

37 AUTOMATIC SEND-RECEIVE (ASR)

TELETYPEWRITER SET

INSTALLATION

CONTENTS	PAGE
1. GENERAL	1
2. UNPACKING	2
TABLE AND CONSOLE	2
TYPING UNIT	2
RT MODULE	5
3. LUBRICATION	5
4. ASSEMBLY PROCEDURE	6
TYPING UNIT	6
A. Base Mobilization	6
B. Typing Unit Mounting	7
C. Interrelated Adjustments	7
D. Cable Connection	7
E. Ribbon Routing	10
F. Cover Replacement	10
G. Paper Guides and Wear Strip	11
H. Paper Assembly and Routing	11
I. Form-Out Positioning	13
RT MODULE	13
A. Interrelated Adjustments	13
B. Cable Connection	14
C. Ribbon Routing	14
D. Paper Tape Routing	15
ELECTRICAL SERVICE UNIT	16
A. Answer-Back Unit (Option)	16
B. Encoding Answer-Back Drum	17
5. CHECKOUT	19
1. GENERAL	

issue did not receive general distribution, marginal arrows normally used to indicate changes or additions have been omitted. A station is a self-contained arrangement which is completely assembled and tested by the service center prior to shipment. It is intended to be shipped completely assembled, with the exception of the typing unit, which is shipped in a separate carton.

1.02 The installation of this set requires supplementary information found in the appropriate station installation section.

1.03 The customer must furnish a standard 3-wire, grounding-type, 106 to 129 volt, 59.55 to 60.45 Hz ac power receptacle (to accept a plug equipped with two parallel blades and a round-shaped grounding pin). All components of a station should be connected to the same fused circuit.

Note: The ac receptacle should not be under control of a switch.

1.04 The 37 ASR Set consists of a reperforator-transmitter (RT) module and a 37 keyboard send-receive unit. The set can be



Figure 1 - 37 ASR Teletypewriter Set

1.01 This section provides the general installation procedures for the 37 Automatic Send-Receive (ASR) Teletypewriter Set (Figure 1). Since this is a general revision and the previous

installed in a floor space 44-1/2 inches wide and 27 inches deep (allow 33-1/2 inches in depth for sets with form box). Maximum height is 46 inches with the printer cover and RT cabinet lids open. Space for the operator must be added to the depth dimension. The station weighs approximately 360 pounds.

1.05 Reference directions are based on the normal position of the operator facing the keyboard. Left or right, up or down, and front or rear are referenced with the keyboard in front.

1.06 Refer to the appropriate station practice and wiring diagrams for information concerning the station, circuit cards, and auxiliary equipment.

2. UNPACKING

2.01 The 37 ASR Set is shipped on a pallet strapped down and covered with a container fastened to the pallet. The sets that are shipped a long distance are packaged in a standard wooden crate.

TABLE AND CONSOLE

2.02 Unpack the shipping container carefully and avoid marring paint finishes. Observe all special unpacking instructions associated with the shipping container.

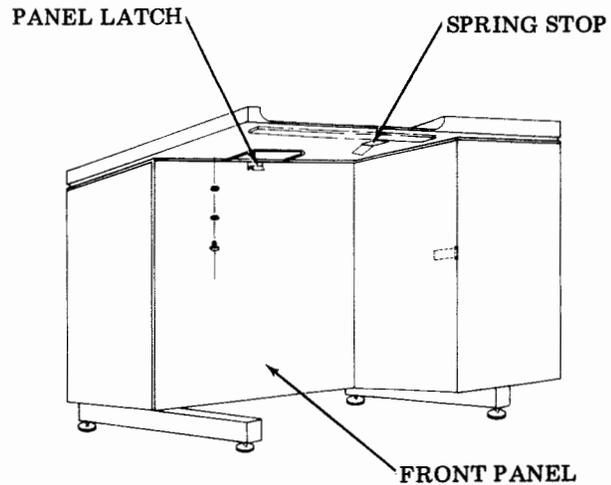
2.03 Remove the tape that secures the table/console to the RT module and the tape that holds the units to the pallet. Place the table/console in the assembly area. Check that the set is level and rests squarely on all feet. If adjustment is necessary, turn the hex-head bolts attached to the feet to level the cabinet.

Table Access (Figure 2)

2.04 Front panel is removed as follows:

- (1) While holding the front panel, push down on the panel latch in the panel slot to unlatch the panel to allow it to move forward.
- (2) Release (push up) the spring stop on the underside of the table.
- (3) Open the panel and align its top edge with the front edge of the table. Disconnect ground strap between the front panel and table, if present.

- (4) Carefully lift upward and remove panel from its hinges. Place the panel aside until the set is completely assembled.



(Left Front View)

Figure 2 - 37 Teletypewriter Table

Cover Removal

2.05 Open the cover (Figure 3) by depressing the two cover latches (one on each side), and lift the front cover upward. If desired, remove the cover from the pan by the following procedure:

- (1) Disconnect the cover ground strap and the optional copyright connector.
- (2) Disconnect the cover balancing arm, located on the right side, by sliding the cam to its lowest position and moving the arm to the left.
- (3) Pull back on the spring clip located inside lower left corner of the cover and slide the cover to the right until the clip clears the retaining plate.
- (4) Slide the cover to the right, disengaging the hinges.
- (5) Place the cover aside until the final assembly.

TYPING UNIT

2.06 Unpack the typing unit (Figure 4) from its carton and remove all packing material. The typing unit may be lifted by

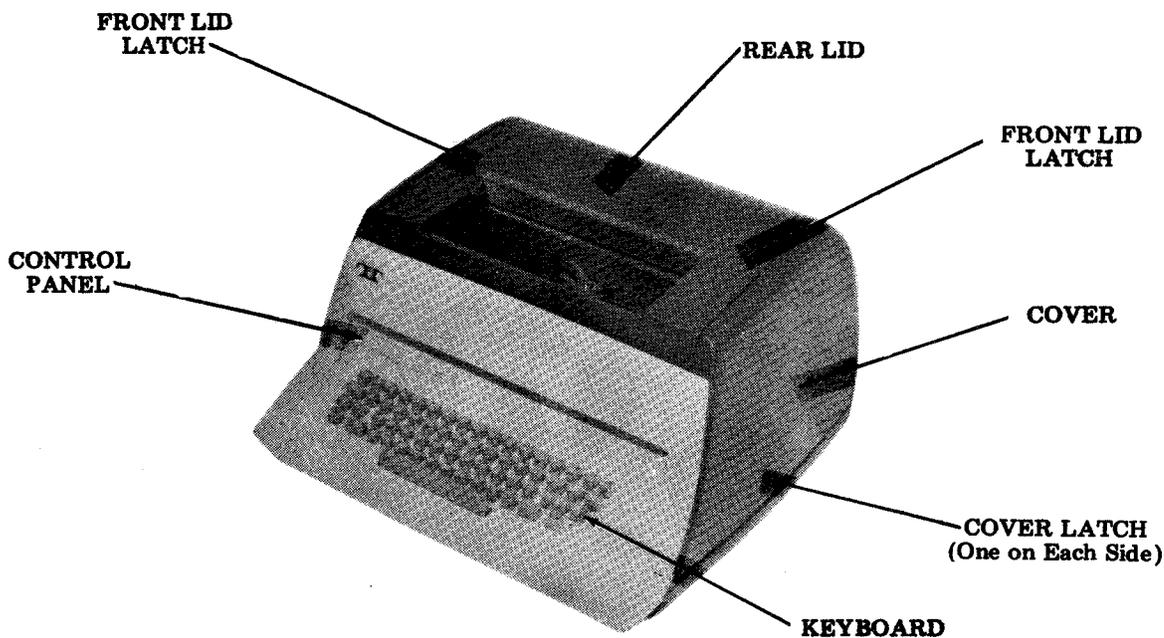


Figure 3 - Keyboard and Cover Assembly

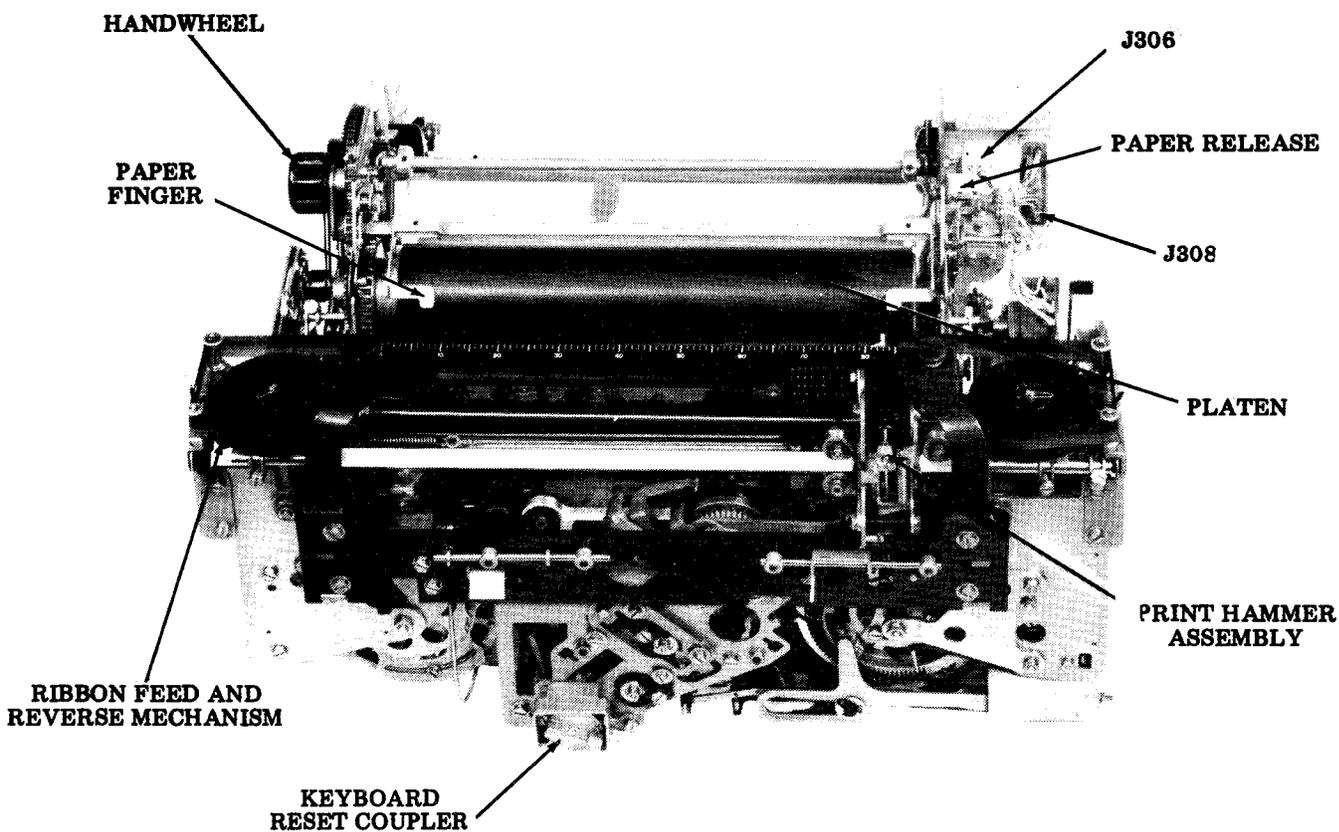


Figure 4 - 37 Typing Unit

grasping the right side of the front plate and the rear curve under the left side plate. Do not lift any other way. Place the typing unit on its front plate on a flat surface allowing the shipping pallet to hang over the edge. Remove the shipping pallet from the typing unit. Remove the four shipping fasteners clipped to the feet of the typing unit. Remove the wire retainers that secure the print hammer assembly and the retraction reset slide, if present. Check the feed pawls and the ratchet wheel for packing detail. If detail is present, remove it when moving the print hammer assembly toward the left.

CAUTION: INSTALL THE TYPEBOX IN THE TYPING UNIT BEFORE APPLYING POWER TO AVOID THE POSSIBILITY OF DAMAGING PARTS.

2.07 Perform the following three operations before applying power to the Model 37 typing unit:

(1) View the typing unit from the back over the trip shaft mechanism, and check to insure that the suppression slide is not hung-up over the suppression bail. The correct position is indicated in Figure 5. If corrective action is required, push down on suppression bail and move the suppression slide towards the front of the unit. Hold slide in and release the bail.

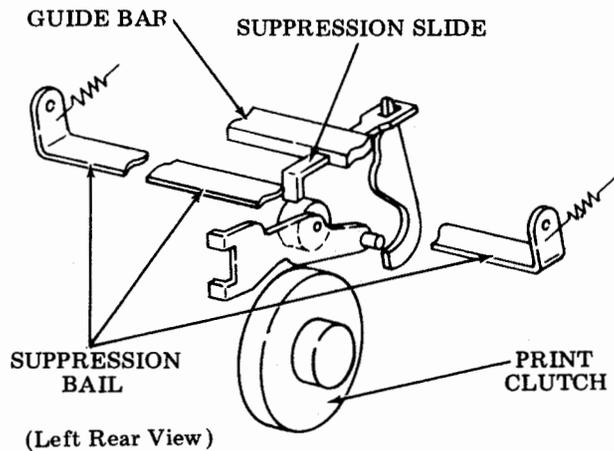


Figure 5 - Suppression Slide and Bail

(2) View the typing unit from the top and check the alignment of the four horizontal positioning clutch trip levers with the codebar forks. The correct alignment is shown in Figure 6. If corrective action is required, lift up the codebar fork and position the Number 4 horizontal trip lever

into the fork. Perform the same corrective action for all four forks and trip levers. It may be necessary to loosen front plate mounting screws in order to reposition trip levers. Tighten mounting screws.

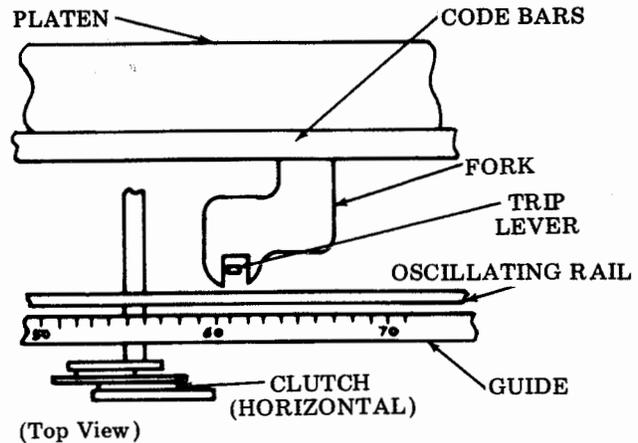


Figure 6 - Codebar Fork and Clutch Trip Lever Alignment

(3) View the left side of the typing unit and check the position of the retraction reset slide and the retraction check pawls in the retraction mechanism. The retraction reset slide shall be positioned in front of the retraction check pawls. Correct position is shown in Figure 7. If corrective action is required, move retraction reset slide out and around to the front of the check pawls.

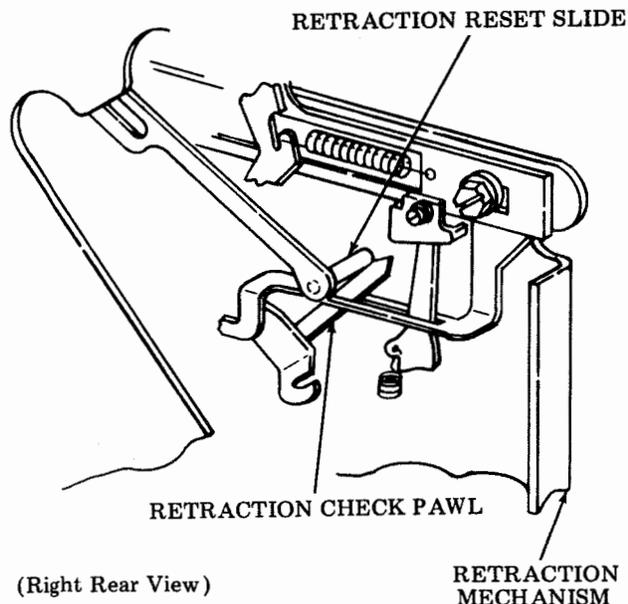


Figure 7 - Retraction Slide and Check Pawl

RT MODULE

2.08 Remove the RT module (Figure 8) from the pallet and place the module in the assembly area. Move the cabinet to the left side of the table and route the RT module interface plug (P310), and the power cord through the base of the cabinet and into the opening at the base of the table.

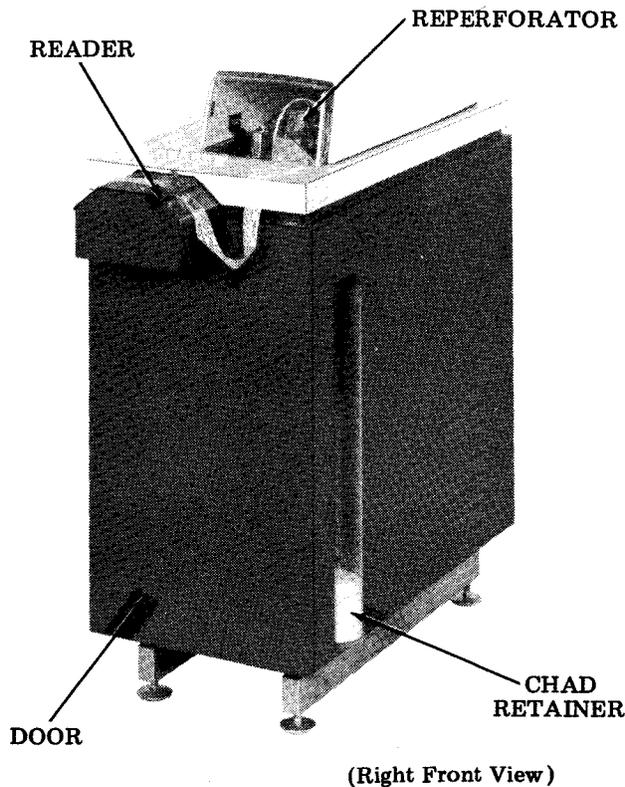


Figure 8 - 37 RT Module

2.09 If required, remove the shipping bracket mountings on the reperforator base by the following procedure (Figure 9):

- (1) Remove and discard the four shipping screws securing the reperforator base to the shipping brackets.
- (2) Loosen the four shipping bracket retaining screws.
- (3) Drop the shipping brackets out of engagement with the reperforator base.
- (4) Slide the shipping brackets down until the top of its stowing slot is resting on the retaining screws.

- (5) Tighten the four shipping bracket retaining screws.

Note: All four shipping brackets must be disengaged from the reperforator and motor mounting plate before operating the unit.

3. LUBRICATION

3.01 Visually inspect the components for general lubrication requirements. Check oil locations on felt washers, oil cups, and in most locations where parts rub or move with respect to each other. Grease should be used on gears, rollers, points of heavy pressure, and some ball bearings.

3.02 General requirements for lubrication areas for the units are as follows:

- (1) Pivot points require two or three drops of oil.
- (2) Felt washers are saturated with oil.
- (3) Cams and sliding surfaces require a film of oil.
- (4) All open roller bearings should be packed with grease (KS7471).

Note: Closed roller bearings do not require lubrication.

3.03 Overlubrication which would allow oil to drip or grease to be thrown on other parts should be avoided. Excessive lubricants should be removed with a dry lint-free cloth. Keep all electrical contacts free of oil or grease.

Note: Use maintenance pad TP124828 to protect furniture and floor coverings from oil and grease while lubricating the units.

3.04 After 300 to 500 hours of operation, the unit should be relubricated to make sure all operating points receive lubrication. At this time, all clutch gaps should be rechecked to insure that the gaps have not opened up after all parts have seated themselves. Refer to typing unit adjustment Section 574-320-703 and reperforator adjustment Section 574-330-700 for requirements. Thereafter, the unit should be relubricated every 1500 hours of operation or 6 months, whichever occurs first.

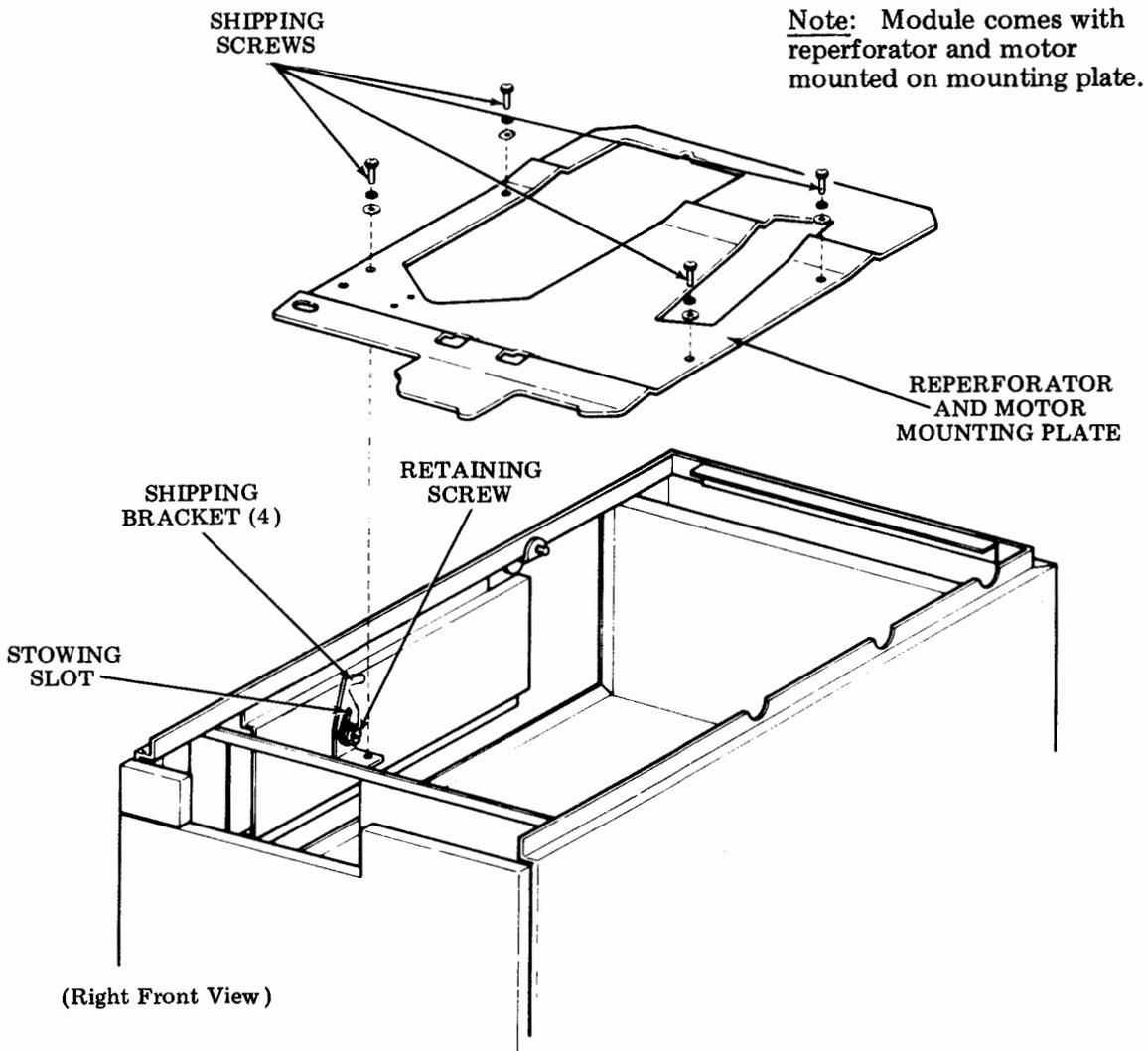


Figure 9 - Disabling Shipping Brackets — RT Module

4. ASSEMBLY PROCEDURE

TYPING UNIT

A. Base Mobilization

4.01 Remove the 6-40 screws from the two base retainers (Figure 10). DO NOT REMOVE THE BASE RETAINERS. Remove packing detail between base and pan. When packing detail is removed, vibration mounts will push the base against the base retainers. When installed, the weight of the typing unit will restore clearance between base and base retainers.

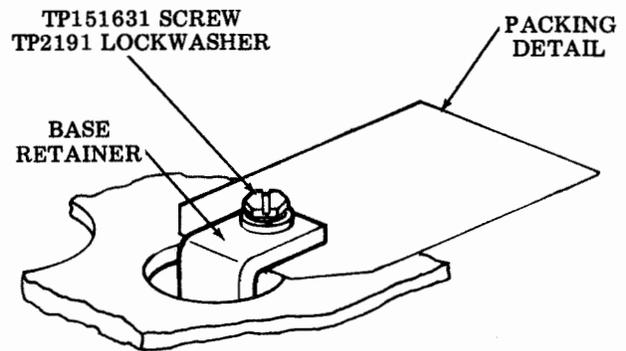


Figure 10 - Base Retainers

B. Typing Unit Mounting

4.02 Locate the selector clutch on the right end of the typing unit main shaft and the keyboard reset coupler (Figure 4) at the lower center front. Facing the right end of the typing unit, rotate the selector clutch drum in a counter-clockwise direction until the lugs on the keyboard reset coupler are vertical.

4.03 Viewing the keyboard reset mechanism from the right side of the keyboard, rotate the mechanical reset shaft in a clockwise direction until the open slots in the plastic universal joint member are vertical to receive the lugs on the typing unit (Figure 4) keyboard reset coupler.

4.04 The typing unit may be gripped for lifting by grasping the right side of the front plate and the rear curve under the left side plate. Do not lift any other way. Loosen the control panel mounting screws (one at each end) and rotate the panel forward away from the typing unit mounting area. From a level position, tilt the typing unit slightly forward (toward the front panel). Carefully lower the typing unit over the locating studs and intermediate gear assembly. Rotate the motor fan to be sure the main shaft driven gear and intermediate gear mesh properly.

CAUTION: WHEN PLACING THE TYPING UNIT ON THE BASE, BE SURE THAT THE TYPING UNIT DOES NOT REST ON ANY CABLES.

4.05 Install the four typing unit mounting screws, starting with the left rear.

4.06 Rotate the control panel back to its original position. Tighten the control panel mounting screws.

C. Interrelated Adjustments

4.07 **Keyboard Trip Arm:** Due to movement during shipment, the keyboard trip arm may become out of adjustment; an indication of this is when the keyboard double trips. If adjustment is necessary, refer to the keyboard trip arm as shown in Figure 11.

4.08 The motor intermediate gear assembly (Figure 12), and the typing unit driven gear should rotate freely without friction between the gears. The backlash should be barely perceptible as outlined in the requirements in the following paragraphs.

4.09 **Intermediate Gear Assembly:** Remove the gear guard and check for a backlash of 0.004 inch between the typing unit driven gear and intermediate driving gear. This backlash has a tolerance from 0.004 inch minimum to 0.008 inch maximum. The backlash should move freely and the gears should mesh properly. If adjustment is necessary, loosen the three intermediate gear assembly mounting screws, and the five motor mounting screws friction tight. Move the motor to the rear. Using the pry points at the rear of the intermediate gear assembly, adjust the assembly from front to rear until the requirement is met. Tighten the three intermediate gear assembly mounting screws. Proceed with the next step to provide backlash between motor pinion and intermediate gear assembly.

4.10 **Motor Unit:** Check for a backlash of 0.004 inch between the motor pinion and intermediate driven gear as outlined in the preceding paragraph. If adjustment is necessary, loosen the five motor mounting screws friction tight. Use the back edge of the base and the motor cradle as a pry point and adjust to meet the requirement. Tighten the five motor mounting screws.

4.11 **Paper Advance and Local Return:** With the control panel in its normal position and the typing unit secured to the base, loosen the two eccentric screw locknuts friction tight. Rotate the eccentric until the gap between the paper advance bail and/or the local return bail is 0.060 inch minimum (Figure 13). Tighten both nuts. Move the print hammer carriage to the right and check the local carriage return operation. The paper advance operation must be checked under power.

CAUTION: IF WIDE PLATEN TYPING UNIT IS USED, GAP BETWEEN THE ECCENTRIC AND LOCAL RETURN BAIL MUST BE 0.040 TO 0.060 INCH.

D. Cable Connection

4.12 Attach the typing unit cable connectors, P306 and P308, to the rear of the typing unit.

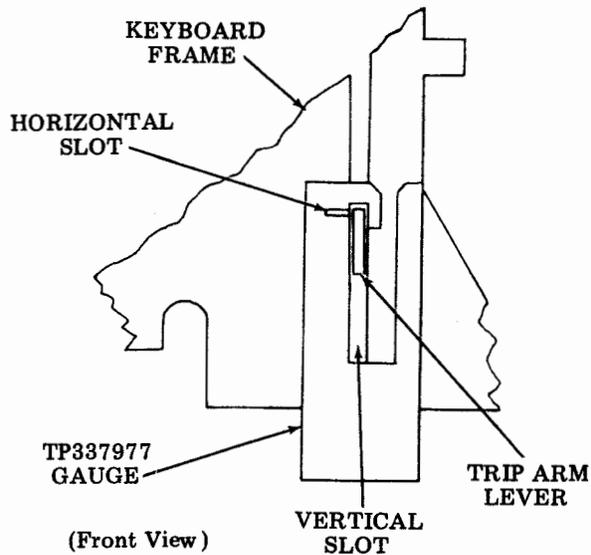
4.13 Check the cable connections to insure that they are closed and fitted properly.

TRIP ARM (With TP337977 Gauge)

Note: The typing unit must be assembled on the base to make the trip arm adjustment.

To Check

Depress keylever to trip keyboard. Rotate clutch until clutch shoe lever and clutch disc stop-lug have cleared the clutch stop arm. Depress trip arm to its latched position. Insert TP337977 gauge over the trip arm so that the top edge of the gauge vertical slot is positioned against the top edge of the trip arm. Rotate cam until the reset bail roller is on the high of one cam lobe. Remove gauge and check other cam lobe. Adjustment should be made on lower of the two cam lobes (least downward travel of trip arm).



Requirement

The top surface of the trip arm should be within the width of the gauge horizontal slot. (If grooved lines are present on keyboard frame, disregard them.)

To Adjust

Loosen clamp screw friction tight. Insert screwdriver between upper pry points and rotate plate until trip arm is lowered below horizontal slot. Using lower pry points, slowly rotate H-plate until trip arm is positioned to bottom of horizontal slot. Tighten clamp screw. Remove gauge. Recycle clutch to its original stop position.

TRIP ARM (Without Gauge)

To Check

Engage clutch and rotate cam until reset bail roller is on high of cam lobe. Check both cam lobes. Adjustment should be made on lower of the two cam lobes (least downward travel of trip arm).

To Adjust

Same as with TP337977 gauge except, rotate H-plate until trip arm is positioned to 0.050 inch latchlever clearance.

Requirement

Min 0.020 inch -- Max 0.050 inch between latchlever and trip arm.

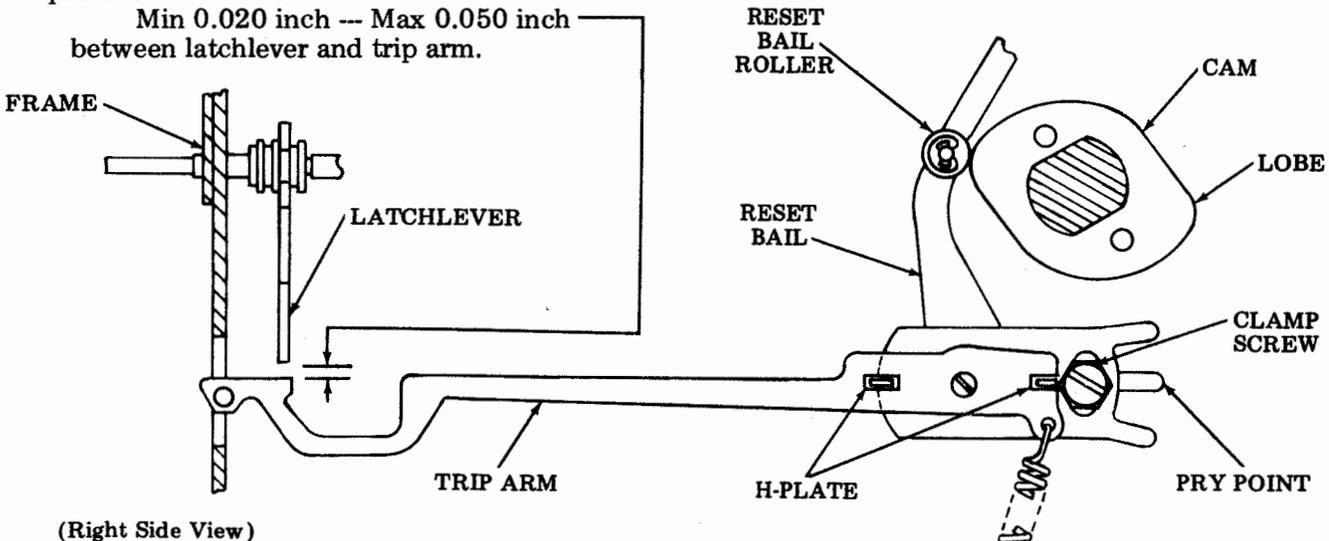


Figure 11 - Keyboard Trip Arm

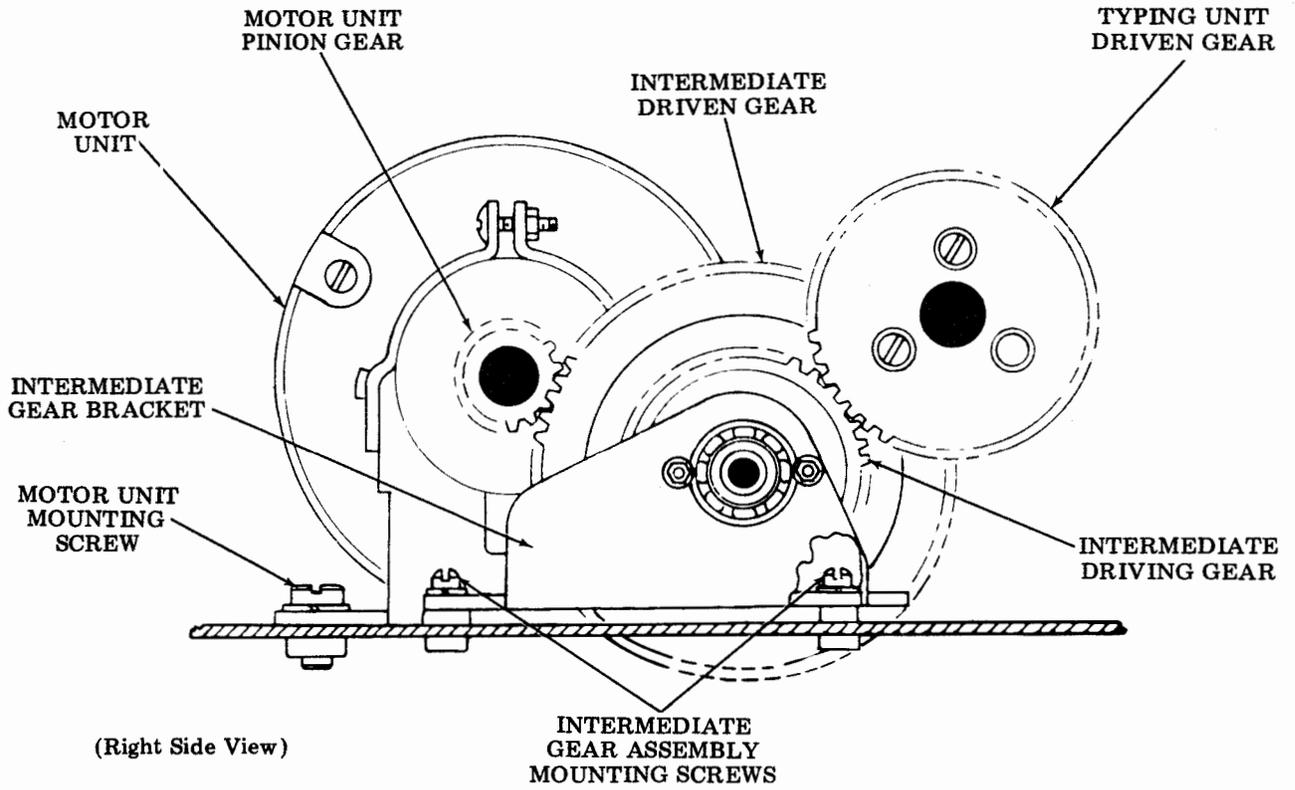


Figure 12 - Intermediate Gear Assembly

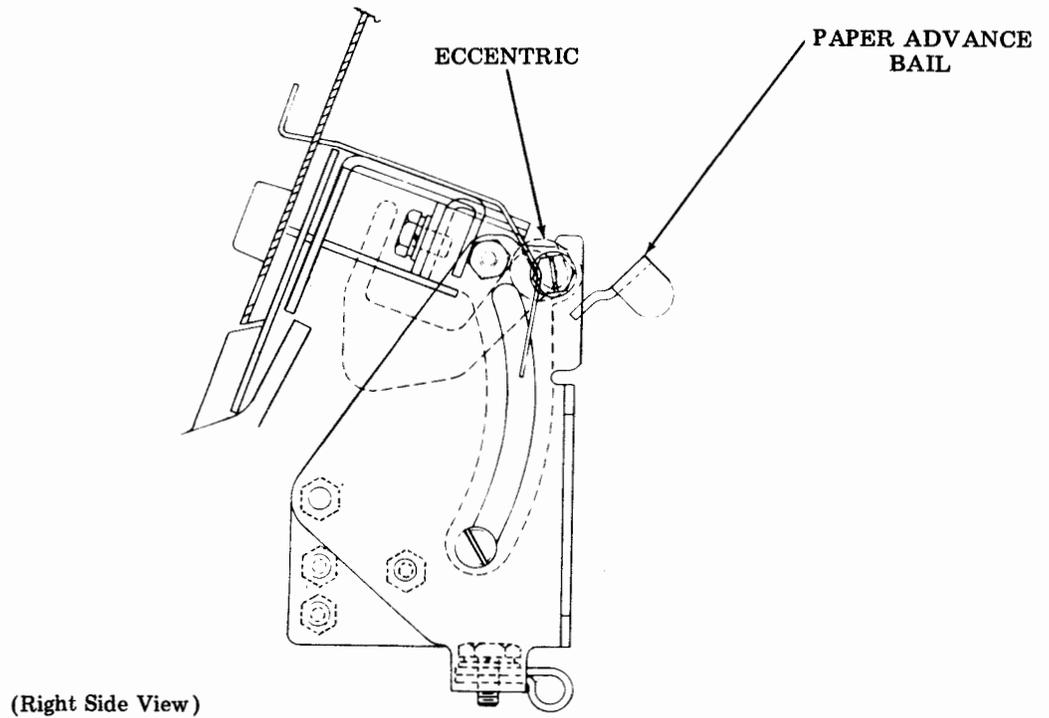


Figure 13 - Control Panel Button Adjustment

E. Ribbon Routing

4.14 To route the new teletypewriter ribbon, straighten the spring bail on the ribbon spool shaft, and lift the spool of the shaft. Remove the packaging, and reel out enough ribbon to reach the empty spool, plus an additional three turns on the spool. Refer to Figure 14 and perform the following routing procedure:

Note: Use only nylon ribbon on the typing unit. A new ribbon is supplied with the unit. Additional ribbons can be ordered under the following Bell System numbers:

61215 Nylon Ribbon — Black

62215 Nylon Ribbon — Red/Black

- (1) Place the new ribbon spool on the left shaft, turning the spool until the spool shaft pin is engaged.
- (2) Thread the ribbon over the rollers and through both ribbon guide levers. Keep the ribbon free of twists and in line between the two ribbon guide levers and between the fingers of the ribbon guide.
- (3) Position the reversing eyelet, near the ribbon end, between the shaft of the empty spool and the ribbon guide lever.

- (4) Attach the ribbon to the empty spool and install the spool on the shaft.
- (5) Turn the ribbon spool on the shaft until the spool shaft pin is engaged. Lower the two spring bails.
- (6) Adjust the ribbon tension by turning the ribbon on the spool until the ribbon is tight and under a spring load.

F. Cover Replacement

4.15 Install the cover by tilting the cover back towards the right of the hinges and perform the following:

- (1) Align the hinge pins on the cover with the hinges on the pan.
- (2) Engage the hinges and slide the cover to the left until the spring clip slides off the retaining plate, locking the cover in place. Connect the cover balancing arm.
- (3) If equipped with copylights, attach the copylight connector to the receptacle mounted on the right rear corner of the cover and attach the ground tab terminal.
- (4) Close the cover; the latches on the left and right side will snap into place.

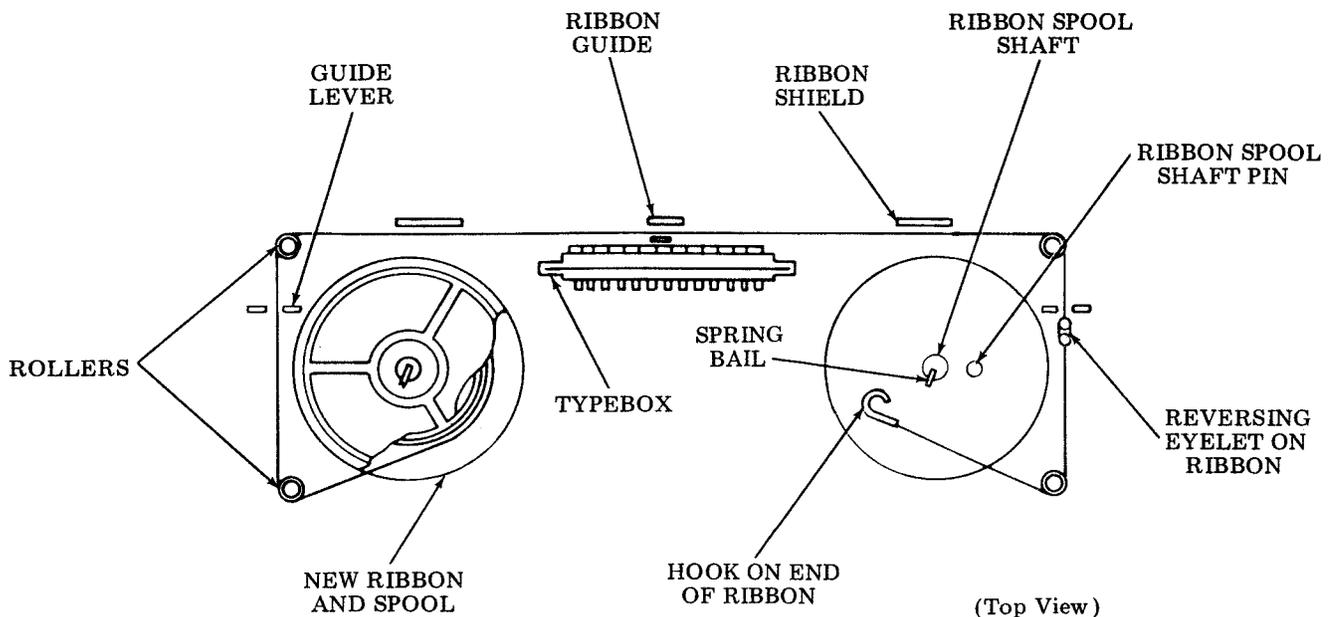


Figure 14 - Ribbon Routing

G. Paper Guide and Wear Strip

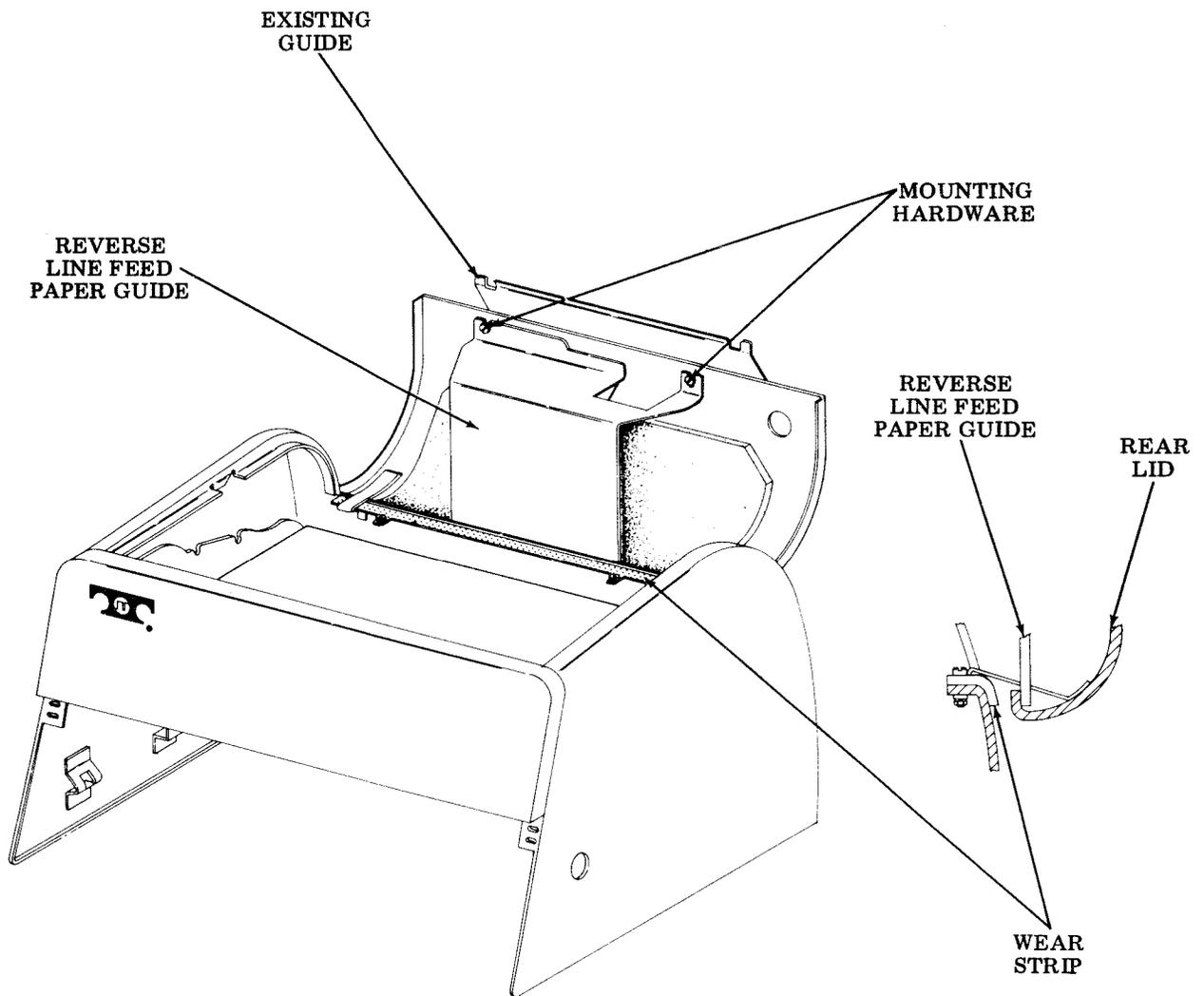
4.16 On sprocket feed typing units, remove the wear strip tied to the print position indicator. Install the wear strip to the rear of the cover assembly using the mounting hardware supplied with the wear strip (Figure 15).

4.17 On typing units equipped with reverse line feed, it is necessary to install a paper guide to the lid assembly. It is to be secured with the same mounting hardware as the existing guide (Figure 15).

4.18 Remove the mounting hardware from the existing guide. Position the bottom surface of the reverse line feed paper guide against the flange of the rear lid. Place the open slots over the weld screws and replace the mounting hardware.

H. Paper Assembly and Routing

4.19 Open the front lid of the cover by depressing the two latch releases located on top of the lid. Pivot the front lid upward and toward the front and pivot the rear lid upward and toward the rear.



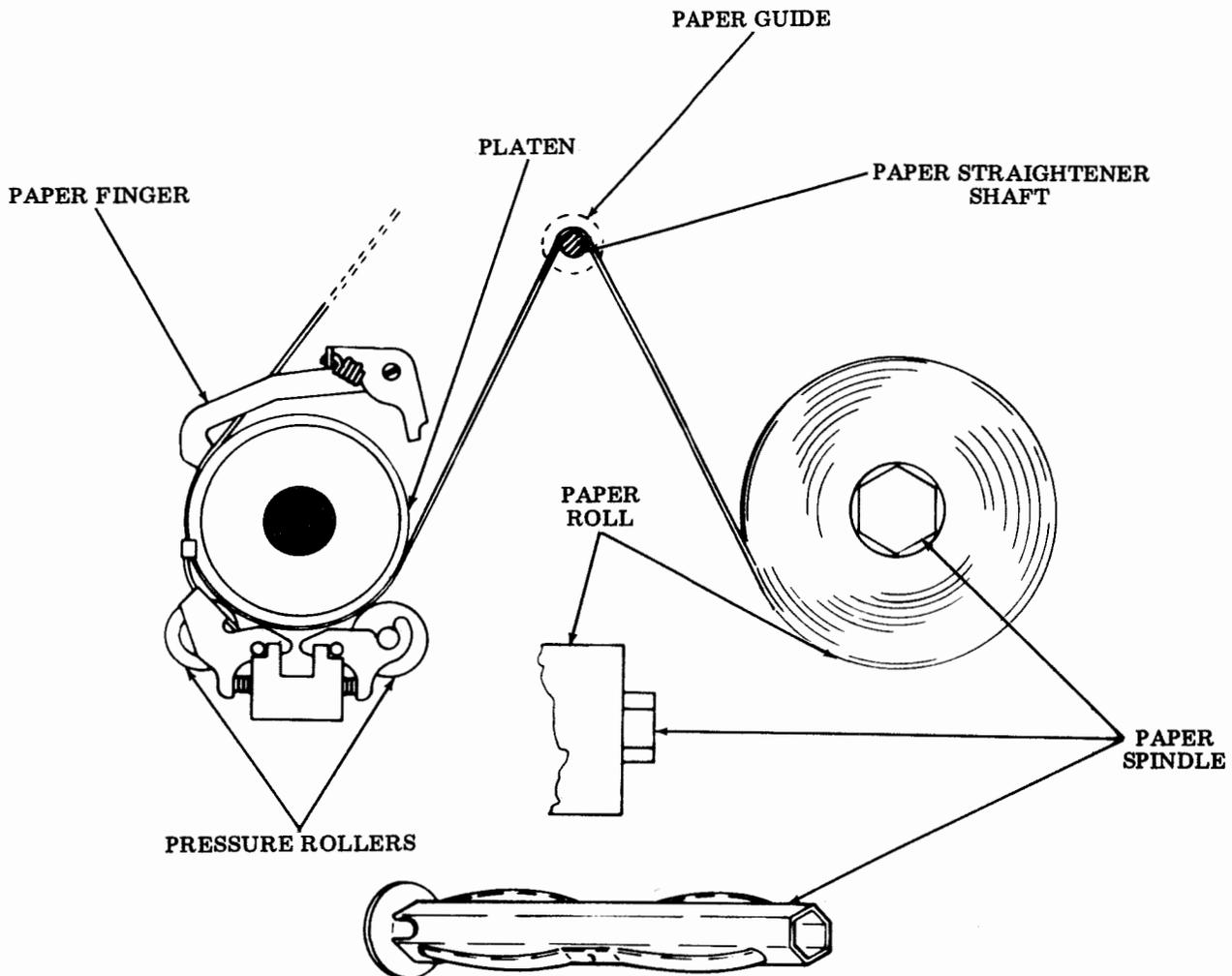
(Right Front View)

Figure 15 - Paper Guide and Wear Strip

4.20 Insert the paper spindle into the paper roll and install the paper roll into the spindle blocks. Flip the paper release lever on the top of the right side plate towards the rear of the typing unit to release the pressure rollers. Route the paper over the paper straightener between the two paper guides (Figure 16). Lift the paper finger on the platen and insert the paper between the platen and the pressure rollers. Flip the paper release lever towards the front of the typing unit to hold the paper between the platen and pressure rollers. Turn the handwheel to move the paper

through the platen assembly, leaving one foot of loose paper. Lower the paper fingers on the platen assembly and hold the paper towards the front of the typing unit. Close the rear lid. Close the front lid, and position the paper between the window and the paper guide. Be sure that the cover and lids are latched.

4.21 When installing paper in sprocket feed typing units, feed the paper through the slot in the cover between the wear strip and the rear lid (Figure 15). Route the paper over the



(Right Side View)

Figure 16 - Paper Routing Assembly — Friction Feed

paper tray under the paper-out lever, and under the platen (Figure 17). Depress the paper finger release lever on the right side plate of the typing unit. Position the print carriage at a point in the middle of the platen to prevent the paper from jamming on the ribbon guide as it is fed under the platen. Turn the handwheel while engaging the holes in the paper with the feed pins at both ends of the platen. Feed several inches of paper out of the typing unit. Depress the paper fingers until they are latched.

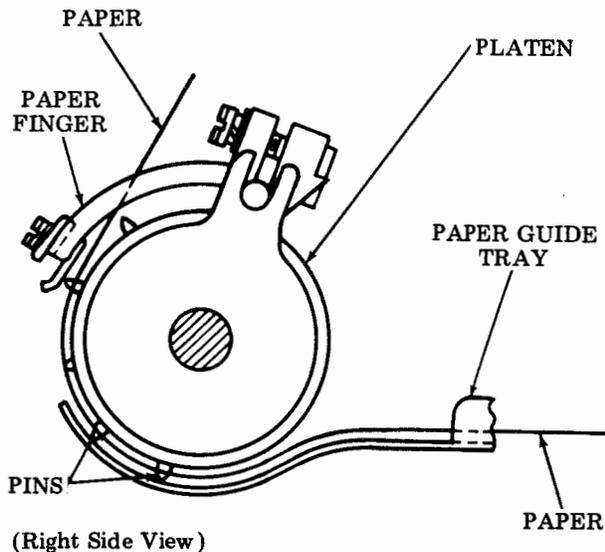


Figure 17 - Paper Routing Assembly — Sprocket Feed

4.22 Turn the typing unit handwheel to advance the paper to the first line of the next form. Set the form-out disc to the stop position. Close the rear lid, then the front lid, positioning the paper between the window and the paper guide.

I. Form-Out Positioning

4.23 Before operating a set equipped with vertical tabulation and/or form-out, check to see if the required stops for the form length have been added. All units are shipped from the factory with only the stop for the longest form length. Extra form-out stops are provided in a bag tied to the typing unit. They are to be installed if a form length shorter than the wheel length was ordered. For example: on an 8-, 4-, 2-inch wheel (Figure 18), if an 8-inch form is used, no action is necessary. If a 4-inch form is used, a form-out stop must be inserted in the slot marked 4. For 2-inch forms, insert form-out stops in slot marked 4 and slot marked 2.

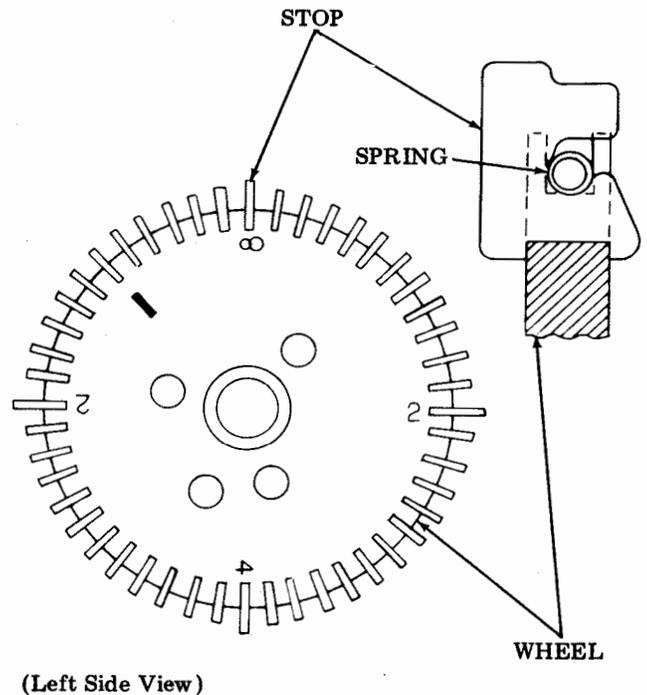


Figure 18 - Form-Out Positioning

4.24 To install form-out stop, remove vertical tab stop from appropriate slot by lifting it up and rotating it out of the slot. Replace the vertical tab stop with the form-out stop by raising the spring slightly and sliding the stop into the slot.

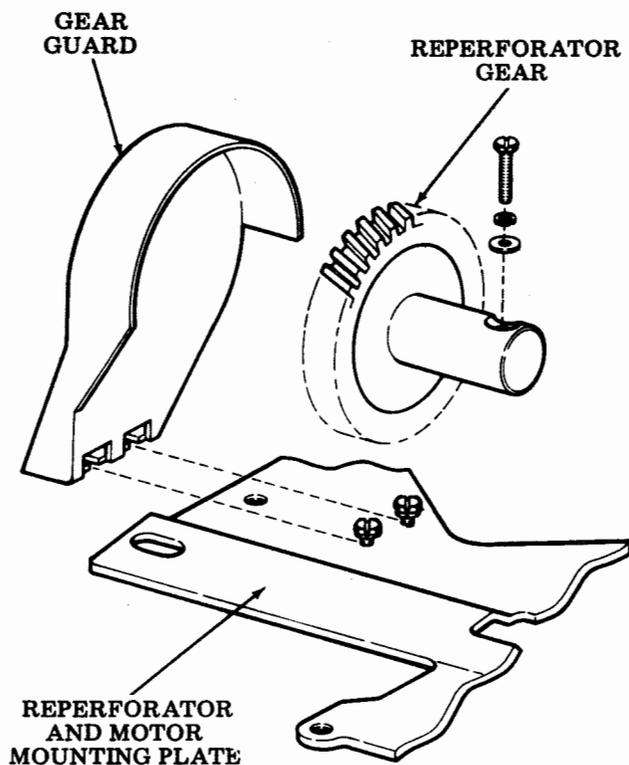
CAUTION: DO NOT OVEREXTEND SPRING; IT MAY SNAP AND DROP STOPS INTO TYPING UNIT. DO NOT DROP STOPS INTO TYPING UNIT WHEN INSERTING THEM INTO SLOT.

RT MODULE

A. Interrelated Adjustments

4.25 If required, install the reperforator gear and gear guard (Figure 19). The reperforator gear and motor pinion gear should rotate freely without apparent friction between the gears.

4.26 Reperforator Gear Mesh: Check for a backlash of 0.004 inch minimum to 0.008 inch maximum between the motor pinion gear and the reperforator gear. If adjustment is necessary, loosen the two bushing locknuts on the motor plate, and turn both threaded bushings up or down. Tighten the locknuts and recheck.



(Right Front View)

Figure 19 - Gear and Gear Guard Installation

4.27 **Isolation Bracket Adjustment:** The four isolation assembly brackets (Figure 20) are slotted to provide the correct tape exit level for either laminated RT cabinet top or the painted cabinet top. With the mounting screws loosened, locate all four brackets as high as they will go for the laminated top and as low as they will go for the painted top. Tighten all eight mounting screws.

B. Cable Connection

4.28 Connect the ac power cord from the RT module to a convenience receptacle on the electrical service unit in the bottom of the teletypewriter table. Also, connect plug P310 to J310 inside the table.

C. Ribbon Routing

4.29 To route the new reperfector ribbon, straighten the spring bail and lift the spool off the shaft. Remove the packaging, and reel out enough ribbon to reach the empty spool, and for three turns on the spool. Refer to Figure 21 and perform the following routing procedure:

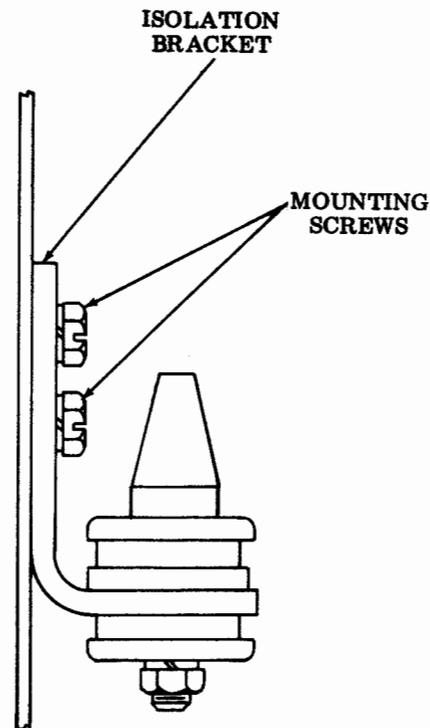


Figure 20 - Isolation Bracket

- (1) Place the spool on the right spool shaft, engaging the shaft by turning the spool.
- (2) Thread the ribbon under the right roller and through the reversing lever guides near the roller. Place the ribbon underneath the type wheel ribbon guide, through the reversing lever guides near the left roller, over the left roller and then on to the left spool.
- (3) Position the reversing eyelet, located near the end of the ribbon end, between the left roller and the reversing lever guide.
- (4) Attach the ribbon to the empty spool, and install the spool on the left spool shaft.
- (5) Adjust the ribbon tension by turning the ribbon on the spool until the ribbon is tight and under a spring load.
- (6) Engage the spool shaft pin and lower the two spring bails.

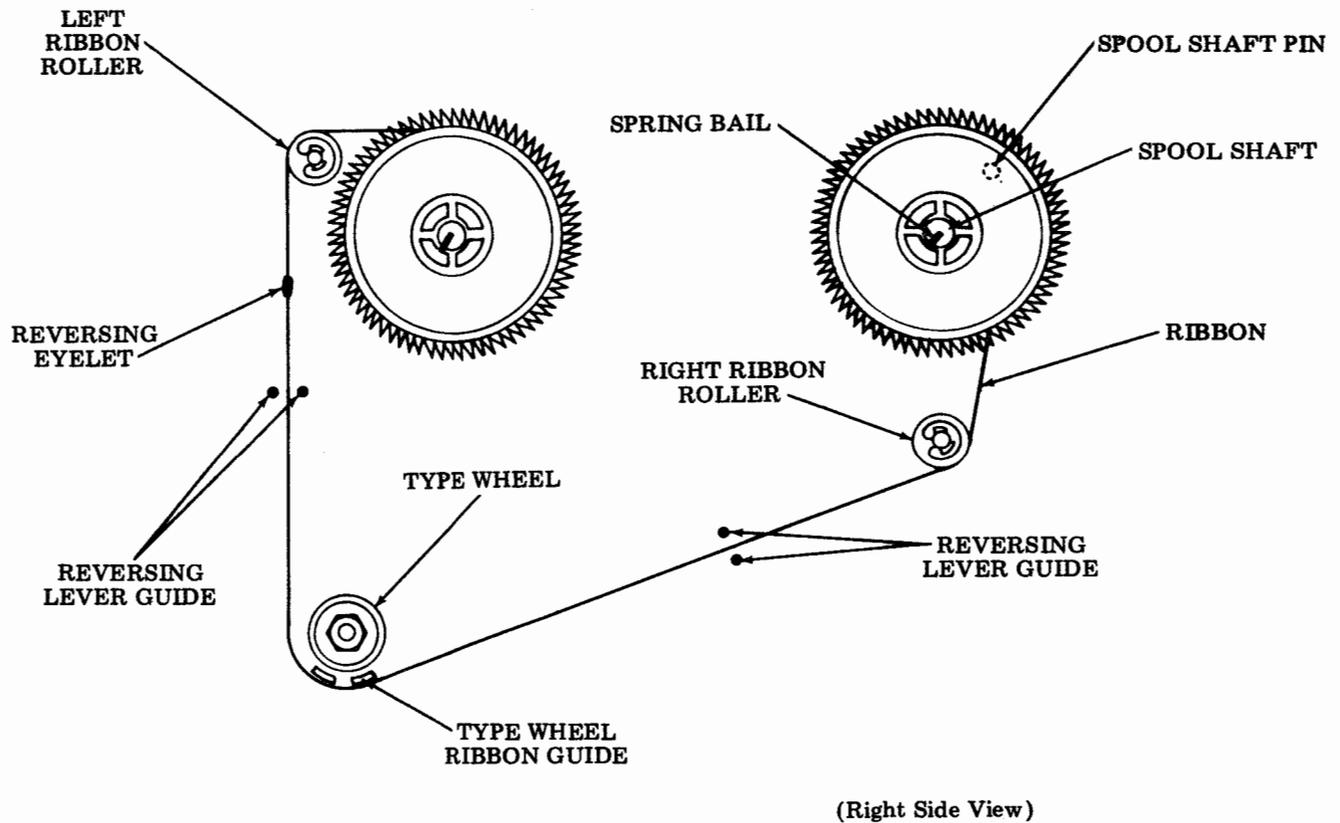


Figure 21 - Reperforator Ribbon Routing

D. Paper Tape Routing

4.30 To route the paper tape refer to Figure 22 and perform the following routing procedure:

- (1) Cut the end of the paper tape so that it has a straight edge and feeds into the perforator properly.
- (2) Place the end of the tape in the tape guide and push it down until it engages the underside of the die wheel.
- (3) Turn the ratchet wheel in a counter-clockwise direction while keeping a downward pressure on the paper tape until the tape begins to move through the mechanism freely.
- (4) Turn the ratchet wheel slowly until the paper tape has completely cleared the mechanism, and moves smoothly through the slot in the punch block.

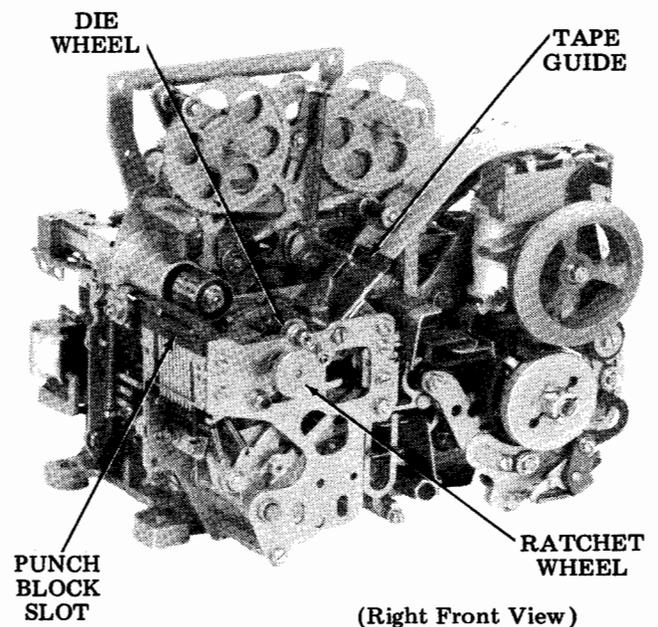


Figure 22 - 37 Typing Reperforator

ELECTRICAL SERVICE UNIT

4.31 The utility strip (Figure 23), if used, and the electrical service unit (ESU) are exposed when the front panel on the table is removed (2.04). To gain easier access to the circuit cards and answer-back unit (optional), the electrical service unit may be removed from the table. To remove the ESU, refer to Figure 24 and proceed as follows:

- (1) Remove the three mounting screws on the front panel, one on the top and two on the bottom.
- (2) Unhook the ESU cables from the cable bracket located on the upper back portion of the table.
- (3) Slide the ESU to the right, clearing the left edge of the table and pull the unit from the table.

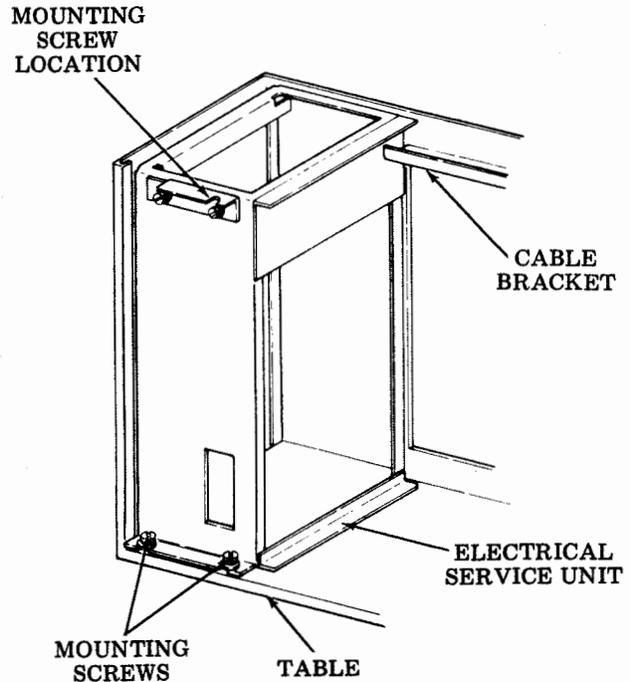


Figure 24 - ESU Mounted in Table

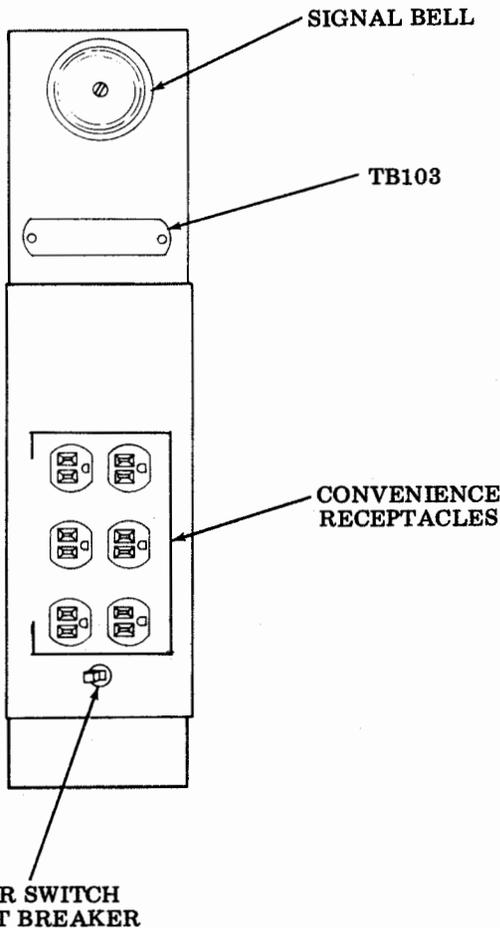


Figure 23 - 37 Utility Strip

4.32 The electrical service unit for the punch and reader is located in the RT cabinet. If it is necessary to remove the RT electrical service unit for access to the circuit cards, open the cabinet door and remove the three mounting screws on the front panel and pull the unit out.

4.33 Refer to the ordering information to check for the desired circuit cards (options and variable features) that are installed in the electrical service units.

A. Answer-Back Unit (Option)

4.34 Remove the packing material from the answer-back unit (Figure 25) by performing the following procedures:

- (1) Cut the plastic strapping with a pair of side cutters.
- (2) Pull out the strapping, being careful not to jar the unit.
- (3) Remove the packing material.

4.35 Code the answer-back drum as outlined in the following paragraphs. Use the ASCII (American National Standard Code for Information Interchange) code shown in Figure

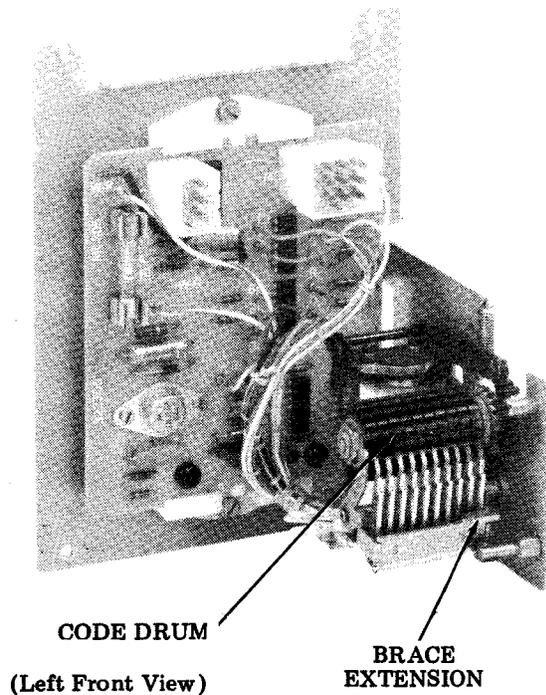


Figure 25 - Answer-Back Unit

26. Replace the electrical service unit, install the three mounting screws on the front plate, and route the cables over the bracket on the back panel (Figure 24). Route the power supply cable from the utility strip (Figure 23) through the oblong opening in the base of the table. **DO NOT CONNECT THE POWER CABLE AT THIS TIME.** If equipped with a utility strip, check to insure that the power cable from the electrical service unit is connected to an outlet on the utility strip.

B. Encoding Answer-Back Drum

4.36 The answer-back drum is contained within the answer-back unit (Figure 25). If detailed coding instructions are unavailable, the instructions outlined here describe the method used to encode the drum.

4.37 Remove the code drum by deflecting the brace extension downward and withdrawing the code drum.

4.38 Encoding the answer-back drum is performed by removing tines on the drum. The rows of tines are numbered and embossed on the right end of the code drum. The elements in each row are shown in Figure 26, which is the

answer-back code drum chart used for encoding the drum.

4.39 Any message may be selected that does not contain more than 20 characters including spaces. The coding of the drum normally begins with carriage return, new line, and delete. This arrangement insures that the message will appear at the beginning of a line on the distant printer, and that overprinting of the message will not occur on carriage return.

4.40 Two methods are provided for coding character sequences shorter than 20 characters. One row of tines on the code drum controls a character suppression contact, which may be programmed to blind the answer-back transmission at the end of a predetermined number of characters. In this mode of operation, the unit must continue to operate through its full cycle of 21 steps (although blinded after the predetermined number of characters). Another row of tines on the code drum assembly controls the off-normal cycle contact, and may be programmed for partial cycle. The length of the cycle is determined by the number of off-normal tines broken out. The code drum will stop in the row that has the off-normal tine remaining on the drum. It will continue stepping through any row that has the off-normal tine broken out. The row in which the code drum stops will not be read, and consequently should not be coded. For example, the coded message may contain the following numbers of characters:

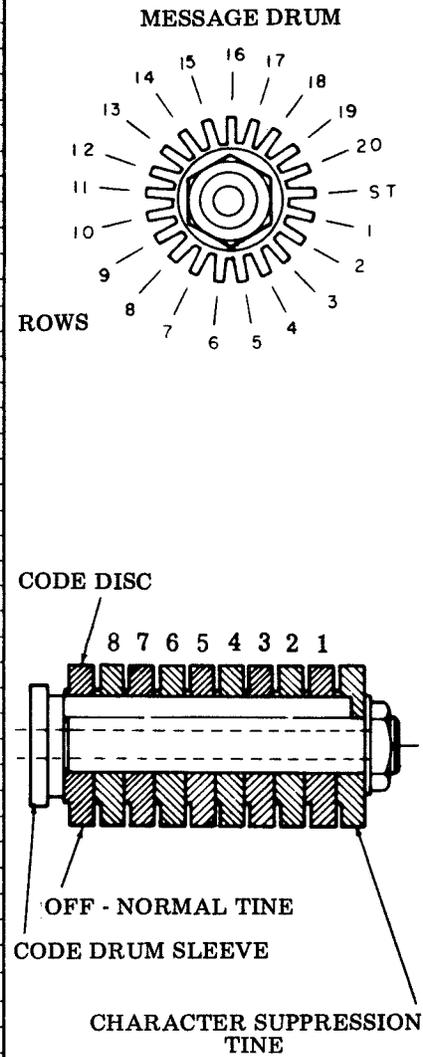
1-Cycle Operation — 20 Characters

3-Cycle Operation — 6 Characters

4.41 Code the drum in a clockwise direction (viewing from the numbered end) beginning with the row numbered 1. Each row is provided with an off-normal tine, a character suppression tine, and 8 tines for 8-level operation. A row is coded by breaking off the designated tines. The chart in Figure 26 indicates which tines are to be removed for a particular character or cycle. Leave tine for a MARK element and remove tine for a SPACE element. To remove a tine, grasp it firmly and twist it until it breaks off. Tine tool TP161868 may also be used in a similar manner.

4.42 Unused character rows may be coded either for delete, null, or some other character, or the character suppression tine may

	CODE LEVELS REMOVE TINES		CODE LEVELS REMOVE TINES
NUL	1-2-3-4-5-6-7-8	@	1-2-3-4-5-6
SOH	2-3-4-5-6-7	A	2-3-4-5-6-8
STX	1-3-4-5-6-7	B	1-3-4-5-6-8
ETX	3-4-5-6-7-8	C	3-4-5-6
EOT	1-2-4-5-6-7	D	1-2-4-5-6-8
ENQ	2-4-5-6-7-8	E	2-4-5-6
ACK	1-4-5-6-7-8	F	1-4-5-6
BEL	4-5-6-7	G	4-5-6-8
BS	1-2-3-5-6-7	H	1-2-3-5-6-8
HT	2-3-5-6-7-8	I	2-3-5-6
LF	1-3-5-6-7-8	J	1-3-5-6
VT	3-5-6-7	K	3-5-6-8
FF	1-2-5-6-7-8	L	1-2-5-6
CR	2-5-6-7	M	2-5-6-8
SO	1-5-6-7	N	1-5-6-8
SI	5-6-7-8	O	5-6
DLE	1-2-3-4-6-7	P	1-2-3-4-6-8
DC1	2-3-4-6-7-8	Q	2-3-4-6
DC2	1-3-4-6-7-8	R	1-3-4-6
DC3	3-4-6-7	S	3-4-6-8
DC4	1-2-4-6-7-8	T	1-2-4-6
NAK	2-4-6-7	U	2-4-6-8
SYN	1-4-6-7	V	1-4-6-8
ETB	4-6-7-8	W	4-6
CAN	1-2-3-6-7-8	X	1-2-3-6
EM	2-3-6-7	Y	2-3-6-8
SUB	1-3-6-7	Z	1-3-6-8
ESC	3-6-7-8	[3-6
FS	1-2-6-7	\	1-2-6-8
GS	2-6-7-8]	2-6
RS	1-6-7-8	^	1-6
US	6-7	_	6-8
SPACE	1-2-3-4-5-7	`	1-2-3-4-5-8
!	2-3-4-5-7-8	a	2-3-4-5
"	1-3-4-5-7-8	b	1-3-4-5
#	3-4-5-7	c	3-4-5-8
\$	1-2-4-5-7-8	d	1-2-4-5
%	2-4-5-7	e	2-4-5-8
&	1-4-5-7	f	1-4-5-8
(APOS)	4-5-7-8	g	4-5
(1-2-3-5-7-8	h	1-2-3-5
)	2-3-5-7	i	2-3-5-8
*	1-3-5-7	j	1-3-5-8
+	3-5-7-8	k	3-5
,	1-2-5-7	l	1-2-5-8
-	2-5-7-8	m	2-5
.	1-5-7-8	n	1-5
/	5-7	o	5-8
0	1-2-3-4-7-8	p	1-2-3-4
1	2-3-4-7	q	2-3-4-8
2	1-3-4-7	r	1-3-4-8
3	3-4-7-8	s	3-4
4	1-2-4-7	t	1-2-4-8
5	2-4-7-8	u	2-4
6	1-4-7-8	v	1-4
7	4-7	w	4-8
8	1-2-3-7	x	1-2-3-8
9	2-3-7-8	y	2-3
:	1-3-7-8	z	1-3
;	3-7	{	3-8
<	1-2-7-8	:	1-2
=	2-7	}	2-8
>	1-7	~	1-8
?	7-8	DEL	NONE



Note 1: Remove tine — spacing. Leave tine — marking.

Note 2: The eighth code level must be coded as shown for even parity operation.

Figure 26 - Answer-Back Code Drum Chart

be left in these rows. This prevents any character from being transmitted as the drum steps through these rows to the stop position. Should an encoding error be made, the character suppression line must be left in the row with the erroneous characters. The next row shall be encoded with the correct character. Nothing will be transmitted from the "erased" row. With the individual code discs used on this drum assembly, an encoding error can also be corrected by replacing a code disc or discs.

5. CHECKOUT

5.01 Connect the power cable to an ac receptacle. Using the appropriate ASR station installation section as a guide, connect the P303 connector to the appropriate controlling device and check the set for proper local operation.

5.02 Check that the set is level and rests squarely on its feet.

