

DISTRICT JUNCTOR TESTS SD-25620-02

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1. GENERAL

1.1 Description of Test: This section covers the routine and supplementary tests of subscriber district junctor circuits per SD-25620-02. The routine tests and certain supplementary operating tests are made with the automatic test circuit SD-25158-01.

1.2 Test Sequence: The following circuits are used in testing district junctors and should be in working condition before the routine tests of the district junctors are started: Subscriber sender link, subscriber sender, marker connector, originating marker, district link and office link circuits.

1.3 A Circuit Test is one of the single routine tests (charge or early disconnect or operator, etc.) applied once to one district junctor circuit.

1.4 Records: ID-1313, 1315 and 1334 trouble records are required to record the results of these tests. For further information on records see Handbook 50 Section 3.

1.5 Requirements: Section 3 lists all the tests to be made on these circuits together with the performance requirements.

2. TESTING EQUIPMENT

2.1 Test Sets and Accessories

<u>Amt</u>	<u>Code</u>	<u>Description</u>	<u>With ITE</u>
Ø1	ITE-4073	Z.R. Test Set	
1	ITE-4034	Ohmmeter	
7/1	ITE-9627	Remote Control Cord	4023
As Req	298A	Make busy Plugs	4023
1	ITE-8253	Contact Protection Test Set	4023

Ø Optional, may be used at same time as the test frame to speed up testing of local timing.

7 The 32A test set furnished with the test frame may be used in place of ITE-9627.

2.2 Cords Required with ITE-4073

<u>Amt</u>	<u>ITE</u>	<u>Lgth</u>	<u>Cdrs</u>	<u>One End</u>	<u>Other End</u>	<u>With ITE</u>
2	9598	12'	2	110 Plug	110 Plug	4023
3	9639	12'	3	110 Plug	3-ITE-2455 Plugs	4023
1	9975	12'	6	2-110 Plugs	325 Type Plug	4073
2	9952	12'	20	2-Recp. Plugs	20 Pt. Fixt.	4073
1	9547	12'	1	ITE-2455 Plug	ITE-2455 Plug	4023
1	9601	12'	3	310 Plug	310 Plug	4023

% Crossbar Test Accessory Set.

3. FUSING

3.1 Talking Battery Filter Fuses

NOTE: The talking battery filter circuit is shown on the miscellaneous circuit for district junctor frames. It is not advisable to place these fuses until the power plant is operating on a 24 hour basis.

3.11 Before placing the 20 ampere fuses of the filter circuit or the 1-1/3 ampere fuses (FC1 and FC2) on the frame fuse panel, connect a 25 or 60 watt, 110 volt, lamp across the fuse posts for the 20 ampere fuse. When the lamp dims appreciably disconnect the lamp and install the 20 ampere fuse. Then install the associated 1-1/3 ampere fuse (FC1 and FC2).

3.2 20 Ampere Fuses

3.21 Before placing the 20 ampere fuse for each side of the frame check that the fuse contacts are free from crosses and ground.

3.3 Circuit Fuse

3.31 Check each fuse post for crosses and ground.

3.32 Verify at one point that each fuse is associated with its proper circuit.

NOTE: Include the test of A switch-board district junctor circuit fuses.

3.4 Ground Bar

3.41 In order to detect imperfect or missing ground connections on district junctor frames perform the following tests on each district junctor frame.

NOTE: On district junctor frames which include operators districts such as SD-25021-01 or SD-25481-01 all SL relays in the unit must be blocked operated to eliminate any back up over the register lead thru the normal contacts of the SL relays. The test may be made in conjunction with the tests per Handbook 61, Section 124, Paragraph 4.23 or Section 125, Paragraph 6.11 respectively.

3.411 Using a receiver R-9572, connect one end to 48V battery thru a fuse. Touch the other end to the vertical ground bar several times on each equipped unit on the district junctor frame. Do not place receiver directly on ear when making this test. Loud clear clicks should be heard. The absence of loud clear clicks indicate missing ground connections.

3.412 Move the connection from the battery to a solid ground, preferably the horizontal ground bar at top of frame, making sure that good contact is made. Again touch the pick to each unit ground bar. No click or noise of any kind should be heard in the test receiver. If no clicks are heard in the receiver it should be placed directly on the ear and the test per this paragraph repeated. If any click or noise is heard in the receiver when performing this test, it is an indication of a poor connection or missing strap between units or in the connection from the vertical bar to the horizontal ground bar at the top of the frame.

3.413 If the tests described in Paragraphs 3.411 and 3.412 indicate imperfect or missing ground connections, the contact surfaces involved shall be cleaned, screws tightened, or missing connections added, as necessary.

4. CONTACT PROTECTION

4.1 Check the following contact protection circuits using the method described in Section 2 of Handbook 50. The condensers and resistances composing the following contact protection circuits are located on the sender link frame and the interrupter checking circuit associated with the district junctor frame. Insulate the B and F contacts of the CH and RL interrupters while making this test. The following circuits are equivalent circuits and may be checked one against the other, except the B condenser which can be checked against an equivalent B circuit.

Ckt. Desig.	SD Dwg.	Mtg. Pl. & Pos	Test at	Insulate	Type of Ckt.
FO	25620	F50	1T,OBR	B & F of RL int.	Normally Chgd.
FE	25620	F51	1T,EBR	"	" "
BO	25620	F52	1T,OFR	"	" "
BE	25620	F53	1T,EFR	"	" "
OF	25620	F54	1T,OF	B & F of CH int.	" "
EF	25620	F55	1T,EF	"	" "
OB	25620	F56	1T,OB	"	" "
EB	25620	F57	1T,EB	"	" "
B res. & Cond.	25268	-	4T,Z	-	" "

5. CHECK OF 10 OHM SLEEVE RESISTANCES

5.1 Set the switches of the ohmmeter for DC and RES. Connect cords to terminals R and X of the ohmmeter.

5.2 Connect one lead of the ohmmeter to the number 2 punching (sleeve) on the vertical terminal strip on the unit. Connect the other lead to Pchg. 16 of the Vert. T.S. on Unit.

5.3 Observe that the ohmmeter reads:

Min. 9 ohms - Max. 11.0 ohms

6. CHECK OF 680 OHM MR RESISTANCES

6.1 Set the switches of the ohmmeter for DC and RES. Connect cords to terminals R x 10 and X of the ohmmeter.

6.2 At the rear of the frame connect one lead of the ohmmeter to the number 14 punching (lead MR) or 15 punching (lead MR1), MISC punchings for the odd numbered district link primary switches on the horizontal terminal strip on the unit, or to the number 6 or 7 punching, MISC punchings for the even numbered district link primary switches, on the horizontal terminal strip on the unit. Each of these connections is used for testing 10 districts on the unit. Connect the other lead of the ohmmeter to the 2T contact of each F relay in turn in the group of 10 being tested.

6.3 Observe that the ohmmeter reads:

Min. 646 ohms - Max. 714 ohms

7. DISTRICT JUNCTOR INTERRUPTER CHECKING CIRCUIT

7.1 Block the first interrupter relay OB in the non-operated position to prevent the 1 and 2 bottom springs from making when operate ground is applied to the relay. Observe that the PC lamp lights and the alarm operates. Remove the block and momentarily operate the RL key to extinguish the PC lamp and to retire the alarm.

7.2 Block the first OF relay in the operated position. This prevents the first OB relay from operating and causes the PC lamp to light and the alarm to sound as described in 7.1. Remove the block and retire the alarm.

7.3 All OB relays on a district junctor frame have their 1 and 2 bottom springs wired in a chain checking circuit and their operate paths thru break contacts of similarly numbered OF relays. These circuits should be verified as described in 7.1 and 7.2.

7.4 Repeat the tests per 7.1 and 7.2 on the EB, OF and EF interrupter relays on the district frame. These relays have their 1 and 2 bottom springs wired in a chain checking circuit and the OF relays operate through break contacts of the OB relays, the EB relays through break contacts of EF relays and the EF relays through break contacts of EB relays.

8. AUTOMATIC RELEASE & FALSE AUTOMATIC RELEASE

8.1 At the subscriber sender link frame insert a make busy plug into the MB jack associated with the group of twenty district junctors to be tested. At the unit vertical terminal strip, using bare strap wire or alligator clips, short-circuit the tips and rings of the twenty circuits. This may be done with continuous wire since it is not necessary to separate the circuits.

8.2 Insulate the F contact of the RL interrupter.

8.3 Manually operate each T and CH relay of the twenty circuits in the group and note that they lock. Remove the insulation from RL interrupter. The R relays will operate and lock when the RL interrupter front contact makes. Observe that the twenty circuits restore to normal when the RL interrupter back contact makes after the operation of the R relay. This action will be delayed about 14.5 seconds with X option, 116 seconds with W option or 59 seconds with V option. If the B & F leads to the interrupter are reversed or the B lead falsely grounded the circuits will release immediately after the operation of R relay.

8.4 Remove strap wire and the make busy plug.

9. CROSSES AT RELAYS EB, OB, EF AND OF

NOTE: 1T and 2T contacts were tested for false continuity in Paragraph 7.

9.1 Test 1

9.11 Test that the 12T, 10T, 8T, 6T, 4T, 4B, 6B, 8B, 10B and 12B contacts of the EB relay are free from resistance battery. This checks false continuity through the relay contacts to the I relays.

9.12 Block the EB relay operated and momentarily attach ground in turn to the contacts as listed below and observe that the I relay operates in the district junctor circuit indicated and the I relays in the other circuits in the subgroup do not operate. While ground is connected to the contact manually operate the TA relay in the associated district junctor circuit and observe that the CH relay does not operate.

<u>Momentarily Ground Contact</u>	<u>I Relay Operates In Dist. Junctor</u>
12T	0
10T	1
8T	2
6T	3
4T	4
4B	5
6B	6
8B	7
10B	8
12B	9

9.13 Leave the EB relay blocked operated for tests of Paragraph 9.2.

9.2 Test 2

9.21 Block operated relay EF and momentarily attach ground in turn to the contacts of relay EB as listed below and perform operations of Paragraphs 9.211 to 9.214 for each contact grounded.

<u>Momentarily Ground Contact</u>	<u>I Relay Operates in Dist. Jct. Ckt.</u>	<u>CH Relay Operates in Dist. Jct. Ckt.</u>
12T	0	0
10T	1	1
8T	2	2
6T	3	3
4T	4	4
4B	5	5
6B	6	6
8B	7	7
10B	8	8
12B	9	9

9.211 Observe that the I relay in the associated district junctor circuit operates and the I relays in the other circuits do not operate.

9.212 Block operated the TC relay in the circuit being tested.

9.213 Manually operate and release the TA relay in the circuit being tested. Observe that the associated CH relay operates and locks and that no other CH relays operate.

9.214 Release the TC relay in the circuit being tested. Observe that the CH relay releases.

9.22 Release the Blocked EB and EF relays.

9.3 Perform operations of Paragraphs 9.1 to 9.2 using the OB and OF relays in place of the EB and EF relays respectively.

10. CROSSES AT RELAYS OFR, EFR, OBR AND EBR

10.1 Momentarily operate the OBR relay and observe that none of the associated R relays operate. Repeat this test using the EBR relay.

10.2 Block operated the OFR and EFR relays in turn and ground one at a time the contacts on the blocked relay as listed below. Observe that only the associated R relay operates as each contact is grounded.

<u>Momentarily ground contact of blocked OFR or EFR</u>	<u>R relay operates</u>
12T	0
10T	1
8F	2
6T	3
4T	4
4B	5
6B	6
8B	7
10B	8
12B	9

10.3 Release the blocked EFR or OFR relay.

11. MISCELLANEOUS CIRCUITS

11.1 Check miscellaneous circuits not checked on other tests as follows: (1) test battery supply, (2) fuse alarm. Check that the fuse alarm is not stopped when the FA, FC1, FC2 or 20A lamps are burned out or removed, (3) spare jack to MDF, and (4) frame line circuit.

12. CH INTERRUPTER TEST

12.1 Insulate the front and back contacts of the CH interrupters associated with the district junctor frame under test.

12.2 Ground the back contact of the odd interrupter and observe that the OB relays operate. Remove ground.

12.3 Ground the front contact of the odd interrupter and observe that the OF relays operate. Remove ground.

12.4 Repeat operations of Paragraphs 12.2 and 12.3 using the back and front contacts of the even interrupter, observing that the EB and EF relays operate respectively.

12.5 Remove insulation from CH interrupters.

13. ROUTINE TEST

NOTE: To reduce testing time, test set ITE-4073 may be used to make charge call and timing tests. With the setup per Paragraph 14 the test frame and the ITE-4073 test set may be used without interference.

13.1 Failure Indications

13.11 If a trouble is encountered the test circuit stops and TA lamp lights. Refer to the lamp signals provided on the test frame and to Section 121 for indications regarding the character of the

trouble. Where a particular trouble or progress lamp is not lighted, note the class of test, class of district junctor circuit, and position of the TST selector on the test frame.

13.2 Charge Call

13.21 When testing two-party districts every other routine cycle should be made with the TPC key operated and the LC key normal, or if both keys are operated two cycles of test are made on these districts. When testing districts equipped for zone service every other cycle should be made with the Z key operated and the LC key normal, for if both keys are operated, two cycles of test are made on these districts.

13.22 Operate the LC key, the TPC or Z key as described in Paragraph 13.21 and then operate the ST key. The EC lamp lights at the end of the cycle unless a trouble is encountered. Restore the test circuit to normal when the EC lamp lights.

13.3 Early Disconnect

13.31 The purpose of this test is to check the operation of the district junctor circuit in those cases where the call is abandoned after the office code has been dialed and the originating marker circuit has completed its functions, but before the sender circuit has made trunk test.

13.32 Operate the DSC key and then operate the ST key. The EC lamp lights at the end of the cycle unless trouble is encountered. Restore the test circuit to normal when the EC lamp lights.

NOTE: In offices where the senders are of the timed release type, on one cycle of test a visual check shall be made to verify the correct operation of the I relay.

13.4 Operator and Condenser Test

13.41 Operation call test (Paragraph 13.43) and condenser test (Paragraph 13.44) shall be made on alternate routine cycles.

13.42 On one cycle of test (either the operator or condenser test) use the emergency controller circuit at each sender link frame in order to check the district junctor test frame leads through the emergency sender link controller circuit. When the test is completed at a sender link frame reconnect the regular controller circuit. The emergency circuit should be cut in at only one sender link frame at a time.

13.43 Operate the OPR key and then operate the ST key. The EC lamp lights at the end of the cycle unless a trouble is encountered.

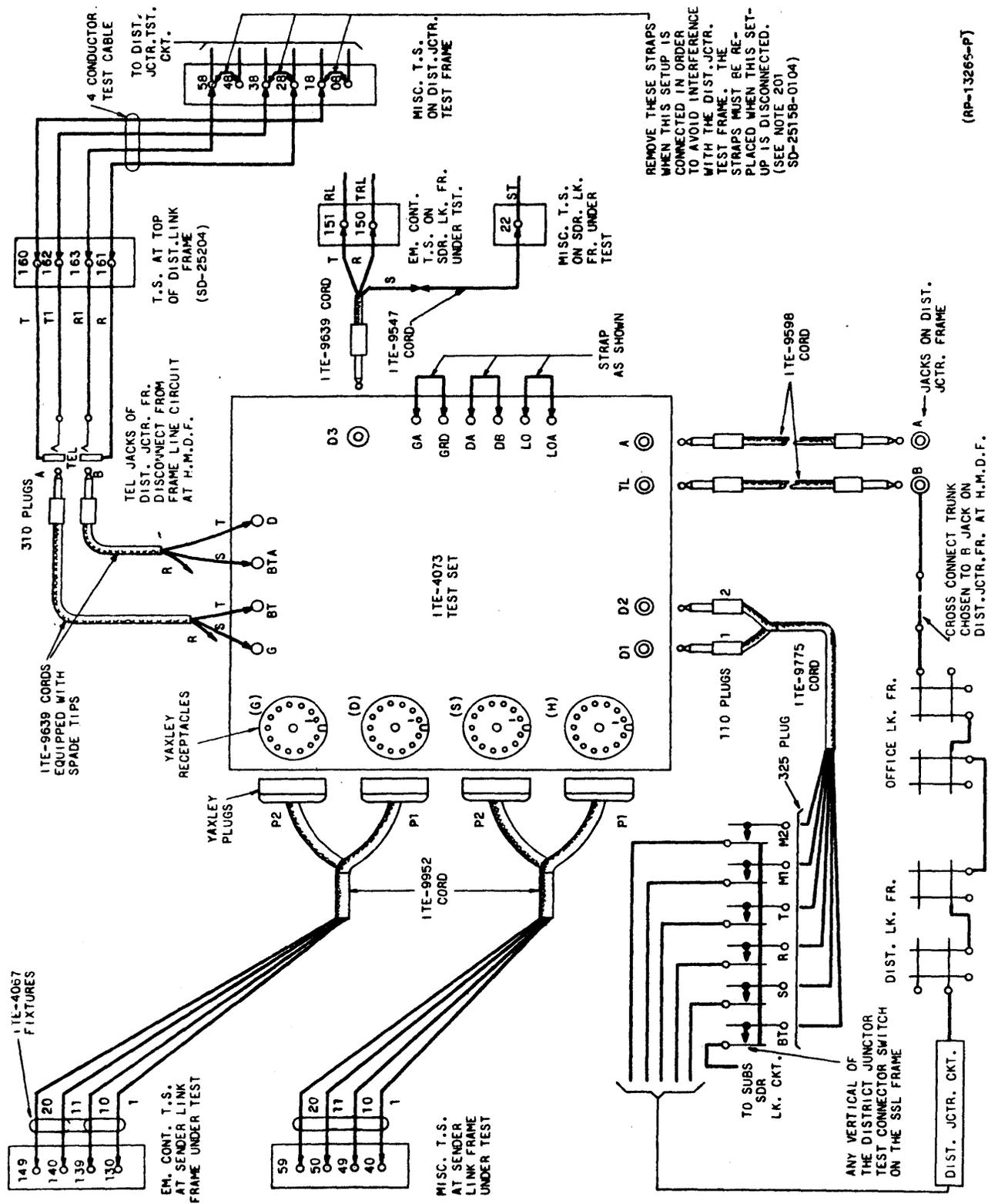


FIG. 1 SETUP FOR TEST USING ITE-4073 TO SUPPLEMENT TEST FRAME

(RP-13265-P)

13.44 Operate the LC and T keys and operate the ST key. The EC lamp lights at the end of the cycle unless a trouble is encountered.

13.45 Restore the test circuit to normal when the EC lamp lights.

13.5 Local Timing

13.51 This test is applied to non-coin district junctors arranged for overtime registration of non-zone calls.

13.52 Perform test per Paragraphs 13.53 and 13.54 on alternate cycles.

13.53 Operate the LC and T keys, and then operate the ST key. After the initial charge is checked the test circuit measures the initial talking period of approximately 5 minutes and 7 seconds, during which time the test circuit checks that no additional charge is received. After the initial talking period has elapsed, the test circuit checks the first overtime charge and disconnects. The EC lamp lights when the test has been made of all circuits.

13.54 Operate the LC, SUB-DIS and T keys and then operate the ST key. After the initial charge is checked the test circuit measures the initial talking period, during which time the test circuit checks that no additional charge is received. Immediately before the end of the initial talking period, the test circuit releases the district junctor CS relay, indicating that the called subscriber has disconnected and then checks that no overtime charge is sent out by the district junctor circuit. The EC lamp lights when the test has been completed on all circuits.

13.6 Non-Charge Call

13.61 Operate the FC key and then operate the ST key. A test is made on each circuit that no charge is received when a free call code is dialed. The EC lamp lights at the end of the cycle.

14. ROUTINE TESTS USING ITE-4073 TO SUPPLEMENT THE TEST FRAME

14.1 Setup for Test (See Figure 1)

NOTE: With the following test setup the district junctor test frame and the ITE-4073 test set can be used without interference. However tests cannot be made simultaneously on district junctors associated with the same sender link frame.

14.101 Locate the test set, ITE-4073, at the sender link frame whose associated district junctors are to be tested. Run a four conductor test cable from the district junctor test frame to the MISC. T.S. of any district link frame. Referring to Note 201 on district junctor test frame schematic drawing SD-25158-0104, remove the straps between terminals 08 & 18, 28 & 38 and 48 & 58 during the time the

ITE-4073 test set is connected. Connect punchings on the miscellaneous T.S. at the test and district link frames as follows:

Dist. Jctr. Test	Shown on Misc. Ckt.
Frame (SD-25158)	SD-25204 District Link
<u>Misc. T.S. punch.</u>	<u>Frame Misc. T.S. punch.</u>

18	160
28	161
38	162
58	163

14.102 Temporarily remove the TEL jacks of the district junctor frames from the frame line circuit by disconnecting the cross-connection at the H.M.D.F.

14.103 Connect the test set terminals to the TEL jacks of the district junctor frame, using two ITE-4109 spade tips, as follows:

<u>Test Set</u>	<u>TEL jack</u>
Term. G	Jack A - Sleeve
" BT	" A - Tip
" BTA	" B - Sleeve
" D	" B - Tip

14.104 Strap the terminals of the test set as follows: GA to GRD, DA to DB, and LO to LOA.

14.105 Using an ITE-9952 cord, connect the fixture to punchings 130-139 (leads GO-G9) and 140-149 (leads DO-D9) on the EM CONT terminal strip at the sender link frame. Connect plugs P1 and P2 to the test set connectors D and G respectively.

14.106 Using a second ITE-9952 cord, connect the fixture to punchings 40-49 (leads HO-H9) and 50-59 (leads SO-S9) on the MISC terminal strip and connect plugs P1 and P2 to the test set connectors H and S respectively.

14.107 Using cord ITE-9639 equipped with alligator clips connect the test set D3 jack to punchings on the EM CONT and MISC terminal strips as follows:

<u>D3 Jack</u>	<u>Pchg.</u>	<u>T.S.</u>	<u>Lead</u>
Ring	150	EM CONT.	TRL
Tip	151	EM CONT.	RL
%Sleeve	22	MISC	ST (See Note)

% Extend, using ITE-9547 cord.

NOTE: The ST lead may be connected to punching 89 of the EM CONT TS instead of the punching shown above if the A and B transfer switches of the sender link are operated.

14.108 Connect the 1 and 2 plugs of ITE-9775 cord to the D1 and D2 jacks, respectively, of the test set. Connect the 325 plug of ITE-9775 to any vertical of the district junctor test connector switch on the SSL frame.

14.109 Select a small group of local charge trunks at the H.M.D.F. and change cross-connections on the marker route relays as required to gain access to these trunks. Determine the code of the trunk group selected.

14.110 Connect one trunk in the trunk group associated with the selected route relays to the district junctor frame B jack at the H.M.D.F. Make the remaining trunks of the group busy at the jack bay.

14.111 Patch the TL and A jacks of the test set to the B and A jacks, respectively, of the district junctor frame using ITE-9601 and 9598 cords.

14.112 Using three 298 type plugs set up the office code to be dialed by inserting plugs into the A1-9 jack corresponding to the A digit and into the B1-9 and C1-9 jacks corresponding to the B and C digits. If no plug is inserted 0 will be dialed for the particular digit.

14.2 Failure Indications

14.21 If a trouble is encountered the test circuit stops. Refer to lamp signals provided on the test set and TMO-4073 for indications regarding the character of the trouble.

14.3 Charge Calls

14.31 When testing two-party districts (2-PY) (2-PY) operate the (0-1), (2-3), etc. keys corresponding to the two party district junctor groups before starting the test; on every other routine cycle operate the TPC key. When testing districts equipped for zone service every other cycle should be made with the ZR key operated and the D key normal.

14.32 Operate the (2 Py), TPC, and ZR or D keys as required per Paragraph 14.31 and then the ST key. The EC lamp lights on the test set at the end of the cycle unless a trouble is encountered. Release the ST key to restore the test circuit to normal when the EC lamp lights.

14.4 Local Timing

14.41 This test is applied to non-coin district junctors arranged for overtime registration of non zone calls.

→ Arrowed lines indicate new or changed information.

14.42 Perform tests per Paragraphs 14.43 and 14.44 on alternate cycles.

14.43 Operate the D and T keys, and then operate the ST key. After the initial charge is checked the test circuit measures the initial talking period of approximately 5 minutes and 7 seconds, during which time the test circuit checks that no additional charge is received. After the initial talking period has elapsed, the test circuit checks the first overtime charge and disconnects. The EC lamp lights when the test has been made on all circuits. Release the ST key to restore the test set to normal.

14.44 Operate the D, SUB-DISC and T keys and then operate the ST key. After the initial charge is checked the test circuit measures the initial talking period, during which time the test circuit checks that no additional charge is received. Immediately before the end of the initial talking period, the test circuit releases the district junctor CS relay, indicating that the called subscriber has disconnected, and then checks that no overtime charge is sent out by the district junctor circuit. The EC lamp lights when the test has been completed on all circuits. Release the ST key to restore the test set to normal.

15. SUPPLEMENTARY TEST USING THE AUTOMATIC TEST CIRCUIT

NOTE: The tests per Paragraphs 15.1 and 15.2 need be made on only one district junctor in each group.

15.1 Automatic Release

15.11 Operate the AR key and then operate the ST key. A test is made on each circuit for its ability to release the calling subscribers line if the called subscriber disconnects and the calling subscriber does not. The AR lamp lights during the timing of the release interval. The EC lamp lights at the end of the cycle.

15.2 False Automatic Release

15.21 Operate the AR and FAR keys and then operate the ST key. A test is made on each circuit that the release circuit does not release the district junctor during momentary release of the district CS relay. The EC lamp lights at the end of the cycle.

R. E. RAHMES

Engineer of Installation

Reason for Reissue:
Correct note under Paragraph 15.

Replaces Section 122.1 dated 8-16-51.