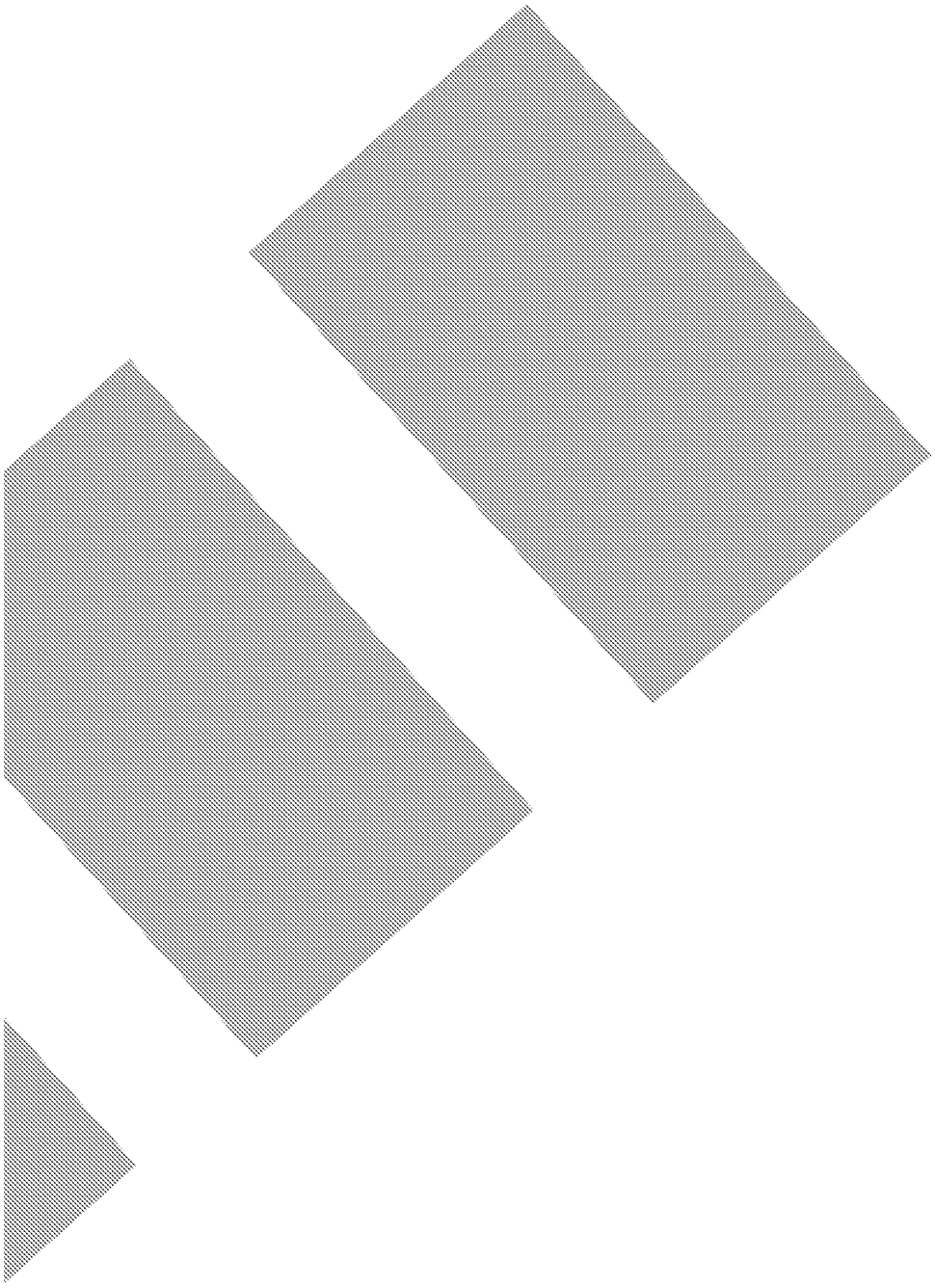
brother®

SERVICE MANUAL

MODEL: PT-9200DX



MECHANISMS & ELECTRONICS

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MODEL: PT-9200DX

PREFACE

This publication is a service manual covering the specifications, theory of operation,disassembly/ reassembly procedure, and troubleshooting of the Brother label printer PT-9200DX. It is intended for service personnel and other concerned persons to accurately and quickly provide after-sale service for our PT-9200DX.

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.

CHAPTER I

SPECIFICATIONS

CONTENTS

CHAPTER I SPECIFICATIONS

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 kg (only the machine)
Machine and package	Approx. 3.0 kg

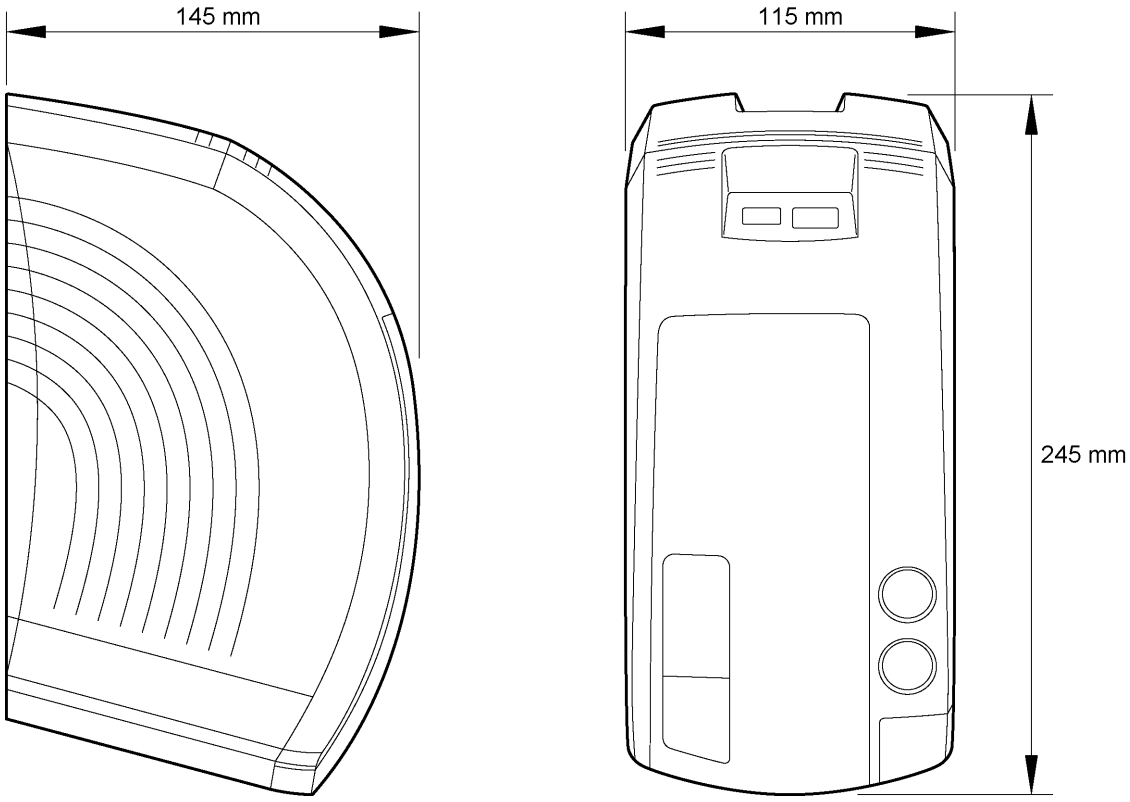


Fig. 1.1-1 External View

1.1.2 Input Specifications

(1) Number of keys — 2 (ON/OFF (⏻) and FEED/CUT (✂) keys)

(2) Key layout — See Fig. 1.1-2.

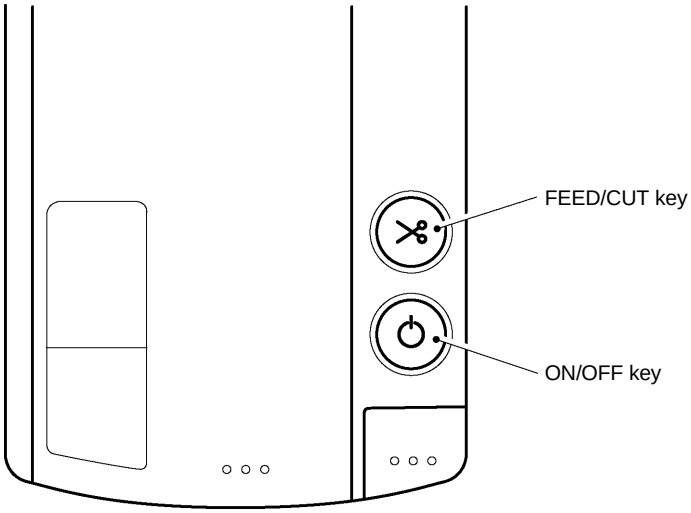


Fig. 1.1-2 Key Layout

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 Kbps

** USB

Standard — USB standard Ver.1.1 Full speed

(2) Attachments

Serial I/F cable	Dedicated cable
Editor	Dedicated editor
USB I/F cable	USB standard cable

1.2 ELECTRONIC SPECIFICATIONS

1.2.1 Power Supply Specifications

(1) Power supply method

Commercially available power (100V-120V AC, 60 Hz and 220V-240V AC, 50 Hz) 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

CONTENTS

CHAPTER II MECHANISMS

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 0.0545 mm high, as shown in Fig. 2.1-1.

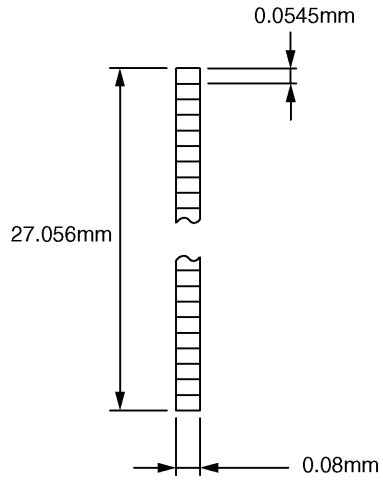


Fig. 2.1-1 Heating Elements of the Thermal Head

(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.

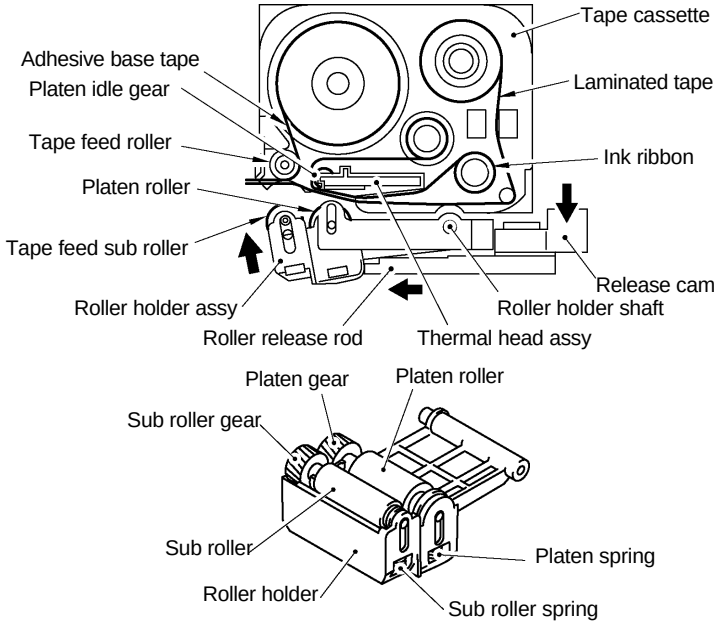


Fig. 2.1-2 Roller Holder Assy Setting and Retracting Mechanism

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.

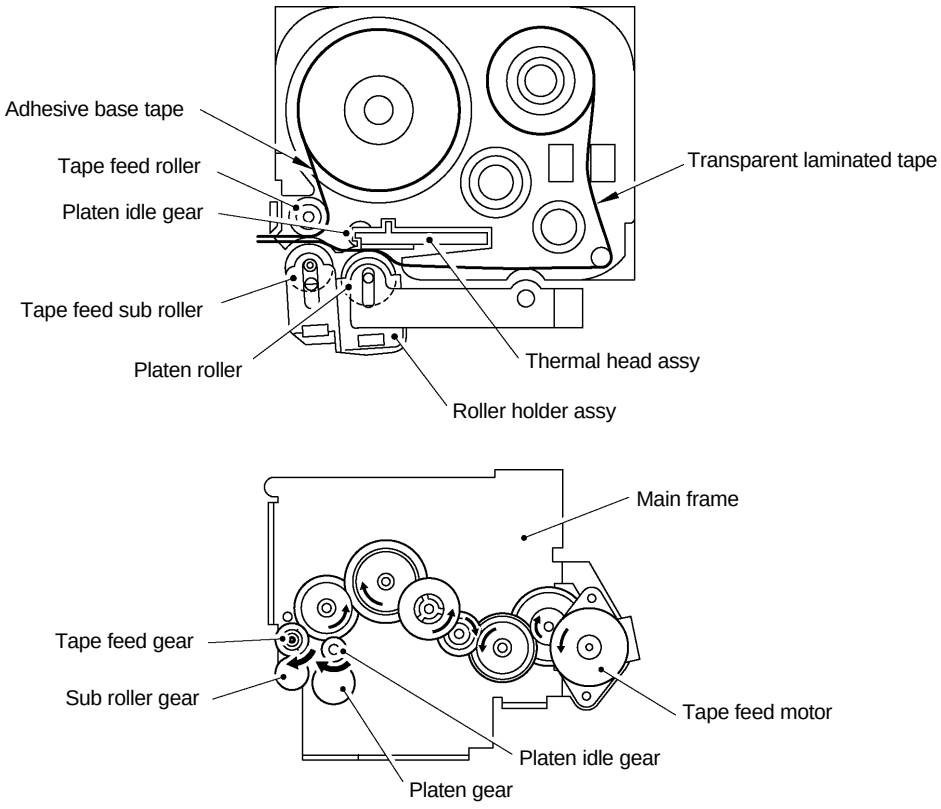


Fig. 2.1-3 Tape Feed Mechanism

(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.

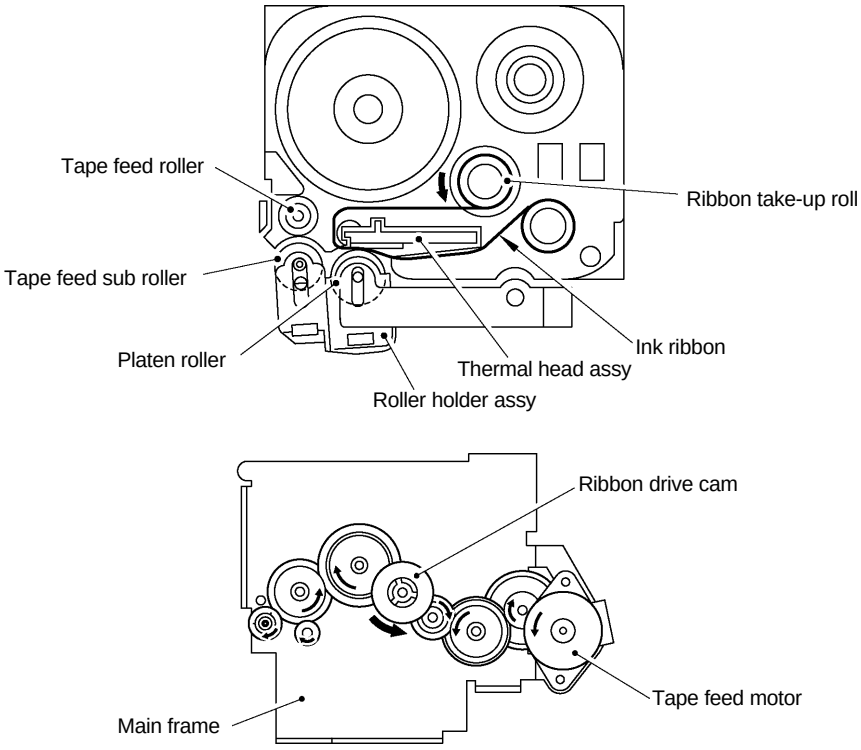


Fig. 2.1-4 Ribbon Feed Mechanism

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.

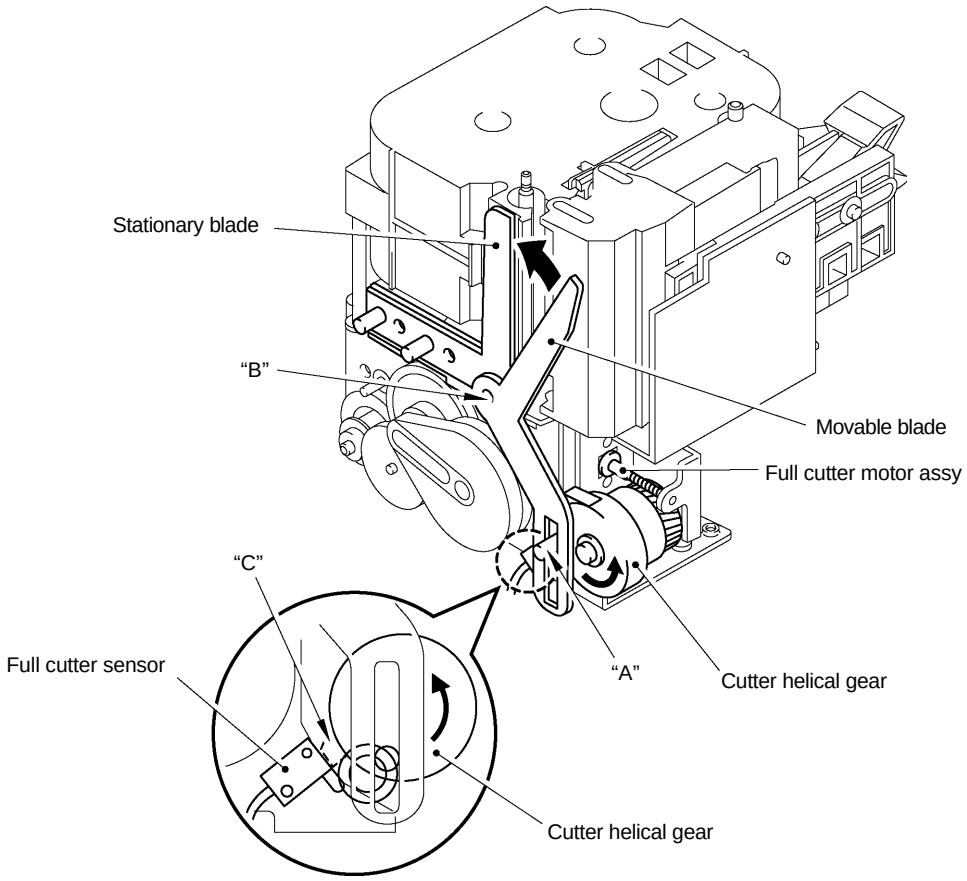


Fig. 2.1-5 Tape Automatic Full Cutter Mechanism

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.

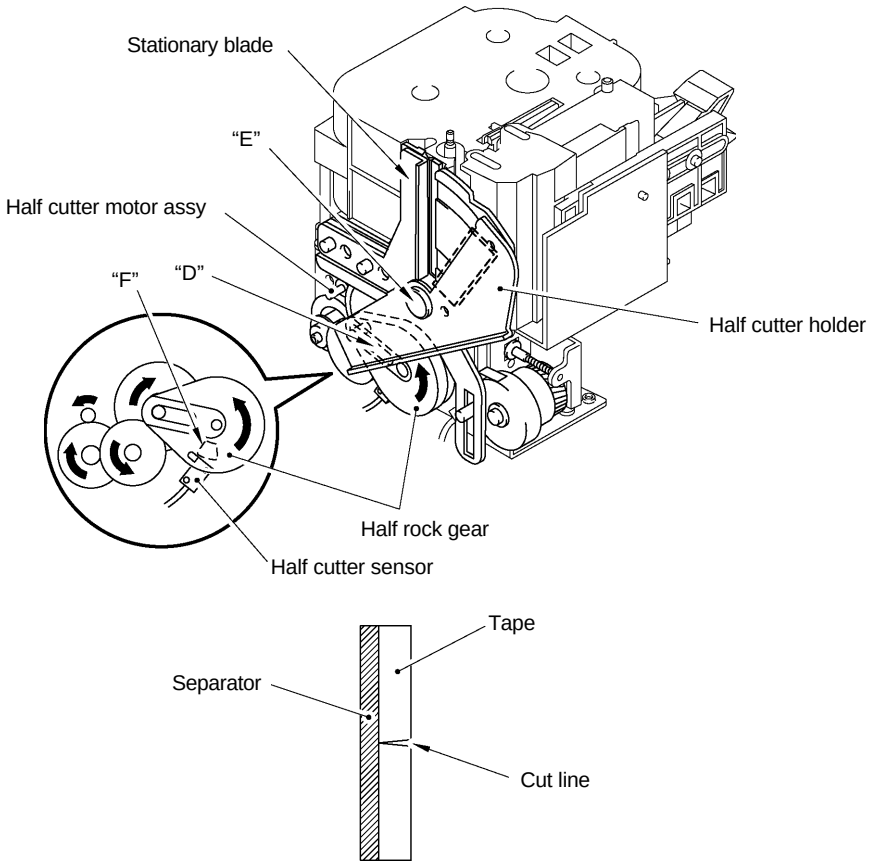


Fig. 2.1-6 Tape Automatic Half Cutter Mechanism

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.

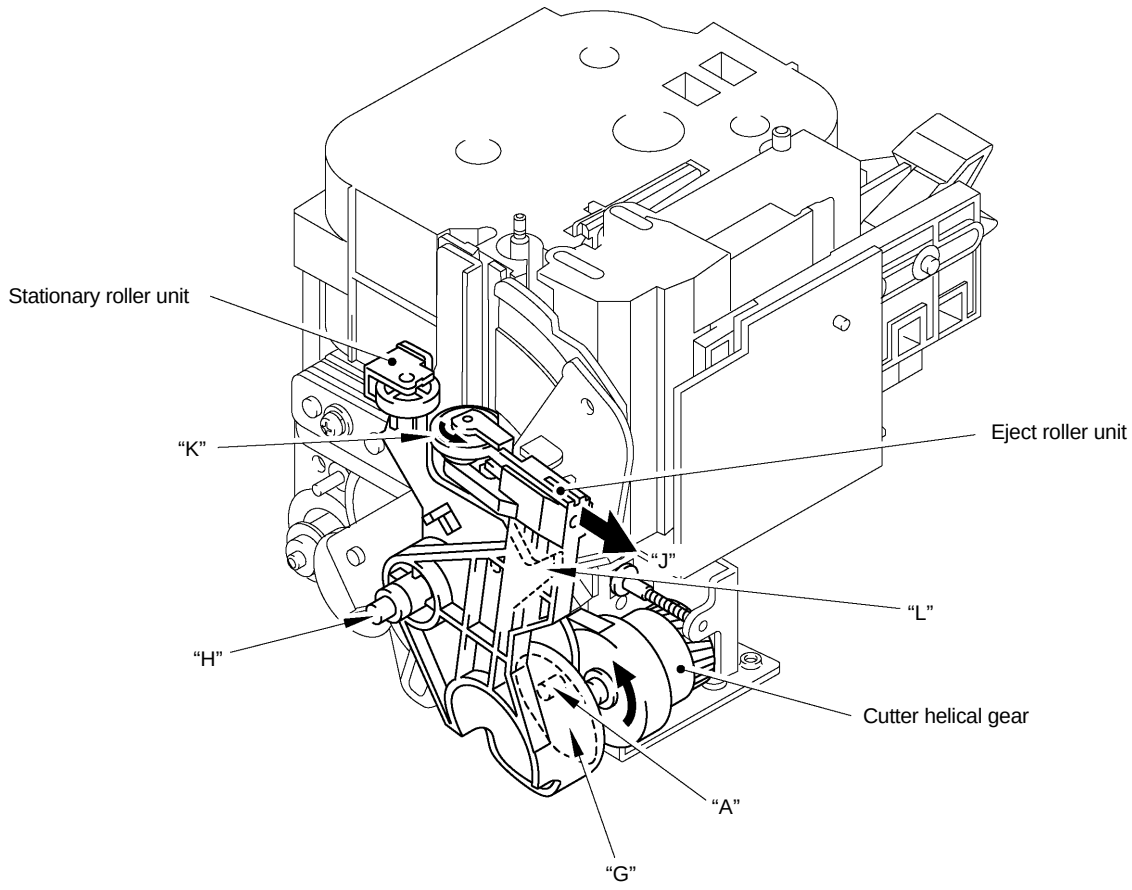


Fig. 2.1-7 Forced Tape Eject Mechanism

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.

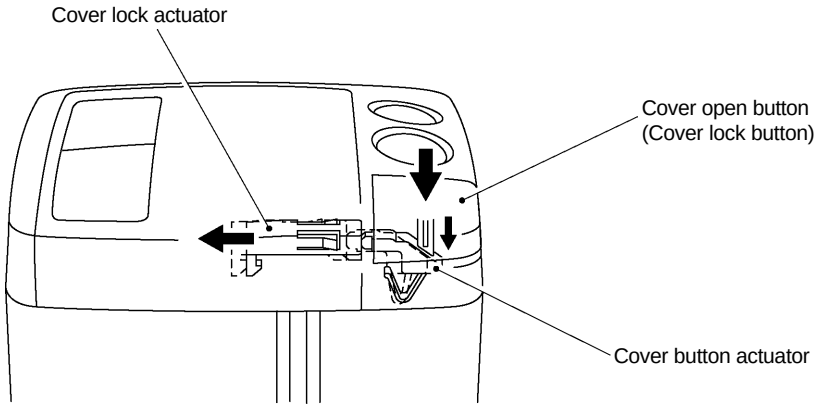


Fig. 2.1-8 Cover Open Button

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.

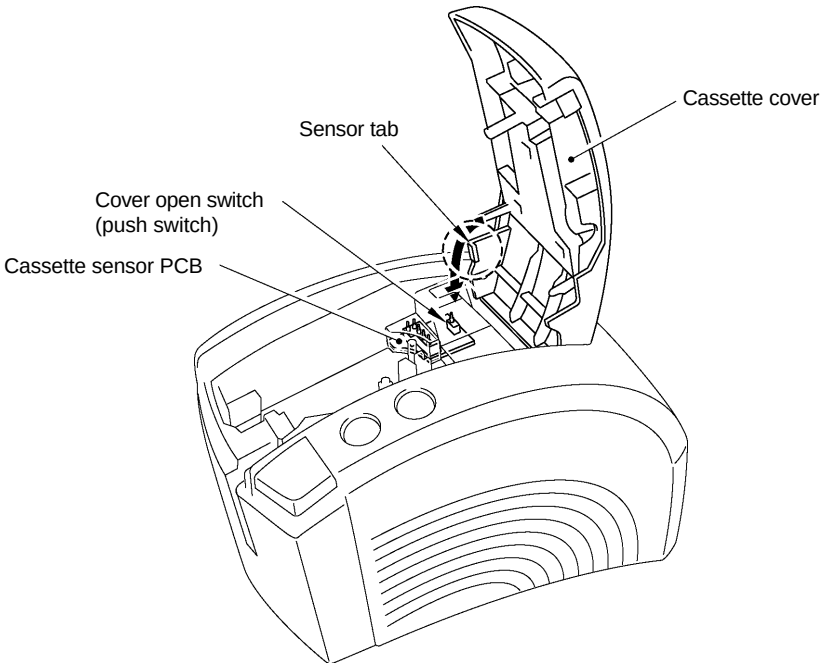


Fig. 2.1-9 Cover Open Sensor

2.2 DISASSEMBLY AND REASSEMBLY

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.

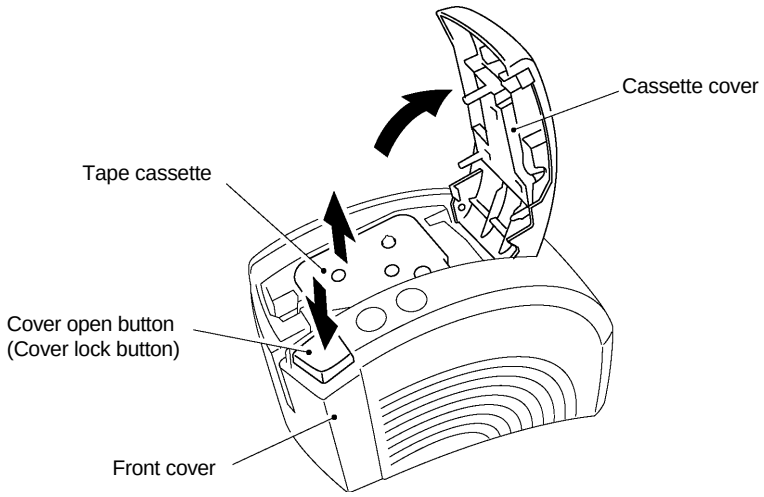


Fig. 2.2-1 Removing the Tape Cassette

[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.

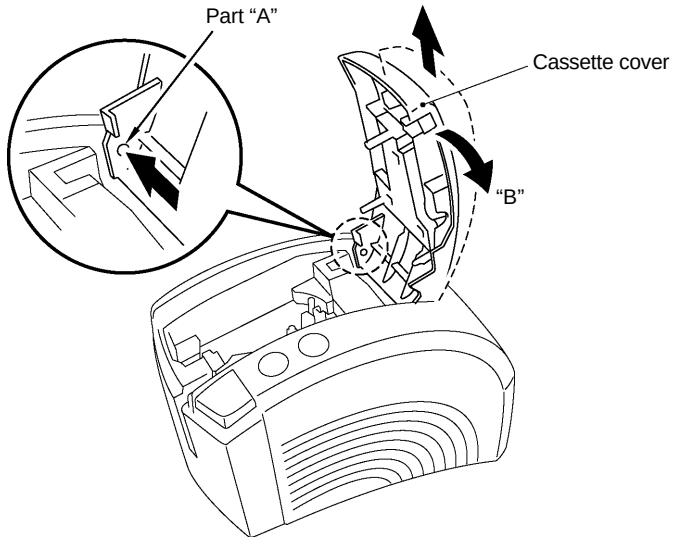


Fig. 2.2-2 Removing the Cassette Cover

[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.

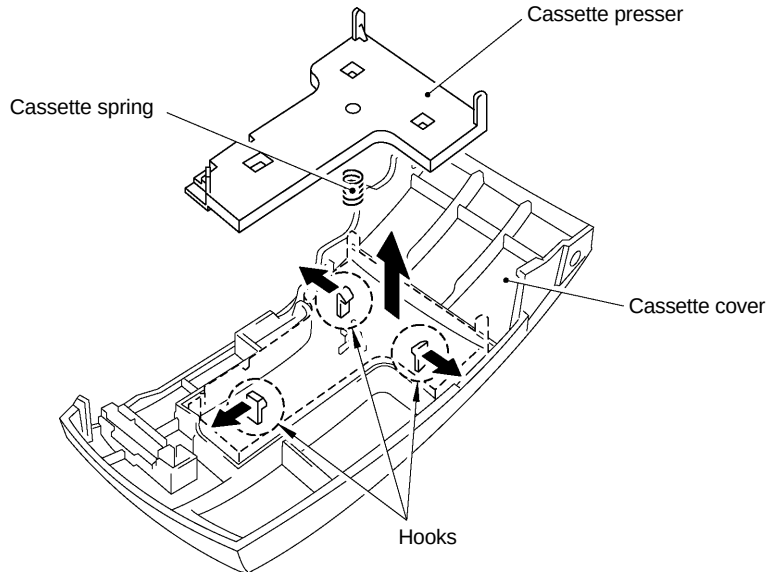


Fig. 2.2-3 Removing the Cassette Presser and Spring

(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.

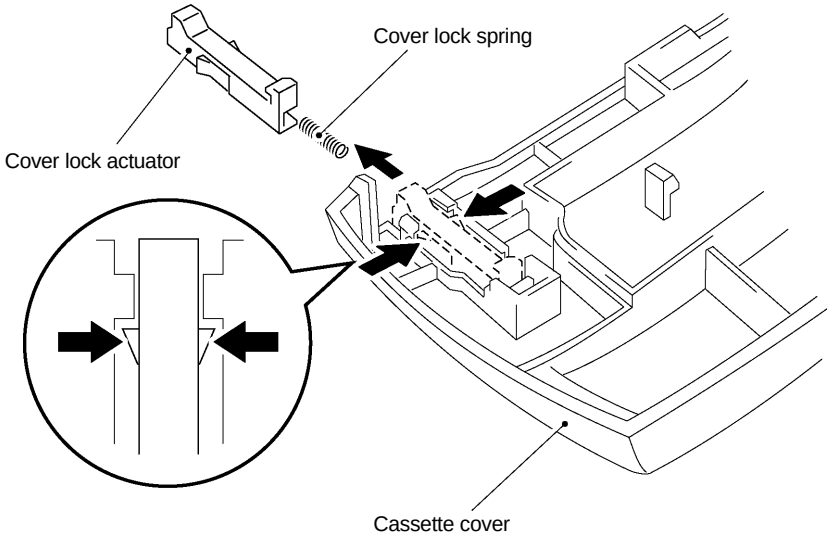


Fig. 2.2-4 Removing the Cover Lock Actuator and Spring

[4] Removing the Lower Cover

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

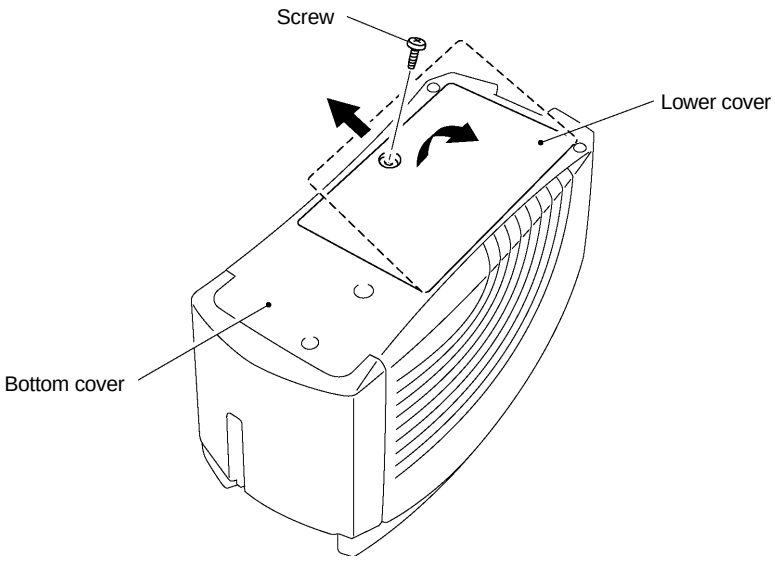


Fig. 2.2-5 Removing the Lower Cover

[5] Removing the Bottom Cover and the Front Cover

(1) Remove screws “A” and “B” securing the ground wire.

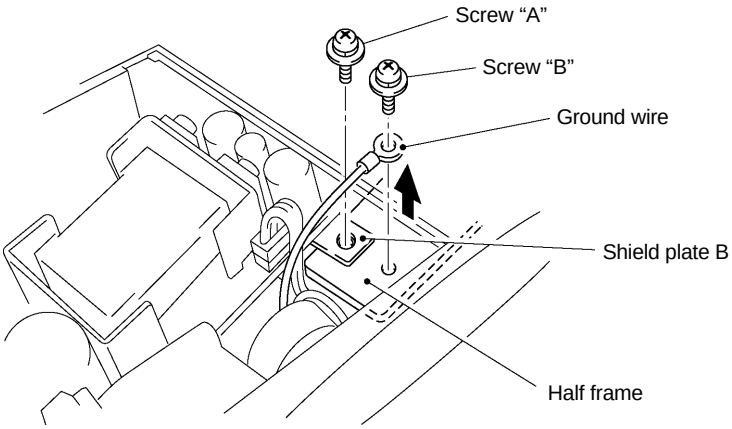


Fig. 2.2-6 Removing the Screws Securing the Ground Wire

(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.

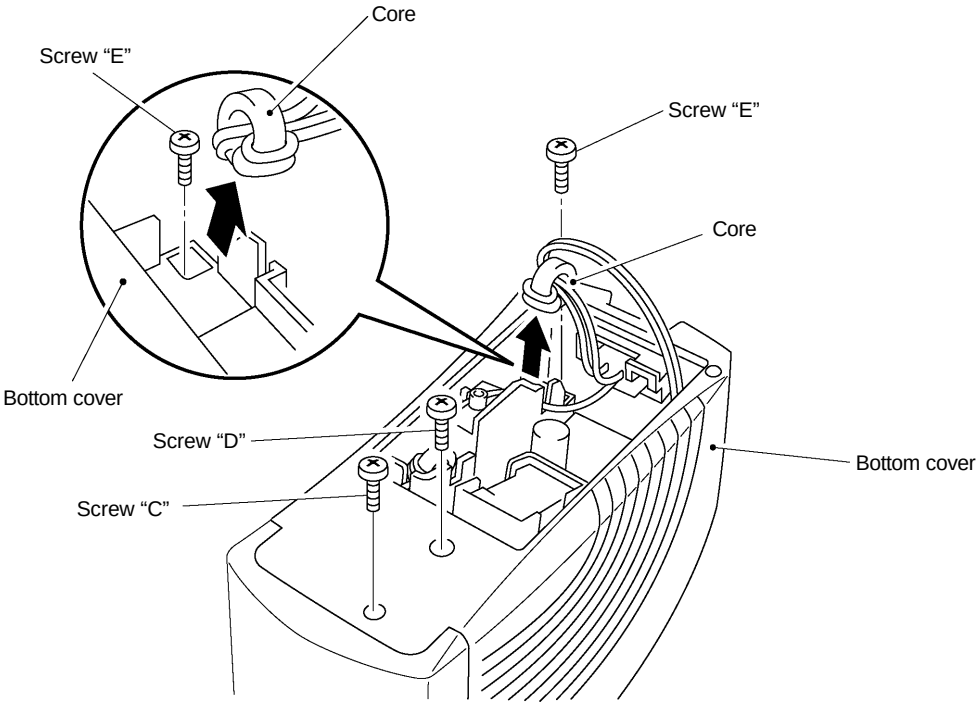


Fig. 2.2-7 Removing the Screws Securing the Bottom Cover

(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.

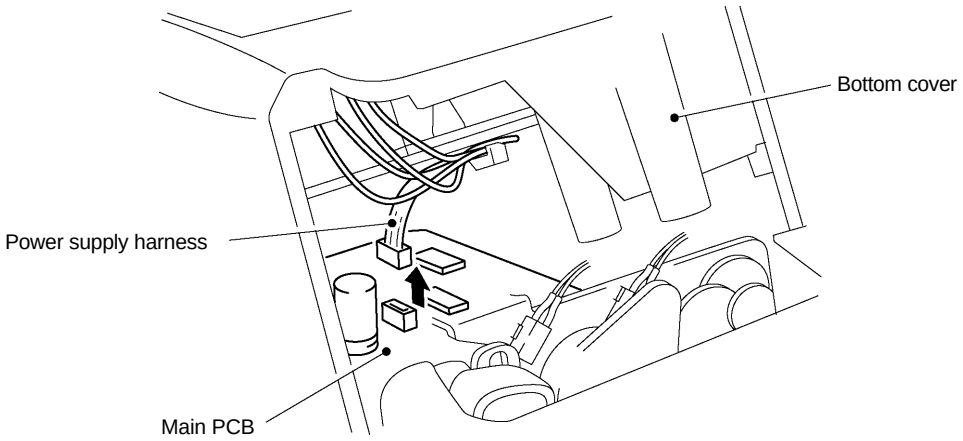


Fig. 2.2-8 Removing the Power Supply Harness and Connector

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

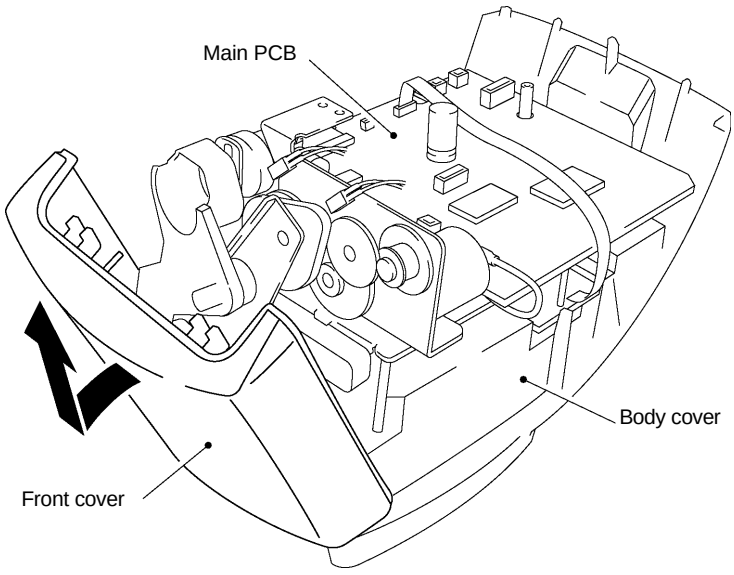


Fig. 2.2-9 Removing the Front Cover

[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.

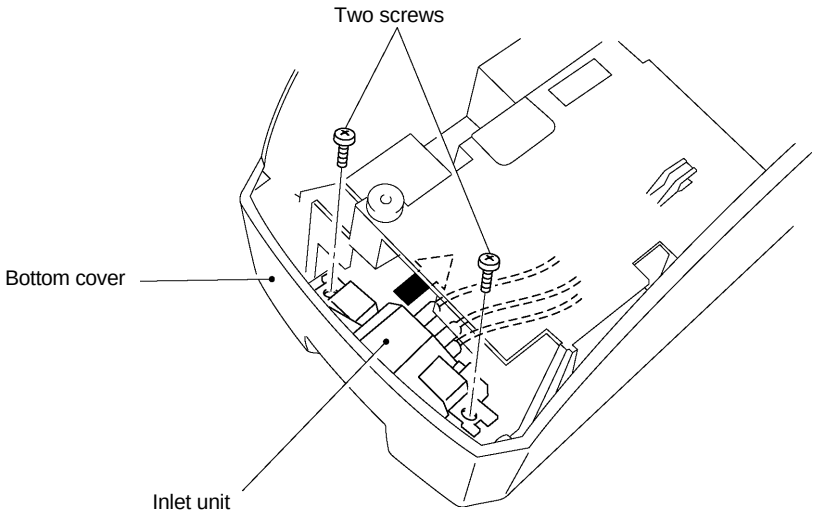


Fig. 2.2-10 Removing the Inlet Unit

(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.

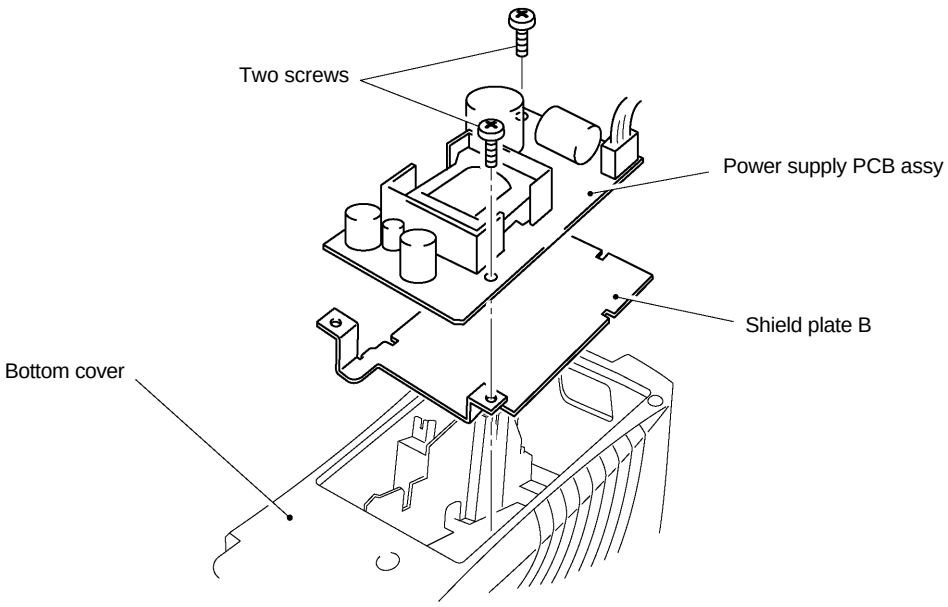


Fig. 2.2-11 Removing the Power Supply PCB Assy and Shield Plate B

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

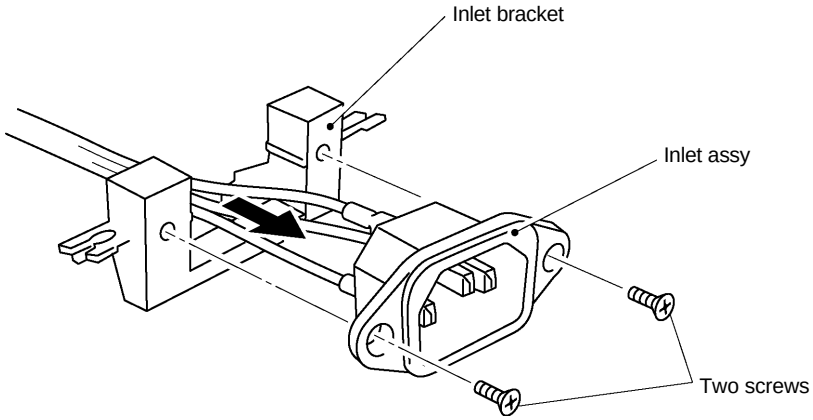


Fig. 2.2-12 Removing the Inlet Assy

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

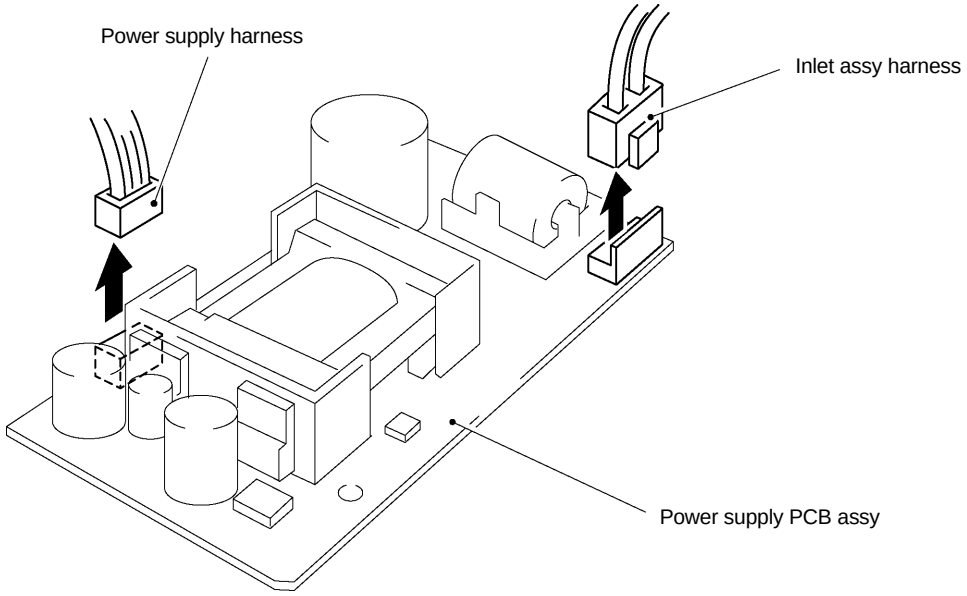


Fig. 2.2-13 Removing the Inlet Assy and Power Supply Harnesses

[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.

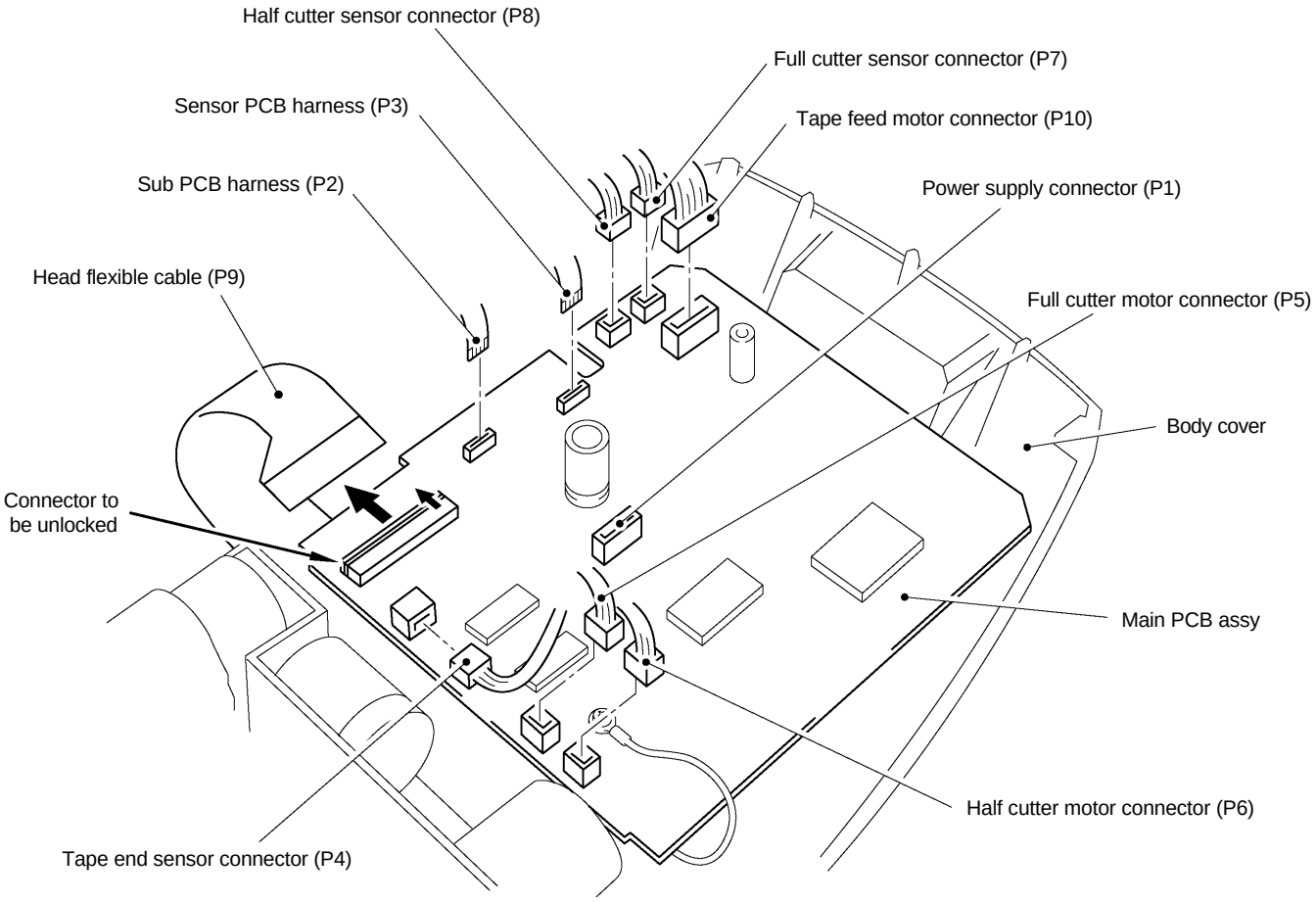


Fig. 2.2-14 Removing the Connectors and Cables

(2) Remove the three screws securing the main PCB, disconnect one terminal of the FG harness,and lift the top of the main PCB assy to remove it.

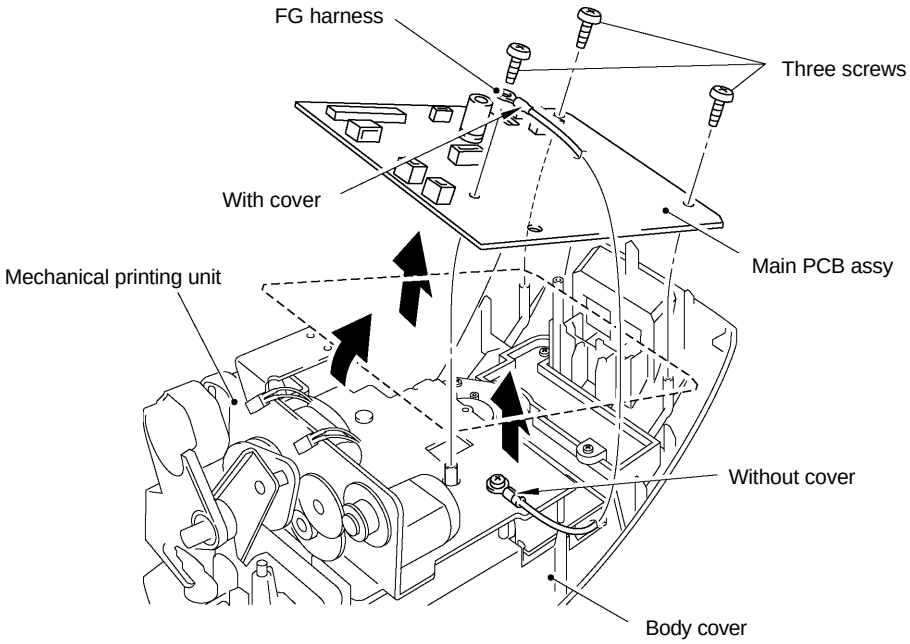


Fig. 2.2-15 Removing the Main PCB Assy

(3) Remove the two screws securing the FG harness and the mechanical printing unit to remove them.

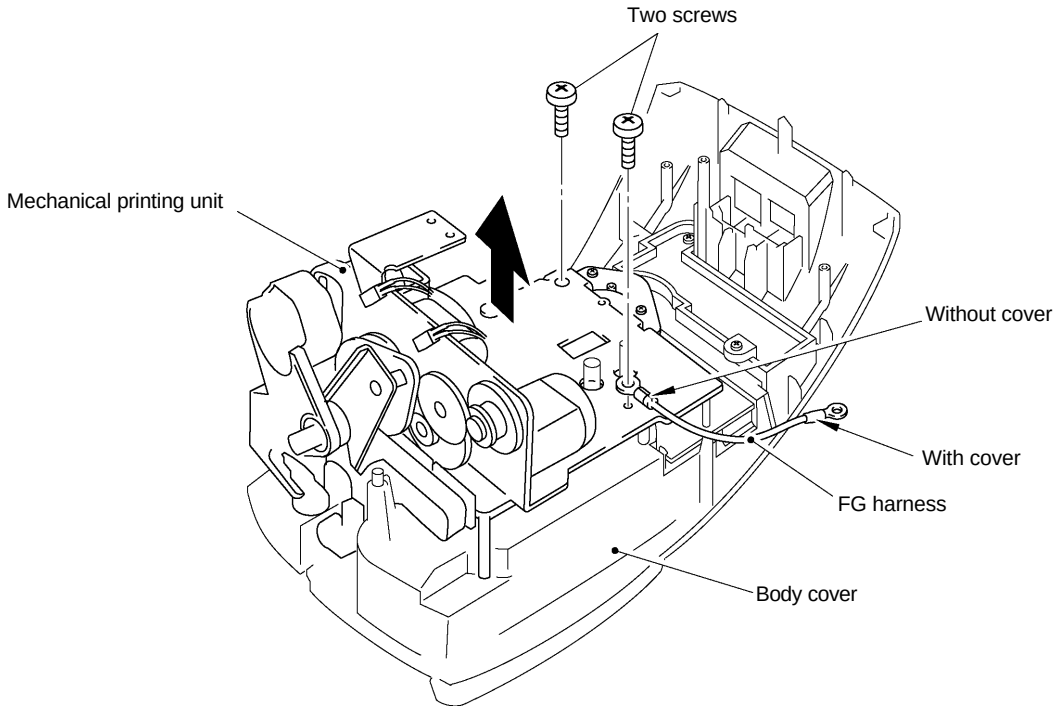


Fig. 2.2-16 Removing the Mechanical Printing Unit

[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.

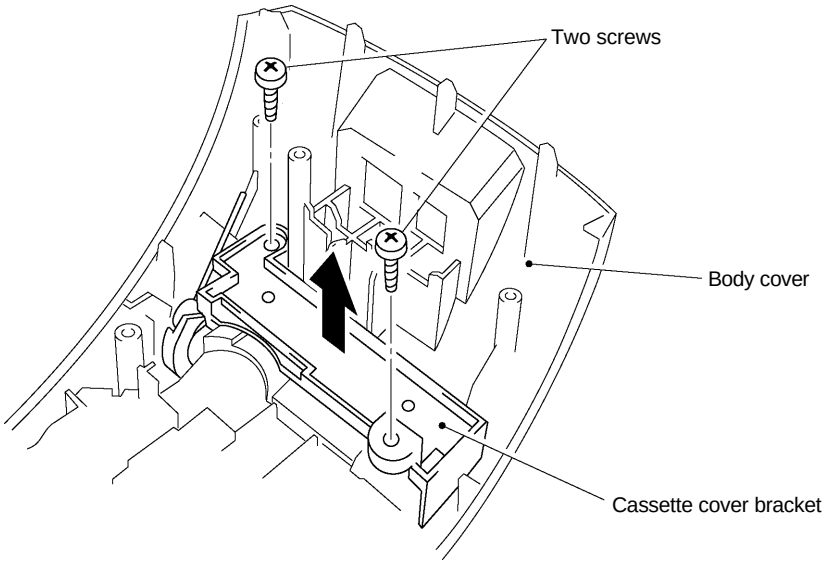


Fig. 2.2-17 Removing the Cassette Cover Bracket

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

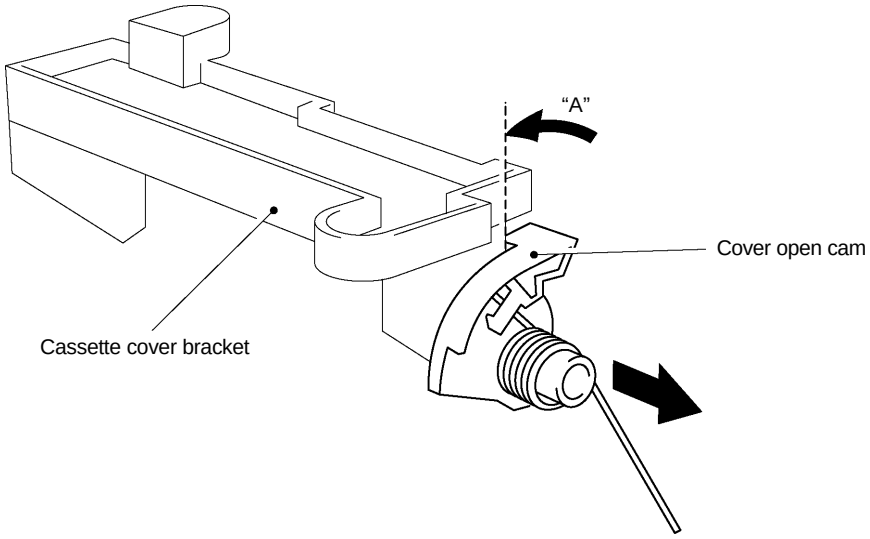


Fig. 2.2-18 Removing the Cover Open Cam

(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.

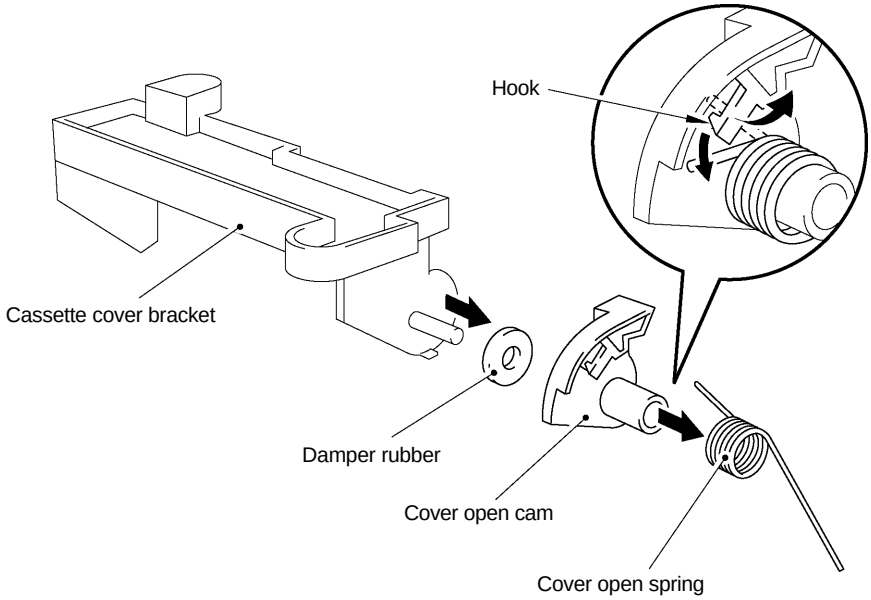


Fig. 2.2-19 Removing the Damper Rubber and the Cover Open Spring

(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.

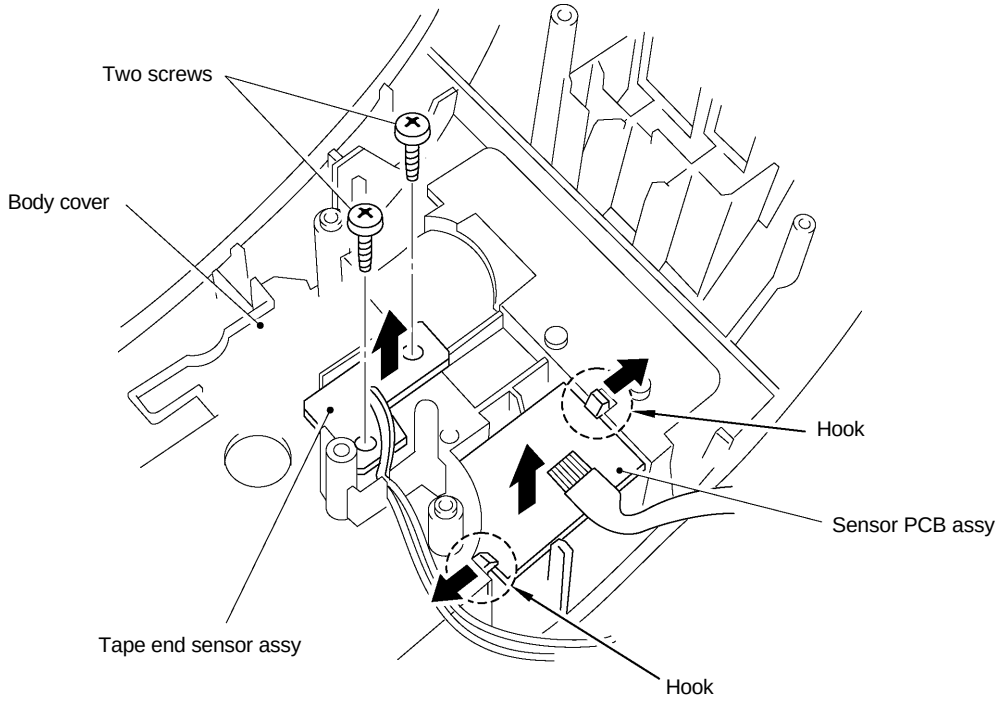


Fig. 2.2-20 Removing the Tape End Sensor Assy and the Sensor PCB Assy

(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.

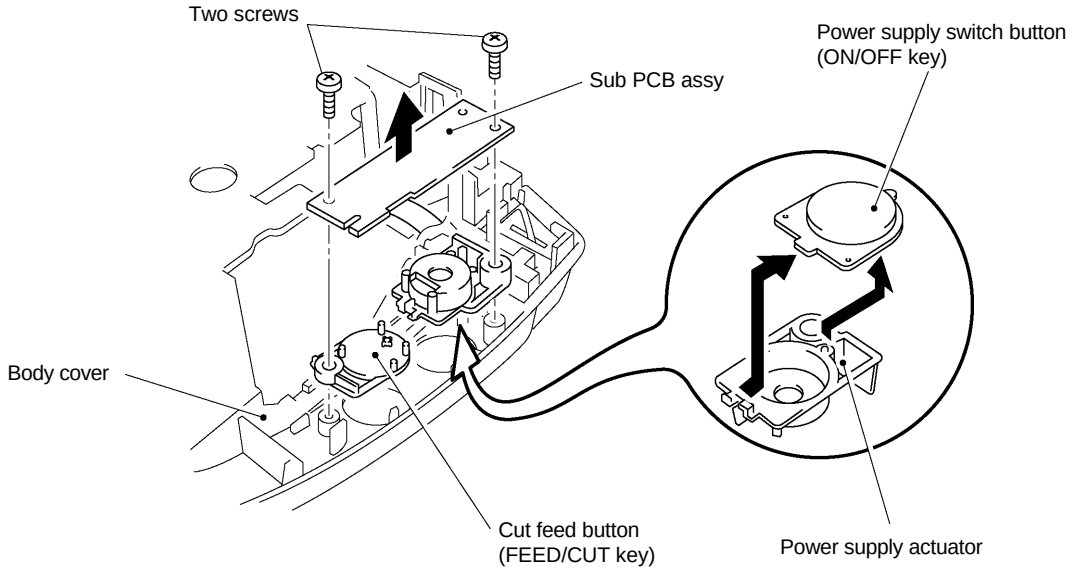


Fig. 2.2-21 Removing the Sub PCB Assy and the Button

(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.

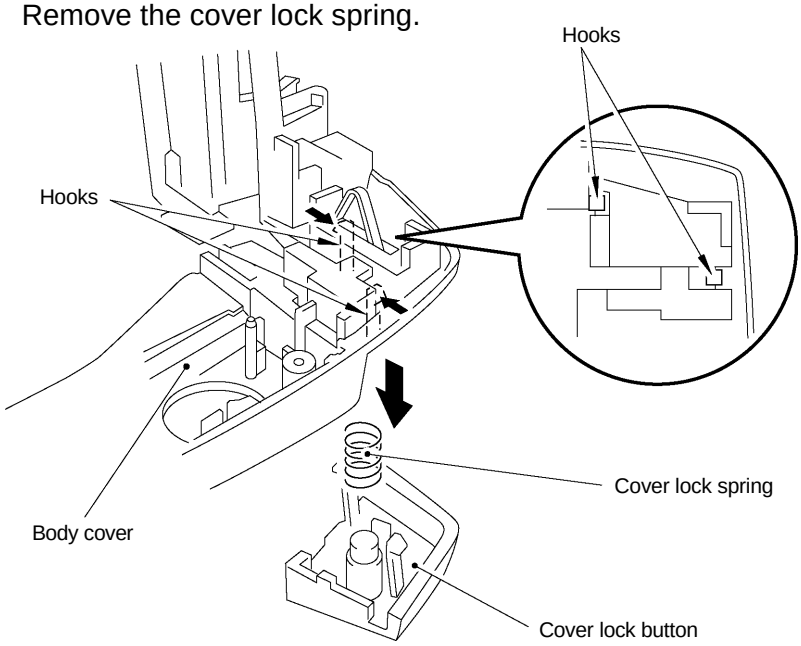


Fig. 2.2-22 Removing the Cover Lock Button and Spring

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

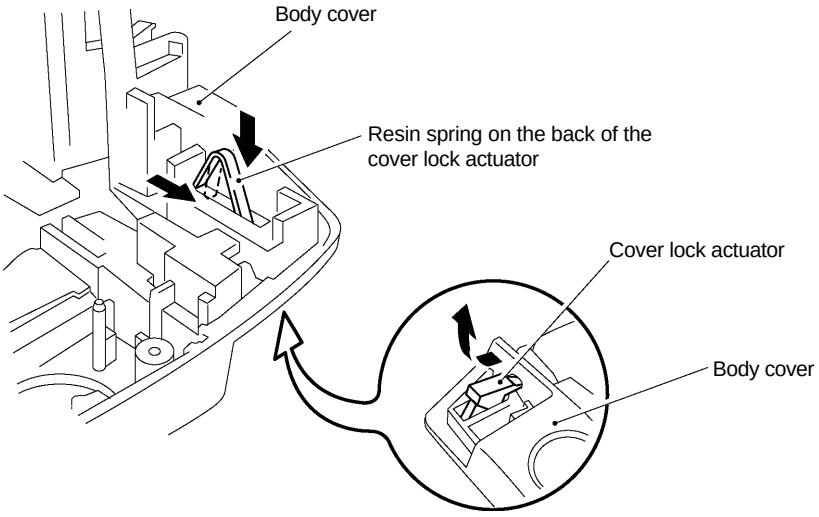


Fig. 2.2-23 Removing the Cover Lock Actuator

[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 otherwise danger will be caused.

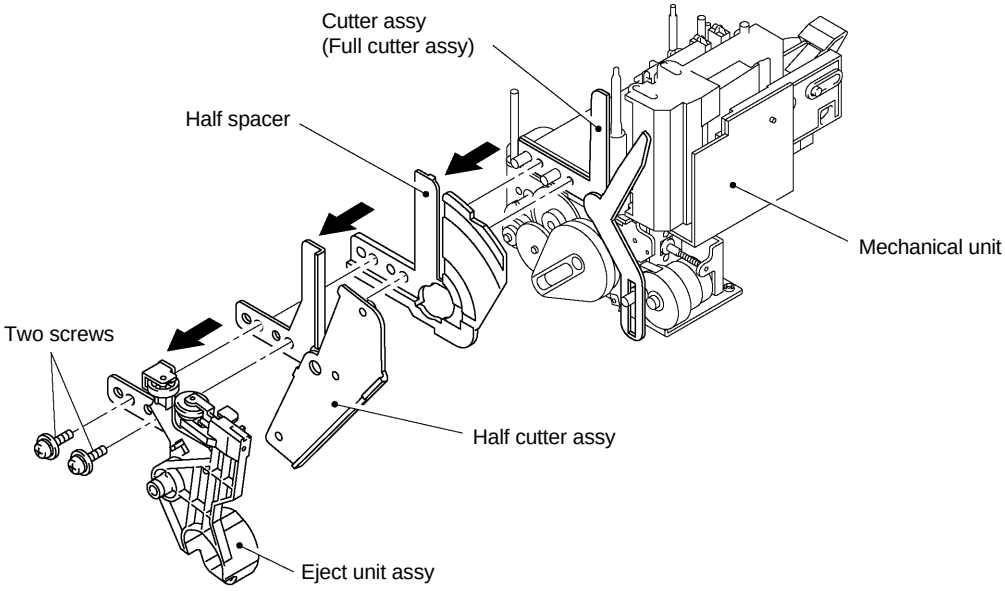


Fig. 2.2-24 Removing the Eject Unit Assy, the Half Cutter Assy, the Half Spacer, and the Cutter Assy

[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.

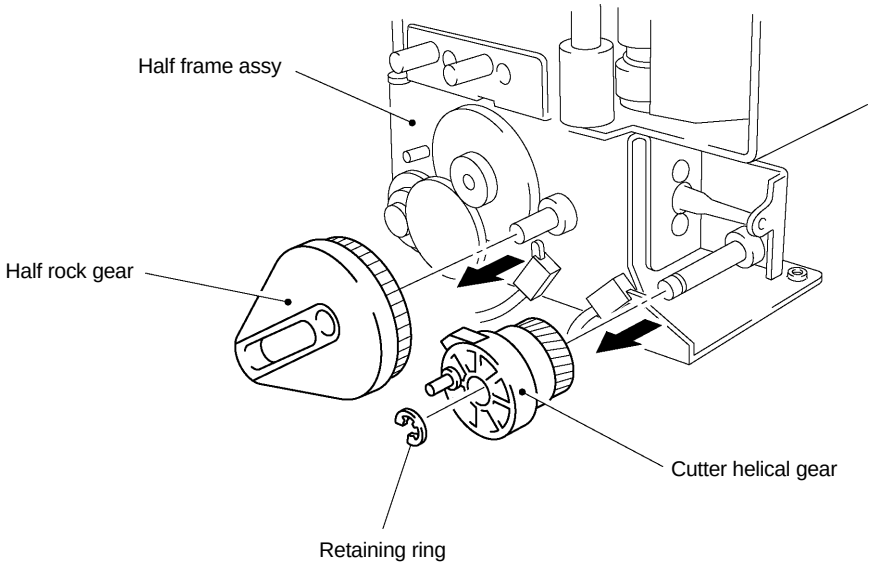


Fig. 2.2-25 Removing the Half Rock Gear and the Cutter Helical Gear

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

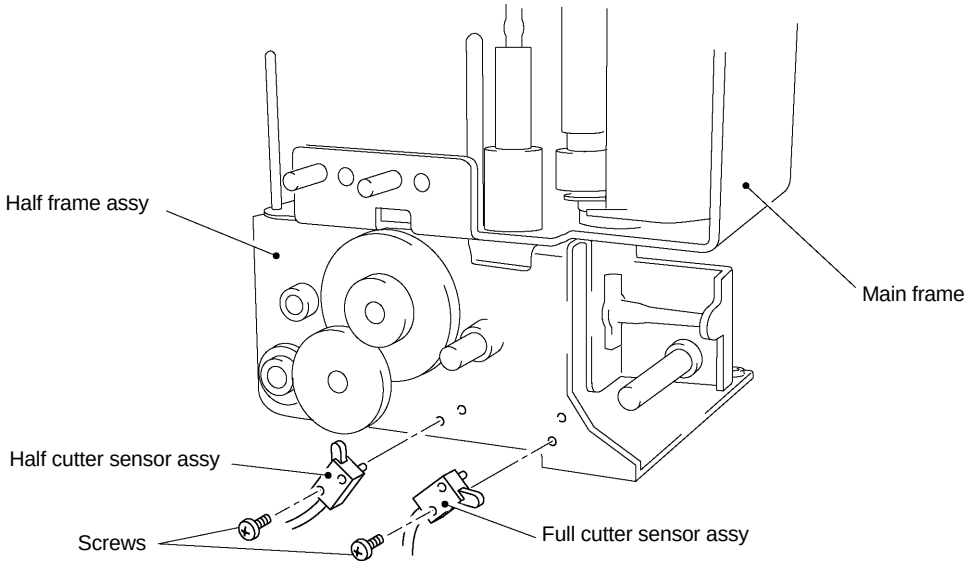


Fig. 2.2-26 Removing the Half Cutter Sensor Assy and the Full Cutter Sensor Assy

(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.

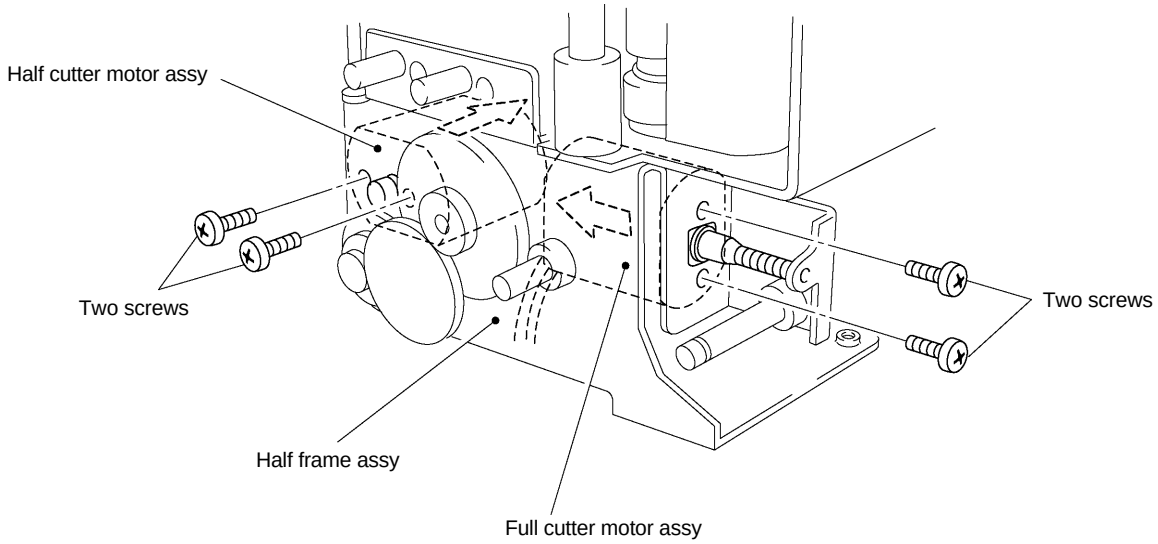


Fig. 2.2-27 Removing the Half Cutter Motor Assy and the Full Cutter Motor Assy

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

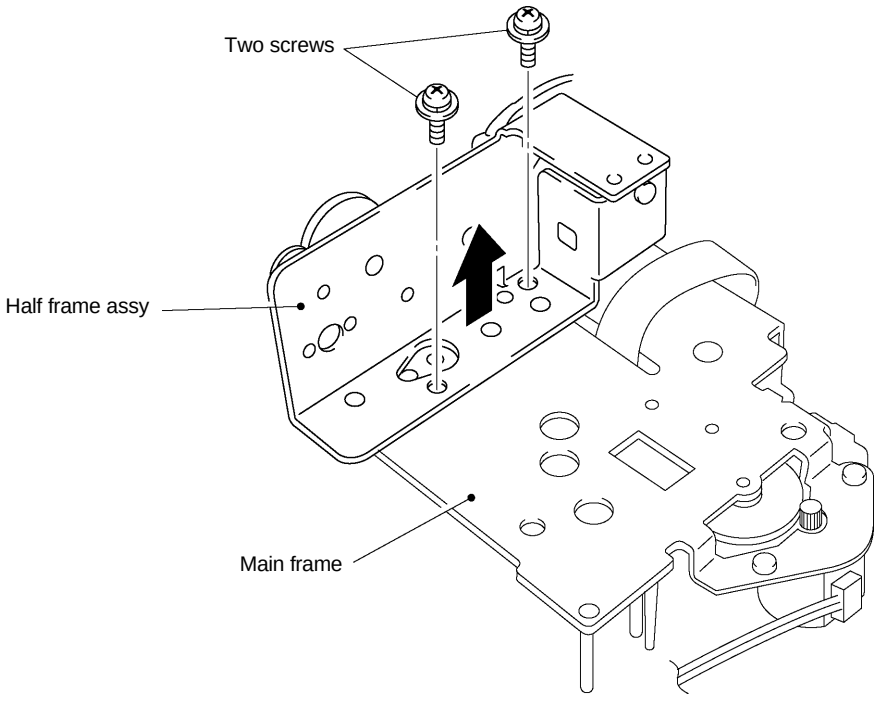


Fig. 2.2-28 Removing the Half Frame Assy

[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.

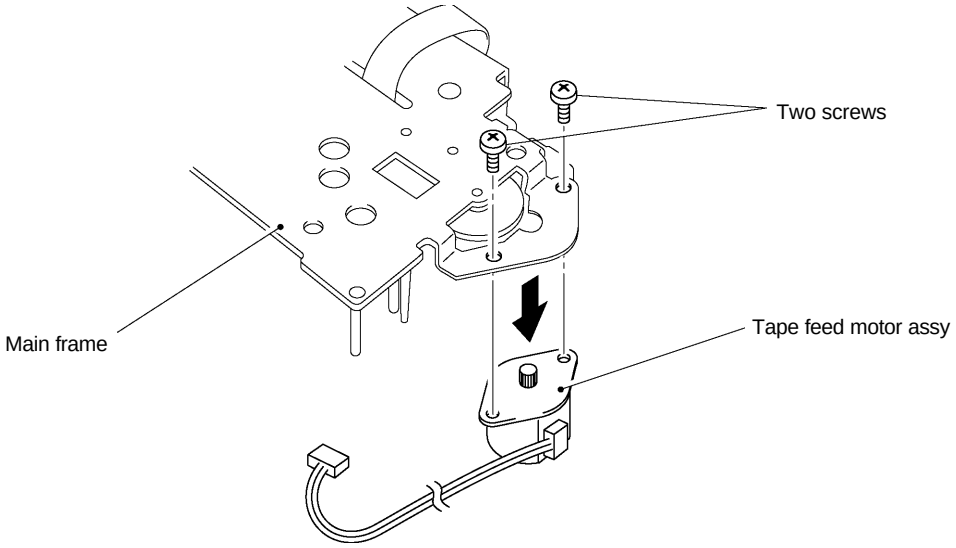


Fig. 2.2-29 Removing the Tape Feed Motor Assy

(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.

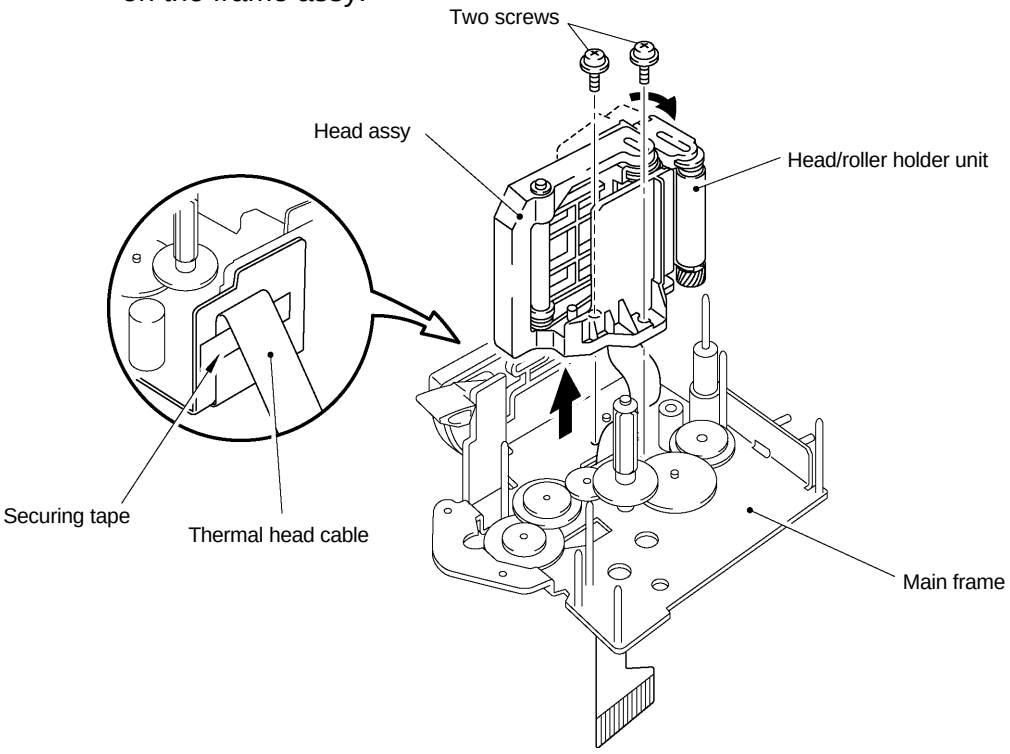


Fig. 2.2-30 Removing the Head/Roller Holder Unit

(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.

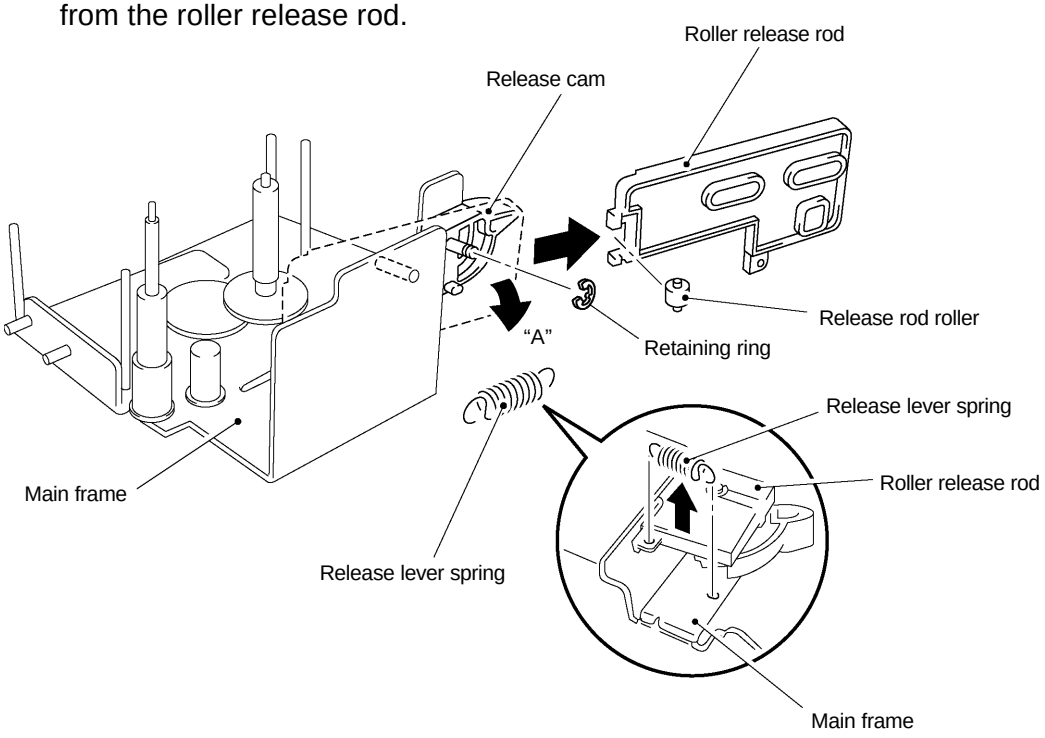


Fig. 2.2-31 Removing the Roller Release Rod

[12] Disassembly of the Head/Roller Holder Unit

(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.

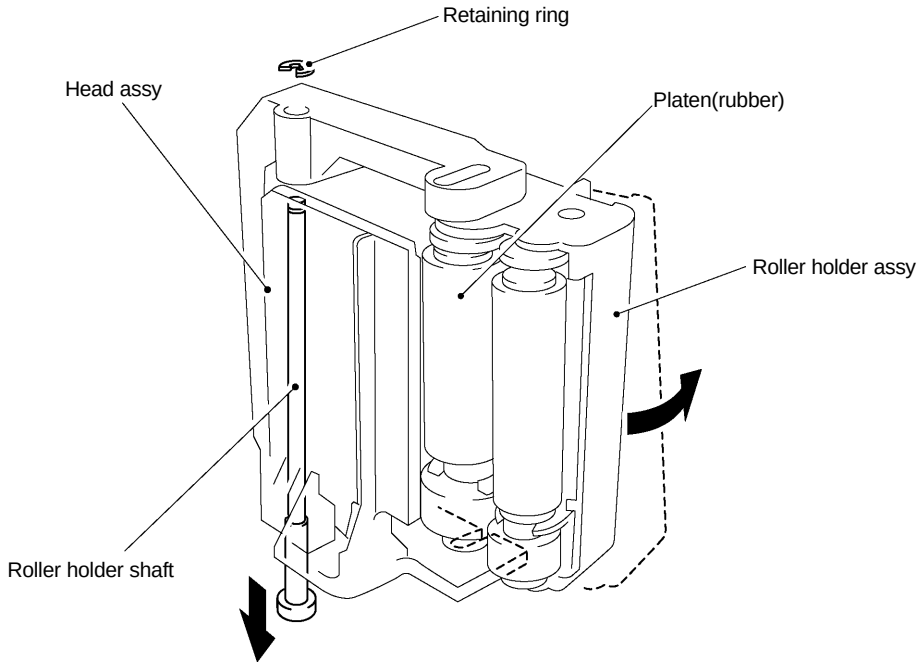


Fig. 2.2-32 Removing the Roller Holder Assy

(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.

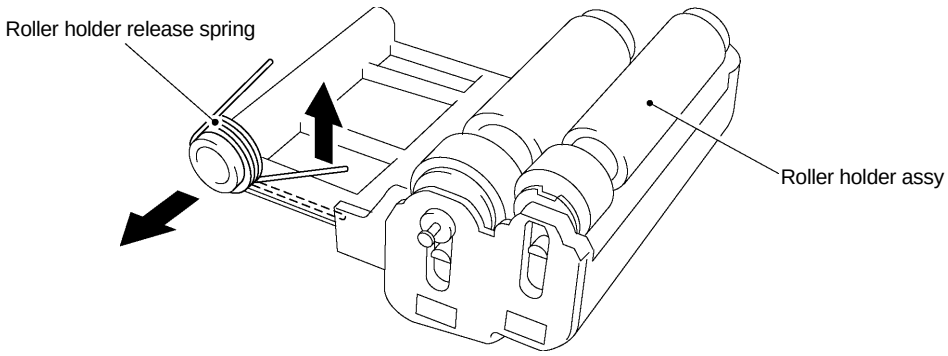


Fig. 2.2-33 Removing the Roller Holder Release Spring

2.2.2 Reassembly Procedures

[1] Reassembly of the Head/Roller Holder Unit

(1) Apply the specified grease (1 mm^3) on each of the top and bottom of the platen shaft of the roller holder assy. (Specified grease: Silicone grease G501)

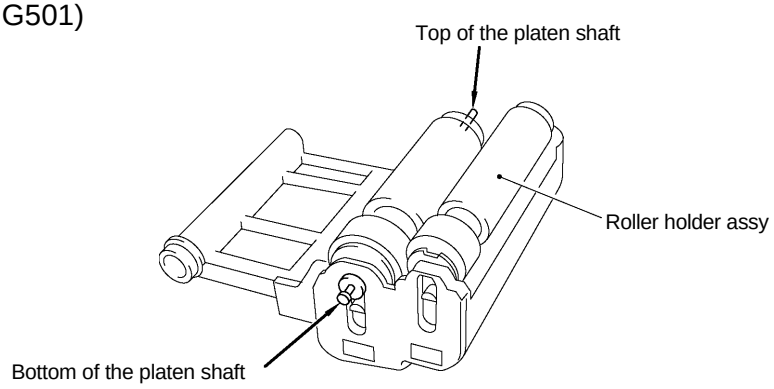


Fig. 2.2-34 Applying the Grease on the Platen Shaft

(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.

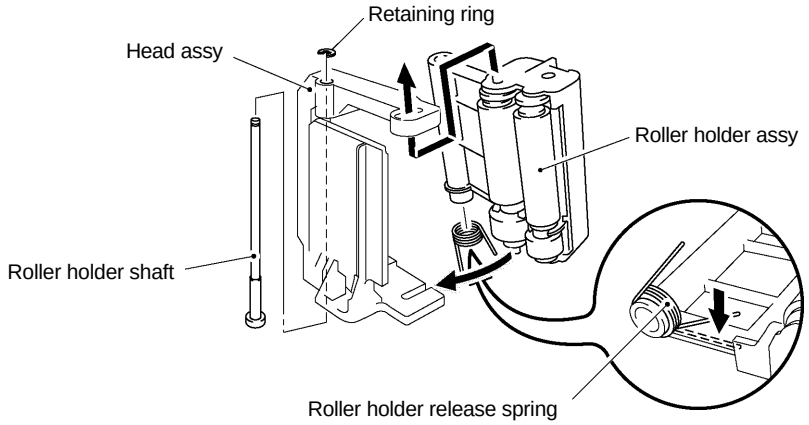


Fig. 2.2-35 Reassembly of the Roller Holder Assy

[2] Reassembly of the Mechanical Unit

(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 mm^3) on each of the inside of the square hole in the roller release rod and the release rod roller. (Specified grease: Silicone grease G501)

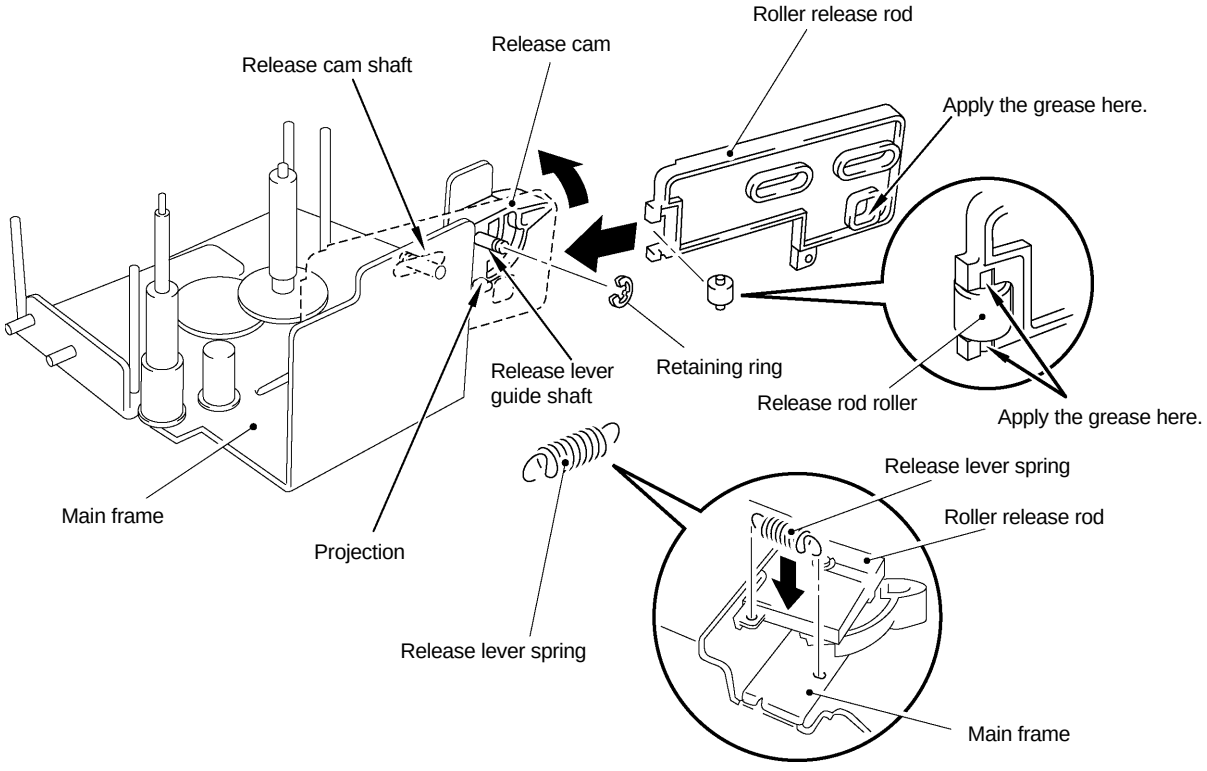


Fig. 2.2-36 Reassembly of the Roller Release Rod

(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.

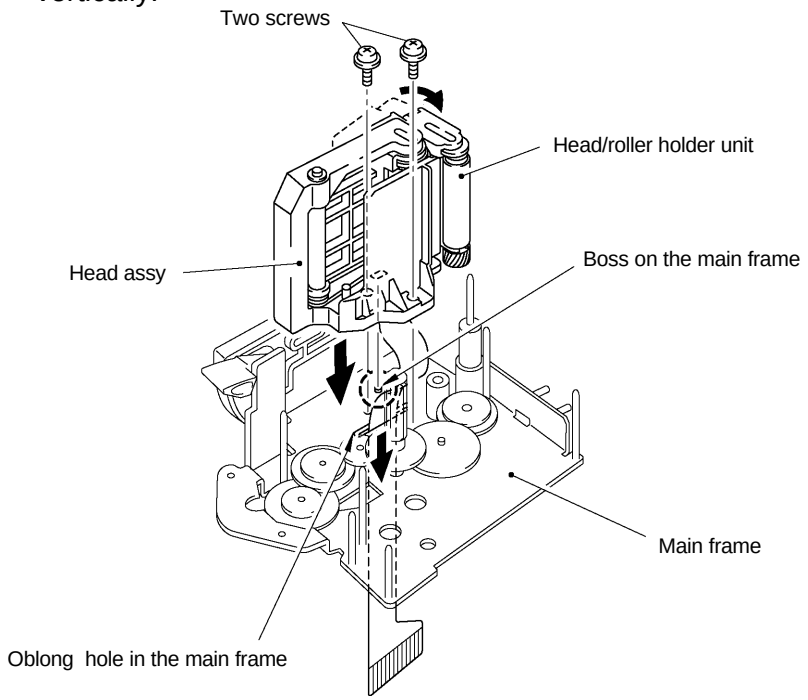


Fig. 2.2-37 Reassembly of the Head/Roller Holder Unit

(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.

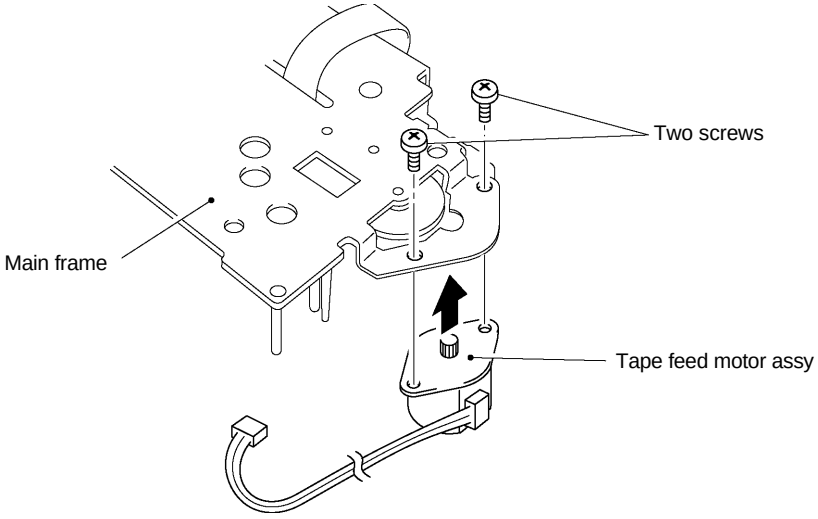


Fig. 2.2-38 Reassembly of the Tape Feed Motor Assy

[3] Reassembly of the Half Frame Assy

(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.

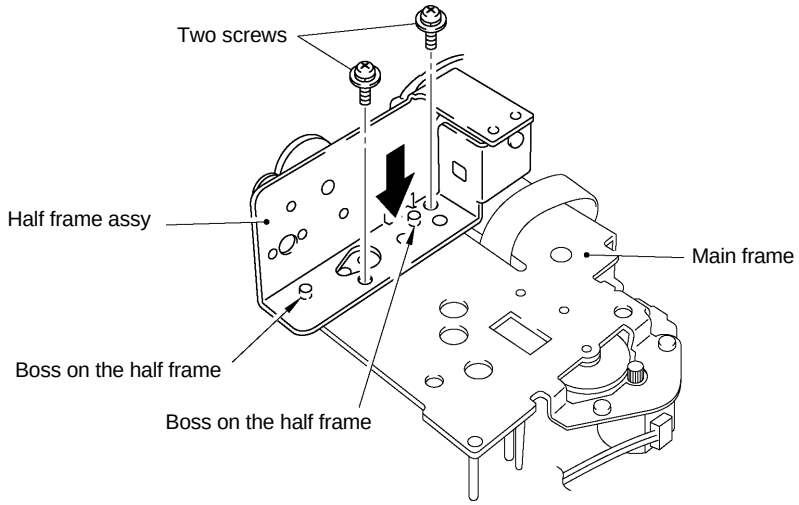


Fig. 2.2-39 Reassembly of the Half Frame Assy

(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.

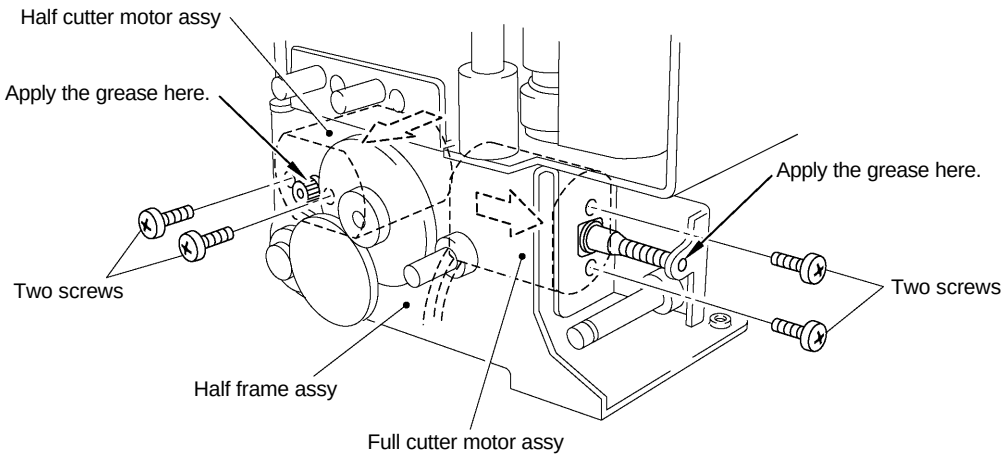


Fig. 2.2-40 Reassembly of the Half Cutter Motor Assy and the Full Cutter Motor Assy

(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).

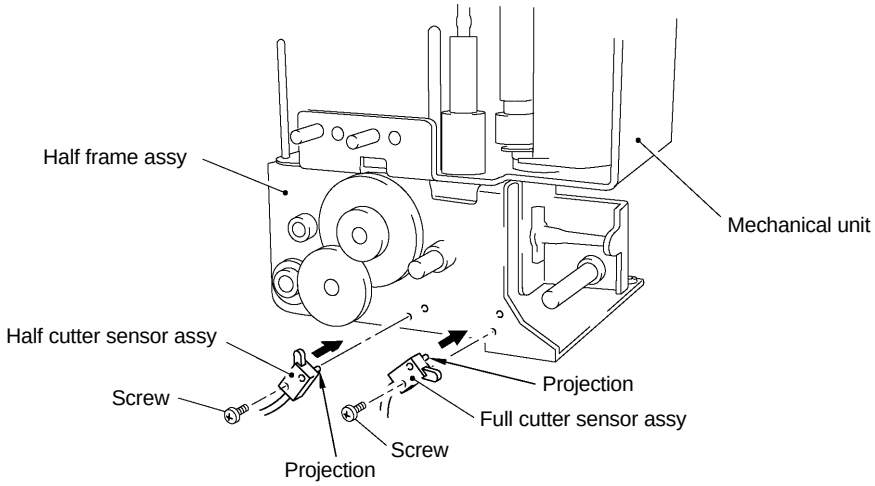


Fig. 2.2-41 Reassembly of the Half Cutter Sensor Assy and the Full Cutter Sensor Assy

(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 mm^3) on the inside of the groove. (Specified grease: Silicone grease G501)

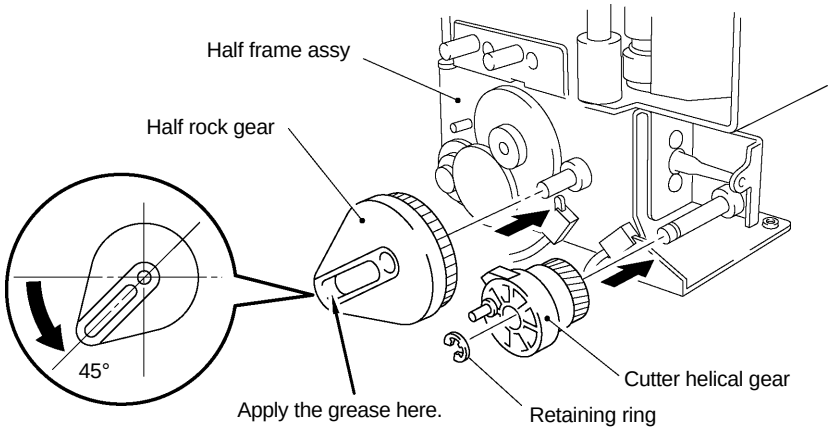


Fig. 2.2-42 Reassembly of the Cutter Helical Gear and the Half Rock Gear

[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 otherwise danger will be caused.

(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.

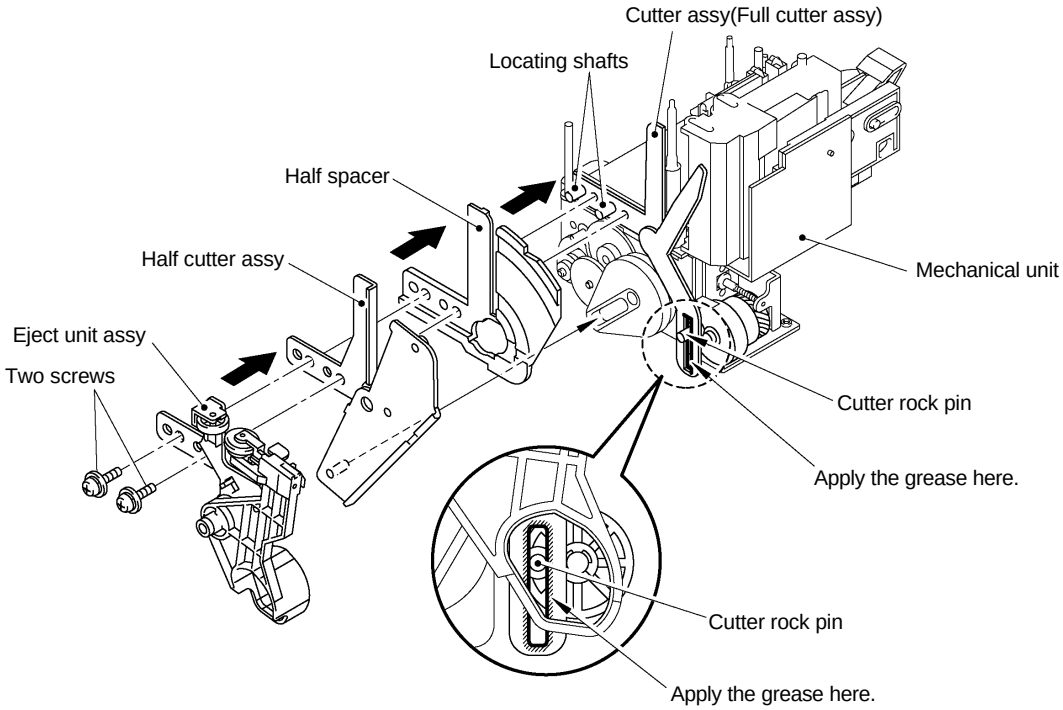


Fig. 2.2-43 Reassembly of the Cutter Assy, the Half Spacer, the Half Cutter Assy, and the Eject Unit Assy

[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.

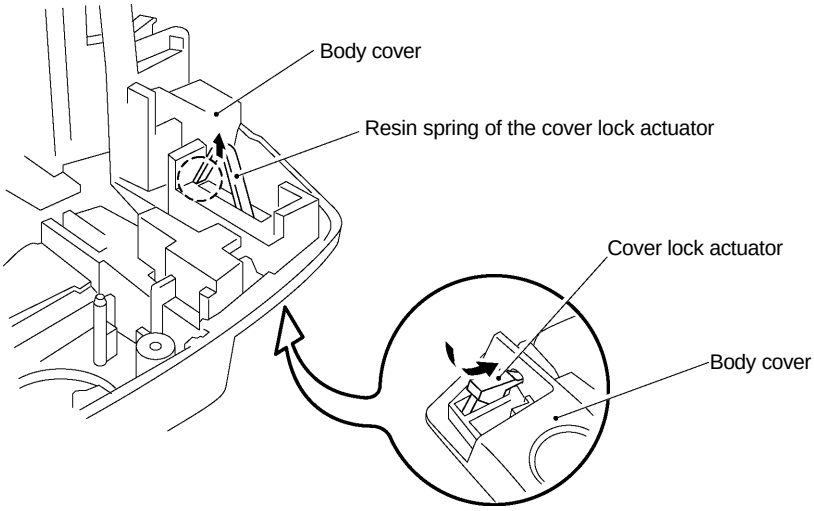


Fig. 2.2-44 Reassembly of the Cover Lock Actuator

(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.

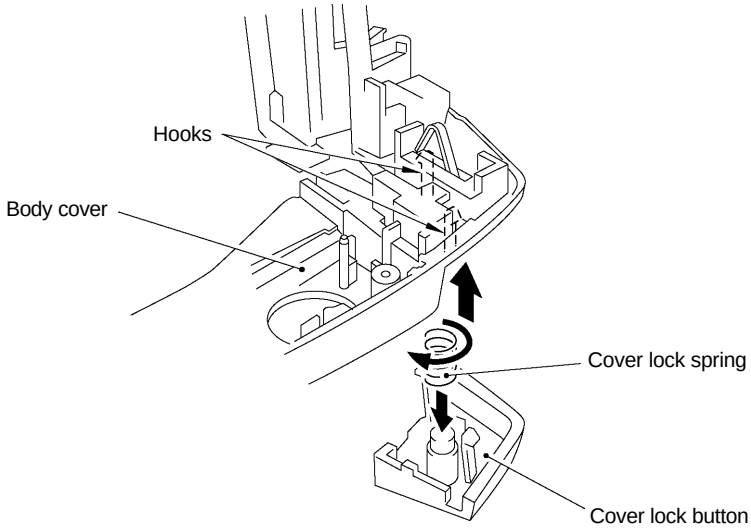


Fig. 2.2-45 Reassembly of the Cover Lock Spring and Button

(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.

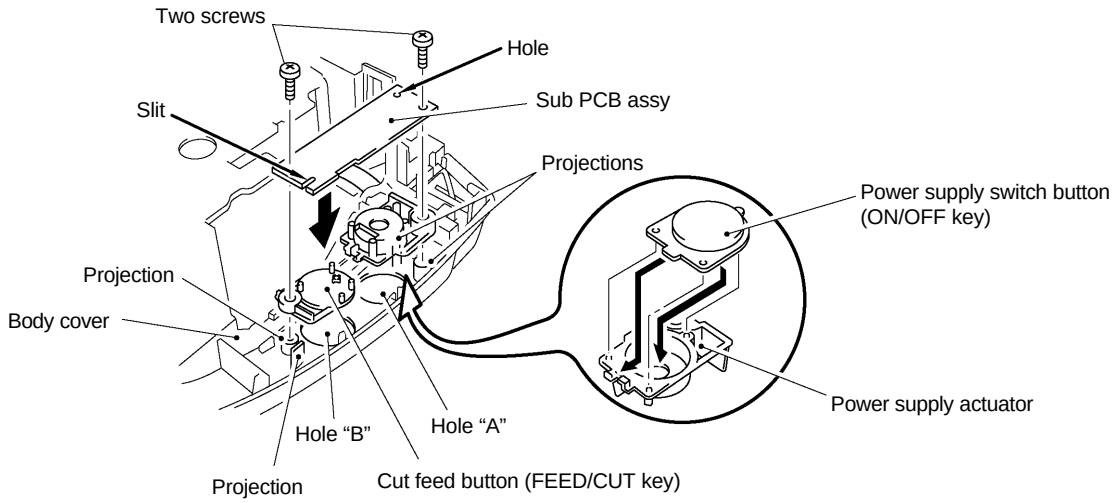


Fig. 2.2-46 Reassembly of the Button and the Sub PCB Assy

(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.

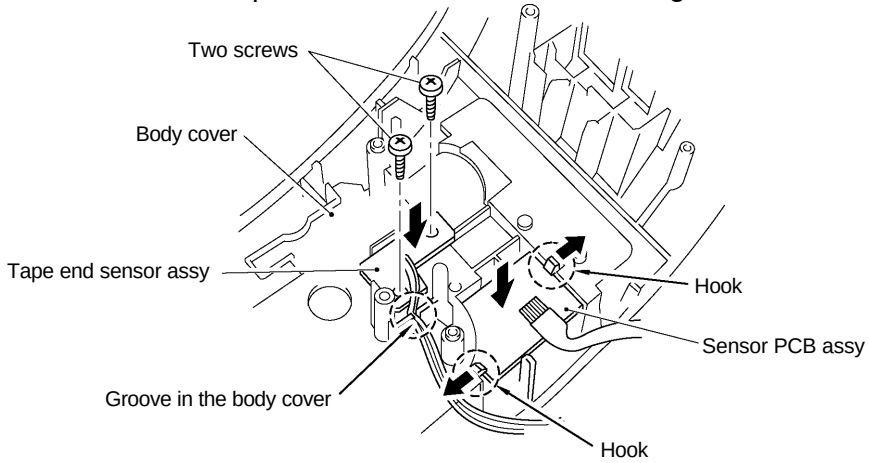


Fig. 2.2-47 Reassembly of the Sensor PCB Assy and the Tape End Sensor Assy

(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 mm^3) 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 mm^3) 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)

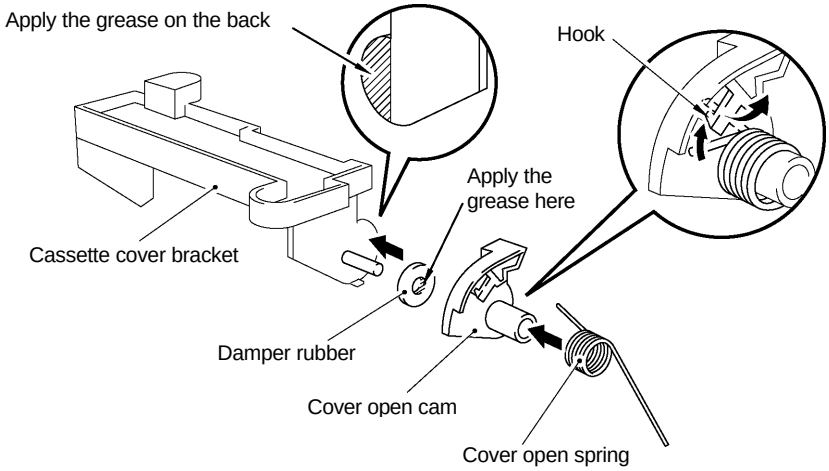


Fig. 2.2-48 Reassembly of the Cover Open Cam

(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.

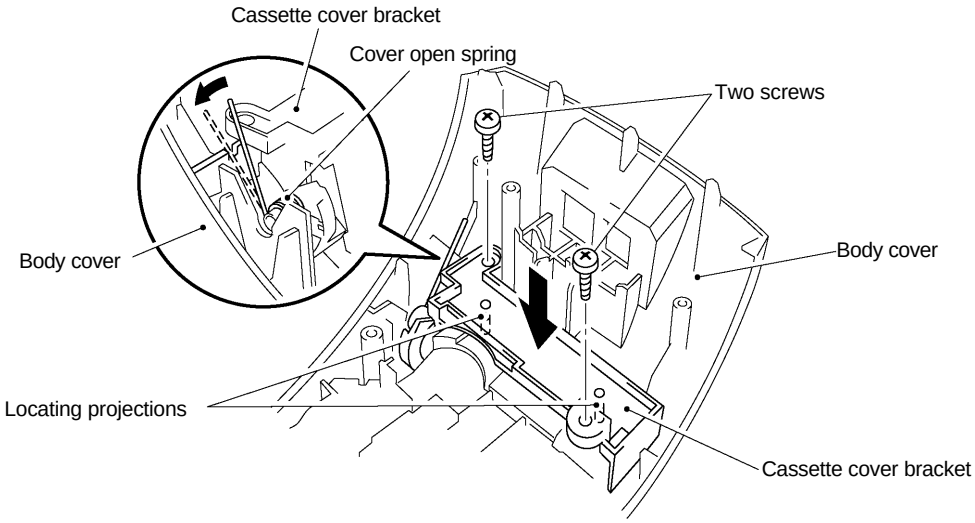


Fig. 2.2-49 Reassembly of the Cassette Cover Bracket

[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.

Tighten the FG harness together with the mechanical printing unit using one screw,and tighten the other screw,too.

Note: Tighten the terminal of the FG harness having no cover at the crimp terminal.

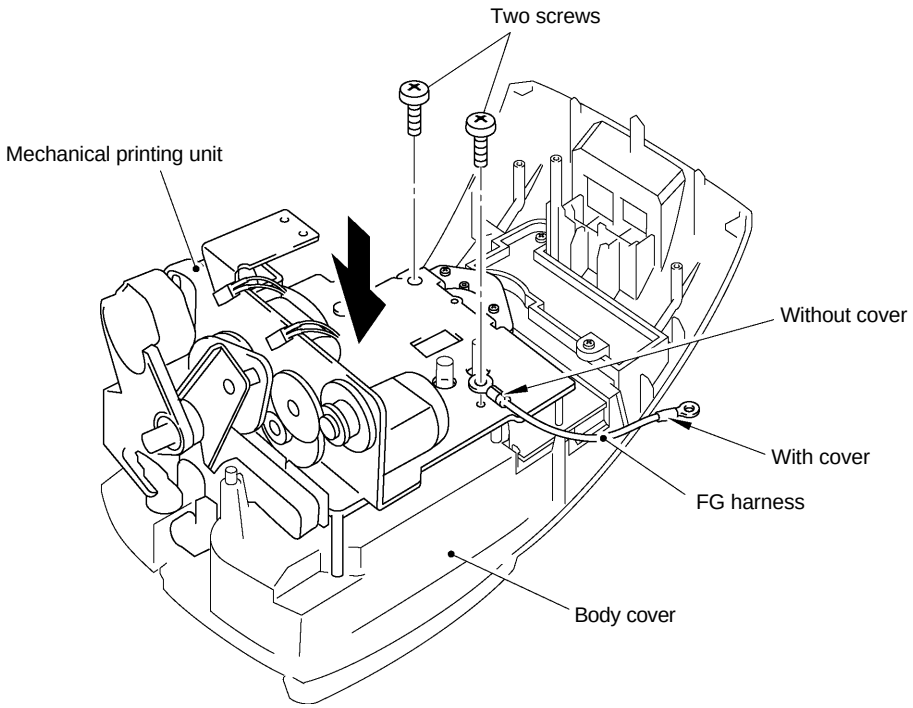


Fig. 2.2-50 Reassembly of the Mechanical Printing Unit

(2) Keep the ends of the harnesses, and the connectors out of the main PCB assy. While tilting the main PCB assy, plug the serial I/F connector and USB I/F connector into the corresponding square holes at the bottom of the body cover, and then set the main PCB on the two projections on the body cover, with sandwiched inbetween. Subsequently, tighten the three screws together with the FG harness.

Note 1: Be sure to tighten the crimp terminal of the FG harness equipped with a cover.

Note 2: If the main PCB assy has been replaced, refer to section 3.2.1 logic and related matter and section 3.4 description of model name and serial number writing software.

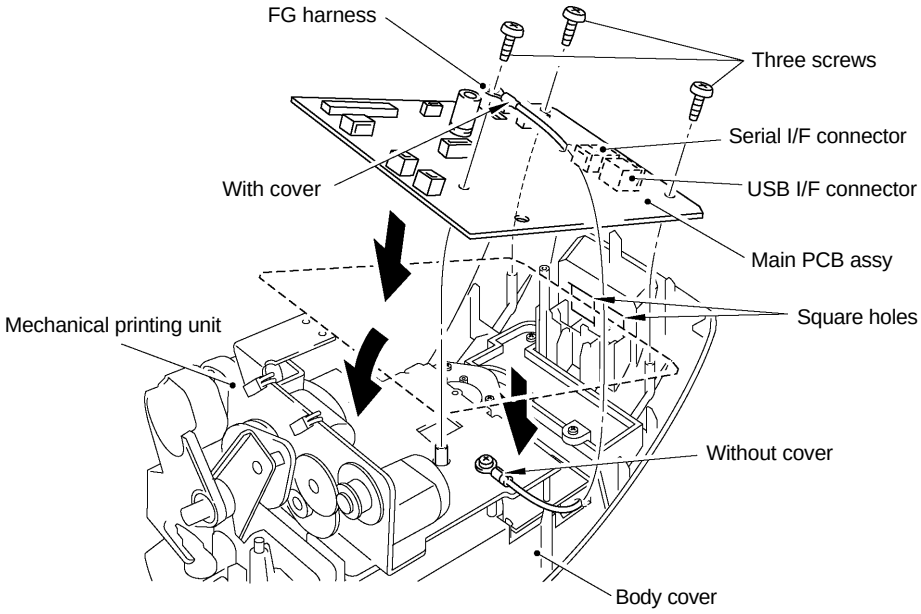


Fig. 2.2-51 Reassembly of the Main PCB Assy

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

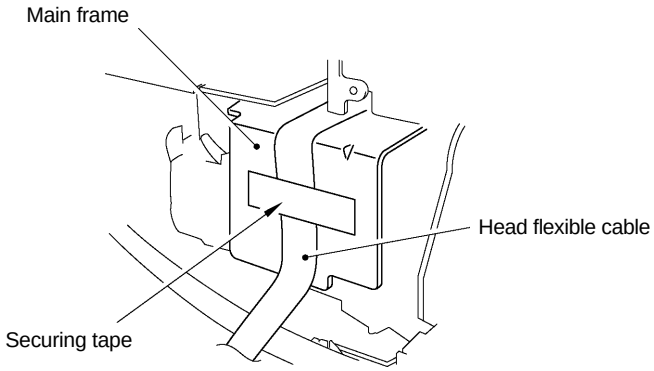


Fig. 2.2-52 Attaching the Head Flexible Cable with Tape

(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. After the soldering point has been changed,check if solder is removed completely from the soldering point,using a multimeter or the like.

Thermal Head Resistance Values and Soldering Points

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

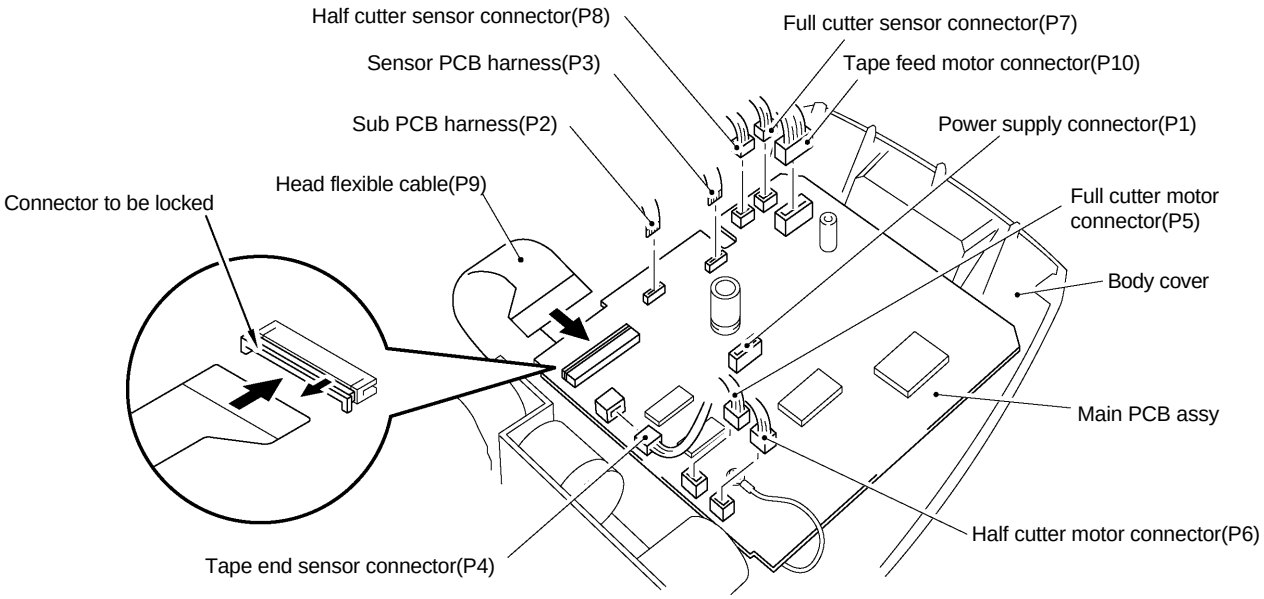


Fig. 2.2-53 Setting the Connectors and Cables

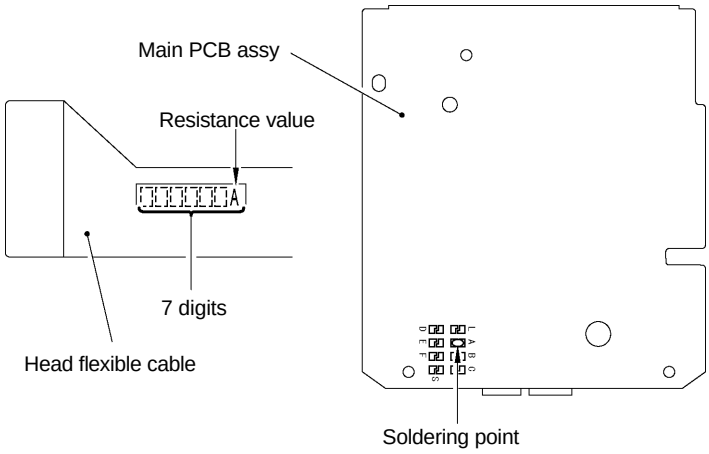


Fig. 2.2-54 Changing the Soldering Point

[7] Reassembly of the Power Supply PCB Assy

(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.

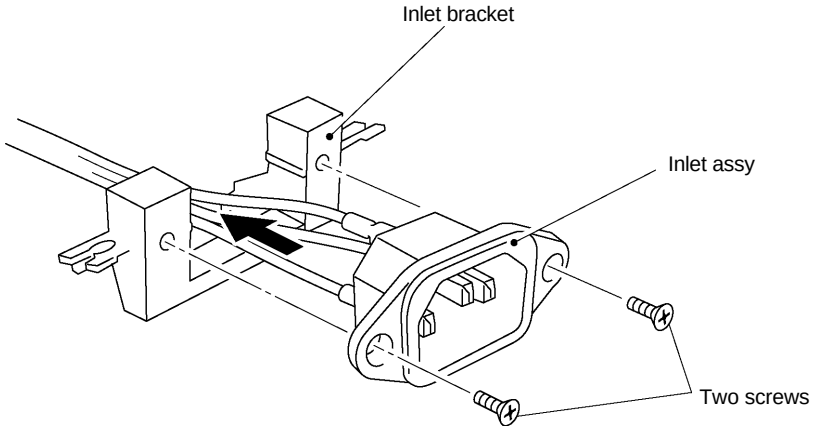


Fig. 2.2-55 Reassembly of the Inlet Assy

(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.

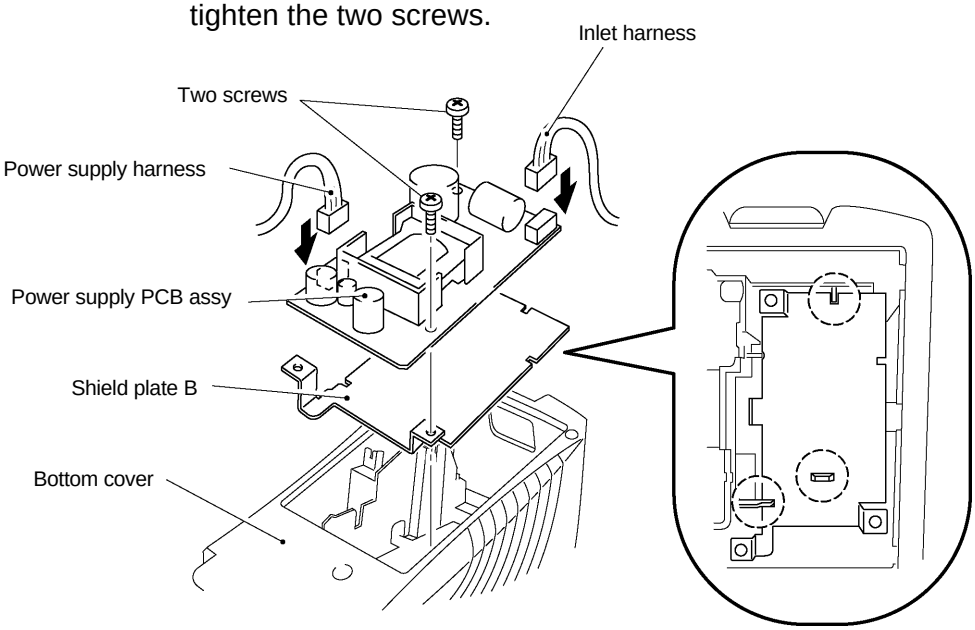


Fig. 2.2-56 Reassembly of the Shield Plate B and the Power Supply PCB Assy

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

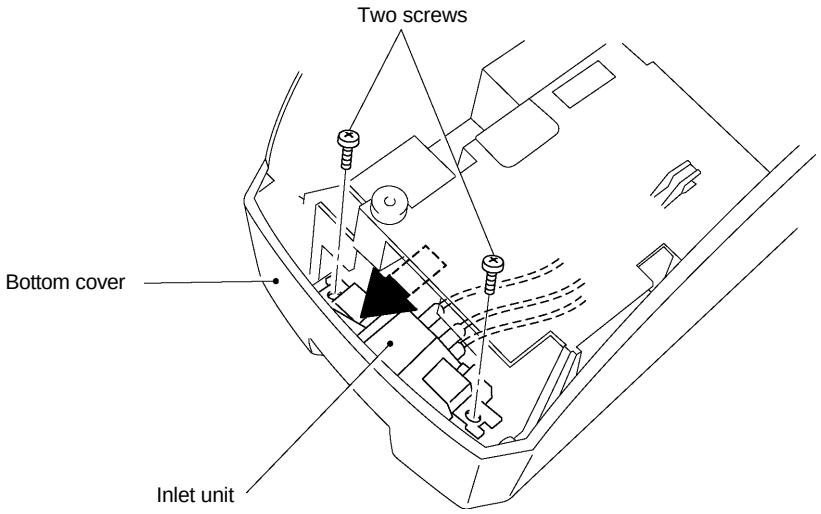


Fig. 2.2-57 Reassembly of the Inlet Unit

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

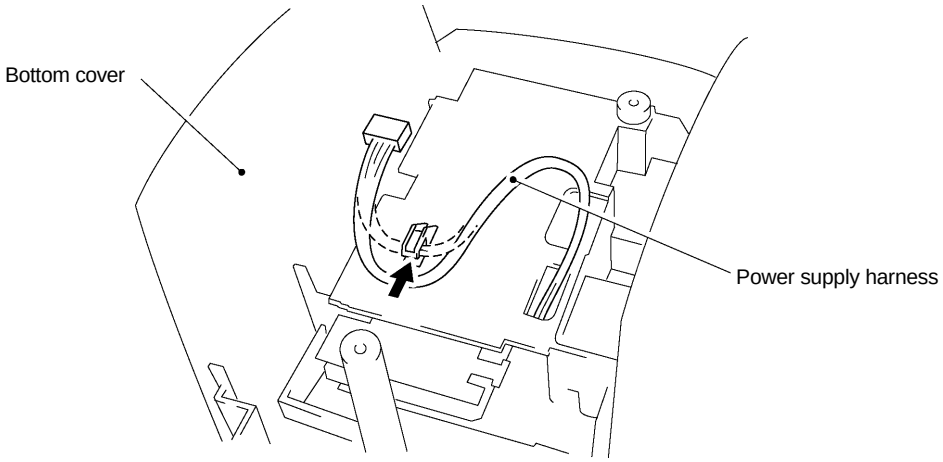


Fig. 2.2-58 Securing the Power Supply Harness

(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.

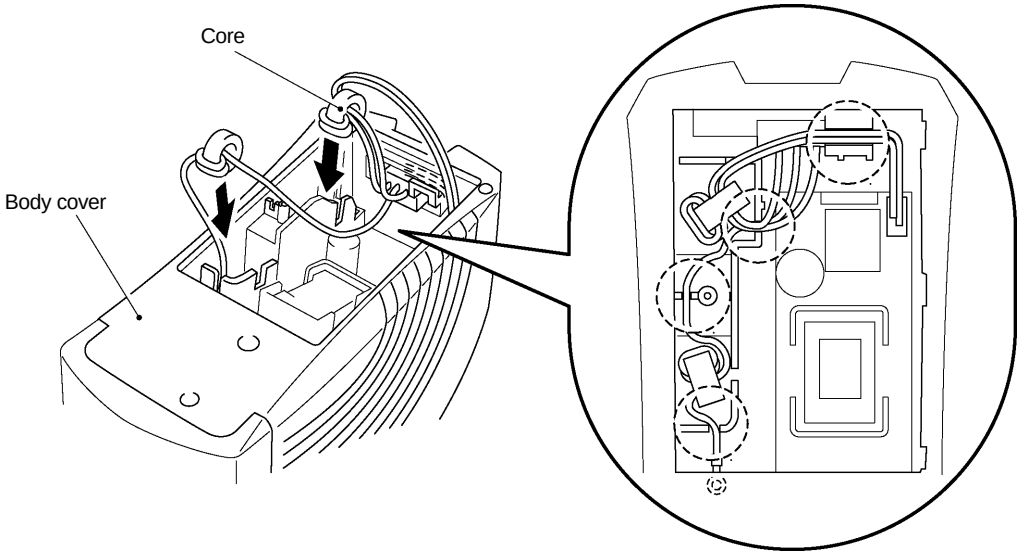


Fig. 2.2-59 Running the Inlet Unit Harnesses

[8] Reassembly of the Covers

(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.

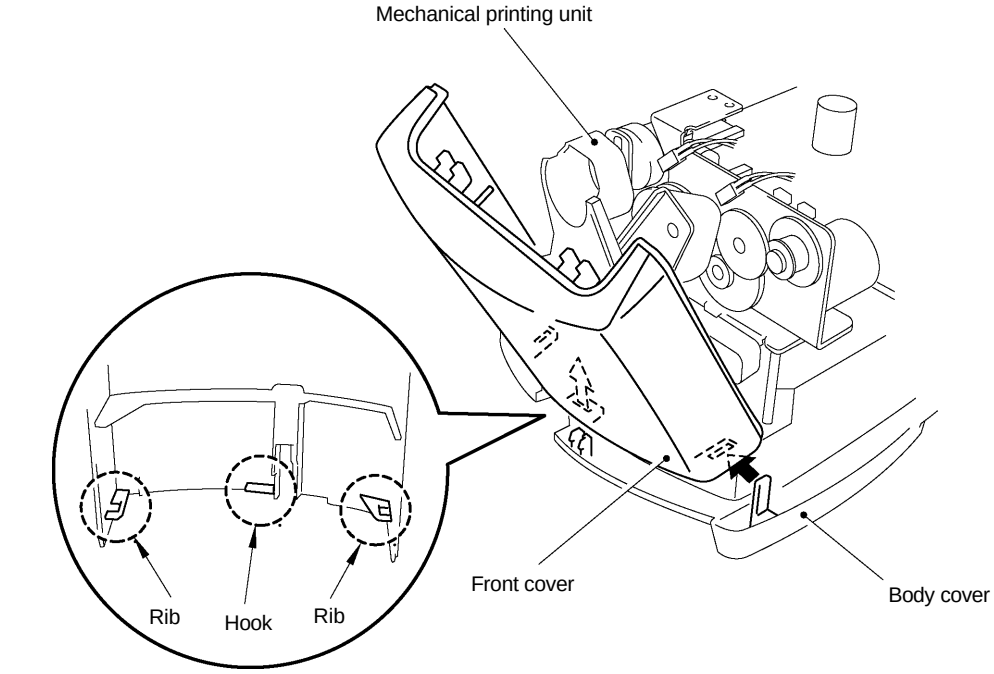


Fig. 2.2-60 Reassembly of the Front Cover

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

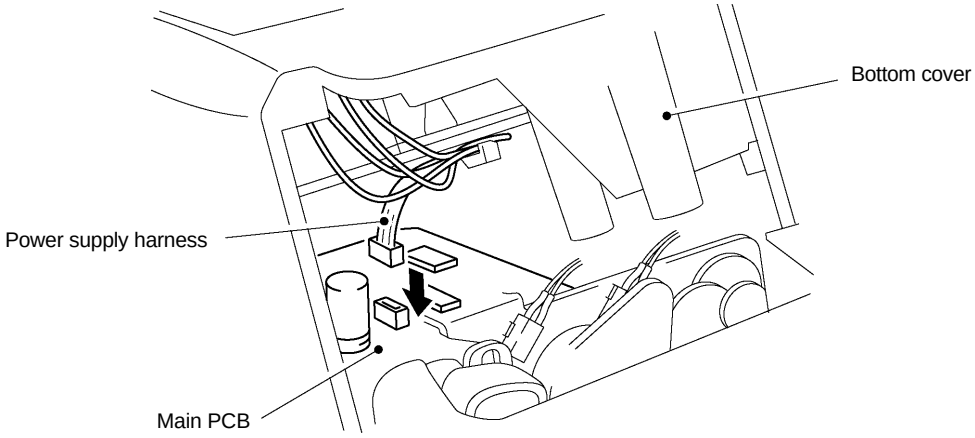


Fig. 2.2-61 Connecting the Power Supply Harness and Connector

(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”.

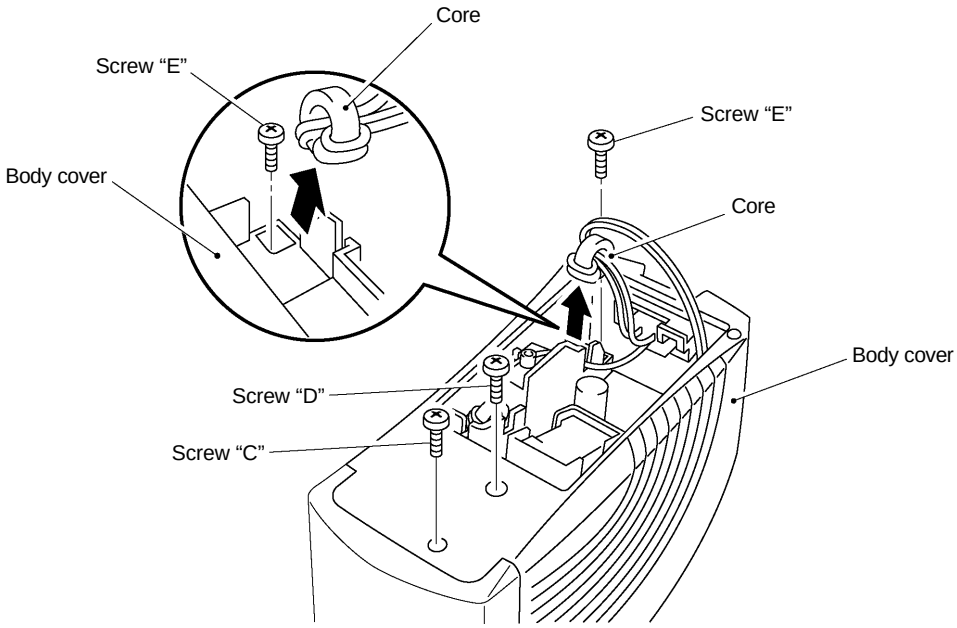


Fig. 2.2-62 Reassembly of the Body Cover and the Bottom Cover

(5) Tighten screws “A” and “B” to secure shield plate B and the ground wire on the half frame. And insert the core into the cover.

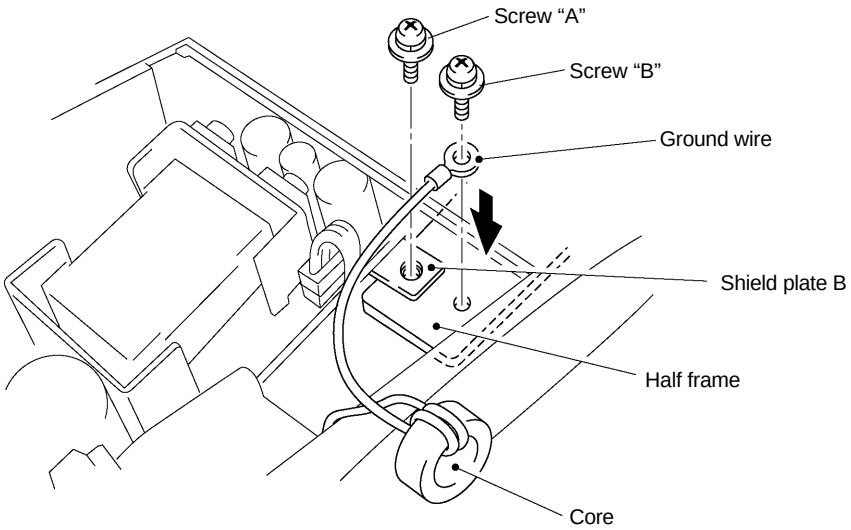


Fig. 2.2-63 Tightening the Screw to Secure the Ground Wire

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

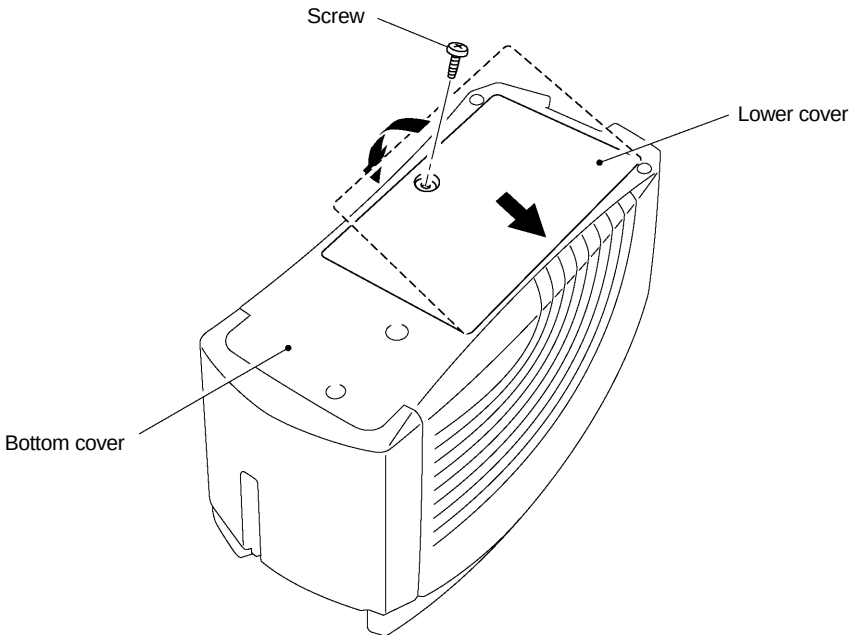


Fig. 2.2-64 Reassembly of the Lower cover

[9] Reassembly of the Cassette Cover Components

(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.

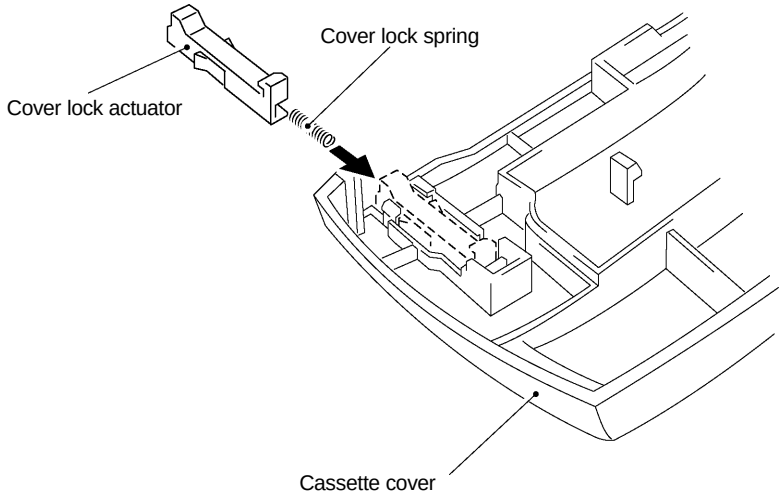


Fig. 2.2-65 Reassembly of the Cover Lock Actuator

(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.

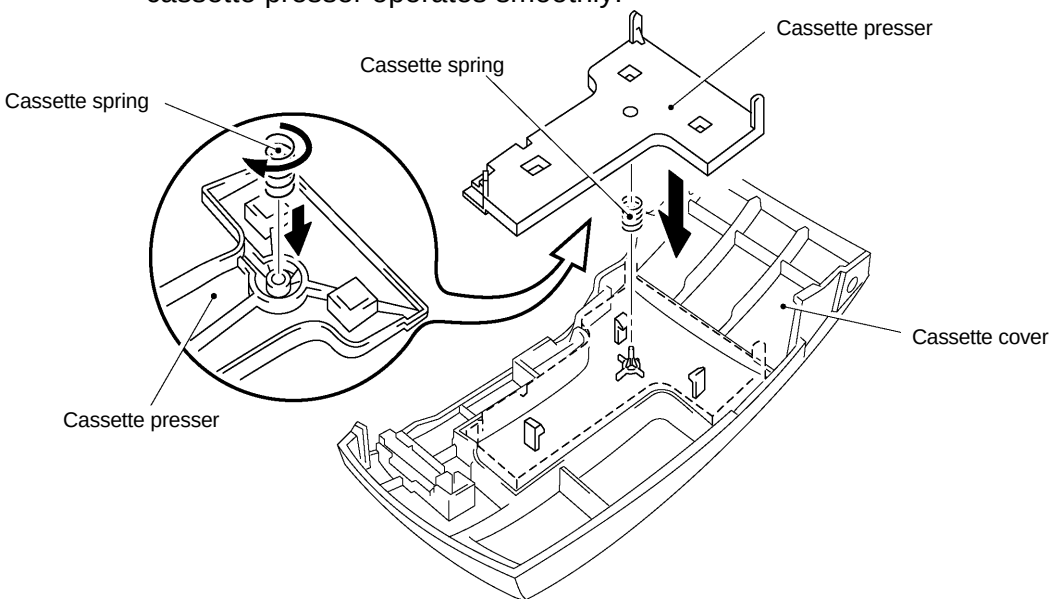


Fig. 2.2-66 Reassembly of the Cassette Presser

[10] Reassembly of the Cassette Cover

(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.

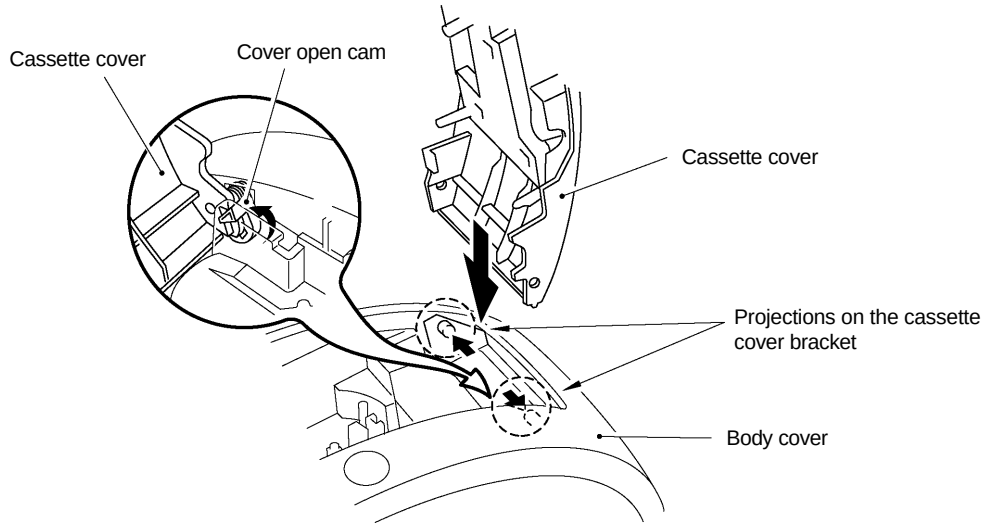


Fig. 2.2-67 Reassembly of the Cassette Cover

[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.

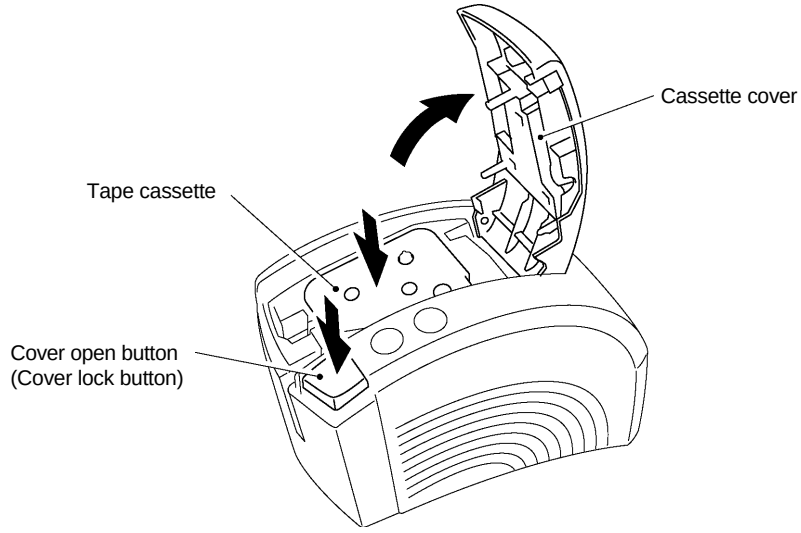


Fig. 2.2-68 Reassembly of the Tape Cassette

[12] Test Printing and Operation Check

(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.
	Buffer error.
Lights up in red.	Cutter jam (before and during printing, and when power is turned on).
	EEPROM error.
	RAM error.

[13] Error Code

A list of error codes for the baud rate change wizard of PT-9200DX (related to communications and connection) is shown below.

The language monitor displays the error number only.

Error Number	Description	Note
1	Failure to open COM port	The port is occupied by another application or a serial communication device. Finish the application or uninstall it, or delete the driver of the serial communication device.
2	Get Comm failure	Function failure at API level. (API: Application interface)
3	Build Comm failure	Function failure at API level. (API: Application interface)
4	Set Comm Timeout failure	Function failure at API level. (API: Application interface)
5	No applicable baud rate	This error is caused by complex factors actually. The probable cause includes cable breakage, conversion connector wiring, machine breakage, and occupancy, concealment or internal renumbering of port by another serial communication device.
6	Failure to write baud rate change command	Check if the power is shut down during operation or the cable is disconnected or other causes related to the power supply.
7	Failure to read baud rate change command	Check if the power is shut down during operation or the cable is disconnected or other causes related to the power supply.
8	Build Comm failure	Function failure at API level. (API: Application interface)
9	Failure to write status request during confirmation	Check if the power is shut down during operation or the cable is disconnected or other causes related to the power supply.
10	Failure to read status request during confirmation	Check if the power is shut down during operation or the cable is disconnected or other causes related to the power supply.
50	Baud rate not supported by PC	The designated baud rate is not supported by the PC. Set the baud rate at 9600.
99	Shutdown or something related to COM port	Check the power supply. This error is sometimes caused by complex factors. The probable cause includes cable breakage, conversion connector wiring, machine breakage, and occupancy, concealment or internal renumbering of port by another serial communication device.

[14] Error Message

A list of error messages related to PT-9200DX is shown below.

The language monitor displays the error message and the countermeasure.

Error Message Displayed on Monitor	**Countermeasure Displayed on Monitor (User Takes an Action Referring to This.)**
No Errors.	There is no advice.
Cassette not installed.	After installing the correct cassette, click the Resume button in the P-touch Monitor. (Caution) Install the tape cassette specified in the P-touch Monitor into the P-touch.
End of tape.	Install a new tape cassette into the P-touch, then click the Resume button in the P-touch Monitor.
Buffer full error in the P-touch.	Turn off the P-touch and turn it back on. Then click the Resume button.
P-touch tape cutter not operating.	After removing the jammed tape, try printing again. (Caution) Before removing the jammed tape, be sure to turn off the machine's power and disconnect its power supply cable. Be careful that you do not cut your fingers on the tape cutter.
Cannot change cassette while printing.	Turn off the P-touch and turn it back on. Then click the Resume button.
Appropriate cassette not installed.	After installing the correct cassette, click the Resume button in the P-touch Monitor. (Caution) Install the cassette specified in the P-touch Monitor into the P-touch.
P-touch may have invalid data in memory.	Turn off the P-touch and turn it back on.
Battery weak.	Replace batteries with new ones or use the power cable. (Caution) This is not displayed if the battery is so weak that power supply to the P-touch is not turned on.
Cover open.	Close the cover.
Connected P-touch is not PT-9200DX.	Connect the correct P-touch.
End of tape cannot be found.	Check that the tape is not caught on anything.

Error Message Displayed on Monitor	**Countermeasure Displayed on Monitor (User Takes an Action Referring to This.)**
Wrong AC adapter connected.	Use the AC adapter designed exclusively for this unit.
Communication error between PC and P-touch.	Check for the following.
Communication error in the P-touch.	Start up the Change Baud Rate Wizard. However, the current job should be deleted before starting it up.
Transmission settings incorrect.	A communication error occurs within the P-touch due to an over-run error, a communication buffer full error, etc.
Not enough memory to print document.	Try again after the other application is finished.
Not enough disk space to spool document.	Make sure that there is enough free space on the disk.
Invalid port was specified.	Select a valid COM port using the Control Panel and Resume.
Port being used for another application.	Try again after the other application is finished. (Caution) If this error occurs, check for the following. - Is a mail application which uses the same port as the P-touch not running? - Is transmission software that uses the same port as the P-touch not being used immediately before? - Is the same port selected by more than one P-touch units?
Error of unknown cause occurred.	Unexpected error occurred. Make a copy of the Fault Report sheet, fill in the necessary information, and then fax it to your service representative.

CHAPTER III

ELECTRONICS

CONTENTS

CHAPTER III ELECTRONICS

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.

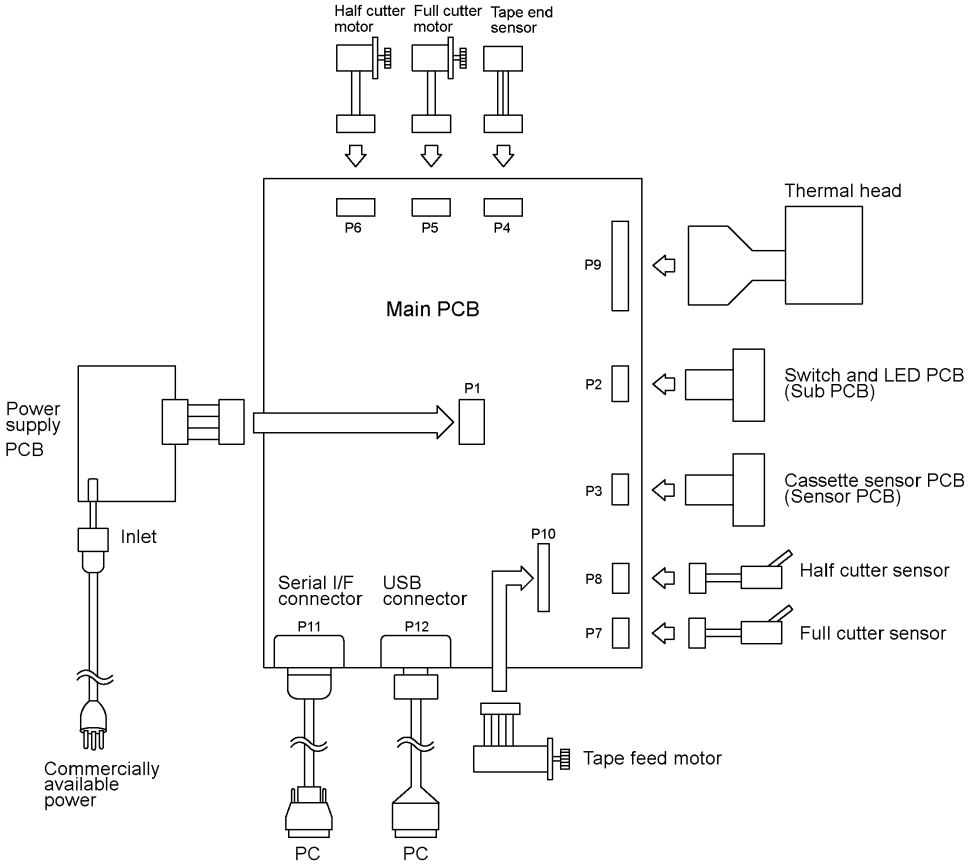


Fig. 3.1-1 Configuration of the Electronic Part

3.1.1 Main PCB

The main PCB controls all electronic operations.

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

3.1.2 Power Supply PCB

There are two types of power supply PCB (100V-120V system and 220-240V system). 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±0.3V

Vcc: 5V DC±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 (128 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) Head temperature detection circuit

(9) Reset circuit

(10) RS-232C serial interface circuit

(11) USB interface circuit

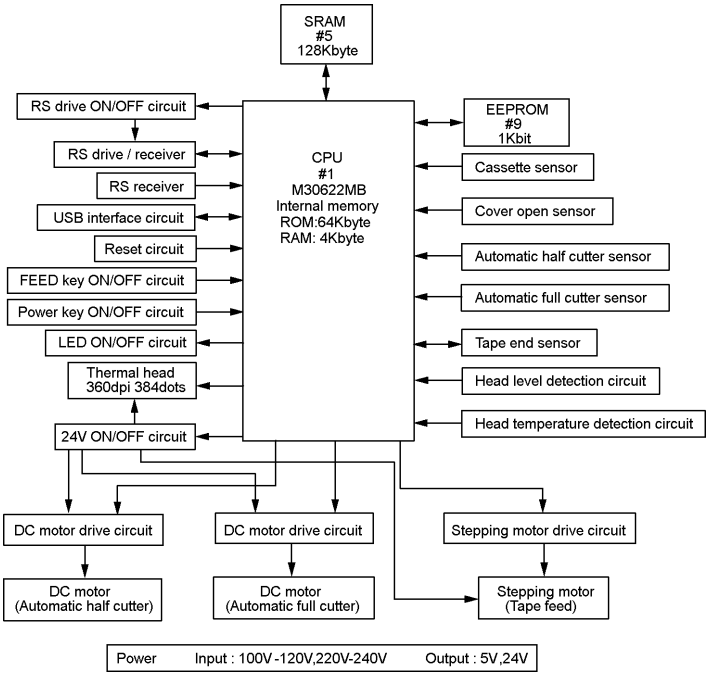


Fig. 3.2-1 Main PCB Block Diagram

3.2.1 Logic Components

[1] CPU (M30622M8)

The CPU (#1) 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)

A 128-Kbyte SRAM (#5) is used as a data buffer.

[3] ROM (EEPROM)

A 1-Kbit EEPROM (#9) is used, into which baud rate,vendor ID code,product ID code and mechanical information is written to be stored.

After the main PCB assy has been replaced ,the serial number shown on the main body and model name (PT-9200DX) must be stored in the EEPROM on the main PCB. To do this, Fig.3.2.-2 shows connect the PC with PT-9200DX via a serial I/F cable, and use special software supplied separately. For details, refer to section 3.4 description of model name and serial number writing software.

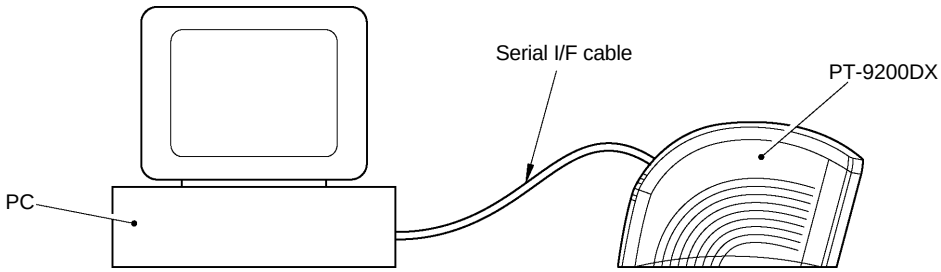


Fig. 3.2-2 Model Name and Serial Number Writing

3.2.2 Solder Points

Fig. 3.2-3 shows the solder point circuit.

One of solder points L-S is soldered according to the resistance level of the thermal head.

After the power is turned on, AN0 and AN3 are read to judge the soldering point in combination with the voltage level.

After the soldering point has been changed, check if solder is completely removed from the soldering point, using a multimeter or the like.

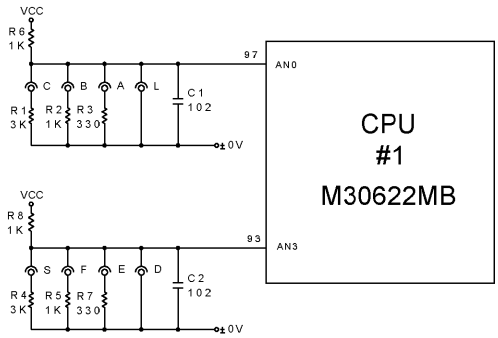


Fig. 3.2-3 Solder Point Circuit

3.2.3 Logic and VH Power, and Related Circuits

Power from a commercially available wall outlet is Vcc (+5V±0.25V) which is supplied to the main PCB, and then to all logic components.

When Vcc is supplied, the reset IC (Q5) 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 $\overline{\text{NMI}}$ 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, P81 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. 3.2-4 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 (#1) 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)

a) At the interruption of printing, the motor overruns (five through-down pulses) before it stops.

b) If cutter operation is necessary, full or half cutting is performed.

c) The motor rotates counterclockwise for 70 pulses.

d) The motor rotates clockwise to resume printing with 3 dots printed again.

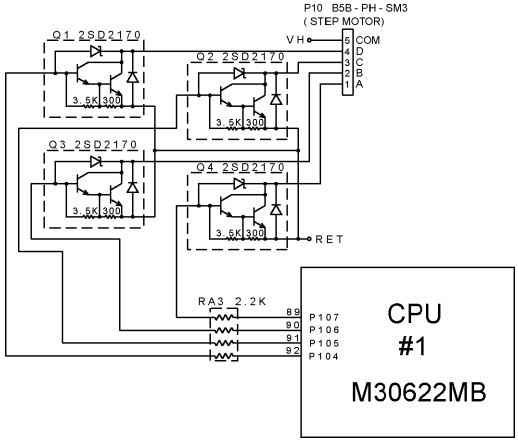


Fig. 3.2-4 Stepping Motor Drive Circuit

(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. 3.2-5 and 3.2-6 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 (#1) to BA6919FP (#7) to drive the motor. With half cutting, drive pulses are transmitted from DCR2 and DCF2 of the CPU (#1) to BA6919FP (#8) to drive the motor.

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

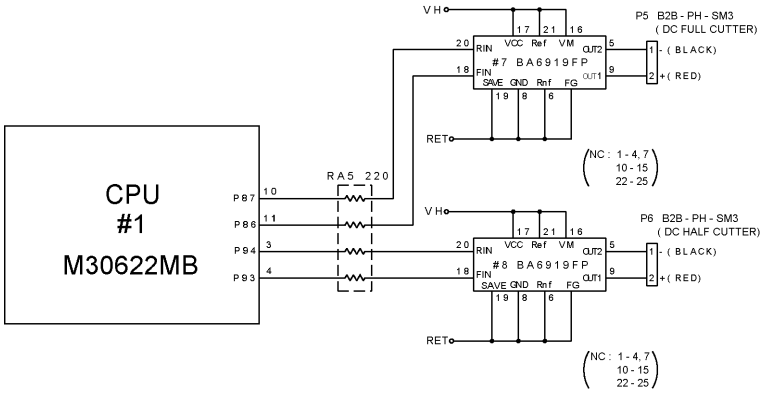


Fig. 3.2-5 DC Motor Drive Circuit

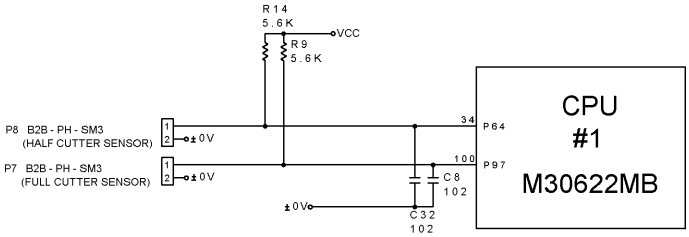


Fig. 3.2-6 Cutter Sensor Circuit

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. 3.2-7 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.

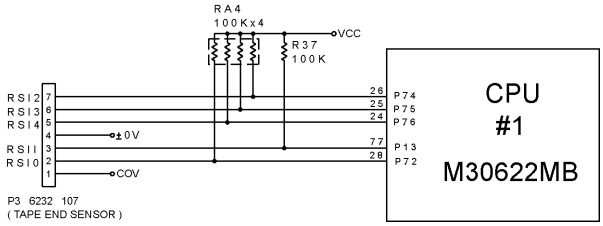


Fig. 3.2-7 Cassette Detection Sensor Circuit

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

(Sensor input level) 0=Low
1=High

Table 3.2-2 Combinations of the Cassette

3.2.7 Thermal Head Control Circuit

Figs. 3.2-8 and 3.2-9 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 14.7456 MHz).

In response to the $\overline{\text{LATCH}}$ signal from P62 of the CPU(#1), the head driver circuit latches the print data to synchronize it with the $\overline{\text{STB}}$ signal from P80, driving the specified heating elements.

The method of controlling the thermal head is as follows.

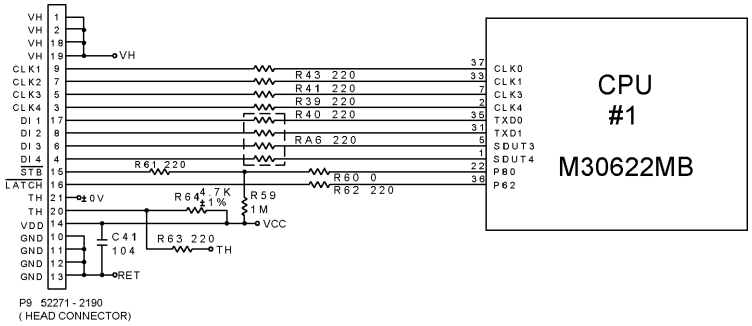


Fig. 3.2-8 Thermal Head Control Circuit

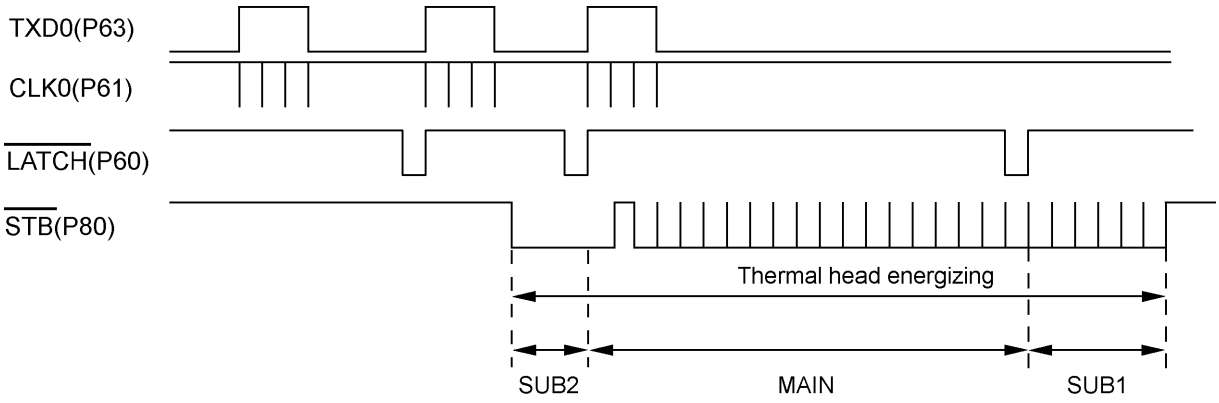


Fig. 3.2-9 Thermal Head Drive Timing Chart

[1] Basic Energizing Time

The energizing time is based on SUB2+MAIN+SUB1, with MAIN, SUB1 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 L-S 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. 3.2-10 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.

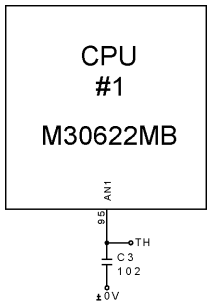


Fig. 3.2-10 Head Temperature Detection Circuit

3.2.9 Oscillation Circuit

Fig. 3.2-11 shows the oscillation circuit.

This circuit contains a 14.7456 MHz oscillator to generate an oscillation at 14.7456 MHz. The internal operations of the CPU are executed based on this clock.

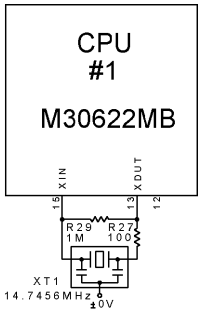


Fig. 3.2-11 Oscillation circuit

3.2.10 Interface Circuit

[1] Serial Interface Circuit

Fig. 3.2-12 shows the serial interface circuit.

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

#2 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 Kbps.

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

With the power on, P66 is switched to low to turn on Q6 (transistor) so that the power Vcc is supplied to #2.

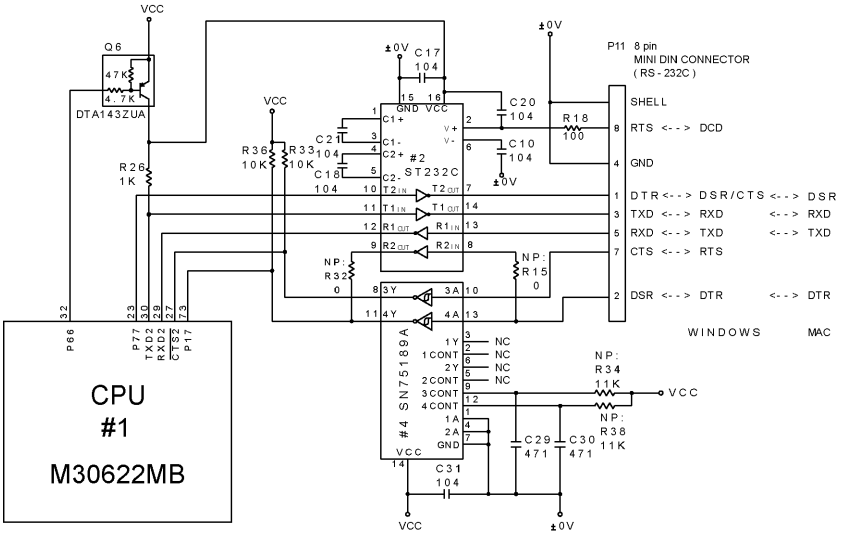


Fig. 3.2-12 Serial Interface Circuit

[2] USB Interface Circuit

Fig. 3.2-13 shows the USB interface circuit.

#3 is a USB chip meeting requirements of the high speed mode, and data is transmitted or received with a computer via two data signal cables D+ and D-.

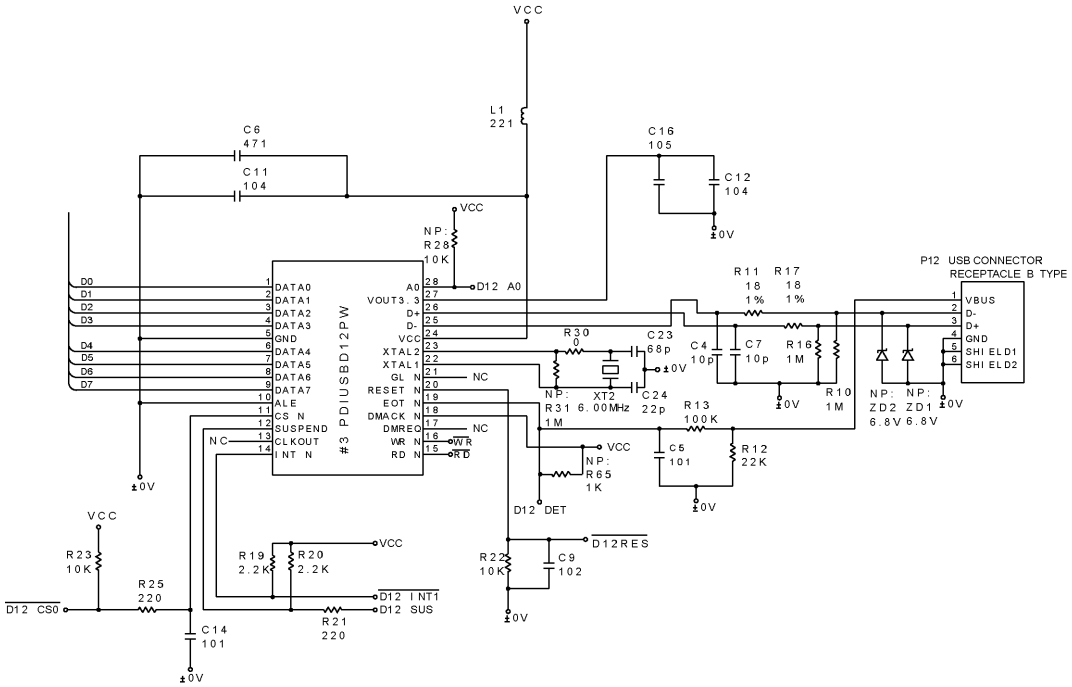


Fig. 3.2-13 USB Interface Circuit

3.2.11 Tape End Sensor Circuit

Fig. 3.2-14 shows the tape end sensor circuit.

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

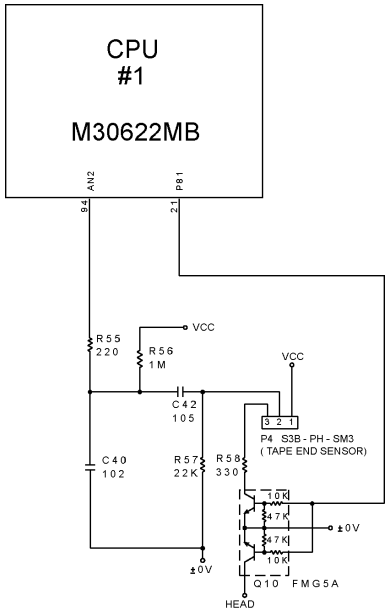


Fig. 3.2-14 Tape End Sensor Circuit

3.2.12 Switch and LED Circuit

Fig. 3.2-15 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.

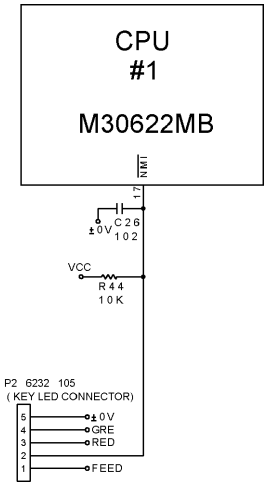


Fig. 3.2-15 Switch and LED Circuit

3.2.13 Cover Open Sensor Circuit

Fig. 3.2-16 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.

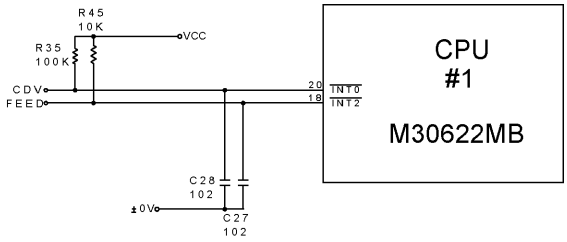


Fig. 3.2-16 Cover Open Sensor Circuit

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 ±0.3V for the thermal head and the DC motor, and Vcc: +5V DC±0.25V for the logic components), supplying it to the main PCB.

3.4 DESCRIPTION OF MODEL NAME AND SERIAL NUMBER WRITING SOFTWARE PT-9200DX

This software writes the model name, serial number and so on in the EEPROM installed on the control PCB assy after it is replaced.

3.4.1 Operation Procedure

1. Connect the main body of the PT-9200DX with the PC via a serial I/F cable.(Use a PC with aserial port.)
   * Do not connect USB cable between PT-9200DX and PC.
   * The software runs on a PC with the Windows 95 or Windows 98 operation system and serial I/F connection.
   * Use the serial I/F cable attached to PT-9200DX.
2. After starting the operation system of the PC, turn the power button of the main body.
3. Run the PT-9200DX software (file name: CS9200DX.exe) for service personnel.

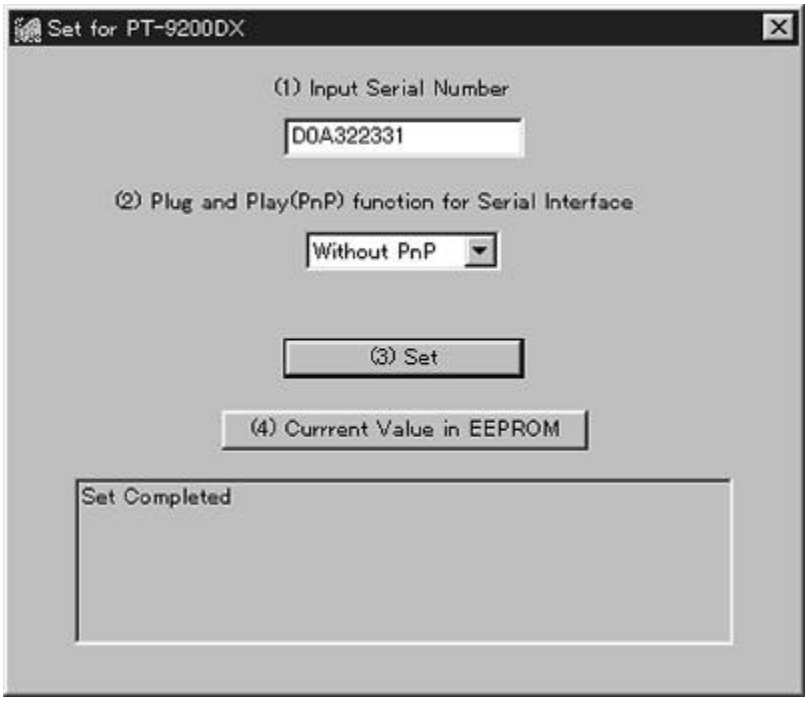


Fig. 3.4-1 CS9200DX.exe Main Menu Screen

4. Enter the lower nine digits of the serial number specified on the nameplate at the bottom of the main body cover, into the “(1) Input Serial Number” field.

   Example : If “U52662-D0A322331” is written on the nameplate, enter the lower nine digits “D0A322331.”

5. Next, select “Without PnP” or “With PnP” for “(2) Plug and Play (PnP) Function for Serial Interface.” Select “Without PnP” basically.

6. Next, click on the “(3) Set” button.

   The serial number and serial PnP settings are stored in the EEPROM of the main body and the model name is also stored in memory.

   After setting, “Set Completed” is displayed. If setting has failed, “Error!” is displayed. If the error is displayed, check to see referring to the items of “Troubleshooting in Case of Error”.

7. After setting, turn the power button of the main body of the PT-9200DX off then on again.

   Next, click on the “(4) Current Value in EEPROM” button. Values set in the main body are displayed. Check the displayed model name, serial number and serial PnP.

   If there is an error in the entered data, return to step 4 and repeat the procedure.

8. After operation and confirmation have been finished, turn the power button of the main body off, disconnect the AC code, then disconnect the serial I/F cable. Close the software as the last step.

   Setting and confirmation are completed in the above procedure.

3.4.2 Troubleshooting in Case of Error

If the message, “Error!”, occurs while the serial number is being written, check the following items.

1. Check that the serial I/F cable is connected correctly.

2. Check that the power to the PT-9200DX is turned on.

3. Check that the serial I/F cable is connected to the COM1 port of the PC.
   Depending on the model of the PC, two COM ports (COM1 and COM2 ports) are provided. Always connect the serial I/F cable to the COM1.
   To operate this serial number writing software, it is absolutely necessary to connect the serial I/F cable to the COM1.

4. If the message, “Error!”, occurs even though the above items 1 – 3 are set correctly, the contents of the EEPROM in the PT-9200DX main unit may be corrupted. Follow the steps below to restart the serial number writing software.

   1) Exit the serial number writing software (CS9200DX.exe).
   2) Next, start up PT92RST2.exe.
      (This software is used to initialize the contents of the EEPROM in the PT-9200DX main unit.)

Fig. 3.4-2 PT92RST2.exe Main Menu Screen

   3) Turn on the power button on the PT-9200DX.
   4) Select COM1 on the PT92RST2 screen.
   5) Next, click the [Reset EEPROM in PT-9200DX] button.
   6) Turn off the power button on the PT-9200DX and click the [OK] button.
      After that, exit PT92RST2.exe.
   7) Turn on the power button on the PT-9200DX.
      The contents of the EEPROM in the PT-9200DX is then initialized.
   8) Restart the serial number writing software (CS9200DX.exe) and operate it to check that it runs correctly.

CHAPTER IV

TROUBLESHOOTING

CONTENTS

CHAPTER IV TROUBLESHOOTING

4.1 TROUBLESHOOTING

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.

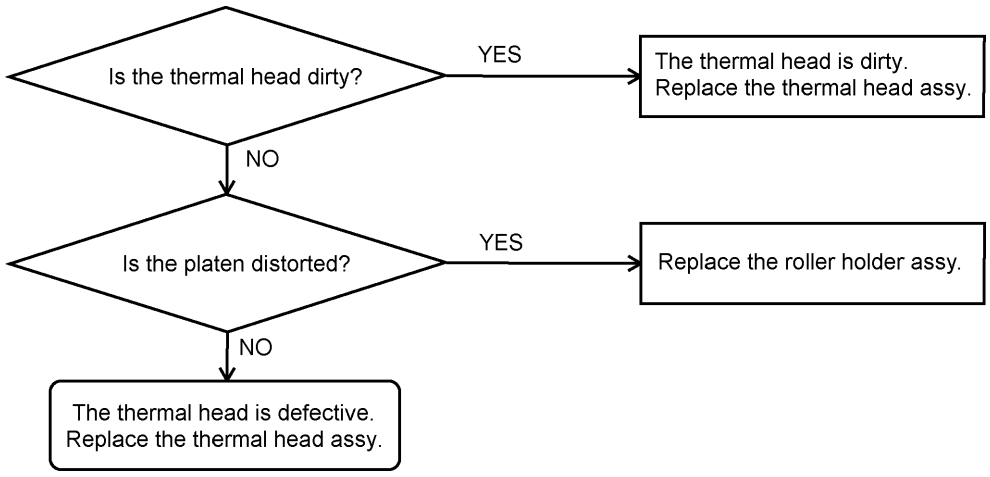
(3) Check AC for voltage to make sure that the voltage value is appropriate.

4.1.2 After Repairing

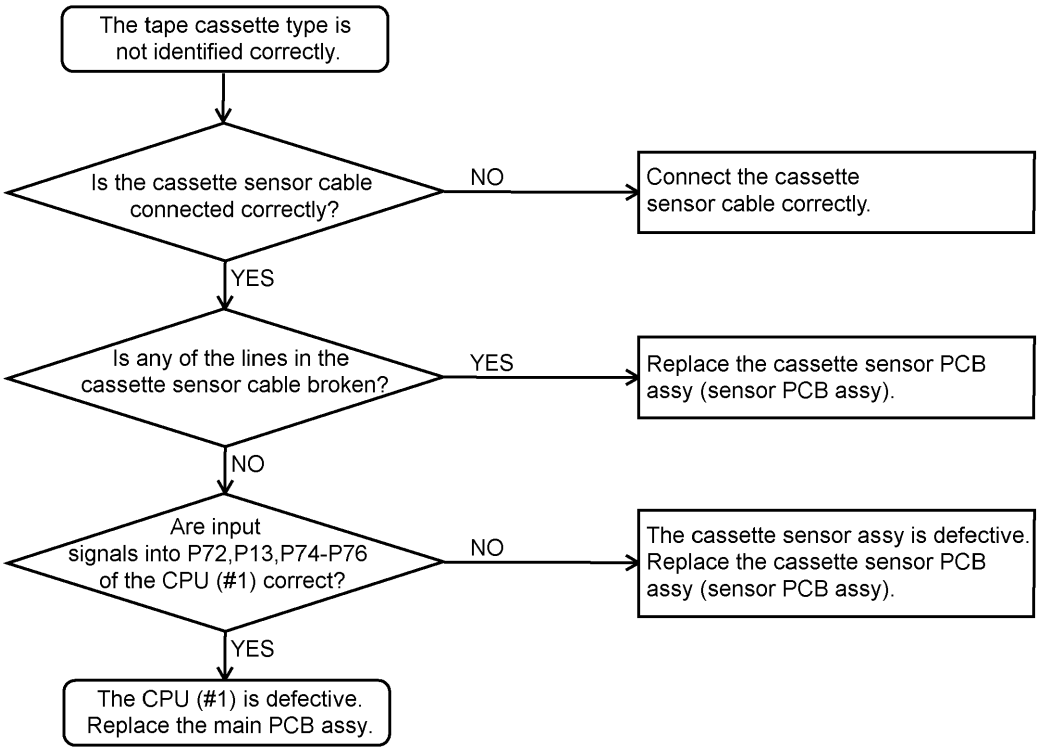
After troubleshooting, be sure to check the failure to make sure that the failure has been completely remedied. Note and keep the troubleshooting procedure acturally followed for later troubleshooting.

4.1.3 Troubleshooting Flows

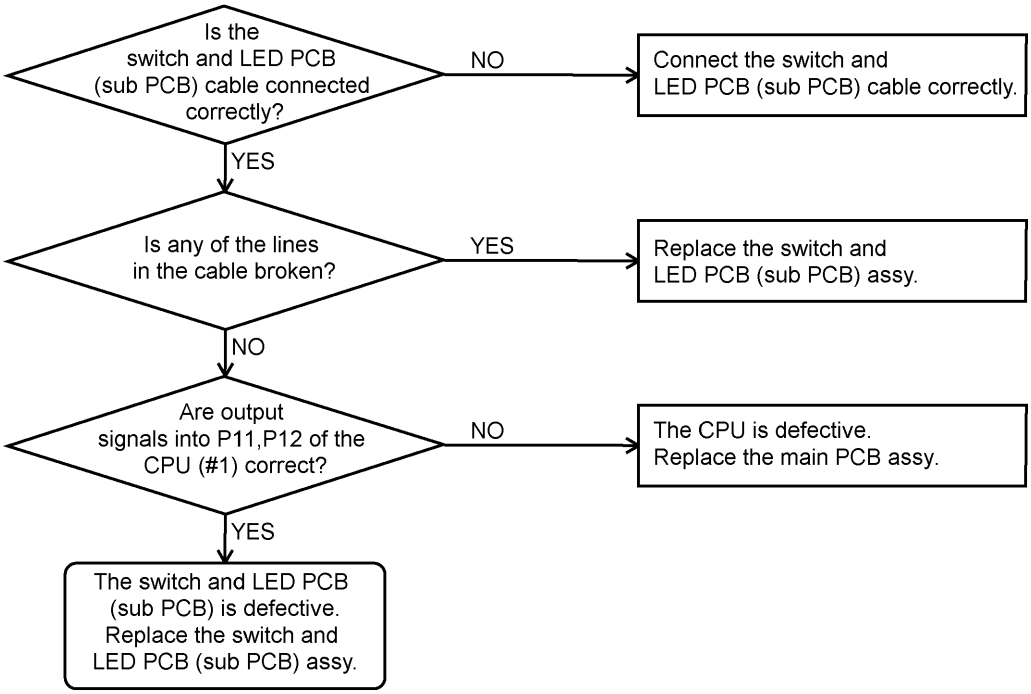
[1] Printing is performed with specific dots omitted.



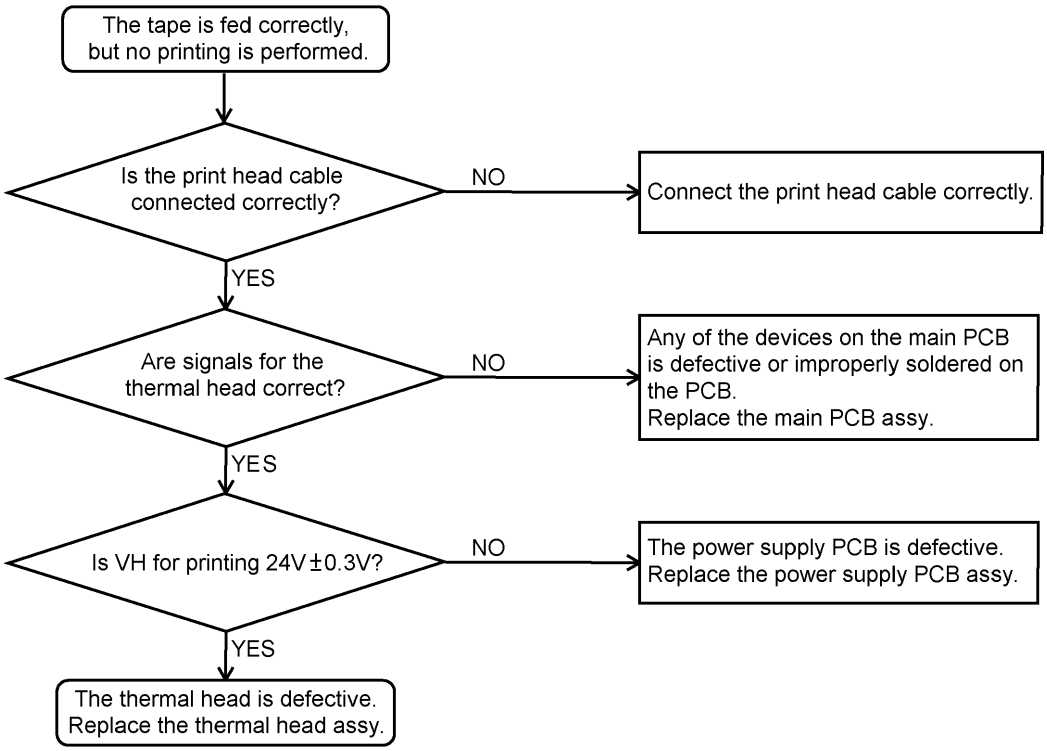
[2] The tape cassette type is not detected correctly.



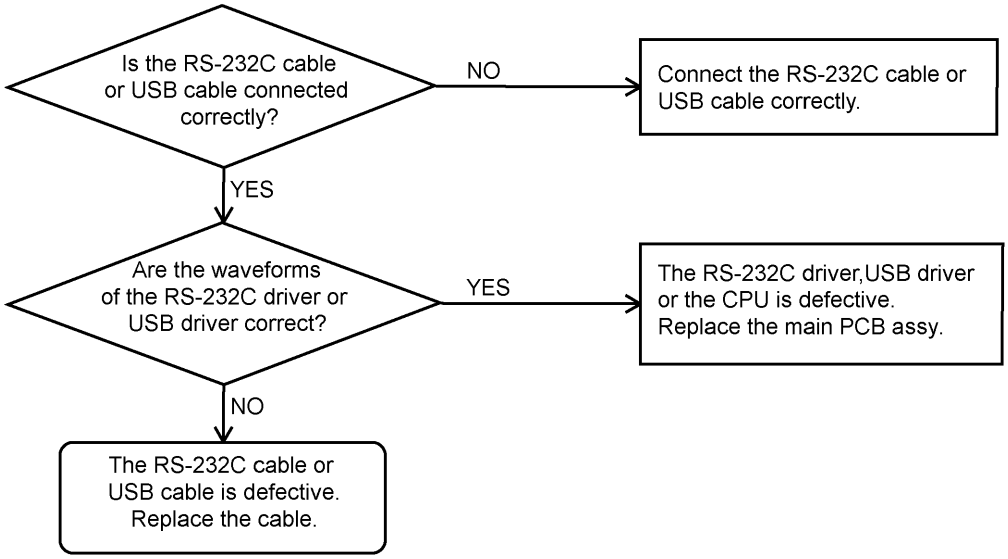
[3] The LED does not light up.



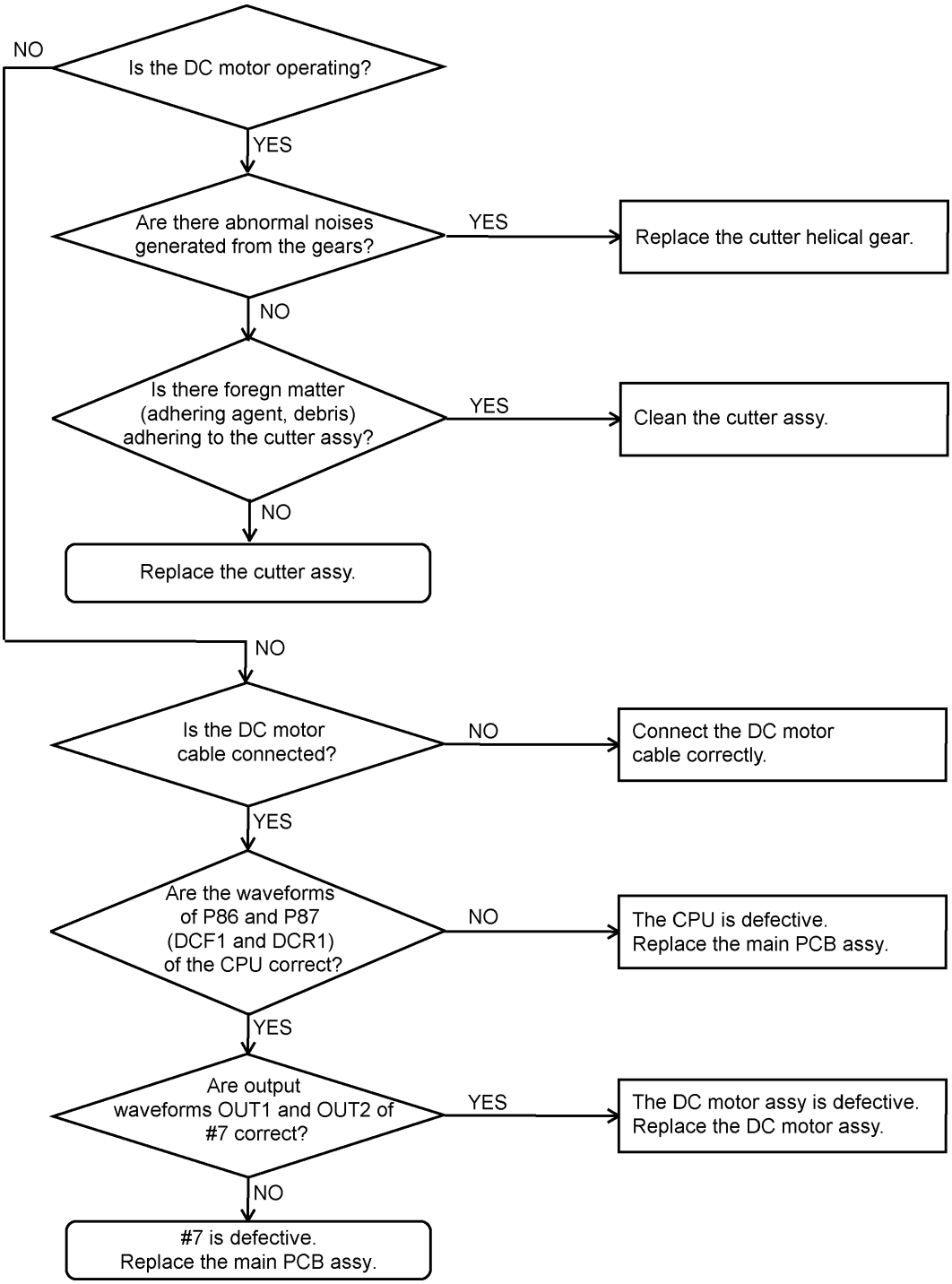
[4] No printing is performed.



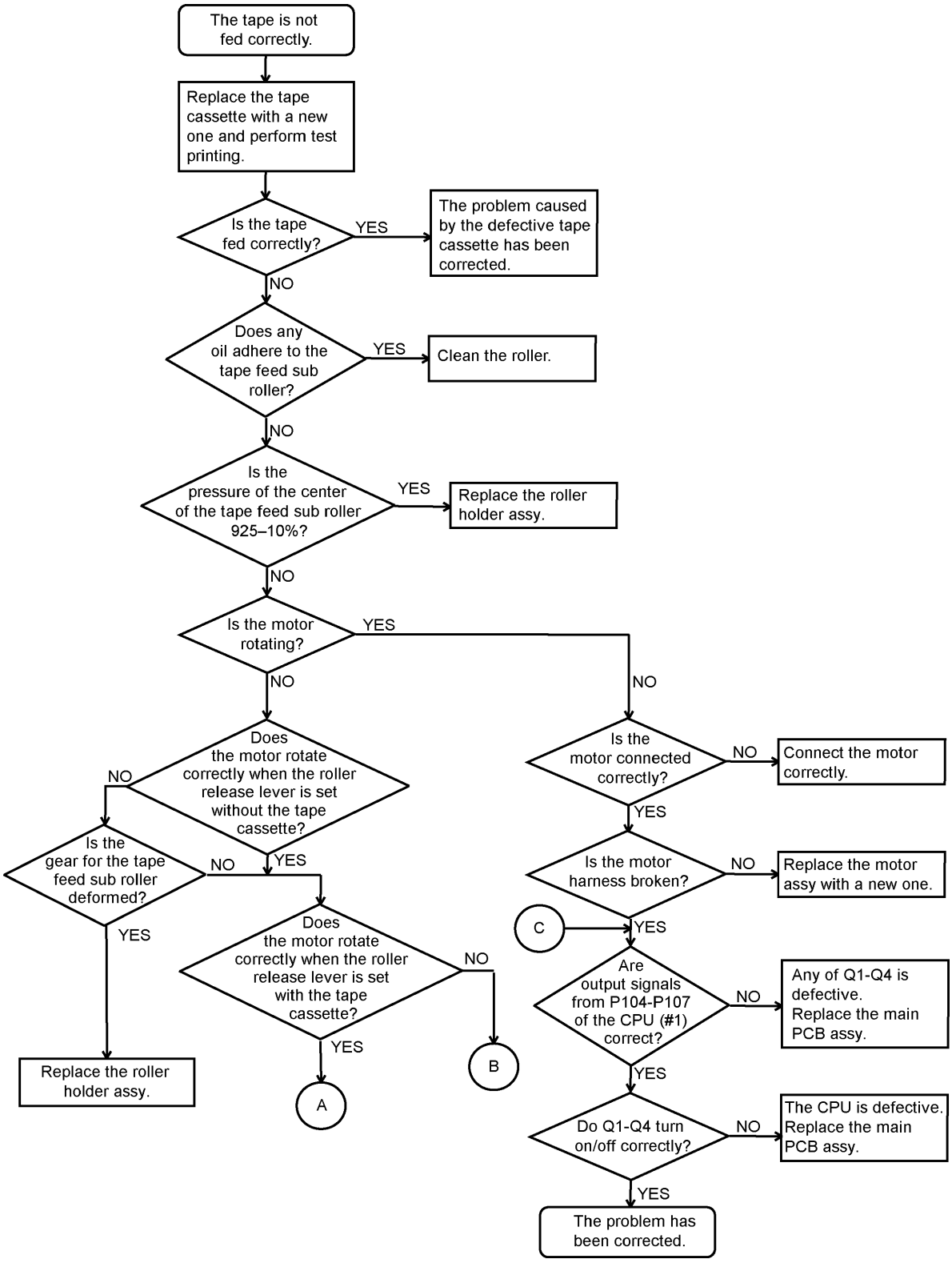
[5] The interface malfunctions.

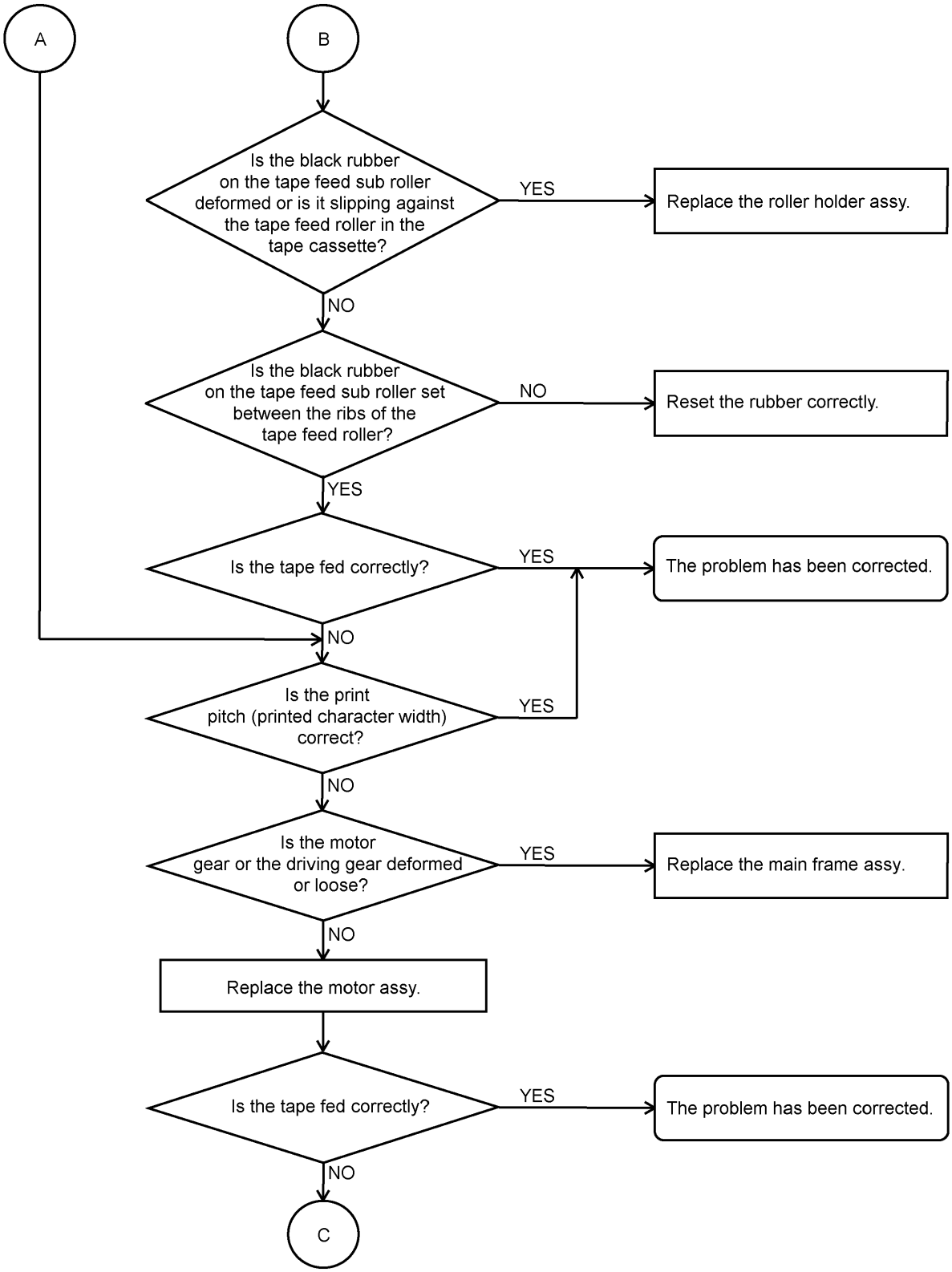


[6] The tape is not cut.

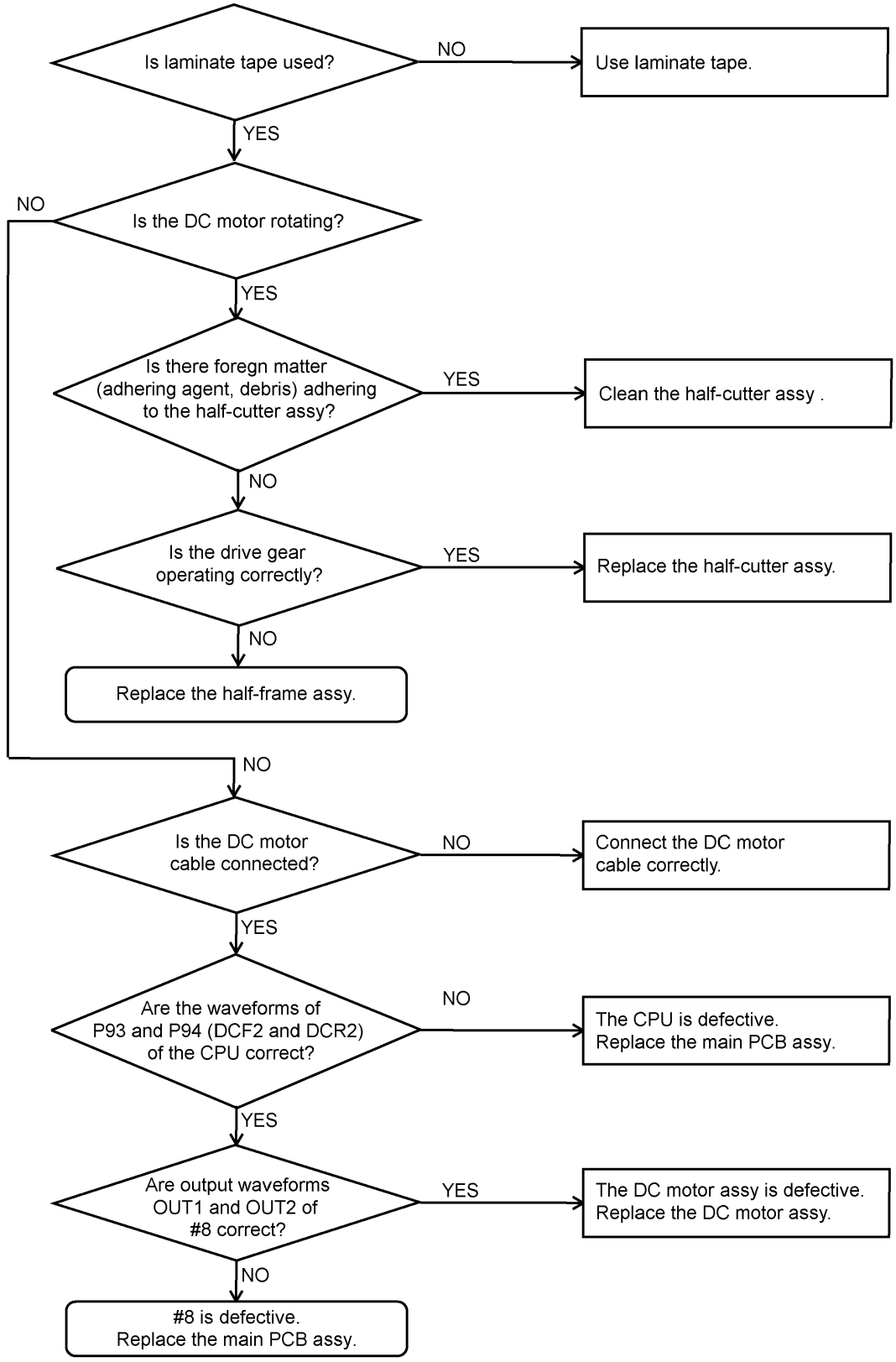


[7] The tape is not fed correctly.

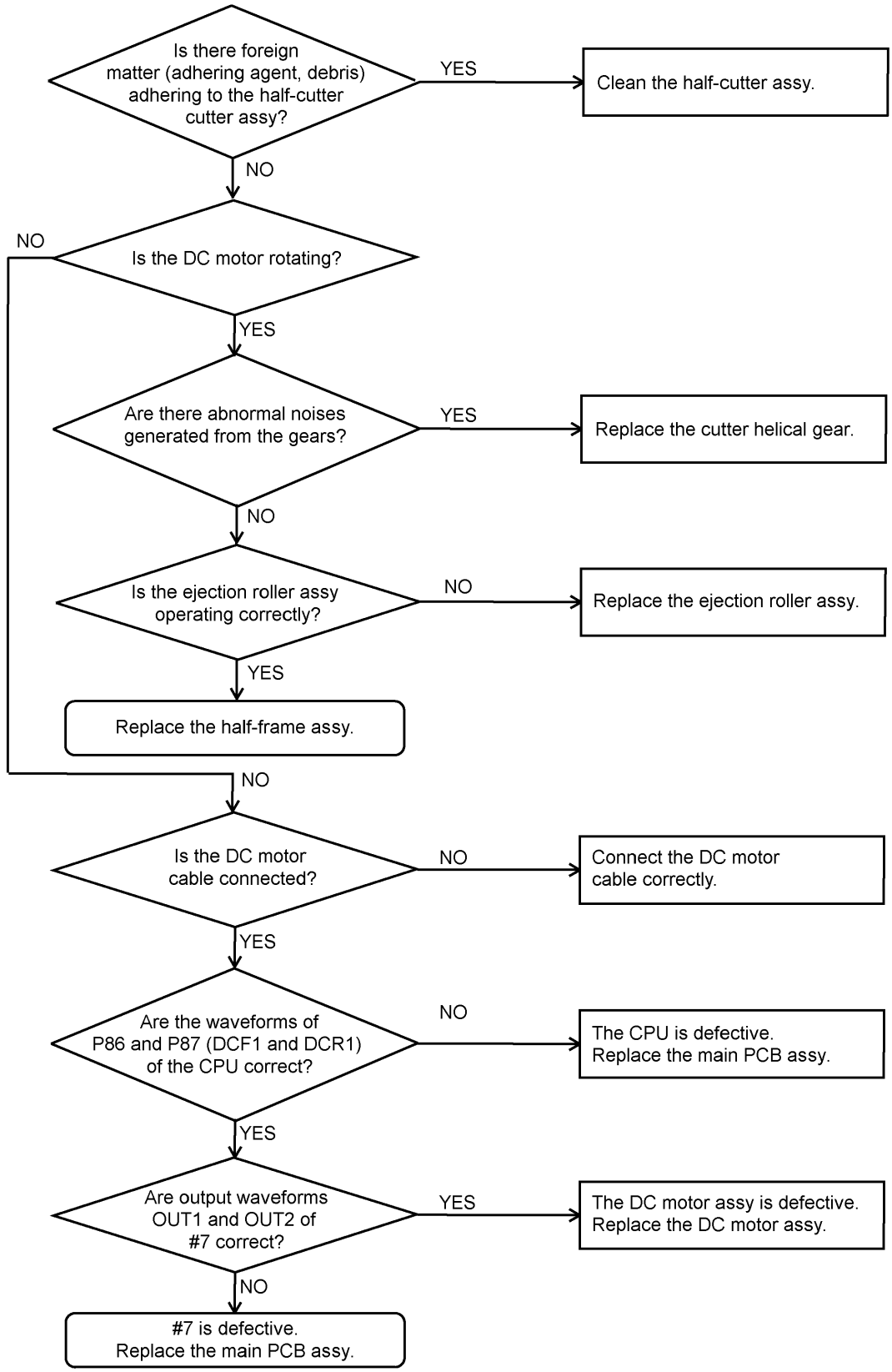



A
B
Is the black rubber on the tape feed sub roller deformed or is it slipping against the tape feed roller in the tape cassette?
YES
Replace the roller holder assy.
NO
Is the black rubber on the tape feed sub roller set between the ribs of the tape feed roller?
NO
Reset the rubber correctly.
YES
Is the tape fed correctly?
YES
The problem has been corrected.
NO
Is the print pitch (printed character width) correct?
YES
NO
Is the motor gear or the driving gear deformed or loose?
YES
Replace the main frame assy.
NO
Replace the motor assy.
Is the tape fed correctly?
YES
The problem has been corrected.
NO
C

[8] Half-cut is not possible.



[9] The tape is not ejected forcibly.



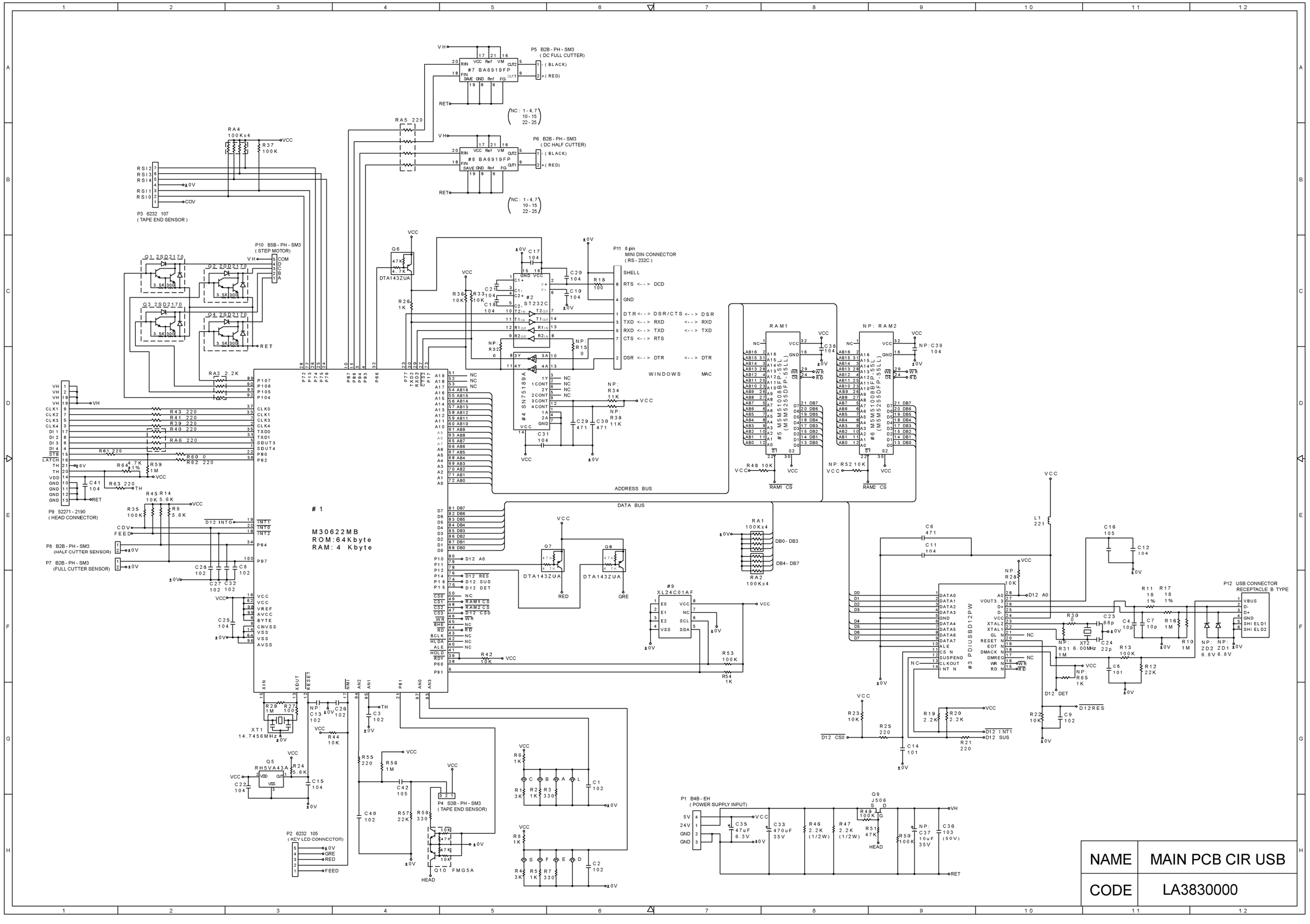
APPENDIX

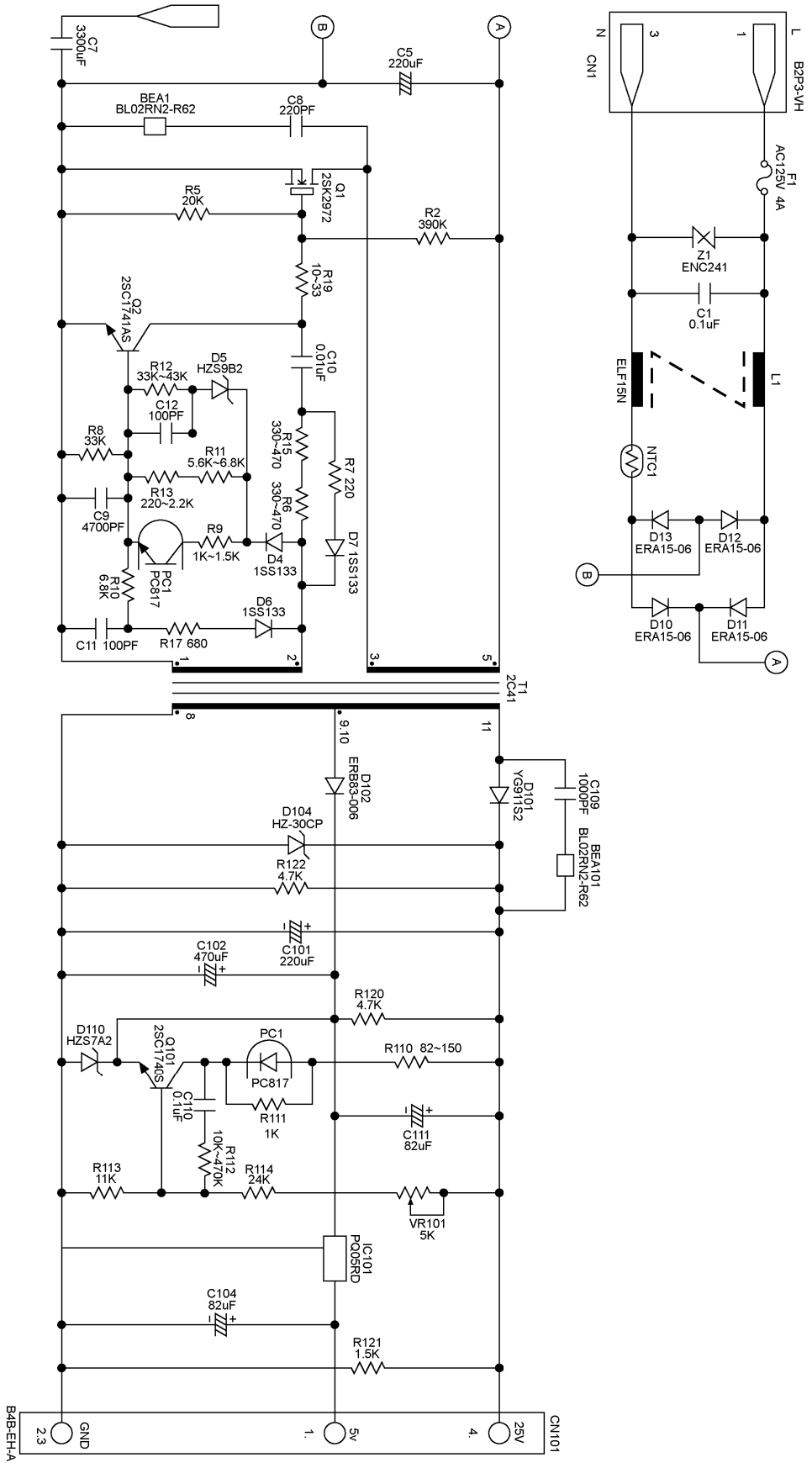
Circuit Diagram

- Main PCB
- Power Supply PCB (100-120V)
- Power Supply PCB (230V)

CONTENTS

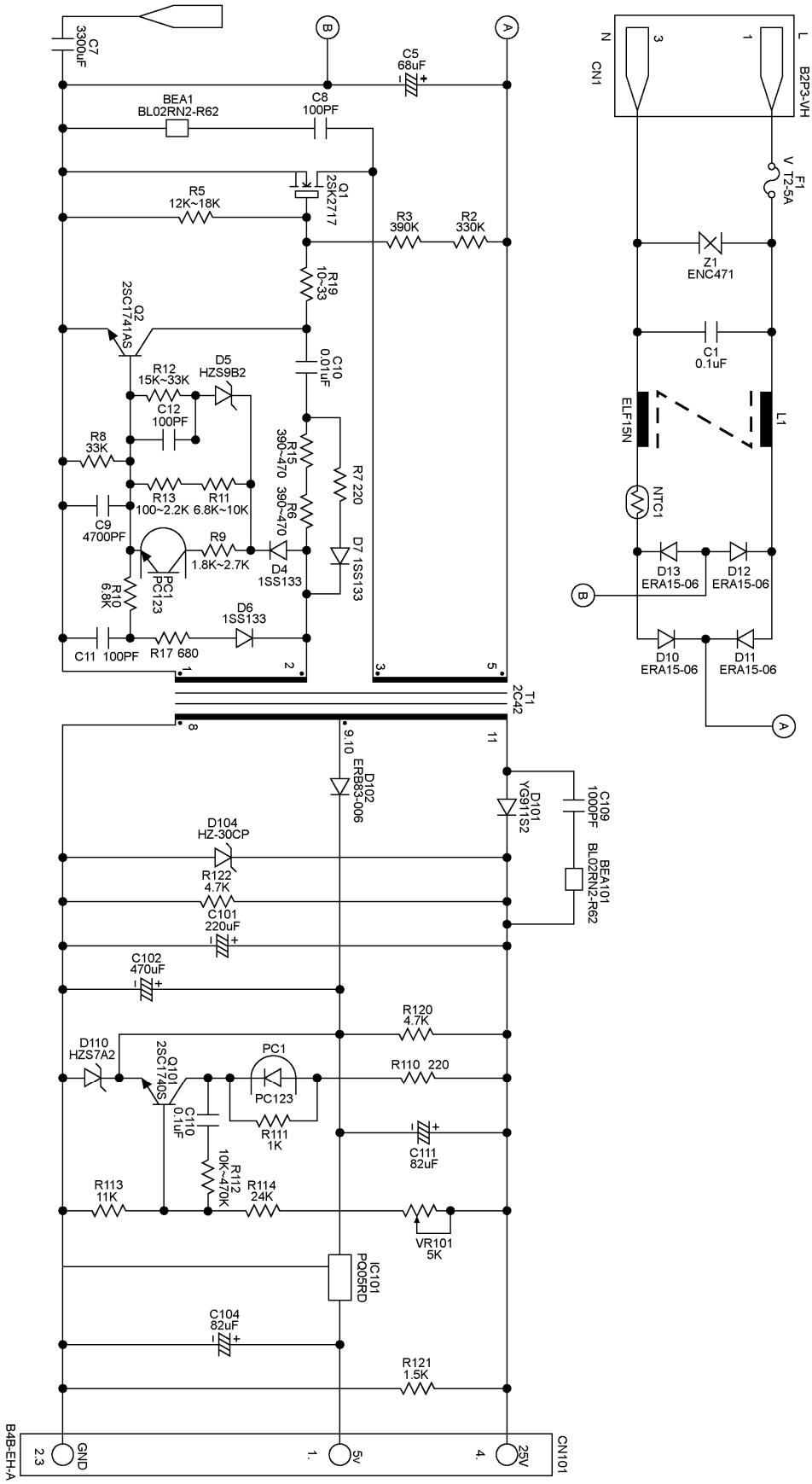
APPENDIX


P5 B2B - PH - SM3
(DC FULL CUTTER)
- (BLACK)
+ (RED)
#7 BA6919FP
(NC : 1 - 4, 7
10 - 15
22 - 25)
P6 B2B - PH - SM3
(DC HALF CUTTER)
#8 BA6919FP
RA4
100Kx4
R37
100K
RA5 220
P3 6232 107
(TAPE END SENSOR)
P10 B5B - PH - SM3
(STEP MOTOR)
Q1 2SD2170
Q2 2SD2170
Q3 2SD2170
Q4 2SD2170
3.5K 300
COM
RET
Q6
DTA143ZUA
R26
1K
C17
104
C20
104
C10
104
C21
104
C18
104
R36
10K
R33
10K
ST232C
P11 8 pin
MINI DIN CONNECTOR
(RS - 232C)
SHELL
R18
100
RTS <--> DCD
GND
DTR <--> DSR/CTS <--> DSR
TXD <--> RXD <--> RXD
RXD <--> TXD <--> TXD
CTS <--> RTS
DSR <--> DTR <--> DTR
WINDOWS MAC
NP:
R32
0
NP:
R15
0
#4 SN75189A
NP:
R34
11K
NP:
R38
11K
C29
471
C30
471
C31
104
RA3 2.2K
R43 220
R41 220
R39 220
R40 220
RA6 220
R61 220
R60 0
R62 220
R64 4.7K 1%
R59
1M
C41
104
R63 220
R45 R14
10K 5.6K
R35
100K
R9
5.6K
P9 52271 - 2190
(HEAD CONNECTOR)
CDV
FEED
P8 B2B - PH - SM3
(HALF CUTTER SENSOR)
P7 B2B - PH - SM3
(FULL CUTTER SENSOR)
C28
102
C8
102
C27 C32
102 102
C25
104
1
M30622MB
ROM:64Kbyte
RAM: 4 Kbyte
ADDRESS BUS
DATA BUS
RAM1
NP: RAM2
#5 M5M5100BFP-55LL
(M5M5255DFP-55LL)
#6 M5M5100BFP-55LL
(M5M5255DFP-55LL)
C38
104
NP:C39
104
R48 10K
NP:R52 10K
RAM1 CS
RAM2 CS
RA1
100Kx4
DB0- DB3
DB4- DB7
RA2
100Kx4
Q7
Q8
DTA143ZUA
DTA143ZUA
RED
GRE
#9
XL24C01AF
R42
10K
R53
100K
R54
1K
#3 PDIUSBD12PW
NP:
R28
10K
D12 A0
L1
221
C6
471
C11
104
C16
105
C12
104
R30
0
C23
68p
C24
22p
NP: XT2
R31 6.00MHz
1M
C4
10p
C7
10p
R16
1M
R10
1M
R11 R17
18 18
1% 1%
P12 USB CONNECTOR
RECEPTACLE B TYPE
NP: ZD2 6.8V
NP: ZD1 6.8V
C5
101
R12
22K
R13
100K
NP:
R65
1K
D12 DET
D12RES
R23
10K
R25
220
D12 CS0
C14
101
R19
2.2K
R20
2.2K
R21
220
D12 INT1
D12 SUS
R22
10K
C9
102
XT1
14.7456MHz
NP:
C13
102
C26
102
C3
102
R44
10K
Q5
RH5VA43A
C22
104
R24
5.6K
C15
104
R55
220
R56
1M
C42
105
C40
102
R57
22K
R58
330
Q10 FMG5A
HEAD
P4 S3B - PH - SM3
(TAPE END SENSOR)
P2 6232 105
(KEY LED CONNECTOR)
GRE
RED
FEED
R6
1K
R1
3K
R2
1K
R3
330
C1
102
R4
3K
R5
1K
R7
330
C2
102
P1 B4B - EH
(POWER SUPPLY INPUT)
5V
24V
GND
GND
C35
47uF
6.3V
C33
470uF
35V
R46
2.2K
(1/2W)
R47
2.2K
(1/2W)
Q9
J506
R49
100K
R51
47K
HEAD
R50
100K
NP:
C37
10uF
35V
C36
103
(50V)
RET
NAME
MAIN PCB CIR USB
CODE
LA3830000



NAME	POWER SUPPLY PCB CIR,100-120V

APP-3



NAME	POWER SUPPLY PCB CIR,230V

Sep., 2000
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