

AUTOMATIC TRUNK TEST CIRCUIT
 STEP-BY-STEP
 ANI-B

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1. GENERAL INFORMATION

- 1.1 This section describes the tests to be performed on the Automatic Trunk Test Circuit per SD-32315-01.
- 1.2 The Output-pulser-Identifier Test Circuit should be tested per Section 120, Handbook 59, prior to the start of this section.
- 1.3 Tests of the timing circuits for Automatic Trunk Test Circuit are outlined in Section 127, Handbook 59, using timing set J24753A (ITE-4325).
- 1.4 When testing outgoing E and M lead signaling trunks with Automatic Trunk Test Frame (SD-32315-01) it is necessary to properly terminate the trunk before testing is started. Normally the E and M lead signaling trunk is terminated with a CX signaling circuit. If the trunk is not properly terminated it is necessary to cross connect the E and M trunk circuit as follows:

Cross connect CAD1 T.S.B. on unit punchings 28 to 48 and 38 to 58.

2. RECORDS AND REQUIREMENTS

- 2.1 Records
- 2.11 Record test results of this section on forms SD-4-1313 and SD-4-1315. For further information on preparing records, refer to Handbook 50, Section 6B.
- 2.2 Requirements
- 2.21 Test of this section agrees with performance requirements as contained in BSP 815-015-180, 814-200-180, and 816-200-180.

3. TEST EQUIPMENT

3.1 Test Sets

<u>Amt</u>	<u>Code</u>	<u>Description</u>
1	ITE-4442A	Volt-Ohmmeter
1	R-9572	Test Receiver

3.2 Cords

<u>Amt</u>	<u>ITE</u>	<u>Cdrs</u>	<u>Lgth</u>	<u>One End</u>	<u>Other End</u>	<u>With ITE</u>
2	9447	1	6'	Push Clip	Alligator Clip	2360
1	9621	3	12'	310 Plug	3 Alliga-tor	2360

3.3 Accessories

<u>Amt</u>	<u>Code or ITE</u>	<u>Description</u>
As Req.	322A	Make Busy Plug

4. FUSING, LEAD, AND TIMING TESTS

4.1 Fusing

4.11 Fuses Installed by Shop

- 4.111 Observe each fuse block and fuse panel equipped with alarm type fuses and check that the fuses are correctly positioned, that the fuses are of the correct type and current carrying capacity and that there are no loose screws.

4.12 Fuses Not Installed by Shop

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

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

Automatic Trunk Test Circuit
SU-32315-01

Desig.	Voltage	Capacity	Check Point
A	+130	1/2	Term 19, T.S. (MISC)
A	-48	1 1/3	L-MS Relay
B	-48	1 1/3	2U-SMB Relay
C	-48	1 1/3	L-RM1 Relay
D	-48	1 1/3	L-SD2 Relay
E	-48	1 1/3	L-LA Relay
F	-48	1 1/3	L-SL1 Relay
G	-48	1 1/3	Right Bottom 1-PB Relay
H	-48	1 1/3	L-BLK1 Relay
J	-48	1 1/3	1L or 2L-RT1 Relay
K	-48	1 1/3	L-WC Relay
L	-48	1 1/3	Operate Relay W0 W0 lamp lights.
M	-48	1 1/3	2L-AVB Relay
H	-48	1 1/3	L-W Relay
P	-48	1 1/3	2U-WC1 Relay
R	-48	1 1/3	L-MGL Relay
S	-48	1 1/3	2U-IR Relay
T	-48	1 1/3	2U-RS Relay
V	-48	1 1/3	Black-D Relay
W	-48	1 1/3	L-WK1 Relay

4.2 Lead Test

4.21 Lead tests for this circuit are contained in Section 109 of this handbook.

4.3 Timing Tests

4.31 Timing tests for this circuit are contained in Section 127 of this handbook.

5. SUPPLEMENTARY TESTS FOR NON COIN AND COIN TRUNKS

5.1 Trunk Busy Test

5.11 Insert a make busy plug into the T jack of a trunk selected manually using the test circuit. Manually apply grd. to the sleeve lead of the trk. ckt.

5.12 Operate TT and ST keys on the test circuit. bY lamp lights on the test trunk remains busy longer than two (2) minutes, an alarm will sound.

5.13 Remove the make busy plug from the T jack in the Trunk. Test circuit seizes the trunk and proceeds to test it. Remove the grd. from the sleeve lead of the trk.

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5.14 Release the ST and TT keys.

5.15 Insert a make busy plug into the T jack of a trunk.

5.16 Operate TT, PB, MS and ST keys. Select any trunk which proceeds the busy trunk.

5.17 Release the MS key. The trunk circuit makes an operation test of the trunk which proceeds the busy trunk and passes the busy trunk.

5.18 Release ST, TT, and PB keys.

5.19 Operate RM key on the test circuit to return the test circuit to normal.

5.2 Trunk Seizure

5.21 Block relay CK1 operated and relay X nonoperated. Operate key MS on the test frame. Lamps SO, HO, XCO, and MS light on the test frame.

5.22 Verify that cross-point 00 has closed on the crossbar switch.

5.23 At the trunk frame miscellaneous circuit, verify that relays FRO and FR1 have operated and relay TT has operated in the trunk circuit assigned to cross-point 00.

5.24 Remove the block from relays CK1 and X.

5.25 Operate key RM on the test circuit to return the test circuit to normal.

5.3 Particular Circuit Selection

5.31 Operate MS key. Operate and release H-PCS key. The H(0-9) lamps light in sequence.

5.32 Operate and release S-PCS key. The S(0-9) lamps light in sequence.

5.33 Operate and release XC-PCS key. The XC(0-4) lamps light in sequence.

5.34 Repeat test paragraphs 5.61 to 5.63 for each crossbar switch equipped. (maximum of three crossbar switches). Lamp SW0 lights for the first crossbar switch. Lamp SW1 lights for the second crossbar switch, and lamp SW2 lights for the third crossbar switch.

5.35 Operate key RM on the test circuit to return the test circuit to normal.

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- 5.4 Cross Test
- 5.41 At the trunk connector switch, using an ITE-9447 cord or equivalent, connect terminal 0 of vertical 0 to terminal 1 of vertical 0.
- 5.42 Operate MS key on the test frame. Lamp XTT lights.
- 5.43 Remove connection between terminals 0 and 1 on vertical 0 and release MS key. XTT lamp extinguished.
- 5.44 Momentarily operate a select or hold magnet on the crossbar switch. X lamp lights.
- 5.45 Momentarily operate CK1 relay. X lamp lights momentarily.
- 5.46 Block relay ON1 operated. Momentarily operate relay CLX. Lamp CLX and BLK light.
- 5.47 Remove block from ON1 relay. Lamps CLX and BLK extinguished.
- 5.48 Operate RN key on the test circuit to return the test circuit to normal.
- 5.5 Cross Test Between Two TT Relays
- 5.51 Cross the wires between any two TT relay contacts on the crossbar switch.
- 5.52 Operate TT, MS, and ST keys. XTT lamp lights and blocks the test circuit.
- 5.53 Remove the cross between the two TT relays and release all operated keys. XTT lamp extinguished.
- 5.54 Operate RN key on the test circuit to return the test circuit to normal.
- 5.6 Cross Test Between Two CL- Relays
- 5.61 Cross the wires between two class relays in sequence.
- CL1 and CL2
CL2 and CL3
CL3 and CL4
CL4 and CL5
CL5 and CL6
CL6 and CL7
CL7 and CL8
CL8 and CL9
CL9 and CL10
CL10 and CL11
CL11 and CL12
- 5.62 After each group of two class relays are crossed, operate ST, TT and MS keys. The CLX and BLK lamps light and block the test circuit.
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- 5.63 Remove the wire that crosses the last two CL- relays tested and release all keys. All lamps extinguished.
- 5.64 Operate RN key on the test circuit to return the test circuit to normal.
- 5.7 Recycle of Trunk Test
- 5.71 Operate the S-PCS, H-PCS and XC-PCS keys to the last terminal of the crossbar switch equipped with a trunk.
- 5.72 Operate TT, MS, and ST keys. EC lamp lights after the last trunk has been tested.
- 5.73 Release all keys.
- 5.74 Operate RN key on the test circuit to return the test circuit to normal.
- 5.8 Unequipped Terminal on the Switch
- 5.81 Leave a terminal of the crossbar switch unequipped.
- 5.82 Operate the TT, MS and ST keys. Observe that the unequipped terminal is passed.
- 5.83 Release all keys.
- 5.84 Operate RN key on the test circuit to return the test circuit to normal.
6. OPERATION TESTS FOR NON COIN TRUNKS
- 6.11 A Relay-Originating Polarity Test
- 6.111 Remove fuses to trunk circuit selected for test before performing the following test; Tip and Ring Incoming Circuit.
- 6.112 Block the OPT relay in the test circuit operated and the TT relay in the trunk nonoperated. Using an ITE-4442A VOM set on the thousand ohm scale, measure the resistance across the TI and RI leads at the OITT frame, (T.S. (A) punching 07 and 17, respectively). The resistance measurement should be in the range between 28,785 ohms to 31,815 ohms.
- 6.113 Remove blocks from OPT and TT relays. Insert the fuse removed in paragraph 6.111.
- 6.114 Block relay TT in the trunk operated.
- 6.115 Using an ITE-4442A VOM, verify that ground is present on terminal 07, terminal strip A.

- 6.116 Using an ITE-4442A VOM, verify that battery is present on terminal 17, terminal strip A.
- 6.117 Remove block from TT relay in the trunk.
- 6.118 At the trunk test circuit, insulate contact 12 make of relay OPT.
- 6.119 Operate TT,MS and ST keys on the test frame. Observe that test proceeds to operate OPT relay.
- 6.120 Verify that OPF,BLK and OPT lamps light test circuit blocks.
- 6.121 Release ST,TT and MS keys. Operate RN key to return test circuit to normal. Remove insulation from relay OPT.
- 6.12 A Relay - Nonoperate Test
- 6.121 Block the A relay operated in the test circuit. If Q or ZH options are provided also block relay CLA operated in the test circuit. Using an ITE-4442A VOM set on the X1000 scale measure the resistance across the TI and RI leads (T.S.(A) punchings 07 and 17 respectively). The resistance reading should be between 3396 and 3464 ohms.
- 6.122 Remove the block from relay A and relay CLA (if provided).
- 6.123 Using an ITE-9447 or equivalent cord, connect contact 10 fixed of relay AOP to contact 10 make of relay AOP.
- 6.124 Operate TT and ST keys on the test circuit. Observe that test progresses to operation of the A relay in the test circuit.
- 6.125 Lamps ANO,SL,AF and BLK light causing the circuit to block.
- 6.126 Release ST and TT keys and operate RN key to return the test circuit to normal.
- 6.127 Remove the connection from relay AOP.
- 6.13 A Relay - Operate Test
- 6.131 block relays AOP and A operated in the test circuit. If Q or ZH options are provided also block relay CLA operated in the test circuit. Using an ITE-4442A VOM set at X1000 scale measure the resistance across the TI and RI leads (T.S.(A) punchings 07 and 17 respectively). The resistance reading should be approximately 2630 ohms.

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- 6.132 Remove the blocks from relays AOP and A.
- 6.133 At the test circuit block relay SL normal.
- 6.134 Operate TT and ST keys on the test frame. Observe that the test advances to operate AOP relay. Lamps AOP,AF and BLK light and test circuit blocks.
- 6.135 Release ST and TT keys and operate RN key to return the test frame to normal.
- 6.136 Remove the block from the SL relay.
- 6.14 Tip Party Test
- 6.141 Insulate contact 2 make of relay TPT.
- 6.142 Operate key TT,TP and ST on the test frame. Observe that test proceeds to operate relay 1DGA in the test frame. Lamps PTF,SL,PT,RP,WG(CL 9,12 or 15) and BLK light causing the test circuit to block.
- 6.143 Release ST,TT and TP keys and operate RN key on the test frame to return the test circuit to normal. Remove insulation from relay TPT.
- 6.15 Ring Party Test
- 6.151 Using an ITE-9447 or equivalent cord, connect one end to contact 2 make of relay TPT and the other end to contact 2 fix of relay TPT on the test frame.
- 6.152 Operate TT and ST keys on the test frame. Observe that the call proceeds to operate relay 2DGA in the test frame. Lamps PTF,SL,PT,WG (CL-9,12,or 15) and BLK light causing the test circuit to block.
- 6.153 Release ST and TT keys and operate RN key to return the test circuit to normal. Remove the connection from the TPT relay.
- 6.16 Trunk Party Test (Operator Assist Trunks)
- 6.161 Block relay HDG in the test circuit normal.
- 6.162 Operate TT and ST keys. The test proceeds to party test lighting lamps PTF,OPT,OPF,CPK,OPQ,IDG,WG (CL-9,12,or 15) and BLK.
- 6.163 Remove block from relay HDG and release all keys on the test frame.

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- 6.164 Operate RN key on the test frame to return the test circuit to normal.
- 6.17 Loop Signaling on E & M Lead Signaling Test (CS or E Relay Test)
- 6.171 Block relay SP in the trunk circuit normal.
- 6.172 Operate the TT and ST keys on the test frame. Observe that the test circuit progresses to operate the CSO relay in the test frame. Test circuit blocks lighting lamps CSO, SL and OPO. After 2 to 5 seconds TTO lamp lights. After an interval of 3 minutes lamp BLK lights.
- 6.173 Release ST and TT keys. Operate RN key to return test circuit to normal.
- 6.174 Remove block from relay SP.
- 6.18 Identification Check Test
- 6.181 Block relay IOK in the test circuit normal.
- 6.182 Operate TT and ST keys. Observe that the test proceeds to operate relay SOK in the test frame. Lamps ID and SP1 light. After 2 to 5 seconds lamps IF, BLK and if option ZR is provided CRF lamp lights.
- 6.183 Release ST and TT keys. Operate RN key to return the test circuit to normal.
- 6.184 Remove block of relay IOK.
- 6.19 Ring Back Test and Check of CAMA Hold Features for Loop Trunks
- 6.191 Block operated relay RB in the test circuit.
- 6.192 Operate TT and ST keys on the test circuit. Lamps OPF, OPT, CPK, PTF, WO, BLK, OPO, and IDO light.
- 6.193 Remove the block from relay RB.
- 6.194 Release all keys.
- 6.195 Operate key RN to return the test circuit to normal.
- 6.20 CS or E Relay Soak (Loop Signaling) Station to Station)
- 6.201 Block relay CS normal in the trunk.
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- 6.202 Operate TT and ST keys. Lamps CSO and SL light. After 3 minutes lamp BLK lights causing the test circuit to block.
- 6.203 Remove block from relay CS and release all keys.
- 6.204 Operate RN key to return the test circuit to normal.
- 6.21 CS or E Relay Release (Loop Signaling Trunk)
- 6.211 Block relay CS or E operated and relay CS1 nonoperated in the trunk.
- 6.212 Operate TT and ST keys on the test frame. Lamps CSO and SL light. After 3 minutes lamp BLK lights causing the test circuit to block.
- 6.213 Remove the block from relay CS or E and CS1 release all keys.
- 6.214 Operate RN key to return the test circuit to normal.
- 6.22 Check Trunk S Lead Open
- 6.221 Block relay WO (if provided) in the trunk normal.
- 6.222 Operate TT and ST keys. Test Circuit blocks and lamp BLK lights.
- 6.223 Release ST and TT keys and remove block from relay WO.
- 6.224 Operate RN key to return the test circuit to normal.
- 6.23 Ground Removal Test and Non-operate Test of PT Relays (2-Party Message Rate and Tip Party Flat Rate Lines)
- 6.231 Block relay GRT operated in the test circuit.
- 6.232 Using an ITE-4442A VOM set at X1000 scale measure the resistance ground across the TI and RI leads (T.S.(A) punchings 07 and 17 respectively). The resistance ground should read approximately 19,500 ohms.
- 6.233 Remove block from relay GRT.
- 6.234 Insulate contacts 3 break and 6 break of relay GRF.
- 6.235 Operate TT, TP and ST keys on the test frame. Observe that test proceeds to operate GRT relay. Lamps CSO and SL light momentarily. Lamp GRT lights. After 3 minutes lamp GRF and BLK light causing the test circuit to block.

- 6.236 Release ST, TT and TP keys and operate RN key to return the test circuit to normal.
- 6.237 Operate MR, TP, TT and ST keys. Observe that test proceeds to operate GRT relay. Lamps CSO and SL light momentarily. Lamp GRT lights. After 3 minutes lamps GRF and BLK light causing the test circuit to block.
- 6.238 Release all keys and operate RN key to return the test circuit to normal.
- 6.239 Remove insulation from relay GRF.
- 6.24 Two Party Message Rate ID Check
- 6.241 If two(2) party message rate lines are served by the office, insulate contact 6 make of relay SK in the test circuit. Block nonoperated relay IOK in the test circuit.
- 6.242 Operate TT, MR, and ST keys on the test frame. Observe that the Call progresses to operate the ID lamp. Observe that lamps IF and BLK light causing the test circuit to block.
- 6.243 Release ST key and operate RN key to return the test circuit to normal.
- 6.244 Release MR key and remove the insulation from relay SL. Remove block from relay IOK in trunk circuit.
- 6.25 Ground Removal Failure (2 Party Message Rate and Tip Party Flat Rate Lines)
- 6.251 Operate keys TT, MR and GRFMR on the test frame (where 2 Party Message Rate is served).
- 6.252 Insulate contact 4 make of relay GRF in the test circuit.
- 6.253 Operate ST key on the test frame. Observe that test circuit blocks and lamps SL and MR are extinguished. Lamp GRT lights.
- 6.254 Release ST, MR and GRFMR keys and operate RN key to return the test circuit to normal.
- 6.255 Operate TP, GRFFR, and ST keys on the test circuit. Observe that test circuit blocks and lamps SL and FR are extinguished.
- 6.256 Release ST key only and operate RN key to return the test circuit to normal. Remove insulation from relay GRF.

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- 6.257 Operate REP and ST keys. Observe that test continues through to completion, and repeats on the same trunk.
- 6.258 Release ST, TP, and GRFFR keys and operate RN key to return the test circuit to normal.
- 6.259 Operate MR, GRFMR, and ST keys. Observe that test continues through to completion, and repeats on the same trunk. Release all keys and operate RN key.
- 6.26 Polarity and Sleeve Open Test
- 6.261 Insulate contact 12 make of relay OPT in the test circuit.
- 6.262 Operate TT and ST keys on the test circuit. Test progresses to operate OPT relay. Verify that lamps OPF, OPT and BLK light causing the test circuit to block.
- 6.263 Release ST and TT keys and operate RN key to return the test circuit to normal.
- 6.264 Remove the insulation from relay OPT.
7. OPERATION TESTS FOR COIN TRUNKS
- 7.11 A Relay - Originating Polarity Test
- 7.111 This test is similar to the originating polarity test described in paragraph 6.11 of this section.
- 7.12 A Relay - Nonoperate Test
- 7.121 This test is similar to the A relay nonoperate test described in paragraph 6.12 of this section.
- 7.13 A Relay - Operate Test
- 7.131 This test is similar to the A relay operate test described in paragraph 6.13 of this section.
- 7.14 Identification of Seizure by Station to Station Call (0+) or Person to Person Call (1+)
- 7.141 Block the A relay in the coin trunk nonoperated.
- 7.142 Operate the TT and ST keys on the test circuit. The circuit proceeds to test the trunk and lamps AR and BLK light.
- 7.143 Remove block from A relay and release all the keys.

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- 7.144 Operate RN key to return the test circuit to normal.
- 7.15 S Relay Operate Test For Loop Trunk (CL7)
- 7.151 Block the S relay normal in the trunk.
- 7.152 Operate the TT and ST keys on the test circuit. The test circuit blocks and lamps TTO and BLK light.
- 7.153 Remove block from S relay.
- 7.154 Release ST and TT keys. Operate RN key to return the test circuit to normal.
- 7.16 S Relay Operate Test For E & H Trunk (CL8)
- 7.161 Block the S relay in the trunk normal.
- 7.162 Operate TT and ST keys on the test circuit. Lamp TTO lights. After 3 minutes lamp BLK lights causing the test circuit to block.
- 7.163 Remove block from S relay.
- 7.164 Release ST and TT keys. Operate RN key to return the test circuit to normal.
- 7.17 S Relay Operate Test (Outpulser Attached) For Coin Trunks
- 7.171 Block the SP relay normal in the trunk.
- 7.172 Operate TT and ST keys on the test circuit. Lamp TTO lights. After 3 minutes lamp BLK lights causing the test circuit to block.
- 7.173 Remove block from SP relay and release all keys.
- 7.174 Operate RN key to return the test circuit to normal.
- 7.18 Identification Check for Coin Trunks
- 7.181 Block the ID relay normal in the trunk.
- 7.182 Operate TT and ST keys on the test circuit. The test circuit blocks and lamps IF and BLK light.
- 7.183 Release the ST and TT keys. Remove the block from ID relay.
- 7.184 Block the MF relay normal in the trunk.
- 7.185 Operate the TT and ST keys on the test circuit. Test circuit blocks and lamps IF and BLK light.
- 7.186 Remove block from MF relay and release the ST and TT keys.
- 7.187 Operate RN key to return the test circuit to normal.
- 7.19 Ringback and CAMA Hold Tests
- 7.191 This test is similar to the ringback test in paragraph 6.19 of this section.
- 7.20 S Relay Release-Loop Signaling Trunk
- 7.201 Block the S relay operated in the trunk.
- 7.202 Operate the TT and ST keys on the test circuit. The test circuit blocks and lamp BLK lights.
- 7.203 Remove block from S relay and release the ST and TT keys. Operate the RN key to return the test circuit to normal.
- 7.21 Diode Test for Loop Trunks
- 7.211 Block DT relay normal in the trunk.
- 7.212 Operate TT and ST keys on the test circuit. Circuit proceeds to diode test and then blocks lighting lamps TTO and BLK.
- 7.213 Release all operated keys and remove the block from DT relay in the trunk.
- 7.214 Operate RN key to return the test circuit to normal.
- 7.22 Check Polarity And Trunk Sleeve Open
- 7.221 This test is similar to the check polarity and trunk sleeve open test in paragraph 6.26 of this section.
8. MISCELLANEOUS TESTS FOR NON COIN AND COIN TRUNKS
- 8.11 CT Register Test
- 8.111 Record CT register reading.
- 8.112 Block relays OK1, STTA and REP in the test circuit operated. CT register scores once.
- 8.113 Remove blockings from REP and OK1 relays.

8.12 RST Register Test

- 8.121 Record RST register reading.
- 8.122 Block relays OK1, STTA and REP in the test circuit.
- 8.123 Manually operate relay AV momentarily. Observe RST register scores once.
- 8.124 Remove all relay blocks.
- 8.13 PB Register Test
- 8.131 Observe that the PB register scores the number of busy trunks passed.
- 8.14 Time Out Alarm
- 8.141 Verify that TTO lamp lights and alarm sounds if trunk testing exceeds three (3) minutes.

8.15 Transmission Measuring Test (Loop Signaling Trunk)

- 8.151 Connect the tip and ring alligator clips for an ITE-9621 cord and the alligator clip of an R-9572 test receiver to the test probe.
- 8.152 Insulate the sleeve clip of the ITE-9621 cord with friction tape.
- 8.153 Insert the 310 plug of the ITE-9621 cord into the TM CAL jack of the test frame. Verify that tone is heard in the test receiver.
- 8.154 Remove the 310 plug from the TM CAL jack and insert into the TM IN jack. Verify that no tone is heard in the test receiver.
- 8.155 Operate key TRMS and then the TT and ST keys. Observe that the test progresses to operate relay SIMW in the test circuit. Verify that tone is heard in the test receiver.
- 8.156 Remove the 310 plug from TM IN jack. Release ST, TRMS and TT keys.
- 8.157 Operate RN key to return the test circuit back to normal.

→ Arrows not indicated due to extensive changes.

Manager, Engineering, Switching
Equipment, Step-by-Step PECC and
Manufacturing Power Equipment Shops

Reason for Reissue:

To change Paragraphs 5.11, 5.12, 5.13, 5.16, 5.52, 5.72, 5.82, 6.119, 6.124, 6.131, 6.134, 6.142, 6.152, 6.162, 6.172, 6.182, 6.192, 6.202, 6.212, 6.222, 6.235, 6.237, 6.242, 6.257, 7.15, 7.16, 7.17, 7.18, 7.20 and 7.21.