SEISCOR
TELEPHONE EQUIPMENT
OPERATION MANUAL

T84 TELEPHONE TEST SET
MODELS B/B1/G/G1

Seismograph Service Corporation
A SUBSIDIARY OF RAYTHEON COMPANY

SEISCOR DIVISION
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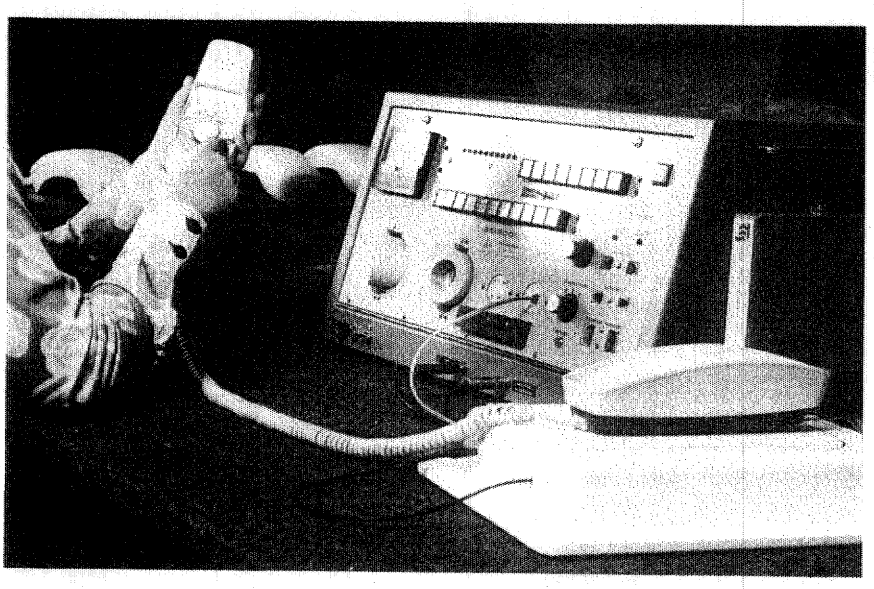

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Seismograph Service Corporation

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TELEPHONE TEST EQUIPMENT

SEISCOR TELEPHONE TYPE T84 TEST SETS

MODELS B/B1/G/G1

GENERAL DESCRIPTION

OPERATION

ISSUE 1

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SEISCOR DIVISION
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SECTION

GENERAL DESCRIPTION

1. GENERAL

1.01 This section provides the General Description of the Seiscor Telephone Test Sets Type T84 B Model, T84 B1 Model, T84 G Model, and T84 G1 Model, and accessory equipment.

1.02 This is the initial issue of this document.

1.03 Operation information is provided in Section 2.

2. APPLICATION

2.01 The T84 series Test Sets and accessory equipment provide telephone equipment distributors, retail stores, and installation and repair center personnel with a test capability for quickly verifying that new or used standard telephone sets, key telephone sets (six-key sets only), individual bases, and handsets are either "operational" or "defective." Operational units can then be classified as "ready for service" and defective units can be placed in a "to be repaired" status.

2.02 These test sets can also be used to determine the type of ringing for which a telephone instrument is wired (tip party, ring party or bridged party connection). These sets can also be used to perform Automatic Number Identification (A.N.I.) verification tests on telephone instruments intended for A.N.I. application.

2.03 The capability of these test sets to determine quickly the "operational" or "defective" status of telephone equipment results in reduced repair and maintenance costs. In addition, the possibility of installing defective equipment is eliminated, which reduces lost time in installation, improves customer service, and reduces customer complaints.

2.04 Table A is a list of the most common telephone equipment that can be tested by the T84 series Telephone Test Sets. *NOTE:* These test sets will test any telephone equipment equivalent to that listed in this table.

TABLE A. Typical Telephone Equipment Tested by the Seiscor T84 Series Telephone Test Sets

Non-Key, Rotary Dialing, Desk Telephone Sets
Non-Key, Rotary Dialing, Wall Mounting Telephone Sets
Non-Key, Tone Dialing, Desk Telephone Sets
Non-Key, Tone Dialing, Wall Mounting Telephone Sets
Six-Key, Rotary Dialing, Desk Telephone Sets
Six-Key, Tone Dialing, Desk Telephone Sets
Non-Key, Rotary or Tone Dialing, Dial-in-Handset, Desk or Wall Mounting Telephone Sets
Telephone Handsets
Telephone Handsets, Rotary Dialing, Dial-in-Handset
Telephone Handsets, Tone Dialing, Dial-in-Handset
Desk Telephone Bases for Dial-in-Handset Telephones
Wall Mounting Telephone Bases for Dial-in-Handset Telephones
Telephone Sets Equipped With Tone Pulse Dials
NOTE: Unless otherwise specified, the telephone equipment described in this table does not have the dial in the handset.

2.05 The T84 series Telephone Test Sets test telephone equipment on a simple pass/fail basis, for most tests. The test specifications are listed in Table B. This table can be used for reference to determine if telephone equipment not specifically listed in Table A can be tested by these test sets.

3. DESCRIPTION

3.01 All of the Seiscor T84 series Test Sets are completely solid state in design. All operator controls, indicators, test connectors, and handset acoustic couplers required for testing are located on the front panel of the units for ease of access to the operator. The test panels are designed to enable test personnel to quickly connect and test telephone equipment in a simple, logical sequence of steps. The dimensions of all of the T84 series Test Sets are identical and are as follows: 22 inches (55.9 cm) wide, by 12 inches (30.5 cm) high, by 11 inches (27.9 cm) deep. The units weigh approximately 30 pounds (13.6 kg).

3.02 All of the test sets and accessory equipment test the following basic telephone equipment functions:

NOTE: Additional tests are provided by the four configurations of test sets. These tests will be specified in detail when the individual models of the test sets are described in the following paragraphs.

1. Lamp Test: verifies that the lamp circuit of "illuminated" telephones is operating.

2. Loop Test: simulates the loop current from the central office through the telephone network with the handset off-hook, and verifies that the loop resistance is within the pass band.

3. Receiver Varistor Test: verifies that receiver varistor is operational.

4. Contact Sequence Test: verifies the proper operation of the telephone hookswitch contact sequence.

5. 500 Volt Breakdown Test: 500 vdc is applied between the telephone network and the base to verify that the leakage current is within tolerance.

6. Rotary Dial Speed Test: verifies that the dial speed is within the pass band and that ten output pulses result whenever the number "0" is dialed.

7. Rotary Dial Percent Break Test: verifies that the make and break time intervals of the telephone under test are within the pass band.

8. Transmitter Output Level Test: verifies that the handset transmitter output level is within the required tolerance.

9. Receiver Sensitivity Level Test: verifies that the handset receiver sensitivity is within the required tolerance.

NOTE: Tests 10, 11, and 12 are conducted with the bias spring of the ringer assembly set to the "high notch" position, and with loudness control set to the "low" position.

10. Normal Voltage Straight Line Ring Test: verifies that normal straight line ringing voltage will ring the telephone.

11. Low Voltage Straight Line Ring Test: verifies that a standard low ringing voltage will ring the telephone.

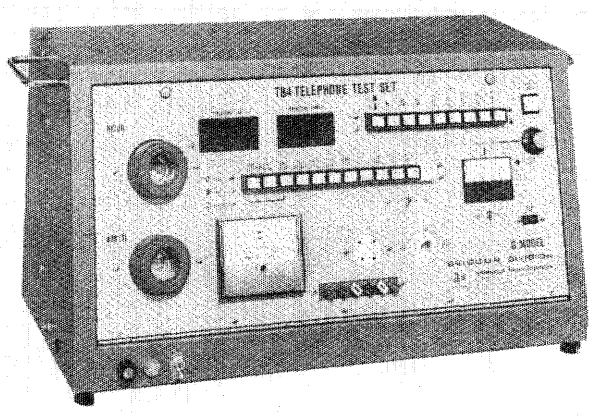
TABLE B. T84 Series Telephone Test Set Test Specifications

TEST	SPECIFICATIONS
LOOP TEST	A telephone set drawing less than 18 ma or greater than 55 ma will fail this test.
500 VOLT BREAKDOWN TEST	A telephone set will fail this test if the breakdown current is 225 microamperes or greater (this represents a leakage resistance of approximately 2.4 Mohms).
DIAL SPEED TEST	Nominal pass band: 9.4 to 11.2 Pulses Per Second (PPS).
DIAL PERCENT BREAK TEST	Nominal pass band: 58.2 to 63.8 percent break. 41.8 to 36.2 percent make.
TONE DIAL TEST	T84 B Model and G Model: Direct digital readout of tone frequency and voltage. T84 B1 Model and G1 Model: ±1.75 percent of impressed frequency. Tone dialing digit depressed must cause a correspondingly identified number of test panel to illuminate.
TRANSMISSION TEST (TRANSMIT AND RECEIVE TEST)	Transmit Level: Verifies a pass condition for the handset transmitter if the output level at 1000 Hz is 0.42 v p-p or greater. Receive Level: A signal of 1000 Hz at 0.4 v p-p is applied to tip and ring and used as a 0 dB reference level with a ±3 dB tolerance. *NOTE:* These tests are the electrical equivalent of an acoustical pressure test at 1000 Hz.
RING TEST(1)	Straight Line Ring Test (applies to all T84 Series Test Sets)(2) Normal: 95 to 105 volts at 20 Hz. Low Ring: 60 to 62 volts at 20 Hz. Bell Tap: 40 to 42 volts at 20 Hz. Tuned Ringer Test (applies only to the T84 G Model and G1 Model Test Sets, and not to the T84 B Model or B1 Model Test Sets)(3) Harmonic: Frequency (Hz): 16-2/3, 25, 33-1/3, 50, 66-2/3 Normal Ring Voltage: 90, 100, 110, 125, 140 Low Ring Voltage: 35, 35, 35, 45, 45 Synchromonic: Frequency (Hz): 20, 30, 42, 54, 66 Normal Ring Voltage: 95, 105, 115, 125, 140 Low Ring Voltage: 35, 35, 45, 45, 45 Decimonic: Frequency (Hz): 20, 30, 40, 50, 60 Normal Ring Voltage: 95, 105, 115, 125, 135 Low Ring Voltage: 35, 35, 45, 45, 45 (1) A Capacitor Short Test and A.N.I. Wiring Verification Test is automatically provided during all Ring Tests. (2) Straight line ringer bias spring must be set to the "high notch" position and loudness control must be set to the "low" position. (3) Tuned ringer must not ring on more than one frequency in the group (must not "cross ring").

12. [illegible] ap S[illegible] [illegible] g [illegible]est: [illegible]rifies [illegible] [illegible]vill [illegible]ot [illegible]ap at [illegible] [illegible]age [illegible] for the Bell Tar[illegible] [illegible] [illegible]his test may [illegible] to [illegible]ll [illegible]ght line ringers be[illegible] of differences in sensitivity le[illegible]els provided by different manufacturers.

13. Capacitor Shorted Test: verifies that the ringing capacitor of ringer assembly is not shorted, and that a capacitor is installed in the assembly.

14. A.N.I. Test: enables determining whether or not the telephone instrument is correctly wired for A.N.I. application.



NOTE: The T84 Model, B1 Model, and G1 Model Telephone Test Sets are nearly identical in appearance to the G Model, shown above.

Fig. 1. T84 G Model Telephone Test Set

T84 B MODEL TELEPHONE TEST SET

3.03 The T84 B Model Telephone Test Set (Part No. 3790-9100) is identical in appearance and function to the G Model Test Set shown in Fig. 1, with the exception that the B Model unit does not provide Tuned Ringer Test capability. The B Model unit provides the capability for conducting all tests listed in paragraph 3.02 (items 1 through 14), and in addition provides a Tone Dial Test. This test verifies that each digit depressed on a tone dialing telephone results in the correct frequency and output voltage. *NOTE:* This Tone Dial Test is also provided by the T84 G Model Test Set, as well as Tuned Ringer Test capability.

T84 B1 MODEL TELEPHONE TEST SET

3.04 The T84 B1 Model Telephone Test Set (Part No. 3790-9200) is identical to the B Model set with the exception that the Tone Dial Test is conducted differently. The B1 Model Test Set contains a Seiscor T8 KTU which converts the unique pair of tones generated as each digit on the telephone is depressed, into a direct illuminated numerical readout on the test panel. (E.g., if tone button "1" is depressed by the operator, the numeral "1" will be displayed on the panel of the test set, etc. If the correct number is not displayed whenever a tone button is depressed, this indicates a fail condition; the tones for the digit are not within the required ±1.75% of the impressed frequency specified in Table B.)

T84 G MODEL TELEPHONE TEST SET

3.05 The T84 G Model Telephone Test Set (Part No. 3790-9000) is shown in Fig. 1. This test set performs all tests listed in paragraph 3.02 (items 1 through 14), and in addition provides capability for Tuned Ringer Tests, and Tone Dial Tests (test set provides a direct digital readout of tone dial frequencies and output voltage). The T84 G Model provides the following Tuned Ringer Tests:

1. Normal Voltage Tuned Ringer Test: verifies that a tuned ringer telephone or ringer assembly will ring at the normal ring voltage, and will not ring at any frequency other than the one designated for the assembly.

2. Low Voltage Tuned Ringer Test: verifies that a tuned ringer telephone or ringer assembly will ring at a normal low ring voltage.

T84 G1 MODEL TELEPHONE TEST SET

3.06 The T84 G1 Model Telephone Test Set (Part No. 3790-9300) is identical to the G Model set with the exception that the unit contains a Seiscor T8 KTU and directly illuminated numerical indicators for the Tone Dial Tests. This unit performs Tone Dial Tests identically to the T84 B1 Model Test Set (refer to paragraph 3.04).

ACCESSORY TEST EQUIPMENT

3.07 Accessory test equipment is required by the T84 series Telephone Test Sets to enable some of the listed tests to be performed. The accessory equipment required depends on the type of telephone equipment to be tested, and the particular tests to be performed.

A. T5 Key Set Adapter

3.08 The T5 Key Set Adapter (T5 Adapter, Part No. 3790-7905) is required whenever any of these test sets is being used to test the key operation of key telephone sets (six-key sets only). This adapter provides switches to test the line bu[illegible] line ke[illegible] buzzer test sw[illegible]ch, [illegible] network l[illegible] uity LED in[illegible]

B. T6 Breakdow[illegible]se

3.09 The T6 Breakdown Base (T6 Base, Part No. 3790-6305) is required to test for the breakdown current between the telephone set network and the telephone set base. The dimensions of the T6 Base are: 14-1/2 inches (36.8 cm) long, by 10-3/4 inches (27.3 cm) wide, by 3-1/2 inches (89 mm) high.

C. T8 Key Telephone Unit

3.10 A T8 Key Telephone Unit (KTU, Part No. 3790-7756) is required with both the T84 B1 Model and G1 Model Test Sets if the set is to be used for Tone Dialing Tests. The KTU is required to verify that the tones from a tone dialing set are within the required tolerance (see Table B), and if within tolerance, the resulting output from the KTU will cause the test set to illuminate a numeral on the test set panel corresponding to the digit depressed on the telephone set. The T8 KTU (and illuminated numeral indicator) must be factory installed, and must therefore be specified at the time of ordering the test set if Tone Dial Tests are required in the application.

NOTES

SECTION 2

OPERATION

1. GENERAL

1.01 This section provides the information required by the operator of the T84 series Telephone Test Sets to set up the test equipment to test telephones and associated telephone equipment, and to operate these test sets in testing this equipment.

2. DESCRIPTION TEST PANEL

2.01 Since the T84 G Model Telephone Test Set control panel is most representative of all test features of the T84 series Test Sets, the purpose of the controls, indicators, test connectors, and acoustic couplers of this set will be used as an example to acquaint the operator with the operation of the complete T84 series Test Sets. Clarifying notation will be used, as appropriate, to point out the differences between the sets. Fig. 2 shows the front panel of the T84 G Model Telephone Test Set, for reference.

1. FREQUENCY HZ DIGITAL INDICATOR: provides the operator with a visual indication of each frequency generated by a tone dialing telephone, for comparison with specified standard frequencies. *NOTE:* This indicator is provided only on the T84 B Model and G Model Test Sets. Illuminated numeral indicators are provided in this location for the optional tone dial tests of the T84 B1 Model and G1 Model Test Sets.

2. AMPLITUDE VRMS DIGITAL INDICATOR: provides the operator with a visual indication of the exact voltage generated by each tone of a tone dialing telephone, for comparison with specified standard voltages. *NOTE:* This indicator is provided only on the T84 B Model and G Model Test Sets. Illuminated numeral indicators are provided in this location for the optional tone dial tests of the T84 B1 Model and G1 Model Test Sets.

3. RINGER TEST SELECT SWITCH ASSEMBLY: these switches are used in conjunction with the RING TEST/TIP PARTY/LOW RING/BELL TAP switches, to apply the appropriate ringing voltage to the telephone or ringer assembly under test, to test the ring function of the unit. *NOTE:* This switch assembly is provided only on the T84 G Model and G1 Model Test Sets.

4. RCVR ACOUSTIC COUPLER: provides the facility for applying the test tone from the handset receiver to the test sets, as required during a transmission test.

5. XMTR ACOUSTIC COUPLER: provides the facility for applying the test tone from the test set to the handset transmitter, as required during a transmission test.

6. TEST PASS/FAIL LED INDICATORS: in conjunction with the switches of the TEST SELECT SWITCH ASSEMBLY, provide a visual indication as to whether the equipment under test has passed or failed the selected test.

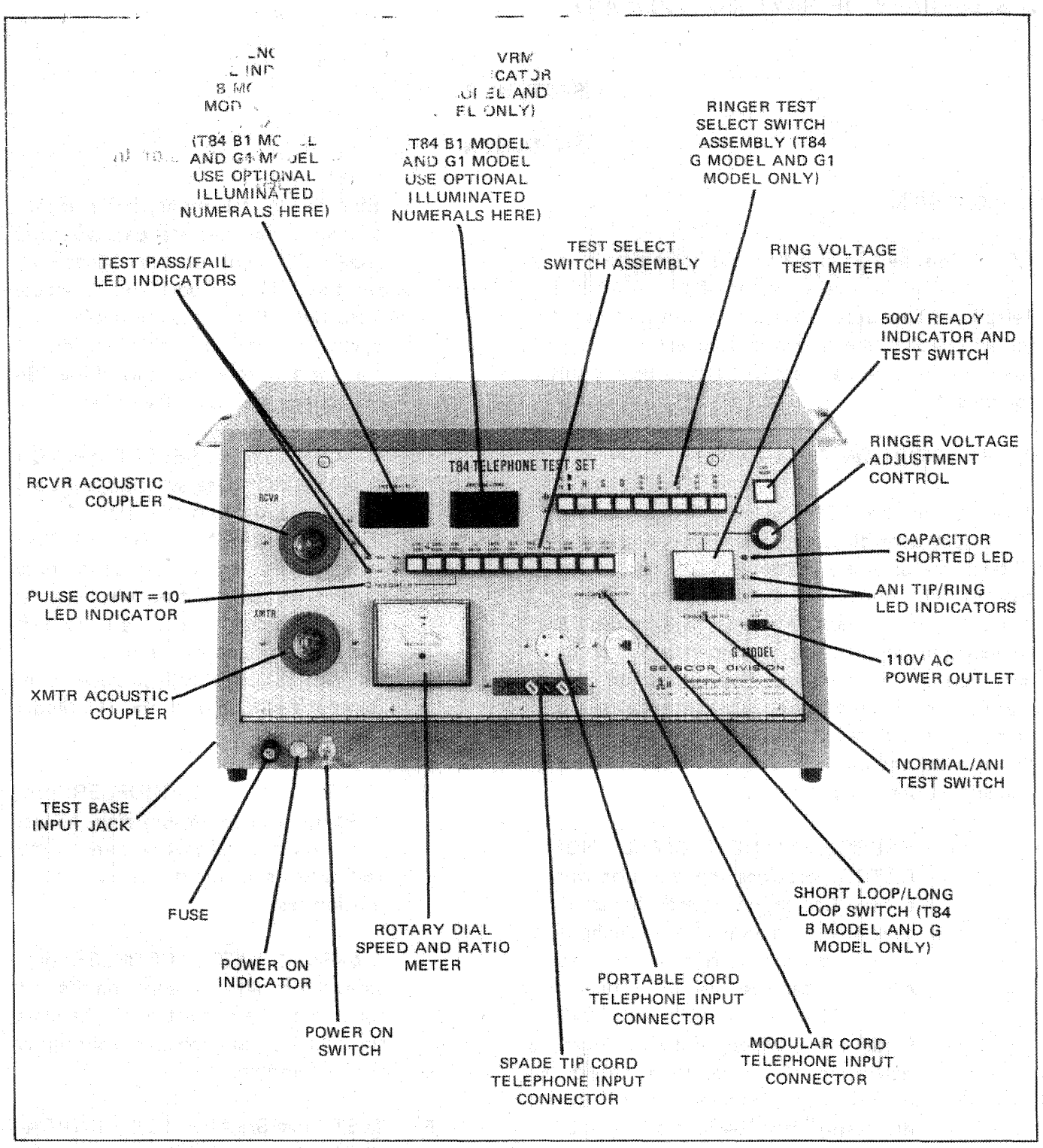


Fig. 2. T84 G Model Telephone Test Set Panel Controls

7. 500V READY INDICATOR AND TEST SWITCH: illuminates only when the 500V BRKN switch is depressed and the telephone base is making good contact with the test base pins, during the 500 Volt Breakdown Test, and completes this test when depressed by the operator.

8. TEST SELECT SWITCH ASSEMBLY provides the test select switches for the tests to be performed on the equipment by the test sets.

9. PULSE COUNT = 10 LED INDICATOR: when illuminated after dialing a "0" during a Dial Speed Test, indicates that exactly 10 pulses were output from a rotary dialing telephone set.

10. ROTARY DIAL SPEED AND RATIO METER: provides a visual indication that the rotary dial speed (meter SPEED band), and make and break times (meter RATIO band) of a rotary dialing telephone set under test are within the required limits.

11. SHORT LOOP/LONG LOOP SWITCH: used in conjunction with the Touch Tone test to simulate a short loop or long loop (touch tone circuit current is reduced with switch in LONG LOOP position, to simulate a "long loop" condition for the test). *NOTE:* This switch is only provided on the T84 B Model and G Model Test Sets, and is not provided on the T84 B1 Model or G1 Model Test Sets.

12. SPADE TIP CORD TELEPHONE INPUT CONNECTOR: input receptacle for spade tip terminated cord telephone sets.

13. MODULAR CORD TELEPHONE INPUT CONNECTOR: input receptacle for modular cord telephone sets.

14. PORTABLE CORD TELEPHONE INPUT CONNECTOR: input receptacle for portable cord telephone sets.

15. LINE FUSE: protects the test set [illegible] line current [illegible] as a [illegible] it) w[illegible]

16. [illegible]ON INDIC[illegible] illu[illegible]ates [illegible] inform[illegible] the operato[illegible] that th[illegible] test set is turned on.

17. POWER ON SWITCH: applies power to the test set when in the ON position and turns off the power when in the OFF position.

18. TEST BASE INPUT JACK: the input receptacle used to connect the test set to the breakdown telephone base.

19. NORMAL/ANI TEST SWITCH: selects normal ring test (Tip Party/Ring Party/Bridged) in NORMAL position, selects A.N.I. test (for all ring tests) in ANI position.

20. RING VOLTAGE TEST METER: indicates to the operator the voltage level applied to the ringer assembly. The meter measures voltage values from 0 to 150 vac.

21. RINGER VOLTAGE ADJUSTMENT CONTROL: enables the operator to adjust the voltage applied to the ringer assembly during HIGH RING, LOW RING, and BELL TAP tests.

    Normal voltages are applied to the telephone or ringer assembly with this control set to align the knob pointer with the RINGER VOLTAGE line on the panel.

    When the control is turned in a clockwise direction, the normal voltages are increased (by as much as 10%). When this control is turned in a counter-clockwise direction, the normal voltages are decreased (to 0 vac, if

required). *NOTE:* This feature is especially useful since it allows the bell tap voltage applied to straight line ringer assemblies to be varied to match unique bell tap voltages applicable to various manufacturers of telephone equipment.

22. CAPACITOR SHORTED LED: This indicator illuminates during any ringing test if the telephone set ringer assembly capacitor is shorted, or not installed.

23. ANI TIP/ANI RING LED INDICATORS: these illuminating indicators are used in conjunction with the Automatic Number Identification (A.N.I.) tests and are activated whenever the test set is in the Ring Test mode of operation.

24. 110V AC POWER OUTLET: this outlet provides a low amperage source of 110 vac for use (if required) during testing (e.g., to supply power to a dial light transformer, etc.).

3. GUIDELINES FOR USING THE TEST SETS

3.01 The following guidelines apply to the use of the T84 series test sets in testing telephone equipment.

1. The test operator should thoroughly familiarize himself with all details of the tests described in this section prior to actually initiating tests on telephone equipment.

   The operator should minimize the cord plug-in/removal cycles as much as possible, with respect to the connectors and jacks of the test panel, and thereby keep the wear on these components to a minimum. Plan the test sequence such that in a given test cycle all standard telephone sets are tested prior to the testing of key telephone sets, etc.

2. If applicable, group together similar types of telephone equipment, then plan an optimum order in which to test this equipment.

3. Ensure that the standard procedures of the test and/or repair center are followed in routing the "operational" or "defective" equipment through the center after this equipment has been tested.

4. Use schematics for telephone equipment not specifically listed in Table A and Table B to determine if this equipment can be tested by the T84 test set to be used.

4. TEST SETUP PROCEDURE

4.01 Prior to performing tests on telephone equipment it must be correctly connected to the test set and required accessory equipment. The particular setup that applies depends on the type of equipment to be tested.

4.02 Test setup procedures for telephone equipment that can be tested by the T84 series test sets and accessory equipment are detailed in the steps which follow. Fig. 3 depicts a typical test setup using a T84 G Model Test Set and a T6 Breakdown Base.

INITIAL SETUP OF TEST SET

4.03 Follow these steps to set up the test set for the tests which follow:

STEP	ACTION
1	Place test set on a clean flat test bench (or equivalent) which has an unobstructed area adequate in size to conduct the tests required.

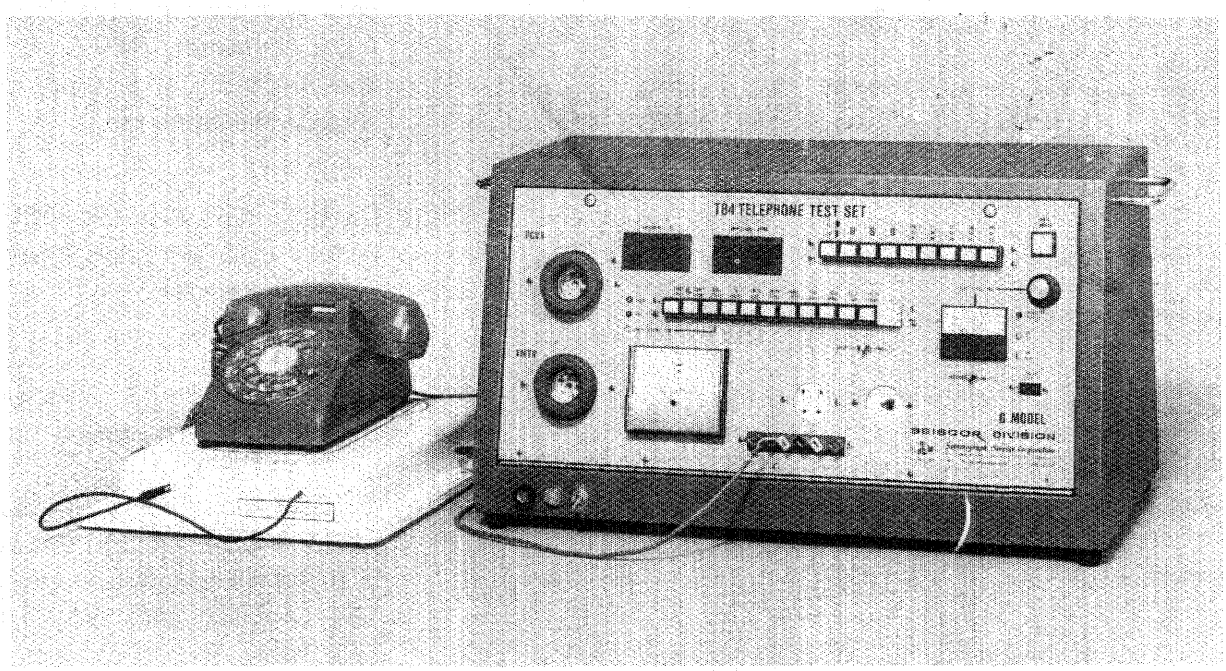


Fig. 3. Typical Test Setup Using a T84 G Model Telephone Test Set and a T6 Breakdown Base

STEP	ACTION
2	Set power switch of test set to OFF position. *NOTE:* Step 3 applies only to the T84 G Model and G1 Model Test Sets. If a T84 B Model or B1 Model Test Set is being setup for testing, go directly to Step 4.
3	Release all switches in Ringer Test Select Switch Assembly (switch is released when indicator shows "white," not "green"). *NOTE:* Slightly depress an "H", "S", or "D" switch to release any of these depressed switches; slightly depress one of the frequency select switches to release any depressed switch in this group.
4	Depress RLS switch of Test Select Switch Assembly (this will release any depressed switches in this assembly). *NOTE:* Step 5 applies only to the T84 B Model and G Model Test Sets. If a T84 B1 Model or G1 Model Test Set is being setup for testing, go directly to Step 6.
5	Set SHORT LOOP/LONG LOOP switch to SHORT LOOP position.
6	Align pointer of RINGER VOLTAGE control with "panel line" provided (90 degrees counter-clockwise from vertical position).

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COMPLETE TELEPHONE SET ASSEMBLIES

4.04 The following steps are required to set up the test set and accessory equipment to test complete telephone set assemblies (bases and handsets):

STEP	ACTION
READ	If telephone base does not have a cord (or cord is cut off), a cord suitable for the type of telephone to be tested must be installed prior to proceeding with Step 1 (or Step 3 if a six-key telephone set is to be tested).
1	Perform steps 1 through 8 of paragraph 4.03. *NOTE 1:* If telephone to be tested is a six-key telephone set, go directly to Step 3.
2	Connect telephone base cord to test set modular, portable, or spade tip connector, as applicable. *NOTE:* This step applies only to non-key telephone sets.
3	Connect T6 Base to 500V BRKN BASE jack of test set. *NOTE 2:* If telephone to be tested is a non-key telephone set, go directly to Note 3 of Step 6.
4	Connect key telephone set base cord connector into the T5 Adapter input connector. *NOTE:* This step and Steps 5 and 6 apply only to six-key telephone sets.
5	Connect T5 Adapter cable connector into modular input connector of test set.
6	Fully depress "hold" button of key telephone set to release all keys. *NOTE 3:* Go directly to Step 8 if a tuned ringer telephone or assembly is to be tested (applies only to the T84 G Model and T84 G1 Model Test Sets).
7	Set the bias spring of a straight line ringer to the "high notch" position and set the amplitude control to the "low" position. *NOTE:* This step applies only to straight line ringers.
8	Position telephone base until it matches one of the patterns of the test base.
9	If telephone to be tested is a desk type, set handset in normal position on base. *NOTE:* Lay handset of wall mounting telephones onto test bench until otherwise specified in the functional tests. *NOTE 4:* This completes the test setup for all rotary or tone dialing telephone sets. Refer now to the applicable functional tests of paragraph 5.

TELEPHONE HANDSETS

4.05 The following steps are required to set up the T84 series test sets and accessory equipment to test telephone handsets. *NOTE:* These tests apply only to non-dial-in handset handsets.

STEP	ACTION
1	Connect handset to be tested to a standard known-working telephone set base.
2	Perform steps 1 through 8 of paragraph 4.03.
3	Connect telephone base cord to test set modular, portable, or spade tip connector, as applicable.
4	If telephone handset to be tested is connected to a desk type telephone for the test, set handset in normal position on base. If handset is connected to a wall mounting telephone for the test, lay handset onto test bench until otherwise specified in the functional tests. *NOTE:* This completes the test setup for telephone handsets. Refer now to the applicable functional tests in paragraph 5.

5. FUNCTIONAL TESTS

5.01 The following paragraphs provide a step-by-step test procedure for all telephone equipment that can be tested by the T84 series Telephone Test Sets. It is recommended that all steps be performed in the exact sequence presented, to avoid confusion.

5.02 [illegible] different [illegible] T84 [illegible] pro- [illegible] occur.

In all functional tests whic[illegible] on-hook condition specified for a telephone set shall signify that the handset of desk type telephones is placed in the "normal" position on the telephone base, or that the hookswitch of wall-mounting telephones is fully depressed. Conversely, an off-hook condition for a telephone set shall signify that the handset of desk type telephones is removed from the base, or that the hookswitch of wall-mounting telephones is fully released.

Ringer Test Select Switch Assembly switches (applies only to the T84 G Model and G1 Model Test Sets) and Test Select Switch Assembly switches are "off" when the switch indicator display is "white," and are "on" (down) when the indicator is "green." *NOTE:* Slightly depress an "H," "S," or "D" switch to release any of these three switches; slightly depress one of the frequency select switches to release any of the switches in this group (applies only to the Ringer Test Select Switch Assembly of the T84 G Model and G1 Model Test Sets). Depress RLS switch of Test Select Switch Assembly to release any depressed switch in this assembly.

It is recommended, subject to the users standard operating practices, that if a failure occurs at any step during a test sequence, the test should be immediately discontinued, the problem identified, and the equipment be placed in a "to-be-repaired status.

TURNING ON TEST SET

5.03 Follow these steps to turn on the test set:

STEP	ACTION	VERIFICATION
	CAUTION: Prior to turning on the test set, the operator must ensure that lamp power wires in a telephone set to be tested have not been wired to present a direct short to the lamp power supply of the test set. If the lamp circuit of the telephone is internally shorted, the excessive current drain imposed on the set when it is turned on may cause invalid test results.	
1	Verify that the test set, test set accessory equipment and telephone equipment to be tested are correctly set up for testing (refer to paragraphs 4.01 through 4.05, as applicable).	
2	Turn on test set power switch (see *CAUTION* above).	Power on indicator of test set shall illuminate.

COMPLETE TELEPHONE SET ASSEMBLIES

5.04 Turn on test set as detailed in paragraph 5.03, then follow these steps to test complete telephone set assemblies (bases and handsets):

A. Lamp Test

5.05 The Lamp Test applies only to illuminating type telephone sets (including six-key telephone sets). Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: If a non-illuminating dial six-key telephone set is to be tested, go directly to Step 7.	
	NOTE 2: Determine if the telephone to be tested is wired to be illuminated at all times, or only when handset is off-hook.	
	NOTE 3: If telephone is wired to illuminate only when off-hook, go directly to Step 4.	
1	With telephone on-hook, observe dial of telephone. *NOTE:* This step and steps 2 and 3 only apply if telephone is wired to illuminate at all times.	Dial of telephone base or handset shall be illuminated.

STEP	ACTION	VERIFICATION
2	Place telephone in off-hook condition.	Dial of telephone base or handset shall remain illuminated.
3	Place telephone back in on-hook condition.	

NOTE 4: This completes the lamp test for non-key telephone sets which are wired to illuminate at all times. Go directly to paragraph 5.06, Loop Test.

4	With telephone on-hook, observe dial of telephone. *NOTE:* This step and steps 5 and 6 only apply if telephone is wired to illuminate only when taken off-hook.	Dial of telephone base or handset shall be extinguished.
5	Place telephone in off-hook condition.	Dial of telephone base or handset shall illuminate.
6	Place telephone back in on-hook condition.	

NOTE 5: This completes the Lamp Test for non-key telephone sets which are wired to illuminate only when taken off-hook. Go directly to paragraph 5.06, Loop Test.

7	Depress switch LP1 of T5 Adapter. *NOTE:* This step and step 8 only apply to key telephone sets.	The lamp under line key 1 of key telephone set shall illuminate.
8	Depress, in sequence, LP2 through LP5 of T5 Adapter.	As each T5 Adapter switch is depressed, the lamp under line keys 2 through 5 shall correspondingly illuminate.

NOTE 6: This completes the Lamp Test sequence for key telephone sets not equipped with a buzzer (not wired for intercom use). Go directly to paragraph 5.06, Loop Test.

9	Depress BUZZ switch of T5 Adapter. *NOTE:* This step only applies if telephone set is wired for intercom installation.	The key telephone set buzzer shall activate as long as the BUZZ switch is held depressed.

NOTE 7: This completes the Lamp Test (and Buzzer Test) for key telephone sets. Go directly to paragraph 5.06, Loop Test.

B. Loop Test

5.06 Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if a key telephone set is to be tested.	
1	Telephone set is in on-hook condition.	FAIL LED of test set shall be illuminated.
2	Fully depress LOOP TEST switch.	FAIL LED shall remain illuminated.
3	Place telephone in off-hook condition.	PASS LED shall illuminate (and LED on T5 Adapter shall illuminate, if a key telephone set is being tested).
4	Place telephone back in on-hook condition.	FAIL LED shall illuminate.
	NOTE 2: This completes the Loop Test for non-key telephone sets. Go directly to paragraph 5.07, Contact Sequence Test.	
5	Place telephone set in off-hook condition. *NOTE:* This step and step 6 apply only if key telephone sets are being tested.	PASS LED shall illuminate and LED on T5 Adapter shall illuminate.
6	With line switch 1 depressed, and while gently blowing into transmitter of handset, depress in sequence "hold" button then line switch 2, "hold" button then line switch 3, "hold" button then line switch 4, "hold" button then line switch 5, and then "hold" button.	While a key telephone line switch is depressed the PASS LED on the test set shall illuminate, the LED indicator on T5 Adapter shall illuminate, and sidetone shall be heard. After a "hold" button has been depressed the FAIL LED on test set shall illuminate, the LED indicator on T5 Adapter shall extinguish, and no sidetone shall be heard.
	NOTE 3: This completes the Loop Test for key telephone sets. Go directly to paragraph 5.07, Contact Sequence Test.	

C. Contact Sequence Test

5.07 Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if a key telephone set is to be tested.	

STEP	ACTION	VERIFICATION
1	With LOOP TEST switch still fully depressed, slowly release hook-switch while gently blowing into handset transmitter and listening to handset receiver.	FAIL LED shall [illegible] and PASS LED shall illuminate before [illegible] non-dial-in-handsets, only). If a dial-in-handset telephone is being tested, the PASS LED shall illuminate simultaneously with sidetone being heard.

NOTE 2: If telephone under test is a dial-in-handset type, go directly to step 4.

2	With telephone set off-hook and while gently blowing into hand-set transmitter, move rotary dial off-normal, or slightly depress a tone button of a tone dialing telephone set. *NOTE:* This step does not apply to dial-in-handset telephones.	No sidetone shall be heard.
3	Release rotary dial or tone button of telephone.	

NOTE 3: This completes the Contact Sequence Test for rotary or tone dialing non-dial-in-handset telephones. Go directly to paragraph 5.08, Receiver Varistor Test.

4	With telephone off-hook, depress "recall" button of handset while gently blowing into transmitter. *NOTE:* This step and step 5 only apply to dial-in-handset telephones.	With "recall" button depressed, no sidetone shall be heard.
5	Release "recall" button.	

NOTE 4: This completes the Contact Sequence Test for dial-in-handset telephones. Go directly to paragraph 5.08, Receiver Varistor Test.

D. Receiver Varistor Test

5.08 Follow these steps:

STEP	ACTION	VERIFICATION

NOTE 1: Fully depress line switch 1 if handset is connected to a key telephone set.

1	With LOOP TEST switch still fully depressed, place telephone in off-hook condition.	

STEP	ACTION	VERIFICATION
2	While listening to handset receiver, slowly move rotary dial off-normal, or slightly depress a tone button of tone dialing telephone or handset.	If a "soft click" is heard from handset (and XMTR coupler of test set), the receiver varistor is not defective. If a "loud click" is heard, the varistor is defective.
3	Release LOOP TEST switch.	

NOTE 2: This completes the Receiver Varistor Test. Go directly to paragraph 5.09, 500 Volt Breakdown Test.

E. 500 Volt Breakdown Test

5.09 Follow these steps:

STEP	ACTION	VERIFICATION

NOTE 1: Fully depress line switch 1 if a key telephone set is to be tested.

1	Place telephone in off-hook condition.	
2	Depress and hold down 500V BRKN switch.	500V READY lamp at upper right of test panel shall illuminate. *NOTE:* If this lamp does not illuminate, the metallic underside of telephone base is not making good contact with the test base contact pins. Move telephone base about on test base until 500V READY lamp does illuminate.

WARNING: In step 3, if FAIL LED illuminates, the telephone set should immediately be rejected as "unsafe" and removed from the test setup in preparation for testing the next telephone assembly.

3	While holding the 500V BRKN switch depressed, depress the illuminated 500V READY switch for at least two seconds.	The PASS LED shall illuminate for approximately one second.

NOTE 2: This completes the 500 Volt Breakdown Test for all telephone sets. Go directly to paragraph 5.10, Rotary/Tone Pulse Dial Test, if telephone under test is a rotary dialing telephone. If telephone under test is non-rotary dialing, go directly to paragraph 5.11, Transmission Test.

F. Rotary/Tone Pulse Dial Test

5.10 The following steps only apply to rotary dialing (dial in base or handset) and tone pulse dialing telephones. Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if a key telephone set is to be tested.	
1	Depress DIAL SPEED switch.	Both PASS and FAIL LED's shall be extinguished and Rotary Dial Speed and Ratio Indicator Meter pointer (see Fig. 2) shall rest at the full left position.
2	Dial a "0" on telephone set dial.	During "wind-down" of telephone dial, the test meter shall indicate within the black pass band labeled SPEED. At the moment the "wind-down" is complete, the PULSE COUNT = 10 LED shall illuminate. *NOTE:* The illumination of this LED verifies that exactly 10 output pulses were output from the dial, when the number "0" (10) was dialed.
3	Depress the % BREAK switch.	The pointer of the test meter shall now go to the "full scale" (full right) position.
4	Dial a "0" on telephone set dial.	During "wind-down" of dial, the test meter shall indicate within the black pass band labeled RATIO. *NOTE:* This test verifies that the make and break times of the dial are within the pass band.
5	Release % BREAK switch.	

NOTE 2: This completes the Rotary/Tone Pulse Dial Test. Go directly to paragraph 5.11, Transmission Test.

G. Transmission Test

5.11 Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if handset is connected to a key telephone set base.	

STEP	ACTION	VERIFICATION
	NOTE 2: steps 1 and 2, it is very important that the handset be firmly held against the RCVR or XMTR Acoustic Coupler pads prior to depressing the test switches specified. Failure to do so may result in an invalid test (FAIL LED may illuminate even though the handset and/or telephone network is not defective).	
	NOTE 3: In steps 1 and 2, the FAIL LED may illuminate momentarily on initiation of this test. This is normal and does not necessarily signify that the handset or network is defective.	
1	Place transmitter (mouthpiece) of handset firmly against XMTR coupler pad, then depress XMTR LEVEL switch.	PASS LED shall illuminate.
2	Place receiver (earpiece) of handset firmly against RCVR coupler pad, then depress RCVR LEVEL switch.	PASS LED shall illuminate.
3	Release RCVR LEVEL switch.	
	NOTE 4: This completes the Transmission Test. Go directly to paragraph 5.12, Straight Line Ringer Test, or paragraph 5.13, Tuned Ringer Test, as applicable to the telephone under test.	

H. Straight Line Ringing Telephone Set Test Procedure

5.12 Follow these steps to test straight line ringer assemblies installed in a telephone set:

STEP	ACTION	VERIFICATION
	NOTE 1: Inspect telephone to be tested and verify that it is a straight line ringing unit.	
	NOTE 2: If the CAPACITOR SHORTED LED illuminates and stays "on" during any of the following tests, the ringer capacitor is either shorted or is not installed. The telephone set should be rejected as defective. This indicator may illuminate for a few seconds then go "out," during the ring tests. This is normal and does not indicate that the ringer capacitor circuit is defective.	
	NOTE 3: Fully depress line switch 1 if a key telephone set is to be tested.	
1	Place telephone in on-hook condition.	

STEP	ACTION	VERIFICATION
	NOTE 4: Steps 2 and 3 apply only to the T84 G Model and G1 Model Test Sets. If a T84 B Model or B1 Model is being used in this test, go directly to Step 4.	
2	Verify that SL/FQ switch is in released position (sets up test set for straight line 20 Hz ringer testing).	
3	Fully depress "D" and "16-2/3 /20/20" switches (of Ringer Test Select Switch Assembly).	
	NOTE 5: In steps 4 and 5, the type of ringing circuit for which the telephone ringer is wired will be determined. The test operator is directed to appropriately identify the telephone ringer connection for future reference.	
	WARNING: Whenever the Ring Test is activated, a hazardous voltage can exist across the input leads at the Spade Tip Terminated Telephone Cord Input Connector (if used), and also across the ringer assembly (if cover is removed from telephone set).	
4	Fully depress RING TEST switch.	The telephone ringer shall ring. *NOTE:* Even if the ringer does not ring, continue with step 5, leaving the RING TEST switch depressed.
5	Fully depress the TIP PARTY switch.	If ringer rings in step 4 and also in this step, it is wired for "bridged bell ringer" connection. If ringer rings in step 4 but does not ring in this step, if is wired for "ring party" connection. If ringer did not ring in step 4 but rings in this step, it is wired for "tip party" connection.
6	Leave TIP PARTY switch depressed, or release, as necessary to cause ringer to ring.	Ringer assembly of telephone is ringing.
7	Release RING TEST switch. *NOTE:* Ringer must completely stop ringing prior to continuing with step 8.	Ringer shall stop ringing.
8	Fully depress LOW RING switch.	Telephone shall ring.

STEP	ACTION	VERIFICATION
9	Move ringer loudness control from full low to full high position, then back to full low position.	Ringer shall ring throughout the entire range of loudness control and shall ring loudest at the full high position.
10	Release LOW RING switch. *NOTE:* Ringer must completely stop ringing prior to continuing with step 11.	Ringer shall stop ringing.
11	Fully depress BELL TAP switch, and observe voltage on Ring Voltage Test Meter (Fig. 2).	Telephone may or may not ring, depending on manufacturer's specifications. *NOTE:* If the BELL TAP test applies to the telephone under test, but the tap voltage required is different from the meter value, the RINGER VOLTAGE control can be used to set the correct bell tap voltage for this step.

NOTE 6: The Bell Tap Test of step 11 may not apply to all straight line ringers because of differences in sensitivity levels provided by different manufacturers.

12	Release BELL TAP switch.	
13	Ensure that TIP PARTY switch is fully released.	

NOTE 7: This completes the Straight Line Ringing Telephone Test. Go directly to paragraph 5.15, A.N.I. Test (if applicable), or paragraph 5.16, Tone Dial Test (if applicable). This completes all telephone set tests if the A.N.I. and/or Tone Dial Tests are not applicable. Remove telephone unit and install next unit to be tested (go to paragraph 5.04).

I. Tuned Ringer Telephone Set Test Procedure

5.13 The Tuned Ringer Test applies only to the T84 G Model and G1 Model Telephone Test Sets, and cannot be performed on the T84 B Model or B1 Model Test Sets.

5.14 Follow these steps to test tuned ringer assemblies installed in a telephone set:

STEP	ACTION	VERIFICATION

NOTE 1: Inspect telephone to be tested and verify that it is a tuned ringing type. Determine the correct ringing frequency for the assembly.

STEP	ACTION	VERIFICATION

NOTE 2: If the CAPACITOR SHORTED LED illuminates and stays "on" during any of the following tests, the ringer capacitor is either shorted or is not installed. The telephone set should be rejected as defective. This indicator may illuminate for a few seconds then go "out," during the ring tests. This is normal and does not indicate that the ringer capacitor circuit is defective.

NOTE 3: If a tuned ringer telephone is wired for ANI application, the CAPACITOR SHORTED LED will illuminate whenever the telephone is in an off-hook condition.

NOTE 4: Fully depress line switch 1 if a key telephone set is to be tested.

1	Place telephone in on-hook condition.	
2	Set SL/FQ switch to FQ position (fully depressed, switch indicating "green").	
3	Depress appropriate H, S, or D switch, then fully depress the appropriate Ringer Test Select Switch for the frequency of the ringer of the telephone under test.	

NOTE 5: In steps 4 and 5, the type of ringing circuit for which the telephone ringer is wired will be determined. The test operator is directed to appropriately identify the telephone ringer connection for future reference.

WARNING: Whenever the Ring Test is activated a hazardous voltage can exist across the input leads at the Spade Tip Cord Telephone Input Connector (if used), and also across the ringer assembly (if cover is removed from telephone set).

4	Fully depress RING TEST switch.	The telephone ringer shall ring. *NOTE:* Even if the ringer does not ring, continue with step 5, leaving the RING TEST switch depressed.
5	Fully depress the TIP PARTY switch.	If ringer rings in step 4 and also in this step, it is wired for "bridged bell ringer" connection. If ringer rings in step 4 but does not ring in this step, it is wired for "ring party" connection. If ringer did not ring in step 4 but rings in this step, it is wired for "tip party" connection.

		VERIFICATION
6	[illegible] PART [illegible]ch depressed, or release, is necessary to cause ringer to ri[illegible]	Ringer assembly of telephone is ringing.
7	Do not change condition of H, S, or D switches, but fully depress all other frequency select switches in the group, one-at-a-time (Cross Ring Test).	The ringer assembly shall ring only at the one designated frequency.
8	Depress frequency select switch that is correct for the ringer assembly under test.	Telephone is ringing.
9	Release RING TEST switch. *NOTE:* Ringer must completely stop ringing prior to continuing with step 10.	Ringer shall stop ringing.
10	Fully depress LOW RING switch. *NOTE:* Verify that correct low ring voltage is being applied (refer to Ring Voltage Test Meter and adjust if necessary using RINGER VOLTAGE Control).	Ringer shall ring.
11	Release LOW RING switch.	
12	Ensure that TIP PARTY switch is fully released.	
13	If necessary, realign pointer of RINGER VOLTAGE control with "panel line."	

NOTE 5: This completes the Tuned Ringer Telephone Set Test. Go directly to paragraph 5.15, A.N.I. test (if applicable), or paragraph 5.16, Tone Dial Test (if applicable). This completes all telephone set tests if the A.N.I. or Tone Dial Test is not applicable. Remove unit and install next unit to be tested (go to paragraph 5.04).

J. A.N.I. Test

5.15 Follow these steps to perform the Automatic Number Identification Test on complete telephone sets:

STEP	ACTION	

NOTE 1: If telephone set under test fails to pa[illegible] the fo[illegible] s[illegible] [illegible]s not wired for A.N.I. application. If unit does not pass thi[illegible] [illegible]e test o[illegible]rator is di[illegible]ed to follow the established procedures to determine the proper [illegible] position of telephon[illegible] [illegible]ets not wired for A.N.I. application.

NOTE 2: Fully depress line switch 1 if a key telephone set is to be tested.

1	Place telephone in an off-hook condition.	
2	Set NORMAL/ANI Test Switch to ANI position.	
3	Fully depress RING TEST switch.	ANI TIP LED shall illuminate. *NOTE:* If telephone set has successfully passed the ring tests of paragraphs 5.12 or 5.13, but ANI TIP LED does not illuminate in this step, the telephone is incorrectly wired for A.N.I. application (i.e., it is either wired for bridged party ringing or tip party ringing).

NOTE 3: This completes the A.N.I. Test for non-rotary dialing telephone sets. If a tone dialing telephone set is under test, go directly to step 5.

4	Dial a "0" if telephone under test is a rotary dialing type.	The ANI TIP and the ANI RING LED's shall flash at the dial pulse rate during the wind-down of the dial.
5	Release RING TEST switch.	
6	Set NORMAL/ANI Test Switch to NORMAL position.	

NOTE 4: This completes the A.N.I. Test for all telephone sets.

NOTE 5: If a rotary dialing telephone set is under test, remove unit and install next unit to be tested (go to paragraph 5.04).

NOTE 6: If a tone dialing telephone is under test, go directly to paragraph 5.16, Tone Dial Test.

K. Tone Dial Test

5.16 The Tone Dial Test applies only to tone dialing telephones. Tone dialing telephones are tested by one of two methods determined by the type of T84 test set being used for the test. The T84 B Model and G Model units test tone dialing telephones by providing a digital readout of the actual frequency of each tone of the tone dialing telephone and the amplitude of each tone. The T84 B1 Model and the G1 Model sets test tone dialing telephones by verifying that all tones from the telephone set (activated by depressing the digit buttons on the telephone in a specified sequence) are within the pass band (refer to Table B). If the tone is within the pass band, the Seiscor T8 KTU (which must be internally installed in the T84 B1 or G1 Model Test Set being used) will cause an illuminated digit on the test panel corresponding to the depressed digit, to illuminate.

5.17 Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if a key telephone set is to be tested.	
	NOTE 2: Steps 1 through 13 only apply to the T84 B Model and G Model Test Sets. If a T84 B1 Model or G1 Model test set is being used for the Tone Dial Test, go directly to step 14.	
	NOTE 3: If a T84 B Model or G Model Test Set is being used for this test, it is required that two unique tone buttons be depressed simultaneously in order to cause the one particular tone (to be tested for frequency and amplitude) to be output.	
	NOTE 4: The frequencies and voltages specified in steps 2 through 13 may not apply to all manufacturers of tone dialing telephone sets. If other values are used as a standard by a particular telephone company, these values should be substituted in the VERIFICATION column for all appropriate steps, prior to using these steps for tone dial tests.	
1	Depress TOUCH TONE switch.	
2	Place telephone in an off-hook condition.	
3	Simultaneously depress and hold down tone buttons "1" and "2."	The FREQUENCY HZ digital indicator shall display "697" Hz.
4	Simultaneously depress and hold down tone buttons "4" and "5."	FREQUENCY HZ indicator shall display "770" Hz, and AMPLITUDE VRMS digital indicator shall display "0.36 to 0.72" volts.
5	Simultaneously depress and hold down tone buttons "7" and "8."	FREQUENCY HZ indicator shall display "852" Hz.

STEP	ACTION	VERIFICATION
6	Simultaneously depress and hold down tone buttons "*" and "0."	FREQUENCY HZ indicator shall display "941" Hz.
7	Simultaneously depress and hold down tone buttons "1" and "4."	FREQUENCY HZ indicator shall display "1209" HZ.
8	Simultaneously depress and hold down tone buttons "2" and "5."	FREQUENCY HZ indicator shall display "1336" Hz, and AMPLITUDE RMS indicator shall display "0.43 to 0.85" volts.
9	Simultaneously depress and hold down tone buttons "3" and "6."	FREQUENCY HZ indicator shall display "1477" Hz.
10	Set SHORT LOOP/LONG LOOP switch to LONG LOOP position.	
11	Refer to Notes 5 and 6, below then repeat steps 2 through 9.	

NOTE 5: When steps 2 through 9 are repeated with the SHORT LOOP/LONG LOOP switch in the LONG LOOP position, the FREQUENCY HZ digital indicator shall indicate the same frequency previously specified for each step.

NOTE 6: With the SHORT LOOP/LONG LOOP switch in the LONG LOOP position, the voltage measured in step 3 shall be "0.22 to 0.44" volts. The voltage measured in step 7 shall be "0.25 to 0.51" volts.

12	Set SHORT LOOP/LONG LOOP switch to SHORT LOOP position.	
13	Depress RLS switch to release TOUCH TONE switch.	

NOTE 7: This completes all tests for tone dialing telephone sets using a T84 B Model or G Model Test Set. Remove unit and install next unit to be tested (go to paragraph 5.04).

NOTE 8: Steps 14 through 17 only apply to the T84 B1 Model or G1 Model Test Sets, in testing tone dialing telephones.

14	Depress TOUCH TONE switch.	
15	Place telephone in off-hook condition.	

	ACTION	VERIFICATION
	Dep , in erce, ut-tons 3, 4, , 7, 8, 9, then tone utton 2, wo times. *NOTE:* Tone button 2 must be depressed two times in this test because the first time this digit is depressed it only activates a transfer function in the accessory equipment KTU and the tone is not applied to the test set digit test circuit. The second time a 2 digit is depressed, the tone is applied through the KTU to the test set to complete the test.	As each tone button is depressed, a TONE DIALING DIGIT INDICATOR corresponding to the tone dial button depressed shall illuminate. Indicator 22 shall illuminate after the digit 2 is depressed two times.
17	Release TOUCH TONE switch.	

NOTE 9: This completes all tests for telephone sets. Remove tested unit and install next unit to be tested (refer to paragraph 5.04).

TELEPHONE HANDSETS

5.18 Connect handset to be tested as detailed in paragraph 4.05. Refer to paragraphs 5.01, 5.02, and 5.03, then turn on test set.

A. Loop Test

5.19 Follow these steps:

STEP	ACTION	VERIFICATION
1	Place telephone in on-hook condition.	FAIL LED of test set shall illuminate.
2	Fully depress LOOP TEST switch.	FAIL LED shall remain illuminated.
3	Place telephone in off-hook condition.	PASS LED shall illuminate.
4	Place telephone back in on-hook condition.	FAIL LED shall illuminate.

NOTE: This completes the Loop Test for telephone handsets. Go directly to paragraph 5.20, Receiver Varistor Test.

B. Receiver Varistor Test

5.20 Follow these steps:

STEP	ACTION	VERIFICATION
1	With LOOP TEST switch still fully depressed, place telephone in off-hook condition.	
2	While listening to handset receiver, slowly move rotary dial off-normal or slightly depress a tone button of tone dialing base set.	If a soft "click" is heard from handset (and XMTR coupler of test set), the receiver varistor is not defective. If a "loud click" is heard, the varistor is defective.
3	Release LOOP TEST switch.	

NOTE: This completes the Receiver Varistor Test for handsets. Go directly to paragraph 5.21, Transmission Test.

C. Transmission Test

5.21 Follow these steps:

STEP	ACTION	VERIFICATION

NOTE 1: In steps 1 and 2, it is very important that the handset be firmly held against the RCVR or XMTR Acoustic Coupler pads prior to depressing the test switches specified. Failure to do so may result in an invalid test (FAIL LED may illuminate even though the handset and/or telephone network is not defective).

NOTE 2: In steps 1 and 2, the FAIL LED may illuminate momentarily on initiation of this test. This is normal and does not necessarily signify that the handset or network is defective.

1	Place transmitter (mouthpiece) of handset firmly against XMTR coupler pad, then depress XMTR LEVEL switch.	PASS LED shall illuminate.
2	Place receiver (earpiece) of handset firmly against RCVR coupler pad, then depress RCVR LEVEL switch.	PASS LED shall illuminate.
3	Release RCVR LEVEL switch.	

NOTE 3: This completes the Transmission Test. Remove tested handset and install next unit to be tested (refer to paragraph 5.18).

NOTES

TELEPHONE TEST EQUIPMENT

SEISCOR
TELEPHONE EQUIPMENT
CALIBRATION MANUAL

T84 SERIES
TELEPHONE
TEST SETS

Seismograph Service Corporation
A SUBSIDIARY OF RAYTHEON COMPANY

SEISCOR DIVISION
P.O. BOX 1590 ● TULSA, OKLAHOMA 74102 ● (918) 663-9945

TELEPHONE TEST EQUIPMENT

SEISCOR T84 SERIES TELEPHONE TEST SETS

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TABLE OF CONTENTS

CALIBRATION PROCEDURES

1. GENERAL

1.01 This manual provides the information required by test personnel to verify that any of the Seiscor T84 series Telephone Test Sets are operating within the required calibration limits. The manual provides also detailed instructions to enable these test sets to be recalibrated if necessary. Table A is a cross reference between the T84 series Test Sets and the tests/calibrations which are applicable.

1.02 The T84 Series Telephone Test Sets consist of the A Model, the B Model, the B1 Model, the G Model, the G1 Model, and the R Model. Detailed descriptive and operational information on these test sets is contained in the Operation Manual for the T84/84R Telephone Test Set, and the Operation Manual for the T84 series Telephone Test Set Models B/B1/G/G1. It is recommended that these operation manuals be read, and the operation of the test sets to be calibrated be thoroughly understood before calibration of the sets.

1.03 This is the initial issue of this document.

2. TEST EQUIPMENT REQUIRED

2.01 The following test equipment is required to test/calibrate the T84 series Telephone Test Sets:

1. Digital voltmeter, Fluke Model 8020A, or equivalent.
2. Oscilloscope, Tektronix Model T922, or equivalent.
3. Card Extender Assembly, Seiscor Part No. 3790-0100.
4. Audio Oscillator, Heathkit Model 1G-18, or equivalent.
5. Distortion Analyzer, Heathkit Model SM5258, or equivalent.
6. Frequency Counter, Fluke Model 1910A, or equivalent.
7. Rotary Dialing Test Telephone, Model 500, or equivalent.
8. Known good tone dialing test telephone, Type 2500, or equivalent.
9. ANI Test Telephone, Type 500 wired for ANI, or equivalent.
10. Seiscor T100 Dial Pulse Standard, or equivalent.
11. Seiscor T6 Breakdown Base.
12. 4 conductor "mounting," "handset," or "trimline handset" cord.
13. Three 12 to 15 inch (30.5 to 38.1 cm) insulated test leads, with insulated alligator clips on each end.
14. One 1.1 megohm, 1/2 watt, 5% resistor, with spade tip terminal connected to one end (only).
15. One 20 megohm, 1/2 watt, 5% resistor, with spade tip terminal connected to one end (only).
16. One 50 ohm, 1/2 watt, 5% resistor, with spade tip terminal connected to each end.

TABLE A. Test/Calibration Applicable to T84 Telephone Test Sets

TEST (STARTING PAGE)		TEST SET MODEL					
		T84 A MODEL	T84 B MODEL	T84 B1 MODEL	T84 G MODEL	T84 G1 MODEL	T84 R MODEL
GENERAL VOLTAGE AND ROUTINE RESPONSE TESTS	(PAGE 3)	X	X	X	X	X	X
500 VOLT BREAKDOWN TEST/ CALIBRATION	(PAGE 8)	X	X	X	X	X	X
DIAL SPEED AND RATIO TEST/ ADJUSTMENT	(PAGE 11)	X	X	X	X	X	X
T84 STRAIGHT LINE RINGING TESTS AND CALIBRATION	(PAGE 12)	X	X	X			
T84 TUNED RINGER TESTS AND CALIBRATION	(PAGE 15)				X	X	X
T84 DIGITAL READOUT TOUCHTONE TESTS AND CALIBRATION	(PAGE 20)		X		X		
T84 TOUCHTONE LED READOUT TEST	(PAGE 21)	X		X		X	X
T84 CORD TEST AND CALIBRATION	(PAGE 22)	X					X
ANI CALIBRATION	(PAGE 23)		X	X	X	X	

NOTE: THE SYMBOL "X" INDICATES THAT TEST APPLIES TO THE TEST SET MODEL.

17. One 270 ohm, 1/2 watt, 5% resistor, with spade tip terminal connected to each end.

18. One 470 ohm, 1/2 watt, 5% resistor, with spade tip terminal connected to each end.

19. One 100 mfd, 50 volt (minimum) non-electrolytic (non-polarized) capacitor, with spade tip terminal connected to one end.

20. One 3.3 kohm, 1/2 watt, 5% resistor, with spade tip terminal connected to each end.

21. One 2.6 kohm, 1/2 watt, 5% resistor, with spade tip terminal connected to each end.

3. TEST/CALIBRATION T84 SERIES TELEPHONE TEST SETS

3.01 The test and calibration procedures have been divided into two classifications. One classification of tests groups together those tests/calibration procedures common to all of the T84 series of test sets. The other classification groups those tests/calibration procedures unique to specific models of these test sets (e.g., sets which test straight line ringer telephone sets, tuned ringer telephone sets, sets which test tone dialing telephone sets, and sets which test telephone cord equipment).

TESTS/CALIBRATION PROCEDURES COMMON TO ALL T84 SERIES TEST SETS

3.02 The following test and calibration procedures are basically identical for all of the T84 series Telephone Test Sets. Minor differences sometimes exist between the sets (e.g., switch/indicator/control nomenclature). These differences will be specified as they occur in the procedural steps which follow.

3.03 In the following steps, whenever it is necessary to use an extender card assembly in a test or calibration procedure, ensure that the test set cards are fully seated in the assembly and correctly oriented pin-for-pin prior to the test/adjustment.

3.04 If the test set fails to pass any of the requirements of a step, return the test set (or known defective card assembly) to an "authorized service agency" for inspection and repair.

A. General Voltage and Routine Response Tests

3.05 Follow these steps:

STEP	ACTION	VERIFICATION
1	Ensure that test set is connected to 110 vac grounded power source and turned off.	
2	Ensure that test set is in 20 Hz straight line ringing mode.	

NOTE 1: To set the T84 G Model or G1 Model test sets to the 20 Hz straight line ringing mode, fully release SL/FQ switch and fully depress switches "D" and "16-2/3 /20/20." To set the T84 R Model test set to this mode, set the STRAIGHT/TUNED switch to the STRAIGHT position and fully depress switches "DECI" and "16.6/20/20."

STEP	ACTION	VERIFICATION
3	Unlock front panel of test set (turn two locking screws on panel counter-clockwise) and open the panel for access to the interior of set.	

NOTE 2: Refer to Fig. 1. This illustration shows the location of all card assemblies of the T84 series Test Sets. Card Assembly No. 10 provides the cord test circuitry for the T84 A and R Model Test Sets (only) when inserted into the slot shown. Card Assembly No. 25 is used in this slot to provide the Digital Tone Dial Test for the T84 B and G Model Test Sets (only).

4	Refer to Fig. 2 and connect DVM ground lead to TPA.	
5	Depress BELL TAP switch on panel.	
6	Turn on test set and measure and record the voltages at the following test points of motherboard using DVM (refer to Fig. 2 for test points TP1 through TP6, Fig. 4 for TP7, and Fig. 5 for TP8).	13, on other side of resistor TP1: 13.5 ± 2.0 vac 9.03 ok? TP2: -18.5 ± 3.0 vdc -17.30 TP3: -37.0 ± 4.0 vdc -33.35 TP4: -24.0 ± 1.0 vdc -24.24 TP5: 17.0 ± 3.0 vdc 15.62 TP6: 12.0 ± 1.0 vdc 12.03 TP7: 12.0 ± 1.0 vdc 12.03 TP8: 5.0 ± 0.5 vdc 5.08

NOTE 3: If any of the voltages measured in step 6 are not within the specified tolerance, the test set is defective.

7	Release the BELL TAP switch and turn test set off.	
8	Remove Card Assembly No. 8 from slot in test set and insert into an extender card assembly.	
9	Insert extender card assembly connector into test set slot 8.	
10	Connect test lead from DVM to test point TP-LOW of Card Assembly No. 8 (refer to Fig. 5).	

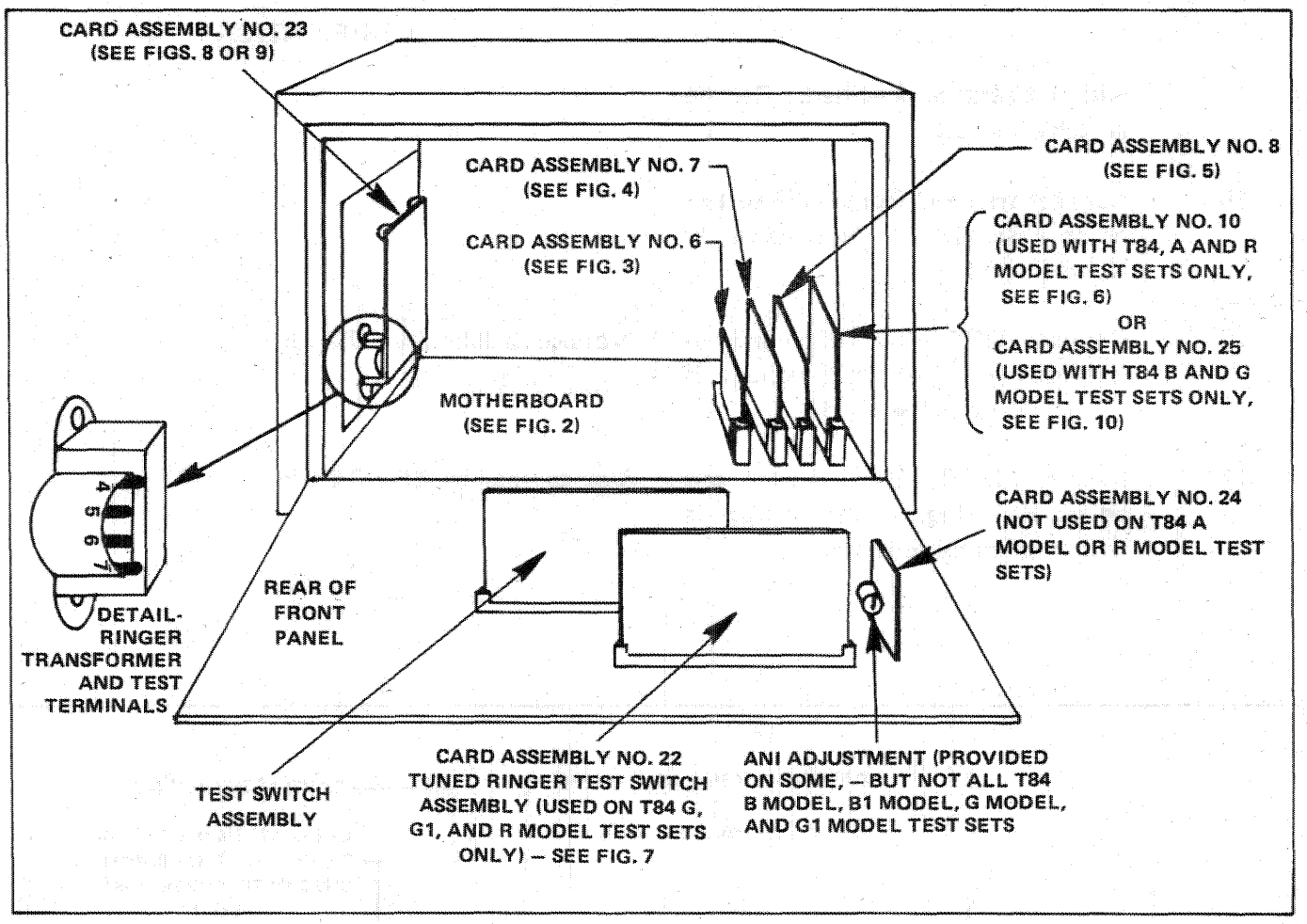


Fig. 1. Location of Major Assemblies, Seiscor T84 Series Telephone Test Sets

STEP	ACTION	VERIFICATION
11	Turn on test set.	
12	Depress LOOP TEST switch and adjust LL1 on Card Assembly No. 7 (refer to Fig. 4), as required until voltage is within tolerance specified.	Voltage shall be 2.8 ± 0.1 vdc. was 2.929 now 2.800
13	Depress XMTR LEVEL switch and adjust LL2 (Fig. 4) until voltage is within tolerance specified.	Voltage shall be 1.2 ± 0.2 vdc. was 1.344 now 1.200
14	Depress RCVR LEVEL switch and adjust LL3 (Fig. 4) until voltage is	Voltage shall be 0.4 ± 0.05 vdc. was .518 now .412

STEP	ACTION	VERIFICATION
	within tolerance specified. (Release switch after test.)	
15	Connect test lead from DVM to test point TP-HIGH of Card Assembly No. 8 (Fig. 5).	
16	Depress LOOP TEST switch and adjust HL1 (Fig. 4) until voltage is within tolerance specified.	Voltage shall be 7.4 ± 0.2 vdc. was 5.656 Now 7.904
17	Depress XMTR LEVEL switch and adjust HL2 (Fig. 4) until voltage is within tolerance specified.	Voltage shall be 7.5 ± 0.2 vdc. was 7.738 Now 7.501

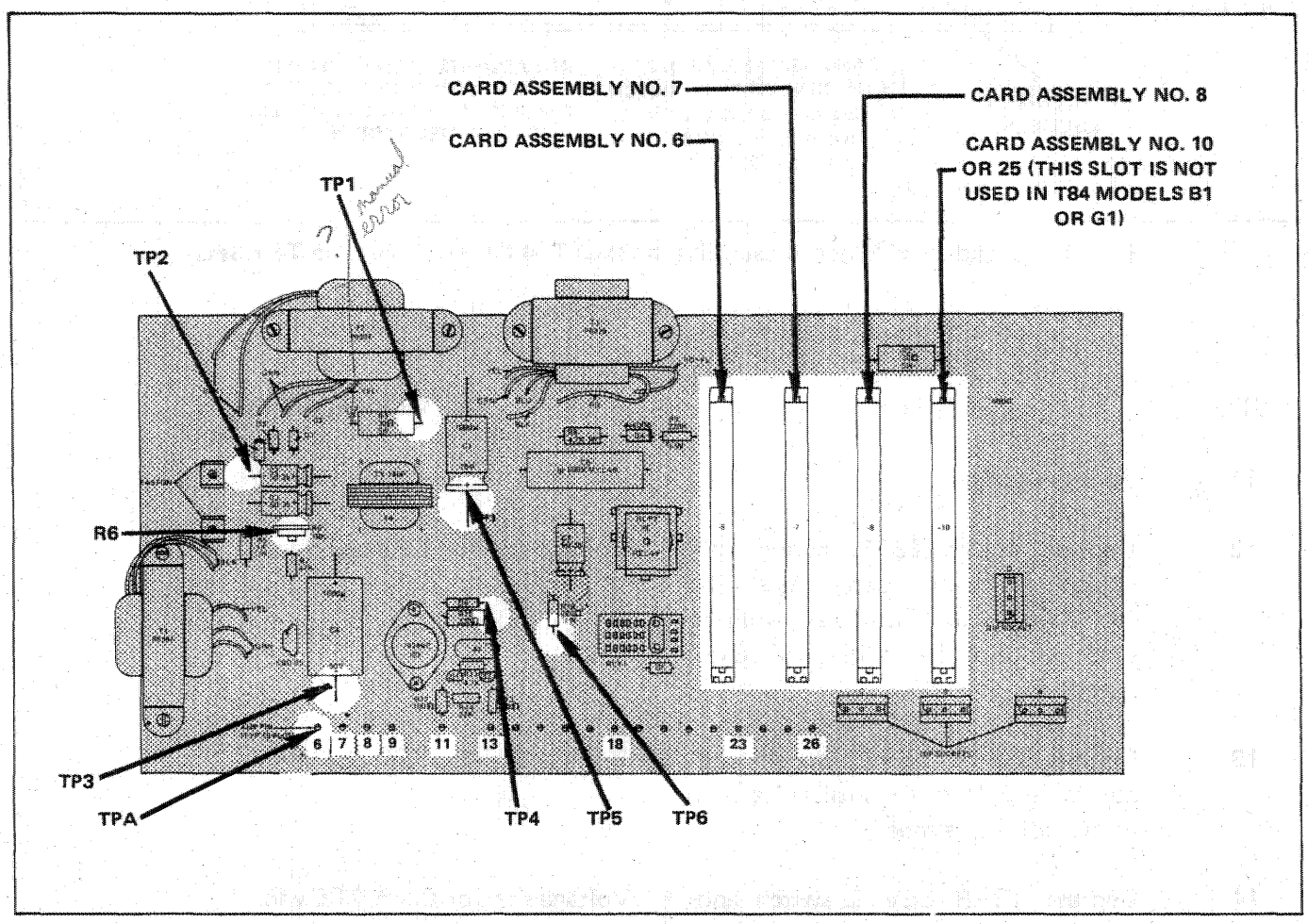


Fig. 2. Motherboard, Test Point and Adjustment Locations

STEP	ACTION	VERIFICATION
18	Depress RCVR LEVEL switch and adjust HL3 (Fig. 4) until voltage is within tolerance specified. (Release switch after test.)	Voltage shall be 4.0 ± 0.1 vdc. was 4.123 4.001
19	Turn off test set, and reinstall Card Assembly No. 8 in slot 8 of test set.	
20	Turn on test set.	
21	Depress LOOP TEST switch and verify the following test set response using a 50 ohm, 270 ohm, and a 470 ohm resistor (refer to items 16, 17, and 18 of paragraph 2.01), connected in sequence one-at-a-time between the red and green spade tip terminals at the front of test set.	50 ohm resistor connected between spade tip terminals: FAIL LED shall illuminate. ok 270 ohm resistor connected between spade tip terminals: PASS LED shall illuminate. ok 470 ohm resistor connected between spade tip terminals: FAIL LED shall illuminate. ok
22	Depress XMTR LEVEL switch. A "white noise" sound shall be audible from the XMTR coupler of test set for the time period specified in the VERIFICATION column, at which time a 1000 Hz tone shall be audible. ok	Adjust R28 on Card Assembly No. 7 (Fig. 4), as required, until the "white noise" sound is on for approximately one to two seconds. (The XMTR LEVEL switch will have to be released, then depressed again each time the "white noise" on time is measured.) 1.5 SECONDS
23	Connect ground lead from the oscilloscope to TPA of motherboard (Fig. 2).	
24	Connect the test lead from the oscilloscope to the red spade tip input terminal on front of test set. If signal is not received on red spade tip terminal, operate tip party switch to check for signal. *NOTE:* Test sets manufactured after January 1979 have output signal on green spade tip terminal.	manual error? ? 12VDC
25	Connect test telephone (item 7 of paragraph 2.01) to panel connector of test set (telephone must be in off-hook condition).	

STEP	ACTION	VERIFICATION
26	Depress RCVR LEVEL switch and adjust R20 of Card Assembly No. 7 (Fig. 4), as necessary until voltage is within tolerance specified.	Voltage read on scope shall be as near as possible to 0.650 v p-p. meas .700 with push button plane .650 now
27	Move oscilloscope ground lead to the ground lead from the XMTR coupler. Connect test lead from scope to the signal lead (ungrounded lead) to XMTR coupler pad.	
28	Depress XMTR LEVEL switch.	
29	Adjust R16 on Card Assembly No. 7 (Fig. 4), as necessary, until voltage is within tolerance specified.	Voltage read on scope shall be as near as possible to 0.175 v p-p. meas .225 now .175
30	Release XMTR LEVEL switch.	
31	Turn off test set and disconnect all test equipment.	

B. 500 Volt Breakdown Test/Adjustment

CANT DO NEED A T6 BREAKDOWN BASE

3.06 Follow these steps:

STEP	ACTION	VERIFICATION
1	Ensure test set is turned off.	
2	Connect a T6 Breakdown Base into test set receptacle provided.	
3	Use test leads, as required, and interconnect all four of the T6 base pins (all must be connected together in order to continue this test).	
4	Turn on test set.	
5	Depress and hold down 500V BKDN switch of test set.	The 500V READY indicator at upper right of test set shall illuminate.
6	While still holding the 500V BKDN switch depressed, depress the 500V READY switch.	Either the PASS or FAIL LED shall illuminate for approximately one to two seconds. *NOTE:* If "on time" for LED is as specified, go directly to step 8.

STEP	ACTION	VERIFICATION
7	If "on time" specified in step 6 is not within tolerance, release switches and start adjusting R11 of Card Assembly No. 6 (Fig. 3) and repeating steps 5 and 6 until the "on time" is as specified.	PASS or FAIL LED shall illuminate from one to two seconds when R11 is correctly adjusted (and when steps 5 and 6 are repeated).
8	Release 500V BKDN and 500V READY switches.	
9	Insert the 20 megohm resistor (item 15 of paragraph 2.01) spade tip terminated end into any of the test set spade tip terminal inputs.	
10	Set DVM to a scale of 1000 vdc (minimum), and connect ground lead to TPA of motherboard (Fig. 2). Connect positive lead from meter to spade tip terminated end of 20 megohm resistor.	
11	Set R6 of motherboard (Fig. 2) to full counterclockwise position.	
12	Depress and hold down 500V BKDN switch, then depress and hold down the 500V READY switch.	The PASS LED shall illuminate and DVM shall read 500 ± 70 vdc for one to two seconds.
13	Set R6 (Fig. 2) to full clockwise position.	
14	Depress and hold down 500V BKDN switch, then depress and hold down 500V READY switch.	FAIL LED shall illuminate and DVM shall read 20 ± 10 vdc for one to two seconds.
15	Release both switches and connect a test lead from the interconnected T6 base pins to the free end of the 20 megohm resistor.	

STEP	ACTION	VERIFICATION
16	Depress and hold down 500V BKDN then 500V READY switches, check voltage, then release switches and adjust R6 (Fig. 2) counterclockwise, as required until requirements in VERIFICATION column are satisfied. (Repeat this step as many times as necessary to meet the requirements.)	PASS LED shall just illuminate and voltage shall read 500 ± 70 vdc.
17	Turn R6 an additional 1/16 inch (approximately) counterclockwise.	
18	As a final check of this adjustment, depress and hold down first 500V BKDN then the 500V READY switches.	PASS LED shall illuminate, and voltage shall read 500 ± 70 vdc.
19	Remove 20 megohm resistor from test set and insert 1.1 megohm resistor (item 14 of paragraph 2.01) spade tip terminated end into any of the test set spade tip terminal inputs.	
20	Connect the test lead from the interconnected pins of the T6 base to the free end of the 1.1 megohm resistor.	
21	Connect the positive lead from DVM to the spade tip terminated end of 1.1 megohm resistor.	
22	Depress and hold down first 500V BKDN then 500V READY switches.	The FAIL LED shall illuminate and voltage shall read 20 ± 10 vdc for one to two seconds.
23	Turn off test set, and disconnect all test equipment.	

C. Dial Speed and Ratio Test/Adjustment

3.07 Follow these steps:

STEP	ACTION	VERIFICATION
1	Ensure test set is turned on.	
2	Temporarily close front panel of test set and adjust "zeroing" screw of dial speed/ratio meter until needle is aligned with reference mark at left of meter.	
3	Connect a Seiscor T100 Dial Pulse Standard to the red and green spade tip terminals at front of test set.	
4	Set T100 selector switch to AUTO/10 or MANUAL/10 position and set SPEED/PPS switch to 10.	

NOTE 1: If T100 standard is set to AUTO/10, 10 output pulses will be applied to test set automatically every 1.5 seconds.

NOTE 2: In the following steps, if a T84 A Model or R Model set is under test during the % Break Test (only) the PASS LED will remain continuously illuminated (unless a dial noise test is being conducted using a rotary dialing telephone, in which case the PASS LED shall illuminate if dial is not noisy, or the FAIL LED shall illuminate for a noisy dial).

NOTE 3: If a T84 B Model, B1 Model, G Model, or G1 Model test set is being tested, the indicator labeled PULSE COUNT = 10 will illuminate for approximately one second at the end of each 10-count pulse train. If any other count (e.g., 9- or 11-count pulse train) is applied, none of the LED indicators will illuminate.

5	Depress % BREAK switch of test set.	
6	Refer to Note 1 and apply a 10-count pulse train to test set.	On T84 A Model and R Model test sets (only) adjust R15 of Card Assembly No. 8 (Fig. 5) until the pointer of meter is centered in the black RATIO band. On the rest of the T84 series test sets adjust R15 (Fig. 5) until the pointer of meter is exactly lined up with the % BREAK/% MAKE "60/40" mark on meter.

STEP	ACTION	VERIFICATION
	NOTE 4: This completes the % BREAK test. In the following steps (during DIAL SPEED test only) if a T84 A Model or R Model (only) set is under test, the PASS LED will illuminate for approximately one second at the end of each 10-count pulse train. If any other pulse count (e.g., 9 or 11, etc., pulse train) is applied the FAIL LED will illuminate.	
7	Depress DIAL SPEED switch of test set.	On T84 A Model and R Model test sets (only) adjust R8 on Card Assembly No. 8 (Fig. 5) until the pointer of meter is centered in the black SPEED band. On all the rest of the T84 series test sets adjust R8 (Fig. 5) until pointer of meter is exactly lined up with the SPEED "10" mark on meter.
8	Turn off test set and disconnect all test equipment.	
9	Secure panel of test set by closing panel and turning locking screws clockwise.	

T84 STRAIGHT LINE RINGING TEST SETS (ONLY) TEST AND CALIBRATION PROCEDURES

3.08 The following test and calibration procedures apply to only the T84 staight line ringer test sets (i.e., the A Model, B Model, and B1 Model test sets).

STEP	ACTION	VERIFICATION
1	Ensure that test set is connected to 110 vac grounded power source and turned off.	
2	On T84 B Model, B1 Model, G Model, and G1 Model test sets, only, "zero" the AC VOLTS meter.	
	CAUTION: Test set must be turned off while "zeroing" this meter, or setting will not be valid.	

STEP	ACTION	VERIFICATION
3	Fully depress RING TEST switch.	
4	Unlock front panel of test set (turn two locking screws on panel counter-clockwise) and open the panel for access to the interior of set.	
5	Refer to Fig. 1 and Fig. 8 and connect the frequency counter ground lead to the GROUND FOIL of Card Assembly No. 23, and the test lead to TPF.	
6	Connect the test telephone (item 7 of paragraph 2.01) to the red and green spade tip terminals of test set. (Telephone must be in "on-hook" condition.)	
7	Connect DVM ground lead to the green spade tip terminal of test set and the test lead to the red spade tip terminal.	
8	Connect ground leads from both oscilloscope and distortion analyzer to terminal 4 of ringer transformer (see detail of Fig. 1).	
9	Connect test lead from analyzer to terminal 5 of ringer transformer.	
10	Connect oscilloscope test lead to terminal 6 of ringer transformer.	
11	Refer to Fig. 8 and set R2 of Card Assembly No. 23 to mid position.	
12	Turn on test set. (On T84 B Model and B1 Model Test Sets, set RINGER VOLTAGE control to align knob pointer with black line on panel leading to AC VOLTS meter.)	Telephone will ring if ringing voltage is at least 60 vac (and if ring frequency is correct: 20/30 Hz).

STEP	ACTION	VERIFICATION
13	Adjust R6 of Card Assembly No. 23 (Fig. 8) until voltage is as specified in VERIFICATION column.	For 20 Hz ringers the ringing voltage shall be 95 ± 3 vrms. For 30 Hz ringers the ringing voltage shall be 105 ± 3 vrms.
14	Refer to Fig. 8 and adjust FREQUENCY POTENTIOMETER until period of frequency is as specified in VERIFICATION column.	For 20 Hz ringer, period shall be 50.00 ms. For 30 Hz ringer, period shall be 33.30 ms.
15	Set switch on distortion analyzer to SET LEVEL position, and use SET LEVEL control to set analyzer meter to full scale.	
16	Set distortion analyzer to read distortion and null meter until lowest per cent null is obtained.	
17	Adjust R2 on Card Assembly No. 23 (Fig. 8) while continually nulling meter on analyzer until minimum per cent null is obtained.	R2 will be set to obtain the minimum null (least distortion in ringing signal).
18	Verify that ringing voltage and frequency is correct, by repeating steps 13 and 14.	For 20 Hz ringers the ringing voltage shall be 95 ± 3 vrms. For 30 Hz ringers the ringing voltage shall be 105 ± 3 vrms.
19	Turn off distortion analyzer and disconnect from test set.	
20	Depress LOW RING switch.	Voltage read on DVM shall be 62 ± 3 vrms for 20 Hz ringing sets. Voltage read on DVM shall be 69 ± 3 vrms for 30 Hz ringing sets.
21	Depress BELL TAP switch.	Voltage read on DVM shall be 42 ± 3 vrms for 20 Hz ringing sets. Voltage read on DVM shall be 48 ± 3 vrms for 30 Hz ringing sets.
22	Turn off test set and disconnect all test equipment.	

STEP	ACTION	VERIFICATION
23	Secure panel of test set by turning locking screws clockwise.	

T84 TUNED RINGER TEST SETS TEST AND CALIBRATION PROCEDURES

3.09 The following test and calibration procedures apply only to the T84 G Model, G1 Model, and R Model Telephone Test Sets. These sets provide the capability for testing tuned ringer telephone equipment. Follow these steps:

STEP	ACTION	VERIFICATION
1	Ensure that test set is turned off.	
2	On T84 B Model, B1 Model, G Model, and G1 Model test sets, only, "zero" the AC VOLTS meter.	
	CAUTION: Test set must be turned off while "zeroing" this meter, or setting will not be valid.	
3	On T84 G Model and G1 Model Test Sets, fully release SL/FQ switch (straight line mode). On T84 R Model Test Sets, set STRAIGHT/TUNED switch to STRAIGHT position.	
4	On T84 G Model and G1 Model Test Sets, fully depress switches "D" and "50/54/50," and set the RINGER VOLTAGE control to align knob pointer with the black line to AC VOLTS meter. On T84 R Model Test Sets, fully depress switches "DECI" and "50/54/50."	
5	Fully depress RING TEST switch.	
6	Unlock front panel of test set (turn	

STEP	ACTION	VERIFICATION
	two locking screws on panel counterclockwise) and open the panel for access to the interior of set.	
7	Refer to Fig. 1 and Fig. 9 and connect the frequency counter ground lead to the GROUND FOIL of Card Assembly No. 23, and the test lead to TPF.	
8	Connect the test telephone (item 7 of paragraph 2.01) to the red and green spade tip terminals of test set. (Telephone must be in "on-hook" condition.)	
9	Connect DVM ground lead to the green spade tip terminal of test set and the test lead to the red spade tip terminal.	
10	Connect ground leads from both oscilloscope and distortion analyzer to terminal 4 of ringer transformer (see detail of Fig. 1).	
11	Connect test lead from analyzer to terminal 5 of ringer transformer.	
12	Connect oscilloscope test lead to terminal 6 of ringer transformer.	
13	Refer to Fig. 9 and set R2 of Card Assembly No. 23 to mid position.	
14	Turn on test set.	Telephone may or may not ring. was 119 Now 124.8
15	Adjust R6 of Card Assembly No. 23 (Fig. 9) until voltage is as specified in VERIFICATION column.	Voltage shall be approximately 125 vrms (minimum). (If the ringing frequency is correct, the period shall be approximately 20 ms. The correct period/frequency will be established, if necessary, in the steps which follow.)
16	Set switch on distortion analyzer to SET LEVEL position, and use	

STEP	ACTION	VERIFICATION
	SET LEVEL control to set analyzer meter to full scale.	
17	Set distortion analyzer to read distortion and null meter until lowest per cent null is obtained.	
18	Adjust R2 on Card Assembly No. 23 (Fig. 9) while continually nulling meter on analyzer until minimum per cent null is obtained.	R2 will be set to obtain the minimum null (least distortion in ringing signal).
19	Turn off distortion analyzer and disconnect from test set.	
20	Refer to Fig. 7 which shows the location of all tuned ringer adjustment potentiometers for the tuned ringer switch assembly (Card Assembly No. 22). Depress ringer switch "16-2/3," and switch "H" or "HARM."	The voltage shall read 90 vrms, minimum. was 99.7 now 90.1

NOTE 1: If voltage is lower than specified in step 20, adjust 16-2/3 AMPLITUDE potentiometer until voltage reads as specified. If voltage cannot be achieved with the potentiometer adjust R6 on Card Assembly No. 23 until voltage reads as specified.

21	With ringer switch "H" or "HARM" still fully depressed, depress ringer switch "66-2/3."	The voltage shall read 140 vrms, minimum. was 139.5 140.1

NOTE 2: If voltage is lower than specified in step 21, adjust 66-2/3 AMPLITUDE potentiometer until voltage reads as specified. If voltage cannot be achieved, the test set is defective.

STEP	ACTION	VERIFICATION	
		FREQ POT	PERIOD (MS)
22	Refer to Fig. 7 and set all FREQUENCY potentiometers listed in VERIFICATION column to the periods specified (use frequency select switches of tuned ringer switch assembly to select the frequencies).	16.9 16-2/3	Approximately 60
		19.9 20	50.00
		25.1 25	40.00
		30.1 30	33.30
		33.3 33-1/3	30.00
		40.1 40	25.00
		42.1 42	23.80
		50.1 50	20.00
		54.1 54	18.51
	NOTE! CHANGED 2KΩ → POT TO 5KΩ	60.1 60 WAS 66.3	16.66
		66.3 66	15.15
		66.7 66-2/3	15.00 was 14
23	Refer to Fig. 7 and adjust all AMPLITUDE potentiometers until DVM reads the values specified in the VERIFICATION column. (Use frequency select switches of tuned ringer switch assembly to select the frequencies.)	AMP POT	VOLTAGE
		16-2/3	90 ± 3 vrms
		20	95 ± 3 vrms
		25	100 ± 3 vrms
		30	105 ± 3 vrms
		33-1/3	110 ± 3 vrms
		40/42	115 ± 4 vrms
		50	125 ± 4 vrms
		54	125 ± 4 vrms
		60	135 ± 4 vrms
		66/66-2/3	140 ± 4 vrms
24	Repeat steps 22 and 23 and verify that none of the ringing frequencies have changed. *NOTE:* If any of the frequencies have changed, readjust, as necessary, then repeat steps 22 and 23.	All frequencies shall be as specified in step 22.	
25	On T84 G Model and G1 Model test sets, fully depress the SL/FQ switch on tuned ringer switch assembly. On T84 R Model test sets, set STRAIGHT/TUNED switch to TUNED position.		
26	Depress LOW RING switch (with test telephone still on-hook).	Telephone may or may not ring.	

STEP	ACTION	VERIFICATION

NOTE 3: Refer to Fig. 7. This illustration shows the correct location of the LOW RING 35 VOLT POTENTIOMETER and the LOW RING 45 VOLT POTENTIOMETER. Disregard the markings actually on the foil of the tuned ringer assembly.

NOTE 4: The T84 R Model test set is not equipped with these adjustments. The two low ring voltages are set at the factory using fixed resistors. 12-14 Vrms

STEP	ACTION	VERIFICATION	
27	As necessary, adjust LOW RING 35 VOLT POTENTIOMETER (Fig. 7) until DVM reads the voltage specified in the VERIFICATION column for the frequencies given.	FREQUENCY (HZ) 16-2/3 20 25 30 33-1/3	VOLTAGE 35 ± 1 vrms
28	As necessary, adjust LOW RING 45 VOLT POTENTIOMETER (Fig. 7) until DVM reads the voltage specified in the VERIFICATION column for the frequencies given.	FREQUENCY (HZ) 40/42 50 54 60 66/66-2/3	VOLTAGE 45 ± 1 vrms

NOTE 5: If the voltage specified for the group of frequencies in either (or both) steps 27 and 28 cannot be obtained for any one or more of the frequencies given, the test set is defective.

STEP	ACTION	VERIFICATION
29	If a T84 G Model or G1 Model test set is under test, release the SL/FQ switch. If a T84 R Model set is under test, set STRAIGHT/TUNED switch to STRAIGHT position.	
30	Set up a straight line ringing output by depressing the "S" or "D" switches (T84 G Model or G1 Model test sets) or "SYNC" or "DECI" switches (T84 R Model test sets), and then depressing the 20 Hz ringing frequency switch.	
31	Depress HIGH RING switch.	The ringing voltage shall be 95 ± 3 vrms.
32	Depress LOW RING switch.	The ringing voltage shall be 62 ± 3 vrms. 14.5 ?

STEP	ACTION	VERIFICATION
33	Depress BELL TAP switch.	The ringing voltage shall be 42 ± 3 vrms. 43.5 OK
34	Turn off test set and disconnect all test equipment.	
35	Secure panel of test set by closing panel and turning locking screws clockwise.	

T84 DIGITAL READOUT TOUCHTONE TEST SETS TEST AND CALIBRATION PROCEDURES

3.10 The following test and calibration procedures apply only to the T84 B Model and G Model Telephone Test Sets. These sets provide a digital readout of both frequency and amplitude during tone dialing tests on telephone equipment. Follow these steps:

STEP	ACTION
1	Ensure that test set is turned off.
2	Unlock front panel of test set (turn two locking screws on panel, counterclockwise) and open the panel for access to the interior of set.
3	Remove Card Assembly No. 25 (Fig. 1) from test set slot.
4	Connect ground lead of audio oscillator and DVM to green spade tip terminal of test set.
5	Set SHORT LOOP/LONG LOOP switch to SHORT LOOP position and depress TOUCHTONE switch.
6	Turn on test set.
7	Insert test capacitor (item 19 of paragraph 2.01) into red spade tip terminal of test set, and apply 0.500 ± 0.005 vac at 1000 ± 10 Hz from audio oscillator to free end of capacitor.
8	Measure voltage at TPX then TPY (refer to Fig. 10). Voltage at both test points shall be 0.495 to 0.505 vac.
9	Compare the frequency of the audio oscillator and the frequency read from the test set digital frequency indicator. These frequencies shall agree within ± 2 Hz.
10	Disconnect ribbon cable from output of Card Assembly No. 25 (remove cable from DIP socket, see Fig. 10). *NOTE 1:* The cable must be removed from the assembly to stabilize the voltage reading to be made in step 11.
11	Connect DVM lead to TPZ (Fig. 10)

STEP	ACTION
	and adjust R21, as necessary, until voltage read from test set digital voltmeter agrees with test DVM within ± 0.002 vac. This voltage shall be between 0.390 and 0.407 vac.
	NOTE 2: If requirements of step 11 cannot be met, the test set or one of the card assemblies is defective.
12	Turn off test set and disconnect all test equipment.
13	Install ribbon cable into DIP socket of Card Assembly No. 25 and reinstall this assembly back into test set.
14	Secure panel of test set by closing panel and turning locking screws clockwise.

T84 TOUCHTONE LED READOUT VERIFICATION TEST

CANT DO NEED

3.11 The following tests apply only to the T84 A Model, B1 Model, G1 Model, and R Model Telephone Test Sets. These test sets test touchtone telephones by illuminating an LED on the panel which corresponds to the number depressed on the tone dialing test telephone. All four of these models of test sets require that a Seiscor T8 KTU be installed either outside the cabinet for the T84 A Model and R Model Test Sets, or inside the cabinet for the T84 B1 Model and G1 Model Test Sets. Follow these steps:

STEP	ACTION	VERIFICATION
1	Ensure that test set is turned off.	
	NOTE 1: This test is made without opening the front panel of test set.	
2	Connect a known working tone dialing telephone (item 8 of paragraph 2.01) to one of the input receptacles (spade tip, portable, or modular) of test set.	
3	Fully depress TOUCH TONE switch, then turn on test set.	
4	Place telephone in an off-hook condition.	

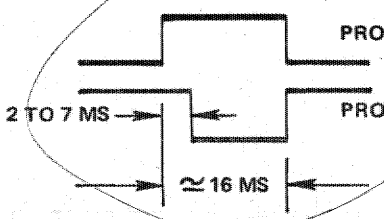
STEP	ACTION	VERIFICATION
5	Depress, in sequence, tone buttons 1, 3, 4, 5, 6, 7, 8, 9, 0, then tone button 2, two times. *NOTE:* Tone button 2 must be depressed two times in this test because the first time this digit is depressed it only activates a transfer function in the accessory equipment KTU and the tone is not applied to the test set digit test circuit. The second time a 2 digit is depressed, the tone is applied through the KTU to the test set to complete the test.	As each tone button is depressed, a TONE DIALING DIGIT LED INDICATOR corresponding to the tone dial button depressed shall illuminate. Indicator 22 shall illuminate after the digit 2 is depressed two times.

T84 CORD TEST SETS TEST AND CALIBRATION PROCEDURES

3.12 The following test and calibration procedures apply only to the T84 A Model and R Model Telephone Test Sets. These sets provide cord test capability for telephone and handset cords. Follow these steps:

STEP	ACTION
1	Ensure that test set is turned off.
2	Unlock front panel of test set (turn two locking screws on panel counterclockwise) and open the panel for access to the interior of set.
3	Remove Card Assembly No. 10 (Fig. 1) from test set slot, and insert into an extender card assembly.
4	Insert extender card assembly connector into test set slot 10/25.
5	Connect ground lead of oscilloscope of TPA of motherboard (refer to Fig. 2).
6	Connect probe 1 of scope to TPB of Card Assembly No. 10 (Fig. 6).
7	Connect probe 2 of scope to TPA of this card assembly.
8	Set both input channels of scope to 1 V/cm and set time base to 2 ms/cm.
9	Set CONTACT/NOISE switch of test set to CONTACT position.
10	Install a "known good" 4 conductor cord (item 12 of paragraph 2.01) into the appropriate "CORD TEST" receptacle, and set "CONDUCTORS" switch to position "5".
11	At rear of test panel, short together the two RETEST switch contacts using a test lead.
12	Adjust TIME DELAY ADJUSTMENT POTENTIOMETER of Card Assembly No. 10 (Fig. 6), as re-

STEP	ACTION
	quired, until the time delay is from 2 to 7 ms, as shown in figure below:



STEP	ACTION
13	Turn off test set and disconnect all test equipment.
14	Reinstall Card Assembly No. 10 in slot 10/25 of test set.
15	Secure panel of test set by closing panel and turning locking screws clockwise.

ANI CALIBRATION

3.13 This calibration procedure applies only to the T84 B Model, B1 Model, G Model, and G1 Model Test Sets. These test sets provide an ANI (Automatic Number Identification) test for telephone sets wired for automatic number identification. Follow these steps:

STEP	ACTION
1	Ensure that test set is turned off.
2	Unlock front panel of test set (turn two locking screws on panel counterclockwise) and open the panel for access to the interior of set.
3	Set NORMAL/ANI switch to ANI position.
4	Turn on test set.
5	Fully depress RING TEST switch.
6	Insert spade tip terminated ends of 3.3 kohm resistor (item 20 of paragraph 2.01) into green and yellow spade tip connectors on panel of test set.
7	Refer to Fig. 1 and turn ANI ADJUSTMENT potentiometer on Card Assembly No. 24, as required, until ANI TIP LED illuminates.
8	Remove 3.3 kohm resistor and insert spade tip terminated ends of 2.6 kohm resistor (item 21 of paragraph 2.01) into green and yellow spade tip connectors.
9	Repeat step 7, then remove 2.6 kohm resistor and repeat steps 6 and 7.
10	Repeat steps 6, 7, 8, and 9 until ANI TIP LED illuminates using either resistor.
11	Connect ANI test telephone (item 9 of paragraph 2.01) to applicable input receptacle of test set. (Telephone must be "off-hook.")
12	Dial a zero. During the pulsing period both the ANI TIP and ANI RING LEDs shall alternately illuminate.
13	Turn off test set and remove all test equipment.
14	Secure panel of test set by closing panel and turning locking screws clockwise.

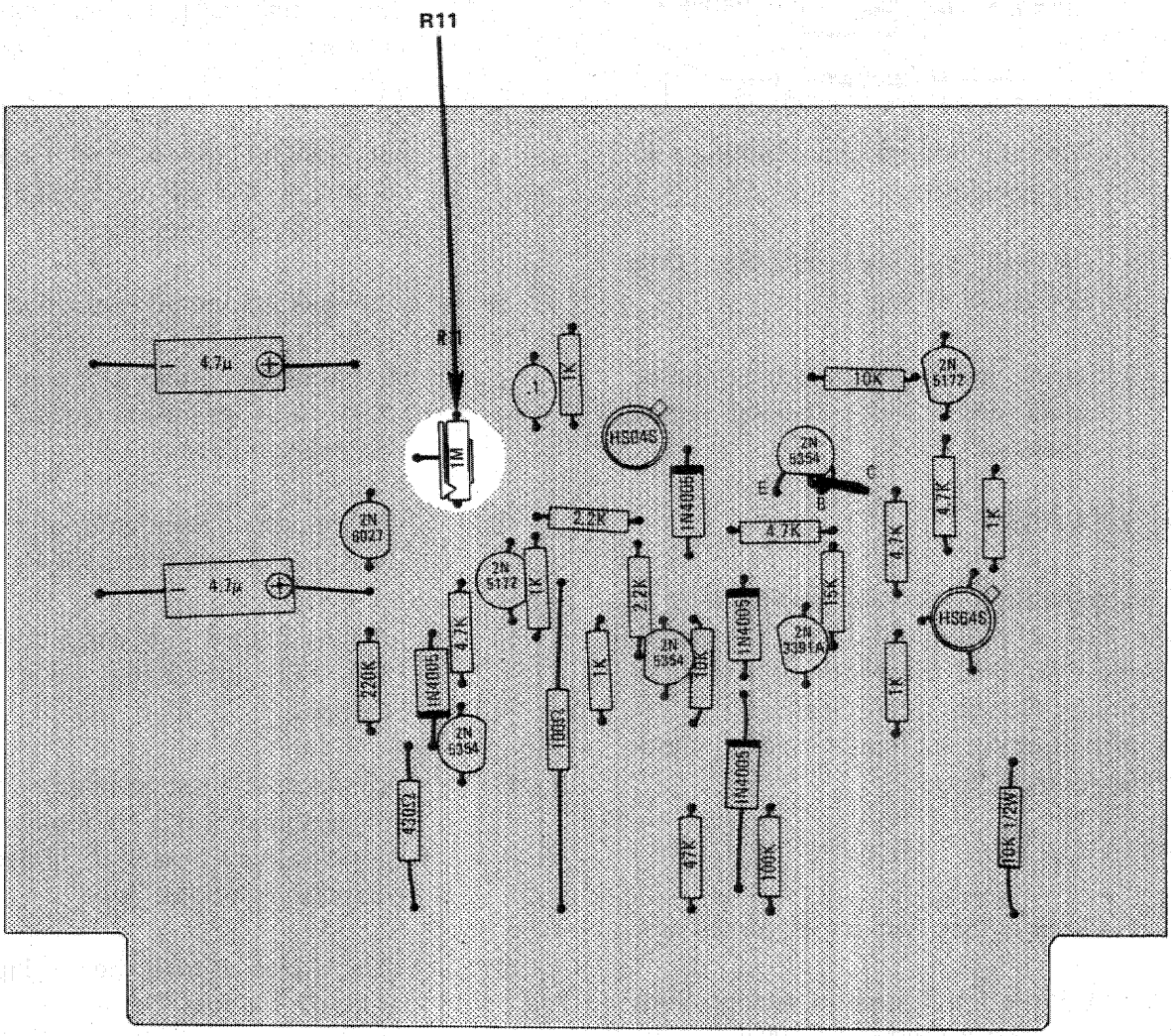


Fig. 3. Card Assembly No. 6, Adjustment Location

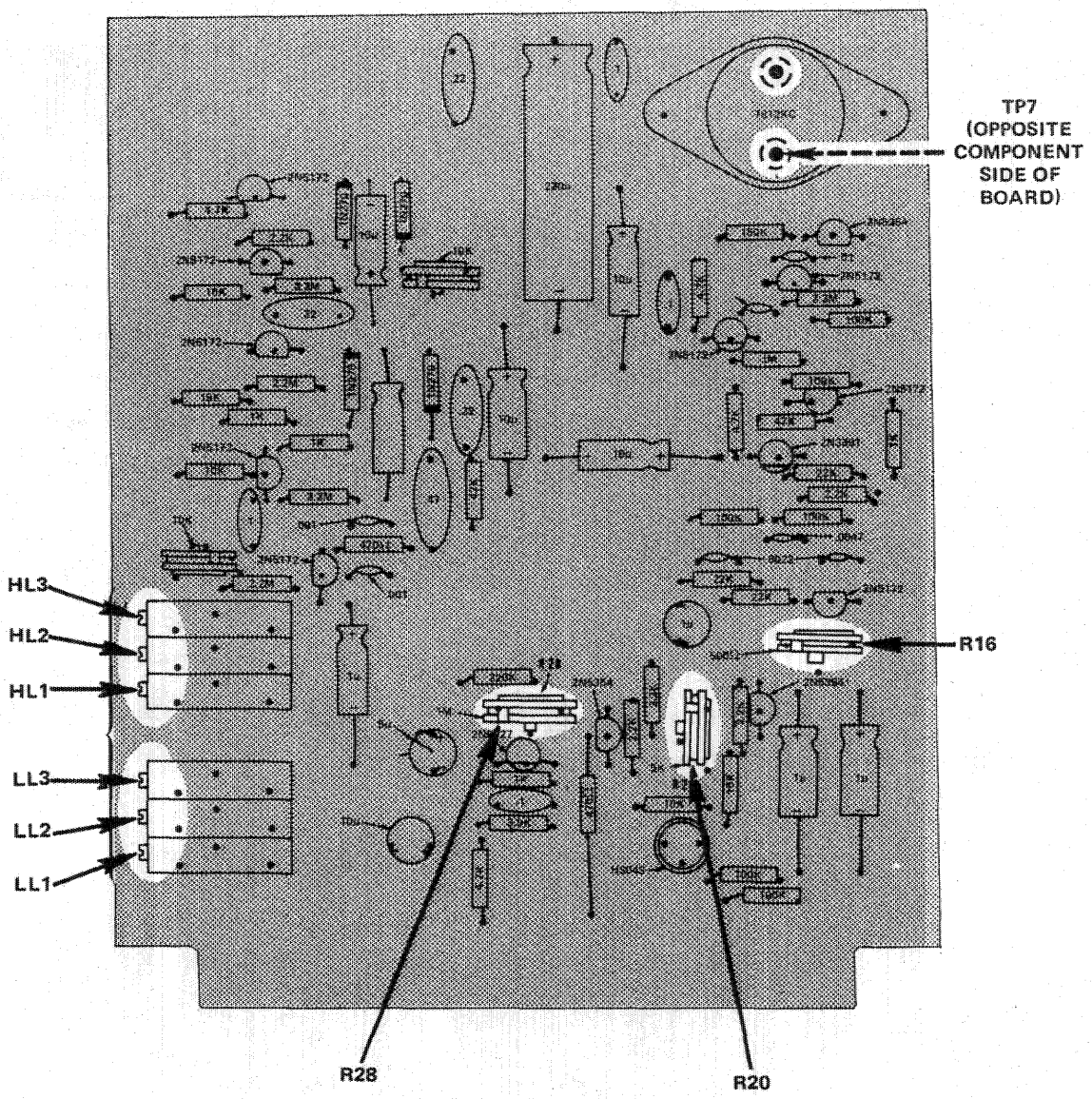


Fig. 4. Card Assembly No. 7, Adjustment Locations

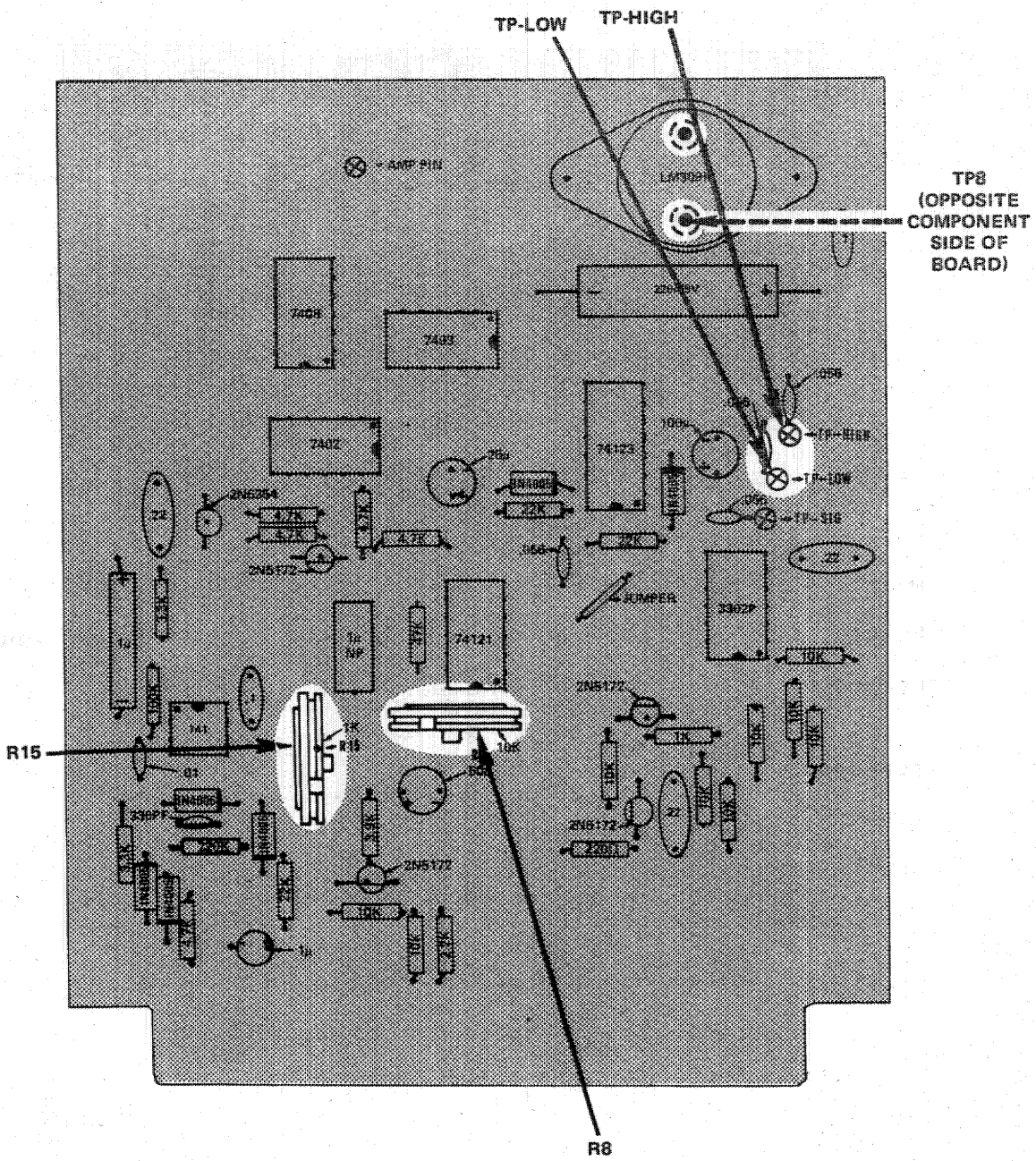


Fig. 5. Card Assembly No. 8, Test Point and Adjustment Locations

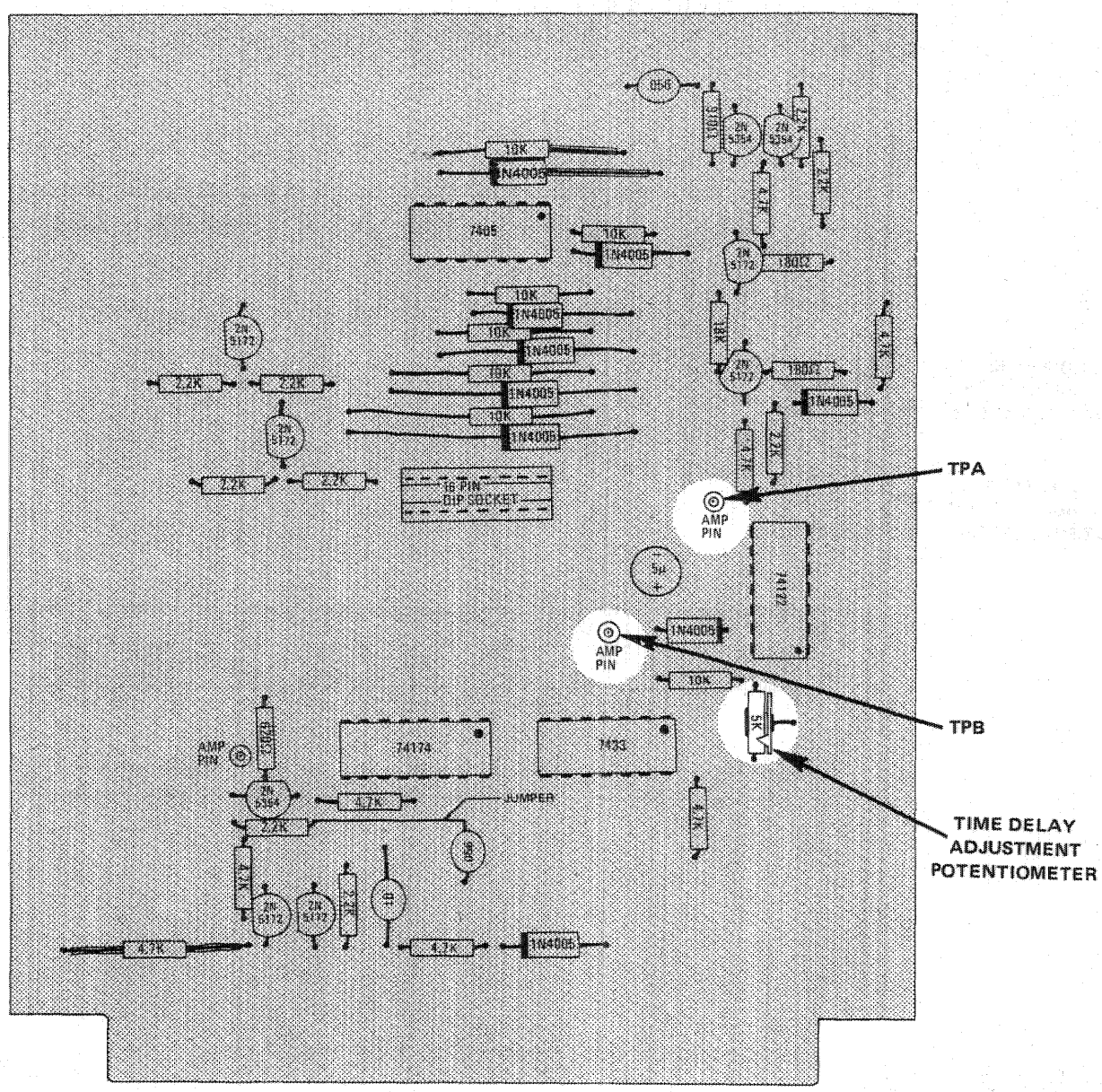


Fig. 6. Card Assembly No. 10, Test Point and Adjustment Locations

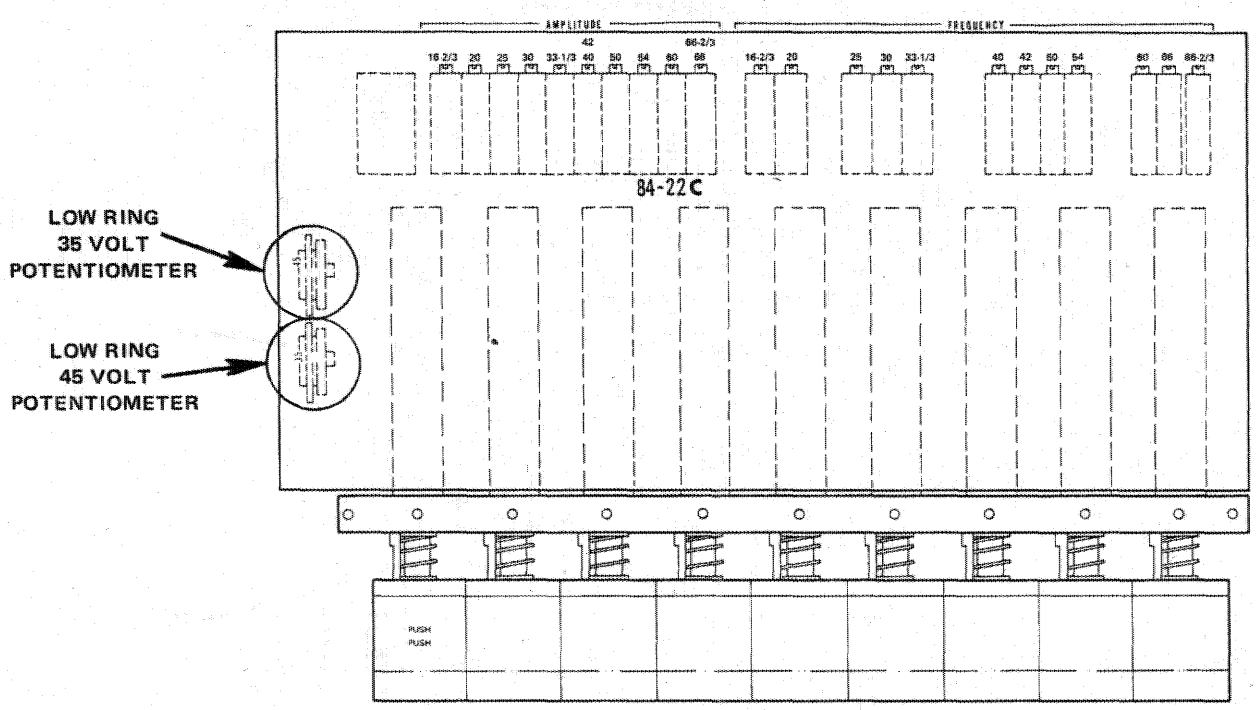


Fig. 7. Card Assembly No. 22 (Tuned Ringer Switch Assembly), Adjustment Locations

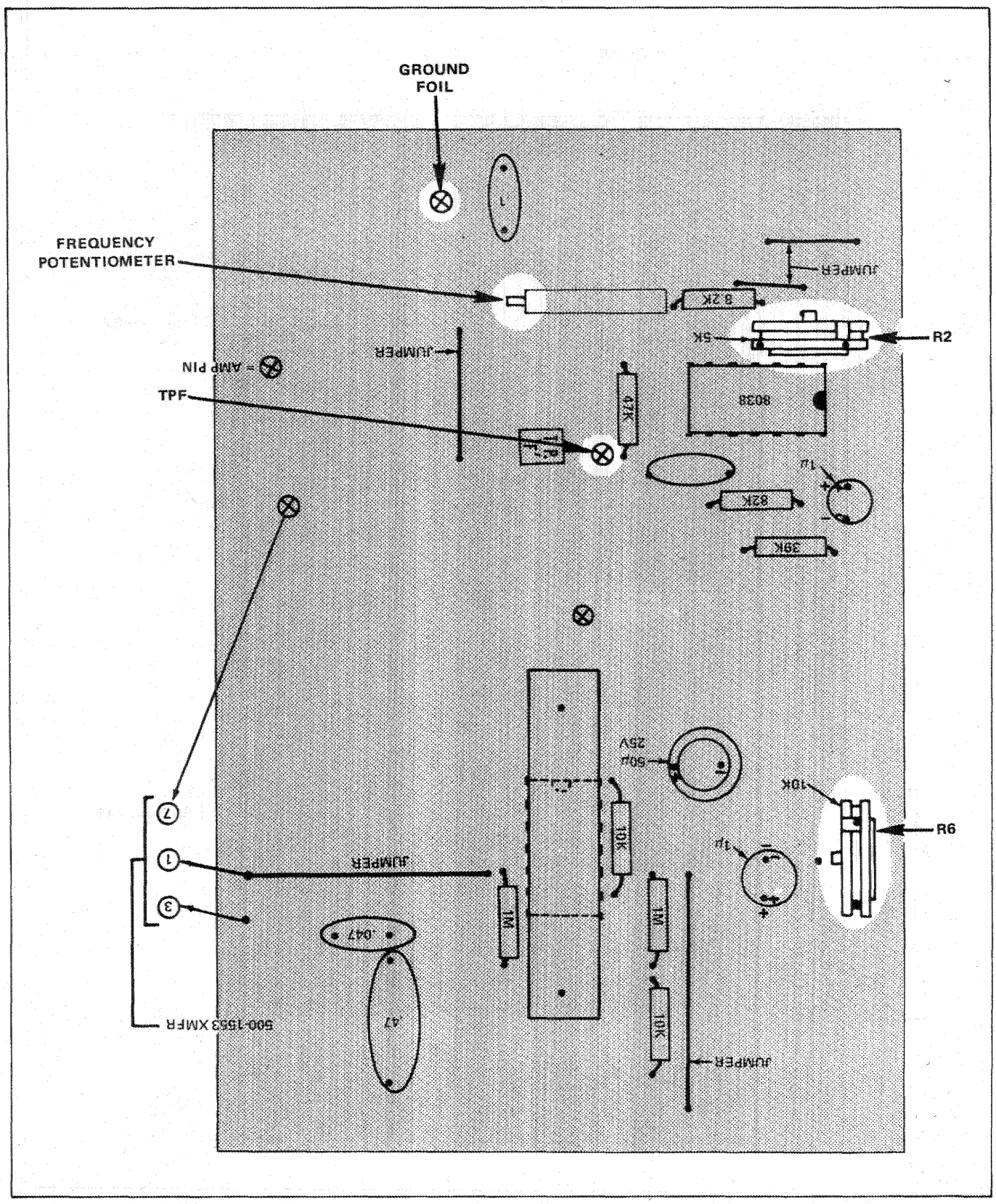


Fig. 8. Card Assembly No. 23, Straight Line Ringing Test Sets Only (T84 Models A, B and B1), Test Point and Adjustment Locations

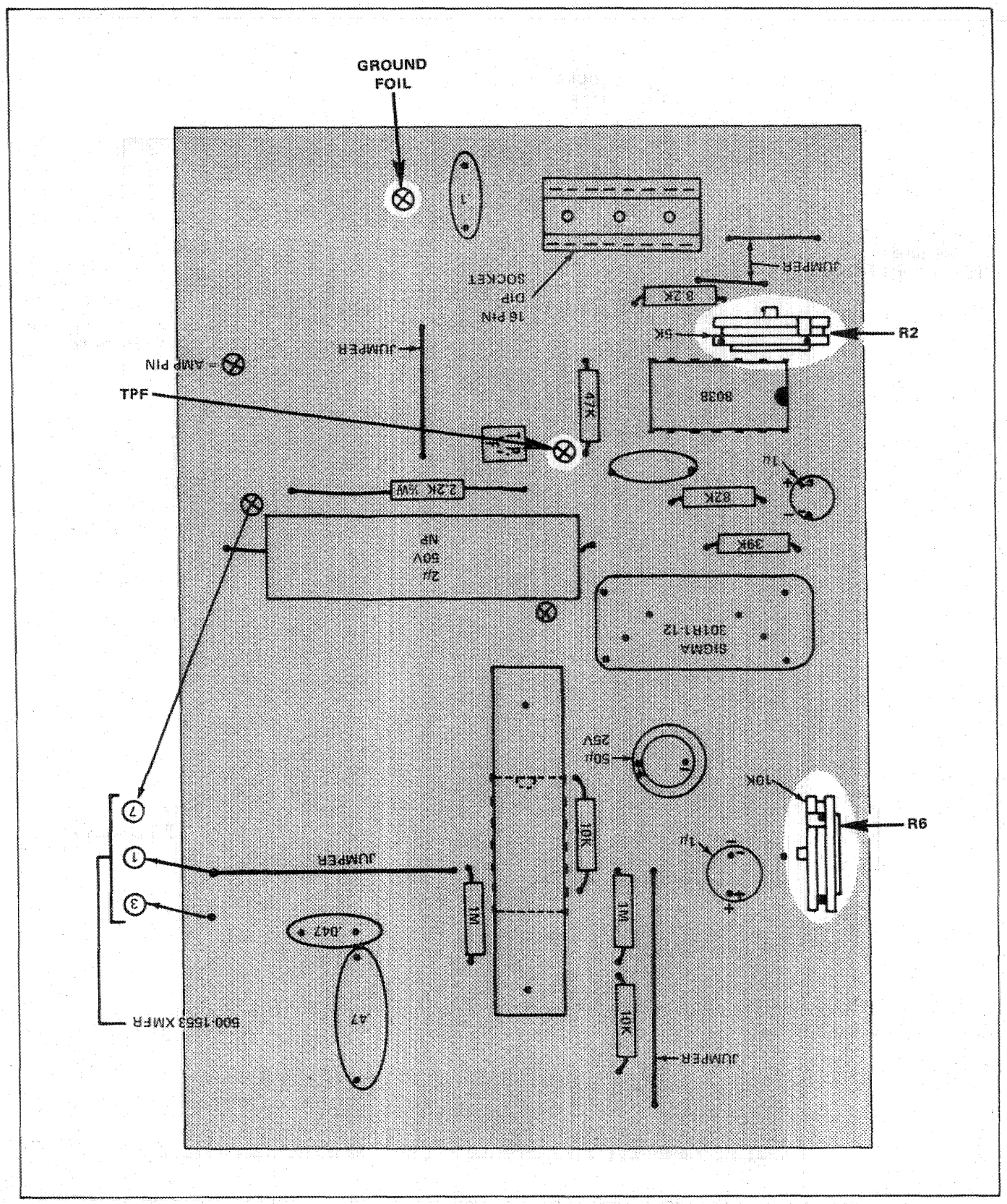


Fig. 9. Card Assembly No. 23, Tuned Ringer Test Sets Only (T84 Models G, G1 and R), Test Point and Adjustment Locations

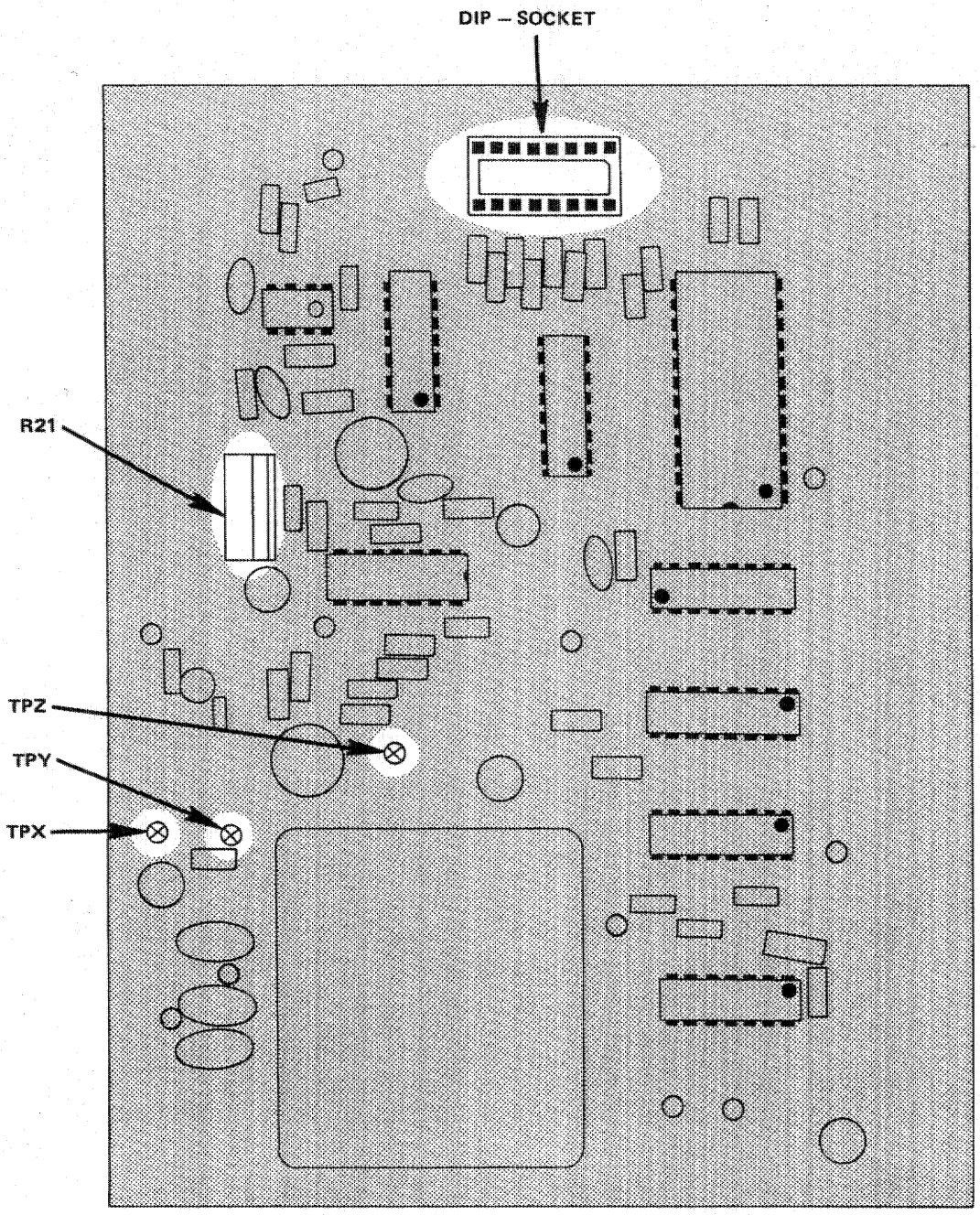


Fig. 10. Card Assembly No. 25, Test Point and Adjustment Locations

NOTES

SEISCOR
TELEPHONE EQUIPMENT
OPERATION MANUAL

T84/84R
TELEPHONE
TEST SET

Seismograph Service Corporation
A SUBSIDIARY OF RAYTHEON COMPANY

SEISCOR DIVISION
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PART NO. 9962-8213

TELEPHONE TEST EQUIPMENT

SEISCOR TELEPHONE TEST SET TYPES T-84/T-84R

GENERAL DESCRIPTION

OPERATION

TABLE OF CONTENTS

CONTENTS PAGE

SECTION 1

GENERAL DESCRIPTION

1. GENERAL

1.01 This section provides the General Description of the Seiscor Telephone Test Sets Type T-84 (T-84 Test Set), and Type T-84R (T-84R Test Set), and accessory equipment.

1.02 Whenever this practice is reissued, the reason for reissue will be listed in this paragraph.

1.03 Operation Information is included in Section 2.

2. APPLICATION

2.01 The T-84 and T-84R Test Sets and accessory equipment provide telephone installation and repair center personnel with a test capability for quickly verifying that new or used standard telephone sets, key telephone sets (six-key sets, only), individual bases, handsets, cords, and tone dialing Key Telephone Units (KTU's) are either "operational" or "defective." Operational units can then be classified as "ready for service" and defective units can be placed in a "to be repaired" status. The capability of these sets to determine quickly the "operational" or "defective" status of telephone equipment results in reduced repair and maintenance costs. In addition, the possibility of installing defective equipment is eliminated, which reduces lost time in installation, improves customer service, and reduces customer complaints.

2.02 Table A is a list of the most common telephone equipment that can be tested by these test sets. NOTE: The T-84 and T-84R Test Sets and accessory equipment can be used to test any telephone equipment as long as this equipment is equivalent to the units listed in Table A.

2.03 These test sets test telephone equipment on a simple pass/fail basis to the specifications listed in Table B. This table can be used to determine if telephone equipment not specifically listed in Table A can be tested by these test sets.

3. DESCRIPTION

T-84 TELEPHONE TEST SET

3.01 The T-84 Test Set is shown in Fig. 1. This unit is completely solid state in design and contains all of the controls, indicators, test connectors, and handset acoustic couplers required to test the equipment listed in Table A (or equivalent equipment). The test panel of the unit is designed to enable test personnel to quickly connect and test telephone equipment in a simple, logical sequence of steps. PASS/FAIL indications are provided by Light Emitting Diodes (LED's) and a

TABLE A

TYPICAL TELEPHONE EQUIPMENT TESTED BY T-84 AND T-84R TELEPHONE TEST SETS

DESCRIPTION	TYPICAL TELEPHONE COMPANY TYPE NO.
Non-Key, Rotary Dialing, Desk Telephone Set	500
Non-Key, Rotary Dialing, Wall Mounting Telephone Set	554
Non-Key, Tone Dialing, Desk Telephone Set	2500
Non-Key, Tone Dialing, Wall Mounting Telephone Set	2554
Six-Key, Rotary Dialing, Desk Telephone Set	564/565
Six-Key, Tone Dialing, Desk Telephone Set	2564/2565
Non-Key, Rotary Dialing, Desk Telephone Set	702
Non-Key, Tone Dialing, Desk Telephone Set	2702
Non-Key, Rotary or Tone Dialing, Dial-In-Handset, Desk or Wall Mounting Telephone Set	Trimline®
Telephone Handset	G-Type
Telephone Handset, Rotary Dialing, Dial-In-Handset	220
Telephone Handset, Tone Dialing, Dial-In-Handset	2220
Desk Telephone Base for Dial-In-Handset Telephone	ADI
Wall Mounting Telephone Base for Dial-In-Handset Telephones	ACI
Key Telephone Unit, Tone Dialing Telephone Sets	TD508
Key Telephone Unit, Tone Dialing Telephone Sets	TC1900
Modular Mounting Telephone Cords	
Handset Telephone Cords	
Trimline Handset Cords	
Spade Lug Terminated Telephone Cords	

NOTE: Unless otherwise specified, the telephone equipment described in this table does not have the dial in the handset.

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TABLE B

T-84 AND T-84R TELEPHONE TEST SET TEST SPECIFICATIONS

TEST	SPECIFICATIONS
LOOP TEST	A telephone set drawing less than 18 ma or greater than 55 ma will fail this test.
500 VOLT BREAKDOWN TEST	A telephone set will fail this test if the breakdown current is 225 microamperes or greater (this represents a leakage resistance of approximately 2.3 Mohms).
DIAL SPEED TEST	Nominal Pass Band: 9.4 to 11.2 Pulses Per Second (PPS).
DIAL PERCENT BREAK TEST	Nominal Pass Band: 58.2 to 63.8 percent break. 41.8 to 36.2 percent make.
TONE DIAL TEST	±1.75 percent of impressed frequency (T-8 KTU only). Tone dialing digit depressed must cause a correspondingly identified Light Emitting Diode (LED) on the test panel to illuminate.
TRANSMISSION TEST (TRANSMIT AND RECEIVE TEST)	Transmit Level: The minimum value of .42 v p-p at 1000 Hz is an unacceptable, or fail, condition at the tip and ring of the telephone instrument under test. Receive Level: A signal of 1000 Hz at .65 v p-p is applied to tip and ring and used as 0 dB reference level with a ±3 dB tolerance. NOTE: These tests are the electrical equivalent of an acoustical pressure test at 1000 Hz.
RING TEST	Straight Line Ring Test (T-84 and T-84R Test Sets)(1)(2) Normal: 95 to 105 volts at 20 Hz. Low Ring: 60 to 62 volts at 20 Hz. Bell Tap: 40 to 42 volts at 20 Hz. Tuned Ringer Test (T-84R Test Set only)(3)

Harmonic:

Frequency (Hz)	16-2/3	25	33-1/3	50	66-2/3
Normal Ring Voltage	90	100	110	125	140
Low Ring Voltage	35	35	35	45	45

Synchromonic:

Frequency (Hz)	20	30	42	54	66
Normal Ring Voltage(1)	95	105	115	125	140
Low Ring Voltage(4)	35	35	45	45	45

Decimonic:

Frequency (Hz)	20	30	40	50	60
Normal Ring Voltage(1)	95	105	115	125	135
Low Ring Voltage(4)	35	35	45	45	45

(1) All voltages are rms ±5%.
(2) Straight line ringer loudness control must be set to "low" position.
(3) Tuned ringer must not ring on more than one frequency in the group.
(4) All voltages are rms ±10%.

test meter with "pass bands" marked on the face of the meter. The dimensions of the unit are 22 inches (55.9 cm) wide, by 12 inches (30.5 cm) high, by 11 inches (27.9 cm) deep. The unit weighs approximately 30 pounds (13.6 kg).

3.02 The T-84 Test Set and accessory equipment test the following equipment functions:

1. Lamp Test: verifies that the lamp circuit of "illuminated" telephones is operating.

2. Loop Test: simulates the loop current from the central office through the telephone network with the handset off-hook, and verifies that the loop resistance is within the pass band.

3. Receiver Varister Test: verifies that receiver varister is operational.

4. Contact Sequence Test: verifies the proper operation of the telephone hookswitch contact sequence.

5. 500 Volt Breakdown Test: 500 vdc is applied between the telephone network and the base to verify that the leakage current is within tolerance.

6. Rotary Dial Speed Test: verifies that the dial speed is within the pass band and that ten output pulses result whenever the number "0" is dialed.

7. Rotary Dial Percent Break Test: verifies that the make and break time intervals of the telephone under test are within the pass band.

8. Dial Noise Test: verifies that the mechanical noise generated by a rotary dialing telephone is not excessive.

9. Tone Dial Test: verifies that each digit depressed on a tone dialing telephone results in the correct output frequency tone.

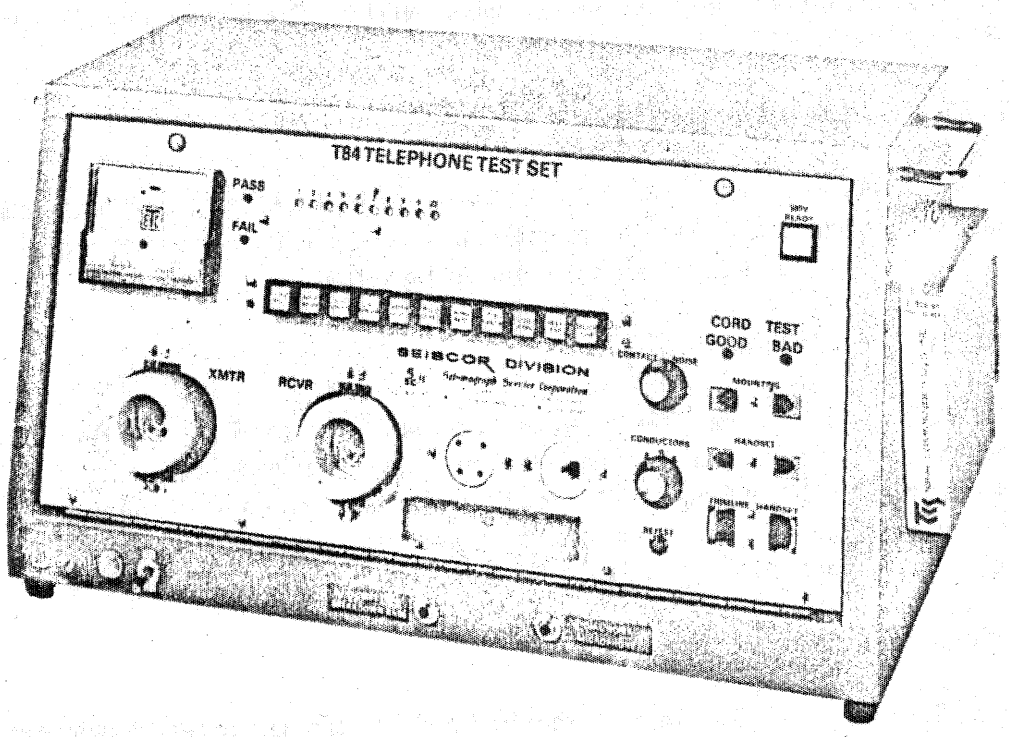
10. Transmitter Output Level Test: verifies that the handset transmitter output level is within the required tolerance.

11. Receiver Sensitivity Level Test: verifies that the handset receiver sensitivity is within the required tolerance.

12. Normal Voltage Straight Line Ring Test: verifies that normal straight line ringing voltage will ring the telephone with the loudness control set to the "low" position.

13. Low Voltage Straight Line Ring Test: verifies that a standard low ringing voltage will ring the telephone with the loudness control set to the "low" position.

14. Bell Tap Straight Line Ring Test: verifies that the telephone will not tap at the voltage provided for the Bell Tap Test with the telephone bias spring set in the "high



PART NUMBER 9962-6306

NOTE: T-8 Key Telephone Unit is shown installed at right of test set.

Fig. 1 — Seiscor T-84 Telephone Test Set

notch" position and with the loudness control set to the "low" position. NOTE: This test may not apply to all straight line ringers because of differences in sensitivity levels provided by different manufacturers.

15. Cord Continuity Test: verifies that modular, handset, Trimline, and spade tip terminated cords have continuity (no "opens"), and have no "crosses" or "shorts."

16. Cord Noise Test: verifies that cords tested in 14 will not generate noise while being manually flexed. Noise conditions are indicated visually by GOOD/BAD LED's and aurally from the test set XMTR acoustic coupler.

T-84R TELEPHONE TEST SET

3.03 The T-84R Test Set is shown in Fig. 2. This test set is identical to, and performs all of the tests of the T-84 Test Set, but has the additional capability of testing tuned ringer telephones. The T-84R Test Set provides a normal and a low ring test (bell tap does not apply to tuned ringers) for harmonic, synchromonic, and decimonic ringers. NOTE: This is the only difference between the T-84 and the T-84R Test Sets.

ACCESSORY TEST EQUIPMENT

3.04 Accessory test equipment is required by the T-84 and T-84R Test Sets to enable these sets to completely test certain equipment listed in Table A. The particular accessory equipment required depends on the type of telephone equipment to be tested.

A. T-4 Spade Tip Cord Adapter

3.06 The T-4 Spade Tip Cord Adapter (T-4 Adapter) is required with the T-84 or T-84R Test Sets to test for continuity and noise in spade tip terminated telephone cords. The T-4 Adapter plugs into the two TRIMLINE HANDSET receptacles on the test panel of the test set. The spade tip terminated cord to be tested must then be connected between the two spade tip terminal receptacles now provided by the adapter to complete the test connection.

T-5 Key Set Adapter

3.07 The T-5 Key Set Adapter (T-5 Adapter) is required with the test sets to test the key operation of key telephone sets (six-key sets only). This adapter provides switches to test the line button lamps under the line keys, a buzzer test switch, and a telephone network loop continuity LED indicator.

C. T-6 Breakdown Base

3.08 The T-6 Breakdown Base (T-6 Base) is required to test for the breakdown current between the telephone set network and the telephone set base. The dimensions of the T-6 Base are: 14-1/2 inches (36.8 cm) long, by 10-3/4 inches (27.3 cm) wide, by 3-1/2 inches (89 mm) high.

D. TD508 Key Telephone Unit

3.09 A TD508 (or T-8) Key Telephone Unit (KTU) is required with the test sets to test tone dialing telephone units. Each digit button depressed on a tone dialing telephone set causes a TD508 KTU to latch onto this digit for 1-1/2 to 3 seconds. During this time interval, an LED corresponding to the tone digit depressed will remain illuminated on the test panel and the rest of the tone dialing buttons on the telephone set will be held deactivated by the KTU. After the KTU unlatches from the tested tone digit, the next digit function can be tested.

T-8 Key Telephone Unit

3.10 The T-8 Key Telephone Unit performs the same function as the TD508 KTU. However,

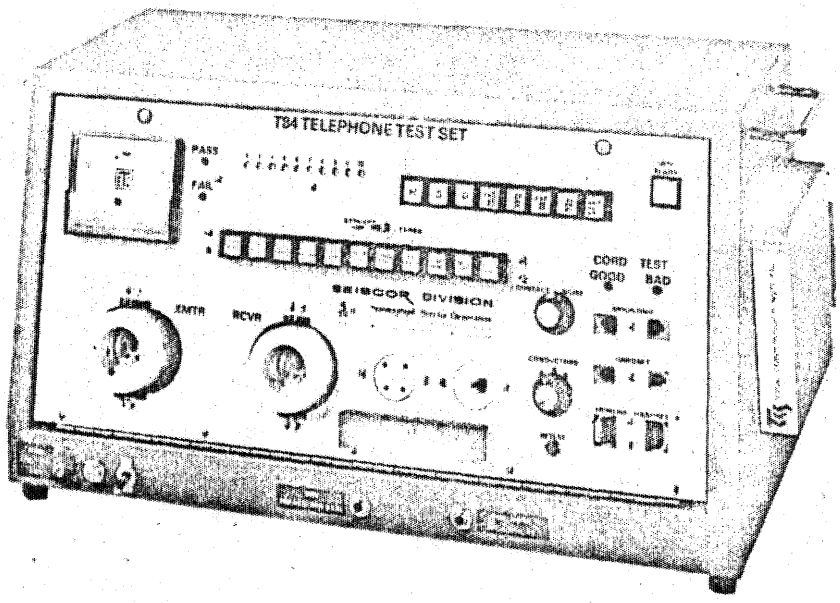


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Fig. 2—Seiscor T-84R Telephone Test Set

the T-8 KTU does not latch onto the tone generated by the depressed digit of the tone dialing telephone set, and the operator does not have to wait for 1-1/2 to 2 seconds between each digit tested. This allows the operator to go through the tone dialing test sequence very quickly, thereby decreasing the total time required to test a tone dialing telephone set.

F. T-9 Microphone

3.11 The T-9 Microphone is required to perform the Dial Noise Test on rotary dialing telephone sets. This microphone is clipped to the finger stop of rotary dialing telephones while the test is being performed. NOTE: This test cannot be performed on rotary dialing dial-in-handset telephones.

G. Tone Dialing Telephone Sets

3.12 A standard tone dialing telephone set is required if the test set is to be used to test the operation of TD508 or TC1900 (or equivalent) KTU's. The tone dialing digit LED indicators on the test set panel are used to determine if the KTU under test is "operational" or "defective."

NOTES

SECTION 2

OPERATION

1. GENERAL

1.01 This section provides the information required by the operator of the T-84 or T-84R Test Sets to set up the test equipment to test telephones and associated components and to operate the test sets in testing this equipment.

2. DESCRIPTION TEST PANELS

T-84 TELEPHONE TEST SET

2.01 The T-84 Test Set control panel is shown in Fig. 3. The purpose of the controls, indicators, test connectors, and acoustic couplers on the panel is as follows:

1. ROTARY DIAL SPEED AND RATIO METER: provides a visual indication that the rotary dial speed (meter SPEED band), and make and break times (meter RATIO band) of a rotary dialing telephone set under test are within the required limits.

2. TEST PASS/FAIL LED INDICATORS: in conjunction with the switches of the TEST SELECT SWITCH ASSEMBLY, provide a visual indication as to whether the equipment under test has passed or failed the selected test.

3. TONE DIALING DIGIT LED INDICATORS: illuminate during testing of tone dialing telephones and tone dialing KTU's to verify that the tone generated by the depressed digit is within the pass band.

4. TEST SELECT SWITCH ASSEMBLY: provides the test select switches for the tests to be performed on the equipment by the test sets.

5. HANDSET AND NETWORK TRANSMISSION TEST ACOUSTIC COUPLERS: provide the facility for applying the transmission test tone to the handset and network for the transmission test.

6. LINE FUSE: protects the test set from excessive ac power line current in the event of a failure (such as a short circuit) within the test set.

7. POWER ON INDICATOR: illuminates to inform the operator that the test set is turned on.

8. POWER ON SWITCH: applies power to the test set when in the ON position and

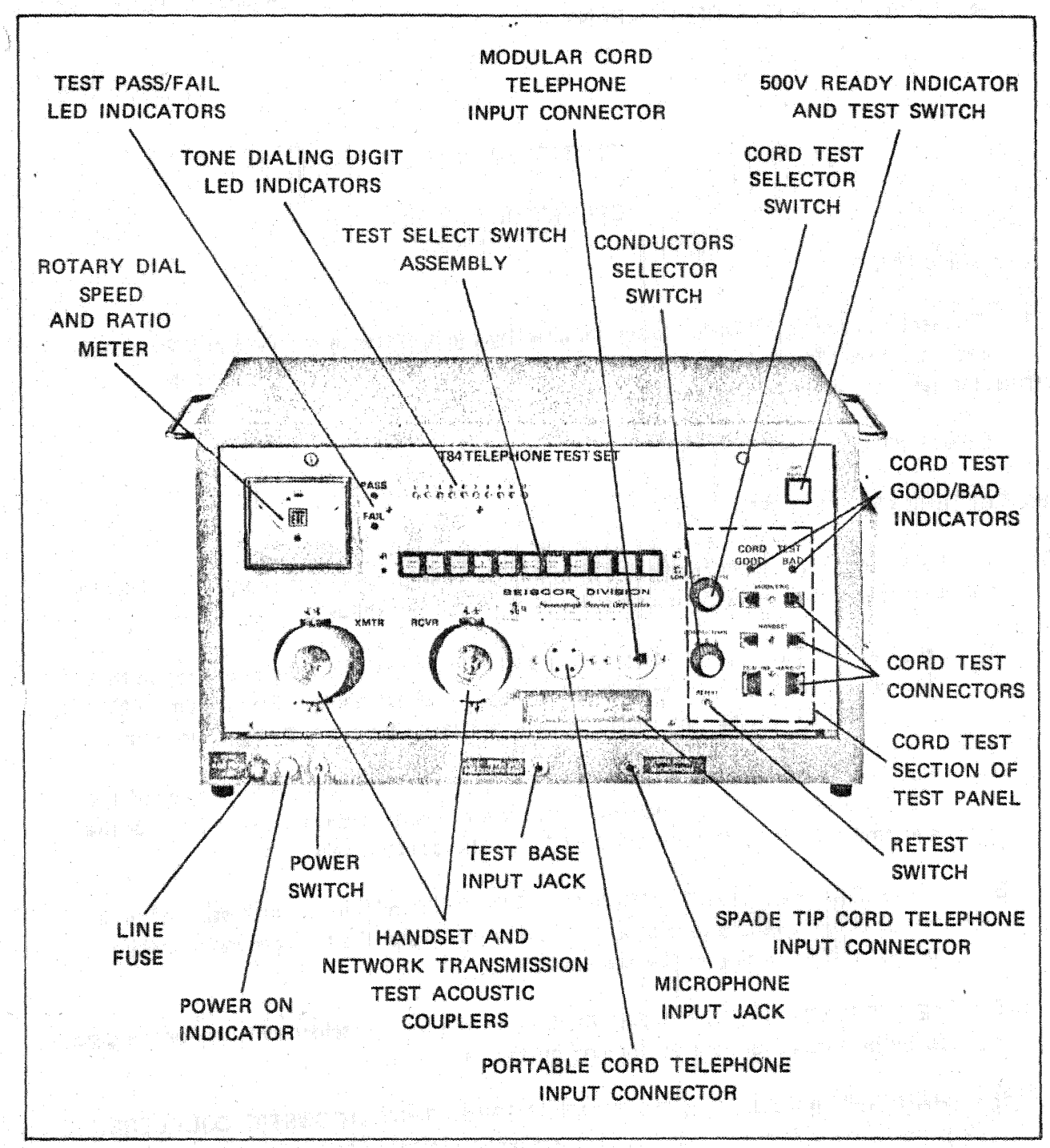


Fig. 3—Test Panel T-84 Test Set

turns off the power when in the OFF position.

9. TEST BASE INPUT JACK: the input receptacle used to connect the test set to the breakdown telephone base.

10. MICROPHONE INPUT JACK: the input receptacle for the T-9 Microphone used in the dial noise test of rotary dialing telephone sets.

11. PORTABLE CORD TELEPHONE INPUT CONNECTOR: input receptacle for portable cord telephone sets.

12. MODULAR CORD TELEPHONE INPUT CONNECTOR: input connector for modular cord telephone sets.

13. SPADE TIP CORD TELEPHONE INPUT CONNECTOR: input receptacle for spade tip terminated cord telephone sets.

14. 500V READY INDICATOR AND TEST SWITCH: illuminates only when the 500V BRKN switch is depressed and the telephone base is making good contact with the test base pins, during the 500 volt breakdown test, and completes this test when depressed by the operator.

15. CORD TEST CONNECTORS: provide the facility for continuity and noise tests of telephone cords.

16. CORD TEST SELECTOR SWITCH: selects the test to be applied to the telephone cord plugged into a set of CORD TEST CONNECTORS (CONTACT or NOISE position).

17. CONDUCTORS SELECTOR SWITCH: used to set up the test set circuitry to match the number of conductors in the cord to be tested (four, five, or six conductors) during the cord tests.

18. CORD TEST PASS/FAIL INDICATORS: GOOD or BAD LED illuminates during the cord test to inform the operator if cord under test has passed or failed the test.

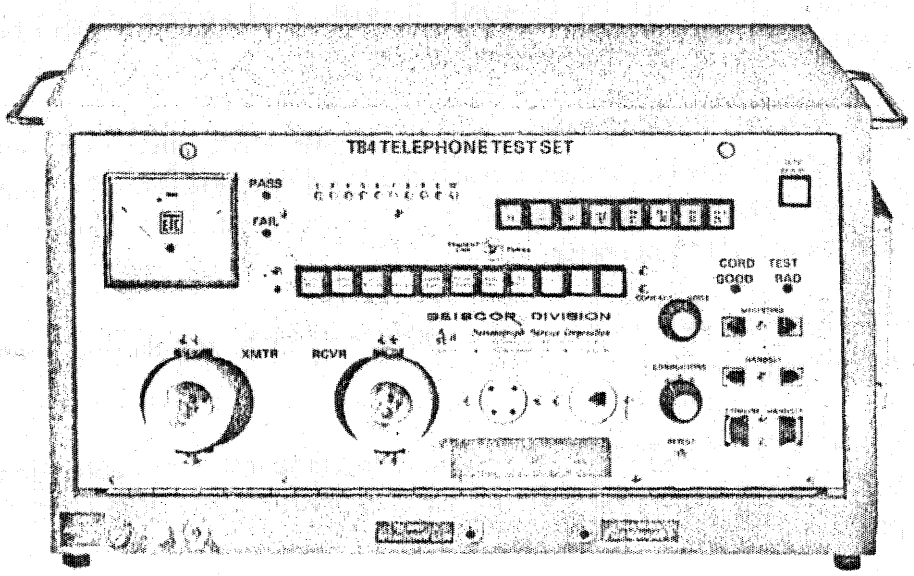
19. RETEST SWITCH: enables operator to repeat a cord test by simply depressing this switch.

20. Test Set KTU Cable (not visible in Figs. 3 or 4): used to connect the test set to a TD508 or a T-8 KTU to test tone dialing telephones, or used to connect the test set to "to-be-tested" TD508 or TC1900 (or equivalent) KTU's.

T-84R TELEPHONE TEST SET

2.02 The T-84R Test Set control panel is shown in Fig. 4. All panel controls of the T-84R Test Set are functionally identical to those of the T-84 Test Set, with the exception of the tuned ringer test switches provided by the T-84R unit. The TUNED RINGER TEST SELECT SWITCH ASSEMBLY switches are used to test the ring function of tuned ringer telephones. The STRAIGHT LINE/TUNED SWITCH is used to set the ring test mode of the set.

3. GUIDELINES FOR USING THE TEST SETS

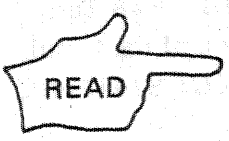


NOTE: With the exception of the TUNED RINGER TEST SELECT SWITCH ASSEMBLY, and the STRAIGHT LINE/TUNED SWITCH, all T-84R test panel controls, indicators, test connectors, and handset acoustic couplers are identical in function to those of the T-84 Test Set.

Fig. 4—Test Panel T-84R Telephone Test Set

3.01 The following guidelines apply to the use of the T-84 and T-84R Test Sets in testing telephones and components:

1. The test operator should thoroughly familiarize himself with all details of the tests described in this section prior to actually initiating tests on telephone equipment.



The operator should minimize the cord plug-in/removal cycles as much as possible, with respect to the connectors and jacks of the test panel, and thereby keep the wear on these components to a minimum. Plan the test sequence such that in a given test cycle all standard telephone sets are tested prior to the testing of key telephone sets, etc. Plan the cord tests such that tests on standard (non-spade tip terminated) cords are completed prior to installation of a T-4 Adapter to test spade tip terminated cords.

2. If applicable, group together similar types of telephone equipment, then plan an optimum order in which to test this equipment.

3. Ensure that the standard procedures of the test and/or repair center are followed in routing the "operational" or "defective" equipment through the center after this equipment has been tested.

4. Use schematics for telephone equipment not specifically listed in Table A and Table B to determine if this equipment can be tested by the T-84 or T-84R Test Sets.

4. TEST SETUP PROCEDURE

4.01 Prior to performing tests on telephone equipment it must be correctly connected to the test set and required accessory equipment. The particular setup that applies depends on the type of equipment to be tested.

4.02 Test setup procedures for telephone equipment that can be tested by the T-84 (or T-84R) Test Set and accessory equipment are detailed in the steps that follow. Fig. 5 depicts a typical test setup using the T-84 Test Set and standard accessory equipment.

INITIAL SETUP OF TEST SET

4.03 The following steps apply to all test setups of the T-84 or T-84R Test Sets:

STEP	ACTION
1	Place test set on a clean flat test bench (or equivalent) which has an unobstructed area adequate in size to conduct the tests required.
2	Set power switch of test set to OFF position.
3	Set CONTACT/NOISE switch to CONTACT position.
4	Verify that all eleven of the test switches of TEST SELECT SWITCH ASSEMBLY (refer to Fig. 3) of the T-84 (or T-84R) Test Set are in the full "out" position. NOTE: Slightly depress any released switch (other than 500V BRKN or TIP PTY switch) to release a depressed switch. The TIP PTY switch is released by fully depressing this switch then releasing it.
5	If the T-84R Test Set is to be used, verify that all switches in the TUNED RINGER TEST SELECT SWITCH ASSEMBLY (refer to Fig. 4) are released. NOTE: Slightly depress one of the released H, S, or D switches to release any of these switches that are depressed. Likewise, slightly depress one of the released tuned ringer switches to release a depressed tuned ringer switch.
6	Insert test set power cord into a standard 117 vac power outlet.

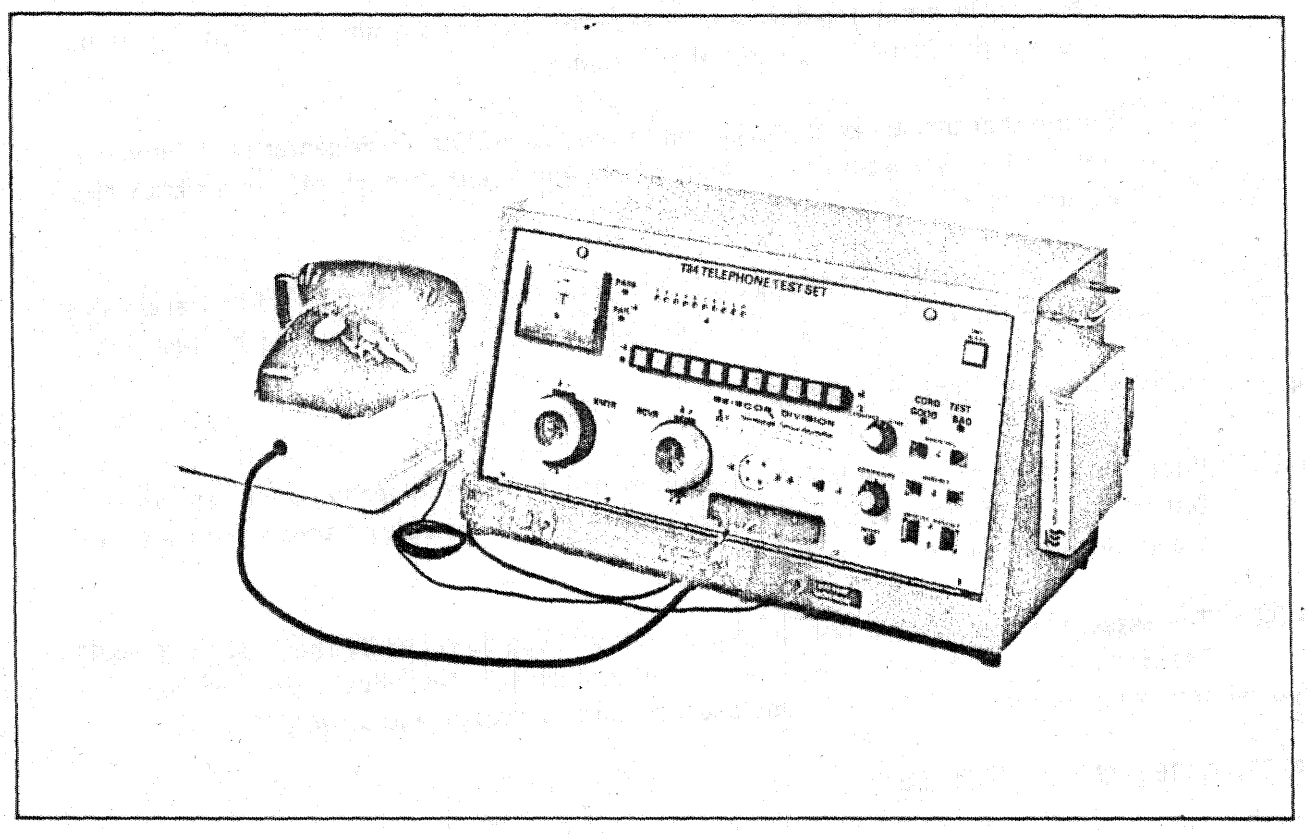


Fig. 5—Typical Test Setup Using The T-84 Telephone Test Set and T-6 Base

COMPLETE TELEPHONE SET ASSEMBLIES

4.04 The following steps are required to set up the test set and accessory equipment to test complete telephone set assemblies (bases and handsets):

STEP	ACTION
READ	If telephone base does not have a cord (or cord is cut off), a cord suitable for the type of telephone to be tested must be installed prior to proceeding with step 1 (or step 3 if a six-key telephone set is to be tested).
1	Perform steps 1 through 6 of paragraph 4.03. NOTE 1: If telephone to be tested is a six-key telephone set, go directly to step 3.
2	Connect telephone base cord to test set modular, portable, or spade tip connector, as applicable. NOTE: This step applies only to non-key telephone sets.
3	Connect T-6 Base to 500V BRKN BASE jack of test set.

STEP	ACTION
	NOTE 2: If telephone to be tested is a non-key telephone set, go directly to Note 3 of step 6.
4	Connect key telephone set base cord connector into the T-5 Adapter input connector. NOTE: This step and steps 5 and 6 apply only to six-key telephone sets.
5	Connect T-5 Adapter cable connector into modular input connector of test set.
6	Fully depress "hold" button of key telephone set to release all keys.
	NOTE 3: Go directly to step 8 if a tuned ringer is to be tested during the ring test.
7	Set the bias spring of a straight line ringer to the "high notch" position and set the amplitude control to the "low" position. NOTE: This step applies only to straight line ringers.
8	Connect ground lead from test base to the frame of the ringer assembly (or to the ringer loudness control of a straight line ringer).
9	Position telephone base until it matches one of the patterns of the test base.
10	If telephone to be tested is a desk type, set handset in normal position on base. NOTE: Lay handset of wall mounting telephones onto test bench until otherwise specified in the functional tests.
	NOTE 4: Go directly to Note 7 of step 11 if tone dialing telephones are to be tested.
	NOTE 5: This completes the test setup for rotary dialing dial-in-handset telephones. Refer now to the applicable functional tests in paragraph 5.
11	Clip T-9 Microphone to finger stop of rotary dial and plug microphone connector into DIAL NOISE MIC jack of test set. NOTE: This step does not apply to rotary dials of dial-in-handset telephones.
	NOTE 6: This completes the test setup for all non-tone dialing telephone sets. Refer now to the applicable functional tests in paragraph 5.
	NOTE 7: This also completes the test setup for tone dialing telephone sets if a KTU is already installed at the right end of the test set cabinet. Refer now to the applicable functional tests in paragraph 5. If a KTU is not already installed on test set, and tone dialing telephones are to be tested, continue with step 12.
12	Install a TD508 or T-8 KTU (refer to Fig. 1) using the mounting holes provided. NOTE: This step and step 13 are required only if tone dialing telephones are to be

STEP	ACTION
	tested and the KTU for these tests is not already installed.
13	Connect the test set KTU cable to the rear of the KTU installed in step 12.
	NOTE 8: This completes the test setup for tone dialing telephone sets. Refer now to the applicable functional tests in paragraph 5.

TELEPHONE HANDSETS

4.05 The following steps are required to set up the test set and accessory equipment to test telephone handsets. NOTE: These tests apply only to non-dial-in-handset handsets.

4.06 Follow these steps:

STEP	ACTION
1	Connect handset to be tested to a standard known-working telephone set base.
2	Perform steps 1 through 6 of paragraph 4.03.
3	Connect telephone base cord to test set modular, portable, or spade tip connector, as applicable.
4	If telephone handset to be tested is connected to a desk type telephone for the test, set handset in normal position on base. If handset is connected to a wall mounting telephone for the test, lay handset onto test bench until otherwise specified in the functional tests.
	NOTE: This completes the test setup for telephone handsets. Refer now to the applicable functional tests in paragraph 5.

KEY TELEPHONE UNITS

4.07 The following steps are required to set up the test set and accessory equipment to test Key Telephone Units (KTU's):

STEP	ACTION
1	Perform steps 1 through 6 of paragraph 4.03.
	NOTE 1: Go directly to step 3 if a KTU is not already installed at right end of test set cabinet (refer to Fig. 1).
2	Unplug test set KTU cable from rear of KTU installed at right end of test set cabinet (if applicable).

STEP	ACTION
3	Plug the test set KTU cable connector into the KTU to be tested.
4	Connect a standard known-working tone dialing telephone base (with handset) to the modular, portable, or spade tip connector of test set.
	NOTE 2: This completes the test setup for KTU tests. Refer now to the applicable functional tests in paragraph 5.

TELEPHONE CORDS

4.08 The following steps are required to set up the test set and accessory equipment to test telephone cords:

STEP	ACTION
1	Perform steps 1 through 6 of paragraph 4.03.
	NOTE 1: Go directly to step 3 if cord to be tested is terminated with spade tip lugs.
2	Connect the telephone cord to be tested between the two MOUNTING, HANDSET, or TRIMLINE HANDSET connectors (as applicable) on test panel.
	NOTE 2: Go directly to step 5 if cord to be tested is not terminated with spade tip terminals.
3	Insert the T-4 Adapter into the two TRIMLINE HANDSET connectors of test panel.
4	Connect the spade tip terminated telephone cord between the two spade tip connectors now provided by the T-4 Adapter, observing color code.
5	Set CONTACT/NOISE switch to CONTACT position.
6	Set CONDUCTORS switch to a position that corresponds to the number of wires in cord to be tested (e.g., set switch to "6" if cord to be tested contains six condutors, etc.).
	NOTE 3: This completes the test setup for telephone cords. Refer now to the applicable functional tests in paragraph 5.

5. FUNCTIONAL TESTS

5.01 The following paragraphs provide a step-by-step test procedure for all telephone equipment that the T-84 and T-84R Test Sets are capable of testing. It is recommended that the steps of individual functional tests be performed in the exact sequence presented, to avoid confusion.

READ

In all functional tests which follow, an on-hook condition specified for a telephone set shall signify that the handset of desk type telephones is placed in the "normal" position on the telephone base, or that the hook-switch of wall-mounting telephones is fully depressed. Conversely, an off-hook condition for a telephone set shall signify that the handset of desk type telephones is removed from the base, or that the hookswitch of wall-mounting telephones is fully released.

READ

Slightly depress any released switch (other than 500V BRKN or TIP PTY switch) to release any depressed test switch. The TIP PTY switch is released by fully depressing this switch, then releasing it. If applicable, slightly depress one of the released T-84R Test Set H, S, or D tuned ringer switches to release any of these three switches that is depressed. Slightly depress one of the tuned ringer select switches to release a depressed switch in this group.

READ

It is recommended, subject to the users standard operating practices, that if a failure occurs at any step during a test sequence, the test should be immediately discontinued, the problem identified, and the equipment be placed in a "to-be-repeaired" status.

TURNING ON TEST SET

5.02 Follow these steps to turn on the test set:

WARNING: Prior to turning on the test set, the operator must ensure that lamp power wires in a telephone set to be tested have not been wired to present a direct short to the lamp power supply of the test set. If the lamp circuit of the telephone is internally shorted the excessive current drain imposed on the set when it is turned on may cause invalid test results.

STEP	ACTION	VERIFICATION
1	Verify that the test set, test set accessory equipment and telephone equipment to be tested are correctly set up for testing (refer to paragraphs 4.01 through 4.08, as applicable).	
2	Turn on test set power switch (see WARNING above).	Power on indicator of test set shall illuminate.

COMPLETE TELEPHONE SET ASSEMBLIES

5.03 Turn on test set as detailed in paragraph 5.02, then follow these steps to test complete telephone set assemblies (bases and handsets):

A. Lamp Test

5.04 The Lamp Test applies only to illuminating type telephone sets (including six-key telephone sets). Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: If a non-illuminating dial six-key telephone set is to be tested, go directly to step 7.	
	NOTE 2: Determine if the telephone to be tested is wired to be illuminated at all times, or only when handset is off-hook.	
	NOTE 3: If telephone is wired to illuminate only when off-hook, go directly to step 4.	
1	With telephone on-hook, observe dial of telephone. NOTE: This step and steps 2 and 3 only apply if telephone is wired to illuminate at all times.	Dial of telephone base or handset shall be illuminated.
2	Place telephone in off-hook condition.	Dial of telephone base or handset shall remain illuminated.
3	Place telephone back in on-hook condition.	
	NOTE 4: This completes the lamp test for non-key telephone sets which are wired to illuminate at all times. Go directly to paragraph 5.05, Loop Test.	
4	With telephone on-hook, observe dial of telephone. NOTE: This step and steps 5 and 6 only apply if telephone is wired to illuminate only when taken off-hook.	Dial of telephone base or handset shall be extinguished.
5	Place telephone in off-hook condition.	Dial of telephone base or handset shall illuminate.
6	Place telephone back in on-hook condition.	
	NOTE 5: This completes the Lamp Test for non-key telephone sets which are wired to illuminate only when taken off-hook. Go directly to paragraph 5.05, Loop Test.	
7	Depress switch LP1 of T-5 Adapter. NOTE: This step and step 8 only apply	The lamp under line key 1 of key telephone set shall illuminate.

STEP	ACTION	VERIFICATION
6	With line switch 1 depressed, and while gently blowing into transmitter of handset, depress in sequence "hold" button then line switch 2, "hold" button then line switch 3, "hold" button then line switch 4, "hold" button then line switch 5, and then "hold" button.	While a key telephone line switch is depressed the PASS LED on the test set shall illuminate, the LED indicator on T-5 Adapter shall illuminate, and sidetone shall be heard. After a "hold" button has been depressed the FAIL LED on test set shall illuminate, the LED indicator on T-5 Adapter shall extinguish, and no sidetone shall be heard.

NOTE 3: This completes the Loop Test for key telephone sets. Go directly to paragraph 5.06, Contact Sequence Test.

C. Contact Sequence Test

5.06 Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if a key telephone set is to be tested.	
1	With LOOP TEST switch still fully depressed, slowly release hookswitch while gently blowing into handset transmitter and listening to handset receiver.	FAIL LED shall extinguish and PASS LED shall illuminate before sidetone is heard (non-dial-in-handsets, only). If a dial-in-handset telephone is being tested, the PASS LED shall illuminate simultaneously with sidetone being heard.
	NOTE 2: If telephone under test is a dial-in-handset type, go directly to step 4.	
2	With telephone set off-hook and while gently blowing into handset transmitter, move rotary dial off-normal, or slightly depress a tone button of a tone dialing telephone set. NOTE: This step does not apply to dial-in-handset telephones.	No sidetone shall be heard.
3	Release rotary dial or tone button of telephone.	

NOTE 3: This completes the Contact Sequence Test for rotary or tone dialing non-dial-in-handset telephones. Go directly to paragraph 5.07, Receiver Varister Test.

STEP	ACTION	VERIFICATION
4	With telephone off-hook, depress "recall" button of handset while gently blowing into transmitter. NOTE: This step and step 5 only apply to dial-in-handset telephones.	With "recall" button depressed, no sidetone shall be heard.
5	Release "recall" button.	

NOTE 4: This completes the Contact Sequence Test for dial-in-handset telephones. Go directly to paragraph 5.07, Receiver Varistor Test.

D. Receiver Varistor Test

5.07 Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if handset is connected to a key telephone set.	
1	With LOOP TEST switch still fully depressed, place telephone in off-hook condition.	
2	While listening to handset receiver, slowly move rotary dial off-normal, or slightly depress a tone button of tone dialing telephone or handset.	If a "soft click" is heard from handset (and XMTR coupler of test set), the receiver varistor is not defective. If a "loud click" is heard, the varistor is defective.
3	Release LOOP TEST switch.	

NOTE 2: This completes the Receiver Varistor Test. Go directly to paragraph 5.08, 500 Volt Breakdown Test.

E. 500 Volt Breakdown Test

5.08 Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if a key telephone set is to be tested.	
1	Place telephone in off-hook condition.	

STEP	ACTION	VERIFICATION
2	Depress and hold down 500V BRKN switch.	500V READY lamp at upper right of test panel shall illuminate. NOTE: If this lamp does not illuminate, the metallic underside of telephone base is not making good contact with the test base contact pins. Move telephone base about on test base until 500V READY lamp does illuminate.

WARNING: In step 3, if FAIL LED illuminates, the telephone set should immediately be rejected as "unsafe" and removed from the test setup in preparation for testing the next telephone assembly.

3	While holding the 500V BRKN switch depressed, depress the illuminated 500V READY switch for at least two seconds.	The PASS LED shall illuminate for approximately one second.

NOTE 2: This completes the 500 Volt Breakdown Test for all telephone sets. Go directly to paragraph 5.09, Rotary Dial Test, if telephone under test is a rotary dialing telephone. If telephone under test is non-rotary dialing, go directly to paragraph 5.10, Transmission Test.

F. Rotary Dial Test

5.09 The following steps only apply to rotary dialing telephones (dial in base or handset). Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if a key telephone set is to be tested.	
1	Depress DIAL SPD switch of test set.	Both PASS and FAIL LED's shall be extinguished and test meter pointer shall rest at the full left position.
2	Dial a "0" on telephone set dial.	During "wind-down" of telephone dial, the test meter shall indicate within the black pass band labeled SPEED. At the moment the "wind-down" is complete, the PASS LED shall illuminate for approximately one second. NOTE: The illumination of the PASS LED verifies that the correct number of pulses (i.e., exactly ten) was output by the telephone dial. If any other number is dialed the FAIL LED shall illuminate.

STEP	ACTION	VERIFICATION
3	Depress the % BREAK switch of test set.	The PASS LED shall remain illuminated, but the pointer of the test meter shall now go to the "full scale" (full right) position.
4	Dial a "0" on telephone set dial.	During "wind-down" of dial, the test meter shall indicate within the black pass band labeled RATIO. NOTE: This verifies that the make and break times of the rotary dial are within the pass band. If rotary dial is in the base (i.e., if T-9 Microphone is used), the PASS LED shall also illuminate before, during, and after this step, to verify that the dial noise is not excessive. NOTE: During this step, the FAIL LED may momentarily flash on initiating the step, and may flash when the dial winds down to the stop, but this is normal and does not signify that the dial is excessively noisy. However, the FAIL LED must not flash at any time during the "wind-down" of the dial after it is released.
5	Release % BREAK switch.	

NOTE 2: This completes the Rotary Dial Test. Go directly to paragraph 5.10, Transmission Test.

G. Transmission Test

5.10 Follow these steps:

STEP	ACTION	VERIFICATION

NOTE 1: Fully depress line switch 1 if handset is connected to a key telephone set base.

NOTE 2: In steps 1 and 2, it is very important that the handset be held firmly against the XMTR/RCVR coupler pads prior to depressing the XMTR L'VL and RCVR L'VL test switches. Failure to do so may result in an invalid test (i.e., the FAIL LED may illuminate even though the handset and/or telephone network is not defective).

STEP	ACTION	VERIFICATION
	NOTE 3: In steps 1 and 2, the FAIL LED may illuminate momentarily on initiation of this test. This is normal and does not necessarily signify that the handset or network is defective.	
1	Place handset of telephone firmly against XMTR and RCVR coupler pads (handset cord must be to the left of handset), then depress XMTR L'VL test switch.	PASS LED shall illuminate.
2	While still firmly holding handset against the coupler pads, depress RCVR L'VL test switch.	PASS LED shall illuminate.
3	Release RCVR L'VL switch.	
	NOTE 4: This completes the Transmission Test. Go directly to paragraph 5.11, Straight Line or Tuned Ringer Test.	

H. Straight Line Or Tuned Ringer Test

5.11 The T-84 Test Set can only test straight line ringers. The T-84R Test Set can test both straight line and tuned ringers. Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if a key telephone set ringer is to be tested.	
	NOTE 2: Determine the type of ringing mode of the ringer to be tested (i.e., straight line or tuned ringer). If a tuned ringer is to be tested, determine the frequency required to ring the assembly (T-84R Test Set only).	
	NOTE 3: If tuned ringer assemblies are to be tested, they must be either installed on a telephone base, or otherwise rigidly held in place, to ensure that the normal mechanical resonance frequency of the assembly is maintained.	
	NOTE 4: If a straight line ringer is to be tested on a T-84R Test Set, fully depress the switch labeled D, the switch labeled 16.6/20/20, and set the STRAIGHT LINE/TUNED SWITCH to the STRAIGHT LINE position.	
	NOTE 5: If a tuned ringer assembly is to be tested, fully depress the appropriate H, S, or D switch, then depress the related ring frequency select switch, and set the STRAIGHT LINE/TUNED SWITCH to the TUNED position.	
1	Place telephone in on-hook condition.	

STEP	ACTION	VERIFICATION
	NOTE 9: This completes all tests for non-tone dialing tuned ringer telephone sets. Release TIP PTY switch (if depressed) and LOW RING switch. Remove tested unit and install next unit to be tested (refer to paragraph 4.04).	
	NOTE 10: If a tone dialing tuned ringer telephone is under test, go directly to paragraph 5.12, Tone Dial Test.	
8	Move ringer loudness control from full low to full high position, then back to full low position. NOTE: This step and steps 9 through 12 only apply to straight line ringers.	Ringer shall ring throughout the entire range of volume control and shall ring the loudest at the full high position.
9	Release LOW RING switch. NOTE: Telephone must completely stop ringing prior to continuing with step 10.	Telephone shall stop ringing.
10	Fully depress BELL TAP switch.	Telephone may or may not ring, depending on manufacturer's specifications. NOTE: This test may not apply to all straight line ringers because of differences in sensitivity levels provided by different manufacturers.
11	Release BELL TAP Switch.	
12	Ensure that TIP PTY switch is fully released.	
	NOTE 11: If a tone dialing telephone is under test, go directly to paragraph 5.12, Tone Dial Test.	
	NOTE 12: This completes all tests for non-tone dialing telephone sets. Remove tested unit and install next unit to be tested (refer to paragraph 4.04).	

I. Tone Dial Test

5.12 The Tone Dial Test only applies to tone dialing telephones. Follow these steps:

STEP	ACTION	VERIFICATION
	NOTE 1: Fully depress line switch 1 if a key telephone set is to be tested.	

STEP	ACTION	VERIFICATION
1	Fully depress TCH TONE switch.	
2	Place telephone in an off-hook condition.	
3	Depress, in sequence, tone buttons 1, 3, 4, 5, 6, 7, 8, 9, 0, then tone button 2, two times. NOTE: Tone button 2 must be depressed two times in this test because the first time this digit is depressed it only activates a transfer function in the accessory equipment KTU and the tone is not applied to the test set digit test circuit. The second time a 2 digit is depressed, the tone is applied through the KTU to the test set to complete the test.	As each tone button is depressed, a TONE DIALING DIGIT LED INDICATOR (see Fig. 3) corresponding to the tone dial button depressed shall illuminate. Indicator 22 shall illuminate after the digit 2 is depressed two times. NOTE: If a TD508 KTU is used with the test set for this test, the LED corresponding to the depressed digit will illuminate for a 1-1/2 to 3 second interval and will have to extinguish before the next digit button can be tested. If a T-8 KTU is used for this test, no waiting period is required between each digit button function tested.
4	Release TCH TONE switch.	

NOTE 2: This completes all tests for telephone sets. Remove tested unit and install next unit to be tested (refer to paragraph 4.04).

TELEPHONE HANDSETS

5.13 Connect handset to be tested as detailed in paragraph 4.05. Refer to paragraphs 5.01 and 5.02 to turn on the test set.

A. Loop Test

5.14 Follow these steps:

STEP	ACTION	VERIFICATION
1	Place telephone in an on-hook condition.	FAIL LED of test set shall illuminate.
2	Fully depress LOOP TEST switch.	FAIL LED shall remain illuminated.
3	Place telephone in off-hook condition.	PASS LED shall illuminate.

STEP	ACTION	VERIFICATION
4	Place telephone back in on-hook condition.	FAIL LED shall illuminate.

NOTE: This completes the Loop Test for telephone handsets. Go directly to paragraph 5.15, Receiver Varistor Test.

B. Receiver Varistor Test

5.15 Follow these steps:

STEP	ACTION	VERIFICATION
1	With LOOP TEST switch still fully depressed, place telephone in off-hook condition.	
2	While listening to handset receiver, slowly move rotary dial off-normal or slightly depress a tone button of tone dialing base set.	If a soft "click" is heard from handset (and XMTR coupler of test set), the receiver varistor is not defective. If a "loud click" is heard, the varistor is defective.
3	Release LOOP TEST switch.	

NOTE: This completes the Receiver Varistor Test for handsets. Go directly to paragraph 5.16, Transmission Test.

C. Transmission Test

5.16 Follow these steps:

STEP	ACTION	VERIFICATION

NOTE 1: In steps 1 and 2, it is very important that the handset be held firmly against the XMTR/RCVR coupler pads prior to depressing the XMTR L'VL and RCVR L'VL test switches. Failure to do so may result in an invalid test (i.e., the FAIL LED may illuminate even though the handset may not be defective).

NOTE 2: In steps 1 and 2, the FAIL LED may illuminate momentarily on initiation of this test. This is normal and does not necessarily signify that the handset is defective.

1	Place handset firmly against XMTR and RCVR coupler pads (handset cord must be to left of handset), then depress XMTR L'VL test switch.	PASS LED shall illuminate.

STEP	ACTION	VERIFICATION
2	While still firmly holding handset against the coupler pads, depress RCVR L'VL test switch.	PASS LED shall illuminate.
3	Release RCVR L'VL switch.	

NOTE 3: This completes the telephone handset tests. Remove tested handset and install next unit to be tested (refer to paragraph 4.05).

KEY TELEPHONE UNITS

5.17 Connect Key Telephone Unit to be tested as detailed in paragraph 4.07. Refer to paragraphs 5.01 and 5.02 to turn on the test set. NOTE: If KTU is to be tested with a tone dialing key telephone set, depress line switch 1 of the set.

5.18 Follow these steps:

STEP	ACTION	VERIFICATION
1	Fully depress TCH TONE switch.	
2	Place telephone in an off-hook condition.	
3	Depress, in sequence, tone buttons 1, 3, 4, 5, 6, 7, 8, 9, 0, then tone button 2, two times. NOTE: Tone button 2 must be depressed two times in this test because the first time this digit is depressed it only activates a transfer function in the accessory equipment KTU and the tone is not applied to the test set digit test circuit. The second time a 2 digit is depressed, the tone is applied through the KTU to the test set to complete the test.	As each tone button is depressed, a TONE DIALING DIGIT LED INDICATOR (see Fig. 3) corresponding to the tone dial button depressed shall illuminate. Indicator 22 shall illuminate after the digit 2 is depressed two times.
4	Release TCH TONE switch.	

NOTE: This completes the Key Telephone Unit tests. Remove tested KTU and install next KTU to be tested (refer to paragraph 4.07).

TELEPHONE CORDS

5.19 Connect telephone cord to be tested as detailed in paragraph 4.08. Refer to paragraphs 5.01 and 5.02 and turn on the test set.

A. Contact Test

5.20 Follow these steps:

STEP	ACTION	VERIFICATION
1	Depress then release RETEST switch.	CORD TEST GOOD LED shall illuminate.
2	Shake cord under test.	If CORD TEST BAD LED illuminates or flashes, reject the cord.

NOTE: This completes the Cord Contact Test, go directly to paragraph 5.21, Cord Noise Test.

B. Noise Test

5.21 Follow these steps:

STEP	ACTION	VERIFICATION
1	Set CONTACT/NOISE switch to NOISE position.	
2	Depress then release RETEST switch.	
3	Shake cord under test.	CORD TEST GOOD LED shall remain illuminated. If CORD TEST BAD LED illuminates or fashes, or audible noise is heard from XMTR coupler, reject the cord.
4	Set CONTACT/NOISE switch to CONTACT position.	

NOTE: This completes the Cord Tests. Remove tested cord and install next cord to be tested (refer to paragraph 4.08).

NOTES

SEISCOR PRODUCT DATA

NO: 2001

Product Line: TEC Section

ISSUE: 1

Product: Telephone Test Set

DATE: 11/20/76

Description:

The Seiscor Telephone Test Set provides telephone companies an economical method to identify telephone set status, easily. Designed for use in installation and repair work locations the Test Set allows I & R personnel to quickly verify telephones removed from service or to be placed in service. The Seiscor Test Set provides a means of measuring the parameters of a telephone set and display the measurments and results as a "pass" or "fail" visual indication.

The Test Set checks the following by a simple push button sequence:

Loop Current - 500 Volt Leakage - Dial Speed -
Dial Ratio - Transmitter Output - Receiver Output -
Ringer Response - Ringer Connection -
Long Loop Ringer Response - Tone Dialing - Cord .
Continuity -

In addition provision is made for testing cords seperatly for continuity and noise. Cord test indicate good or bad and noise heard audibly as well as indicated visually.

The Seiscor Telephone Test Set offers the following advantages:

* Simple operation
* Immediate decision to use or place telephone set in repair status
* Eliminates repair status on non defective sets
* Can be used at I & R work centers

And the following benefits:

* Reduces repair costs
* Reduces in service complaints
* Reduces installation time lost due to set replacement
* Improves customer service
* Introduces savings in station maintenance

The Seiscor Telephone Test Set was designed in cooperation with operating telephone company personnel. Designed to meet the needs of the telephone industry.

Models and Accessories:

Model	Description	Use
T-84	Telephone Test Set	As above, tests 20 cycle ringers only.
T-84 R	Telephone Test Set	As above, test multi-frequency ringers. (also 20 cycle)

Models and Accessories: (continued)

Model	Description	Use
T-4	Cord adapter, Spade Tip	Cord test section provides for modular cords this adapter provided for spade tip also.
T-5	Key set adapter & breakdown base	Provides 500 volt breakdown base that has lamp and key features for key set testing. T-6 base not required if T-5 is equipped.
T-6	Standard Breakdown base	Provides 500 volt breakdown base for single line telephone instruments.

Notes

A. The T-84 test set can be used to test tone decoders by use of a good touchtone* telephone.

B. Tone decoders are normally purchased or supplied seperatly by the customer.

C. All T-84 and T-84 R test sets are supplied with a T-6 breakdown base unless specified otherwise.

Specifications:

Operating Current:	110V AC
Size:	22" wide,12" high,11" depth
Weight:	38 lbs.
Test Method:	All tests GO/NO GO based on standard telephone specifications.

Operating Description:

The T-84 Telephone Test Set provides a means of measuring the following parameters of a subscribers telephone set and displaying the result and measurement as a "pass" or "fail" visual indication:

1. Loop Current

Operating Description: (continued)

2. 500 Volt Leakage Current
3. Dial Speed (Pulse Count)
4. Dial Ratio (Dial Noise)
5. Transmitter Output Level
6. Receiver Output Level
7. Normal Ringer Response
8. Tip Party Ringer Connection
9. Long Loop Ringer Response
10. Bell Tap
11. Touch Tone* Dial Output

In addition provision is made for testing modular mounting and handset cords as well as Trimline* handset cords for continuity (shorts, crosses, or opens) as well as noise. All tests are displayed as "good" or "bad" and noise is heard audibly as well as indicated visually.

1. Loop Current — LOOP TEST

Insert the mounting cord leads into the color coded receptacles. Depress switch position. With the Telephone off-hook the green PASS light, next to the meter, should light.

The contact sequence may be checked by depressing the hook switch and slowly letting the plunger up while listening to the earpiece. The read FAIL light should go out and the PASS light come on before sidetone is heard.

If the FAIL light remains on the loop current is not within limits.

2. 500 V Breakdown — 500V BKDN

The encapsulated safety contactor must make contact to the base of the set through each of its probes. It will fit the wide feet of a Trimline set or any metallic contact of the base of other sets.

This contact arms the breakdown test as indicated by the READY light when switch position 2 is depressed.

With the set in an off-hook status and with the READY light lit depress the safety switch on the upper right corner of the test set panel.

If the leakage current is within limits the PASS light will light for the one second duration of the TEST. If the set leakage current is above its limit the FAIL light will light.

After this test remove the safety contactor from the base of the set.

3. Rotary dial Speed — DIAL SPEED

Depress switch 3. With the handset off the cradle dial a ZERO. The meter needle should lie within the red "T" marked SPEED and the PASS light should turn on. (The PASS light indicates a correct count of ten pulses

* Trademark, AT&T Co.

in this position.)

4. Rotary dial percent break — DIAL % BK

Attach the microphone to the finger stop of the set.

Depress switch 4 and dial a zero. The meter indication should lie within the blue "T" marked RATIO and the green PASS light should remain on during the dial rundown period.

(A flash on the FAIL light might occur as the dial hits its stop at the end of its rundown. This is normal and should not be cause for failing the set.)

5. Transmitter Output level — XMTR L'VEL

Hold the handset firmly against the XMTR and RCVR couplers. Depress switch 5. After the white noise source turns off the PASS light should light. (This test may be repeated by depressing switch 6 and then switch 5 again.)

6. Receiver output level — RCVR L'VEL

Still holding the handset firmly push switch 6. The PASS light should turn on. (This test is continuous while the switch is depressed.)

7. Normal ringer test — RING TEST

Replace the handset in the cradle. Push switch 8. The set should ring. If it does not it may be connected internally for tip party ringing. Push switch 8, TIP PTY, which reverses tip and ring connections to the set. If the phone rings tag it for later change.

8. Long loop ringer test — LOW RING

If the ringer was activated when switch 7 (or 7 and then 8) was pushed then push switch 9. This reduces the ringer voltage and the set should still ring.

9. Bell Tap — BELL TAP

Depress switch position 10. The ringer voltage should not cause the clapper to strike the gongs. If it does hit them it is possible that the clapper spring is not in the high bias slot.