PREPARATION OF CONTROL TAPES FOR OPERATIONAL TRUNK TESTS USING AUTOMATIC PROGRESSION TRUNK TEST FRAME NO. 5 CROSSBAR OFFICES

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1. GENERAL

1.01 This section describes the procedure for preparing control tapes used to perform automatic operational tests on outgoing trunks. These trunks may be outgoing from the office containing the automatic progression trunk test frame (APTT) SD 25938-01 or outgoing from a remote office which is equipped with a remote office test line circuit (ROTL). The control tapes provide instructions to the APTT and, when remote office testing is being performed, to the ROTL. These instructions include information to enable the APTT to seize the trunks to be tested and to obtain connection to the desired far-end test line.

1.02 This section is reissued for the following reasons:

(a) To revise Part 4 to include CCSA trunk class.

(b) To update Table A to include CCSA trunks.

(c) To revise Fig. 3 to show changes to tape preparation worksheets.

(d) To make minor changes as required.

This reissue does not affect Equipment Test Lists

1.03 The control tapes for APTTs of Issues 23D and later are made by perforating standard 5-level 11/16-inch teletype paper tape by means of a 28-type teletypewriter set. Usually the tapes for these test frames will be prepared at a centralized location. However, there may be infrequent occasions when it is necessary or desirable to use the teletypewriter set associated with the APTT.

1.04 This section covers methods of splicing and copying control tapes. It is not recommended, however, that spliced tapes be used for operating the APTT, because of the possibility of blocking the frame. All spliced tape should be copied to provide a duplicate tape for the APTT operation.

1.05 It is imperative that instructions for preparation of tape given in this section are followed explicitly. Failure to comply may cause improper operation of the test frame when the tape is used for testing.

2. EQUIPMENT AND APPARATUS

2.01 Offices provided with the APTT will have one of four types of the teletypewriter equipment and associated apparatus, depending upon the features provided in the APTT and the office.

Model 14 and 28A Transmitter-Distributor and Reperforator

2.02 The Model 14 transmitter-distributor and reperforator provides and reads a fully perforated tape in a 2-out-of-5 code (Fig. 1). The perforation of the tape is controlled by the operation of keys and/or switches located at the test frame. Complete test information must be repeated for each trunk tested except where the switch control method is provided. Then only the information that changes need be reset.

2.03 The 28A transmitter-distributor and reperforator is the replacement for the Model 14 described above and provides the same features as the Model 14.

2.04 The following equipment and apparatus is used with the Model 14 and 28A transmitter-distributor and reperforator:

(a) RPEC 200BH cover (for Model 14 reperforator)

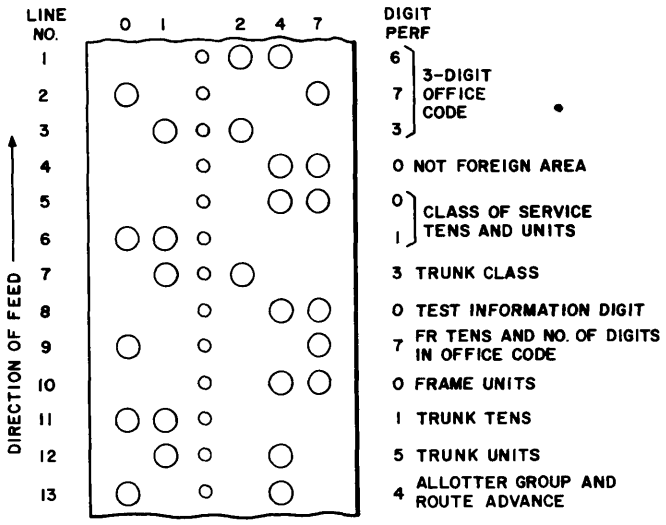


Fig. 1—Fully Perforated Tape Prepared by Model 14 or 28A Reperforator

(b) TP115753BH tape winder

(c) TP103035 tape unwinder

(d) KS-9781 L1 heavy duty, gray tape

(e) Rubber cement (Bell System or equivalent).

28A or 28B ASR Teletypewriter Set

2.05 The 28A ASR teletypewriter set is equipped with a modified A-type keyboard (Fig. 2) and reperforator-type wheel. The 28A ASR teletypewriter set uses a 5-level, standard 11/16-inch paper tape. The teletypewriter is also equipped with a transmitter-distributor and reperforator. The reperforator is used for perforating the tapes, either by operation of the keyboard or by electrical impulses received from the test frame. Since there is a typing unit associated with the teletypewriter, a page copy can be produced containing the information that is perforated on the tape.

2.06 The 28B ASR teletypewriter set provides the same features as the 28A teletypewriter set and, in addition, the ability to control the page printer to provide the tabbing feature which is used only for transmission testing. Fig. 2 shows an example of a control tape containing preamble, caption, priming information trunk address, and trunk information. The worksheet from which this tape was prepared is shown in Fig. 3.

2.07 The following equipment and apparatus is used with the 28A or 28B teletypewriter set:

(a) KS-8483 L1 perforator tape

(b) 5C tape winder

(c) Western apparatus TU2 tape unwinder

(d) 1A45 paper winder

(e) TP193950 copy display rod

(f) KS-1920 teletypewriter paper

(g) 317212 teletype tape splicer

(h) 317325 teletype splicing patch, 5-channel, color coded blue.

3. TRUNK GROUP CONTROL TAPES

3.01 A control tape must be prepared for each trunk group. For offices which have 14- or 28-type transmitter-distributors and reperforators, tapes will be prepared using the APTT. For offices which have a 28A or 28B ASR teletypewriter set, tapes will usually be prepared at some central location. Information required to prepare these tapes may be found on one or more worksheets prepared as described in Section 218-220-301. The procedure for perforating tape using the 14- or 28-type transmitter-distributor and reperforator is covered in Part 5 of this section.

3.02 A page copy is produced when perforating or copying the tape using the 28A or 28B teletypewriter set. The Model 14 or 28A transmitter-distributor and reperforator has no typing unit and therefore does not produce a page copy.

3.03 The page copy produced when making a tape should be returned to the APTT office and cut into suitable lengths to file in proper sequence in binders designed for 8-1/2 by 11-inch documents and retained as part of the office records for use as particular circuit charts. The information recorded on the page copy may be used when it is desired to perform a particular circuit test. The trunks listed on the page copy are identified by the trunk group and by the traffic assigned trunk number. The trunk cards are used to associate the trunk location and traffic assigned trunk number. The particular circuit tests are to be made manually as covered in Section 218-262-501. The trunk group control tapes and page copy must be updated with the addition or deletion of the trunk circuits or priming information.

4. COMPOSITE CONTROL TAPES

4.01 Four or five composite control tapes are required for each marker group as given in Table A. These tapes should be marked to show the appropriate control tape number. Control tapes for offices which have APTTs equipped with 28-type ASR teletypewriter sets should be prepared by a separate machine in another location. To accomplish this, the worksheets for these offices must be arranged and combined in a manner which would provide proper information for preparing tapes of the type required by that particular office and should contain the caption and subcaption information required for these tapes.

4.02 The composite tapes are prepared to conform to needs of a particular office. In determining the number and contents of the tapes to be prepared, primary consideration should be given to the frequency of testing of the particular trunks and the amount of time available to test these trunks. It may be desirable to perform the trunk tests over a predetermined number of hours during a period when the traffic is light; therefore, the tape should be of sufficient length in order to utilize this time. When composite tapes are prepared for testing in offices that are unattended during the testing period, trunks, which would require changes in key and/or switch settings on the test frame, should not be combined in the composite tape. When using an APTT equipped with a 14A or 28-type transmitter-distributor and reperforator, composite tapes may be made by cutting and splicing together the selected portions from the duplicates of trunk group control tapes.

4.03 The offices which have an APTT prior to Issue 30D require that any identifying information must be written on the tapes since no provision is made for perforating or printing the caption information.

4.04 The caption information pertaining to the tape may be included at the beginning of the tape if the APTT is Issue 30D or later, followed by the marker priming information for the trunk

group and the trunk priming information for the trunks within the group to be tested. In addition to caption information, these tapes may contain a preamble which provides information regarding the contents of the tape or any other significant information. The trunk priming information must be preceded by the marker priming information for each trunk group. Caption information will be inserted ahead of marker priming information. In addition to the priming digits, the trunk entries include the machine instructions. A composite tape duplicate is then made using the copying procedures and is to be used for performing tests. Copy procedures are covered in Part 5 and splicing methods are covered in Part 6.

(a) The 26 combinations listed in the TEST AND TRUNK CLASS column in Table A cover all six test classes and all 20 trunk classes. The test classes are ITDO, IAO1, OGT, IAO2, CAM0, and CAM1. The trunk classes are as follows: centrex, DT, FR1, FR2, CN1, CN2, LLP, MR1, MR2, AMA1, AMA2, AMA3, CAMA incoming-operator number identification—CINC-ONI, CAMA incoming-automatic number identification— CINC-ANI, CAMA junctor—CJTR, CAMA intermarker group—CIMG1, CAMA intermarker group—CIMG2, automatic number identification— ANI, traffic service position system—TSP(s), and common control switched access—CCSA.

(b) The composite control tape numbers that apply to the various test and trunk class combinations are listed in the COMPOSITE TAPE NO. column.

4.05 ***No. 1 Composite Control Tape:*** For all offices, prepare one No. 1 composite control tape for each marker group for making tests in the ITDO (incoming trunk in distant office) test class.

(a) In the ITDO test class, the outgoing interoffice trunks are tested on a test line (TL) test, a busy line (BL) test, or a continuity and polarity (CP) test. The busy line tests should be made on junctors in order to test the validity of the line link appearance of the auxiliary junctor. When using an APTT prior to Issue 30D, the three tests can be made from a single composite control tape, regardless of the trunk class, when all trunks have the same polarity. Refer to (c) when all trunks are not of the same polarity. When using an APTT of Issue 30D or later, it is necessary to punch the test line number on the control tape. As a result, a composite tape must be made for the test line tests and another for the busy line tests. Either of these tapes may be used to perform continuity and polarity tests since sender outpulsing is not required. Refer to (c) when all trunks are not of the same polarity.

(b) The trunks to be included on the No. 1 composite control tape include trunks to panel, No. 1 crossbar, No. 5 crossbar, crossbar tandem, ESS, and step-by-step offices. Calls may be made through the panel sender tandem office but must terminate in a distant test line. Trunks outgoing to a CAMA office cannot be tested in the ITDO class.

(c) When some of the trunks have battery on the tip and ground on the ring (poled opposite to the accepted standard), two methods may be used as follows:

(1) Two No. 1 composite control tapes, one for each type of trunk, may be prepared in order to make all three tests (TL, BL, and CP) from one tape.

(2) One No. 1 composite control tape may be prepared to include both types of trunks for making only TL and BL tests. If this is done, two supplementary composite tapes must be prepared for making the CP test so that all the trunks normally poled can be tested with the REV key normal for one tape and the trunks poled opposite can be tested with the REV key operated for the second tape.

4.06 ***No. 2 Composite Control Tape:*** For all offices, prepare one No. 2 composite control tape for each marker group for making tests in the IAO1 test class and, if provided, the CAM1 test class.

(a) In the IAO1 test class, which is made on intraoffice and intermarker group subscriber-to-subscriber trunks, the TL test is made from a single composite control tape, regardless of the trunk class.

(b) In marker group 0 in multimarker group offices, the No. 2 composite control tapes include the intraoffice trunks in marker group 0

and the intermarker group subscriber-to-subscriber trunks in marker group 0 having access to the marker groups 1 and 2.

(c) In marker group 1 in multimarker group offices, the No. 2 composite control tapes include the intraoffice trunks in marker group 1 and the intermarker group subscriber-to-subscriber trunks in marker group 1 having access to marker groups 0 and 2.

(d) In marker group 2 in multimarker group offices, the No. 2 composite control tapes include the intraoffice trunks in marker group 2 and the intermarker group subscriber-to-subscriber trunks in marker group 2 having access to marker groups 0 and 1.

(e) In a CAMA office, the CAMA trunks to be tested from No. 2 composite control tapes include all subscriber-to-subscriber CAMA intermarker group trunks and all incoming CAMA trunk circuits arranged for local completion.

4.07 ***No. 3 Composite Control Tape:*** For all offices, prepare one No. 3 composite control tape for each marker group for making tests in the OGT, IAO2, and CAM0 test classes in all trunk classes. The directing information for combination trunks is perforated on the composite control tapes for each of the affected trunk classes in order to test the trunk in each of its trunk classes.

> ***Note:*** The OGT, IAO2, and CAM0 tests can be made in all the trunk classes from the same control tape since the pass-by feature permits the test frame to pass by trunk circuits when a feature cannot be tested.

(a) In the OGT test class, which is made on the outgoing interoffice trunk circuits, outgoing junctors, trunks to TSP(S), ▶CCSA trunks,◀ and intermarker group subscriber-to-subscriber trunks, the call is directed back to the terminating test line in the test frame (APTT test line) to check the local relay equipment on a charge (CH) test, noncharge (NC) test, consecutive charge-noncharge (CHNC) test, and timed release originating hold (TRO) test. For AMA trunks arranged to initiate the disconnect entry, a cancel disconnect entry (CDE) test may also be made. A supplementary control tape may be used for making a rapid test for a faulty trunk identity check (TIC) lead on AMA trunks. The routine tape used for making the overtime charge (OTC) test on the CN and/or MR trunks with timing is described in 4.09.

(b) In the IAO2 test class, which is made on intraoffice and subscriber-to-subscriber intermarker group trunks, the call is directed back to the APTT in order to check the relay equipment on CH, NC, CHNC, TRO, and timed release terminating hold (TRT) tests. On AMA trunks arranged to initiate disconnect entry, a CDE test may also be made. The composite control tape used for making the OTC test on the CN and/or MR trunks with timing is described in 4.09. The routine tape used for making free line (FL) tests on the CN, MR, and AMA intraoffice trunks is described in 4.08.

(c) In the CAM0 test class which is made on the CAMA incoming trunks, CAMA intermarker group trunks, and CAMA junctors, the call is directed back to the APTT to check the relay equipment on CH, NC, TRO tests, and for local termination trunks on a TRT test. On trunks or junctors arranged to initiate disconnect entry, a CDE test may also be made.

(d) In single marker group offices, prepare one No. 3 composite control tape for making tests in the OGT, IAO2, and CAM0 test classes. Include on the tape the following: (1) the outgoing interoffice trunks to panel, No. 1 and 5 crossbar, ESS, step-by-step, PCI manual, PCI tandem, panel tandem, crossbar tandem, TSPS offices, and ▶CCSA;◀ and (2) all intraoffice trunks, all CAMA trunk circuits, and all CAMA junctors.

(e) In marker group 0 in multimarker group offices, the trunks to be tested from the No. 3 composite control tape include the following: (1) all the outgoing interoffice trunks in marker group 0 to panel, No. 1 and 5 crossbar, ESS, step-by-step, PCI manual, PCI tandem, panel tandem, crossbar tandem, TSPS offices, ▶CCSA;◀ and (2) all the intraoffice trunks in marker group 0, all intermarker group subscriber-to-subscriber trunks in marker group 0 having access to marker groups 1 and 2, all CAMA trunk circuits, and all CAMA junctors.

(f) In No. 1 marker group in multimarker group offices, the trunks to be tested from the

No. 3 composite control tape include the following: (1) all the outgoing interoffice trunks in marker group 1 to panel, No. 1 and 5 crossbar, ESS, step-by-step, PCI manual, PCI tandem, panel tandem, crossbar tandem, TSPS offices, and ◗CCSA;◖ and (2) all the intraoffice trunks in marker group 1, all intermarker group subscriber-to-subscriber trunks in marker group 1 having access to marker groups 0 and 2, all CAMA trunks, and all CAMA junctors, regardless of trunk class.

(g) In marker group 2 in multimarker group offices, the trunks to be tested from No. 3 composite control tape include the following: (1) all the outgoing interoffice trunks in marker group 2 to panel, No. 1 and 5 crossbar, ESS, step-by-step, PCI manual, PCI tandem, panel tandem, crossbar tandem, TSPS offices, and ◗CCSA;◖ and (2) all the intraoffice trunks in marker group 2, all intermarker group subscriber-to-subscriber trunks in marker group 2 having access to marker groups 0 and 1, all CAMA trunk circuits, and CAMA junctors.

4.08 ***No. 4 Composite Control Tape:*** For all offices, prepare one No. 4 composite control tape for each marker group for making FL tests of the CN, MR, and AMA intraoffice trunks. Although the test frame is arranged to pass by the outgoing interoffice, FR intraoffice, and FR, CN, MR, and AMA intermarker group subscriber-to-subscriber trunks, it is desirable to prepare the No. 4 composite control tape in order to avoid excessive use of the pass-by feature when making the FL tests.

4.09 ***No. 5 Composite Control Tape:*** For all offices using CN and/or MR trunks with timing, prepare one No. 5 composite control tape for each marker group for making OTC tests of the CN and MR outgoing interoffice, intraoffice, and intermarker group subscriber-to-subscriber trunks. It is desirable to prepare the No. 5 composite control tape to avoid excessive use of the automatic pass-by feature when making the OTC tests and because the OTC test cannot be made on the following trunk circuits:

(a) Message register trunks using 1B timers

(b) Coin outgoing trunks SD-25739-01

(c) Coin intraoffice trunks SD-25737-01 not provided with X wiring.

4.10 ***Supplementary Control Tapes:*** In general, the purpose of supplementary control tapes is to provide more efficient use of the APTT in the solution of maintenance problems and to assist in the detection and elimination of unusual trouble conditions. Since there is unlimited flexibility in the number and arrangement of the supplementary control tapes, it is probable that field experience will be a determining factor in the solution of this type of problem in the individual offices. A typical example of a supplementary control tape is one which contains all the outgoing interoffice trunks that are poled alike and the TL, BL, and CP tests are made from one No. 1 composite control tape. A separate supplementary control tape may be prepared for making CP tests of the PCI manual and PCI tandem trunks. Another example of a supplementary control tape is one containing trunks on which a glare test is made, since this test is performed separately from other types of tests.

TABLE A

COMPOSITE CONTROL TAPES

	TEST AND TRUNK CLASS	COMPOSITE TAPE NO.
1.	ITDO — FR, CN, MR, AMA, DT, centrex	1
2.	IAO1 — FR, CN, MR, AMA, DT, centrex	2
3.	OGT — FR, LLP, or ANI IMG S/T or JCTR, TSP(s), and CCSA	3
4.	OGT — CN, IMG S/T or JCTR without timing, TSP(s), and CCSA	3
5.	OGT — CN, IMG S/T or JCTR with timing	3, 5
6.	OGT — MR, DT, IMG S/T or JCTR without timing, TSP(s), and CCSA	3
7.	OGT — MR, DT, IMG S/T or JCTR with timing	3, 5
8.	OGT — AMA, DT, IMG S/T or JCTR arranged to initiate disconnect entry	3
9.	OGT — AMA, DT, IMG S/T or JCTR arranged to omit disconnect entry	3
10.	IAO2 — FR, DT, IAO, IMG S/S, and centrex	3
11.	IAO2 — CN, IAO without timing	3, 4
12.	IAO2 — CN, IAO with timing	3, 4, 5
13.	IAO2 — CN, IMG S/S without timing	3
14.	IAO2 — CN, IMG S/S with timing	3, 5
15.	IAO2 — MR, DT, IAO without timing	3, 4
16.	IAO2 — MR, DT, IAO with timing	3, 4, 5
17.	IAO2 — MR, IMG S/S without timing	3
18.	IAO2 — MR, IMG S/S with timing	3, 5
19.	IAO2 — AMA, DT, IAO arranged to initiate disconnect entry	3, 4
20.	IAO2 — AMA, DT, IAO arranged to omit disconnect entry	3, 4
21.	IAO2 — AMA, IMG S/S arranged to initiate disconnect entry	3
22.	IAO2 — AMA, IMG S/S arranged to omit disconnect entry	3
23.	CAM1 — CAMA, IMG S/S, INC (LOC Compl)	2
24.	CAM0 — CAMA, IMG S/S, INC (LOC Compl) arranged to initiate disconnect entry	3
25.	CAM0 — CAMA, IMG S/S, JCTR, INC (TAN, TOL Compl) arranged to initiate disconnect entry	3
26.	CAM0 — CAMA, IMG S/S arranged to omit disconnect entry	3

5. LOADING, PERFORATING, CHECKING, AND COPYING TAPE

A. Using Model 14 or 28A Transmitter-Distributor and Reperforator

5.01 *Preparation for Perforating and Copying Tape*

(1) At APTT, restore all keys and switches; after 5 seconds, momentarily operate RL key. All lamps extinguished.

(2) At the teletypewriter equipment, set all switches to OFF. Transmitter-distributor and reperforator motors are not running.

(3) Insert transmitter-distributor Hubbell cap into TRS DIST Hubbell receptacle. Insert reperforator Hubbell cap into REPERF Hubbell receptacle. Insert 4-pronged H. B. Jones plug into REPERF Hubbell receptacle. Insert 21-pronged H. B. Jones plug into TD H. B. Jones socket.

(4) Push in stop-pins of winders and turn winding keys until motor springs are completely wound.

(5) If reperforator is not loaded with sufficient tape, lift reperforator cover and tape retaining lid of tape reel. Place roll of unperforated tape in tape reel and close retaining lid and perforator cover. Allow extension arm of NO TAPE switch to rest against the periphery of tape roll. Extend leading end of tape into tape guide over pins of feed roll and under tape tension lever.

5.02 *Perforating Tape—Key Control Method*

(1) At APTT operate PERF and CPST keys. KEY and PERF lamps lighted. If tape being perforated is for a line link pulsing route, operate LLP key.

(2) At teletypewriter equipment, set TRS DISTR switch to ON. Transmitter-distributor motor starts running. Set power switch on reperforator to ON. Reperforator motor starts running.

(3) If reperforator was loaded with a new supply of tape, operate and hold SPACE OUT lever on reperforator. Apply slight downward tension on leading end of tape until tape is advanced freely by pins on feed roll. Release SPACE OUT lever.

(4) At APTT, operate LDR key. Momentarily operate SPA key. After 1 minute, restore LDR key. About 3 feet of tape will have been perforated with space lines.

(5) If reperforator was loaded with a new supply of tape, tear off and discard 5-hole perforations on leading end of tape.

(6) Mark tape "Leading End."

Note: Leading end can be used for handwritten identification of trunks appearing on tape.

(7) Remove outer side plate of reel on winder associated with reperforator. Pass tape lead under tape stop arm of winder. Insert end in split winder core. Replace outer side plate of reel and pull out stop-pin of winder. Tape slack is taken up.

(8) If a visual check of a digit to be perforated on tape is desired, restore the CPST key to normal. With this key normal, operation of 0 through 9 keys representing digit to be perforated causes the K- lamps to display the digit. If an incorrect digit is selected, operation of the WO key will release this digit and allow another to be selected by a second operation of the 0 through 9 keys. After the digit is selected, momentarily operate PST key and the digit is perforated on tape. KEY lamp lights to indicate that next digit may be selected. Repeat this procedure for remaining digits for the trunk to be tested. Reoperate CPST key.

(9) If a visual check of digit to be perforated is ***not*** desired, momentarily operate a 0 through 9 key for digit to be perforated. As each 0 through 9 key is operated, the digit will be perforated on tape. After the digit is perforated, KEY lamp lights. Repeat this procedure for the remaining digits for the trunk to be tested.

(10) After Step (8) or (9) has been performed for a trunk, momentarily operate the SPA key four or five times to provide space between trunk entries on the tape. Repeat Steps (8) or (9) for remaining trunks to be tested.

(11) If sufficient space for handwritten information between trunk entries is desired, after perforating a trunk entry [Steps (8) and (10) or (9) and (10)], momentarily operate 5H key. KEY lamp is lighted. Operate LDR key. Momentarily operate SPA key. After 15 seconds, restore LDR key. About 6 inches of tape perforated with space entries is then produced. This tape may be used for handwritten information. Operate 5H key. KEY lamp is lighted. Momentarily operate SPA key four or five times. Four or five lines of 5-hole entries are perforated in tape.

(12) Repeat Steps (8) through (11), as required until desired information has been perforated on tape.

(13) Operate LDR key. Momentarily operate SPA key. After 15 seconds, restore LDR key. Trailing end leader is produced on tape.

(14) Push in stop-pin of tapewinder associated with reperforator. Tear off tape at reperforator to include section of spaces at trailing end. Manually rotate reel to take up trailing end of tape. Remove outer side plate of reel and remove tape from reel. Replace outer side plate on reel.

(15) At APTT, restore CPST and PERF keys. At teletypewriter equipment, reperforator motor stopped. At test frame, KEY lamp extinguished after 5 seconds.

(16) At teletypewriter equipment, set all switches to OFF. Transmitter-distributor motor stopped.

5.03 *Perforating Tape—Switch Control Method*

(1) At APTT operate PERF key. KEY lamp lighted. If tape being perforated is for a line link pulsing route, operate LLP key.

(2) At teletypewriter equipment, set TRS DISTR switch to ON. Transmitter-distributor motor starts running. Set power switch on reperforator to ON. Reperforator motor starts running.

(3) If reperforator was loaded with a new supply of tape, operate and hold SPACE OUT lever on reperforator. Apply slight downward tension on leading end of tape until tape is advanced freely by pins on feed roll. Release SPACE OUT lever.

(4) At APTT, set all switches as required for particular test being performed.

(5) Operate LDR key. Momentarily operate SPA, PST keys. After 1 minute, restore LDR key. About 3 feet of tape will have been perforated with space lines.

(6) If reperforator was loaded with a new supply of tape, tear off and discard 5-hole perforations on leading end of tape.

(7) Mark tape "Leading End."

Note: Leading end can be used for handwritten identification of trunks appearing on tape.

(8) Remove outer side plate of reel on winder associated with reperforator. Pass tape lead under tape stop arm of winder. Insert end in split winder core. Replace outer side plate of reel and pull out stop-pin of winder. Tape slack is taken up.

(9) A visual check of a digit to be perforated on tape can be made by observing the lighted lamps that correspond to the switch settings according to the desired digit for the line of entry to be perforated. If an incorrect digit is selected, operation of the WO key will release this digit and allow another to be selected by setting the proper switch to the desired position. After the digit is selected, momentarily operate the PFS key. The PERF lamp lights and the entry is perforated on the tape. At the end of perforation of the entry, the PERF lamp will extinguish and the switches for the next entry may be set.

(10) Repeat Step (9) for remaining trunks to be tested resetting only the necessary switches. (Usually only the FTCD, FU, TBT, and TBU switches, for the trunk link frame tens and units and the trunk number tens and units respectively, need resetting.)

(11) If sufficient space for handwritten information between trunk entries is desired, after perforating a trunk entry [Steps (9) and (10)], momentarily operate 5H key. KEY lamp is

lighted. Operate LDR key. Momentarily operate SPA key. After 15 seconds, restore LDR key. About 6 inches of tape perforated with space entries is then produced. This tape may be used for handwritten information. Operate 5H key. KEY lamp is lighted. Momentarily operate SPA key four or five times. Four or five lines of 5-hole entries are perforated in tape.

(12) Repeat Steps (9) through (11), as required, until desired information has been perforated on tape.

(13) Operate LDR key. Momentarily operate SPA key. After 15 seconds, restore LDR key. Trailing end leader is produced on tape.

(14) Push in stop-pin of tapewinder associated with reperforator. Tear off tape at reperforator to include section of spaces at trailing end. Manually rotate reel to take up trailing end of tape. Remove outer side plate of reel and remove tape from reel. Replace outer side plate on reel.

(15) At APTT, restore PERF key. At teletypewriter equipment, reperforator motor stopped. At test frame, KEY lamp extinguished after 5 seconds.

(16) At teletypewriter equipment, set all switches to OFF. Transmitter-distributor motor stopped.

5.04 *Checking Tape*

(1) Select control tape to be checked and place in unwinder. Lift retaining lid of tape guide on transmitter-distributor and insert leading end of tape so that feed wheel pin engages any traction hole immediately preceding first line of information to be checked. Close retaining lid. Remove outer side plate of reel on tapewinder associated with transmitter-distributor. Pass tape leader under tape stop arm of winder and insert tape end into slit of winder core. Replace outside plate of reel. Pull out stop-pin in winder. Tape slack is taken up.

(2) Set TRS DISTR switch to ON. Transmitter-distributor motor starts running. Set TAPE STOP switch to ON.

(3) At APTT, operate LP and TPCK keys. DW lamp is lighted.

(4) Momentarily operate ST key. DW lamp extinguished and register lamps corresponding to trunk selecting information for first trunk on tape lighted. Momentarily operate TCAV key. Register lamps corresponding to trunk selecting information for next trunk on tape lighted. Repeat operation of TCAV key until all trunks have been checked. After complete tape is checked, register lamps corresponding to last trunk on tape extinguished and EC and A lamps lighted. Restore TPCK key.

(5) Momentarily operate RL key. EC and A lamps extinguished and DW lamp lighted. Restore LP key. DW lamp extinguished.

(6) At teletypewriter equipment, set TAPE STOP switch on transmitter-distributor to OFF. Set TRS DISTR switch to OFF. Transmitter-distributor motor stopped. Push in stop-pin of winder associated with transmitter-distributor. Lift retaining lid of transmitter-distributor guide. Disengage tape from feed wheel pin. Close retaining lid. Manually rotate reel of winder to take up trailing end of tape. Remove outer side plate of reel. Remove tape and replace outer side plate of reel.

5.05 *Copying Tape*

(1) At teletypewriter equipment, set TRS DISTR switch to ON. Transmitter-distributor motor starts running. Set power switch on reperforator to ON.

(2) If reperforator has just been reloaded with tape, operate PERF and CPST keys. KEY and PERF lamps lighted. Reperforator motor starts running. Operate and hold SPACE OUT lever on reperforator and apply slight downward tension on leading end of tape until tape is advanced freely by pins of feed roll. Release SPACE OUT lever. At APTT, operate LDR key and momentarily operate SPA key. After 15 seconds, restore LDR key. About 6 inches of tape perforated with space lines are produced. Tear off tape at reperforator and discard. At APTT, restore PERF and CPST keys. At teletypewriter equipment, reperforator motor stopped. At APTT, PERF and KEY lamps extinguished.

(3) At teletypewriter equipment, select tape to be copied and place tape in unwinder. Lift retaining lid of tape guide on transmitter-distributor. Insert leading end of tape into tape guide so that feed wheel pin engages approximately the fifth traction hole from edge of tape. Close retaining lid. Set TAPE STOP switch on transmitter-distributor to ON. At APTT, operate COPY key. At teletypewriter equipment, reperforator motor starts running.

(4) At APTT, operate CST key. At teletypewriter equipment, copying of tape is started. After approximately 3 feet of tape is copied, restore TAPE STOP switch on transmitter-distributor to OFF. Remove outer side plate of reels. Pass tape leads from transmitter-distributor and from reperforator under the tape stop arm of the respective winders. Replace outer side plate of reels. Pull out stop-pin of each winder. Tape slack taken up.

(5) Set TAPE STOP switch on transmitter-distributor to ON. Copying of tape started and continued until complete tape is copied. After tape is copied, at test frame, EC lamp lighted.

(6) Restore CST and COPY keys. EC lamp extinguished; after 5 seconds, reperforator motor stops running. Set all switches to OFF. Transmitter-distributor motor stopped running. Push in stop-pins of tapewinders. Tear off tape at reperforator and manually wind tape on reel. Lift retaining lid of tape guide on transmitter-distributor and disengage tape from feed wheel. Manually wind tape on reel. Remove outer side plates of reels and remove tapes from reels. Replace outer side plates on reels.

B. Using 28A or 28B ASR Teletypewriter Set

5.06 ***Loading Procedures for Reperforator Tape:*** Loading the reperforator associated with the 28A or 28B teletypewriter with tape is accomplished as follows:

(1) At test frame and teletypewriter (TTY), restore all keys and switches.

(2) At TTY, open center top door and tear off old tape at tape chute.

(3) Operate PMC and BRT keys. At test frame, PMC lamp is lighted.

(4) At TTY, feed out the remaining tape by repeated operation of LTRS key and lift used roll of tape out of holder.

(5) Place a new roll of tape on the spindle in holder with tape feeding out from the top of the roll.

(6) Open center front door and thread tape through tape guide arm and down into tape chute.

(7) As paper is eased through chute, repeatedly operate LTRS key until tape goes through punch head.

(8) Close center top and front doors.

(9) Depress and hold REPT key and momentarily operate space bar.

(10) When a sufficient length of leader is perforated to permit threading into tape winder, release REPT key.

(11) Remove outside reel from tape winder.

(12) Raise tape arm (Fig. 5) until it is secured by the latch.

(13) Thread approximately 6 inches of tape through any post in the center of tape reel, and manually wind two or more turns to secure tape. (Tape should be wound so that tape winds on top of the reel with the chads facing outward.

(14) Replace reel in tape winder and thread tape through tape arm and guides as shown in Fig. 5 and 6. Release latch.

(15) Set tape winder switch to ON position; tape slack is taken up and reel stops turning.

Note: If tape winds too tightly (chads interlocking between layers of tape on the reel) or too loosely, adjust tension by loosening locking screw on U bracket and moving bracket on tape guide arm toward rear of arm to

decrease tension or toward front of arm to increase tension. Tighten locking screw.

5.07 ***Loading Procedures for TTY Paper:*** Loading the 28A or 28B TTY with paper is accomplished as follows:

(1) At test frame and TTY, restore all keys and switches.

(2) At TTY, open right front and top doors and move paper release lever back.

(3) Lift paper fingers, pull paper out from under platen, and lift out used roll.

(4) Remove spindle from core of used roll and insert it into new roll.

(5) Place new roll in TTY with spindle in spindle grooves and with roll positioned so that paper feeds from underneath roll toward platen.

(6) Feed paper over paper straightener rod, under platen, and up between platen and paper fingers.

(7) Pull paper up a few inches beyond top of the platen and straighten paper. Lower paper fingers to secure paper. Move paper release lever forward.

Note: Do not disturb ribbon or type box.

(8) Close right top door. Bring end of paper up so that it feeds out between doors and close right front door.

(9) When page copy is of sufficient length, place paper over display rod and thread into paper winder.

(10) Set paper winder switch to ON position.

5.08 ***Perforating Tapes***

(1) After the worksheets have been assembled in the desired order as described in Parts 3 and 4, the tape is perforated by operation of the TTY keyboard. It is necessary to follow precisely the data as entered in the worksheets. Any errors in the priming information will cause the test frame to block, or will cause a wrong measurement.

(2) Before starting the tape perforation, it is desirable to provide a sufficient length (about 3 feet) of tape leader to permit it to reach the tape winder when it is used on the machine associated with the APTT. To produce a leader on the 28-type TTY, ▶operate the PMC and BRT keys, depress and hold the REPT key.◀ The space bar is operated momentarily. When sufficient length of leader is produced, the REPT key is released.

(3) A page copy is always made simultaneously with the perforated tape. When a specific tape has been completed, the page copy should be checked for accuracy by comparing it carefully and in detail to the worksheets.

5.09 ***Correction of Errors***

(1) If an incorrect character is perforated on the tape and discovered a short time later, it is necessary to delete the character and any others that follow. The tape is moved back in the tape punch by depressing the TAPE B. SP. key on the keyboard once for each character to be deleted until the first character that must be corrected is over the punch pins. The LTRS key which causes all holes to be punched is then depressed once for each character to be deleted. After all the required characters have been deleted, the correct information is then perforated and perforation is continued in the normal manner. Care should be taken when retyping the correct information to ensure that, if the first character to be perforated is in FIGS mode, the FIGS key is depressed at the end of the string of LTRS punches. The deleted characters should be obliterated on the page copy by drawing a line through them.

(2) If errors are found after the tape has been completed, corrections can be made by cutting out the affected portion of tape, preparing an insert containing the correct information, and splicing it into the control tape. If desired, corrections can be made while copying tape by stopping the tape being copied at the appropriate point, manually perforating the correct information on the new tape, advancing the tape being copied to the next character following that which was corrected, and then continuing the copying procedure. Whenever a tape is spliced, a duplicate should be made for use by the test frame TTY.

5.10 *Copying Tape*

(1) Load the reperforator with new tape, if required.

(2) Produce about 3 feet of tape leader by depressing and holding the REPT key. Momentarily operate the space bar. When sufficient length of tape leader has been perforated, release REPT key.

(3) Set the tape read switch of the transmitter-distributor to STOP.

Caution: Pin 6 will tear the tape if the switch is in the RUN position when the tape is placed in the transmitter-distributor and the gate is closed.

(4) Open the gate of the transmitter-distributor.

(5) Place the tape to be copied over the feed pins of the transmitter-distributor. The first printed character or symbol on the tape should be aligned with the engraved lines. This places the first perforation under the tape reader.

(6) Close the tape gate.

(7) Set the tape read switch of the transmitter-distributor to RUN.

(8) Operate the COPY and CST keys. The tape will be copied and a page print copy will be produced.

(9) If it is desired to stop the tape in order to delete, add, or correct information when the approximate location on tape is reached, the CST key must be released. Momentarily reoperate and release the key until the exact location is reached.

(10) To add information, or to insert corrected information, type the desired characters by depressing the appropriate keyboard keys.

(11) If information is to be deleted or incorrect information eliminated, operate the tape read switch of the transmitter-distributor to STOP, open the tape gate, and move the tape to the first character on which copying is to be resumed. [Refer to (5).] Close the tape gate and operate the tape read key to RUN.

(12) To resume copying, operate the COPY and CST keys.

(13) When copying of tape has been completed, depress and hold the REPT key and momentarily operate the LINE FEED key.

(14) When sufficient tape (approximately 12 inches) and paper (approximately 6 inches) have been obtained beyond the end of the perforated and printed parts, release the REPT key.

(15) Restore all keys and switches.

(16) Cut the duplicated tape and tear off the page copy. The page copy should be retained for future reference.

6. TAPE SPLICING METHODS

6.01 *To Splice Fully Perforated Tape That is Torn:*

(1) Prepare the test circuit for perforating.

(2) Perforate a new section of tape to include the five lines preceding the damaged section, the lines in the damaged section, and the five lines succeeding the damaged section.

(3) Apply rubber cement to one side of the damaged section and to one side of the newly perforated section.

(4) Allow cement to become tacky; then join both cement-covered sections so that the holes coincide.

(5) Press together, smooth the surfaces, and remove excess cement.

6.02 *To Splice Additional Information to the End of a Fully Perforated Tape:*

(1) Prepare the test circuit for perforating.

(2) Perforate five space lines, followed by the information to be added and approximately 6 inches of space lines.

(3) Cut the trailing end of the original control tape evenly so that five space lines are left.

(4) Apply rubber cement to one side of this 5-space line section and to one side of the new tape section up to the first line of information.

(5) Allow cement to become tacky; then join both cement-covered sections so that the space holes coincide.

(6) Press together, smooth the surfaces, and remove the excess cement.

6.03 ***To Splice Additional Information to a Fully Perforated Tape at an Intermediate Point:***

(1) Cut the tape evenly where the splice is to be made.

(2) Prepare the test circuit for perforating.

(3) Perforate the last three lines appearing on the leading section of the control tape, followed by five space lines and the new information.

(4) Perforate five space lines and the first three lines appearing on the trailing end of tape record.

(5) Apply rubber cement to one side of the tape sections to be joined and allow the cement to become tacky.

(6) Join the cement-covered sections so that the holes coincide.

(7) Press together, smooth the surfaces, and remove the excess cement.

6.04 ***To Splice Chadless Tape That is Torn:***

(1) Place the leading end of torn tape on the cutting pins of the splicer with the torn edge of the tape to the right. Note the printed entry on the tape which is ***in line with*** the scribe mark on the splicer (Fig. 4A).

(2) Pull the cutting head of splicer to the left and then forward to cut the tape. Release the cutter head.

(3) Pull the cutting head to the right and remove the tape from the splicer.

(4) Place the trailing end of torn tape on the cutting pins of the splicer with the torn end of the tape to the left. Note the printed entry which is ***one space to the left*** of the scribe mark (Fig. 4B).

(5) Pull the cutting head of splicer to the left and then forward to cut the tape. Release the cutting head.

(6) Pull the cutting head to the right and remove the tape from the splicer.

(7) Perforate a new tape containing the information starting with the printed entry noted in (1) through and including the printed entry ***one space to the left*** of the scribe mark noted in (4).

(8) Place the leading end of the new tape-insert on cutting pins of the splicer positioning the printed entry noted in (1) ***in line with*** the scribe mark (Fig. 4C). Cut the tape and remove from the splicer.

(9) Place the trailing end of the new tape-insert on cutting pins of the splicer positioning the printed entry noted in (4) ***one space to the left*** of the scribe mark (Fig. 4D). Cut the tape and remove from the splicer.

(10) Remove the backing and place the tape splicing patch on block with the adhesive side up and the feed holes over the pins.

(11) Place the trailing end of the tape being revised and the leading edge of the new tape-insert end-to-end with feed holes over the pins and the end of each tape over one-half of the patch. Press down over the pins using the grooved bar supplied with the splicer. Exert sufficient pressure on the bar to form a good bond between the tapes and splicing patch.

(12) Remove the tape from the splicer.

(13) Splice the trailing end of the new tape to the leading end of the original tape using the methods described in (10), (11), and (12).

(14) Remove the tape from the splicer.

(15) Using copying procedures, make a duplicate of the spliced tape.

(16) Retain the spliced tape as a spare.

Note: When a tape is perforated, the printing lags the related perforations by six spaces. When a tape is spliced to insert a new section of tape, the six lines of perforation preceding the splice lose the related printing. The printing related to the last six lines of perforations on the new tape insert appear on the trailing end of the spliced tape. When the spliced tape is copied, the perforations and the printing will appear in their proper places.

6.05 ***To Splice Additional Information to Chadless Tape:***

(1) If adding information to the end of tape, place the trailing end of the tape to be revised on the cutting pins of the splicer with the printed character of the last perforation to be retained ***one space to the left*** of the scribe mark. Cut and remove the tape from the splicer. If the tape is for an APTT of Issue 23D through 29D, the priming information for the last trunk on the original tape must be removed and reperforated on the tape to be added. (Refer to step 3.) If adding information to tape at an intermediate point, place the tape to be revised on the cutting pins of the splicer with the printed character for the first line of perforations to be retained on the trailing end of the tape ***in line with*** the scribe mark. Cut and remove the tape from the splicer.

(2) Prepare to perforate a new section of tape starting with approximately 2 inches of blanks by depressing and holding the REPT key and momentarily operating the blank key (unmarked key at lower right of keyboard). Release REPT key.

(3) Perforate the new section of tape with added information, leaving approximately 2 inches of blanks on the trailing end. If the new section of tape is to be added to the end of the existing tape and the APTT is Issue 23D through 29D, the new section must begin with the trunk priming information for the trunk which was formerly last on the existing tape and must include information for the added trunk(s). The digit 2 or 3 associated with the TT line designation of the last trunk on a tape is used to signal the APTT to release all register relays previously operated at the completion of the test for the last trunk.

(4) Using the tape splicer, cut off all the blanks from the ends of the newly perforated tape. If new information is to be added to the end of the tape to be revised, cut off the blanks from the leading end only.

(5) Remove the backing and place the tape splicing patch on the block with the adhesive side up and the feed holes over the splicing pins.

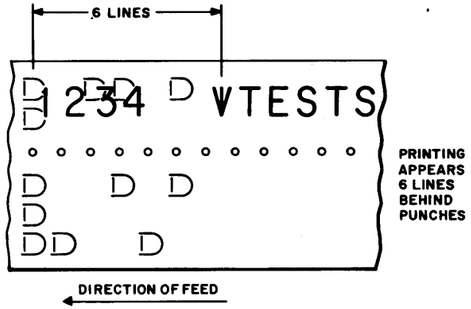
(6) Place the trailing end of the tape being revised and the leading end of the new tape-insert end-to-end with feed holes over the splicing pins and the end of each tape over one-half of the patch. Press the tapes down over the pins using the grooved bar supplied with the splicer. Exert sufficient pressure on the bar to form a good bond between tapes and splicing patch.

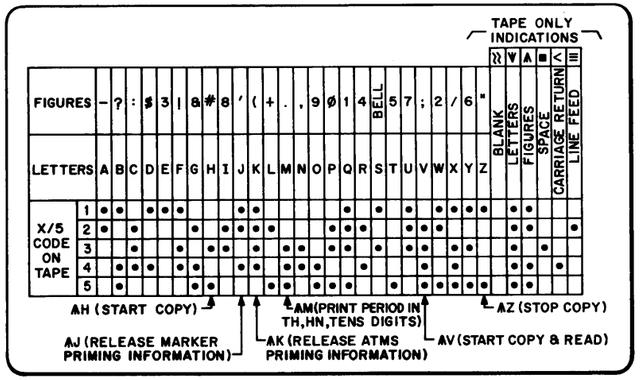
(7) Remove the tape from the splicer.

(8) If required, splice the trailing end of the new tape-insert and the leading end of the tape being revised using the method described in (6). Remove the tape from the splicer.

(9) Using the copying tape procedures in Part 6, make a duplicate of the spliced tape.

Note: When a tape is perforated, the printing lags the perforations by six spaces. When a tape is spliced to add a new section of tape, the six perforations preceding the splice lose the printing related to them as this printing is on the trailing end of the tape separated by the tape insert. When the spliced tape is copied, the perforations and printing on the duplicate tape will appear in their proper places.





MODIFIED A–TYPE KEYBOARD

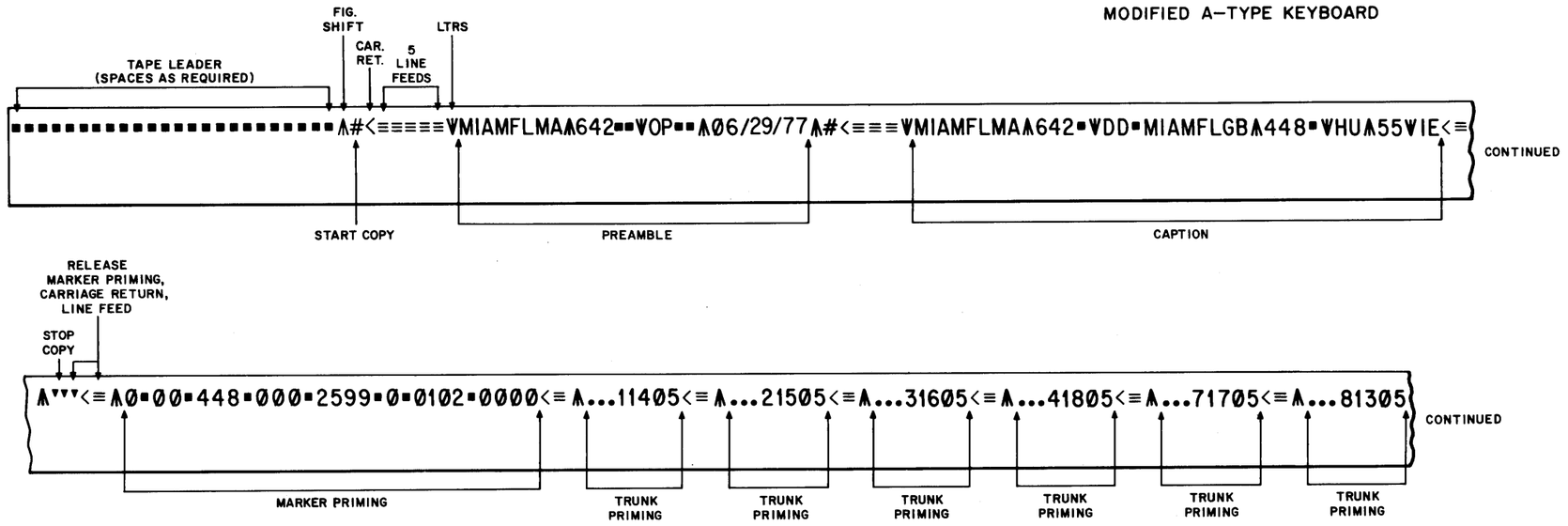


Fig. 2—Teletypewriter Tape

APTT-5XB: BSP 218-220-301 & -303
AOTT-4XB: BSP 212-512-301
AOTT-SXS: BSP 226-591-300
ALL: BSP 800-102-100

TAPE PREPARATION WORKSHEET
PREAMBLE INFORMATION

NO. 5 CROSSBAR APTT FRAME, ISSUE 30 AND LATER
NO. 4 CROSSBAR AOTT FRAME
STEP-BY-STEP AOTT FRAME

E-6121 (4/72)
SHEET_____OF _____
DATE _____

▨ INDICATES SPACE

APTT-5XB: ↑ #

AOTT-4XB: CTL DCO | RUB OUT | RUB OUT

AOTT-SXS: ↑ ↓ ↑ ↓ ↑ ↓

ALL:

						ORIGINATING OFFICE						TAPE		DATE		
						TOWN		STATE	BLDG	UNIT		TYPE		MONTH	DAY	YEAR
CRT	LNF	LNF	LNF	LNF	LNF	M I A M		F L	M A	6 4 2		0 P		Ø 6 /	2 9 /	7 7

ADDITIONAL PREAMBLE INFORMATION:

CRT	LNF	LNF
CRT	LNF	
CRT	LNF	
CRT	LNF	
CRT	LNF	
CRT	LNF	
CRT	LNF	
CRT	LNF	
CRT	LNF	
CRT	LNF	

NOTE: 1. TOTAL CHARACTERS IN THE ADDITIONAL PREAMBLE INFORMATION (INCLUDING CARRIAGE RETURNS AND LINE FEEDS) SHOULD NOT EXCEED 240.
2. INFORMATION IN SHADED AREAS SHALL NOT BE PERFORATED ON THE TAPE.

Fig 3—Sample of Tape Preparation Worksheet (Sheet 1 of 2)

BSP 218 – 220 – 301
218 – 220 – 303
800 – 102 – 100

TAPE PREPARATION WORKSHEET
NO. 5 CROSSBAR APTT FRAME
SD – 25938 – 01, ISSUE 30 AND LATER, WITH TAPE SIMPLIFICATION

E – 6122 (11/73)
Sheet 2 Of 2
Date 6-29-77
Tape Type OP1

GROUPING METHOD	TEST GROUP FACILITY	TEST LINE TYPE	ACCESS MODE
F TF ✓ T		TL TEST	SUBSCRIBER

CAPTION INFORMATION

TTY	ORIGINATING OFFICE					TERMINATING OFFICE					TRUNK TYPE				TTY
	TOWN	STATE	BLDG	UNIT	PULSING	TOWN	STATE	BLDG.	UNIT		TRAFFIC CLASS	OFFICE CLASSES	TRAFFIC USE	MODIFIER	
# < ≡ ≡ ≡	MIAMI	FL	MA	642	DD	MIAMI	FL	GB	448		HU	55	IE		< ≡

TTY	TEST GROUP		FACILITY IDENTIFICATION			FACILITY TERMINAL			TTY
	FACILITY		NUMBER	TYPE		TOWN	STATE	BLDG.	
< ≡	N1		101	N1		MIAMI	FL	GB	" < ≡

INDICATES SPACE

MARKER PRIMING

TTY	RET	MKG	TMT	TMU	A	B	C	OA/DDA	OB/DDB	OC/DDC	NTH	NH	NT	NU	X	CLT	CLU	TIT	TIU	AG-RA	CRG	CRU	CST	CSU
' < ≡		Ø	Ø	Ø	4	4	8	Ø	Ø	Ø	2	5	9	9	Ø	Ø	1	Ø	2	4	Ø	Ø	Ø	Ø

TRANSMISSION PRIMING

TTY	FE	TPL	EML	LOSS DEV	NOISE M.L.	NDL	NOISE I.A.L.	DR
(< ≡								

TRUNK PRIMING

TTY	ASN CST	ASH CSU	ITH	IHT	ITT	IUT	TRUNK NUMBER	FT/RDA	FU/RDB	TT/RDC	TU/RDD	RDE	#	CHAN NO.	"
< ≡															
< ≡							••• 1	1	4	Ø	5		#	Ø 5	"
< ≡							••• 2	1	5	Ø	5		#	Ø 6	"
< ≡							••• 4	1	8	Ø	5		#	1 Ø	"

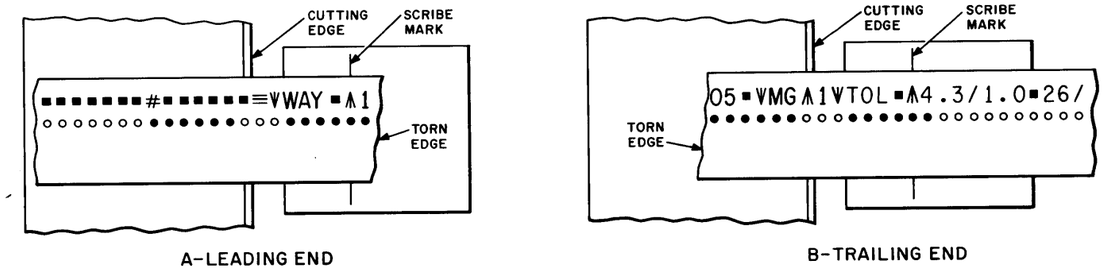
TRUNK PRIMING

TTY	ASN CST	ASH CSU	ITH	IHT	ITT	IUT	TRUNK NUMBER	FT/RDA	FU/RDB	TT/RDC	TU/RDD	RDE	#	CHAN NO.	"
< ≡															

NOTE: INFORMATION IN SHADED AREAS SHALL NOT BE PERFORATED ON THE TAPE

Fig. 3—Sample of Tape Preparation Worksheet (Sheet 2 of 2)

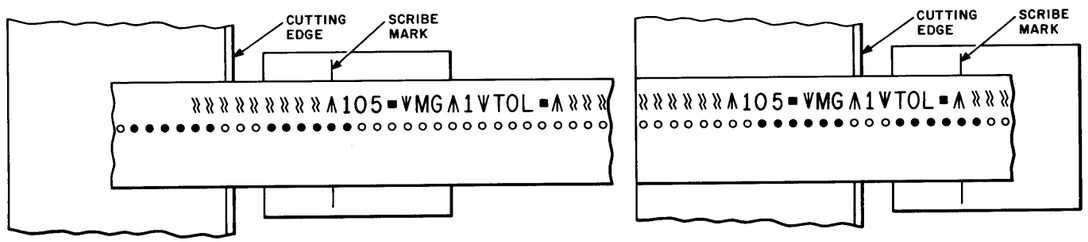
TORN TAPE



A-LEADING END

B-TRAILING END

NEW TAPE



C-LEADING END

D-TRAILING END

Fig. 4—Tape Splicing

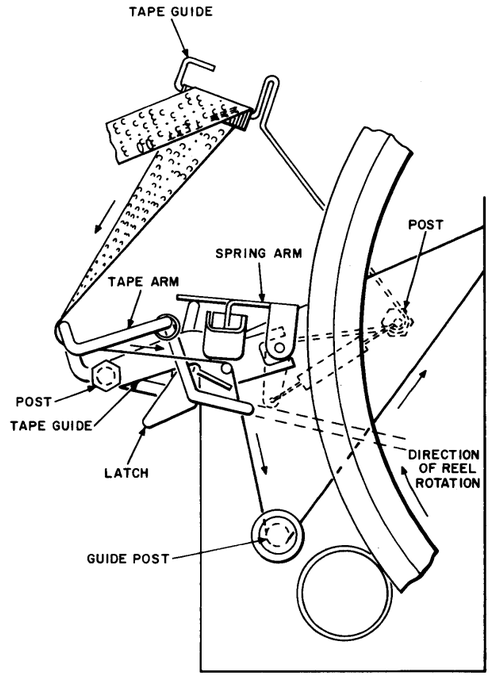


Fig. 5—Tape Threading Method For 5C Tape Winder

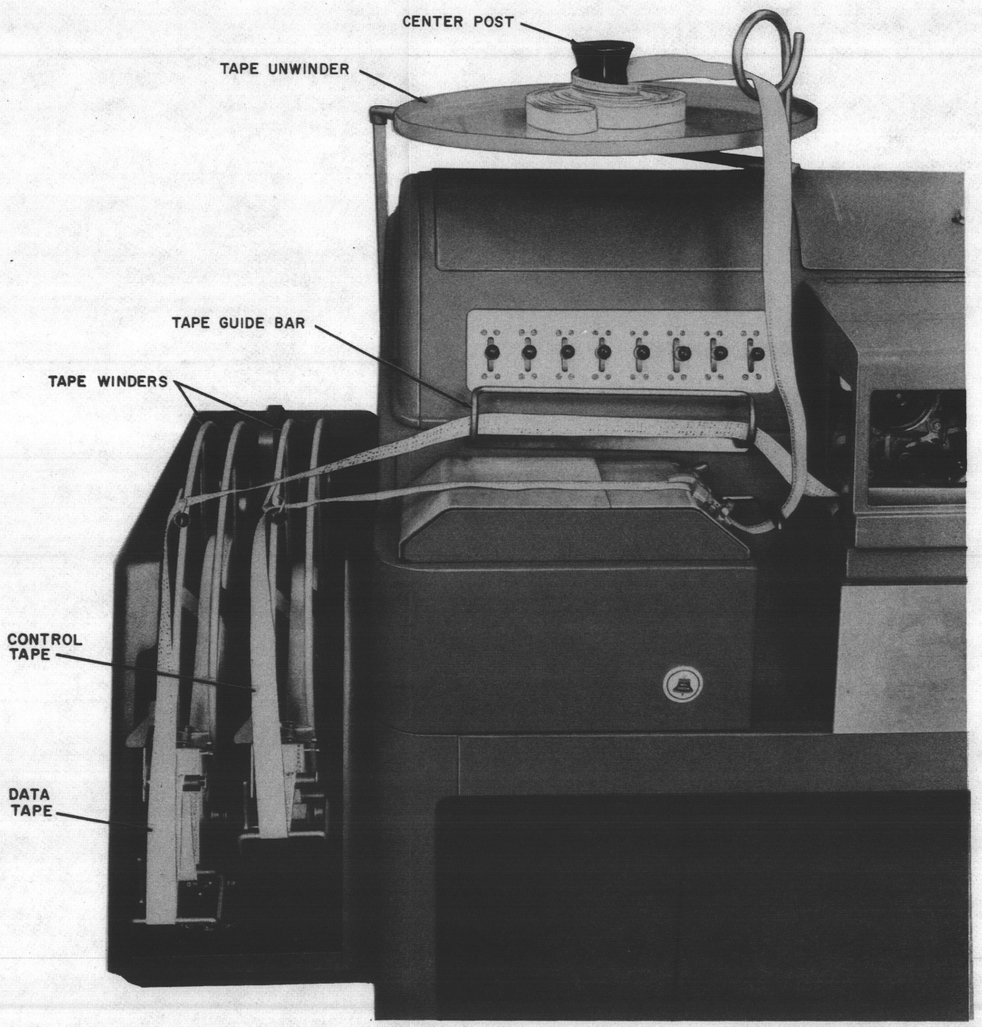


Fig. 6—28B Teletypewriter Set