

32 TELETYPEWRITER SET  
 INSTALLATION

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→ carton. Remove cardboard liner which surrounds the teletypewriter set. Carefully lift set with pallet from carton.

**CAUTION: TELETYPEWRITERS, DEPENDING ON TYPE, WEIGH FROM 47 TO 61 POUNDS.**

1.07 The typing unit and subbase are mounted on a shipping pallet by seven screws. Remove the seven screws, being careful that the typing unit does not fall off subbase. When three hexagon screws are removed, the typing unit is seated only on rubber isolators attached to the subbase.

Note: Retain the forward mounting screw and associated flat washer. This screw is used to secure the typing unit when shipped to another location without its cover fastened in place. The screw and washer may be stored in the TP181104 cable clip (included in bag of hardware with pedestal mounted units) to be mounted on the typing unit frame between the two dashpot mounting screws (Figure 1).

→ 1.08 Remove teletypewriter from the shipping pallet.

→ **CAUTION: DO NOT TILT THE TELETYPEWRITER AFTER IT HAS BEEN REMOVED FROM THE PALLET. THE TYPING UNIT**

**FLOATS ON RUBBER ISOLATORS AND MAY PULL LOOSE IF IT IS TILTED.**

**PREPARATION FOR INSTALLATION**

1.09 Remove the tape from across the top of the cover and take out the cables, platen knob (if not mounted on typing unit), and paper spindle from the paper recess. Unwrap the parts.

1.10 Remove the call control bezel, if used, after removing its two mounting screws. Remove volume control knob or power switch rotary knob, if used, by pulling knob forward. Detach the nameplate (Figure 2) by pulling it down and out. Remove the four front and three rear cover mounting screws. If platen knob is mounted on typing unit, remove.

Note: On Automatic Send-Receive (ASR) Sets, remove the screw from the left rear corner of the tape reader cover.

Gently lift the cover from the subbase.

1.11 Remove the twist tie holding the carriage to the left side frame and the tissue paper retaining the spacing pawls. Remove two yellow clips from the function drive bail.

Note: If the teletypewriter is an ASR Set with early design tape reader, remove the retaining clip from the tape reader upstop screw (Figure 12). Also, remove the yellow clip under the sensing lever of the tape punch.

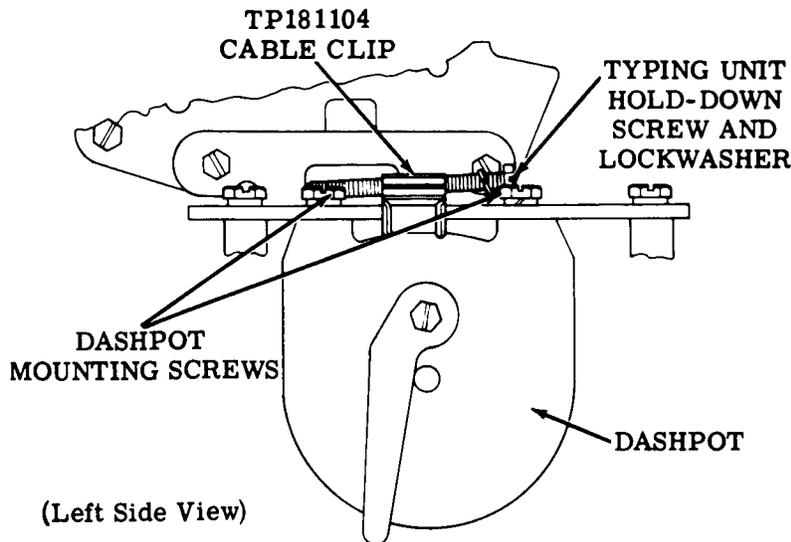


Figure 1 - Typing Unit Hold-Down Screw Storage

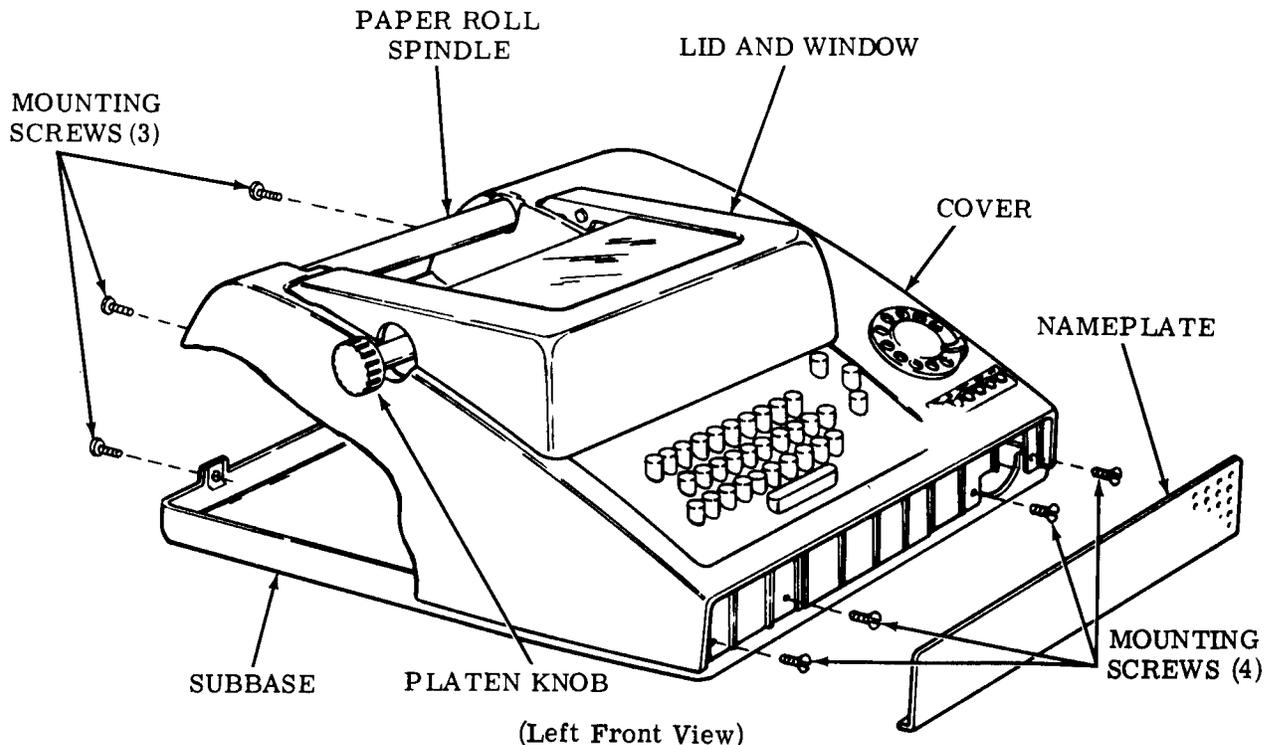


Figure 2 - Cover Mounting

1.12 If a stand is used, remove its two rear panel mounting screws and take panel off. Remove bag attached inside of stand and place its hardware contents on the bench.

1.13 The teletypewriter set should be thoroughly lubricated before placing it into service and relubricated after a short period of service. Thereafter, maintain the regular lubrication intervals as required in the appropriate lubrication sections.

## 2. INSTALLATION

### MOUNTING TYPING UNIT ON STAND

2.01 If the teletypewriter set is to be bolted to the floor, remove the front screw in each leg of the stand (Figure 3).

2.02 Install the plug button, included in the bag of hardware, in the forward hole in the bottom of the subbase.

2.03 Place the subbase and typing unit on top of the stand so that its back edge and sides line up with the back edge and sides of the

stand. Install the two retaining clips, included in the hardware bag, on the base at the rear (one each end) and snap them in place on the stand. Refer to Figure 4. Mount the base to the stand from the bottom with four TP181237 screws and four TP125928 flat washers.

### CODING THE ANSWER-BACK DRUM

2.04 To remove answer-back drum for coding, press back and down on the tab portion of the TP180854 brace until it becomes detented in its open position. Lift feed pawl slightly (do not overextend its spring) and remove drum.

2.05 Code the answer-back drum in a counter-clockwise direction (Figures 5 and 6), starting with row no. 1.

**Note 1:** The ST row is the first row sensed at the beginning of an answer-back cycle. It is coded at the factory for character suppression and must not be recoded.

**Note 2:** The TP184149 answer-back drum (in which the suppression tine is not factory-removed, as in other drums) requires a

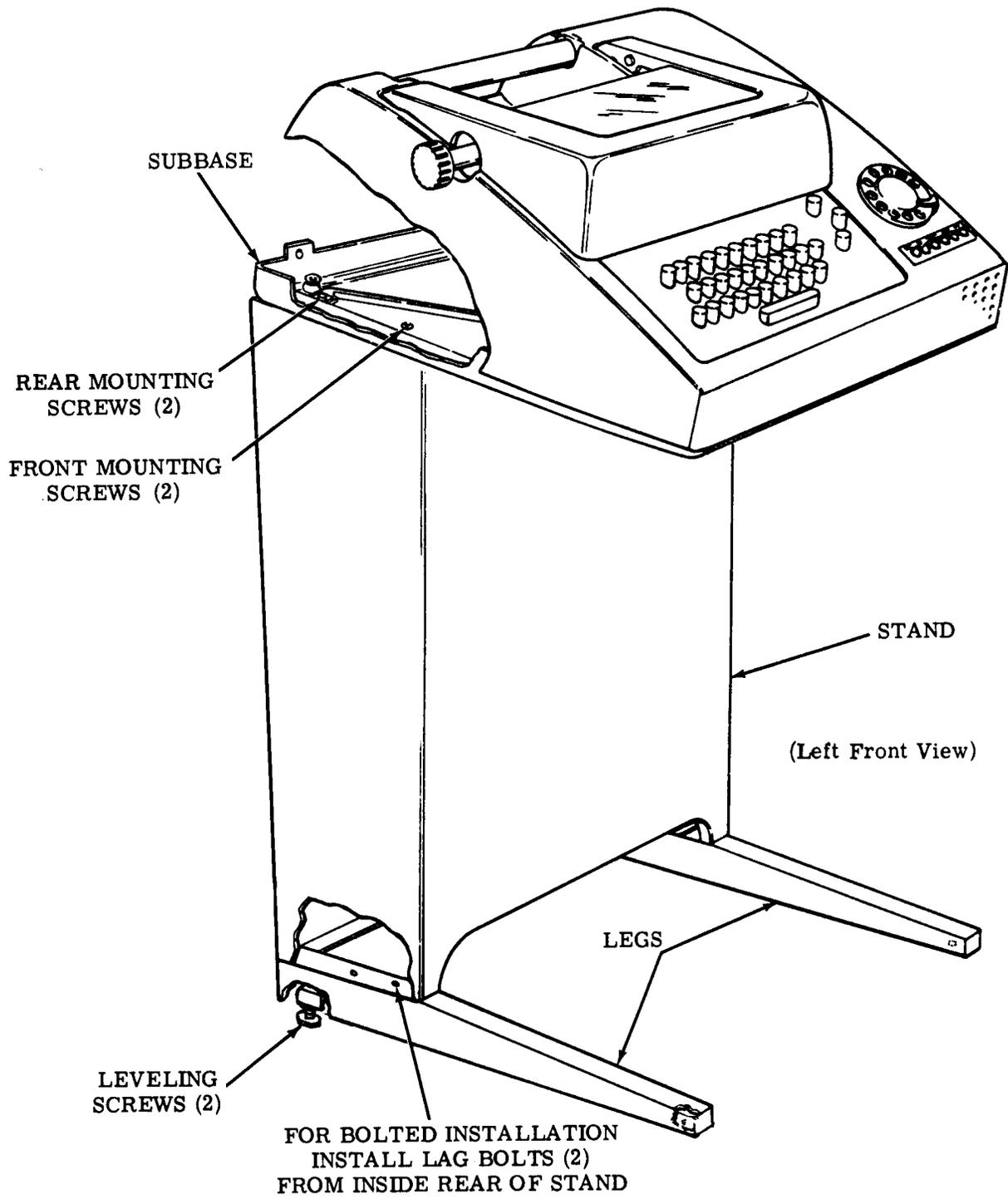


Figure 3 - Stand Leveling and Anchoring and Assembly of Subbase with Typing Unit to Stand

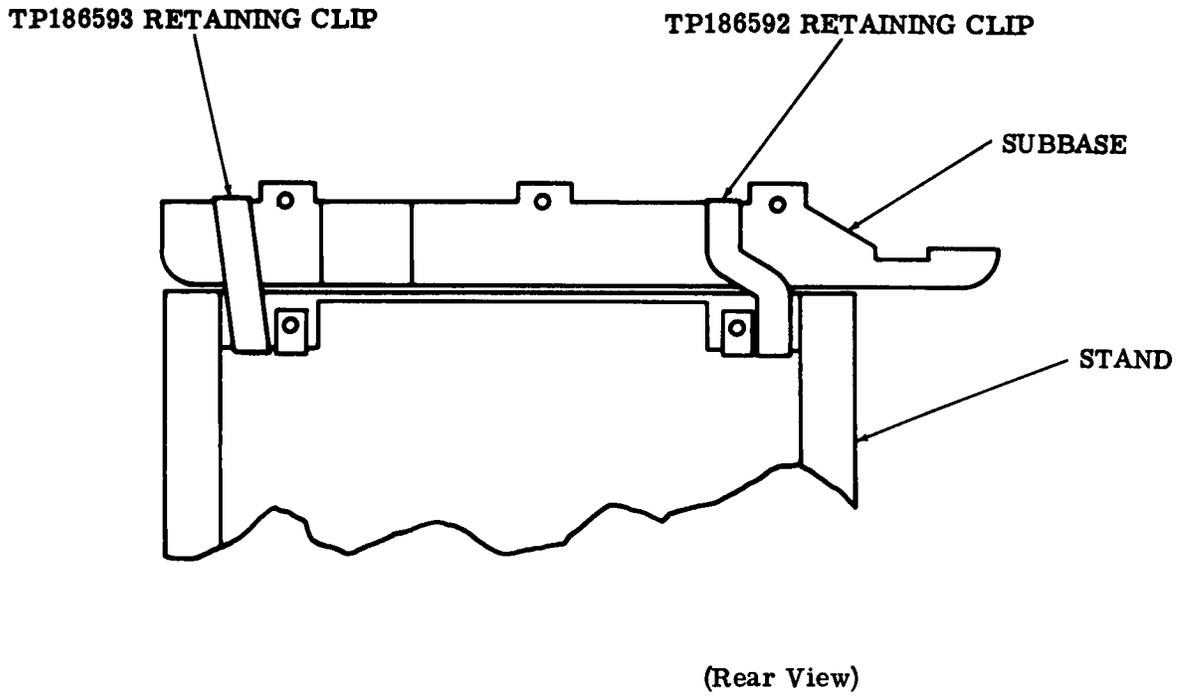


Figure 4 - Installation of Retaining Clips to Subbase and Stand

coding pattern. When a tine is removed, at least one tine (same level, adjacent row) must also be removed. The coding pattern thus established results in a minimum of two successive removed tines in each area of required tine removal.

The tines of the three unused levels may be left intact since no contact wires sense these positions.

2.06 A particular character is coded by either retaining or removing tines within a row, as illustrated in Figure 5. A tine may be removed by either of the two following methods.

(a) Method 1: Place the end of a screwdriver blade at the base of a tine in the row previously coded. Press the side of the blade against the top of the unwanted tine until the tine breaks off. Figure 5 illustrates this method — pressure applied to base of row no. 18 and against top of adjacent tine being removed from row no. 19.

(b) Method 2: Place the unwanted tine in the slot of a TP161686 tine tool, or grasp the tine firmly with long-nose pliers. With the tool or pliers held stationary, rotate the answer-back drum back and forth until the unwanted tine breaks off near its base. Do not damage adjacent tines.

Note: If a coding error is made, or for some other reason it is necessary to suppress (erase) characters from the answer-back drum, remove the character suppression tine from the row(s) affected.

2.07 The length of an answer-back sequence can be varied either by removing the stop cam tine(s) and/or the character suppression tine(s).

(a) For short sequences, code the drum for either 2- or 3-cycle operation by removing the appropriate tine(s) as indicated in Figure 5.

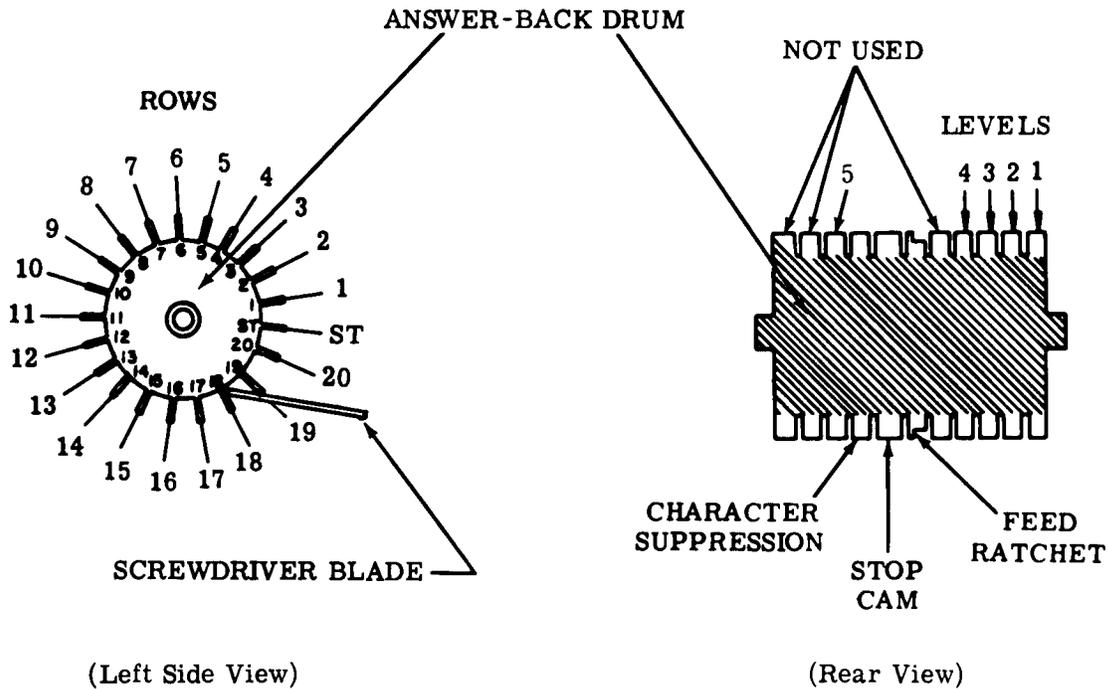


Figure 5 - Answer-Back Drum

LETTERS	FIGURES	CODE LEVELS							
		5	4	3	2	1			
A	-	■	■	■	■	■	■	■	■
B	?	■	□	■	■	■	■	■	■
C	:	■	■	■	■	■	■	■	■
D	WRU	■	■	■	■	■	■	■	■
E	3	■	■	■	■	■	■	■	■
F	\$	■	■	■	■	■	■	■	■
G	&	■	□	■	■	■	■	■	■
H	#	■	□	■	■	■	■	■	■
I	8	■	■	■	■	■	■	■	■
J	BELL	■	■	■	■	■	■	■	■
K	(	■	■	■	■	■	■	■	■
L	)	■	□	■	■	■	■	■	■
M	.	■	□	■	■	■	■	■	■
N	,	■	■	■	■	■	■	■	■
O	9	■	□	■	■	■	■	■	■
P	0	■	□	■	■	■	■	■	■
Q		■	□	■	■	■	■	■	■
R	4	■	■	■	■	■	■	■	■
S	'	■	■	■	■	■	■	■	■
T	5	■	□	■	■	■	■	■	■
U	7	■	■	■	■	■	■	■	■
V	;	■	□	■	■	■	■	■	■
W	2	■	□	■	■	■	■	■	■
X	/	■	□	■	■	■	■	■	■
Y	6	■	□	■	■	■	■	■	■
Z	"	■	□	■	■	■	■	■	■
CARRIAGE RETURN		■	■	■	■	■	■	■	■
LINE FEED		■	■	■	■	■	■	■	■
LETTERS SHIFT		■	□	■	■	■	■	■	■
FIGURES SHIFT		■	□	■	■	■	■	■	■
SPACE		■	■	■	■	■	■	■	■
BLANK		■	■	■	■	■	■	■	■
1 CYCLE OPER - ROW 6		■	■	■	■	■	■	■	■
1 CYCLE OPER - ROW ST		■	■	■	■	■	■	■	■
2 CYCLE OPER - ROWS 6&17		■	■	■	■	■	■	■	■
2 CYCLE OPER - ROWS ST&11		■	■	■	■	■	■	■	■
3 CYCLE OPER - ROWS 6,13, & 20		■	■	■	■	■	■	■	■
3 CYCLE OPER - ROWS ST, 7, & 14		■	■	■	■	■	■	■	■

■ LEAVE TINE

□ REMOVE TINE

CHARACTER SUPPRESSION →

STOP CAM →

FEED RATCHET →

Note: Be sure to allow for any variation from the charted codes above that are unique to the system in which the answer-back drum will be used.

Figure 6 - Coding of Answer-Back Drum

(b) Removal of the character suppression tine from any row prevents transmission from the answer-back mechanism. To shorten the answer-back sequence, remove the suppression tine from any unused row(s) after the end of a message.

Note: Do not remove the character suppression tine from the last row of each segment of the answer-back drum — row no. 20 for answer-back drums coded for 1-cycle operation — on sets used in systems where a response to each answer-back activation signal must be obtained. The last row can be coded with any other character that is compatible with the particular system.

2.08 The number of rows available for message coding is shown below for 1-, 2-, or 3-level operation:

<u>CYCLE OPERATION</u>	<u>TOTAL ROWS</u>	<u>AVAILABLE ROWS</u>
1	21	20
2	10 (11)*	9 (10)*
3	7	6

\*Alternately one, then the other.

2.09 The number of rows available for actual station identification is less than shown above, because each coded message should begin and end with carriage return and line feed (this may be altered in specific applications). This assures that the transmitted message will appear at the beginning of a line of the receiving teletypewriter set and eliminates overprinting.

2.10 In switched network service, the station identification for 1-cycle operation may not exceed 14 characters, including spaces. The answer-back drum should be coded as follows:

<u>ABBREVIATION</u>	<u>KEY TO ABBREVIATION</u>
ACK	Acknowledge
CR	Carriage Return
LF	Line Feed
RO	Rub Out
SP	Space
SUP	Character Suppression

(a) Example 1:

SUP CR LF RO

TELETYPE SP NILES CR LF ACK

Company City

Station Identification  
(Maximum-14 characters)

Note: In this system, the ACK character code combination must be the final significant character code combination in the coded answer-back message.

(b) Example 2:

SUP CR LF RO

ERIE SP BOST CR LF ACK SUP  
SUP SUP SUP SUP

Company City

Station Identification  
(Less than maximum number of characters)

Note: If the station identification is less than the maximum of 14 characters in length, then the remaining rows on the answer-back drum must be coded with the character suppression code according to Example 2 above.

2.11 To replace the answer-back drum, place the TP180854 brace in its detented open position, and lift feed pawl (do not overextend its spring). Replace drum with its shaft firmly seated in the contact block slots. Release feed pawl and TP180854 brace. Rotate answer-back drum to assure proper seating of its associated parts. Check that the contact wires are located in their proper slots.

**ELECTRICAL CONNECTION**

**CAUTION: MAKE SURE POWER CORD IS NOT CONNECTED.**

2.12 Refer to the appropriate wiring diagrams packed with teletypewriter set or to the appropriate wiring diagram section when provided.

2.13 Connect the signal line leads (supplied by customer) to the terminals on the terminal board at the rear of the call control unit as indicated on the wiring diagram.

- 2.14 Connect power cord to an ac source, 115-volt 60 hertz.

#### ADJUSTMENTS

2.15 Check DASHPOT ORIFICE (Spacing Area) adjustment, since altitude may have some affect on dashpot operation. See the appropriate typing unit section for adjusting procedure.

2.16 Sets equipped with an answer-back mechanism must be tested for proper response to a predetermined call character such as WRU. The following procedure is recommended for performing this test.

(a) Use a predetermined call character, such as WRU, to call the newly installed set.

(b) The set should establish the connection and automatically transmit the answer-back message.

Note: Set will not respond if the suppression tine has been removed from the last row. See 2.07 (b).

(c) If proper response is not obtained, check and correct the answer-back area adjustments (Section 574-172-700TC), beginning with those of the following list.

DRUM POSITION  
TRIP LEVER CLEARANCE  
FEED PAWL POSITION  
FEED LEVER POSITION  
"HERE-IS" BELLCRANK POSITIONING  
TRIP BAIL POSITIONING  
CHARACTER SUPPRESSION CONTACT  
WIRE GAP

#### PLACEMENT

##### A. Without Stand

2.17 If a stand is not included, place the teletypewriter set on the surface where it is to be used.

##### B. With Stand

2.18 Figure 3 illustrates the facilities for leveling and anchoring the stand.

2.19 Place the partially assembled set where it is to be used. If the set rocks to one side or another, tip it slightly and reposition the leveling screws.

Note: Reaction to the carriage returning to its left position may cause early design teletypewriter sets to move across the floor toward the left. To correct this, either add weight to the stand, arrange to have it bolted to the floor, or drill one 0.328 inch diameter hole into each leg and install TP182285 rubber bumper in each leg.

2.20 If the teletypewriter set is to be bolted to the floor, place stand at the desired location and drive lag bolts into the floor through the front holes in the legs.

### 3. FINAL ASSEMBLY

#### GENERAL

3.01 Replace the back panel onto the stand, if used, using the removed screws.

Note: Before replacing an ASR cover, remove the retaining clip (early design units only) from the tape reader upstop screw (Figure 12).

3.02 Replace the cover over the typing unit and onto the subbase (Figure 2). Take care that all seams are tight and that keyboard pushbuttons, dial, etc, are properly aligned. Insert and tighten the cover mounting screws removed during PREPARATION FOR INSTALLATION.

Note: On an ASR Set, insert and tighten the screw at the left rear corner of the tape reader cover.

3.03 Replace the nameplate making sure that the formed lip fits around the bottom of the flange on the cover, that the top edge is behind the small lip on the cover, and that the bottom of the nameplate rests on top of the two small projections on the subbase.

3.04 Replace the volume control knob or the power switch rotary knob, if either is used, by positioning and pushing it rearward.

3.05 Position the bezel, if used, on the cover over the call control unit. Insert and tighten its two mounting screws.

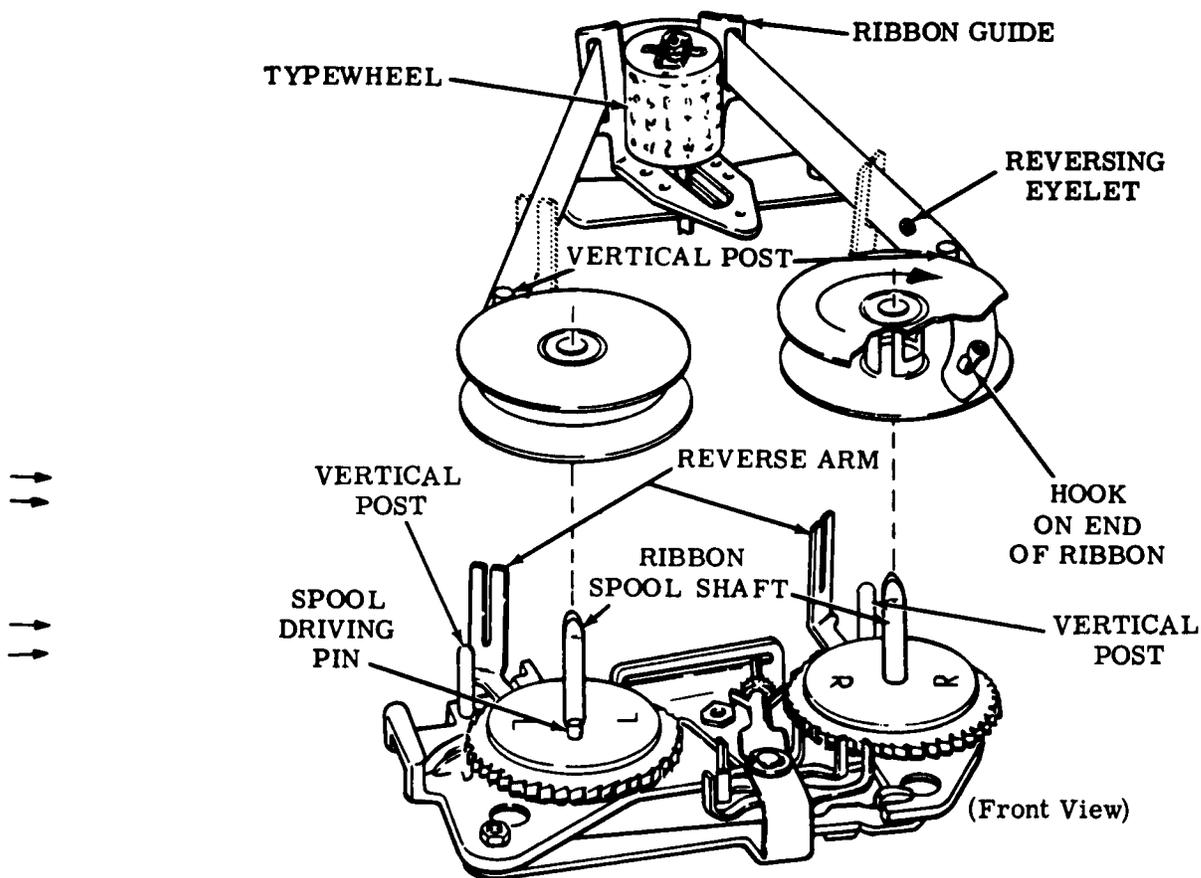


Figure 7 - Ribbon Threading

3.06 On friction feed typing units, align the platen knob with the flat on the left side of the platen. Push knob in place. On sprocket feed typing units, install platen knob on left side of platen. Fully seat knob to the right and secure it with the screw provided.

#### RIBBON INSTALLATION

3.07 Figure 7 illustrates ribbon threading.

→ 3.08 Raise the cover lid. Remove the spools from the sealed envelope.

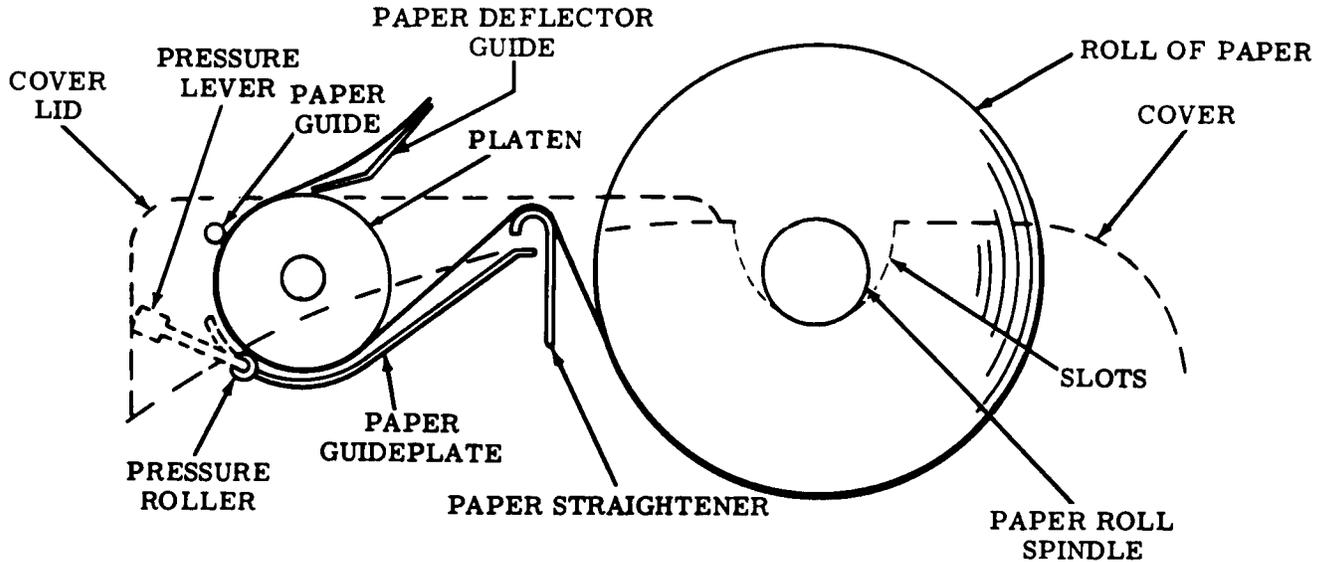
3.09 Place the spools on the shafts in such a manner that the ribbon feeds to the rear from the right side of the right spool and from the left side of the left spool. Turn each spool slight-

ly until the spool driving pin engages the hole in the spool. Guide the ribbon around the right vertical post and through the slot in the reverse arm. Place the ribbon in the ribbon guide behind the typewheel. Guide the ribbon through the left side of the reverse arm and around the vertical post. Rotate the spool to take up any slack.

3.10 Single color printing during full-duplex operation may be provided by either of the following methods.

(a) Replace the two-color ribbon with a single-color ribbon.

(b) Install the two-color ribbon with the desired color at the top of the spools. Disable the color selector latch in the printer



(Right Side View)

Figure 8 - Paper Threading — Friction Feed

carriage as follows. Place printer in stop condition; loosen color selection latch clamp screws (2); raise lever which engages R code-bar until all adjusting clearance is taken up between it and the color selection latch; tighten both clamp screws.

#### PAPER OR FORM INSTALLATION

##### A. Friction Feed

3.11 A friction feed teletypewriter set accommodates a standard roll of paper 8-1/2 inches wide and 5 inches in diameter. Figure 7 illustrates paper threading for a friction feed typing unit.

3.12 Insert the paper roll spindle into the roll of paper so that an equal length of spindle is exposed at either end of the roll. Place roll into the cover recess with the ends of the spindle resting in the slots so that the paper will unroll from the bottom.

3.13 Raise the cover lid. Release pressure roller tension by moving the pressure lever forward. Prepare a smooth leading edge of paper. Pass paper over paper straightener, under platen, and under paper guide. Straighten paper and reapply the pressure roller tension. Close the cover lid.

Note: When typing units are stored or out of service for an extended period of time, release the pressure roller tension.

##### B. Sprocket Feed

3.14 A sprocket feed teletypewriter set accommodates forms 8-1/2 inches wide and of various lengths. The forms are normally passed to the typing unit from a conveniently located supply at the rear of the set.

3.15 Place the paper roll spindle into the paper recess of the cover so that it rests in the slots provided.

3.16 Figure 9 illustrates form threading for a sprocket feed typing unit.

3.17 **Form Threading:** Raise the cover lid. Pass the leading edge of the first form under the paper roll spindle. Thread the form under the low-paper and paper-out arms, if used, and between the platen and paper guideplate. Guide the form squarely into the platen and rotate the platen until the form is advanced by the sprocket pins. Lift up the wire guide and continue to rotate the platen until the form is under the wire guide and positioned for the first typing line. Lower wire guide and cover lid. After the first form is fed out, lift the form over the paper roll spindle to separate the incoming forms from the outgoing forms.

3.18 Figure 10 illustrates the zeroizing position of the platen drive mechanism for one cam lobe operation. For platen drive mechanisms using more than one cam lobe, see

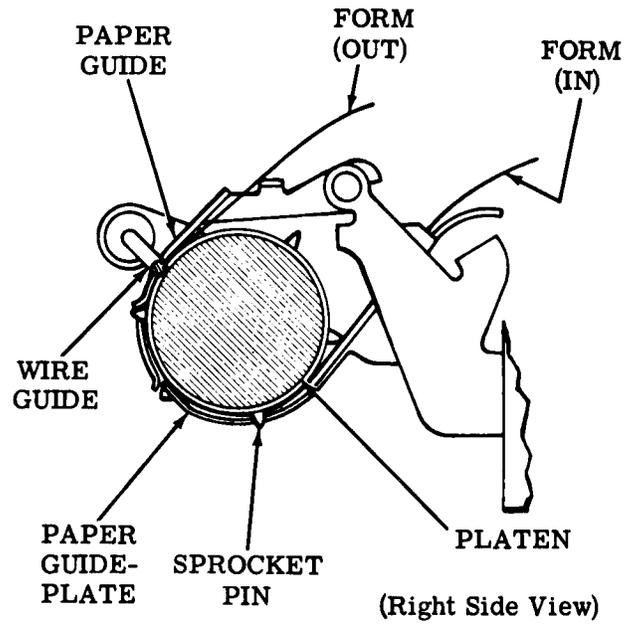


Figure 9 - Form Threading — Sprocket Feed

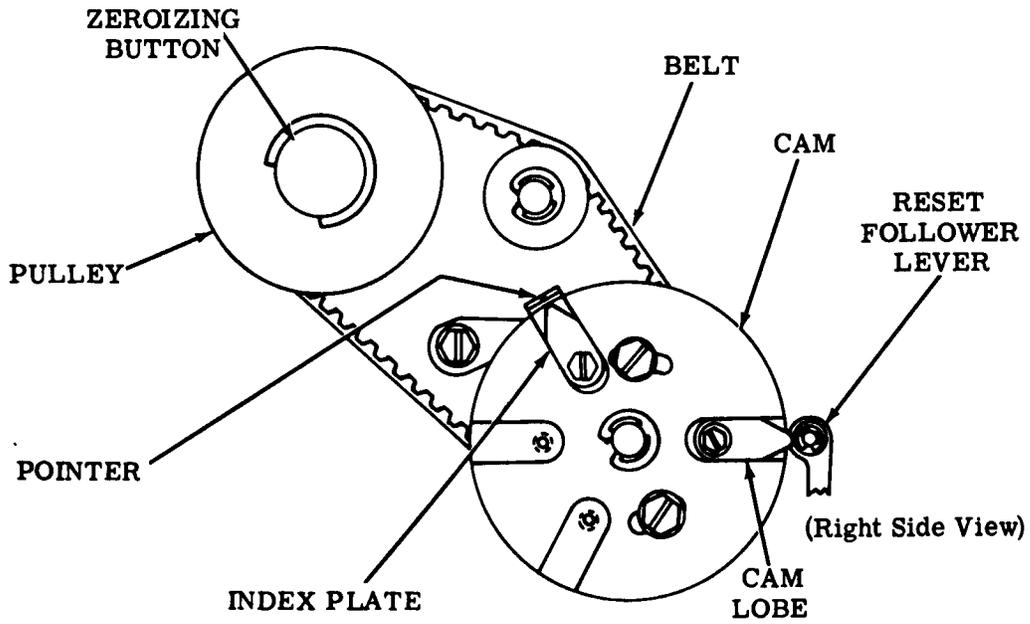


Figure 10 - Zeroizing Position of Platen Drive Mechanism — One Cam Lobe Operation

the CAM ZERO POSITION (Platen Drive Area, Sprocket Feed Mechanism) adjustment in the appropriate typing unit adjustment section.

3.19 Zeroized Position: Position a form at its first printing line in the typing unit. Depress the zeroizing button and rotate the pulley until the index plate is lined up with the pointer. Release the zeroizing button.

Note 1: To initiate the action to feed out a form, depress the FIGS Z keytop. The form-out mechanism will not respond to successive commands to feed out a form. At the end of a form feed-out, advance the form at least one line before issuing a second form-out command.

Note 2: The typing unit, in an ASR Set, operates one cycle behind the tape reader. Thus, a nonprint fill in code selection is required immediately after each form-out selection for proper set operation.

#### 4. OPTIONAL FEATURES

##### A. Copyholder

4.01 With the line guide facing forward (Figure 11), insert the rear mounting tabs in the lower mounting slots. Pivot the copyholder to align the front mounting tabs above their mounting slots. Push copyholder downward until the tabs are fully seated.

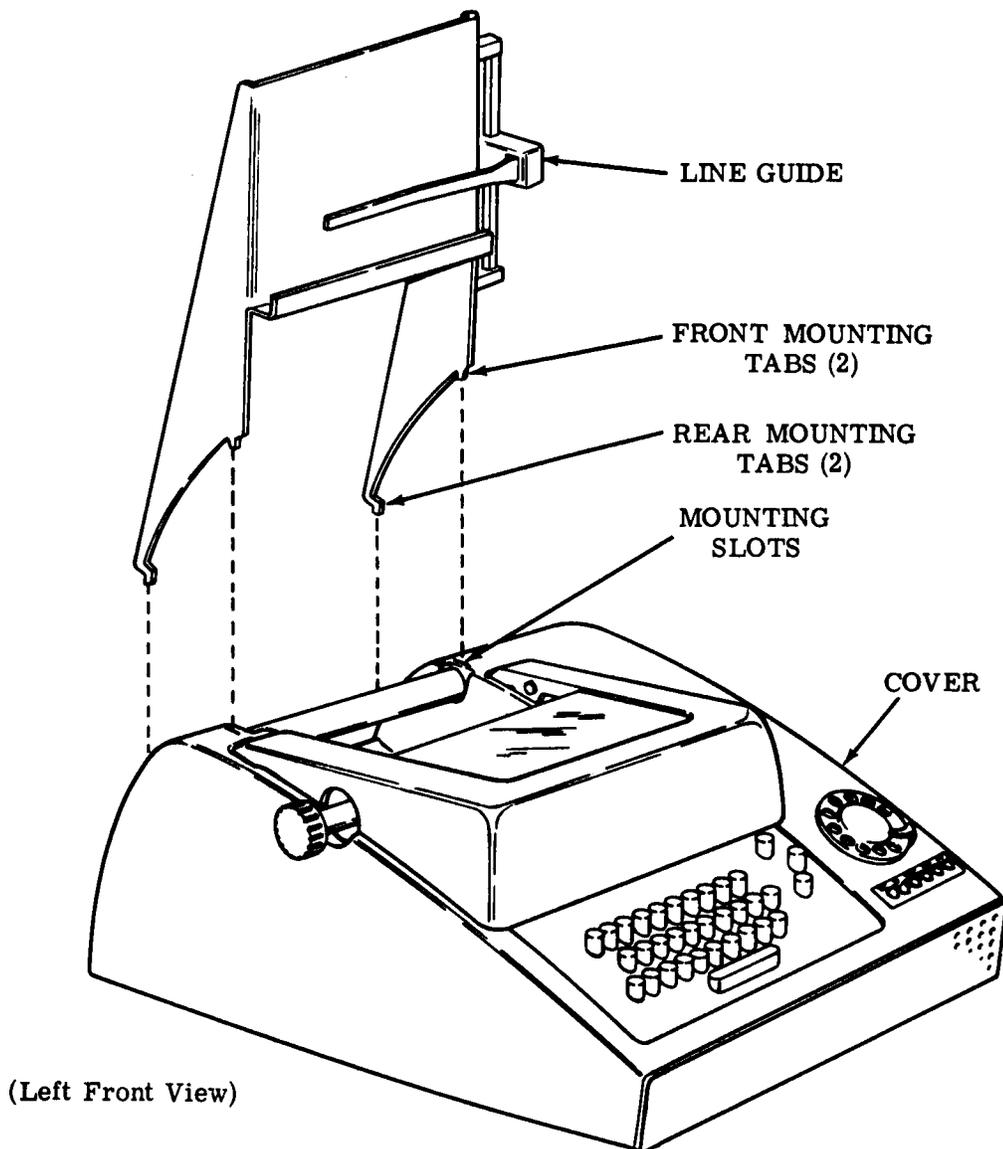


Figure 11 - Copyholder

B. Hand Receiver

4.02 To install the hand receiver, connect the two white wires to terminals no. 5 and 6 on the 9-point terminal board.

5. TAPE READER

5.01 A retaining ring or clip (Figure 12) is assembled (on early design units) to the upstop screw to prevent the sensing pins from being dislodged during shipment. This retaining clip must be removed before placing the tape reader in operation.

5.02 When inserting tape into the tape reader prior to operation, allow enough slack in the tape between the tape punch and the reader so that the reader lid can be easily closed.

**CAUTION: THE TAPE READER OPERATES UNDER HIGH VOLTAGE. PRECAUTIONARY MEASURES SHOULD BE TAKEN WHENEVER POWER TO THE TAPE READER IS TURNED ON. HIGH VOLTAGE FROM THE POWER PACK WILL CONTINUE UNTIL APPROXIMATELY 10 SECONDS AFTER THE TAPE READER HAS BEEN DISCONNECTED.**

5.03 Do not place the control lever beyond the STOP position while the tape reader is operating under power. The reader must come to a complete stop before placing the control lever in the FREE position.

6. POWER PACK ASSEMBLY

6.01 Clip the power pack to the front panel inside the stand (Figure 13). Position the power pack approximately 1/2 inch from the right panel.

6.02 The auxiliary ASR power supply is mounted in the enclosure of the stand. It is used in the off-line mode to provide 115 volts on the tape reader, answer-back, and distributor contacts when a tape reader is used. When the tape reader is not used, a plug with a jumper wire is inserted in position R2 at the rear of the call control unit.

7. TAPE PUNCH

7.01 The tape punch, drive link mechanism, baseplate, and plastic cover are assembled at the factory.

7.02 Figure 14 illustrates the proper installation of a tape spool in a tape roll.

- (a) For 2-inch inside diameter tape rolls, use the tube-type spool.
- (b) For 1-inch inside diameter tape rolls, use the 2-piece spool.
- (c) Place the tape and spool into the tape punch cover so that the leading edge of the tape is at the top of the roll.

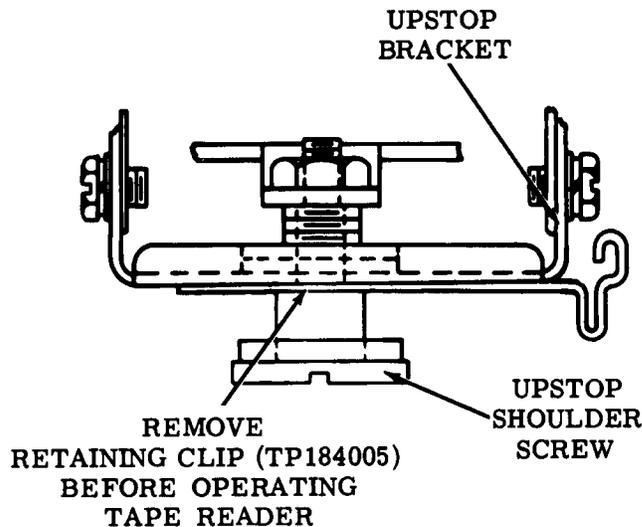


Figure 12 - Tape Reader Upstop Bracket Retaining Clip

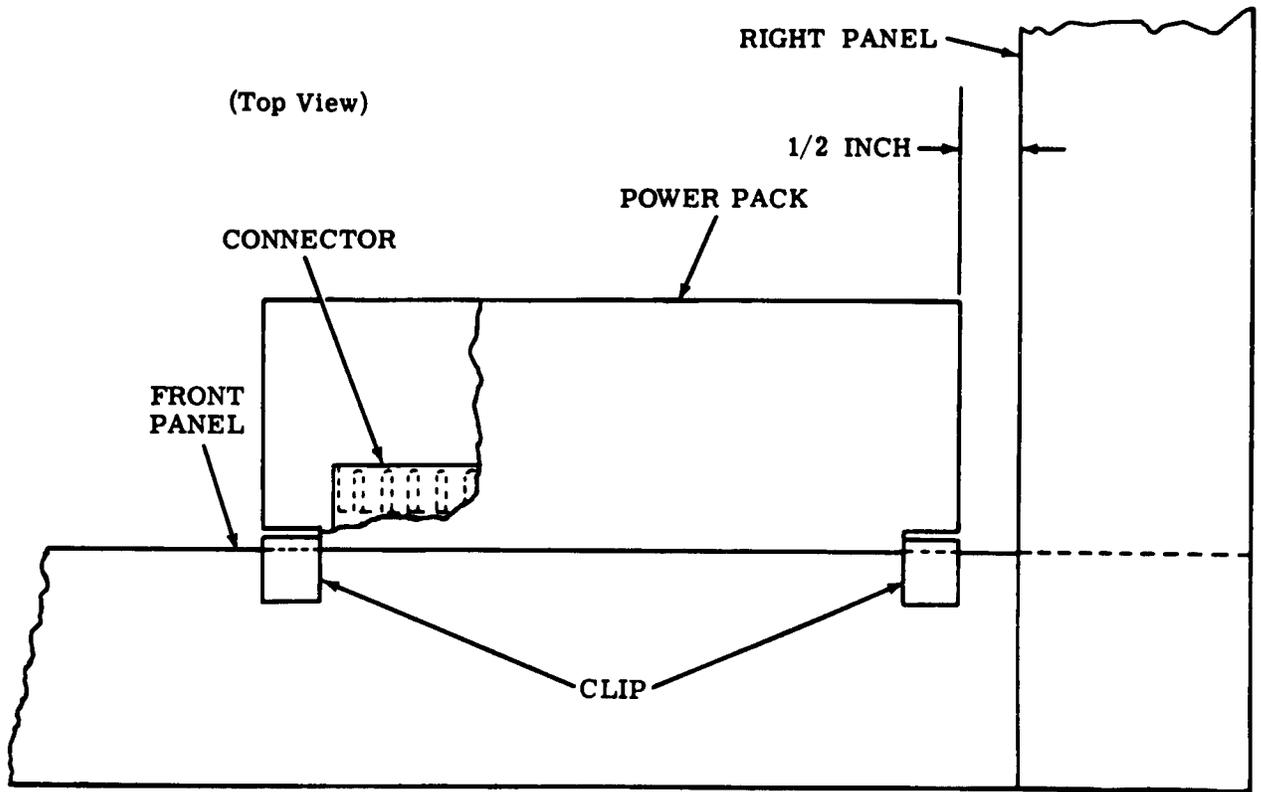


Figure 13 - Power Pack Assembly

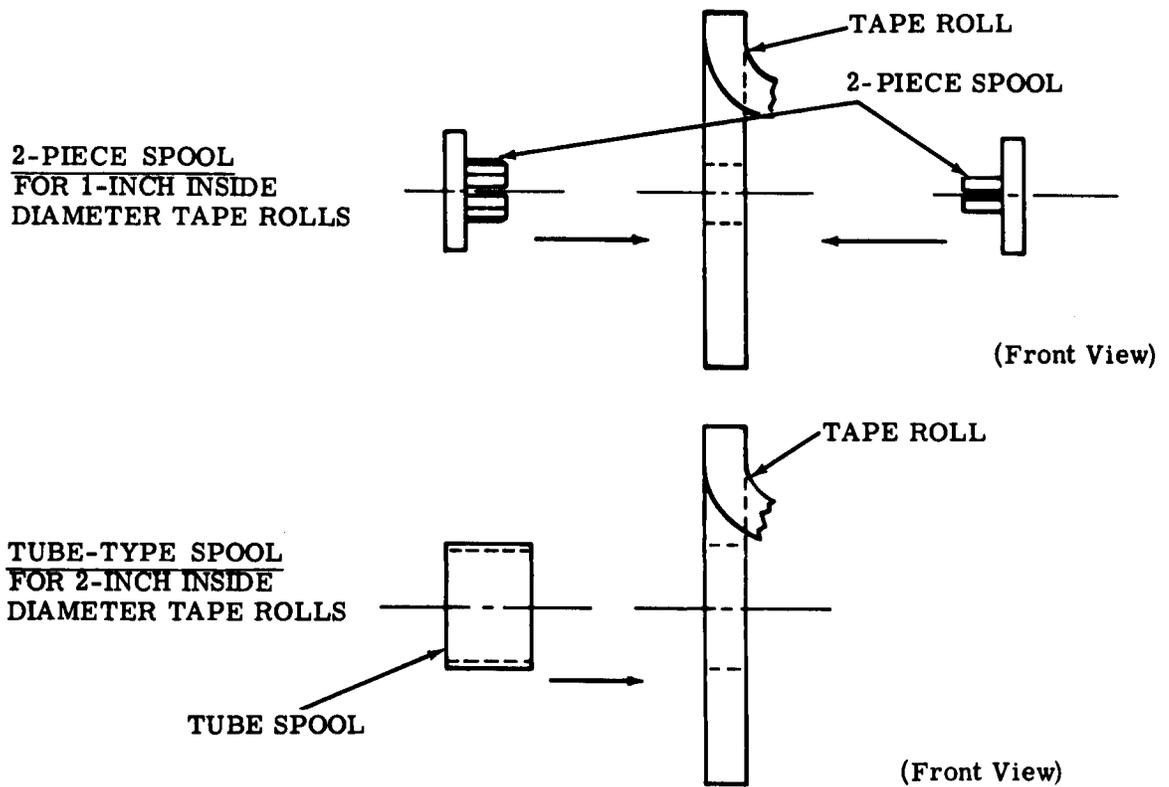


Figure 14 - Tape Roll and Tape Spool Assembly

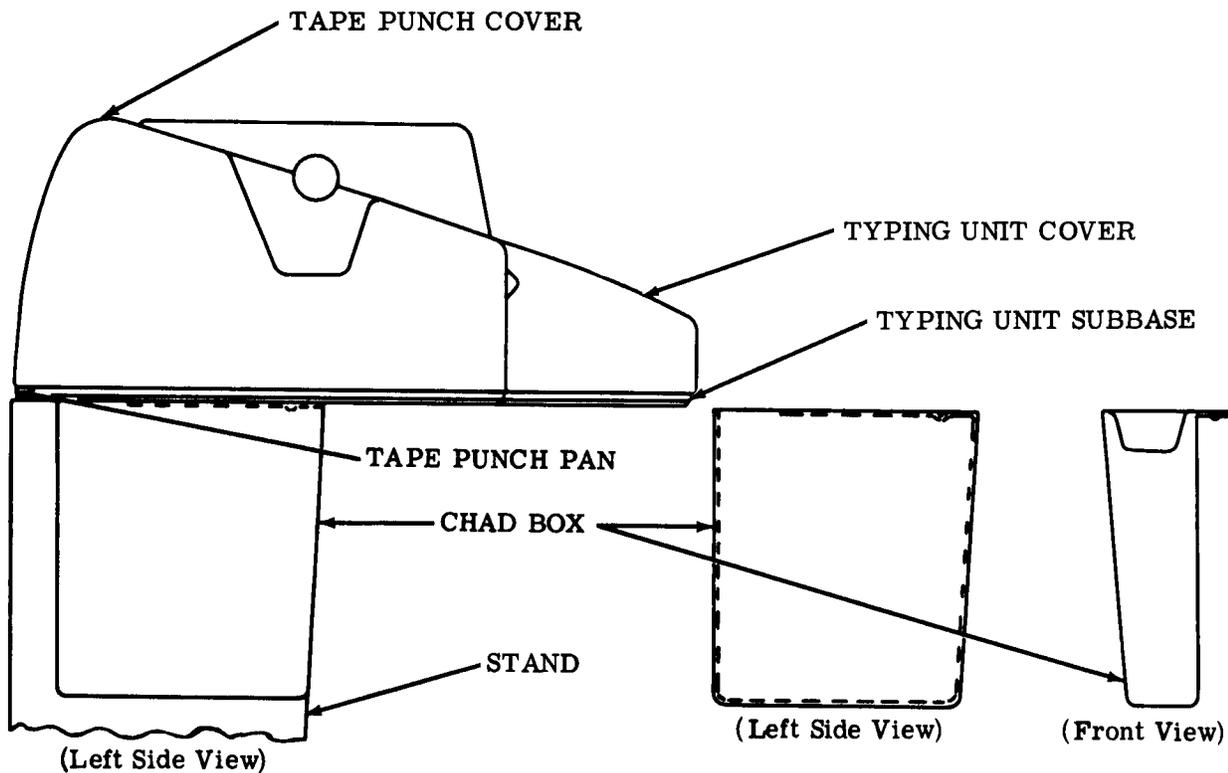


Figure 15 - Tape Punch Chad Chute Assembly

7.03 Figure 15, illustrates the chad box installation.

- (a) Assemble the chad box under the tape punch pan by inserting the back of the flanged surface between the stand and the typing unit subbase.
- (b) Push the chad box toward the rear until the bent surface located at the front of the chad box engages the stand. An embossing located on the front bottom surface of the flanged surface engages an oblong hole in the stand and holds the chad box in place.
- (c) To empty the chad box, lift the front slightly and pull the chad box toward the front until it becomes disengaged.

## 8. RESHIPMENT

8.01 If the teletypewriter set is to be shipped to another location without its cover, the following must be done to avoid damage to the typing unit.

- (a) Remove subbase and typing unit from the stand.
- (b) Remove the plug button from the forward mounting hole in the bottom of the subbase.
- (c) Secure typing unit to the base by inserting and tightening the screw and washer previously stored in the TP181104 cable clip (1.09). Do not damage the typing unit by over-tightening the screw.
- (d) Store the removed plug button in the TP181104 cable clip.

32 TELETYPEWRITER SET

REMOVAL AND REPLACEMENT OF COMPONENTS

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PUNCH . . . . .	4

1. GENERAL

- 1.01 This section is issued to provide removal and replacement instructions for major components of the 32 Teletypewriter Set.
- 1.02 References to left, right, front, rear, etc, consider the set as viewed from the normal operating position.
- 1.03 The removal procedure given in this section subdivides the set into its major components. Each removal procedure is written assuming the set to be completely assembled, ie, no components previously removed. If further disassembly of the component is required, refer to the appropriate disassembly and reassembly section or the illustrated parts section which gives detailed arrangements of all parts. Where it will help in determining their location, the numbers of the parts are given in the instructions.
- 1.04 All tools used to remove the major components referred to in this section can be found in the 570-005-800TC standard tool section.
- 1.05 All damaged, worn, or distorted parts should be replaced if encountered in the removal and replacement procedure.

**CAUTION: BEFORE REMOVING COMPONENTS, REMOVE CONNECTORS FROM EXTERNAL RECEPTACLES (POWER SOURCE, DATA SET, ETC).**

2. REMOVAL AND REPLACEMENT

COVER

2.01 To remove the set cover (Figure 1), proceed as follows.

(a) Remove paper and paper roll spindle. Remove bezel, if used, on call control unit by removing screws. Remove the volume control knob, if used, or the power switch rotary knob, if used, by pulling frontward. Remove the nameplate by pulling it down and out. Remove the platen knob used on friction feed typing units by pulling it to the left. On sprocket feed typing units, remove a platen knob screw first, then remove the platen knob by pulling it to the left.

(b) Remove the four TP181141 screws from front and the three TP184085 screws from rear of typing unit cover.

Note: On Automatic Send-Receive (ASR) Teletypewriter Sets, remove the TP183112 screw from left rear corner of the tape reader cover.

(c) Gently lift the cover from the subbase and set it aside.

Note: On Automatic Send-Receive (ASR) Teletypewriter Sets, the typing unit cover, tape punch cover, and reader cover are all interconnected and they remove as one unit. If desired the three covers can then be separated from each other.

(d) To replace the cover, reverse the procedure used to remove it. Make sure that all protrusions are aligned in the holes provided.

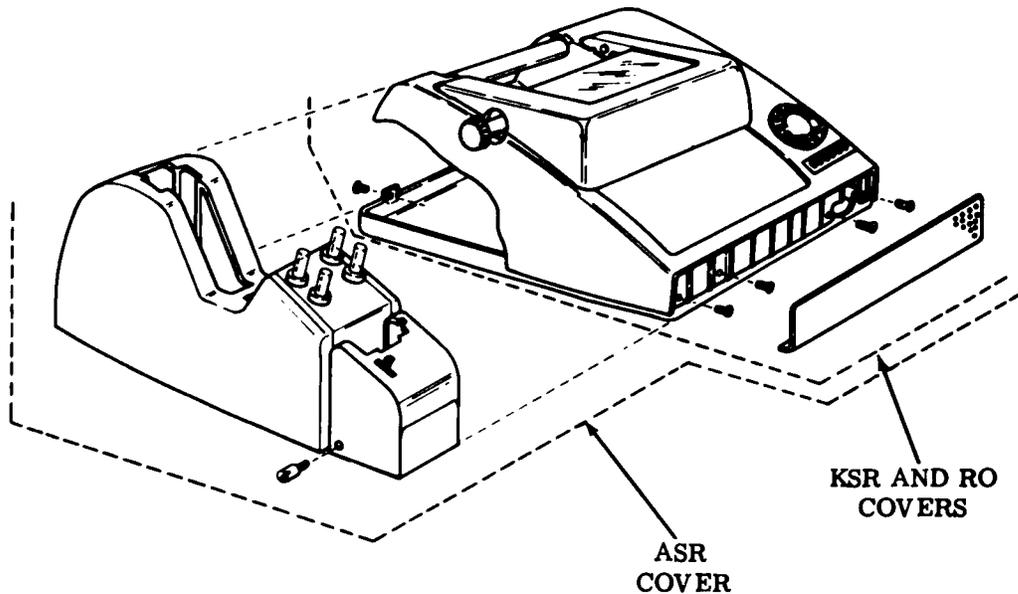


Figure 1 - Set Covers

### TYPING UNIT

2.02 To remove typing unit (Figure 2), proceed as follows.

- (a) Remove cover assembly as described in 2.01.
- (b) Remove all plugs which connect the typing unit to the call control unit. Remove ground strap from ground tab on call control unit.

Note: On ASR Sets, remove the two leads that connect to the reader cable from the contact assembly.

- (c) Insert screwdriver in slot of TP180977 H-plate and push to left against pressure of spring until plate is disengaged from universal lever. Remove H-plate.
- (d) Lift typing unit from subbase using the following procedure.

(1) Insert a screwdriver between the typing unit base casting and the subbase in the left rear of the typing unit.

(2) Using the screwdriver as a lever, lift the left rear section of the typing unit until the left hand can be placed under the unit.

(3) Grasp the extreme right side of the front carriage shaft and lift the typing unit from the subbase.

(e) To replace typing unit, reverse procedure used to remove it. Make sure that the typing unit is properly seated on rubber isolators and that the TP180831 answer-back bellcrank is under and aligned with the HERE IS keylever. Replace plugs into proper receptacles on call control unit.

### KEYBOARD

2.03 To remove the keyboard (Figure 3), proceed as follows.

- (a) Remove cover assembly as described in 2.01.
- (b) Remove the keyboard plug from its receptacle on the call control unit.

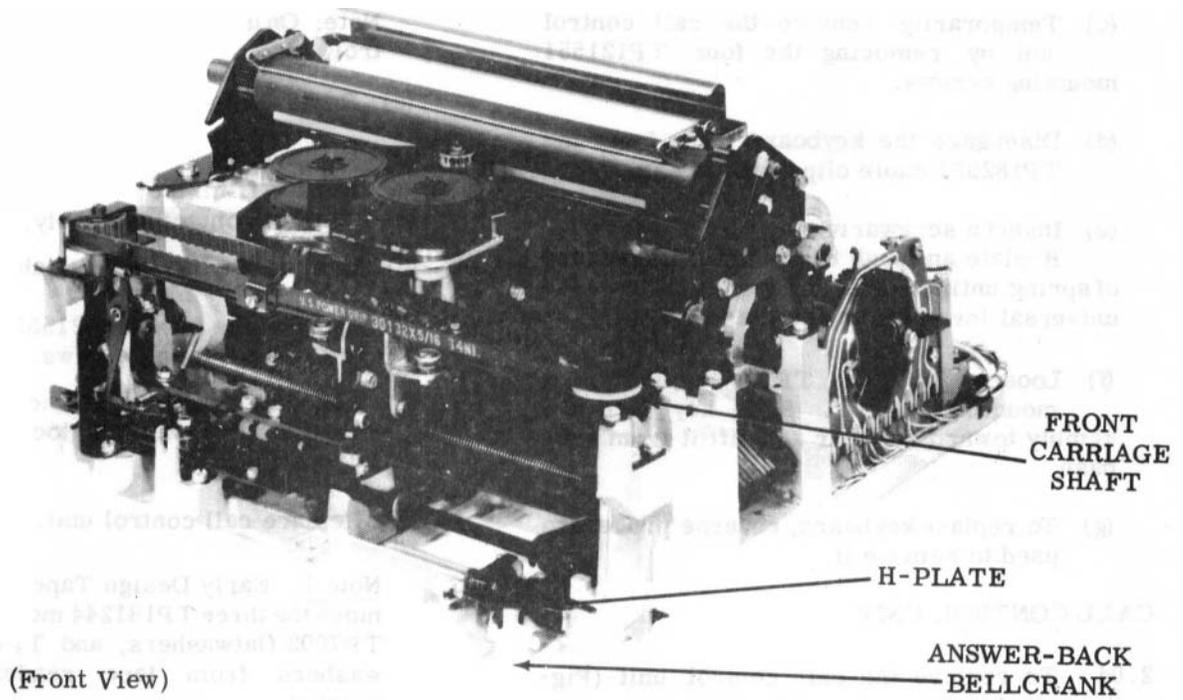


Figure 2 - Typing Unit

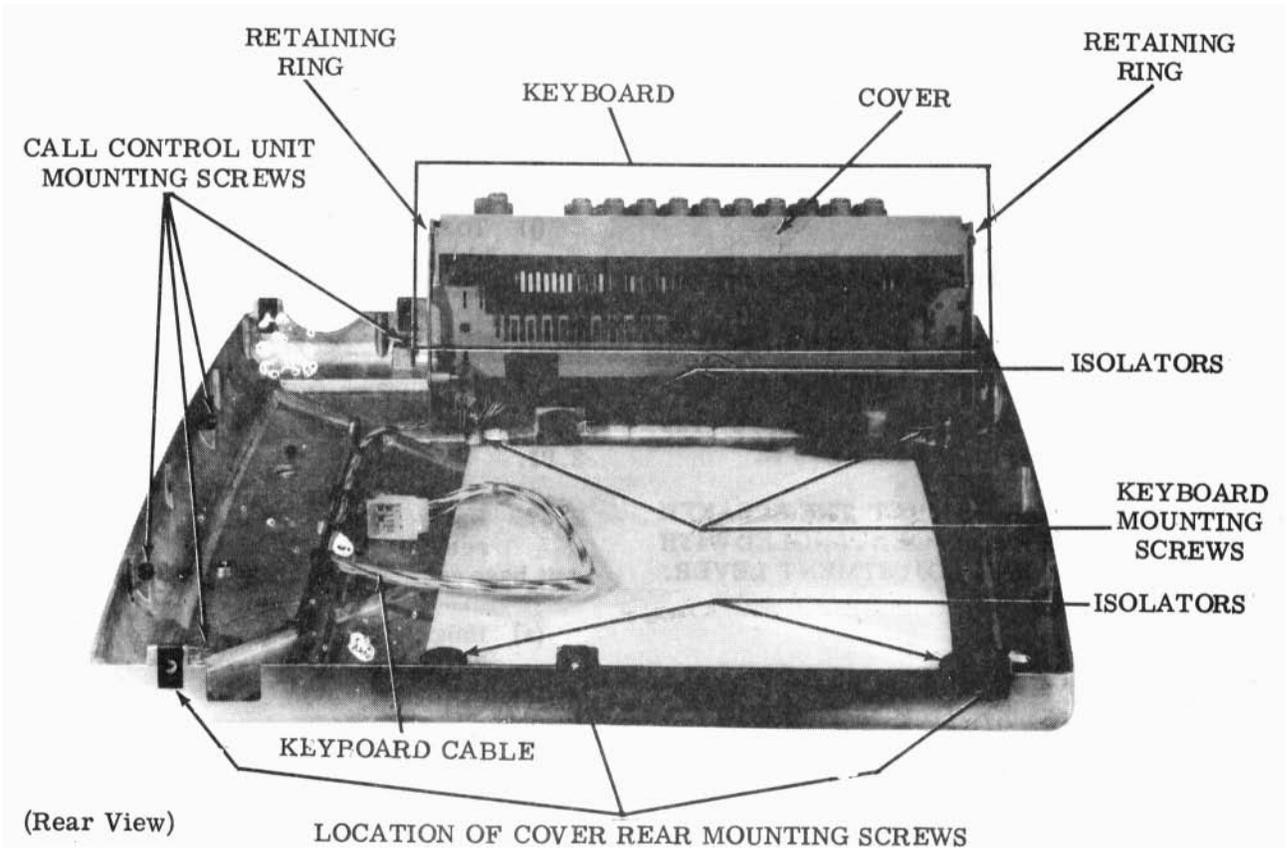


Figure 3 - Subbase With Keyboard

## SECTION 574-160-702TC

- (c) Temporarily remove the call control unit by removing the four TP121551 mounting screws.
- (d) Disengage the keyboard cable from the TP182531 cable clips on subbase.
- (e) Insert a screwdriver in slot of TP180977 H-plate and push to left against pressure of spring until H-plate is disengaged from the universal lever. Remove the H-plate.
- (f) Loosen the two TP180798 keyboard mounting screws. Slide keyboard assembly toward the rear and lift it from subbase.
- (g) To replace keyboard, reverse procedure used to remove it.

### CALL CONTROL UNIT

2.04 To remove the call control unit (Figure 3), proceed as follows.

- (a) Remove cover assembly as described in 2.01.

Note: If a speaker is used in conjunction with the call control unit, lift it off the subbase and set it with the call control unit.

- (b) Remove all plugs from rear of call control unit.
- (c) Remove the four TP121551 mounting screws.
- (d) Remove the call control unit.
- (e) To replace the call control unit, reverse the procedure used to remove it.

**CAUTION: BE SURE THAT THE SPEAKER WIRES DO NOT BECOME ENTANGLED WITH THE BELL RINGER ADJUSTMENT LEVER.**

### READER

2.05 To remove the tape reader and attached cable assembly, proceed as follows.

- (a) Remove cover assembly as described in 2.01.
- (b) Remove tape reader plug marked "6" from receptacle in back of call control unit.

Note: On units with automatic reader control, also remove plug marked "5".

- (c) Remove plug from power pack.
- (d) Remove the two TP182726 push-on terminals from the tabs of the tape reader feed magnet contact assembly.
- (e) Remove any necessary cable clamps.
- (f) Remove the four TP121551 call control bracket mounting screws.
- (g) Lift call control unit and remove tape reader cable which is located under the call control unit.
- (h) Replace call control unit.

Note 1: Early Design Tape Readers: Remove the three TP181244 mounting screws, TP7002 flatwashers, and TP124177 lockwashers from tape reader mounting bracket.

Note 2: Late Design Tape Readers: First remove the TP119651 retaining ring from the TP183117 locking screw on tape readers so equipped. Then, remove the TP183117 locking screw from tape reader mounting bracket.

- (i) Lift out tape reader and cable assembly.
- (j) To replace tape reader and cable assembly, reverse the procedure used to remove it.

### PUNCH

2.06 To remove the tape punch lid assembly, remove cover assembly as described in 2.01.

2.07 Early Design (Aluminum Casting): To remove the tape punch from the typing unit base casting (Figure 4), proceed as follows.

- (a) Unhook the TP3864 spring from the TP182894 drive link and rotate drive link out of the way.
- (b) Remove the three screws which secure the tape punch base casting to the typing unit base casting in the following order:

First, the TP181246 screw.  
Second, the rear TP182891.  
Finally, the most forward TP182891 screw.

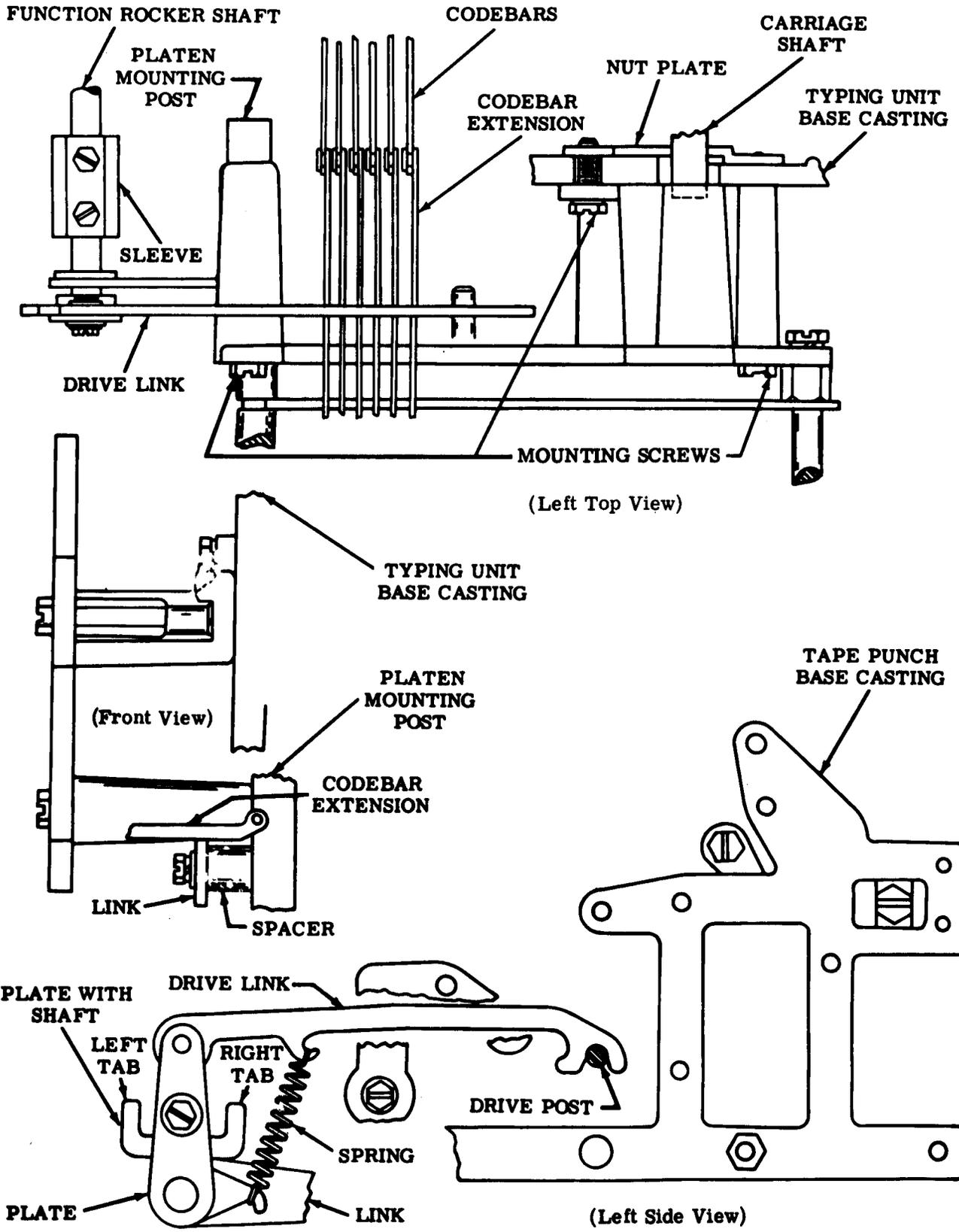


Figure 4 - Tape Punch (Early Design)

(c) Remove the TP182805 nut plate from the inside surface of the front wall of the typing unit base casting.

(d) Remove the codebar extensions from their respective codebar slots while removing the tape punch base casting from the carriage shaft.

(e) To replace the tape punch to the typing unit base casting, reverse the procedure used to remove it. Prior to replacing the tape punch to the left side of the typing unit base casting, manually set up the typing unit so that all codebars are in the marking position.

(a) Unhook the TP3864 spring from the TP182894 drive link and rotate drive link out of the way.

(b) Remove the two TP181241 bracket connecting screws.

(c) Remove the TP181242 screw that holds the TP182252 post to the TP182256 plate.

(d) Remove the codebar extensions from their respective codebar slots while also removing the tape punch from the typing unit.

(e) To replace the tape punch to the typing unit base casting, reverse the procedure used to remove it. Prior to replacing the tape punch to the left side of the typing unit base casting, manually set up the typing unit so that all codebars are in the marking position.

2.08 Late Design (Sheet Steel Frame): To remove the tape punch from the typing unit base casting (Figure 5), proceed as follows.

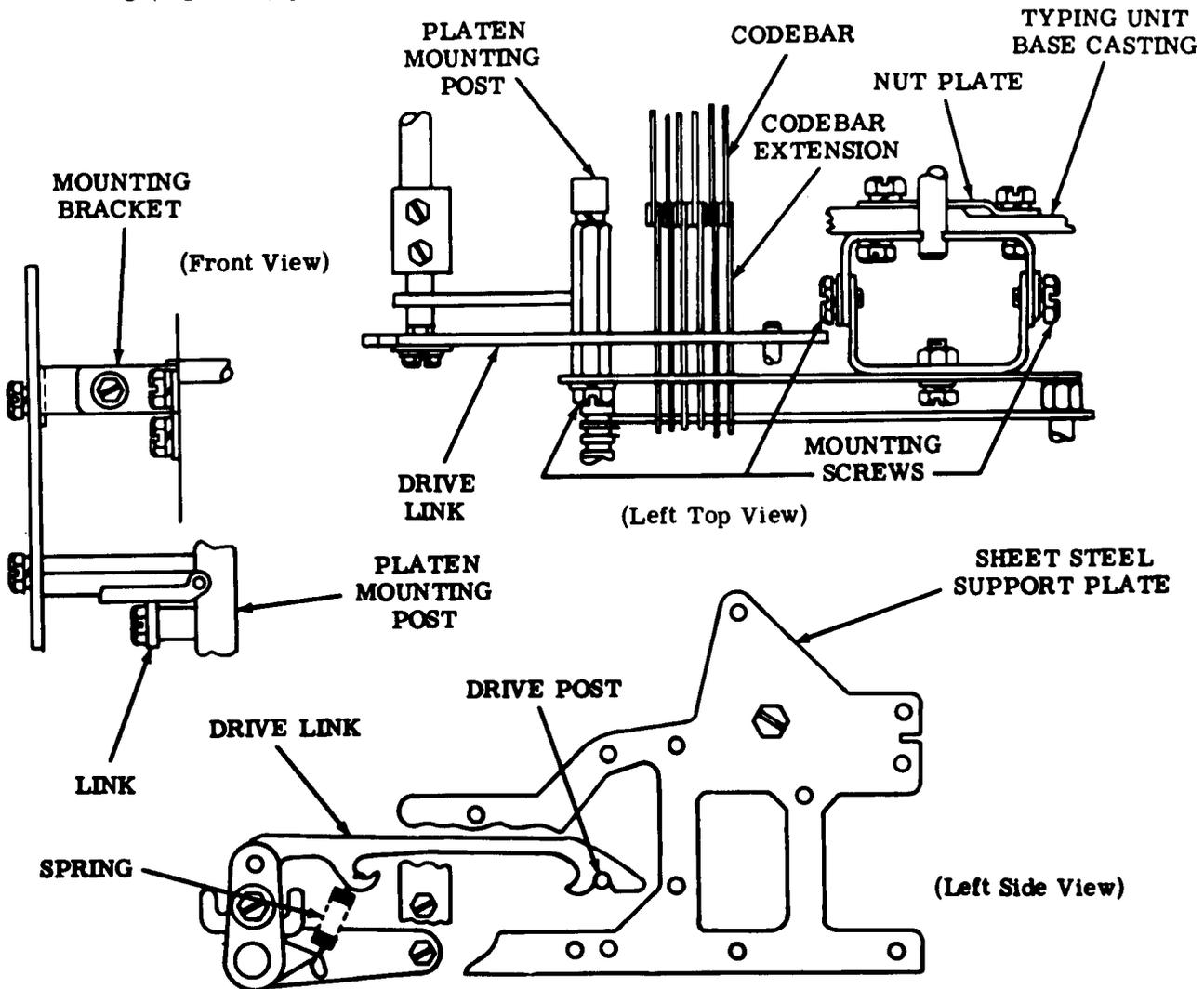


Figure 5 - Tape Punch (Late Design)

32 KEYBOARD  
 GENERAL DESCRIPTION AND  
 PRINCIPLES OF OPERATION

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1. GENERAL	
1.01 This section provides the description and principles of operation for the 32 keyboard. It is reissued to include operating temperature requirements and to add the keyboard locking mechanism. Marginal arrows indicate the additions.	
1.02 The teletypewriter code used by the keyboard is described in the typing unit Section 574-172-100TC.	
1.03 The 32 keyboard is a 5-level electro-mechanical device serving as the transmitting component of the set.	
1.04 References to left, right, front, rear, etc consider the keyboard as viewed by the operator (Figure 1).	
1.05 In the illustrations fixed pivots are solid black and floating pivots — those mounted on parts that move — are crosshatched.	

**CAUTION: DISCONNECT ALL POWER FROM THE EQUIPMENT BEFORE INSPECTION.**

2. TECHNICAL DATA

**CAUTION: THIS EQUIPMENT IS INTENDED TO BE OPERATED IN A ROOM ENVIRONMENT WITHIN THE TEMPERATURE RANGE OF 40° F TO 110° F. SERIOUS DAMAGE TO IT COULD RESULT IF THIS RANGE IS EXCEEDED. IN THIS CONNECTION, PARTICULAR CAUTION SHOULD BE EXERCISED IN USING ACOUSTICAL OR OTHER ENCLOSURES.**

2.01 Dimensions and Weight (Approximate)

Height . . . . . 5 inches  
 Width . . . . . 12 inches  
 Depth . . . . . 5 inches  
 Weight . . . . . 6 pounds

2.02 Electrical

Long loops . . . . . 0.015 to 0.070 ampere,  
 48 to 240 volts dc inductive

Short loops on local . . . . . 0.058 to 0.072  
 operation ampere, 16 to 22 volts  
 dc resistive

2.03 Transmission Code

5-level

3. OUTLINE OF OPERATION

3.01 Transmission of messages is accomplished by an operator selectively depressing the keys and spacebar of the keyboard in the same manner as in typing. The downward movement of each key or the spacebar is translated by a codebar mechanism into mechanical arrangement corresponding to the code combination representing the character on the keytop. The mechanical arrangements set up the code combinations in a set of keyboard contacts, and, by parallel output, the code combinations are transmitted to a distributor mechanism. A universal mechanism trips a distributor clutch, and a distributor mechanism then translates the parallel output from the keyboard contacts into corresponding start-stop signal for application to the transmission facilities.

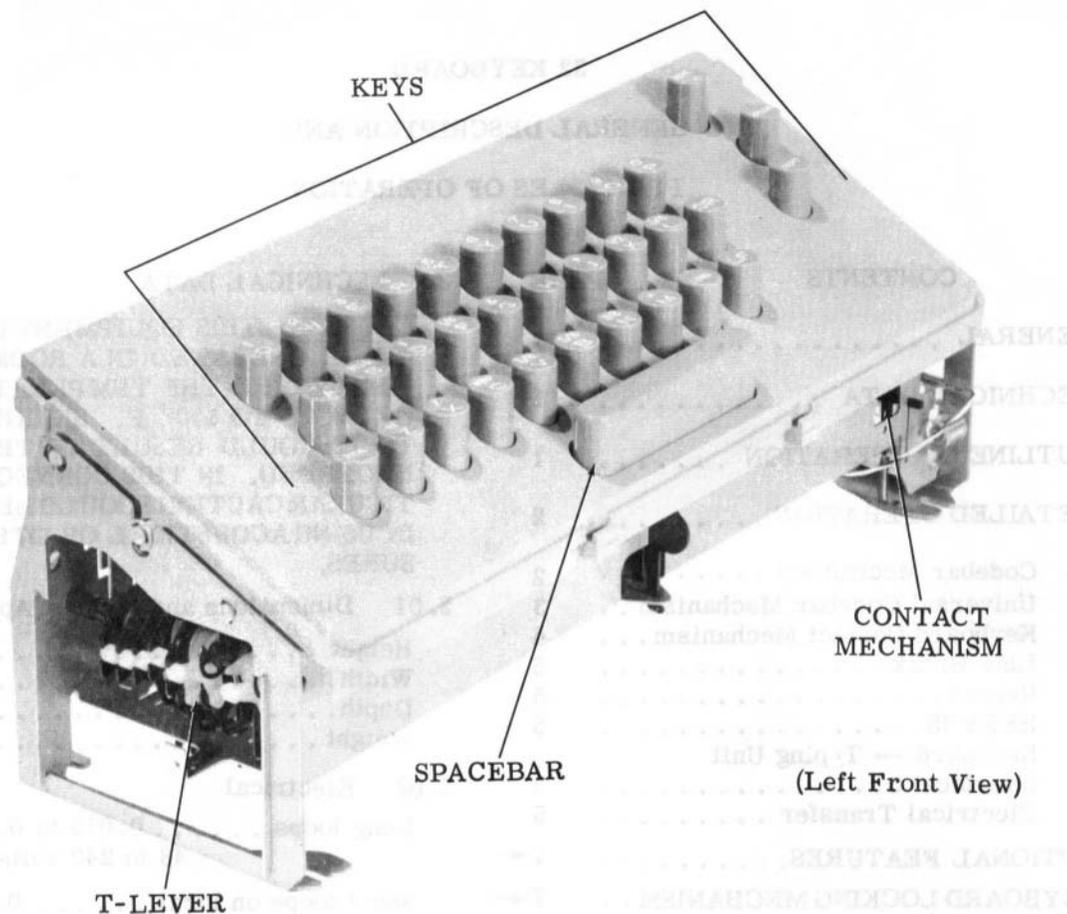


Figure 1 - 32 Keyboard

#### 4. DETAILED OPERATION

##### A. Codebar Mechanism

4.01 For each code level there is a codebar mechanism (Figure 2) which consists of a front codebar, rear codebar, a tie link, and two T-levers. The 32 keyboard has 5 pairs of codebars whose function is to set up 5 pairs of contacts in a coded arrangement representing the key depressed. In addition, there is a universal codebar mechanism consisting of one codebar, a tie link, and two T-levers. Four row keyboards also include one additional set of codebars which are utilized to block either the 3rd or 4th row keylevers in the keyboard figures or letters condition, respectively.

4.02 The codebars have slots in their top edges which codes them so they are selectively depressed by the key's keylevers. Each mechanism has a marking and a spacing position. In the marking position, the front

codebar is down, the rear codebar is up, and the right T-lever is in the clockwise position. The spacing position is the opposite: front codebar up, rear codebar down, and right T-lever in counterclockwise position.

4.03 The two codebars in each mechanism are complementary coded so that, at any keylever position, where one has a slot the other is solid. When a key is depressed, it is returned to its up position by a leaf spring on the underside of the keyboard. However, the code combination representing the character for the key remains in the codebar mechanism. When a new key is depressed, only the mechanisms whose code elements differ from those of the preceding combination are operated.

4.04 As an example, assume that the letter "S" has been transmitted. The "S" code combination 1-3-- remains in the codebar mechanisms. Now assume that another key is depressed — "D" for example (1--4-). The

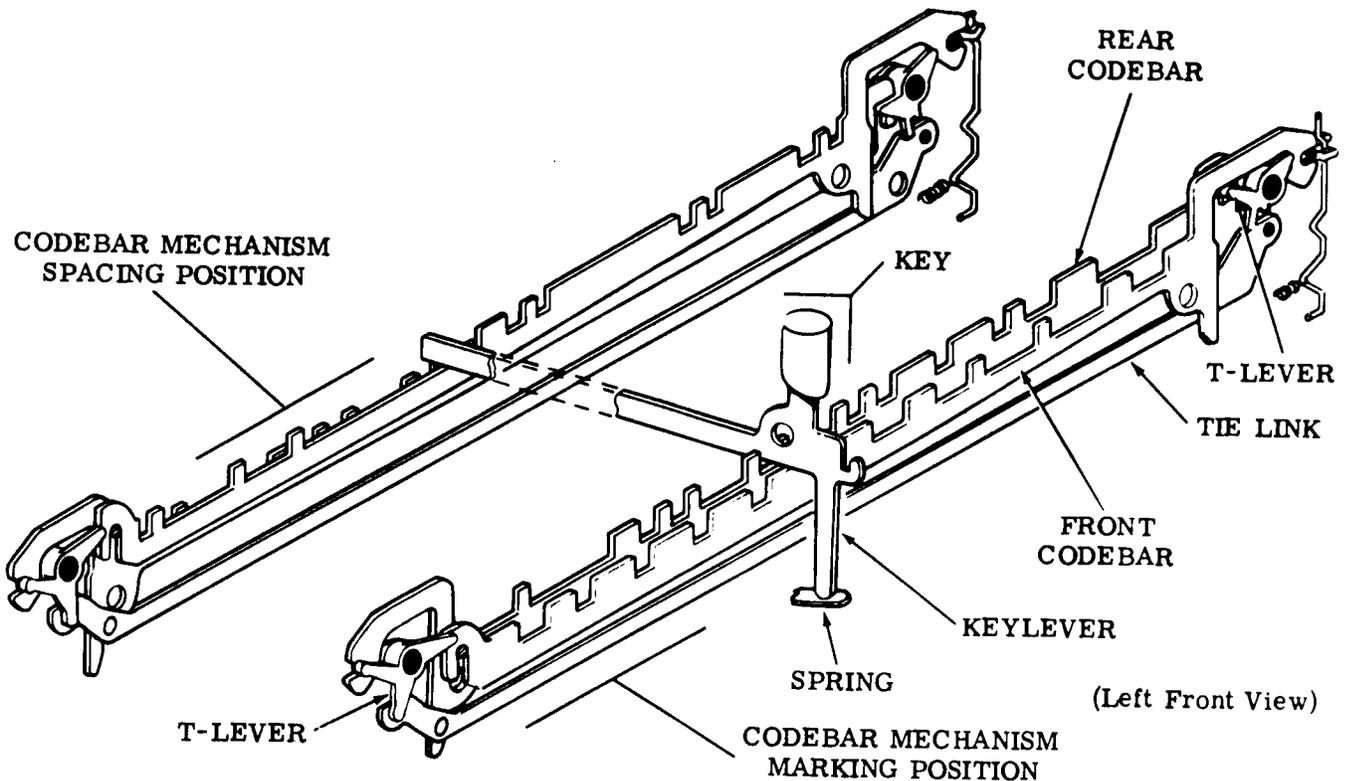


Figure 2 - Codebar Mechanism

keylever of the key depressed encounters a slot in the rear codebar of the no. 1 codebar mechanism. For the no. 2 and no. 5 codebar mechanisms the keylever encounters a slot in the front codebar, and they remain spacing. In the case of the no. 3 codebar mechanism, the keylever encounters the solid portion of the rear codebar and shifts it to its spacing position. In a similar manner the keylever encounters the solid portion of the front codebar mechanism and shifts it to the marking position.

4.05 Since each code combination is different and is locked in the codebar mechanisms, the complementary coding of the codebars serves as an interlock for the keylevers. When one keylever is depressed, another cannot be depressed because it will be blocked by the solid portion of one or more codebars.

#### B. Universal Codebar Mechanism

4.06 The universal codebar mechanism is illustrated in Figure 3.

4.07 As a keylever nears the bottom of its travel, it depresses a codebar which is part of the universal codebar mechanism. The

codebar, in turn, causes associated T-levers to pivot and a tie link to move to the left. After some free movement, the tie link encounters a tab on a nonrepeat lever and pivots the latter to the left. The tab, in turn, pivots a latchlever which releases a universal lever. Under spring pressure, the universal lever moves up and lifts the nonrepeat lever so that its tab is moved from between the universal tie link and the latchlever. Under spring tension, the latchlever and nonrepeat lever move back to the right to their unoperated position.

4.08 In its up position, the universal lever locks the right intelligence T-levers in the positions set up by the keylever, permits a contact bail to pivot to its down position and, through a trip linkage, trips the distributor clutch. Near the end of the distributor cycle, the trip linkage moves the universal lever back to its down position where it is latched by the latchlever.

4.09 Should the keylever remain depressed beyond the end of the distributor cycle, when the universal lever moves to its down position, the nonrepeat lever under spring tension moves down until it hangs up on the

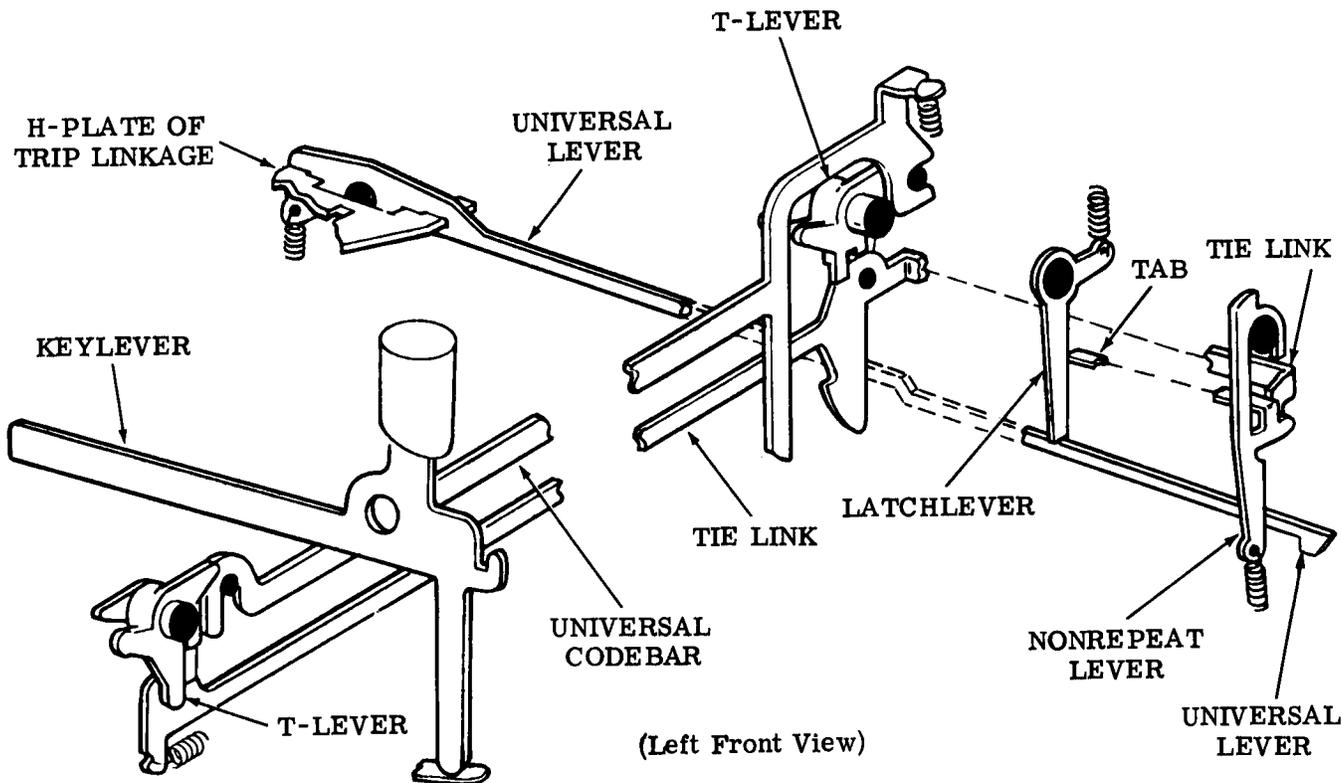


Figure 3 - Universal Codebar Mechanism

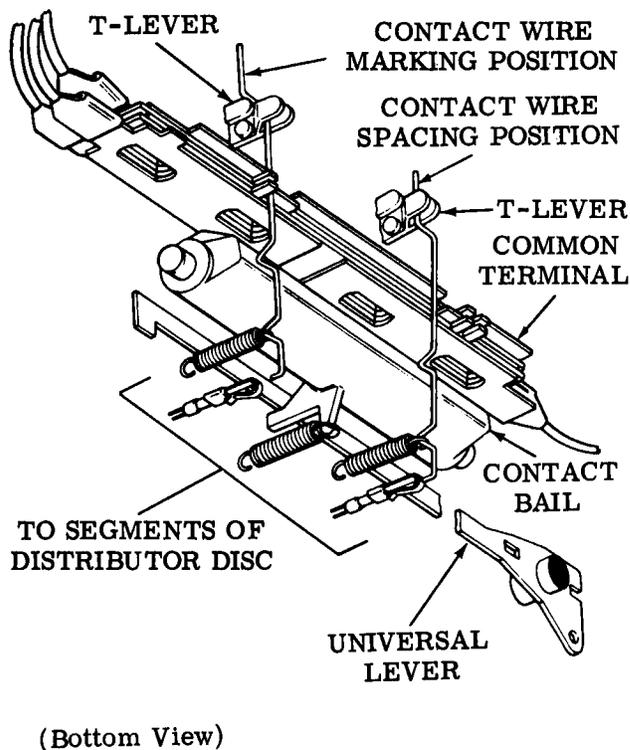
top of the universal tie link which is still in its left position. When the keylever is finally released, the tie link moves back to the right and permits the nonrepeat lever to move all the way down so that its tab is again between the tie link and the latchlever. The trip mechanism operates in this way to prevent the distributor clutch from being retripped when a keylever is held down.

C. Keyboard Contact Mechanism

4.10 The keyboard contact mechanism is illustrated in Figure 4.

4.11 The codebar mechanisms set up the code combinations in a set of keyboard contacts. A contact wire is associated with each right T-lever excluding the universal and the 4-row keyboard letters-figures blocking lever which is associated with a detent wire. In the stop condition of the keyboard, a contact bail is held in its up position by the universal lever, and, in turn, holds the contact wires to the right away from the T-levers.

4.12 When a keylever is depressed, a code combination is set up in the codebar mechanisms. The universal lever moves to its up position and permits the contact bail to pivot



(Bottom View)

Figure 4 - Keyboard Contact Mechanism

under spring tension to its down position. The contact wires associated with the T-levers that are in the marking (clockwise) position are permitted under spring tension to move to the left against a common terminal. Those associated with the T-levers that are in the spacing (counterclockwise) position are held to the right away from the terminal. For example, if the "D" code combination (1--4-) is set up in the codebar mechanism, the no. 1 and no. 4 contact wires are against the common terminal. The no. 2, 3, and 5 contact wires are away from the common terminal.

4.13 The distributor mechanism converts these positions to start-stop signals. Near the end of the distributor cycle, the universal lever moves back to its down position and pivots the bail to its up position. The bail, in turn, cams the contact wires back to the right and holds them there in the stop position.

#### D. Line Break

4.14 When the BREAK key is depressed, it pivots a T-lever which opens the break contact. This action opens the signal line until the BREAK key is released.

#### E. Repeat

4.15 To repeat the transmission of a character, its keylever is held down along with the REPT keylever. The latter holds the non-repeat lever down where its tab remains between the tie link and the latchlever (Figure 3). The latchlever is held in its left position and does not latch the universal lever at the end of the cycle. The universal lever thus moves up and trips the distributor clutch causing the character to be retransmitted as long as the REPT key is depressed.

#### F. HERE IS

4.16 When the HERE IS key is depressed, its keylever pivots linkages in the typing unit which in turn activate the local answer-back.

#### G. Keyboard — Typing Unit Interface

4.17 The H-plate (Figure 3) serves as the interface between the keyboard and typing unit.

4.18 After a key is depressed and the keyboard contacts are positioned, the universal lever moves to its up position. This upward movement is transferred by the H-plate to the distributor clutch linkage to trip the distributor clutch. Near the end of the distributor cycle, the trip linkage, through the H-plate, resets the universal lever back to its lower position.

#### H. Electrical Transfer

4.19 Figure 5 is a simplified schematic of the signal wiring for 32 keyboard contacts.

4.20 In the stop position, the outer brush rests on the stop distributor disc segment, and current flows in the signal circuit which is closed (the path being from one side of the line through the start distributor disc segment, the inner distributor disc, the brushes, the stop distributor disc segment, the common terminal, and the break contact to the other side of the line). Thus a marking condition exists. Assume again that the "D" key is depressed. The (1--4-) code combination is set up in the keyboard contacts.

4.21 The distributor clutch is tripped, and the brush holder begins its revolution. While the brush is on the start distributor disc segment, the circuit is open, no current flows, and a spacing element is transmitted. While it is on the no. 1 distributor disc segment, the circuit is closed (the signal path being through the start distributor disc segment, the inner distributor disc, the brushes, the no. 1 distributor disc segment, the closed no. 1 contact, the common terminal, and the break contact); thus current flows, and a marking element is transmitted. While the brush is on the no. 2 and no. 3 distributor disc segments, since the no. 2 and no. 3 contacts are open, the circuit is broken, and no current flows and spacing elements are transmitted. In a similar manner, a no. 4 marking element and a no. 5 spacing element are transmitted. When the brush reaches the stop distributor disc segment, the distributor clutch is disengaged, and the line again becomes marking.

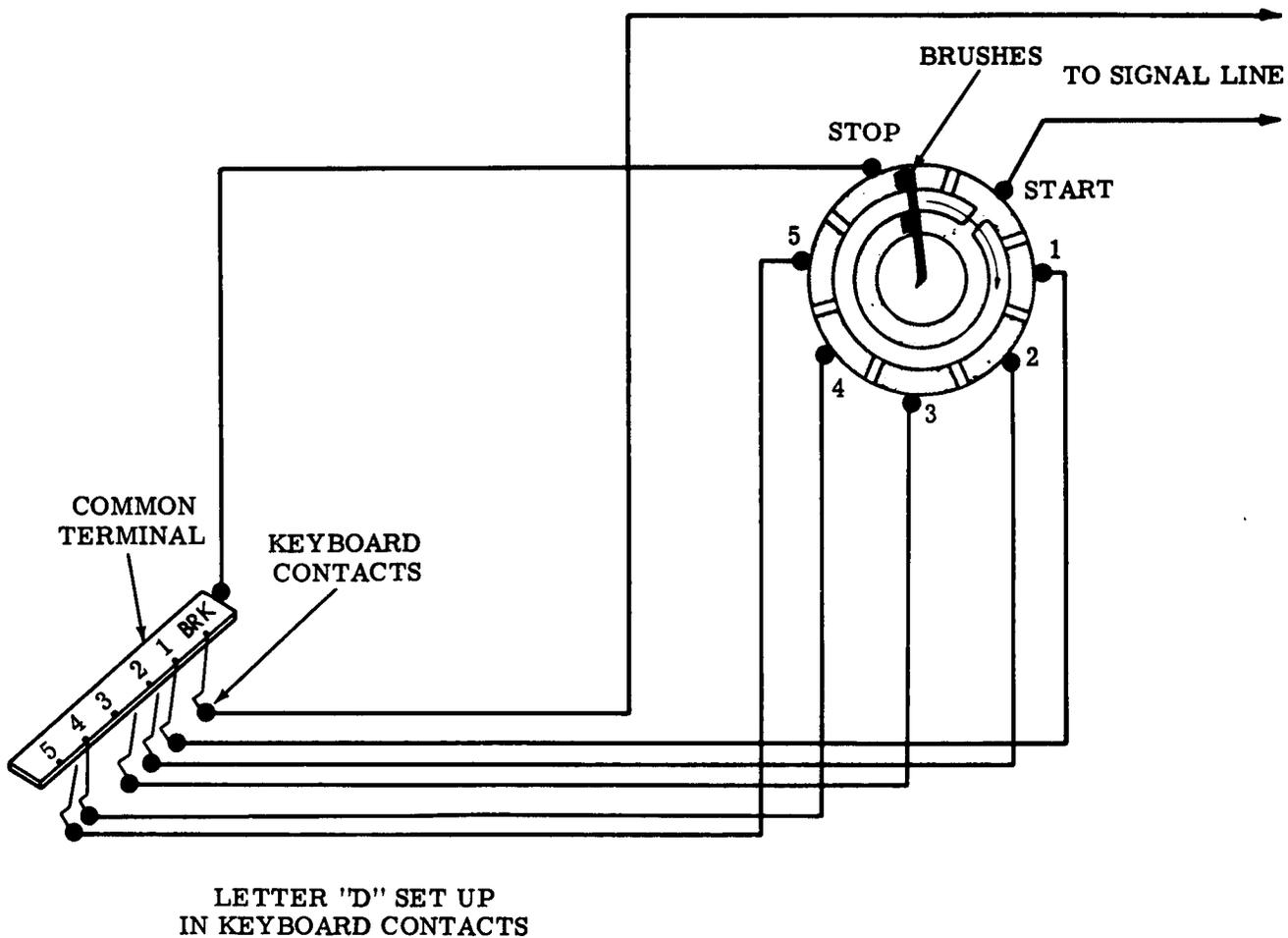


Figure 5 - Signal Wiring - 32 Keyboard Contacts

5. OPTIONAL FEATURES

KEYBOARD LOCKING MECHANISM

5.01 The function of the locking mechanism is to block the universal lever in its latched position, thus preventing it from tripping the distributor clutch in the typing unit. See Figure 6.

5.02 The locking mechanism consists of a solenoid, which, thru a cam shaft assembly, operates a trip cam which blocks the uni-

versal lever, preventing it from being tripped. When the solenoid is energized the solenoid plunger is pulled causing the cam shaft assembly to rotate. Rotation of the cam assembly causes the trip cam to drive the universal lever (which is in the latched, down position) further down and blocks it.

5.03 This lock mechanism operates only when the universal lever is latched (down position). If the set is turned off and the keyboard is tripped, keyboard lock will not occur until the universal lever is related.

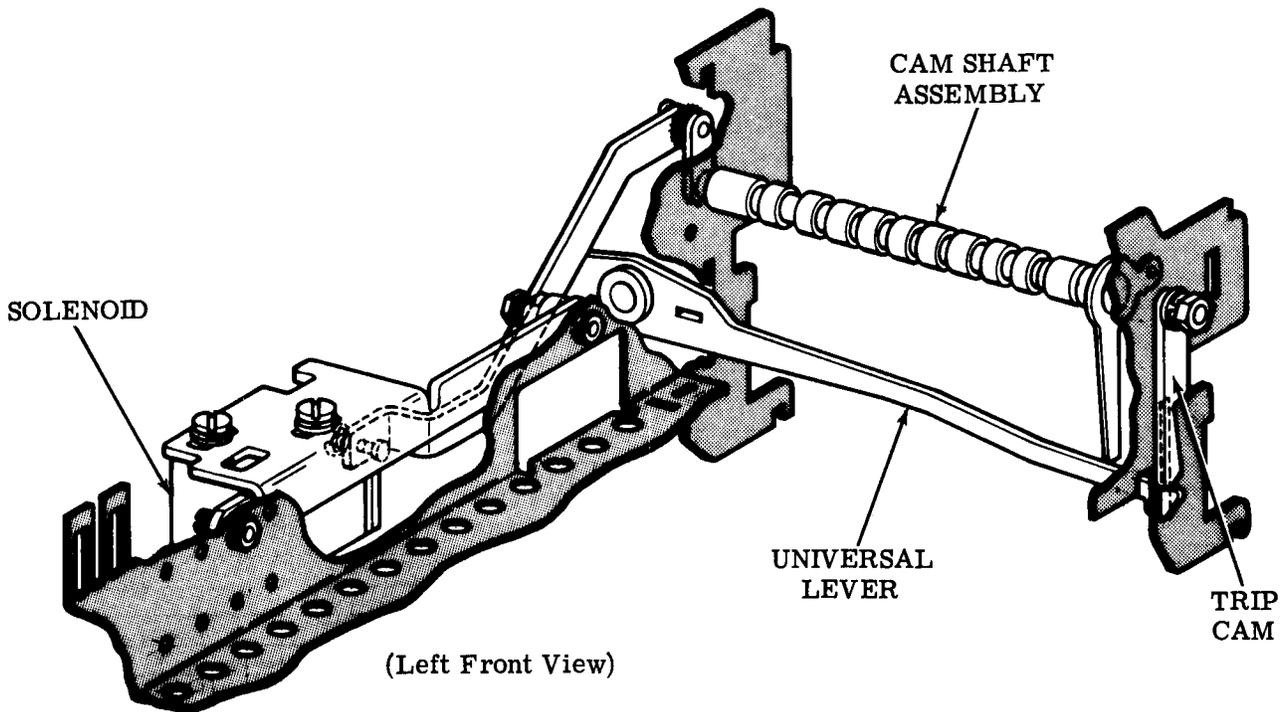


Figure 6 - Keyboard Locking Mechanism

