

28 AUTOMATIC SEND-RECEIVE (ASR) TELETYPEWRITER SET
 INSTALLATION OF COMPONENT UNITS

CONTENTS	PAGE
1. GENERAL	1
2. INSTALLATION	3
3. CABINET ASSEMBLY	3
A. Installation	3
B. Electrical Routing Access Holes (Connections)	3
C. Separately Ordered Accessories	4
4. ELECTRICAL SERVICE UNIT	4
5. KEYBOARD PERFORATOR- TRANSMITTER, MOTOR UNIT, AND TYPING UNIT	5
A. Initial Assembly before Installation in Cabinet	5
B. Adjustments before Installation	5
C. Installation of Units in Cabinet	6
6. TRANSMITTER DISTRIBUTOR UNIT (LCXD) AND BASE (LCXB)	6
7. TRANSMITTER DISTRIBUTOR UNIT (LAXD) AND BASE (LCXB)	8
8. TRANSMITTER DISTRIBUTOR UNIT (LBXD) AND BASE (LCXB)	9
9. TRANSMITTER DISTRIBUTOR UNIT (LXD) AND BASE (LCXB)	11
10. TRANSMITTER DISTRIBUTOR UNIT COMBINATION (LXD PLUS READER LX), AND BASE (LCXB)	12
11. TAPE WINDER (TW)	14
12. AUXILIARY TYPING REPERFO- RATOR UNIT (LPR), BASE (LRB) AND MOTOR UNIT (LMU)	14
13. MISCELLANEOUS INSTRUCTIONS	18

CONTENTS	PAGE
14. LIGHTING FACILITIES	18
15. OPERATING TESTS	19
1. GENERAL	
1.01 This section is issued to describe the installation of component units and the method of assembling a 28 Automatic Send-	

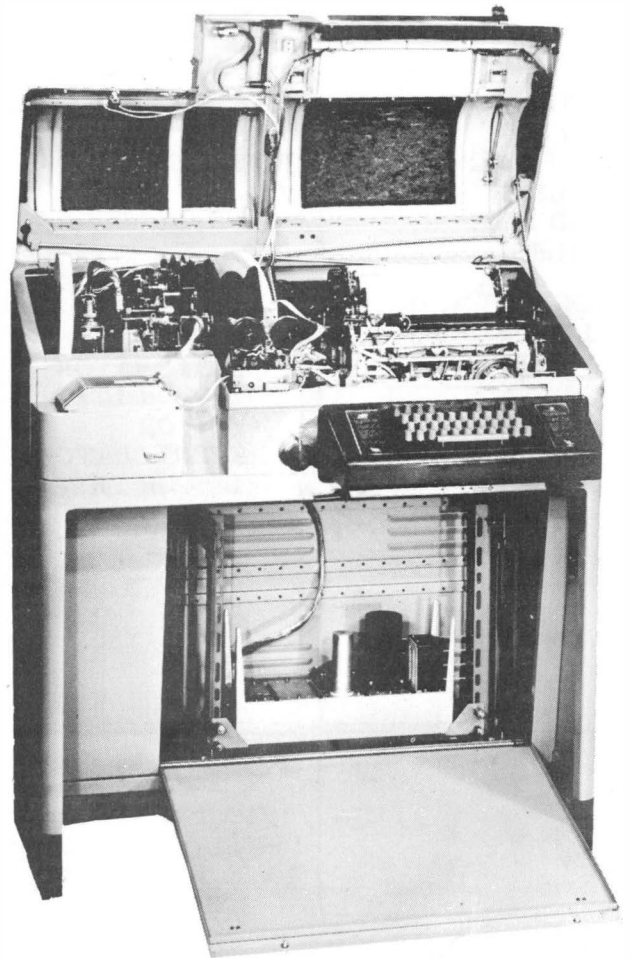


Figure 1 - Typical Automatic Send-Receive (ASR) Set

SECTION 573-101-200TC

Receive Set (28 ASR). It also provides the requirements and adjusting procedures needed for proper operation of the set.

1.02 This section includes additional installation and adjustment information for the 28 ASR transmitter distributors.

1.03 Instructions for installing an auxiliary typing reperforator in a 28 ASR cabinet are given in the section entitled "Auxiliary Typing Reperforator for 28 Automatic Send-Receive Set — Installation."

1.04 In this section all references to the location of parts are made from the operator's position in front of the set.

1.05 Essentially, a complete 28 ASR Set consists of the following basic Model 28 units, some of which may be provided with various accessories for different service requirements:

(1) Automatic Send-Receive Cabinet — LAAC

Note: This section contains instructions for removing and installing the housing for the TD unit (transmitter distributor unit) when the housing is furnished as part of the cabinet. When the housing for the TD unit is ordered separately, as a modification kit, refer to Teletype Specification 5885S (furnished with each kit) for installation information.

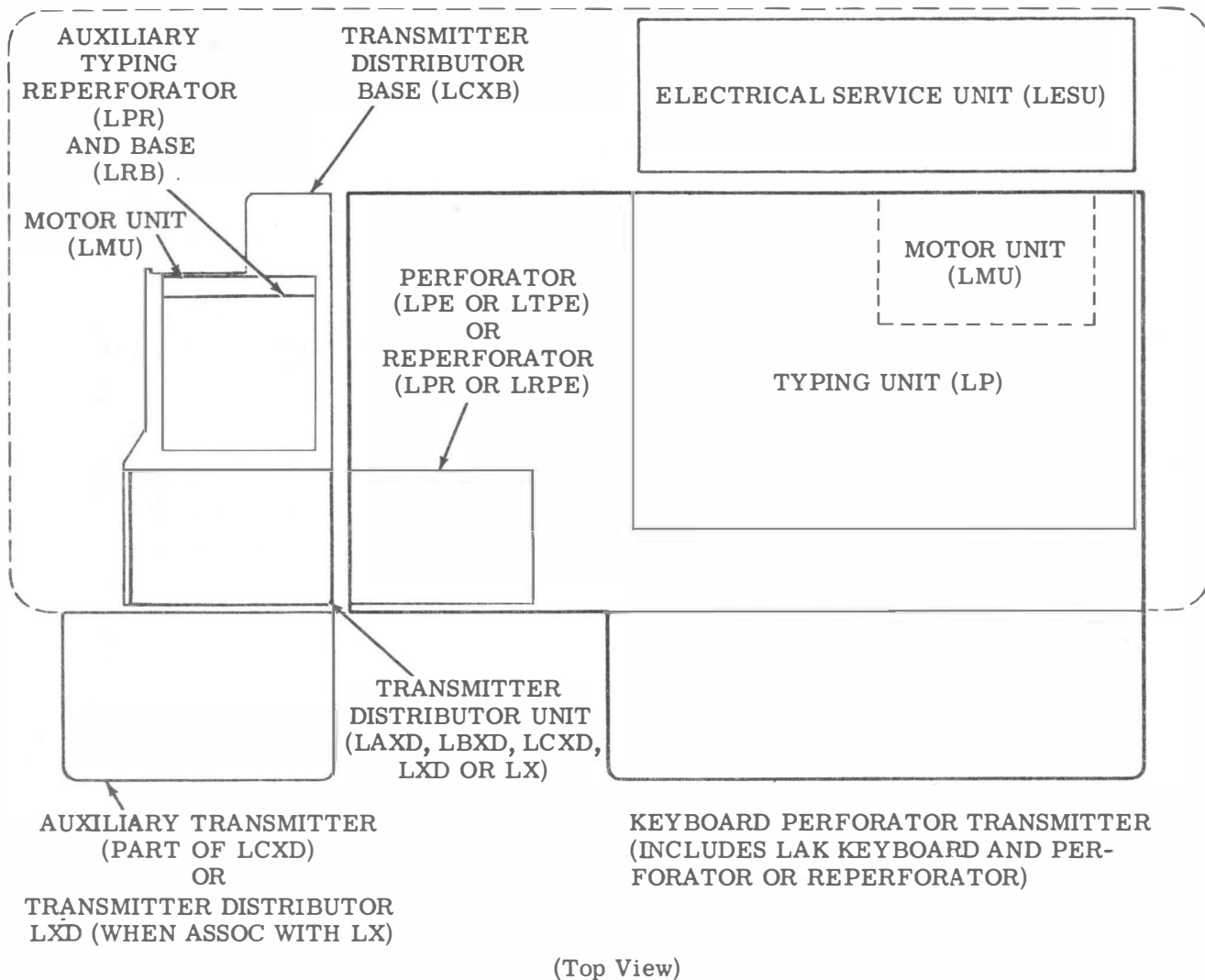
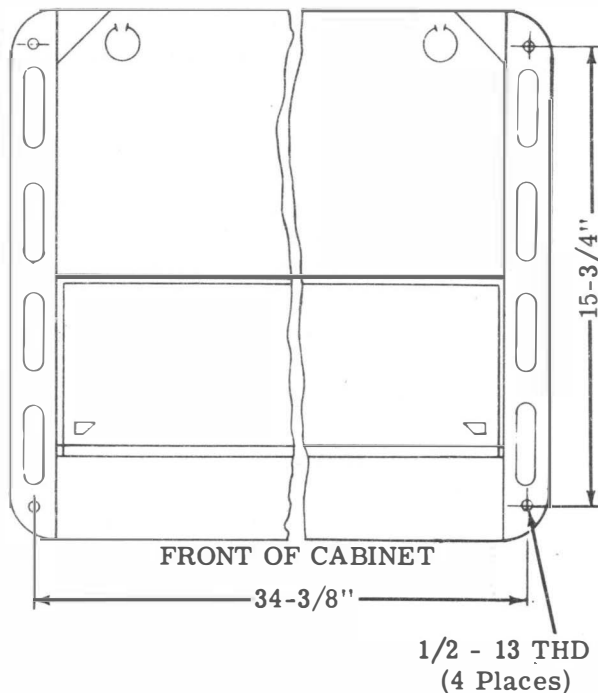


Figure 2 - Location of Units in Automatic Send-Receive Cabinet

- (2) Electrical Service Unit — LESU
- (3) Keyboard Perforator-Transmitter — LAK/LPE, LTPE, LRPE or LPR
- (4) Typing Unit — LP
- (5) Motor Unit — LMU
- (6) Transmitter Distributor Unit — LAXD, LBXD, LCXD, LXD or LXD and LX
- (7) Base for Transmitter Distributor Unit — LCXB
- (8) Two (or three) sets of gears (depending on the apparatus to be installed in the cabinet) must be ordered as separate items for desired speed of operation. For part numbers referred to, see the appropriate section covering parts ordering information.

2. INSTALLATION

2.01 When assembling a 28 ASR Set, the components should be installed in the following sequence:



(Bottom View)

Figure 3 - Securing Automatic Send-Receive Cabinet to Mounting Surface

- (1) Cabinet
- (2) Electrical service unit
- (3) Perforator-transmitter base, motor unit, gears for both the typing unit and the punch mechanism
- (4) Typing unit
- (5) Transmitter distributor unit and base
- (6) Auxiliary typing reperforator and base

An illustration of a typical 28 ASR Set is shown in Figure 1. The general arrangement of the components of the 28 ASR Set is shown in diagram form in Figure 2.

Note: If the set is being assembled from new components, observe the following precautions:

Unpack all components with care.

Observe all caution labels and instructions.

All bags and loose parts should be kept with their associated components until used to assemble the set.

3. CABINET ASSEMBLY

A. Installation

3.01 Adjust the four feet of the cabinet using a 3/4-inch open-end wrench, until the cabinet is level. If desired, a maximum of one-inch increase in cabinet height may be obtained by this adjustment. This adjustment may be modified at the time of station installation, if necessary. See Figure 3.

- (a) If it is desirable to secure the cabinet directly to a mounting surface, remove and discard the four feet.
- (b) In selecting the mounting bolts to be used, make certain that they are of such length as to engage all the threads in the holes from which the feet have been removed.

3.02 Electrical Connections:

B. Electrical Routing Access Holes (Connections)

- (a) Remove the cover plate from the right rear corner of the floor in the lower compartment of the cabinet. Remove the two punchouts from the cover plate and reinstall the cover plate in the floor of the cabinet. Install clamp bushings in the two punched-out

SECTION 573-101-200TC

holes and feed the line and power cords through them and then up through the hole in the right rear corner of the shelf of the apparatus compartment. If additional cable thickness is required, wind the clamping point of the cord with electrical or friction tape.

(b) Make power and telegraph circuit connections to the cabinet, and attach the various units comprising the printer set, in accordance with the appropriate wiring diagrams furnished with the cabinet.

Note: At the time of station installation, the screw located on the right rear of the cabinet above the C40 terminal should be connected to the common station ground.

3.03 Insert the shaft of the power switch under the right base angle of the cradle so that the control handle protrudes through the hole provided in the right front of the cabinet. The shaft rests on the spring mounted under the right end of the rear base rail. The arm bracket is to the rear of, but just touching, the rear base rail of the cradle. The shaft handle should point to the right.

Note: In order to prevent transmission of vibrations to the cabinet and thereby to aid in reduction of the operating noise level, be sure that all components of the set are mounted in such a way that they do not come in direct contact with the cabinet shell.

C. Separately Ordered Accessories

3.04 Installation instructions for the separately ordered accessories are included with each accessory; for example:

- (1) Offset Copyholder — Specification 5736S
- (2) Directory Holder (Furnished with LAAC-209*, LAAC210*, LAAC235*, and LAAC236* Cabinets) — Specification 5729S
- (3) Apparatus Mounting Rack — Specification 5730S
- (4) Relay Rack — Specification 5915S
- (5) Mounting of Electrical Service Unit on Relay Rack — Specification 5928S
- (6) Subbase to permit Stand-Up Operation of ASR Set — Specification 5846S

(7) Check each accessory package for installation specification.

*Denotes a suffix which indicates the color of paint finish.

4. ELECTRICAL SERVICE UNIT

4.01 Insert the LINE-TEST key shaft under the left side of the cradle in the cabinet so that the control handle protrudes through the hole provided in the center front of the cabinet. The shaft rests on the spring mounted on the left end of the rear base rail. The arm bracket is to the rear of, but just touching, the rear base rail of the cradle. The shaft handle should point to the left.

4.02 Place the electrical service unit in the rear right corner of the cabinet behind the cradle with the legs extending upward and the nameplate facing the front. Install the two mounting studs through the holes in the electrical service unit container and into the threaded holes in the cabinet shelf.

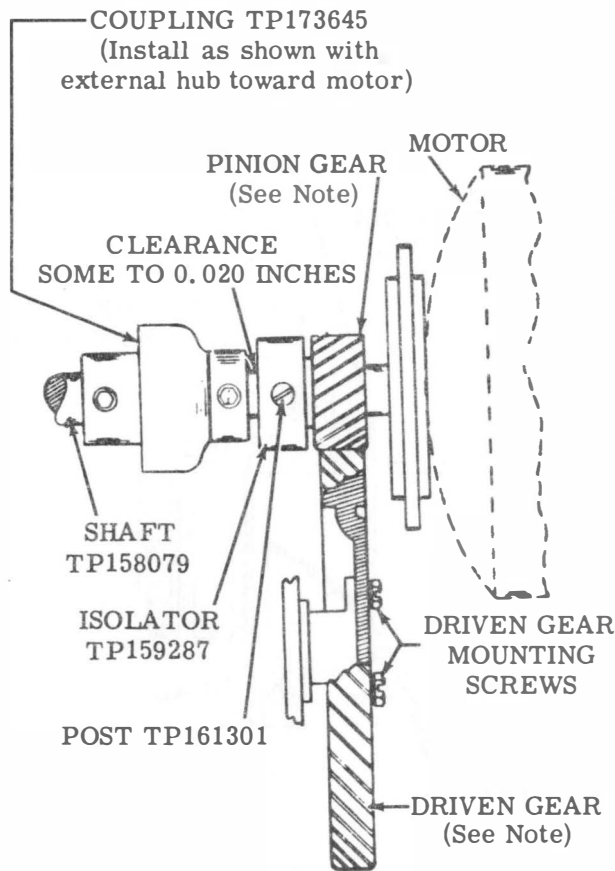
4.03 Connect the cabinet terminal block cables in accordance with the wiring diagram for the particular cabinet and electrical service unit being used.

4.04 Route each of the cables which are to connect to the typing unit, the perforator-transmitter base, and the transmitter distributor, to the approximate location where it will later be connected to its respective component.

4.05 Make the necessary strap connections at the cabinet terminal block as shown in the wiring diagram for the electrical service unit.

4.06 Fasten the power switch fork to the bracket arm of the power switch with the screws, lockwashers, and washers provided. Place this fork end over the power switch on the electrical service unit and locate the end of the power switch shaft in the hole near the right end of the container. The right-angle shaft should point to the right. Make certain that the groove in the end of the shaft engages the hole in the electrical service unit container.

4.07 Repeat 4.06 for the LINE-TEST key on the left side of the electrical service unit, with the exception that the control shaft should point to the left.



Note: Gear sets must be ordered as separate items.

Figure 4 - Installation of Motor Pinion, Gear and Flexible Coupling

5. KEYBOARD, PERFORATOR-TRANSMITTER, MOTOR UNIT, AND TYPING UNIT

A. Initial Assembly before Installation in Cabinet

5.01 Place the motor unit on the right rear portion of the perforator-transmitter base and line up the screw holes of the motor mounting plate with those of the motor mounting strip. Secure the motor unit to the base with three of four mounting screws (with captive lockwashers). At this time omit the screw from the left rear corner of the motor mounting plate.

5.02 Connect the motor leads to terminals 1 and 2 of the terminal block on the perforator-transmitter base just to the left of the motor unit.

5.03 Install the gears for 60, 75, or 100 wpm operation of the 28 ASR Set using the following procedure (see Figure 4):

(a) Remove the screw and lockwasher from the left end of the motor shaft. Place the motor pinion on the motor shaft with the gear end toward the motor. Secure the gear with the screw and lockwasher just removed.

(b) Remove the two screws and lockwashers from the hub on the right end of the intermediate gear shaft. Mount the typing unit intermediate driven gear on the shaft with the flat side of the gear to the right. Secure the gear with the two screws and lockwashers just removed. Make certain the motor gear and the typing unit intermediate driven gear are properly meshed.

(c) Slide the end of the motor coupling shaft into the coupling end of the motor gear. Slide the coupling with setscrews over the shaft with bearings and the pinion gear that drives the perforator. Properly seat the shafts in the couplings and tighten the setscrews in both couplings. Place the gear guard over the motor pinion, and match the screw hole in the gear guard with the rear left screw hole of the motor mounting plate. Secure the guard with the remaining motor mounting screw.

(d) Place the typing unit on the keyboard base mechanism with the front feet of the typing unit placed over its locating studs. Rotate the motor shaft by hand until the gear teeth are meshed. Secure the typing unit to the base using the four mounting screws with captive lockwashers.

B. Adjustments before Installation

5.04 **Typing Unit to Signal Generator:** There should be a barely perceptible amount of backlash between the signal generator gear and the typing unit main shaft gear at their closest point. To adjust, remove the signal generator and add or remove shims beneath the rear of the signal generator frame.

5.05 **Typing Unit Intermediate Driving Gear to Typing Unit Main Shaft Gear:** There should be a barely perceptible amount of backlash between the typing unit main shaft gear and the typing unit intermediate driving gear at their closest point. To adjust, loosen the three mounting screws on the intermediate gear bracket

until the bracket is held only friction tight. Position the complete intermediate gear assembly by utilizing the adjusting slot at the rear of the bracket. Tighten the mounting screws.

5.06 Motor Pinion to Intermediate Driven Gear: There should be a barely perceptible amount of backlash between the motor pinion and the intermediate driven gear at their closest point. To adjust, loosen the adjusting and clamping screws located on the front end of the intermediate gear bracket and raise or lower the front end of the bracket as required. Refine this adjustment and the typing unit gear adjustment if necessary in order to obtain quiet operation. Tighten the screws (see Figure 4).

5.07 Remove the four mounting screws that secure the typing unit and lift the typing unit off the base.

C. Installation of Units in Cabinet

5.08 Remove the front panel and the transmitter distributor housing including the crossbar from the cabinet in accordance with the Section 573-134-702TC entitled "28 Teletypewriter Cabinet — Disassembly and Reassembly."

Note: Before installing the perforator-transmitter base in the cabinet, check to see whether or not the transmitter distributor base has been equipped with rubber isolation bushings for reduction of noise level. If the transmitter distributor base has been modified in this manner, the perforator-transmitter base must be raised by inserting a washer 0.095 inch thick under each corner in order to maintain proper alignment between the keyboard and the shafting of the transmitter distributor base.

5.09 Fasten the perforator-transmitter base to the cabinet cradle assembly with the four studs provided.

5.10 Typing Unit: Before reinstalling the typing unit, insert a piece of bond paper between the selector magnet pole faces and the armature to soak up any lubricant which may have accumulated. When removing the paper make sure no lint or bits of paper remain on the pole faces. Reinstall the typing unit on the base in accordance with 5.03 (d).

5.11 Electrical Connection: Insert the plug that terminates the keyboard cable coming from the left end of the electrical service

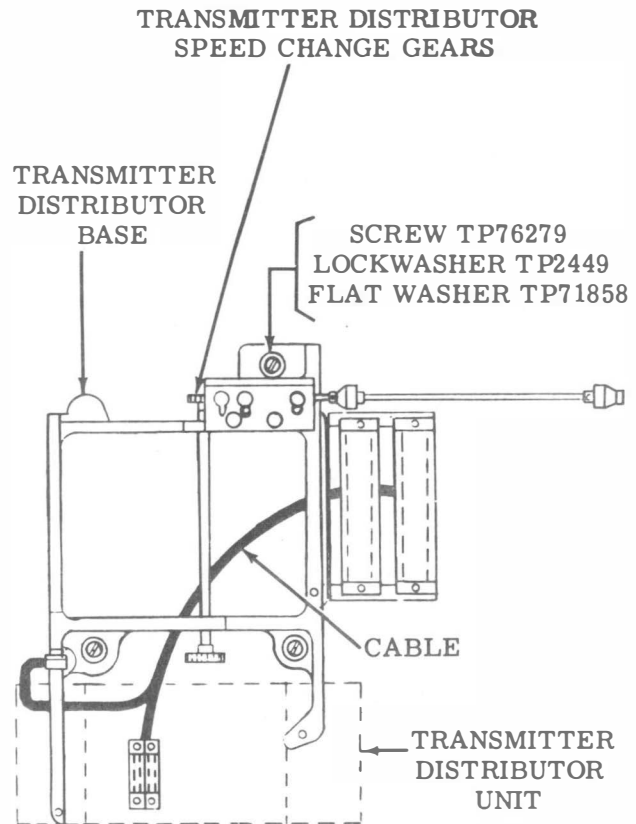


Figure 5 - Typical Transmitter Distributor Unit and Base Arrangement

unit into the receptacle connector at the middle of the perforator-transmitter base. Push the plug down until it is latched in position in the receptacle. Insert the plug of the typing unit cable in its receptacle on the typing unit.

6. TRANSMITTER DISTRIBUTOR UNIT (LCXD) AND BASE (LCXB)

6.01 Mount the tape chute (supplied with the ASR teletypewriter cabinet) friction tight on the transmitter distributor base using the two screws, two lockwashers, and two washers provided (see Figures 1, 2, and 5).

6.02 Loosen the base locating bracket on the cradle of the cabinet. Install and tighten the two transmitter distributor adjusting studs in the front base rail of the cradle (see Figure 5).

6.03 Loosen the two gear guard mounting screws, slide the gear guard forward and lift it off the transmitter distributor base.

- 6.04 To install the speed change gear set for 60, 75, or 100 wpm operation on the TD base, install the pinion on the short shaft at the rear of the transmitter distributor base and the larger gear on the long shaft which extends to the TD (see Figure 5).
- 6.05 Install the transmitter distributor base on the cradle using the screw, three lock-washers, three washers, and two nuts furnished with the base. Fasten friction tight.
- 6.06 Install the coupling shaft and the two rubber couplings between the driving shaft of the transmitter distributor base and the power shafting of the perforator-transmitter base. The short driving shaft on the TD base and power shafting should be in line. To adjust, move the transmitter distributor base backward or forward until the shafts are lined up. Check with a straightedge (see Figure 5).
- 6.07 Remount the gear guard on the transmitter distributor base and tighten its mounting screws.
- 6.08 Mount the plate with studs (part of the LCXD transmitter distributor housing) to the front of the transmitter distributor unit using the two screws, lock washers, and washers provided. This plate should fit tightly against the cover plate, top plate, and tape guide plate.
- 6.09 Turn the three mounting bushings of the transmitter distributor unit so that they protrude approximately $7/32$ inch beneath the main casting and place the unit on the base. Mount the two receptacles of the transmitter distributor cable assembly on the mounting bracket on the base with the female receptacle next to the base casting. Plug the cabling from the electrical service unit into the receptacles.
- 6.10 The transmitter distributor unit should be against the two locating studs on the left.
- 6.11 There should be a barely perceptible amount of backlash between the gears at their closest point. The cover plate and top plate of the fixed-head unit should be parallel within $1/32$ inch to the top of the tape winder access door on the cabinet. To adjust, turn the three mounting bushings as required. Tighten the locknuts.
- 6.12 Fasten the transmitter distributor unit to the base using the three mounting screws, lock washers, and flat washers. Turn the screws until they are friction tight.
- 6.13 Check again to be sure the unit is **against** the two locating studs on the left side of the base. With the pivoted sensing head **against** the punch, the top plate of the pivoted sensing head (tape lid open) should be flush to 0.010 inch below the bottom surface of the tape slot in the punch block. To adjust, turn each of the two base adjusting studs in the same direction an equal amount at a time until the requirement is met. Loosen the base mounting screws and check to see that the base is resting on all three mounting bushings. The cover and top plates should remain parallel within $1/32$ inch to the top of the tape winder access door on the cabinet.
- 6.14 The tape sensing pins should line up with the punch pins. Gauge by eye. To adjust, move the transmitter distributor unit backward or forward using the play in the mounting holes.
- 6.15 Tighten the mounting screws for both the unit and the base.
- 6.16 Position the eccentric on the transmitter distributor base so that it rests against the lower right corner of the rear plate of the unit and tighten its mounting screw.
- 6.17 Position the base locating bracket on the cabinet cradle assembly so that both locating surfaces rest against the base. Tighten the mounting screws.
- 6.18 Tighten the setscrews on the rubber couplings.
- 6.19 The top plate of the pivoted sensing head should meet the punch squarely. To adjust, remake the top plate adjustment given in the section covering adjustments.
- 6.20 There should be a clearance of $3/16$ inch between the tape depressor and the punch. To adjust, position the tape depressor bracket by using the play in the base mounting holes if necessary. Recheck the squareness and the alignment of the shafts. If it was necessary to loosen the base mounting screws in making this adjustment, retighten them.
- 6.21 The tape chute mounted on the casting of the transmitter distributor unit should clear all moving parts on the transmitter distributor unit and perforator at their closest point to the chute during an operating cycle. To adjust, loosen the tape chute mounting screws to friction tightness and position the chute. Tighten the mounting screws.

SECTION 573-101-200TC

6.22 Reinstall the crossbar, the housing that encloses the fixed head of the transmitter distributor unit, and the front panel of the cabinet (removed in 5.08). Avoid damage to the character counter.

6.23 Mount the auxiliary transmitter distributor cover to the rear of the fixed tape sensing unit using the screw, lockwasher, and flat washer provided.

6.24 Install the keyboard tape designation plate with the screws and lockwashers provided.

6.25 Attach the keyboard control switch shaft to its knob using the setscrew in the knob. Then install the shaft with knob by inserting the shaft through the hole in the designation plate. Turn and push the shaft until it snaps in place.

6.26 Secure the tape storage bin to the cabinet by means of the two studs and the thumb-screw. Plug the cord into the receptacle provided on the left side of the cabinet partition.

6.27 Tape Depressor Extension

(a) The tape depressor extension should be 0.040 inch to 0.080 inch from the punch block, and flush to 0.060 inch below the top of the punch block.

(b) The small tip of the tape depressor extension should be centered in the area between the second and third punch-pin slots of the punch block.

(1) To adjust, loosen the locknut and position the depressor extension by moving it angularly and/or horizontally.

(2) If the requirement cannot be met by following the adjustment given in (1), loosen the four mounting screws securing the oil reservoir mounting bar to the unit and turn the bar until the requirement is met. Tighten the four mounting screws. Remake the oil reservoir assembly adjustment and check the tape depressor adjustment given in the section covering adjustments.

(3) Loosen the two horizontal adjusting screws on the depressor extension and position the extension as required to meet (b).

(c) With the tape following in its normal path, and with the pivoted head approximately 15 characters from the punch block, the edge of the tape must not touch the depressor. If necessary, refine the tape depressor adjustment given in the section covering adjustments.

(d) With the pivoted transmitter unit not transmitting, and with the tape following in its normal path and flowing from the punch, the tape depressor should guide the tape to the tape beater to assure positive stuffing of the tape into the tape storage bin. If necessary, readjust the tape depressor extension.

6.28 Last Character Contact Switch Assembly:

With the motor running and tape extending from the punch to the pivoted sensing head, and with the sensing head one character away from the punch block, there should be a clearance of 0.010 inch to 0.015 inch between the tape deflector ear and the last character switch insulating button. With the pivoted sensing head against the punch block, there should be a clearance of at least 0.005 inch between the contacts. To adjust, loosen the contact bracket mounting screws and position the bracket as required. Tighten the screws.

7. TRANSMITTER DISTRIBUTOR UNIT (LAXD) AND BASE (LCXB)

7.01 Mount the tape chute (furnished with the appropriate ASR cabinet) friction tight on the transmitter distributor base using the two screws, lockwashers, and flat washers provided.

7.02 Loosen the gear guard mounting screws, slide the gear guard forward and lift it off the transmitter distributor base.

7.03 Install the speed change gear set for 60, 75, or 100 wpm operation on the TD base, as follows: Install the pinion on the short shaft at the rear of the transmitter distributor base, and the larger gear on the long shaft which extends to the TD. The gear set to provide the desired speed of operation must be ordered as a separate item (see Figure 5).

7.04 Adjust the three mounting bushings on the transmitter distributor unit so that they protrude approximately 7/32 inch beneath the main casting and place the unit on the base. Do not tighten the locknuts. There should be a barely perceptible amount of backlash between the gears at their closest point. To adjust, turn the mounting bushings as required.

- 7.05 Loosen the locating bracket on the cradle assembly. Place the base, together with the transmitter distributor, on the cradle assembly. Mount the connector of the cable assembly to the side mounting bracket on the base using the two screws and lockwashers furnished. Plug the cable from the electrical service unit into the connector.
- 7.06 Secure the base friction tight with the three screws, lockwashers, and flat washers furnished with the cabinet.
- 7.07 Install the coupling shaft and the two rubber couplings between the driving shaft of the base and the power shafting of the perforator-transmitter base. The driving shaft and the power shafting should be in line. To adjust, move the transmitter distributor base backward or forward until the shafts are aligned. Check with a straightedge (see Figure 5).
- 7.08 Remount the gear guard on the transmitter distributor base and tighten its mounting screws.
- 7.09 Make certain the unit is against the two locating studs on the left side of the base.
- 7.10 The pivoted sensing head should meet the punch squarely. To adjust, position the base by using the play in the base mounting holes. If necessary, remake the top plate adjustment given in the section covering adjustments.
- 7.11 There should be a clearance of 3/16 inch between the tape depressor and the punch. To adjust, position the tape depressor bracket by using the play in the base mounting holes. Recheck squareness and shaft lineup. Tighten the base mounting screws.
- 7.12 Position the base locating bracket on the cradle assembly so that both of its locating surfaces rest against the transmitter distributor base. Tighten the locating bracket mounting screws and the setscrews on the rubber couplings.
- 7.13 With the pivoted sensing head against the punch, the top plate of the pivoted sensing head (tape lid open) should be flush to 0.010 inch below the bottom surface of the tape slot in the punch block. To adjust, use the gear meshpoint as a pivot point and turn the mounting bushings of the transmitter distributor unit as required. Recheck gear backlash.
- 7.14 The sensing pins of the transmitter distributor unit should line up with the punch pins. Gauge by eye. To adjust, move the transmitter distributor unit backward or forward as required, and fasten it with the three mounting screws, lockwashers, and washers.
- 7.15 Position the eccentric on the transmitter distributor base so that it rests against the rear plate of the transmitter distributor unit, and tighten its screw.
- 7.16 Position the tape chute so that it clears all moving parts on the transmitter distributor unit and the perforator at their closest point to the chute during an operating cycle. To adjust, loosen the tape chute mounting screws to friction tightness and position the chute. Tighten the mounting screws.
- 7.17 Reinstall the crossbar and then the front panel removed in 5.08. Exercise care to avoid damage to the character counter.
- 7.18 Install the designation plate to the left front of the keyboard with the two screws and lockwashers provided.
- 7.19 Install the parts and make the adjustments specified in 6.25, 6.26, 6.27, and 6.28.
8. TRANSMITTER DISTRIBUTOR UNIT (LBXD) AND BASE (LCXB)
- 8.01 Remove the two screws, two lockwashers, and the washer which mount the deflector to the rear plate of the transmitter distributor unit. Replace the right mounting screw and lockwasher. The deflector and the remaining screw, lockwasher, and washer may be discarded.
- 8.02 Screw in the three bushings which serve as the mounting feet of the transmitter distributor unit until they are tight. (No vertical adjustment of the unit is needed.)
- 8.03 Loosen the two gear guard mounting screws, slide the gear guard forward and lift it off the transmitter distributor base. The gear set that will provide the desired speed of operation must be ordered as a separate item.
- 8.04 Install the speed change gear set for 60, 75, or 100 wpm operation on the TD base as follows: Install the pinion on the short shaft at the rear of the transmitter distributor base, and the large gear on the long shaft which extends to the TD (see Figure 5).

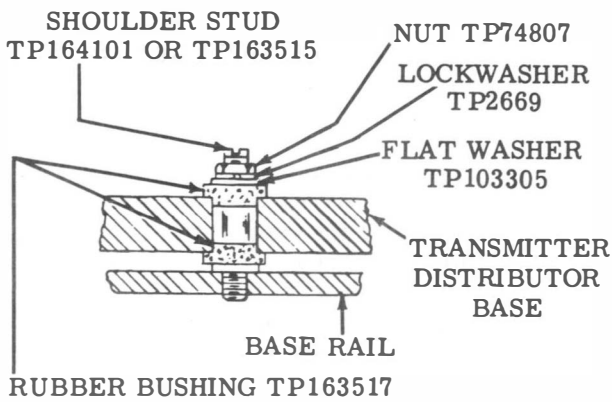


Figure 6 - Isolation Mounting of Transmitter Distributor Base

8.05 Mount the transmitter distributor unit on the transmitter distributor base with the three screws, lockwashers, and washers provided. Tighten the mounting screws friction tight.

8.06 Insert and tighten the three shoulder studs (furnished with TD base) into the TD base mounting holes in the front and rear cradle rails. Place a rubber bushing (furnished with TD base) over each stud (smaller diameter of bushings upward). Position the TD base (with TD unit) over the three studs so that the smaller diameter of the bushings extends into the mounting holes of the base, and the base rests on the shoulders of the bushings. Route the ground strap forward under the base, onto the rear under the rear cradle rail. Route cabling under the cradle rails and plug into connector on the TD unit. Mount the connectors (also resistors if applicable) using the hardware furnished (see Figures 6 and 7).

8.07 Place a rubber bushing (with smaller diameter downward) on the three studs that now extend upward through the mounting holes of the base. The smaller diameter of the bushings must extend into the base mounting holes. Place a washer, lockwasher, and nut (furnished with TD base) on each stud (the terminal of the ground strap should be placed on top of the washer on the right rear stud and followed by the lockwasher and nut); do not tighten the nuts (see Figures 6 and 7).

8.08 Couple the transmitter distributor shaft to the shafting of the perforator-transmitter base. The shafts should be in line. Check

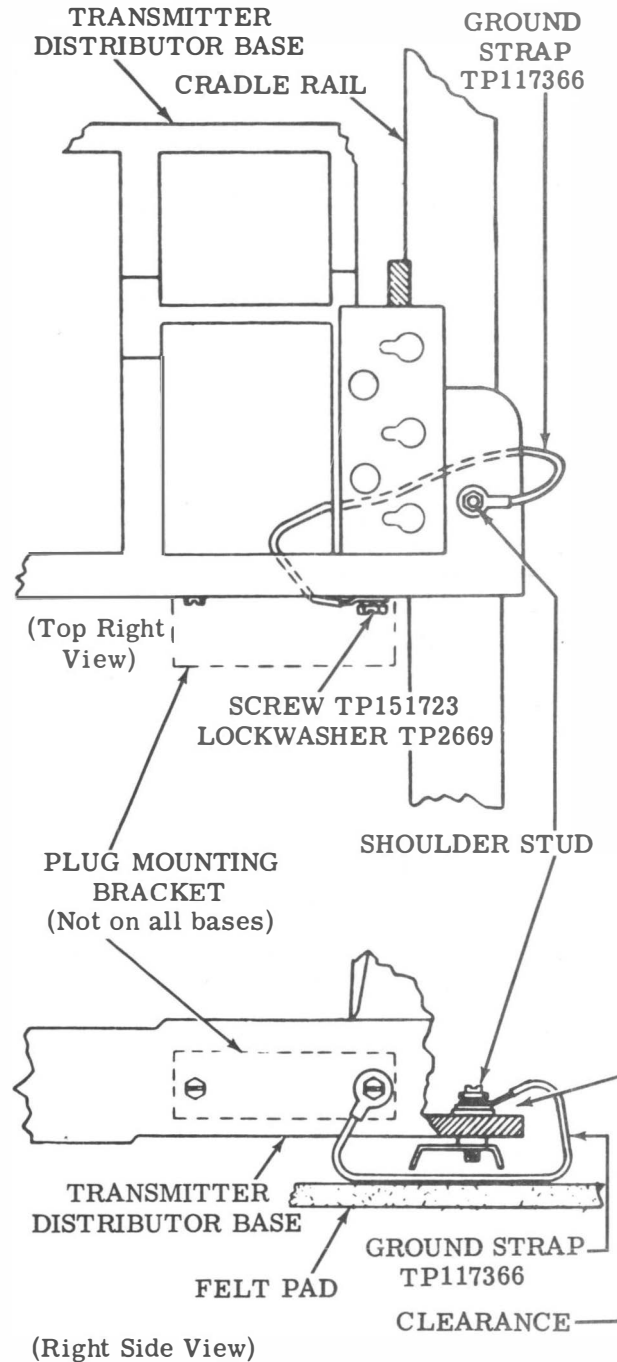


Figure 7 - Installation of Transmitter Distributor Base Ground Strap

with a straightedge. To adjust, use the play in the mounting holes of the transmitter distributor base to line up the driving shaft, the coupling shaft, and the shafting of the perforator-transmitter base. Tighten the transmitter distributor base mounting screws and the setscrews on the rubber coupling (see Figure 5).

8.09 The gears should be aligned and there should be a barely perceptible amount of backlash between the gears at their closest point. To adjust, move the transmitter distributor unit laterally on the base as required. Tighten the mounting screws on the transmitter distributor unit.

8.10 Install the plate with studs on the front of the transmitter distributor unit using the two screws, lockwashers, and washers.

8.11 Remount the gear guard on the transmitter distributor base and tighten its mounting screws.

8.12 Reinstall the crossbar and cover of the transmitter distributor housing and the front panel of the teletypewriter cabinet (in that order). Exercise care to avoid damage to the character counter.

8.13 In order to maintain a low noise level, the transmitter distributor unit should clear its housing and the cabinet by 1/32 inch. To adjust, loosen the mounting screws of the housing detent spring until they are friction tight and move the spring backward or forward as required. Tighten the mounting screws. See 13.01, (a), (b), and (c).

8.14 Install the designation plate to the left front of the keyboard using the screws and lockwashers provided.

8.15 Attach the keyboard control switch shaft to its knob with the setscrew in the knob. Install the shaft with knob by inserting the shaft through the hole in the designation plate. Turn and push the shaft until it snaps in place.

9. TRANSMITTER DISTRIBUTOR UNIT (LXD) AND BASE (LCXB)

Note: No vertical adjustment of the transmitter distributor unit is needed.

9.01 Loosen the two gear guard mounting screws, slide the gear guard forward and lift it off the transmitter distributor base.

9.02 Install the speed change gear set for 60, 75, or 100 wpm operation on the TD base as follows: Install the pinion on the short shaft at the rear of the transmitter distributor base, and the large gear on the shaft that extends to the TD (see Figure 5). The gear set to provide the desired speed of operation must be ordered

as a separate item. Mount the TD unit on the base with its three mounting screws friction tight.

9.03 Insert and tighten the three shoulder studs (furnished with TD base) into the TD base mounting holes in the front and rear cradle rails. Place a rubber bushing (furnished with TD base) over each stud (smaller diameter of bushing upward). Position the TD base (with TD unit) over the studs so that the smaller diameter of the bushing extends into the mounting holes of the base, and the base rests on the shoulders of the bushings. Route the ground strap forward and under the base, then to the rear under the rear cradle rail (see Figure 7). Route cabling along the right side of the base.

9.04 Place a rubber bushing (with smaller diameter downward) on the three studs that now extend up through the mounting holes of the base. The smaller diameter of the bushings must extend down into the base mounting holes. Place a washer, lockwasher, and nut (furnished with TD base) on each stud (the terminal of the ground strap should be placed on top of the washer on the right rear stud followed by the lockwasher and nut); do not tighten the nuts (see Figures 6 and 7). Couple the TD shaft to the keyboard shafting with a flexible coupling. The flexible couplings should be installed with the external hub on the TD base shaft. Utilize the play in the TD base mounting holes to line up the driving shaft, coupling shaft, and keyboard perforator power shafting; check with straight-edge rule. Tighten the TD base mounting nuts and the coupling screws. In order to prevent transmission of vibration, neither the terminal nor the wire of the ground strap should touch the TD base. The wire should be slack. If necessary, bend the terminal upward for clearance (see Figure 7).

9.05 The gears should be in alignment and there should be a barely perceptible amount of backlash between the gears at their closest point. To adjust, laterally position the transmitter distributor unit on the base. Tighten the mounting screws.

9.06 Remount the gear guard on the transmitter distributor base and tighten its mounting screws.

9.07 Install the plate with studs on the front of the transmitter distributor unit using the screws, lockwashers, and washers provided.

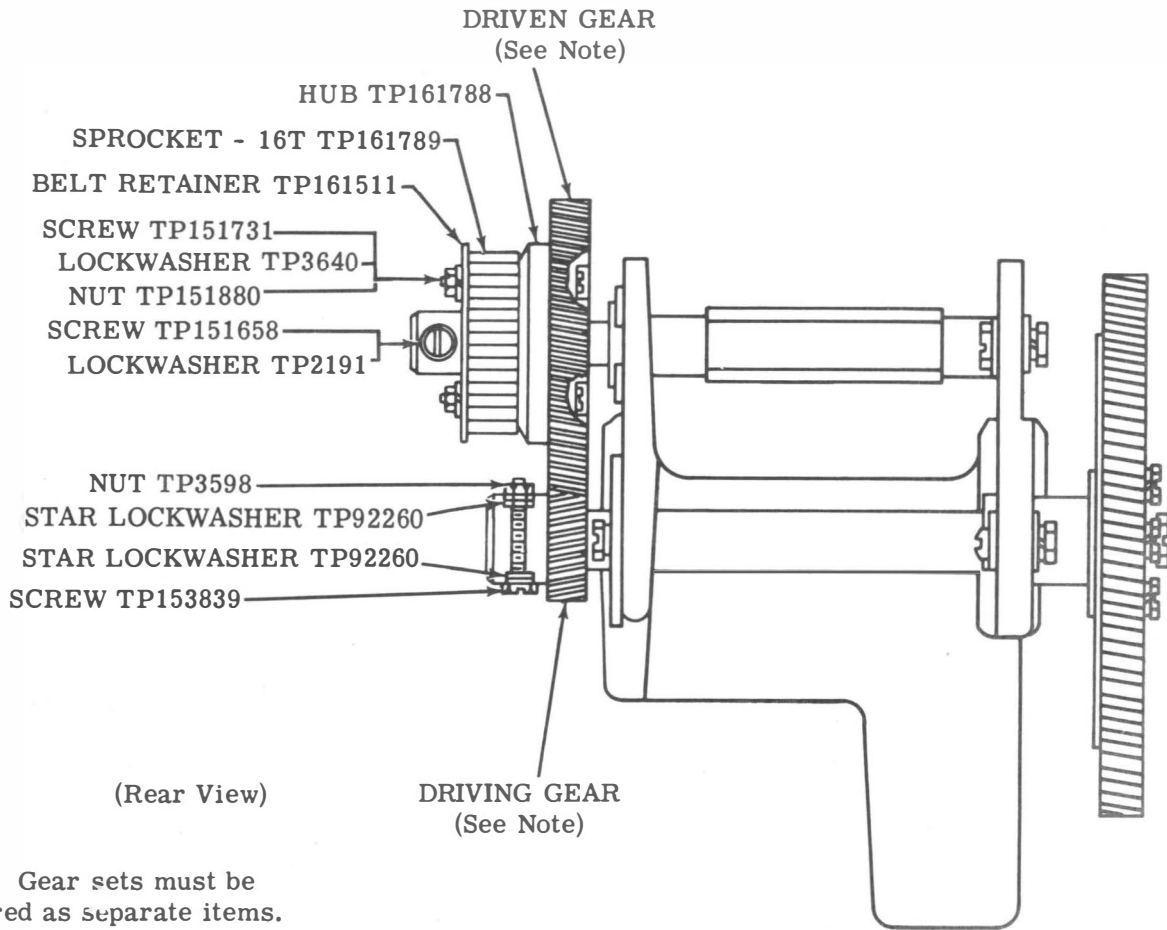


Figure 8 - Installation of Gear Set on Gear Bracket Assembly (Auxiliary Reperforator Base)

- 9.08 Reinstall the crossbar and the auxiliary housing of the transmitter distributor housing, and the front panel of the teletypewriter cabinet (in that order). Avoid damage to the character counter.
- 9.09 Make the adjustments and install the parts covered in 8.13, 8.14, and 8.15.
- 10. TRANSMITTER DISTRIBUTOR UNIT COMBINATION (LXD PLUS READER LX) AND BASE (LCXB)

Note: No vertical adjustment of the TD unit is needed.

- 10.01 Loosen the two gear guard mounting screws, slide the gear guard forward and lift it off the transmitter distributor base. The gear set to provide the desired speed of operation must be ordered as a separate item. Install

the speed change gear set for 60, 75, or 100 wpm operation on the TD base as follows: Install the pinion on the short shaft at the rear of the TD base and the large gear on the long shaft that extends to the TD (see Figure 5).

- 10.02 Insert and tighten the three shoulder studs (furnished with TD base) into the TD base mounting holes in the front and rear cradle rails. Place a rubber bushing (furnished with TD base) over each stud (smaller diameter of bushings upward). Position the TD base over the studs so that the smaller diameter of the bushings extends into the mounting holes of the base, and the base rests on the shoulders of the bushings (see Figure 6).

- 10.03 Route the ground strap forward and under the base, then to the rear under the rear cradle rail (see Figure 7). Place a rubber bush-

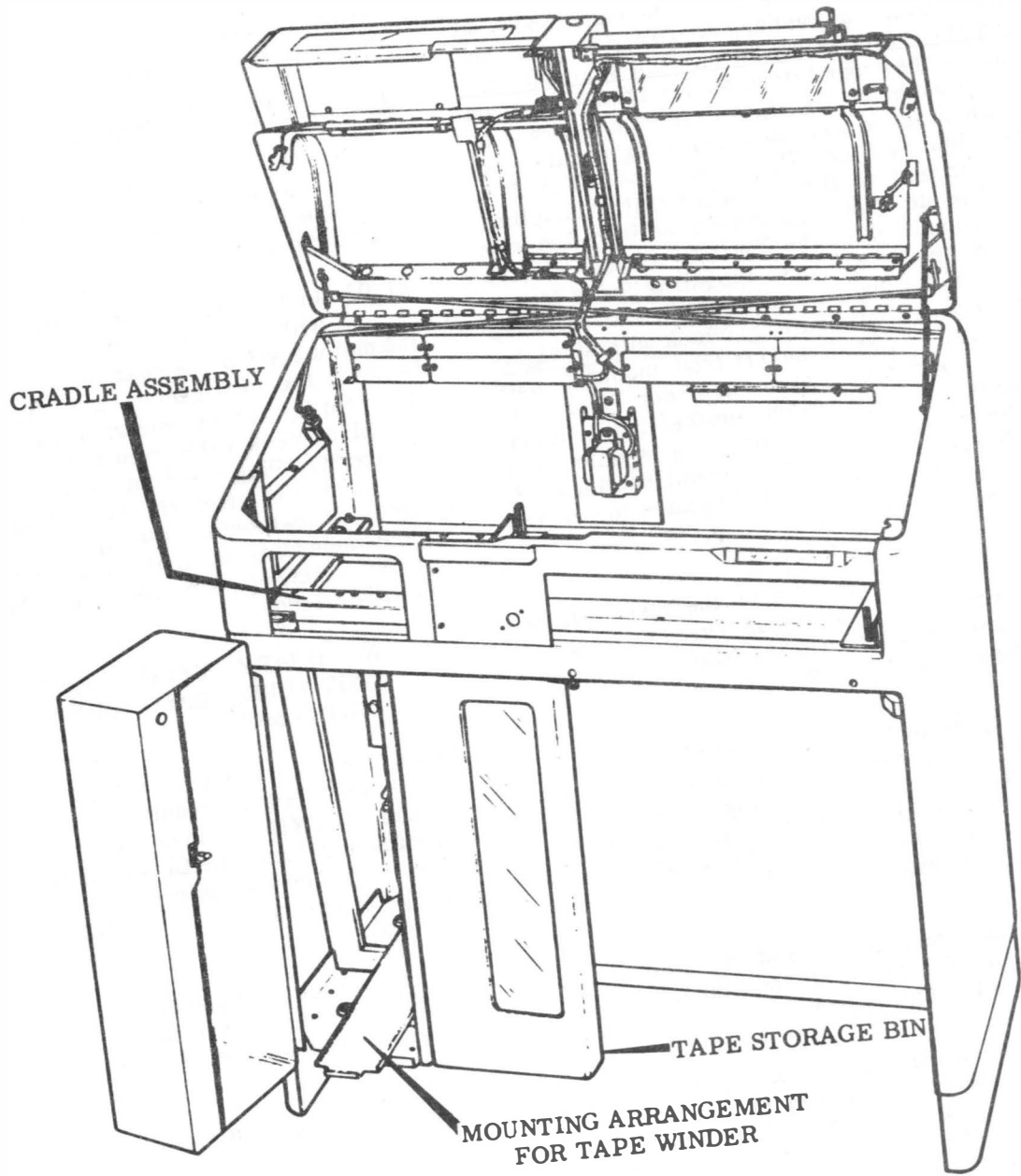


Figure 9 - Typical Automatic Send-Receive Cabinet (LAAC) Shown Open

SECTION 573-101-200TC

ing (with smaller diameter downward) on the three studs that now extend up through the mounting holes of the base. The smaller diameter of the bushings must extend into the base mounting holes. Place a washer, lockwasher, and nut (furnished with TD base) on each stud (the terminal of the ground strap should be placed on top of the washer on the right rear stud followed by the lockwasher and nut); do not tighten the nuts (see Figures 6 and 7). Couple the TD shaft to the keyboard shafting with a flexible coupling. The flexible couplings should be installed with the external hub on the TD base shafts. Utilize the play in the TD base mounting holes to line up the driving shaft, coupling shaft, and keyboard perforator power shafting; check with straight-edge rule. Tighten the TD base mounting nuts and the coupling screws. In order to prevent transmission of vibration, neither the terminal nor the wire of the ground strap should touch the TD base, and the wire should be slack. If necessary, bend the terminal upward for clearance (see Figure 7).

10.04 Mount the TD units on the base with the six screws, lockwashers, and washers provided in the bag tied to the base. Tighten the mounting screws friction tight.

10.05 Adjust the lateral position of the TD units on the base so that the gears are in alignment with a minimum amount of backlash between the gear teeth at the closest point. Tighten the screws. The TD units should be parallel. Reposition if necessary.

10.06 Install the plate with studs on the front of the TD unit with the screws, lockwashers, and washers provided.

10.07 Reinstall the crossbar, housing, and front panel. Avoid damage to the counter. There should be a minimum of 1/32 inch clearance between the LX unit and the cabinet. A minimum clearance of 1/32 inch is also required between the side and top plates of the TD units and the housing. To obtain these clearances, required for reducing noise level, adjust the housing detent springs and/or reposition the cradle.

CAUTION: TO AID IN THE REDUCTION OF THE NOISE LEVEL, THE UNITS MUST NOT TOUCH THE CABINET AT ANY POINT, THEREBY PREVENTING TRANSMISSION OF VIBRATIONS TO THE CABINET.

10.08 Attach the knob to the shaft using the screw in the knob. These parts are furnished with the appropriate cabinet. Insert the shaft in the hole to the left of the keyboard.

11. TAPE WINDER (TW)

11.01 The backlash and alignment between the motor pinion and the driven gear should meet the requirements of the applicable adjusting information.

11.02 Installation of tape winders in cabinets with provisions at lower left side: With the motor toward the rear, place the tape winder between the two flanges and slide it back until the front part of the tape winder baseplate drops into place behind the front retaining flange (see Figure 9). Plug cord into receptacle provided in the cabinet after the tape winder is fully in place, or just before the tape winder is fully in place depending on applicable cabinet and tape winder. Reverse the procedure when removing the tape winder.

12. AUXILIARY TYPING REPERFORATOR UNIT (LPR), BASE (LRB), AND MOTOR UNIT (LMU)

12.01 Install the parts contained in TP161814 or TP161815 modification kit to adapt a TD base (LCXB) to mount an auxiliary typing reperforator base (LRB) and to provide a tape guide. Installation instructions are covered in the specification furnished with the kit (see Figure 1).

Note: A tape (exit) guide is not used on ASR Sets where the tape from the auxiliary typing reperforator is wound on a tape winder in the cabinet.

12.02 Remove and discard the gear guard on the TD base.

12.03 On units not equipped with variable speed drive, install the gears for the desired speed of operation on the shafts of the gear bracket assembly as shown in Figure 8. Mounting hardware is in a bag tied to the base. The set of gears must be ordered as a separate item.

12.04 Remove the gear bracket assembly and the gear guard.

Note: Before installing the motor unit, check to see if the leads on the motor unit, as received, are threaded through the hole in the

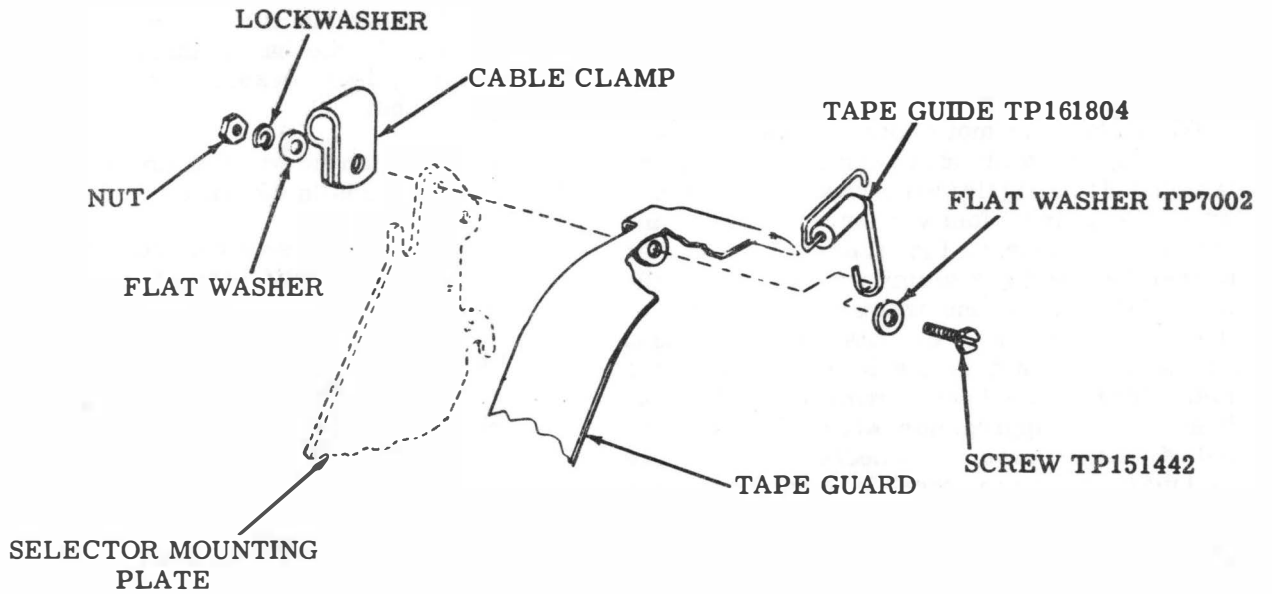


Figure 10 - Installation of Tape Guide TP161804 (Auxiliary Reperforator without Letters-Figures Contact Assembly)

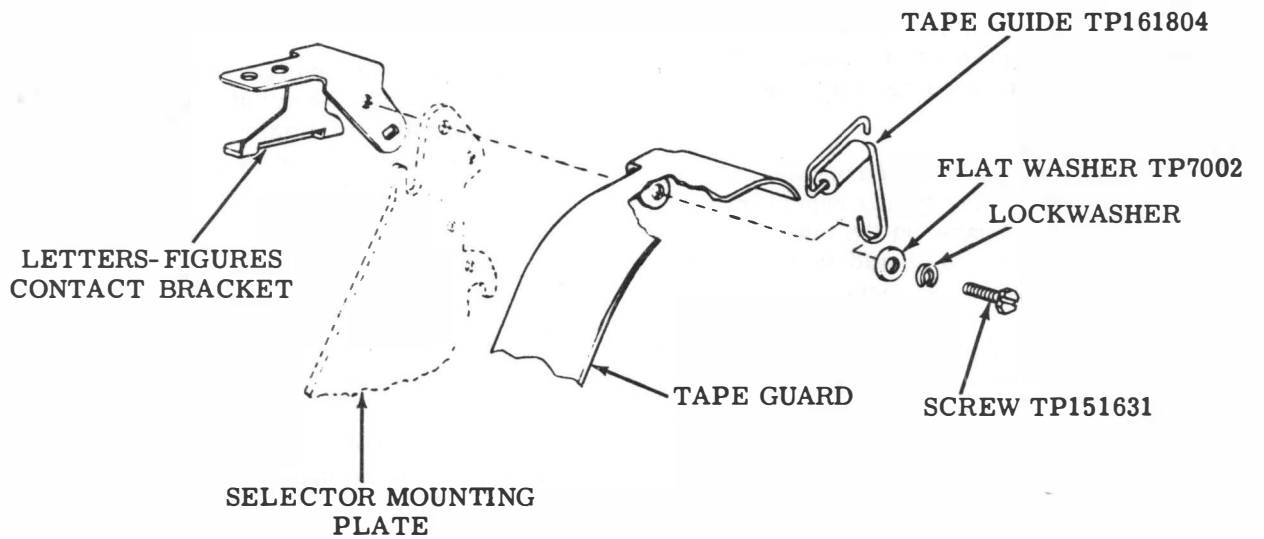


Figure 11 - Installation of Tape Guide TP161804 (Auxiliary Reperforator with Letters-Figures Contact Assembly)

SECTION 573-101-200TC

motor mount bracket. If so, pull them out. They should not be routed through the hole when the unit is installed.

12.05 Install the motor unit on the auxiliary reperforator base using the following parts found in a bag tied to the base: four screws, three lockwashers, four washers, four nuts, and two star lockwashers. Place one star lockwasher against the anodized aluminum surface of the motor bracket and one against the painted surface on the bottom of the base so as to ground the motor bracket to the base. Connect the motor leads to the lower terminal block as indicated in the appropriate wiring diagram furnished with the base. It is necessary to remove the tape container to reach these terminals with a screwdriver. Replace the tape container leaving the screws frictiontight for later adjustment. Replace the gear bracket assembly and the gear guard.

12.06 Mount the tape guide on the typing reperforator as follows:

(a) On units not equipped with letters-figures contact assembly, remove and discard the screw in the location shown in Figure 10 and mount the tape guide using the screw and washer furnished in a bag tied to the base and the existing mounting parts as shown in Figure 10.

(b) On units equipped with letters-figures contact assembly, remove and discard the screw in the location shown in Figure 11 and mount the tape guide using the screw and washer furnished.

12.07 Mount the sprocket (from the bag tied to the base) on the typing reperforator with the mounting hardware on the hub. The screw heads and lockwashers should be on the side of the deeper inset of the sprocket.

12.08 Mount the gear on the motor shaft with the isolator and two posts. Screw the posts down tight.

12.09 Loosen the three gear bracket assembly mounting screws to frictiontightness and position the assembly up or down until there is a barely perceptible amount of backlash between the motor pinion and the driven gear at the closest point. The gears should be parallel to each other. Tighten the screws.

12.10 Mount the auxiliary typing reperforator onto the base as follows:

(a) Remove the following parts from the bag tied to the base: three screws, three washers, four lockwashers, one screw, and one washer.

(b) Position the reperforator over its mounting studs in the base.

(c) Loosen the screw holding the small "L" shaped anchor bracket to the right front of the punch.

(d) Start the screw with lockwasher and washer through the "L" shaped anchor bracket into the proper tapped hole in the base plate. Do not tighten the screw.

(e) To allow for maximum accessibility for a screwdriver to the rear mounting screw, position the pushbar bail of the reperforator to its foremost position. Start the three screws with lockwashers and washers through the holes in the casting and into the proper tapped studs in the "T" shaped plate. Do not tighten the screws.

(f) Remove the timing belt from the bag and place it over the sprockets. Take up the slack in the belt by moving the reperforator away from the motor. The belt should have just enough slack so that a light pressure (8 oz) applied midway between the sprockets will cause the belt to deflect approximately 1/8 inch. Tighten the three mounting screws. Check timing belt deflection.

(g) Hold the anchor bracket so that it rests squarely against the reperforator and base plate and tighten the screw that secures the anchor bracket to the baseplate. Tighten the screw that secures the anchor bracket to the reperforator.

12.11 Route and connect the power cable from the bag as follows: Place the receptacle connector over the plug connector and tighten the associated knurled locknut. Route the cable forward and downward, past the right side of the TD unit drive shaft, to the right, under the right side of the TD base casting, left and right, keyboard cradle rails and up to the cabinet terminal block. Connect the black lead to terminal 39, white lead to terminal 40, and the green lead to the cabinet ground screw as indicated in the appropriate wiring diagram furnished with the LRB base.

12.12 Install the cables (if applicable) as indicated in the appropriate wiring diagram furnished with the LRB base.

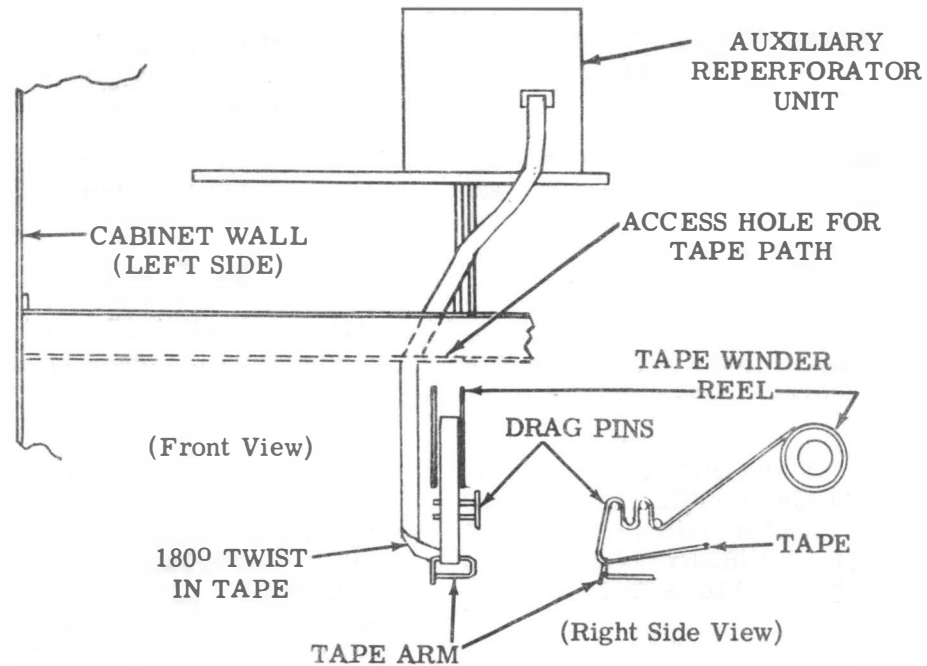


Figure 12 - Tape Path from Auxiliary Reperforator Unit to Tape Winder Reel

12.13 Place the base (with reperforator) on its mounting posts and secure it with the following parts found in the bag attached to the base: three screws, two lockwashers, three washers, and one star lockwasher. Place the star lockwasher next to the upper painted surface of the base under the left front mounting screw.

Note: When an old style LRB base is used (old style mounting bracket and "T" plate), a 13/16 inch diameter flexible coupling must be used on the TD base under the LRB base. Use of larger diameter couplings results in interference when mounting the LRB base. If no 13/16 inch diameter coupling is present, it should be ordered separately. New style LRB bases have a modified mounting bracket and nut plates, and provide clearance for 1-1/16 inch diameter couplings.

12.14 Install the desired control panel in place of the blank panel in the cabinet dome. The control panel must be ordered as a separate item.

(a) When a modification kit (ordered) as a separate item) consisting of a TAPE FEED OUT control panel and a cable w/switch is used, proceed with installation of this kit

as follows: Install the control panel in place of the blank panel in the cabinet dome using the existing mounting hardware. Secure the switch, on the cable, to the control panel with the mounting nuts on the switch. Route the cable along the left side of the cabinet through the hole at the rear of the dome. Connect the cable in accordance with applicable wiring diagram furnished with the LRB base. Secure the cable, if necessary, to clear any moving parts.

12.15 Adjust the tape guide included in the modification kit in accordance with instructions contained in Specification 50055S (for TP161814 kit) or 5929S (for TP161815 kit) furnished with the kit.

12.16 Install the TP161829 modification kit (which must be ordered separately) to mount an electrical service unit to a relay rack bracket assembly used with the ASR cabinet. Installation instructions are covered in Specification 5928S furnished with the kit.

12.17 Position the tape container so that a full roll of tape may be inserted through the access door in the dome of the cabinet. Tighten the screws.

SECTION 573-101-200TC

13. MISCELLANEOUS INSTRUCTIONS

13.01 Cradle

(a) The cradle in the cabinet is factory adjusted (no load) for nominal squareness and parallelism with respect to the cabinet. Two locating eccentrics are positioned against the rear rail. The cradle may have to be repositioned after the units are installed in order to level the equipment and obtain a flush fit with respect to the cabinet (see Figure 9). Exercise care to avoid damage to the counter.

CAUTION: TO AID IN THE REDUCTION OF THE NOISE LEVEL, THE UNITS MUST NOT TOUCH THE CABINET AT ANY POINT, THEREBY PREVENTING TRANSMISSION OF VIBRATIONS TO THE CABINET.

(b) Should it be necessary to raise or lower the cradle after the units are installed, loosen the locknuts on the right front and the two rear vibration mounts, and the locknut on the lower end of the stud in the left front vibration mount. Raise or lower the cradle by turning the studs. Tighten the locknuts while holding the studs in position.

(c) Should it be necessary to move the cradle forward or backward after the units are installed, loosen the four screws holding the front and rear rails and the two screws securing the eccentrics against the rear rail and tighten their mounting screws.

13.02 Secure all cords and cables where necessary to keep them away from any moving parts.

13.03 Apply a thin film of grease to all newly installed gears. Use standardized lubricant.

13.04 Make a visual check of all fuses, plugs, screw terminal connections, and lamps for loosening or breakage.

CAUTION: ANY TD BASE WHICH IS EQUIPPED WITH RUBBER ISOLATION BUSHINGS MUST BE GROUNDED TO THE CRADLE USING THE GROUND STRAP AS SPECIFIED IN THE FOREGOING TEXT AND FIGURE 7. ALSO, CHECK TO SEE THAT THE CABINET IS CONNECTED TO THE COMMON STATION GROUND AS SPECIFIED IN THE FOREGOING TEXT.

13.05 Make certain that the power switch is in its OFF position before closing the main power to the equipment.

13.06 Refer to standardized instructions for installing paper and ribbon in the page printer.

13.07 A thumb wheel or screwdriver slot is provided on the tape feed wheel shaft for starting or advancing the tape manually. On units with backspace mechanism, a hole is provided in the guard for a screwdriver. Turn the thumb wheel or screwdriver to the left.

13.08 For keyboard tape perforating unit — thread the tape from the top of the roll of tape, over the roller of the tape guide on the tape container and into the tape entry chute. Position and/or reform the tape guide, as necessary, so that the tape flows freely and makes full contact with the roller on the tape guide. Tighten the screws.

13.09 For auxiliary typing reperforator unit — thread the tape from the bottom of the roll of tape, over the roller of the tape guide on the tape container, over the roller of the tape guide on the selector bracket and into the tape entry chute. Position and/or reform the tape guides, as necessary, so that the tape flows freely and makes full contact with the rollers on the tape guides. Tighten the screws.

13.10 To route the tape from the auxiliary typing reperforator unit to the tape winder reel, thread the tape through the access hole provided, twist it 180 degrees, thread it through the tape arm around the drag pins and onto the tape winder reel (see Figure 12).

Note: The Model 28 Automatic Send-Receive Set should be completely assembled with the appropriate units and ready for the following operating tests (Paragraphs 14 and 15 inclusive).

14. LIGHTING FACILITIES

14.01 The incoming power is controlled by a three-position switch located inside of the cover and to the left of the lid opening for the printer.

(a) OFF — Lights are off.

(b) NORMAL ON — Lights are on, excluding end-of-line lamp when printer set is operating.

- (c) **MAINTENANCE ON** — Lights are continuously on, except end-of-line lamp.

15. OPERATING TESTS

Note: Tapes to be run through TD unit LCXD should have at least two blanks at the end so as to clear the unit.

15.01 Keyboard Position (K)

- (a) Manually depress each key and determine that the proper character is printed or the proper function is performed.
- (b) The LOC LF (local line feed) key, when depressed, should cause paper to be fed out of the machine at approximately three times the speed obtained when the LINE FEED and REPT (repeat) keys are continuously depressed.
- (c) The REC (keyboard lock) key, when depressed, should cause the signal generator to be shunted, preventing signal generation. Check this action on the page printer. The key should remain depressed until released by the SEND (keyboard unlock) key.
- (d) The SEND (keyboard unlock) key, when depressed, should remove the shunt from the signal generator.
- (e) The BREAK key, when depressed, should hold the transmitting line open. If the duration of the open line interval is greater than two character cycles, the electrical keyboard lock should be operated as in Paragraph (c) above.
- (f) The REPT (repeat) key, when depressed together with any other key except the local function keys, should cause repeat transmission of the associated code combination.
- (g) The LOC CR (local carriage return) key, when depressed, should cause the carriage to be returned.
- (h) The bell should ring clearly on single or repeated operation of the BELL key.
- (i) The "blank" key, when alternately depressed with any other key except the local function keys, should not lock the keyboard. Depression of the "blank" key twice in succession should operate the keyboard

lock making it necessary to depress the SEND key to resume keyboard transmission.

- (j) When the LINE-TEST key control shaft is turned to the TEST position, the keyboard should operate the page printer as above. No break in the signal line should occur as the LINE TEST key control shaft is switched.

15.02 Keyboard-Tape Position (K-T)

- (a) Manually depress each key and determine that the correct character is printed on the page printer and perforated in the tape.
- (b) When the "blank" and REPT (repeat) keys are depressed simultaneously, the tape should feed out without interruption.
- (c) When the E and REPT (repeat) keys are depressed simultaneously, the character counter should count without missing. The end-of-line indicator should light at its preset count. When the CAR RET (carriage return) key is depressed, the counter should return to zero. When the E key is again depressed, the counter should count one character.
- (d) The electrical keyboard lock should be operative.
- (e) The TD unit should be operative. Accuracy of transmission should be tested using a prepared tape and monitoring the transmission on the page printer.
- (f) Turning the LINE-TEST key control shaft to the TEST position should result in operation similar to the above except that operation is on a local loop.

15.03 Tape Position T

- (a) Depress the "blank" and REPT (repeat) keys simultaneously; the tape should feed out of the punch at high speed without interruption.
- (b) Depress the E and REPT (repeat) keys simultaneously; the character counter should count without missing, and the end-of-line indicator should light at its preset count. Depressing the CAR RET (carriage return) key should cause the counter to return to zero and the end-of-line indicator to shut off. When the E key is again depressed, the counter should count one character.