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OKIDATA®

Service Manual

ML172/ML182 Series Dot Matrix Printers

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Chapter 0 About This Manual

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Service Guide ML172/ML182 Series

Chapter 1 General Description & Specifications

1.1 GENERAL DESCRIPTION

The Microline 172, 182, 182-PLUS and 182-TURBO Printers are reliable, compact, dot matrix printers using a 9-wire printhead. These printers use a re-inking cartridge ribbon.

Although these printers are similar in appearance, there are differences in the features that each printer offers. Lets take a closer look at each printer.

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Service Guide ML172/ML182 Series

Chapter 1 General Description & Specifications

1.1.1 ML172

- Emulates the IBM Graphics Printer.
 - Pitch, page length and print mode are set through a MENU.
 - Switches on the Control Board select default Menu settings. Settings return to default values when the printer is powered off.
 - Pull tractor is standard.
 - Available in two models:
 1. Centronics parallel interface, this model will not accept a serial board.
 2. RS232-D serial interface. This model can be configured for parallel operation by removing the Serial Board from the Control Board.
-

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Service Guide ML172/ML182 Series

Chapter 1 General Description & Specifications

1.1.2 ML182

- Two models are available, IBM emulation, or Microline emulation.
 - Available with two interfaces, Centronics Parallel, or RS232-C Serial (9600 Baud, Ready Busy Protocol). An optional Super Speed Serial board (19.2 Baud, Ready Busy and X-On, X-Off Protocols) is available.
-

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Service Guide ML172/ML182 Series

Chapter 1 General Description & Specifications

1.1.3 ML182-PLUS

The ML182-PLUS is an enhanced version of the ML182, with the following features:

- Push-button front panel which allow the setting of Pitch (10,12 or 17 CPI), and Mode (Near Letter Quality, Utility and High Speed Draft).
 - SASF (Semi-Automatic Sheet Feed), which allows single sheets of paper to be automatically loaded using the bail arm lever.
-

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Service Guide ML172/ML182 Series

Chapter 1 General Description & Specifications

1.1.4 ML182-TURBO

The ML182-Turbo is a faster version of the ML182-PLUS, but does not provide SASF capability. Print speed at 10 CPI is 155 CPS in Utility mode, and 186 CPS in HSD mode. Super Speed Draft at 232 CPS is available at 12 CPI.

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Service Guide ML172/ML182 Series

Chapter 1 General Description & Specifications

1.2 SPECIFICATIONS

1.2.1 Paper-end Detection

- Paper-end is detected when the end of the paper is about 1 inch from the printing position.

1.2.2 Input Power

- 120 VAC +/- 10% 50/60 Hz +/- 2%
- 220 VAC +/- 10% 50/60 Hz +/- 2%
- 240 VAC +/- 10% 50/60 Hz +/- 2%

1.2.3 Ribbon

- Type: Re-Inking Cartridge
- Ribbon Life: Approximately 3 million characters

1.2.4 Line Feed Selection

- 6 lpi (.167 inch)
- 8 lpi (.125 inch)
- n/72 inch
- n/144 inch (Microline emulation)
- n/216 inch (IBM emulation)

NOTE: Refer to your Printer Handbook for applicability to your specific printer model.

1.2.5 Number Of Copies

- Original plus three copies (16 to 20 lb. weight paper)

NOTE: The ML172 is capable of printing an original plus two copies

1.2.6 Paper Feed Methods

- Bottom Feed
- Rear Feed
- Top feed (single sheets)
- Semi-Automatic Sheet Feeder (SASF) - ML182-Plus only

1.2.7 Print Speed

- ML172, ML182, ML182-PLUS

Print Mode	Char. Speed	Character Pitch
Utility Mode	120 cps	@ 10, 12 & 17.1 cpi
	60 cps	@ 5, 6 & 8.5 cpi
Near Letter Quality(NLQ)	30 cps	@ 10 & 12 cpi
	15 cps	@ 5 & 6 cpi
High Speed Draft (HSD)	144 cps	@ 10, 12 & 17.1 cpi ¹

1 - Applies to ML172 & ML182-PLUS only

- ML182-TURBO

Print Mode	Char. Speed	Character Pitch
Utility Mode	155 cps	@ 10, 12 & 17.1 cpi
Near Letter Quality(NLQ)	40 cps	@ 10 & 12 cpi
High Speed Draft (HSD)	186 cps	@ 10 & 17.1 cpi
	232 cps	@ 12 cpi

1.2.8 Reliability

- Printhead Life: Approximately 200 million characters
- MTBF: 4000 hours @ 25% duty cycle/35% page density
- MTTR: 15 minutes @ major sub-assembly level

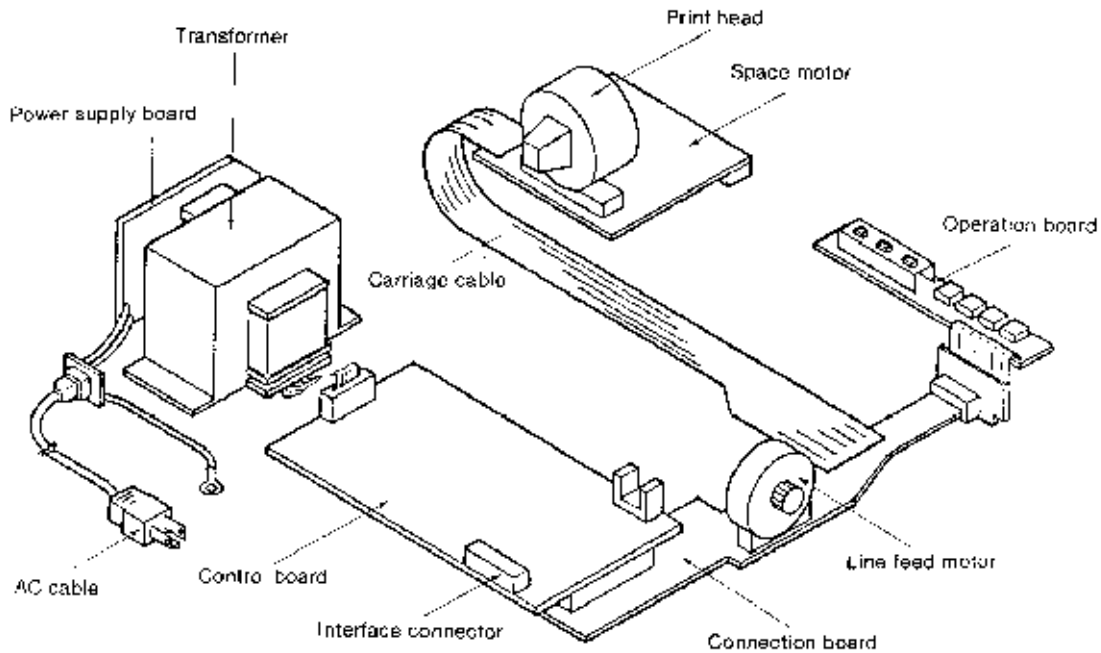
1.2.9 Available Options

- Tractor Feed Assembly 1
 - Super-speed Serial Interface (RS232-C)
 - Roll Paper Stand
- 1 - Standard on the ML172
2 - Not available for ML172

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2.1 ELECTRICAL PRINCIPLES OF OPERATION

The printer's major electrical assemblies are shown in Figure 2-1.



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Service Guide ML172/ML182 Series

Chapter 2 Principles of Operation

2.1.1 Power Supply

The Power Supply consists of the power supply board and the transformer. The Power Supply Board, which contains the ON/OFF Switch, Line Filter and related circuits, uses a 1 amp fuse for over-current protection. This circuit board transforms the AC input voltage into 7.6 VAC, 24 VAC and 10 VAC for use on the Control PCB. The Transformer contains a thermal fuse for protection against overheating. If the thermal fuse opens, the transformer must be replaced.

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Chapter 2 Principles of Operation

2.1.2 Control PCB

The Control PCB contains the microprocessor and related circuits, DC power circuit, motor drive circuits, paper end sensor and interface connector(s). If a serial interface is installed, it will be connected to the Control PCB. The DC power circuit converts the AC input from the power supply board into +8 VDC, +5 VDC and +30 VDC to be used throughout the printer.

The Control PCB also contains the following two protective circuits:

a) Driver Fault - Alarm Circuit

This circuit causes the AC fuse (on the power supply board) to open when a fault occurs in the printhead drive circuit, linefeed motor drive circuit or the spacemotor drive circuit. If the drive time of any drive circuit exceeds a pre-determined time, an alarm condition will exist as follows:

- HDALM - Printhead drive circuit alarm
- SPALM - Spacemotor drive circuit alarm
- LFALM - Linefeed motor drive circuit alarm

When any of the above signals become active, the Driver Fault - Alarm Circuit will output the ALM signal. This signal then turns ON an SCR (which is located on the Control Board). When the SCR turns ON, the secondary winding (30V) of the transformer is short-circuited. This induces an over-current condition through the primary winding of the transformer causing the AC fuse (F1) to open.

b) Head Overheat - Alarm Circuit

In order to protect the printhead coils, this circuit monitors the head temperature using the printheads built-in thermistor. When the temperature of the printhead exceeds 100 degrees Celsius, a head overheat alarm (HEAD TEMP) is generated. This alarm causes the printing operation to stop until the printhead cools. Once the printhead temperature returns below the alarm detection threshold, the printing operation is restarted.



Service Guide ML172/ML182 Series

Chapter 2 Principles of Operation

2.1.3 Interconnect Board

The Interconnect Board is nothing more than a BUS, used to connect the printhead, operator panel, spacemotor, linefeed motor and semi-automatic sheet feeder (SASF) Switch (ML182 PLUS only) to the Control PCB.

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Chapter 2 Principles of Operation

2.1.4 Operator Board

The Operator Board contains switches and indicators which allow the printer operator to control and monitor the printers operation. The ML172 and ML182 use the same type Operator Board (SLSQ) while the ML182-PLUS and ML182-TURBO use the same type Operator Board (SLSX). For specific information on the capabilities and use of each of these Boards, please refer to the appropriate Printer Handbook.

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2.2 MECHANICAL PRINCIPLES OF OPERATION : Printhead

The Printhead used by the ML172, ML182, ML182-PLUS and ML182-TURBO is a highly efficient Stored Energy type. Power is not consumed until a printwire is activated, thereby extending the printhead life to approximately 200 million characters.

The printhead is designed with nine (9) vertically aligned wires. Each wire is welded to an armature ring. Behind this armature ring is a spacer ring.

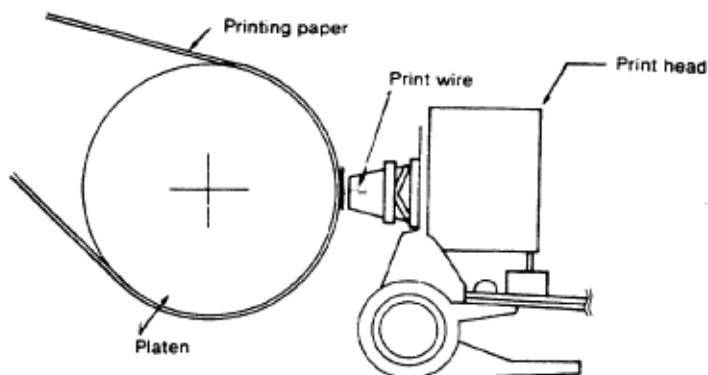
Each of the nine print wire armatures on the ring has a permanent magnet behind it. The magnets attract the armatures, keeping the print wires inside the printhead. Because of the spacer ring behind the armature ring, the armature is attracted toward the permanent magnet at a cocked angle. There is also a coiled wire, wrapped around each of the nine permanent magnets.

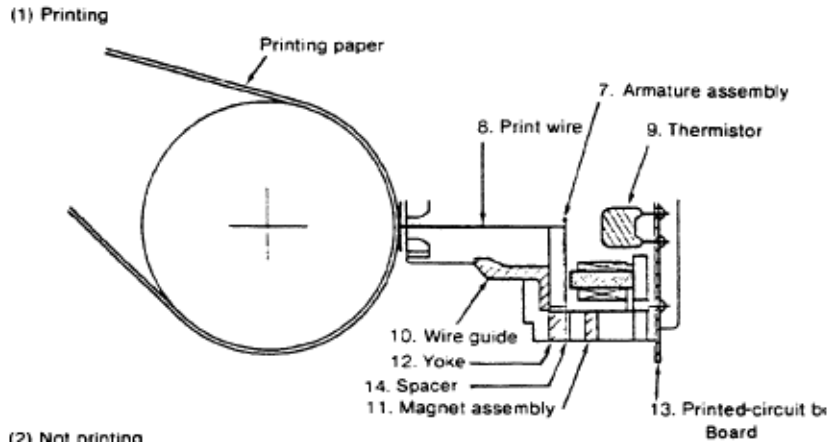
When a dot is to be printed, current passes through the coiled wire, creating a magnetic field which counters the magnetic field of the permanent magnet. This causes the armature and print wire to spring forward and imprint a dot onto the paper.

When the current is removed from the coiled wire, the magnetic field of the permanent magnet attracts the armature, causing the print wire to retract into the printhead.

This printhead contains a built-in thermistor (rated at 100 degrees Celsius) to monitor the head temperature. When the printhead temperature exceeds the 100 degree setting, the thermistor generates an output signal to the Control PCB.

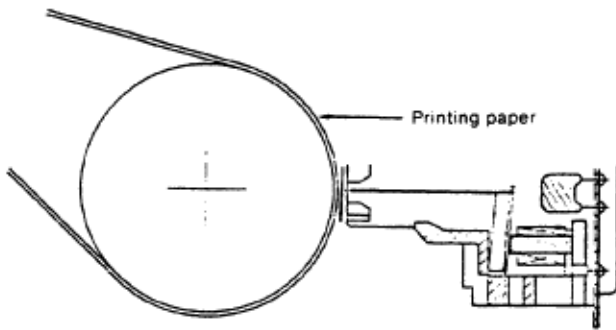
The printer then stops printing and sends a BUSY signal to the host computer. Data remains in the print buffer until the printhead temperature is below 100 degrees Celsius. At this time, the BUSY signal to the host computer becomes inactive and printing is resumed.





(2) Not printing

(2) Not printing

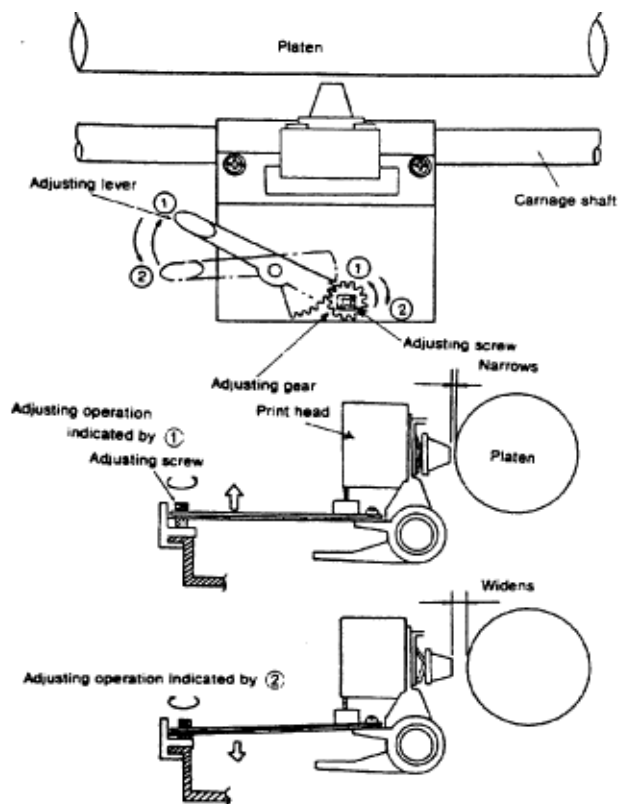


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2.2.2 Head Gap Adjusting Mechanism

The head-gap adjusting mechanism adjusts the gap between the platen and printhead by changing the tilt angle of the carriage frame. This is accomplished by using the adjusting lever.

When the adjusting lever is operated, the adjusting screw, which is interlocked with the lever via a gear, rotates and changes the position of the carriage frame around the carriage shaft. The printhead, mounted vertically on the carriage frame, moves closer to or farther away from the platen with the change in the carriage frame tilt angle.



2.2.3 Space Mechanism / Operation

The spacing operation is performed by applying power to the DC Spacemotor. This drives the Carriage Frame along the Carriage Shaft, which is mounted parallel to the platen.

The Spacemotor Assembly consists of :

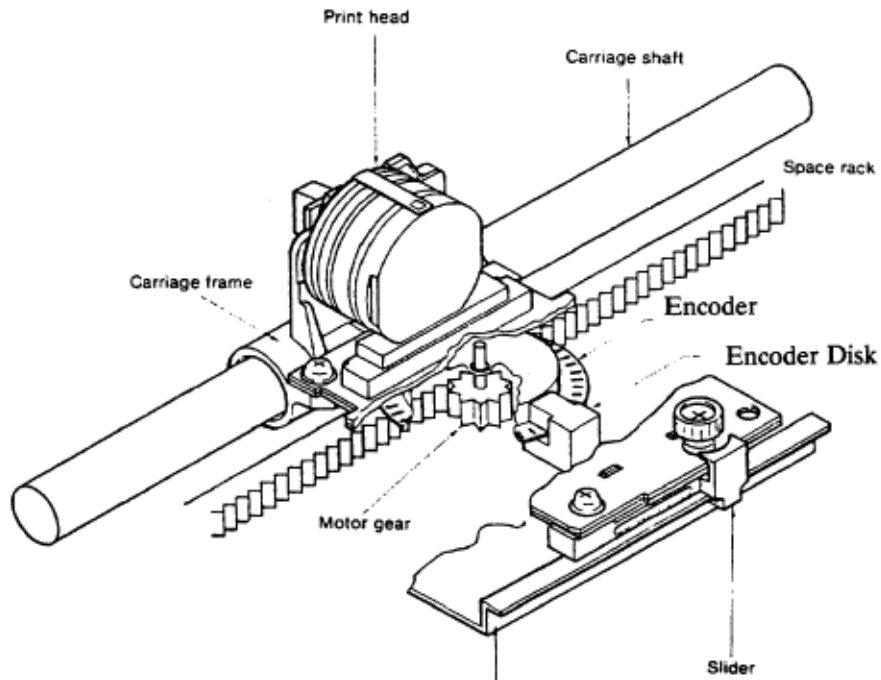
- DC Motor with Motor Gear
- Carriage Frame (includes Stator Yoke & Motor Board)
- Carriage Shaft
- Space Rack
- Encoder Disk Sensor
- Encoder Disk
- Slider

SPACING OPERATION

The Carriage Frame, with the Printhead and Spacemotor mounted on it, moves parallel to the platen along the Carriage Shaft. As the Spacemotor rotates counterclockwise, the Carriage is driven to the right, along the Space Rack.

The spacing mechanism is designed so when the Spacemotor rotates one turn, the Carriage Frame moves 0.8 inch (20.56 mm).

Motor rotation also turns the Encoder Disk, causing the timing windows on the disk to pass through the Encoder Disk Sensor. The position of the Carriage Frame is obtained by counting the number of windows detected by the Encoder Disk Sensor.



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Service Guide ML172/ML182 Series

Chapter 2 Principles of Operation

2.2.4 Ribbon Feed Mechanism / Operation

NOTE: The ribbon feed gear assembly is secured to the top of the spacemotor assembly by the four claw tabs.

The ribbon feed mechanism feeds the ribbon synchronously with the spacing operation. The mechanism is driven by the spacemotor.

The ribbon feed mechanism consists of :

- Ribbon feed gear assembly
- Ribbon gear (attached to the spacemotor)
- Ribbon cartridge

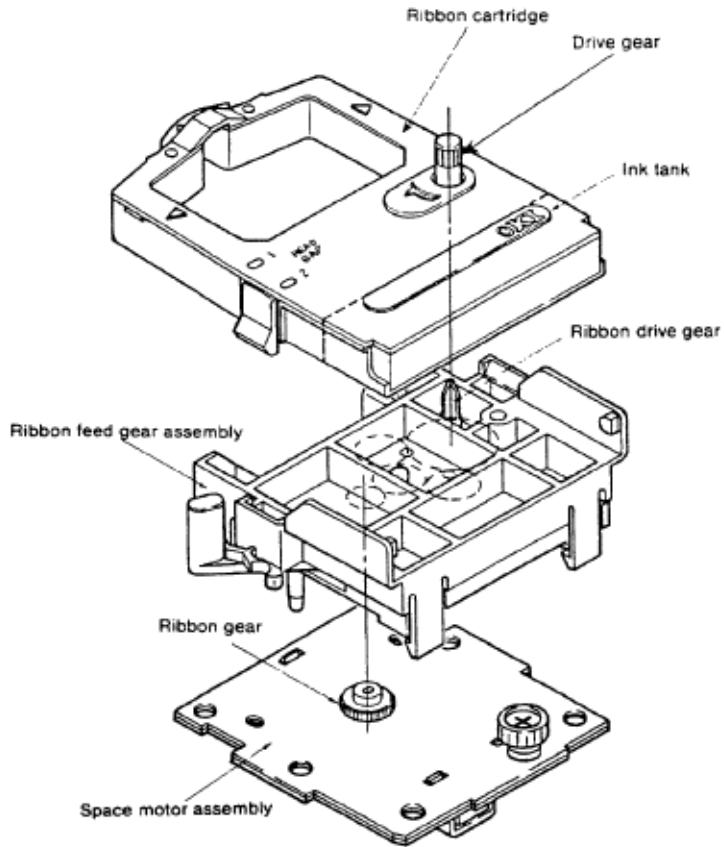
RIBBON CARTRIDGE

A uni-directional feed, continuous ribbon is used. The ribbon is replenished by a built-in ink tank in the ribbon cartridge so that quality printing is assured.

RIBBON FEED OPERATION

As the spacemotor rotates, the ribbon gear on the spacemotor shaft turns the drive gear in the ribbon cartridge via the ribbon feed gear assembly. As a result, the ribbon is fed.

In bi-directional printing, the ribbon gear rotational direction reverses each time the direction of the carriage movement reverses. In this case, the gears in the ribbon feed gear assembly switch the rotational direction so as to feed the ribbon in a fixed direction.



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2.2.5 Paper Feed Mechanism / Operation

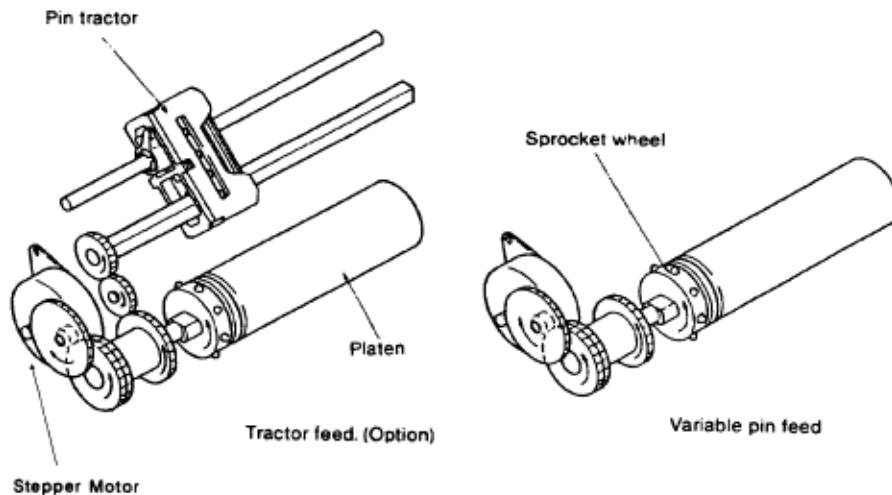
Paper Feed is performed by rotating the platen and pin tractors, which are driven by the linefeed stepper motor.

The paper feed mechanism consists of :

- Stepper motor with drive gear
- Reduction gear
- Platen - (no pins on ML172 Platen)
- Optional Tractor unit (standard on ML172)
- Pressure (friction feed) rollers - (no rear rollers on ML172)

PAPER FEED OPERATION

The paper feed stepper motor is mounted on the left side frame of the print unit, and it drives the platen via the reduction gear. If the optional tractor unit is installed, platen rotation is also transmitted through the idle gear to the tractor unit.



The paper feed mechanism is designed so when the stepper motor rotates 48 steps (360 degrees), paper is fed 0.17 inch (4.23 mm).

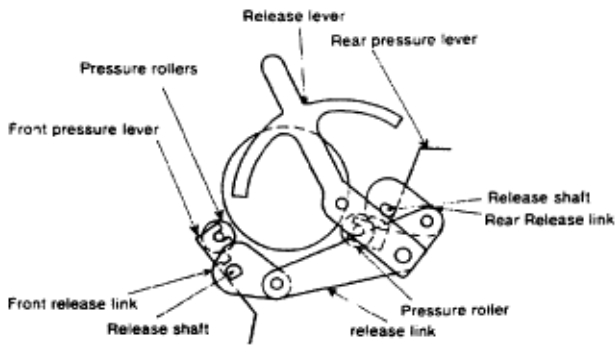
PAPER CLAMP MECHANISM (FRICTION FEED)

When the release lever is set to the OPEN position, the release link moves backward, and the front and rear release links rotate counter-clockwise.

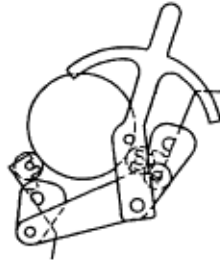
At the same time, the release shaft (interlocked with them) rotates counter-clockwise and places a gap between the pressure rollers and platen, allowing paper to be inserted.

When the release lever is set to the CLOSED position, the release link moves forward, and the front and

rear release links rotate clockwise. At the same time, the release shaft (interlocked with them) also rotates clockwise so that the pressure rollers are pushed against the platen by the front and rear pressure levers, allowing paper to be fed.



OPEN



CLOSE

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Service Guide ML172/ML182 Series

Chapter 2 Principles of Operation

2.2.6 Paper-end Detection Mechanism

REAR PAPER FEED

When paper is installed in the printer, it prevents the near-end lever from falling into the groove of the paper chute and platen, the paper-end sensor is on.

When the printer runs out of paper, the near-end lever falls into the groove of the paper chute and the rear part of the near-end lever turns off the paper-end sensor, paper-end is detected.

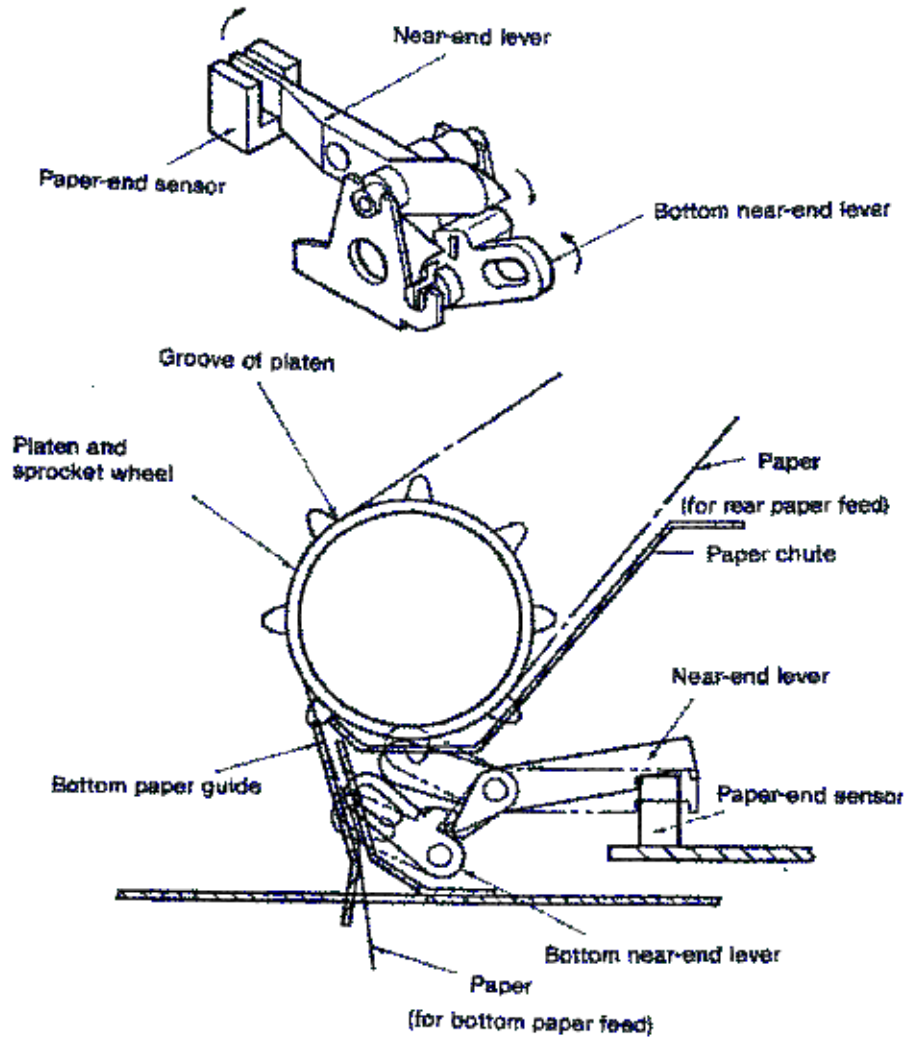
Paper-end is detected when the end of the remaining paper is about 1 inch (25.4 mm) from the printhead position.

BOTTOM PAPER FEED

When paper is installed in the printer, it prevents the bottom near-end lever from falling into the hole in the bottom paper guide. That is, the wedge on the bottom near-end lever pushes down the projection of the near-end lever, and the paper-end sensor is on.

When the printer runs out of paper, the tip of the bottom near-end lever falls into the hole in the bottom paper guide so that the rear part of the near-end lever turns off the paper-end sensor, and thus paper-end is detected.

Also in this case, paper-end is detected when the end of the remaining paper is about 1 inch (25.4 mm) from the printhead position.



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Service Guide ML172/ML182 Series

Chapter 2 Principles of Operation

2..2.7 Semi-Automatic Sheet Feed (SASF)

NOTE: Applies to ML182-PLUS only

The ML182-PLUS printer has a built in feature that allows you to automatically feed a single sheet of paper into the printer.

The Semi-Automatic Sheet Feed operates as follows:

- Place the printer OFF-LINE (Deselected) and set the Paper Release Lever for friction feed (rear position).
- Place the Sheet Separator in the upright position.
- Insert the Cut Sheet Paper by placing it against the Sheet Separator and allowing it to rest against the Platen. The ALARM LAMP should be ON, indicating that a PAPER-OUT condition exists.
- Pull the Bail Arm toward the front of the printer. The Bail Arm will contact the SASF Switch (which is mounted on the Interconnect Board) causing it to CLOSE. The signal SASF-N is then sent to the Control Board. This causes the CPU to command the Carriage to move toward the center of the Platen. At this time, approximately 1.1 inches of paper will be fed.
- Place the Bail Arm back in its original position. As you do this, the SASF Switch will OPEN, causing an additional 0.3 inch of paper to be fed.

NOTE: As a result, the first line of printing will occur 1 inch below the top edge of the paper.

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Service Guide ML172/ML182 Series

Chapter 3 Printer Maintenance

3.1 GENERAL INFORMATION

Observe the following precautions when performing maintenance on the MICROLINE printer:

WARNING

Before dismantling the printer, turn the POWER SWITCH "OFF" and remove the AC POWER CABLE from the outlet and the printer.

1. Do not remove any parts unless instructed to do so.
2. Do not place the printed circuit boards on conductive surfaces.
3. When disassembling the printer, temporarily replace screws to prevent loss.

NOTE: Refer to Figures 3.1a, 3.1b and 3.1c for the location of each printer's major assemblies.

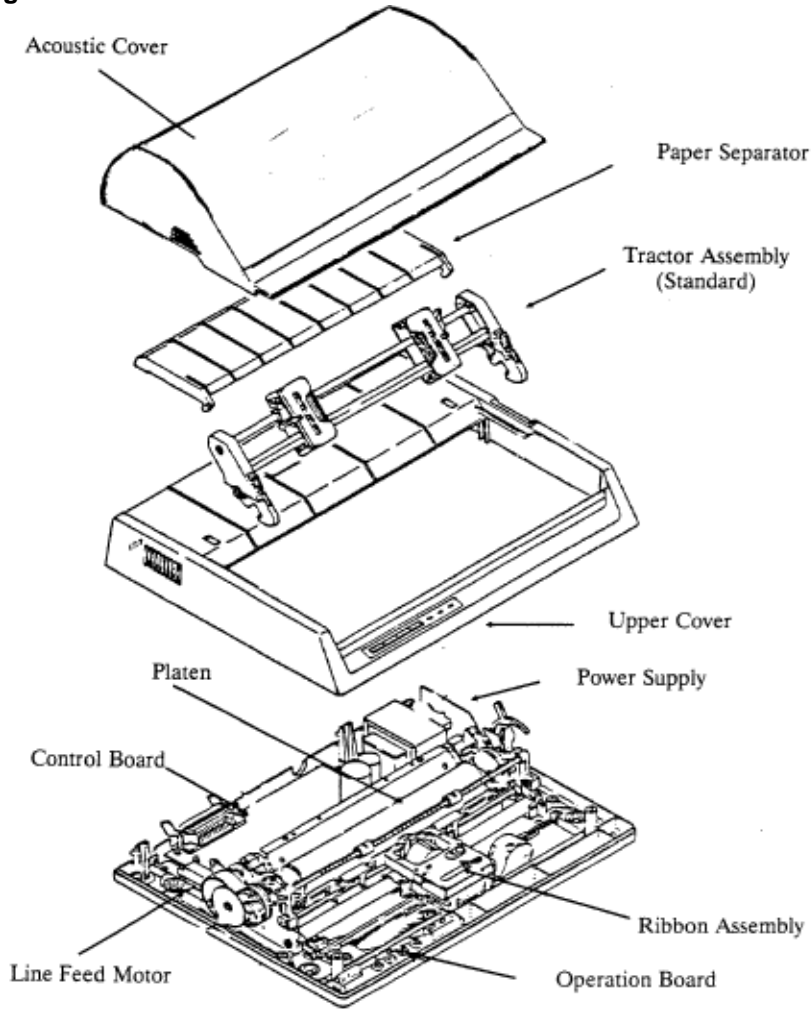
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Chapter 3 Printer Maintenance

Figure 3-1a - ML172



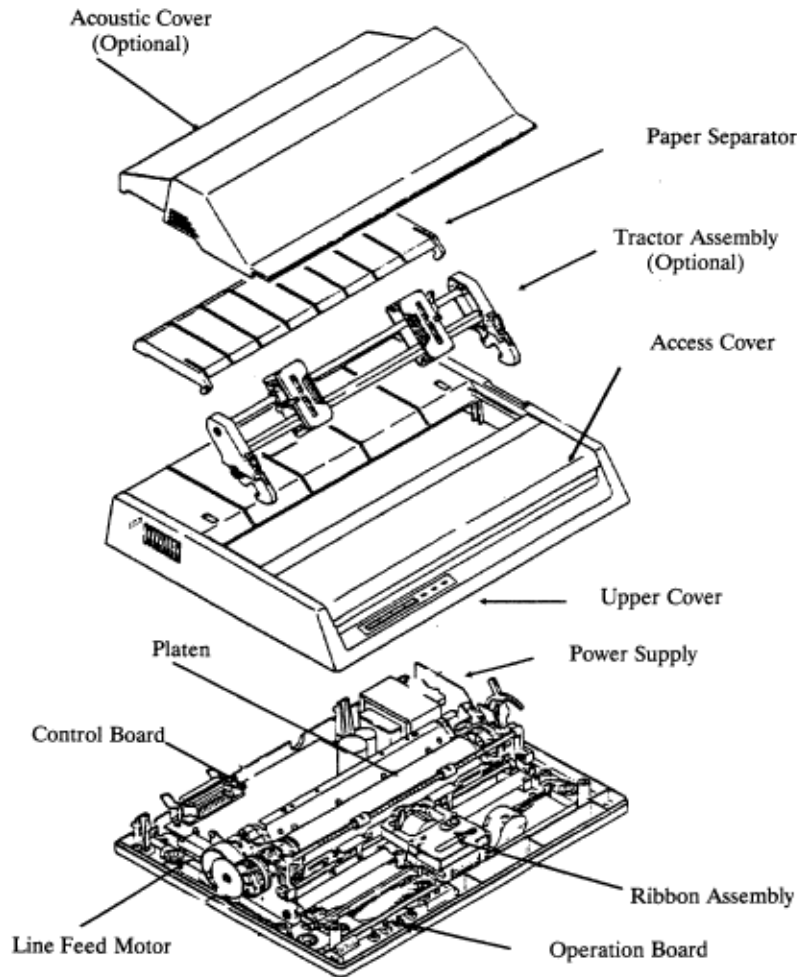
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Chapter 3 Printer Maintenance

Figure 3-1b - ML182



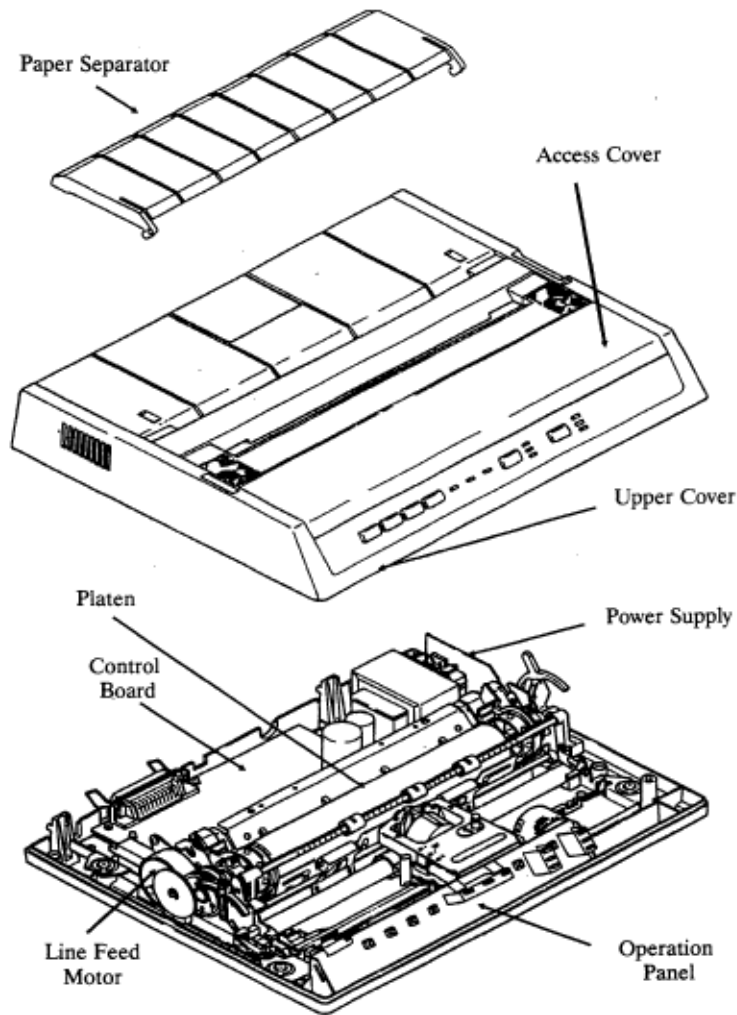
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Figure 3-1c - ML182-PLUS/ML182-TURBO





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3.2 MAINTENANCE PROCEDURES

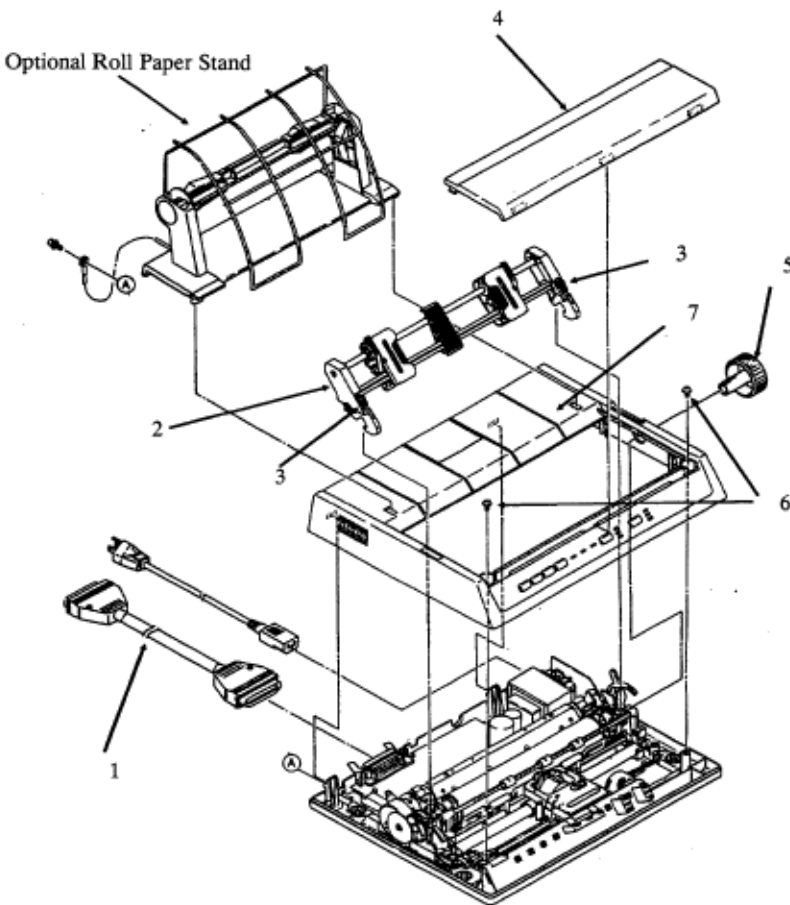
NOTE:

The following maintenance procedures apply to the ML172, ML182 ,ML182 PLUS and the ML182 TURBO printers. Unless the validity of the procedure will be effected, the drawings will depict an ML182 PLUS. When differences exist between the printers, they will be documented within the applicable procedure and additional drawings will be shown.

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3.2.1 Upper Cover

1. Detach the interface cable (1) and remove the paper.
2. Remove the paper separator (not shown) if installed.
3. Remove the tractor feed unit (2) by depressing the lock levers (3) and tilting toward the rear of the printer (if installed).
4. Detach the access cover (4) by lifting the rear edge.
5. Remove the platen knob (5) by pulling.
6. Remove the two cover mounting screws (6).
7. Detach the upper cover (7) by lifting it slightly and then pushing toward the rear of the printer.



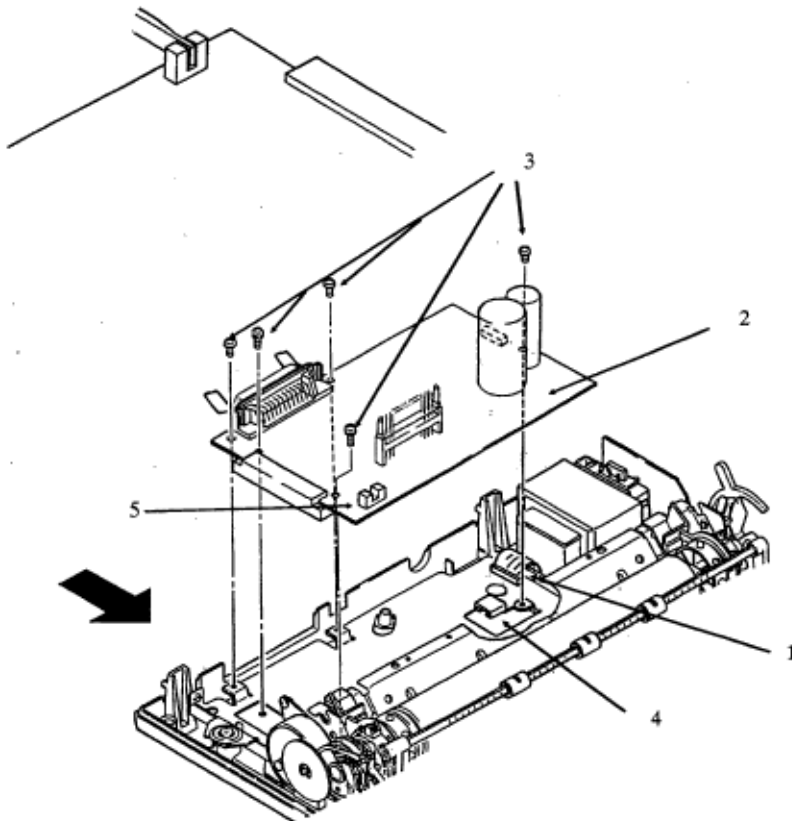
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3.2.2 Control Board

1. Detach the upper cover (3.2.1 )
2. If installed, remove the serial interface board (not shown).
 - 2a. Remove the two serial interface board mounting screws located on each side of the interface connector.
 - 2b. Remove the serial interface board by lifting.
3. Remove the transformer connector (1) from the control board (2).
4. Remove the five control board mounting screws (3) (If a serial interface board was installed, you should remove the three mounting screws and two stand-off posts).

CAUTION: When performing step 5, be careful not to break the PAPER NEAR-END LEVER.

5. Remove the control board by lifting.




CAUTION When reassembling:

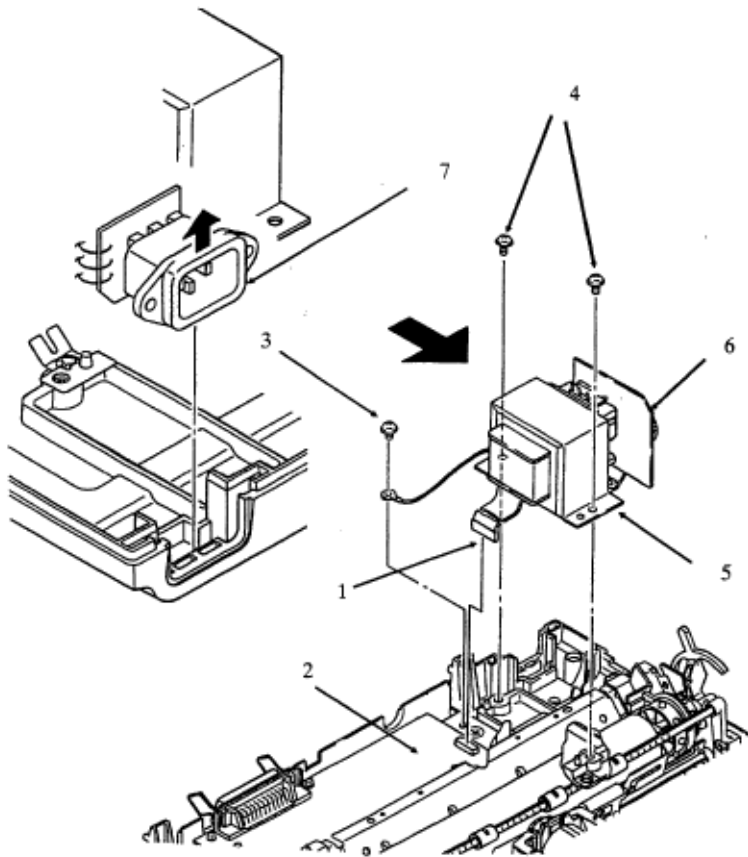
(1) Be sure the rubber insulator is (4) installed beneath the control board (applies to older ML182's only).

(2) Make sure the paper near-end lever moves freely in the groove of the



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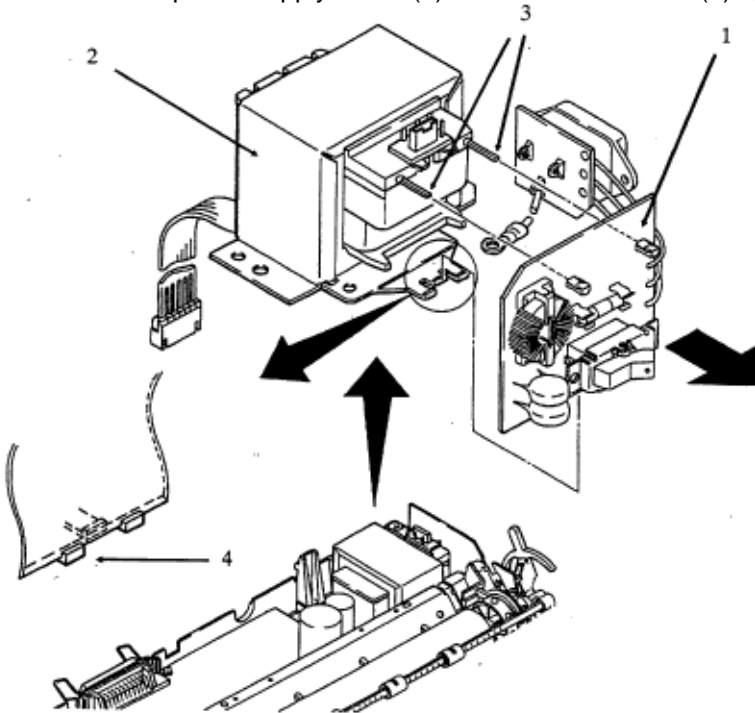
3.2.3 Transformer Assembly

1. Remove the upper cover (3.2.1 ).
2. Detach the transformer connector (1) from the control board (2).
3. Remove the ground strap mounting screw (3).
4. Remove the two transformer mounting screws (4).
5. Remove the transformer assembly (5) along with the power supply board (6) and AC receptacle (7) by lifting.




3.2.4 Power Supply Board

1. Remove the upper cover (3.2.1 ).
2. Remove the transformer assembly (3.2.3 ).
3. Detach the power supply board (1) from the transformer (2) by pulling from the connection pins (3).

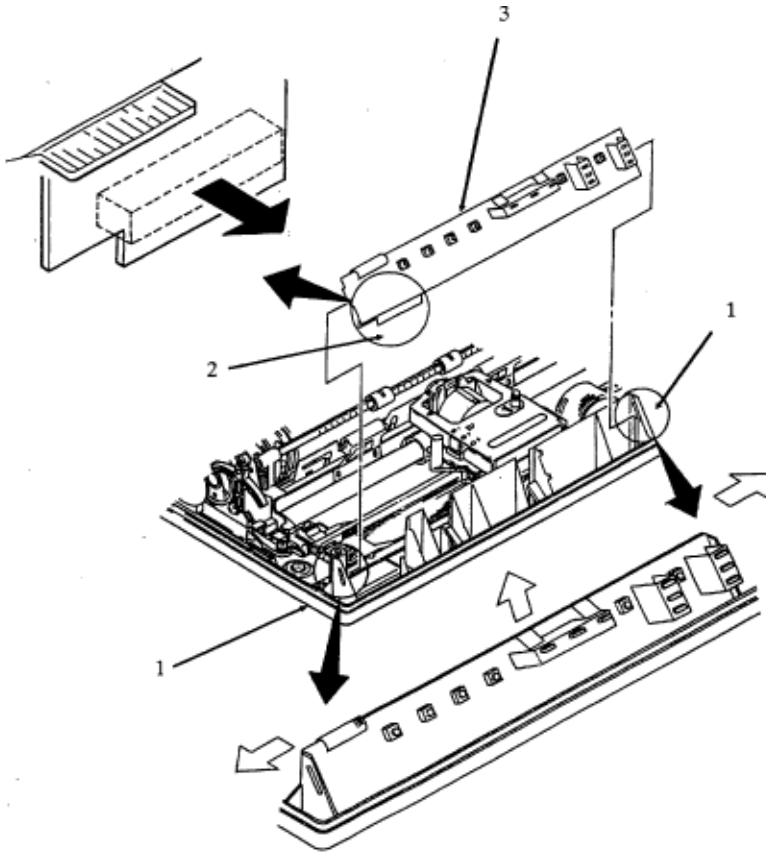
**CAUTION:**

When reassembling, place the Power Supply Board inside the guide (4).

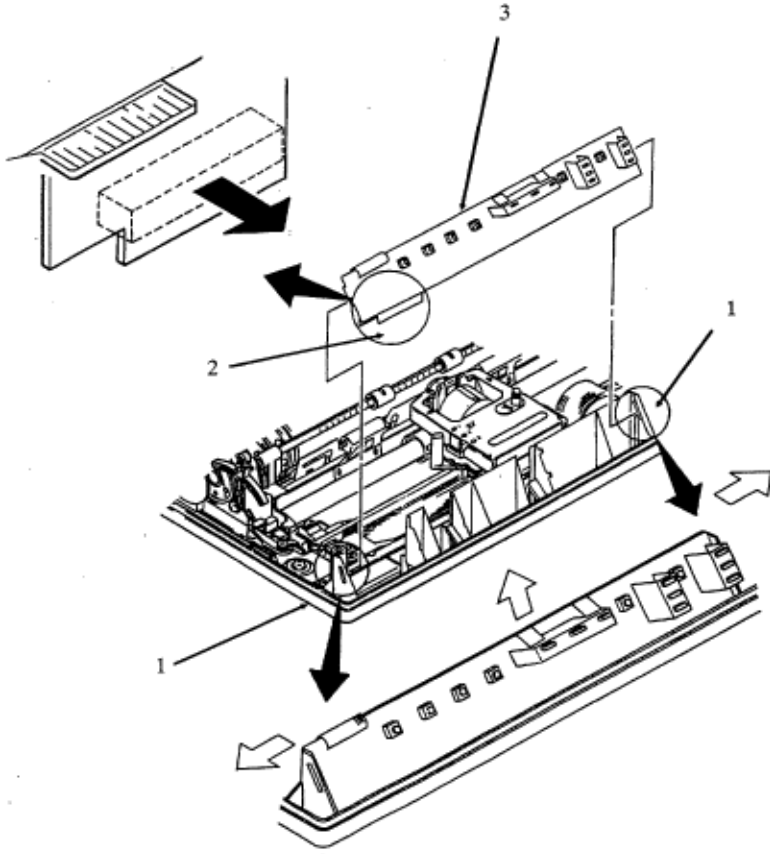
3.2.5 Operation Board

1. Remove the upper cover (3.2.1 )
- 2a. (ML172 and ML182) Disengage the two mounting tabs (1).
- 2b. (ML182-PLUS / ML182-TURBO) While pulling the side plates (1) outward, lift the operator panel slightly.
3. Remove the connector (2) from the interconnect board.
4. Lift the operation board (3) from the printer.

OPERATION BOARD - ML172 and ML182



OPERATION BOARD - ML182- PLUS/ML182-TURBO

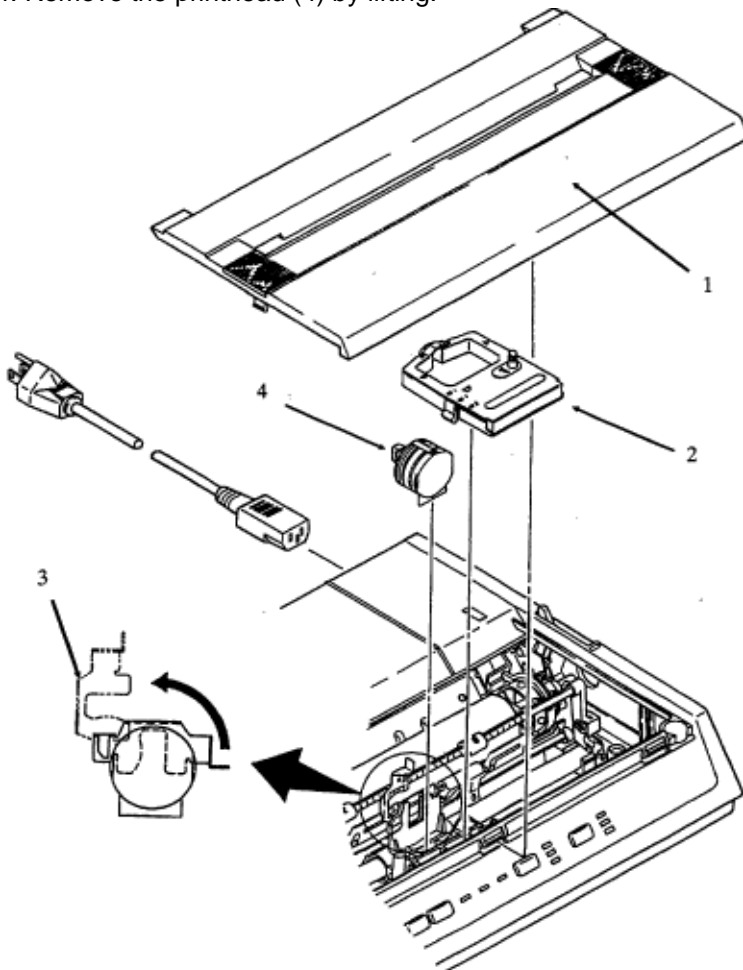


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3.2.6 Printhead

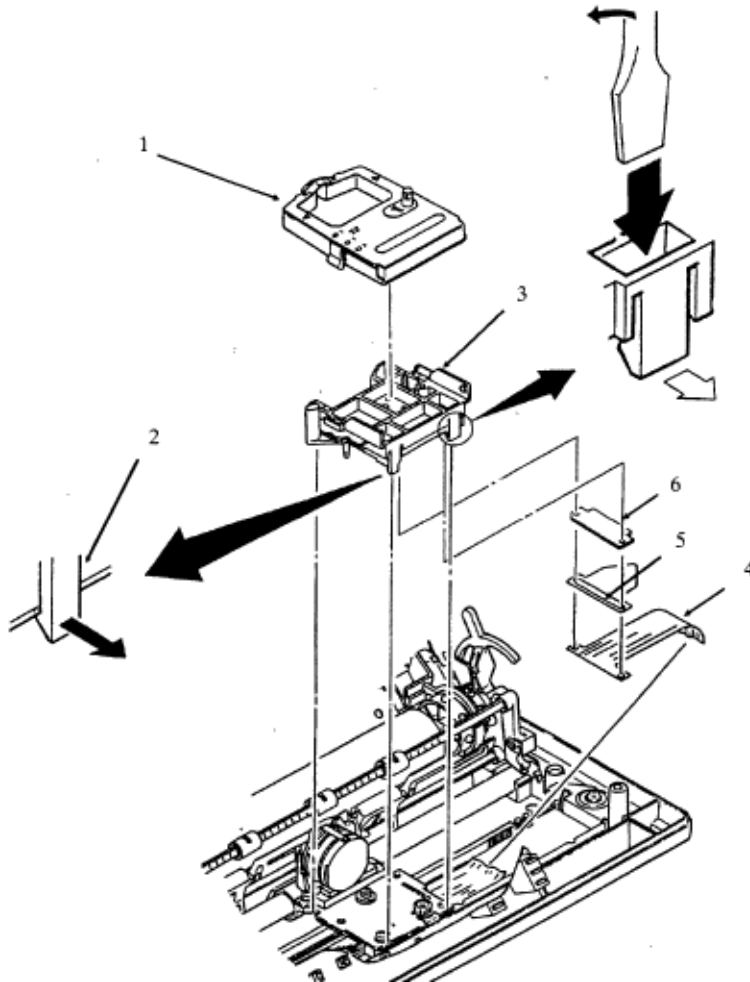
WARNING: The Printhead may be HOT after printing.

1. Detach the access cover (1) by lifting the rear edge.
2. Remove the ribbon cartridge (2) by grasping the sides and lifting.
3. Raise the head clamp (3) by swinging the right tab upward.
4. Remove the printhead (4) by lifting.



3.2.7 Ribbon Feed Gear Assembly

1. Remove the upper cover (3.2.1 ).
2. Remove the ribbon cartridge (1) by grasping the sides and lifting.
3. Disengage the two front tabs (2) and the two rear tabs.
4. Slowly lift the ribbon feed gear assembly (3) being careful not to separate the upper and lower feed gear housings.
5. Remove the carriage cable (4), cable holder (5), and contact pressure seal (6) from the ribbon feed gear assembly.



NOTE:

After replacing this assembly, you must perform the PRINTHEAD GAP ADJUSTMENT - See your printer handbook for instructions(3.4.1).



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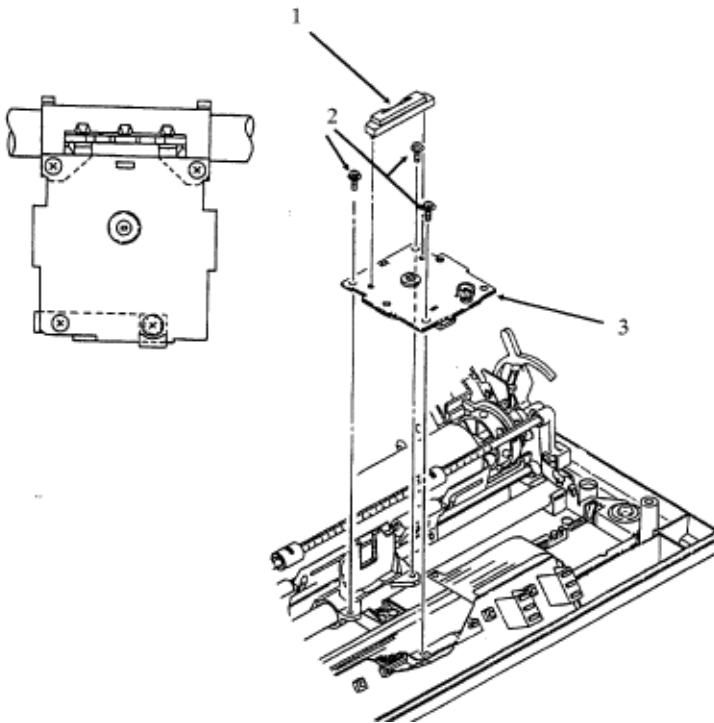
Chapter 3 Printer Maintenance

3.2.8 Space Motor Assembly





1. Remove the upper cover (3.2.1 .
2. Remove the printhead (3.2.6 .
3. Remove the ribbon feed gear assembly (3.2.7).
4. Detach the connector (1) and observe the position of the concave surface.
5. Remove the three mounting screws (2).
6. Remove the space motor (3) from the printer.

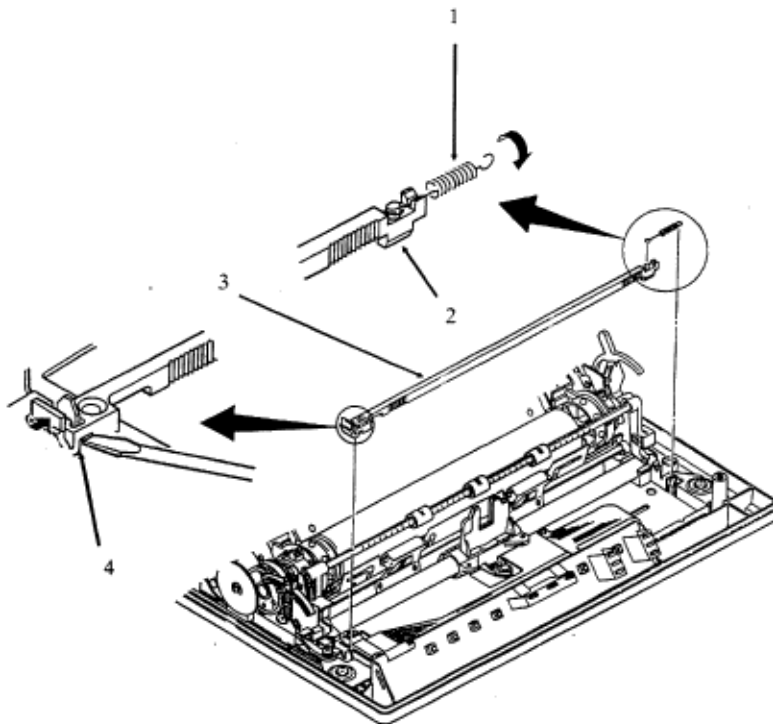
NOTE:

After replacing this assembly, you must perform the PRINthead GAP ADJUSTMENT (3.4.1).



3.2.9 Space Rack

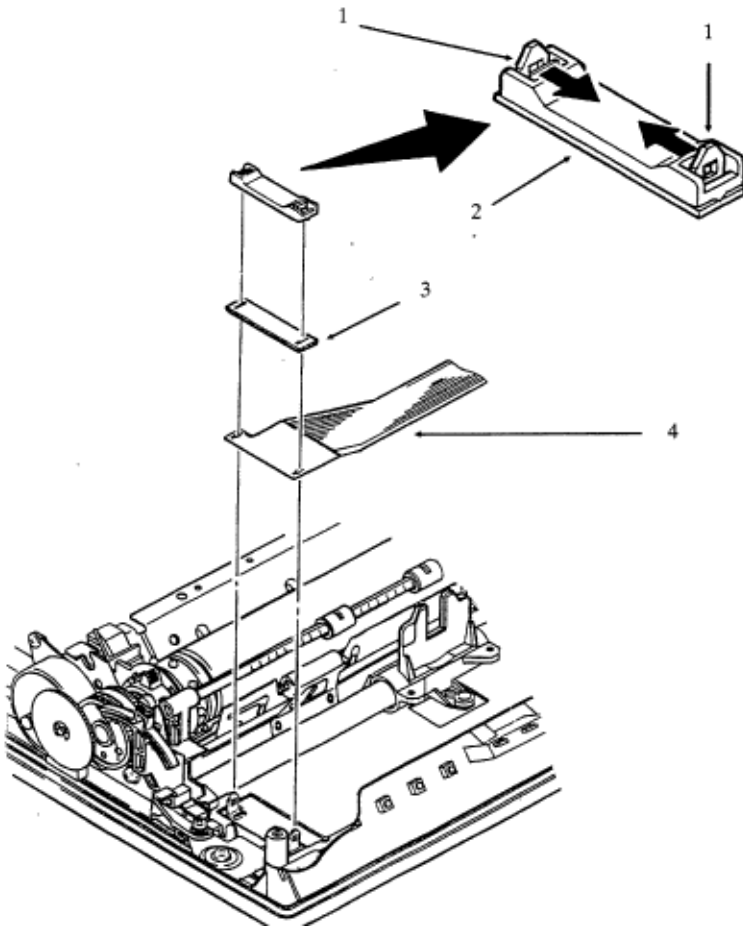
1. Remove the upper cover (3.2.1 ).
2. Remove the printhead (3.2.6 ).
3. Remove the ribbon feed gear assembly (3.2.7 ).
4. Remove the space motor assembly (3.2.8 ).
5. Detach the spring (1).
6. Disengage the tab (2) from the base plate.
7. Remove the space rack (3) by inserting a small screwdriver between the space rack and the base frame and gently pry the space rack upward (4).



NOTE: After replacing the space motor assembly, you must perform the PRINTHEAD GAP ADJUSTMENT - See your printer handbook for instructions(3.4.1).

3.2.10 Carriage Cable

1. Remove the upper cover [\(3.2.1 !\[\]\(f15d3c54be60b4fd0ce1da9fb3f67256_img.jpg\)](#)).
2. Remove the printhead [\(3.2.6 !\[\]\(7bf135d42c40a6430c927b2fd03d7659_img.jpg\)](#)).
3. Remove the ribbon feed gear assembly [\(3.2.7 !\[\]\(2bcc37677ea6b96900e4d746ad300082_img.jpg\)](#)).
4. Remove the space motor assembly [\(3.2.8 !\[\]\(b62812e390f75b509ead0f847e76b4ce_img.jpg\)](#)).
5. Remove the space rack [\(3.2.9 !\[\]\(702f396a3c354a80d179cf62e75a5343_img.jpg\)](#)).
6. Unlock the two tabs (1) and remove the carriage cable clamp (2).
7. Detach the rubber seal (3).
8. Remove the carriage cable (4).





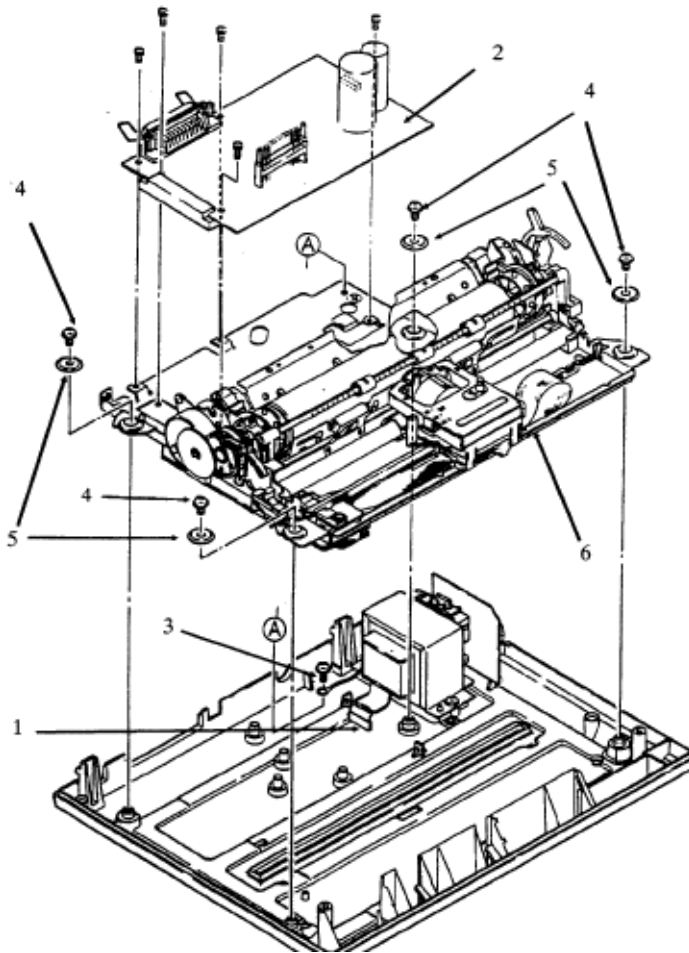
NOTE:

After replacing the space motor assembly, you must perform the PRINTHEAD GAP ADJUSTMENT - See your printer handbook for instructions(3.4.1).

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3.2.11 Printer Mechanism

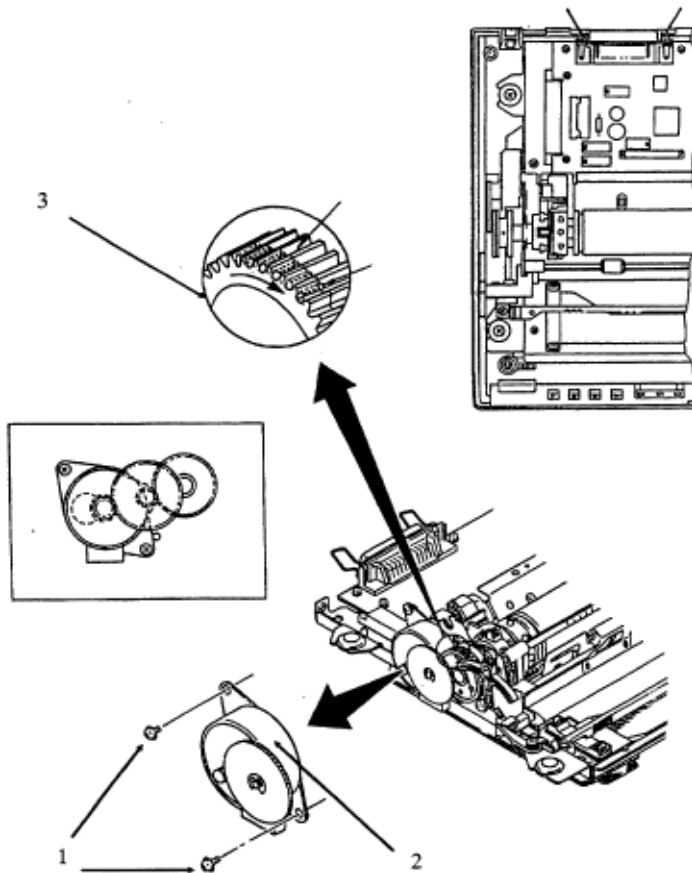
1. Remove the upper cover (3.2.1 ).
2. Detach the transformer connector (1) from the control board (2).
3. Remove the transformer ground strap mounting screw (3).
4. Detach the operation panel (3.2.5 ).
5. Remove the four printer mechanism mounting screws (4) and washers (5).
6. Remove the printer mechanism (6).




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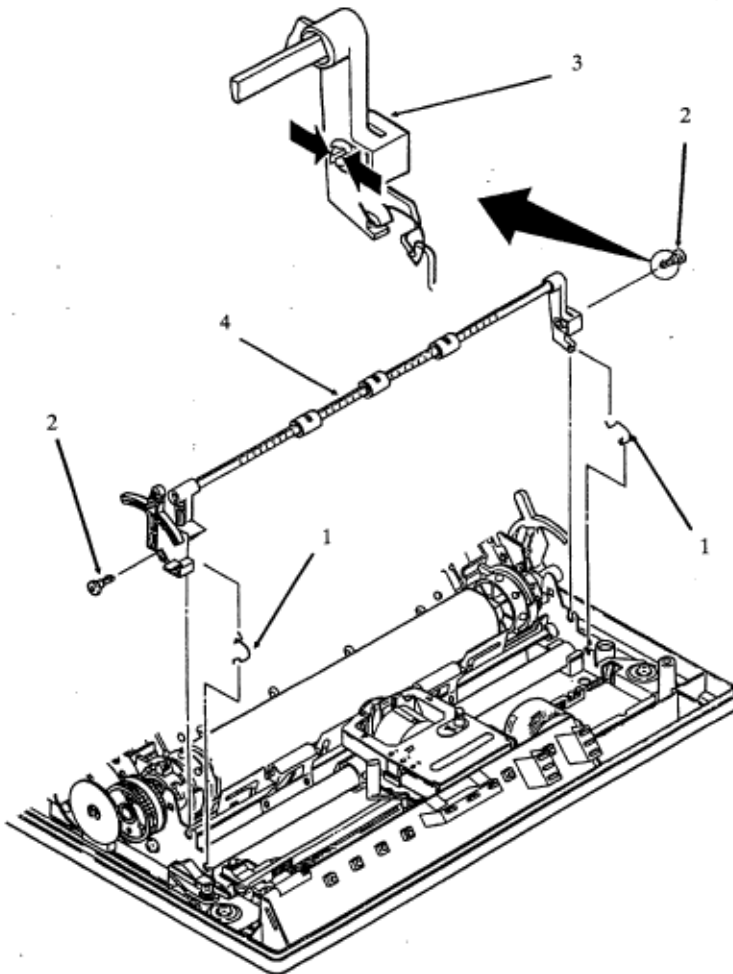
3.2.12 Linefeed Motor Assembly

1. Remove the printer mechanism ([3.2.11](#) ) .
2. Remove the two LF motor mounting screws (1).
3. Detach the LF motor assembly (2).




3.2.13 Column Indicator Bar

1. Remove the upper cover (3.2.1 .
2. Remove the two springs (1).
3. Remove the two shafts (2) by compressing the exposed shaft pin and push out (3).
4. Detach the column indicator bar (4).

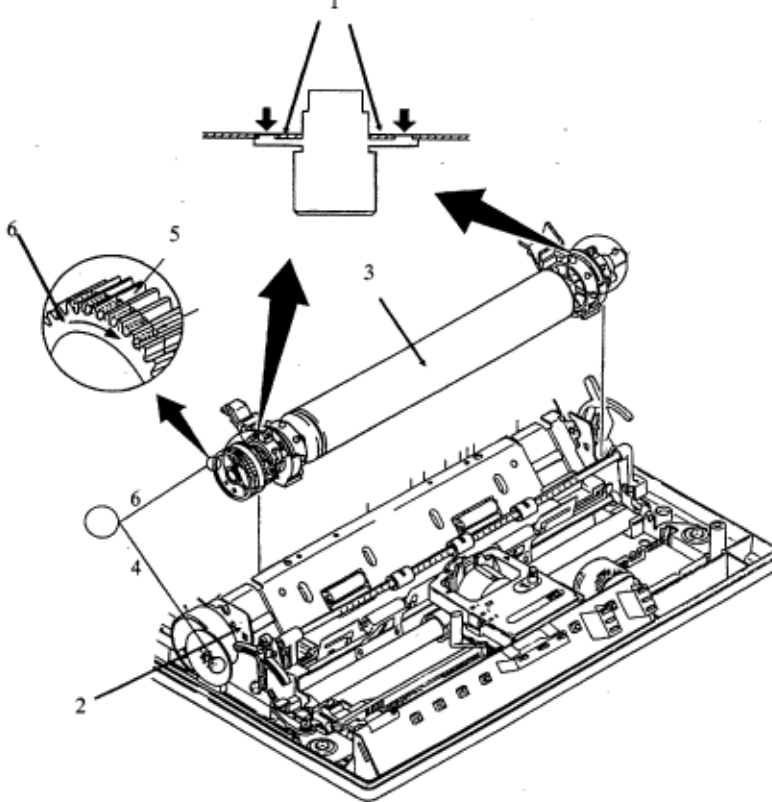


3.2.14 Platen Assembly


1. Remove the upper cover (3.2.1 .
2. Disengage the four mounting tabs (1) by gently prying the tabs from the side plate (2).
3. Remove the platen (3).

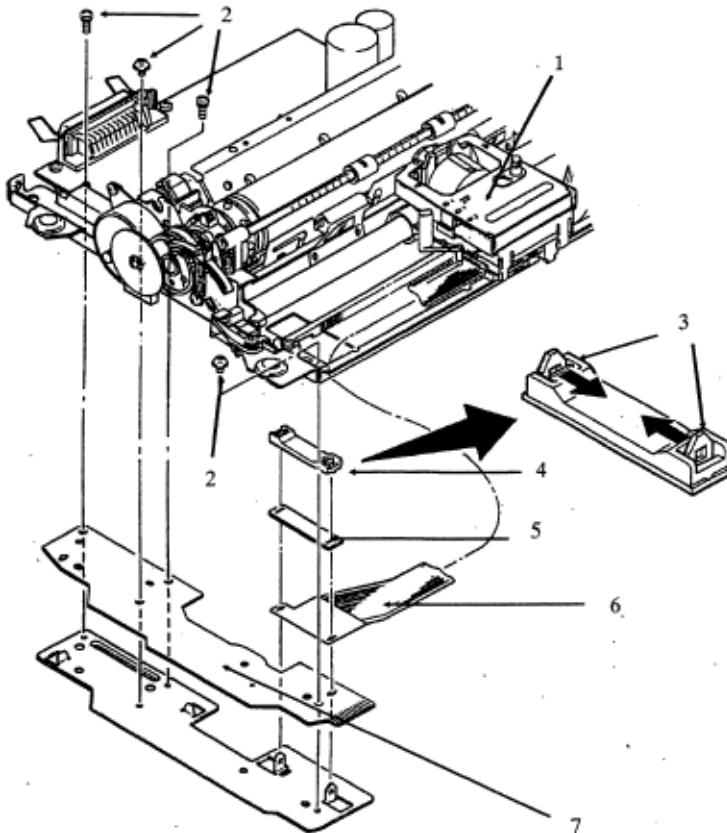
NOTE: The ML172 does not have pins on the Platen Assembly. A Tractor Assembly is standard.

To eliminate backlash between the line feed motor gear (4) and the line feed drive gear (5), rotate the bias gear (6) slightly and hold it in position while you reinstall the platen assembly.





3.2.15 Interconnect Board

1. Remove the printer mechanism (3.2.11 .
2. Move the carriage (1) to the right side of the printer mechanism.
3. Remove the four mounting screws (2).
4. Unlock the two tabs (3) and remove the carriage cable clamp (4).
5. Detach the rubber seal (5).
6. Remove the carriage cable (6).
7. Remove the interconnect board (7) from the printer mechanism.

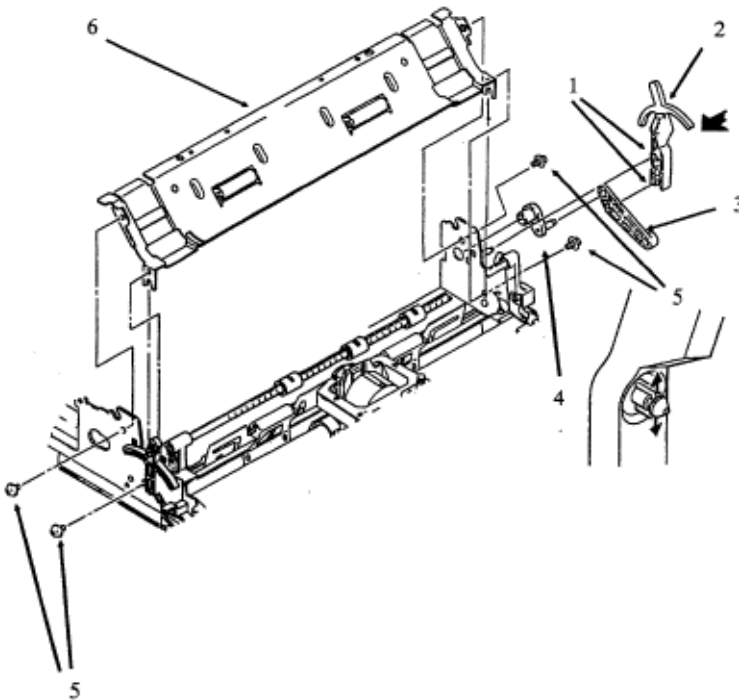


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3.2.16 Paper Chute Assembly

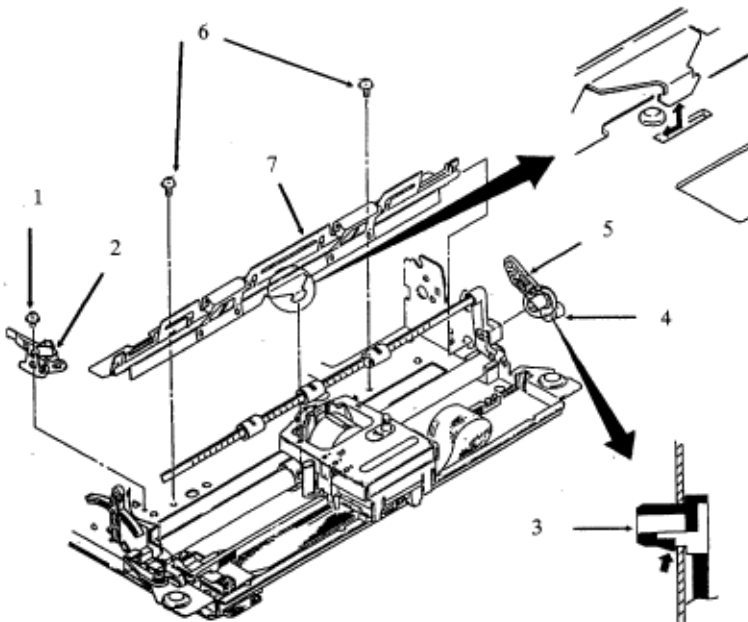
1. Remove the linefeed motor assembly (3.2.12 ).
2. Remove the platen assembly (3.2.14 ).
3. With a small screwdriver, pry open the two claws (1). With the claws open, detach the paper lock release lever (2).
4. Disengage the middle release link (3) from the rear release link (4) and remove the rear release link.
5. Remove the four mounting screws (5).
6. Detach the paper chute assembly (6).

NOTE: The ML172 Paper Chute does not have rear rollers.




3.2.17 Bottom Paper Guide Assembly

1. Remove the paper chute assembly (3.2.16 ).
2. Remove the mounting screw (1) and detach the near-end lever assembly (2).
3. Close the claws (3) and remove the front release link (4) and the middle release link (5).
4. Remove the two mounting screws (6).
5. Remove the bottom paper guide assembly (7).

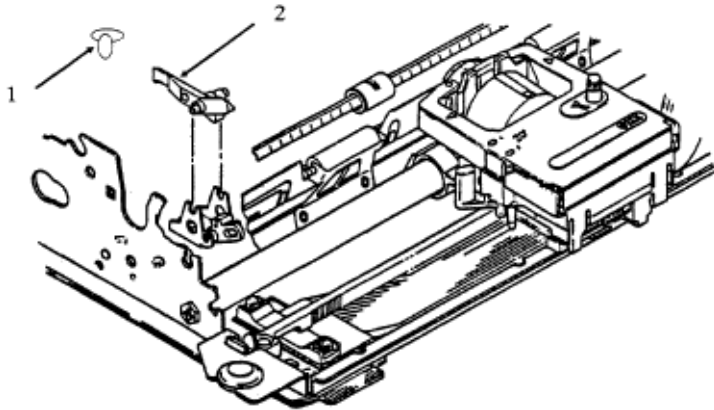


3.2.18 Near-end Lever And Bracket

1. Remove the paper chute assembly ([3.2.16](#) ).
2. Remove the mounting screw (1) and detach the near-end lever assembly (2).

NOTE:

The near-end lever (without the bracket) can be removed by first removing the control board, then pulling the lever upward.




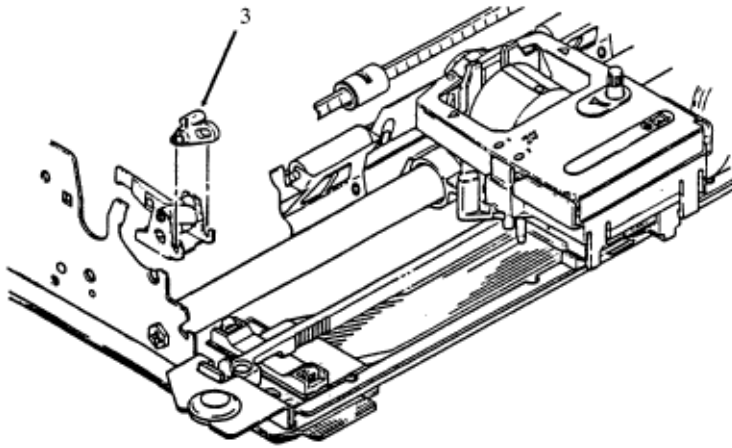


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3.2.19 Bottom Near-end Lever

1. Remove the paper chute assembly (3.2.16 ).
2. Detach the bottom near-end lever (3).



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3.3.1 ADJUSTMENTS - Head Gap Adjustment

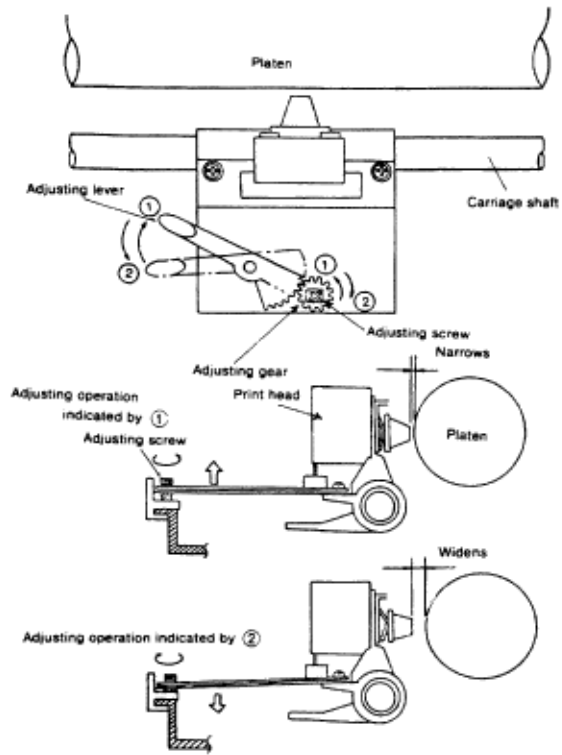
Required Tools:

- Feeler Gauge (.019 inch)
- Phillips Screwdriver (#2)
- Jewelers Screwdriver

Adjustment Procedure:

1. Turn the AC Power OFF and remove the AC plug from the power receptacle.
2. Remove the printer access cover.
3. Remove the ribbon cartridge.
4. Set the gap adjusting lever to range #1.
5. Move the paper lock release lever to the rear.
6. Insert a 0.019 inch thickness gauge between the platen and the printhead. Make sure that the thickness gauge can be smoothly inserted, although a small amount of friction is acceptable.
7. If adjustment of the gap is required, press down on the adjusting gear with a jewelers screwdriver to disengage the gear from the adjusting lever. Adjust the gap by turning the adjusting screw with a screwdriver.
8. After adjustment, move the adjusting lever from position 1 to 3 and then back to position 1. Recheck the head gap once more. The gap must be between .017 inch and .019 inch.

NOTE: Perform Steps 6, 7 and 8 at both ends of the platen.



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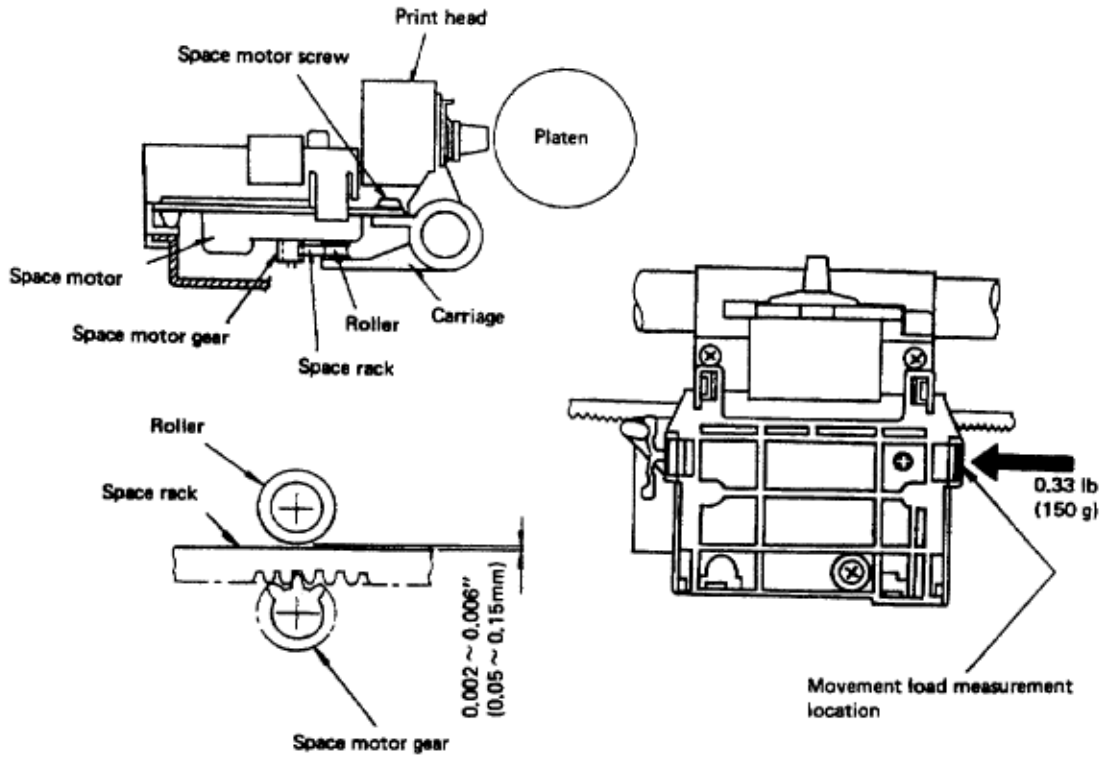
3.3.2 Space Rack and Roller Gap Adjustment

Required Tools:

- Feeler Gauge (.004 inch)
- Phillips Screwdriver (#2)
- Tension Gauge (250 g)

Adjustment Procedure:

1. Turn the AC Power OFF and remove the AC plug from the power receptacle.
2. Remove the Upper Cover ([3.2.1](#) ).
3. Remove the ribbon cartridge.
4. Insert a 0.004 inch thickness gauge between the Space Rack and the Roller. Make sure that the thickness gauge can be smoothly inserted, although a small amount of friction is acceptable.
5. If adjustment is required, loosen the three spacemotor mounting screws and move the spacemotor until the required gap is attained. Tighten the mounting screws.
6. After adjustment, check the gap between the space rack and the roller once more. The gap must be between 0.002 inch and 0.006 inch.
7. While pulling the carriage with the force gauge (without a ribbon cartridge installed) the carriage movement load should be 150 g or less.



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3.4 PRINTER SELF-TESTS

NOTE: Please refer to the appropriate Printer Handbook for instructions on running the printer self-tests.

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Chapter 3 Printer Maintenance

3.5 PREVENTIVE MAINTENANCE

WARNING

Before performing Preventive Maintenance, turn the AC Power switch OFF and remove the power cable from the outlet.

3.5.1 Printer Cleaning

The printer should be cleaned periodically as follows:

- Cleaning interval: 6 months or 300 operating hours
- Required time: Approximately 10 minutes
- Tools needed: Dry, soft cloth; (vacuum cleaner -if available)
- Parts to be cleaned: SEE TABLE LISTED BELOW

PARTS TO BE CLEANED

<u>PARTS</u>	<u>DESCRIPTION</u>
Carriage and its surroundings	Remove paper lint, dust, dirt and ribbon lint.
Paper Path	Clean platen pinch rollers with cleaning fluid.
Paper-end Sensor	Remove paper lint and dust from the sensor.

3.5.2 Printer Lubrication

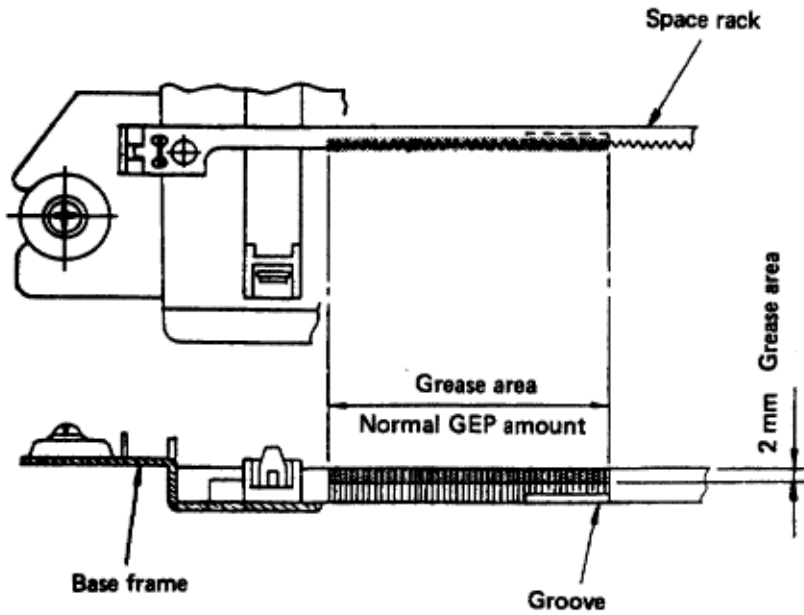
The ML172, ML182, ML182-PLUS and ML182-TURBO printers do not require lubrication during normal operation. Lubrication must be performed, however, if the printer has been disassembled/reassembled, after cleaning lubricated parts and after replacing lubricated parts.

Lubricant types: Albania grease, #2 machine oil

- Areas to lubricate: Carriage Shaft, Space Rack (refer to the figure at the bottom of this page for space rack lubrication locations).

CAUTION: Do NOT allow any lubricant to contact the following areas:

- Platen
- Tractor Pins
- Printhead



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Chapter 4 Interfacing Techniques

4.1 INTERFACING TECHNIQUES

A major difference between the ML172, ML182, ML182-PLUS and ML182-TURBO is the type of interface available for each printer. The following TABLE depicts these interface types:

PRINTER	STANDARD INTERFACE	OPTIONAL INTERFACE
o ML172	Centronics (Parallel)	None Available or Super Speed RS232-D
o ML182/ML182-PLUS	Centronics (Parallel) (IBM Emulation)	Super Speed RS232-D
o ML182/ML182-PLUS	Centronics (Parallel) (Microline Emulation)	Super Speed RS232-D or High Speed RS232-D
o ML182-TURBO	Centronics (Parallel) (IBM Emulation)	Super Speed RS232-D
o ML182-TURBO	Centronics (Parallel) (Microline Emulation)	Super Speed RS232-D or Super Speed RS232-D

NOTE 1: The ML182 and ML182-PLUS (Microline) Serial configurations shipped from OKIDATA will contain a High Speed Serial Interface Board (9600 BAUD maximum). This board supports READY/BUSY Protocol only.

NOTE 2: The ML182-TURBO (Microline) Serial configurations shipped from OKIDATA will contain a Super Speed Serial Interface Board (19,200 BAUD maximum). This board supports READY/BUSY and X-ON/X-OFF protocols.

For additional information about interfacing and printer emulation, please refer to the appropriate printer handbook.



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Chapter 5 Failure Analysis Procedures

5.1 Failure Analysis Procedure

First, verify that a problem exists. Many technicians have spent countless hours "troubleshooting" a good piece of equipment because they were unfamiliar with its proper operation! Once a problem has been detected, locate the category which most closely describes the fault on your printer. You should then perform the referenced procedure (which should lead you to the cause of the problem).

The procedures referred to in the last paragraph are called Repair Analysis Procedures or RAPs. RAPs will ask the technician questions regarding printer operation / electrical measurements. The answers to these questions will determine the technicians next course of action.

If the RAPs do not lead you to the solution of the problem, please complete the REPAIR ANALYSIS PROCEDURE - PROBLEM REPORT and return it to:

OKIDATA
532 Fellowship Rd.
Mt. Laurel, NJ 08054
Attention: Training Department

NOTE

Figure 5-1 is a list of the RAPs currently available.

Figure 5-2 through Figure 5-4c have been included as reference materials for voltage checkpoints and component locations.

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Chapter 5 Failure Analysis Procedures

Rap Index

Error Conditions		
Error Type	Description	RAP #
During POWER ON	The carriage does not move.	①
	The carriage does not move and the POWER lamp is lit.	②
	Carriage moves abnormally (runaway, vibration, or incomplete homing) and POWER lamp is lit.	③
	Homing operation is normal, but indicators are abnormal.	④
	Fuse F(1) on the power supply board (SLPB) is blown.	⑤
	Fuse F(1) on the power supply board (SLPX) is blown.	⑥
During data receive or print	Neither spacing nor printing is performed and POWER and SELECT lamps are lit.	⑦
	Spacing is normal, but does not print.	⑧
	Printing stops.	⑨
	Wrong characters printed or some characters not printed.	⑩
	Some dots not printed.	⑪
	Print is too light.	⑫
	Line feed not performed.	⑬
	Fuse (F1) on power supply board is blown.	⑭
	Switch on the operation panel does not work. (Carriage moves to home at power on.)	⑮
Paper does not feed to print position (SASF function).	⑯	

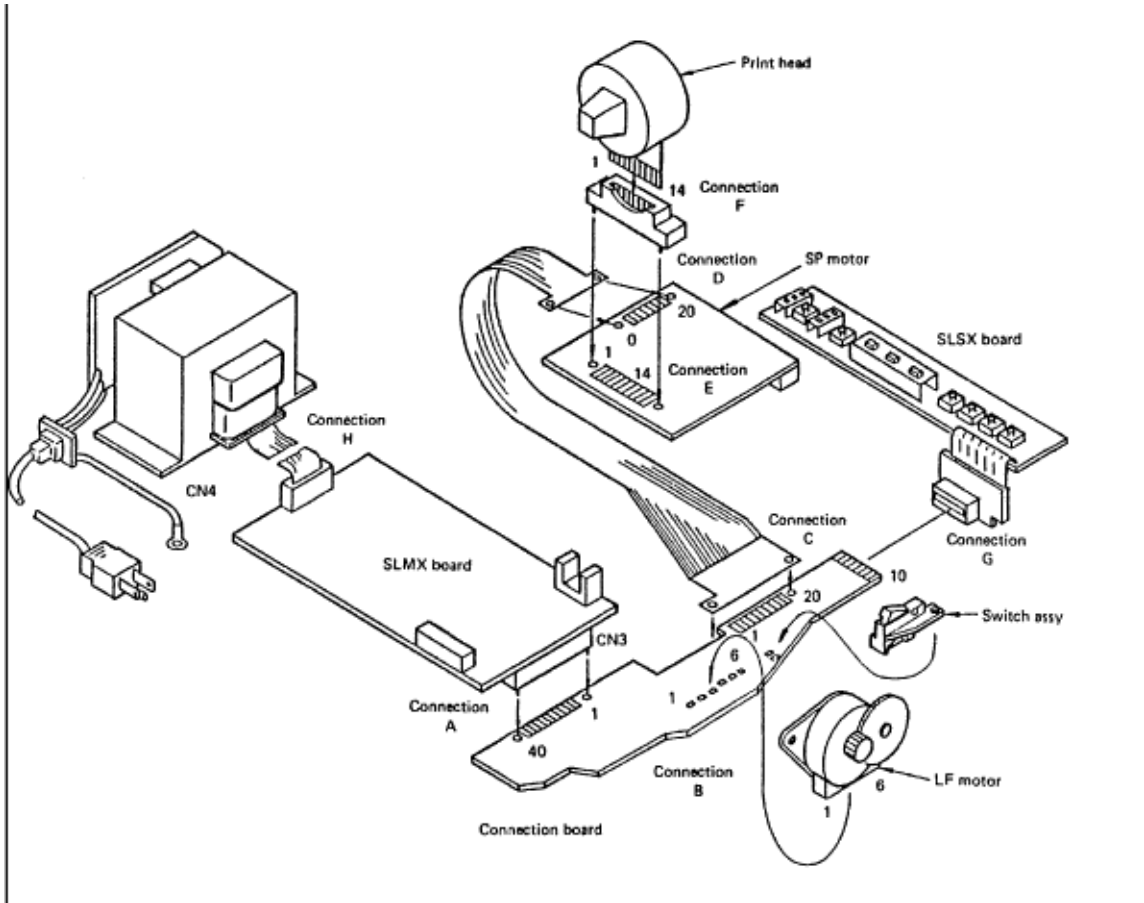
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Chapter 5 Failure Analysis Procedures

Board layout and Wiring - ML182Plus and ML182Turbo



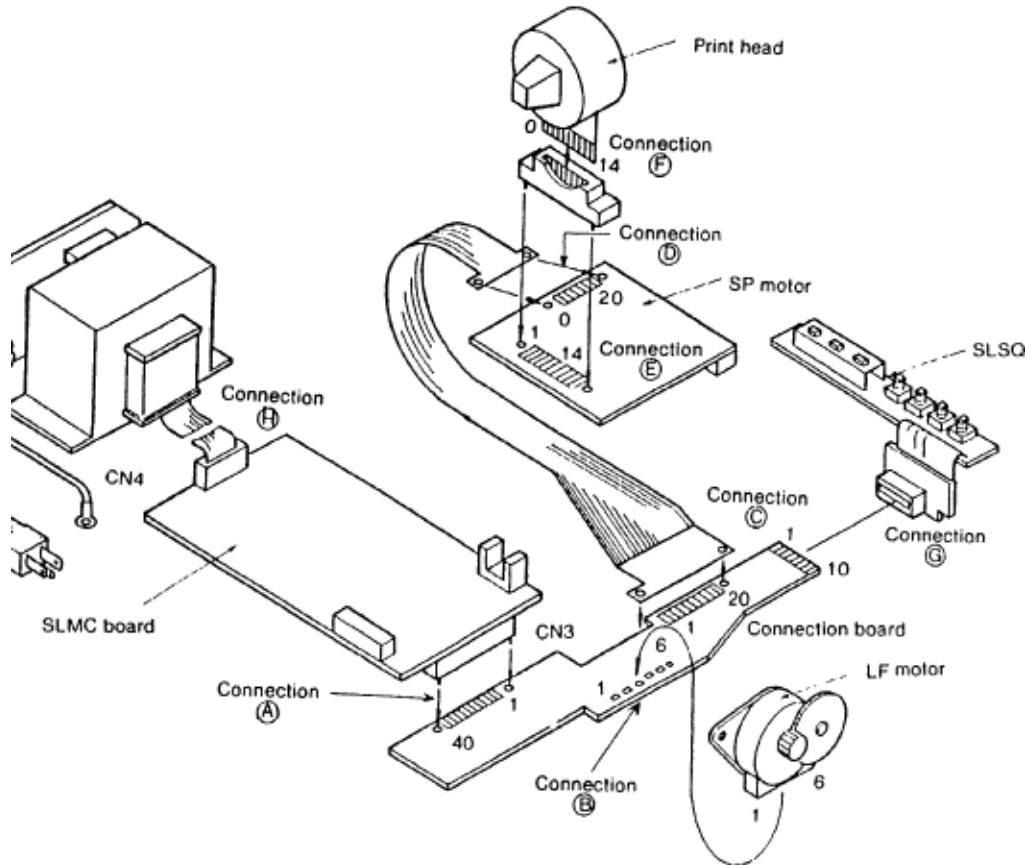
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Chapter 5 Failure Analysis Procedures

Board layout and Wiring - ML172 and ML182



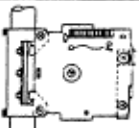
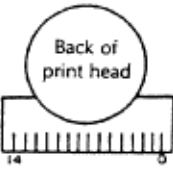
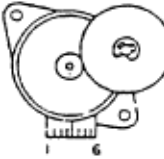
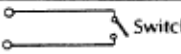
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Chapter 5 Failure Analysis Procedures

Pin Numbers and Signals

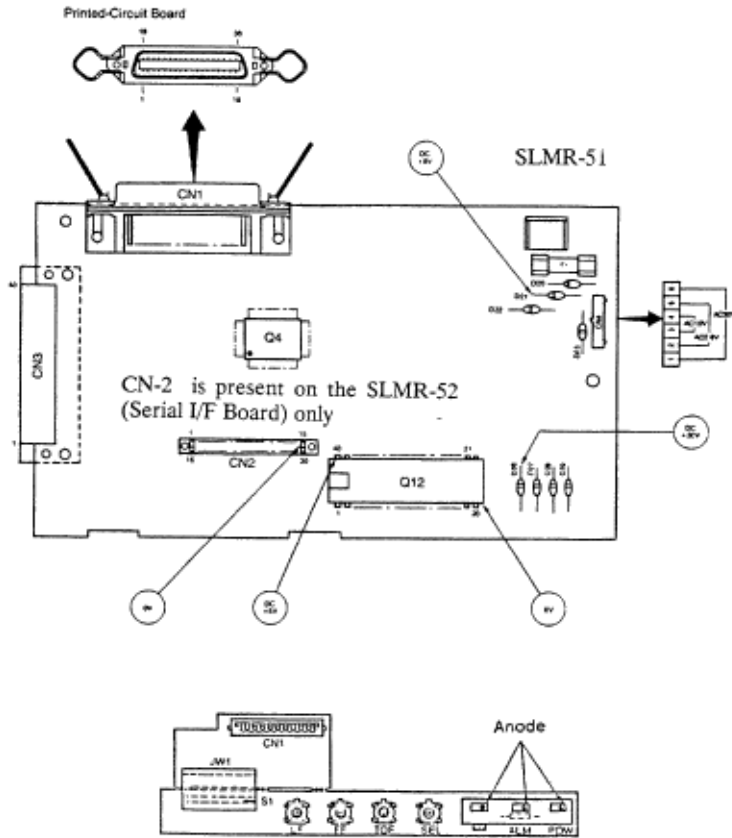
Pin Numbers and Signal Names											
Name	Signal Name	Connection								Coil Resistance	Figure
		A	B	C	D	E	F	G	H		
SP MOTOR	V	17		15	15					Approx. 21Ω	
	U	16		14	14						
	W	18		16	16						
	φA	22		20	20						
	φB	21		19	19						
PRINT HEAD	#1	14		13	13	14	15			Approx. 20Ω	
	#2	13		12	12	13	14				
	#3	1		1	1	1	2				
	#4	12		11	11	12	13				
	#5	2		2	2	2	3				
	#6	11		10	10	11	12				
	#7	3		3	3	3	4				
	#8	10		9	9	10	11				
	#9	4		4	4	4	5				
	Common	5,6,7		5,6	5,6	5,6,7,6,7,8					
HEAD ALM	8		7	7	8	9					
0V	9		8	8	9	10					
LF MOTOR	φ1	38	3							Approx. 70Ω	
	φ3	40	1								
	Common	39	2								
	φ2	37	4								
	φ4	35	6								
Common	36	5									
OPERATION PANEL	SW SEL	31							7		
	SW 1	30							6		
	SW 2	28							4		
	SW 3	27							3		
	LAMP SEL	34							10		
	+5 V	32							8		
	0 V	29							5		
SWITCH	SASF	24								ML182PLUS	
	0V	20									
CN4	Approx. AC 7.6 V									2-5	
	Approx. AC 25.8 V									1-6	
	Approx. AC 10 V									3-4	



Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Check Points for Printed Circuit Boards - 172



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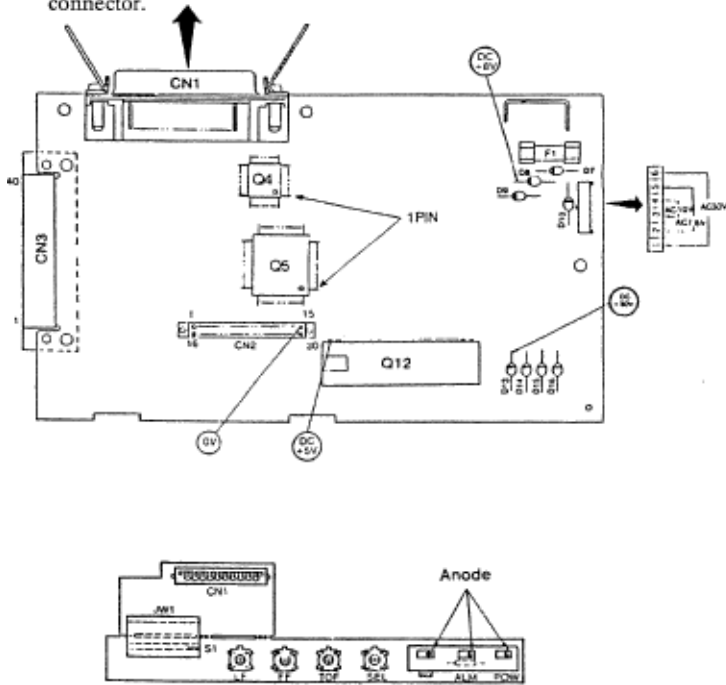


Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Check Points for Printed Circuit Boards - ML182

See Figure 5-4b for description of interface connector.



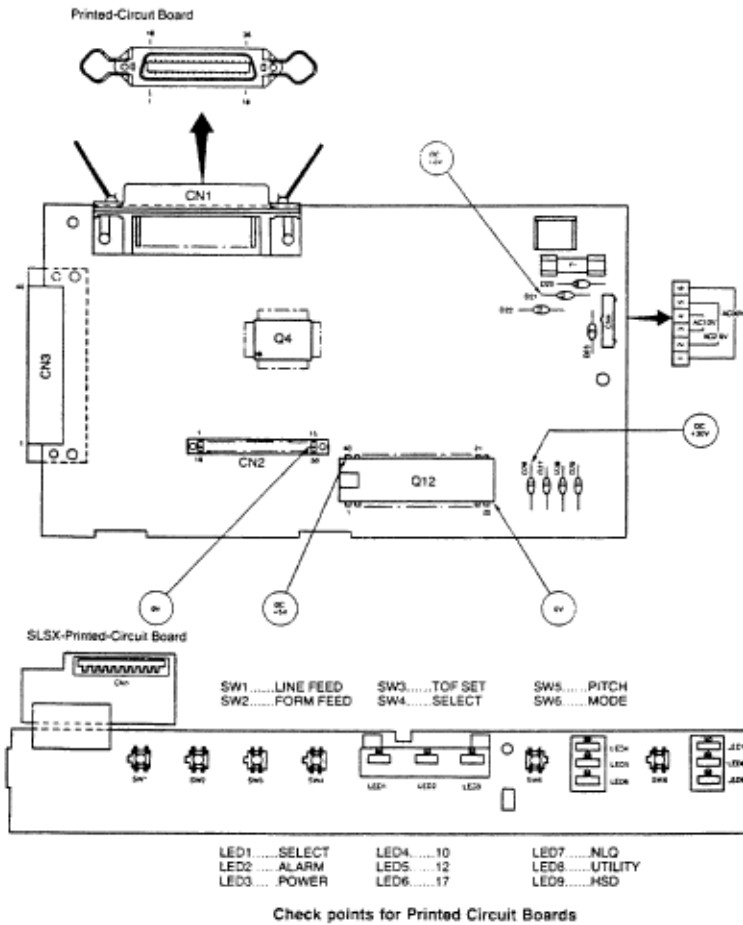
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Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Check Points for Printed Circuit Boards - ML182Plus and ML182Turbo



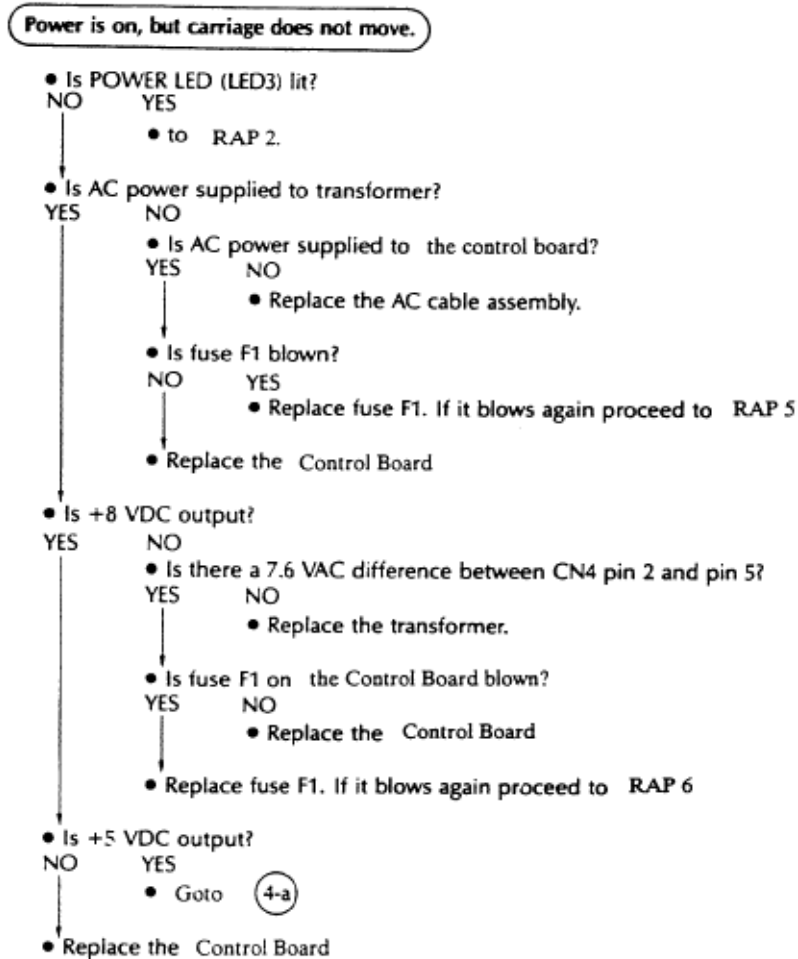
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Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Rap #1: Power is on but carriage does not move



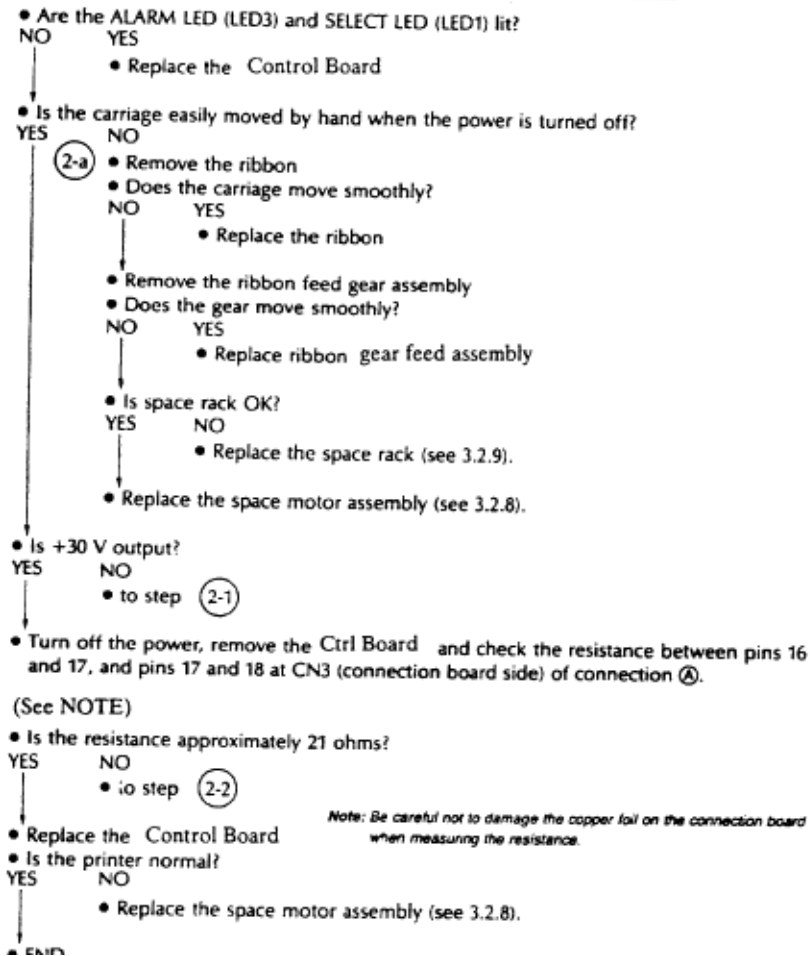


Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Rap #2: Power LED lights, but the carriage does not move

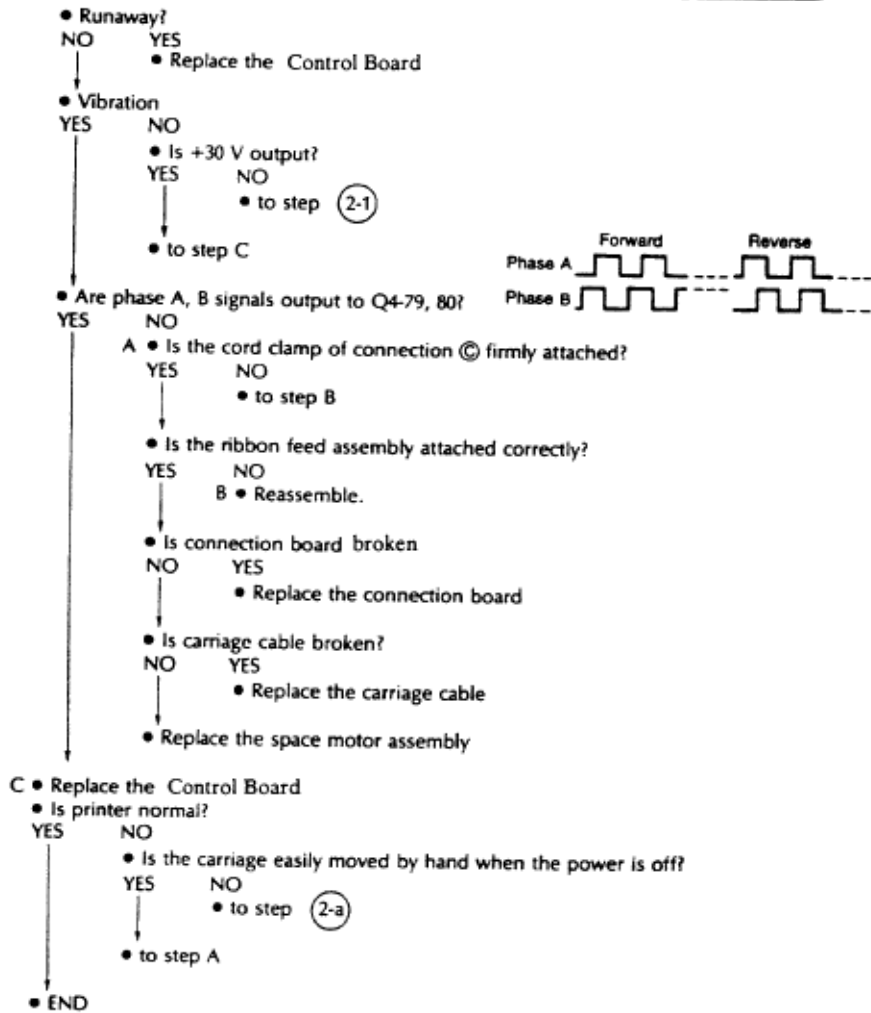
The Power LED lights when power is turned on, but the carriage does not move.



Rap #3: Carriage movement is abnormal when power is turned on

RAP - 3

Carriage movement is abnormal (runaway, vibration, incomplete homing) when the power is turned on.



2-1

- Is the voltage difference between pins 1 and 6 of CN4 28.5 VAC with CN4 disconnected?
YES NO
 - Replace the transformer.
- Replace the Control Board

2-2

- Is the cord clamp of connection ㉔ firmly attached?
YES NO
 - Check that the contact pressure rubber is firmly inserted.
 - Is the ribbon feed assembly attached correctly?
YES NO
 - Check that the contact pressure rubber is firmly inserted.
 - Are the screws on the connection board tight?
YES NO
 - Match the assembly to the board and tighten the screws.
 - Is carriage cable broken?
NO YES
 - Replace the carriage cable
 - Remove the ribbon cassette and ribbon feed gear assembly. Check the resistance of space motor at connection ㉕
 - Is the resistance approximately 21 ohms?
YES NO
 - Replace the space motor assembly
 - Verify that the contacts of connection ㉔ are not damaged or worn.
-



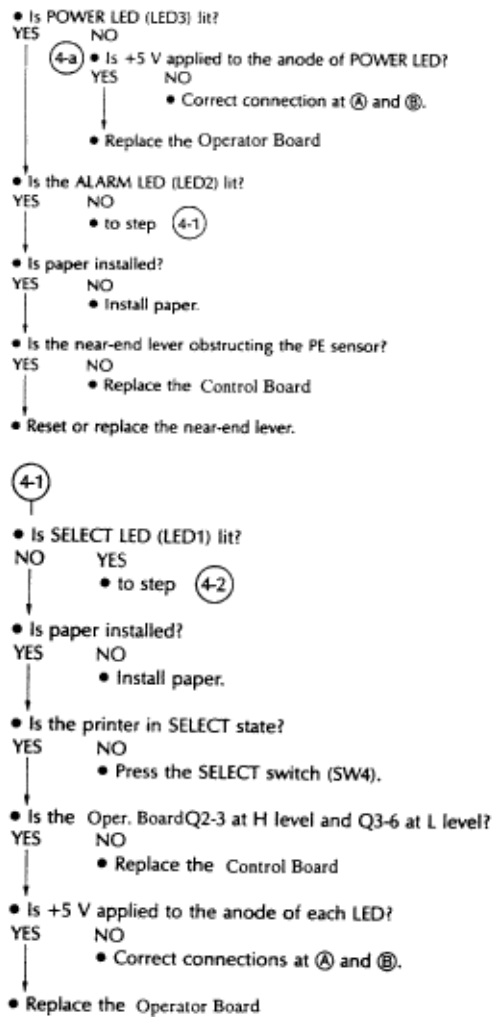
Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

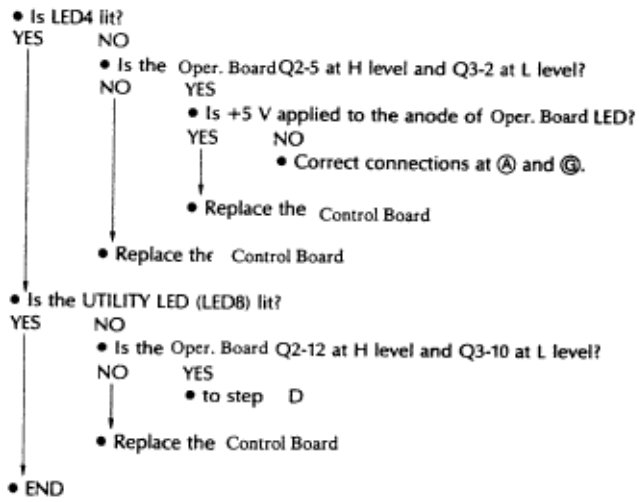
Rap #4 - Homing operation is normal, but the indicators (LED1 to LED9) are abnormal when power is turned on.

RAP - 4

Homing operation is normal, but the indicators (LED1 to LED9) are abnormal when power is turned on.



4-2





Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Rap #5: Fuse F1 on power supply board (SLPB) blows when power is turned on.

RAP - 5

Fuse F1 on power supply board (SLPB) blows when power is turned on.

- Is the fuse properly rated?
YES NO
 - Replace the fuse with properly rated fuse.
 - Remove connector CN4 and turn on the power.
 - Does the fuse blow again?
YES NO
 - Replace the Control Board
 - Replace the SLPB board and turn on the power.
 - Does the fuse blow again?
YES NO
 - Normal operation.
 - Replace the transformer.
-



Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Rap #6: Fuse F1 on the control board blows when power is turned on.

RAP - 6

Fuse F1 on the control board blows when power is turned on.

- Is the fuse properly rated (1.5 A)?
 - YES
 - NO
 - Replace the fuse with properly rated fuse.
- Replace the Control Board

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Chapter 5 Failure Analysis Procedures

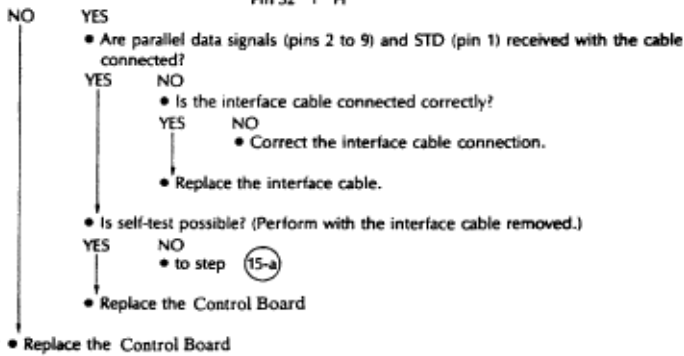
Rap #7: Neither spacing nor printing performed while receiving data.

RAP - 7

Neither spacing nor printing performed while receiving data.

- Verify that data is being sent to the printer.
- Is SELECT LED (LED1) lit?
 - YES
 - NO
 - to step (4-1)
- Are the signal levels at CN1 as shown in the table below with the interface cable removed?

Signal Level	
Pin 10	H
Pin 11	L
Pin 12	L
Pin 13	H
Pin 32	H





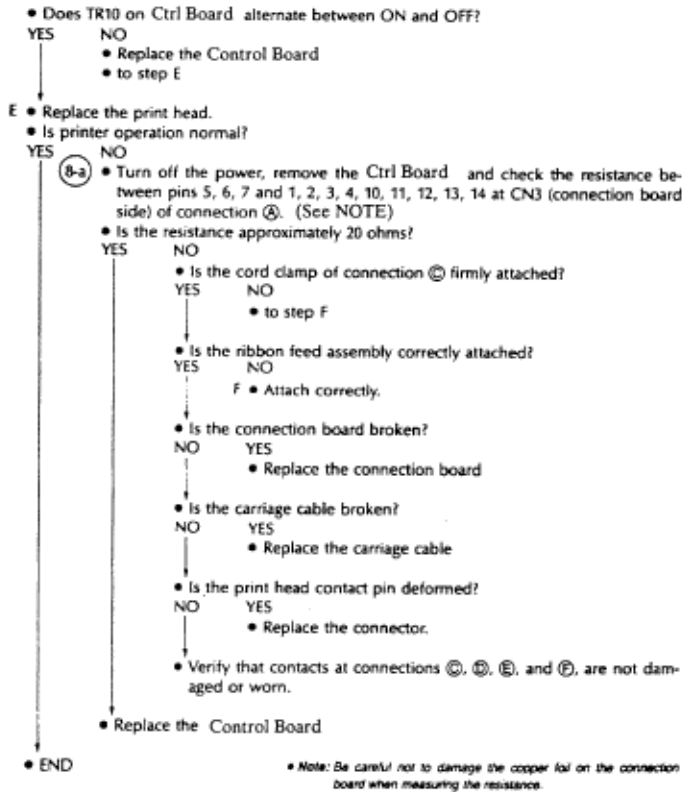
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Chapter 5 Failure Analysis Procedures

Rap #8: Spacing is normal, but nothing is printed while receiving data.

RAP - 8

Spacing is normal, but nothing is printed while receiving data.



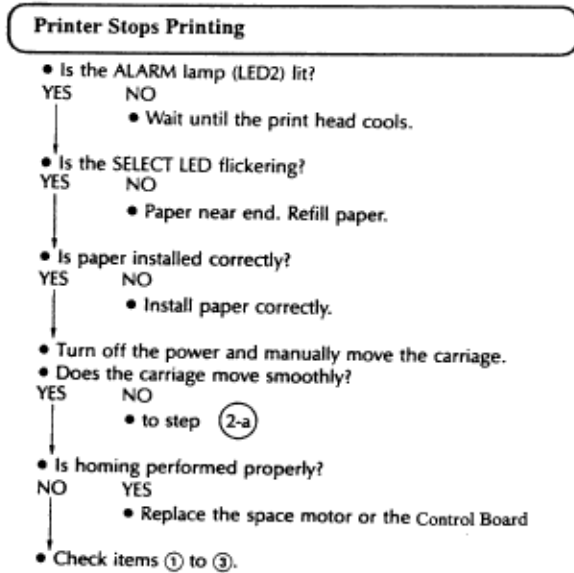


Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Rap #9: Printer stops printing.

RAP - 9





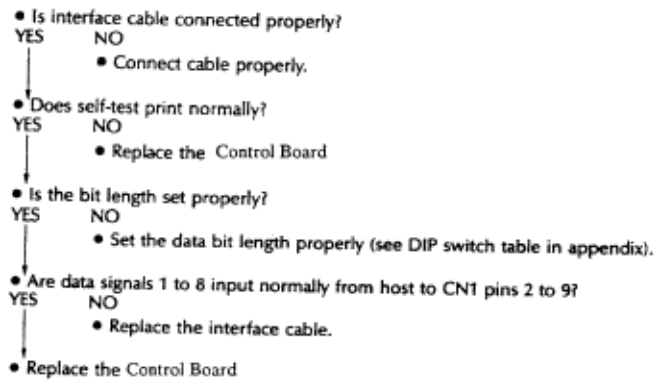
Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Rap #10: Wrong characters are printed or some characters are missing.

RAP - 10

Wrong characters are printed or some characters are missing



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Chapter 5 Failure Analysis Procedures

Rap #11: Some dots are missing.

RAP - 11

Some dots are missing

- Remove the print head.
 - Is any dot pin broken?
NO YES
 - Replace the print head.
 - Check the resistance of print head coil at connection ⑤.
• Is the resistance approximately 20 ohms?
YES NO
 - Replace the print head.
 - to step ⑧-a
-



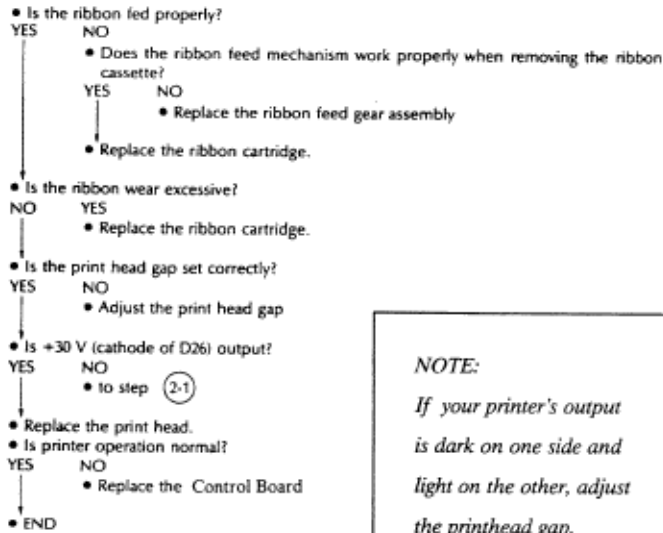
Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Rap #12: Print is light.

RAP - 12

Print is light



NOTE:

If your printer's output is dark on one side and light on the other, adjust the printhead gap.



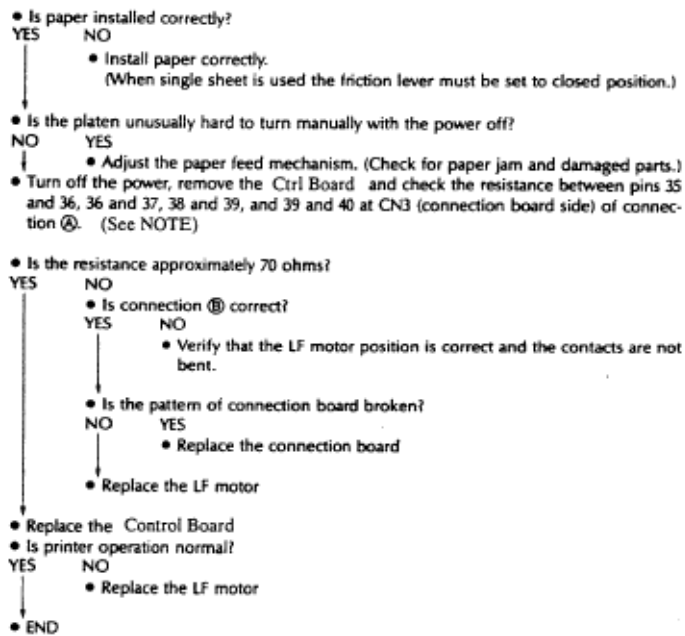
Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Rap #13: Line feed is not performed.

RAP - 13

Line feed is not performed



* Note: Be careful not to damage the copper foil on the connection board when measuring the resistance.



Service Guide ML172/ML182 Series

Chapter 5 Failure Analysis Procedures

Rap #14: Fuse F1 on power supply board blows while receiving data and printing.

RAP - 14

Fuse F1 on power supply board blows while receiving data and printing

- Is the fuse properly rated?
 YES NO
 • Replace with properly rated fuse.
- Turn off the power and check the print head coil, SP motor, and LF motor resistance.
- Is the print head resistance approximately 20 ohms?
 YES NO
 • Replace the print head. Connect connections Ⓐ, Ⓒ, Ⓓ, Ⓔ, and Ⓕ properly.
- Is the SP motor resistance approximately 21 ohms?
 YES NO
 • Replace the SP motor. Connect connections Ⓐ, Ⓒ, and Ⓓ properly.
- Is the LF motor resistance approximately 70 ohms?
 YES NO
 • Replace the LF motor. Connect connections Ⓐ and Ⓔ properly.
- Replace the Control Board

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Chapter 5 Failure Analysis Procedures

Rap #15: Switch on the operator panel does not work (Carriage returns to home position when power is turned on).

RAP - 15

Switch on the operation panel does not work (Carriage returns to home position when power is turned on)

- Is signal input to Q4 pins 49 to 52 when the switch is pressed?
 - NO
 - YES
 - Replace the Control Board
 - Are connections Ⓐ and Ⓑ proper?
 - YES
 - NO
 - Correct the connections.
 - Replace the Operator Board
-

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Chapter 5 Failure Analysis Procedures

Rap #16: Paper not fed properly (SASF function).

RAP - 16

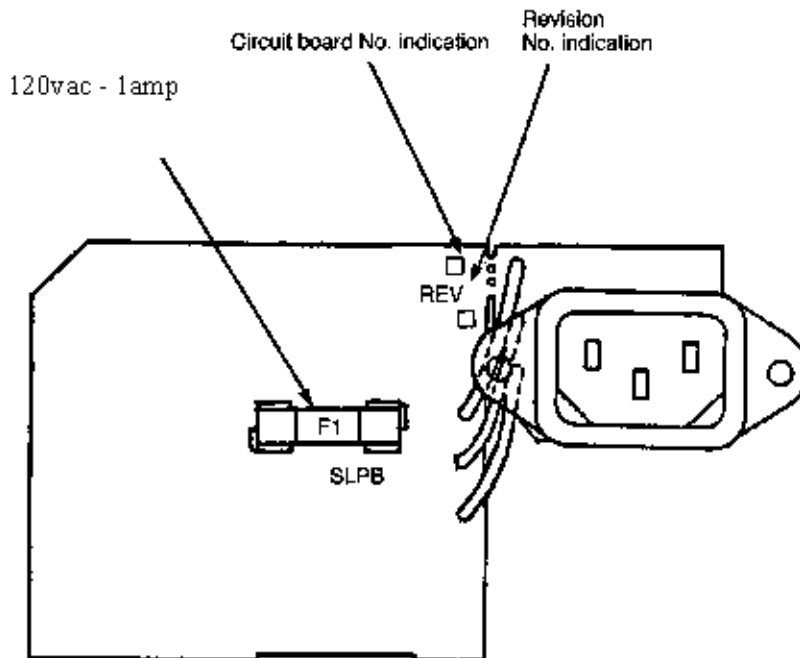
Paper not fed properly (SASF function)

- Turn off the power, remove the SLMX board, open the bail arm, and check the resistance between pins 20 and 24 at connection Ⓐ.
 - Is the resistance 0 ohms?
 - NO
 - YES
 - Replace the SLMX board.
 - Is the connection board broken?
 - NO
 - YES
 - Replace the connection board (see 3.2.15).
 - Is the switch broken?
 - NO
 - YES
 - Replace the switch assembly (see 3.2.21).
 - Replace the SLMX board.
-

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Power Supply Board (SLPB)

- Fuses
F1 = 1 amp
- Switches
NONE
- Jumpers
NONE





Service Guide ML172/ML182 Series

Chapter A PCB Reference Charts

ML172 Control Board (SLMR-51 & SLMR-52) and Operator Board

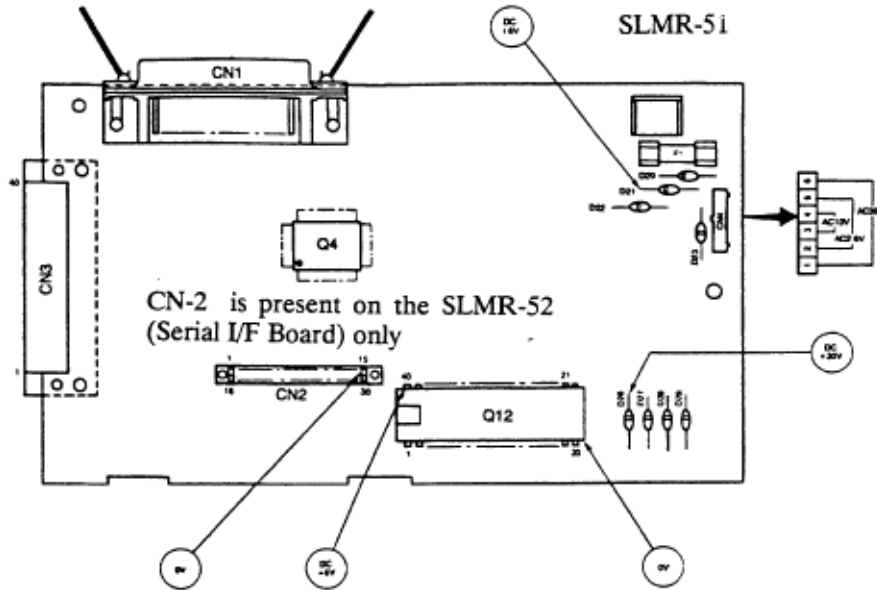
- Fuses
 - F1 - 1.5 amp
- Switches
 - 1 Switch Bank with 8 Switches NOTE:

Please refer to the appropriate Users Manual for switch definitions

- Jumpers

Jumper	Side A	Side B	Definition
SP4	Enabled	Disabled	+5vdc on Pin 18 of Centronics I/F
SP5	Host Selectable	Constant ON	AutoFeed
SP6	Enabled	Disabled	I-Prime (Reset)

■ Denotes "Factory Setting"





Service Guide ML172/ML182 Series

Chapter A PCB Reference Charts

ML182 Control Board (SLMC)

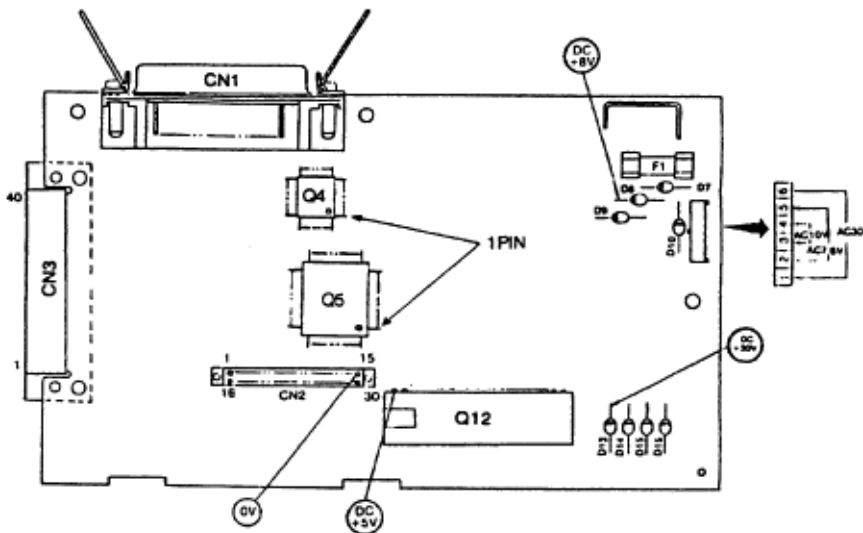
- Fuses
F1 - 1.5 amp
- Switches
1 Switch Bank with 8 Switches NOTE:

Please refer to the appropriate Users Manual for switch definitions

- Jumpers

NOTE:

Please refer to the ML182 Maintenance Manual for jumper plug settings for your Control Boards revision level



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Service Guide ML172/ML182 Series

Chapter A PCB Reference Charts

ML182 Control Board (SLMR) and Operator Board

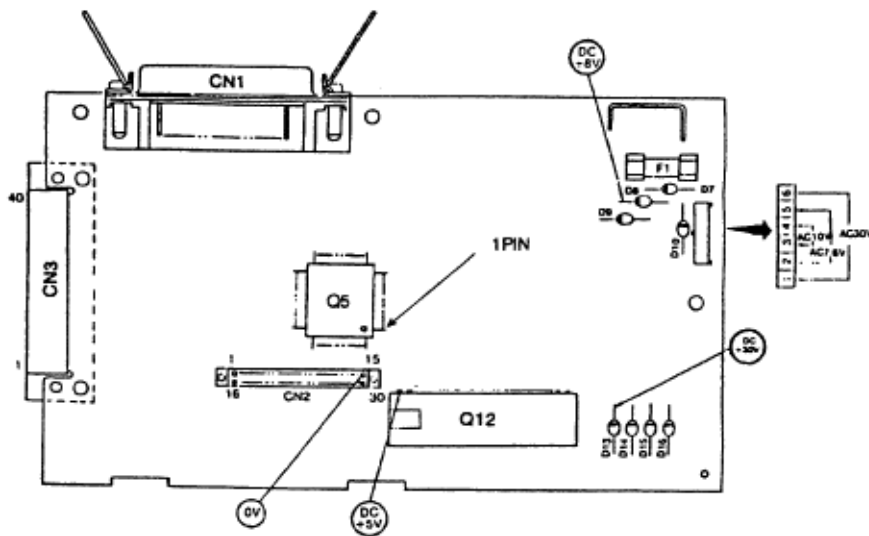
- Fuses
 - F1 - 1.5 amp
- Switches
 - 1 Switch Bank with 8 Switches NOTE:

Please refer to the appropriate Users Manual for switch definitions

- Jumpers

NOTE:

Please refer to the ML182 Maintenance Manual for jumper plug settings for your Control Boards revision level





Service Guide ML172/ML182 Series

Chapter A PCB Reference Charts

ML182-PLUS & ML182-TURBO Control Board (SLMX) and Operator Boards

- Fuses
F1 - 1.5 amp
- Switches
1 Switch Bank with 8 Switches

NOTE:

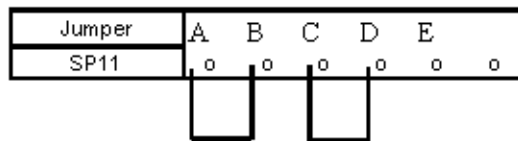
Please refer to the appropriate Users Manual for switch definitions

- Jumpers

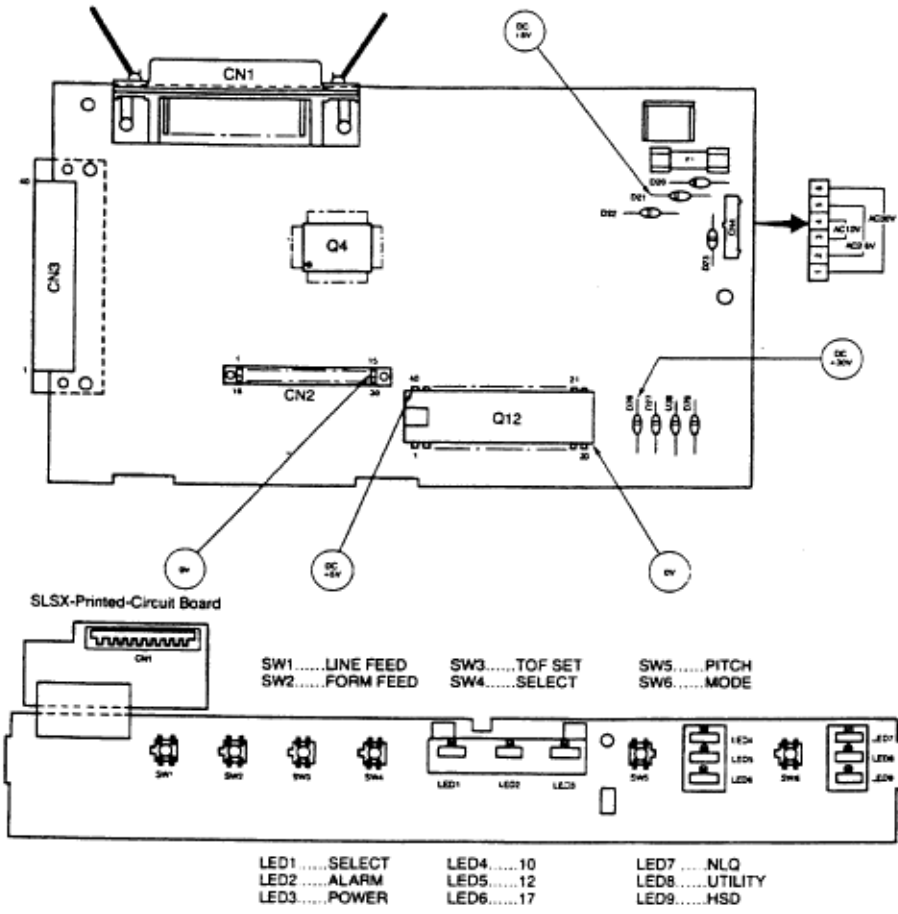
- Jumpers

Jumper	Side A	Side B	Definition
SP4	Enabled	Disabled	+5vdc on Pin 18 of Centronics I/F
SP5	Host Selectable	Constant ON	AutoFeed
SP6	Enabled	Disabled	I-Prime (Reset)

Denotes "Factory Setting"



Note: Please refer to Technical Information Bulletin #139 for variations in the positioning of SP11



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Chapter A PCB Reference Charts

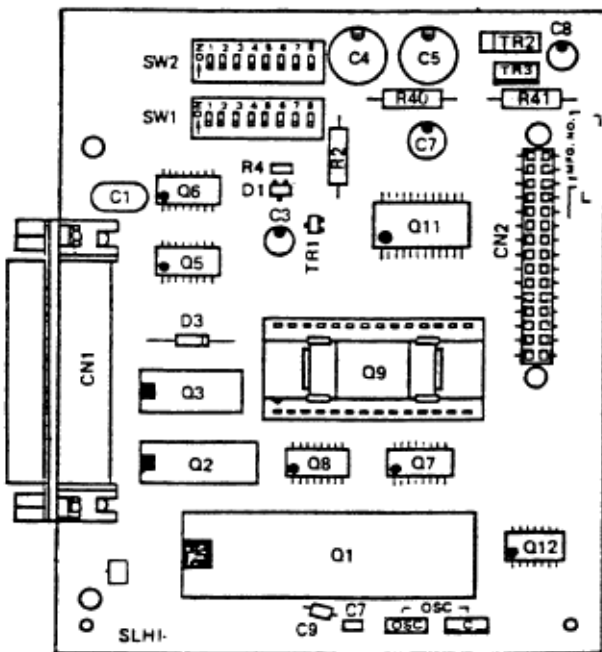
RS232-D Super Speed Serial I/F Board

- Fuses
NONE
- Switches
2 Switch Banks with 8 Switches on each

NOTE: Please refer to the appropriate Users Manual for switch definitions

- Jumpers

NOTE: Refer to Technical Information Bulletin #147 for Jumper Settings





Service Guide ML172/ML182 Series

Chapter B Parts Compatibility Chart

Parts Compatibility Chart

Part Description	Part Number	ML172	ML182	ML182+	ML182-T
Access Cover	53467401				
Access Cover	53467410				
Access Cover	50036601				
Access Cover (Tractor)	53479801				
Acoustic Cover (Tractor)	53450001				
Acoustic Cover	53505901				
AC Transformer Assy	56404601				
AC Transformer Assy	56408001				
Carriage Cable	56613701				
Connector Cover	53462801				
Connector Cover	53469209				
Connection Bd (SLES)	55017201				
Connection Bd (SLEP)	55029401				
Cover: Lower	53479401				
Cover: Lower	53506204				
Cover: Lower	53505801				
Cover: Lower	53446901				
Cover: Upper	53479601				
Cover: Upper	53506303				
Cover: Upper	53506101				
Cover: Upper	53447101				
Dip Sw. Access Cover	53447301				
Dip Sw. Access Cover	53447310				
Fuse: 1.0 amp	56301501				
Fuse: 1.5 amp	56301701				
Indicator Assy	55017001				
Indicator Assy	55035301				
Indicator Assy	50214201				
Line Feed Motor	56504201				
Control Board (SLMK-1)	55035411				
Control Board (SLMK)	55047202				
Control Board (SLMC-2 / SLMR)	55017511				
Control Bd - Parallel (SLMP-51)	55047006				
Control Bd-Serial (SLMR-52)	55047007				
Operator Panel (SLSX)	55035601				
Operator Panel (SLSQ)	55017401				

Part Description	Part Number	ML172	ML182	ML182+	ML182-T
Paper Separator	53460308				
Paper Separator	50047304				
Paper Separator	53460301				
Platen Assembly	50210801				
Platen Assembly	50214101				
Platen Knob	53459803				
Platen Knob	53459807				
Printhead Assembly	55017301				
Ribbon Feed Gear Assy	50036501				
Space Motor Assembly	56504101				
Space Rack	53447401				
Tapping Screw (Upper Cover)	50312701				
Tractor Assembly	50044701				
Tractor Assembly	50214301				
Options/Accessories					
Part Description	Part Number	ML172	ML182	ML182+	ML182-T
Tractor Feed Kit	70009701				
Roll Paper Stand	70007701				
RS232-D Super Speed Serial Interface Bd.	70004601				
Acoustic Cover (Tractor)	53450001				
Ribbon Cartridge	53102001				

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