

UNIVERSAL STATION CONVERTER SETS  
GENERAL DESCRIPTION AND OPERATION

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1. INTRODUCTION

1.01 This section contains a general description of Universal Signal-to-Tape and Tape-to-Tape Station Converter Sets used to translate 8-level Data Interchange Code into 5-level Baudot Code, and visa-versa. Illustrations used are of pre-production models, and may differ in design from production models. These differences will be corrected in later issues of this section.

2. GENERAL

2.01 The function of the Universal Station Converter Sets is to serve as a communications link between 5-level and 8-level code teletypewriter equipment. The station converters are designed to operate on-line (signal-to-tape) or off-line (tape-to-tape), translating 5-level Baudot Code into 8-level Data Interchange Code or 8-level Data Interchange Code into 5-level Baudot Code, depending on the Set used. A translation applique, in the form of a plug-in cable, permits the conversion of 5-level Baudot Bell System code arrangements "A" or "C" into their 8-level Data Interchange code equivalents. Refer to the appropriate sections for a detailed explanation of the code translation capabilities of these sets.

2.02 Universal Station Converters are available in a variety of set arrangements. For example, the following variations are possible:

(a) Tape-to-Tape Universal Station Converter sets.

- (1) Code arrangement "A", 5 to 8-level.
- (2) Code arrangement "C", 5 to 8-level.
- (3) Code arrangement "A", 8 to 5-level.
- (4) Code arrangement "C", 8 to 5-level.

(b) Signal-to-Tape Universal Station Converter sets.

- (1) Code arrangement "A", 5 to 8-level.
- (2) Code arrangement "C", 5 to 8-level.
- (3) Code arrangement "A", 8 to 5-level.
- (4) Code arrangement "C", 8 to 5-level.

2.03 Station converters are intended for use either at locations connected to external teletypewriter network circuits, or they may be incorporated into private closed circuit systems. The specific converter set used at any given

location will depend, among other factors, upon the type of teletypewriter equipment present at the location, the kind and amount of traffic being handled, and the urgency with which the messages must be handled. It would, therefore, be possible to find at a location one converter set, or a number of converters in almost any combination of the available sets.

### 3. DESCRIPTION

#### GENERAL

3.01 Each of the Universal Station Converter Sets is housed in a sheet metal, floor standing cabinet. The cabinet shell is 16 inches wide, 54-1/4 inches high, and 24-3/8 inches deep. Operating controls are located on a hori-

zontal shelf about 30 inches above the floor level. The enclosure below the horizontal cabinet shelf houses the necessary electronic module assemblies for translation of the coded message. The modules are contained in 5-1/2 by 7 inch steel frames which slide out for easy access to components. The door to the enclosure is opened by pushing in at the upper left hand corner of the door and releasing it. Each of the electronic modules locks in place by means of the knurled knob located at the top center of each module. To release the module, turn the knurled knob counterclockwise. In order to remove a module entirely, the safety latch located at the lower right rear corner of the module must be lifted up in order to clear the stop on the cabinet shelf (see Figure 1).

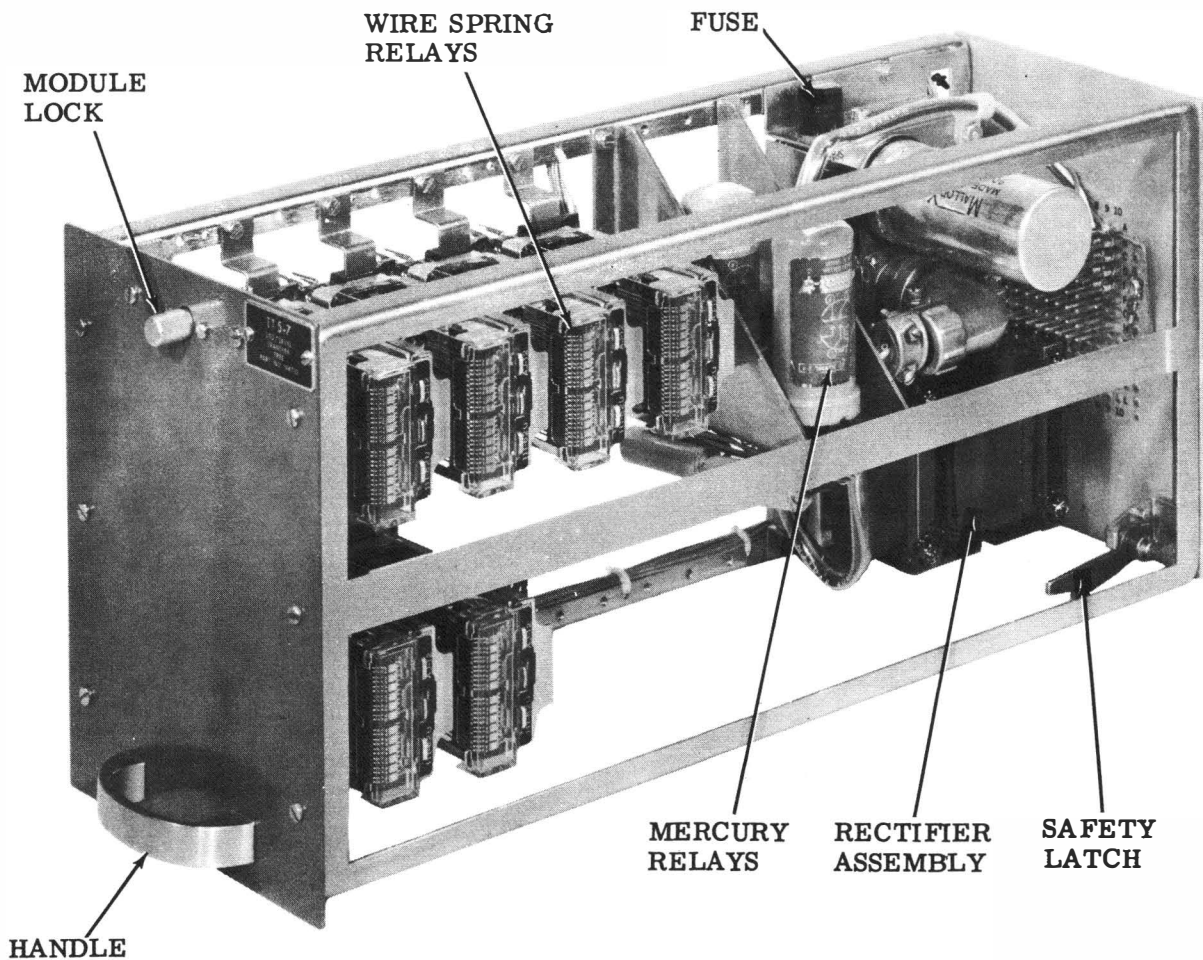
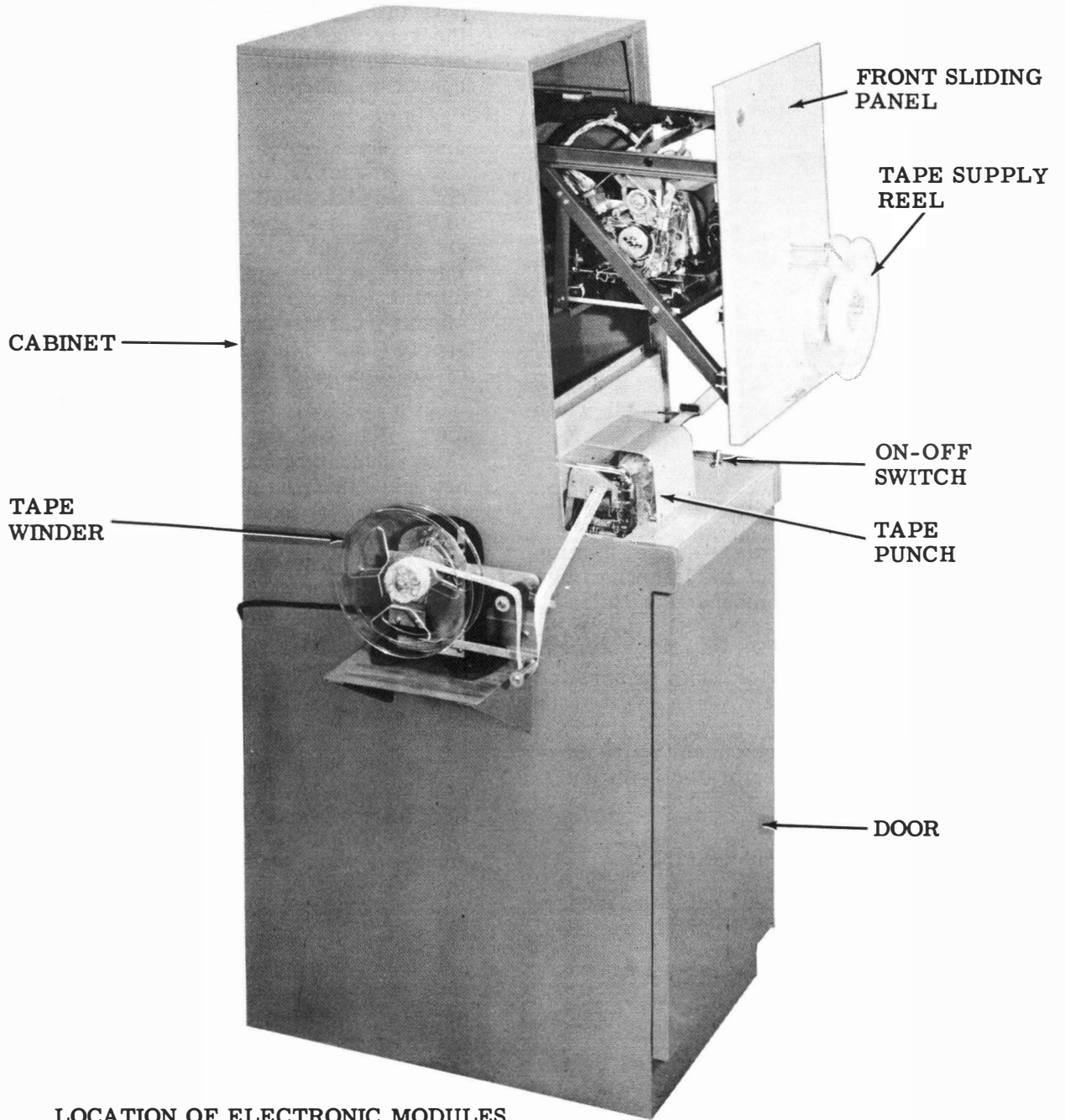


Figure 1 - Typical Electrical Module Assembly



LOCATION OF ELECTRONIC MODULES

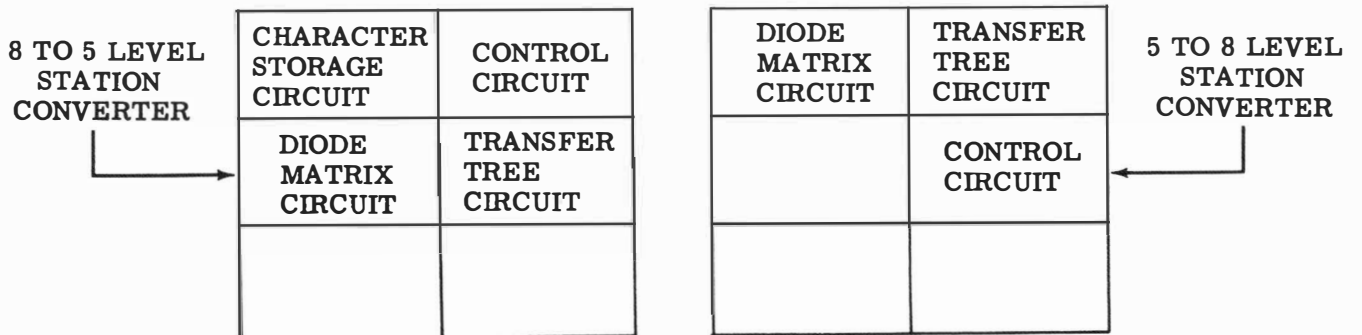


Figure 2 - Signal-to-Tape Station Converter

## SECTION 570-100-101

3.02 Available as optional equipment is a tape winder mechanism which provides winding and storage facilities for the parallel input tape punch. The tape winder mounts on a shelf at the left side of the cabinet, and adds 8 inches to the cabinet width. This feature is available for both Tape-to-Tape and Signal-to-Tape Station Converter Sets.

3.03 Another available optional feature - for Tape-to-Tape Station Converter Sets only - is a center unwind reel. This reel is used to hold the tape reader message tape supply, and is mounted on a bracket attached to the sliding front panel of the cabinet. The reel extends past the right side of the cabinet, adding 6-1/2 inches to the cabinet width, increasing the total width to 30-1/2 inches.

### SIGNAL - TO - TAPE STATION CONVERTERS

3.04 A Universal Signal-to-Tape Station Converter consists of the following mechanical and electronic components: (Refer to Figure 2).

- (a) A receiving selector with associated base and motor unit.
- (b) A parallel input tape punch (multi-magnet non-typing reperforator) with associated base and motor unit.
- (c) A tape winder mechanism.
- (d) A character storage circuit module (present on 8 to 5-level converters only).
- (e) A diode matrix circuit module.
- (f) A control circuit module.
- (g) A transfer tree circuit module.
- (h) A cabinet with necessary tape handling and electrical interconnection facilities.
- (i) An electrical service unit.

3.05 Receiving Selector: The receiving selector is mounted behind the front sliding panel in the upper half of the cabinet. It receives its motive power from an associated motor unit, and its control connections from associated apparatus. The receiving selector is an electro-mechanical device designed to accept a sequentially coded telegraphic signal input, and convert it into an equivalent parallel wire out-

put. In Signal-to-Tape Station Converter Sets, the receiving selector passes the parallel wire signal to the translator portion of the set for conversion purposes.

3.06 Translator: The translator portion of the Signal-to-Tape Station Converter Set consists of three (5 to 8-level sets) or four (8 to 5-level sets) electronic modules mounted on shelves in the lower half of the cabinet (see Paragraph 3.04, and Figure 2). The translator functions to convert the 5 or 8-level parallel signal from the receiving selector to its respective 8 or 5-level counterpart, for reception by the tape punch.

3.07 Parallel Input Tape Punch: The tape punch is located at the front of the cabinet below the front sliding panel. It receives its motive power from an associated motor unit, and its control connections from associated apparatus. The tape punch is an electro-mechanical device which accepts a parallel wire telegraphic coded input signal, and records the signal on paper tape in the form of coded perforations.

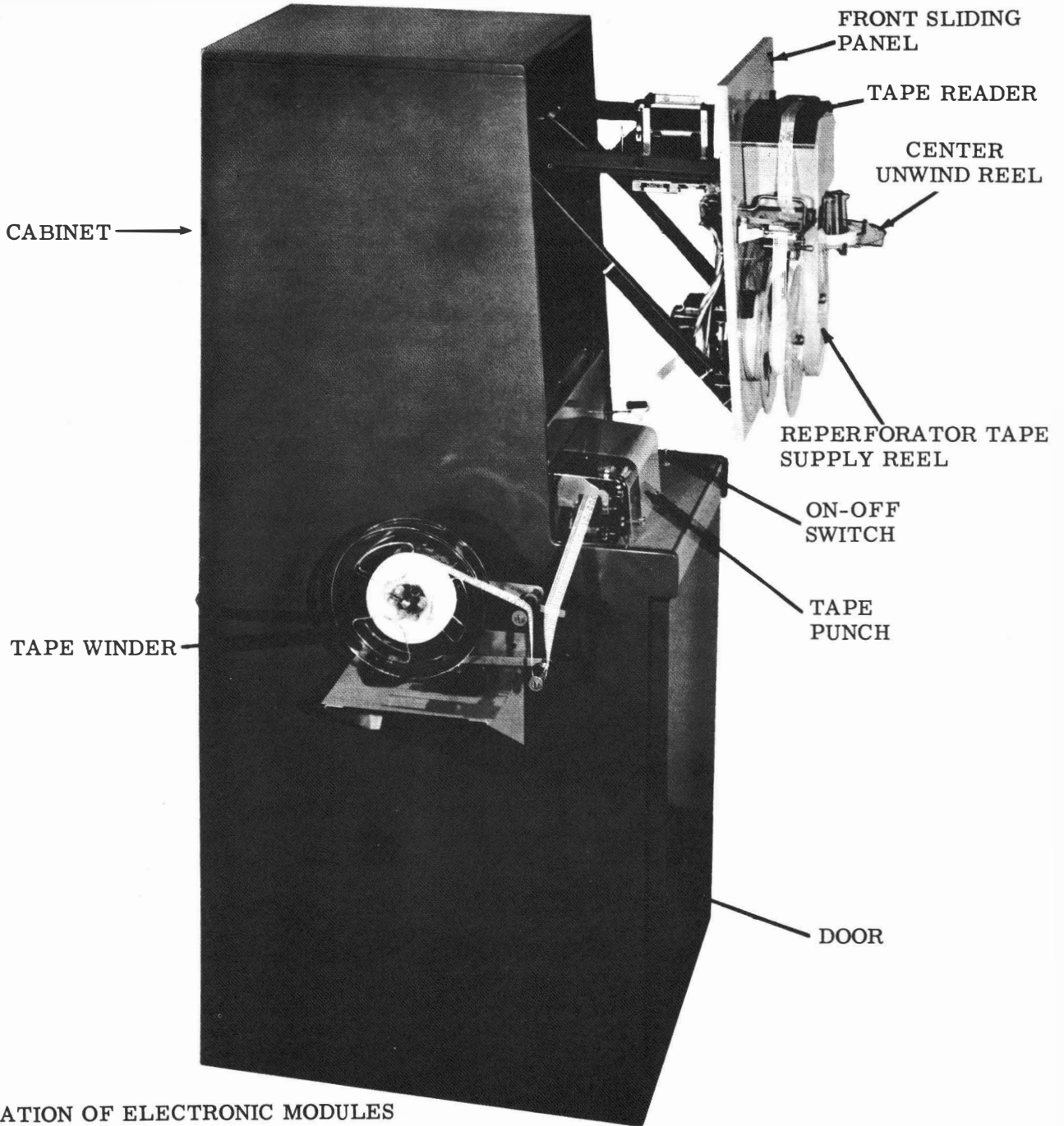
3.08 Tape Winder Mechanism (Optional): The tape winder, located on the left side of the cabinet mounted on a shelf, is a completely self-contained unit, and operates automatically to wind the tape perforated by the tape punch. Up to 650 feet of fully perforated tape may be accumulated on the tape winder reel.

3.09 Electrical Service Unit: Located at the center rear of the cabinet, the electrical service unit provides electrical terminal facilities for signal line, remote control, and certain local connections. It also provides mounting facilities for the automatic LTRS tape non-interfering feed-out assembly and the selector magnet driver assembly.

### TAPE - TO - TAPE STATION CONVERTERS

3.10 A Tape-to-Tape Station Converter consists of the following mechanical and electronic components (refer to Figure 3):

- (a) A tape reader (tape transmitter) with associated motor unit.
- (b) A parallel input tape punch (multi-magnet non-typing reperforator) with associated base and motor unit.
- (c) A tape winder mechanism.



LOCATION OF ELECTRONIC MODULES

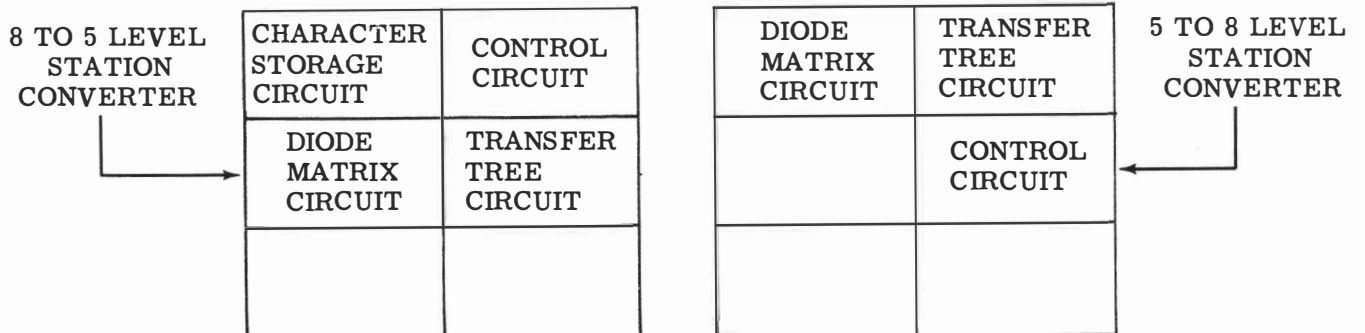


Figure 3 - Tape-to-Tape Station Converter

- (d) A character storage circuit module (present on 8 to 5-level code converters only).
- (e) A diode matrix circuit module.
- (f) A control circuit module.
- (g) A transfer tree circuit module.
- (h) A cabinet with necessary tape handling and electrical interconnection facilities.
- (i) An electrical service unit.

3.11 **Tape Reader:** The tape reader is mounted on the front sliding panel immediately above the two plastic tape reels. It receives its motive power from an associated motor unit, and its control connections from associated apparatus. The tape reader is designed to mechanically sense coded character perforations in a message tape. The sensed character is temporarily stored in a code reading contact assembly, the contacts of which are wired to an external circuit. In the Tape-to-Tape Station Converter Sets, the code reading contacts are wired to condition the translator portion of the converter.

3.12 **Translator:** The translator portion of the Tape-to-Tape Station Converter Set consists of three (5 to 8-level Sets) or four (8 to 5-level Sets) electronic modules mounted on shelves in the lower half of the cabinet (see Paragraph 3.10 and Figure 3). The translator functions to convert the 5 or 8-level parallel signal from the tape reader to its respective 8 or 5-level counterpart, for reception by the tape punch.

3.13 **Parallel Input Tape Punch:** Refer to Paragraph 3.07.

3.14 **Tape Winder Mechanism:** Refer to Paragraph 3.08.

3.15 **Electrical Service Unit:** Located at the center rear of the cabinet, the electrical service unit provides terminal facilities for remote control and certain local connections, and mounting facilities for the manual interfering LTRS tape feed-out assembly.

#### 4. PRINCIPLE OF OPERATION

##### GENERAL

4.01 **Operation of the Signal-to-Tape and Tape-to-Tape Station Converters is**

similar. The major differences between the Converters exists in the source of the input signal, and the initial electro-mechanical apparatus which accepts this input and passes it on to the translator portion of the station converter.

##### SIGNAL-TO-TAPE STATION CONVERTERS (See Figure 4)

4.02 The input information, or message, is received in sequential form from the signal line by the receiving selector. The receiving selector changes the signal from sequential to parallel form, and passes the information to the translator portion of the Converter where the actual code conversion takes place. From the translator, the signal - still in parallel form - activates the tape punch mechanism which perforates the signal into paper tape.

##### TAPE-TO-TAPE STATION CONVERTERS (See Figure 5)

4.03 The input information, or message, already in punched tape form, is inserted into the tape reader. The tape reader interprets the coded tape input, and passes the coded information to the translator portion of the Converter where the actual code conversion takes place. From the translator, the signal - still in parallel form - activates the tape punch mechanism which perforates the signal into another paper tape.

#### 5. OPERATING PROCEDURES - MANUAL

##### CONTROLS

5.01 Manual operating controls and alarms are located to the right of the tape punch on the control panel. The location of these controls, and a description of their function, may be found in Figures 6 and 7.

##### SIGNAL-TO-TAPE STATION CONVERTERS

5.02 The following operating procedures are applicable to both 5 to 8-level and 8 to 5-level Universal Signal-to-Tape Station Converters.

- (a) Thread tape into the tape punch (see Figure 8):

- (1) Place a 1,000 foot roll of blank tape on the tape punch supply reel, and place the supply reel on its hub while holding the tape tension arm out of the way.

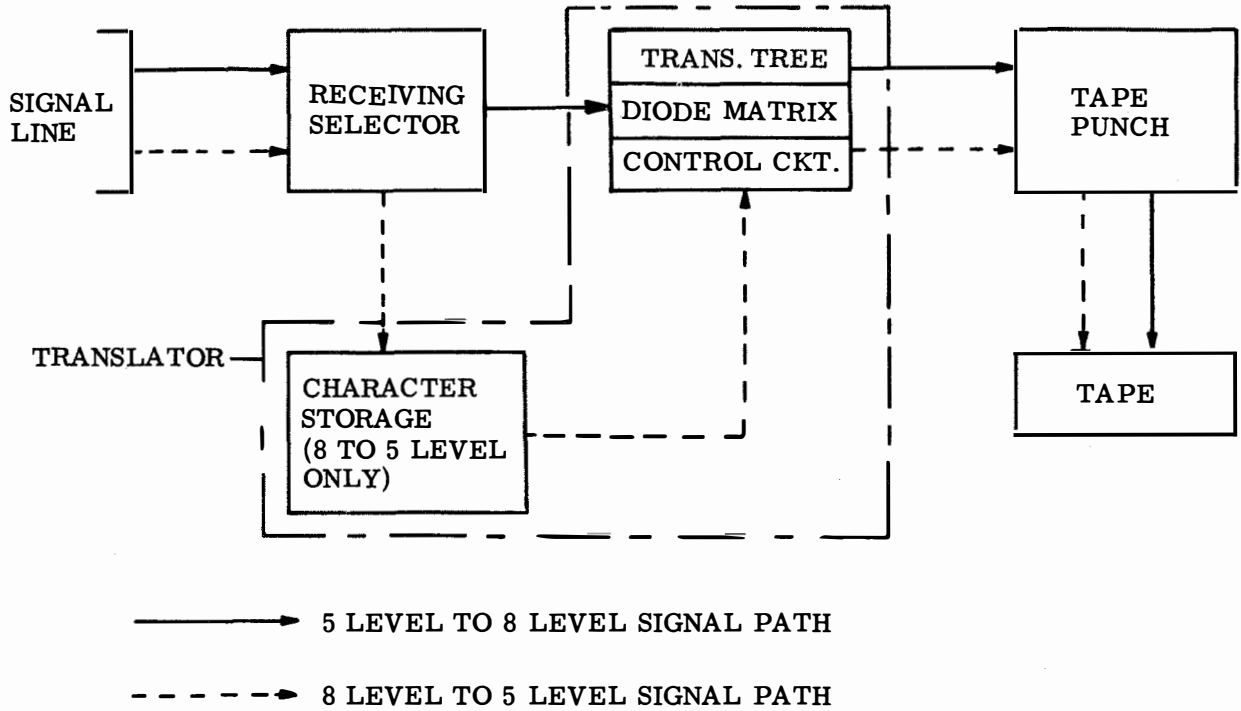


Figure 4 - Signal-to-Tape Signal Converter - Typical Block Diagram

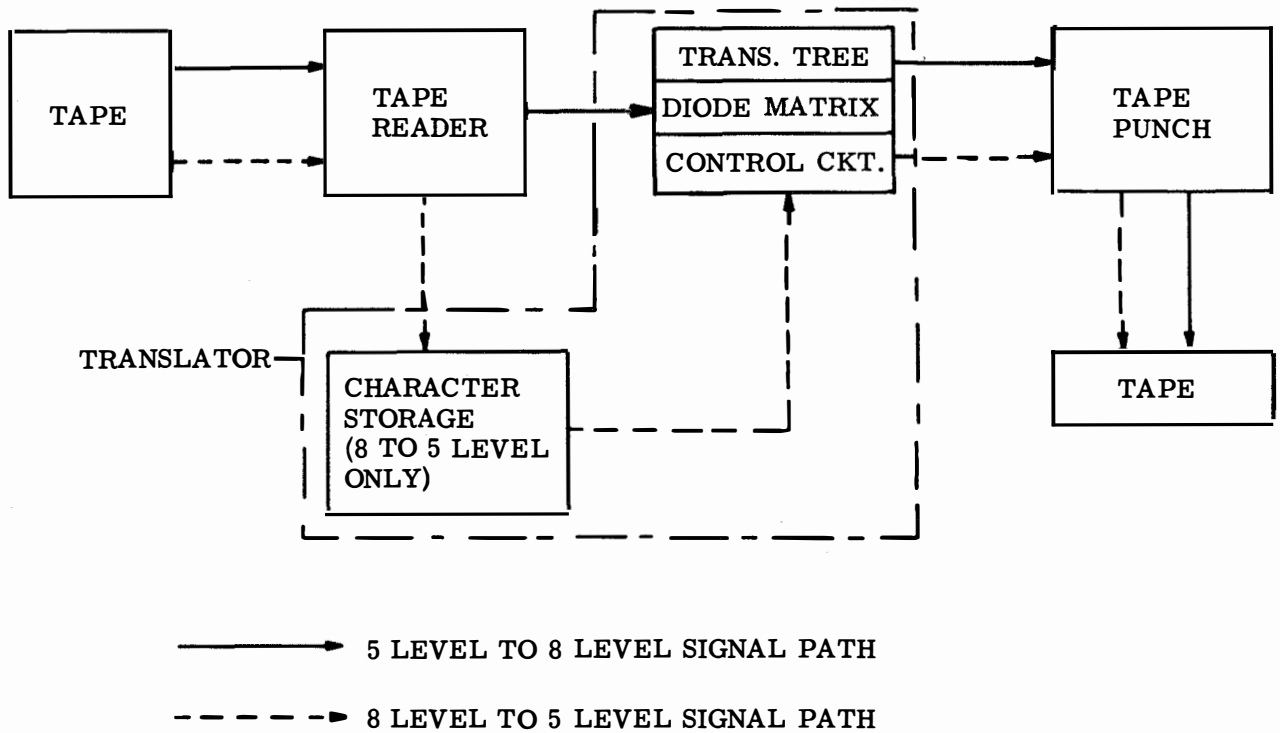
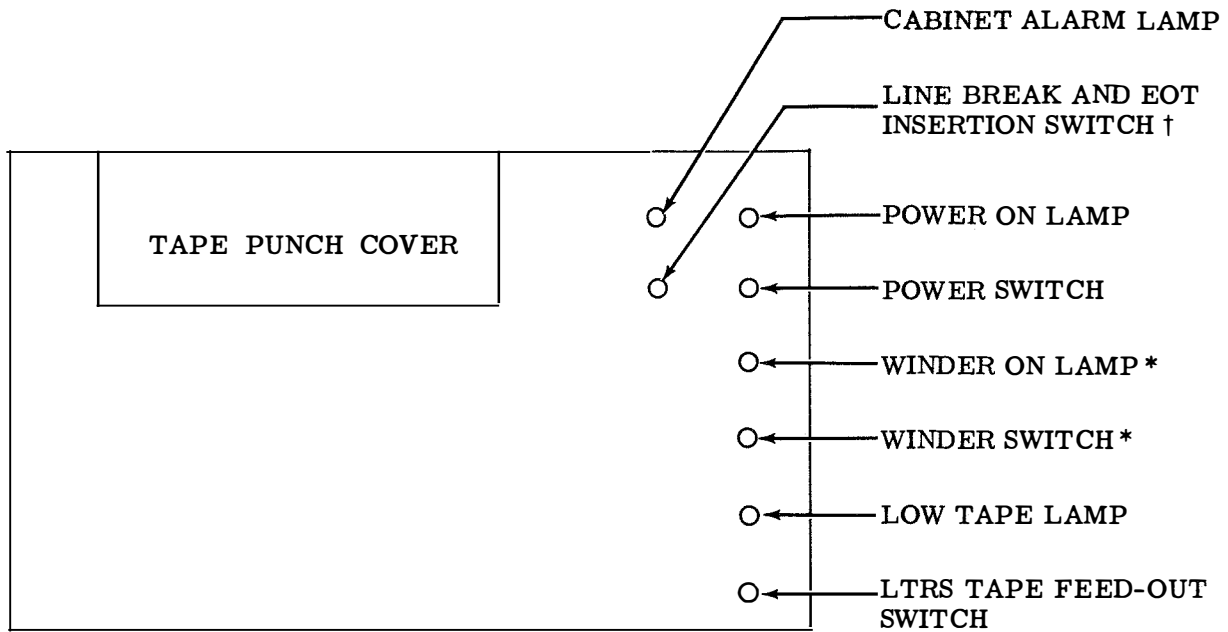


Figure 5 - Tape-to-Tape Signal Converter - Typical Block Diagram



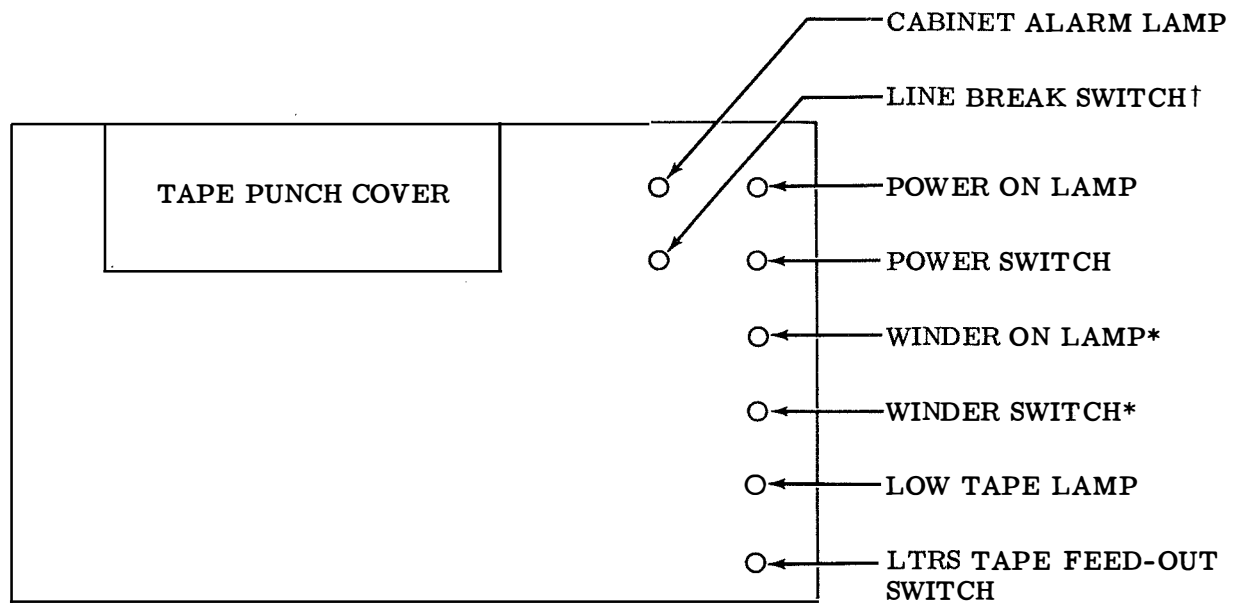
\* TAPE-TO-TAPE SETS ONLY

† SIGNAL-TO-TAPE SETS ONLY

CONTROL	TYPE	FUNCTION
Cabinet Alarm Lamp	RED neon lamp	General alarm. Indicates trouble in electrical modules.
Line Break and EOT Insertion Switch †	Momentary push button switch	Initiates line break, and causes insertion of EOT code into tape.
Power Lamp	RED neon lamp	Indicates power ON condition.
Power Switch	Toggle switch	To energize or de-energize the converter.
Winder On Lamp *	AMBER neon lamp	Indicates take-up reel motor ON condition.
Winder Switch *	Locking push button switch	To energize or de-energize the take-up reel motor.
Low Tape Lamp	YELLOW neon lamp	Indicates low-tape condition on tape punch supply reel.
Manual LTRS Tape Feed-Out Switch	Momentary push button switch	Initiates punching and feed-out of LTRS coded tape.
Mode Switch	Toggle switch	Located at rear of cabinet. Selects feed-out mode depending upon type of converter input (i.e., tape input or signal input).

Figure 6 - Manual Controls, 5 to 8-Level Universal Station Converters





\* TAPE-TO-TAPE SETS ONLY

† SIGNAL-TO-TAPE SETS ONLY

CONTROL	TYPE	FUNCTION
Cabinet Alarm Lamp	RED neon lamp	General alarm. Indicates trouble in electrical modules.
Line Break Switch †	Momentary push button switch	Initiates line break condition.
Power Lamp	RED neon lamp	Indicates power ON condition.
Power Switch	Toggle switch.	To energize or de-energize the converter.
Winder On Lamp *	AMBER neon lamp	Indicates take-up reel motor ON condition.
Winder Switch *	Locking push button switch	To energize or de-energize the take-up reel motor.
Low Tape Lamp	YELLOW neon lamp	Indicates low-tape condition on tape punch supply reel.
Manual LTRS Tape Feed-Out Switch	Momentary push button switch	Initiates punching and feed-out of LTRS coded tape.
Mode Switch	Toggle switch	Located at rear of cabinet. Selects feed-out mode depending upon type of converter input (i.e., tape input or signal input).

Figure 7 - Manual Controls, 8 to 5-Level Universal Station Converters

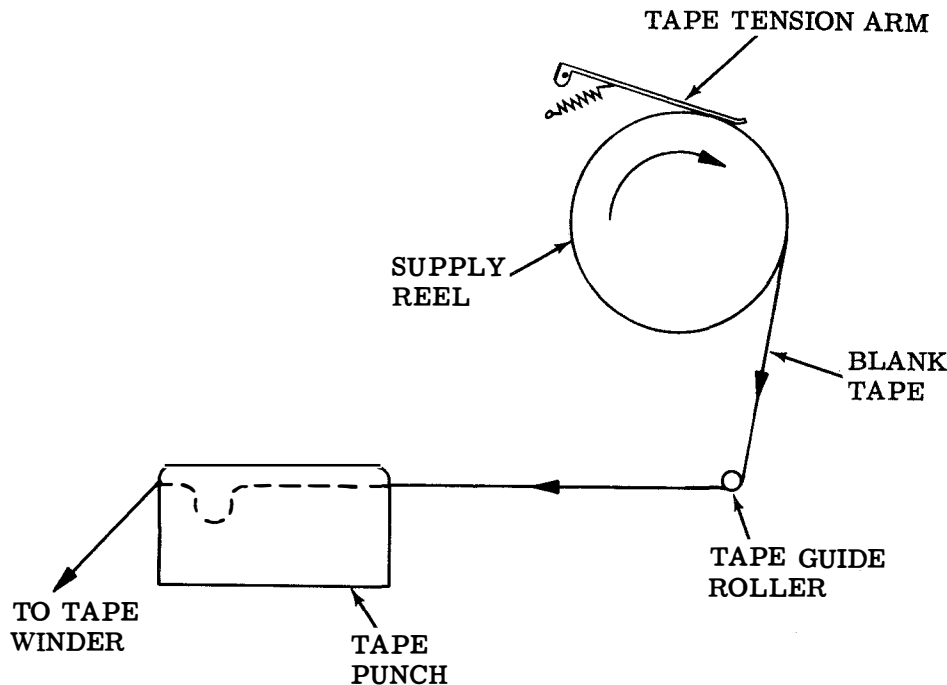


Figure 8 - Tape Routing, Signal-to-Tape Station Converters

- (2) Open the bubble covering the tape punch.
  - (3) Thread the tape down from the supply reel, under the tape guide roller, and then left to the tape punch. Insert the tape into the tape guide on the punch and turn the knurled feed knob counterclockwise until tape emerges from the punch.
- (b) Thread tape onto the tape winder (see Figure 9):
- Optional equipment, refer to Paragraph 3.02.
- (1) Feed about 3 feet of tape out of the tape punch.
  - (2) Thread the tape over the tape guide and rollers of the tape winder, and wind the excess onto the plastic storage reel.
  - (3) Operate the tape winder ON-OFF lever to its ON position.
- (c) Operate the main power ON-OFF switch, located to the right of the tape punch, to the ON position. The RED power lamp will light to indicate the ON condition.

- (d) Keep the equipment free of chad.

**CAUTION: EMPTY THE CHAD CONTAINER AFTER TWO 1,000 FOOT ROLLS OF TAPE HAVE RUN THROUGH THE PUNCH. DO NOT ALLOW MORE THAN THIS AMOUNT OF CHAD TO ACCUMULATE IN THE CONTAINER. ANY STRAY CHAD IN THE TAPE PUNCH MOUNTING AREA OR IN ANY RELAY MODULE MUST BE CLEARED.**

5.03 After reception of a message (whenever the signal line becomes idle) up to 30 inches of LTRS perforated tape will be automatically punched and fed from the tape punch. The length of the LTRS tape can be adjusted by means of the control located on the front of the control circuit module in the cabinet's lower enclosure. Turning the control clockwise increases the amount of LTRS tape automatically fed out.

#### TAPE-TO-TAPE STATION CONVERTERS

5.04 The following operating procedures are applicable to both 5 to 8-level and 8 to 5-level Universal Tape-to-Tape Station Converters.

- (a) Thread tape into the tape punch (see Figure 10). Follow the threading procedure outlined in Paragraph 5.02(a).
- (b) Thread tape onto the tape winder (see Figure 9). Follow the threading procedure outlined in Paragraph 5.02(b).
- (c) Thread tape onto the tape reader and the take-up reel (see Figure 10).
  - (1) Place tape on center unwind reel.
    - Optional equipment, refer to Paragraph 3.03.

Note: Message tape may be wound on a standard reel if a TP146698 reel adapter is used. The adapter will increase the

core diameter of the standard reel so that the message tape, when removed, will fit on the center unwind reel.

- (2) Unwind about 3 feet of tape (before message begins) for threading winder.
- (3) Place bat handle lever in FREE position. Insert tape in reader gate.
- (4) Lift chad depressor arm and rotate tape-tension arm to extreme left. Release chad depressor arm to lock tension arm in place for threading.
- (5) Pass tape between stationary post and posts on tension arm, then upward between chad depressor and its post.

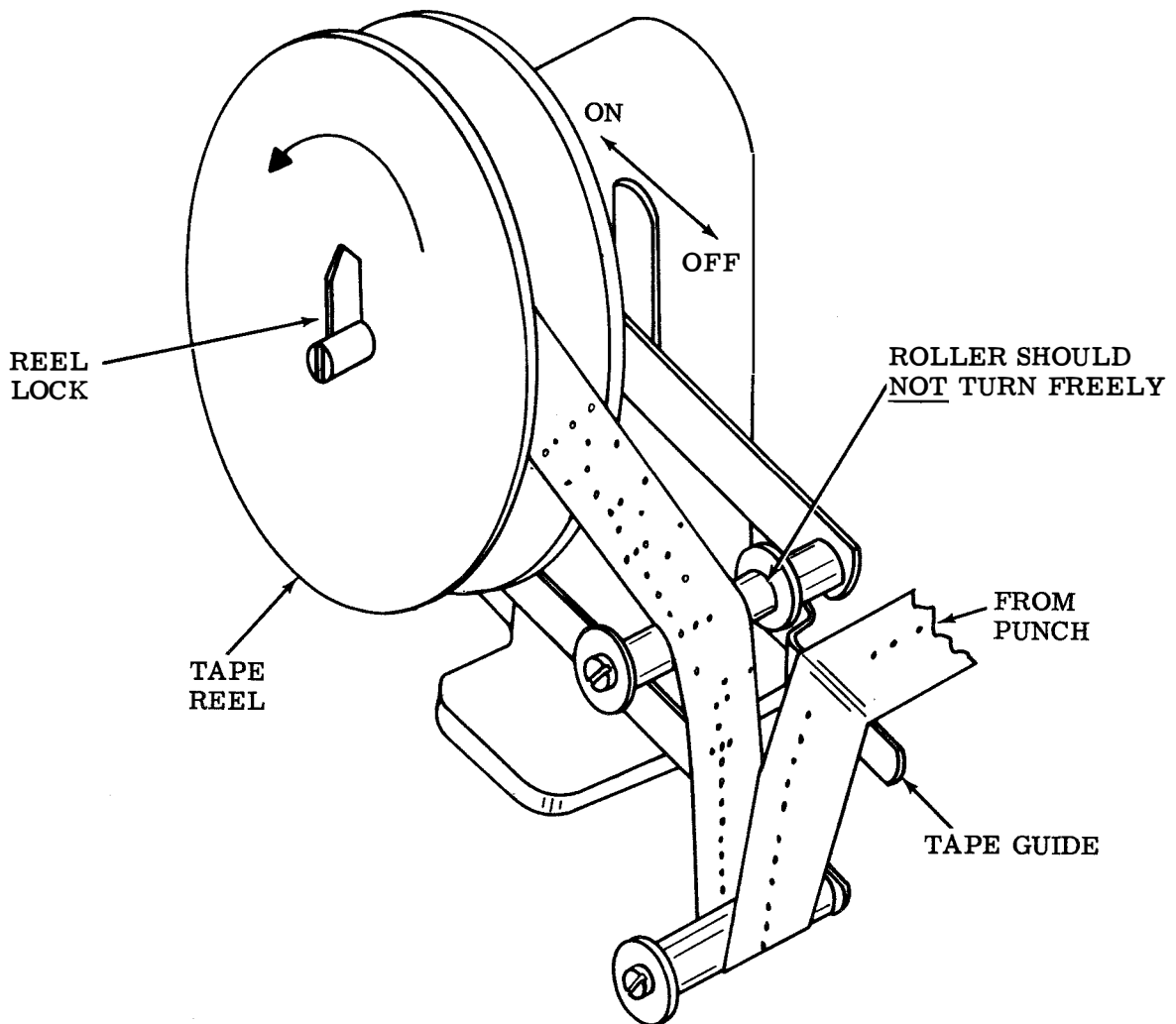
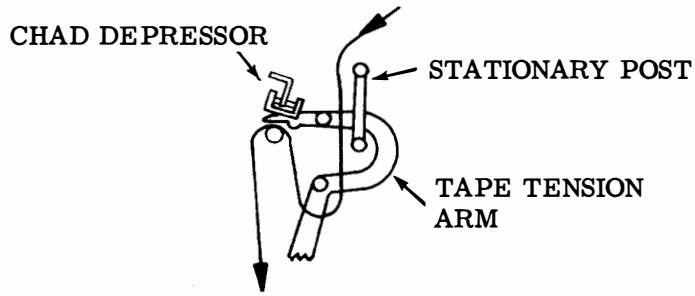


Figure 9 - Tape Routing, Tape Winder



TAPE THREADING

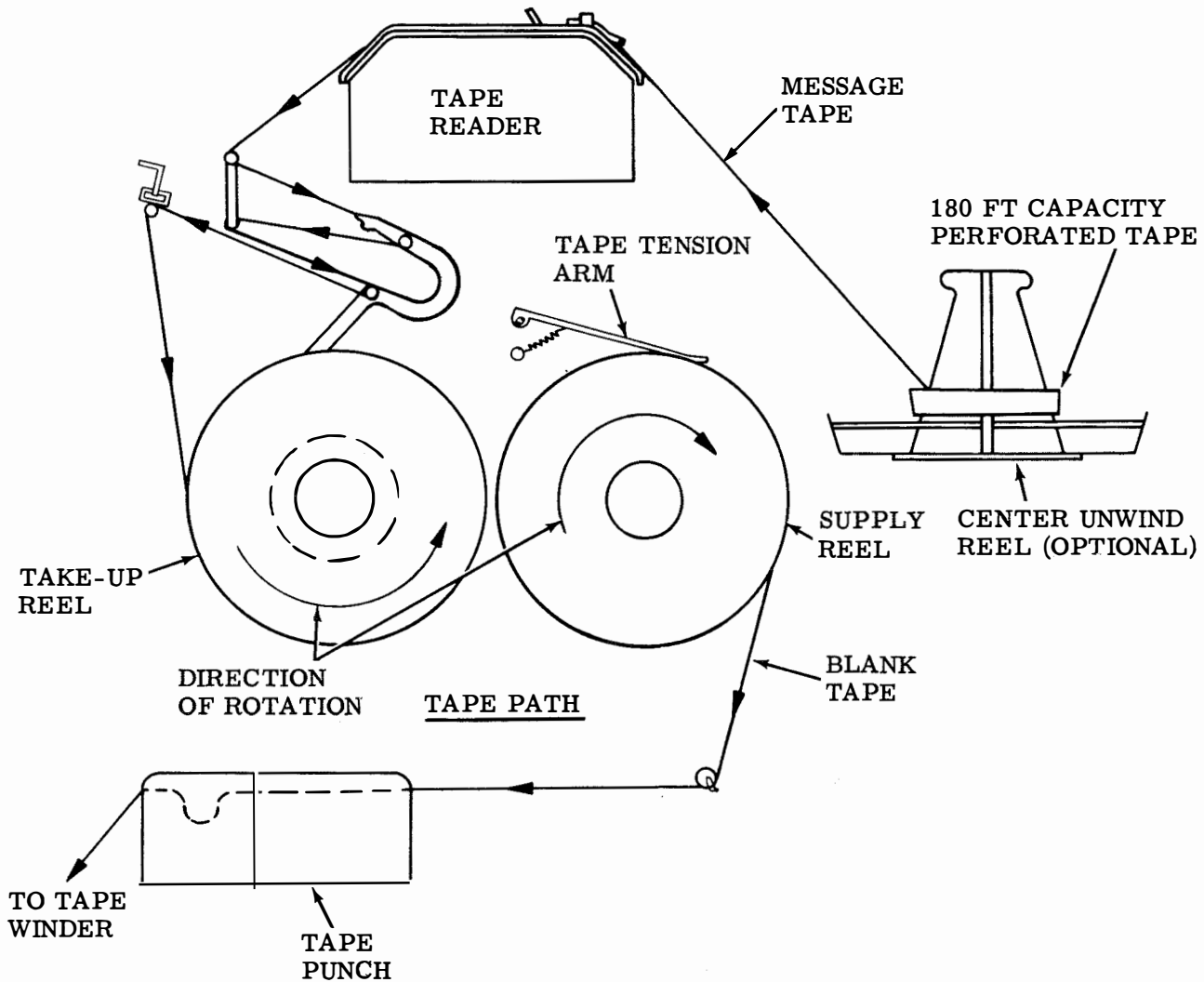


Figure 10 - Tape Routing, Tape-to-Tape Station Converters

(6) Hold tension on free end of tape and lift chad depressor arm, allowing tension arm to restore slowly.

(7) Place end of tape in take-up reel and manually rotate reel counterclockwise to take up excess tape.

(d) Operate the power switch to the ON position (see Figure 7). The RED power lamp will light to indicate the ON condition.

(e) Depress the winder switch (see Figure 7). The AMBER winder on lamp will light.

(f) Keep the equipment free of chad (see CAUTION note in Paragraph 5.02(d)).

5.05 The manual LTRS tape feed-out button should only be operated when the tape reader bat handle lever is in the OFF position, or a tight-tape or tape-out condition exists at the reader. The length of the LTRS tape feed-

out is determined by the length of time the feed-out button is held depressed.

**CAUTION: DO NOT OPERATE THE FEED-OUT BUTTON WHILE TAPE IS BEING READ - THIS WILL CAUSE THE FEED-OUT TO INTERFERE WITH THE MESSAGE TEXT.**

5.06 Audible Low Tape Alarm: The audible low tape alarm provides a buzzer and a light to indicate a low tape condition on the converter sets. In the normal position (low tape contacts are in the unoperated position), the low tape alarm circuit is complete and there is no response from either the lamp or the buzzer. When the low tape contacts are operated, 24 v ac is supplied to the low tape lamp and buzzer. The buzzer may be turned off by operating the low tape switch, but the lamp remains lighted. When a new roll of tape is inserted, the low tape contacts transfer to their normal position causing the buzzer to sound and the lamp to be turned off. The buzzer can be turned off again by operating the low tape switch.

