

**CONTENTS**

27-020	Safety	27-415	Picker/Cam Bezel to Carriage Bed Service Check
27-030	Tools	27-420	Picker/Cam Bezel to Carriage Bed Adjustment
27-120	Diskette Protection	27-425	Picker/Cam Bezel Removal and Replacement
27-200	72MD Removal and Replacement	27-430	Picker/Cam, Stepper Motor, and Belt Removal and Replacement
27-205	72MD Service Position	27-435	Picker Carriage Assembly Removal and Replacement
27-210	Cover Open Switch Service Check	27-440	Picker Carriage Detent Service Check
27-215	Cover Open Switch Adjustment	27-445	Picker Carriage Detent Adjustment
27-220	Cover Open Switch Removal and Replacement	27-450	Picker Carriage Detent Removal and Replacement
27-225	AC Drive Motor Removal and Replacement	27-453	Picker Finger Service Check
27-230	Carriage Bed Stop Service Check	27-455	Picker Finger Adjustment
27-235	Carriage Bed Stop Adjustment	27-460	Picker Finger Removal and Replacement
27-240	Carriage Bed Stop Removal and Replacement		Machines with Old Style Picker
27-245	Carriage Bed Stepper Motor Removal and Replacement		Machines with New Style Picker
27-250	Carriage Bed Monorail Removal and Replacement	27-465	Picker Rest Sensor Service Check
27-255	Carriage Bed Belt Removal and Replacement	27-470	Picker Rest Sensor Adjustment
	Machines with Old Style Tray	27-475	Picker Rest Sensor Removal and Replacement
	Machines with New Style Tray	27-480	Picker Extend Service Check
27-260	Carriage Bed Orient Switch Service Check	27-485	Picker Extend Adjustment
27-265	Carriage Bed Orient Switch Adjustment	27-490	Picker/Cam Stepper Motor Windings Resistance Service Check
27-270	Carriage Bed Orient Switch Removal and Replacement	27-495	Jam Removal Wheel Removal and Replacement
27-275	Carriage Bed Stepper Motor Windings Resistance Service Check	27-500	Stripper Removal and Replacement
27-280	Magazine Interlock/Indicator Adjustment	27-505	Stripper Magnet Service Check
27-285	Magazine Interlock/Indicator Removal and Replacement	27-510	Stripper Magnet and Switch Assembly Removal and Replacement
27-290	Carriage Bed Orient Service Check	27-515	Stripper Magnet Switch Service Check
27-295	Carriage Bed Orient Adjustment	27-520	Stripper Magnet Switch Adjustment
27-300	Carriage Bed Assembly Removal and Replacement	27-525	Stripper Magnet Switch Removal and Replacement
27-305	Carriage Bed to Diskette Drive Bezel Adjustment	27-600	Head/Carriage Service Check
27-310	Carriage Bed to Diskette Drive Bezel Service Check	27-605	Head/Carriage Adjustment
27-315	Magazine Pressure Roll Housing Removal and Replacement	27-610	Head/Carriage Removal and Replacement
27-400	Picker/Cam Casting Assembly Removal and Replacement	27-615	Head/Carriage Stepper Motor Removal and Replacement
27-405	Picker/Cam Timing Service Check	27-620	Head/Carriage Pulley and Clamp Removal and Replacement
27-410	Picker/Cam Timing Adjustment	27-625	Drive Band Service Check

- 27-645 Diskette In Switch Adjustment and Service Check
- 27-650 Diskette In Switch Removal and Replacement
- 27-653 Head Load Bail Assembly Service Check and Adjustment
- 27-655 Head Load Bail Assembly Removal and Replacement
- 27-660 Collet Assembly Removal and Replacement
- 27-665 Diskette Drive Bezel Removal and Replacement
- 27-670 Diskette Drive Assembly Removal and Replacement
- 27-675 Index Sense Alignment Service Check
- 27-680 Index Sense LED Output Service Check
- 27-685 Index Sense LED Assembly Removal and Replacement
- 27-690 Index Sense PTX Output Service Check
- 27-695 Index Sense PTX Assembly Removal and Replacement
- 27-700 Diskette Speed Service Check
- 27-800 Driver Board Output to the Picker/Cam Stepper Motor Service Check
- 27-805 Driver Board Output to the Carriage Bed Stepper Motor Service Check
- 27-810 Driver Board Assembly Removal and Replacement
- 27-815 Control Card Removal and Replacement
- 27-820 Control Card Test Pins
  - Machines with Old Style Picker
  - Machines with New Style Picker
- 27-825 Control Card Logic Pins
- 27-830 Control Card Socket and Connector Pins
- 27-835 Control Card Head Cable Pins
- 27-840 Control Card and Mounting Assembly Removal and Replacement
- 27-845 Carriage Bed Stepper Motor Control Card Signal Output Check
- 27-850 Picker/Cam Stepper Motor Control Card Signal Output Check
- 27-900 Diskette Quality and Head Wear Service Check
- 27-910 Diskette Failure Descriptions
- 27-920 Diskette Test Descriptions
- 27-930 Diskette Figure
- 27-940 Diskette Quality Service Check
- 27-950 Head Wear Service Check



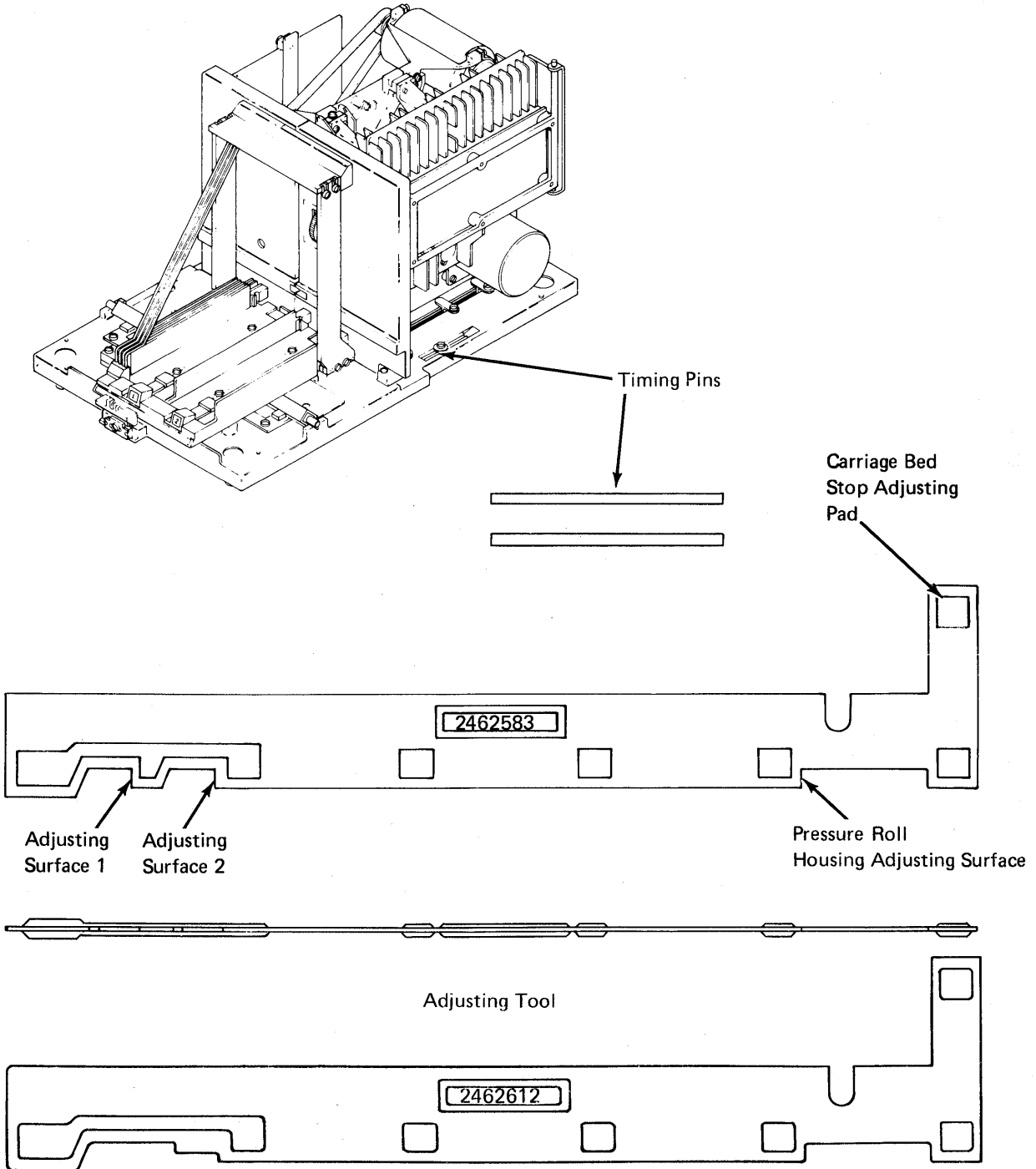
**27-030 TOOLS**

Two timing pins (part 5562019, located on the base of the 72MD unit) are used to align the following:

- The read/write head carriage stepper motor.
- The PTX-LED assembly.

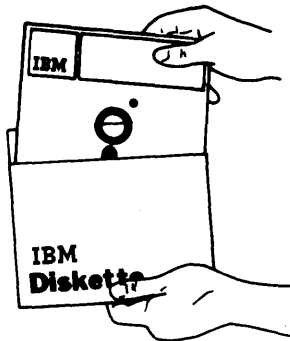
Use the adjusting tool (part 2462583 for old style picker, part 2462612 for new style picker) for the following:

- The carriage bed adjustments and service checks.
- The picker finger adjustments and service checks.
- The picker/cam adjustments and service checks.
- The magazine pressure roll housing replacement.

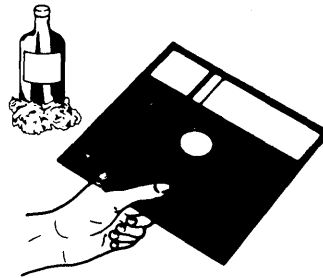


**27-120 DISKETTE PROTECTION**

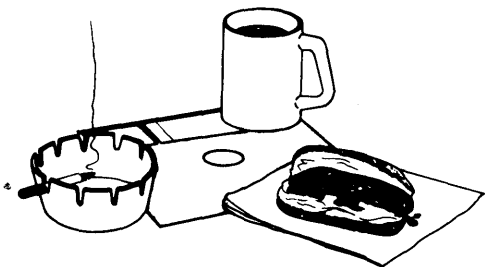
Return a diskette to its envelope when it is removed from the diskette drive.



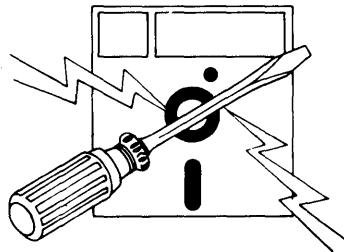
Do not touch or attempt to clean diskette surfaces. Contaminated diskettes will not work correctly.



Do not lay diskettes near smoke or other things that can cause the diskette to be contaminated.

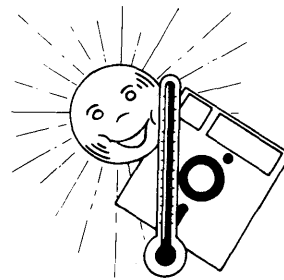


Do not place diskettes near magnetic materials. Data can be lost from a diskette exposed to a magnetic field.

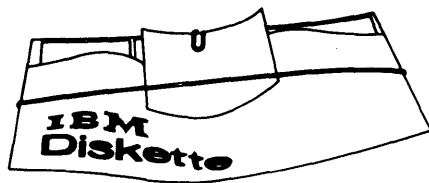


27

Do not expose diskettes to heat greater than 51.7° C (125° F) or direct sunlight.



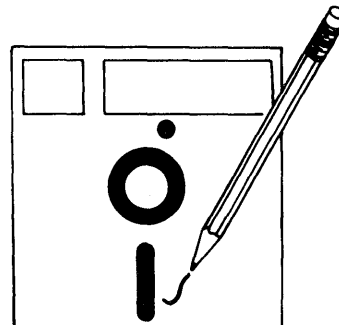
Do not use clips or rubber bands on a diskette.



Do not place heavy books on diskettes.



Do not write outside the label area on diskettes.



**27-200 72MD REMOVAL AND REPLACEMENT**

1. Set Power to O (operator panel).
2. Open the front left side cover and remove screw **B**, open the front right side cover and remove screw **G**. Remove the panel assembly.
3. Loosen the two front safety shield screws and remove the two rear safety shield screws **A** and the safety shield.
4. Disconnect the AC drive motor power cable.
5. Disconnect the A2 signal cable from the control card socket.

**DANGER**

The 72MD unit weight is 18 kg (40 pounds).

**CAUTION**

1. The DC power cable is still connected.
2. Ensure that the cables on the right side of the 72MD unit clear the operator panel bracket.

- 
- 
- 
6. Release the latch mechanism **H** and slide the 72MD unit forward and place the 72MD unit **C** on top of the 5340 system unit.

Note: The cable straps must be removed.

7. Open the heat sink assembly **D** and disconnect the DC power cable **E** from the J1 socket.
8. To operate the 72MD outside the machine, connect the cables removed in steps 4, 5, and 7 and tape the actuator of the interlock switch **F** to the operated position.
9. To reinstall, reverse the above procedure.

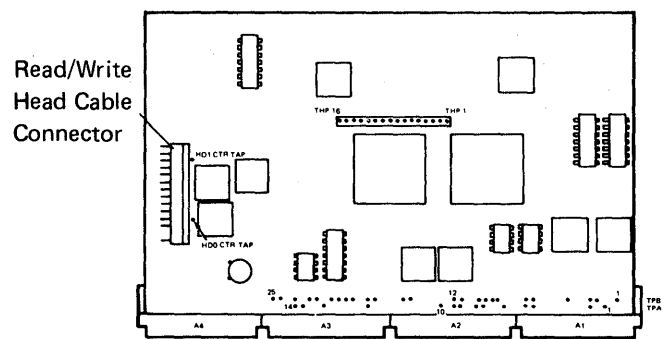
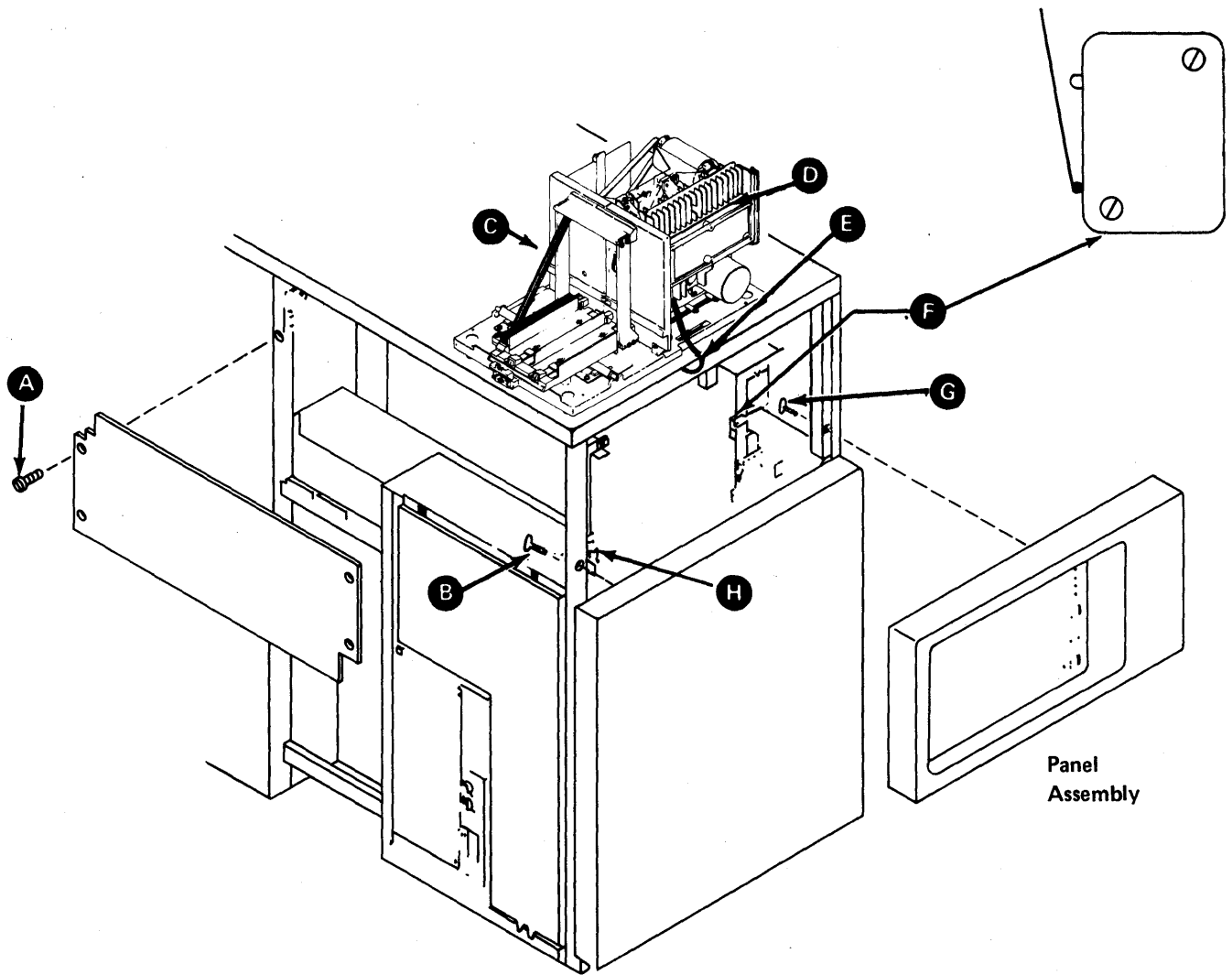
**27-205 72MD SERVICE POSITION**

1. Set Power to O (operator panel).
2. Open the front left side cover and remove screw **B**, open the front right side cover and remove screw **G**. Remove the panel assembly.
3. Loosen the two front safety shield screws and remove the two rear safety shield screws **A** and the safety shield.
4. Remove the cable straps.

**CAUTION**

Ensure that the cables on the right side of the 72MD unit clear the operator panel bracket when the 72MD is placed in the service position.

- 
- 
- 
5. Release the latch mechanism **H** and slide the 72MD unit forward to the service position (the second time the latch has stopped the unit).
  6. To operate the 72MD in the service position, tape the actuator of the interlock switch **F** to the operated position.
  7. To reinstall, reverse the above procedure.



## 27-210 COVER OPEN SWITCH SERVICE CHECK

1. Open the front left side cover.
2. Loosen the two front safety shield screws and remove the two rear safety shield screws **A** and the safety shield.
3. Probe test pin TPB-25 **H** for machines with old style picker or TPB-24 for machines with new style picker (+ cover open) for a zero voltage when the cover is closed and for a plus (+) when the cover is open.
4. If the level is not correct, go to cover open switch adjustment (see paragraph 27-215).
5. If the level is correct, reinstall the safety shield using the four screws **A** and close the front left side cover.

## 27-215 COVER OPEN SWITCH ADJUSTMENT

1. Remove the 72MD unit (see paragraph 27-200).
2. Open the front left side cover.
3. Loosen the two front safety shield screws and remove the two rear safety shield screws **A** and the safety shield.
4. Loosen the four screws **J** that attach the switch assembly to the operator panel bracket.
5. Place the switch assembly **M** so that the switch **F** is made when the cover **L** is closed and not made when the cover is open. Then, tighten the four screws **J**.
6. Perform the cover open switch service check (see paragraph 27-210).

## 27-220 COVER OPEN SWITCH REMOVAL AND REPLACEMENT

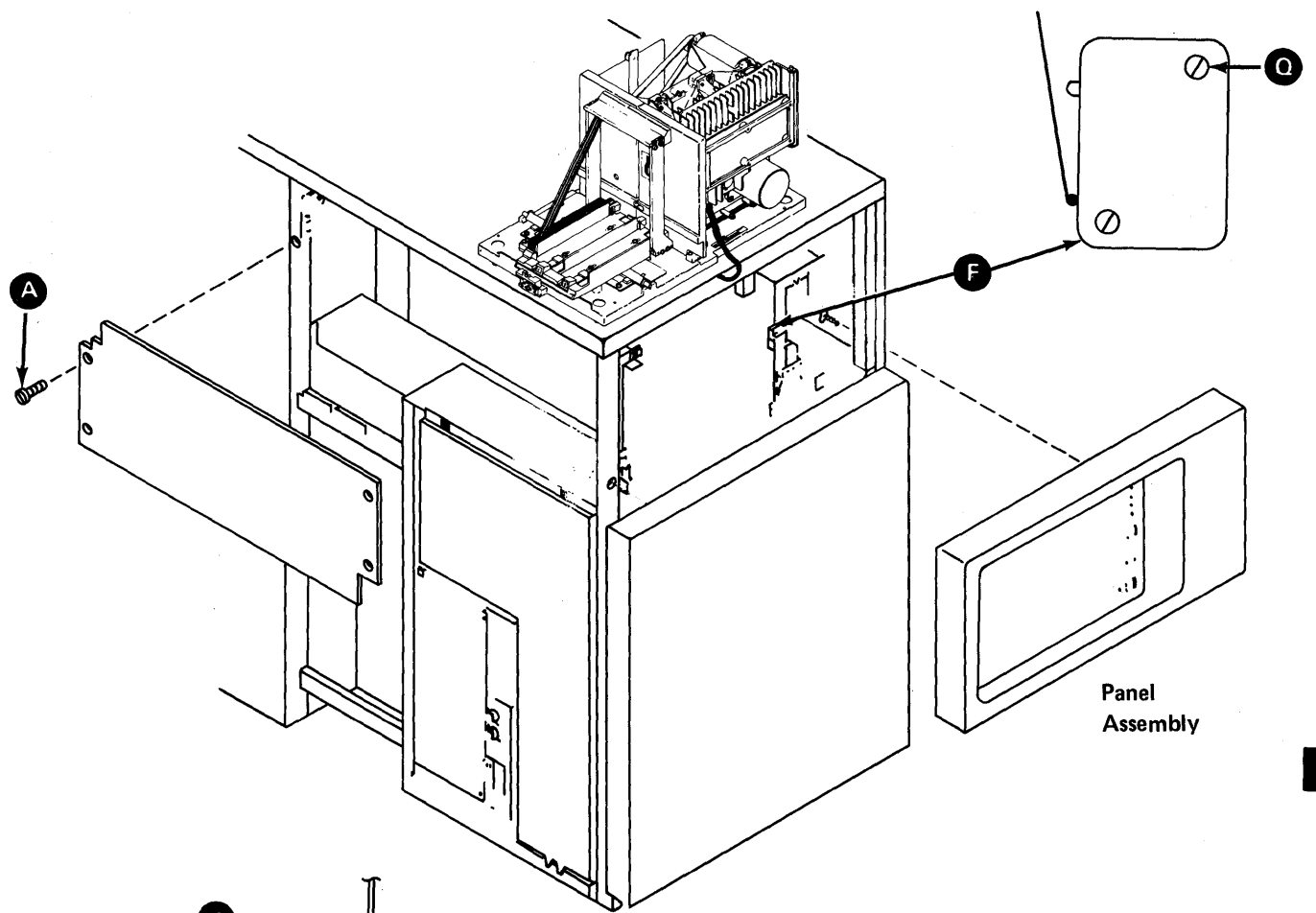
### Removing the Cover Open Switch

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Open the front left side cover.
3. Loosen the two front safety shield screws and remove the two rear safety shield screws **A** and the safety shield.
4. Remove the four screws **J** that attach the switch assembly **M** to the operator panel bracket **N** (do not lose the nut plate **P**).
5. Disconnect the two leads from the cover open switch.
6. Remove the two mounting screws **Q** and the cover open switch **F**.

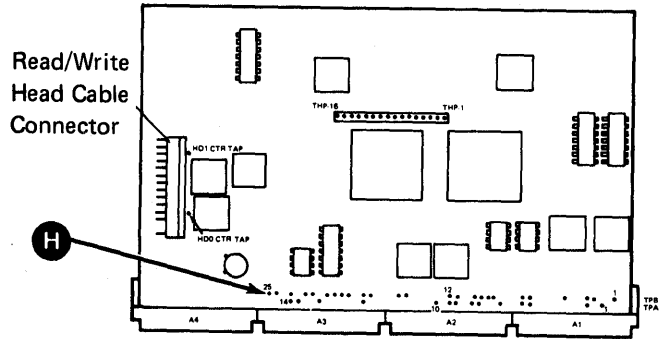
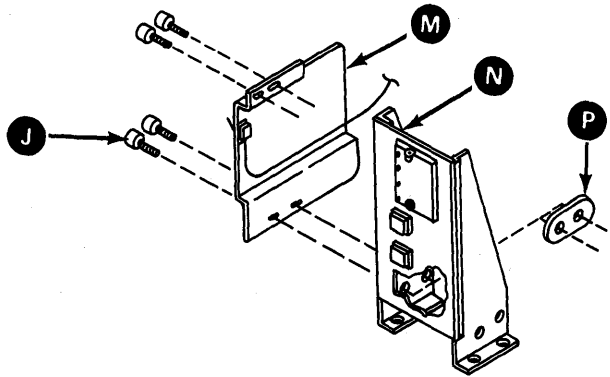
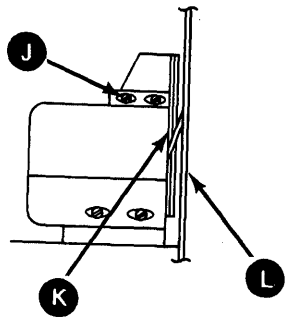
### Reinstalling the Cover Open Switch

1. Position the cover open switch **F** and fasten with the two mounting screws **Q**.
2. Connect the leads to the cover open switch.
3. Attach the switch assembly **M** to the operator panel bracket **N** using the four screws **J** and the nut plate **P**. (Do not tighten the screws.)
4. Perform the cover open switch adjustment (see paragraph 27-215).
5. Reinstall the 72MD unit (see paragraph 27-200).





Panel Assembly



Note: See paragraph 27-820 for control card test pins.

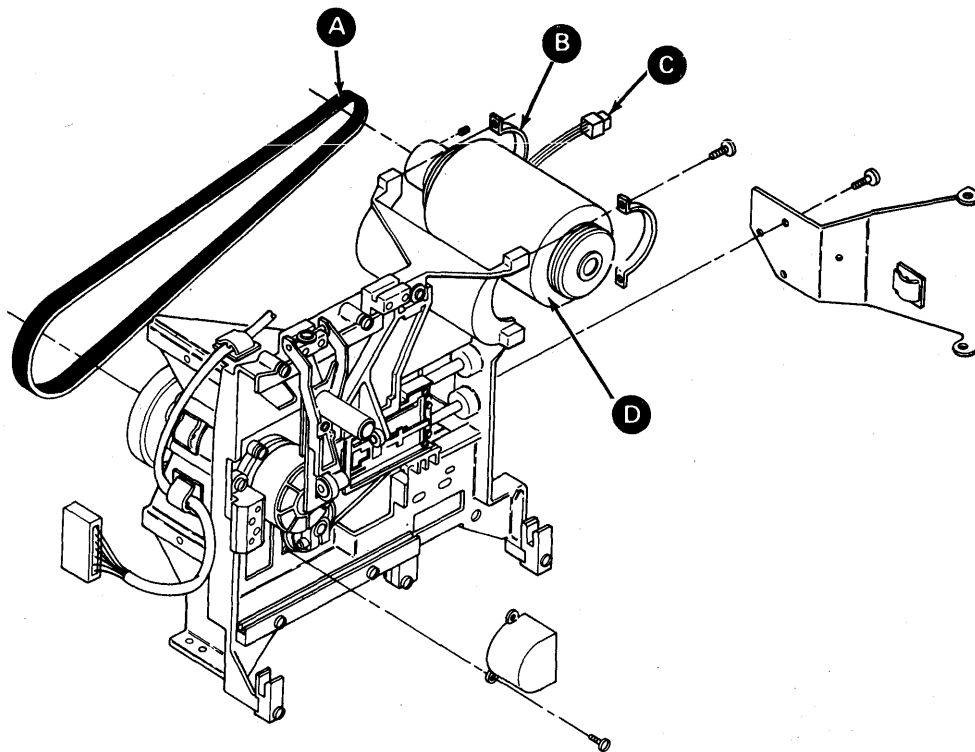
## 27-225 AC DRIVE MOTOR REMOVAL AND REPLACEMENT

### Removing the AC Drive Motor

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Disconnect the AC drive motor power cable **C**.
3. Remove the drive belt **A**.
4. Remove the two motor mounting clamps **B**.
5. Remove the motor **D**.

### Reinstalling the AC Drive Motor

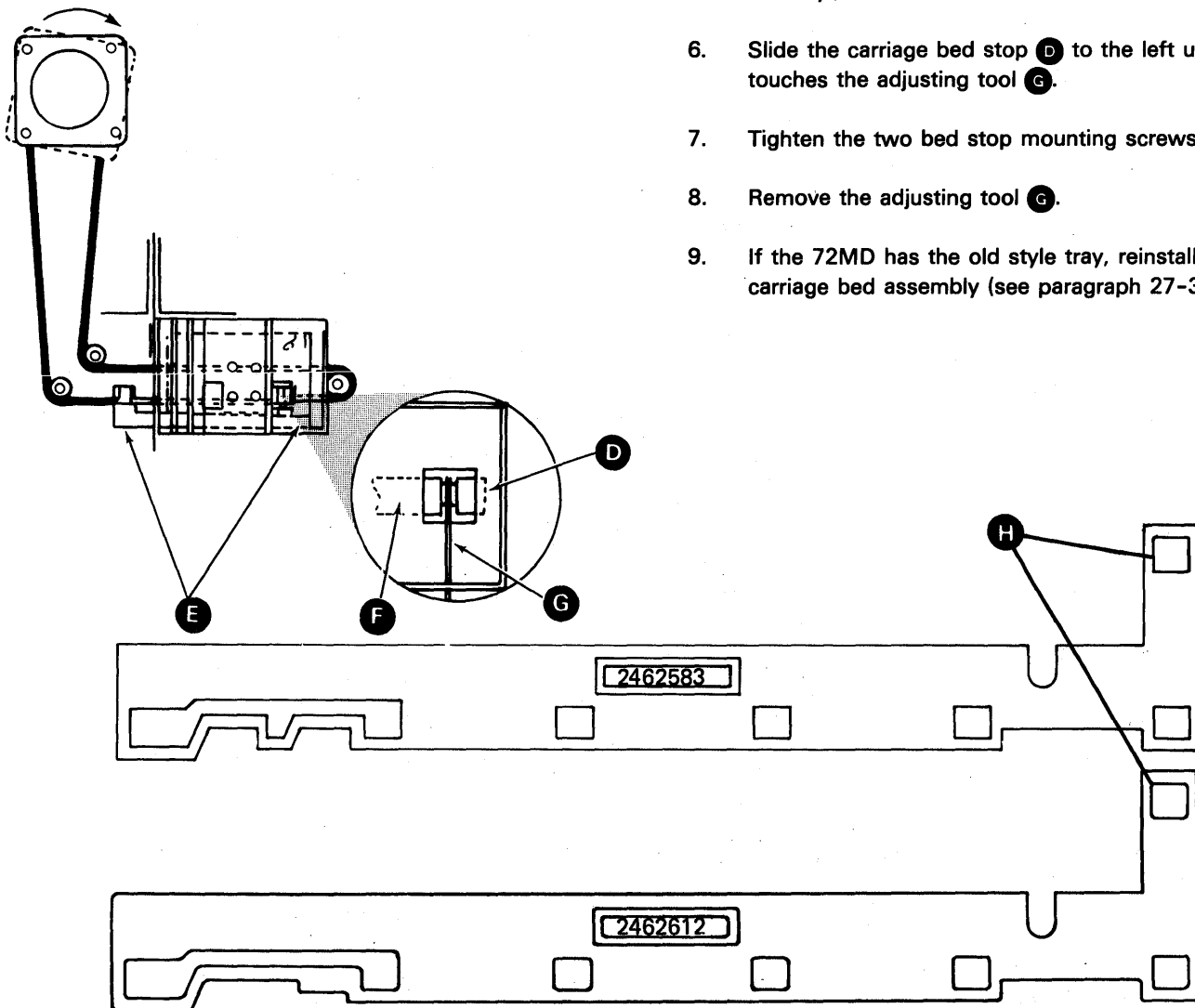
1. Place the drive motor **D** on the casting and fasten it with the two motor mounting clamps **B**.
2. Reinstall the drive belt **A**.
3. Connect the AC drive motor power cable **C**.
4. Reinstall the 72MD unit (see paragraph 27-200).



This page is intentionally left blank.

## 27-230 CARRIAGE BED STOP SERVICE CHECK

1. Set Power to I (operator panel).
2. Press the Reset switch (CE panel) to orient the carriage bed.
3. Visually check to ensure that I/O slot 1 is aligned with the window diskette guide.
4. If the 72MD has the old style tray, remove the carriage bed assembly (see paragraph 27-300).
5. Check the gap from the carriage bed casting **F** to the rubber bed stop pad **D** with end **H** of the adjusting tool **G**. (If the 72MD has the new style tray, insert the tool through the hole in the tray.) If the gap is not correct do the carriage bed stop adjustment (see paragraph 27-235).
6. If the 72MD has the old style tray, reinstall the carriage bed assembly (see paragraph 27-300).



## 27-235 CARRIAGE BED STOP ADJUSTMENT

**Note:** The carriage bed orient adjustment (see paragraph 27-295) must be correct before this adjustment can be made.

1. Set Power to I (operator panel).
2. Press the Reset switch (CE panel) to orient the carriage bed.
3. If the 72MD has the old style tray, remove the carriage bed assembly (see paragraph 27-300).
4. Loosen the two bed stop mounting screws **E** and slide the carriage bed stop **D** to the right.
5. Insert end **H** of the adjusting tool **G** (part 2462583 for old style picker, part 2462612 for new style picker) between the carriage bed stop **D** and the carriage bed **F**. (If the 72MD has the new style tray, insert the tool through the hole in the tray.)
6. Slide the carriage bed stop **D** to the left until it touches the adjusting tool **G**.
7. Tighten the two bed stop mounting screws **E**.
8. Remove the adjusting tool **G**.
9. If the 72MD has the old style tray, reinstall the carriage bed assembly (see paragraph 27-300).

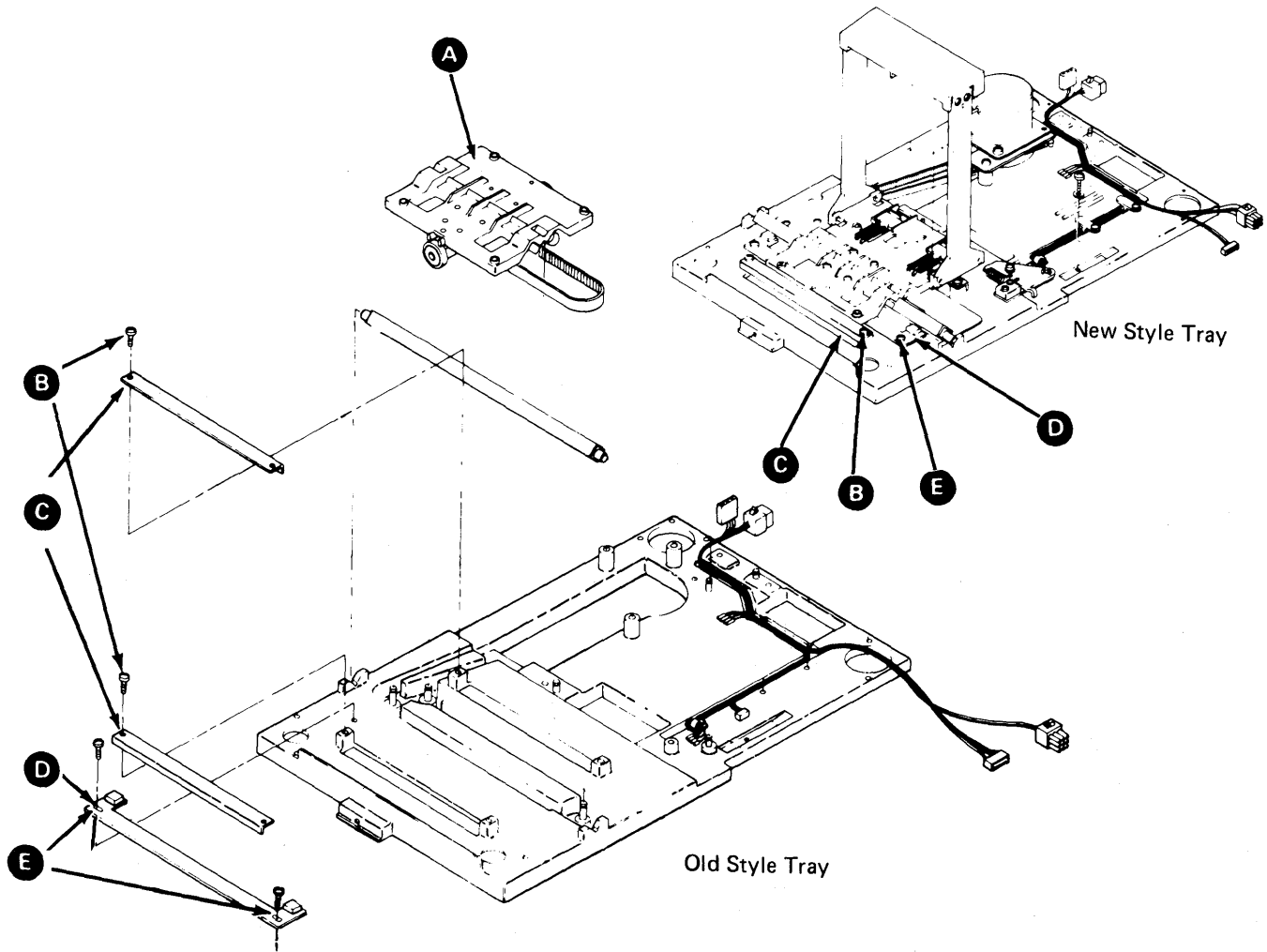
## 27-240 CARRIAGE BED STOP REMOVAL AND REPLACEMENT

### Removing the Carriage Bed Stop

1. Remove the carriage bed assembly (see paragraph 27-300).
2. Remove the two mounting screws **B** from the carriage bed casting stabilizer guide rail **C** and remove the rail. (Remove both rails if the 72MD has the old style tray.)
3. Remove the two bed stop assembly mounting screws **E**.
4. Lift the carriage bed casting assembly **A** (old style tray only) and remove the bed stop assembly **D**.

### Reinstalling the Carriage Bed Stop

1. Locate the bed stop assembly **D** on the base casting and reinstall the two mounting screws **E**. (Do not tighten the screws.)
2. Place the carriage bed casting assembly **A** on the monorail (old style tray only) and reinstall the carriage bed casting stabilizer guide rail **C** and screws **B**. (Both rails must be reinstalled for old style tray.)
3. Perform the carriage bed stop adjustment (see paragraph 27-235).
4. Reinstall the carriage bed assembly (see paragraph 27-300).



## 27-245 CARRIAGE BED STEPPER MOTOR REMOVAL AND REPLACEMENT

### Removing the Carriage Bed Stepper Motor

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Remove the control card mounting assembly (see paragraph 27-840).
3. Disconnect the stepper motor connector **P** from the base cable connector near the motor.
4. Loosen the three screws **K** holding the belt tension bracket assembly **L**.
5. Turn the stepper motor against the belt tension spring to release belt tension and tighten bracket screw **J**.
6. Remove the three stepper motor screws **H** from their nut plate **M**.
7. Lift the stepper motor and attached pulley **G** clear of the belt **C** and remove.
8. Remove the pulley and collar **N** from the stepper motor shaft.

### Reinstalling the Carriage Bed Stepper Motor

1. Reinstall the pulley and collar **N** on the stepper motor shaft. The pulley should be even with the end of the stepper motor shaft.
2. Locate the stepper motor and attached pulley **G** on the base casting **Q**. Be careful to place the belt **C** around the stepper motor pulley.
3. Reinstall the three stepper motor screws **H** and their nut plate **M** (do not tighten the screws).
4. Loosen the tightened bracket screw **J** to permit the belt tension spring to set the belt tension.
5. Tighten the three screws **K** for the belt tension bracket assembly **L**.
6. Connect the stepper motor connector **P** to the base cable connector near the motor.

7. Reinstall the control card mounting assembly (see paragraph 27-840).
8. Perform the carriage bed orient adjustment (see paragraph 27-295).
9. Perform the carriage bed orient switch adjustment (see paragraph 27-265).
10. Perform the carriage bed orient switch service check (see paragraph 27-260).
11. Reinstall the 72MD unit (see paragraph 27-200).

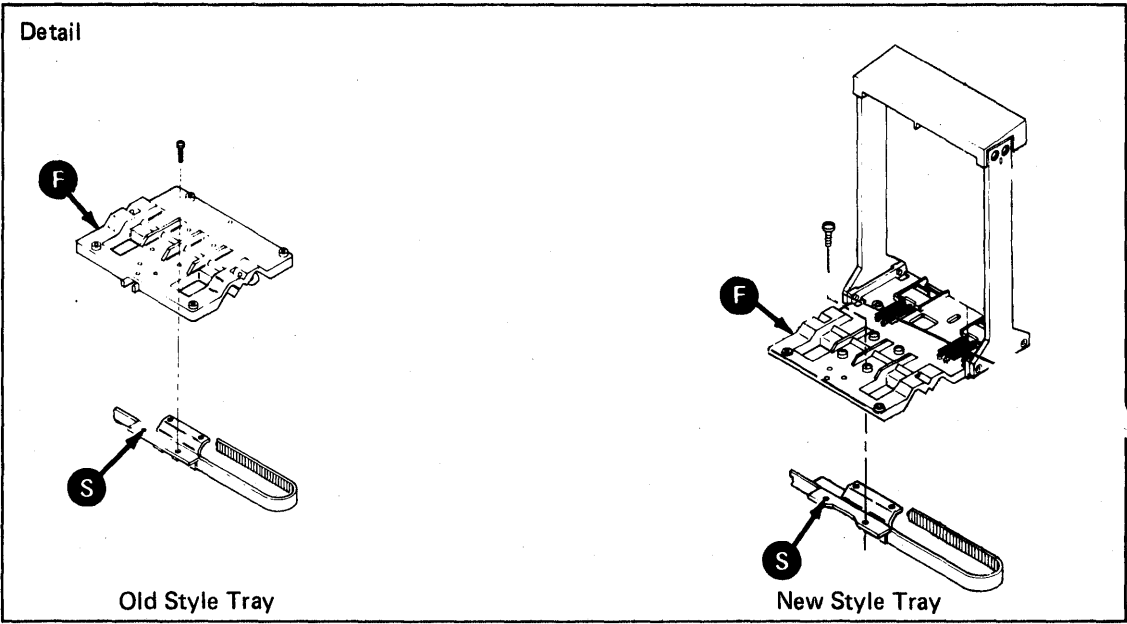
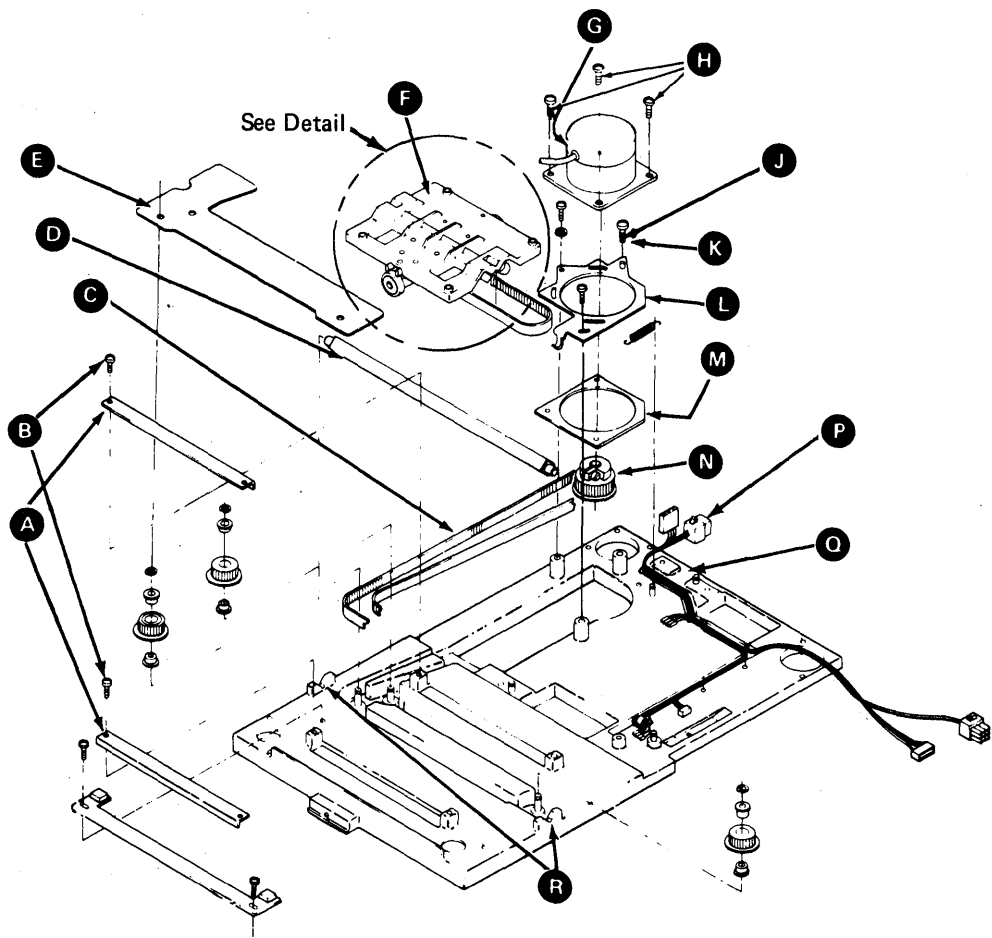
## 27-250 CARRIAGE BED MONORAIL REMOVAL AND REPLACEMENT

### Removing the Carriage Bed Monorail

1. Remove the carriage bed assembly (see paragraph 27-300).
2. If the 72MD has the old style tray, remove the belt shield **E**.
3. Remove the two mounting screws **B** from each of the carriage bed casting stabilizer guide rails **A** and remove the rails.
4. Lift the carriage assembly **F** and remove the monorail **D**.

### Reinstalling the Carriage Bed Monorail

1. Place the monorail **D** into the carriage bed belt yoke **S** and set the monorail into the V-slots **R** on the base casting.
2. Place the carriage assembly **F** on the monorail and fasten with the two carriage bed stabilizer guide rails **A** and mounting screws **B**.
3. If the 72MD has the old style tray, reinstall the belt shield **E**.
4. Reinstall the carriage bed assembly (see paragraph 27-300).
5. Perform the carriage bed orient service check (see paragraph 27-290).
6. Reinstall the 72MD unit (see paragraph 27-200).



## 27-255 CARRIAGE BED BELT REMOVAL AND REPLACEMENT

### Machines with Old Style Tray

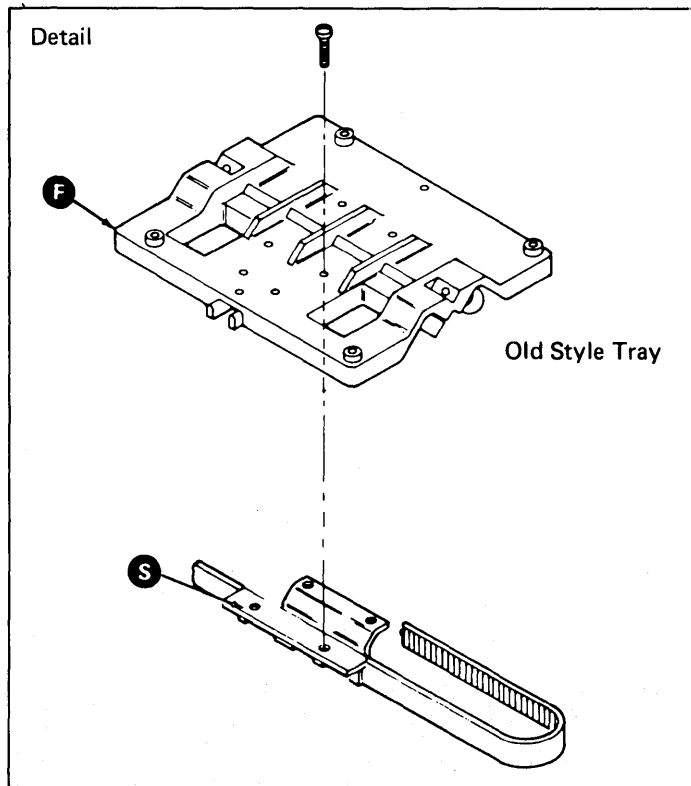
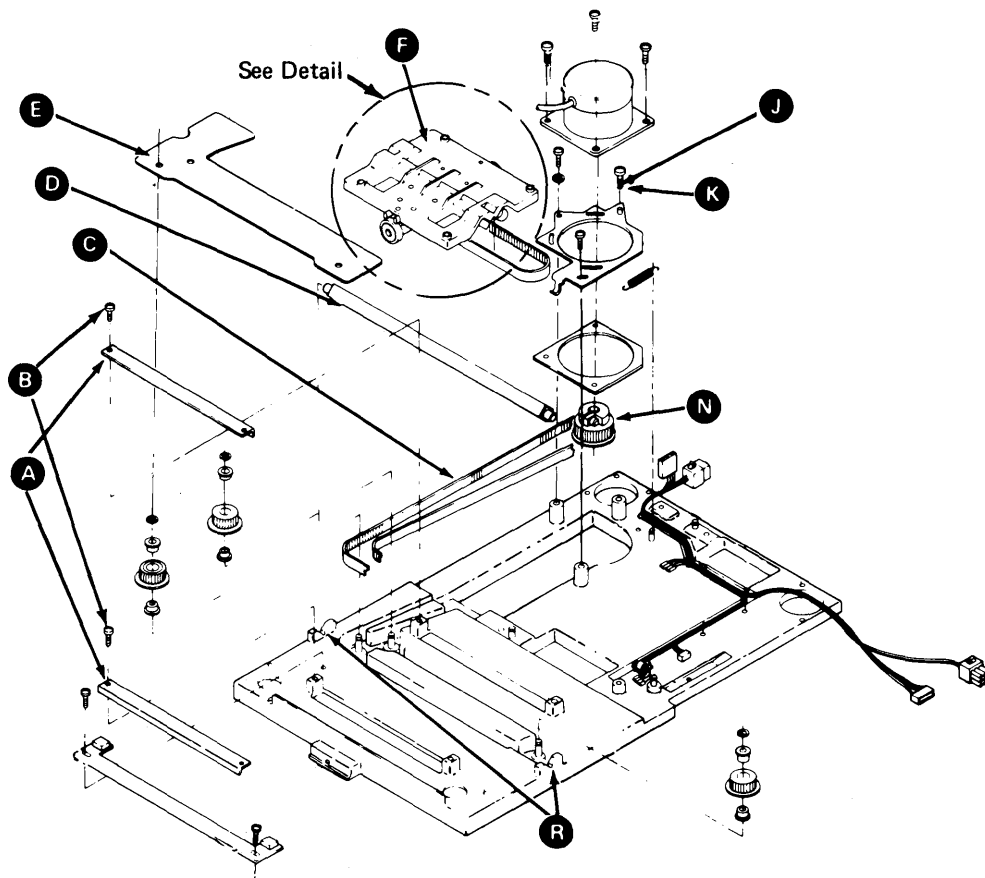
#### Removing the Carriage Bed Belt

1. Remove the carriage bed assembly (see paragraph 27-300).
2. Remove the diskette drive assembly bezel (see paragraph 27-665).
3. Loosen the three belt tension bracket screws **K**.
4. Turn the stepper motor against the belt tension spring to release belt tension and tighten bracket screw **J**.
5. Remove the belt shield **E**.
6. Remove the two mounting screws **B** from each of the carriage bed casting stabilizer guide rails **A** and remove the rails.
7. Lift the carriage bed casting assembly **F** and attached belt from the base.
8. Pull the monorail **D** from under the carriage bed casting.
9. Remove the belt **C** from around the stepper motor pulley **N**.
10. Remove the carriage bed belt yoke **S** from the carriage bed casting assembly **F**.

#### Reinstalling the Carriage Bed Belt

1. Reinstall the carriage bed belt yoke **S** on the bottom of the carriage bed casting assembly **F**.
2. Reinstall the belt **C** around the stepper motor pulley **N**.
3. Place the monorail **D** into the carriage bed yoke **S** and set the ends of the monorail into the V-slots **R** in the base casting.
4. Locate the carriage bed casting assembly **F** and attached belt on the base.
5. Loosen the tightened bracket screw **J** to permit the spring to set the tension.
6. Tighten the three belt tension bracket screws **K**.
7. Reinstall the two carriage bed casting stabilizer guide rails **A** and the mounting screws **B**.
8. Reinstall the belt shield **E**.
9. Reinstall the diskette drive assembly bezel (see paragraph 27-665).
10. Reinstall the carriage bed assembly (see paragraph 27-300).
11. Perform the carriage bed orient adjustment (see paragraph 27-295).
12. Perform the carriage bed orient switch service check (see paragraph 27-260).
13. Reinstall the 72MD unit (see paragraph 27-200).





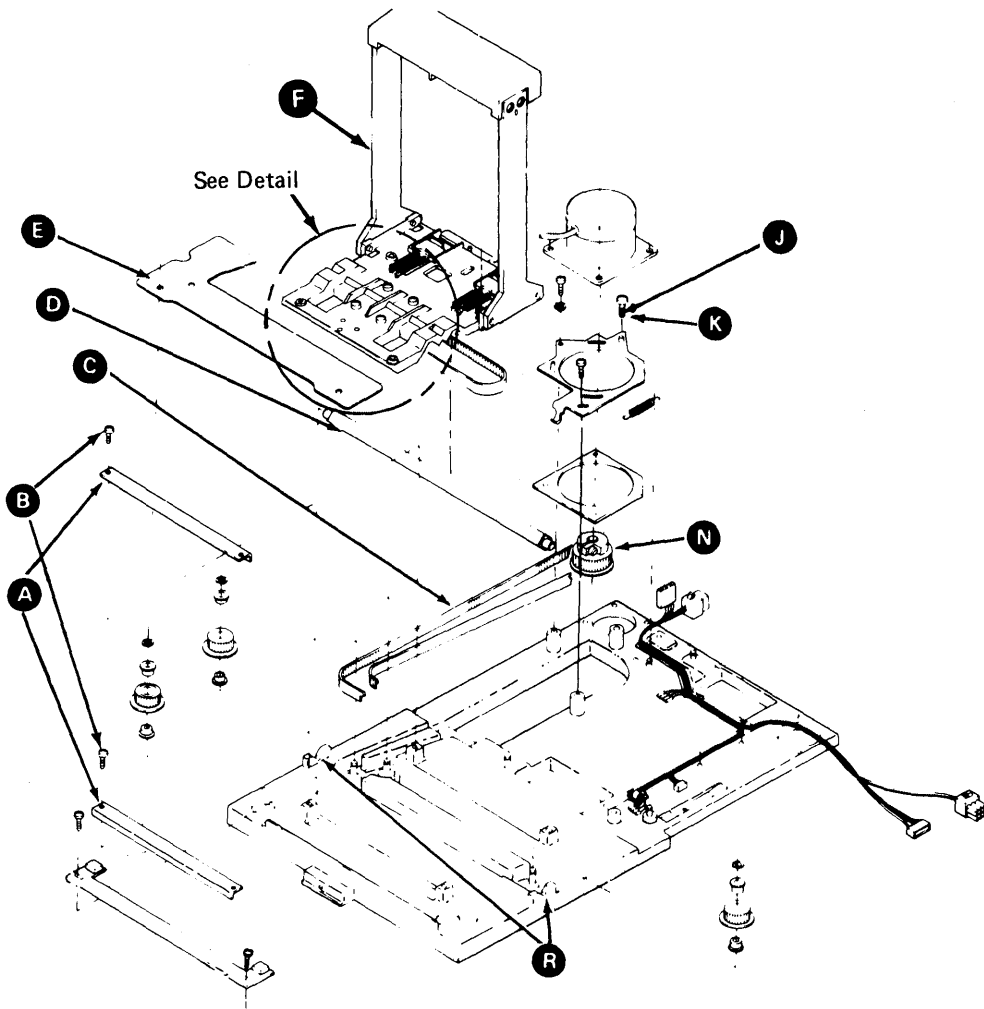
## Machines with New Style Tray

### Removing the Carriage Bed Belt

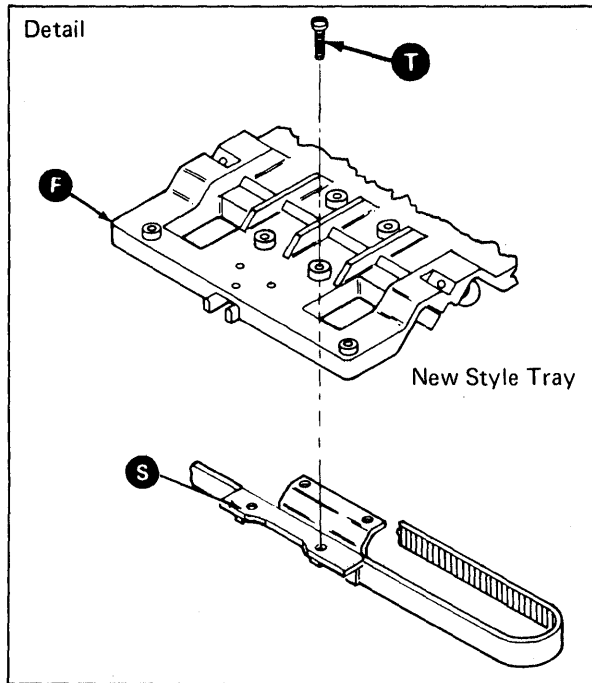
1. Remove the carriage bed assembly (see paragraph 27-300).
2. Remove the two mounting screws **B** from each of the carriage bed stabilizer guide rails **A** and remove the rails.
3. Remove the four screws **T** to remove the carriage assembly **F** from the carriage bed belt yoke **S**.
4. Remove the monorail **D** from the V-slots **R** in the base casting.
5. Remove the diskette drive assembly bezel (see paragraph 27-665).
6. Loosen the three belt tension bracket screws **K**.
7. Turn the stepper motor against the belt tension spring to release belt tension and tighten bracket screw **J**.
8. Remove the belt shield **E**.
9. Lift the carriage bed belt yoke **S** and attached belt from the base.
10. Remove the belt **C** from around the stepper motor pulley **N**.

### Reinstalling the Carriage Bed Belt

1. Reinstall the belt **C** around the stepper motor pulley **N**.
2. Locate the carriage bed belt yoke **S** and attached belt on the base.
3. Reinstall the belt shield **E**.
4. Loosen the tightened bracket screw **J** to permit the spring to set the tension.
5. Tighten the three belt tension bracket screws **K**.
6. Reinstall the diskette drive assembly bezel (see paragraph 27-665).
7. Place the ends of the monorail **D** into the V-slots **R** in the base casting.
8. Attach the carriage bed belt yoke **S** to the carriage assembly **F** using the four screws **T**.
9. Reinstall the two carriage bed stabilizer guide rails **A** and the mounting screws **B**.
10. Reinstall the carriage bed assembly (see paragraph 27-300).
11. Perform the carriage bed orient adjustment (see paragraph 27-295).
12. Perform the carriage bed orient switch service check (see paragraph 27-260).
13. Reinstall the 72MD unit (see paragraph 27-200).



27



## 27-260 CARRIAGE BED ORIENT SWITCH SERVICE CHECK

1. Place the 72MD unit in the service position (see paragraph 27-205).
2. Set Power to I (operator panel).
3. Press the Reset switch (CE panel) to orient the carriage bed.
4. Visually check that I/O slot 1 aligns with the diskette guide.

If the I/O slot 1 does not align with the diskette guide, perform the carriage bed orient switch adjustment (see paragraph 27-265).

5. Verify that the switch is good by probing its output as you activate the switch **A** (the level should change).

Probe the output at:

For the old style picker, TPB-16 **F**.  
For the new style picker, TPB-17 **F**.

## 27-265 CARRIAGE BED ORIENT SWITCH ADJUSTMENT

At power on time as well as at the end of a command the picker/cam stepper motor and the carriage bed stepper motor are at normal detent with windings 0 and 1 active.

Carriage bed orient is when I/O slot 1 is aligned with the drive diskette guide and the stepper motor is at normal detent.

To check or adjust the carriage bed orient switch, the carriage bed must be at the orient position with the stepper motor at normal detent.

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Set Power to I (operator panel).
3. Remove the magazine in position 2 to view the carriage bed orient switch.

4. Disconnect the carriage stepper motor cable **E** from the driver board at J4.
5. Align I/O slot 1 with the diskette guide window.
6. Connect the carriage stepper motor cable **E** to J4.
7. Loosen the switch adjusting screw **D**.
8. Turn the orient switch assembly until the gap between the actuator and the switch is 0.0 to 0.25 millimeter (0.0 to 0.001 inch).
9. Tighten the switch adjusting screw **D**.
10. Reinstall the 72MD unit (see paragraph 27-200).

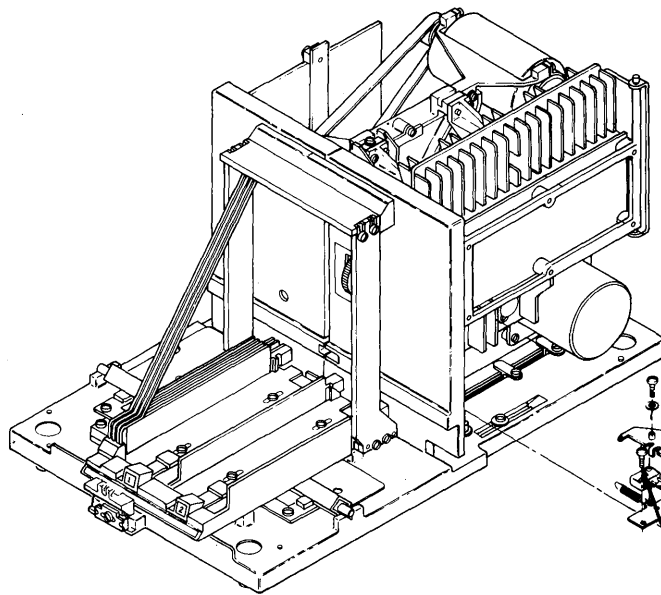
## 27-270 CARRIAGE BED ORIENT SWITCH REMOVAL AND REPLACEMENT

### Removing the Carriage Bed Orient Switch

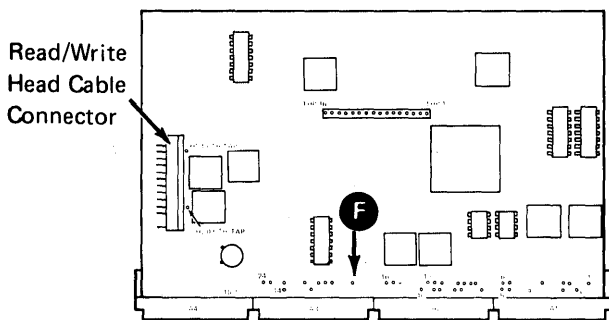
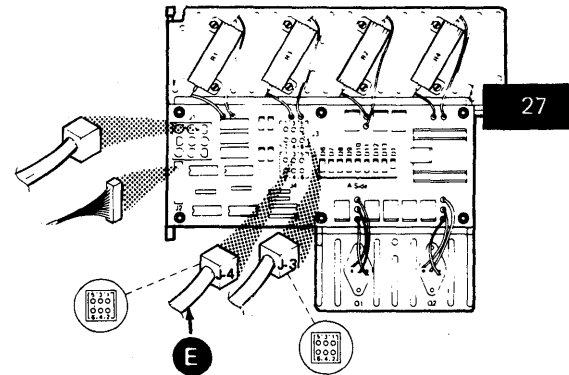
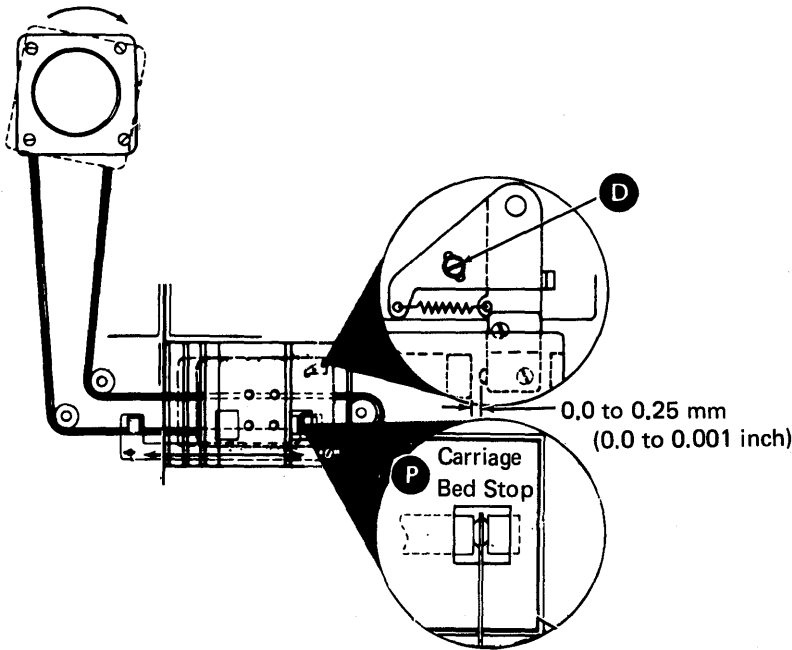
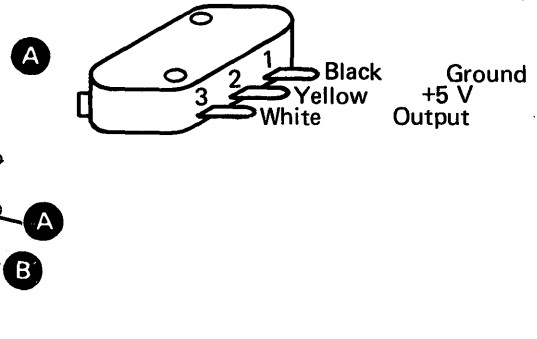
1. Remove power and the 72MD unit (see paragraph 27-200).
2. Remove the leads from the switch **A**.
3. Remove the two mounting screws **C** from the the switch bracket **B**, and remove the switch.

### Reinstalling the Carriage Bed Orient Switch

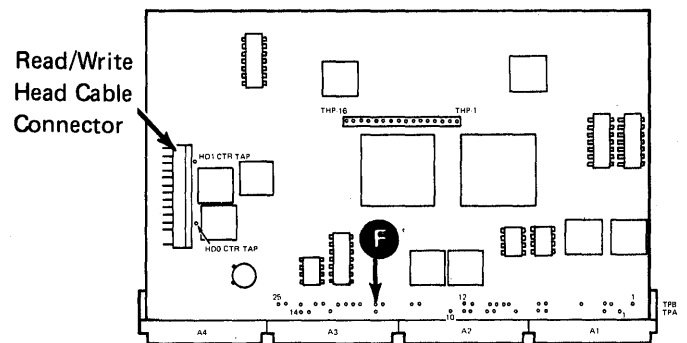
1. Locate the switch **A** and fasten it to the switch bracket **B** with the two mounting screws **C**.
2. Connect the leads to the switch.
3. Adjust the carriage bed orient switch (see paragraph 27-265).
4. Reinstall the 72MD unit (see paragraph 27-200).



**Diskette-In, Carriage Bed Orient and Window Stripper Switches**



**Note:** See paragraph 27-820 for control card test pins for the new style picker.

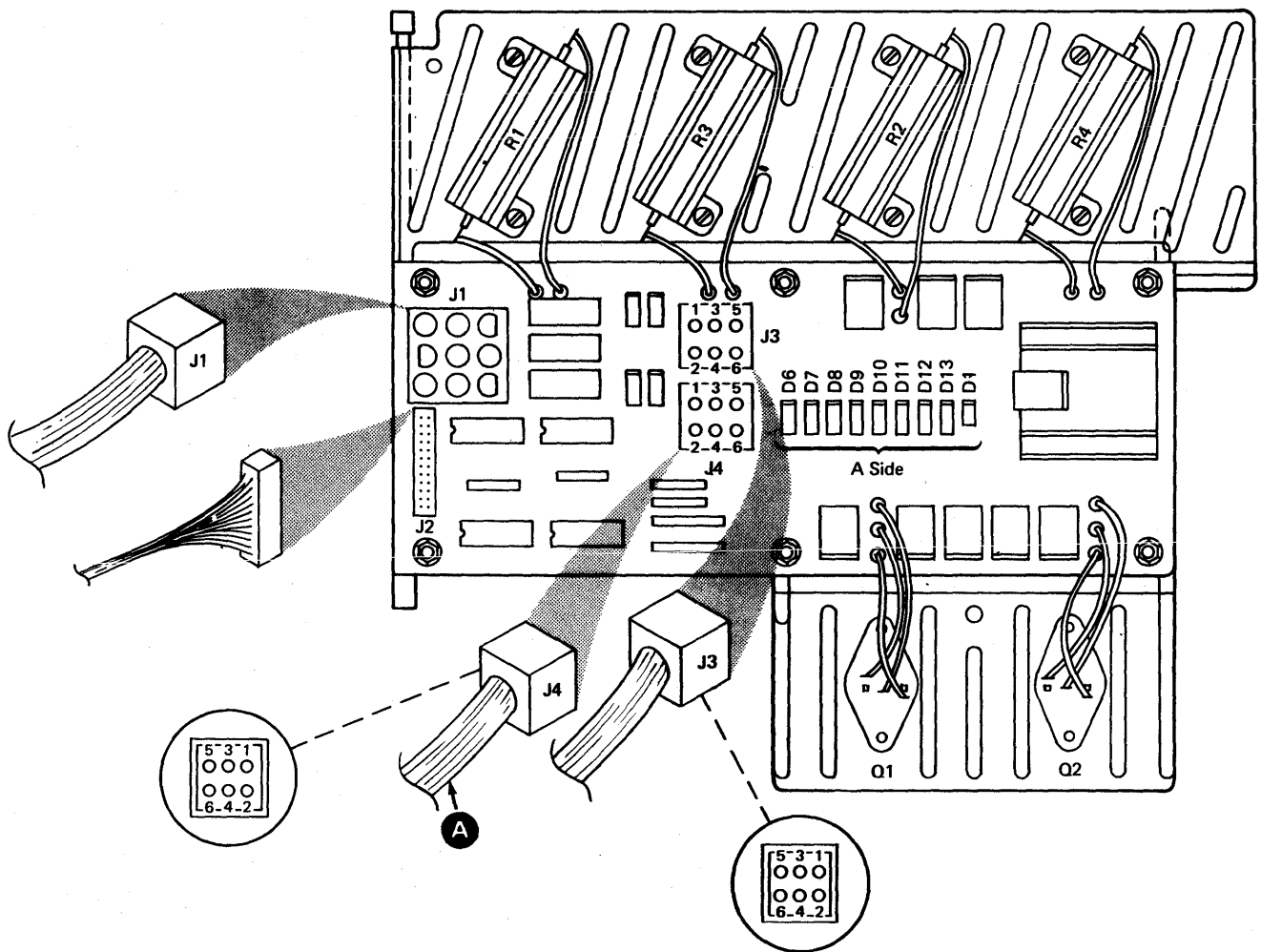


**Note:** See paragraph 27-820 for control card test pins for the old style picker.

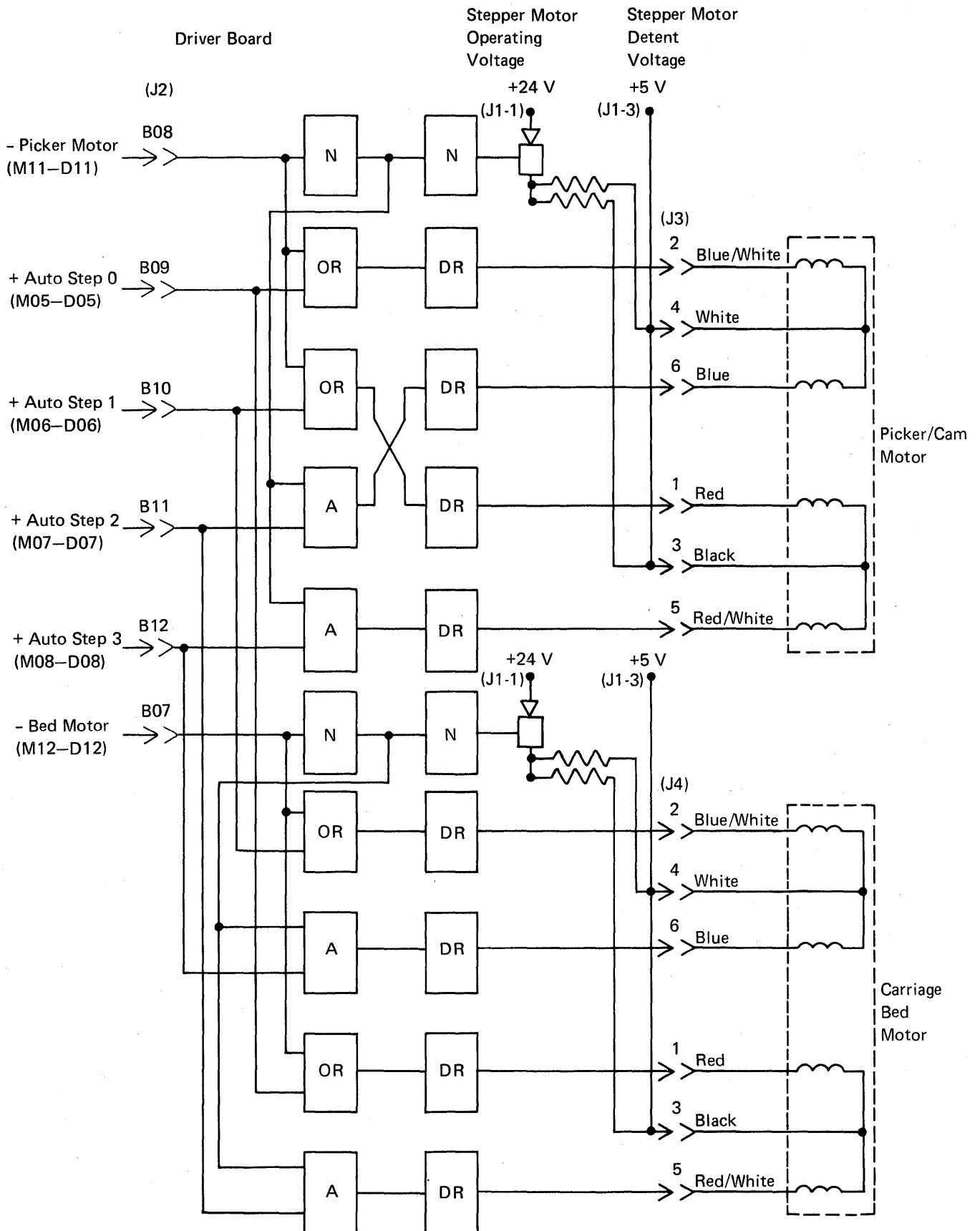
**27-275 CARRIAGE BED STEPPER MOTOR  
WINDINGS RESISTANCE  
SERVICE CHECK**

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Disconnect the stepper motor cable **A** from driver board connector J4.
3. Use a multimeter to measure the resistance between pins: 2 and 4, 4 and 6, 1 and 3, 3 and 5.

The resistance should be 3 ohms  $\pm$  10% each.



### Stepper Motor Logic



**27-280 MAGAZINE INTERLOCK/INDICATOR  
ADJUSTMENT**

1. With power on, press the Reset switch (CE panel) to orient the carriage bed.
2. Loosen the screw **A** on the interlock/indicator assembly **C** and center the indicator slot on the 1 in the I/O positions.
3. Tighten the screw **A**.

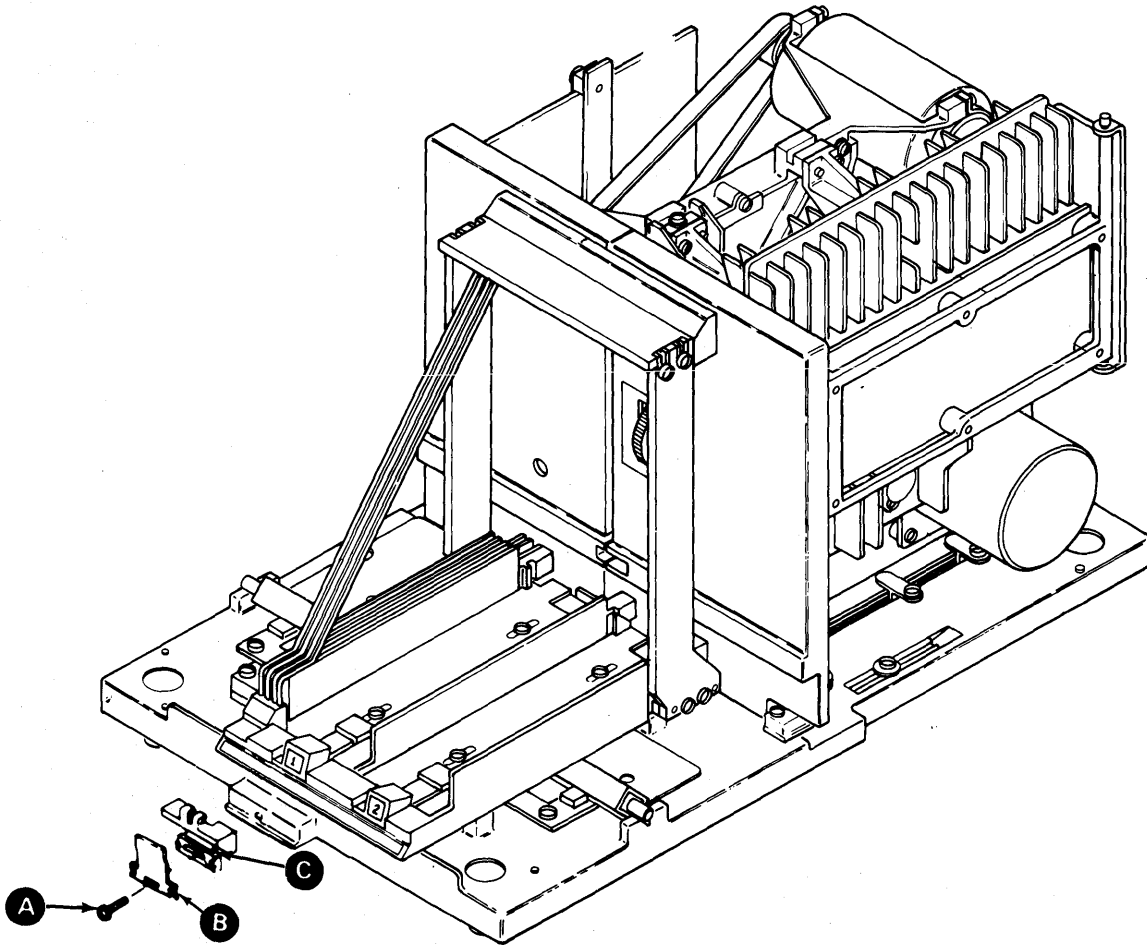
**27-285 MAGAZINE INTERLOCK/INDICATOR  
REMOVAL AND REPLACEMENT**

**Removing the Magazine Interlock/Indicator**

Remove the screw **A** that holds the magazine interlock/indicator assembly **C** and remove the assembly.

**Reinstalling the Magazine Interlock/Indicator**

1. Insert the stop plate **B** into the interlock/indicator and fasten this assembly **C** to the base casting with the mounting screw **A**. (Do not tighten the screw.)
2. Perform the magazine interlock/indicator assembly adjustment (see paragraph 27-280).





This page is intentionally left blank.

**27-290 CARRIAGE BED ORIENT SERVICE CHECK**

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Set Power to I (operator panel).
3. Disconnect connector J1 **A** from the driver board.
4. Visually align I/O slot 1 with the drive diskette guide.
5. Locate the picker carriage assembly **F** near the picker carriage detent assembly **E**.
6. Power on by connecting J1 **A** to the driver board.
7. Insert the adjusting tool (part 2462583 for old style picker, part 2462612 for new style picker) into the drive diskette guide and carefully put downward pressure to the top of the tool. (This will align the tool to the drive diskette guide.
8. Check for the following conditions:
  - a. Check that the right wall of I/O slot 1 and the right side of the tool touch.
  - b. Check that the carriage bed does not move when the tool is inserted or that the tool must not be forced into the I/O slot.
9. If both conditions are not correct, perform the carriage bed orient adjustment (see paragraph 27-295).
10. If both conditions are correct, reinstall the 72MD unit (see paragraph 27-200).

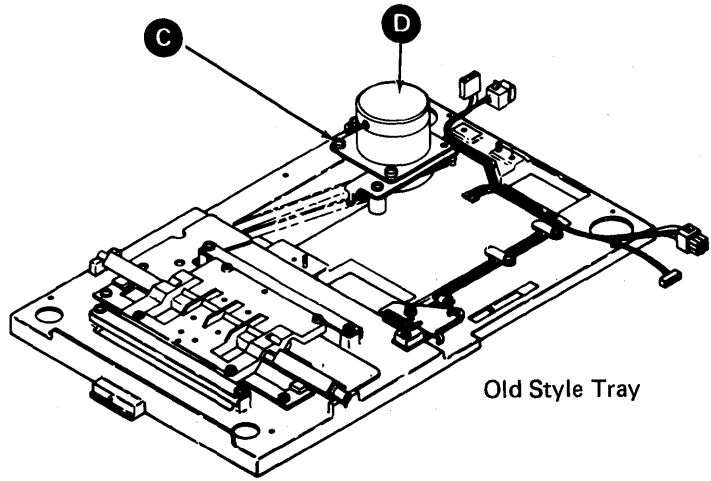
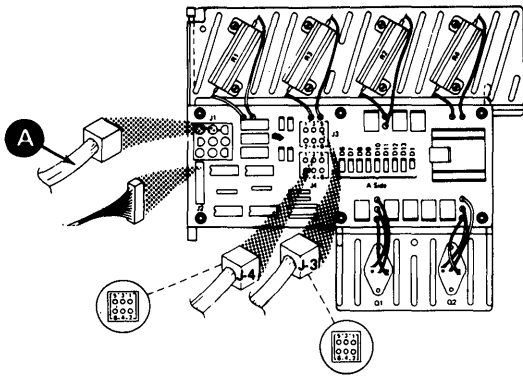
**27-295 CARRIAGE BED ORIENT ADJUSTMENT**

1. Remove power and the 72MD unit (see paragraph 27-200). Do not connect the AC power connector **B** to the drive motor or connector J1 **A** to the driver board.
2. Set Power to I (operator panel).

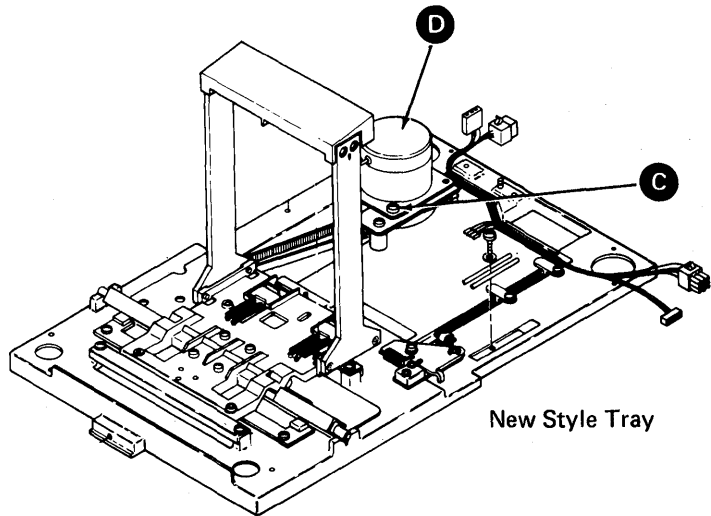
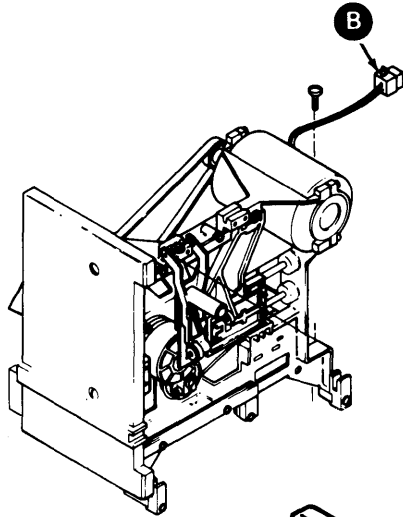
**DANGER**

Voltage is still present at the power connector when it is disconnected and power is on.

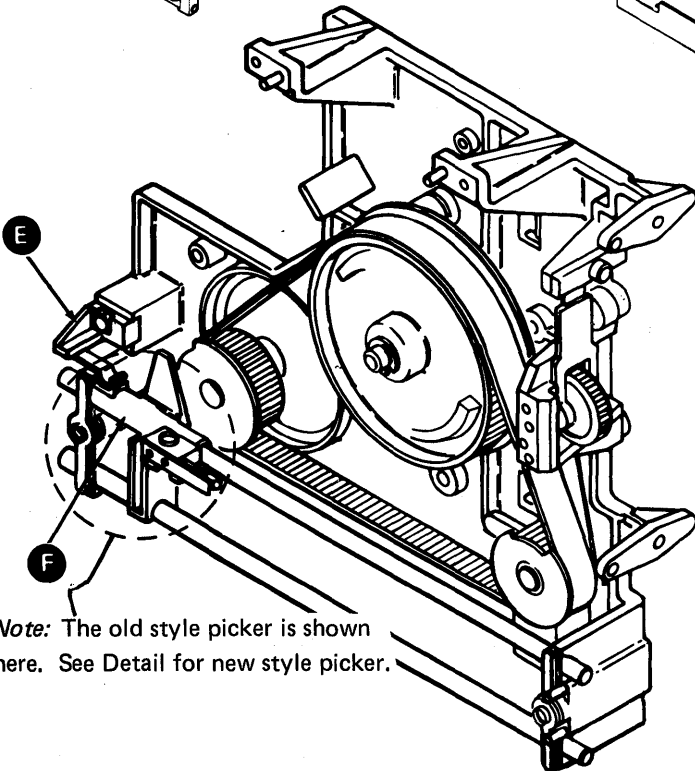
- 
- 
- 
- 
3. Visually align I/O slot 1 with the drive diskette guide.
  4. Loosen the three screws **C** that fasten the carriage stepper motor **D** to the motor plate.
  5. Locate the picker carriage assembly **F** near the picker carriage detent assembly **E**.
  6. Connect J1 **A** to the driver board.
  7. Insert the adjusting tool (part 2462583 for old style picker, part 2462612 for new style picker) into the drive diskette guide and carefully put downward pressure to the top of the tool. (This will align the tool to the drive diskette guide.)
  8. Turn the stepper motor clockwise by hand until the right wall of I/O slot 1 and the right side of the tool touch.
  9. Tighten the three screws **C**.
  10. Perform the carriage bed orient switch adjustment (see paragraph 27-265).
  11. Visually check the magazine interlock/indicator. If the indicator slot is not centered on the 1 in the I/O positions, perform the magazine interlock/indicator adjustment (see paragraph 27-280).
  12. Remove power and reinstall the 72MD unit (see paragraph 27-200).



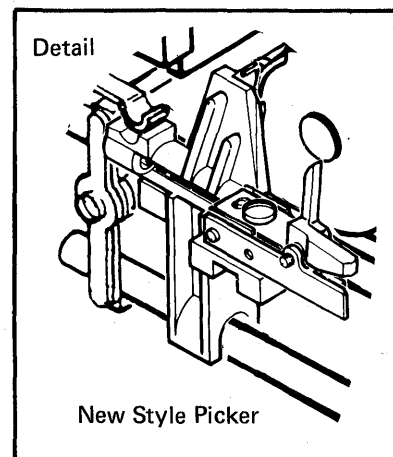
Old Style Tray



New Style Tray



Note: The old style picker is shown here. See Detail for new style picker.



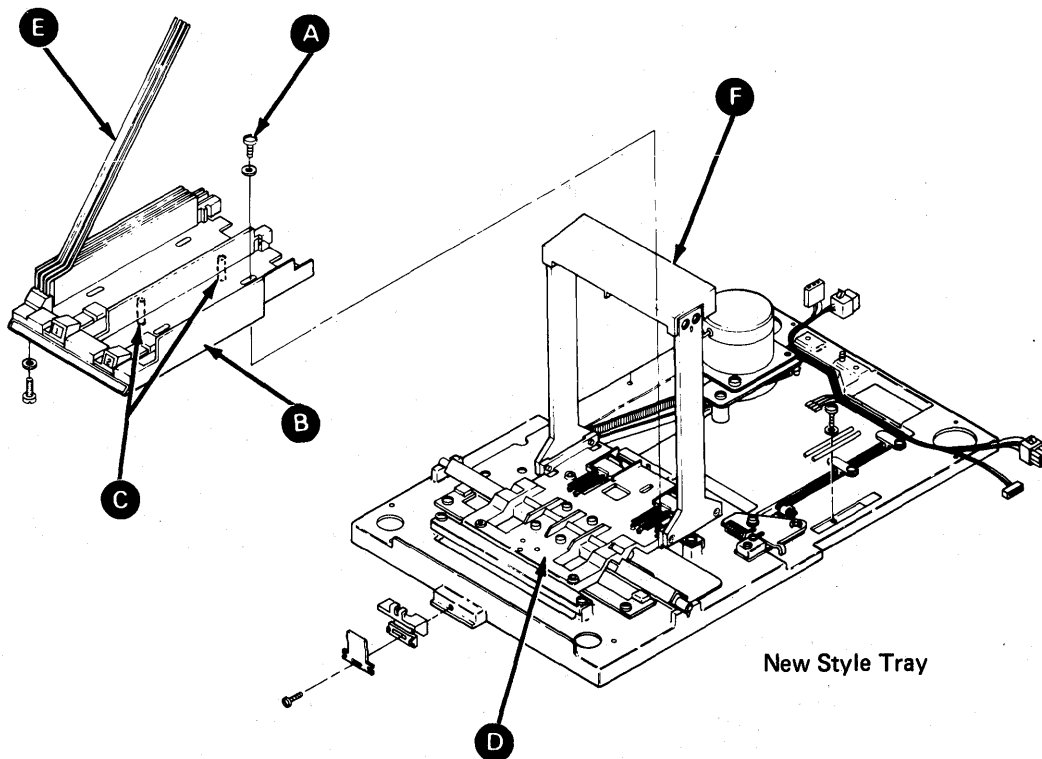
## 27-300 CARRIAGE BED ASSEMBLY REMOVAL AND REPLACEMENT

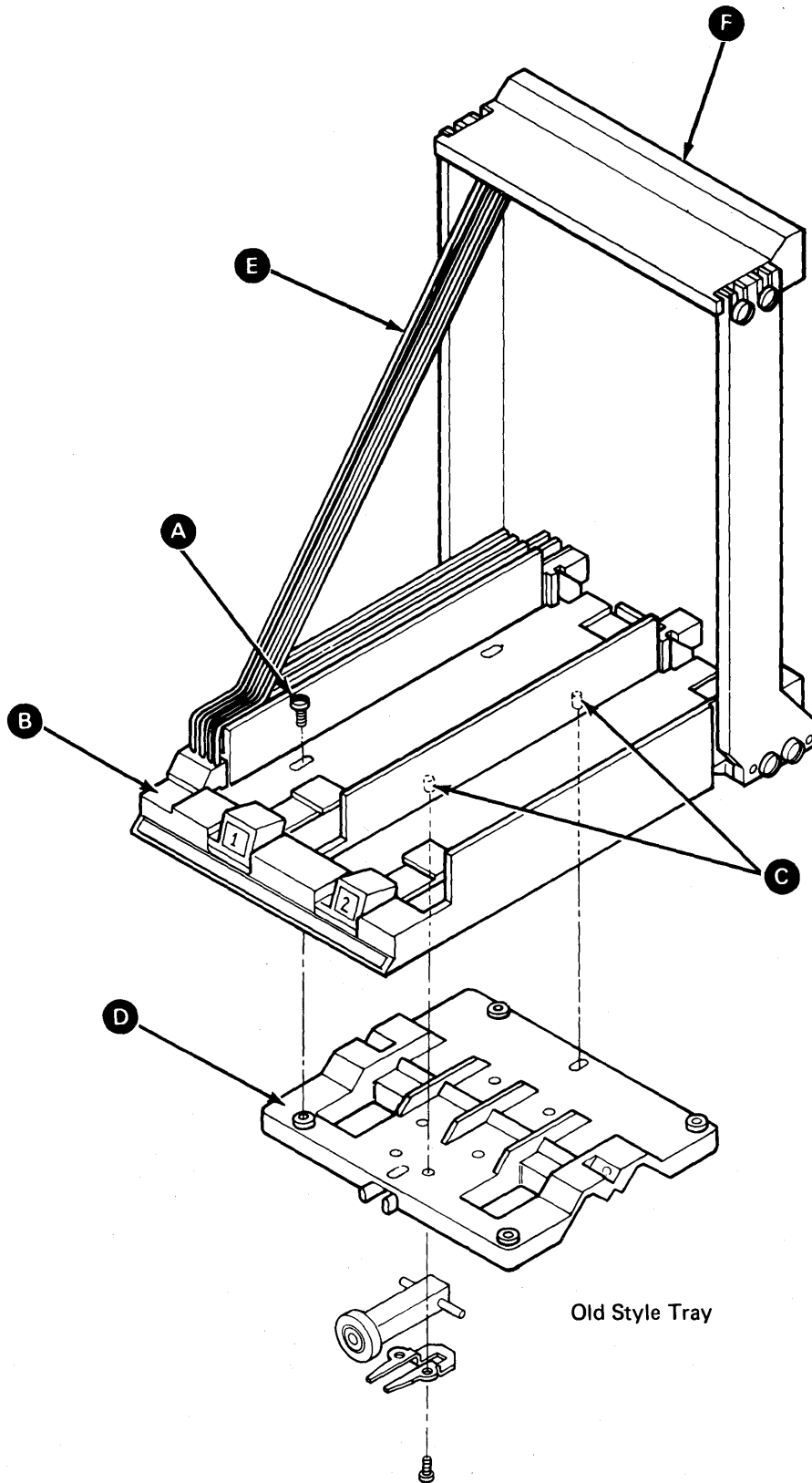
### Removing the Carriage Bed Assembly

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Remove the four mounting screws **A**.
3. Lift the carriage bed assembly **B** from the carriage bed casting **D**. (Be careful not to damage the locating pins **C** on the bottom of the carriage bed.)

### Reinstalling the Carriage Bed Assembly

1. If the 72MD has the new style tray, insert the I/O slot guide wires **E** in the slots in the housing **F** and place the carriage bed assembly locating pins **C** on the carriage bed assembly **D**. Fasten the carriage bed assembly with the four mounting screws **A** (do not tighten the screws).
2. Perform the carriage bed to diskette drive bezel adjustment (see paragraph 27-305).
3. Perform the carriage bed orient service check (see paragraph 27-290).
4. Reinstall the 72MD unit (see paragraph 27-200).



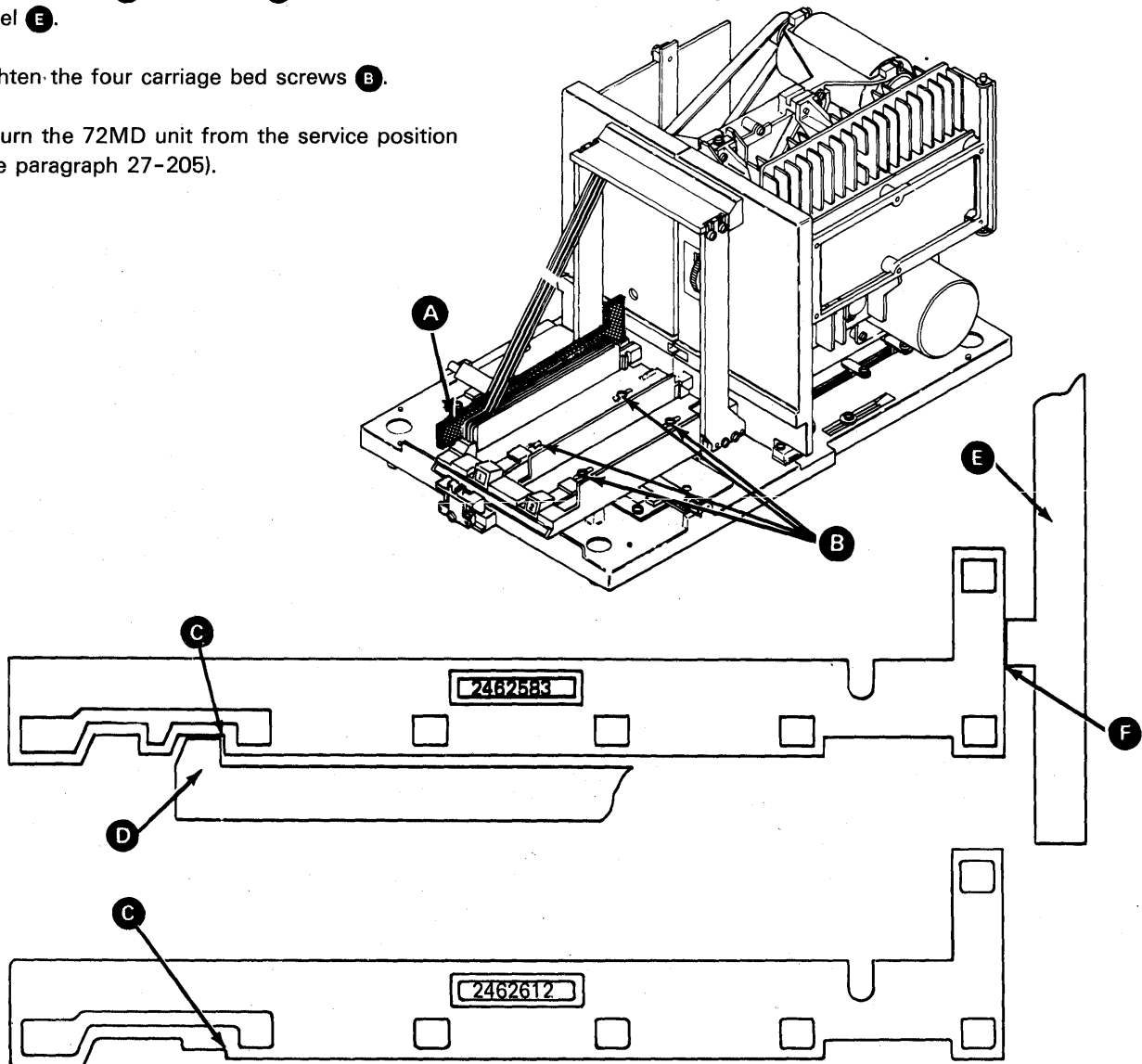


**27-305 CARRIAGE BED TO DISKETTE DRIVE  
BEZEL ADJUSTMENT**

1. Place the 72MD unit in the service position (see paragraph 27-205).
2. Place I/O slot 1 at the center of the drive bezel.
3. Loosen the four carriage bed screws **B** and slide the carriage bed **D** away from the bezel **E**.
4. Install the adjusting tool **A** (part 2462583 for old style picker, part 2462612 for new style picker) into I/O slot 1 with the second adjusting surface **C** of the tool touching the carriage bed **D**.
5. Slowly move the bed **D** toward the bezel **E** until the other end **F** of the tool **A** touches the drive bezel **E**.
6. Tighten the four carriage bed screws **B**.
7. Return the 72MD unit from the service position (see paragraph 27-205).

**27-310 CARRIAGE BED TO DISKETTE DRIVE  
BEZEL SERVICE CHECK**

1. Place the 72MD unit in the service position (see paragraph 27-205).
2. Place I/O slot 1 at the center of the diskette drive bezel.
3. Slowly lower the adjusting tool **A** (part 2462583 for old style picker, part 2462612 for new style picker) into I/O slot 1 so that the second adjusting surface **C** touches the carriage bed **D**.
4. Check that the other end **F** of the tool **A** touches the drive bezel **E**. If it does not, perform the carriage bed to diskette drive bezel adjustment (see paragraph 27-305).



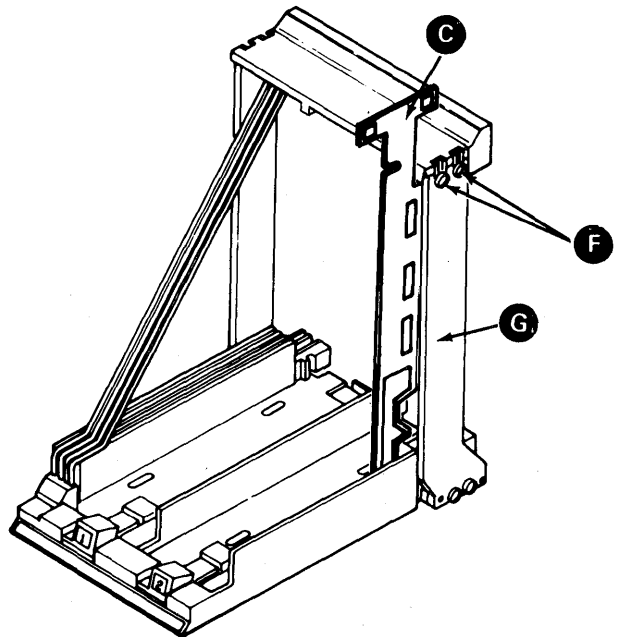
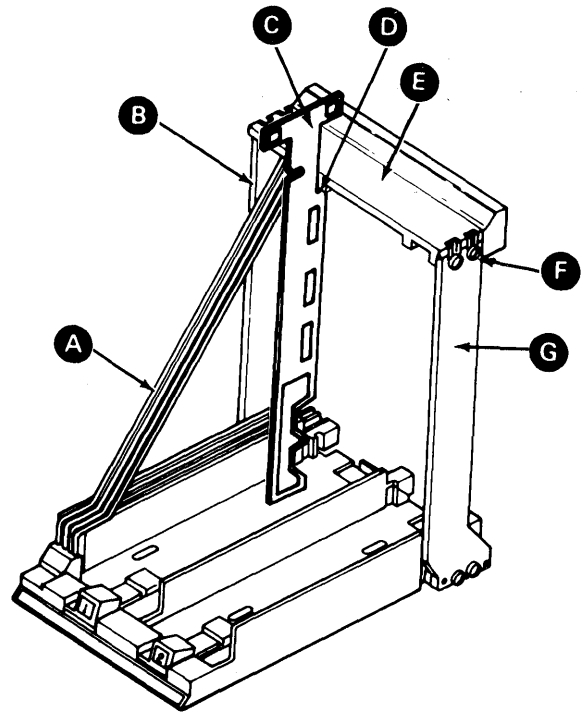
## 27-315 MAGAZINE PRESSURE ROLL HOUSING REMOVAL AND REPLACEMENT

### Removing the Magazine Pressure Roll Housing

1. Place the 72MD in the service position (see paragraph 27-205).
2. Loosen the four screws **F** in the magazine pressure roll housing **E** and remove the housing from the supports **B** and **G**. (Be careful not to damage the four diskette I/O slot guide wires **A**).

### Reinstalling the Magazine Pressure Roll Housing

1. Locate the magazine pressure roll housing **E** on the supports **B** and **G**.
2. Insert the four diskette I/O slot guide wires **A** into the carriage bed and the magazine pressure roll housing **E**.
3. Place the adjusting tool **C** (part 2462583 for old style picker, part 2462612 for new style picker) between the magazine pressure roll housing **E** (on the surface of the guide rail **D**) and the carriage bed near the diskette I/O slots and tighten the two screws on the left end of the magazine pressure roll housing **E**. (Ensure that the magazine pressure roll housing is parallel to the carriage bed as you tighten the screws.)
4. Place the adjusting tool **C** between the magazine pressure roll housing **E** and the carriage bed near the support **G** and tighten the two screws on the right end of the magazine pressure roll housing **E**.
5. Return the 72MD unit from the service position (see paragraph 27-205).



**27-400 PICKER/CAM CASTING ASSEMBLY  
REMOVAL AND REPLACEMENT**

**Removing the Picker/Cam Casting Assembly**

1. Remove power and the 72MD unit (see paragraph 27-200).

Note: If the two driver board gate shipping bolts **A** are still in place, remove them.

2. Release the gate spring latch **M** and open the driver board gate **J**.
3. Disconnect the picker/cam stepper motor cable **B** from driver board connector J3 .
4. Disconnect the sensor cable connector **F** (located near the top of the picker/cam casting).
5. If the 72MD has the old style picker, disconnect the stripper magnet cable connector **L** (located in the lower base).
6. Move the carriage bed assembly away from the orient position to the left end **K** of its movement.
7. Locate the picker carriage assembly **P** between the diskette in position and the picker rest position.
8. Remove the two picker/cam casting holding screws **N**.

**CAUTION**

Be careful not to hit the head load bail assembly on the cam when you remove the picker/cam casting. This can damage the read/write head carriage assembly.

---

---

---

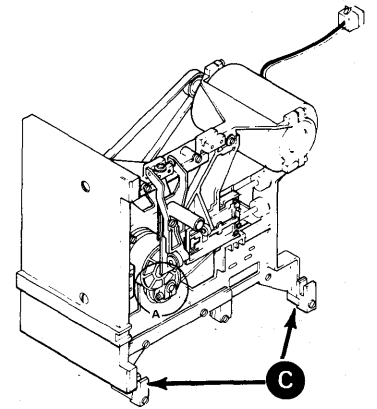
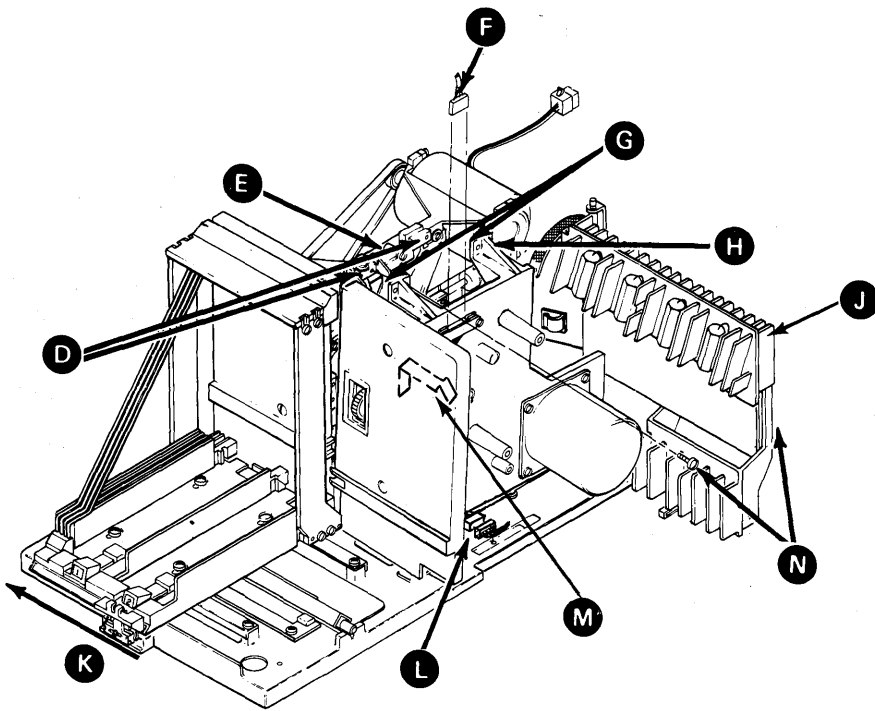
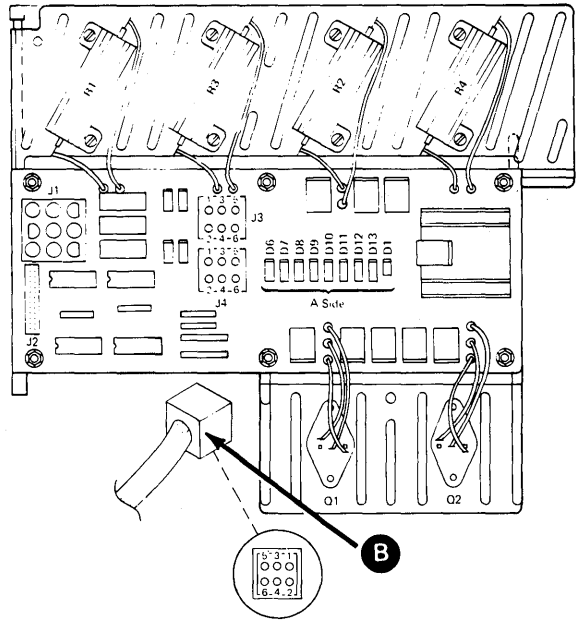
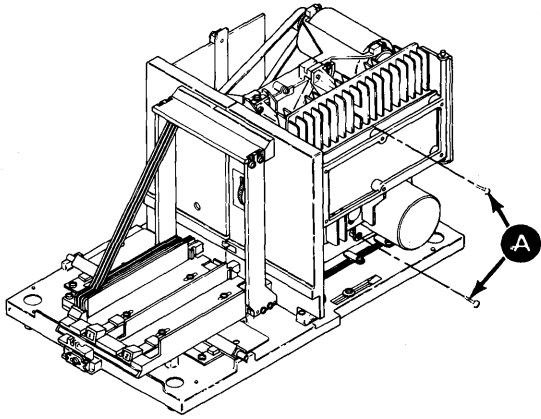
---

9. Separate the picker/cam casting **H** from the diskette drive casting **E** and lift it out.

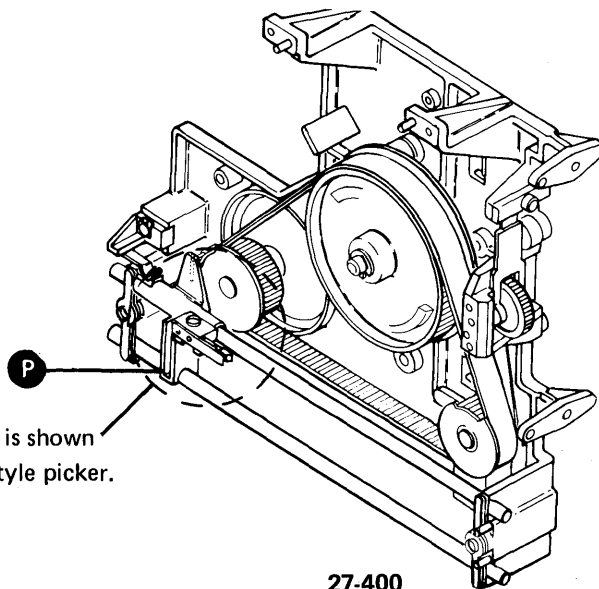
**Reinstalling the Picker/Cam Casting Assembly**

1. Locate the picker carriage assembly **P** between the diskette in position and the picker rest position.
2. Set the lower picker arm rail on its two brackets **C**.
3. Align the picker/cam casting pins **G** with the holes **D** in the diskette drive casting **E**.
4. Reinstall the two holding screws **N**.
5. If the 72MD has the old style picker, connect the stripper cable connector **L**.
6. Connect the sensor cable connector **F**.
7. Connect the stepper motor cable **B** to driver board connector J3.
8. Perform the picker/cam bezel to carriage bed adjustment (see paragraph 27-420).
9. Perform the head load bail assembly service check (see paragraph 27-653).
10. Close the driver board gate until the latch engages.
11. Reinstall the 72MD unit (see paragraph 27-200).

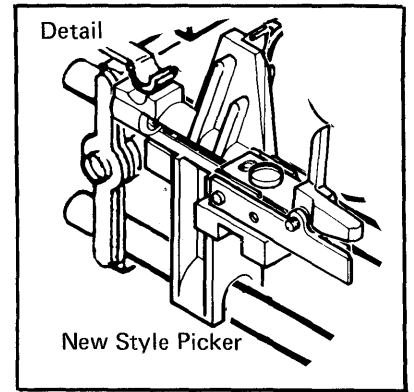




27



*Note:* The old style picker is shown here. See Detail for new style picker.

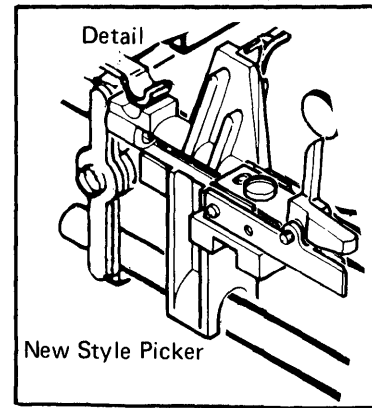
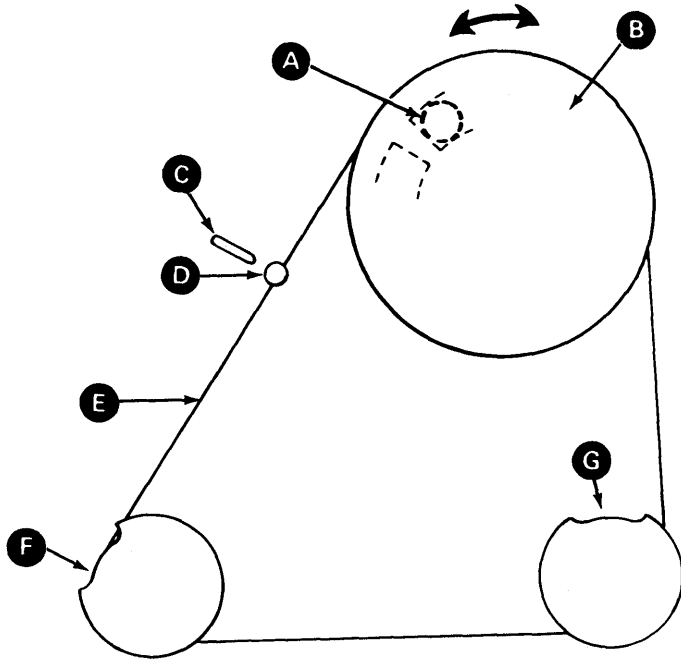


#### 27-405 PICKER/CAM TIMING SERVICE CHECK

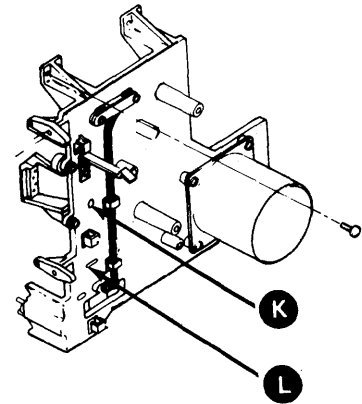
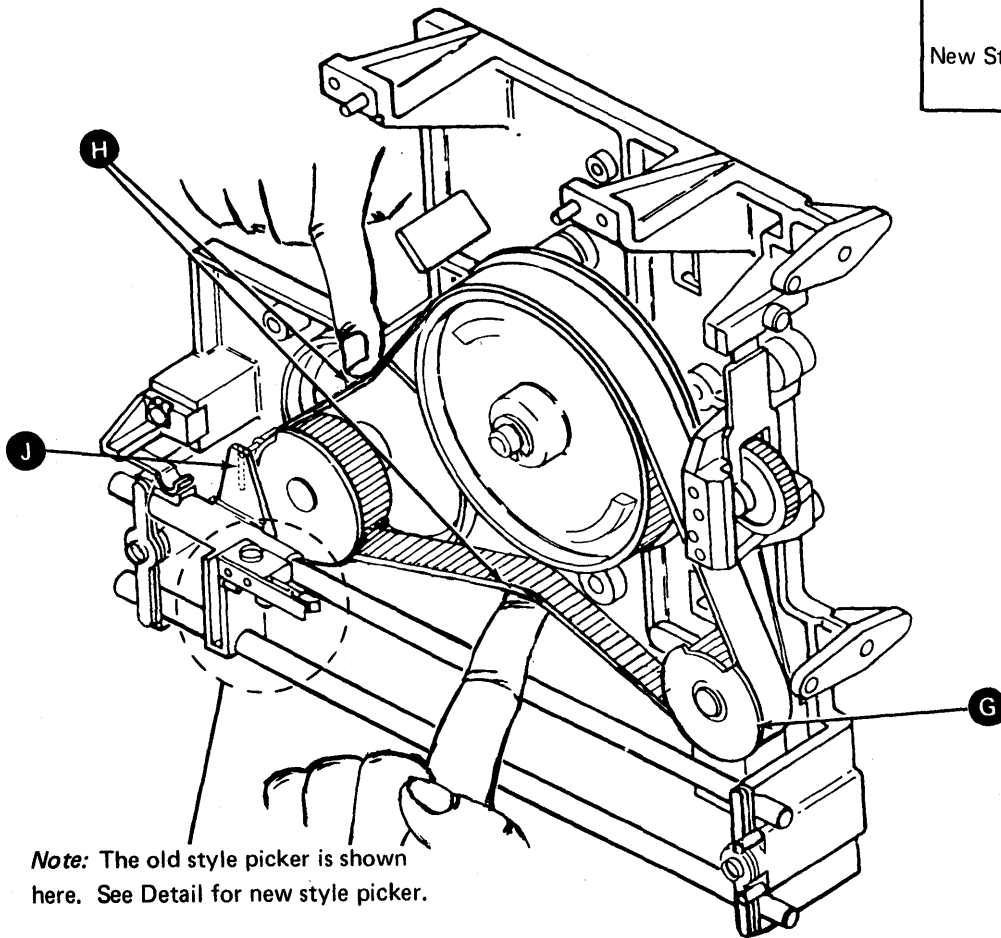
1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Turn the cam **B** clockwise until it touches the cam stop pin **A**.
3. Check that the belt pin **D** aligns with the timing indicator **C** on the casting.
4. Turn the cam **B** counterclockwise and check that the belt pin **D** aligns with the notch **F** in the drive pulley flange and the notch **G** in the idler pulley flange. If it does not, repeat the picker/cam timing adjustment (see paragraph 27-410).
5. Reinstall the picker/cam casting assembly (see paragraph 27-400).

#### 27-410 PICKER/CAM TIMING ADJUSTMENT

1. Remove the picker/cam assembly (see paragraph 27-400).
2. Loosen the holding screw **L** for the belt idler assembly **G**.
3. Loosen the pivot screw **K**.
4. Press on the belt **H** to move the belt idler pulley **G** to the end of its movement and tighten the screw **K**.
5. Turn the cam **B** clockwise until it touches the cam stop pin **A**.
6. Keep the cam **B** against the cam stop pin **A** and slip the belt **E** until the pin **D** on the belt aligns with the timing indicator **C** on the casting. Place the notches **G** and **F** in the idler assembly pulley and the stepper motor pulley flanges as shown.
7. Loosen the belt idler assembly screw **K** to permit the spring to set the belt tension.
8. Tighten the locking screw **L** on the belt idler assembly.
9. Tighten the pivot screw **K**.
10. Turn the picker/cam and check that the belt pin aligns with both the notch in the stepper drive pulley flange **F**, the notch in the idler pulley flange **G**, and the picker carriage slot **J**.
11. Reinstall the picker/cam assembly (see paragraph 27-400).



27



*Note:* The old style picker is shown here. See Detail for new style picker.

**27-415 PICKER/CAM BEZEL TO CARRIAGE BED SERVICE CHECK**

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Move the carriage bed to the carriage bed orient position.
3. Slowly lower the adjusting tool **A** (part 2462583 for old style picker, part 2462612 for new style picker) into I/O slot 3 so that the second adjusting surface **G** touches the carriage bed.
4. Check that the other end **H** of the tool touches the picker/cam bezel **J**. If it does not, perform the picker/cam bezel to carriage bed adjustment (see paragraph 27-420).

**27-420 PICKER/CAM BEZEL TO CARRIAGE BED ADJUSTMENT**

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Perform the carriage bed to diskette drive bezel service check (see paragraph 27-310)  
  
*Note: The carriage bed to drive bezel adjustment must be correct before the picker/cam bezel to carriage bed adjustment can be made.*
3. Move the carriage bed to the carriage bed orient position.
4. Loosen the two picker/cam casting screws **B**.
5. Install the adjusting tool **A** (part 2462583 for old style picker, part 2462612 for new style picker) in I/O slot 3 with the second adjusting surface **G** against the carriage bed.
6. Place a slight pressure on the bottom of the picker/cam casting toward the carriage bed **C** to ensure the bezel **J** touches the tool.
7. Tighten the two picker/cam casting screws **B**.
8. Reinstall the 72MD unit (see paragraph 27-200).

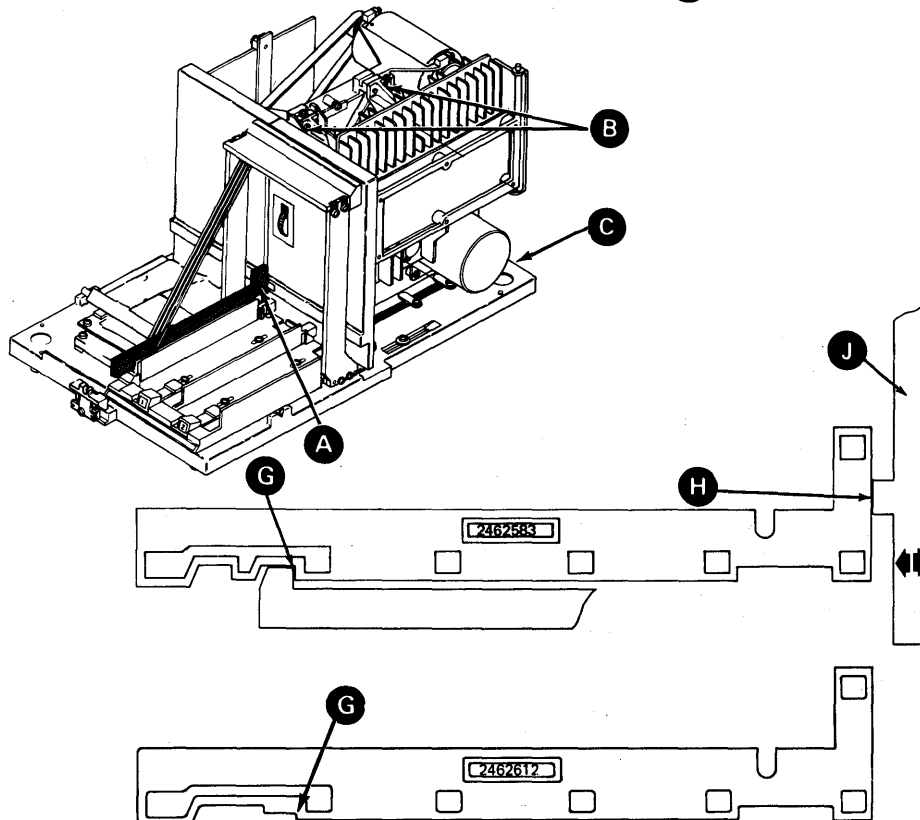
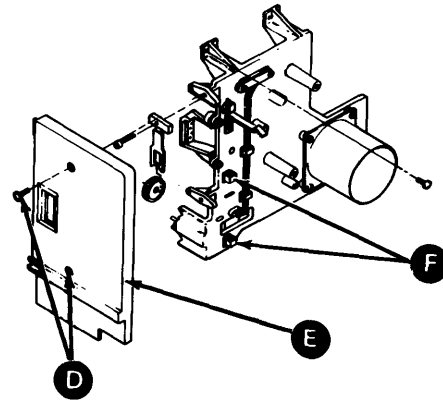
## 27-425 PICKER/CAM BEZEL REMOVAL AND REPLACEMENT

### Removing the Picker/Cam Bezel Assembly

1. Remove the carriage bed assembly (see paragraph 27-300).
2. If the 72MD has the old style picker, remove the stripper assembly cable from the two guides **F** on the picker/cam casting.
3. Remove the two bezel mounting screws **D** and remove the bezel assembly **E**.

### Reinstalling the Picker/Cam Bezel Assembly

1. Reinstall the bezel **E** using the two bezel mounting screws **D**.
2. If the 72MD has the old style picker, insert the stripper assembly cable in the two guides **F** on the picker/cam casting.
3. Reinstall the carriage bed assembly (see paragraph 27-300).



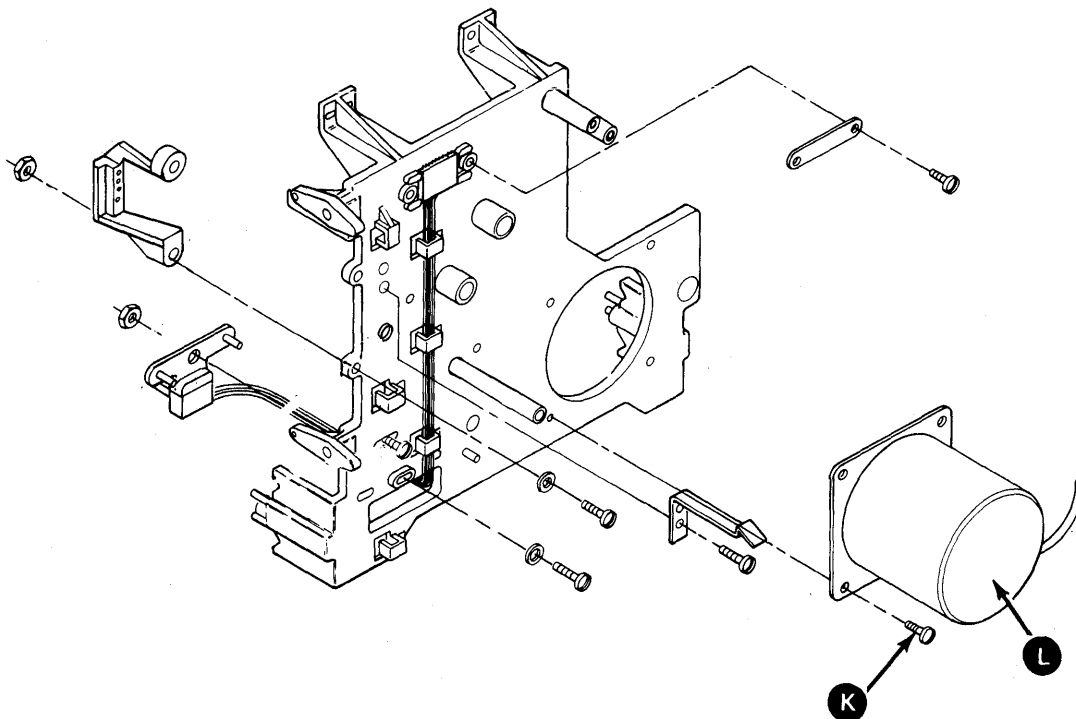
**27-430 PICKER/CAM, STEPPER MOTOR, AND BELT REMOVAL AND REPLACEMENT**

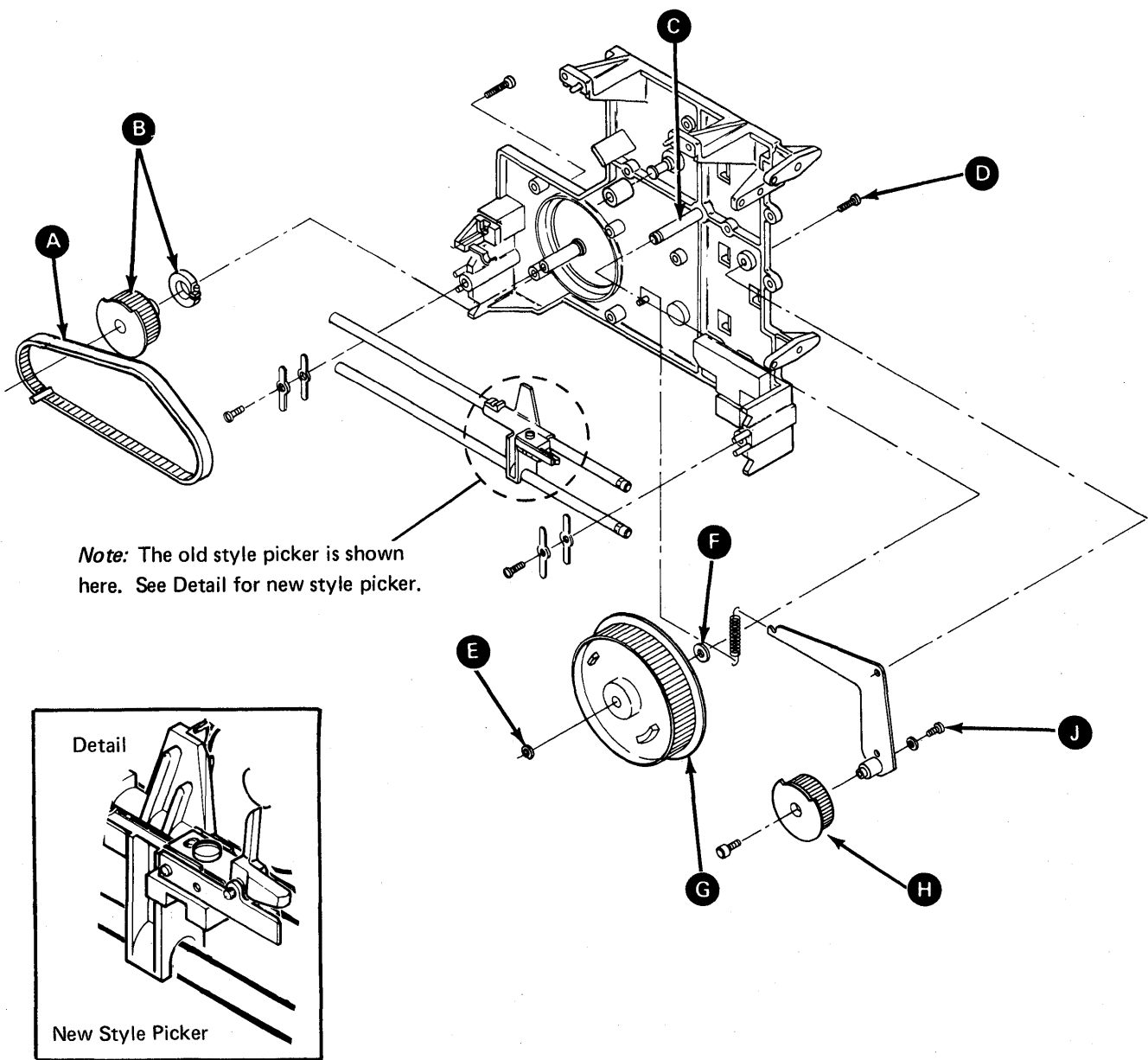
**Removing the Picker/Cam, Stepper Motor, and Belt**

1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Loosen the screw **J** in the belt idler assembly.
3. Loosen the pivot screw **D**.
4. Press on the belt **A** to move the belt idler pulley **H** to the end of its movement and tighten the screw **J**.
5. Remove the belt **A**.
6. If the cam **G** is being removed, remove the clip **E** from the cam stud **C** and remove the cam **G**. (Note the spacer **F** behind the cam.)
7. If the stepper motor **L** is being removed, remove the four stepper motor mounting screws **K** and remove the stepper motor.
8. Remove the pulley and collar **B** on the motor shaft.

**Reinstalling the Picker/Cam Stepper Motor and Belt**

1. Reinstall the pulley and collar **B** on the motor shaft.
2. Reinstall the picker/cam stepper motor **L** in position with the leads extending away from the bezel and reinstall the four mounting screws **K**.
3. Reinstall the cam **G** on its stud **C** and attach the clip **E**. (Ensure that the spacer **F** is installed first.)
4. Reinstall the picker/cam drive belt **A**.
5. Perform the picker/cam timing adjustment, starting at step 5 (see paragraph 27-410).





**27-435 PICKER CARRIAGE ASSEMBLY  
REMOVAL AND REPLACEMENT**

**Removing the Picker Carriage Assembly**

1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Remove the picker carriage assembly rail holding straps **D**.
3. Remove the rails **A** and the picker carriage assembly **E**.
4. Slide the picker carriage off the rails.

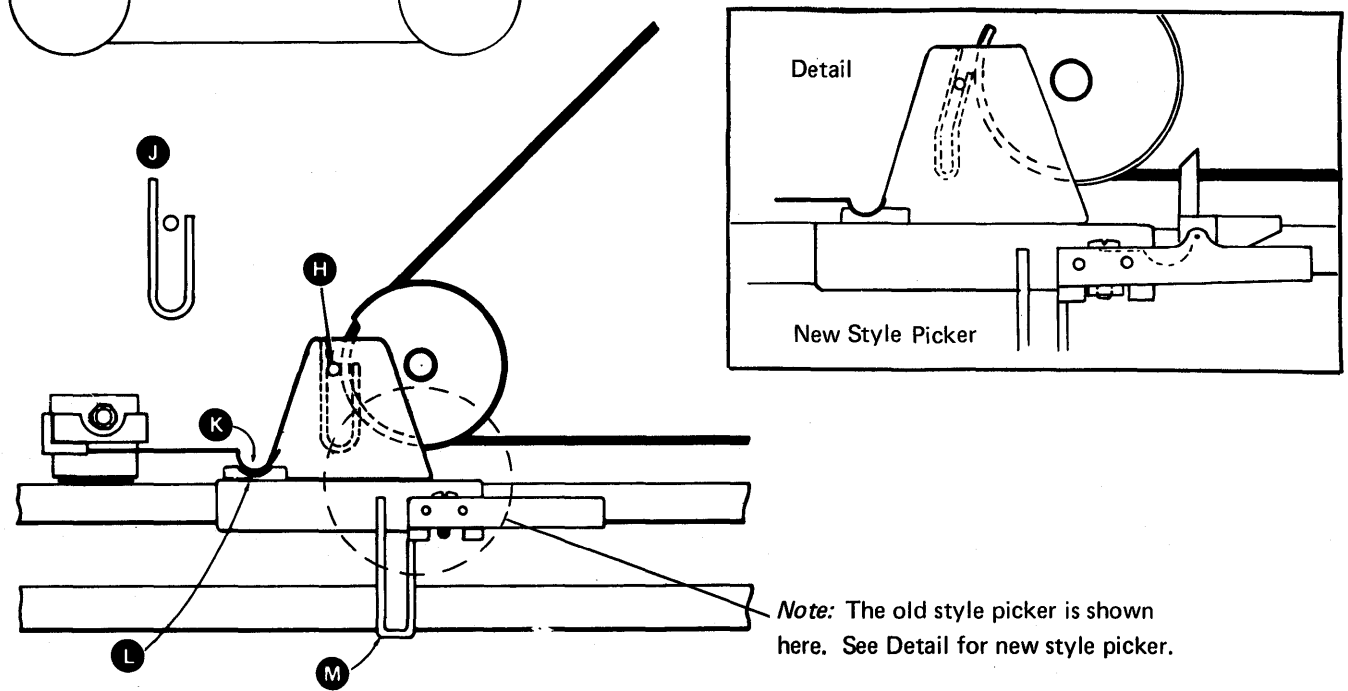
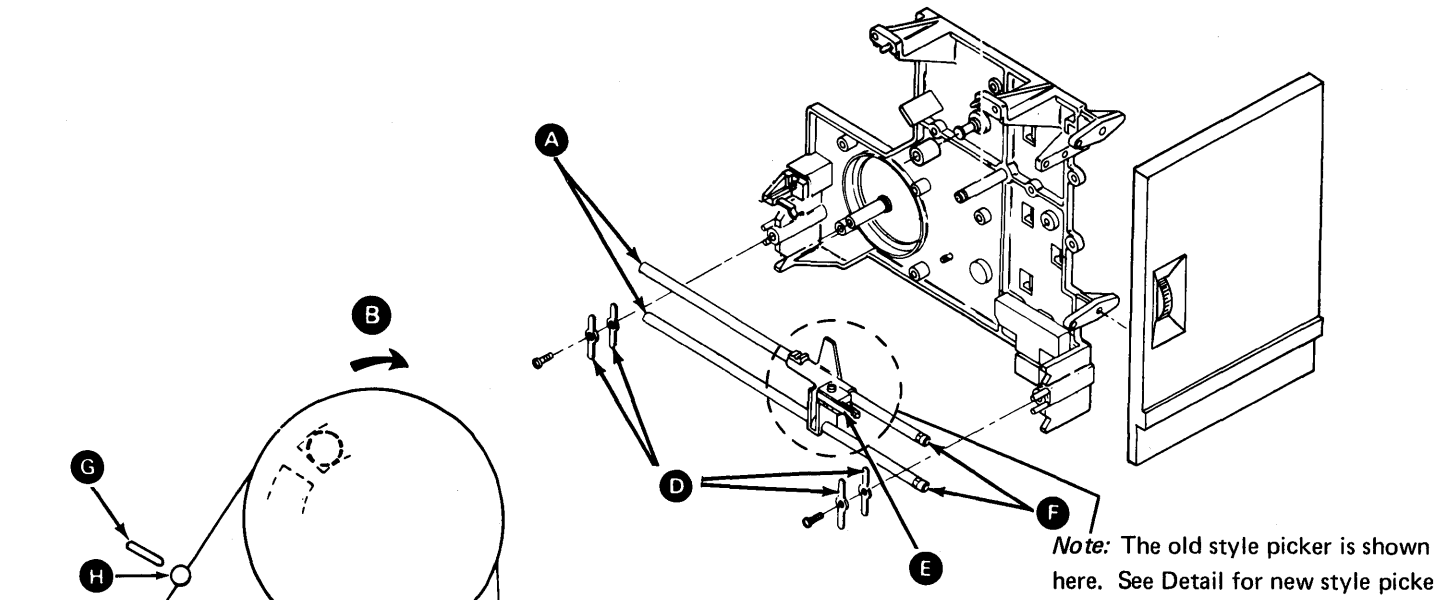
**Reinstalling the Picker Carriage Assembly**

1. Reinstall the picker carriage **E** on the rails **A**.
2. Place the rails **A** on the casting with the ground ends **F** nearest to the picker/cam bezel and reinstall the holding straps **D**.
3. Reinstall the picker/cam casting assembly (see paragraph 27-400). Do not reinstall the 72MD unit at this time.
4. Perform the picker finger assembly adjustment (see paragraph 27-455).
5. Perform the picker rest adjustment (see paragraph 27-470).
6. Reinstall the 72MD unit (see paragraph 27-200).

**27-440 PICKER CARRIAGE DETENT  
SERVICE CHECK**

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Align the belt pin **H** with the timing mark **G** on the casting.
3. Move the picker carriage assembly **M** to where the lobe on the detent spring **K** touches the bottom of the dwell **L** on the picker carriage.
4. Turn the picker/cam **B** to advance the belt pin **H** toward the picker carriage.
5. Check that the pin enters the center of the slot **J** in the picker carriage. If it does not, perform the picker carriage detent adjustment (see paragraph 27-445).
6. Reinstall the 72MD unit (see paragraph 27-200).





**27-445 PICKER CARRIAGE DETENT  
ADJUSTMENT**

1. Remove power and the 72MD unit (see paragraph 27-200).
2. With the belt pin **H** engaged in its slot **J** in the picker carriage **M**, turn the picker/cam **A** clockwise until the picker carriage stops moving. (The belt pin should still be touching the rear surface of the slot.)
3. Carefully move the picker carriage to where the belt pin is centered inside the slot **J**.
4. Loosen the screw **C** in the detent **B** and locate the detent assembly to where the lobe on the detent spring **K** touches the bottom of the dwell **L** on the picker carriage.
5. Tighten the screw **C**.
6. Reinstall the 72MD unit (see paragraph 27-200).

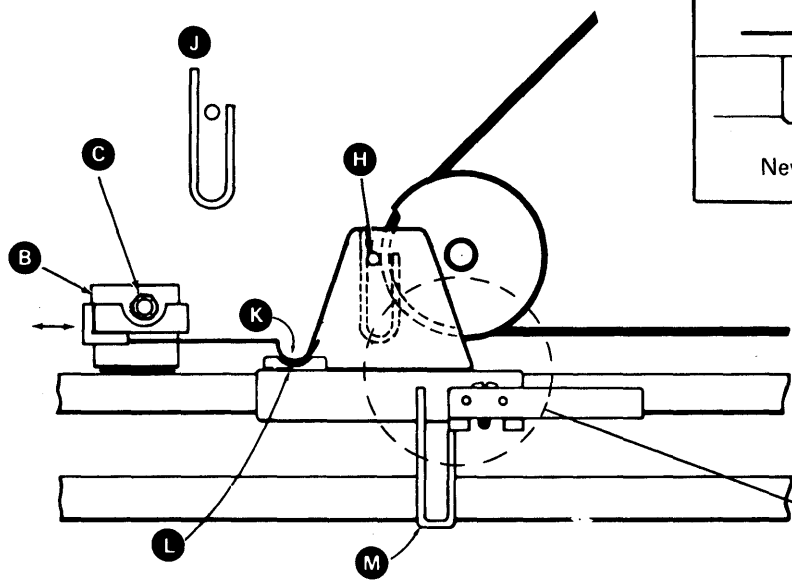
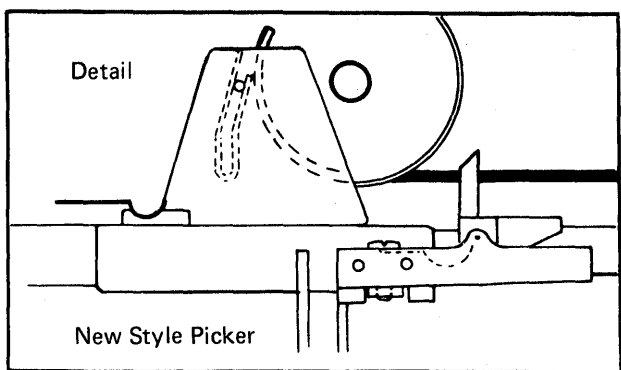
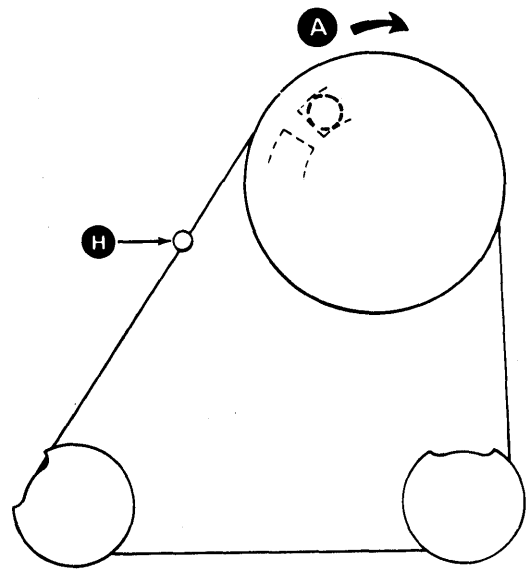
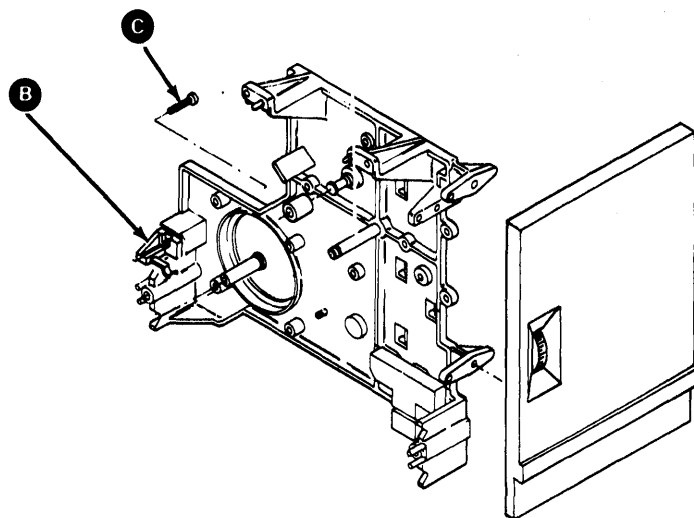
**27-450 PICKER CARRIAGE DETENT REMOVAL  
AND REPLACEMENT**

**Removing the Picker Carriage Detent**

1. Remove power and the 72MD unit (paragraph 27-200).
2. Remove the fastening screw and nut **C** from the detent assembly **B**.
3. Remove the detent assembly **B**.

**Reinstalling the Picker Carriage Detent**

1. Place the detent **B** in position on the picker/cam casting.
2. Reinstall the fastening screw and nut **C** (do not tighten).
3. Perform the picker carriage detent adjustment (see paragraph 27-445).
4. Reinstall the 72MD unit (see paragraph 27-200).



Note: The old style picker is shown here. See Detail for new style picker.

## 27-453 PICKER FINGER SERVICE CHECK

Note: The Carriage Bed to Diskette Drive Bezel Adjustment (27-305), Picker Extend Adjustment (27-485), and Picker Finger Adjustment (27-455) must be correct before this service check can be made.

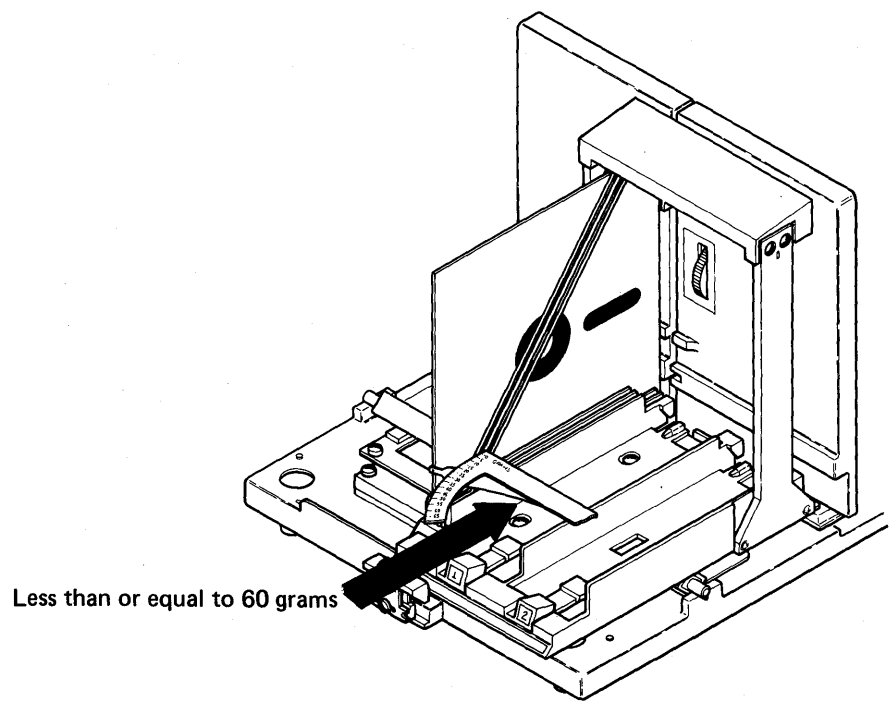
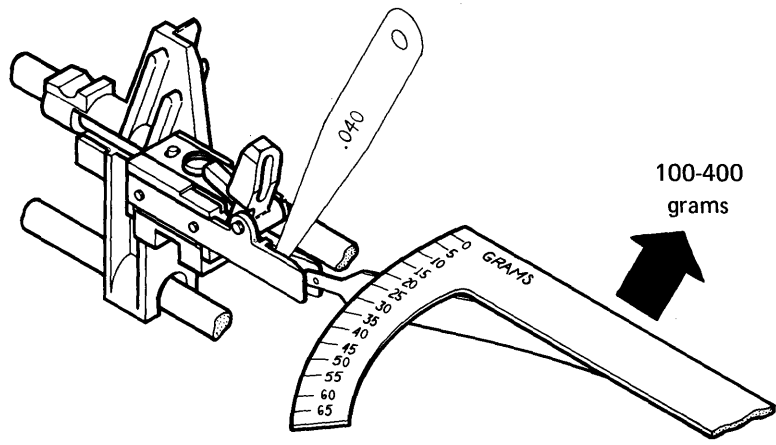
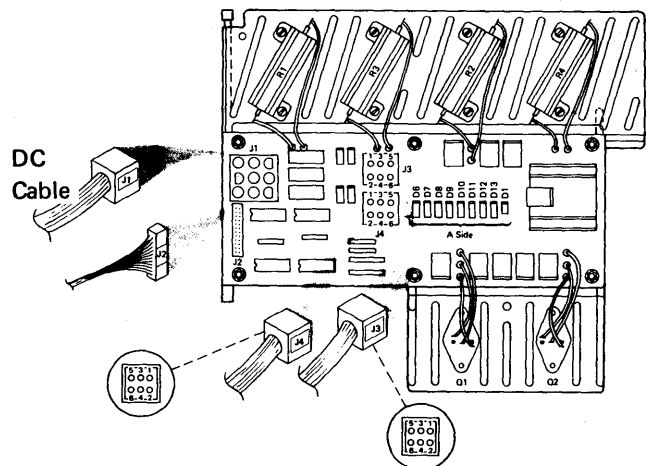
1. Disconnect the DC cable (J1) from the driver board.
2. Place the carriage bed so that slot 2 (approximate) of magazine 2 is aligned with the drive station diskette guide.
3. Place the picker carriage assembly so that the picker finger assembly is completely extended.
4. Place a 1.0 millimeter (0.040 inch) gauge between the picker fingers. Measure the force needed to make the gauge move or fall out of position (use a gram gauge [ Part 450459 ] with a X10 blade).

If the gauge will not remain in position or if the force needed is less than 100 grams or more than 400 grams, replace the picker spring finger.

5. Connect the DC cable (J1) to the driver board.

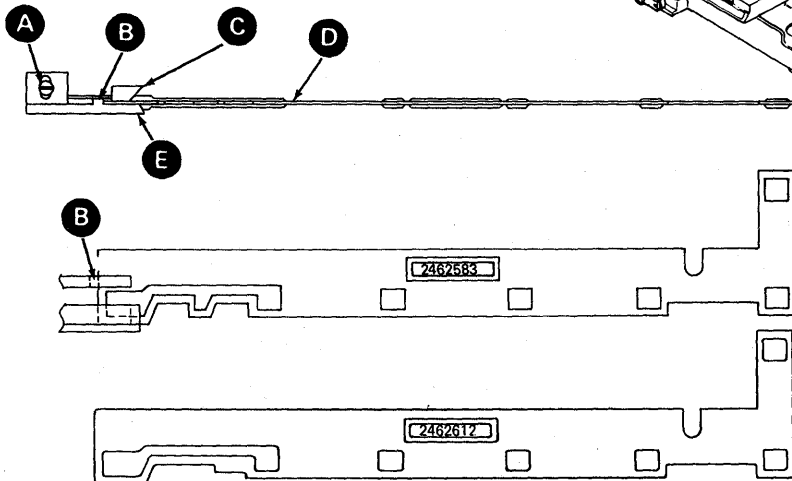
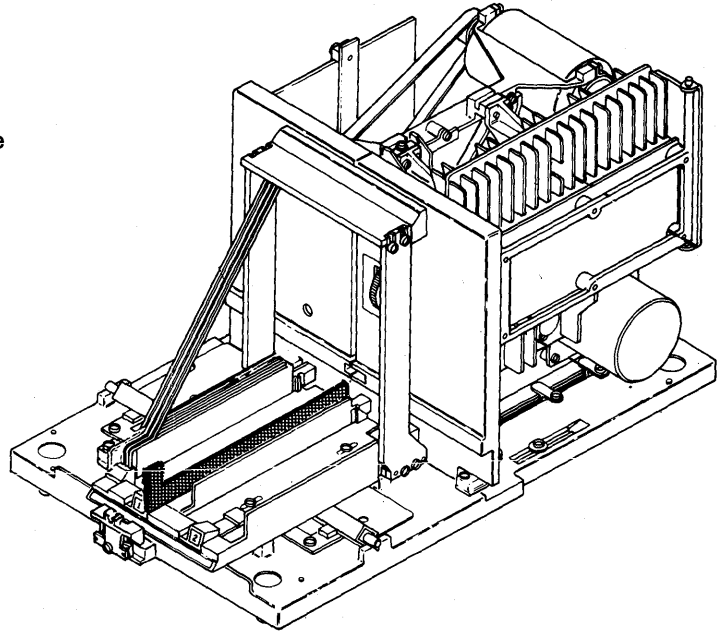
If the machine still fails to pick diskettes, check that the I/O slot guide wires are not bent and that the diskettes are not damaged. To check for damaged diskettes, do the following:

1. Place a failing diskette in the I/O slot that fails the most.
2. Use the gram gauge to measure the force needed to move the diskette out of the slot. If more than 60 grams are needed, the diskette is damaged.



## 27-455 PICKER FINGER ADJUSTMENT

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Place the carriage bed so that magazine 1 position 5 aligns with the diskette guide.
3. Place the picker assembly so that the front tips of the picker fingers are even with the front guide surfaces of the bezels.
4. Push the collet assembly until it engages the hub. (This will permit you to access the picker finger mounting screw.)
5. Loosen the picker finger mounting screw **A**.
6. If the 72MD has the new style picker, turn the diskette ejector **H** up.
7. Pivot the stripper assembly out of the way and install the adjusting tool **D** (part 2462583 for old style picker, part 2462612 for new style picker) with one end between the solid finger **E** and the spring finger **C** of the picker and against the picker diskette stop **B**.
8. Slide the tool approximately 13 millimeters (0.512 inch) into the drive (be careful to maintain the position of the tool and the picker finger from step 6).
9. Carefully put downward pressure to the top of the tool. (This will align the tool and the angle of the picker arms to the diskette guide.)
10. Tighten the picker mounting screw **A** and remove the tool.
11. Perform the picker extend service check (see paragraph 27-480).
12. Reinstall the 72MD unit (see paragraph 27-200).



**27-460 PICKER FINGER REMOVAL AND REPLACEMENT**

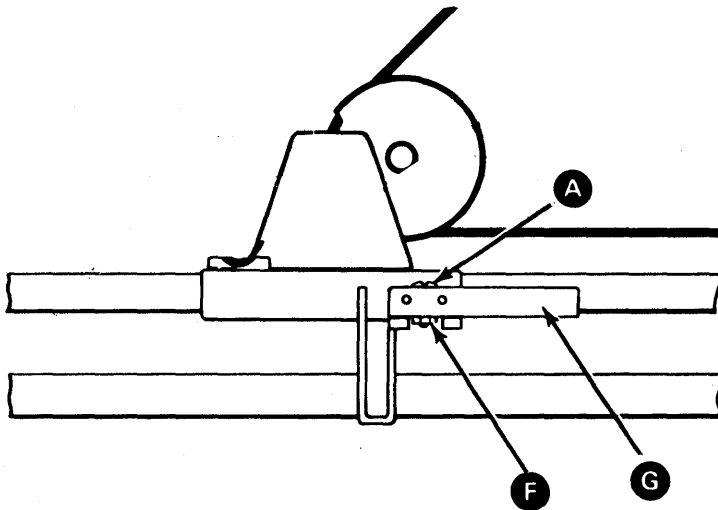
**Machines with Old Style Picker**

*Removing the Picker Finger*

1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Remove the picker finger assembly mounting screw **A** and nut **F** and the picker finger assembly **G**.

*Reinstalling the Picker Finger*

1. Reinstall the picker finger assembly **G** on the picker carriage and fasten it with the mounting screw **A** and nut **F**. (Do not tighten.)
2. Reinstall the picker/cam casting assembly (see paragraph 27-400). Do not reinstall the 72MD unit at this time.
3. Perform the picker finger assembly adjustment (see paragraph 27-455).



Old Style Picker

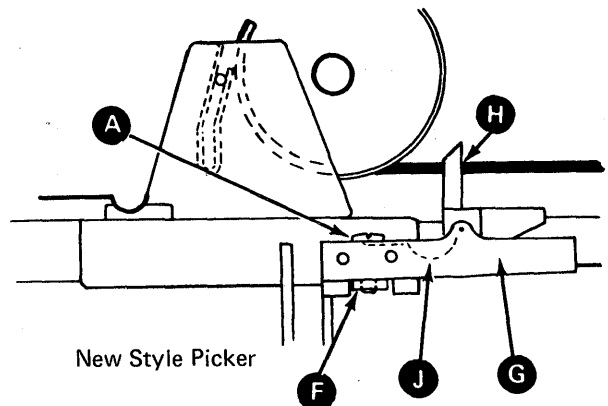
**Machines with New Style Picker**

*Removing the Picker Finger*

1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Remove the picker finger assembly mounting screw **A** and nut **F**, then remove the diskette ejector **H**, the ejector detent spring **J**, and the picker finger assembly **G**.

*Reinstalling the Picker Finger*

1. Reinstall the picker finger assembly **G** on the picker carriage and fasten it with the mounting screw **A** and nut **F**. (Do not tighten.)
2. Reinstall the picker/cam casting assembly (see paragraph 27-400). Do not reinstall the 72MD unit at this time.
3. Perform the picker finger assembly adjustment (see paragraph 27-455).



New Style Picker

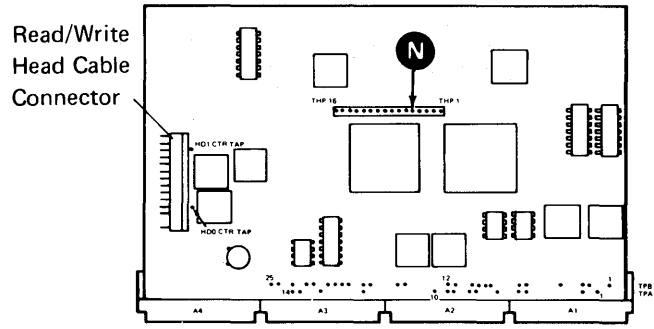
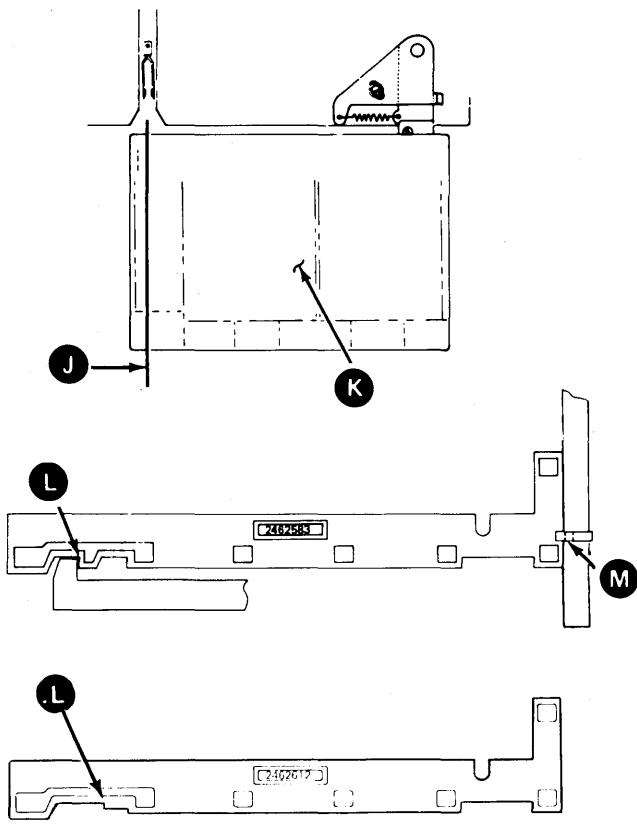
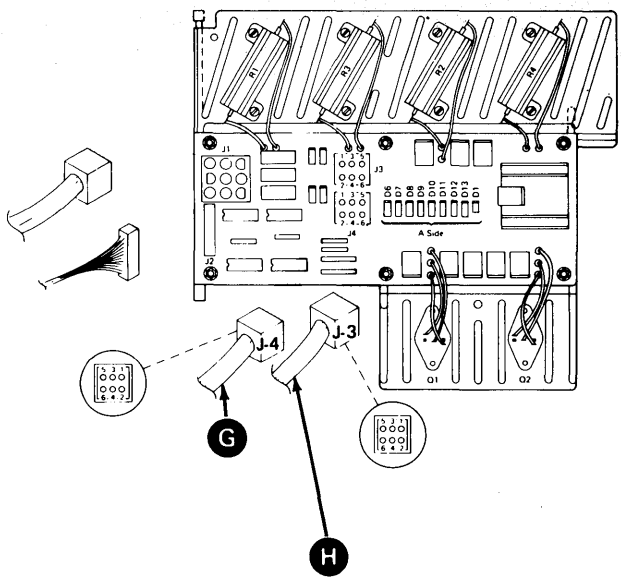
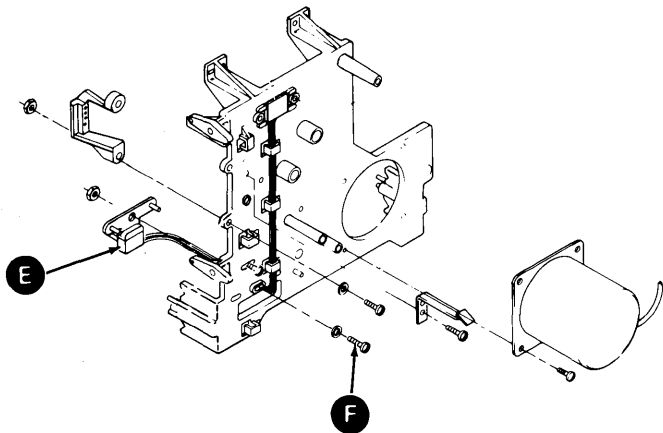
## 27-465 PICKER REST SENSOR SERVICE CHECK

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Set Power to I (operator panel).
3. Press the Reset switch (CE panel) to orient the carriage bed.
4. Disconnect the picker stepper motor cable **H** from the driver board connector J3.
5. Probe test pin THP-5 **N** (-picker extended).
6. Insert the adjusting tool **J** (part 2462583 for old style picker, part 2462612 for new style picker) into I/O slot 1 and locate the picker stop **M** against one end of the tool and the carriage bed **L** against adjusting surface 1. The output should be minus (-).
7. Turn the picker/cam so that the picker carriage moves away from the carriage bed. The output should become positive when the picker/cam has been turned approximately one tooth. If the output is not positive, perform the picker rest sensor adjustment (see paragraph 27-470).
8. Connect the picker/cam stepper motor cable **H** to driver board connector J3.
9. Reinstall the 72MD unit (paragraph 27-200).

## 27-470 PICKER REST SENSOR ADJUSTMENT

1. Perform the picker extend service check (see paragraph 27-480).  
*Note:* The picker extend timing must be corrected before the picker rest sensor can be correctly adjusted.
2. Disconnect the carriage bed stepper motor cable **G** from driver board connector J4.
3. Locate the carriage bed assembly **K** so that I/O slot 1 aligns with the diskette guide in the drive.
4. Disconnect the picker drive stepper motor cable **H** from driver board connector J3.
5. Set Power to I (operator panel).
6. Insert the adjusting tool **J** (part 2462583 for old style picker, part 2462612 for new style picker) into I/O slot 1 and turn the picker by hand to place the picker stop **M** against one end of the tool and the carriage bed **L** against adjusting surface 1.
7. Probe test pin THP-5 **N** (-picker extend).
8. Loosen the sensor mounting screw **F** and adjust the sensor **E** so that the output is minus (-).
9. Tighten the sensor mounting screw **F**. Turn the picker/cam so that the picker carriage moves away from the carriage bed. The output should become positive when the picker/cam has been turned approximately one tooth.
10. Connect the carriage bed stepper motor cable **G** to driver board connector J4 and the picker drive stepper motor cable **H** to driver board connector J3.
11. Reinstall the 72MD unit (see paragraph 27-200).





Note: See paragraph 27-820 for control card test pins.

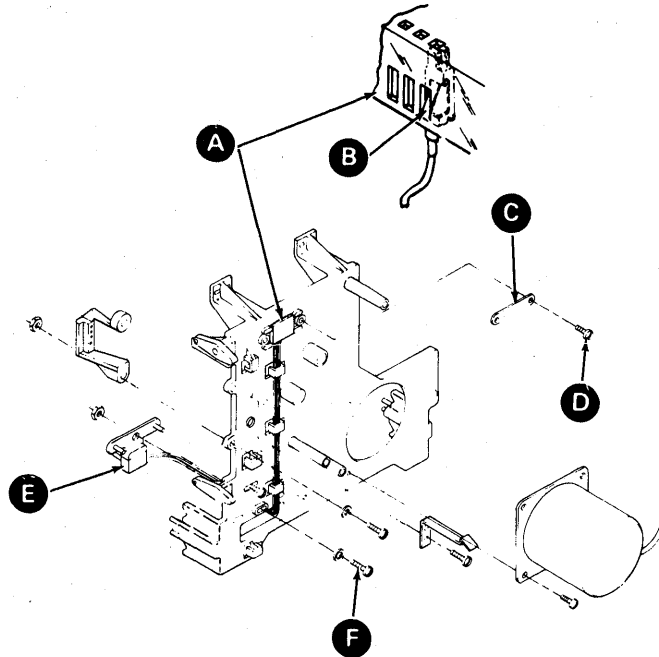
## 27-475 PICKER REST SENSOR REMOVAL AND REPLACEMENT

### Removing the Picker Rest Sensor

1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Remove the two screws **D** and the clamp **C** from the sensor cable connector **A**.
3. Remove the picker rest sensor leads from connector A1 by pressing the tabs **B** in the connector with a small screwdriver.
4. Remove the mounting screw **F** from the bottom of the sensor **E** and remove the sensor.

### Reinstalling the Picker Rest Sensor

1. Locate the picker rest sensor **E** and fasten it with the screw **F**.
2. Attach the picker rest sensor leads to connector A1.
3. Reinstall the sensor cable connector **A** on the picker/cam casting and fasten it with the clamp **C** and the two mounting screws **D**.
4. Reinstall the picker/cam casting assembly (see paragraph 27-400). Do not reinstall the 72MD unit at this time.
5. Perform the picker rest sensor adjustment (see paragraph 27-470).
6. Reinstall the 72MD unit (see paragraph 27-200).



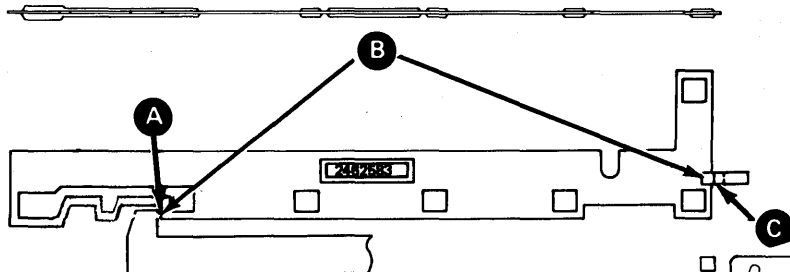
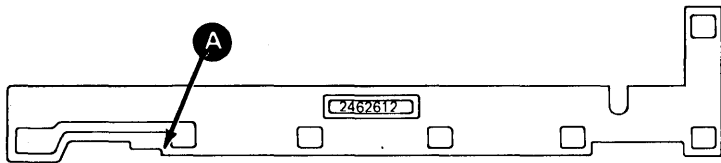
This page is intentionally left blank.

## 27-480 PICKER EXTEND SERVICE CHECK

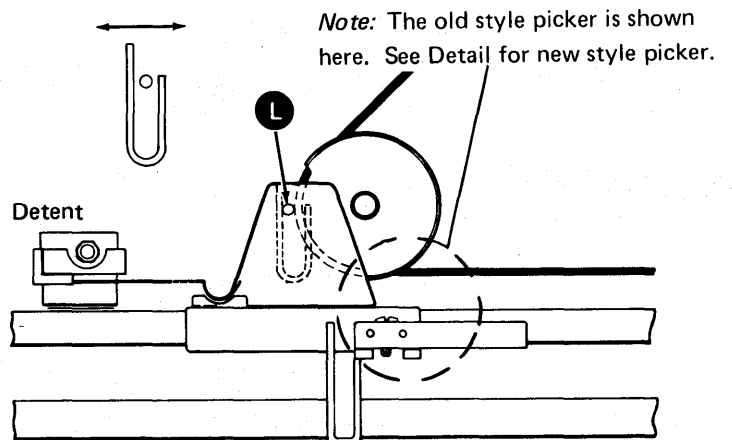
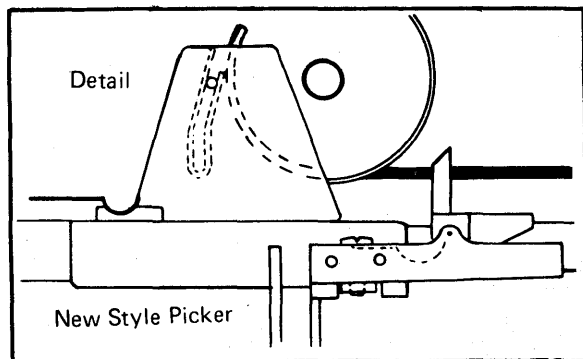
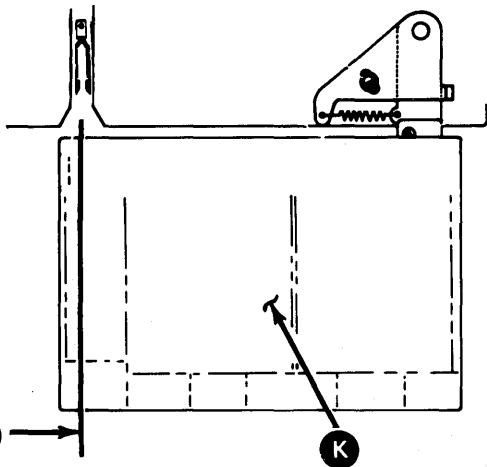
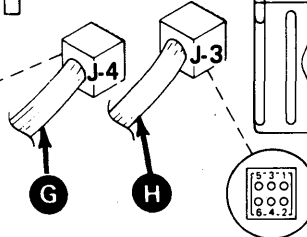
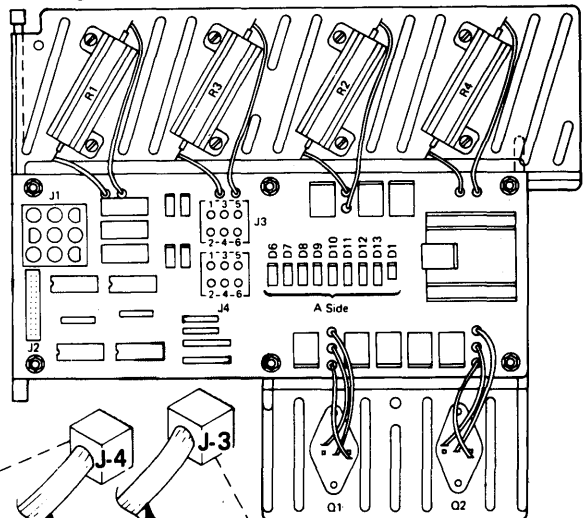
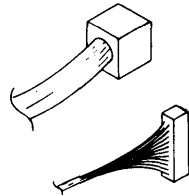
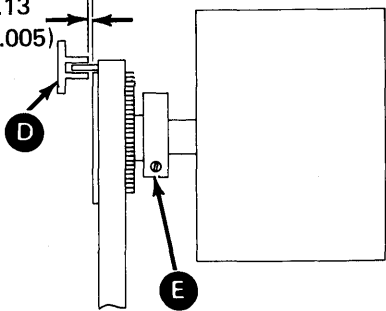
1. Remove power and the 72MD unit (see paragraph 27-200).
2. Set Power to I (operator panel).
3. Disconnect the picker/cam stepper motor cable **H** from driver board connector J3 and the carriage bed stepper motor cable **G** from driver board connector J4.
4. Align the carriage bed assembly **K** I/O slot 1 with the diskette guide.
5. Connect the carriage bed stepper motor cable **G** to driver board connector J4.
6. Insert the adjusting tool **J** (part 2462583 for old style picker, part 2462612 for new style picker) in I/O slot 1 (use adjusting surface 2 **A** and the diskette guide).
7. Turn the picker/cam by hand to place the picker stop **C** against the tool.
8. Connect the picker/cam stepper motor cable **H** to driver board connector J3.
9. Remove the adjusting tool.
10. Ensure that the stepper motor is held in place.
11. Verify the position of the picker stop **C** using the adjusting tool. The tool should touch at **B**. If it is not correct, perform the picker extend adjustment (see paragraph 27-485).

## 27-485 PICKER EXTEND ADJUSTMENT

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Perform the carriage bed to diskette drive bezel service check before continuing (see paragraph 27-310).
3. Turn the cam until the pin on the belt starts to enter the slot **L** on the picker carriage.
4. Loosen the collar **E** on the stepper motor pulley and set the gap between the stepper motor pulley flange and the picker carriage **D** to  $1.68 \pm 0.13$  millimeters ( $0.066 \pm 0.005$  inch).
5. Tighten the collar **E**.
6. Place the carriage bed **K** to where I/O slot 1 aligns with the drive diskette guide.
7. Disconnect connector plug J3 **H**.
8. Set power to I (operator panel).
9. Insert the picker tool **J** into I/O slot 1 and place the picker stop **C** near the tool. Connect connector plug J3 **H**. Loosen the collar **E** and carefully turn the pulley until one end of the tool touches the picker stop **C** and the other end touches the back of I/O slot 1 **B**. (Be careful when turning the pulley that the gap from step 4 is not changed.)
10. Verify the adjustment from step 9 and tighten the collar **E**.
11. Remove the tool **J**.
12. Check the gap from step 4.
13. Perform the picker rest service check (see paragraph 27-465).



.68 mm ± 0.13  
0.066 in ± 0.005

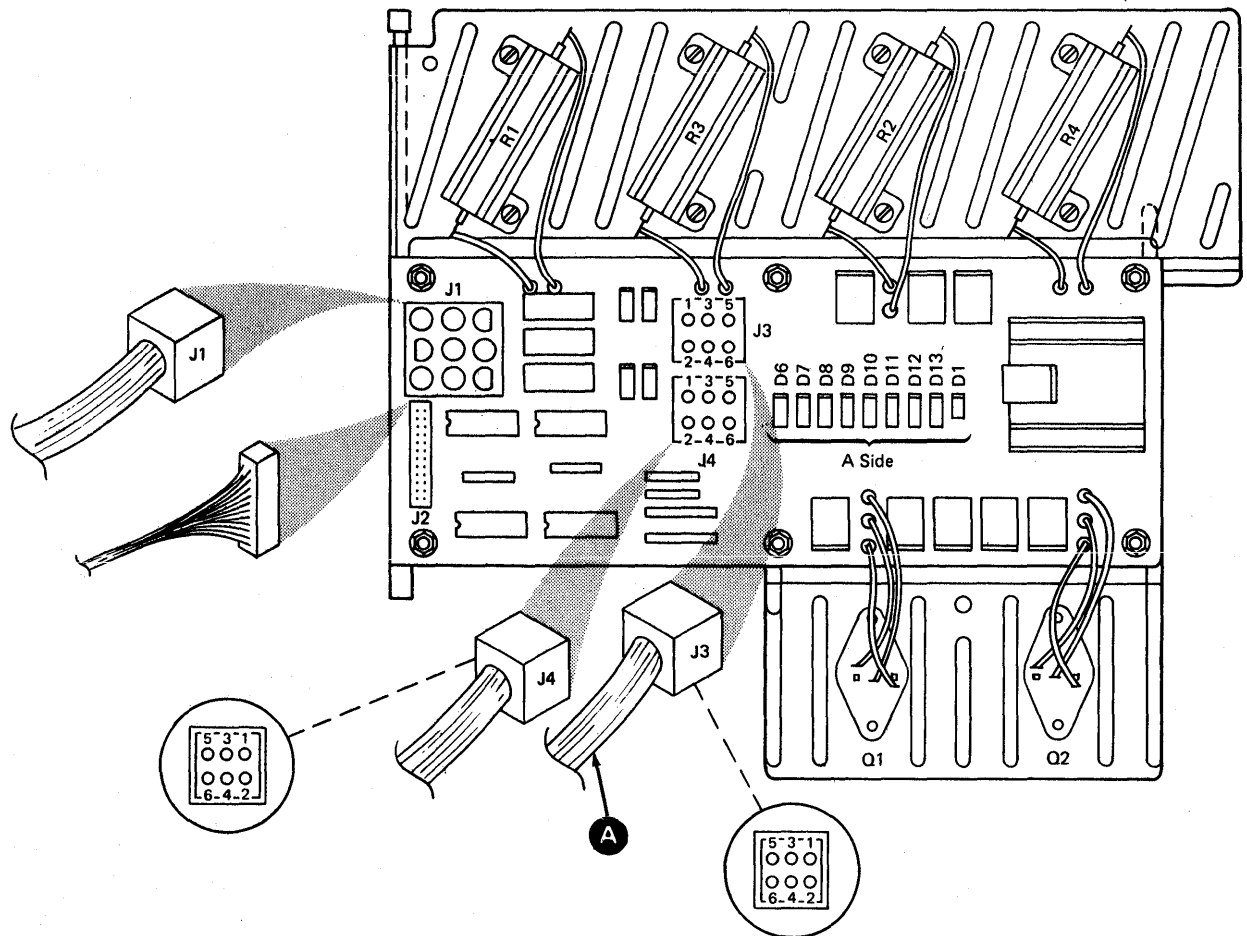


**27-490 PICKER/CAM STEPPER MOTOR  
WINDINGS RESISTANCE  
SERVICE CHECK**

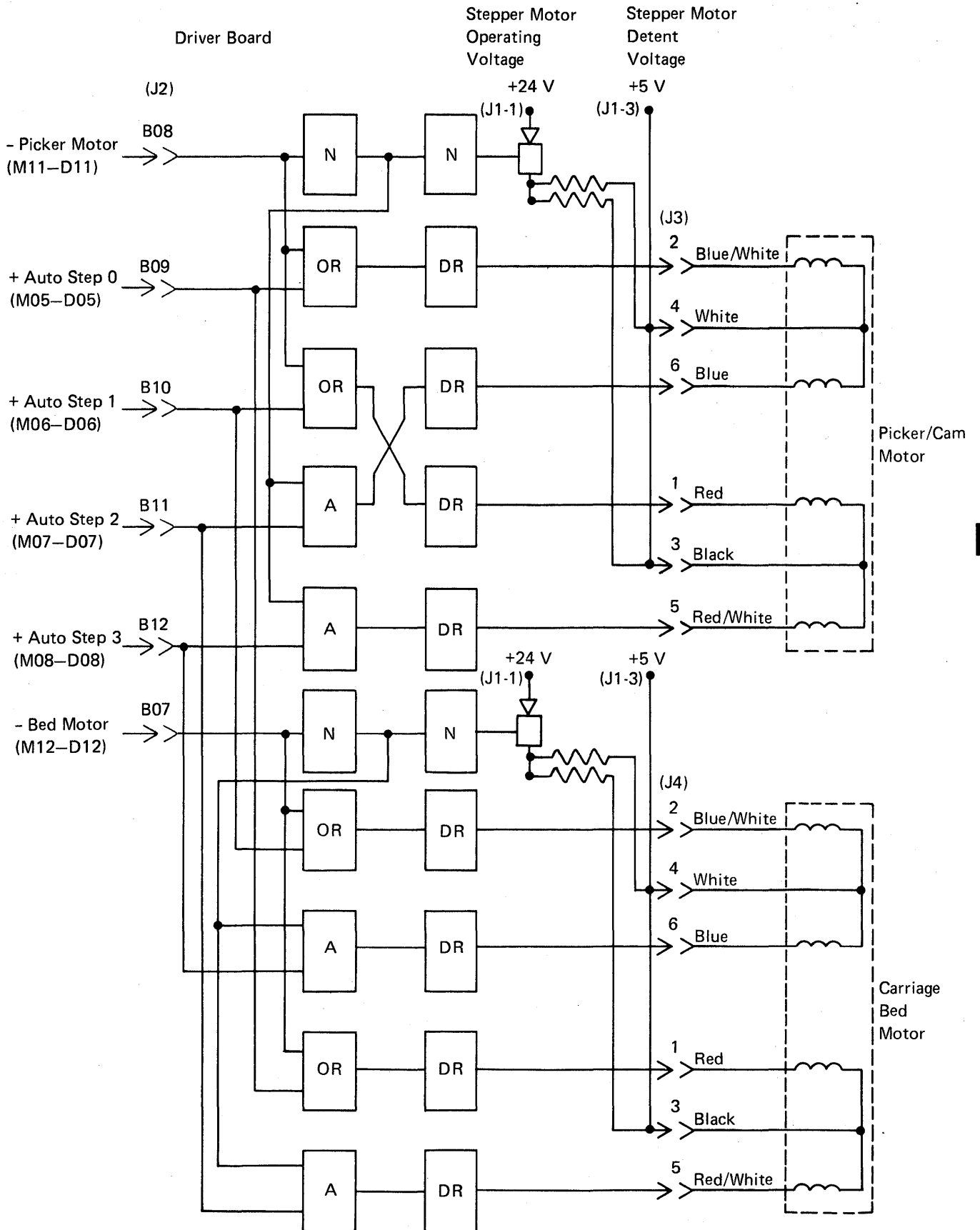
1. Remove power and the 72MD unit (see paragraph 27-200).
2. Disconnect the stepper motor cable **A** from driver board connector J3.
3. Use a multimeter to measure the resistance between pins: 2 and 4, 4 and 6, 1 and 3, 3 and 5.

The resistance should be 3 ohms  $\pm$  10%.

4. Reinstall the 72MD unit (see paragraph 27-200).



### Stepper Motor Logic



## 27-495 JAM REMOVAL WHEEL REMOVAL AND REPLACEMENT

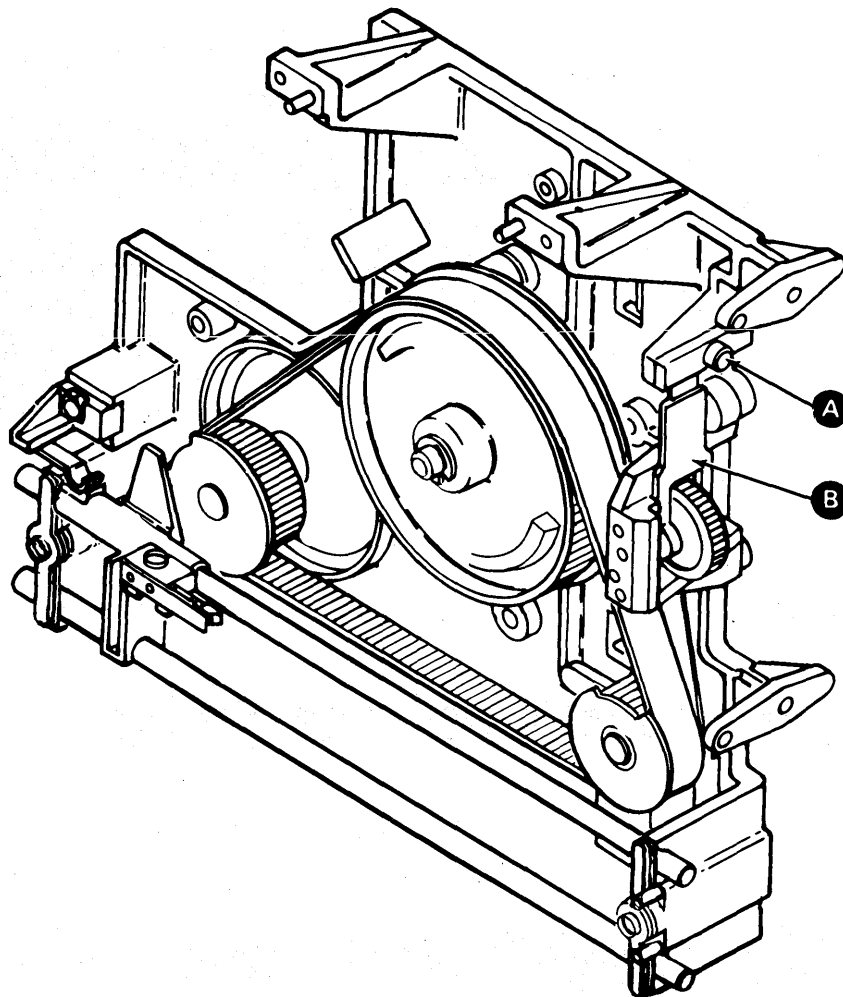
### Removing the Jam Removal Wheel

1. Remove the picker/cam bezel assembly (see paragraph 27-425).
2. Remove the mounting screw **A** and the jam removal wheel assembly **B**.

*Note:* Be careful not to damage the stripper sensor wires.

### Reinstalling the Jam Removal Wheel

1. Reinstall the jam removal wheel **B** using the mounting screw **A**.
2. Reinstall the picker/cam bezel assembly (see paragraph 27-425).





**This page is intentionally left blank.**

## 27-500 STRIPPER REMOVAL AND REPLACEMENT

### Removing the Stripper

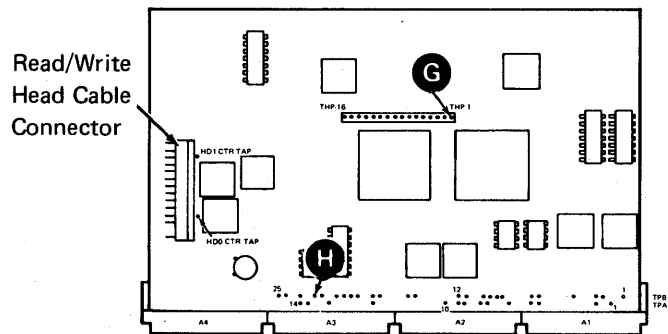
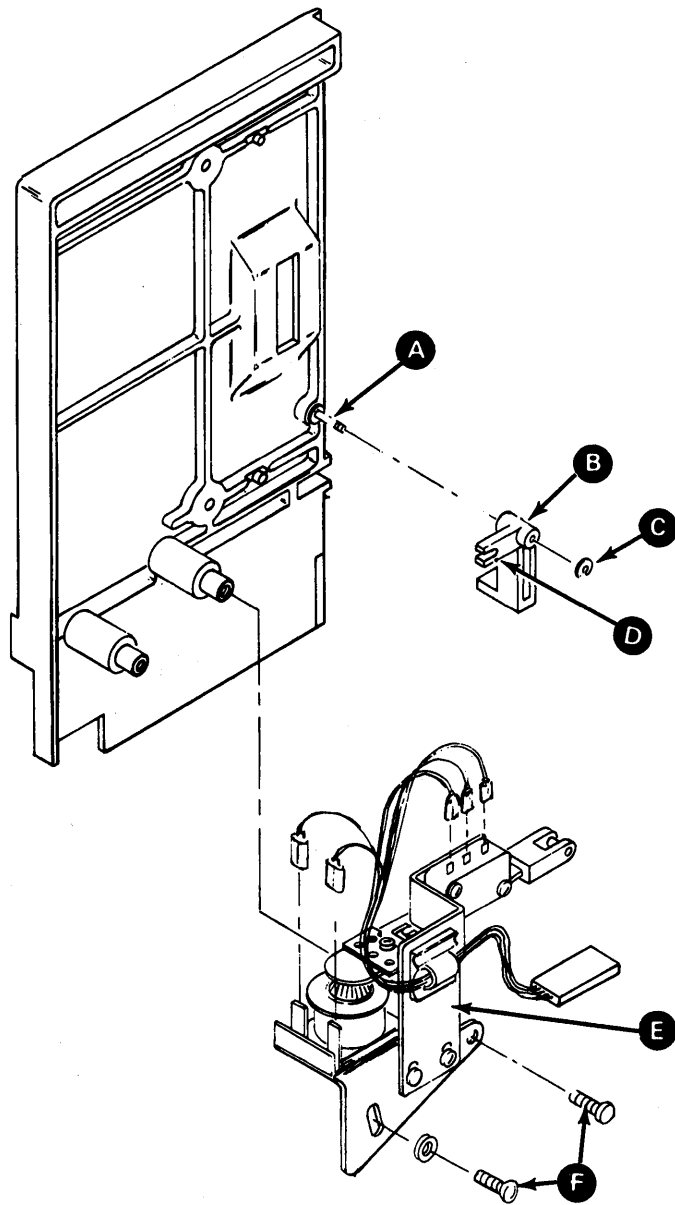
1. Remove the picker/cam bezel assembly (see paragraph 27-425).
2. Remove the two screws **F** from the stripper magnet bracket assembly **E** and remove the assembly.
3. Remove the holding clip **C** from the stripper pivot stud **A**.
4. Lift the stripper **B** from the pivot stud.

### Reinstalling the Stripper

1. Place the stripper **B** on the pivot stud **A** and attach the holding clip **C**.
2. Reinstall the stripper magnet bracket assembly **E** using the two mounting screws **F**. (Ensure that the magnet armature tip is in the stripper fork **D**.)
3. Reinstall the picker/cam bezel assembly (see paragraph 27-425). Do not reinstall the 72MD unit at this time.
4. Adjust the stripper magnet and switch assembly (see paragraph 27-520).
5. Reinstall the 72MD unit (see paragraph 27-200).

## 27-505 STRIPPER MAGNET SERVICE CHECK

1. Open the front left side cover.
2. Loosen the two front safety shield screws and remove the two rear safety shield screws and the safety shield.
3. Set Power to I (operator panel).
4. Activate the magnet by jumpering test point TPB-22 **H** (-window magnet) to THP-1 **G** ground.
5. Check that the stripper foot **B** moves. If it does not move, reinstall the stripper magnet assembly.
6. Check that the stripper foot is aligned  $\pm 0.5$  millimeters (0.02 inches) to the picker/cam bezel surface. If it is not, perform the stripper magnet switch adjustment (see paragraph 27-520).
7. Reinstall the safety shield using the four screws.



Note: See paragraph 27-820 for control card test pins.

**27-510 STRIPPER MAGNET AND SWITCH  
ASSEMBLY REMOVAL  
AND REPLACEMENT**

**Removing the Stripper Magnet and Switch  
Assembly**

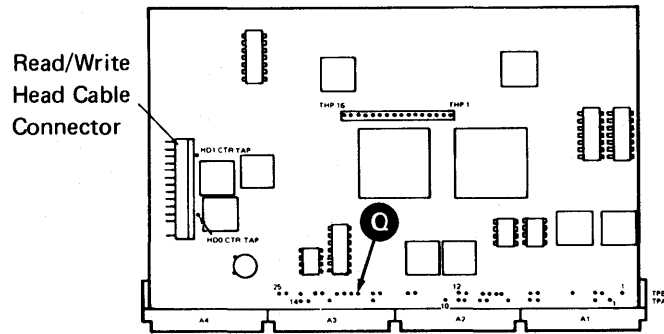
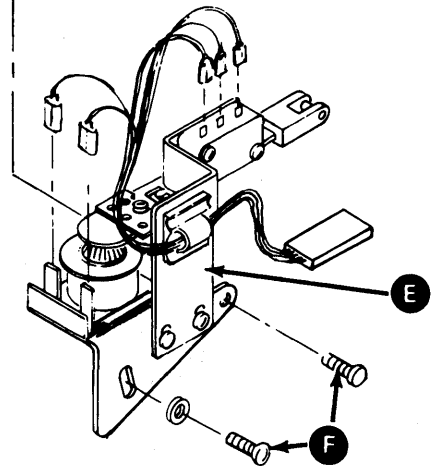
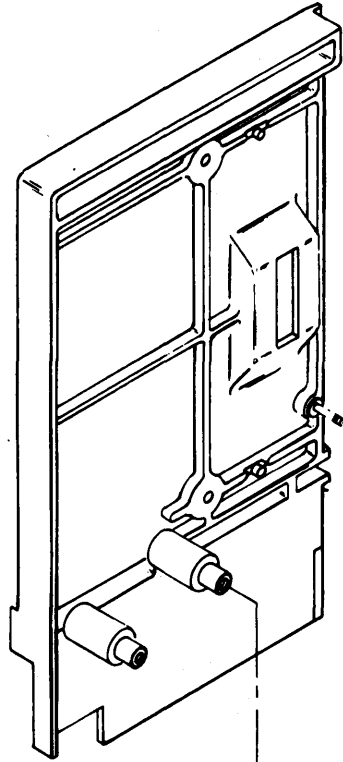
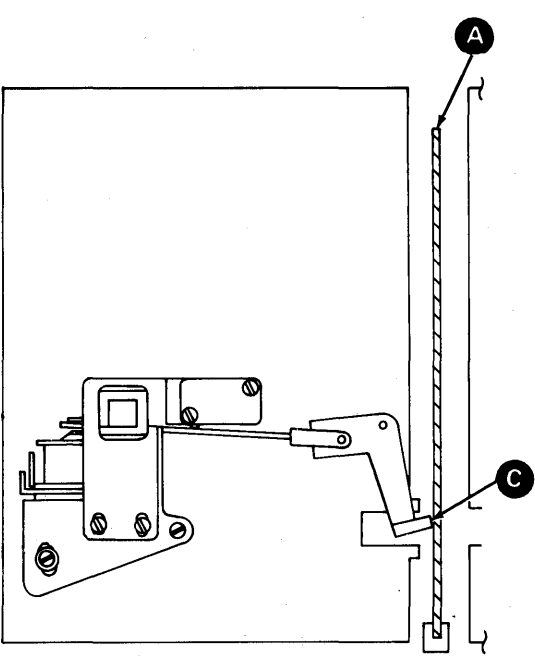
1. Remove the picker/cam bezel (see paragraph 27-425).
2. Remove the two screws **F** from the stripper magnet bracket assembly **E** and remove the assembly.

**Reinstalling the Stripper Magnet and Switch  
Assembly**

1. Reinstall the stripper magnet bracket assembly **E** using the two mounting screws **F**. (Ensure that the magnet armature tip is in the stripper fork.)
2. Reinstall the picker/cam bezel (see paragraph 27-425). Do not reinstall the 72MD unit at this time.
3. Adjust the stripper magnet and switch assembly (see paragraph 27-520).

**27-515 STRIPPER MAGNET SWITCH  
SERVICE CHECK**

1. Open the front left side cover.
2. Loosen the two front safety shield screws and remove the two rear safety shield screws and the safety shield.
3. Set Power to I (operator panel).
4. Press the Reset switch (CE panel) to orient the carriage bed.
5. Insert a diskette **A** into the drive by hand.
6. Probe test point TPB-17 **Q** (-window open).
7. Check that the switch output (-window open) is minus (-) with the stripper **C** held tightly against the diskette.
8. Remove the diskette **A** and check that the output is plus (+).
9. Reinstall the safety shield using the four screws



Note: See paragraph 27-820 for control card test pins.

## 27-520 STRIPPER MAGNET SWITCH ADJUSTMENT

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Set Power to I (operator panel).
3. Activate the magnet by jumpering test point TPB-22 **P** (-window open) to THP-1 **N** (ground) with both the pivot **H** and the adjusting **G** screws loose.
4. Turn the assembly in the direction shown until the stripper foot **F** is aligned  $\pm 0.5$  millimeter (0.020 inches) to the bezel surfaces **J**. Then tighten both of the screws **G** and **H**.
5. Insert a diskette **A** into the drive station by hand.
6. Remove the jumper installed in step 3.
7. Probe test point TPB-17 **Q** (-window open).
8. Loosen the pivot screws **M** in the switch bracket.
9. Adjust the switch **L** so that the output (-window open) goes minus (-) with the stripper **C** against the diskette.
10. Tighten the screws **M**.
11. Test the switch **L** to ensure that it returns to normal (+window open) with the diskette **A** removed.
12. Reinstall the 72MD unit (see paragraph 27-200).

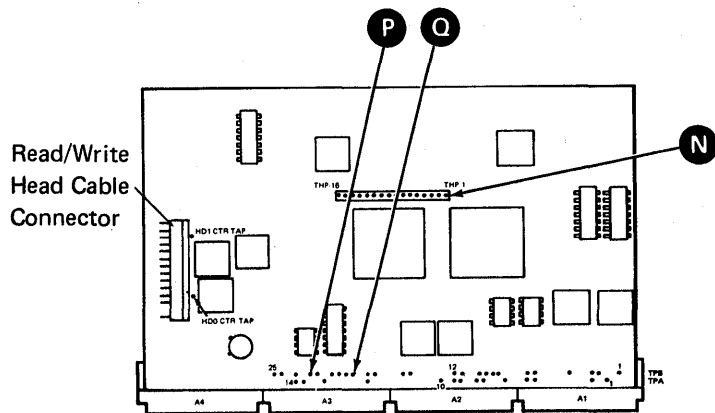
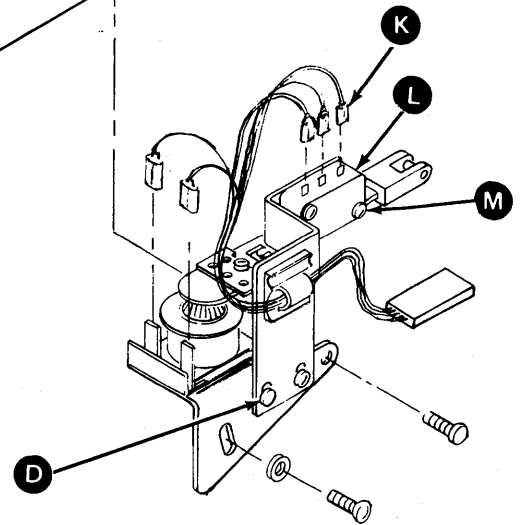
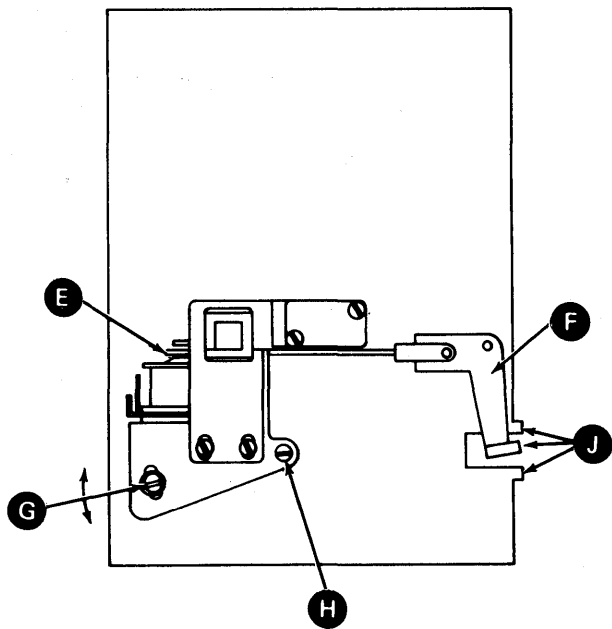
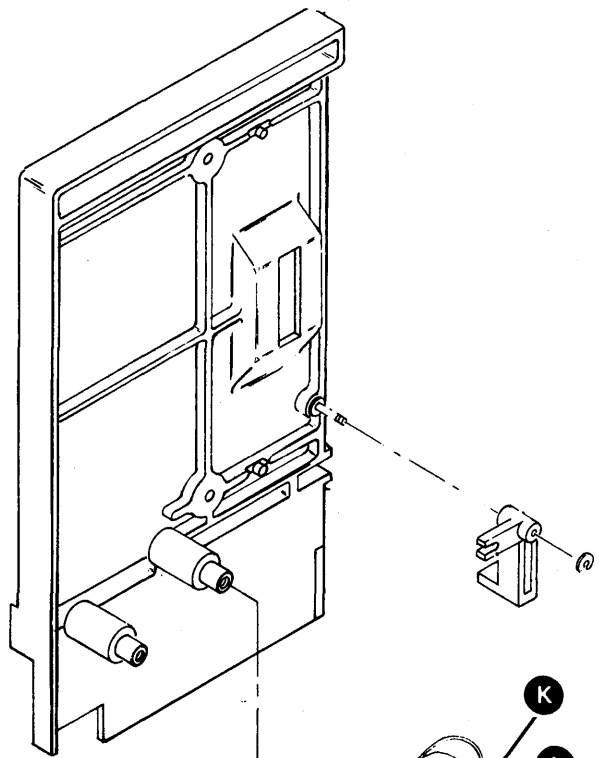
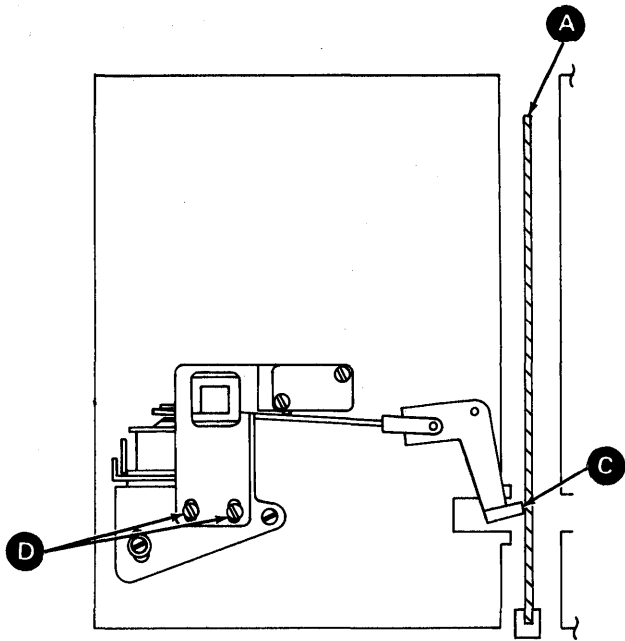
## 27-525 STRIPPER MAGNET SWITCH REMOVAL AND REPLACEMENT

### Removing the Stripper Magnet Switch

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Remove the two switch bracket screws **D**.
3. Remove the leads **K** from the switch.
4. Remove the screws **M** that fasten the switch **L** to the bracket.

### Reinstalling the Stripper Magnet Switch

1. Reinstall the switch **L** on the switch bracket and fasten with the two screws **M**.
2. Connect the leads **K** to the switch.
3. Reinstall the switch bracket (do not tighten the screws **D**).
4. Perform the stripper magnet switch adjustment (see paragraph 27-520).



Note: See paragraph 27-820 for control card test pins.

## 27-600 HEAD/CARRIAGE SERVICE CHECK

**Note:** Run the head alignment exerciser before performing this service check. If the head alignment is good, go to the *Diskette Quality and Head Wear Service Check* (see paragraph 27-900). If the head alignment is bad, continue with this service check.

### CAUTION

The head carriage service check must be performed with the diskette drive in the same position as when installed or the adjustment might not be accurate.

---

---

---

---

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Remove the picker/cam casting assembly (see paragraph 27-400).

### CAUTION

Insert a strip of clean paper **S** between the heads **U** to keep the head surfaces from touching.

---

---

---

---

3. Remove the two screws **D** and the wiper assembly **C**.
4. Turn the stepper motor pulley to cylinder 40. Use the timing pin **B** to verify the alignment but remove the timing pin before going to the next step.
5. Disconnect the AC power cable **A** to the drive motor.

### DANGER

Voltage is still present at the power connector when the head/carriage is disconnected and power is on.

---

---

---

---

6. Install a jumper from THP-2 **G** (head reference) to THP-1 **H** (ground).
7. Set Power to I (operator panel).
8. Insert the timing pin **B** through the hole in the pulley and into the casting.
9. Does the timing pin pass freely through the stepper motor pulley into the timing slot in the casting?  
Y N  
| - Remove the timing pin **B**.  
| - Remove the jumper.  
| - Power down.  
| - Go to paragraph 27-605, step 5.
10. Remove the timing pin **B**.
11. Load the diskette exerciser (if you have not already loaded it in another paragraph) by the following steps:
  - Set the Mode Selector switch to the Proc Run position (CE panel).
  - Set the Address/Data switches to F800 (CE panel).
  - Set all CE panel switches to their down positions.
  - Press the Load switch (operator panel).
  - Select the exerciser option.
  - Select the diskette option.
  - Select the head/carriage option.
12. Remove the jumper from THP-2 and THP-1.
13. Use the exerciser to select cylinder 39 (hexadecimal 27).
14. Verify that this is cylinder 39 (hexadecimal 27) by visually checking for no gap **E** between the timing pointer and the timing block.
15. Use the exerciser to select cylinder 40 (hexadecimal 28).
16. Verify that this is cylinder 40 (hexadecimal 28) by visually checking that the timing hole in the pulley lines up with the timing slot in the casting. (Do not use a timing pin.)

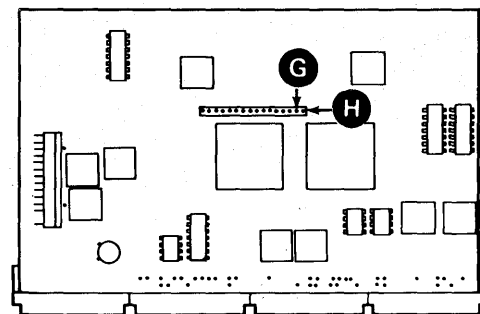
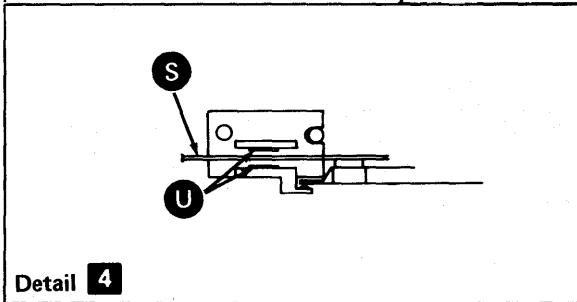
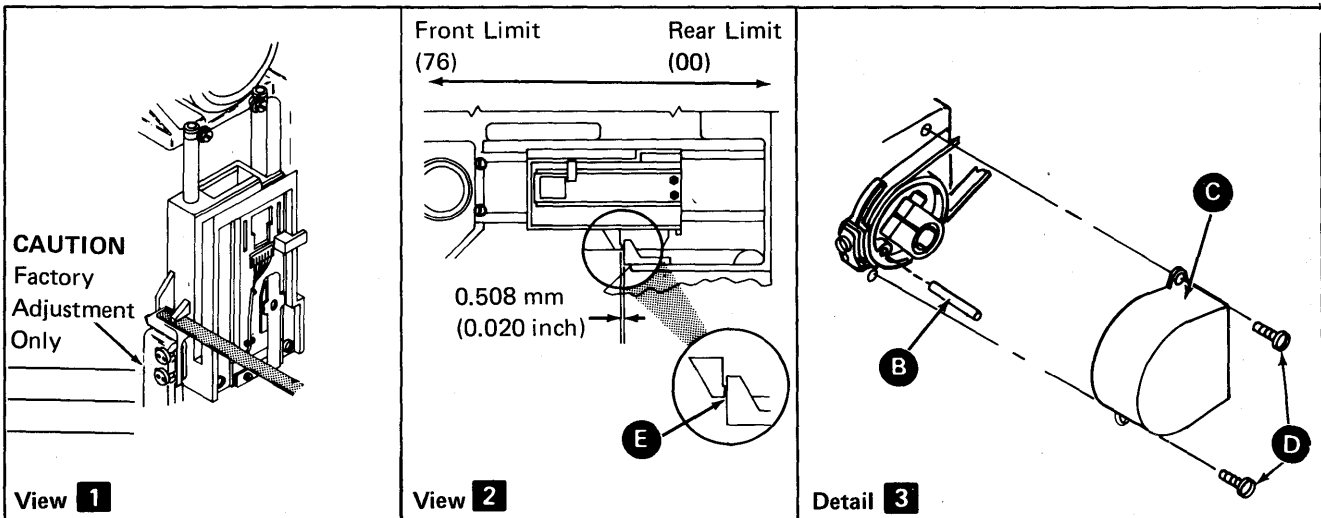
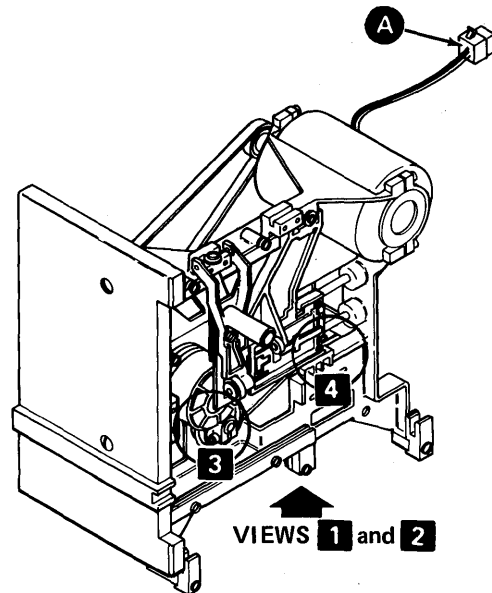


17. Verify the 0.508 millimeter (0.020 inch) gap **E** as follows:
  - Insert thickness gauges measuring 0.495 millimeter (0.0195 inch) and visually check that the head/carriage assembly does not move.
  - Insert thickness gauge measuring 0.533 millimeter (0.021 inch) and visually check that the head/carriage moves slightly while carefully inserting a 0.021 thickness gauge.

**Note:** Because of the torque of the stepper motor, this step can only be performed once. If it is necessary to perform this again, go back to step 13 of this service check.

18. Is the adjustment correct?  
 Y N  
 | - Go to paragraph 27-605, step 14
19. Set Power to O (operator panel).
20. Reinstall the wiper assembly **C** using the two screws **D**.
21. Remove the paper **S** from between the heads **U**.

22. Reinstall the picker/cam casting assembly (see paragraph 27-400).
23. Connect the drive motor power cable **A**.



**Note:** See paragraph 27-820 for control card test pins.

**27-605 HEAD/CARRIAGE ADJUSTMENT**

**CAUTION**

The head/carriage assembly adjustment must be performed with the diskette drive installed (or in the same position as when installed) or the adjustment might not be accurately made.

---

---

---

---

---

---

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Remove the picker/cam casting assembly (see paragraph 27-400).
3. Remove the two screws **D** and the wiper assembly **C**.
4. Remove the diskette drive bezel (see paragraph 27-665).
5. Measure and record the gap **P** between the stepper motor pulley and the casting.
6. Loosen the clamp screw **T** so that the stepper motor shaft can turn inside the pulley.
7. Turn the stepper motor pulley by hand to cylinder 40 and insert a timing pin **B**.
8. Disconnect the AC power cable **A** to the drive motor.

**DANGER**

Voltage is still present at the power connector when the head/carriage is disconnected and power is on.

---

---

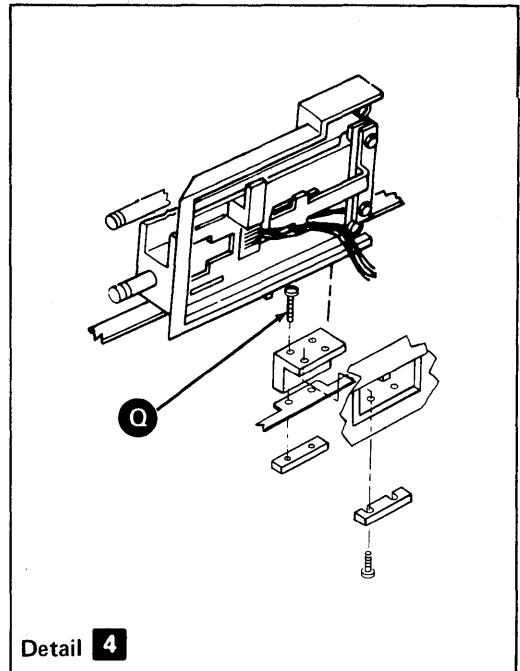
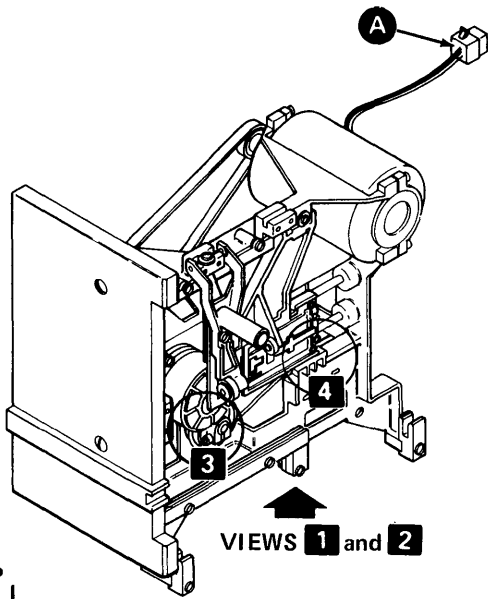
---

---

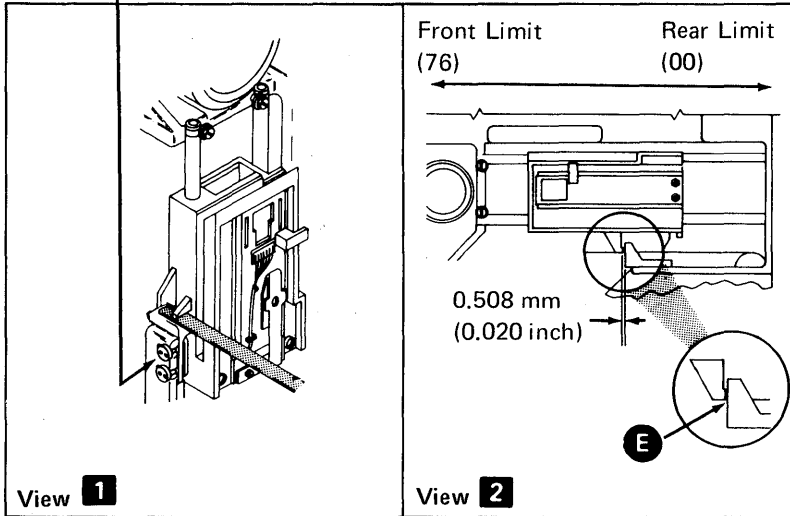
9. Install a jumper from THP-2 **G** (head reference) to THP-1 **H** (ground).

10. Set Power to I (operator panel).
11. Make the gap **P** the same size as the gap recorded in step 5 and tighten the clamp screw **T**. (Ensure that the timing pin **B** passes freely through the stepper motor pulley into the timing slot in the casting.)
12. Remove the timing pin **B**.
13. Load the diskette exerciser (if you have not already loaded it in another paragraph) by the following steps:
  - Set the Mode Selector switch to the Proc Run position (CE panel).
  - Set the Address/Data switches to F800 (CE panel).
  - Set all CE switches to their down position.
  - Press the Load switch (operator panel).
  - Select the exerciser option.
  - Select the diskette option.
  - Select the head/carriage option.
14. Loosen the two band clamp screws **Q**.
15. Remove the jumper from THP-2 and THP-1 (if installed).
16. Use the exerciser to select cylinder 39 (hexadecimal 27).
17. Use the exerciser to select cylinder 40 (hexadecimal 28).
18. Verify that this is cylinder 40 by visually checking that the timing hole in the pulley lines up with the timing slot in the casting. (Do not use a timing pin.)
19. Insert a 0.508 millimeter (0.020 inch) thickness gauge between the timing pointer and the timing block **E**. (Put light finger pressure to the top of the carriage to hold the thickness gauge in place.)
20. Tighten the band clamp screws **Q**. (Ensure that the drive band is straight.)
21. Reinstall the diskette drive bezel (see paragraph 27-665).
22. Go to paragraph 27-600, step 13.

**CAUTION**  
Factory  
Adjustment  
Only

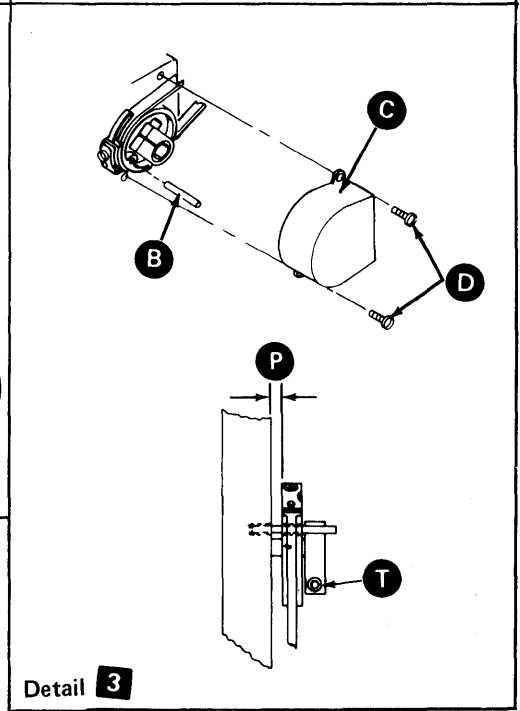


Detail 4

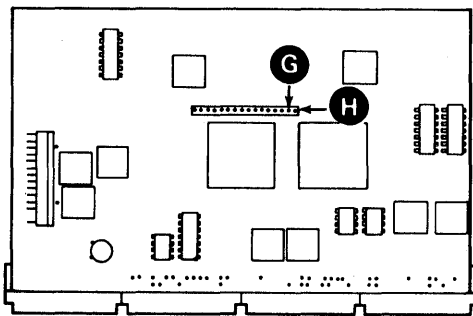


View 1

View 2



Detail 3



Note: See paragraph 27-820 for control card test pins.

## 27-610 HEAD/CARRIAGE REMOVAL AND REPLACEMENT

### Removing the Head/Carriage

1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Remove the two screws **D** and the wiper assembly **C**.
3. Carefully remove the head cable **F** from the control card. (Remember the cable path for the replacement procedure.)
4. Move the head/carriage assembly toward the hub to its front limit (cylinder 76).
5. Remove the two band clamp screws **O** and the clamp **R**.
6. Place the head/carriage assembly at the back limit (cylinder 00).

### CAUTION

Insert a strip of clean paper between the heads to keep the head surfaces from touching.

- 
- 
- 
- 
7. Remove the bail assembly (see paragraph 27-655).
  8. Loosen the screw **K** and remove the lower guide rod **J**.
  9. Carefully lift and turn the head/carriage assembly **L** to remove it from the guide rod **M**. (Be careful not to damage the drive band.)
  10. If the head/carriage assembly is to be exchanged with a different assembly, remove the two screws **U**, the retainer **T**, and the block **S**, and reinstall them on the replacement assembly.

### Reinstalling the Head/Carriage

### CAUTION

When reinstalling the head/carriage assembly, ensure that the bail is under the tab of the carriage arm. Also, ensure that a strip of clean paper is inserted between the head surfaces during installation.

- 
- 
- 
- 
1. Disconnect the AC power **A** to the drive motor.

### DANGER

Voltage is still present at the power connector when the head/carriage is disconnected and power is on.

- 
- 
- 
- 
2. If the head/carriage assembly is being exchanged with a different assembly, remove the two screws **U**, the retainer **T**, and the block **S**, and reinstall them on the replacement assembly if they are not already installed.
  3. Carefully reinstall the head/carriage assembly **L** on the guide rod **M** and then place the head/carriage assembly at the back limit (cylinder 00).
  4. Reinstall the lower guide rod **J** and tighten the screw **K**. (Ensure that the guide rod notch **N** is aligned with the screw and the guide rod **J** is seated in the V-slot correctly.)
  5. Reinstall the bail assembly (see paragraph 27-655).
  6. Move the head/carriage assembly toward the hub to its front limit (cylinder 76).
  7. Reinstall the clamp **R** and the two band clamp screws **O**. (Do not tighten these two screws now.)

- Connect the head cable **F** to the diskette drive control card.

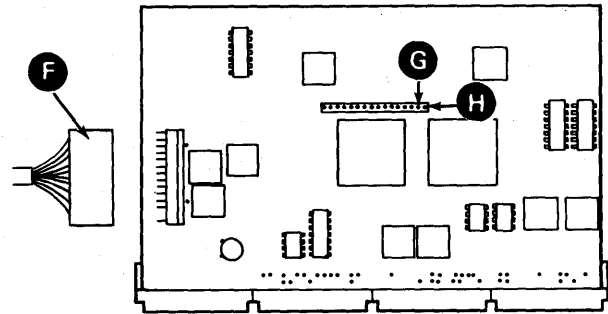
*Note:* Ensure that you use the same head cable path that was used before you removed the head/carriage.

- Turn the stepper motor pulley to cylinder 40. Use the timing pin to verify the alignment but remove the timing pin **B** before going to the next step.
- Install a jumper from THP-2 **G** (head reference) to THP-1 **H** (ground).
- Set Power to I (operator panel).
- Insert the timing pin **B** through the hole in the pulley and into the casting.

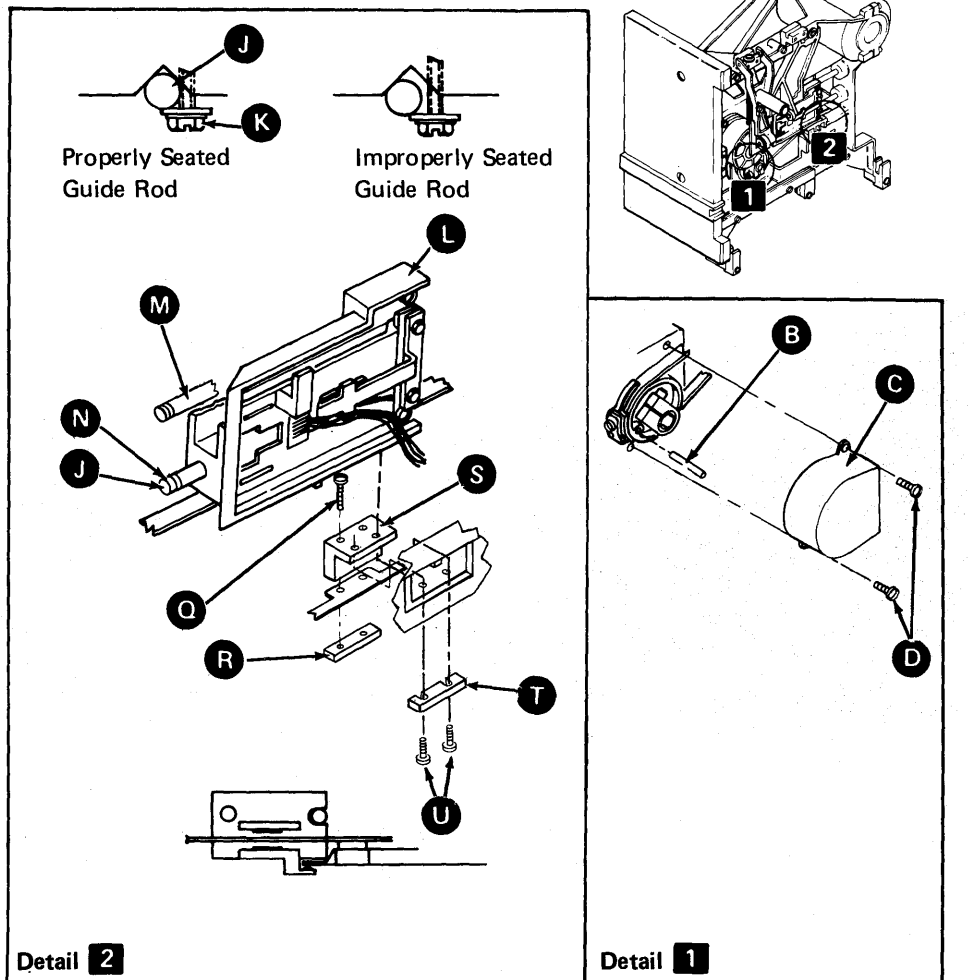
- Does the pin slide freely?

Y N  
| Go to paragraph 27-605, step 5.

Go to paragraph 27-605, step 12.



*Note:* See paragraph 27-820 for control card test pins.



**27-615 HEAD/CARRIAGE STEPPER MOTOR REMOVAL AND REPLACEMENT**

**Removing the Head/Carriage Stepper Motor**

1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Carefully disconnect the head cable **T** from the control card.
3. Remove the control card and mounting assembly (see paragraph 27-840).
4. Remove the two screws **G** and the two connector covers **F** from the A1 cable.
5. Remove the stepper motor leads from the cable connector by pushing down on the terminal tabs with a small screwdriver.

**CAUTION**

While performing the following steps, be careful not to damage the drive band.

---



---



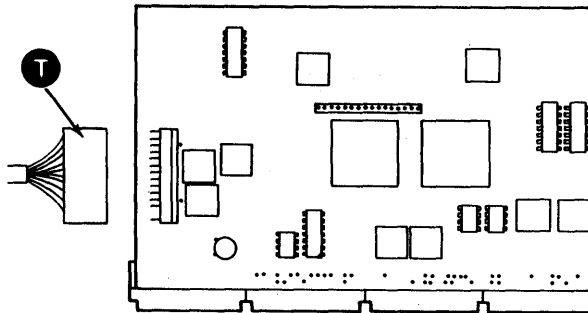
---



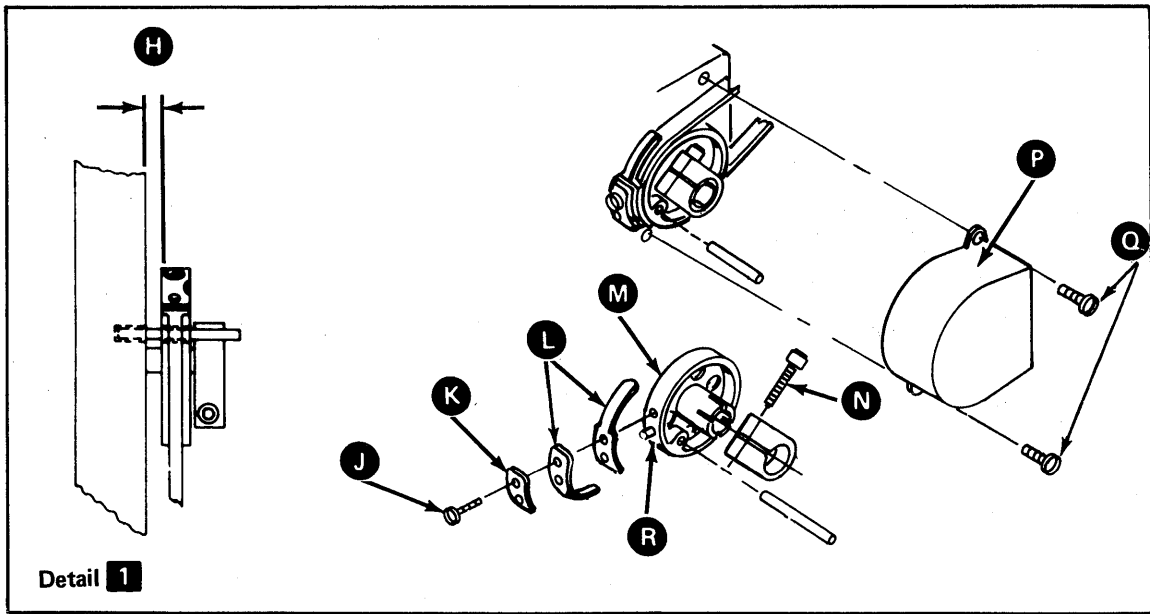
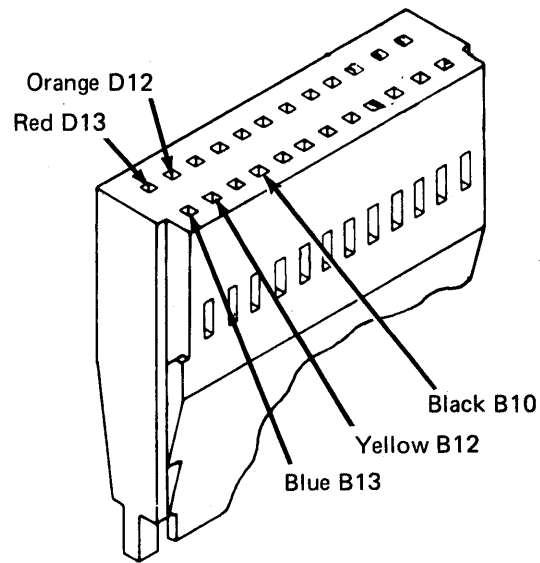
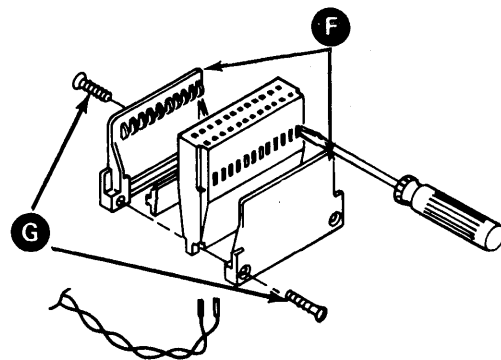
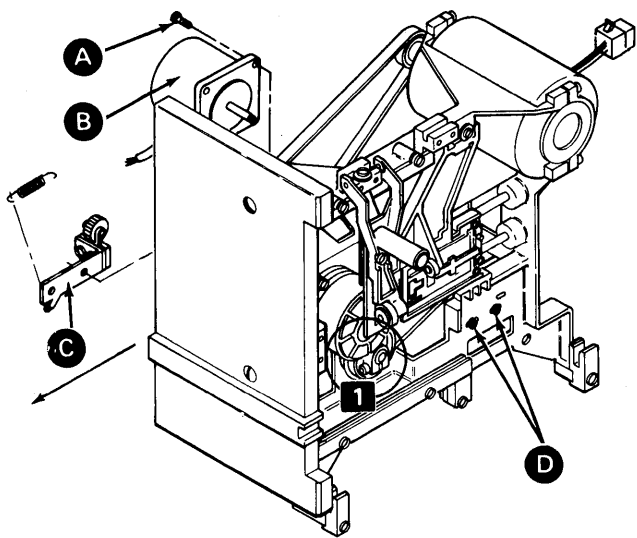
---

6. Remove the two screws **Q** and the wiper assembly **P**.

7. Loosen the two idler mounting screws **D**, push the idler assembly **C** against the spring tension, and tighten the screws **D**.
8. Remove the diskette drive bezel (see paragraph 27-665).
9. Remove the clamp screw **J** and the band clamp **K**.
10. Carefully remove the drive band ends **L** from the pulley pin **R**.
11. Measure and record the gap **H** between the stepper motor pulley and the casting.
12. Loosen the clamp screw **N** and remove the stepper motor pulley **M**.
13. Remove the three stepper motor mounting screws **A** and then remove the stepper motor **B**.



*Note:* See paragraph 27-820 for control card test pins.



## Reinstalling the Head/Carriage Stepper Motor

1. Reinstall the stepper motor **B** using the three mounting screws **A**. (Place the motor cable at the rear of the unit.)
2. Insert the stepper motor leads into the cable connector. Ensure that the locking tabs on the terminals lock in the connector slots.
3. Reinstall the connector covers **F** and the two screws **G**.
4. Reinstall the stepper motor pulley **M**. (Keep the clamp screw **N** loose so that the motor shaft can turn inside the pulley.)
5. Carefully reinstall the drive band ends **L** on the pulley pin **R** as shown. Reinstall the band clamp **K** (with the notch facing away from the stepper motor) and the screw **J**. (Do not tighten the screw.)
6. Loosen the two idler mounting screws **D** and let the spring tension place the idler **C**.
7. Tighten the mounting screws **D** and center the drive band on the idler pulley as shown **E**.
8. Reinstall the control card and mounting assembly (see paragraph 27-840).
9. Carefully reinstall the head cable **T** on the control card.
10. Turn the stepper motor pulley to cylinder 40 and insert a timing pin **S**.
11. Disconnect the AC power **W** to the drive motor.
12. Install a jumper from THP-2 **U** (head reference) to THP-1 **V** (ground).
13. Set Power to I (operator panel).
14. Make the gap **H** between the pulley and the casting the same size as the gap that was recorded in *Removing the Head/Carriage Stepper Motor*, step 11.
15. Tighten the pulley clamp screw **N**.
16. Remove the timing pin **S**.
17. Remove the jumper.
18. Tighten the band clamp screw **J**. (Ensure that the drive band is straight.)
19. Set Power to O (operator panel).
20. Reinstall the diskette drive bezel (see paragraph 27-665).
21. Turn the stepper motor pulley by hand and check to see that the drive band is centered on the idler pulley in all of the head/carriage assembly movement (cylinder 00 to cylinder 76).
22. Is the band centered?  
Y N  
| - Go to paragraph 27-630, step 4.  
Go to paragraph 27-600, step 4.

### DANGER

Voltage is still present at the power connector when the head/carriage stepper motor is disconnected and power is on.

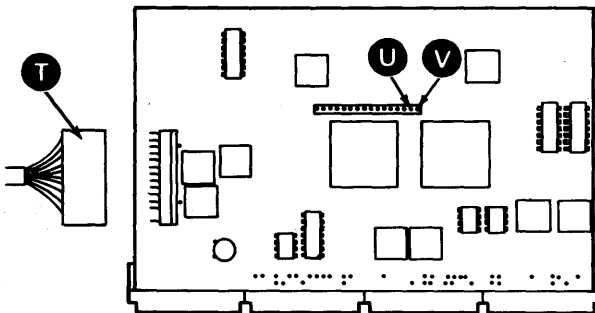
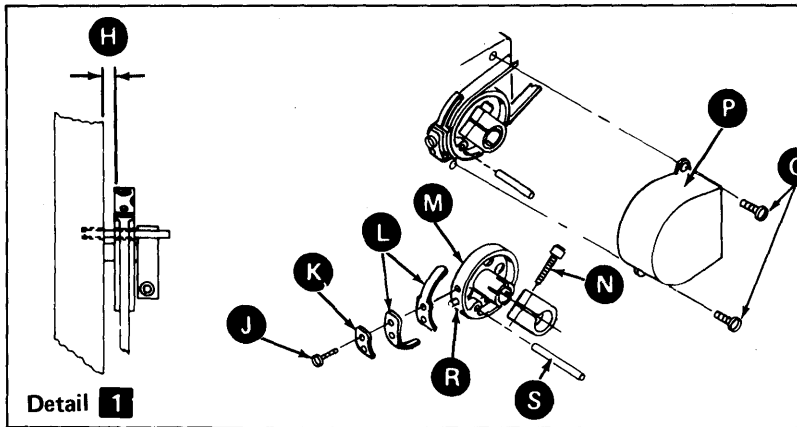
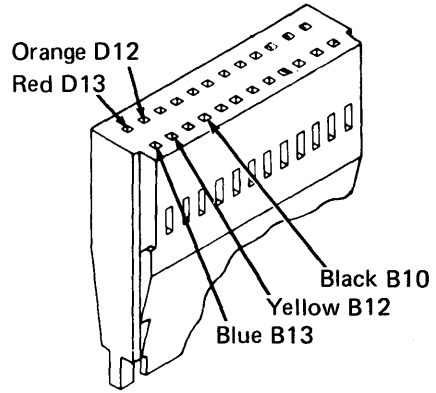
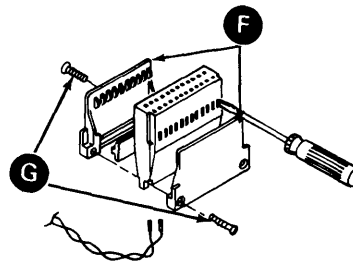
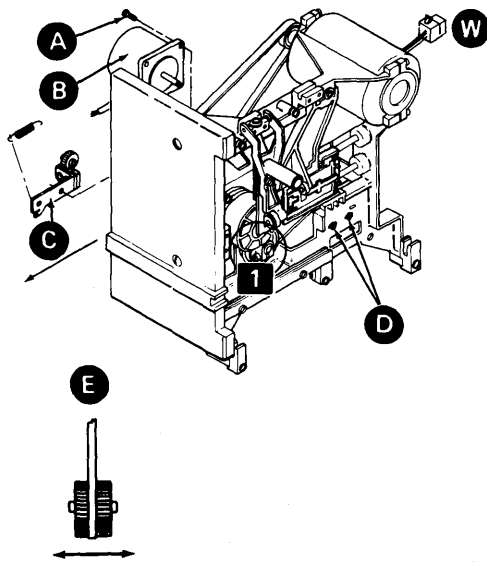
---

---

---

---





Note: See paragraph 27-820 for control card test pins.

**27-620 HEAD/CARRIAGE PULLEY AND CLAMP  
REMOVAL AND REPLACEMENT**

**Removing the Head/Carriage Pulley and Clamp**

1. Remove the picker/cam casting assembly (see paragraph 27-400).

**CAUTION**

While performing the following steps, be careful not to damage the drive band.

---



---



---

2. Remove the two screws **M** and the wiper assembly **F**.
3. Loosen the two idler mounting screws **B**, push the idler assembly **A** against the spring tension, and tighten the screws **B**.
4. Remove the clamp screw **G** and the band clamp **H** from the pulley.
5. Carefully remove the drive band ends **J** from the pulley pin **N**.
6. Measure and record the gap **E** between the stepper motor pulley and the casting.
7. Loosen the clamp screw **L** and remove the stepper motor pulley **K** and the clamp **O**.

**Reinstalling the Head/Carriage Pulley and Clamp**

**DANGER**

Voltage is still present at the power connector when the head/carriage is disconnected and power is on.

---



---



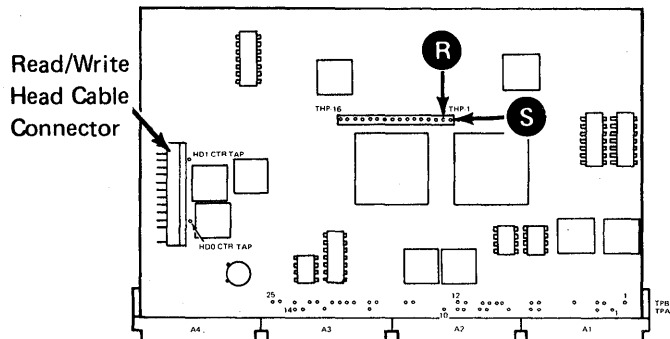
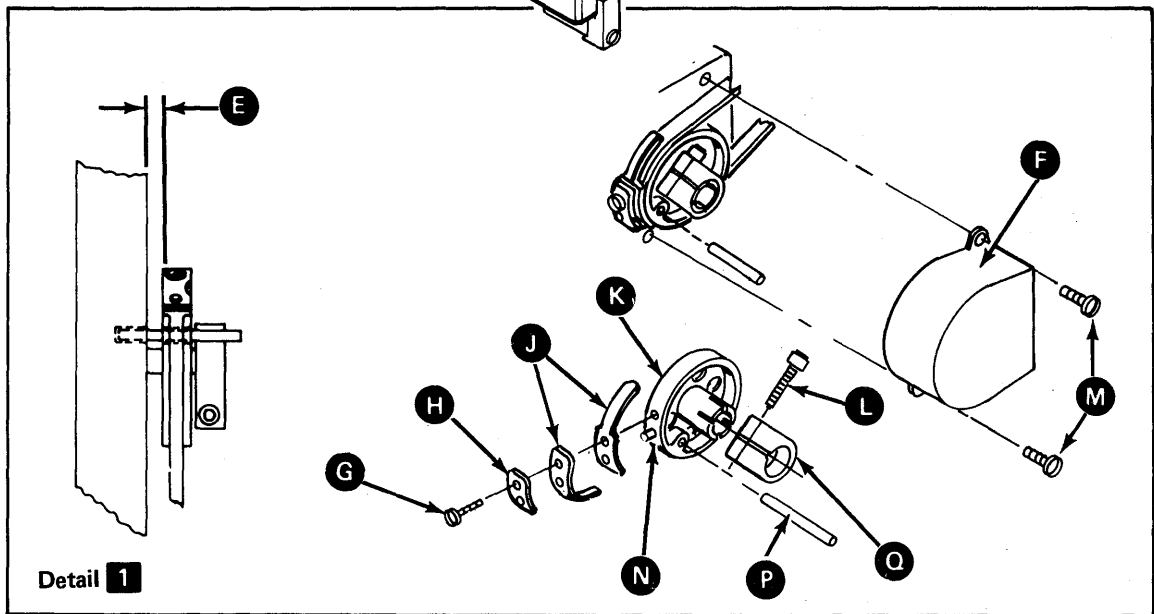
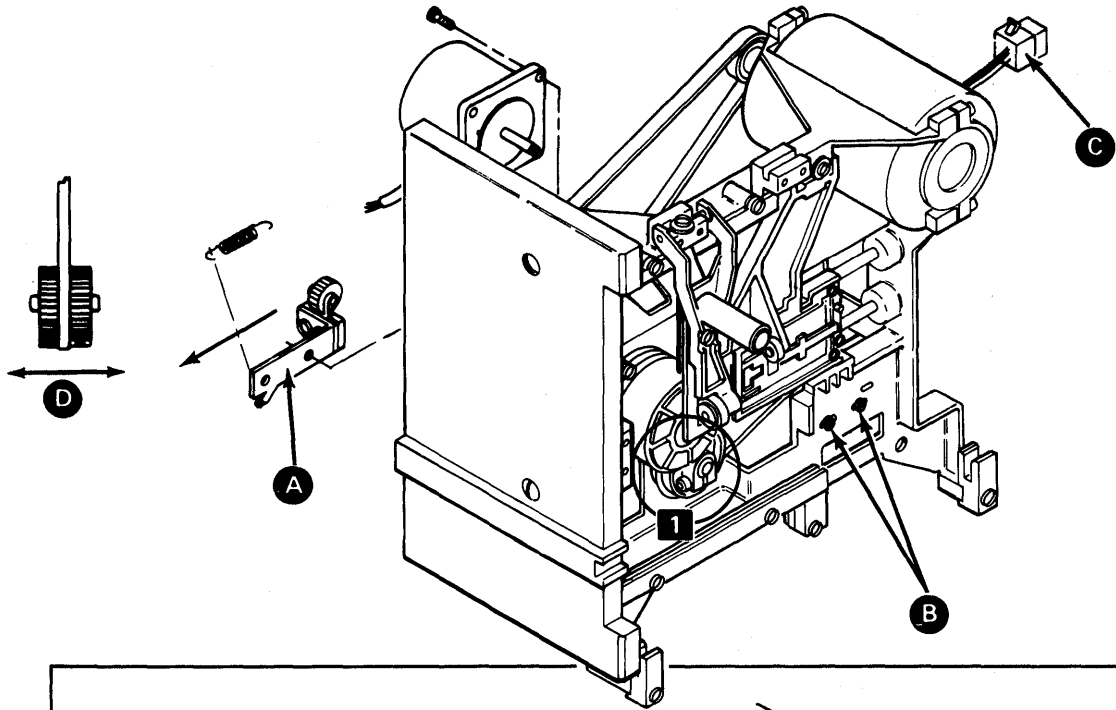
---

1. Reinstall the pulley **K**, clamp **O**, and clamp screw **L**. (Keep the screw loose so that the motor shaft can turn inside the pulley.)

2. Carefully reinstall the drive band ends **J** on the pulley pin **N** as shown, reinstall the band clamp **H** (with the notch facing away from the stepper motor), and the screw **G**. (Do not tighten the screw.)
3. Loosen the two idler mounting screws **B** and let the spring tension place the idler **A**.
4. Tighten the idler mounting screws **B**. (Center the drive band on the idler pulley **D**).
5. Turn the stepper motor by hand to cylinder 40 and insert a timing pin **P**.
6. Disconnect the AC power **C** to the drive motor.
7. Install a jumper from THP-2 **R** (head reference) to THP-1 **S** (ground).
8. Set Power to I (operator panel).
9. Make the gap **E** between the pulley and the casting the same as the gap that was recorded in *Removing the Head/Carriage Pulley and Clamp*, step 6.
10. Tighten the pulley clamp screw **L**.
11. Remove the timing pin **P**.
12. Remove the jumper.
13. Tighten the band clamp screw **G**. (Ensure that the drive band is straight.)
14. Set Power to O (operator panel).
15. Turn the stepper motor pulley **K** by hand and check to ensure that the drive band is centered on the idler pulley in all of the head/carriage assembly movement (cylinder 00 through cylinder 76).
16. Is the drive band centered?

Y N  
| - Go to paragraph 27-630, step 4.

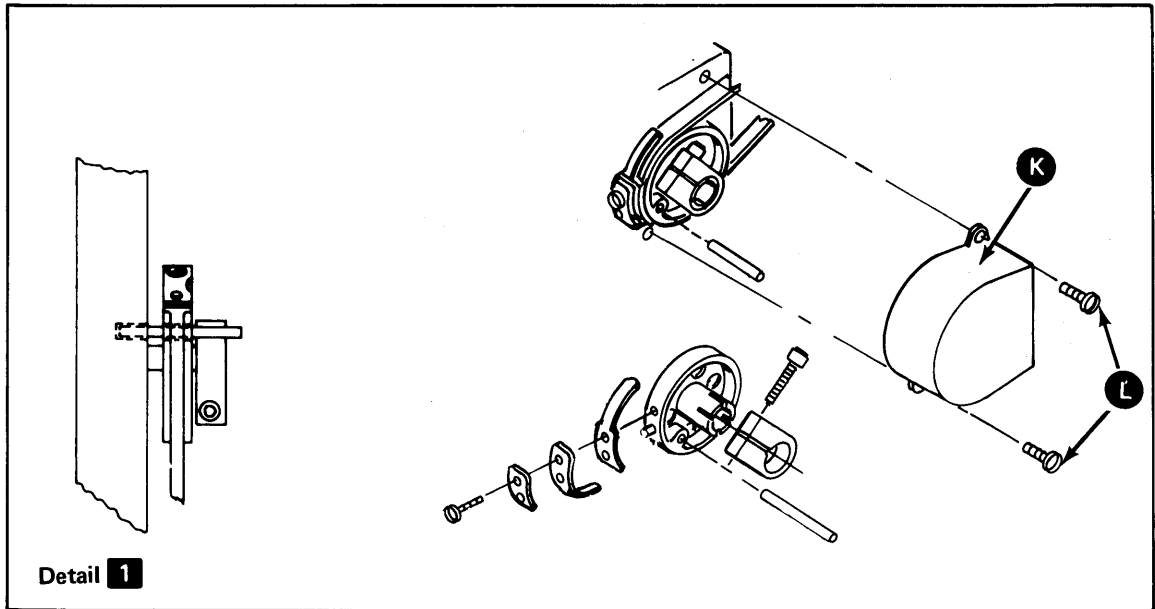
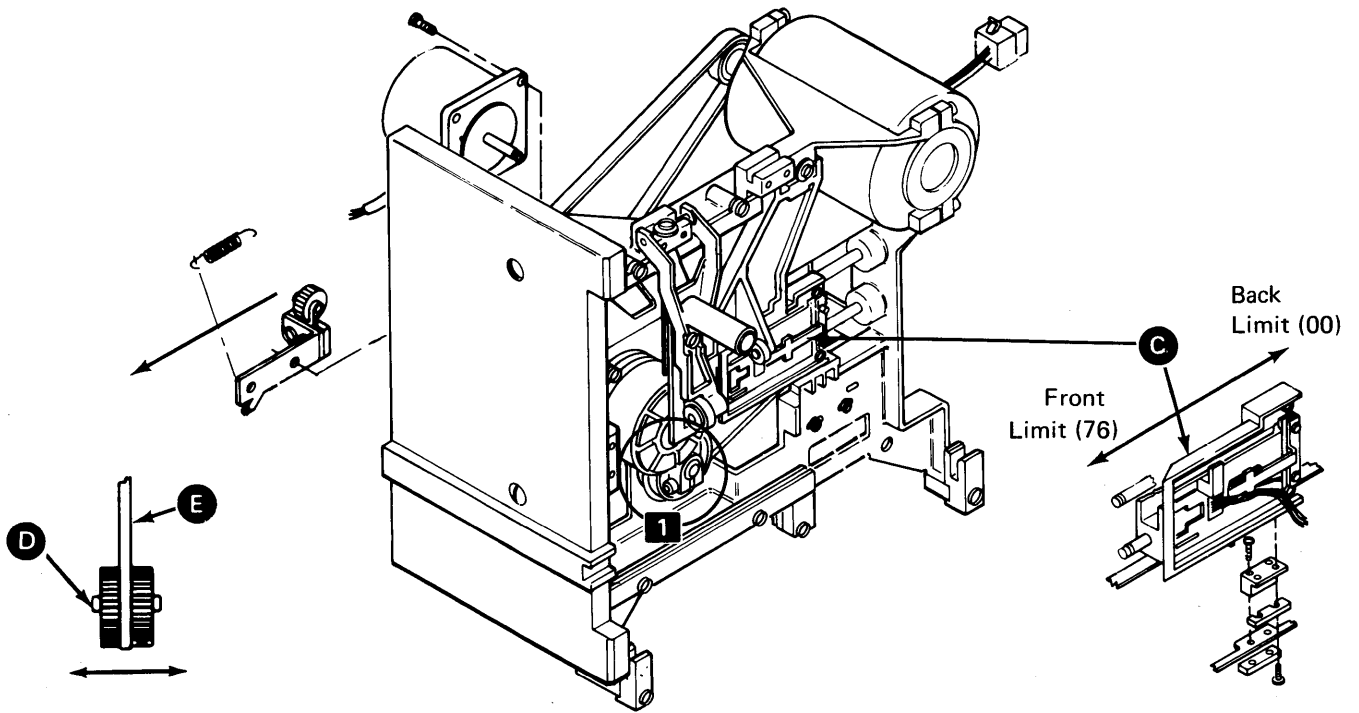
Go to paragraph 27-600, step 4.



Note: See paragraph 27-820 for control card test pins.

**27-625 DRIVE BAND SERVICE CHECK**

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Remove the picker/cam casting assembly (see paragraph 27-400).
3. Remove the two screws **L** and the wiper assembly **K**.
4. Move the head/carriage assembly **C** toward the hub to its front limit (cylinder 76).
5. Turn the stepper motor pulley by hand and check that the drive band **E** is centered on the idler pulley **D** in all of the head/carriage assembly movement (cylinder 00 through cylinder 76).
6. Is the drive band centered?  
Y N  
| - Go to paragraph 27-630, step 4.
7. Reinstall the wiper assembly **K** using the two screws **L**.
8. Reinstall the picker/cam casting assembly (see paragraph 27-400).



## 27-630 DRIVE BAND ADJUSTMENT

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Remove the picker/cam casting assembly (see paragraph 27-400).
3. Remove the two screws **L** and the wiper assembly **K**.
4. Move the head/carriage assembly **C** toward the hub to its front limit (cylinder 76).
5. Remove the two band clamp screws **M** and the clamp.
6. Loosen the two idler mounting screws **B** and let the spring tension position the idler assembly **A**. Tighten the mounting screws.
7. Turn the stepper motor pulley by hand a few times to center the drive band **E** on the idler pulley **D**.
8. Place the head/carriage assembly **C** at cylinder 40. Check to see that the band mounting slots **N** are centered (left to right) over the mounting holes on the carriage pad.
9. Repeat steps 7 and 8 with the head/carriage assembly at cylinder 76 and then cylinder 00.
10. Are the mounting slots centered?  
Y N
  - Loosen the band clamp screw **F** and the pulley clamp screw **P**.
  - Turn the stepper motor pulley to center the mounting slots **N** and then tighten the band clamp screw **F** and the pulley clamp screw **P**.
  - Return to step 7.
11. Move the head/carriage assembly **C** toward the hub to its front limit (cylinder 76).
12. Reinstall the clamp and the two clamp screws **M**. (Do not tighten.)
13. Go to paragraph 27-605, step 4.

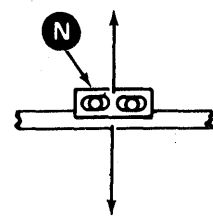
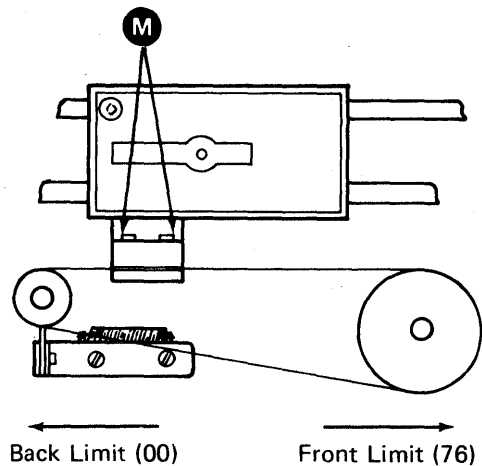
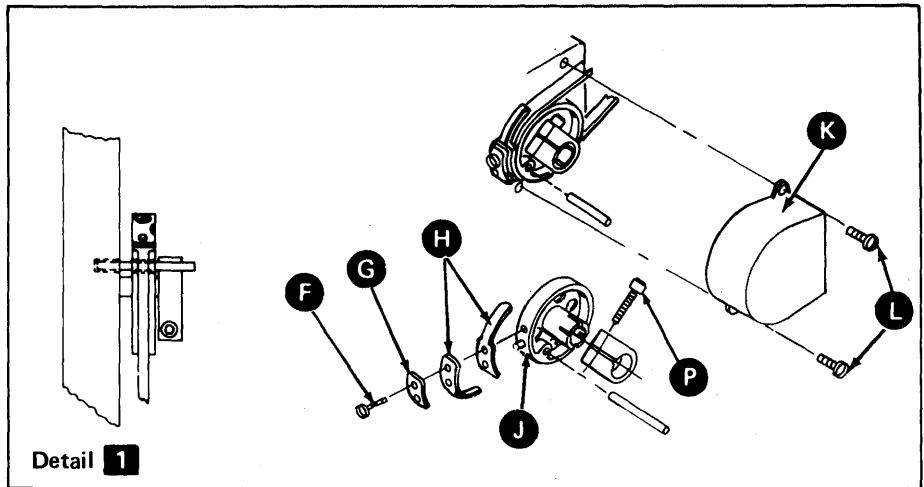
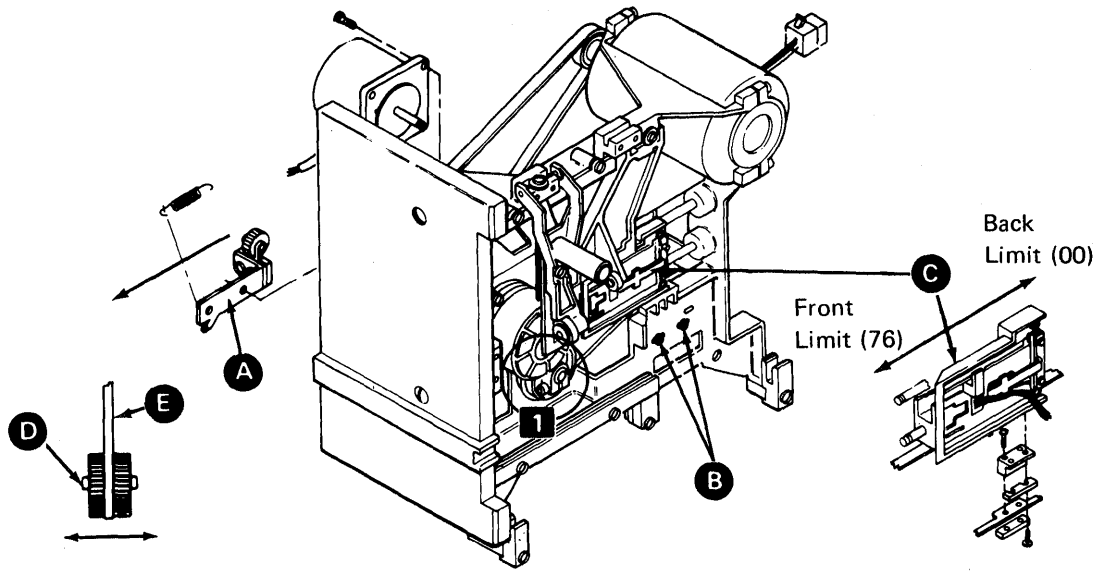
## 27-635 DRIVE BAND REMOVAL AND REPLACEMENT

### Removing the Drive Band

1. Remove the picker/cam casting assembly (see paragraph 27-200).
2. Remove the two screws **L** and the wiper assembly **K**.
3. Move the head/carriage assembly **C** toward the hub to its front limit (cylinder 76).
4. Loosen the two idler mounting screws **B**, push the idler assembly **A** against the spring tension, and then tighten the mounting screws **B**.
5. Remove the two band clamp screws **M** and the clamp and place the head/carriage assembly at the back limit (cylinder 00).
6. Remove the clamp screw **F** and the clamp **G**.
7. Carefully remove the drive band ends **H** from the pulley pin **J** and remove the band.

### Reinstalling the Drive Band

1. Place the drive band **E** around the idler assembly **D**.
2. Carefully install the drive band ends **H** on the pulley pin **J** as shown.
3. Reinstall the band clamp **G** (with the notch facing away from the stepper motor) and the clamp screw **F**. (Ensure that the drive band is straight.)
4. Go to paragraph 27-630, step 6.



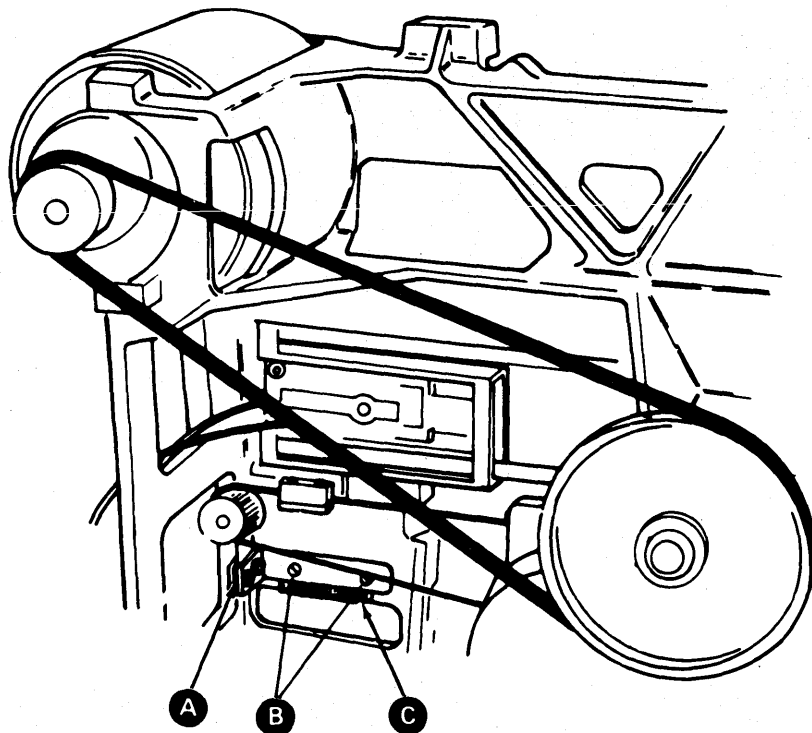
## 27-640 IDLER ASSEMBLY REMOVAL AND REPLACEMENT

### Removing the Idler Assembly

1. Remove the drive band (see paragraph 27-635).
2. Loosen the two mounting screws **B**.
3. Remove the idler spring **C**.
4. Remove the mounting screws **B** and the idler assembly **A**.

### Reinstalling the Idler Assembly

1. Reinstall the idler assembly **A** and the two mounting screws **B** (do not tighten).
2. Reinstall the idler spring **C**.
3. Push the idler assembly against spring tension and tighten the mounting screws **B**.
4. Reinstall the drive band (see paragraph 27-635).





This page is intentionally left blank.

## 27-645 DISKETTE IN SWITCH ADJUSTMENT AND SERVICE CHECK

1. Remove power and the 72MD unit (see paragraph 27-200).
  2. Remove the picker/cam casting assembly (see paragraph 27-400).
  3. Insert the diskette **A** into the diskette drive by hand until the diskette is against the diskette stop **B**.
  4. Loosen the two screws **J** holding the diskette in switch **H**.
  5. Adjust the switch for a gap of 0.0 to 0.4 millimeter (0.000 to 0.016 inch) between the diskette **A** and the switch lever **C** when the lever is touching the switch case.
  6. Tighten the two screws **J**.
- Note:** Ensure that the diskette is stopped by the stop **B** and not the switch.
7. Reinstall the picker/cam casting assembly (see paragraph 27-400). Do not reinstall the 72MD unit at this time.
  8. Connect the probe to test pin TPB-15 **K** (diskette in).
  9. Check that the output is minus (-) when a diskette is in the drive against the stop and plus (+) when the diskette is removed from the drive.
  10. Reinstall the 72MD unit (see paragraph 27-200).

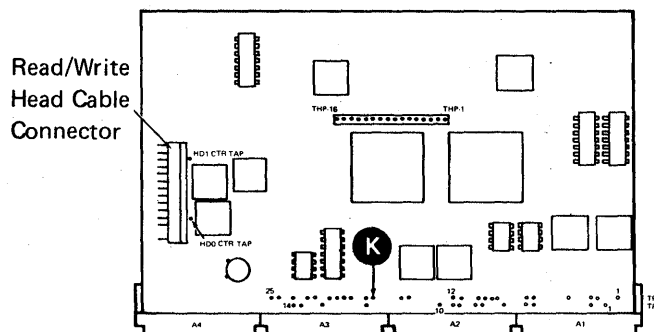
## 27-650 DISKETTE IN SWITCH REMOVAL AND REPLACEMENT

### Removing the Diskette In Switch

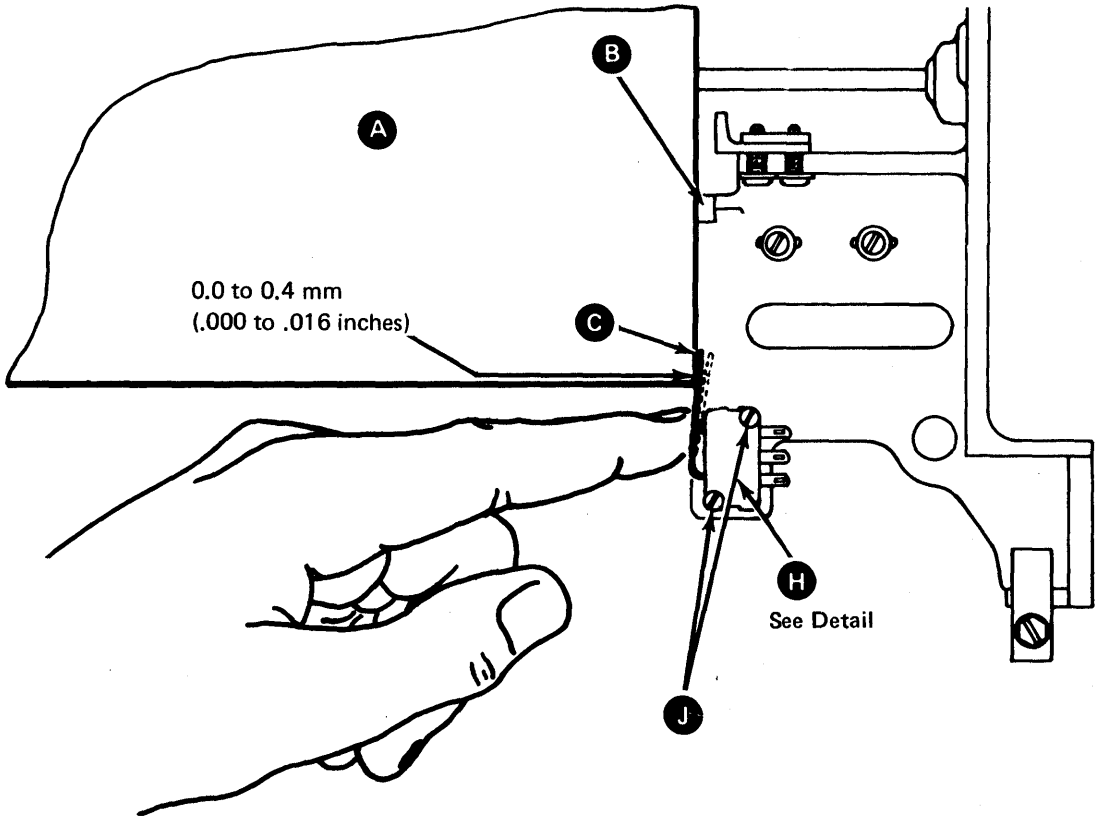
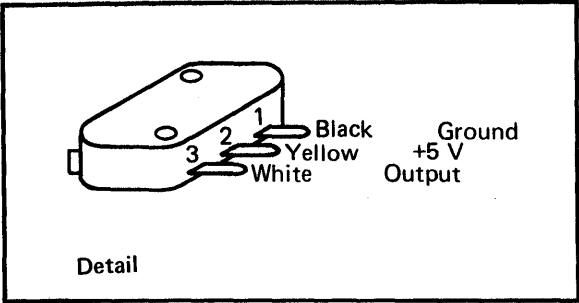
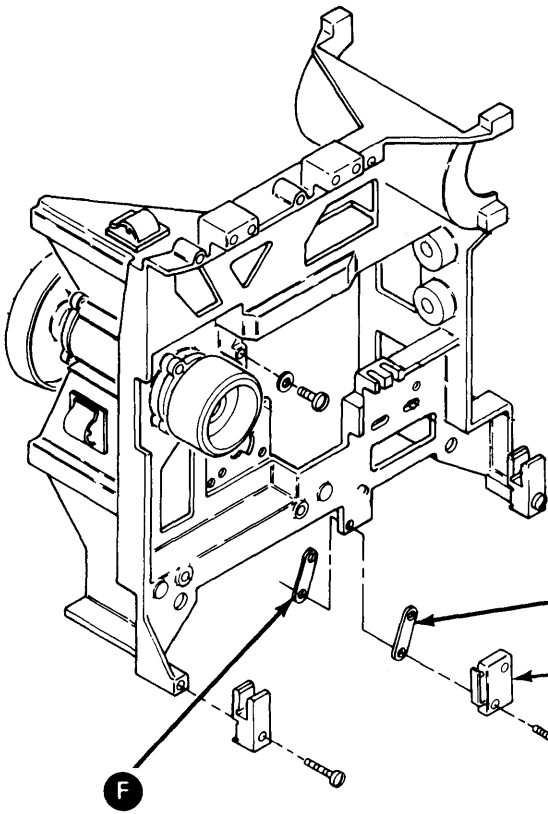
1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Disconnect the leads from the diskette in switch **H**.
3. Remove the two mounting screws **J**, the spacer **G**, and the nut clamp **F** from the back.
4. Remove the diskette in switch **H**.

### Reinstalling the Diskette In Switch

1. Reinstall the diskette in switch **H** using the two mounting screws **J**, the spacer **G**, and the nut clamp **F**.
2. Connect the leads to the diskette in switch **H**.
3. Perform the diskette in switch adjustment (see paragraph 27-645).



**Note:** See paragraph 27-820 for control card test pins.



### 27-653 HEAD LOAD BAIL ASSEMBLY SERVICE CHECK AND ADJUSTMENT

1. Remove the 72MD unit (see paragraph 27-200).
2. Turn the cam **Q** counter clockwise until the cam stops.
3. Move the head carriage assembly **N** in both directions as far as it will go and ensure that there is always a gap between the bail assembly **P** and the head carriage tabs **H**.
4. If the gap **K** is not correct, turn the bail adjusting screw **G** until the bail assembly **P** just touches the head carriage tab **H**.
5. Turn the bail adjusting screw clockwise 90 degrees to make a gap of 0.25 to 0.5 millimeters (0.010 to 0.020 inches) between the bail assembly **P** and the head carriage tab **H**.
6. Repeat step 3 and check for the gap.
7. Reinstall the 72MD unit (see paragraph 27-200).

### 27-655 HEAD LOAD BAIL ASSEMBLY REMOVAL AND REPLACEMENT

#### Removing the Head Load Bail Assembly

1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Insert a strip of clean paper **L** between the heads **M**.
3. Loosen the clamp screw **E** on the head load bail pivot shaft **D**.
4. Slide the pivot shaft **D** out and remove the bail assembly **F**.

#### Reinstalling the Head Load Bail Assembly

1. Reinstall the head load bail assembly **F** and pivot shaft **D**. (Ensure that the bail **P** is on the correct side of the head carriage tab **H**.)
2. Tighten the clamp screw **E** on the head load bail pivot shaft.
3. Remove the strip of paper **L** from between the heads **M**.
4. Reinstall the picker/cam casting assembly (see paragraph 27-400).

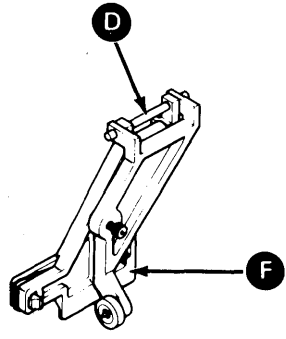
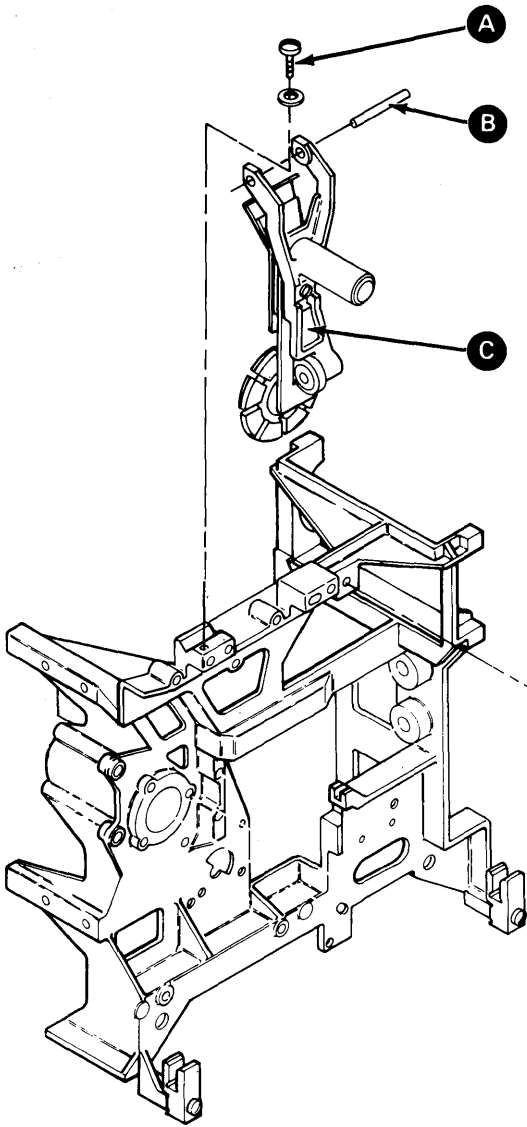
### 27-660 COLLET ASSEMBLY REMOVAL AND REPLACEMENT

#### Removing the Collet Assembly

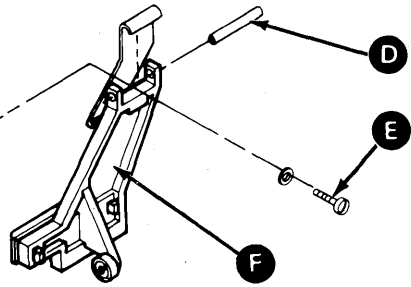
1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Loosen the clamp screw **A** on the collet assembly pivot shaft **B**.
3. Slide the pivot shaft **B** out.
4. Remove the collet assembly **C**.

#### Reinstalling the Collet Assembly

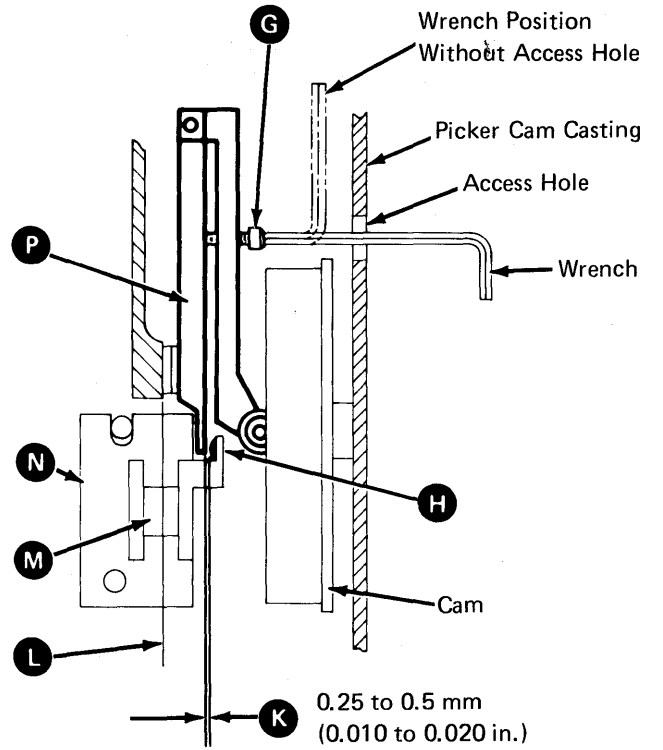
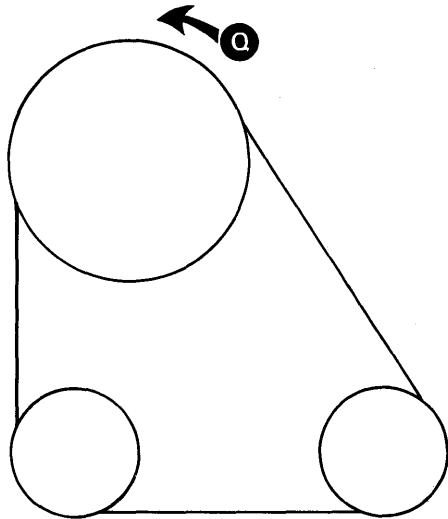
1. Reinstall the collet assembly **C**.
2. Reinstall the pivot shaft **B**.
3. Tighten the clamp screw **A** on the collet assembly pivot shaft **B**.
4. Reinstall the picker/cam casting assembly (see paragraph 27-400).



New Style  
Bail Assembly



Old Style  
Bail Assembly



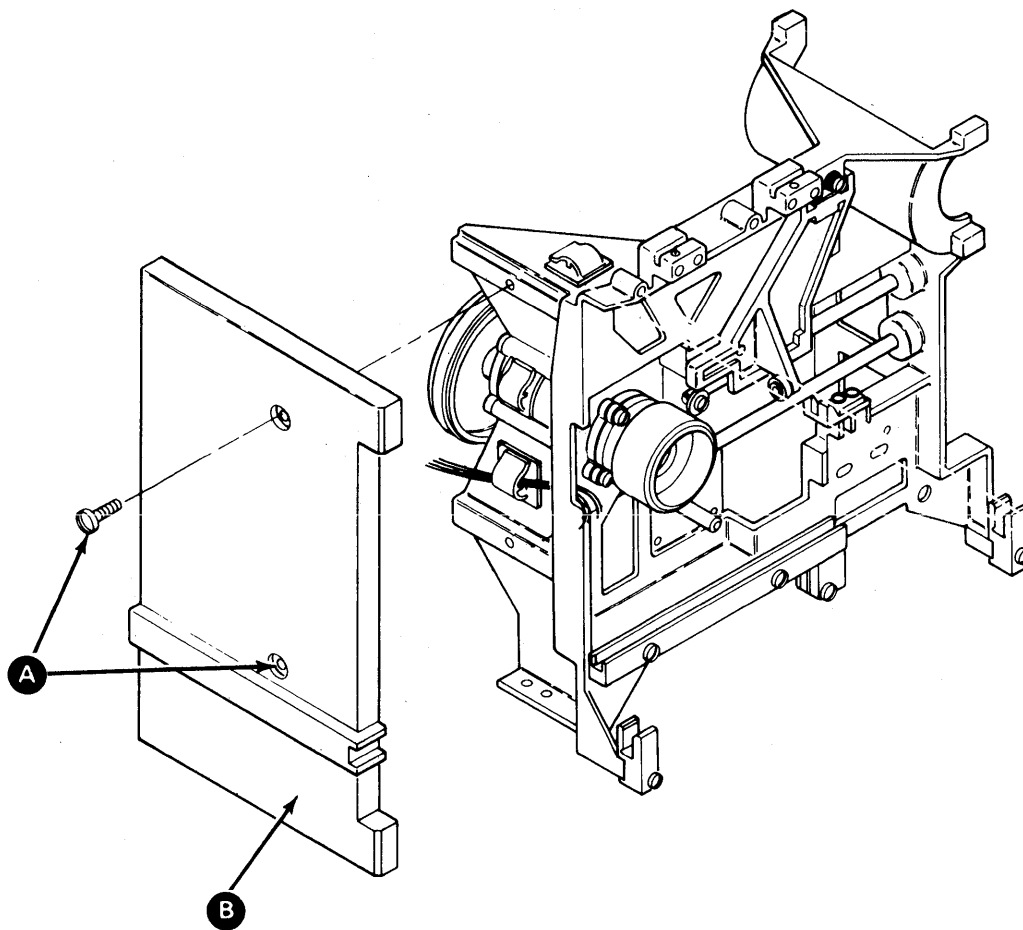
## 27-665 DISKETTE DRIVE BEZEL REMOVAL AND REPLACEMENT

### Removing the Diskette Drive Bezel

1. Remove the two mounting screws **A** from the bezel.
2. Remove the bezel **B**.

### Reinstalling the Diskette Drive Bezel

Reinstall the bezel **B** using the two mounting screws **A**. (No adjustment needed.)



**This page is intentionally left blank.**

## 27-670 DISKETTE DRIVE ASSEMBLY REMOVAL AND REPLACEMENT

### Removing the Diskette Drive Assembly

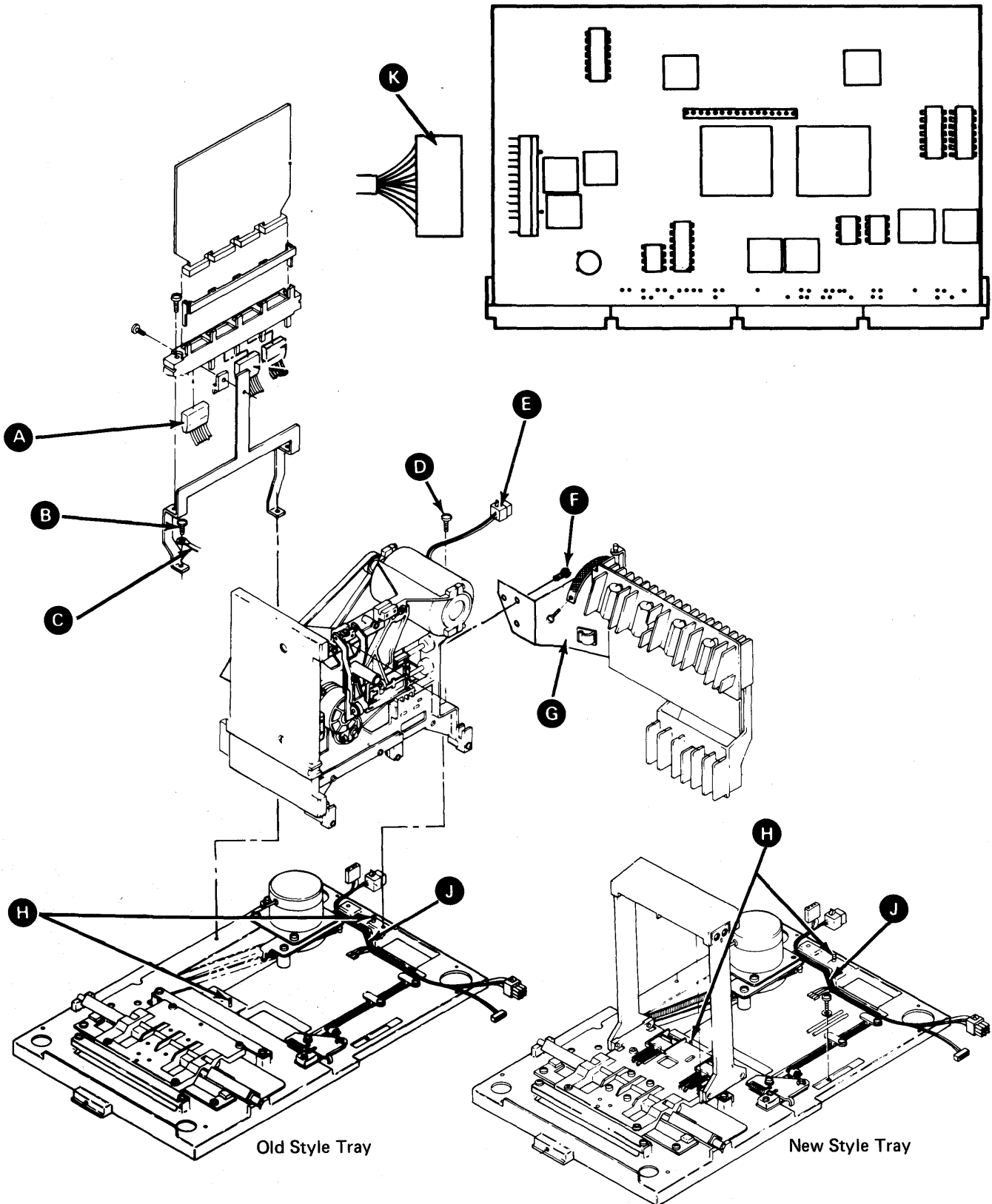
1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Disconnect the drive motor AC cable **E**.
3. Disconnect the head cable **K** from the control card.
4. Disconnect the diskette drive stepper motor/sensor cable (A1) **A** from the control card.
5. Remove the ground wire **C** from the control card bracket screw **B**.
6. If the 72MD has the old style picker, disconnect the leads **J** from the diskette in switch.
7. Remove the three screws **F** from the driver board bracket **G** and remove the bracket.
8. Remove the diskette drive bezel (see paragraph 27-665).
9. Remove the three mounting screws **D** (and star washers) for the diskette drive assembly. (One at the carriage bed end and two in the rear.)
10. Lift the drive assembly from the locating pins **H**.

### Reinstalling the Diskette Drive Assembly

1. Reinstall the diskette drive assembly on the locating pins **H** and fasten it with the three mounting screws **D** (and star washers). (One at the carriage bed end and two in the rear.) Ensure the safety ground wire is attached while tightening the screws.
2. Reinstall the diskette drive bezel (see paragraph 27-665).
3. If the 72MD has the old style picker, connect the leads **J** to the diskette in switch.
4. Connect the diskette drive stepper motor/sensor cable (A1) **A** to the control card.
5. Attach the ground wire **C** to the control card bracket screw **B**.
6. Connect the head cable **K** to the control card.
7. Reinstall the driver board bracket **G** using the three screws **F**.
8. Connect the drive motor AC cable **E**.
9. Reinstall the picker/cam casting assembly (see paragraph 27-400).



Note: See paragraph 27-820 for control card test pins.



**27-675 INDEX SENSE ALIGNMENT  
SERVICE CHECK**

1. Place the 72MD unit in the service position (see paragraph 27-205).
2. Remove the diskette drive bezel (see paragraph 27-665).
3. Loosen the two LED mounting screws **F** that are located on the picker/cam casting assembly.
4. Insert the alignment pins **D** to align the LED assembly **E** to the PTX assembly **G**. (Insert the pins from the diskette drive assembly side.)
5. Tighten the two LED mounting screws **F**.
6. Remove the alignment pins **D**.
7. Reinstall the diskette drive bezel (see paragraph 27-665).
8. Return the 72MD from the service position (see paragraph 27-205).

**27-680 INDEX SENSE LED OUTPUT SERVICE  
CHECK**

1. Open the front left side cover.
2. Loosen the two front safety shield screws and remove the two rear safety shield screws and the safety shield.
3. Set Power to I (operator panel).
4. For the old style picker, connect the negative probe of a multimeter to test pin TPA-12 **H** (ground) on the control card.  
  
For the new style picker, connect the negative probe of a multimeter to test pin TPA-13 **H** (ground) on the control card.
5. Set the multimeter scale to 5 Vdc and connect the positive probe to test pin TPA-2 **J** (53FD LED anode).
6. Check for a voltage level of 1 Vdc to 2 Vdc.
7. Move the positive probe to test pin TPA-1 **K** (33FD LED anode).
8. Check for a voltage level of 1 Vdc to 2 Vdc.

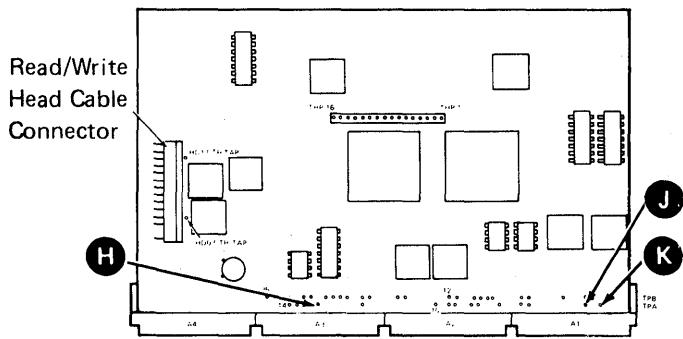
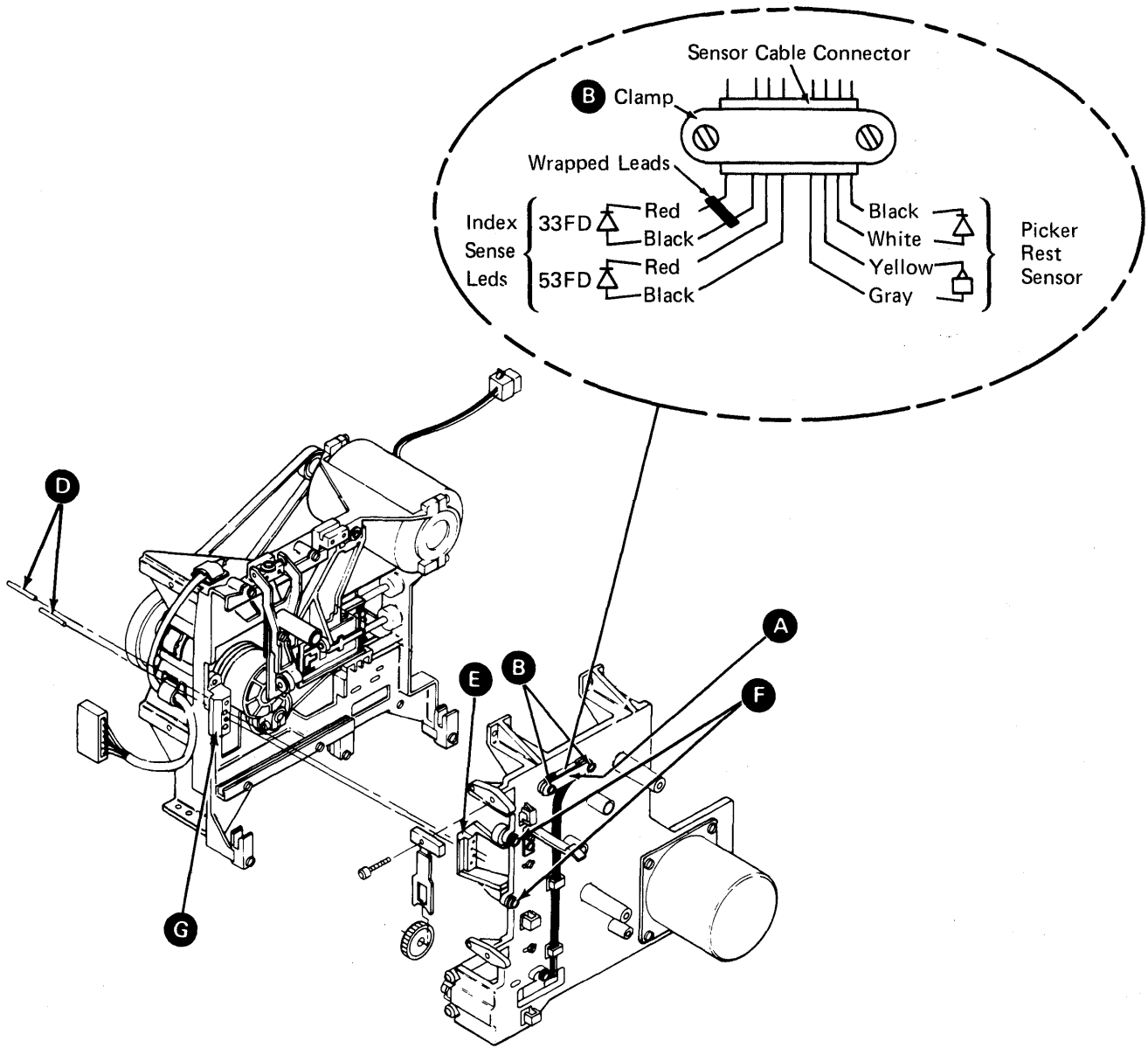
**27-685 INDEX SENSE LED ASSEMBLY  
REMOVAL AND REPLACEMENT**

**Removing the Diskette Sense LED Assembly**

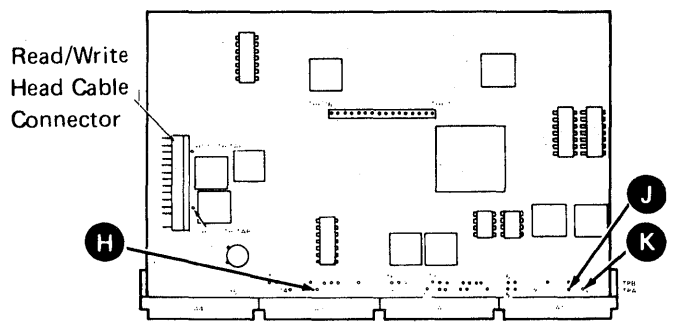
1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Remove the drive assembly bezel (see paragraph 27-665).
3. Remove the two screws **B** and the clamp **A** from the sensor cable connector located near the top of the picker/cam casting.
4. Remove the LED leads (the wrapped leads are for the 33FD LED) from the sensor cable connector (lift the tabs in the connector with a small screwdriver).
5. Remove the two mounting screws **F** and nuts from the LED assembly.
6. Remove the LED assembly **E**.

**Reinstalling the Index Sense LED Assembly**

1. Reinstall the index sense LED assembly **E** on the casting and fasten it with the two mounting screws **F** and two nuts. (Do not tighten.)
2. Reinstall the picker/cam casting assembly (see paragraph 27-400). Do not reinstall the 72MD unit at this time.
3. Insert the alignment pins **D** to align the LED assembly **E** and the PTX assembly **G** and tighten the two screws **F**. Then remove the alignment pins.
4. Insert the LED leads (the wrapped leads are for the 33FD LED) into the cable connector. Ensure that the locking tabs on the terminals lock in the connector slots.
5. Reinstall the sensor cable connector, clamp **A**, and the two screws **B** on the picker/cam casting.
6. Reinstall the drive assembly bezel (see paragraph 27-665).
7. Reinstall the 72MD unit (see paragraph 27-200).



Note: See paragraph 27-820 for control card test pins for the old style picker.



Note: See paragraph 27-820 for control card test pins for the new style picker.

**27-690 INDEX SENSE PTX OUTPUT SERVICE CHECK**

**CAUTION**

Always perform this service check with a diskette inserted backward (with the label facing the hub pulley), so that the LED (light-emitting diode) does not cause a wrong service check or destroy the PTX.

---

---

---

---

---

---

---

1. Remove power and the 72MD unit (see paragraph 27-200).
2. Disconnect the drive motor AC power cable **K** and driver board connector J3 **J**.

**DANGER**

Voltage is still present at the power connector when it is disconnected and power is on.

---

---

---

---

---

3. Set Power to I (operator panel).
4. Place the picker assembly to the rear of the unit.
5. Insert a diskette backward until it touches the collet.
6. For the old style picker, connect the positive probe of a multimeter (15 Vdc scale) to test pin TPB-14 **L** (+index) on the control card.

For the new style picker, connect the positive probe of a multimeter (15 Vdc scale) to test pin TPB-16 **L** (+index) on the control card.

7. For the old style picker, connect the negative probe of the multimeter to test pin TPA-12 **M** (ground).

For the new style picker, connect the negative probe of the multimeter to test pin TPA-13 **M** (ground).

8. Check the multimeter for a reading of less than 1 Vdc.

9. Install one end of a jumper to test pin TPB-2 **P** (53FD PTX emitter).

10. For the old style picker, while observing the multimeter, touch the other end of the jumper to test pin TPA-11 **N** (+5 volts) several times. The multimeter should read 2.5 Vdc or more when the test pin is touched. (A wrong reading can occur the first time the test pin is touched.)

For the new style picker, while observing the multimeter, touch the other end of the jumper to test pin TPA-15 **N** (+5 volts) several times. The multimeter should read 2.5 Vdc or more when the test pin is touched. (A wrong reading can occur the first time the test pin is touched.)

11. Repeat steps 9 and 10 with the jumper on test pin TPB-1 **Q** (33FD PTX emitter).

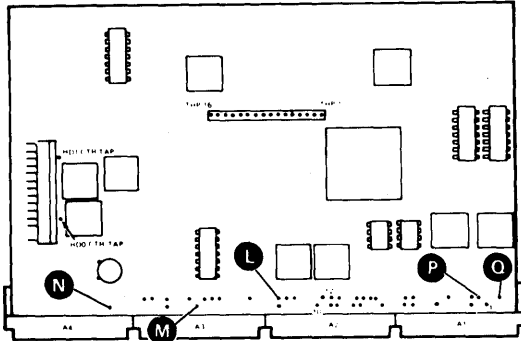
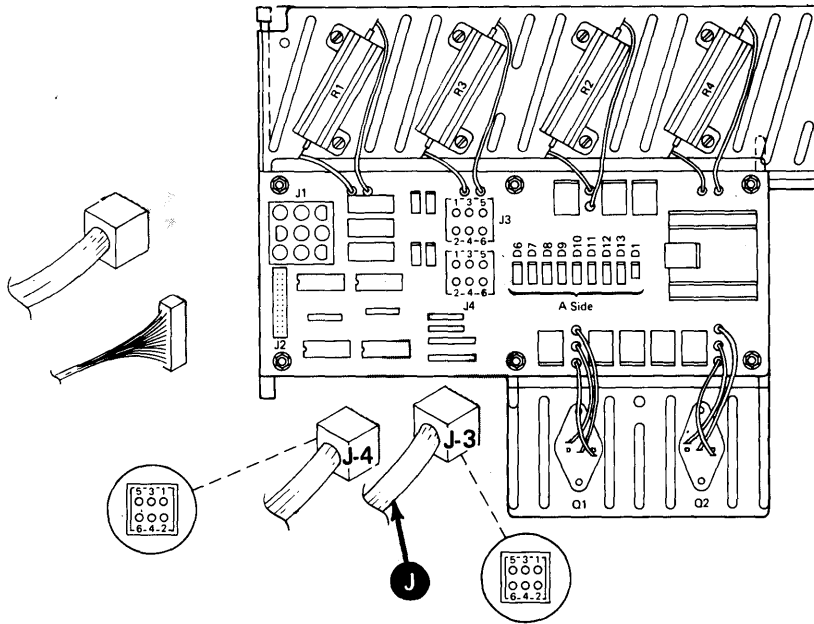
12. Set Power to 0 (operator panel).

13. Remove the jumper.

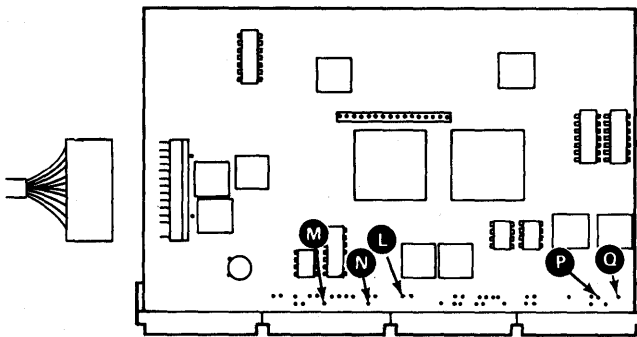
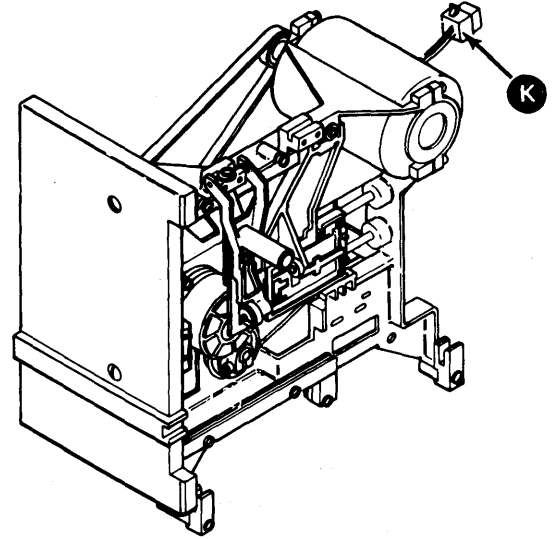
14. Remove the diskette.

15. Connect the drive motor AC power cable **K** and driver board connector J3 **J**.

16. Reinstall the 72MD unit (see paragraph 27-200).



**Note:** See paragraph 27-820 for control card test pins for the new style picker.



**Note:** See paragraph 27-820 for control card test pins for the old style picker.

**27-695 INDEX SENSE PTX  
ASSEMBLY REMOVAL  
AND REPLACEMENT**

**Removing the Index Sense PTX Assembly**

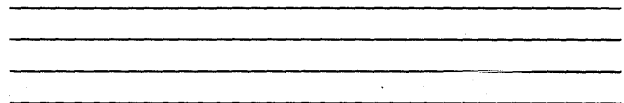
1. Remove the picker/cam casting assembly (see paragraph 27-400).
2. Remove the diskette drive assembly bezel (see paragraph 27-665).
3. Disconnect the diskette drive stepper motor/sensor cable (A1) **A** from the control card.
4. Remove the two screws **C** and the two connector covers **B**.
5. Remove the PTX leads (the wrapped leads are for the 33FD PTX) from the cable connector by pushing down on the terminal tabs with a small screwdriver.
6. Remove the two mounting screws **G** from the PTX assembly **H**.
7. Remove the PTX assembly **H**.

**Reinstalling the Index Sense PTX Assembly**

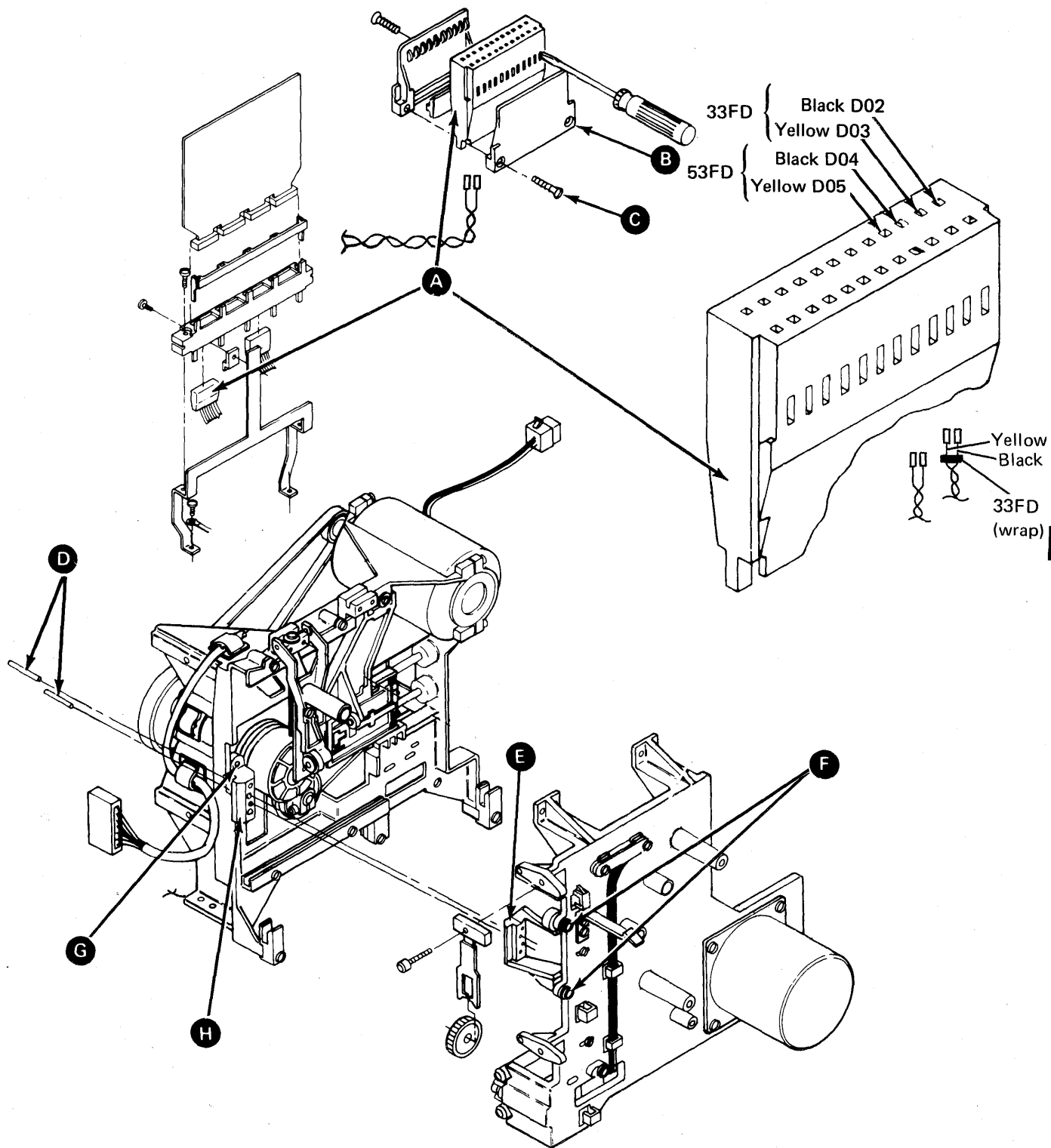
1. Reinstall the PTX assembly **H** on the casting and fasten it with the two mounting screws **G**.
2. Loosen the two mounting screws **F** for the LED assembly **E** on the picker/cam casting.
3. Reinstall the picker/cam casting assembly (see paragraph 27-400). Do not reinstall the 72MD unit at this time.
4. Insert the alignment pins **D** and align the LED assembly **E** to the PTX assembly **H** and tighten the two screws **F**.
5. Insert the PTX leads (the wrapped leads are for the 33FD PTX) into the cable connector. Ensure that the locking tabs on the terminals lock in the connector slots.
6. Reinstall the connector covers **B** and the two screws **C**.
7. Connect the diskette drive stepper motor/sensor cable (A1) **A** to the control card.

**CAUTION**

Ensure that the cables are located in the slot in the casting when installing the diskette drive assembly bezel.



8. Reinstall the diskette drive assembly bezel (see paragraph 27-665).
9. Reinstall the 72MD unit (see paragraph 27-200).



## 27-700 DISKETTE SPEED SERVICE CHECK

This service check must have a diskette engaged to the hub and the read/write heads must be loaded at cylinder 00.

1. Open the front left side cover.
2. Loosen the two front safety shield screws and remove the two rear safety shield screws and the safety shield.
3. Set Power to I (operator panel).
4. Clamp a diskette to the hub and load the read/write heads at cylinder 00 as follows:
  - Set the Mode Selector switch to the Proc Run position (CE panel).
  - Set the Address/Data switches to FF00 (CE panel).
  - Set the MSIPL switch to the Diskette position (CE panel).
  - Set the CSIPL switch to the Diskette position (CE panel).
  - Set all other CE panel switches to their down position.
  - Insert a scratch diskette.
  - Press the Load switch (operator panel).

**Note:** The Load light remains on during this service check. Press the Reset switch (CE panel) to release the loaded heads and to eject the diskette.

5. Set up an oscilloscope as follows:

**Note:** Use a Tektronix 453, 454, or a similar scope with X10 probes.

Channel A sweep mode	Normal
Channel A level	+
Channel A coupling	DC
Channel A slope	+
Channel A source	Internal
Trigger	Normal
Mode	Channel 1
Channel 1 volts/division	1.0 V/cm
Channel 1 input	DC
Times per division	10 ms
Channel 1 probe	(See note)

**Note:** For the old style picker, connect the channel 1 probe to TPB-14 (+index). For the new style picker, connect the channel 1 probe to TPB-16 (+index).

6. Observe an index pulse width of 0.75 to 1.5 milliseconds occurring each  $83.3 \pm 2.1$  milliseconds. Pulse amplitude should be between 2.4 Vdc and 4.2 Vdc.
7. Reinstall the safety shield using the four screws.



This page is intentionally left blank.

**27-800 DRIVER BOARD OUTPUT TO THE PICKER/CAM STEPPER MOTOR SERVICE CHECK**

1. Open the front left side cover.
2. Loosen the two front safety shield screws and remove the two rear safety shield screws and the safety shield.
3. Set Power to I (operator panel).
4. Connect the negative probe of a multimeter to test pin THP-1 **C** (ground). With the positive probe measure the voltage at point **A** on diodes 7 and 9 (3.5 Vdc to +4.7 Vdc).
5. Access the read/write head carriage to single step the picker/cam stepper motor as follows: (Do not access the read/write head carriage more than one cylinder at a time.)
  - Set the Mode Selection switch to the Proc Run position (CE panel).
  - Set the Address/Data switches to hexadecimal F800 (CE panel).
  - Set all CE panel switches to their down position.
  - Press the Load switch (operator panel).
  - Select the exerciser option.
  - Select the diskette option.
  - Select the stepper motor step test option and the read/write head carriage will move to cylinder 40.
  - Install a jumper from THP-3 **B** (single step picker) to THP-1 **C** (ground).
  - Use the advance motor option of the stepper motor test to single step the picker/cam stepper motor.

*Note:* This procedure uses the read/write head carriage control circuits to move the picker/cam motor. Therefore, be careful to prevent damaging the read/write head circuit as well as the read/write head carriage assembly.

**DANGER**

Parts of the driver board become hot after continuous use.

- 
- 
- 
6. For the old style picker, probe test pin TPB-23 **D** (-picker motor) for a down level. If the output is not at the desired level, perform the control card output check (see paragraph 27-850).

For the new style picker, probe test pin TPB-22 **D** (-picker motor) for a down level. If the output is not at the desired level, perform the control card output check (see paragraph 27-850).

7. For the old style picker, connect the negative probe of a multimeter to test pin TPA-12 **E** (ground). With the positive probe, measure the voltages at point **A** on diodes D6, D7, D8, and D9. The voltages should compare with those shown on the chart when single stepping. The measured not active level (measured when single stepping) should be higher than the detent voltage measured in step 4.

For the new style picker, connect the negative probe of a multimeter to test pin TPA-13 **E** (ground). With the positive probe, measure the voltage at point **A** on diodes D6, D7, D8, and D9. The voltages should compare with those shown on the chart when single stepping. The measured not active level (measured when single stepping) should be higher than the detent voltage measured in step 4.

8. Remove the jumper.
9. Reinstall the safety shield using the four screws.

**TEST POINTS**

Read/Write Control Line	Picker Motor Test Point	Bed Motor Test Point
Auto Step 0	D6-A	D12-A
Auto Step 1	D8-A	D10-A
Auto Step 2	D7-A	D13-A
Auto Step 3	D9-A	D11-A

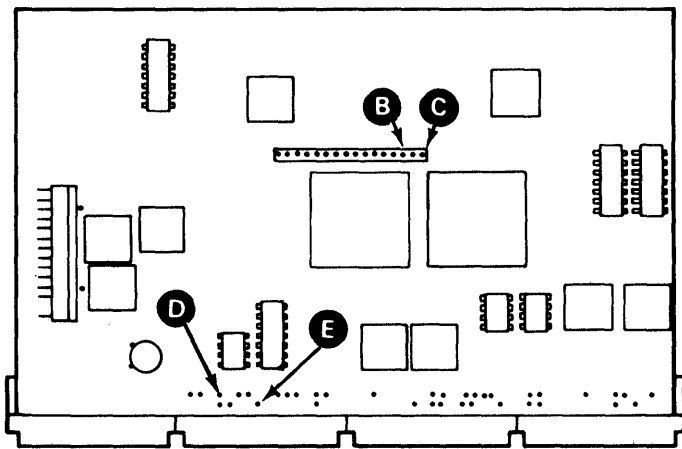
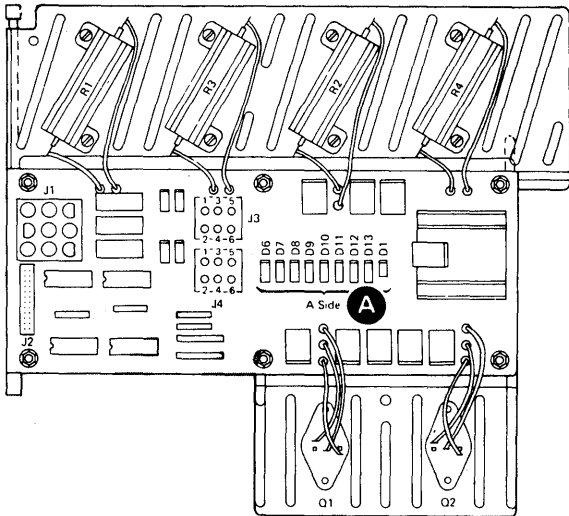
**Condition of Stepper Motor Phases at:**

Cyl	Cyl	Cyl	Cyl	Cyl
40	41	42	43	44
1	0	0	1	1
1	1	0	0	1
X	1	1	0	X
X	0	1	1	X

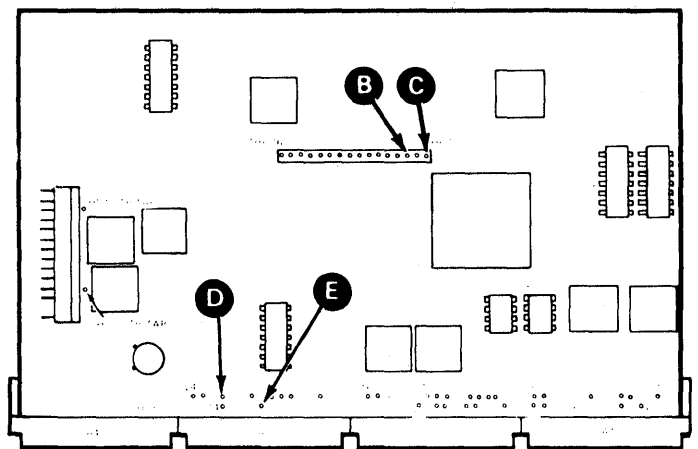
0 = Not active level 5.0 Vdc or more at point A

1 = Active level 0.5 Vdc to 1.1 Vdc at point A

X = When at detent position, 3.5 Vdc to 4.7 Vdc at point A



*Note:* See paragraph 27-820 for control card test pins for the old style picker.



*Note:* See paragraph 27-820 for control card test pins for the new style picker.

**27-805 DRIVER BOARD OUTPUT TO THE  
CARRIAGE BED STEPPER  
MOTOR SERVICE CHECK**

1. Open the front left side cover.
2. Loosen the two front safety shield screws and remove the two rear safety shield screws and the safety shield.
3. Set Power to I (operator panel).
4. Connect the negative probe of a multimeter to test pin THP-1 **C** (ground). With the positive probe measure the voltage at point **A** on diodes 11 and 13 (3.5 Vdc to 4.7 Vdc).
5. Access the read/write head carriage to single step the carriage bed stepper motor as follows: (Do not access the read/write head carriage more than one cylinder at a time.)
  - Set the Mode Selector switch to the Proc Run position (CE panel).
  - Set the Address/Data switches to F800 (CE panel).
  - Set all CE panel switches to their down position.
  - Press the Load switch (operator panel).
  - Select the exerciser option.
  - Select the diskette option.
  - Select the stepper motor step test option and the read/write head carriage will move to cylinder 40.
  - Install a jumper from THP-4 **B** (single step bed) to THP-1 **D** (ground).
  - Use the advance motor option of the stepper motor test to single step the bed stepper motor.

*Note:* This procedure uses the read/write head carriage circuits to move the carriage bed stepper motor. Therefore, be careful to prevent damaging the read/write head carriage control circuits as well as the read/write carriage assembly.

**DANGER**

Parts of the driver board become hot after continuous use.

---

---

---

---

6. For the old style picker, probe test pin TPB-24 **D** (-bed motor) for a down level. If the output is not at the desired level, perform the control card output check (see paragraph 27-850).

For the new style picker, probe test pin TPB-23 **D** (-bed motor) for a down level. If the output is not at the desired level, perform the control card output check (see paragraph 27-850).

7. For the old style picker, connect the negative probe of a multimeter to test pin TPA-12 **E** (ground). With the positive probe measure the voltage at point **A** on diodes D10, D11, D12, and D13. The voltages should compare with those shown on the chart when single stepping. The measured not active level voltage (measured when single stepping) should be higher than the detent voltage measured in step 4.

For the new style picker, connect the negative probe of a multimeter to test pin TPA-13 **E** (ground). With the positive probe measure the voltage at point **A** on diodes D10, D11, D12, and D13. The voltages should compare with those shown on the chart when single stepping. The measured not active level voltage (measured when single stepping) should be higher than the detent voltage measured in step 4.

8. Remove the jumper.
9. Reinstall the safety shield using the four screws.

**TEST POINTS**

Read/Write Control Line	Picker Motor Test Point	Bed Motor Test Point
Auto Step 0	D6-A	D12-A
Auto Step 1	D8-A	D10-A
Auto Step 2	D7-A	D13-A
Auto Step 3	D9-A	D11-A

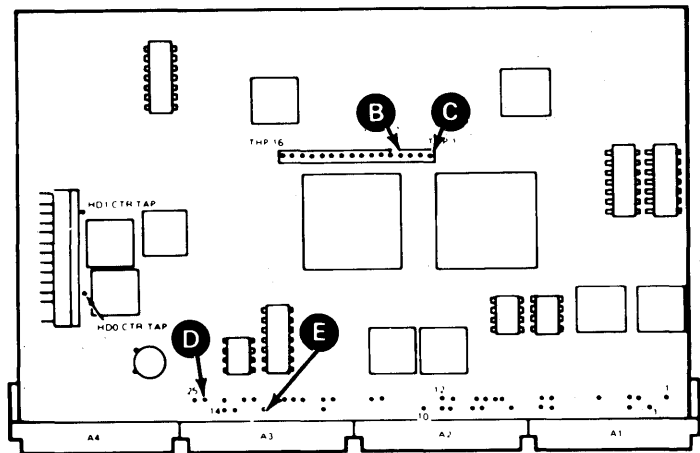
**Condition of Stepper Motor Phases at:**

Cyl 40	Cyl 41	Cyl 42	Cyl 43	Cyl 44
1	0	0	1	1
1	1	0	0	1
X	1	1	0	X
X	0	1	1	X

0 = Not active level +5.0 V or more at point A

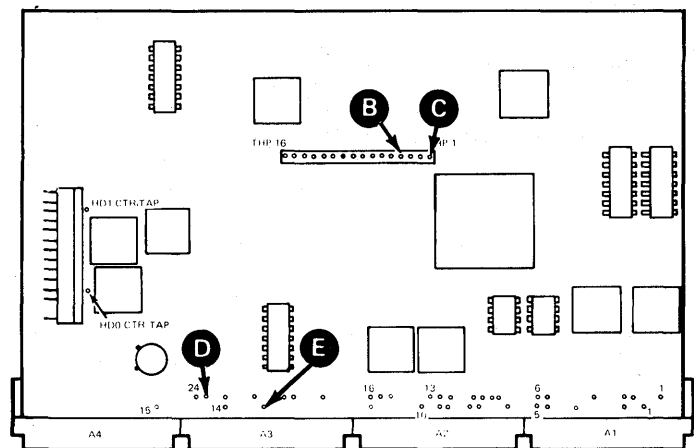
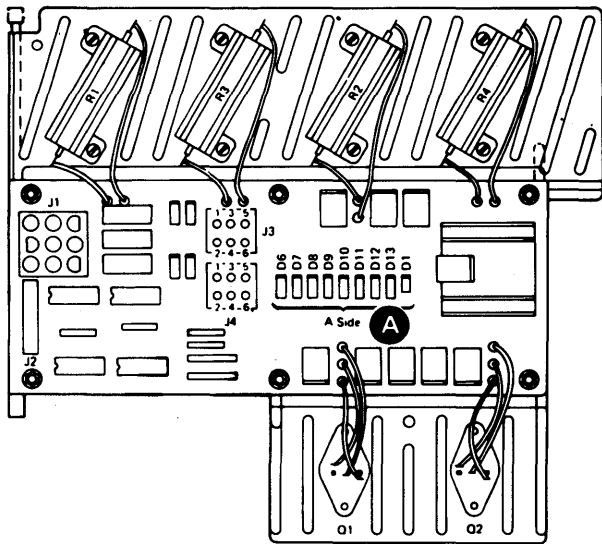
1 = Active level +0.5 V to +1.1 V at point A

X = When at detent position, +3.5 V to +4.7 V at point A



27

*Note:* See paragraph 27-820 for control card test pins for the old style picker.



*Note:* See paragraph 27-820 for control card test pins for the new style picker.

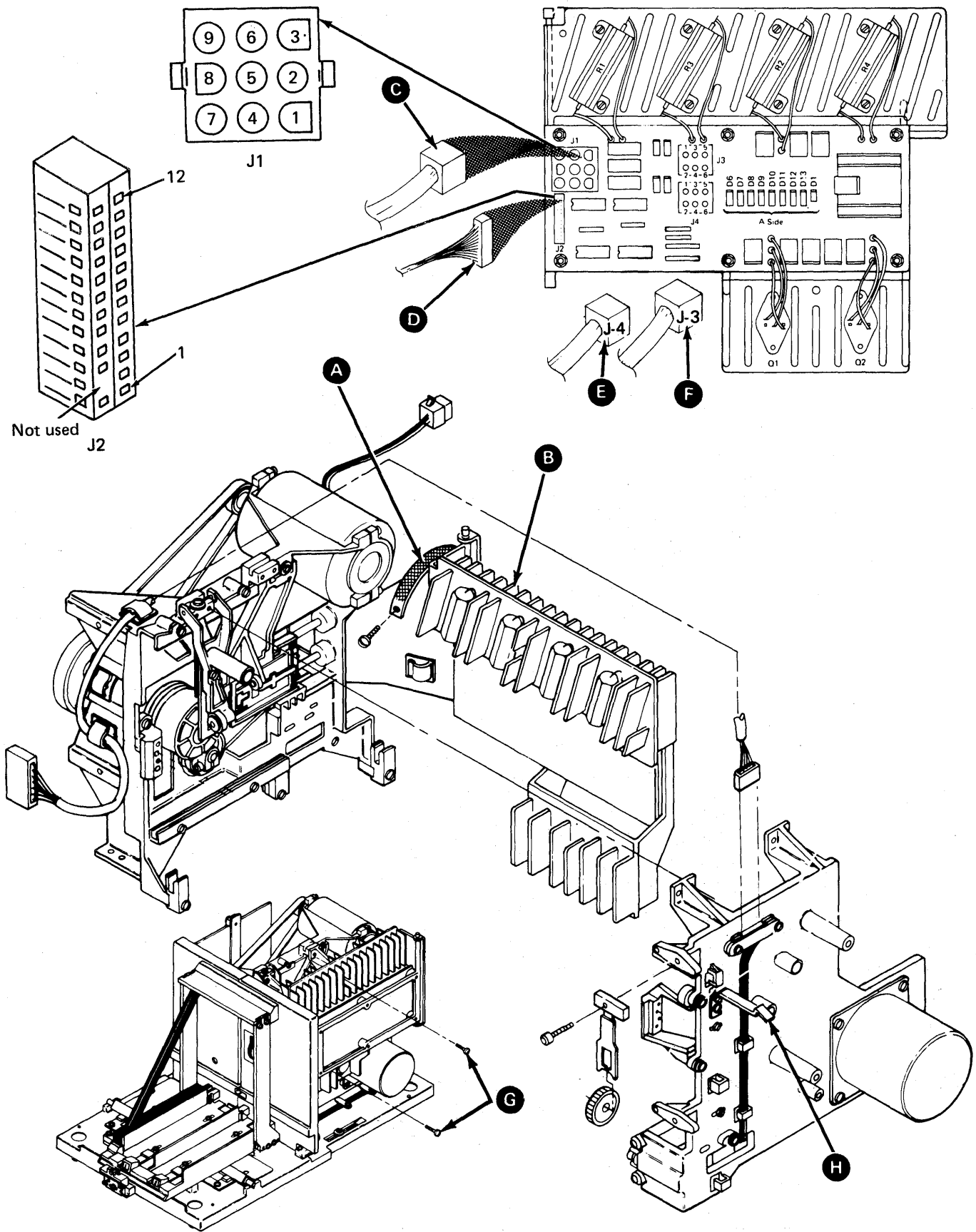
## 27-810 DRIVER BOARD ASSEMBLY REMOVAL AND REPLACEMENT

### Removing the Driver Board Assembly

1. Remove power and the 72MD unit (see paragraph 27-200).
2. If the two driver board shipping bolts **G** are still in place, remove them.
3. Release the gate spring latch **H** and open the driver board gate assembly **B**.
4. Disconnect the DC cable J1 **C**.
5. Disconnect the control card cable J2 **D**.
6. Disconnect the two stepper motor cables J3 **E** and J4 **F**.
7. Remove the driver board ground strap **A**.
8. Lift the driver board assembly up and pivot the bottom hinge pin away from the hinge bracket to remove the driver board assembly.

### Reinstalling the Driver Board Assembly

1. Insert the top hinge pin into the single bracket and pivot the bottom hinge pin into the open hinge to mount the driver board assembly.
2. Connect the two stepper motor cables J3 **E** and J4 **F**.
3. Connect the control card cable J2 **D**.
4. Connect the DC cable J1 **C**.
5. Connect the driver board ground strap **A**.
6. Close the driver board gate until the spring latch **H** engages.
7. Reinstall the 72MD unit (see paragraph 27-200).



## 27-815 CONTROL CARD REMOVAL AND REPLACEMENT

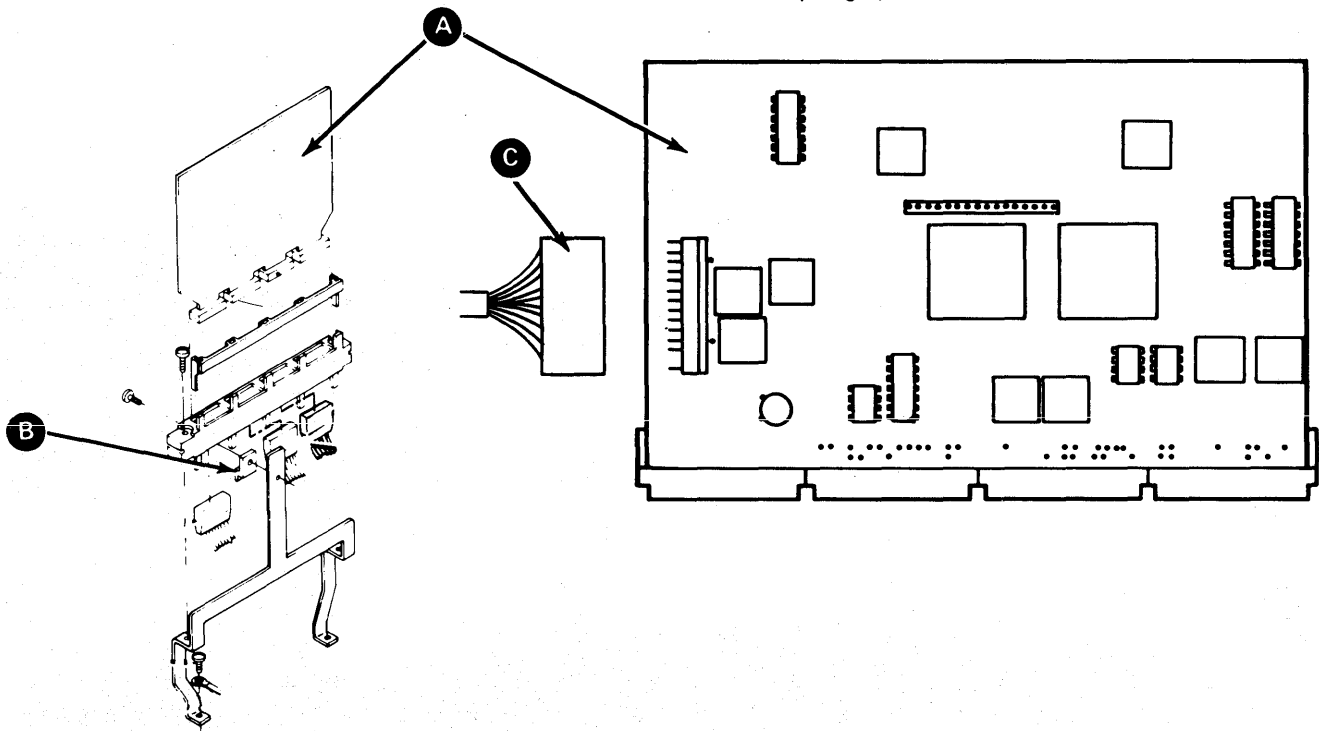
### Removing the Control Card

1. Set Power to O (operator panel).
2. Open the front left side cover.
3. Loosen the two front safety shield screws and remove the two rear safety shield screws and the safety shield.
4. Disconnect the read/write head cable **C**.
5. Remove the card retainer **B** at the top of the card.
6. Remove the card **A**.

### Reinstalling the Control Card

1. Reinstall the control card **A**.
2. Attach the card retainer **B** at the top of the card.
3. Connect the read/write head cable **C**.
4. Reinstall the safety shield using the four screws.
5. Close the front left side cover.

*Note:* See paragraph 27-820 for control card test pins.





**This page is intentionally left blank.**

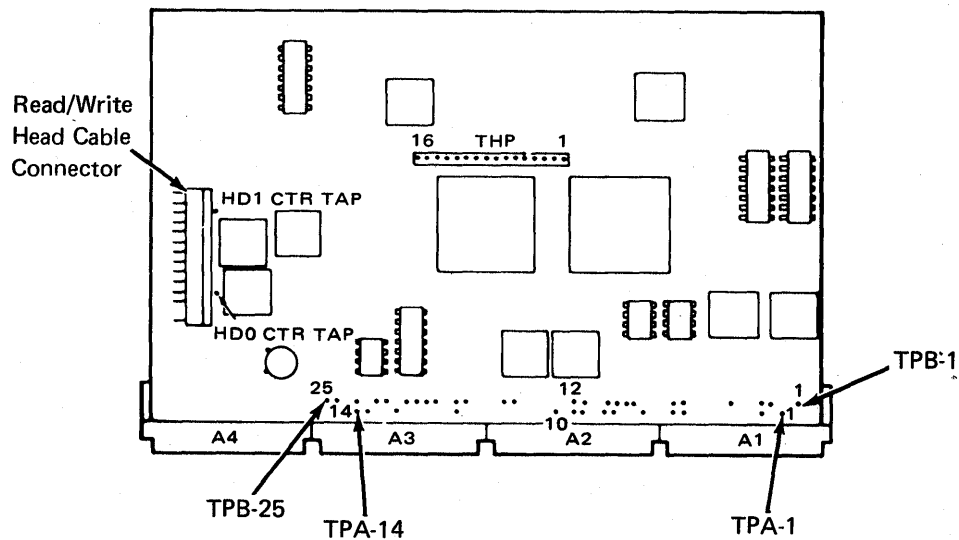
27-820 CONTROL CARD TEST PINS

Machines with Old Style Picker

TPA-1	33FD LED anode
TPA-2	53FD LED anode
TPA-3	Head motor MC-2 (yellow)
TPA-4	Head motor MC-3 (blue)
TPA-5	+Write data/+500 kHz osc.
TPA-6	+Erase gate
TPA-7	+Write gate
TPA-8	+Inner tracks/+command 5
TPA-9	+Head select/+command P
TPA-10	+Erase current sense/+status C
TPA-11	+5 volts
TPA-12	Ground
TPA-13	+24 volts
TPA-14	-5 volts

THP-1	Ground
THP-2	Head reference (CE mode)
THP-3	Single step picker
THP-4	Single step bed
THP-5	Picker extended
THP-6	-AGC out
THP-7	+AGC out
THP-8	Ground
THP-9	Control voltage
THP-10	
THP-11	
THP-12	+14.3 volts
THP-13	
THP-14	-VGA in preamp TP-1
THP-15	+VGA in preamp TP-2
THP-16	Ground

TPB-1	33FD PTX emitter
TPB-2	53FD PTX emitter
TPB-3	Picker PTX collector
TPB-4	Picker LED anode
TPB-5	Head motor MC-0 (orange)
TPB-6	Head motor MC-1 (red)
TPB-7	+Access 0/+command 0
TPB-8	+Access 1/+command 1
TPB-9	+Access 2/+command 2
TPB-10	+Access 3/+command 3
TPB-11	+enable autoloader
TPB-12	+File data/xxxx
TPB-13	+Switch filter/+command 4
TPB-14	+Index
TPB-15	-Diskette In
TPB-16	-Bed orient switch
TPB-17	-Window open
TPB-18	+Auto step 0
TPB-19	+Auto step 1
TPB-20	+Auto step 2
TPB-21	+Auto step 3
TPB-22	-Window magnet
TPB-23	-Picker motor
TPB-24	-Bed motor
TPB-25	+Cover open

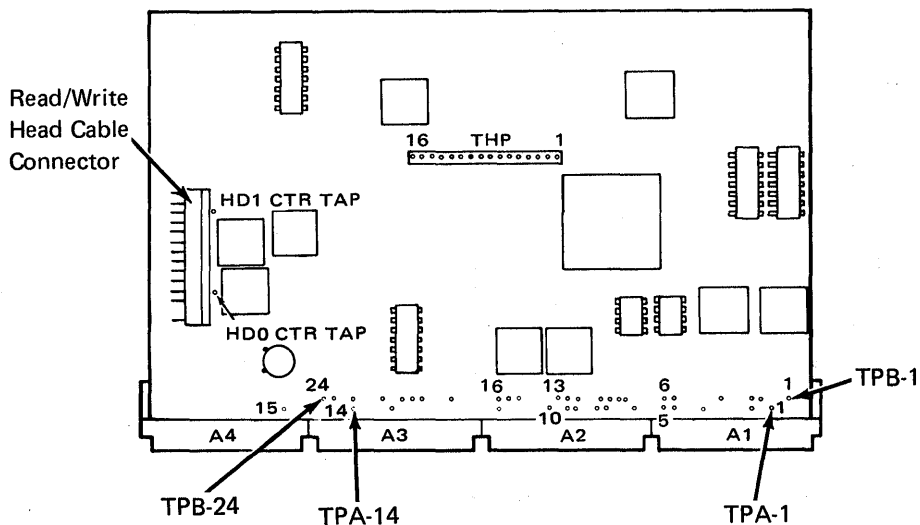


### Machines with New Style Picker

TPA-1	33FD LED anode
TPA-2	53FD LED anode
TPA-3	+24 volts
TPA-4	Head motor MC-2 (yellow)
TPA-5	Head motor MC-3 (blue)
TPA-6	+Write data/+500 kHz osc.
TPA-7	+Erase gate
TPA-8	+Write gate
TPA-9	+Inner tracks/+command 5
TPA-10	+Head select/+command P
TPA-11	+Erase current sense/+status C
TPA-12	XXXX/+status D
TPA-13	Ground
TPA-14	-5 volts
TPA-15	+5 volts

THP-1	Ground
THP-2	Head reference (CE mode)
THP-3	Single step picker
THP-4	Single step bed
THP-5	Picker extended
THP-6	-AGC out
THP-7	+AGC out
THP-8	Ground
THP-9	Control voltage
THP-10	
THP-11	
THP-12	+14.3 volts
THP-13	
THP-14	-VGA in preamp TP-1
THP-15	+VGA in preamp TP-2
THP-16	Ground

TPB-1	33FD PTX emitter
TPB-2	53FD PTX emitter
TPB-3	Picker PTX collector
TPB-4	Picker LED anode
TPB-5	Head motor MC-0 (orange)
TPB-6	Head motor MC-1 (red)
TPB-7	+Access 0/+command 0
TPB-8	+Access 1/+command 1
TPB-9	+Access 2/+command 2
TPB-10	+Access 3/+command 3
TPB-11	+enable autoloader
TPB-12	+File data/XXXX
TPB-13	+Diskette 2/status B
TPB-14	XXXX/+status A
TPB-15	+Switch filter/+command 4
TPB-16	+Index
TPB-17	-Bed orient switch
TPB-18	+Auto step 0
TPB-19	+Auto step 1
TPB-20	+Auto step 2
TPB-21	+Auto step 3
TPB-22	-Picker motor
TPB-23	-Bed motor
TPB-24	+Cover open



27-825 CONTROL CARD LOGIC PINS

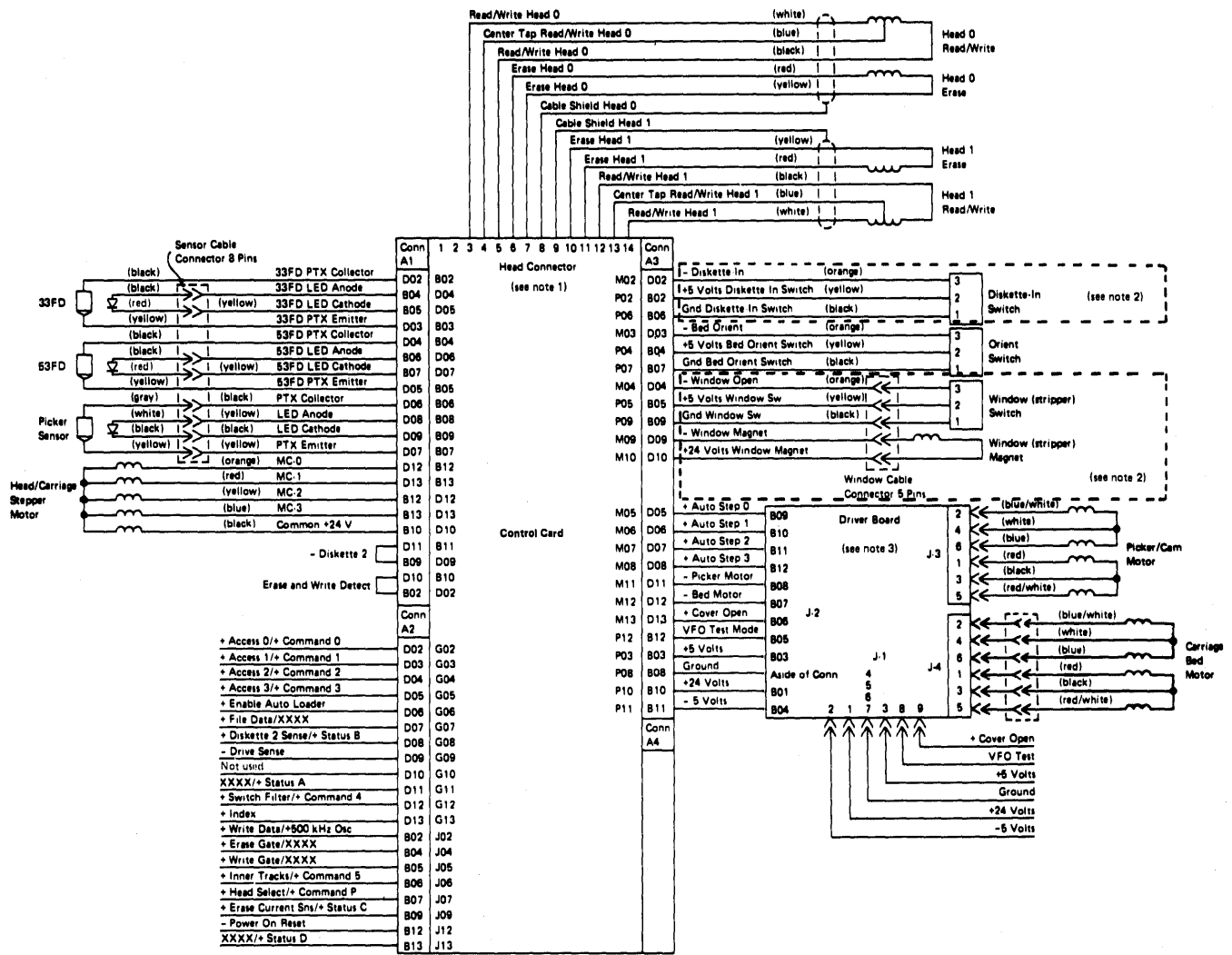
I/O Pin	B02/D02 Line Name
B02	33FD PTX Collector
B03	33FD PTX Emitter
B04	53FD PTX Collector
B05	53FD PTX Emitter
B06	Picker PTX Collector
B07	Picker PTX Emitter
B08	Picker LED Anode
B09	Picker LED Cathode
B10	Erase and Write Detect
B11	-Diskette 2
B12	Head Motor Phase 0
B13	Head Motor Phase 1
D02	
D03	+5 Volts (reserved)
D04	33FD LED Anode
D05	33FD LED Cathode
D06	53FD LED Anode
D07	53FD LED Cathode
D08	Ground (reserved)
D09	
D10	Head Motor Common (+24 volts)
D11	
D12	Head Motor Phase 2
D13	Head Motor Phase 3

I/O Pin	G02/J02 Line Name
G02	+Access 0/+Command 0
G03	+Access 1/+Command 1
G04	+Access 2/+Command 2
G05	+Access 3/+Command 3
G06	+Enable Autoloader
G07	+File Data/XXXX
G08	+Diskette 2 Sense/+Status B
G09	-Drive Sense
G10	
G11	XXXX/+Status A
G12	+Switch Filter/+Command 4
G13	+Index
J02	+Write Data/+500 kHz Oscillator
J03	+5 Volts (reserved)
J04	+Erase Gate/XXXX
J05	+Write Gate/XXXX
J06	+Inner Tracks/+Command 5
J07	+Head Select/+Command P
J08	Ground (reserved)
J09	+Erase Current Sense/+Status C
J10	+24 Volts (reserved)
J11	-5 Volts (reserved)
J12	-Power on Reset
J13	XXXX/+Status D

I/O Pin	M02/P02 Line Name
M02	-Diskette-In <sup>1</sup>
M03	-Bed Orient Switch
M04	-Window Oper. <sup>1</sup>
M05	+Auto Step 0
M06	+Auto Step 1
M07	+Auto Step 2
M08	+Auto Step 3
M09	-Window Solenoid <sup>1</sup>
M10	+24 Volts Window Solenoid <sup>1</sup>
M11	-Picker Motor
M12	-Bed Motor
M13	+Cover Open
P02	Diskette Switch +5 <sup>1</sup>
P03	+5 Volts (enters card)
P04	Bed Switch +5
P05	Window Switch +5 <sup>1</sup>
P06	Diskette Switch Ground <sup>1</sup>
P07	Bed Switch Ground
P08	Ground (enters card)
P09	Window Switch Ground <sup>1</sup>
P10	+24 Volts (enters card)
P11	-5 Volts (enters card)
P12	VFO Test Mode
P13	-Data Protect

I/O Pin	S02/U02 Line Name
S02	-A Clock
S03	-B Clock
S04	-C Clock
S05	+Gated A Clock
S06	+Gated B Clock
S07	+Gated C Clock
S08	-Disable Abort
S09	-Single Step Picker
S10	-Single Step Bed
S11	-Head Reference
S12	
S13	
U02	-Scan In
U03	+5 Volts (reserved)
U04	-Set Clock Latch
U05	
U06	-Reset Clock/Head Latches
U07	
U08	Ground (reserved)
U09	
U10	
U11	
U12	
U13	

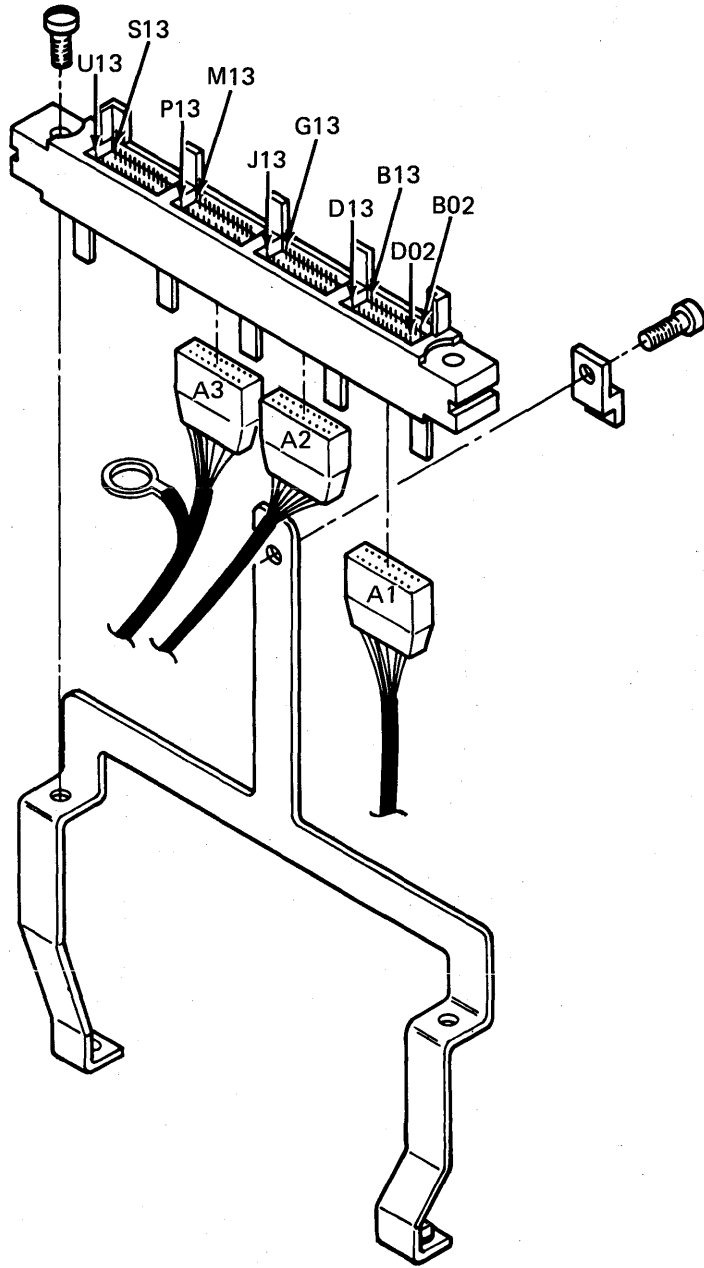
<sup>1</sup>Applies only to machines with the old style picker.



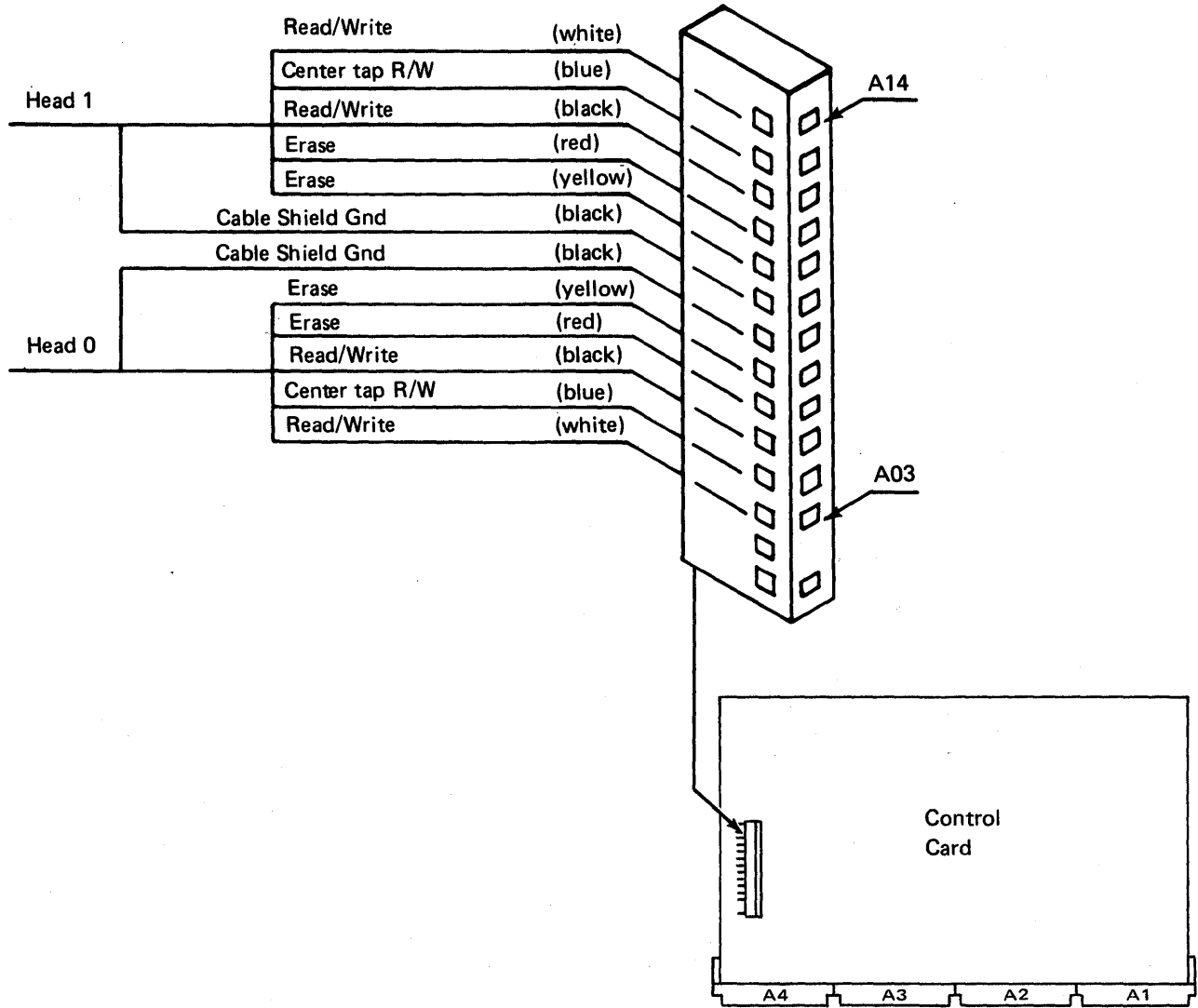
**Notes:**

1. See paragraph 27-835 for the location of the head connector.
2. The diskette-in switch, window switch, and window magnet are present only on machines with the old style picker.
3. See paragraph 27-810 for the location of the J connectors.

27-830 CONTROL CARD SOCKET AND CONNECTOR PINS



27-835 CONTROL CARD HEAD CABLE PINS



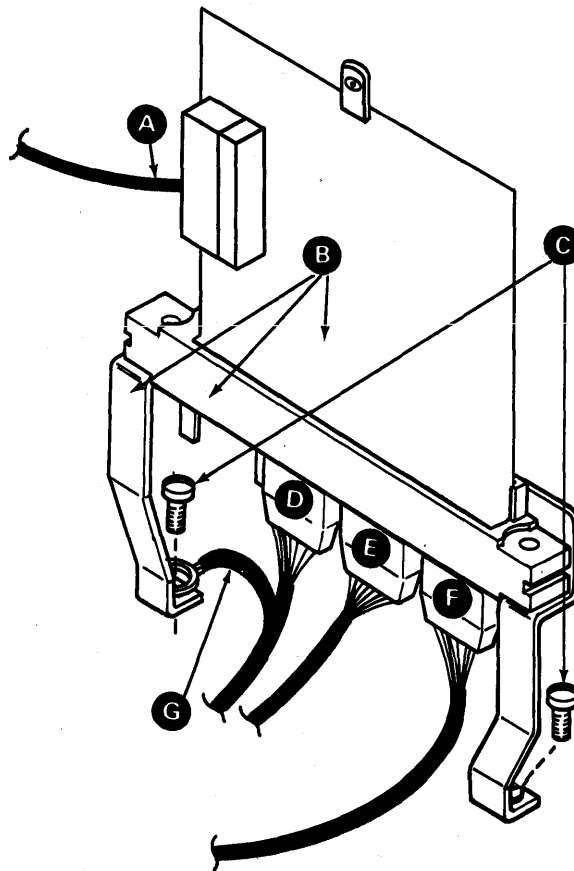
**27-840 CONTROL CARD AND MOUNTING ASSEMBLY REMOVAL AND REPLACEMENT**

**Removing the Control Card and Mounting Assembly**

1. Set Power to O (operator panel).
2. Open the front left side cover.
3. Loosen the two front safety shield screws and remove the two rear safety shield screws and the safety shield.
4. Disconnect the read/write head cable **A**.
5. Disconnect the system cable A2 **E**, the diskette stepper motor/sensor cable A1 **F**, and the cable from the driver board A3 **D**.
6. Remove the two mounting screws **C** and the ground wire **G** from the bracket assembly and then remove the control card and mounting assembly **B**.

**Reinstalling the Control Card and Mounting Assembly**

1. Reinstall the control card and mounting assembly **B** using the two mounting screws **C**. (Attach the ground wire **G** to the bracket assembly before you tighten the mounting screws.)
2. Connect the system cable A2 **E**, the diskette stepper motor/sensor cable A1 **F**, and the cable from the driver board A3 **D**.
3. Connect the read/write head cable **A**.
4. Reinstall the safety shield using the four screws and close the front left side cover.





This page is intentionally left blank.

27

**27-845 CARRIAGE BED STEPPER MOTOR  
CONTROL CARD SIGNAL  
OUTPUT CHECK**

1. Open the front left side cover.
2. Loosen the two front safety shield screws and remove the two rear safety shield screws and the safety shield.
3. Set Power to I (operator panel).
4. Access the read/write head carriage to single step the carriage bed stepper motor as follows: (Do not access the read/write head carriage more than one cylinder at a time.)
  - Set the Mode Selector switch to the Proc Run position (CE panel).
  - Set the Address/Data switches to F800 (CE panel).
  - Set all CE panel switches to their down position.
  - Press the Load switch (operator panel).
  - Select the exerciser option.
  - Select the diskette option.
  - Select the stepper motor step test option and the read/write head carriage will move to cylinder 40.
  - Install a jumper from THP-4 **A** (single step bed) to THP-1 **B** (ground).
  - Use the advance motor option of the stepper motor test to single step the bed motor.

**Note:** This procedure uses the read/write head carriage circuits to move the carriage bed stepper motor. Therefore, be careful to prevent damaging the read/write head carriage control circuits as well as the read/write carriage assembly.

**DANGER**

Parts of the driver board become hot after continuous use.

- 
- 
- 
- 
5. For the old style picker, probe test pin TPB-24 **C** (-bed motor) for a down level.  
  
For the new style picker, probe test pin TPB-23 **C** (-bed motor) for a down level.
  6. Probe test pins TPB-18 **G**, 19 **F**, 20 **E**, and 21 **D** (+auto step 0 through 3) for up levels (two lines should be active at each step). Single step for this check. (See chart.)
  7. Remove the jumper.
  8. Reinstall the safety shield using the four screws.

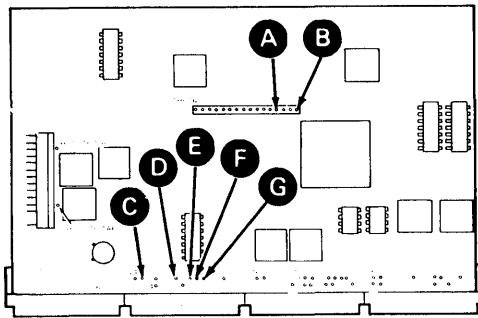
**TEST POINTS**

Read/Write Control Lines	Test Points
Auto Step 0	TPB-18
Auto Step 1	TPB-19
Auto Step 2	TPB-20
Auto Step 3	TPB-21

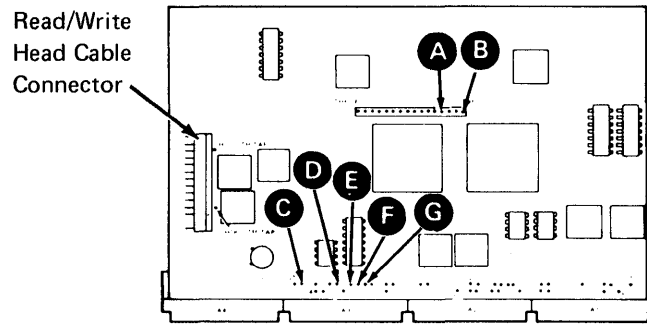
**Condition of Stepper Motor Phases at:**

Cyl 40	Cyl 41	Cyl 42	Cyl 43	Cyl 44
Up	Down	Down	Up	Up
Up	Up	Down	Down	Up
Down	Up	Up	Down	Down
Down	Down	Up	Up	Down

Up level = 5 Vdc  
Down level = Ground



*Note:* See paragraph 27-820 for control card test pins for the new style picker.



*Note:* See paragraph 27-820 for control card test pins for the old style picker.

**27-850 PICKER/CAM STEPPER MOTOR  
CONTROL CARD SIGNAL  
OUTPUT CHECK**

1. Open the front left side cover.
2. Loosen the two front safety shield screws and remove the two rear safety shield screws and the safety shield.
3. Set Power to I (operator panel).
4. Access the read/write head carriage to single step the picker/cam stepper motor as follows: (Do not access the read/write head carriage more than one cylinder at a time.)
  - Set the Mode Selector switch to the Proc Run position (CE panel).
  - Set the Address/Data switches to F800 (CE panel).
  - Set all CE panel switches to their down position.
  - Press the Load switch (operator panel).
  - Select the exerciser option.
  - Select the diskette option.
  - Select the stepper motor step test option and the read/write head carriage will move to cylinder 40.
  - Install a jumper from THP-3 **A** (single step picker) to THP-1 **B** (ground).
  - Use the advance motor option of the stepper motor test to single step the picker/cam stepper motor.

**Note:** This procedure uses the read/write head carriage circuits to move the picker/cam stepper motor. Therefore, be careful to prevent damaging the read/write head carriage control circuits as well as the read/write carriage assembly.

5. For the old style picker, probe test pin TPB-23 **C** (-picker motor) for a down level.  
  
For the new style picker, probe test pin TPB-22 **C** (-picker motor) for a down level.
6. Probe test pins TPB-18 **G**, 19 **F**, 20 **E**, and 21 **D** (+auto step 0 through 3) for up levels (two lines should be active at each step). Single step for this check.
7. Remove the jumper.
8. Reinstall the safety shield using the four screws.

**DANGER**

Parts of the driver board become hot after continuous use.

---

---

---

---

---

**TEST POINTS**

**Read/Write Control Lines**

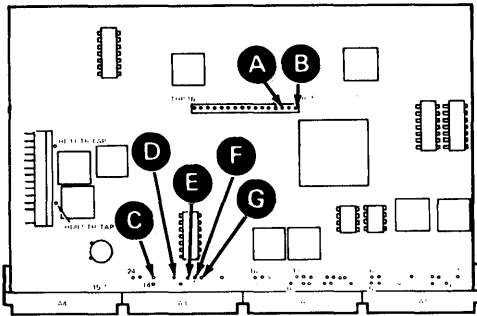
**Test Points**

Auto Step 0	TPB-18
Auto Step 1	TPB-19
Auto Step 2	TPB-20
Auto Step 3	TPB-21

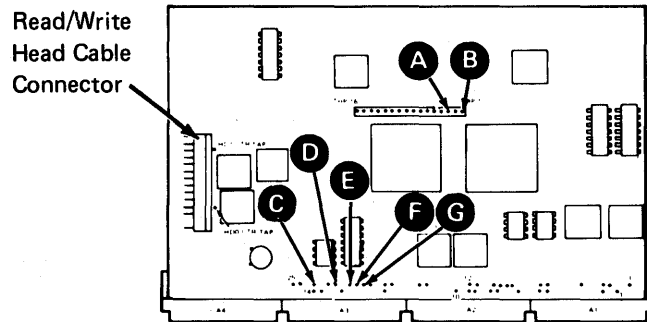
**Condition of Stepper Motor Phases at:**

Cyl 40	Cyl 41	Cyl 42	Cyl 43	Cyl 44
Up	Down	Down	Up	Up
Up	Up	Down	Down	Up
Down	Up	Up	Down	Down
Down	Down	Up	Up	Down

Up level = 5 Vdc  
Down level = Ground



*Note:* See paragraph 27-820 for control card test pins for the new style picker.



*Note:* See paragraph 27-820 for control card test pins for the old style picker.

## 27-900 DISKETTE QUALITY AND HEAD WEAR SERVICE CHECK

### CAUTION

The diskette quality and head wear service check must be performed with the diskette drive in the same position as when installed or the results might not be accurate.

---

---

---

A new head will write and read correctly on most diskettes. As the head wears, the quality of the diskette becomes more important. The tests described in this paragraph will aid in determining the quality of the diskette and the condition of the head.

**Note:** Some of the failures indicated by these tests cannot always be repeated.

Inspect the diskette failure descriptions, print the ERAP error history table, and run the following tests as necessary to verify the errors indicated by the ERAP.

### 27-910 Diskette Failure Descriptions

- A bump, scratch, crease, or fingerprint causes errors on the same sectors, usually across tracks that are next to each other.
- Too large of a center hole causes errors on sectors that are on opposite sides of the center hole. (Example: sectors hexadecimal 01 and 0E or sectors hexadecimal 06 and 13.)
- Material from the diskette jacket cause random errors.
- A diskette written by a worn 33FD head causes random read errors on cylinders hexadecimal 2B through 4C when read by a 72MD.
- A worn 53FD or 72MD head causes read errors on the inner tracks area of the diskette (cylinders hexadecimal 40 through 4C) when using MFM mode. If there are failures in this area, suspect a worn head. TUs E1, 9A, and 9B may be run to indicate the quality of the head in your system.

## 27-920 Diskette Test Descriptions

Diskette analysis—This routine reads the complete diskette (written in any IBM format) and causes a printout, which identifies the locations (logical cylinder, head, and sector) of any failures. Each sector is read only once (without trying again). To run this routine:

1. Perform a CS IPL from the DIAGB1 diskette.
2. Select the UTILITIES option on the main menu.
3. Select the EC UPDATE Copy option.

The following three tests are diskette TUs and are selected after taking the TU SELECT option on the main menu. (For easier use, set the Address/Data switches to F800 (CE panel) and perform an IPL before running the TUs.)

### CAUTION

The following three TUs write on the diskette.

---

---

TU E1—This TU runs only on a diskette 2D. This TU writes on each sector of the diskette and then reads each sector of the diskette. The 'switch filter' line is off (not normal) when cylinders hexadecimal 3D through 4C are read. A printout identifies the location (physical cylinder, head, sector, byte, and bit) of any failures. because of the pattern written by this TU and because the 'switch filter' line is off while reading the inner cylinders, the printout may indicate failures not found by the diskette analysis routine or failures not indicated by ERAP. Four or more data bytes did not compares per track on cylinders hexadecimal 48 through 4C indicates that TU 9A should be run.

**Note:** The location of a failure indicated by this TU may be used when scoping diskette damage using the read loop exerciser.

TU 9A—This TU runs only on a diskette 2D formatted to 256-byte sectors. This TU writes on each sector of the inner cylinders of the diskette with the 'inner tracks' line off (not normal). The same cylinders are then read with the 'inner tracks' and 'switch filter' lines off (not normal). A printout identifies the location (cylinder, head, and sector) of any failures. Because of the pattern written by this TU and because the 'inner tracks' and 'switch filter' lines were not used normally, the printout may indicate many errors on cylinders hexadecimal 49 through 4C. If the following two conditions are indicated, the head is probably worn:

- Fourteen or more sectors on cylinders hexadecimal 4B and 4C have failures.
- There are four or more failures per track on any cylinder hexadecimal 40 through 48.

For more information, check the head resolution (see paragraph 27-950).

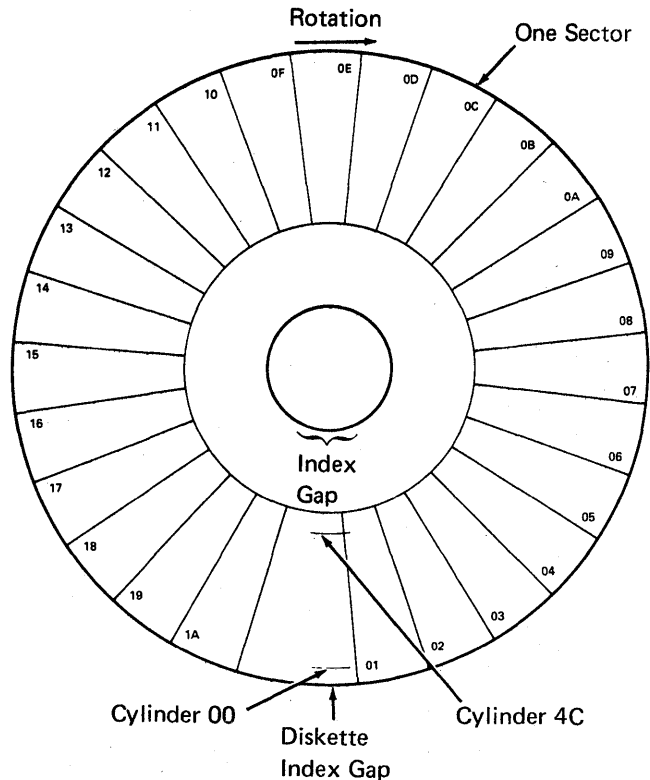
**Note:** Because of the difference in diskette quality, some diskettes may fail on this TU and some may not. It is typical for the failures to occur as early as 10 tracks earlier on a diskette with acceptable quality than on diskettes with the best quality.

TU 9B—This TU runs only on a diskette 2D. This TU writes on each sector of cylinder 4C with the 'inner tracks' line off (not normal) and then writes a different pattern on the same cylinder with the 'inner tracks' line on (normal). This cylinder is then read with the 'inner tracks' and 'switch filter' lines on (normal) to test the ability of the head to write over old data. Four or more failures indicates that the head is probably worn. This test should be run on more than one diskette. For more information, check the head resolution (see paragraph 27-950).

## 27-930 Diskette Figure

To look for visible damage, align the index hole in the diskette with the hole in the diskette jacket, then use the following figure of the diskette shown to locate the damaged area of the diskette.

**Note:** For a normal size figure of the diskette, see Appendix A of the 5340 System Unit Theory Diagrams Manual.



### Notes:

1. The cylinder labels are hexadecimal 00 through 4C.
2. The sector labels are hexadecimal 01 through 1A as shown or hexadecimal 01 through 08.
3. The diskette is shown above as seen from the label side of diskette jacket, which is also the head 1 side of the diskette.

**27-940 Diskette Quality Service Check**

After determining the failing area of a diskette from the ERAP and diskette analysis printouts, the following exercisers may be run:

- Read sector exerciser—This exerciser attempts to read the sector up to 10 times and, if an error is sensed, does up to 20 read verifies to identify any failing byte. You may use this exerciser to locate the failing byte if TU E1 does not fail.
- Read loop exerciser—This exerciser permits you to synchronize on any byte in a sector to scope a failing area of a diskette.

The following two examples of scoping damaged diskettes show the loss of amplitude at the read circuit preamplifier. These are examples of damage such as scratches or bumps. The loss of amplitude on a diskette with a very small scratch will not be as visible.

Example 1: The TU-E1 printout indicates that data did not compare on cylinder 24, head 1, sector 11, byte 93.

To scope this failure do the following:

1. Set up an oscilloscope as follows:

Note: Use a Tektronix 453, 454, or a similar oscilloscope with X10 probes.

Channel A sweep mode	Normal
Channel A level	+
Channel A coupling	DC
Channel A slope	+
Channel A source	External
Trigger	Normal
Mode	Add
Channel 1 volts/division <sup>1</sup>	5 mV/cm
Channel 2 volts/division <sup>1</sup>	5 mV/cm
Channel 1 input	AC
Channel 2 input	AC
Invert	Pull out
Times per division	50 $\mu$ s/cm
Channel 1 probe <sup>2</sup>	THP-14 (preamp TP1)
Channel 2 probe <sup>2</sup>	THP-15 (preamp TP2)
Connect trigger to <sup>3</sup>	A-A1xxU02 (+MS address compare)

<sup>1</sup>The volts/division setting may have to be changed as the signal output is different between the inner and outer cylinders.  
<sup>2</sup>See paragraph 27-820 for control card test pins.  
<sup>3</sup>xx = Q2 on level 1 boards  
 xx = L2 on level 2 boards  
 See paragraph 15-110.



2. Set the Address/Data switches to F800 (CE panel) and perform an IPL.
3. Select the EXERCISERS option from the main menu.
4. Select the DISKETTE DRIVE option from the first exerciser menu.
5. Select the DISKETTE EXERCISER LOAD MODULE option from the second exerciser menu.
6. Select an orient carriage, select diskette from slot 3, recalibrate, and for this example, a seek to cylinder 24 from the diskette exerciser test 1 command menu (enter an E after selecting the cylinder number).
7. Use the default option to execute the commands.
8. Press the Attn key (three times) to return to the diskette exerciser test 1 command menu.
9. Select the READ LOOP command and, for this example, select MFM mode, cylinder 24, head 1, sector length = 256, sector 11, and M/S data field 1 from the displays (enter an E after selecting the sector number).
10. Select the LOOP ON CMND TABLE option and, for this example, set the Address/Data switches (CE panel) to 0093 to display byte 93.

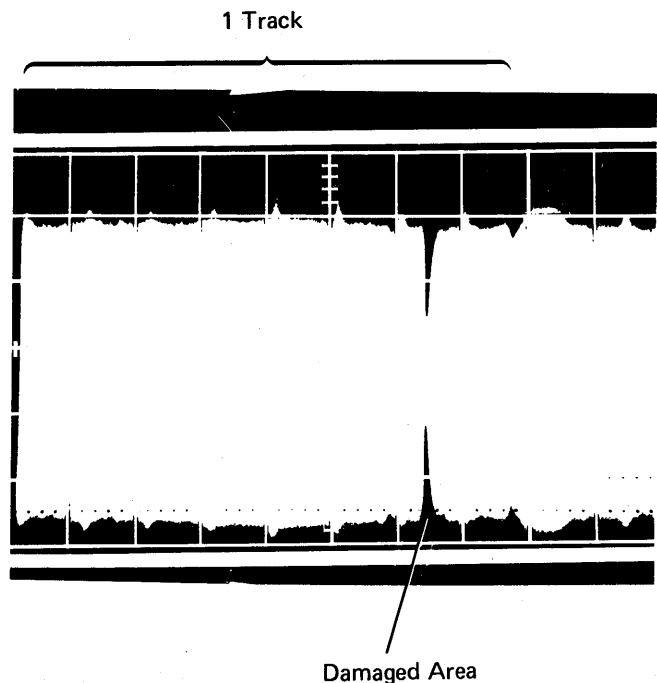
The loss of amplitude can be seen on the oscilloscope.



Example 2: To scope a damaged track, the following changes must be made to the preceding procedure:

1. Set the Times Per Division on the oscilloscope to 10 ms/cm.
2. Connect the trigger to the +index test pin (TPB-14 for machines with the old style picker, TPB-16 for machines with the new style picker).
3. In step 6 of example 1, seek to the damaged cylinder.
4. In step 9 of example 1, select the READ 1 SECTOR ON CURRENT CYL command (select the mode, head, sector length, sector number, M/S data field, and cylinder number that you want to scope).
5. In step 10 of example 1, select the SCOPE LOOP A CMND option.

The following oscilloscope screen image shows the damaged area of the diskette.



**27-950 Head Wear Service Check**

Head wear is determined by the head resolution and the errors indicated on the inner tracks area of a diskette (cylinders hexadecimal 40 through 4C).

Head resolution is the ratio of the signal amplitude of hexadecimal FF in centimeters to the signal amplitude of hexadecimal AA in centimeters multiplied by 100.

If the head resolution of both heads is more than 50, the heads are good. If the head resolution of either head is less than 40, that head is bad and the assembly should be exchanged. When the resolution is between 40 and 50, use the ERAP data and the TU printouts to determine if the head is bad.

The head is bad, if the ERAP data and the TU printouts indicate data errors on cylinders hexadecimal 40 through 4C on diskette 2D and the head resolution is less than 50.

Example: Perform the following to scope head resolution:

1. Initialize a diskette 2D:
  - a. Perform an IPL under SSP.
  - b. Sign on the system (if the system has the password security function specified in the machine configuration, you will need aid from the customer to sign on).
  - c. Initialize a diskette 2D with the following command:

INIT<sup>1</sup>,,FORMAT

2. Set up an oscilloscope as follows:

Note: Use a Tektronix 453, 454, or a similar oscilloscope with X10 probes.

Channel A sweep mode	Normal
Channel A level	+
Channel A coupling	DC
Channel A slope	+
Channel A source	External
Trigger Mode	Normal
Channel 1 volts/division	5 mV/cm
Channel 2 volts/division	5 mV/cm
Channel 1 input	AC
Channel 2 input	AC
Invert	Pull out
Times per division	10 $\mu$ s/cm
Channel 1 probe <sup>1</sup>	THP-14 (preamp TP1)
Channel 2 probe <sup>1</sup>	THP-15 (preamp TP2)
Connect trigger to <sup>2</sup>	A-A1xxU02 (+MS address compare)
<sup>1</sup> See paragraph 27-820 for control card test pins. <sup>2</sup> xx = Q2 on level 1 boards xx = L2 on level 2 boards See paragraph 15-110.	

3. Move the data heads to track hexadecimal 4C and determine head resolution as follows:

- a. Set the Address/Data switches to F800 (CE panel) and perform an IPL.
- b. Select the EXERCISERS option from the main menu.
- c. Select the DISKETTE DRIVE option from the first exerciser menu.
- d. Select the DISKETTE EXERCISER LOAD MODULE option from the second exerciser menu.
- e. Select ORIENT CARRIAGE, SELECT DISKETTE FROM SLOT 3, RECALIBRATE, SEEK to track 4C, and WRITE 1 SECTOR ON CURRENT CYL (select MFM mode, the head you want to scope, the sector length, the sector number, and M/S data field 1 from the displays). Enter an E after selecting M/S data field 1.
- f. Select Y to see the command data field option.
- g. Select the scroll fields option.
- h. Change the first 8 bytes of M/S data field 1 from:

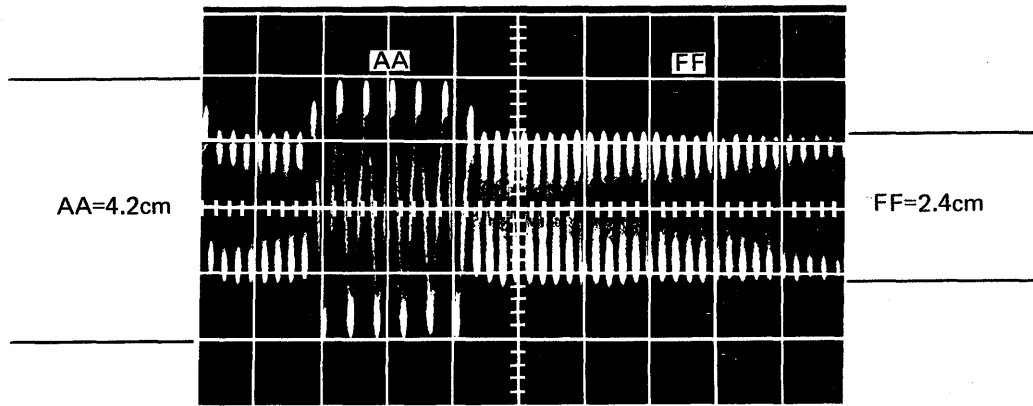
FF FF FF FF FF FF FF FF  
to:

AA AA AA FF FF AA AA AA  
and the @@@@S on line 11 to:  
@@@@M

- i. Press the Attn key to return to the menu.

j. Select an E to exit.

- k. Use the default option to execute the commands.
- l. Press the Attn key (three times) to return to the diskette exerciser test 1 command menu.
- m. Select the READ LOOP command (select MFM mode, cylinder 4C, the head you want to scope, the sector length, the sector number, and M/S data field 1 from the displays). Enter an E after selecting the cylinder number.
- n. Select the LOOP ON CMND TABLE option, set the Address/Data switches to 0005 (CE panel), and measure the amplitude of the hexadecimal FF and AA.



$$\text{Head Resolution} = \frac{2.4}{4.2} \times 100 = 57$$

