

PRECISE BUSY TONE SUPPLY J87353A

TESTS

STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section provides a method of testing and adjusting the precise busy tone supply J87353A (SD-82003-01).

1.02 This issue affects the Equipment Test List.

1.03 The tests covered are:

A. Tone Generator Output Power:

This test checks the output voltage levels of the 480-Hz and 620-Hz oscillators on both individual and combined bases.

3

B. Tone Monitor Test: This test checks the adjustments of the 10D monitoring circuit.

4

C. Busy Tone Output Check: This test checks for the presence of combined 480-Hz and 620-Hz tones at the 60- and 120-ipm outputs under both normal and transfer conditions.

6

1.04 The tests in this section should preferably be performed during periods of light traffic conditions.

1.05 The Hewlett-Packard model 3400A root mean square (RMS) voltmeter (or equivalent) **must** be used in making ac voltage measurements. **Do not** substitute for any other voltmeter unless it is capable of measuring true RMS voltages.

1.06 **Lettered Steps:** A letter a, b, c, etc, added to a step number in Part 3 or 4 of this section indicates an action which may or may

not be required depending on local conditions. The condition under which a lettered step, or a series of lettered steps, should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

Tests A and B

2.01 Hewlett-Packard model 3400A (or equivalent, see 1.05) true RMS voltmeter equipped with test leads adaptable to standard pinjacks.

Tests A and C

2.02 Two W1BB cords, 2 feet long, equipped with a KS-19531 L2 plug on one end and a Mueller 30 minigator clip on the other end.

Test A

2.03 One 1/2 watt 40,000 \pm 4,000 ohm resistor.

Test B

2.04 A KS-20538 L1 volt-ohm-milliammeter (VOM) equipped with KS-20538 L2 test leads.

Test C

2.05 A 716C test receiver attached to a 2W21A cord. Equip 360A tools of 2W21A cord with KS-6278 connecting clips.

2.06 A KS-3008 (or equivalent) stop watch.

2.07 One 1/2 watt 10,000 (10K) \pm 1,000 ohm resistor.

SECTION 226-806-500

3. PREPARATION

STEP	ACTION	VERIFICATION
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All Tests

1	At precise busy tone supply— Observe state of GT lamp.	
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2a	If GT lamp is lighted in Step 1— Restore TRFR switch to NOR.	
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Note: If TRFR switch is already in the NOR position and the GT lamp is lighted, a trouble condition is indicated and testing should not continue until the trouble condition is cleared.

3a	Momentarily operate RST key.	GT lamp extinguished.
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Tests A and B

4	Connect true RMS voltmeter with a Hubbell isolation plug to 115-volt ac power supply.	
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Caution: *The Hewlett-Packard model 3400A true RMS voltmeter is ac powered and grounded. If this meter is to be used, an isolation plug should be used to prevent possible damage to components of the tone power plant.*

5	Operate the power switch to ON.	
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6	Connect BNC connector of true RMS voltmeter test cord to INPUT jack.	
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Test A

7	Connect the minigator clip of each W1BB cord to each end of the 40K resistor.	
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Test C

8	Using W1BB cords, connect 10K resistor in series with one lead of 716C test receiver.	
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STEP	ACTION	VERIFICATION
4. METHOD		
STEP	ACTION	VERIFICATION
A. Tone Generator Output Power		
8	At <i>lower</i> 404E tone generator— Using W1BB cords, connect 40K resistor across TP8 (-13) and TP10 (L2) pinjacks. <i>Note:</i> The above action disables the 620-Hz oscillator in the lower tone generator.	
9	Set RANGE switch on true RMS voltmeter to 3 VOLTS.	
10	Connect test leads of true RMS meter to TP4 (GRD) and TP11 (LT1) pinjacks.	True RMS voltmeter indicates exactly 1.45 volts. (If requirement is not met, proceed to next step.)
11b	If true RMS voltmeter <i>does not</i> indicate exactly 1.45 volts— Rotate BIAS ADJ 1 potentiometer until voltmeter indicates exactly 1.45 volts.	
12	Remove W1BB cord connections from TP8 and TP10 and connect to TP3 (-13) and TP5 (L1) pinjacks. <i>Note:</i> The above action disables the 480-Hz oscillator in the lower tone generator and restores the 620-Hz oscillator to normal.	True RMS voltmeter indicates exactly 1.85 volts. (If requirement is not met, continue to next step.)
13b	If true RMS voltmeter <i>does not</i> indicate exactly 1.85 volts— Rotate BIAS ADJ 2 potentiometer until meter indicates exactly 1.85 volts.	
14	Remove W1BB cord connections from TP3 and TP5 pinjacks.	True RMS voltmeter indicates between 2.35 and 2.45 volts. <i>Note:</i> The above indication represents the combined outputs of the 480-Hz and 620-Hz oscillators.
15	Remove test leads of true RMS voltmeter from TP4 and TP11 pinjacks.	Pointer on true RMS voltmeter restores to normal.
16	Set RANGE switch on true RMS voltmeter to 1 VOLT.	

SECTION 226-806-500

STEP	ACTION	VERIFICATION
17	Connect test leads of true RMS voltmeter to terminals 1A and 2 of T1 transformer.	True RMS voltmeter indicates between .58 and .62 volt.
18	Remove test leads of true RMS voltmeter from T1 transformer terminals.	Pointer on true RMS voltmeter restores to normal.
19	Operate TRFR switch.	GT lamp lighted.
20	Repeat Steps 8 through 18, substituting <i>upper</i> 404E tone generator for lower 404E tone generator.	
21	Restore TRFR switch to NOR.	
22	Momentarily operate RST switch.	GT lamp extinguished.

B. Tone Monitor Test

7	Prepare VOM to measure 3 volts dc.	
8	At tone monitor circuit— Connect test leads of VOM to TP12 (–) and TP15 (+) pinjacks. <i>Note:</i> It may be necessary to change DC+Ω or DC–Ω pushbutton setting of VOM to obtain indication.	VOM indicates exactly 1.6 volts. (If requirement is not met, proceed to next step.)
9b	If VOM <i>does not</i> indicate exactly 1.6 volts— Rotate HLV REF 1 potentiometer until VOM indication is exactly 1.6 volts.	
10	Remove test lead of VOM from TP12 and connect to TP16 (–) pinjack.	VOM indicates exactly 1.6 volts. (If requirement is not met, proceed to next step.)
11b	If VOM <i>does not</i> indicate exacty 1.6 volts— Rotate HLV REF 2 potentiometer until VOM indication is exactly 1.6 volts.	
12	Rotate HLV LEV 1 and HLV LEV 2 potentiometers to their fully clockwise positions.	
13	Remove VOM test leads from TP15 and TP16 pinjacks.	Pointer on VOM restores to normal.
14	Connect VOM test leads to TP13 (+) and TP14(–) pinjacks. (See note after Step 8.)	VOM indicates exactly 2.0 volts. (If requirement is not met, proceed to next step.)

STEP	ACTION	VERIFICATION
15c	If VOM <i>does not</i> indicate exactly 2.0 volts— Rotate HLV LEV 1 potentiometer counterclockwise until VOM indication is exactly 2.0 volts.	
16	Remove VOM test leads from TP13 and TP14 pinjacks.	Pointer on VOM restores to normal.
17	Connect VOM test leads to TP17 (+) and TP18 (–) pinjacks. (See note after Step 8.)	VOM indicates exactly 2.0 volts. (If requirement is not met, proceed to next step.)
18c	If VOM <i>does not</i> indicate exactly 2.0 volts— Rotate HLV LEV 2 potentiometer counterclockwise until VOM indication is exactly 2.0 volts.	
19	Remove VOM test leads from TP17 and TP18 pinjacks.	Pointer on VOM restores to normal.
20	Set RANGE switch on true RMS voltmeter to 3 VOLTS.	
21	At <i>lower</i> 404E tone generator— Connect test leads of true RMS voltmeter to TP4 (GRD) and TP11 (LT1) pinjacks.	
22	Slowly rotate BIAS ADJ 1 potentiometer counterclockwise until HLVM2 relay is operated.	At tone monitor circuit— HLVM2 lamp lighted. Audible alarm sounds. True RMS voltmeter indicates between 1.80 and 2.10 volts.
23	Rotate BIAS ADJ 1 potentiometer clockwise until true RMS voltmeter indication is exactly 2.40 volts.	HLVM2 lamp extinguished. Audible alarm silenced.
24	Remove test leads of true RMS voltmeter from TP4 and TP11 pinjacks of lower 404E tone generator.	Pointer on true RMS voltmeter restores to normal.
25	At tone monitor circuit— Operate TRFR switch.	GT lamp lighted.
26	At <i>upper</i> 404E tone generator— Connect test leads of true RMS voltmeter to TP4 (GRD) and TP11 (LT1) pinjacks.	
27	Slowly rotate BIAS ADJ 1 potentiometer counterclockwise until HLVM1 relay is operated.	At tone monitor circuit— HLVM1 lamp lighted. Audible alarm sounds. True RMS voltmeter indicates between 1.80 and 2.10 volts.

SECTION 226-806-500

STEP	ACTION	VERIFICATION
28	Rotate BIAS ADJ 1 potentiometer clockwise until true RMS voltmeter indication is exactly 2.40 volts.	HLVM1 lamp extinguished. Audible alarm silenced.
29	Remove test leads of true RMS voltmeter from TP4 and TP11 pinjacks of upper 404E tone generator.	Pointer on true RMS voltmeter restores to normal.
30	At tone monitor circuit— Operate TRFR switch to NOR.	
31	Momentarily operate RST switch.	GT lamp extinguished.

C. Busy Tone Output Check

9	At precise busy tone supply— Connect test lead of 716C test receiver (with 10K resistor) to ground.	
10	Connect other test lead of 716C test receiver to terminal 9 of T.S.(1).	Interrupted tone heard in 716C test receiver.
11	After receiving any given burst of tone— Start timing and count tone interruptions. After 1 minute interval— Stop timing.	Number of tone interruptions heard in 716C test receiver within 1-minute timing interval equals 60.
12	Remove test lead of 716C test receiver from terminal 9 of T.S.(1) and connect to terminal 11.	Interrupted tone heard in 716C test receiver.
13	After receiving any given burst of tone— Start timing and count tone interruptions. After 1 minute interval— Stop timing.	Number of tone interruptions heard in 716C test receiver within 1-minute timing interval equals 120.
14	Remove test lead of 716C test receiver from terminal 11 of T.S.(1) and connect to terminal 20.	Continuous busy tone heard in the 716C test receiver.
15	While listening to continuous tone— At tone monitor circuit— Operate TRFR switch.	GT lamp lighted. Continuous tone still heard in 716C test receiver.
16	Remove test lead of 716C test receiver from terminal 20 of T.S.(1) and connect to terminal 9.	Tone interrupted at 60 ipm heard in 716C test receiver.
17	Remove test lead of 716C test receiver from terminal 9 of T.S.(1) and connect to terminal 11.	Tone interrupted at 120 ipm heard in 716C test receiver.

STEP	ACTION	VERIFICATION
18	Remove 716C test receiver test lead connections.	
19	Restore TRFR switch to NOR.	
20	Momentarily operate RST switch.	GT lamp extinguished.