TRUNK OPERATIONAL TESTS
USING AUTOMATIC PROGRESSION TRUNK TEST CIRCUIT SD-25938-01
NO. 5 CROSSBAR OFFICES

1. GENERAL

1.01 This section describes a control tape method and a particular circuit method of testing trunks and junctors using the automatic progression trunk test circuit (APTT) SD-25938-01 and remote office test lines. The trunks and junctors included are as follows:

- AIS trunks
- CAMA incoming trunk circuits
- CAMA intermarker group trunks
- CAMA junctors
- CCSA trunks
- Centrex trunks
- Data trunks
- Intermarker group trunks—subscriber to subscriber
- Intermarker group trunks—subscriber to trunk
- Intraoffice trunks
- Line link pulsing trunks
- Outgoing interoffice trunks
- Outgoing junctors
- Outgoing intertoll trunks
- Outgoing trunks from a remote office equipped with a remote office test line (ROTL).
- TSP(S) trunks
- 4-Wire 2-way trunks
- 4-Wire intraoffice trunks

1.02 This section is reissued for the reasons listed below. Revision arrows are used to emphasize the more significant changes. This reissue does not affect the Equipment Tests Lists.

(a) To add in Part 1 information regarding tests of trunks and junctors provided with AMA features when the No. 5 crossbar office is equipped with ETS.

(b) To add in Part 1 information regarding tests of CAMA trunks and junctors when the No. 5 crossbar office is equipped with ETS.

(c) To provide reference in Table A to (a) and (b) above.

(d) To make minor changes as required.

1.03 The tests covered are:

A. Supervision and Ringing: This test is an operational check of the outgoing trunk circuit in the originating or ROTL office and the incoming trunk circuit or selector in the distance office. It is also an operational check of intraoffice, intermarker group subscriber-to-subscriber, CAMA incoming, or CAMA intermarker group subscriber-to-subscriber trunks. The following features are checked:

Call to Test Line Through Intraoffice Trunks or Subscriber-to-Subscriber Intermarker Group Trunk to Terminating Test Line in Test Circuit

(1) Continuity of sleeve leads. (2) Operation of S relay. (3) Continuity and polarity of originating tip and ring leads. (4) Ability of S1 relay to hold if extra digits are dialed into trunk. (5) Application of ringing. (6) Ringing pretrip. (7) Ringing trip. (8) Continuity and polarity of terminating tip and ring leads. (9) Release of S relay. (10) Check for slow release of S1 relay. (11) Station transfer, IAO only.

Call Through Outgoing Trunk From APTT or ROTL Office to Test Line or Test Trunk in Distant Panel, Crossbar, or Step-by-Step Office

(12) Supervision in the outgoing trunk. (13) Supervision, ringing, pretripping, and tripping in the incoming trunk or selector. (14) Station transfer.

Call Through Subscriber-to-Subscriber CAMA Intermarker Group Trunk or CAMA Incoming Trunk Arranged for Local Completion to Terminating Test Line in Test Circuit

(15) Continuity of sleeve lead. (16) Operation of A or S relay. (17) Continuity and polarity of originating tip and ring leads. (18) Application of ringing. (19) Ringing pretrip. (20) Ringing trip. (21) Continuity and polarity of terminating tip and ring leads.

B. Charge—Nonovertime: This test checks the ability of a trunk or a CAMA junctor to charge when a call is answered for 5 seconds. The following features are checked:

All Trunks and CAMA Junctors (Except CAMA Trunk Circuits)

(1) Continuity of sleeve leads. (2) Operation of S relay. (3) Continuity and polarity of originating tip and ring leads. (4) Removal of ringing (intraoffice and intermarker group trunks). (5) Continuity and polarity of terminating tip and ring leads. (6) Operation of CS relay. (7) Release of CS relay.

CAMA Incoming Trunk Circuits

(8) Continuity and polarity of originating tip and ring leads. (9) Nonbylink, ground shunt on an A relay as required. (10) Operation of A relay. (11) Release of A relay. (12) Removal of ringing (local completion). (13) Continuity and polarity of terminating tip and ring leads (local completion). (14) Operation of CS relay. (15) Release of CS relay.

CAMA Intermarker Group Trunks

(16) Continuity and polarity of originating tip and ring leads. (17) Operation of S relay. (18) Release of S relay. (19) Removal of ringing (subscriber-to-subscriber type). (20) Continuity and polarity of terminating tip and ring leads (subscriber-to-subscriber type). (21) Operation of CS relay. (22) Release of CS relay.

AMA and CAMA Trunks and CAMA Junctors

(23) Ability of trunk or CAMA junctor to cause call identity indexer to forward trunk number to recorder for initial entry. (24) Request for answer entry. (25) Request for disconnect entry (trunks arranged to initiate disconnect entry). (26) Omission of disconnect entry (trunks arranged to omit disconnect entry).

Message Register Trunks

(27) Ability to recognize whether tip or ring party originated the call. (28) Application of message register potential for the required interval. (29) Connection held through varistor during time sleeve is being transferred to message register potential.

Coin Trunks

(30) Collection of coin.

Centrex Trunks With Repeated Supervision

(31) Checks that supervision is repeated.

C. Noncharge: This test checks that a charge condition is not established when an answered call is held for less than 2 seconds for 2-wire trunks or is held for less than 1 to

1.4 seconds for 4-wire trunks. The following features are checked:

All Trunks (Except CAMA Trunk Circuits and CAMA Junctors)

(1) Continuity of sleeve leads. (2) Operation of S relay. (3) Continuity and polarity of originating tip and ring leads. (4) Removal of ring (intraoffice and intermarker group trunks). (5) Continuity and polarity of terminating tip and ring leads. (6) Ability of S1 relay to hold if extra digits are dialed (outgoing trunks). (7) Operation of CS relay (outgoing trunks). (8) Release of CS relay (outgoing trunks). (9) Release of S relay (outgoing trunks). (10) Check for slow release of S1 relay.

CAMA Junctors

(11) Operation of S relay. (12) Release of S relay. (13) Continuity and polarity of originating tip and ring leads. (14) Ability of S1 relay to hold if extra digits are dialed. (15) Operation of CS relay. (16) Release of CS relay. (17) Check for slow release of S1 relay.

CAMA Incoming Trunk Circuits

(18) Continuity and polarity of originating tip and ring leads (except E and M lead supervision). (19) Operation of A relay (except E and M lead supervision). (20) Release of A relay. (21) Removal of ringing (local completion). (22) Continuity and polarity of terminating tip and ring leads (local completion). (23) Operation of CS relay. (24) Release of CS relay.

CAMA Intermarker Group Trunks

(25) Continuity and polarity of originating tip and ring leads. (26) Operation of S relay. (27) Release of S relay. (28) Removal of ringing (subscriber-to-subscriber type). (29) Continuity and polarity of terminating tip and ring leads (subscriber-to-subscriber type). (30) Operation of CS relay. (31) Release of CS relay. (32) Check for slow S1 relay.

AMA and CAMA Trunks and CAMA Junctors

(33) Ability of trunk to cause call identity indexer to forward trunk number to recorder for initial entry. (34) No request for answer entry.

Message Register Trunks

(35) No message register potential applied.

Coin Trunks

(36) Return of coin.

LUNKs

(37) Ability of preemptible LUNKs to return preemption signal toward a PBX.

D. Initial and Overtime Charges—Trunks Arranged for Message Register or Coin Operation With Timing: This test checks the ability of these trunks to charge for initial and overtime talking periods. The following features are checked:

Message Register Trunks

(1) Ability to recognize whether tip or ring party originated call. (2) Application of message register potential for the required interval. (3) Connection held through varistor during time sleeve is being transferred to message register potential. (4) Application of message register potential 5 seconds after end of initial interval. (5) Timer locked under control of HD cam to prevent false charging (nonwire-spring-relay type trunks).

Coin Trunks—Offices Equipped With Only Nonwire-Spring-Relay Type Trunks

(6) Collection of initial deposit 3-1/2 or 4-1/2 minutes after call is answered. (7) Test for overtime deposit. (8) Return of overtime deposit on disconnect after test for overtime deposit but before charge condition is reestablished.

Coin Trunks—Offices Equipped With Only Wire-Spring-Relay Type Trunks or Both Wire-Spring-Relay Type and Nonwire-Spring- Relay Type Trunks

(9) Collection of initial deposit. (10) Test for initial overtime deposit. (11) Collection of initial overtime deposit. (12) Test for subsequent overtime deposit. (13) Return of subsequent overtime deposit on disconnect after test for subsequent overtime deposit but before charge condition is reestablished.

E. Call to Free Line—Intraoffice Trunks Arranged for Message Register, AMA, or Coin Operation: This test checks that no charge is made when a call to a free line is answered for over 5 seconds. The following features are checked: (1) No charge made when using message register trunks. (2) No request for answer or disconnect entry when using AMA trunks. (3) Return of coin or disconnect when using coin trunks.

F. Timed Release—Originating End Holding: This test checks the ability of 2-wire and 4-wire trunks to release with 13 to 32 seconds after called customer disconnects and calling customer fails to disconnect. The following features are checked: (1) Release of flat rate, ANI, or message register trunks. (2) Release of calling line and request for disconnect entry when using AMA or CAMA trunk arranged to initiate disconnect entry. (3) Release of calling line and omission of disconnect entry when using AMA or CAMA trunk arranged to omit disconnect entry. (4) Collection of coin and release of coin trunk.

G. Timed Release—Terminating End Holding—Intraoffice and Intermarker Group Trunks: This test checks the ability of 2-wire and 4-wire trunks to release within 13 to 32 seconds after calling customer disconnects and called customer fails to disconnect. The following features are checked: (1) Release of flat rate, ANI, message register, CAMA, and AMA trunks. (2) Collection of coin on calling customer disconnect and release of coin trunk.

H. Cancel Disconnect Entry—Trunks Arranged for AMA or CAMA Operation and Initiation of Disconnect Entry: This test checks the ability to cancel request for a disconnect entry if the entry is not made within 5 seconds after calling customer disconnects.

Caution: This test should be performed only during periods of light traffic because the AMA recorder appears busy to all other trunks associated with that recorder. These trunks are prevented from initiating timing entries for approximately 6 seconds.

I. Ability of Trunk to Cause Call Identity Indexer to Forward the Trunk Number to Recorder for Initial Entry—Trunks Arranged for AMA or CAMA Operation: This test is a rapid test made to check the continuity of the trunk identifier check (TIC) leads through trunk and associated circuits.

J. Call to Busy Line in Distant Panel or Crossbar Office: This test is a functional check of the outgoing trunk circuit, intermarker group subscriber-to-trunk trunks, or junctors including supervision in the originating office and the incoming trunk circuit or selector in the distant office. This test also checks the function of establishing the connector to the busy line and that the outgoing trunk supervisory CS relay responds to busy-back flashes. These flashes are not checked if a tone detector is furnished.

K. Continuity and Polarity Test: This test checks the continuity and polarity of each outgoing trunk cable pair except on junctor operation, outgoing trunks using simplex supervision, outgoing or intermarker group subscriber-to-trunk circuits, or if outgoing trunk is connected to an auxiliary trunk which converts reverse battery supervision to E and M lead supervision. When the incoming trunks in the distant office normally have battery on tip side, operation of REV key is required.

L. Line Link Pulsing Test: This test checks that the tripping diode is correctly poled and not open or shorted. This test also includes operate and release test of the called end supervision (CS) relay and control of the ringing trip check (RTK) lead.

M. Centrex Don't Answer Transfer Test: This test checks that the centrex IAO and ITDO trunks will initiate ringing and, if an off-hook signal is not returned in 15, 30, 45, or 60 seconds, a don't answer transfer is automatically initiated.

N. Glare Test: This test checks that when glare is detected on a 2-way intertoll trunk reorder will be sent to the calling customer, the outgoing call released, and the incoming call accepted.

O. Outgoing Trunks to TSP(S): This test checks the following features of TSP(S) trunks: (1) Answer sleeve and terminating end of trunk. (2) Originating continuity and polarity tests (3) ACP (A relay continuity and check) contacts (4) S1 hold test—non charge (5) CS relay operate test (6) Recall conditions (7) Operator return and collect of coins (8) Terminating hold test (9) Disconnect of terminating test line.

1.04 Centrex trunks are used for completing either centrex- or noncentrex-type calls. The only function peculiar to a centrex class call is the ability of the trunk to provide station transfer and don't answer transfer. Because of this arrangement, don't answer transfer test calls must be made on a separate test. Station transfer features are made following normal trunk tests when centrex class test is used. The repeated supervision feature is checked under the charge-nonovertime test.

1.05 The following features are not tested by this section:

(a) Message register timing features of trunks using 1B timers

(b) Coin timing features of outgoing trunk SD-25739-01

(c) Coin timing features of intraoffice trunk SD-25737-01 not provided with X wiring.

1.06 In Test G, there is a possibility that the trunk will be seized on a service call during the timeout interval since some trunks do not hold themselves busy while the called end is holding. If one of the above mentioned trunks fails when performing Test G using control tape, verify the failure by making the trunk busy and retesting on a particular circuit basis.

1.07 The APTT may be arranged to pass by a trunk group under test whenever unexpected audible ring is received on any two trunks in the group. If a voice announcement is received, only that trunk under test is bypassed and the next trunk in the group is tested. A new arrangement may be provided for the APTT to pass by the trunk group whenever unexpected audible ring is detected on one trunk and voice announcement on another, or voice announcement is detected on any two trunks, or unexpected audible ring is detected on any two trunks.

1.08 If a control tape contains trunks for which a particular test does not apply, the test circuit will pass by those trunks. The test circuit decides to test or pass by a trunk by comparing information recorded on the control tape against operated keys as shown in Table A.

1.09 For each trunk that is to be tested, the test circuit requires priming information. When the test circuit is operated on an automatic basis, the required information is supplied by control tapes. When the test circuit is operated on a particular circuit basis, the required information must be supplied by operation of the keys or switches on the test frame. The keys, 0 through 9, or switches (one per line of input information), that must be operated are shown in particular circuit charts (worksheets) prepared in accordance with Section 218-220-301 when a Model 14 or 28A transmitter-distributor is provided or Section 218-220-302 when a 28A or 28B teletypewriter set is provided.

1.10 Switch control of priming information may be provided for any vintage of the APTT. Rotary switches, one per line of input information, may be used to replace the 0 to 9 (G-type) keys presently used. Using the G-type keys makes it necessary to sequentially key in all the information required to direct the trunk tests. The number of lines of input required varies according to the features incorporated in the particular frame, but requires considerable effort in priming since all digits have to be repeated for each trunk tested where the key method is used. When manually selecting a particular trunk using the switch control method, only the trunk location information (4 lines) need be changed from one trunk entry to another when the trunks are in the same group. This method requires only the resetting of the switches for those four lines instead of repeating all lines of input.

1.11 The ability to request any trunk at random may be provided for any vintage of the APTT but is limited to particular circuit selection only. This may be done by marker priming

information sufficient enough to enable it to pick a trunk from a selected route. As in service calls, any idle trunk will be selected. The APTT will register and store the location of the trunk, as it is identified during marker selection, for possible use in printout if the trunk encounters a busy or trouble condition.

1.12 ▮When the No. 5 crossbar office is equipped with ETS, the function of AMA recorders, transverters, and translators are performed by ETS software. The charge timing, cancel disconnect, initial entry, answer and disconnect entry tests are removed from the APTT and transferred to control and audit programs provided by the ETS processor. Therefore, in an ETS No. 5 crossbar office, when testing trunks or junctors having AMA features, select the trunks as flat rate (FR) class rather than AMA class of trunk.

1.13 Tests of CAMA trunks and junctors using the APTT in a No. 5 crossbar office equipped with ETS are essentially the same as pre-ETS operation, even though the CAMA transverter and recorder are removed. However, the recorder number lamps, the cancel disconnect entry test, and control and testing of the charge lead are eliminated. The "entry functions" will continue to be registered by the APTT frame.◀

1.14 A loudspeaker to permit monitoring of test progress may be provided for any vintage of the APTT. This loudspeaker is equipped with a volume control and is energized whenever the test circuit is in use.

1.15 When the APTT is used in conjunction with the 28A or 28B teletypewriter set to perform trunk tests using control tapes, a busy or trouble retest tape and/or printout will be produced if any trunk under test fails to satisfactorily complete a test. Refer to CD-25938-01 for interpretation of printout, operational failure marks, and explanation of busy or trouble retest tape.

1.16 The ability to perforate a retest tape for any trunk found to be busy or in trouble, when the APTT has been directed to test that trunk, may be provided for post issue 30 vintages of the APTT. At the completion of testing, the tape produced as the result of such busy or trouble conditions may be used as a new input tape thereby enabling retest. Key control to read only the busy trunks or trunks in trouble is provided to allow either of these conditions to be entered on the retest tape.

1.17 The method for loading a Model 14 or 28A reperforator with nonperforated tape is covered in Section 218-220-302. The method for loading a Model 14 or 28A transmitter-distributor with a control tape is covered in this section. The method of loading a 28A or 28B teletypewriter with nonperforated tape, paper, or control tape is also covered in this section.

1.18 ***Lettered Steps:*** The letters a, b, c, etc, added to a step number in Parts 3 and 4 of this section indicate an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

2.01 When a Model 14 or 28A transmitter-distributor and reperforator are furnished, the following associated apparatus is required:

(a) RPEC200BH cover (for Model 14 reperforator)

(b) TP115753BH tape winder

(c) TP103035 tape unwinder

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

2.02 When the 28A or 28B teletypewriter is furnished, the following associated apparatus is required:

(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.

3. PREPARATION

3.01 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. 1) 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. 1 and 2. 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.

3.02 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.

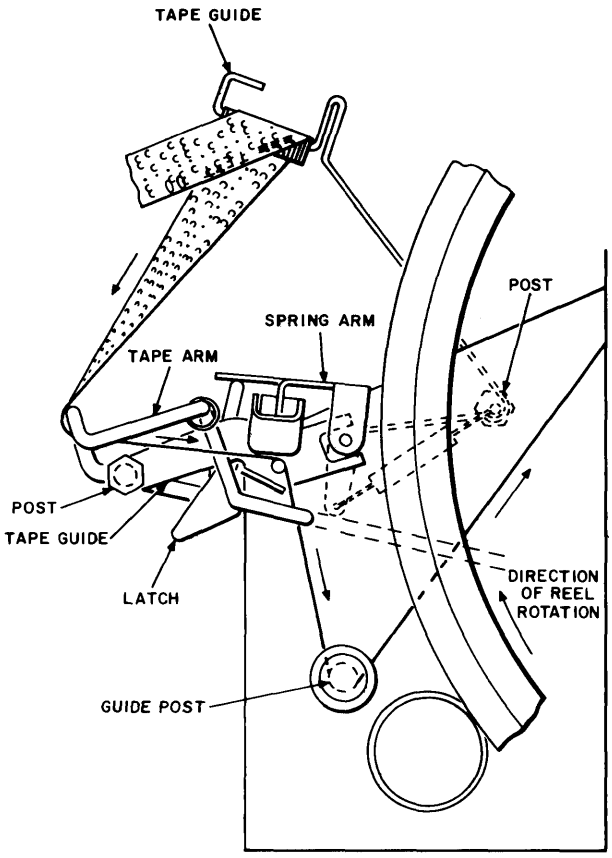

Fig. 1—Tape Threading Method for 5C Tape Winder

3. PREPARATION (Cont)

STEP	ACTION	VERIFICATION
All Tests		
1	At test frame— Restore all keys and switches.	
2	After 5 seconds— Momentarily operate RL key.	All lamps extinguished.
3	Operate LP key.	DW lamp lighted.
4	Restore LP key.	DW lamp extinguished.
All Tests—Control Tape Method (Using Model 14 or 28A Transmitter-Distributor)		
5	At teletypewriter equipment— Set TRS DISTR, TAPE STOP switches to OFF.	Transmitter-distributor motor not running.

STEP	ACTION	VERIFICATION

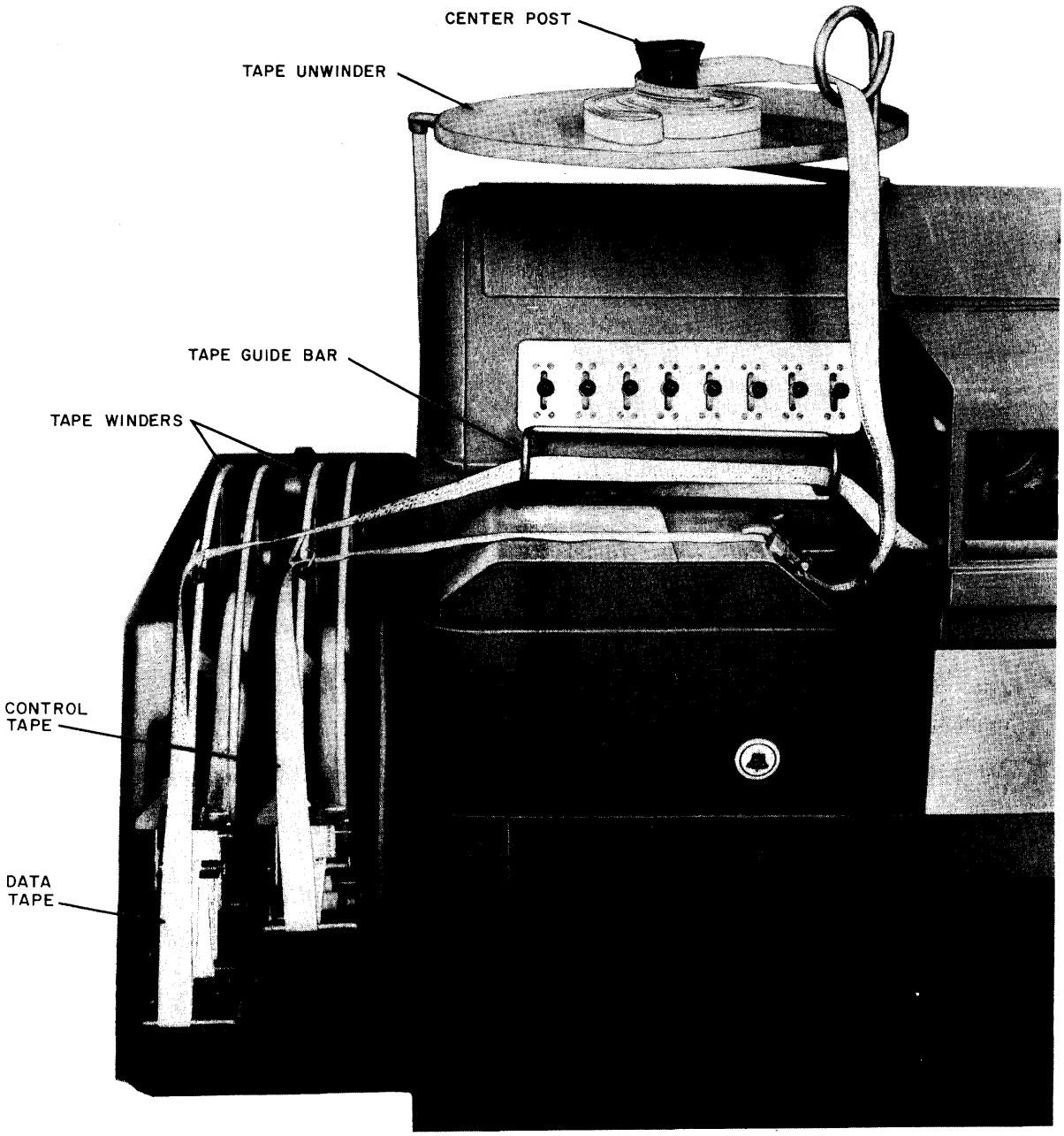

Fig. 2—28B Teletypewriter Set

6 Insert Hubbell cap on cord from transmitter-distributor into TRS DIST Hubbell receptacle.

7 Insert 21-prong, H. B. Jones plug into H. B. Jones plug socket.

STEP	ACTION	VERIFICATION
8	Push in stop-pin on tape winder associated with transmitter-distributor. Turn winding key until winder motor spring is fully wound.	
9	Select control tape containing trunks to be tested. Place tape in unwinder.	
10	Unwind sufficient tape leader from inner side of tape roll to permit attachment at tape winder.	
11	Lift retaining lid on transmitter-distributor. Insert control tape into tape guide so that space preceding first line of trunk information for first trunk to be tested is directly over tape reading pins and feed wheel engages traction holes in tape. Close retaining lid. ***Note:*** A line of five holes in tape is not part of trunk information.	
12	Remove outer side plate of tape winder reel. Pass leading end of tape under tape stop arm of winder. Insert leading end in slit of winder core. Replace outer side plate of reel.	
13	Pull out stop-pin of winder. Guide tape manually into winder.	Slack in tape taken up.
14	Set TAPE STOP, TRS DISTR switches to ON.	Transmitter-distributor motor running.
15	At test frame— Operate keys and switches in accordance with Table A for test to be made.	
All Tests—Control Tape Method (Using 28A or 28B Teletypewriter Set)		
16	At teletypewriter— Restore all keys.	
17	Determine that teletypewriter has sufficient supply of paper and paper is engaged in paper winder (paragraph 3.02).	
18	Determine that reperforator has sufficient supply of tape and tape is threaded and engaged in outside (left) tape winder (paragraph 3.01).	
19	Select control tape containing trunks to be tested. Place tape on unwinder.	

STEP	ACTION	VERIFICATION
20	Unwind sufficient tape leader from inner side of tape roll to permit attachment at tape winder.	
21	Set tape read switch of transmitter-distributor to STOP.	
	Caution: Pin will tear tape if switch is in RUN position when tape is placed in transmitter-distributor.	
22	Open tape gate of transmitter-distributor.	
23	Place tape feed holes over feed pins of the transmitter-distributor. The first printed character or symbol on the tape is to be aligned with the engraved guide line.	
24	Close tape gate.	
25	Set tape read switch to RUN.	
26	Install tape on inside (right) reel of tape winder.	
27	Set tape winder switch to ON.	
28	Set K-KT-T switch to KT.	
29	At test frame— Operate keys and switches in accordance with Table A for test to be made.	
30a	If audible alarm is ***not*** desired on trunk trouble printout— Operate TTAL key.	TTAL lamp lighted.
31b	If test is to be stopped after two printout failures— Operate CRCY key.	

All Tests—Particular Circuit Method

32c	If particular circuit selection is by switch control— Operate PCS key.	
33d	If particular circuit selection is by key control— Operate PC key.	
34	Operate REP key.	

STEP	ACTION	VERIFICATION
	Note: When repeat timed release tests of CAMA incoming trunk circuits or CAMA intermarker group trunks are made, false indications may result; therefore, these tests should not be repeated by use of the REP or REP1 key.	
35e	If random trunk selection capabilities are provided and if desired— Operate RDM key.	RDM lamp lighted.
36	Operate keys and switches in accordance with Table A for test to be made.	
37	Operate LP key.	DW lamp lighted.

4. METHOD

STEP	ACTION	VERIFICATION
	All Tests—Control Tape Method (Using Model 14 or 28A Transmitter-Distributor)	
38	Momentarily operate ST key. ***Note:*** Test may be started automatically by setting AST timer to desired starting time and operating AST key.	Tests of trunk on tape started. When all trunks on tape have been tested or passed— EC lamp lighted. Minor alarm heard after timing interval.
39	Momentarily operate RL key.	Minor alarm silenced. All lamps extinguished.
40	Restore all keys and switches.	
41	At teletypewriter equipment— Set TRS DISTR, TAPE STOP switches to OFF.	Transmitter-distributor motor not running.
42	Push in stop-pin of winder. Remove tape from transmitter-distributor and winder.	
	All Tests—Control Tape Method (Using 28A or 28B Teletypewriter Set)	
43	At test frame— Momentarily operate ST key. ***Note:*** Test may be started automatically by setting AST timer to desired starting time and operating AST key.	Tests of trunk started. FG lamp lighted. If troubles or busy trunks are encountered— Busy retest tape and page printout produced. If TTAL key is normal— Minor alarm sounds. When all trunks on tape have been tested or

STEP	ACTION	VERIFICATION
		passed— EC lamp lighted.
44	Momentarily operate RL key.	All lamps extinguished.
45	At teletypewriter and test frame— Restore all keys and switches.	
46	At teletypewriter set— Remove tapes from tape winders.	
	All Tests—Particular Circuit Method Using Key Control (Model 14 or 28A Transmitter-Distributor or 28A Teletypewriter Set)	
47	At test frame— Momentarily operate ST key.	KEY lamp lighted. Lamp indicating first priming digit lighted. DW lamp extinguished.
48	Operate 0 through 9 keys for first priming digit at trunk to be tested using information listed on particular circuit chart (worksheet).	K- lamps lighted corresponding to digit key operated. KEY lamp momentarily extinguished. Lamp indicating first priming digit extinguished. Lamp indicating second priming digit lighted.
49	Repeat Step 48 for each priming digit listed on particular circuit chart.	When test frame is primed with last digit— KEY lamp extinguished. TC lamp flashes at completion of each repeated test.
50f	If change of test in progress is desired— Operate CA key.	TC lamp lighted.
51f	Restore any operated keys and switches listed in Table A.	
52f	Operate keys and switches in accordance with Table A for desired test.	
53f	Restore CA key.	TC lamp flashes at completion of each repeated test.
54	When desired number of repeat tests have been made— Restore REP key.	When test in progress is completed— KEY, A lamps lighted.
55	Momentarily operate RL key. *Note:* When testing trunks arranged for coin operation, CA key should be operated before RL key in order to permit the coin	DW lamp lighted.

STEP	ACTION	VERIFICATION
	supervisory circuit to complete its functions satisfactorily.	
56	Restore all keys and switches.	All lamps extinguished.
	All Tests—Particular Circuit Method Using Switch Control (Model 14 or 28A Transmitter-Distributor or 28A Teletypewriter Set)	
57	Set keys and switches as required for particular test and marker priming.	Lamps lighted corresponding to switch settings for priming information.
58e	If random trunk selection is desired— Set FU, TBT, TBU switches to OFF.	
59	Momentarily operate ST key.	When marker is primed with last digit— EOD lamp lighted.
60f	If change of test in progress is desired— Operate CA key.	
61f	Reset switches to desired positions.	
62f	Restore CA key.	
63	When desired number of repeat tests have been made— Restore REP key.	
64	Momentarily operate RL key.	DW lamp lighted.
65	Restore all keys and switches.	
	All Tests—Particular Circuit Method Using Key Control (28B Teletypewriter)	
66	Operate ST key.	DW lamp momentarily lighted. FG lamp lighted. KEY lamp lighted.
67	Momentarily operate PM key.	Key lamp momentarily extinguished.
68	Operate FIG key.	KEY lamp momentarily extinguished. MKG lamp lighted.
69	Operate 0 through 2 keys for first marker priming digit of trunk to be tested using information listed on particular circuit chart.	MKG0-2(registration)lamps lighted corresponding to key operated. MKG (steering) lamp extinguished. TMT lamp lighted. KEY lamp momentarily extinguished.

STEP	ACTION	VERIFICATION
70	Repeat Step 69 for each marker priming digit listed on particular circuit chart.	Steering lamp lighted for next marker priming digit to be keyed. Steering lamp for preceding digit extinguished. Registration lamps 0 through 7 lighted corresponding to key operated. KEY lamp momentarily extinguished.
71	Momentarily operate FIG key.	Steering lamp for first trunk priming digit lighted. KEY lamp momentarily extinguished.
72	Operate 0 through 9 keys for first trunk priming digit of trunk to be tested using information listed on particular circuit chart.	Registration lamps 0 through 7 lighted corresponding to key operated. Steering lamp for first trunk priming digit extinguished. Steering lamp for second trunk priming digit lighted. KEY lamp momentarily extinguished.
73	Repeat Steps 71 and 72 for each trunk priming digit listed on particular circuit chart.	Steering lamp lighted for next trunk priming digit to be keyed. Steering lamp for preceding digit extinguished. Registration lamps 0 through 7 lighted corresponding to digit keyed. KEY lamp momentarily extinguished. After last digit of trunk priming keyed— KEY lamp extinguished. EOD lamp lighted. TC lamp flashes at completion of each repeated test.
74f	If change of test in progress is desired— Operate CA key.	TC lamp lighted.
75f	Restore any operated keys and switches listed in Table A.	
76f	Operate keys listed in Table A for desired test.	
77f	Restore CA key.	When provided, and troubles or busy trunks are encountered— Page printout produced. TC lamp flashes at completion of each repeated test.
78g	If more than one trunk in same group is to be tested— Restore REP key.	TC lamp lights at completion of test.
79g	Operate REP key.	

STEP	ACTION	VERIFICATION
80g	Momentarily operate FIG key.	KEY lamp lighted.
81g	Repeat Steps 72, 73 for additional trunks to be tested.	When provided, and troubles or busy trunks are encountered— Page printout produced.
82	When desired number of repeat tests have been made— Restore REP key.	When test in progress is completed— KEY, FG lamps lighted.
83	Momentarily operate RL key. ***Note:*** When testing trunks arranged for coin operation, CA key should be operated before RL key in order to permit the coin supervisory circuit to complete its functions satisfactorily.	
84	Restore all keys and switches.	All lamps extinguished.
All Tests—Particular Circuit Method Using Switch Control (28B Teletypewriter)		
85	Set keys and switches as required for particular test and marker priming.	Lamps lighted corresponding to switch settings for priming information.
86e	If random trunk selection is desired— Set FU, TBT, TBU switches to OFF.	
87	Momentarily operate ST key.	When marker is primed with last digit— EOD lamp lighted.
88f	If change of test in progress is desired— Operate CA key.	
89f	Reset switches to desired positions.	
90f	Restore CA key.	When provided and troubles or busy trunks are encountered— Page printout produced. TC lamp flashes at completion of each repeated test.
91h	If more than one trunk in the same group is to be tested— Restore REP key.	TC lamp lights at completion of test.
92h	Operate REP key.	
93h	Repeat Steps 89f, 90f for additional trunks to be tested.	When provided and troubles or busy trunks are encountered— Page printout produced.

STEP	ACTION	VERIFICATION
94h	When desired number of repeat tests have been made— Restore REP key.	
95	Momentarily operate RL key.	

BPB (NOTE 19)	BY- (NOTE 20)	REP (NOTES 14, 21)	REV (NOTE 22)	TU (NOTE 23)	CDLY (NOTE 24)	RTB (NOTE 25)	RTT (NOTE 26)	BRT (NOTE 27)	PDT (NOTE 28)	RTU (NOTE 29)	CFB (NOTE 30)	RAP (NOTE 31)
✓	✓	✓				✓	✓	✓	✓	✓	✓	✓
✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
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✓	✓	✓						✓	✓	✓	✓	✓
✓	✓	✓		✓		✓	✓	✓			✓	

.ttempt to seize a busy trunk
es, operate the BY4 or BY6

ɜst call one time, operate

ɜ in distant office normally
ip side, operate REV key.

ı to a nonoccupied operator

efore charge or noncharge
Y key. A test failure may be
iently cooled RL relay. Re-
th the CDLY key in the
ion.

runks on a busy retest tape,
TTY only).

26. To test only trunks on a busy retest tape that indicate trouble conditions, operate RTT key (28A TTY only).

27. To obtain busy retest tapes and page printout, operate BRT key.

28. If provided and data tape is desired, operate PDT key.

29. If provided and remote printout is desired, operate RTU key.

30. To prevent frame blockage due to a tape reading failure, operate CFB key (used during unattended operation).

31. If provided and printout is desired on audible announcement, operate RAP key.