# TOUCH-TONE®
# DETECTOR TEST CIRCUIT SD-1A263-01
# TESTS AND ADJUSTMENTS
# 2-WIRE NO. 1 ELECTRONIC SWITCHING SYSTEM

## 1. GENERAL

**1.01** This section describes a method for testing and adjusting the TOUCH-TONE® detector test circuit SD-1A263-01 used in the 2-Wire No. 1 Electronic Switching System (ESS).

**1.02** This section is reissued for the following reasons:

(a) To include changes covered in a previous addendum.

(b) To include HP Model 5328A Frequency Counter.

(c) To add Step 25 in Test A.

(d) To rearrange connection of the 2563E transformer and J94023A TMS.

(e) To extend terminals 7 and 10 of HB and LB transformers in the preparation for Tests B through H.

(f) To add a note after each adjustment in Test C.

Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

This reissue does not affect the Equipment Test List.

**1.03** The tests and adjustments covered are:

***A. Scan Points and State 0, Idle Test:*** This test checks circuit continuity to scan points 00 through 02 and checks that all scan points are unsaturated when all relays operated by the signal distributor and the central pulse distributor are released.

***B. State 2, Overload Test and Adjustment:*** This test checks that all frequencies are 1.5 percent below the nominal value and that scan point 01 is saturated.

***C. State 1, High Band Edge Test and Adjustment:*** This test checks that all frequencies are 1.5 percent above the nominal value and that scan point 01 is saturated.

***D. State 3, Low Band Edge Test:*** This test checks that all frequencies are 1.5 percent below the nominal value and that scan point 01 is unsaturated.

***E. State 6, Out of Band Test:*** This test checks that all frequencies are 3.5 percent below the nominal value and that scan point 01 is unsaturated.

***F. State 7, Third Frequency Test and Adjustment:*** This test checks the 2000-cycle third frequency and that scan point 01 is saturated.

***G. State 5, Low Group Only Test:*** This test checks that only a low group signal is emitted when the high group oscillator is inhibited. Scan point 01 is unsaturated.

***H. State 4, High Group Only Test:*** This test checks that only a high group signal is emitted when the low group oscillator is inhibited. Scan point 01 is saturated.

**1.04** These tests should be performed when a malfunction in the TOUCH-TONE detector test circuit is suspected.

**1.05** If the frequency or level requirements described in this section cannot be met, CP A157 (for T-T signals) or CP A158 (for 2000-Hz third frequency) should be changed and requirements rechecked. If changing circuit packs does not result in meeting frequency requirements, consideration should be given to the use of an oscillator trimmer capacitor (refer to CD-1A263.01) or to replacing the appropriate oscillator inductor (HB, LB, or 3F).

**1.06** Reference to the Output Message Manual OM-1A001 should be made to interpret TTY output messages relating to these tests.

**1.07** In this section, the transmission measuring set is referred to as TMS and the volt-ohm-milliammeter is referred to as VOM.

**1.08** ***Lettered Steps:*** A letter a, b, c, etc, added to a step number in Part 3 or 4 of this section indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

## 2. APPARATUS

**2.01** The apparatus required for each test is shown in Table A. The details of each item are covered in the paragraph indicated by the number in parentheses.

**2.02** Blocking tools. Use tools and apply as covered in Section 069-020-801.

**2.03** Hewlett-Packard 5328A, 5233L, 5216A, or 522B electronic counter (frequency counter) or equivalent. (522B counter is manufacture discontinued.)

**2.04** Hewlett-Packard 11001A cable assembly.

**2.05** J94023A (23A) transmission measuring set (TMS).

**2.06** Testing cord, W2C cord, 10 feet long, equipped with one 310 plug and two 59 cord tips (2W6A cord), insulated with 108 cord tips.

**2.07** Testing cord, 893 cord, 3 feet long, equipped with two 360A tools (1W13A cord) and two KS-6278 connecting clips, insulated with 108 cord tips.

**2.08** Resistor, 600 ohms, 1/2 watt.

**2.09** KS-14510 L1 volt-ohm-milliammeter (VOM).

**2.10** KS-14510 L3 test leads (one red and one black), each test lead equipped with an alligator clip at one end and a connector at the other end. Insulate alligator clip with 108 cord tip (insulating tubing).

**2.11** Screwdriver D.

**2.12** Screwdriver KS-6854.

**2.13** 158A adapter extender board used to bring out circuit packs that contain controls that require adjustment.

**2.14** Resistor, 1500 ohms, 2 watts.

**2.15** KS-19355 L3 adjusting tool, used to adjust transformers.

**2.16** Pomona Electronics test cord 3787-C-60.

**2.17** KS2138-L1 test pin adapter, KS6278 test clip, 1W13B cords, and 419A tools are used for extending terminals 7 and 10 of HB and LB transformers to the front of the MT frame.

***Caution: When making connections to terminals on test circuit terminal strip C, care should be taken to ensure that one terminal is not shorted to another.***

## 3. PREPARATION

**3.01** Unless otherwise indicated all keys are locking keys. When the locking key is operated and released, the key remains closed until operated and released again. The nonlocking key remains closed only during the time the key is held operated.

TABLE A

| APPARATUS | TESTS | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H |
| Blocking Tools (2.02) | 3 | 1 | 1 | 2 | 2 | 3 | 2 | 1 |
| Frequency Counter (2.03) | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Cord (2.04) | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| TMS (2.05) | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Cord (2.06) | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Cord (2.07) | — | 10 | 10 | 10 | 10 | 8 | 9 | 9 |
| Resistor (2.08) | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| VOM (2.09) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Test Leads (2.10) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Screwdriver (2.11) | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Screwdriver (2.12) | — | 1 | 1 | — | — | 1 | — | — |
| Adapter (2.13) | — | 1 | 1 | — | — | 1 | — | — |
| Resistor (2.14) | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Adjusting Tool (2.15) | — | 1 | 1 | — | — | 1 | — | — |
| 227D Amplifier | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2563E Transformer | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| KS-14525 Connector | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 624B Tool | — | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Cord (2.16) | — | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Test Pin Adapter (2.17) | — | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Test Clip (2.17) | — | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 419A Tools (2.17) | — | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Cord (2.17) | — | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| **All Tests** | | |
| 1 | At trunk and line test panel (TLTP)—Pick up handset and operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—MTL lamp lighted. Dial tone heard from handset. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 2 | At TOUCH-TONE set—<br>Dial trunk network number of TOUCH-TONE detector test circuit to be tested. | At TLTP—<br>MASTER TEST LINE—MTL lamp extinguished.<br>Dial tone stops after first digit is dialed. |
| 3 | Operate nonlocking ST key. | MASTER TEST LINE—REG lamp lighted.<br>MASTER TEST LINE—EQPT ST lamp lighted as follows:<br>Steady—idle trunks<br>60 ipm—traffic busy<br>120 ipm—maintenance busy. |
| 4 | Operate BUSY CONTROL—MAKE BUSY nonlocking key. | |
| 5 | Operate MASTER TEST LINE—RLS nonlocking key. | |
| 6 | Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—REG and EQPT ST lamps extinguished.<br>At TTY—<br>If circuit is not already busy—<br>Receive TL01 output message.<br><br>***Note 1:*** The TL01 message indicates that the circuit has been made maintenance busy. If the circuit is traffic busy, the printout is delayed until the traffic busy condition is completed.<br><br>***Note 2:*** If power is temporarily removed from a circuit during any of the tests, it must be made maintenance busy again. |
| **Tests B Through H** | | |
| 7 | At frequency counter—<br>Connect power cord of frequency counter to ac power supply; operate POWER switch to ON; and allow at least 5 minutes for equipment to warm up. | POWER ON lamp lighted. |
| 8a | If using a 5328A counter—<br>Operate FUNCTION switch to CHECK. | |
| 9a | Operate FREQ RESOLUTION switch to 1 kHz. | |
| 10a | Operate SAMPLE RATE control to obtain a display long enough to be read. | Counter displays 00000.0. |
| 11a | Move channel input switch to SEP. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 12a | Operate FUNCTION switch to FREQUENCY A. | |
| 13b | If using a 5233L frequency counter—<br>Operate channel input switch to CHECK. | |
| 14b | Operate TIME BASE switch to 10. | |
| 15b | Operate SAMPLE RATE control to obtain a display long enough to be read. | Counter displays 00000.0. |
| 16b | Operate channel input switch to SEP. | |
| 17b | Operate FUNCTION switch to FREQUENCY A. | |
| 18c | If using a 5216A frequency counter—<br>Operate SENSITIVITY switch to CHECK. | |
| 19c | Operate GATE TIME switch to 1. | |
| 20c | Operate SAMPLE RATE control to obtain a display long enough to be read. | Counter displays 000000.0. |
| 21 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 22 | Operate INPUT switch to 900. | |
| 23 | At VOM—<br>Set DC VOLTS switch to 60. | |
| 24 | Equip each of the four 1W13B cords with a KS2138-L1 test pin adapter and KS6278 test clip. | |
| 25 | Extend terminals 7 and 10 of LB and HB transformers to the front of the MT frame using four 419A tools and four 1W13B cords. | |
| 26 | At test circuit—<br>Establish connections as shown in Fig. 2, and remove circuit pack A45. | |
| | ***Caution: When making connections to terminals on test circuit terminal strip C, care should be taken to ensure that one terminal is not shorted to another.*** | |

| STEP | ACTION | VERIFICATION |
|---|---|---|

**4. METHOD**

**A. Scan Points and State 0, Idle Test**

**Scan Point 00 Test**

| | | |
|---|---|---|
| 7 | At VOM—<br>Set OHMS switch to X100. | |
| 8 | At test circuit—<br>Make connections designated 1 as shown in Fig. 1. | |

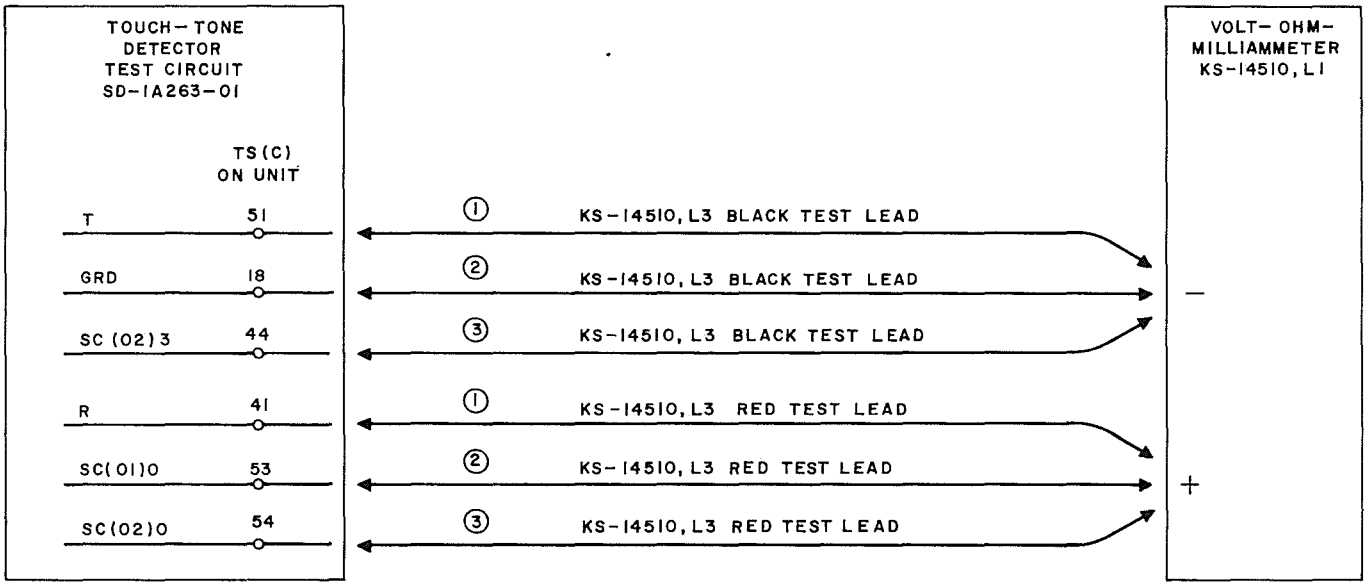



**Fig. 1—Test A Connections**

***Caution: When making connections to terminals on test circuit terminal strip C, care should be taken to ensure that one terminal is not shorted to another.***

| | | |
|---|---|---|
| 9 | Block operated A relay. | At VOM—<br>Meter indicates approximately 1000 ohms. |
| 10 | Remove blocking tool from A relay. | Meter indicates open circuit. |
| 11 | Block operated B relay. | Meter indicates approximately 1000 ohms. |
| 12 | Remove blocking tool from B relay. | Meter indicates open circuit. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 13 | Block operated C relay. | Meter indicates approximately 1000 ohms. |
| 14 | Remove blocking tool from C relay. | Meter indicates open circuit. |
| **Scan Point 01 Test** | | |
| 15 | At VOM—<br>Set DC VOLTS switch to 60. | |
| 16 | At test circuit—<br>Remove connections designated 1 and make connections designated 2 as shown in Fig. 1. | |
| 17 | Block operated A relay. | Meter indicates zero. |
| 18 | Block operated B relay. | Meter indicates +24 volts. |
| 19 | Remove blocking tool from A relay. | Meter indicates zero. |
| 20 | Block operated C relay. | Meter indicates +24 volts. |
| 21 | Block operated A relay. | Meter indicates zero. |
| 22 | Remove blocking tool from B relay. | Meter indicates +24 volts. |
| 23 | Remove blocking tool from A relay. | Meter indicates zero. |
| 24 | Remove blocking tool from C relay. | Meter indicates +24 volts. |
| **Scan Point 02 Test** | | |
| 25 | At VOM—<br>Set DC VOLTS switch to 3. | |
| 26 | At test circuit—<br>Remove connections designated 2 and make connection designated 3 as shown in Fig. 1. | |
| 27 | Block operated A relay. | Meter indicates 1.35 volts. |
| 28 | Remove blocking tool from A relay. | Meter indicates zero. |
| 29 | Block operated B relay. | Meter indicates 1.35 volts. |
| 30 | Remove blocking tool from B relay. | Meter indicates zero. |
| 31 | Block operated C relay. | Meter indicates 1.35 volts. |
| 32 | Remove blocking tool from C relay. | Meter indicates zero. |
| 33 | Remove all connections between test circuit and VOM. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 34 | At TLTP—<br>Operate MASTER TEST LINE—TEST and TRUNK keys. | At TLTP—<br>MASTER TEST LINE—MTL lamp lighted. |
| 35 | At TOUCH-TONE set—<br>Dial trunk network number of TOUCH-TONE detector test circuit used. | At TLTP—<br>MASTER TEST LINE—MTL lamp extinguished. |
| 36 | Operate nonlocking ST key. | MASTER TEST LINE—REG lamp lighted.<br><br>MASTER TEST LINE—EQPT ST lamp flashes at 120 ipm. |
| 37 | Operate BUSY CONTROL—RMV BUSY nonlocking key. | |
| 38 | Operate MASTER TEST LINE—RLS nonlocking key. | |
| 39 | Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—REG and EQPT ST lamps extinguished.<br>At TTY—<br>Receive TL01 output message. |

**B. State 2, Overload Test and Adjustment**

| | | |
|---|---|---|
| 27 | At amplifier—<br>Set MON potentiometer to 3. | |
| 28 | At screws 10-24 and 21-36 on amplifier—<br>Turn screws back out to prevent contact with respective side rails. | |
| 29 | At screw 0-13 on amplifier—<br>Turn screw in to make contact with respective side rails. | |
| 30 | At TMS—<br>Operate ADD DBM switch to +5. | |
| 31 | At test circuit—<br>Using 1W13A cord, connect terminal 7 to 10 of transformer HB (HB transformer grounded). | |
| 32 | Block operated B relay. | |
| 33 | Using 1W13A cord, connect terminal 18 to 47 of terminal strip C. | At frequency counter—<br>Counter indicates between 685.8 and 687.2. |
| 34c | If frequency requirement of Step 33 is not met— | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| | Adjust transformer LB to obtain frequency counter indication of 686.5. | |
| 35 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.75 and -5.25 dBm.<br>At VOM—<br>Meter indicates zero. |
| 36d | If level requirement of Step 35 is not met—<br>Remove circuit pack A157 from its socket; replace it with 158A adapter; and plug circuit pack A157 into 158A adapter. | |
| 37d | Adjust potentiometer R4 to obtain TMS meter indication of -5 dBm. (See Fig. 3 for location of R4.) | |
| 38d | Remove 158A adapter from socket and replace it with circuit pack A157. | |
| 39 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 40 | Remove 1W13A cord connection from terminal 47 of terminal strip C, and connect to terminal 37. | At frequency counter—<br>Counter indicates between 757.7 and 759.2. |
| 41e | If frequency requirement of Step 40 is not met—<br>Adjust transformer LB to reduce difference between 758.5 and frequency counter indication in Step 40 by one-half. | |
| 42 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.75 and -5.25 dBm.<br>At VOM—<br>Meter indicates zero. |
| 43f | If level requirement of Step 42 is not met—<br>Remove circuit pack A157 from its socket; replace it with 158A adapter; and plug circuit pack A157 into 158A adapter. | |
| 44f | Adjust potentiometer R4 to reduce difference between -5 dBm and meter reading in Step 42 by one-half. (See Fig. 3 for location of R4.) | |
| 45f | Remove 158A adapter from socket, and replace it with circuit pack A157. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 46 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 47 | Remove 1W13A cord connection from terminal 37 of terminal strip C, and connect to terminal 47. | |
| 48 | Remove 1W13A cord connection from terminal 7 to 10 of transformer HB, and connect terminal 7 to 10 of transformer LB (LB transformer grounded). | At frequency counter—<br>Counter indicates between 1189.7 and 1192.1. |
| 49g | If frequency requirement of Step 48 is not met—<br>Adjust transformer HB to obtain frequency counter indication of 1190.9. | |
| 50 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.75 and -5.25 dBm.<br>At VOM—<br>Meter indicates zero. |
| 51h | If level requirement of Step 50 is not met—<br>Remove circuit pack A157 from its socket; replace it with 158A adapter; and plug circuit pack A157 into 158A adapter. | |
| 52h | Adjust potentiometer R10 to obtain TMS meter indication of -5 dBm. (See Fig. 3 for location of R10.) | |
| 53h | Remove 158A adapter from socket, and replace it with circuit pack A157. | |
| 54 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 55 | Remove 1W13A cord connection from terminal 47 of terminal strip C, and connect to terminal 37. | At frequency counter—<br>Counter indicates between 1314.6 and 1317.3. |
| 56i | If frequency requirement of Step 55 is not met—<br>Adjust transformer HB to reduce difference between 1316.0 and frequency counter indication in Step 55 by one-half. | |
| 57 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.75 and -5.25 dBm.<br>At VOM—<br>Meter indicates zero. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 58j | If level requirement of Step 57 is not met—Remove circuit pack A157 from its socket; replace it with 158A adapter; and plug circuit pack A157 into 158A adapter. | |
| 59j | Adjust potentiometer R10 to reduce difference between -5 dBm and meter indication in Step 57 by one-half. (See Fig. 3 for location of f R10.) | |
| 60j | Remove 158A adapter from socket, and replace it with circuit pack A157.<br><br>***Note:*** Transformers HB and LB and potentiometers R4 and R10 should now be in adjustment for the remaining tests. The third frequency transformer (3F) and the potentiometer (R4 on circuit pack A158) are adjusted in Test F if necessary. | |
| 61 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 62 | Remove 1W13A cord connection from terminal 37 of terminal strip C, and connect to terminal 27. | At frequency counter—<br>Counter indicates between 1453.4 and 1456.4. |
| 63 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 64 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 65 | Remove 1W13A cord connection from terminal 27 of terminal strip C, and connect to terminal 36. | At frequency counter—<br>Counter indicates between 1606.8 and 1610.2. |
| 66 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 67 | At TMS—<br>Operate DIAl-MEAS-SLV switch to DIAL. | |
| 68 | Remove 1W13A cord connection from terminal 7 to 10 of transformer LB, and connect to terminal 7 to 10 of transformer HB (HB transformer grounded). | At frequency counter—<br>Counter indicates between 925.9 and 927.8. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 69 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 70 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 71 | Remove 1W13A cord connection from terminal 36 of terminal strip C, and connect to terminal 27. | At frequency counter—<br>Counter indicates between 838.3 and 840.1. |
| 72 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 73 | At test circuit—<br>Remove 1W13A cord connection from terminals 18 and 27 of terminal strip C. | |
| 74 | Remove 1W13A cord connection from terminal 7 to 10 of transformer HB. | |
| 75 | Remove blocking tool from B relay.<br><br>***Note:*** If Test C, D, E, F, G, or H is to be performed, proceed to Step 27 of Test C or the appropriate test. | |
| 76 | Remount circuit pack A45 removed in Step 26 of preparation, and remove all connections established as shown in Fig. 2. | |
| 77 | At TLTP—<br>Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—MTL lamp lighted. |
| 78 | At TOUCH-TONE set—<br>Dial trunk network number of TOUCH-TONE detector test circuit used. | At TLTP—<br>MASTER TEST LINE—MTL lamp extinguished. |
| 79 | Operate nonlocking ST key. | MASTER TEST LINE—REG lamp lighted.<br>MASTER TEST LINE—EQPT ST lamp flashes at 120 ipm. |
| 80 | Operate BUSY CONTROL—RMV BUSY nonlocking key. | |
| 81 | Operate MASTER TEST LINE—RLS nonlocking key. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 82 | Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—REG and EQPT ST lamps extinguished.<br>At TTY—<br>Receive TL01 output message. |
| **C. State 1, High Band Edge Test and Adjustment** | | |
| 27 | At amplifier—<br>Set MON potentiometer to 15. | |
| 28 | At screws 0-13 and 21-36 on amplifier—<br>Turn screws back out to prevent contact with respective side rails. | |
| 29 | At screw 10-24 on amplifier—<br>Turn screws in to make contact with respective side rails. | |
| 30 | At TMS—<br>Operate ADD DBM switch to -20. | |
| 31 | At test circuit—<br>Using 1W13A cord, connect terminal 7 to 10 of transformer LB (LB transformer grounded). | |
| 32 | Block operated A relay. | |
| 33 | Using 1W13A cord, connect terminal 18 to 47 of terminal strip C. | At frequency counter—<br>Counter indicates between 1225.9 and 1228.3. |
| 34 | At TMS—<br>Move DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 35c | If level requirement in Step 34 is not met—<br>Extend circuit pack A157 with 158A adapter. | |
| 36c | Adjust potentiometer R10 to reduce different between -2.0 dBm and meter reading in Step 34 by one-half. (See Fig. 3 for location of R10.)<br><br>***Note:*** If adjustment was performed in Step 36c, it may be necessary to recheck levels in Test B performed with LB transformer grounded. | |
| 37c | Remove 158A adapter and replace circuit pack A157. | |
| 38 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 39 | Remove 1W13A cord connection from terminal 47, and connect cord to terminal 37 of terminal strip C. | At frequency counter—<br>Counter indicates between 1354.7 and 1357.4. |
| 40 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 41 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 42 | Remove 1W13A cord connection from terminal 37, and connect cord to terminal 27 of terminal strip C. | At frequency counter—<br>Counter indicates between 1497.6 and 1500.6. |
| 43 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 44 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 45 | Remove 1W13A cord connection from terminal 27, and connect cord to terminal 36 of terminal strip C. | At frequency counter—<br>Counter indicates between 1655.8 and 1659.2. |
| 46 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 47 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 48 | Remove 1W13A cord connection from terminal 7 to 10 of transformer LB, and connect terminal 7 to 10 of transformer HB (HB transformer grounded). | At frequency counter—<br>Counter indicates between 954.2 and 956.1. |
| 49 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 50 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 51 | Remove 1W13A cord connection from terminal 36, and connect cord to terminal 27 of terminal strip C. | At frequency counter—<br>Counter indicates between 863.9 and 865.6. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 52 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 53 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 54 | Remove 1W13A cord connection from terminal 27, and connect cord to terminal 37 of terminal strip C. | At frequency counter—<br>Counter indicates between 780.8 and 782.3. |
| 55 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 56 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 57 | Remove 1W13A cord connection from terminal 37, and connect cord to terminal 47 of terminal strip C. | At frequency counter—<br>Counter indicates between 706.8 and 708.2. |
| 58 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 59d | If level requirement in Step 58 is not met—<br>Extend circuit pack A157 with 158A adapter. | |
| 60d | Adjust potentiometer R4 to reduce difference between -2.0 dBm and meter reading in Step 58 by one-half. (See Fig. 3 for location of R4.)<br><br>***Note:*** If adjustment was made in Step 60d, it may be necessary to recheck levels in Test B performed with transformer HB grounded. | |
| 61d | Remove 158A adapter and replace circuit pack A157. | |
| 62 | At test circuit—<br>Remove 1W13A cord connection from terminal 18 to 47 of terminal strip C. | |
| 63 | Remove 1W13A cord connection from terminal 7 to 10 of transformer HB. | |
| 64 | Remove blocking tool from A relay. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| | ***Note:*** If Test D, E, F, G, or H is to be performed, proceed to Step 27 of Test D or the appropriate test. | |
| 65 | Remount circuit pack A45 removed in Step 26 of preparation, and remove all connections established as shown in Fig. 2. | |
| 66 | At TLTP—<br>Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—MTL lamp lighted. |
| 67 | At TOUCH-TONE set—<br>Dial trunk network number of TOUCH-TONE detector test circuit used. | At TLTP—<br>MASTER TEST LINE—MTL lamp extinguished. |
| 68 | Operate nonlocking ST key. | MASTER TEST LINE—REG lamp lighted.<br>MASTER TEST LINE—EQPT ST lamp flashes at 120 ipm. |
| 69 | Operate BUSY CONTROL—RMV BUSY nonlocking key. | |
| 70 | Operate MASTER TEST LINE—RLS nonlocking key. | |
| 71 | Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—REG and EQPT ST lamps extinguished.<br>At TTY—<br>Receive TL01 output message. |
| **D. State 3, Low Band Edge Test** | | |
| 27 | At amplifier—<br>Set MON potentiometer to 15. | |
| 28 | At screws 0-13 and 21-36 on amplifier—<br>Turn screws back out to prevent contact with respective side rails. | |
| 29 | At screw 10-24 on amplifier—<br>Turn screw in to make contact with respective side rails. | |
| 30 | At TMS—<br>Operate ADD DBM switch to -20. | |
| 31 | At test circuit—<br>Using 1W13A cord, connect terminal 7 to 10 of transformer LB (LB transformer grounded). | |
| 32 | Block operated A and B relays. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 33 | Using 1W13A cord, connect terminal 18 to 47 of terminal strip C. | At frequency counter—<br>Counter indicates between 1189.7 and 1192.1. |
| 34 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 35 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 36 | Remove 1W13A cord connection from terminal 47, and connect cord to terminal 37 of terminal strip C. | At frequency counter—<br>Counter indicates between 1314.6 and 1317.3. |
| 37 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 38 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 39 | Remove 1W13A cord connection from terminal 37, and connect cord to terminal 27 of terminal strip C. | At frequency counter—<br>Counter indicates between 1453.4 and 1456.4. |
| 40 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 41 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 42 | Remove 1W13A cord connection from terminal 27, and connect cord to terminal 36 of terminal strip C. | At frequency counter—<br>Counter indicates between 1606.8 and 1610.2. |
| 43 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and 2.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 44 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 45 | Remove 1W13A cord connection from terminal 7 to 10 of transformer LB, and connect terminal 7 to 10 of transformer HB (HB transformer grounded). | At frequency counter—<br>Counter indicates between 925.9 and 927.8. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 46 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 47 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 48 | Remove 1W13A cord connection from terminal 36, and connect cord to terminal 27 of terminal strip C. | At frequency counter—<br>Counter indicates between 838.3 and 840.1. |
| 49 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 50 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 51 | Remove 1W13A cord connection from terminal 27, and connect cord to terminal 37 of terminal strip C. | At frequency counter—<br>Counter indicates between 757.7 and 759.2. |
| 52 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 53 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 54 | Remove 1W13A cord connection from terminal 37, and connect cord to terminal 47 of terminal strip C. | At frequency counter—<br>Counter indicates between 685.8 and 687.2. |
| 55 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -1.5 and -2.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 56 | At test circuit—<br>Remove 1W13A cord connection from terminal 18 to 47 of terminal strip C. | |
| 57 | Remove 1W13A cord connection from terminal 7 to 10 of transformer HB. | |
| 58 | Remove blocking tools from A and B relays. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| | *Note:* If Test E, F, G, or H is to be performed, proceed to Step 27 of Test E or the appropriate test. | |
| 59 | Remount circuit pack A45 removed in Step 19 of preparation, and remove all connections established as shown in Fig. 2. | |
| 60 | At TLTP—<br>Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—MTL lamp lighted. |
| 61 | At TOUCH-TONE set—<br>Dial trunk network number of TOUCH-TONE detector test circuit used. | At TLTP—<br>MASTER TEST LINE—MTL lamp extinguished. |
| 62 | Operate nonlocking ST key. | MASTER TEST LINE—REG lamp lighted.<br>MASTER TEST LINE—EQPT ST lamp flashes at 120 ipm. |
| 63 | Operate BUSY CONTROL—RMV BUSY nonlocking key. | |
| 64 | Operate MASTER TEST LINE—RLS nonlocking key. | |
| 65 | Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—REG and EQPT ST lamps extinguished.<br>At TTY—<br>Receive TL01 output message. |
| **E. State 6, Out of Band Test** | | |
| 27 | At amplifier—<br>Set MON potentiometer to 3. | |
| 28 | At screws 10-24 and 21-36 on amplifier—<br>Turn screws back out to prevent contact with respective side rails. | |
| 29 | At screw 0-13 amplifier—<br>Turn screw in to make contact with respective side rails. | |
| 30 | At TMS—<br>Operate ADD DBM switch to +5. | |
| 31 | At test circuit—<br>Using 1W13A cord, connect terminal 7 to 10 of transformer LB (LB transformer grounded). | |
| 32 | Block operated B and C relays. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 33 | Using 1W13A cord, connect terminal 18 to 47 of terminal strip C. | At frequency counter—<br>Counter indicates between 1164.3 and 1169.1. |
| 34 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -7.0 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 35 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 36 | Remove 1W13A cord connection from terminal 47, and connect cord to terminal 37 of terminal strip C. | At frequency counter—<br>Counter indicates between 1286.5 and 1291.9. |
| 37 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -7.0 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 38 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 39 | Remove 1W13A cord connection from terminal 37, and connect cord to terminal 27 of terminal strip C. | At frequency counter—<br>Counter indicates between 1422.4 and 1428.3. |
| 40 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -7.0 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 41 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 42 | Remove 1W13A cord connection from terminal 27, and connect cord to terminal 36 of terminal strip C. | At frequency counter—<br>Counter indicates between 1572.5 and 1579.0. |
| 43 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -7.0 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 44 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 45 | Remove 1W13A cord connection from terminal 7 to 10 of transformer LB, and connect terminal 7 to 10 of transformer HB (HB transformer grounded). | At frequency counter—<br>Counter indicates between 906.2 and 910.0. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 46 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -7.0 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 47 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 48 | Remove 1W13A cord connection from terminal 36, and connect cord to terminal 27 of terminal strip C. | At frequency counter—<br>Counter indicates between 820.5 and 823.9. |
| 49 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -7.0 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 50 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 51 | Remove 1W13A cord connection from terminal 27, and connect cord to terminal 37 of terminal strip C. | At frequency counter—<br>Counter indicates between 741.5 and 744.6. |
| 52 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -7.0 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 53 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 54 | Remove 1W13A cord connection from terminal 37, and connect cord to terminal 47 of terminal strip C. | At frequency counter—<br>Counter indicates between 671.2 and 674.0. |
| 55 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -7.0 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 56 | At test circuit—<br>Remove 1W13A cord connection from terminal 18 to 47 of terminal strip C. | |
| 57 | Remove 1W13A cord connection from terminal 7 to 10 of transformer HB. | |
| 58 | Remove blocking tools from B and C relays. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| | ***Note:*** If Test F, G, or H is to be performed, proceed to Step 27 of Test F or the appropriate test. | |
| 59 | Remount circuit pack A45 removed in Step 26 of preparation, and remove all connections established as shown in Fig. 2. | |
| 60 | At TLTP—<br>Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—MTL lamp lighted. |
| 61 | At TOUCH-TONE set—<br>Dial trunk network number of TOUCH-TONE detector test circuit used. | At TLTP—<br>MASTER TEST LINE—MTL lamp extinguished. |
| 62 | Operate nonlocking ST key. | MASTER TEST LINE—REG lamp lighted.<br>MASTER TEST LINE—EQPT ST lamp flashes at 120 ipm. |
| 63 | Operate BUSY CONTROL—RMV BUSY nonlocking key. | |
| 64 | Operate MASTER TEST LINE—RLS nonlocking key. | |
| 65 | Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—REG and EQPT ST lamps extinguished.<br>At TTY—<br>Receive TL01 output message. |
| **F. State 7, Third Frequency Test and Adjustment** | | |
| 27 | At amplifier—<br>Set MON potentiometer to 15. | |
| 28 | At screws 10-24 and 21-36 on amplifier—<br>Turn screws back out to prevent contact with respective side rails. | |
| 29 | At screw 0-13 on amplifier—<br>Turn screw in to make contact with respective side rails. | |
| 30 | At TMS—<br>Operate ADD DBM switch to -5. | |
| 31 | At test circuit—<br>Block operated A, B, and C relays. | At frequency counter—<br>Counter indicates between 1800 and 2200. |
| 32 | If frequency requirement of Step 31 is not met— | |

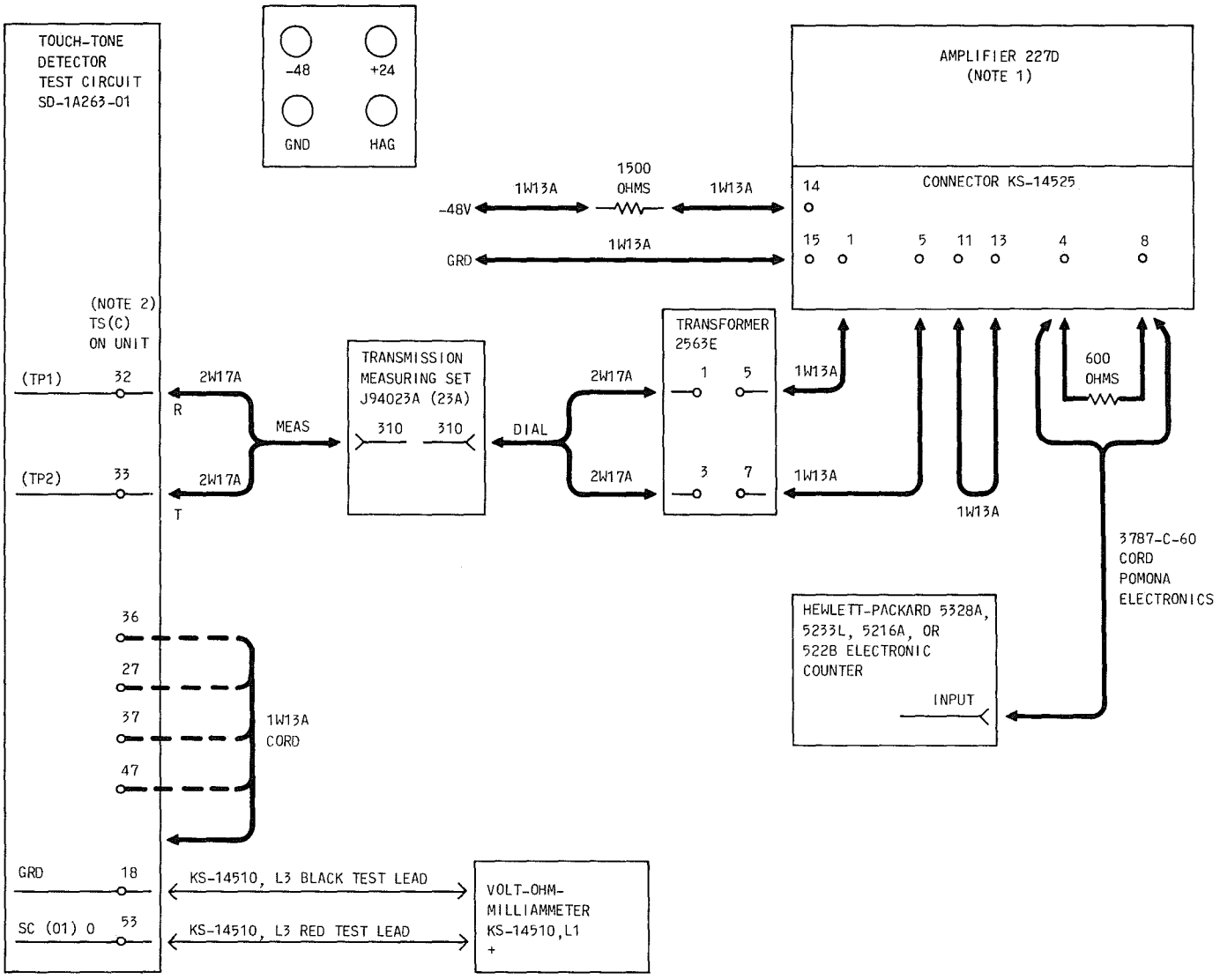
| STEP | ACTION | VERIFICATION |
|---|---|---|
| | Adjust transformer 3F to obtain frequency counter indication between 1980.0 and 2020.0. | |
| 33 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.75 and -5.75 dBm.<br>At VOM—<br>Meter indicates zero. |
| 34d | If level requirement of Step 33 is not met—<br>Remove circuit pack A158 from its socket; replace it with 158A adapter; and plug circuit pack A158 into 158A adapter. | |
| 35d | Adjust potentiometer R4 to obtain TMS meter indication of -5 dBm. | |
| 36d | Remove 158A adapter from socket, and replace it with circuit pack A158. | |
| 37 | Remove blocking tools from A, B, and C relays. | |
| | ***Note:*** If Test G or H is to be performed, proceed to Step 27 of Test G or the appropriate test. | |
| 38 | Remount circuit pack A45 removed in Step 26 of preparation, and remove all connections established as shown in Fig. 2. | |
| 39 | At TLTP—<br>Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—MTL lamp lighted. |
| 40 | At TOUCH-TONE set—<br>Dial trunk network number of TOUCH-TONE detector test circuit used. | At TLTP—<br>MASTER TEST LINE—MTL lamp extinguished. |
| 41 | Operate nonlocking ST key. | MASTER TEST LINE—REG lamp lighted.<br>MASTER TEST LINE—EQPT ST lamp flashes at 120 ipm. |
| 42 | Operate BUSY CONTROL—RMV BUSY nonlocking key. | |
| 43 | Operate MASTER TEST LINE—RLS nonlocking key. | |
| 44 | Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—REG and EQPT ST lamps extinguished.<br>At TTY—<br>Receive TL01 output message. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| **G. State 5, Low Group Only Test** | | |
| 27 | At amplifier—<br>Set MON potentiometer to 15. | |
| 28 | At screws 10-24 and 21-36 on amplifier—<br>Turn screws back out to prevent contact with respective side rails. | |
| 29 | At screw 0-13 on amplifier—<br>Turn screw in to make contact with respective side rails. | |
| 30 | At TMS—<br>Operate ADD DBM switch to -5. | |
| 31 | At test circuit—<br>Block operated A and C relays. | |
| 32 | Using 1W13A cord, connect terminal 18 to 47 of terminal strip C. | At frequency counter—<br>Counter indicates between 695.6 and 698.4. |
| 33 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 34 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 35 | Remove 1W13A cord connection from terminal 47, and connect cord to terminal 37 of terminal strip C. | At frequency counter—<br>Counter indicates between 768.5 and 771.5 |
| 36 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 37 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 38 | Remove 1W13A cord connection from terminal 37, and connect cord to terminal 27 of terminal strip C. | At frequency counter—<br>Counter indicates between 850.3 and 853.7. |
| 39 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 40 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 41 | Remove 1W13A cord connection from terminal 27, and connect cord to terminal 36 of terminal strip C. | At frequency counter—<br>Counter indicates between 939.1 and 942.9. |
| 42 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates +24 volts. |
| 43 | At test circuit—<br>Remove 1W13A cord connection from terminal 18 to 36 of terminal strip C. | |
| 44 | Remove blocking tools from A and C relays.<br><br>***Note:*** If Test H is to be performed, proceed to Step 27 of Test H. | |
| 45 | Remount circuit pack A45 removed in Step 26 of preparation, and remove all connections established as shown in Fig. 2. | |
| 46 | At TLTP—<br>Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—MTL lamp lighted. |
| 47 | At TOUCH-TONE set—<br>Dial trunk network number of TOUCH-TONE detector test circuit used. | At TLTP—<br>MASTER TEST LINE—MTL lamp extinguished. |
| 48 | Operate nonlocking ST key. | MASTER TEST LINE—REG lamp lighted.<br>MASTER TEST LINE—EQPT ST lamp flashes at 120 ipm. |
| 49 | Operate BUSY CONTROL—RMV BUSY nonlocking key. | |
| 50 | Operate MASTER TEST LINE—RLS nonlocking key. | |
| 51 | Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—REG and EQPT ST lamps extinguished.<br>At TTY—<br>Receive TL01 output message. |
| **H. State 4, High Group Only Test** | | |
| 27 | At amplifier—<br>Set MON potentiometer to 15. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 28 | At screws 10-24 and 21-36 on amplifier—<br>Turn screws back out to prevent contact with respective side rails. | |
| 29 | At screw 0-13 on amplifier—<br>Turn screw in to make contact with respective side rails. | |
| 30 | At TMS—<br>Operate ADD DBM switch to -5. | |
| 31 | At test circuit—<br>Block operated C relay. | |
| 32 | Using 1W13A cord, connect terminal 18 to 47 of terminal strip C. | At frequency counter—<br>Counter indicates between 1206.6 and 1211.4. |
| 33 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 34 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 35 | Remove 1W13A cord connection from terminal 47, and connect cord to terminal 37 of terminal strip C. | At frequency counter—<br>Counter indicates between 1333.3 and 1338.7. |
| 36 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 37 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 38 | Remove 1W13A cord connection from terminal 37, and connect cord to terminal 27 of terminal strip C. | At frequency counter—<br>Counter indicates between 1474.0 and 1480.0. |
| 39 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 40 | At TMS—<br>Operate DIAL-MEAS-SLV switch to DIAL. | |
| 41 | Remove 1W13A cord connection from terminal 27, and connect cord to terminal 36 of terminal strip C. | At frequency counter—<br>Counter indicates between 1629.7 and 1636.3. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 42 | At TMS—<br>Operate DIAL-MEAS-SLV switch to MEAS. | At TMS—<br>Meter indicates between -4.5 and -5.5 dBm.<br>At VOM—<br>Meter indicates zero. |
| 43 | At test circuit—<br>Remove 1W13A cord connection from terminal 18 to 36 of terminal strip C. | |
| 44 | Remove blocking tool from C relay. | |
| 45 | Remount circuit pack A45 removed in Step 26 of preparation, and remove all connections established as shown in Fig. 2. | |
| 46 | At TLTP—<br>Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—MTL lamp lighted. |
| 47 | At TOUCH-TONE set—<br>Dial trunk network number of TOUCH-TONE detector test circuit used. | At TLTP—<br>MASTER TEST LINE—MTL lamp extinguished. |
| 48 | Operate nonlocking ST key. | MASTER TEST LINE—REG lamp lighted.<br>MASTER TEST LINE—EQPT ST lamp flashes at 120 ipm. |
| 49 | Operate BUSY CONTROL—RMV BUSY nonlocking key. | |
| 50 | Operate MASTER TEST LINE—RLS nonlocking key. | |
| 51 | Operate MASTER TEST LINE—TEST and TRUNK keys. | MASTER TEST LINE—REG and EQPT ST lamps extinguished.<br>At TTY—<br>Receive TL01 output message. |




NOTES:
1. CONNECT CONNECTOR KS-14525 TO AMPLIFIER 227D.
2. USE 624B TOOL TO MAKE CONNECTIONS TO TS(C);

**Fig. 2—Tests B Through H Connections**

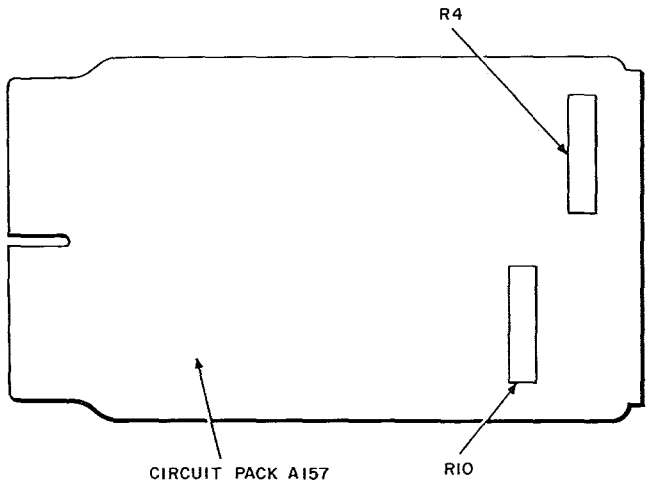



**Fig. 3—Locations of R4 and R10 on Circuit Pack A157**