SPEECH PATH MAINTENANCE

1A *ESS*™ SWITCH

AUTOPLEX™ SYSTEM 100

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Figures

1. GENERAL

The procedures in this document address the most common circuit faults encountered. In all cases it is presumed that:

- There is only one fault in the equipment
- Specified test equipment (or equivalent) is used
- Test equipment and test panels are in proper operating condition

Circuits tested in this volume are those for which no system diagnostics exist or, in some instances, for which field experience indicates that a test more comprehensive than a system diagnostic is necessary to identify trouble.

Trouble-clearing rationale assumes that circuit trouble-clearing will be requested as a result of a routine check of the trunk out-of-service list and, therefore, trouble-clearing is presented as routine tasks.

1.1 Signal Distributor (SD) Point and Circuit State Trouble-Clearing

When operating or releasing relays by use of 4-digit codes (*, 1909,# etc.), the **PROGRESS AND ERROR** lamp lights steadily for approximately 5 seconds if SD point operation is satisfactory and the relay in the trunk circuit operates or releases correctly. When the **PROGRESS AND ERROR** lamp flashes at 60 ipm, indicating that the desired operation could not be carried out, procedures call for voltage measurements and/or scan point indications to be checked. A failure at this point may indicate a set of defective relay contacts or a defective SD point. Before replacing a relay, procedures call for relay to be checked to determine what adjustments or corrective action might be taken to return to service. A **PROGRESS AND ERROR** lamp that flashes at 120 ipm indicates that human error was involved in inputting 4-digit code; try again.

1.2 Equipment Repair

In general, procedures isolate faults to a plug-in unit within the universal trunk (UT), miniaturized universal trunk (MUT), or combined miscellaneous trunk (CMT) frames and to hard-wired circuits in the miscellaneous trunk (MT) frame. When defective, the plug-in units are readily replaced. For defective hard-wired circuits, procedures provide specific references to SDs for individual component checking. Defective components are then repaired or replaced as necessary.

1.3 Trunk Test Panel Usage

Balance routines for the trunk test panel and the code 100 test lines required prior to using the test panel for transmission measurements are contained in this document.

However, procedures for using the test panel in transmission and diagnostic testing are provided in the AT&T documents 231-050-007 and 231-050-009.

2. BUILD OUT, HYBRID BALANCE ADJUSTMENTS AND VERIFICATION OF CODE 100 TEST LINES SD-1A310 AND TEST ACCESS TRUNK SD-1A322

2.1 Obtain Support Apparatus Listed

- 791A Tool
- Return Loss Measuring Set (RLMS)-KS-20501
- 8A Terminating Network--A323957
- 9A Terminating Network--A323959
- Test Tone Generator--KS-19260 or Equivalent
- 723B, Circuit Pack Removal Tool

2.2 Identify Junctor Grouping Frame Jack and Pin Pair Numbers

1. From office records, obtain the trunk network numbers or route index number to be used
2. Establish a network connection between a Code 100 test circuit, (SD-1A310) and a TAT 1 circuit SD-1A322 (Fig. 1)
3. At terminal, type **TT-TPATH-aaaaaa 003 c dddddd 003**

   where: a = TNN of TAT-1
   c = T for TNN (Code 100 TL)
   = R for Route Index (RI)
   d = TNN or RI of Code 100 TL

   Response: **AKM01** output message

4. At Code 100 test circuit, insert a test tone into the **MON** jack (Fig. 1)
5. Observe test tone at the **MON** jack on the **TAT 1** circuit using a telephone test set
6. At the terminal, request a trace of network path by typing the following message **NET-TNN-aaaaaa**

   where: a = TNN of Code 100 test circuit

   Response: **NE05 T-T** message

7. Convert the JNN (use third line of **NE05** message for Code 100 and fourth line for TAT 1) from packed octal to binary (Fig. 2)
8. Apply switch and level as entry to table (Fig. 3)

9. Apply grid and circuit number to determine terminal number

END OF PROCEDURE

2.3 Perform Build Out on Code 100 and TAT 1 Circuits

1. At MTCE terminal type **NET-WORK-REMOVE,aaa xx, JS X, GRID X**

   where: aaa = LLN or TLN

   xx = Number of particular unit

   Response: An **NN06** message will be generated for each of the eight switches that are out of service (Fig. 4)

2. Open the plug and jack connection on the front of the junctor grouping frame which contains the pair connecting to the Code 100 and to the **TAT 1** (Fig. 5)

3. Place a **9A** termination across the pair at the back of the frame (Fig. 6) and perform build out for the Code 100, and then repeat the procedure for the **TAT 1.**

4. Remove the test tone from the **MON** jack

5. Connect the 2-wire line of the **8A** test hybrid and external network arrangement to the **MON** jack (Fig. 7)

   Comment: The **8A** network simulates 400 feet of 26 AWG cable

6. Set up a portable return loss measuring set to measure echo return loss and connect to the 4-wire ports of the test hybrid (Fig. 8)

   Note: Opening the **BOR** screws adds resistance and closing the **BOC** screws adds capacitance

7. Adjust the **BOC** and **BOR** screw switches to values giving the greatest echo return loss, greater than 40 db indication on the RLMS

8. Record **BOR** and **BOC** values on locally prepared forms (Fig. 9)

9. Disconnect the test hybrid arrangement and portable RLMS from the **MON** jack, replace plug and jack connection on JGF, and remove termination on back of bay. If this adjustment is for the Code 100, go to Step 10, otherwise, go to Step 11.

10. Repeat Steps 3 through 9.

11. At terminal, type **NET-WORK-DGN, MRB.**

    Response: **DR03** output message

    ATP (all phases)

12. At terminal, type **NET-WORK-RESTORE, MRB.**

13. At terminal, type **NET-WORK-STATUS, MRB.**

    Response: **NN06 STAT FAB**
    XX C XX XO X 006
    GRID IS

END OF PROCEDURE

2.4 Adjust for Echo Return Loss

1. At miscellaneous frame, operate **PWR OFF** key on **TAT-1**
2. Remove the **A1008** circuit pack and insert a **791A** tool
3. Release **PWR OFF** key
4. Connect a portable RLMS as follows, **TRMT** to **J2** on **791A** tool **RCV** to **J1**
5. Set KS-20501 RLMS switches as shown, (Fig. 8)

   Note: **COMP NET** screw on the 4WTS at the **TAT-1** must be down to read correct **THL**

6. Operate **SW1** on the 791A tool to **THL** and adjust the **THL OR ADD** switches on the RLMS to obtain a 0.0 dB meter indication
7. Record the sum of the **THL** switches on locally prepared form (Fig. 9)
8. Operate **SW1** on 791A tool to **RL** position
9. Adjust the **NBOC** and **NBOR** of the **HYB BAL NET** in the **TAT-1** trunk circuit to obtain the greatest **ERL** indication
10. Record the **NBOC** value on locally prepared form

    Note: The **ERL** must be at least 40 db and the lower **SRL** or **SRL HI** must be at least 35 db

11. Measure and record the **ERL, SRL,** and **SRL HI** values on the locally prepared form
12. Operate the **PWR OFF** key on the **TAT-1** trunk circuit
13. Disconnect the portable RLMS, remove the 791A tool and replace the CPS **A1008** circuit pack
14. Release the **PWR OFF** key
15. At terminal, type **T-TNN-DC o o aaaaaa**

    where: a = TNN of either trunk A or B

    Response: **AKM01**

END OF PROCEDURE

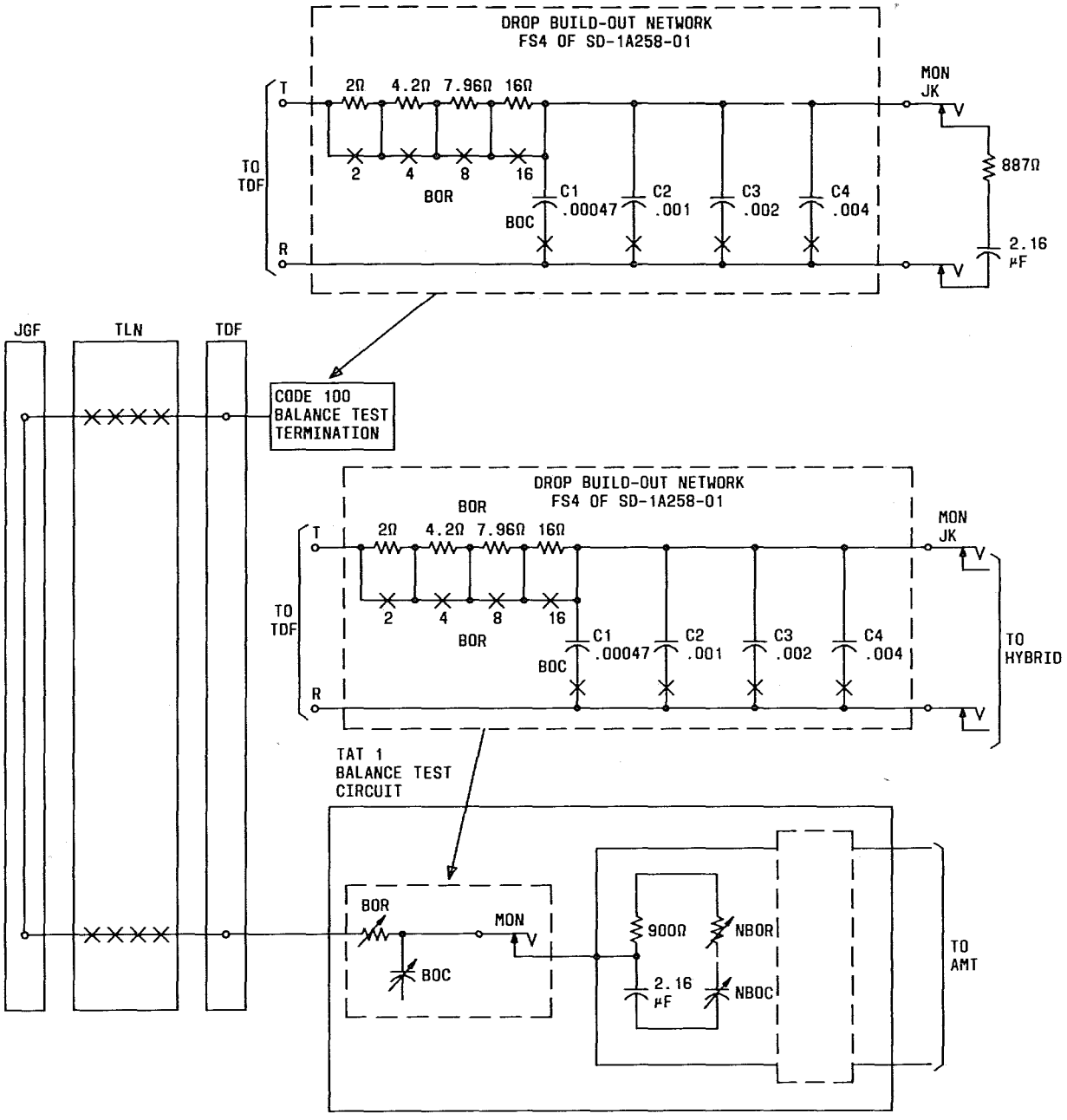


Fig. 1 — Network Interconnection

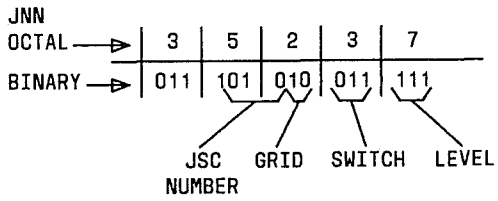


Fig. 2 — Octal to Binary Conversion

SWITCH	LEVEL							
	0	1	2	3	4	5	6	7
7	JGF EVEN SHELF 7 PLUG 0	JGF ODD SHELF 7 PLUG 1	JGF EVEN SHELF 7 PLUG 2	JGF ODD SHELF 7 PLUG 3	JGF EVEN SHELF 6 JACK 4	JGF ODD SHELF 6 JACK 5	JGF EVEN SHELF 6 JACK 6	JGF ODD SHELF 6 JACK 7
6	JGF EVEN SHELF 6 PLUG 0	JGF ODD SHELF 6 PLUG 1	JGF EVEN SHELF 6 PLUG 2	JGF ODD SHELF 6 PLUG 3	JGF EVEN SHELF 7 JACK 4	JGF ODD SHELF 7 JACK 5	JGF EVEN SHELF 7 JACK 6	JGF ODD SHELF 7 JACK 7
5	JGF EVEN SHELF 5 PLUG 0	JGF ODD SHELF 5 PLUG 1	JGF EVEN SHELF 5 PLUG 2	JGF ODD SHELF 5 PLUG 3	JGF EVEN SHELF 4 JACK 4	JGF ODD SHELF 4 JACK 5	JGF EVEN SHELF 4 JACK 6	JGF ODD SHELF 4 JACK 7
4	JGF EVEN SHELF 4 PLUG 0	JGF ODD SHELF 4 PLUG 1	JGF EVEN SHELF 4 PLUG 2	JGF ODD SHELF 4 PLUG 3	JGF EVEN SHELF 5 JACK 4	JGF ODD SHELF 5 JACK 5	JGF EVEN SHELF 5 JACK 6	JGF ODD SHELF 5 JACK 7
3	JGF EVEN SHELF 3 PLUG 0	JGF ODD SHELF 3 PLUG 1	JGF EVEN SHELF 3 PLUG 2	JGF ODD SHELF 3 PLUG 3	JGF EVEN SHELF 2 JACK 4	JGF ODD SHELF 2 JACK 5	JGF EVEN SHELF 2 JACK 6	JGF ODD SHELF 2 JACK 7
2	JGF EVEN SHELF 2 PLUG 0	JGF ODD SHELF 2 PLUG 1	JGF EVEN SHELF 2 PLUG 2	JGF ODD SHELF 2 PLUG 3	JGF EVEN SHELF 3 JACK 4	JGF ODD SHELF 3 JACK 5	JGF EVEN SHELF 3 JACK 6	JGF ODD SHELF 3 JACK 7
1	JGF EVEN SHELF 1 PLUG 0	JGF ODD SHELF 1 PLUG 1	JGF EVEN SHELF 1 PLUG 2	JGF ODD SHELF 1 PLUG 3	JGF EVEN SHELF 0 JACK 4	JGF ODD SHELF 0 JACK 5	JGF EVEN SHELF 0 JACK 6	JGF ODD SHELF 0 JACK 7
0	JGF EVEN SHELF 0 PLUG 0	JGF ODD SHELF 0 PLUG 1	JGF EVEN SHELF 0 PLUG 2	JGF ODD SHELF 0 PLUG 3	JGF EVEN SHELF 1 JACK 4	JGF ODD SHELF 1 JACK 5	JGF EVEN SHELF 1 JACK 6	JGF ODD SHELF 1 JACK 7

JNN = 00 0 0 0 0 ← LEVEL, SWITCH — SEE CHART TO DETERMINE ODD/EVEN-SHELF-PLUG/JACK

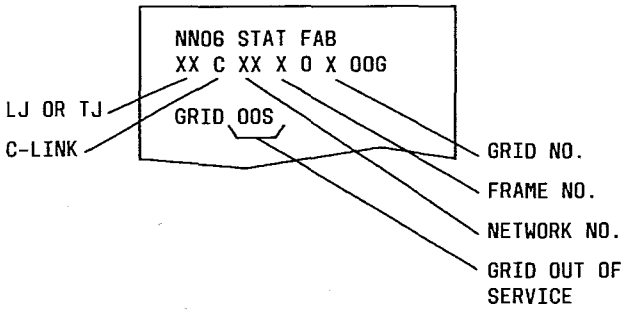
GRID, FRAME — SEE PLUG/JACK CHART TO DETERMINE TERMINAL

NETWORK - DETERMINE VF LOCATION AT JGF

PLUG TERMINAL STRIP						
JSC	GRID	SHELF 0 1	SHELF 2 3	SHELF 4 5	SHELF 6 7
3	3	00	10	20	30
	2	33	03	13	23
	1	32	02	12	22
	0	31	01	11	21
2	3	30	00	10	20
	2	23	33	03	13
	1	22	32	02	12
	0	21	31	01	11
1	3	20	30	00	10
	2	13	23	33	03
	1	12	22	32	02
	0	11	21	31	01
0	3	10	20	30	00
	2	03	13	23	33
	1	02	12	22	32
	0	01	11	21	31

JACK CONNECTOR		
JSC	GRID	
3	3	33
	2	32
	1	31
	0	30
2	3	23
	2	22
	1	21
	0	20
1	3	13
	2	12
	1	11
	0	10
0	3	03
	2	02
	1	01
	0	00

Fig. 3 — Switch and Level to TR Conversion



EXAMPLE OF OUT OF SERVICE CONDITION

Fig. 4 — Example of Out-of-Service Condition

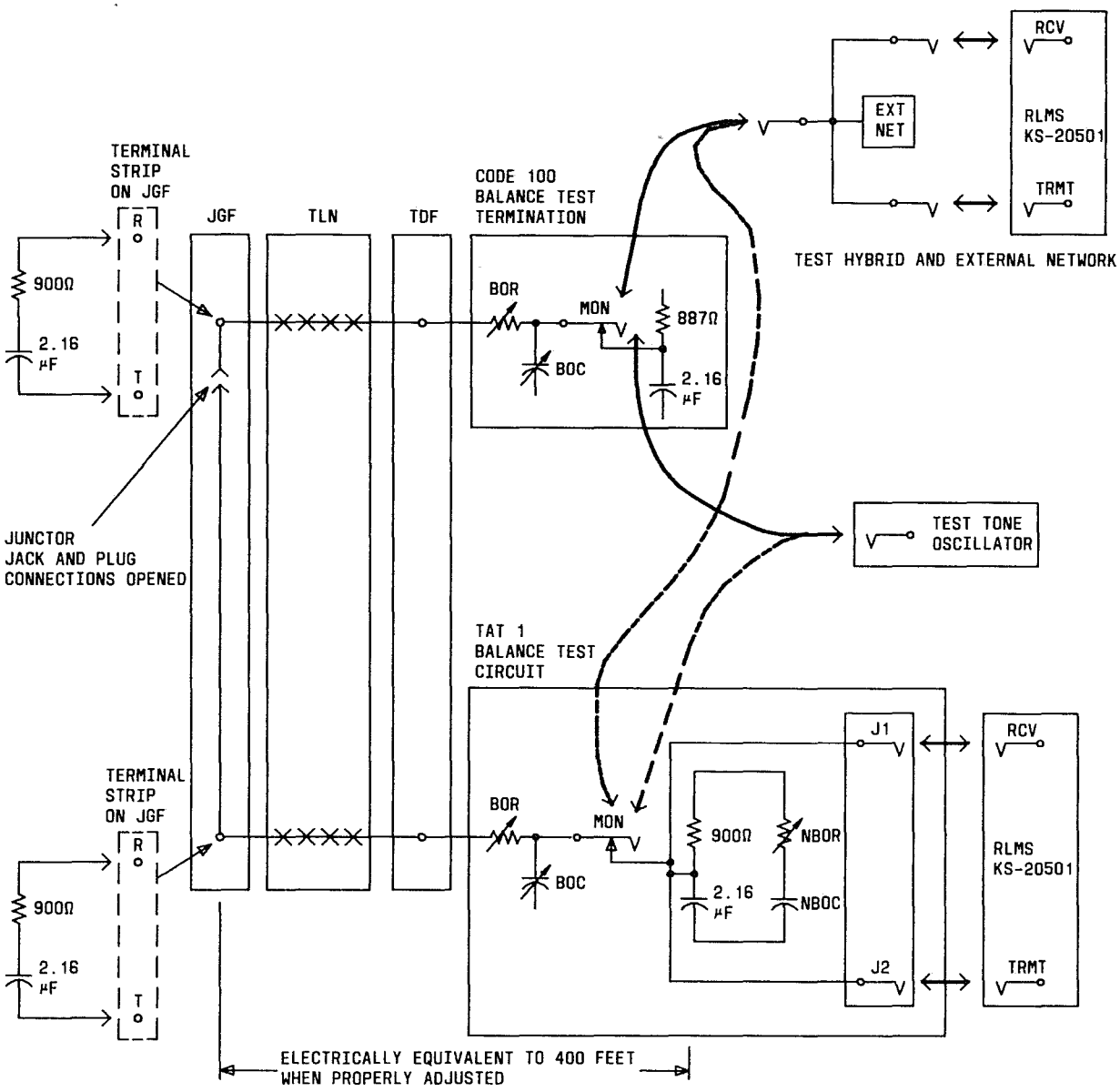


Fig. 5 — Grouping Frame Plug and Jack Connections

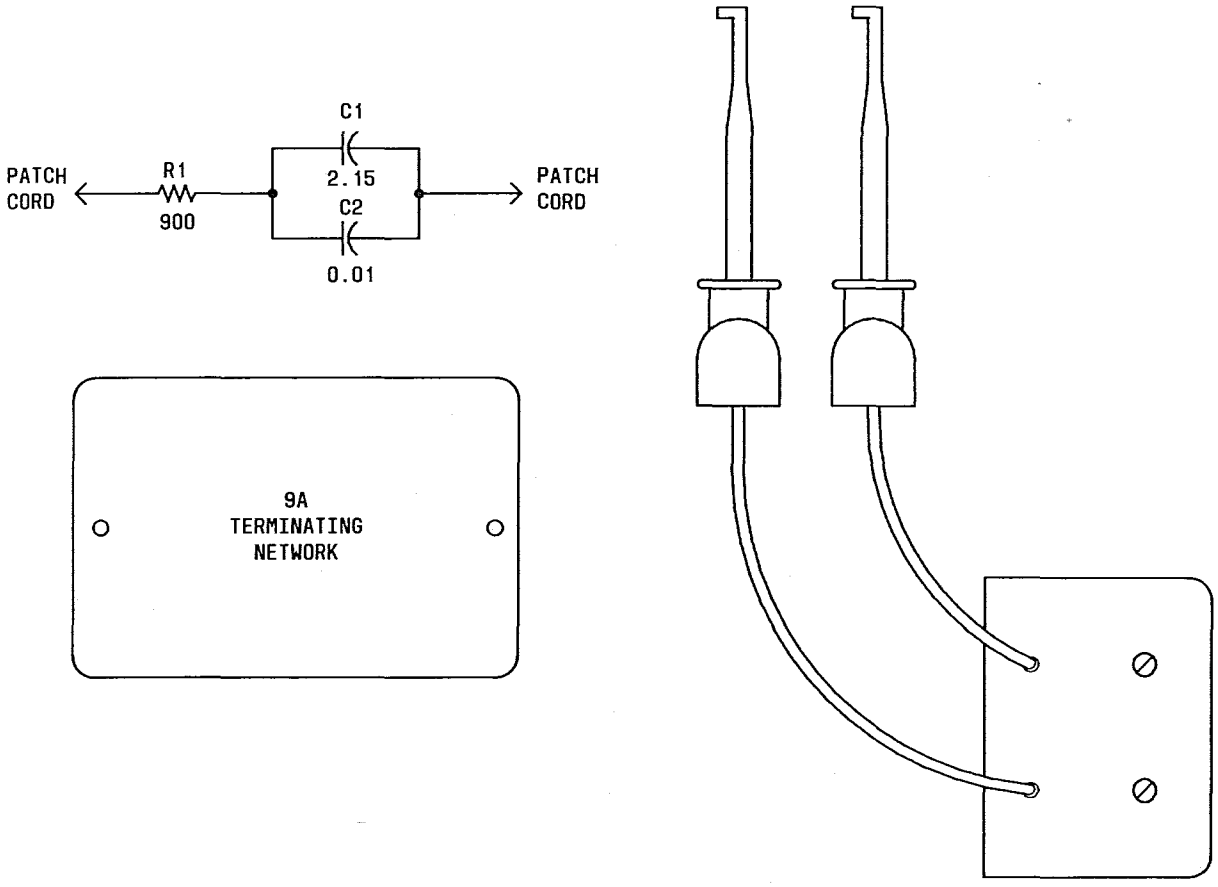


Fig. 6 — 9A Termination

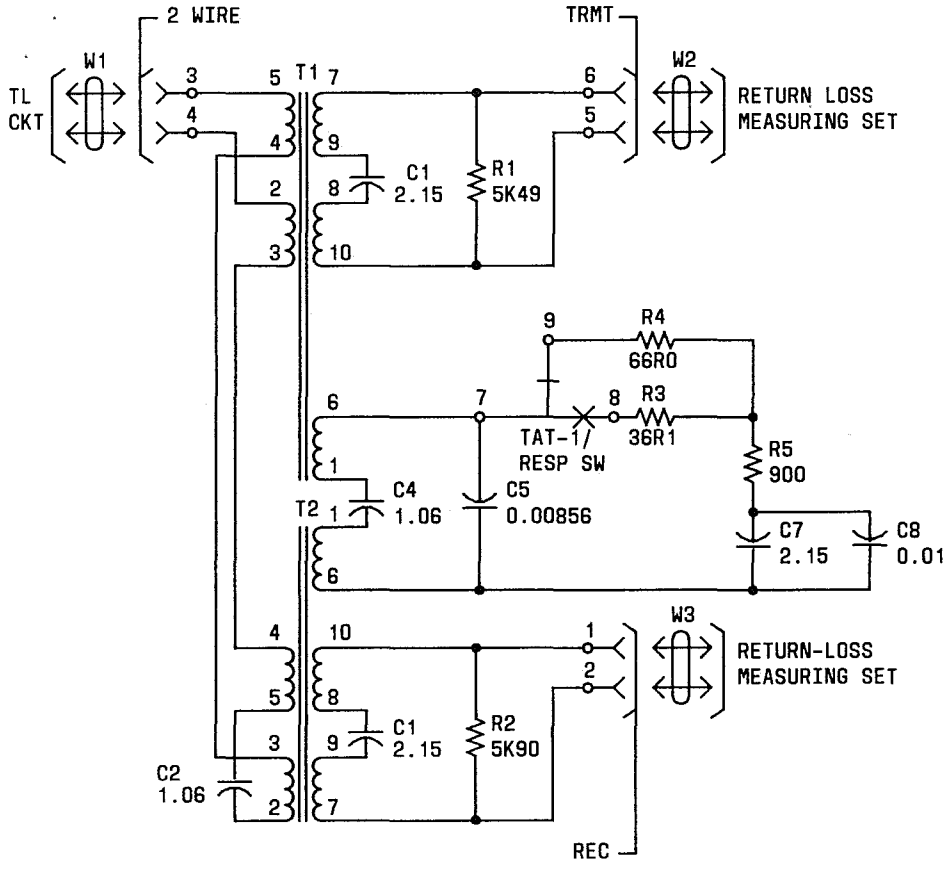


Fig. 7 — 8A Test Hybrid

TEST EQUIPMENT	SWITCH	POSITION
KS-20501 RLMS	TEST TYPE	ERL
	TEST LOCATION	+0 dB
	NETWORK	INT
	PWR	ON
	ADD DB	Meter indication

Fig. 8 — KS-20501 Switch Settings

RECORD OF ADJUSTMENTS MADE TO CODE 100 AND TAT 1 TEST CIRCUITS

OFFICE_____

THL SETTING_____dB

CODE 100			TAT 1						
TNN	BOR	BOC	TNN	BOR	BOC	NBOC	ERL	SRL	SRL HI
A	B	C	D	E	F	G	H	I	J

Fig. 9 — Locally Prepared Form

3. THROUGH BALANCE ADJUSTMENTS FOR SD-1A236-05 USING THE THROUGH BALANCE TEST FACILITIES (TBTF) FEATURE

3.1 Obtain Support Apparatus

- Trunk Test Stand (SD-1A437)
- Return Loss Measuring Set KS-20501 or Equivalent

> ***Note:*** For proper operation of sequential testing mode, consecutive scan point assignments to consecutively laid-out trunk circuits within the frame are required. Form E-6004 provides a list of TNNs in the order in which they should be tested. Space is also provided for recording the ERL after adjustment

3.2 From Office Records, Obtain List of Trunk Network Numbers (TNNs) to Be Tested

3.3 Initiate TBTF Feature

Connect SD-1A236 to SD-1A310

1. At terminal, type: **TT-TBAL-Tbbbbbb**

   where: b = TNN of first SD-1A236-05 trunk circuit to be tested

   Response: **AKM01 TST (TNN1) cc**

   cc = craftsperson identification number (1-22)

3.4 Trunk Test Stand Configuration

1. At **CMT** frame, remove power from trunk circuit pack
2. Remove trunk circuit pack from slot in frame
3. Insert trunk test stand, probe card into slot vacated by trunk circuit and plug trunk circuit into test stand
4. Restore power to trunk circuit pack
5. Set test stand sequence control switch **SW2** to **TST**.

   Response: Sequence indicating light **CR1** lights
6. Connect portable KS-20501 return loss set **TRMT** jack to **J2** and **RCV** jack to **J1** on trunk test stand
7. Set return loss test set **PWR** switch to **ON**
8. Set **TEST TYPE** switch to **ERL**
9. Set **TEST LOCATION** switch to **+0 dB**
10. Set **NETWORK** switch to **INT**
11. Set **ADD DB** switch to **0**

END OF PROCEDURE

3.5 Perform Return Loss Adjustments

1. At trunk test stand, operate **SW1** switch to **THL**
2. Adjust KS-20501 RLMS **THL** or **ADD** switches for a 0 db indication on meter
3. Operate **SW1** switch to **RL**
4. Verify that **COMP NET** screw on **HYB BAL NET** is down

> ***Note:*** ERL must be greater than 40 db (meter indication plus **ADD dB** switch setting)

5. Adjust **NBOC** and **NBOR** on **HYB BAL NET** for a maximum ERL indication
6. Record **THL** and **ERL** values
7. Set **TEST TYPE** switch to **SRL**
8. Adjust **ADD dB** switch for indication on meter
9. Record **ADD dB** switch setting plus meter indication
10. Set **TEST TYPE** switch to **SRL H1**
11. Adjust **ADD dB** switch for indication on meter
12. Record **ADD dB** switch setting plus meter indication

> ***Note:*** If lamp **CR1** stays on, look up last **AKM01** message with your ID code. To restart sequential test operation after finding a bad trunk circuit, use **TT-TBAL-N TNN** using TNN printed in **AKM01** message

13. Set trunk test stand sequence control switch (**SW2**) to **NXT**

    Response: Sequence indicating light **CR1** extinguishes
14. Remove power from circuit pack
15. Remove probe card from trunk frame
16. Remove trunk circuit pack from test stand and reinsert into trunk frame
17. Restore power to circuit pack
18. Repeat 3.3, 3.4, and 3.5 for the next TNN until all TNNs listed are tested.

END OF PROCEDURE

4. TEST SD-1A263 TOUCH-TONE DETECTOR TEST CIRCUIT

4.1 Obtain Support Apparatus

- Digital Multimeter (KS-20599, L4)
- Transmission Measuring Set (TMS) (Hewlett-Packard 3551A or Equivalent)
- Circuit Pack Removal Tool (723B)
- Extender Board Adapter (158A)
- Transformer Adjusting Tool (KS-19355, L3)
- Test Cord (2W6A)
- Screwdriver (KS-6845)
- Relay Blocking Tool (768A)

4.2 From Office Records, Obtain Trunk Network Number (TNN) of Service Circuit to Be Made Maintenance Busy

4.3 Make Service Circuit Maintenance Busy Using A or B

A. TLTP: 11. MAKE CIRCUIT MAINTENANCE BUSY (TLTP)

B. MTTP: 12. MAKE CIRCUIT MAINTENANCE BUSY (MTTP)

4.4 Connect Test Equipment for Testing Touch-Tone Detector Test Circuit SD-1A263

1. At unit under test (Fig. 10), operate **PWR OFF** key

   Response: **PWR OFF** lamp lights
2. At unit under test, connect test equipment shown in (Fig. 11)
3. At unit under test, remove circuit pack (CP) A45
4. At unit under test, release **PWR OFF** key

   Response: **PWR OFF** lamp goes off

END OF PROCEDURE

4.5 Test Overload of Touch-Tone Detector Test Circuit SD-1A263

SUMMARY: Using VOM and TMS, test circuit as follows:

Short 2583A transformer

Terminals **7** and **10**

Block relay **B** operated

Connect:

TS C-18 to **TS C-47**, 685.8 - 687.2 Hz, -4.75 to -5.25 dBm
TS C-18 to **TS C-37**, 757.7 - 759.2 Hz, -4.75 to -5.25 dBm
TS C-18 to **TS C-27**, 838.4 - 840.1 Hz, -4.5 to -5.5 dBm
TS C-18 to **TS C-36**, 925.9 - 927.8 Hz, -4.5 to -5.5 dBm

Remove 2583A short

Short 2583B transformer terminals **7** and **10**;

Connect:

TS C-18 to **TS C-36**, 16-6.8 - 1610.2 Hz, -4.5 to -5.5 dBm
TS C-18 to **TS C-27**, 1453.4 - 1456.4 Hz, -4.5 to -5.5 dBm
TS C-18 to **TS C-37**, 1314.6 - 1317.3 Hz, -4.5 to -5.5 dBm
TS C-18 to **TS C-47**, 1189.7 - 1192.1 Hz, -4.5 to -5.5 dBm

Release relay **B**

1. At transmission measuring set (TMS), set **RECEIVE** switch to **TONE-NORMAL**
2. At transmission measuring set (TMS), set **FUNCTION** switch to **RECEIVE-TERM** and **900**
3. At circuit under test, on back of **TT DETR TST** circuit, connect test cord from terminal **7** to **10** of 2583A transformer
4. At circuit under test, on front of **TT DETR TST** circuit, block relay **B** operated using 768A blocking tool
5. Does VOM indicate between **0** and **1** volt?

   If YES, proceed to Step 6.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

6. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
7. Does TMS indicate between **685.8** and **687.2** hertz?

   If YES, proceed to Step 8.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

8. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
9. Does TMS indicate power level between **-4.75** and **-5.25** dBm?

If YES, proceed to Step 10.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

10. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
11. Move test lead from **TS C-47** to **TS C-37**
12. Does TMS indicate between 757.7 and 759.2 hertz?

If YES, proceed to Step 13.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

13. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
14. Does TMS indicate power level between -4.75 and -5.25 dBm?

If YES, proceed to Step 15.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

15. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
16. Move test lead from **TS C-37** to **TS BC-27**
17. Does TMS indicate between 838.4 and 840.1 hertz?

If YES, proceed to Step 18.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

18. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
19. Does TMS indicate power level between -4.5 and -5.5 dBm?

If YES, proceed to Step 20.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

20. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
21. Move test lead from **TS C-27** to **TS C-36**
22. Does TMS indicate between 925.9 and 927.8 hertz?

If YES, proceed to Step 23.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

23. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
24. Does TMS indicate power level between -4.5 and -5.5 dBm?

If YES, proceed to Step 25.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

25. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
26. Remove test cord from rear of 2583A transformer
27. On back of **TT DETR TST** circuit, connect test cord from terminal **7** to **10** of 2583B transformer
28. Does TMS indicate between 1606.8 and 1610.2 hertz?

If YES, proceed to Step 29.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

29. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
30. Does TMS indicate power level between -4.5 and -5.5 dBm?

If YES, proceed to Step 31.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

31. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
32. Move test lead from **TS C-36** to **TS C-27**
33. Does TMS indicate between 1453.4 and 1456.4 hertz?

If YES, proceed to Step 34.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

34. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
35. Does TMS indicate power level between -4.5 and -5.5 dBm?

If YES, proceed to Step 36.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

36. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
37. Move test lead from **TS C-27** to **TS C-37**
38. Does TMS indicate between 1314.6 and 1317.3 hertz?

If YES, proceed to Step 39.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

39. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
40. Does TMS indicate power level between -4.5 and -5.5 dBm?

If YES, proceed to Step 41.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

41. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
42. Move test lead from **TS C-37** to **TS C-47**
43. Does TMS indicate between 1189.7 and 1192.1 hertz?

    If YES, proceed to Step 44.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

44. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
45. Does TMS indicate power level between -4.5 and -5.5 dBm?

    If YES, proceed to Step 46.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

46. Remove blocking tool from relay **B**
47. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

END OF PROCEDURE

4.6 Test High Band Edge of Touch-Tone Detector Test Circuit SD-1A263

SUMMARY: Using VOM and TMS test circuit as follows:

Block relay **A** operated, 1225.9 - 1228.3 Hz, -1.5 to -2.5 dBm

Connect:

TS C-18 to **TS C-37**, 1354.7 - 1357.4 Hz, -1.5 to -2.5 dBm
TS C-18 to **TS C-27**, 1497.6 - 1500.6 Hz, -1.5 to -2.5 dBm
TS C-18 to **TS C-36**, 1655.8 - 1659.2 Hz, -1.5 to -2.5 dBm

Remove 2583B short

Short 2583A transformer terminal **7** and **10**, 954.2 -956.1 Hz, -1.5 to -2.5 dBm

Connect:

TS C-18 to **TS C-27**, 863.9 - 865.6 Hz, -1.5 to -2.5 dBm
TS C-18 to **TS C-37**, 780.8 - 782.3 Hz, -1.5 to -2.5 dBm
TS C-18 to **TS C-47**, 706.8 - 708.2 Hz, -1.5 to -2.5 dBm.

Note: This procedure begins with **TS C-18** already connected to **TS C-47**

1. On front of **TT DETR TST** circuit, block relay **A** operated
2. Does VOM indicate between **0** and **1** volt?

   If YES, proceed to Step 3.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).
3. Does TMS indicate between 1225.9 and 1228.3 hertz?

   If YES, proceed to Step 4.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).
4. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
5. Does TMS indicate power level between -1.5 and -2.5 dBm?

   If YES, proceed to Step 6.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).
6. Operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
7. Move test lead from **TS C-47** to **TS C-37**
8. Does TMS indicate between 1354.7 and 1357.4 hertz?

   If YES, proceed to Step 9.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

9. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
10. Does TMS indicate power level between -1.5 and -2.5 dBm?

    If YES, proceed to Step 11.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

11. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
12. Move test lead from **TS C-37** to **TS C-27**
13. Does TMS indicate between 1497.6 and 1500.6 hertz?

    If YES, proceed to Step 14.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

14. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
15. Does TMS indicate power level between -1.5 and -2.5 dBm?

    If YES, proceed to Step 16.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

16. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
17. Move test lead from **TS C-27** to **TS C-36**
18. Does TMS indicate between 1655.8 and 1659.2 hertz?

    If YES, proceed to Step 19.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

19. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
20. Does TMS indicate power level between -1.5 and -2.5 dBm?

    If YES, proceed to Step 21.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

21. Disconnect test cord from rear of 2583B transformer
22. On back of **TT DETR TST** circuit, connect test cord from terminal **7** to **10** of 2583A transformer
23. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
24. Does TMS indicate between 954.2 and 956.1 hertz?

    If YES, proceed to Step 25.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

25. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
26. Does TMS indicate power level between -1.5 and -2.5 dBm?

If YES, proceed to Step 27.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

27. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
28. Move test lead from **TS C-36** to **TS C-27**
29. Does TMS indicate between 863.9 and 865.6 hertz?

If YES, proceed to Step 30.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

30. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
31. Does TMS indicate power level between -1.5 and -2.5 dBm?

If YES, proceed to Step 32.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

32. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
33. Move test lead from **TS C-27** to **TS C-37**
34. Does TMS indicate between 780.8 and 782.3 hertz?

If YES, proceed to Step 35.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

35. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
36. Does TMS indicate power level between -1.5 and -2.5 dBm?

If YES, proceed to Step 37.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

37. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
38. Move test lead from **TS C-37** to **TS C-47**
39. Does TMS indicate between 706.8 and 708.2 hertz?

If YES, proceed to Step 40.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

40. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
41. Does TMS indicate power level between -1.5 and -2.5 dBm?

    If YES, proceed to Step 44.

    If NO, proceed to Step 42.
42. Adjust **R4** on CP **A157** to reduce difference between indication and -2 dBm by one-half
43. Does TMS indicate power level between -1.5 and -2.5 dBm?

    If YES, proceed to Step 44.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).
44. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

END OF PROCEDURE

4.7 Test Low Band Edge of Touch-Tone Detector Test Circuit SD-1A263

SUMMARY: Using VOM and TMS, test circuit as follows:

Block relay **B** operated, 23 - 27 volts, 685.8 - 687.2 Hz, -1.5 to -2.5 dBm

Connect:

TS C-18 to **TS C-37**, 757.7 - 759.3 Hz, -1.5 to -2.5 dBm
TS C-18 to **TS C-27**, 838.4 - 840.1 Hz, -1.5 to -2.5 dBm
TS C-18 to **TS C-36**, 935.9 - 927.8 Hz, -1.5 to -2.5 dBm;

Remove 2583A short

Short 2583B transformer terminals **7** and **10**, 1606.8 - 1610.2 Hz, -1.5 to -2.5 dBm

Connect:

TS C-18 to **TS C-27**, 1453.4 - 1456.4 Hz, -1.5 to -2.5 dBm
TS C-18 to **TS C-37**, 1314.6 - 1317.3 Hz, -1.5 to -2.5 dBm
TS C-18 to **TS C-47**, 1189.7 - 1192.1 Hz, -1.5 to -2.5 dBm

Release relay **A**.

Note: This procedure begins with **TS C-18** already connected to **TS C-47**.

1. On front of **TT DETR TST** circuit, block relay **B** operated
2. Does VOM indicate between 23 and 27 volts?

   If YES, proceed to Step 3.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

3. Does TMS indicate between 685.8 and 687.2 hertz?

   If YES, proceed to Step 4.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

4. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
5. Does TMS indicate power level between -1.5 and -2.5 dBm?

   If YES, proceed to Step 6.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

6. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
7. Move test lead from **TS C-47** to **TS C-37**
8. Does TMS indicate between 757.7 and 759.3 hertz?

If YES, proceed to Step 9.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

9. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
10. Does TMS indicate power level between -1.5 and -2.5 dBm?

If YES, proceed to Step 11.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

11. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
12. Move test lead from **TS C-37** to **TS C-27**
13. Does TMS indicate between 838.4 and 840.1 hertz?

If YES, proceed to Step 14.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

14. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
15. Does TMS indicate power level between -1.5 and -2.5 dBm?

If YES, proceed to Step 16.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

16. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
17. Move test lead from **TS C-27** to **TS C-36**
18. Does TMS indicate between 925.9 and 927.8 hertz?

If YES, proceed to Step 19.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

19. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
20. Does TMS indicate power level between -1.5 and -2.5 dBm?

If YES, proceed to Step 21.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

21. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
22. Remove test cord from rear of 2583A transformer
23. On back of **TT DETR TST** circuit, connect test cord from terminals **7** to **10** of 2583B transformer

24. Does TMS indicate between 1606.8 and 1610.2 hertz?

    If YES, proceed to Step 25.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

25. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**

26. Does TMS indicate power level between -1.5 and -2.5 dBm?

    If YES, proceed to Step 27.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

27. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

28. Move test lead from **TS C-36** to **TS C-27**

29. Does TMS indicate between 1453.4 and 1456.4 hertz?

    If YES, proceed to Step 30.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

30. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**

31. Does TMS indicate power level between -1.5 and -2.5 dBm?

    If YES, proceed to Step 32.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

32. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

33. Move test lead from **TS C-27** to **TS C-37**

34. Does TMS indicate between 1314.6 and 1317.3 hertz?

    If YES, proceed to Step 35.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

35. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**

36. Does TMS indicate power level between -1.5 and -2.5 dBm?

    If YES, proceed to Step 37.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

37. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

38. Move test lead from **TS C-37** to **TS C-47**

39. Does TMS indicate between 1189.7 and 1192.1 hertz?

If YES, proceed to Step 40.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

40. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**

41. Does TMS indicate power level between -1.5 and -2.5 dBm?

If YES, proceed to Step 42.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

42. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

43. Remove 786A blocking tool from relay **A**

END OF PROCEDURE

4.8 Test Out-of-Band Edge of Touch-Tone Detector Test Circuit SD-1A263

SUMMARY: Using VOM and TMS test circuit as follows:

Block relay **C** operated, 23 - 27 volts, 1164.3 - 1169.1 Hz, -4.5 to -7.0 dBm

Connect:

TS C-18 to **TS C-37**, 1286.5 - 1291.9 Hz, -4.5 to -7.0 dBm
TS C-18 to **TS C-27**, 1422.4 - 1428.3 Hz, -4.5 to -7.0 dBm
TS C-18 to **TS C-36**, 1572.5 - 1579.0 Hz - 4.5 to -7.0 dBm

Remove 2583B short

Short 2583A transformer terminals **7** and **10**, 906.2 - 910.0 Hz, -4.5 to -7.0 dBm

Connect:

TS C-18 to **TS C-27**, 820.5 - 823.9 Hz, -4.5 to -7.0 dBm
TS C-18 to **TS C-37**, 741.5 - 744.6 Hz, -4.5 to -7.0 dBm
TS C-18 to **TS C-47**, 671.2 - 674.0 Hz, -4.5 to -7.0 dBm

Remove test cord from **TS C**

Remove 2583A short.

Note: This procedure begins with **TS C-18** already connected to **TS C-47**.

1. On front of **TT DETR TST** circuit, block relay **C** operated
2. Does VOM indicate between 23 and 27 volts?

   If YES, proceed to Step 3.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

3. Does TMS indicate between 1164.3 and 1169.1 hertz?

   If YES, proceed to Step 4.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

4. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
5. Does TMS indicate power level between -4.5 and -7.0 dBm?

   If YES, proceed to Step 6.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

6. Operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
7. Move test lead from **TS C-47** to **TS C-37**

8. Does TMS indicate between 1286.5 and 1291.9 hertz?

   If YES, proceed to Step 9.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

9. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
10. Does TMS indicate power level between -4.5 and -7.0 dBm?

    If YES, proceed to Step 11.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

11. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
12. Move test lead from **TS C-37** to **TS C-27**
13. Does TMS indicate between 1422.4 and 1428.3 hertz?

    If YES, proceed to Step 14.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

14. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
15. Does TMS indicate power level between -4.5 and -7.0 dBm?

    If YES, proceed to Step 16.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

16. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
17. Move test lead from **TS C-27** to **TS C-36**
18. Does TMS indicate between 1572.5 and 1579.0 hertz?

    If YES, proceed to Step 19.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

19. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
20. Does TMS indicate power level between -4.5 and -7.0 dBm?

    If YES, proceed to Step 21.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

21. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
22. Remove test cord from rear of 2583B transformer
23. On back of **TT DETR TST** circuit, connect test cord from terminals 7 to 10 of 2583A transformer

24. Does TMS indicate between 906.2 and 910.0 hertz?

    If YES, proceed to Step 25.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

25. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**

26. Does TMS indicate power level between -4.5 and -7.0 dBm?

    If YES, proceed to Step 27.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

27. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

28. Move test lead from **TS C-36** to **TS C-27**

29. Does TMS indicate between 820.5 and 823.9 hertz?

    If YES, proceed to Step 30.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

30. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**

31. Does TMS indicate power level between -4.5 and -7.0 dBm?

    If YES, proceed to Step 32.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

32. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

33. Move test lead from **TS C-27** to **TS C-37**

34. Does TMS indicate between 741.5 and 744.6 hertz?

    If YES, proceed to Step 35.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

35. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**

36. Does TMS indicate power level between -4.5 and -7.0 dBm?

    If YES, proceed to Step 37.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

37. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

38. Move test lead from **TS C-37** to **TS C-47**

39. Does TMS indicate between 671.2 and 674.0 hertz?

If YES, proceed to Step 40.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

40. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
41. Does TMS indicate power level between -4.5 and -7.0 dBm?

If YES, proceed to Step 42.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

42. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
43. Remove test cord connected between **TS C-18** and **TS C-47**
44. Remove test cord from rear of 2583A transformer

END OF PROCEDURE

4.9 Test Third Frequency of Touch-Tone Detector Test Circuit SD-1A263

1. At circuit under test, block relay **A** operated on front of **TT DETR TST** circuit
2. Does VOM indicate less than 1.0 volt?

   If YES, proceed to Step 3.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

3. Does TMS indicate between 1800 and 2200 hertz?

   If YES, proceed to Step 4.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

4. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
5. Does TMS indicate power level between -4.75 and -5.75 dBm?

   If YES, END OF PROCEDURE

   If NO, proceed to Step 6.

6. Operate **PWR OFF** key

   Response: **PWR OFF** lamp lights

7. Remove CP A158 from socket using 723B tool; replace with 158A adapter; plug CP A158 into adapter (Fig. 12)
8. Release **PWR OFF** key

   Response: **PWR OFF** lamp goes off

9. Adjust **R4** on CP A158 to obtain TMS power level indication of **-5** dBm (Fig. 12)
10. Does TMS indicate power level of -5 dBm?

    If YES, proceed to Step 11.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

11. Operate **PWR OFF** key

    Response: **PWR OFF** lamp lights

12. Remove 158A adapter from socket; remove CP A158; plug CP A158 into socket
13. Release **PWR OFF** key

    Response: **PWR OFF** lamp goes off

14. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

END OF PROCEDURE

4.10 Test Low Only and High Only Groups of Touch-Tone Detector Test Circuit SD-1A263

SUMMARY: Using VOM and TMS, test circuit as follows:

Connect **TS C-18** to **TS C-47**

Release relay **B**, 23 - 27 volts, 695.6 - 698.4 Hz, -4.5 to -5.5 dBm

Connect:

TS C-18 to **TS C-37**, 768.5 - 771.5 Hz, -4.5 to -5.5 dBm
TS C-18 to **TS C-27**, 850.7 - 853.7 Hz, -4.5 to -5.5 dBm
TS C-18 to **TS C-36**, 939.1 - 942.9 Hz, -4.5 to -5.5 dBm

Release relay **A**

Connect:

TS C-18 to **TS C-47**, 1206.6 - 1211.4 Hz, -4.5 to -5.5 dBm
TS C-18 to **TS C-37**, 1333.3 - 1338.7 Hz, -4.5 to -5.5 dBm
TS C-18 to **TS C-27**, 1474.0 - 1484.0 Hz, -4.5 to -5.5 dBm
TS C-18 to **TS C-36**, 1629.7 - 1636.3 Hz, -4.5 to -5.5 dBm

Remove test cord between **TS C-18** and **TS C-36**

Release relay **C**.

1. At circuit under test, on front of **TT DETR TST** circuit, connect test cord from **TS C-18** to **TS C-47**
2. At circuit under test, remove blocking tool from relay **B**
3. Does VOM indicate between 23 and 27 volts?

   If YES, proceed to Step 4.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

4. Does TMS indicate between 695.6 and 698.4 hertz?

   If YES, proceed to Step 5.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

5. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
6. Does transmission measuring set (TMS) indicate power level between -4.5 and -5.5 dBm?

   If YES, proceed to Step 7.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

7. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
8. Move test lead from **TS C-47** to **TS C-37**

9. Does TMS indicate between 768.5 and 771.5 hertz?

   If YES, proceed to Step 10.

   If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

10. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
11. Does TMS indicate power level between -4.5 and -5.5 dBm?

    If YES, proceed to Step 12.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

12. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
13. Move test lead from **TS C-37** to **TS C-27**
14. Does TMS indicate between 850.3 and 853.7 hertz?

    If YES, proceed to Step 15.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

15. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
16. Does TMS indicate power level between -4.5 and -5.5 dBm?

    If YES, proceed to Step 17.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

17. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
18. Move test lead from **TS C-27** to **TS C-36**
19. Does TMS indicate between 939.1 and 942.9 hertz?

    If YES, proceed to Step 20.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

20. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
21. Does TMS indicate power level between -4.5 and -5.5 dBm?

    If YES, proceed to Step 22.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

22. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
23. Remove blocking tool from relay **A**
24. Move test lead from **TS C-36** to **TS C-47**

25. Does VOM indicate between 0.3 and 0.7 volt?

    If YES, proceed to Step 26.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

26. Does TMS indicate between 1206.6 and 1211.4 hertz?

    If YES, proceed to Step 27.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

27. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**

28. Does TMS indicate power level between -4.5 and -5.5 dBm?

    If YES, proceed to Step 29.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

29. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

30. Move test lead from **TS C-47** to **TS C-37**

31. Does TMS indicate between 1333.3 and 1338.7 hertz?

    If YES, proceed to Step 32.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

32. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**

33. Does TMS indicate power level between -4.5 and -5.5 dBm?

    If YES, proceed to Step 34.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

34. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**

35. Move test lead from **TS C-37** to **TS C-27**

36. Does TMS indicate between 1474.0 and 1480.0 hertz?

    If YES, proceed to Step 37.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

37. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**

38. Does TMS indicate power level between -4.5 and -5.5 dBm?

    If YES, proceed to Step 39.

If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

39. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
40. Move test lead from **TS C-27** to **TS C-36**
41. Does TMS indicate between 1629.7 and 1636.3 hertz?

    If YES, proceed to Step 42.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

42. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-LEVEL**
43. Does TMS indicate power level between -4.5 and -5.5 dBm?

    If YES, proceed to Step 44.

    If NO, proceed to 26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263).

44. At TMS, operate **DISPLAY & MONITOR** switch to **RECEIVE-FREQ**
45. Remove test cord connected between **TS C-18** and **TS C-36**
46. Remove blocking tool from relay **C**
47. At circuit under test, operate **PWR OFF** key
48. Disconnect test equipment
49. Replace circuit pack (CP) A45
50. Plug CP A157 into A157 socket
51. Release **PWR OFF** key
52. Release service circuit from maintenance busy using A or B

    A. TLTP: 22. RELEASE FROM MAINTENANCE BUSY (TLTP)

    B. MTTP: 23. RELEASE FROM MAINTENANCE BUSY (MTTP)

END OF PROCEDURE

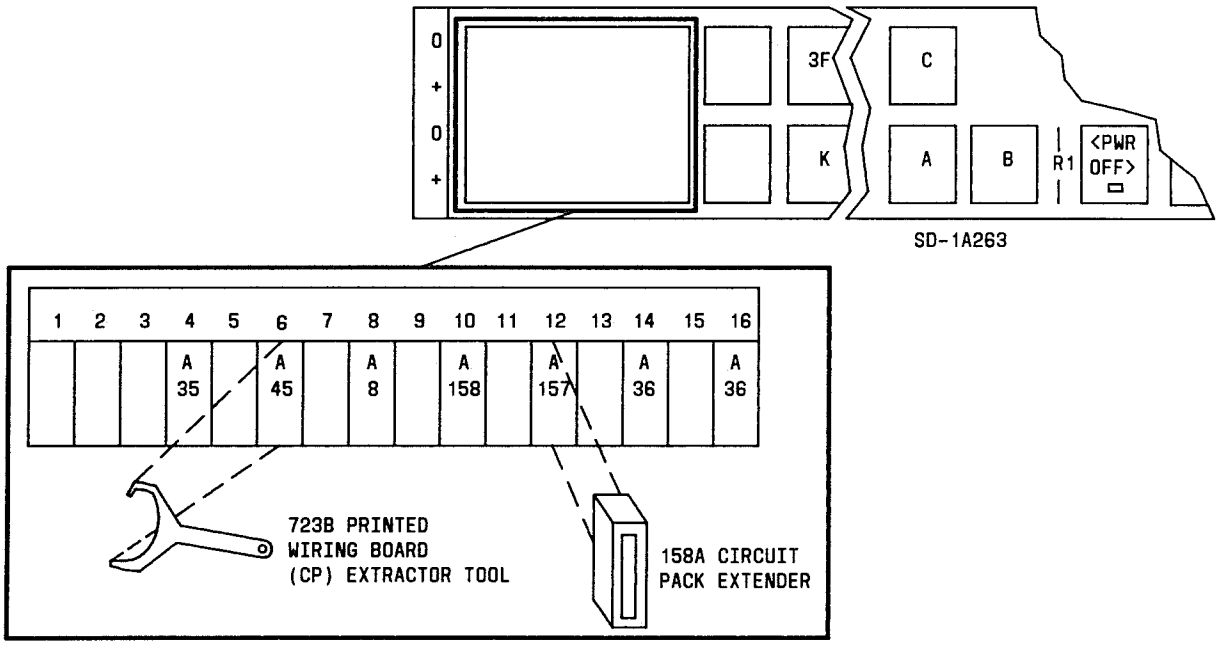


Fig. 10 — Touch-Tone Detector Test Circuit, 158A Extender, and 723B Tool

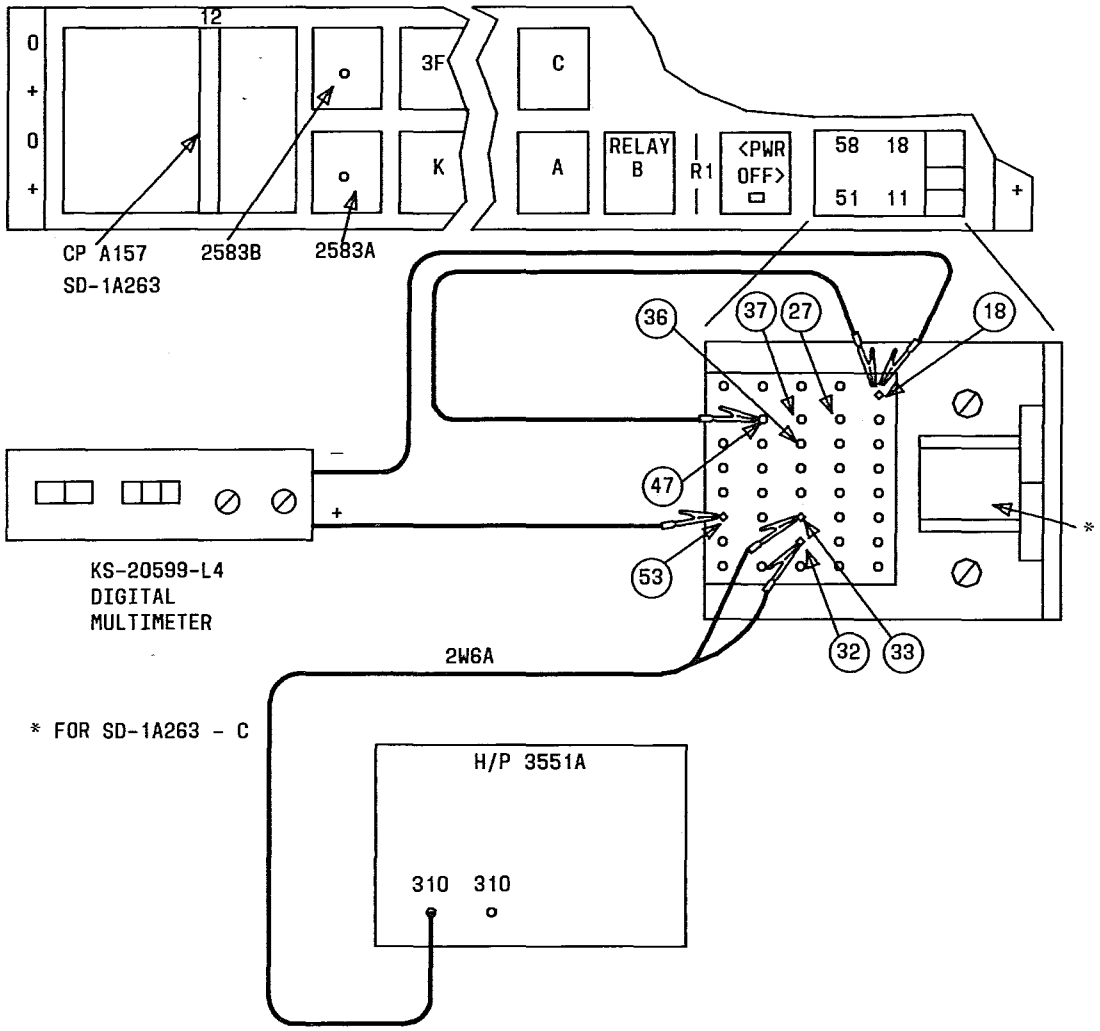


Fig. 11 — Circuit Under Test

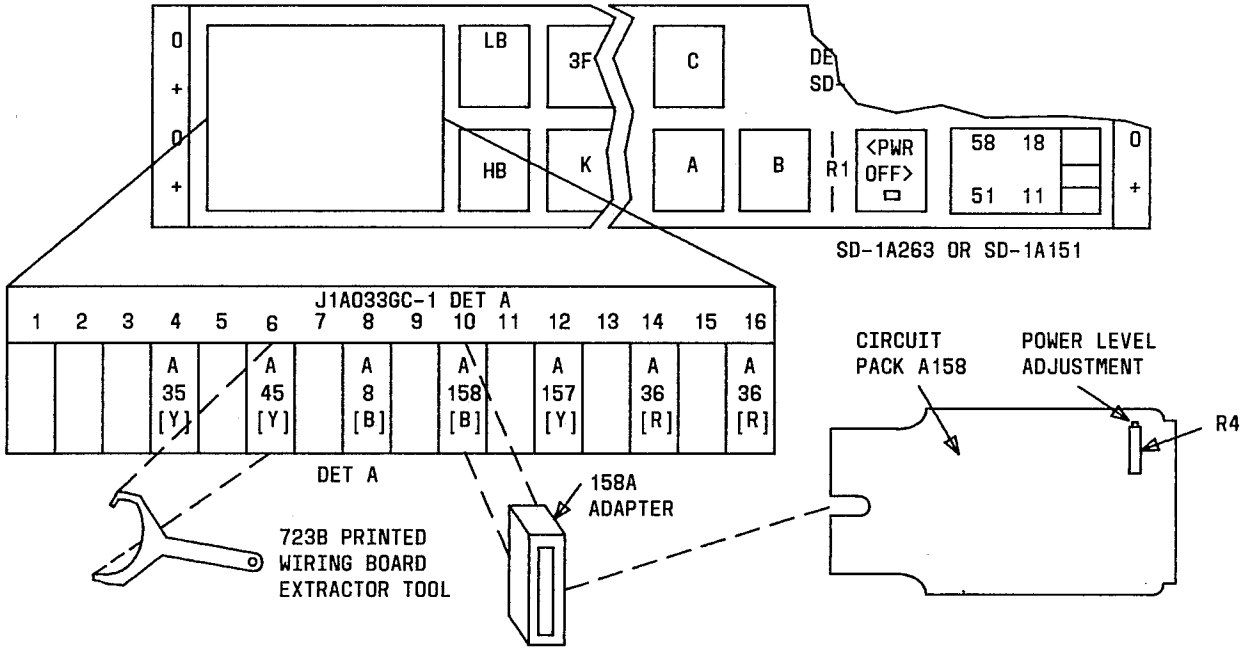


Fig. 12 — dBm Adjustment

5. TEST SD-1A150 MULTIFREQUENCY TEST ENVIRONMENT CIRCUIT

5.1 Obtain Support Apparatus

- Variable Frequency Oscillator (900-Ohm Output Impedance) (KS-19260 Oscillator or Equivalent)
- Transmission Measuring Set (TMS) (23D or Equivalent)
- Frequency Counter (Hewlett-Packard 5300A With 5301A Counter Module or Equivalent)
- Resistor (900-Ohms, 1/4 Watt)
- Test Cords (5) (W1AP(4), 2W17A(1))
- Relay Blocking Tool (3) (768A)

5.2 From Office Records, Obtain Trunk Network Number (TNN) of Service Circuit to Be Tested

5.3 Determine Equipment Option From Strapping of Terminals on Terminal Strip A as Follows

- 16 and 46 - Option **R**:
- 16 and 36 - Option **Z**:
- 16 and 26 - Option **Y**:

5.4 Make SD-1A150 Circuit Maintenance Busy Using A or B

A. TLTP: 11. MAKE CIRCUIT MAINTENANCE BUSY (TLTP)

B. MTTP: 12. MAKE CIRCUIT MAINTENANCE BUSY (MTTP)

5.5 Test Losses of SD-1A150 Multifrequency (MF) Test Environment Circuit

SUMMARY: Using transmission test set (TMS) and frequency counter, input frequency between **TS A-31** and **TS A-41** at **0** dBm and measure dBm between **TS A-11** and **TS A-21** with appropriate relays blocked operated. The relays, frequency, and dBm limits, respectively, are as follows:

A, 1000 Hz,
Option **R** -17.0 to -16.6 dBm
Option **Y** -14.6 to -14.4 dBm
Option **Z** -13.6 to -13.4 dBm
A and **B**, 700 Hz, -4.0 to 0
A and **B**, 1500 Hz, -6.75 plus 700 Hz dBm to -6.25 plus 700 Hz dBm
A, **B**, and **C**, 1000 Hz, -8.3 to 8.1
A and **C**, 1000 Hz, -0.5 to 0.

Note: Power is removed from circuit throughout this test.

1. At MF test environment circuit, operate **PWR OFF** key (Fig. 13)

   Response: **PWR OFF** lamp lights
2. At MF test environment circuit, connect test equipment as shown (Fig. 13)
3. At TMS, rotate **ADD DBM** switch to **0**
4. At TMS, set **DIAL-MEAS-EXT** switch to **MEAS**
5. At TMS, set **INPUT** switch to **900**

   Response: TMS conditioned
6. At oscillator, rotate **FREQ RANGE** switch to **X10**
7. At oscillator, rotate **FUNCTION** switch to **900**
8. At oscillator, set **OUTPUT LEVEL** control fully CCW

   Response: Oscillator conditioned
9. Adjust oscillator **FREQUENCY - CPS** for **1000** Hz on counter
10. Remove counter connections from **TS A-41** and **TS A-31**
11. Move TMS connection from **TS A-21** and **TS A-11** to **TS A-41** and **TS A-31**, respectively
12. Adjust oscillator **OUTPUT LEVEL** for **0** dBm on TMS
13. Move TMS connection from **TS A-41** and **TS A-31** to **TS A-21** and **TS A-11**, respectively
14. Block relay **A** operated

    Comment: Relay **A** blocked

    Oscillator adjusted to **1000** Hz **0** dBm

15. Is TMS indication within limits specified (Fig. 14) per option?

    If YES, proceed to Step 17.

    If NO, proceed to Step 16.

16. Check value of resistors in flat loss pad using SD-1A150-01
17. Remove blocking tool from relay **A**
18. Connect counter to **TS A-41** and **TS A-31**
19. Adjust oscillator **FREQUENCY - CPS** for **700** Hz on counter
20. Remove counter connections from **TS A-41** and **TS A-31**
21. Move TMS connection from **TS A-21** and **TS A-11** to **TS A-41** and **TS A-31**, respectively
22. Adjust oscillator **OUTPUT LEVEL** for **0** dBm on TMS
23. Move TMS connection from **TS A-41** and **TS A-31** to **TS A-21** and **TS A-11**, respectively
24. Block relay **A** and **B** operated

    Comment: Oscillator adjusted to **700** Hz **0** dBm

25. Is TMS indication between -4.00 and 0 dBm?

    If YES, proceed to Step 27.

    If NO, proceed to Step 26.

26. Check value of components in **N** network. See SD-1A150-01
27. Record level measured in Step 25 to three decimal places for use in Step 36
28. Unblock relay **A**
29. Connect counter to **TS A-41** and **TS A-31**
30. Adjust oscillator **FREQUENCY - CPS** for **1500** Hz on counter
31. Remove counter connection from **TS A-41** and **TS A-31**
32. Move TMS connection from **TS A-21** and **TS A-11** to **TS A-41** and **TS A-31**, respectively
33. Adjust oscillator **OUTPUT LEVEL** for **0** dBm on TMS
34. Move TMS connection from **TS A-41** and **TS A-31** to **TS A-21** and **TS A-11**, respectively
35. Block relay **A** operated

    Comment: Oscillator adjusted to **1500** Hz **0** dBm

Note: Value recorded in Step 27 = 3.00 dBm. Limits of Step 37 = -3.00 -6.75 = -9.75 and -3.00 -6.25 = 9.25 dBm.

36. Establish limits by adding value recorded in Step 27 to -6.75 and to -6.25
37. Is TMS indication between limits determined in Step 36?

    If YES, proceed to Step 39.

    If NO, proceed to Step 38.
38. Check value of components in **N** network. See SD-1A150-01
39. Unblock relay **A**
40. Block relay **C** operated (insulate **7** make contact)
41. Connect counter to **TS A-41** and **TS A-31**
42. Adjust oscillator **FREQUENCY - CPS** for **1000** Hz on counter
43. Remove counter connections from **TS A-41** and **TS A-31**, respectively
44. Move TMS connection from **TS A-21** and **TS A-11** to **TS A-41** and **TS A-31,** respectively
45. Adjust oscillator **OUTPUT LEVEL** for **0** dBm on TMS
46. Move TMS connection from **TS A-41** and **TS A-31** to **TS A-21** and **TS A-11,** respectively
47. Block relay **A** operated

    Comment: Oscillator adjusted to **1000** Hz **0** dBm
48. Is TMS indication between -8.3 and -8.1 dBm?

    If YES, proceed to Step 50.

    If NO, proceed to Step 49.
49. Check values of components in tone pad and signal pad. See SD-1A150-01
50. Unblock relay **A** and **B**
51. Connect counter to **TS A-41** and **TS A-31**
52. Adjust oscillator **FREQUENCY - CPS** for **1000** Hz on counter
53. Remove counter from **TS A-41** and **TS A-31**
54. Move TMS connection from **TS A-21** and **TS A-11** to **TS A-41** and **TS A-31,** respectively
55. Adjust oscillator **OUTPUT LEVEL** for **0** dBm on TMS
56. Move TMS connection from **TSA-41** and **TSA-31** to **TSA-21** and **TSA-11,** respectively
57. Block relay **A** operated

    Comment: Oscillator adjusted to **1000** Hz **0** dBm
58. Is TMS indication between -0.5 and 0 dBm?

    If YES, proceed to Step 60.

If NO, proceed to Step 59.

59. Check value of components in tone pad. See SD-1A150-01
60. Remove all test connections (Fig. 13)
61. Remove all relay blocking tools and insulator
62. Release **PWR OFF** key

    Response: **PWR OFF** lamp goes off

END OF PROCEDURE

5.6 Test Output Levels of SD-1A150 MF Test Environment Circuit

SUMMARY: Using TMS connected between pins **TS A-21** and **TS A-11** and 900-ohm resistor connected between pins **TS A-41** and **TS A-31,** block relays and measure power levels as follows:

A, B, and **C** blocked operated
Option **R** -7.1 to -8.7 dBm
Option **Y** -9.2 to -10.6 dBm
Option **Z** -10.2 to -11.7 dBm
A and **C** blocked
Loss limits are option reading -13.9 and option reading -13.5.

1. At MF test environment circuit (Fig. 15), operate **PWR OFF** key

   Response: **PWR OFF** lamp lights

2. At MF test environment circuit, connect Transmission Measuring Set (TMS) **MEAS - R** jack to terminal **11** of terminal strip (TS) **A**
3. At MF test environment circuit, connect TMS **MEAS - T** jack to terminal **21** of TS **A**
4. At MF test environment circuit, connect 900-ohm resistor between terminals **31** and **41** of TS **A**
5. At MF test environment circuit, release **PWR OFF** key

   Response: **PWR OFF** lamp goes off

6. At TMS (Fig. 15), operate **DIAL-MEAS-EXT** switch to **MEAS**
7. At TMS, operate **INPUT** switch to **900**
8. At unit under test, block relays **A, B,** and **C** operated
9. Is TMS indication within limits specified (Fig. 16) per option?

   If YES, proceed to Step 11.

   If NO, proceed to Step 10.

   Warning: If power is not removed before removing or installing circuit pack, damage may occur.

10. Replace circuit pack (CP) A155 and repeat from Step 1.

    Reference: 19. REPLACE CIRCUIT PACK

11. Record TMS reading to three decimal places for use in Step 12

Note: Value in Step 11 = -8.10 dBm, limits for Step 14 =
-8.10 -13.9 = -22.0
to
-8.10 -13.5 = -21.6 dBm

12. Determine loss limits for Step 14 by adding value in Step 11 to -13.9 and to -13.5
13. At unit under test, unblock relay **B**
14. Is TMS indication within limits determined in Step 12?

    If YES, proceed to Step 16.

    If NO, proceed to Step 15.

    Warning: If power is not removed before removing or installing circuit pack, damage may occur.

15. Replace circuit pack (CP) A155 and repeat from Step 1.

    Reference: 19. REPLACE CIRCUIT PACK
16. Unblock all relays
17. Operate **PWR OFF** key

    Response: **PWR OFF** lamp lights
18. Remove all test connections
19. Release **PWR OFF** key

    Response: **PWR OFF** lamp goes off
20. Release circuit from maintenance busy using A or B

    A. TLTP: 22. RELEASE FROM MAINTENANCE BUSY (TLTP)

    B. MTTP: 23. RELEASE FROM MAINTENANCE BUSY (MTTP)

END OF PROCEDURE

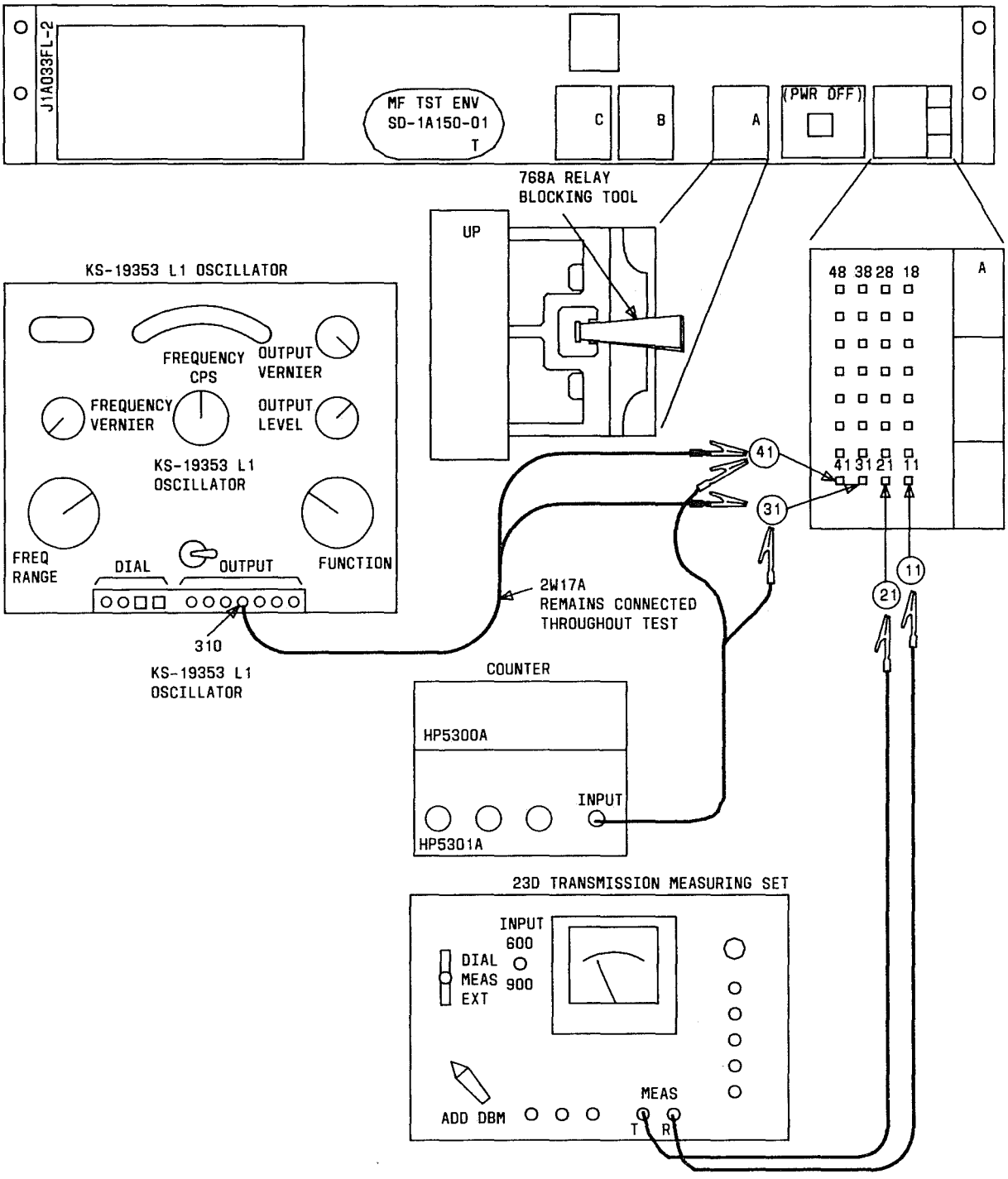


Fig. 13 — Test Setup

OPTION	LIMITS
R	−17.0 to −16.6 dBm
Y	−14.6 to −14.4 dBm
Z	−13.6 to −13.4 dBm

Fig. 14 — Options

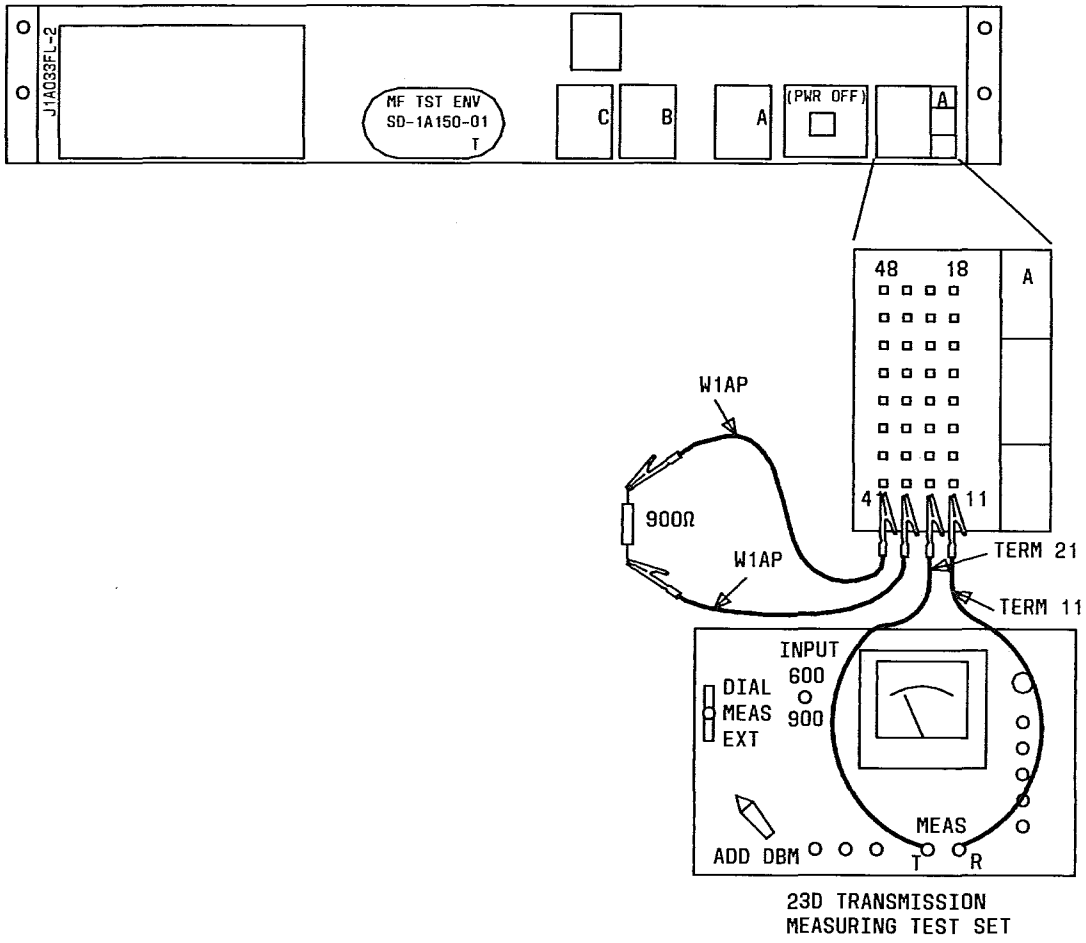


Fig. 15 — Test Equipment to Unit Under Test Connections

OPTION	LIMITS
R	−7.10 to −8.70 dBm
Y	−9.20 to −10.6 dBm
Z	−10.2 to −11.7 dBm

Fig. 16 — Options

6. TEST SD-1A152 TONE PRESENCE DETECTOR CIRCUIT (TPC)

6.1 Obtain Support Apparatus

- Oscillator (OSC) (KS-19260 or Equivalent)
- RMS Voltmeter (VM) (Hewlett-Packard 3400A or Equivalent)
- Cable Assembly (2) (Hewlett-Packard 11002A)
- Test Cord (1) 2W25A
- Test Cords (2) W1T
- Test Cords (3) (1W13A and Four KS-6278 Clips)
- Tools (2) 624B
- Oscilloscope (Scope) (Tektronix 434 Storage)
- Probe Assembly (2) (Tektronix 6065A)
- Pulse Generating Test Set (J94732A (3A) or Equivalent)
- Blocking Tools (3) (768A)
- Resistor, 10,000 Ohms (Type 18JW or Equivalent)

6.2 From Office Records, Obtain Trunk Network Number (TNN) for Service Circuit to Be Tested

6.3 Make SD-1A152 Circuit Maintenance Busy Using A or B

A. TLTP: 11. MAKE CIRCUIT MAINTENANCE BUSY (TLTP)

B. MTTP: 12. MAKE CIRCUIT MAINTENANCE BUSY (MTTP)

6.4 Connect Test Equipment for Testing SD-1A152 Tone Presence Detector Circuit (TPC)

1. At TPC, operate **PWR OFF** key or associated power off key on frame control panel
   Response: **PWR OFF** lamp lights
2. Connect test equipment as shown in Fig. 17
3. At TPC, release **PWR OFF** key or associated power off key on frame control panel
   Response: **PWR OFF** lamp goes off

END OF PROCEDURE

6.5 Test Tone Detection Level of SD-1A152 Tone Presence Detector Circuit (TPC)

1. At TPC, block relay **A** (lower part) operated
2. At TPC, block relay **B** released
3. At RMS voltmeter, rotate **RANGE - VOLTS** switch to **.03**
4. At oscilloscope, rotate **VOLTS/DIV CH2** switches to **V-DC** and **5**
5. At oscillator, adjust **FREQUENCY - CPS** for 1000 Hz and **OUTPUT LEVEL** for **RMS VOLTMETER** indication of 0.030 volt
6. At TPC, set **GAIN** control fully CCW; adjust CW to point where oscilloscope indication switches to less than 10 volts
7. At oscillator, decrease **OUTPUT LEVEL** for VM indication of 0.027 volt
8. Does oscilloscope indicate greater than 19 volts?

   If YES, proceed to Step 14.

   If NO, proceed to Step 9.
9. At oscillator, adjust **FREQUENCY - CPS** for 1000 Hz and **OUTPUT LEVEL** for **RMS VOLTMETER** indication of 0.030 volt
10. At TPC, set **GAIN** control fully CCW; adjust CW to point where oscilloscope indication switches to less than 10 volts
11. At oscillator, decrease **OUTPUT LEVEL** for VM indication of 0.027 volt
12. Does oscilloscope indicate greater than 19 volts?

    If YES, proceed to Step 14.

    If NO, proceed to Step 13.
13. Check the components comprising the filter between **AMP 1** and **AMP 2** for operation and value per SD-1A152
14. Remove blocking tool from relay **B**

END OF PROCEDURE

6.6 Test Voice Detection Level of SD-1A152 Tone Presence Detector Circuit (TPC)

SUMMARY: Using oscillator, oscilloscope, RMS voltmeter, blocking relay **B** operated, and setting **OPERATE** and **RELEASE** controls CCW, test circuit as follows:

Apply **1000** Hz at .095 RMS volt to pins **31** and **41** of TS A

Adjust **OPERATE** control CW until multimeter reads less than 10 Vdc. Remove tone, when voltage at terminal 32 increases to 19 volts, reapply tone, voltage decreases below +10 in 100 to 400 msec.

Adjust **RELEASE** control slightly clockwise. Apply tone 10 seconds, then remove, voltage decreases to below +10 volts for 10 to 12 seconds

Remove blocking tool from **B** relay.

1. At TPC, block relay **B** operated
2. At TPC, adjust **RELEASE** control fully CCW
3. At RMS voltmeter, rotate **RANGE - VOLTS** switch to **.1**
4. At oscilloscope, rotate **VOLTS/DIV CH2** switches to **V-DC** and **5**
5. At oscillator, adjust **FREQUENCY - CPS** for **1000** Hz and **OUTPUT-LEVEL** for **RMS VOLTMETER** (VM) indication of 0.095 volt
6. At TPC, set **OPERATE** control fully CCW. Adjust CW slowly to point where oscilloscope indication switches to less than 10 volts
7. Remove tone
8. Reapply tone when voltage at terminal **32** increases above 19 volts
9. Does oscilloscope indicate a decrease below +10 volts within 100 to 400 msec after tone is applied (Fig. 18)?

   If YES, proceed to Step 11.

   If NO, proceed to Step 10.
10. Adjust **OPERATE** control slightly CW and repeat from Step 7
11. Adjust **RELEASE** control slightly clockwise
12. Apply tone for 10 seconds, then remove tone
13. Does oscilloscope indicate a decrease from +19 volts to below +10 volts for 10 to 12 seconds (Fig. 18)?

    If YES, END OF PROCEDURE

    If NO, proceed to Step 14.
14. Repeat from Step 11

END OF PROCEDURE

6.7 Test Detector Network (Circuit Pack A378) of SD-1A152 Tone Presence Detector Circuit (TPC)

SUMMARY: Using oscilloscope, pulse generator, oscillator, and RMS voltmeter, test circuit as follows:

Block relay **B** released

Apply **1000** Hz 96-104 milliseconds (" on"), at least 300 milliseconds (" off") to **TS A-41** (Fig. 21)

TS A-32 output greater than 19 volts dc, apply **1000** Hz 186-194 milliseconds (" on") at least 300 milliseconds (" off") to **TS A-41** (Fig. 22)

TS A-32 output less than 10 volts 110-180 milliseconds after start of input

Apply **1000** Hz at least 400 milliseconds (" on"), 70-90 milliseconds (" off") to **TS A-41** (Fig. 23)

TS A-32 output greater than 19 volts 110- 210 milliseconds after start of input and less than 10 volts for period measured in 110-180 milliseconds limits plus 20-50 milliseconds

Remove blocking tools from relays **A** and **B**.

1. At TPC (Fig. 19), operate **PWR OFF** key

   Response: **PWR OFF** lamps lights

2. At TPC, connect oscilloscope and pulse generator test set to test setup per Fig. 19
3. At TPC, release **PWR OFF** key

   Response: **PWR OFF** lamp goes off

4. At TPC, block relay **B** released using 768A blocking tool
5. On oscillator, adjust **FREQUENCY - CPS** for **1000** Hz and output level for RMS voltmeter indication 0.03 volt
6. On pulse generator, position controls as indicated in Fig. 20
7. At circuit under test, set up input signal at **TS A-41** for 96 to 104 milliseconds period of **1000** Hz followed by at least 300 milliseconds of no signal (Fig. 21)
8. Is dc voltage greater than 19 volts at **TS A-32** (Fig. 21)?

   If YES, proceed to Step 10.

   If NO, proceed to Step 9.

   Warning: If power is not removed before removing or installing circuit pack, damage may occur.

9. Replace circuit pack (CP) A378

   Reference: 19. REPLACE CIRCUIT PACK

10. At pulse generator, rotate **PERCENT** to **95**
11. At circuit under test, set up input signal at **TS A-41** for 186 to 194 milliseconds period of **1000** Hz followed by at least 300 milliseconds of no signal (Fig. 27)
12. Does waveform at **TS A-32** switch from greater than 19 volts to less than 10 volts between 110 and 180 milliseconds after start of **1000** Hz input (Fig. 27)?

    If YES, proceed to Step 14.

    If NO, proceed to Step 13.

    Warning: If power is not removed before removing or installing circuit pack, damage may occur.

13. Replace CP A378 and repeat from Step 6

    Reference: 19. REPLACE CIRCUIT PACK

14. Record measured time for output waveform to switch to low voltage
15. At pulse generator, rotate **IDG TIME SCALE MILLISECONDS** to **100**
16. At pulse generator, rotate **PPS** to **2**
17. At pulse generator, rotate **PERCENT** to **90**
18. At pulse generator, rotate **IDG TIME** to **80**
19. At circuit under test, set up input signal at **TS A-41** for period of at least 400 milliseconds of **1000** Hz followed by 70- to 90-milliseconds period of no signal (Fig. 23)
20. Does waveform at **TS A-32** switch from less than 10 volts to greater than 19 volts between 110 and 210 milliseconds after start of no signal period and switch to less than 10 volts in time recorded in step 14 plus 20 to 50 milliseconds (Fig. 23)?

    If YES, proceed to Step 21.

    If NO, proceed to Step 22.

21. Remove blocking tools from relays **A** and **B**

    Warning: If power is not removed before removing or installing circuit pack, damage may occur.

22. Replace CP A378 and repeat from Step 6

    Reference: 19. REPLACE CIRCUIT PACK

23. At TPC, operate **PWR OFF** key or associated power off key on frame control panel
24. Disconnect test equipment

25. At TPC, release **PWR OFF** key or associated power off key on frame control panel
26. Release SD-1A152 circuit from maintenance busy using A or B
    A. TLTP: 22. RELEASE CIRCUIT FROM MAINTENANCE BUSY (TLTP)
    B. MTTP: 23. RELEASE CIRCUIT FROM MAINTENANCE BUSY (MTTP)

END OF PROCEDURE

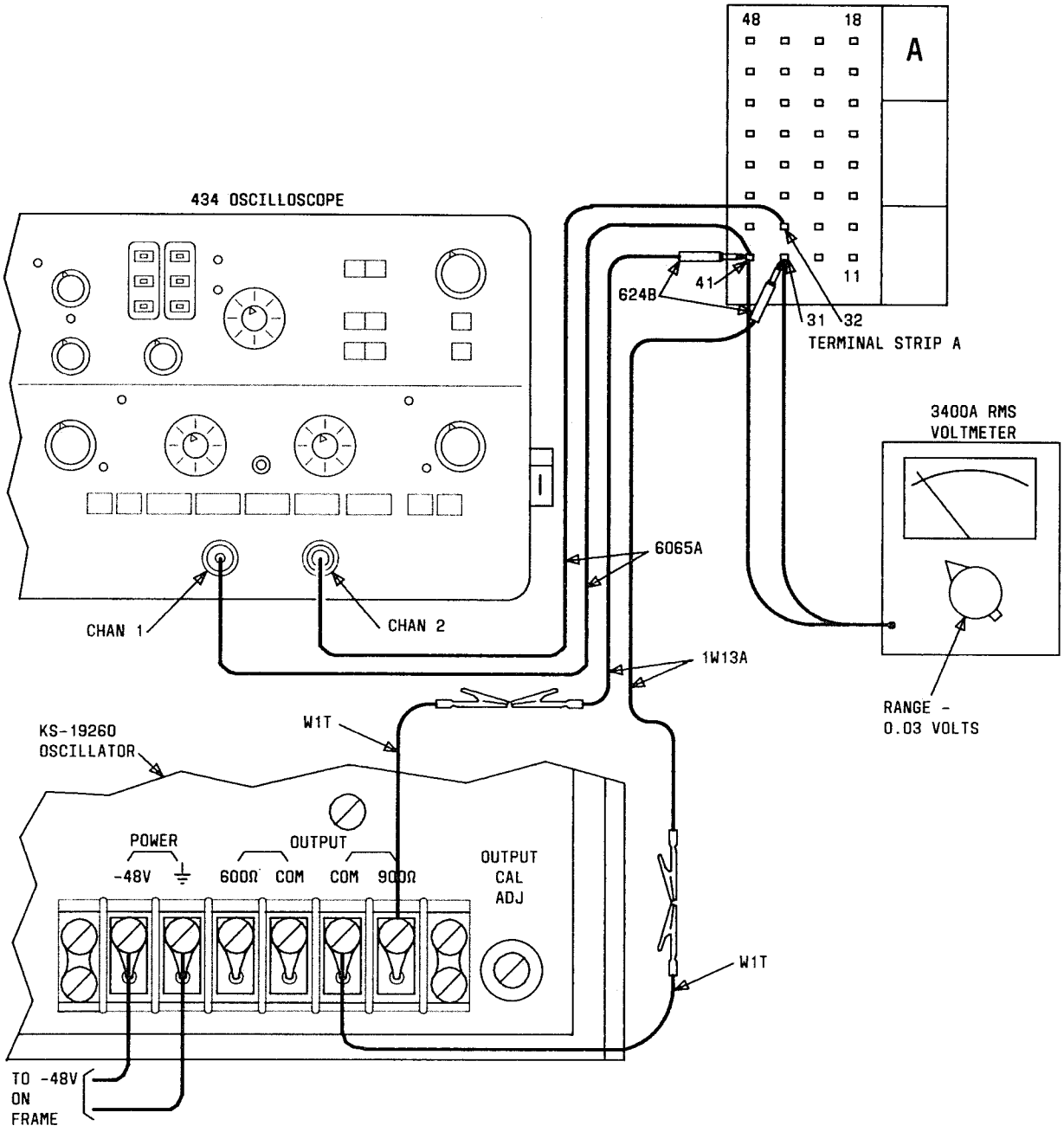


Fig. 17 — Example of Test Equipment Connected to TPC

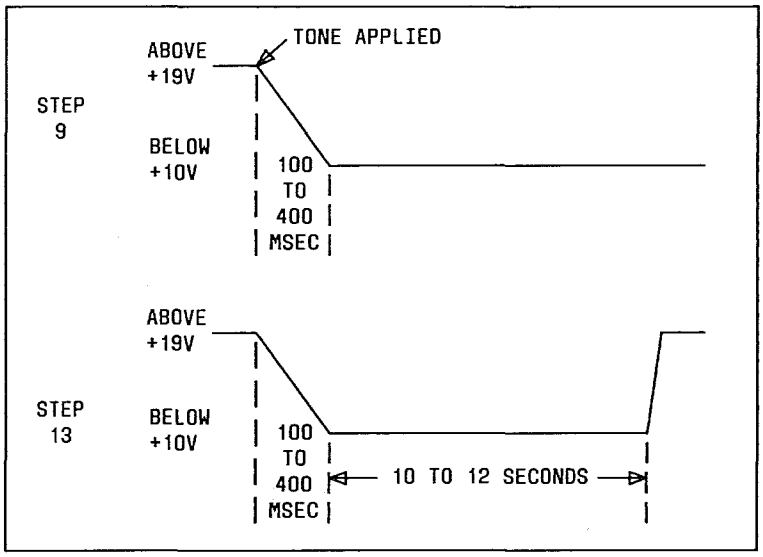


Fig. 18 — Example of Voice Detection Test Characteristics

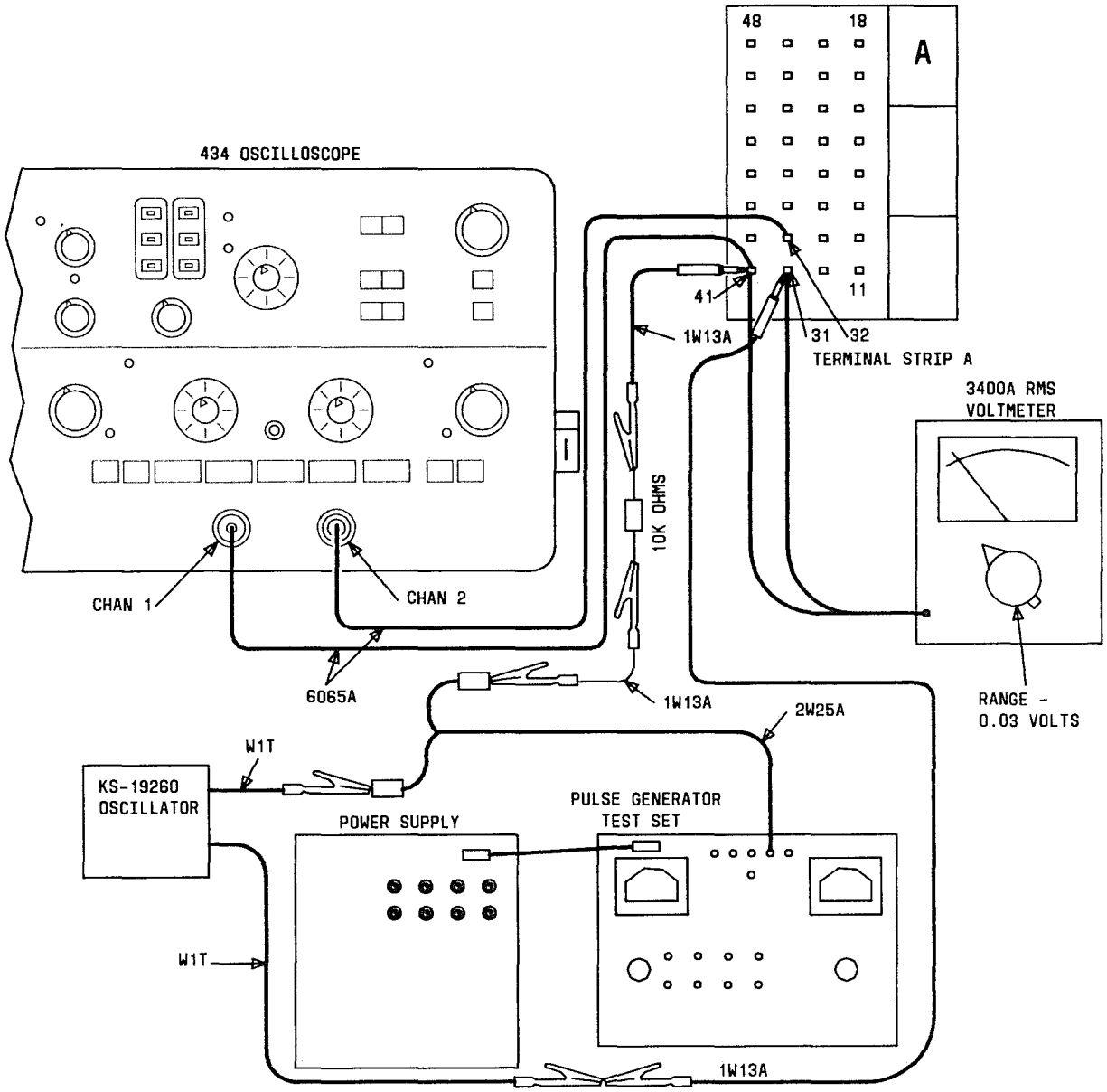


Fig. 19 — Example of Test Connections

CONTROL	CONTROL SETTING	CONTROL	CONTROL SETTING
PULSES PER TRAIN	1	TRAIN CONTROL	PULSE
PULSE SEL	CONTROL TRANS	IDG TIME SC-MS	500
EM ST-REL CHK	NOR	PPS SCALE	5
LINE	PULSE	PPS	5
CAL	NOR	PERCENT	50
LOOP	OPEN	IDG TIME (MS)	300

Fig. 20 — Generator Control Settings

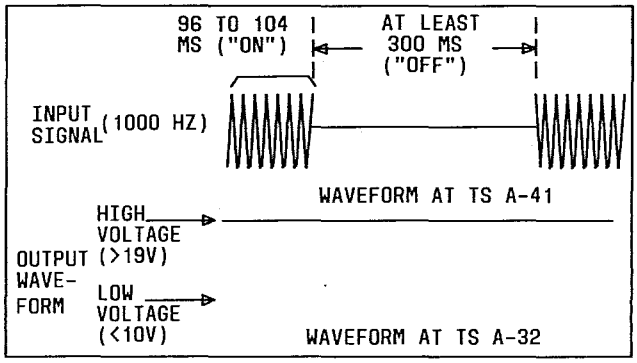


Fig. 21 — Example of 100-Millisecond Pulsing

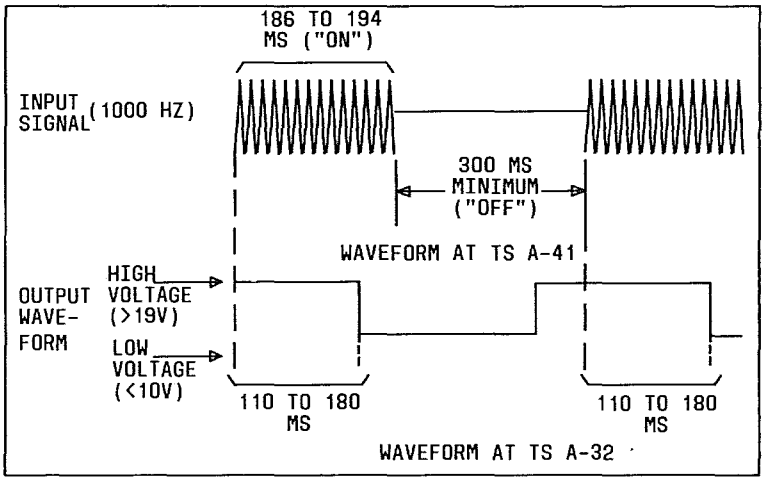


Fig. 22 — Example of 190-Millisecond Pulsing

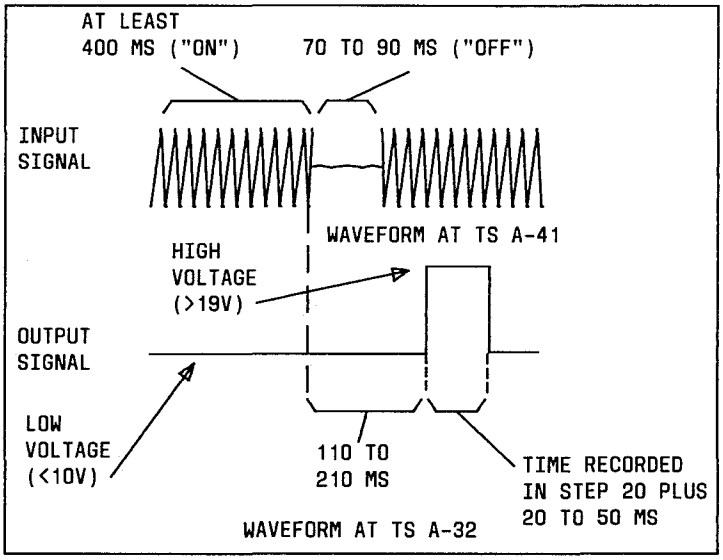


Fig. 23 — Example of 400-Millisecond Pulsing

7. TEST SD-1A176 NETWORK ACCESS CIRCUIT

7.1 Obtain Support Apparatus

- 262B Plug
- Test Cord (1W13A)
- Clips (2) (KS-6278)
- Clip Insulators (2) (Type 108)

7.2 From Office Records, Obtain

- Trunk Network Number (TNN) (Form ESS 1200, Columns 29-34)
- Physical Location of Circuit Under Test (TNN Known - Form ESS 1203A, Columns 34-43)

7.3 Make SD-1A176 Circuit Maintenance Busy Using A or B

A. TLTP: 11. MAKE CIRCUIT MAINTENANCE BUSY (TLTP)

B. MTTP: 12. MAKE CIRCUIT MAINTENANCE BUSY (MTTP)

7.4 Seize TNN Using A or B

A. TLTP: 13. SEIZE TRUNK NETWORK NUMBER (TLTP)

B. MTTP: 14. SEIZE TRUNK NETWORK NUMBER (MTTP)

7.5 Transfer TNN to ACCESS TRUNK 1 (With VM Key Operated) Using A or B

A. TLTP: 15. TRANSFER TNN TO ACCESS TRUNK (TLTP)

B. MTTP 16. TRANSFER TNN TO ACCESS TRUNK (MTTP)

7.6 Test SD-1A176 Signal Distributor (SD) Points

1. Operate **VOLTMETER TEST - FOREIGN EMF** key
2. Dial ***, 1909, #**

   Response: **P&E** lamp lights briefly
   Voltmeter indicates 42-53 volts

   Comment: Relay **A** operated

3. Was normal response received?

   If YES, proceed to Step 4.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM
4. Operate **VOLTMETER TEST - TRK TEST REV** key
5. Release **VOLTMETER TEST - FOREIGN EMF** key

   Response: Voltmeter indicates 95-105 volts
6. Was normal response received?

   If YES, proceed to Step 7.

   If NO, Clear fault using SD-1A176
7. Release **VOLTMETER TEST - TRK TEST REV** key
8. Dial ***, 1908, #**

   Response: **P&E** lamp lights briefly

   Comment: Relay **A** released

9. Was normal response received?

   If YES, proceed to Step 10.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM
10. Dial ***, 1919, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **B** operated

11. Was normal response received?

    If YES, proceed to Step 12.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

12. Dial *, **1918**, #

    Response: **P&E** lamp lights briefly

    Comment: Relay **B** released

13. Was normal response received?

    If YES, then proceed to Step 14

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

14. Condition scan point display using A or B

    A. At MCC system display panel, perform 17. CONDITION SCAN POINT DISPLAY

    B. At MTTP, dial *, **201**, #

END OF PROCEDURE

7.7 Test SD-1A176 Customer Line to Test Circuit - Circuit State

1. Insert **262B** plug at writing shelf/**TR** jack
2. Operate **VOLTMETER TEST - TRK TEST REV** key
3. Dial *, **1909**, #

    Response: **P&E** lamp lights briefly
    Scan point display **0 0**

    Comment: Relay **A** operated

4. Was normal response received?

    If YES, proceed to Step 5.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

5. Dial *, **1919**, #

    Response: **P&E** lamp lights briefly
    Scan point display **1 1**

    Comment: Relay **B** operated

6. Was normal response received?

   If YES, proceed to Step 7.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

7. Dial ***, 1918, #**

   Response: **P&E** lamp lights briefly
   Scan point display **0 0**

   Comment: Relay **B** released

8. Was normal response received?

   If YES, proceed to Step 9.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

9. Remove **262B** plug from writing shelf/**TR** jack
10. Release **VOLTMETER TEST - TRK TEST REV** key
11. Dial ***, 1908, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **A** released

12. Was normal response received?

    If YES, END OF PROCEDURE

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

7.8 Test SD-1A176 Trunk to Test Circuit - Circuit State

SUMMARY:

Using test frame and scan point display, operate relay **B** and verify scan points **0** and **1** are unsaturated. Ground **VOLTMETER TEST** circuit

Short tip and ring on transmission side of circuit being tested

Operate relay **A**

Observe VOLTMETER indication of 95 to 105 volts. With VOLTMETER not grounded and relay **A** released, VOLTMETER indicates 0 volt.

Remove short and release relay **B**.

1. At test frame, dial ***, 1919,** and # to operate relay **B**

   Response: **PROGRESS AND ERROR** lamp lights briefly

2. Was normal response received?

   If YES, proceed to Step 3.

   If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR

   Note: Scan point indications are:

   unsaturated = lighted lamp or binary **1**
   saturated = extinguished lamp or binary **0**

3. At scan point display, are scan points **0** and **1** unsaturated?

   If YES, proceed to Step 4.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

4. At test frame, operate **VOLTMETER TEST - GRD** key

5. Place shorting strap between terminals 016 and 215 for circuit **0**, 005 and 205 for circuit **1** (Fig. 24)

6. At test frame, dial ***, 1909,** and # to operate relay **A**

   Response: **PROGRESS AND ERROR** lamp lights briefly

7. Was normal response received?

   If YES, proceed to Step 8.

   If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR

8. Does VOLTMETER indicate between 95 and 105 volts?

   If YES, then proceed to Step 9.

If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

9. Release **VOLTMETER TEST - GRD** key
10. Dial ***, 1908,** and # to release relay **A**

    Response: **PROGRESS AND ERROR** lamp lights briefly
11. Was normal response received?

    If YES, proceed to Step 12.

    If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR
12. Does **VOLTMETER** indicate between 0 and 2 volts?

    If YES, proceed to Step 13.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM
13. Remove shorting strap installed in Step 5
14. Dial ***, 1918,** and # to release relay **B**

    Response: **PROGRESS AND ERROR** lamp lights briefly
15. Was normal response received?

    If YES, END OF PROCEDURE

    If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR
16. Release scan point display using A or B
    A. At MCC System Display Panel: 18. RELEASE SCAN POINT DISPLAY
    B. At MTTP - Dial ***, 200, and #**
17. Idle SD-1A176 Circuit From ACCESS TRUNK 1 using A or B
    A. TLTP: 20. IDLE CIRCUIT FROM TLTP ACCESS TRUNK
    B. MTTP: 21. IDLE CIRCUIT FROM MTTP ACCESS TRUNK
18. Release Service Circuit (if Second Circuit on 2-Circuit Plug-In Was Made Busy) Using A or B
    A. TLTP: 22. RELEASE CIRCUIT FROM MAINTENANCE BUSY (TLTP)
    B. MTTP: 23. RELEASE CIRCUIT FROM MAINTENANCE BUSY (MTTP)
19. At Test Frame, Release All Operated Keys

END OF PROCEDURE

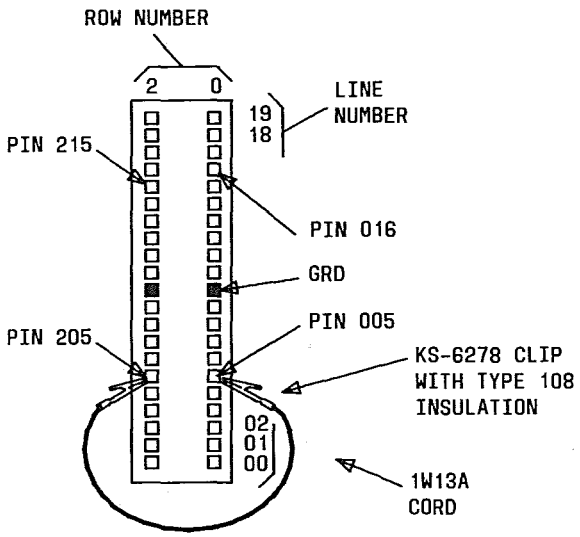


Fig. 24 — Rear View of Connector on MUT

8. TEST SD-1A303 TEST COUPLER CIRCUIT

8.1 From Office Records, Obtain

- Trunk Network Number (TNN) (Form ESS 1201A, Columns 29-34)
- Physical Location of Circuit Under Test (TNN Known - Form ESS 1203A, Columns 34-43)

8.2 Make SD-1A303 Circuit Maintenance Busy Using A or B

A. TLTP: 11. MAKE CIRCUIT MAINTENANCE BUSY (TLTP)

B. MTTP: 12. MAKE CIRCUIT MAINTENANCE BUSY (MTTP)

8.3 Seize TNN Using A or B

A. TLTP: 13. SEIZE TRUNK NETWORK NUMBER (TLTP)

B. MTTP: 14. SEIZE TRUNK NETWORK NUMBER (MTTP)

8.4 Transfer TNN to ACCESS TRUNK 1 (With VM Key Operated) Using A or B

A. TLTP: 15. TRANSFER TNN TO ACCESS TRUNK (TLTP)

B. MTTP: 16. TRANSFER TNN TO ACCESS TRUNK (MTTP)

8.5 Test SD-1A303 Signal Distributor (SD) Points

1. Operate **VOLTMETER TEST - FOREIGN EMF** key
2. Dial ***, 1909, #**

   Response: **P&E** lamp lights briefly

   Voltmeter indicates 42 to 53 volts

   Comment: Relay **A** operated

3. Was normal response received?

   If YES, proceed to Step 4.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

4. Release **VOLTMETER TEST - FOREIGN EMF** key
5. Dial ***, 1908, #**

   Response: **P&E** lamp lights briefly

   Comment: Relay **A** released

6. Was normal response received?

   If YES, proceed to Step 7.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

7. Dial ***, 1919, #**

   Response: **P&E** lamp lights briefly

   Comment: Relay **B** operated

8. Was normal response received?

   If YES, proceed to Step 9.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

9. Dial ***, 1918, #**

   Response: **P&E** lamp lights briefly

   Comment: Relay **B** released

10. Was normal response received?

    If YES, END OF PROCEDURE

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

11. Condition scan point display using A or B
    A. At MCC system display panel: 17. CONDITION SCAN POINT DISPLAY
    B. At MTTP - dial *, **201,** and #

END OF PROCEDURE

8.6 Test SD-1A303 Test Coupler Circuit - Circuit States

1. Operate **VOLTMETER TEST - GRD** key
2. Operate **VOLTMETER TEST - TRK TEST REV** key
3. Dial ***, 1909, #**

   Response: **P&E** lamp lights briefly

   Voltmeter indicates 95 to 105 volts

   Scan point display **1 0**

   Comment: Relay **A** operated

4. Was normal response received?

   If YES, proceed to Step 5.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

5. Dial ***, 1919, #**

   Response: **P&E** lamp lights briefly

   Scan point display **0 1**

   Comment: Relay **B** operated

6. Was normal response received?

   If YES, proceed to Step 7.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

7. Dial ***, 1918, #**

   Response: **P&E** lamp lights briefly

   Voltmeter indicates 95 to 105 volts

   Scan point display **1 0**

   Comment: Relay **B** released

8. Was normal response received?

   If YES, proceed to Step 9.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

9. Dial *, **1908**, #

   Response: **P&E** lamp lights briefly
   Scan point display **1 1**

   Comment: Relay **A** released

10. Was normal response received?

    If YES, proceed to Step 11.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

11. Release **VOLTMETER TEST - GRD** key
12. Release **VOLTMETER TEST - TRK TEST REV** key
13. Release scan point display using A or B
    A. At MCC system display panel: 18. RELEASE SCAN POINT DISPLAY
    B. At MTTP - dial *, **200**, and #
14. Idle SD-1A303 circuit from ACCESS TRUNK 1 using A or B
    A. TLTP: 20. IDLE CIRCUIT FROM ACCESS TRUNK (TLTP)
    B. MTTP: 21. IDLE CIRCUIT FROM ACCESS TRUNK (MTTP)
15. At test frame, release all operated keys.

END OF PROCEDURE

9. TEST SD-1A192 2-WAY TRUNK CIRCUIT

9.1 Obtain Support Apparatus

- Two 1W13A Cords
- Four KS-6278 Clips
- Four Type 108 Clip Insulators
- One No. 18BH, 1000-Ohm, 5-Watt Resistor, or Equivalent
- One 262B Plug

9.2 From Office Records, Obtain

- Trunk Network Number (TNN) (Form ESS 1200, Columns 29-34)
- Physical Location of Circuit Under Test (TNN Known - Form ESS 1203A, Columns 34-43)

9.3 Seize TNN using A or B

A. TLTP: 13. SEIZE TRUNK NETWORK NUMBER (TLTP)

B. MTTP: 14. SEIZE TRUNK NETWORK NUMBER (MTTP)

9.4 Transfer TNN to ACCESS TRUNK 1 (With VM Key Operated) per A or B

A. TLTP: 15. TRANSFER TNN TO ACCESS TRUNK (TLTP)

B. MTTP: 16. TRANSFER TNN TO ACCESS TRUNK (MTTP)

9.5 Test SD-1A192 Signal Distributor (SD) Points

1. Dial *, **1908**, #

   Response: **P&E** lamp lights briefly

   Comment: Relay **A** released

2. Was normal response received?

   If YES, proceed to Step 3.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

3. Dial *, **1909**, #

   Response: **P&E** lamp lights briefly

   Comment: Relay **A** operated

4. Was normal response received?

   If YES, proceed to Step 5.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

5. Dial *, **1908**, #

   Response: **P&E** lamp lights briefly

   Comment: Relay **A** released

6. Was normal response received?

   If YES, proceed to Step 7.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

7. Operate **VOLTMETER TEST - FOREIGN EMF** key

8. Dial *, **1919**, #

   Response: **P&E** lamp lights briefly

   Voltmeter indicates 42 to 53 volts

   Comment: Relay **B** operated

9. Was normal response received?

   If YES, proceed to Step 10.

If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

10. Operate **VOLTMETER TEST - TRK TEST REV** key
11. Release **VOLTMETER TEST - FOREIGN EMF** key

    Response: Voltmeter indicates 95 to 105 volts

12. Was normal response received?

    If YES, proceed to Step 13.

    If NO, clear fault using SD-1A192

13. Dial ***, 1918, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **B** released

14. Was normal response received?

    If YES, proceed to Step 15.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

15. Release **VOLTMETER TEST - TRK TEST REV** key
16. Dial ***, 1929, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **C** operated

17. Was normal response received?

    If YES, proceed to Step 18.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

18. Dial ***, 1928, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **C** released

19. Was normal response received?

    If YES, END OF PROCEDURE

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

20. Condition Scan Point Display using A or B

    A. At MCC System Display Panel: 17. CONDITION SCAN POINT DISPLAY

B. At MTTP - Dial *, **201**, and #

END OF PROCEDURE

9.6 Test SD-1A192 2-Way Trunk Circuit - Circuit States

Note: Scan point indications are:

unsaturated = lighted lamp or binary **1**
saturated = extinguished lamp or binary **0**

1. At scan point display, are scan points **0** and **1** unsaturated?

   If YES, proceed to Step 2.

   If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

2. Is this circuit **0** or circuit **1**?

   If **0**, proceed to Step 3.

   If **1**, proceed to Step 4.

   Caution: 48 volts present on this unit. Avoid contact with unspecified pins.

3. Strap 1000-ohm resistor between pins **016** and **215** of unit under test (Fig. 25) and do Step 5.

   Caution: 48 volts present on this unit. Avoid contact with unspecified pins.

4. Strap 1000-ohm resistor between pins **005** and **205** of unit under test (Fig. 26)
5. At test frame, dial ***, 1909, and #*** to operate relay **A**

   Response: **PROGRESS AND ERROR** lamp lights briefly

6. Did **PROGRESS AND ERROR** lamp light as desired?

   If YES, proceed to Step 7.

   If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR

7. At scan point display, are scan points **0** and **1** unsaturated?

   If YES, then proceed to Step 8.

   If NO, clear relay A fault using 25. CLEAR CIRCUIT RELAY PROBLEM

8. At test frame, dial ***, 1919, and #*** to operate relay **B**

Response: **PROGRESS AND ERROR** lamp lights briefly

9. Did **PROGRESS AND ERROR** lamp light as desired?

   If YES, proceed to Step 10.

   If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR

10. At scan point display, is scan point **0** unsaturated and **1** saturated?

    If YES, proceed to Step 11.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

11. At test frame, dial ***, 1929, and #** to operate relay **C**

    Response: **PROGRESS AND ERROR** lamp lights briefly

12. Did **PROGRESS AND ERROR** lamp light as desired?

    If YES, proceed to Step 13.

    If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR

13. At scan point display, is scan point **0** unsaturated and **1** saturated?

    If YES, proceed to Step 14.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

14. At test frame, dial ***, 1918, and #** to release relay **B**

    Response: **PROGRESS AND ERROR** lamp lights briefly

15. Did **PROGRESS AND ERROR** lamp light as desired?

    If YES, proceed to Step 16.

    If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR

16. At scan point display, is scan point **0** unsaturated and **1** saturated?

    If YES, proceed to Step 17.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

17. At test frame, dial ***, 1908,** and # to release relay **A**

    Response: **PROGRESS AND ERROR** lamp lights briefly

18. Did **PROGRESS AND ERROR** lamp light as desired?

    If YES, proceed to Step 19.

    If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR

19. At scan point display, is scan point **0** unsaturated and **1** saturated?

If YES, proceed to Step 20.

If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

Note: All locking keys contain lamps that light when key is operated.

20. At test frame, operate **VOLTMETER TEST - FOREIGN EMF** key
21. At test frame, dial ***, 1919,** and # to operate relay **B**

    Response: **PROGRESS AND ERROR** lamp lights briefly
22. Did **PROGRESS AND ERROR** lamp light as desired?

    If YES, proceed to Step 23.

    If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR
23. Does **VOLTMETER** indicate between 42 and 53 volts?

    If YES, proceed to Step 26.

    If NO, proceed to Step 24.
24. Operate **VOLTMETER TEST - VM REV** key
25. Does **VOLTMETER** indicate between 42 and 53 volts?

    If YES, proceed to Step 26.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM
26. At scan point display, is scan point **0** unsaturated and **1** saturated?

    If YES, proceed to Step 27.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM
27. At test frame, operate **VOLTMETER TEST - TRK TEST REV** key
28. At test frame, release **VOLTMETER TEST - VM REV** key (if operated)
29. At test frame, release **VOLTMETER TEST - FOREIGN EMF** key
30. Does **VOLTMETER** indicate between 95 and 105 volts?

    If YES, proceed to Step 31.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM
31. At writing shelf, insert 262B plug into **ACCESS TRK 1/TR** jack
32. At scan point display, are scan points **0** and **1** saturated?

    If YES, proceed to Step 33.

If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM

33. At writing shelf, remove **262B** plug from **ACCESS TRK 1/TR** jack
34. At scan point display, is scan point **0** unsaturated and **1** saturated?

    If YES, proceed to Step 35.

    If NO, clear ferrod **1** fault using SD-1A192
35. At test frame, operate **VOLTMETER TEST - FOREIGN EMF** key
36. At test frame, release **VOLTMETER TEST - TRK TEST REV** key
37. At test frame, dial ***, 1928,** and # to release relay **C**

    Response: **PROGRESS AND ERROR** lamp lights briefly
38. Did **PROGRESS AND ERROR** lamp light as desired?

    If YES, proceed to Step 39.

    If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR
39. Does **VOLTMETER** indicate between 42 and 53 volts?

    If YES, proceed to Step 42.

    If NO, proceed to Step 40.
40. Operate **VOLTMETER TEST - VM REV** key
41. Does VOLTMETER indicate between 42 and 53 volts?

    If YES, proceed to Step 42.

    If NO, proceed to 25. CLEAR CIRCUIT RELAY PROBLEM
42. At scan point display, is scan point **0** unsaturated and **1** saturated?

    If YES, proceed to Step 43.

    If NO, clear ferrod 1 fault using SD-1A192
43. At test frame, release **VOLTMETER TEST - VM REV** key
44. At test frame, dial ***, 1918,** and # to release relay **B**

    Response: **PROGRESS AND ERROR** lamp lights briefly
45. Did **PROGRESS AND ERROR** lamp light as desired?

    If YES, proceed to Step 46.

    If NO, proceed to 24. CLEAR PROGRESS AND ERROR LAMP ERROR
46. At scan point display, is scan point **0** unsaturated and **1** saturated?

    If YES, proceed to Step 47.

If NO, clear ferrod 1 fault using SD-1A192

47. At test frame, release **VOLTMETER TEST - FOREIGN EMF** key

Caution: 48 volts present on this unit. Avoid contact with unspecified pins.

48. Remove 1000-ohm resistor from pins of circuit under test
49. Release scan point display using A or B
    A. At MCC system display panel: 18. RELEASE SCAN POINT DISPLAY
    B. At MTTP - dial ***, 200,** and #

END OF PROCEDURE

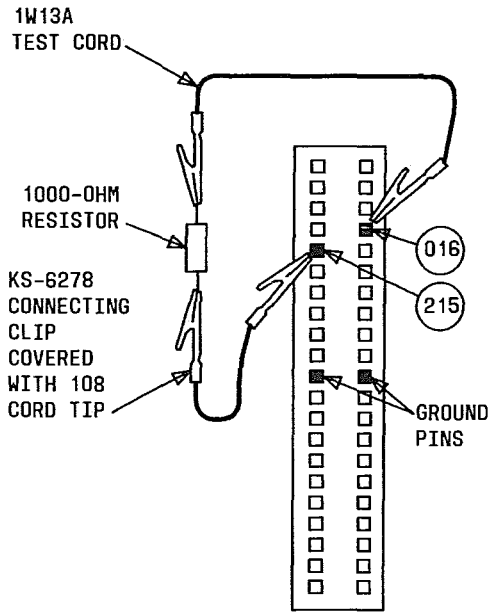


Fig. 25 — Rear View of Connector at MUT Frame (Pins for Circuit 0 Shown)

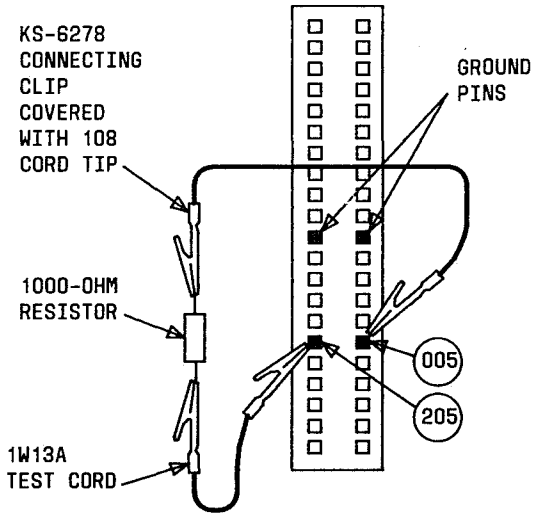


Fig. 26 — Rear View of Connector at MUT Frame (Pins for Circuit 1 Shown)

10. TEST SD-1A240 SIGNAL DISTRIBUTOR POINTS

10.1 From Office Records, Obtain

- Trunk Network Number (TNN) (Form ESS 1201A, Columns 29-34)
- Physical Location (TNN Known - Form ESS 1203A, Columns 34-43)

10.2 Obtain Support Apparatus

- Two 1W13A Cords
- One 262B Plug
- Four KS-6278 Clips
- Four Type 108 Clip Insulators
- One No. 18AE, 600-Ohm, 5-Watt Resistor, or Equivalent

10.3 Seize TNN using A or B

A. TLTP: 13. SEIZE TRUNK NETWORK NUMBER (TLTP)

B. MTTP 14. SEIZE TRUNK NETWORK NUMBER (MTTP)

10.4 Transfer TNN to ACCESS TRUNK 1 (With VM Key Operated) Using A or B

A. TLTP: 15. TRANSFER TNN TO ACCESS TRUNK (TLTP)

B. MTTP: 16. TRANSFER TNN TO ACCESS TRUNK (MTTP)

10.5 Test SD-1A240 Signal Distributor Points

1. Operate **VOLTMETER TEST - GRD** key
2. Dial ***, 1918, #**

   Response: **P&E** lamp lights briefly

   Voltmeter indicates 95 to 105 volts

   Comment: Relay **B** released

3. Was normal response received?

   If YES, proceed to Step 4.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM
4. Release **VOLTMETER TEST - GRD** key
5. Dial ***, 1908, #**

   Response: **P&E** lamp lights briefly

   Comment: Relay **A** released

6. Was normal response received?

   If YES, proceed to Step 7.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM
7. Dial ***, 1919, #**

   Response: **P&E** lamp lights briefly

   Comment: Relay **B** operated

8. Was normal response received?

   If YES, proceed to Step 9.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM
9. Dial ***, 1918, #**

   Response: **P&E** lamp lights briefly

   Comment: Relay **B** released

10. Was normal response received?

    If YES, proceed to Step 11.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

11. Operate **VOLTMETER TEST - FEMF** key

12. Dial ***, 1929, #**

    Response: **P&E** lamp lights briefly

    Voltmeter indicates 42 to 53 volts

    Comment: Relay **C** operated

13. Was normal response received?

    If YES, proceed to Step 14.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

14. Operate **VOLTMETER TEST - TT REV** key

15. Release **VOLTMETER TEST - FEMF** key

    Response: Voltmeter indicates 95 to 105 volts

16. Was normal response received?

    If YES, proceed to Step 17.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

17. Release **VOLTMETER TEST - TT REV** key

18. Dial ***, 1928, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **C** released

19. Was normal response received?

    If YES, proceed to Step 20.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

20. Dial ***, 1939, #**

    Response: **P&E** lamp lights briefly

Comment: Relay **D** operated

21. Was normal response received?

    If YES, proceed to Step 22.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

22. Dial ***, 1938, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **D** released

23. Was normal response received?

    If YES, proceed to Step 24.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

24. Dial ***, 1949, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **E** operated

25. Was normal response received?

    If YES, proceed to Step 26.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

26. Dial ***, 1948, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **E** released

27. Was normal response received?

    If YES, END OF PROCEDURE

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

28. Condition scan point display using A or B
    A. At MCC system display panel: 17. CONDITION SCAN POINT DISPLAY.
    B. At MTTP - dial ***, 201,** and #.

10.6 Test SD-1A240 Local Originating Call Circuit States

1. At trunk circuit, connect 600-ohm resistor between **TS A-22** and **TS A-32** (Fig. 27)
2. Dial ***, 1949, #**

   Response: **P&E** lamp lights briefly
   Scan point display **1 0 1**

   Comment: Relay **E** operated

3. Was normal response received?

   If YES, proceed to Step 4.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

4. Dial ***, 1919, #**

   Response: **P&E** lamp lights briefly

   Comment: Relay **B** operated

5. Was normal response received?

   If YES, proceed to Step 6.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

6. Operate **VOLTMETER TEST - GRD** key
7. Dial ***, 1909, #**

   Response: **P&E** lamp lights briefly
   Voltmeter indicates 95 to 105 volts
   Scan point display **1 1 1**

   Comment: Relay **A** operated

8. Was normal response received?

   If YES, proceed to Step 9.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

9. Dial ***, 1948, #**

   Response: **P&E** lamp lights briefly

   Comment: Relay **E** released

10. Was normal response received?

    If YES, proceed to Step 11.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

11. Dial ***, 1929, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **C** operated

12. Was normal response received?

    If YES, proceed to Step 13.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

13. At trunk circuit, disconnect 600-ohm resistor from **TSA-22** and **TSA-32**
14. Release **VOLTMETER TEST - GRD** key
15. Dial ***, 1918, #**

    Response: **P&E** lamp lights briefly

    Comment: Relay **B** released

16. Was normal response received?

    If YES, proceed to Step 17.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

17. Operate **VOLTMETER TEST - FEMF** key
18. Dial ***, 1908, #**

    Response: **P&E** lamp lights briefly

    Voltmeter indicates 42 to 53 volts

    Comment: Relay **A** released

19. Was normal response received?

    If YES, proceed to Step 20.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

20. Operate **VOLTMETER TEST - TT REV** key
21. Release **VOLTMETER TEST - FEMF**

Response: Voltmeter indicates 95 to 105 volts

22. Was normal response received?

    If YES, proceed to Step 23.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

23. At writing shelf/**TR** jack, insert **262B** plug

    Response: Scan point display **1 1 0**

24. Was normal response received?

    If YES, proceed to Step 25.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

25. Dial ***, 1928, #**

    Response: **P&E** lamp lights briefly
    Scan point display **1 1 1**

    Comment: Relay **C** released

26. Was normal response received?

    If YES, proceed to Step 27.

    If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

27. At writing shelf/**TR** jack, remove **262B** plug

28. Release **VOLTMETER TEST - TT REV** key

END OF PROCEDURE

10.7 Test SD-1A240 Outgoing Tandem Call Circuit States

1. Operate **VOLTMETER TEST - GRD** key
2. Dial ***, 1909, #**

   Response: **P&E** lamp lights briefly

   Voltmeter indicates 95 to 105 volts

   Comment: Relay **A** operated

3. Was normal response received?

   If YES, proceed to Step 4.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

4. Dial ***, 1939, #**

   Response: **P&E** lamp lights briefly

   Voltmeter indicates 0 to 2 volts

   Scan point display **1 1 1**

   Comment: Relay **D** operated

5. Was normal response received?

   If YES, proceed to Step 6.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

6. Dial ***, 1938, #**

   Response: **P&E** lamp lights briefly

   Scan point display **1 1 1**

   Comment: Relay **D** released

7. Was normal response received?

   If YES, proceed to Step 8.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

8. Dial ***, 1908, #**

   Response: **P&E** lamp lights briefly

Comment: Relay **A** released

9. Was normal response received?

   If YES, proceed to Step 10.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

10. Release **VOLTMETER TEST - GRD** key

END OF PROCEDURE

10.8 Circuit State Tests - Local Terminating Call

1. Operate **VOLTMETER TEST - GRD** key
2. Dial ***,1909,#**

   Response: **P&E** lamp lights briefly

   Voltmeter indicates 95 to 105 volts

   Scan point display **1 1 1**

   Comment: Relay **A** operated

3. Was normal response received?

   If YES, proceed to Step 4.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM
4. Release **VOLTMETER TEST - GRD** key
5. Dial ***,1929,#**

   Response: **P&E** lamp lights briefly

   Comment: Relay **C** operated

6. Was normal response received?

   If YES, then proceed to Step 7.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM
7. At writing shelf/**TR** jack, insert **262B** plug
8. Dial ***,1908,#**

   Response: **P&E** lamp lights briefly

   Scan point display **1 1 0**

   Comment: Relay **A** released

9. Was normal response received?

   If YES, proceed to Step 10.

   If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM
10. At writing shelf/**TR** jack, remove plug
11. Dial ***,1909,#**

Response: **P&E** lamp lights briefly
Scan point display **1 1 1**

Comment: Relay **A** operated

12. Was normal response received?

If YES, proceed to Step 13.

If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

13. Operate **VOLTMETER TEST - FEMF** key
14. Dial ***,1908,#**

Response: **P&E** lamp lights briefly
Voltmeter indicates 42 to 53 volts
Scan point display **1 1 1**

Comment: Relay **A** released

15. Was normal response received?

If YES, proceed to Step 16.

If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

16. Release **VOLTMETER TEST - FEMF** key
17. Dial ***,1928,#**

Response: **P&E** lamp lights briefly
Scan point display **1 1 1**

Comment: Relay **C** released

18. Was normal response received?

If YES, proceed to Step 19.

If NO, clear fault using 25. CLEAR CIRCUIT RELAY PROBLEM

19. At trunk circuit, momentarily connect **TS A-35** to **TS A-56** (Fig. 28)
20. At scan point display, are scan points **0, 1** unsaturated and is **2** saturated?

If YES, END OF PROCEDURE

If NO, proceed to Step 21.

21. Clear ferrod **2** fault using SD-1A240

22. Release Scan Point Display using A or B
    A. At MCC system display panel: 18. RELEASE SCAN POINT DISPLAY
    B. At MTTP - dial ***, 200,** and #
23. Idle Trunk Circuit From **ACCESS TRUNK 1**
    A. TLTP: 20. IDLE CIRCUIT FROM ACCESS TRUNK (TLTP)
    B. MTTP: 21. IDLE CIRCUIT FROM ACCESS TRUNK (MTTP)
24. At Test Frame, Release All Operated Keys

END OF PROCEDURE

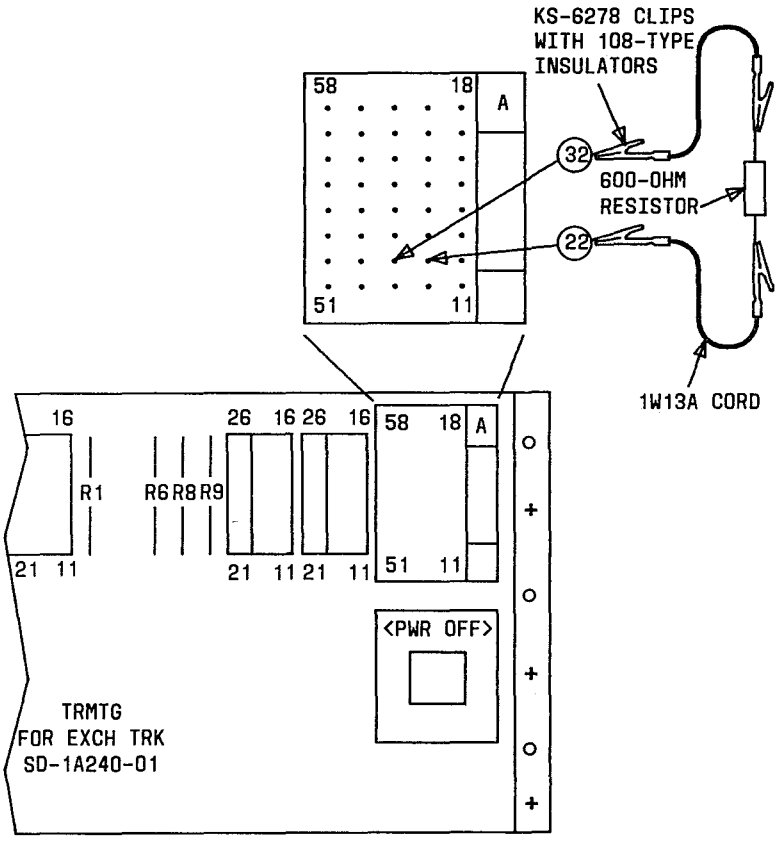


Fig. 27 — Trunk Circuit TS Layout - 600 Termination

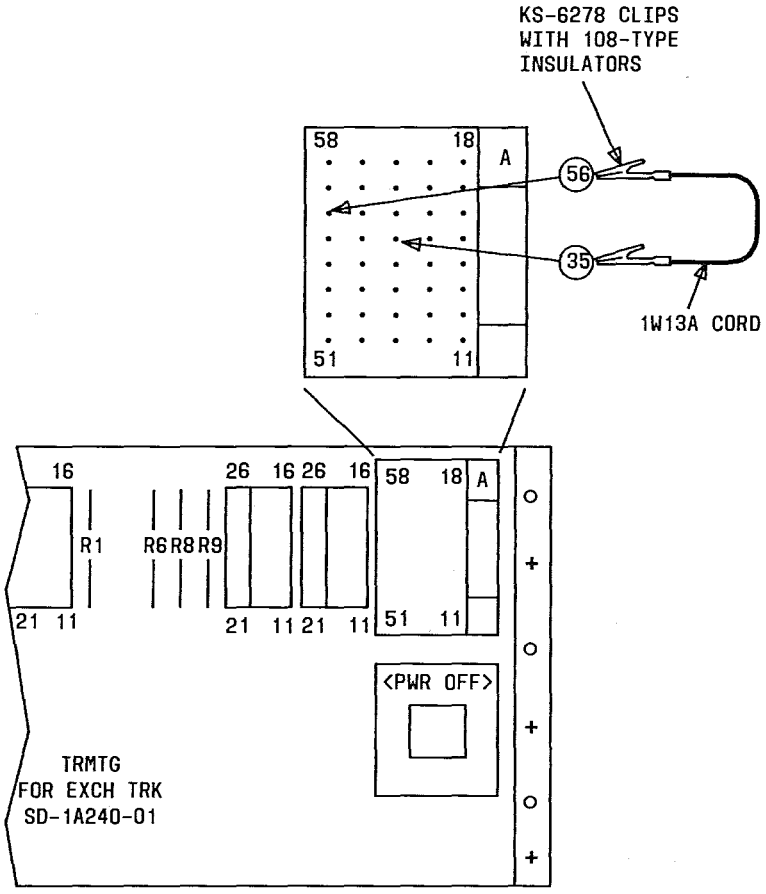


Fig. 28 — Trunk Circuit TS Layout

11. MAKE CIRCUIT MAINTENANCE BUSY (TLTP)

1. Plug headset into **TEL SET** jacks

   Note: It may be necessary to release and operate **TEST** key several times before dial tone is heard.

2. Operate **TEST** key

   Response: **MASTER TEST TRUNK** lamp lights

   Dial tone heard

3. Release **OUTPULSE** key
4. Operate **TRUNK** key
5. Dial 6-digit trunk network number (TNN)

   Response: **MASTER TEST TRUNK** lamp goes off

   Dial tone removed

6. Dial * and #

   Response: **EQUIPMENT STATE** lamp lighted steady = circuit active

   EQUIPMENT STATE lamp 60 IPM = circuit locked out

   EQUIPMENT STATE lamp 120 IPM = circuit disabled

   REGISTER lamp lighted steady = traffic idle

   REGISTER lamp 60 IPM = traffic busy

7. Release **TEST** key

   Response: **REGISTER** lamp goes off

8. Operate **MAKE BUSY** or **TWIN BUSY** for dual circuit on single chassis (Fig. 29)

   Response: Circuit placed in maintenance busy state **TL01** message printed provided circuit state changed

END OF PROCEDURE

TLØ1 aa TNN cc cc cc ddddd eeee OUTPUT MESSAGE (aa = TLTP/MTTP NO., cc cc cc = TNN)		
ddddd	eeee	ACTION
LKDO		TNN was put in out-of-service, maintenance, locked out state
DSBLD		TNN was put in out-of-service, maintenance, disabled state
LKDO	BUSY	Camp-on request for changing to maintenance state as specified by ddddd has been initiated on given TNN which is traffic busy
DSBLD	BUSY	
LKDO	IDLE	Camp-on request for changing maintenance state of traffic busy trunk has been honored. Given TNN has been put into maintenance state indicated by ddddd following transition from traffic busy to traffic idle state
DSBLD	IDLE	

Fig. 29 — TL01 Message Format

12. MAKE CIRCUIT MAINTENANCE BUSY (MTTP)

1. Plug head set into **TEL SET** jack

   Note: It may be necessary to release and operate **TEST** key several times before dial tone is heard.

2. Operate **TEST** key

   Response: **MTT** lamp lights

   Dial tone heard

3. Release **OP** key
4. Operate **TNN** key
5. Dial 6-digit trunk network number (TNN)

   Response: **MTT** lamp goes off

   Dial tone removed

6. Dial * and #

   Response: Status lamp **IDLE** = circuit idle

   Status lamp **BUSY** = circuit traffic busy

   Status lamp **ACT** = circuit in active state

   Status lamp **LKDO** = circuit in locked out state

   Status lamp **DSA** = circuit in disabled state

   Status lamp **BLKD** = circuit in blocked state

   Status lamp **2 WIRE** = 2-wire circuit accessed

7. Release **TEST** key

   Response: Status lamps go off

8. Momentarily operate **LKDO** or **TWIN** key for dual circuit on single chassis (Fig. 29)

   Response: Circuit placed in maintenance busy state **TL01** message printed provided circuit state changed

END OF PROCEDURE

13. SEIZE TRUNK NETWORK NUMBER (TNN) (TLTP)

1. Plug headset into **TEL SET** jacks

   Note: It may be necessary to release and operate **TEST** key several times before dial tone is heard.

2. Operate **TEST** key

   Response: **MASTER TEST TRUNK** lamp lights

   Dial tone heard

3. Release **OUTPULSE** key
4. Operate **TRUNK** key
5. Dial 6-digit trunk network number (TNN)

   Response: **MASTER TEST TRUNK** lamp goes off

   Dial tone removed

6. Dial * and #

   Response: **PROGRESS AND ERROR** lighted steady = test in progress

   REGISTER lamp lighted steady = idle

   60 IPM = traffic busy (retry test)

END OF PROCEDURE

14. SEIZE TRUNK NETWORK NUMBER (TNN) (MTTP)

1. Plug headset into **TEL SET** jacks

   Note: It may be necessary to release and operate **TEST** key several times before dial tone is heard.

2. Operate **TEST** key

   Response: **MTT** lamp lights

   Dial tone heard

3. Release **OP** key
4. Operate **TNN** key
5. Dial 6-digit trunk network number (TNN)

   Response: **MTT** lamp goes off

   Dial tone removed

6. Dial * and #

   Response: Status lamp **IDLE** = circuit idle

   Status lamp **BUSY** = circuit traffic busy

   Status lamp **ACT** = circuit in active state

   Status lamp **LKDO** = circuit in locked out state

   Status lamp **DSA** = circuit in disabled state

   Status lamp **BLKD** = circuit in blocked state

   Status lamp **2 WIRE** = 2-wire circuit accessed

END OF PROCEDURE

15. TRANSFER TNN TO ACCESS TRUNK USING TLTP

1. Release **TEST** key
2. Which of the access trunk test modes is desired?

   If **VM**, proceed to Step 3.

   If **TRMSN**, proceed to Step 4.

   If **REMOTE**, proceed to Step 5.
3. Operate **VM** key

   Response: **SUPV** lamp lights

   MASTER TEST TRUNK, EQUIPMENT STATE and **REGISTER** lamps go off
4. Operate **TRMSN** key

   Response: **SUPV** and **CALLED SUPV** lamps light

   MASTER TEST TRUNK, EQUIPMENT STATE and **REGISTER** lamps go off
5. Operate **REMOTE** key

   Response: **SUPV** lamp lights

   MASTER TEST TRUNK, EQUIPMENT STATE and **REGISTER** lamps go off
6. Operate **TEST** key

END OF PROCEDURE

16. TRANSFER TNN TO ACCESS TRUNK USING MTTP

1. Release **TEST** key
2. Which of the access trunk test modes is desired?

   If **VM**, proceed to Step 3.

   If **XMSN**, proceed to Step 4.

   If **REM**, proceed to Step 5.
3. Operate **VM** key

   Response: **VM** lamp lights

   2-WIRE indicated on alphanumeric display
4. Operate **XMSN**

   Response: **CS** and **XMSN** lamps light

   2-WIRE indicated on alphanumeric display
5. Operate **REM** key

   Response: **REM** lamp lights

   2-WIRE indicated on alphanumeric display
6. Operate **TEST** key

END OF PROCEDURE

17. CONDITION SCAN POINT DISPLAY

SUMMARY: Using MCC **SYSTEM DISPLAY** panel, release **HOLD** key and input TNN, coded into binary digits, into **DATA INSERT** register. Condition **BINARY DISPLAY** lamps to display scan points.

1. At MCC **SYSTEM DISPLAY** panel, release **DISPLAY STATUS - HOLD** key
2. At MCC **SYSTEM DISPLAY** panel, code decimal TNN into 15-bit binary TNN (Fig. 30)
3. At MCC **SYSTEM DISPLAY** panel, operate or release **DATA INSERT** keys **0** through **23** to input binary TNN (Fig. 30)
4. At MCC **SYSTEM DISPLAY** panel, operate **DATA INSERT** keys **19** and **20** to select TNN display
5. At MCC **SYSTEM DISPLAY** panel, operate **BINARY DISPLAY SELECTION - SCAN POINT READING** key

END OF PROCEDURE

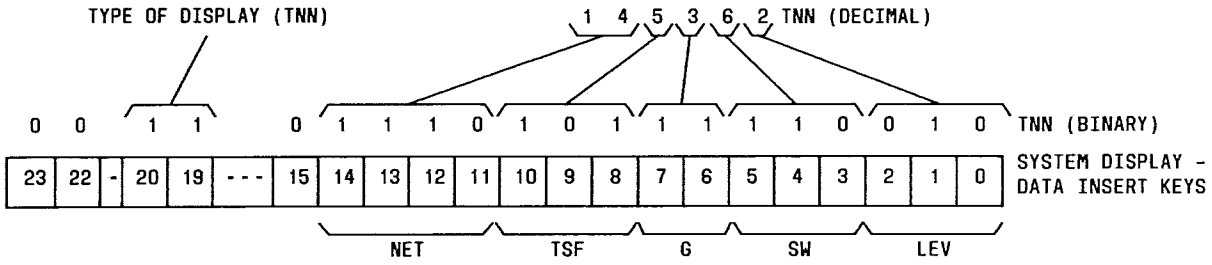


Fig. 30 — Example of Decimal TNN Coded Into Binary TNN

18. RELEASE SCAN POINT DISPLAY

1. At MCC **SYSTEM DISPLAY** panel, release **BINARY DISPLAY SELECTION - SCAN POINT READING** key
2. At MCC **SYSTEM DISPLAY** panel, depress **DISPLAY STATUS - HOLD** key

END OF PROCEDURE

19. REPLACE CIRCUIT PACK

Warning: If power is not removed before removing or installing circuit pack (CP), damage may occur.

1. At trunk circuit, depress **PWR OFF** key

   Response: **PWR OFF** lamp lights

2. Using 723B tool (Fig. 31), remove CP
3. Install replacement CP
4. Depress **PWR OFF** key

   Response: **PWR OFF** lamp goes off

END OF PROCEDURE

Fig. 31 — 723B Tool

20. IDLE CIRCUIT FROM TLTP ACCESS TRUNK

1. Which of the access trunk test mode keys is operated?

   If **VM**, proceed to Step 2.

   If **TRMSN**, proceed to Step 3.

   If **REMOTE**, proceed to Step 4.

2. Release **VM** key
3. Release **TRMSN** key
4. Release **REMOTE** key

   Note: **TL01** message is printed. A request to make a trunk active which is already active is ignored by the system and no printout is produced.

5. Momentarily operate **REMOVE BUSY** key

END OF PROCEDURE

21. IDLE CIRCUIT FROM MTTP ACCESS TRUNK

1. Which of the access trunk test mode keys is operated?

   If **VM**, proceed to Step 2.

   If **XMSN**, proceed to Step 3.

   If **REM**, proceed to Step 4.

2. Release **VM** key
3. Release **XMSN** key
4. Release **REM** key

   Note: Request to make trunk active which is already active is ignored by system and no printout is produced.

5. Momentarily operate **ACT** key

END OF PROCEDURE

22. RELEASE CIRCUIT FROM MAINTENANCE BUSY (TLTP)

1. Plug head set into **TEL SET** jacks

   Note: It may be necessary to release and operate **TEST** key several times before dial tone is heard.

2. Operate **TEST** key

   Response: **MASTER TEST TRUNK** lamp lights

   Dial tone heard

3. Operate **TRUNK** key
4. Dial 6-digit trunk network number (TNN)

   Response: **MASTER TEST TRUNK** lamp goes off

   Dial tone removed

5. Dial * and #

   Response: **PROGRESS AND ERROR** lamp lights briefly

6. Release **TEST** key
7. Momentarily operate **REMOVE BUSY** key

   Response: **EQUIPMENT STATE** lamp goes off

8. Release **TRUNK** key

   Response: Circuit placed in active state

   TL01 or **TL07** message printed

END OF PROCEDURE

23. RELEASE CIRCUIT FROM MAINTENANCE BUSY (MTTP)

1. Plug head set into **TEL SET** jack

   Note: It may be necessary to release and operate **TEST** key several times before dial tone is heard.

2. Operate **TEST** key

   Response: **MTT** lamp lights

   Dial tone heard

3. Operate **TNN** key
4. Dial 6-digit trunk network number (TNN)

   Response: **MTT** lamp goes off

   Dial tone removed

5. Dial * and #

   Response: **LKDO** lamp lit = circuit in locked out state

   DSA lamp lit = circuit in disabled state

   BLKD lamp lit = circuit in blocked state

   2-WIRE lamp lit = 2-wire circuit accessed

6. Release **TEST** key

   Response: Status lamps go off

7. Momentarily operate **ACT** key

   Response: Circuit placed in active state

   TL01 or **TL07** message printed

8. Release **TNN** key

END OF PROCEDURE

24. CLEAR PROGRESS AND ERROR LAMP ERROR

Note: **TL02** message is received whenever **PROGRESS AND ERROR** lamp flashes at 60 IPM or 120 IPM.

1. Was **TL02** message received?

   If YES, proceed to Step 3.

   If NO, proceed to Step 2.

2. Replace **PROGRESS AND ERROR** lamp bulb

   END OF PROCEDURE

3. What are **TL02 bbbbb** variables (Fig. 32)?

   If **DE, OP**, or **KYE**, proceed to Step 4.

   If **NO-OP** or **SCAB**, proceed to Step 5.

4. Check outpulsing information and repeat dialing procedure

5. Is circuit a plug-in unit?

   If YES, proceed to Step 6.

   If NO, check for faulty relay operation and SD distributor point operation using AT&T Practice 231-051-001.

6. Make second circuit on 2-circuit plug-in maintenance busy

   Reference: 11. MAKE CIRCUIT MAINTENANCE BUSY (TLTP)

   12. MAKE CIRCUIT MAINTENANCE BUSY (MTTP)

7. Replace plug-in circuit and repeat test that caused failure

8. Was **TL02** printout problem corrected?

   If YES, END OF PROCEDURE

   If NO, clear SD point diagnostic failure using AT&T Practice 231-050-002.

TL02 bbbbb VARIABLES	DEFINITION OF VARIABLES
DE	Dialing error
OP	Outpulsing information invalid
KYE	Key request invalid
NO-OP	Failure during outpulsing
SCAB	Scanning aborted due to failure

Fig. 32 — TL02 Variables and Definitions

25. CLEAR CIRCUIT RELAY PROBLEM

1. Is circuit a plug-in unit?

   If YES, proceed to Step 2.

   If NO, troubleshoot possible relay fault and clear SD point operation using AT&T Practice 231-051-001.

2. Make second circuit on 2-circuit plug-in maintenance busy.

   Reference: 11. MAKE CIRCUIT MAINTENANCE BUSY (TLTP)

   12. MAKE CIRCUIT MAINTENANCE BUSY (MTTP)

3. Replace plug-in circuit and repeat test that caused failure

4. Was test successful?

   If YES, END OF PROCEDURE

   If NO, troubleshoot possible relay fault and clear signal distributor using AT&T Practice 231-051-002.

26. CLEAR TROUBLE IN TOUCH-TONE DETECTOR TEST UNIT (SD-1A263)

1. Which measurement is out of tolerance?

   If VOLTAGE POWER, proceed to Step 2.

   If FREQUENCY, proceed to Step 8.

2. At unit under test, depress **PWR OFF** key

   Response: **PWR OFF** lamp lights

3. Remove CP A157 from socket, replace with 158A adapter, and plug CP A157 into adapter

4. Depress **PWR OFF** key

   Response: **PWR OFF** lamp goes off

5. Which transformer has its output shorted (pins **7** and **10** connected)?

   If 2583A, proceed to Step 6.

   If 2583B, proceed to Step 7.

6. Adjust **R4** to produce desired indication (Fig. 33) and do Step 13.

7. Adjust **R10** to produce desired indication (Fig. 33) and do Step 13.

8. At unit under test, depress **PWR OFF** key

   Response **PWR OFF** lamp lights

9. Remove CP A157 from socket, replace with 158A adapter, and plug CP A157 into adapter

10. Depress **PWR OFF** key

    Response: **PWR OFF** lamp goes off

11. Find desired frequency (Fig. 34)

12. Use KS-19355-L3 adjusting tool to adjust transformer to reduce difference between indication and midfrequency by one-half

13. Is trouble cleared?

    If YES, END OF PROCEDURE

    If NO, proceed to Step 14.

14. At unit under test, depress **PWR OFF** key

    Response: **PWR OFF** lamp lights

15. Remove 158A adapter from socket and replace with CP A157

16. Depress **PWR OFF** key

    Response: **PWR OFF** lamp goes off

17. Repeat test which caused failure
18. Is trouble cleared?

    If YES, END OF PROCEDURE

    If NO, proceed to Step 19.

Warning: If power is not removed before removing or installing CP, damage may occur.

19. Replace circuit packs (CPs) one at a time in order listed (Fig. 35).

    Reference: 19. REPLACE CIRCUIT PACK
20. Repeat test which caused failure after each CP is replaced
21. Is trouble cleared?

    If YES, END OF PROCEDURE

    If NO, proceed to Step 22.
22. Which transformer is associated with failure?

    If 2583A, proceed to Step 23.

    If 2583B, proceed to Step 24.

    If 2583C, proceed to Step 25.
23. Replace transformer 2583A and repeat from Step 1.
24. Replace transformer 2583B and repeat from Step 1.
25. Replace transformer 2583C and repeat from Step 1.

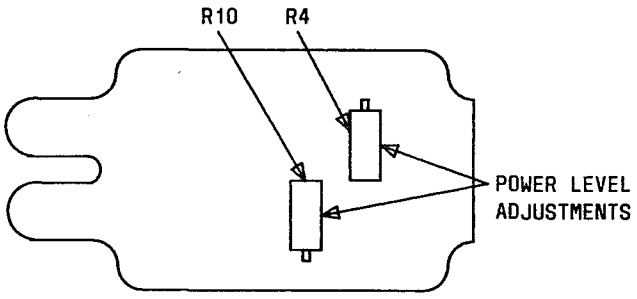


Fig. 33 — CP A157

ADJUST TRANSFORMER	FREQUENCY RANGE (HERTZ)	MIDFREQUENCY (HERTZ)	ADJUST TRANSFORMER	FREQUENCY RANGE (HERTZ)	MIDFREQUENCY (HERTZ)
2583B (LB)	671.2-674.0	672.6	2583A (HB)	1164.3-1169.1	1166.7
	685.8-687.2	686.5		1189.7-1192.1	1190.9
	695.6-698.4	697.0		1206.6-1211.4	1209.0
	706.8-708.2	707.5		1225.9-1228.3	1227.1
	741.5-744.6	743.0		1286.5-1291.9	1289.2
	757.7-759.2	758.5		1314.6-1317.3	1315.9
	768.5-771.5	770.0		1333.3-1338.7	1336.0
	780.8-782.3	781.6		1354.7-1357.4	1356.1
	820.5-823.9	822.2		1422.4-1428.3	1425.3
	838.4-840.1	839.3		1453.4-1456.4	1454.9
	850.3-853.7	852.0		1474.0-1480.0	1477.0
	863.9-865.6	864.7		1497.6-1500.6	1499.1
	906.2-910.0	908.1		1572.5-1579.0	1575.7
	925.9-927.8	926.9		1606.8-1610.2	1608.5
	939.1-942.9	941.0		1629.7-1636.3	1633.0
	954.2-956.1	955.2		1655.8-1659.2	1657.5
2583C (3F)	1800-2200	2000.0			

Fig. 34 — Detector Test Unit Frequency Chart

ORDER	CIRCUIT PACK
1	CP12 (A157)
2	CP10 (A158)

Fig. 35 — Sequence of Replacement