

"BELLBOY"
 PERSONAL SIGNALING SYSTEM NO. 1A
 J1 CONTROL TERMINAL

TONE SUPPLY AND TONE GENERATOR TESTS

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1. GENERAL INFORMATION

1.1 Description: This section describes a method for testing the Tone Supply and Tone Generators of the J1 Control Terminal for use with Personal Signaling System 1A (Bellboy).

1.2 Application of Test: The tests of this section shall be performed as outlined in Section 310 of this handbook.

2. PREPARATION OF ELECTRONIC COUNTER

2.1 The Model 524C or 524D Electronic Counter should be equipped with a plug-in unit Model 526C Period Multiplier. If the plug-in unit is not installed, install it now.

2.2 Connect the ac power cord and observe that during warm-up the crystal oven thermometer does not overshoot the green area on the dial scale. Normal operating temperature is $65^{\circ} \pm 5^{\circ} \text{C}$ or $(149^{\circ} \pm 9^{\circ} \text{F})$.

2.3 If the thermometer does overshoot, disconnect the power cord immediately to prevent damage to the crystal. The thermostatic switch may be stuck or defective.

2.4 Put the power switch in the ON position. The STAND BY position is provided for intermittent use of the test set, in order to reduce warm-up time.

2.5 Continue warm-up until the self-checking test in Paragraph 2.6 gives consistent results. Normal warm-up time is 2 to 3 hours.

NOTE: A thermal switch TC201 will remove power from all circuits except the crystal oven heater, should the temperature become excessive. After cooling, reset by pressing a small button on the thermal switch, which can be reached by removing a plug button on the left-upper-rear of the instrument case.

2.6 Self-Checking Test

CAUTION: Do not move any of the screw-driver adjustments on the face of the electronic counter or the plug-in unit. These adjustments are set by the manufacturer, and require special facilities to check.

2.6. Put the 100KC STANDARD switch in the INT position.

2.62 Put the MANUAL GATE switch in the INT position.

2.63 Set the FUNCTION SELECTOR switch in the 100KC CHK position.

2.64 Set the DISPLAY TIME knob to give a constant display. Eight digits and a decimal point are displayed.

TABLE A

Frequency Unit Switch Setting	100KC Check	10MC Check
10 sec.	0100.0000	0000.0000 + .0001
1 sec.	00100.000	10000.000 + .001
0.1 sec.	000100.00	010000.00 + .01
0.01 sec.	0000100.0	0010000.0 + .1
0.001 sec.	00000100.	00010000. + 1

2.65 Set the FREQUENCY UNIT switch to each of its positions, and check that the reading obtained agrees with the 100KC Check column of Table A.

2.66 Set the FUNCTION SELECTOR switch to the 10MC CHK position.

2.67 Set the FREQUENCY UNIT switch to each of its 5 positions, and check that the reading obtained agrees with the 10MC CHECK column of Table A.

2.68 In the 10MC Check, the eighth digit may be one unit off as indicated in Table A.

2.7 These requirements must be met before the electronic counter may be used.

2.8 The electronic counter shall be in operation for at least 24 hours immediately prior to the tests of 36A Oscillators.

3. TONE SUPPLY CIRCUIT

3.1 Power Supply Voltage
 (Fig. 1-SD-96563-01)

3.11 Place ITE-4442 Volt-ohmmeter on 60V dc scale. Check for presence of less than -40 volts between ground and terminal 43 of power supply card for Group A (Regular) at rear of TCF.

3.12 Strap resistors R134, R135, R136, and R137 of card to obtain a voltmeter indication of -26 volts.

3.13 Place the (+) and (-) leads of the voltmeter on terminals 21 and 43 respectively at card. Using voltmeter

3V dc scale, adjust the R138 potentiometer of card to obtain an indication of 2.7 volts.

3.14 Repeat Paragraphs 3.11 through 3.13 for power supply card for Group B (Standby).

3.2 36A Oscillator Output Voltage

3.21 Use ITE-4414 Vacuum Tube Voltmeter to measure the voltage between ground and the OSC OUT jack on the front of each oscillator in Group A and Group B.

3.22 Record the voltages measured to two decimal places in the test record (ID-1313).

3.23 All Voltages shall be between 3.00 and 3.50 volts. The highest and lowest voltages in each Group (A or B) shall be within 0.20 volts of each other.

4. OSCILLATOR FREQUENCY MEASUREMENTS

4.1 The Tone Supply Circuit shall have been fused with all 36A Oscillators or 4035A Networks in place for at least 24 hours prior to beginning the frequency measurements.

4.2 The output frequency of the oscillator will be verified by using the Electronic Counter to measure the length of a period in microseconds.

4.3 If an oscillator frequency is found to be out of the limits indicated in Table B, the frequency may be adjusted slightly by variable condenser C-16. Oscillator position and associated crystal frequency information is provided in Circuit Note 106 of SD-96563-01.

4.4 Test Procedure:

4.41 Connect test cord provided with Electronic Counter to the SIGNAL INPUT jack on the front of the Counter.

4.42 Locate Electronic Counter at TCF so that test cord will reach all oscillator OSC OUT jacks in Groups A and B.

4.43 Set Electronic Counter selector switches to positions indicated in following table:

Selector	Position
Divide Reading By	1000
Function	10 Period Average
Time Unit	Microsec

→ Arrows indicate new or changed information.

TABLE B

Osc #	Xtal Freq	Period Limits
1	2070	1932.554 - 1932.181
2	2130	1878.111 - 1877.758
3	2190	1826.651 - 1826.317
4	2250	1777.936 - 1777.620
5	2310	1731.752 - 1731.452
6	2370	1687.906 - 1687.621
7	2430	1646.226 - 1645.955
8	2490	1606.555 - 1606.297
9	2550	1568.751 - 1568.504
10	2610	1532.685 - 1532.450
11	2670	1498.240 - 1498.015
12	2730	1465.309 - 1465.094
13	2790	1433.796 - 1433.589
14	2850	1403.607 - 1403.410
15	2910	1374.665 - 1374.476
16	2970	1346.892 - 1346.711
18	3090	1294.582 - 1294.415
19	3150	1269.922 - 1269.761
20	3210	1246.184 - 1246.028
21	3270	1223.316 - 1223.167
22	3330	1201.273 - 1201.129
23	3380	1180.011 - 1179.871
24	3450	1159.488 - 1159.353
25	3510	1139.666 - 1139.536
26	3570	1120.511 - 1120.385
27	3630	1101.989 - 1101.868
28	3690	1084.070 - 1083.952
29	3750	1066.724 - 1066.610
30	3810	1049.924 - 1049.814
31	3870	1033.645 - 1033.538
32	3930	1017.864 - 1017.760
33	3990	1002.557 - 1002.456

4.44 Connect test cord probe to OSC OUT jack of 36A Oscillator in position 1 of Group A. Connect ground clip of cord to convenient point on oscillator mounting.

4.45 Set DISPLAY TIME control of Counter to give convenient interval to read and record indicated period.

4.46 Compare the displayed time with limits given in Table B and make slight adjustment by variable condenser C-16 if necessary. Record the display time in the test record SD-4-1313.

4.47 Repeat Paragraphs 4.44 and 4.46 for all other oscillators in Groups A and B.

4.48 Disconnect all cords to the Electronic Counter.

Manager, Panel and Step-by-Step
Engineering

Reason for Reissue:
To make corrections in Paragraphs 4.3
and 4.46.

Replaces Section 312 dated 2-21-63.