CHAPTER 6

CORRECTIVE MAINTENANCE

6-1. INTRODUCTION.

6-2. This chapter contains instructions, exclusive of preventive maintenance actions, required for adjusting, aligning, removing, and repairing all Input/Output Console OA-7984(V)/UYK (I/O Console) repairable parts, modules, subassemblies, and assemblies. A list of test equipment and special tools needed to complete I/O Console corrective maintenance is provided in table 6-1. References to volume 3 schematics are included to enable the technician to correlate the various procedures to I/O Console electronics; for example, (9-3/16) would be interpreted as figure 9-3, sheet 16.

6-3. It is assumed the technician has isolated the problem to a faulty assembly, subassembly, or component using troubleshooting procedures in chapter 5 and is now ready to adjust or repair the fault. Chapter 7 provides parts information for ordering and replacing the faulty component. Adjustment and alignment, repair, and wire-wrap techniques are the areas discussed in this chapter with appropriate illustrations.

6-4. ADJUSTMENTS AND ALIGNMENT.

6-5. Adjustments and alignments requiring nonoperator expertise are discussed in the following paragraphs. A complete adjustment procedure should be read before attempting to make the adjustment. After an adjustment is completed, ensure all nuts or screws are tightened, unless otherwise specified. The adjusting illustrations indicate tolerances, positions of moving parts, spring tensions and the angle at which scales should be applied. The tools required to make adjustments are not supplied with the equipment, but are listed in another section. Springs which do not meet the requirements, and for which there are no adjusting procedures, should be discarded and replaced by new springs.

6-6. KEYBOARD ALIGNMENT. The following paragraphs provide instructions for adjustment of the keyboard assemblies. Normal keyboard turn-on procedure is listed below and will be followed throughout the keyboard alignment procedures unless otherwise specified. At the I/O Console control panel:

1. Set 400-Hz CONSOLE POWER circuit breaker to ON.

2. Set 60-Hz CONSOLE POWER switch to ON.

3. Set 60-Hz BLOWER POWER switch to ON; observe BLOWER POWER indicator (lit) and blower motor (starts).

4. Set LOGIC POWER switch to ON; observe LOGIC POWER indicator (lit).

5. Set ON LINE/OFF LINE switch to OFF LINE.

6. Press MASTER CLEAR pushbutton.

7. Press ON/OFF KYBD switch.

6-7. Keyboard Left and Right Margin Adjustment. To adjust left and right margins, perform normal turn-on procedure (paragraph 6-6), see figures 6-1, 6-2 and 6-3, and proceed as follows:

1. Release latches, and open upper and lower covers of teletypewriter.

Table 6-1. Test Equipment and Special Tools

Name	Designation	Required Use
Multimeter	AN/USM-311 (SCAT 4245)	Troubleshooting and maintenance procedures
Oscilloscope (Dual Trace)	AN/USM-281E (SCAT 4308)	Troubleshooting and maintenance procedures
Neutral Density Filter	Digitronics Part No. AA4559	Tape reader photodiode amplifier adjustment
Communications Data Processing System Input/Output Console Modification Kit	Litton Systems Part No. 105127-690	LHA-1 class ships modifications only

2. Ensure teletypewriter ON-OFF switch is ON.

3. Adjust left margin (see figure 6-1).

a. Verify that left edge of type box is aligned with left edge of platen ±1/16 inch; then proceed to step 4 a.. If requirement is not met, proceed with step 3 b. (see figure 6-1).

b. Verify that the front feed pawl is farthest advanced; if not, depress keyboard space bar once (see figure 6-2).

c. Set teletypewriter ON-OFF switch to OFF.

d. Loosen four carriage return ring mounting screws (see figure 6-2).

e. Hold carriage return ring, and position the left edge of type box to left edge of platen ±1/16 inch; then tighten mounting screws.

f. Set teletypewriter ON-OFF switch to ON.

g. Depress carriage RETURN key on keyboard.

h. Repeat step 3 a..

4. Adjust right margin (see figure 6-3).

a. Type out a complete line of any character.

b. Verify that 72 characters are printed; proceed to step 4 k.. If requirement is not met, continue with step 4 c..

c. Depress carriage RETURN and LINE FEED keys.

d. Type out 70 characters.

e. Set teletypewriter ON-OFF switch to OFF.

f. Loosen mounting screws (see figure 6-3).

g. Rotate the space suppression ring to obtain clearance of 0.011 (0.008 to 0.015) inch between spacing cutout transfer bail and space supression ring extension; then tighten mounting screws.

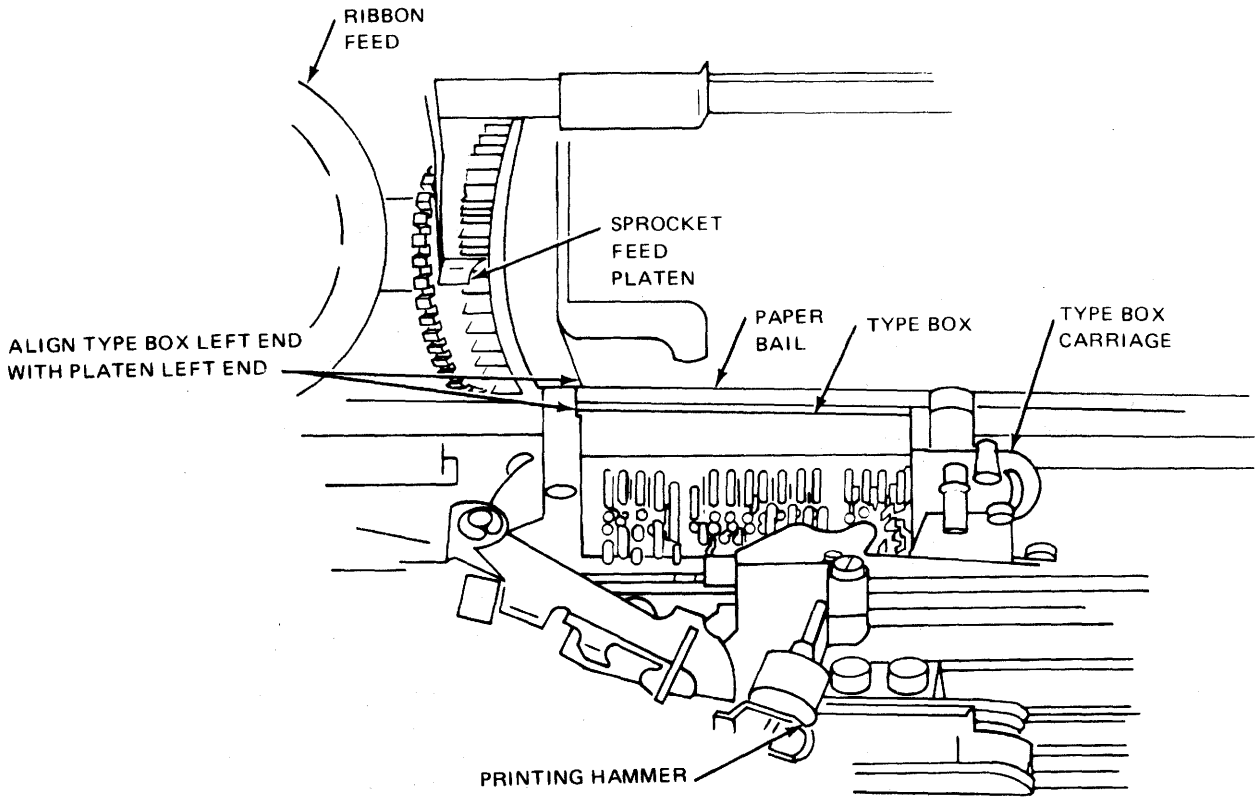


Figure 6-1. Left Margin Measurement (Top View).

h. Set teletypewriter ON-OFF switch to ON.

i. Depress carriage RETURN and LINE FEED keys.

j. Repeat steps 4 a. and 4 b..

k. Close lower and upper covers.

l. Set ON LINE/OFF LINE switch on the I/O Console control panel to ON LINE.

m. Return I/O Console to normal condition.

6-8. Keyboard Hammer Bearing Stud Adjustment. To adjust the hammer bearing stud, perform normal turn-on procedure (paragraph 6-6), see figures 6-4 and 6-5, and proceed as follows:

1. Release latches, and open upper and lower covers.

2. Ensure teletypewriter ON-OFF switch to ON.

3. Depress SHIFT and ? keys on keyboard.

4. Set teletypewriter ON-OFF switch to OFF.

5. Adjust printing hammer bearing stud.

a. Release print box clutch on left end of printer unit main shaft by momentarily lifting the print box clutch trip lever while rotating the main shaft counterclockwise (see figure 6-4). Continue to rotate main shaft slowly until the printing hammer strikes the type pallet.

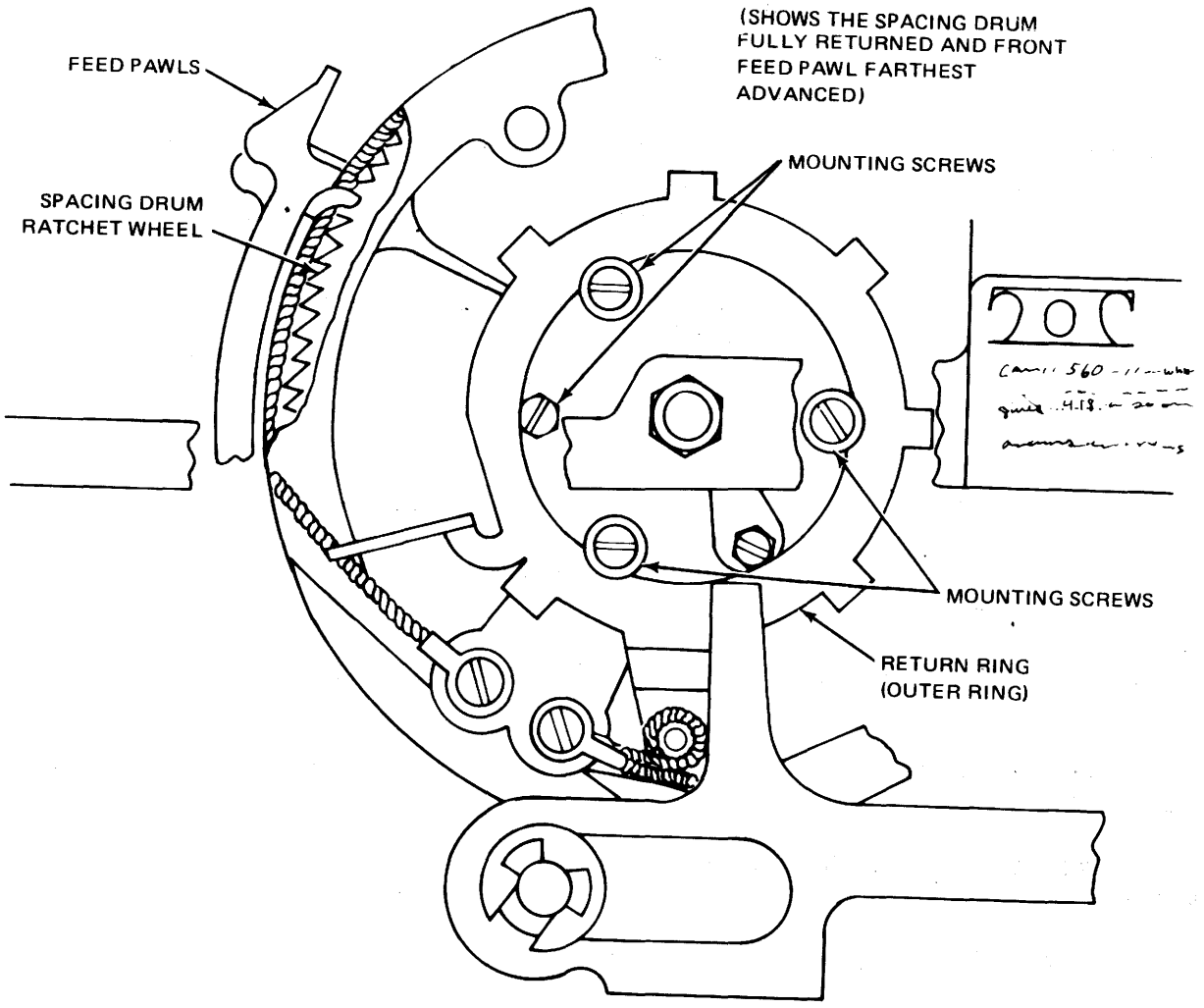


Figure 6-2. Left Margin Adjustment (Front View).

NOTE

Printer unit main shaft can be turned counterclockwise by rotating the motor fan counterclockwise as viewed from the right side.

b. Verify that printing hammer bearing stud has at least two-thirds vertical contact with type pallet (see figure 6-5); then proceed to step 5 d..

If requirement is not met, proceed to step 5 c..

c. Add or delete shims until requirement of step 5 b. is met. When checking, take up play in hammer operating bail by pushing downward on post.

d. Set teletypewriter ON-OFF switch to ON.

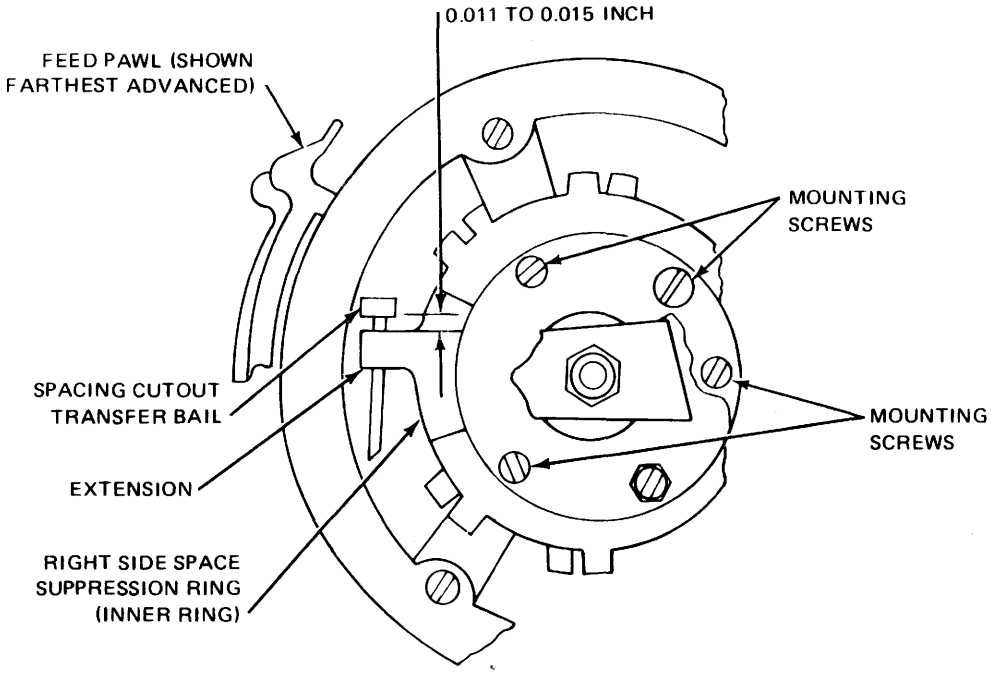


Figure 6-3. Right Margin Adjustment.

e. Close lower and upper covers.

f. Set ON LINE/OFF LINE switch on the I/O Console control panel to ON LINE.

g. Return I/O Console to normal readiness condition.

6-9. Keyboard Hammer Stop Bracket Adjustment. To adjust hammer stop bracket, perform normal turn-on procedure (paragraph 6-6), see figures 6-4 and 6-6, and proceed as follows:

1. Release latches, and open upper and lower covers of teletypewriter.

2. Ensure teletypewriter ON-OFF switch is ON.

3. Depress SHIFT and ? keys on keyboard.

4. Set teletypewriter ON-OFF switch to OFF.

5. Adjust printing hammer stop bracket.

a. Release print box clutch at left end of printer unit main shaft by momentarily lifting print box clutch trip lever while rotating main shaft counterclockwise (see figure 6-4). Continue to rotate main shaft until printing hammer strikes type pallet (see figure 6-6).

NOTE

Printer unit main shaft can be turned counterclockwise by rotating motor fan counterclockwise as viewed from right side.

b. While applying 8 ounces of pressure to printing mechanism, loosen stop bracket mounting screw and move stop bracket to obtain clearance of 0.0175 (0.005 to 0.035) inch between printing hammer bearing stud and type pallet (see figure 6-6).

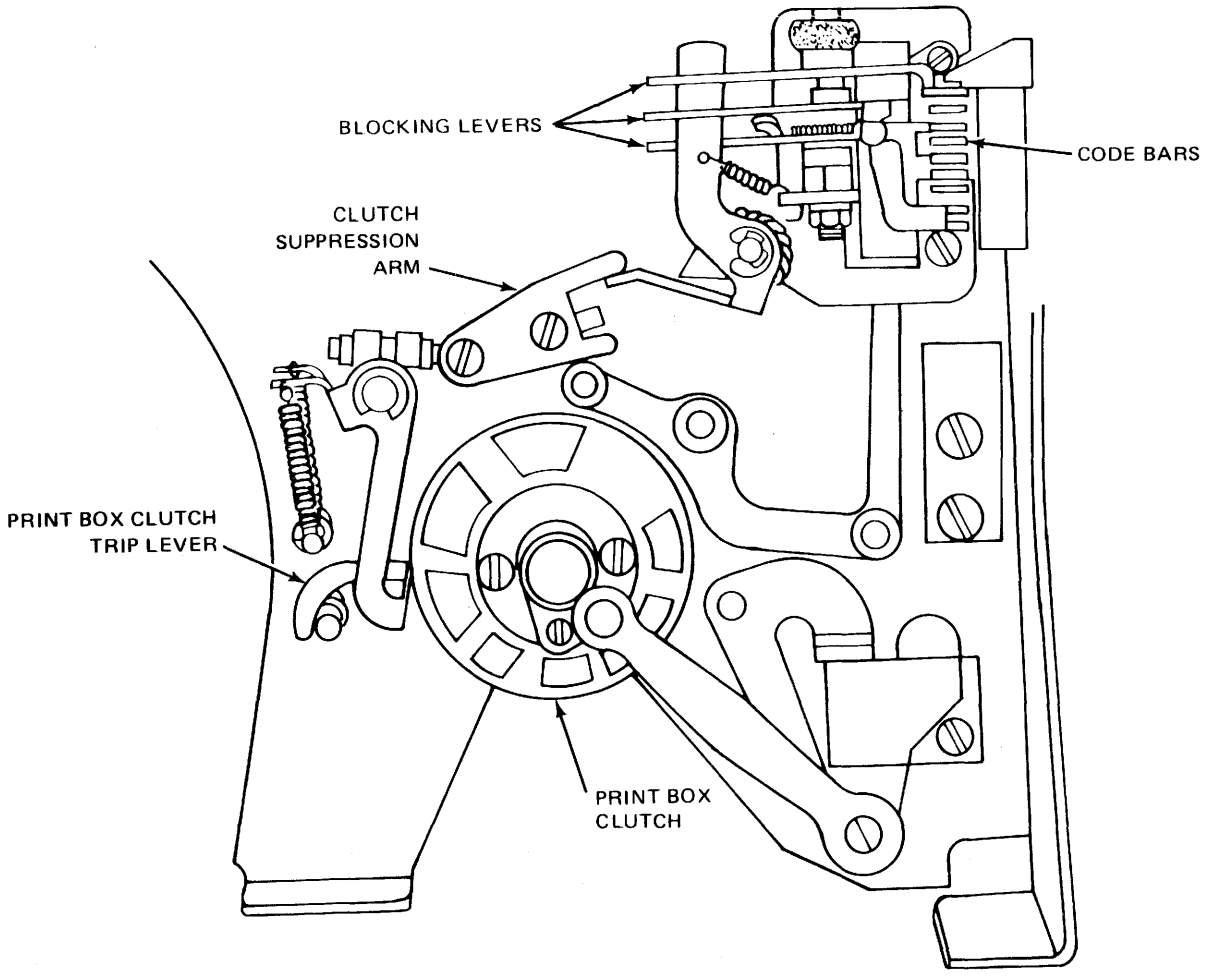


Figure 6-4. Print Box Clutch Trip Lever.

c. Tighten mounting screw.

d. Set teletypewriter ON-OFF switch to ON.

e. Depress C key on keyboard.

f. Set teletypewriter ON-OFF switch to OFF.

g. Repeat step 5 a..

h. Apply 8 ounces of pressure to printing mechanism, and verify that spacing between printing hammer bearing stud and type pallet is 0.0175 (0.005 to 0.035) inch; then proceed to step 5 i.. If requirement is not met, repeat step 5 b..

NOTE

It may be necessary to repeat steps 5 b. and 5 h. until requirements of both steps are met.

i. Set teletypewriter ON-OFF switch to ON.

j. Close lower and upper covers.

k. Set ON LINE/OFF LINE switch on the I/O Console control panel to ON LINE.

l. Return I/O Console to normal readiness condition.

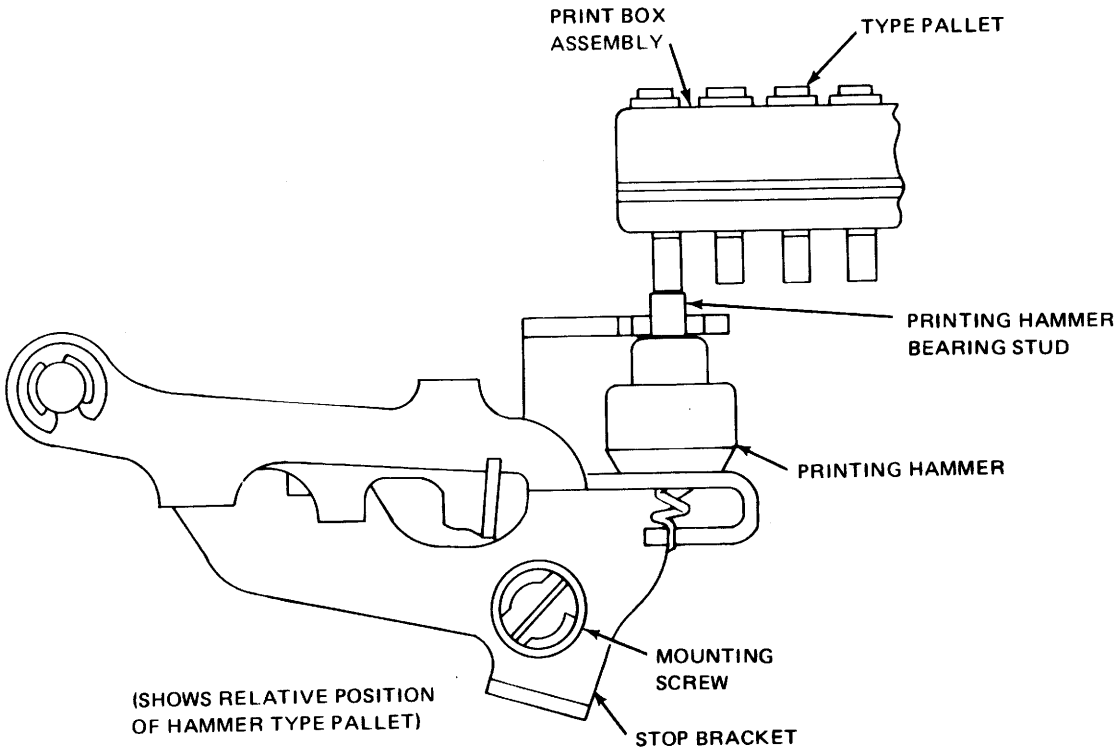


Figure 6-5. Printing Hammer Bearing Stud Adjustment.

6-10. Keyboard Dashpot Adjustment. To adjust keyboard dashpot, perform normal turn-on procedure (paragraph 6-6), see figure 6-7, and proceed as follows:

1. Release latches, and open upper and lower covers on teletypewriter.

2. Adjust dashpot to correct excessively hard carriage return (see figure 6-7).

a. Loosen dashpot vent screw locknut.

b. Rotate dashpot vent screw one quarter turn clockwise.

c. Move type box carriage to right margin using space bar.

d. Depress carriage RETURN key on keyboard.

e. Repeat steps 2 b. through 2 d. until a slight pneumatic bounce is perceptible.

NOTE

Pneumatic bounce effect occurs when carriage returns in steps instead of one continuous motion.

f. Tighten locknut.

3. Adjust dashpot to correct erratic carriage return.

a. Loosen dashpot vent screw locknut (see figure 6-7).

b. Rotate dashpot vent screw one quarter turn counterclockwise.

c. Move type box carriage to right margin using space bar.

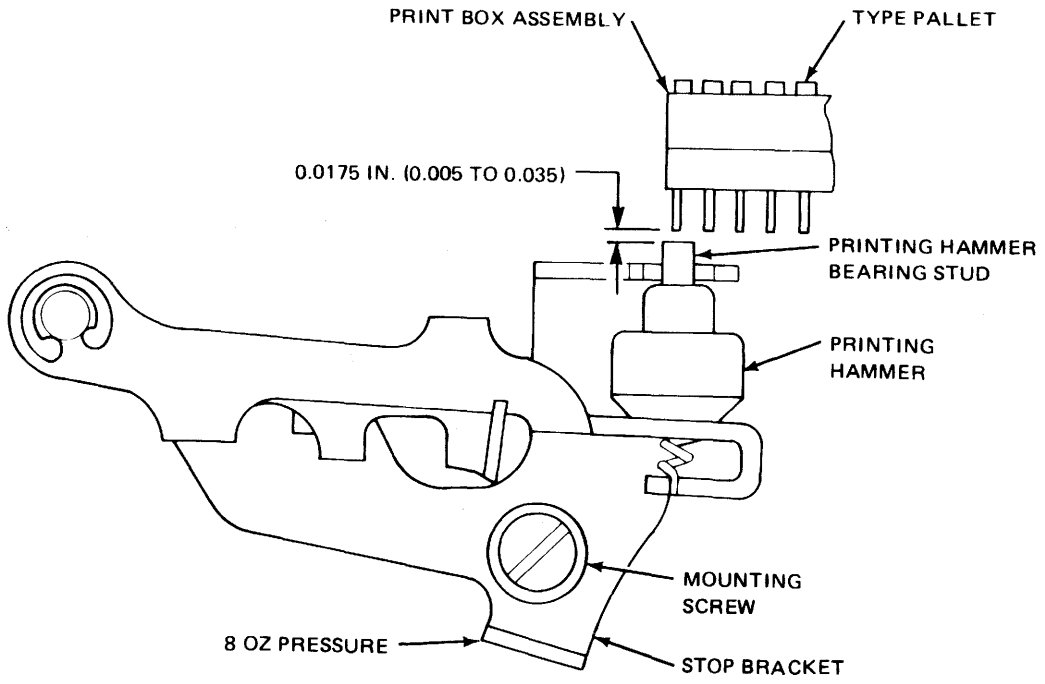


Figure 6-6. Print Hammer Stop Bracket Adjustment.

d. Depress carriage RETURN key on keyboard.

e. Repeat steps 3 b. through 3 d. until pneumatic bounce effect disappears.

f. Back off vent screw an additional one quarter turn; tighten locknut.

g. Set ON LINE/OFF LINE switch on I/O Console control panel to ON LINE.

h. Close teletypewriter lower and upper covers.

i. Return I/O Console to normal readiness condition.

6-11. Keyboard Carriage Adjustment. To adjust the keyboard carriage, perform turn-on procedure (paragraph 6-6), see figures 6-4 and 6-8, and proceed as follows:

1. Release latches, and open upper and lower covers on the teletypewriter.

2. Depress carriage RETURN key on keyboard.

3. Position the type box to approximate center of carriage.

4. Depress SHIFT and ▽ keys (▽ key is on number 7 key).

5. Ensure teletypewriter ON-OFF switch is OFF.

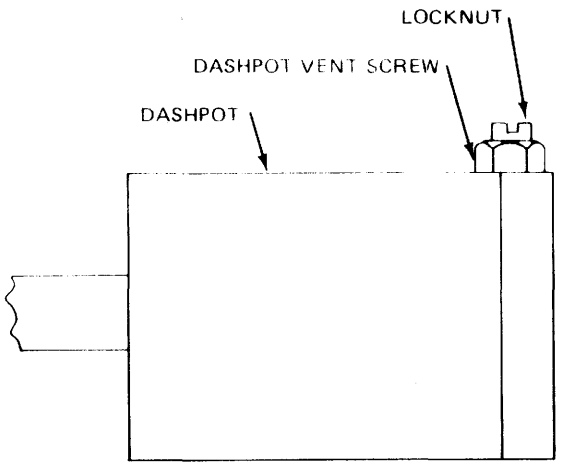


Figure 6-7. Dashpot Adjustment (Front View).

6. Adjust keyboard carriage position.

a. Release the print box clutch at left end of printer unit main shaft by momentarily lifting the print box clutch trip lever (see figure 6-4) while rotating main shaft counterclockwise. Continue to rotate main shaft until the printing hammer strikes the type pallet.

NOTE

Printer unit main shaft can be turned counterclockwise by rotating the motor fan counterclockwise as viewed from right edge.

b. Loosen two clamp screws (see figure 6-8).

c. Position the printing carriage by taking up play in printbox carriage alternately from left to right.

d. Tighten clamp screws.

NOTE

Print carriage must be secured at point where print hammer is in center of play.

e. Set teletypewriter ON-OFF switch to ON.

f. Close lower and upper covers.

g. Set ON LINE/OFF LINE switch on I/O Console control panel to ON LINE.

h. Return I/O Console to normal readiness condition.

6-12. Keyboard Lower Draw Wire Rope Adjustment. To adjust keyboard lower draw wire rope, see figures 6-4 and 6-9, and proceed as follows:

1. Set LOGIC POWER switch on I/O Console control panel to OFF.

2. Set 60-Hz CONSOLE POWER circuit breaker to OFF.

3. Set teletypewriter ON-OFF switch to OFF.

4. Remove printing unit in accordance with paragraph 6-49.

5. Adjust teletypewriter lower draw wire rope.

a. Manually position the printing carriage to extreme right.

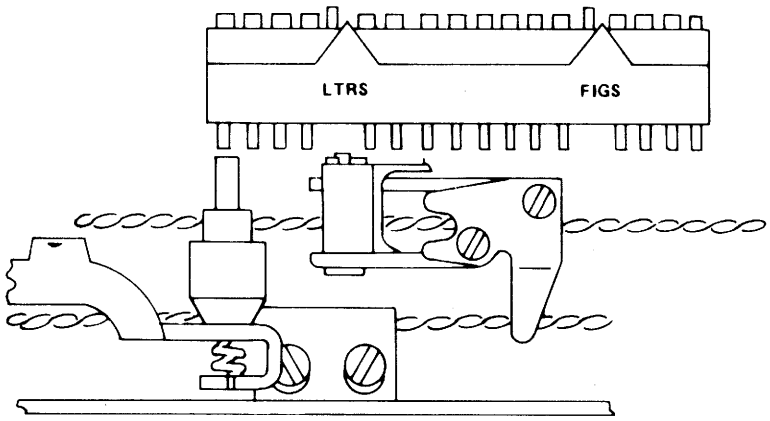


Figure 6-8. Printing Carriage Position Adjustment (Top View).

b. Release the print box clutch at left end of printer unit main shaft by momentarily lifting the print box clutch trip lever (see figure 6-4) while rotating main shaft counterclockwise. Continue to rotate main shaft until left horizontal positioning drive linkage is at its lowest position.(see figure 6-9).

NOTE

Printer unit main shaft can be turned counterclockwise by rotating the motor fan counterclockwise as viewed from right side.

c. Loosen pulley bearing stud mounting screws and rope clamp screw.

d. Adjust the pulley bearing studs to obtain the following:

(1) Minimum clearance of 0.006 inch between carriage return latch bail post and lower draw wire rope (see figure 6-9).

(2) Minimum clearance of 0.030 inch between left horizontal positioning drive linkage and lower draw rope (see figure 6-9).

e. Tighten pulley bearing stud mounting screws.

f. Ensure cable has moved around its equalizing clamps by gauging cable tension.

NOTE

Cable should have equal tension and can be gauged by feel.

g. Tighten rope clamp screw.

h. Verify print box alignment in accordance with paragraph 6-12.

i. Adjust left and right margins in accordance with paragraph 6-7.

j. Reinstall printing unit in accordance with paragraph 6-49.

k. Close upper and lower covers.

l. Return I/O Console to normal readiness condition.

6-13. Keyboard Print Box Alignment. To align the keyboard print box, perform turn-on procedure (paragraph 6-6), see figure 6-10, and proceed as follows:

1. On teletypewriter keyboard, type out a line containing characters E and Z, and last character containing any number (EZEZEZEZ...4).

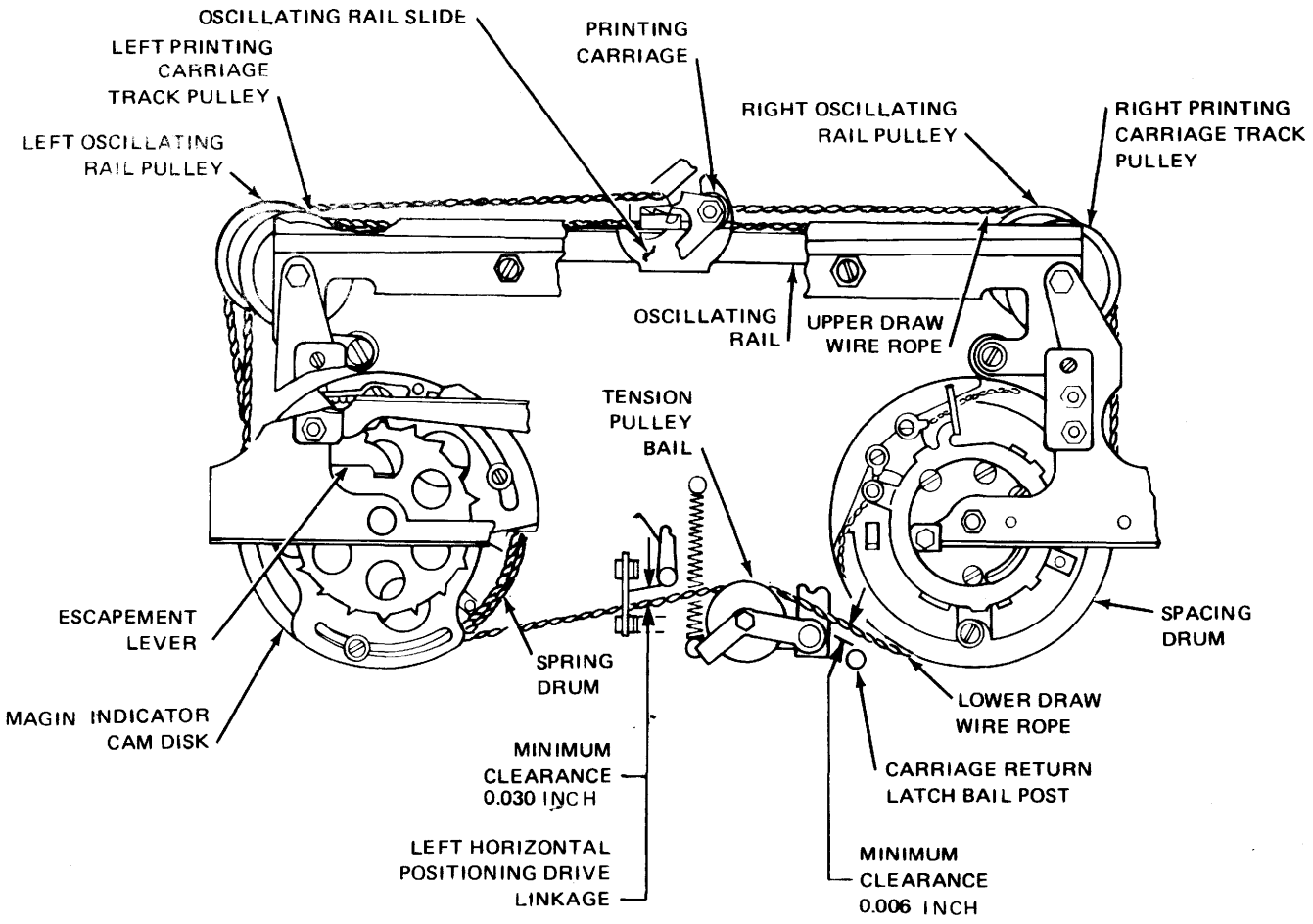


Figure 6-9. Lower Draw Wire Rope Adjustment (Front View).

2. Release latches, and open upper and lower covers.

3. Set teletypewriter ON-OFF switch to OFF.

4. Align teletypewriter print box.

a. Inspect printout to verify that printed impression of top and bottom of each character is equal. If impressions are equal, proceed to step 4 k.; if unequal, continue with step 4 b..

b. Remove print box in accordance with paragraph 6-49.

c. Loosen locknut while holding screw stationary (see figure 6-10).

d. Rotate adjusting screw one quarter turn clockwise to improve character printout at bottom; and counterclockwise to improve printout at top.

e. Tighten locknut while holding adjusting screw stationary.

f. Reinstall print box in accordance with paragraph 6-49.

g. Set teletypewriter ON/OFF switch to ON.

h. On keyboard, momentarily depress RETURN and LINE FEED keys.

i. Repeat steps 1 through 4 h. until the characters E and Z are printed with equal impressions.

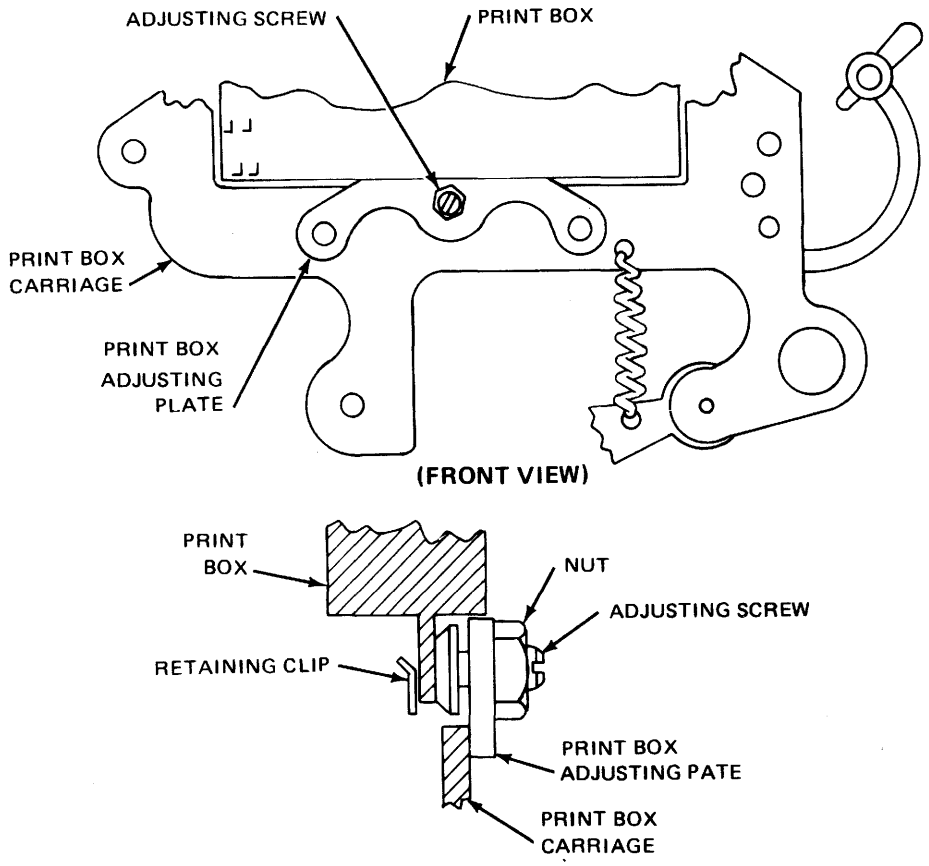


Figure 6-10. Print Box Alignment.

j. Adjust printing hammer stop bracket in accordance with paragraph 6-8.

k. Set teletypewriter ON-OFF switch to ON.

l. Close lower and upper covers.

m. Set ON LINE/OFF LINE switch on I/O Console control panel to ON LINE.

n. Return I/O Console to normal readiness condition.

6-14. Keyboard Rangefinder Knob Alignment. To align the keyboard rangefinder knob, perform turn-on procedure (paragraph 6-6), see figure 6-11, and proceed as follows:

1. Set teletypewriter ON-OFF switch to OFF.

2. Release latches, and open upper and lower covers.

3. Align keyboard rangefinder knob.

a. Push rangefinder knob toward the fixed index mark to engage teeth, and rotate knob to one end of rack (see figure 6-11).

b. Ensure inner teeth of rangefinder knob and teeth on rack are engaged.

c. Verify that the center mark of range scale is within 3 divisions of fixed index mark; then proceed to step 3 i.. If requirement is not met, continue with step 3 d..

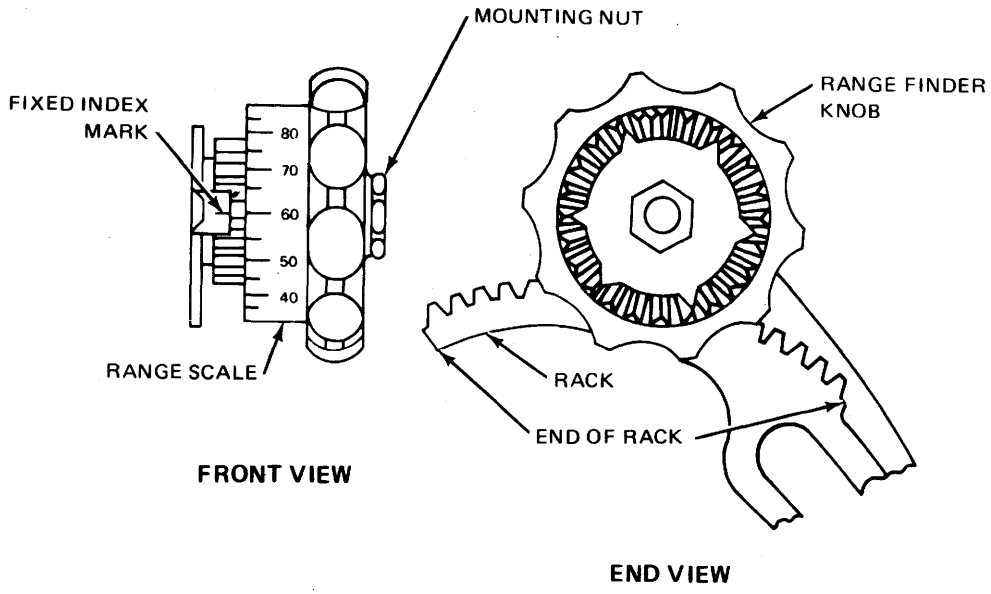


Figure 6-11. Rangefinder Knob Alignment.

d. Loosen knob mounting nut until teeth on knob disengage teeth on rack.

e. Rotate rangefinder knob until center mark of range scale is within 3 divisions of fixed index mark.

f. Depress knob until its teeth mesh with teeth on rack.

g. Tighten knob mounting nut while holding knob depressed.

h. Repeat steps 3 a. through 3 c..

i. Set teletypewriter ON-OFF switch to ON.

j. Adjust rangefinder mechanism in accordance with paragraph 6-15.

k. Close teletypewriter lower and upper covers.

l. Return I/O Console to normal condition.

6-15. Keyboard Rangefinder Mechanism Adjustment. To adjust keyboard rangefinder mechanism, perform turn-on procedure (paragraph 6-6), see figure 6-11, and proceed as follows:

1. Release latches on teletypewriter, and open upper and lower covers.

2. Ensure teletypewriter has an adequate supply of paper and printer ribbon is in satisfactory condition.

3. Ensure teletypewriter ON-OFF switch is ON.

4. Adjust keyboard rangefinder mechanism.

a. Type out a complete line of characters R and Y alternately, and adjust rangefinder knob clockwise until error is observed. Record range scale value (see figure 6-11).

b. Repeat step 4 a. and rotate rangefinder knob counterclockwise until error is observed. Record range scale value.

c. Calculate optimum range scale setting by adding the two recorded range scale values and dividing their sum by 2.

d. Position rangefinder knob to value calculated in step 4 c..

e. Type out a complete line of characters R and Y alternately, and observe that no errors are typed.

f. Close lower and upper covers on teletypewriter.

g. Set ON LINE/OFF LINE switch on I/O Console control panel to ON LINE.

h. Return I/O Console to normal readiness condition.

6-16. Keyboard Intermediate Gear Assembly Adjustment. To adjust keyboard intermediate gear assembly, see figure 6-12, and proceed as follows:

1. Turn I/O Console to OFF.

a. Set LOGIC POWER switch to OFF.

b. Set BLOWER POWER switch to OFF.

c. Set 60-Hz CONSOLE POWER circuit breaker to OFF.

2. Release latches on teletypewriter, and open upper and lower covers.

3. Remove printing unit in accordance with paragraph 6-52.

4. Adjust keyboard intermediate gear assembly.

a. Remove gear guard that extends over gear assembly by removing left rear motor unit mounting screw; reinstall screw to fasten motor unit in position.

b. Loosen four gear assembly mounting screws (see figure 6-12).

c. Loosen two locknuts that lock the vertical adjusting bushings, which allow vertical adjusting, at rear of gear assembly.

d. Loosen nut plate mounting screw, which allows fore and aft adjustment, at front of gear bracket.

e. Reinstall printing unit in accordance with paragraph 6-52.

f. Move assembly fore or aft, and adjust height to obtain backlash of 0.006 (0.004 to 0.008) inch between motor pinion and intermediate drive gear, and between typing unit driven gear and keyboard driving gear (see figure 6-12).

g. Tighten locknut and gear assembly mounting screw that fastens adjusting bushing nearest motor.

h. Rotate other bushing manually until it touches base plate; tighten locknut and gear assembly mounting screw.

NOTE

Height adjustment at rear can be accomplished by adjusting bushing nearest motor. If the gear assembly is to be lowered, other bushing must be turned counterclockwise to obtain clearance.

i. Remove printing unit gently in accordance with paragraph 6-52.

j. Tighten nut plate mounting screw.

k. Reinstall printing unit in accordance with paragraph 6-52.

l. Verify that requirments of step 4 f. are met; then proceed to step 4 p.. If requirements are not met, continue with step 4 n..

m. Repeat steps 4 b. through 4 l..

n. Reinstall gear guard.

o. Close teletypewriter lower and upper covers.

p. Set teletypewriter ON-OFF switch to ON.

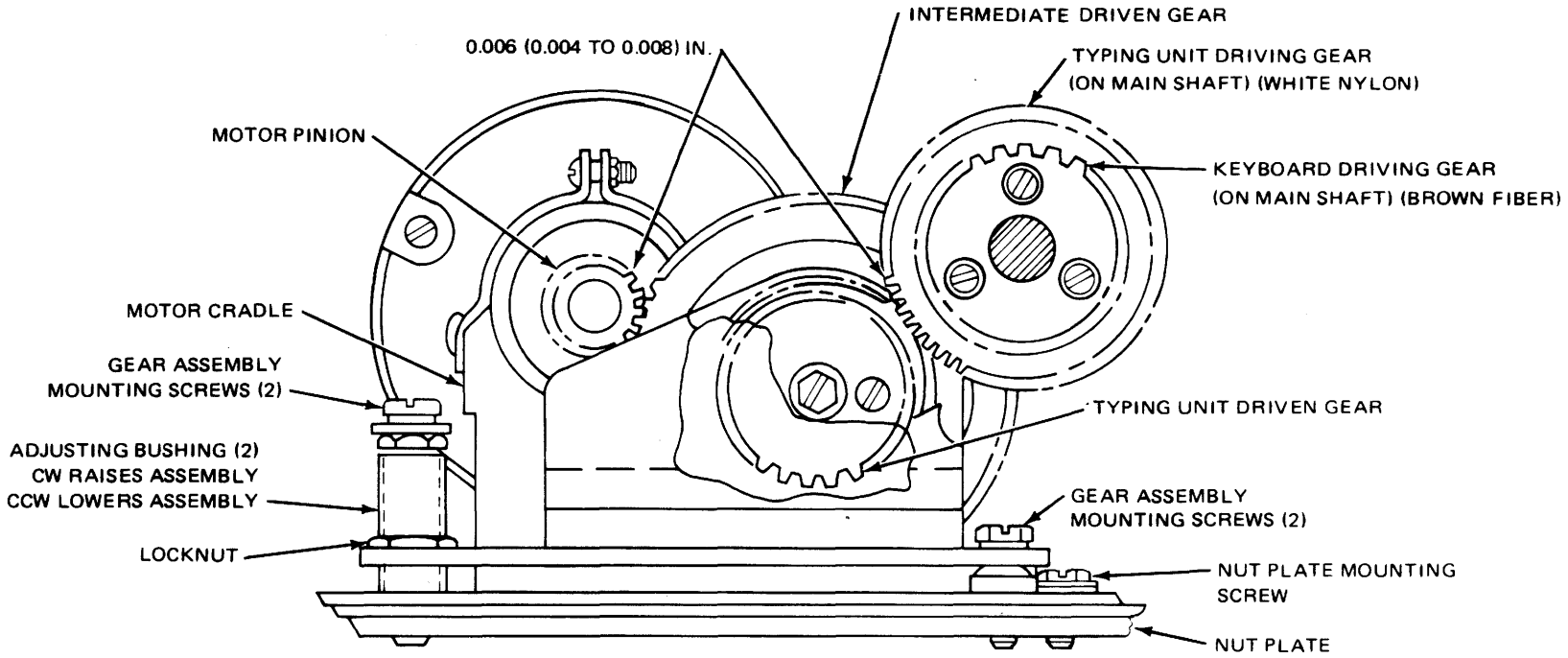


Figure 6-12. Intermediate Gear Assembly.

q. Return equipment to normal readiness condition.

6-17. Keyboard Signal Generator Gear Clearance Adjustment. To adjust the keyboard signal generator gear clearance, see figure 6-13, and proceed as follows:

1. Turn I/O Console to OFF.

a. Set LOGIC POWER switch to OFF.

b. Set BLOWER POWER switch to OFF.

c. Set CONSOLE 60-Hz POWER circuit breaker to OFF.

2. Release teletypewriter latches, and open upper and lower covers.

3. Remove printing unit in accordance with paragraph 6-52.

4. Adjust keyboard signal generator gear clearance.

a. Remove signal generator frame rear-mounting screws (see figure 6-13).

b. Loosen shim screw; add or remove shims so that a minimum perceptible amount of backlash exists between signal generator driven gear and driving gear at point where backlash is least.

c. Tighten shim screw; reinstall signal generator frame rear mounting screw.

d. Reinstall printing unit in accordance with paragraph 6-52.

e. Verify that the requirement of step 4 b. still exists; then proceed to step 4 g.. If requirement is not met, continue with step 4 f..

f. Repeat step 3 and steps 4 a. through 4 e. until proper clearance is obtained.

g. Close teletypewriter lower and upper covers.

h. Set teletypewriter ON-OFF switch to ON.

i. Return I/O Console to normal readiness condition.

6-18. READER ADJUSTMENTS. The reader adjustments and alignments covered in this section are: photodiode amplifier, pinch roller and drive belt tension. Normal turn-on procedure used for the reader is as follows, unless otherwise specified:

1. Turn power at the I/O Console control panel to ON.

a. Set 400-Hz CONSOLE POWER circuit breaker to ON.

b. Set 60-Hz CONSOLE POWER circuit breaker to ON.

c. Set BLOWER POWER switch to ON; observe BLOWER POWER indicator (lit) and blower motor (starts).

d. Set LOGIC POWER switch to ON; observe LOGIC POWER indicator (lit).

e. Set ON LINE/OFF LINE switch to OFF LINE.

f. Press MASTER CLEAR pushbutton.

g. Press READER switch.

6-19. PHOTODIODE AMPLIFIER ADJUSTMENTS. There are two methods of adjusting the photodiode amplifiers; one employing the use of the neutral density filter, and the other by adjusting the duty cycle of the sprocket and data channel outputs. The neutral density filter method is the more accurate and preferred method. The duty cycle method may be used as an alternate method. The adjustments must be made with the data amplifiers ungated by the sprocket signal. In gated units this can be done by disconnecting pins S and T (signals G1 and G2) of the input/output connector J2 (see figure 6-14).

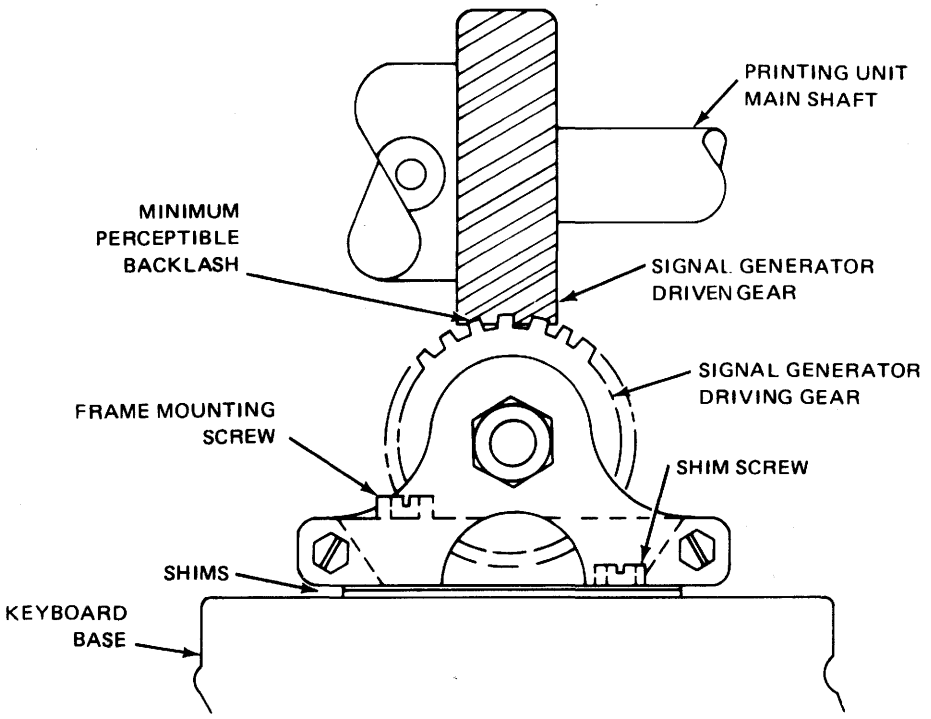


Figure 6-13. Signal Generator Frame.

6-20. NEUTRAL DENSITY FILTER METHOD. The neutral density filter (see table 6-1) has a neutral density of 50 percent, which means that only 50 percent of the light available from the exciter lamp will be passed through the filter. To adjust photodiode amplifier by the neutral density filter method, perform the following procedure:

1. Set tape reader ON/OFF switch to OFF.

2. Remove outside covers, and extend reader drawer.

3. Adjust photodiode amplifier.

a. Plug in oscilloscope; allow 15-minute warmup.

b. Connect jumper lead across common (c) and normally open (no) of READY/LOAD switch (S2) (see figure 6-14).

c. Check that pins Z (-15S) and AA (-15L) of connector J2 are shorted together. If not, short them together.

d. Set tape reader ON/OFF switch to ON. Apply AC power, and allow at least 15 minutes for unit to stabilize at ambient room temperature with exciter lamp on.

e. Check that lamp voltage is +8.6 (±0.5 volts). If not, adjust resistor R22 for proper voltage (see figure 6-14).

f. With READY/LOAD switch in LOAD position, place neutral density filter on top of photodiode head so that filter covers all of the photodiodes.

g. Adjust oscilloscope for a -15 volt signal, connect ground lead to reader signal OV (pin K of connector J2) and connect probe to sprocket output signal PSP (pin V of J2).

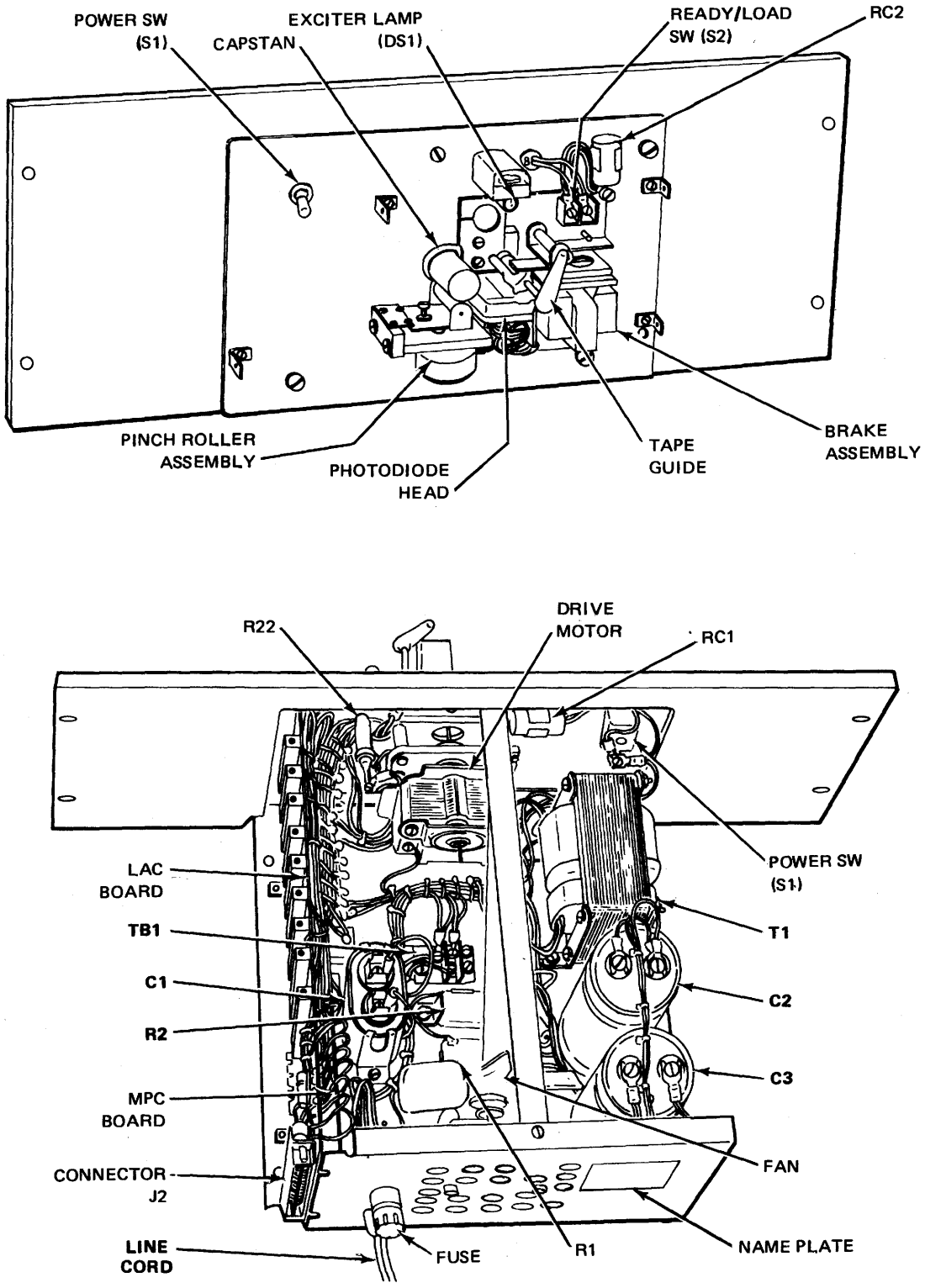


Figure 6-14. Reader Panel (Front and Rear Views).

CAUTION

In this unit, the DC return is not tied to the chassis. Therefore, for DC waveform and voltage measurements, signal OV, (pin K of connector J2) must be used for ground reference.

h. Adjust potentiometer R23 of sprocket channel circuit (see figure 6-15) so that sprocket output is negative (-15 volts).

i. Slowly readjust R23 to point where sprocket output just goes to 0-volts (see figure 6-15). Care should be taken to seek this point as accurately as possible.

j. Repeat steps g., h., and i. for each data channel output, signals PD-1 through PD-8 (pins A through J respectively of connector J2).

k. Disconnect oscilloscope from pin K and V of connector J2 after last adjustment. Remove probe.

l. Remove neutral density filter from top of photodiode head.

m. Set READY/LOAD switch to READY.

n. Remove jumper from common (c) and normally open (no) terminals of READY/LOAD switch S2.

4. Set reader ON/OFF switch to OFF.

5. Install reader cover, and close reader drawer.

6. Set ON LINE/OFF LINE switch on the I/O Console control panel to ON LINE.

7. Return I/O Console to normal condition.

6-21. DUTY CYCLE METHOD. The duty cycle method of adjusting the amplifiers is done by monitoring the sprocket and data channel outputs with an oscilloscope while the reader is slewing a test tape that is fully punched, and adjusting the ON/OFF ratio of the output signals. The neutral density filter method is preferred to this method because the reader is adjusted to a test tape and the adjustments will vary from tape to tape, while with the neutral density method the reader is adjusted to a fixed standard. To adjust, perform the following procedure:

1. Set tape reader ON/OFF switch to OFF.

2. Remove outside covers, and extend reader drawer.

3. Adjust photodiode amplifier by duty cycle method.

a. Plug in oscilloscope; allow 15-minute warmup.

b. Check that pins Z (-15S) and AA (-15L) of connector J2 are shorted together. If not, short them together.

c. Set tape reader ON/OFF switch to ON. Apply AC power, and allow at least 15 minutes for unit to stabilize at ambient room temperature with exciter lamp on.

d. Check that lamp voltage is +8.6 (±0.5 volts). If not, adjust resistor R22 for proper voltage (see figure 6-14).

f. Adjust oscilloscope for a -15 volt signal; connect ground lead to reader OV (pin K of connector J2), and connect probe to sprocket output signal PSP (pin V of J2).

CAUTION

In this unit, the DC return is not tied to the chassis. Therefore, for DC waveform and voltage measurements, signal OV (pin K of connector J2) must be used for ground reference.

g. Set READY/LOAD switch to LOAD.

h. Load test tape.

AMPLIFIER ADJUSTMENT LOCATIONS

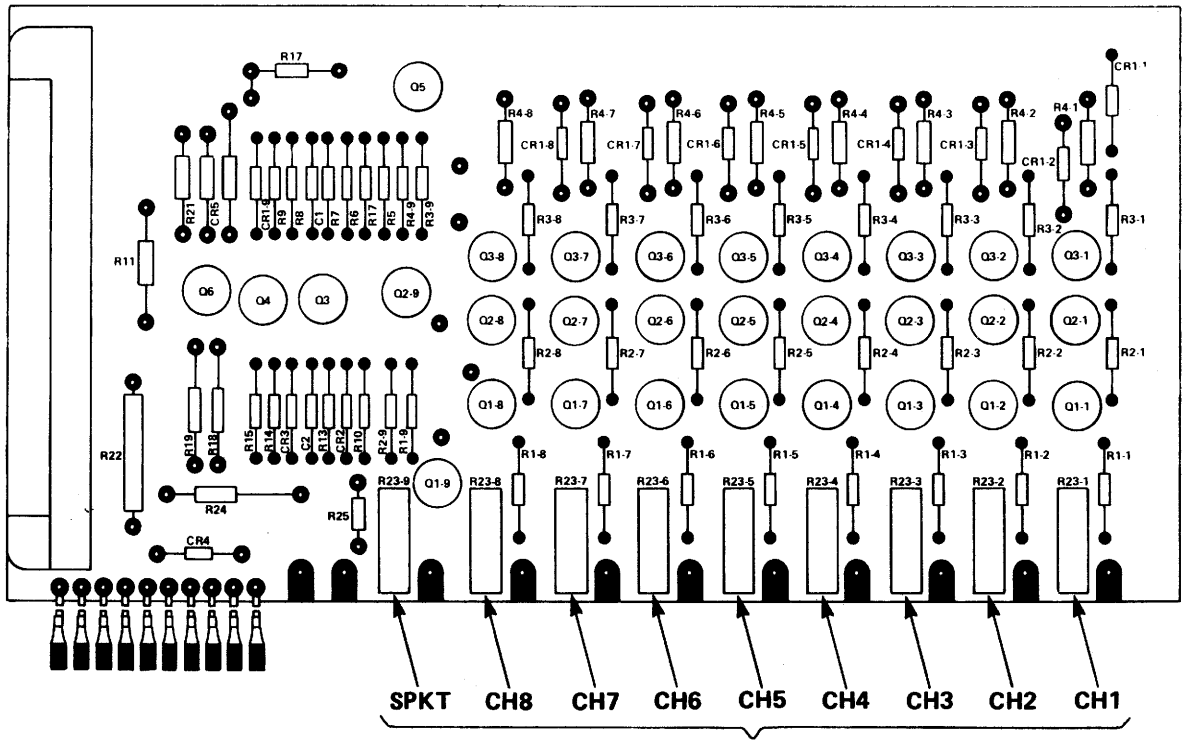


Figure 6-15. LAC Board Locations (Sheet 1 of 2).

PHOTODIODE HEAD CONNECTIONS ON LAC BOARD

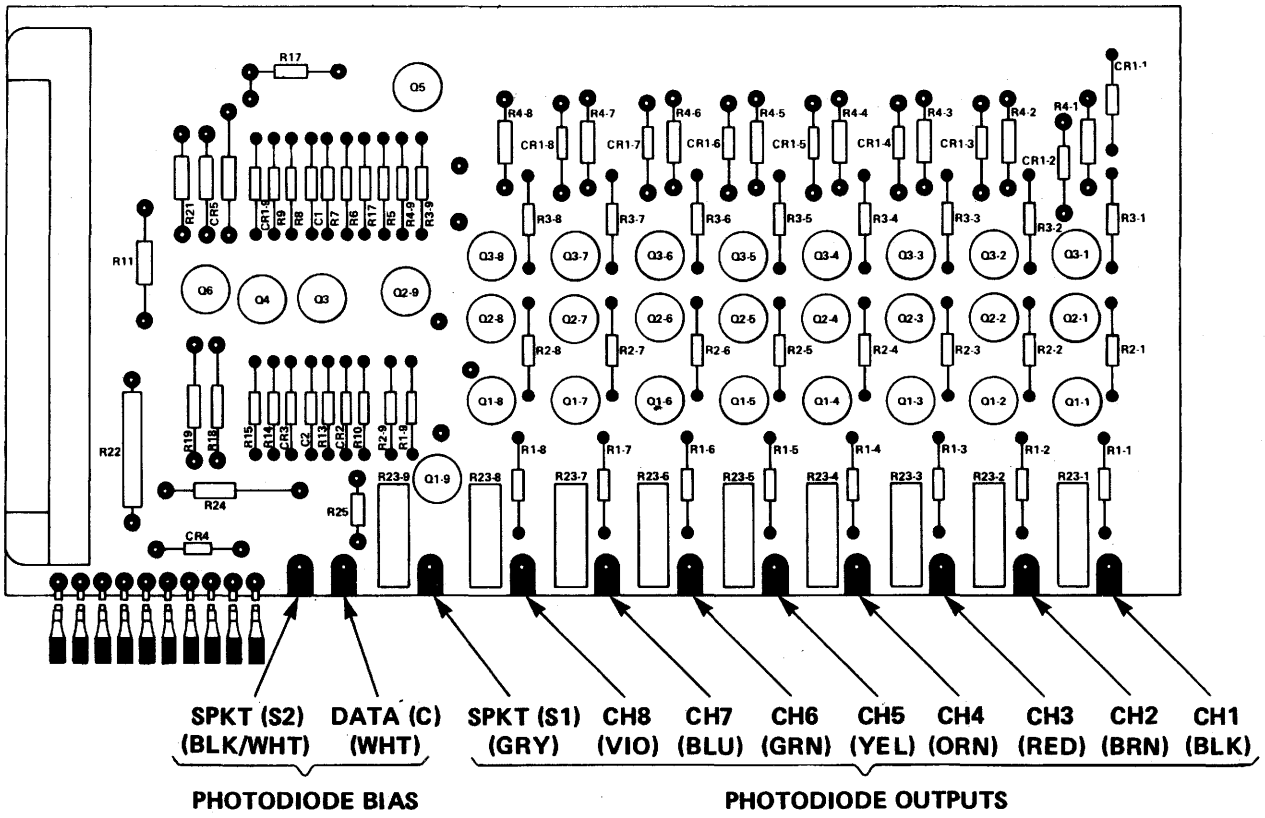


Figure 6-15. LAC Board Locations (Sheet 2 of 2).

i. Set READY/LOAD switch to READY. Apply a run signal so that reader will slew test tape.

j. Adjust oscilloscope for one full cycle of signal PSP equal to ten divisions of oscilloscope scale.

k. Adjust potentiometer R23 of sprocket channel (see figure 6-15) so that signal PSP is negative (-15 volts) for 40 percent of cycle, and 0-volts for 60 percent of cycle.

l. Connect oscilloscope probe to data channel 1 output signal PD-1 (pin A of J2).

m. Adjust oscilloscope for one full cycle of PD-1 signal equal to 10 divisions of oscilloscope scale.

n. Adjust potentiometer R23 of data channel 1 (see figure 6-15) so that signal PD-1 is negative (-15 volts) for 70 percent of cycle, and 0-volts for 30 percent of cycle.

o. Repeat steps l., m., and n. for the remaining data channels PD-2 through PD-8 (pins B through J on connector J2).

p. Disconnect oscilloscope lead and probe after final adjustment.

q. Set READY/LOAD switch to LOAD.

r. Remove test tape.

4. Set tape reader ON/OFF switch to OFF.

5. Install reader cover and secure reader drawer.

6. Set ON LINE/OFF LINE switch on I/O Console panel to ON LINE.

7. Return I/O Console to normal condition.

6-22. Reader Pinch Roller Alignment and Adjustment. To align the reader pinch roller vertically and horizontally, and adjust the pinch roller-capstan gap, perform reader turn-on procedure (paragraph 6-18), see figures 6-15 and 6-16, and proceed as follows:

1. Set OFF/LOAD/RUN switch on reader to OFF.

2. Remove reader covers, and pull out electrical equipment chassis (see figure 6-15).

3. Align reader pinch roller vertically (see figure 6-16).

a. Loosen two pinch roller assembly mounting screws on front of mounting bracket.

b. Adjust pinch roller/capstan gap by using a feeler inserted between the rollers to determine that gap spacing is equal at both ends of the rollers or tape skewing will occur during operation.

c. Tighten mounting screws snug but not completely tight.

4. Align reader pinch rollers horizontally.

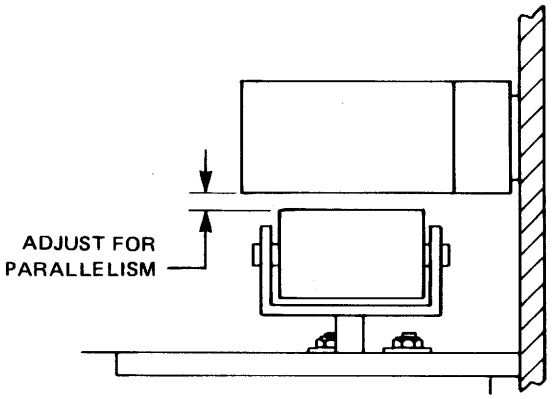
a. Loosen screws on pinch roller spring.

b. Ensure pinch roller engages capstan bottom center point to prevent tape rising off tape head.

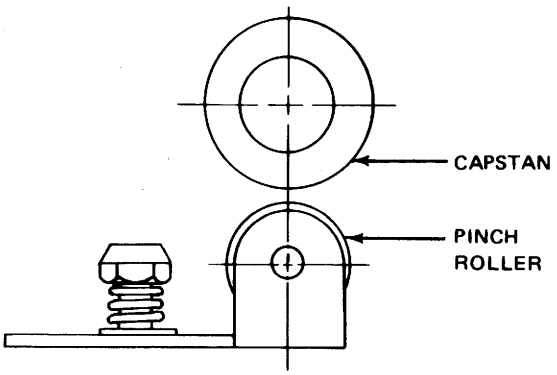
c. Tighten screws securely.

d. Rock pinch roller assembly (see figure 6-16) on front and back of bracket to ensure that the assembly is properly seated on the solenoid shaft.

e. Check for horizontal and vertical pinch roller-capstan parallel alignment.



(A) PINCH ROLLER AND PARALLELISM



(B) PINCH ROLLER/CAPSTAN CENTERLINE ADJUSTMENT

Figure 6-16. Pinch Roller/Capstan Alignment.

NOTE

Hexagonal head screws attaching roller bracket and flatspring to mounting bracket may have to be loosened, then retightened to meet requirement in step 4 e.. When performing this adjustment, care should be taken to keep pinch roller bracket and pinch roller assembly mounting bracket parallel.

5. Adjust pinch rollers-capstan gap.

a. Set reader READY/LOAD switch to LOAD.

b. Connect jumper between pins W and X (connector J2) together simulate run mode.

NOTE

When sliding feeler gauge in and out, a light drag should be felt.

c. A 0.008-inch feeler gauge inserted in direction of tape motion fits snugly, but does not cause pinch roller to turn at both ends of pinch roller.

d. Adjust pinch roller-capstan gap, if necessary.

e. Remove jumper, and tighten pinch roller assembly.

f. Repeat steps 5 a. through 5 e.. If requirement is not met, loosen pinch roller assembly and repeat steps 5 c. through 5 e..

g. Set reader OFF/ON switch to OFF.

h. Install reader cover, and close reader drawer.

i. Set ON LINE/OFF LINE switch on the I/O Console control panel to ON LINE.

j. Return I/O Console to normal condition.

6-23. Reader Drive Belt Tension Adjustment. To adjust the drive belt tension, see figures 6-14 and 6-17, and proceed as follows:

1. Set reader OFF/ON switch to OFF (see figure 6-14).

2. Remove front cover.

3. Adjust drive belt tension.

a. Loosen three capstan bearing block assembly mounting screws, and position capstan bearing block assembly in the center of its adjustment range.

b. Tighten mounting screws.

CAUTION

Clearance between drive motor and electronics unit printed circuit board (see figure 6-14) must be a minimum of 0.015 inch to prevent shorting to motor.

c. Loosen three drive motor mounting screws, and shift motor until belt tension allows approximately a 3- to 4-pound force to displace the driving belt 1/4-inch measured from the top center of drive belt.

d. Tighten drive motor mounting screws.

e. If requirement in step 3 c. is met, continue with step 3 e.; if requirement in step 3 c. is not met, loosen the three capstan bearing block assembly mounting screws and adjust capstan bearing block assembly until requirement is met.

f. Perform reader pinch roller alignment and adjustment (paragraph 6-22).

g. Return I/O Console to normal condition.

6-24. PUNCH ADJUSTMENTS. Punch adjustments discussed in the following paragraphs are: punch base component, magnetic pickup, punch pin, punch block drag links, tape guide, biasing spring, code hole interval, stop plate and long toggle arm spring, armature springs, magnetic plate, punch motor and timing belt. Normal turn-on and turnoff procedures unless otherwise directed are as follows:

1. Normal turn-on procedure for punch at I/O Console control panel.

a. Set 400-Hz CONSOLE POWER circuit breaker to ON.

b. Set 60-Hz CONSOLE POWER circuit breaker to ON.

c. Set BLOWER POWER switch to ON; observe BLOWER POWER indicator (lit) and blower motor (starts).

d. Set LOGIC POWER switch to ON; observe LOGIC POWER indicator (lit).

e. Set ON LINE/OFF LINE switch to OFF LINE.

f. Press MASTER CLEAR switch.

2. Normal turnoff for punch at I/O Console control panel.

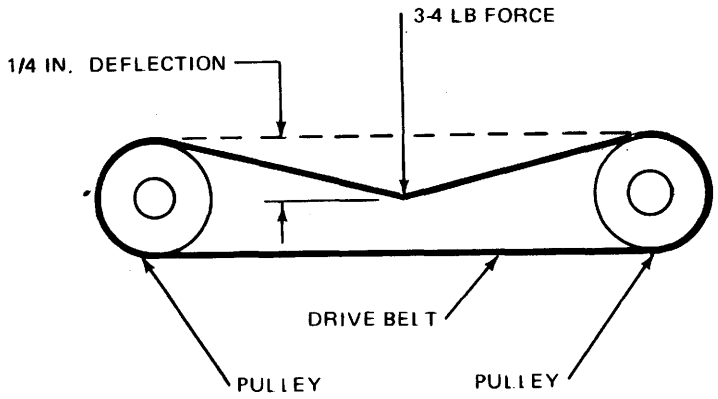


Figure 6-17. Drive Belt Tension Adjustment.

a. Press MASTER CLEAR pushbutton.

b. Set LOGIC POWER switch to OFF.

c. Set BLOWER POWER switch to OFF.

6-25. Punch Base Component Adjustments. The punch base components discussed in this paragraph are: low tape contacts, low tape contact bracket, tape reel brake spring, and low tape lever spring. To adjust the punch base components, perform turnoff procedure (paragraph 6-24, step 2), see figures 6-18, 6-19, 6-20 and 6-21, and proceed as follows:

1. Remove tape punch in accordance with paragraph 6-66.

2. Remove tape spool.

3. Remove plastic protective cover from low tape contacts assembly.

4. Adjust low tape contacts (see figure 6-18).

a. Hold low tape lever away from swinger, and verify that gap at rear contact is 0.025 to 0.035 inch. If this requirement is met, proceed to step 4 c.. If requirement is not met, continue with step 4 b..

b. Bend stiffener slightly, and repeat step 4 a..

c. Attach scale to swinger contact.

d. Verify that force required to open front contact is 4.0 to 5.0 ounces, then proceed to step 5 a.. If requirement is not met, continue with step 4 e..

e. Bend swinger contact spring slightly, and repeat 4 d..

f. Repeat step 4 a..

5. Adjust low tape contact bracket (see figure 6-19).

a. Install a roll of tape with 1/2 inch of tape remaining on reel.

b. Loosen contact bracket mounting screws so that they are only friction tight.

c. Position contact bracket so that contact just closes.

d. Tighten mounting screws.

e. Remove tape roll.

6. Adjust tape reel brake spring (see figure 6-20).

a. Attach 20-ounce scale to tape reel brake.

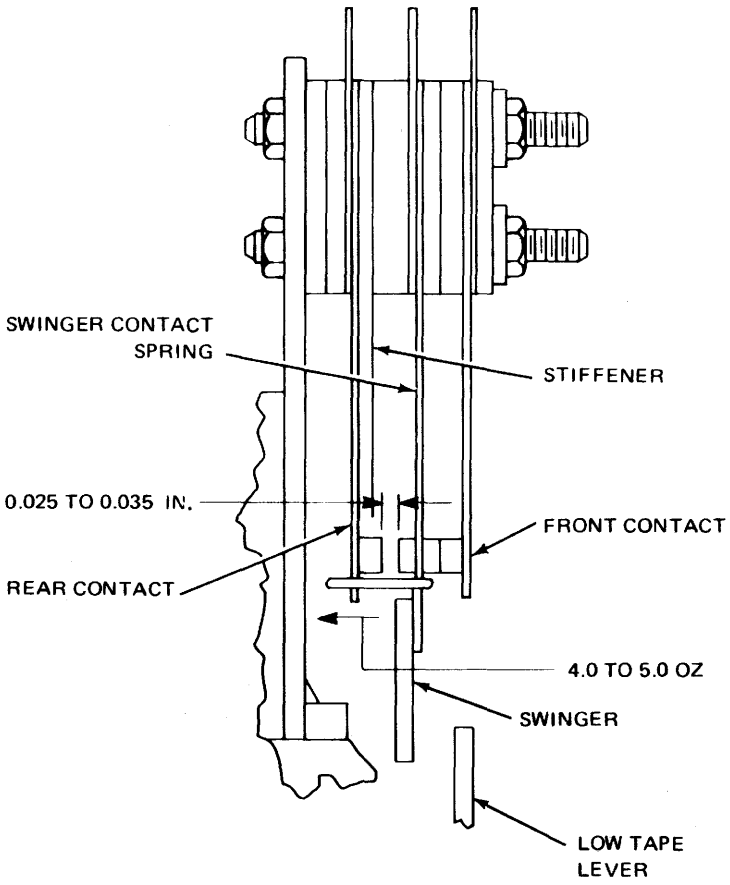


Figure 6-18. Low Tape Contacts (View from Motor Side).

b. Verify that force required to move tape reel brake is 12.0- to 15.0-ounce, then proceed to step 7 a.. If requirement is not met, replace spring.

c. Repeat steps 6 a. and 6 b..

7. Adjust low tape lever spring (see figure 6-21).

a. Place full roll of tape on reel.

b. Attach 20-ounce scale to low tape lever.

c. Verify that force required to move low tape lever is a minimum of 1.5 ounces, then proceed to step 8; if requirement is not met, replace spring.

d. Repeat steps 7 b. and 7 c.

8. Reassemble punch by reversing steps 1, 2, and 3.

9. Return equipment to normal readiness condition.

6-26. Punch Magnetic Pickup Adjustment. To adjust punch magnetic pickup, perform turnoff procedure (paragraph 6-24, step 2), see figure 6-22, and proceed as follows:

1. Remove punch unit in accordance with paragraph 6-66.

2. Adjust punch magnetic pickup.

a. Loosen two screws that secure magnetic pickup to mounting plate (see figure 6-22).

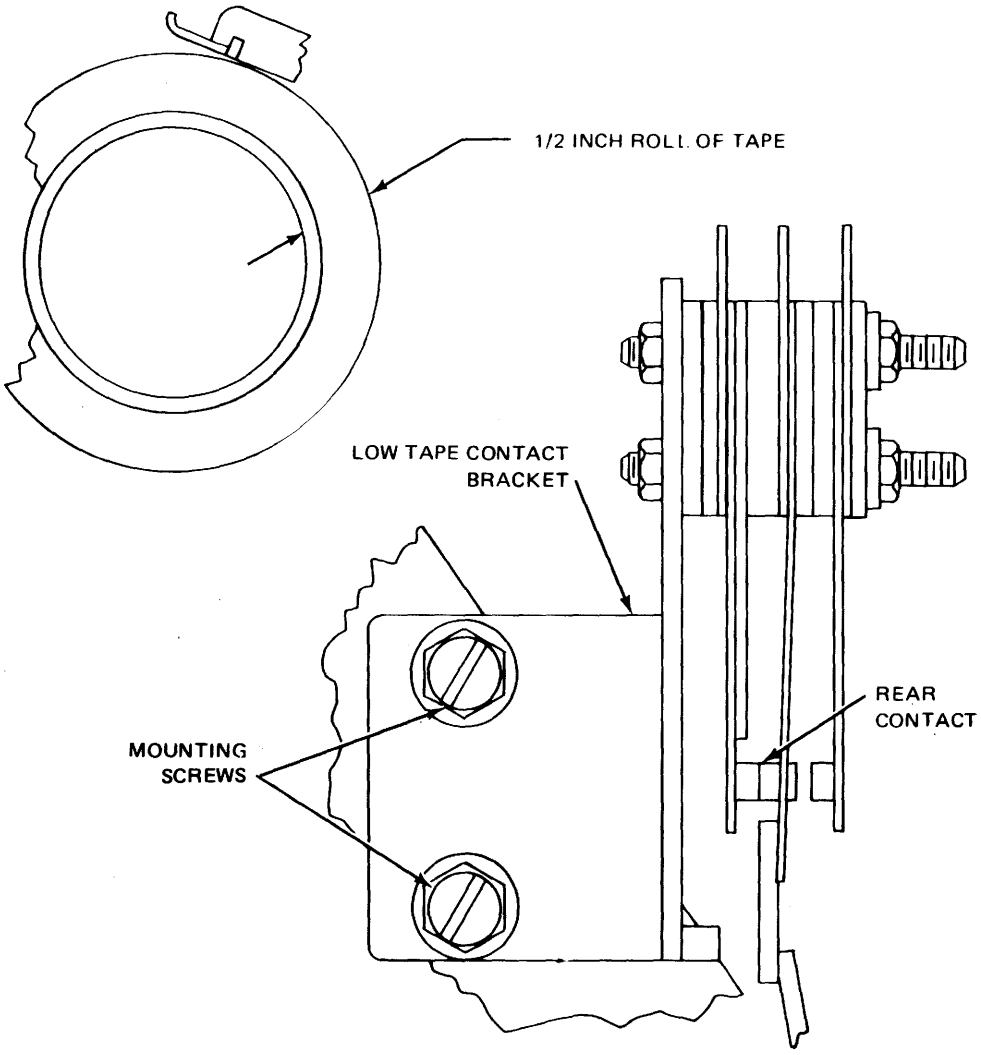


Figure 6-19. Low Tape Contacts (Motor Side).

b. Position magnetic pickup to obtain clearance of 0.0075 (0.005 to 0.01) inch between flywheel and magnetic pickup.

c. Tighten two screws.

d. Recheck clearance; readjust if necessary.

e. Reinstall punch unit in accordance with paragraph 6-66.

f. Return equipment to normal readiness condition.

6-27. Punch Pin, Punch Block Drag Links, Tape Guide, and Biasing Spring Adjustment. To adjust the punch pin, punch block drag links, tape guide, and biasing spring, perform turnoff procedure (paragraph 6-24, step 2.); see figure 6-23, 6-24, 6-25, 6-27, and 6-28, and proceed as follows:

1. Remove punch unit in accordance with paragraph 6-66.

2. Adjust punch pin (see figures 6-23 and 6-24).

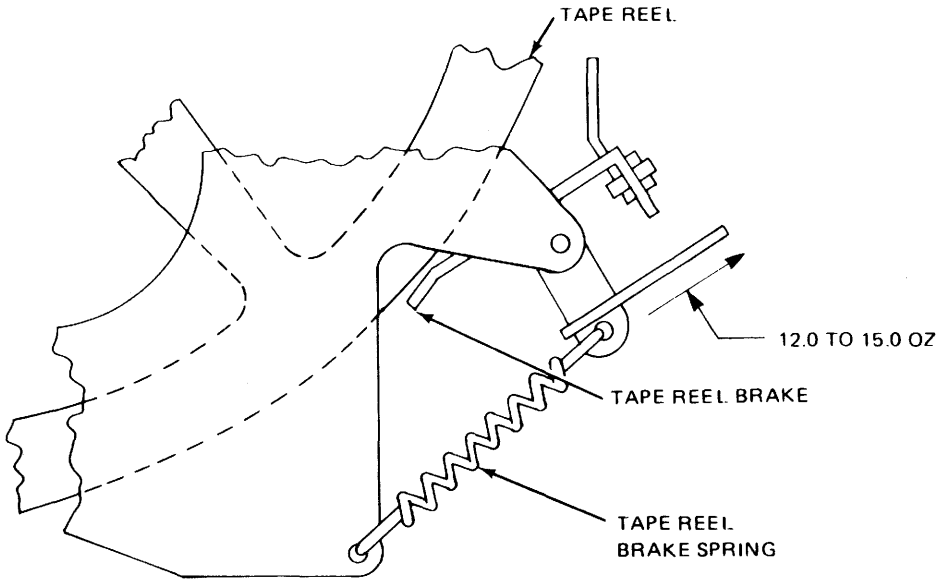


Figure 6-20. Tape Reel Brake Spring.

a. Remove tape punch unit cover (see figure 6-23).

b. Remove tape from punch block.

c. Remove two punch block mounting screws (see figure 6-24).

d. Remove two screws that hold punch block bracket, and remove bracket.

e. Remove screw that fastens chad chute to punch block.

f. Remove screw that fastens chad chute to base plate.

g. Remove punch block.

h. Verify punch pins move freely in punch block with a minimum clearance between punch pins and retaining plate. If minimum clearance exists, proceed with step 2 l.; if not, continue with step 2 i..

i. Loosen retaining plate mounting screws.

j. Position retaining plate to meet requirements of step 2 h..

k. Tighten retaining plate mounting screws.

l. Reinstall punch block by reversing procedures of steps 2 c. through 2 g..

3. Adjust punch block (see figures 6-25 and 6-26).

a. Verify that the clearance between drag links and punch pins is a maximum of 0.003 inch with no binding (see figure 6-25). If required clearance exists, proceed to step 4; if not, continue with step 3 b..

NOTE

If punch block is removed from unit for any reason, repeat step 1 before reinstalling it. Also, clean and lubricate the block.

b. Loosen punch block mounting screws and locating eccentric lock screw (see figure 6-26).

c. Adjust punch block by positioning either the locating eccentric or the punch block.

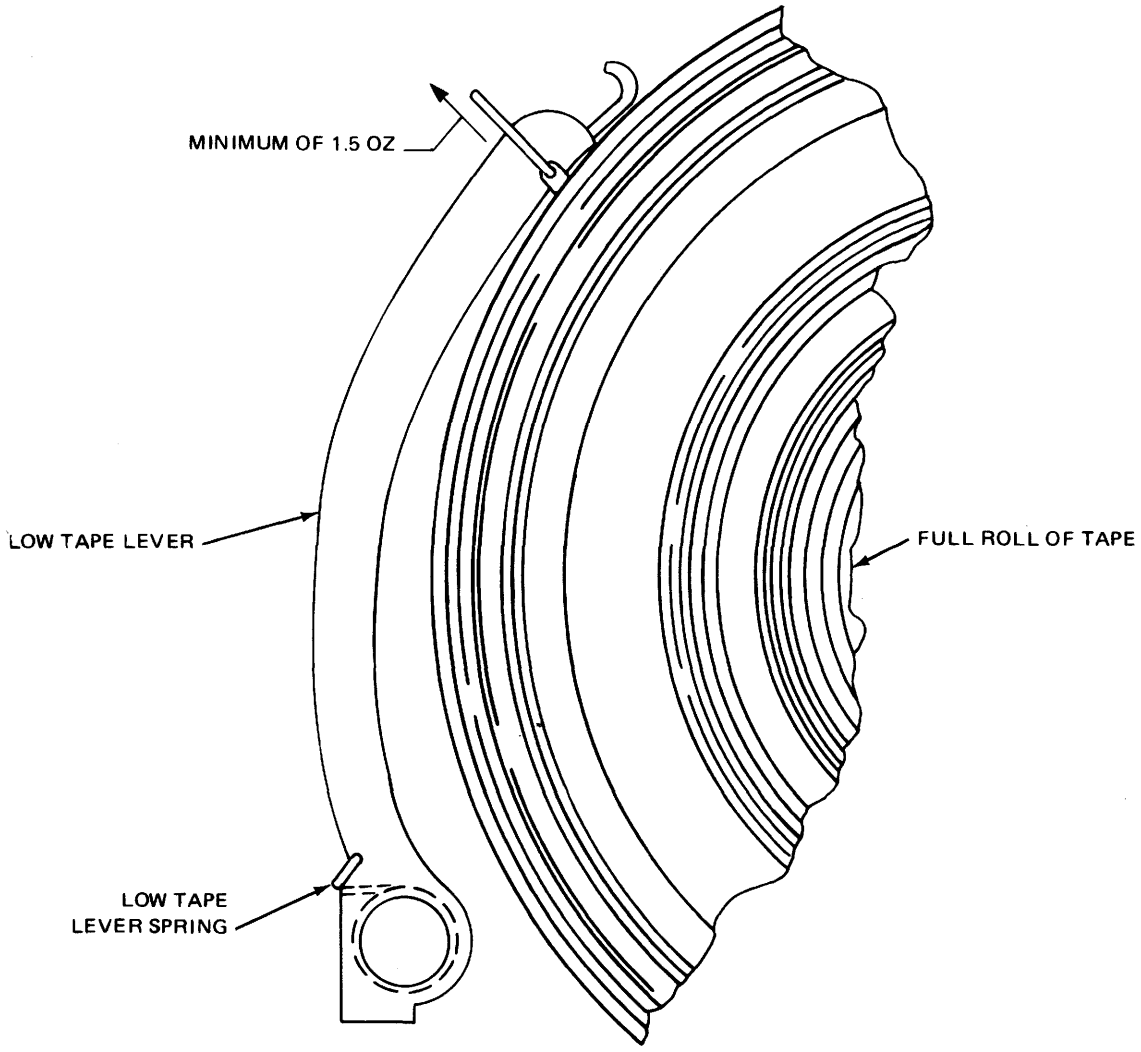


Figure 6-21. Low Tape Lever Spring.

d. Ensure each pin is free from binds.

e. Tighten locating eccentric screw and punch block mounting screws. Eccentric must rest against punch block.

f. Repeat step 3 a..

4. Adjust tape guide (see figures 6-23 and 6-27).

a. Rotate far side of main shaft (see figure 6-23) to ensure punch bail is in its highest position.

b. Loosen tape guide mounting screws until they are friction tight (see figure 6-27).

c. Lift tape lid arm to allow free passage of tape (see figure 6-23).

d. Position tape guide bracket to ensure tape passes freely from the bracket through the punch die plate (see figure 6-27).

e. Tighten tape guide mounting screws.

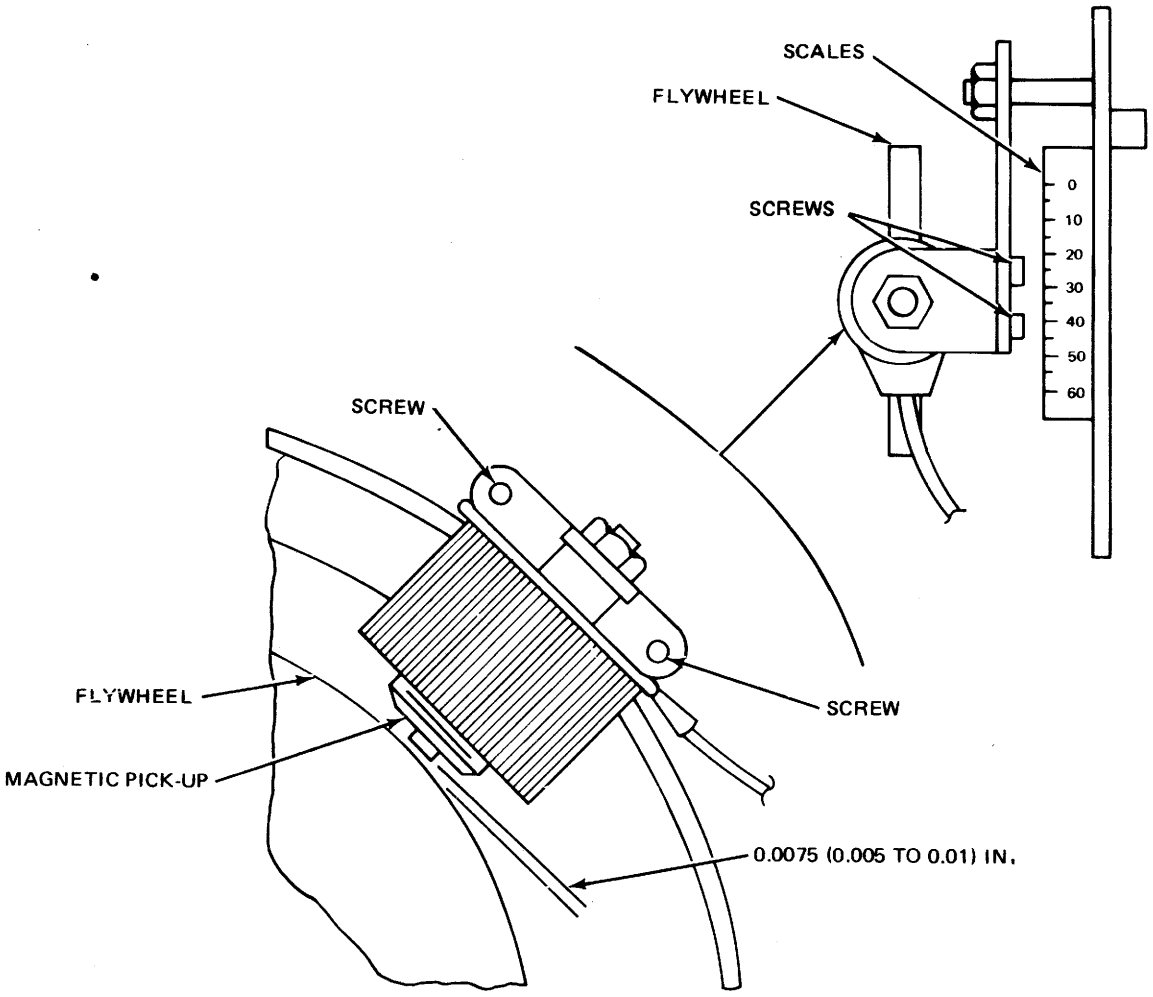


Figure 6-22. Magnetic Pickup Adjustment.

f. Reinstall tape punch unit in accordance with paragraph 6-66, do not close drawer.

5. Adjust drag links.

a. Insert two thicknesses of tape into punch block.

b. Perform punch turn-on procedure in accordance with paragraph 6-22.

c. Set ON LINE/OFF LINE switch to OFF LINE.

d. Press MASTER CLEAR switch.

e. Press ON/OFF LINE PUNCH switch.

f. Allow 10-minute idling time, then verify that no punch pin impressions or marks appear on upper surface of top thickness of tape. If requirement is met, press OFF LINE MASTER CLEAR switch and proceed to step 5 l.. If not, continue with step 5 f..

g. Perform the turn-off procedure (paragraph 6-24, step 2).

h. Loosen mounting screws (see figure 6-25).

i. Move drag link bracket down.

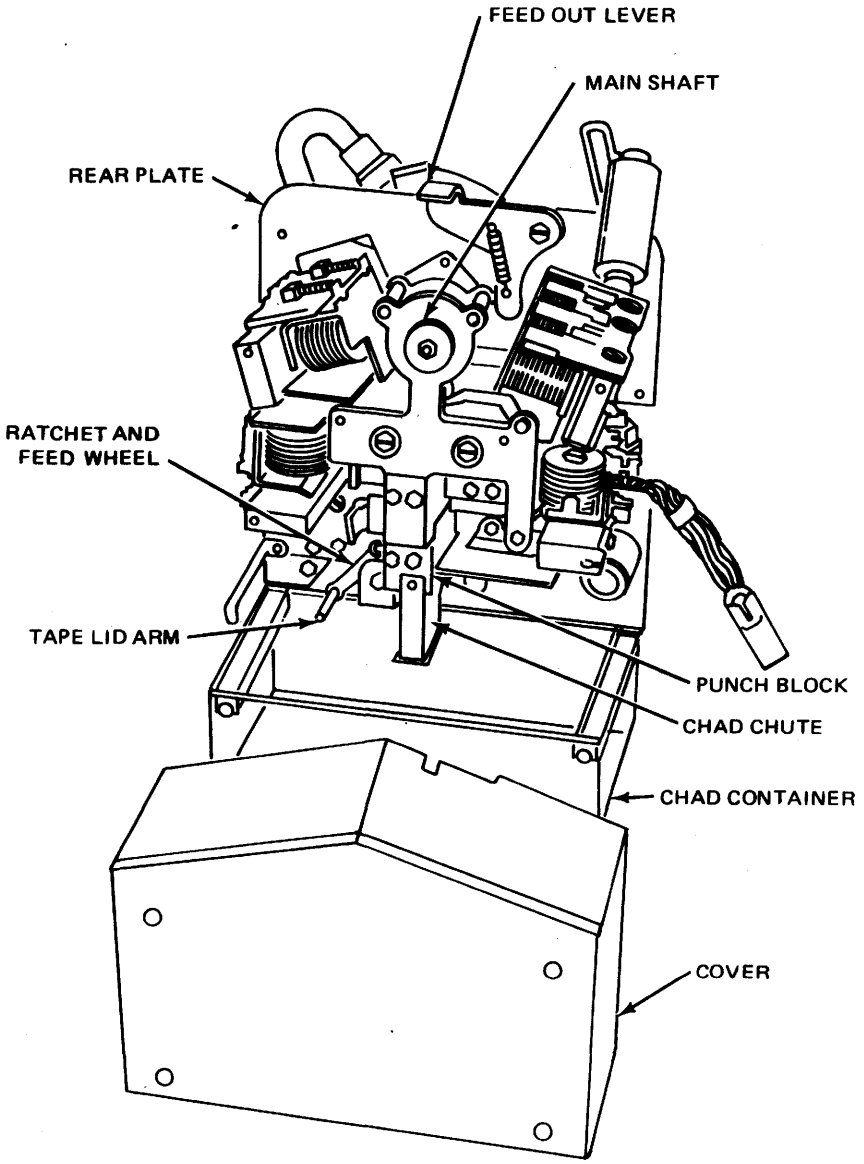


Figure 6-23. Tape Punch Unit.

j. Tighten mounting screws.

k. Repeat steps 5 a. through 5 c..

NOTE

If punch pins continue to make marks in top thickness of tape when drag link bracket is at its lowest position, loosen punch block mounting screws and push punch block down. Tighten mountings screws. In extreme cases, it may be necessary to move the mounting plate down (see figure 6-26). If the mounting plate is removed, recheck adjustment of the punch block and tape guide.

l. Reinstall tape in tape punch unit.

m. Repeat steps 5 a. through 5 d..

n. Perforate a series of marking (holes) code combinations approximately 3-feet long.

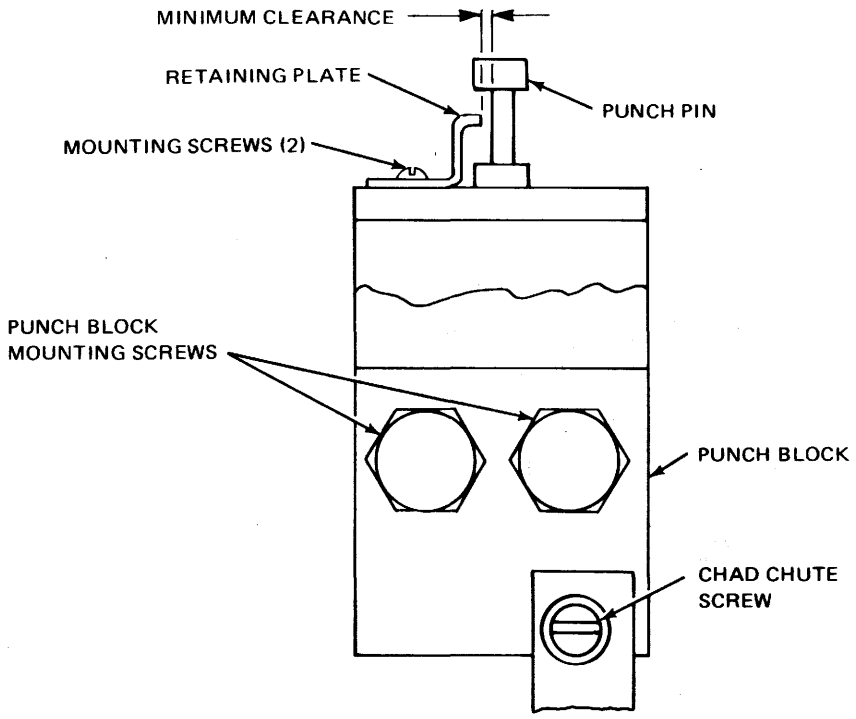


Figure 6-24. Punch Pin Adjustment.

o. Verify that the holes are punched cleanly, then proceed to step 6. If punched holes show burrs, continue with step 5 p..

p. Repeat steps 5 a. through 5 h., but this time move drag link up slightly.

6. Adjust tape biasing spring (see figure 6-28).

a. Obtain tape punched in step 5 k..

b. Holding one end of tape sample at eye level, sight down the tape to verify that there is no wavering in alignment of perforations with respect to tape edge; then proceed to step 6 g.. If requirement is not met, continue with step 6 c..

c. Perform turnoff procedure (refer to paragraph 6-22).

d. Loosen mounting screws until they are friction tight (see figure 6-28).

e. Position tape biasing spring to ensure it slants toward rear of punch block without crimping or curling front end of tape.

NOTE

Ensure tape biasing spring does not bind against punch guide plate or punch die plate.

f. Tighten mounting screws.

g. Perform normal turn-on procedure (refer to paragraph 6-24, step 1).

h. Press ON-OFF PUNCH switch.

i. Perforate a series of marking (holes) code combinations approximately 3-feet long.

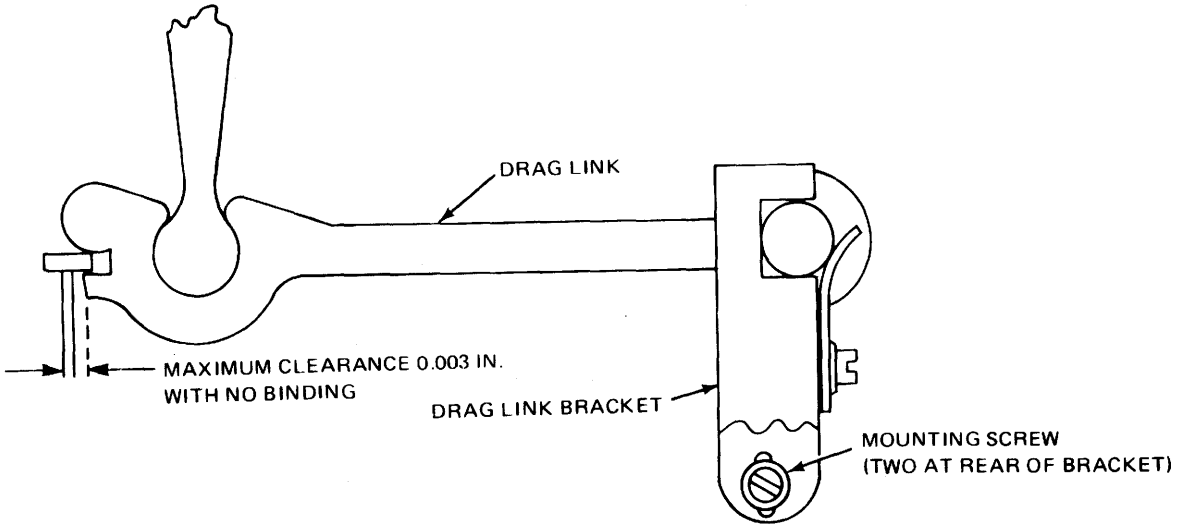


Figure 6-25. Drag Links Adjustment.

j. Repeat step 6 b..

k. Perform normal turnoff procedure (refer to paragraph 6-24, step 2).

l. Reinstall tape punch unit cover, and close drawer.

m. Perform normal turn-on procedure (refer to paragraph 6-24, 1 a. through 1 f.).

n. Set ON LINE/OFF LINE switch to ON LINE.

o. Return I/O Console to normal condition.

6-28. Punch Code Hole Interval Adjustment. The punch code hole interval adjustment consists of adjusting the tape lid spring, feed ratchet detent arm, feed ratchet detent arm spring, feed pawl spring, feed pawl link, and wedge block. To adjust the punch code hole interval, perform the turnoff procedure (refer to paragraph 6-24, step 2); see figures 6-29, 6-30, 6-31, and 6-32; and proceed as follows:

1. Remove tape punch unit in accordance with paragraph 6-66.

NOTE

The following adjustments must be performed in the sequence given to ensure proper code hole intervals.

2. Adjust tape lid spring (see figure 6-29).

a. Attach scale to tape lid arm.

b. Verify that a force of 5±1 ounce is required to move tape lid arm, then proceed to step 3. If requirement is not met, continue with step 2 c..

c. Loosen locknut on tape lid post.

d. Rotate tape lid post slightly (clockwise rotation decreases tension).

e. Tighten locknut.

f. Repeat steps 2 a. and 2 b..

3. Adjust feed ratchet detent arm (see figure 6-30).

a. Verify that feed ratchet detent arm is positioned so that eccentric is in its lowest position, then proceed to step 4. If requirement is not met, continue with step 3 b..

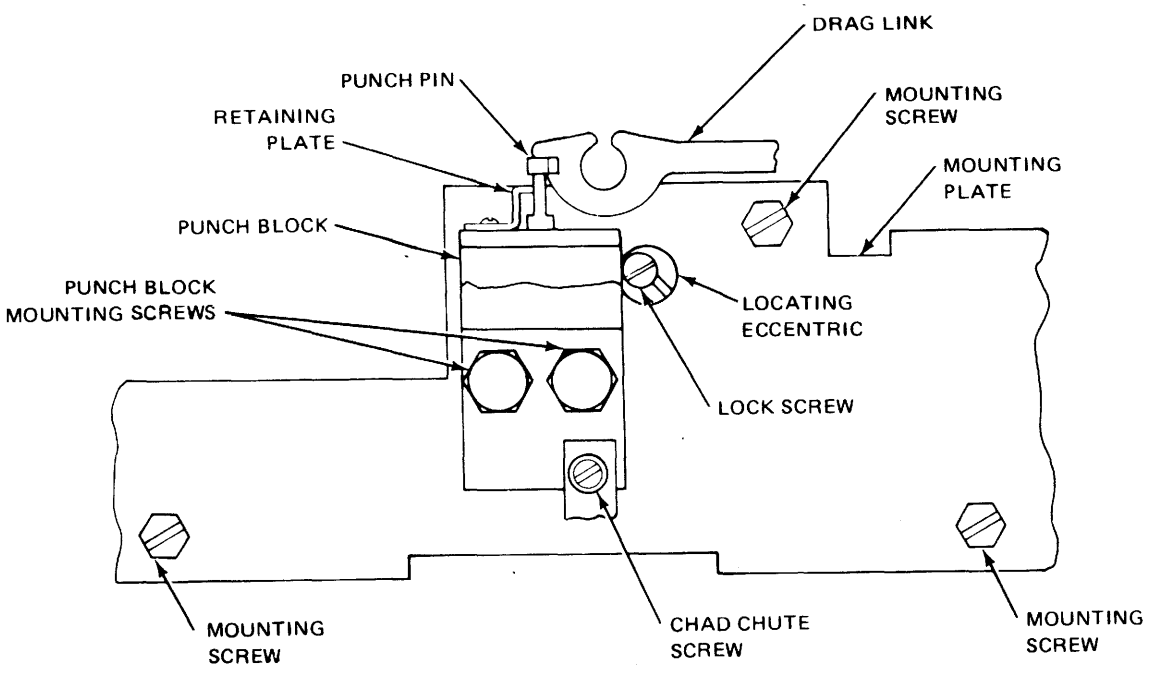


Figure 6-26. Punch Block Adjustment.

b. Loosen locknut that fastens eccentric.

c. Position eccentric to its lowest position.

d. Tighten locknut.

e. Repeat 3 a..

4. Adjust feed ratchet detent arm spring (see figure 6-30).

a. Attach scale to feed ratchet detent arm.

b. Verify that a force of 41±5 ounce is required to move feed ratchet detent arm, then proceed to step 5. If requirement is not met, continue with step 4 c..

c. Reform or replace feed ratchet spring to obtain requirement of step 4 b..

5. Adjust feed pawl spring (see figure 6-31).

a. Attach scale to feed pawl.

b. Verify that a force of 4±1 ounce is required to move feed pawl, then proceed to step 6; if requirement is not met, continue with step 5 c..

c. Reform or replace feed pawl spring to obtain requirement of step 5 b..

6. Adjust feed pawl link (see figure 6-31).

a. Loosen wedge block mounting screw and wedge block eccentric locknut.

b. Move wedge block eccentric locknut and wedge block to their lowest positions.

c. Tighten mounting screw and locknut.

d. Depress feed-out lever to hold feed magnet armature in operating position, and rotate main shaft manually.

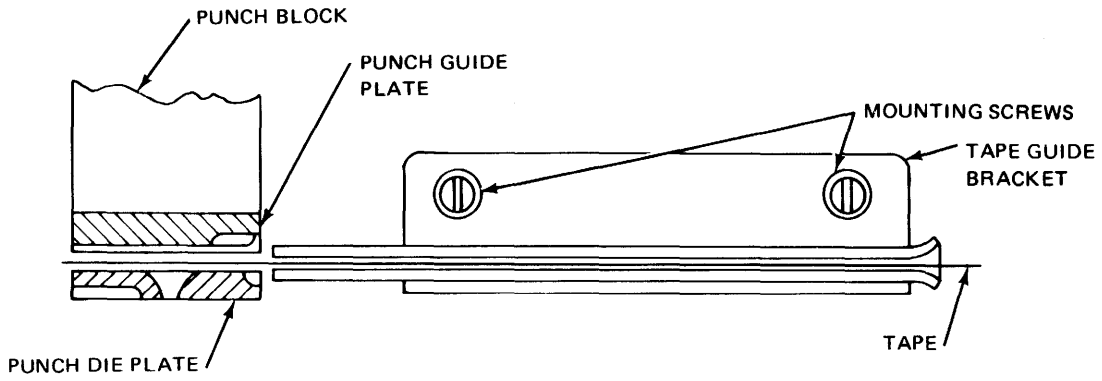


Figure 6-27. Tape Guide Adjustment.

e. Verify that feed pawl advances feed one full tooth with perceptible overtravel beyond fully detented position of ratchet, then proceed to step 7. If requirement is not met, continue with step 6 f..

f. Loosen plate mounting screws and plate eccentric locknut.

g. Position feed link by rotating plate eccentric.

h. Tighten plate mounting screws and plate eccentric locknut.

i. Verify that feed pawl picks up tooth at top of next feeding cycle.

7. Adjust wedge block (see figure 6-32).

NOTE

This adjustment can be refined by reducing amount of overtravel.

a. Verify that no clearance exists between wedge block and feed pawl when feed pawl is at its lowest position, then proceed to step 7 i.; if requirement is not met, continue with step 7 b..

b. Loosen wedge block mounting screw, and move wedge block to its highest position.

c. Tighten wedge block mounting screw friction tight.

d. Loosen wedge block eccentric locknut, and move wedge block eccentric to its lowest position.

e. Depress feed out lever to hold feed magnet armature in operating position, and rotate main shaft manually to position wedge block.

f. Move wedge block eccentric up to touch bottom of wedge block.

g. Tighten eccentric locknut.

h. Repeat step 7 a..

i. Reinstall tape punch unit in accordance with paragraph 6-66.

8. Perform adjustment check.

a. Load perforator with full roll of tape (refer to chapter 5).

b. Perform normal turn-on procedure (paragraph 6-24, step 1).

c. Power-perforate an all 1's tape approximately 12-inches long.

d. Inspect punched paper tape. Look for the following qualities:

(1) Holes do not have burrs.

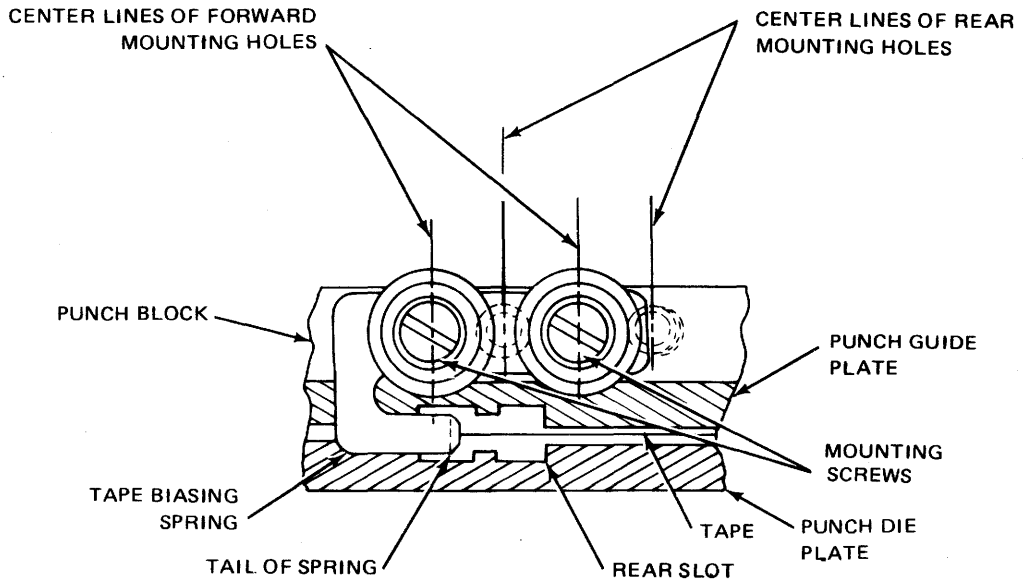


Figure 6-28. Tape Biasing Spring Adjustment.

(2) Holes are round and approximately 0.072-inch diameter. Tape can be compared to tape gauge.

(3) Holes are evenly spaced and are approximately 10 per inch (exactly 10 holes per inch is not required).

e. If requirements of step 8 d. are met, proceed to step 8 f.; if not, repeat steps 3, 4, 5, and 8.

f. Return I/O Console to normal condition.

6-29. Punch Stop Plate and Long Toggle Arm Spring Adjustment. To adjust the punch stop plate and long toggle arm spring (code magnets and feed magnet), see figure 6-33, and proceed as follows:

1. Perform normal turnoff procedure (paragraph 6-24, step 2).

2. Remove tape punch unit in accordance to paragraph 6-66.

3. Adjust punch stop plate.

a. Hold blocking pawls against stop plates and away from toggle arm (see figure 6-33).

b. Rotate main shaft until long toggle arms are below engaging surfaces of blocking pawls, and wedge flywheel is in place.

c. Loosen stop plate mounting screws.

d. Position stop plates to obtain clearance of 0.005 (0.002 to 0.008) inch between long arms and blocking pawls.

e. Tighten mounting screws.

f. Repeat step 3 d. If requirement of step 3 d. is met, remove wedge and proceed to step 4; if requirement is not met, repeat steps 3 c. through 3 f..

4. Adjust punch long toggle arm spring (code magnets).

a. Position punch bail at top dead center, and wedge flywheel in place.

b. Hook scale on long toggle arm (see figure 6-33).

c. Depress armature to hold code magnet in operating position, and pull scale until knee of toggle linkage buckles.

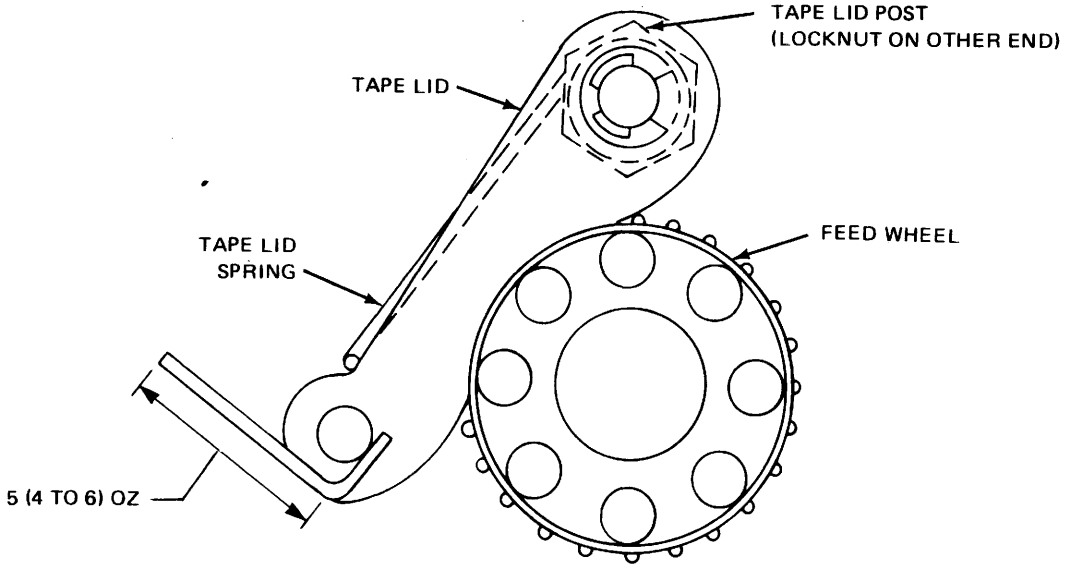


Figure 6-29. Tape Lid Spring Adjustment.

d. Verify that force required to start short toggle arm moving away from long arms is 10±4 ounces. If requirement is met, remove wedge and proceed with step 5; if requirement is not met, replace long toggle arm and repeat steps 4 a. through 4 d..

5. Adjust punch long toggle arm spring (feed magnet).

a. Position punch bail at top dead center.

b. Rotate main shaft counterclockwise until code magnet long toggle arms just touch blocking pawls, then wedge flywheel in place.

c. Free feed magnet long toggle arm from its blocking pawl by depressing feed magnet armature.

d. Hook spring scale under long toggle arm (see figure 6-33).

e. Pull scale until knee of toggle linkage buckles.

f. Verify that force required to start short toggle arm moving away from long toggle arm is 10±4 ounces. If requirement is met, remove wedge and proceed to step 5 g.; if requirement is not met, repeat steps 5 a. through 5 f..

g. Reinstall tape punch unit in accordance with paragraph 6-66.

h. Perform normal punch turn-on (paragraph 6-24, steps 1 through 1 d.).

i. Return I/O Console to normal condition.

6-30. Punch Armature Springs and Magnet Plate Adjustment. To adjust punch magnet plates and armature springs, perform normal turnoff procedure (paragraph 6-24, step 2.), see figure 6-34, and proceed as follows:

1. Remove tape punch unit in accordance with paragraph 6-66.

2. Adjust nine magnet plates (see figure 6-35).

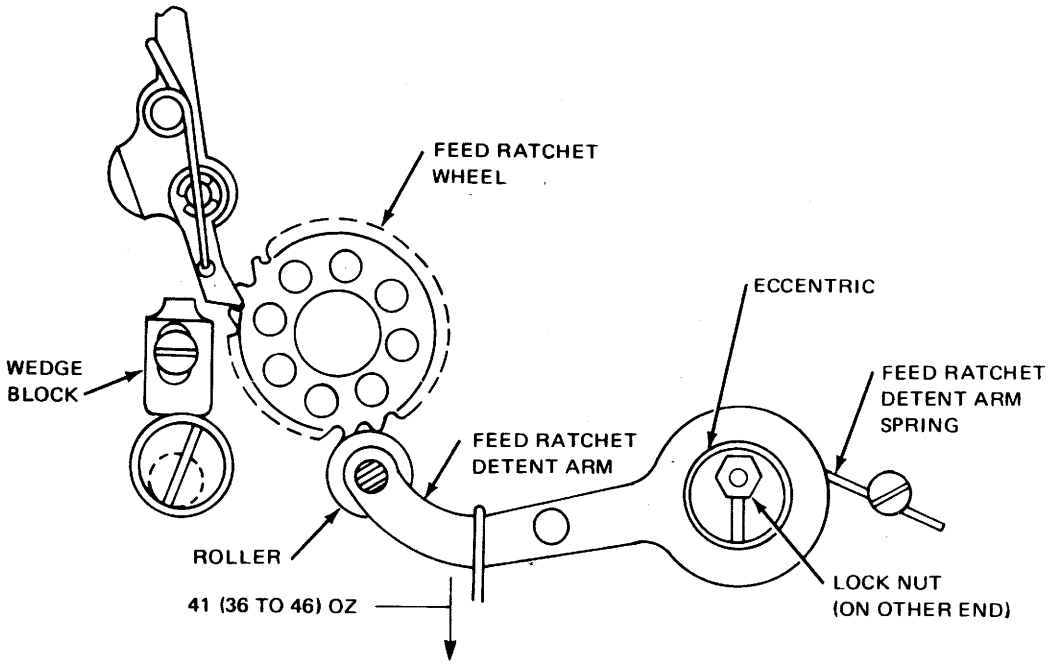


Figure 6-30. Feed Ratchet Detent Arm Adjustment.

a. With armature in attached position, verify that clearance between armature and pole face at point of minimum clearance is 0.005±0.001 inch, then proceed to step 3; if requirement is not met, continue with step 2 b..

b. Loosen two magnet plate mounting screws.

c. Adjust position of magnet plate to obtain required clearance.

d. Tighten screws.

e. Repeat step 2 a..

3. Adjust armature and feed level springs.

a. Position punch bail in highest position (see figure 6-34).

b. Attach scale to armature (see figure 6-34).

c. Verify force required to move armature is 16 (14 to 17) ounces.

d. Loosen spring anchor locknuts.

e. Adjust position of spring anchor to obtain required force.

f. Tighten locknuts.

g. Repeat step 3 c..

4. Adjust armature and code level spring.

a. Insert armature clip to yoke located under the magnet plate (see figure 6-34).

b. Set punch bail to highest position.

c. Attach scale under armature clip and pull in on a line with the armature spring.

d. Verify force required to move armature is 6±.5 ounces (minimum 5.5 ounces, maximum 6.5 ounces).

e. Loosen spring anchor locknuts.

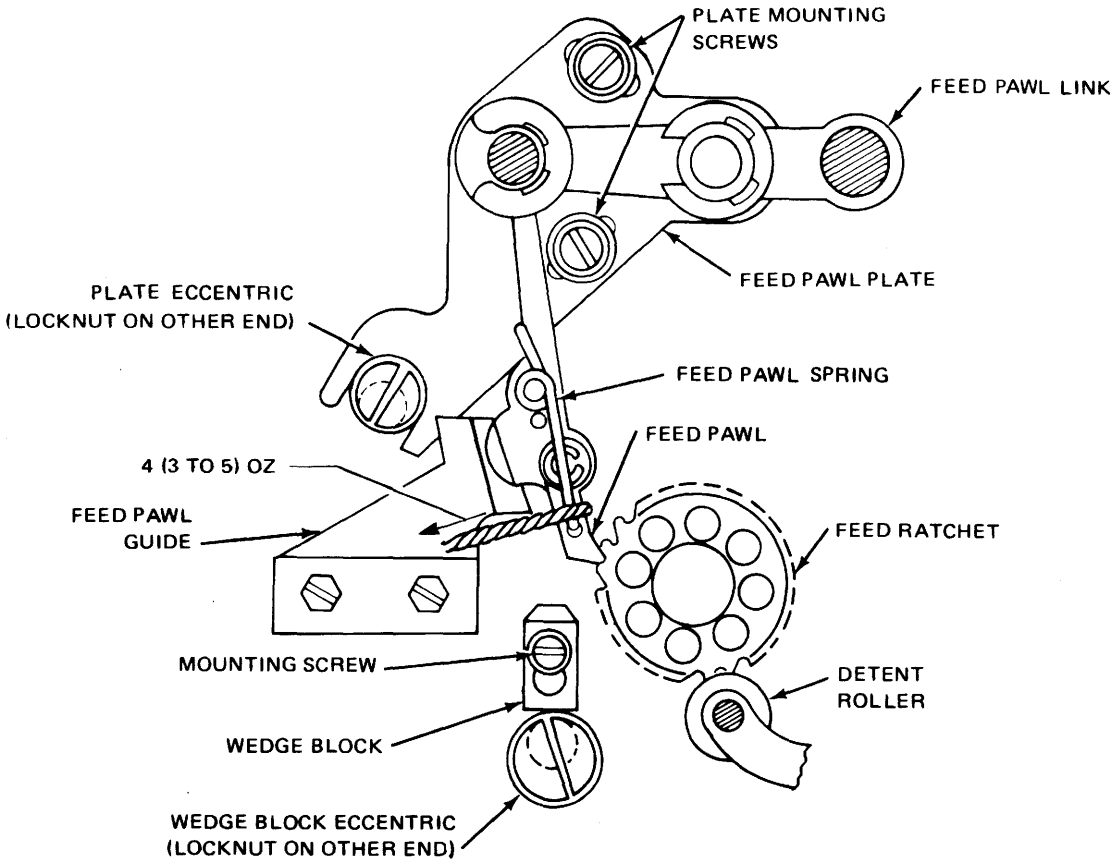


Figure 6-31. Feed Pawl Spring Adjustment.

f. Adjust position of spring anchor to obtain required force.

g. Tighten spring anchor locknuts.

h. Repeat step 4 d..

5. Reinstall tape punch unit in accordance with paragraph 6-62.

6. Perform normal turn-on procedure (paragraph 6-24, steps 1 through 1 d.).

7. Return I/O Console to normal condition.

6-31. Punch Motor and Timing Belt Adjustments. To adjust punch motor and timing belt, perform normal turnoff procedure (paragraph 6-24, step 2), see figure 6-35, and proceed as follows:

1. Release latches, and pull out electrical equipment chassis drawer to fully extended position.

2. Adjust punch motor (see figure 6-35).

a. Verify that oilers are upward and approximately equidistant from a vertical line through motor shaft, then proceed with step 3; if requirement is not met, continue with step 2 b..

b. Loosen two motor clamp screws.

c. Position motor to meet requirements of step 2 a..

d. Tighten clamp screws.

3. Adjust punch timing belt (see figure 6-35).

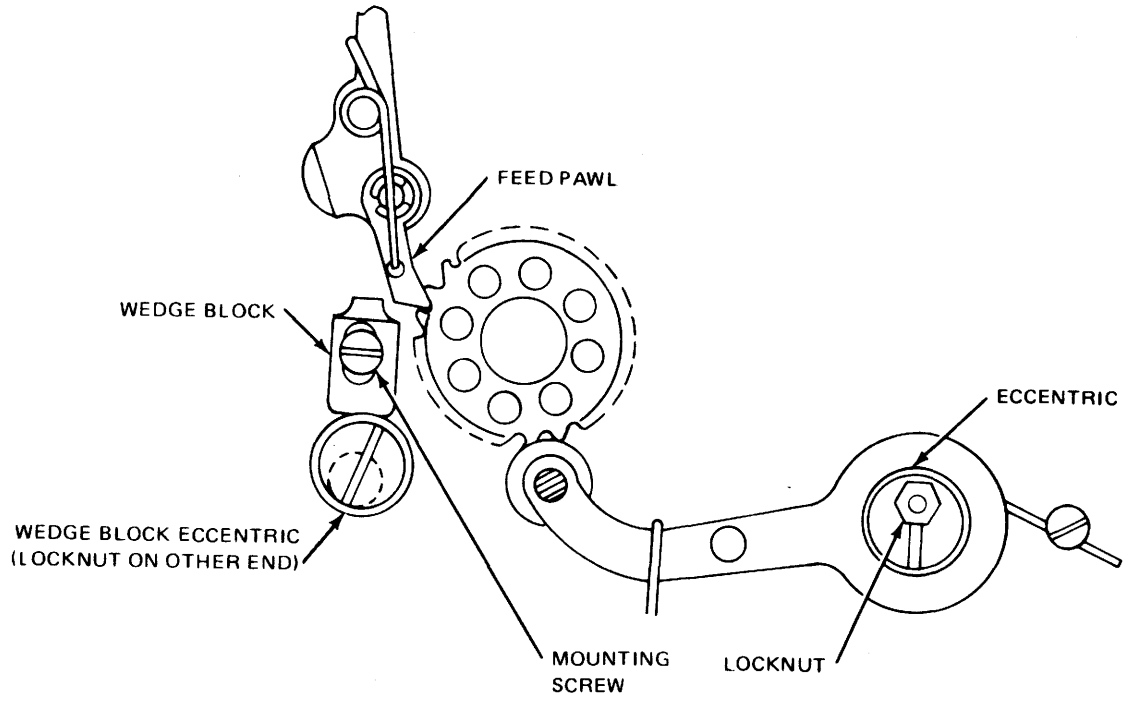


Figure 6-32. Wedge Block Adjustment.

a. Verify that one pound of pressure at center of timing belt span deflects belt approximately 1/16 inch, then proceed to step 4; if requirement is not met, continue with step 3 b..

b. Remove four motor mounting screws, lockwashers, flat washers, and spare shims.

c. Lift motor unit from supporting spacers.

d. Add or remove shims from supporting spacers.

e. Reinstall motor unit.

f. Reinstall spare shims, flat washers, lock washers and mounting screws; tighten screws friction tight.

g. Repeat step 3 a..

h. Tighten mounting screws.

NOTE

This adjustment can be refined by shifting motor horizontally.

4. Close electrical equipment chassis drawer.

5. Perform normal turn-on procedure (paragraph 6-24, step 1).

6. Return I/O Console to normal condition.

6-32. **REPAIR.**

6-33. The procedures for disassembly, inspecting, and replacing repairable assemblies and parts are presented in the following paragraphs. The replaceable areas discussed are I/O Console assemblies, keyboard/printer assemblies, reader assemblies, and punch unit assemblies. After unit is replaced, it is necessary to test the unit replaced for normal operation (chapter 4 or 5).

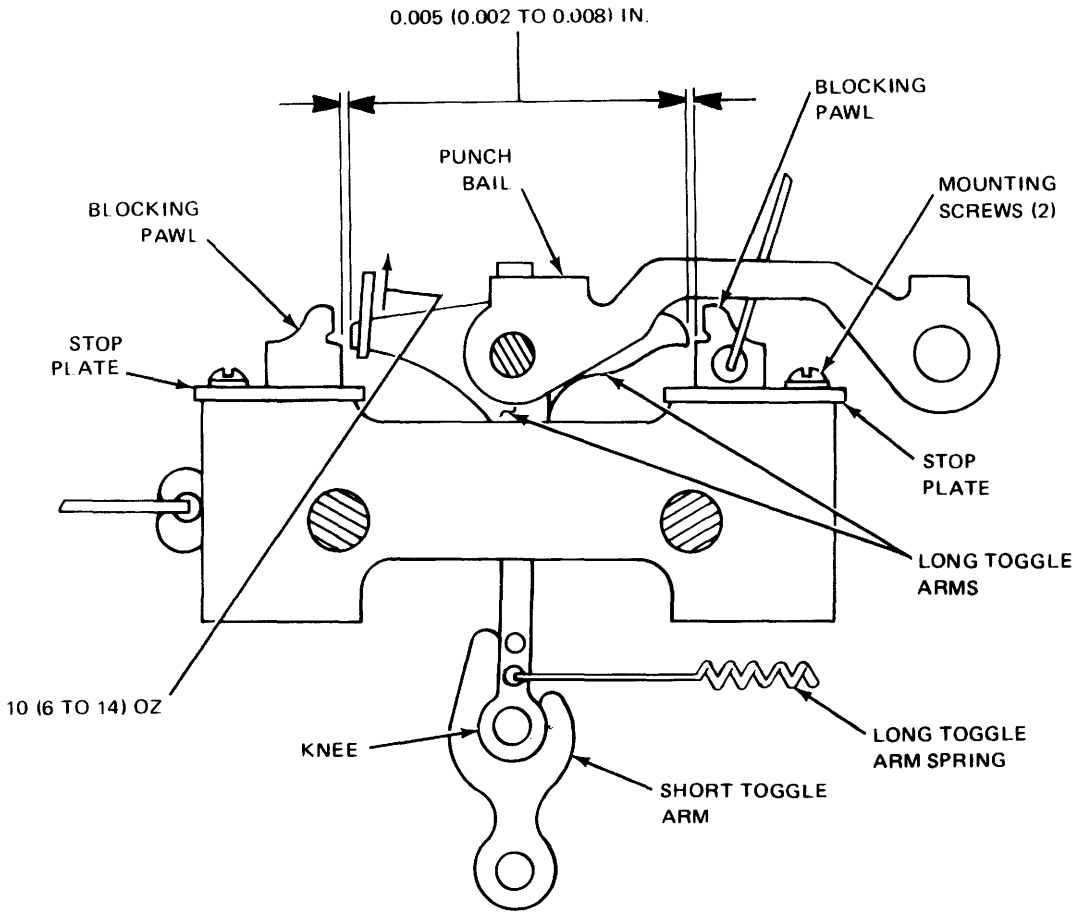


Figure 6-33. Stop Plate and Toggle Arm Springs Adjustment.

6-34. I/O Console Assemblies. The I/O Console assemblies discussed are the logic chassis, power supply, printed circuit card, reader punch drawer, oscillator horn, filters and capacitors, and fan assembly. The procedure for removal and replacement of each I/O Console assembly is described. The procedure for turning on and turning off power to replace or repair I/O Console assemblies, unless otherwise specified is as follows:

1. Turn I/O Console power to OFF.

a. Set LOGIC POWER switch to OFF.

b. Set BLOWER POWER switch to OFF.

c. Set 60-Hz CONSOLE POWER circuit breaker to OFF.

d. Set 400-Hz CONSOLE POWER circuit breaker to OFF.

2. Turn power to ON.

a. Set 400-Hz CONSOLE POWER circuit breaker to ON.

b. Set 60-Hz CONSOLE POWER circuit breaker to ON.

c. Set BLOWER POWER switch to ON.

d. Set LOGIC POWER switch to ON.

6-35. Logic Chassis Removal and Replacement. To replace the logic chassis, see figure 6-36, and proceed as follows:

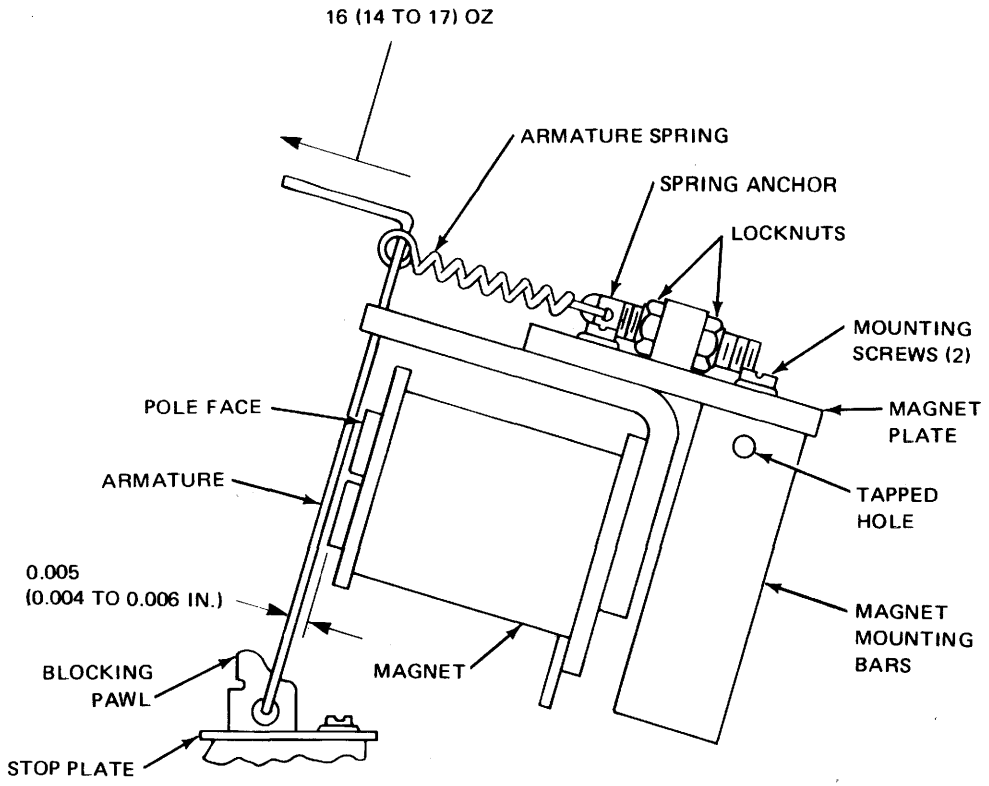


Figure 6-34. Code and Feed Level Magnet Assembly.

1. Secure I/O Console power (refer to paragraph 6-34, steps 1 a. through 1 d.).

2. Turn logic chassis and control panel lock to the left until chassis is released. Pull chassis out to stops.

3. Press in latch releases on chassis guides.

4. Remove logic chassis. Be prepared to lift drawer as it slides out.

5. Replace logic chassis.

a. Place logic chassis on chassis guides.

b. Align logic chassis on chassis guides.

c. Slide chassis into cabinet until chassis latches secure on chassis guides.

d. Push logic chassis back into unit, and turn lock to the right until chassis is secured.

6. Return I/O Console to normal condition.

6-36. Circuit Card Removal and Replacement. To remove and replace circuit module cards, see figures 6-36 and 5-1 through 5-20, and proceed as follows:

CAUTION

Remove power from the logic circuitry before extending drawer to prevent possible damage to logic module cards.

1. Secure I/O Console (refer to paragraph 6-34, steps 1 a. through 1 d.).

2. Turn logic chassis and control panel lock to the left until chassis is released.

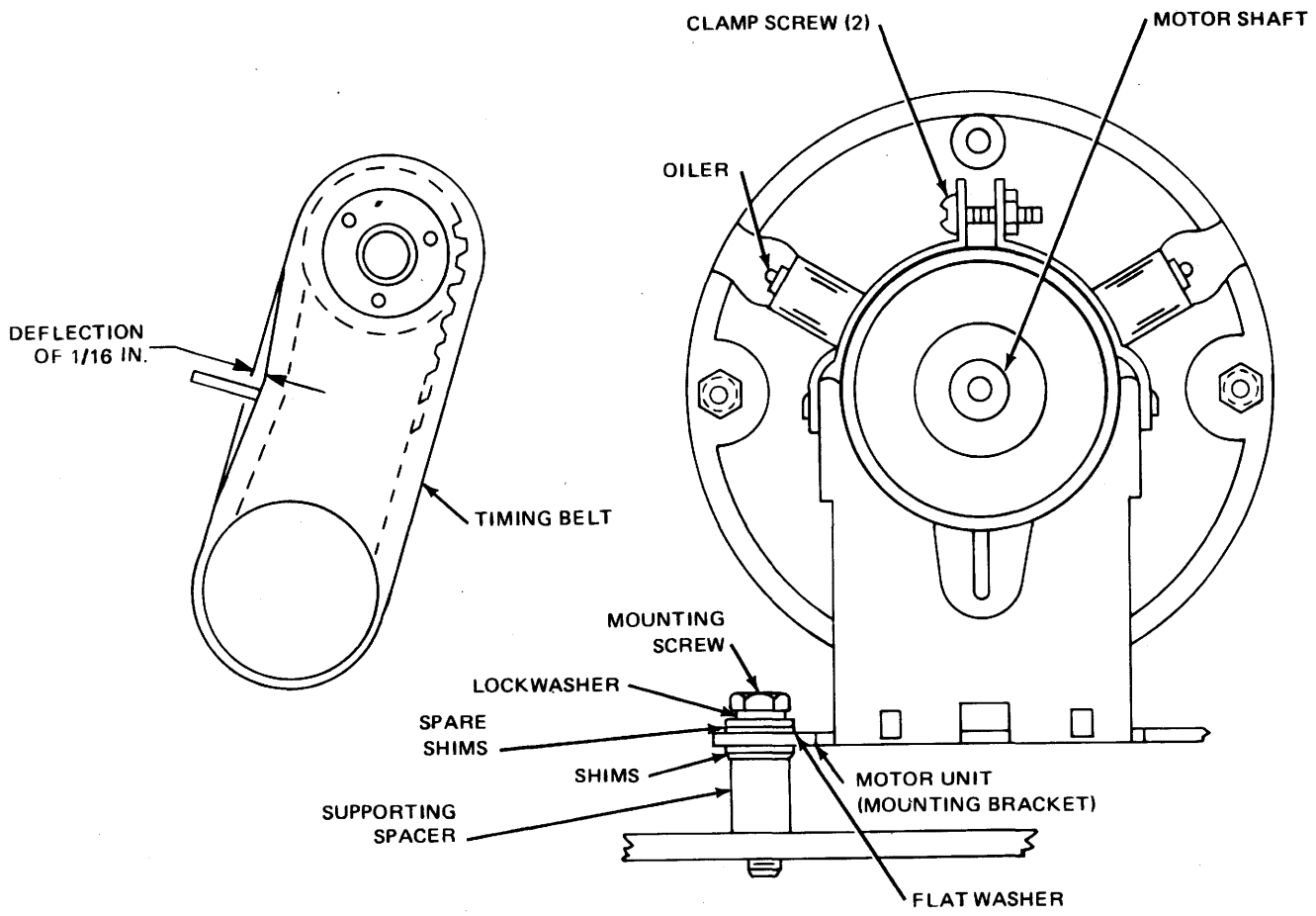


Figure 6-35. Motor and Timing Belt Adjustment.

3. Remove circuit card retainers by removing retainer screws located on top of retainers.

4. Clamp circuit card extractor to notches on printed circuit card.

5. Remove printed circuit card with rocking motion.

6. Remove circuit card extractor from printed circuit card.

7. Replace printed circuit card.

a. Locate correct chassis location for replacement card.

b. Align connector pins.

c. Press circuit card into place.

d. Replace circuit card retainers and secure locking retainer screws.

8. Close logic chassis and turn lock to the right until chassis is secure. Turn on I/O Console (refer to paragraph 6-34, step 2 a. through 2 d.).

9. Return I/O Console to normal condition.

6-37. Power Supply Assembly Removal and Replacement. To replace the power supply assembly, see figure 3-1, and proceed as follows:

1. Secure I/O Console power (refer to paragraph 6-34, steps 1 a. through 1 d.).

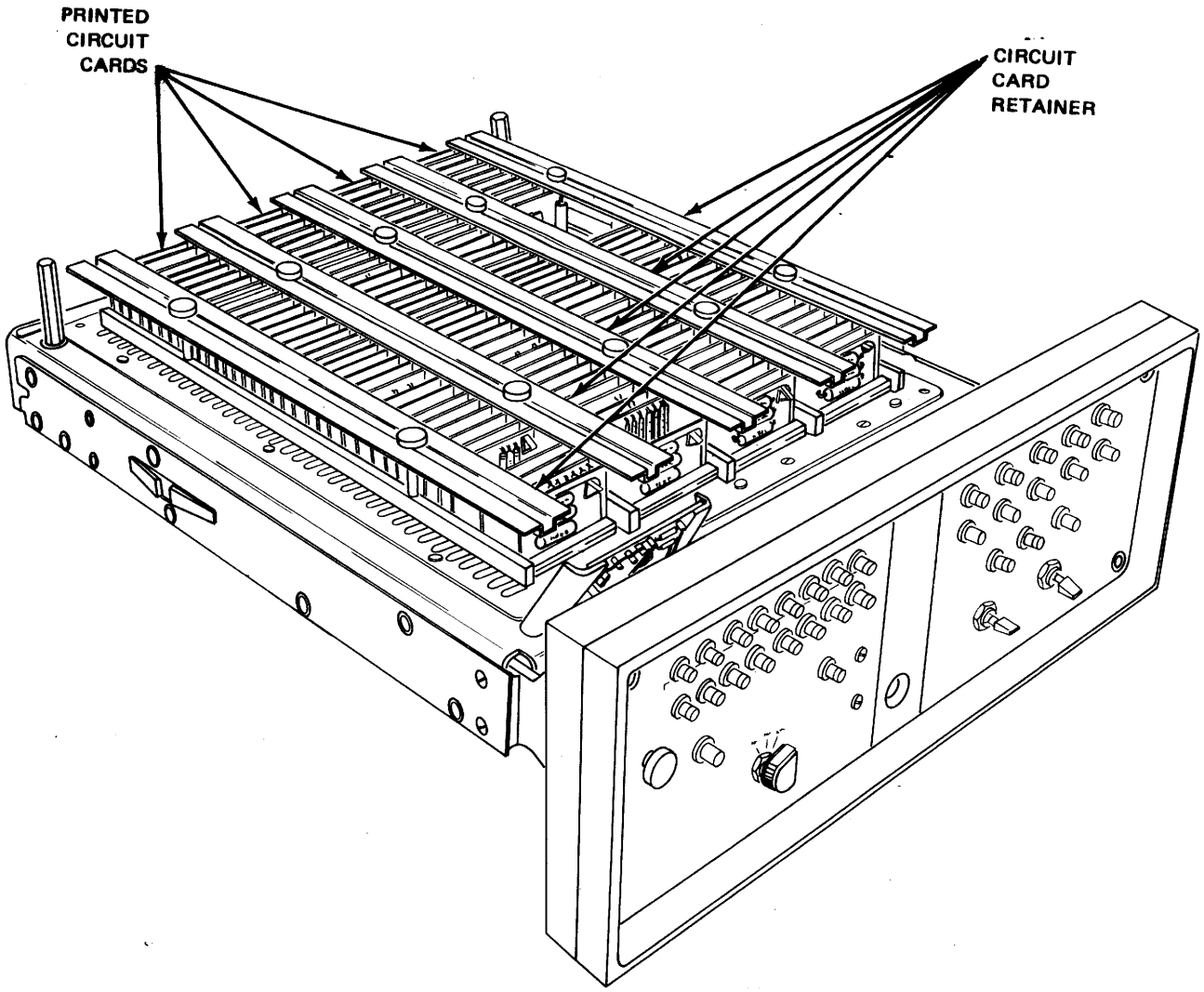


Figure 6-36. Logic Chassis and Printed Card Location.

2. Remove tape bin by unlocking handle, tilting tape bin forward, pressing latches located on sides and lifting tape bin out.

3. Pull down power supply located behind tape bin by handles.

4. Remove connectors P1 and P2 from rear of power supply.

5. Remove 2 knurled mounting screws from top of power supply assembly and pull power supply out.

6. Replace power supply assembly.

a. Align power supply with mounting holes located at top of power supply assembly.

b. Replace the mounting screws into power supply assembly and power supply and secure.

c. Replace connectors P1 and P2 into rear of power supply.

d. Lift power supply back up into position and secure.

7. Replace tape bin by lifting in, pressing catches on sides until secure, tilting tape bin backwards, and locking handle.

8. Turn on I/O Console (refer to paragraph 6-34, steps 2 a. through 2 d.).

9. Return I/O Console to normal condition.

6-38. Reader-Perforator Drawer Removal and Replacement. The reader-perforator drawer can be extended to reach all reader and punch components, or removed to replace cabinet wiring. To replace the reader-perforator drawer, see figure 3-1, and proceed as follows:

1. Secure I/O Console power (refer to paragraph 6-34, steps 1 a. through 1 d.).

2. Release latches of reader-perforator drawer and pull chassis out to fully extended position. Ensure slide catches engage.

3. After extending drawer, remove two cable connectors from left side of punch assembly and one cable from the rear of reader logic assembly.

CAUTION

Two people must perform steps 4 through 6 to avoid damage to the drawer and the assemblies therein.

4. Depress rear slide catches, and extend the drawer until the nut and bolt holding the cable extender to the lower rear of the drawer clears the cabinet frame.

5. Remove the nut and bolt holding the cable extender to the drawer.

6. Remove drawer from guides.

7. Replace reader-perforator drawer.

a. Align chassis on chassis guides.

b. Push reader-perforator drawer in until lower rear of drawer clears cabinet frame.

c. Install nut and bolt holding the cable extender to the drawer.

d. Push drawer in until slide catches engage.

e. Replace two cable connectors to the left side of tape punch unit and one cable to rear of reader logic assembly.

8. Push drawer in and secure latches.

9. Turn on I/O Console (refer to paragraph 6-34, steps 2 a. through 2 d.).

10. Return I/O Console to normal condition.

6-39. Fan Assemblies Removal and Replacement. To replace fan assembly, see figure 3-1, and proceed as follows:

1. Secure I/O Console power (refer to paragraph 6-34, steps 1 a. through 1 d.).

2. If keyboard/printer is mounted on top of basic unit, remove keyboard/printer.

3. Remove 8 mounting screws from top cover of basic unit.

4. Turn logic chassis and control panel lock to the left until chassis is released. Pull chassis out to stops.

5. Disconnect plug from fan assembly.

6. Remove 4 bolts holding fan assembly and lift out.

7. Replace fan assembly.

a. Replace fan assembly to proper position.

b. Replace four mounting bolts for holding fan assembly and reconnect plug to fan.

c. Release stops and push chassis back into unit.

8. Turn logic chassis and control panel lock to the right until chassis is secured.

9. Turn on I/O Console and listen for fan motor.

10. Return I/O Console to normal condition.

6-40. Oscillator Horn Removal and Replacement. To replace oscillator horn, see figure 3-1, and proceed as follows:

1. Secure I/O Console (refer to paragraph 6-34, steps 1 a. through 1 d.).

2. If keyboard/printer is mounted on top of basic unit, remove keyboard/printer.

3. Remove eight mounting screws from top cover of basic unit.

4. Remove top cover from unit.

5. Turn logic chassis and control panel lock to left until chassis is released. Pull chassis out to stops.

6. Locate oscillator horn on fan assembly and disconnect and tag wires.

7. Tag wires for terminal connections (- and +).

8. Remove knurled collar holding oscillator horn in place and lift horn from position.

9. Replace oscillator horn.

a. Replace new oscillator horn to proper position.

b. Replace knurled collar on oscillator horn and secure into position.

c. Replace wires on oscillator horn.

10. Release catches and slide logic chassis and control panel into unit.

11. Turn logic and control panel chassis lock to the right until chassis is secured.

12. Turn on I/O Console.

13. Return I/O Console to normal condition.

6-41. I/O Console Filter Removal and Replacement. To remove I/O Console filters, see figure 3-1, and proceed as follows:

1. Secure I/O Console power (refer to paragraph 6-34, steps 1 a. through 1 d.).

2. If keyboard/printer is mounted on top of basic unit, remove keyboard/printer.

3. Remove eight mounting screws from top cover of basic unit. Remove top cover.

4. Disconnect power cables J5 and J6 at rear of I/O Console.

5. Replace filters.

a. Locate filters FL1 through FL5 at rear of cabinet and discharge each filter to ground, using insulated clip lead.

b. Remove 14 screws that secure J4, J5, and J6 mounting plate to main chassis; and move mounting plate away carefully to gain access to filters.

c. Remove 12 screws that secure the filter mounting plate to main chassis and pull mounting plate away from chassis.

d. Tag leads on filter to be removed and remove leads.

e. Remove filter mounting bolt and remove filter.

f. Install new filter; reinstall and tighten mounting bolt.

g. Connect leads to filter and remove tags.

h. Reassemble I/O Console by reversing steps 3, 4, 5 b., and 5 c..

6. Reinstall cover on basic unit.

7. Reinstall keyboard on basic unit if removed.

8. Turn on I/O Console.

9. Return I/O Console to normal condition.

6-42. I/O Console Capacitors Removal and Replacement. To remove I/O Console capacitors. See figure 3-1, and proceed as follows:

1. Secure I/O Console power (refer to paragraph 6-34, steps 1 a. through 1 d.).

2. If keyboard/printer is mounted on top of basic unit, remove keyboard/printer and cover.

3. Disconnect power cables J5 and J6 from rear of I/O Console.

4. Replace I/O Console capacitors.

WARNING

High-voltage high-capacitance components may contain voltages dangerous to life. Discharge all high-voltage capacitance components to electrical ground before working.

a. On power panel (A1), unfasten grill-retaining screws by turning counterclockwise.

b. Swing grill upward and remove filter.

c. Remove 10 screws that mount power panel A1 and remove panel.

d. Unsolder and disconnect wires from capacitors to be replaced; attach identification tags to wires.

e. Remove locknuts from capacitors and remove capacitors.

f. Install new capacitors; reinstall and tighten locknuts.

g. Connect and solder wires to capacitors referring to identification tags; remove tags.

h. Reinstall power panel A1; tighten screws.

i. Reinstall filter and fasten down front grill.

j. Connect power cables J5 and J6.

5. Reinstall cover on basic unit.

6. Reinstall keyboard on basic unit if removed.

7. Turn on I/O Console.

8. Return I/O Console to normal condition.

6-43. KEYBOARD/PRINTER REPAIR. Keyboard/printer assembly replacements discussed in the following paragraphs are: covers, paper roll, paper takeup mechanism, printer ribbon, print box, intermediate gear, carriage, printing unit, platen, pressure roller, and electrical service unit. The procedure for turning off and turning on power to repair the keyboard/printer assemblies are as follows, unless otherwise specified:

1. Turn off keyboard/printer power.

a. Set teletypewriter ON-OFF switch to OFF.

b. Press KYBD pushbutton.

2. Turn on power.

a. Ensure 400-Hz CONSOLE POWER circuit breaker is ON.

b. Ensure 60-Hz CONSOLE POWER circuit breaker is ON.

c. Ensure BLOWER POWER switch is ON.

d. Ensure LOGIC POWER switch to ON.

e. Set ON LINE/OFF LINE switch to OFF LINE.

f. Push MASTER CLEAR OFF LINE pushbutton.

g. Press KYBD pushbutton.

h. Ensure keyboard/printer ON-OFF switch is ON.

6-44. Keyboard/Printer Lower/Upper Cover Assembly Removal and Replacement. To replace cover assemblies, proceed as follows:

1. Turn off keyboard/printer (refer to paragraph 6-43).

2. Remove lower/upper cover assemblies.

a. Release latches, and open cover.

b. Remove printer paper roll in accordance with paragraph 6-47.

c. Release lower cover latch, and hold lower cover slightly opened.

d. Close upper cover to latched position.

e. Raise cover assembly to fully opened position, and support covers from rear.

f. Remove plug containing leads to copy light and margin indicator from electrical service unit.

g. Remove acorn-type nut from upper stop arm stud, and disengage arm from cover.

h. Loosen hinge lock bracket mounting screw; slide bracket away from hinge.

i. Move cover to the right to separate it from pins on hinge, and remove cover assembly.

3. Replace cover assemblies.

a. Move replacement cover sideways to install it on hinge pins.

b. Reengage upper stop arm with cover; reinstall acorn-type nut on arm stud.

c. Lower the cover towards front while supporting it at rear.

d. Slide bracket toward hinge; tighten hinge lock bracket mounting screws.

e. Reinstall copy light and margin indicator plug.

f. Close cover assembly.

g. Release latches, and open upper cover.

h. Reinstall printer paper roll in accordance with paragraph 6-76.

i. Close upper cover.

j. Return I/O Console to normal condition.

6-45. Keyboard Lower Draw Wire Rope Removal and Replacement. To replace the keyboard lower draw wire rope, see figures 6-37, 6-38, and 6-39, and proceed as follows:

1. Turn off teletypewriter (refer to paragraph 6-43).

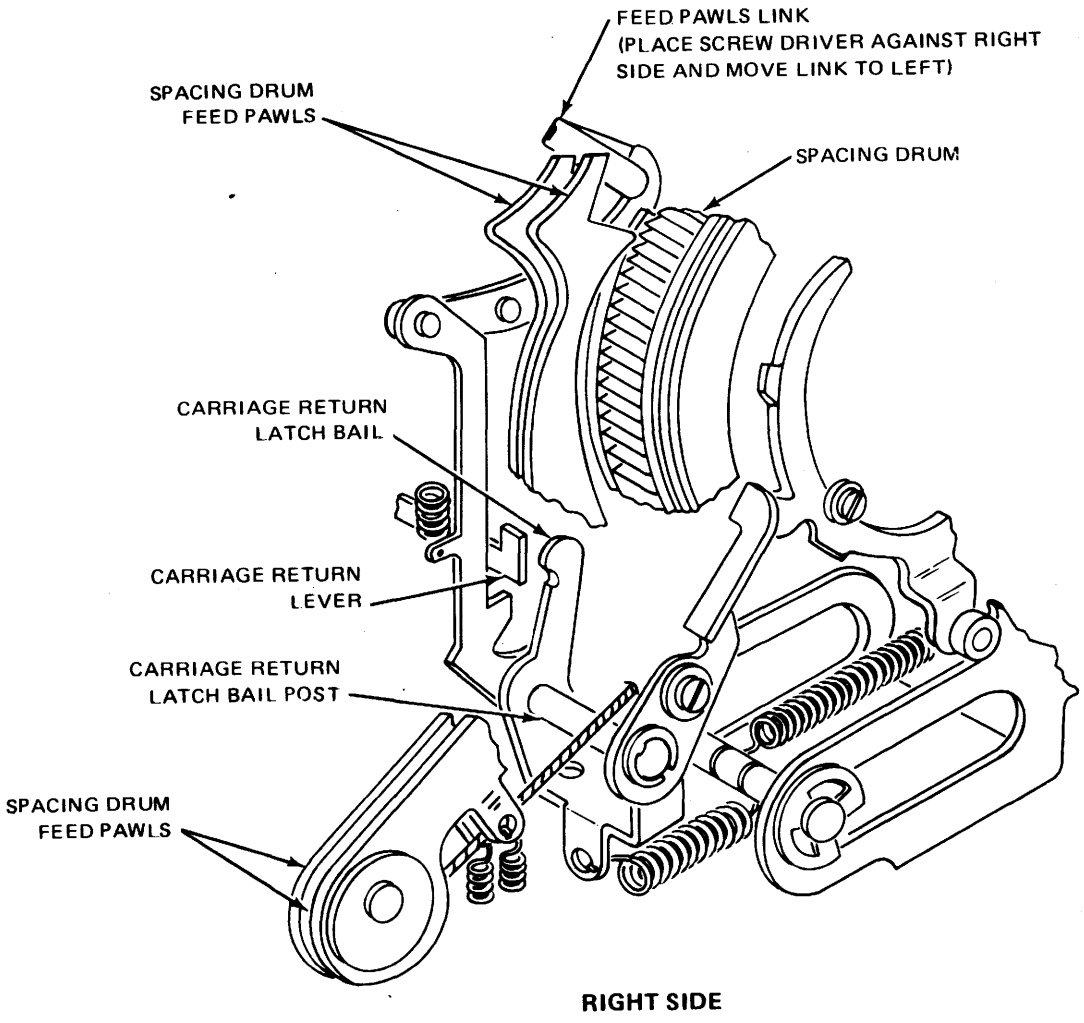


Figure 6-37. Carriage Return Mechanism (Front View).

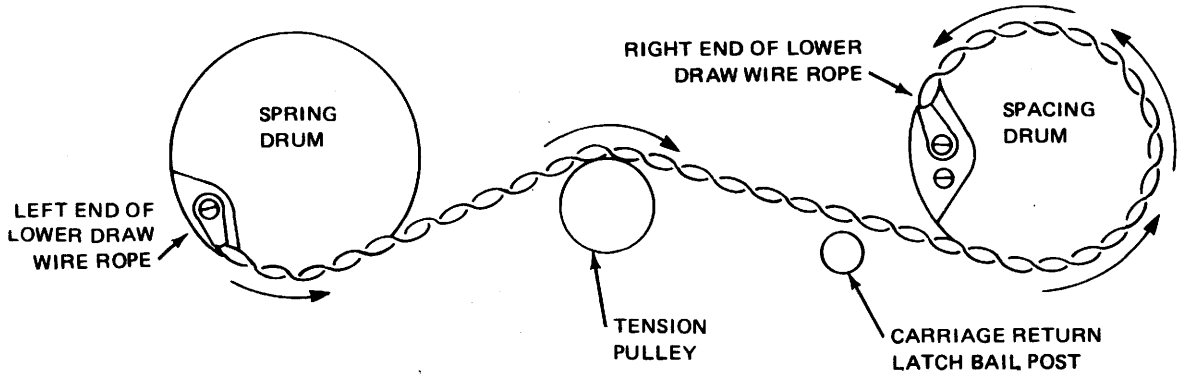


Figure 6-38. Lower Draw Wire Rope Route (Front View).

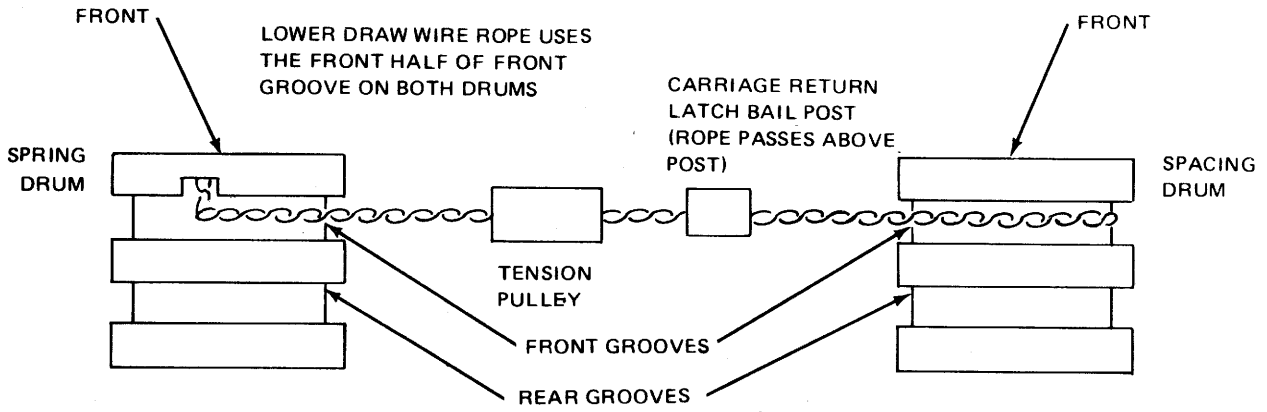


Figure 6-39. Lower Draw Wire Rope Route (Bottom View).

2. Release latches on the teletypewriter, and open upper and lower covers.

3. Remove printing unit in accordance with paragraph 6-52.

4. Replace lower draw wire rope.

a. Disengage feed pawls from spacing drum by moving feed pawls link to left with screwdriver (see figure 6-37).

NOTE

Carriage will return to left margin automatically.

b. Remove screw and washer holding left end of rope to spring drum (see figure 6-38).

c. Remove screw and washer holding right end of rope to spacing drum; remove wire rope.

d. Install new wire rope by reversing procedure in steps 4 a. through 4 c. (see figure 6-39).

e. Verify print box alignment in accordance with paragraph 6-13.

f. Inspect printing carriage position and lower draw wire rope.

g. Reinstall printing unit in accordance with paragraph 6-52.

h. Close lower and upper covers.

i. Return I/O Console to normal condition.

6-46. Keyboard Upper Draw Wire Rope Removal and Replacement. To replace upper draw wire rope, see figures 6-40 through 6-44, and proceed as follows:

1. Turn teletypewriter power off in accordance with paragraph 6-43.

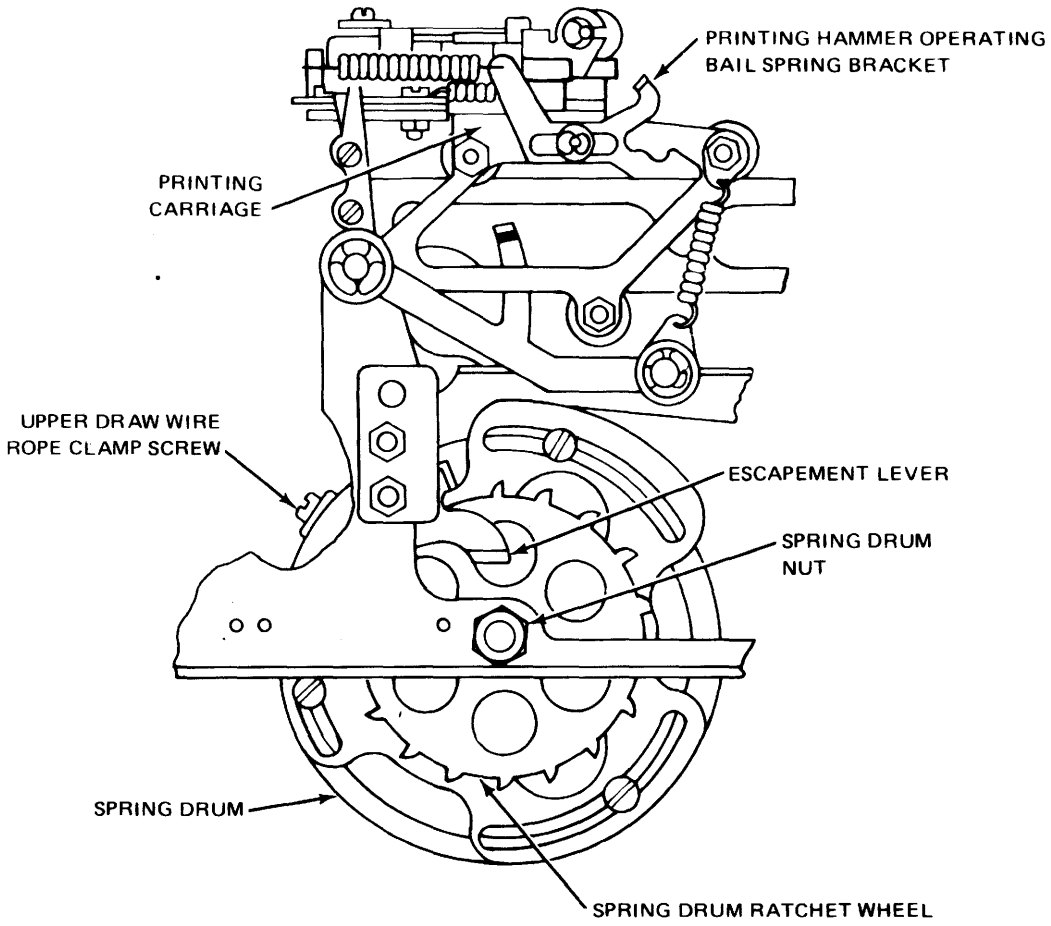
2. Release teletypewriter latches and open upper and lower covers.

3. Remove printing unit in accordance with paragraph 6-52.

4. Remove upper draw wire rope (wire rope).

a. Loosen spring drum nut (see figure 6-40).

b. Move escapement lever manually up and down until all tension on spring in spring drum has been removed; record number of clicks required to unwind spring (see figure 6-38).



LOWER LEFT

Figure 6-40. Spring Drum Assembly (Front).

NOTE

When removing tension on spring in spring drum, record number of clicks required to unwind spring. This information is required for rewinding (step 5 m.).

c. Loosen printing carriage clamp screws; slide wire rope from between clamp plates (see figure 6-41).

d. Remove print box clamp screws and clamp plate from print box assembly.

e. Remove spacing drum clamp screw from spacing drum (see figure 6-42).

f. Loosen rope clamp screw from spring drum; slide wire rope loop from under clamp.

NOTE

It is not necessary to remove clamp screw completely.

g. Remove wire rope carefully.

NOTE

One end of the wire rope will pass through the print box assembly.

5. Replace upper draw wire rope.

a. Loop new wire rope to find approximate center (see figure 6-43).

b. Place looped end of wire under rope clamp on spring drum; tighten clamp screw friction tight (see figure 6-44).

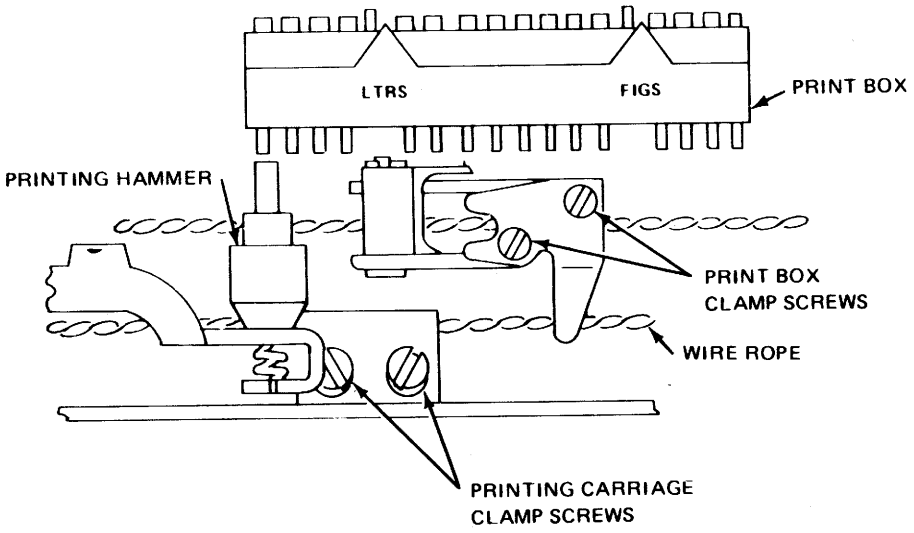


Figure 6-41. Printing Carriage and Print Box Clamps (Top View).

NOTE

Clamp screw should be tight enough to hold wire rope, but loose enough to allow rope to move under clamp.

c. Route front half of wire rope (see figure 6-42):

(1) Up along rear half of front groove in spring drum

(2) Up and over left front pulley

(3) Through printing carriage clamp (see figure 6-41)

(4) Along side of right front pulley.

NOTE

Wire rope is routed along side of right front pulley to allow slack for routing rear half of wire rope.

(5) Down rear half of front groove of spacing drum

(6) Through exit groove on spacing drum.

d. Place wire rope lug on spacing drum clamp screw; tighten clamp screw to hold front half of wire rope to spacing drum temporarily.

e. Route rear half of wire rope (see figure 6-42):

(1) Up along rear groove in spring drum

(2) Up and over left rear pulley

(3) Through print box assembly and print box assembly clamp (see figure 6-41)

(4) Over and down right rear pulley

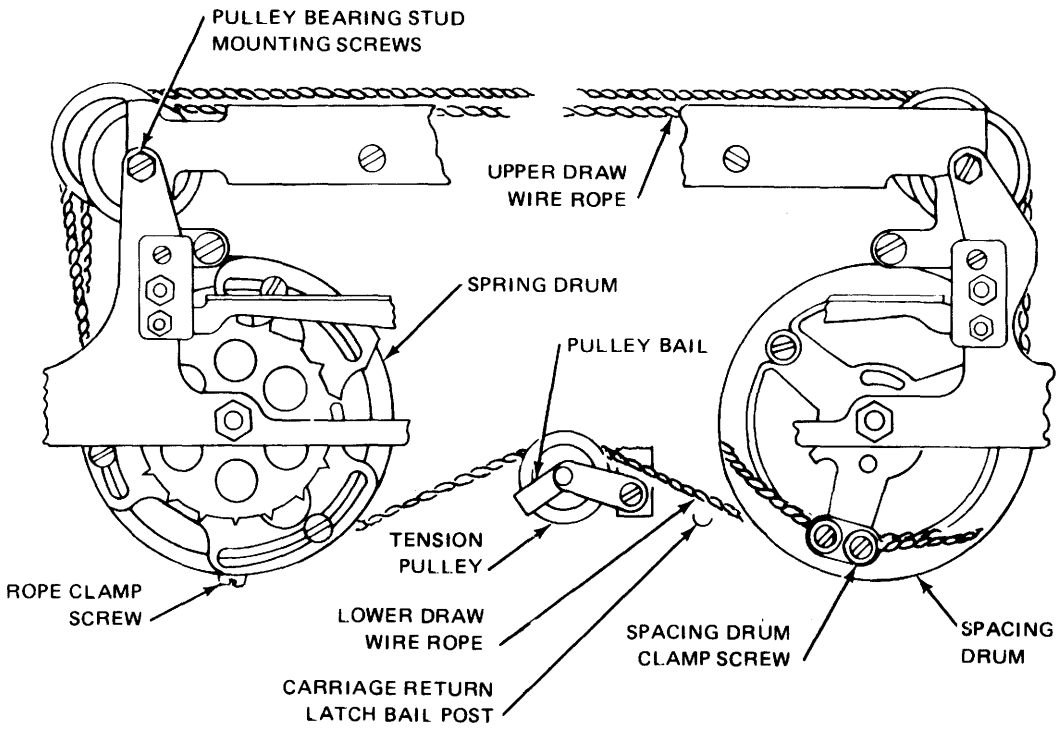


Figure 6-42. Upper Draw Wire Rope Routing (Front View).

(5) Down rear groove in spacing drum and out rear exit groove.

f. Remove clamp screw temporarily tightened in step 5 d..

g. Place wire rope lug of rear half of wire rope on clamp screw which already has lug from front half installed.

h. Reinstall clamp screw on spacing drum; tighten screw.

CAUTION

Exercise care to avoid chipping the pulley.

i. Raise right end of front half of wire rope; place wire rope over right front pulley carefully.

j. Reinstall printing carriage clamp, fastening it to front half of wire rope.

k. Reinstall print box assembly clamp, fastening it to rear half of wire rope.

l. Ensure upper wire rope is free to move under clamp on spring drum.

m. Hold escapement lever (figure 6-40) down, and wind spring drum by reversing direction of rotation in step 4 b.; continue rotation until number of take-up clicks equals one-half the number of clicks recorded in step 4 b..

n. Tighten spring drum nut.

6. Reinstall printing unit in accordance with paragraph 6-52, but leave the upper cover open.

7. Turn on teletypewriter power (refer to paragraph 6-43).

8. Test keyboard/printer.

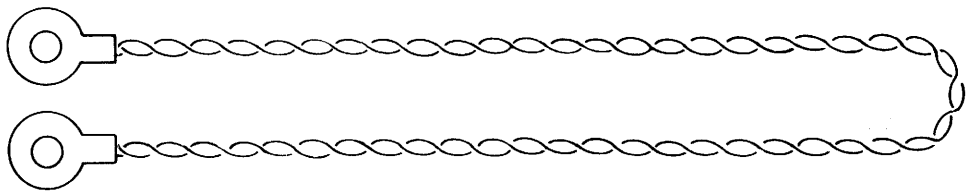


Figure 6-43. Looped Upper Drawer Wire Rope.

a. Print out 10 lines of random characters to equalize tension on both halves of upper draw wire rope.

b. Set teletypewriter ON-OFF switch to OFF.

c. Manually move carriage left or right until spring drum clamp screw is visible; then tighten the clamp screw (see figures 6-40 and 6-44).

d. Adjust left and right margins in accordance with paragraph 6-7.

e. Adjust printing carriage position in accordance with paragraph 6-11.

f. Close upper cover.

g. Set teletypewriter ON-OFF switch to ON.

h. Set ON LINE/OFF LINE switch to ON LINE.

i. Return I/O Console to normal condition.

6-47. Printer Paper Roll Removal and Replacement. To replace the paper roll, see figure 6-45, and proceed as follows:

1. Set teletypewriter ON-OFF switch to OFF.

2. Raise teletypewriter plastic bubble on upper cover.

3. Replace printer paper roll.

a. Push back PAPER RELEASE lever to disengage pressure rollers.

b. Remove paper spindle.

c. Remove all unused paper from around platen assembly.

d. Remove cardboard core from spindle.

e. Place new paper roll over spindle.

f. Install paper roll in recess with ends of spindle resting in slots.

NOTE

Ends of spindle must rest in slots to ensure paper will unroll from bottom.

g. Prepare a smooth leading edge of paper, and route paper (see figure 6-45).

h. Ensure paper is aligned around platen assembly.

i. Pull PAPER RELEASE lever forward to engage pressure rollers.

NOTE

If typing unit is to be stored or out of service for an extended period of time, release pressure roller tension by pushing back PAPER RELEASE lever.

j. Lower plastic bubble.

k. Set teletypewriter ON-OFF switch to ON.

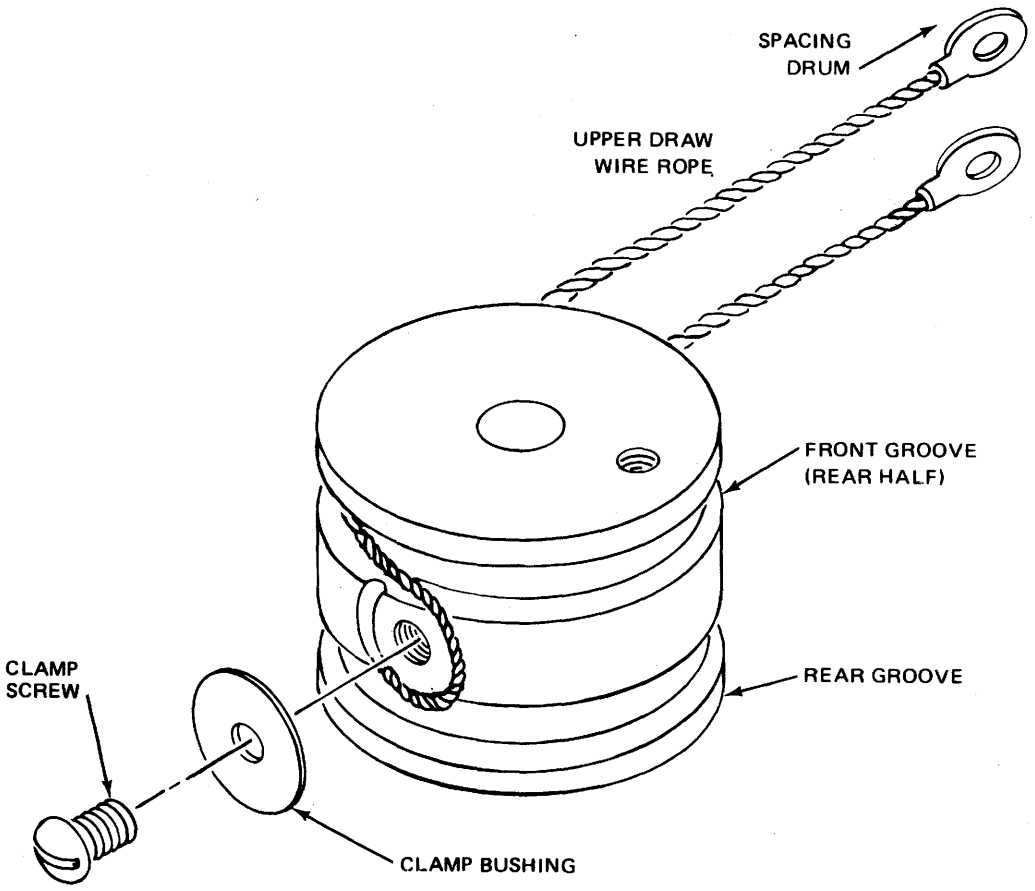


Figure 6-44. Upper Draw Wire Rope Routing on Spring Drum (Bottom View).

1. Ensure I/O Console is turned on (refer to paragraph 6-43, steps 2 a. through 2 e.).

m. Return I/O Console to normal condition.

6-48. Printer Ribbon Removal and Replacement. To replace printer ribbon, see figures 6-46 and 6-47, and proceed as follows:

1. Set teletypewriter ON-OFF switch to OFF.

2. Release teletypewriter latches, and open upper cover.

3. Replace printer ribbon.

a. Wind ribbon to be removed onto one spool manually.

NOTE

The reverse levers can be used to shift direction in which ribbon is wound (see figure 6-46).

b. Lift spring bails to vertical positions on both centering shafts.

c. Remove and discard spool containing old ribbon.

d. Remove and retain empty spool.

e. Engage hook at end of new ribbon to hub of empty spool (see figure 6-47).

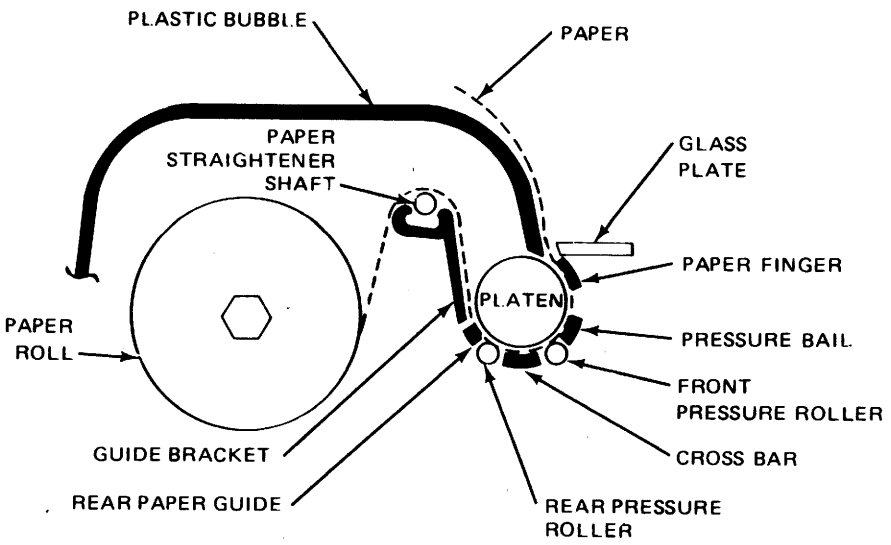


Figure 6-45. Paper Routing (Left View).

NOTE

If there is no hook, pierce end of ribbon over the point of arrow in hub of empty spool.

f. Wind ribbon onto empty spool until reversing eyelet has been wound upon spool.

g. Place spools on centering shafts so that ribbon feeds to rear from right side of right spool and from left side of left spool (see figure 6-46).

h. Turn each spool slightly until spool driving pin engages hole in spool.

i. Guide ribbon around right roller and through slot in right reversing arm.

j. Place ribbon in ribbon guides behind print box.

k. Guide ribbon through slot in left reversing arm and around left roller.

l. Rotate spool to take up ribbon slack.

m. Close upper cover.

n. Set teletypewriter ON-OFF switch to ON.

o. Ensure I/O Console power is on (refer to paragraph 6-43, steps 2 a. through 2 e.).

p. Return I/O Console to normal operation.

6-49. Keyboard Print Box Removal and Replacement. To replace the keyboard print box, see figure 6-48, and proceed as follows:

1. Set teletypewriter ON-OFF switch to OFF.

2. Release teletypewriter latches, and open upper cover.

3. Replace keyboard print box.

a. Push trip lever to right and pivot print box latch clockwise to release print box (see figure 6-48).

b. Lift right end of print box upward to an angle of approximately 45° and pull toward right to disengage it from left bearing stud.

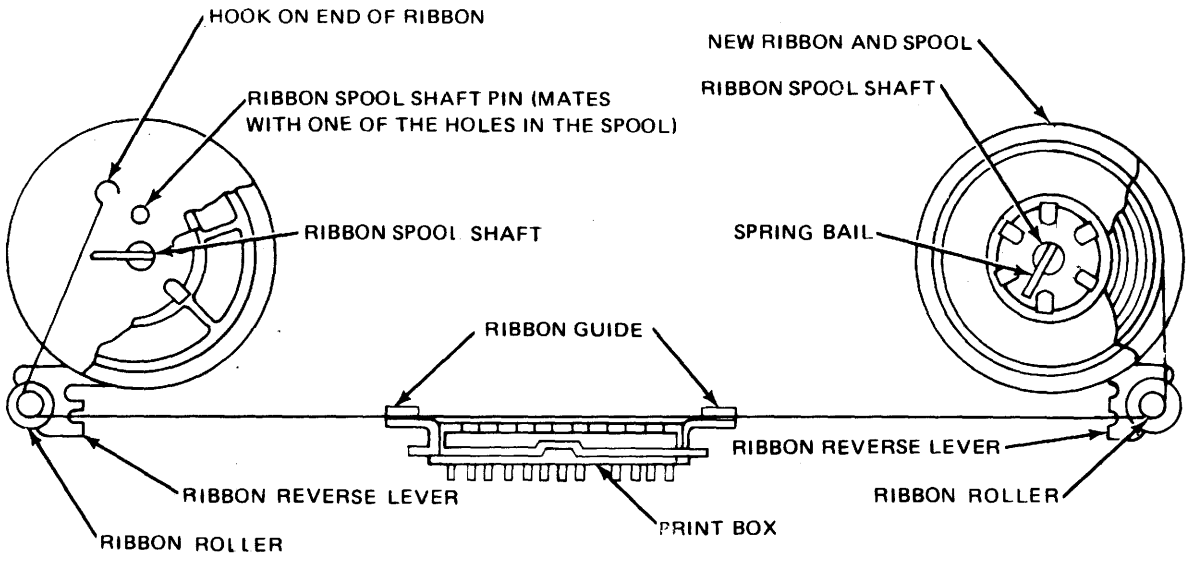


Figure 6-46. Path of Printer Ribbon (Top View).

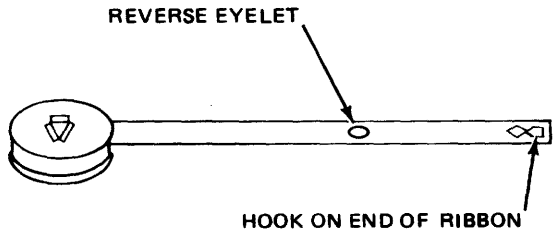


Figure 6-47. Printer Ribbon with Spool.

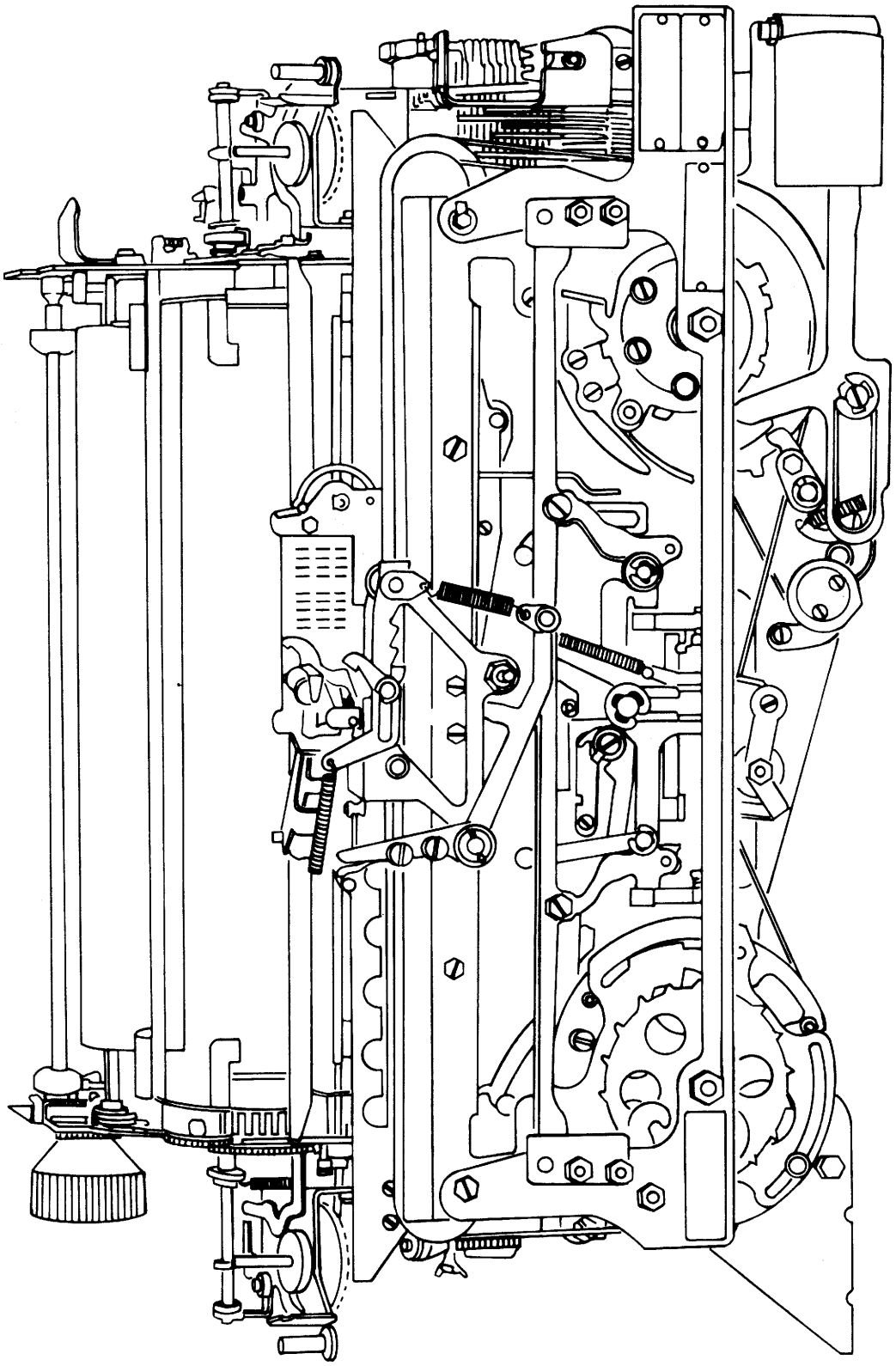


Figure 6-48. Keyboard Print Box.

c. Install print box by reversing procedures in steps 3 a. and 3 b..

d. Close upper cover.

e. Ensure I/O Console power is on (refer to paragraph 6-43, steps 2 a. through 2 e.).

f. Return I/O Console to normal condition.

6-50. Keyboard Intermediate Gear Assembly Removal and Replacement. To replace the keyboard intermediate gear assembly, see figure 6-12, and proceed as follows:

1. Secure I/O Console power (refer to paragraph 6-43).

2. Release teletypewriter latches, and open upper and lower covers.

3. Remove printing unit in accordance with paragraph 6-52.

4. Replace keyboard intermediate gear assembly.

a. Remove gear guard that extends over gear assembly by removing left rear motor unit mounting screw; reinstall screw to fasten motor unit in position.

b. Remove four gear assembly mounting screws (see figure 6-12).

c. Lift gear assembly from keyboard base.

d. Remove two motor pinion mounting screws from motor shaft.

e. Remove pinion and pinion retainer.

f. Install new gear on gear assembly.

g. Reinstall pinion and pinion retainer; reinstall and tighten mounting screws.

h. Reinstall gear assembly to keyboard base; reinstall and tighten four mounting screws.

i. Adjust intermediate gear assembly in accordance with paragraph 6-16.

j. Reinstall gear guard.

k. Reinstall printing unit in accordance with paragraph 6-52.

l. Close upper and lower covers.

m. Ensure I/O Console power is on (refer to paragraph 6-43, steps 2 a. through 2 e.).

6-51. Keyboard Carriage Assembly Removal and Replacement. To replace the keyboard carriage assembly, see figures 6-49 and 6-50, and proceed as follows:

1. Set teletypewriter ON-OFF switch to OFF.

2. Release teletypewriter latches, and open upper and lower covers.

3. Replace keyboard carriage assembly.

a. Loosen two clamp screws on printing carriage clamp plate, disengage printing carriage from upper draw wire rope (see figure 6-49).

b. Slide printing carriage to left end of track, then tilt lower part forward to disengage rollers and printing area slide from tracks.

c. Install new printing carriage assembly by using reverse procedures in step 3 b..

d. Ensure bearing rollers engage field tracks on front plate mechanism (see figure 6-50).

e. Ensure printing area slide is properly seated on moveable printing track.

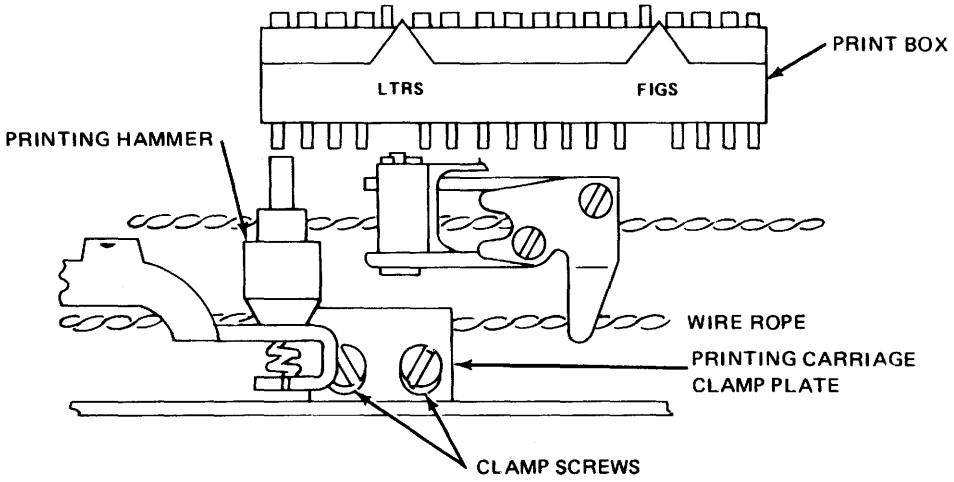


Figure 6-49. Printing Carriage (Top View).

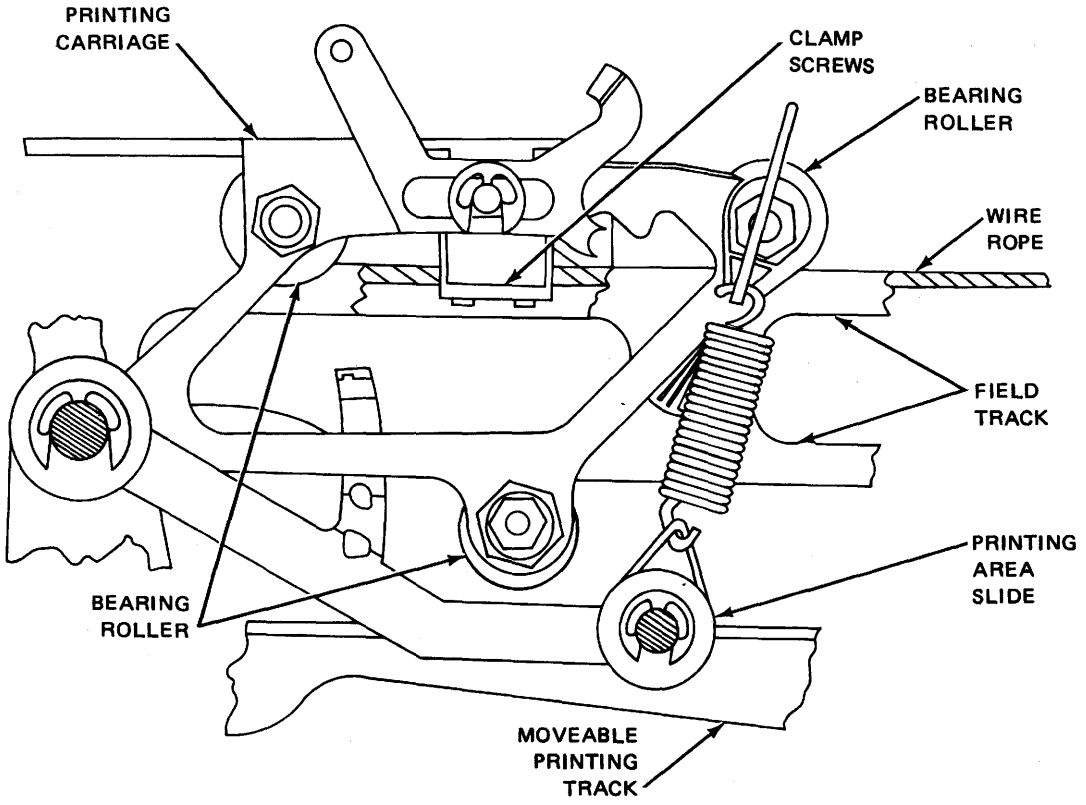


Figure 6-50. Printing Carriage (Front View).

f. Install wire rope to printing hammer clamp plate using reverse procedures in step 3 a..

g. Adjust printing carriage position in accordance with paragraph 6-11.

h. Verify print box alignment in accordance with paragraph 6-13.

i. Close lower and upper covers.

j. Return I/O Console to normal condition.

6-52. Keyboard Printing Unit Removal and Replacement. To replace the keyboard printing unit, see figures 6-51 and 6-52, and proceed as follows:

1. Turn off teletypewriter power in accordance with paragraph 6-43, step 1.

2. Release teletypewriter latches, and open upper and lower covers.

NOTE

If necessary, remove lower/upper cover assemblies in accordance with paragraph 6-44.

3. Remove paper roll in accordance with paragraph 6-47.

4. Disconnect cable from connector mounted at top right of printing unit.

5. Replace keyboard printing unit.

a. Remove four mounting screws that fasten printing unit to base (see figure 6-51).

CAUTION

When lifting printing unit, grasp center of tie rod (located in rear of unit) with one hand, and center of rail plate (located in lower front on unit) with other hand.

b. Carefully lift printing unit from base.

NOTE

If necessary, tilt printing unit slightly toward rear.

When placing printing unit on base, hold it tilted slightly to right, and lower right end to engage right locating stud. While easing left end downward, rotate motor slowly counterclockwise by hand to mesh gears properly.

c. Mount printing unit on base (see figure 6-51).

d. Ensure local carriage return bail on keyboard is in front of carriage return lever on printing unit (see figure 6-52).

e. Depress local carriage return key lever; verify that local carriage return bail on keyboard moves carriage return lever on unit slightly to rear.

f. Ensure signal generator gear engages keyboard driving gear on main shaft of printing unit properly.

g. Ensure driving gear on main shaft of printing unit engages smaller gear on intermediate gear assembly properly.

h. Rotate fan on right side of motor unit counterclockwise manually; verify normal gearing operation.

i. Reinstall and tighten four mounting screws (see figure 6-51).

j. Reconnect cable to connector mounted at top right of typing unit.

k. Reinstall paper roll in accordance with paragraph 6-47.

l. Reinstall lower/upper cover assembly, or close lower and upper covers.

m. Ensure I/O Console power is on (refer to paragraph 6-43, steps 2 a. through 2 e.).

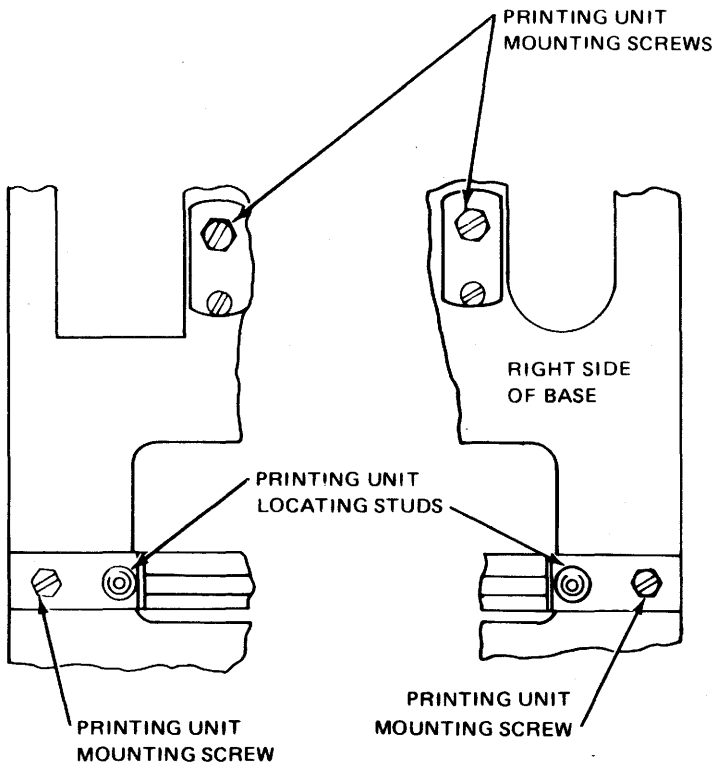


Figure 6-51. Mounting Printing Unit on Base (Top View).

n. Return I/O Console to normal condition.

6-53. Keyboard Platen and Pressure Roller Removal and Replacement. To replace the keyboard platen and pressure roller, see figures 6-53 and 6-54, and proceed as follows:

1. Set teletypewriter ON-OFF switch to OFF.

2. Release teletypewriter latches, and open upper and lower covers.

3. Remove printer paper roll and spindle in accordance with paragraph 6-47.

4. Remove printer ribbon in accordance with paragraph 6-48.

5. Replace keyboard platen and pressure rollers.

CAUTION

Detent bail is spring-loaded so care must be exercised when assembly screw is removed.

a. Remove detent bail assembly located near upper-left section of platen assembly (see figure 6-53).

b. Remove platen spur gear mounted on extreme left end of platen assembly.

NOTE

When removing gear, tilt it slightly to ensure it clears left reversing lever of left ribbon feed mechanism.

c. Remove top screw from platen retainer mounted on outside of left side frame. (See figure 6-54 for right side view.)

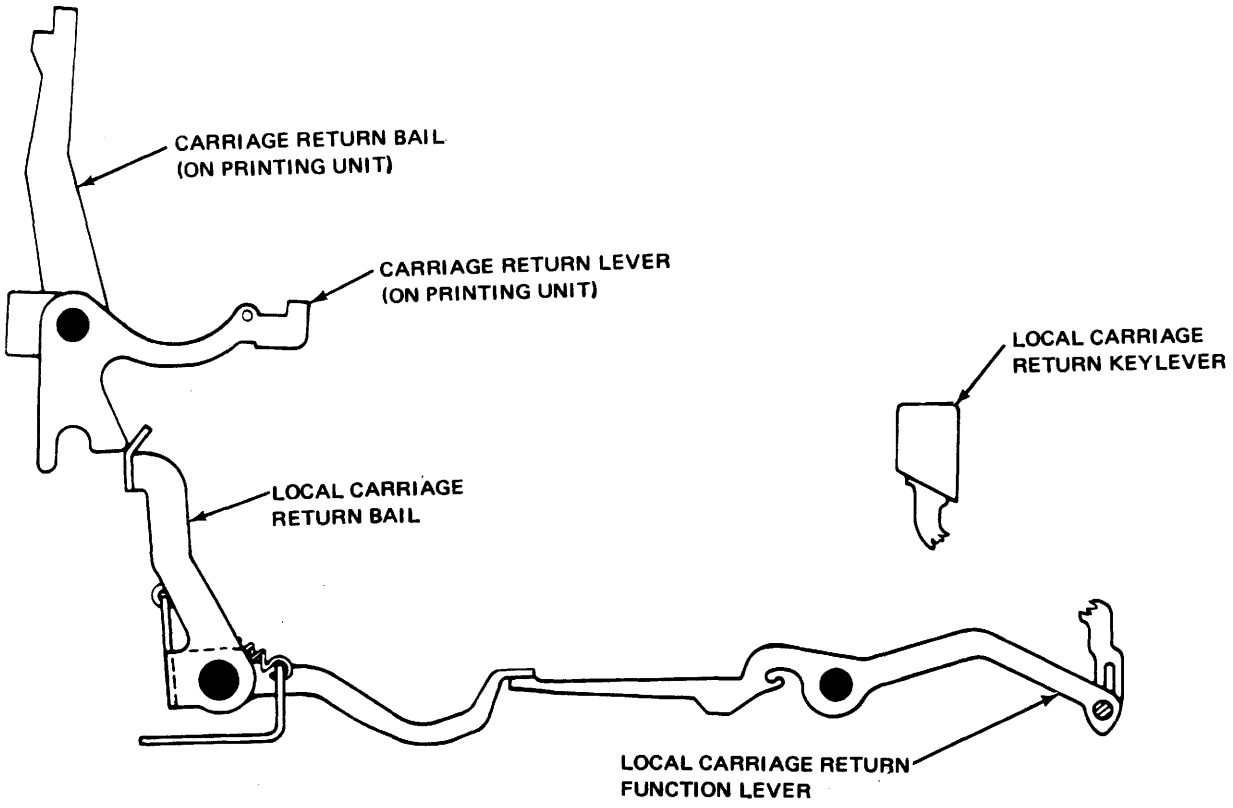


Figure 6-52. Local Carriage Return Mechanism.

d. Loosen bottom screw sufficiently to free tang on bottom of platen retainer, then swing platen retainer away from platen.

e. Remove platen retainer mounted on right-side frame (see figure 6-54).

f. Slide right and left paper guides to left end of paper guide bar.

g. Rotate paper guide bar to rear, allowing it to rest against guide bracket.

h. Remove spring from extreme right end of paper guide bar.

i. Slide paper guide bar to right until left end is free of its slot.

j. Move left end of guide bar to rear to allow more room for removal of platen assembly.

k. Lift platen assembly from printing unit.

NOTE

When removing sleeve bearings, note position of bearings for reassembly.

l. Remove sleeve bearing from each end of platen shaft.

m. Pry pressure rollers gently from their slots with small screwdriver.

n. Insert new pressure rollers in slots.

o. Install new platen assembly, using reverse procedures in steps 5 a. through 5 l.. Ensure line feed bars properly engage line feed spur gear at end of platen shaft (see figure 6-53).

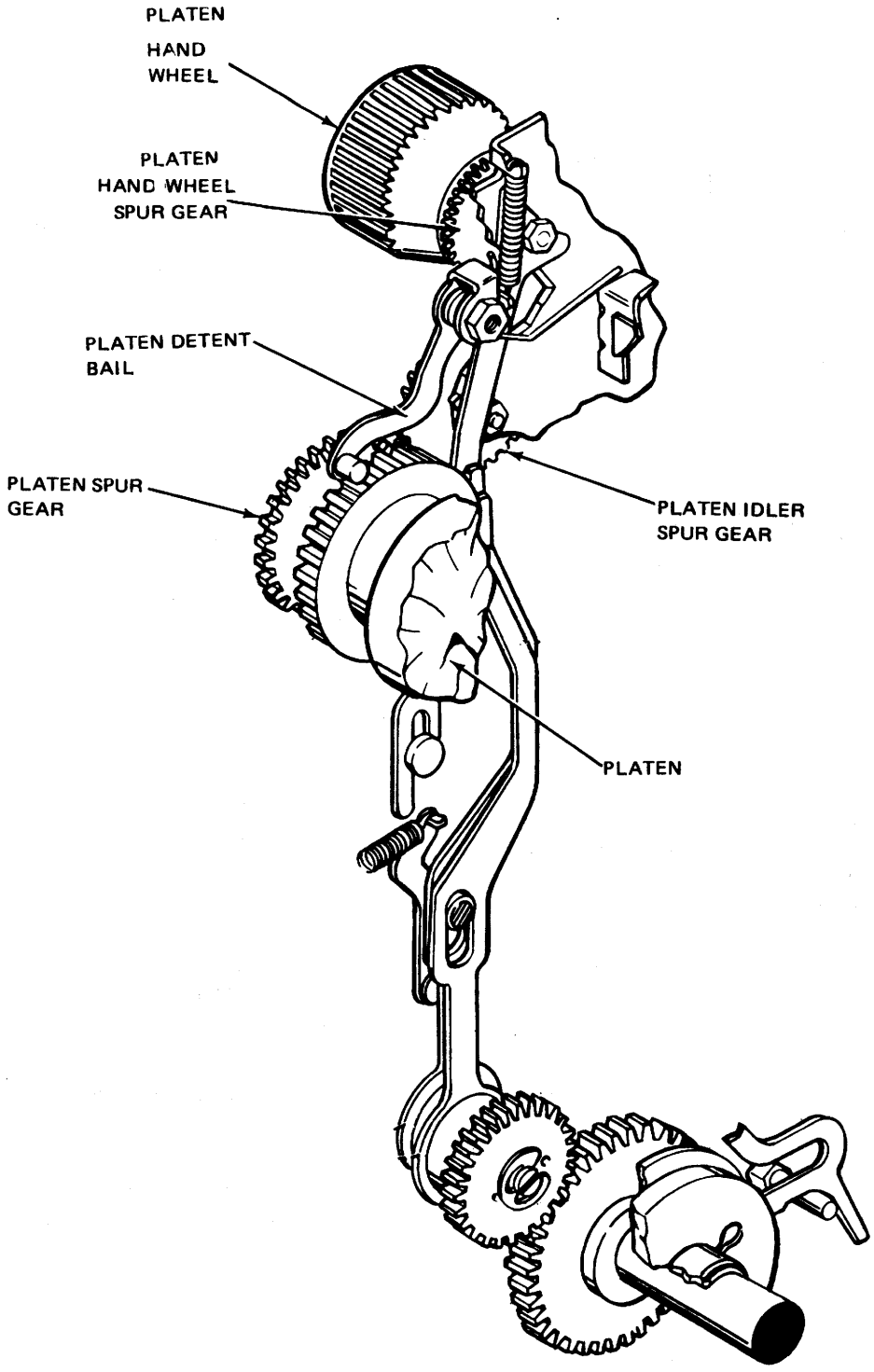


Figure 6-53. Left Platen Mechanism.

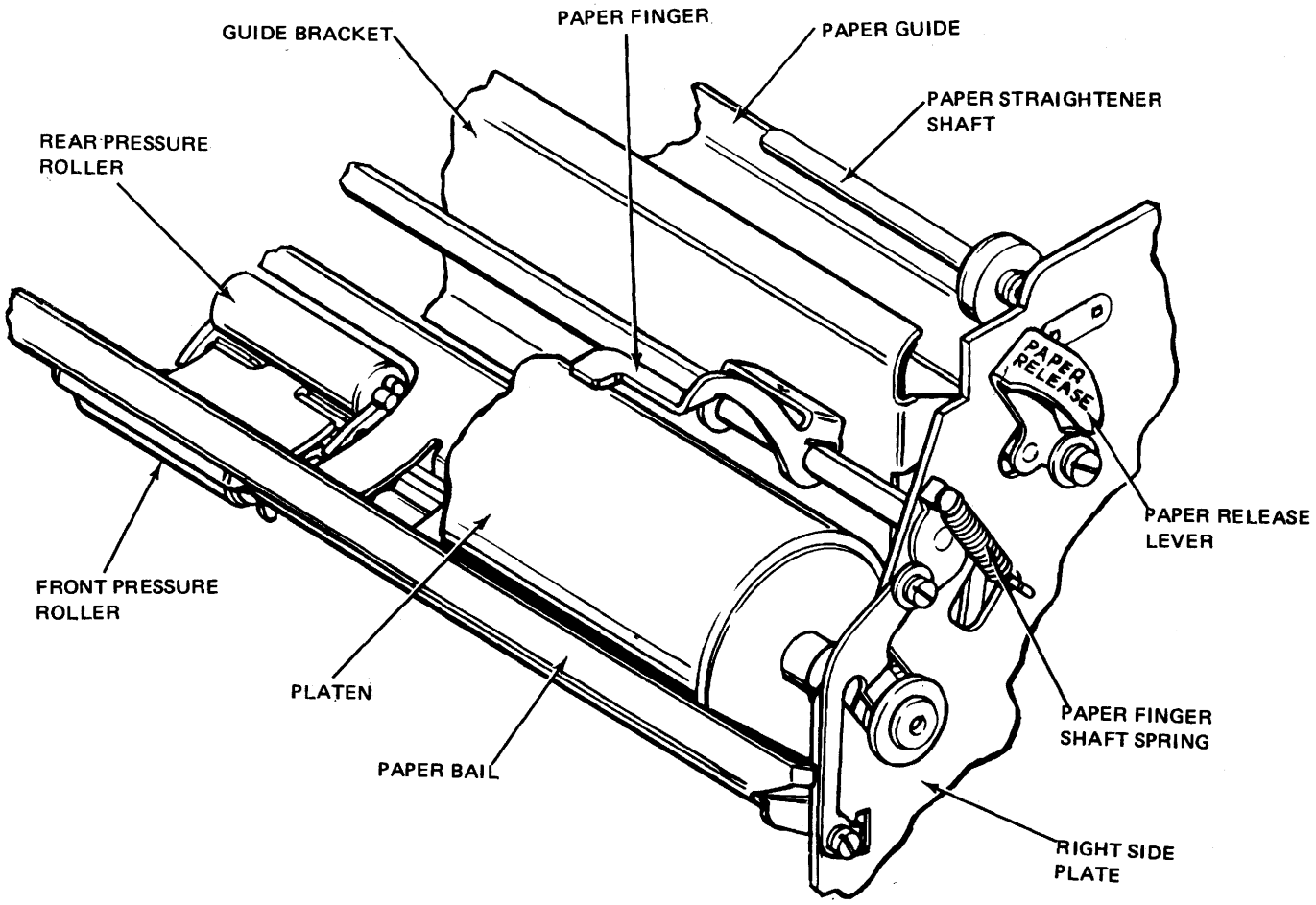


Figure 6-54. Friction Feed Platen Mechanism.

p. Ensure that platen detent bail stud is seated between two teeth on line feed spur gear (see figure 6-54; then proceed to step 5 r.). If stud is not seated, proceed to step 5 q..

NOTE

When installing left and right platen retainers, ensure their upper tangs are fitted into slots provided in sleeve bearings. Lower tangs must be properly fitted into their respective slots in slide frames before tightening screws.

q. Loosen platen detent bail mounting screws, and rotate eccentric until requirements of step 1 p. are met. Tighten screws.

r. Reinstall printing ribbon in accordance with paragraph 6-48.

s. Reinstall paper roll in accordance with paragraph 6-47.

t. Close lower and upper covers.

u. Ensure that I/O Console power is on (refer to paragraph 6-43, steps 2 a. through 2 e.).

v. Return I/O Console to normal condition.

6-54. Printer or Punch Motor Unit Removal and Replacement. The printer motor unit replacement is presented in steps 1 through 4 j.; the punch motor unit replacement in step 1 and steps 5 through 8 l.. To replace the printer or punch motor unit, proceed as follows:

1. Turn off I/O Console in accordance with paragraph 6-43.

2. Release teletypewriter latches, and open upper and lower covers.

3. Removing printing unit in accordance with paragraph 6-52.

4. Replace printer motor unit.

a. Remove cover from terminal board at left of intermediate motor gear assembly, and disconnect black wires from terminals 1 and 2.

b. Remove and retain four screws and lockwashers that secure motor unit to base.

c. Remove gear guard and motor unit.

d. Remove necessary motor shaft hardware from old motor and install on new motor unit.

e. Install new motor unit, using reverse procedures in steps 4 a., 4 b., and 4 c.

f. Reinstall printing unit in accordance with paragraph 6-52.

g. Adjust intermediate gear assembly in accordance with paragraph 6-16.

h. Close lower and upper covers.

i. Ensure I/O Console power is on in accordance with paragraph 6-43, steps 2 a. through 2 e..

j. Return I/O Console to normal condition.

5. Replace punch motor unit.

6. Release latches, and open drawer A3 to fully extended position.

7. Remove tape punch in accordance with paragraph 6-63.

c. Position punch unit with paper-tape reel up.

d. Remove cover from terminal board located to the left of and below the resistor board, and disconnect motor wires from terminals 2 and 3.

e. Place punch unit in normal position (upright), and remove screws and washers that fasten motor unit to base; then, disengage drive belt, and lift motor unit from base.

f. Remove shaft hardware, and install on new motor unit.

g. Install new motor unit on base using reverse procedure in step 8 c..

h. Align motor shaft hardware so that drive belt is perpendicular to motor shaft; tighten shaft hardware.

i. Position punch unit with paper-tape reel up.

j. Connect motor wires to terminals 2 and 3 (white wire on terminal 2, black wire on terminal 3, and one motor lead on each terminal).

k. Reinstall terminal board cover.

l. Reinstall tape punch unit in accordance with paragraph 6-63.

m. Close drawer, and engage latches.

n. Repeat steps 4 i. and 4 j..

6-55. Electrical Service Unit Removal and Replacement. To replace the electrical service unit, see figure 6-55, and proceed as follows:

1. Set teletypewriter ON/OFF switch to OFF.

2. Release latches, and open upper and lower covers of teletypewriter.

3. Remove electrical service unit.

a. Turn ELECTRICAL SERVICE UNIT ON/OFF switch to OFF.

b. Disconnect panel power connector, typing unit connector (keyboard/printer), power cord, and ground strapping from unit located directly behind printing unit.

c. Remove two mounting screws from electrical service unit and pan assembly (see figure 6-56).

d. Lift unit out from pan assembly.

e. Install new electrical service unit, using reverse procedures in steps 3 a. through 3 d..

4. Close upper and lower covers.

5. Set teletypewriter ON/OFF switch to ON.

6. Return I/O Console to normal condition.

6-56. Electrical Service Unit Circuit Card Removal and Replacement. To replace electrical service unit circuit card, see figure 6-55, and proceed as follows:

CAUTION

Disconnect power to selector magnet driver assembly before removing circuit card to avoid damaging transistors.

1. Set teletypewriter ON/OFF switch to OFF.

2. Release latches, and open upper and lower covers of teletypewriter.

3. Remove electrical service unit circuit card.

a. Clamp circuit card extractor to notches on printed circuit card.

b. Remove circuit card with rocking motion.

c. Remove circuit card from extractor.

d. Replace new circuit card by aligning connector pins and pressing into place.

4. Close upper and lower covers.

5. Set teletypewriter ON-OFF switch to ON.

6-57. Electrical Service Unit Fuses Removal and Replacement. To replace electrical service unit fuses, see figure 6-55, and proceed as follows:

1. Set teletypewriter ON-OFF switch to OFF.

2. Release latches, and open upper and lower covers of teletypewriter.

3. Replace fuse.

a. Remove fuse by pushing in and turning holder.

b. Install new fuse in holder; secure fuse by pushing in and turning holder.

4. Close upper and lower covers.

5. Set teletypewriter ON-OFF switch to ON.

6. Return I/O Console to normal condition.

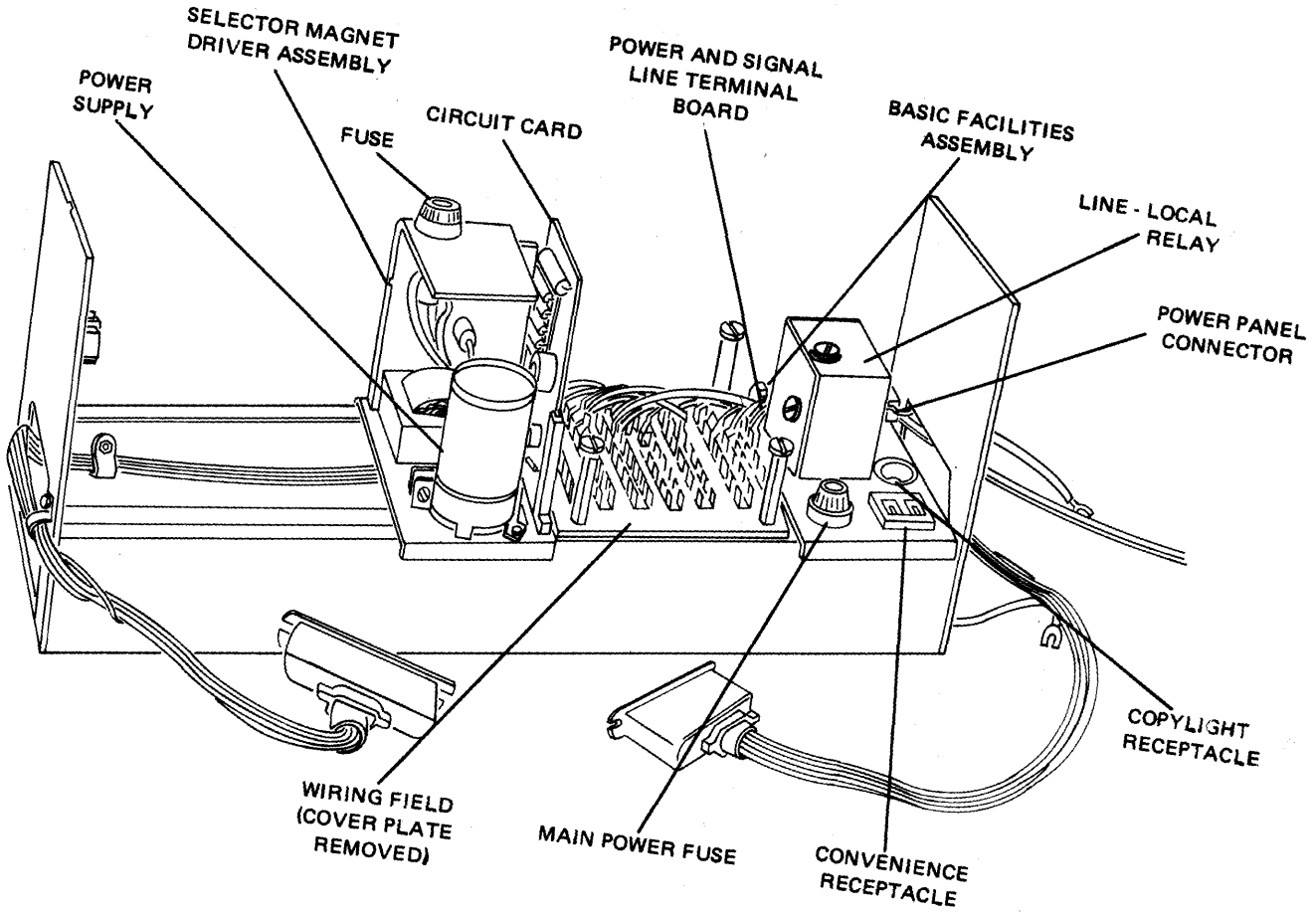


Figure 6-55. Electrical Service Unit.

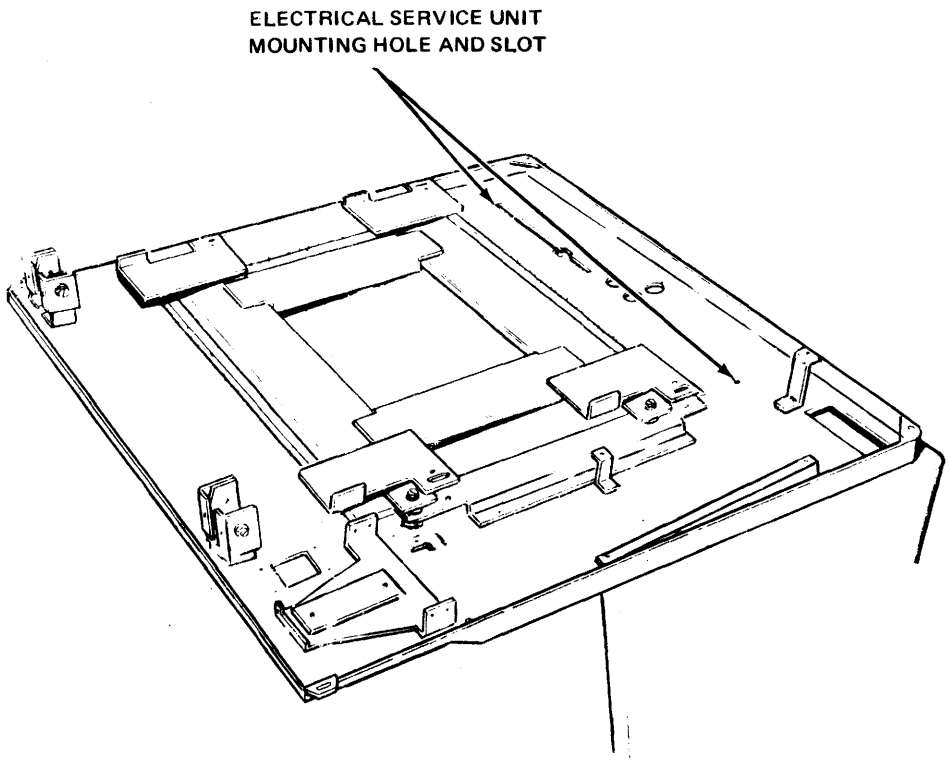


Figure 6-56. Pan Assembly.

6-58. Reader Assemblies Removal and Replacement. The reader assemblies or parts discussed in the following paragraphs are: exciter lamp, capstan and capstan bearings, pinch roller bearings and solenoid, brake coil, OFF/LOAD/RUN switch, motor drive belt read tape head assembly tape guide. Unless otherwise specified, the turnoff and turn-on procedures for performing reader repairs are as follows:

1. Turn off reader.

a. Set reader OFF/ON switch to OFF.

b. Set LOGIC POWER switch on control panel to OFF.

c. Set BLOWER POWER switch to OFF.

d. Set 60-Hz CONSOLE POWER circuit breaker to OFF.

2. Turn on reader.

a. Set 60-Hz CONSOLE POWER switch to ON.

c. Set BLOWER POWER switch to ON.

d. Set LOGIC POWER switch to ON.

e. Press MASTER CLEAR switches.

f. Press READER pushbutton.

g. Set ON LINE/OFF LINE switch to OFF LINE.

6-59. Reader Exciter Lamp, Capstan and Capstan Bearings, Removal and Replacement. To remove or replace these assemblies, see figures 6-14 and 6-57, and proceed as follows:

1. Set reader ON/OFF switch to OFF.

2. Extend READER/PUNCH drawer.

3. Remove top and bottom covers (see figure 6-14).

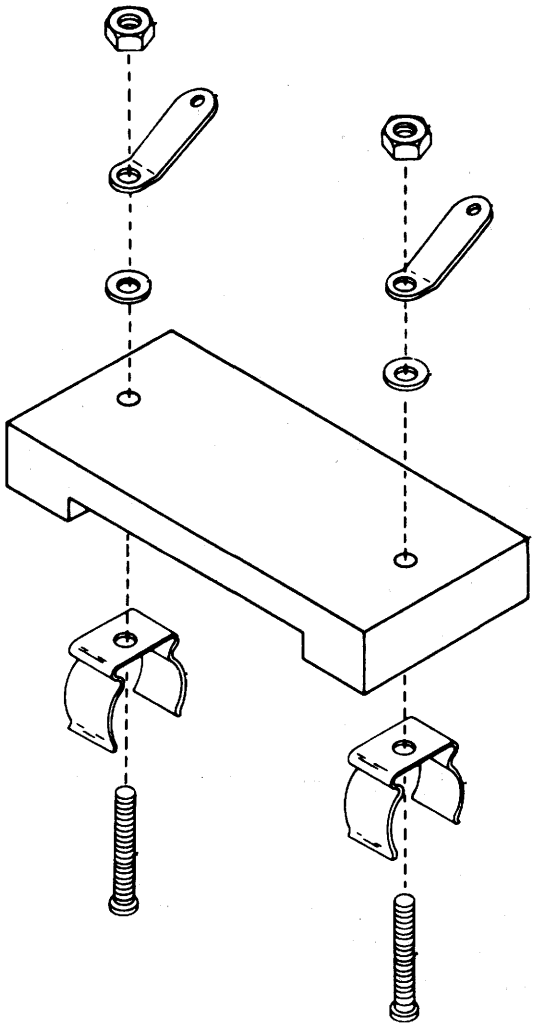


Figure 6-57. Exciter Lamp Holder Assembly.

4. Replace exciter lamp (see figure 6-57).

a. Lift top cover.

b. Pull lamp down from lamp holder assembly.

c. Install new exciter lamp, and check lamp adjustment and voltage in accordance with paragraph 6-19 and figure 6-57.

NOTE

When a new exciter lamp is installed, the lamp holder may have to be repositioned and lamp voltage may have to be readjusted to compensate for lamp-to-lamp variation by adjusting resistor R22 (see figure 6-14).

5. Replace capstan and capstan bearings.

a. Loosen capstan setscrew, and slide capstan off shaft.

b. Slide capstan shaft with pulley out of bearing block assembly from rear of panel; retain wave washer.

c. Replace two capstan bearings.

d. With wave washer on shaft, reinsert capstan shaft (with pulley) in bearing block assembly.

e. Remount capstan to shaft; leave capstan setscrew loose.

f. Apply two-pound force to rear of capstan shaft to preload wave washer; hand-tighten capstan setscrew securely (see figure 6-58).

6-60. Reader Pinch Roller Solenoid Removal and Replacement. To replace the pinch roller solenoid, see figures 6-59 and 6-60, and proceed as follows:

1. Set reader ON/OFF switch to OFF.

2. Extend reader-punch drawer.

3. Remove reader upper and lower covers.

4. Replace pinch roller solenoid.

a. Disconnect two solenoid leads PR1C and PR2C from edgeboard connections on MPC board (see figure 6-59), separate leads from harness and pull through hole in front panel.

b. Remove pinch roller assembly from front panel by removing two socket head mounting screws, lockwashers, and flatwashers from front of solenoid mounting bracket.

c. Remove locknut, compression spring, and flatwasher from spring stud.

d. Remove two screws and lockwashers which attach pinch roller spring to roller mount block, and remove roller bracket assembly.

e. Remove pinch roller solenoid by removing two hexagonal mounting nuts and lockwashers; retain felt oil pad and solenoid spacer.

f. Mount replacement solenoid with retained spacer and felt oil pad to mounting bracket; hand-tighten mounting hardware.

g. Observing bottom of solenoid, apply a radial (all directions) force to armature hub; adjust gap between solenoid hub and body for maximum clearance on all sides without binding by tapping solenoid body to shift its position on mounting bracket relative to oilite bushing (see figure 6-60).

h. Tighten solenoid mounting nuts securely; recheck step 4 g..

i. Replace roller bracket assembly and two screws and lockwashers which attach pinch roller spring.

j. Replace locknut, compression spring and flatwasher to spring stud.

k. Replace two sockethead mounting screws, lockwashers and flatwasher on solenoid mounting bracket.

l. Pull solenoid leads through front panel hole. Connect leads to harness and connect to PR1C and PR2C on MPC board (see figure 6-59).

m. Return I/O Console to normal condition.

6-61. Reader Capstan Drive Motor Assembly Removal and Replacement. To replace capstan drive motor assembly, proceed as follows:

1. Set reader ON/OFF switch to OFF.

2. Extend reader punch drawer.

3. Remove reader upper and lower cover.

4. Replace capstan drive motor (motor) assembly.

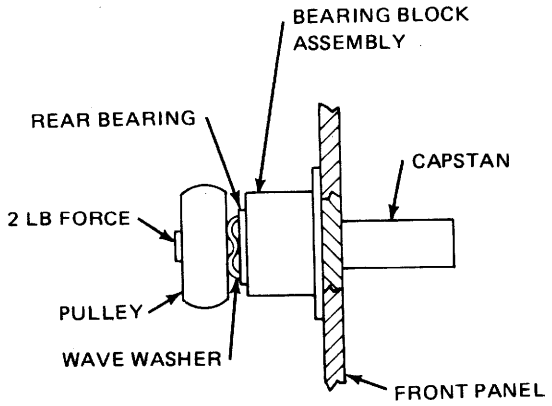


Figure 6-58. Capstan Bearing Preload Adjustment.

a. Disconnect motor leads from terminal board TB1; remove wires from wire clips.

b. Slip drive belt off capstan pulley.

c. Remove motor assembly by removing three mounting screws from front panel.

CAUTION

Care should be taken when replacing motor assembly to ensure no damage is done to printed circuit components of printed circuit board.

d. Transfer motor pulley from old motor to replacement motor shaft.

e. Mount replacement motor assembly with motor shaft visually centered in hole in front panel; tighten mounting screws.

f. Slip drive belt onto motor and capstan pulleys.

g. Replace motor leads on terminal board TB1.

h. Perform drive belt tension adjustment in accordance with paragraph 6-23.

i. Return I/O Console to normal operation.

6-62. Reader Brake Coil Removal and Replacement. To replace the brake coil, see figure 6-61, and proceed as follows:

1. Set reader ON/OFF switch to ON.

2. Extend reader punch drawer.

3. Remove reader covers.

4. Replace brake coil.

a. Disconnect brake coil leads from edgeboard connections B1C and B2C (see figure 6-59); separate wires from harness and pull through hole in front panel.

b. Remove two head cover and spring mounting bracket mounting screws, and associated washers from top of brake assembly; remove cover and spring mounting bracket (with spring and armature).

c. Remove brake coil from base plate by removing two socket head mounting screws and associated washers from front of coil.

d. Mount replacement brake coil to base plate, leaving mounting screws hand-tight.

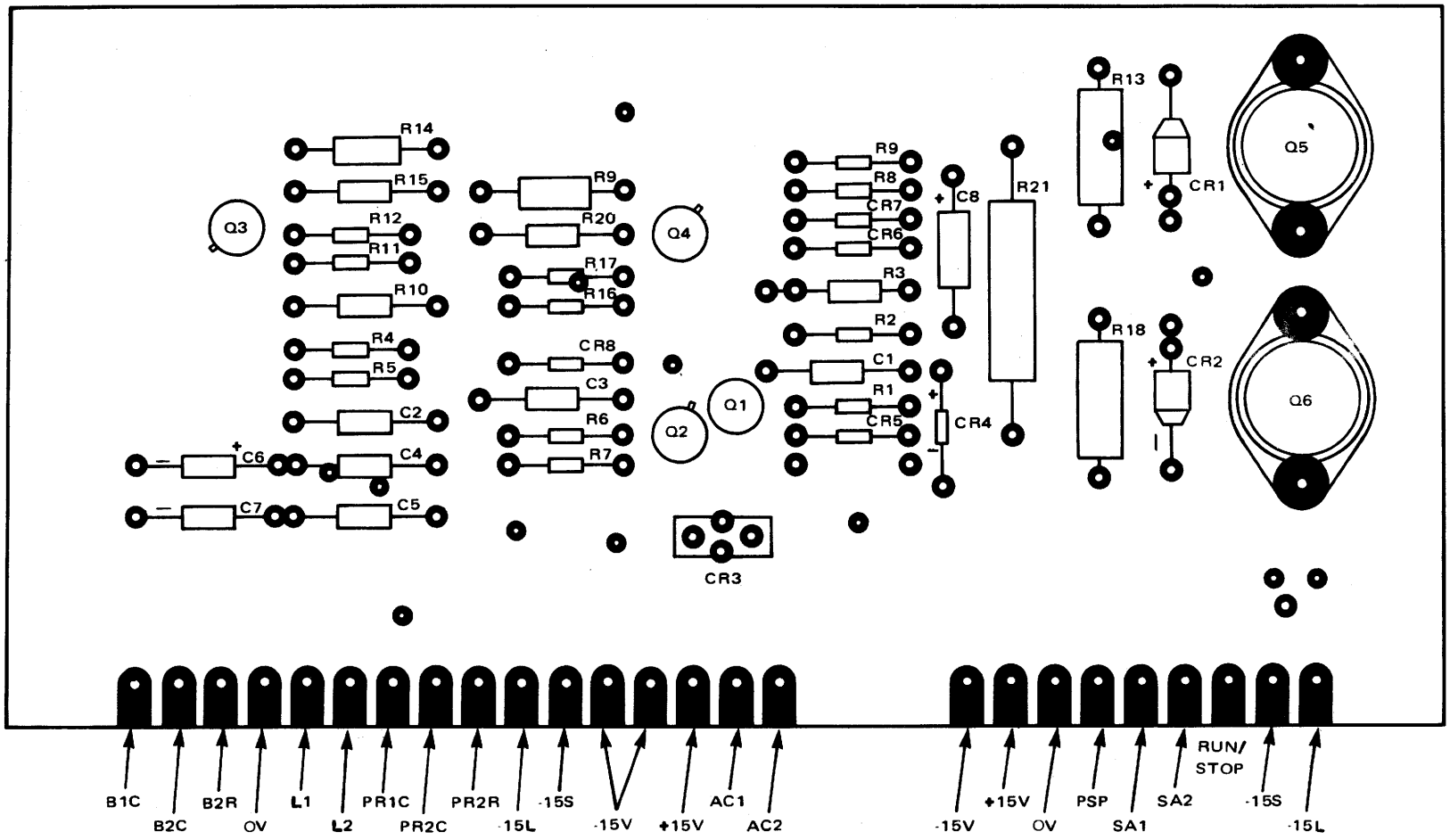


Figure 6-59. MPC Edgeboard Connections.

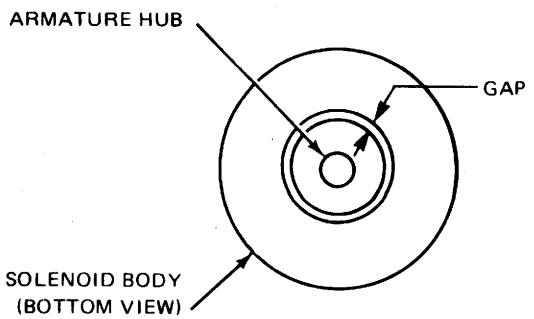


Figure 6-60. Solenoid Radial Gap Adjustment.

e. Route and connect coil leads to edgeboard.

5. Perform brake assembly adjustment.

a. Assemble spring mounting bracket (with spring and armature attached) to baseplate with back of bracket flush to back of baseplate; position armature 0.005 to 0.010 inch from guide bar [see figure 6-61(A)] and 1/8-inch back from front edge of coil assembly [see figure 6-61(B)].

NOTE

The brake assembly adjustment should be performed when the brake coil has been replaced. The procedure is intended to be performed following the brake coil replacement procedure, and assumes that the brake cover and spring mounting bracket (with spring and armature) have been removed.

b. With two armature support bracket screws loose, insert brake cover on top of bracket and tighten screws securely.

c. With bracket assembly in upright position and coil assembly mounting screws loose, slide coil upward (against baseplate and guide bar) from lowest position until poles of coil just contact dimples on bottom of armature; tighten coil mounting screws securely.

6-63. Tape Reader READY/LOAD Switch Removal and Replacement. To replace tape reader READY/LOAD switch, see figure 6-14, and proceed as follows:

1. Secure I/O Console power (refer to paragraph 6-58).

2. Set reader ON/OFF switch to OFF.

3. Remove upper cover.

4. Replace tape reader READY/LOAD switch.

a. Unsolder four leads on READY/LOAD switch S2 (see figure 6-14).

b. Remove READY/LOAD switch by removing two screws that fasten switch to front plate.

c. Mount new switch; tighten two screws.

d. Solder four leads to new switch.

5. Replace upper cover.

6. Set tape reader ON/OFF switch to ON.

7. Return I/O Console to normal condition.

6-64. Tape Reader Drive Belt Removal and Replacement. To replace the drive belt, proceed as follows:

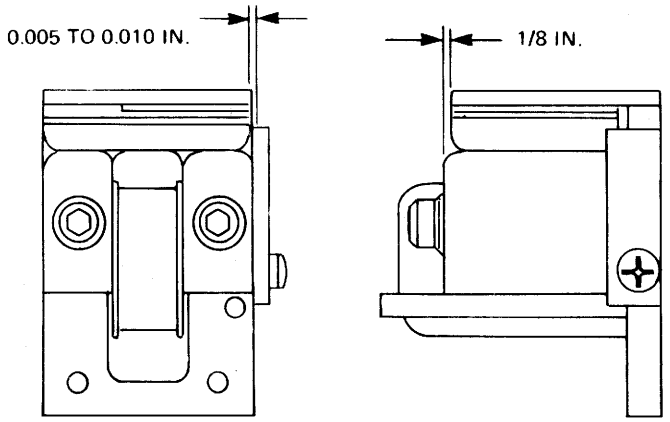


Figure 6-61. Brake Armature Positioning.

1. Set reader ON/OFF switch to OFF.

2. Remove upper and lower covers.

3. Extend reader-punch drawer.

4. Replace drive belt.

a. Loosen four screws and remove perforator drawer cover to expose capstan drive motor.

b. Loosen capstan setscrew and slide capstan off of shaft.

c. Remove motor reducer assembly from rear of front panel by removing three mounting screws, flatwashers, and lockwashers from rear of assembly.

d. Remove front plate from reducer assembly.

e. Remove pulley and drive belt.

f. Install new drive belt and reinstall pulley.

g. Reinstall front plate on reducer assembly.

h. Mount motor reducer assembly on front panel using screws and washers removed in step 4 c.; tighten screws.

i. Reinstall capstan on pulley shaft.

j. Align capstan over pinch roller and tighten setscrew.

k. Adjust capstan in accordance with paragraph 6-22.

l. Reinstall perforator drawer cover and close drawer.

5. Reinstall upper and lower covers.

6. Set reader ON/OFF switch to ON.

7. Return I/O Console to normal condition.

6-65. Tape Read Head Assembly Removal and Replacement. To replace tape read head assembly, see figure 6-14, and proceed as follows:

1. Set reader ON/OFF switch to OFF.

2. Remove upper and lower covers.

3. Release latches of reader/perforator punch drawer and pull drawer to fully extended position.

4. Replace tape read head assembly.

a. Disconnect photodiode head lead edgeboard connections on LAC board (see figure 6-15), and separate leads from wire harness.

b. Remove lens and head assembly from front panel by removing two mounting screws and lockwashers on front of base plate.

c. Pull head assembly leads through hole in front panel and remove lens and head assembly.

d. Remove head assembly from tape guide block and base plate by removing two screws and lockwashers at rear of base plate.

e. Mount guide block and new head assembly to base plate, using screws and lockwashers removed in step 4 d..

f. Connect photodiode head leads to LAC board connections through hole in front panel.

g. Connect color-coded leads as per color code on LAC board (see figure 6-15).

h. Install lens and head assembly using hardware removed in 4 b.. To adjust, refer to paragraph 6-19.

5. Close reader/perforator drawer.

6. Reinstall upper and lower covers.

7. Set reader ON/OFF switch to ON.

8. Return I/O Console to normal condition.

6-66. Tape Guide Head Assembly. To replace tape guide assembly, see figure 6-15, and proceed as follows:

1. Set reader ON/OFF switch to OFF.

2. Remove upper and lower covers.

3. Replace tape guide assembly.

a. Loosen mounting screw on right side of base plate.

b. Slide tape guide assembly out of base plate mounting hole.

c. Install new tape guide assembly.

d. Adjust tape guide for proper tape dimension by loosening mounting screw on right side of base plate and moving the assembly in or out in the mounting hold to achieve proper dimension.

4. Reinstall upper and lower covers.

5. Set reader ON/OFF switch to ON.

6. Return I/O Console to normal condition.

6-67. Punch Unit Removal and Replacement. To replace the punch unit, proceed as follows:

1. Turn off I/O Console power in accordance with paragraph 6-43.

2. Release latches, and pull drawer A3 to fully extended position.

3. Remove punch unit.

a. Disconnect plugs from on left side of tape punch unit.

b. Remove chad box from tape punch unit.

c. Remove chad box and attaching bars by removing two screws that fasten rear bar to plate of tape punch unit.

CAUTION

When nuts are removed (step 3 d.), washers will fall out. Note location of washers for reinstallation.

d. Remove the four nuts and accompanying washers, located under drawer A3, that fasten tape punch unit to main chassis.

e. Remove tape punch unit from drawer A3.

f. Reinstall tape punch unit, by performing steps 3 a. through 3 c. in reverse order.

g. Close drawer, and engage latches.

h. Ensure I/O Console power is on in accordance with paragraph 6-43, steps 2 a. through 2 e..

i. Return I/O Console to normal condition.

6-68. **WIRE WRAP TECHNIQUE.**

6-69. Many components of the I/O Console are wire-wrapped instead of soldered. Wire wrapping requires special techniques for removal, installation and wire routing, which are discussed in the following paragraphs.

6-70. WIRE WRAP REMOVAL. Step-by-step procedures are listed for precautionary guidelines and wire wrap removal procedures. Adhering to the precautionary guidelines will prevent damaging wires or components during wire wrap removal procedures.

6-71. Precautionary Guidelines. The following guidelines should be adhered to when removing a wire wrap:

1. Use only the designated unwrap tools for the gauge wire being removed.

2. Ensure that no chips or pieces of wire fall into or remain in the chassis (possibly causing shorts).

3. If a lower wire wrap must be removed, upper levels must be removed first to gain access.

4. Clip both unwrapped wire ends before removing wire from chassis (this prevents pigtails and sharp ends of wires from nicking or unloosening other wires in the wire's path).

6-72. Wire Wrap Removal Procedures. Procedures for removing wire wrap are as follows:

1. Locate one end of the wire to be deleted.

2. Place barrel of the unwrap tool over the pin, and rotate the tool in a direction opposite that of the wrap.

3. Locate the opposite end of the wire to be deleted, and repeat step 2.

4. Verify continuity between the two lifted wire ends.

5. Cut both unwrapped wire ends, and remove the wire by pulling gently on either end.

6. It may be necessary to use a spring hook in the removal of the wire (if problems are encountered in removing the wire, continue with steps 7, 8, and 9).

7. Using a no-nick wire stripper, remove one inch of wire insulation from one end of the wire.

8. Using a pair of needle nose pliers, remove the center conductor.

9. If possible, remove the insulation from the chassis.

6-73. MODIFIED WIRE WRAP. Step-by-step techniques are listed for precautionary guidelines, modified wire wrap and incorrect wire wrap procedures. The precautionary guidelines will prevent damage to the wire being installed.

6-74. Precautionary Guidelines. The following guidelines should be adhered to when executing a modified wire wrap:

1. Use only the designated tools for the wire size to wire wrap.

2. Make sure no chips or pieces of wire fall into or remain in chassis.

3. Due to the possibility of stretching or nicking the wire when stripping, a thermal stripper (if available) is advisable for use rather than a mechanical wire stripper.

6-75. Modified Wire Wrap Procedures. Procedure for executing a modified wire wrap is as follows:

1. Using a thermal stripper or a no-nick stripper, remove 1 1/8±1/16 inch of insulation from end of wire.

2. Insert the wire between longitudinal groove and stationary sleeve, making sure that the insulation extends into the groove of the bit [see figure 6-62(A)].

3. Bend the wire at a right angle to longitudinal groove of bit [(see figure 6-62(B)].

4. Position the gun over the designated pin, with pin inserted into the bit, apply slight forward pressure and press trigger of gun.

NOTE

The wire wrap gun supplies necessary pressure to form the required wrap. With the correct amount of forward pressure, the wire wrap gun pushes itself backward as the wrap is formed.

5. The modified wire wrap formed should have the required amount of wire and insulation turns (refer to table 6-2) around the pin. The wire wrap should be evenly wrapped without overlapping the turns or gaps between them (see figure 6-63).

6-76. Unacceptable Wire Wraps. Improper use of the wire wrap gun can result in unacceptable wire wrapping (see figure 6-64). Overwrapping, loose wraps, insufficient turns and pigtails are explained below:

1. Overwrapping [figure 6-64(A)] results when excessive forward pressure is used on the wire wrapping gun during the wrapping process.

2. Loose wraps [see figure 6-64(B)] are created when the wire wrap gun is pulled away from the chassis during the wrapping process.

3. Insufficient turns [see figure 6-64(C)] are caused by not having the wire insulation completely inserted into the outer hole of the bit prior to starting the wire wrap.

4. Pigtails [see figure 6-64(D)] are created when the wire wrap is not completely formed around the pin. This normally results from selecting an incorrect bit and sleeve combination, or terminating the wrap before the full length of wire is wrapped around the pin.

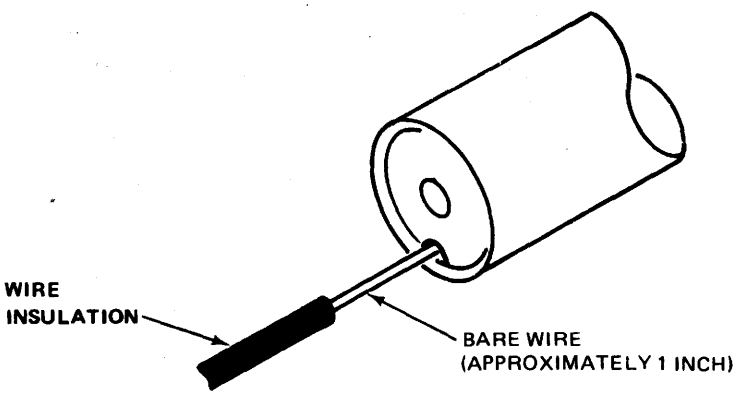
6-77. WIRE ROUTING. Wire routing requires techniques not readily apparent. Precautionary guidelines, wire plane layout, wire routing designators and wire routing procedures are discussed.

6-78. Precautionary Guidelines. The following precautionary guidelines should be adhered to when routing wire within the chassis:

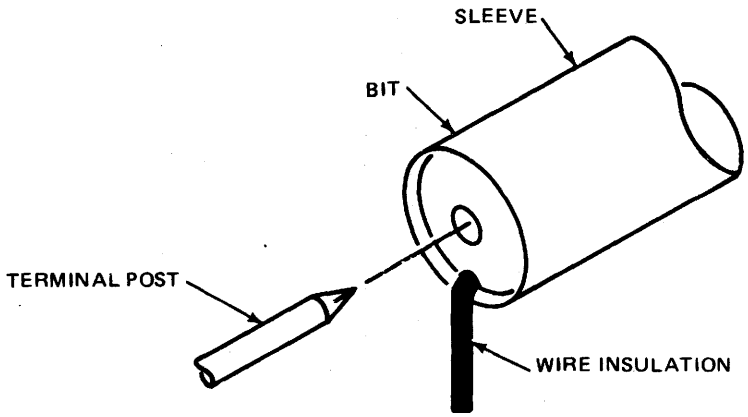
1. Use care and time when routing wires to avoid stress on pins along the routing path and to avoid damage to wire insulation.

2. When wire routing information is supplied between the origin and destination reference designators, it must be followed exactly. When no specific routing information is called out, wire routings should follow the same general paths used by manufacturing, where it is possible.

6-79. Wire Plane Layout. The following describes wire planes by rows, card columns, card pins and wire wrap level:



(A) INSERTION OF WIRE INTO LONGITUDINAL GROOVE



(B) POSITIONING OF GUN, WIRE INSULATION AND TERMINAL POST

Figure 6-62. Wire Wrap Procedure.

1. The card rows are numbered at the side of each row. Odd-numbered rows are indicated by black bands on the wire plane. Even-numbered rows are uncolored, but numbered in black.

2. The IOA wire plane is organized into four card columns lettered A through D. The MEM, IOC, and CPU wire planes are organized into three card columns lettered A through C. The DDM wire plane is organized into five card columns lettered A through E.

3. Card pin numbers are numbered 1 through 56. The pin numbers are printed

Table 6-2. Number of Turns

Wire Gauge	Minimum No. of Wire Turns	Insulation Turns	Total Turns
30	7	1/2 to 2	7 1/2 to 9
26	6	1/2 to 2	6 1/2 to 8

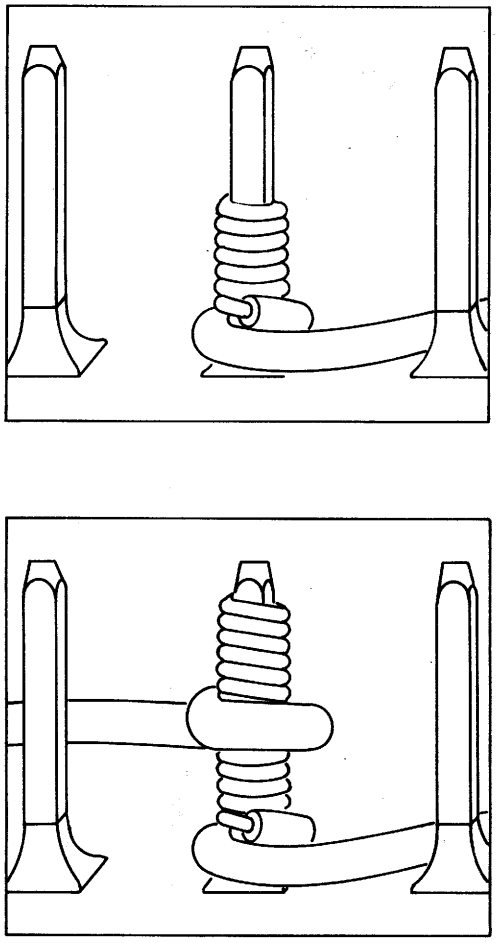


Figure 6-63. Acceptable Wire Wraps.

on the wire plane at the beginning and the end of the card columns. Even pin numbers are at one end, and odd pin-numbers at the opposite of the card columns.

4. The wire wrap located at the top third of the pin is referred to as wire wrap level three, and the wire wrap located at the bottom of the pin closest to the chassis is referred to as wire wrap level one.

6-80. Wire Routing Designator. The wire routing designator shows the card row, card column, card pin and wire wrap designator. The following is a breakdown of the wire routing designator J01A-12-3:

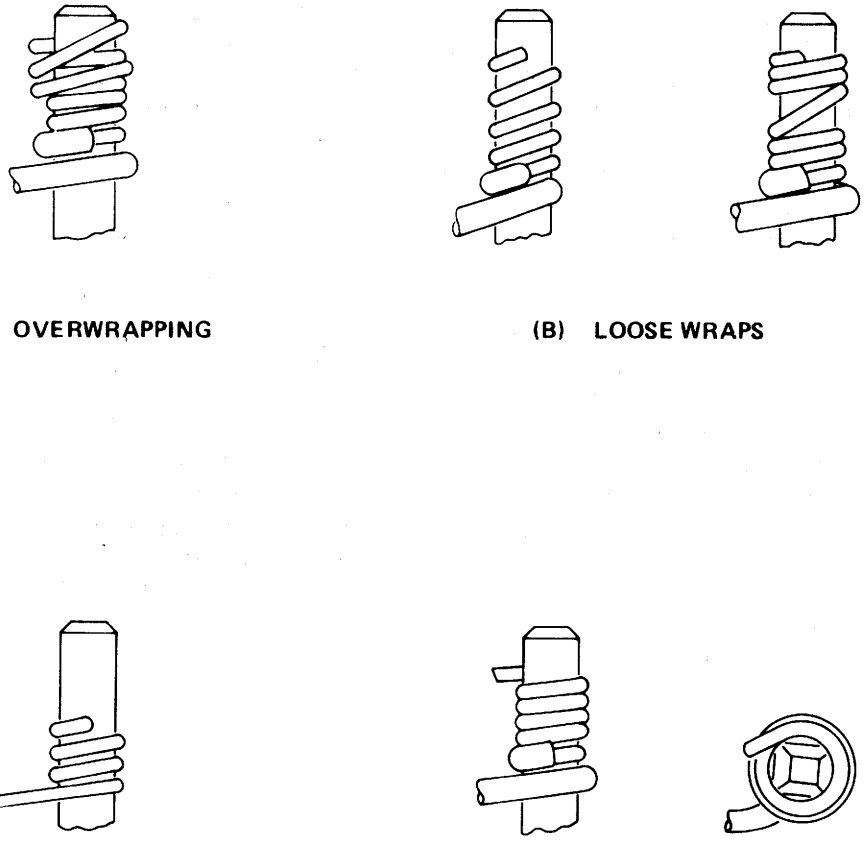


Figure 6-64. Wire Wrap Examples.

Card row	J01
Card column	A
Card pin	-12
Wire wrap level	-3

6-81. Wire Routing Procedures. Procedures for routing the wire correctly with notes for incorrect wiring is as follows:

NOTE

Point-to-point wiring is not used. Wire should be laid out along manufacturer's path before attaching to pin.

1. Wire routing should follow paths similiar to those used by the manufacturer. Wires follow paths of previously laid wires.

NOTE

If wire is not laced beneath other wires, tears in insulation or undue stress on wire could occur. Also, if at a later time other wiring must be removed, the job is more difficult when wires on top are cobwebbed.

2. Form the wire around the routing point and proceed to the next routing point, if called out, making sure that the wire stays within the row of pins and around the routing paths.

6-82. LHA-1 Class Ships Modifications. The LHA modified input/output console, referred to as OA-7984(V)4812-A and applicable only to LHA-1 class ships, is the same as the unmodified input/output console except the unit is adapted to accept standard 5-level baudot teletype tape. Affected units have a modification plate adjacent to the existing name plate.

6-83. The punch block assembly is replaced with a punch block assembly (Teletype part no. 146261) that can be adjusted to accept either 1-inch or 11/16-inch tapes for either eight-level or five-level punching. For punch block adjustments after replacing, refer to paragraph 6-27.

6-84. The tape guide is also replaced with a tape guide assembly (Teletype part no. 146284) that can be adjusted to guide either the 1-inch or 11/16-inch tapes into the punch block assembly (see figure 6-65). For tape guide adjustments after replacing, refer to paragraph 6-27.

6-85. The tape guide detent spring maintains a 6-ounce minimum and a 14-ounce maximum pull force in moving the tape guide plate from the rear eight-level position to the forward five-level position (see figure 6-65).

6-86. The LHA-1 class ships modifications referred to in paragraphs 6-82/83 are supplied in the communications data processing system input/output console modification kit, part no. 105127-690 (see table 6-1). There are no further changes to other I/O Console assemblies.

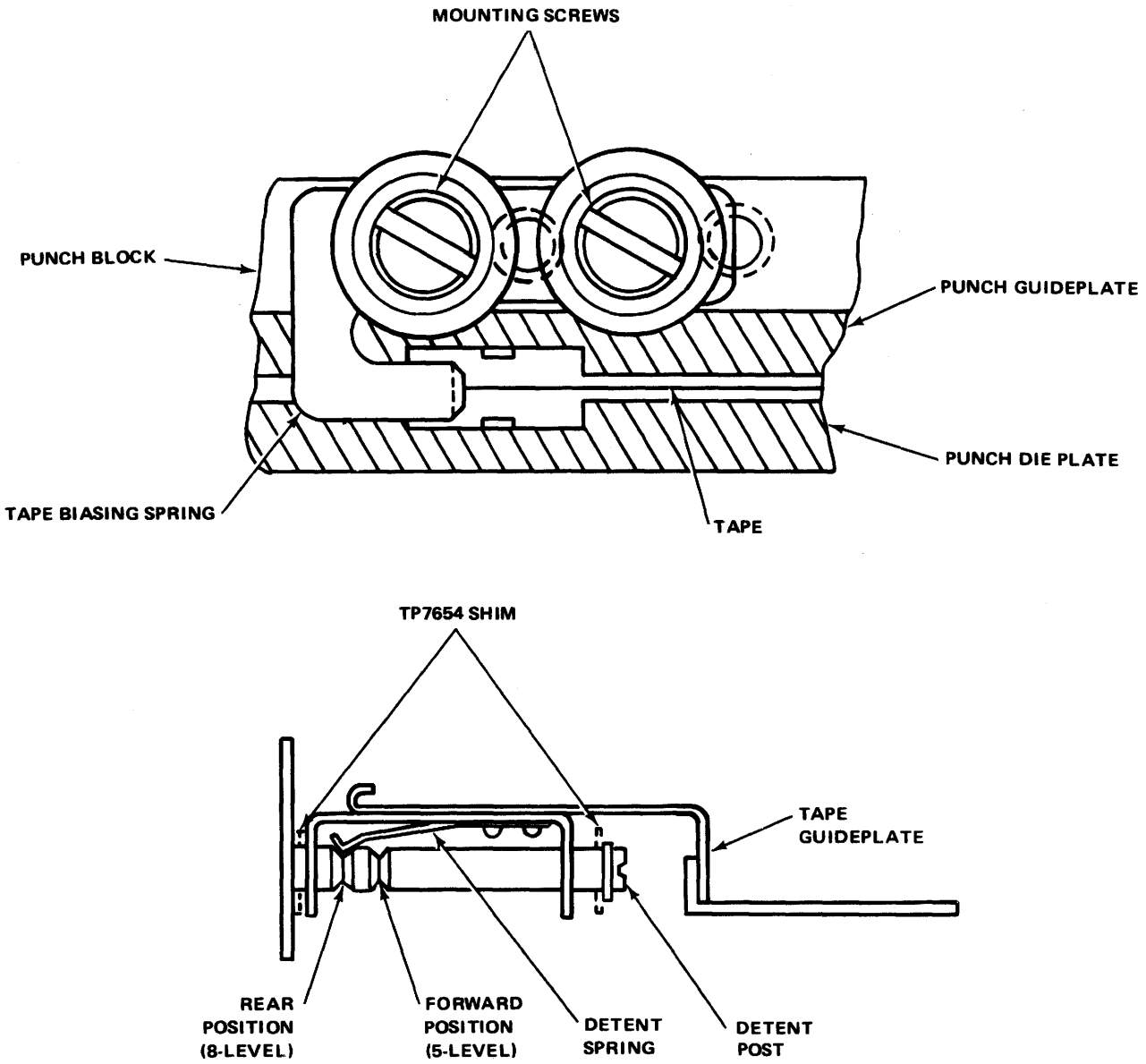


Figure 6-65. Tape Guide for LHA-1 Class Ships.