OUTGOING TRUNK TEST FRAME TEST

CONTENTS

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1. GENERAL INFORMATION

1.1 Description of Test

1.11 This section describes the test of the Outgoing Trunk Test Frame SD-25177 (when SD-95476 is furnished, use Sections 40 and 40.1 of Handbook 50). Paragraphs 4 to 7 apply to the circuit as a whole. Paragraphs 8 to 17 have been designed to cover the major divisions of the test circuit. Individually, these paragraphs do not constitute a complete test of their respective circuit divisions for in some cases where the circuit functions of the divisions are interdependent it has been advisable to combine the test procedure in one of the paragraphs. No attempt has been made to point out the test combinations. The sequence of Paragraphs 4 to 17 has been selected as a suggested test procedure in order to avoid the use of large quantities of untested apparatus.

1.12 The test of the Revertive Pulsing and Steering Circuit, the Call Indicator Pulsing Circuit and the MF Pulsing Circuit, Paragraphs 9, 10 and 11 respectively are made using the Preliminary Sender Test Set ITE-2990, the RCI Unit Sender Test Set ITE-2886 and the MF Key Pulsing Test Set ITE-4253. The tests on the remaining circuit divisions are made by simulating trouble conditions and applying operating tests.

1.13 Paragraph 18 provides specific information for testing the test frame RTL jack circuit and for testing the OGTTF test circuit SD-96370. Test cross-references are also provided for all other miscellaneous circuits associated with the test frame for which specific or general test methods are available.

1.14 When a test selection circuit (SD-25437) for terminating senders is provided the connections to the test frame are tested in accordance with Section 515 of Handbook 63, covering the test of the test selection circuit. ←

1.15 The test of equipment or features described in this section but not specified for a particular job may be disregarded.

2. RECORDS AND REQUIREMENTS

2.1 Records: SD-4-1313 and SD-4-1315 Trouble Records shall be used for this test. See Handbook 50, Section 3. ←

2.2 Requirements: All tests listed in this section are supplementary and should be completed before the concentrated load test is made.

3. TESTING EQUIPMENT

NOTE: This is a complete list of test equipment required for test. Individual lists are provided for each major paragraph covering the test of a division of the circuit.

3.1 Test Sets and Accessories

Amt	Code or ITE	Description	With ITE
1	2886	Sender Test Set - RCI Unit	
1	2990	Sender Test Set - Universal Preliminary	
1	1883	Wheatstone Bridge	
1	2502	Two-Scale Current Flow Set	

Amt	Code or ITE	Description	With ITE
1	4171	Secondary Std. Meter	
1	4034 or 4442	Volt-Ohmmeter Volt-Ohmmeter	
2	298A	Make Busy Plug	4023
2	2260	Call Wire Jack	4023
1	4011	Miscellaneous Trunk Test Set	
2	298A	Make busy plug	4023
1	322A	Make busy plug	4023
1	R-9572	Test Receiver	4023
1	4253	MF Key Pulsing Test Set	
1	R-2674	Ground Adapter	4253
%1	J94723 or 4029	Pulse Checking Test Set	
As Req.	8507	Alligator Clip	4011

% When telephone company's J94723 test set is available, ITE-4029 test set is not required.

3.2 Cords

Amt	ITE	Lgth	Cdrs	One End	Other End	With ITE
2	9500	6'	1	Spade Clip	Allig. Clip	2502
2	9601	12'	3	310 Plug	310 Plug	4023
4	9547	12'	1	ITE-2455	ITE-2455	4023
2	9639	12'	3	310 Plug	ITE-2455	4023
2	9650	15'	4	396A Plug	Trans. & Rec.	4023
14	9548	9'	1	ITE-2455	ITE-2455	4011
1	9690	12'	4	2-310 Plugs	351A Plug	4023
1	9627	12'	3	310 Plug	508A Key	4023
1	9547	12'	1	ITE-2455	ITE-2455	4011
3	3P12H	8'	3	310 Plug	309 Plug	OGTTF
1	9313	10'	3	R-3185 Plug	7555-3W Hubbel Body	4253
1	9598	12'	2	310 Plug	310 Plug	4023

4. RESISTANCE MEASUREMENTS

4.1 Note that all keys and selectors are normal and that no fuses are installed.

4.2 Connect the X1 and X2 terminals of the Wheatstone Bridge, ITE-1883, to the T and R of an ITE-9639 cord or connect these terminals to the circuit under test as described in the chart shown in Section 143.1. Patch the ITE-9639 cord into the T1 jack when so specified on the chart.

4.3 Using the Wheatstone Bridge as described in Section 2 of Handbook 50, verify the resistance values shown in Section 143.1.

4.4 Resistance values vary with change in temperature and care should be taken that the resistance measurements are not made under abnormal temperature conditions.

5. FUSING TEST

5.1 Using a test receiver or volt-ohmmeter check each fuse post for absence of battery or ground.

5.2 Using fuses of the correct type, as indicated by the circuit drawings and fuse panel designations, install the following fuses one at a time. Verify that each fuse is associated with its proper equipment and is free from crosses with other unfused posts on the fuse panel.

	Fuse	Test Frame Misc. T.S. PCH
-	24V Sig	74
A	48V Sig	86
B	"	87
C	"	94
D	"	85
E	"	95
F	"	96
G	"	97
H	"	13
J	48 Sig	15 (T.S. MF)
K	"	200
-	LT1	299
* -	130V	93
* -	±105V	135
* -	20V	124
* -	100V	126
* -	-116V	77
* -	+116V	107
* -	200V	128

* Use Volt-Ohmmeter adjusted to the appropriate scale to verify these potentials.

5.3 Verify that the motor on the Miscellaneous Interrupter Frame is operating.

6. TONE DETECTION

NOTES: (1) The Outgoing Trunk Test Circuit, SD-25177-01, must be in accordance with Issue 54D or later.

(2) All tests of Tone Detector Circuit, SD-94800-01, per sections 160 and 161 of Handbook 50 must be accomplished first.

6.1 Tone Detector Leads

6.11 USING TEST RECEIVER R-9572, apply ground to Terminal Strip A at the Tone Detector and verify the proper relays operate at the OTTF per the following table:

Tone Detector Lead Designation	Terminal Strip A PCH. No.	OTTF Relays Operated
BY	32	LB (Fig.35)
RO	42	OF (Fig.35)

6.12 ST Lead - Block operated relay ON in the Tone Detector. At the OTTF, block relays ON1 operated and SL1 normal. Verify relays SDT1 operates in the OTTF and ST in the Tone Detector. Release relays ON and ON1 and remove blocking tool from relay SL1.

6.13 ON Lead - Momentarily operate relay SDT1 in the OTTF. Verify relay ON operates in the Tone Detector.

6.14 T Lead - Apply ground to Terminal Strip A Punching 34 of the Tone Detector. Verify ground is present at 1T of relay SDT1 in the OTTF.

6.15 R Lead - Apply ground to Terminal Strip A Punching 24 of the Tone Detector. Verify ground is present at 3T of relay SDT1 in the OTTF.

6.2 Tone Detector Keys

6.21 The Tone Detector is sensitive to any noise in the audible frequency from 300 CPS to 10,000 CPS with a sensitivity of -30 dbm and a minimum detectable pulse length of 10 milliseconds.

6.22 Any signal of 120 milliseconds that generates 2 volts DC to the input of the Tone Detector will cause it to be activated. The Tone Detector then times the occurrence of these signals to indicate various tones such as busy, overflow, ringing, etc. Any tone or noise which does not fall within these classifications will be indicated as an announcement.

6.23 Therefore, any pulsing test conditions or any switching noise with sufficient voltage will cause an indication from the Tone Detector. To control this problem, Keys TD1 and TD2 are furnished to control the application of the Tone Detector.

6.24 Key TD1 will activate the Tone Detector after dialing for the remainder of the call.

6.25 Key TD2 will activate the Tone Detector after dialing and remove it after two cycles of ringing.

6.26 Both Keys TD1 and TD2 operated will activate the Tone Detector immediately.

6.27 An example of where the use of these keys is required is Incoming Trunk Test Features per Paragraph 15.

7. CONDENSER TIMED AND PULSING RELAYS

7.1 Make pulsing check on relay P, PG1, CKP and PLS in accordance with information contained in circuit requirement tables, Pages 6 to 9 of SD-25177-0120.

NOTE 1: Section 5 of Handbook 50 describes test of condenser timed relays and probable causes of failure of the interrupter to meet pulsing requirements, using Pulse Checking Test Set, ITE-4029.

NOTE 2: When telephone company's Pulse Checking Test Set, J94723 is available on the job, use this set and BSP 163-653-501 for making test.

8. CONNECTOR AND CONTROL

8.1 Test Equipment

Amt	Code	Description
1	ITE-2990	Univ.Prelim.Sender Test Set
2	ITE-9650	Operators Telephone Set
1	ITE-9601	12' 3 cdr.cord with 310 plugs
AS Req.		#16-20 Ga. Insulated Wire
1	ITE-2502	2-scale current flow test set

8.2 Setup for Test

8.21 Connect 24V, 48V and ground to the ITE-2990 test set. These leads should be No. 16 or No. 20 gauge wire. The N lamp lights if the test set selector is normal.

8.22 At the ITE-2990 test set, connect terminals T, R, S, and CALL WIRE T and R to terminals FT, FR, SC, REC' and REC respectively.

8.23 Insert the plugs of two Operator's Telephone Set, ITE-9650, into the OGTTF Tel. jacks A and B and the TEL jacks of ITE-2990, respectively.

8.24 Patch the T1 jack of the OGTTF to the T jack of ITE-2990 using an ITE-9601 cord. Set the compensating resistance switch of ITE-2990 on terminal 9.

8.25 Connect the TEST jack of ITE-2502 test set to the RCI jack of ITE-2990 test set. Connect 24 volt battery to the BAT terminal and ground to the R terminal of ITE-2502 test set.

8.3 Busy Feature

8.31 Operate SC1 key of ITE-2990. The ON1 and BY1 lamps light on test frame. Manually operate ON1 relay once and note that BY1 relay remains operated. Release SC1 key. The BY1 lamp is extinguished. Operate and release DISC-1 key.

8.32 Operate SDR1 key on test frame. ON1 lamp lights. BY1 lamp may flash once. Operate SC key and observe that the SC lamp lights on ITE-2990. Release SDR1 and operate DISC-1 key. The ON1 lamp is extinguished and the SC lamp is extinguished on ITE-2990. Release SC key.

8.4 "No Test" Feature

8.41 Operate test set SC1 key and test frame SDR1 key. Lamps BY1 and ON1 light. Relay ST does not operate. Operate NT1 key. Relay ST operates.

8.42 Release all keys. Operate and restore DISC-1 key. All lamps are extinguished.

8.5 T2 Jack

8.51 Repeat tests of Paragraph 8.2 to 8.4 with the ITE-9601 cord patched to the Test Frame T2 jack. The operations and results will be the same except that the Test Frame keys, lamps and relays will be designated ON2, BY2 etc., instead of ON1, BY1, etc. When this test is completed, reinsert the ITE-9601 cord into the T1 jack.

9. REVERTIVE PULSING AND STEERING

NOTE: The mark = indicates test set operation or result. The mark # indicates test frame operation or result.

9.1 Test Equipment: The test equipment listed in Paragraph 8.1 is used for this test.

9.2 Setup for Test: The setup for test described in Paragraph 8.2 is used for this test.

9.3 Direct Mechanical Trunks

(a) Trunk Seizure: = Operate R key until N lamp lights. # Operate DM, SDR-1, TRUNK COMP keys 0 (left key strip) and 0 (right key strip), TH-0, H-1, T-2 and U-3 keys. #ON1 lamp lights and SDR lamp flashes fast.

(b) Trunk Guard: = Operate key PC then FR and F keys.

(c) Incoming Brush: = Release PC key. 0 lamp lights.

(d) Incoming Group: = Release key F. Operate and hold R key until N lamp lights. Reoperate F key. 0 lamp lights.

(e) Final Brush: = Release key F. Operate and hold R key until N lamp lights. Reoperate F key. 1 lamp lights.

(f) Final Tens: = Release key F. Operate and hold R key until N lamp lights. Reoperate F key. 3 lamp lights.

(g) Final Units: = Release key F. Operate and hold R key until N lamp lights. Reoperate F key. 2 lamp lights. Operate PC key then operate R key until N lamp lights.

(h) Incoming Advance: = Reoperate F key. Operate REV key and release and reoperate F key. # SDR lamp lights steadily and is then extinguished. SUP-1 lamp may flash once.

(i) Flashing and Talking: = Release and operate REV key several times. # SUP-1 lamp flashes. (Leave REV key normal.) # SUP-1 lamp lights. = Operate SUB key. # Operate TALK-1 key. Make a talking test. = Operate REV key and release SUB key. # Release TALK-1 key. Lamp SUP-1 is extinguished.

(j) Disconnect: = Release all keys. # Release all keys and operate and release DISC-1 key. All lamps are extinguished.

(k) Overflow: Repeat (a), (b) and (c) then = operate REV key and operate R key until N lamp lights. Reoperate F key 0 lamp lights. # OFL and SDR lamp flash. = Release all keys. #Release all keys and operate and release DISC-1 key. OF1, ON1 and SDR lamps are extinguished.

(l) Selections and Registrations Test:

Repeat (a) to (g) inclusive, operating and releasing the test frame DISC-1 key after each test and use the test calls listed below. Operate TRUNK COMP. 900 (left key strip) and 0 (right key strip) keys during 50% of the calls.

NUMBER				SELECTIONS				
TH	H	T	U	IB	IG	FB	FT	FU
0	1	2	3	0	0	1	2	3
1	2	3	4	0	2	2	3	4
2	3	4	5	1	0	3	4	5
3	4	5	6	1	2	4	5	6
4	5	6	7	2	1	0	6	7
5	6	7	8	2	3	1	7	8
6	7	8	9	3	1	2	8	9
7	8	9	0	3	3	3	9	0
8	9	0	1	4	1	4	0	1
9	0	1	2	4	2	0	1	2

(m) T2 Jack and Associated Equipment:

Repeat tests (a) to (j) inclusive with the test cord from ITE-2990 T jack patched to the T2 jack of the test frame. The ON2, BY2, and SUP-2 lamps light instead of the ON1, BY1 and SUP-1. Reinsert the cord in the T1 jack when this test is completed.

9.4 Direct Mechanical Trunk MTG Test

(a) At the ITE-2502 test set operate B switch to terminal T. Operate A switch to terminal B. All other switches should be in their normal (center) positions. Operate and lock the 4 key.

(b) Trunk Seizure: = Operate R key until N lamp lights, operate RC1 key. # Operate DM, TFV, SDR-1, TRUNK COMP keys 0 (left key strip) and 0 (right key strip), TH-0, H-1, T-2, U-3 keys. ON1 lamp should light and SDR lamp flashes fast.

(c) Remove all resistance from the ITE-2502 test set by moving the number 4 black and red sliders to the extreme left. Operate the 30M key and the reading on the meter should be approximately 1.5 MA.

(d) The test should block due to the failure of the MTG relay in the OGTTF to operate on 24 volt battery.

(e) = Release number 4 key on ITE-2502 and the RC1 key and the test should then proceed as described in Paragraphs 9.3(b) to 9.3(j).

9.5 Distant Office Trunk

(a) Trunk Seizure: = Operate and hold R key until N lamp lights. Operate DIST OFF 1 OFF, 1 OFF-COMP 300, 1 OFF - OB-0 and 1 OFF - OG-1 keys. # Operate SDR-1 key. ON1 lamp lights. SDR lamp flashes.

(b) Trunk Guard Test: = Operate PC then FR and F keys.

(c) Office Brush: = Release PC key. 0 lamp lights.

(d) Office Group: = Release F key and hold R key operated until N lamp lights then operate F key. L lamp lights.

(e) Test Line Test: = Operate PC key. Release F key and operate R key until N lamp lights. Reoperate F key. # SUP-1 lamp lights. SDR lamp lights steadily and is then extinguished. = Operate and release REV key several times. # SUP-1 lamp flashes.

(f) Disconnect: = Release all keys. # Operate and release DISC-1 and KR keys. Release all keys. SUP-1 and ON-1 lamps are extinguished.

(g) Overflow and Tell-Tale: Repeat tests (a), (b) and (c), = Operate REV key and then operate R key until N lamp lights. Reoperate F key. # OFL and SDR lamps flash. = Release all keys. # Release all keys. Operate and release DISC-1 and KR keys. All lamps are extinguished.

(h) Office Selections and Registration Tests: Repeat tests (a) to (d), operating and releasing the DISC-1 key of the test frame after each test and use the test calls shown below.

	TEST CALLS									
Key	1	2	3	4	5	6	7	8	9	10
1-OFF-OB	0	1	2	3	4	5	6	7	8	9
1-OFF-OG	1	2	3	4	5	6	7	8	9	0

(i) Repeat tests (a) to (h) using the T2 jack.

10. CALL INDICATOR PULSING

NOTE: The mark = indicates test set operation or result. The mark # indicates test frame operation or result.

10.1 Test Equipment: In addition to the equipment listed in Paragraph 8.1 (less ITE-2502), the following equipment is also required.

Amt	Type or ITE	Description
1	2886	Sender Test Set - RC1 Unit
1	9601	12' 3 Cdr. Cord with 310 Plugs
1	35G	Fuse, 3 AMP

10.2 Setup for Test: In addition to the setup for test described in Paragraph 8.21 to 8.24 it will be necessary to connect 24V, 48V and ground to the ITE-2886 test set. The three ampere fuse should be installed in the 24V Test Battery Supply Circuit at the Relay Rack Fuse Panel and tagged to identify it as a temporary arrangement so as to insure its removal upon completion of tests. Using an ITE-9601 cord, patch RC1 jack of ITE-2990 to E-900 jack of ITE-2886.

10.3 Direct PCI Trunks

(a) Seizure and Trunk Guard: = Operate the RCI key on ITE-2990 and NT key on ITE-2886. # Operate CI, TRUNK COMP keys 0 (left key strip) and 0 (right key strip), TH-0, H-1, T-2, U-3 and STA-1 keys and then operate key SDR-1. = Lamp A lights. # Lamp ON1 lights. SDR lamp flashes.

(b) Pulsing: = Operate AS key. Lamp A is extinguished and number is displayed. (When a final positive pulse is required, lamp FP also lights.) # Lamp SDR flashes fast and is then extinguished.

(c) Test Line Test: = Release AS key. Display is wiped out. Lamp A is relighted. # SUP-1 lamp lights. = Operate and release CS key several times. # SUP-1 lamp flashes.

(d) Disconnect: = Release CS key. # Release all keys and operate DISC-1 key. = Lamp A is extinguished. # All lamps are extinguished.

(e) Pulsing Paths: Repeat tests (a) to (d) except that key DISC-1 is operated and released after each call and keys CI and SDR-1 are left operated until all calls shown below have been made.

Direct PCI Test Calls

Key	1	2	3	4	5	6	7	8	9	10
TH	0	1	2	3	4	5	6	7	8	9
H	1	2	3	4	5	6	7	8	9	0
T	2	3	4	5	6	7	8	9	0	1
U	3	4	5	6	7	8	9	0	1	2
STA	1	J	M	R	W					

10.4 Tandem PCI Trunks

(a) Repeat test operations outlined for Direct PCI Trunks (a) to (e) with the following exceptions: TDM key is operated instead of CI key on the test frame. Release NT key on ITE-2886. Setup TAN-H, TAN-T and TAN-U keys in addition to numerical digits 0123W.

(b) Make calls using all tandem codes shown below. Test frame key DISC-1 is operated and released after each call to restore the circuit to normal.

Tandem PCI Test Calls

Key	1	2	3	4	5	6	7	8	9	10
TAN-H	0	1	2	3	4	5	6	7	8	9
TAN-T	1	2	3	4	5	6	7	8	9	0
TAN-U	2	3	4	5	6	7	8	9	0	1

NOTE: When testing in two digit areas, operate test set 2-DGT key.

11. MF PULSING

NOTE: The mark = indicates test set operation or result. The mark # indicates test frame operation or result.

11.1 Test Equipment: In addition to the equipment listed in Paragraph 8.1 (less ITE-2502), the following equipment is also required.

Amt	Code	Description
1	ITE-4253	MF Key Pulsing Test Set
1	ITE-9313	Power Cord
1	R-2674	Ground Adapter
1	ITE-9601	12' 3 cdr. cord with 2-310 Plugs

PRECAUTION: On completion of tests using ITE-4253, check that the MEAS switch is in its OFF position, before placing the set in its shipping position, to avoid damaging the meter.

11.2 Setup for Test

11.21 Using power cord ITE-9313 (and if necessary ground adapter R-2674), connect ITE-4253 test set to a source of 110V, 60 cycle AC. Connect 24V, 48V and ground, to binding posts 24V, 48V and GND, respectively.

11.22 Operate power switch to ON position and allow set to warm up for 5 minutes.

11.23 Check that meter needle rests at the left end boundary of the scale (with MEAS switch in OFF position).

NOTE 1: Test set must always be operated with front panel horizontal, otherwise meter will not read correctly.

NOTE 2: If meter needle does not rest at left-hand edge of scale carefully reset it by means of the "zero corrector" screw using a thin bladed screwdriver inserted thru the hole in the main panel directly below the center of the meter scale.

11.24 Set MEAS switch at A position and with a screwdriver adjust the A potentiometer until the meter indicates 0 db. Set switch on B and adjust B potentiometer until meter indicates 0 db. Set switch alternately on first one C position then the other and adjust C potentiometer until the average of the two meter readings is 0 db.

11.25 Set MEAS switch on MEAS position and set SEL switch on OSC ADJ position. Set FREQUENCY dial on 700~, set DEVIATION dial on 0 and adjust OUTPUT control until meter indicates 0 db.

11.26 Set MEAS switch on OFF position and SEL switch on BIAS ADJ position. With a screwdriver adjust BIAS ADJ potentiometer until the 0-700~ indicating lamp just lights. Operate the FREQUENCY dial to the 900, 1100, 1300, 1500 and 1700 cycle steps in turn and note that the corresponding indicating lamps light. The fact that all lamps do not light to the same brilliance has no significance with relation to this check of the test set.

11.27 Operate SEL switch to KP position. Set SA switch on 4 and SR switch on 3.

11.28 In addition to the setup for test described in Paragraphs 8.21 to 8.24, it will be necessary to patch the RCI jack of ITE-2990 to J2 jack of ITE-4253, using cord ITE-9601.

11.3 Wink Start MF Pulsing Trunks

(a) Trunk Seizure: = Operate the RCI key on ITE-2990. # Operate A OPR COMP 6000, TST-1, TAN H-0, TAN T-0, TAN U-0, TH-0, H-0, T-0, U-0, STA-0 keys, then operate key MF1. ON1 lamp lights.

(b) Pulsing: = Operate and release SS key. # KP lamp flashes. = The ITE-4253 lamps will flash in pairs, 10 times as follows: first pulse (KP), lamps 2 and 10; second to ninth pulses, lamps 4 and 7; tenth pulse (ST) lamps 7 and 10. # KP and SUP-1 lamps light. Repeat tests (a) and (b) until pulses have been properly identified, after first operating and releasing the # DISC-1 key.

NOTE: When making a repeat test the # DISC-1 key should be held operated until the ON1 lamp is extinguished and then released.

(c) Supervision: = Operate and release SS key several times. # SUP-1 lamp flashes.

(d) Disconnect: = Release SS key. # Release all keys and operate and release DISC-1 key. All lamps are extinguished.

(e) Reorder During MF Pulsing: Repeat tests (a) and (b), except that, when pulsing starts, the = SS key is operated. Test should block and # OFL lamp should flash. = Release SS key. # Release all keys and operate and release DISC-1 key. All lamps are extinguished.

(f) Pulsing Paths: Repeat tests (a) and (b) nine times, except that, before the # DISC-1 key is operated at the completion of each test call, a new test call is set up on the eight register keys, eight 1s for the first call, eight 2s for the second, etc. On each test call the first pulse (KP) will light lamps = 2 and 10 and the tenth pulse (ST) will light lamps 7 and 10. The second to ninth pulses will light lamps depending on register keys operated, as follows:

Key	Pulse	Lamps Lighted	
1	1	0-700~	1-900~
2	2	0-700~	2-1100~
3	3	1-900~	2-1100~
4	4	0-700~	4-1300~
5	5	1-900~	4-1300~
6	6	2-1100~	4-1300~
7	7	0-700~	7-1500~
8	8	1-900~	7-1500~
9	9	2-1100~	7-1500~

(g) Repeat tests (a) to (d) using test frame T2 jack, TST2, MF2 and DISC-2 keys. When this test is completed, reinsert the ITE-9601 cord into the T1 jack.

11.4 Delay Dial Start Pulsing Trunks

(a) Trunk Seizure: Repeat test of Paragraph 11.3(a), with #TO and RS1 keys operated. Observe same results.

(b) Pulsing: Repeat test of Paragraph 11.3(b) with = SS key operated. Observe same results

(c) Supervision: = Release and operate SS key several times. # SUP-1 lamp flashes.

(d) Disconnect: Repeat test of Paragraph 11.3(d). Observe same results.

(e) Reorder During MF Pulsing: Repeat tests (a) and (b), except that, = SS key is released when pulsing starts. Test should block and # OFL lamp should flash. # Release all keys and operate and release DISC-1 key. All lamps are extinguished.

12. AUTOMATIC DIAL PULSING

NOTE: The mark = indicates test set operation or result. The mark # indicates test frame operation or result.

12.1 Test Equipment

Amt	Code	Description
1	ITE-4011	Miscellaneous Trunk Test Set
4	ITE-9548	9" 1 cdr. cord with 2-2455 Plugs
1	ITE-9601	12' 3 cdr. cord with 2-310 Plugs
1	ITE-9639	12' 3 cdr. cord with 1-310 Plug and 3-2455 Plugs
2	ITE-8507	Alligator Clips

12.2 Setup for Test

12.21 Locate the ITE-4011 test set at the Outgoing Trunk Test Frame and using ITE-9548 cords, patch the jacks as follows:

(a) Test per Paragraphs 12.3 and 12.4

Patch	To
(BG-LP)T	(REV-1)T1
(BG-LP)R	(REV-1)R1
(REV-1)T	(T-JK)T
(REV-1)R	(T-JK)R

(b) Test per Paragraph 12.5

Patch	To
(POL)-	(T-JK)T
(POL)+	(T-JK)R
(BAT)B1	(TM)R
(GRD)G1	(TM)T

12.22 Using the ITE-9639 cord equipped with ITE-8507 alligator clips, connect 48 volt battery and ground to the T and S, respectively, and insert in test set A jack.

12.23 Using the ITE-9601 cord, patch the test set T jack to test frame T1 jack.

12.3 Go-Start Loop Dial Pulsing Trunks

(a) Trunk Seizure: = Operate ITE-4011 BG key. # Operate LPD, DT, GO, RS1, A OPR COMP-500, TAN H-1, TAN T-1, TAN U-1, TH-1, H-1, T-1, U-1 keys, then operate key DP1. ON1 lamp lights. = BG and BG1 lamps light.

(b) Pulsing: # Release DT key. KP lamp flashes. = BG and BG1 lamps are extinguished seven times (one pulse for each digit) and then light steadily. # KP lamp lights steadily. Repeat tests (a) and (b) until pulses have been properly checked, after first operating and releasing the # DISC-1 key.

(c) Supervision: = Operate and release REV-1 key several times. # SUP-1 lamp flashes.

(d) Disconnect: = Release REV-1 key. # Release all keys and operate and release DISC-1 key. All lamps are extinguished.

(e) Polarity Check: Repeat tests (a) and (b), except that = REV-1 key is operated. Test should block and # OFL lamp should flash. = Release REV-1 key. # Release all keys and operate and release DISC-1 key. All lamps are extinguished.

(f) Polarity Check During Pulsing: Repeat tests (a) and (b), except that, after pulsing starts = REV-1 key is operated. Test should block and # OFL lamp should light steadily. = Release the REV-1 key. The # OFL lamp is extinguished and the remaining digits are pulsed. # Release all keys and operate and release DISC-1 key. All lamps are extinguished.

(g) Digit Control Paths: # Connect ground to 7 bottom of H relay, block W relay normal, block OND1 and MFC2 relays operated. Operate H2 key. Manually operate and release CKP relay two times. Check that P2 relay is locked operated. Manually operate and release CKP relay. Check that P2 relay is released and that SP1 and SP2 relays are operated. Momentarily release the OND1 relay to release SP1 and SP2 relays. Operate H3 key. Manually operate and release CKP relay three times. Check that P3 relay is locked operated. Manually operate and release CKP relay. Check that P3 relay is released and that SP1 and SP2 relays are operated. Momentarily release the OND1 relay to release SP1 and SP2 relays. Continue the check, operating a different H key for each test, until all paths have been checked as follows:

Key Operated	Operate & Release CKP Relay	Check Relays Operated	Operate & Release CKP Relay	Check Relays Released
H-4	4 times	P4	1 time	P4
H-5	5 "	P5	1 "	P5
H-6	6 "	P5,P6	1 "	P5,P6
H-7	7 "	P1,P6	1 "	P1,P6
H-8	8 "	P2,P6	1 "	P2,P6
H-9	9 "	P3,P6	1 "	P3,P6
H-0	10 "	P4,P6	1 "	P4,P6

Remove ground from 7 bottom H relay and remove blocks from W, OND1 and MFC2 relays.

(h) Repeat tests (a) to (d) using test frame T2 jack, RS2, DP2, and DISC-2 keys. When this test is completed, reinsert the ITE-9601 cord into the T1 jack.

12.4 Go-Start Loop Resistance Dial Pulsing Trunks: Repeat test of Paragraph 12.3 (a) to (d), except that in (a), key #ORD should be operated and key LPD released. Observe same results. The 1481 ohm U resistance was checked when resistance measurement tests were performed.

12.5 Go-Start Battery and Ground Pulsing Trunks

NOTE: This test is primarily made to check the polarity of the pulses sent out by the test frame pulsing circuit. If the = POL lamp can not be observed, due to shortness of pulse, it will be satisfactory to observe the operation of the POL relay instead.

(a) Trunk Seizure: Rearrange the ITE-4011 set to agree with Paragraph 12.21 (b). # Operate BGD, GO, RS1, A OPR COMP-500, TAN H-1, TAN T-1, TAN U-1, TH-1, H-1, T-1, U-1 keys, then operate key DP1. ON1 lamp lights.

(b) Pulsing: = Operate and immediately release STT key. Check for one flash of POL lamp. Again operate and immediately release STT key. The POL lamp will again flash once. Repeat five more times, checking the flash of POL lamp each time. After the seven digits have been pulsed, # KP lamp will light steadily. (During pulsing operations the KP lamp may flash momentarily.)

(c) Disconnect: # Release all keys and operate and release DISC-1 key. All lamps are extinguished.

13. VOLTMETER TEST FEATURES

13.1 Test Equipment

(a) The equipment listed below is used for applying the tests outlined in Paragraph 13.3.

Amt	Code	Description
1	ITE-2502	Two-Scale Current Flow Set
1	ITE-4171	Secondary Std. Meter
4	ITE-9547	12' 1 cdr. cord with ITE-2455 plugs

(b) The equipment listed in Paragraph 8.1 is used for making the test outlined in Paragraphs 13.4, 13.5 and 13.6.

13.2 Setup for Test

(a) The following setup for test is used only for making the tests outlined in Paragraph 13.3. Using ITE-9547 cords connect ground to the R terminal of ITE-2502. Connect the T terminal to the negative terminal on the ITE-4171 meter and to the negative (#2) terminal of the OGTTF volt-milliammeter. Connect the VM terminal of ITE-4171 to the 120V (#7) terminal of the OGTTF volt-milliammeter. All OGTTF keys normal. All ITE-2502 switches should be normal (center position) and all resistance sliders to extreme right. Set the ITE-4171 switches M and V on short and 150, respectively.

(b) The setup for test described in Paragraph 8.2 is used for making the tests per Paragraphs 13.4, 13.5 and 13.6. The ITE-9601 cord should be removed from the T jack on the ITE-2990 set.

NOTE: The test operations described in Paragraphs 13.4(a) to 13.6 (h) are to be made in sequence.

13.3 Accuracy Test

NOTE: The "maximum scale deflection" specified for the following tests is intended to mean the deflection obtained at the maximum voltage provided at the OGTTF for the particular test.

(a) Check that the OGTTF voltmeter is accurate to within 1.2 volts at 1/4, 1/2, 3/4 and maximum scale deflection. The voltage is varied by adjusting the resistances in the ITE-2502 set.

(b) Move the cord from the 120V (#7) terminal of the volt-milliammeter to the 24V (#4) terminal. Operate the OGTTF key 20,000.

(c) Check that the OGTTF voltmeter is accurate to within .24 volts at 1/4, 1/2, 3/4 and maximum scale deflection. The voltage is varied by adjusting the resistances in ITE-2502 set.

(d) Release key 20,000 and operate key 1000.

(e) Check that the OGTTF voltmeter is accurate to within .24 volts at 1/4, 1/2, 3/4 and maximum scale deflection. The voltage is varied by adjusting the resistances in the ITE-2502 set.

(f) Release the 1000 key and remove the cords.

(g) Connect ground to the T terminal of ITE-2502. Connect the R terminal of ITE-2502 to the VM terminal of the ITE-4171 meter. Connect the negative terminal of ITE-4171 to the 300 MA (#3) terminal of the volt-milliammeter. Set the ITE-4171 switches M and V on 300 and MA, respectively. Operate the OGTTF key AM.

(h) Check that the OGTTF meter (milliammeter in this case) is accurate to within 3 milliamperes at 1/4, 1/2, 3/4 and maximum scale deflection. The current is varied by adjusting the resistance in ITE-2502.

(i) Release the AM key and remove test equipment.

13.4 Ringing Test

(a) Operate VM-1 key. Lamp ON1 lights.

(b) Operate ± key and using a test receiver check for ground on the tip and generator battery on ring of the cord in T1 jack. Operate REV key and check that the conditions on tip and ring of the cord are reversed. Release ± and REV keys.

13.5 Supervision and Talking Test

(a) Operate VM-TALK and BAT keys of voltmeter circuit. The SV lamp lights.

(b) Using a test receiver, momentarily connect ground to ring of cord in T1 jack. The SV lamp is extinguished momentarily. Check for ground on the tip of cord. Short the tip and ring of the cord and note that SV lamp is extinguished.

(c) Release BAT key. Patch the T1 jack cord into the T jack of ITE-2990. Operate R key of ITE-2990 until N lamp lights. Operate PC key then FR and F keys. The SV lamp lights. Operate REV key on ITE-2990 several times and note that SV lamp on test frame is extinguished each time the key is operated.

(d) Release all keys on ITE-2990, SV lamp is extinguished. Operate SUB key. Make a talking test between ITE-2990 and test frame. Release VM-TLK, VM1 and SUB keys. Remove cord from T jack of ITE-2990.

13.6 Voltmeter Operation

(a) Operate VM1 and G keys. Using a test receiver check for solid ground on tip of cord. Release G key.

(b) Connect ground on the ring of the cord. The voltmeter indicates approximately 100 volts. Operate 20,000 key; voltmeter indicates approximately 20 volts (24V scale). Release 20,000 key and operate 1000 key; voltmeter indicates approximately 20 volts, (24V scale).

(c) Operate VM REV key and connect ground on tip of cord. Voltmeter indicates approximately 20 volts (24V scale). Release 1000 and VM REV keys. Remove ground from tip of cord.

(d) Operate AM and G keys. Short tip and ring of cord. Meter reads approximately 238 milliamperes (office voltage at 48V). Release AM key and remove short from tip and ring of cord.

(e) Operate FEMF key. Connect 48V battery to ring of cord. Meter indicates approximately 48 volts.

(f) Release G and FEMF keys. Release the VM1 key. Operate key DISC-1 and ON1 lamp is extinguished.

(g) Remove the cord from the T1 jack and insert it in the T2 jack. Operate the VM-2 key. ON2 lamp lights. Operate G key. Check for ground on tip and that meter deflects approximately 100V when ring is grounded. Release G and VM2 keys and operate DISC-2 key. The ON2 lamp is extinguished. Remove cord from T2 jack.

(h) When Y wiring is specified and keys -STA and +STA are furnished, locate the ITE-4011 test set at the OGTTF. Using the ITE-9548 cords, patch jacks as follows:

(MTB) T	to	(T-JK) T
(MTB) R	to	(T-JK) R

Using an ITE-9601 cord, patch the T jack of the test set to the T1 jack of the test frame. The following information may be used as a guide in determining that correct negative or positive coin potential is received.

Operate Test Frame Keys	Test Set Meter Deflection
VM1, G and -STA	Right
VM1, G REV & -STA	Left
VM1, G and +STA	Left
VM1, G REV & +STA	Right

14. SUBSCRIBERS LINE

14.1 General Information

(a) This method has been designed for testing one OGTTF and one associated incoming test trunk. When more than one test frame or incoming test trunk are to be used in combination (Figure 10 SD-25177-0112) the following additional tests shall be made:

(1) To obtain access to a particular office unit it is necessary to insert a 322A make busy plug into the U jack associated with this unit.

(2) Tests per Paragraphs 14.44, 14.45, 14.46 and (when facilities are provided) 14.48 shall be repeated using each test frame.

(b) When the test frame or frames are arranged to test extra numbers not in the regular subscriber numbering series, (Figure 29, SD-25177-0121) it will be necessary, to make the test per Paragraph 14.48.

(c) The test of the incoming trunk circuit SD-25299 and the test of the associated terminating sender link crosspoint paths have been combined with a portion of the subscriber line test outlined in Paragraphs 14.4 and 14.5.

14.2 Test Equipment

Amt	Code	Description
2	ITE-9650	Operator's Telephone Set
1	ITE-4011	Misc. Trunk Test Set
1	ITE-4034 or 4442	Volt-Ohmmeter Volt-Ohmmeter ←
1	ITE-9690	12' 4 cdr. cord, 310 plugs and 351A plug ←
6	ITE-9548	9" 1 cdr. cord, ITE-2455 plugs
2	298A	Make Busy Plug
1	322A	Make Busy Plug
1	ITE-9598	12' 2 cdr. cord, 310 plugs ←

14.3 Setup for Test

(a) An individual setup for test is provided for each major test paragraph.

(b) Operate TRUNK COMP keys 0 (left key strip) and 0 (right key strip) for 0 resistance, unless otherwise specified, in the following paragraphs requiring test calls.

14.4 Incoming Trunk

14.41 Setup for Test

(a) Use the volt-ohmmeter as described in Paragraph 14.42.

(b) When required, insert a 322A plug into the proper U jack. (See Paragraph 14.1 (a).)

(c) Plug an ITE-9650 telephone set into the test frame A and B TEL jacks when performing the test per Paragraph 14.43(c).

14.42 Resistance Measurements

(a) Test of 10 Ohm Sleeve: Using the ITE-4034 or 4442 Volt-Ohmmeter adjusted to the proper scale, connect one lead to ground and the other lead to terminal 1B of F relay of the SD-25299 trunk. Manually operate relay D and note that the ohmmeter reads 9-12 ohms. Release relay D; the ohmmeter reads open circuit. ↰ ↲

(b) Test of 510 Ohm CO Lead Resistance: Connect one lead of the ohmmeter to lead CO terminal 16 (Vertical T.S. on Unit) and the other lead to contact T1 of the RC relay and note that the ohmmeter reads between 504 and 516 ohms.

14.43 Busy, Overflow and Intercept

(a) Busy: Operate key DM. Set up on the numerical keys the number of the "Busy" test line. Operate and release key LT-ST. Lamp LT will flash at 60 IPM. Operate and release key LT-DIS. Lamp LT is extinguished and the equipment restores to normal.

(b) Overflow: Set up on the key set the "Overflow" test line number and operate and release key LT-ST. Lamp LT flashes at 120 IPM. Restore the equipment by operating and releasing key LT-DIS.

(c) Intercept: Set up on the key set the number of an uncross-connected subscriber line. Operate and release key LT-ST. The call will be rerouted to the intercept operator. Operate keys MV, VM-TLK and momentarily operate key ±. Listen in the telephone set for ringing induction tone which identifies the intercept trunk. No lamp indications are made. Release keys MV and VM-TLK and restore the equipment by operating and releasing key LT-DIS.

14.44 PBX Group

(a) Set up on the key set the first number of a cross-connected PBX line group.

(b) Operate and release key LT-ST. Lamp HG lights when the call is completed.

(c) Operate and release key LT-DIS to restore the equipment.

14.45 Tip Party

(a) Set up on the key set the number of a cross-connected tip party subscriber line.

(b) Operate and release key LT-ST. Lamp TP lights when the call is completed.

(c) Operate and release key LT-DIS to restore the equipment.

14.46 Ring Party

(a) Set up on the key set the number of a cross-connected ring party or individual subscriber line.

(b) Operate and release key LT-ST. Lamp RP lights when the call is completed.

(c) Operate and release key LT-DIS to restore the equipment.

14.47 Premature Disconnect: Repeat a call to the ring party line and before lamp RP lights, operate and release key LT-DIS and observe that the equipment restores to normal.

14.48 Extra Number: See Paragraph 14.1 (b). Operate key XN and set up on the key set the number of a subscriber line in the extra number series. Operate and release key LT-ST. Observe that the HG lamp lights. At the line link frame, verify that the proper hold magnet of the called line is operated. Operate and release key LT-DIS to restore the equipment to normal.

14.49 Off-Normal Test

(a) Operate and release key LT-ST with all other keys normal. Lamp LT-ON lights.

(b) Operate and release key LT-DIS. Lamp LT-ON is extinguished.

14.5 TSL Crosspoint

14.51 Setup for Test

(a) See Paragraph 14.1(a). When required, insert a 322A plug into the desired U jack.

(b) Using two ITE-9650 telephone sets and the frame line talking circuit set up a talking circuit between the OGTTF and the miscellaneous frame on which the terminating sender link MB jacks are located.

(c) Two 298A make busy plugs are required for this test.

14.52 Test Operations

(a) Set up on the key set the number of a cross-connected ring party subscriber line. Operate key DM.

(b) Operate and release key LT-ST. When the called line is selected lamp RP lights. Observe that the preferred sender subgroup is used.

(c) Make the preferred sender subgroup busy by inserting a 298A plug into the sender group MB jack on the miscellaneous frame.

(d) Operate and release the LT-DIS key to restore the equipment. Lamp RP is extinguished.

(e) Operate and release key LT-ST to originate another call. Observe that the second choice sender subgroup is used to handle the call. Lamp RP lights at the successful completion of the test.

(f) Restore this call, make the second choice sender subgroup busy and originate a third call as before. The third choice sender subgroup is used. Lamp RP lights.

(g) Restore all equipment to normal.

14.6 Voltmeter

14.61 Setup for Test

(a) Using two ITE-9650 telephone sets and the frame line talking circuit, set up a talking circuit between the OGTTF and the line link frame. Select a TEL jack at the line link frame near a cross-connected individual subscriber line.

(b) See Paragraph 14.1(a). When required, insert a 322A plug into the desired U jack.

(c) Locate the ITE-4011 at the Line Link Frame to be used for test. Using the ITE-9548 cords, patch test jacks as follows:

(OR)T	to	(CW)T
(OR)R	to	(CW)R
(OR)T1	to	(BG-LP)T
(OR)R1	to	(BG-LP)R

(d) Using an ITE-9690 cord, patch the H plug into the test set O jack, and the SO shoe into the line jack of a cross-connected single party subscriber line.

(e) Supply battery and ground to the test set by means of an ITE-9598 cord patched to the test set and line link frame A jack.

(f) Plug an ITE-9650 telephone set into the test set TEL jacks.

(g) At the test frame, operate key SOT.

14.62 Automatic Voltmeter

(a) Set up on the numerical keys the number of the subscriber line used for test. Operate key DM.

(b) Operate and release key LT-ST. When the called line is selected, lamp RP lights.

(c) Operate key SOR and then operate key AV. Lamp VM lights indicating that the voltmeter test is being made.

(d) As the A selector is advanced to position 13 the line is discharged. Lamp R is lighted. The winding associated with the 120V scale of the voltmeter is connected in series with the 100 volt test battery and the ring of the line. The tip of the line is grounded through key RG.

NOTE: When the test battery is connected to the line, the meter will deflect slightly and then restore to normal if the ring is not grounded or crossed with the tip.

(e) At the test set connect ground to the ring of the subscriber line by patching together the (OR) R2 and the G1 jacks. Operate key STO. Note that the voltmeter shows a permanent deflection.

(f) Operate test frame key RG. The voltmeter deflection does not change. Restore key RG.

(g) Remove the patched cord from the G1 jack. The voltmeter restores to normal. Short the line tip and ring by patching the (OR)R2 and (OR)T2 jacks. The meter shows a permanent deflection. Operate key RG. The meter restores to normal. Release key RG. The meter deflects. Remove the tip and ring cross. The meter restores to normal.

(h) Restore key SOR and operate key SOT. The A selector is advanced from position 13 through position 16 by interrupter pulses, (total elapsed time approximately 2 seconds) to allow time to observe possible meter deflection. When the selector leaves position 16 the R lamp is extinguished. The A selector is advanced to normal; a new cycle is started, the line is discharged and when position 13 is reached lamp T is lighted indicating that the voltmeter may be observed for tip test. The ring side of the line is grounded from key RG.

(i) At the test set connect ground to the tip of the subscriber line by patching together the (OR)T2 and G1 jacks. Note that the voltmeter shows a permanent deflection.

(j) Operate test frame key RG. The voltmeter deflection does not change. Restore key RG. At the test set, remove the ground from the tip. The voltmeter restores to normal. Short the tip and ring. The voltmeter assumes a permanent deflection. Operate key RG. The voltmeter restores to normal. Remove the short from the tip and ring and restore RG key to normal.

(k) Release key SOT. The selector is advanced through terminal 16 in about 2 seconds. The T lamp is extinguished. When the A selector has returned to normal the ET lamp will light.

(l) Operate and hold key RP until lamp ET is extinguished, then allow it to release. Another automatic voltmeter test will be made as before, but with keys SOR and SOT normal, the A selector will not stop for meter observations but will be advanced through positions 13 to 16 (in 2 seconds) and continue automatically until lamp ET is again lighted.

(m) Operate the LT-DIS key until lamps RP and ET are extinguished and then operate key LT-ST momentarily. A new call to the same subscribers line will be completed. The automatic voltmeter test will again be made. The ET lamp will be lighted at the end of the test.

(n) Operate and hold key LT-ST operated until lamps RP and ET are extinguished and then allow it to release. A new call will be completed to the subscribers line. When the R lamp lights, operate key SOR and note that the A selector does not advance. Release the SOR key. The selector resumes its timed advance. The ET lamp will light at the end of the test.

(o) Operate key RP until lamp ET is extinguished. When the VM lamp lights release key AV. Note that the test continues. When the R lamp lights, operate key RP. Hold it operated until lamp T lights. Release key RP and operate key LT-DIS. Note that the equipment restores to normal.

14.63 Manual Voltmeter

(a) Plug an operator's telephone set ITE-9650 into the A and B telephone jacks at the OGTTF.

(b) Operate keys VM-TLK and MV.

(c) Momentarily operate LT-ST key. Lamp RP lights when the connection to the called line is established.

(d) Operate test frame REV key and test set BG key. Test frame SV lamp lights and test set BG and BG1 lamps light.

(e) Operate test frame BAT key. Lamp SV is extinguished. Release REV key. SV lamp lights. Lamps BG and BG1 are extinguished. Release test set BG key and operate the LP key. Lamp SV is extinguished and lamps BG and BG1 light. Release LP key. Lamp SV lights and lamps BG and BG1 are extinguished.

(f) Operate test set DD-CW key and check talking transmission between the test frame and the test set.

(g) Operate and release key LT-DIS. The equipment restores to normal.

(h) Release keys VM-TLK, MV, BAT and DD-CW. The remaining test setup is used for the insulation breakdown test.

14.7 Insulation Breakdown

14.71 Setup for Test

(a) Use the setup for test provided after the completion of the previous test.

14.72 Both Sides of Line Tested Simultaneously

(a) Operate key IBD.

(b) Operate key LT-ST to start the call. Lamp RP lights when connection is made to the subscriber line. Lamp IBD lights indicating that a breakdown test is being made. The A selector is advanced to position 6, then the B selector is advanced to position 18. The T and R lamps are lighted indicating that both sides of the line are being tested and that the meter should be observed. The interrupter now advances the A selector from position 6 to 12 in approximately 3 seconds. If there is no insulation breakdown, there should be no permanent meter deflection. When test B selector advances from position 18, the meter is shorted and lamps T and R are extinguished. The B selector advances to normal. The B selector makes a second revolution to discharge the line. When the B selector reaches normal the A selector is advanced to normal. The ET lamp lights indicating the end of the test.

(c) Using cords ITE-9548 patch the test set G1 jack to the RES-2 jack and the (OR)T2 jack to the RES-1 jack. Operate key RES-1 to the 0 position and set the RES switch on terminal 10.

(d) Operate key RP until lamp ET is extinguished. The breakdown test is repeated. In this case the OGTTF meter will indicate approximately 20 milliamperes on the 300 mil scale when the T and R lamps are lighted. When the ET lamp lights, change the cord patched to the (OR)T2 jack to the (OR)R2 jack. Repeat the test as before and note that the meter reading is the same. The ET lamp will light at the end of the test. Release key IBD. Operate and release key IT-DIS. The equipment restores to normal.

14.73 Each Side of Line Tested Separately

(a) Operate key IBDI.

(b) Operate key IT-ST to start the call. Lamp RP lights when connection is made to the subscriber line. Lamp IBD lights indicating that the breakdown test is being made. In this test the line tip is grounded. The R lamp is lighted to indicate meter observation. The meter will indicate approximately 20 milliamperes. The R lamp is extinguished, the A selector makes a second revolution to discharge the line. The B selector advances to position 18. In this test the ring side of the line is grounded. The T lamp lights. The meter does not show a permanent deflection. The T lamp is extinguished. The ET lamp lights when the selectors have restored to normal.

(c) Change the cord patched to the (OR)R2 jack to the (OR)T2 jack and repeat test (b). In this case the meter will indicate 20 milliamperes when the T lamp is lighted. When the ET lamp lights operate the LT-DIS key until the RP and ET lamps are extinguished. Remove the ITE-4011 connections. The numerical IBDI and DM keys are left operated for the combined test which follows.

14.8 Combined Automatic VM and IBD

14.81 Setup for Test

(a) With the test frame IBDI, DM and numerical keys set up from the previous test, operate key AV.

14.82 Test Operations

(a) Operate and release key IT-ST. The RP lamp lights when connection is made to the subscribers line.

(b) The automatic voltmeter test is made first. The VM lamp lights. Lamp R will light for meter observation. No permanent meter deflection will be noted. Lamp R is extinguished. Lamp T lights. The meter shows no permanent deflection. Lamp T is extinguished. Lamp VM is extinguished. Lamp IBD now lights for insulation breakdown test. Lamp R lights. The meter does not indicate a permanent deflection. Lamp R is extinguished. Lamp T lights. The meter does not indicate a permanent deflection. Lamp T is extinguished. Lamp IBD is extinguished. Lamp ET lights.

(c) Operate and release key LT-DIS. The equipment restores to normal. Restore all keys to normal.

15. INCOMING TRUNK TEST FEATURES

NOTE 1: Tests shall be made to each type of incoming trunk installed. One of the tests, 15.3 to 15.7, shall be made through each appearance of the belt line circuit. When more than one Figure 9 is provided insert a 322A plug into the proper N-TL jack as required.

NOTE 2:

(a) When common incoming trunks associated with two office units are provided and test lines are located on the second unit, calls shall be made through the second unit to these lines.

(b) Full mechanical calls are directed through the second office unit by the operation of key HF in addition to the proper numerical key operation.

(c) When "B" calls are made through common incoming trunks, single order tone is heard. In this case it is necessary to pass the office code as well as the directory number of the terminating line to the "B" operator.

NOTE 3: Refer to CD-25177-01, Paragraph 5.2, Pages 6 to 9, for detailed charts showing keys to be operated for each type of incoming trunk tested by this circuit.

15.1 Test Equipment

(a) Incoming Trunk Test Features

Amt	Code	Description
1	ITE-9601	3 cdr. cord, 310 plugs
1	ITE-9627	Remote control cord
2	ITE-9650	Operator's Telephone Set

15.2 Setup for Test

(a) Incoming Trunk Tests

Connect Cord	From	To
ITE-9601	Inc.Fr.TST jack	Inc.Trk.T jack
ITE-9627		Inc.Fr.RC jack
ITE-9650		Inc.Fr.TEL-1 jack
ITE-9650		TestFr.TEL A&B jack

(b) Operate test frame TST-1, TLK-1 and RC keys. Operate TRUNK COMP keys 0 (left key strip) and 0 (right key strip) for 0 resistance, unless otherwise specified, in the following paragraphs requiring test calls.

15.3 Immediate Ringing Mechanical Trunks

15.31 Preliminary Key Operations

(a) Operate keys DM, IRM and SDR-1. ON1 lamp lights. Operate key AOS or AOUA as required.

NOTE: Key AOS is operated when the trunk A relay is an S type but is normal when the A relay is a B type. Key AOUA is operated when the trunk A relay is a UA type.

15.32 Test Line Test

(a) Set up on the numerical keys the number of the incoming trunk test line. If Tone Detector is furnished, operate key TD2. See Paragraph 6.2.

(b) Start a test call by momentarily operating the test frame ADV key or the white button on the remote control cord. Test frame ON1 lamp lights. Lamp SDR flashes while the test frame sender is functioning. The test frame and the belt line supervisory lamps light.

(c) When connection is made to the incoming trunk test line ringing induction may be heard in either Operator's Telephone Set. Ringing will be heard twice while the test line applies a pre-trip and trip test of ringing. After ringing has been tripped the SUPV lamp at the incoming trunk frame and the SUP-1 lamp at the OGTTF flashes six times and then remains lighted. The flashes are in order as follows: one long, two short, one long and two short. After these flashes have been noted, tick-tock tone may be heard in the Operator's Telephone Set.

(d) Operate and hold key ADV at the OGTTF or the white button on the remote control cord. The test frame applies an SL lead ground test. If the test is satisfactory, the supervisory lamps are momentarily extinguished. If the test fails the lamps will remain extinguished.

(e) Release the ADV key or the white button. A release test is applied to the A relay. A satisfactory release test is indicated when the supervisory lamps are extinguished.

(f) Operate and release the DISC-1 key at the OGTTF or the red button on the remote control cord to disconnect the call. Release key TD2.

(g) Repeat the test call per Paragraphs (b) and (c). Insulate 3 and 4T of relay RL at the OGTTF and note that when test (d) is applied the supervisory lamps remain extinguished. Operate and release key DISC-1.

(h) Repeat the test call per Paragraphs (b), (c) and (d). Block incoming trunk relay (A) in its operated condition. Release the white button. The SUPV lamp is not extinguished. Remove the block from relay A. The SUPV lamp is extinguished. Operate and release the red button to disconnect the call.

15.33 Test to Return Test Line

(a) Set up on the numerical keys the number of return test lines. If Tone Detector is furnished, operate key TD1. See Paragraph 6.2.

(b) Start a call by momentarily operating the ADV key. Lamp ON1 lights and SDR flashes. When the call has been satisfactorily completed lamp SUP-1 lights and one of the ringing indication lamps light depending on the type of line called. Lamp TD-AR lights. (See the following chart for the proper lamp indication.)

NOTE: Test operations Paragraph 15.34 (c) to (h) are a continuation of the above test and are performed when testing to a non-free return test line.

Type of Service		Ringing	Party	Ringing Lamp
= 4-Pty S.S.	#	1R Code	R	R-1
		1R "	T	T-1
	#	2R "	R	R-2
		2R "	T	T-2
4-Pty F.S.	#	± -	R	R-
		± -	T	T-
	#	± +	R	R+
		± +	T	T+
2-Pty	#	± -	R	R-
		± -	T	T-
Free	#	± -	Free	R-
No Pty		± -	Ind.	R-
No Free Ind. Only		± -	Ind.	R-

= When testing to four-party semi-selective return test lines, observe that the proper ringing is received by noting whether the signal is one ring or two ring code.

When a free line, return test line, is provided the test operations are the same as for a non-free line except that the operation of key TMR does not extinguish the SUP-1 supervisory lamp.

15.34 Tip Party Test to Return Test Line

(a) Set up on the numerical keys the number of return test line.

(b) Start a call by momentarily operating the ADV key. Lamp ON1 lights and SDR flashes. When the call has been satisfactorily completed the proper ringing lamp lights. Lamp SUP-1 lights.

Ringing Tripped and Supervision Check

(c) Operate key TMR. Lamp TMR lights and lamp SUP-1 is extinguished. Ringing stops.

(d) Release key TMR. Lamp SUP-1 lights.

Incoming Condenser Check

(e) Operate key CTT to test the tip condenser. Lamp ICT lights indicating an OK test. Lamp SUP-1 is extinguished. Release CTT. Lamp ICT is extinguished.

(f) Operate key CTR to test the ring condenser. Lamp ICT lights indicating an OK test. Release key CTR. ICT lamp is extinguished and lamp SUP-1 lights. Operate key TMR. Lamp SUP-1 is extinguished.

Time Measure Release

(g) Momentarily operate key ADV. Lamp TMR remains lighted, two to four minutes before being extinguished.

(h) Release key TMR and operate and release key DISC-1. Release key TD1.

15.35 Busy Line

(a) Set up on the numerical keys, the number of the "Busy" line. If Tone Detector is furnished operate keys TD1 and TD2.

(b) Momentarily operate the ADV key or the white button on the remote control cord. Lamp ON1 lights and SDR flashes. A busy condition will be set up in the trunk circuit causing the supervisory lamps to flash at 60 IPM. Busy tone will be heard in the telephone sets. Lamp TD-LB lights.

(c) Release the call by operating key DISC-1 or the red button on the remote control cord. Releasekeys TD1 and TD2.

15.36 Overflow

(a) Set up on the numerical keys the number of the "overflow" line. If Tone Detector is furnished, operate keys TD1 and TD2.

(b) Momentarily operate the ADV key or the white button on the remote control cord. Lamp ON1 lights and SDR flashes. An overflow condition will be set up in the trunk circuit causing the supervisory lamps to flash at 120 IPM. Overflow tone will be heard in the telephone sets. Lamp TD-OF lights.

(c) Release the call by operating key DISC-1 or the red button on the remote control cord.

(d) Release keys DM, IRM, TD1, TD2 and SDR-1.

15.4 Delayed Ringing Mechanical Trunks

15.41 Preliminary Key Operations

(a) Operate keys DM, DRM and SDR-1. Operate key AOS or AOUA as required.

NOTE: Key AOS is operated when the trunk A relay is an S type but is normal when the A relay is a B type. Key AOUA is operated when the trunk A relay is a UA type.

15.42 Test Line Test

(a) This test is made in the same manner as the test described in Paragraph 15.32 except that key TD2 is not operated and when the supervisory lamps light for the first time the ADV key or the white button on the remote control cord must be operated to start ringing. Lamp SUP-1 is extinguished while the ADV key is operated.

(b) Repeat tests corresponding to 15.32 (a) to (f) with key R ± operated. Release key R ± at the end of this test.

15.43 Return Test Line Test (Use a non-free line, tip party line when available.)

(a) Set up on the numerical keys the number of the return test line.

(b) Start a call by momentarily operating key ADV. Lamp ON1 lights and SDR flashes. When the call reaches the test line, lamp SUP-1 lights indicating that ringing is required. Operate key RTL.

(c) Operate and hold key ADV. Observe that the proper ringing lamp is lighted. Lamp SUP-1 is extinguished. Release key ADV. Lamp SUP-1 lights.

Rering Test

NOTE: If ringing start is required on the ring side of the line only, operate keys RGO and R± before operating the ADV key. Otherwise, operate either RNO key or R± key.

(d) Operate key TMR. Ringing is tripped and the ringing indication lamp is extinguished. Lamp TMR lights. Operate keys RGO and R± as described in the Note above. Operate key ADV. Ringing is heard in the OGTTF subset each time key ADV is operated. Release key ADV. Ringing stops. Release keys RGO and R±.

(e) Repeat the test described in Paragraph (d) above using key RNO instead of keys RGO and R±. Release key RNO at completion of test.

(f) Repeat the test described in Paragraph (d) above using key R± instead of RGO and R±. Release key R± at completion of test.

Non-Operate Test (Trunks requiring ringing on tip or ring only to start ringing.)

(g) Operate key RNO then ADV and observe that no ringing is heard in the OGTTF subset and that no ringing indication lamp lights. The RNO lamp lights indicating that the nonoperate test ringing current is being applied. Release keys ADV and RNO. Lamp RNO is extinguished. Operate and release key DISC-1.

15.44 Busy Line

(a) Repeat Paragraph 15.35.

15.45 Overflow

(a) Repeat Paragraph 15.36 except that in Paragraph (d) key DRM is released instead of key IRM.

15.5 Delayed Ringing "B" Trunks

15.51 Preliminary Key Operations

(a) Operate keys DRB and NO-SDR-1. Operate key AOS or AOUA as required.

NOTE 1: Key AOS is operated when the trunk A relay is an S type but is normal when the A relay is a B type. Key AOUA is operated when the trunk A relay is a UA type.

NOTE 2: Key (No. 1 Toll) should also be operated when these trunks are from No. 1 switchboard and are not provided with outgoing trunk circuits.

15.52 Test Line Test

(a) Operate and release key ADV or the white button on the remote control cord. Lamp ON1 lights. The supervisory lamps light. Order tone is heard in the telephone set and the number of the incoming trunk test line should be passed to the "B" operator.

(b) Operate and release key ADV or the white button. Ringing is started and the test progresses as described in Paragraph 15.32 (c) to (f).

15.53 Tip Party Test to Return Test Line

NOTE: This test is made to an individual line (RTL) when a tip party line is not provided.

(a) Originate a call as in 15.52(a) and pass the return test line number to the operator.

(b) Test operations from this point are the same as in 15.43(b) to (g).

15.54 Busy Line

(a) Originate a call as in 15.52(a) and pass the "Busy" line number to the operator. The supervisory lamps will flash at 60 IPM, (if trunks have not been modified for removal of flash features), and busy tone will be heard in the telephone sets.

(b) Operate and release the DISC-1 key.

15.55 Overflow

(a) Originate a call as in 15.52 (a) and pass the "Overflow" line number to the operator. The supervisory lamps will flash at 120 IPM (if trunks have not been modified for the removal of flash features) and overflow tone will be heard in the telephone sets.

(b) Operate and release the DISC-1 key or the remote control red button.

(c) Release keys DRB and NO-SDR-1.

15.6 Immediate Ringing "B" Trunks

15.61 Preliminary Key Operations

(a) Operate keys IRB and NO-SDR-1. Operate key AOS or AOUA as required.

NOTE 1: Key AOS is operated when the trunk A relay is an S type but is normal when the A relay is a B type. Key AOUA is operated when the trunk A relay is a UA type.

NOTE 2: Key (No. 1 Toll) should also be operated when these trunks are from No. 1 switchboard and are not provided with outgoing trunk circuits.

15.62 Test Line Test

(a) Momentarily operate key ADV or the white button on the remote control cord. Lamp ON1 lights. The supervisory lamps light. When the position is reached, order tone is heard in the telephone sets. The test line number is passed to the "B" operator.

(b) When the call reaches the incoming trunk test line the supervisory lamps light. The test line applies pre-trip and trip tests. Ringing can be heard in the operator's telephone sets. The supervisory lamps flash six times and then remain lighted. Tick-tock tone is heard in the telephone set.

(c) Operate the advance key. The supervisory lamps may flash momentarily. Release the advance key. If the release test of the incoming trunk L relay is satisfactory the supervisory lamps will be extinguished.

(d) Operate and release key DISC-1 or the red button to release the call.

15.63 Test to Return Test Line

(a) Originate a call as in 15.62 (a) and pass the return test line number to the operator.

(b) The test operations from this point on are the same as in 15.34(c) to (h).

NOTE: The condenser test is omitted on trunks equipped with repeating coils.

15.64 Test to Return Test Line, Busy Line and Overflow

(a) The above tests are performed in the same manner as the tests described in Paragraphs 15.33, 15.35 and 15.36 except that the proper test line number is passed to the operator instead of being set up on the key set.

(b) At the completion of this test, release keys IRB and NO-SDR-1.

15.7 Auxiliary Trunks

15.71 Preliminary Key Operations

(a) Operate keys AUX and NO-SDR-1.

15.72 Test Line Test

(a) Momentarily operate key ADV or the white remote control key. Lamp ON1 lights. When order tone is heard the incoming trunk test line number is passed to the "B" operator. When the test line is reached it functions to trip ringing and flashes the supervisory lamp six times after which they remain extinguished.

(b) Release keys AUX and NO-SDR-1. Operate and release key DISC-1.

16. SUBS. REC. COMP. TRUNK TEST FEATURES

16.1 Test Equipment

Amt	Code	Description
1	ITE-4011	Misc. Trunk Test Set
3	3P12H	3 Cdr. Cord, 309 and 310 Plugs with Test Frame
1	ITE-9639	3 Cdr. Cord, 310 and ITE-2455 Plugs
2	ITE-9650	Operator's Tel. Set
7	ITE-9548	1 Cdr. Cord, ITE-2455 Plugs
2	ITE-9547	1 Cdr. Cord, ITE-2455 Plugs

16.2 Setup for Test

(a) Using ITE-9548 cords patch the test set jacks as follows:

T JK (T) to CW (T)
T JK (R) to CW (R)
RG (T1) to POL (+)
RG (R1) to POL (-)
TM (T) to RG (T)
TM (R) to RG (R)
TN (1) to G1

(b) Locate the ITE-4011 Test Set near the OGT Test Frame and OGT Jack Bay. Connect the test equipment to Non-Coin Subscriber Recording Completing trunk as shown in the following chart:

Connect Cord	From	To
3P12H	Test Fr. T1 Jack	Trk. T Jack
3P12H	" " MB "	" T & MB Jack
3P12H	" Set T "	" TO Jack
ITE-9547	" " TN(2)	" T & MB Jack Tip
ITE-9547	" " RG Term.	Pchg.135 Misc.T.S. on TF for R Res. lamp
ITE-9639	" " A Jack	48V and Grd.
ITE-9650		TestSet TEL A&B Jacks
ITE-9650		TestFr. TEL A&B Jacks

(c) Preliminary key operations: Operate test set key DD-CW. Operate test frame TST-1 and SUB-REC keys. Operate key ADJ-1 or ADJ-2 as required. (See Note)

NOTE: Key ADJ-1 and ADJ-2 is provided to test recording completing trunk line relays for either the number 1 or 2 adjustments specified on the circuit requirement table.

16.3 Trunk Tests

16.31 Trunk Busy Test

(a) If the trunk is busy lamp BY1 will light. Check this condition by connecting ground through a test receiver to the sleeve of the T jack. The ON1 lamp also lights.

(b) Operate the NO-SDR-1 key. When ground is removed from the T jack sleeve, the BY1 lamp is extinguished and the RC lamp lights.

(c) Operate test frame RSG key and the SUP-1 lamp should light. Connect direct ground to the S lead of the MB jack and the SUP-1 lamp should be extinguished. Remove the ground from the S lead and it should relight. Restore the RSG key to normal and it should be extinguished.

16.32 Operate Test of Trunk A Relay

(a) Operate key RNCO. Audible ringing is heard at the test frame and test set. Operate test set STT key. The test frame SUP-1 lamp lights. Test set POL lamp lights. Check transmission between test set and test frame.

16.33 Flashing Test of Trunk A Relay

(a) Operate and release flash key RFL. Test set POL lamp flashes.

16.34 Ringing Recall

(a) Operate test set RG key. Test frame subset bell rings. Release RG key. Ringing stops.

16.35 Number Checking Test

NOTE: When more than one Figure 9 is provided, insert a 322A plug into the proper TL jack as required to associate ALS lead with the OGTTF.

(a) Operate test frame key RNC. Operate test set TN key. Using a test receiver connected to ground, check for tone on the ALS lead at the OGTTF terminal strip "OS" terminal 2. Release key TN.

16.36 Disconnect Test

(a) Release keys RNCO and RNC. Test set POL and test frame SUP-1 lamps are extinguished.

(b) Release test set STT key. Test frame SUP-1 lamp lights.

(c) Momentarily operate key DISC-1. Lamps RC and SUP-1 are extinguished.

16.4 Coin Collect and Return Tests

16.41 Using the chart outlined in Paragraph 16.2(b), connect the test equipment to a Coin Subscriber Recording Completing Trunk. Operate NO-SDR-1 key.

16.42 Automatic Coin Return

(a) Operate the RCT and RCO keys. Audible ringing is heard at the test frame test set.

(b) Operate the test set STT key. The test frame CR lamp lights momentarily. The test set POL and test frame SUP-1 lamps also light. Check transmission between the test set and test frame.

16.43 Coin Collection and Return

(a) Using the T2 jack and a special service trunk to the A board or the test frame telephone circuit associated with a two way trunk, call the A board and request the operator to coin collect on the particular trunk used for test. Test frame CC lamp lights for a short interval. Request the A operator to return the coin. Lamp CR lights for a short interval. Restore the A board calling equipment to normal.

16.44 Automatic Coin Collection

(a) Release key RCO. Test set lamp POL and test frame SUP-1 are extinguished. Release test set STT key. Test frame lamp SUP-1 lights. The CC lamp lights for a short interval.

(b) Release key RCT and operate key DISC-1 momentarily to extinguish lamps RC and SUP-1.

(c) Restore all equipment to normal.

17. DIAL AND CONTROL CIRCUIT (SXS)

17.1 Loop Dialing to Step-by-Step Office Using T1 Jack

17.11 Test Equipment

Amt	Code	Description
1	ITE-2502	Two-Scale Current Flow Set
2	ITE-9500	6' One Conductor Cord
1	ITE-9639	12' Three Conductor Cord
1	ITE-9601	12' Three Conductor Cord

17.12 Setup for Test

(a) Connect battery and ground to the BAT and G terminal of ITE-2502 test set. Use ITE-9500 cords.

(b) Connect the BL3 terminal of ITE-2502 test set to the T of DMB1 jack of OGTTF. Use ITE-9639 cord.

(c) Connect the TST jack of ITE-2502 test set to the T1 jack of OGTTF. Use ITE-9601 cord.

(d) Operate switch R to term. BS
" " T " " GS
" " B " " R
" " A " " T
" " S " " MIL

17.13 Blocking the Dial Feature

(a) Operate the NO-SDR-1 key in the OGTTF and then operate the DT1 key. The DT1 relay should not operate.

(b) Restore the NO-SDR-1 and DT1 keys to normal.

17.14 Test of Dial Operations

(a) Operate the DT1 key and then operate the NO-SDR-1 key and the DT1 relay should operate.

(b) The test set BL3 lamp should be lighted and the BS and GS signals should be operated.

(c) The ON1 lamp on the OGTTF should be lighted.

(d) Operate the test set T switch from GS terminal to BS terminal and the GS and BS signals should release. Operate the R switch to GS terminal and the GS and BS signals should reoperate and the SUP-1 lamp on the OGTTF should be lighted.

(e) Operate the dial in the operator's telephone circuit on the OGTTF to the zero position and observe that the SUP-1 lamp stays lighted during this operation.

(f) Release the dial and observe that the GS and BS signals on the test set release each time the pulsing contacts of the dial are opened. The SUP-1 on the OGTTF should be extinguished until the dial is back in the normal position. The SUP-1 lamp should not flash between the dialing of numbers.

(g) The DT1 and NO-SDR-1 keys should remain operated for the next test.

17.15 Check for 250 Ohm Bridge and the 1000 Ohm Dial Loop

(a) Operate A switch to term. G
" B " " " T
" T " " " MIL
" R " " " MIL

Strap the R terminal to the BAT terminal. All sliders on the test set should be moved to the extreme right.

(b) Block the DON and DP1 relays in OGTTF operated.

(c) Set up a reading of 100 MA on the test set meter using the #4 locking key.

(d) The circuit for this reading will be from ground and battery at the test set through a short circuit loop caused by the operated DP1 relay in the OGTTF.

(e) Insulate the 1 and 2T contacts or relay DP1 causing the reading on the meter to drop to approximately 74 MA. This is caused by removing the short circuit from the 250 ohm bridge in parallel with the 500 ohm P1 relay and 27 ohm T1 repeat coil windings.

(f) Remove the insulation from the contacts of relay DP1. The meter should again read 100 MA.

(g) Remove block from DP1 relay. Operate the ORD key and ORD relay should operate causing the reading on the meter to drop to approximately 24 MA. This is caused by the insertion of 1000 ohms in series with P1 relay and T1 repeat coil.

(h) Remove the blocking tool from relay DON which should release.

(i) Restore the DT1, ORD and NO-SDR-1 keys normal and remove the cord from the T1 jacks at the OGTTF.

(j) Operate and release the DISC-1 key. The test circuit should restore to normal.

17.16 Loop Dialing to Step-By-Step Office Using T2 Jack

(a) The test using the T2 jack should be made in the same manner as described for T1 jack. The DMB2

jack SUP-2 lamp, DT2 relay, NO-SDR-2 and DT2 keys replace the DMB1 jack SUP-1 lamp, DT1 relay, NO-SDR-1 and DT1 keys.

17.17 Battery and Ground Dialing to Step-By-Step Office Using T1 Jack

17.171 Set-Up for Test

(a) The same as described in Paragraph 17.1 for testing loop dialing.

17.172 Test of Battery and Ground

(a) Operate the DT1, BGD and NO-SDR-1 keys in the order named and the DT1 relay should operate.

(b) The SUP-1 lamp at the OGTTF should not light. The ON1 lamp should light.

(c) The BL3 test lamp should be lighted and the BS and GS signals should be operated.

(d) Operate the T switch from the GS terminal to the BS terminal and the R switch from the BS terminal to GS terminal and observe that the SUP-1 lamp on the OGTTF lights and the GS and BS signals release and reoperate.

(e) Operate the dial on OGTTF to the zero position and observe that SUP-1 lamp stays lighted during this operation.

(f) Release the dial and observe that the GS and BS signals on the test set release each time the pulsing contacts of the dial are opened. The SUP-1 lamps on the OGTTF should be extinguished until the dial is back in the normal position.

(g) The SUP-1 lamp should not flash between the dialing of numbers.

(h) Restore the test circuit to normal.

17.18 Test of Contact Protection in Dialing Loop

(a) Check for the presence of the contact protection feature by first charging and then discharging the condenser using a test receiver on contact. 7T and ground or battery on contact 2T of the DT1 relay. Insulate the 1 and 2T contacts of DON relay.

(b) For checking condenser E and resistance G the dial control circuit should be normal.

(c) For checking condenser F and resistance H the ORD key should be operated.

(d) For checking condenser C and resistance F the BGD key should be operated.

(e) Remove the insulation from the DON relay.

17.19 1000 Ohm Loop Dialing to Step-By-Step Office Using the T1 and T2 Jacks

(a) The only difference between the regular loop dialing and the 1000 ohm loop dialing is the operated ORD relay inserts 1000 ohms in the loop.

(b) The test method covered in Paragraphs 17.12, 17.13, 17.14 and 17.16 for testing loop dialing can be used for this feature by operating the ORD in conjunction with the DT1 key.

18. MISCELLANEOUS TESTS

18.1 RTL Jack Intercept Feature

18.11 Test Equipment

Amt	Code	Description
2	ITE-9650	Operator's Tel. Set
1	ITE-2260	Call Wire Jack
1	ITE-9639	3 Cdr. Cord, 310 Plug & ITE-2455 Plugs

18.12 Setup for Test

NOTE: When more than one Figure 9 is provided, insert a 322A plug into the proper N-TL jack as required and operate key SUB-REC.

(a) Connect an Operator's Telephone Set, ITE-9650 to a call wire jack, ITE-2260. Connect the T and R leads of an ITE-9639 cord to the ITE-2260 jack. Plug an ITE-9650 Operator's Telephone Set into the OGTTF TEL jacks.

18.13 Test Operations

(a) Plug the ITE-9639 cord into the T jack of the "B" incoming trunk.

(b) When the "B" operator answers, request the number of the Return Test Line.

(c) The subscribers bell at the OGTTF operates.

(d) Answer this call at the OGTTF by operating keys VM-1, REV, and VM-TALK and patching the T1 jack and the RTL jack. Use the cord provided at the OGTTF.

(e) Ringing stops. The ON1 and SV lamps are lighted.

(f) Check talking between the incoming and test frames.

(g) Disconnect and restore all equipment to normal.

18.2 Outgoing Trunk Test Frame Test Circuit (SD-96370)

18.21 Test Equipment

Amt	Code	Description
1	ITE-4011	Miscellaneous Trunk Test Set
6	ITE-9548	1 cdr. cord, ITE-2455 plugs
1	ITE-9601	3 cdr. cord, 310 plugs
1	ITE-9639	3 cdr. cord, 310 plug & ITE-2455 plugs
2	ITE-8507	Alligator Clip

18.22 Setup for Test

(a) Locate the ITE-4011 test set at the OGTTF and using ITE-9548 cords, patch the jacks as follows:

Patch	To
(BG-LP)T	(REV-1)R1
(BG-LP)R	(RES)1
(RES)2	(REV-1)T1
(REV-1)T	(T-JK)T
(REV-1)R	(T-JK)R
(T-D)R	(T-JK)S

(b) Using the ITE-9639 cord equipped with alligator clips, connect 48 volt battery and ground to the T and S, respectively, and insert in test set A jack.

(c) Using the ITE-9601 cord, patch the test set T jack to the CT jack of the circuit to be tested.

(d) Set the test set resistance switch on 10 and operate RES-1 key to 10500.

18.23 Test Operations - Figures 1, 2, 4 and 5

(a) Operate test set key BG. The CT buzzer operates.

(b) If Figure 4 is furnished, operate test frame key RP. The buzzer stops. Release key RP. The buzzer operates.

(c) Operate test set REV-1 key. The buzzer stops. Release key REV-1. The buzzer operates.

(d) Operate test set key DG. The CT-BY lamp, or lamps, light and the buzzer stops. Release test set BG and DG keys. The circuit restores to normal.

(e) Repeat tests (a) to (d) for each CT jack appearance.

18.3 OGTTF Telephone Circuit (SD-25107) and Associated Trunk and Link Circuits

(a) The major portion of the telephone circuit is tested by operation with the test frame circuit test.

(b) The untested features of the telephone circuit, e.g., the key and lamp circuit for Tie Lines, Trunks, and Local Station Lines, should be tested as outlined in Handbook 50 Section 2 Paragraphs 3 and 4.

18.4 Frame Line Talking Circuit: The frame line talking circuit is tested by Section 309, Handbook 63.

18.5 Test Frame Test Jack Bay

(a) The cables (trunks) from the office multiple to the T jacks on the test frame jack panels (T, R and S-1 leads) are tested in accordance with Paragraph 10, Section 201 of Handbook 62.

(b) The TO and T & MB jacks and associated cables to outgoing trunks should be checked by continuity test as outlined in Section 2 of Handbook 50. Some of these trunks are tested when the trunk circuits are tested. See Section 305 of Handbook 63.

18.6 Miscellaneous Line, Trunk and Auxiliary Signal Circuits: The miscellaneous circuits associated with the test frame that are not specifically covered by this or any other method shall be operation tested in accordance with Section 1 of Handbook 50.

19. MISCELLANEOUS TRUNKS TEST FEATURES

19.1 Setup for Test

19.11 Using two three conductor cords, connect the test frame T1 and MB jacks to the T and S jacks associated with a Zero Operator Trunk. If a non-coin trunk is used, operate A OPR. COMP. key 1000. If a coin trunk is used operate A OPR COMP. keys 1000 and 2000. Operate MISC. TRKS and TST-1 keys.

19.2 Test Operations

19.21 Operate NO-SDR-1 key. Audible ringing is heard at the test frame and the trunk lamp at the "A" switchboard lights. When the operator answers, the lamp is extinguished and the ringing stops.

19.22 Operate test frame RCT key. Request operator to collect coin and note that the test frame CC lamp lights for a short interval. Operate test frame RNCO or RCO key. Request the operator to return coin and note the test frame CR lamp lights for a short interval.

19.23 Request operator to ring back. Test frame subset rings.

19.24 Hold operated the test frame RFL key. The A switchboard operator receives a disconnect signal. When the operator disconnects, the trunk L relay is reconnected to the tip and ring but does not operate while the RFL key is held operated. Release the NO-SDR-1 and RFL keys and momentarily operate the DISC-1 key to restore the test frame to normal.

20. PERMANENT SIGNAL TESTS

20.1 Setup for Test

20.11 Using a three conductor cord, connect the test frame T1 jack to the T jack associated with a Permanent Signal Holding Trunk. Operate A OPR. COMP. keys 500, 1000 and 4000. Operate PERM. SIG. and TST-1 keys.

20.2 Test Operations

20.21 Operate the test frame NO-SDR-1 key and check that tone is heard in the test frame subset and trunk lamp at the A switchboard flashes about once per second.

20.22 When the A operator answers, the tone is removed from the trunk, and the trunk lamp lights steadily. Request the operator to disconnect. The trunk lamp remains lit and tone is reconnected to the trunk. Request the A operator to operate the DS key.

20.23 Hold operated the test frame RFL key. Tone cannot be heard and the trunk lamp flashes at the rate of twice per second. This fast rate of flashing indicates that the permanent signal condition has been removed, so the operator should release the DS key at the A switchboard to dismiss the trunk.

21. MOMENTARY OPEN TEST

(a) Operate the test frame MO key and block TR relay operated.

(b) Manually operate the MO relay. Check that the MO lamp does not light.

(c) Release and reoperate the MO relay. The MO lamp lights.

(d) Release the MO relay and MO key. The MO lamp remains lighted.

(e) Remove block from TR relay. The MO lamp is extinguished.

➔ Arrowed lines indicate new or changed information.

Manager, Crossbar Product Engineering
Control Center

Reason for Reissue:
To delete Contact Protection Tests, to add Tone Detection Test, Paragraph 6 and to make miscellaneous corrections and additions throughout as indicated.

Replaces Section 143 of 11-6-52.