

**“TOUCH-TONE®” STATION TEST RECEIVER (J99297)**

**SD-98150-01**

**TESTS**

**1. GENERAL**

**1.01** This section describes a method to determine if the channel detector passbands and sensitivity level are within proper operating limits.

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

- (a) To revise title and test titles
- (b) To revise Part 2 (Table A added)
- (c) To revise Tests A and B
- (d) To make minor changes as required.

Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted. This reissue affects the Equipment Test List.

**1.03** The tests covered are:

**A. Channel Detector Passbands:** This test checks the passband lower and upper frequencies (band edges) of the eight channel detectors of the circuit.

**B. Receiver Sensitivity:** This test checks the minimum input signal amplitude for proper circuit operation.

**1.04** Test B should be performed only after the results of Test A are satisfactory. For adjustment of band edge frequencies and/or receiver sensitivity adjustment information, refer to Section 100-143-701.

**1.05** When any circuit board is replaced in the receiver, Tests A and B should be performed.

**2. APPARATUS**

**2.01** The apparatus required for each test is shown in Table A. The details of each item

are covered in the paragraph indicated by the number in parentheses.

TABLE A

APPARATUS	TEST	
	A	B
72A Meter (2.02)	1	1
23A TMS (2.03)	1	1
KS-14510 Meter (or equivalent)	2	1
Electronic Counter (2.04)	1	1
11001A Cable Assembly (2.05)	1	1
Cord (2.06)	2	1
Cord (2.07)	1	1
Cord (2.08)	1	1
Cord (2.09)	1	1

**2.02** J64072A frequency meter.

**2.03** J94023A transmission measuring set (TMS).

**2.04** Hewlett-Packard Model 5300A main frame equipped with 5304A module frequency counter (or equivalent, capable of measuring 685.1 to 1659.7 Hz with  $\pm 0.1$  Hz accuracy).

**2.05** Hewlett-Packard 11001A cable assembly, 44 inches long, equipped with one dual banana plug and one UG-88 C/U BNC male connector (50 ohm coaxial cable) (for interconnection of frequency counter and 23A TMS).

**2.06** Patching cord assembly, 12 feet long, equipped with two KS-14530 connectors and two KS-19531 plugs (P2CK cord) (for interconnection of B18 circuit board test points and KS-14510 volt-ohm-milliammeters as required).

**2.07** Patching cord assembly, 12 feet long, equipped with two KS-19531 plugs and two 47 cord

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tips arranged for tip and ring connection to a 310 plug (P2CL cord) (for interconnection of B10 circuit board test points to 23A TMS 310 MEAS jack).

**2.08** Patching cord assembly, P2AM cord, 8 feet long, equipped with one 327A plug and one 309 plug (2P22A cord) (for interconnection of 72A meter and 23A TMS).

**2.09** Patching cord assembly, 2 feet long, equipped with two KS-19531 L1 plugs arranged with a 47,000 ohm resistor (incased in one plug shell) in series with conductor (P1T cord) (for interconnection of circuit board test points).

**3. PREPARATION**

**Note:** All test equipment shall be known to be correctly calibrated.

**All Tests**

(1) Prepare the 72A meter for use as follows.

(a) Set controls in accordance with Table B.

**TABLE B**

CONTROL	SET TO
CAL-MEAS-SEARCH	MEAS
HORIZ GAIN AND OSC OUT	Approximately 1/2 clockwise
INTENSITY	Maximum clockwise
ON-OFF	OFF
VERTICAL GAIN	Maximum counterclockwise

(b) Connect the 105-125 volt 60 Hz power source.

(c) Connect the ground connector to ground.

(d) Operate the ON-OFF switch to ON.

(e) Wait approximately one-half minute for a horizontal trace to appear on the oscilloscope tube screen.

(f) Adjust the INTENSITY and FOCUS controls so that the trace on the oscilloscope screen is a sharply defined line.

(2) Connect the counter power cord to the ac power source.

(3) Operate the counter power switch to ON.

(4) Allow at least 5 minutes for the equipment to warm up.

(5) At the SD-94813-01 TOUCH-TONE frequency test circuit associated with the receiver under test, operate the MB switch to MB.

(6) Remove the front cover from the receiver.

(7) Set the 72A meter CAL-MEAS-SEARCH control to CAL or MEAS.

(8) Set the 72A meter HORIZ GAIN and OSC OUT control completely counterclockwise.

(9) Set the 23A TMS ADD DBM control to +10.

(10) Set the 23A TMS INPUT control to 600.

(11) Set the 23A TMS DIAL-MEAS-SLV control to MEAS.

(12) Connect the 72A meter OSC OUT jacks to the 23A TMS 309 MEAS jack using the 2P22A cord.

(13) Connect the B10 circuit board T and R test points to the 23A TMS 310 jack using the P2CL cord.

(14) Connect the counter INPUT connector to the 23A TMS MEAS T and R binding posts using the 11001A cable assembly.

(15) Set the counter GATE switch to 10s.

(16) Select the 60-volt dc scale on one of the KS-14510 meters, and connect the positive terminal to the GRD test point (located on the B18 circuit board), and the negative terminal to the STR test point (located on the B9 circuit board) using a P2CK cord as required.

**Note:** All references to this KS-14510 meter are now as the **STR meter**.

(17) Connect the -48 test point (located on B9 circuit board) to either one of the CKH test points (located on the B14 and B15 or B16 circuit boards) using the P1T cord.

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(18) Select the 60-volt scale on the other KS-14510 meter and connect the positive terminals to the -22 test point (located on the B18 circuit board) and the negative terminals to L1 test point (located on the B12 circuit board) using the other P2CK cord as required.

*Note:* All references to this KS-14510 meter are now as **L1 meter**.

**4. METHOD**

**A. Channel Detector Passbands**

(19) Adjust the 72A meter oscillator output level by means of the HORIZ GAIN AND OSC OUT control to -5 dBm as indicated by the 23A TMS.

(20) Adjust the 72A meter frequency by means of FREQUENCY CPS dials to the midband frequency for the L1 channel in accordance with Table C as measured by the counter.

*Note:* Follow the manufacturer instructions for frequency measurement with the counter.

(21) Note that the L1 meter indicates about 26 volts.

(22) Note that the STR meter indicates about 22 volts.

(23) Vary the 72A meter frequency output first to one side and then to the other side of midband noting the frequency extremes for which the STR meter indication remain unchanged at about 22 volts.

*Note:* No intermittent dip should be observed on the L1 meter. On the outsides of the frequency extremes determined by the STR meter, the STR meter should increase and indicate about 48 volts. The indication of the L1 meter should remain at about 26 volts.

(24) Vary the 72A meter frequency (pass one extreme and then the other) to a frequency where the STR meter indication increases to 48 volts.

(25) Adjust the 71A meter frequency toward midband observing the indications on both L1 and STR meters. A momentary dip should be observed on the L1 meter at the time when the indication on the STR meter changes from 48 to 22 volts.

(26) Adjust the 72A meter frequency (to one side and then the other side) to the points where the STR meter indication just remains at 22 volts.

TABLE C

BAND EDGE FREQUENCY TEST LIMITS

CHANNEL	TEST POINT LOCATION	MIDBAND FREQ	LOWER		UPPER	
			MIN	MAX	MIN	MAX
	CIRCUIT BOARD	HZ	HZ		HZ	
L1	B12	697	685.1	687.9	705.6	708.4
L2	B12	770	757.0	760.0	779.5	782.5
L3	B13	852	837.3	840.7	862.8	866.2
L4	B13	941	925.1	928.9	952.6	956.4
H1	B14	1209	1188.6	1193.4	1224.0	1228.8
H2	B14	1336	1313.3	1318.7	1353.7	1358.1
H3	B15,B16	1477	1452.0	1458.0	1495.4	1501.4
H4*	B15	1633	1605.7	1612.3	1653.1	1659.7

\* To be used only if J99297A, List 2 is under test.

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**Note:** The frequencies of these two points are the band edge frequencies. They should be determined as accurately as possible using the 72A meter 0-1.0 FREQUENCY CPS dial and measured with the counter. The frequencies should lie within the limits shown in Table C.

- (27) Repeat (18) through (26) for each of the low group L2, L3, and L4 replacing references to L1 with L2, L3, and L4 respectively. Corresponding test points are shown in Table C.
- (28) Disconnect the P1T cord on the CKH test point and reconnect to one of the two CKL test points (located on B12 and B13 circuit boards).
- (29) Repeat (18) through (26) for each of the high group H1, H2, H3, and H4 replacing references to L1 with H1, H2, H3, and H4 respectively. Corresponding test points are shown in Table C.
- (30) If no further test(s) are to be performed, remove all test connection, replace the front cover, and restore the receiver to normal service by operating the MB switch to N.

### B. Receiver Sensitivity

- (18) If option E for SD-98150-01 under test is provided, set the 23A TMS ADD DBM control to -5.
- (19) If option D for SD-98150-01 under test is provided, set the 23A TMS ADD DBM control first to 0 and later to -5 as required.
- (20) Adjust the 72A meter to 941 Hz output.
- (21) Increase the 72A meter oscillator output level by means of the HORIZ GAIN AND OSC OUT control past the point where the STR meter indicates 22 volts.
- (22) Determine the minimum 72A meter output amplitude as indicated by the 23A TMS for which the STR meter remains at about 22 volts by slowly rotating the HORIZ GAIN AND OSC OUT control counterclockwise and noting the 23A TMS indication when the STR meter indication changes.
- (23) If option E for receiver under test is provided, note that the 23A TMS indicates between 15.7 and 17.7 dBm.
- (24) If option D for receiver under test is provided, note that the 23A TMS indicates between 18.2 and 20.2 dBm.
- (25) Remove all test connections, replace the front cover, and restore the receiver to normal service by operating the MB switch to N.