

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

SD-98150-01

ADJUSTMENTS

1. GENERAL

- 1.01** This section describes a method for adjustments of the station test receiver.
- 1.02** This section is reissued for the following reasons:
 - To update Table C
 - To revise Part 4 METHOD, B (19), (21), (22), (25), and (26).
- 1.03** The adjustments should be made when a receiver under test fails to meet the test(s) prescribed in Section 100-143-501.
- 1.04** If the adjustments do not provide specified receiver responses, send the receiver to the service center.

2. APPARATUS

- 2.01** The apparatus required for each adjustment is shown in Table A. The details of each item are covered in the paragraph indicated by the number in parentheses.
- 2.02** J64072A frequency meter.
- 2.03** J94023A transmission measuring set (TMS).
- 2.04** Hewlett-Packard Model 5300 main frame equipped with 5304A module frequency counter (or equivalent capable of measuring 685.1 to 1659.7 Hz with ± 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 one KS-14672 L2 connector and one

TABLE A

| APPARATUS | ADJUSTMENT | |
|--------------------------------|------------|---|
| | A | B |
| 72A Meter (2.02) | 1 | 1 |
| 23A TMS (2.03) | 1 | 1 |
| KS-14510 Meter (or equivalent) | 1 | 1 |
| Electronic Counter (2.04) | | |
| 11001A Cable Assembly (2.05) | 1 | 1 |
| Cord (2.06) | 1 | 1 |
| Cord (2.07) | 1 | |
| Cord (2.08) | 1 | |
| Cord (2.09) | 1 | |
| Cord (2.10) | 1 | |
| 3-Inch C Screwdriver (2.11) | 1 | |
| 32 Tool (2.12) | 1 | |
| B17 Card Extender | 1 | 1 |

KS-14671 L2 connector (P21A cord) (for reconnection of receiver under test at a suitable level when the receiver is normally mounted too high on the frame for convenient adjustments.)

2.07 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-milliammeter as required).

2.08 Patching cord assembly, 12 feet long, equipped with two KS-19531 plugs and two 47 cord tips arranged for tip and ring connection to 310 plug (P2CL cord) (for interconnection of B10 circuit board test points to 23A TMS 310 MEAS jack).

2.09 Patching cord assembly, P2AM cord, 8 feet long, equipped with one 327A plug and one

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309 plug (2P22A cord) (for interconnection of 72A meter and 23A TMS).

2.10 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).

2.11 3-inch C screwdriver for adjusting KS-19069 potentiometers.

2.12 32 tool, 1/4-inch hexagon, single-end, socket wrench (for adjusting 1653-type inductors).

2.13 B17 card extender, a component of each receiver (for providing access to inductors and potentiometers on circuit boards for adjustment).

3. PREPARATION

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

All Adjustments

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

(a) Set control in accordance with Table B.

TABLE B

| CONTROL | SET TO |
|------------------------|---------------------------|
| CAL-MEAS-SEARCH | MEAS |
| HORIZ GAIN AND OSC OUT | Approximately ½ clockwise |
| INTENSITY | Maximum clockwise |
| ON-OFF | OFF |
| VERTICAL GAIN | Maximum counterclockwise |

(b) Connect to 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 jack to the 23A TMS 309 MEAS jack using the 2P22A cord.

(13) If the location of the receiver under test on the frame is at a height so that the receiver is not readily accessible from the floor level (normally higher than 5 feet), proceed as follows.

(a) Disconnect the receiver from the circuit.

(b) Remove the receiver from the frame.

(c) Support the receiver at a suitable level with the front side up.

(d) Reconnect the receiver into the circuit using the P21A cord.

- (14) Connect the B10 circuit board T and R test points to the 23A TMS 310 jack using the P2CL cord.
- (15) Connect the counter INPUT connector to the 23A TMS MEAS T and R binding posts using the 11001A cable assembly.
- (16) Set the counter GATE switch to 10s.
- (17) Select the 60-volt dc scale on the KS-14510 meter, 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 when the meter leads do not reach the test points.

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

- (18) 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.

4. METHOD

A. Adjustment of Band Edge Frequencies

- (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 the FREQUENCY CPS dials to the midband for the first channel in the low group to be adjusted in accordance with Table C as measured by the counter.

Note 1: Follow the manufacturer instructions for frequency measurement with the counter.

Note 2: Adjustment of band edge frequencies is accomplished by means of the bandwidth adjustment potentiometer R1 (or R9) and the adjustable 1653-type inductor in the channel filter. To gain access to R1 (R9) and the 1653-type inductor (in accordance with Table D), the particular channel circuit board must be removed, attached to the B17 cord extender, and the combination reinserted into the circuit board location. Rotating the R1 (R9) adjustment screw clockwise increases the upper edge frequency and decreases the lower edge frequency by approximately the same amount. Rotating the inductor adjustment screw clockwise increases both the upper and lower edge frequencies by approximately the same amount.

→TABLE C←
BAND EDGE FREQUENCY ADJUSTMENT LIMITS

| CHANNEL | NOMINAL MIDBAND FREQ | LOWER | | | UPPER | | |
|---------|----------------------|--------|--------|--------|--------|--------|--------|
| | | MIN | NOM | MAX | MIN | NOM | MAX |
| | cps | cps | | | cps | | |
| L1 | 697 | 686.3 | 686.5 | 686.7 | 706.8 | 707.0 | 707.2 |
| L2 | 770 | 758.3 | 758.5 | 758.7 | 780.8 | 781.0 | 781.2 |
| L3 | 852 | 838.8 | 839.0 | 839.2 | 864.3 | 864.5 | 864.7 |
| L4 | 941 | 926.8 | 927.0 | 927.2 | 954.3 | 954.5 | 954.7 |
| H1 | 1209 | 1190.6 | 1191.0 | 1191.4 | 1226.0 | 1226.4 | 1226.8 |
| H2 | 1336 | 1315.6 | 1316.0 | 1316.4 | 1355.0 | 1355.4 | 1355.8 |
| H3 | 1477 | 1454.6 | 1455.0 | 1455.4 | 1498.0 | 1498.4 | 1498.8 |
| H4* | 1633 | 1608.6 | 1609.0 | 1609.4 | 1656.0 | 1656.4 | 1656.8 |

* To be used only if J99297A L2 is under test.

TABLE D

| CHANNEL CIRCUIT BOARD | CHANNEL | INDUCTOR | POTENTIOMETER |
|-----------------------|---------|----------|---------------|
| B12 | L1 | 1653A | R1 |
| B12 | L2 | 1653B | R9 |
| B13 | L3 | 1653C | R1 |
| B13 | L4 | 1564D | R9 |
| B14 | H1 | 1653E | R1 |
| B14 | H2 | 1653F | R9 |
| B15,B16 | H3 | 1653G | R1 |
| B15 | H4* | 1653H | R9 |

* To be used only with J99297A L2.

(21) Adjust the 72A meter frequency to the nominal value in accordance with Table C for the lower edge frequency.

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

(23) If the STR meter does not indicate about 22 volts, adjust R1 (R9) clockwise using the 3-inch C screwdriver until the meter indicates 22 volts and remains at 22 volts.

(24) Adjust the 72A meter frequency toward the upper edge frequency to the point where the STR meter indication just remains at 22 volts.

Note: If the frequency at this point is within the adjustment tolerance limits for the upper edge frequency (Table C), the adjustment of the channel passband is completed.

(25) If the frequency is not within tolerance limits, proceed as follows.

(a) Adjust the 72A meter frequency half way between the measured upper edge frequency determined in (24) and the nominal band edge frequency (Table C).

(b) Determine in what direction [(20) Note 2] the 1653-type inductor adjustment screw should be rotated.

(c) Adjust the inductor until the STR meter indication remains at just 22 volts using the 3/2 tool.

(d) Adjust the 72A meter frequency to the nominal value for the upper band edge frequency (Table C).

(e) Adjust R1 (R9) to the point where the STR meter indication remains just at 22 volts using the 3-inch C screwdriver.

(f) Repeat (24) and then (a) through (f) as required, except that the lower edge frequency is now checked and adjusted within tolerance limits given in Table C.

(g) Repeat (24) and (25)(a) through (f) as many times as required so that both edge frequencies are within the adjustment tolerance limits.

(26) Repeat (20) through (25) for each remaining low group channel requiring adjustment using appropriate designations from Tables C and D.

(27) Disconnect one terminal of the P1T cord from the CKH check point and reconnect to either one of the two CKL test points (located on B12 and B13 circuit boards).

(28) Repeat (20) through (26) for each high-group channel (H1, H2, H3, and H4) to be adjusted.

(29) If no further tests and/or adjustments are to be made, remove all test connections, return the receiver to the proper frame location as required, replace the front cover and restore the receiver to normal service by operating the MB switch to N.

B. Sensitivity Adjustment

(19) Disconnect one terminal of the P1T cord from the CKL test point, and connect it to the CKH test point.

(20) Adjust the 72A meter to 941-Hz output.

(21) If option E for SD-98150-01 under test is provided, adjust the 72A meter oscillator output level by means of the HORIZ GAIN

AND OSC OUT control to $\blacktriangleright -16.7 \blacktriangleleft$ dBm as indicated by the 23A TMS.

(22) If option D for SD-98150-01 under test is provided, adjust the 72A meter oscillator output level by means of the HORIZ GAIN AND OSC OUT control to $\blacktriangleright -19.2 \blacktriangleleft$ dBm as indicated by the 23A TMS.

(23) Arrange access to the input amplifier (B10) by adapting the B17 cord extender to the amplifier and reinserting the combination in the location for the amplifier.

(24) Adjust the R14 potentiometer in the input amplifier to the point where the STR meter indication just remains at 22 volts.

(25) If option E for SD-98150-01 under test is provided, \blacktriangleright decrease \blacktriangleleft the 72A meter oscillator output level to $\blacktriangleright -17.0 \blacktriangleleft$ dBm as indicated by the 23A TMS. The STR meter indication should change from 22 volts to 48 volts.

(26) If option D for SD-98150-01 under test is provided, \blacktriangleright decrease \blacktriangleleft the 72A meter output level to $\blacktriangleright -19.5 \blacktriangleleft$ dBm as indicated by the 23A TMS. The STR meter indication should change from 22 volts to 48 volts.

(27) If no further tests and/or adjustments are to be made, remove all test connections, return the receiver to the proper frame location as required, replace the front cover, and restore the receiver to normal service by operating the MB switch to N.