

**ZONE REGISTRATION TESTS**

**CONTENTS**

- |                             |  |
|-----------------------------|--|
| 1. GENERAL INFORMATION      | 8. CONNECTING SWITCH CROSSPOINT TESTS      |
| 2. RECORDS AND REQUIREMENTS | 9. MISCELLANEOUS CIRCUITS                  |
| 3. TEST EQUIPMENT           | 10. TEST OF CONTROL AND CONNECTOR CIRCUITS |
| 4. FUSING                   | 11. TRAFFIC REGISTERS                      |
| 5. CONTACT PROTECTION       | 12. OPTIONAL WIRING AND APPARATUS          |
| 6. MISCELLANEOUS LEADS TEST | 13. ZONE REGISTRATION TIMING TEST          |
| 7. LL RELAY CHAIN CIRCUITS  | 14. GROUP BUSY FEATURE                     |
|                             | 15. ROUTINE TESTS                          |

**1. GENERAL INFORMATION**

1.1 This section describes the methods to be used for testing the zone registration and control circuit SD-25320-01, and miscellaneous circuit SD-25211-01.

1.2 It will be necessary to set up temporary test route relays in the originating markers in order to simulate calls routed to each zone by the test equipment.

1.3 The following reference drawings are required for test outlined in Paragraph 11 of this section.

SD-25158-01 Dist. Jctr. Test Ckt.  
SD-25204-01 Misc. Ckt. for Dist. Jctr. Fr.

**NOTE:** If the District Junctor Test Frame is available, it may be used (Par. 10.3) in place of the ITE-4073 (Par. 10.1 and 10.2) only when the number of ZR circuits to be tested is of a size small enough to warrant no interference with the other tests for which the test frame is required.

**2. RECORDS AND REQUIREMENTS**

2.1 ID-1313, ID-2206, ID-2207 and ID-1334 Trouble Records are required as outlined in Handbook 50, Section 3.

2.2 For requirements see Section 3E and 3F of this handbook.

**3. TEST EQUIPMENT**

**3.1 Test Sets Required**

<u>Amt</u>	<u>Code</u>	<u>Description</u>
1	ITE-4073	Zone Registration Test Set
1	ITE-4033	Link Frame Test Set
1	ITE-2045	Idle Multiple Test Set

**3.2 Test Frames**

SD-25311-01 Zone Registration Test Circuit  
★SD-25158-01 District Junctor Test Circuit

★ See Note in Paragraph 1.3.

**3.3 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	9775	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

**3.4 Cords Required with ITE-4033**

<u>Amt</u>	<u>ITE</u>	<u>Lgth</u>	<u>Cdrs</u>	<u>One End</u>	<u>Other End</u>	<u>With ITE</u>
1	9598	12'	2	110 Plug	110 Plug	4033
1	9947	12'	10	Recp. Plug	10-ITE-2455 Plugs	4033

**3.5 Cords Required with ITE-2045**

<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	9690	12'	4	325A Plug	2-310 Plugs	%4023
1	9639	12'	3	310 Plug	3-2455 Plugs	%4023

**3.6 Cords Required for Other Operations**

<u>Amt</u>	<u>ITE</u>	<u>Lgth</u>	<u>Cdrs</u>	<u>One End</u>	<u>Other End</u>	<u>With ITE</u>
1	9547	12'	1	2455 Plug	2455 Plug	%4023
1	9548	9"	1	2455 Plug	2455 Plug	%4023

**3.7 Accessories Required**

<u>Amt</u>	<u>Code</u>	<u>Description</u>	<u>With ITE or Kit</u>
As Req.	298A	Make Busy Plug	%4023
1	ITE-8253	Contact Protection Test Set	%4023
As Req.	ITE-8507	Alligator Clips	%4023
As Req.	ITE-4109	Spade Tip	%4023
1	ITE-4137, ITE-2418 or ITE-2046	Continuity Test Set	Tool Kit 102
As Req.	ITE-2601	Insulating Sleeves	%4023
% Crossbar Test Accessory Set			

4. FUSING

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

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

Registration Timing Interrupter Frame

Fuse	Equipment
0-4	Wdg., M rly. (5B) Ckts. 0-4
5-9, etc.	" " " " 5-9, etc.
TBS	Term. 48 Volt Test Battery

Registration Control Frame

Fuse	Equipment
★0,1 etc.	Resistance B, ZR Ckts., 0, 1, etc.
%0,1 etc.	Winding, ZR Selector
GB	Resistance GB, Grp. Bay Equip.
Cont.0-2	Resistance CT, Control Ckts. 0-2
LL	Contact 2B, LL relay, Com. Grp.
TBS	Terminal, 48 Volt Test Battery

★ Do not fuse until Connecting Switch Crosspoint Tests (Par. 8) are completed.

% Located on Timing Interrupter Frame

Registration District Connector Frame

Fuse	Equipment
0-1	Wdg., hold mag. D.J. sw. (0 & 1)
2-3, etc.	" " " " (2 & 3) etc.

5. CONTACT PROTECTION

Check the following contact protection circuits, using the method described in Section 2, Handbook 50.

C.P. Ckt.		Type of Ckt. As Shown in Figure 6, Section 2	Connect to
Cond.	Res.		
%M	M	2	4T (relay ST)
P-(ZR)	(P)0,1,	1	Inner wdg. of Z.R. Ckt.
0,1,etc.	etc.		step magnet

% Insulate B contact ZR interrupter.

6. MISCELLANEOUS LEAD TEST

6.1 Leads to the Originating Marker

6.11 ZL Leads (SD-25320-011 Figs. 1, 4, 5 & 7): This test is designed to check the continuity of the ZL leads from the originating markers to the zone connector units on the zone registration control frame.

6.111 At the (DJ)0 zone connector circuit on the zone registration control frame, block operated the equipped (Z)- relays.

6.112 Using a test receiver, touch ground to 5 bottom contact of each (Z)- relay, noting each time that relay R of the (DJ)0 zone registration control circuit and relay ZL (AS Mtg. Plt.) of the originating marker (associated with the (Z)- relay to which ground is being applied) operate.

6.113 Release the (Z)- relays in zone connector circuit (DJ)0.

6.114 Repeat 6.111 thru 6.113 for each equipped (DJ)- zone connector.

6.12 ZK Leads (SD-25320-011, Fig. 5):

This test is designed to check the continuity of the "ZK" leads from each equipped originating marker to its associated (Z)- relays in the (DJ)- zone connector units on the zone registration control bays.

6.121 Using a test receiver, check for the absence of battery or ground on punching 09 of terminal strip "DIST" on each equipped originating marker.

6.122 At the zone registration control frame, momentarily close 7 & 8 top contacts of relay (Z)0 in (DJ)0 zone connector unit. Note that closure of the contacts places a ground on punching 09 of terminal strip "DIST" at originating marker "0".

6.123 Repeat 6.122 at each equipped (DJ)- zone connector unit.

6.124 Perform operations of 6.122 and 6.123 for each equipped originating marker, closing 7 & 8 top contacts of the (Z)- relay associated with the marker under test.

6.13 ZR Leads (SD-25320-011, Fig. 5)

6.131 Using a test receiver, check for the absence of battery or ground on punchings 40, 50, 60 and 70 of each zone connector unit terminal strip.

6.132 Close contact 50 of relay CIA in Originating Marker 0. Verify at each zone connector unit terminal strip that ground is present only on the punching associated with Marker 0 as indicated below:

CIA Relay Contact #50 Closed in Marker No.	Pchg. Grounded on T.S. of Z.C. Unit
0 or 4	40
1 or 5	60
2 or 6	50
3 or 7	70

6.133 Release contact 50 of relay CIA in Marker 0.

6.134 Repeat steps 6.132 and 6.133 for each equipped originating marker.

6.2 Leads to the District Link Frame

6.21 ZS Leads (SD-25320-011, Fig. 2): This test checks the grouping of the ZS leads at the district link frames.

6.211 Block normal relay SB in each (DJ)- control circuit on the zone registration control frames.

6.212 At the district link frames, punchings 70-79 of the miscellaneous terminal strip are the cable appearances of the ZS leads associated with relays (LC)0 to (LC)9 respectively of the district link frame. Momentarily ground in turn punchings 70 to 79 of the miscellaneous terminal strip at district link frame "0". Note that the correct (SM)- relay operates in the associated (DJ)- control circuit on the zone registration control frame. (The ZS lead assignments are obtained from the job information.)

6.213 Repeat 6.212 for each equipped district link frame.

6.214 Remove the blocks from the SB relays.

#### 6.22 ZO Lead (SD-25320-01, Fig. 4)

6.221 Manually operate the CB relay of the ZR control circuit associated with district junctor frame 0. Note the presence of ground on contact 51 of relay OMCA at the associated district link frame.

6.222 Release relay CB. The ground is removed.

6.223 Repeat 6.221 and 6.222 for each equipped ZR Control circuit.

#### 6.23 Z Leads (SD-25320-011, Figs. 4 & 5):

This test is designed to check the continuity of the Z leads from the originating marker connector relays on the district link frames to the ZB relays of the zone registration control circuits associated with the respective district link frames.

6.231 Block operated relay ZB of each zone registration control circuit on the zone registration control bays.

6.232 Insulate 9 and 10 top contacts of the operated ZB relays.

6.233 At district link frame 0, momentarily close contact 01 of the OMCB relay. Verify that relay (Z)0 in the (DJ)0 control circuit on the zone registration control frame is operated.

6.234 Release contact 01 and relay (Z)0 releases.

6.235 Close contact 06 of the 1MCB relay. Verify that relay (Z)1 operates.

6.236 Release contact 06 and relay (Z)1 releases.

6.237 Repeat 6.233 thru 6.236 on relays 2MCB to 7MCB as equipped. Note that (Z)2 to (Z)7 relays operate as equipped.

6.238 Perform 6.233 thru 6.237 for each equipped district link frame, verifying (at its associated (DJ)- control circuit) the operation of the equipped (Z)- relays.

6.239 Remove the insulation from the ZB relays and release the ZB relays.

#### 6.3 Leads to the District Junctor Circuit

##### 6.31 HM Leads (SD-25320-011, Fig. 4):

The purpose of this test is to check the continuity of the HM leads from the zone registration control circuit to its associated district junctors. Included in this test is a check of the DH leads.

6.311 Block operated relay HM of (DJ)0 zone registration control circuit.

6.312 From the job information determine the district junctors of district junctor frame "0" which are arranged for zone registration; their location on the zone registration district connector frame.

6.313 In turn, momentarily close 6 and 7 top contacts of relay F at each district junctor circuit arranged for zone registration and determine at each operation that the district junctor's associated hold magnet operates at the zone registration district connector frame.

6.314 Release relay HM of (DJ)0 zone registration control circuit.

6.315 Perform 6.311 thru 6.314 for each equipped (DJ)- zone registration control circuit and its associated district junctor frame.

##### 6.4 Leads to the Trouble Indicator Circuit

##### 6.41 ZR Leads (SD-25320-011, Fig. 4)

6.411 Close 11 and 12 top contacts of relay GD1 in the originating trouble indicator circuit.

6.412 Close 1 and 2 top contacts of relay LP in the originating trouble indicator circuit.

6.413 Block operated relays TI and SE1 of the control circuit associated with district junctor frame "0".

6.414 Momentarily operate in turn relays S(0-9) as equipped, of the control circuit. Observe that its associated lamp ZR (0-9) of the trouble indicator circuit lights and remains lit.

6.415 Release relays TI and SE1 of the control circuit.

6.416 Open 11 and 12 top contacts of relay GD1 in the trouble recorder circuit. Lamps ZR(0-9) are extinguished.

6.417 Repeat 6.413 thru 6.415 for each control circuit. Observe however that the lamps no longer lock operated but merely light for the interval in which the S(0-9) relays are operated.

6.418 Open 1 and 2 top contacts of relay LP in the originating trouble indicator circuit.

### 6.5 Leads to the Zone Registration Test Circuit

#### 6.51 TC and BC Leads (SD-25320-011, Fig. 4 and SD-25311-011, Figs. 2 & 8):

This test is to check that the TC and BC leads at the zone registration and timing test circuit are associated with the proper ZR control circuit.

6.511 The TC lead associated with ZR circuits of an inter-frame common group is wired to the winding of the LL relay (mounted on the test frame) assigned to that group.

6.5111 Check each TC lead at the horizontal side of one crosspoint (spring 1, verticals 0-4) of its associated common group by applying ground to the crosspoint and observing that the proper LL relay operates.

6.512 Repeat 6.5111 for each ZR circuit associated with the LL relay.

6.513 Perform 6.511 and 6.512 for each LL relay.

6.514 The TC lead associated with ZR circuits of an inter-frame individual group or an intra-frame group is wired to the secondary winding of relay R of the ZR control circuit serving the district junctor frame associated with the ZR circuits.

6.5141 Using an ITE-9547 cord equipped with two alligator clips and insulating sleeves, connect 48V test battery to the CI lead crosspoint (spring 2, verticals 0-4) on the connector switch vertical of a ZR circuit associated with district junctor frame 0.

6.5142 Apply ground to the TC lead crosspoint (spring 1, vertical 0-4) of the same ZR circuit. Note that the R relay of the (DJ)0 ZR control circuit operates. The R relay in turn operates the CI relay (ZR test circuit) associated with (DJ)0.

6.5143 Remove the ground from the TC lead crosspoint. Relays R and CI release.

6.515 Repeat 6.5142 and 6.5143 for each ZR circuit associated with the R relay of (DJ)0 control circuit.

6.516 Remove the 48V test battery from the CI lead contact. Perform 6.5141 thru 6.516 for each equipped district junctor frame and its associated R and CI relays.

#### 6.52 BG Leads (SD-25320-011, Fig. 8 and SD-25311-011, Fig. 2)

6.521 The BG lead (at crosspoints on the ZR test frame connector switches) associated with an individual or common group of ZR circuits is wired to the 2T spring of relay GB of the group busy circuit (zone registration control frame) associated with the same individual or common group of zone registration circuits.

6.5211 Block normal each equipped GB relay on the ZR control bays.

**NOTE:** The GB relays are normally in an operated position. From the job information determine the ZR circuits (and their position on the connector switches) associated with the first GB relay.

6.5212 Verify the presence of a resistance battery on the BG lead contact (spring 3, verticals 0-4) at the horizontal side of the crosspoints associated with the ZR circuits of the first GB relay.

6.5213 Check each BG lead by momentarily opening 2 and 3 bottom contacts of the first GB relay. The resistance battery is removed from the BG lead contact of each ZR circuit associated with the first GB relay.

**NOTE:** If 1 and 2 bottom contacts of the GB relay are falsely made while opening 2 and 3 bottom contacts, solid ground will be found on the BG lead. If 1 and 2 bottom contacts are not made, resistance ground will be found on the BG lead.

6.522 Repeat 6.5212 thru 6.5213 for each equipped GB relay.

6.523 Remove the blocks from the GB relays.

#### 6.6 TI Leads (SD-25320-011, Figs. 4 & 5)

6.61 Connect ground to punchings 40, 50, 60 and 70 at any zone connector unit for markers 0-3 and at any zone connector unit for markers 4-7, as equipped. This provides ground for checking all Z.R. connector TI leads and their associated TI relays of the Z.R. control circuits.

6.62 Momentarily operate relays (Z) 0-7 (as equipped) one at a time, on the zone connector unit associated with the control circuit for district junctor frame 0. Observe that relay TI of the control circuit for district junctor frame 0 operates while relays (Z) 0-7 are operated. Repeat the test of Paragraph 6.62 for each district junctor frame associated with the zone registration control frames. Remove the ground from the punchings associated with the equipped markers.

6.7 (S)0-9 Leads (SD-25320-011, Figs. 2 & 4):  
This test is designed to check the proper district connecting switch select magnet operations.

6.71 At the DJ0 control circuit on the zone registration control frame:

6.711 Block operated relays (SM)0-1 to (SM)8-9.

6.712 Close 11 and 12 top contacts of relay SE1.

6.713 Block normal relay SE.

6.72 Momentarily operate in turn relays (S0) to (S9) and at the zone registration district connector frame note that select magnets 0-9 of each connector switch associated with DJO operate in the correct sequence.

6.73 Release relays (SM)0-1 to (SM)8-9.

6.74 Open 11 and 12 top contacts of relay SE1.

6.75 Remove the block from relay SE.

6.76 Repeat the tests of Paragraphs 6.71 to 6.75 for each district junctor frame control circuit.

7. LL RELAY CHAIN CIRCUITS

7.1 Connect 48V battery and ground to the A jack of the Link Frame Test Set, ITE-4033, using an ITE-9598 cord.

7.2 Connect the receptacle plug of an ITE-9947 cord to the A connector of the set. Connect leads 0-9 of this cord as follows, to operate the LL relays of the chain circuit.

Lead	Pchg. on T.S. on Com. Grp. Conn. Unit
9	16 (last ckt. in chain)
2-8	16 (intermediate ckts. as equipped)
1	16 (first ckt. in chain)
0	4T (LL) of Z.R. test frame

7.3 Connect the receptacle plug of an ITE-9947 cord to the S connector of the set. Connect leads 0-9 of this cord as follows, to check for ground connected by the operation of the LL relays.

Lead	Pchg. on T.S. on Com. Grp. Conn. Unit
9	28 (last ckt. in chain)
2-8	28 (intermediate ckts. as equipped)
1	28 (first ckt. in chain)
0	No connection

7.4 Operate keys AG and SB and leave them operated.

**NOTE:** In the following tests the S lamps will light dimly as they are connected in series with the TB relay of the common group connector circuit.

7.5 Operate keys A0 to A9 (associated with equipped circuits) in the order named. No lamps light. Release key A0. Lamp S1 lights. Release key A1. Lamp S2 lights if there are one or more intermediate circuits in the chain; otherwise lamp S9 lights. Continuing in this manner, check that the lower numbered circuits are served first when two or more circuits are seized. When key (A) 2-8 associated with the last intermediate circuit is released, lamp S9 lights, unless it lighted when key A1 was released.

7.6 With key A9 operated and lamp S9 lighted, operate and release all lower numbered A keys associated with

equipped circuits and observe that lamp S9 remains lighted and no other lamp lights. Release key A9 and operate the next lower numbered A key associated with an equipped circuit. Assume this is key A3. Lamp S3 lights. Operate and release all lower numbered A keys and observe that lamp S3 remains lighted and no other lamp lights. Continuing in this manner, check that the higher numbered circuits when operated lock out the lower numbered circuits.

7.7 Operate the GB1 relay of the group busy circuit that is associated with the common group connector circuits whose LL relays are in the chain circuit under test. Check that battery is disconnected from the winding (1B) of the LL relay of the test circuit that is in the chain circuit under test.

7.8 Repeat the above test on each chain of LL relays.

7.9 Remove all test connections.

8. CONNECTING SWITCH CROSSPOINT TESTS

**NOTE:** The zone registration circuit's 48V fuses must not be installed at this time. (See Note in Par. 4.2)

8.1 Crosspoint Test of DC, ST and MR Leads

**NOTE:** (a) An ITE-2045 (Idle Multiple Test Set) is to be used for this test.

(b) It is understood that the district junctor circuits (associated with the district connecting switch under test) are not in service. However, should there be a possibility of the associated junctors being seized, insert a 298A make busy plug into the group MB- jack (at the secondary bay of the related subscriber sender link frame) associated with the junctor group per job requirements.

(c) Crosspoint tests are to start at the top level of the top connecting switch on the zone registration district connector frames.

8.11 At the 325A plug ends of two ITE-9690 cords, reverse leads 0 and 3. Leads 0 and 3 are the sleeve leads of the H and H1 plugs respectively.

8.111 Using 2 ITE-4109 spade tips, connect the tip and sleeve of an ITE-9639 cord to the "48V" and "Grd." posts respectively of the ITE-2045.

8.112 Insert the plug end of the ITE-9639 cord into an accessible "A" (Battery and Ground Supply) jack.

**NOTE:** If the ITE-2045 is not connected to 48V operation, it may be used on 48 volts with a resistance of approximately 120 ohms connected in series with the 24 volt terminal.

8.113 Insert the H and H1 plugs of an ITE-9690 cord into the M and L jacks respectively of ITE-2045 and the H and H1 plugs of an ITE-9690 cord into the M-1 and L-1 jacks respectively.

**NOTE:** The H1 plugs perform no test functions whatever but are inserted in the L and L-1 jacks because of a sleeve ground condition on the plugs.

8.114 Verify that the keys on the ITE-2045 are all in their normal positions.

8.12 Block operated relay MR and insulate 2 and 3 top contacts of relay TC in each zone registration circuit associated with the district connecting switch under test.

8.13 Connect the 325A plug ends of the ITE-9690 cords to verticals 0 and 1 of the connecting switch.

8.131 Manually operate select magnet 9 of the connecting switch.

8.132 While holding select magnet 9 operated, manually operate hold magnets 0 and 1. The test set checks the ST, DC and MR crosspoints (in that order) for continuity, crosses and grounds. The buzzer indicates the completion of a successful test.

**NOTE:** See Figure 1 for an operational short of the crosspoint test.

8.133 When the buzzer sounds indicating a completed test, release the select and hold magnets.

8.14 Repeat 8.131 thru 8.133 for select magnets 7, 5, 3, 1, 8, 6, 4, 2 and 0 in the order mentioned.

8.15 Remove the ITE-9690 cord from vertical 0 and insert it in vertical 2.

8.151 Repeat 8.131 thru 8.14 for verticals 1 and 2.

8.16 Perform 8.15 thru 8.151 for verticals 2 and 3, 3 and 4, 4 and 5, etc. until all crosspoints on the connecting switch have been tested.

8.17 Remove the ITE-9690 cords from verticals 8 and 9.

8.171 Remove the blocks and insulators from the MR and TC relays respectively of the ZR circuits associated with the connecting switch on which the test has been completed.

8.18 Perform 8.12 thru 8.171 for each connecting switch to be tested.

8.19 Upon completion of the crosspoint tests on all district connecting switches, restore leads 0 and 3 of the ITE-9690 cords to normal.

8.191 Remove the 298A make busy plugs from the group MB- jacks of any junctor group that may have been made busy in the test interval.

8.192 Disconnect the ITE-2045 test connections.

## 8.2 Crosspoint Test of HD Lead

8.21 Connect one side of a buzzer to ground. Using an ITE-9547 cord equipped with an insulated alligator clip, connect the other side of the buzzer to banjo strap "0" of horizontal 9 on the highest equipped district connecting switch.

8.22 Manually operate the associated select magnet. While holding the select magnet operated, momentarily operate in turn, hold magnets 0-9. The buzzer sounds at each crosspoint closure.

8.23 Release the select magnet.

8.24 Transfer the buzzer cord to banjo strap "0" of the next lower horizontal and perform the operations of Paragraphs 8.22 and 8.23.

8.25 Repeat 8.24 for each horizontal on the district connecting switch.

8.26 Transfer the buzzer cord to banjo strap "0" of horizontal 9 on the next lower numbered district connecting switch.

8.27 Perform operations of Paragraphs 8.22 thru 8.25 for the lower numbered connecting switch.

8.28 Repeat 8.26 thru 8.27 for the remaining district connecting switches.

8.29 Disconnect the buzzer leads.

## 9. MISCELLANEOUS CIRCUITS

9.1 Verify the miscellaneous circuits on the zone registration control, district connector and timing interrupter frames, not checked on other tests, as follows: (1) test battery supply, (2) spare jack to MDF, (3) frame line circuit, (4) fuse alarm. Check that the fuse alarm is not stopped when the FA lamp is burned out or removed, (5) remote control circuits (RC) jacks.

## 10. TEST OF CONTROL AND CONNECTOR CIRCUITS

**NOTE:** With the following test setup, the district junctor test frame and the ITE-4073 test set can be used without interference. See Paragraph 10.3 for use of district junctor test frame alone on small installations.



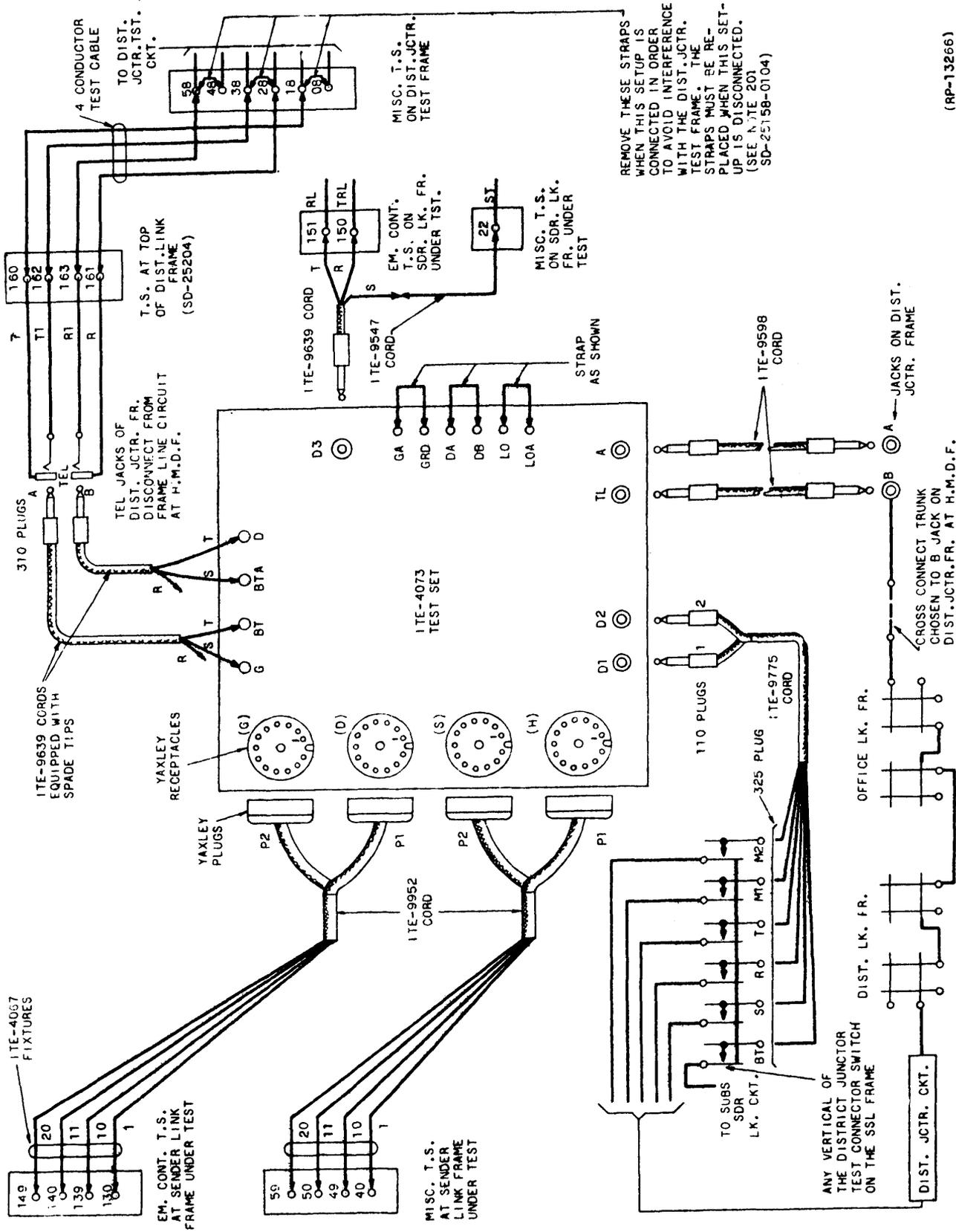


FIG. 2 SETUP FOR TEST OF CONTROL AND CONNECTOR CIRCUITS

(RP-13266)

10.1 Setup for Test (See Figure 2)

10.11 Locate the test set, ITE-4073, at the sender link frame whose associated district junctors have access to the zone registration circuits under test. 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 straps between punchings 08 and 18, 28 and 38, and 48 and 58 during the time that the test set is connected. (These straps must be replaced when the test set is disconnected.) Connect punchings on the miscellaneous T.S. at the test and district link frames as follows:

Dist. Jctr. Test Frame (SD-25158) Misc. T.S. Punch.	Shown on Misc. Ckt. SD-25204 District Link Frame Misc. T.S. Punch.
18	160
28	161
38	162
58	163

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. Connect the test set terminals to the TEL jacks of the district junctor frame, using two ITE-9639 cords equipped with ITE-4109 spade tips, as follows:

Test Set	TEL Jack
Term. G	Jack A - sleeve
" BT	" " - tip
" BTA	Jack B - sleeve
" D	" " - tip

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

10.13 Using an ITE-9952 cord, connect the fixture to punchings 130-139 (leads G0-G9) and 140-149 (leads D0-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.

10.14 Using a second ITE-9952 cord, connect the fixture to punchings 40-49 (leads H0-H9) and 50-59 (leads S0-S9) on the MISC terminal strip and connect plugs P1 and P2 to the test set connectors H and S respectively.

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

D3 Jack	Pchg.	T.S.	Lead
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.

10.16 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.

10.17 Select from the marker cross-connection list, one of the codes for each of the zones installed, (SC lead column) having a small trunk group. Temporarily change the class of call, special, office brush and group cross-connections of the route relays for the codes selected to indicate a direct operator class of call, as follows:

CL	SP	OB	OG
6S	SPB	5P	5S

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

10.18 Patch the TL and A jacks of the test set to the B and A jacks, respectively, of the district junctor frame.

10.2 Test Operations (Using ITE-4073)

**NOTE:** Perform the tests of Paragraphs 10.205 to 10.208 so that each district junctor circuit is used at least once.

10.201 Make busy all except the first marker. Determine that make busy plugs are removed from all zone registration circuits.

10.202 Operate the ZR key; operate the S (S0-1, S2-3, etc.) key corresponding to the levels on the district junctor test connector on which appear the first group of 20 district junctors to be used. If only 10 districts are associated with the ZR district connector (the horizontal multiple of the ZR district connector is split) operate the ES or OS key in addition to one of the S keys. Operate ES for an even sub-group of OS for an odd sub-group.

10.203 Insert 298 type plugs in the A-, B-, and C- jacks corresponding to the office code for the first zone. If no plug is inserted 0 will be dialed for the particular digit.

10.204 Operate the proper CHG key depending upon the number of charges to be received.

No. of Charges	Charge Key Operated
5	5 CHG
4	4 CHG
3	3 CHG
2	2 CHG
1	None

10.205 Operate the ST key and observe that a call is completed using the first zone registration circuit.

10.206 Make the first registration circuit busy and note that the second circuit is used.

10.207 Continue in this manner until all zone registration circuits on the connector switch have been used.

10.208 Allow the last zone registration circuit to be reseized until each district junctor has been used.

10.209 Release the ST key. Remove the make busy plugs from the zone registration circuits and change the plugs in the A-, B-, and C- jacks as required to set up calls to the second equipped zone. Operate the proper CHG key for the zone to be tested.

10.210 Operate the ST key and repeat the operations of 10.205 thru 10.207.

10.211 Repeat 10.209 thru 10.210 for each equipped zone.

10.212 When all zones have been checked make busy the last registration circuit (all circuits busy) and note that the test set blocks due to an insufficient number of charges having been received. A zone requiring more than one charge should be used.

10.213 Release the operated CHG key to arrange the test set to check one charge. Operate and release the RS key and then operate the T1 and ST keys. The test call is completed. This checks that on the zone overflow feature, one charge will be received when all zone registration circuits are busy.

10.214 Release the ST, TI and S- keys.

10.215 Operate the S- key for the junctor group associated with the next connector switch.

10.216 Perform 10.203 thru 10.215 for each equipped connector switch.

10.217 Make busy the first marker and release the second. Leave all zone registration circuits busy except one. Make a call to each equipped zone changing the plugs in the A-, B-, and C- jacks and the CHG keys as required.

10.218 Repeat the tests outlined in Paragraphs 10.212 and 10.213.

10.219 Perform the tests outlined in Paragraphs 10.217 thru 10.218 for each marker.

10.220 Change the test connections as required and perform the tests outlined in Paragraphs 10.202 thru 10.219 from each district junctor frame so that the tests are made through each zone registration control circuit.

10.221 Remove all temporary marker, test line and frame line connections. Replace all temporarily removed cross-connections.

10.222 Release all zone registration circuits by removing all make busy plugs.

### 10.3 Test Operations (Using the District Junctor Test Frame)

**NOTE:** This method is to be used in place of Paragraphs 10.1 and 10.2 only when the number of ZR circuits to be tested is small enough to not interfere with the other tests for which the test frame is required.

10.301 From the job cross-connection assignment records determine the "Route" relay associated with the district junctor test frame zone class code.

10.302 Make busy all but the first originating marker.

10.303 At the available originating marker frame (route relay bay) temporarily remove the cross-connection from the R- punching ("R" cross-connecting field) associated with the route relay determined in Paragraph 10.301.

10.304 Using an ITE-9547 cord equipped with two insulated alligator clips, connect the R- punching to punching ZA ("Z" cross-connection field) associated with the marker ZA relay.

10.305 At the district junctor test frame operate the Z and LC keys.

10.306 Verify that all make busy plugs are removed from the zone registration circuits and that the zone registration circuits are idle (ZR selector switch position 1).

10.307 Operate the ST key. Observe that a call is completed using the first zone registration circuit on the first connector switch and that relay ZA of the ZR circuit operates.

10.308 Make busy the first ZR circuit. Note that the second ZR circuit is seized and its ZA relay operates.

10.309 Make busy the remaining ZR circuits in such a fashion that all the district juncctors and all the ZR circuits on the connector switch are used, checking meanwhile the operation of the associated ZA relays.

10.310 Allowing the test circuit to continue its functions, perform the operations of 10.307 thru 10.309 for each equipped connecting switch.

10.311 When the last equipped connecting switch has been tested, release the ST key.

10.312 Remove the make busy plugs from the ZR circuits.

10.313 At the originating marker move the ITE-9547 cord to the ZB punching associated with the marker ZB relay.

10.314 Direct the test frame to the junctor group associated with the first connecting switch.

10.315 Operate key REP in the test frame.

10.316 Operate the ST key. A call is completed to the first ZR circuit. Verify the operation of the ZR circuit ZB relay.

10.317 Complete a call to each ZR circuit on the first connector switch by busying out each registration circuit in turn. Verify the operation of the correct zone relay at each ZR circuit.

10.318 Release the ST key and remove the make busy plugs from all ZR circuits except those common to other connector switches.

**NOTE:** It is the purpose of this portion of the test to make one call to each ZR circuit. Therefore, ZR circuits of a common group appearing on more than one connector switch should be tested only at one appearance.

10.319 Advance the test frame to the junctor group associated with the next connector switch.

10.320 Operate the ST key and complete a call to each ZR circuit (except those having been tested on other connector switches), verifying each time the operation of the correct zone relay.

10.321 Repeat 10.318 thru 10.320 for each equipped connector switch.

10.322 When the last connector switch has been tested, release the ST and FEP keys.

**NOTE:** The tests of 10.3221 thru 10.3225 are to be performed once per zone registration control circuit per marker. It is necessary to perform the tests on just one zone class relay. A zone requiring more than one charge must be used.

10.3221 Make busy the last registration circuit (all circuits busy) and reoperate the ST and REP keys. The test proceeds normally.

10.3222 At the district junctor test frame close 1 and 2 top contacts of relay Z1 (when Figure S of SD-25158-0105 is used) or 5 and 6 top contacts of relay Z1 (when Figure R of SD-25158-0105 is used). The test proceeds normally.

10.3223 Release the last registration circuit and note that the test frame blocks.

10.3224 Open the contacts of the Z1 relay.

10.3225 Release the ST and REP keys. Operate and release the RN key to restore the test frame to normal.

10.323 Remove the make busy plugs from the ZR circuits.

10.324 Perform 10.313 thru 10.323 for each equipped marker zone relay (ZC thru Z-).

10.325 Remove the ITE-9547 cord from the available marker and re-connect the permanent cross-connection to the R punching as previously connected.

10.326 Make available the next marker and make busy the marker formerly available.

10.327 Perform 10.303 thru 10.325 for the next available marker.

10.328 Repeat 10.326 and 10.327 for each equipped originating marker.

10.329 Release all markers.

10.330 Release the Z and LC keys at the test frame.

10.331 Operate and release the RN key if the test frame has not returned to normal.

## 11. TRAFFIC REGISTERS

Momentarily operate the CB relay of the zone registration control circuit. Observe that the associated overflow (OFL) traffic register operates.

## 12. OPTIONAL WIRING AND APPARATUS

12.1 Verify that optional wiring and apparatus in the individual group connector circuits are equipped as specified.

## 13. ZONE REGISTRATION TIMING TEST

13.1 At the zone registration test frame operate the following keys T, REP, and ZA to ZE.

13.2 Operate the ST key and check that a timing test is made in consecutive order on zones ZA to ZE as described in Paragraph 8 of CD-25311-01.

13.3 Release the REP key in the test circuit and check that the test circuit advances to the next zone registration circuit. Continue the test until the EC lamp in the test circuit lights, indicating the timing test has been completed on all zone registration circuits.

## 14. GROUP BUSY FEATURES

**NOTE:** (a) From the job requirement tables determine the manner in which the zone registration circuits are grouped to each group busy circuit (Figure 8).

(b) From the job requirement tables determine the manner in which the group busy circuits are wired to the individual and common group connectors.

(c) The following tests refer to district junctors associated with district junctor frame "0" as the first group to be tested. However, the tests will apply similarly to the junctors associated with any district junctor frame.

#### 14.1 Interframe Grading of the Registration Multiple

The following tests are to be performed when the ZR circuits are arranged on an Interframe Graded basis.

14.101 Insulate 2 and 3 top contacts of relay GT in each individual group connector associated with district junctor frame "0".

14.102 Block operated the LC relay (District Link Frame) associated with the first individual group connector.

14.103 Using an ITE-9548 cord equipped with 2 ITE-8507 alligator clips, apply ground to contact 53 of the LC relay. Relays BT and CT of the individual group connector should not operate.

14.104 Remove the insulation from 2 and 3 top contacts of relay GT in the individual group connector. Relays BT and CT will operate.

14.105 Make busy all the zone registration circuits associated with the first individual group connector by inserting a 298A make busy plug into the MB jack of each ZR circuit. As the last ZR circuit is made busy, relay GB of the associated group busy circuit is released and relay GT of the individual group connector is operated. Upon operation of the GT relay, relays TB and CC of the common group connector (associated with the individual group connector under test) will operate and relays BT and CT of the individual group connector will release.

14.106 Remove the ground from contact 53 of the LC relay. Relays TB and CC of the common group connector will release.

14.107 Remove the make busy plugs from the ZR circuits associated with the individual group connector. Relay GT of the individual group connector releases and relay GB of the associated group busy circuit will operate.

14.108 Release the LC relay associated with the individual group connector.

14.109 Repeat 14.102 thru 14.108 for each individual group connector associated with district junctor frame "0".

14.110 Make busy all the ZR circuits associated with the common group connector of district junctor frame "0". When the last ZR circuit is made busy, relay GB of the group busy circuit will release.

14.111 Manually operate relay CC of the common group connector. Relay CB of the zone registration control circuit (associated with district junctor frame "0") will operate.

14.112 Release relay CC. Relay CB releases.

14.113 Remove the make busy plugs from the common group ZR circuits. Relay GB of the group busy circuit reoperates.

14.114 Repeat 14.101 thru 14.113 for each district junctor frame.

#### 14.2 Intra-frame Grading of the Registration Multiple

The following tests are to be performed when the ZR circuits are arranged on an Intra-Frame Graded basis.

14.201 Insulate 2 and 3 top contacts of relay GT in each individual group connector associated with district junctor frame "0".

14.202 Block operated the LC relay (District Link Frame) associated with the first individual group connector.

14.203 Using an ITE-9548 cord equipped with 2 ITE-8507 alligator clips, apply ground to contact 53 of the LC relay. Relays BT and CT of the individual group connector should operate.

14.204 Remove the insulation from contacts 2 and 3 top contacts of the GT relay.

14.205 Make busy all the zone registration circuits of the individual group connector associated with the individual group connector by inserting a 298A make busy plug into the MB jack of each ZR circuit. As the last ZR circuit is made busy, relay GB of the associated group busy circuit is released and relay GT of the individual group connector is operated.

14.206 Make busy all the zone registration circuits of the common group associated with the individual group connector. As the last ZR circuit is made busy, relay GB of the associated group busy circuit is released and relay CB of the district junctor "0" zone registration control circuit should operate.

14.207 Remove the MB plugs from the ZR circuits of the individual group associated with the individual group connector. As the first ZR circuit is restored to normal, relay GR of the group busy circuit operates, relay GT of the individual group connector releases, and relay CB of the district junctor "0" zone registration control circuit will release.

14.208 Remove the MB plugs from the ZR circuits of the common group associated with the individual group connector. The GB relay of the group busy circuit reoperates.

14.209 Remove the ground from contact 53 of the LC relay.

14.210 Release the LC relay.

14.211 Perform 14.202 thru 14.210 for each individual group connector associated with district junctor "0".

14.212 Repeat 14.201 thru 14.211 for each district junctor frame.

### 14.3 Inter-Frame Non-Graded Registration Multiple

The following tests are to be performed when the ZR circuits are common to junctors of more than one frame.

14.31 Block operated an LC relay (District Link Frame) associated with the common group connector of district junctor frame "0".

14.32 Using an ITE-9548 cord equipped with 2 ITE-8507 alligator clips, apply ground to contact 53 of the LC relay. Relays TB and CC of the common group connector should operate.

14.33 Make busy all the zone registration circuits associated with the common group connector by inserting a 298A make busy plug into the MB jack of each ZR circuit. As the last ZR circuit is made busy, relay GB of the common group's associated group busy circuit releases and relay CB of the zone registration control circuit (for district junctor frame "0") will operate.

14.34 Remove the make busy plugs from the ZR circuits. Relay GB of the group busy circuit will reoperate and the zone registration control circuit CB relay will release.

14.35 Remove the ground from contact 53 of the LC relay. Relays TB and CC of the common group connector will release.

14.36 Release the LC relay.

14.37 Repeat 14.31 thru 14.36 for each district junctor frame.

### 14.4 Intra-Frame Non-Graded Registration Multiple

The following tests are to be performed when the ZR circuits are common to the junctors of one frame.

14.41 Block operated an LC relay (District Link Frame) associated with the first individual group connector of district junctor frame "0".

14.42 Using an ITE-9548 cord equipped with 2 ITE-8507 alligator clips, apply ground to contact 53 of the LC relay. Relays BT and CT of the individual group connector will operate.

14.43 Make busy all the zone registration circuits associated with the first individual group connector by inserting a 298A make busy plug into the MB jack of each ZR circuit. As the last ZR circuit is made busy, relay GB of the associated group busy circuit is released and relay CB of the district junctor frame "0" zone registration control circuit will operate.

14.44 Remove the ground from contact 53 of the LC relay. Relays BT and CT of the individual group connector and relay CB of the zone registration control circuit will release.

14.45 Release the LC relay.

14.46 Remove the make busy plugs from the MB jacks of the ZR circuits. As the first ZR circuit is returned to normal, relay GB of the group busy circuit will reoperate.

14.47 Repeat 14.41 thru 14.46 for each individual group connector associated with district junctor frame "0".

14.48 Perform 14.41 thru 14.47 for each district junctor frame.

### 15. ROUTINE TEST

15.1 A zone registration circuit is considered routine tested when the zone registration test frame has completed the functions of the test circuit with only one of the ZA to ZE keys operated and the T key normal. A different ZA to ZE key should be operated for different cycles.

15.2 A cycle of routine test is considered complete when the test circuit has completed a routine test on all zone registration circuits and the test circuit EC lamp is lighted.

Due to extensive changes, arrows have been omitted.

R. E. RAHMES

Engineer of Installation

#### Reason for Reissue:

To make extensive changes in the test procedures covered under this section.

Replaces Section 129 dated 4-15-48.