5.1 REQUIRED TOOLS

3M Products recommends the following tools as potential additions to those on hand at a repair facility. These items outfit the facility for the maintenance and repair of 3M Max Secure Printer Modules:

TOOL KIT	
Item No.	**Description**
1	25 inch-pound Torque Screwdriver
2	15 inch-pound Torque Screwdriver
3	9 inch-pound Torque Screwdriver
4	5.5 inch-pound Torque Screwdriver
5	4 inch-pound Torque Screwdriver
6	2.5 inch-pound Torque Screwdriver
7	3mm Hex Bit—1/4-inch Drive
8	1.5mm Allen Bit—1/4-inch Drive
9	13mm Socket
10	5mm Socket
11	5.5-Millimeter Open End Wrench
12	Number 1 Phillips Bit
13	Number 2 Phillips Bit
14	Number 2 Slot Bit Screwdriver
15	Snap Ring Pliers
16	13mm E-Ring Tool
17	8.5mm E-Ring Tool
18	Wire Cutters (Small)
19	Spring Hook
20	Shim Gage, 0.030-inch (Eltron 900223-001)
21	Shim Gage, 0.010-inch (Eltron 900222-001)
22	Clutch Torque Fixture—FX540
23	Clutch Gage (Eltron C413)
24	Shim Fixture (Eltron 900400-203
15	Shim Gage (Eltron 900400-201)
26	Shim Gage (Eltron 900412-001)
27	Pulley Press Fixture (Eltron 900103-002)
28	Spacing Gage, Gear (Eltron 900224-001)
29	Stepper Belt Tensioning Fixture (Eltron 900116-001)
30	Left Front Belt Tensioning Fixture (Eltron C601)
31	Right Front Belt Tensioning Fixture (Eltron C599)

5.2 PART REPLACEMENTS

The following sections describe the requirements for removing both major assemblies and, where applicable, components on those assemblies that appear in the list of spares. Only removal descriptions appear. Unless noted otherwise, replacements can take place by reversing the steps required for removals. Also, replacements for some items in the spares list do not appear. These items are considered too easily identifiable to warrant descriptions.

5.2.1 Case Removal

Figure 5-1 shows the fasteners holding the case members. Four case parts exist—the hinged front panel, two side panels, and the back panel, which includes the top and hinged front cover. Note that the four fasteners holding the back panel only require loosening. Service personnel can then separate this case member by lifting it straight up. Most of the procedures that follow require the removal of one or more case members.

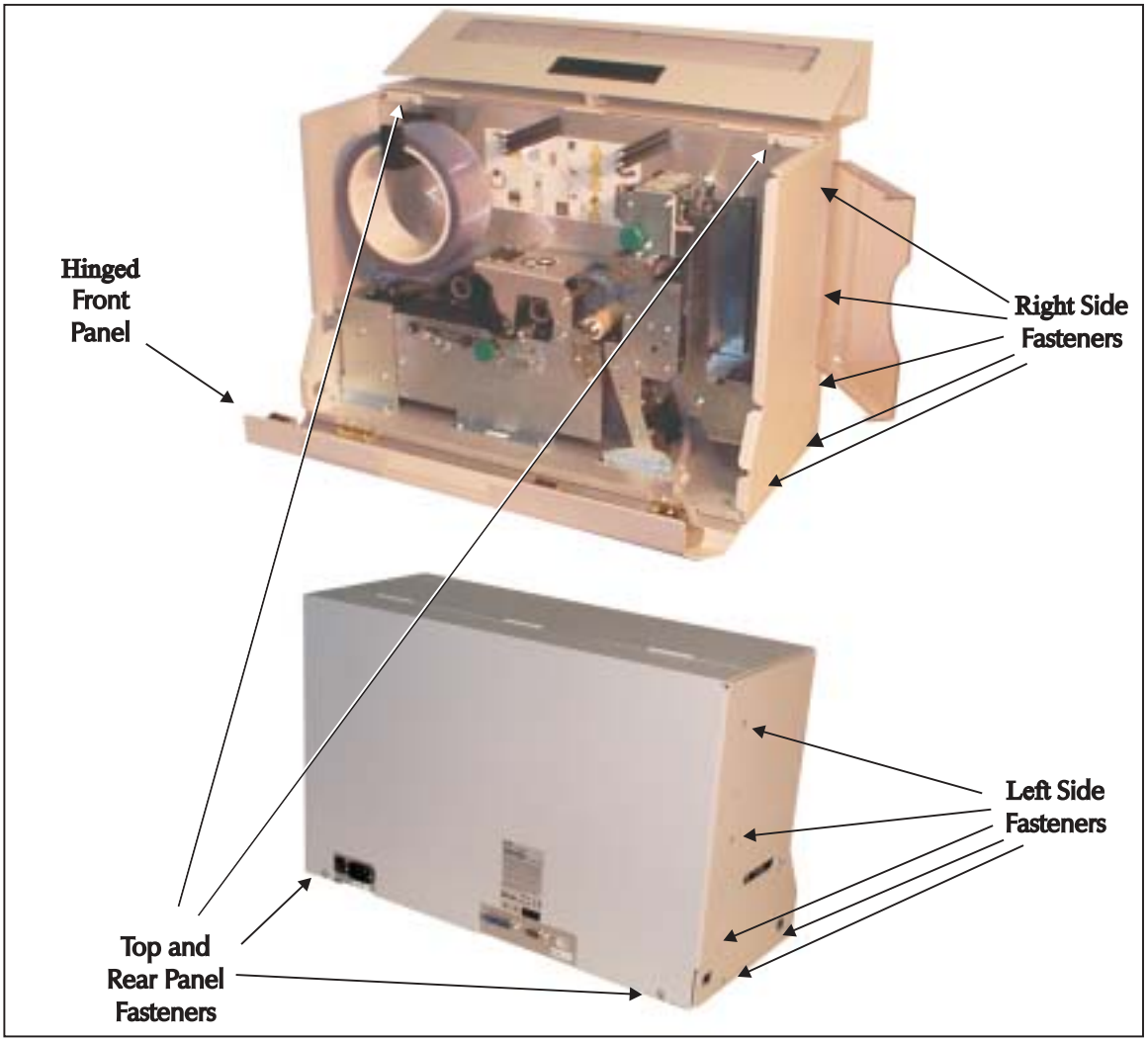


Figure 5-1. Case Fasteners.

5.2.2 White Card Feeder Station Removal

Refer to Figure 5-2, and proceed as follows

Step 1. Swing down the Front Panel and remove the, Rear, and Right Side Panels (see Section 5.2.1).

Step 2. To replace the complete unit, unplug J3, J5 and the upper part of J17 on the Extension Board, and cut all related cable ties leading to the White Card Feeder Station.

Step 3. Remove the four screws holding the unit to the Rear Plate.

Step 4, To replace the unit, separate the unit from the Printer Module while feeding the cables through the rear plate access cutout. To replace the timing belt or related dc motor, position the unit on one side while taking care to avoid stressing the cable wires. Then continue with the following section.

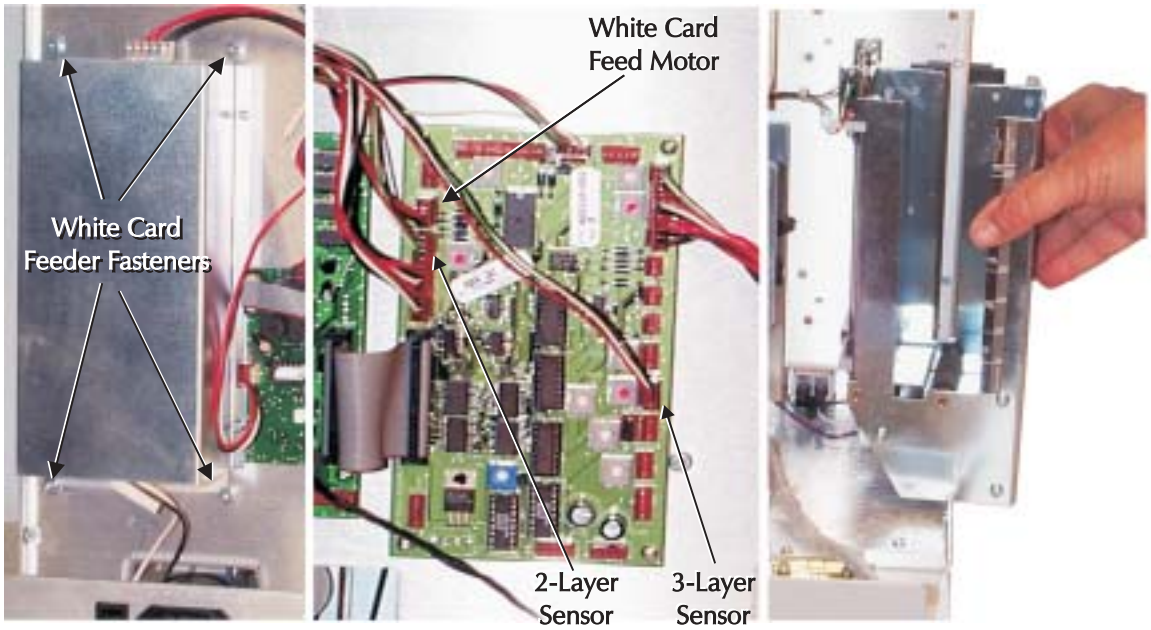


Figure 5-2. White Card Feed Station Removal.

5.2.3 White Card Feeder Station Replacements

Figure 5-3 shows the White Card Feeder Station. The timing belt, associated drive motor, and rollers are considered replaceable. After replacing the timing belt, adjust belt tension as follows:

Step 1. Loosen the two screws holding the Idler Pulley bracket.

Step 2. Swing the Idler Pulley against the timing belt to remove slack in the belt. Only remove belt slack. Do not stretch the belt.

Step 3. While holding the bracket in the position established in step 2, tighten the two screws.

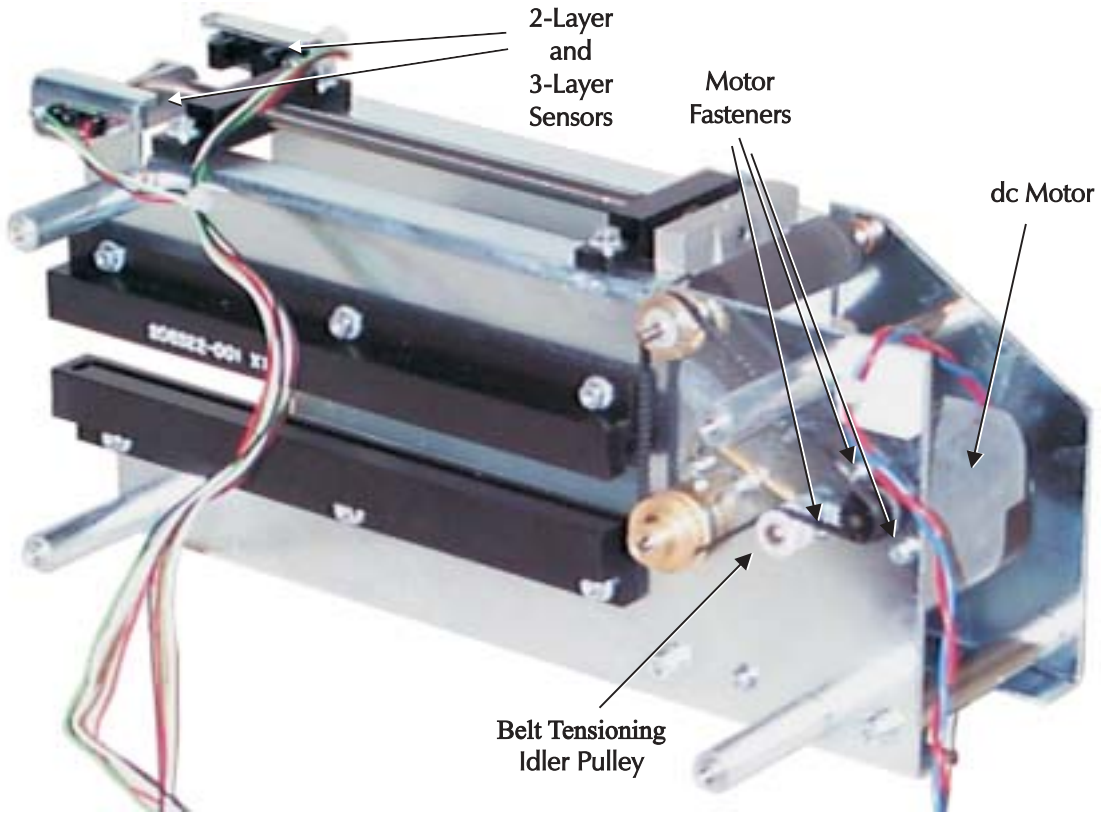


Figure 5-3. White Card Feeder Components.

5.2.4 Upper Clear Card Station Removal

Figure 5-4 shows the fasteners holding the Upper Clear Card Station, the connections on the Expansion board, and the timing belt that extends card drive to the lower unit. To remove the unit, proceed as follows:

Step 1. Remove the rear and right side case parts (see Section 5.3.1) and the Card Feeder Assembly (see Section 5.2.2).

Step 2. Unplug the Shear, Stepper, and Clear Material Sensor connectors. Cut associated cable ties.

Step 3. Remove the timing belt that couples rollers in the Upper and Lower Clear Card Stations and the two fasteners holding the Upper Clear Card Station. The idler pulley can fall off, so take care not to loose it.

Step 4. While feeding the cables through the access cut outs in the rear plate, remove the Upper Clear Card Station.

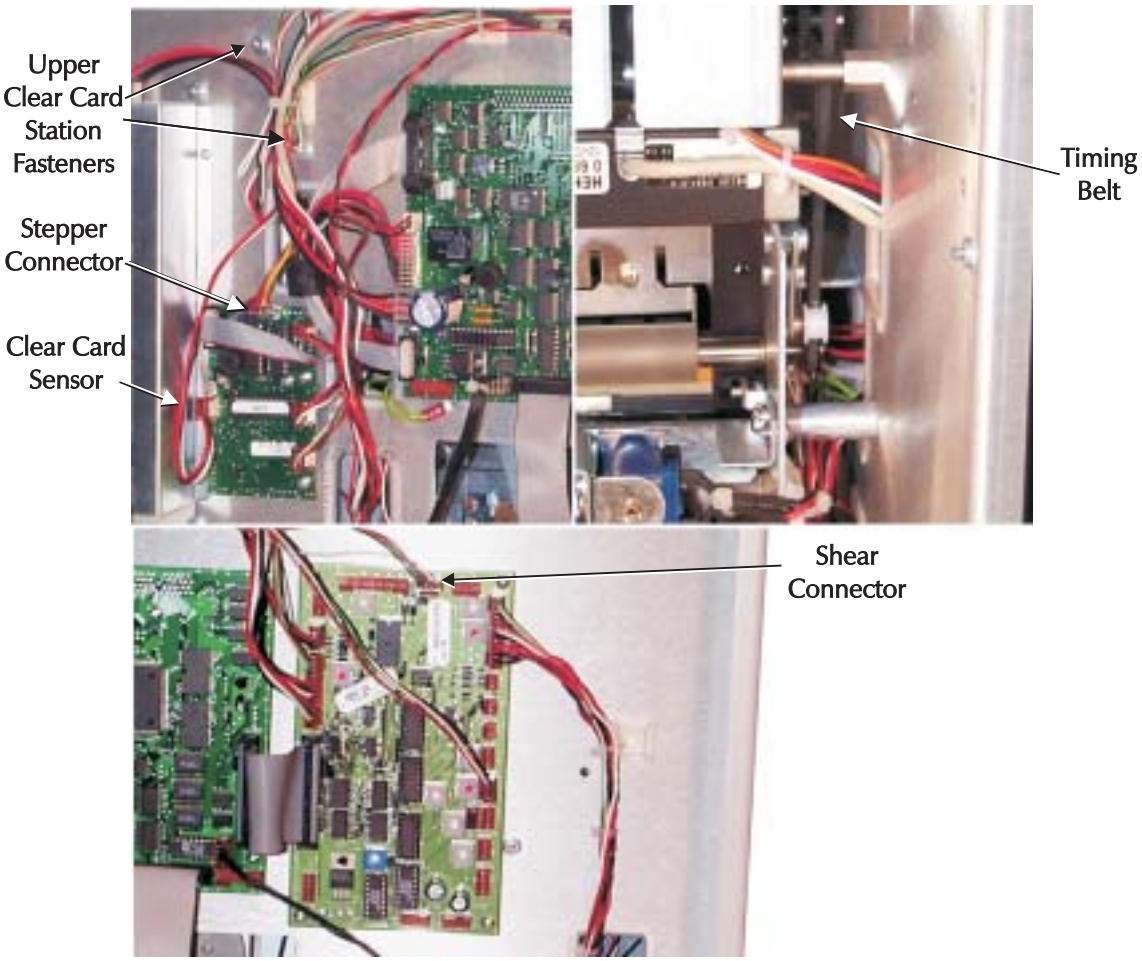


Figure 5-4. Upper Clear Card Station Removal.

5.2.5 Upper Clear Card Station Component Replacements

The Upper Clear Card Station includes a stepper motor, a related timing belt (that extends card drive to the lower unit), a Clear Material sensor, and the Clear Card Shear. Service personnel can replace any of these components and the Card Feed roller. The Clear Card Shear has a useful life in excess of 100,000 cuts. Figure 5-5 shows the fasteners for these components.

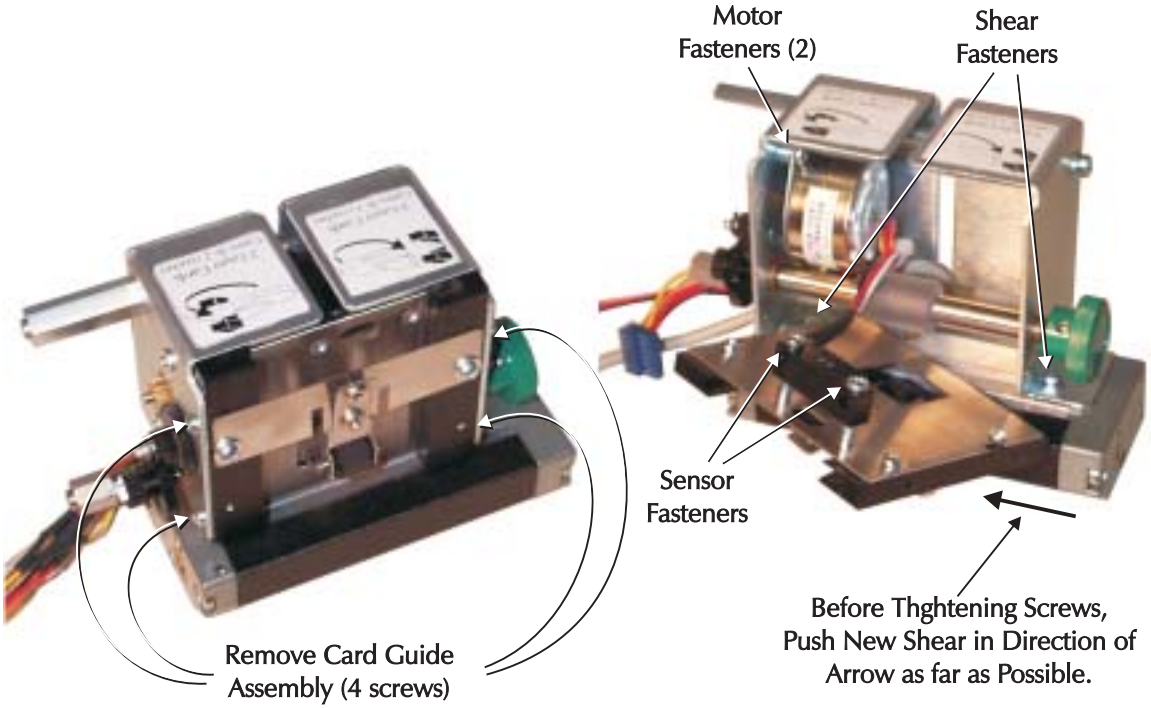


Figure 5-5. Upper Clear Card Station Replaceable Components.

5.2.6 Lower Clear Card Station Removal

Refer to Figure 5-6, and proceed as follows:

Step 1. Remove the Upper Clear Card Station (see Section 5.2.4).

Step 2. Remove White Card Feeder Station sufficiently to gain clearance from the Lower Clear Card Station (see Section 5.2.2).

Step 3. Remove connectors on the Clear Card Controller board that connect to the Lower Clear Card Station and J17 on the CPU Extension board (see Figure 5-26).

Step 4. Remove the fasteners holding the Clear Card Controller board, and swing the board away from the underlying Lower Clear Card Station fasteners.

Step 5. Remove the fasteners holding the Lower Clear Card Station, both front and back. Then, while feeding the cables through the cutouts in the Rear Plate, lift the unit away from the Printer module.

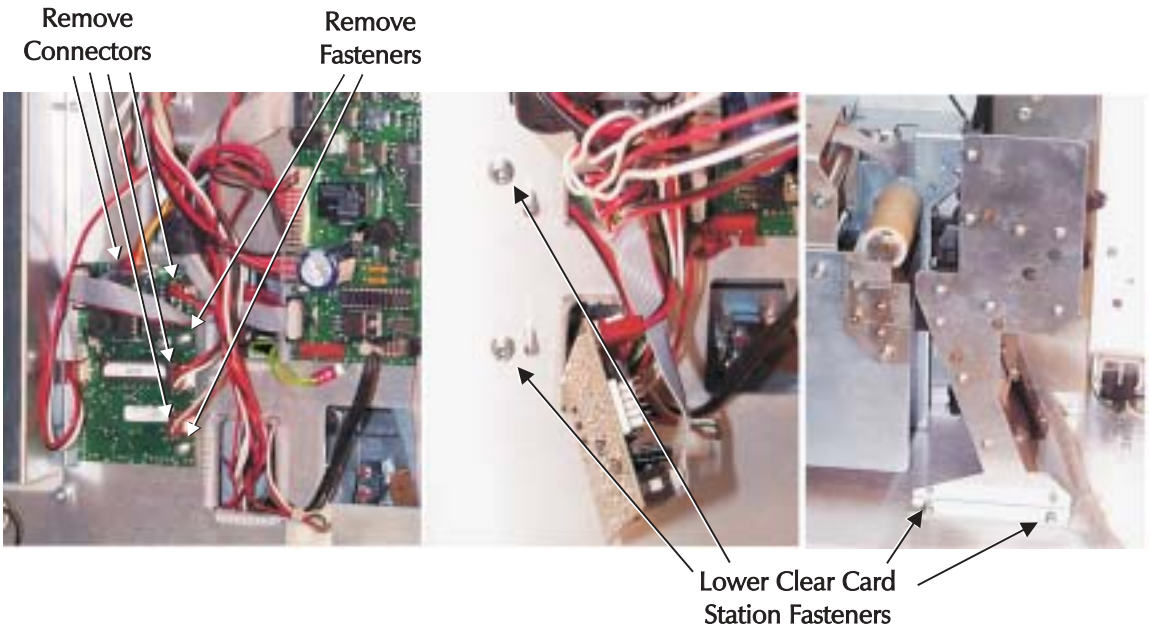


Figure 5-6. Lower Clear Card Station.

5.2.7 Lower Clear Card Station Components

Figure 5-7 shows the components that comprise the Lower Clear Card Station.

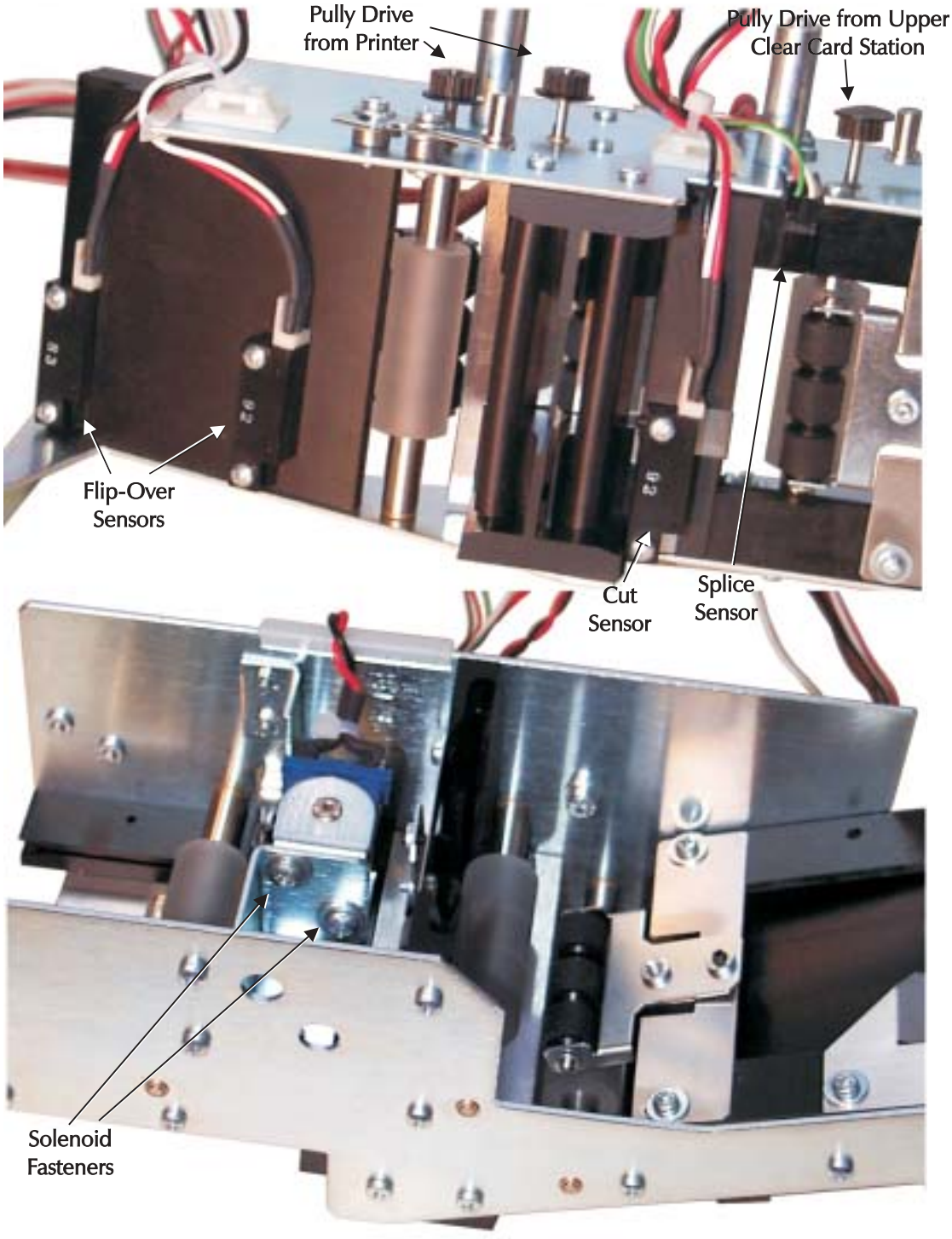


Figure 5-7. Lower Clear Card Station Components.

5.2.8 Card Assembly Station Removal

Refer to Figure 5-8, and proceed as follows:

Step 1. Remove the rear and left side case members (see Section 5.2.1).

Step 2. Unplug J19 from the Extension board.

Step 3. Cut the ties holding the J19 cable to the chassis.

Step 4. Remove the four fasteners holding the Card Assembly Station.

Step 5. Feed the Card Assembly Station cables through the hole in the rear plate, and remove the station. Either replace the entire station or continue with the following.

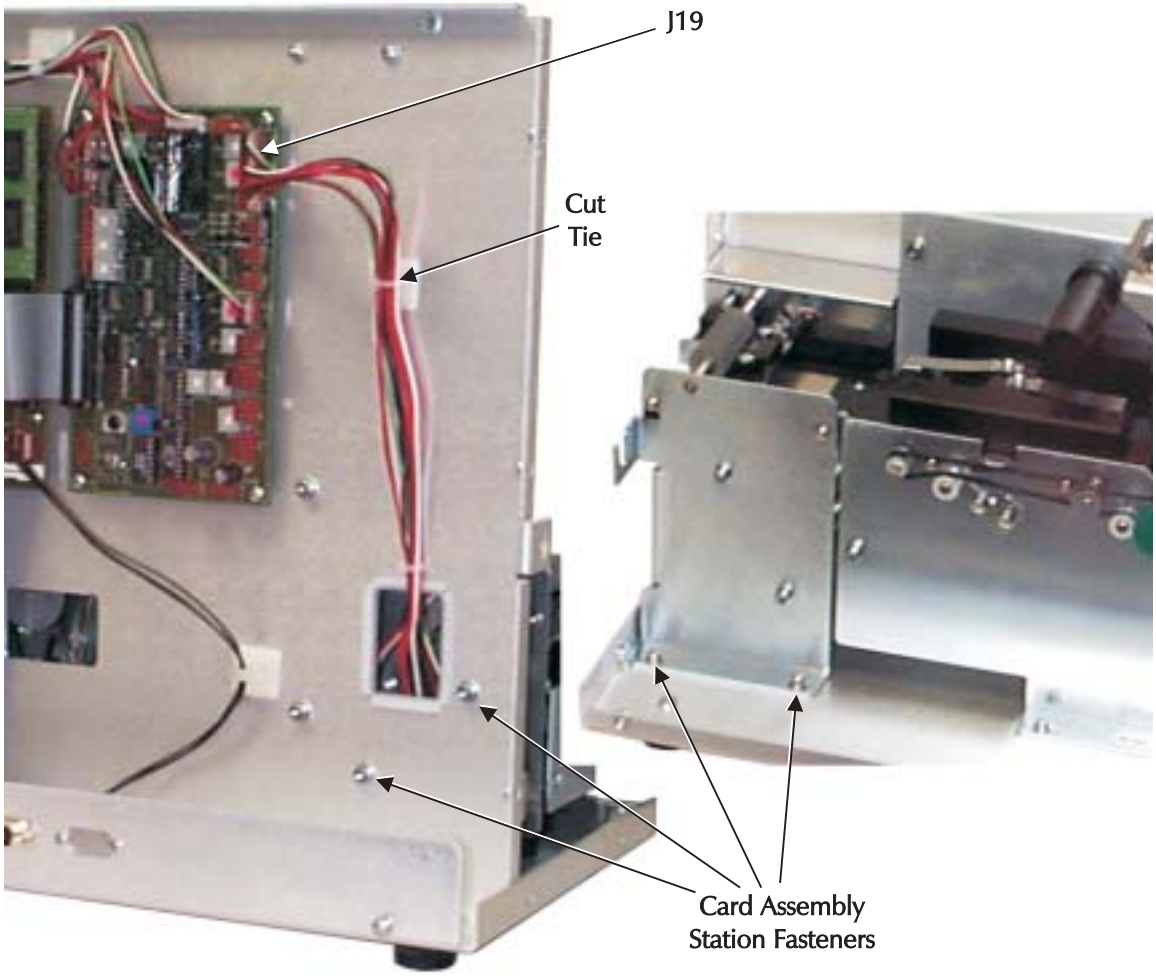


Figure 5-8. Card Assembly Station Removal.

5.2.9 Card Assembly Station Component Replacements

Six components on the Card Assembly Station are considered replaceable—two sensors, a dc motor, a timing belt, a solenoid, and the Card Feed roller. Figure 5-9 shows these components.

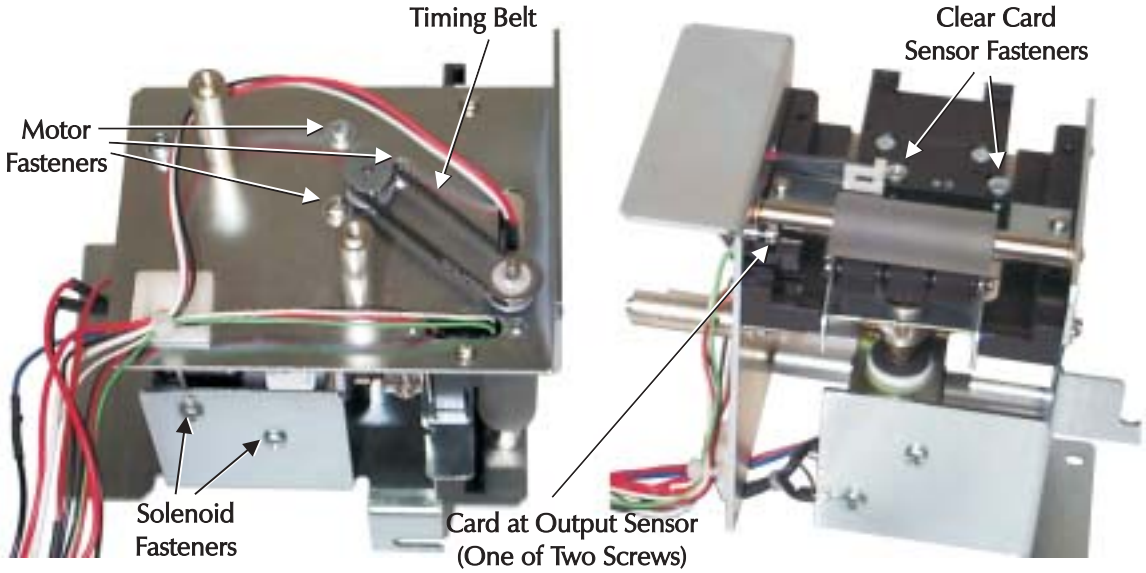


Figure 5-9. Card Assembly Station Components.

5.2.10 Print Head Replacement

Replacement Print Heads arrive in ESD-safe plastic bags. Upon removal, servicing personnel should exercise extreme care to protect the Print Head from both ESD and mechanical damage to the delicate Internal circuitry and Print Head elements. An area specifically equipped for work on ESD-sensitive devices is strongly advised.

Step 1. As shown in Figure 5-10, loosen the four Torx Head screws on top of the Print Head assembly.

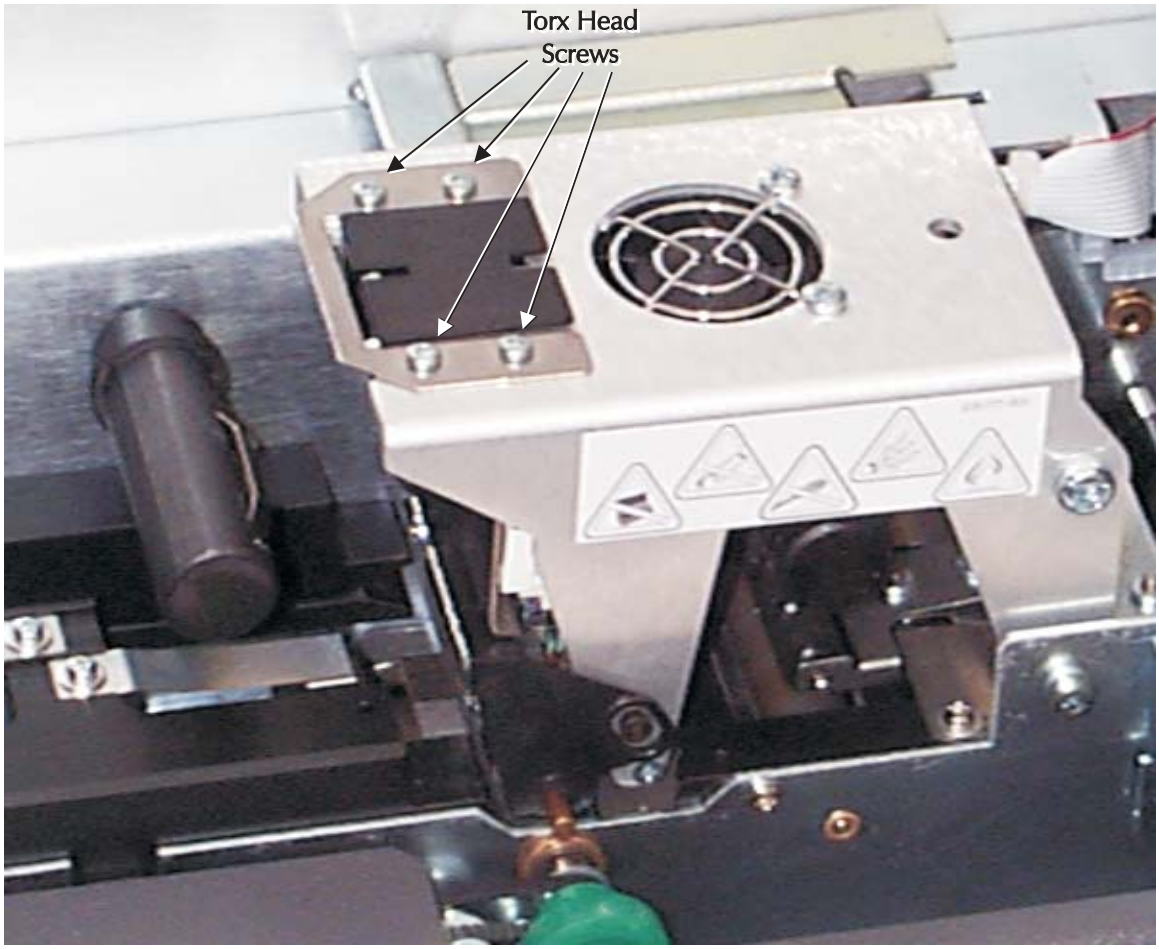


Figure 5-10. Print Head Upper Fastener Removal.

Step 2. As shown in Figure 5-11, loosen the screw holding the grounding lug, and pull the ground lug free.

Figure 5-11. Print Head Assembly Fasteners.

Step 3. As shown in Figure 5-12, unhook the ring holding the lower part of the Print Head assembly, and slide the unit away from its mounting. Note that this step may require some loosening of attached cables.

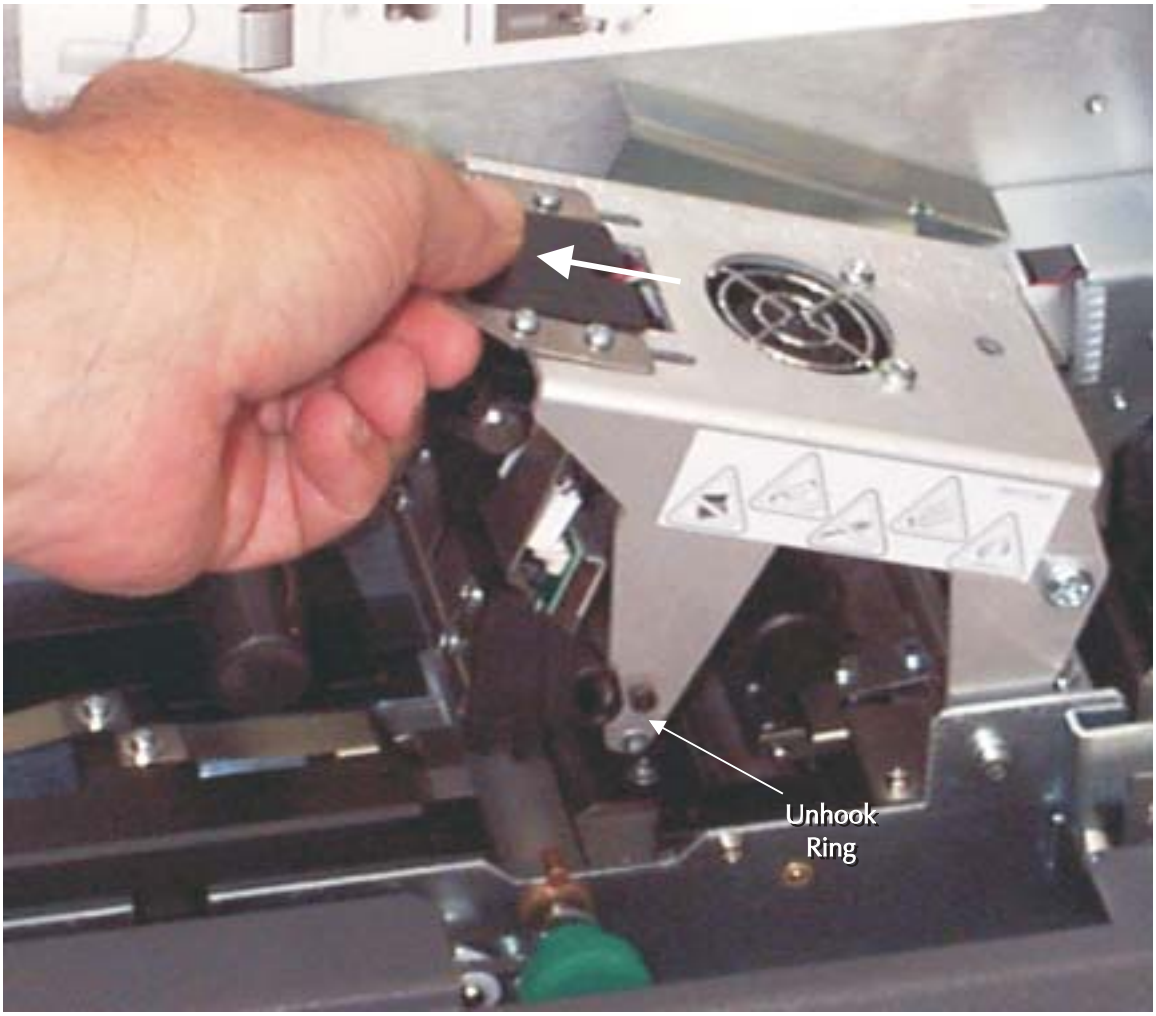


Figure 5-12. Print Head Assembly Parts.

Step 4. Disconnect the two cable connectors from the Print Head assembly shown in Figure 5-13. Note that until pushed away, a spring tab prevents removal of the far connector. The near connector locks to a connector extension, which releases with a slight deflection.

Step 5. Note the routing of the ground wire through the Print Head cutout. Free the ground wire, and separate the Print head from the Printer Module.

Figure 5-13. Print Head Connectors.

Step 6. Note the R value (resistance) marked on the new Print Head. Then, install the new Print Head by reversing the steps used during removal. Before tightening the Torx Screws, make sure to push the Print Head in as far as possible, as shown in Figure 5-14. DO NOT adjust the screw that stops the Print Head when pushing the unit in. All replacement units ship with this screw set to deliver optimum performance.

First tighten the Torx screw in the corner nearest to the printer front and closest to the fan. Then tighten the screw nearest to the printer back and closest to the fan. Tighten the remaining two screws in any order.

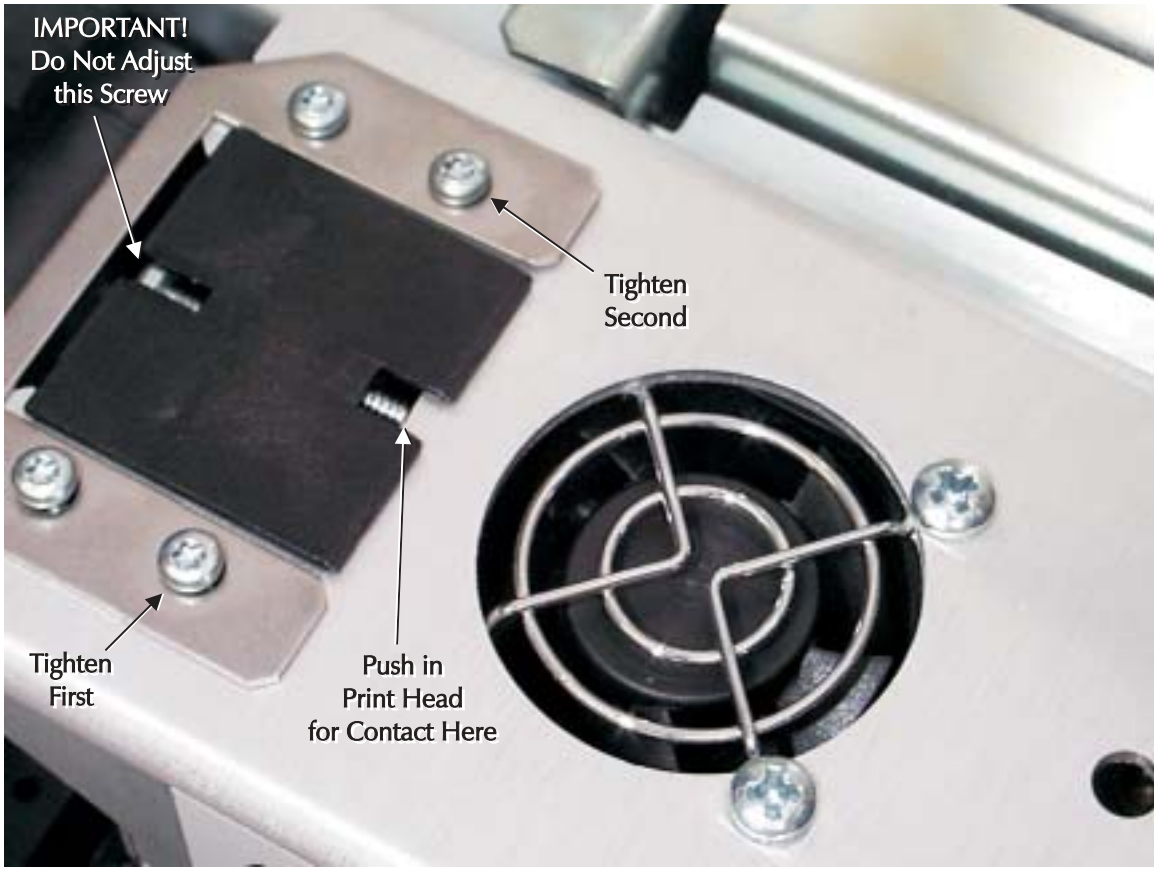


Figure 5-14. Properly positioned Print Head.

Step 7. Enter the new R value noted in Step 6 using the Test Software (see Section 6.3.1).

5.2.11 Fan Replacement

Two self-tapping screws secure both the fan and the associated fan guard. Figure 5-15 shows both the fasteners and the connection to the CPU board. Access to the connector requires removal of the Rear Case.

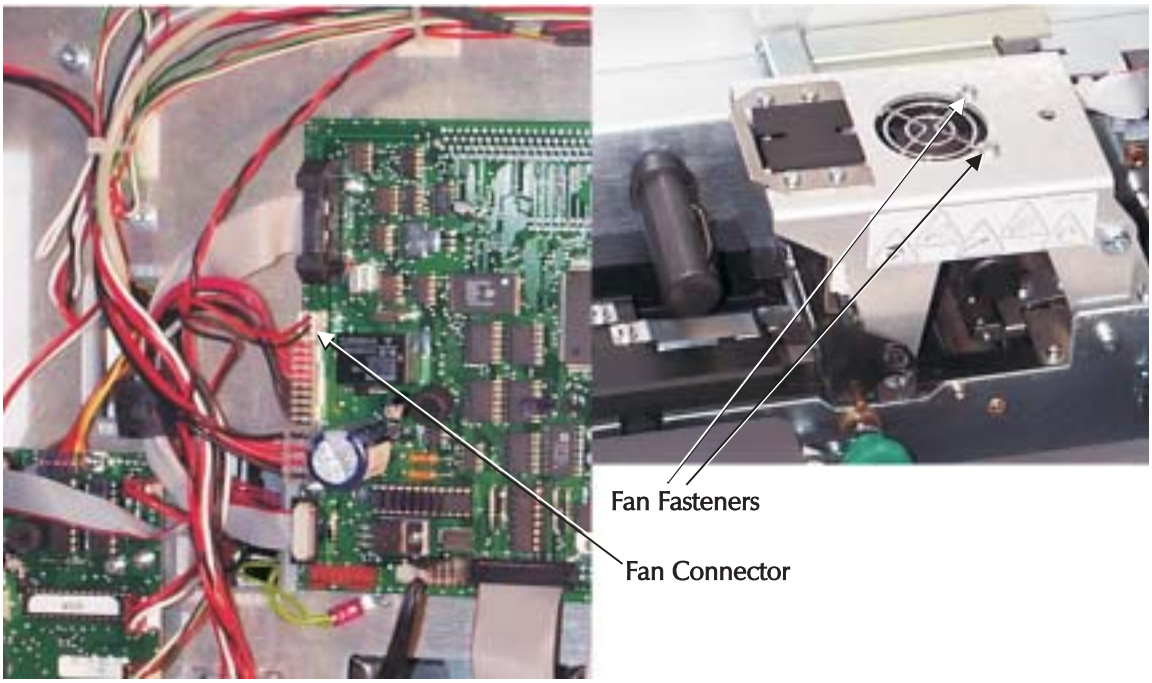


Figure 5-15. Fan Replacement.

5.2.12 Ribbon Sensor Replacement

Figure 5-16 shows the Ribbon Sensor. Although this sensor connects to the Daughter board, which requires Printer Station removal for access, the connecting wires loop through the Rear Plate. This offers a convenient point to splice the wires of a replacement sensor. Splicing then only requires removal of the Rear Case.

Note that the shape of the sensor conforms to the rod positioned behind the Print Head. Also, due to restricted access, take particular care not to damage the Print Head. Either ESD or mechanical impacts with tools can damage delicate Print Head elements.

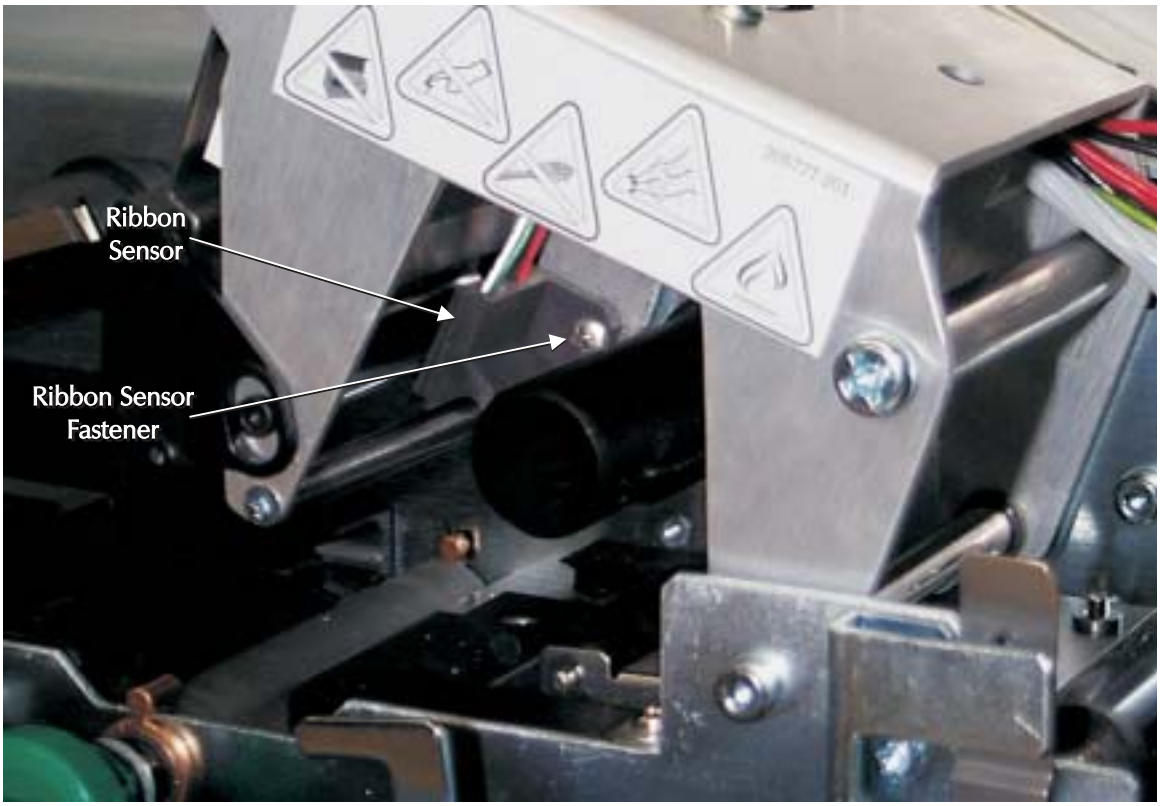


Figure 5-16. Ribbon Sensor.

5.2.13 Cleaning Roller Spring Clip Replacement

Figure 5-17 shows the spring clip that holds the Cleaning Roller in place above the first feed roller of the Printer Station. Proceed as follows:

Step 1. Swing down the Front Panel (see Section 3.2.1).

Step 2. Remove the Cleaning Roller, and unhook the spring that applies a downward force on the combined clip and Cleaning Roller.

Step 3. Remove the two screws that hold the clip. Note that both screws have shoulders that tighten against the chassis while giving the clip a degree of free vertical movement. Servicing personnel must not use any other screw type as a fastener for this clip.

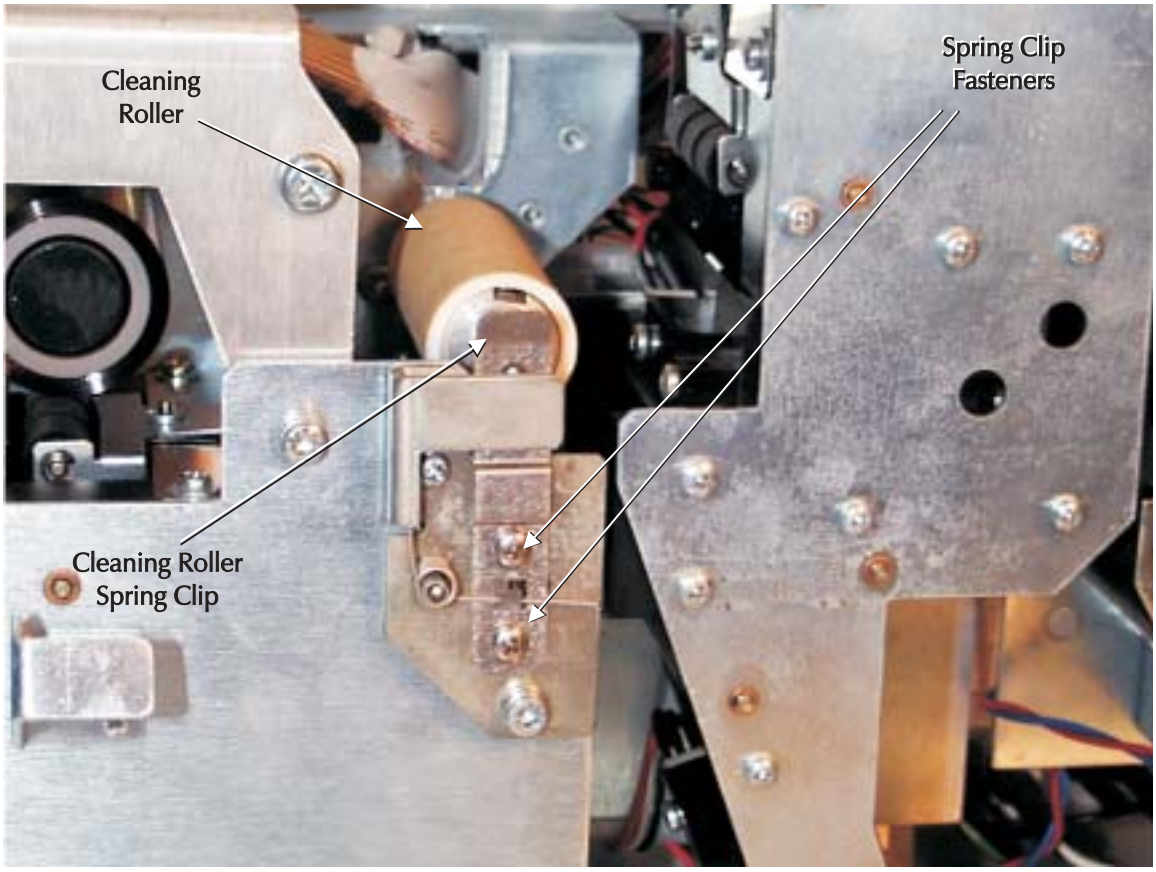


Figure 5-17. Cleaning Roller Spring Clip.

5.2.14 Front Belt Removals

Refer to Figure 5-18, and proceed as follows:

Step 1. Swing down the Front Panel (see Section 5.2.1).

Step 2. Loosen the screws holding both Idler Pulley Brackets.

Step 3. Replace the timing belt(s). Note that the belt on the right requires removal to replace the belt on the left.

Step 4. Take up the belt slack by swinging the Idler Pulley(s) against the associated belt. Then tighten the associated Idler Pulley Bracket screws. Note that with too much belt tension, the Stepper motor stalls. Therefore, make the belts slightly loose rather than too tight. Note that for precise settings, belt tension fixtures are available (see Section 6.3.6).

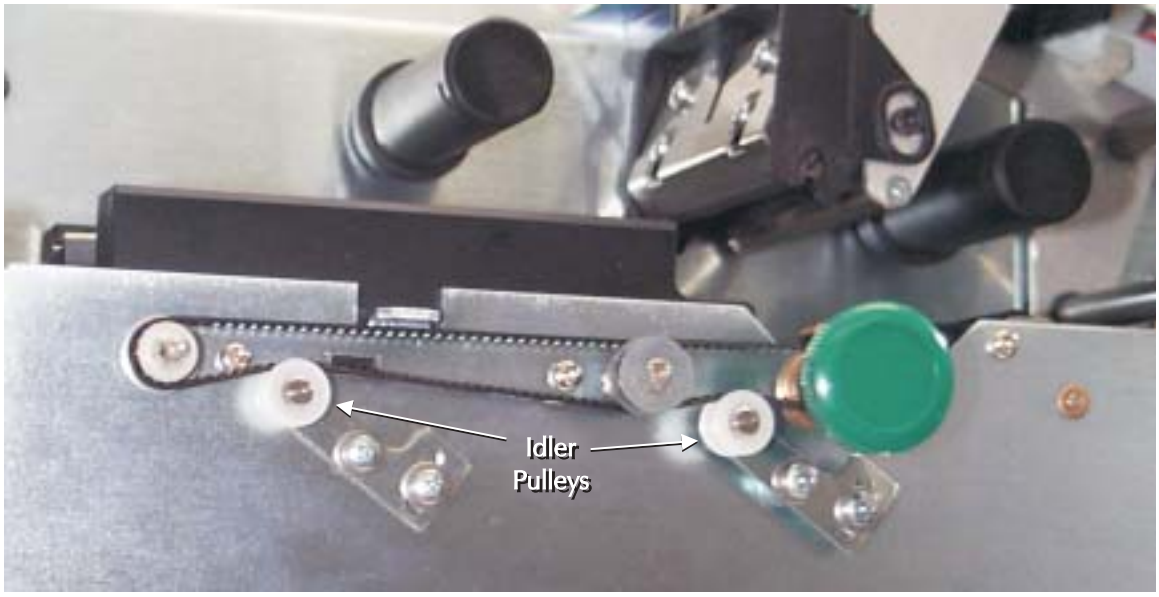


Figure 5-18. Front Belt Removals.

5.2.15 Printer Station Removal

Figure 5-19 shows the cables and fasteners holding the Printer Station. To remove the Printer Station, proceed as follows:

Step 1. Raise the Print Head, and place tape across the Print Head Release lever. If not taped, the lever and its associated spring can fall away from the assembly.

Step 2. Lower the Front Panel (see Section 5.2.1) and remove the Card Assembly Station (see Section 5.2.8). These removals clear the way for Printer Station removal. Note that a Clear Card Station removal also makes this possible. Therefore, the removal of either station can offer the required access.

Step 3. Remove the cables and fasteners holding the Printer Station, but do not as yet attempt to move the station from its mounting position.

Step 4. After loosening the two screws holding the associated Idler pulley bracket, remove the timing belt that extends between the Printer Station and the Clear Card Station. Note that the idler pulley may fall off during disassembly procedures; so take care to prevent its loss.

Step 5. While feeding the cables through the cutouts in the rear plate, remove the Printer Station. See Figure 5-24 for cables to the Print Head, Fan, and Daughter Board.

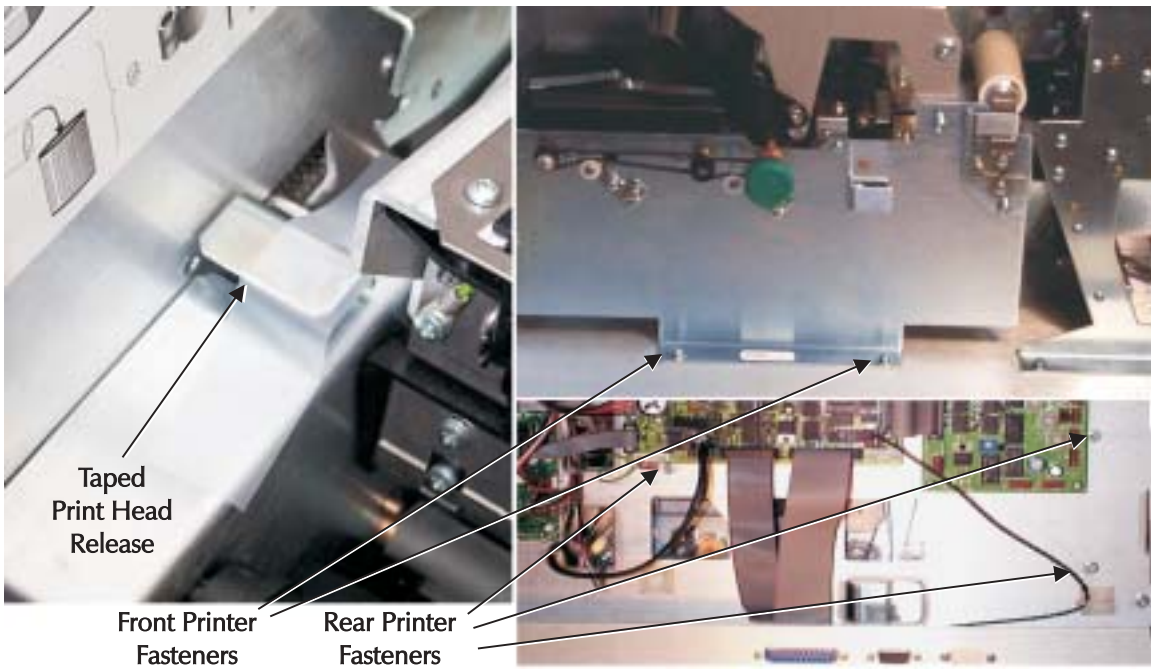


Figure 5-19. Printer Station Removal.

5.2.16 Printer Station Motors and Rear Belts and Sensors

Figure 5-20 shows the Rear Belts, the Flag Sensor, and the Head Up/Head Down switch sensors. Note that the table lists the pulley and cam spacing from the middle plate. Although other replaceable items appear in this figure, this section only deals with the following:

Stepper Motor and Associated Belt

Two screws hold the Stepper Motor in place. Servicing personnel should only secure the motor by tightening the screws with the belt under proper tension. See Section 6.3.5.

Roller Transport Belts

Two belts extend the control of the Stepper Motor to the two rollers that deliver cards to the platen roller. Because of the pulley arrangement, a belt replacement may require the removal of one or more other belts that lie in the way. To access a belt, servicing personnel may need to remove either the large pulley on the platen roller or the screws securing the Stepper Motor. A belt replacement accomplished without disturbing the Stepper Motor avoids the use of the belt tensioning procedure.

Take Up Spindle O-ring

This O-ring delivers dc motor drive to the Ribbon Take-up Spindle. Due to the highly elastic nature of this O-ring, users cannot remove ribbon slack by turning the Take Up Spindle. The O-ring can stretch to the breaking point before advancing the dc motor. Any manually induced rotation short of one that can produce a failure results in a spring back to the original position.

Dc Motors

Dc motors drive the Take Up Spindle and the cam that raises and lowers the Print Head. Three screws secure each dc motor. Replacement also requires removal of either the pulley or the cam, depending on the motor being replaced. Motor wires connect to the Daughter board. Note that for removal, plastic belt pulleys must be broken using diagonal cutters. Secure replacements with Loctite® 420 adhesive.

Switch Sensors

These microswitch sensors signal completion of Head-up and Head-down conditions. The wires to these sensors connect to the Daughter board. Be sure to note where the different colored wires attach before starting a replacement.

Flag Sensor

This sensor delivers pulses that signal the passing of slots in the large brass disk attached to the Supply Spindle. The sensor attaches to a bracket that also serves as a tie down for the spring used to return the Head Release Latch. Access to the single Flag Sensor fastener requires detaching the Head Release Latch by removing the tape that temporally holds it in place. The Flag Sensor wires attach to the Daughter Board.

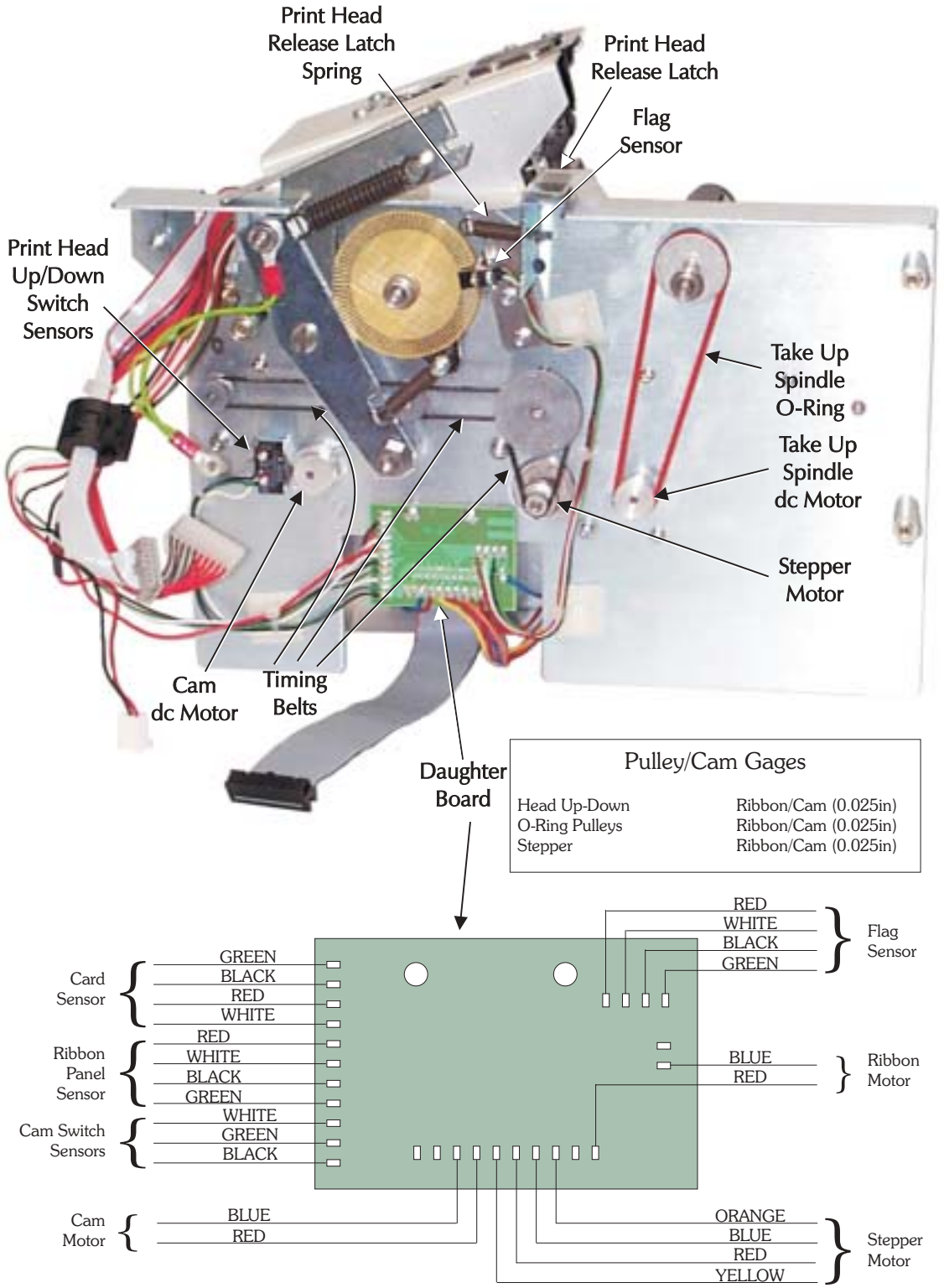


Figure 5-20. Printer Station Rear Parts.

5.2.17 Ribbon Supply Spindle and Clutch Replacements

Figure 5-21 shows the Ribbon Supply Spindle and associated Clutch Assembly. Replacement options include any of the parts that appear in the exploded view.

Step 1. Remove the Printer Station (See Section 5.2.15).

Step 2. Remove the Flag Sensor bracket.

Step 3. Remove the Spring that raises the Print Head Assembly when unlatched, along with the post used as a spring attachment point.

Step 4. Remove the End Cap from the Spindle by deflecting a tab with a small screwdriver.

Step 5. Remove the screw holding the Spindle and friction spring to the rod that runs through the assembly.

Step 6. Slide the Spindle free of the rod, and slide the remaining Flag and Clutch parts away from the Printer Station.

Note: At this point, reassembly can occur with a new Clutch and Flag Assembly, a new Spindle, or both. Also, with further disassembly, individual Clutch parts can be replaced (note the items in the exploded view). However, any new Clutch Pads require a burn-in followed by a torque test. Normally two washers create the proper torque. Added washers increase torque while washer removal decreases torque. A torque of from 100 to 140 centimeter grams produces the required friction.

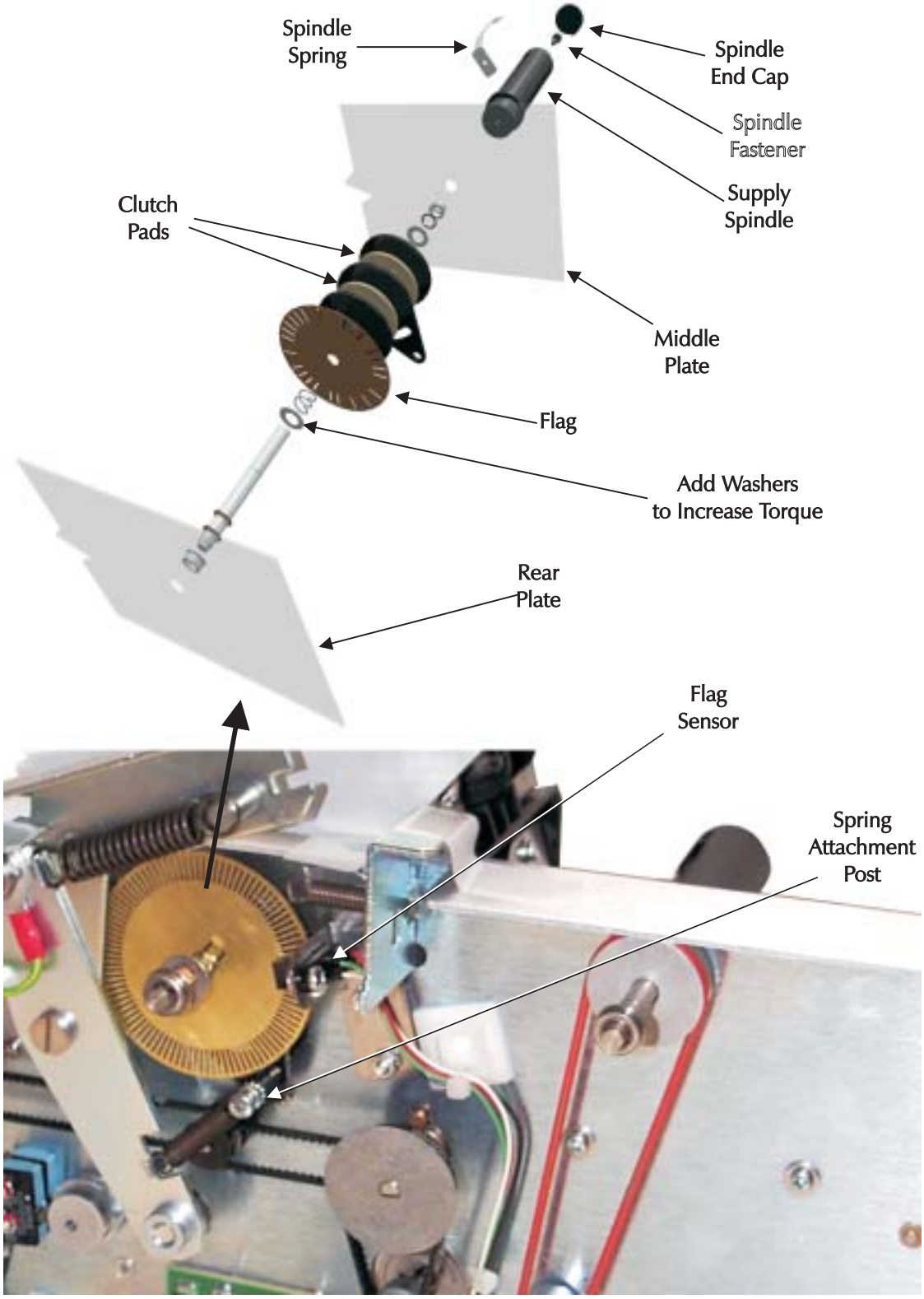


Figure 5-21. Supply Spindle Assembly.

5.2.18 Ribbon Take Up Spindle Replacements

Figure 5-22 shows the Ribbon Supply Spindle and associated Clutch Assembly. Replacement options include any of the parts that appear in the exploded view.

Step 1. Remove the Printer Station (See Section 5.2.15).

Step 2. Remove the O-ring from the spindle pulley.

Step 3. Remove the End Cap from the Spindle by deflecting a tab with a small screwdriver.

Step 4. Remove the screw holding the Spindle and friction spring to the rod that runs through the assembly.

Step 5. Slide the Spindle free of the rod, and if desired, slide the remaining parts away from the Printer Station.

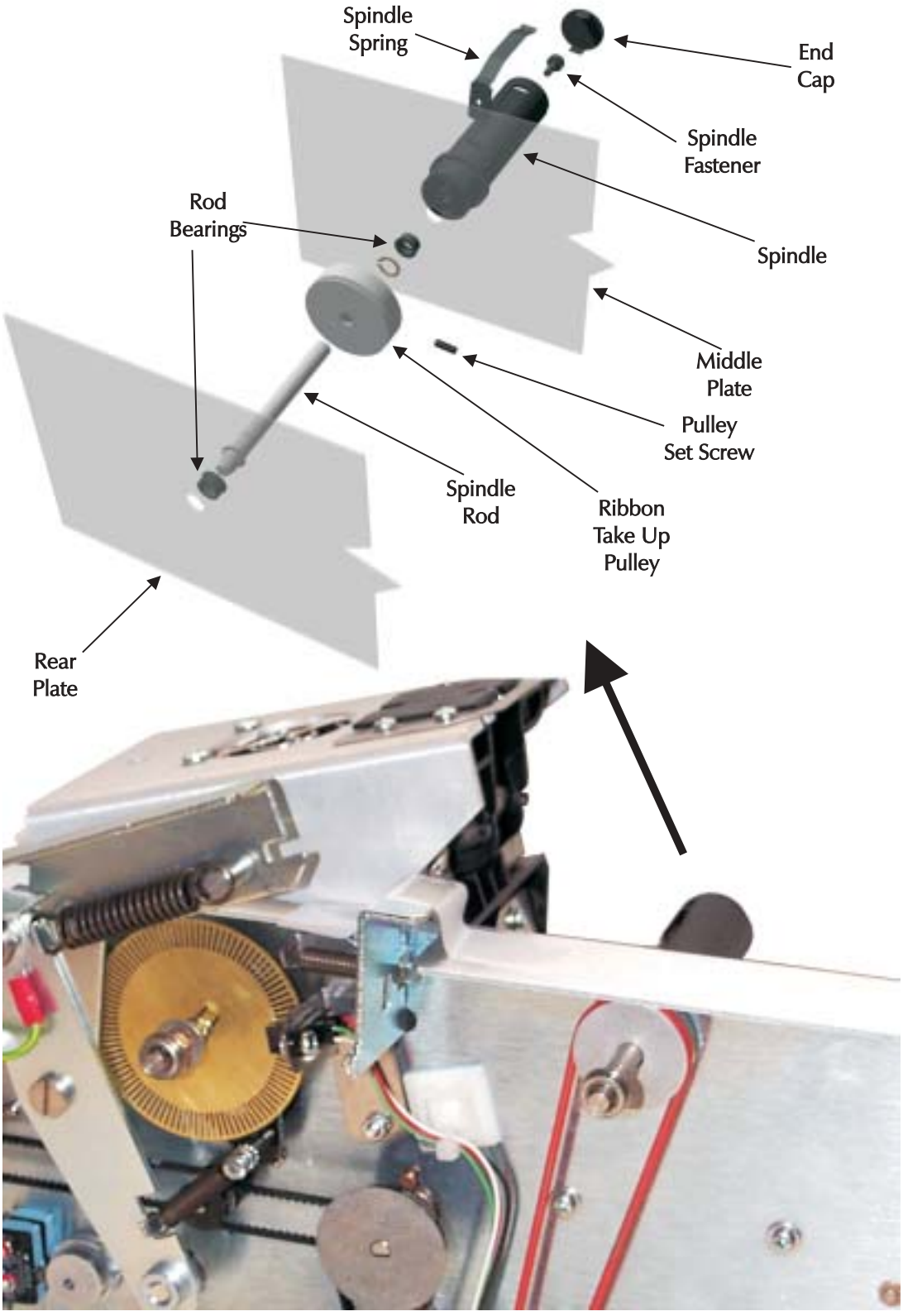


Figure 5-22. Ribbon Take Up Spindle.

5.2.19 Print Station Card Sensor

Figure 5-23 shows the sensor that signals reception of cards entering the Printer Station. The Cam motor partially obscures one of the two screws that secure this sensor, making motor removal a prerequisite for sensor removal.

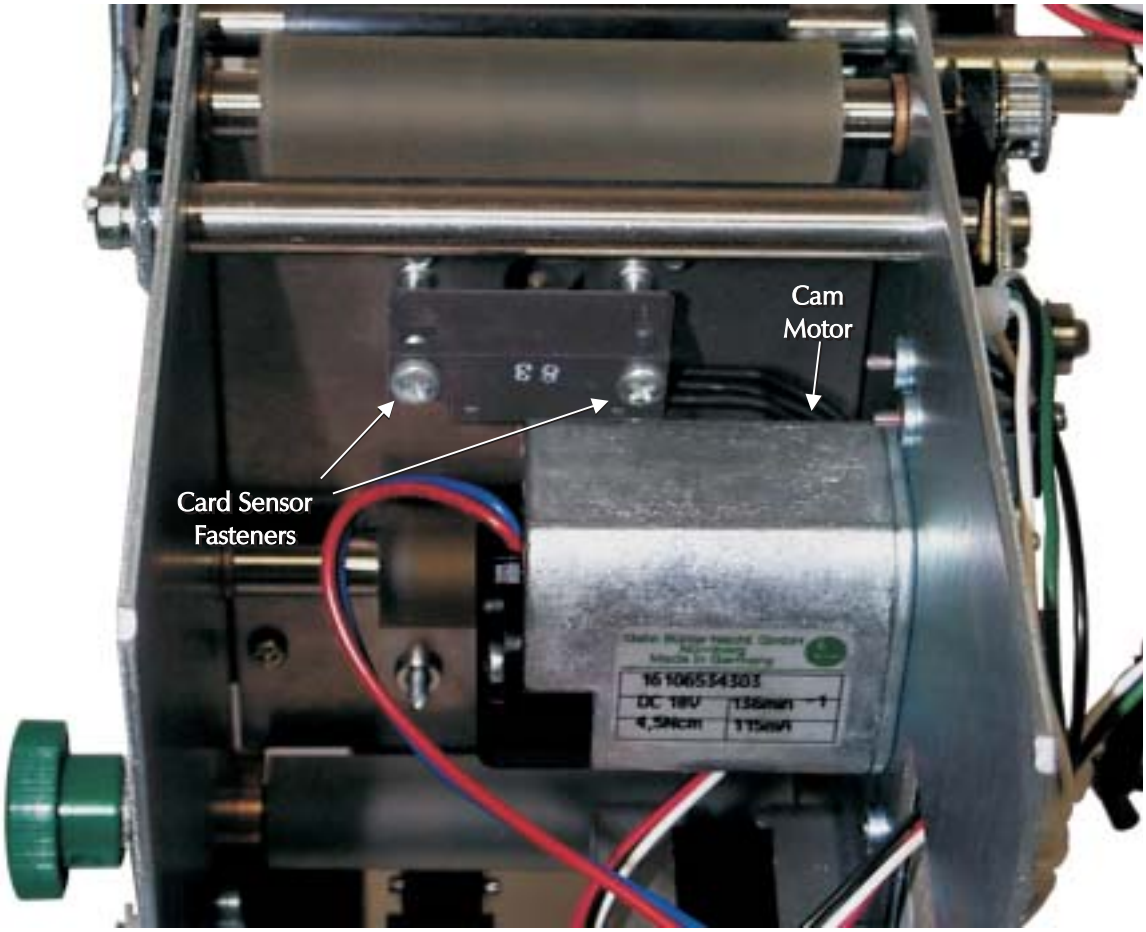


Figure 5-23. Printer Station Card Sensor.

5.2.20 CPU Board and Socketed IC Removals

Refer to Figure 5-24, and proceed as follows:

Note that the Motor driverand Serial driver ICs have socket mounts. If possible, attempt a repair by replacing one of these ICs. A repair made at this level should prove less costly in both time and material.

Step 1. Remove the Rear Panel (see Section 5.2.1).

Step 2. If replacement of a socketed component fails to effect a repair, proceed with step 3.

Step 3. To replace the CPU board, unplug the connectors from the board. Then, remove the four fasteners holding the CPU, and lift the board free of the printer.

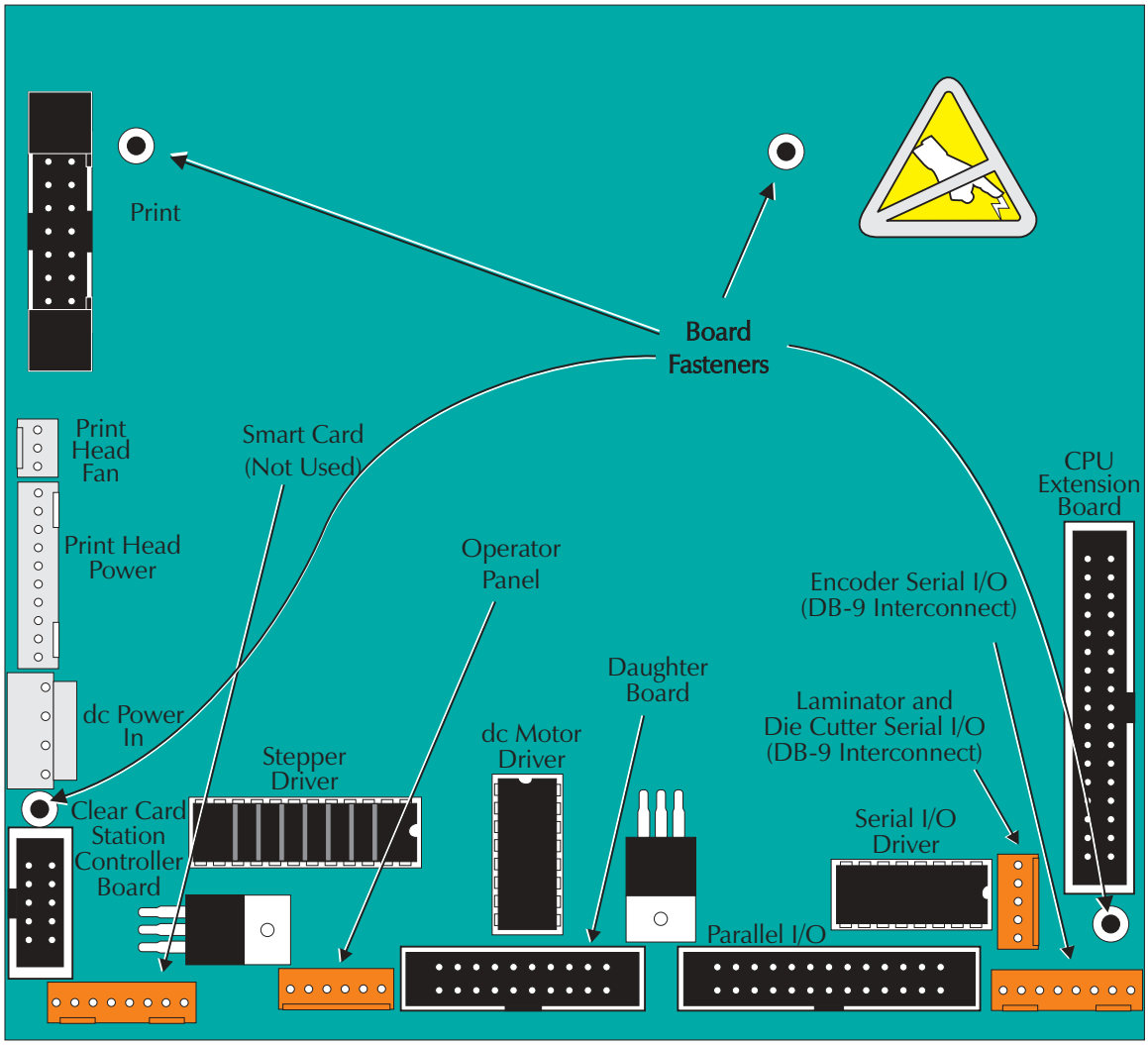


Figure 5-24. CPU Board.

5.2.21 Extension PCBA Circuit Board and Socketed IC Replacements

Several ICs on the Extension PCBA are socket mounted. As with the CPU board, repairs made at this level can prove less costly. In case of a motor problem, consider changing the dc motor driver IC U4, which is an L293.

Refer to Figure 5-25, and proceed as follows:

Step 1. Remove the Rear panel (see Section 3.5.1).

Step 2. If IC replacement fails to effect a repair, proceed with step 3.

Step 3. Unplug the connectors, and remove the four fasteners securing the board.

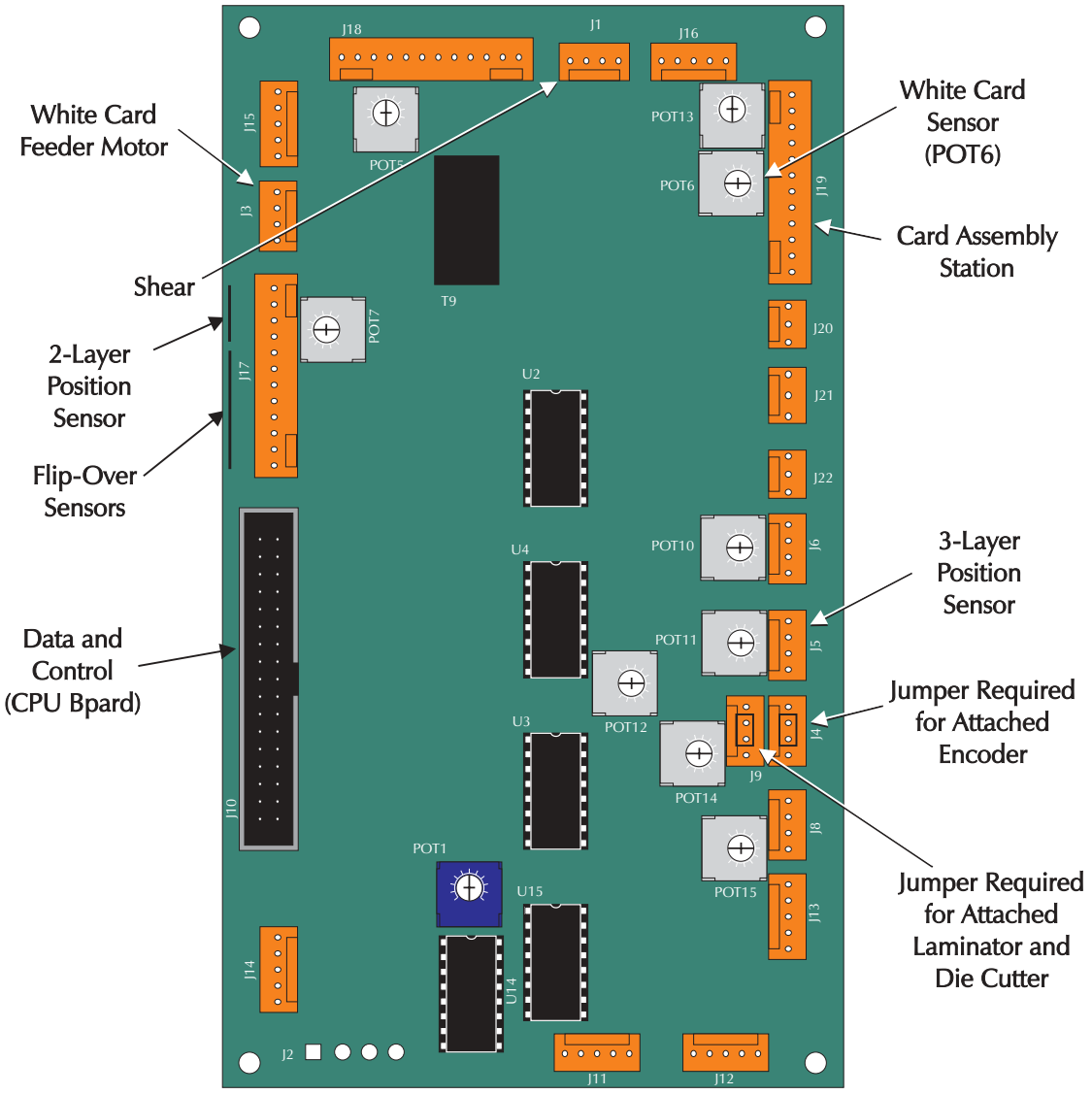


Figure 5-25. Extension PCBA.

5.2.22 Clear Card Station Controller Board Replacements

Before replacing the entire board, consider a repair by replacing one of the socketed ICs.

To replace the board, refer to Figure 5-26, and proceed as follows:

Step 1. Disconnect the six connectors. Note that three of the connectors have the same pin configurations, so consider identifying these connectors with tags to simplify installation.

Step 2. Remove the two fasteners holding the board, and then remove the board.

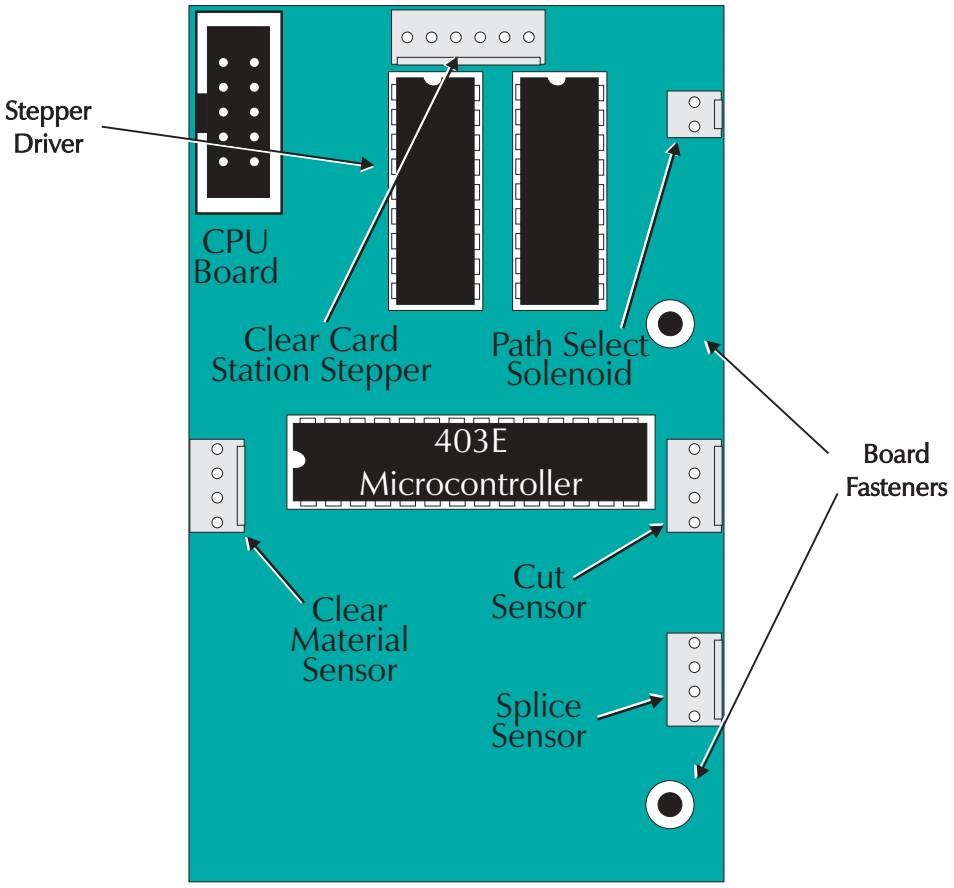


Figure 5-26. Clear Card Station Controller Board.

5.2.23 Power Supply Replacements

Refer to Figure 5-27, and proceed as follows:

Step 1. Remove Rear and Right side Case members (see Section 5.2.1).

Step 2. Remove the four fasteners holding the Power Supply Shield to the Rear Plate, and separate the Shield.

Step 3. Unplug the Power Supply ac input and dc output cables.

Step 4. Remove the fasteners holding the Power Supply board to the Rear Plate.

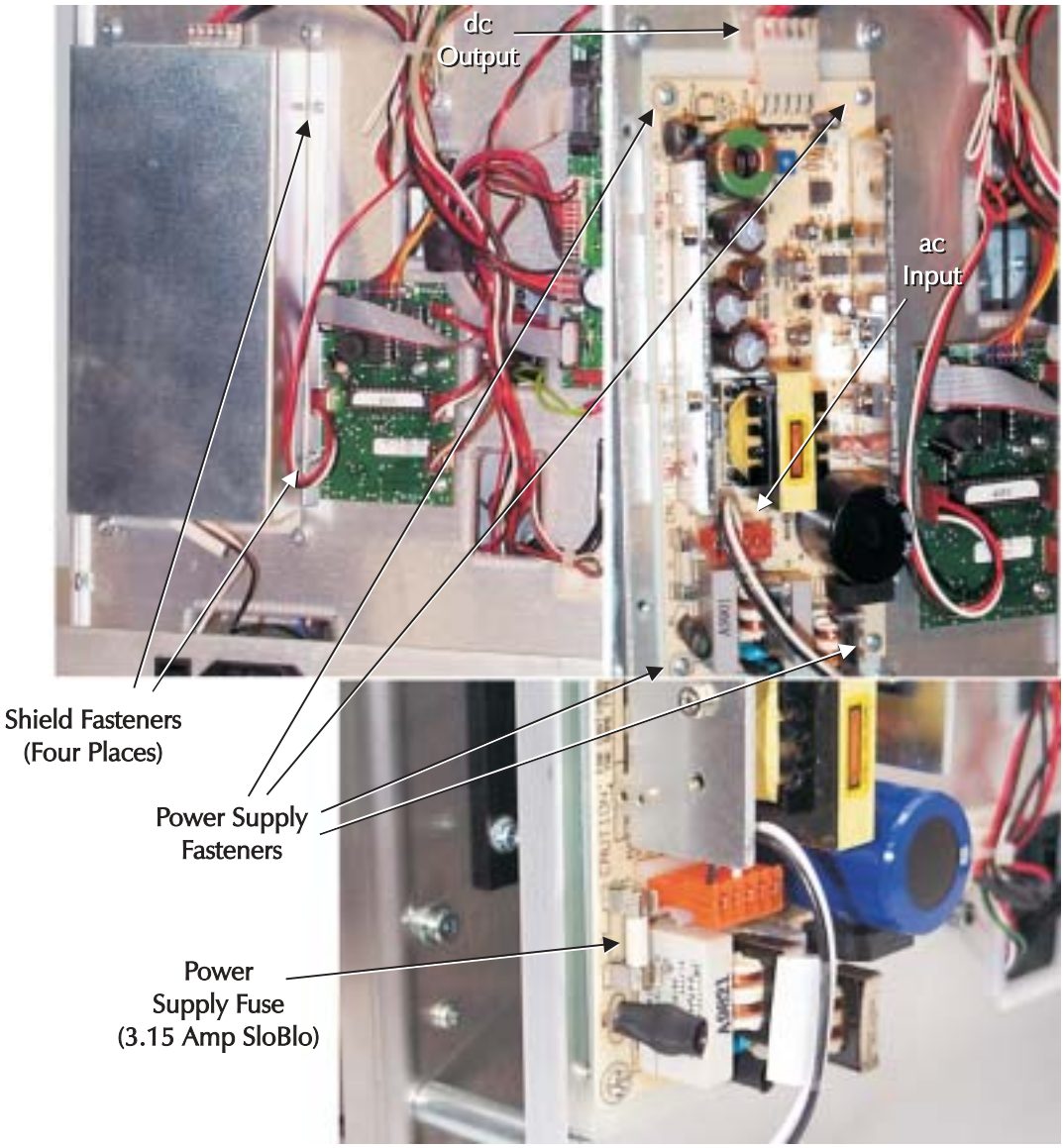


Figure 5-27. Power Supply Removal.

5.2.24 Operator Panel Replacement

Refer to Figure 5-28, and proceed as follows:

Step 1. Swing down the Front Panel.

Step 2. Unplug the Operator Panel connector from the CPU board.

Step 3. Remove the three screws holding the Operator Panel Shield and underlying board.

Step 4. Remove the board and switch assembly while feeding the cable through the associated chassis cutouts.

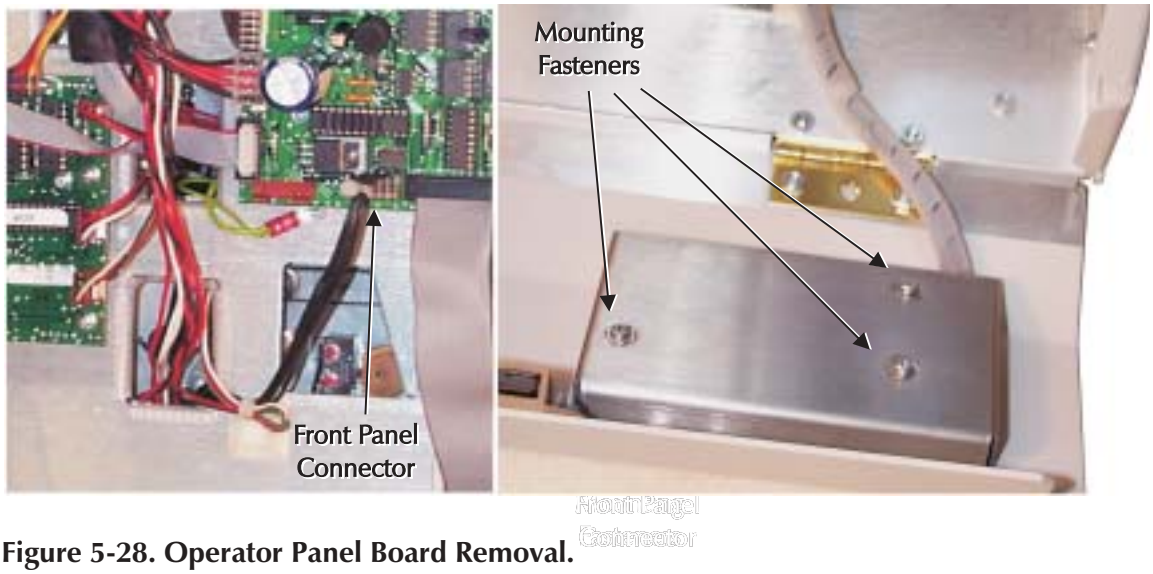


Figure 5-28. Operator Panel Board Removal.

CHAPTER 6
MAINTENANCE AND ADJUSTMENTS

This chapter contains procedures for Cleaning and Adjustments. Other than cleaning and Cleaning Core replacement, no other regular maintenance requirements exist. Under no circumstances, should anyone ever apply either a lubricant or any other unprescribed material to a component inside the printer. No lubricated parts exist. Only 99-percent pure or better cleaning materials are specified here to minimize any chance of a residue. Moreover, users must maintain a printing environment essentially free of contaminants that could migrate onto cards, ribbons, or into the printer.

Respond with a Cleaning Roller replacement, and a Print Head and a Roller cleaning when the LCD indicates CLEANING. For any deterioration in either print quality or other printer function, cleaning can occur sooner.

Adjustments initially made at the factory typically remain operative for an extended period and have no associated time- or use-based schedule for their employment. Adjustments typically occur in response to a part replacement, a printer upgrade, or an operational anomaly. Chapters four and five contain most of the referrals to the adjustments contained here.

Procedures for adjusting the potentiometers on the Main and Extension circuit boards do not appear in this chapter. Refer to Appendix A, Test software, for these adjustments.

6.1 CLEANING MATERIALS

Figure 6-1 shows the cleaning materials available from 3M Products. The following table lists their use:

Item Cleaned	Item Used	Part No.
Print Head	Swab	104526-001
Rollers	Swab	104526-001
Card Path Items	Cl;eaning Card	800104-004
NOTES: Swabs come in boxes of 25. Cards come in boxes of 50.		

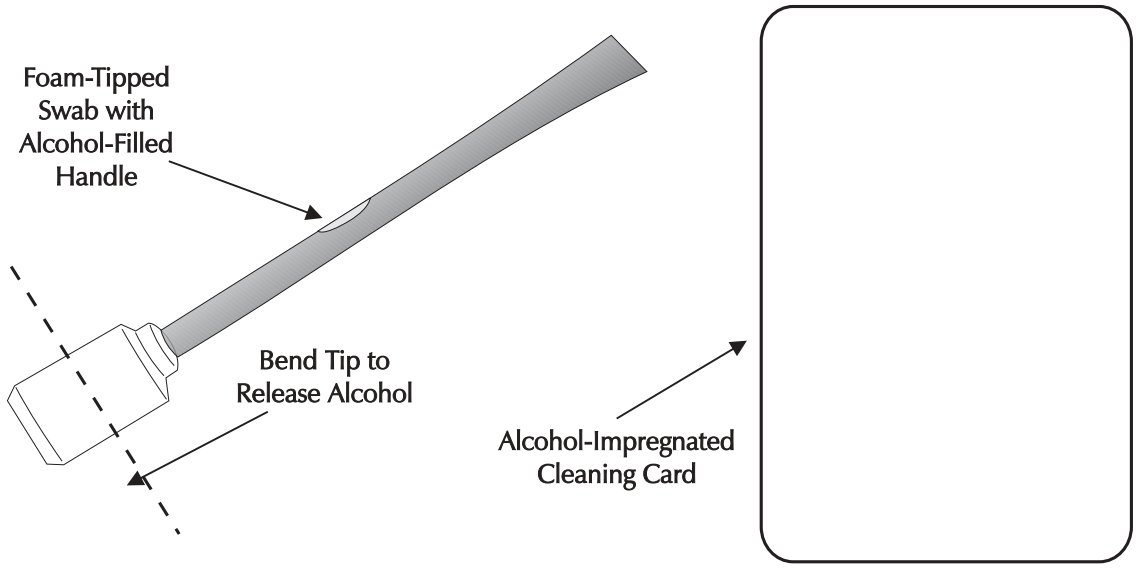


Figure 6-1. Cleaning Materials

6.2 CLEANING

Refer to the User's Guide for cleaning using the Cleaning Card. This Section describes a manual cleaning of the following items:

- Print Head
- Card Transport and Pressure Rollers

6.2.1 Print Head Cleaning

Refer to Figure 6-2, and proceed as follows:

Step 1. Turn off power, open the Cover, and raise the Print Head.

Step 2. Remove any ribbon installed.

Step 3. For recently operated printers, the Print Head may be hot. If so, allow about a five-minute cool-down before proceeding.

Step 4. Prepare a foam-tipped swab with alcohol, For 3M-supplied swabs, bend the foam tip until the underlying plastic breaks and releases the alcohol.

Step 5. Using the swab, rub the foam tip back and forth across the head several times. When cleaning due to print anomalies, concentrate the effort in the area that produced the anomalies. Check the condition of the swab. If necessary, finish with a clean swab.

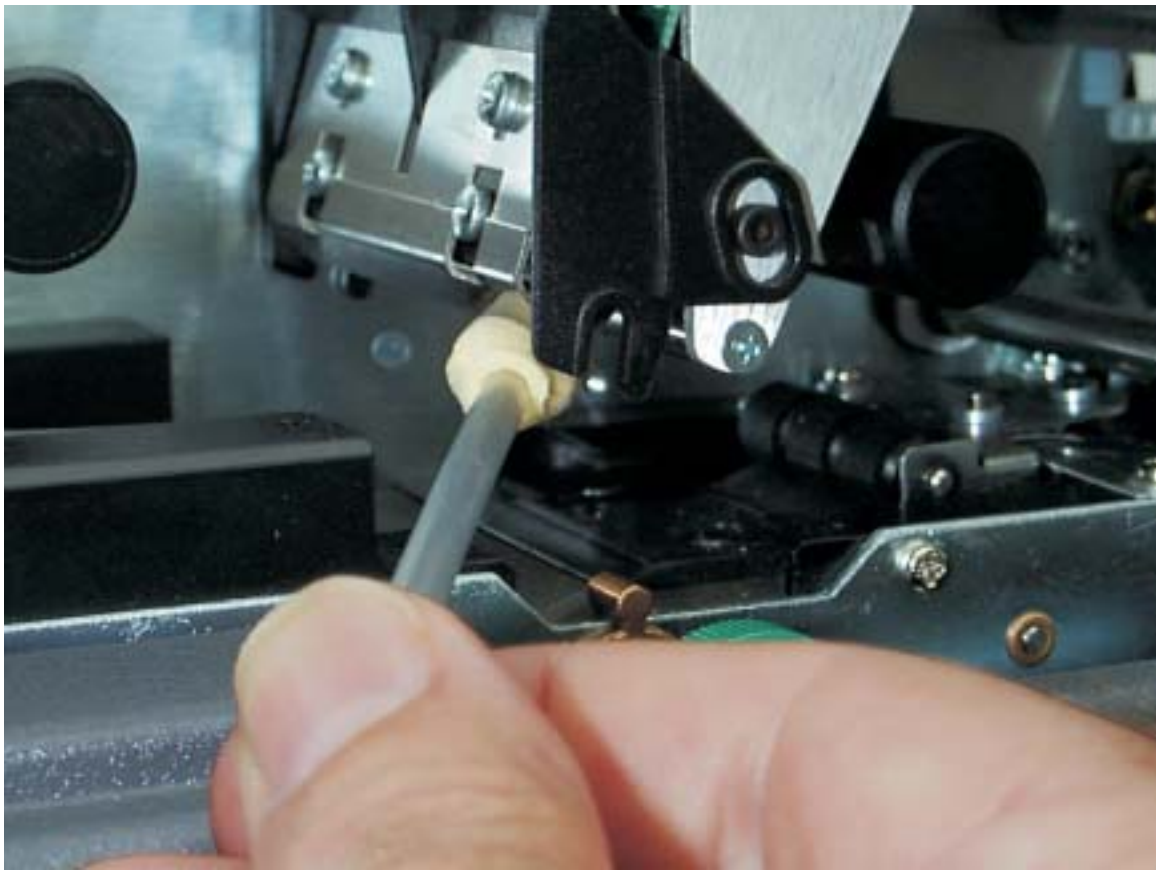


Figure 6-2. Print Head Cleaning.

6.2.2 Replacing Cleaning Roller Sheath

Refer to Figure 6-3, and proceed as follows:

Step 1. Turn off power, open the cover, and remove the Upper Cleaning Roller.

Step 2. Slide off the old outer sheath, and replace it with a new one.

Step 3. Reinstall the Cleaning Roller, and while avioding contact with the tacky surface of the roller, remove the protective tape. If necessary, turn the Manual Advance knob while removing the tape.

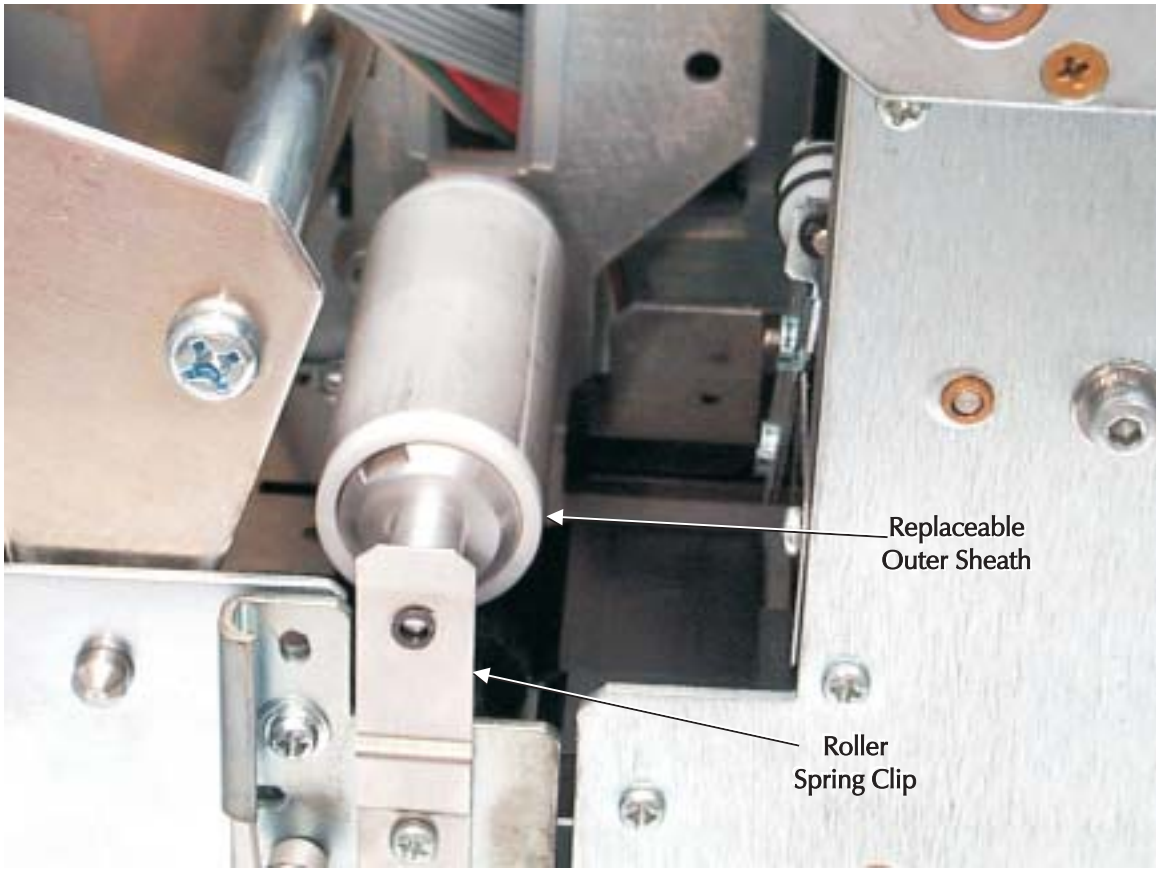


Figure 6-3. Changing the Upper Cleaning Roller

6.2.3 Cleaning Card-Feed and Card-Transport Rollers

As shown in Figure 6-4, motor-driven rollers move the cards from the source roll and Feeder to the Output during printer operations. Except for the White Card Feed rollers and the Platen roller, all rollers have accompanying pressure rollers that keep the cards against the motor-driven rollers. The following procedure applies to all rollers except the Upper Cleaning Roller. Proceed as follows:

Step 1. Turn off power, raise the cover, and remove the Upper Cleaning Roller.

Step 2. Remove any ribbon or card media.

Step 3. Clean the rollers using either a cleaning pen or a foam swab moistened with alcohol. Note that rollers that cannot be moved manually require brief motor drives for access to initially unexposed areas.

Step 4. Close the cover, and turn the printer on with the panel button held pressed for three seconds to expose a new area on the rollers. Alternately, issue a two-second Stepper drive Command (!P) from the Window's print driver or the Test Software (See Appendix A).

Step 5. Repeat Steps 3 and 4 until all areas on the rollers are cleaned.

Step 6. After installing its outer core, replace the Upper Cleaning Roller, and return the Printer Module to its operational configuration.

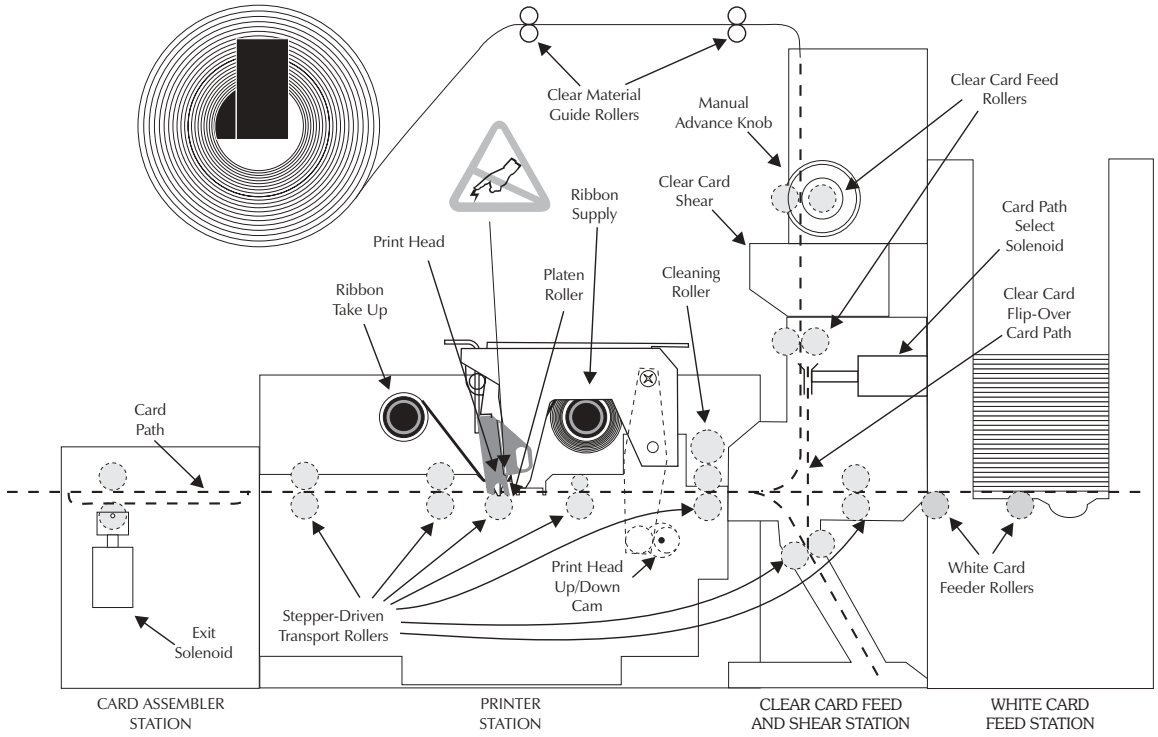


Figure 6-4. Card Transport Rollers.

6.3 ADJUSTMENTS

Adjustments exist for the following:

- Print Head Resistance
- Peel Bar Position
- Card Image Centering
- Clear Card Pressure Roller Position
- Belt Tension
- See Appendix A for Potentiometer Adjustments.

6.3.1 Print Head Resistance

The manufacturing process produces Print Heads with characteristics that vary slightly. Imaging results from the heat generated by the Print Head elements. To establish a current verses heat relationship, equipment designers must factor in resistance—the most significant of the variables. Accordingly, Print Head manufacturers place a label indicating resistance on each Print Head. The firmware requires this value for proper imaging.

Proceed as follows:

Step 1. Find the label on the Print Head that specifies resistance (e.g., R=1711)

Step 2. Using either or the Window's print driver or the Test Software, issue the following Printer Control command:

R value

Where:

value = Print Head Resistance (A space separates R and value.)

6.3.2 Peel Bar Adjustment

Two screws fasten the Peel Bar to the Print Head assembly through slotted holes that allow vertical positioning. Properly adjusted, the Peel Bar produces an even flow of the ribbon over the Print Head. Uneven ribbon flow results in uneven card printing.

Refer to Figure 6-5, and proceed as follows:

Step 1. Open the Cover, raise the Print Head, and remove any ribbon.

Step 2. Sufficiently loosen the upper two screws securing the Peel Bar to give the bar free vertical movement. Note that the lower two screws secure the other Print Head components and do not interfere with this adjustment.

Step 3. Position a 0.022-inch thick card in the card path under the Print Head.

Step 4. Lower the Print Head to the latched-down position.

Step 5. Issue a Head Down command (!D) from the Window's print driver (see User's manuals) or the Test Software (see Apendix A).

Step 6. Push down on the Peel Bar until both ends of the Peel Bar rest on the card.

Step 7. To avoid applying a torque that displaces the Peel Bar from its position on the card, gradually tighten the screws while alternating between the two.

Step 8. Issue a Head Up command (!M) from the Window's print driver, or the Test Software.

Step 9. Remove the card placed in Step 2, install a ribbon, and print one or more cards to verify proper ribbon flow.

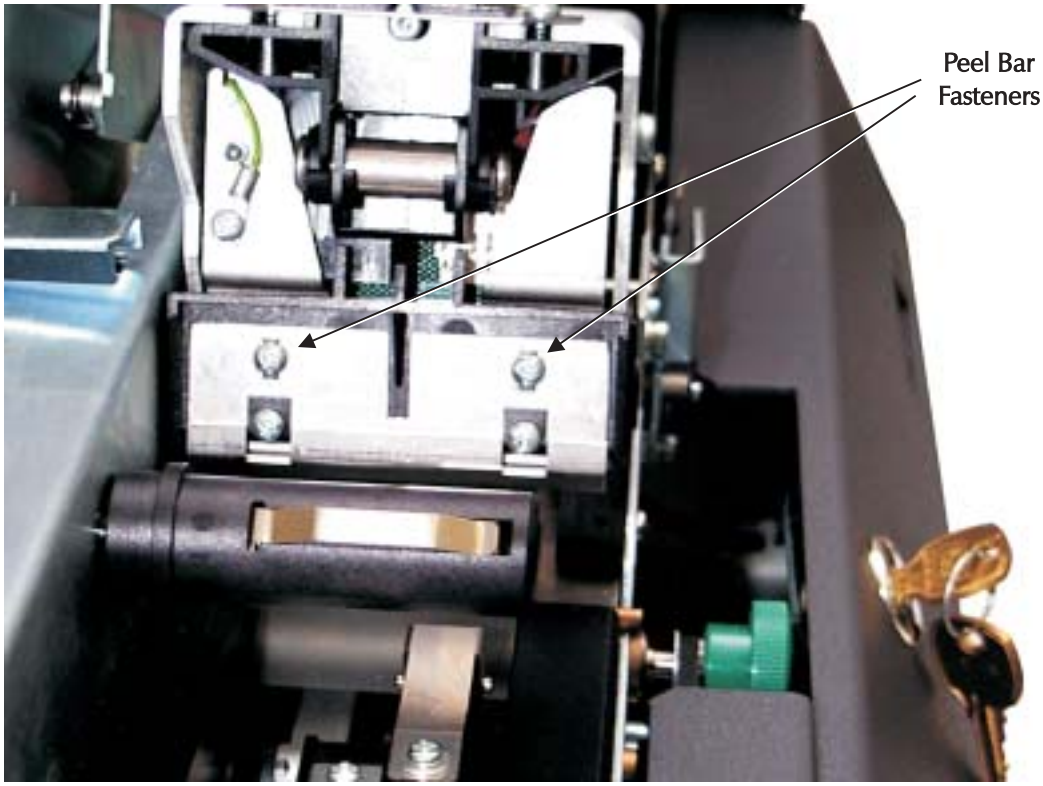


Figure 6-5. Peel Bar Fasteners.

6.3.3 Image Centering

Centering establishes x- and y-offset values. The x offset determines when the Print Head lowers and raises, between which printing occurs. The y offset determines which group of Print Head elements produce images.

If the Print Head lowers too soon, the leading card edge in encountering an already lowered Print Head can shear the ribbon. Another ribbon shear condition can occur if the Print Head remains lowered past the trailing edge of the card, where the head can abruptly drop below card level. Centering should be checked by printing a full-bleed image.

Proceed as follows:

Step 1. From the Window's print driver, or Test software issue the "Print Test Card" command (A). Note that the resulting printed card includes x- and y-offset values (e.g., Offset X - Y 008-006.

Step 2. Create and print a full-bleed image using a suitable graphic application and the 3M-provided Window's print driver).

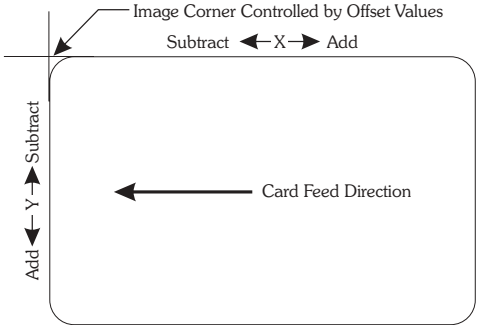
Step 3. Check for the conditions below.

Result	Remedy
Image Centered on Card	None; Skip Remaining Steps
Ribbon Sheared (No Image), or Excessive Border at Trailing Edge	Increase x Offset
Excessive Border at Leading Card Edge; Ribbon Shear Possible	Decrease x Offset
Excessive Border at Card Edge Nearer Front of Printer.	Increase y Offset
Excessive Border at Card Edge Nearer Back of Printer.	Decrease y Offset

Probable starting points for Offsets are at or near:

X-offset = 0

Y-offset = 0



Step 4. Either measure or estimate any departure from a centered image, and convert the result to dots. Note that at 300 dpi, the distance between dots measures 0.00333... inches. Also, 300 dpi converts to 11.81 dots per millimeter, and the dot spacing measures 0.085 millimeters.

Step 5. Either add or subtract (per the Remedy prescribed in table above) the Step-4 value(s) from the associated value(s) found on the Test Card printed in Step 1.

Step 6. Enter the new x and y offsets calculated in Step 5 using either WindCard, the Window's print driver, or the Test Software, as follows:

For x values, enter:

O value

For y values enter:

OY value

Where:

value = new offset in dots (a space separates the command from the value).

6.3.4 Pressure Roller Position

Card jams in the lower part of the Clear Card Feeder can result from a pressure roller not positioned parallel to the associated drive roller. To adjust this roller, refer to Figure 6-6, and proceed as follows:

Step 1. Remove the rear and right case members (see Section 5.2.1).

Step 2. Without unplugging its connectors, remove the White Card Feeder fasteners, and move the unit enough to access the Clear Card Feeder (see Section 5.2.2).

Step 3. Loosen the two screws holding the Pressure Roller bracket.

Step 4. Position the upper edge of the bracket parallel to the upper edge of the underlying Card Guide with each side spaced equally.

Step 5. Install the White Card Feeder and Case members.

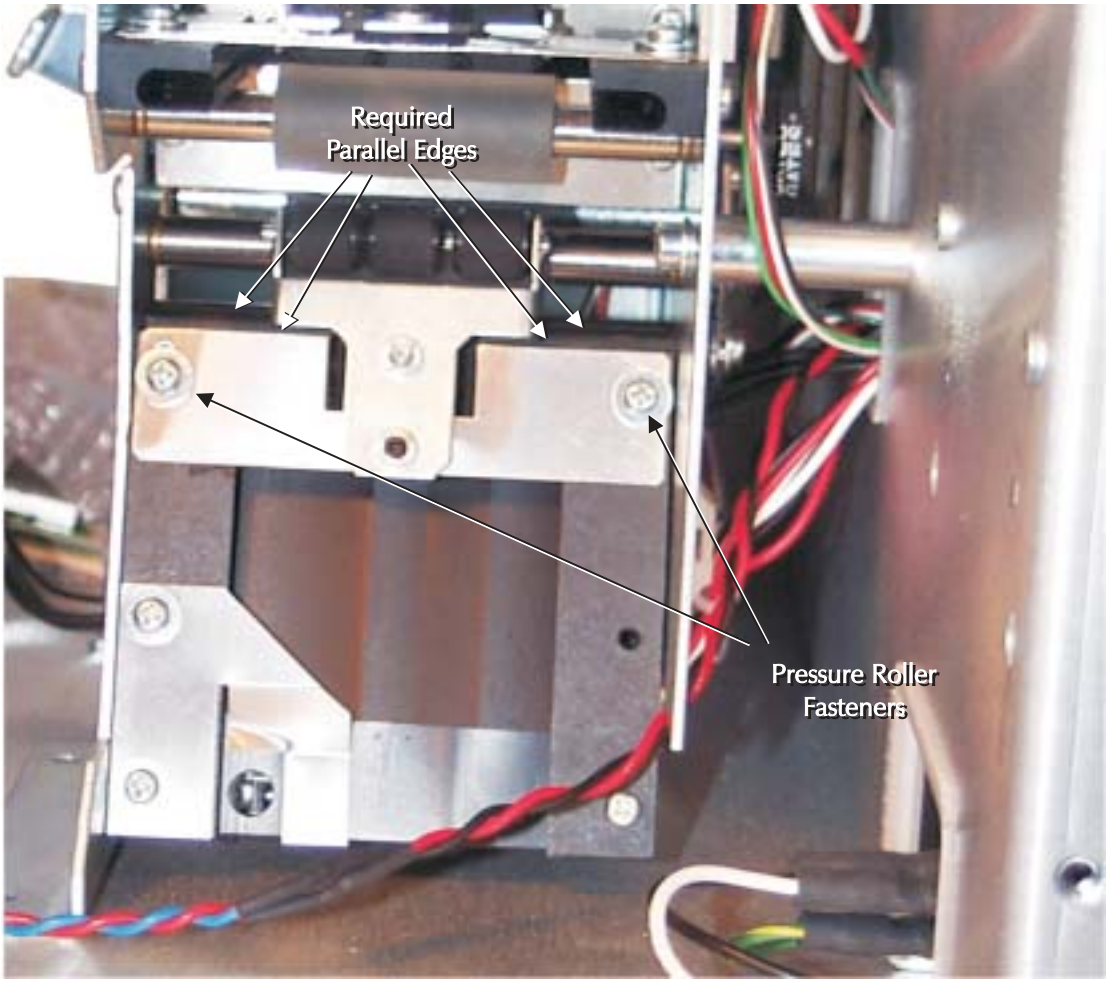


Figure 6-6. Lower Clear Card Feeder Pressure Roller Adjustment.

6.3.5 Stepper Belt Tension Adjustment

Installation of Fixture 900116-001 applies pressure that pushes the Stepper Motor Pulley away from the Platen Pulley. Proceed as follows:

Step 1. Remove the Printer Assembly and its rear plate (see Section 5.2.15).

Step 2. Loosen the two screws holding the Stepper Motor.

Step 3. Using a screwdriver as a pry-bar, pre-position the Stepper toward the lower-right quadrant of the panel cutout.

Step 4. While holding the position obtained in Step 3, tighten the upper Stepper Motor screw. This screw becomes a pivot point for subsequent steps, so tighten only to the point the screw cannot shift position, not too tight for pivoting.

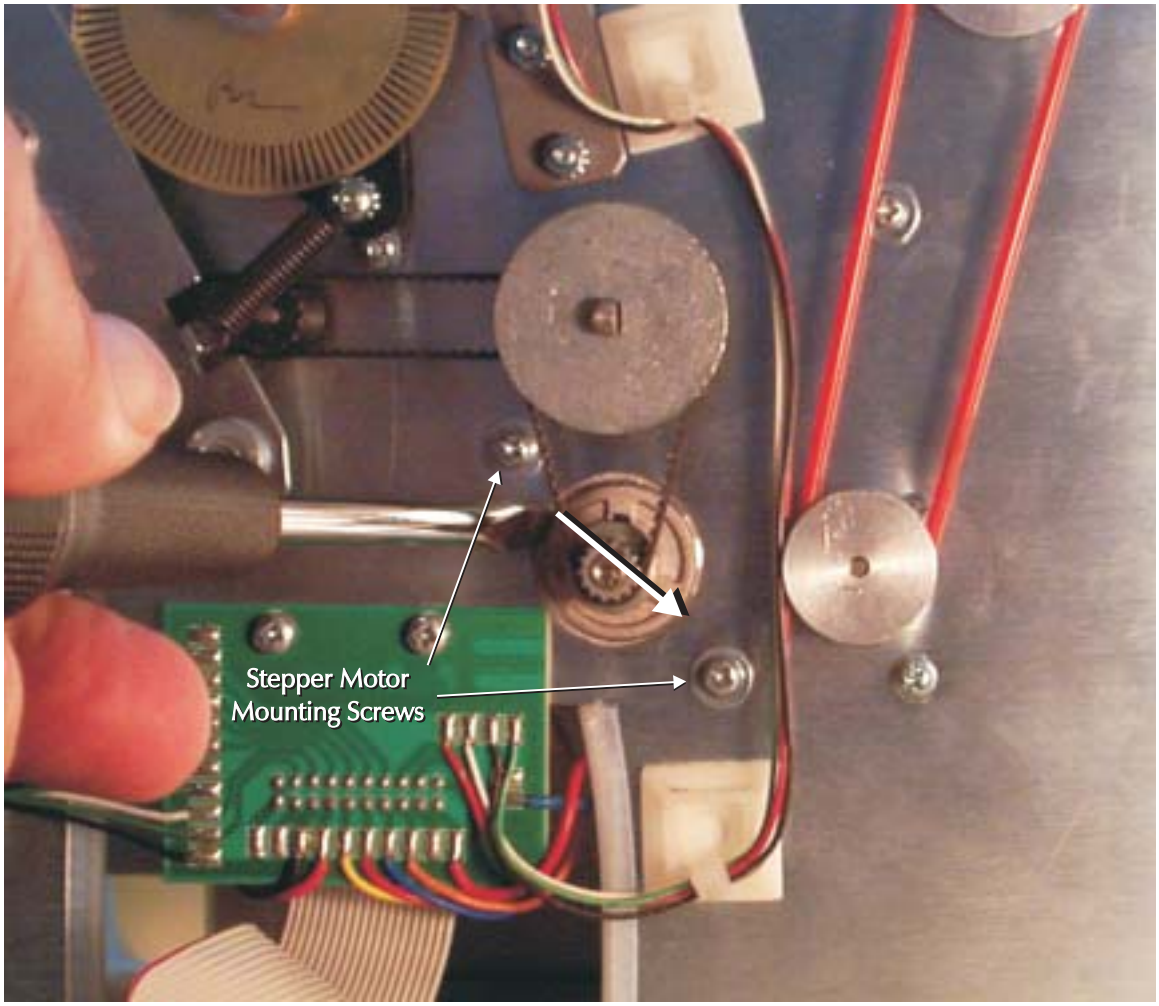


Figure 6-7. Stepper Motor Fasteners.

Step 5. Attach the Belt Tensioning Fixture between the Stepper and Platen pulleys (see Figure 6-8). Note how the fixture interfaces with the pulleys and belt.

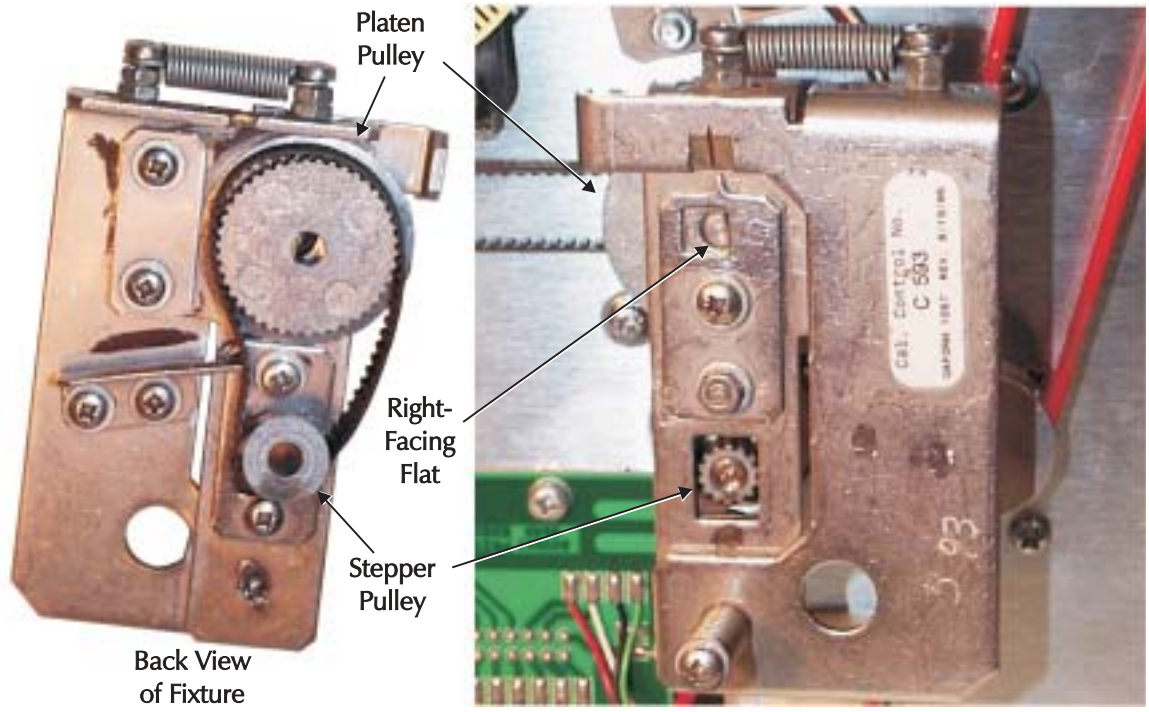


Figure 6-8. Stepper Motor Belt Tensioning Fixture.

Step 6. As shown in Figure 6-9, use a screwdriver as a pry-bar to move the Stepper Motor away from the Ribbon Take Up Motor to a position the pointer on the fixture aligns with the center marker.

Step 7. While holding the position established in Step 6, tighten the lower Stepper Motor Screw. Then, fully tighten the upper Stepper Motor Screw.

Step 8. Remove the fixture, and using the Manual Advance Knob, verify a smooth operation of all the stepper-driven pulleys and belts.

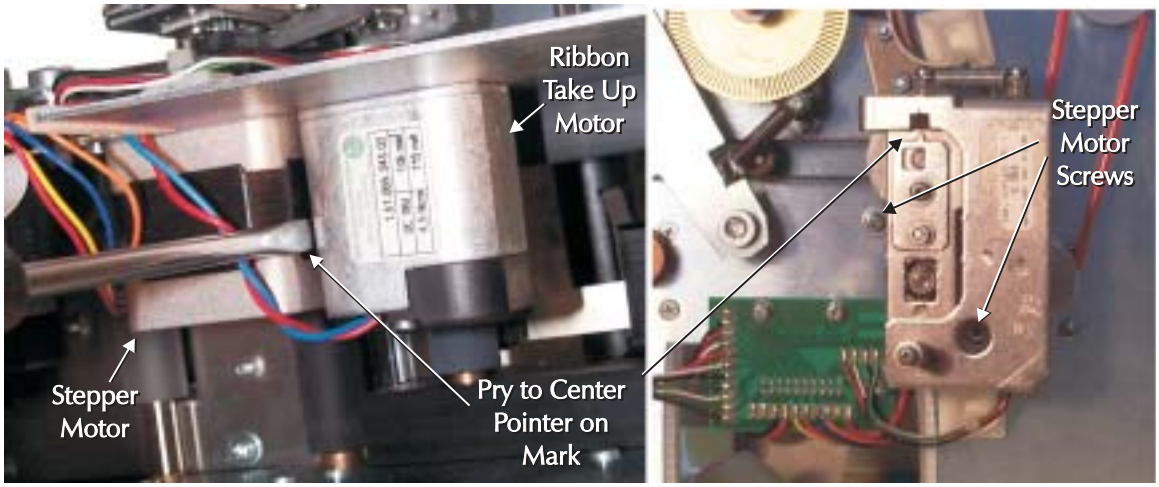


Figure 6-9. Stepper Belt Tensioning.

6.3.6 Front Belt Tension Adjustments

Installation of Fixtures C599 and C601 applies pressure that pulls the Belt Tensioning Idlers against the Front Timing belts. Refer to Figure 6-10, and proceed as follows:

Step 1. Swing down the Front Panel.

Step 2. Loosen the two screws holding each of the Belt Tension Idler Brackets.

Step 3. Install the right (C599) and left (C601) Tensioning Fixtures between the Idler Pulleys and the top of the front plate.

Step 4. Tighten the screws holding the Belt Tensioning Idler Brackets, and remove the fixtures.

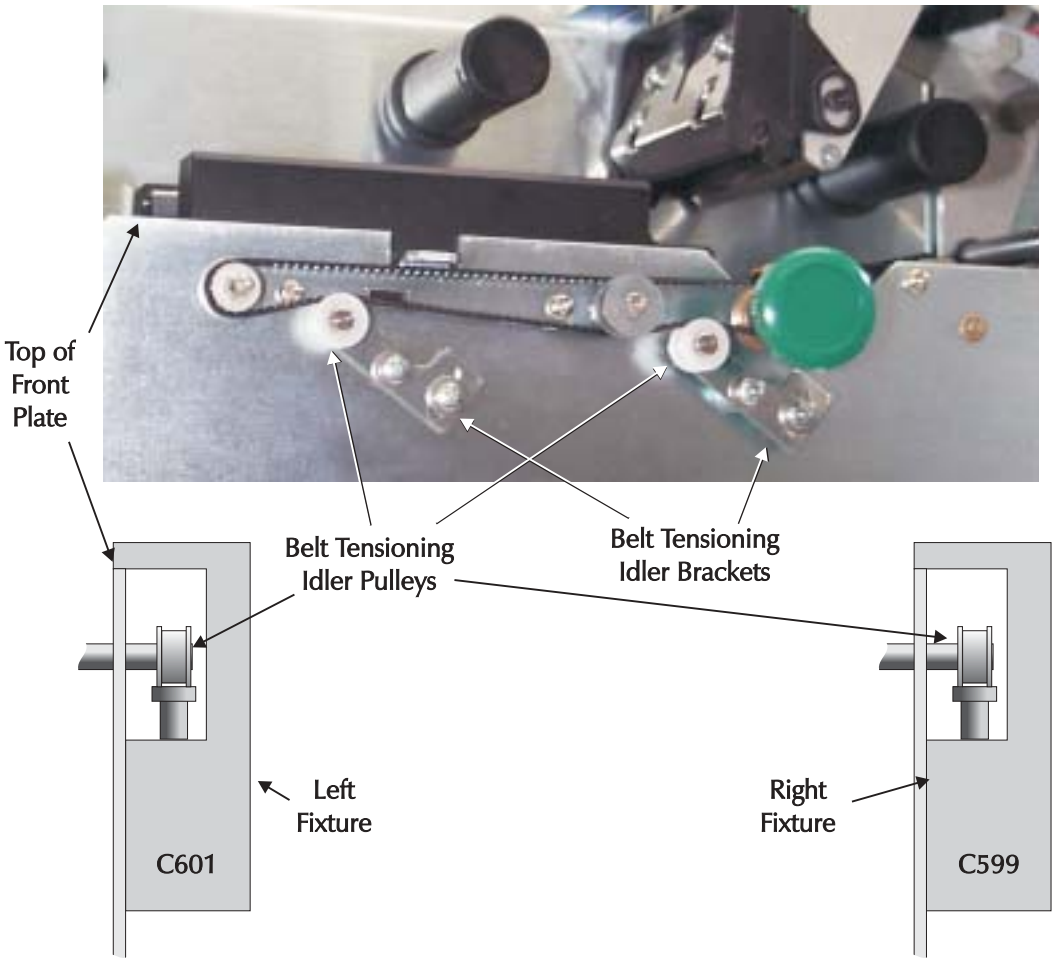


Figure 6-10. Front Belt Tension Adjustments.

APPENDIX A
TEST SOFTWARE

Test Software supports factory procedures that contribute to a functioning Printer Module. This same software lets service personnel exercise the various functions of both the Printer Module and the companion Laminator and Die Cutter Module. Additionally, the software prompts the adjustment of potentiometers located on the circuit boards. Potentiometers establish the switching thresholds for the various sensors. Because of this critical relationship, potentiometer adjustments must accompany any board or sensor replacement.

As the 3M MAXSecure product line expands and evolves, so too will the Test Software. Because of these dynamics, and because of the intuitive nature of the software, this appendix only calls attention to some typical software operations. Service personnel should explore the selections available to expand their ability to test assemblies in the Printer Module.

NOTE: This software operates in a DOS environment and may not always operate properly under Windows 95/98 or NT.

A.1 INSTALLATION

Unzip a Copy the Test Software into a folder on the C drive or any other mapped volume.

A.2 OPERATION

Characteristically, the Test Software has a tree structure. A program launch produces a list of selections. Selection of items in this list can either produce another list of related selections or allow entry of a setup parameter. In any case, selection of an item from the first list begins a path that leads—often via sub lists—to a desired result related to operation of a Secure Card System.

The presentation here presumes a printer familiarity consistent with the information contained in other sections of this manual. Therefore, servicing personnel should have no trouble interpreting listed items.

Begin by preparing the printer for operation, as follows:

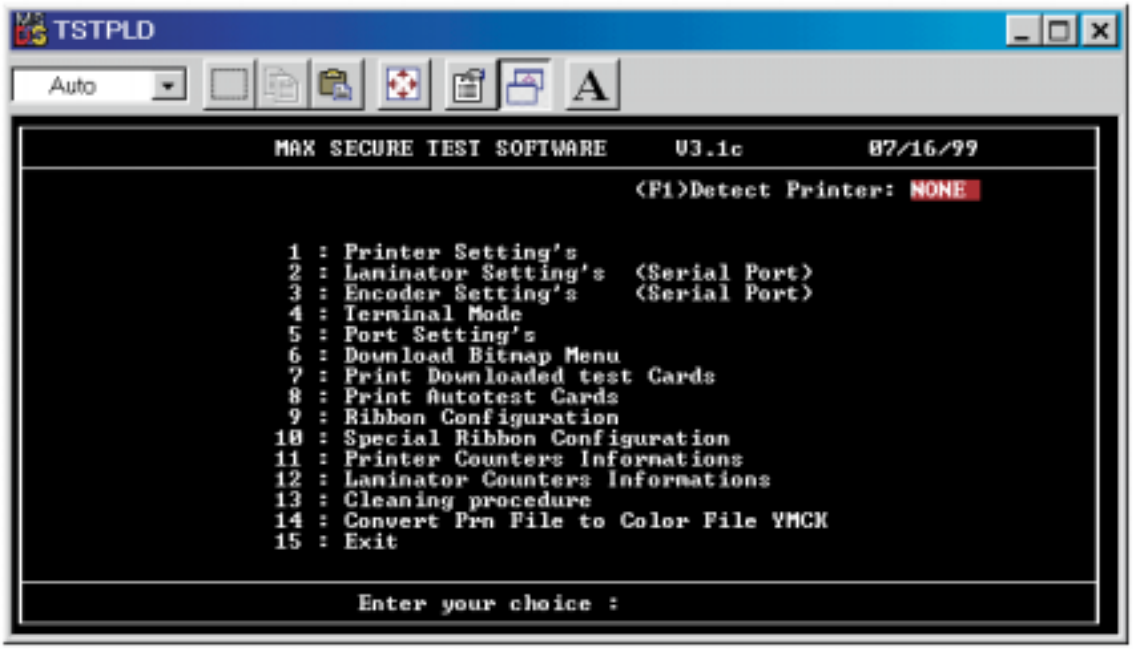
- Attach the required cables (see Section 2.1.4).
- Install a ribbon (see Section 2.2.4).
- Load Clear Card material and some White Cards (see Section 2.2.6 and 2.2.7).

A.2.1 Launching the Card Printer Test Software

With DOS operating and the prompt set to the volume and folder containing the Test Software (e.g., C:\PNTRTST), enter the following:

TSTPLD<Enter>

Note a screen similar to the following:

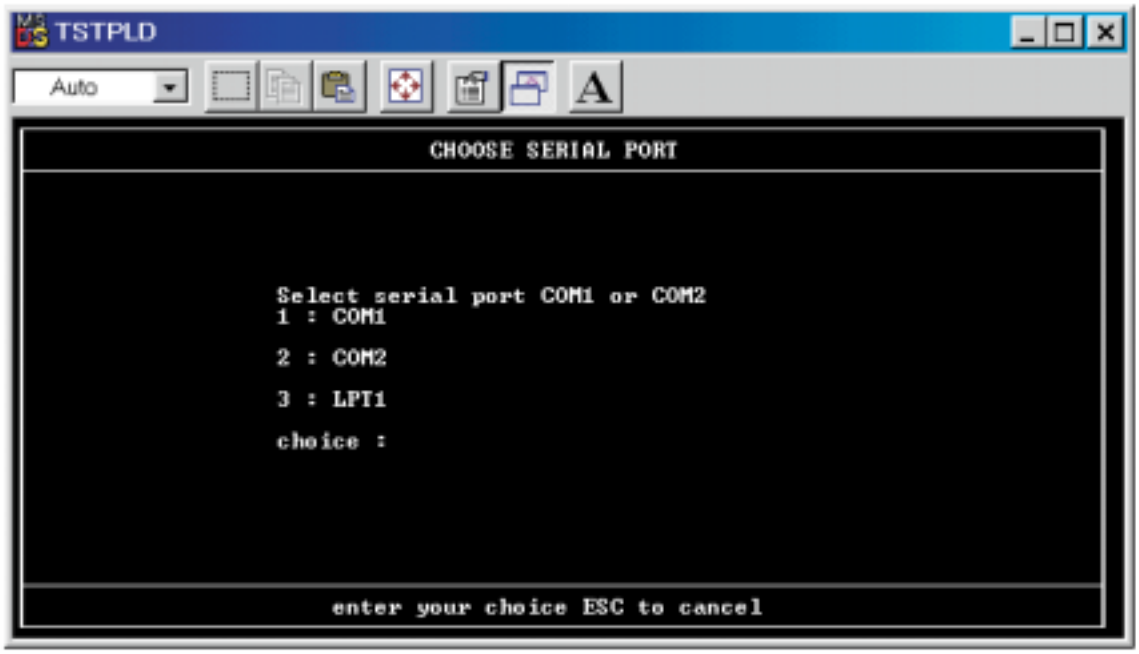


Particularly note the following:

- A selection results by typing a list item number followed by <Enter>.
- Selection of Exit returns the DOS prompt.
- Selection of "Change of COM port" should always follow the program launch to establish the port that has the printer attached.
- Typing <Esc> usually returns the previous screen.

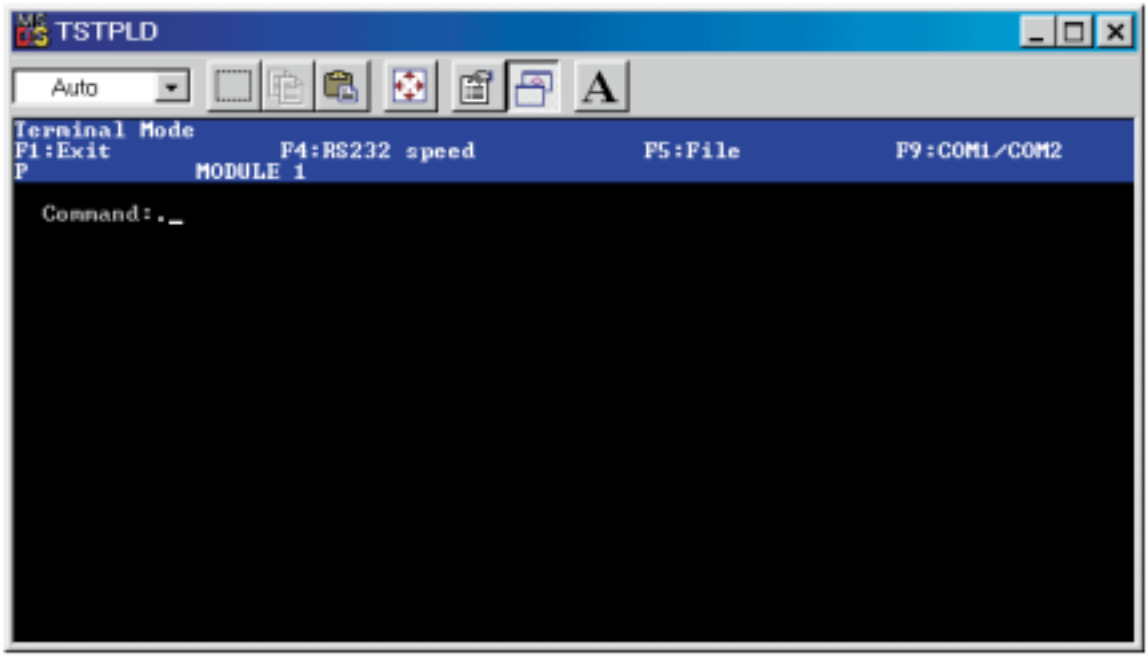
A.2.2 Changing the COM Port

Note that the following screen, that appears with selection of Item 5. Port Selectings offers three choices—two serial (COM 1 and COM 2) and one parallel (LPT 1). Item 3, LPT1, is required for connection to 3M MAXSecure Printer Modules.



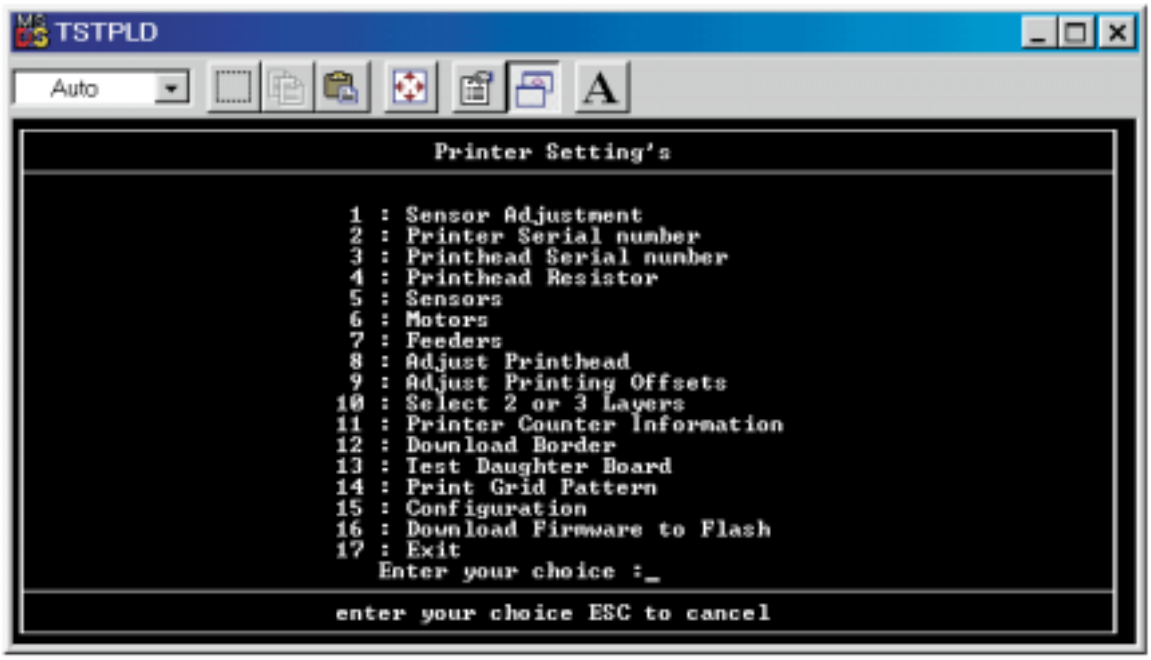
A.2.3 Operating in Terminal Mode

The following screen appears following selection of item 4, Terminal Mode, from the first screen. Terminal Mode offers a convenient means for sending commands to the printer. This screen allows entry of all applicable commands found in the Programmer's Manual. Before altering any of the parameters basic to printer operation, servicing personnel should record the current printer configuration (see "Printer Settings" in first screen). This record can then serve as a basis both for subsequent changes and for reestablishing any parameters that return the printer to a previous starting point.



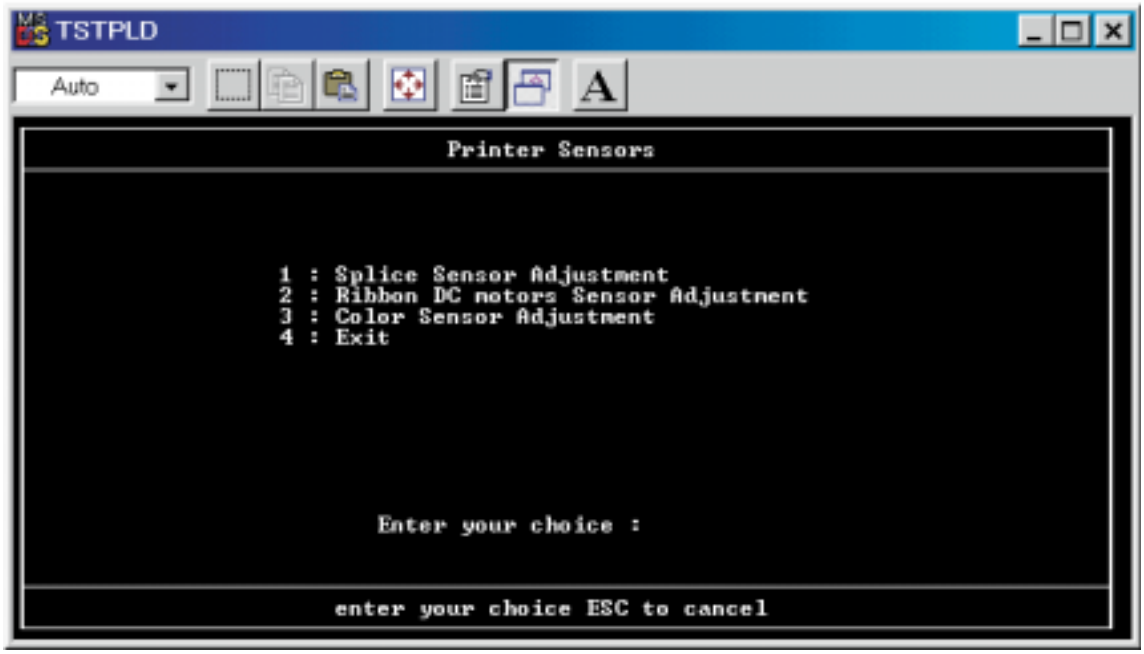
A.2.4 Typical Sub List

Selection of Item 1, Printer Setting's [sic], from the first screen produces the following screen. which offers related selections. Note that many items in this list produce an observable action in the printer. Others present computer-prompted adjustment procedures.

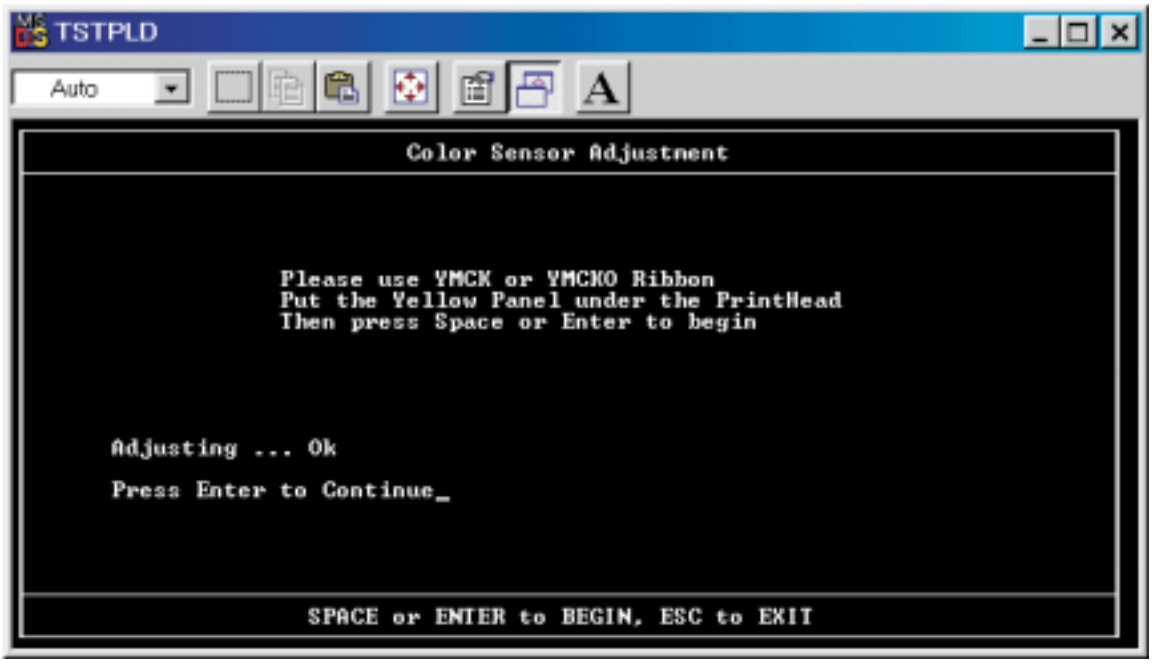


A.2.5 Typical Pot Adjustment Selection

The following screen appears after selection of item 3, Sensors, from the previous screen.

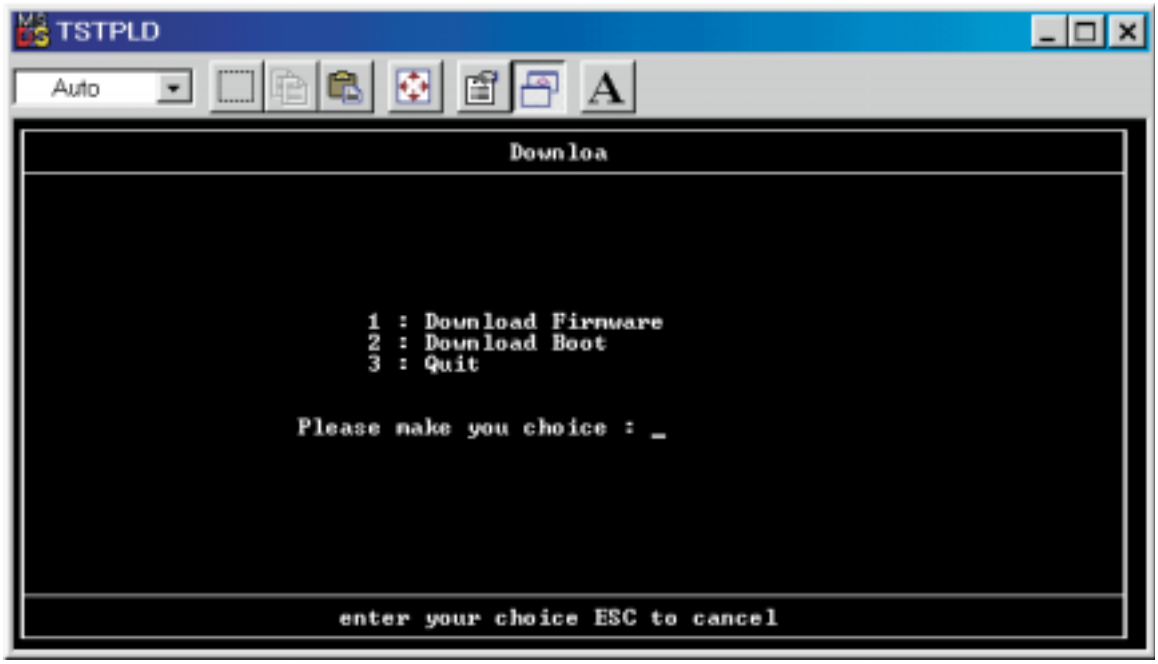


Continuing along the same path, the following screen appears with selection of Item 3, Color Sensor, from the previous screen. Properly setup, this sensor detects the yellow ribbon panel at Initialization.To locate the potentiometers related to sensor adjustments, see Figure 5-25.



A.2.6 Downloading Firmware

Selection of item 16 from the Printer Setting's screen produces the following screen:



Then, selection of Item 1, Download Frimware, produces the following screen(s), allowing entry of the firmware source: