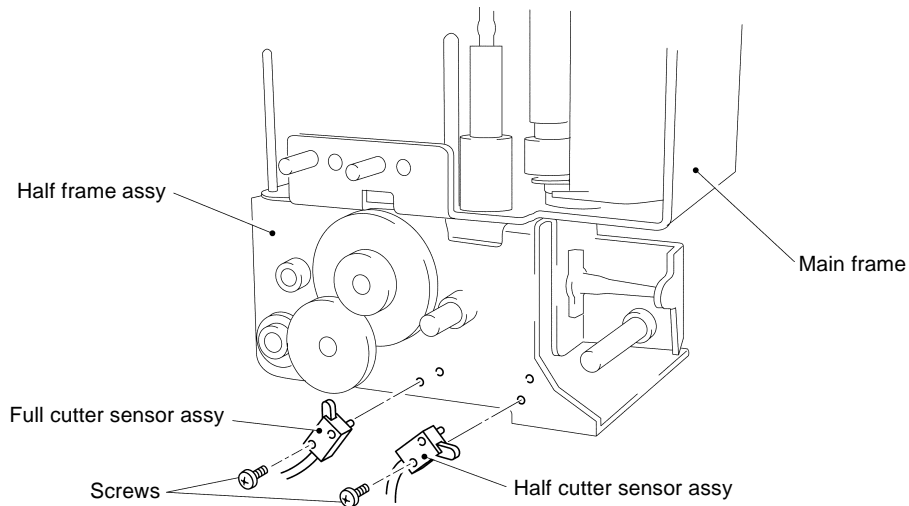


Fig. 2.2-26 Removing the Half Cutter Sensor Assy and the Full Cutter Sensor Assy

- (4) Remove the two screws to remove the half cutter motor assy.
- (5) Remove the two screws from the full cutter motor assy, and pull the full cutter motor assy backward to remove it. At this time, take care not to damage the motor worm gear.

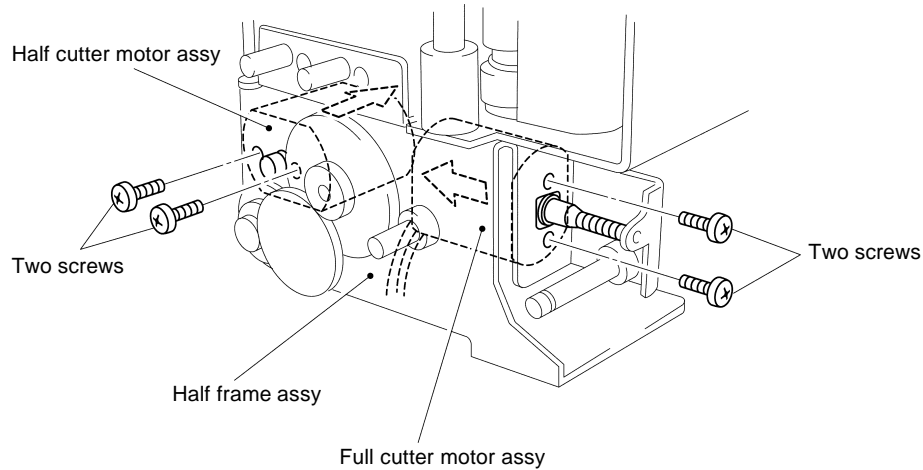


Fig. 2.2-27 Removing the Half Cutter Motor Assy and the Full Cutter Motor Assy

- (6) Remove the two screws from the half frame assy to remove it.

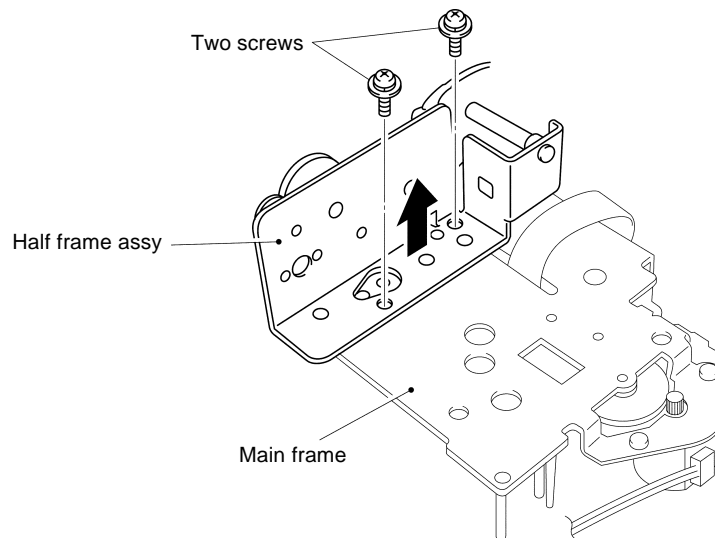


Fig. 2.2-28 Removing the Half Frame Assy

[11] Disassembly of the Mechanical Unit

- (1) Remove the two screws from the back of the tape feed motor to remove the tape feed motor assy.

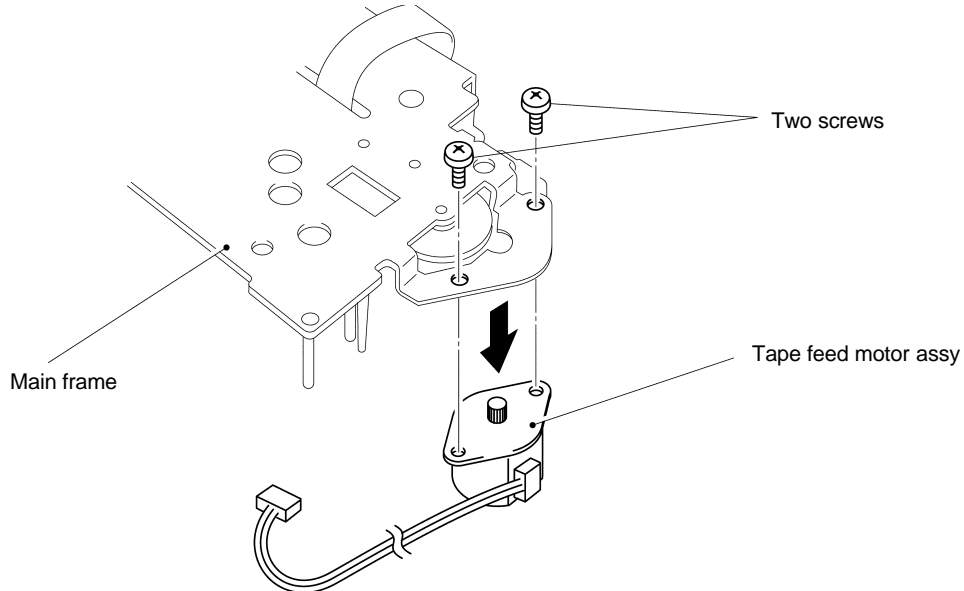


Fig. 2.2-29 Removing the Tape Feed Motor Assy

- (2) Remove the two screws and press the back of the head/roller holder unit to remove it. At this time, detach the tape securing the thermal head cable on the frame assy.

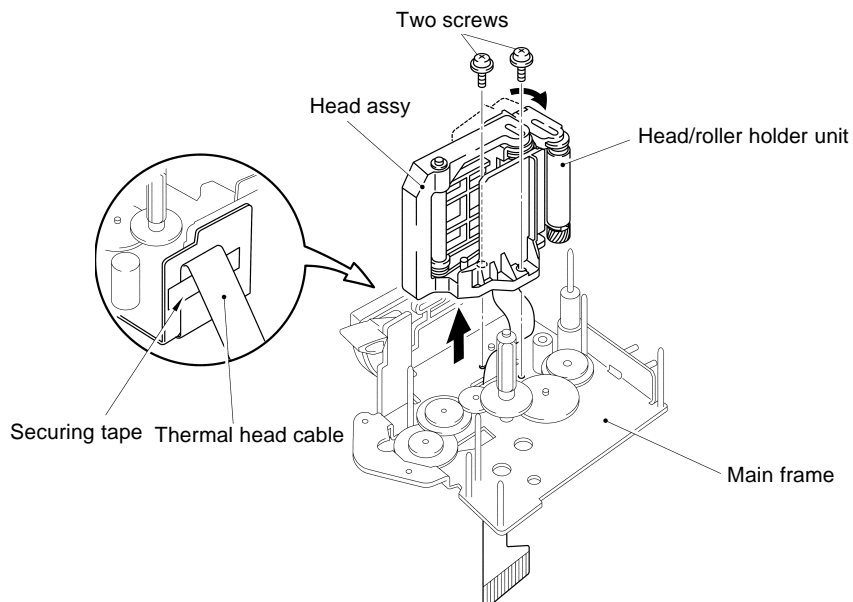


Fig. 2.2-30 Removing the Head/Roller Holder Unit

- (3) Pull the release lever spring slightly to remove it.
- (4) After removing the retaining ring, remove the roller release rod while tilting it in direction "A".
- (5) Pull the release cam out of the shaft.
- (6) As the release rod roller is secured in place by the elasticity of the resin of the roller release rod, press the shaft of the release rod roller to remove it from the roller release rod.

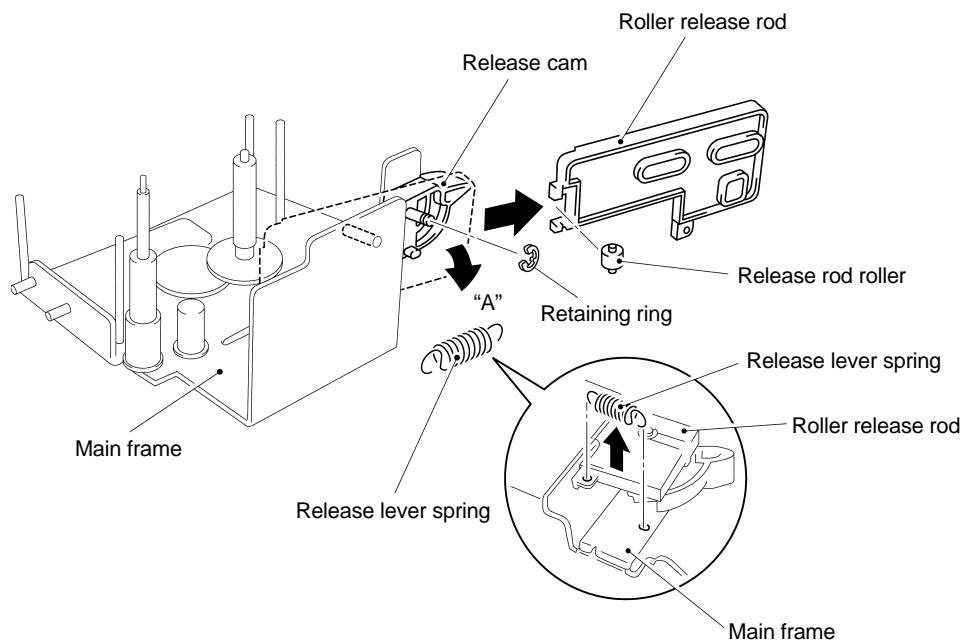


Fig. 2.2-31 Removing the Roller Release Rod

[12] Disassembly of the Head/Roller Holder Unit

PT99007

- (1) Remove the retaining ring from the top of the head assy, and pull the roller holder shaft downward to remove it.
- (2) While tilting the bottom of the roller holder assy toward you, remove the roller holder assy from the head assy.

Note: Do not touch the rubber platen. Touching the platen may impair printing quality.

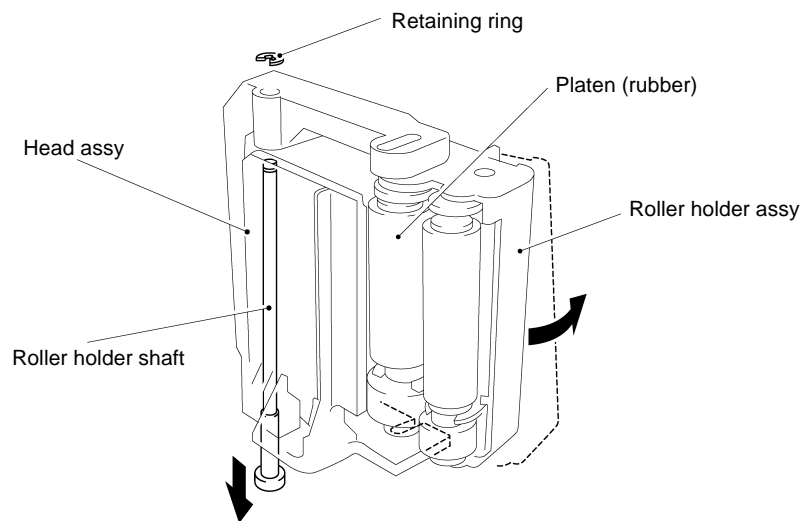


Fig. 2.2-32 Removing the Roller Holder Assy

- (3) Remove the roller holder release spring.

Note: Take care not to lose the roller holder release spring which is removed simultaneously when the roller holder assy is removed.

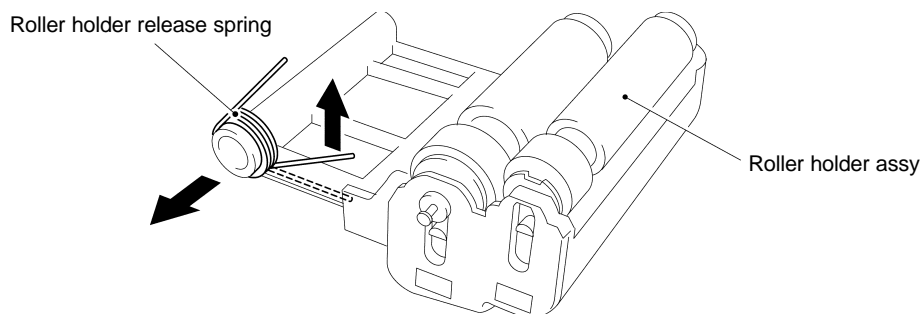


Fig. 2.2-33 Removing the Roller Holder Release Spring

[1] Reassembly of the Head/Roller Holder Unit

- (1) Apply the specified grease (1 mm³) on each of the top and bottom of the platen shaft of the roller holder assy. (Specified grease: Silicone grease G501)

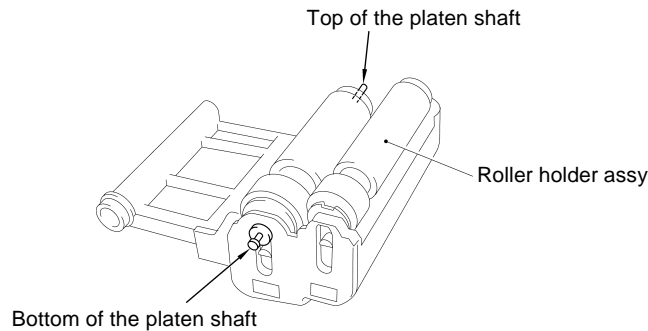


Fig. 2.2-34 Applying the Grease on the Platen Shaft

- (2) Set the roller holder release spring at the bottom of the shaft of the roller holder assy. With one of the hooks of the roller holder release spring inserted into the groove in the roller holder, insert the platen shaft at the top of the roller holder assy, into the slit at the top of the head assy, while tilting the roller holder assy.

Then, insert the shaft at the bottom into the slit at the bottom of the head assy to set the roller holder assy.

At this time, check that the release spring is hooked on the correct portion of the head assy.

- (3) After inserting the roller holder shaft from the bottom of the head assy, set the retaining ring at the top of the shaft.

At this state, check that the roller holder rotates smoothly by pressing the back of the roller holder assy.

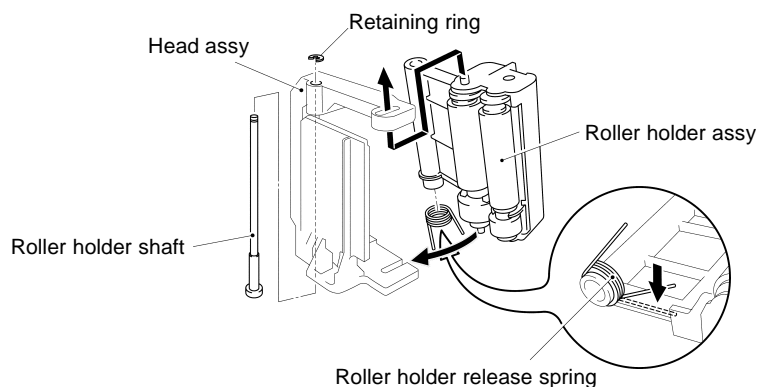


Fig. 2.2-35 Reassembly of the Roller Holder Assy

[2] Reassembly of the Mechanical Unit

PT99007

- (1) Set the release rod roller by inserting it into the slit in the roller release rod.
- (2) Set the release cam on the release lever guide shaft.
- (3) While tilting the roller release rod, set it on the release cam shaft and the projection on the release cam, and then on the release lever guide shaft.
- (4) Set the retaining ring on the release lever guide shaft.
- (5) After hooking the release lever spring on the hole at the bottom of the roller release rod, pull the release lever spring to hook it on the hole in the frame.
- (6) Apply the specified grease (3 mm³) on each of the inside of the square hole in the roller release rod and the release rod roller. (Specified grease: Silicone grease G501)

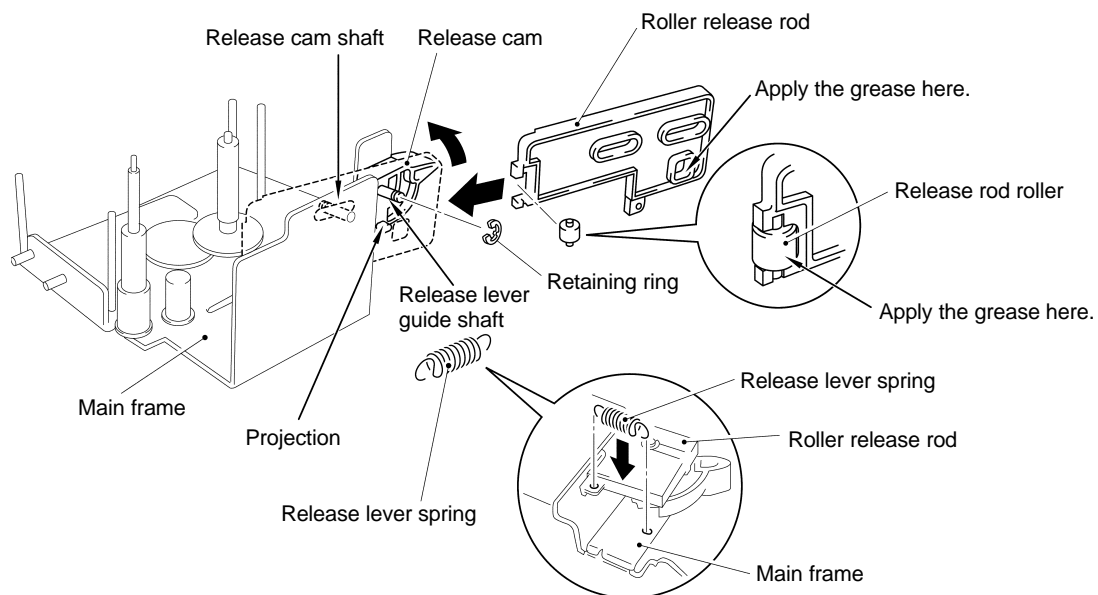


Fig. 2.2-36 Reassembly of the Roller Release Rod

- (7) After passing the harness through the oblong hole in the frame and setting the head/roller holder unit on the boss and the hole in the frame, tighten the two screws.
- (8) Check that the roller holder rotates smoothly by moving the release cam vertically.

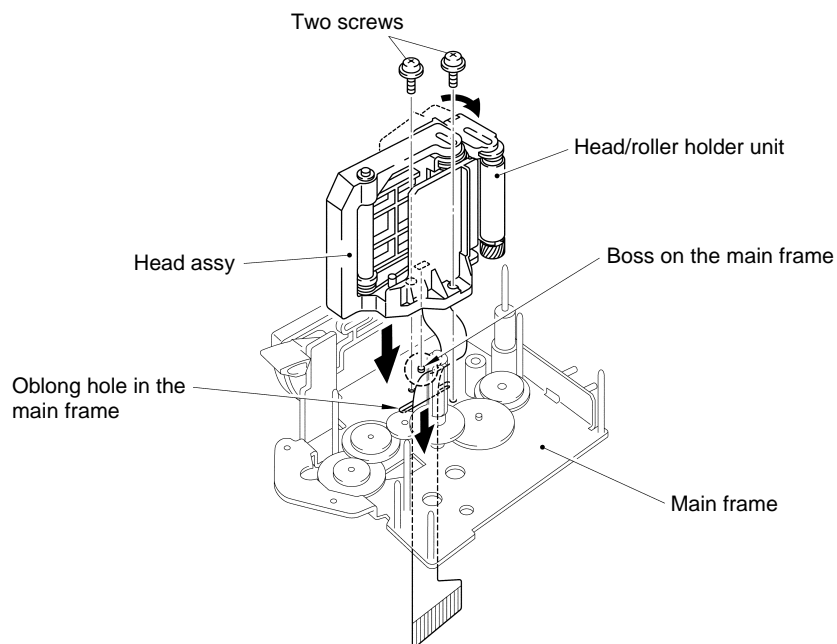


Fig. 2.2-37 Reassembly of the Head/Roller Holder Unit

- (9) Set the tape feed motor assy on the frame, and tighten the screws from the back of the frame.

Note: Backlash on the motor gear should be 0.05 to 0.3 mm.

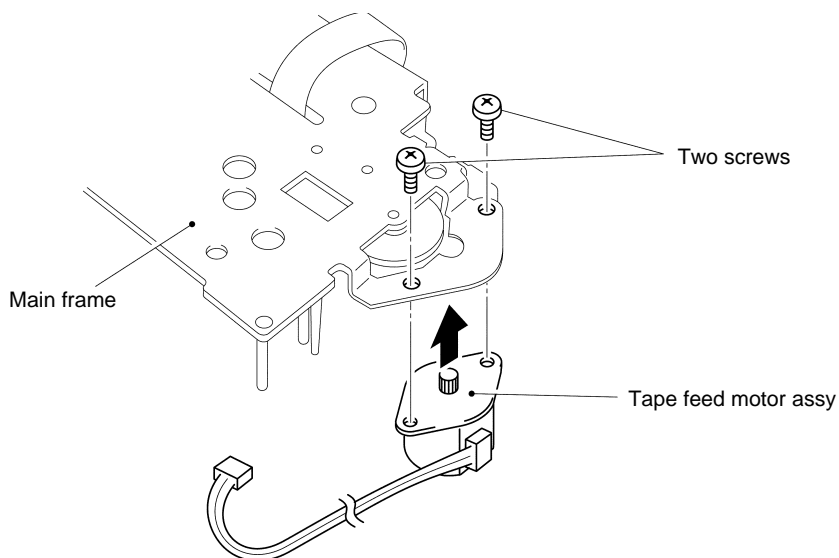


Fig. 2.2-38 Reassembly of the Tape Feed Motor Assy

[3] Reassembly of the Half Frame Assy

PT99007

- (1) With the holes in the frame set on the bosses on the half frame assy, tighten the two screws from the half frame side.

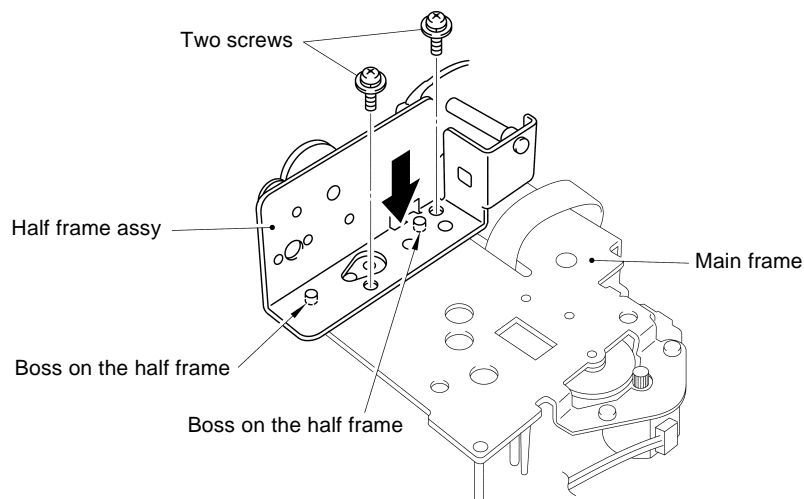


Fig. 2.2-39 Reassembly of the Half Frame Assy

- (2) After applying the specified grease (2 mm^3) on the end of the motor worm gear, insert the full cutter motor assy into the square hole in the half frame assy from the back then insert the end of the motor worm gear into the small hole in the half frame. After that tighten the two screws with the end of the motor worm gear pressed downward. (Specified grease: Silicone grease G501)
- (3) Insert the half cutter motor assy from the back of the half frame assy, and tighten the two screws. Then, apply the specified grease (3 mm^3) on the gear of the half cutter motor assy. (Specified grease: Silicone grease G501)
Backlash on the motor gear should be 0.05 to 0.3 mm.

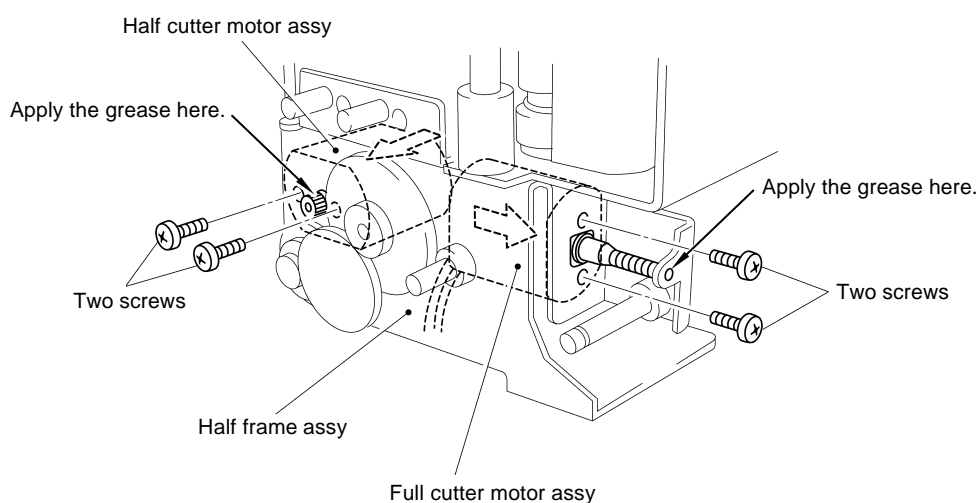


Fig. 2.2-40 Reassembly of the Half Cutter Motor Assy and the Full Cutter Motor Assy

- (4) After setting the half cutter sensor assy and the full cutter sensor assy in place, tighten the screw for each of them.

Check that the projections on the sensors are inserted into the holes in the half frame.

Note: Observe the colors of their harnesses (half cutter sensor harness: black, full cutter sensor harness: blue).

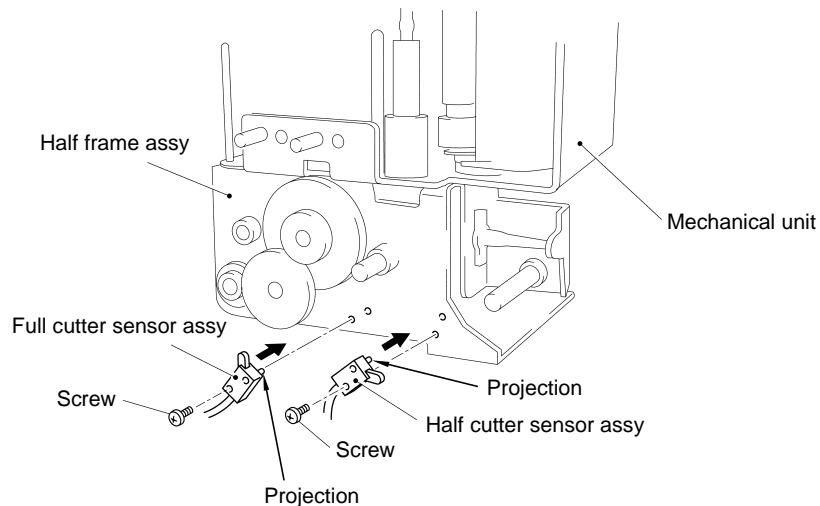


Fig. 2.2-41 Reassembly of the Half Cutter Sensor Assy and the Full Cutter Sensor Assy

- (5) Mount the cutter helical gear onto the shaft and check to be sure that the backlash between the helical gear and the cutter worm gear is 0 to 0.1 mm. If the backlash is greater than this range, remove the two screws of the full cutter motor and adjust the backlash correctly. After obtaining the correct amount of backlash, set the retaining ring on the shaft.
- (6) Set the half rock gear with its groove tilted at an approximately 45° angle. Then, apply the specified grease (3 mm³) on the inside of the groove. (Specified grease: Silicone grease G501)

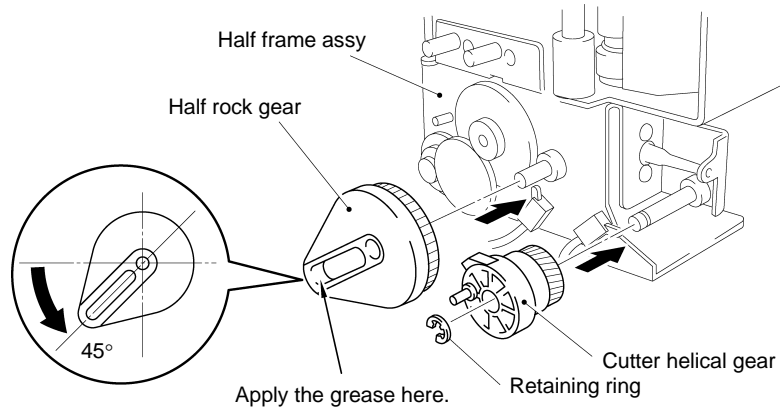


Fig. 2.2-42 Reassembly of the Cutter Helical Gear and the Half Rock Gear

[4] Reassembly of the Cutter Assy, the Half Spacer, the Half Cutter Assy, and the Eject Unit Assy

- (1) Apply the specified grease (3 mm^3) on each slot of the cams in the cutter assy and the eject unit assy, where the cutter rock pin slides up and down. (Specified grease: Silicone grease G501)
- (2) After inserting the cutter rock pin into the groove in the movable blade of the cutter assy, insert the two locating shafts of the frame assy into the round and oblong holes.

Warning : Take care not to be injured by the blades of the cutter assy and the half cutter assy.

- (3) Insert the two locating shafts of the frame assy into the round and oblong holes in the half spacer.
- (4) After inserting the half rock pin of the half cutter assy into the groove in the half rock gear, insert the two locating shafts of the frame assy into the round and oblong holes.
- (5) After setting the eject cam of the eject unit assy on the cutter rock pin, insert the two locating shafts of the frame assy into the round and oblong holes.
- (6) While pressing the vicinity of the screws to be tightened on each of the above four units, tighten the two screws.

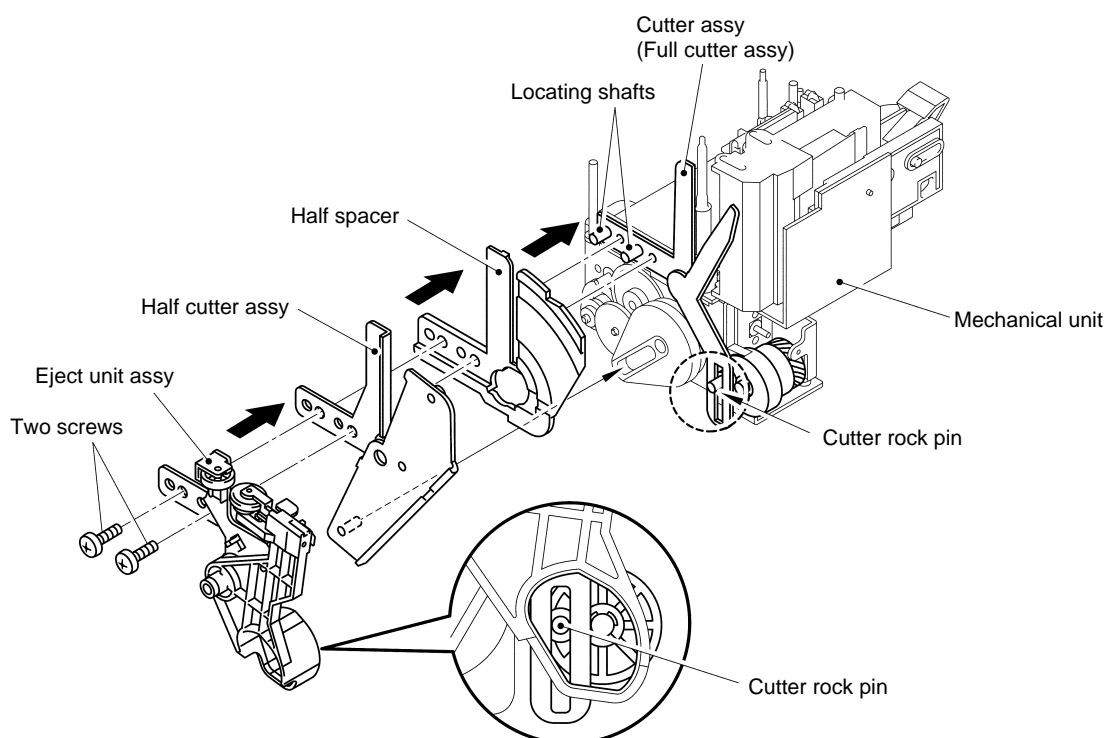


Fig. 2.2-43 Reassembly of the Cutter Assy, the Half Spacer, the Half Cutter Assy, and the Eject Unit Assy

[5] Reassembly of the Body Cover

- (1) Set the cover lock actuator on the hole in the body cover diagonally from the top. Check that the resin spring of the cover lock actuator is securely set in the body cover.

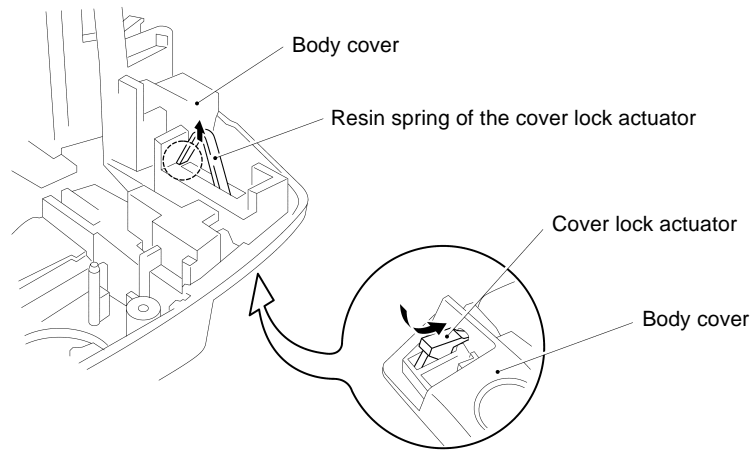


Fig. 2.2-44 Reassembly of the Cover Lock Actuator

- (2) Press-fit the cover lock spring on the projection on the back of the cover lock button while slightly rotating the cover lock spring.
- (3) Align the cover lock spring set in the cover lock button on the projection of the body cover for the cover lock spring to set the cover lock button in the body cover.

Check that the cover lock actuator slides smoothly by pressing the cover lock button.

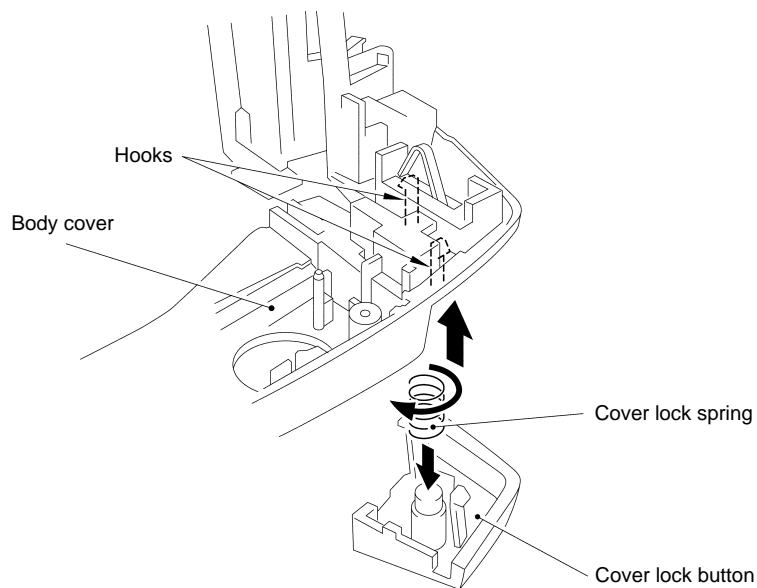


Fig. 2.2-45 Reassembly of the Cover Lock Spring and Button

- (4) Turn the body cover over, and set the cut feed button on the projection and hole "B" in the body cover.
- (5) Insert the projection on the power supply switch button into the guide of the power supply actuator. With the three projections set, set this button on the projection and hole "A" in the body cover.
- (6) Set the hole and the slit of the sub PCB assy on the projections of the body cover, and tighten the two screws. At this time, check if the solder of the harness has peeled off.

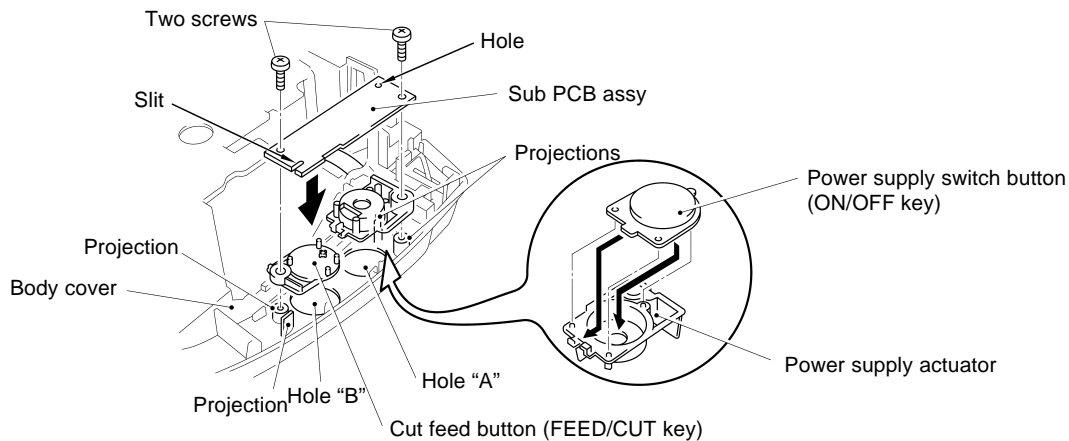


Fig. 2.2-46 Reassembly of the Button and the Sub PCB Assy

- (7) Set the sensor PCB assy on the two hooks of the body cover and press the sensor PCB until these hooks click. (There is no screw to be tightened.) Check if the solder of the harness has peeled off.
- (8) Insert the tape end sensor assy into the square hole in the body cover, and tighten the two screws.

Insert the tape end sensor harness into the groove in the body cover.

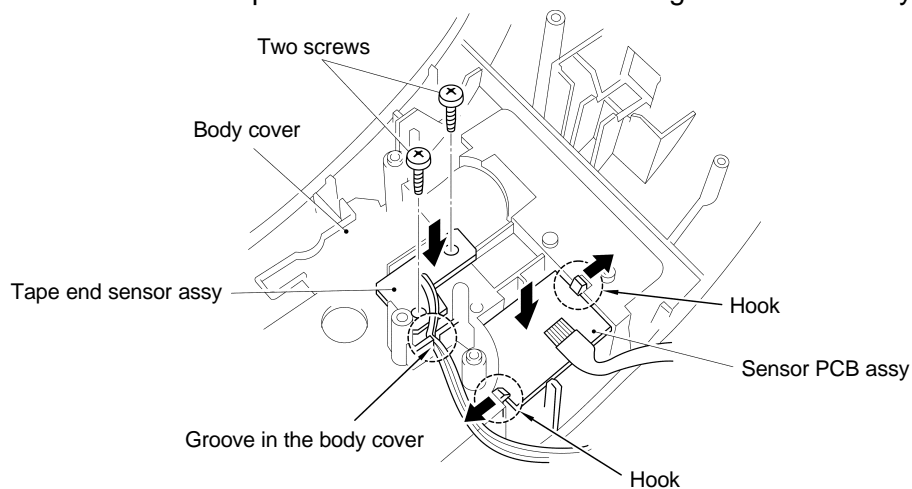


Fig. 2.2-47 Reassembly of the Sensor PCB Assy and the Tape End Sensor Assy

- (9) Set the cover open spring on the cover open cam. While rotating the cover open spring, set the shorter of its hooks on the hook of the cover open cam.
- (10) Apply the specified grease (3 mm³) on the cassette cover bracket and set the damper rubber on the shaft on the side of the cassette cover bracket. (Specified grease: Silicone grease G501)
- (11) Apply the specified grease (1 mm³) on the damper rubber, then set the assy of the cover open cam and the cover open spring on the shaft of the cassette cover bracket in the manner the damper rubber is sandwiched between the assy and the bracket. (Specified grease: Silicone grease G501)

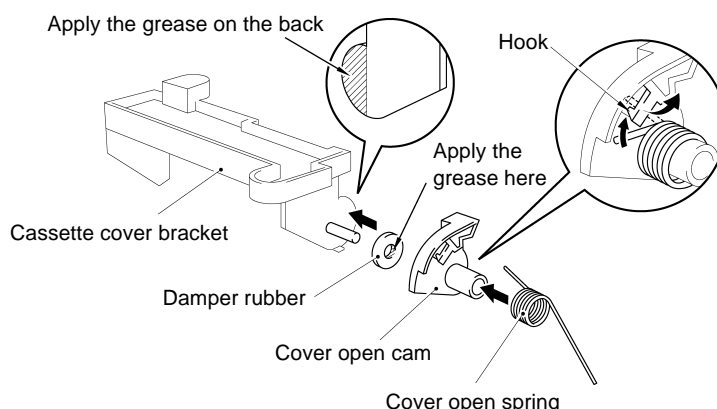


Fig. 2.2-48 Reassembly of the Cover Open Cam

- (12) Align the two locating projections on the body cover with the holes in the cassette cover bracket to set the cassette cover bracket on the body cover. At this time, check that the longer of the hooks of the cover open spring is set on the projection on the body cover. Subsequently, tighten the two screws.

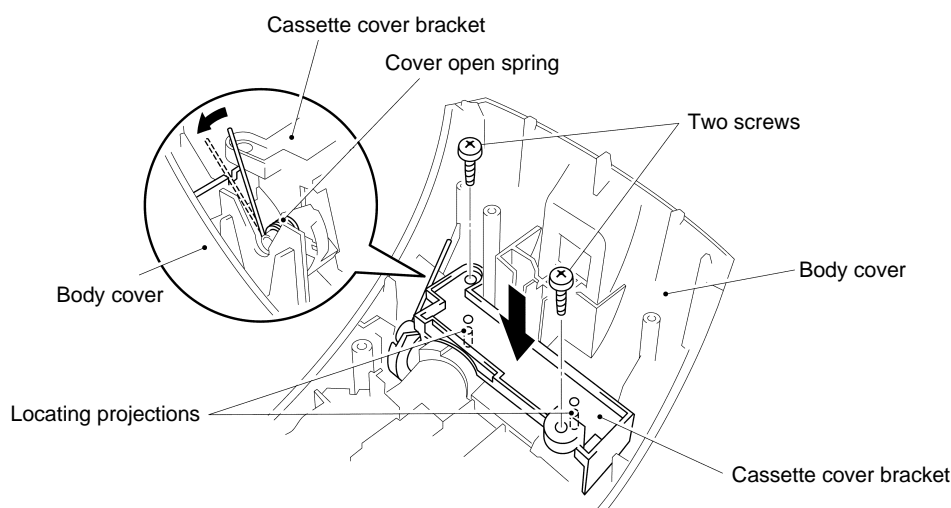


Fig. 2.2-49 Reassembly of the Cassette Cover Bracket

[6] Reassembly of the Mechanical Printing Unit and the Main PCB assy

- (1) Set the mechanical printing unit vertically on the three locating projections on the body cover. At this time, take care not to sandwich the harnesses and connectors inbetween.

Set shield plate A on the two projections on the body cover.

Subsequently, tighten the two screws.

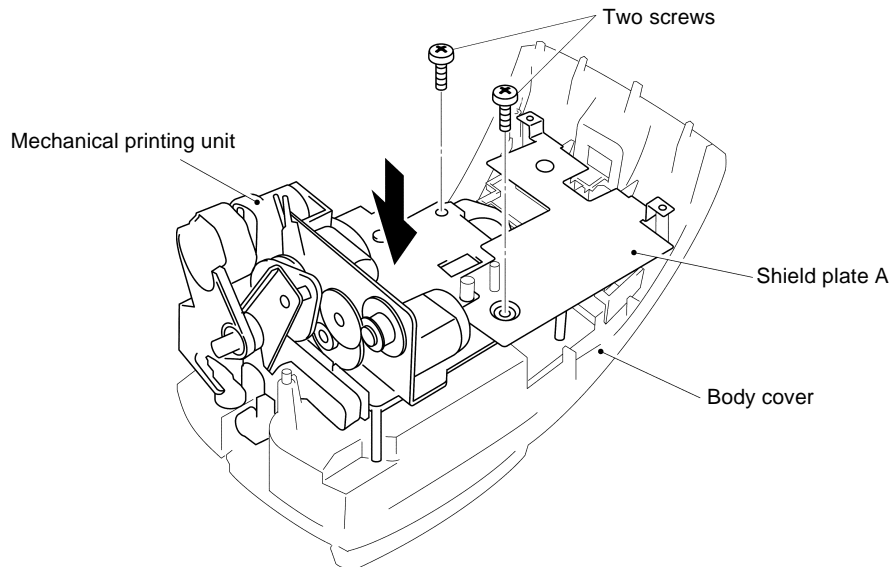


Fig. 2.2-50 Reassembly of the Mechanical Printing Unit

- (2) Keep the ends of the harnesses, and the connectors out of the main PCB assy. While tilting the main PCB assy, plug the I/F connector into the square hole at the bottom of the body cover, and then set the main PCB on the two projections on the body cover, with shield plate A sandwiched inbetween. Subsequently, tighten the three screws.

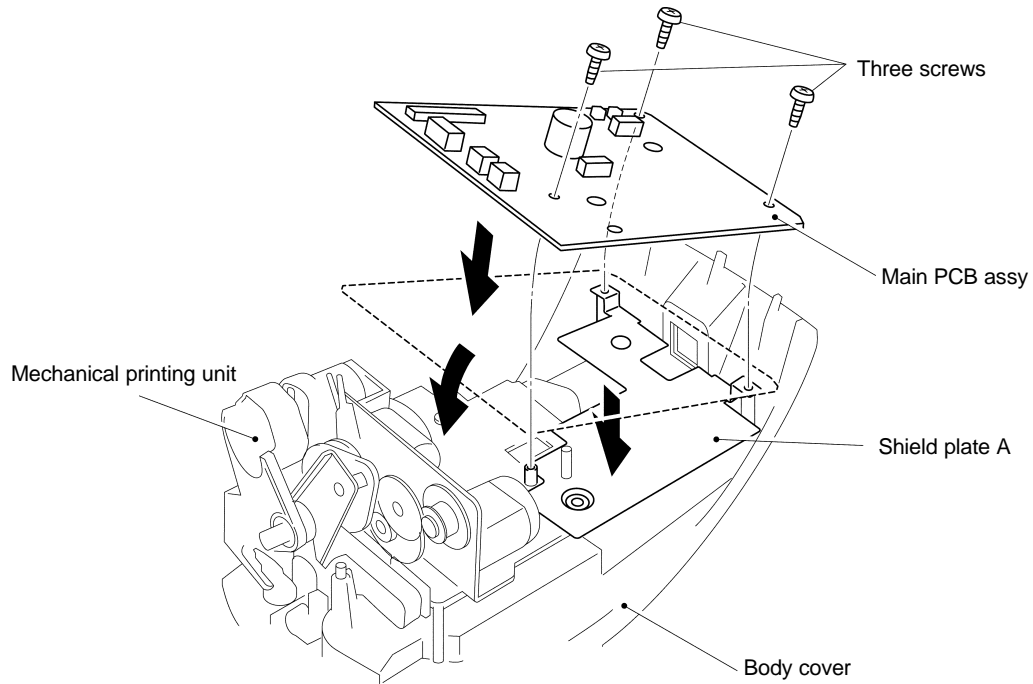


Fig. 2.2-51 Reassembly of the Main PCB Assy

- (3) Attach the head flexible cable on the back of the main frame with a tape.

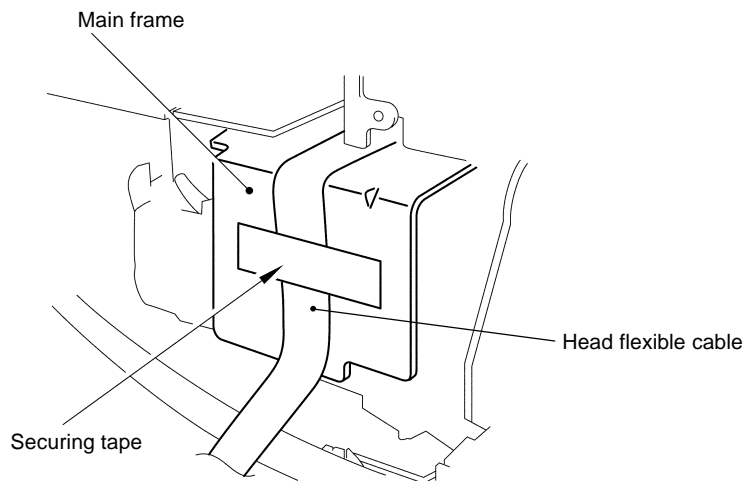


Fig. 2.2-52 Attaching the Head Flexible Cable with Tape

(4) Set the following connectors and cables.

Note: Unlock the connector before inserting the head flexible cable, and then lock the connector after inserting the cable. (Insert the correct end of the cable.)

Note: If the thermal head is replaced, change the soldering point on the main PCB meeting the resistance value of the new thermal head.

Thermal Head Resistance Values and Soldering Points

Thermal head resistance value	L	A	B	C	D	E	F	S
Soldering point	A	A	B	C	D	E	F	F

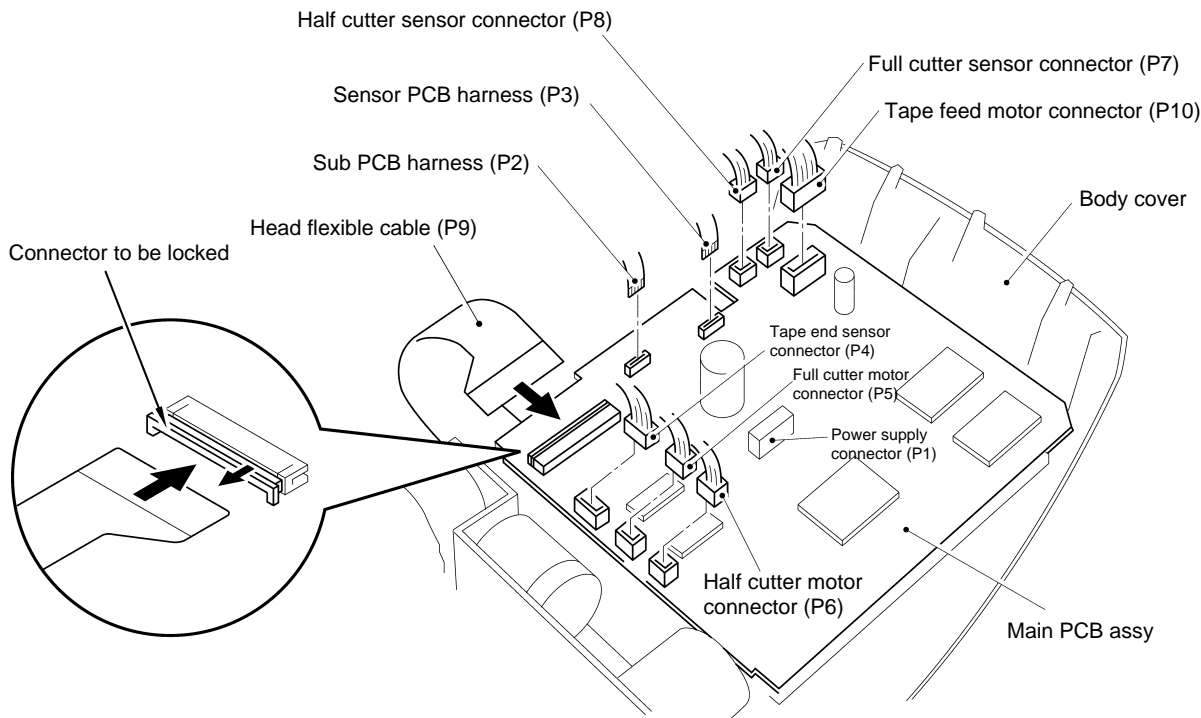


Fig. 2.2-53 Setting the Connectors and Cables

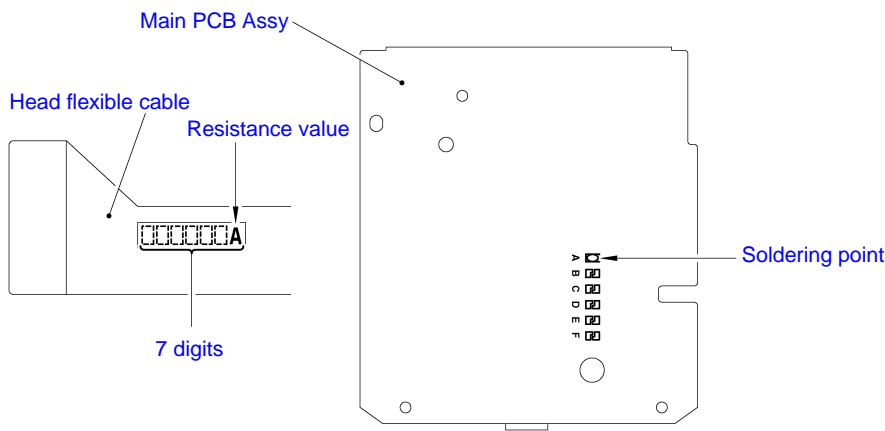


Fig. 2.2-53A Changing the Soldering Point

[7] Reassembly of the Power Supply PCB Assy

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- (1) After orienting the inlet assy correctly in the inlet bracket, tighten the two screws.

Note: Always mount the inlet assy in the inlet bracket in the direction shown in the illustration below.

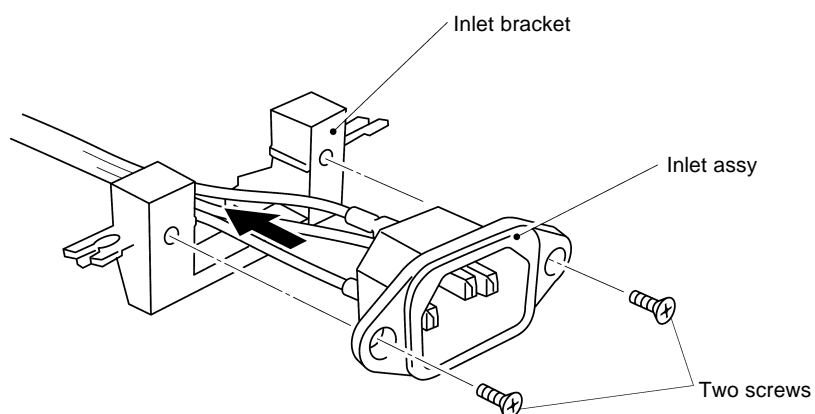


Fig. 2.2-54 Reassembly of the Inlet Assy

- (2) Turn the bottom cover over, and set the oblong hole in shield plate B on the projection on the bottom cover to set shield plate B on the bottom cover.
- (3) After plugging the inlet assy and power supply harnesses into the connectors on the power supply PCB, set the power supply PCB assy on the bottom cover, with shield plate B sandwiched inbetween. Then, tighten the two screws.

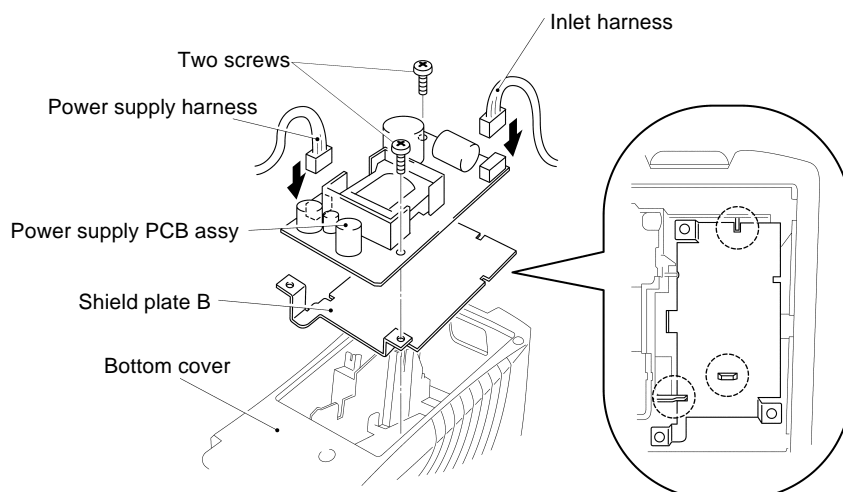


Fig. 2.2-55 Reassembly of the Shield Plate B and the Power Supply PCB Assy

- (4) Set the inlet bracket on the right and left projections on the bottom cover, and tighten the two screws.

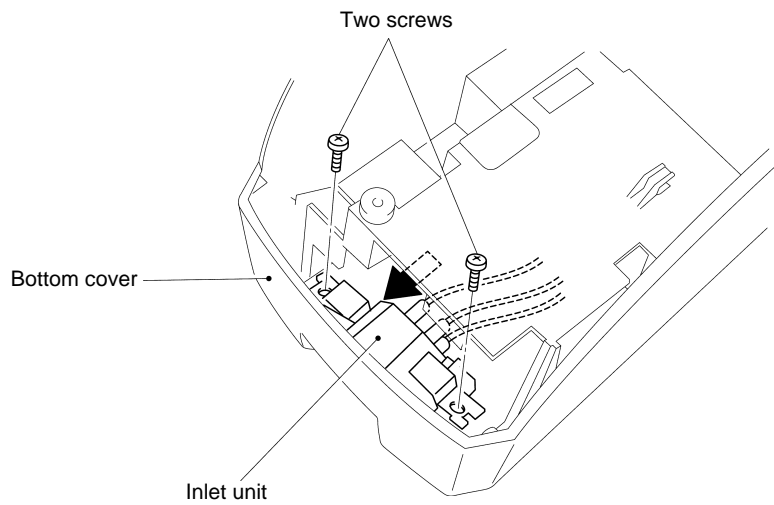


Fig. 2.2-56 Reassembly of the Inlet Unit

- (5) Pass the power supply harness through the hole in the bottom cover, and secure it on the hook of the bottom cover.

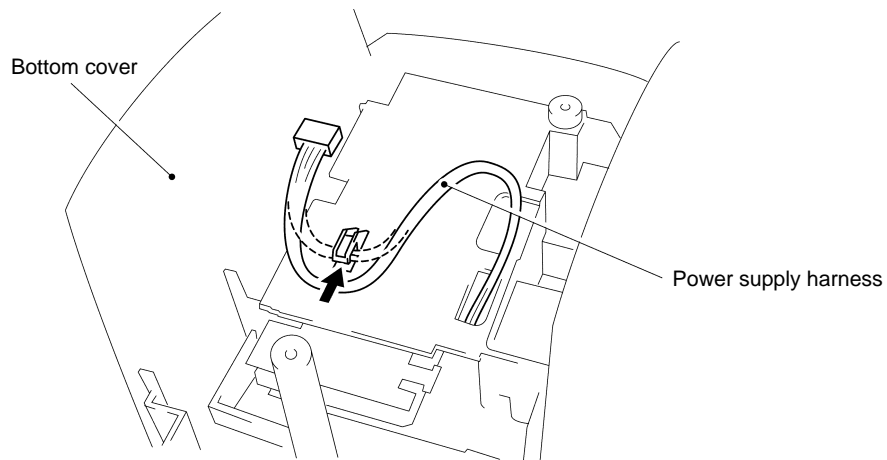


Fig. 2.2-57 Securing the Power Supply Harness

- (6) Store the two large and small cores in the storage space in the bottom cover, and insert the two harnesses (blue and brown) into the slits in the inlet bracket.

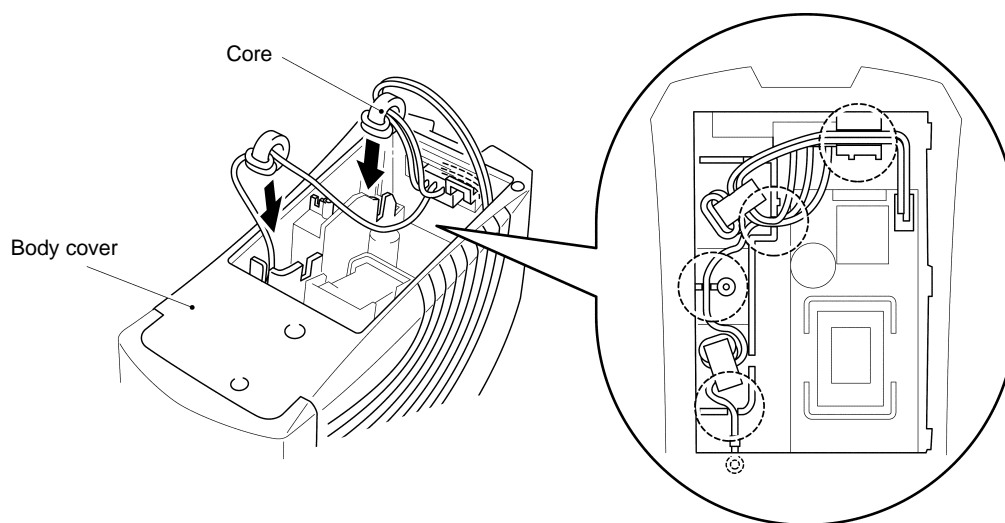


Fig. 2.2-58 Running the Inlet Unit Harnesses

[8] Reassembly of the Covers

PT99007

- (1) Turn the body cover. After setting the front cover on the two ribs of the body cover, set the front cover on the hook.

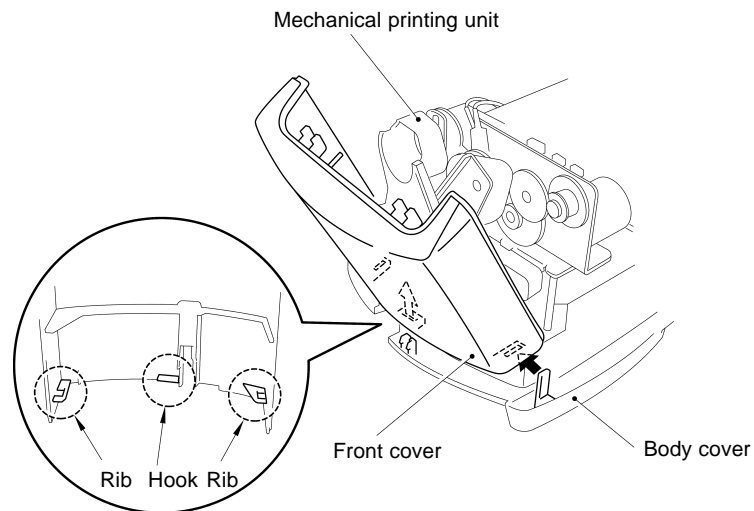


Fig. 2.2-59 Reassembly of the Front Cover

- (2) Insert the power supply harness into the connector on the main PCB.

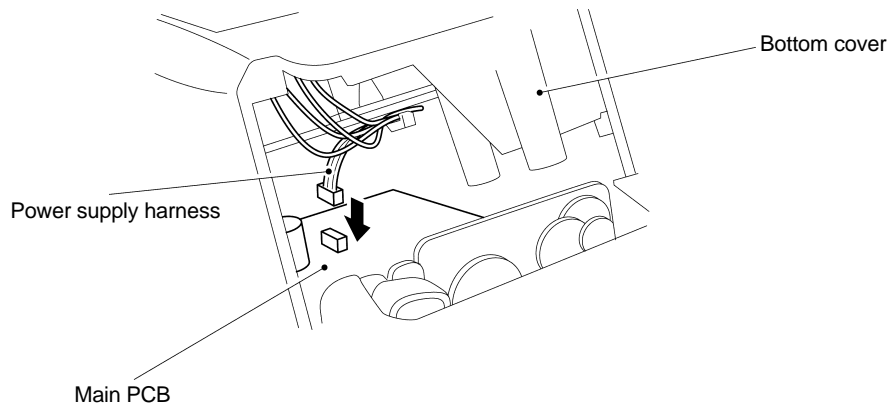


Fig. 2.2-60 Connecting the Power Supply Harness and Connector

- (3) Place the bottom cover on the body cover and the front cover to reassemble them.

Press the bottom cover against the body cover vertically and horizontally until the four hooks inside the body cover click.

- (4) Tighten screws "C" and "D" securing the bottom cover.

Pull out the (large) core from the storage space, and tighten screw "E".

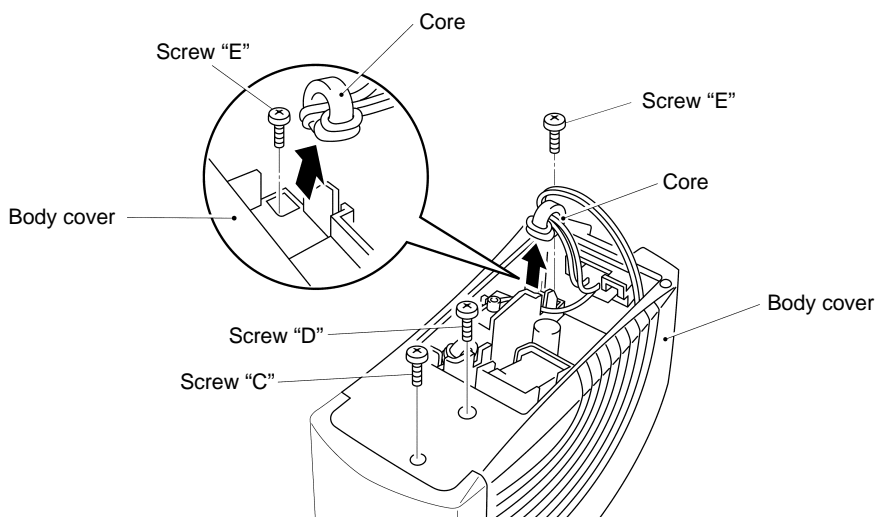


Fig. 2.2-61 Reassembly of the Body Cover and the Bottom Cover

- (5) Tighten screws "A" and "B" to secure shield plate B and the ground wire on the half frame.

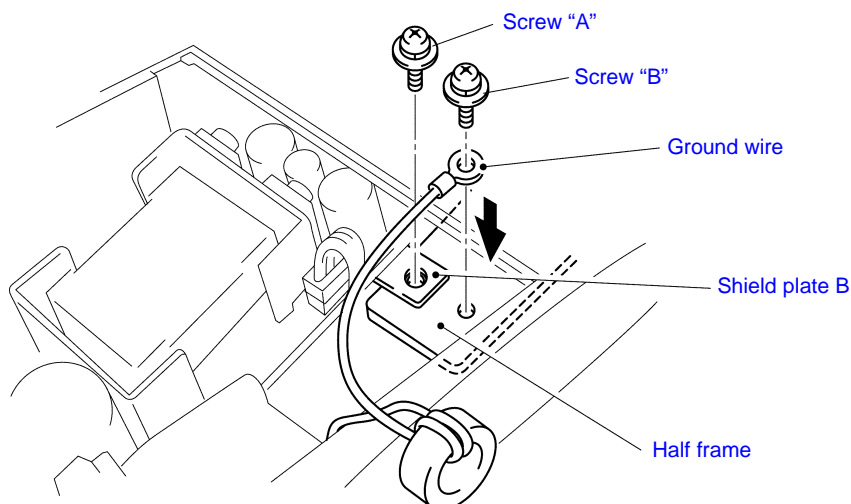


Fig. 2.2-62 Tightening the Screw to Secure the Ground Wire

- (6) Set the lower cover on the bottom cover, and tighten the screw.

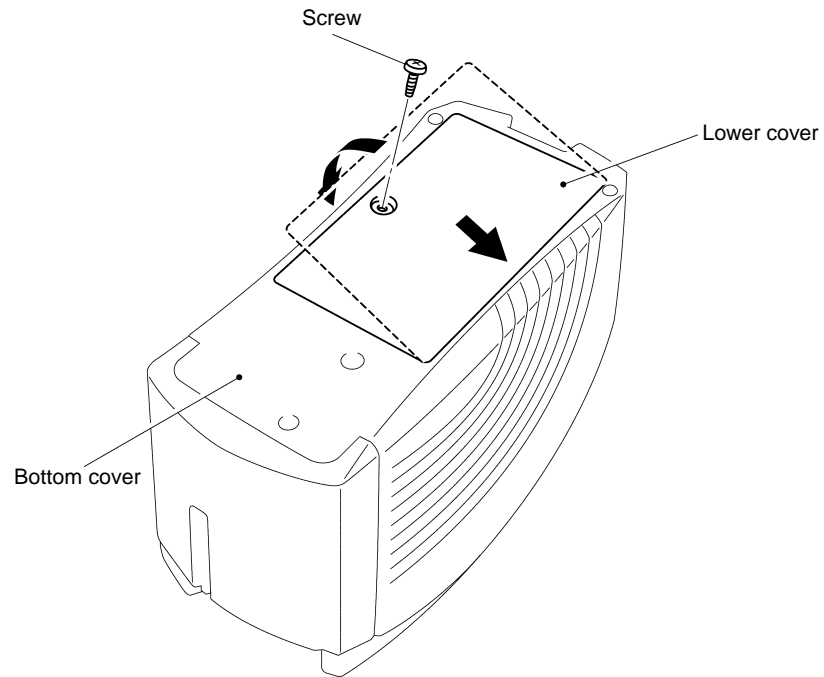


Fig. 2.2-63 Reassembly of the Lower cover

[9] Reassembly of the Cassette Cover Components

PT99007

- (1) Set the cover lock spring on the projection on the cover lock actuator, and insert it until it locks into the guide of the cassette cover. After inserting it, check that the cover lock actuator operates smoothly by pressing its end.

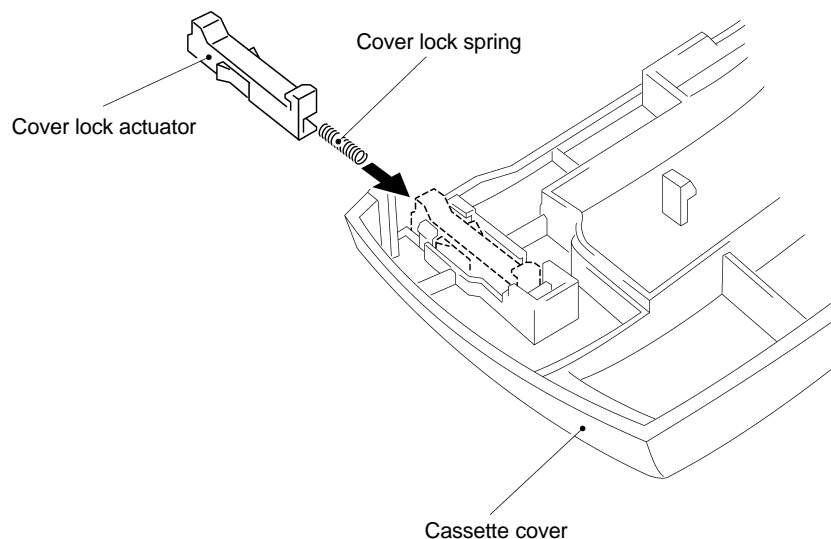


Fig. 2.2-64 Reassembly of the Cover Lock Actuator

- (2) Press-fit the cassette spring on the projection on the back of the cassette presser while slightly rotating the cassette spring.
- (3) Set the cassette presser. At this time, check that the cassette spring is set on the projection on the cassette cover by viewing it from the side.

After setting it, check that the three hooks are securely locked and that the cassette presser operates smoothly.

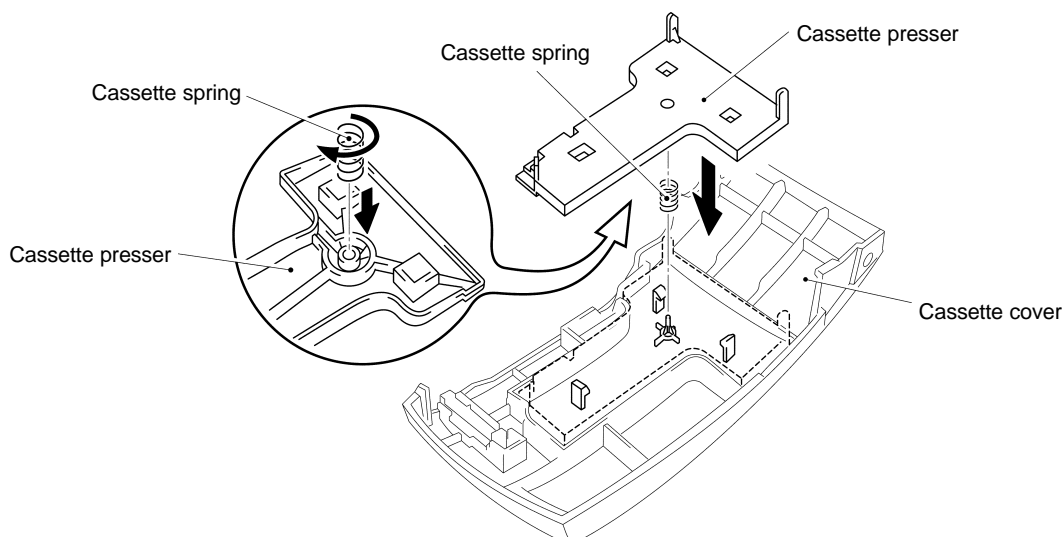


Fig. 2.2-65 Reassembly of the Cassette Presser

[10] Reassembly of the Cassette Cover

PT99007

- (1) While pressing the two projections on the cassette cover bracket to the outside, insert the two projections on the cassette cover bracket into the holes on both sides of the cassette cover.

Check that the cover open cam is engaged with the right projection on the cassette cover.

- (2) Check that the cassette cover opens and closes properly.

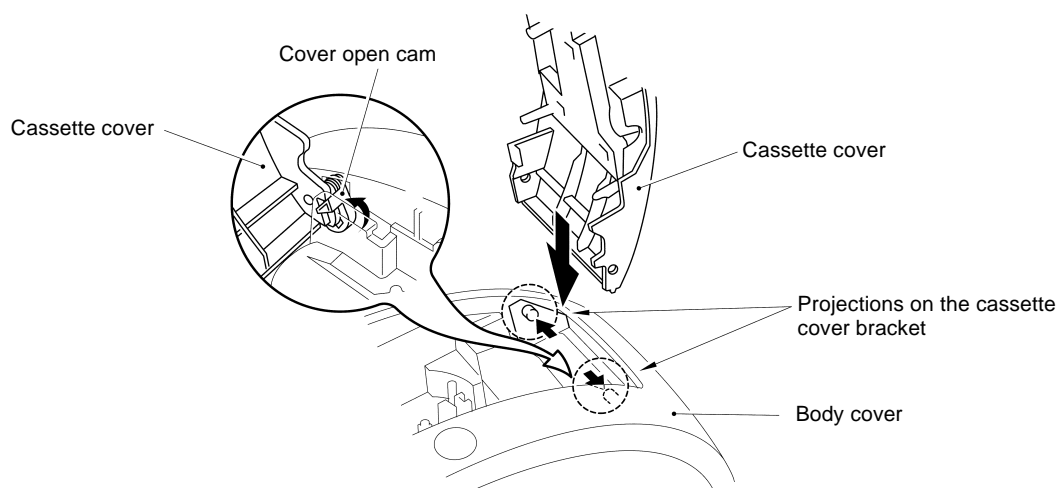


Fig. 2.2-66 Reassembly of the Cassette Cover

[11] Reassembly of the Tape Cassette

Press the cover open button (cover lock button) to open the cassette cover.
Set the tape cassette from the top, and then close the cassette cover.

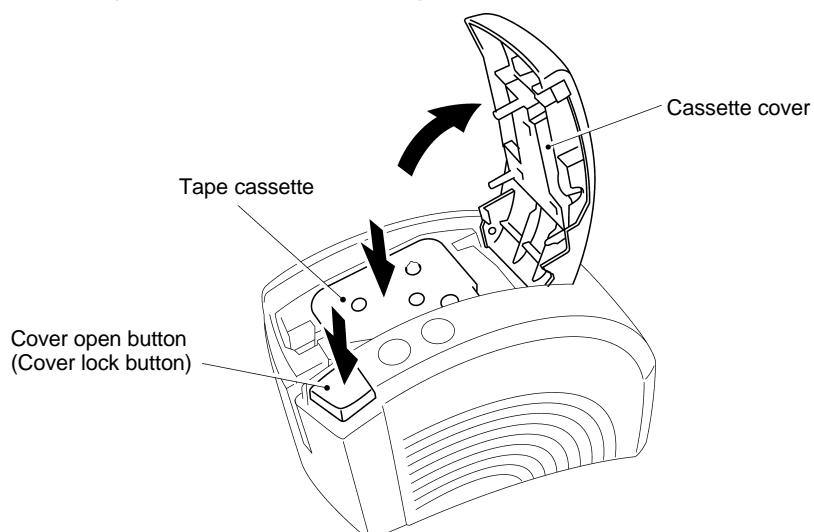


Fig. 2.2-67 Reassembly of the Tape Cassette

[12] Test Printing and Operation Check

PT99007

- (1) Plug the AC cord into the machine.
- (2) With the ON/OFF (⏻) key held pressed, press the FEED/CUT (⌂) key twice to perform test printing.
- (3) During test printing, check if the tape is fed correctly for printing, and if it is cut correctly.

If any problem is found, refer to CHAPTER IV TROUBLESHOOTING.

- (4) Check that opening the cassette cover releases the roller holder assy from the thermal head, and that closing the cassette cover crimps the roller holder assy on the thermal head.
- (5) Check that the FEED/CUT (⌂) key operates correctly.
- (6) Check that the ON/OFF (⏻) key operates correctly.
 - LED (ON/OFF key) Display

State of the LED Display	
Lights up in green.	Data reception standby mode.
Blinks in green.	Data has been received.
Lights up in orange.	No cassette is present in the data reception standby mode.
	The cover is open while data is being received (before printing).
Blinks in orange.	The cover is open in the data reception standby mode.
Blinks in red.	No cassette is present during printing.
	Tape end.
	Replace the cassette.
	The cover is open during printing.
	Communications error.
Lights up in red.	Buffer error.
	Cutter jam (before and during printing, and when power is turned on).
	EEPROM error.
	RAM error.

CHAPTER III

ELECTRONICS

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CHAPTER III ELECTRONICS

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3.1 CONFIGURATION OF THE ELECTRONIC PART

Fig. 3.1-1 shows the configuration of the electronic part.

The electronic part consists of the following components.

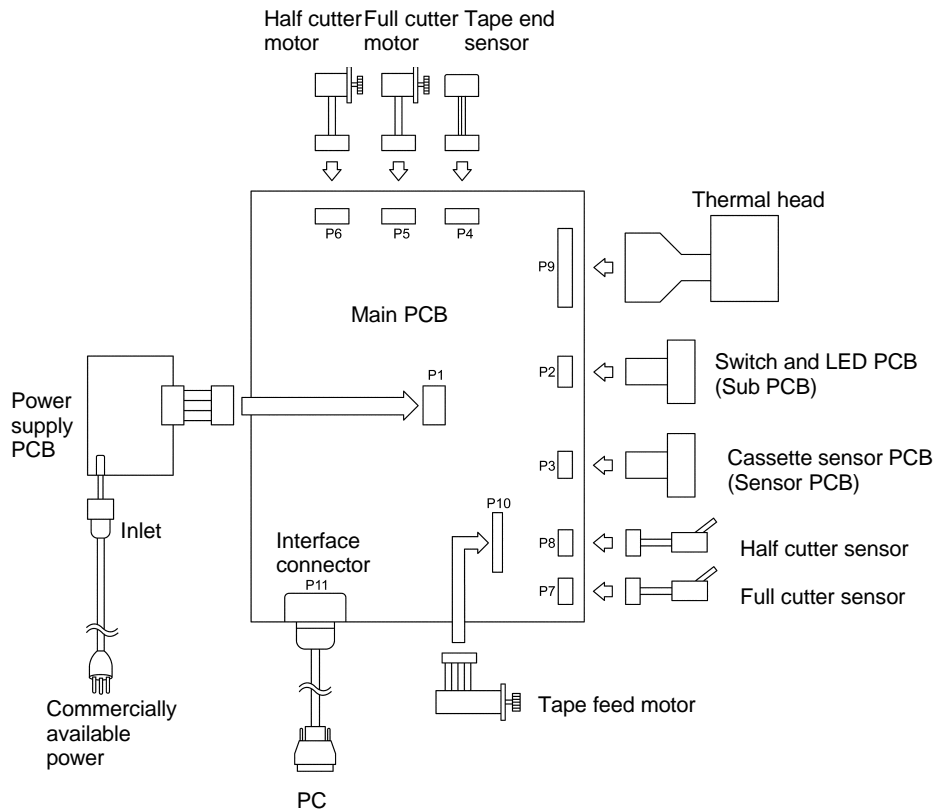


Fig. 3.1-1 Configuration of the Electronic Part

3.1.1 Main PCB

The main PCB controls all electronic operations.

This PCB consists of the CPU, the RAM, the EEPROM, the I/F driver, and the motor driver.

3.1.2 Power Supply PCB

There are two types of power supply PCB (100V system for North America, and 200V system for Europe). This PCB, equipped with a switching regulator, stabilizes commercially available power (AC voltage) to generate DC voltage. The following two voltages are output.

VH: 24V DC \pm 0.3V

Vcc: 5V DC \pm 0.25V

3.1.3 Cassette Sensor PCB (Sensor PCB)

The cassette sensor PCB (sensor PCB) is equipped with the sensor which detects the cassette tape width and ink ribbon type, and the sensor (mechanical switch) which detects the open cassette cover.

3.1.4 Tape End Sensor PCB

The tape end sensor uses a photo-interrupter to detect the tape end (zebra) pattern.

3.1.5 Switch and LED PCB (Sub PCB)

The switch and LED PCB (sub PCB) is equipped with the ON/OFF and FEED/CUT switches, and the LED (green/red).

3.1.6 Full Cutter Sensor

The full cutter sensor is a sensor (mechanical switch) which detects the position of the full cutter.

3.1.7 Half Cutter Sensor

The half cutter sensor is a sensor (mechanical switch) which detects the position of the half cutter.

3.1.8 Full Cutter Motor

The full cutter motor is the drive to cut the tape. This DC motor runs at a drive voltage of VH (24V).

3.1.9 Half Cutter Motor

The half cutter motor is the drive for the half cutting of laminated tapes. This DC motor runs at a drive voltage of VH (24V).

3.1.10 Tape Feed Motor

The tape feed motor is the drive to feed both the ribbon and the tape. This Ø25 stepping motor runs at a drive voltage of VH (24V).

3.1.11 Thermal Head

The thermal head has 384 dots×1 dot (360 dpi), thin-film configuration and incorporates a drive circuit. The drive voltage is 24V.

3.2 MAIN PCB

Fig. 3.2-1 shows the main PCB block diagram.

The main PCB consists of the following components.

- (1) CPU (including the ROM and the RAM)
- (2) SRAM (256 Kbytes)
- (3) EEPROM (1 Kbits)
- (4) Power supply, head power supply, FEED key, and LED ON/OFF circuits
- (5) Full cutter motor drive circuit, half cutter motor drive circuit, and tape feed motor drive circuit
- (6) Cassette sensor circuit, cover open sensor circuit, automatic full and half cutter sensor circuit, and tape end sensor circuit
- (7) Head level detection circuit
- (8) Ambient temperature detection circuit and head temperature detection circuit
- (9) Reset circuit
- (10) RS-232C serial interface circuit

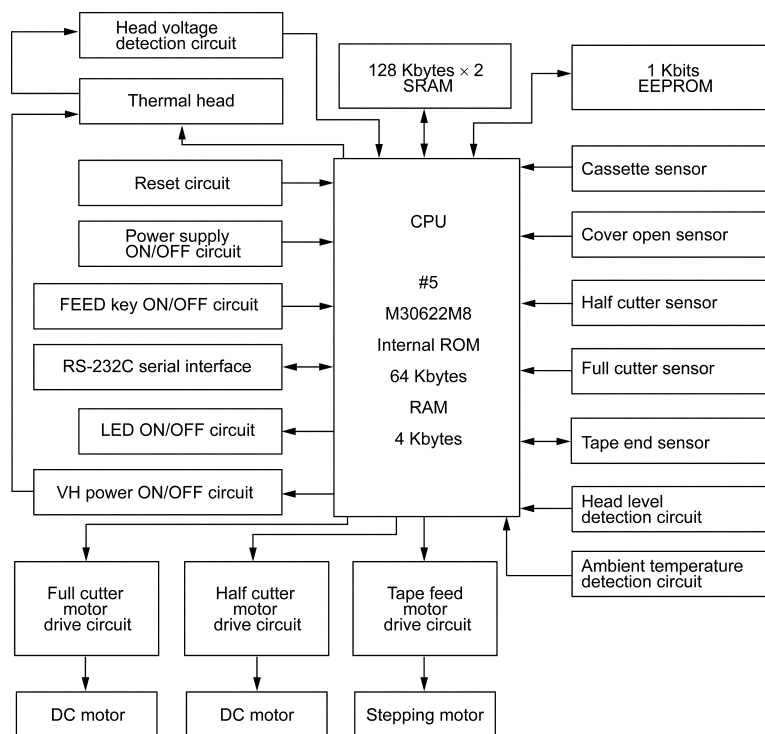


Fig. 3.2-1 Main PCB Block Diagram

3.2.1 Logic Components

[1] CPU (M30622M8)

The CPU (#5) is a 16-bit microprocessor manufactured by Mitsubishi Electric Corp., which controls and manages the entire system.

This CPU has a 64-Kbyte internal ROM which stores all programs. The internal RAM has 4 Kbytes.

[2] RAM (SRAM)

Two 128-Kbyte SRAMs (#1 and #2) are used as a data buffer.

[3] ROM (EEPROM)

A 1-Kbit EEPROM (#4) is used, into which baud rate and mechanical information is written to be stored.

3.2.2 Solder Points

Fig. 3.2-2 shows the solder point circuit.

One of solder points A-F is soldered according to the resistance level of the thermal head.

The solder points are read once immediately after the power is turned on.

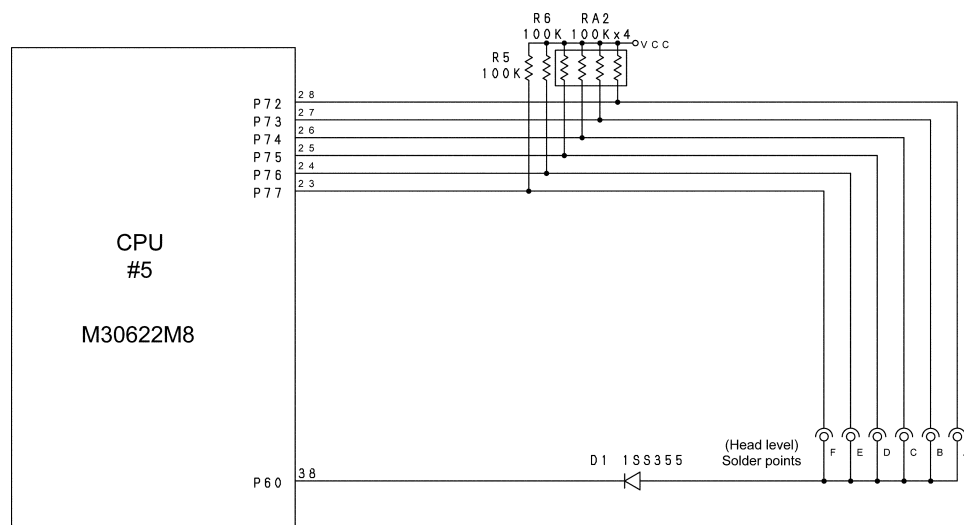


Fig. 3.2-2 Solder Point Circuit

3.2.3 Logic and VH Power, and Related Circuits

Power from a commercially available wall outlet is V_{cc} ($+5V \pm 0.25V$) which is supplied to the main PCB, and then to all logic components.

When V_{cc} is supplied, the reset IC (Q7) switches the reset signal level to high to start the CPU.

When the CPU starts after the power is supplied, ports are initialized, and the CPU enters the sleep state (the power is turned off).

With the power off, pressing the ON/OFF key causes the interruption of \overline{NMI} to start the CPU, turning on the power.

With the power on, pressing the ON/OFF key places the CPU in the sleep state (the power is turned off).

With the machine in operation, P83 is switched to high to turn on Q9 (FET), supplying VH to the thermal head, the full cutter motor, the half cutter motor, and the tape feed motor.

3.2.4 Stepping Motor (Tape Feed Motor) Drive Circuit

Fig. 3.2-3 shows the stepping motor drive circuit.

The Ø25 stepping motor is used to feed the ribbon and the tape. The stepping motor feeds the tape 1/720 in. for one pulse (one dot for two pulses).

Drive pulses are transmitted from P104-P107 of the CPU (#5) to Q1-Q4 to drive the motor with a unipolar 2-2 phase excitation (AB→DA→CD→BC forward feed).

(1) Printing at fixed speed

The rate of fixed speed printing, at which printing is performed while the tape is fed at a fixed speed, is 571 pps (1.75 msec/pulse).

The through-up pulses (including pre-excitation) and through-down pulses (including post-excitation) are 56 and 5 pulses, respectively.

(2) Halfway stop of printing

If printing is stopped halfway, the circuit continuously drives the motor (overrun for 198 pulses) after the stop, then shuts off the power.

- (3) Printing interruption (margin cutting drive, half cutting drive, and buffer full drive)
- At the interruption of printing, the motor overruns (five through-down pulses) before it stops.
 - If cutter operation is necessary, full or half cutting is performed.
 - The motor rotates counterclockwise for 70 pulses.
 - The motor rotates clockwise to resume printing with 3 dots printed again.

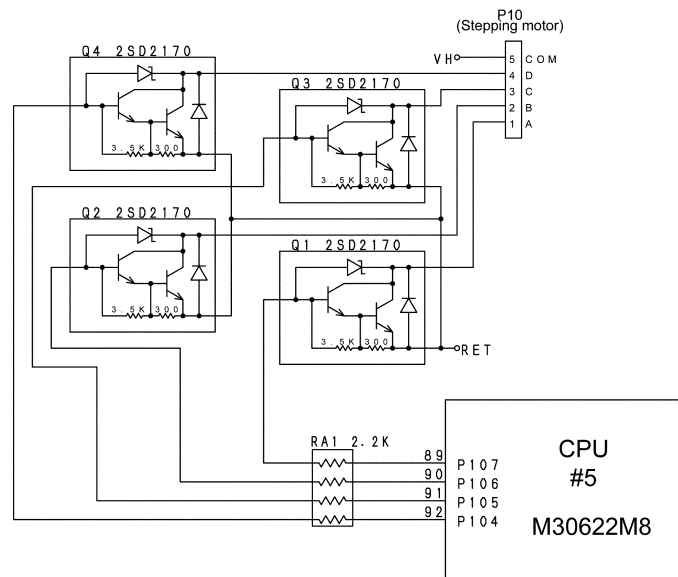


Fig. 3.2-3 Stepping Motor Drive Circuit

- (4) Printing at low speed

If the head temperature is 41°C or higher during printing on laminated or non-laminated tapes, low speed printing is performed to ensure printing quality.

The through-up pulses (including pre-excitation) and the through-down pulses (including post-excitation) are 56 and 5 pulses, respectively.

The rate of low speed printing is 426 pps (2.35 msec/pulse).

3.2.5 DC Motor (Cutter Motor) Drive Circuit

Figs. 3.2-4 and 3.2-5 show the DC motor drive circuit and the cutter sensor circuit, respectively.

The DC motor performs the full or half cutting of the tape. With full cutting, drive pulses are transmitted from DCR1 and DCF1 of the CPU (#5) to BA6919FP (#6) to drive the motor. With half cutting, drive pulses are transmitted from DCR2 and DCF2 of the CPU (#5) to BA6919FP (#7) to drive the motor.

Table 3.2-1 shows the logic of DCR1, DCF1, DCR2, and DCF2.

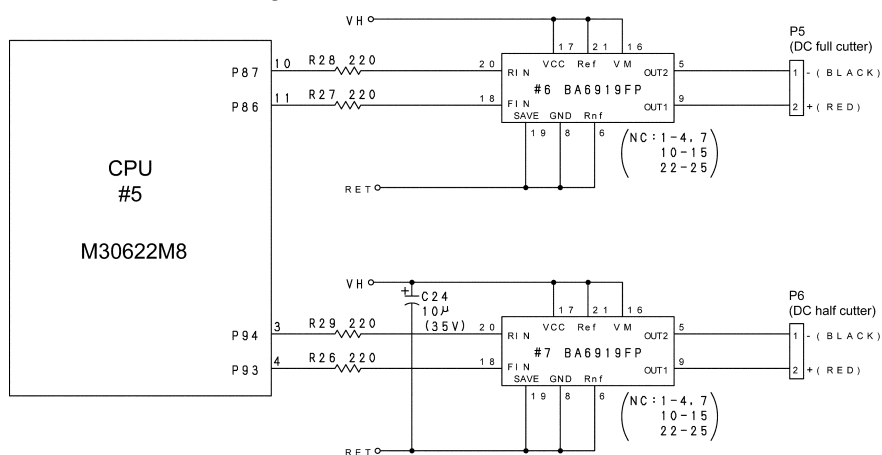


Fig. 3.2-4 DC Motor Drive Circuit

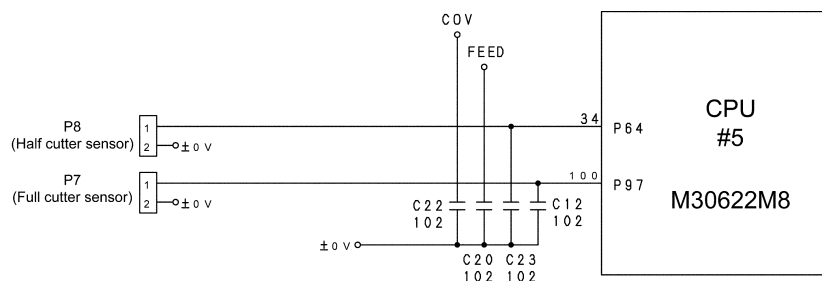


Fig. 3.2-5 Cutter Sensor Circuit

State	DCF1	DCR1	DCF2	DCR2
OFF	0	0	0	0
Clockwise	1	0	1	0
Counterclockwise	0	1	0	1
Brake	1	1	1	1

Table 3.2-1 Logic of the DC Motor Control

[1] Full Cutter Motor Drive Circuit and Full Cutter Sensor Circuit

The drive sequence of the full cutter motor is shown below.

The cutter stays at the home position in the normal state. (The full cutter sensor input level is low.)

A tape cutting drive command rotates the DC motor clockwise to cut the tape. At this time, the sensor input level switches from low to high. When this input level switches to low again, it indicates that the cutter has returned to the home position after cutting the tape.

When the low level of sensor input is detected, the DC motor brake is applied. When the sensor input level switches to high again during braking, which indicates that the cutter has passed by the home position, the DC motor rotates counterclockwise. When the sensor input level switches to low again, the motor brake is applied to monitor the sensor input level.

When the sensor input level switches to high, the DC motor rotates clockwise. When it switches to low, the motor brake is applied.

If the sensor input level is low for 100 msec with the brake applied when the above operations are repeated, the cutter is judged as returned to the home position, completing the operations.

If an abnormal end shifts the cutter from the home position, the DC motor rotates counterclockwise before printing to return the cutter to the home position (initialization).

If the cutter remains at the home position 300 msec or does not return to the home position 1000 msec after the DC motor starts rotating clockwise, it is processed as an error.

The DC motor does not operate with the cover open, which is detected by the cover open sensor.

[2] Half Cutter Motor Drive Circuit and Half Cutter Sensor Circuit

The cutter stays at the home position in the normal state. (The half cutter sensor input level is low.)

A tape half cutting drive command rotates the DC motor clockwise (for 800 msec) for the half cutting of the tape. At this time, the sensor input level switches from low to high. Then the DC motor rotates counterclockwise. When the sensor input level switches to low again, the motor brake is applied.

If the sensor input level is low for 100 msec with the brake applied, the cutter is judged as returned to the home position, completing the operations.

If the cutter remains at the home position with the DC motor rotating clockwise or does not return to the home position 800 msec after the DC motor starts rotating counterclockwise, it is processed as an error.

The DC motor does not operate with the cover open, which is detected by the cover open sensor.

[3] Process of Full or Half Cutter Errors

An error causes LED 1 (red) to light up to disable all operations.

Turning off the ON/OFF switch turns off the power, and the subsequent pressing of this switch turns on the power to return the cutter to the home position.

3.2.6 Cassette Detection Sensor Circuit

Fig. 3.2-6 shows the cassette detection sensor circuit.

The sensor board is mounted on the cassette side so that the board turns on the switch of the cassette sensor which detects the ribbon type and the tape width.

Table 3.2-2 shows the combinations of the cassette.

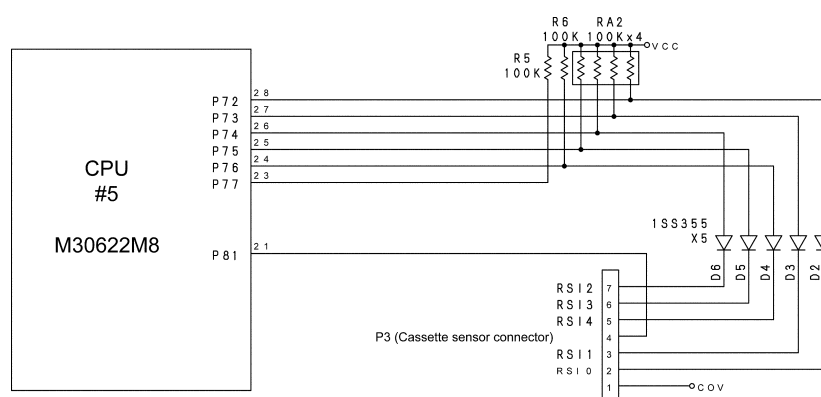


Fig. 3.2-6 Cassette Detection Sensor Circuit

Cassette type		RS10	RS11	RS12	RS13	RS14
No cassette		0	0	0	0	0
6 mm	Laminated	0	0	1	0	0
	Non-laminated	0	0	1	1	0
9 mm	Laminated	1	1	1	0	0
	Non-laminated	1	1	0	0	0
12 mm	Laminated	0	1	0	0	0
	Non-laminated fabric	0	1	1	1	0
18 mm	Laminated	1	0	1	1	0
	Non-laminated and YS	1	0	0	0	0
24 mm	Lettering and fabric	1	1	1	0	1
	Laminated	1	0	1	1	1
36 mm	Non-laminated	1	0	0	0	1
	Laminated	0	0	0	1	0

Table 3.2-2 Combinations of the Cassette

3.2.7 Thermal Head Control Circuit

Figs. 3.2-7 and 3.2-8 show the thermal head control circuit and the thermal head drive timing chart, respectively.

The thermal head uses a 384-dot (360 dpi) edge head and incorporates four 96-dot driver ICs. Serial data is transferred to the four drivers in synchronization with the clock signal. Print data is output in synchronization with the 3.685 MHz clock (a quarter of 14.74 MHz).

In response to the LATCH signal from P62 of the CPU, the head driver circuit latches the print data to synchronize it with the STB signal from P80, driving the specified heating elements.

The method of controlling the thermal head is as follows.

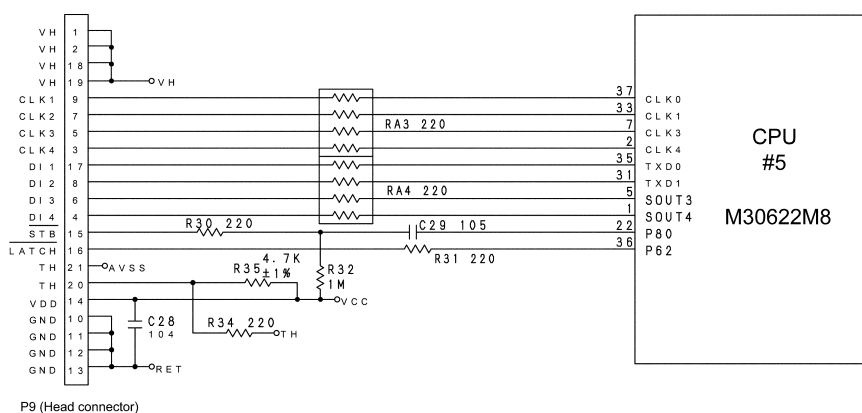


Fig. 3.2-7 Thermal Head Control Circuit

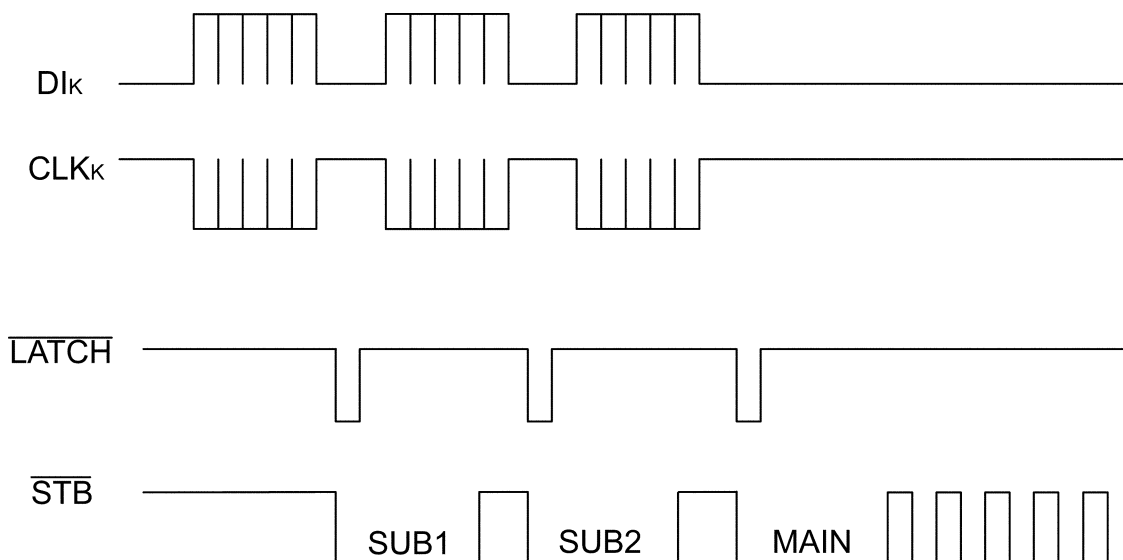


Fig. 3.2-8 Thermal Head Drive Timing Chart

[1] Basic Energizing Time

The energizing time is based on SUB1+SUB2+MAIN, with MAIN being used for chopping control.

[2] Log Control

SUB2 turns on, when the two consecutive dots before the dot to be energized are not energized. Otherwise, SUB2 turns off.

[3] 4-Dot Control

384 dots are divided into 96 4-dot blocks. SUB1 turns on, when one or two dots are to be energized, with the preceding dot energized. Otherwise, SUB1 turns off.

[4] Control by Ribbon Type

An energizing time appropriate for the ribbon type is set.

[5] Control by the Resistance Level of the Thermal Head

The resistance values of the thermal head are classified into levels of A-F and read from the above-mentioned solder points to calculate an energizing time appropriate for the resistance value.

[6] Temperature Control

The temperature detection circuit reads the head temperature during printing based on the A/D input of the CPU to set an energizing time appropriate for these temperatures.

3.2.8 Head Temperature Detection Circuit

Fig. 3.2-9 shows the head temperature detection circuit.

The head temperature detection circuit uses the thermistor on the heat radiation plate of the thermal head to convert variations in the temperature of the head into variations in voltage to input them into the A/D input port AN1 of the CPU.

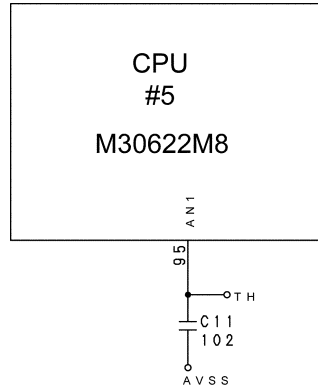


Fig. 3.2-9 Head Temperature Detection Circuit

3.2.9 Oscillation Circuit

Fig. 3.2-10 shows the oscillation circuit.

This circuit contains a 14.74-MHz oscillator to generate an oscillation at 14.74 MHz. The internal operations of the CPU are executed based on this clock.

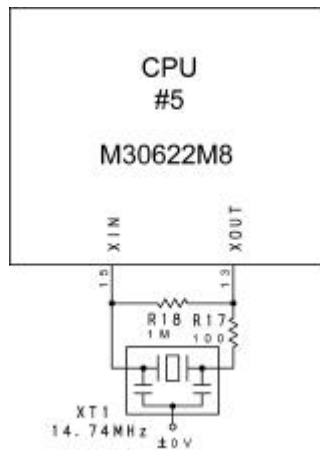


Fig. 3.2-10 Oscillation circuit

3.2.10 Interface Circuit

Fig. 3.2-11 shows the interface circuit.

This circuit is a 8-pin, RS-232C interface circuit for making connections to a computer.

#3 is a RS-232C driver IC which converts logic level signals into RS-232C (+ and) signals.

The RXD signal is a print data input signal from the computer and transmitted at a maximum baud rate of 115.2 K.

The TXD and DTR signals are control output signals to the computer.

With the power on, P66 is switched to high to turn on Q5 (transistor) so that the power Vcc is supplied to #3.

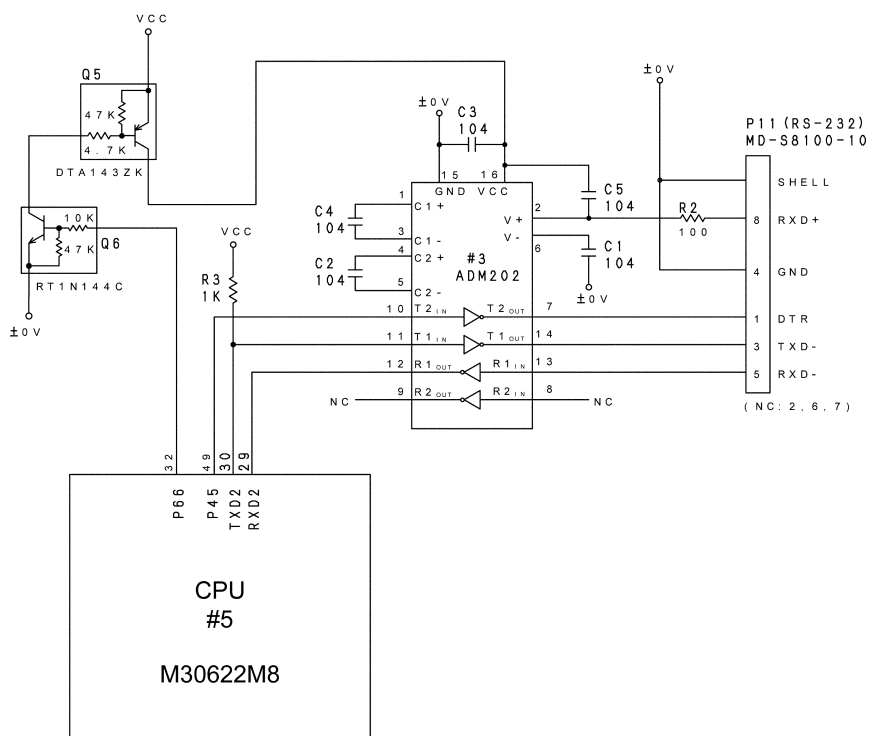


Fig. 3.2-11 Interface Circuit

3.2.11 Tape End Sensor Circuit

Fig. 3.2-12 shows the tape end sensor circuit.

This circuit detects the voltage of P102 (AN2) to detect the tape end when the zebra tape (black/transparent) at the end of the tape passes by the photosensor.

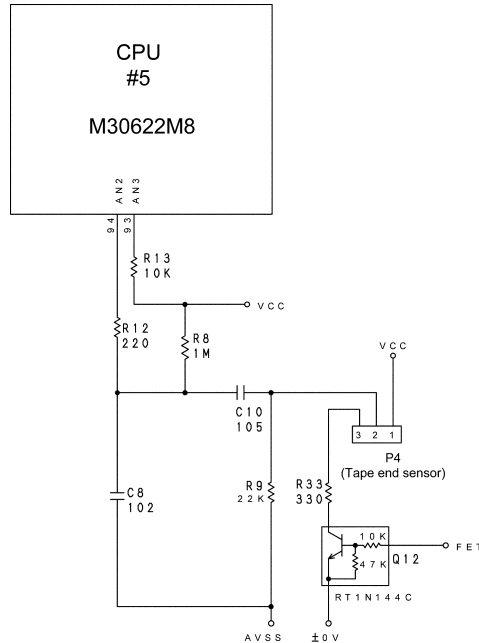


Fig. 3.2-12 Tape End Sensor Circuit

3.2.12 Switch and LED Circuit

Fig. 3.2-13 shows the switch and LED circuit.

This circuit controls the ON/OFF and FEED/CUT switches and the power supply LED.

The LED lights up or blinks in green or red according to the state of the machine.

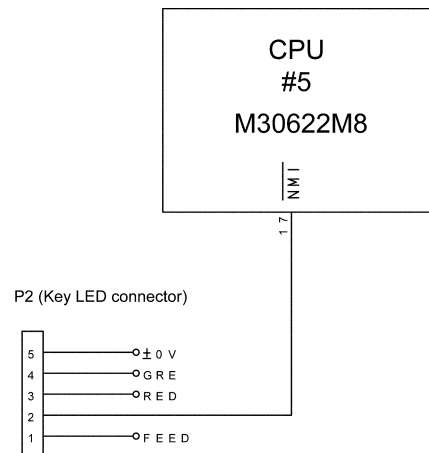


Fig. 3.2-13 Switch and LED Circuit

3.2.13 Cover Open Sensor Circuit

Fig. 3.2-14 shows the cover open sensor circuit.

This circuit detects the open/closed state of the cassette cover.

The sensor input level is low with the cover closed, while it is high with the cover open.

With the cover open, all drives are disabled.

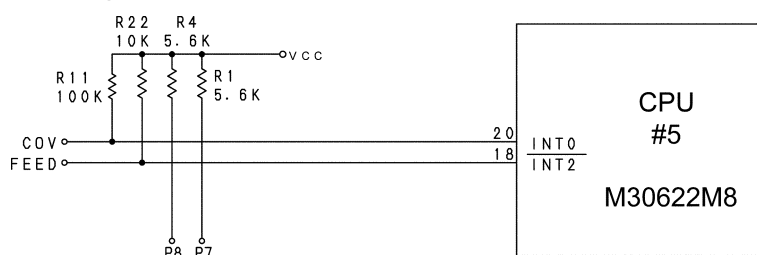


Fig. 3.2-14 Cover Open Sensor Circuit

3.3 POWER SUPPLY PCB

Commercially available power is supplied to the power supply PCB through the power supply cord, which is inserted into an inlet. The inlet has a total of three wires, one of which is for grounding, and the other two are for inputting AC voltage into the power supply PCB. The switching regulator of the power supply PCB stabilizes the AC voltage to generate DC voltage (VH: +24V \pm 0.3V for the thermal head and the DC motor, and Vcc: +5V DC \pm 0.25V for the logic components), supplying it to the main PCB.

CHAPTER IV

TROUBLESHOOTING

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PT99007

CHAPTER IV TROUBLESHOOTING

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4.1 TROUBLESHOOTING

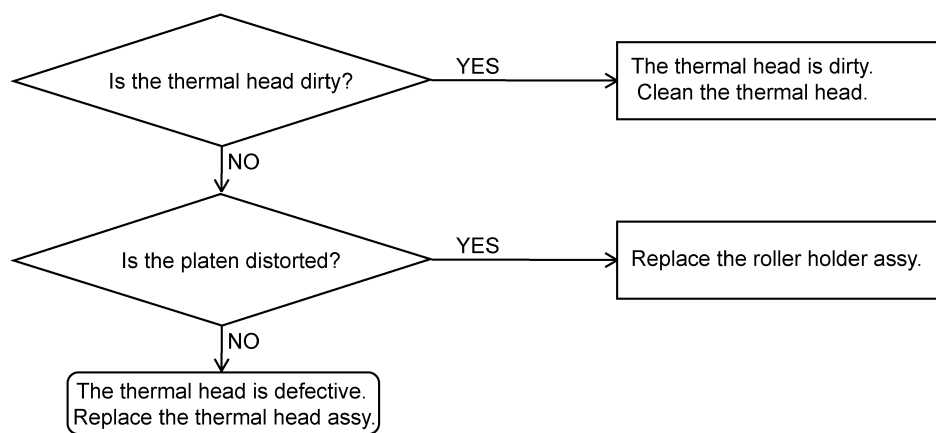
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4.1.1 Precautions on Repairing

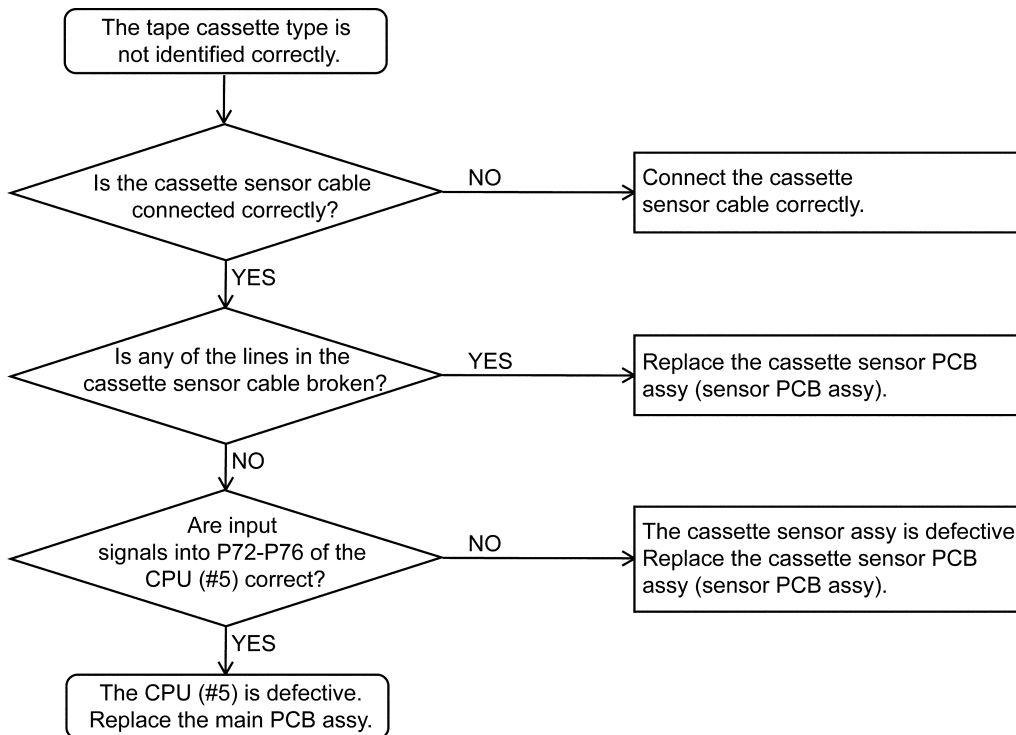
- (1) Before testing electric conductivity with a circuit tester, unplug the power supply cord and check that power is not supplied to the machine.
- (2) If a printer failure occurs, unplug the thermal head cable and wait until the thermal head and related circuits are restored to execute normal operation.
- (3) Use a specified AC adapter to supply power to the machine.

4.1.2 Troubleshooting Flows

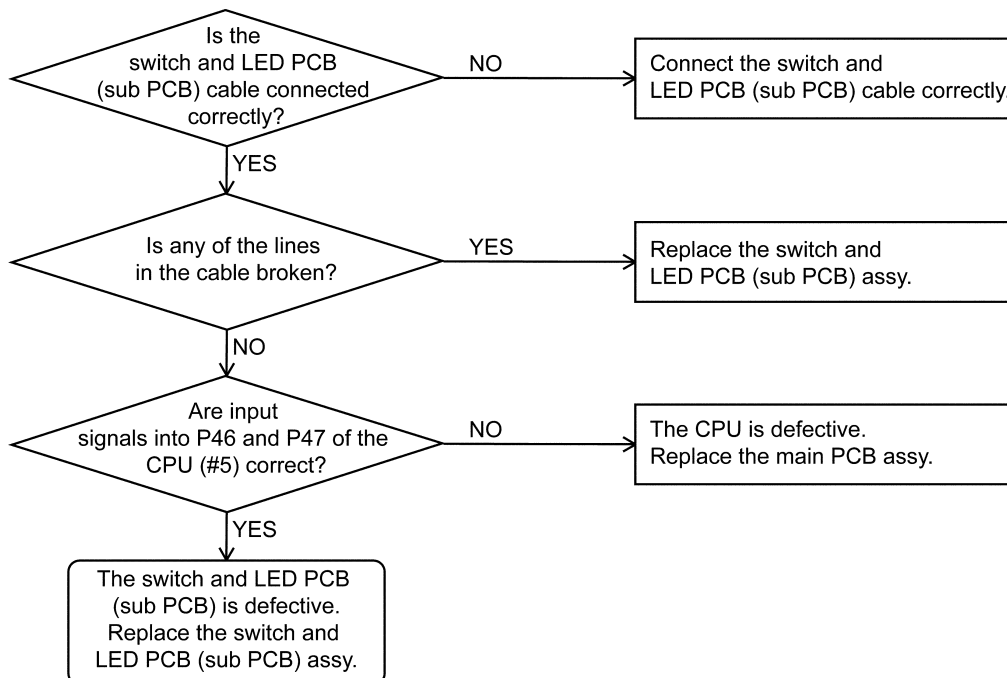
[1] **Printing is performed with specific dots omitted.**



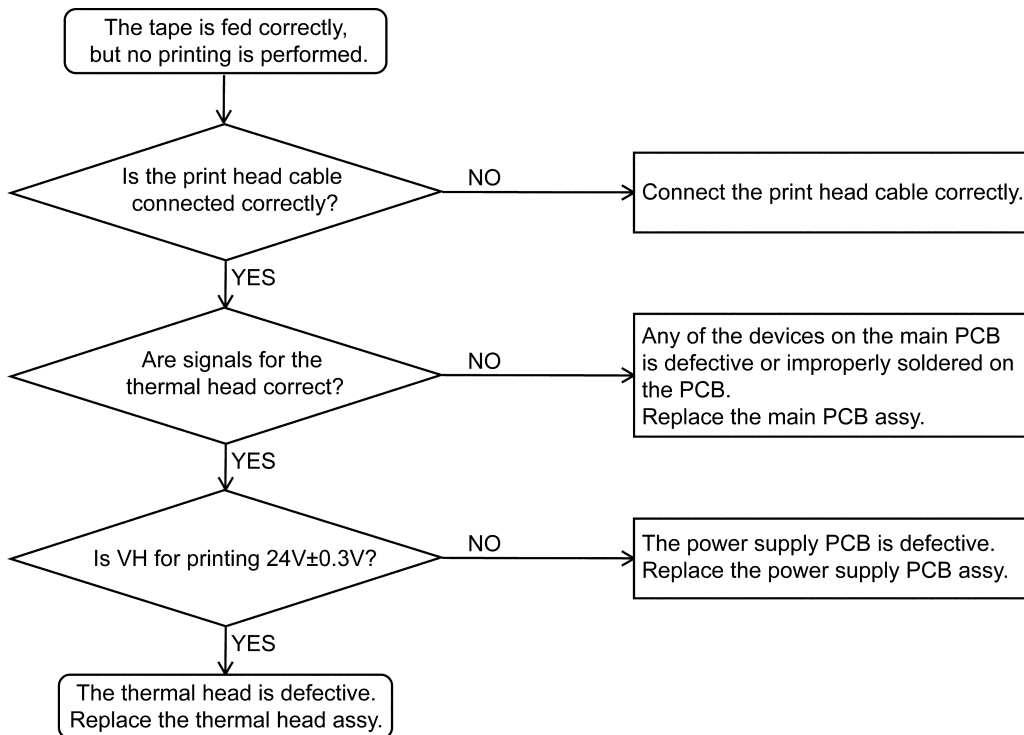
[2] The tape cassette type is not detected correctly.



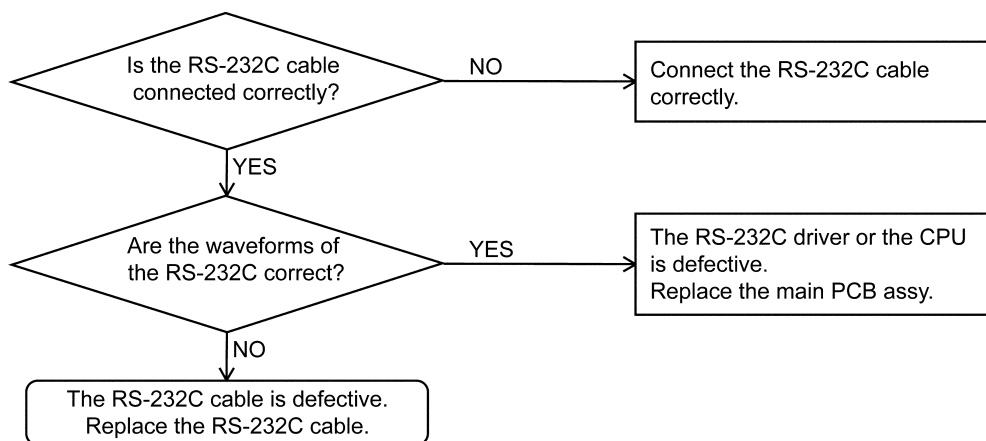
[3] The LED does not light up.



[4] No printing is performed.

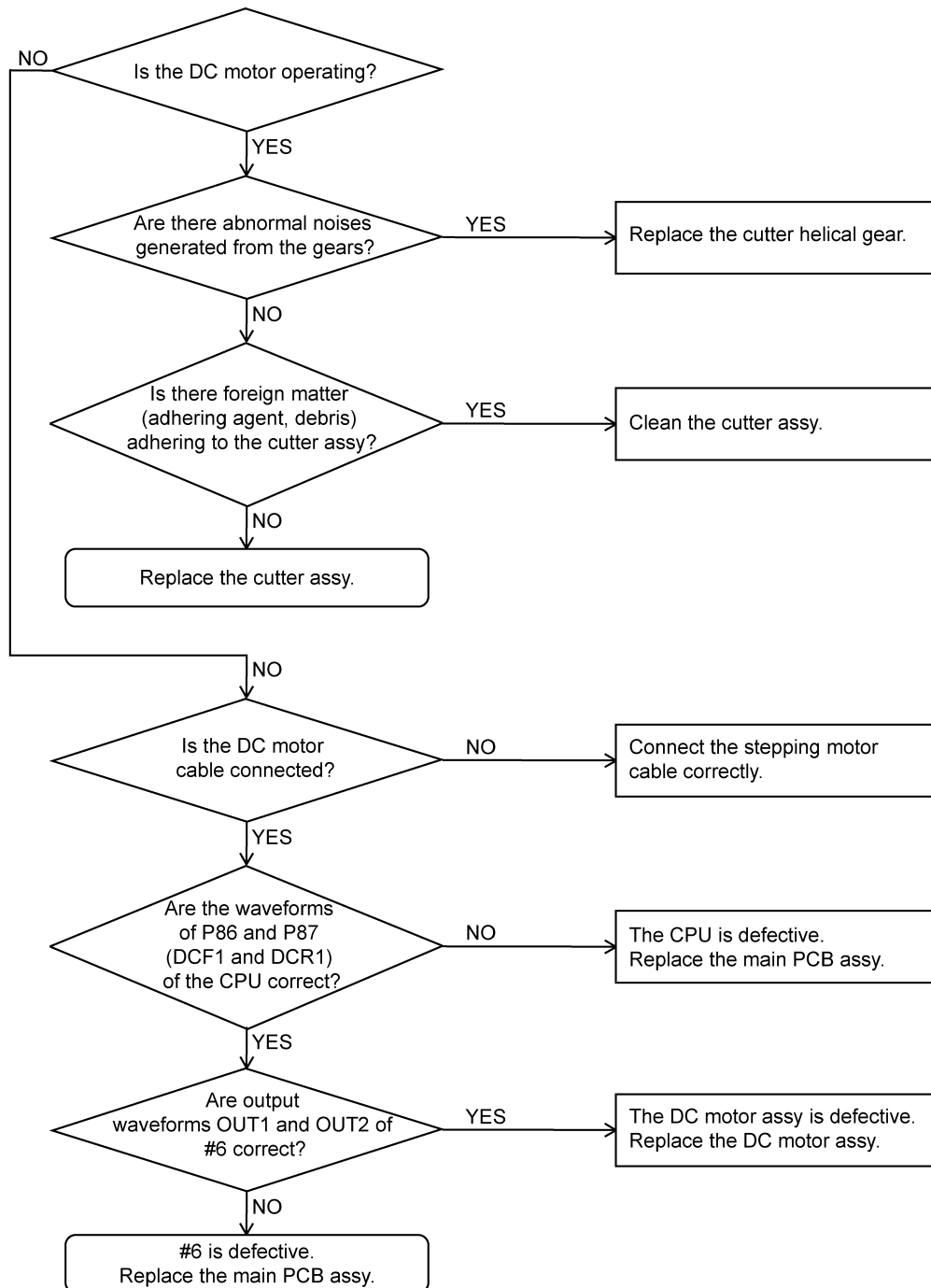


[5] The interface malfunctions.



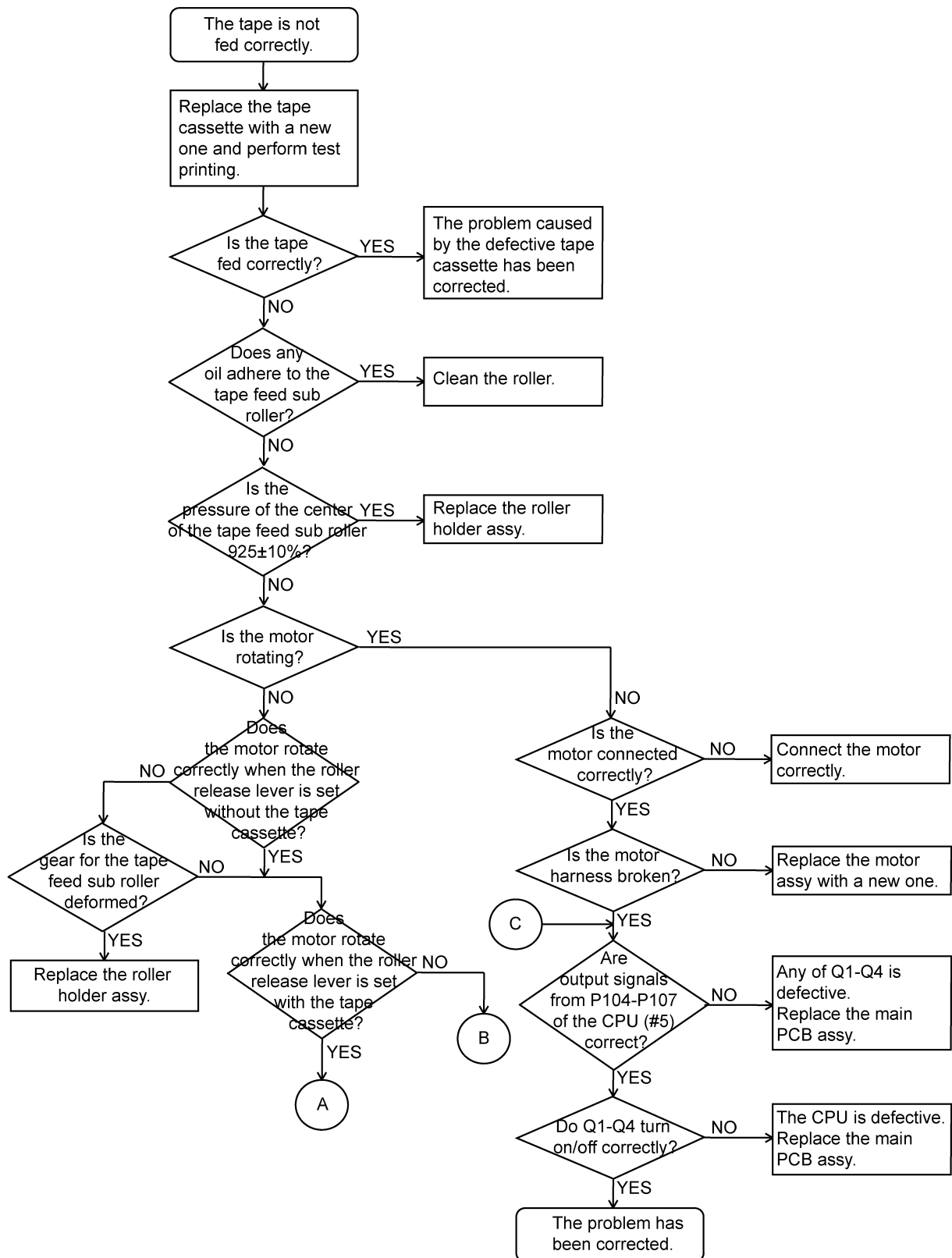
[6] The tape is not cut.

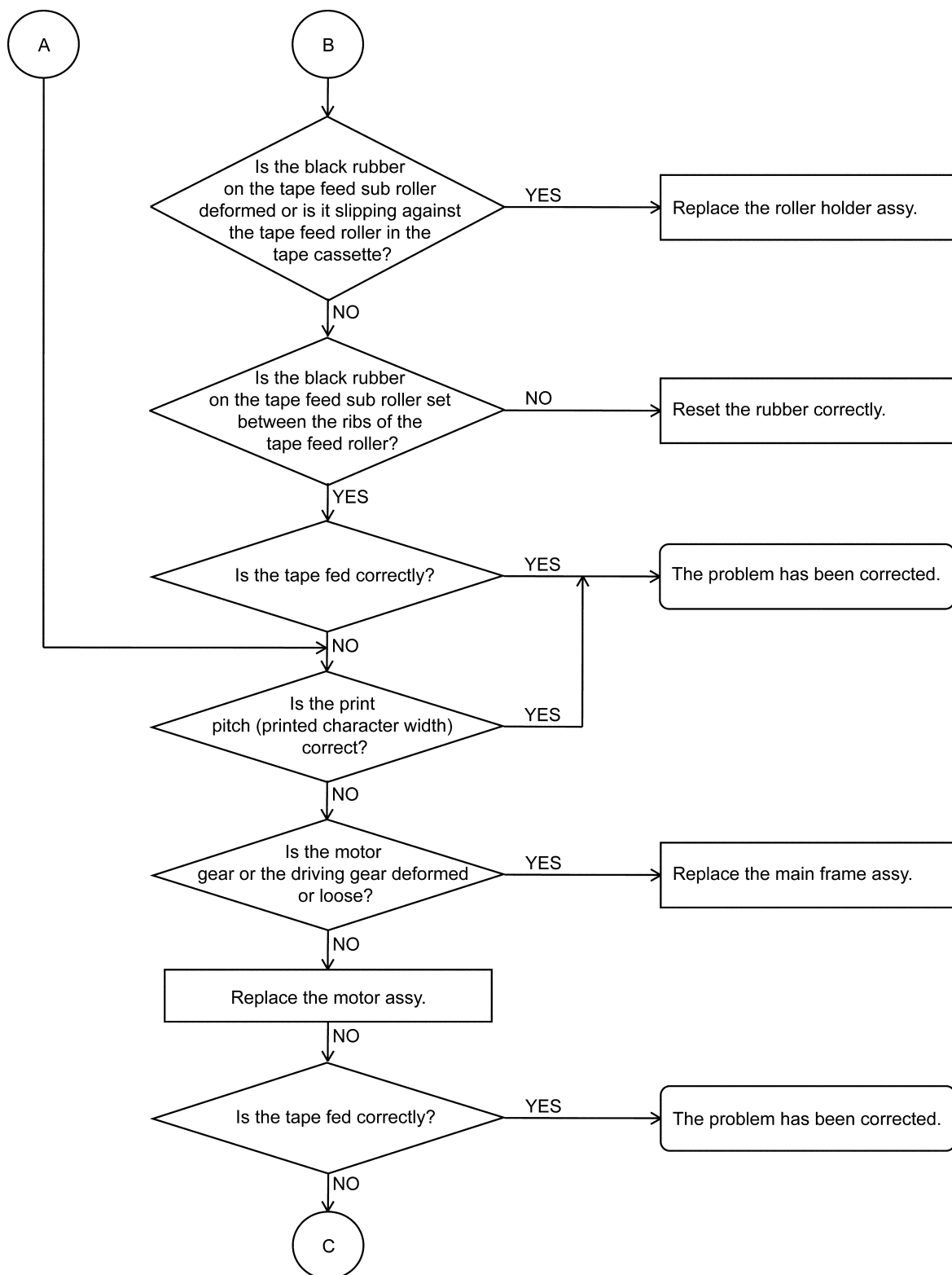
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[7] The tape is not fed correctly.

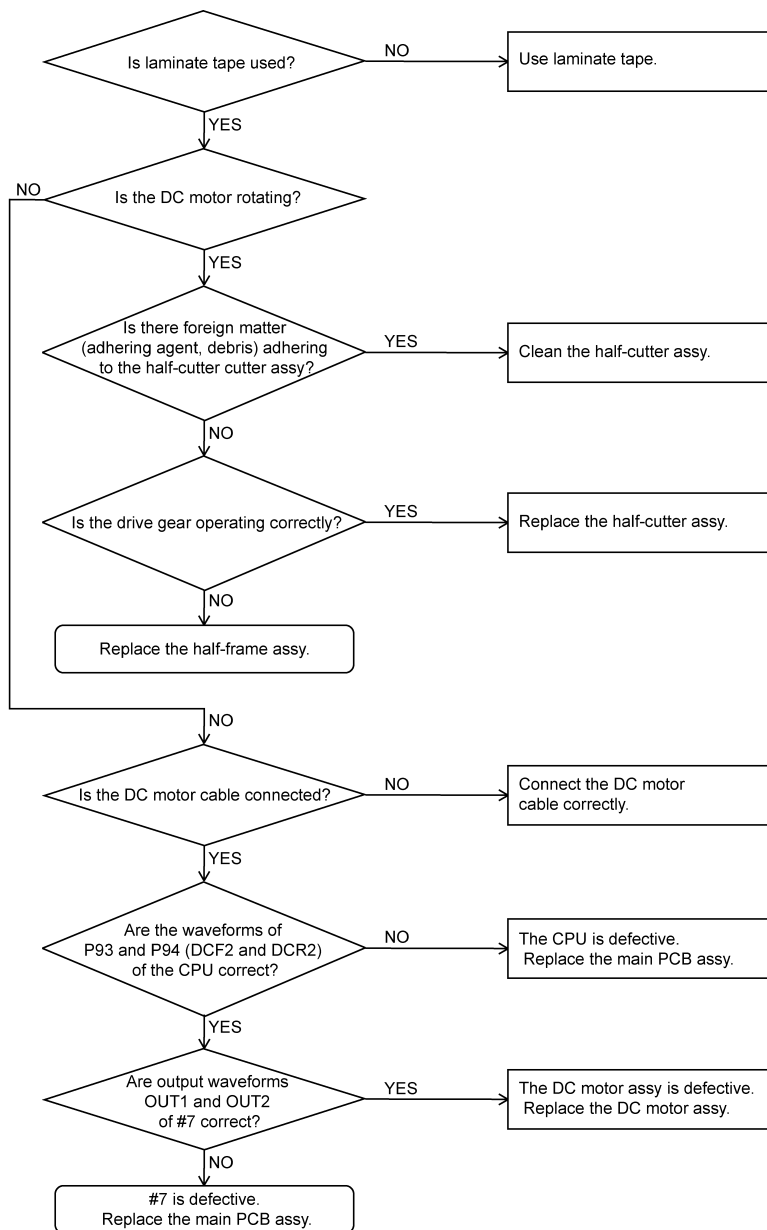
PT99007





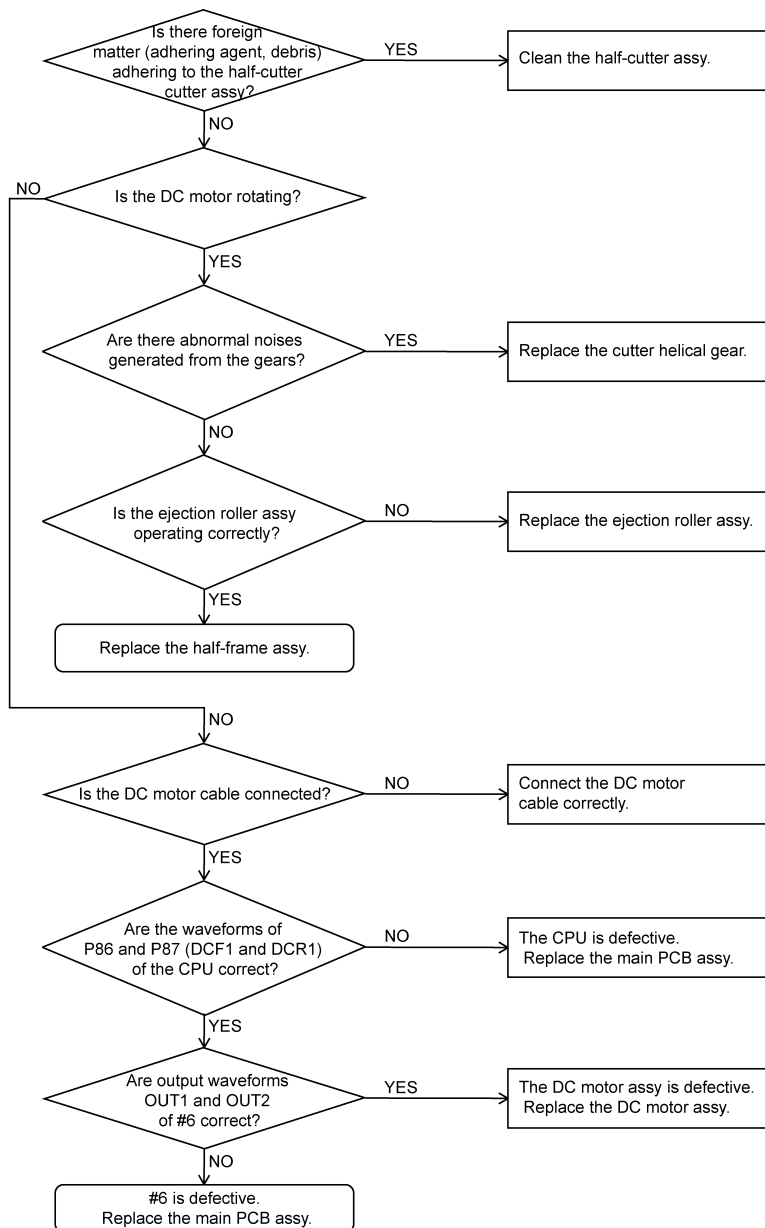
[8] Half-cut is not possible.

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[9] The tape is not ejected forcibly.

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APPENDIX

Circuit Diagram

Main PCB
Power Supply PCB

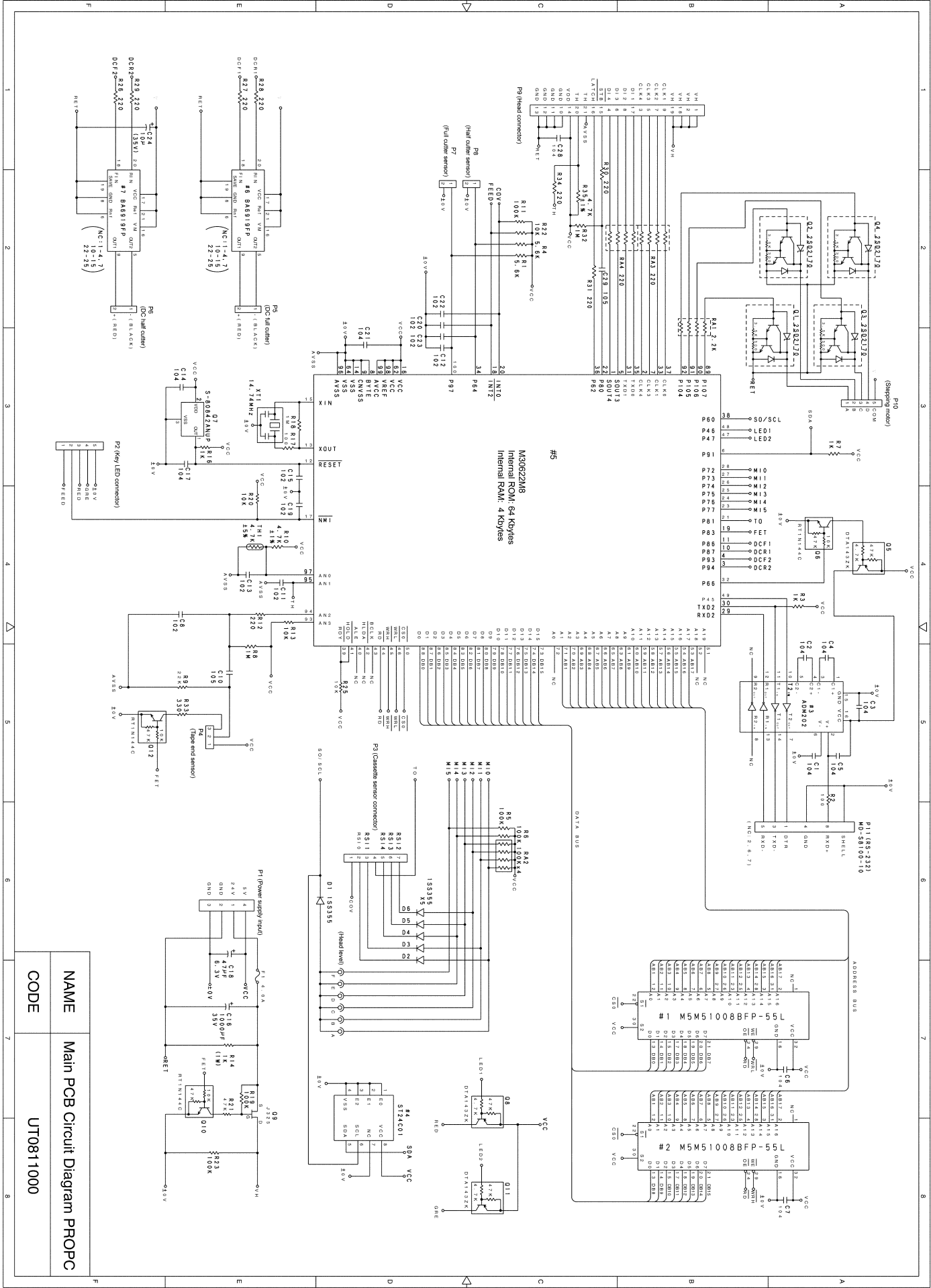
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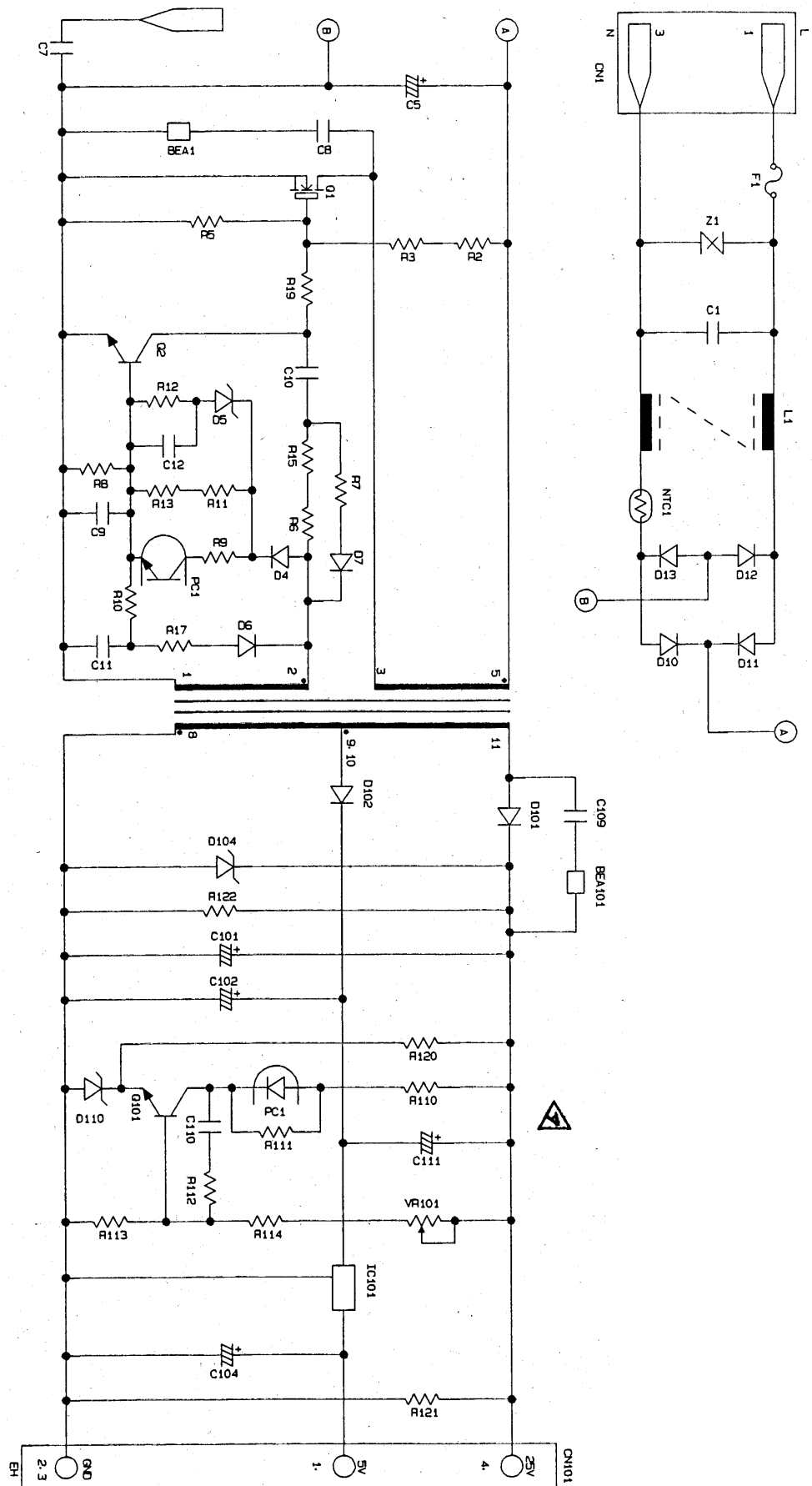
APPENDIX

Main (Control) PCB Circuit Diagram.....	APP-1
Power Supply PCB	APP-2

Appendix. Main (Control) PCB Circuit Diagram



NAME	Main PCB Circuit Diagram PROPC
CODE	UT0811000



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