SY20-8575-0

IBM 5218 Printer
Models A03/A04
Maintenance Information Manual

First Edition (May 1983)

IBM has prepared this maintenance manual for the use of IBM customer engineers in the installation, maintenance, or repair of the specific machines indicated. IBM makes no representations that it is suitable for any other purpose.

This publication uses a specific range of words so that the text can be understood by customer engineers in countries where English is not the normal language.

Information contained in this manual is subject to change from time to time. Any such change will be reported in subsequent revisions or Technical Newsletters.

It is possible that this material may contain reference to, or information about, IBM products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be construed to mean that IBM intends to announce such IBM products, programming, or services in your country.

Requests for copies of IBM publications should be made to your IBM representative or to the IBM branch office servicing your locality.

A form for reader's comments is provided at the back of this publication. If the form has been removed, comments may be addressed to IBM Corporation, Department 997, 11400 Burnet Road, Austin, Texas 78758, U.S.A. IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

PREFACE

This maintenance information manual (MIM) provides customer service representatives (CSRs) with the operational theory and adjustment procedures for servicing the IBM 5218 Printer. CSRs using this manual are assumed to have completed the education course on the IBM 5218 A03/A04 Printer.

Adjustments are numbered sequentially to help in servicing. Arrows are used to show the direction in which the part can be adjusted.

Acronyms used in this MIM are defined in the Definition and Acronym List.

RELATED PUBLICATIONS

Related Information can be found in the following manuals:

IBM 5218 Printer Maintenance Analysis Procedures, SY20-8576

IBM Displaywriter System Printer Guide, S544-0861.

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 CEs, and customer 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 CE 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 machinepower 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 dc, observe the special safety instructions given in customer engineering memorandums (CEMs).

- 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-Wrap[1] tools and power drills, are inspected regularly.

---

[1] Trademark of the Gardner-Denver Co.

- 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.

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.

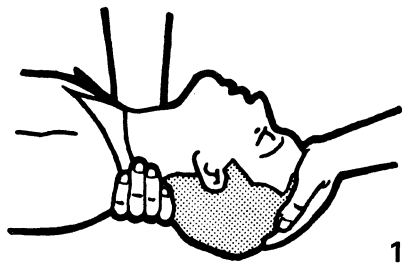
CAUTION
Use extreme care when you perform rescue breathing for a victim who may have breathed-in toxic fumes. Do not breathe-in air that the victim has breathed-out.

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].



1

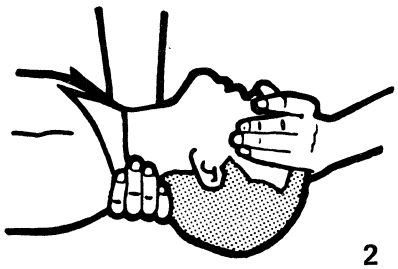
2. Look, listen, and feel to determine if the victim is breathing freely

   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].

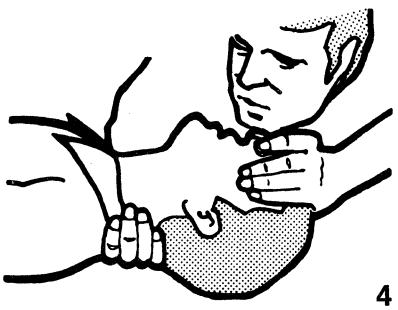


2

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.

3

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



4

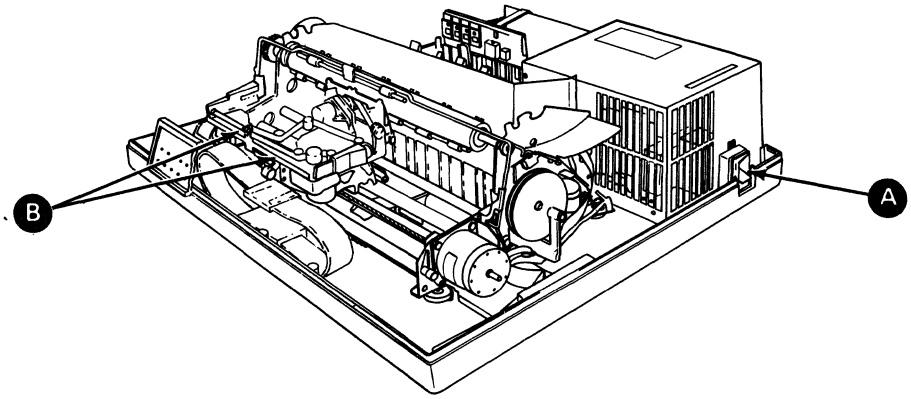
d. Repeat steps b and c once every 5 seconds either until the victim breathes for himself/herself or until medical aid comes.

REPORTING ACCIDENTS

Report, to your field 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.)

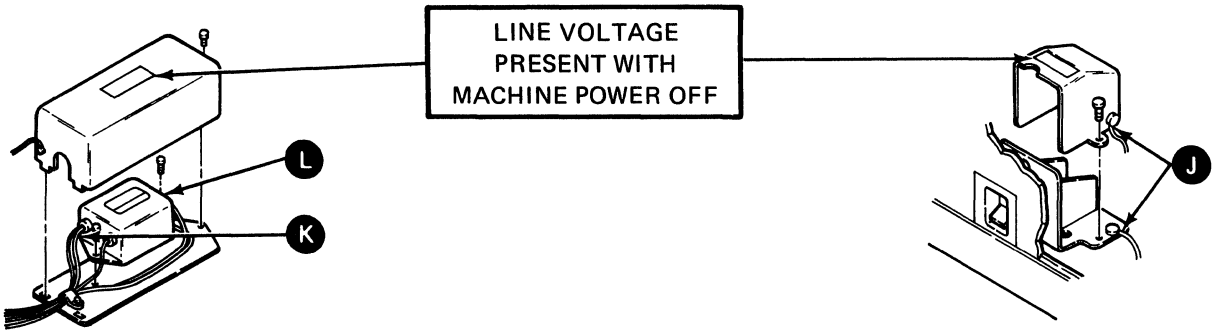
PRINTER SAFETY INSPECTION



- Turn the printer power switch (A) off.
- Unplug the ac line cord from the wall outlet and rear of the printer.
- Ensure that the ac line cord is a molded three wire grounded plug.
- Check the ac line cord for any visibly worn, frayed, or pinched condition and for any bent or loose components.
- Check the ground pin between both ends of the ac line cord for 0.1 ohms or less. Flex the line cord as you measure.

CAUTION
This printer is equipped with a UL and CSA required and approved plug for the user's safety. It is to be used with a properly grounded receptacle.

- Measure the ac wall outlet. Check to ensure that the printer ac voltage tag matches the wall outlet.
- Check for any obvious non-IBM alterations. If any alterations have been installed, has "R009 Non-IBM Alteration/Attachment Survey" been completed?
- Ensure that the ribbon plate (B) is free of sharp edges, and burrs.
- If the power on switch is separate from the power supply do the following:
  - Check the green/yellow wire on the power supply for 0.1 ohms or less between the following:
    - Attachment panel plate and ac line cord cover (C)
    - AC line cord ground plug (D)
    - Printer frame (E)
    - Operator panel shield (F)
    - Index and escapement motor housing (G)
    - Fan ground strap (H)
    - AC line cord ground plug when attached to the rear of the printer.

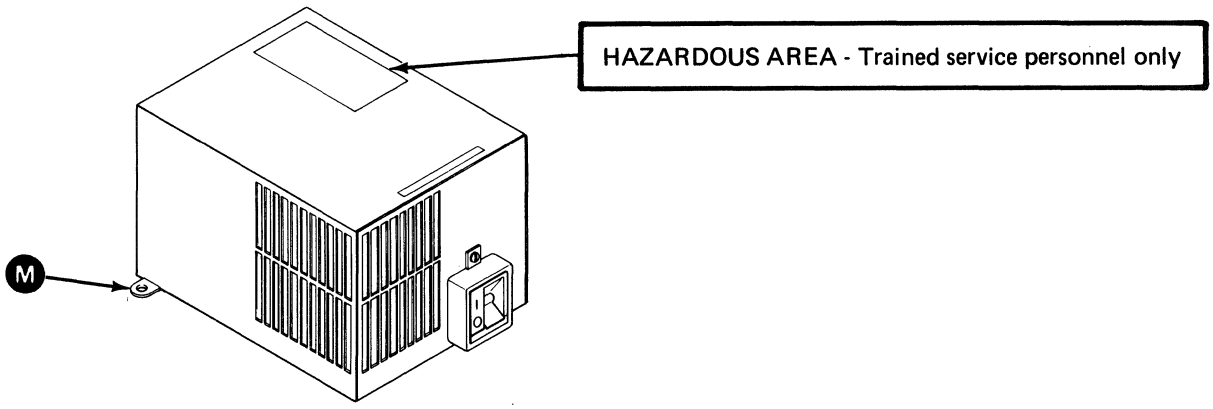


AC Line Filter
(On early machines only)

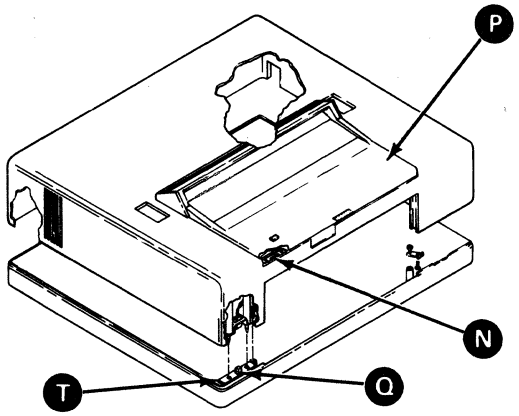
Power Switch

- Check the power switch ground wire (green/yellow) J to the printer frame for 0.1 ohms or less.
- Ensure that the power switch cover is mounted securely, and has no loose or damaged connections.
- Check the power switch cover to the printer frame for 0.1 ohms or less.
- Check for proper safety labels, as shown.

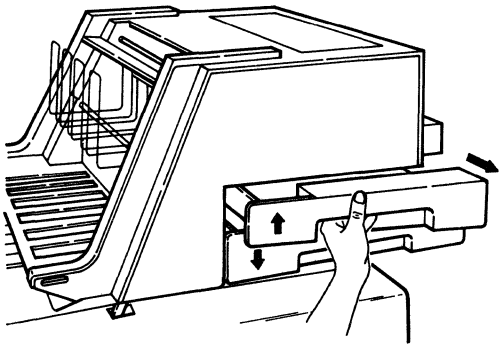
- Check the fan safety cover and if the fan is separate from the power supply ensure that the terminals are covered (shrink tubing).
- Check for any visibly worn, frayed, or pinched cable.
- Check both sides of the power supply for loose cables, connectors, or pins and that grommets are installed where cables pass through metal opening.
- If an AC line filter is installed do the following:
  - Check the AC line filter ground wire K (green/yellow) to the printer frame for 0.1 ohms or less.
  - Check to ensure that the bleeder resistor L is on the load side of the filter.
  - Check the line filter cover to the printer frame for 0.1 ohms or less.
  - Ensure that the line filter cover is mounted securely, and has no loose or damaged connections.
  - Check for proper safety labels, as shown.

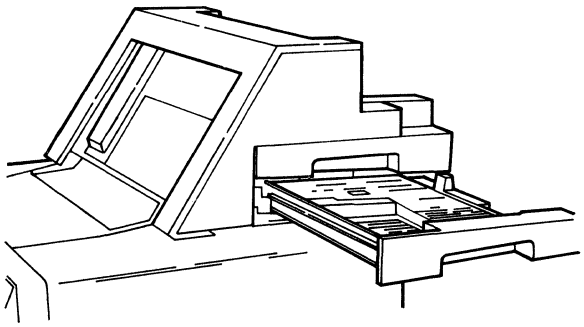


- Ensure that the correct fuse is installed.
- Ensure that all power supply mounting screws M are installed.
- Check for proper safety labels, as shown.

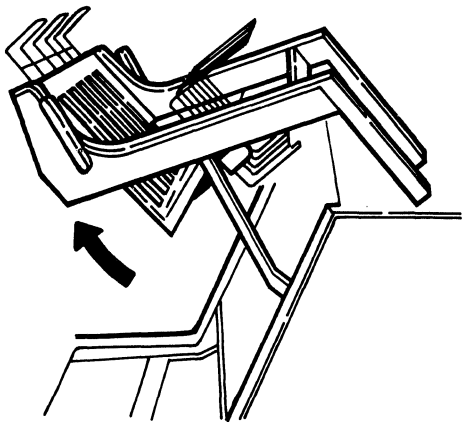


- Check the exterior covers and paper guide racks for any sharp edges or burrs on the printer, tractor feed, sheet-feed, or front exit sheet-feed.
- Check for any loose, broken or sharp edges on the cover pivots.
- Check the cover interlock switch for 0.1 ohms or less between the top connector pins (N). Open the operator access cover (P) to ensure that the switch opens. Check the bottom cover interlock connector (Q) for sharp edges while unplugged.
- Check the cover latches (T) for any sharp edges, file if necessary.

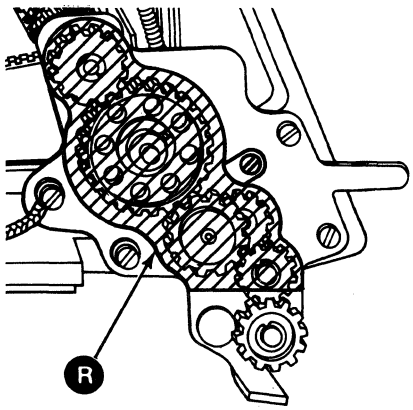


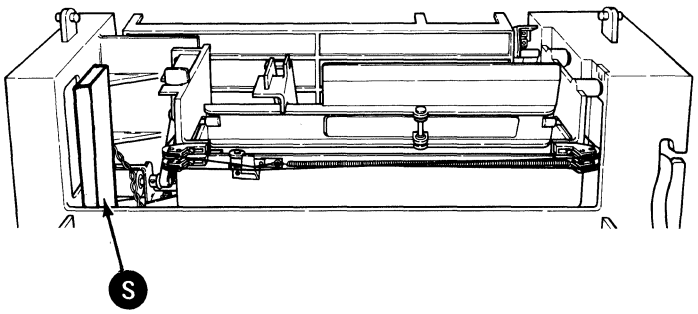


- Check the paper trays for sharp edges or burrs. Ensure that the trays slide in properly and latch in position.
- Check the sheet-feed cable for any loose, damaged, or frayed sections.



- Check the front exit sheet-feed for the following:
  - Raise the output tray and ensure that it latches in the service position.
  - Unlatch the output tray and ensure that it locks in the down position.





  - Ensure that the gear guard (R) is installed and not damaged.
  - Ensure that the analog card shield is installed correctly on the paper only feature and is not damaged.
  - Ensure that the envelope motor shield (S) is installed correctly on the envelope/paper feature and not damaged.

HOW TO USE THIS MANUAL

The information in this manual is to be used as reference material when diagnosing machine failures. The maintenance information manual (MIM) contains maintenance procedures, diagnostic aids, and theory.

The format for page numbering is X-YYY.2. X is the section number, YYY is the page number, and 2 (although, not normally used) is for expansion when it is not practical to give new numbers to all pages.

The reference method used in this maintenance information manual is the maintenance analysis procedures (MAP) three-digit reference numbers. The

numbers are assigned to location figures and maintenance procedures to refer from the MAPs. For example, 127 indicates the carrier eccentric adjustments.

DEFINITIONS AND ACRONYMS LIST

This section contains definitions of terms and abbreviations that are not common, but are used in the MIM and MAPs.

PRINTER MAINTENANCE

This section contains location figures, adjustment procedures, and service checks for repairing field-replaceable units (FRUs) that the MAPs diagnosed as failing in the printer . All procedures have a three-digit reference numbers assigned to refer from the MAPs.

PRINTER REMOVALS AND REPLACEMENTS

This section contains the removal and replacement procedures for field-replaceable units (FRUs) that the MAPs diagnosed as failing in the printer. All procedures have a three-digit reference numbers assigned to refer from the MAPs.

DIAGNOSTIC AIDS

This section contains diagnostic program descriptions, how to use them, and what is available when they are in control. To aid in diagnosing machine failures in more detail, a list of error conditions is included in this section.

PRINTER PREVENTIVE MAINTENANCE

Printer parts needing regular service are described in this section.

TOOLS AND TEST EQUIPMENT

The tools needed to service the printer, sheet-feed, and tractor feed are described in this section.

PRINTER THEORY

The theory section contains descriptions of the printer functional units.

SHEET-FEED

This section contains adjustments, removal and replacements, and theory for the sheet-feed used on the IBM 5218 Printer.

FRONT EXIT SHEET-FEED

This section contains adjustments, removal and replacements, and theory for the front exit sheet-feed used on the IBM 5218 Printer.

TRACTOR FEED

This section contains adjustments and theory for the tractor feed.

DEFINITIONS AND ACRONYMS LIST

This list includes terms and abbreviations used in the MAPs and the maintenance (MIM).

amplifier. A device to increase the size of a signal.

BAT. Basic assurance test.

DAC. Digital to analog converter.

detent. Lock.

eccentric shafts. Shafts that allow the selection motor to be adjusted vertically.

escapement. The horizontal movement of the carrier assembly.

exception condition. Error or stop condition.

FRU. Field-replaceable unit.

full duplex. Receive and transmit at the same time.

GND. Ground.

GNDA. Analog ground.

GNDL. Analog ground.

GNDTR. Transducer ground.

IPH. Interface/paper handling.

MAPs. Maintenance analysis procedures.

MIM. Maintenance information manual.

paper curl. A condition in which paper tends to curve.

PPI. Programmable peripheral interface.

POR. Power on reset.

restraint pawls. Mechanical arms that restrict the feeding of more than one sheet of paper at a time.

sequencer cylinders. Cylinders that turn the paper at the output paper tray.

static test. A test that occurs at an idle condition.

summation check. The sum of individual digits composed to a value already computed.

Vdc. Volts direct current.

RAM. Random access memory.

ROS. Read-only storage.

VTL. Vendor transistor logic.

CONTENTS

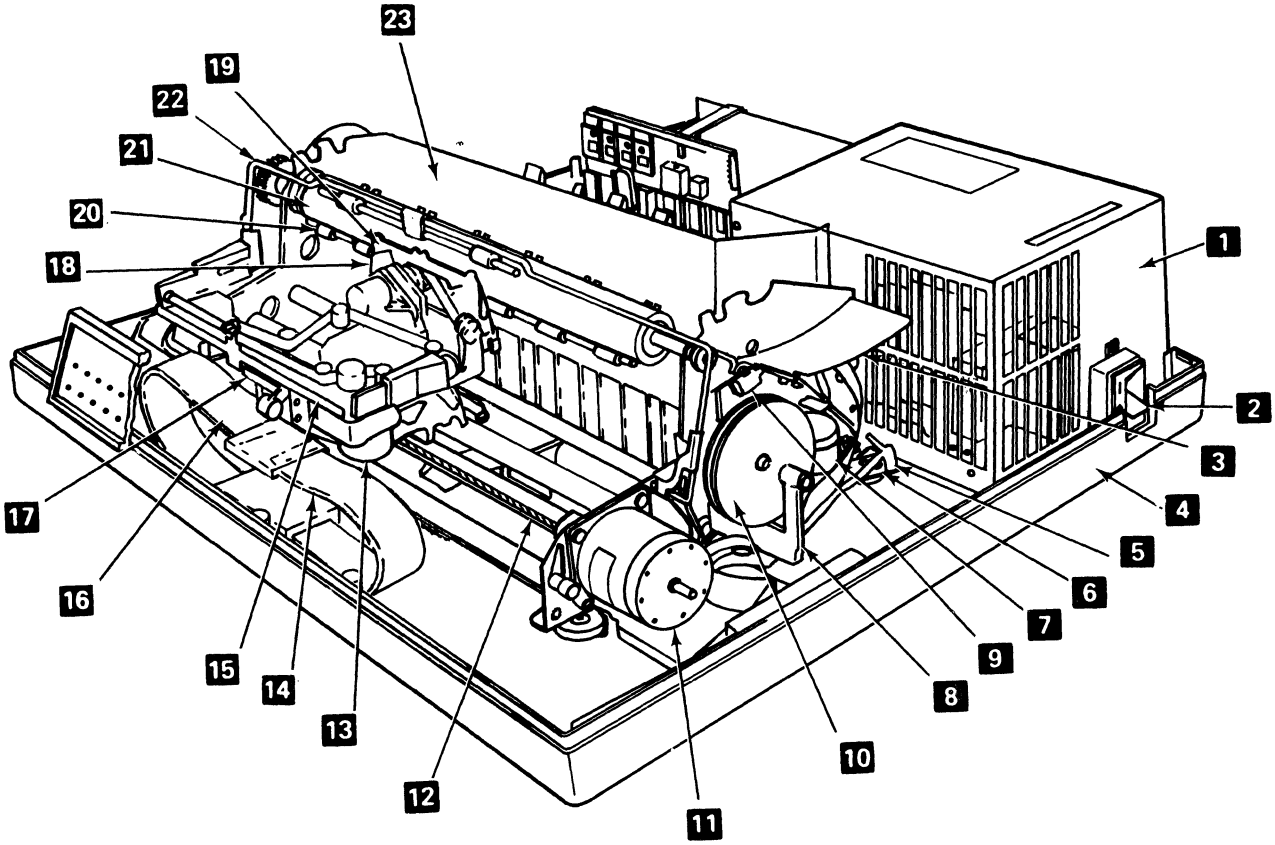
CHAPTER 1. PRINTER MAINTENANCE

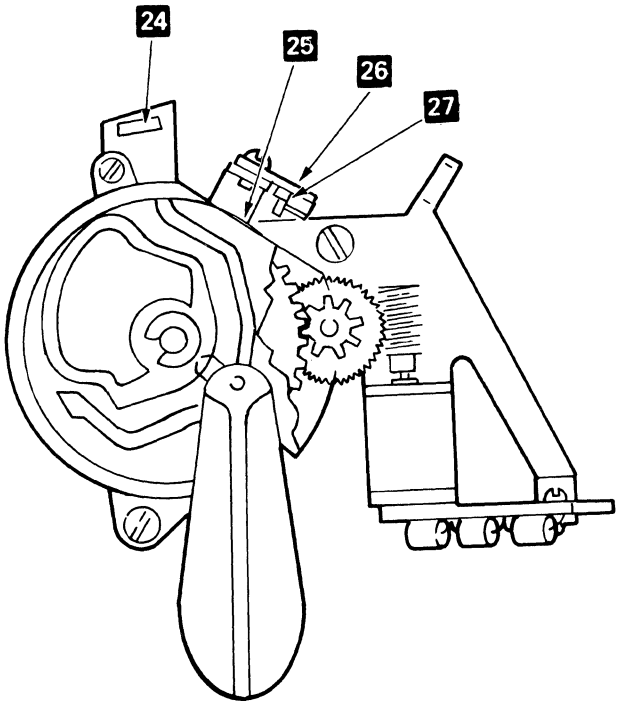
This chapter contains location figures, adjustment procedures, and service checks for repairing field-replaceable units (FRUs) that the MAPs diagnose to be failing. All procedures have a three-digit reference number referred to in the MAPs.

LOCATIONS

100 FRONT AND RIGHT SIDE LOCATIONS

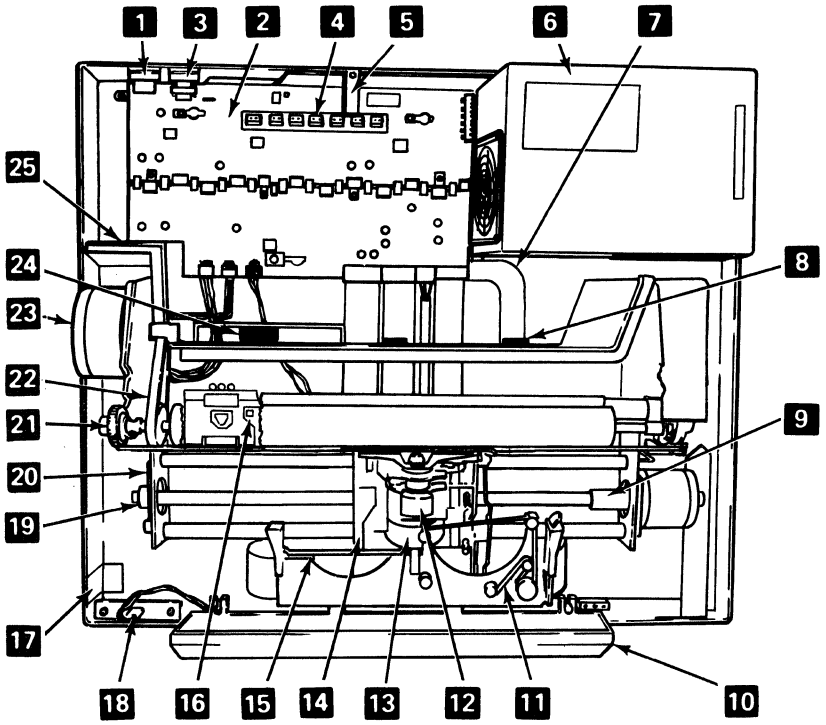
1. Power Supply
2. Power switch
3. Gear guard
4. Bottom printer cover
5. Cam motor plug
6. Cam motor filter board
7. Cam motor
8. Deflector arm
9. Cam position switch plug
10. Cam and safety shield
11. Escapement motor
12. Leadscrew
13. Ribbon motor drive assembly
14. Right carrier cable
15. Ribbon plate
16. Left carrier cable
17. Carrier assembly
18. Ribbon sensor
19. Cardholder
20. Feed roller assemblies
21. Platen
22. Paper bail
23. Baffle
24. Cam position switch
25. Cam home magnet
26. Cam home switch
27. Cam home switch plug


23
19
22
21
20
18
1
2
3
4
5
6
7
9
8
10
11
12
13
14
15
16
17


24
25
26
27

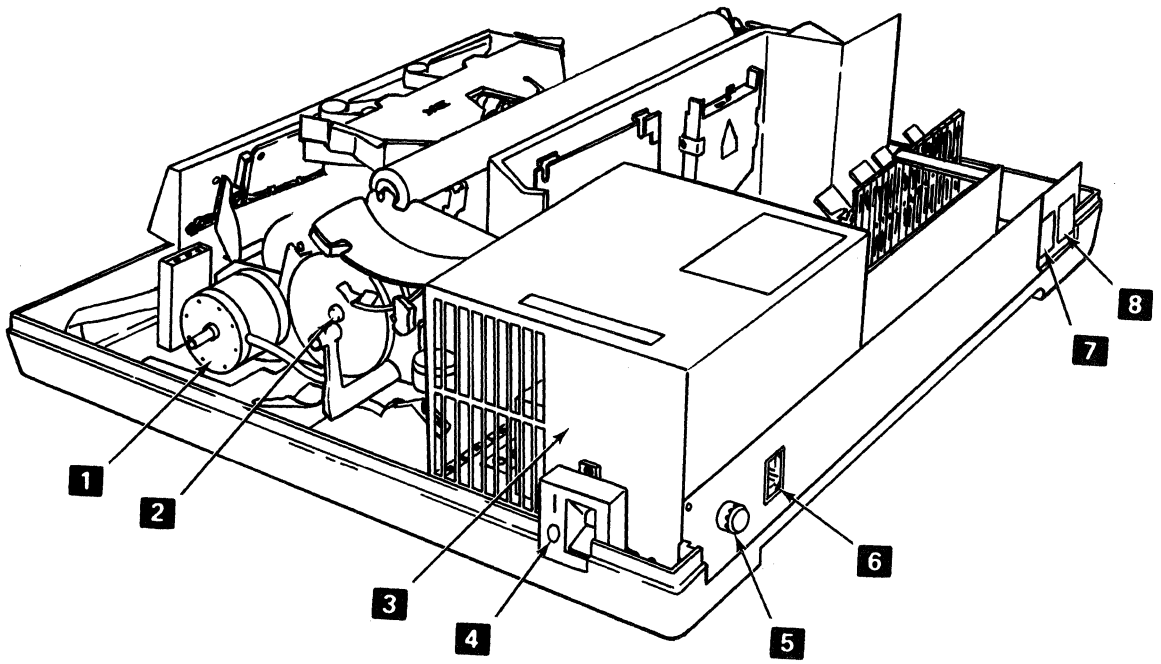
101 TOP LOCATIONS

1. Paper Handling connector
2. A-A1 distribution/analog board
3. Communications cable connector
4. Processor card (A-A1N8)
5. Card clip
6. Power supply
7. EMC shield
8. Cover adjustment tool (stored in the baffle)
9. Leadscrew coupler
10. Control panel
11. Ribbon drive belt
12. Print hammer assembly
13. Selection motor
14. Selection home lever
15. Selection motor pull-back lever
16. Paper sensor
17. Wrap plug
18. Cover interlock jumper (shown installed)
19. Leadscrew bearing
20. Left margin switch
21. Platen gear
22. Index motor belt
23. Index motor
24. Print alignment tool (stored in the baffle)
25. Baffle


1
3
2
4
5
6
7
25
24
23
22
21
20
19
17
8
9
18
16
15
14
13
12
11
10

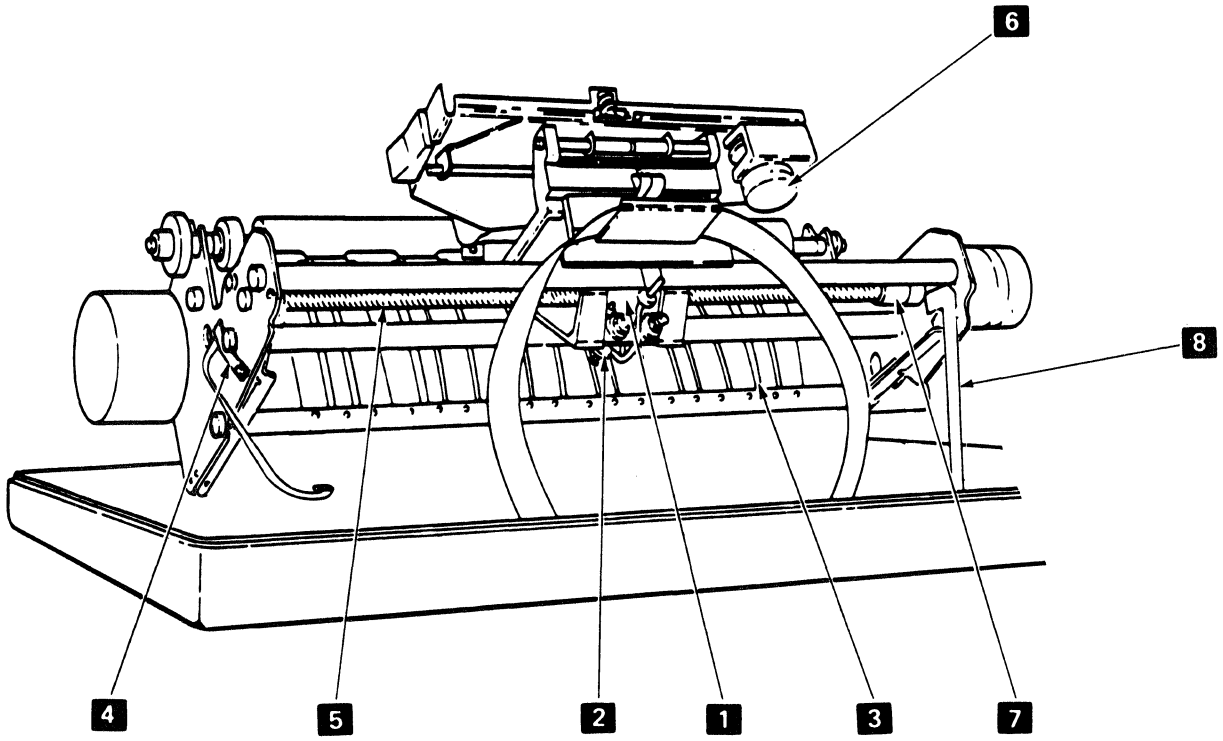
102 BACK LOCATIONS

1. Escapement motor
2. Cam assembly
3. Power supply
4. Power switch
5. Power supply fuse
6. AC line cord connector
7. Communications cable connector
8. Paper handling connector



103 BOTTOM LOCATIONS (PRINTER MECHANISM IN SERVICE POSITION)

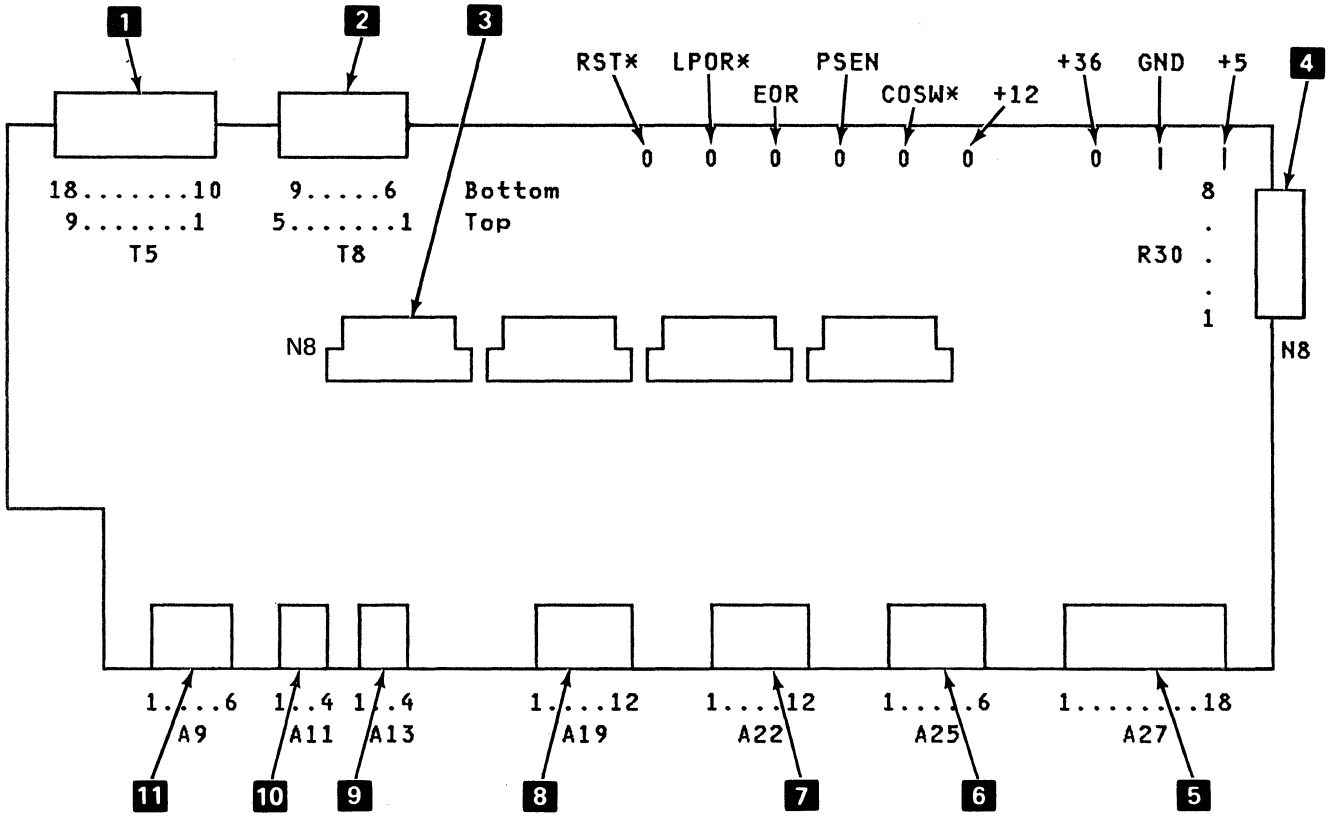
1. Leadscrew followers
2. Bottom bearing/shaft assembly
3. Spring/comb deflector arm
4. Left margin switch
5. Leadscrew
6. Ribbon motor drive assembly
7. Leadscrew coupler
8. Cover adjustment tool



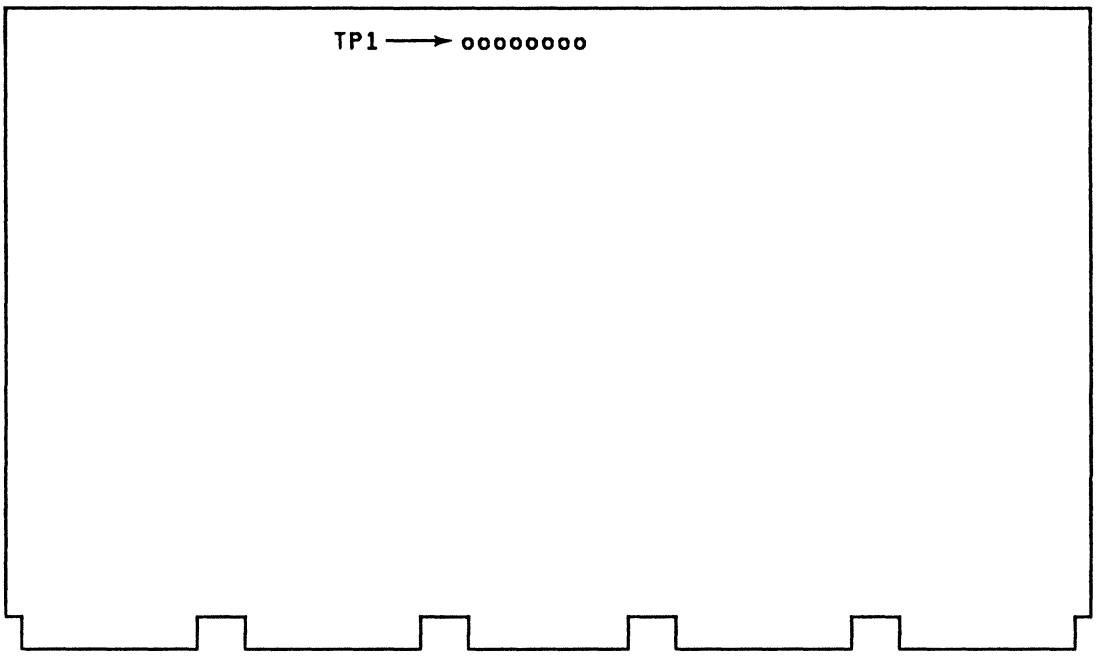
104 CARD LOCATIONS

CAUTION
Always power off and wait 30 seconds before removing or replacing a card.

1. A-A1T5 Paper handling connector
2. A-A1T8 Communications connector
3. A-A1N8 Processor card
4. Power supply dc connector
5. A-A1A27 Control panel and cam assembly connector
6. A-A1A25 Escapement motor connector
7. A-A1A22 Right carrier cable connector
8. A-A1A19 Left carrier cable connector
9. A-A1A13 Paper sensor connector
10. A-A1A11 Left margin switch connector
11. A-A1A9 Index motor connector



Processor Card (Component Side)

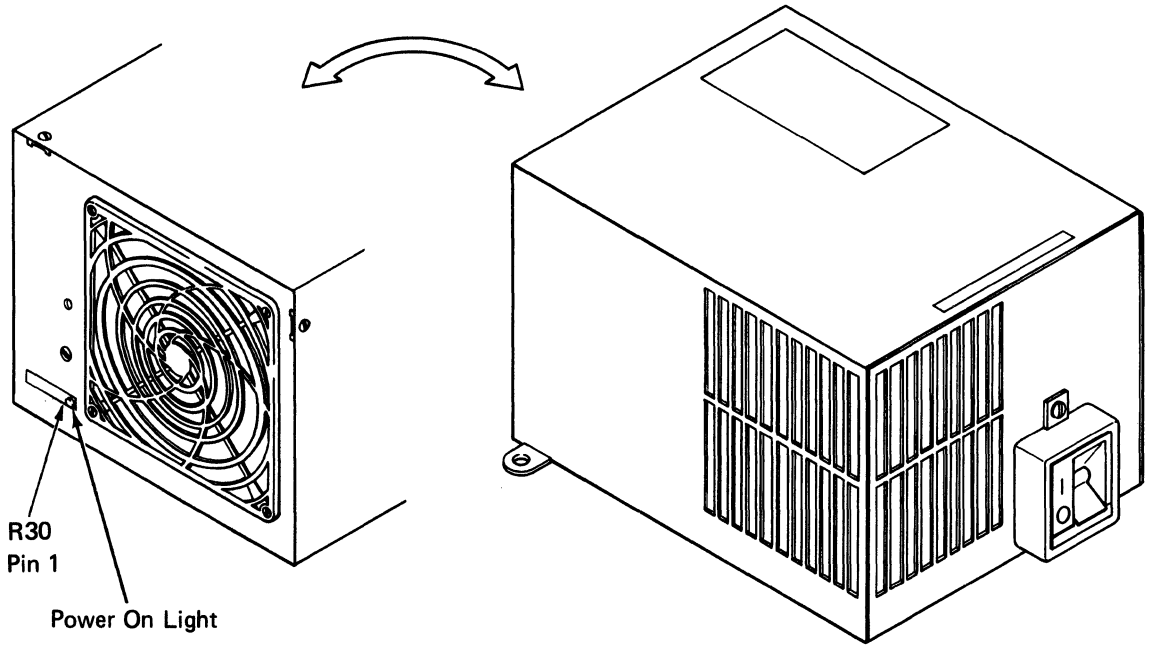


Processor Card (A-A1N8)Test Points	
Test Point	Signal Name
1	+5 Vdc
2	Logic ground
3	-5 Vdc
4	-24 Vdc
5	Control Panel
6	Buffer Full
7	RXD
8	TXD

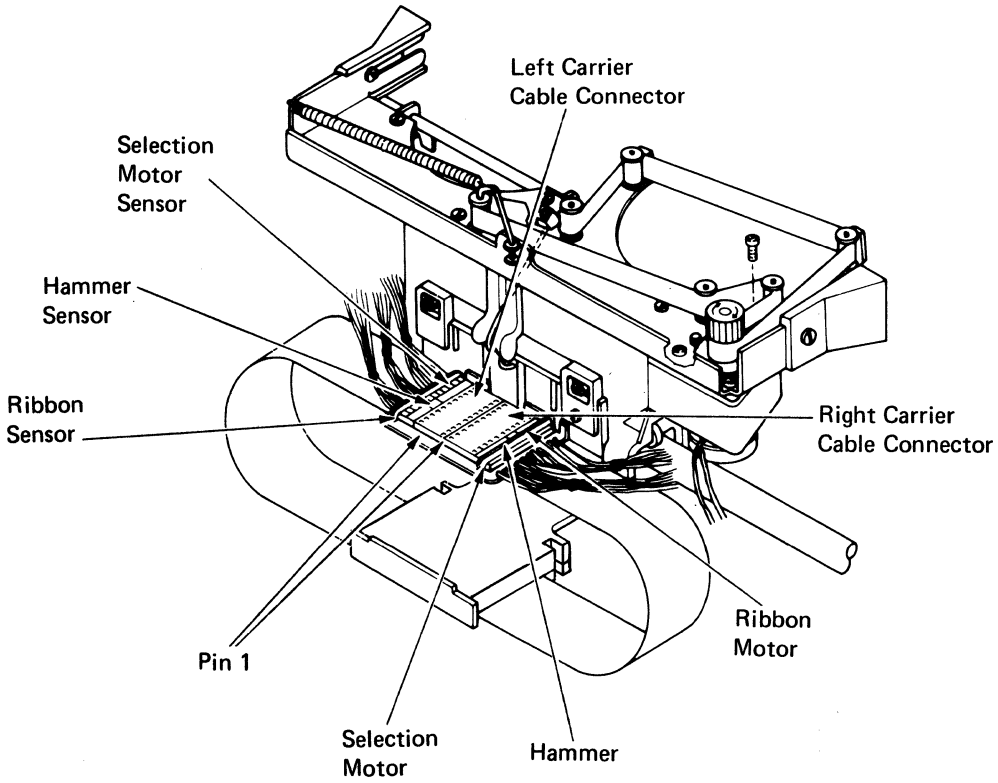
105 DC DISTRIBUTION

Name	Connector	Pin
+5 Vdc	A-A1N8	B02
	A-A1N8	B03
	A-A1A13	1
	A-A1A19	2
	A-A1A27	10
	A-A1T5	11
	A-A1R30	6
	A-A1R30	7
GNDL	A-A1N8	D02
	A-A1N8	D03
	A-A1N8	P07
	A-A1N8	S08
	A-A1N8	D12
	A-A1N8	J11
	A-A1A11	2
	A-A1A27	4
	A-A1A27	6
	A-A1A27	9
	A-A1A27	18
	A-A1T5	10
	A-A1R30	4
	A-A1R30	5

Name	Connector	Pin
+12 Vdc	A-A1T5	18
	A-A1A19	1
+36 Vdc	A-A1R30	2
	A-A1T5	14
-24 Vdc	A-A1N8	S02
	A-A1R30	8
GNDAC	A-A1A19	7
GNDTR	A-A1A19	12
GNDA	A-A1T5	16
	A-A1R30	3



R30 Connector	
Pin	Voltage
1	Not used
2	+36 Vdc
3	GNDA
4	GNDL
5	GNDL
6	+5 Vdc
7	+5 Vdc
8	-24 Vdc



Left Carrier Cable Connector Pin	Signal Function	A-A1A19 Connector Pin
1	+12 Vdc(EORS)[1]	1
2	+5 Vdc(EORS)[1]	2
3	EORS[1]	3
4	EORS[1]	4
5	+HIT[2]	5
6	-HIT[2]	6
7	Safety Ground	7
8	ST--A[3]	8
9	ST--B[3]	9
10	ST--C[3]	10
11	ST--H[3]	11
12	ST--Ground[3]	12

Right Carrier Cable Connector Pin	Signal Function	A-A1A22 Connector Pin
12	RM--phase D[4]	1
11	RM--phase C[4]	2
10	RM--phase B[4]	3
9	RM--phase A[4]	4
8	Hammer -	5
7	Hammer +	6
6	SMW--C[5]	7
5	SMW--B[5]	8
4	SMW--A[5]	9
3	SMCW--A[6]	10
2	SMCW--B[6]	11
1	SMCW--C[6]	12

[1]EORS = End of Ribbon Sensor
[2]HIT = Hammer Impact Transducer
[3]ST = Selection Transducer
[4]RM = Ribbon Motor
[5]SMW = Selection Motor Winding
[6]SMCW = Selection Motor Common Winding

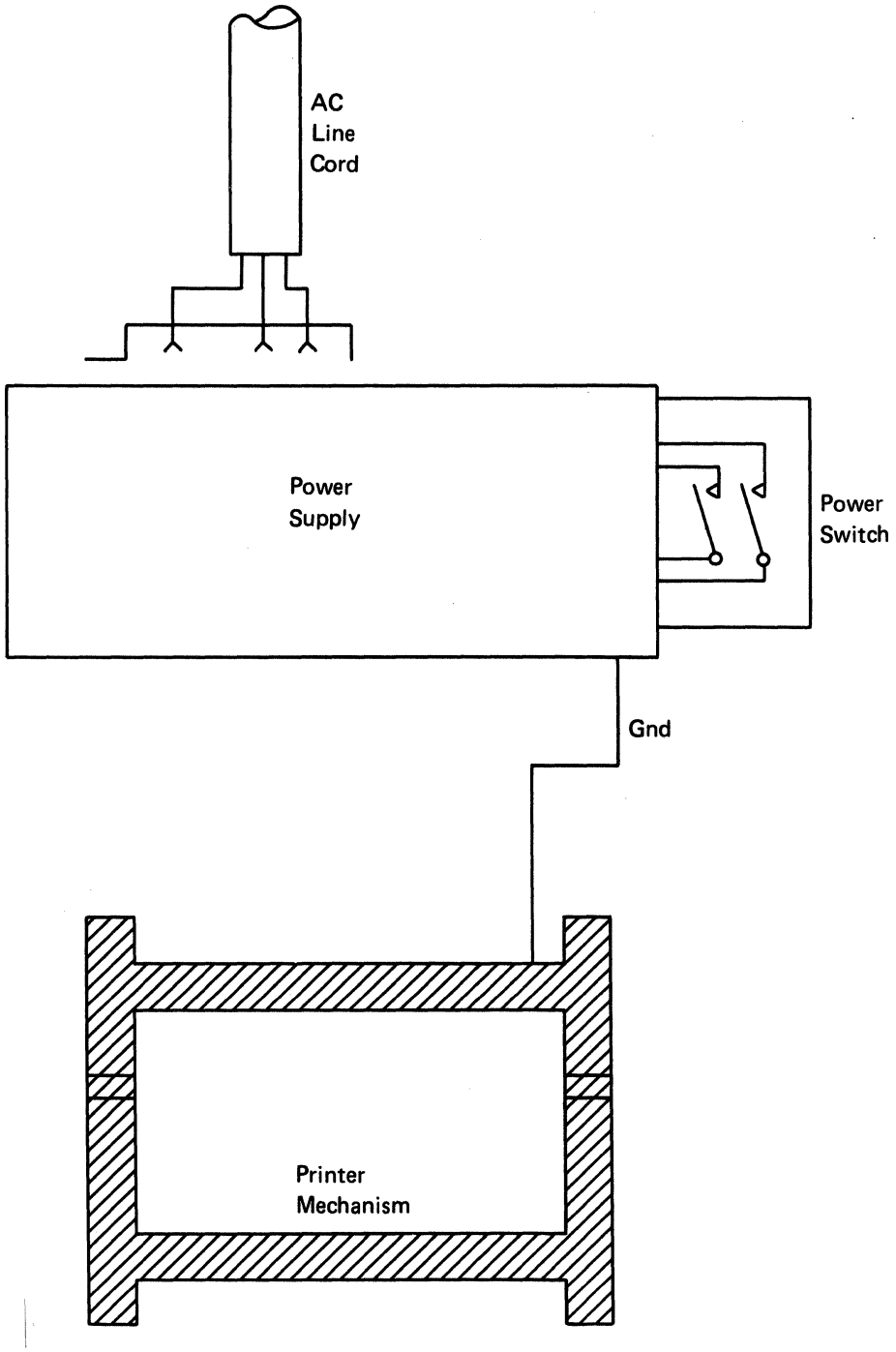
(105 DC Distribution Continued)

Communications Connector	
A-A1T8 Connector	Signal Function
1	LINEAIN
2	LINEBIN
3	Spare
4	Spare
5	SHIELDOUT
6	SHIELDIN
7	Spare
8	LINEAOUT
9	LINEBOUT

Paper Handling Cable	
A-A1T5 Connector	Signal Function
1	AF (+alternate feed)
2	TF* (-tractor feed sense)
3	Spare
4	R2MO* (-paper tray motor 2 on)
5	R1MO*(-paper tray motor 1 on)
6	SFCUR (+sheet-feed BAT passed)
7	SF* (-sheet-feed sense)
8	H1S (paper tray 1 sensor)
9	H2S (paper tray 2 sensor)
10	GNDL (logic ground)
11	+5 Vdc
12	Spare
13	Spare
14	+36 Vdc
15	Spare
16	GNDA (analog ground)
17	APOR* (-analog POR)
18	+12 Vdc

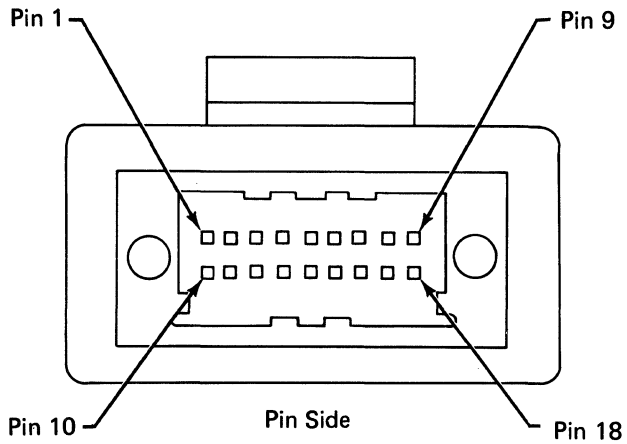
ART TAG AU102452

107 AC DISTRIBUTION AND GROUNDING DIAGRAM

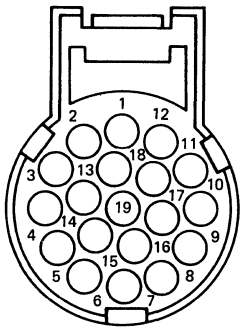


108 SHEET-FEED ADAPTER CABLE

Printer Connector	Signal Function	Sheet-Feed Connector
1	AF (+alternate feed)	5
2	TF* (-tractor feed sense)	9
3	Spare	11
4	R2MO* (-paper tray motor 2 on)	3
5	R1MO*(-paper tray motor 1 on)	2
6	SFCUR (+sheet-feed BAT passed)	15
7	SF* (-sheet-feed sense)	8
8	H1S (paper tray 1 sensor)	17
9	H2S (paper tray 2 sensor)	18
10	GNDL (logic ground)	1,7
11	+5 Vdc	13
12	Spare	
13	Spare	
14	+36 Vdc	19
15	Spare	
16	GNDA (analog ground)	4,10
17	APOR* (-analog POR)	14
18	+12 Vdc	16
Shield	Frame ground	6



Printer Connector



Pin Side

Sheet-Feed Connector

ADJUSTMENTS

COVERS

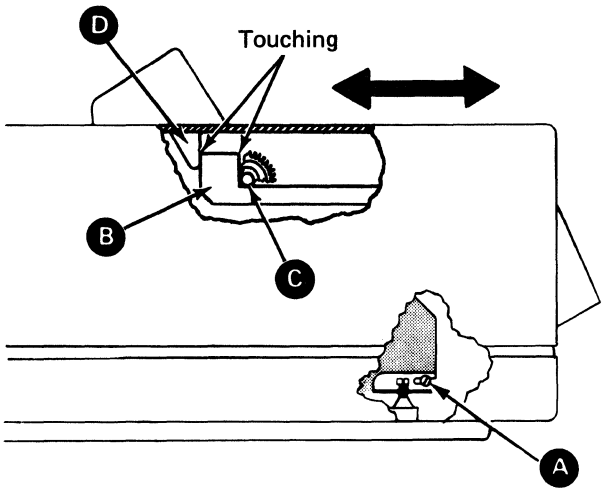
114 PRINTER-TO-COVER FRONT/REAR ADJUSTMENT

Adjustment

1. Power off.
2. Lift the operator access cover.
3. Loosen the left and right front shock mount bracket mounting screws (A).

   Note: The rear mounting screws do not need to be loosened.
4. Pull the printer mechanism forward.
5. Insert the cover adjustment tool (101) (B) on the left side of the printer between the platen shaft (C) and the flat of the top cover (D).
6. Slide the printer mechanism to the rear until the platen shaft and the top cover flat touch the cover adjustment tool.
7. Tighten the left front shock mount bracket mounting screw.
8. Repeat steps 5, 6, and 7 for the right side of the printer mechanism.
9. Close the operator access cover.

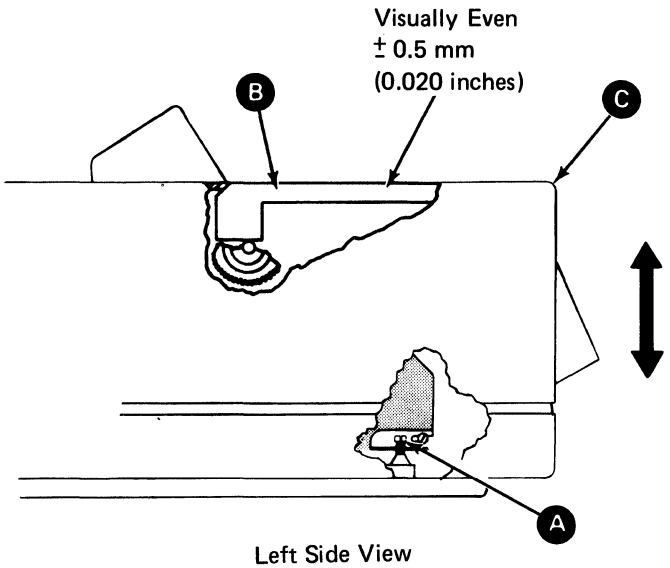
Al



115 PRINTER-TO-COVER HEIGHT ADJUSTMENT

Adjustment

1. Power off.
2. Lift the operator access cover.
3. Loosen the right and left height adjustment screw nuts.
4. Install the cover adjustment tool (101) (B) as shown.
5. Adjust the left height adjustment screw (A) until the top of the cover adjustment tool (B) is visually even within 0.5 mm (0.020 inches) with the top of the top cover (C). The printer mechanism pivots on the rear shock mount bracket mounting screws.
6. Repeat steps 4 and 5 for the right side of the printer mechanism.
7. Tighten the right and left height adjustment screw.
8. Close the operator access cover.



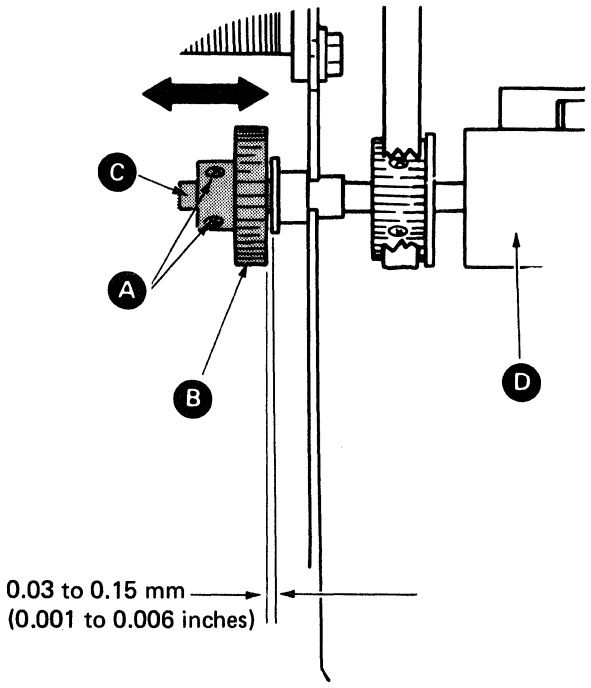
Left Side View

PAPER FEED

120 PLATEN GEAR

Adjustment

1. Power off.
2. Remove the top cover (200).
3. Loosen the two platen gear setscrews (A).
4. Adjust the platen gear (B) on the platen shaft (C) so that the platen (D) has 0.03 to 0.15 mm (0.001 to 0.006 inches) of end play between the gear and the bearing.
5. Tighten the two platen gear setscrews.
6. Reinstall the top cover.

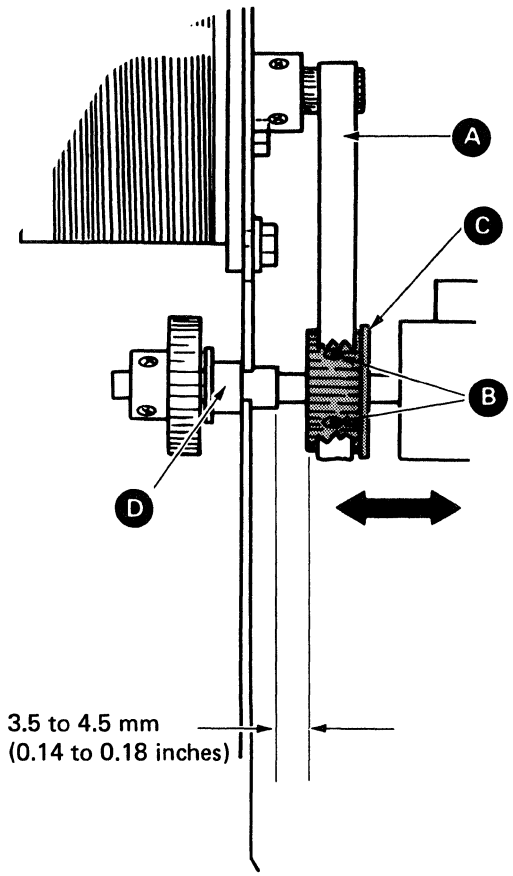


Top View

121 PLATEN PULLEY

Adjustment

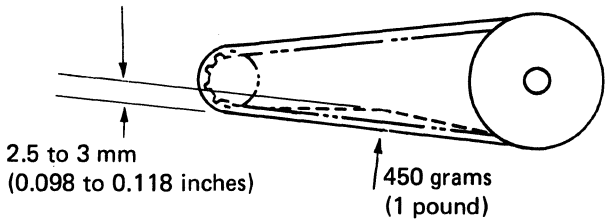
1. Power off.
2. Remove the top cover (200).
3. Remove the index motor belt (A) by turning the platen by hand and pushing the belt off of the pulley.
4. Loosen the two platen pulley setscrews (B).
5. Adjust the platen pulley (C) for a 3.5 to 4.5 mm (0.140 to 0.180 inches) gap from the left end platen bearing (D).
6. Tighten the platen pulley setscrews (B).
7. Reinstall the index motor belt.
8. Reinstall the top cover.



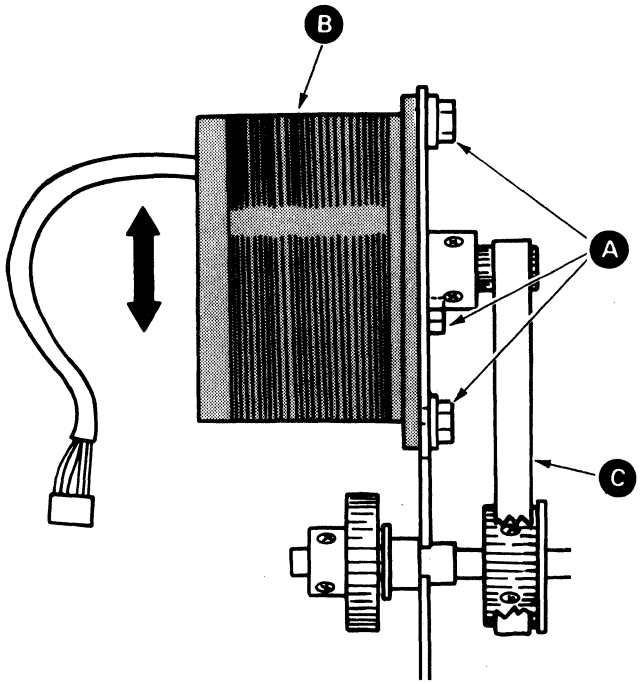
122 INDEX MOTOR

Adjustment

1. Power off.
2. Remove the top cover (200).
3. Loosen the three index motor mounting screws (A).
4. Adjust the index motor (B) so that the index motor belt (C) deflects only 2.5 to 3 mm (0.098 to 0.118 inches) with 450 grams (1 pound) of force at the midway point.
5. Tighten the index motor mounting screws.
6. Reinstall the top cover.



Left View



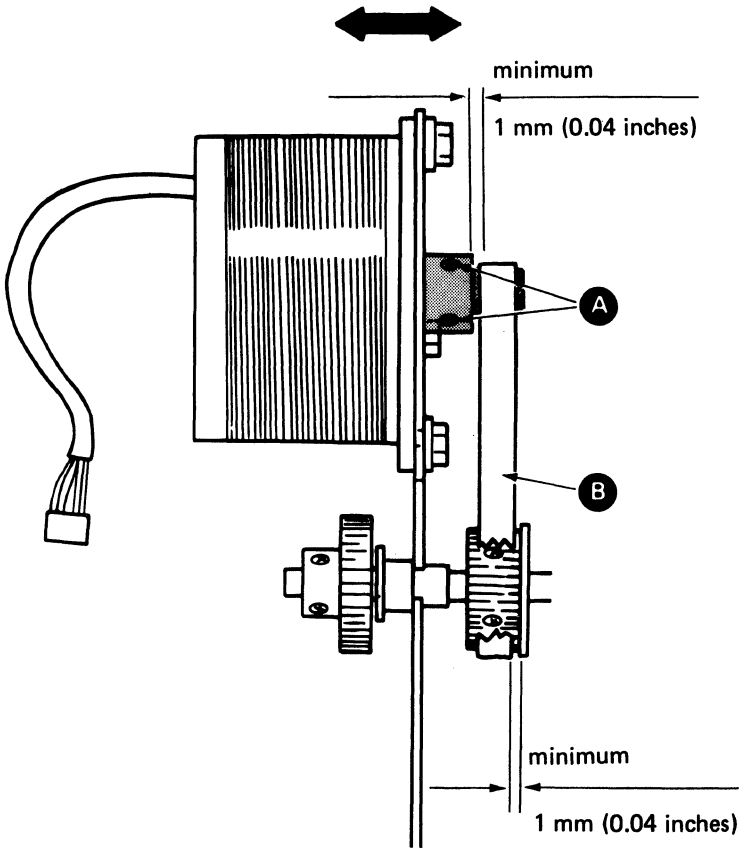
Top View

123 INDEX MOTOR PULLEY

Note: Verify the platen pulley adjustment (121) before performing this adjustment.

Adjustment

1. Power off.
2. Remove the top cover (200).
3. Loosen the two index motor pulley setscrews (A).
4. Adjust the index motor pulley so that the belt (B) will clear either the index motor pulley or platen pulley flanges by a minimum of 1 mm (0.04 inches) depending on the direction the motor is turning.
5. Tighten the two index motor pulley setscrews.
6. Reinstall the top cover.

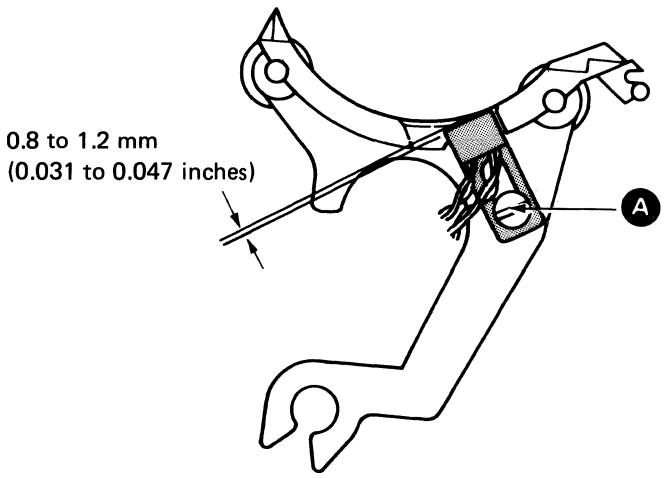


Top View

124 FIRST WRITING LINE SENSOR

Adjustment

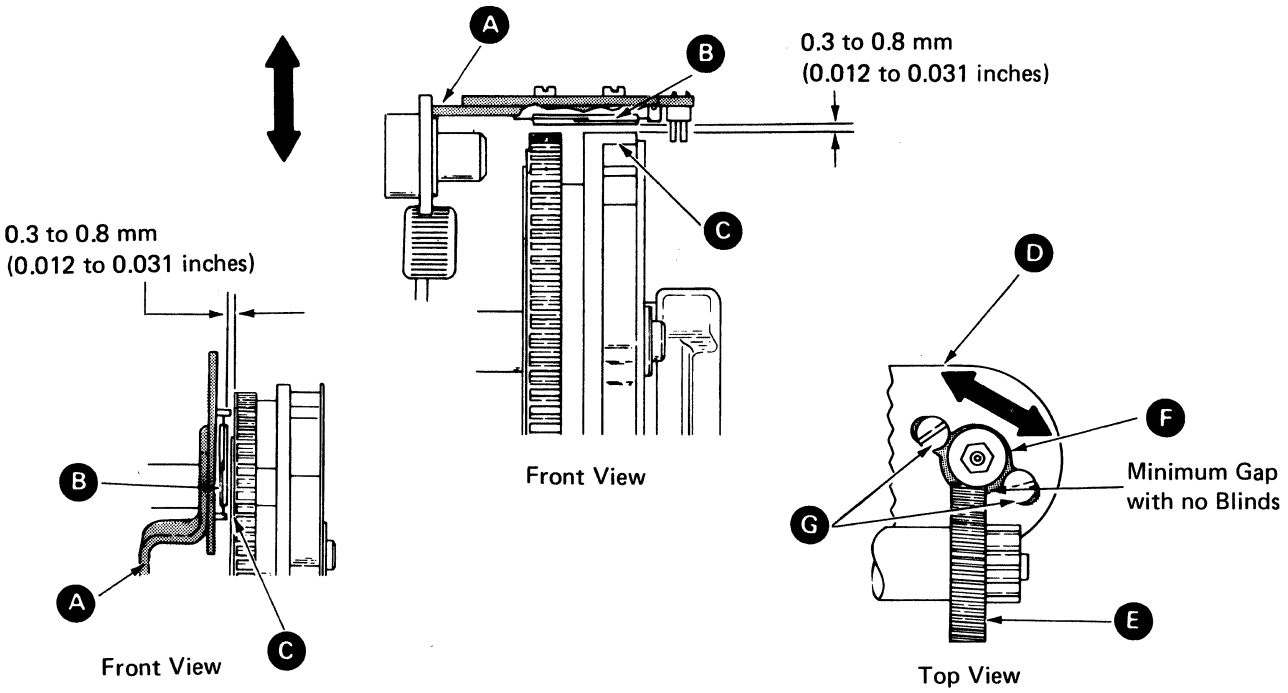
1. Power off.
2. Remove the top cover (200).
3. Remove the platen (214).
4. Loosen the sensor screw (A).
5. Adjust the sensor so that the face of the sensor is 0.8 to 1.2 mm (0.031 to 0.047 inches) below the surface of the feed roller assembly at the closest point.
6. Reinstall the platen.
7. Reinstall the top cover.



125 CAM MOTOR AND REED SWITCH BRACKETS

Adjustments

1. Power off.
2. Remove the top cover (200).
3. Shape the reed switch brackets (A) for 0.3 to 0.8 mm (0.012 to 0.031 inches) gap between the reed switch (B) and the magnets on the cam (C) at the nearest point.
4. Install the cover interlock jumper (101).
5. Power on.
6. Press the Release switch.
7. Power off.
8. Loosen the two cam motor mounting screws (G) and adjust the cam motor (D) for minimum gap, without binds, between the idler gear (E) and the worm gear (F).
9. Tighten the cam motor mounting screws.
10. Remove the cover interlock jumper.
11. Reinstall the top cover.

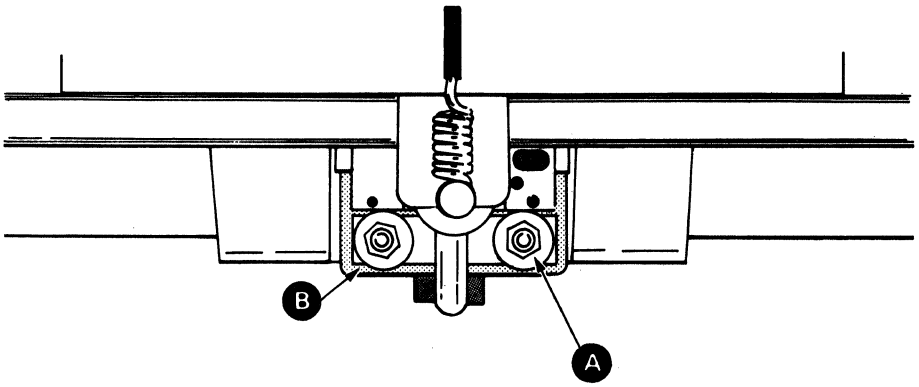


CARRIER

126 LEADSCREW FOLLOWER

Adjustment

1. Power off.
2. Remove the top cover (200).
3. Place the printer mechanism in the CSR service position (152).
4. Loosen the nuts (A) on the two leadscrew follower mounting screws.
5. By hand, rotate the leadscrew back and forth while observing the vertical motion of the followers (B).
6. Rotate the leadscrew to a position so that the followers are vertically even with each other.
7. Tighten the nuts (A).
8. Ensure that there are no binds by sliding the carrier assembly back and forth through its entire range of travel several times.
9. Return the printer mechanism to the normal operating position.
10. Reinstall the top cover.



Front View

127 CARRIER ECCENTRICS

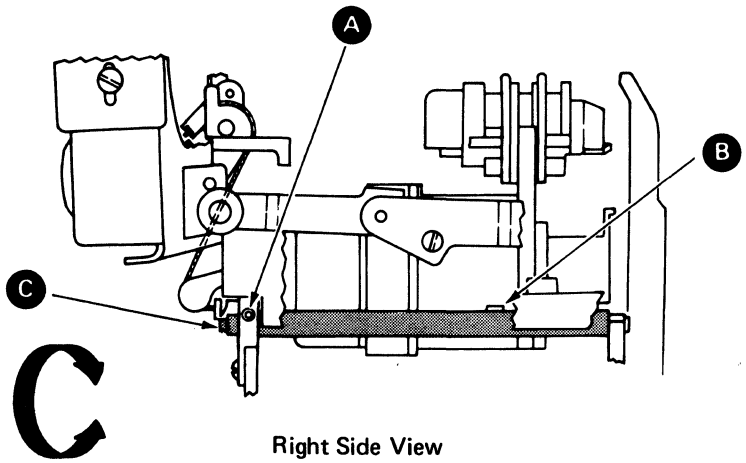
Adjustment

If the top or bottom of the characters appears to be too light, perform this adjustment.

1. Power off.
2. Remove the top cover (200).
3. Remove the control panel without disconnecting any cables (202).
4. Loosen the left and right eccentric shaft setscrews (A).
5. Adjust the eccentrics, up and down, for maximum coverage of the printed characters. For a sample printout do the following:

   a. Install the cover interlock jumper.
   b. Power on.
   c. Press Print Test.
   d. Power off.
   e. Remove the cover interlock jumper.

6. When the adjustments are completed, both tabs (B) of the eccentric shafts (C) should point in the same direction.
7. Tighten the left and right eccentric shaft setscrews.
8. Reinstall the control panel.
9. Reinstall the top cover.

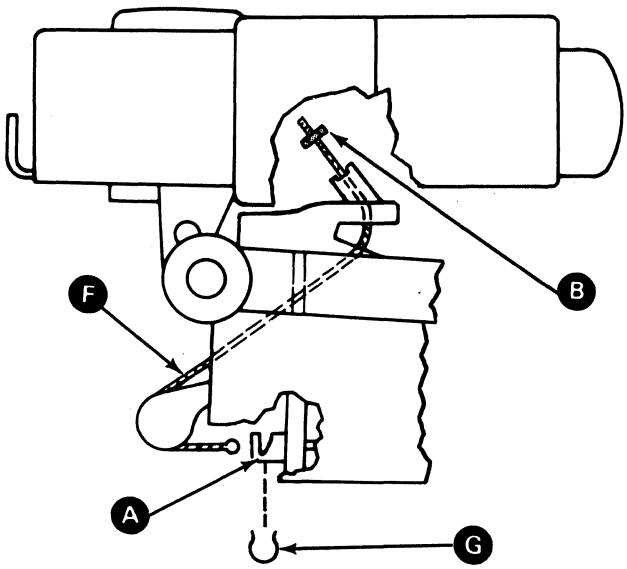


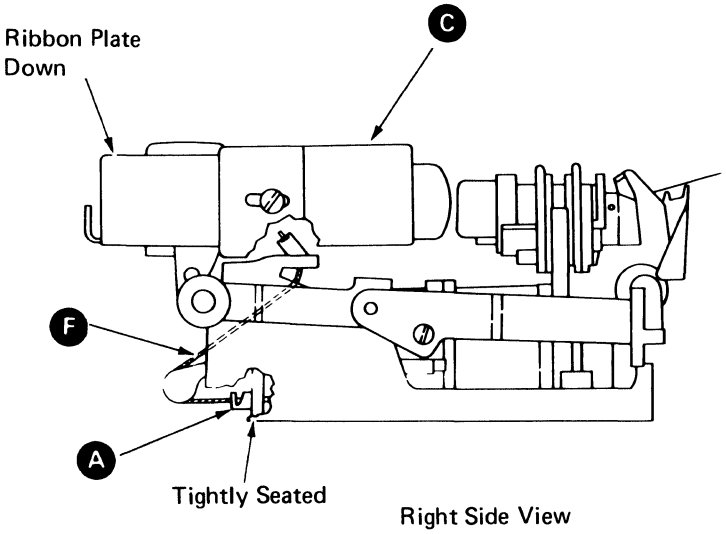
Right Side View

128 SELECTION MOTOR PULL-BACK CABLE

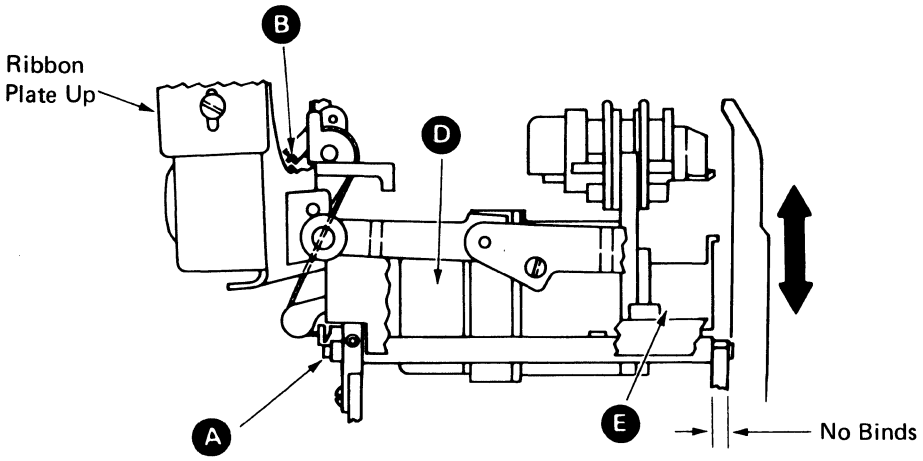
Adjustment

1. Power off.
2. Remove the top cover (200).
3. Remove the control panel.
4. Remove one end of each selection motor pull-back spring (222, step 9) and pull the selection motor back by hand. Remove the retaining clip (G). Remove the pull-back cable end from the selection motor adjustment screw (A).
5. Push the cable upward so that the pull-back cable nut (B) can be adjusted.
6. Turn the pull-back cable nut (B) to adjust the cable length.
7. Reinstall the pull-back cable in the selection motor adjustment screw.
   - When the ribbon plate (C) is down, the cable (F) should be loose enough so that the selection motor adjustment screw (A) can be tightly seated against the carrier body.
   - When the ribbon plate is lifted and the selection motor (D) is pulled back, the printwheel hub (E) must be pulled back far enough so the printwheel cartridge can be removed or inserted freely.
8. Reinstall the retaining clip.
9. Reinstall the selection motor pull-back springs.
10. Reinstall the control panel.
11. Reinstall the top cover.





Right Side View



Right Side View

PRINTWHEEL

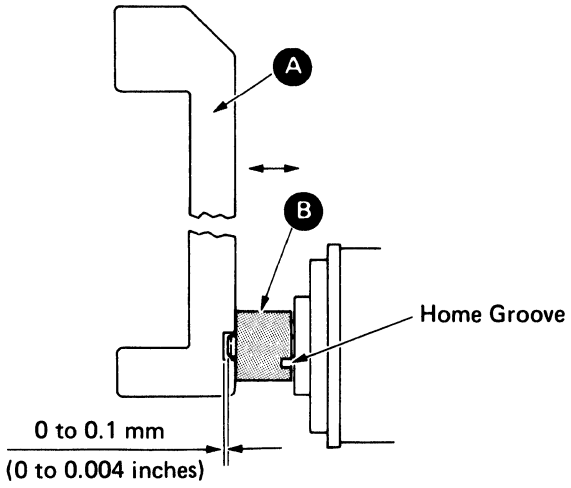
Note: Printwheel adjustments 129 through 133 should be done in sequence.

129 PRINTWHEEL HUB

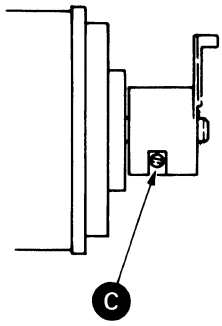
Note: If the printwheel hub does not have a screw (C), this adjustment is not necessary.

Adjustment

1. Power on.
2. Remove the printwheel cartridge.
3. Power off.
4. Remove the top cover (200).
5. Remove the ribbon cartridge. Do not lower the ribbon plate.
6. Insert the cover adjustment tool (101) (A) into the carrier assembly so that the slot in the tool is directly to the rear of the selection motor shaft.
7. Lower the ribbon plate only enough to allow the selection motor shaft to enter the slot in the cover adjustment tool. The tool should sit on the face of the printwheel hub (B).
8. There should be 0 to 0.1 mm (0 to 0.004 inches) between the end of the motor shaft and the bottom of the slot in the tool. If correct, reinstall the top cover. If not, proceed with the adjustment.
9. Remove the selection motor (222).
10. Loosen the printwheel hub screw (C) until the hub just slides on the motor shaft.
11. Place the cover adjustment tool (A) opening on the selection motor shaft.
12. Press the selection motor and the printwheel hub so that both are touching the cover adjustment tool. Adjust the printwheel hub for 0 to 0.1 mm (0 to 0.004 inches) between the end of the motor shaft and the bottom of the slot in the tool.
13. Tighten the print hub screw 1/4 turn more.
14. Reinstall the selection motor (222).
15. Reinstall the cover adjustment tool.
16. Continue with the carrier assembly adjustment (130).



Left Side View



Right Side View

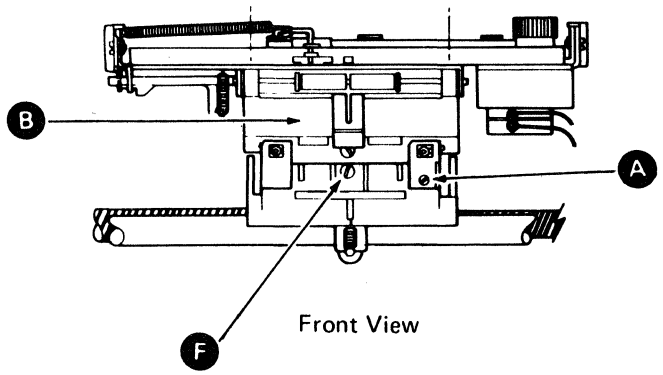
130 CARRIER ASSEMBLY

Adjustment

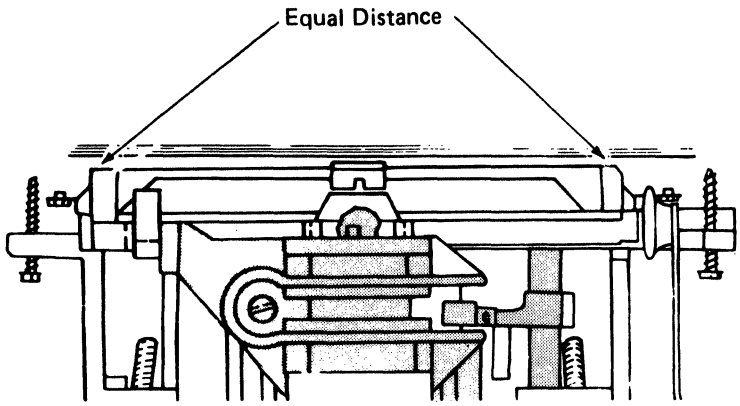
1. Power on.
2. Remove the printwheel cartridge, if installed.
3. Power off.
4. Remove the top cover (200).
5. Remove the control panel (202).
6. Remove the ribbon cartridge and cardholder (100).

   Note: Ensure that the extended part of the printwheel hub points up before performing step 7.

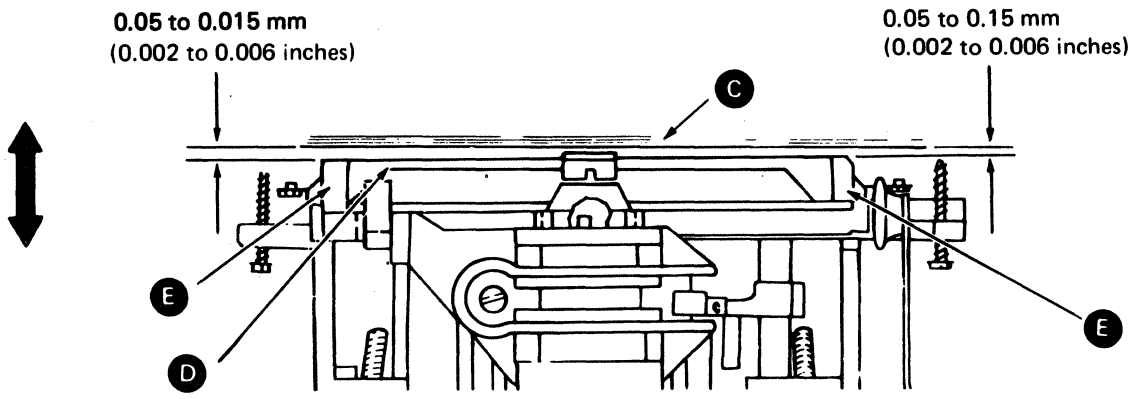
7. Install the print alignment tool (101) (D) and place the ribbon plate in the down position.
8. Check to ensure that the gap between the platen (C) and the left and right vertical tabs (E) on the printer alignment tool are equal. If the distance is equal, go to step 11. If the distance is not equal continue with the next step.
9. Loosen the carrier block adjustment screw (A). Pivot the upper carrier assembly (B) until the gap between the platen (C) and the left and right vertical tabs (E) of the print alignment tool is equal. Tighten the carrier block adjustment screw.
10. Turn the carrier adjustment screw (F) to adjust for 0.05 to 0.15 mm (0.002 to 0.006 inches) gap between the vertical tabs (E) of the print alignment tool and the platen (C).
11. Continue with the printwheel hub adjustment (131).



Front View



Top View



Top View

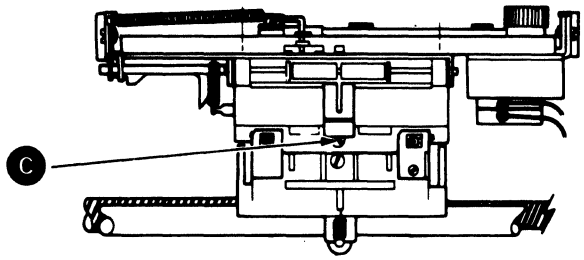
131 PRINTWHEEL HUB TO PLATEN

Adjustment

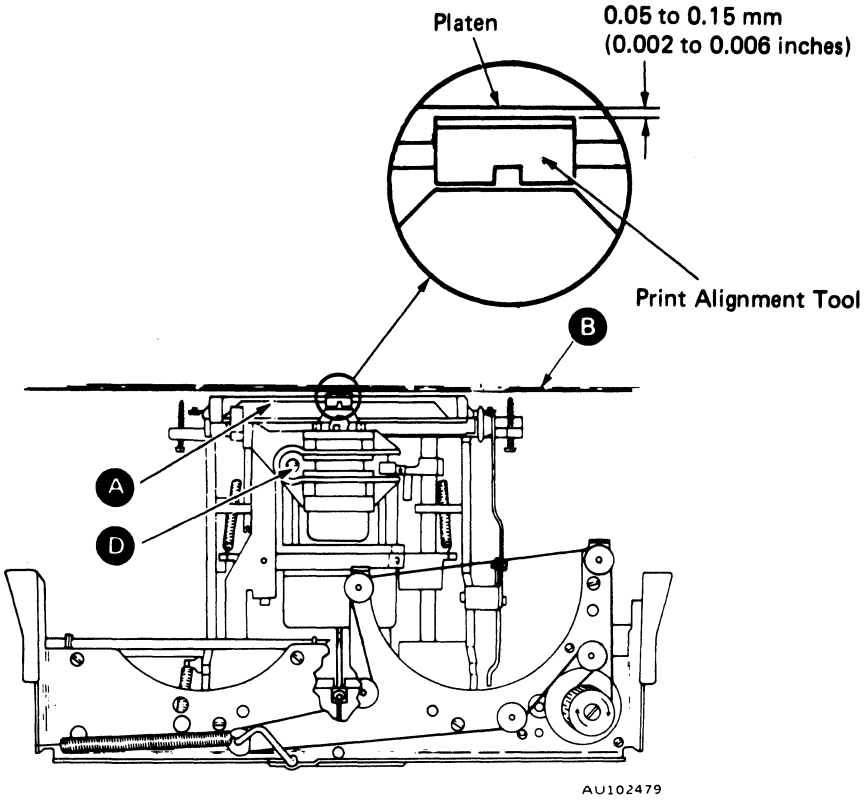
1. Power on.
2. Remove the printwheel cartridge, if installed.
3. Power off.
4. Remove the top cover (200).
5. Remove both ribbon cartridge and cardholder (100).
6. Remove the control panel (202).

   Note: Ensure that the extended part of the printwheel hub points up before inserting the print alignment tool.

7. Install the print alignment tool (101) Ⓐ.
8. Place the ribbon plate in the down position. The print alignment tool and print hammer assembly should not touch. If necessary, loosen the print hammer bracket screw Ⓓ and move the print hammer away from the tool.
9. Turn the selection motor adjustment screw Ⓒ to adjust for a 0.5 to 0.15 mm (0.002 to 0.006 inches) gap between the back of the print alignment tool Ⓐ and the platen Ⓑ.
10. Reinstall the control panel.
11. Continue with the printwheel homing adjustment (132).



Front View



Top View

132 PRINTWHEEL HOMING

Adjustment

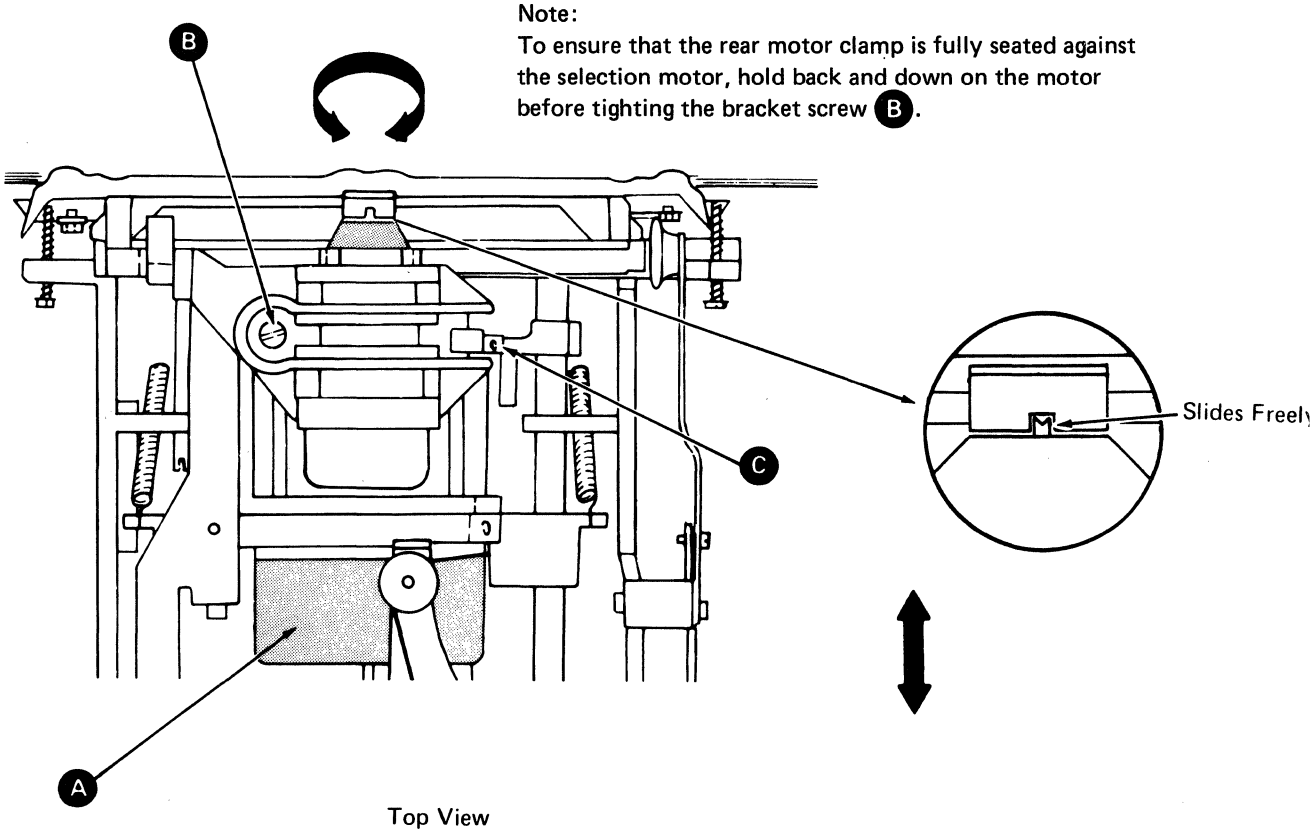
1. Power on.
2. Remove the ribbon cartridge and printwheel cartridge, if installed.
3. Power off.
4. Remove the top cover (200) and install the cover interlock jumper.

   Warning: Never Power on with the print alignment tool installed.

---

5. Power on.
6. Press the Stop switch.
7. Install the print alignment tool.
8. Place the ribbon plate in the down position.
9. If the print hammer slides freely in and out of the opening of the print alignment tool this adjustment is correct, continue with the print hammer assembly adjustment (133). If the adjustment is not correct, continue with step 11.
10. Loosen the selection motor clamp setscrew (C).
11. Loosen the print hammer assembly bracket screw (B).
12. Turn the selection motor (A) and print hammer assembly until the hammer slides freely in and out of the opening of the print alignment tool.
13. Tighten all setscrews. Ensure that the selection motor clamp is resting on both carrier eccentrics (127) and is touching the flange on the selection motor while tightening the selection motor clamp setscrew.
14. Remove the print alignment tool.
15. Power off.
16. Power on.
17. Recheck the adjustment.
18. Continue with the print hammer assembly adjustment (133).

Note:
To ensure that the rear motor clamp is fully seated against the selection motor, hold back and down on the motor before tighting the bracket screw (B).

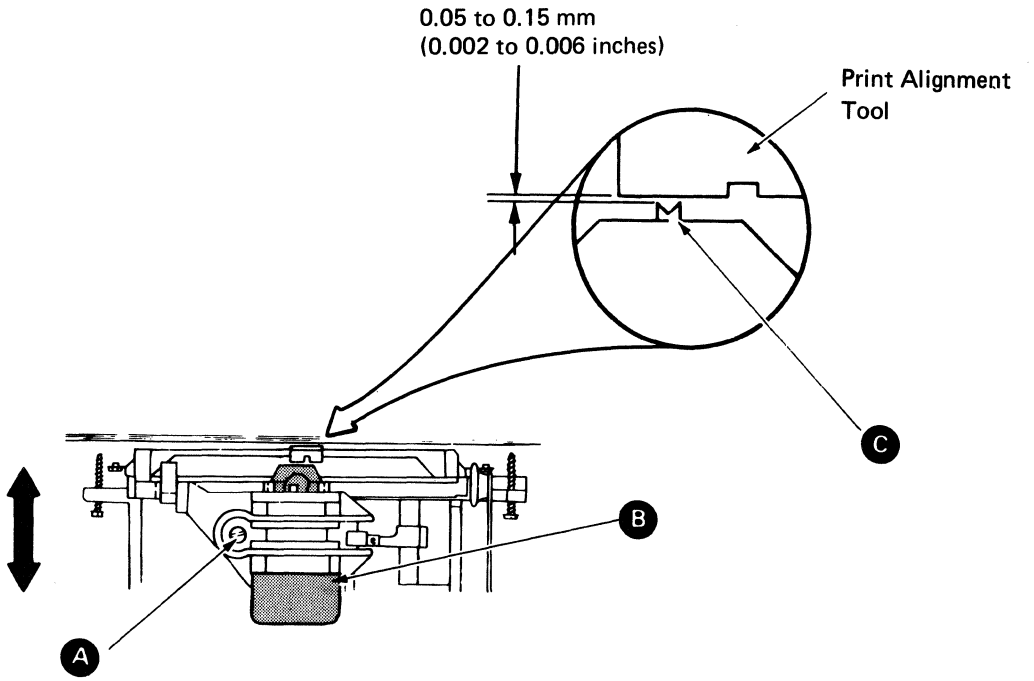


Top View

133 PRINT HAMMER ASSEMBLY

Adjustment

1. Power on.
2. Remove the printwheel cartridge, if installed.
3. Power off.
4. Remove the top cover (200).
5. Remove the ribbon cartridge and cardholder (100).
6. Install the print alignment tool.
7. Place the ribbon plate in the down position.
8. Loosen the print hammer assembly bracket screw (A).
9. Move the print hammer assembly (B), front to rear within the housings, to obtain 0.05 to 0.15 mm (0.002 to 0.006 inches) between the front surface of the print alignment tool and the tip of the print hammer (C). To obtain a better measurement surface, offset the print alignment tool as shown.
10. Recheck the printwheel homing adjustment (132).
11. Reverse steps 2 through 6 to complete the procedure.



Top View

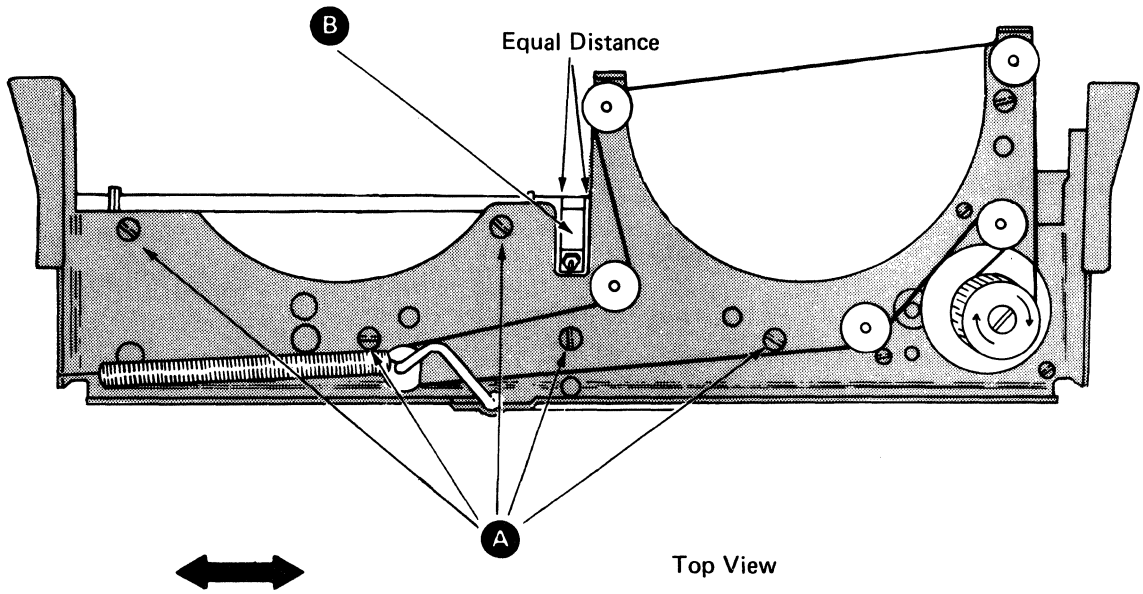
RIBBON

134 RIBBON PLATE

Note: If the ribbon plate does not have mounting screws (A), it does not need adjusting.

Adjustment

1. Power off.
2. Lift the operator access cover.
3. Remove the ribbon cartridge.
4. Move the carrier assembly to the center of the print mechanism.
5. Loosen the five ribbon plate mounting screws (A).
6. Visually center the ribbon plate left to right over the pull-back cable bracket (B).
7. Tighten the five ribbon plate mounting screws.
8. Reinstall the ribbon cartridge.
9. Close the operator access cover.



Top View

135 RIBBON LIFT ARM

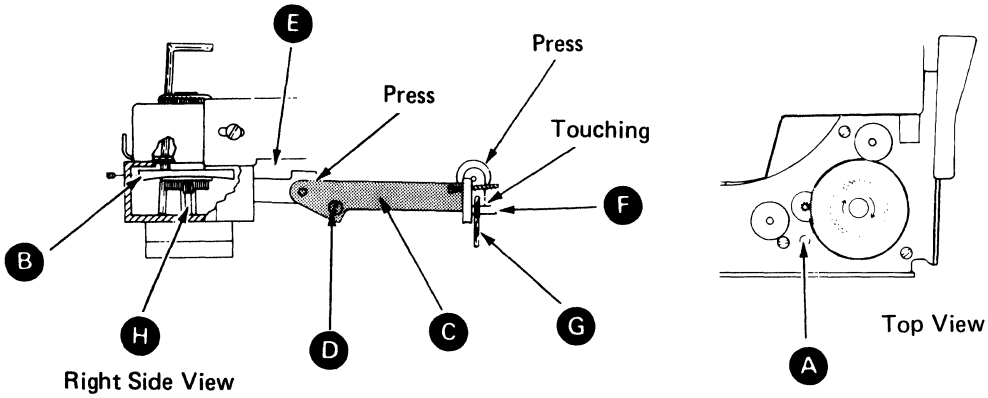
Note: If the bottom of the hole in the ribbon lift lever (C) aligns with carrier downstop (F) this adjustment is correct.

Adjustment

1. Power off.
2. Remove the top cover.
3. Move the carrier assembly to the center of the printer mechanism.
4. Remove the ribbon cartridge.

   Note: Check to ensure that the ribbon lift lever does not bind on the carrier downstop (F) and that the ribbon drive shaft (H) setscrew is tight.

5. Place a 6-flute socket key in the ribbon gear box hole (A).
6. Turn the ribbon lift cam (B) until the flute socket key passes through a similar hole in the ribbon lift cam. This keeps the ribbon lift cam from moving while the adjustment is being made and puts the cam follower on the low side of the cam.
7. Place a 6-flute socket key (G) through the hole in the ribbon lift lever (C).
8. Loosen the ribbon lift arm adjustment screw (D).
9. Press down on the cam follower lever (E) directly above the adjusting screw and on the ribbon lift lever (C) above the carrier downstop (F).
10. Tighten the ribbon lift arm adjustment screw.
11. Remove both 6-flute socket keys.
12. Reinstall the ribbon cartridge.
13. Run test execute mode test 48 (307) to verify adjustment.
14. Reinstall the top cover.

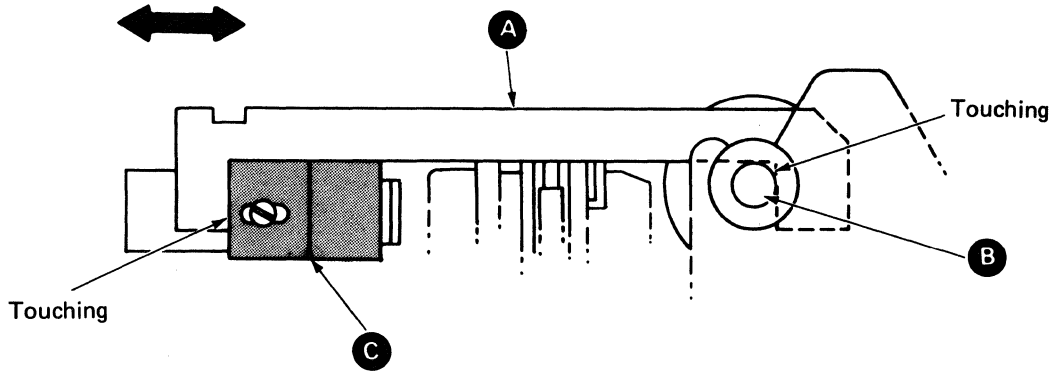

E
Press
Press
Touching
F
B
H
D
C
G
Right Side View
Top View
A

137 RIBBON CARTRIDGE LATCHES

Note: If the ribbon cartridge latch (C) does not have a screw in it, this adjustment is not needed.

Adjustment

1. Power off.
2. Remove the top cover (200).
3. Remove the ribbon cartridge.
4. Move the carrier assembly to the right so that the right edge of the ribbon plate is in line with the right edge of the platen.
5. Loosen the right ribbon cartridge latch screw.
6. Place the cover adjustment tool (A) behind the platen shaft (B) as shown.
7. Place the right ribbon cartridge latch (C) against the cover adjustment tool as shown.
8. Tighten the right ribbon cartridge latch screw.
9. Repeat steps 4, 5, 6, 7 and 8 for the left side.
10. Reinstall the ribbon cartridge.
11. Reinstall the top cover.



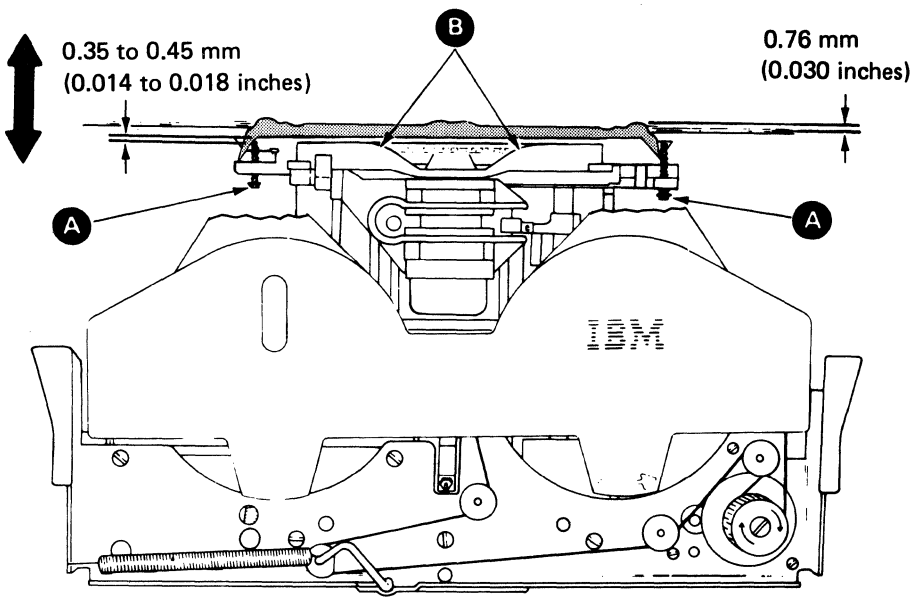
Right Side View

138 CARDHOLDER

Adjustment

1. Power off.
2. Lift the operator access cover.
3. Move the carrier assembly to the center of the printer mechanism.
4. Adjust the cardholder adjustment screws (A) for a gap of 0.35 to 0.45 mm (0.014 to 0.018 inches) between the cardholder and the ribbon guides (B) on the printwheel cartridge.
5. Check for approximately 0.76 mm (0.030 inches) gap between the cardholder and the platen.

   Note: If this clearance is not correct, check the carrier assembly adjustment (130) and for a defective printwheel cartridge. The gap between the ribbon guides on a good printwheel cartridge and the platen should be 1.54 to 1.83 mm (0.061 to 0.071 inches).
6. Close the operator access cover.



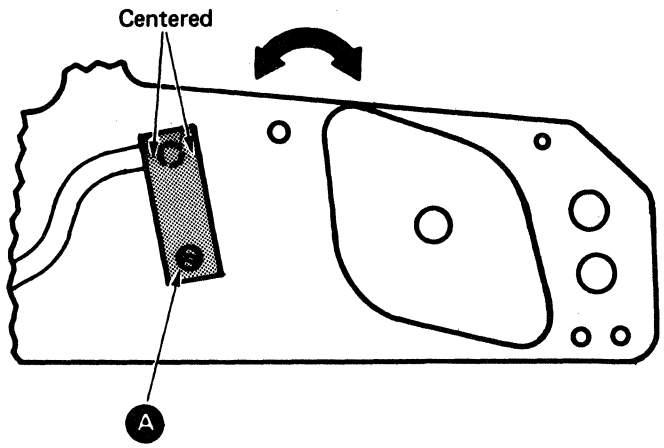
Top View

139 LEFT MARGIN SWITCH

Adjustment.

1. Power off.
2. Remove the top cover (200).
3. Place the printer in the CSR service position (152).
4. Loosen the left margin switch mounting screw (A).
5. Adjust the left margin switch so that it is visually centered over the plunger.

   Note: The left margin switch will read between 10 and 15 ohms when closed.
6. Tighten the left margin switch mounting screw.
7. Return the printer to the normal operating position.
8. Reinstall the top cover.



Left Side View

This page left blank intentionally.

SERVICE CHECKS

150 RIBBON MOVEMENT

Service Check

1. Power off.
2. Remove the top cover (200).
3. Jumper the cover interlock.
4. Power on.
5. Load paper.
6. Select and run test execute mode test 52 (307).

   Note: Early level printers may not run test execute mode test 52. If this test does not run, select test 22.

7. Observe the ribbon movement. (Both ribbon spools should be turning and the ribbon should move up and down.)
8. Run test execute mode test 48 (307).
9. Observe the up and down movement of the ribbon.
10. Inspect the placement of printed characters on the ribbon. The used area of ribbon should be visually centered on the ribbon.
11. If the ribbon is not working correctly, perform the following:

    a. Ribbon lift arm adjustment (135)

    b. Ribbon cartridge latches adjustment (137)

    c. Cardholder adjustment (138).

12. If the ribbon is working correctly, continue as follows:

    a. Power off.

    b. Remove the cover interlock jumper.

    c. Reinstall the top cover.

151 LEFT AND RIGHT CARRIER CABLES

Service Check

1. Power off.
2. Remove the top cover (200).
3. Move the carrier assembly to the left side frame of the printer.
4. Check the right carrier cables (100,104) to ensure they are plugged in and seated correctly.
5. Check for any obstruction that would inhibit free movement of the cable.
6. Check the continuity of the right carrier cable (105).
7. Move the carrier to the right side frame of the printer.
8. Check the left carrier cable to ensure it is plugged in and seated correctly.
9. Check for any obstruction that would inhibit free movement of the cable.
10. Check the continuity of the left carrier cable (105).
11. Reinstall the top cover.

152 CSR SERVICE POSITION

CAUTION
Take extreme care when placing the printer in the CSR service position so as not to damage the carrier signal cables.

Warning: Never turn power on when the printer is in the CSR service position.

To place the printer in the CSR service position, do the following:

1. Power off.
2. Remove the top cover (200).
3. Remove the baffle (100).
4. Remove the power supply (234).
5. Remove the left margin switch cable (A-A1A11) (104) and reroute the control panel cable.
6. Loosen the front shock mount bracket screws (A).
7. Remove the cover adjustment tool from the baffle.
8. Slide the printer mechanism forward past the end of the bracket slot and lift the front of the printer mechanism. Use the cover adjustment tool to hold the printer in the service position:

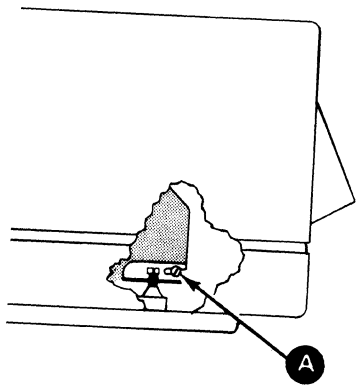
   a. Place the cover adjustment tool against the right side frame between the front carrier support shaft and the leadscrew coupler (B).

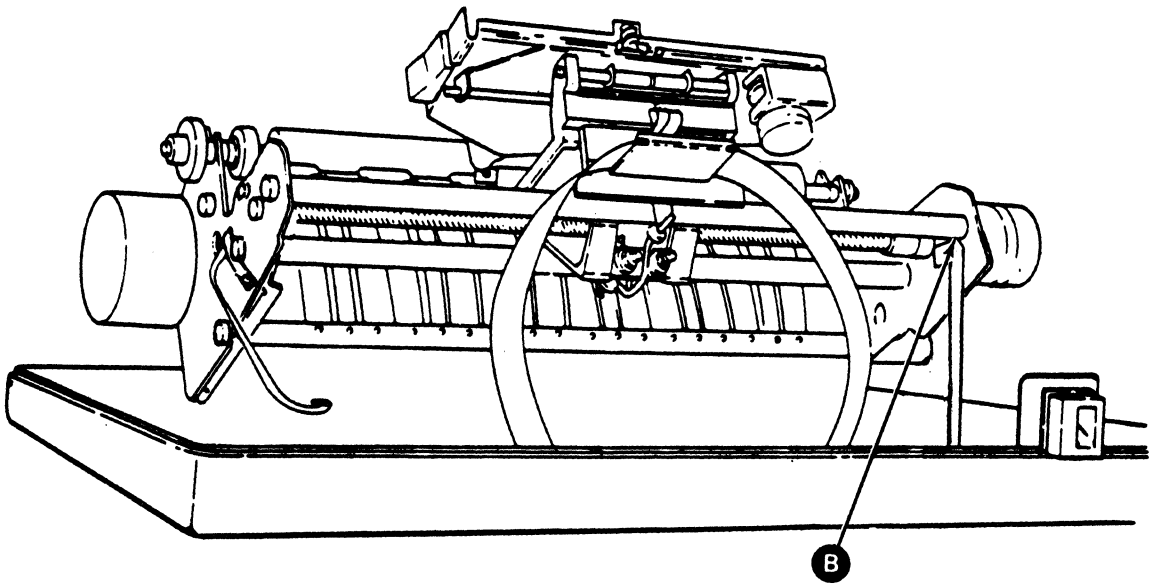
   b. Locate the opposite end of the tool on the acoustic material in the bottom cover to ensure that it does not slip.

   c. Press down on the printer mechanism to ensure that it is held firmly and will not slip when you are working on the printer.

   Note: For additional access remove the control panel (202).

9. To return the printer to its normal position, reverse the preceding steps.
10. Perform the the printer-to-cover front/rear adjustment (114).


A


B

153 FIRST WRITING LINE SENSOR

Service Check

1. Power on.
2. Run test execute mode test 26 (307).
3. Observe the two digit display on the control panel.

   00 = no paper covering sensor.
   01 = paper covering sensor.

An alternate method of checking the first writing line sensor is making voltage checks.

1. Power on.
2. With no paper covering the sensor, check for approximately 10 Vdc between pin 3 and pin 4 on connector A-A1A13 (104).
3. Cover the sensor with paper and check for approximately 1 Vdc between pin 3 and 4 on connector A-A1A13.

Note: Incorrect voltages can be caused by a shiny platen, dirty FWL sensor or a defective FWL sensor.

CHAPTER 2. PRINTER REMOVALS AND REPLACEMENTS

COVER

200 TOP COVER

Removal and Replacement

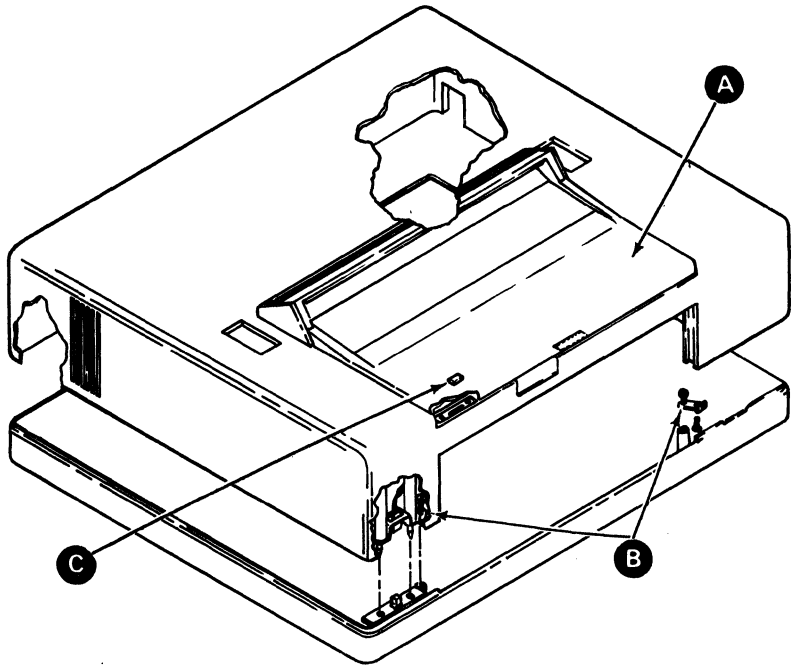
1. Power off.
2. Remove the sheet-feed or tractor feed if installed.
3. Lift the operator access cover (A).

   Note: When replacing the operator access cover magnet (C), the V-notch must be to the front.

4. Loosen the two top cover mounting screws (B).

   Note: The top cover is not hinged.

5. To remove the top cover, tilt the cover from the front and slide slightly it to the rear of the printer.
6. For replacement of the top cover, reverse this procedure.

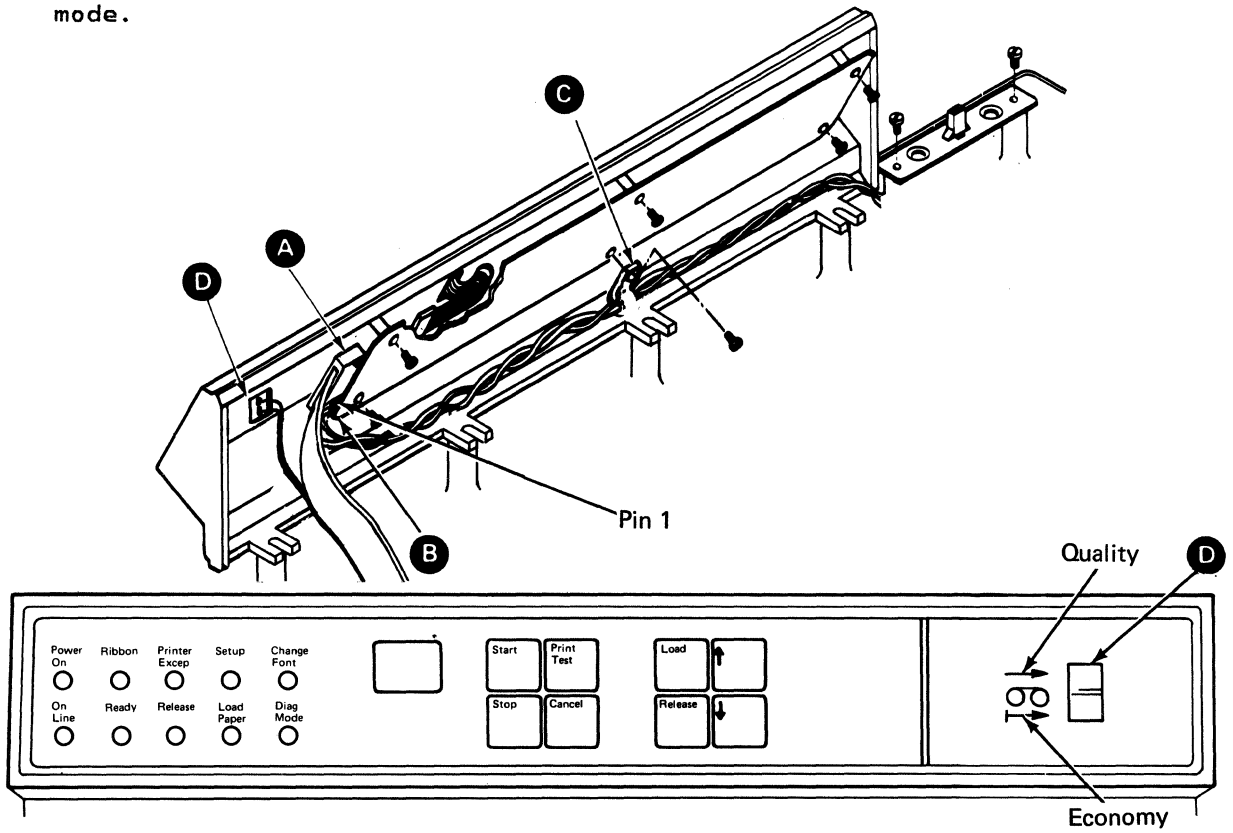


CONTROL PANEL AND CABLE ASSEMBLY

202 CONTROL PANEL

Removal and Replacement

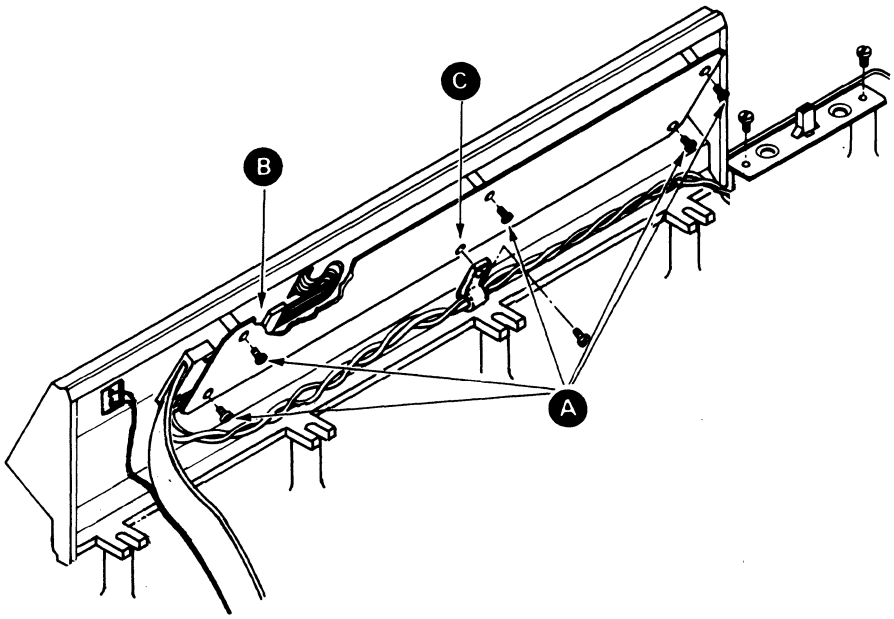
1. Power off.
2. Remove the top cover (200).
3. Disconnect the control panel signal cable (A).
4. Disconnect the cover interlock cable connector (B) at the control panel logic card.
5. Remove the two wire from the ribbon saver switch (D).
6. Remove cable clamp (C) and remove the control panel.
7. For replacement of the control panel, reverse this procedure. Ensure that the two ribbon saver switch wires are attached to the top two pins on the ribbon saver switch.
8. Install the control panel so the top cover seats tightly and evenly on the bottom cover.
9. To verify the ribbon function, press in on the top part of the ribbon saver switch for the quality mode or the bottom part of the switch for the economy mode.



203 CONTROL PANEL LOGIC CARD AND SWITCH ASSEMBLY

Removal and Replacement

1. Perform steps 1 through 6 of the control panel removal (202).
2. Remove the five remaining control panel logic card mounting screws (A).
3. Remove the control panel logic card shield.
4. Separate the control panel logic card (C) and the switch assembly (D).
5. Disconnect the control panel switch cable (B) from the control panel logic card.
6. For replacement of the control panel and switch assembly, reverse this procedure.
7. Install the control panel so the top cover seats tightly and evenly on the bottom cover.

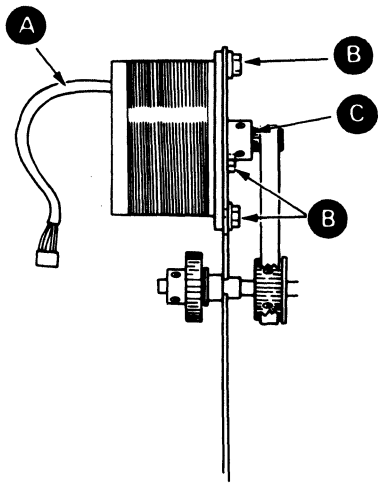


PAPER FEED

210 INDEX MOTOR

Removal and Replacement

1. Power off.
2. Disconnect the ac line cord.
3. Remove the top cover (200).
4. Remove the baffle (101).
5. Disconnect the index motor cable (A) (connector A-A1A9) from the A-A1 distribution/analog board (104).
6. Remove the three index motor mounting screws (B).
7. Remove the index motor.
8. Remove the index motor pulley (C) and install the pulley on the new index motor shaft.
9. For replacement of the index motor, reverse this procedure.
10. Perform the index motor and index motor pulley adjustments (122, 123).

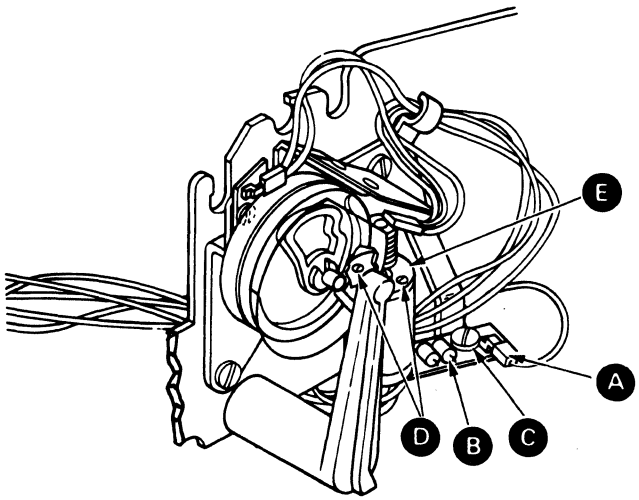


Top View

211 CAM MOTOR

Removal and Replacement

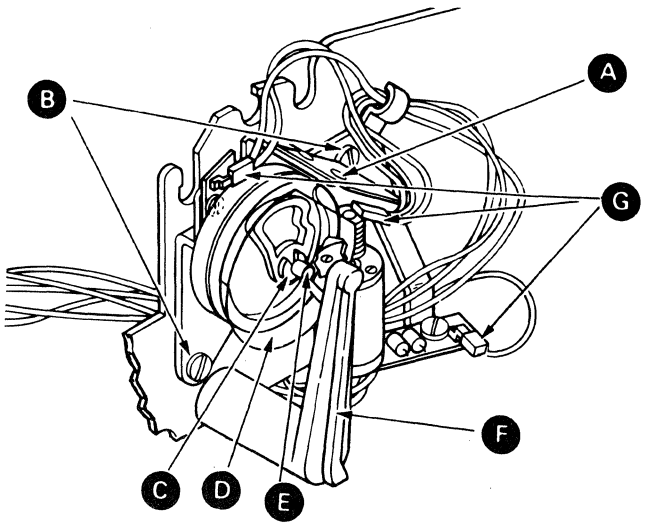
1. Power off.
2. Remove the top cover (200).
3. Remove the cam gear guard (100).
4. Disconnect the cam motor cable (A) from the cam motor filter board (B).
5. Remove the screw (C) from cam motor filter board.
6. Remove the two screws (D) from the top of the cam motor.
7. Remove the motor (E).
8. For replacement of the cam motor, reverse this procedure.
9. Adjust the cam motor for minimum gap, without binds, between the idler gear and the worm gear (125 step 8).



212 CAM

Removal and Replacement

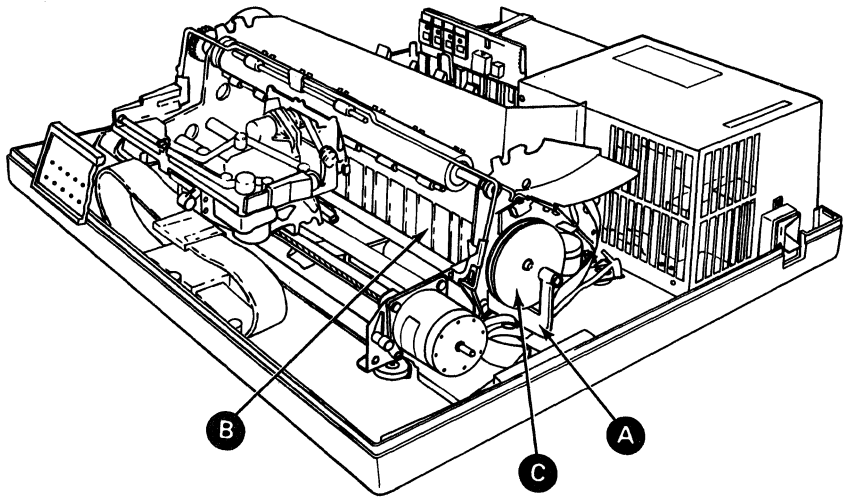
1. Power on.
2. After the Ready indicator comes on, press Stop.
3. Press Release.
4. Power off.
5. Remove the top cover (200).
6. Remove the cam gear guard (100).
7. Remove the three cam and motor signal cables (G).
8. Remove the home position reed switch board (A).
9. Disconnect the paper bail springs and move the paper bail (100) forward.
10. Remove the C-clip from the shaft (C).
11. Remove the cam safety shield (D).
12. Remove the two screws (B) from the cam and motor assembly bracket.
13. Remove the cam and motor assembly. If necessary remove the cam motor (211) to free the cam motor assembly from the deflector arm (F).
14. Remove the cam from the shaft (E).
15. For replacement of the cam, reverse the procedure.
16. Perform the cam motor and reed switch bracket adjustment (125).



213 DEFLECTOR ARM AND SPRING COMB

Removal and Replacement

1. Power on.
2. After the Ready indicator comes on, press Stop.
3. Press Release.
4. Power off.
5. Remove the top cover (200).
6. Remove the feed roller assemblies (214).
7. Place the printer mechanism in the CSR service position (152).
8. Turn the cam motor gear to disengage the deflector arm from the cam.
9. Turn the deflector arm (A) 180 degrees so that the spring comb deflectors (B) will slide through the opening (C) of the right side frame of the printer mechanism.
10. For replacement of the deflector arm and spring comb, reverse this procedure.

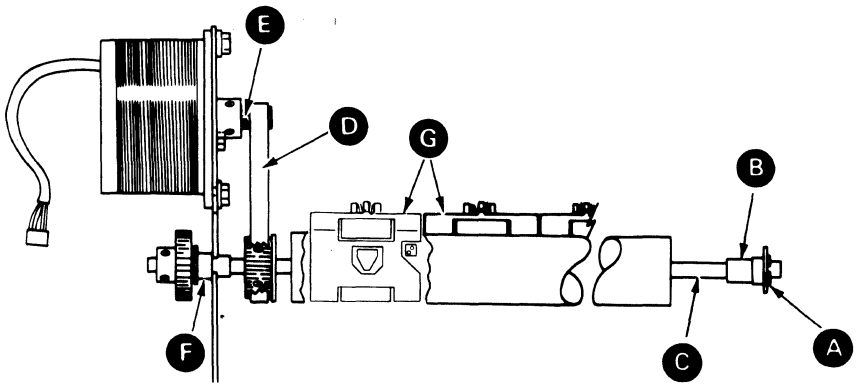


214 PLATEN AND FEED ROLLER ASSEMBLIES

Removal and Replacement

1. Power on.
2. After the Ready indicator comes on, press Stop.
3. Press Release.
4. Power off.
5. Remove the top cover (200).
6. Remove the C-clip (A) from the right side of the platen.
7. Pull the right platen shaft bearing (B) to the right to free the right end of the platen shaft (C).
8. Remove the index motor belt (D) from the index motor pulley (E).
9. Pull the left platen shaft bearing (F) left and lift the left end of the platen.
10. Pull the feed roller assemblies (G) from the shaft.
11. If the first writing line sensor was installed, remove it from the old feed roller assembly and install it on the new feed roller assembly. Adjust the sensor so the face of the sensor is 0.8 to 1.2 mm (0.031 to 0.047 inches) below the surface of the feed roller assembly.
12. For replacement of the platen, or feed roller assemblies reverse this procedure.
13. Perform the following adjustments:

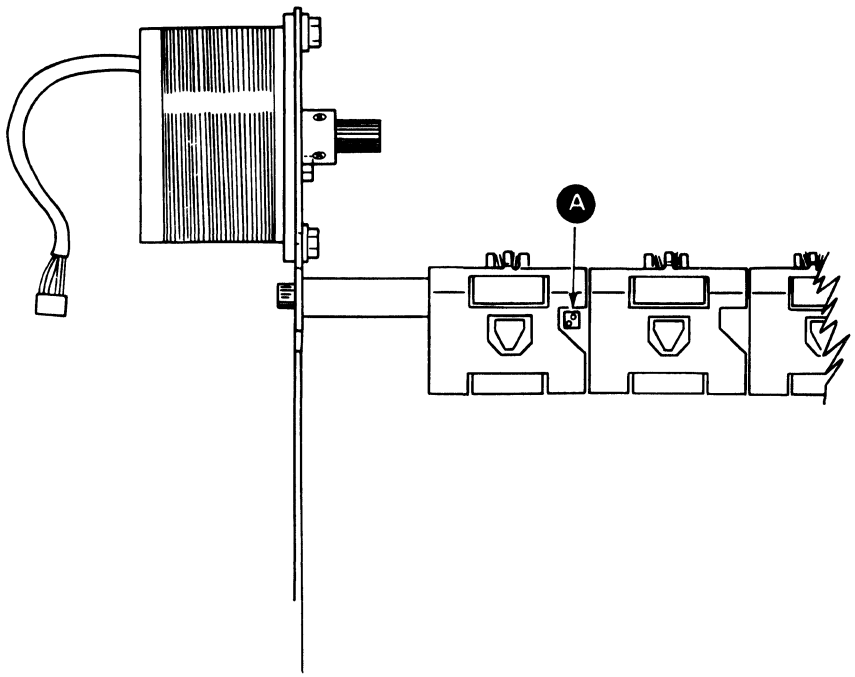
    a. Platen pulley (121)
    b. Index motor pulley (123)



215 FIRST WRITING LINE SENSOR

Removal and Replacement

1. Power off.
2. Remove the top cover (200).
3. Remove the platen (214).
4. Remove the A-A1A13 connector from the A-A1 distribution/analog board (104).
5. Remove the leftmost feed roller assembly (214).
6. Remove the first writing line sensor (A).
7. For replacement of the first writing line sensor, reverse this procedure.
8. Adjust the sensor so the face of the sensor is 0.8 mm to 1.2 mm (0.031 to 0.047 inches) below the surface of the feed roller assembly (124).



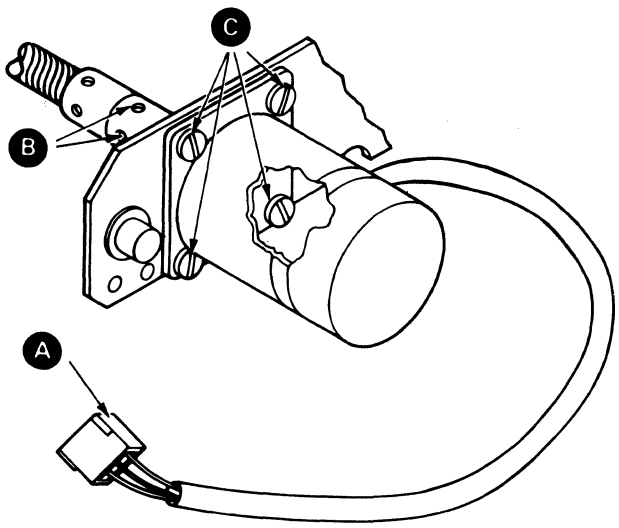
CARRIER

216 ESCAPEMENT MOTOR

Removal and Replacement

1. Power off.
2. Remove the top cover (200).
3. Remove the baffle (100).
4. Disconnect the escapement motor cable (A) (104).
5. Loosen the two setscrews (B) that attach the leadscrew coupler and the escapement motor shaft.
6. Remove the four escapement motor mounting screws (C).
7. Remove the escapement motor.
8. For replacement of the escapement motor, reverse this procedure. Route the escapement motor cable away from the carrier travel path.

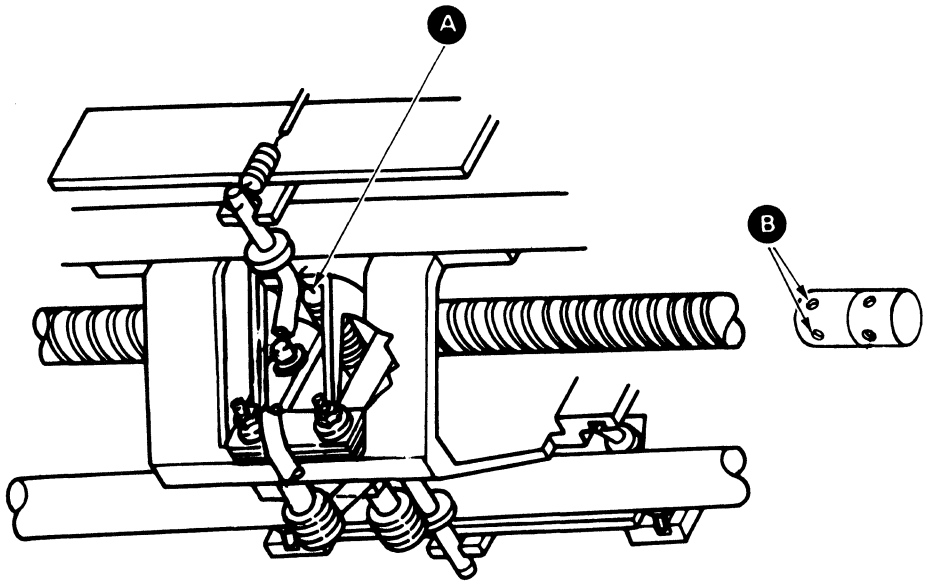
Note: The leadscrew coupler should be positioned with a small gap, 1 mm (0.040 inches) maximum, between the escapement motor and the coupler to prevent binds.



217 LEADSCREW

Removal and Replacement

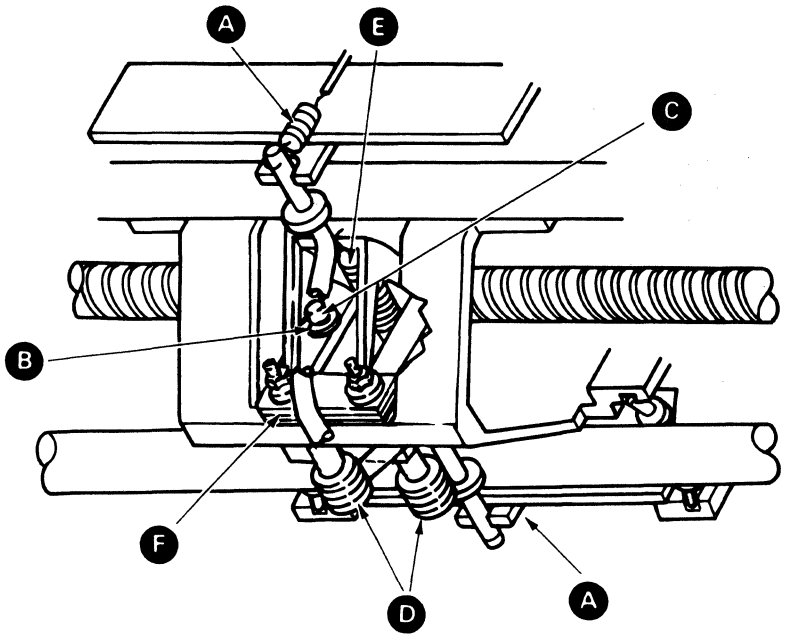
1. Power off.
2. Remove the top cover.
3. Loosen the two setscrews (B) that attach the leadscrew to the leadscrew coupler.
4. Place the printer mechanism in the CSR service position (152).
5. Disconnect one end of the leadscrew follower spring (A).
6. Turn the leadscrew through the left side of the printer mechanism.
7. For replacement of the leadscrew, reverse this procedure.



218 LEADSCREW FOLLOWER

Removal and Replacement

1. Power off.
2. Remove the top cover (200).
3. Place the printer mechanism in the CSR service position (152).
4. Remove the bottom bearing/shaft assembly by removing the two bottom roller springs (A). Remove the C-clip (B) and the stop shaft (C).
5. Loosen the two leadscrew follower screws (D).
6. Remove the leadscrew follower spring (E).
7. Remove the leadscrew follower (F).
8. For replacement of the leadscrew follower, reverse this procedure.
9. Perform the leadscrew follower adjustment (126).



This page left blank intentionally.

219 CARRIER ASSEMBLY

Removal and Replacement

1. Power on.
2. Remove the printwheel cartridge.
3. Power off.
4. Remove the top cover (200).
5. Remove the ribbon cartridge, and cardholder (100).
6. Remove the control panel (202)
7. Remove all cables from the carrier assembly (105).
8. Remove the ribbon plate (228).
9. Remove the selection motor (222 steps 6 through 11).
10. Place the printer mechanism in the CSR service position (152).
11. Remove the bottom bearing/shaft assembly (A) by disconnecting the spring (B) on each side.
12. Remove the leadscrew (217).
13. Place the printer mechanism in the normal operating position.
14. Lift the carrier assembly from the printer mechanism.
15. Remove the old ribbon lift arm (135), and install it on the new carrier assembly.
16. For replacement of the carrier assembly, reverse this procedure.

17. Check or perform the following adjustments in order:

    a. Leadscrew follower (126)

    b. Carrier eccentrics (127)

    c. Selection motor pull-back cable (128)

    d. Carrier assembly (130)

    e. Printwheel hub to platen (131)

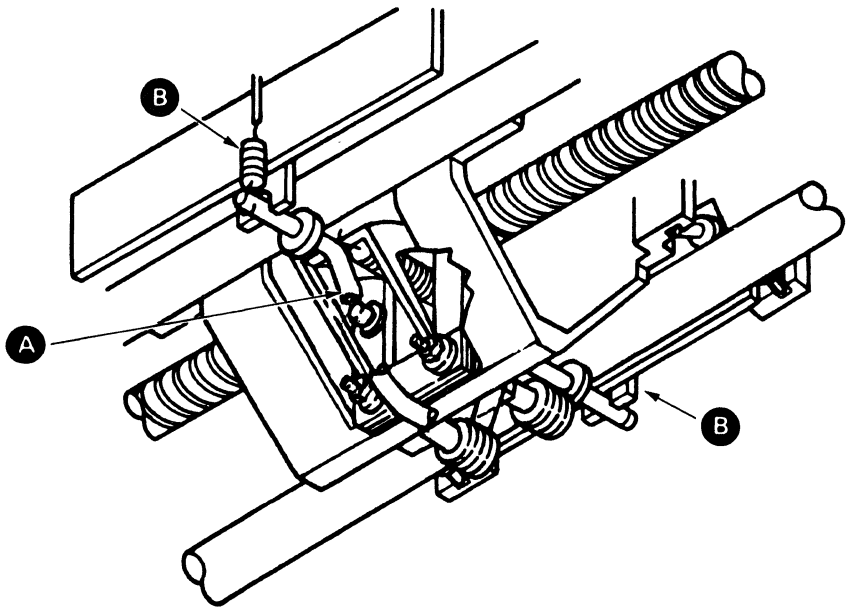
    f. Printwheel homing (132)

    g. Print hammer assembly (133)

    h. Ribbon lift arm (135)

    i. Ribbon cartridge latches (137)

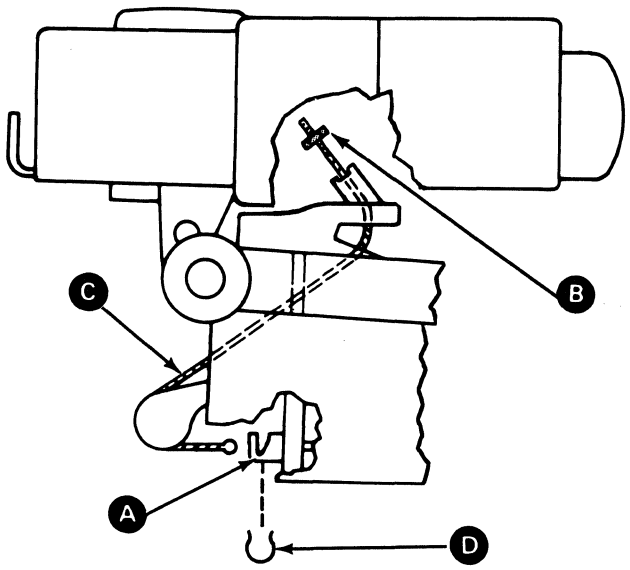
    j. Cardholder (138)



220 SELECTION MOTOR PULL-BACK CABLE

Removal and Replacement

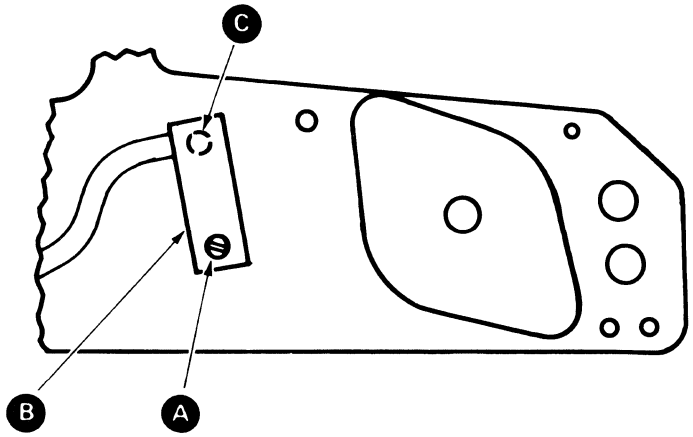
1. Power off.
2. Remove the top cover (200).
3. Push the carrier assembly to the left side frame.
4. Remove the retainer clip (D).
5. Remove one end of each selection motor pull-back spring (222 step 9), pull the selection motor back by hand and remove the pull-back cable end from the selection motor adjustment screw (A).
6. Push the cable upward so that the pull-back cable nut (B) can be removed.
7. Remove the pull-back cable (C).
8. For replacement of the selection motor pull-back cable, reverse this procedure.
9. Perform the selection motor pull-back cable adjustment (128).



221 LEFT MARGIN SWITCH

Removal and Replacements

1. Power off.
2. Remove the top cover (200).
3. Place the printer mechanism in the CSR service position (152).
4. Disconnect the left margin switch, A-A1A11, from the A-A1 distribution/analog board.
5. Remove the left margin switch mounting screw (A) and remove the left margin switch (B).
6. Remove the plunger (C) by pushing it out of the left side frame.
7. For replacement of the left margin switch, reverse steps 4 through 6.
8. Adjust the left margin switch so that it is visually centered over the plunger (139).



Left Side View

222 SELECTION MOTOR

Removal and Replacement

1. Power on.
2. Remove the ribbon cartridge and printwheel cartridge.
3. Power off.
4. Remove the top cover (200).
5. Remove the control panel (202).
6. Remove the carrier cable clamps and disconnect the selection motor and selection motor sensor cable connectors (105).
7. Remove the cable clamp securing the hammer, hammer sensor, and ribbon sensor cables.
8. Place the printwheel hub (B) so that the extended part of the printwheel hub points down.
9. Disconnect the motor end of the two selection motor pull-back springs (D).
10. Remove the selection motor adjustment screw (C).
11. Tilt the selection motor (E) forward slightly and lift the selection motor out of the carrier assembly.
12. Remove the selection home lever (A) by disconnecting the return spring and removing the two lever studs.
13. Remove the selection motor clamp (F) and the printwheel hub from the old selection motor, and install them on the new selection motor.

    Note: If the new selection motor has the printwheel hub already installed, it is not necessary to remove the hub from the old selection motor or perform the printwheel hub adjustment.

14. Before reinstalling the selection motor, perform the printwheel hub adjustment (129).
15. For replacement of the selection motor, reverse this procedure.

16. After installing the new selection motor perform the following adjustments in order:

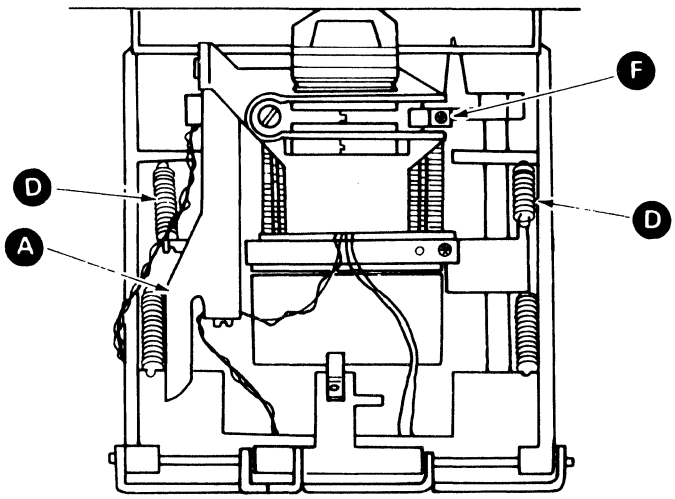
    a. Carrier eccentric (127)

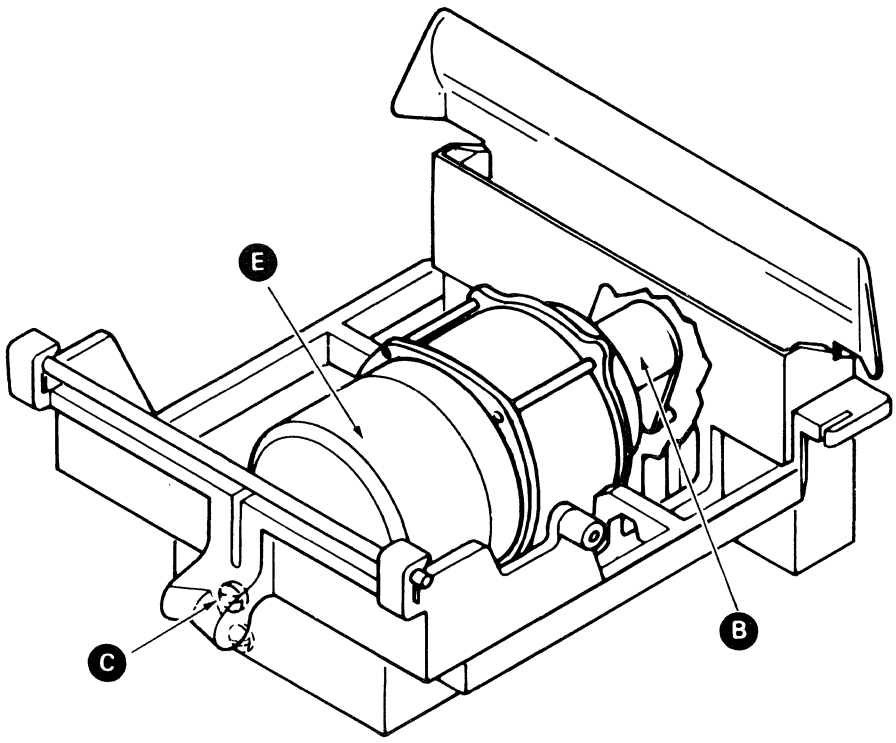
    b. Selection motor pull-back cable (128)

    c. Printwheel hub to platen (131)

    d. Printwheel homing (132)

    e. Print hammer assembly (133)

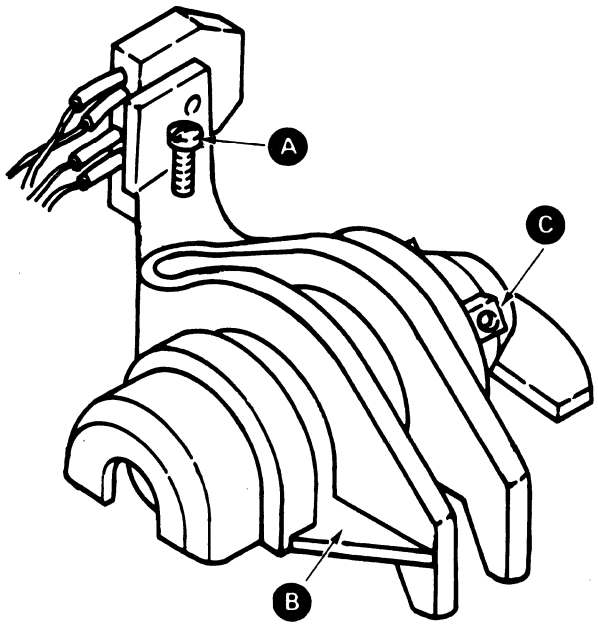




223 PRINT HAMMER ASSEMBLY

Removal and Replacement

1. Power on.
2. Remove the ribbon cartridge and printwheel cartridge.
3. Power off.
4. Remove the top cover (200).
5. Disconnect the carrier cable clamps and the hammer and hammer sensor cables (105).
6. Remove the cable clamp on the left side of the carrier.
7. Remove the hammer bracket screw (A) and hammer bracket (B).
8. Remove the hammer assembly (C).
9. For replacement of the print hammer assembly, reverse this procedure.
10. After installing a new hammer assembly perform the printwheel homing (132) and print hammer assembly adjustments (133).



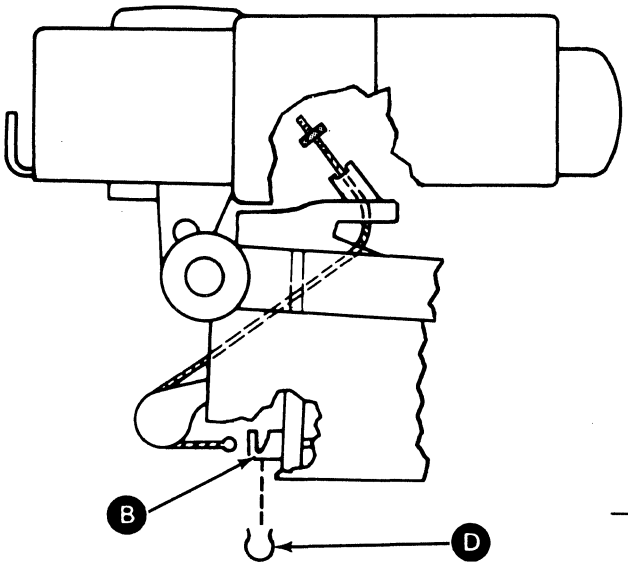
This page left blank intentionally.

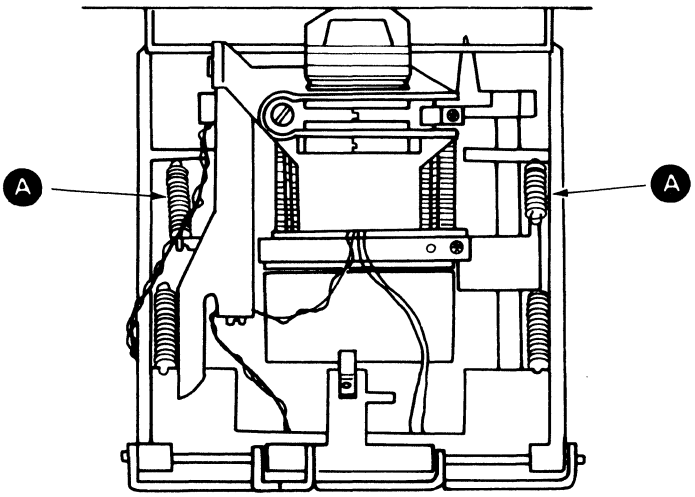
224 PRINTWHEEL HUB

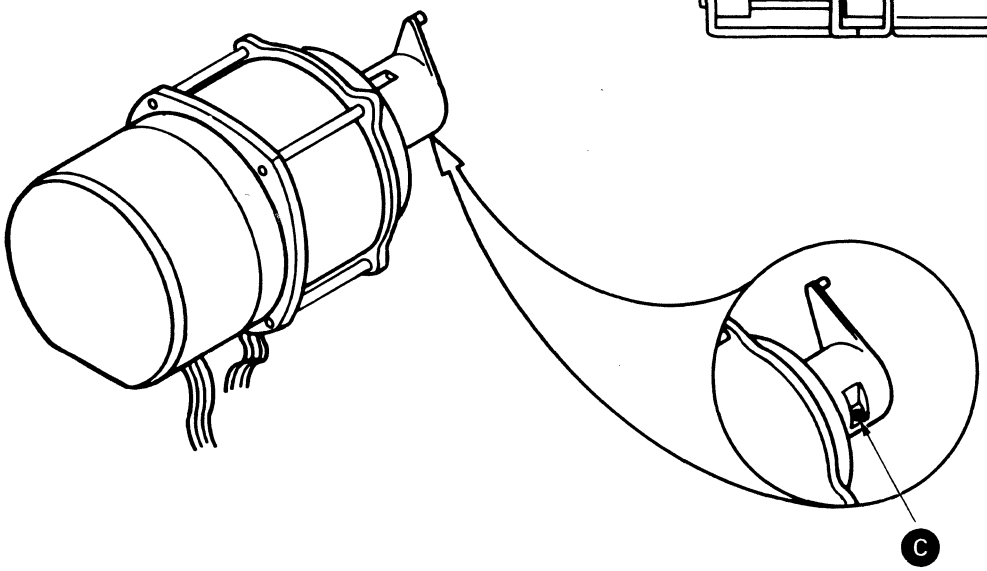
Removal and Replacement

Note: If the printwheel does not have a screw (C), this procedure is not necessary.

1. Power on.
2. Remove the ribbon cartridge and printwheel cartridge.
3. Power off.
4. Remove the top cover (200).
5. Remove the retainer clip (D).
6. Remove the motor end of the two selection motor pull-back springs (A), pull the selection motor back by hand and remove the pull-back cable end from the selection motor adjustment screw (B).
7. Turn the printwheel hub so that the extended part points down.
8. Lift the motor out of the carrier.
9. Loosen the screw (C) in the printwheel hub.
10. Remove the old printwheel hub and install the new one.
11. Perform the printwheel hub adjustment (129).
12. Install the selection motor by reversing steps 5, 6, and 7.
13. After installing the selection motor, perform the following adjustments in order:
    a. Printwheel hub to platen (131)
    b. Printwheel homing (132)
    c. Print Hammer assembly (133).


B
D


A
A

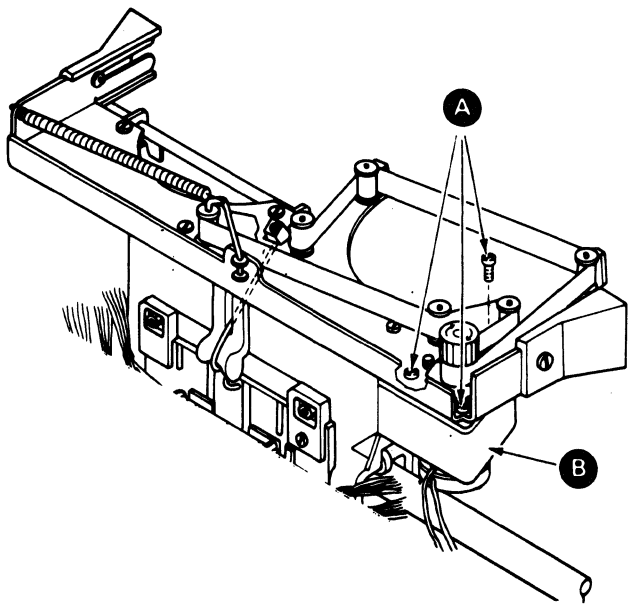

C

RIBBON

226 RIBBON MOTOR DRIVE ASSEMBLY

Removal and Replacement

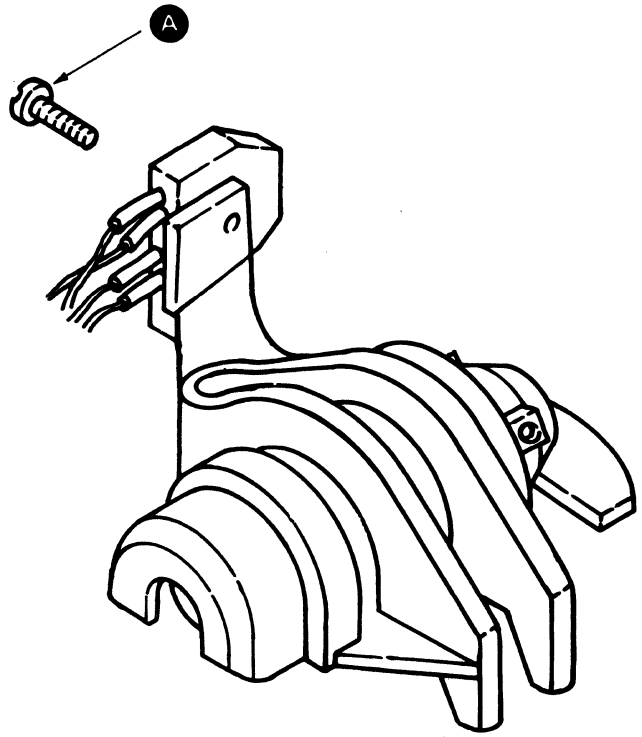
1. Power off.
2. Remove the top cover (200).
3. Remove the ribbon cartridge.
4. Disconnect the right carrier cable clamp and ribbon motor cable (105).
5. Remove the three ribbon motor drive assembly mounting screws (A).
6. Remove the ribbon motor drive assembly (B).
7. For replacement of the ribbon motor drive assembly, reverse this procedure.
8. Perform the ribbon plate adjustment (134) and the ribbon lift arm adjustment (135).



227 RIBBON SENSOR ASSEMBLY

Removal and Replacement

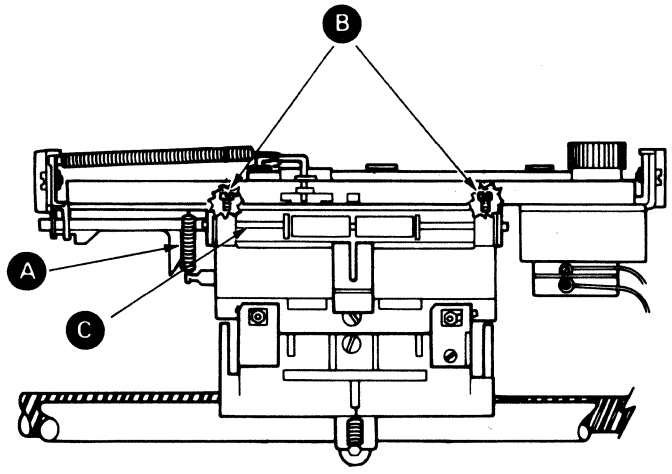
1. Power off.
2. Remove the top cover (200).
3. Disconnect the left carrier cable clamp and the ribbon sensor cable (105).
4. Lift the ribbon plate and remove the ribbon cartridge.
5. Remove the cable clamp on the left side of the carrier.
6. Remove the ribbon sensor screw (A) and the ribbon sensor assembly.
7. For replacement of the ribbon sensor, reverse this procedure.
8. Shape the leads on the ribbon sensor so they do not inhibit the ribbon cartridge's up and down movement.



228 RIBBON PLATE

Removal and Replacement

1. Power off.
2. Remove the top cover (200).
3. Remove the ribbon cartridge.
4. If replacing a defective ribbon plate, remove the three screws for the ribbon motor drive assembly (226).
5. Disconnect the ribbon plate spring (A).
6. Remove the selection motor pull-back cable (220).
7. Remove the ribbon plate by loosening the two screws (B) holding the small restraint plates against the ribbon plate shaft (C). Turn the plates off the shaft and lift the ribbon plate off the carrier.
8. For replacement of the ribbon plate, reverse this procedure.
9. Perform the following adjustments:
   a. Ribbon plate (134)
   b. Ribbon lift arm (135)
   c. Ribbon cartridge latches (137).

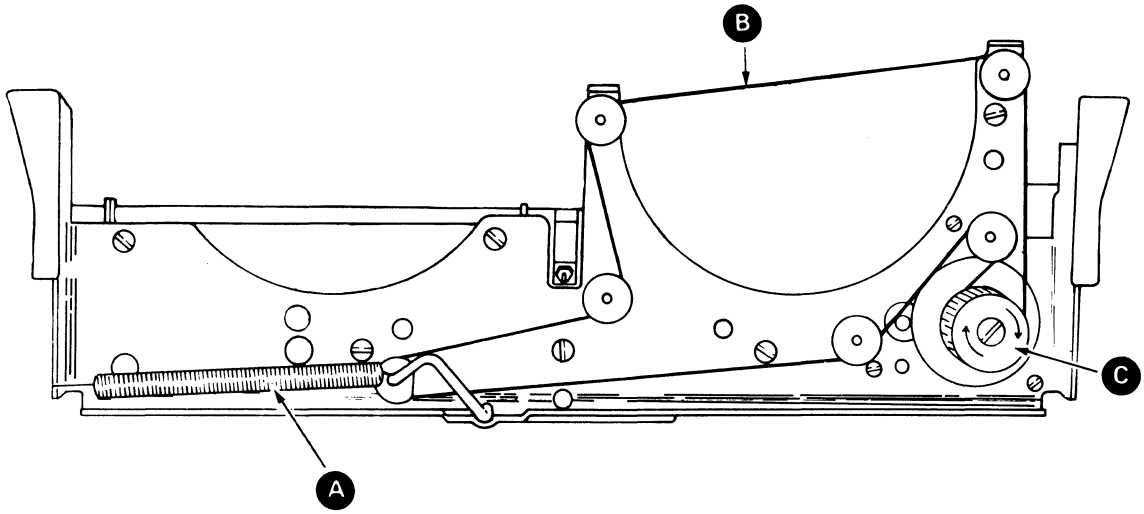


230 RIBBON DRIVE BELT

Removal and Replacement

1. Power off.
2. Open the operator access cover.
3. Remove the ribbon cartridge.
4. Remove the ribbon drive belt tension spring (A).
5. Remove the ribbon drive belt (B).
6. For replacement of the ribbon drive belt, reverse this procedure.

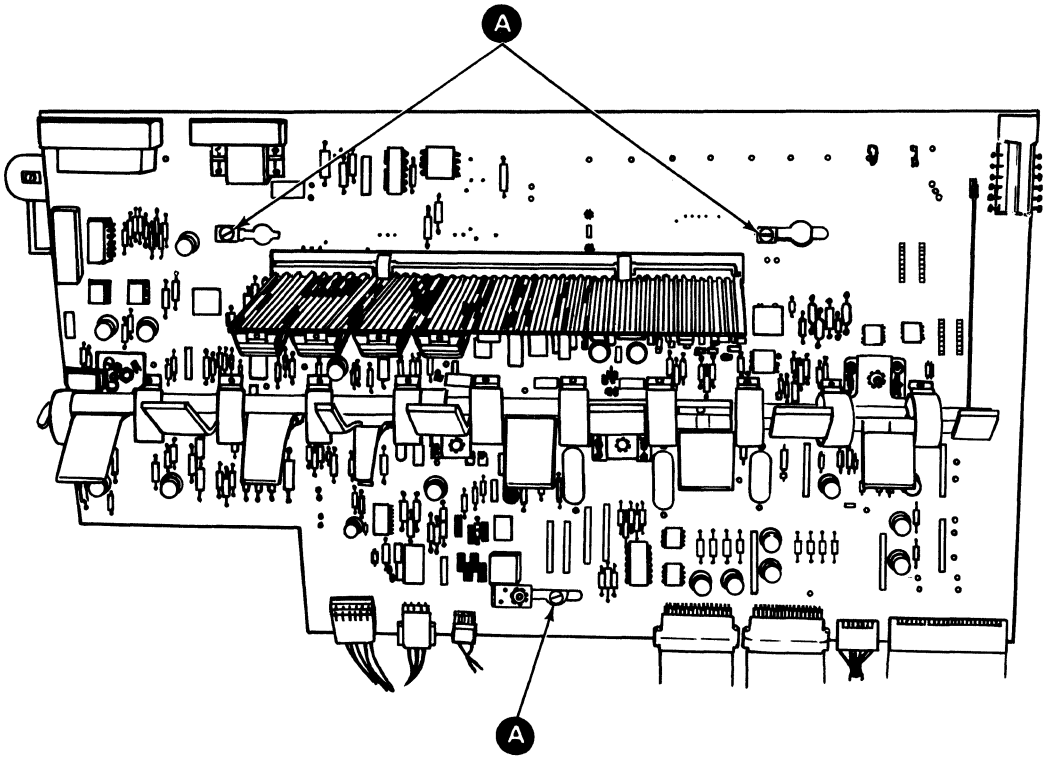
Note: The smooth surface of the new ribbon drive belt touches the drive capstan part of the ribbon advance knob (C).



231 A-A1 DISTRIBUTION/ANALOG BOARD

Removal and Replacement

1. Power off.
2. Remove the top cover (200).
3. Remove the processor card (100).
4. Remove the rear panel.
5. Remove the baffle (100).
6. Remove all connectors from the A-A1 distribution/analog board (104).
7. Loosen the three mounting screws (A) from the distribution/analog board.
8. Slide the A-A1 distribution/analog board to the left.
9. Lift the A-A1 distribution/analog board out of the bottom cover.
10. For replacement of the A-A1 distribution/analog board, reverse this procedure.

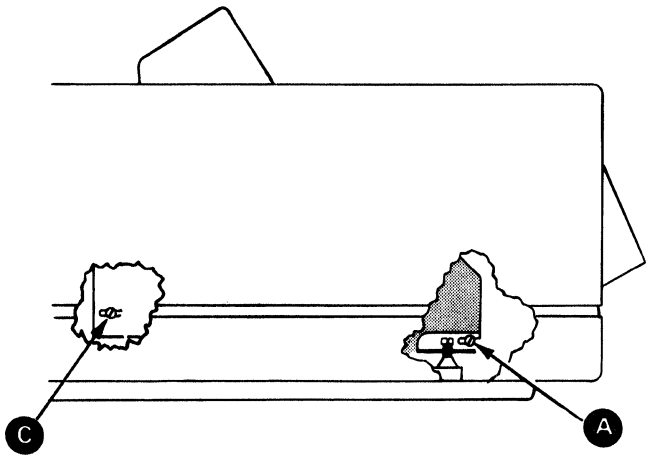


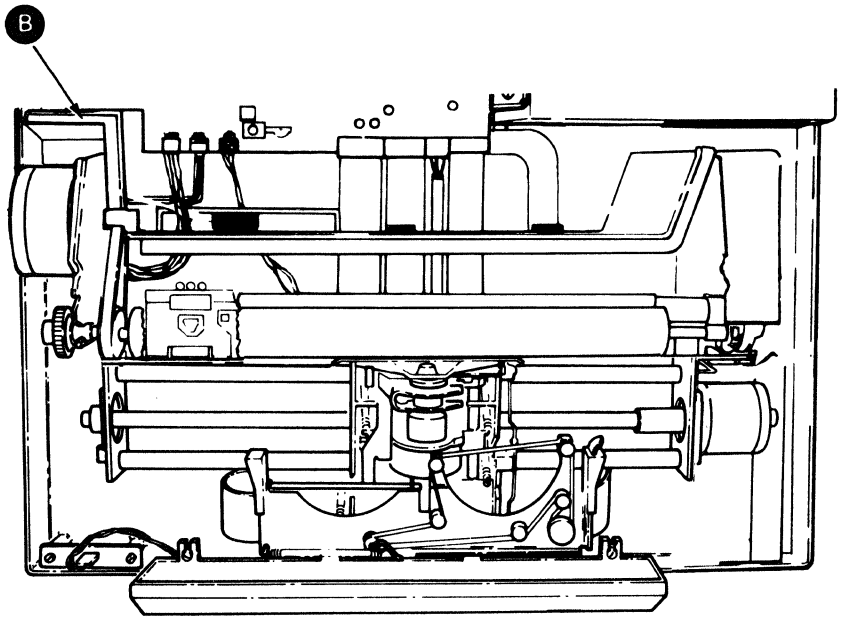
This page left blank intentionally.

233 PRINTER MECHANISM

Removal and Replacement

1. Power off.
2. Disconnect the ac line cord from the outlet.
3. Remove the top cover (200).
4. Remove the control panel.
5. Remove the baffle (B).
6. Remove the A-A1 distribution/analog board (231).
7. Remove the power supply mounting screw.
8. Slide the power supply to the left and remove the power supply (234).
9. Place the power supply behind the bottom cover.
10. Loosen the front shock mount bracket screws (A).
11. Slide the printer mechanism forward past the end of the slot.
12. Remove the rear shoulder screws (C).
13. Disconnect the left and right carrier cable connectors (105) at the carrier end.
14. Disconnect the ground wires located on the left and right sides of the printer frame.
15. Lift the printer mechanism out of the bottom cover.
16. For replacement of the printer mechanism, reverse this procedure.


C
A

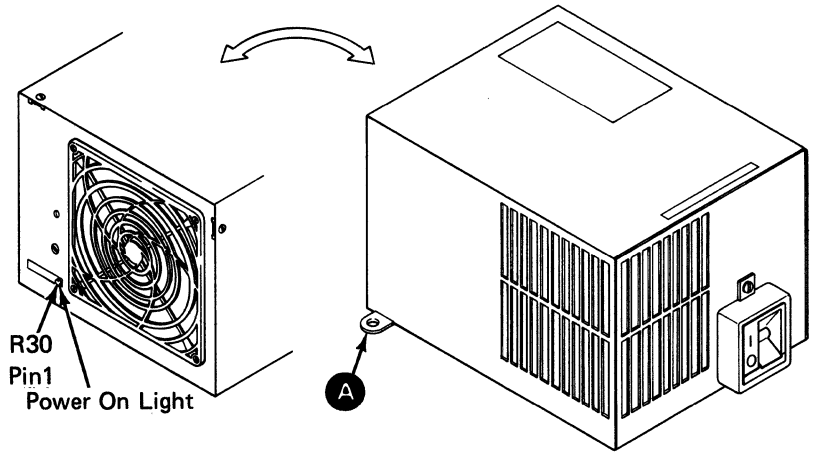

B

POWER SUPPLY

234 POWER SUPPLY

Removal and Replacement

1. Power off.
2. Disconnect the ac line cord from the electrical outlet and the power supply.
3. Remove the top cover (200).
4. Loosen the A-A1 distribution/analog board mounting screws.
5. Slide the A-A1 distribution/analog board to the left.
6. Remove the power supply mounting screw (A).
7. Slide the power supply to the left and remove the power supply.
8. For replacement of the power supply, reverse this procedure.



R30 Connector	
Pin	Voltage
1	Not used
2	+36 Vdc
3	GNDA
4	GNDL
5	GNDL
6	+5 Vdc
7	+5 Vdc
8	-24 Vdc

CHAPTER 3. DIAGNOSTIC AIDS

301 CSR DIAGNOSTICS

The internal diagnostics in the IBM 5218 Printer let the CSR service the printer without using the controller. Control panel switches are used to select and run specific tests in the test execute mode. Information about the tests is displayed on the control panel indicators and the two-digit display.

The test execute mode tests are controlled by the processor card and are run in the test execute mode.

302 TEST EXECUTE MODE ENTRY

Before entering the test execute mode ensure that the wrap plug is not plugged in and at least one of the following conditions exist:

1. The On Line indicator must be on.
2. The printer must be disconnected from the controller.
3. The controller must be powered off.

To enter the test execute mode a specific control panel switch sequence must be pressed. The sequence follows:

1. Press the Stop switch and wait for the Ready indicator to go off.
2. Press and hold the Stop switch.
3. Press and release the Paper Up (↑) switch.
4. Press and release the Release switch.
5. Release the Stop switch.

The printer is now in the test execute mode. The Power On, Release, and Diag Mode indicators are on and 00 is displayed in the two-digit display.

Note: If an error condition exists, press Cancel then do steps 2 through 5.

Control Panel - Test Execute Mode

In the test execute mode the switches and indicators serve different functions than in the normal mode. They function as follows:

SWITCHES

- **Start**- used to run a test once; press the Load switch to run the test in the loop mode.
- **Stop**- used to stop a test in progress. Some tests may need the Stop switch pressed several times .
- **Load**- used to run a test in the loop mode, stopping on the first error.

- **Cancel**- used for various purposes depending on the number of consecutive times pressed.

Number of Consecutive Times Pressed	Effect on the Test Execute Mode
1	Zero's the two-digit display, stops the test in progress, and resets the loop counter.
2	Clears the test number and two-digit display.
3	Exits the test execute mode.

- **Paper Up**- used to increase the left digit of the two-digit display.

- **Paper Down**- used to increase the right digit of the two-digit display.

The remaining switches are not used in the test execute mode.

INDICATORS

- **Power On**- indicates that primary power is supplied to the printer.

- **On Line**- indicates the status of the communications line to the controller.

- **Ribbon**- indicates that the printer is out of ribbon.

- **Ready**- must be off in the test execute mode.

- **Printer Excep**- indicates that an error was sensed during the execution of a test or selection of a test. The error code is displayed in the two-digit display.

- **Change Font**- indicates that a test execute mode test is in progress.

- **Load Paper**- indicates that the printer is out of paper.

- **Setup**- indicates that a test execute mode test is running in the loop mode.

- **Diag Mode**- indicates that the printer is operating in the test execute mode.

- **Release**- this indicator is not used in the test execute mode.

- **Two-Digit Display**- indicates a test number, error code, or output information.

305 TEST SELECTION

Before a test execute mode test can be selected, the printer must be in the test execute mode and not running a test. Pressing the Paper Up (↑) Paper Down (↓) switches increases the two-digit display. When the selected test number is displayed, press the Start switch to run the test once, or press the Load switch

to run the test in the loop mode. In the loop mode the test stops when the first error is sensed.

306 TEST EXECUTE MODE

The test execute mode tests are classified into three categories: printer mechanism tests, output data tests, and command output tests.

PRINTER MECHANISM TESTS (TESTS 1 - 18)

The printer mechanism tests exercise the hardware on the printer without sending commands through the printer interface. These tests exercise the printer mechanism and processors.

OUTPUT DATA TESTS (TESTS 23 - 29)

The output data tests let the CSR display information from the printer on the two-digit display. When an output data test is selected, the decimal points on the two-digit display turn on indicating output information. Information is displayed for 750 milliseconds before the two-digit display returns to the test number.

COMMAND OUTPUT TESTS (TESTS 20, 21, 22, 40 - 53)

The command output tests supply commands to the printer that simulate the controller interface. These tests exercise various printer mechanism components and supply information to the CSR through the storage dump.

307 TEST EXECUTE MODE DIAGNOSTIC TESTS

Test Number	Test Definition
01	Printer Test and Initialization This test performs the complete basic assurance test for the printer. The interface, index, selection, and escapement processors, associated driver circuits, and mechanisms are verified for proper operation. Then, the selection, cam, and escapement mechanisms are homed and the carrier assembly is centered.
02	Index Area Test and Initialization This test performs BAT for the index area. The processor card is initialized, and then the BAT is performed for the interface and index processor. The escapement processor is then initialized.

03 Interface Configuration Check, Printer Test and Initialization

This test is a combination of the configuration check test (test 04) followed by the printer test and initialization (test 01).

04 Configuration Check

This test checks to ensure that the interface configuration is correct. The printer is first reset, the interface module is initialized, the control panel is read, and the printer is in the reset mode

05 Control Panel Test

This test checks the control panel logic card. It checks the continuity of the wires from the switches and the control panel, and checks to ensure that no switches are held down. The two-digit display and all control panel indicators are turned on.

06 ART Internal Wrap Test

This test does an internal wrap of the asynchronous receiver/transmitter (ART) logic. After running this test, you must power off and back on to continue running tests.

07 ART Loop Test

This test verifies the ability of the ART to send and receive serial data. It is performed with the printer offline and disconnected from the controller, and can check both the printer and the cable to the controller.

To check the printer do the following:
1. Disconnect the attachment cable from the printer attachment panel.
2. Plug the wrap plug into the attachment panel.
3. Run test 07.

To check the attachment cable do the following:
1. Disconnect the attachment cable from the controller.
2. Plug the wrap plug into the attachment cable.
3. Run test 07.

After running this test you must exit the test execute mode and then reenter it to continue running test execute mode tests.

08 ROS Test

This test checks each ROS module on the processor card to verify that it can be addressed. If a module fails, run test execute mode test 28 to identify the failing module.

09 RAM Test and Initialization

This test does a read/write of the RAM addresses. Then it initializes the RAM for printer operation. This test will not clear the maintenance statistics.

10 Interface/Paper Handling Processor Group

This test does a complete BAT for the interface/paper handling processor. After running this test, run test 50 before running any other printer test.

11 Escapement Processor Group

This test does a complete BAT for the escapement area. After running this test, run test 50 before running any other printer test.

12 Selection Processor Group

This test does a complete BAT for the selection area. After running this test, run test 50 before running any other printer test.

13 Interface/Paper Handling Group

Same as test 10.

14 Escapement Home And Escape To Maximum Right Margin

Escapement home causes the carrier to move slowly to the left side frame and then moves to the right to the logical left margin. Then the carrier moves to the right side frame.

15 Escapement Shake Test

This test centers the carrier assembly, and then moves the carrier three steps to the right. In the loop mode this test causes the carrier to shake. Used this test to verify adjustments 127, 130, 131, 132, and 133.

16 Selection Home

Selection home moves the printwheel to the home position and checks the selection home sensor.

17 Cam Home

Cam home moves the cam to the home position. If the cam is already home, the cam will not move. In the loop mode, the test runs only once, the two-digit display is blank, and the Change Font indicator in on.

18 Cam Move

Cam move moves the cam one position in the following sequence: home, tractor, load, release, and open paper bail.

19 Not used

20 Print Test

This test is the same as the print test (323).

21 First 1K Bytes of RAM

This test prints RAM locations X'A000' to X'A400'.

22 Last 1K Bytes of RAM

This test prints RAM locations X'A000' to X'A800'.

23 Display Test Execute Mode Maintenance Statistics

This test displays the 16 bytes of the maintenance statistics (311), one byte at a time on the control panel.

This test runs only once in the loop mode.

24 Switch Port

This test displays a byte that describes the printer configuration, switch status, and cover open status.

FF=Cover open, no paper handling device, and no switch pressed
FE=Cover closed, no paper handling, no switch pressed
FC=Cover closed, no paper handling, Stop switch pressed
E2=cover closed, no paper handling, Cancel switch pressed
E6=Cover closed, no paper handling, Start switch pressed
EA=Cover closed, no paper handling, Release switch pressed
EE=Cover closed, no paper handling, Paper Up switch pressed
F2=Cover closed, no paper handling, Paper Down switch pressed
F6=Cover closed, no paper handling, Load switch pressed
FA=Cover closed, no paper handling, Print Test switch pressed
7E=Cover closed, tractor feed attached, no switch pressed
BE=Cover closed, sheet-feed attached, no switch pressed
3E=Cover closed, front exit sheet-feed attached, no switch pressed

In the single step mode, press the Start switch to display the switch port continuously. Any change in the switch port configuration (pressing another switch) displays the change before ending the test. In the loop mode, press the Load switch to display the switch port continuously. Changes in the switch port configuration (pressing another switch) do not change the display. Press the Stop switch to end the test.

25 Ribbon Sensor Test

This test displays the status of the ribbon sensor in the two-digit display.

00 = No ribbon sensed
01 = Ribbon sensed

26 First Writing Line Sensor Test

This test displays the status of the first writing line sensor in the two-digit display.

00 = No paper sensed
01 = Paper sensed

27 Paper Sensor Test

This test displays the status of the sheet-feed paper sensors (701) in the two-digit display.

00 = No paper sensed under either paper sensor
01 = Paper sensed or sheet-feed not installed

28 Failed ROS Identification Byte

This test displays the results of the last complete background ROS test. Successful completion of the ROS test is indicated by CF in the two-digit displays. If the background ROS test failed, one of the following codes is displayed:

C0 = ROS module 0 failed
C1 = ROS module 1 failed
C2 = ROS module 2 failed
C3 = ROS module 3 failed

29 Configuration Port

This test displays a byte of additional information about the printer configuration.

X1, X5, X9, XD = Indicate ribbon saver on
X3, X7, XB, XF = Indicate ribbon saver off

30/39 Not used

40 Sheet-Feed Paper Tray 1 (lower) Test

This test executes a restore and feeds a sheet of paper from the sheet-feed paper tray 1 followed by an eject of the paper. If the sheet-feed is not attached, d6 is displayed in the two-digit display.

41 Sheet-Feed Paper Tray 2 (upper) Test

Same as test 40 but utilizing paper tray 2.

42 Sheet-Feed Paper Tray 1 (lower) Feed Test

This test executes a restore and then feed a sheet from sheet-feed tray 1.

43 Sheet-Feed Paper Tray 2 (upper) Feed Test

This test executes a restore and then feeds a sheet from sheet-feed tray 2.

44 Sheet-Feed Eject

This test ejects paper from the sheet-feed if paper is present, otherwise a sheet-feed jam will be sensed. The CSR should ensure that paper is present, that it is indexed past the paper bail, and that the paper bail is closed.

45 Low Velocity Hammer Test

This test executes a restore before printing five low velocity characters. The five characters printed are shown below:

,-:_.

46 Medium Velocity Hammer Test

This test executes a restore before before printing 27 medium velocity characters. The 27 characters printed are shown below:

anrcslf)LIJ(/17+?=xvzjyitoe

47 High Velocity Hammer/Left Margin Test

This test executes a restore before printing 29 high velocity characters. The first character is printed at the first print position on the left side of the page. The 29 characters printed are shown below:

MmdhkVGUFBZHPRSNCTDEAOYW9K3X2

48 Ribbon Coverage Test

This test executes a restore and prints the following string of characters to test the ribbon mechanism for proper coverage.

)()()()()()()()()()()()()()()()()()()(
yyyyyyyyyyMMMMMMMMMM

49 Restore

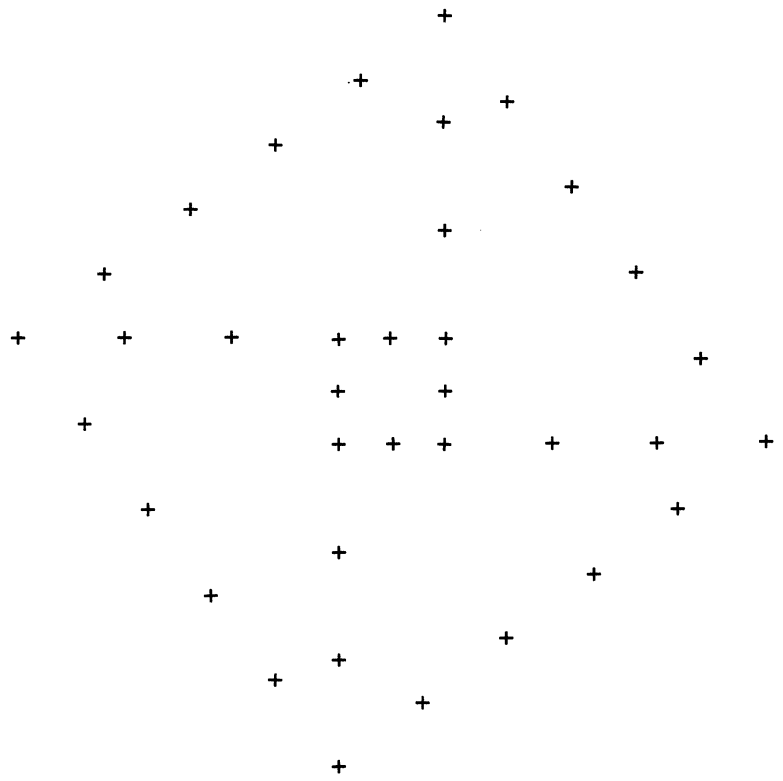
This test sends a fast restore command through the printer interface.

50 Restore

This test sends a slow restore command through the printer interface.

51 Diamond Pattern

This test executes a restore and then prints out the diamond pattern. The diamond pattern can be helpful in observing tilt, skew, or registration problems. This test should not be executed with the sheet-feed or tractor feed attached.



52 Ribbon Move

Ribbon move test executes a restore and advances the ribbon approximately 8 to 15 mm (0.5 to 0.75 inch) in the quality mode, and 2 to 7 mm (0.1 to 2.5 inch) in the economy mode.

53 Front Exit Sheet-Feed Envelope Hopper Test

This test executes a restore, and then feeds, ejects and stacks an envelope. If the sheet-feed is installed, a sheet of paper from the lower paper tray is fed and ejected.

310 ERROR CODES

The following is a list of error codes with adjustments, service checks and possible FRUs to correct the errors. FRUs should be replaced in the order called out. All error codes must have the Printer Excep indicator on to be considered valid.

Error Number	Error Description
01	Sheet-feed paper tray 1 (lower) empty, sheet-feed not attached correctly, or paper jam. Paper not sensed within eight seconds after the lower picker/separator motor energized. 1. Paper sensor 1 (lower) 2. Sheet-feed analog card 3. Sheet-feed I/O cable 4. Processor card (A-A1N8) 5. A-A1 distribution/analog board.
02	Sheet-feed paper tray 2 (upper) empty, sheet-feed not attached correctly, or paper jam. Paper not sensed within eight seconds after the upper picker/separator motor energized. 1. Paper sensor 2 (upper) 2. Sheet-feed analog card 3. Sheet-feed I/O cable 4. Processor card (A-A1N8) 5. A-A1 distribution/analog board.
03	Envelope hopper empty
05	Sheet-feed not correctly attached or paper jam (sheet-feed only). Caused by: Paper not sensed by the first writing line. Sequencer magnet never energized or remained energized. 1. First writing line sensor 2. Sequencer reed switch 3. Sheet-feed analog card.
06	Cover was opened when the printer was ready or when printer diagnostics were running. Close cover, press cancel. Check cover open switch and cover interlock. 1. Check the cover interlock switch 2. Cover interlock switch 3. Control panel logic card 4. Processor card (A-A1N8).

09 The sheet-feed paper sensors are stuck at +5 Vdc or a double feed occurred.

Note: In the maintenance statistic log, error code 05 is entered when this error is sensed.

30 Processor card failed.

1. Processor card (A-A1N8).

31 Processor card failed.

1. Processor card (A-A1N8).

32 Processor card ROS failed.

1. Processor card (A-A1N8).

33 Processor card RAM failed.

1. Processor card (A-A1N8).

34 Processor card failed.

1. Processor card (A-A1N8).

35 Control panel wrap test failed.

1. Control panel switch assembly
2. Control panel logic card
3. Cable (A-A1A27)
4. Processor card (A-A1N8)
5. A-A1 distribution/analog board.

36 An illegal command was sent to the printer control logic.

1. Processor card (A-A1N8).

38 A device processor reported unexpected preset mode.

1. Processor card (A-A1N8)
2. A-A1 distribution/analog board.

41 No current was sensed in the escapement motor winding during the printer test.

1. Escapement motor assembly
2. A-A1 distribution/analog board
3. Processor card (A-A1N8).

43 The escapement processor wrap test to the distribution/analog board failed when executing the printer tests.

1. A-A1 distribution/analog board
2. Processor card (A-A1N8).

44 Left margin switch stuck at +5 Vdc, or the escapement mechanism lost registration.

1. Left margin switch
2. Escapement motor assembly
3. A-A1 distribution/analog board
4. Processor card (A-A1N8).

46 Escapement mechanism failed to arrive home after the longest possible escapement move was issued.

1. Left margin switch
2. Leadscrew coupler
3. Processor card (A-A1N8)
4. A-A1 distribution/analog board.

51 No current sensed in the selection motor winding during the print test.

1. Selection motor
2. A-A1 distribution/analog board
3. Right carrier cable (A-A1A22)
4. Processor card (A-A1N8).

53 The selection processor wrap test to A-A1 distribution/analog board failed when executing the printer test.

1. Processor card (A-A1N8)
2. A-A1 distribution/analog board.

54 No feedback sensed after a selection motor advance has been issued.

1. Selection motor
2. A-A1 distribution/analog board
3. Processor card (A-A1N8)
4. Left carrier cable (A-A1A19).

56 The selection mechanism failed to reach home after 32 three-step moves were issued.

1. Selection motor
2. Left carrier cable (A-A1A19)
3. A-A1 distribution/analog
4. Processor card (A-A1N8).

57 Possible failure was sensed in the selection mechanism home sensor. After the selection motor was homed it failed to show no home on a three-step move.

1. Selection motor
2. Left carrier cable (A-A1A19)
3. A-A1 distribution/analog
4. Processor card (A-A1N8).

58 A periodic check for the selection motor position detected that the motor was not in the proper position.

1. Selection motor
2. A-A1 distribution/analog
3. Left carrier cable (A-A1A19).

60 No print hammer impact is sensed after a specified time period following the desired impact point.

1. Check print hammer position
2. Print hammer assembly
3. A-A1 distribution/analog board
4. Left carrier cable (A-A1A19)
5. Processor card (A-A1N8).

61 No current was sensed in the print hammer driver during the printer tests.

1. Print hammer assembly
2. Right carrier cable (A-A1A22)
3. A-A1 distribution/analog board
4. Processor card (A-A1N8).

63 Print hammer control failure.

1. Check print hammer position
2. Print hammer assembly
3. A-A1 distribution/analog board
4. Processor card (A-A1N8)
5. Right carrier cable (A-A1A22).

65 Print hammer feedback failure.

1. Check print hammer position
2. Print hammer assembly
3. A-A1 distribution/analog board
4. Left carrier cable (A-A1A19)
5. Processor card (A-A1N8).

69 A failure was sensed in the ribbon area during the printer test.

1. Ribbon motor drive assembly
2. A-A1 distribution/analog board
3. Processor card (A-A1N8)
4. Right carrier cable (A-A1A22).

71 No current sensed in the index motor winding during the printer test.

1. A-A1 distribution/analog board
2. Index motor assembly
3. Processor card (A-A1N8).

73 The paper handling wrap test to the distribution/analog board failed during the printer test.

1. A-A1 distribution/analog board
2. Processor card (A-A1N8).

74 No current sensed in the cam motor driver circuit during the printer tests.

1. A-A1 distribution/analog board
2. Processor card (A-A1N8).

75 Cam motor was moved to home position but the home position was not sensed after the cam stopped.

1. A-A1 distribution/analog board
2. Cam home switch
3. Processor card (A-A1N8).

76 No feedback was sensed after the cam motor was started.

1. Cam home switch
2. Cam position switch
3. Cam idler gear
4. Cam motor assembly
5. Cam assembly
6. A-A1 distribution/analog board
7. Cable (A-A1A27)
8. Processor card (A-A1N8).

77 Home position of the cam was sensed unexpectedly.

1. Cam home switch
2. Cam position switch
3. Cam assembly
4. Cable (A-A1A27)
5. Processor card (A-A1N8)
6. A-A1 distribution/analog board.

78 The sheet-feed BAT failed.

1. Sheet-feed I/O cable
2. Processor card (A-A1N8).

80 A failure was sensed in the printer control logic.

1. Processor card (A-A1N8)
2. A-A1 distribution/analog board.

81 A device processor failed.

1. Processor card (A-A1N8)
2. A-A1 distribution/analog board.

83 Printer initialization failed

1. Processor card (A-A1N8).

85 A wrong response was sent from printer control logic to the attachment processor.

1. Processor card (A-A1N8).

86 Wrap test to the printer control logic from the attachment processor failed.

1. Processor card (A-A1N8).

87 Reset command to the printer control logic generated wrong response.

1. A-A1 distribution/analog board
2. Processor card (A-A1N8).

88 Error code not valid.

1. Control panel logic card
2. Processor card (A-A1N8)
3. Cable (A-A1A27)
4. A-A1 distribution/analog board.

89 Attachment processor timed out.

1. Processor card (A-A1N8).

8A* Printer not ready.

1. Processor card (A-A1N8).

8C* Illegal test group.

1. Processor card (A-A1N8).

90 ART initialization failed.

1. Processor card (A-A1N8)
2. A-A1 distribution/analog board.

93 ART did not respond to the attachment processor

1. Processor card (A-A1N8)
2. A-A1 distribution/analog board.

9A* ART loop test failed.

1. Processor card (A-A1N8)
2. Attachment panel
3. A-A1 distribution/analog board.

C0* Test number not valid.

CC* Printer cover open.

d6* Command reject.

EE* Error not cleared before running test. Run test 50.

* Used only in diagnostic mode

311 MAINTENANCE STATISTICS LOG

TEST EXECUTE MODE MAINTENANCE STATISTICS LOG

The test execute mode maintenance statistics log contains counts of communications errors, the last non-recoverable error information, and the printer hammer fire and the sheet-feed count.

The maintenance statistics log is printed by the dump formatter at the end of the verify function (317), or when the Print Test switch is pressed. Test execute mode test 23 displays the test execute mode maintenance statistic log if the printer is not operational.

A sample of the test execute mode maintenance statistics log is shown below:

abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
,±°½§¶¢]³²"='':.?_%,#/-[;)*$&!+(.¼@

0000 0000 0000 0000 0000 0000 006E 0000

Byte Number	Description
1	Frame error count
2	Overrun error count
3	Parity error count
4*	Return code
5*	Printer control logic status byte
6*	Error code before running diagnostics
7*	Error code after running diagnostics
8*	Last command sent to the printer control logic
9*	Response received for the last command
10*	Procedure error code
11*	DMS error code
12	Print hammer fire count most significant byte
13	Print hammer fire count middle byte
14	Print hammer fire count least significant byte
15	Sheet-feed count least significant byte
16	Sheet-feed count most significant byte

* This is only true at the time of the last error.

316 BASIC ASSURANCE TEST SEQUENCE

A basic assurance test (BAT) sequence is run when the printer is powered-on or a verify function is selected. BAT and the verify function operate the same except for the amount of RAM that is initialized. In verify function only a part of RAM is initialized so the maintenance statistics are not destroyed.

317 VERIFY

The verify function is the same as the BAT sequence except for the RAM check. The verify function is selected by pressing and holding the Stop switch, and then pressing and releasing the Print Test switch and finally releasing the Stop switch. To ensure that the maintenance statistics log is not erased, the verify function tests and initializes all RAM except for the 16 byte maintenance statistics log. When the verify function is complete, the results are sensed the same as the BAT results. The print test and the maintenance statistics log prints if the verify function does not sense any errors.

320 NON-RECOVERABLE ERRORS

Non-recoverable errors are errors that might cause an error on the printed page. When the printer senses a non-recoverable error, the processor card executes a series of tests and then homes the escapement, cam, and selection mechanism to determine if the error is intermittent or solid. Non-recoverable errors are reported to the controller by the exception response ID where bit 7 is always on.

Recovery commands sent by the controller are Ready Restore and Not Ready Restore. The Ready Restore command causes the printer to initialize, clears the control panel, and runs the diagnostic test. The escapement, cam, and the selection mechanisms are homed and the carrier assembly is centered. It also clears the print image data from the printer storage.

The Not Ready Restore command performs all of the functions of the Ready Restore command but does not cause any mechanical movement or clear the control panel. This lets the operator look for any obvious mechanical failure and the error code for the failure.

SOFT NON-RECOVERABLE ERRORS

Soft non-recoverable errors are intermittent errors and are cleared by running the printer diagnostic test. The error code for the error sensed is displayed on the control panel, and the last two soft non-recoverable errors sensed and the print hammer count are logged in the maintenance statistics. When the printer receives a Restore command from the controller, the error is cleared. The printer sends the receive ready response ID indicating that the error is cleared and when the Start switch is pressed, the controller can start sending the failed page.

HARD NON-RECOVERABLE ERRORS

Hard non-recoverable errors are errors that are solid and will not clear when the diagnostic test is run. In this case, the error code from the diagnostic test that failed is displayed on the control panel. Most, but not all hard non-recoverable errors are sensed when a Restore command is executed.

TRANSMISSION ERRORS

Three types of transmission errors are sensed by the ART:

Parity - parity of the incoming serial data not valid
Frame - frame Stop bit not sensed
Overrun - new data byte received before the last byte processed

When a transmission error is sensed, the error is specified in status byte 3, the link check bit in status byte 0 is set, and a response ID with link check bit is sent to the controller. The errors specified in status byte 3 are:

X'88' = Parity error
X'90' = Overrun error
X'A0' = Frame error

323 PRINT TEST

The print test prints all petals on the installed printwheel. All alphanumeric characters print in the forward direction in increasing EBCDIC order. All other characters are printed in the reverse direction.

Activate print test by pressing the Print Test switch when the printer is not ready or by running test execute mode test 20.

A sample of the print test is shown below:

abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
,±°½§¶¢]³²"='':.?_%,#/-[;)*$&!+(.¼@

0000 0000 0000 0000 0000 0000 006E 0000

324 PRINTER EXCEPTIONS

Printer exceptions are printer conditions that do not indicate a printer malfunction but require operator intervention. The following is a list of printer exceptions:

- Paper jam (sheet-feed)
- Paper tray empty (sheet-feed)
- Envelope hopper empty
- Ribbon out
- Font change
- Paper out (tractor feed)
- Cover open.

CHAPTER 4. PREVENTIVE MAINTENANCE

No scheduled preventive maintenance is needed for the printer. Perform preventive maintenance at the time of a service call.

Clean the platen, feed roller assemblies, paper bail rollers, ribbon drive belt, and ribbon drive belt rollers.

Use lubrication only in quantities enough to lubricate the specified area.

Take special care to prevent lubrication from touching the platen, feed roller assemblies, paper bail rollers, or ribbon drive belt.

Use the specified lubricant only at the first installation of the following hardware.

Use IBM Number 23 grease for:

- Cam motor worm
- Cam motor worm gear
- Cam gear
- Cam follower
- Spring comb pivots
- Paper bail pivots
- Worm gear stud
- Ribbon lift pivot and guide stud
- Drive stud
- Cam stud
- Leadscrew follower mounting screws and washers.

Use IBM Number 10 oil for:

- Platen bushing
- Cam motor
- Working length of lead screw
- Leadscrew bearing.

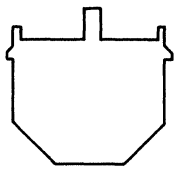
CHAPTER 5. TOOLS AND TEST EQUIPMENT

Special tools and test equipment needed to service the printer are listed below:

- Print alignment tool
- Cover adjustment tool
- Metric tool kit
- Wrap plug

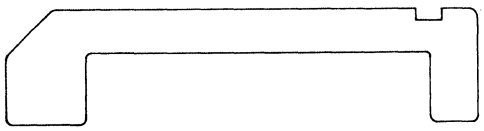
PRINT ALIGNMENT TOOL

The print alignment tool is a special tool shipped with each printer. The tool is needed to perform some of the adjustments in the printer mechanism. Order part number 1495090.



COVER ADJUSTMENT TOOL

The cover adjustment tool is a special tool shipped with each printer that is used to adjust the printer to the covers, printwheel hub and the ribbon cartridge latches. It is also used to hold the printer in the service position. Order part number 1308858.



METRIC TOOL KIT

Order part number 1749235

WRAP PLUG

The wrap plug is used to verify the ability of the printer to send and receive data. It is used to check both the printer and the cable to the controller. Order part number 1494851.

CHAPTER 6. THEORY

INTRODUCTION

The IBM 5218 Printer is a printwheel printer that prints left-to-right and right-to-left, and is available in two models. The IBM 5218 Printer A03 model and the IBM 5218 Printer A04 model. The A04 model processor card drives the escapement motor at a higher speed. Except for this difference, both printers operate the same.

The printer is designed for table-top use and has a stand-alone maintenance package.

Both printers are made up of the printer mechanism, power supply, distribution/analog board, control panel, and processor card.

The printer mechanism control and logic voltages are supplied in the printer. The data and control signals are received on a cable from the controller.

The IBM 5218 Printer has the following characteristics:

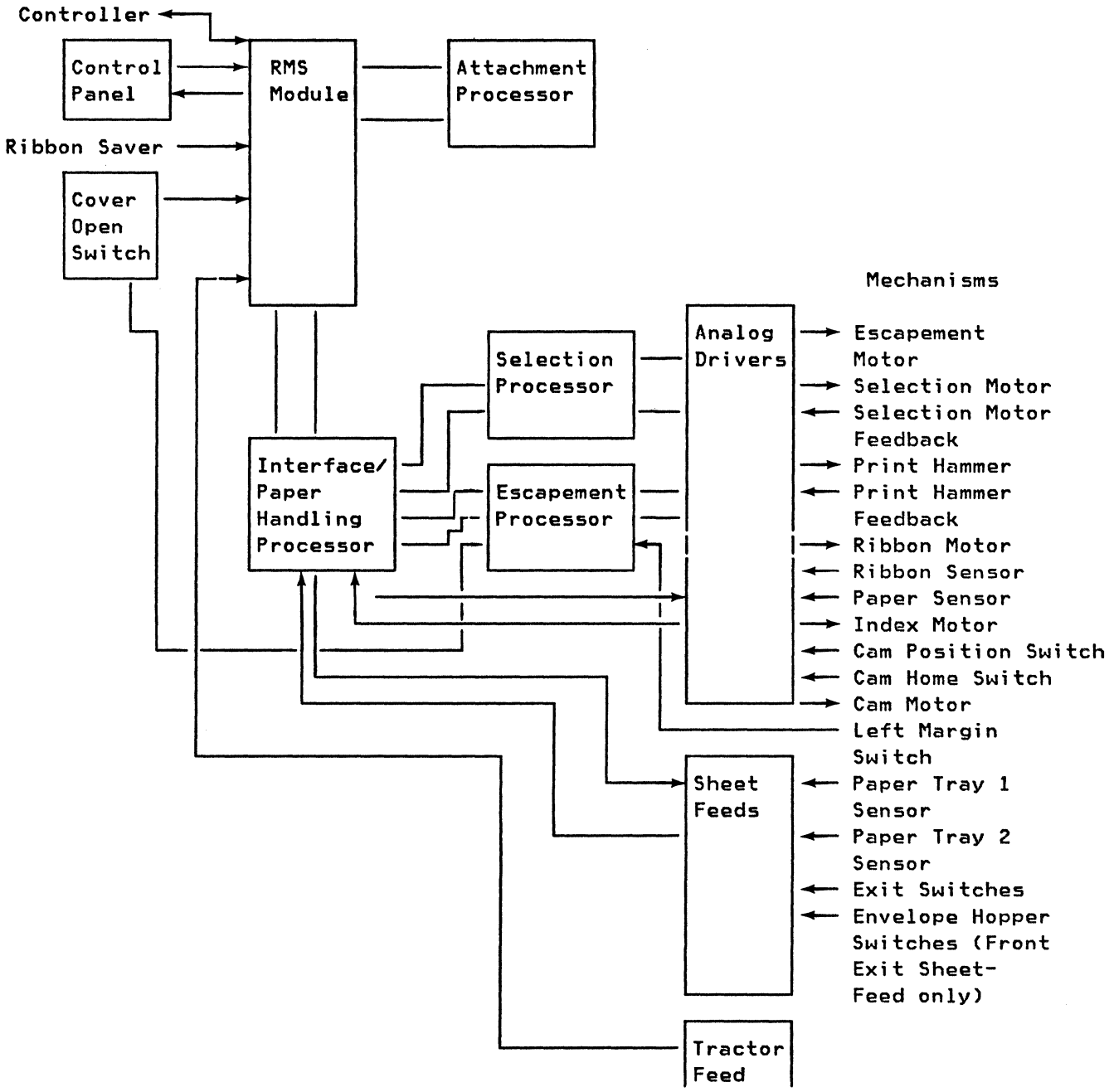
- Supports 10 pitch, 12 pitch, 15 pitch, and proportional spacing mode (PSM).
- Prints as many as 96 different characters using a printwheel cartridge.
- Has vertical spacing in steps of 0.26 mm (1/96 inch).
- Has horizontal spacing in steps of 0.11 mm (1/240 inch).
- Has, as a feature, a tractor feed unit for continuous forms feed.
- Has, as a feature, a sheet-feed unit that feeds cut sheets or envelopes automatically into the printer.
- Permits printing while the carrier is moving either to the right or to the left.
- Supports a maximum writing line of 335 mm (13.2 inches) and permits handling of paper up to 392 mm (15.4 inches).

PRINTER OPERATION SUMMARY AND DATA FLOW.

The printer electronics consists of the distribution/analog board, and the processor card. The distribution/analog board contains the drivers and receivers for the mechanical parts. The processor card contains the RMS module, attachment processor, interface/paper handling processor, escapement/ribbon processor, and the selection/hammer processor. Commands are received from the controller by the RMS module. The ART, located in the RMS, converts the serial, communication line signals into parallel, logic level signals, assembles the data, and checks for errors. The ART sends an interrupt to the attachment processor that causes the attachment processor to read the ART status to determine if an error occurred. If the data is error free, the attachment processor reads the data to clear the ART receiver register, and translates the data into print packets. The print packets describe the index, escapement, selection, and print hammer actions needed to print a character.

The print packets are passed by the RMS to the interface/paper handling processor. The RMS supplies storing and synchronization function between the processors.

The interface/paper processor receives the print packets and sends the commands to the desired device processor.


Controller
Control Panel
RMS Module
Attachment Processor
Ribbon Saver
Cover Open Switch
Mechanisms
Analog Drivers
Selection Processor
Interface/ Paper Handling Processor
Escapement Processor
Escapement Motor
Selection Motor
Selection Motor Feedback
Print Hammer
Print Hammer Feedback
Ribbon Motor
Ribbon Sensor
Paper Sensor
Index Motor
Cam Position Switch
Cam Home Switch
Cam Motor
Left Margin Switch
Sheet Feeds
Paper Tray 1 Sensor
Paper Tray 2 Sensor
Exit Switches
Envelope Hopper Switches (Front Exit Sheet-Feed only)
Tractor Feed

RMS MODULE

The RMS module contains the ART, the interface buffer between the attachment processor and the interface/paper handling processor, the interface buffer between the control panel and the attachment processor, and provides the status of the paper handling devices.

The RMS is used as a buffer between the attachment processor and the interface processor. The attachment processor communicates with the RMS through the common address and data bus. The RMS stores a byte of data sent between the interface processor and the attachment processor. This lets the two processors work separately from one another.

ASYNCHRONOUS RECEIVER/TRANSMITTER

The asynchronous receiver/transmitter (ART) is used in an asynchronous start/stop mode. Each data frame will be 12 bits long. This includes a start bit, 8 data bits, a parity bit, and two stop bit. The ART is used in a full duplex environment and is initialized to even parity.

Incoming serial data is checked for parity, frame, and overrun errors. When a byte is assembled, the attachment processor reads the ART status to determine if the byte was received correctly, or caused an error. Then, the attachment processor reads the data byte to clear the ART receive register.

Data, from the printer, to be transmitted to the controller is written into the ART by the attachment processor one byte at a time. The ART generates the correct parity for this byte and transmits it in serial form.

The ART transmit and receive rate is fixed at 9600 bits per second. The controller has the ability to select parity. The bit sequence is shown below:

Start Bit	0*	1	2	3	4	5	6	7	Parity Bit	Stop Bit	Stop Bit

* The least significant bit is transferred following the Start bit.

ATTACHMENT PROCESSOR

The attachment processor performs the following functions:

- Responds to ART interrupts by reading and storing received data
- Responds to IPH input interrupts by reading and interpreting the data sent by the interface processor
- Starts data flow to the interface processor
- Responds to IPH signal by sending the next byte of a print packet assembled for the interface processor
- Responds to control panel switch interrupts

- Writes control messages to the control panel
- Responds to the controller
- Processes print data to form print packets
- Modifies printer status
- Performs error correction and diagnostic functions.

INTERFACE/PAPER HANDLING PROCESSOR

This processor receives print packets from the attachment processor, through the RMS, and sends the various commands to the specified device processors. It also controls the index motor that runs the platen, the cam motor that controls the feed roller assemblies, the paper bail, and the sheet-feed devices.

Information from the device processors passes through the interface/paper handling processor on its way to the attachment processor.

DEVICE PROCESSORS

The two device processors and their functions are as follows:

- Selection processor - controls printwheel rotation and print hammer firing
- Escapement processor - controls the escapement, and ribbon advance.

Each of these processors interface with analog circuits, which control the mechanical devices. Feedback circuits supply information on the actions of the print hammer, and selection motor.

COVER

OPERATOR ACCESS COVER

The operator access cover is held in the closed position by a spring clip. The cover may be opened at any time by pulling up on the cover with enough force to overcome the clip. Opening the operator access cover while the printer is printing is not recommended. The result in opening the cover, relies on the ready/not ready condition.

EXPECTED COVER OPEN

When the printer is not ready, opening of the operator access cover is expected. In this condition, the printer is not active and the escapement mechanism is not moving.

UNEXPECTED COVER OPEN

When the printer is ready, opening of the operator access cover is unexpected. In this condition, the escapement and selection mechanisms may be running. To prevent injury to the operator or CSR, the escapement mechanism is immediately stopped when the cover is opened. The controller is informed of the unexpected cover open condition. The page being printed when the cover is opened must be re-started by the controller.

To recover from the unexpected cover open, close the cover and press the Start switch. The controller should respond with a Restore command.

ESCAPEMENT

The escapement assembly, controlled by the escapement processor, consists of an escapement motor, a leadscrew, the carrier assembly, and a left margin switch.

The escapement motor is a 200-step per revolution permanent magnet stepper motor, coupled directly to the leadscrew. One complete revolution of the leadscrew moves the carrier 21.16 mm (0.833 inches). This moves the carrier assembly 0.106 mm (1/240 of an inch) per step of the escapement motor.

PAPER FEED/INDEXING

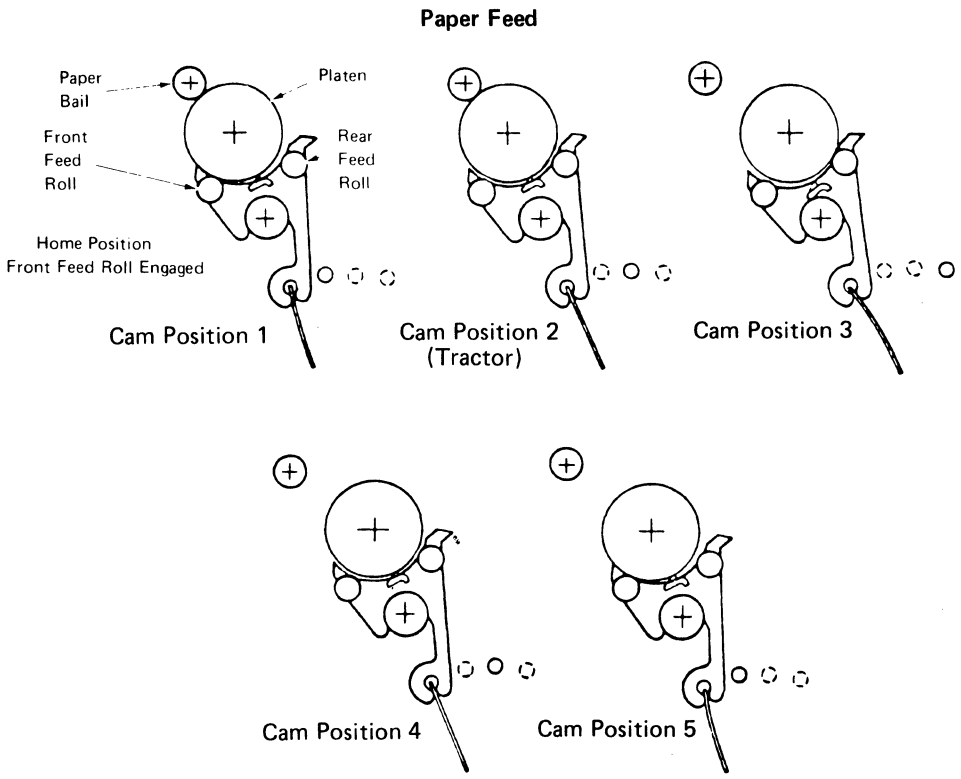
The paper feed area includes the index motor, platen, feed roller assemblies, paper bail, and cam motor assembly. The paper feed area is controlled by the interface/paper handling processor.

The index motor is a 180-step per revolution permanent magnet stepper motor that drives the platen through a timing belt. The index motor also drives the sheet-feed or tractor feed mechanism (if either is attached to the printer). The index motor steps 0.2646 mm (1/96 of an inch) and may be driven in either direction for forward or reverse indexing.

The feed roller assemblies that press the paper against the platen are located on a rod below the platen. There are six separate modules and each module contains one front and one rear feed roller, plus one paper aligner assembly. The feed roller assemblies are driven by the cam deflector arm. The spring fingers of the cam deflector arm turn the modules (front to rear) and let the paper either engage or disengage the platen. The cam deflector arm is driven by the cam motor through the cam.

The index processor receives two feedback signals from the cam. The cam has a round magnet located on the inside. This magnet, in conjunction with a reed switch, controls cam positions 2, 3, 4, and 5. Another reed switch and magnet located on the cam indicate position 1 (home).

The paper bail extension moved by the cam, controls opening and closing of the paper bail. The paper bail opens automatically when the Load or Release switch is pressed.



PAPER SENSOR

The paper sensor is mounted on the leftmost feed roller assembly under the platen. It is used to sense the correct location of paper in the paper path when operating with the sheet-feed or tractor feed. The sensor is read by the index processor.

The paper sensor is a reflective phototransistor/LED pair that supplies maximum sensing of various paper colors. No paper in the paper path causes the phototransistor to cut off.

CHARACTER SELECTION

The character selection hardware includes the selection motor/emitter and the printwheel.

The selection motor is a three-phase, 96-step per revolution variable reluctance stepper motor controlled by the selection processor. Located on the back of the selection motor shaft are four reluctance pick up devices. Three of the reluctance pick up devices (one for each phase) supply feedback information to the motor driver. The fourth reluctance pick up device supplies home feedback information for the selection processor. Home position is a lowercase a on the printwheel.

The printwheel is turned by the selection motor. The distance and direction to turn the printwheel is calculated in the number of steps from the present printwheel location to the next desired character. The printwheel will then turn the shortest direction to the desired character and detent.

PRINT HAMMER ASSEMBLY

The print hammer assembly is a solenoid device. The armature of the solenoid is the print hammer. Supplying power to the print hammer assembly will cause the armature to move toward the platen and hit the printwheel.

Attached to the rear of the armature is a magnet that moves in a coil attached to the rear of the print hammer assembly to sense the flight time and direction of travel of the armature. The force of the armature is controlled by the amount of current and the length of time that current is supplied to the armature. The armature force will automatically be adjusted to reach the correct print hammer flight time.

The printer groups all of the printwheel characters in three force groups. The lowest group includes the punctuation and symbol characters. The medium force group includes most of the average or medium size characters. The highest force is used for larger characters such as the M or W.

At power on, the first six to eight characters in each force group may vary in density while the printer is adjusting print hammer force to reach correct hammer flight time. For this reason, when diagnosing a print quality problem, select a print sample that was printed after the print force compensation has taken place.

RIBBON

The ribbon cartridge permits easy removal and replacement without touching the ribbon. The ribbon is 11.8 mm (0.465 inches) wide by 122 meters (400.2 feet) long, and prints an average of 340,000 characters per cartridge in the quality mode, and an average of one million characters per cartridge in the economy mode.

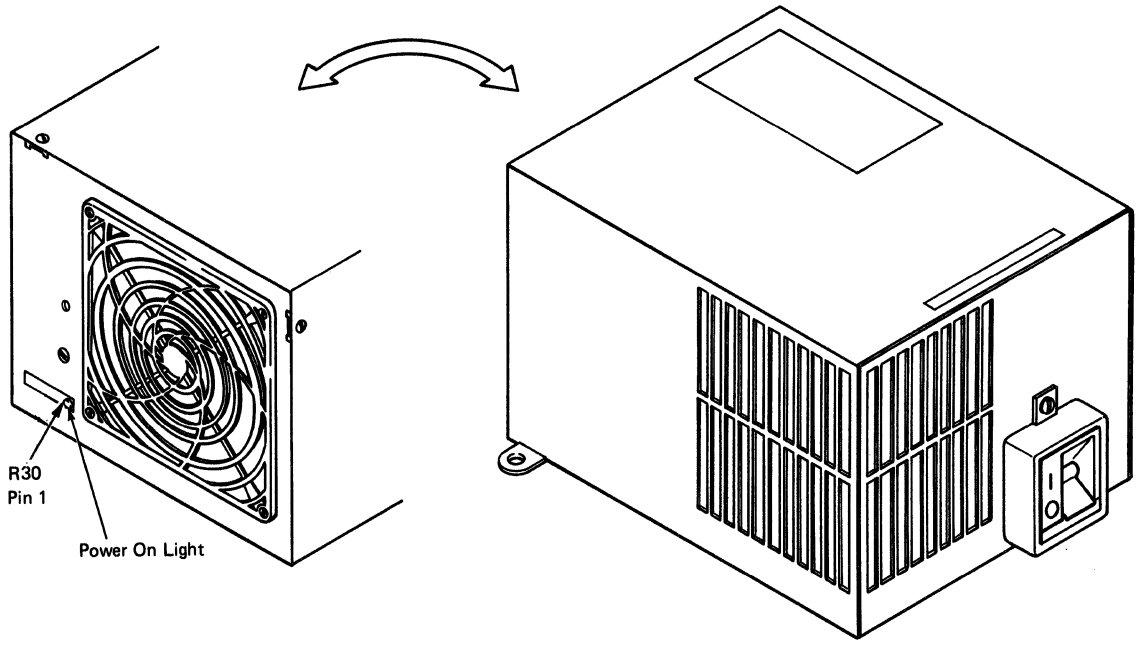
Ribbon feed is maintained by two spools in the ribbon cartridge. The take up spool is driven by a belt powered through a gear train by the ribbon stepper motor. The ribbon stepper motor is driven by the escapement processor.

An end-of-ribbon sensor (an optical transducer) is used to sense when there is less than 200 characters that may be printed on the remaining ribbon. The controller and operator are informed of an end of ribbon condition. However, the printer can operate without the ribbon cartridge installed.

POWER SUPPLY

The printer power supply is a switching regulator power supply. The power supply has overvoltage, undervoltage, and overcurrent protection. The power supply contains a fuse for the ac input voltage and a power on light for diagnostic purposes.

A power supply power on light indicates that the power supply is operating. The power on light goes off when a overvoltage, overcurrent, or undervoltage condition exists, or when the ac switch is Off. The input ac voltage must be turned off for 5 seconds before turning the printer back on.



R30 Connector	
Pin	Voltage
1	Not used
2	+36 Vdc
3	GNDA
4	GNDL
5	GNDL
6	+5 Vdc
7	+5 Vdc
8	-24 Vdc

Two types of power supplies are available for use with the printer, low voltage power supply, and the high voltage power supply.

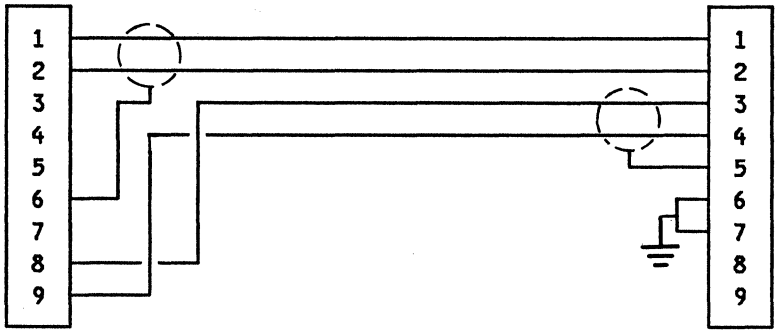
Listed below are the input voltages, normal operating maximum current limit, and fuse ratings for the power supplies.

Power Supply	Minimum Input	Maximum Input	Normal Operation MAX. RMS Current	Fuse Rating	Fuse Type
Low Voltage	100 Vac	127 Vac	3.0 amps	8A	250V SLO BLOW
High Voltage	200 Vac	240 Vac	2.0 amps	5A	250V SLO BLO

INTERFACE

The printer communicates with the controller over a twisted pair of transmission lines in a 9600 bits per second full duplex mode. Data movement is a 2-byte command from the controller with a 1-byte response from the printer and is controlled by a start/stop protocol.

Communication cable lengths of 6, 30, and 60 meters (19.8, 99, and 198 feet) are available to connect the printer to the controller. Pin configuration and cable connectors are different for each end of the cable. The printer end of the cable is marked with a P; the controller end is marked with an O. The controller end of the cable is configured with pin 6 connected to pin 7.



Printer Attachment Panel

Controller Attachment Panel

INTERFACE PROTOCOL

The IBM 5218 Printer interface protocol is separated into five parts; power-on sequence, command exchange, printer exception, transmission error, and block exchange.

POWER-ON PROTOCOL

The printer power-on sequence contains a set of basic assurance tests (BAT) that test all functional parts of the printer that can be checked without any operator or CSR aid. When these tests are completed the printer transmits an initialization byte (X'80') to the controller every 2 to 100 milliseconds. The controller responds with a Wrap Data command; any other command will be ignored. The printer responds to the Wrap Data command with a response ID, indicating receive ready and returns the next 8 bytes received to the controller without interpretation. If an error is sensed by the printer during the Wrap Data sequence, an exception response ID is reserved and sent to the controller 5 milliseconds after the printer returns the eighth wrap data byte. If the wrap data sequence is successful, the printer will enter the command exchange protocol.

The power-on protocol is also activated if the printer receives a break character at any time, or a frame error or overrun during a wrap data sequence. In these cases the initialization byte is X'C0' instead of X'80'.

COMMAND EXCHANGE PROTOCOL

The Command Exchange Protocol is used to send the print image commands and printer control commands to the printer. Two bytes of data are received from the controller and are stored until they can be executed. When they are received, the printer sends a 1-byte response. When a Read Status command or Read Device ID command is received the requested status byte is transmitted as the response. If a status byte is requested that is not supported, X'80' is returned. In all other cases, a response ID is returned. The controller may continue to send one more command as long as receive ready is indicated in the response ID.

Subsets of this protocol result from the Send Statistic and Wrap Data commands. A Receive Ready response to Send Statistic indicates that a maintenance statistic transmission follows. A Receive Ready to Wrap Data command indicates that the printer is ready to wrap. The printer remains in this mode until 8-bytes have been received and returned.

Note: The Response ID Receive Ready normally indicates that the command has been received and execution of the command will be attempted. It does not indicate acceptable execution of the command. The only exceptions to this are responses to Pause and End-of-Data.

PRINTER EXCEPTION PROTOCOL

The Printer Exception Protocol sends the Response ID to the controller as a result of a printer mechanism error or a change in printer mechanism status. The exception is also posted to the LED display. The controller determines the reason for the asynchronous transmission of the response ID through use of Read Status commands.

TRANSMISSION ERROR PROTOCOL

Three transmission errors, parity error, frame error, and data overrun, can occur. A response ID indicating receive ready/communication line error is sent to the controller as a result of a transmission error. Status byte 3 contains a transmission error ID. The transmission error IDs are as follows:

X'88'=Parity error
X'90'=Data overrun
X'A0'=Frame error

The controller may decide to retransmit the failing command or start communication line diagnostic procedure.

If the controller senses a transmission error it may send a Freeze Status command. This will freeze all status indications to the value last transmitted. The controller can then read any of the Status Bytes by the normal commands. The only acceptable commands honored for freeze status are Read Status (or Device ID), Ready, Parity Restore, and Resume. Restore returns the printer to the command exchange protocol. Resume will release the status indications.

If a Break character is sensed, it is interpreted as an open line and causes the printer to go through its power on sequence in an attempt to establish the communication line.

BLOCK EXCHANGE PROTOCOL

The block exchange protocol is used to send print image and control commands in blocks up 256 bytes, instead of two-byte pairs, to the printer. The block exchange protocol is entered when an Execute Block command is accepted by the printer.

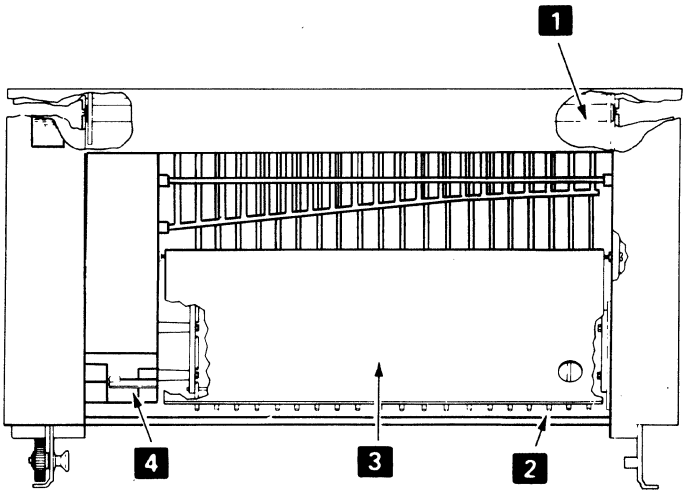
CHAPTER 7. SHEET-FEED

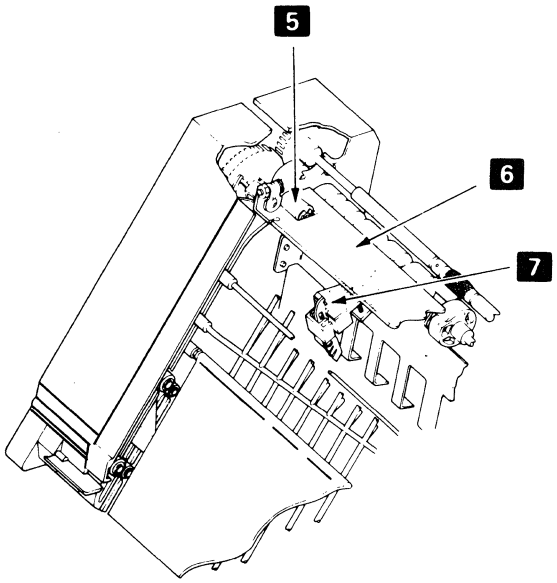
SHEET-FEED MAINTENANCE

SHEET-FEED LOCATIONS

700 FRONT LOCATIONS

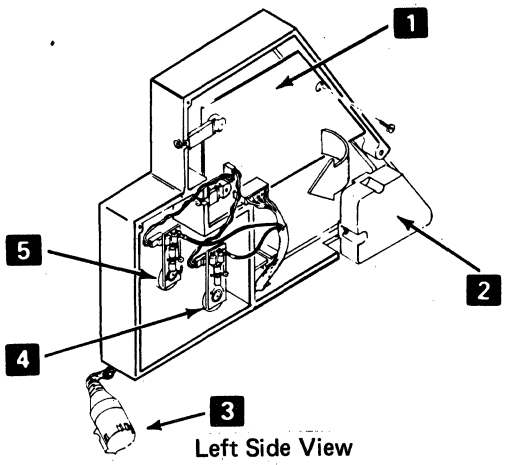
1. Support bar
2. Lower inner rack
3. Splitter
4. Manual paper insertion deflector
5. Eject backup roller
6. Gate
7. Reed switch



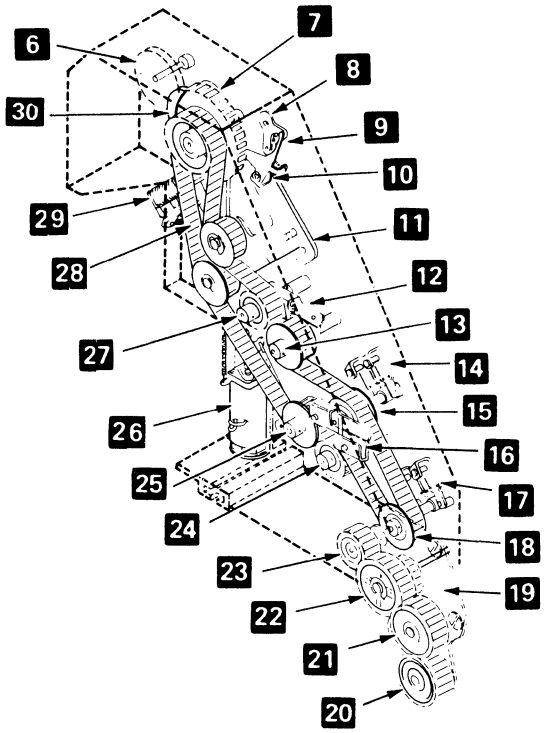


701 LEFT SIDE LOCATIONS

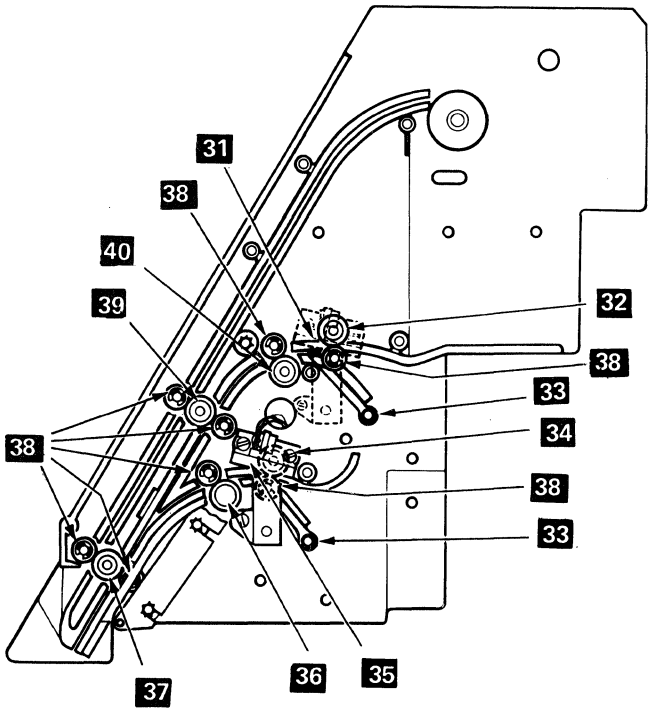
1. Sheet-feed analog card
2. Gear guard
3. Printer attachment sheet-feed cable
4. Picker/separator motor 1 (lower)
5. Picker/Separator motor 2 (upper)
6. Sequencer gear
7. Sequencer pulley
8. Gate latch plate
9. Gate latch
10. Gate latch pivot stud
11. Idler bracket
12. Rockers 5 and 6
13. Pulley P5
14. Rocker 4
15. Pulley P4
16. Rockers 2 and 3
17. Rocker 1
18. Pulley P1
19. Left mounting plate assembly
20. Platen driven gear
21. Idler gear
22. Cluster idler gear
23. Lower drive gear
24. Pulley P2
25. Pulley P3
26. Second sheet restraint solenoid
27. Pulley P6
28. Timing belt
29. Sequencer magnet
30. Ratchet
31. Paper sensor 2 (upper)
32. Cone roller C6
33. Second sheet restraint pawl
34. Cone roller C3
35. Paper sensor 1 (lower)
36. Cone roller C2
37. Cone roller C1
38. Back up rollers
39. Cone roller C4
40. Cone roller C5



Left Side View



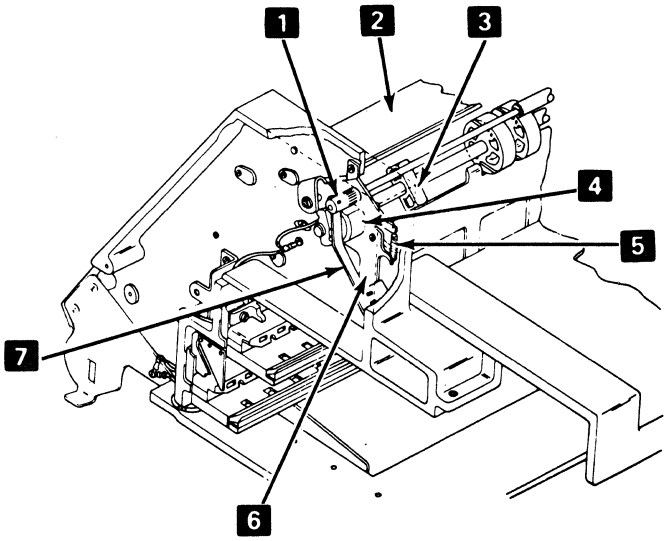
Left Side View



Right Side View

702 RIGHT SIDE LOCATIONS

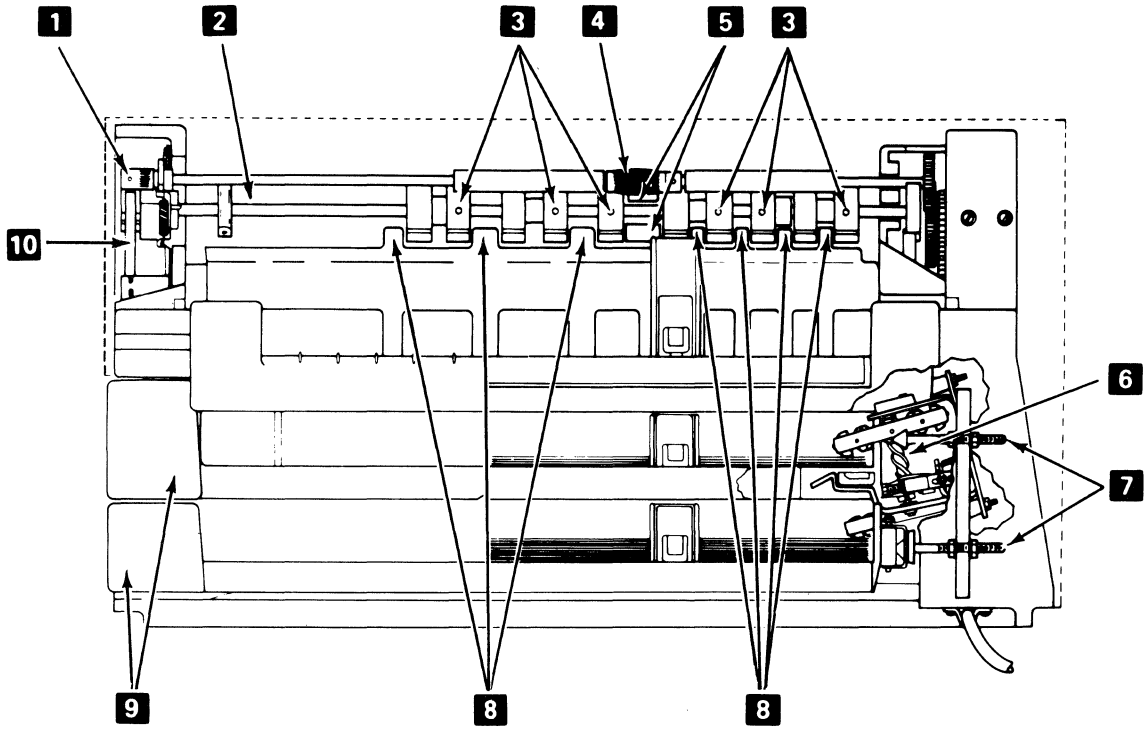
1. Drive roller
2. Gate
3. Gate cam
4. Drive wheel
5. Tension spring
6. Sequencer plate
7. Trip spring



Right Side View

703 BACK LOCATIONS

1. Drive roller
2. Sequencer cylinder shaft
3. Sequencer cylinders
4. Upper kick roller
5. Lower kick rollers
6. Picker/separator leadscrew
7. Detent screws
8. Stripper fingers
9. Paper trays
10. Trip spring



Back View

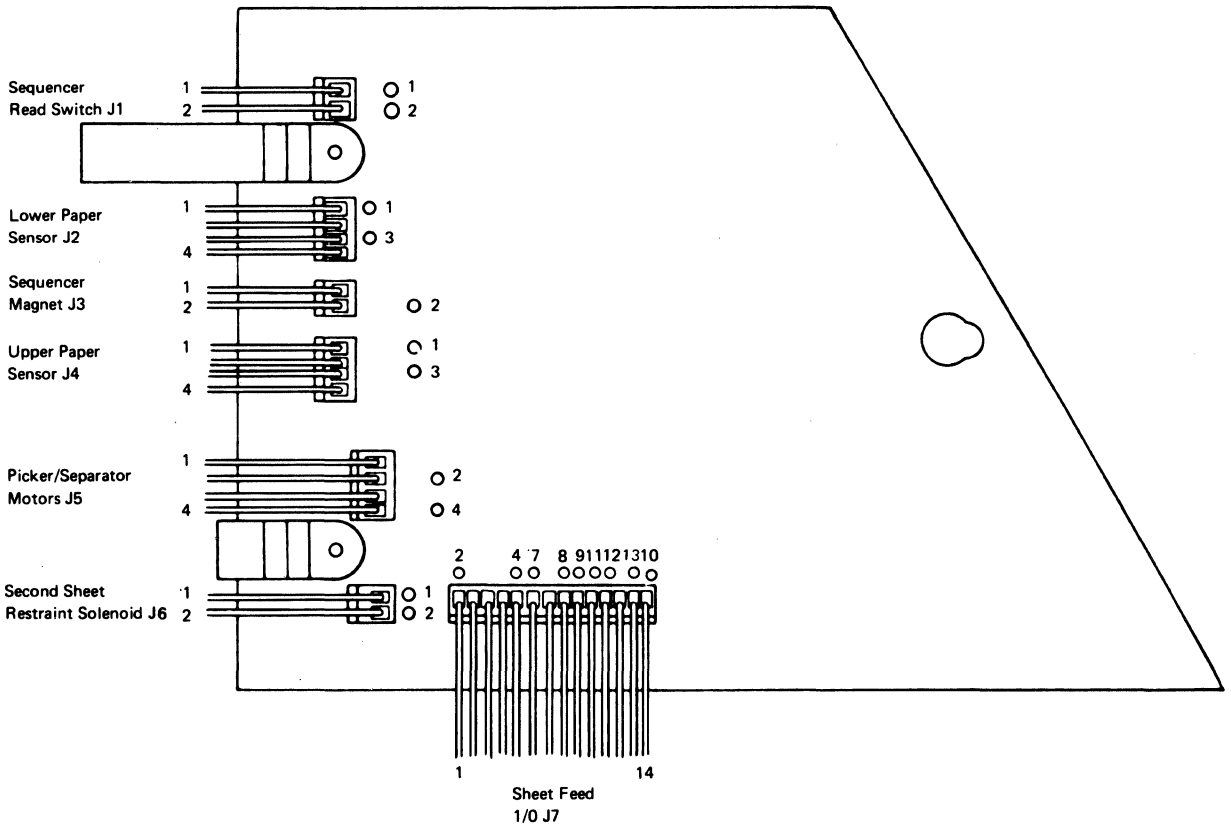
705 I/O CONNECTOR AND SHEET-FEED ANALOG CARD CONNECTIONS

Sheet-Feed Analog Card Connector	Pin Number	Signal Name	Destination
J1	1 2	PAPFLP*+ PAPFLP*-	Sequencer reed switch
J2	1 2 3 4	LED1+ LED1- PTX1+ PTX1-	Lower paper tray sensor
J3	1 2	PAPFLP+ PAPFLP-	Sequencer magnet
J4	1 2 3 4	LED2+ LED2- PTX2+ PTX2-	Upper paper tray sensor
J5	1 2 3 4	DCM1+ DCM1- DCM2+ DCM2-	Picker/separator motors
J6	1 2	SSRS+ SSRS-	Second sheet restraint solenoid

* Not (negative logic) signal

Sheet-Feed Analog Card J7	Signal Name	Printer Attachment Panel Connector Pin
1	Not Used	
2	Motor GND	4,10
3	Logic GND	1,7
4	+12 Vdc	16
5	+36 Vdc	19
6	SF*	8
7	APOR*	14
8	R2MO*	3
9	R1MO*	2
10	SFCUR	15
11	H2S	18
12	H1S	17
13	+5 Vdc	13
14	GND	6
	TF*	9

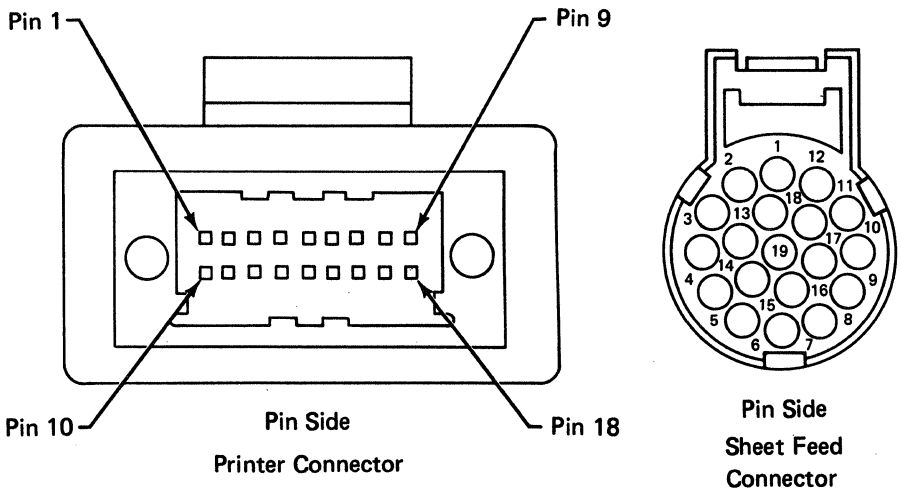
* Not (negative logic) signal



Sheet-Feed Adapter Cable

Printer Connector	Signal Function	Sheet-Feed Connector
1	AF (+alternate feed)	5
2	TF* (-tractor feed sense)	9
3	Spare	11
4	R2MO* (-paper tray motor 2 on)	3
5	R1MO*(-paper tray motor 1 on)	2
6	SFCUR (+sheet-feed BAT passed)	15
7	SF* (-sheet-feed sense)	8
8	H1S (paper tray 1 sensor)	17
9	H2S (paper tray 2 sensor)	18
10	GNDL (logic ground)	1,7
11	+5 Vdc	13
12	Spare	
13	Spare	
14	+36 Vdc	19
15	Spare	
16	GNDA (analog ground)	4,10
17	APOR* (-analog POR)	14
18	+12 Vdc	16
Shield	Frame ground	6

* Not (negative logic) signal



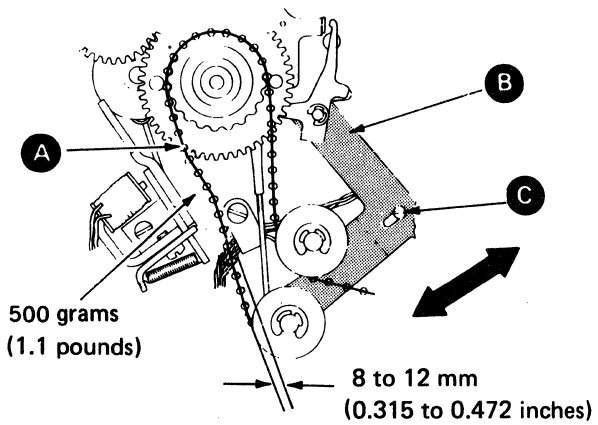
SHEET-FEED ADJUSTMENTS

POWER APPLICATION

720 TIMING BELT

Adjustment

1. Power off.
2. Remove the left side cover (760).
3. Remove the sheet-feed analog card support screw (763 B, step 4).
4. Check the timing belt tension. A 500 gram (1.1 pound) force on the half way point of the timing belt (A), between the sequencer pulley and the rear idler pulley, deflects the timing belt 8 to 12 mm (0.315 to 0.472 inches).
5. If adjustment is necessary, loosen the idler bracket mounting screw (C).
6. Move the idler bracket (B), tighten the idler bracket mounting screw, and check the timing belt tension.
7. Repeat steps 5 and 6 as necessary.
8. Reinstall the sheet-feed analog card support screw.
9. Reinstall the left side cover.

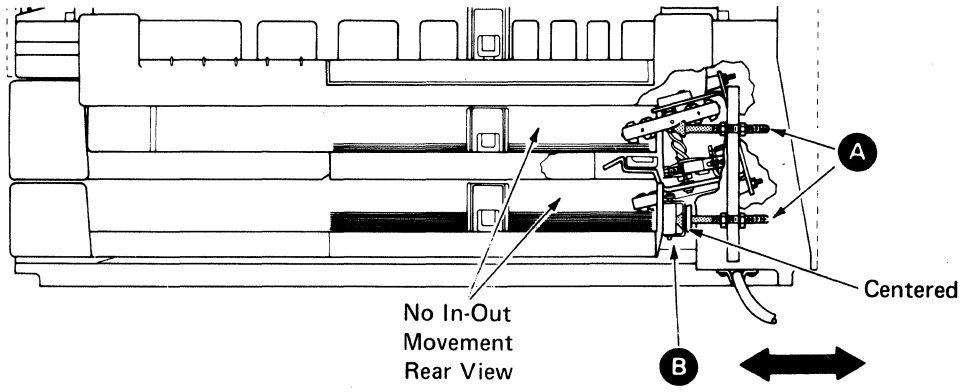


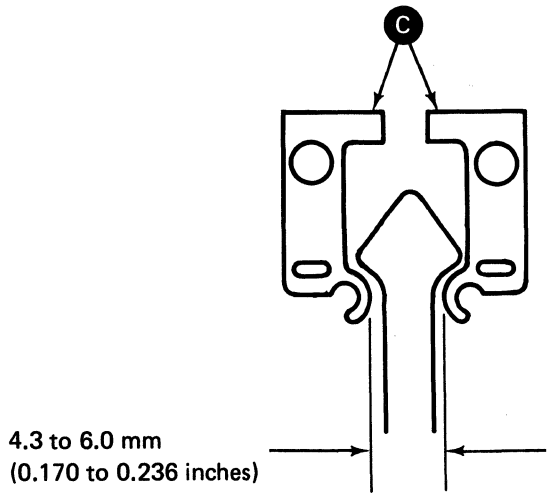
Left Side View

723 PAPER TRAY DETENT

Adjustment

1. Power off.
2. Remove the left side cover (760).
3. Reinstall the paper trays.
4. Loosen the two detent screws (A).
5. Adjust the paper tray detents (B) left-to-right, so that when the paper trays are installed, the paper tray brackets (C) are spread apart 4.3 to 6.0 mm (0.170 to 0.236 inches). Ensure that there is no in-out movement of the paper trays when the tray are installed, and that the picker/separator lift mechanism is not limiting the travel of the paper tray.
6. Check the picker/separator lift mechanism adjustment (725).
7. Reinstall the left side cover.

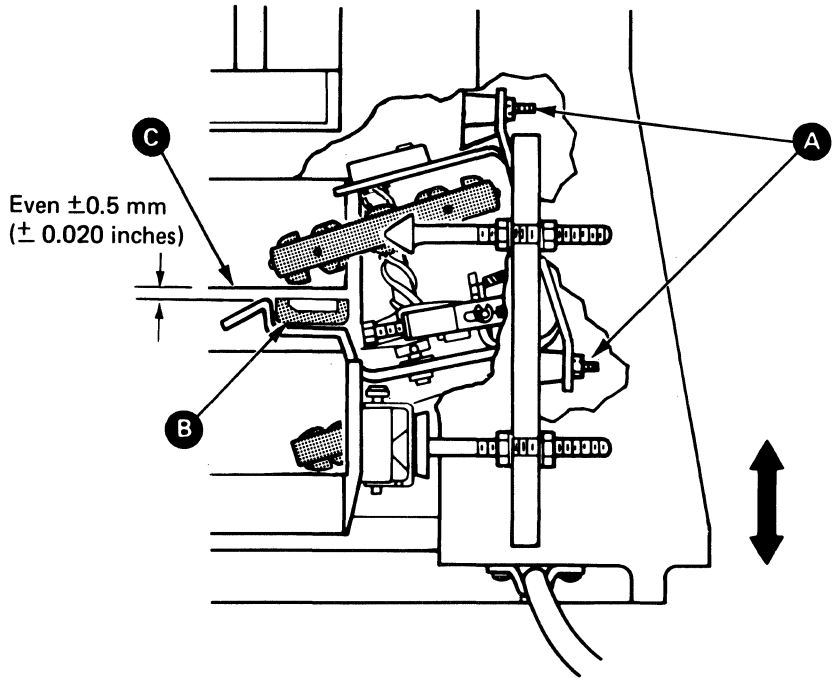




724 PICKER/SEPARATOR ASSEMBLY

Adjustment

1. Power off.
2. Remove the left side cover (760).
3. Remove paper from the paper trays and reinstall the paper trays.
4. Loosen the three mounting nuts (A) for the picker/separator mechanism.
5. Adjust the picker/separator mechanism so that the support pad (B) and the top surface of the paper tray (C) are even to within ±0.5 mm (±0.020 inches).
6. Tighten the three mounting nuts.
7. Check the picker/separator lift mechanism adjustment (725).
8. Reinstall the left side cover.



Rear View

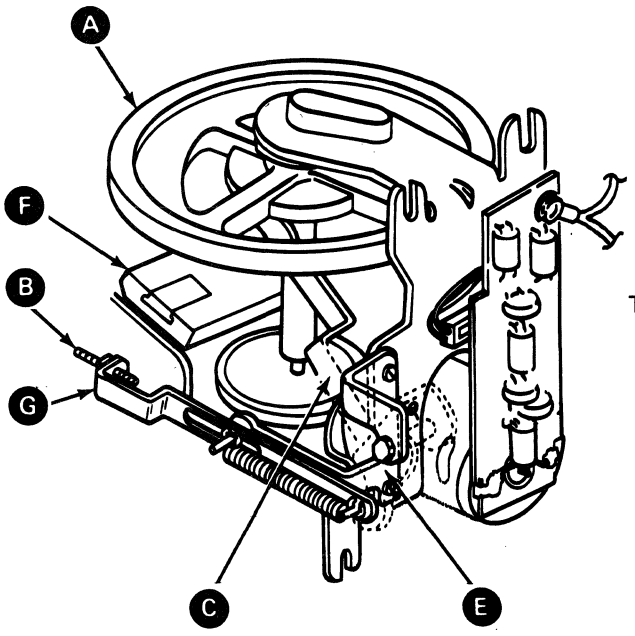
725 PICKER/SEPARATOR LIFT MECHANISM

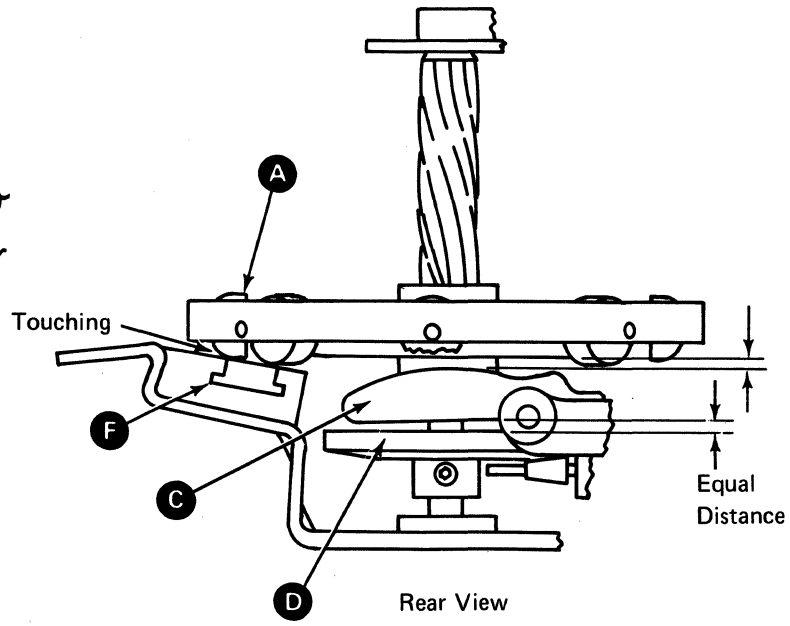
Note: If the picker/separator lift mechanism does not have an adjusting screw (B), this adjustment is not necessary.

Adjustment

Note: The picker/separator assembly adjustment (724) must be performed before performing the picker/separator lift mechanism adjustment.

1. Power off.
2. Remove the left side cover (760).
3. Remove paper from the paper trays and reinstall the paper trays.
4. Ensure that the picker/separator wheel (A) touches the support pad (F).
5. Loosen the locking nut (G). Adjust the picker/separator lift mechanism screw (B) so that the picker/separator lift arm (C) is centered between the picker/separator wheel (A) and the drive disk (D) with the paper tray installed. Ensure that the lift arm does not touch the lift bracket (E). Tighten in place with the locking nut (G).
6. Reinstall the left side cover.



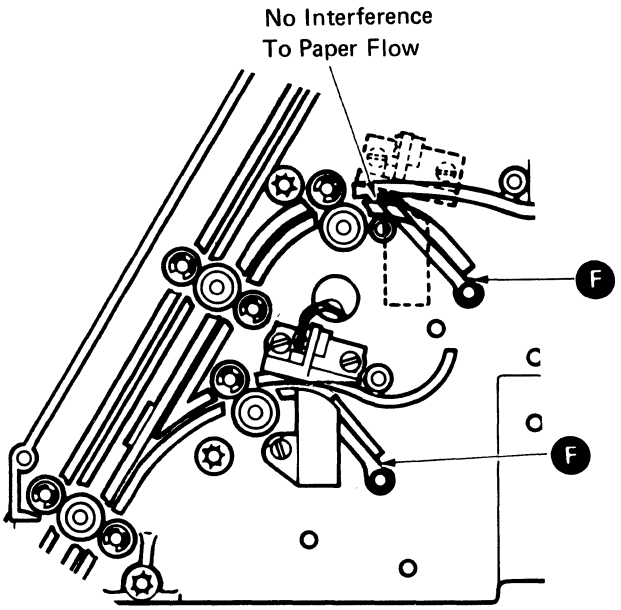


This page left blank intentionally.

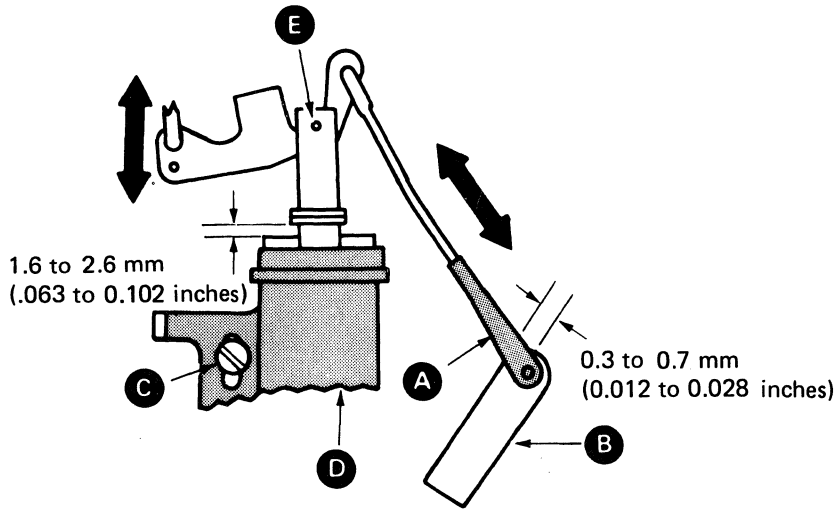
726 SECOND SHEET RESTRAINT ASSEMBLY

Adjustment

1. Power off.
2. Remove the left side cover (760).
3. Adjust the link clevis (A) for 0.3 to 0.7 mm (0.012 to 0.028 inches) of movement before the clevis moves the lower bellcrank (B).
4. Loosen the second sheet restraint solenoid mounting screw (C).
5. Locate the second sheet restraint solenoid (D) so that the solenoid plunger (E) will move 1.6 to 2.6 mm (0.063 to 0.102 inches) when the solenoid is activated.
6. Tighten the second sheet restraint solenoid mounting screw (C).
7. Feed a sheet of paper by hand.
8. Activate the solenoid by hand.
9. Ensure that the paper pawls (F) do not interfere with the paper flow.
10. If there is an interference, the second sheet restraint solenoid needs to be moved lower.
11. Check to ensure that neither paper pawl touches any screw housing when the solenoid is activated.
12. If there is interference, the second sheet restraint solenoid needs to be moved higher.
13. Check the gate latch adjustment (747).
14. Reinstall the left side cover.



Right View



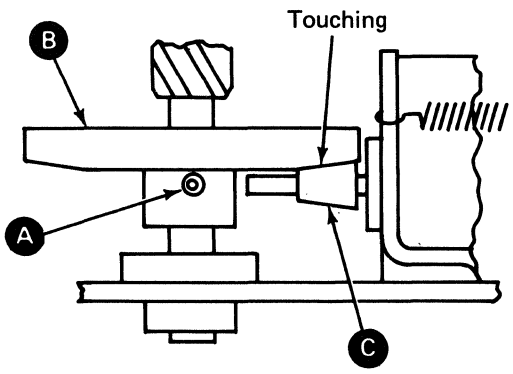
Left Side View

728 PICKER/SEPARATOR DRIVE DISK

Note: If the picker/separator does not have a drive disk setscrew (A), this adjustment is not necessary.

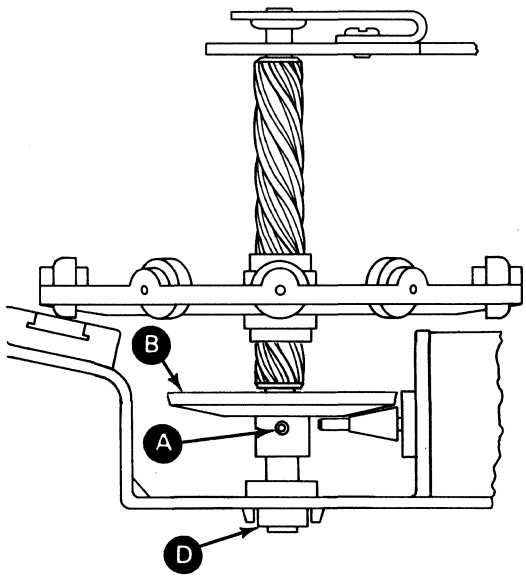
Adjustment

1. Power off.
2. Remove the left side cover (760).
3. Remove the picker/separator assembly (764).
4. Loosen the setscrew (A) located in the drive disk (B).
5. Depending on the level of the mechanism, perform one of the following:
   a. If the mechanism is level 1 (with a pivoting, spring-loaded motor assembly), adjust the drive disk so that the drive disk is flat on the motor cone surface (C).
   b. If the mechanism is level 2 (with a fixed motor mount and a leaf spring-loaded leadscrew), adjust the drive disk so that a 450 to 670 grams (1 to 1.5 pounds) load on the leadscrew at (D) will just lift the disk from the motor.
6. Tighten the setscrew (A).
7. Perform the following adjustments after the picker/separator has been reinstalled.
   a. Picker/Separator assembly (724).
   b. Picker/Separator lift mechanism (725).
8. Reinstall the left side cover.



Rear View

Level 1



Level 2

This page is left blank intentionally.

729 UPPER AND LOWER PAPER SENSOR ASSEMBLY

Adjustment

1. Power off.

2. Remove the left and right side covers (760, 761), and any necessary racks (780).

3. Check to ensure that the top surface of the lower sensor backup guide (A) is even to 0.5 mm (0.020 inches) below the bottom of the paper path. Loosen the sensor backup guide mounting screw (B) to make this adjustment.

4. Tighten the sensor backup guide mounting screw (B).

5. Loosen the sensor mounting screw (F).

6. Locate the paper sensor (C) in the housing (E) so that the sensor is against the downstop at the bottom of the housing.

7. Tighten the sensor mounting screw.

8. Loosen the two housing mounting fasteners (D). (Some sheet-feeds have studs instead of screws.)

9. Locate the housing vertically to obtain a gap of 1.4 to 1.8 mm (0.055 to 0.071 inches) between the housing and the sensor backup guide.

10. Reinstall the sheet-feed on the printer.

11. To ensure that paper is sensed 1 to 3 mm (0.039 to 0.118 inches) beyond the pinch point of the first cone roller, do the following:

    a. Connect a meter between J7-12 and J7-3 (ground) for the lower sensor or J7-11 and J7-3 (ground) for the upper sensor (705).

    b. Power on.

    c. Activate by hand the second sheet restraint solenoid and manually feed a sheet of paper to the pinch point of the cone roller (701).

    d. While looking at the meter, press the Paper Up switch until the meter reads +5 Vdc. The meter should change to +5 Vdc between the second and sixth time the switch is pressed.

    e. Adjust the housing front-to-rear until it is correct.

    Note: Each time the Paper Up switch is pressed, the paper moves 0.5 mm (0.020 inches).

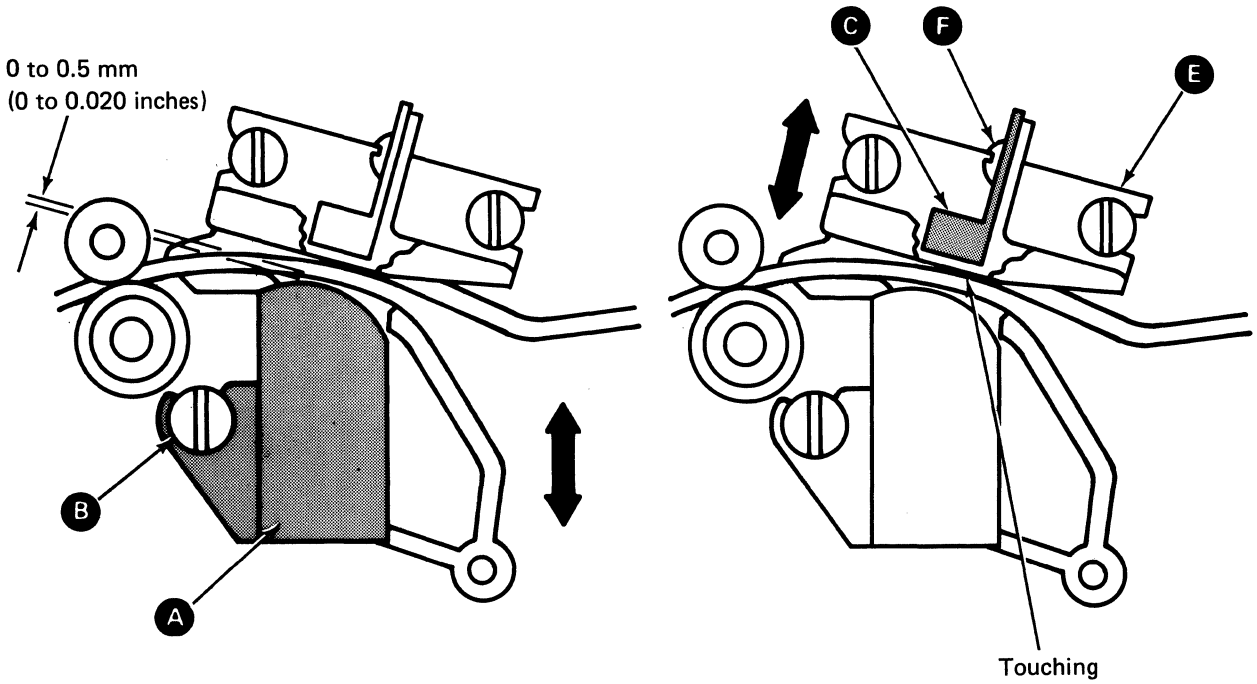
(continued on next page)

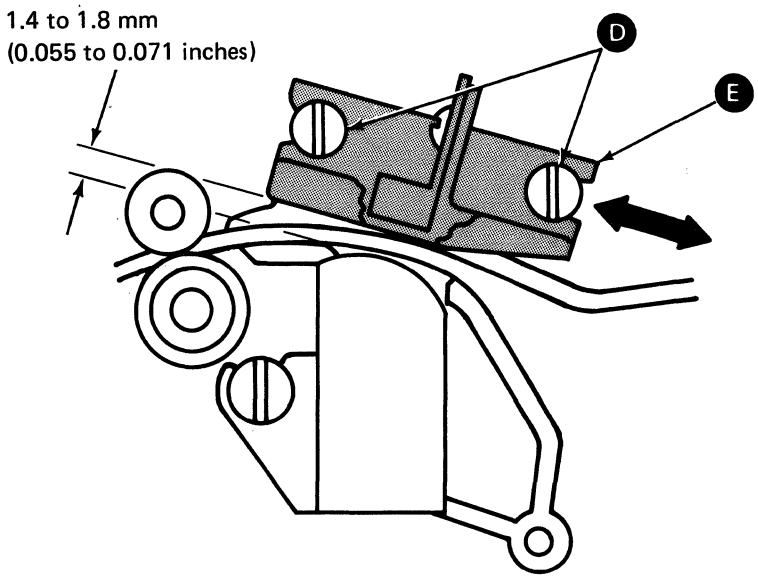
12. Tighten the two housing mounting screws.

13. Repeat steps 2 through 11 for the upper sensor assembly.

14. Reinstall the racks.

15. Reinstall the covers.

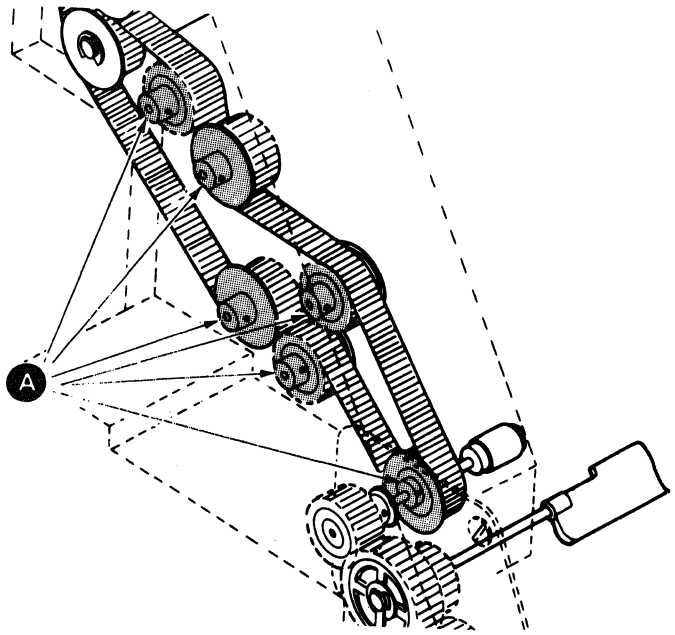


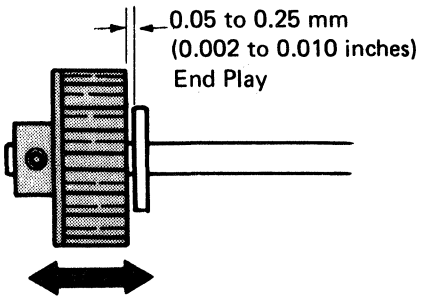


730 TRANSPORT ALIGNER PULLEYS

Adjustment

1. Power off.
2. Remove the left side cover (760) and the sheet-feed analog card support screw (763 B, step 4).
3. Loosen the setscrews on the transport aligner pulleys (A).
4. Adjust the transport aligner pulleys for 0.05 to 0.25 mm (0.002 to 0.010 inches) of end play.
5. Tighten the setscrews on the transport aligner pulleys.
6. Reinstall the sheet-feed analog card support screw.
7. Reinstall the left side cover.



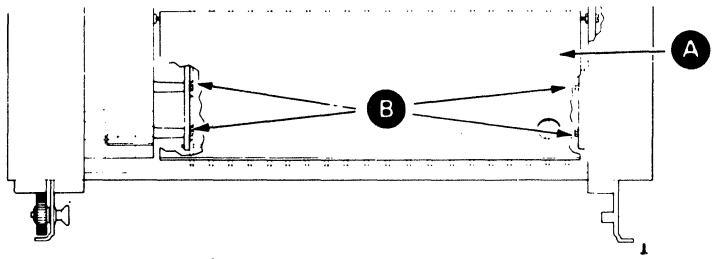


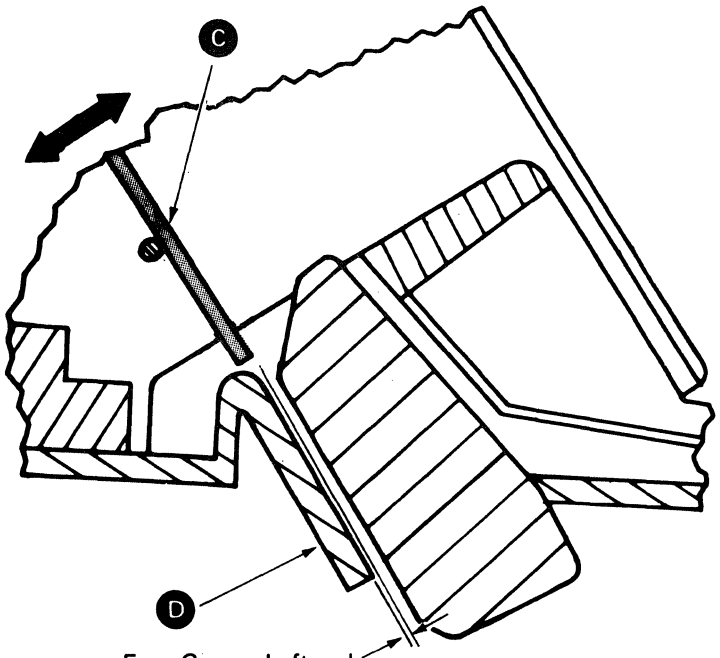
Front View

731 LOWER INNER RACK

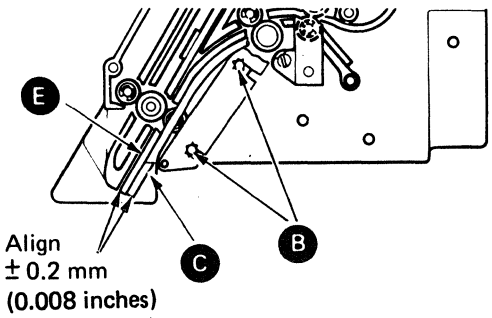
Adjustment

1. Power off.
2. Lift the splitter (A).
3. Loosen the four rack mounting screws (B).
4. Adjust the lower left side of the rack (C) so that it is even ± 0.2 mm (± 0.008 inches) with the bottom of the paper path (E).
5. Adjust the right side of the rack so that the gap between the rack and the printer striker plate (D) is even at the left and right side.
6. Tighten the four rack mounting screws.
7. Close the splitter and ensure that it does not touch the lower inner rack within the paper path.





Left View

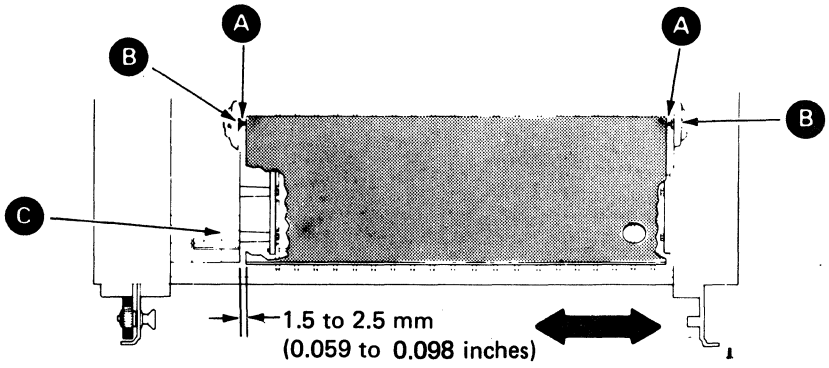


Right End View

732 SPLITTER ASSEMBLY

Adjustments

1. Power off.
2. Remove the left and right side covers (760, 761).
3. Loosen the splitter assembly pivot screw locknuts (A).
4. Adjust the splitter pivot screws (B) so that there is 1.5 to 2.5 mm (0.059 to 0.098 inches) gap between the manual paper insertion deflector (C) and the splitter. Ensure that the splitter has 0.2 to 0.5 mm (0.008 to 0.020 inches) end play.
5. Tighten the splitter assembly pivot screw locknuts.
6. Reinstall the covers.



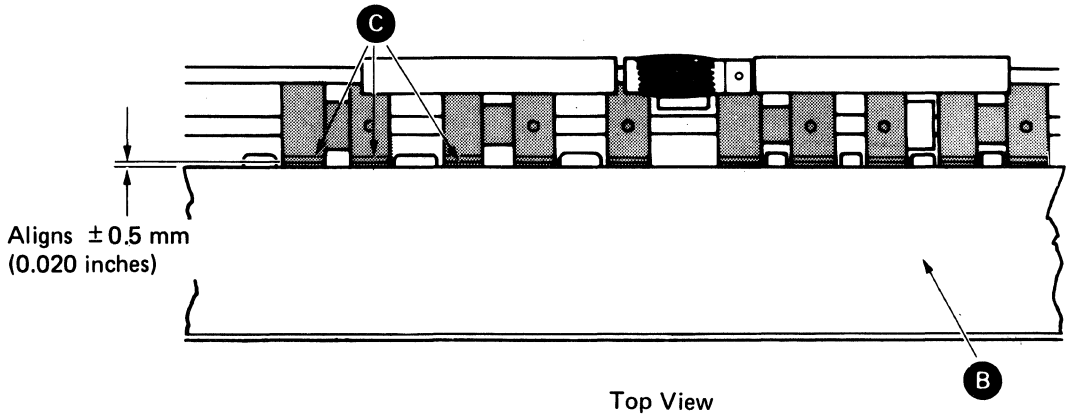
Front View

This page is left blank intentionally.

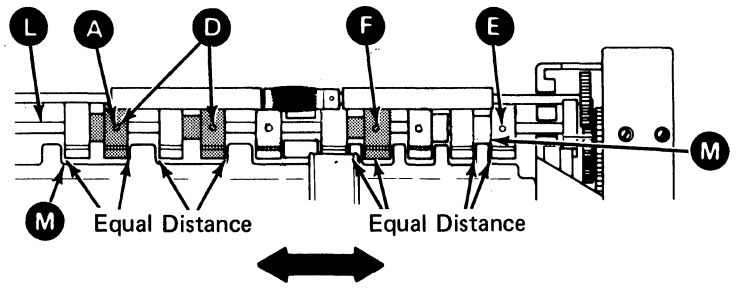
740 SEQUENCER CYLINDERS

Adjustment

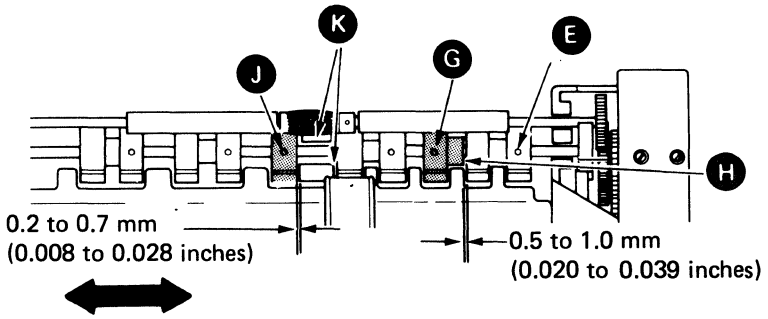
1. Power off.
2. Remove the center cover (762).
3. To adjust any of the sequencer cylinders, loosen the setscrews (A).
4. Place the gate (B) in the downward position by releasing the gate latch (701).
5. To align the sequencer cylinders, locate the paper openings (C) of the sequencer cylinders in line to within 0.5 mm (0.020 inches), using the gate as the reference line.
6. Adjust the double sequencer cylinders (D), (E), (F) on the shaft (L) so that they are visually centered between the stripper fingers (M).
7. Adjust the second sequencer cylinder (G) so there is 0.5 to 1.0 mm (0.020 to 0.039 inches) gap between sequencer cylinder 1 (F) and the clamp (H). This adjustment will allow free movement of the clamp.
8. Adjust sequencer cylinder 4 (J) to allow 0.2 to 0.7 mm (0.008 to 0.028 inches) of end play for both lower kick rollers (K).
9. Loosen the upper kick roller setscrew (N).
10. Center the upper kick roller (P) on the lower kick rollers (K). Ensure that the upper kick roller does not touch the sequencer cylinders.
11. Tighten the upper kick roller setscrew (N).
12. Perform the ratchet adjustment (743).
13. Reinstall the center cover.



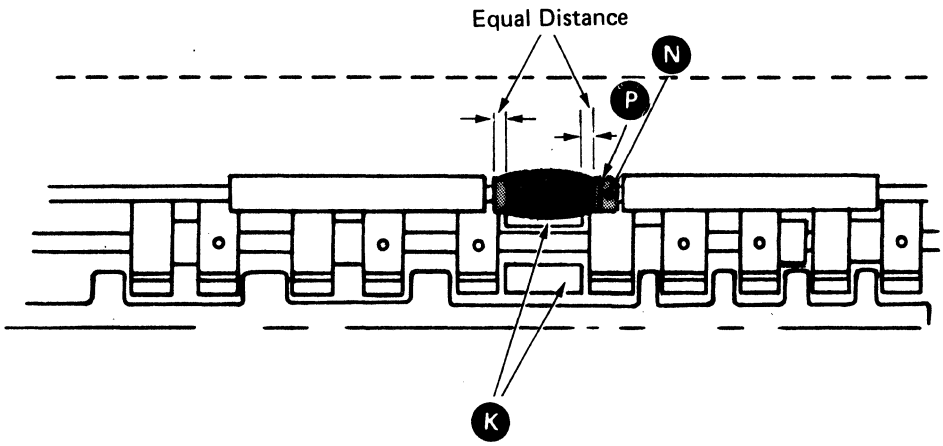
Top View



Rear View



Rear View

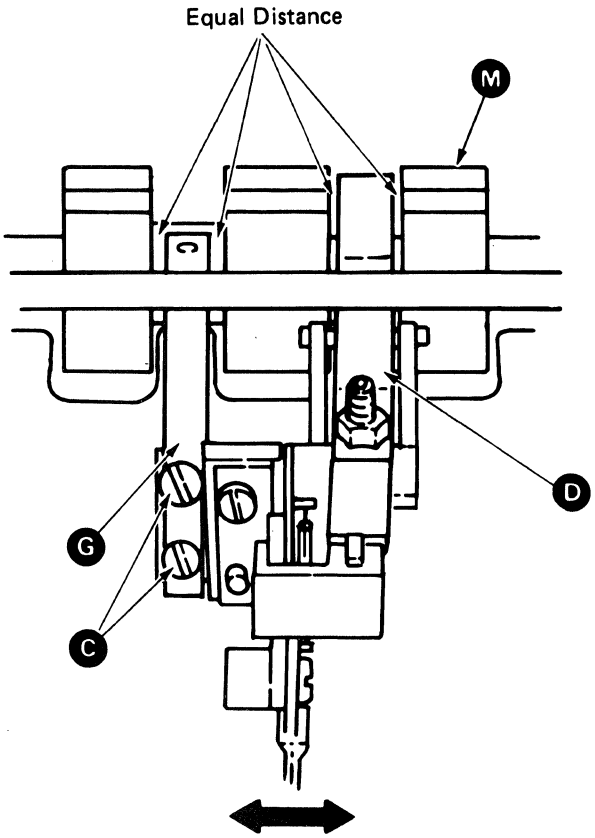


Rear View

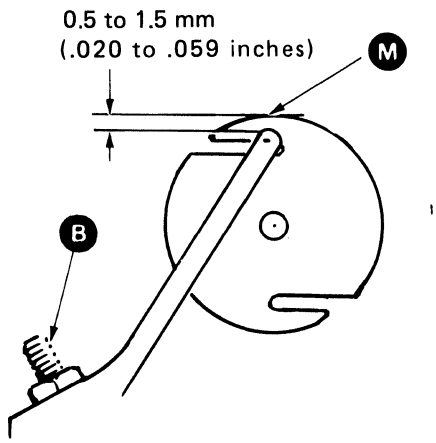
741 REED SWITCH

Adjustment

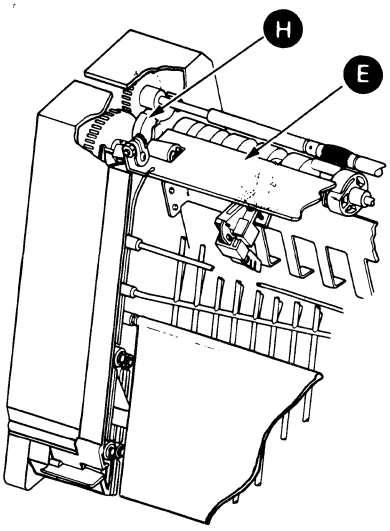
1. Power off.
2. Remove the center cover (762).
3. Loosen the mounting screws (C).
4. Center the reed switch lever (D) and the clamp spring (G) between the sequencer cylinders (M). The minimum clearance between the sides of each part and the cylinders must be 0.5 mm (0.020 inches). When setting this clearance, ensure that the cylinder shaft end play is 0.05 to 0.25 mm (0.002 to 0.010 inches).
5. Tighten the mounting screws (C).
6. Adjust the reed switch lever screw (B) so that the top of the lever is 0.5 to 1.5 mm (0.020 to 0.059 inches) below the top of the sequencer cylinder (M).
7. Power on.
8. Activate, by hand, the second sheet restraint solenoid to drop the gate (E).
9. Loosen the reed switch mounting screw (F) and place the reed switch (A) to the full up position.
10. With the ratchet tooth (H) latched against the sequencer magnet armature, insert a sheet of paper by hand halfway into the paper openings (K) of the sequencer cylinders. (**Note:** Position the paper so that the reed switch mounting screw (F) is still accessible.)
11. Lower the reed switch until the sequencer magnet activates; then tighten the reed switch mounting screw (F).
12. Verify that this adjustment is correct by repeatedly relatching the latch and inserting a sheet of paper into the sequencer slot. The sequencer should activate when the sheet of paper is approximately half way into the slot.
13. Ensure that the reed switch lever has an upward travel distance of 0.5 to 1.5 mm (0.020 to 0.059 inches) after the reed switch opens again; ensure that the gate does not touch the reed switch lever (D), when the gate is dropped.
14. Verify the adjustments by feeding several sheets of paper. Refine adjustments as necessary.
15. Tighten the reed switch lever screw locking nut (J).
16. Reinstall the center cover.

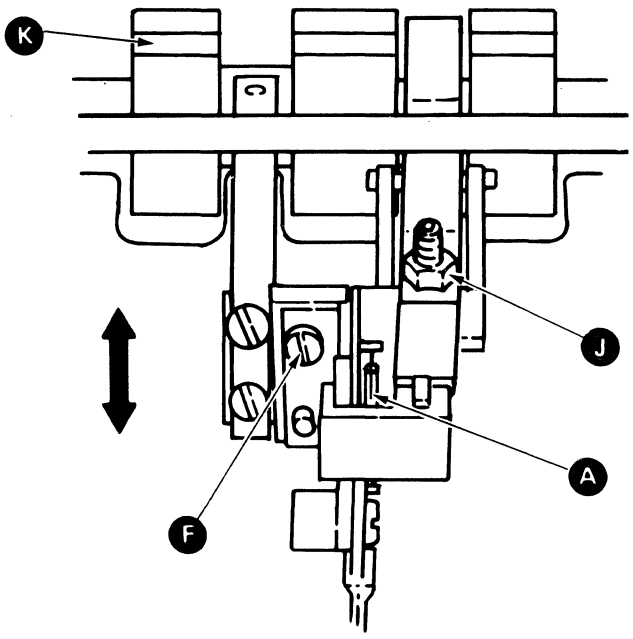


Front View



Side View



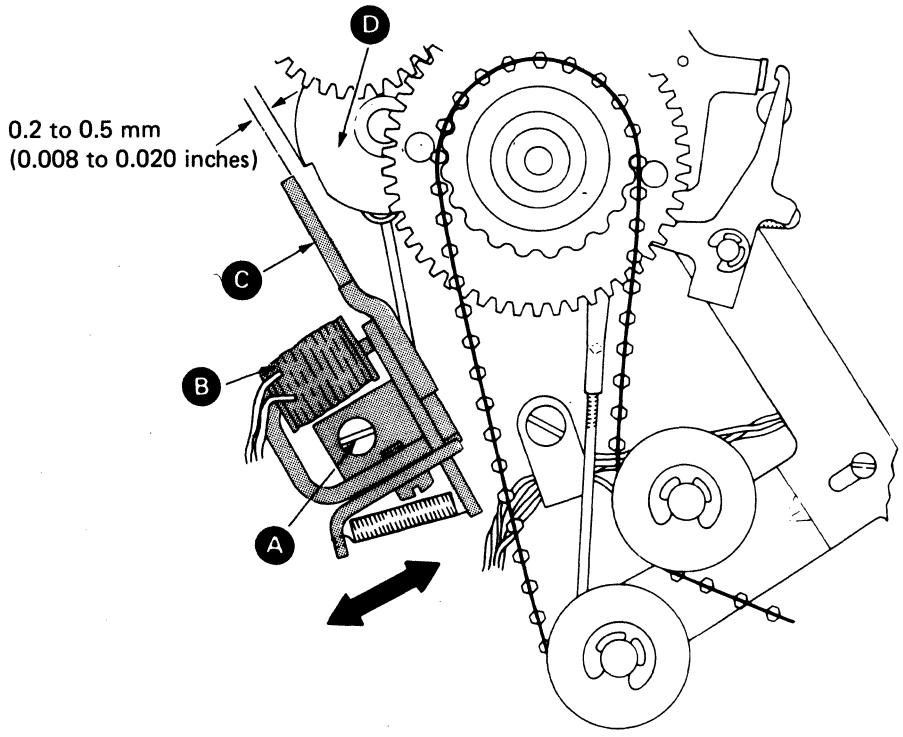


Front View

742 SEQUENCER MAGNET ASSEMBLY

Adjustment

1. Power off.
2. Remove the left side cover (760).
3. Remove the sheet-feed analog card support screw (763 B, step 4).
4. Loosen the sequencer magnet assembly mounting screw (A).
5. Adjust the sequencer magnet assembly (B) so that when activated, the sequencer magnet armature (C) clears the ratchet (D) by 0.2 to 0.5 mm (0.008 to 0.020 inches).
6. Pick the magnet by hand and rotate the ratchet counterclockwise, 180 degrees; check the adjustment again.
7. Tighten the sequencer magnet assembly mounting screw (A).
8. Reinstall the sheet-feed analog card support screw.
9. Reinstall the left side cover.

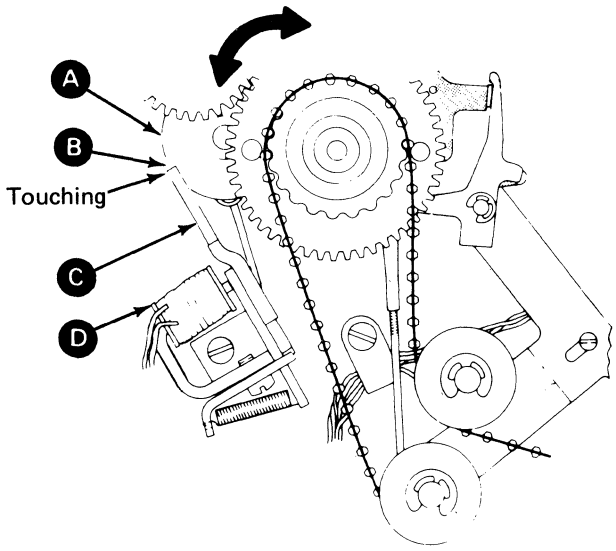


Left Side View

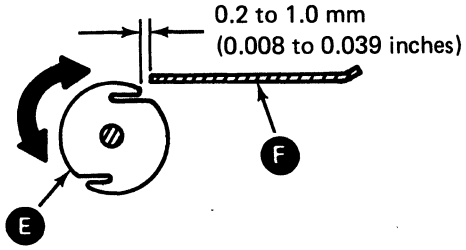
743 RATCHET

Adjustment

1. Power off.
2. Remove the center cover (762).
3. Check the sequencer cylinders adjustment (740).
4. Loosen the ratchet (A) setscrew (through the access hole).
5. Place the ratchet tooth (B) against the armature (C) of the sequencer magnet assembly (D).
6. Place the sequencer cylinders (E) so that the front of the paper openings of all of the sequencer cylinders are 0.2 to 1.0 mm (0.008 to 0.039 inches) from the rear edge of the gate (F).
7. Tighten the ratchet setscrew with 0.05 to 0.25 mm (0.002 to 0.010 inches) of shaft end play.
8. Pick the magnet and turn the sequencer cylinder 180 degrees; check the adjustment again.
9. Check the drive wheel and roller adjustment (744).
10. Reinstall the sheet-feed analog card support screw.
11. Reinstall the covers.



Left End View

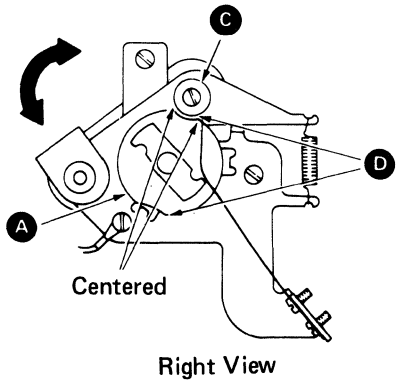


Left Side View

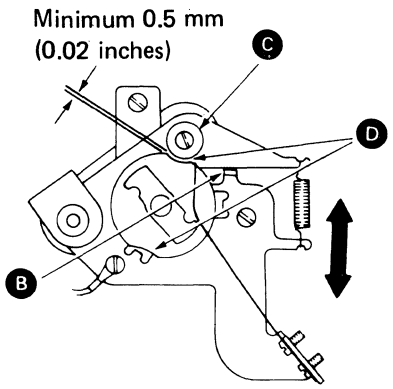
744 DRIVE WHEEL AND ROLLER

Adjustment

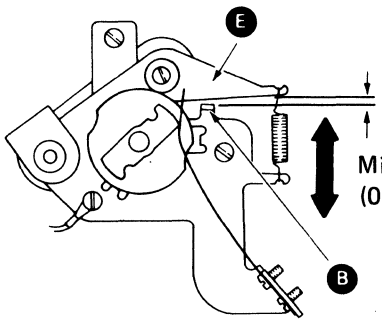
1. Power off.
2. Remove the left and right side covers (760 and 761).
3. Ensure that the ratchet tooth is latched against the sequencer magnet armature. Maintain this condition throughout this adjustment.
4. Loosen the drive wheel (A) setscrew.
5. Turn the drive wheel (A) so that the drive roller (C) is centered in a drive wheel groove (D).
6. Tighten the drive wheel setscrew, maintaining 0.05 to 0.25 mm (0.002 to 0.010 inches) of shaft end play.
7. Bend the pivot arm down stop (B) to obtain at least a 0.5 mm (0.020 inches) gap between the drive roller (C) and the bottom of the drive wheel groove (D) in the latched position.
8. Pick the sequencer magnet and turn the ratchet approximately 90 degrees.
9. Ensure that there is at least 0.2 mm (0.008 inches) gap between the pivot arm (E) and the pivot arm down stop (B).
10. Reinstall the left and right side covers.



Right View



Right View

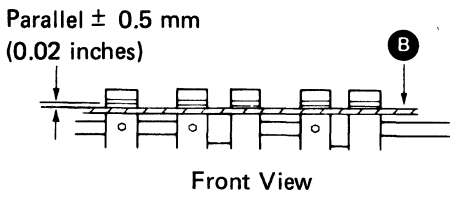


Right View

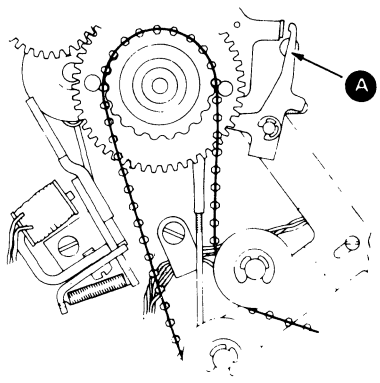
745 GATE DOWNSTOP

Adjustment

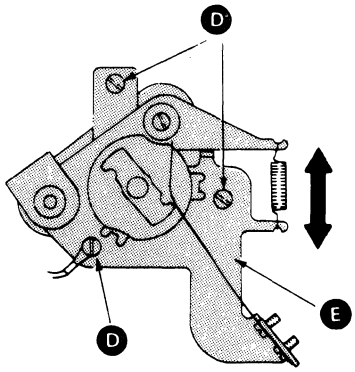
1. Power off.
2. Remove the center cover (762).
3. Check the sequencer cylinders and ratchet adjustments (740 and 743).
4. Loosen the three sequencer plate mounting screws (D).
5. Adjust the sequencer plate (E) up and down so that the sequencer cylinders are parallel to the rear edge of the gate (B) 0.5 mm (0.020 inches).
6. Tighten the three sequencer plate mounting screws (D).
7. Release the gate latch (A) so that the gate (B) is on the gate downstop (C).
8. Bend the downstop so that the bottom of the gate is 0.2 to 0.7 mm (0.008 to 0.028 inches) from the bottom of the paper slots of the sequencer cylinders on both the left and right sides.
9. Check the gate cam adjustment (746) and the reed switch adjustment (741).
10. Reinstall the covers.



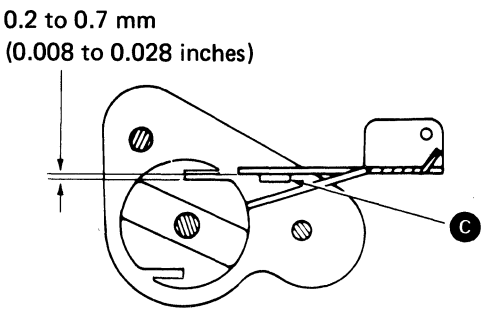
Front View



Left End View



Left Side View

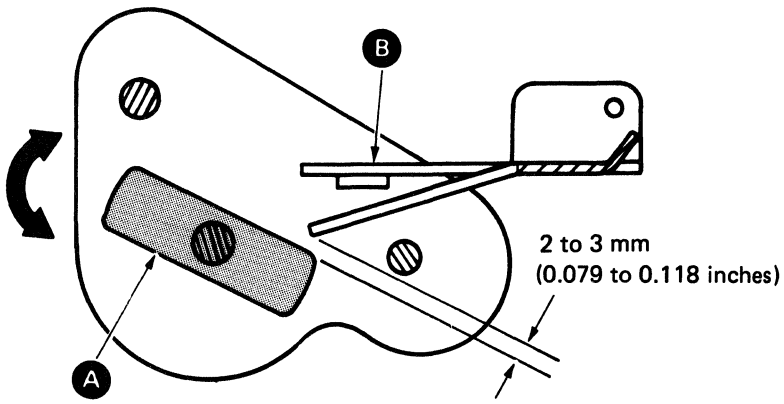


Left End View

746 GATE CAM

Adjustment

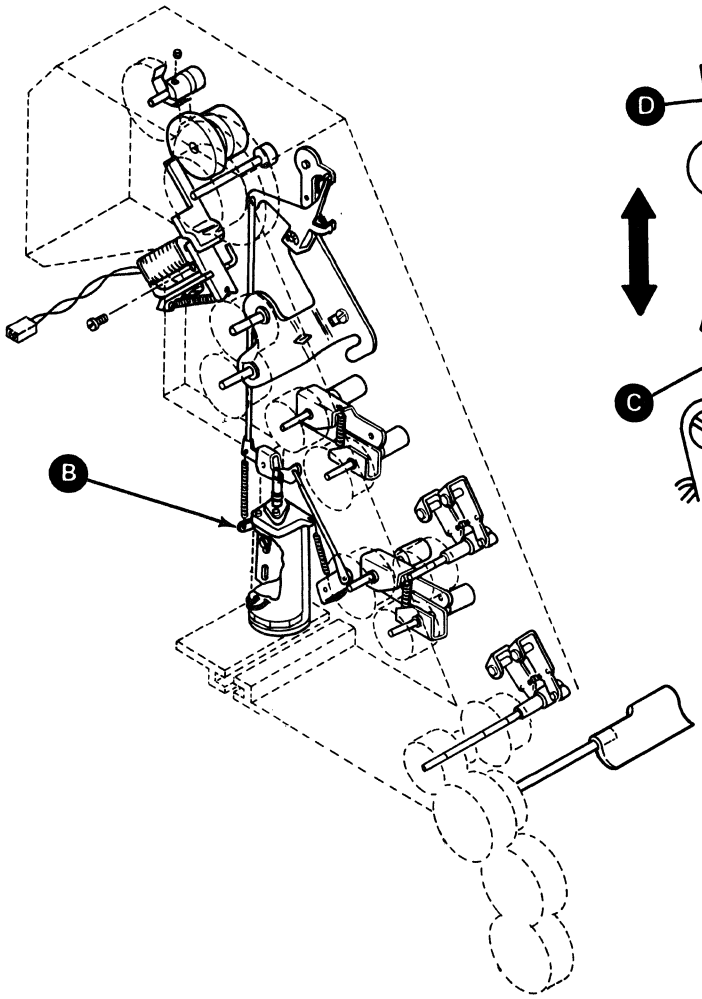
1. Power off.
2. Remove the left side cover (760).
3. Check the gate downstop adjustment (745).
4. With the ratchet tooth latched up against the sequencer magnet armature, loosen the gate cam (A) setscrew.
5. With the gate (B) in its downward position, turn the cam on the shaft until there is a 2 to 3 mm (0.079 to 0.118 inches) gap between the cam and the gate. This lets the drive wheel and roller engage before the gate cam (A) starts to lift the gate.
6. Tighten the cam setscrew.
7. Reinstall the left side cover.

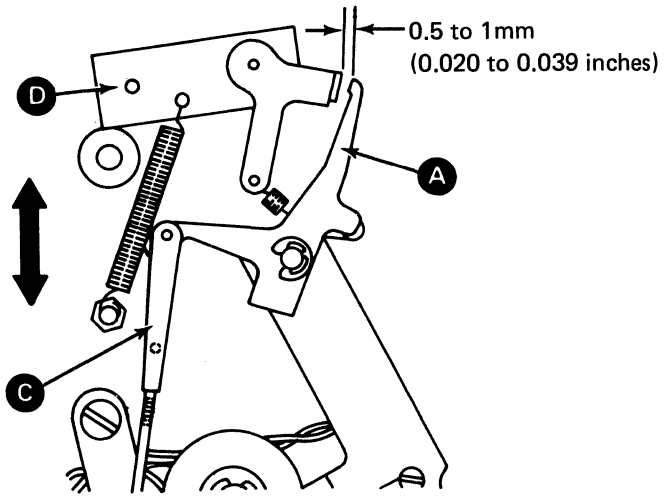


747 GATE LATCH

Adjustment

1. Power off.
2. Remove the center cover (762).
3. Remove the timing belt from around the sequencer pulley.
4. Remove the sequencer pulley (773).
5. Adjust the gate latch clevis (C) so that the gate latch (A) clears the latch plate (D) by 0.5 to 1 mm (0.020 to 0.039 inches), when the solenoid (B) is activated.
6. Reinstall the sequencer pulley and the timing belt, maintaining the 0.1 to 0.5 mm (0.004 to 0.020 inches) shaft end play.
7. Reinstall the covers.



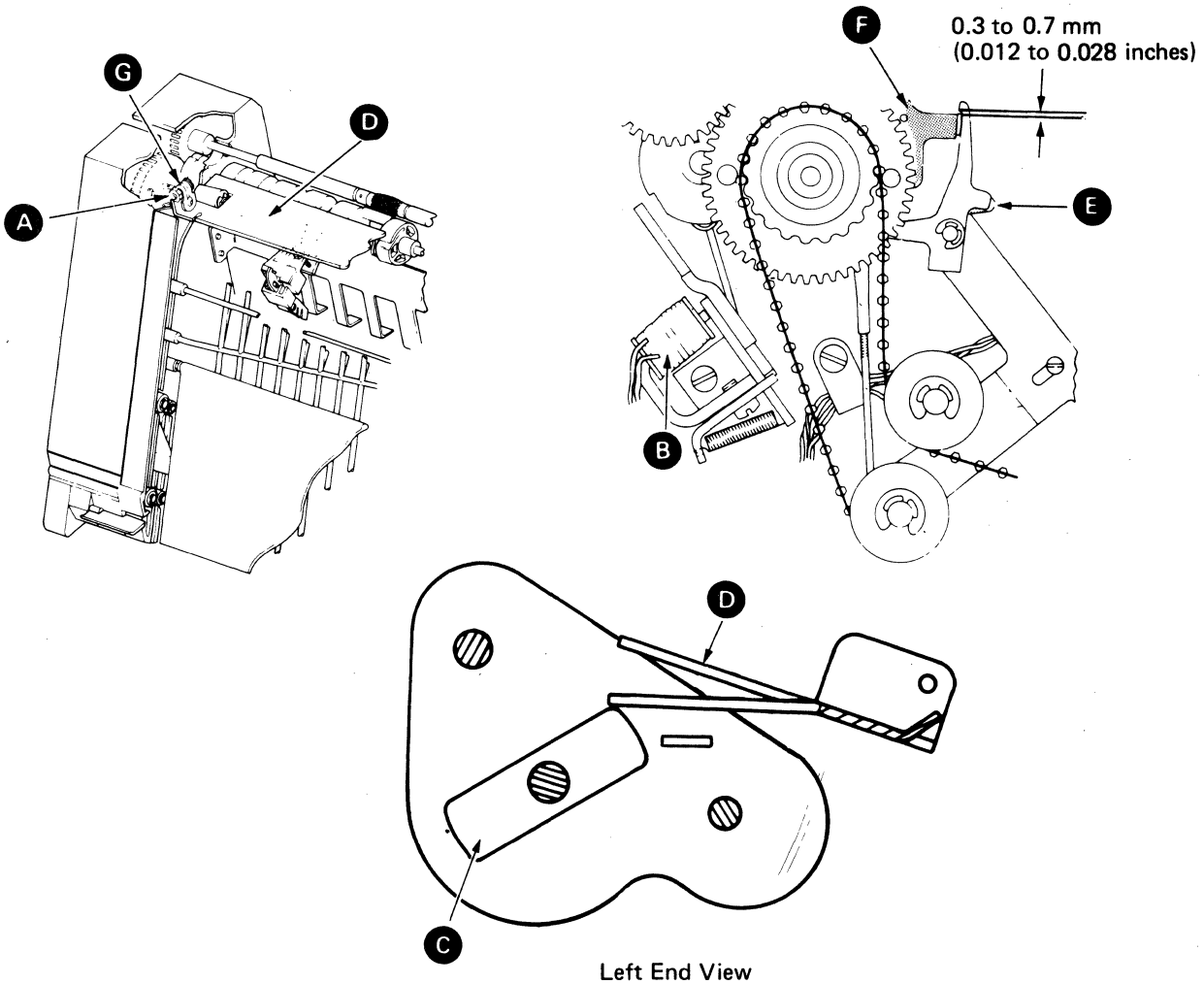


Left Side View

748 GATE

Adjustment

1. Power off.
2. Remove the center cover (762).
3. Loosen the left gate mounting screw (A) and open the gate clamp (G) to free the gate (D) from the latch plate (F).
4. Activate the sequencer magnet (B) by hand.
5. Turn the platen driven gear until the gate (D) is at its highest point on the gate cam (C).
6. Adjust the latch plate (F) so that it clears the latch (E) by 0.3 to 0.7 mm (0.012 to 0.028 inches).
7. Tighten the left gate mounting screw while maintaining 0.1 to 0.5 (0.004 to 0.020 inches) of end play.
8. Reinstall the covers.

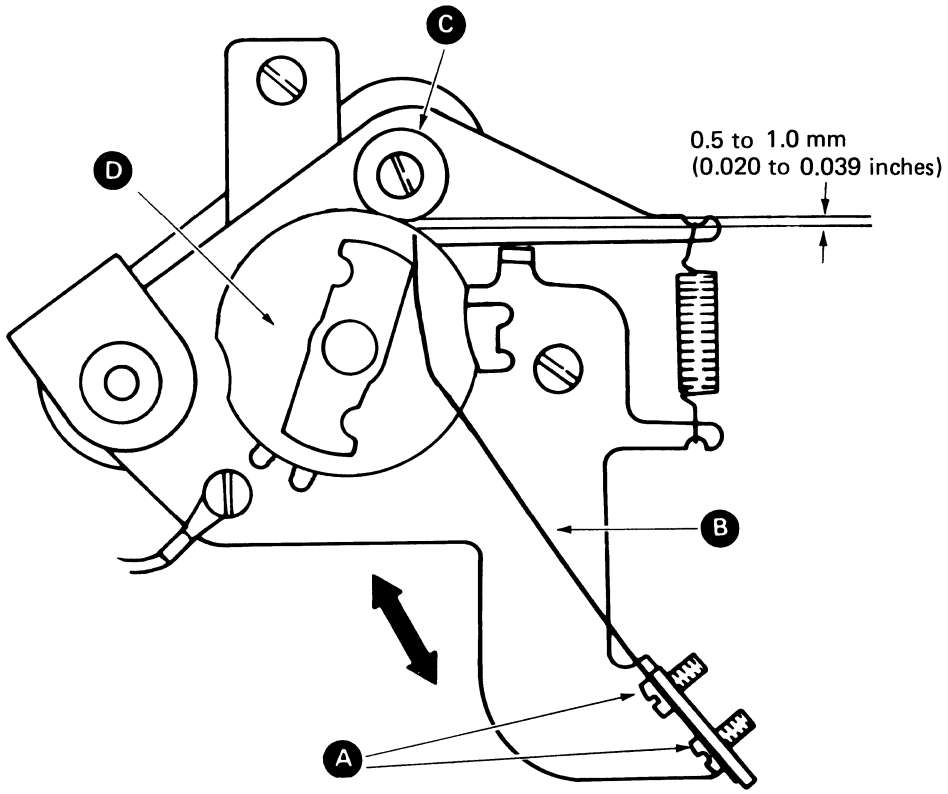


Left End View

749 TRIP SPRING

Adjustment

1. Power off.
2. Remove the right side cover (761).
3. Loosen the two trip spring mounting screws (A).
4. Adjust the trip spring (B) for 0.5 to 1.0 mm (0.020 to 0.039 inches) gap between the top of the trip spring and the drive roller (C). Ensure that the drive wheel (D) is turned so that the trip spring and drive wheel are at the nearest point.
5. Tighten the two trip spring mounting screws.
6. Reinstall the right side cover.



Right Side View

This page is left blank intentionally

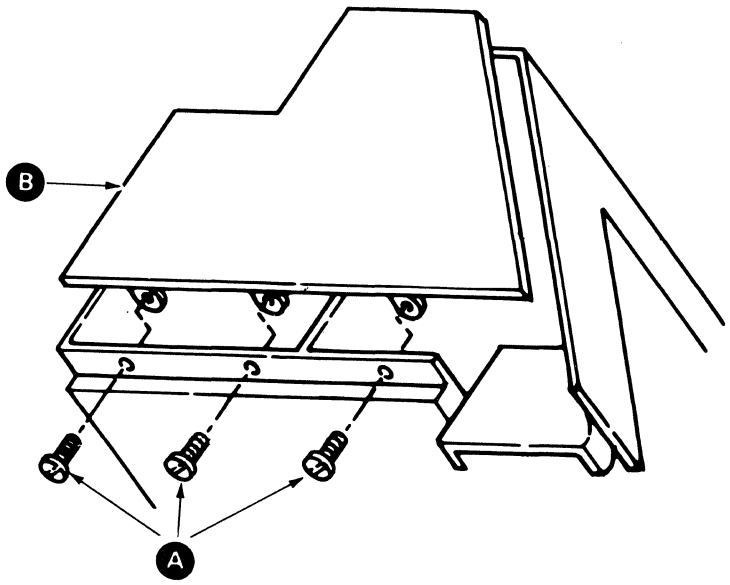
SHEET-FEED REMOVALS AND REPLACEMENTS

COVERS

760 LEFT SIDE COVER

Removal and Replacement

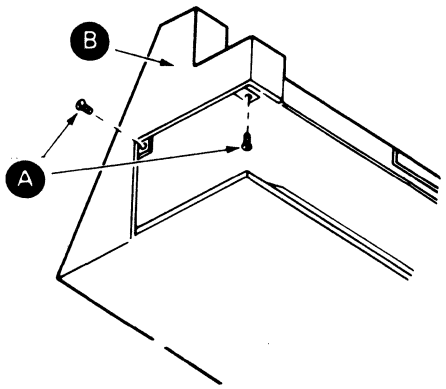
1. Power off.
2. Disconnect the sheet-feed cable from the printer.
3. Remove the two paper trays and paper from the output paper tray.
4. Remove the sheet-feed from the printer.
5. Place the sheet-feed right side on a flat surface.
6. Remove the three left cover mounting screws (A).
7. Remove the left side cover (B).
8. For replacement of the left side cover, reverse this procedure.



761 RIGHT SIDE COVER

Removal and Replacement

1. Power off.
2. Disconnect the sheet-feed cable from the printer.
3. Remove the two paper trays and paper from the output paper tray.
4. Remove the sheet-feed from the printer.
5. Place the sheet-feed left side on a flat surface.
6. Remove the two right cover mounting screws (A).
7. Remove the right side cover (B).
8. For replacement of the right side cover, reverse this procedure.

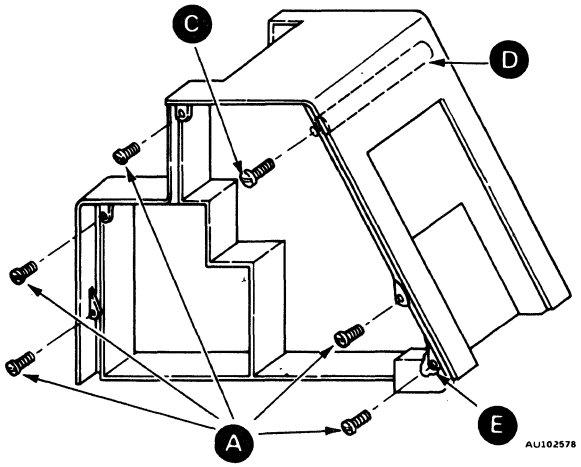


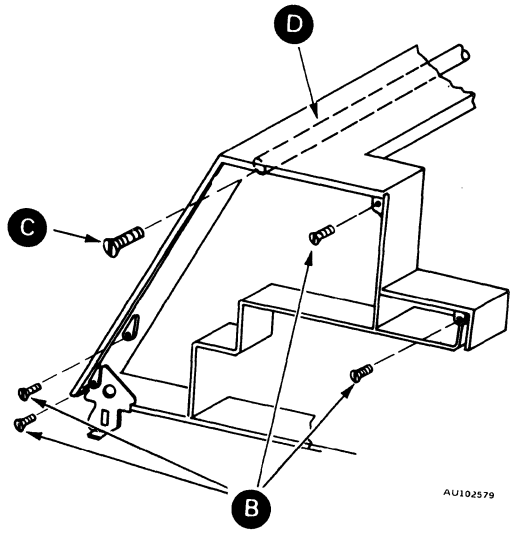
762 CENTER COVER

Removal and Replacement

1. Remove the left and right side covers (760, 761).
2. Remove the sheet-feed analog card support screw (763 B, Step 4).
3. Remove the gear guard (E).
4. Remove the five mounting screws (A) on the left side of the center cover.
5. Remove the four mounting screws (B) on the right side of the center cover.
6. Remove the two support bar mounting screws (C).
7. Remove the center cover.
8. Remove the support bar (D).
9. For replacement of the center cover, reverse this procedure.

Note: When performing adjustments that require the removal of the center cover, the support bar and gear guard must be reinstalled.



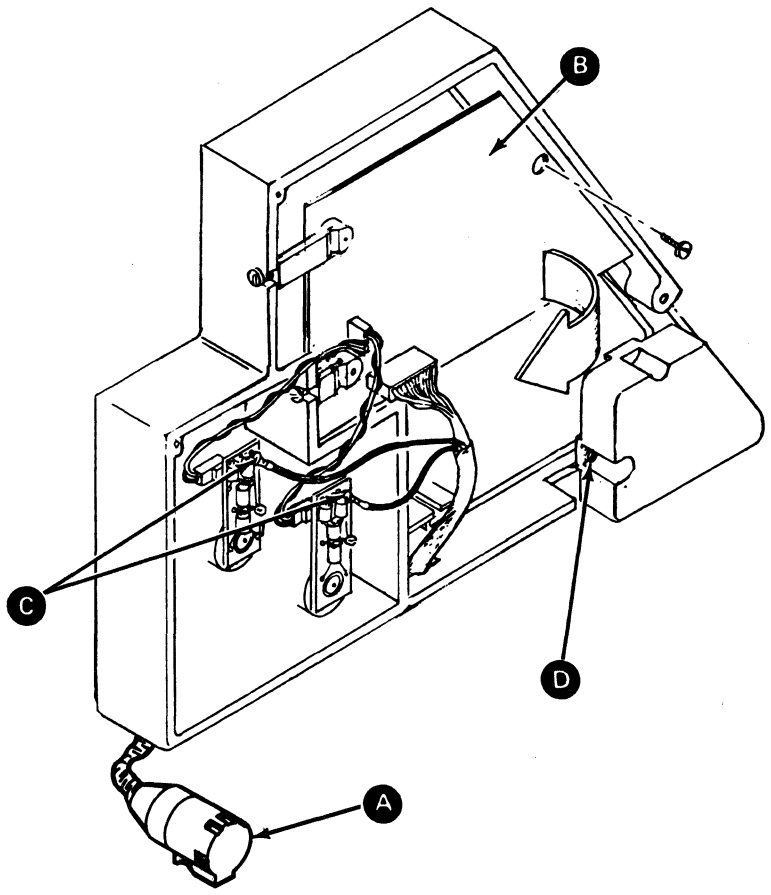


763 SHEET-FEED CABLE AND ANALOG CARD

A. SHEET-FEED CABLE

Removal and Replacement

1. Power off.
2. Disconnect the sheet-feed cable (A) from the printer.
3. Remove the left side cover (760).
4. Remove the two cable clamps that attach the sheet-feed cable to the sheet-feed. Remove the screws that attach the ground wires, if present, to the filter board (C) on both picker/separator motors and to the left side mounting plate (D).
5. Disconnect the sheet-feed cable from the sheet-feed analog card (B).
6. Remove the sheet-feed cable.
7. For replacement of the sheet-feed cable, reverse this procedure.

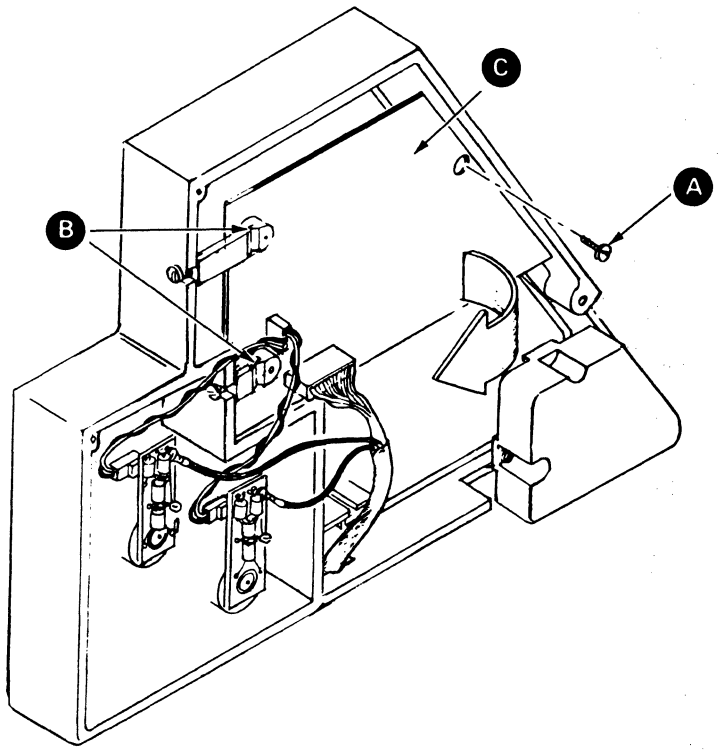


B. SHEET-FEED ANALOG CARD

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Remove all connectors that attach to the sheet-feed analog card.
4. Remove the sheet-feed analog card support screw (A) and pivot the card back.
5. Remove the two sheet-feed analog card mounting screws (B) from inner side of board.
6. Remove the sheet-feed analog card (C), disconnecting all cables.
7. For replacement of the sheet-feed analog card, reverse the proceeding steps.

Warning: Ensure that connectors J2, J4, and J5, and J1, J3, and J6 (705) are not swapped when exchanging the sheet-feed analog card.

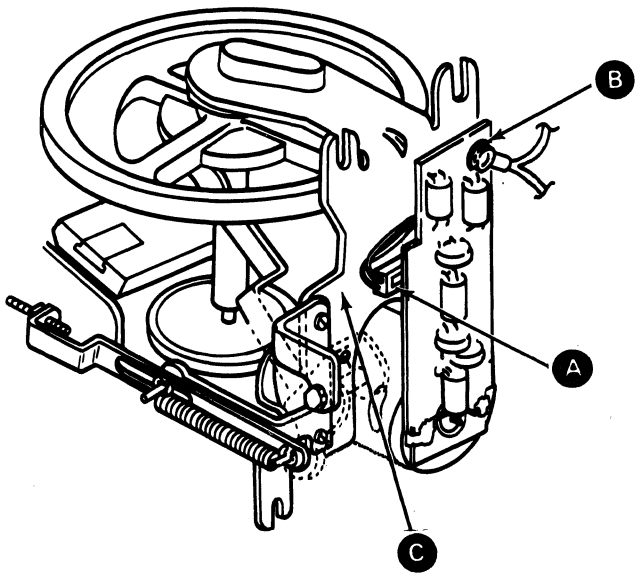


AU102538

764 PICKER/SEPARATOR ASSEMBLY

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Remove the connector (A) and the ground wire (B) if present, from the filter board of the picker/separator assembly.
4. Loosen the three support nuts. One or more nuts must be removed.
5. Remove the picker/separator assembly (C).
6. For replacement of the picker/separator assembly, reverse steps 3 through 5.
7. Perform the picker/separator assembly adjustment (724).
8. Reinstall the left side cover.



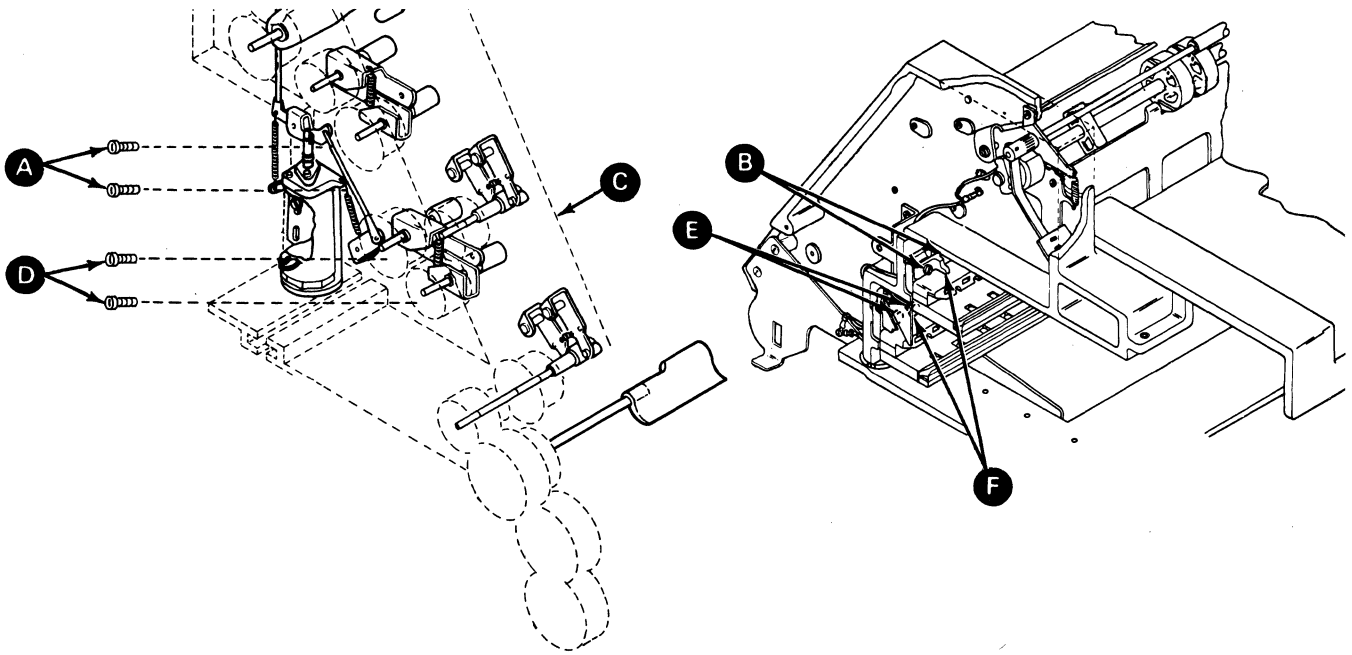
766 PAPER TRAY SUPPORT RAIL

Removal and Replacement

Warning: Never remove the upper and lower paper tray support rails at the same time. Doing so will cause alignment problems.

1. Power off.
2. Remove the left side cover (760).
3. Remove the two left paper tray support rail mounting screws (A) or (D).
4. Remove the two right paper tray support rail mounting screws (B) or (E) and the tray inhibitor (F).
5. Remove the paper tray support rail.
6. Reinstall the rail by reversing steps 3 through 5.
7. Adjust the inhibitor even with the edge of the rail and push up on the rail before tightening the right side screws.
8. Reinstall the left side cover.
9. Reinstall the paper trays.

Note: Ensure that the rail is against the paper path block (C) before tightening the right screws.

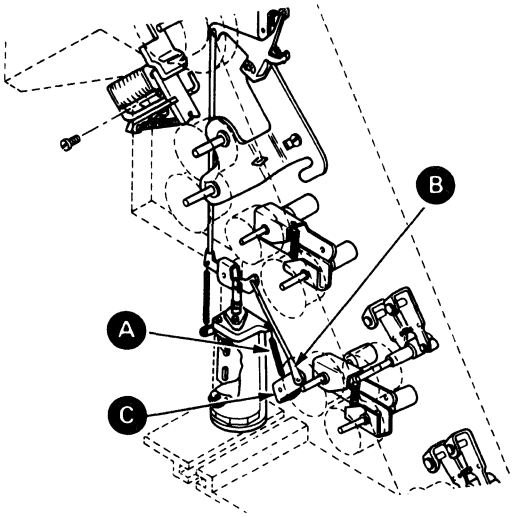


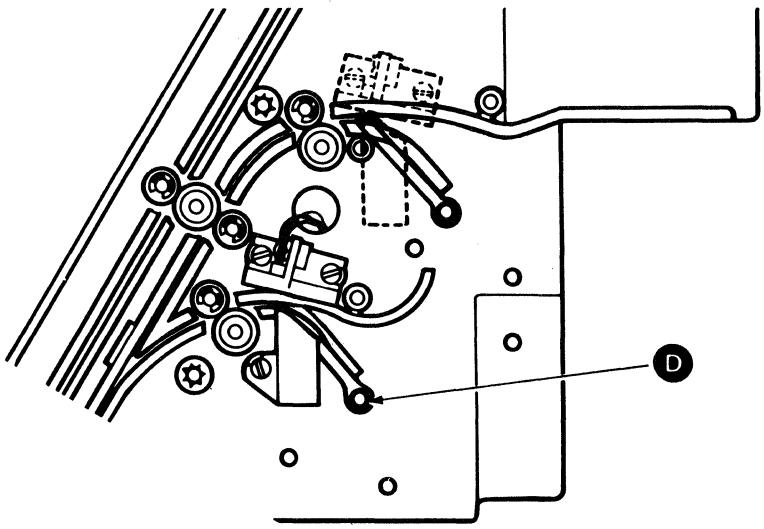
767 LOWER SECOND SHEET RESTRAINT PAPER PAWL

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Disconnect the lower end of the lower bellcrank spring (A).
4. Disconnect the lower part of the clevis (B) from the lower bellcrank.
5. Remove the lower paper tray support rail (766).
6. Loosen the lower second sheet restraint paper pawl (D) setscrew.
7. Remove the lower bellcrank (C) so that the lower second sheet restraint paper pawl can be removed.
8. For replacement of the lower second sheet restraint paper pawl, reverse steps 3 through 7.
9. Perform the second sheet restraint assembly adjustment (726).
10. Reinstall the left side cover.

Note: When the lower second sheet restraint paper pawl is screwed to the shaft, the paper pawl should be in the up position and the bellcrank should be at a 45 degree angle. The shaft should have 0.1 to 0.5 mm (0.004 to 0.020 inches) end play.



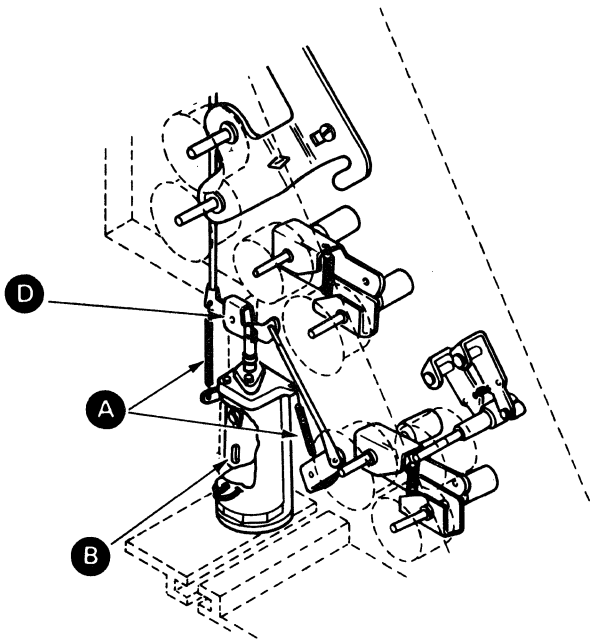


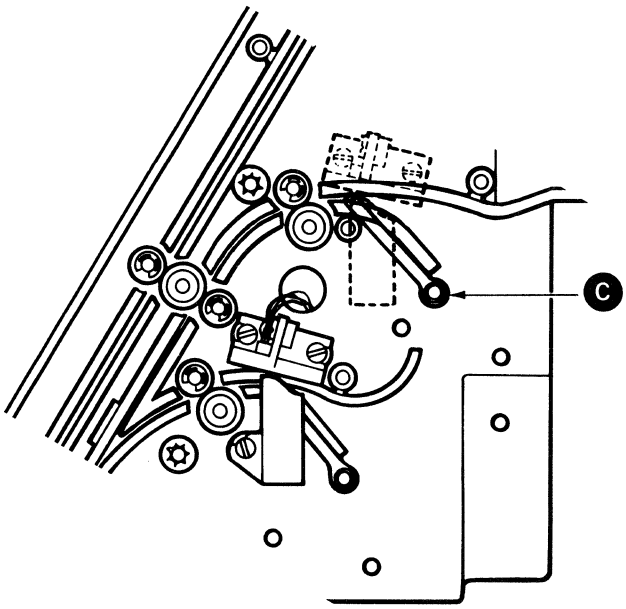
768 UPPER SECOND SHEET RESTRAINT PAPER PAWL

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Remove the upper and lower springs (A).
4. Remove the second sheet restraint solenoid (B) (769).
5. Loosen the upper second sheet restraint paper pawl (C) setscrew.
6. Pull the upper bellcrank (D) out enough so that the upper second sheet restraint paper pawl can be removed.
7. For replacement of the upper second sheet restraint paper pawl, reverse steps 3 through 7.
8. Perform the second sheet restraint assembly adjustment (726).
9. Reinstall the left side cover.

Note: When the upper second sheet restraint paper pawl is screwed to the shaft, the paper pawl should be in the up position and the bellcrank should be approximately horizontal. The shaft should have 0.1 to 0.5 mm (0.004 to 0.020 inches) end play.

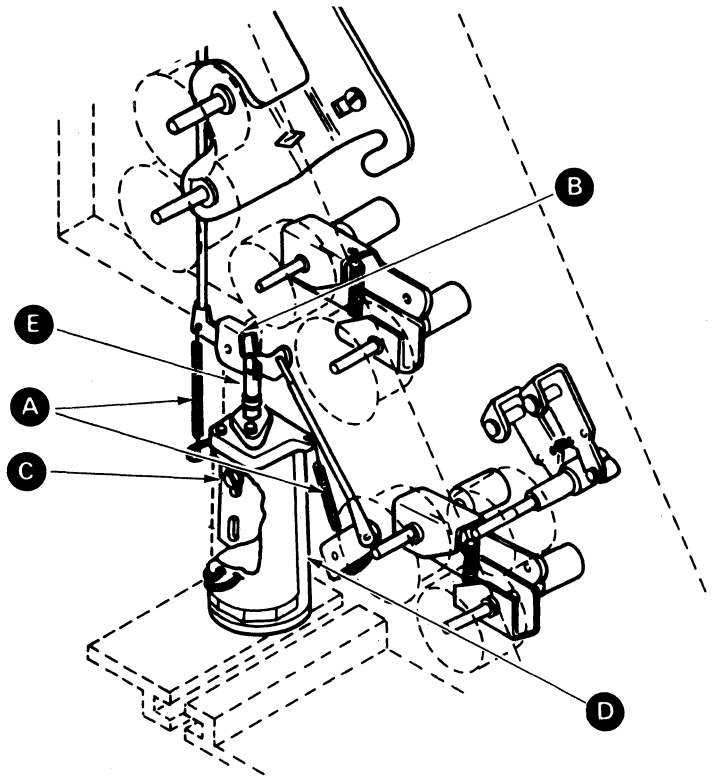




769 SECOND SHEET RESTRAINT SOLENOID

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Remove the sheet-feed analog card support screw (763 B, step 4).
4. Remove the two bellcrank springs (A).
5. Remove the second sheet restraint solenoid cable connector J6 (705).
6. Remove the solenoid cable from the clamp.
7. Remove the second sheet restraint solenoid mounting screw (B).
8. Turn the second sheet restraint solenoid (C) counterclockwise so the plunger (D) can be separated from the upper bellcrank (E).
9. For replacement of the second sheet restraint solenoid, reverse steps 3 through 7.
10. Perform the second sheet restraint assembly adjustment (726).
11. Reinstall the left side cover.

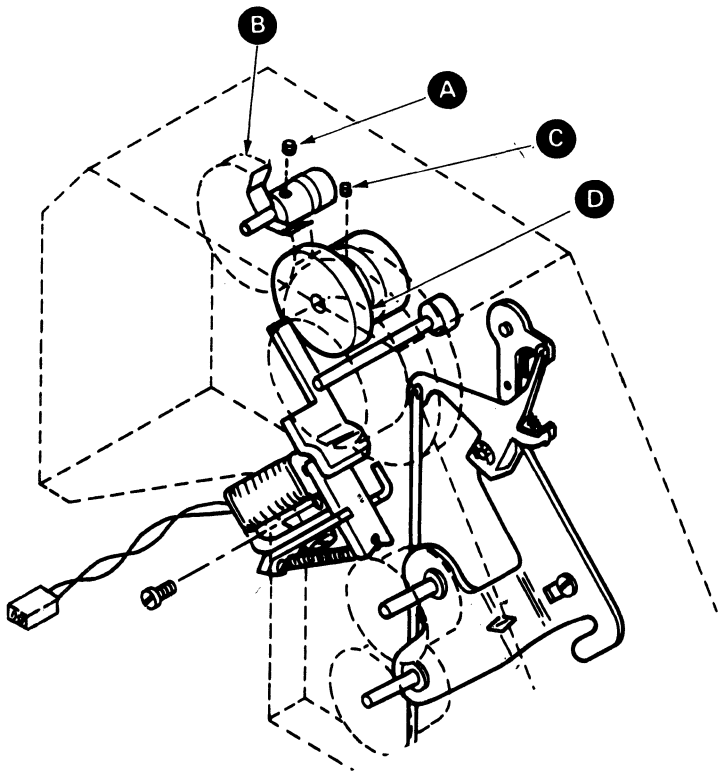


EXIT MECHANISM

770 RATCHET

Removal and Replacement

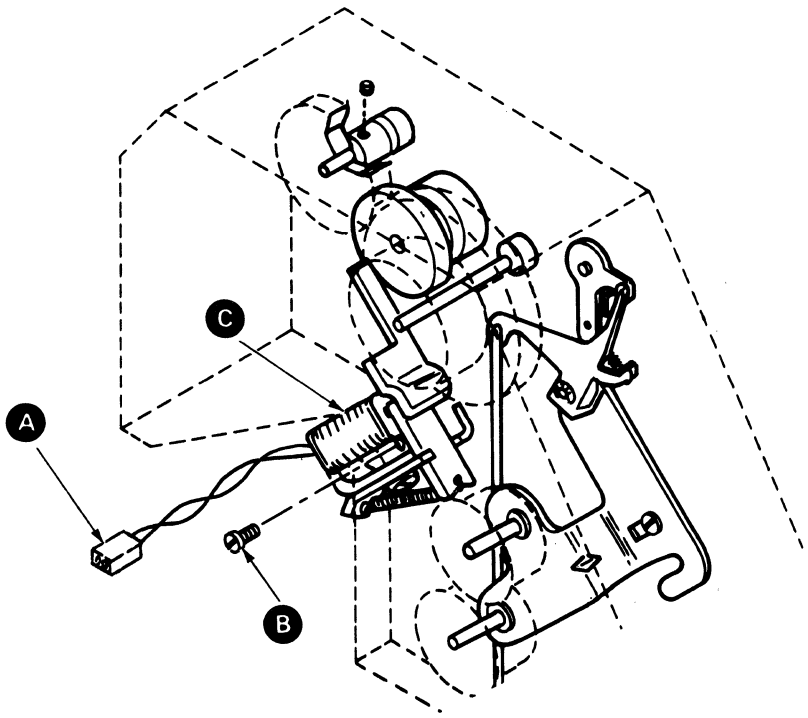
1. Power off.
2. Remove the center cover (762).
3. Remove the sequencer pulley (773, steps 3, 4, and 5).
4. Loosen the sequencer gear setscrew (A).
5. Remove the sequencer gear (B).
6. Loosen the ratchet setscrew (C).
7. Remove the ratchet (D).
8. For replacement of the ratchet, reverse steps 3 through 7. Reset the end play of the sequencer gear and pulley shafts at 0.1 to 0.5 mm (0.004 to 0.020 inches).
9. Perform the ratchet adjustment (743), and check the drive wheel and roller adjustment (744).
10. Reinstall the covers.



771 SEQUENCER MAGNET ASSEMBLY

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Disconnect the sequencer magnet assembly cable (A) from the sheet-feed analog card connector J3 (705).
4. Remove the sheet-feed analog card support screw (763 B, step 4).
5. Remove the sequencer magnet assembly screw (B).
6. Remove the sequencer magnet assembly (C).
7. For replacement of the sequencer magnet assembly, reverse steps 3 through 9.
8. Perform the sequencer magnet assembly adjustment (742).
9. Reinstall the left side cover.



This page is left blank intentionally.

772 SEQUENCER CYLINDERS

Removal and Replacement

1. Power off.

2. Remove the center cover (762).

3. Remove the sequencer pulley (773, steps 3, 4, and 5).

4. Remove the ratchet (770, steps 4, 5, 6, and 7).

5. Remove the four stripper plate support screws (A).

6. Remove the three sequencer assembly (B) support screws from the right side.

7. Remove the complete sequencer assembly.

8. For replacement of the sequencer assembly, reverse steps 3 through 9. Center the stripper plate upper screws in their slots to insure adequate spring load against the paper clamp.

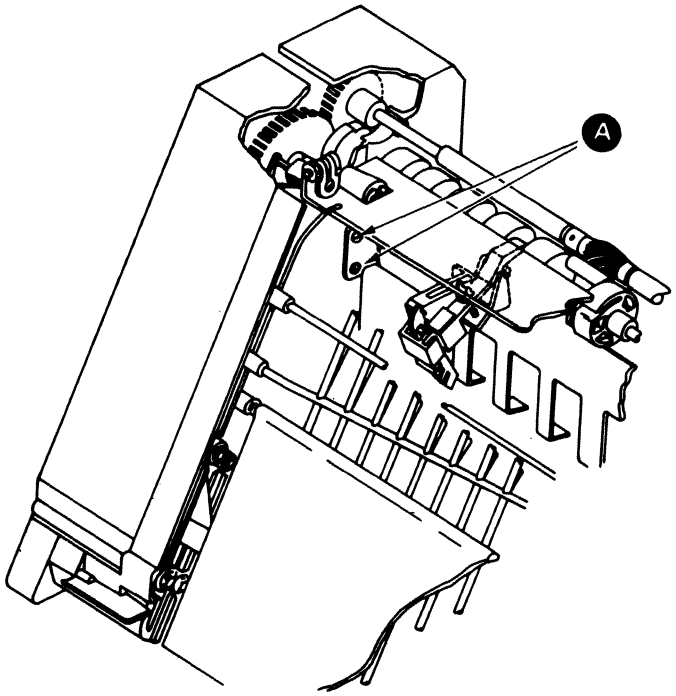
9. Perform the following adjustments in order:

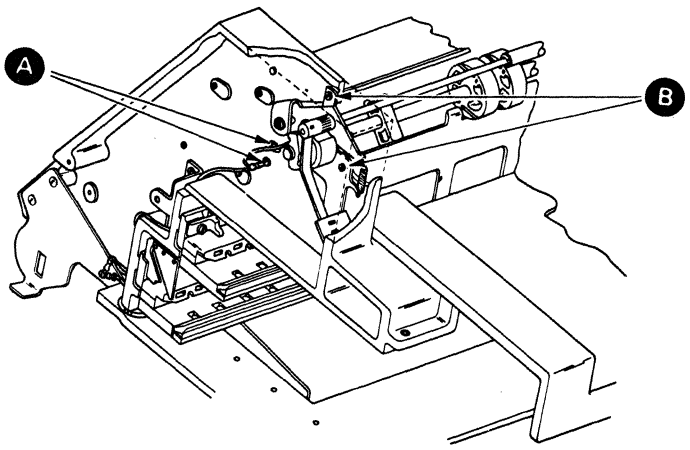
   a. Sequencer cylinders (740)
   b. Ratchet (743)
   c. Drive wheel and roller (744)
   d. Gate downstop (745).

10. Check the following adjustments:

    a. Upper kick roller (740)
    b. Reed switch (741)
    c. Gate cam (746)
    d. Gate (748)
    e. Sequencer pulley shaft and sequencer gear shaft end play (770, step 8).

11. Reinstall the covers.

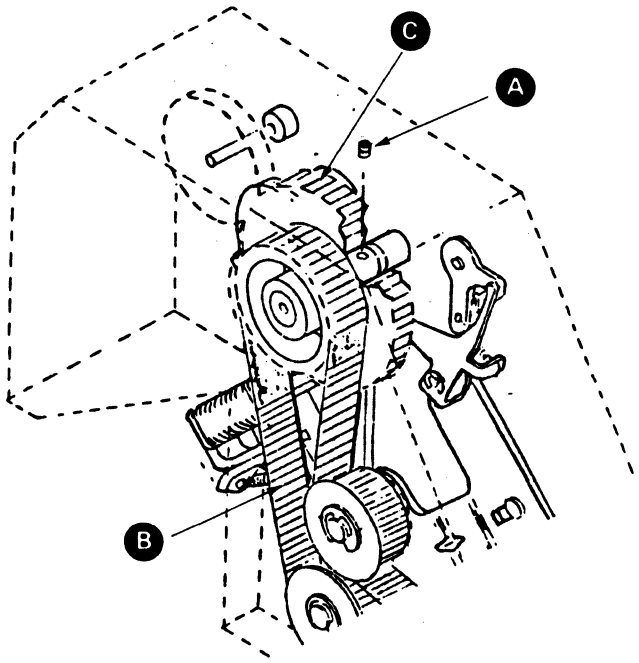

A


A
B

773 SEQUENCER PULLEY

Removal and Replacement

1. Power off.
2. Remove the center cover (762).
3. Remove the sheet-feed analog card support screw (763 B, step 4).
4. Loosen the sequencer pulley setscrew (A).
5. Remove the timing belt (B) from the sequencer pulley.
6. Remove the sequencer pulley (C).
7. For replacement of the sequencer pulley, reverse steps 3 through 5. Set the shaft end play at 0.1 to 0.5 mm (0.004 to 0.020 inches).

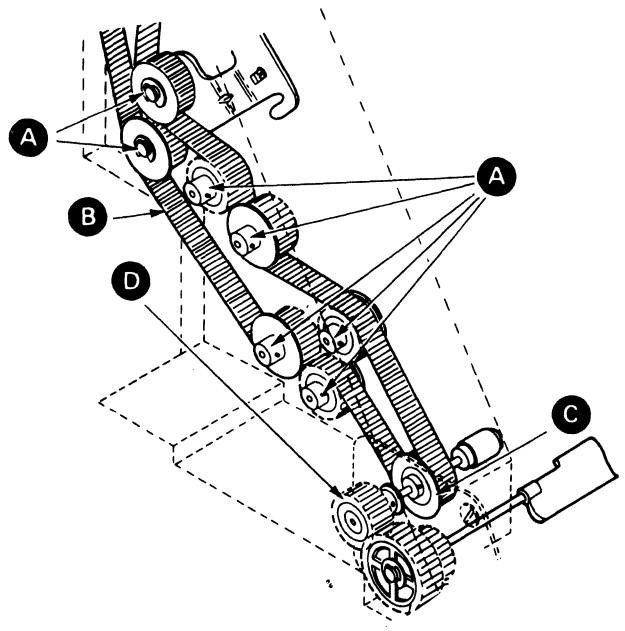


774 PULLEY

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Remove the sheet-feed analog card support screw (763 B, step 4).
4. Remove the pulley (A) C-clip or setscrew.
5. Remove the timing belt (B).
6. Remove the pulley.
7. For replacement of the pulley, reverse steps 3 through 6.
8. If the pulley was held by a C-clip, lubricate the stud with IBM number 23 grease.
9. Reset the shaft end play (730).

Note: If the lower drive pulley (C) is to be removed, the lower drive gear (D) must be removed. The shaft end play (730) must be reset with the lower drive pulley (C) and not with the lower drive gear (D).

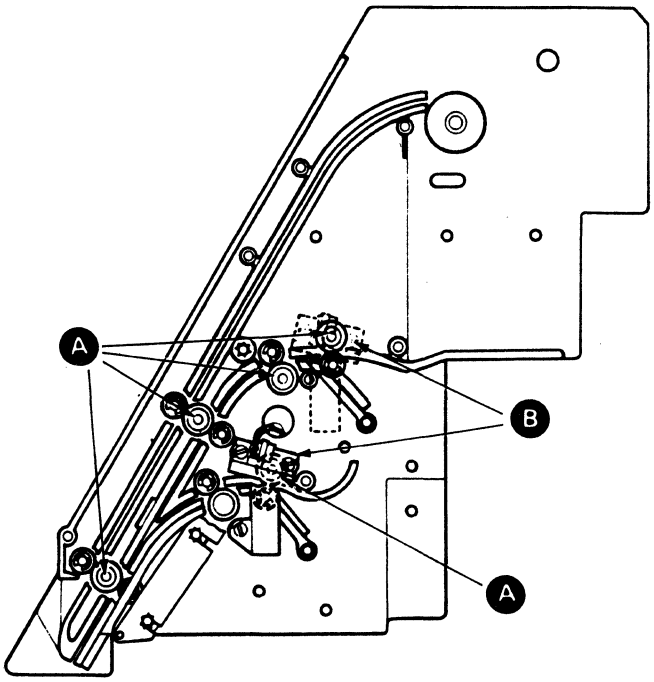


775 CONE ROLLER

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Remove the sheet-feed analog card support screw (763 B, step 4).
4. Remove the pulley (774) from the shaft of the cone roller (A) that is to be removed.
5. Remove the cone roller by pushing the shaft to the right side.
6. For replacement of the cone roller, reverse this procedure, resetting the shaft end play (730).

Note: Some cone rollers need the sensor housing (B) (729) and/or the racks removed (780).



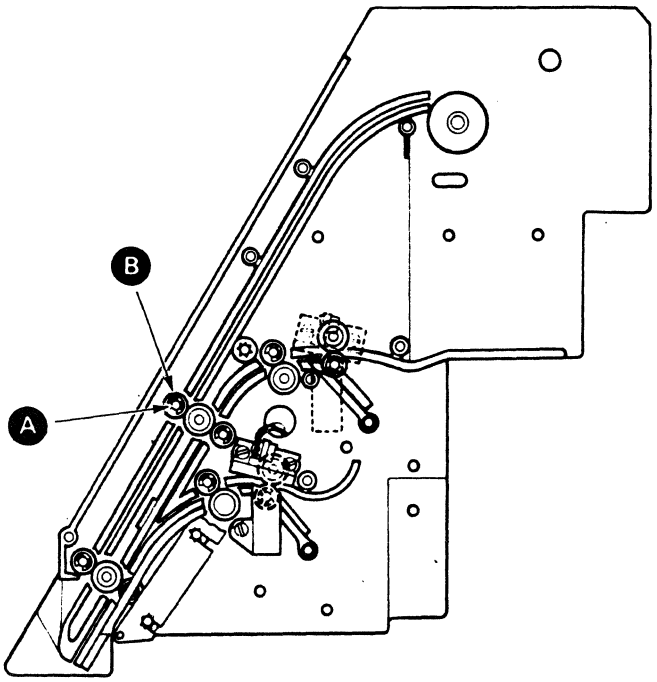
776 BACK-UP ROLLER, ROCKER ASSEMBLY AND SENSOR BACK-UP GUIDE

Removal and Replacement

1. Power off.
2. Remove any necessary racks (780).
3. Remove the C-clip (A) retaining the back-up roller (B).
4. Remove back-up roller.

   Note: If the back up rollers touching cone rollers C3 or C6 (701) are not to be replaced, then skip to step 11.

5. Remove the left side cover (760).
6. Remove the sheet-feed analog card support screw (763 B, step 4).
7. Remove the timing belt (701).
8. Remove pulleys P2 and P3, or P5 and P6 (701).
9. Remove the back-up roller rocker assembly (701).
10. Remove the sensor back-up guide (729).
11. For replacement of the back-up roller rocker assembly and sensor back-up guide, reverse steps 3 through 10.



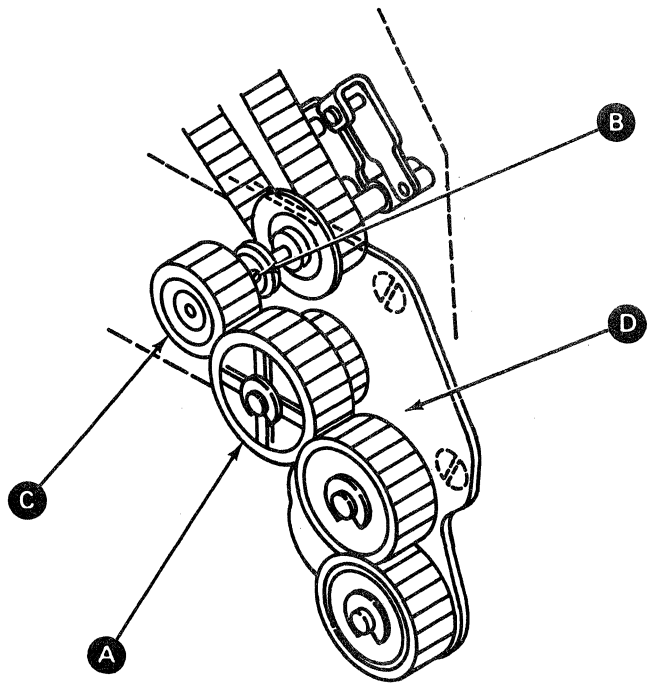
777 LEFT SIDE MOUNTING PLATE

Note: Do not adjust the mounting plates. They are preset at the factory.

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Remove the ground strap.
4. Remove the gear guard.
5. Scribe around the mounting plate.
6. Remove the setscrew (B) from the lower drive gear (C), and remove the lower drive gear.
7. Remove the three screws from the mounting plate (D), and remove the plate.
8. Install the mounting plate and mounting plate screws. Ensure that the mounting plate aligns with the scribe marks.
9. Reinstall the lower drive gear so that it engages with the cluster idler gear (A).
10. Reinstall the gear guard, ground strap, and left side cover.

ART TAG AU101983

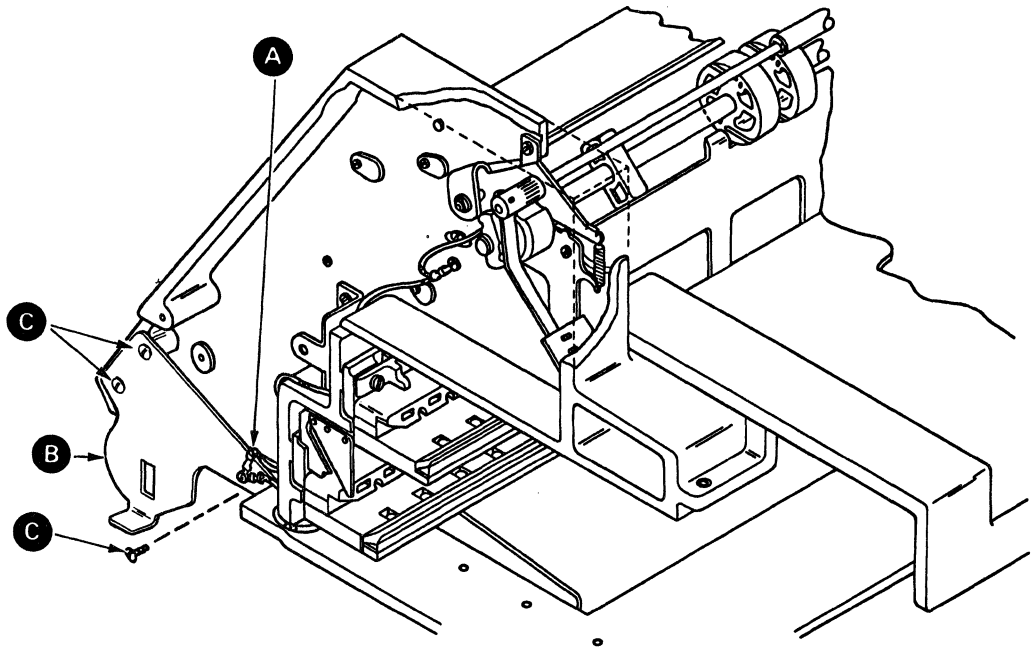


778 RIGHT SIDE MOUNTING PLATE

Note: Do not adjust the mounting plates. They are preset at the factory.

Removal and Replacement

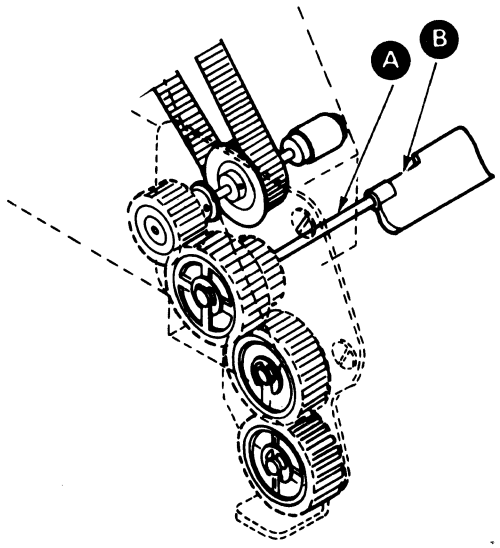
1. Power off.
2. Remove the right side cover (761).
3. Remove the ground straps (A) from the mounting plate (B).
4. Scribe around the mounting plate.
5. Remove the three mounting plate screws (C).
6. Remove the mounting plate.
7. Install the mounting plate and mounting plate screws. Ensure that the mounting plate aligns with the scribe marks.
8. Reinstall the ground straps.
9. Reinstall the right side cover.



779 MANUAL PAPER INSERTION DEFLECTOR

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Remove the left side mounting plate (777).
4. Remove the C-clip and spring from the deflector shaft (A).
5. Remove the manual paper insertion deflector (B).
6. For replacement of the manual paper insertion deflector, reverse this procedure.

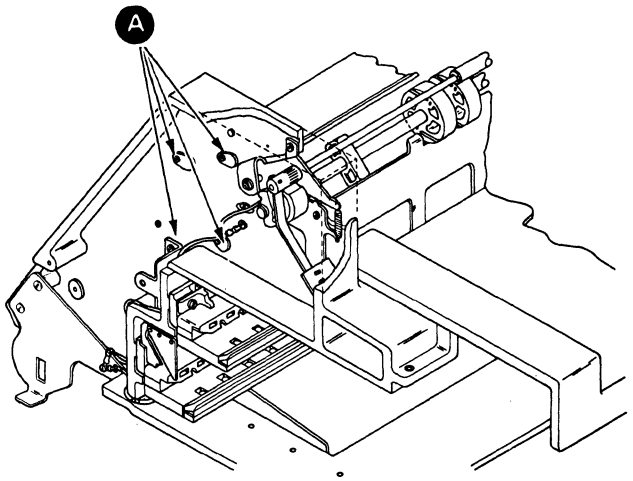


780 RACKS

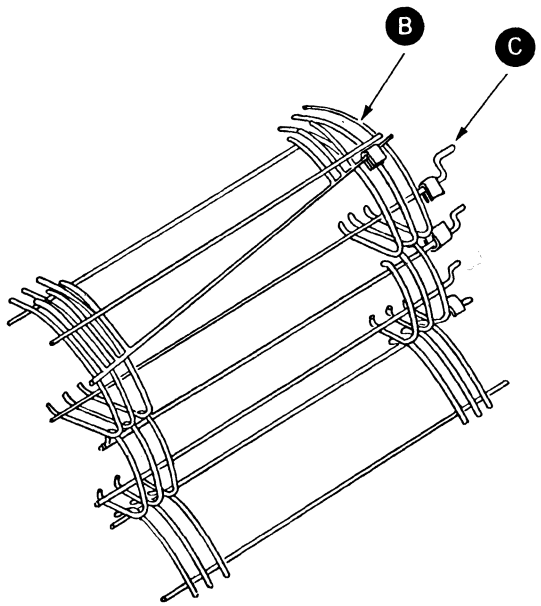
Removal and Replacement

1. Power off.
2. Remove the right side cover (761).
3. If the racks are metal, remove the ground straps.
4. Remove the rack mounting screw and the mount (A).
5. Remove the rack by sliding it to the right.
6. For replacement of the rack, reverse steps 3 through 5.
7. Check the lower inner rack adjustment (731).
8. Reinstall the right side cover.

Note: To remove the upper inner rack (C), the upper outer rack (B) must be removed first.



AU102591

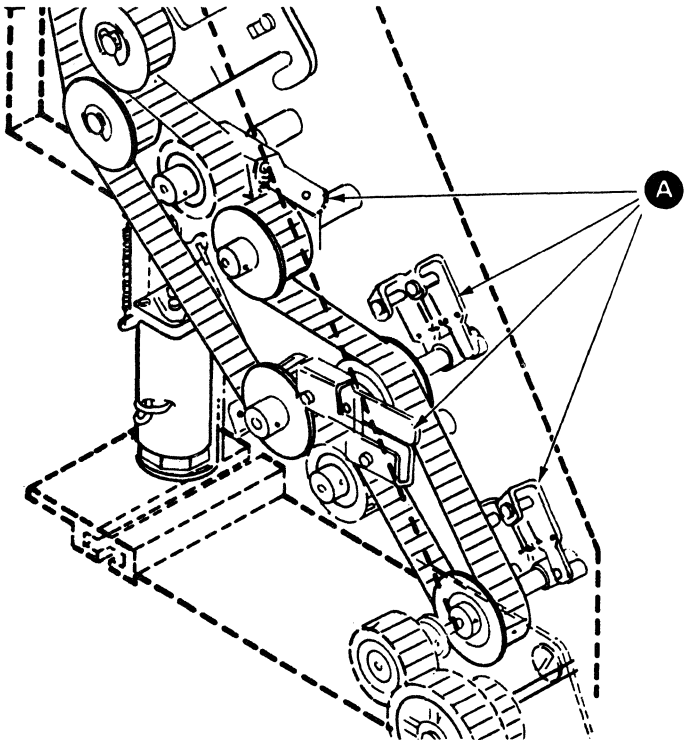


AU102592

781 ROCKER

Removal and Replacement

1. Power off.
2. Remove the left side cover (760).
3. Remove the sheet-feed analog card support screw (763 B, step 4).
4. Remove the timing belt and any necessary pulleys (774).
5. Remove the necessary back up roller (776).
6. Remove the rocker (A).
7. For replacement of the rocker, reverse this procedure.



782 CABLE ROUTING

- The reed switch cable is routed from the reed switch through the clearance hole, above the upper paper sensor, in the aligner block. From the clearance hole the reed switch cable goes though the clamp, located behind the gate latch link, under the sequencer magnet, and around the back of the sheet-feed analog card to connector J1.

- The lower paper sensor is routed from the sensor to the clearance hole directly above the lower paper sensor. From the clearance hole the lower paper sensor cable is routed vertically under the idler bracket to the cable clamp, located behind the gate latch. From the clamp the lower paper sensor cable goes under the sequencer magnet and around the back of the sheet-feed analog card to connector J2.

- The sequencer magnet cable is routed around the back of the sheet-feed analog card to connector J3.

- The upper paper sensor is routed from the sensor through the clearance hole and toward the front of the sheet-feed to the idler bracket. It then goes around and under the idler bracket to the cable clamp. From the clamp the upper paper sensor cable goes under the sequencer magnet and around the back of the sheet-feed analog card to connector J4. Excess cable can be looped around the tab at the bottom of the idler bracket.

- The picker/separator cables go directly from the picker/separator filter boards to connector J5 on the sheet-feed analog card. The 2-pin connector marked 8 plugs in the lower picker/separator motor filter board. The 2-pin connector marked 9 plugs in the upper picker/separator motor filter board.

- The second sheet restraint solenoid cable goes from the solenoid behind its spring tab, and up the back edge of the aligner block to the cable clamp. From the clamp the solenoid cable goes under the sequencer magnet and around the back of the sheet-feed analog card to connector J6.

SHEET-FEED PREVENTIVE MAINTENANCE

No scheduled preventive maintenance is needed for the sheet-feed. Preventive maintenance is performed at the time of a service call.

Lubrication should be used only in quantities enough to lubricate the specified area.

Ensure that the lubricant does not touch the picker/separator, paper trays, paper paths, sheet-feed analog card, or the rubber part of the cone rollers or drive wheel.

Lubrication should only be used at the first installation and as necessary to any of the following hardware.

Use IBM number 23 grease for:

- All gear shafts
- All spring contact points (except picker/separators springs)
- All clevis contact points
- Gate latch pivot stud
- Gate latch/latch plate contact point
- Trip spring/drive wheel contact point
- Second sheet restraint solenoid plunger/upper bell crank attachment point
- Ratchet surface
- Timing belt idler pulley studs
- Gear studs on the left mounting plate
- Back up roller arm pivot studs.

Use IBM number 10 oil for:

- Cone roller shafts
- Back-up roller shafts.

SHEET-FEED THEORY

INTRODUCTION

The sheet-feed is an automatic cutsheet paper feed mechanism that can be installed or removed from the printer.

The sheet-feed automatically supplies paper both lengthwise and sideways from either paper supply tray. If more than one page is being printed, the sheet-feed will sequence the pages in correct order in the output paper tray.

The control and status signals plus the voltages are supplied by a cable from the printer.

When mounted on the printer, the sheet-feed does the following:

- Supports paper length ranges from a minimum of 197 mm (7.75 inches) to a maximum of 364 mm (14.33 inches) and width ranges from a minimum of 148 mm (5.83 inches) to a maximum of 297 mm (11.69 inches).

- Has two separate paper supply trays, each containing a maximum stack of paper 28 mm (1.1 inches) high, approximately 200 sheets, of 754gm/m^2 (20 lb.) paper.

- Has sensors to sense when the paper supply trays are empty or when there is a paper jam.

SHEET-FEED OPERATION SUMMARY

The circuits used to drive the electromechanical devices and sensors are contained on one analog card located in the sheet-feed.

The circuits include two photo detector circuits, two solenoid drive circuits, and two dc motor drive circuits. The voltages present on the sheet-feed analog card are +5 Vdc, +12 Vdc, and +36 Vdc and are supplied by the power supply located in the printer.

Test points are supplied to measure all voltage and signal lines at the connectors without removing the connectors.

The sensing circuits power two reflective sensors (one for each paper path) that sense the paper in the paper path. This information is monitored by the printer.

The solenoids and motors are driven by +36 Vdc. The drive circuits take a logic level signal to activate devices that drive the solenoids and motors. In the case of the picker/separator motors and second sheet restraint solenoid, the logic signals are controlled by the printer.

The paper sequencer logic level is determined internally in the sheet-feed by the opening and closing of a reed switch. This reed switch is used to sense the paper entry into the sequence mechanism. This sensor is also used in sensing a paper jam in the output path between the platen and the sequencer mechanism.

Sheet-Feed Analog Card J7 Pin	Signal Name	Printer Attachment Panel Connector Pin
1	Not Used	
2	Motor GND	4,10
3	Logic GND	1,7
4	+12 Vdc	16
5	+36 Vdc	19
6	SF*	8
7	APOR*	14
8	R2MO*	3
9	R1MO*	2
10	SFCUR	15
11	H2S	18
12	H1S	17
13	+5 Vdc	13
14	GND	6
	TF*	9

* Not (negative logic) signals

SIGNALS

The sheet-feed control signals are:

SF* - SHEET-FEED ATTACHED This signal goes low when the sheet-feed cable has been correctly plugged into the printer. No sheet-feed operations can be activated unless this signal is in the correct condition.

H1S, H2S - PAPER SENSORS 1 AND 2 These signals are the increased outputs of two reflective type LED/phototransistors that sense paper in the two input paper paths. The sensors are located in line with the first cone roller in their respective input paper paths. Paper entering the sensor means the picking/separating process is completed, and the picker/separator motor and the second sheet restraint solenoid must be turned off.

SFCUR - CURRENT SENSE This signal goes high when either picker/separator motor or either solenoid (second sheet restraint solenoid or sequencer magnet) is energized. It may diagnose a problem with the motors, solenoids, or drive circuits.

R1MO*, R2MO* - PICKER/SEPARATOR 1 AND 2 Either signal going low activates the comparable picker/separator motor and the second sheet restraint solenoid. The motor is turned on at the start of a sheet-feed insert cycle. It picks the top sheet off the selected input paper tray and transports it to the point where the comparable paper sensor (H1S or H2S) senses it. Once the paper is sensed by the paper sensor, the picker/separator motors are deactivated. No motor should be on for more than 8 seconds. Both motors may not be activated at the same time.

The second sheet restraint solenoid is activated when either picker/separator motor is activated. When active, the solenoid moves both restraint pawls from the input paper paths (upper and lower) and lets the top sheet from either input stack enter the cone rollers. When deactivated, the spring loaded pawls enter the input paths and prevent a second sheet from being sent with the first.

APOR* POWER ON RESET This signal should be low until full power has been supplied to the sheet feed analog card. It then should go high for normal operation. When this line is low the sheet-feed is not active.

PICKER/SEPARATOR MECHANISM

There is a picker/separator mechanism for each paper tray, but only one motor can be on at any time.

In the following text, all reference is made to the lower picker/separator mechanism; however, the upper picker/separator mechanism operates exactly the same. Only the signal names are different.

The picker/separator motor is used to drive a leadscrew through a friction coupling. The picker/separator wheel moves on the leadscrew.

The picker/separator motor is turned on when it receives a logic low level signal (R1MO*) from the printer. This signal is located at J7 pin 9 of the sheet-feed analog card.

When the picker/separator motor is turned on, the picker/separator wheel and its rollers rotate and drive the top sheet from the paper tray. When the top sheet has been driven into the paper path, the picker/separator motor is turned off. This occurs when the logic level signal R1MO* is high.

When the picker/separator motor is turned off the picker/separator wheel momentarily moves up the leadscrew, decreasing the chance of a double feed.

Once the picker/separator motor is turned on, paper must be sensed in the paper path in 8 seconds. If paper sensing does not occur the picker/separator motor is turned off, with the assumption that there is no paper in the paper tray or a paper feed failure occurred.

SECOND SHEET RESTRAINT MECHANISM

The second sheet restraint solenoid works with the picker/separator motors. The second sheet restraint solenoid is activated when either picker/separator motor is activated.

When activated, the second sheet restraint solenoid moves both restraint pawls from the input paper paths and lets the top sheet in the paper tray enter the cone rollers.

When deactivated, the spring loaded restraint pawls enter the input paper paths to prevent a second sheet from being sent with the first sheet.

PAPER SENSORS

The paper sensors sense paper presence in the two input paper paths. The sensors are located in line with the first cone roller in each input paper path. Paper sensed by these sensors signals that the picking/separating process is completed, and the picker/separator motor and second sheet restraint solenoid must be turned off.

In the following text, all reference is made to the lower paper sensor; however, the upper paper sensor operates exactly the same. The signal names are the only difference.

When paper is present at the lower paper sensor, light generated by the light-emitting diode (LED) is reflected by the paper back to the phototransistor. This light reflection causes the phototransistor to conduct.

The phototransistor conducting lets the signal H1S (connector J7, pin 12) go high. This signal is sent back to the printer, indicating that a sheet of paper was sensed in the paper path and the picker/separator motor can be turned off.

When paper is not present, the light generated by the LED is transmitted into a black cylinder surface and not reflected into the phototransistor. When paper is not present at the paper sensor, H2S is low.

SEQUENCER MECHANISM

The sequencer mechanism, located in the exit path, supplies the method for ejecting the printed document into the output paper tray. The mechanism contains six sequencer cylinders on a friction clutch operated shaft, a ratchet, a reed switch, a toggle clamp, a sequencer magnet, a paper gate and upper kick roller.

The paper gate is placed in its down position to guide the paper into the cylinders by a clevis being pushed up when the second sheet restraint solenoid is activated. This action releases the latch that is holding the paper gate in its upward position.

The leading edge of the paper is guided (by the paper gate) into the paper openings in the cylinders. When the paper trips the lever for the reed switch, the sequencer magnet activates, letting the friction clutch that controls the cylinders turn 180 degrees. During the rotation, a toggle clamp engages the paper and holds the paper in the openings.

After the sequencer cylinders are turned 180 degrees the ratchet latches, stopping the ratchet and the sequencer cylinders from turning. The remainder of the paper is driven out over the clamped leading edge by the upper kick roller.

The leading edge of the paper remains in the sequencer cylinders until the next sheet enters the sequencer mechanism. As the cylinders start to turn, the first sheet is stripped out of the openings by the stripper plate and placed face down in the output paper tray.

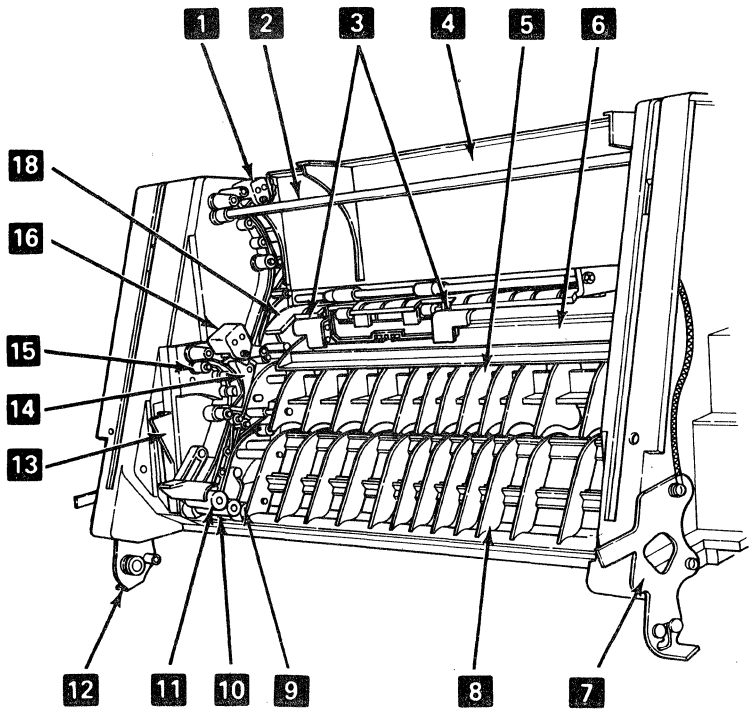
If the reed switch remains closed for longer than 2.5 seconds, the sequencer magnet will deactivate.

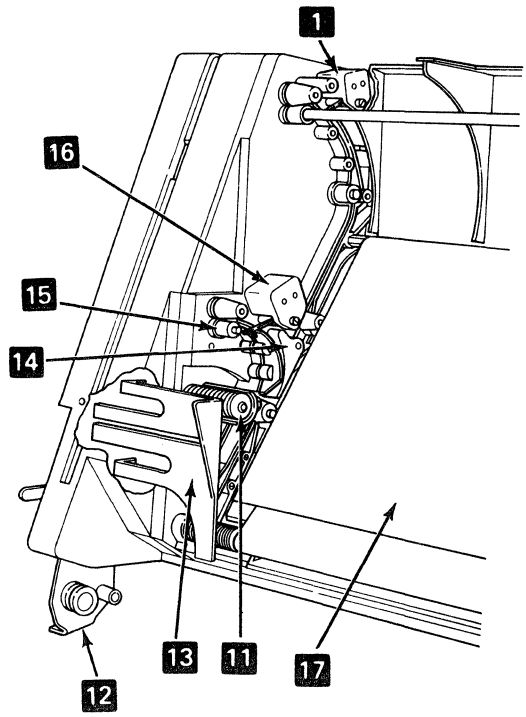
CHAPTER 8. FRONT EXIT SHEET-FEED MAINTENANCE

FRONT EXIT SHEET-FEED LOCATIONS

800 FRONT LOCATIONS

1. Envelope exit switch
2. Support rod
3. Envelope sensor switches
4. Deflector
5. Middle rack
6. Upper rack
7. Right mounting plate
8. Lower rack
9. Lower pressure drive roller
10. Drive roller CP6
11. Upper pressure drive roller
12. Left mounting plate
13. Manual paper insertion deflector
14. Diverter
15. Eject back up roller
16. Paper exit switch
17. Splitter
18. Envelope Tray Guide

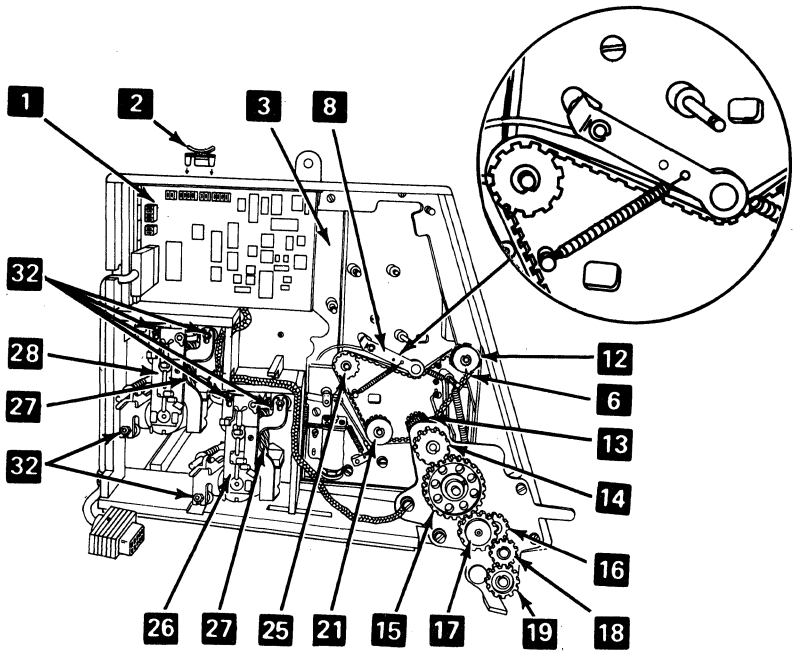




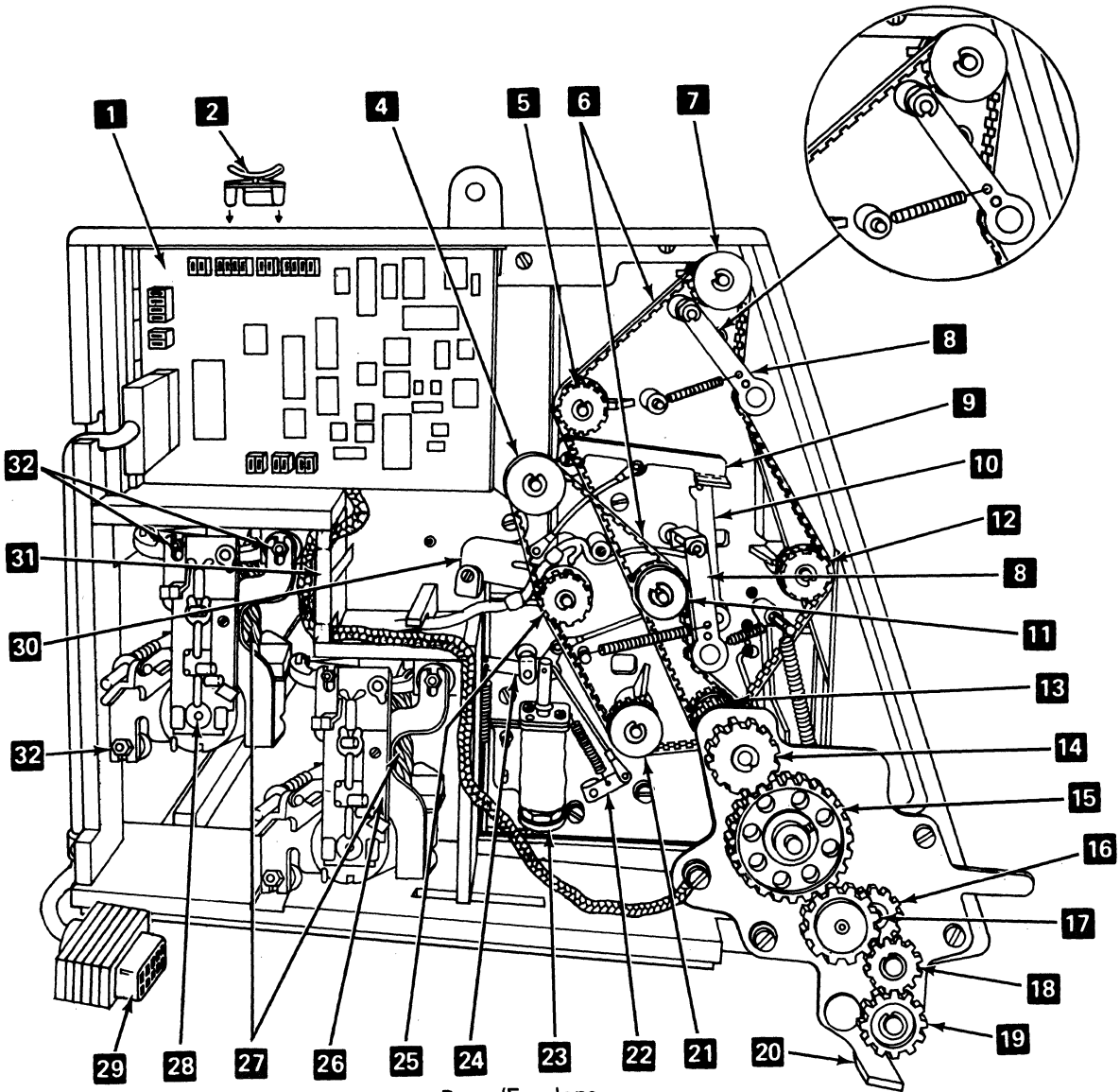
801 LEFT SIDE LOCATIONS

1. Front exit sheet-feed analog card
2. Analog card retainer
3. Analog card safety shield (Paper only)
4. Pulley P6
5. Pulley P7 (10 tooth pulley)
6. Drive belts
7. Pulley P8 (10 tooth pulley)
8. Idler bracket assemblies
9. Diverter latch
10. Diverter arm
11. Pulley P4 (10 tooth pulley)
12. Pulley P5
13. Double drive pulley P1
14. Gear G6
15. Gear G5
16. Gear G3
17. Compound gear G4
18. Gear G2
19. Gear G1
20. Left mounting plate assembly
21. Pulley P2
22. Lower bellcrank
23. Second sheet restraint solenoid
24. Upper bellcrank
25. Pulley P3
26. Picker/separator 1 (lower)
27. Picker/separator leadscrew
28. Picker/separator 2 (upper)
29. Sheet-feed attachment cable
30. Knock-off bellcrank
31. Cable retainer
32. Picker/separator mounting nuts

(Continued on page 8-3 and 8-4)



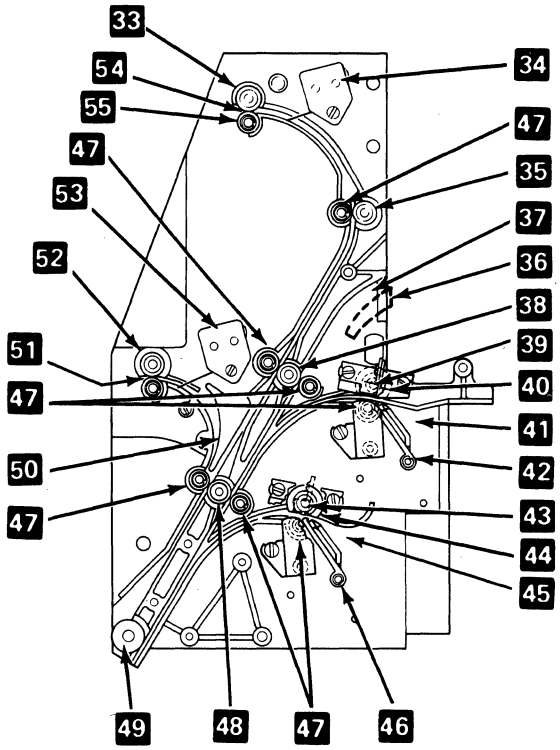
Paper Only



Paper/Envelope

801 Continued

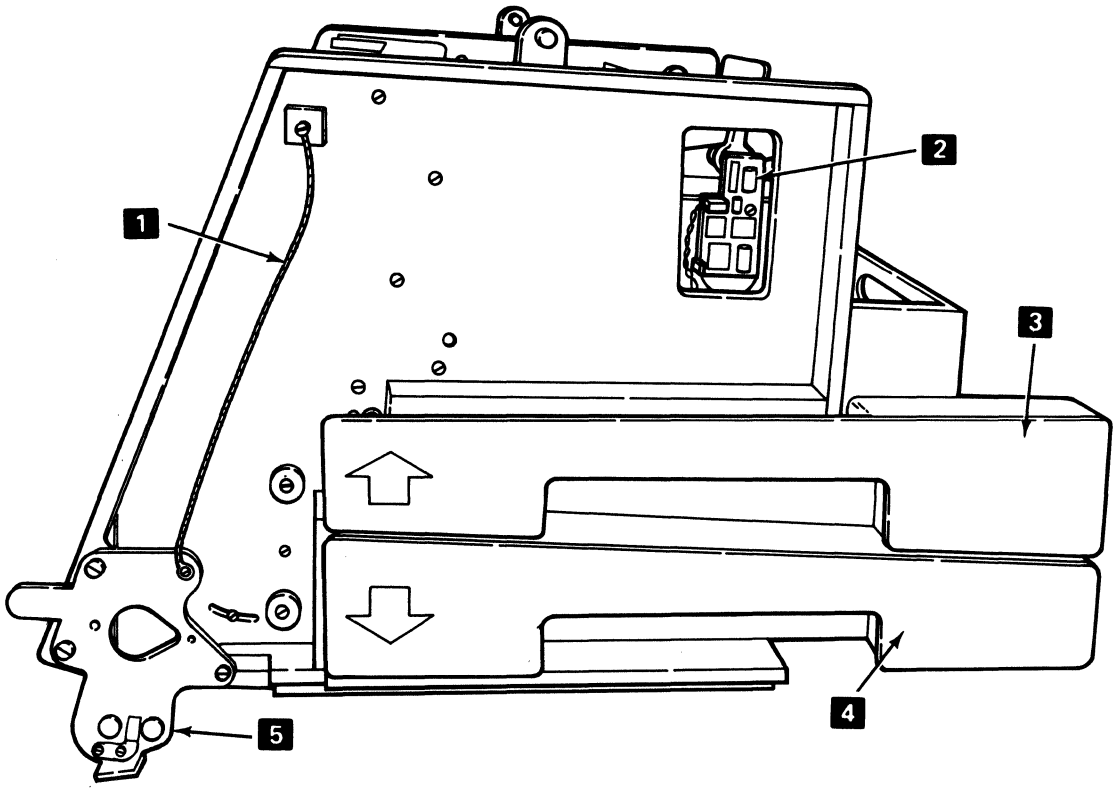
33. Cone roller CP8
34. Envelope exit switch
35. Cone roller CP7
36. Envelope hopper guide (part of the envelope hopper 804)
37. Envelope input path
38. Cone roller CP4
39. Paper sensor 2 (upper)
40. Cone roller CP3
41. Upper input paper path
42. Upper second sheet restraint pawl
43. Paper sensor 1 (lower)
44. Cone roller CP2
45. Lower input paper path
46. Lower second sheet restraint pawl
47. Back-up rollers
48. Cone roller CP1
49. Drive roller CP6
50. Diverter
51. Paper exit path
52. Cone roller CP5
53. Paper exit switch
54. Envelope exit path
55. Envelope output back up roller



Block Assembly
Right Side View

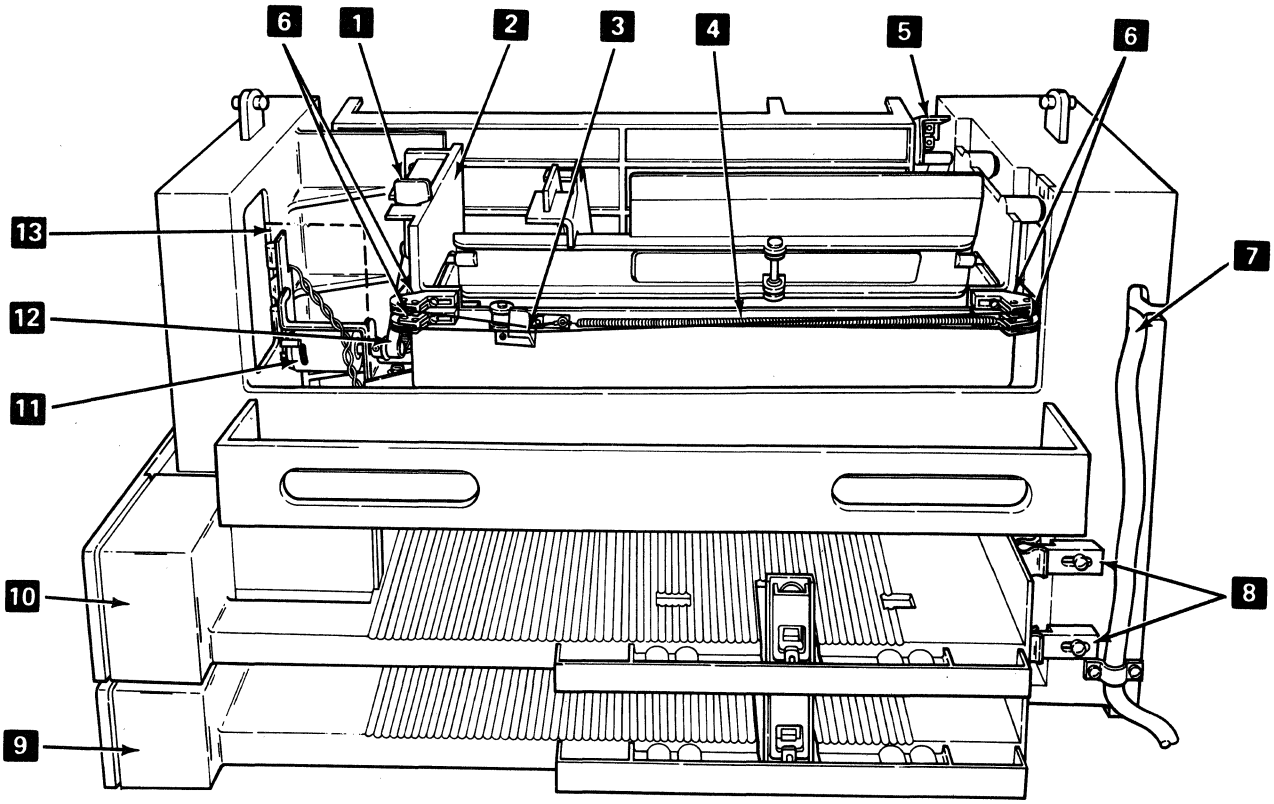
802 RIGHT SIDE LOCATIONS

1. Ground strap
2. Envelope motor filter board
3. Upper paper tray
4. Lower paper tray
5. Right mounting plate



803 BACK LOCATIONS

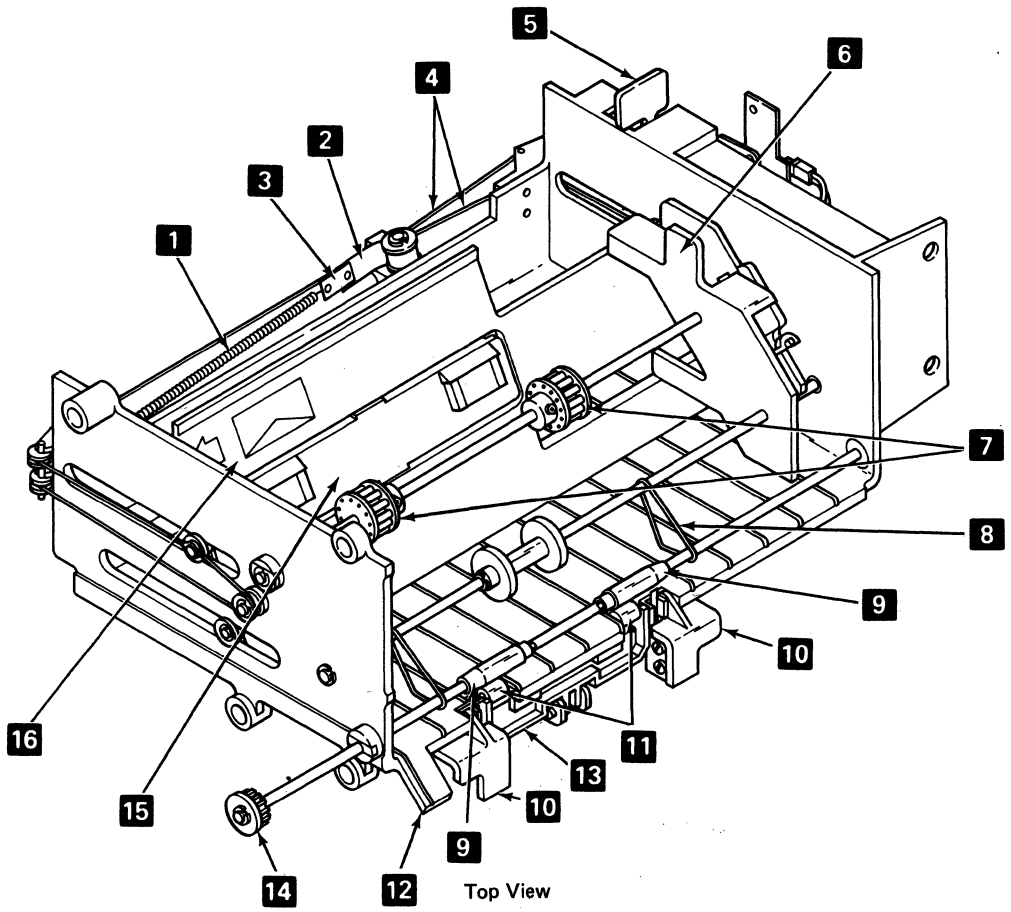
1. Envelope pressure plate release lever
2. Envelope hopper
3. Pressure cable flat spring
4. Pressure cable spring
5. Envelope exit switch
6. Envelope hopper pulley brackets
7. Sheet-feed attachment cable
8. Paper tray detents
9. Lower paper tray
10. Upper paper tray
11. Envelope drive motor
12. Envelope motor drive belt
13. Envelope motor shield



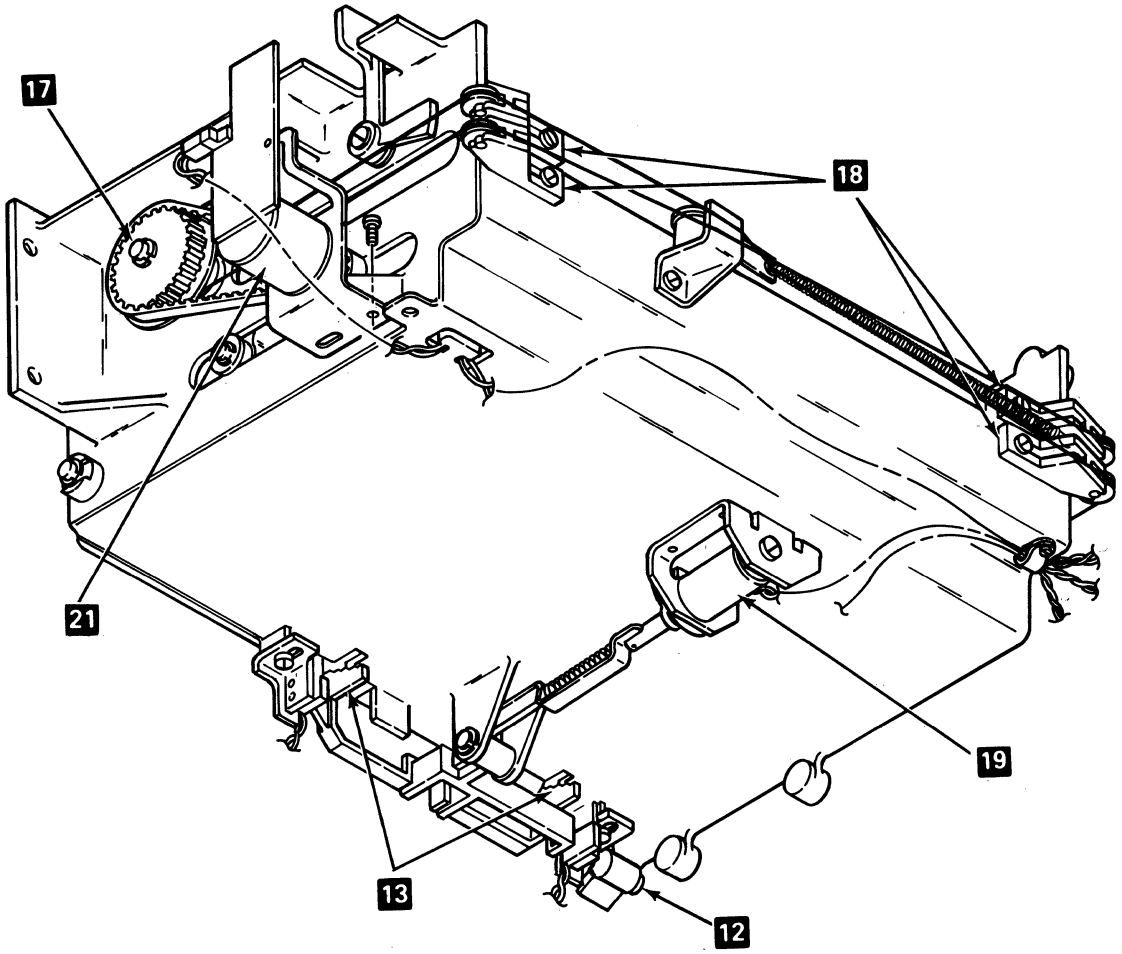
This page left blank intentionally.

804 ENVELOPE HOPPER LOCATIONS

1. Pressure cable spring
2. Pressure cable flat spring
3. Spring connector
4. Pressure cable
5. Pressure plate release lever
6. Envelope side restraint
7. Drive wheel assembly
8. Wire guides
9. Feed rollers
10. Sensor switches
11. Back-up rollers
12. Envelope hopper guide
13. Second envelope restraint bracket
14. Pulley P6
15. Wobble plate
16. Pressure plate
17. Drive pulley
18. Envelope hopper pulley brackets
19. Second envelope restraint solenoid
20. Envelope drive motor assembly



Top View

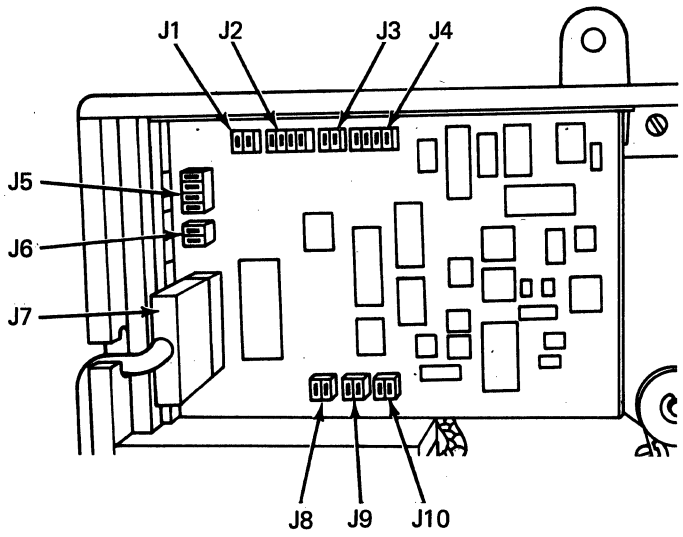

17
18
21
19
13
12

805 ANALOG CARD CONNECTIONS AND PAPER HANDLING CABLE

Analog Card Connector	Pin Number	Pin Name	Destination
J1	1 2	Paper exit + Paper exit -	Paper exit switch
J2	1 2 3 4	LED1+ LED1- Phototransistor 1+ Phototransistor 1-	Lower paper tray sensor
J3	1 2	SER Solenoid + SER Solenoid -	Second envelope restraint solenoid
J4	1 2 3 4	LED2+ LED2- Phototransistor 2+ Phototransistor 2-	Upper paper tray sensor
J5	1 2 3 4	DC Motor 1 + DC Motor 1 - DC Motor 2 + DC Motor 2 -	Picker/separator motors
J6	1 2	SSR Solenoid + SSR Solenoid -	Second sheet restraint solenoid
J7	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	AF Analog ground Logic ground +12 Vdc +36 Vdc SF* APOR* R2MO* R1MO* SFCUR H2S H1S +5 Vdc TF* Ground Ground	Paper handling cable

* Not (negative logic) signal

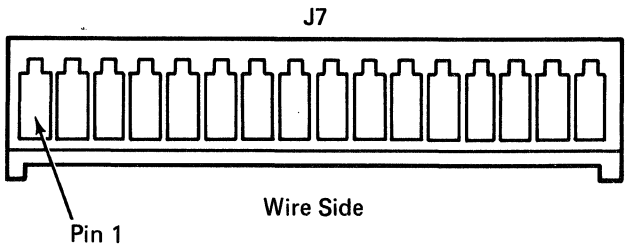
Analog Card Connector	Pin Number	Pin Name	Destination
J8	1 2	Envelope Motor + Envelope Motor -	Envelope motor
J9	1 2	Envelope exit Switch + Envelope Exit Switch -	Envelope exit switch
J10	1 2	Envelope Tray + Envelope Tray -	Envelope sensor switch



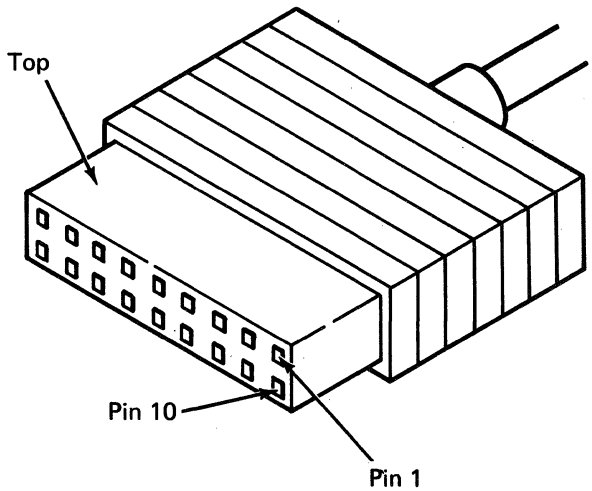
Front Exit Sheet-Feed Attachment Cable

Front Exit Sheet-Feed Analog Card J7 Pin	Signal Name	Printer Attachment Panel Connector Pin
1	AF (alternate feed)	1
2	GNDA (analog ground)	16
3	GNDL (logic ground)	10
4	+12 Vdc	18
5	+36 Vdc	14
6	SF* (- sheet-feed sense)	7
7	APOR* (- analog POR)	17
8	R2MO* (- P/S motor 2)	4
9	R1MO* (- P/S motor 1)	5
10	SFCUR (+ sheet-feed BAT passed	6
11	H2S (+ paper tray 2 sense)	9
12	H1S (+ paper tray 1 sense)	8
13	+5 Vdc	11
14	TF* (- tractor feed)	2
15	Frame ground	Shield
16	Ground (left mounting plate)	

* Not (negative logic) signal



Printer Attachment



FRONT EXIT SHEET-FEED ADJUSTMENTS

820 PULLEYS, BACK-UP ROLLER, AND IDLER ASSEMBLY END PLAY

Adjustment

1. Power off.
2. Remove the cover assembly (860).

   Note: All end play adjustments are made by moving the grip clip in or out on the shaft. To adjust the pulleys, press the cone roller (E) to the left.

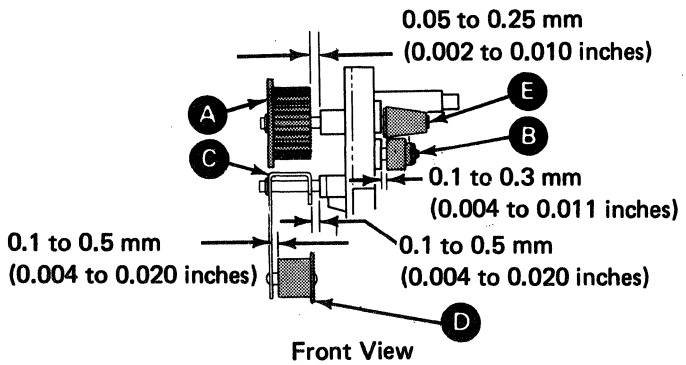
3. Adjust the pulleys (A) (801) that have cone rollers for 0.05 to 0.25 mm (0.002 to 0.010 inches) of end play.
4. Adjust the back-up rollers (B) (801) for 0.1 to 0.3 mm (0.004 to 0.011 inches) of end play.

   Note: To adjust the idler rollers, the idler bracket must be removed.

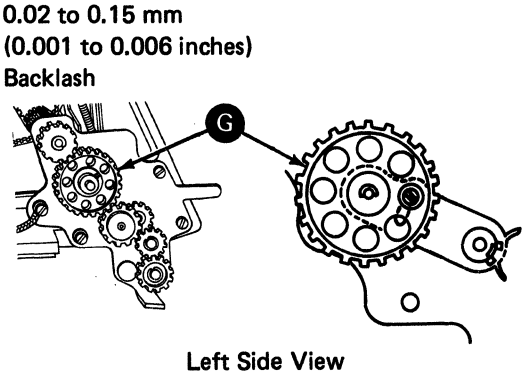
5. Adjust the idler rollers (D) for 0.1 to 0.5 mm (0.004 to 0.020 inches) of end play on the idler assembly shaft.
6. Adjust the idler bracket assemblies (C) (801) for 0.1 to 0.5 mm (0.004 to 0.020 inches) of end play.
7. Ensure that the back-up rollers turn freely when the cone rollers turn.

   Note: To adjust the idler gear, the front exit sheet-feed must be removed from the printer.

8. Remove the gear guard.
9. Adjust the idler gear (G) for 0.02 to 0.15 mm (0.001 to 0.006 inches) backlash at the tightest point. Turn the idler gear, by hand, 360 degrees to check this adjustment.
10. Reinstall the gear guard and cover assembly.
11. Reinstall the front exit sheet-feed on the printer.



Front View

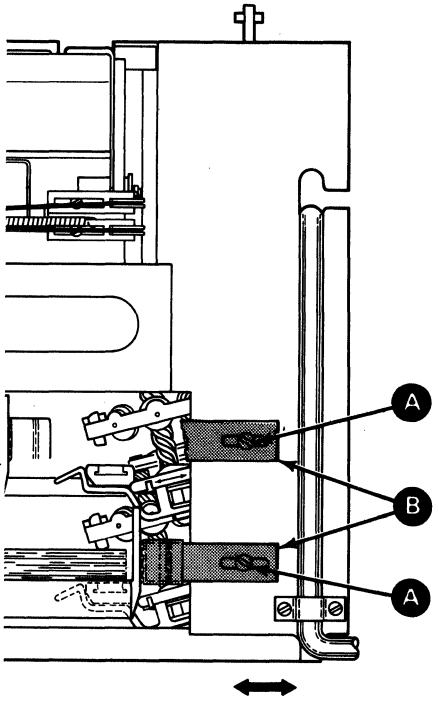


Left Side View

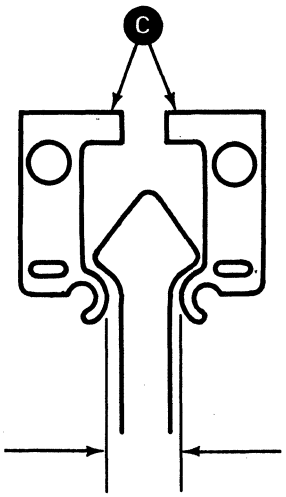
821 PAPER TRAY DETENT

Adjustment

1. Power off.
2. Loosen the two detent screws (A).
3. Adjust the paper tray detents (B), left-to-right, so that when the paper trays are installed, the paper tray brackets (C) are spread apart 4.3 to 6.0 mm (0.170 to 0.236 inches). Ensure that there is no in or out movement of the paper trays when the paper trays are installed, and that the picker/separator lift mechanism is not limiting the travel of the paper tray.



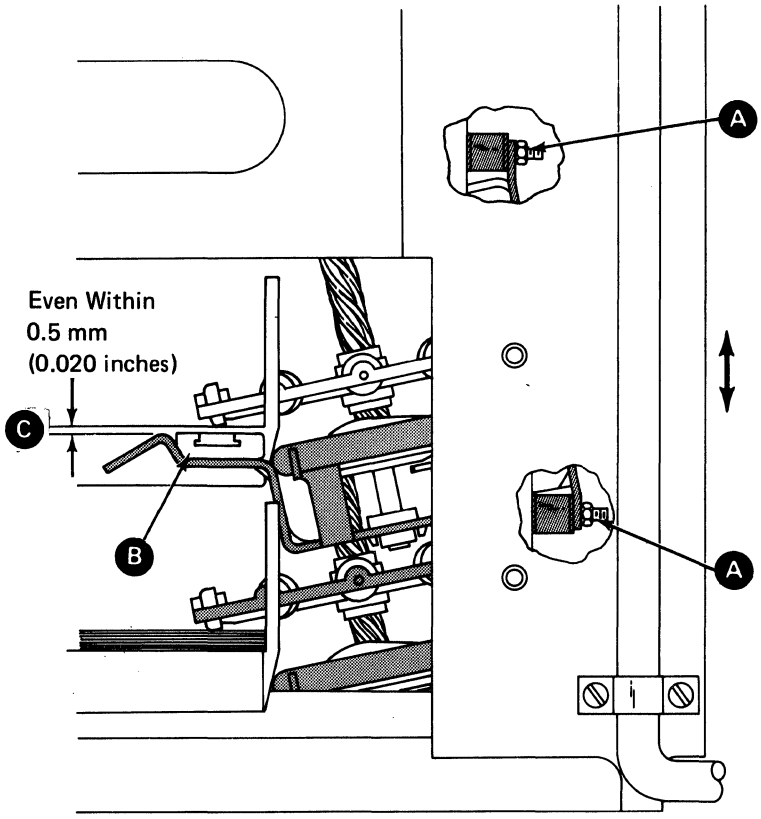
Left Rear View



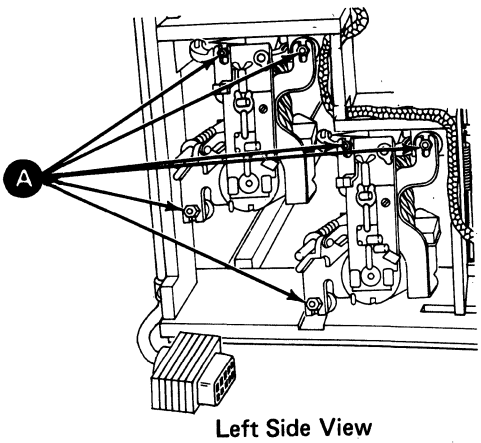
823 PICKER/SEPARATOR ASSEMBLY

Adjustment

1. Power off.
2. Remove the cover assembly (860).
3. Remove the paper from the paper trays and reinstall the paper trays.
4. Loosen the three mounting nuts (A) (801) for the picker/separator mechanism.
5. Adjust the picker/separator mechanism so that the support pad (B) and the top surface of the paper tray (C) are even within 0.5 mm (0.020 inches).
6. Tighten the three mounting nuts.
7. Reinstall the cover assembly.



Left Rear View



Left Side View

824 SECOND SHEET RESTRAINT SOLENOID ASSEMBLY

Adjustment

1. Power off.
2. Remove the cover assembly (860).
3. Remove the bellcrank return springs (H) and (I).
4. Remove the second sheet restraint solenoid (801) mounting screw (D) and remove the solenoid.
5. Loosen the second sheet restraint solenoid core locknut (A).
6. Activate, by hand, the second sheet restraint solenoid plunger (B).

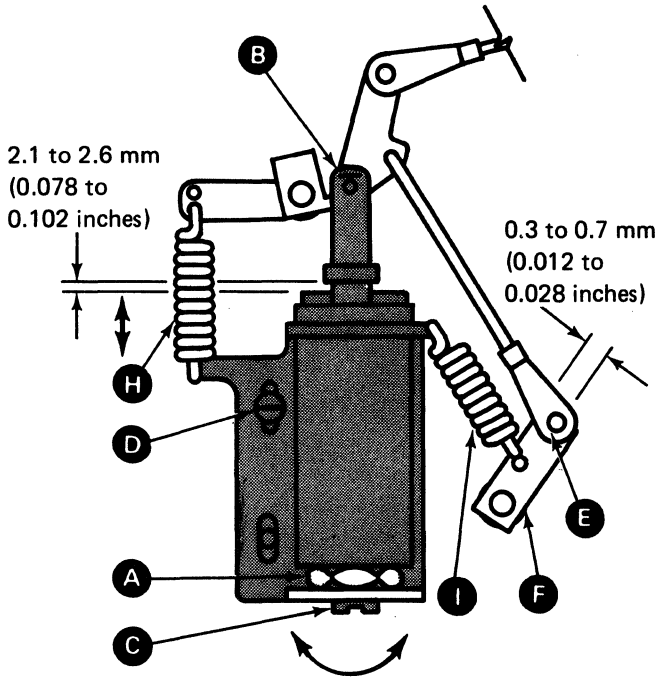
   Note: Ensure that you do not compress the O-ring when you activate the solenoid plunger.

7. Adjust the core adjustment screw (C) so that the solenoid plunger touches the core. Then turn the adjustment screw back 1/2 turn.
8. Tighten the solenoid core locknut against the frame.
9. Ensure that the solenoid plunger moves freely.
10. Reinstall the second sheet restraint solenoid but leave the mounting screw (D) loose.
11. Reinstall the bellcrank return springs (H) and (I).
12. Adjust the second sheet restraint solenoid assembly vertically so that the solenoid plunger (B) moves 2.1 to 2.6 mm (0.083 to 0.102 inches) when the solenoid is activated, and the upper paper pawl (G) (801) is clear of the paper path.
13. Tighten the second sheet restraint solenoid mounting screw.
14. Check the link clevis (E) for 0.3 to 0.7 mm (0.012 to 0.028 inches) movement before the clevis moves the lower bellcrank (F). Adjust by turning the clevis to change the length of link.
15. Insert a sheet of paper by hand.
16. Activate, by hand, the second sheet restraint solenoid plunger (B).
17. Ensure that the paper pawls (G) (801) do not interfere with the paper flow.
18. If there is interference, move the second sheet restraint solenoid lower.
19. Check to ensure that neither paper pawl touches any screw housing when the solenoid is activated.

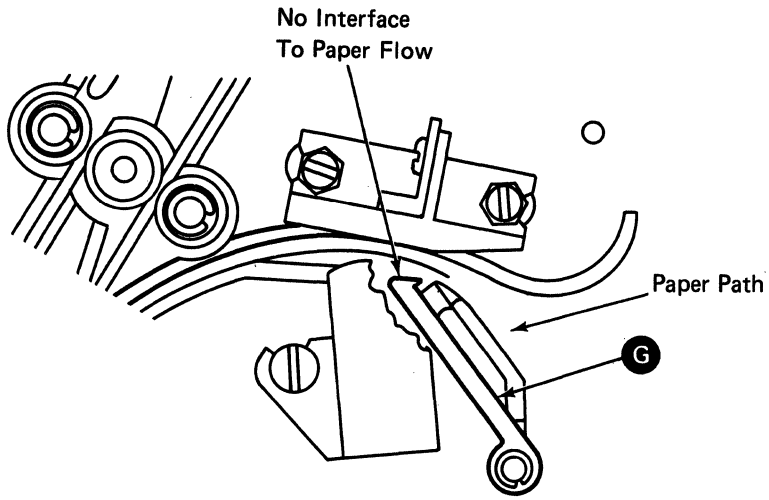
20. If there is interference, move the second sheet restraint solenoid higher.

21. Check the diverter arm adjustment (828).

22. Reinstall the cover assembly.



Left Side View



Block Assembly
Right Side View

825 UPPER AND LOWER PAPER SENSOR ASSEMBLY

Adjustment

1. Power off.

2. Remove the cover assembly (860) and the splitter (800).

3. Remove any necessary racks (869).

4. Check to ensure that the top surface of the lower sensor back-up guide (A) (801) is even to 0.5 mm (0.020 inches) below the bottom of the paper path. To adjust, loosen the sensor back-up guide mounting screw (B). Move the sensor back-up guide, up or down, for the required clearance. Ensure that the sensor back-up guide mounting screw (B) is tightened if the adjustment was needed.

5. Ensure that the paper sensor (C) in the housing (E) is against the downstop at the bottom of the housing. To adjust, loosen the sensor mounting screw (F). Ensure that the sensor mounting screw is tightened after the adjustment is made.

6. Check the housing vertically for a gap of 1.4 to 1.8 mm (0.055 to 0.071 inches) between the housing and the sensor back-up guide. To adjust, loosen the two housing mounting studs (D). Tighten the two housing mounting studs (D), after adjusting.

   Note: The upper housing has only one mounting stud.

7. To ensure that paper is sensed 1 to 3 mm (0.039 to 0.118 inches) beyond the pinch point of the first cone roller, do the following:

   a. Connect a voltmeter between J7-12 (H1S) and J7-3 (logic ground) for the lower sensor and J7-11 (H2S) and J7-3 (logic ground) for the upper sensor (805).

   b. Power on.

   c. Activate, by hand, the second sheet restraint solenoid and manually insert a sheet of paper to the pinch point of the first cone roller (801).

   d. While looking at the meter, press the Paper Up switch on the printer several times until the meter reads +5 Vdc. The meter should change to +5 Vdc between the second and sixth time the switch is pressed.

      Note: Each time the Paper Up switch is pressed, the paper moves 0.5 mm (0.020 inches).

   e. Adjust the housing front-to-rear until it is correct while maintaining the vertical adjustment (Step 6).

8. Ensure that the two housing mounting studs (D) are tight.

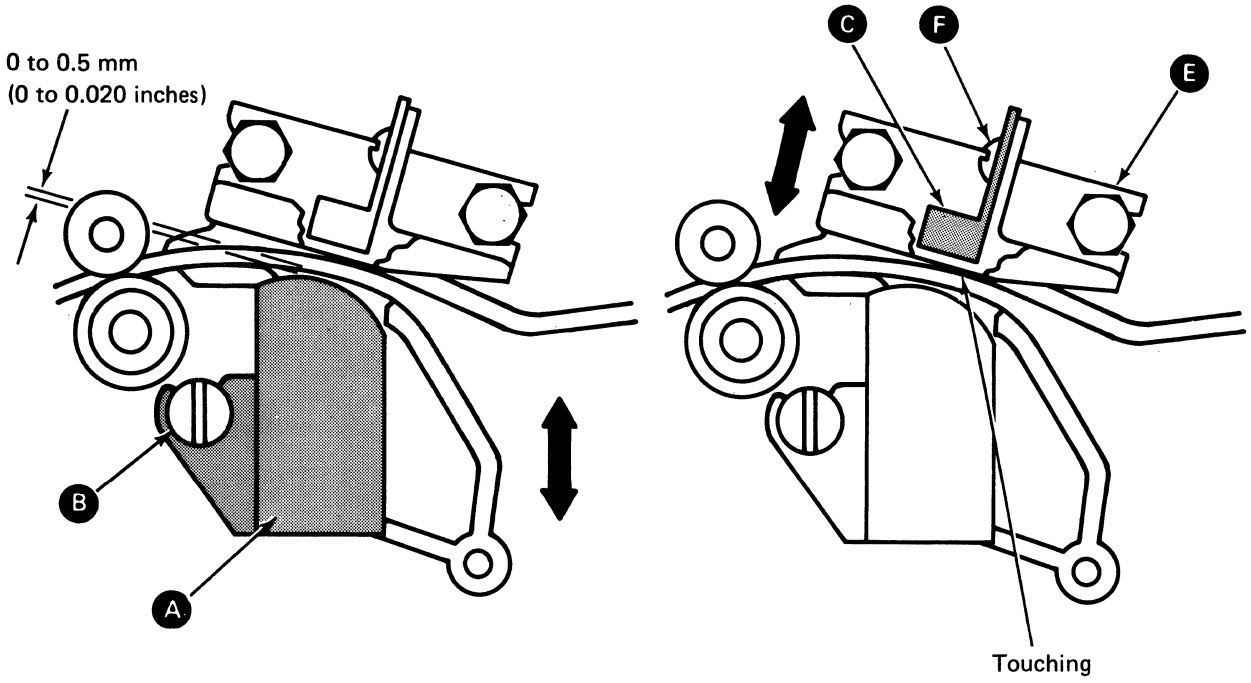
9. Repeat Steps 3 through 11 for the upper sensor assembly.

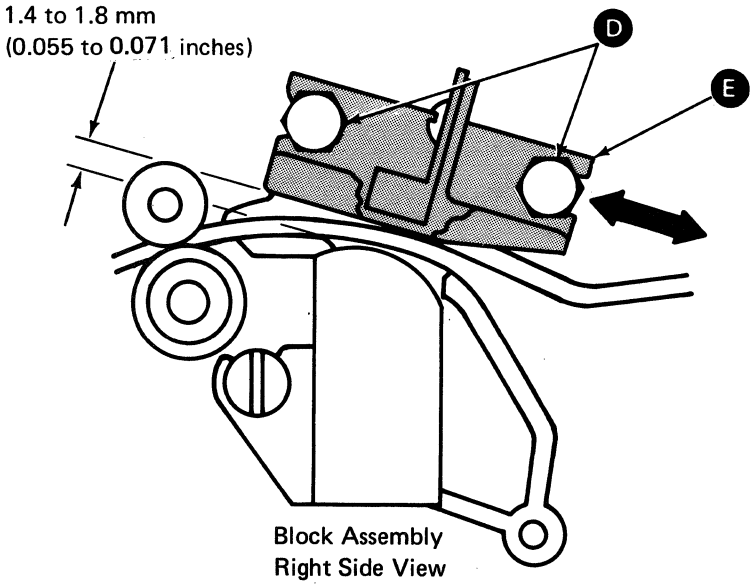
10. Reinstall the racks.

11. If the lower rack was removed, perform the lower rack adjustments (826).

12. Reinstall the splitter. Ensure that the splitter is held against the left side mounting stud as you tighten the splitter mounting screw.

13. Reinstall the cover assembly.

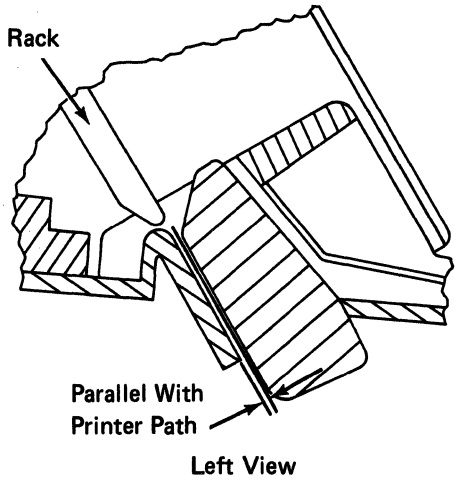




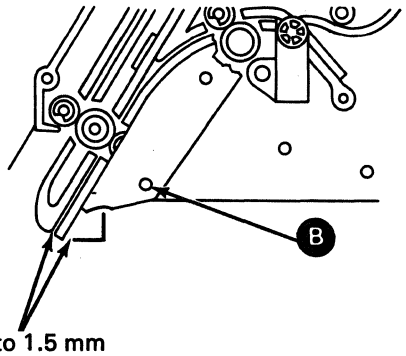
826 LOWER RACK

Adjustment

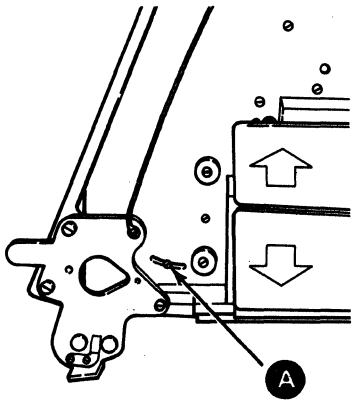
1. Power off.
2. Remove the cover assembly (860).
3. Lift or remove the splitter (800).
4. Loosen the lower rack mounting screw (A) and the lower rack mounting nut (B).
5. Adjust the lower rack so that the tips of the rack are even to 1.5 mm (0.060 inches) to the rear of the sheet-feed paper path, and parallel with the printer paper path opening.
6. Tighten the lower rack mounting screw (A) and the mounting nuts (B).
7. Close or reinstall the splitter. Ensure that the splitter is held against the left side mounting stud as you tighten the splitter mounting screw.
8. Reinstall the cover assembly.



Left View



Block Assembly
Right Side View

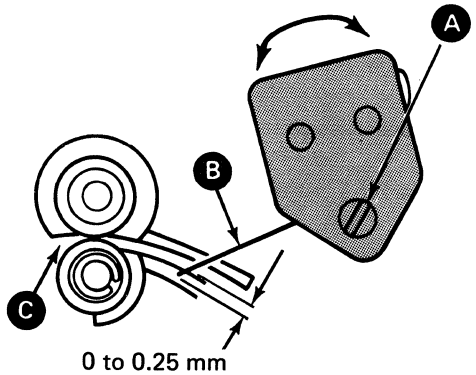


Right Side View

827 EXIT SWITCH (PAPER AND ENVELOPE)

Adjustment

1. Power off.
2. Loosen the exit switch (800) mounting screw (A).
3. Connect an ohmmeter between J1 pins 1 and 2 for the paper exit switch and J9 pins 1 and 2 for the envelope exit switch (805).
4. Adjust the exit switch so that the switch closes, the ohmmeter reads continuity, when the switch lever (B) is even to 0.25 mm (0.010 inches) below the bottom of the exit path (C).
5. Tighten the exit switch mounting screw.
6. Ensure that the exit switch opens when the switch lever is in the rest position.



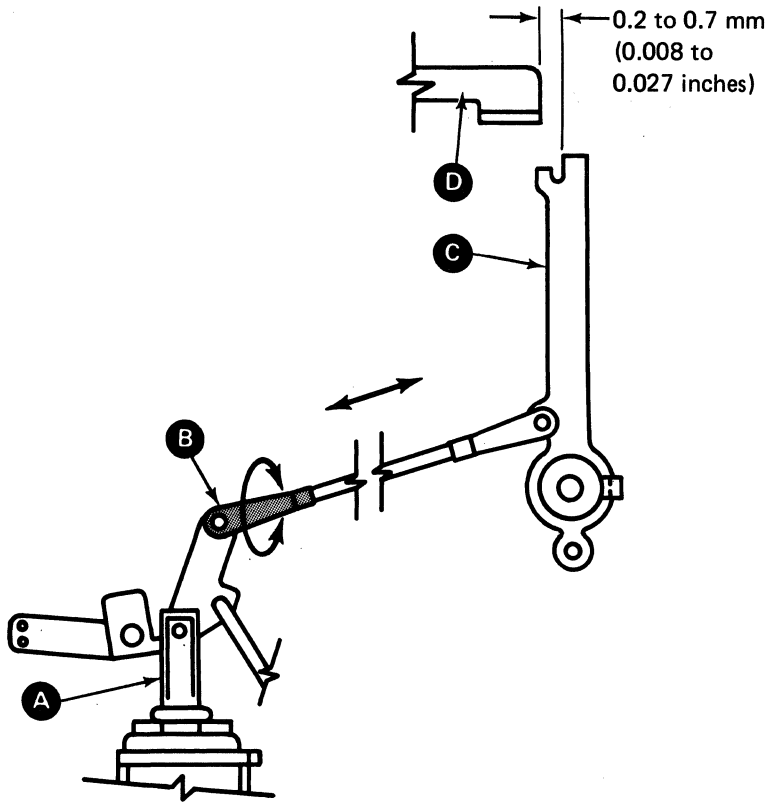
Block Assembly
Right Side View

828 DIVERTER ARM ASSEMBLY

Adjustment

1. Power off.
2. Remove the cover assembly (860).
3. Ensure that the second sheet restraint solenoid adjustment (824) is correct.
4. Activate, by hand, the second sheet restraint solenoid (801) plunger (A).

   Note: Ensure that you do not compress the O-ring when you activate the solenoid plunger.
5. Adjust the arm clevis (B) so that the diverter arm (C) overthrows the latch (D) by 0.2 to 0.7 mm (0.008 to 0.027 inches).
6. Power on.
7. Run test execute mode test 40 or 41 and 53 alternately and observe the latch operation.
8. Power off.
9. Repeat the Steps 3 and 4 if necessary.
10. Reinstall the cover assembly.

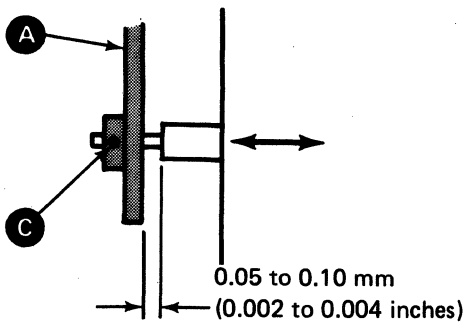


Left Side View

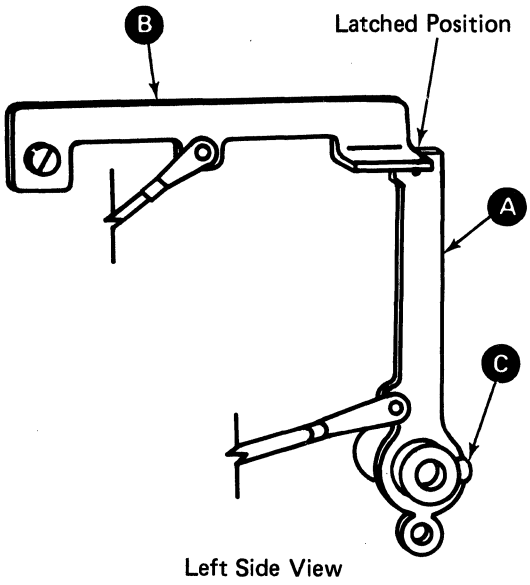
829 DIVERTER

Adjustment

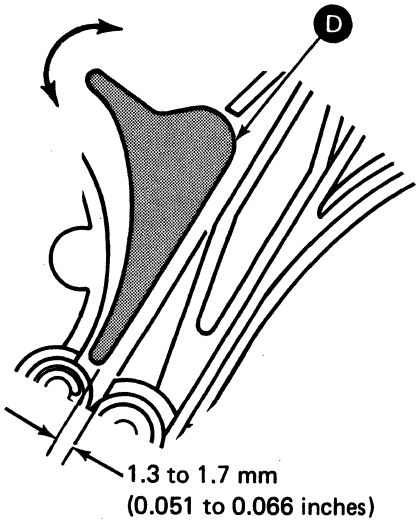
1. Power off.
2. Remove the cover assembly (860).
3. Latch the diverter arm (A) against the diverter latch (B).
4. Loosen the diverter arm (801) setscrew (C).
5. Turn the diverter (801) (D) to obtain a 1.3 to 1.7 mm (0.051 to 0.066 inches) gap between the rear of the diverter and the rear of the paper path while the diverter arm is in the latched position as shown.
6. Adjust the diverter arm for 0.05 to 0.1 mm (0.002 to 0.004 inches) of end play.
7. Tighten the setscrew (C) and check for binds.
8. Reinstall the cover assembly.



Front View



Left Side View

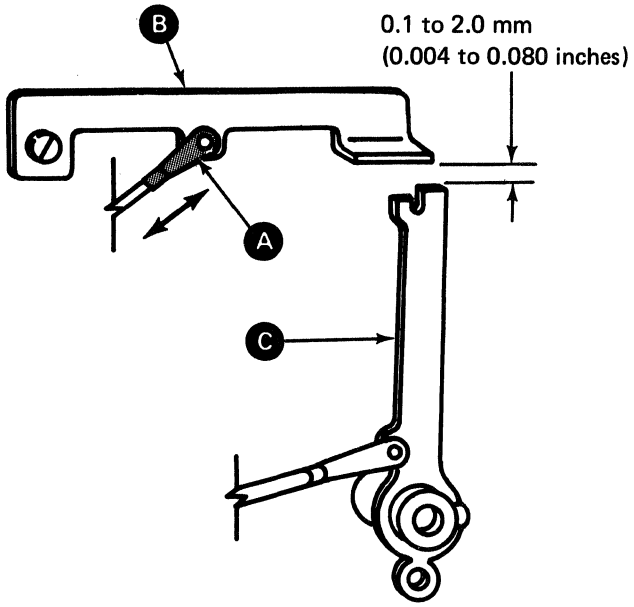


Block Assembly
Right Side View

830 DIVERTER LATCH LINK

Adjustment

1. Power off.
2. Remove the cover assembly (860).
3. Ensure that the second envelope restraint solenoid adjustment (836) is correct.
4. Activate, by hand, the second envelope restraint solenoid (804).
5. Adjust the diverter latch link clevis (A) so that the diverter latch (B) overthrows the diverter arm (C) by 0.1 to 2.0 mm (0.004 to 0.080 inches) with the diverter arm (C) in the position shown.
6. Reinstall the cover assembly.

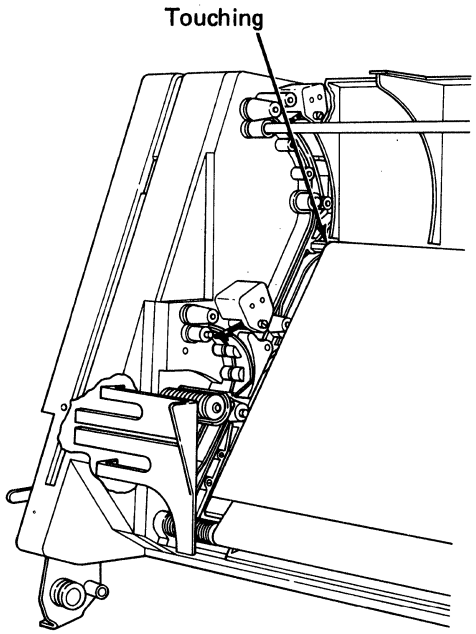


Left Side View

831 SPLITTER

Adjustment

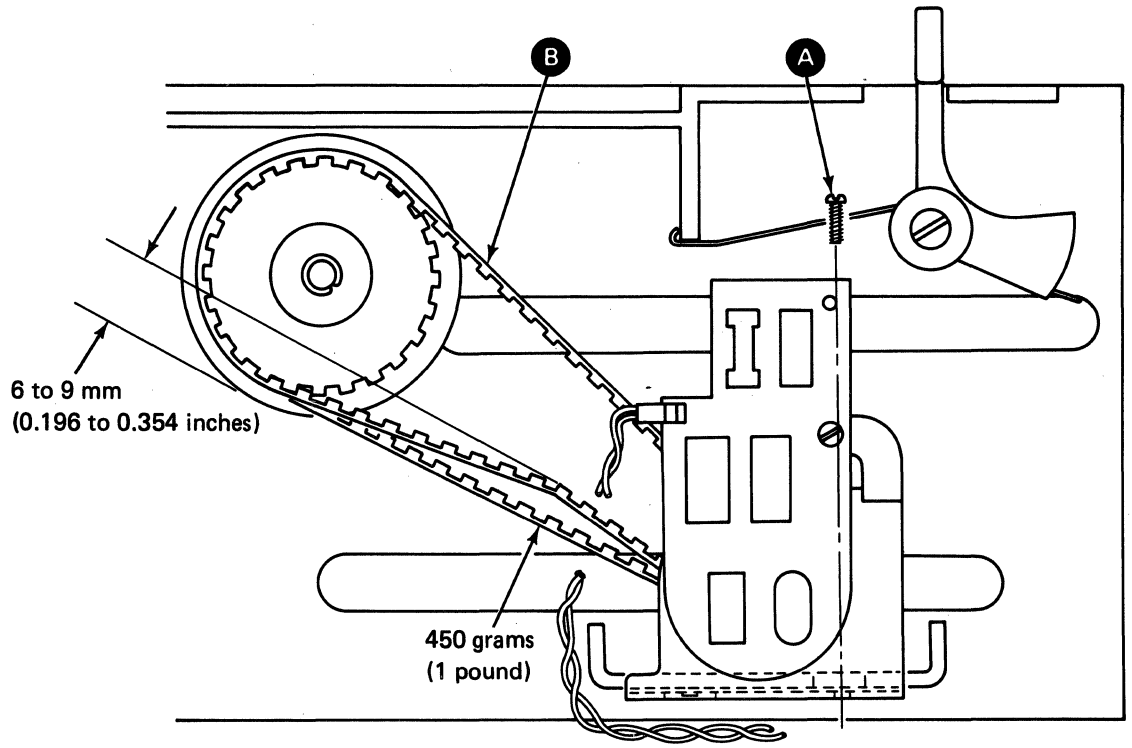
1. Power off.
2. Remove the cover assembly (860).
3. Remove the splitter mounting screw.
4. While holding the splitter against the left mounting stud, reinstall and tighten the splitter mounting screw.
5. Reinstall the cover assembly.



835 ENVELOPE DRIVE MOTOR ASSEMBLY

Adjustment

1. Power off.
2. Remove the cover assembly (860).
3. Loosen the envelope drive motor assembly (804) (A) mounting screw.
4. Adjust the envelope motor so that 450 grams (1 pound) of force, applied at the center point of the drive belt (B), deflects the drive belt 6 to 9 mm (0.196 to 0.354 inches).
5. Tighten the mounting screw.
6. Reinstall the cover assembly.



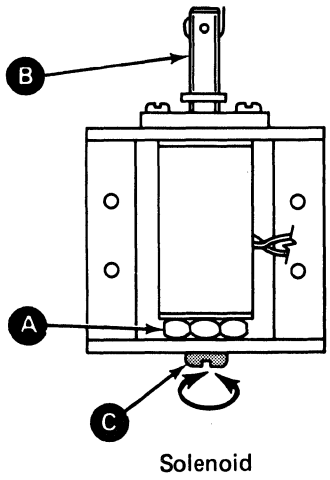
Right Side View

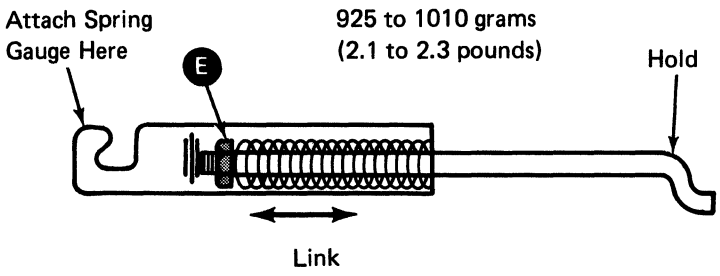
This page left blank intentionally.

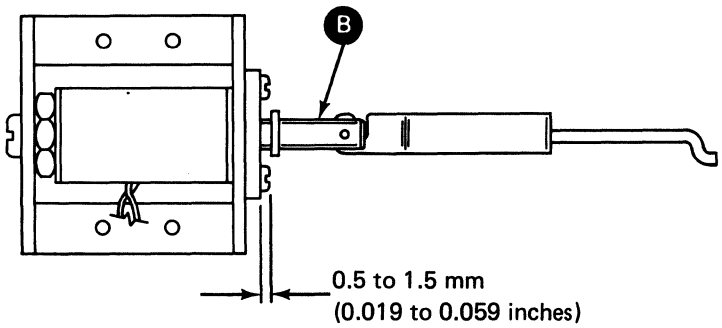
836 SECOND ENVELOPE RESTRAINT SOLENOID ASSEMBLY

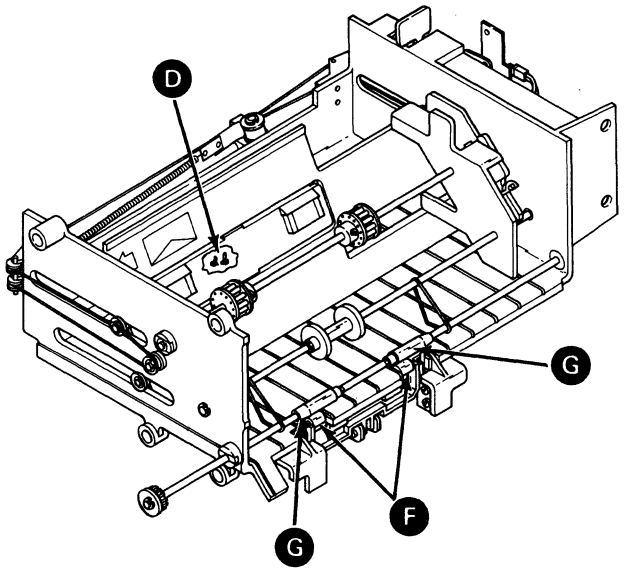
Adjustment

1. Power off.
2. Remove the cover assembly (860).
3. Remove the two second envelope restraint solenoid mounting screws (D) from the top of the envelope tray.
4. Turn the solenoid so that the plunger (B) can be removed from the restraint link bracket.
5. Loosen the second envelope restraint solenoid core locknut (A).
6. Activate, by hand, the second envelope restraint solenoid plunger (B).
7. Adjust the solenoid core adjustment screw (E) so that with the plunger against the downstop the solenoid plunger touches the core. Then turn the adjustment screw back 1/2 turn.
8. Tighten the solenoid core in place with the locknut (A) against the frame.
9. Ensure that the solenoid plunger moves freely.
10. Remove the second envelope restraint link assembly.
11. Adjust the locknut (E) for 925 to 1010 grams (2.1 to 2.3 pounds) of spring compression.
12. Reinstall the second envelope restraint link assembly.
13. Reinstall the second envelope restraint solenoid but leave the two second envelope restraint solenoid mounting screws (D) loose.
14. Pull the second envelope restraint solenoid plunger until the back-up rollers (F) touch the feed rollers (G).
15. Adjust the second envelope restraint solenoid assembly, front to rear, so that the plunger (B) is 0.5 to 1.5 mm (0.019 to 0.059 inches) from seating.
16. Tighten the two second envelope restraint solenoid mounting screws.
17. Perform the diverter latch link adjustment (830).
18. Reinstall the cover assembly.


B
A
C
Solenoid


Attach Spring
Gauge Here
925 to 1010 grams
(2.1 to 2.3 pounds)
E
Hold
Link

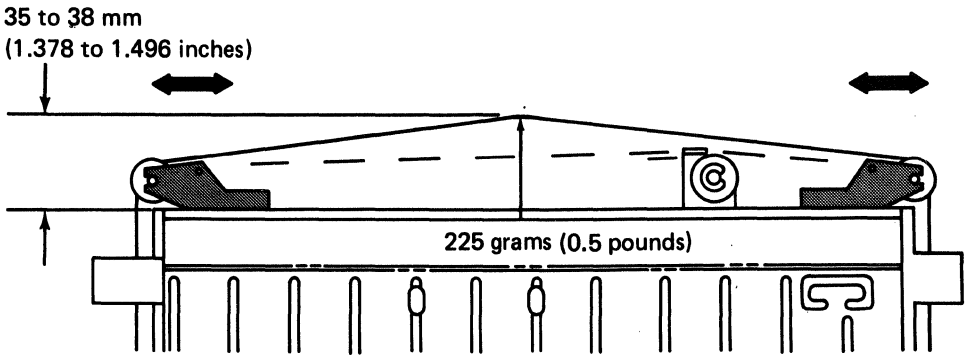

B
0.5 to 1.5 mm
(0.019 to 0.059 inches)


D
G
F
G

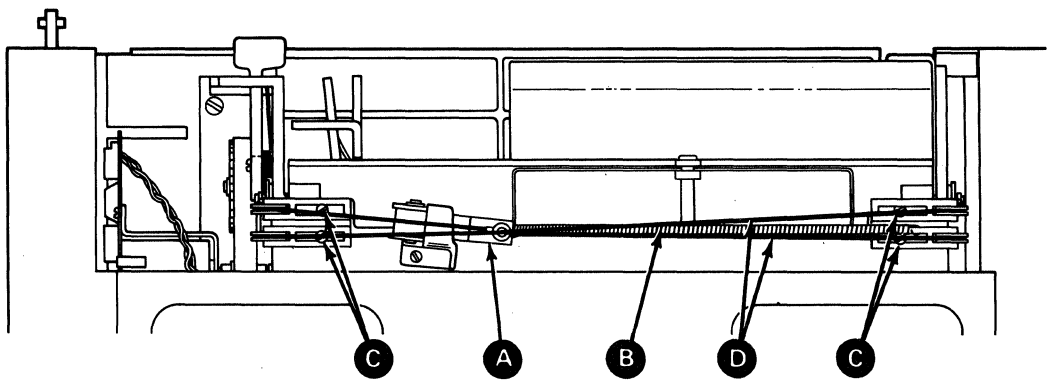
838 ENVELOPE TRAY PULLEYS/PRESSURE CABLE

Adjustment

1. Power off.
2. Remove the cover assembly (860).
3. Disconnect the flat spring (A) (804) and the pressure cable spring (B).
4. Check the pressure cables (D). A 225 gram (0.5 pound) force applied on both cables, at the same time, at the center of the rear envelope wall deflects the cables 35 to 38 mm (1.378 to 1.496 inches) away from the rear envelope tray wall.
5. If adjustment is necessary, loosen the pulley bracket mounting screws (C).
6. Move all of the pulley brackets an equal amount, tighten the mounting screws, and recheck the adjustment. This ensures that the pressure plate is parallel to the envelope tray.
7. Repeat steps 4, 5, and 6 as needed.
8. Reconnect the flat spring (A) and the pressure cable spring (B).
9. Reinstall the cover assembly.



Top View

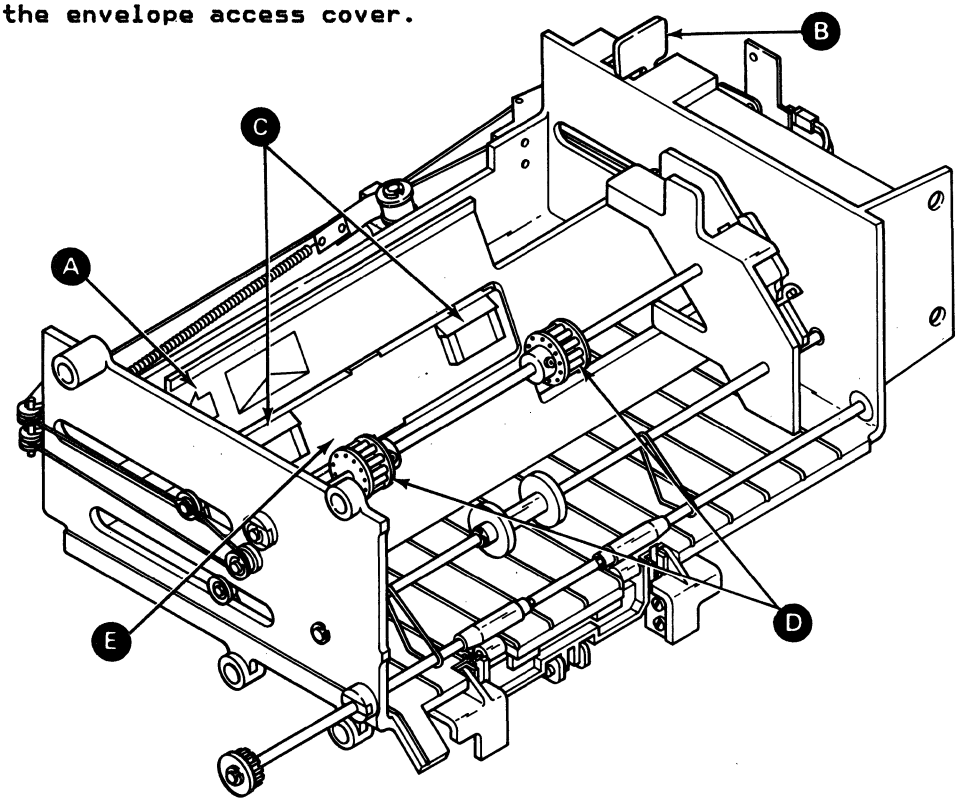


Rear View

FRONT EXIT SHEET-FEED SERVICE CHECKS

850 ENVELOPE TRAY

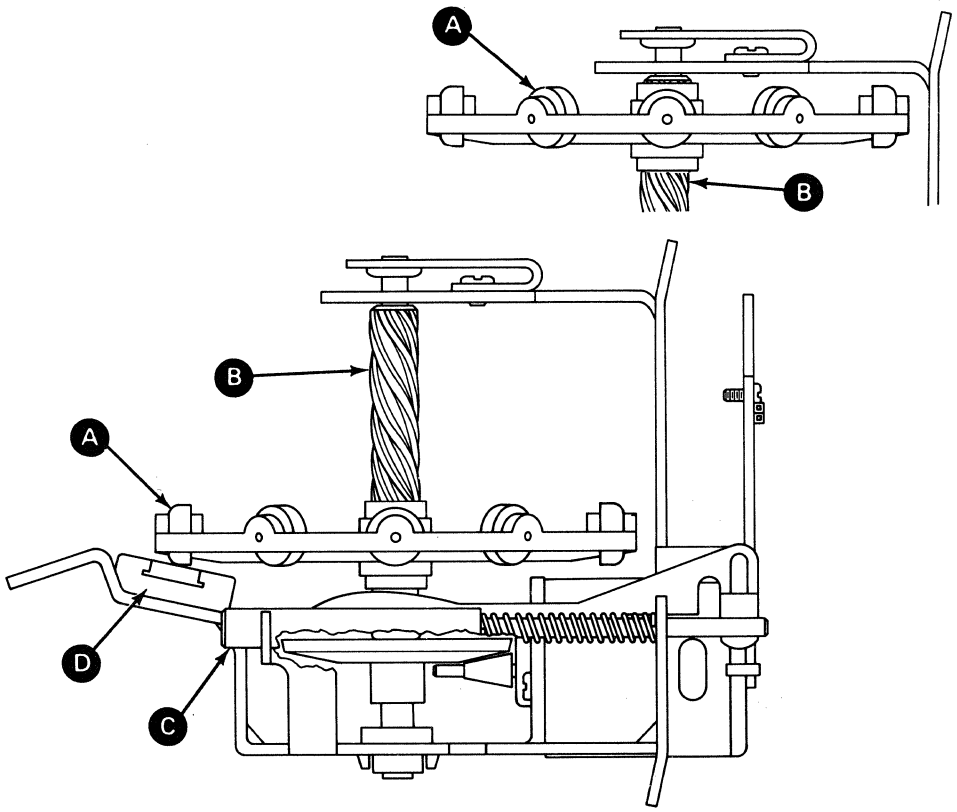
1. Power off.
2. Lift the envelope access cover.
3. Remove the envelopes.
4. Push the pressure plate (A) to the rear. The pressure plate requires approximately 454 grams (1 pound) of force to push it back.
5. Check the bottom of the envelope tray for any obstruction that would prevent free movement of the pressure plate.
6. Pull the pressure plate release lever (B). The pressure plate should slide forward stopping with the wobble plate pads (C) against the drive wheels (D).
7. Check the wobble plate (E) for free movement.
8. Apply IBM #10 oil to all of the cable pulleys as needed.
9. Ensure that there is free movement of all the pressure plate and all of the cable mechanisms.
10. Close the envelope access cover.



Top View

851 PICKER/SEPARATOR ASSEMBLY

1. Power off.
2. Remove the paper trays (802).
3. Check to ensure that the picker/separator drive wheel (A) is at the top of the picker/separator leadscrew (B).
4. Push the picker/separator push rod (C) in. The picker/separator drive wheel should move down the leadscrew (B) and stop on the support pad (D).
5. Reinstall the paper trays.

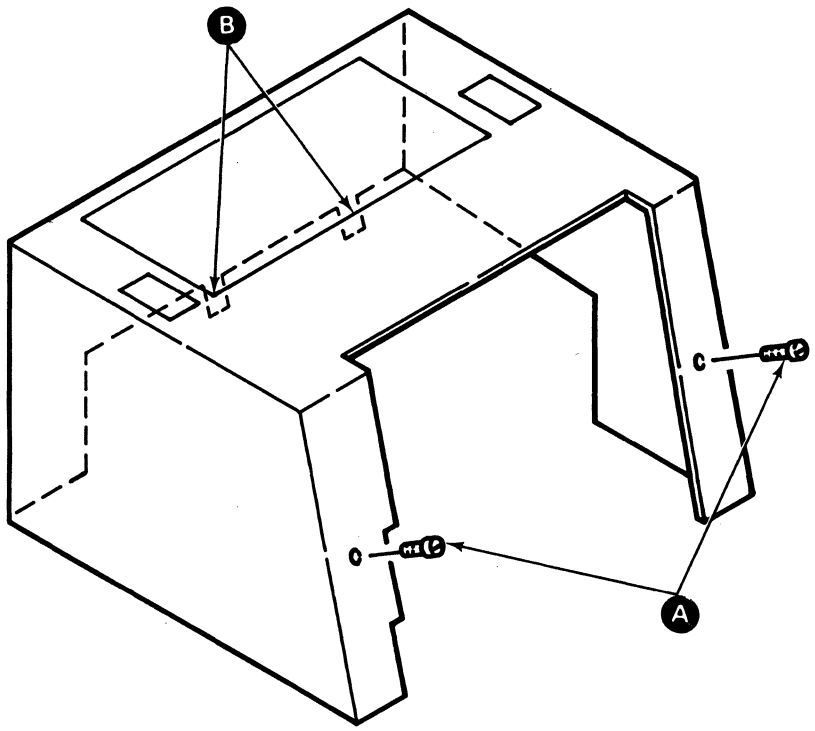


FRONT EXIT SHEET-FEED REMOVALS AND REPLACEMENTS

860 COVER ASSEMBLY

Removal and Replacement

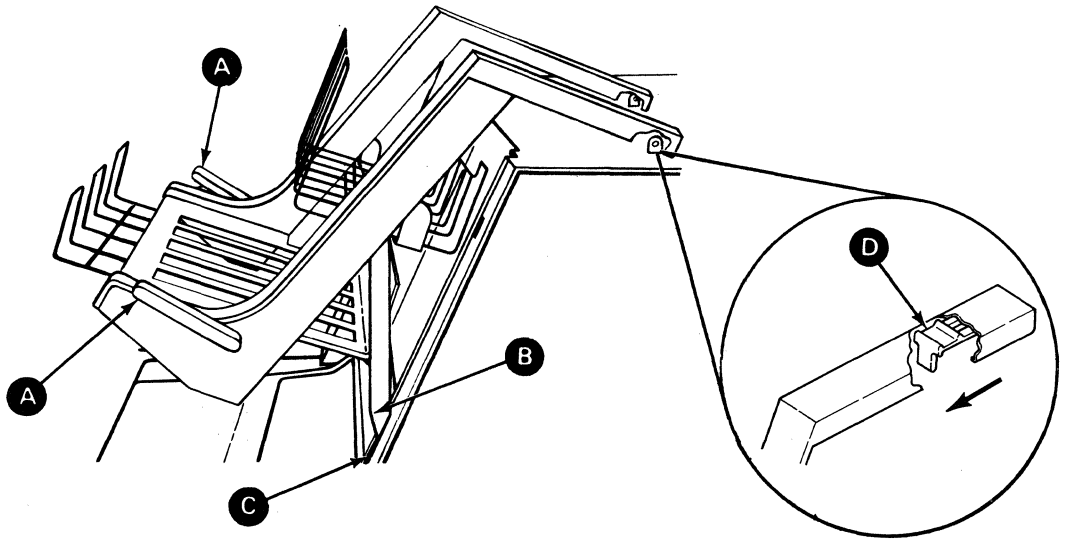
1. Power off.
2. Remove the paper or envelopes from the output trays.
3. Remove the output tray (861).
4. Remove the two mounting screws (A).
5. Press the two snap-detent latches (B) in the rear of the cover and remove the cover.
6. For the replacement of the cover assembly, reverse this procedure.



861 OUTPUT TRAY

Removal and Replacement

1. Power off.
2. Remove the paper and envelopes from the output tray.
3. Pull up on the release levers (A) to unlock the output tray.
4. As you lift the output tray, pull the support legs (B) forward so they come out of the guide tracks (C).
5. Slide the locking mechanisms (D) toward the front of the output tray.
6. Remove the output tray.
7. For replacement of the output tray, reverse this procedure.



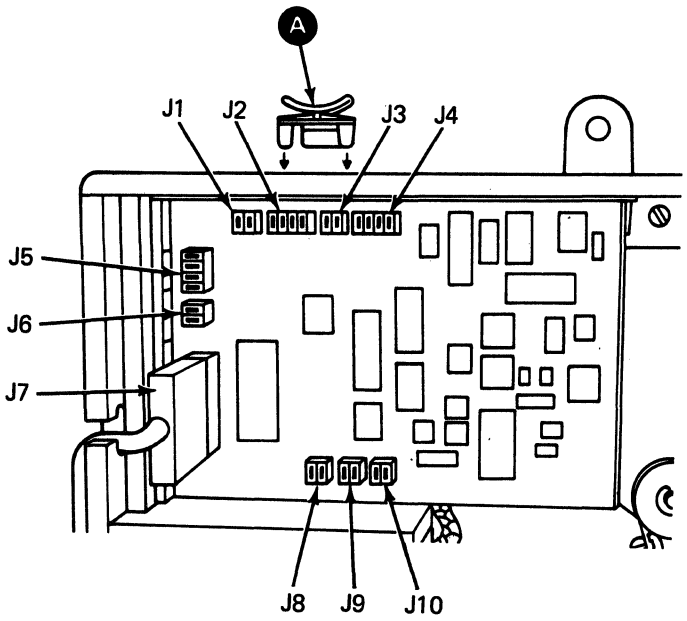
Right Side View

862 ANALOG CARD

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Remove all cable connectors from the analog card (805).
4. Remove the analog card retainer (A).
5. Remove the analog card.
6. For replacement of the analog card, reverse this procedure.

Warning: Connectors J1, J3, J6, J8, J9, and J10 are two pin connectors. Connectors J2, J4, and J5 are four pin connectors. Ensure that the cables are plugged into the correct connectors.

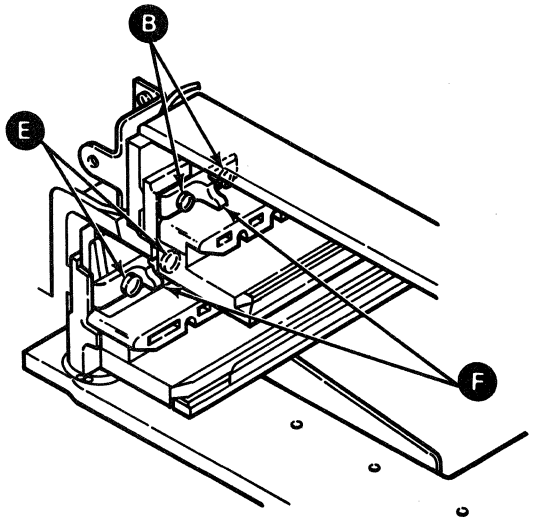


Left Side View

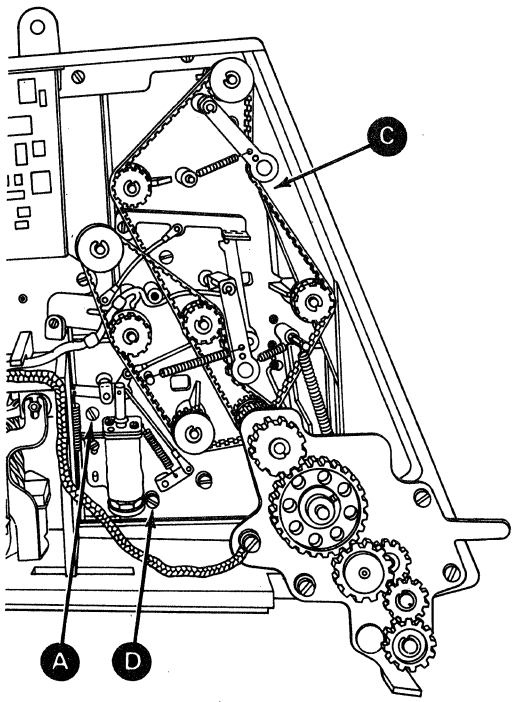
863 PAPER TRAY SUPPORT RAILS

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Remove the left paper tray support rail mounting screw (A) or (D).
4. Remove the two right paper tray support rail mounting screws (B) or (E) and the tray inhibitor (F).
5. Remove the paper tray support rail.
6. Reinstall the rail by reversing steps 3 through 5.
7. Adjust the inhibitor (F) even with the outside edge of the rail. Before tightening the right mounting screws, push up on the rail, and ensure that the rail is against the paper path block (C).
8. Reinstall the cover assembly.
9. Reinstall the paper trays.
10. Reinstall the output tray.



Right Side View

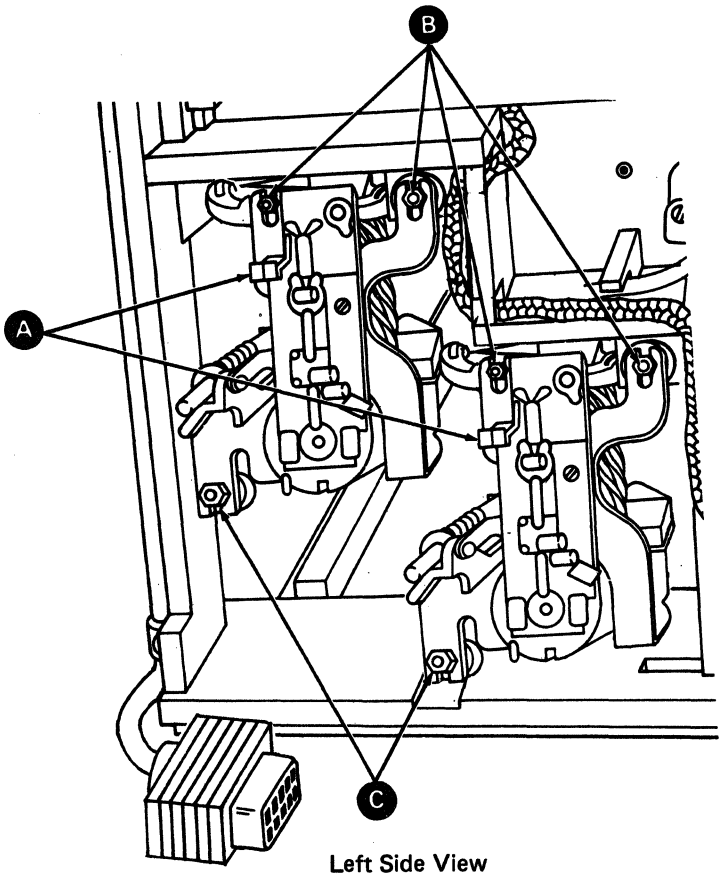


Left Side View

864 PICKER/SEPARATOR ASSEMBLY

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Remove the connector (A) from the picker/separator filter board.
4. Loosen the top picker/separator support nuts (B).
5. Remove the lower picker/separator support nut (C) and washer.
6. Remove the picker/separator assembly.
7. For replacement of the picker/separator assembly, reverse this procedure.
8. Perform the picker/separator assembly adjustment (823).
9. Reinstall the cover assembly.

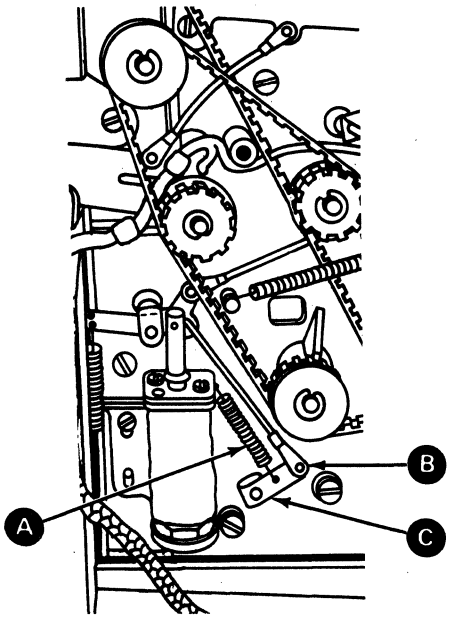


Left Side View

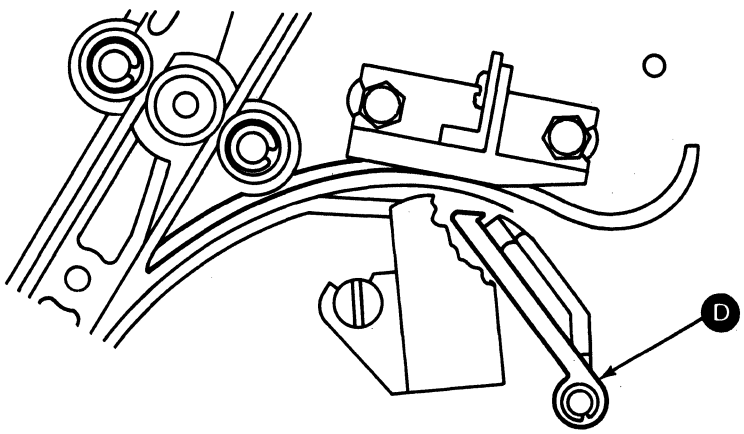
865 LOWER SECOND SHEET RESTRAINT PAWL

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860) and splitter (800).
3. Remove the middle and lower racks (869, Steps 5 to 10).
4. Remove the lower paper tray support rail (863).
5. Remove the lower bellcrank spring (A).
6. Remove the clevis (B) from the lower bellcrank (C).
7. Remove the grip clip (D) from the lower second sheet restraint pawl.
8. Slide the lower bellcrank to the left, so that the second sheet restraint pawl can be removed.
9. For replacement of the lower second sheet restraint pawl, reverse this procedure. Adjust the grip clip to obtain 0.1 to 0.5 mm (0.004 to 0.020 inches) endplay on the bellcrank shaft.
10. Perform the second sheet restraint solenoid adjustment (824).
11. If the lower rack was removed, perform the lower rack adjustment (826).
12. Reinstall the splitter. Ensure that the splitter is held against the the left side mounting stud as you tighten the splitter mounting screw.
13. Reinstall the cover assembly.



Left Side View

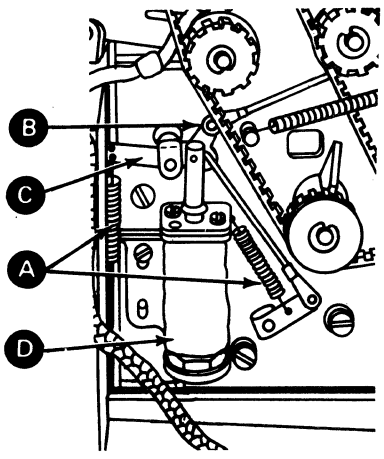


Block Assembly
Right Side View

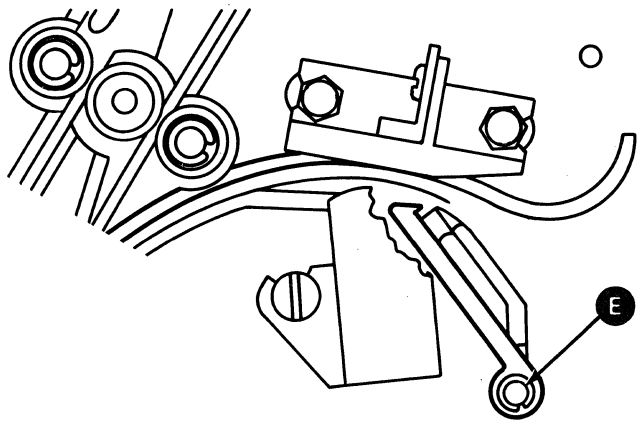
866 UPPER SECOND SHEET RESTRAINT PAWL

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860) and splitter (800).
3. Remove the middle and lower racks (869, Steps 5 to 10).
4. Remove the upper paper tray support rail (863).
5. Remove the upper and lower bellcrank springs (A).
6. Remove the clevis (B) from the upper bellcrank (C).
7. Remove the second sheet restraint solenoid (D) (868).
8. Remove the grip clip (E) from the upper second sheet restraint pawl.
9. Slide the upper bellcrank to the left, so that the second sheet restraint pawl can be removed.
10. For replacement of the upper second sheet restraint pawl, reverse this procedure. Adjust the grip clip to obtain 0.1 to 0.5 mm (0.004 to 0.020 inches) endplay on the bellcrank shaft.
11. Perform the following adjustments:
    a. Second sheet restraint solenoid (824)
    b. Diverter arm assembly (828).
12. If the lower rack was removed, perform the lower rack adjustment (826).
13. Reinstall the splitter. Ensure that the splitter is held against the the left side mounting stud as you tighten the splitter mounting screw.
14. Reinstall the cover assembly.



Left Side View

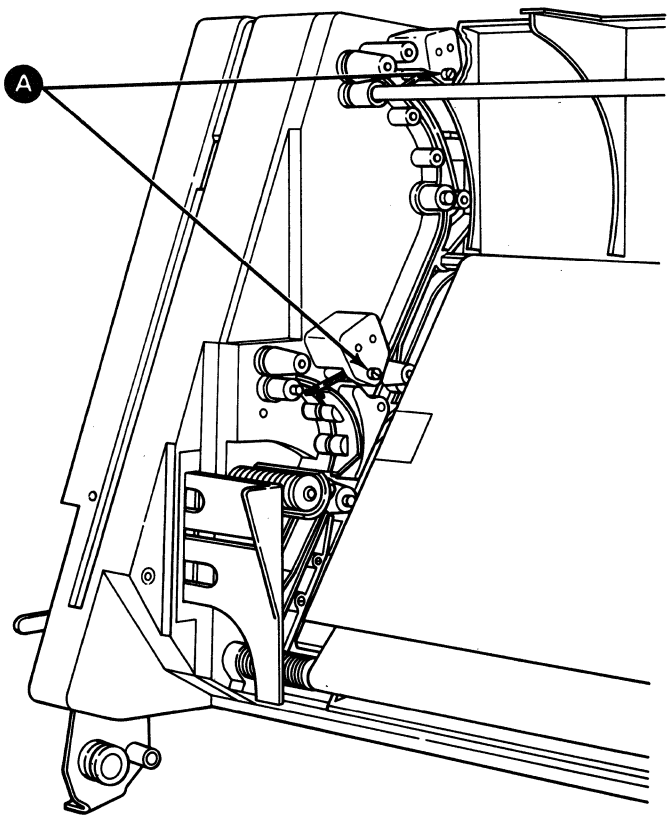


Block Assembly
Right Side View

867 EXIT SWITCH (PAPER AND ENVELOPE)

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Disconnect the exit switch cable connector (J1 for the paper exit switch or J9 for the envelope exit switch) from the analog card (805).
4. Remove the cable from the cable clamp.
5. Remove the exit switch mounting screw (A).
6. Remove the exit switch.
7. For replacement of the exit switch, reverse this procedure.
8. Perform the exit switch adjustment (827).
9. Reinstall the cover assembly.

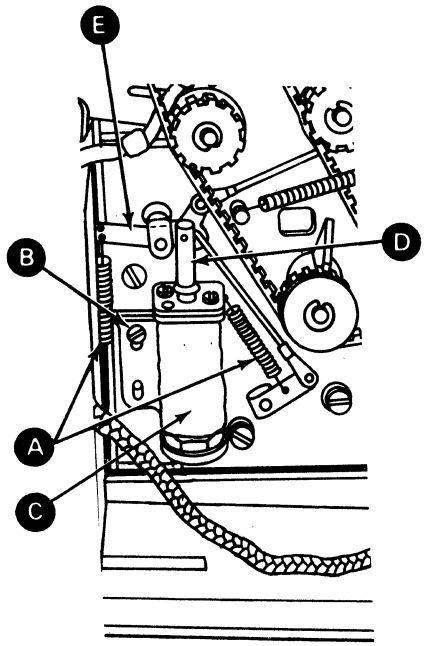


Front View

868 SECOND SHEET RESTRAINT SOLENOID

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Remove the two bellcrank springs (A).
4. Remove the second sheet restraint solenoid cable (J6) from the analog card (805).
5. Remove the cable from the cable clamp.
6. Remove the second sheet restraint solenoid mounting screw (B).
7. To remove the second sheet restraint solenoid (C), turn the solenoid counterclockwise so that the plunger (D) can be removed from the upper bellcrank (E).
8. For replacement of the second sheet restraint solenoid, reverse this procedure.
9. Perform the second sheet restraint solenoid adjustment (824).
10. Reinstall the cover assembly.



Left Side View

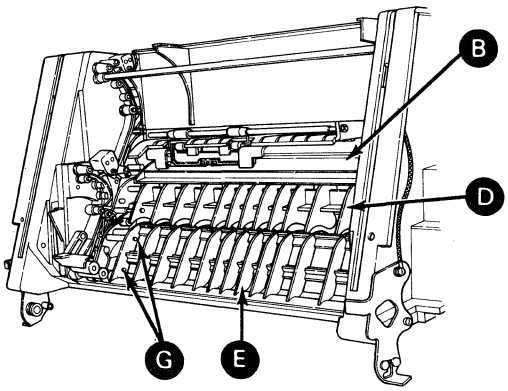
869 RACKS

Removal and Replacement

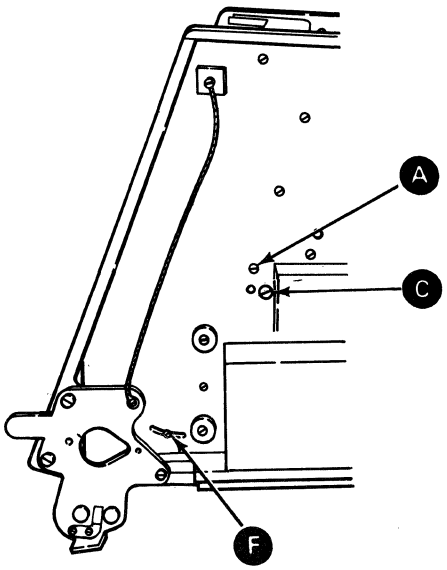
1. Power off.
2. Remove the cover assembly (860).
3. Remove the paper trays (802).
4. Remove the splitter.
5. Remove the upper rack mounting screw (A).
6. Slide the upper rack (B) to the right to remove it from the left side mounts.

   Note: The racks should be removed from top to bottom.

7. Remove the middle rack mounting screw (C).
8. Slide the middle rack (D) to the right to remove it from the left side mounts.
9. Loosen the lower rack mounting screw (F) and mounting nut (G).
10. Lift the lower rack (E) out.
11. For replacement of the racks, reverse this procedure.
12. Perform the lower rack adjustment (826).
13. Reinstall the splitter. Ensure that the splitter is held against the the left side mounting stud as you tighten the splitter mounting screw.
14. Reinstall the cover assembly.



Front View



870 DRIVE BELTS

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Lift the spring loaded idlers (A) and remove the drive belts from the pulleys.
4. Remove the gear guard.
5. Remove the grip-clip and the G6 drive gear (B).
6. Remove the innermost C-clip from the drive shaft containing the P1 double drive pulley (C), if present.
7. Slide the drive shaft to the right until it clears the bushing in the side plate.
8. Remove the outer drive belt (D) first and then the inner drive belt (E).

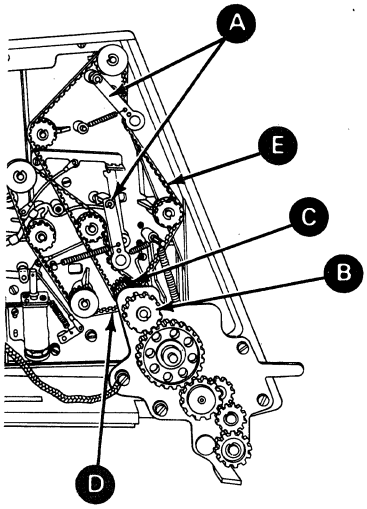
   Note: The paper only sheet-feed has one drive belt.

9. For replacement of the drive belts, reverse this procedure. For the correct idler spring location see 801. Ensure that the drive belts are routed correctly.

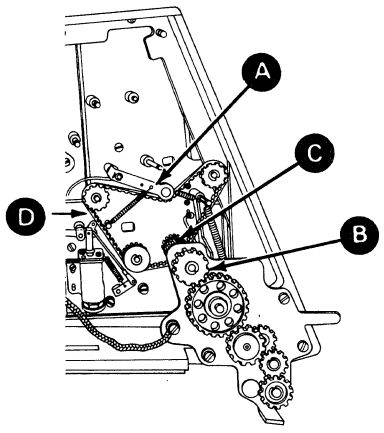
   Note: The C-clip removed in step 6 does not need to be reinstalled.

10. Adjust the G6 drive gear for 0.05 to 0.25 mm (0.002 to 0.010 inches) end play.

    Note: All end play adjustments are made by moving the grip clip in or out on the shaft. To adjust the G6 drive gear, press the cone roller to the left.



Envelope/Paper



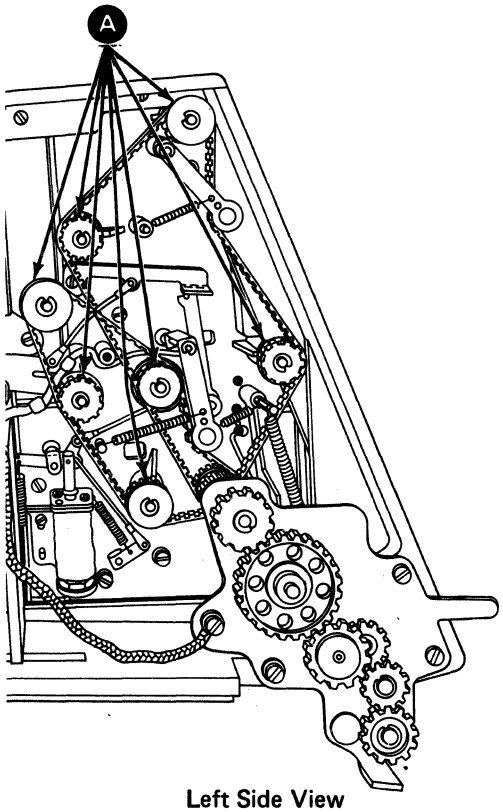
Paper Only
Left Side View

871 CONE ROLLERS

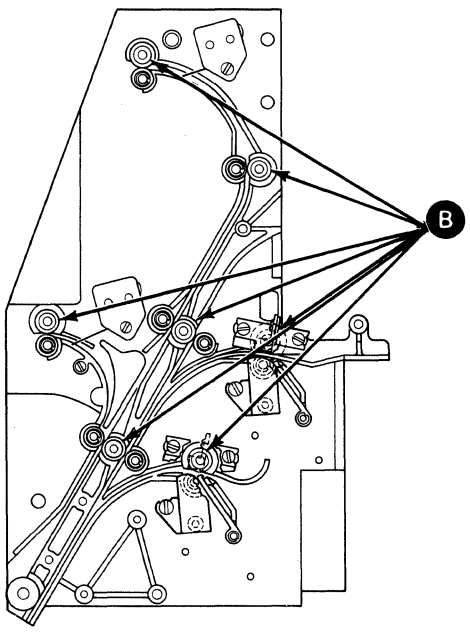
Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Remove the pulley (A) grip clip from the shaft of the cone roller (B) to be removed.
4. Remove the pulley.
5. Remove the cone roller by pushing the shaft to the right.
6. For the replacement of the cone roller, reverse this procedure. To prevent squeaks and wear lubricate the cone roller shaft lightly with IBM #10 oil. Ensure that the oil does not touch the rubber part of the cone roller.
7. Perform the pulley end play adjustment (820).
8. Reinstall the cover assembly.

Note: Some cone rollers need the sensor housing and/or racks removed.



Left Side View



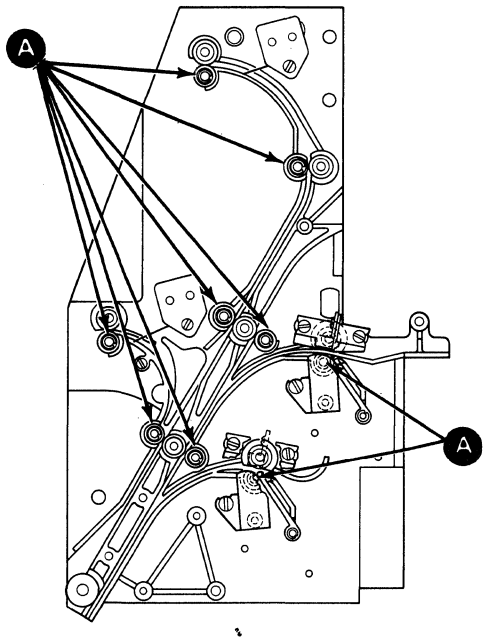
Block Assembly
Right Side View

872 BACK-UP ROLLERS

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Remove any necessary racks (869).
4. Remove the grip clip from the back-up roller (A) shaft.
5. Remove the back-up roller.
6. For replacement of the back-up roller, reverse this procedure. To prevent squeaks and wear lubricate the inside of back-up roller shaft lightly with IBM #10 oil.
7. If the lower rack was removed, perform the lower rack adjustment (826).
8. Reinstall the cover assembly.

Note: Some back-up rollers need the sensor back-up guide removed.



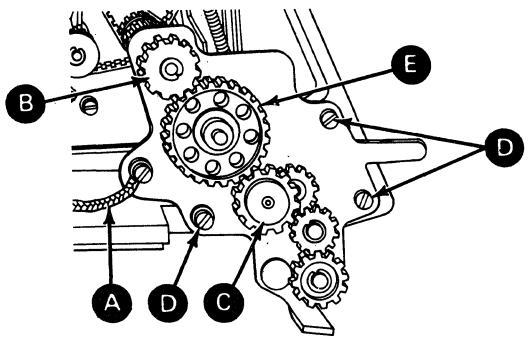
Block Assembly
Right Side View

873 LEFT SIDE MOUNTING PLATE

Removal and Replacement

Warning: This removal and replacement procedure should not performed unless necessary. The adjustment of the mounting plates is critical to the sheet-feed to printer paper paths. If you must replace the mounting plate, ensure that you align the new plate to the scribe marks.

1. Power off.
2. Remove the sheet-feed from the printer.
3. Remove the cover assembly (860).
4. Remove the gear guard.
5. Scribe around the left mounting plate.
6. Remove the ground strap (A).
7. Remove the grip clip from the G6 drive gear (B), and remove the drive gear.
8. Remove the G4 compound drive gear (C) grip clip, and remove the G4 compound drive gear.
9. Remove the three left side plate mounting plate screws (D).
10. Remove the left side mounting plate.
11. For replacement of the left side mounting plate, reverse this procedure. Ensure that the mounting plate aligns with the scribe marks.
12. Perform the G4 and G6 end play and the idler gear adjustment (820).
13. Reinstall the gear guard.
14. Reinstall the cover assembly.
15. Reinstall the sheet-feed.



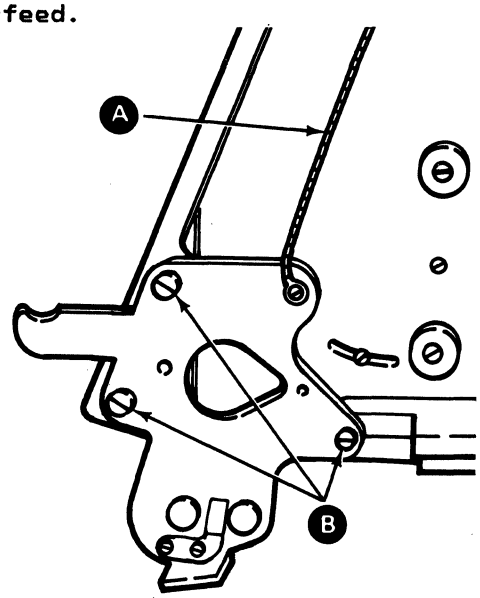
Left Side View

874 RIGHT SIDE MOUNTING PLATE

Removal and Replacement

Warning: This removal and replacement procedure should not performed unless necessary. The adjustment of the mounting plates is critical to the sheet-feed to printer paper paths. If you must replace the mounting plate, ensure that you align the new plate to the scribe marks.

1. Power off.
2. Remove the sheet-feed from the printer.
3. Remove the cover assembly (860).
4. Scribe around the right mounting plate.
5. Remove the ground strap (A).
6. Remove the three right side mounting plate screws (B).
7. Remove the right side mounting plate.
8. For replacement of the right side mounting plate, reverse this procedure. Ensure that the mounting plate aligns with the scribe marks.
9. Reinstall the cover assembly.
10. Reinstall the sheet-feed.



Right Side View

875 INSERTION GUIDE

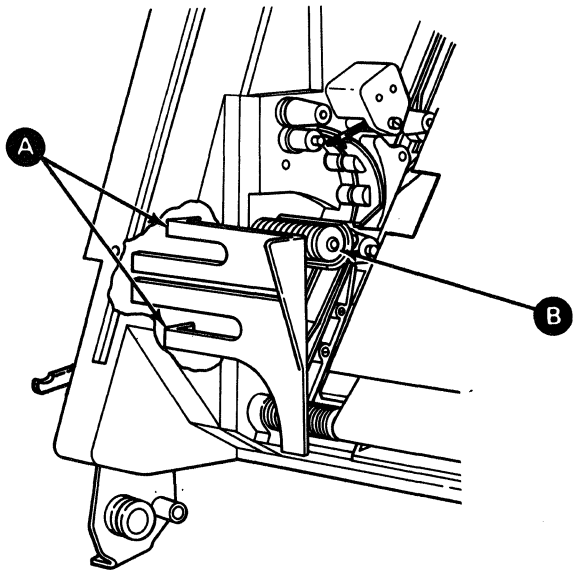
Removal and Replacement

1. Power off.

2. Raise the pressure roller (B) to the manual feed position.

3. Slide the insertion guide to the right. When it is fully extended, pull the two locking tabs (A) on the insertion guide to the front of the sheet-feed and pull the insertion guide to the right to remove it.

4. For the replacement of the insertion guides, reverse this procedure.

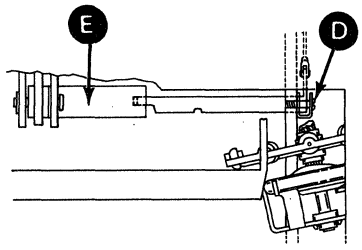


Front View

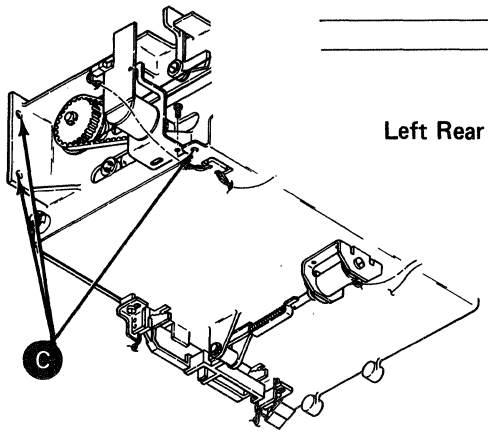
876 ENVELOPE HOPPER

Removal and Replacement

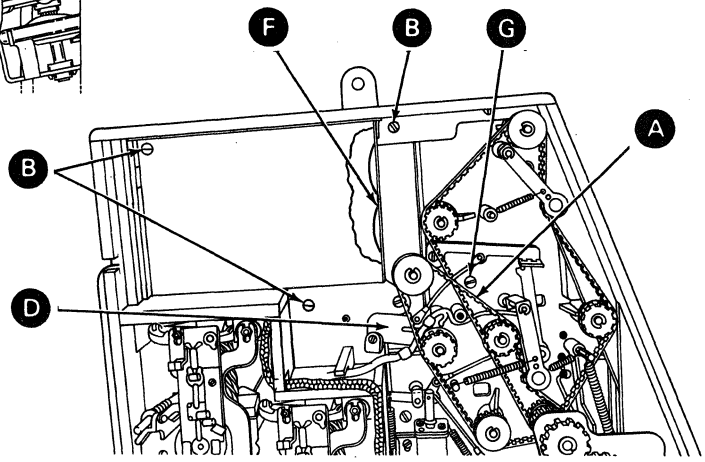
1. Power off.
2. Remove the cover assembly (860).
3. Remove the envelopes from the envelope hopper.
4. Remove the analog card (862).
5. Remove the outer drive belt (A) (870).
6. Remove the C-clip from the knock-off bellcrank (D).
7. Slide the knock-off bellcrank to the left to remove it from the restraint bell crank.
8. Remove the three right side envelope hopper mounting screws (C).
9. Remove the three left side envelope hopper mounting screws (B).
10. Remove the envelope hopper to block mounting screw (G).
11. Remove the envelope hopper.
12. For replacement of the envelope hopper, reverse this procedure. Ensure that the knock off bellcrank (D) slides into the bellcrank (E). Pull the envelope hopper forward so that the locating tabs (F) on the left front side of the hopper touch the block assembly. Tighten the envelope hopper to block mounting screw (G) first. Then tighten the three left side mounting screws (B), and then tighten the three right side mounting screws (C) last.
13. Perform the diverter latch link adjustment (830).



Left Rear View



Bottom View

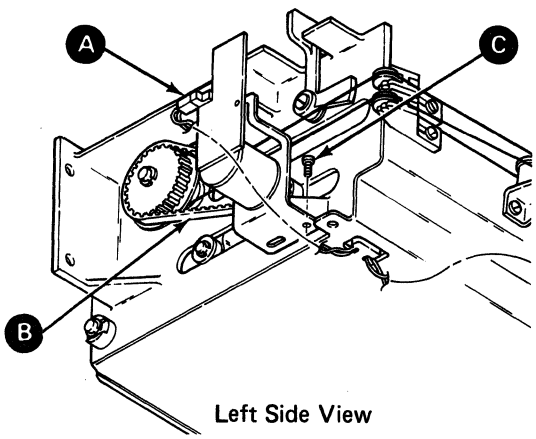


Left Side View

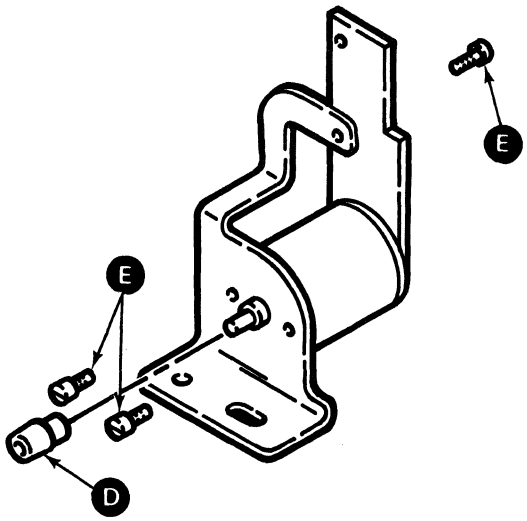
877 ENVELOPE DRIVE MOTOR

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Disconnect the cable (A) from the envelope motor filter board.
4. Remove the envelope motor belt (B).
5. Remove the envelope drive motor assembly mounting screw (C).
6. Remove the envelope drive motor assembly.
7. Loosen the two envelope motor pulley (D) setscrews, and remove the pulley.
8. Remove the three envelope motor mounting screws (E).
9. For replacement of the envelope motor, reverse this procedure.
10. Perform the envelope motor adjustment (835).
11. Reinstall the cover assembly.



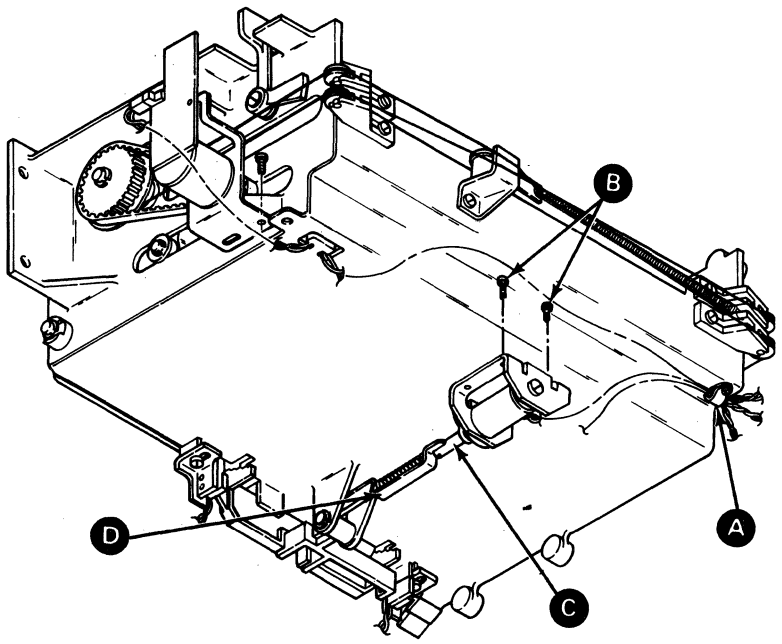
Left Side View



878 SECOND ENVELOPE RESTRAINT SOLENOID

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Remove the paper trays.
4. Remove the sheet-feed from the printer.
5. Remove the second envelope restraint solenoid cable connector (J3) from the analog card (805).
6. Remove the second envelope restraint solenoid cable from the cable clamp (A).
7. Remove the two solenoid mounting screws (B) from the top side of the envelope hopper.
8. Turn the solenoid so that the plunger (C) can be removed from the restraint link bracket (D).
9. For replacement of the second envelope restraint solenoid, reverse this procedure.
10. Perform the second envelope restraint solenoid adjustment (836).
11. Reinstall the cover assembly.
12. Reinstall the sheet-feed on the printer.
13. Reinstall the paper trays.

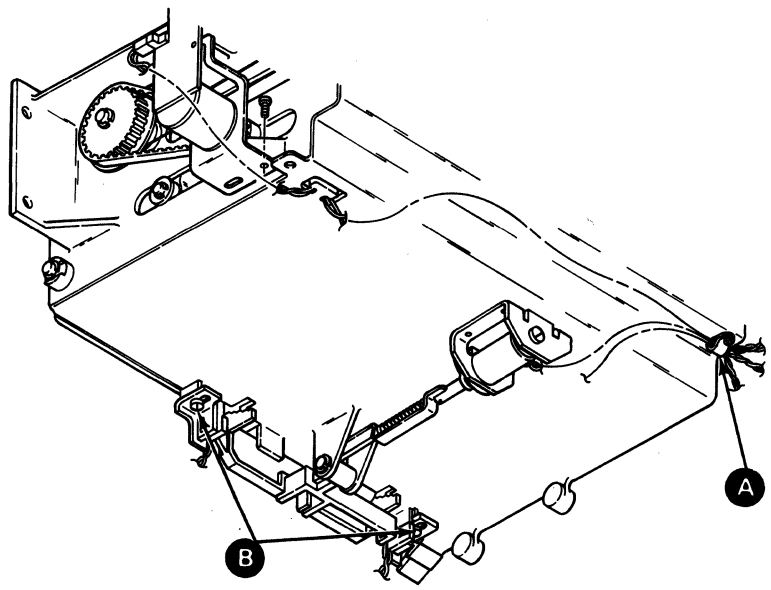


Bottom View

879 ENVELOPE SENSOR SWITCHES

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Disconnect the envelope switch cable from the analog card (805).
4. Remove the paper trays.
5. Remove the middle and the upper racks (869).
6. Remove the envelope sensor switch cable from the cable clamp (A).
7. Remove the two switch mounting screws (B).
8. Remove the sensor switches.
9. For replacement of the envelope sensor switches, reverse this procedure.
10. Reinstall the paper trays.
11. Reinstall the middle and the upper rack.
12. Reinstall the cover assembly.



Bottom View

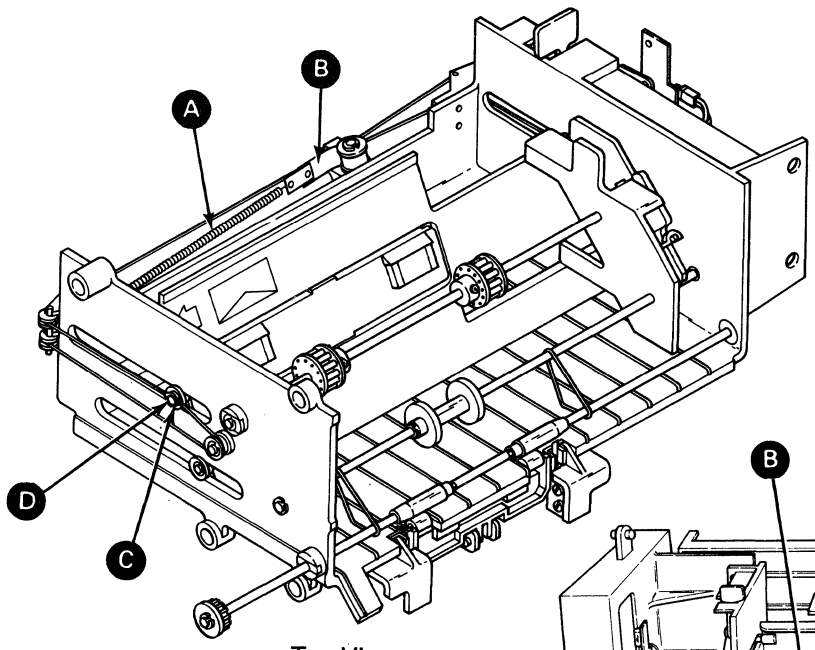
880 ENVELOPE PRESSURE CABLES

Removal and Replacement

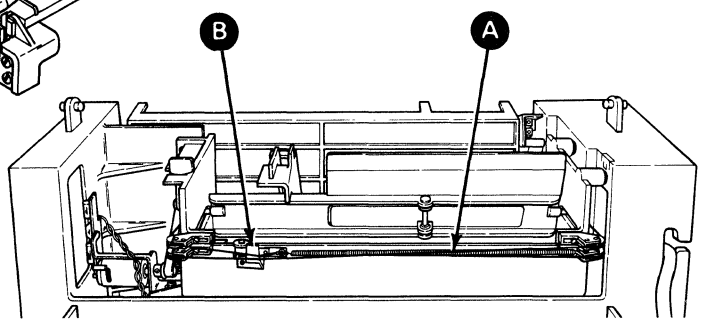
1. Power off.
2. Remove the cover assembly (860).
3. Remove the analog card (862).
4. Disconnect the pressure cable spring (A).
5. Disconnect the flat spring (B).

   Note: Observe how the pressure cables are routed around the pulleys and that they cross at the rear of the envelope hopper.

6. Remove the C-clip (C), one on each side of the hopper, from the pressure plate stud (D).
7. Remove the pressure cables.
8. For replacement of the pressure cables, reverse this procedure.
9. Perform the envelope hopper pulley/pressure cable adjustment (838).
10. Reinstall the analog card.
11. Reinstall the cover assembly.



Top View

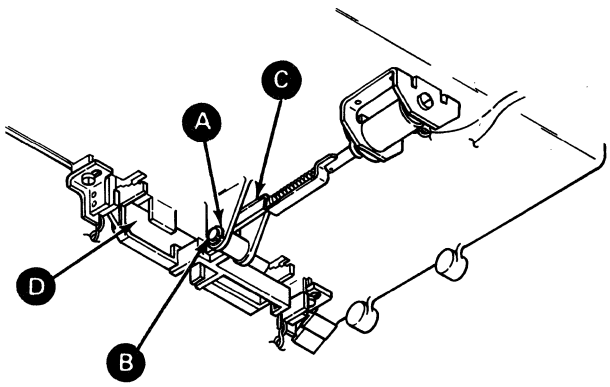


Rear View

881 SECOND ENVELOPE RESTRAINT BRACKET/BACK-UP ROLLERS

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Remove the paper trays.
4. Remove the deflector and the upper rack (869).
5. Remove the C-clip (A) from the bellcrank pin (B).
6. Remove the bellcrank pin.
7. Remove the second envelope restraint link (C) from the bellcrank.
8. Remove the bracket (D).
9. For replacement of the envelope bracket/back-up rollers, reverse this procedure.
10. Ensure the second envelope restraint solenoid adjustment (836) is correct.
11. Reinstall the paper trays.
12. Reinstall the deflector and the upper rack.
13. Reinstall the cover assembly.

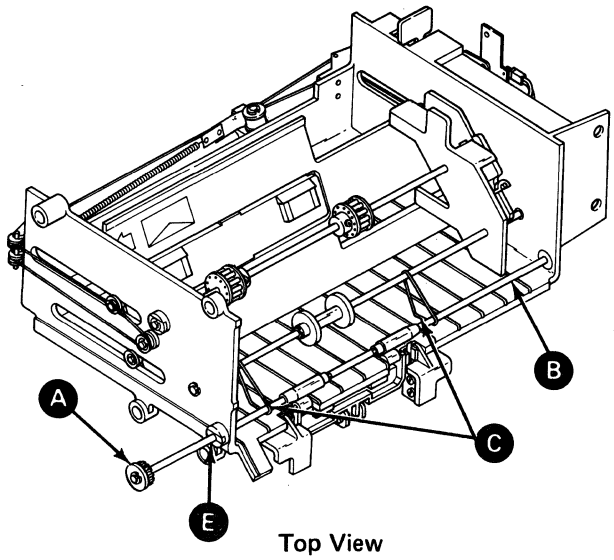


Bottom View

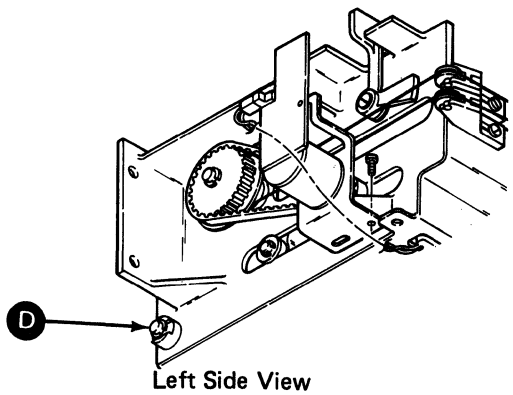
882 ENVELOPE FEED ROLLER SHAFT

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Remove the deflector.
4. Slide the pressure plate to its rear-most position.
5. Remove the grip clip from the P6 pulley (A) and remove the P6 pulley.
6. Remove the wire guides (C).
7. Remove the C-clip (D) from the right side of the feed shaft (B).
8. Remove the C-clip (E) from the left side of the feed shaft.
9. Slide the feed shaft (B) to the left until it clears the envelope hopper.
10. Slide the feed shaft to the right and remove the feed shaft.
11. For replacement of the feed rollers, reverse this procedure.
12. Reinstall the deflector.
13. Reinstall the cover assembly.



Top View

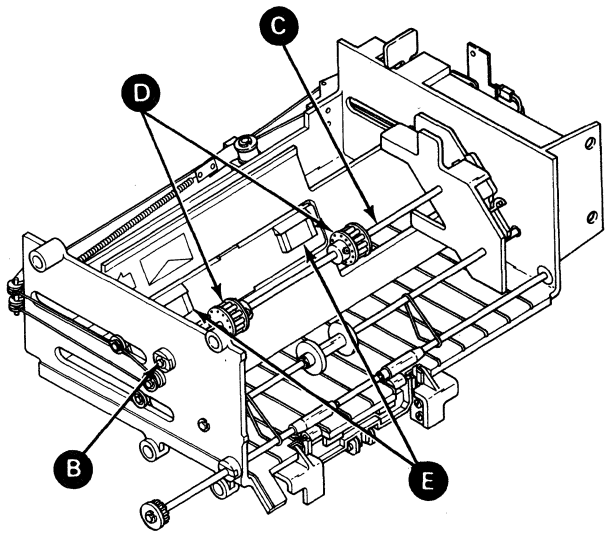


Left Side View

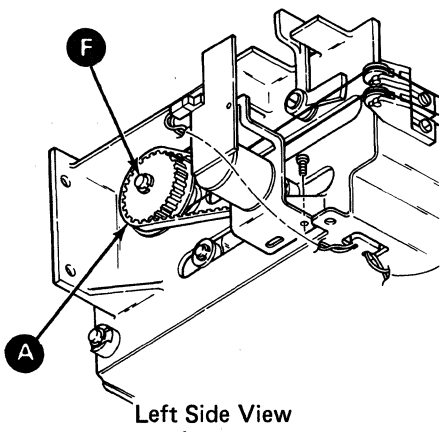
883 ENVELOPE DRIVE WHEEL

Removal and Replacement

1. Power off.
2. Remove the cover assembly (860).
3. Remove the analog card retainer and lay the analog card over (862).
4. Remove the envelope motor drive belt (A).
5. Remove the grip clip and separator shaft drive pulley (F).
6. Remove the C-clip (B) from the left side of the separator shaft (C).
7. Loosen the setscrews on the drive wheels (D).
8. Slide the separator shaft to the left.
9. Remove the drive wheels and envelope restraint.
10. For replacement of the drive wheels, reverse this procedure. Ensure that the drive wheel setscrews are tightened on the flats of separator shaft and facing the center of the separator shaft. This ensures that the drive wheels are centered on the wobble plate pads (E).



Top View



Left Side View

FRONT EXIT SHEET-FEED PREVENTIVE MAINTENANCE

No scheduled preventive maintenance is needed for the front exit sheet-feed. Preventive maintenance is performed at the time of a service call.

Use only enough lubricant to lubricate the specified maintenance area.

Ensure that the lubricant does not touch the picker/separator, paper trays, paper paths, analog card, the rubber part of the cone rollers or drive wheel, or the envelope feed rollers.

Lubrication should only be used at the first installation and as necessary to any of the following hardware.

Use IBM number 23 grease for:

- All gear shafts
- All spring contact points (except picker/separators spring)
- All clevis contact points
- All upper bell crank attachment point
- Gear studs on the left mounting plate.

Use IBM number 10 oil for:

- squeaks in the cone rollers and back-up rollers
- envelope hopper pressure cable pulleys.

FRONT EXIT SHEET-FEED THEORY

INTRODUCTION

The front exit sheet-feed is available in two features. The first feature feeds both cutsheets of paper, and envelopes. The second feature feeds only paper. Except for this difference, both features operate the same.

The front exit sheet-feed:

- Supports paper lengths from 197 mm (7.75 inches) to 364 mm (14.33 inches) and widths from 148 mm (5.83 inches) to 297 mm (11.69 inches).
- Supports envelope lengths from 190.5 mm (7.50 inches) to 241.3 mm (9.5 inches) and widths from 98.6 mm (3.88 inches) to 114.3 mm (4.50 inches).
- Has two separate paper supply trays, each containing a maximum stack of paper 28 mm (1.10 inches) high, approximately 200 sheets, of 75gm/m^2 (20 lb.) paper.
- Has an envelope hopper, containing a maximum stack of envelopes 70 mm (2.76 inches) high, approximately 100 envelopes, of 75gm/m^2 (20 lb.) weight.
- Has sensors to sense when there is a paper jam, when the paper supply trays, or envelope hopper are empty, or when an exit operation is complete.
- Has an output tray with separate envelope and paper sections capable of storing sequenced output. The output tray holds 100 envelopes and 400 sheets of paper.

FUNCTIONAL PARTS

Functional parts include the paper and envelope picker/separator assemblies, second sheet restraint solenoid, second envelope restraint solenoid, paper path sensors, envelope sensors switches, paper exit switch, and envelope exit switch.

Paper Picker/Separator Assemblies

There is a picker/separator assembly for each paper tray. The picker/separator assembly contains the picker/separator motor, drive wheel, and leadscrew. The picker/separator motor is used to drive the leadscrew. When the motor is on, the picker/separator wheel, mounted on the leadscrew, turns and feeds the top sheet of paper out of the paper tray.

Envelope Picker/Separator

The envelope picker/separator contains the envelope drive motor, and the drive wheel assembly. When the motor is on, the drive wheel assembly turns and feeds the top envelope out of the envelope hopper.

Second Sheet Restraint Solenoid

The second sheet restraint solenoid works with the picker/separator motors and is activated when either picker/separator motor is activated.

When activated, the second sheet restraint solenoid moves both restraint pawls from the input paper paths and lets the top sheet in the paper tray enter the cone rollers.

When deactivated, the spring loaded restraint pawls enter the input paper paths to prevent a second sheet from being sent with the first sheet.

Second Envelope Restraint Solenoid

The second envelope restraint solenoid is activated when both envelope sensor switches sense an envelope.

When activated, the second envelope restraint solenoid raises the back-up rollers and the restraint against the envelope feed rollers. The restraint prevents a second envelope from being fed while the pinch force of the back-up rollers against the feed rollers drives the top envelope to the first cone roller.

Paper Path Sensors

The paper path sensors sense the presence of a sheet of paper in the two input paper paths. The sensors are located in line with the first cone roller in each input paper path.

When paper is present at the paper path sensor, light generated by the light-emitting diode (LED) is reflected back to the phototransistor. This light reflection causes the phototransistor to conduct, causing the upper or lower paper path sensor signals (H1S or H2S) to go to +5 Vdc. This signal is sent back to the printer to indicate that a sheet of paper is sensed in the paper path. If paper is not sensed within eight seconds after the picker/separator is turned on, the paper tray is assumed to be empty and 01, 02, or 03 is displayed on the printer two-digit display.

When paper is not present, the light generated by the LED is transmitted into a black cylinder surface and not reflected into the phototransistor.

Envelope Sensor Switches

The envelope sensor switches sense the presence of the envelope moving out of the envelope hopper. If an envelope is not sensed within 8 seconds after the envelope drive motor is turned on, the envelope hopper is assumed to be empty and 03 is displayed on the printer two-digit display.

Exit Switches (Paper and Envelopes)

There are two exit switches for the output tray, one for the paper output and one for the envelope output. When either switch closes, SFCUR goes to +5 Vdc indicating the end of an eject operation.

FRONT EXIT SHEET-FEED OPERATION SUMMARY

The dc circuits needed to drive functional parts are contained on the front exit sheet-feed analog card. The analog card for the envelope/paper feature contains two photo detector circuits, two solenoid drive circuits, and three dc motor drive circuits. The analog card for the paper only feature is the same except it contains only two dc motor drive circuits. DC voltages present on the front exit sheet-feed analog card are +5 Vdc, +12 Vdc, and +36 Vdc and are supplied by the power supply located in the printer.

The front exit sheet-feed is connected to the printer by the paper handling cable. All voltages and control signals needed for front exit sheet-feed operations and all status signals are present on this cable. The paper handling cable connects to the printer at the attachment panel and to the front exit sheet-feed at J7 on the analog card.

Paper Handling Cable

Front Exit Sheet-Feed Analog Card J7 Pin	Signal Name	Printer Attachment Panel Connector Pin
1	AF (alternate feed)	1
2	Analog ground	16
3	Logic ground	10
4	+12 Vdc	18
5	+36 Vdc	14
6	SF* (- sheet-feed sense)	7
7	APOR* (- analog POR)	17
8	R2MO* (- P/S motor 2)	4
9	R1MO* (- P/S motor 1)	5
10	SFCUR (+ sheet-feed BAT passed	6
11	H2S (+ paper tray 2 sense)	9
12	H1S (+ paper tray 1 sense)	8
13	+5 Vdc	11
14	TF* (- tractor feed)	2
15	Frame ground	
16	Ground (left mounting plate)	

* Not (negative logic) signal

SIGNALS

Status signals supplied from the front exit sheet-feed analog card to the printer are:

H1S - Lower paper sensor or envelope sensor switches
H2S - Upper paper sensor
SFCUR - Current sense or exit switch
SF*, TF* - front exit sheet-feed ID

Control signals supplied to the front exit sheet-feed are:

R1MO* - Lower picker/separator or envelope motor switch
R2MO* - Upper picker/separator motor
AF - Alternate Feed Line
APOR* - Analog power on reset

H1S and **H2S** are the output from the paper path sensors.

SFCUR is used to diagnose problems with the dc motor or drivers and to determine that paper or envelopes have passed the exit switches. SFCUR goes to +5 Vdc when either picker/separator motor, or the envelope motor is on, or when the paper exit or envelope exit switch is closed.

SF*, and **TF***, indicate to the printer the feature of front exit sheet-feed installed.

SF*	TF*	
Ground	+5 Vdc	= Paper feature only
Ground	Ground	= Envelope/paper feature

APOR* is low until +36 Vdc, +5 Vdc, and +12 Vdc are present on the front exit sheet-feed analog card. With APOR* low the front exit sheet-feed will not operate, regardless of the other control lines.

FEED OPERATION

The feed operation is divided between feeding paper and envelopes. R1MO*, R2MO*, and AF are the signals that control the feed operation.

With AF at 0 Vdc, R1MO* or R2MO* going 0 Vdc turns on the lower or upper picker/separator motor, and the second sheet restraint solenoid. The second sheet restraint solenoid lowers the paper restraint pawls from the paper path and moves the diverter to the paper feed exit position. The picker/separator drives the top sheet of paper, from the selected paper tray, into the paper path to the point where the paper sensors sense the sheet. When the paper is sensed, H1S or H2S and R1MO* or R2MO* goes to +5 Vdc, turning off the second sheet restraint solenoid and the picker/separator. The paper restraint pawls move back into the paper path stopping a second sheet from being fed.

If paper is not sensed by the paper sensors eight seconds after R1MO* or R2MO* goes to 0 Vdc, error code 01 or 02, paper tray empty, is displayed on the printer two-digit display.

From the paper sensors the paper is driven to the platen by the cone rollers. The cone rollers are driven by the printer platen gear through a gear and timing belt on the front exit sheet-feed. If the printer first writing line sensor does not sense paper in 305 mm (12 inches) of indexing, error code 05, paper jam, is displayed on the printer two-digit display.

With AF at +5 Vdc, R1MO* going to 0 Vdc turns on the envelope motor instead of the lower picker/separator motor and the second sheet restraint solenoid. The envelope motor drives the top envelope into the envelope sensor switches. When both envelope sensor switches close H1S goes to +5 Vdc; the envelope motor stops, and the second envelope restraint solenoid is activated. The second envelope restraint solenoid causes the envelope back-up rollers and restraints to raise against the envelope feed rollers, and the diverter switch switches to the envelope feed position. The envelope is moved into the envelope input path by the feed rollers through the platen and gear train to the first set of cone rollers.

If the envelope sensor switches do not close in 8 seconds, error code 03, envelope hopper empty, is displayed on the printer two-digit display.

Envelopes move along the same path to the printer as paper.

EJECT OPERATION

Once printing is complete, the paper or envelope is indexed until the FWL sensor indicates that no paper or envelope is present. Then an indexing operation equal to 457 mm (18 inches) starts. This drives the envelope or paper into the front exit sheet-feed where it is driven, by the cone rollers, to the output tray. Which output tray is used is defined by the position of the diverter switch.

If, after 457 mm (18 inches) of indexing the first writing line sensor or either exit switch still senses the paper or envelope, or the exit switch has not sensed the paper or envelope, error code 05, paper jam, is displayed on the printer two-digit display.

CHAPTER 9. TRACTOR FEED

The tractor feed unit is required for printing on continuous forms. The unit can easily be installed or removed from the printer. The tractor feed supports the forward index mode only. The tractor feed forms must be new and without paper damage.

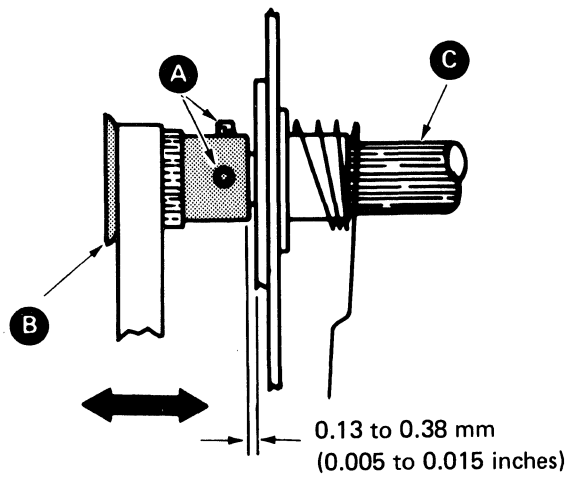
The tractor feed unit supports forms with a maximum width of 370 mm (14.5 inches) and a minimum width of 51 mm (2.0 inches). These measurements are from hole to hole on the forms. If the forms are measured from edge to edge, the forms would have a maximum width of 381 mm (15.0 inches), and a minimum width of 64 mm (2.5 inches).

Single part or multipart forms, up to a maximum of one original and five copies can be supplied from 915 mm (36 inches) below the platen. Single part forms should be 60 to 90 gm/m^2 (16 to 24 lb.) paper. Multipart forms should be 45 to 90 gm/m^2 (12-24 lb.) paper. Both single and multipart forms thickness should not be more than 0.6 mm (0.024 inches). All copies of multipart forms must be positive fastened along at least one edge so that they do not separate prior to reaching the exit tractor drive pins. The carbon paper must be tightly fastened such as to be kept in line with the form. Semi-positive fastened forms are subject to ply separation and are not recommended.

TRACTOR FEED ADJUSTMENTS

SPLINE SHAFT END PLAY

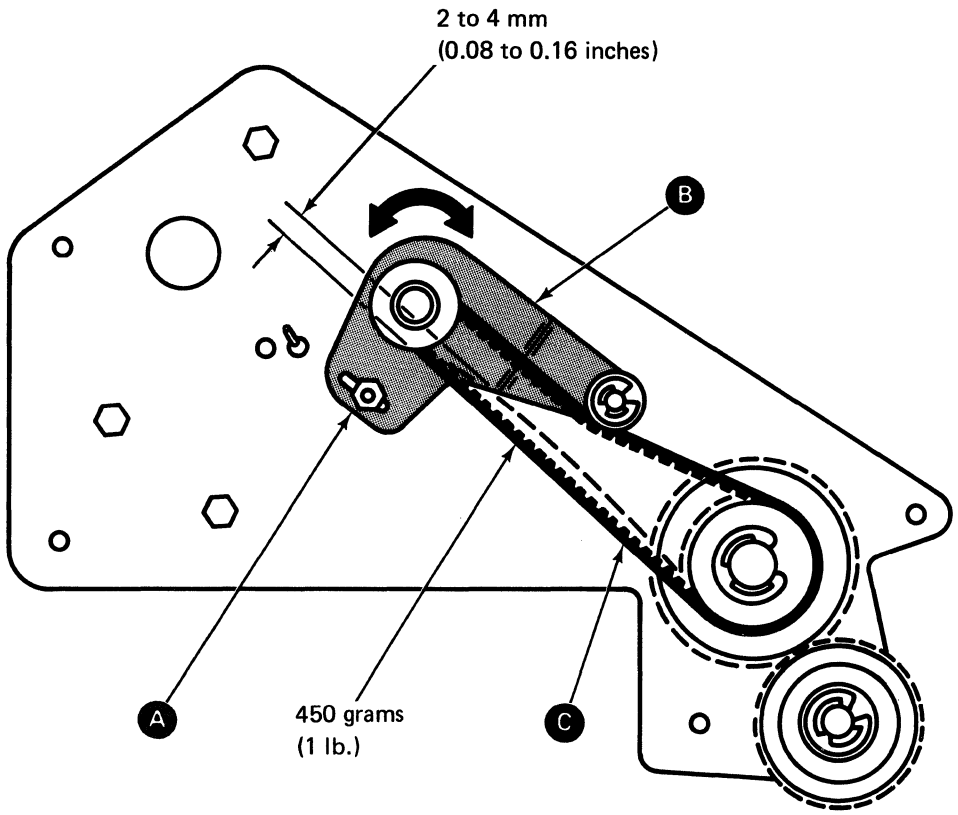
1. Power off.
2. Remove the tractor feed from the printer.
3. Remove the left tractor feed end cover.
4. Loosen the two upper pulley setscrews (A).
5. Place the upper pulley (B) so that the spline shaft (C) has 0.13 to 0.38 mm (0.005 to 0.015 inches) end play.
6. Tighten the two upper pulley setscrews.
7. Perform the drive belt tension adjustment.
8. Reinstall the left tractor feed cover.



Front View

DRIVE BELT TENSION

1. Power off.
2. Remove the tractor feed from the printer.
3. Remove the left tractor feed end cover.
4. Loosen the drive belt tension bracket mounting screw (A).
5. Adjust the drive belt tension bracket (B) so that 450 grams (1 pound) applied at 90 degrees to the straight part of the drive belt (C) deflects the drive belt 2 to 4 mm (0.080 to 0.160 inches).
6. Tighten the drive belt tension bracket mounting screw.
7. Reinstall the left tractor feed end cover.



INDEX

A

B

C

D

E

F

H

I

R

T

V

IBM 5218 Printer Models A03/A04
Maintenance Information Manual
Order No. SY20-8575-0

READER'S COMMENT FORM

You may use this form to communicate your comments about this publication, its organization, or subject matter, with the understanding that IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you. Your comments will be sent to the author's department for whatever review and action, if any, are deemed appropriate.

Note: *Copies of IBM publications are not stocked at the location to which this form is addressed. Please direct any requests for copies of publications, or for assistance in using your IBM system, to your IBM representative or to the IBM branch office serving your locality.*

Possible topics for comment are:
Clarity Accuracy Completeness Organization Coding Retrieval Legibility

If you wish a reply, give your name, company, mailing address, and date:

_____

_____

_____

_____

Note: Staples can cause problems with automated mail sorting equipment.
Please use pressure sensitive or other gummed tape to seal this form.

What is your occupation? _____

Number of latest Newsletter associated with this publication: _____

Thank you for your cooperation. No postage stamp necessary if mailed in the U.S.A. (Elsewhere, an IBM office or representative will be happy to forward your comments or you may mail directly to the address in the Edition Notice on the back of the title page.)

eader's Comment Form

Cut or Fold Along Line

old and tape

Please Do Not Staple

Fold and tape

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

International Business Machines Corporation
Department 997, Building 998
11400 Burnet Rd.
Austin, Texas 78758

Fold and tape

Please Do Not Staple

Fold and tape

IBM

IBM 5218 Printer Models A03/A04 Maintenance Information Manual Printed in U.S.A. SY20-8575-0

SY20-8575-0
P/N 6081979

IBM 5218 Printer Models A03/A04 Maintenance Information Manual Printed in U.S.A. SY20-8575-0

P/N 6081979