

## REMOTE OFFICE TEST LINE FEATURE TESTS

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#### 1. GENERAL INFORMATION

- 1.1 This section provides testing methods to be used during the installation of the Remote Office Test Line (ROTL, SD-28067-01) for Crossbar No. 1 and Crossbar Tandem Offices.
- 1.2 This section in conjunction with Section 412.1 tests the ROTL unit as a frame and as part of the CAROT system.
- 1.3 Present Tables 1.5 and 1.6 of Section 412.1 (see the last three pages of Section 412.1) to the Telephone Company or to the CAROT Control Center to be filled out and returned for the systems test of that section. The completed tables will provide priming information to initiate calls at the ROTL Systems Test Set, ITE-5462, or H-310-150 (TELCO Maintenance).
- 1.4 ROTL installation should progress in a manner similar to the following:
- (a) Install and test the 52A Responder (or modify the 51B Responder). Apply Handbook 50, Sections 156C and 156D.

NOTE: The maximum distance from the responder, through the 105 T.L., through the ROTL, through the ITT connector, to the office link frame, is 1000 feet. The maximum distance from the ROTL, through the ITT connector, to the office link frame is 600 feet. These distances assume 24 gauge cable, or less, and cannot be increased by providing heavier gauge cable.

- (b) Install and test the 105 Test Line (or modify the existing 105 Test Line). Apply Handbook 50, Section 154.
- (c) Connect and test cables between the responder and the 105 Test Line.
- (d) Install and test ROTL additions to the ITT and ITT connector frames. Apply DCS 25161-64.

## 1.4 (Continued)

**NOTE:** The tests of this section (412) can be applied prior to completion of the ITT and ITT connector additions. Once the installer modifies the ITT frame and the ITT connectors that access trunks to be used for the system test of Section 412.1, that section can be applied. Therefore, the ITT frame additions should be installed first; then, ITT connector wiring should be arranged so as to make trunks used for the system test of Section 412.1 accessible first. It is important to test the ITT modifications completely as specified in the DCS and to verify ROTL to ITT cable connections as explained in Paragraph 4 of this section.

(e) Install the ROTL frame.

(f) Connect and test cables between the ROTL frame and:

105 Test Line (See Paragraph 4 of this section.)  
 ITT and ITT Connectors (See Paragraph 4 of this section.)  
 Distributing Frame (to Aux. Line Ckt.)  
 Distributing Frame (to Frame Line Ckt.)  
 Distributing Frame (to No. Gp. Conn. Ckt.; App. Fig. 3)  
 MF Current Supply and Distribution Ckt.  
 Interrupter Frame Ckt. (See Paragraph 4.)  
 Progress Tone Supply Ckt.  
 Milliwatt Distributing Ckt.  
 Tone Supply Ckt.  
 Floor Alarm Fuse and Time Alarm Ckt.  
 Miscellaneous Fuse Bay  
 MF Signal Generator Ckt. (XB1 only)  
 Grd. Start Only Line Ckt. (XB1 only)

(g) Apply the feature tests of this handbook section (412).

(h) Perform the systems test of Section 412.1 with the ITE-5462 (H-310-150) ROTL System Test Set.

**NOTE:**

<u>STEPS</u>	<u>ORDER OF PERFORMANCE</u>
a,b,d,e	First in any order
c	After Steps (a) and (b)
f	After Steps (b),(d), & (e)
g,h	Last

2. TEST EQUIPMENT2.1 Test Sets

<u>Amt</u>	<u>Code</u>	<u>Description</u>
1	ITE-4325 or J24753A	Test Set for Timing Tests
1	ITE-4029 or J94723	Pulse Check Set
1	ITE-5590	70 Type Fuse Alarm Verification Test Set
1	ITE-4442A	Volt-Ohmmeter

2.2 Accessories

<u>Amt</u>	<u>Code</u>	<u>Description</u>
1	ITE-4827	Test Receiver
1	R-3314	Stop Watch
1	R-1824	Pencil Lamp
1	319B	Tool, Lamp Cap Extractor
1	533A	Tool, Lamp Extractor
2	ITE-9650	Operator's Telephone Set

3. PRELIMINARY TESTS3.1 Fuse Alarms

**CAUTION: TO ELIMINATE A FIRE HAZARD, VERIFY THAT DIRECT GROUND IS NOT PRESENT ON THE ALARM BAR OR STUD ON A FUSE PANEL BEFORE INSTALLING THE FEEDER FUSE.**

**NOTE:** Use ITE-5590 Fuse Alarm Verification Test Set to verify the absence of direct ground on the alarm bar. Remove the frame pilot fuse and insert ITE-5590 Fuse Alarm Verification Test Set. If the fuse alarm bus bar is grounded the 70F fuse in the test set will blow and the indicator pop out of the fuse cap. If the alarm bus bar is not grounded a minor alarm will sound, the FA lamp and the red aisle pilot lamp will light. The AL lamp should not light.

- 3.11 Connect battery to cap of fuse block for the PF fuse. Verify the red FA lamp lights, a minor alarm sounds, and the main aisle and aisle pilot lamps light.
- 3.12 Remove the FA lamp. Verify the alarms remain operated.
- 3.13 Replace FA lamp and a good PF fuse.
- 3.14 Insert an operated fuse in the top row of fuses in the fuse panel. Verify that the alarms listed in Paragraph 3.1 are operated.
- 3.15 Remove the operated fuse and verify the fuse alarm is retired.
- 3.16 Repeat Paragraph 3.14 and 3.15 for each horizontal row of fuses.
- 3.17 Restore the fuses removed for the above tests.
- 3.2 Fusing
- 3.21 Verify the proper fuses are installed in the miscellaneous fuse bay for the fuses listed in Table 3.1 and that the proper potential is present at the ROTL frame on the test point listed.

TABLE 3.1

FUSE OR LEAD	POTENTIAL	TEST POINT
LT1 or LT4 RNG A	LT1 or LT4 +105V +130V	TS(AA-C)-51 TS(AA-C)-98 TS(AA-C)-99

- 3.3 Miscellaneous Circuit
- 3.31 Using two ITE-9650 Operator's Telephone Sets, test transmission on the TEL A-B jack to the specified adjacent frames.
- 3.32 Remove the Tel. Sets from the Tel. Jacks.
- 3.33 With an ITE-4442A Volt-Ohmmeter, check for -48V battery on the 48V terminals on the front and rear of the frame and on the tip of the A Jack.

- 3.34 Check for direct ground on the GRD terminals at the front and the rear of the frame and on the sleeve of the A Jack.
- 3.35 Check for 12,000 ohm ground on the HRG terminals at the front and rear of the frame.
- 3.36 Make a continuity test of the B jack to the adjacent specified frames.
- 3.4 Test and adjust the ROTL frame mounted 8A Tone Detector (SD-99551-01, J94008A-1). Apply Handbook 50, Section 156B.
- 3.5 Test and adjust the ROTL frame-mounted V4 Repeaters and Term Sets according to BSP 332-104-500 and BSP-332-104-501.
- 3.51 Setup for V4 Repeaters
  - a) The following screws on the 1M Term. Set should be open: All NOBC screw. The following screws should be closed: All other screws.
  - b) The gain of the 227 Amplifier should be adjusted to 4.5 DB.
- 3.6 The ROTL frame-mounted signaling receiving ckt. (SD-99493-01, J99371-1) should come shop tested and adjusted. If the need arises for a retest, apply Handbook 50, Section 31.2.
- 4. CABLE CONNECTIONS
- 4.1 ITT
- 4.11 Ground the leads given in Table 4.1 (where applicable) and verify the appropriate relay operation in the ROTL connector units at the ITT connector frames (2 installers are required).
- 4.12 Block relay RCT1 operated at the ROTL Access Unit. (In XBI offices, this is at the Miscellaneous Relay Rack; in XBT, at the Supplementary ITT frame.) Ground the leads given in Table 4.2 and verify that the designated relay at the ROTL access unit chatters.
- 4.13 Release relay RCT1.
- 4.14 Buzz the leads from the ROTL frame to the ITT according to Tables 4.3 and 4.31.

TABLE 4.1

LEAD TESTED	ROTL TS(AA-A)	ITT CONN. FR. RELAY
RSW00-09	70-79	RCX00-09
RSW10-19	80-89	RCX10-19
RSW20-29	90-99	RCX20-29
LEAD TESTED	ROTL TS(AA-B)	ITT CONN. FR. RELAY
RSW30-39	0-9	RCX30-39
BSW00-09	30-39	BCX00-09
BSW10-19	40-49	BCX10-19
BSW20-29	50-59	BCX20-29
BSW30-39	60-69	BCX30-39
LEAD TESTED	ROTL TS(AA-E)	ITT CONN. FR. RELAY
BSW40-49	0-9	BCX40-49
BSW50-59	10-19	BCX50-59
BSW60-69	20-29	BCX60-69
BSW70-79	30-39	BCX70-79
BSW80-89	40-49	BCX80-89
BSW90-99	50-59	BCX90-99
LEAD TESTED	ROTL TS(AA-F)	ITT CONN. FR. RELAY
RSW40-49	0-9	RCX40-49
RSW50-59	10-19	RCX50-59
RSW60-69	20-29	RCX60-69
RSW70-79	30-39	RCX70-79
RSW80-89	40-49	RCX80-89
RSW90-99	50-59	RCX90-99

TABLE 4.2

LEAD	ROTL TS(AA-A)	ITT RELAY (ROTL ACCESS UNIT)
H00	50	RH00
H19	69	RH19

TABLE 4.3

LEAD	ROTL TS(AA-A)	ITT TS(RA3) (ROTL ACCESS UNIT)
SELO	40	15
1	41	25
2	42	35
3	43	45
4	44	55
5	45	16
6	46	26
7	47	36
8	48	46
9	49	56

TABLE 4.31

LEAD	ROTL TS(AA-B)	ITT TS(RA3) (ROTL ACCESS UNIT)
AL	70	22
BL	71	21
RD	73	54
T	80	52
T1	81	51
RCI	82	12
SIA	85	32
SIB	86	31
R	90	42
R1	91	41
LEAD	ROTL TS(AA-B)	ITT TS(RA2) (ROTL ACCESS UNIT)
BD (Opt. K)	74	25
SA (Opt. M)	95	15
SB (Opt. M)	96	45

TABLE 4.4

INT.	PENCIL CONNECTIONS	VERIFY
BB	BAT. - Term. 39	60IPM
OF	- Term. 26	120IPM
BY*	- Term. 37	60IPM
FL*	- Term. 35	120IPM
TA*	- Term. 33	1 Sec. ON, 29 Sec. OFF
TA1*	- Term. 31	60IPM
TPU*	- Term. 28	60IPM
TPU*	- Term. 29	60IPM
BPT**	- Term. 65	3 Sec. ON- 117 Sec. OFF
TPT***	- Term. 67	1.6 Sec. ON- 58 Sec. OFF
TPT***	BAT. - Term. 68	2 Sec. ON- 58 Sec. OFF

\* Block operated relay ON2.  
 \*\* Block operated relay P3C.  
 \*\*\* Block operated relay P1CA.

TABLE 4.5

LEAD	ROTL TS(AA-C)	105 TEST LINE TS(B) ON ROTL UNIT
MB	6	28
RL	5	57
CT	3	18
ST	2	38

TABLE 4.6

TONE	LEAD	ROTL TS(AA-C)	LEVEL
Low Tone (SD-81168 9-01 typical)	LT1(Opt. X) LT4(Opt. Y)	51	1V RMS 2V RMS

TABLE 4.6 (Continued)

TONE	LEAD	ROTL TS (AA-C)	LEVEL
Test Prog. Tone (SD-96603-01) (HB50, Sec. 152)	T,R	42,52	-10DBM 600ohm
	T,R	43,53	-10DBM 600ohm
	T,R	44,54	-10DBM 600ohm
	T,R	46,56	-10DBM 900ohm
Milliwatt (1000 Hz) (SD-95277-01, (HB50, Sec. 7.1)	T,R	40,50	+0.5DBM 900ohm
	Verify blocking CTB relay starts Milliwatt Supply if Option W is provided in ROTL.		
MF Current (SD-95391-01 SD-95867-01) (HB50, Sec. 30, HB50, Sec. 34)	T0(700Hz) T1(900Hz) T2(1100Hz) T4(1300Hz) T7(1500Hz) T10(1700Hz)	20 21 22 23 24	-8 DBM or -6 DBM (See SD-95391-01 Note 102 & 25 115, SD-95867-01 Note 102 & Table A)
	Verify blocking MF relay starts the MF Signal Generator if opt on V is provided in ROTL.		

4.2 Interrupter Frame

4.21 Connect an ITE-4827 test receiver between ground and terminal 38 of TS(AA-C) - interrupter lead OFT. Verify 120 IPM low tone.

4.22 Connect the test receiver between ground and terminal 60 of TS(AA-C) interrupter lead RO. Verify 60 IPM low tone.

4.23 Verify the interrupter leads given in Table 4.4 using an R-1824 pencil lamp. All terminals on TS(AA-C).

4.3 105 - Test Line

4.31 Buzz the leads from the ROTL frame to the 105 Test Line according to Table 4.5.

4.4 Tone Supply Circuits

4.41 Verify that the correct tone is present at the punchings listed in Table 4.6. Refer to Handbook 50 and circuit SD's for level adjustment.

5. TIMING REQUIREMENTS

5.01 Perform the tests of Paragraphs 5.02 through 5.10 for using the J24753A or the ITE-4325 test set for timing tests.

5.02 Setup for Test

5.021 Make the test connections shown in Figure 5.1.

5.022 Connections for leads BK (black), R (red), and W (white) are given on the circuit requirements table of the circuit under test.

5.023 Setting for the key SEND and switch REC are shown on the circuit requirements table of the circuit under test.

5.024 Set the MCF key to NORM.

5.025 Set the MIL SEC switch for the range which will just cover the maximum time requirement as given in the circuit requirements table:

EXAMPLE:

<u>Time Requirement</u>		<u>MIL SEC Switch Setting</u>
<u>Min.</u>	<u>Max.</u>	
5MS	- 10MS	0-20
10MS	- 50MS	0-100
300MS	- 400MS	0-500
2000MS	- 5000MS	0-5000
4000MS	- 8000MS	0-5000

(with Half Scale Calibration)

5.03 Calibration of Test Set

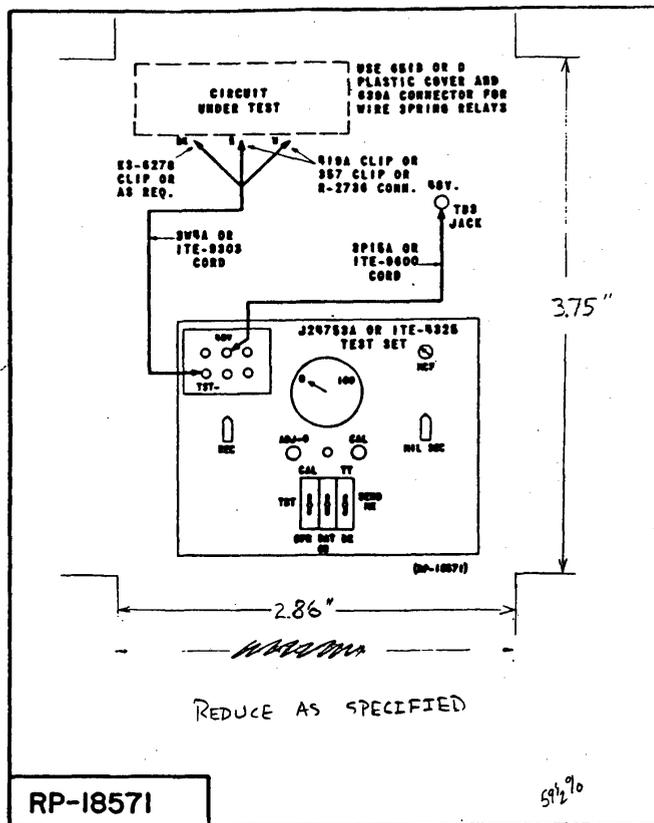
5.031 With the BAT key off, meter should read zero. If not, set pointer to zero with the adjusting screw on meter.

5.032 Operate the BAT key to ON and allow set to warm up for 30 seconds. The BAT lamp should light.

5.033 Adjust the meter to read zero by means of the ADJ-0 knob.

5.034 Full Scale Calibration - (use for time intervals of 5000 mil seconds or less): Operate key TST to CAL and adjust meter to full scale deflection by turning knob CAL.

FIGURE 5.1  
SETUP FOR J24753A OR ITE-4325 TEST SET



5.035 Half-Scale Calibration (use for time intervals greater than 5000 mil seconds): Operate key TST to CAL and adjust the meter to half-scale deflection by turning knob CAL.

5.036 Restore TST key to normal. The meter returns to zero and the set is ready for measurement.

5.037 Recalibrate the set per Paragraphs 5.033 and 5.034 or 5.035 immediately before making each test or if MIL SEC switch setting is changed.

5.04 Test Operation

TABLE 5.1

5.041 Operate and hold key TST to OPR position until meter pointer comes to rest.

MIL SEC Setting

For MIL-Seconds

5.042 Immediately release and reoperate key TST to OPR position to recycle timer.

0-20  
0-100  
0-500  
0-5000

Divide Reading by 5  
Read Direct  
Multiply Reading by 5  
Multiply Reading by 50  
Multiply Reading by 100

NOTE: Some circuits may require manual action to recycle. See circuit requirements table.

0-5000 (Half-Scale Calibration)

5.043 Observe meter reading when pointer comes to rest. Release key TST.

5.045 Compare the test time obtained above with the time requirements of the circuit under test. The test time must lie within the limits given.

5.044 To obtain measured time in mil seconds refer to Table 5.1.

5.05 Continue timing tests as instructed in Table 5.2.

TABLE 5.2

DESIG.	BLOCK OR INSULATE	TEST CLIP DATA			SEND KEY	REC SW		TIME (MSEC)	
		CONN BK	CONN R	CONN W		START	STOP	MIN	MAX
CI1	(C12)NO	GRD	U(CI1)	U(CI2)	BK	GRD	48V	155	365
CTH		GRD	U(CTH)	9(CA3)	BK	GRD	OC	103	260
DKP*	(MFTT)O	GRD	U(DKP)	2(PCK1)	BK	OC	GRD	55	150
FO1	(F02)NO	GRD	U(FO1)	U(F02)	BK	GRD	48V	68	164
	(F02)NO, (TT)O							6.5	22
OFT	10B(CTAT)(RBY)NO	GRD	U(NAS)	L(OFT)	MK	GRD	48V	3000	3500
OFTA	(P1A)O, (P1B)NO		U(LTA)	L(OFTA)					
OFTB	(P2A)O, (P2B)NO		U(LTB)	L(OFTB)					
P1T	(P1B)NO	GRD	U(P1A)	2L(P1T)	MK	GRD	48V	1000	1200
P2T	(P2B)NO		U(P2A)	2L(P2T)					
P3T	(P3B)NO		U(P3A)	2L(P3T)					
SA**	4B(P2C), (ONTP)O, (TPTC)NO	GRD	1L(S)	7(NAS)	MK	GRD	48V	1000	1200
SAB		GRD	1U(SB)	10(SB)	MK	GRD	OC	1000	1200
SIT**	(RCT)O, (ONTP)O, (TPTC)NO	2L(OTA)	BAT.	7(NAS)	MK	48V	GRD	750	870
TG1	(TG2)NO	GRD	U(TG1)	U(TG2)	BK	GRD	48V	42	100
TMH***		GRD	1U(DET)	2(TMH)	MK	OC	GRD	210	240

\* Connect GND to 8(MFTT).

\*\* To reset timer release (ONTP).

\*\*\* To adjust timing rotate TMH potentiometer; CW increases and CCW decreases time.

- 5.06 Block relay P3C operated. Then, with an R-3314 stop watch, verify that relay CTTC operates in 9.0 to 13.0 seconds after relay CTB is blocked operated. All three relays are located on Unit AA.
- 5.07 Release relay P3C and CTB.
- 5.08 With the stop watch, verify that relay TM3 (Unit AF) operates approximately 3 seconds after TM1 (Unit AF) is blocked operated.
- 5.09 Release relay TM1.
- 5.10 Strap resistors PG2, 3, 5, 6, 7, 8, 11, 12, 13, 14 as required in procedures of timing requirements on the F sheets of SD-28067-01.

6. ROTL ACCESS

- 6.1 Perform the tests of Paragraph 6.2 or 6.3 according to the equipment arrangement for accessing the ROTL under test.
- 6.2 Accessing XB1 in Same Office Building (App. Fig. 3) One at a time, connect ground to each of the TS(AA-A) terminals given in Table 6.1 and verify the appropriate P-A relay operates immediately, relay P-C operates approximately one second later, BY- lamp lights and ground is present at T.S. (AA-B) terminals as indicated.

TABLE 6.1

TS(AA-A) TERMINAL	IMMEDIATE RELAY OP.	1 SECOND RELAY OP.	LAMP	TS(AA-B) TERMINAL
25	P1A(Unit	P1C(Unit	BY1	75
24	P2A AD)	P2C AA)	BY2	76
23	P3A "	P3C "	BY3	77

- 6.3 Accessing Distant XB1 or Other System in Same or Distant Building (App. Fig. 4) - Connect temporary jumpers from ringing battery on contacts 12 and 11 of relay STT to each of the TS(AA-A) pairs given in Table 6.2 and verify

that the appropriate P-A relay operates immediately, relay P-C operates approximately one second later, BY-lamp lights and ground is present at TS(AA-B) terminals as indicated. Manually release relays RU1, RU2, or RU3 to release each of the respective circuits after verifying its operation.

TABLE 6.2

TS(AA-A) TERMINAL PAIR	IMMEDIATE RELAY OP.	1 SECOND RELAY OP.	LAMP	TS(AA-B) TERMINAL
0,10	P1A(Unit	P1C(Unit	BY1	75
1,11	P2A AD)	P2C AA)	BY2	76
2,12	P3A "	P3C "	BY3	77

7. TEST FRAME CUT-IN

- 7.1 Connector Busy
  - 7.101 Insulate contact 8M of relay ON2 (Unit AF) and if App. Fig. 4 is provided insulate contact 1B of Relays RUA1, RUA2, and RUA3. If App. Fig. 4 is not provided, connect temporary ground to 1F of relays P1A, P2A, and P3A.
  - 7.102 Block relay P1A operated (Unit AD). Note that relay AS (Unit AE) operates about a second later. Leave relay P1A operated.
  - 7.103 Manually operate and release relay RA (Unit AF) sixteen times and verify that relays BS, CS, DS, ..., RS, and SS (Unit AE) operate and release in turn with each RA operation. **NOTE:** Operate and release relay RA only sixteen times.
  - 7.104 Connect an R-1824 pencil lamp from -48V to contact 4F of relay TBA (Unit AA). Make the pencil lamp visible from the front of the frame.
  - 7.105 Insulate contact 2B of relay RCK2 (Unit AF).
  - 7.106 Manually operate relay RCK (Unit AF). It will lock operated.

TABLE 8.1

RR-RELAYS BLOCKED OPERATED	COUNTING RELAY OPERATION	COUNTING RELAY OPERATION WITH RELAYS RP(UNIT AH) & S2(UNIT AJ) BLOCKED OPERATED	COUNTING RELAY OPERATION WITH RELAYS RP, IG AND S2(UNIT AJ) BLOCKED OPERATED AND RELAY IB(UNIT AJ) BLOCKED RELEASED
0,1	0	0	2
0,2	0	0	0
1,2	2	0	2
4,0	3	2	0
4,1	4	2	2
4,2	6	3	0
7,0	0	3	2
7,1	2	4	0
7,2	3	4	2
7,4	4	0	0

7.107 Remove the insulation from 8M of relay ON2.

NOTE: Perform Paragraph 7.108 within 3 1/2 minutes after the insulation is removed from ON2.

7.108 Manually operate and release relay RA once more and verify that relay EBC (Unit AF) operates two seconds later.

7.109 Manually operate relay RCYF (Unit AF), it will lock operated, and note that the pencil lamp connected to relay TBA lights at 120 IPM for three seconds.

7.110 Remove the blocking instruments from relay P1A and note that it remains operated.

7.111 Momentarily operate relay RLC (Unit AB) and note that relay P1A releases.

7.2 Trunk Busy

7.21 Insulate contact 8M of relay ON2 (Unit AF); then, block relay P1A operated again.

7.22 Connect a temporary ground to terminal 85 of TS(AA-B).

7.23 Manually operate relay RCK (Unit AF). It will lock operated.

7.24 Manually operate relays TS (Unit AE) and RCI (Unit AF). Both will lock operated.

7.25 Remove the insulation from 8M of relay ON2 and verify that about four seconds later the lamp connected to relay TBA lights at 60IPM for three seconds.

7.26 Remove the ground from terminal 85 of TS(AA-B) and remove the pencil lamp from relay TBA.

7.3 Trunk Connection

7.31 Manually release relay P1A. When the frame relays release, block relay P1A operated again.

NOTE: Perform Paragraph 7.32 within 3 1/3 minutes after relay P1A is operated.

7.32 Manually operate relay RCI (Unit AF) (it will lock) and verify that relay S (Unit AB) operates.

7.33 Release relay P1A.

7.34 Remove insulation from 2B of relay RCK2 and 1B of Relay RAU1, RAU2, or RAU3. Remove temporary ground from 1F of P1A, P2A, or P3A relays.

8. COUNTING RELAYS

8.1 Connect a temporary ground to contact 6F of relay PCIA (Unit AH).

8.2 Block operated relays specified at top of Table 8.1, then block each of the RR- relay pairs (Unit AK) listed operated and verify that the proper counting relay (Unit AL) operates under the given conditions.

- 8.3 Release any relays blocked operated and remove the ground from contact 6F of relay PCIA.
9. CLASS OF SERVICE
- 9.1 Block the relays marked in Table 9.1 operated and verify the appropriate class of service relay operation. All relays located on Unit AH.
10. OUTSTEERING
- 10.1 MF Test Call
- 10.101 Insulate contact 8M of relay ON2 (Unit AF). This contact will remain insulated until Paragraph 13.5.
- 10.102 Block relay ON2 operated. ON2 will remain blocked until Paragraph 10.44.
- 10.103 Block relay ST released (Unit AJ).
- 10.104 Block relay MF operated (Unit AH). Note that relay S1 operates (Unit AJ).
- 10.105 Block relays RR1 and RR2 operated (Unit AK). Note that relay F03 operates (Unit AH).
- 10.106 Momentarily operate relay STG (Unit AJ). It will lock operated.
- 10.107 Momentarily operate relay TG (Unit AJ) and note that relay MFTT (Unit AJ) locks operated.
- 10.108 Block relay SPG operated (Unit AK). Verify that relays S2, S3, S4, ..., S10 sequentially operate and release.
- NOTE: The sequence will be fast; approximately 1 second. Ignore the pulsing relay.
- 10.109 Remove the blocking instrument from relay ST. Verify that relay AV1 operates (Unit AK).
- 10.110 Release relays RR1, RR2, MF, and SPG.
- 10.2 DP Test Call
- 10.201 Block relay Z released (Unit AK).
- 10.202 Block relays DPLA (Unit AH) and 3DG (Unit AK) operated. Note that relay S1 operates.
- 10.203 Block relays RR1 and RR2 operated (Unit AK). Note that relay F03 operates.
- 10.204 Momentarily operate relay STG (Unit AJ). It will lock operated.
- 10.205 Manually operate relays PCK1 and PCK2 (Unit AK). Both will lock operated.
- 10.206 Manually operate relay TT (Unit AJ). It will lock also.
- 10.207 Manually operate relay ONS (Unit AJ) and verify that relay P operates and releases ten times.
- NOTE: P will pulse very fast - approximately one second for the ten operations.
- 10.208 Block relay W (Unit AK) in its operated position (W will be operated).
- 10.209 Remove the blocking instrument from relay Z and verify that relay P pulses five times. Again, the pulsing will be fast - approximately 1/2 second.
- 10.210 Remove the blocking instrument from relays W and verify that relay P pulses for about three seconds; then, relay AV1 operates.
- 10.211 Release relays RR1, RR2, DPLA, 3DG, and ONS.
- 10.3 RP Test Call
- 10.31 Block relay RP operated (Unit AH). Note that relay IB operates (Unit AJ).
- 10.32 Block relays RR2 and RR4 operated (Unit AK). Note that relay F03 operates (Unit AH).
- 10.33 Manually operate relay STG (Unit AJ). It will lock operated.
- 10.34 Momentarily operate relay MTG (Unit AJ) and note that relay TT (Unit AJ) locks operated.
- 10.35 Manually operate and release relay STP (Unit AL) four times and verify that counting relays 3, 2, 1, and 0 (Unit AL) operate in sequence with each STP operation.
- NOTE: All four relays will release immediately following relay 0 operation (when relay STP is released).

TABLE 9.1

BLOCK OPERATED											CLASS OF SERVICE
PIJ-					PIH-						
7	4	2	1	0	7	4	2A	2	1	0	
X	X				X	X			X	X	MF,WS DPLA,WS PNL,RP XB2,RP PCI
X	X							X		X	
X	X					X				X	
X	X							X	X	X	
X	X							X		X	
			X	X	X	X			X	X	MF,SOG DPLA,SOG XB,RP XB2,RP,CR3 CR3,PCI
			X	X	X					X	
			X	X	X				X	X	
			X	X	X				X	X	
			X	X	X				X	X	
		X	X		X	X			X	X	MF,DD DPLB,WS XB,RP,CR3 XB2,RP,CR9 PCI,CR9
		X	X		X					X	
		X	X		X				X	X	
		X	X		X				X	X	
		X	X		X				X	X	
	X		X	X					X	X	SOG,DPLB DD,DPLB WS,DPBG SOG,DPBG DD,DPBG
X	X	X		X					X	X	
X	X		X						X	X	
X	X		X						X	X	
X	X		X						X	X	
X	X	X		X					X	X	DD,DPLA PNL,RP,CR6 RP,XB,CR6 RP,PNL,CR9 RP,XB,CR9
	X			X					X	X	
	X			X					X	X	
	X			X					X	X	
	X			X					X	X	
X	X		X	X		X			X		R Opt. DPLA,SOG CPLA,WS
			X	X		X			X		
X	X	X	X	X		X			X		ZI Opt. PCI PCI,CR3 PCI,CR6 PCI,CR9 MF,WS
	X		X	X		X			X		
	X		X	X		X			X		
X	X	X	X	X	X	X	X				ZS Opt. MF,WS DPLA,SOG DPLA,DD DPCB,WS DPLB,SOG DPLB,DD DPBG,SOG MF,DD DPLA,WS
	X	X	X	X	X	X	X				
	X	X	X	X	X	X	X				
	X	X	X	X	X	X	X				
	X	X	X	X	X	X	X				
X	X	X	X	X	X	X	X				
X	X	X	X	X	X	X	X				

- 10.36 Verify that relay IG is operated (Unit AJ).
- 10.37 Block relay IA operated (Unit AK).
- 10.38 Manually operate and release relay STP once more and note that relay AV1 (Unit AK operates).
- 10.39 Release relays RR2, RR4, IA, and RP.
- 10.4 PCI Test Call
- 10.41 Block relay PCI operated (Unit AH). Note that relay S1 operates.
- 10.42 Block relays RR1 and RR4 operated. Note that relay F03 operates.
- 10.43 Manually operate relay STG. It will lock operated.
- 10.44 Manually operate and release relay TG (Unit AJ). Note that relay CI1 (Unit AJ) locks operated when TG is operated and the following relays sequentially operate and release when relay TG is released: S2, S3, S4, S5, S6, S7, S8, AV1 (relay AV1 located on Unit AK). AV1 will remain operated.  
  
NOTE: Sequence approximately 1 1/2 seconds.
- 10.45 Release relays PCI, RR1, RR4, and ON2. (Do not remove the insulation from relay ON2.)
- 11. TRUNK CUT-THROUGH AND RECYCLE
- 11.01 Verify that contact 8M of relay ON2 is insulated (Unit AF).
- 11.02 Block relay P1A operated (Unit AD); then, manually operate relay RCI (Unit AF). It will lock operated. Manually operate relay D (Unit AB), it will lock operated.
- 11.03 Connect a temporary jumper between terminals 5 and 7 of relay CST (Unit AB). Note that relay CS1 operates (Unit AB).
- 11.04 Block relay RCT operated (Unit AB).
- 11.05 Manually operate relay CTA (Unit AB) (it will lock) and verify that relay CT (Unit AB) operates (about two second delay).

- 11.06 Momentarily disconnect the jumper from relay CST and note that relay LTA (Unit AD) locks operated.
- 11.07 Block relay RCYC (Unit AB) operated and note that relay LTA remains operated for about 3 seconds.
- 11.08 Release relays P1A, RCT, and RCYC.
- 11.09 Remove the jumper from relay CST.
- 11.10 Repeat Paragraphs 11.02 through 11.09 with the substitutions shown in Table 11.1

TABLE 11.1

Substitute Relay	For Relay
P2A LTB	P1A LTA

- 12. OPERATIONAL TEST
- 12.1 Verify that contact 8M of relay ON2 is insulated.
- 12.2 Block relay TD2 operated (Unit AG).
- 12.3 Block relay P1A operated (Unit AD).
- 12.4 Block relay RCK2 (Unit AF) operated and note that relay TPTC (Unit AB) operates (for about one second) and releases.
- 12.5 Block relay S (Unit AB) operated and note that relay TPTC operates and releases again.
- 12.6 Momentarily operate relay CS1 (Unit AB) and note that relay OCT (Unit AB) locks operated.
- 12.7 Block relay CS1 (Unit AB) operated and note that relay STD (Unit AB) operates in about three seconds.
- 12.8 Release relays TD2, P1A, S, RCK2, and CS1.
- 13. BALANCE TEST
- 13.1 Verify that contact 8M of relay ON2 is insulated.

- 13.2 Block relay P3A (Unit AD) operated and note that relay TB (Unit AA) operates (one second delay).
- 13.3 Manually operate relay RCI (Unit AF) (it will lock operated) and note that relay SAB (Unit AA) operates in about one second.
- 13.4 Release relay P3A.
- 13.5 Remove the insulation from 8M of relay ON2.
14. PULSE COUNTING
- 14.1 Block ON1 and OT relays operated.
- 14.2 Momentarily operate and release relay CSI twelve (12) times and verify that after the CSI is released for the twelfth time relay RLC operates.
- 14.3 Release relays ONI and OT.

Arrowed Lines indicate new or changed information.

Manager, Product Engineering  
Control Center

Reason for Reissue  
Table 9.1 changed to add Option ZS.