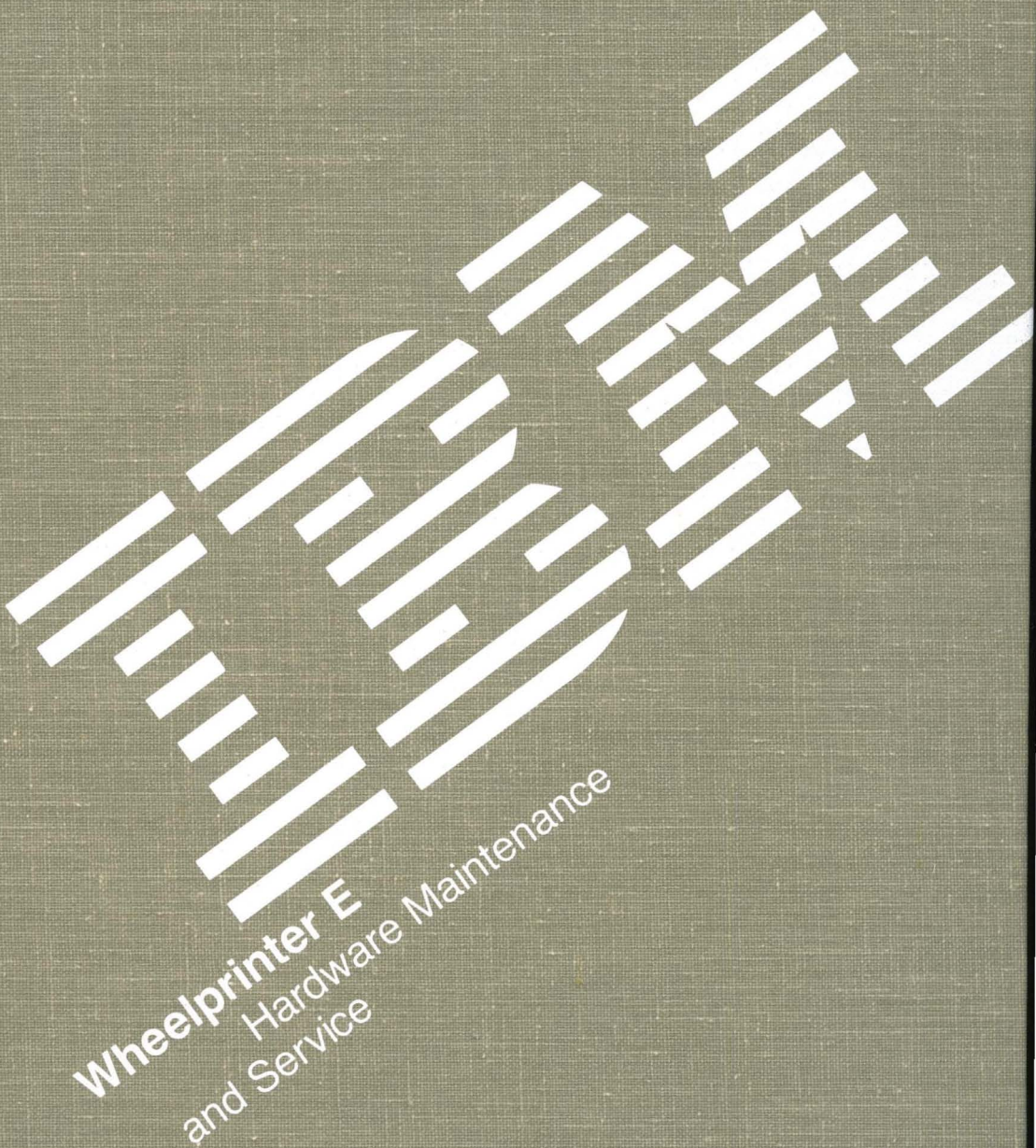




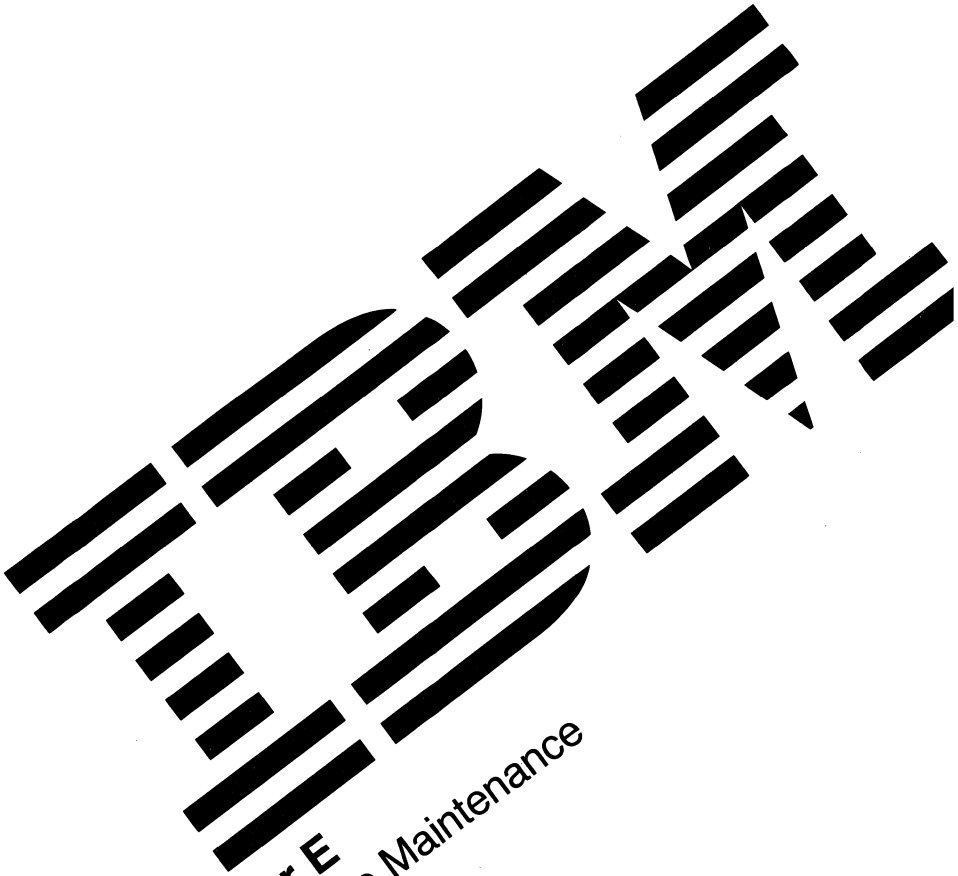
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Wheelprinter E
Hardware Maintenance
and Service

1279888



Wheelprinter E
Hardware Maintenance
and Service



Wheelprinter E
Hardware Maintenance
and Service

FCC Notice

The IBM Wheelprinter E 5223 generates and uses radio frequency energy. If the printer is not installed and used in accordance with the operating instructions, technical or service information, it may interfere with radio or television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of Federal Communications Commission (FCC) rules, which are designed to provide reasonable protection against such interference when operated in a residential area.

If this printer interferes with radio or television reception, which can be determined by switching the printer off and on, the user is encouraged to try one or more of the following:

- Move the receiving antenna on the radio or television;
- Relocate the printer in relation to the radio or television;
- Plug the printer into a different electrical outlet from the radio or television.
- Ensure that the grounding wire is tightly secured.

If necessary, contact your dealer or IBM service representative for additional suggestions.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

Warning: To comply with FCC regulations on electromagnetic interference for a Class B computing device, the printer cable must be shielded and properly grounded.

CAUTION

This product is equipped with a UL listed and CSA certified plug for user safety. It is to be used in conjunction with a properly grounded 115 V ac receptacle to avoid electrical shock.

To assure compliance with FCC regulations for a Class B computing device, use IBM cable Part Number 1525612. Use of substitute cable not properly shielded and grounded may result in violating FCC regulations.

First Edition, August 1985

Publications are not stocked at the address below. For copies, contact an IBM Product Center, an authorized IBM dealer, or IBM Direct.

You can send comments or suggestions using the form in the back of this book. If the form has been removed, simply address your comments to the IBM Corporation, Dept. F98/962-3, 740 New Circle Road N.W., Lexington, KY 40511.

Information you supply may be used by IBM without obligation. You may, of course, use it yourself. Necessary changes will be made in later editions of the manual.

References to IBM products, programs, or services do not imply that IBM intends to make them available outside the United States.

PREFACE

The diagnostic section of *IBM Wheelprinter E 5223 Hardware Maintenance and Service* is intended to be used as a stand-alone document to service the IBM Wheelprinter E.

This manual is divided into the following chapters:

Chapter 1 – “Introduction” – contains a general description of your printer.

Chapter 2 – “Introduction to Diagnostic Aids” – explains the diagnostic aids that are available for the IBM Wheelprinter E.

Chapter 3 – “Problem Isolation Charts (PICs)” – provides step-by-step instructions that aid in locating the failing Field Replaceable Unit (FRU).

Chapter 4 – “Removals and Installations” – provides the information needed to remove and install a FRU.

Chapter 5 – “Adjustments” – is used in the adjustment of a FRU during diagnostics or after the installation of the FRU.

Chapter 6 – “Parts Catalog” – contains illustrations and part numbers for individual FRUs.

Chapter 7 – “Locations” – contains illustrations of the locations of the major components and connectors.

Chapter 8 – “Preventive Maintenance (PM)” – contains information on the lubrication specifications and the lubrication points.

Associated Documentation

- *IBM Wheelprinter E 5223 Guide to Operations*, Item Number 1279889 (Form Number S544-4077)
- *IBM Wheelprinter E 5223 Technical Reference*, Item Number 1279887 (Form Number S544-4078)
- *Sheetfeed Guide to Operations*, Item Number 6373115 (Form Number GA23-1034)
- *Sheetfeed Hardware Maintenance and Service*, Item Number 6373116 (Form Number SY20-8580).

SAFETY

Rules for Safety

If (1) you know the safety rules for working with electrical and mechanical equipment and (2) you observe the rules, you can work safely with IBM equipment.

Do not fear electricity, but respect it.

While you are maintaining IBM equipment, (1) observe every safety precaution possible and (2) observe the following safety rules.

Work Environment

- Do not work alone in hazardous conditions or near equipment that has dangerous voltages. Always inform your manager if the conditions or voltages are a possible problem.
- Always look for possible hazards in your work environment. Examples of hazards are: moist floors, nongrounded extension cables, power surges, and missing safety grounds.
- Do not perform any action that makes the product unsafe or that causes hazards for the customer personnel.
- Before you start the equipment, ensure that other personnel are not in a hazardous position.
- Do not wear loose clothing that can be trapped in the moving parts of a machine.

Ensure that the sleeves of your clothing are fastened or are rolled above the elbow. If your hair is long, or if you wear a neck scarf, fasten it to make it safe.

- Insert your necktie into your clothing or fasten it with a clip (preferably nonconductive) at approximately 8 centimeters (3 inches) from its end.
- Lift the equipment or parts by standing or pushing up with your stronger leg muscles; this action removes the strain from the muscles in your back. Do not lift any equipment or parts that are too heavy for you.
- Put removed machine covers in a safe place while you are servicing the machine. Reinstall the covers before returning the machine to the customer.
- Always keep your tool kit away from walk areas so that other persons cannot trip over it. For example, keep the kit under a desk or table.
- Observe good housekeeping practices in the area of the machines while you are performing maintenance and after completing it.
- After maintenance, reinstall all safety devices, such as guards, shields, labels, and ground wires. Exchange safety devices that are worn or defective. (*Remember:* the safety devices protect you from a hazard. You destroy their purpose if you do not reinstall them when you have completed the service call.)

Electrical Safety

- If possible, always unplug the power-supply cable before you work on a machine. When you switch off power at the wall box, lock the switch in the off position or attach a DO NOT OPERATE tag (Z229-0237) to the switch.

Note: A non-IBM attachment to an IBM machine may be powered from another source and may be controlled by a different switch or circuit breaker.

- Switch off all power before (1) removing or assembling the main units of the equipment, (2) working near to power supplies, (3) inspecting power supplies, or (4) installing changes in machine circuits.
- Unless the maintenance documents specifically instruct you, do not service the following parts with power on *if the part is removed from its installed position in the machine*: power supplies, pumps, blowers, motor generators, and other units with voltages that are more than 30 V ac or 42.4 V dc. (This rule ensures that correct grounding is maintained.)
- If you really need to work on equipment that has exposed live electrical circuits, observe the following precautions:
 - Ensure that another person, who is familiar with the power-off controls, is near you. Another person must be there to switch off the power, if necessary.
 - Do not wear jewelry, chains, metal-frame eyeglasses, or other personal metal objects. (*Remember*: if the metal touches the machine, the flow

of current increases because the metal is a conductor.)

- Use only insulated probe tips or extenders. (*Remember*: worn or cracked insulation is unsafe.)
- Use only one hand while you are working on live equipment. Keep the other hand in your pocket or behind your back. (*Remember*: there must be a complete circuit for an electrical shock to occur. This precaution prevents *your body* from completing the circuit!)
- When you use a tester, set its controls correctly and use insulated probes that have the correct electrical specification.
- Do not touch objects that are grounded, such as metal floor strips, machine frames, or other conductors. Use suitable rubber mats obtained locally, if necessary.
- When you are working with machines having voltages more than 30 V ac or 42.4 V ac, observe any special safety instructions published by IBM.
- Never *assume* that power has been removed from a circuit. First, *check* that it has been removed.
- Do not touch live electrical circuits with the surface of a plastic dental mirror. (*Remember*: the surface of the dental mirror is conductive and can cause damage and personal injury.)
- If an electrical accident occurs:
 1. *Use caution; do not be a victim yourself.*
 2. *Switch off the power.*

3. *Instruct another person to get medical aid.*
4. *If the victim is not breathing, perform mouth-to-mouth rescue breathing. See "Electrical Accidents – First Aid" (below).*

Mechanical Safety

Do not touch moving mechanical parts when you are (1) lubricating a part, (2) checking for play, or (3) doing other similar work.

Safety Glasses

Wear safety glasses when:

- Using a hammer to drive pins or similar parts
- Using a power drill
- Using a spring hook to attach or remove a spring
- Soldering parts
- Cutting wire or removing steel bands
- Using solvents, chemicals, or cleaners to clean parts
- Working in any other conditions that could injure your eyes

Tools, Testers, and Field-Use Materials

- Do not use tools and testers that have not been approved by IBM. Ensure that electrical hand tools, such as Wire-Wrap¹ tools and power drills, are inspected regularly.
- Exchange worn and broken tools and testers.
- Do not use solvents, cleaners, or oils that have not been approved by IBM.

Summary

Prevention is the main aid to electrical safety. Always think about electrical safety and use *good practice*, for example:

- Ensure that the customer's power receptacle matches the IBM equipment specifications.
- Inspect power cables and plugs; check for loose, damaged, or worn parts.
- Review the procedure in the maintenance documents before you remove a part that can hold an electrical charge from the machine. *Carefully* discharge the necessary parts exactly as instructed by the procedure.
- Do not use a normal light (for example, a table lamp) as an extension trouble light at a machine.

¹ Trademark of the Gardner-Denver Co.

Never *assume* that a machine or a circuit is safe. No machine is *always* completely safe. You may not know the exact condition of a machine because, for example:

- The power receptacles could be wrongly wired.
- Safety devices or features could be missing or defective.
- The maintenance and/or changes history could be wrong or not complete.
- The design could have a problem.
- The machine could have damage, caused when it was shipped.
- The machine could have an unsafe change or attachment.
- An engineering change or a sales change could be wrongly installed.
- The machine could be deteriorated (1) because it is old or (2) because it operates in an extreme environment.
- A part could be defective, therefore causing a hazard.
- A part could be wrongly assembled.

These are some of the ways that the condition of the machine could affect safety. *Before you start a service call or procedure, have good judgment and use caution.*

Electrical Accidents – First Aid

When performing rescue procedures for an electrical accident, do as follows:

- *Use Caution:* If the victim is still in contact with the electrical-current source, remove the power; to do this, you may need to operate the room emergency power-off (EPO) switch or the disconnecting switch. If you cannot find the switch, use a dry wooden rod or other nonconductive object to pull or push the victim away from contact with the electrical-current source.
- *Work Quickly:* If the victim is unconscious, he/she may need (1) mouth-to-mouth rescue breathing and possibly (2) external cardiac compression if the heart is not beating.
- *Call for the Rescue Service,* such as the ambulance or the hospital. Instruct another person to call for medical aid.

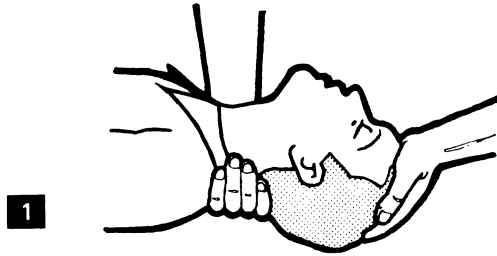
Determine if the victim needs mouth-to-mouth rescue breathing. If he/she does, perform the following steps.

CAUTION

Use extreme care when you perform rescue breathing for a victim who may have breathed in toxic fumes. Do not breathe in air that the victim has breathed out.

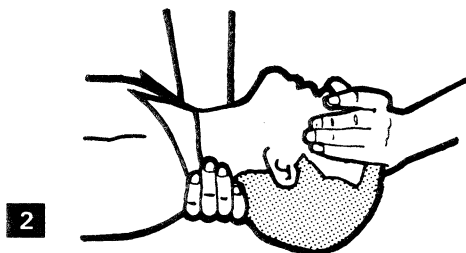
1. Prepare for rescue breathing:
 - a. Ensure that the victim's airway is open and that it is not obstructed; check the mouth for objects that may be obstructing the airway, such as chewing gum, food, dentures, or the tongue.

- b. Place the victim on his/her back, put one hand behind the victim's neck, and put the other hand on his/her forehead.
- c. Lift the neck with one hand, and tilt the head backward by pressing on the forehead with the other hand **1**.

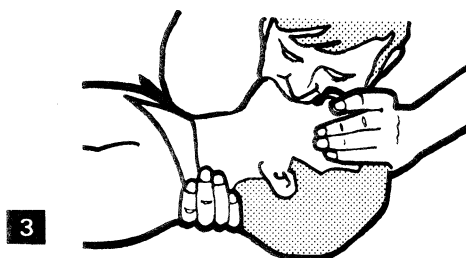


2. *Look, listen, and feel* to determine if the victim is breathing freely:
 - a. Put your cheek near to the victim's mouth and nose.
 - b. Listen and feel for the breathing out of air. At the same time, look at the victim's chest and upper abdomen to see if they move up and down.
3. If the victim is not breathing correctly:

- a. Keep the victim's head tilted backward; (see **1**). Continue to press on the forehead with your hand; at the same time, rotate this same hand so that you can pinch together the victim's nostrils with your thumb and finger **2** .

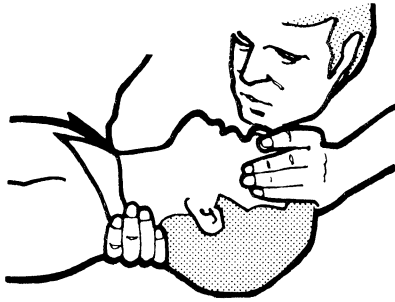


- b. Open your mouth wide and take a deep breath. Make a tight seal with your mouth around the victim's mouth **3** and blow into the victim's mouth.



- c. Remove your mouth to let the victim breathe out, and check that the victim's chest moves down **4** .

4



- d. Repeat steps b and c once every 5 seconds either until the victim breathes for himself/herself or until medical aid comes.

Reporting Accidents

Report, to your *manager*, all electrical accidents, possible electrical hazards, and accidents that nearly occurred. (*Remember*: an accident that nearly occurs might be caused by a design problem; your immediate reporting ensures that the problem will be solved quickly.)

Report also all small electrical shocks. (*Remember*: a condition that causes a small shock need only differ slightly to cause serious injury.)

Safety Inspection General Guidelines

The purpose of this inspection guide is to aid you in identifying unsafe conditions.

Good judgment should be used to identify possible safety conditions not covered by this inspection guide. Refer to the safety reminders on pages iv and xv for a general checklist.

If any unsafe conditions are present, you must find out how serious the hazard could be and if you can continue before you correct the hazard.

Check the following items (see the Parts Catalog section):

- Damaged, missing, or altered parts, especially in the area of the Power switch and the Power Supply.
- Damaged, missing, or altered covers.
- Possible safety exposure from any non-IBM attachments.

IBM Wheelprinter E Safety Precautions

This manual is designed to be used by professional service personnel trained to service this product. There are mechanical and electrical hazards in this product, and trained professional service personnel should recognize these hazards. Therefore, all warnings are not included in this manual.

The IBM Wheelprinter E 5223 incorporates Class II construction as defined by the International Electrotechnical Commission Publication 380, "Safety of Electrically Energized Office Machines," and other national standards.

Class II construction provides protection against electrical shock through the use of double insulation, and does not rely on protective grounding.

The IBM Wheelprinter E 5223 is equipped with a double-insulated 2-wire electrical cord.

For continued protection against electrical shock:

1. Connect only to a properly grounded electrical outlet of the correct voltage. (See machine voltage rating plate.)
2. Refer servicing to trained professional service personnel.
3. When servicing, use only identical replacement parts.

Note: Later safety information will be published by IBM as needed.

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INTRODUCTION

The IBM Wheelprinter E 5223 is a letter-quality impact printer, designed to attach to the IBM Personal Computer and other original equipment manufacturer computers that are compatible with the IBM Personal Computer parallel interface.

The IBM Wheelprinter E can print in 10, 12, and 15 pitch or proportional spacing, depending on the printwheel installed. Printing is accomplished at a rate of 16 characters per second, printing bidirectionally. It has an end-of-ribbon stop and strike-over capability.

Two optional paper feed attachments are available for the IBM Wheelprinter E:

- A pinwheel forms feeder, which handles up to three-part continuous forms. This feeder has an out-of-paper sensor.
- A cut-sheet paper feeder, which can feed and stack cut paper 215.9 mm (8.5 in) by 279.4 mm (11.5 in).

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Introduction

This section explains the diagnostic aids that are available to troubleshoot problems on the IBM Wheelprinter E:

- Problem Isolation Charts (PICs)
- Power-On Self Test
- Printer Self Test
- Printer Diagnostic Test
- Personal Computer Advanced Diagnostic Diskette.

This manual can be used in conjunction with the host system service manual; however, it is intended to be a stand-alone document to service the IBM Wheelprinter E.

Problem Isolation Charts (PICs)

The PICs will help you isolate a problem to the failing FRU.

Always begin diagnostics with the “Printer Entry PIC” on page 3-1000-1. Answer the questions carefully and follow each instruction in sequence.

Printer Entry PIC

1. Inspect the printer for obvious failures such as:
 - Linecord disconnected from the ac outlet
 - Flashing lights
 - Paper clips, staples, or other foreign material in the printer
 - Dirt or contamination on the Carrier or the Platen
 - Broken springs or levers
 - Damaged covers.
 2. Disconnect the Printer cable from the back of the printer and disconnect the grounding thumbscrew.
 3. If you do not have a solid failure or you are not sure of the symptom, use the “Functional Check PIC” on page 3-1100-1 to obtain a clear symptom.
-

Depending on your failure indications, the Printer Entry PIC directs you to one of the other PICs.

Dead Machine PIC

Entry Conditions: It is assumed that the line voltage is correct.

1. Disconnect the linecord from the printer.
2. Measure the voltage at the end of the linecord. It should be between 103 and 127 V ac.

Homing Sensor PIC

Look at the left side frame for the Homing Sensor flag stop.

Paper Feed Electrical PIC

1. Position the Power switch off.
2. Disconnect J3F from the Printer board.
3. Set the meter on the X1 resistance scale.
4. Carefully zero the meter.
5. Make the following resistance checks at the J3F plug on the cable:

These PICs will guide you through a series of steps to identify the failing FRU.

The Removals and Installations and Adjustments sections will guide you to complete the repair.

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This example shows a representative page from the PICs.


Steps to take, tests, checks, or observations.

Question to be answered YES or NO.

Instructions to replace a Field Replaceable Unit (FRU), make adjustment, or go to another page.

DO YOU HAVE A CLEAR SYMPTOM? (If you suspect an intermittent failure, answer this question yes.)

NO Go to the "Functional Check PIC" on page 3-1100-1.


YES  3-1000-1

Check the following chart for your *identical* symptom:

Symptom	Action
No light, no printwheel, carrier, index, or ribbon movement at power-on.	Go to the "Dead Machine PIC" on page 3-1630-1.
2 beeps, Ready light blinking, other lights may be on.	Go to the "Button PIC" on page 3-1500-1.
Multiple beeps and blinking lights	Go to the "Error Light Chart" on page 3-1300-1.
Continuous beep after power-on.	Go to the "Beeper PIC" on page 3-1300-1.
Continuous POR at power-on.	Replace the Function Board.
Carrier continues to drive into either side frame.	Go to the "Homing Sensor PIC" on page 3-1900-1.
Carrier moves; no printing occurs or print quality is poor.	Go to the "Print Quality PIC" on page 3-2600-1.
Paper feed is failing or erratic.	Go to the "Paper Feed Entry PIC" on page 3-2200-1.
Paper light is failing.	Go to the "Options PIC" on page 3-2100-1.
Printer Self Test runs at power-on.	Go to the "Button PIC" on page 3-1500-1.
Does not detect end of ribbon.	Go to the "End-of-Ribbon PIC" on page 3-1700-1.

DO YOU SEE YOUR IDENTICAL SYMPTOM LISTED ABOVE?

YES Perform the required action.

NO  3-1000-2

Indicates continuation to the beginning of the next page.

Power-On Self Test

Each time you power on the IBM Wheelprinter E, it performs a Power-On Self Test as follows:

- The printwheel moves slightly.
- The printer beeps once.
- All lights come on.
- The printwheel rotates approximately 3 times to home the printwheel.
- The carrier moves to the left frame and then out to the first character position.
- The ribbon advances.
- The platen moves up and down slightly.
- The print hammer is fired, but not hard enough to strike the paper.

Note: The hammer movement can be more readily seen if a piece of paper is attached to it.

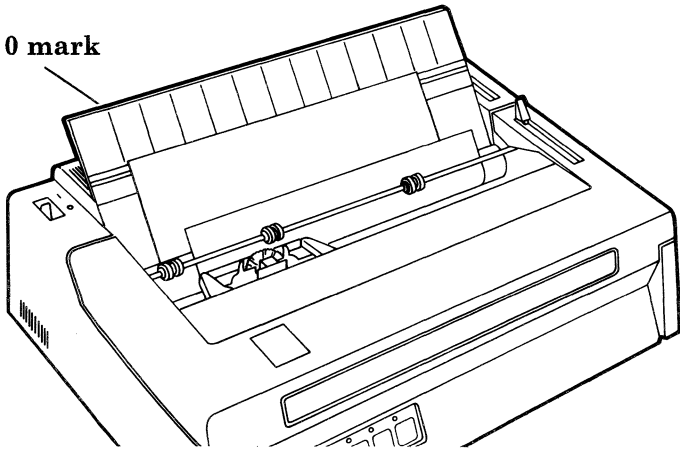
If no hardware failure is detected, the printer either goes online (**Ready** and **Online** lights on) or offline (**Ready**, **Ribbon**, **Wheel**, or **Paper** light on and 3 beeps) indicating an operator correctable error.

Printer Self Test

The Printer Self Test exercises the printer independent of the attached Personal Computer. It can be used to check printer operation.

To perform the Printer Self Test:

1. Position the Power switch on.
2. Insert a piece of paper lengthwise in the printer, left edge aligned with the zero mark on the Paper Table.



3. Position the Power switch off.
4. Press and *hold* the **Stop** button and position the Power switch on.
5. When printing begins, release the **Stop** button. The printer runs the following test:

```
0000000000 01279855
anrmcsdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y./W9K3X12054687*$##^+`@Q&|[\!~<>|!?"'=:_ ;xqvzwj.ybgupit
nrmcsdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y./W9K3X12054687*$##^+`@Q&|[\!~<>|!?"'=:_ ;xqvzwj.ybgupitoe
mcsdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y./W9K3X12054687*$##^+`@Q&|[\!~<>|!?"'=:_ ;xqvzwj.ybgupitoe
mcsdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y./W9K3X12054687*$##^+`@Q&|[\!~<>|!?"'=:_ ;xqvzwj.ybgupitoea
csdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y./W9K3X12054687*$##^+`@Q&|[\!~<>|!?"'=:_ ;xqvzwj.ybgupitoeanr
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hlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y./W9K3X12054687*$##^+`@Q&|[\!~<>|!?"'=:_ ;xqvzwj.ybgupitoeanrmc
lfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y./W9K3X12054687*$##^+`@Q&|[\!~<>|!?"'=:_ ;xqvzwj.ybgupitoeanrmcs
fk,V-GUFBZHP)RLSNCTDEIAJO(M.Y./W9K3X12054687*$##^+`@Q&|[\!~<>|!?"'=:_ ;xqvzwj.ybgupitoeanrmcsd
```

Note: Zeros (0) or ones (1) print in the first ten positions, representing the setup switch settings on the Function Board. A zero indicates the switch is off and a one indicates the switch is on.

Next, an eight-digit code prints. This code is the level of the software in your machine.

The next lines show the characters on your printwheel. If the Printer Cable is connected, the switch settings in the printout may be incorrect.

6. To exit this test, position the Power switch off.
7. If you were directed here from a PIC, return to that PIC.

Printer Diagnostic Test

The Printer Diagnostic Test is used to isolate problems with the feature connector and the End-of-Ribbon sensor.

To perform the Printer Diagnostic Test:

1. Press and hold the **Paper Down** button and position the Power switch on.
2. When the printer beeps, release the **Paper Down** button.
 - The printer performs a power-on reset, and the carrier moves to the center.
 - The **Ready** light blinks.
3. Remove the ribbon cartridge from the printer.
4. Check the status of the following lights, and verify that the conditions are correct:

Online light on	Sheetfeeder installed
Online light off	Sheetfeeder not installed
Ribbon light on	End-of-Ribbon sensor unblocked
Ribbon light off	End-of-Ribbon sensor blocked
Wheel light on	Pinwheel Forms Feeder installed
Wheel light off	Pinwheel Forms Feeder not installed
Paper light on	No paper in the Pinwheel Forms Feeder, the bail is down
Paper light off	Paper in the Pinwheel Forms Feeder, the bail is up

5. To exit this test, position the Power switch off.
6. If you were directed here from a PIC, return to that PIC.

Personal Computer Advanced Diagnostics Diskette

Although it is not required to isolate failing FRUs, the Personal Computer Advanced Diagnostics diskette has tests that check the communications to the IBM Wheelprinter E. To use this feature, run the Diagnostic Diskette, add the matrix printer (14) to the installed devices list, and then run the printer test.

Signal Names

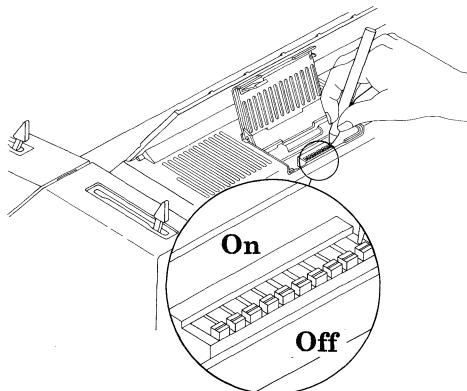
All signal names are printed on the boards at the connectors or at the test points. Some cables also have the connector names. On the output side of the Power Supply, pins that are ground (0 V dc) are labeled as +34R, and GND. The "R" stands for return, since that line is the return line to the Power Supply.

Switch Settings

The IBM Wheelprinter E is equipped with a group of switches the operator can use to configure the printer. Always position the Power switch off before changing a switch setting.

Switch Number	Function	On	Off
1	The paper indexes after receiving a carrier return.	Active	Not Active
2	Form Length	12 in.	11 in.
3	Skipover perforation	Active	Not Active
4-6	Country Select (see table on next page)		
7	Audible Alarm	Not Active	Active
8	Line Spacing	8 lines per inch	6 lines per inch
9	Line length	13.2 in.	8 in.
10	Hex dump	Active	Not Active

Note: These switches are set *Off* at the factory.



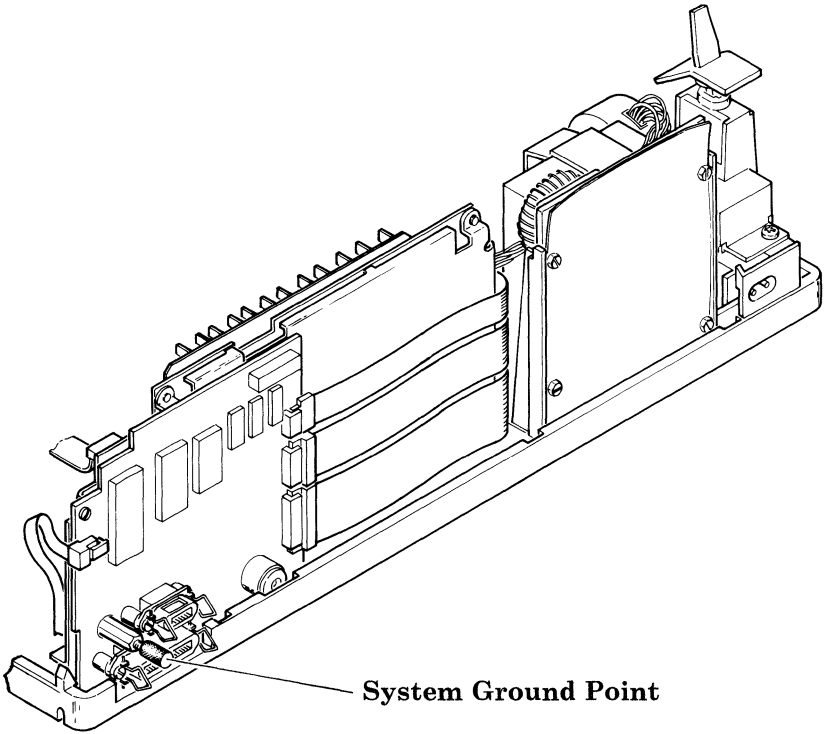
Country Select Switches

The Printer Tables referred to in this chart are in the *IBM Wheelprinter E Guide to Operations*.

Country	Switch 4	Switch 5	Switch 6	Printer Table
U.S.	Off	Off	Off	Table 1
Spain	Off	Off	On	Table 2
France	Off	On	Off	Table 2
Germany	Off	On	On	Table 2
Italy	On	Off	Off	Table 2
U.S.	On	Off	On	Table 2
U.S.	On	On	Off	Table 1
U.S.	On	On	On	Table 1

System Ground Point

Use the System Ground Point as the ground reference for making any voltage measurements.



(Rear View)

Tools Required for Service

Meter readings in this manual were taken with an IBM meter, P/N 9900167.

Use the following tools to service this machine:

Tool	Part Number
6" Metal Scale	P/N 450158
Push-Pull Scale	P/N 460870
3/16" x 6" Flat-Blade Screwdriver	P/N 1650853
5/16" x 6" Flat-Blade Screwdriver	P/N 1650856
3" Small Screwdriver	P/N 9900070
#1 Supadriv Screwdriver	P/N 4760541
#2 Supadriv Screwdriver	P/N 4760542
5/16" x 1/4" Open-End Wrench	P/N 9900005
3/8" x 7/16" Box-End Wrench	P/N 9900182
Large Springhook	P/N 9900059
Feeler Gauges	P/N 1749245, P/N 9900468
T-Bender	P/N 9900094
Analog VOM (Triplet ¹ 310C or equivalent)	P/N 9900167
Medium Screw Starter	P/N 9900060
Large Screw Starter	P/N 9900328

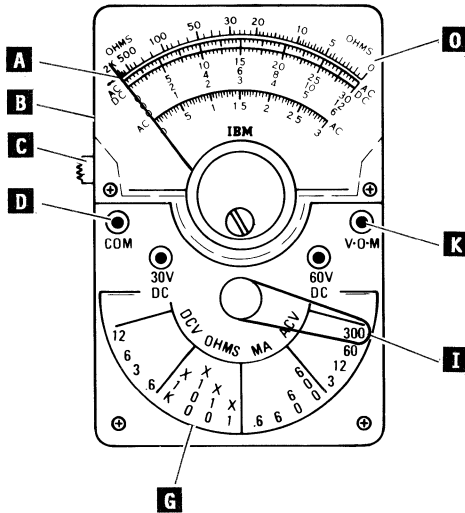
¹ Triplet is a trademark of the Triplet Corporation.

Triplett Meter Quick Reference

Resistance and Continuity Readings

Note: When taking resistance and continuity readings, one end of the component being tested must be detached to avoid measuring back circuits.

1. Position the Power switch off.
2. Set selector switch **I** to appropriate ohms setting **G**.
3. Set polarity switch **C** to plus (+).
4. Insert black meter lead into the COM jack **D**.
5. Insert red meter lead into the VOM jack **K**.
6. Clip leads together and zero the pointer **A** by turning OHMS adjust control **B**.
7. Use the OHMS scale **O** when reading resistance or continuity.

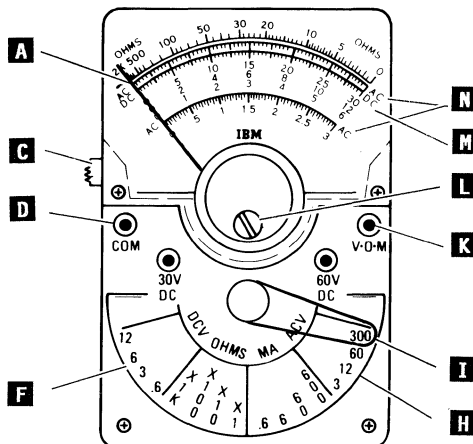


AC Voltage Readings: 0 – 300 volts

1. Zero pointer **A** using the pointer adjusting screw **L**.
2. Set selector switch **I** to appropriate ac setting **H**.
3. Set polarity switch **G** to plus (+).
4. Insert black meter lead into COM jack **D**.
5. Insert red meter lead into VOM jack **K**.
6. Connect black lead to ground, red lead to voltage source.
7. Use the correct ac scale **N** when reading ac voltage.

DC Voltages: 0 – 12 volts

1. Zero pointer **A** using pointer adjusting screw **L**.
2. Set selector switch **I** to appropriate dc setting **F**.
3. Set polarity switch **G** to plus (+) for positive voltages; to minus (-) for negative voltages.
4. Insert black meter lead into COM jack **D**.
5. Insert red meter lead into VOM jack **K**.
6. Connect black lead to ground, red lead to voltage source.
7. Use the correct dc scale **M** when reading dc voltages.

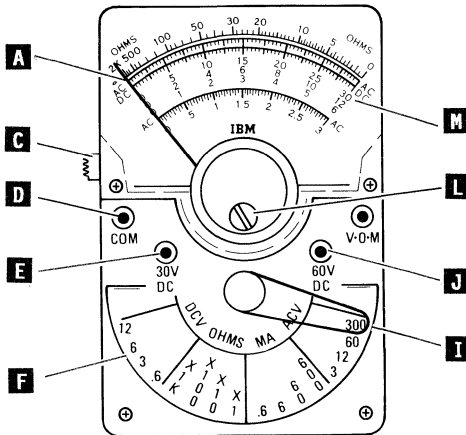


DC Voltage Readings: 30 and 60 volts (positive)

1. Zero pointer **A** using pointer adjusting screw **L**.
2. Set selector switch **I** to *any* dc setting **F**.
3. Insert black meter lead into COM jack **D**.
4. Insert red meter lead into the 30V or 60V jack **E** or **J**.
5. Polarity switch **C** *must* be set to plus (+). If polarity switch is set to minus, the meter will not work.
6. Connect black lead to ground, red lead to voltage source.
7. Use the 30V or 60V scale **M** when reading voltage.

DC Voltage Readings: 30 and 60 volts (negative)

Use the procedure for “DC Voltage Readings: 30 and 60 volts (positive)” except *reverse* meter leads in jacks. (Black meter lead in the 30V or 60V jack **E** or **J**, red meter lead in the COM jack **D**.)



PROBLEM ISOLATION CHARTS (PICS)

Printer Entry PIC	3-1000-1
Functional Check PIC	3-1100-1
Error Light Chart	3-1200-1
Beeper PIC	3-1300-1
Blown Fuse PIC	3-1400-1
Button PIC	3-1500-1
Dead Machine PIC	3-1600-1
End-of-Ribbon PIC	3-1700-1
First Writing Line Knock-Off PIC	3-1800-1
Homing Sensor PIC	3-1900-1
Light PIC	3-2000-1
Options PIC	3-2100-1
Paper Feed Entry PIC	3-2200-1
Paper Feed Electrical PIC	3-2300-1
Print Hammer Entry PIC	3-2400-1
Print Hammer Electrical PIC	3-2500-1
Print Quality PIC	3-2600-1
Ribbon Entry PIC	3-2700-1
Ribbon Electrical PIC	3-2800-1
Selection Entry PIC	3-2900-1
Selection Electrical PIC	3-3000-1
Semi-Automatic Paper Insertion (SAPI) PIC	3-3100-1
System Electronics PIC	3-3200-1
Transport Entry PIC	3-3300-1
Transport Electrical PIC	3-3400-1

This is the entry point for using all of the printer PICs.

At this point you assume the problem is in the IBM Wheelprinter E and not the host computer. You should continue with the "Printer Entry PIC" on page 3-1000-1.


Printer Entry PIC

1. Inspect the printer for obvious failures such as:
 - Linecord disconnected from the ac outlet
 - Flashing lights
 - Paper clips, staples, or other foreign material in the printer
 - Dirt or contamination on the Carrier or the Platen
 - Broken springs or levers
 - Damaged covers.
 2. Disconnect the Printer cable from the back of the printer and disconnect the grounding thumbscrew.
 3. If you do not have a solid failure or you are not sure of the symptom, use the “Functional Check PIC” on page 3-1100-1 to obtain a clear symptom.
-

DO YOU HAVE A CLEAR SYMPTOM? (If you suspect an intermittent failure, answer this question yes.)

NO Go to the “Functional Check PIC” on page 3-1100-1.

YES 



Check the following chart for your *identical* symptom:

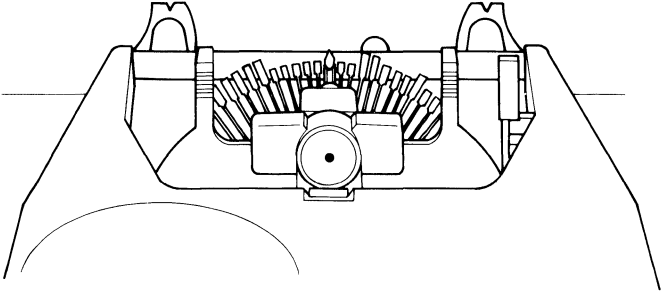
Symptom	Action
No light, no printwheel, carrier, index, or ribbon movement at power-on.	Go to the "Dead Machine PIC" on page 3-1600-1.
2 beeps, Ready light blinking, other lights may be on.	Go to the "Button PIC" on page 3-1500-1.
Multiple beeps and blinking lights	Go to the "Error Light Chart" on page 3-1200-1.
Continuous beep after power-on.	Go to the "Beeper PIC" on page 3-1300-1.
Continuous POR at power-on.	Replace the Function Board.
Carrier continues to drive into either side frame.	Go to the "Homing Sensor PIC" on page 3-1900-1.
Carrier moves; no printing occurs or print quality is poor.	Go to the "Print Quality PIC" on page 3-2600-1.
Paper feed is failing or erratic.	Go to the "Paper Feed Entry PIC" on page 3-2200-1.
Paper light is failing.	Go to the "Options PIC" on page 3-2100-1.
Printer Self Test runs at power-on.	Go to the "Button PIC" on page 3-1500-1.
Does not detect end of ribbon.	Go to the "End-of-Ribbon PIC" on page 3-1700-1.

DO YOU SEE YOUR *IDENTICAL* SYMPTOM LISTED ABOVE?

YES Perform the required action.

NO 

1. Position the Power switch off.
2. Position the Power switch on.



DID THE PRINTWHEEL MOVE?

NO Go to page 3-1000-22.

YES





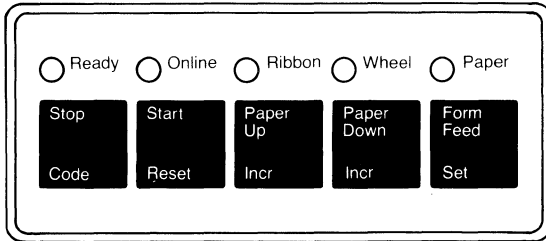
DID THE PRINTER BEEP?

NO Go to page 3-1000-23.

YES 

Check the chart below for failures you have seen:

Symptom	Action
Blinking error lights and multiple beeps.	Go to the "Error Light Chart" on page 3-1200-1.
Continuous POR.	Replace the Function Board.
All of the front panel lights did not come on at POR.	Go to the "Light PIC" on page 3-2000-1.




DID YOU GET ANY OF THE ABOVE SYMPTOMS?

YES Perform the required action.

NO






At power-on, the printwheel rotates 3 times; then the Carrier moves to the side frame, stops, and moves to the first character of the writing line. The Carrier then moves to the center if a ribbon, printwheel, or paper error is detected.

Transport problems may show up as excessive noise.

**DID THE CARRIER MOVE EASILY WITHOUT
EXCESSIVE NOISE?**

NO Go to page 3-1000-25.

YES 



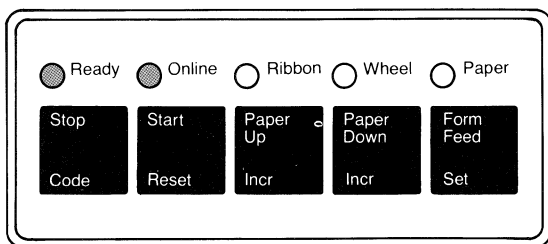
Check the chart below:

Symptom	Action
Ready and Wheel lights on with 3 beeps.	Go to the “Print Quality PIC” on page 3-2600-1.
Ready and Ribbon lights on with 3 beeps.	Go to the “End-of-Ribbon PIC” on page 3-1700-1.
Ready and Paper lights on with 3 beeps.	Go to the “Options PIC” on page 3-2100-1.

IS YOUR SYMPTOM LISTED ABOVE?

YES Perform the required action.

NO 



ARE ONLY THE READY AND ONLINE LIGHTS ON?

NO Go to page 3-1000-26.

YES 

1. Disconnect the features cable from the back of the printer.
 2. Pull the Paper Bail forward to the load position to activate the SAPI switch.
-

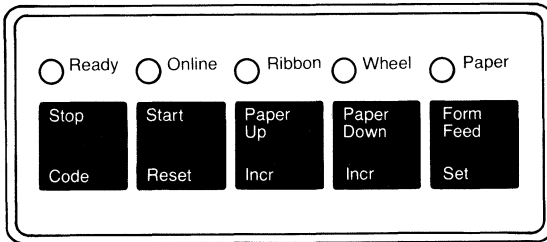
DID THE PLATEN TURN FREELY WITHOUT EXCESSIVE NOISE?

NO Go to page 3-1000-27.

YES 

1. Connect the features cable to the back of the printer.
2. Perform the following steps in order:

Action	Expected Response
Press the Stop button.	Online light turns off and carrier moves to the center.
Press the Paper Up button.	Platen moves up.
Press the Paper Down button.	Platen moves down.
Press the Form Feed button.	Platen moves up 1 page.
Press the Start button.	Online light turns on and carrier moves to the left.



DID ALL THE BUTTONS CAUSE SOME RESPONSE?

NO Go to the "Button PIC" on page 3-1500-1.

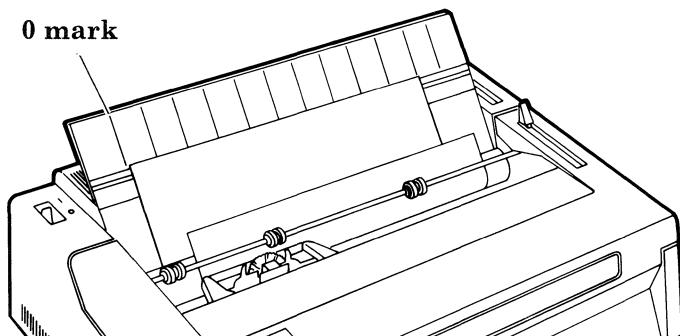
YES 

DID YOU GET 6 BEEPS AND A BLINKING LIGHT PATTERN?

YES Go to the "Error Light Chart" on page 3-1200-1.

NO 

1. Position the Power switch off.
2. Disconnect the Printer cable.
3. Position the Power switch on.
4. Insert a piece of paper lengthwise in the printer, left edge aligned with the zero mark on the Paper Table.



5. Run the Printer Self Test (see page 2-6):
 - a. Position the Power switch off.
 - b. Press and *hold* the **Stop** button and position the Power switch on.


The printer prints the following:

```
0000000000 01279855
anrmscdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$##*~@Q&|[\]^<>|{?""=:;xqvzwl}.ybgupitoe
nrmcsdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$##*~@Q&|[\]^<>|{?""=:;xqvzwl}.ybgupitoea
rmcsdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$##*~@Q&|[\]^<>|{?""=:;xqvzwl}.ybgupitoean
ncsdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$##*~@Q&|[\]^<>|{?""=:;xqvzwl}.ybgupitoeanr
csdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$##*~@Q&|[\]^<>|{?""=:;xqvzwl}.ybgupitoeanrm
sdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$##*~@Q&|[\]^<>|{?""=:;xqvzwl}.ybgupitoeanrmc
dhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$##*~@Q&|[\]^<>|{?""=:;xqvzwl}.ybgupitoeanrms
dhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$##*~@Q&|[\]^<>|{?""=:;xqvzwl}.ybgupitoeanrmcsd
hlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$##*~@Q&|[\]^<>|{?""=:;xqvzwl}.ybgupitoeanrmcsdh
```

Note: The actual characters printed are determined by the typestyle of the printwheel in the printer.

6. To stop this test, position the Power switch off.

CONTINUE



Compare the symptom to the following chart.

Symptom	Action
No print at all, or poor quality print.	Go to the "Print Quality PIC" on page 3-2600-1.
Multiple beeps and error light/lights blinking.	Go to the "Error Light Chart" on page 3-1200-1.
Paper does not load properly.	Go to the "Paper Feed Entry PIC" on page 3-2200-1.
Ribbon breaks or does not feed properly.	Go to the "Ribbon Entry PIC" on page 3-2700-1.

DID YOU GET ONE OF THE ABOVE SYMPTOMS?

YES Perform the required action.

NO 

Compare the switch settings to the printout from the Printer Self Test.

Switch Settings

Level of Software

0000000000	01279855
------------	----------

anrmcsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X1205468
nrmscdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X12054687
rmcsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X12054687
mcsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X12054687
csdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X12054687
sdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X12054687
dhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X12054687
hlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X12054687
lfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X12054687
fk,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X12054687
k,V-GUFBZHP) RLSNCTDEIAJO (M.Y./W9K3X12054687

DO THE SWITCH SETTINGS AND THE PRINTOUT MATCH?

NO Replace the Function Board.


YES 

1. Pull the Paper Bail forward.
 2. Press the **Stop** button to go offline.
 3. Press and *hold* the **Paper Up** button.
-

**DID THE PAPER BAIL RETURN TO THE
PLATEN?**

NO Go to “First Writing Line Knock-Off PIC” on
page 3-1800-1.

YES 

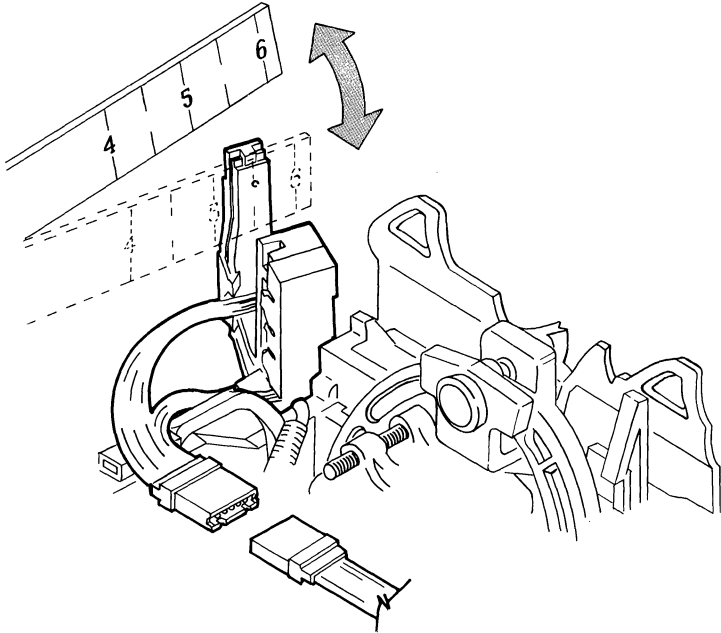
- 
1. Position the Power switch off.
 2. Disconnect any optional paper handler installed.
 3. Remove the ribbon cartridge.
 4. Run the Printer Diagnostic Test. See page 2-8.
-

**IS THE READY LIGHT BLINKING AND THE
RIBBON LIGHT ON SOLID?**

NO Go to the "End-of-Ribbon PIC" on
page 3-1700-1.

YES 

Using a six-inch ruler, block and unblock the light path of the End-of-Ribbon sensor.



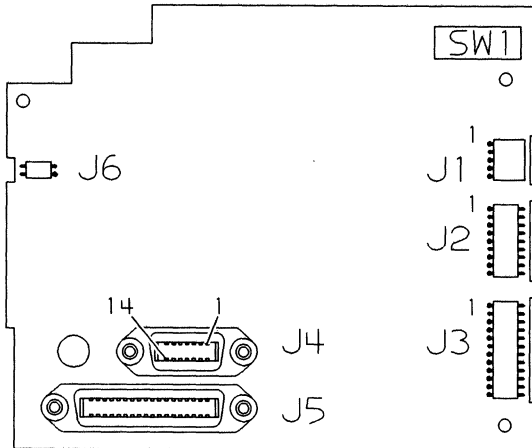
DOES THE RIBBON LIGHT GO OFF AND ON AS YOU BLOCK AND UNBLOCK THE SENSOR?

NO Go to the "End-of-Ribbon PIC" on page 3-1700-1.

YES 

Connect one end of a meter lead to the System Ground point; then connect the other end to J4-2 on the Function board.


Note: Be careful when probing the connector not to probe the wrong pins.



DOES THE ONLINE LIGHT TURN ON?

NO Go to the "Light PIC" on page 3-2000-1.

YES 



Remove the test lead from J4-2 and connect it to J4-3.

Note: Be careful when probing the connector not to probe the wrong pins.

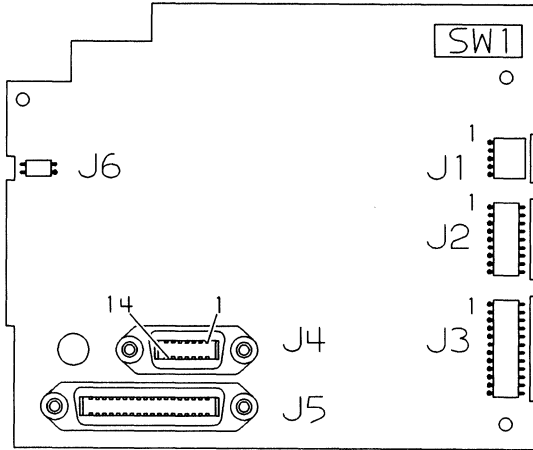
DOES THE WHEEL LIGHT TURN ON?

NO Go to the "Light PIC" on page 3-2000-1.

YES 

Remove the test lead from J4-3 and connect it to J4-14.

Note: Be careful when probing the connector not to probe the wrong pins.



DOES THE PAPER LIGHT TURN ON?

NO Go to the "Light PIC" on page 3-2000-1.

YES 

Locate the operator complaint in the following chart.

Operator Complaint	Action
Poor print quality.	Go to the "Print Quality PIC" on page 3-2600-1.
Paperfeed problems.	Go to the "Paper Feed Entry PIC" on page 3-2200-1.
Intermittent Ribbon light errors.	Go to the "End-of-Ribbon PIC" on page 3-1700-1.
Printer does not print correctly from the host.	Replace the Function board.
Printer locks up sometime after POR has completed.	Go to the "System Electronics PIC" on page 3-3200-1.
Ready light on, Online light blinking, and 3 beeps.	Printer received a stop command (ESC j) from the host system. Press the Start button to continue printing.
Does not operate correctly with an optional paper handler installed.	Go to the "Options PIC" on page 3-2100-1.

DID YOU RECEIVE ANY OF THE ABOVE COMPLAINTS?

YES Perform the required action.

NO The printer is now functional.

Note: The printer is also controlled by program commands from the system unit. There may be commands in the program that are causing the problem.

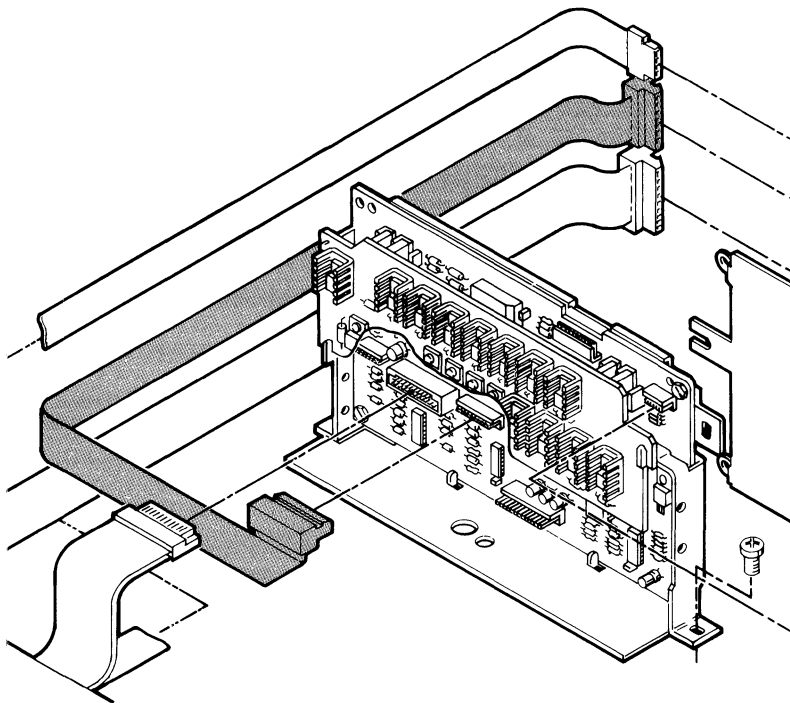


DID THE PRINTER BEEP?

NO Go to the “Dead Machine PIC” on
page 3-1600-1.

YES Go to the “Selection Electrical PIC” on
page 3-3000-1.


1. Position the Power switch off.
2. Disconnect the System cable: J5P from the Printer board and J2 from the Function board.
3. Check for continuity in the System cable.



IS THERE CONTINUITY IN THE SYSTEM CABLE?

NO Replace the System cable.

YES 


- 
1. Connect the system cable connectors:
 - J5P to the Printer board
 - J2 to the Function board.
 2. Position the Power switch on.
 3. Measure the voltage at the J2 plug on the Function board.

J2	Signal	Voltage
Blank	—	—
1	+5 V dc	4.5 to 5.5 V dc
2	POR	2.5 to 5.5 V dc
3	GND	0 V dc
4	BUS	Do not measure.
5	—	—
6	—	—
7	—	—
8	—	—
9	34R	0 V dc
10	+34 V	24 to 44 V dc
Blank	—	—

ARE THE VOLTAGES CORRECT?

NO Replace the Printer board.

YES Replace the Function board.



Observe the Transport Motor shaft while powering on.

**DID THE TRANSPORT MOTOR ATTEMPT TO
TURN OR MAKE ANY NOISE?**

NO Go to the “System Electronics PIC” on
page 3-3200-1.

YES Go to the “Transport Entry PIC” on
page 3-3300-1.



Press the **Stop** button.

DID THE PRINTER GO OFFLINE (Online light off, Ready light on, Carrier moves to center)?

NO Go to the “Button PIC” on page 3-1500-1.


YES Go to the “Light PIC” on page 3-2000-1.

1. Position the Power switch off.
 2. Observe the Platen while powering on. The Platen should turn up a short step while powering on.
-

**DOES THE PLATEN TURN AT ALL WHEN THE
PRINTER IS POWERED ON?**

NO Go to the "Paper Feed Entry PIC" on
page 3-2200-1.

YES 



Pull the Paper Bail forward to the load position to activate the SAPI switch.

**DOES THE PLATEN TRY TO TURN AT ALL
WHEN THE PAPER BAIL IS PULLED?**

YES Go to the “Paper Feed Entry PIC” on page 3-2200-1.

NO Go to the “Semi-Automatic Paper Insertion (SAPI) PIC” on page 3-3100-1.


Functional Check PIC

Perform the following steps in order. If you do not get the expected response, go to the "Printer Entry PIC" on page 3-1000-1.

Action	Expected Response
Position the Power switch on.	Lights turn on; Printer beeps; Printwheel moves; Carrier moves to left frame; Ribbon, Paper, and Wheel lights turn off.
Insert paper and pull Paper Bail forward to load position. Leave Paper Bail away from Platen.	Printer loads the paper to the top of the page if the Pinwheel Forms Feeder is not attached. If the Forms Feeder is attached, the printer beeps.
Press Stop button.	Online light turns off and the Carrier moves approximately 5 inches from the left side frame.
Press and hold Paper Up button.	Paper moves up and Paper Bail automatically returns to the Platen.
Press Paper Down button.	Paper moves down.
Press Code + Paper Up buttons.	Paper moves up a small amount.
Press Code + Paper Down buttons.	Paper moves down a small amount.
Press Form Feed button.	Paper advances one page.

CONTINUE





Action	Expected Response
Press Start button.	Online light turns on.
Perform Printer Self Test.	Printer clearly prints the Printer Self Test characters.
Check switch settings.	Printout and switches are the same.
Pull the Paper Release Lever forward.	Paper moves freely around the platen at both ends.
Push the Paper Release Lever to the rear.	Paper is held tightly between the platen and the Feedrolls.
If a Pinwheel Forms Feeder is attached, remove the paper. Power off and then on.	The printer beeps 3 times and the Paper light turns on.
Lift the Pinwheel Forms Feeder Paper Sense Bail. Power off and then on.	The Paper light goes out.
Perform the Printer Diagnostic Test. See page 2-8.	The Printer Diagnostic Test runs.

DID ALL STEPS GIVE THE EXPECTED RESPONSE?

NO Go to the “Printer Entry PIC” on page 3-1000-1 and proceed with the symptom you found.

YES The printer is functional. If you suspect an intermittent problem, go to the “Printer Entry PIC” on page 3-1000-1.

Error Light Chart

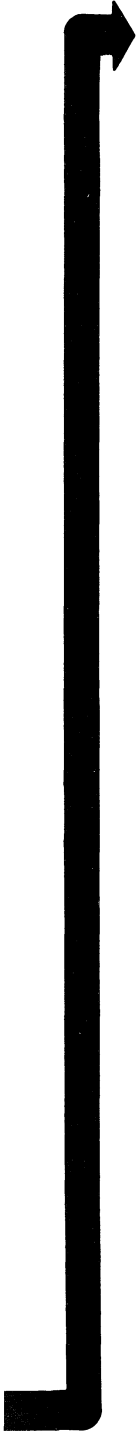
Entry Conditions: The printer gave multiple beeps and the error lights are blinking.

1. Observe all the blinking lights on the Front Panel.
2. Use the following chart to find what action to take.

Note: X's indicate a light is blinking and O's indicate the light is off.

Display	Action
X X O O O	Go to the "Selection Electrical PIC" on page 3-3000-1.
X O X O O	Go to the "Paper Feed Electrical PIC" on page 3-2300-1.
X O O X O	Go to the "Transport Electrical PIC" on page 3-3400-1.
X X O X O	Go to the "Print Hammer Electrical PIC" on page 3-2500-1.
X O X X O	Go to the "Ribbon Electrical PIC" on page 3-2800-1.
X X O O X	Replace the Function board.
X O X O X	Go to the "Ribbon Electrical PIC" on page 3-2800-1.
X X X O X	Go to the "System Electronics PIC" on page 3-3200-1.

CONTINUE



Ready
 Online
 Ribbon
 Wheel
 Paper

Display	Action
X X O X X	Go to the the "System Electronics PIC" on page 3-3200-1.
X O X X X	Go to the "Homing Sensor PIC" on page 3-1900-1.
O O O O O	Go to the "Light PIC" on page 3-2000-1.
X X X X X	Go to the "System Electronics PIC" on page 3-3200-1.

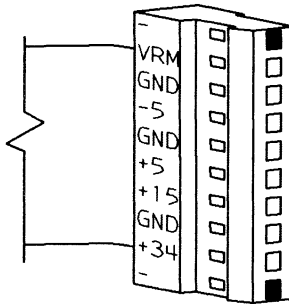
IS THE ERROR CODE YOU RECEIVED LISTED ABOVE?

YES Perform the required action.

NO 

1. Position the Power switch off.
2. Disconnect J6P from the Printer board.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the cable as indicated in the chart below.

J6P	Signal	Voltage
2	GND	—
3	-5	-4.6 to -5.6 V dc
7	GND	—
8	+34	+34 to +46 V dc



J6P

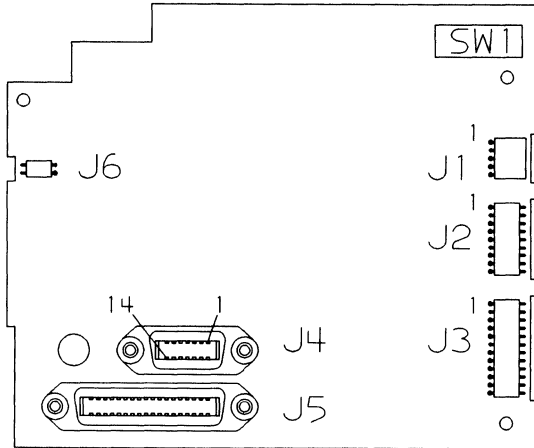
ARE THE VOLTAGES CORRECT?

YES Replace the Printer board.

NO Replace the Power Supply board.

Beeper PIC

1. Position the Power switch off.
 2. Disconnect J3 from the Function Board.
 3. Position the Power switch on.
-



DO YOU STILL GET A CONTINUOUS BEEP?

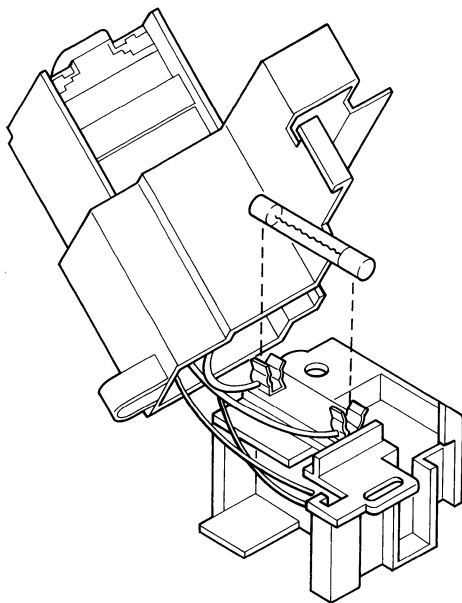
NO Replace the Front Panel assembly.

YES Replace the Function Board.

Blown Fuse PIC

Check the entire machine for loose paper clips, staples, or metal shavings.

1. Position the Power switch off.
 2. Install a new fuse.
 3. Disconnect J6P from the Printer board.
 4. Position the Power switch on.
-



DID THE NEW FUSE BLOW?

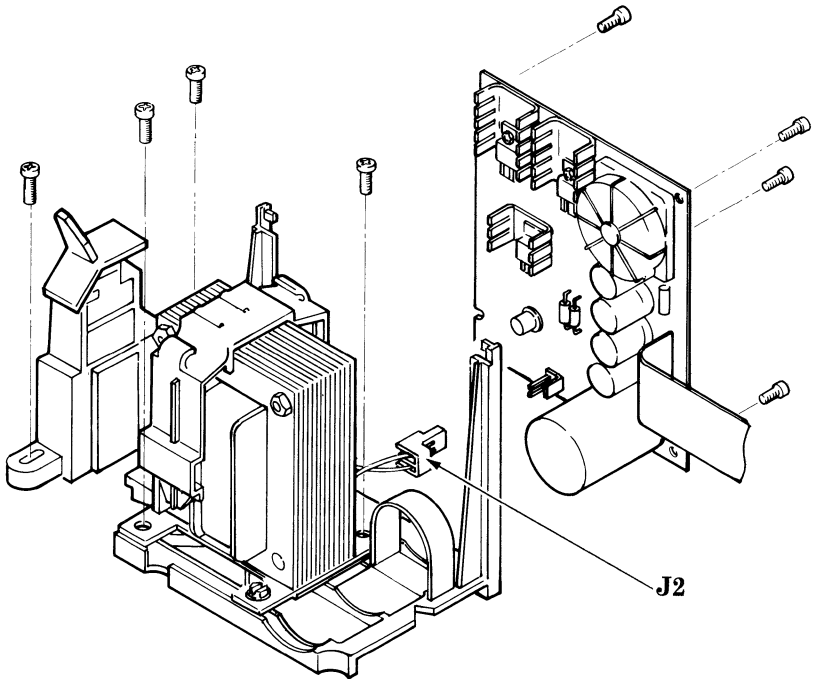
NO Go to 3-1400-3.

YES 

3-1400-1

Blown Fuse

1. Position the Power switch off.
 2. Install a new fuse.
 3. Remove the Power Supply assembly.
 4. Remove the Power Supply board.
 5. Disconnect J2 from the Power Supply board.
 6. Position the Power switch on.
-

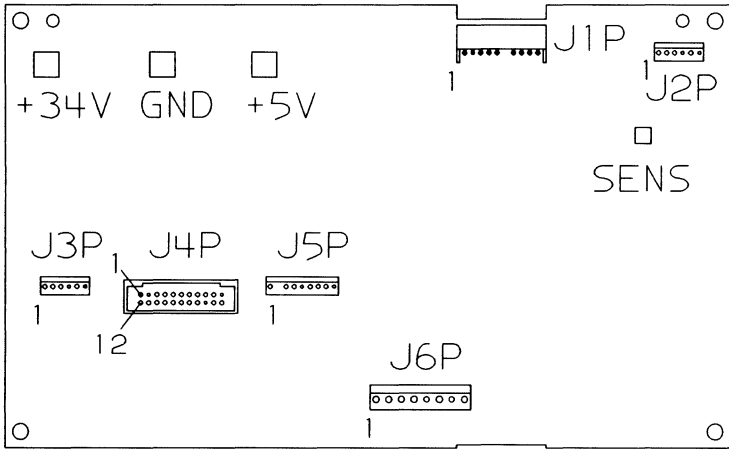


DID THE FUSE BLOW?

NO Replace the Power Supply board.

YES Replace the Power Supply assembly.

1. Position the Power switch off.
 2. Measure the resistance between the +34 test pad and the GND test pad on the Printer board.
-

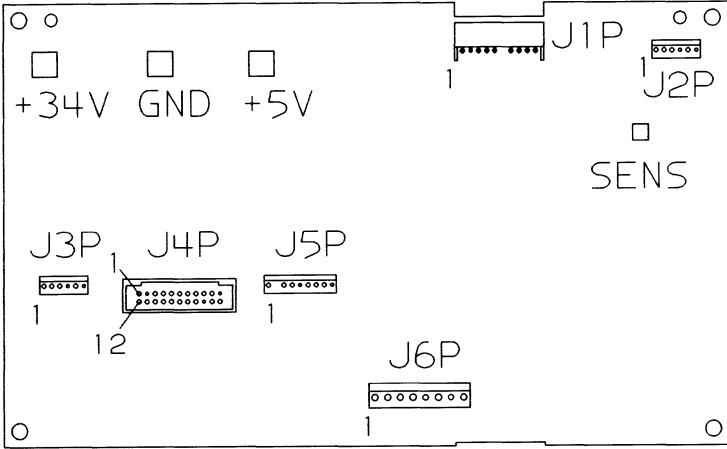


IS THE RESISTANCE LESS THAN 15 OHMS?

NO Connect J6P and go to the “Functional Check PIC” on page 3-1100-1.

YES 

1. Disconnect J2 from the Function board.
2. Measure the resistance between the +34 test pad and the GND test pad on the Printer board.

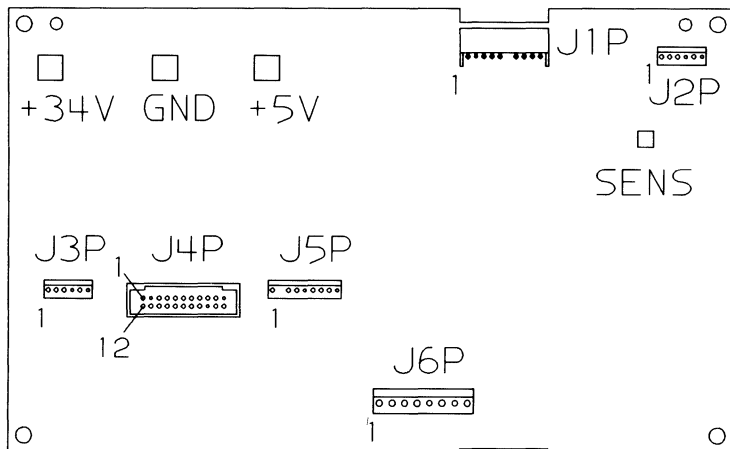


IS THE RESISTANCE LESS THAN 15 OHMS?

NO Replace the Function board.

YES 

1. Connect J2 to the Function board.
2. Disconnect J5P from the Printer board.
3. Measure the resistance between the +34 test pad and the GND test pad on the Printer board.



IS THE RESISTANCE LESS THAN 15 OHMS?

YES Replace the Printer board.

NO Replace the System Cable.

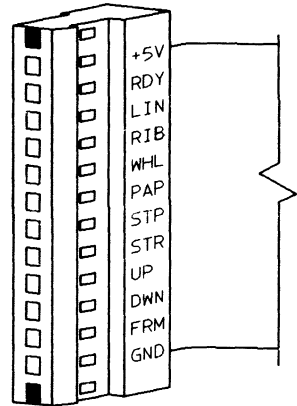
Button PIC

1. Position the Power switch off.
2. Unplug J3 from the Function Board.
3. Set the meter on the 1K ohm scale.
4. Measure the resistance at the plug on the cable between ground, J3-12, and the pin of the failing button while pressing on the failing button to check the button operation. The meter should move from infinity to less than 100 ohms when a good button is pressed.

Note: Be careful not to probe the wrong pins. The cable positions do not match the actual location of the buttons on the Front Panel.

J3 Plug

Pin	Signal
12	Ground
11	Form Feed
10	Paper Down
9	Paper Up
8	Start
7	Stop



J3 Plug

DID THE BUTTON OPERATE CORRECTLY?

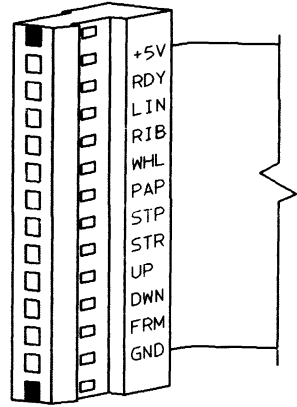
NO Replace the Front Panel assembly.

YES 

Measure the resistance at the J3 plug on the cable from ground, J3-12, to the pins of all buttons with no buttons pressed.

J3 Plug

Pin	Signal
12	Ground
11	Form Feed
10	Paper Down
9	Paper Up
8	Start
7	Stop



J3 Plug

DID YOUR METER MEASURE INFINITY ON ALL BUTTONS?

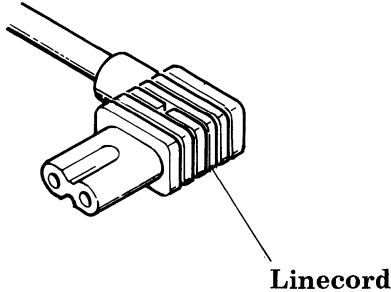
NO Replace the Front Panel assembly.

YES Replace the Function Board.

Dead Machine PIC

Entry Conditions: It is assumed that the line voltage is correct.

1. Disconnect the linecord from the printer.
 2. Measure the voltage at the end of the linecord. It should be between 103 and 127 V ac.
-




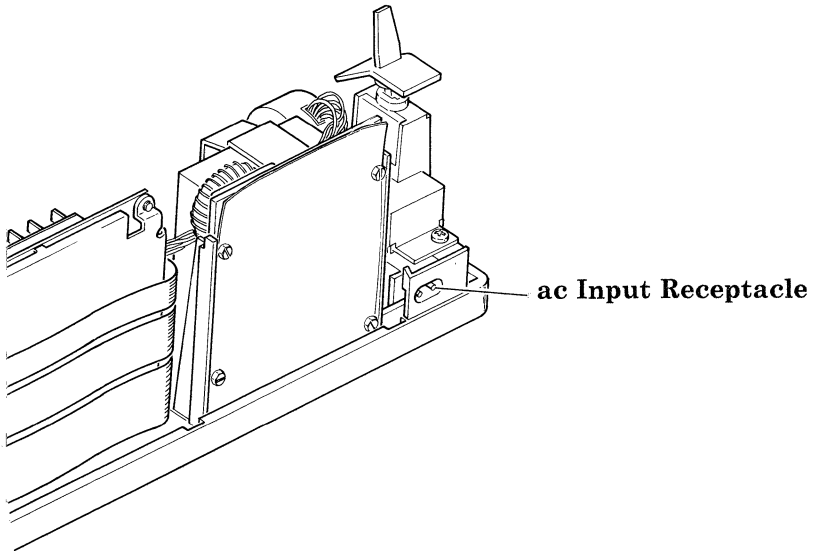
IS THE VOLTAGE CORRECT?

NO Replace the linecord.

YES



- 
1. Position the Power switch off.
 2. Disconnect the linecord at the receptacle and at the rear of the printer.
 3. Position the Power switch on.
 4. Check continuity between pins 1 and 2 on the ac input receptacle of the printer.
-



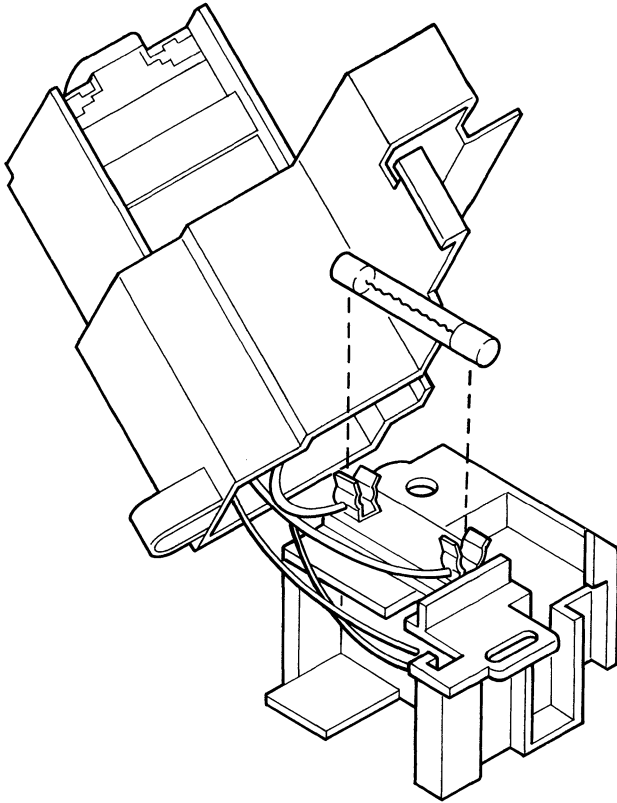
IS THERE CONTINUITY BETWEEN PINS?

YES Go to 3-1600-5.

NO 

3-1600-2

1. Position the Power switch off.
 2. Check continuity on the fuse.
-

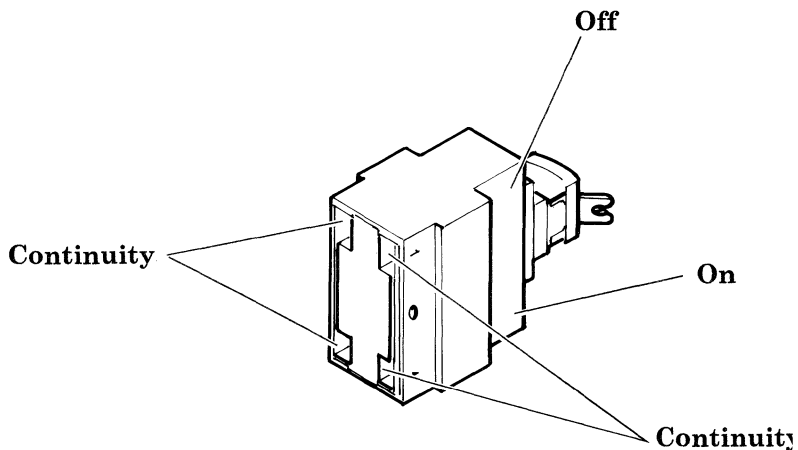


IS THE FUSE GOOD?

NO Go to the "Blown Fuse PIC" on page 3-1400-1.

YES 

1. Remove the Power switch from the machine. See page 4-38.
 2. Remove the wires from the switch.
 3. Position the switch on.
 4. Check the switch for continuity.
-



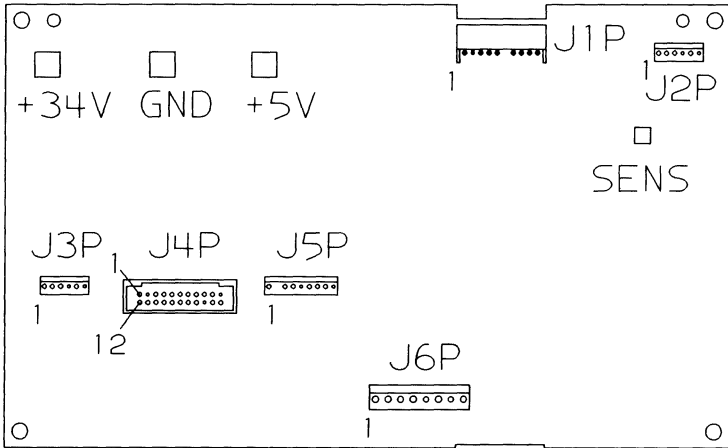
IS THE SWITCH GOOD?

YES Replace the Power Supply assembly.

NO Replace the Power switch.

1. Position the Power switch off.
2. Connect the linecord to the printer and the ac receptacle.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the Printer board.

J6P	Signal	Voltage
Blank	—	—
1	VRM	Do not measure.
2	GND	0 V dc
3	-5	-4.6 to -5.6 V dc
4	GND	0 V dc
5	+5	4.6 to 5.6 V dc
6	+15	13.2 to 15.6 V dc
7	GND	0 V dc
8	+34	27.2 to 46.9 V dc
Blank	—	—



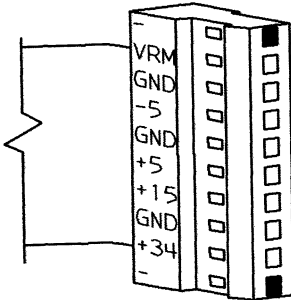
ARE THE VOLTAGES CORRECT?

YES Go to 3-1600-16.

NO

1. Position the Power switch off.
2. Disconnect J6P from the Printer board.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the cable.

J6P	Signal	Voltage
Blank	-	-
1	VRM	Do not measure.
2	GND	0 V dc
3	-5	-4.6 to -5.6 V dc
4	GND	0 V dc
5	+5	4.6 to 5.6 V dc
6	+15	13.2 to 15.6 V dc
7	GND	0 V dc
8	+34	27.2 to 46.9 V dc
Blank	-	-



J6P

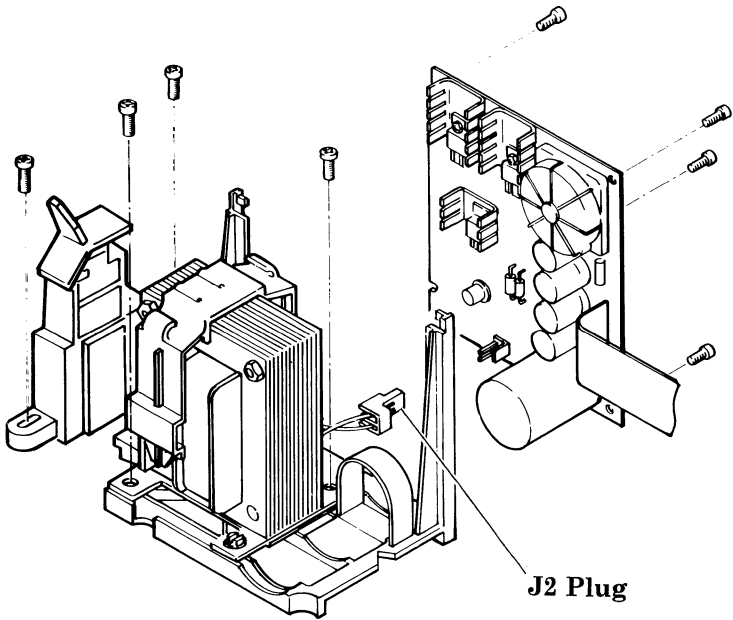
ARE THE VOLTAGES CORRECT?

YES Go to 3-1600-8.

NO 

3-1600-6


1. Position the Power switch off.
2. Remove the Power Supply assembly.
3. Remove the Power Supply board.
4. Disconnect J2 from the Power Supply board.
5. Position the Power switch on.
6. Set the meter to measure ac voltage.
7. Measure the voltage between the pins on the J2 plug.



IS THE VOLTAGE 27 TO 43 V ac?

NO Replace the Power Supply assembly.

YES Replace the Power Supply board.


- 
1. Position the Power switch off.
 2. Connect J6P to the Printer board.
 3. Disconnect J5P from the Printer board.
 4. Position the Power switch on.
 5. Measure the voltages at the J6P plug on the Printer board.

J6P	Signal	Voltage
Blank	—	—
1	VRM	Do not measure.
2	GND	0 V dc
3	-5	-4.6 to -5.6 V dc
4	GND	0 V dc
5	+5	4.6 to 5.6 V dc
6	+15	13.2 to 15.6 V dc
7	GND	0 V dc
8	+34	27.2 to 46.9 V dc
Blank	—	—

ARE THE VOLTAGES CORRECT?

NO Go to 3-1600-13.


YES 

- 
1. Position the Power switch off.
 2. Connect J5P to the Printer board.
 3. Disconnect J2 from the Function board.
 4. Position the Power switch on.
 5. Measure the voltages at the J6P plug on the Printer board.
-

ARE THE VOLTAGES CORRECT?

NO Replace the System cable.

YES 


- 
1. Position the Power switch off.
 2. Connect J2 to the Function board.
 3. Disconnect J3 from the Function board.
 4. Position the Power switch on.
 5. Measure the voltages at the J6P plug on the Printer board.

J6P	Signal	Voltage
Blank	-	-
1	VRM	Do not measure.
2	GND	0 V dc
3	-5	-4.6 to -5.6 V dc
4	GND	0 V dc
5	+5	4.6 to 5.6 V dc
6	+15	13.2 to 15.6 V dc
7	GND	0 V dc
8	+34	27.2 to 46.9 V dc
Blank	-	-

ARE THE VOLTAGES CORRECT?

YES Replace the Front Panel assembly.

NO 

- 
1. Position the Power switch off.
 2. Connect J3 to the Function board.
 3. Disconnect J1 from the Function board.
 4. Position the Power switch on.
 5. Measure the voltages at the J6P plug on the Printer board.
-

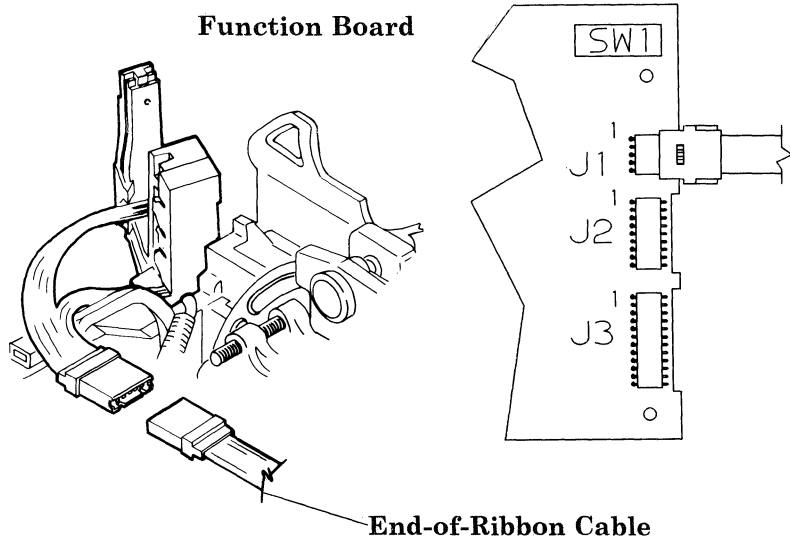
ARE THE VOLTAGES CORRECT?

NO Replace the Function board.

YES 

1. Position the Power switch off.
2. Connect J1 to the Function board.
3. Disconnect the End-of-Ribbon cable from the End-of-Ribbon assembly.
4. Position the Power switch on.
5. Measure the voltages at the J6P plug on the Printer board.


J6P	Signal	Voltage
Blank	—	—
1	VRM	Do not measure.
2	GND	0 V dc
3	-5	-4.6 to -5.6 V dc
4	GND	0 V dc
5	+5	4.6 to 5.6 V dc
6	+15	13.2 to 15.6 V dc
7	GND	0 V dc
8	+34	27.2 to 46.9 V dc
Blank	—	—



ARE THE VOLTAGES CORRECT?

YES Replace the End-of-Ribbon Sensor.

NO Replace the Carrier cable.

- 
1. Position the Power switch off.
 2. Connect J5P to the Printer board.
 3. Disconnect J4P from the Printer board.
 4. Position the Power switch on.
 5. Measure the voltages at the J6P plug on the Printer board.

J6P	Signal	Voltage
Blank	-	-
1	VRM	Do not measure.
2	GND	0 V dc
3	-5	-4.6 to -5.6 V dc
4	GND	0 V dc
5	+5	4.6 to 5.6 V dc
6	+15	13.2 to 15.6 V dc
7	GND	0 V dc
8	+34	27.2 to 46.9 V dc
Blank	-	-

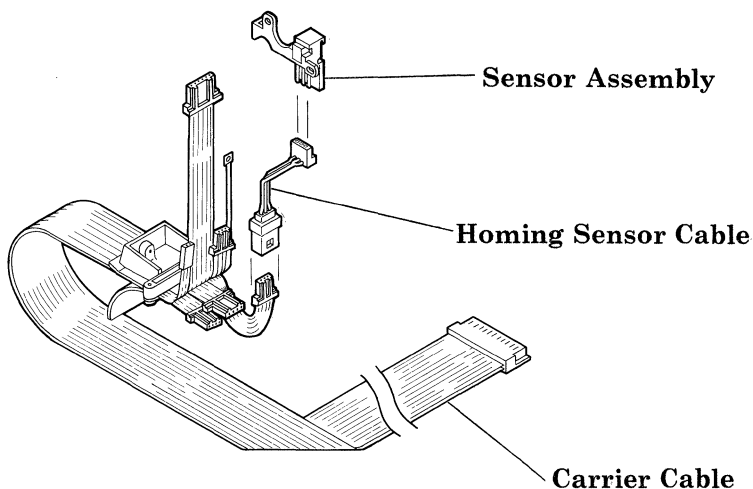
ARE THE VOLTAGES CORRECT?

NO Replace the Printer board.

YES 

1. Position the Power switch off.
2. Connect J4P to the Printer board.
3. Disconnect the Homing Sensor cable from the Carrier cable.
4. Position the Power switch on.
5. Measure the voltages at the J6P plug on the Printer board.

J6P	Signal	Voltage
Blank	—	—
1	VRM	Do not measure.
2	GND	0 V dc
3	-5	-4.6 to -5.6 V dc
4	GND	0 V dc
5	+5	4.6 to 5.6 V dc
6	+15	13.2 to 15.6 V dc
7	GND	0 V dc
8	+34	27.2 to 46.9 V dc
Blank	—	—

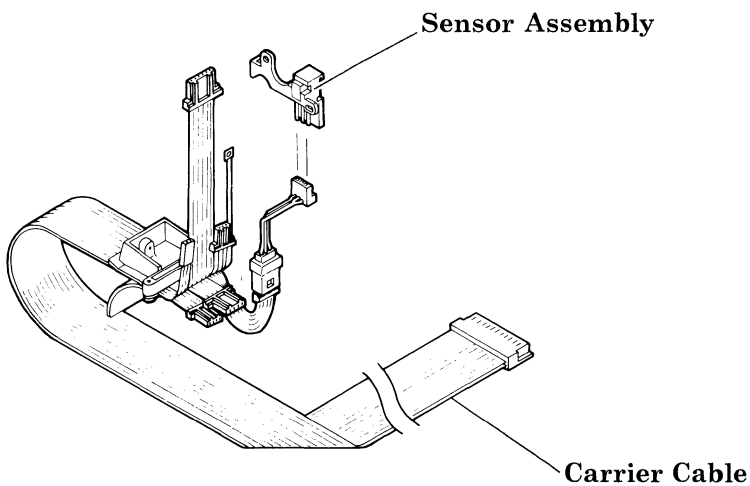


ARE THE VOLTAGES CORRECT?

NO Replace the Carrier cable.

YES

1. Position the Power switch off.
 2. Connect the Homing Sensor cable to the Carrier cable.
 3. Remove the Printwheel.
 4. Remove the Carrier assembly. (See page 4-8.)
 5. Disconnect the Homing Sensor cable from the Homing Sensor assembly.
 6. Position the Power switch on.
 7. Measure the voltages at the J6P plug on the Printer board.
-

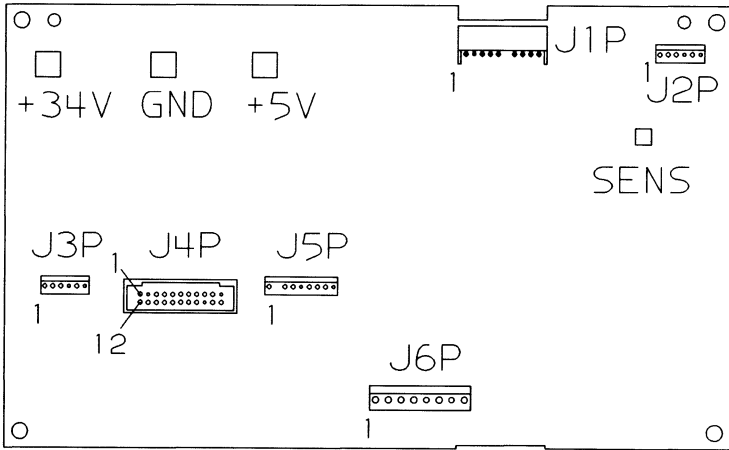


ARE THE VOLTAGES CORRECT?

NO Replace the Homing Sensor cable.

YES Replace the Selection Plate assembly.

1. Position the Power switch off.
 2. Disconnect J5P from the Printer board.
 3. Position the Power switch on.
-

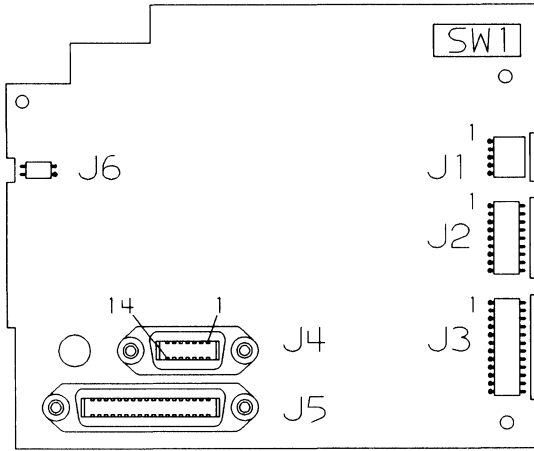


DID THE PRINTWHEEL MOVE?

NO Replace the Printer board.

YES 

1. Position the Power switch off.
 2. Connect J5P to the Printer board.
 3. Disconnect J2 from the Function board.
 4. Position the Power switch on.
-



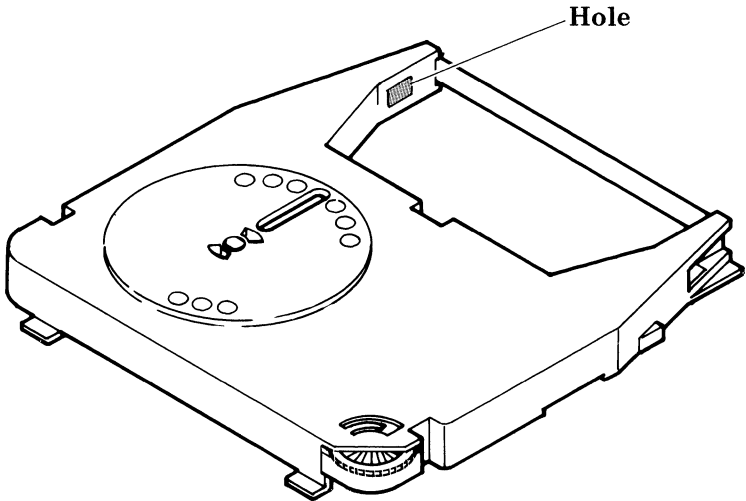
DID THE PRINTWHEEL MOVE?

NO Replace the System cable.

YES Replace the Function board.

End-of-Ribbon PIC

Check the Ribbon Cartridge to be sure it is the correct level. (The correct level cartridge has a hole through the supply side tip.)




End-of-Ribbon

IS THE RIBBON CARTRIDGE THE CORRECT LEVEL?

NO Have the customer purchase the correct level Ribbon Cartridge.

YES





Check the following:

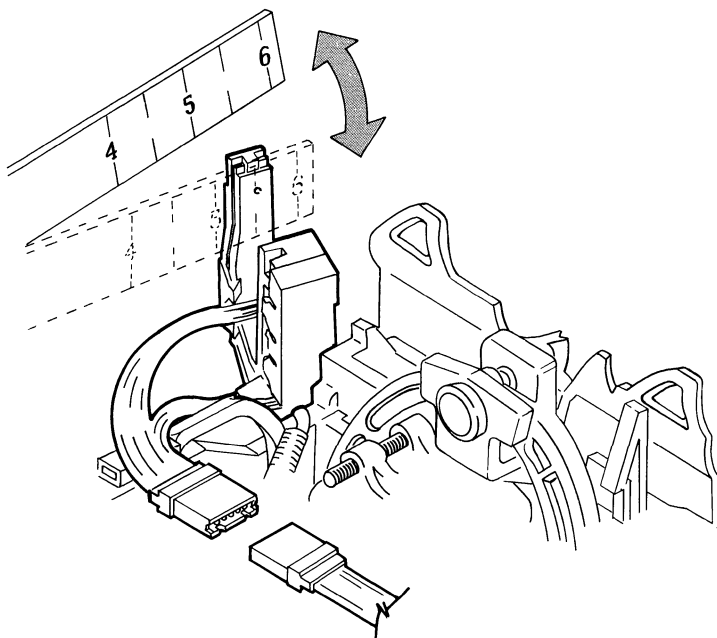
The End-of-Ribbon adjustment.	Adjust as needed. See page 5-2.
Is the End-of-Ribbon Sensor dirty?	Clean as needed.
Is the sensor cracked, broken, or otherwise damaged?	Replace the End-of-Ribbon Sensor.

IS YOUR SYMPTOM LISTED ABOVE?

YES Perform the required action.

NO 

1. Position the Power switch off.
2. Remove the Ribbon Cartridge.
3. Press and *hold* the **Paper Down** button, and position the Power switch on. The Printer Diagnostic Test is now running.
4. Using a six-inch scale, block and unblock the light path in the End-of-Ribbon Sensor.



End-of-Ribbon

DOES THE RIBBON LIGHT GO OFF AND ON AS YOU BLOCK AND UNBLOCK THE SENSOR?

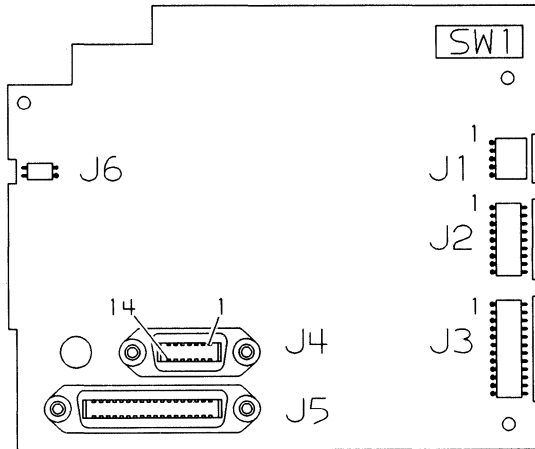
YES Go to the "Functional Check PIC" on page 3-1100-1.

NO



Measure the voltage at J1-2 (RIBB) on the Function board as indicated in the chart below.


Sensor Condition	Meter Reading
Blocked	0-1 V dc
Unblocked	+4.5 to + 5.5 V dc



ARE THE MEASUREMENTS CORRECT?

YES Replace the Function board.

NO 

- 
1. Position the Power switch off.
 2. Disconnect J1 from the Function board.
 3. Position the Power switch on.
 4. Measure the voltage at the Function board as indicated in the chart below.

Meter Connection	Meter Reading
J1-1	+ 4.5 to + 5.5 V dc
J1-4	+ 4.5 to + 5.5 V dc

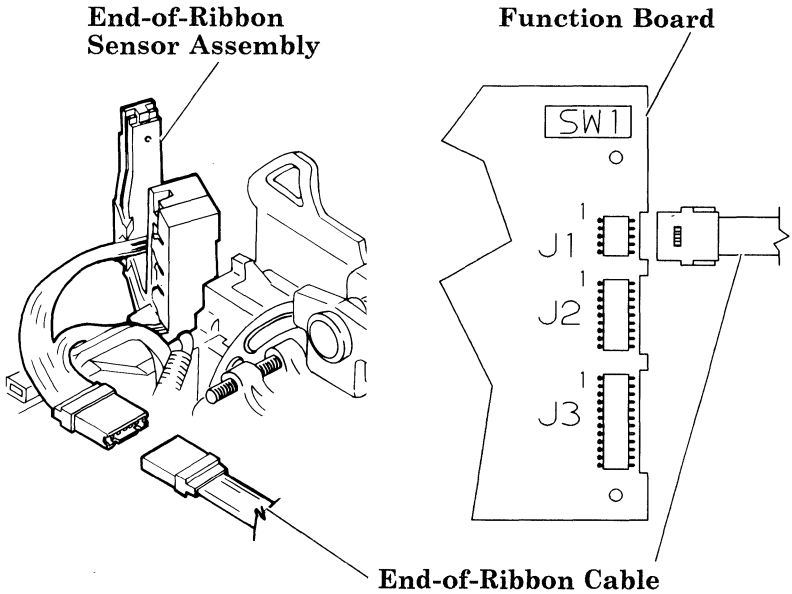
End-of-Ribbon

ARE THE MEASUREMENTS CORRECT?

NO Replace the Function board.

YES 

1. Position the Power switch off.
 2. Disconnect J1 from the Function board.
 3. Disconnect the End-of-Ribbon cable from the End-of-Ribbon Sensor assembly.
 4. Measure all lines of the cable for continuity.
-



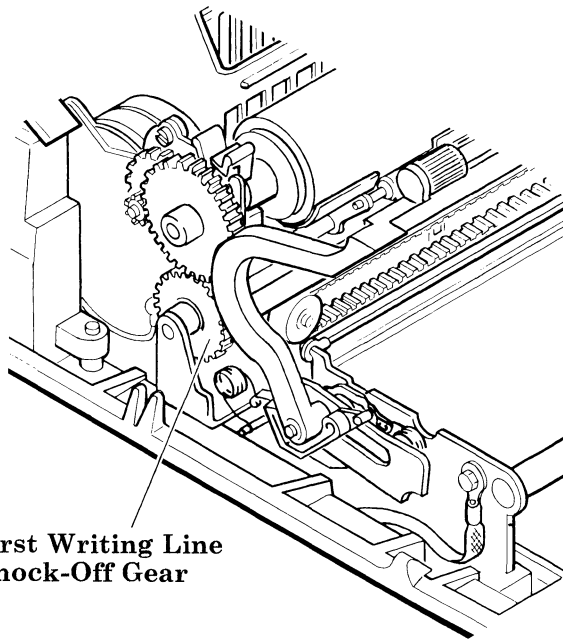
IS THERE CONTINUITY?

NO Install a new Carrier cable.

YES Install a new End-of-Ribbon Sensor assembly.

First Writing Line Knock-Off PIC

1. Position the Power switch off.
2. Press down on both ends of the Platen to make sure the Platen is properly installed.
3. Pull the Paper Bail forward.
4. Turn the Platen top-to-rear by hand.



First Writing Line
Knock-Off Gear

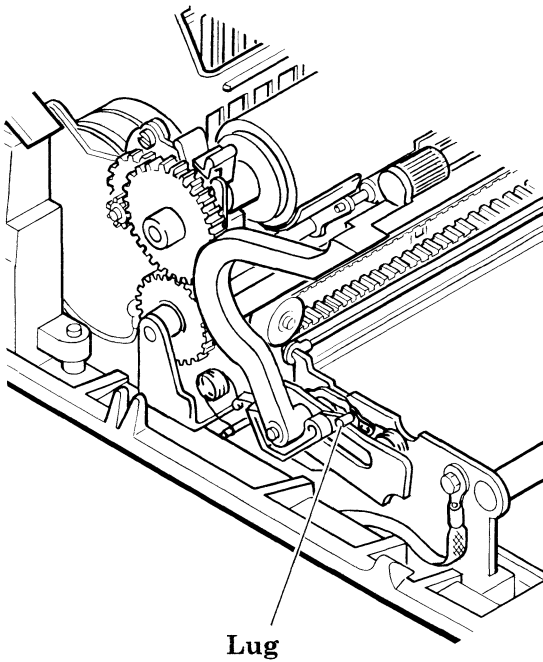
DOES THE FIRST WRITING LINE KNOCK-OFF GEAR TURN?

NO Adjust the gear bracket to cause the gear to engage by loosening the mounting screws and moving the bracket. Then tighten the mounting screws.

YES



Examine the First Writing Line Knock-Off Lug on the Paper Bail Arm.



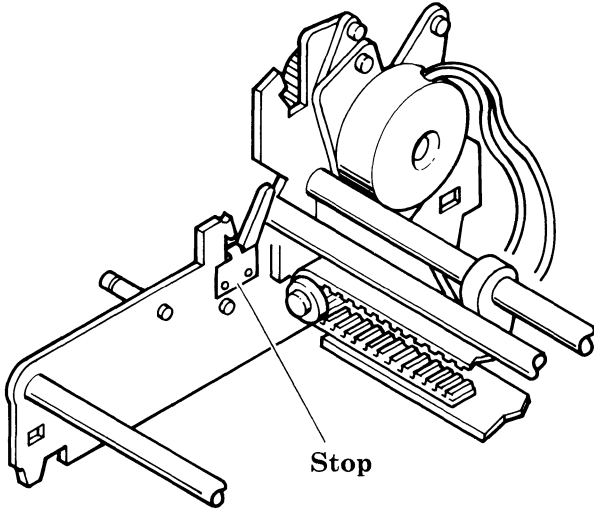
IS THE LUG ON THE LEFT PAPER BAIL ARM WORN?

NO Replace the First Writing Line Knock Off.

YES Replace the Paper Bail Assembly.

Homing Sensor PIC

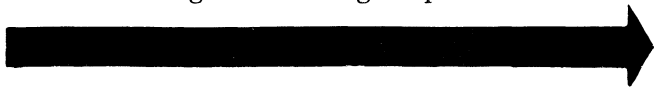
Look at the left side frame for the Homing Sensor flag stop.



IS THE STOP INSTALLED?

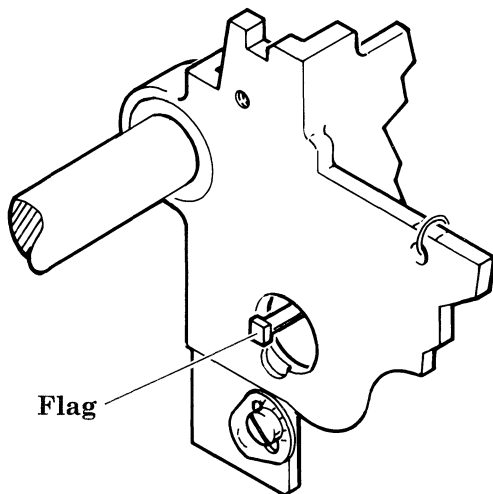
NO Install a Homing Sensor flag stop.

YES



3-1900-1

Look at the homing sensor flag.



IS THE HOMING SENSOR FLAG BROKEN?

YES Install a new Homing Sensor flag.

NO 



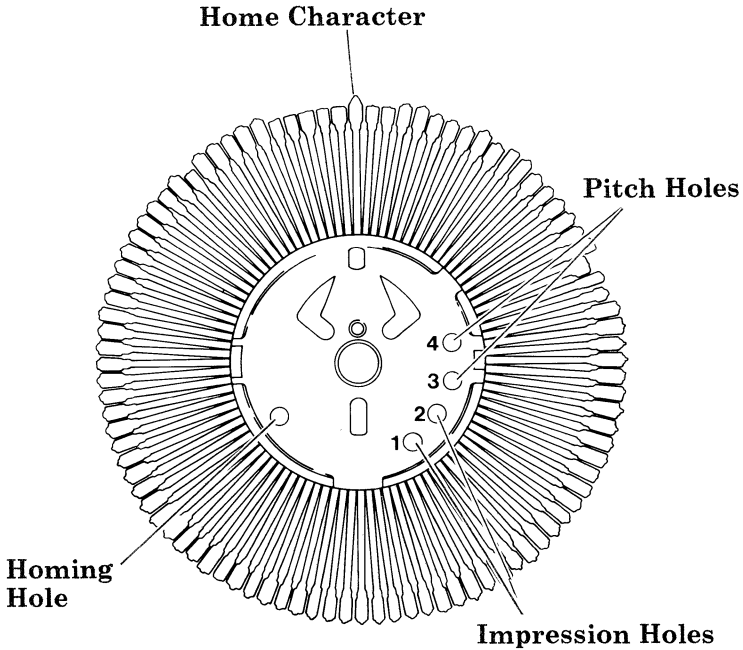
**DO YOU HAVE A KNOWN GOOD PRINTWHEEL
CARTRIDGE TO TRY?**

YES Go to 3-1900-5.

NO 

3-1900-3


1. Position the Power switch off.
2. Remove the Printwheel Cartridge and check the following:
 - The correct holes are open. See page 7-4 for printwheel identification.
 - There are no broken or damaged petals.
 - The printwheel is free of binds. (To check for binds, push the printwheel toward the rear of the cartridge and rotate it.)



IS THE PRINTWHEEL CARTRIDGE GOOD?

NO Have the customer purchase a new Printwheel Cartridge.

YES Go to 3-1900-6.

- 
1. Remove the old Printwheel Cartridge.
 2. Install the new Printwheel Cartridge.
 3. Run the Printer Self Test.
-

IS THE PRINT QUALITY PROBLEM STILL THERE?

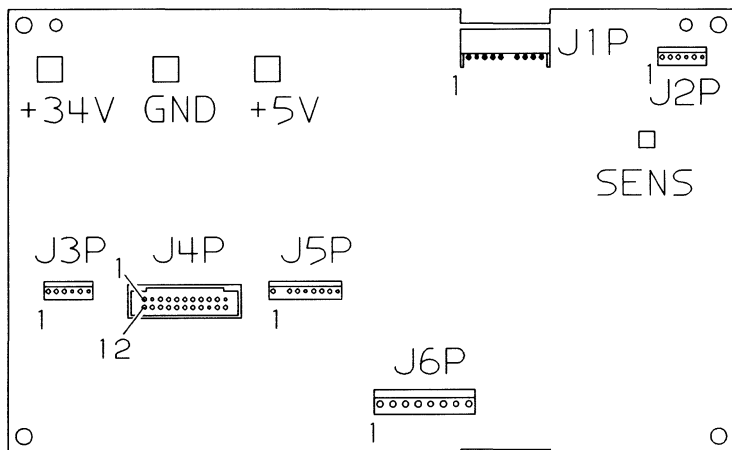
NO Have the customer purchase a new Printwheel Cartridge.

YES 

Important: The Printwheel Cartridge must be removed for correct voltage measurements.

1. Position the Power switch off.
2. Remove the Printwheel Cartridge.
3. Disconnect J2P from the Printer board.
4. Position the Power switch on.
5. Set the meter on the 6 V dc scale.
6. Connect COM meter lead to System Ground point.
7. Measure the voltage at the SENS pad on the Printer board as you *slowly* press in the Homing Sensor flag.

Note: This measurement cannot be taken unless the Printwheel Cartridge is removed.

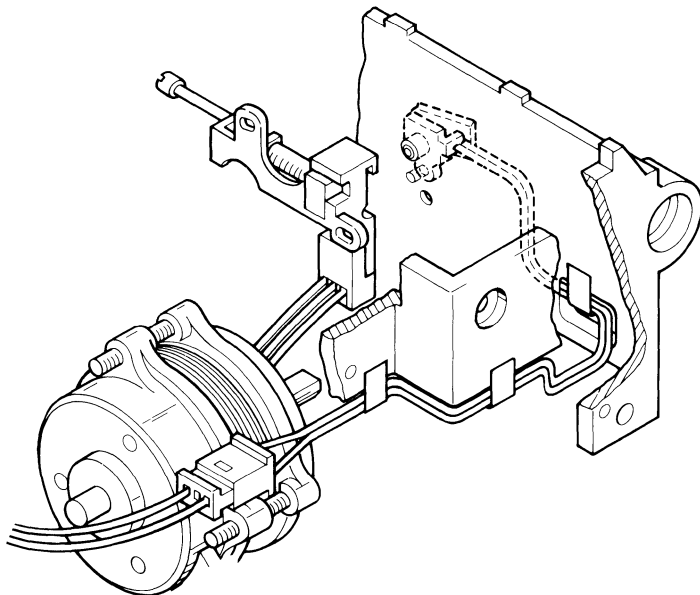


DOES THE VOLTAGE ON THE PAD GO FROM 3-5 to 0-1 V dc WHEN THE FLAG IS SLOWLY PUSHED IN?

YES Go to the "Selection Entry PIC" on page 3-2900-1.

NO 

1. Position the Power switch off.
 2. Remove the Carrier.
 3. Check the Homing Sensor and LED for ribbon particles, obstructions, and paper dust.
-



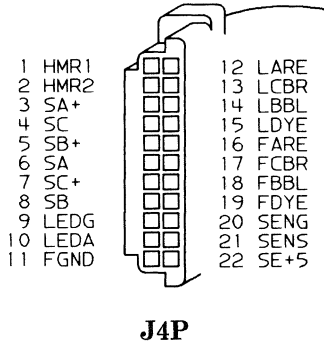
ARE THE HOMING SENSOR AND LED CLEAN?

NO Clean as needed.

YES 

1. Position the Power switch off.
2. Set the meter on the X1K ohms scale.
3. Disconnect J4P from the Printer board.
4. Connect the meter to the J4P plug on the cable as shown in the chart below.

Meter Lead	Plug J4P	Signal	Reading
COM	Pin 9	LEDG	10K to
VOM	Pin 10	LEDA	80 K ohms
COM	Pin 10	LEDA	500K ohms
VOM	Pin 9	LEDG	or more

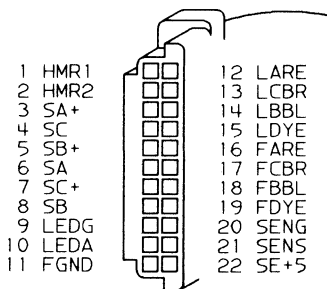
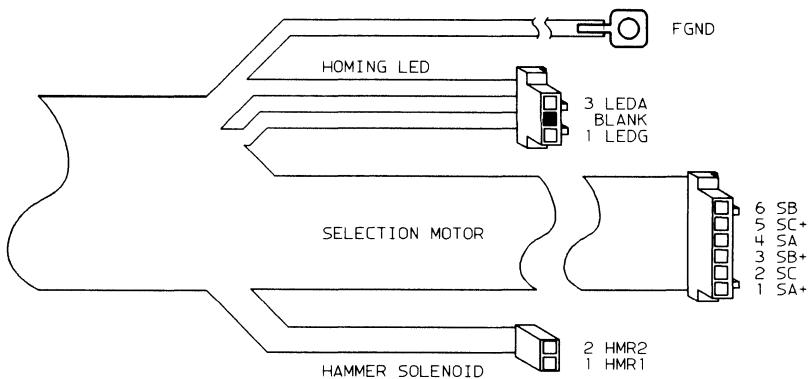


ARE THE MEASUREMENTS CORRECT?

YES Go to 3-1900-10.

NO 

1. Check the Carrier cable for continuity between J4P-9 and pin 1 (LEDG) on the Homing LED connector.
2. Check the Carrier cable for continuity between J4P-10 and pin 3 (LEDA) on the Homing LED connector.



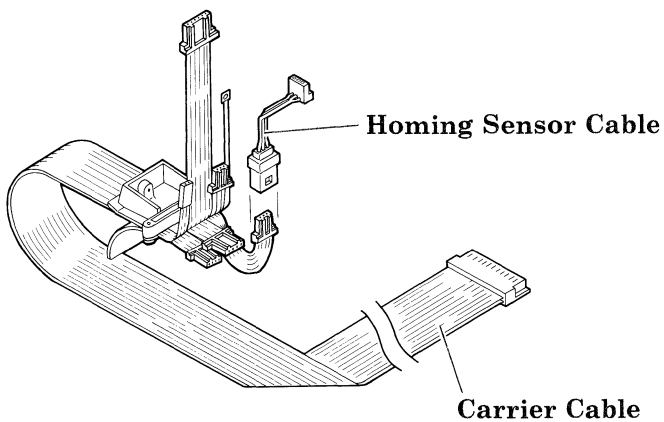
J4P

ARE THE MEASUREMENTS CORRECT?

YES Replace the Homing LED.

NO Replace the Carrier cable.

Check the Homing Sensor cable for continuity. Check all three wires.



IS THERE CONTINUITY IN THE CABLE?

NO Replace the Homing Sensor cable.

YES 

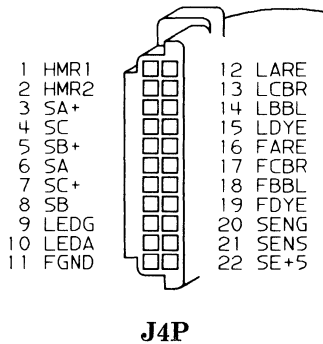
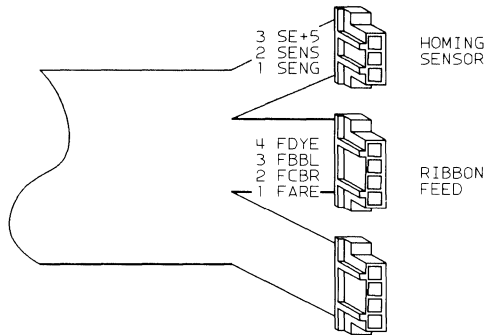
1. Disconnect J4P from the Printer board.
2. Check the Carrier cable for continuity between the pins indicated in the chart below.

Meter Connections

J4P-20 to homing sensor connector pin 1 (SENG)

J4P-21 to homing sensor connector pin 2 (SENS)

J4P-22 to homing sensor connector pin 3 (SE + 5)



IS THERE CONTINUITY?

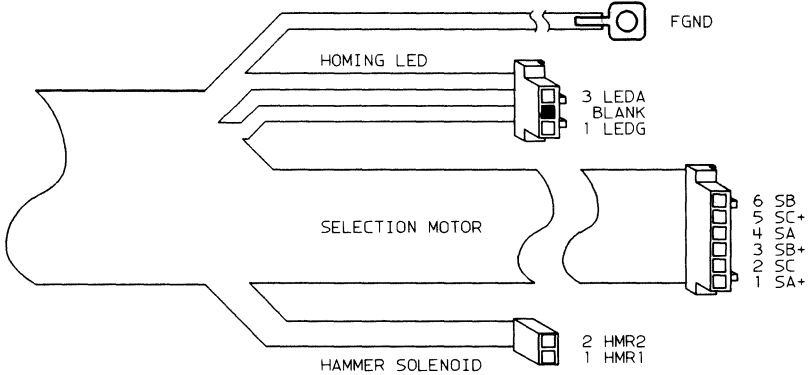
NO Replace the Carrier cable.

YES

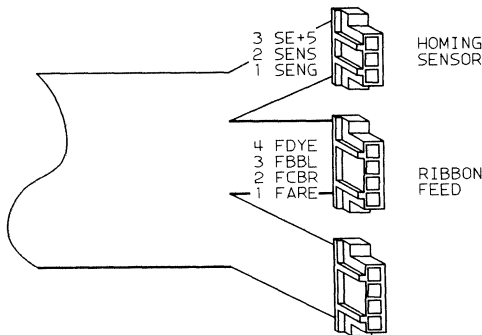


1. Position the Power switch off.
2. Connect J4P to the Printer board.
3. Position the Power switch on.
4. Measure the voltage on the Carrier cable at the Carrier as indicated by the chart below.

Meter	Plug	Signal	Reading
COM	Pin 1	LEDG	+ 4.5 to +5.5
VOM	Pin 2	LEDA	V dc



Meter	Plug	Signal	Reading
COM	Pin 1	SENG	+ 4.5 to +5.5
VOM	Pin 3	SE +5	V dc



ARE THE MEASUREMENTS CORRECT?

YES Replace the Selection Plate assembly.

NO Replace the Printer board.

Light PIC

Entry Conditions: This PIC isolates light failures that can be observed and should only be used after going through the "Printer Entry PIC" on page 3-1000-1.

IS THE FAILING LIGHT ALWAYS ON?

YES Replace the Function board.

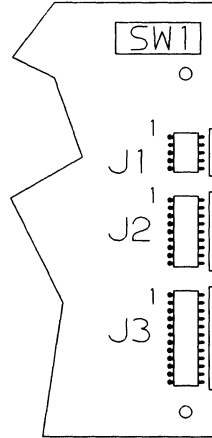
NO 

1. Position the Power switch on.
2. Using a meter lead, connect the pin of the failing light to the System Ground point.

Note: Leave J3 connected to the Function board. Be careful when probing the connector not to probe the wrong pins. The connector locations do not match the actual appearance on the Front Panel.

J3 Connector

Pin	Signal
12	Ground
6	Paper
5	Wheel
4	Ribbon
3	Online
2	Ready



DID THE FAILING LIGHT TURN ON?

YES Replace the Function board.

NO Replace the Front Panel.

Options PIC

Entry conditions: This PIC isolates failures in any optional paper handling feature that is installed. The **Paper** light should turn on only when an optional feature is installed and that optional feature is out of paper.

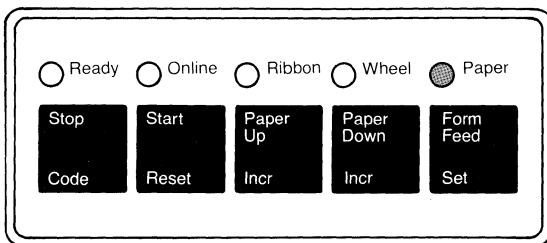
If the **Paper** light turns on without an optional feature installed, refer to the "Light PIC" on page 3-2000-1.

IS THE OPTIONAL PAPER HANDLER AN IBM PRINTER SHEETFEED?

YES Go to the Sheetfeed Entry PIC, in the *Sheetfeed HM&S*, Form Number SY20-8580 (Item 6373116).

NO 

1. Position the Power switch off.
 2. Make sure the paper is properly loaded in the Pinwheel Forms Feeder.
 3. Press and hold the **Paper Down** button and position the Power switch on. The Printer Diagnostic Test is now running.
-

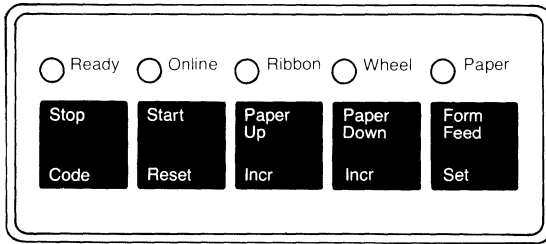


IS THE PAPER LIGHT ON WITH PAPER IN THE PINWHEEL FORMS FEEDER?

YES Go to page 3-2100-6.

NO 

Remove the paper from the Pinwheel Forms Feeder.

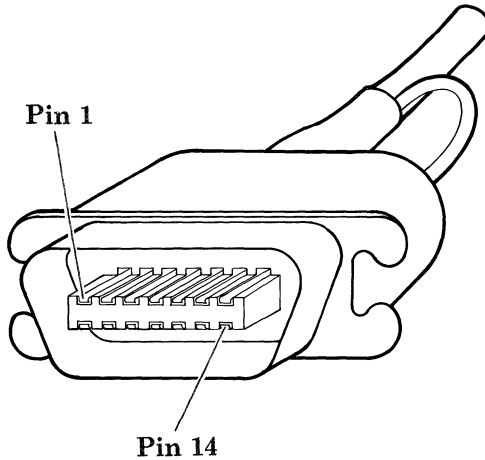


IS THE PAPER LIGHT ON WITH NO PAPER IN THE PINWHEEL FORMS FEEDER?

NO Go to 3-2100-5.

YES 

1. Disconnect the Pinwheel cable.
 2. Check for continuity in the Pinwheel cable between pins 1 (GND) and 3 (ID*).
-

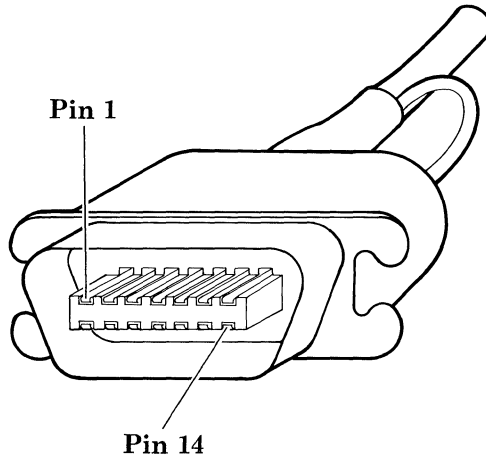


IS THERE CONTINUITY BETWEEN PINS 1 AND 3?

NO Replace the Pinwheel Forms Feeder.

YES The Pinwheel Forms Feeder is working properly. Disconnect the Pinwheel Forms Feeder and go to the "Printer Entry PIC" on page 3-1000-1 to isolate any other failures.

1. Make sure the Paper Sense Bail is all the way down and has no mechanical binds.
2. Disconnect the Pinwheel cable.
3. With no paper in the printer, check the continuity of the End-Of-Paper switch between pins 1 (GND) and 14 (EOFS*) of the Pinwheel Forms Feeder cable.

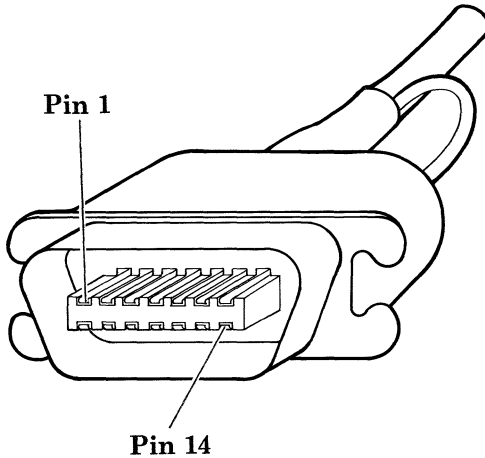


IS THERE CONTINUITY BETWEEN PINS 1 AND 14 WITH NO PAPER IN THE PINWHEEL FORMS FEEDER?

NO Replace the Pinwheel Forms Feeder.

YES Go to the "Light PIC" on page 3-2000-1.

1. Make sure the paper is properly loaded in the Pinwheel Forms Feeder.
 2. Disconnect the Pinwheel cable.
 3. Check for continuity in the Pinwheel cable between pins 1 (GND) and 14 (EOFS*).
-



IS THERE CONTINUITY BETWEEN PINS 1 AND 14 WITH PAPER IN THE PINWHEEL FORMS FEEDER?

NO Replace the Function Board.

YES Replace the Pinwheel Forms Feeder.

Paper Feed, Entry PIC

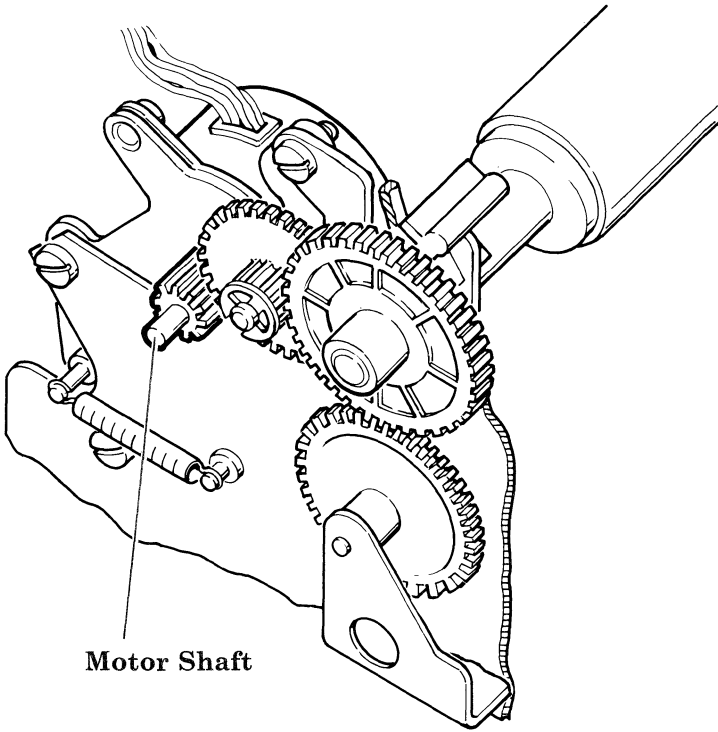
1. Position the Power switch off.
 2. Remove any optional paper handling feature that is installed on the printer.
 3. Observe the Platen while running the Power-On Self Test. The Platen should rotate up and down a small amount.
-

**DID THE PLATEN MOVE AT ALL DURING THE
POWER-ON SELF TEST?**

NO Go to page 3-2200-3.

YES 


Pull the Paper Bail to the load position to activate the SAPI switch.

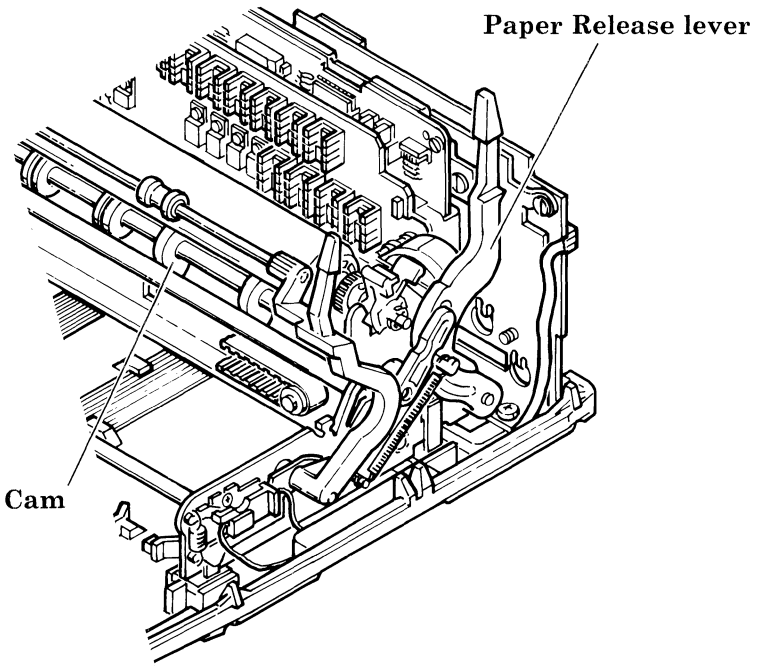


**DOES THE PAPERFEED MOTOR SHAFT
ATTEMPT TO ROTATE?**

NO Go to the "Semi-Automatic Paper Insertion (SAPI) PIC" on page 3-3100-1.

YES 

- 
1. Check the operation of the Paper Release lever.
 2. Inspect the Paper Release lever and cam for wear or damage.
-

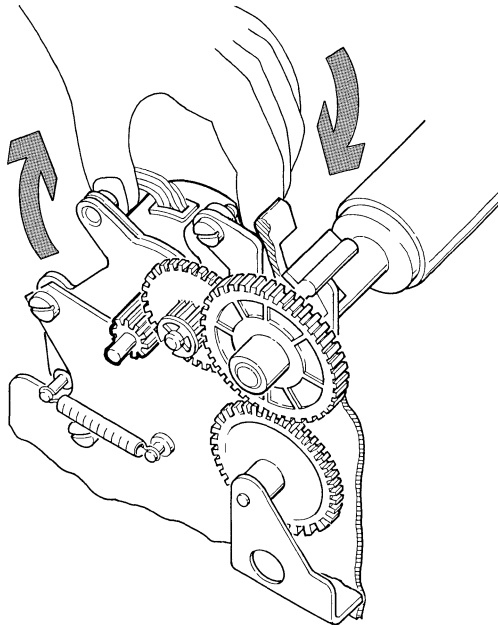


**IS THE PAPER RELEASE LEVER OR CAM
WORN OR DAMAGED?**

YES Replace the Paper Release lever and Cam.

NO 

1. Press down on both ends of the platen. There should be no looseness in the bearings, and the platen should be securely latched in place.
2. Push the Paper Feed Motor to the rear to disengage it from the gear train.
3. Turn the Platen by hand to check for binds.
4. Remove the Platen from the printer.
5. Inspect the plastic latches at both ends for cracks, breaks, or other damage. The latches should rotate freely on the shaft.
6. Inspect the Deflector; clean if necessary.
7. Check the Deflector adjustment.
8. Check the Feedroll assemblies for cracks or binds.
9. Clean the Feedrolls.

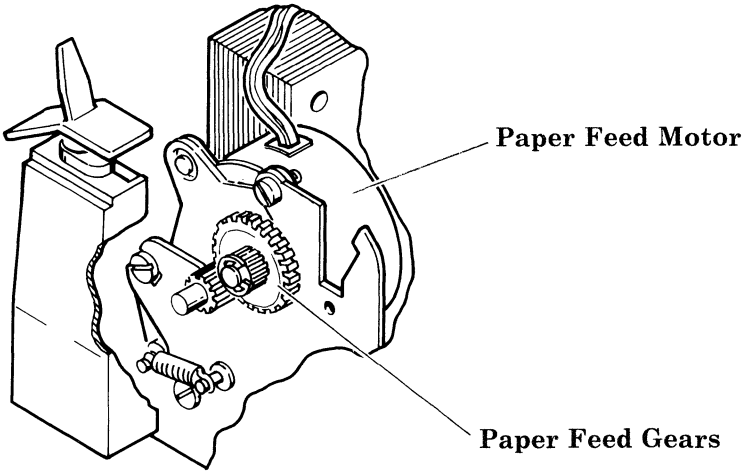


ARE ANY PARTS DAMAGED, BINDING, OR OUT OF ADJUSTMENT?

YES Adjust, lubricate, or install new parts as needed.

NO 

1. Inspect the Paperfeed Gears for wear.
 2. Rotate the Paperfeed Motor by hand.
-

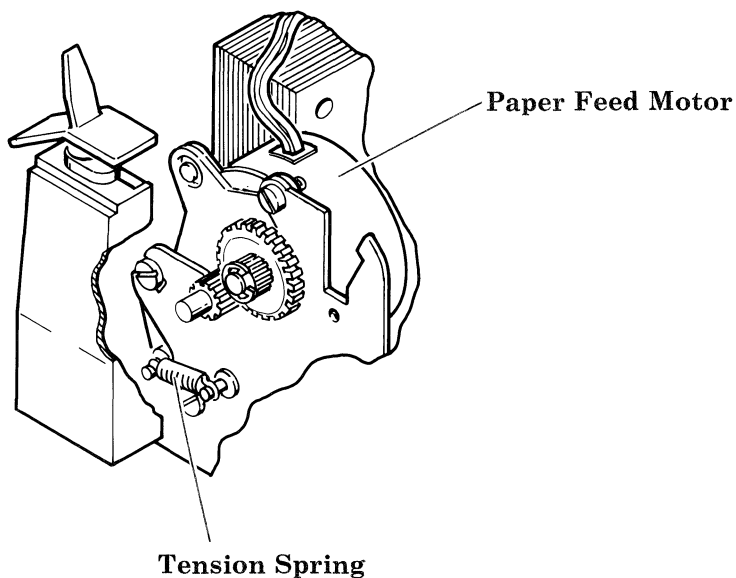


**DOES THE PAPERFEED MOTOR ROTATE
FREELY?**

NO Replace the Paperfeed Motor.

YES 


Make sure the Paper Feed Motor tension spring is attached correctly and is not damaged.



IS THE PAPERFEED MOTOR TENSION SPRING PROPERLY INSTALLED AND IN GOOD CONDITION?

NO Replace the Paperfeed Motor tension spring.


YES 

- 
1. Position the Power switch on.
 2. Pull the Paper Bail to the load position.
-

**DOES THE PAPERFEED MOTOR SHAFT
ROTATE WITHOUT MAKING ANY NOISE?**

NO Go to the "Paper Feed Electrical PIC" on
page 3-2300-1.

YES 



The printer paper feed is now operational.

**IS THE OPTIONAL PAPER HANDLING DEVICE
AN IBM SHEETFEED?**

YES Go to the Sheetfeed Entry PIC, in the
Sheetfeed HM&S, Form Number SY20-8580
(Item 6373116).

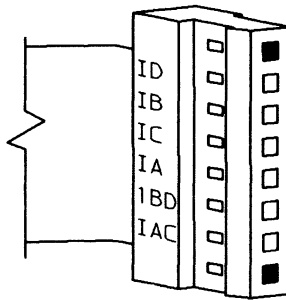
Note: A defective Function Board may cause an apparent sheetfeed failure. If you have completed the Sheetfeed Option PICs, and the Sheetfeed is still inoperative, replace the Function board.

NO Replace the Pinwheel Forms Feeder.

Paper Feed Electrical PIC

1. Position the Power switch off.
2. Disconnect J3P from the Printer board.
3. Set the meter on the X1 resistance scale.
4. Carefully zero the meter.
5. Make the following resistance checks at the J3P plug on the cable:

Meter Connections	Reading
J3P-1 (ID) to J3P-5 (IBD)	5 to 10 ohms
J3P-2 (IB) to J3P-5 (IBD)	5 to 10 ohms
J3P-3 (IC) to J3P-6 (IAC)	5 to 10 ohms
J3P-4 (IA) to J3P-6 (IAC)	5 to 10 ohms

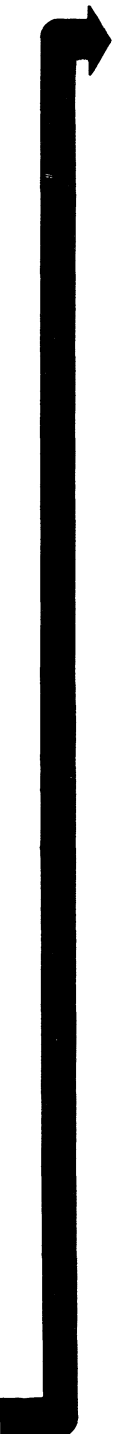


J3P

WERE ALL THE MEASUREMENTS CORRECT?

NO Replace the Paperfeed Motor.

YES 



Make the following resistance checks:

Meter Connections	Reading
J3P-1 (ID) to motor housing	Infinity
J3P-2 (IB) to motor housing	Infinity
J3P-3 (IC) to motor housing	Infinity
J3P-4 (IA) to motor housing	Infinity

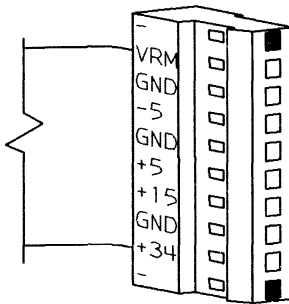
WERE ALL THE MEASUREMENTS CORRECT?

NO Replace the Paperfeed Motor and the Printer board.

YES 

1. Position the Power switch off.
2. Disconnect J6P from the Printer board.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the cable as indicated in the chart below.

J6P	Signal	Voltage
2	GND	—
3	-5	-4.6 to -5.6 V dc
7	GND	—
8	+34	+34 to +46 V dc



J6P

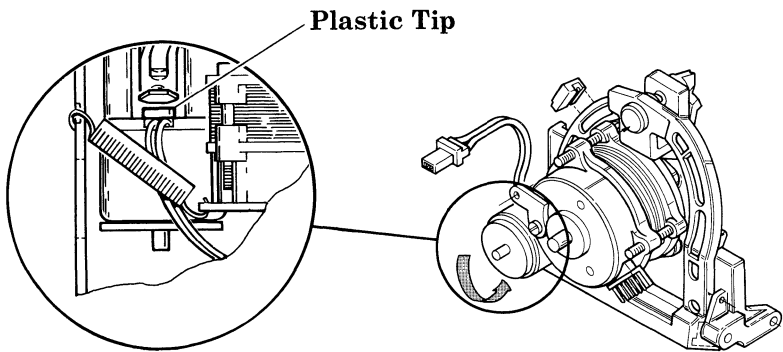
ARE THE VOLTAGES CORRECT?

YES Replace the Printer board.

NO Replace the Power Supply board.

Print Hammer Entry PIC

1. Position the Power switch off.
2. Move the Print Hammer toward the platen and back to rest. It should move freely with no binds.
3. Examine the solenoid plunger:
 - a. While holding the hammer back against its backstop, spin the solenoid plunger counterclockwise 8 turns. This should not loosen the mounting stud.
 - b. Observe the solenoid while you move the hammer toward the platen and back to rest. The solenoid should move in and out, following the hammer action.
4. Examine the plastic tip on the end of the solenoid plunger:
 - a. Hold the Selection Plate away from the platen.
 - b. Push the hammer toward the platen.
 - c. Rotate the plunger and examine the plastic tip. It should not be cracked, broken, or missing.



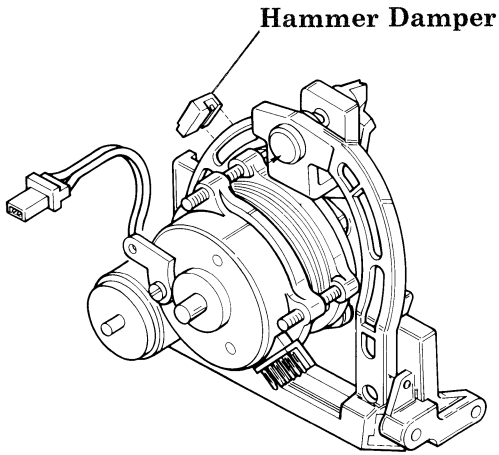
Print Hammer

DID YOU FIND A PROBLEM?

YES Replace the Selection Plate assembly.

NO 

Examine the Hammer Damper. It should not be torn, damaged, or missing.



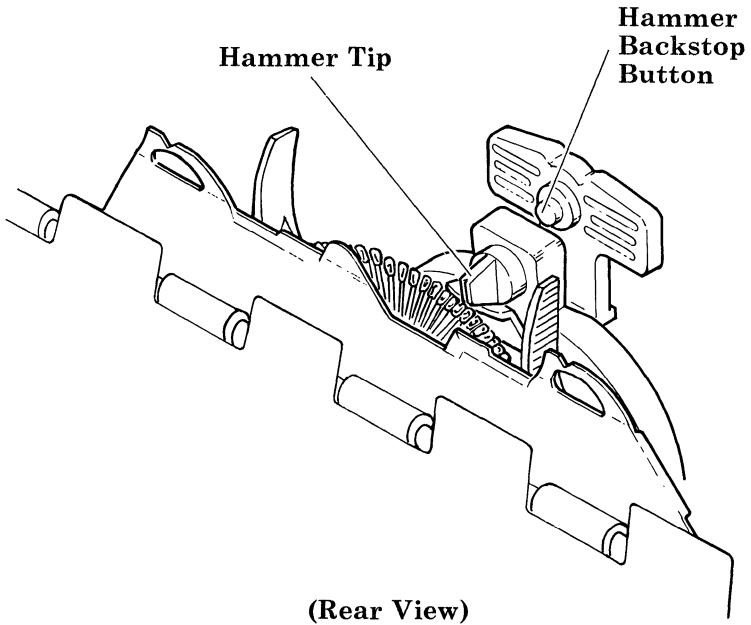
IS THE HAMMER DAMPER DEFECTIVE?

YES Replace the Hammer Damper.

NO 

Examine the Print Hammer:

1. Make sure that the hammer tip is not loose, bent, or damaged.
2. Make sure that the hammer is spring-loaded against the hammer backstop button.
3. Make sure that the hammer backstop button is not nicked, worn, loose, or damaged.



DID YOU FIND A PROBLEM WITH THE PRINT HAMMER?

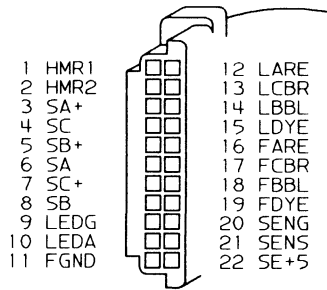
YES Replace the Selection Plate assembly.

NO Go to the "Print Hammer Electrical PIC" on page 3-2500-1.

Print Hammer Electrical PIC

1. Position the Power switch off.
2. Disconnect J4P from the Printer board.
3. Set the meter on the X1 scale.
4. Carefully zero the meter.
5. Measure the resistance of the Print Hammer as indicated in the chart.

Meter Connections	Reading
J4P-1 (HMR1) to solenoid housing	Infinity



J4P

IS THE MEASUREMENT CORRECT?

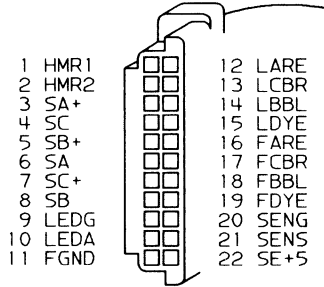
NO Replace the Printer board and the Selection Plate assembly.

YES



Measure the resistance of the Print Hammer as indicated in the chart.

Meter Connections	Reading
J4P-1 (HMR1) to J4P-2 (HMR2)	2 to 4 ohms



J4P

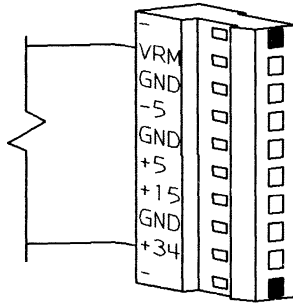
IS THE MEASUREMENT CORRECT?

NO Go to 3-2500-4.

YES 

1. Position the Power switch off.
2. Disconnect J6P from the Printer board.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the cable as indicated in the chart below.

J6P	Signal	Voltage
2	GND	—
3	-5	-4.6 to -5.6 V dc
7	GND	—
8	+34	+34 to +46 V dc



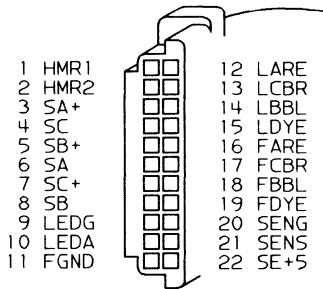
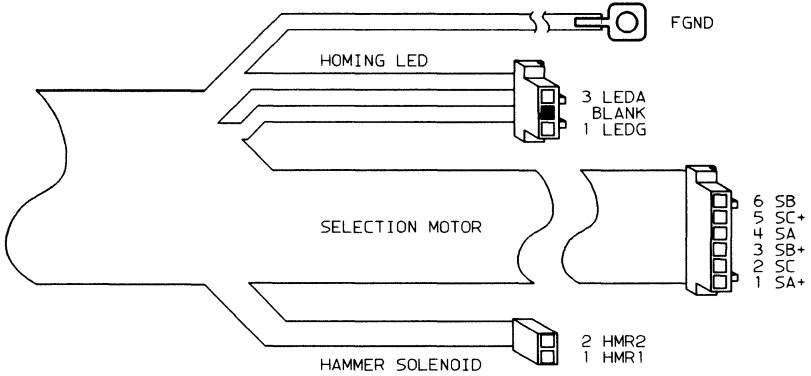
J6P

ARE THE VOLTAGES CORRECT?

YES Replace the Printer board.

NO Replace the Power Supply board.

1. Disconnect the Carrier cable from the Print Hammer Solenoid.
2. Check for continuity in lines J4P-1 (HMR1) and J4P-2 (HMR2) in the Carrier cable.



J4P

IS THERE CONTINUITY IN THE CABLE?

YES Replace the Selection Plate assembly.

NO Replace the Carrier cable.


Print Quality PIC

Make sure the Platen is locked in place by pressing firmly on both ends of the Platen.

IS THE LINE SPACING ERRATIC OR INCORRECT?

YES Go to the "Paper Feed Entry PIC" on page 3-2200-1.

NO 

- 
1. Position the Power switch off.
 2. Inspect the Platen for contamination; clean as necessary.
 3. Inspect the Platen for wear; replace if necessary.
 4. Check the Cardholder adjustment to ensure it does not interfere with the printwheel or ribbon. See page 5-1.
 5. Check the Ribbon Plate adjustment. See page 5-4.
 6. Position the Power switch on.
 7. Insert a piece of paper in the printer lengthwise, left edge aligned with the zero mark on the Paper Table.
 8. Run the Printer Self Test. See page 2-6.
 - a. Position the Power switch off.
 - b. Press and hold the **Stop** button and position the Power switch on. The printer prints the following:

```
0000000000 01279855
anrmcsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K
nrmcsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3
rmcsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X
mcsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X1
csdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X12
sdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X120
dhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X1205
hlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X12054
lfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X120546
fk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X1205468
k,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X12054687
```

Note: The actual characters printed are determined by the typestyle of the printwheel installed in the printer.

9. To stop the test, position the Power switch off.

IS THE PRINT QUALITY PROBLEM CORRECTED?

YES Go to the "Functional Check PIC" on page 3-1100-1.

NO 



**DO YOU HAVE A KNOWN GOOD PRINTWHEEL
CARTRIDGE TO TRY?**

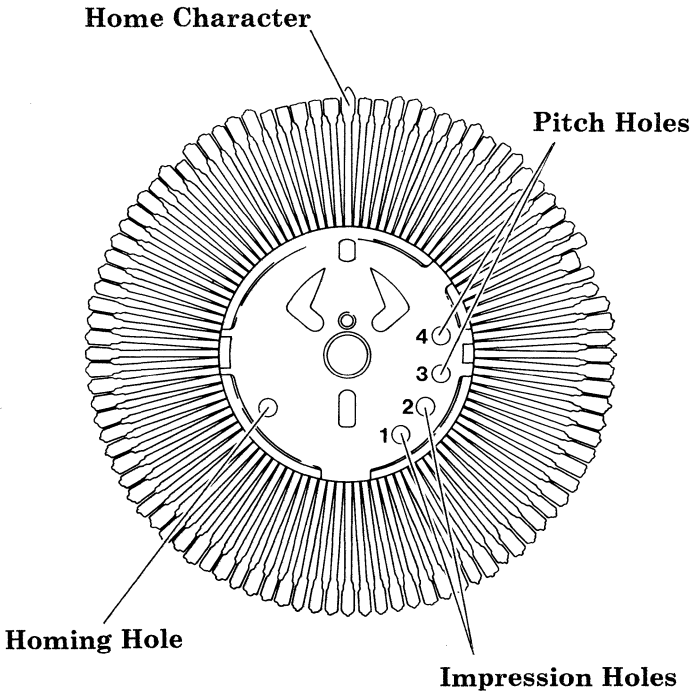
YES Go to 3-2600-5.

NO 

3-2600-3

Print Quality


1. Position the Power switch off.
 2. Remove the Printwheel Cartridge and check the following:
 - The correct holes are open. See page 7-4 for printwheel identification.
 - There are no broken or damaged petals.
 - The printwheel is free of binds. (To check for binds, push the printwheel toward the rear of the cartridge and rotate it.)
-



IS THE PRINTWHEEL CARTRIDGE GOOD?

NO Have the customer purchase a new Printwheel Cartridge.


YES Go to 3-2600-6

- 
1. Position the Power switch off.
 2. Remove the old Printwheel Cartridge.
 3. Install the known good Printwheel Cartridge.
 4. Run the Printer Self Test.
-

IS THE PRINT QUALITY PROBLEM STILL THERE?

NO Have the customer purchase a new Printwheel Cartridge.

YES 




Compare the symptom to the following chart:

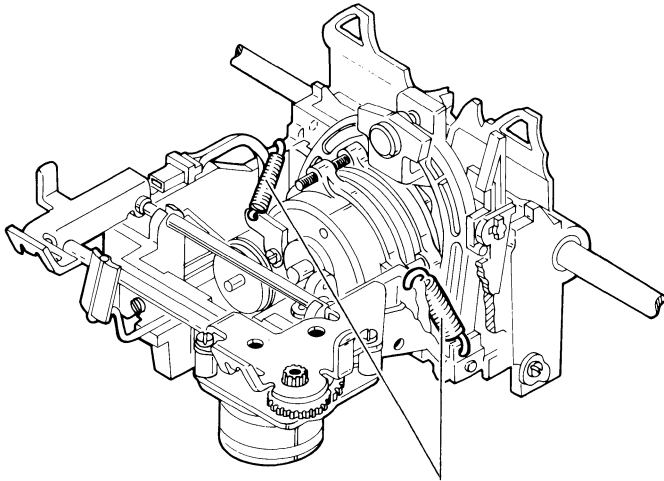
Symptom	Action
Wrong characters, divided characters, or hammer marks	Go to the "Selection Entry PIC" on page 3-2900-1.
No print: impression <i>is</i> on the paper.	Go to the "Ribbon Entry PIC" on page 3-2700-1.
No print: impression <i>is not</i> on the paper.	Go to the "Print Hammer Entry PIC" on page 3-2400-1.

DID YOU GET ONE OF THESE SYMPTOMS?

YES Perform the required action.

NO 

- 
1. Position the Power switch off.
 2. Check the Selection Plate return springs.
-




**Selection Plate
Return Springs**

**ARE THE SPRINGS BENT, STRETCHED, OR
MISSING?**

YES Install new Selection Plate return springs.

NO 

- 
1. Position the Power switch on.
 2. Insert a piece of paper in the printer lengthwise, left edge aligned with the zero mark on the Paper Table.
 3. Run the Printer Self Test. See page 2-6.
 - a. Position the Power switch off.
 - b. Press and hold the **Stop** button and position the Power switch on. The printer prints the following:

0000000000 01279855
anrmcsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K
nrmsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3
rmcsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X
mcsdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X1
csdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X12
sdhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X120
dhlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X1205
hlfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X12054
lfk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X120546
fk,V-GUFBZHP) RLSNCTDEIAJO (M.Y,/W9K3X1205468


Note: The actual characters printed are determined by the typestyle of the printwheel installed in the printer.

4. To stop the test, position the Power switch off.
-

**ARE THE CHARACTERS CROWDED OR
OVERLAPPING?**

YES Go to the "Transport Entry PIC" on
 page 3-3300-1.

NO 

- 
1. Position the Power switch off.
 2. Check the Even Top and Bottom printing adjustment. See page 5-3.
 3. Run the Printer Self Test.
-

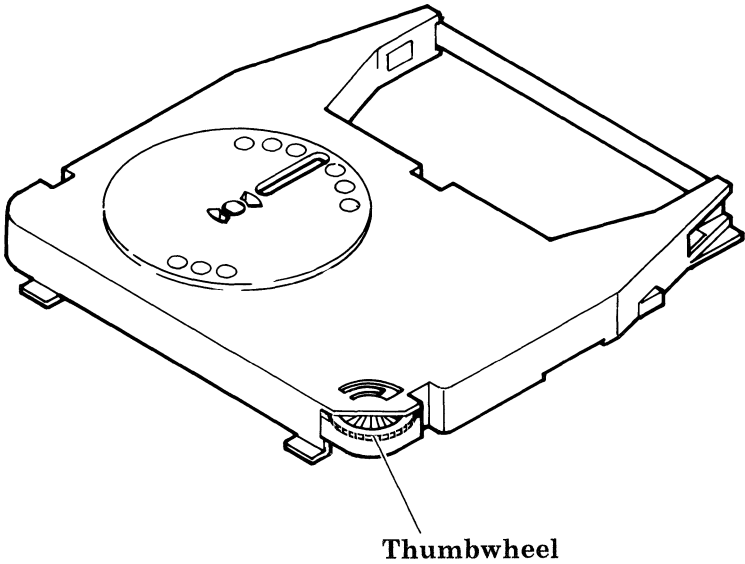
**IS THE PRINT QUALITY PROBLEM
CORRECTED?**

YES Go to the "Functional Check PIC" on
page 3-1100-1.

NO 

Run the Printer Self Test and observe the Ribbon Cartridge thumbwheel.


Note: The thumbwheel motion can more easily be observed if the top of the thumbwheel is marked with a pen.



DID THE THUMBWHEEL ROTATE SMOOTHLY?

NO Go to the "Ribbon Entry PIC" on page 3-2700-1.

YES 



Run the Printer Self Test.

**ARE THE CHARACTERS LIGHT, OR DO THEY
HAVE VOIDS?**

YES Go to the “Print Hammer Entry PIC” on
page 3-2400-1.

NO Go to the “Functional Check PIC” on
page 3-1100-1.


Ribbon Entry PIC

1. Remove and inspect the Ribbon Cartridge.
 2. Advance the ribbon by hand. The ribbon should advance easily.
 3. Inspect the ribbon.
 - There should be no wrinkles, scratches, voids, or folds in the ribbon as it feeds from the supply side of the cartridge.
 - Except for the voids and dents caused by the printing process, the ribbon should be free of wrinkles and folds as it passes from the impact area into the take-up side of the ribbon.
-

DID YOU FIND A PROBLEM?

YES Have the customer purchase a new ribbon cartridge.

NO 



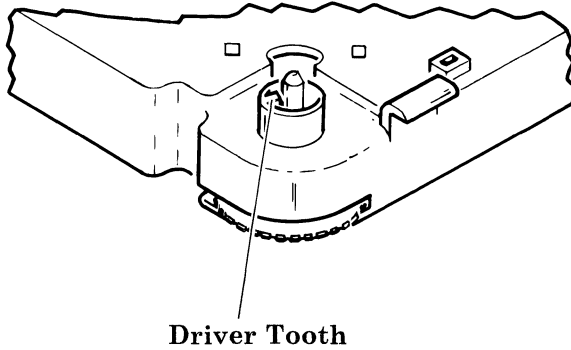
Check the Ribbon Plate adjustment. See page 5-4.

IS THE RIBBON PLATE IN ADJUSTMENT?

NO Adjust the Ribbon Plate.

YES 


Inspect the driver tooth in the bottom of the thumbwheel on the ribbon cartridge.



IS THE DRIVER TOOTH DAMAGED?

YES Have the customer purchase a new ribbon cartridge.

NO 



Inspect the ribbon cartridge latch.

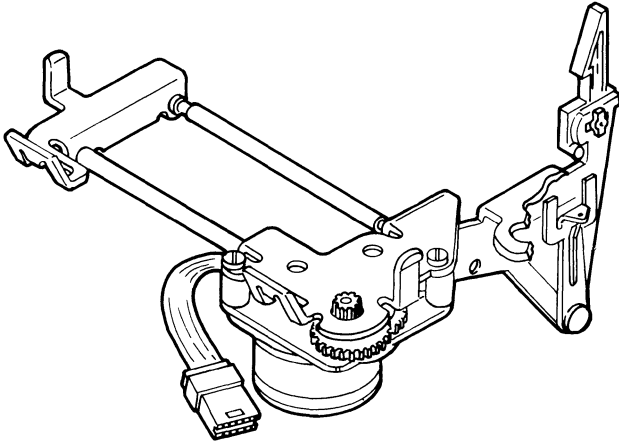
IS THE LATCH LOOSE, BROKEN, OR WORN?

YES Replace the latch.

NO 

Check the ribbon drive train:

- There should be no binds in the gears, no loose or broken gears.
- The motor should not be loose.
- The backcheck mechanism should not be worn, loose, or broken.



ARE ANY PARTS WORN, BROKEN, LOOSE, OR BINDING?

YES Replace the Ribbon Plate.

NO Go to the “Ribbon Electrical PIC” on page 3-2800-1.

Ribbon Electrical PIC

1. Position the Power switch on.
 2. Insert a piece of paper into the printer lengthwise in the printer, left edge aligned with the zero mark on the Paper Table.
 3. Position the Power switch off.
 4. Press and hold the **Stop** button and position the Power switch on. The Printer Self Test runs.
 5. Position the Power switch off.
-

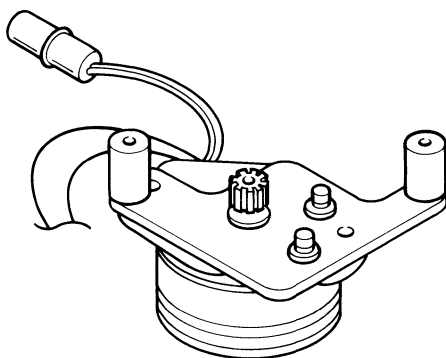
DID THE RIBBON FEED CORRECTLY?

YES Go to the "Functional Check PIC" on page 3-1100-1.

NO 

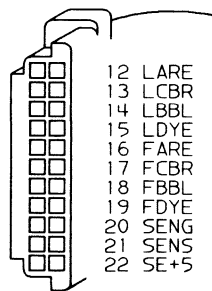
1. Position the Power switch off.
2. Disconnect J4P from the Printer board.
3. Set the meter on the X1 scale.
4. Carefully zero the meter.
5. Measure the resistance of the ribbon feed motor between the points indicated in the chart.

Meter Connections	Reading
J4P-16 (FARE) to motor housing	Infinity
J4P-17 (FCBR) to motor housing	Infinity
J4P-18 (FBBL) to motor housing	Infinity
J4P-19 (FDYE) to motor housing	Infinity



Ribbon Feed Motor

- 1 HMR1
- 2 HMR2
- 3 SA+
- 4 SC
- 5 SB+
- 6 SA
- 7 SC+
- 8 SB
- 9 LEDG
- 10 LEDA
- 11 FGND



J4P

ARE THE MEASUREMENTS CORRECT?

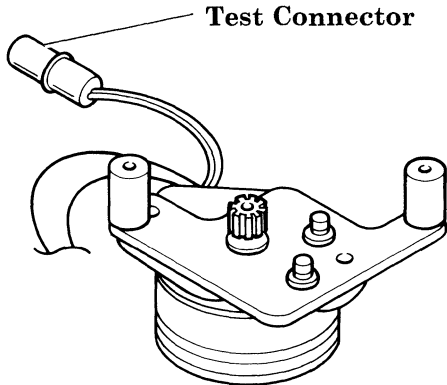
NO Replace the Printer board and the Ribbon Plate assembly.

YES



Measure the resistance of the Ribbon Feed Motor between the points indicated in the chart.

Meter Connections	Reading
J4P-16 (FARE) to test connector	16 to 18 ohms
J4P-17 (FCBR) to test connector	16 to 18 ohms
J4P-18 (FBBL) to test connector	16 to 18 ohms
J4P-19 (FDYE) to test connector	16 to 18 ohms



Ribbon Feed Motor

ARE THE MEASUREMENTS CORRECT?

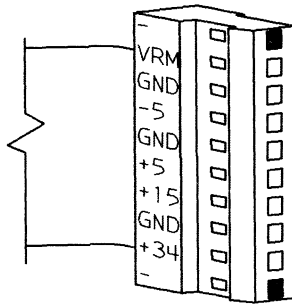
NO Go to 3-2800-5.

YES



1. Position the Power switch off.
2. Disconnect J6P from the Printer board.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the cable as indicated in the chart below.

J6P	Signal	Voltage
2	GND	—
3	-5	-4.6 to -5.6 V dc
7	GND	—
8	+34	+34 to +46 V dc



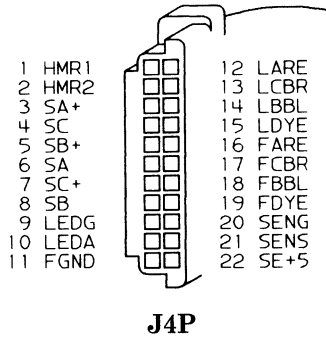
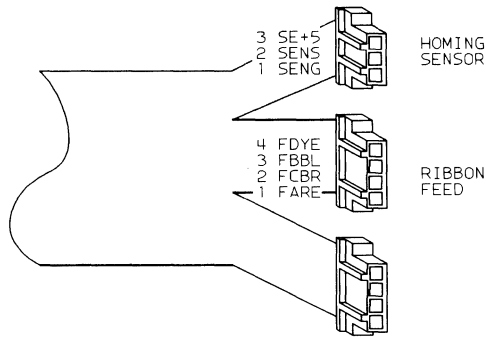
J6P

ARE THE VOLTAGES CORRECT?

YES Replace the Printer board.

NO Replace the Power Supply board.

1. Disconnect the Ribbon Feed Motor from the Carrier cable.
2. Check the continuity of the ribbon feed lines in the Carrier cable.



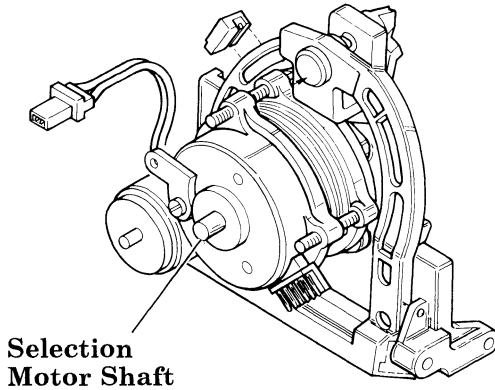
IS THERE CONTINUITY IN THE CABLE?

NO Replace the Carrier Cable.

YES Replace the Ribbon Plate assembly.

Selection Entry PIC

1. Position the Power switch off.
 2. With the printwheel in place, spin the Selection Motor shaft.
-




**Selection
Motor Shaft**

**DOES THE SELECTION MOTOR SPIN FREELY
AND QUIETLY?**

YES Go to 3-2900-3.

NO




- 
1. Remove the Printwheel Cartridge from the printer.
 2. Spin the Selection Motor shaft.
-

**DOES THE SELECTION MOTOR SPIN FREELY
AND QUIETLY?**

YES Have the customer purchase a new Printwheel Cartridge.

NO 



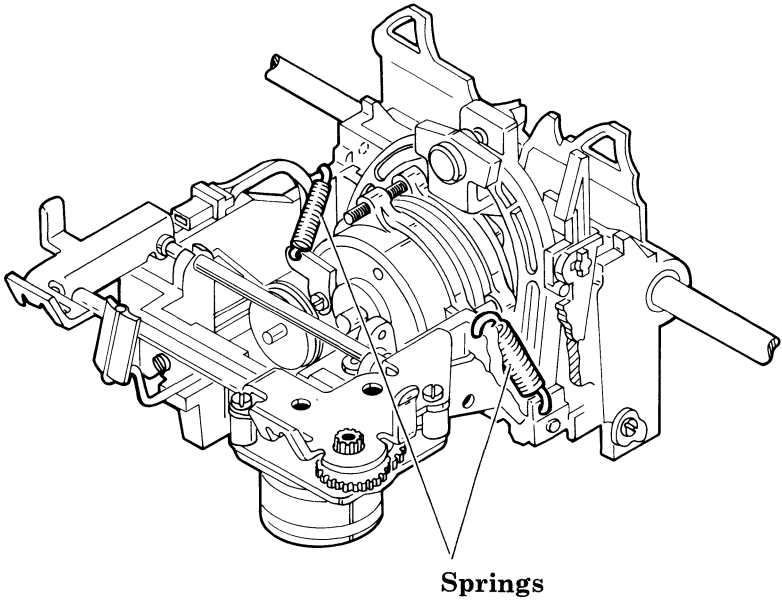
Check to see if the motor is securely mounted.

IS THE MOTOR LOOSE?

YES Tighten the loose parts.

NO 


Check the Selection Plate return springs.



ARE THE SPRINGS BENT, STRETCHED, OR MISSING?

YES Install new Selection Plate return springs.

NO 

- 
1. Pivot the Selection Plate front and rear. It should move freely and be spring-loaded to the left.
 2. Examine the hub. It should not be loose, broken, or bent.
-

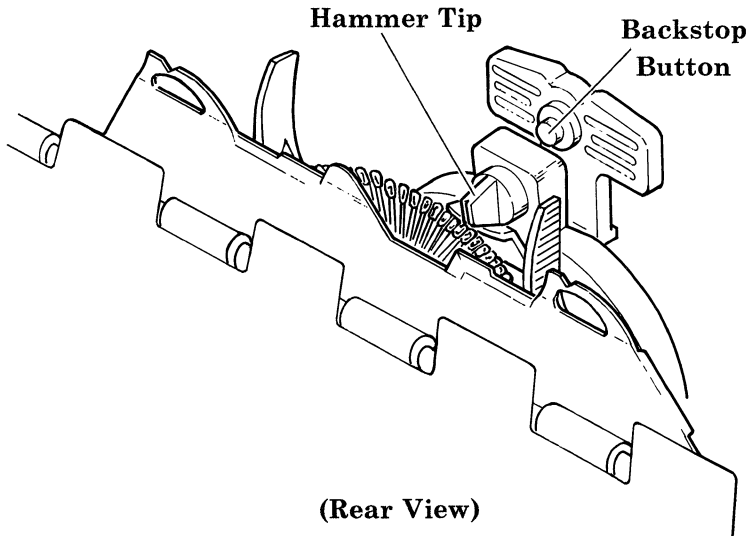
DID YOU FIND A PROBLEM?

YES Replace the Selection Plate assembly.

NO 

Check the Print Hammer:

1. Examine the hammer tip. It should not be loose, bent, or damaged.
2. Check to see that the hammer is spring-loaded against the backstop button.
3. Check to see that the hammer backstop button is not nicked, worn, loose, or damaged.



DID YOU FIND A PROBLEM WITH THE PRINT HAMMER?

YES Replace the Selection Plate assembly.

NO Go to the "Selection Electrical PIC" on page 3-3000-1.

Selection Electrical PIC

1. Position the Power switch off.
 2. Position the Power switch on.
-

Selection

DID THE PRINTER COMPLETE A POR?

YES Go to 3-3000-10.

NO





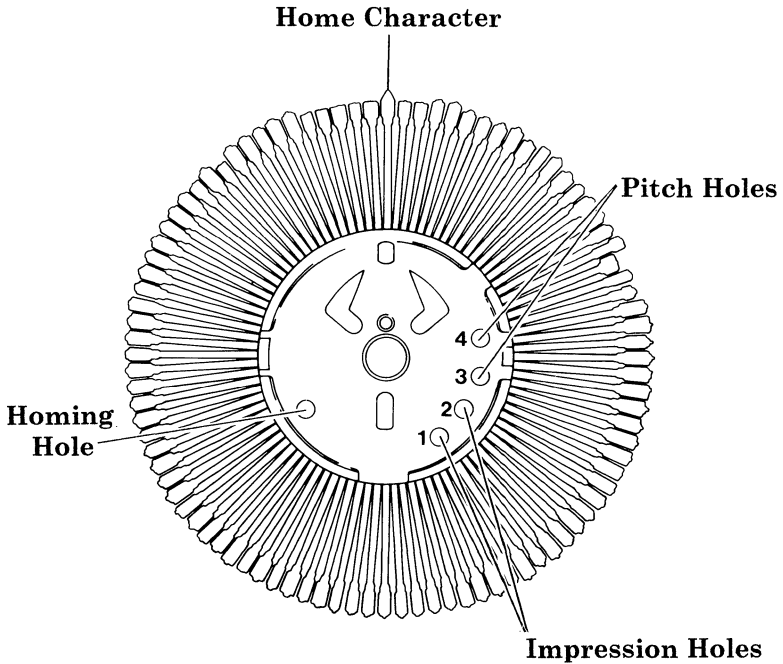
**DO YOU HAVE A KNOWN GOOD PRINTWHEEL
CARTRIDGE TO TRY?**

YES Go to 3-3000-4.

NO 

3-3000-2


1. Position the Power switch off.
2. Remove the Printwheel Cartridge and check the following:
 - The correct holes are open. See page 7-4 for printwheel identification.
 - There are no broken or damaged petals.
 - The printwheel is free of binds. (To check for binds, push the printwheel toward the rear of the cartridge and rotate it.)



IS THE PRINTWHEEL CARTRIDGE GOOD?

NO Have the customer purchase a new Printwheel Cartridge.


YES Go to 3-3000-5.

- 
1. Remove the old Printwheel Cartridge.
 2. Install the known good Printwheel Cartridge.
 3. Run the Printer Self Test.
-

DO YOU STILL HAVE A PROBLEM?

NO Have the customer purchase a new Printwheel Cartridge.

YES 



Check for binds in the selection motor.

Selection

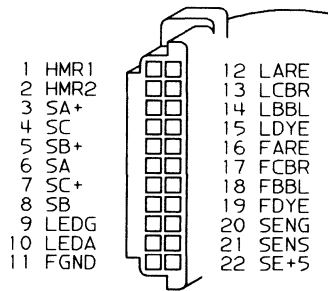
IS THE SELECTION MOTOR GOOD?

NO Replace the Selection Plate assembly.

YES 

1. Position the Power switch off.
2. Disconnect J4P from the Printer board.
3. Set the meter on the X1 scale.
4. Carefully zero the meter.
5. Measure the resistance of the selection motor between the points indicated on the chart.

Meter Connections	Reading
J4P-4 (SC) to motor housing	Infinity
J4P-6 (SA) to motor housing	Infinity
J4P-8 (SB) to motor housing	Infinity




J4P

ARE THE MEASUREMENTS CORRECT?

NO Replace the Selection Motor Plate assembly and the Printer board.

YES 



Measure the resistance of the Selection motor between the points indicated on the chart.

Meter Connections	Reading
J4P-3 (SA +) to J4P-6 (SA)	4 to 6 ohms
J4P-4 (SC) to J4P-7 (SC +)	4 to 6 ohms
J4P-5 (SB +) to J4P-8 (SB)	4 to 6 ohms

Selection

ARE THE MEASUREMENTS CORRECT?

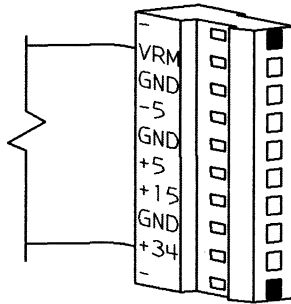
NO Go to 3-3000-9.

YES 

3-3000-7

1. Position the Power switch off.
2. Disconnect J6P from the Printer board.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the cable as indicated in the chart below.

J6P	Signal	Voltage
2	GND	-
3	-5	-4.6 to -5.6 V dc
7	GND	-
8	+34	+34 to +46 V dc



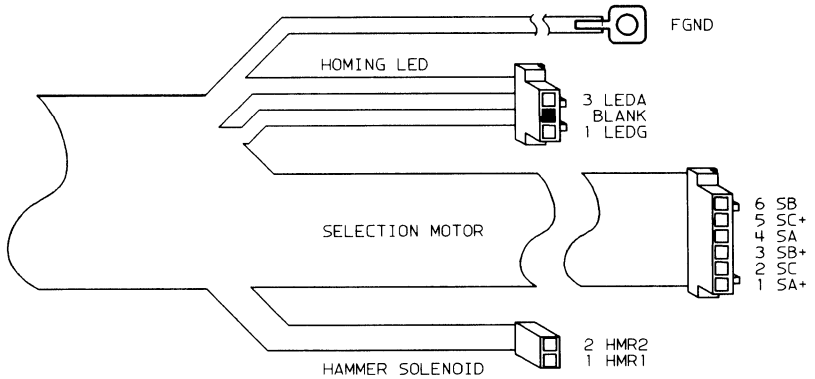
J6P

ARE THE VOLTAGES CORRECT?

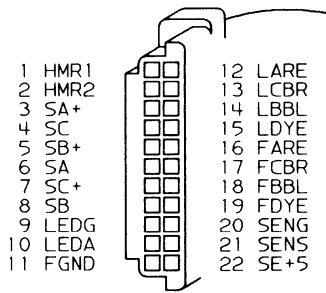
YES Replace the Printer board.

NO Replace the Power Supply board.

1. Position the Power switch off.
2. Check the continuity of all the selection lines in the Carrier cable.



Selection



J4P

IS THERE CONTINUITY IN ALL THE LINES?

NO Replace the Carrier cable.

YES Replace the Selection Plate assembly.

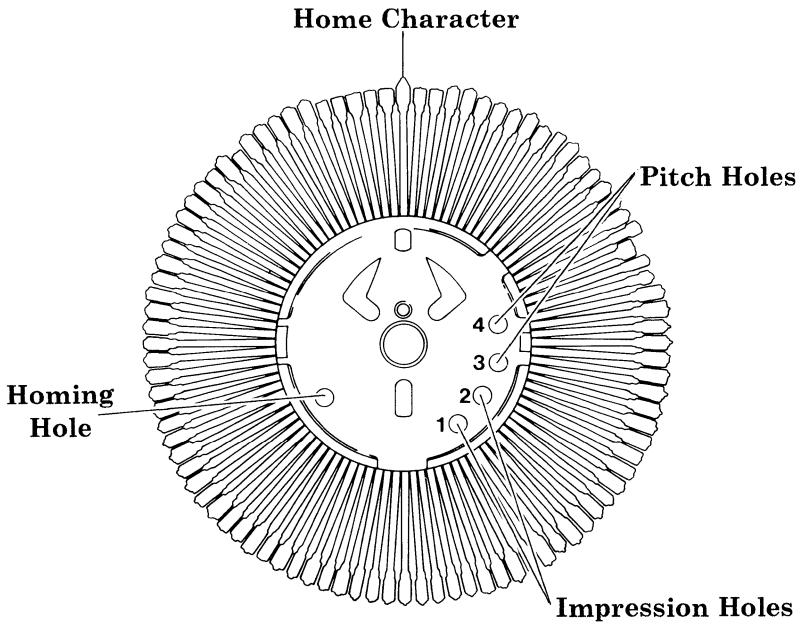


**DO YOU HAVE A KNOWN GOOD PRINTWHEEL
CARTRIDGE TO TRY?**

YES Go to 3-3000-12.

NO 


1. Position the Power switch off.
2. Remove the printwheel and check the following:
 - The correct holes are open. See page 7-4 for printwheel identification.
 - There are no broken or damaged petals.
 - The printwheel is free of binds. (To check for binds, push the printwheel toward the rear of the cartridge and rotate it.)



IS THE PRINTWHEEL CARTRIDGE GOOD?

NO Have the customer purchase a new Printwheel Cartridge.


YES Go to 3-3000-13.

- 
1. Remove the old Printwheel Cartridge.
 2. Install the known good Printwheel Cartridge.
 3. Run the Printer Self Test.
-

IS THE PROBLEM STILL THERE?

NO Have the customer purchase a new Printwheel Cartridge.

YES 

- 
1. Position the Power switch off.
 2. Check for binds in the Selection motor.
-

IS THE SELECTION MOTOR GOOD?

NO Replace the Selection Plate assembly.

YES 

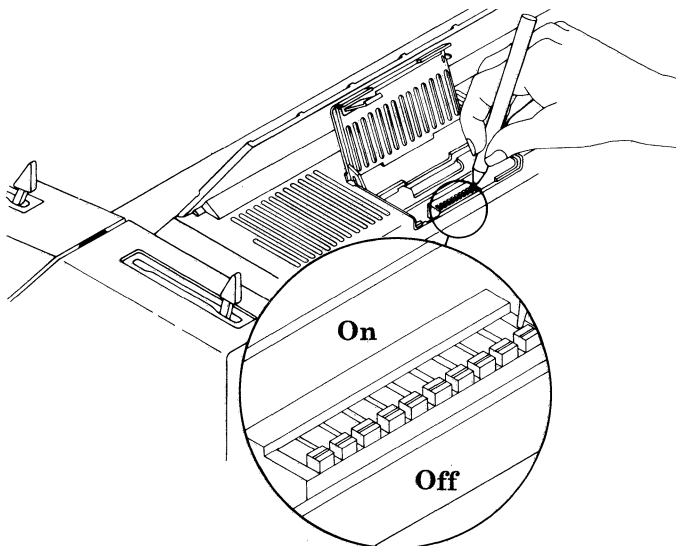
1. Position the Power switch off.
2. Position all the DIP switches off.
3. Position the Power switch on.
4. Insert a sheet of paper lengthwise in the printer, left edge aligned with the Paper Table.
5. Position the Power switch off.
6. Press and hold the **Stop** button and position the Power switch on. The Printer Self Test runs.

Switch Settings

```

0000000000 01279855
anrmcsdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$#f
nrmcSDhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$#f
rmcsdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$#f
mcsdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$#f
csdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$#f
sdhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$#f
dhlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$#f
hlfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$#f
lfk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$#f
fk,V-GUFBZHP)RLSNCTDEIAJO(M.Y,/W9K3X12054687*$#f

```



DO THE SWITCH SETTINGS PRINT OUT AS 0'S?

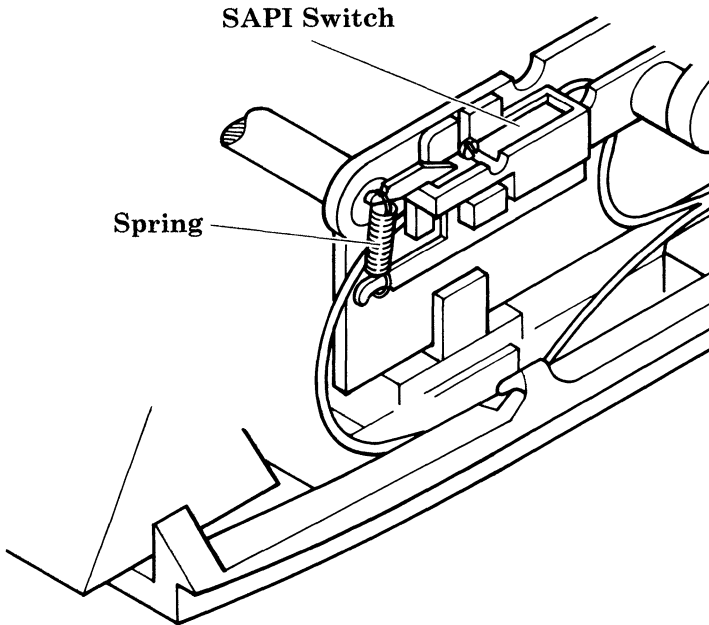
NO Replace the Function board.

YES Go to "Functional Check PIC" on page 3-1100-1.

Semi-Automatic Paper Insertion (SAPI) PIC

Entry Conditions: The platen does not turn when the Paper Bail is pulled forward with the feature cable unplugged from the back of the machine.

1. Position the Power switch off.
2. Inspect the SAPI switch for damage.
3. Make sure the spring is installed correctly and is not damaged.




SAPI

IS THE SAPI SWITCH DAMAGED?

YES Repair or replace the SAPI switch.

NO 

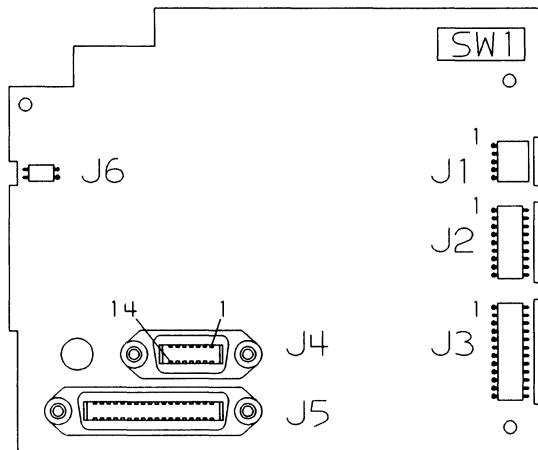
- 
1. Disconnect the SAPI cable from the SAPI switch.
 2. Position the Power switch on.
 3. Connect the wires of the SAPI cable together.
-

DOES THE PLATEN ROTATE?

YES Replace the SAPI switch.

NO 

1. Disconnect J6 from the Function board.
 2. Using a meter lead, short the two pins of J6 together on the Function board.
-




SAPI

DOES THE PLATEN ROTATE?

YES Replace the SAPI switch cable.

NO 

- 
1. Position the Power switch off.
 2. Disconnect J3 from the Function board.
 3. Position the Power switch on.
 4. Using a meter lead, short the two pins of J6 together on the Function board.
-

DOES THE PLATEN ROTATE?

YES Replace the Front Panel Assembly.

NO Replace the Function board.

System Electronics PIC

Check the following chart for your *identical* symptom.

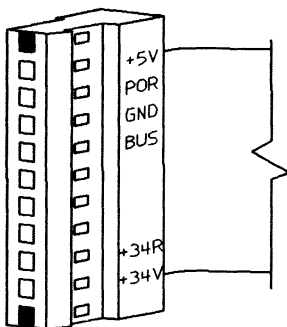
Symptom	Action
Multiple beeps, all lights blinking.	Go to 3-3200-4.
Multiple beeps; Ready , Online , Wheel , and Paper lights blinking.	Go to 3-3200-9.
Multiple beeps; Ready , Online , Ribbon , and Paper lights blinking.	Go to 3-3200-11.

IS YOUR IDENTICAL SYMPTOM LISTED ABOVE?

YES Perform the required action.

NO 

1. Position the Power switch off.
 2. Disconnect J2 from the Function board.
 3. Position the Power switch on.
 4. Connect one end of a meter lead to the System Ground point; then momentarily connect the other end to plug J2-4 (BUS) on the cable.
-




J2 Plug

**DOES THE PRINTER POWER ON AND MOVE
THE CARRIER TO THE LEFT FRAME?**

YES Replace the Function board.


NO 

- 
1. Position the Power switch off.
 2. Disconnect J5P from the Printer board.
 3. Check for continuity in the System cable.
-

**IS THERE CONTINUITY IN THE SYSTEM
CABLE?**

NO Replace the System cable.

YES Replace the Printer board.




Entry Conditions: Multiple beeps and all lights
blinking at power-on.

**DID THE PRINTWHEEL MOVE DURING
POWER-ON?**

YES Go to 3-3200-7.

NO 



Measure the voltages at the J6P plug on the Printer board.

J6P	Signal	Voltage
Blank	—	—
1	VRM	Do not measure.
2	GND	0 V dc
3	-5	-4.6 to -5.6 V dc
4	GND	0 V dc
5	+5	4.6 to 5.6 V dc
6	+15	13.2 to 15.6 V dc
7	GND	0 V dc
8	+34	27.2 to 46.9 V dc
Blank	—	—

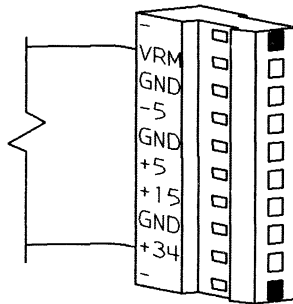
ARE THE VOLTAGES CORRECT?

YES Replace the Printer board.

NO 

1. Position the Power switch off.
2. Disconnect J6P from the Printer board.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the cable.

J6P	Signal	Voltage
Blank	—	—
1	VRM	Do not measure.
2	GND	0 V dc
3	-5	-4.6 to -5.6 V dc
4	GND	0 V dc
5	+5	4.6 to 5.6 V dc
6	+15	13.2 to 15.6 V dc
7	GND	0 V dc
8	+34	27.2 to 46.9 V dc
Blank	—	—



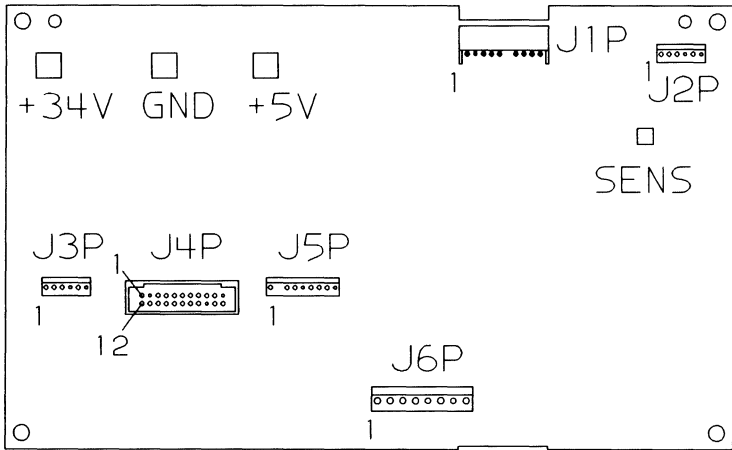
J6P

ARE THE VOLTAGES CORRECT?

YES Replace the Printer board.

NO Replace the Power Supply board assembly.

1. Position the Power switch off.
 2. Disconnect J5P from the Printer board.
 3. Position the Power switch on.
 4. Measure the voltage at J1P-5 (BUS) on the Printer board.
-

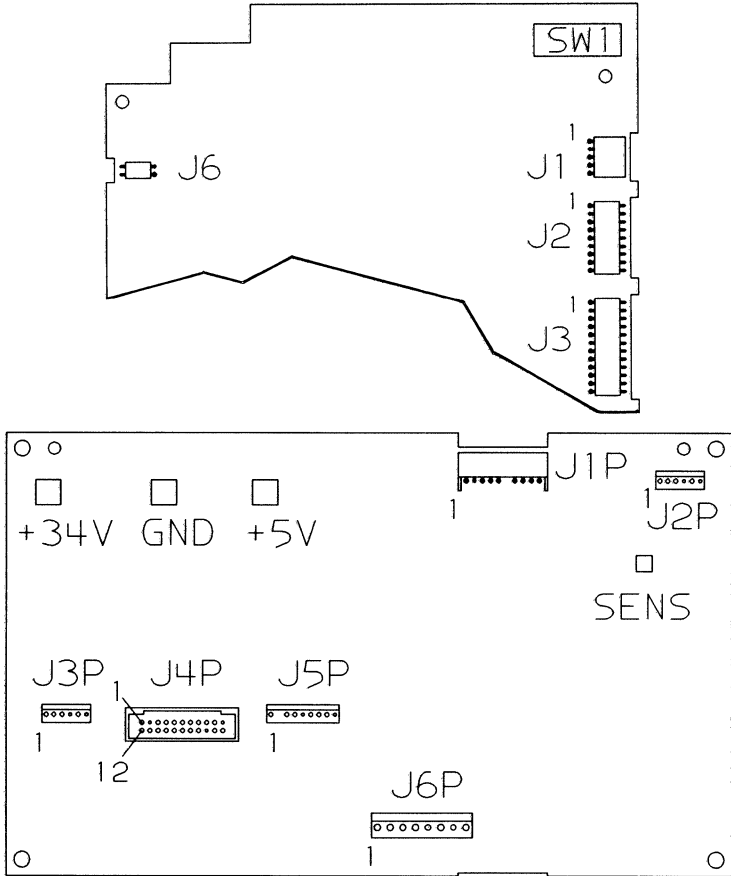


IS THE VOLTAGE BETWEEN +3.5 AND +5.5 V dc?

NO Replace the Printer board.

YES 


1. Position the Power switch off.
2. Connect J5P to the Printer board.
3. Disconnect J2 from the Function board.
4. Position the Power switch on.
5. Measure the voltage at J1P-5 (BUS) on the Printer board.



IS THE VOLTAGE BETWEEN +3.5 AND +5.5 V dc?

NO Replace the System cable.

YES Replace the Function board.



Entry Conditions: Multiple beeps; **Ready**, **Online**, **Wheel**, and **Paper** lights blinking.

1. Position the Power switch off.
 2. Press and hold the **Stop** button.
 3. Position the Power switch on. The Printer Self Test runs.
-

DO YOU STILL HAVE THE SAME ERROR?

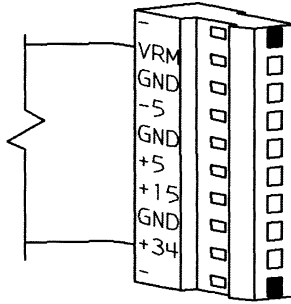
NO Go to the “Functional Check PIC” on page 3-1100-1.

YES

Note: This error could have been caused by the ac line voltage dropping below 84 V ac.

1. Position the Power switch off.
2. Disconnect J6P from the Printer board.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the cable as indicated in the chart below.

J6P	Signal	Voltage
2	GND	—
3	-5	-4.6 to -5.6 V dc
7	GND	—
8	+34	+34 to +46 V dc




J6P

ARE THE VOLTAGES CORRECT?

YES Replace the Printer board.

NO Replace the Power Supply board.



Entry Conditions: Multiple beeps; **Ready**, **Online**, **Ribbon**, and **Paper** lights blinking.

1. Position the Power switch off.
 2. Position the Power switch on.
-

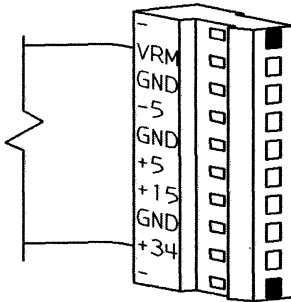
DO YOU STILL HAVE THE SAME ERROR?

NO Go to the “Functional Check PIC” on page 3-1100-1.

YES 

1. Position the Power switch off.
2. Disconnect J6P from the Printer board.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the cable as indicated in the chart below.

J6P	Signal	Voltage
2	GND	—
3	-5	-4.6 to -5.6 V dc
7	GND	—
8	+34	+34 to +46 V dc



J6P

ARE THE VOLTAGES CORRECT?

YES Replace the Printer board.

NO Replace the Power Supply board.

Transport Entry PIC


1. Position the Power Switch off.
2. Observe the Transport mechanism while moving the Carrier left and right by hand.
3. Check the items in the chart.

Check for:	Action
Worn or broken belt or belt clamp.	Replace the belt.
Binds or wear in the drive gear train or bearings.	Replace the Transport.
Binds or wear in the idler gear bearing.	Replace the Transport.
Binds or wear in the Carrier bearing.	Replace the Carrier bearings.
Missing or bent load spring.	Replace the Transport.
Loose idler stud.	Replace the Transport.

DID ANY OF THE ABOVE CHECKS LOCATE A PROBLEM?

YES Perform the required action.

NO 



Check the items in the chart.

Check for:	Action
Loose Transport Motor mounting screws.	Tighten screws.
Binding Transport Motor Shaft.	Replace the Transport Motor.
Pitted or worn Transport shaft.	Replace the Transport shaft and the Carrier bearings.
Loose Transport shaft.	Tighten the Transport shaft. If unable to, replace the Frame Assembly.
No lubrication on shaft.	Lubricate shaft.
Loose or worn Carrier bearing.	Replace the Carrier bearings.
Improper belt tension (See the "Transport Belt Adjustment" on page 5-5.)	Perform the Transport Belt adjustment.
Bent bottom cover.	Replace the bottom cover.

DID ANY OF THE ABOVE CHECKS LOCATE A PROBLEM?

YES Perform the required action.

NO Go to the "Transport Electrical PIC" on page 3-3400-1.

Transport Electrical PIC

1. Position the Carrier to the center.
 2. Position the Power switch on.
 3. Press the **Stop** button.
 4. Press the **Start** button.
-

DID THE TRANSPORT MOVE QUIETLY AND CORRECTLY?

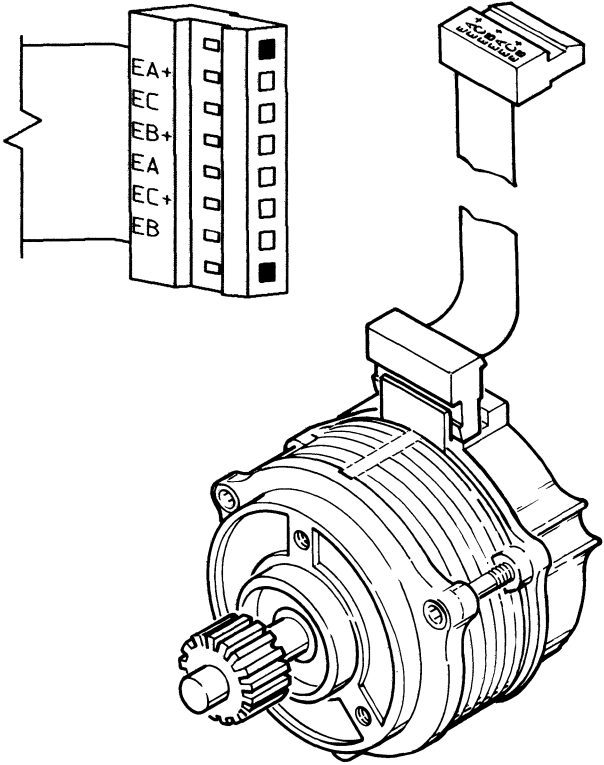
YES Go to the “Functional Check PIC” on page 3-1100-1.

NO



1. Position the Power switch off.
2. Disconnect J2P from the Printer board.
3. Set the meter on the X1 scale.
4. Carefully zero the meter.
5. Measure the resistances in the transport motor indicated in the chart below.

Meter Connections	Reading
J2P-2 (EC) to motor housing	Infinity
J2P-4 (EA) to motor housing	Infinity
J2P-6 (EB) to motor housing	Infinity



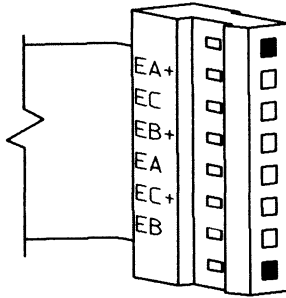
ARE THE MEASUREMENTS CORRECT?

NO Replace the Transport Motor and the Printer board.

YES 

Measure the resistance in the Transport motor between the points indicated in the chart below.

Meter Connections	Reading
J2P-1 (EA +) to J2P-4 (EA)	4 to 6 ohms
J2P-2 (EC) to J2P-5 (EC +)	4 to 6 ohms
J2P-3 (EB +) to J2P-6 (EB)	4 to 6 ohms



J2P

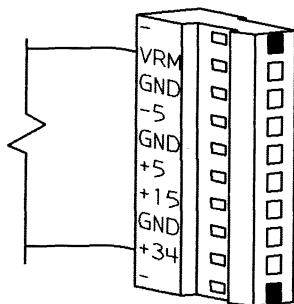
ARE THE MEASUREMENTS CORRECT?

NO Go to 3-3400-5.

YES 

1. Position the Power switch off.
2. Disconnect J6P from the Printer board.
3. Position the Power switch on.
4. Measure the voltages at the J6P plug on the cable as indicated in the chart below.

J6P	Signal	Voltage
2	GND	—
3	-5	-4.6 to -5.6 V dc
7	GND	—
8	+34	+34 to +46 V dc




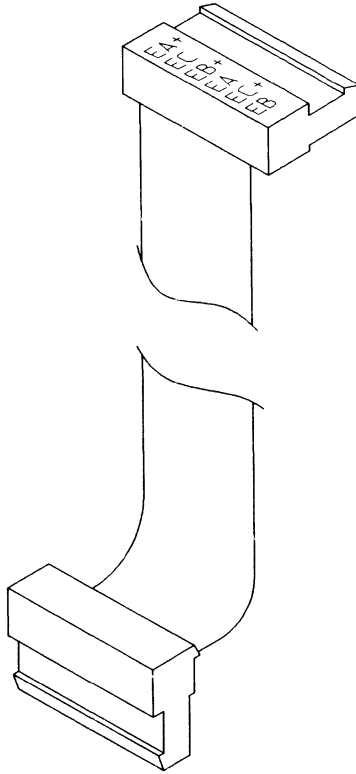
J6P

ARE THE VOLTAGES CORRECT?

YES Replace the Printer board.

NO Replace the Power Supply board.

- 
1. Disconnect the Transport cable from the motor.
 2. Check for continuity on all lines of the Transport cable.
-



IS THERE CONTINUITY ON ALL LINES?

YES Replace the Transport Motor.

NO Replace the Transport Motor Cable.

REMOVALS AND INSTALLATIONS

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Using This Section

The procedures are in alphabetical order. Each removal procedure is followed by an installation procedure, sometimes on the same page. When there is artwork to support a procedure, it appears on the left-hand page.

Perform a functional check of the printer after completing an installation.

Read the following section before handling electronic parts.

Handling ESD-Sensitive Parts

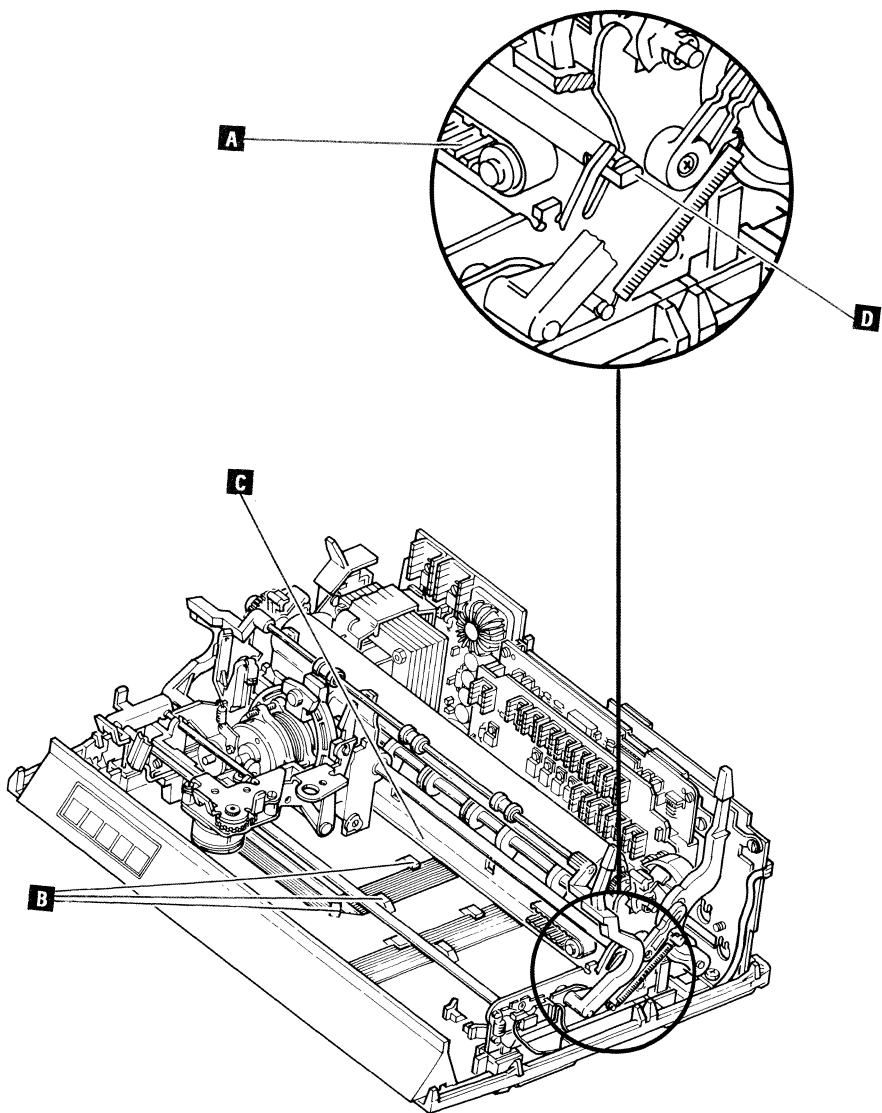
Many electronic products use parts that are known to be sensitive to electrostatic discharge (ESD). To prevent damage when you work with ESD-sensitive parts, observe the following instructions; do these in addition to all the usual precautions such as switching off power before removing logic cards.

- Keep the ESD-sensitive part in its original shipping container (a special “ESD bag”) until you are ready to install the part into the machine.
- Make the least-possible movements with your body to prevent an increase of static electricity from clothing fibers, carpets, and furniture.
- Put the ESD wrist strap on your wrist. Connect the wrist band to the system ground point. This discharges any static electricity in your body to the machine.
- Hold the ESD-sensitive part by its edge connector shroud (cover); *do not touch its pins*. If you are removing a pluggable module, use the correct tool.

- Do not place the ESD-sensitive part on the machine cover or on a metal table; if you need to put down the ESD-sensitive part for any reason, first put it into its special bag.

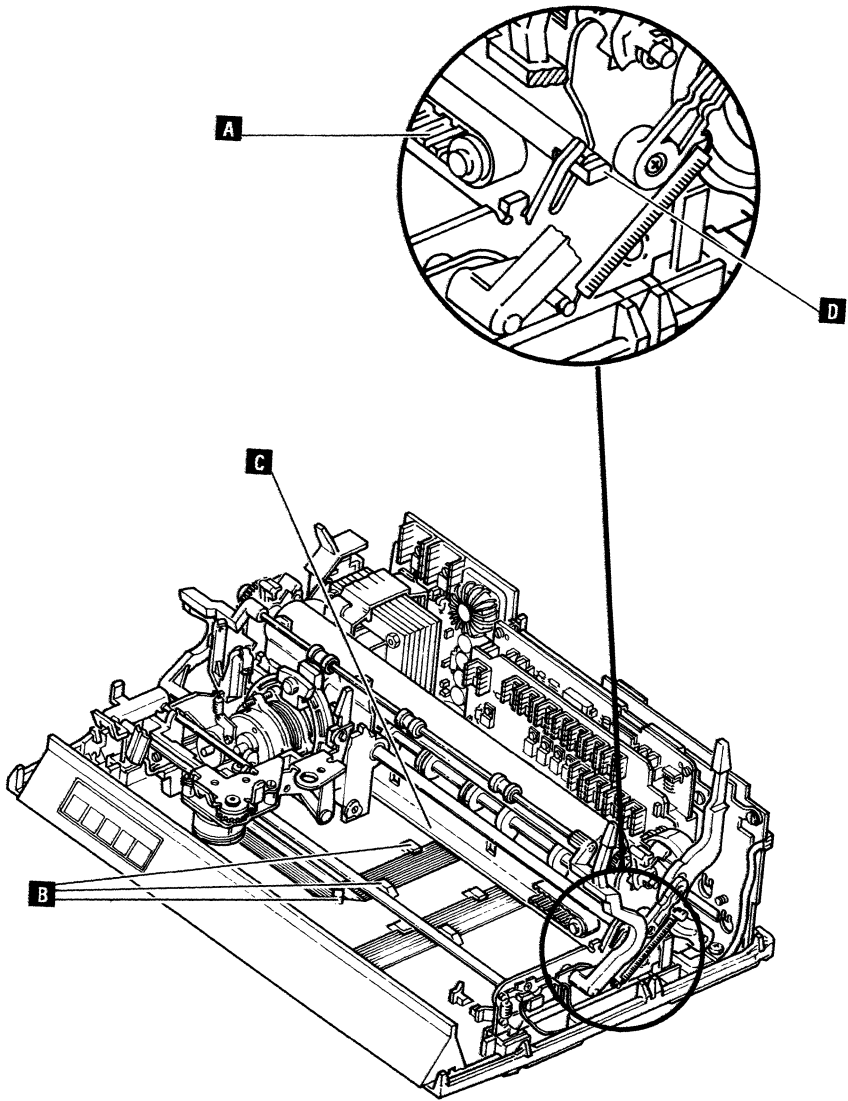
Machine covers and metal tables are electrical grounds. They increase the risk of damage because they make a discharge path from your body through the ESD-sensitive part. (Large metal objects can be discharge paths without being grounded.)

- Prevent ESD-sensitive parts from being accidentally touched by other personnel. Install machine covers when you are not working on the machine, and do not put unprotected ESD-sensitive parts on a table.
- If possible, keep all ESD-sensitive parts in a grounded metal cabinet (case).
- Be extra careful in working with ESD-sensitive parts when cold-weather heating is used because low humidity increases static electricity.



Carrier Assembly Removal

1. Disconnect the linecord and remove the covers.
2. Roll the transport belt from its pulleys **A** . Do not use tools to do this.
3. Disconnect J4P from the printer board and J1 from the function board.
4. Slide the carrier cable from under the tabs in the bottom cover **B** .
5. Slide the carrier cable from under the transport bracket **C** .
6. Using a 1/4" open-end wrench on the right side of the carrier shaft **D** , rotate the shaft about 1/8 turn top to rear to release it.
7. Push the carrier shaft to the right far enough for it to clear the left side frame.
8. Lift and pull the left end of the carrier shaft to the front; then pull the shaft and carrier to the left to clear the right side of the frame.
9. Lift the carrier out of the printer.
10. Pull the carrier shaft out of the right side of the carrier.

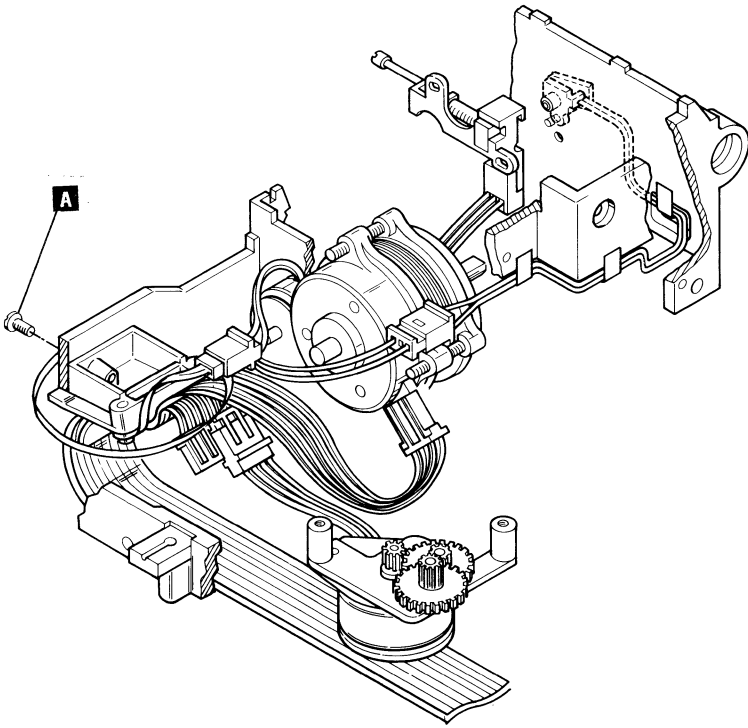


Carrier Assembly Installation

1. Connect the carrier cable to the bottom of the carrier. See page 4-12.
2. Place the left end of the carrier shaft (the end opposite the flats) into the right side of the carrier.
3. Lower the carrier into the printer and install the right end of the carrier shaft into the right side frame.

Note: Make sure the transport belt is not trapped below the carrier.

4. Slide the left end of the carrier shaft into the left side frame.
5. Using a 1/4" open-end wrench on the right side of the carrier shaft **D**, rotate it top to front about 1/8 turn to lock it in place.
6. Roll the transport belt onto its pulleys **A**. (Do not use tools to do this.)
7. Slide the carrier cable under the transport bracket **C**.
8. Slip the carrier cable under the tabs in the bottom cover **B**.
9. Connect J4P to the printer board and J1 to the function board.
10. Install the covers.



Carrier Cable Removal

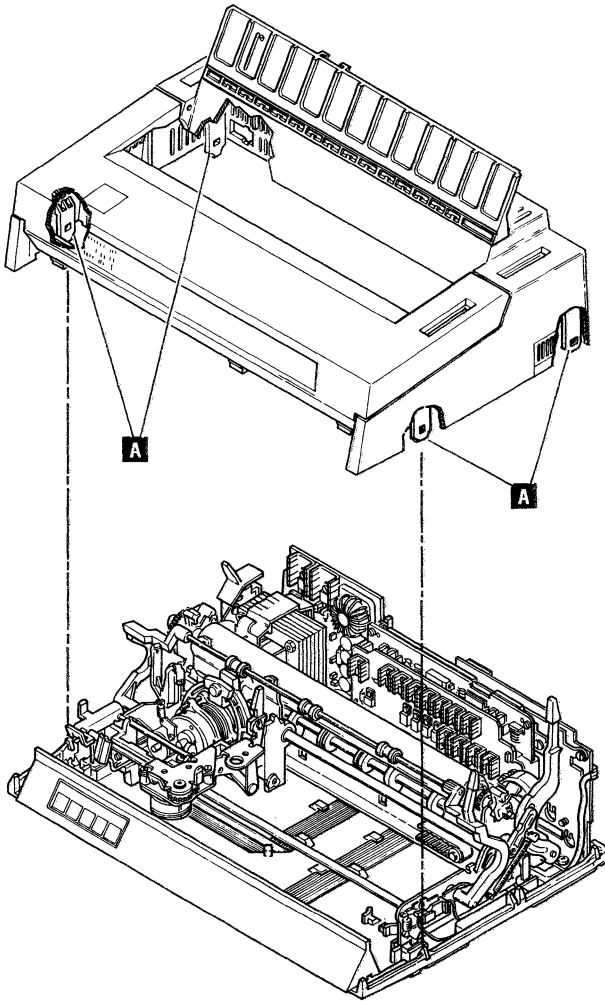
1. Remove the carrier. See page 4-7.
2. Remove the cable clamp screw **A**.
3. Disconnect the:
 - Ribbon feed motor connector
 - Hammer solenoid connector
 - Homing LED connector
 - Homing sensor connector
 - Selection motor connector
 - End-of-ribbon connector.

Note: The connector marked "L" is not used in this printer.

Carrier Cable Installation

1. Install the carrier cable clamp, the ground strap, and the mounting screw **A**.
2. Connect the:
 - Hammer solenoid connector
 - Homing LED connector
 - Homing sensor connector
 - Selection motor connector
 - Ribbon feed motor connector
 - End-of-ribbon connector.

Note: The connector marked "L" is not used in this printer.

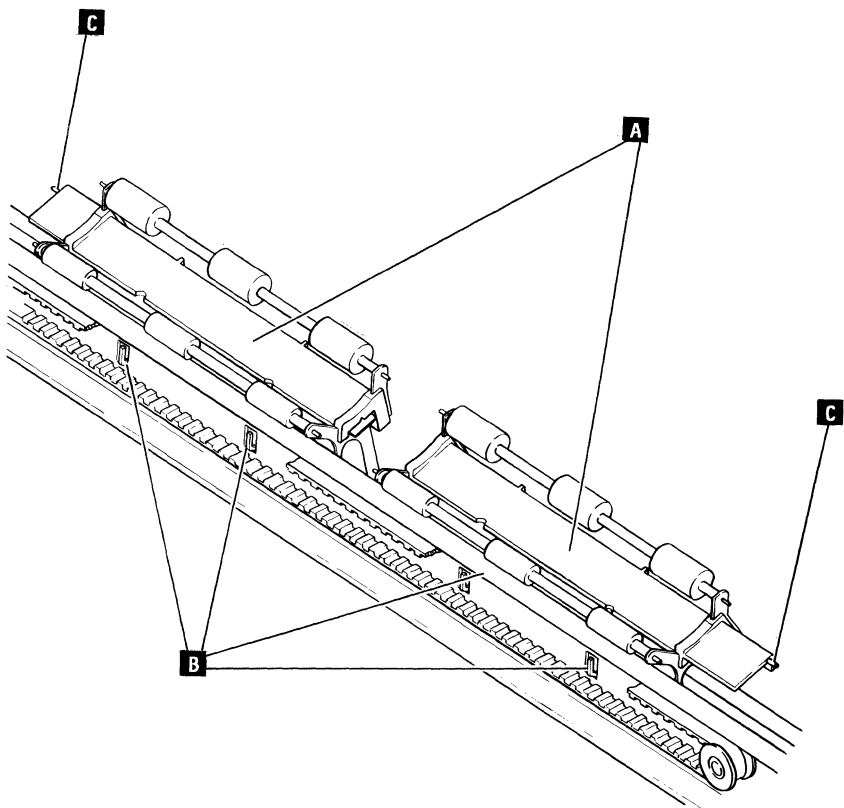


Cover Removal

1. Disconnect the linecord from the printer.
2. Move the carrier to the center of the printer.
3. Pivot the carrier position indicator to the side.
4. Push the tabs in with a screwdriver to release the cover **A** .
5. Lift the cover up.

Cover Installation

1. Move the paper release lever and the power switch to the rear.
2. Lower the cover onto the printer at an angle, with the front of the cover slightly lower than the rear.
3. Lower the cover into position and latch the tabs **A** .
4. Center the carrier position indicator.
5. Connect the linecord.



Feed Roller Assembly Removal

1. Disconnect the linecord and remove the covers.
2. Remove the platen and deflector.
3. Push down and rotate the feed roller assembly **A** top to front until the lower ends of the assembly release from the transport bracket **B** .

Note: Move the carrier left or right to aid in removal and installation of the feed roller assemblies.

Feed Roller Assembly Installation

1. Place the feed roller assembly on the paper release shaft and align the forks with the bearing guides. Position the deflector support **C** to the outside.
2. Push the feed roller assembly down and pivot it top to rear until the lower ends of the assembly connect to the transport bracket **B** .
3. Install the deflector and platen.
4. Install the covers and connect the linecord.

First Writing Line Knock-Off Removal

1. Disconnect the linecord and remove the covers.
2. Remove the toggle springs.
3. Remove the paper bail assembly. See page 4-28.

Warning: Place a shop cloth over the paper bail retaining lugs while cutting off the paper bail arm lugs.

4. Remove the first writing line knock-off bracket mounting screws.
5. Slide the assembly off the paper bail mounting shaft.

First Writing Line Knock-Off Installation

1. Install the first writing line knock-off bracket mounting screws but do not tighten them.
2. Adjust the assembly up or down for minimum backlash with no binds between the gears.
3. Tighten the mounting screws.
4. Install a new paper bail assembly.
5. Install the toggle springs.
6. Install the covers and connect the linecord.

Frame Assembly Removal

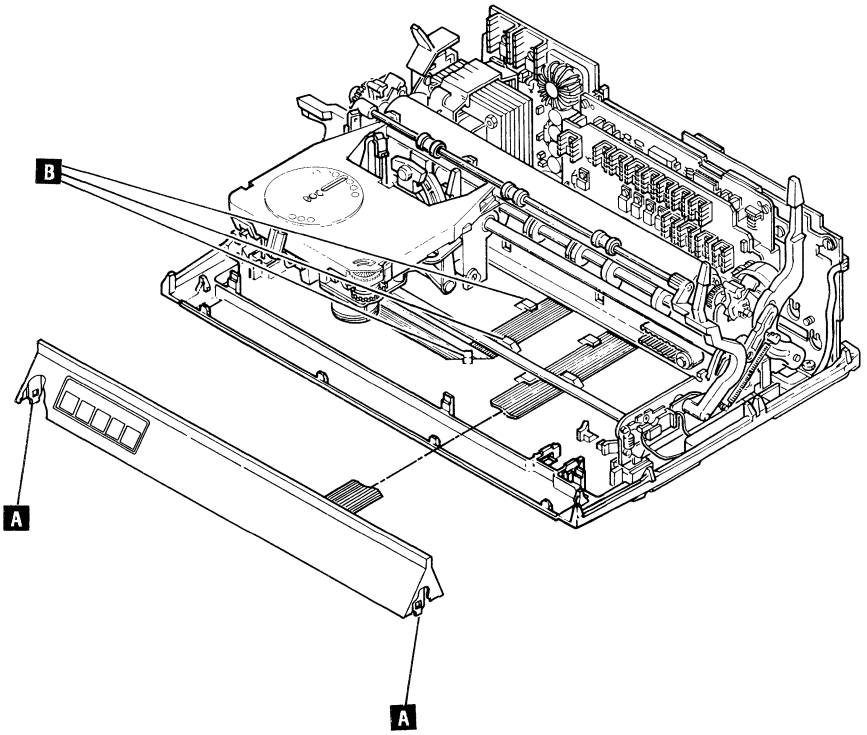
1. Disconnect the linecord.
2. Remove the:
 - Top cover, platen, deflector, and feed roller assemblies
 - Transport motor cable
 - Carrier (see page 4-7)
 - SAPI switch (see page 4-46).
3. Disconnect J3P from the printer board.
4. Release the front frame latches and lift the front of the frame and rest it on top of the frame latches.
5. Release the rear frame latches and lift the frame out of the bottom cover.
6. Remove the:
 - Transport assembly (see page 4-50)
 - Paperfeed motor assembly (see page 4-30)
 - Transport Motor mounting bracket (see page 4-54).

Frame Assembly Installation

1. Install the:
 - Transport assembly
 - Paper feed motor assembly
 - Transport Motor mounting bracket.

Note: Be careful not to pinch any of the wires under the frame or in the latches.

2. Lower the frame assembly into the printer, aligning the frame with the two rear latches, and snap into place. Then snap the two front latches into place.
3. Install the:
 - SAPI switch
 - Carrier
 - Transport motor cable
 - Feed roller assemblies, deflector, and platen.
4. Connect J3P to the printer board.
5. Install the covers and connect the linecord.

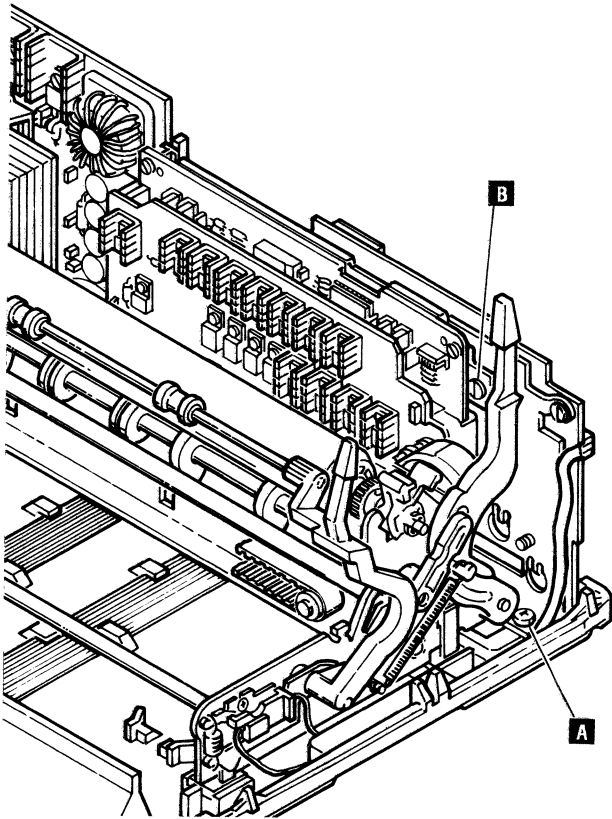


Front Panel Removal

1. Disconnect the linecord and remove the covers.
2. Press the left and right front panel mounting latches inward and raise the front panel **A** .
3. Disconnect J3 from the function board.
4. Slide the front panel cable out of the tabs in the bottom cover **B** and work the cable out from under the frame assembly.

Front Panel Installation

1. Slide the front panel cable under the frame assembly and connect J3 to the function board.
2. Insert the front panel cable into the tabs on the bottom cover **B** .
3. Snap the front panel into place.
4. Install the covers and connect the linecord.



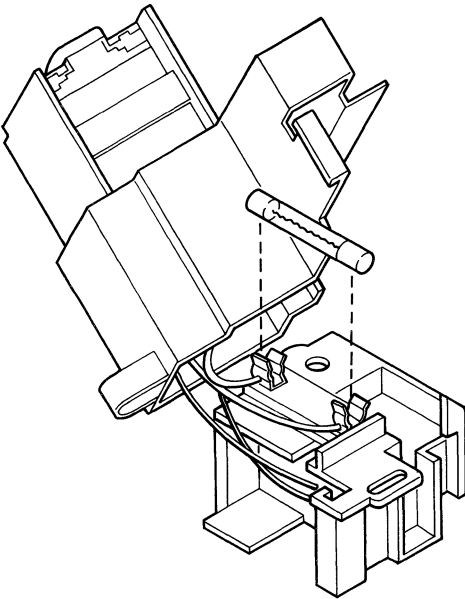
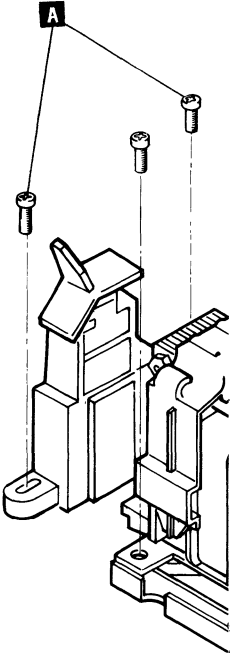
Function Board Removal

Note: Read the ESD information on 4-3 before performing this removal.

1. Position the power switch off.
2. Disconnect the linecord and remove the covers.
3. Disconnect the following from the function board: J1, J2, J3, and J6.
4. Remove the screw **A** that holds the function board mounting bracket to the bottom cover.
5. Remove the screw **B** that holds the function board bracket to the printer board bracket.
6. Facing the rear of the printer, rotate the left end of the function board up, while sliding it to the left, until the function board assembly is free.

Function Board Installation

1. Facing the rear of the printer, slide the locating tab on the function board bracket into the hook on the printer board bracket. Rotate and lower the function board assembly onto the bottom cover.
2. Install the screw **A** that holds the function board bracket onto the bottom cover.
3. Install the screw **B** that holds the function board bracket to the printer board bracket.
4. Connect the following to the function board: J1, J2, J3, and J6.
5. Install the covers.

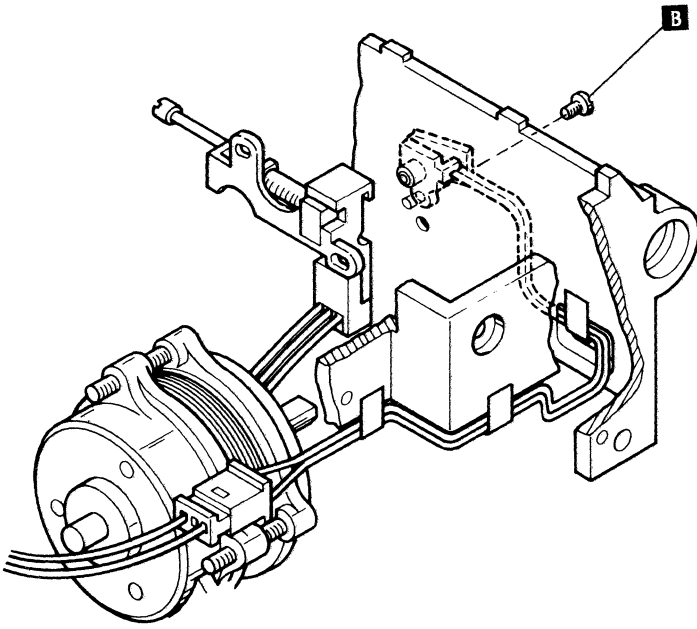


Fuse Removal

1. Disconnect the linecord and remove the covers.
2. Remove the 2 power switch mounting screws **A** .
3. Lift the switch housing up and slide the switch tower from the base.
4. Remove the fuse.

Fuse Installation

1. Install a new fuse.
2. Slide the switch tower onto the base.
Avoid pinching the wires.
3. Mount the switch tower on its mounting posts and tighten the screws **A** .

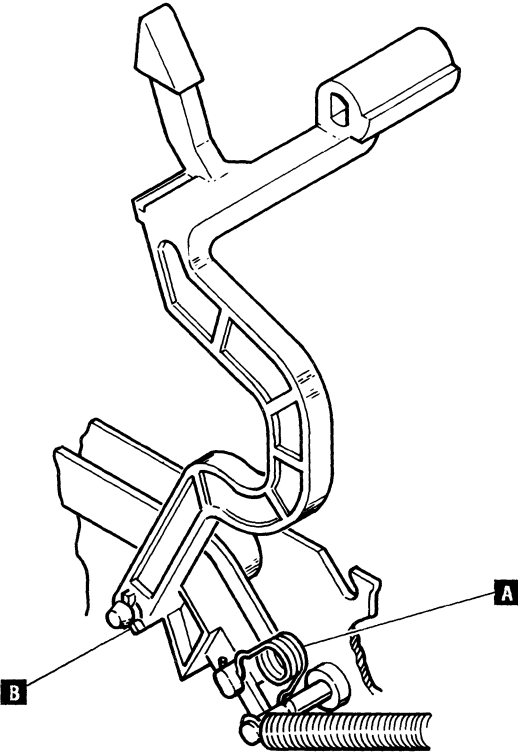


Homing LED Removal

1. Remove the carrier. See page 4-7.
2. Disconnect the homing LED connector.
3. Remove the homing LED cable retaining clips **A**.
4. Remove the homing LED mounting screw **B**.
5. Remove the homing LED.

Homing LED Installation

1. Install the homing LED mounting screw **B**.
2. Install the homing LED cable retaining clips **A**.
3. Connect the homing LED connector to the carrier cable.
4. Install the carrier.



(Right Rear View)

Paper Bail Assembly Removal

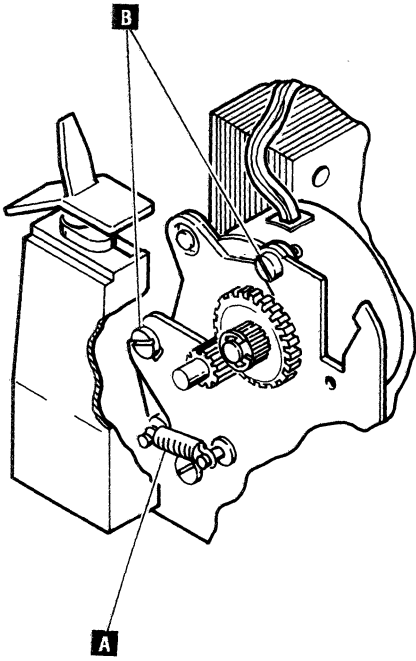
1. Disconnect the linecord and remove the covers.
2. Remove the toggle springs **A** from both arms.

Warning: Place a shop cloth over the paper bail arm while performing the next step to prevent injury from flying plastic.

3. Clip the retaining lugs **B** from both paper bail arms.
4. Slide the paper bail arms off the mounting shaft and the paper bail shaft.

Paper Bail Assembly Installation

1. Slide the paper bail rollers onto the paper bail shaft.
2. Slide the paper bail arms onto the mounting shaft and the paper bail shaft.
3. Install the toggle springs **A**.
4. Install the covers and connect the linecord.

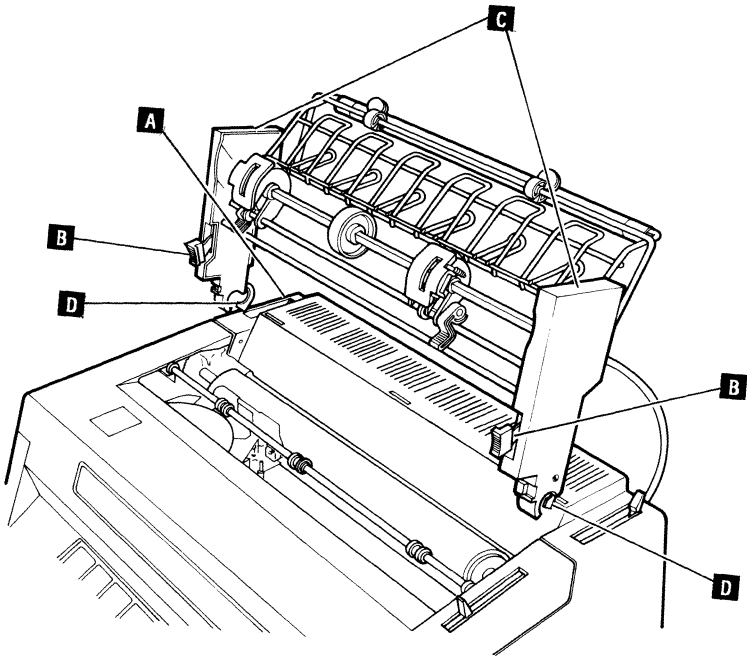


Paperfeed Motor Assembly Removal

1. Disconnect the linecord and remove the covers.
2. Remove the platen.
3. Remove the paperfeed motor tension spring **A**.
4. Remove the 2 paperfeed motor mounting screws **B**.
5. Disconnect the paperfeed motor (J3P) from the printer board.
6. Position the power switch on.
7. Move the paperfeed motor to the rear and lift it out of the printer.

Paperfeed Motor Installation

1. Place the paperfeed motor into the printer.
2. Install the 2 paperfeed motor mounting screws **B**.
3. Install the paperfeed motor tension spring **A**.
4. Connect the paperfeed motor to the printer board.
5. Install the platen.
6. Install the covers.
7. Position the power switch off.
8. Connect the linecord.



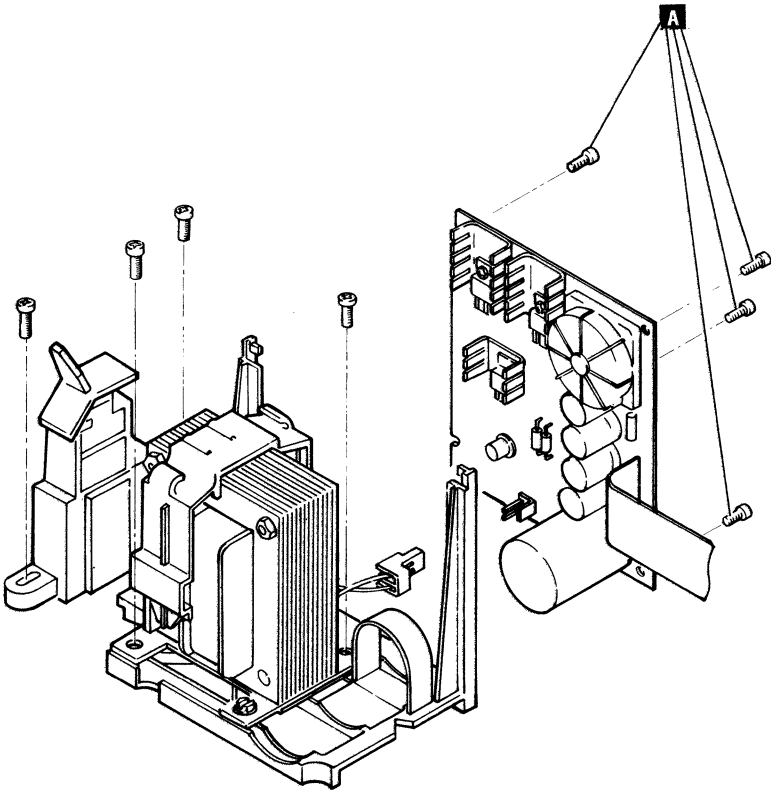
Pinwheel Forms Feeder Removal

1. Position the power switch off.
2. Move the carrier to the center of the printer.
3. Remove the paper from the pinwheel forms feeder.
4. Disconnect the pinwheel forms feeder cable from the back of the printer.
5. Pull the paper bail forward **A**.
6. Pull the two locking buttons **B** forward.
7. Raise the pinwheel forms feeder **C** up and out of the printer.

Pinwheel Forms Feeder Installation

Note: For the initial installation, the paper table must be removed.

1. Position the power switch off.
2. Move the carrier to the center of the printer.
3. Pull the paper bail **A** forward.
4. Pull the two locking buttons **B** forward.
5. Lower the pinwheel forms feeder onto the printer until the slots **D** rest on the platen shaft.
6. Allow the pinwheel forms feeder to move to the rear until it contacts the cover of the printer.
7. Press the two locking buttons **B** to lock the pinwheel forms feeder into place.
8. Connect the pinwheel forms feeder cable to the back of the printer.

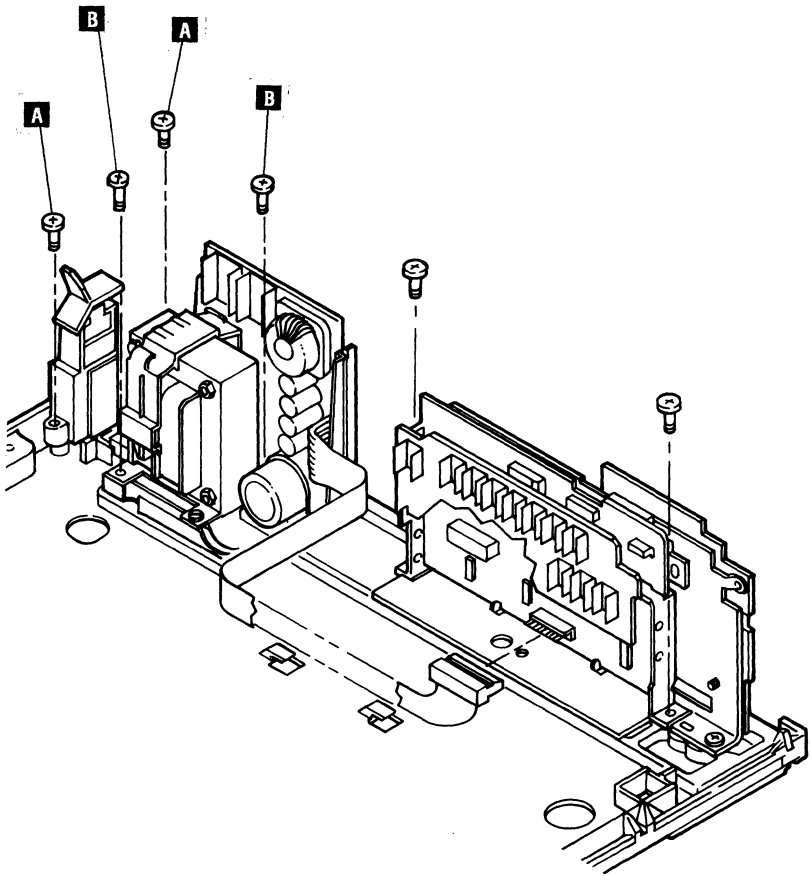


Power Supply Board Removal

1. Remove the power supply from the printer.
See page 4-35.
2. Remove the mounting screws **A** .
3. Spread the mounting brackets slightly and remove the board to the rear.
4. Disconnect the ground strap.
5. Disconnect the transformer plug J2.

Power Supply Board Installation

1. Connect the transformer plug J2.
2. Connect the ground strap.
3. Spread the mounting brackets slightly and install the board from the rear, ensuring that the board is correctly installed in the tabs at the top of the brackets.
4. Install the mounting screws **A** .

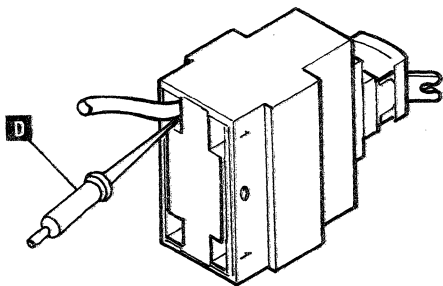
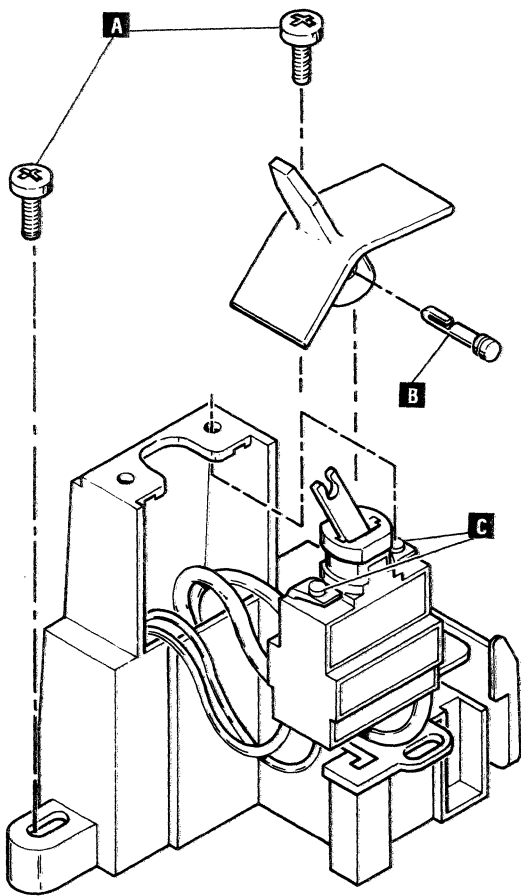


Power Supply Removal

1. Disconnect the linecord and remove the covers.
2. Disconnect J6P from the printer board.
3. Remove the 2 power switch mounting screws **A** .
4. Remove the paperfeed motor wires from the clip on the power supply cover.
5. Remove the left-front and right-rear power supply mounting screws **B** .
6. Lift the power supply straight up.

Power Supply Installation

1. Place the power supply into the printer.
2. Connect J6P to the printer board.
3. Install the 2 power switch mounting screws **A** .
4. Install the left-front and right-rear power supply mounting screws **B** .
5. Install the covers and connect the linecord.

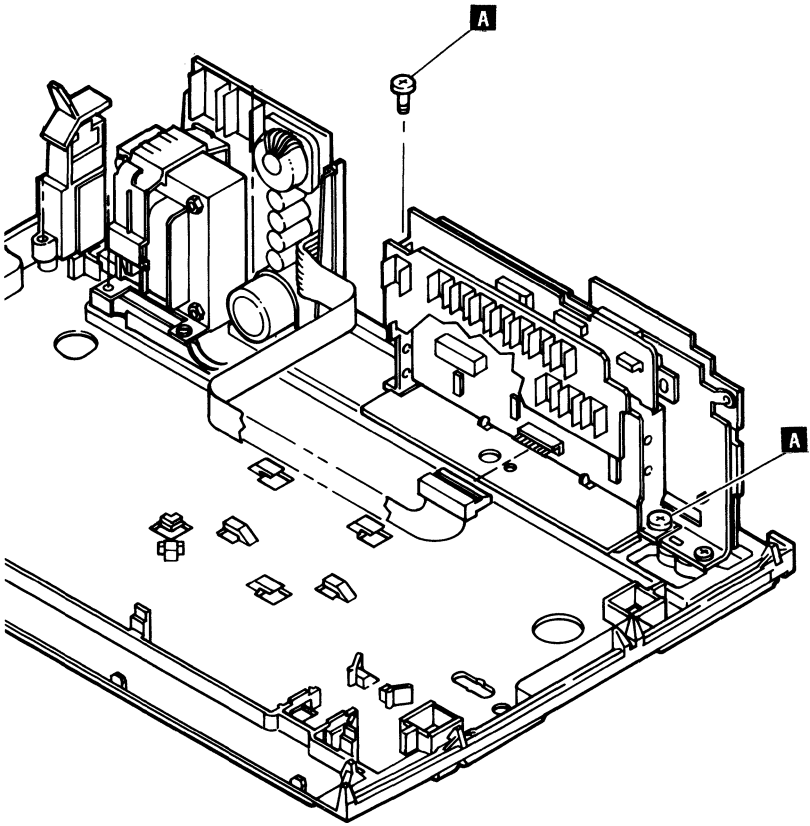


Power Switch Assembly Removal

1. Disconnect the linecord and remove the covers.
2. Remove the 2 mounting screws **A** .
3. Lift the switch housing up.
4. Remove the pin **B** from the switch handle by pinching the left end of the pin while pushing it to the right.
5. Push the tabs **C** down and move the switch to the right until it is freed from the switch tower.
6. Release the wires from the switch by inserting a meter lead **D** into the openings at the bottom of the switch housing and pulling the wires out.

Power Switch Installation

1. Connect the four wires to the bottom of the switch.
2. Slide the switch into its mounting until it snaps into place.
3. Lower the switch assembly onto its mounting posts.
4. Install the 2 mounting screws **A** .
5. Install the covers and connect the linecord.



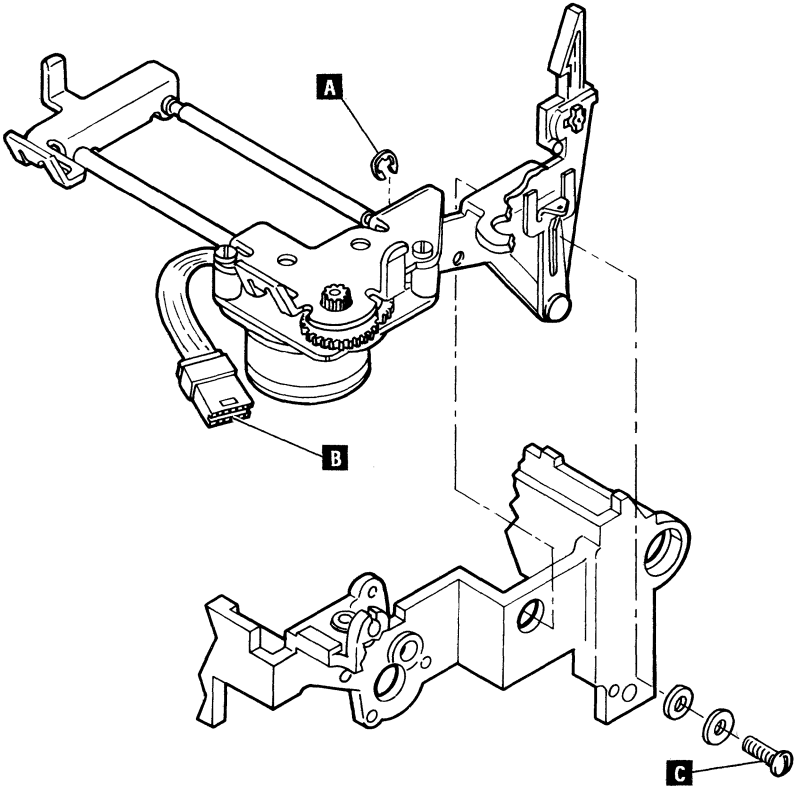
Printer Board Removal

Note: Read the ESD information on page 4-3 before performing this removal.

1. Position the power switch off.
2. Disconnect the linecord and remove the covers.
3. Remove the function board. See page 4-21.
4. Disconnect J1P, J2P, J3P, J4P, J5P, and J6P from the printer board.
5. Remove the 2 printer board bracket mounting screws **A**.
6. Remove the printer board assembly from the printer.

Printer Board Installation

1. Install the printer board assembly and the 2 mounting screws **A**.
2. Connect J1P, J2P, J3P, J4P, J5P, and J6P to the printer board.
3. Install the function board assembly.
4. Install the covers and connect the linecord.

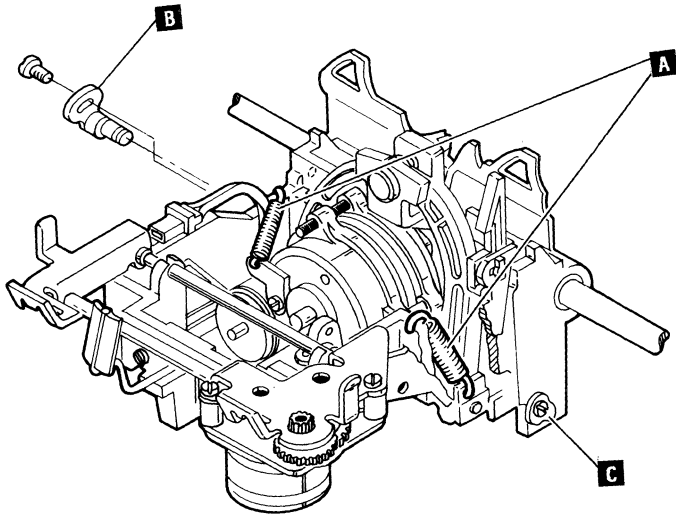


Ribbon Plate Removal

1. Disconnect the linecord.
2. Remove the ribbon cartridge.
3. Note the direction of the high point on the c-clip **A** ; then remove it from the pivot shaft.
4. Disconnect the ribbon feed motor connector **B** .
5. Remove the ribbon plate locking screw **C** , washer, and spacer.
6. Slide the ribbon plate to the right and lift it out of its mounting slots on the carrier.

Ribbon Plate Installation

1. Using a little grease to hold the spacer in place, install it on the carrier over the mounting screw hole.
2. Place the ribbon plate into its mounting slots in the carrier and slide it to the left, being careful not to dislodge the spacer.
3. Install the ribbon plate locking screw **C** and washer.
4. Install the c-clip **A** with the high point in the same direction as it was when it was removed.
5. Connect the ribbon feed motor connector **B** .
6. Make the ribbon height adjustment. See 5-4.



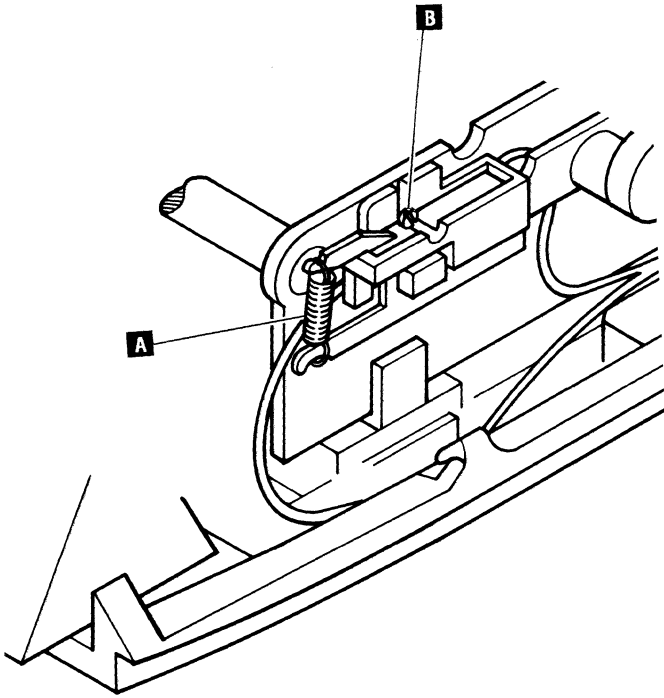
Selection Plate Assembly Removal

1. Disconnect the linecord.
2. Remove the printwheel and ribbon.
3. Disconnect the springs **A** .
4. Remove the carrier.
5. Disconnect the hammer solenoid and selection motor connectors.
6. Disconnect the homing sensor cable from the homing sensor.
7. Remove the 2 selection plate eccentrics **B** and **C** . Mark the position of the eccentrics. Also notice that the eccentric for the left side **B** has the longest shoulder.
8. Remove the selection plate through the bottom of the carrier.

Selection Plate Assembly Installation

Note: A replacement selection plate assembly contains a print hammer solenoid with 2 shims. You may remove 1 shim to adjust for light impression. Put the removed shim back on the solenoid if removing it causes partial lift-off. Do not remove shims from other than new replacement selection plate assemblies.

1. Insert the selection plate through the bottom of the carrier.
2. Install the 2 selection plate eccentrics **B** and **C** , being careful to align the eccentrics with the mark made on the carrier in the removal procedure.
3. Connect the homing sensor cable to the homing sensor.
4. Connect the hammer solenoid and selection motor connectors.
5. Install the carrier.
6. Connect the springs **A** .
7. Make the Even Top and Bottom adjustment. See page 5-3.

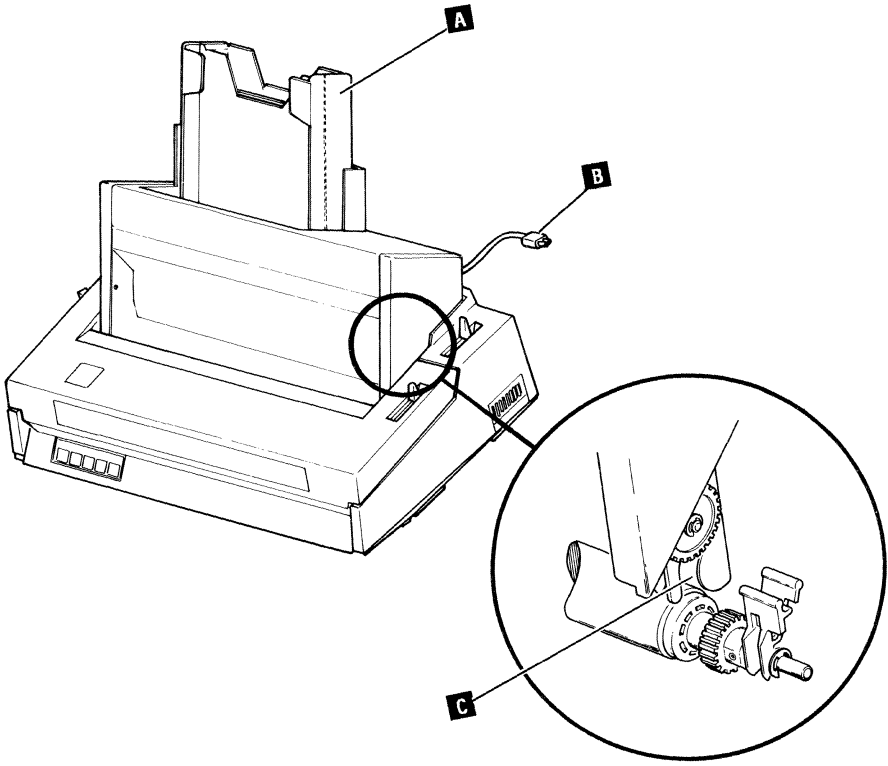


Semi-Automatic Paper Insertion (SAPI) Switch Removal

1. Disconnect the linecord and remove the covers.
2. Remove the spring **A** from the switch.
3. Remove the switch mounting screw **B**.
4. Lift the switch up from the actuator and disconnect the wires.

Semi-Automatic Paper Insertion (SAPI) Switch Installation

1. Connect the switch wires.
2. Place the switch onto the switch actuator.
3. Position the wires to the left side of the actuator.
4. Mount the switch to the left side frame so it is horizontal, and its mounting screw is bottomed in the slot. Install the screw **B**.
5. Connect the spring **A**.
6. Install the covers.



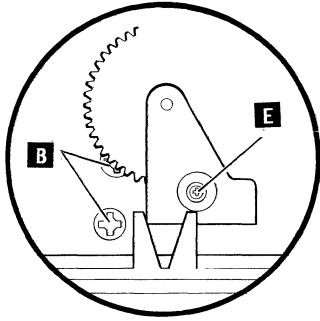
Sheetfeed Removal

1. Position the power switch off.
2. Move the carrier to the center of the printer.
3. Remove the paper tray **A** from the sheetfeed.
4. Disconnect the features cable **B** from the back of the printer.
5. Pull the paper bail forward.
6. Raise the sheetfeed up and out of the machine.

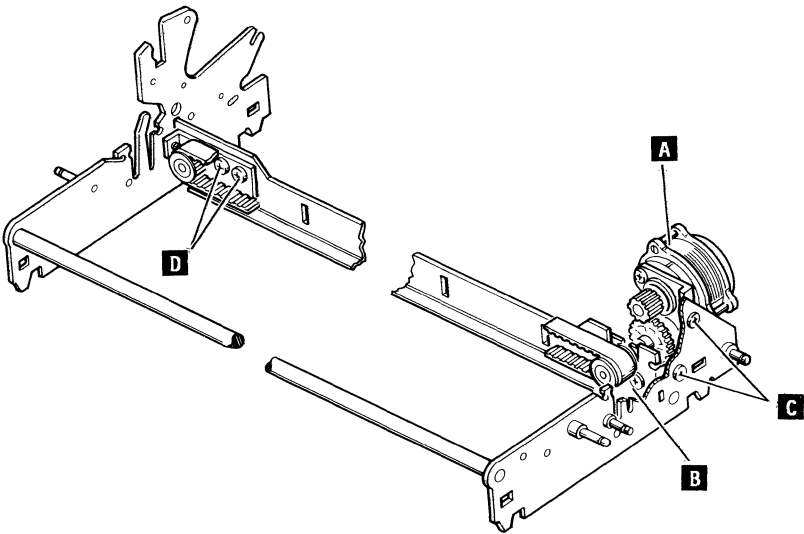
Sheetfeed Installation

Note: For initial installation, the paper table must be removed.

1. Move the carrier to the center of the printer.
2. Pull the paper bail forward.
3. Lower the sheetfeed onto the printer until the slots **C** rest on the platen shaft.
4. Connect the features cable **B** to the back of the printer.
5. Install the paper tray **A** into the sheetfeed.

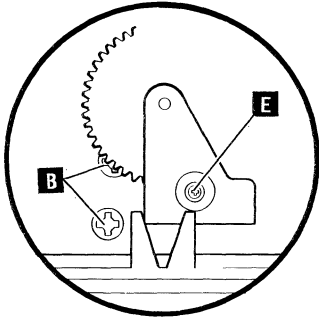


(Left Side View)

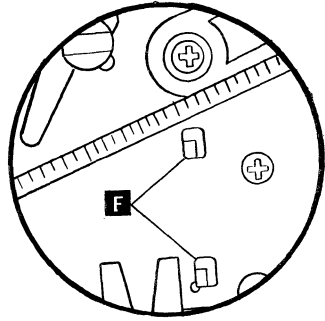


Transport Assembly Removal

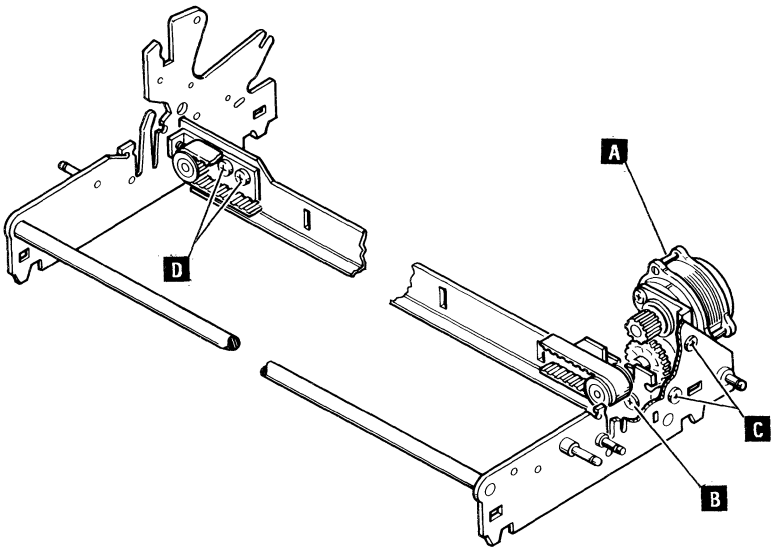
1. Disconnect the linecord and remove the covers.
2. Remove the transport motor **A** . (See page 4-56.)
3. Remove the carrier. (See page 4-7.)
4. Remove the mounting screws **B** . To remove the left-hand mounting screws, it is necessary to loosen the First Writing Line Knock-Off mounting screws.
5. Move the Paper Release Lever to the rear.
6. Remove the 2 right-side transport motor bracket mounting screws **C** .
7. Remove the idler pulley bracket screws **D** .
8. Remove the idler pulley adjusting screw **E** .
9. Move the transport assembly to the right and lift it out of the printer.



(Left Side View)

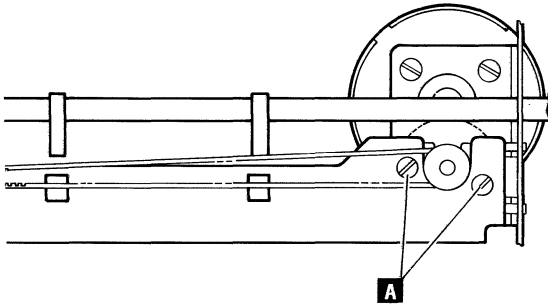


(Right Side View)

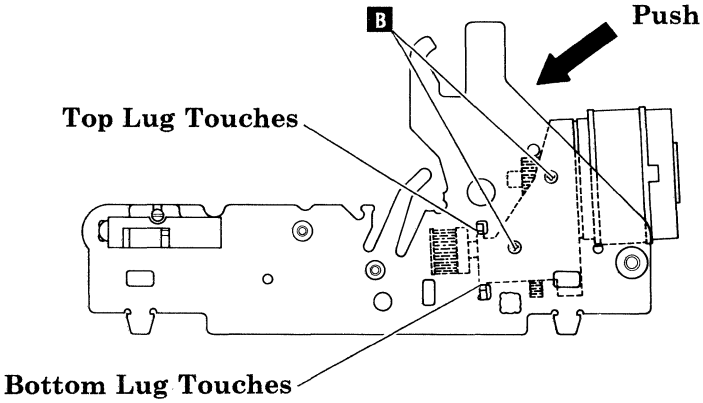


Transport Assembly Installation

1. Disconnect the linecord.
2. Place the transport assembly into the printer. Install the 2 right side transport motor bracket mounting screws **C** and the transport assembly mounting screws **B** but do not tighten them.
3. Install the transport assembly idler pulley bracket with its 2 screws **D** but do not tighten them.
4. Install the idler pulley adjusting screw **E**.
5. Position the right end of the transport bracket **F** in the side frame to meet the following conditions:
 - a. Move the right end of the transport bracket down until the lugs on the right end bottom against the side frame.
 - b. Move the right end of the transport bracket forward until both lugs touch the side frame.
6. Tighten the transport assembly mounting screws **B**.
7. Tighten the First Writing Line Knock-Off mounting screws.
8. Install the carrier and perform the "Transport Belt Adjustment" on page 5-5.
9. Install the transport motor **A**. (See page 4-56.)
10. Install the covers and connect the linecord.



(Front View)



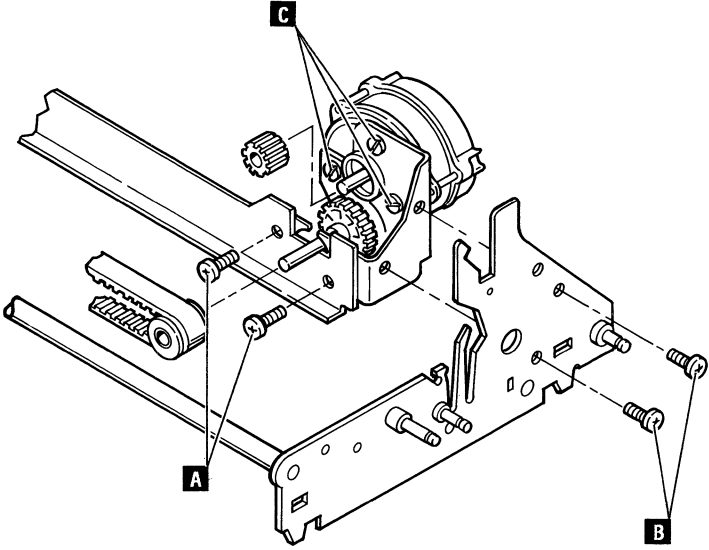
(Right Side View)

Transport Motor Bracket Removal

1. Remove the mounting screws **A** .
2. Remove the 2 motor bracket mounting screws **B** .
3. Remove the transport bracket from the machine.

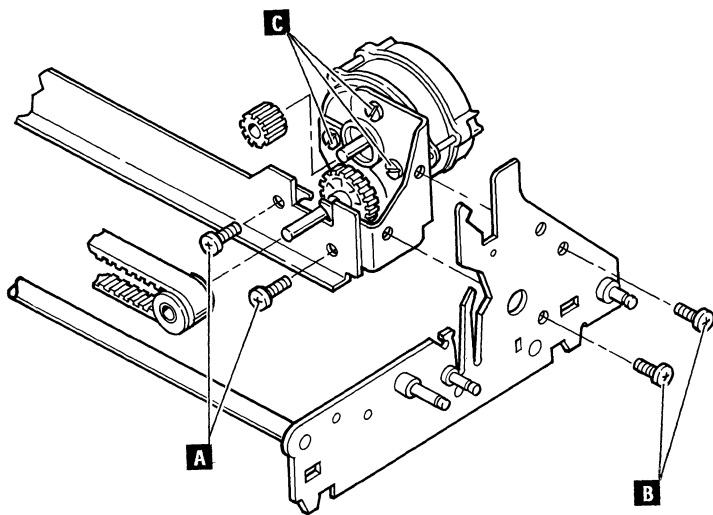
Transport Motor Bracket Installation

1. Position the right-hand end of the transport bracket in the side frame to meet 2 conditions:
 - Down so the bottom lug touches the bottom of the hole in the side frame
 - Forward so the top and bottom lugs touch the front of the holes in the side frame.
2. Tighten the 2 motor bracket mounting screws **B** .
3. Install the mounting screws **A** .



Transport Motor Removal

1. Disconnect the linecord and remove the top cover.
2. Remove the front control panel.
3. Disconnect the transport motor cable.
4. Roll the transport belt off the drive pulley. Do not use tools to do this.
5. Release the frame assembly from the front frame latches.
6. Lift and hold the front of the frame assembly so you can remove the transport motor bracket mounting screws **A** .
7. Move the paper release lever to the rear.
8. Remove the 2 right-side transport motor bracket mounting screws **B** .
9. Loosen, but do not remove, the left-hand printer board mounting screw.
10. Remove the right-hand printer board mounting screw.
11. Remove the right-hand function board mounting screw.
12. Pivot the board assembly to the rear.
13. Move the transport bracket assembly to the rear and lift it out of the printer.
14. Remove the 3 transport motor mounting screws **C** .



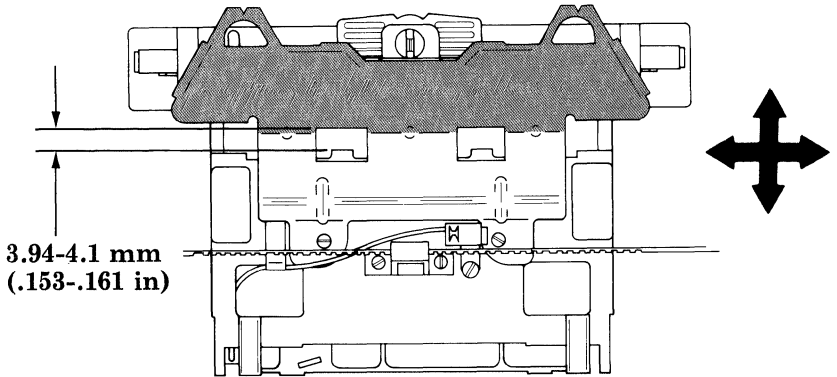
Transport Motor Installation

1. Install the 3 transport motor mounting screws **C** .
2. Install the transport motor bracket assembly, sliding it in from the rear of the printer.
3. Pivot the board assembly into the printer.
4. Install the function board mounting screws.
5. Install the printer board mounting screws.
6. Install the 2 right-side screws **B** , but do not tighten.
7. Install the transport bracket screws. Hold the transport bracket down and to the front, and tighten the screws. See page 4-53.
8. Move the paper release lever to the front of the printer.
9. Holding the front of the frame assembly up, install the transport motor bracket mounting screws **A** .
10. Install the transport gear load spring.
11. Latch the front frame latches.
12. Roll the transport belt onto the drive pulley. Do not use tools to do this.
13. Connect the transport cable.
14. Install the front control panel.
15. Install the cover.

ADJUSTMENTS

Cardholder Adjustment

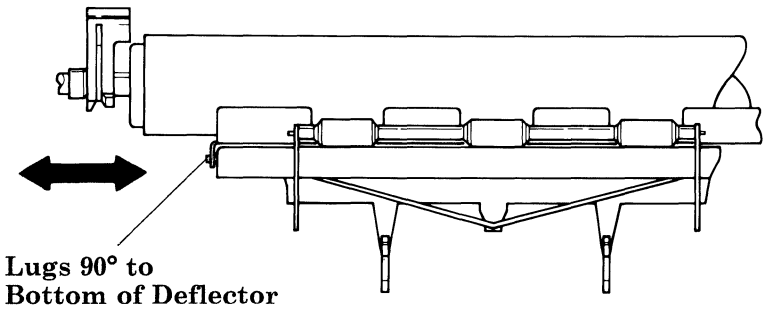
Position the cardholder so it clears the lugs on the back of the carrier by 3.9-4.1 mm (.153-.161 in).



(Rear View)

Deflector Adjustment

Form the deflector lugs so they are 90° to the bottom of the deflector.

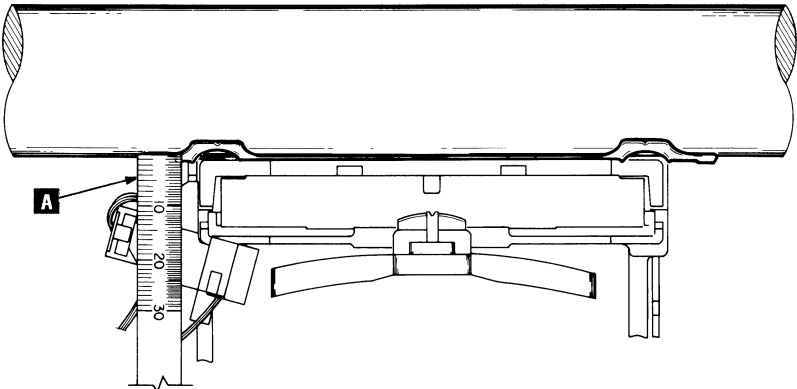


(Front View)

End-of-Ribbon Adjustment

Position the end-of-ribbon sensor assembly 11 ± 0.5 mm (0.43 ± 0.2 in) from the platen.

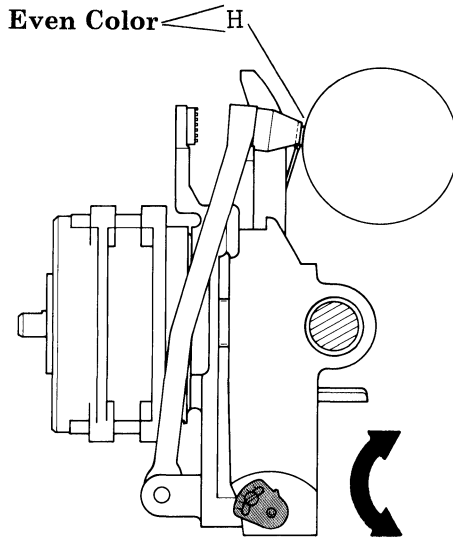
1. Loosen the mounting screw **A** slightly.
2. Hold a scale parallel to the table top and in line with the top of the red line on the cardholder.
3. Move the end-of-ribbon sensor assembly until it is 11 ± 0.5 mm (0.43 ± 0.2 in) from the platen.
4. Tighten the mounting screw.



(Top View)

Even Top and Bottom Printing Adjustment

1. Check the platen bushings for wear before you make this adjustment.
2. Adjust the left and right selection plate eccentrics for even top and bottom printing.

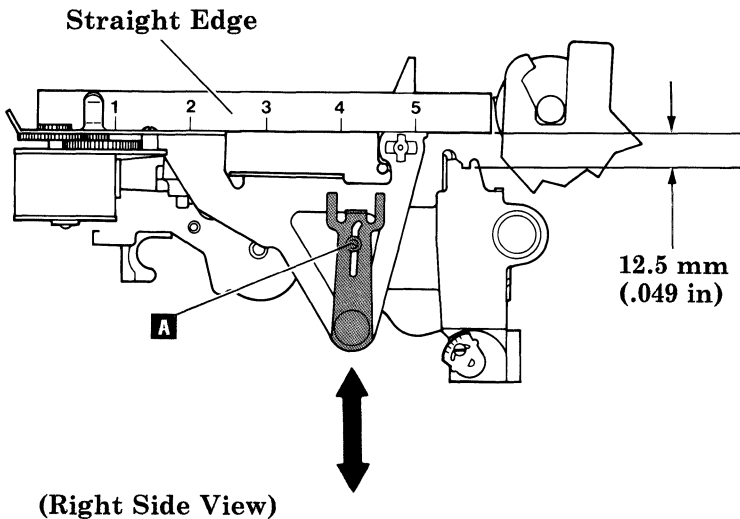


(Right Side View)

Ribbon Plate Adjustment

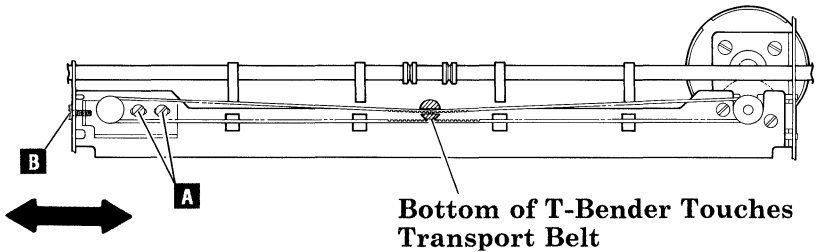
Adjust the ribbon plate so the underscore prints approximately 1.2 mm (.050 in) from the bottom edge of the ribbon.

1. Loosen the ribbon plate locking screw **A**.
2. Place a straight edge on the ribbon plate as shown. Move the ribbon plate until the bottom edge of the straight edge is $12.5 \pm .5$ mm ($.049 \pm .02$ in) from the notch in the carrier.
3. Tighten the locking screw.
4. Run the Printer Self Test. Press and hold the **Stop** button and position the Power switch on. Allow the printer to print until an underscore has printed. Position the Power switch off.
5. Measure the distance from the bottom edge of the ribbon to the bottom of the underscore. If the measurement is not $1.2 \pm .3$ mm ($.050 \pm .012$ in), loosen the locking screw slightly and make a final adjustment.

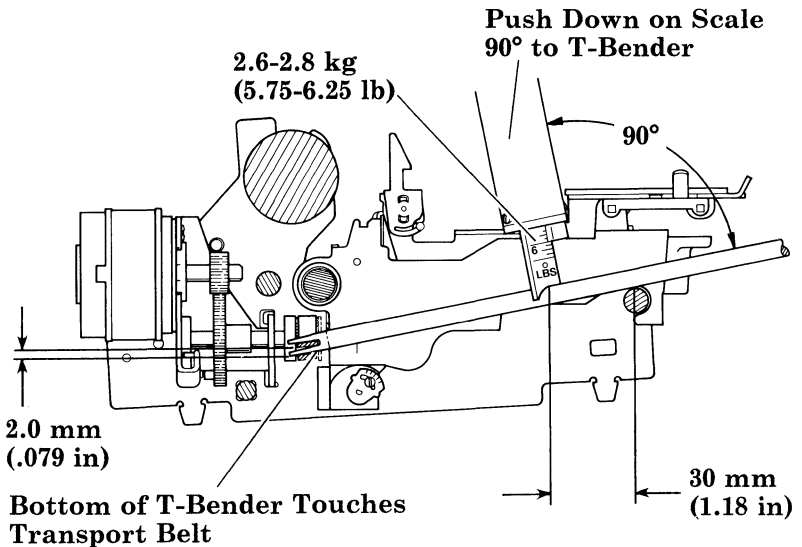


Transport Belt Adjustment

1. Move the carrier all the way to the right.
2. Loosen the idler pulley bracket mounting screws **A**.
3. Slide the T-Bender on the top transport belt at the center of the belt.
4. Rest the T-Bender on the carrier shaft.
5. Hold the scale 90 degrees to the T-Bender. Put 2.6 to 2.8 kg (5.75 to 6.25 lb) pressure on the T-Bender 30 mm (1.18 in) from the center of the carrier shaft.
6. Turn the adjusting screw **B** in or out so the bottom of the T-Bender touches the transport belt.



T-Bender Approximately Centered on Transport Belt



(Left Side View)

PARTS CATALOG

How to Use This Parts Catalog

1. **SIMILAR ASSEMBLIES:** If two assemblies contain a majority of identical parts, they are broken down on the same list. Common parts are shown by one index number. Parts peculiar to one or the other of the assemblies are listed separately and identified by description.
2. **NO PN:** When this indication appears in the part number column, it denotes a group of parts for which no assembly part number has been assigned and the detailed parts should be ordered separately.
3. **NP:** This entry in the unit column indicates the part is non-procurable and the next higher assembly should be ordered.
4. **NR:** This entry in the unit column denotes the part is procurable but not recommended for field replacement. The next higher assembly should be ordered.
5. **AR:** As Required (AR) in the unit column denotes that the quantity is used as required.
6. A circle around a Figure-Index number indicates a complete assembly. The assembly is broken down within the figure.

7. **INDENTURE:** The indenture is marked by a series of dots located before the part description. The indenture indicates the relationship of a part to next higher assemblies. For example:

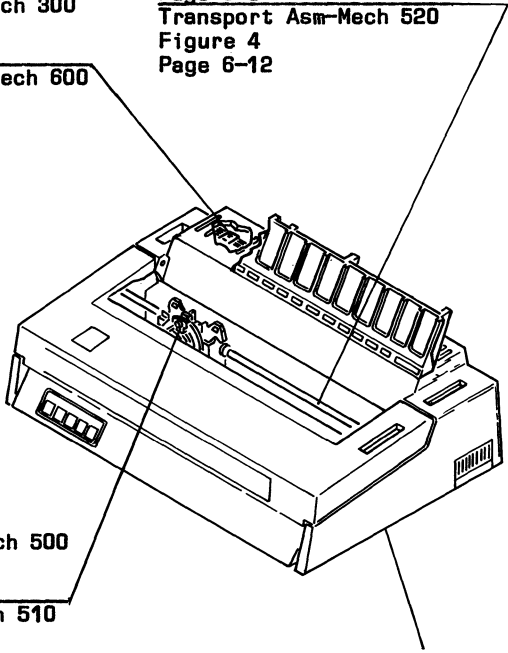
Indenture	Relationship of Parts
(No Dot)	MAIN ASSEMBLY
(One Dot)	• Detail parts of a main assembly
(One Dot)	• Subassembly of the main assembly
(Two Dot)	•• Detail part of a one-dot subassembly
(Two Dot)	•• Subassembly of a one-dot subassembly
(Three Dot)	••• Detail part of a two-dot subassembly

CONTENTS

FIGURE		PAGE
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2	Paper Feed Assembly—Mech 230(2 Sheets).....	6-8
3	Electronics—Mech 300.....	6-12
4	Transport Assembly—Mech 520.....	6-14
5	Carrier Assembly—Mech 500.....	6-16
6	Ribbon Assembly—Mech 510.....	6-18
7	Power Supply Assembly—Mech 600.....	6-20

Electronics-Mech 300
Figure 3
Page 6-10
Power Supply-Mech 600
Figure 7
Page 6-18

Paper Feed Asm-Mech 230
Figure 2
Page 6-8
Transport Asm-Mech 520
Figure 4
Page 6-12



Carrier Asm-Mech 500
Figure 5
Page 6-14
Ribbon Asm-Mech 510
Figure 6
Page 6-16

Cover/Frame Asm-Mech 010
Figure 1
Page 6-6

- 1384499 Retainer Parts Packet
- 1384498 Screw Parts Packet
- 1384497 Spring Parts Packet
- 1384286 Combined Parts Packet
- 7343045 Discontinuance Kit

CATALOG SECTION

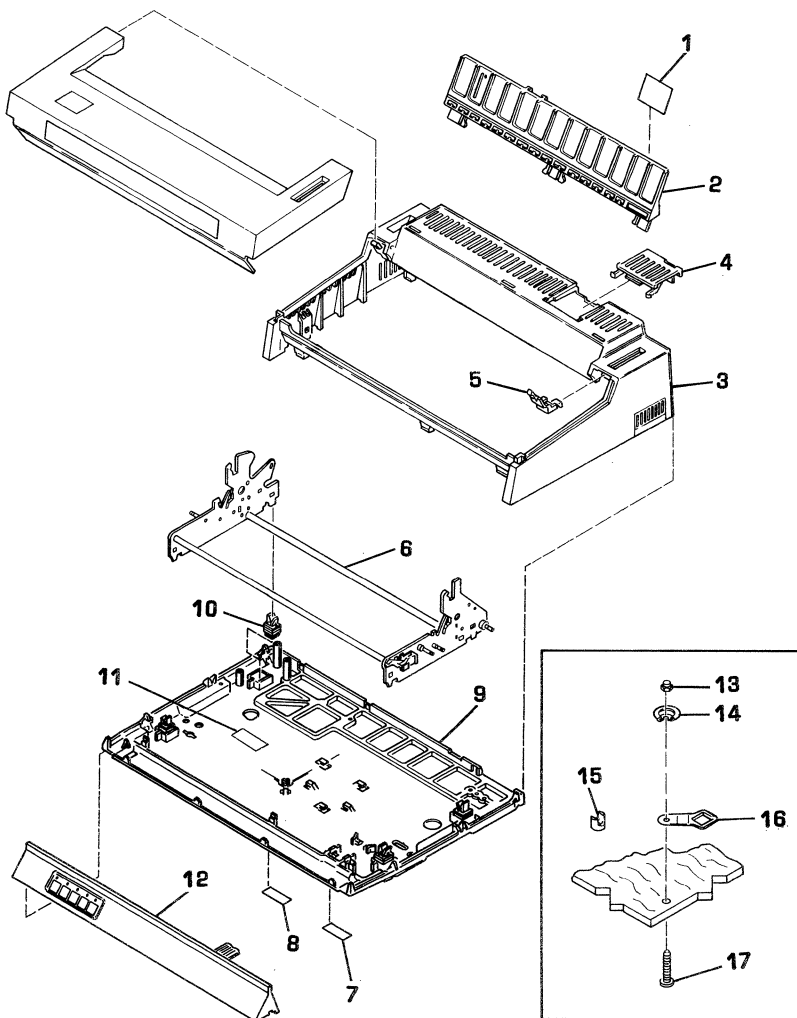


Figure 1. Cover/Frame Asm-Mech 010

FIG- INDEX	PART NUMBER	UNITS	DESCRIPTION
1-1	1342151	1	Logo,Center Rear
-2	1341078	1	Paper Table
-3	1341062	1	Cover,Top And Center Also Order Ref. No. -1 And -18
-4	1342140	1	. Door,Options Access
-5	1337667	2	. Hinge,Cover,Replace Both Hinges
-6	1384251	1	Frame Asm,Machine Also Order 1384044 And 1384047
-7	1279828	1	Label,Electrical Requirements
-8	1279848	1	Label,FCC
-9	1279833	1	Cover,Bottom Also Order Ref No. -7, -8 And -11
-10	1337587	4	. Latch,Frame Replace All 4
-11	1384017	1	Label,Serial Number
-12	1279836	1	Panel Asm,Front Cover
-13	0117281	AR	Nut
-14	1342358	AR	Collar
-15	1342428	1	Guide,Hole Aligning
-16	1342359	1	Plate,Right
-16	1342372	1	Plate,Left
-17	1287007	AR	Bolt,5/8"
-17	1287008	AR	Bolt,3/4"
-17	1287009	AR	Bolt,1"
-17	1287010	AR	Bolt,1 1/4"
-17	1287011	AR	Bolt,1 1/2"
-17	1287012	AR	Bolt,1 3/4"
-17	1287013	AR	Bolt,2"
-17	1287911	AR	Bolt,2 1/4"
-17	1287912	AR	Bolt,2 1/2"
-17	1287913	AR	Bolt,2 3/4"
-17	1287914	AR	Bolt,3"
-18	1384541	1	Logo,Top

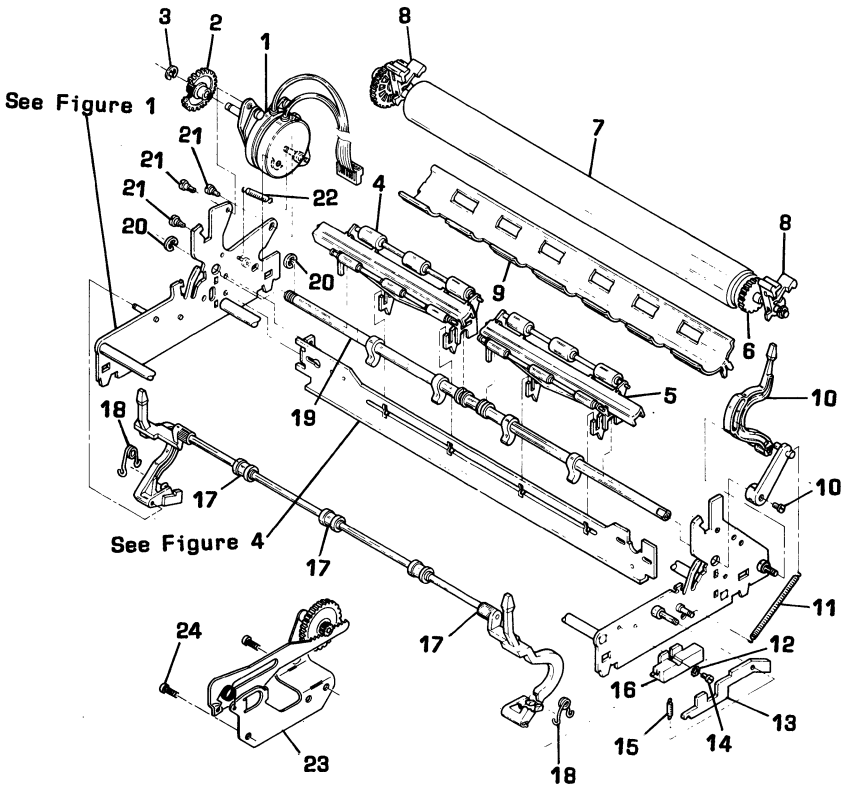


Figure 2. Paperfeed Asm-Mech 230 (1 of 2)

FIG- INDEX	PART NUMBER	UNITS	DESCRIPTION
2-1	1384043	1	Motor, Paper Feed
-2	1337033	1	. Gear, Paper Feed Intermediate
-3	No PN	1	. Retainer Part of Parts Packet 1384499
-4	1384145	1	Roller Asm, Paper Feed-Left Also Order Ref No. -5, -9, And -19
-5	1384146	1	Roller Asm, Paper Feed-Right Also Order Ref No. -4, -9 And -19
-6	No PN	NP	Gear, Platen
-7	1384411	1	Platen
-8	No PN	2	. Latch, Platen
-9	1339237	1	Deflector, Paper Feed
-10	1384047	1	Lever, Paper Release Also Contains Ref No. -11, -21
-11	No PN	1	Spring Part of Parts Packet 1384497
-12	No PN	1	Washer Part of Parts Packet 1384499
-13	1337061	1	Lever, SAPI
-14	No PN	1	Screw Part of Parts Packet 1384498
-15	No PN	NP	Spring Part of Parts Packet 1384497
-16	1317925	1	Switch, SAPI
-17	1384044	1	Paper Bail Asm
-18	No PN	AR	. Spring Part of Parts Packet 1384497
-19	1337884	1	Shaft, Paper Feed Cam
-20	No PN	AR	Retainer Also Order Ref No. -10
-21	1339099	AR	Screw Part of Parts Packet 1384499
-22	No PN	1	Spring Also Part of Parts Packet 1384498
-23	1384412	AR	First Writing Line Knock Off Part of Parts Packet 1384497
-24	1623641	AR	Screw Also Part of Parts Packet 1384286

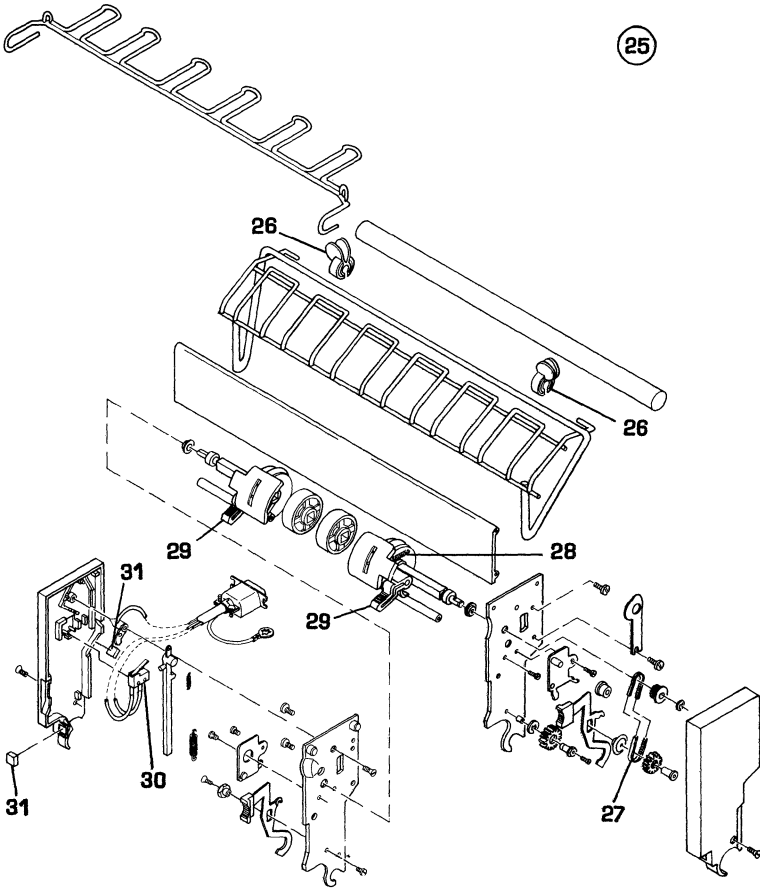


Figure 2. Paperfeed Asm-Mech 230 (2 of 2)

FIG- INDEX	PART NUMBER	UNITS	DESCRIPTION
2-25	1341091	AR	Form Feeder,Pin Wheel
-26	1341086	2	. Paper Insertion Clip
-27	1341112	1	. Belt,Drive
-28	1341176	2	. Spring,Pin Wheel Cover
-29	1341174	2	. Cover,Pin Wheel
-30	1341138	1	. Switch and Cable
-31	1341128	AR	. Pad

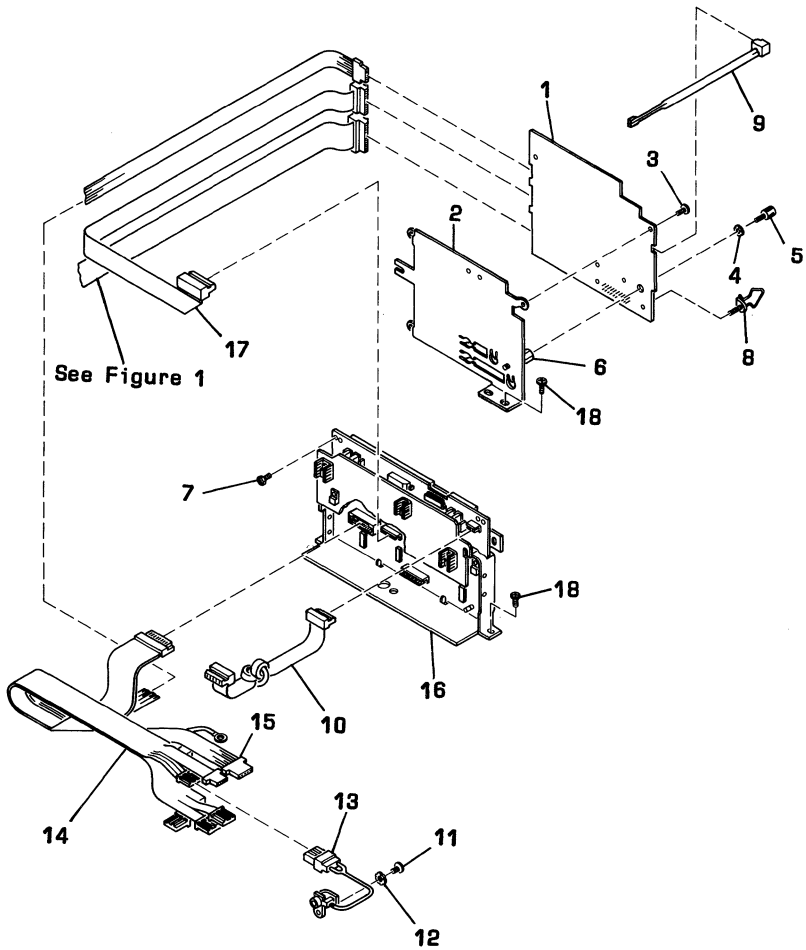


Figure 3. Electronics-Mech 300

FIG- INDEX	PART NUMBER	UNITS	DESCRIPTION
3-1	1384544	1	Board,Function
-2	No PN	NP	. Bracket,Function Board
-3	No PN	AR	. Screw Part of Parts Packet 1384498
-4	No PN	1	. Washer Part of Parts Packet 1384499
-5	1341014	1	. Thumb Nut
-6	1279872	1	. Stand Off
-7	No PN	AR	. Screw Part of Parts Packet 1384286
-8	1621174	AR	Screw
-9	1339037	1	Cable,SAPI
-10	1317722	1	Cable,Transport
-11	No PN	AR	Screw Part of Parts Packet 1384498
-12	No PN	AR	Washer Part of Parts Packet 1384499
-13	1342160	1	Cable,Homing Sensor
-14	1384546	1	Cable,Carrier
-15	No PN	NP	. Cable,End of Ribbon
-16	1384543	1	Board,Printer Asm
-17	1279841	1	Cable,System
-18	No PN	AR	Screw Part of Parts Packet 1384286

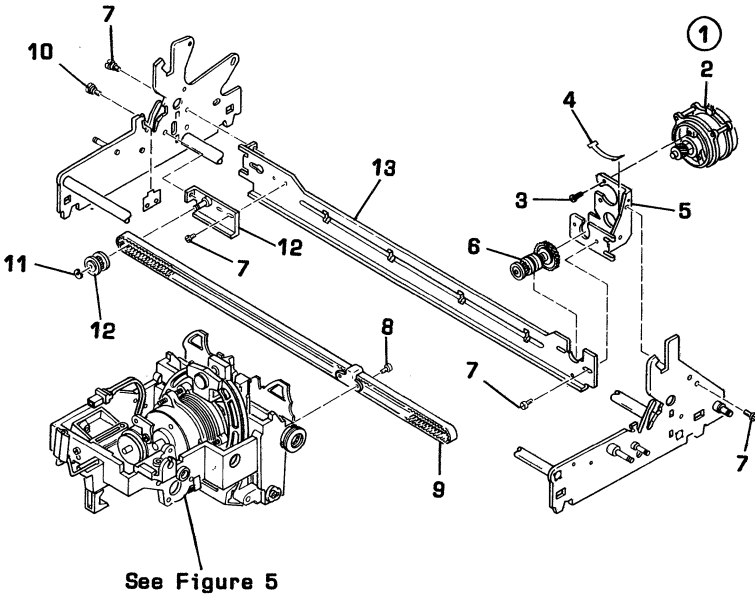


Figure 4. Transport Asm-Mech 520

FIG- INDEX	PART NUMBER	UNITS	DESCRIPTION
4-1	1384082	1	Transport Asm
-2	1384081	1	. Motor,Transport
-3	1621170	AR	. Screw Also Part of Parts Packet 1384498
-4	No PN	NP	. Spring,Transport Gear Load
-5	No PN	NP	. Bracket,Transport Motor
-6	No PN	NP	. Gear,Transport
-7	1623642	AR	. Screw Also Part of Parts Packet 1384498
-8	1621170	AR	. Screw Also Part of Parts Packet 1384498
-9	1337651	1	. Belt,Transport
-10	No PN	1	. Screw Part of Parts Packet 1384286
-11	No PN	1	. Retainer Part of Parts Packet 1384498
-12	No PN	NP	. Pulley Asm
-13	1339140	1	Bracket,Transport Mounting
-14	1342485	1	Clip,Homing Sensor Flag Stop

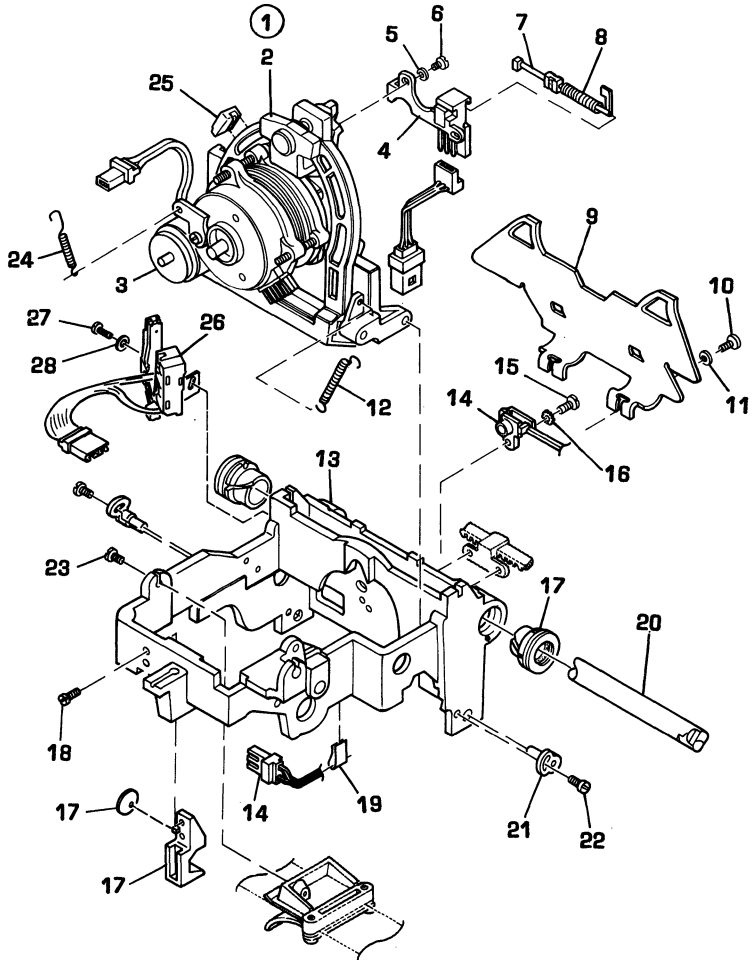


Figure 5. Carrier Asm-Mech 500

FIG- INDEX	PART NUMBER	UNITS	DESCRIPTION
5-1	No PN	1	Carrier Asm
-2	1384061	1	. Selection Plate Asm Includes Ref -27 Also Order Ref -21
-3	No PN	NP	. . Solenoid,Print Hammer
-4	No PN	NP	. . Sensor,Homing
-5	No PN	AR	. . Retainer Part of Parts Packet 1384499
-6	No PN	AR	. . Screw Part of Parts Packet 1384498
-7	1337801	1	. . Flag,Homing Sensor
-8	765129	1	. . Spring,Homing Sensor Flag
-9	1342462	1	. Card Holder
-10	1621187	2	. Screw Also Part of Parts Packet 1384498
-11	1622302	2	. Washer Also Part of Parts Packet 1384499
-12	No PN	1	. Spring Part of Parts Packet 1384497
-13	1384062	1	. Frame,Carrier
-14	1337008	1	. . Led,Homing
-15	No PN	1	. . Screw Part of Parts Packet 1384498
-16	No PN	1	. . Retainer Part of Parts Packet 1384499
-17	1384085	1	. . Carrier,Bearing Asm Includes Ref -18
-18	1622532	AR	. . Screw Also Part of Parts Packet 1384498
-19	1342081	AR	. . Clip,Homing Led
-20	1337071	1	. Shaft,Carrier
-21	1384067	1	. Eccentric B/M Includes Ref -12, -22 and -24
-22	No PN	AR	. . Screw Part of Parts Packet 1384498
-23	1622532	AR	. Screw Also Part of Parts Packet 1384498
-24	No PN	1	. Spring Part of Parts Packet 1384497
-25	1317943	1	. Damper,Printer Hammer
-26	1279846	1	Sensor,End of Ribbon
-27	No PN	1	Screw Part of Parts Packet 1384498
-28	No PN	1	Washer Part of Parts Packet 1384499
-29	No PN	NP	Printwheel

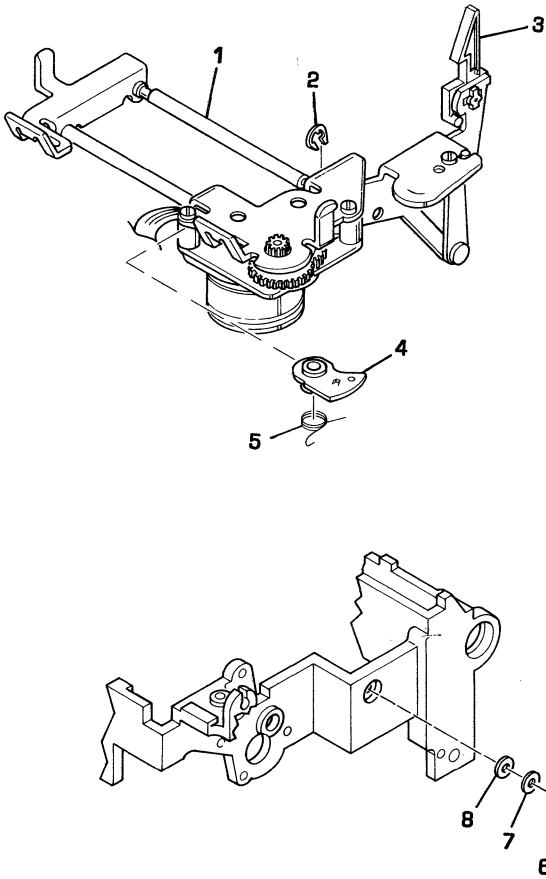


Figure 6. Ribbon Assembly-Mech 510

FIG- INDEX	PART NUMBER	UNITS	DESCRIPTION
6-1	1384545	1	Plate,Ribbon Asm
-2	No PN	1	. Retainer Part of Parts Packet 1384499
-3	1339347	1	. Latch,Ribbon
-4	No PN	NP	. Pawl,Backcheck
-5	No PN	NP	. Spring,Backcheck
-6	1621172	AR	. Screw Also Part of Parts Packet 1384286
-7	1622302	AR	. Washer Also Part of Parts Packet 1384498
-8	1151613	1	. Spacer
-9	No PN	NP	Ribbon Cartridge

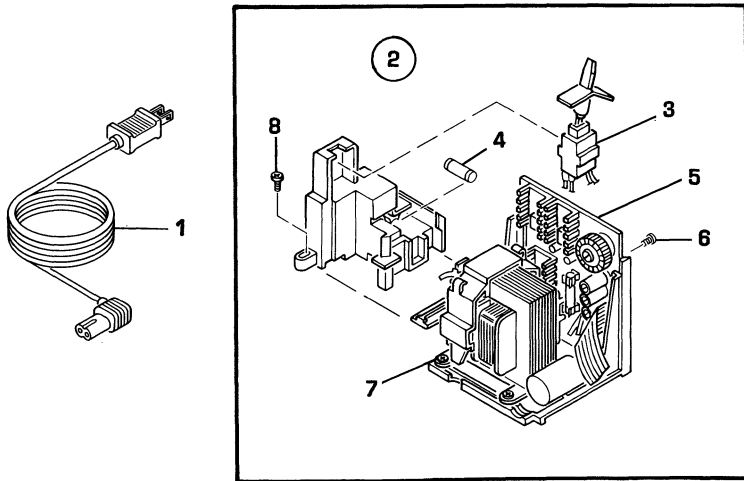
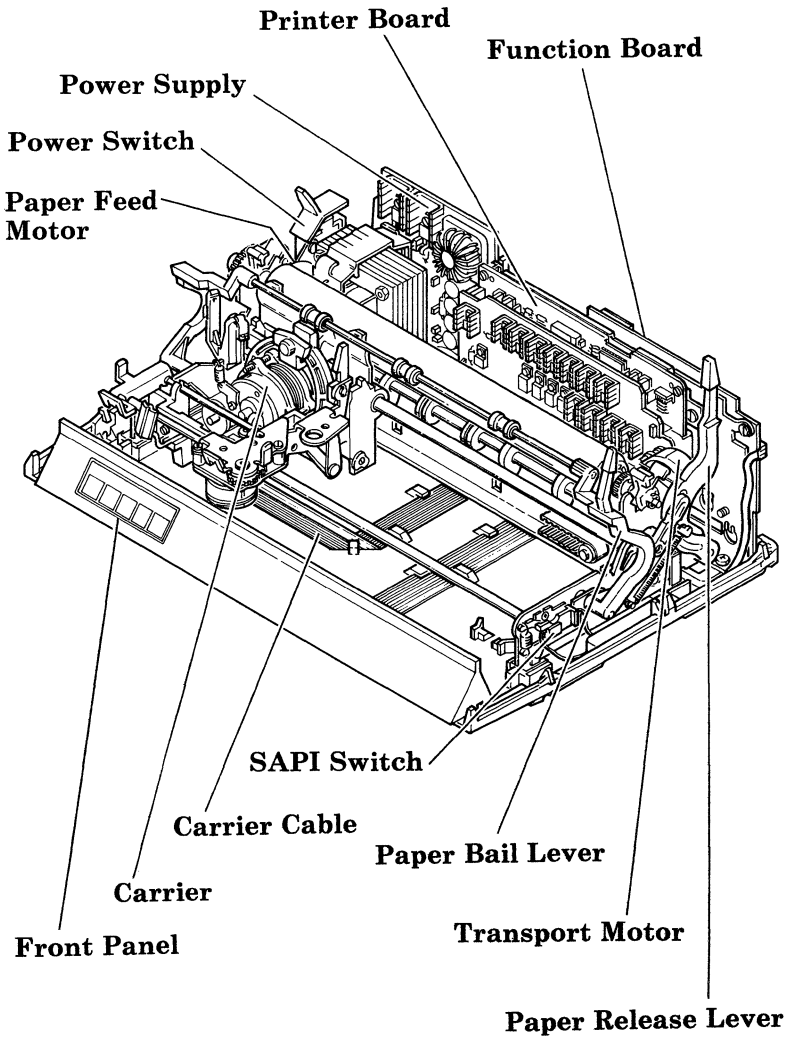


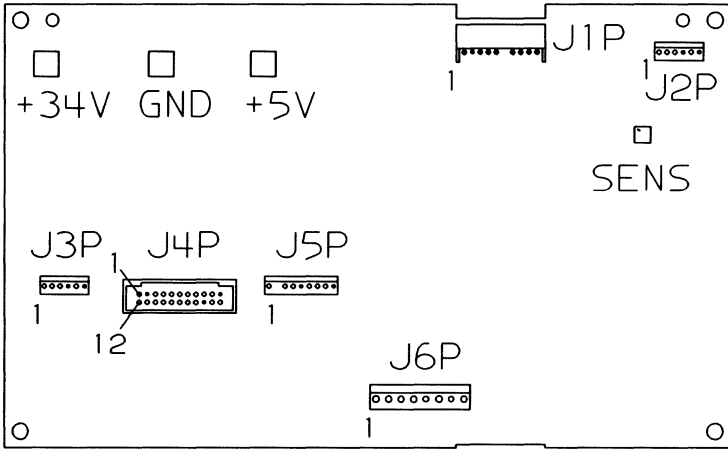
Figure 7. Power Supply Asm-Mech 600

FIG- INDEX	PART NUMBER	UNITS	DESCRIPTION
7-1	1342033	1	Line Cord
-2	1384285	1	Power Supply Assembly
-3	1384281	1	. On/Off Switch Assembly
-4	505077	1	. Fuse, Primary
-5	1384284	1	. Board, Power Supply
-6	No PN	AR	. Screw Part of Parts Packet 1384286
-7	No PN	AR	. Screw Part of Parts Packet 1384286
-8	No PN	AR	. Screw Part of Parts Packet 1384286

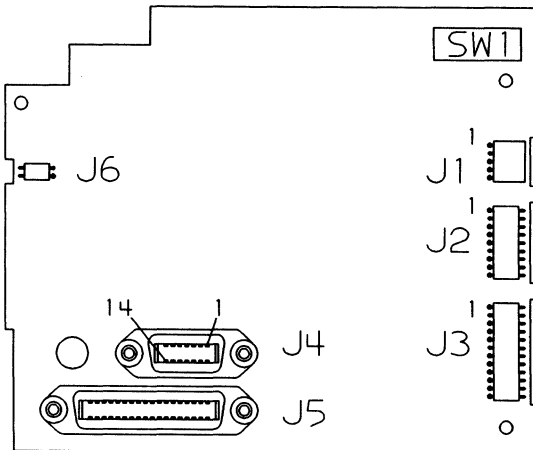
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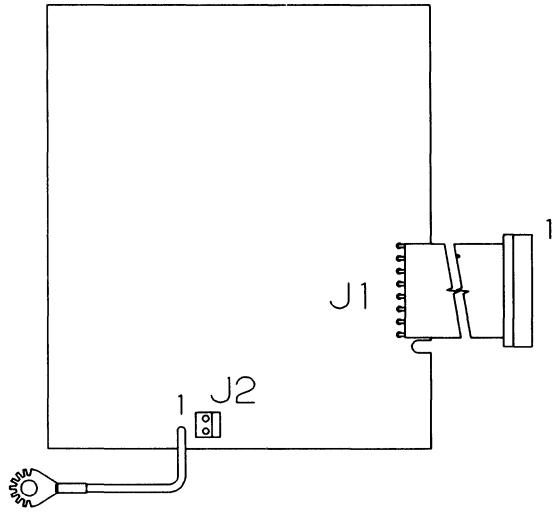




Printer Board



**Function Board
(Rear View)**

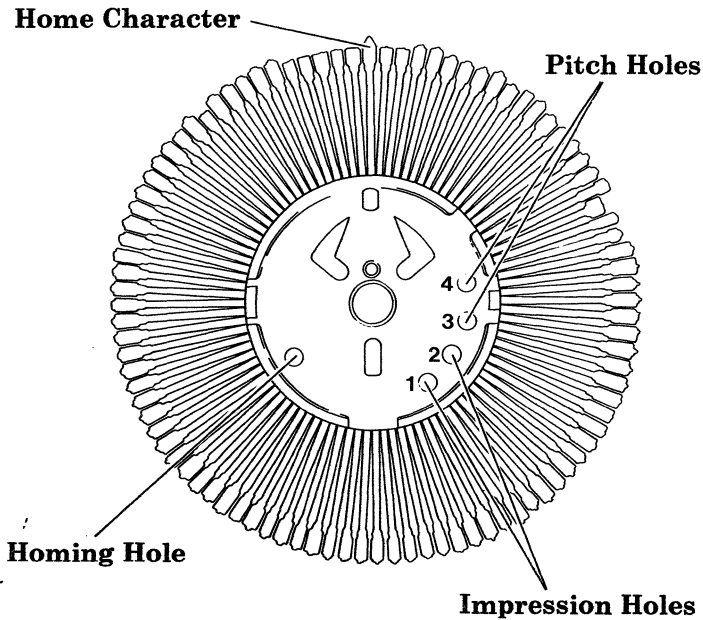


Power Supply Board

Printwheel Identification

Printwheel Code Chart

Hole Code				Pitch	Impression
1	2	3	4		
0				10	Light
	0			10	Medium
				10	Heavy
0		0	0	12	Light
		0	0	12	Medium
	0	0	0	12	Heavy
0			0	15	Light
			0	15	Medium
	0		0	15	Heavy
0		0		PS	Light
		0		PS	Medium
	0	0		PS	Heavy



PREVENTIVE MAINTENANCE (PM)

Lubrication Specifications

CAUTION

Because oil and grease affect rubber, special care should be taken to prevent lubricants from contacting the platen, feed rolls, paper bail rolls, rubber mounts, and drive belts.

Cleaning fluids will damage the typewriter covers.

Use the following numbers to order lubricants from IBM.

Lubricant	Number
IBM #23 grease, 1/2 oz.	P/N 1280441
IBM #23 grease, 1 lb.	P/N 1280442
IBM #10 oil, 4 oz.	P/N 1280443
IBM #10 oil, 1 pt.	P/N 1280444

Do not lubricate the homing LED area, the printwheel, or the transport belt.

Carrier

Area	Lubricant
Carrier rail wipers	No. 10 oil
Print hammer pivot pins	No. 23 grease
Print hammer solenoid rear contact surface	No. 23 grease
Ribbon drive gears and contact surface with ribbon plate	No. 23 grease

Paper Feed

Area	Lubricant
Deflector brackets; transport contact area	No. 23 grease
Paperfeed motor gear; contact surfaces with idler plate, mounting plate	No. 23 grease
Paperfeed motor mounting studs	No. 10 oil
Paperfeed roller shaft pivot points	No. 23 grease
Paperfeed roller tension spring contact surfaces	No. 23 grease
Paperfeed shaft pivot points	No. 23 grease
Paper release bellcrank pin	No. 23 grease
Paper release lever cam slot	No. 23 grease

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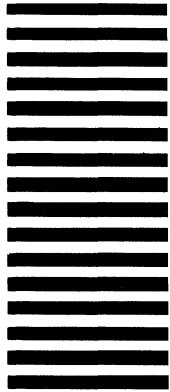
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