TO: ALL HOLDERS OF AURAL WARNING MODULE ASSEMBLY OVERHAUL MANUAL, 31-26-01

REVISION NO. 28, DATED JUL 1/08

HIGHLIGHTS

DESCRIPTION OF CHANGE	TOPICS AFFECTED												
	D & O	D / Assy	Cleaning	Insp / Chk	Repair	Assy	F / C	Test	T / Shooting	S / Tools	Storage	IPL	L / Overhaul
Removed BAE Systems assemblies from manual	X				X			X	X			X	

AURAL WARNING BOX ASSEMBLY

31-26-01

BOEING P/N 65C21854-2

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
31-1030		PRR 32972R	May 10/81

LIST OF EFFECTIVE PAGES

* Indicates pages revised, added or deleted in latest revision
F Indicates foldout pages - print one side only

PAGE	DATE	PAGE	DATE	PAGE	DATE
31-26-01					
* T-1	Jul 1/08				
T-2	BLANK				
* LEP-1	Jul 1/08				
LEP-2	BLANK				
* T/C-1	Jul 1/08				
T/C-2	BLANK				
* 1	Jul 1/08				
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* 401	Jul 1/08				
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* 701	Jul 1/08				
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* 704	Jul 1/08				
* 705	Jul 1/08				
* 706	Jul 1/08				
* 707	Jul 1/08				
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* 1109	DELETED				
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*[1] Use applicable procedures in SOPM 20-11-04 and standard industry practices.

*[2] Special instructions not required.

AURAL WARNING BOX ASSEMBLY

DESCRIPTION AND OPERATION

NOTE: For coverage of 65-54499-12, -15, -17, -21, -23, -25, -26, -27, -28, -29, -32, -34, -36, -38, -40, -41,-42, refer to BAE Systems (V89954 BAE Systems Controls Inc., 600 Main St., Johnson City, NY 13790-1806) CMM 31-26-01.

1. Description

   A. The aural warning box assembly contains sound transmitting devices (speaker, bell, clacker), amplifier transistors, inductors, and audio signal generating printed circuit assemblies. Rear-mounted connectors mate with the airplane wire bundle.

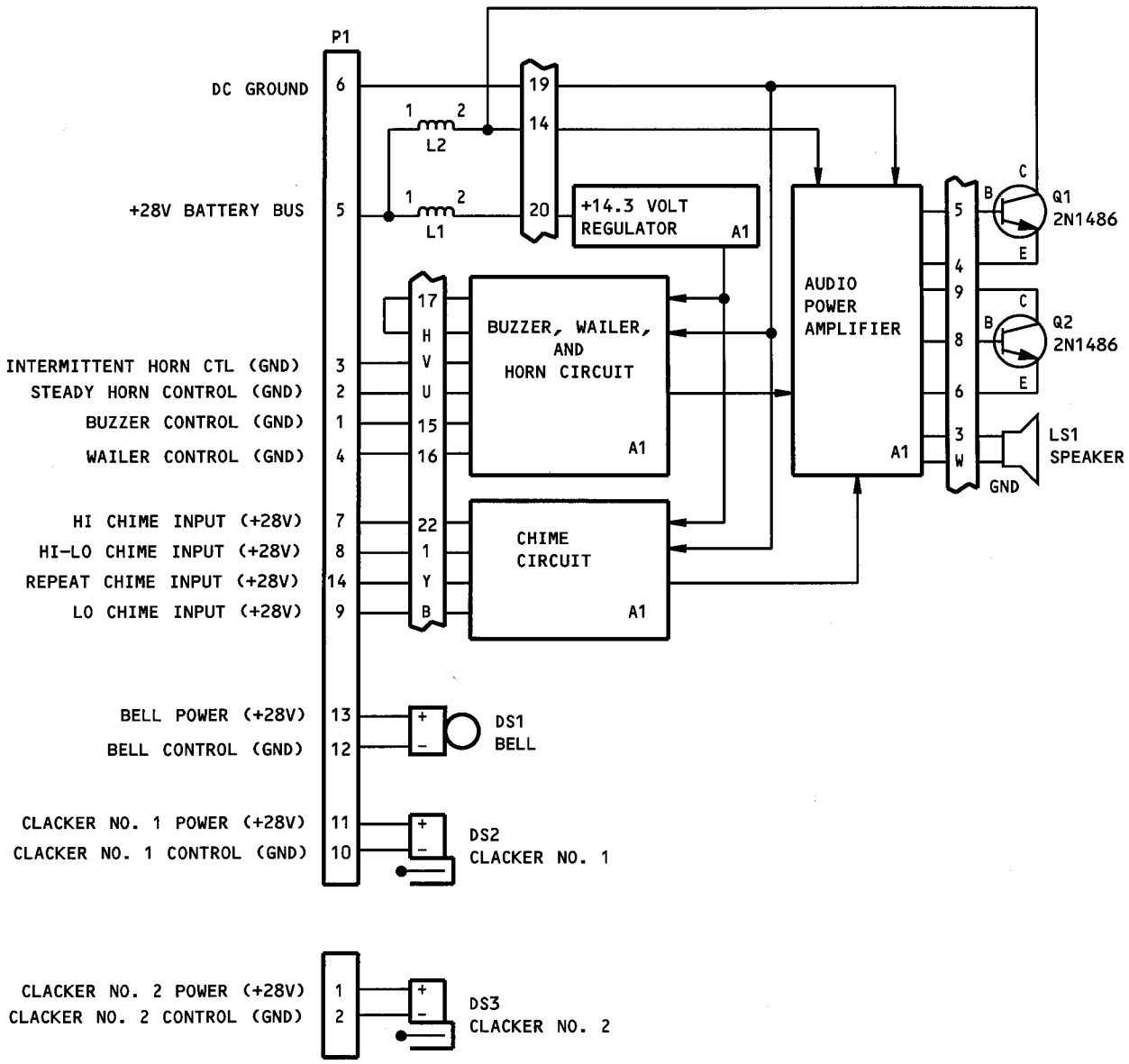
2. Operation

   A. The sounds produced are horn, wailer, buzzer, bell, clacker, and chime. Some configurations generate the bell and clacker drive with printed circuit assembly oscillators, other configurations use mechanical bell and clacker units. A printed circuit assembly generates speaker drive for the sounds of wailer, horn, and chime.

   B. Inductors L1 and L2 filter transient signals and ac from the input circuit power. Transistors Q1 and Q2 join with transistors in the printed circuit assembly to form an audio power amplifier.

   C. Common circuitry is used to generate more than one sound. A priority system prevents generation of two sound patterns at the same time. Order of priority, from highest to lowest, is intermittent horn, steady horn, and buzzer. The high chime, low chime, and high-low combination (not repeated) can be operated simultaneously with the wailer and buzzer but will be turned off by the intermittent or steady horn control signals. The single note high or low chime can be operated at the same time or at close intervals. The high low repeat chime is not contained on all configurations.

   D. Figure 1 is a general block diagram of the aural warning circuitry. On some configurations, mechanical bell and clacker units are wired directly to the external connector, eliminating the printed circuit oscillators.



Block Diagram
Figure 1

572747

REPAIR

1. All repair may be accomplished with standard industry practices and information contained in SOPM 20-11-04 except as noted in the following:

   A. Replace damaged wire with electrical cable BMS 13-16A, Type I, Class 1, color - white, size - AWG 22 unless otherwise noted on schematic diagram.

   B. When replacing insulator (140, Fig. 1102), bond new insulator to case per SOPM 20-50-12, Type 38.

   C. When replacing insulator (12, Fig. 1102), bond new insulator to cover per SOPM 20-50-12, Type 48 or 70.

   D. When replacing spacers (62, Fig. 1102), bond new spacers to insulator per SOPM 20-50-12, Type 38.

   E. When replacing insulator (140, Fig. 1102) bond to case per SOPM 20-50-12, Type 38.

   F. When replacing bell (220, Fig. 1102) orient mounting lug with red dot on mounting bracket with single mounting hole (not 255, Fig. 1102). *[1]

*[1] Keeps bell from sounding due to takeoff vibration when bell plunger spring weakens.

TESTING

1. Test Equipment

   A. DC Power Supply: variable 20-32 ±0.5 volts with ripple content of less than 4 volts peak to peak.

   B. Switches: SPST (14 required) (S2-S13, S15, S16)

   C. Connector: BACC45FT14-15S (or 48-16R14-15S, Amphenol Corp. Sub. of Allied Corp., Commercial & Industrial, 4300 Commerce Court, Lisle, Illinois 60532) (Mate with PI)

   D. Connector: BACC45FT10-5S (Mate with P2)

   E. Octave Band Sound Level Meter: General Radio 1933-9710, 1933-9703, or equivalent

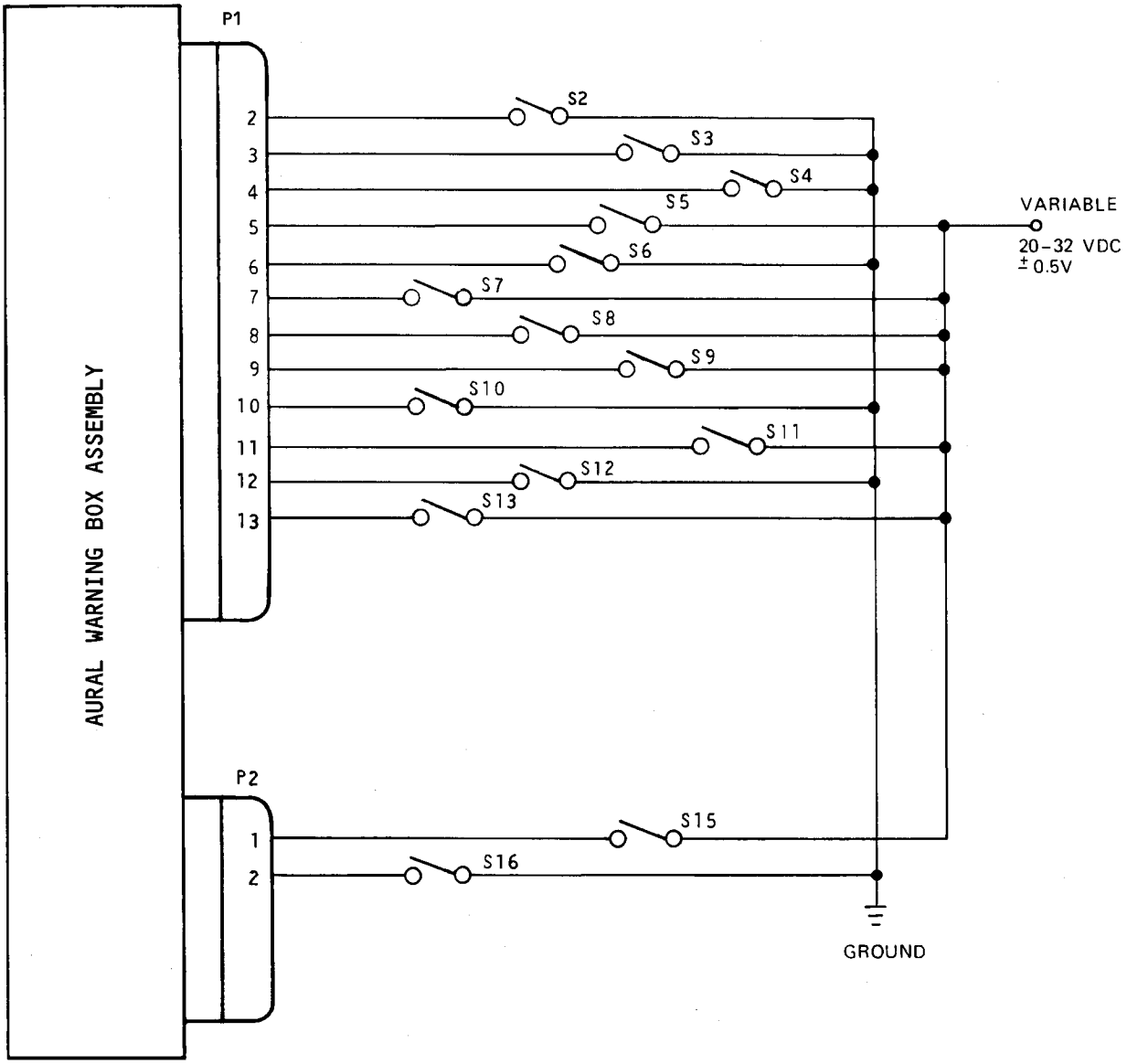
2. Functional Test

   A. General

      (1) When making acoustical measurements in the test, use typical hard-topped electronic work bench with a back wall about 2 feet behind the sound level meter pickup. The assumption is made that this test setup, with the sound level meter at 3 feet from the module, approximates the sound level at the pilot's ear in the cockpit.

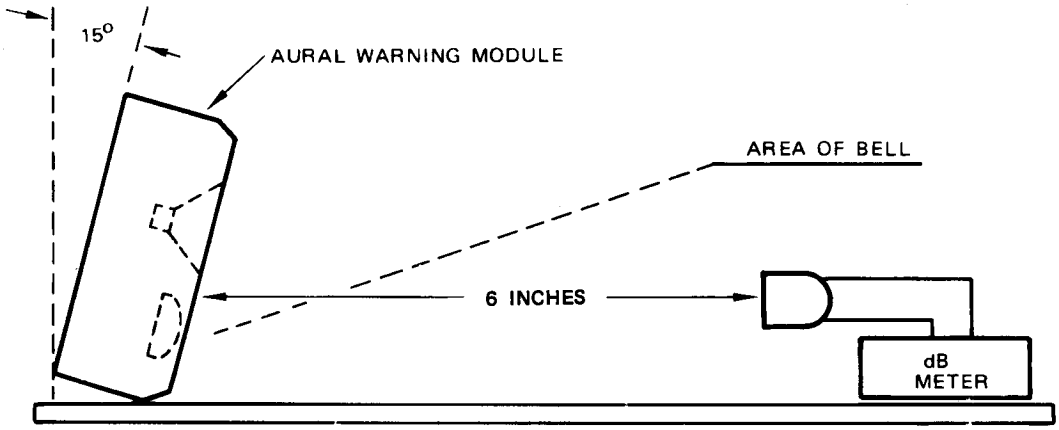
      (2) Figure 703 shows typical sound level characteristics. The curves will vary with the acoustical situation at each test bench. However, penetration of the Alarm Criterion curve (Fig. 703) is a requirement for the bell and clackers. The horn and chime typical curves are shown for reference and trouble shooting.

   B. Connect test setup per Fig. 701 with all switches set to OFF. Place the sound level meter and module per Fig. 702, section A.

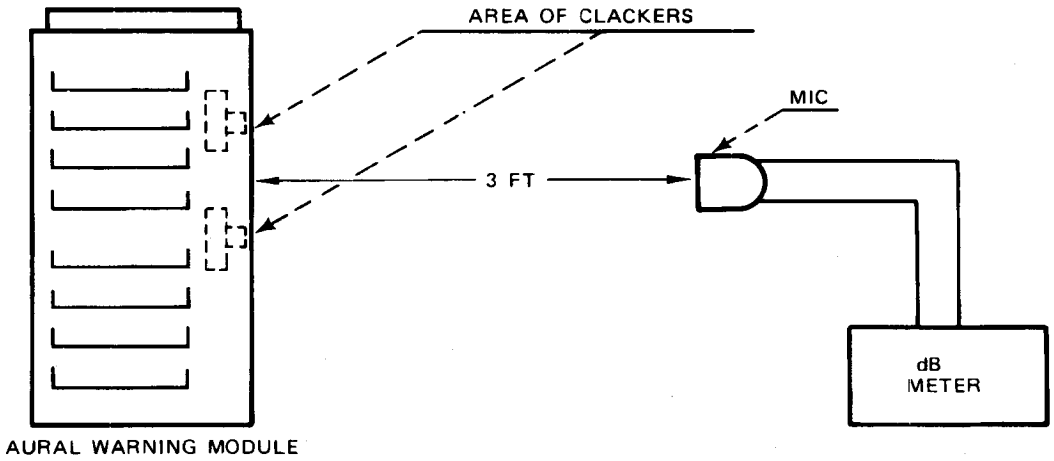


Test Setup for Aural Warning Box Assembly
Figure 701

1550292



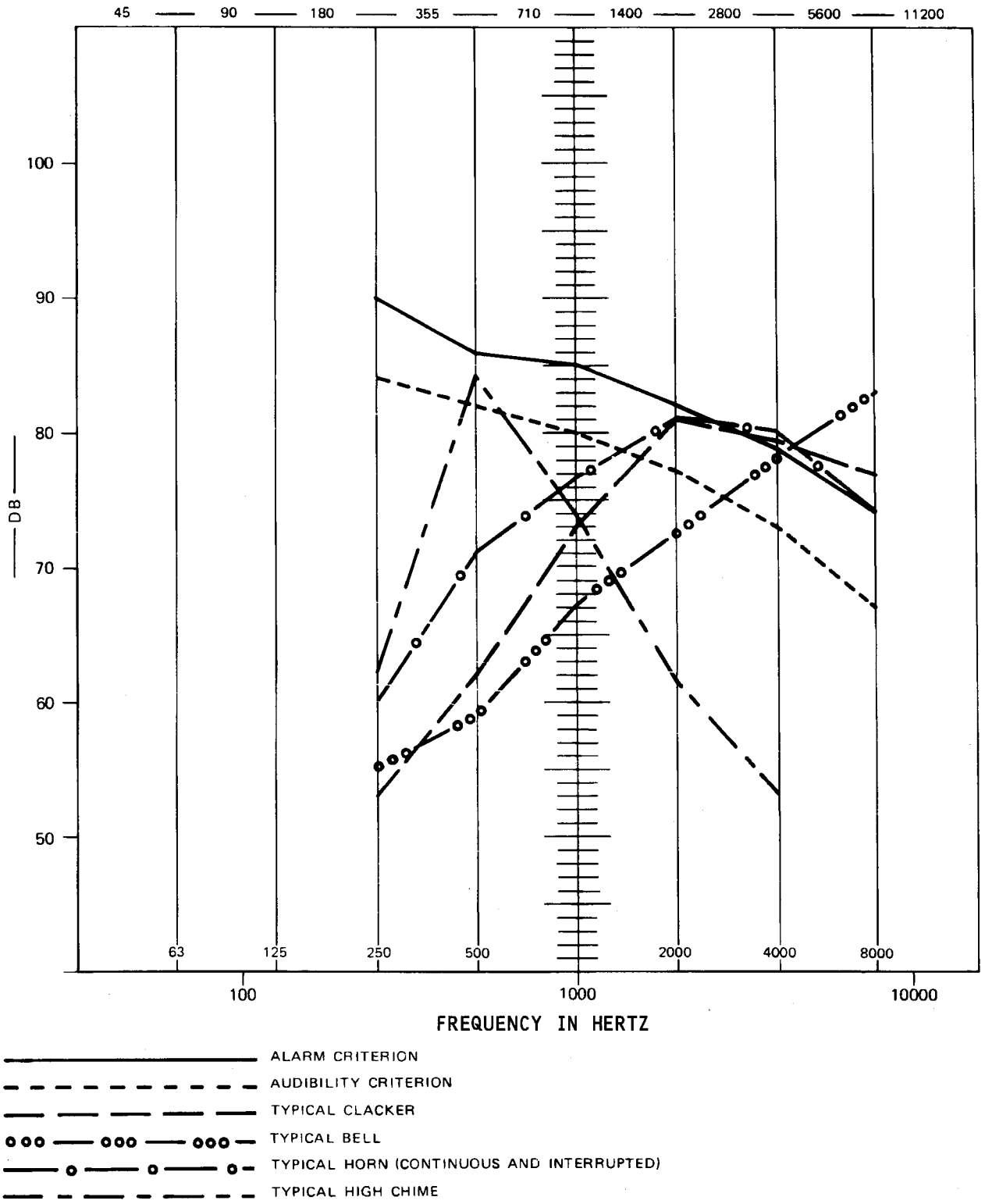
A



B

Sound Level Meter Location
Figure 702

1550332



Sound Level Characteristics
Figure 703

1550379

C. Set the meter to indicate 100 to 110 db, depress the slow response button, and use the A scaling setting. Set to "weighting" position.

D. Set power supply to 28 ±0.5 vdc.

E. Perform the test steps listed in Fig. 704.

Step	Procedure	Required Results
1	Set S5, S6, S2 to ON	Horn sounds continuous
2		Meter indicates 102-103 db (if necessary, adjust R23 on large printed circuit assembly to obtain required level)
3	Set S2 to OFF	Horn ceases
4	Set S3 to ON	Horn sounds, interrupted. Meter indicates 102-103 db (if necessary, adjust resistor on large printed circuit assembly to obtain required level): Adjust R109
5	Set S3 to OFF	Horn ceases
6	Set S8 to ON (to repeat step, S8 to OFF, wait 5 seconds, set S8 to ON)	Hi-lo chime sounds. As chime sounds, meter should swing to 102-103 db. (If necessary, adjust R52 on large printed circuit assembly to obtain required level)
7	Set S5, S6, S8 to OFF	
8	Set S5, S6 to ON	No sound
9	Ground module chassis with alligator clip	
10	Set S3, S2, to ON	Horn sounds, interrupted at approximately 2 cycles per second
11	Set S3 to OFF	Horn sounds continuous

Functional Tests
Figure 704 (Sheet 1)

Step	Procedure	Required Results
12	Set S2, S4 to OFF	Horn ceases. Chime shall sound repeatedly
13	Set S4 to ON	Wailer sounds
14	Set S4 to OFF	Wailer ceases.
15	Set S1 to OFF	Buzzer ceases
16	Set S7 to ON	One high chime sounds
17	Set S7 to OFF	
18	Set S9 to ON	One low chime sounds
19	Set S9 to OFF	
20	Set S8 to ON	One high-low chime set shall sound. Low should follow high at approximately 1/2 second interval
21	Set all switches to OFF	
22	Position module on hard-topped table per Fig. 702, section B. Set power supply to 26.5 $\pm$0.5 volts dc	
23	Set S11, S10 to ON	With octave band meter, determine that the clacker output is above the alarm criterion (Fig. 703) in some octave band.
24	Reduce power supply to 20.5 $\pm$0.5 volts dc	Use a scale meter setting. Verify 63 db minimum
25	Increase voltage to 31 $\pm$0.5 volts dc	Verify that clacker operates for a minimum of 20 seconds
26	Repeat steps 21 thru 25 using switches S15 and S16 instead of S11 and S10	

Functional Tests
Figure 704 (Sheet 2)

Step	Procedure	Required Results
27	Position module on hard-topped table per Fig. 702, section A, except use 3-foot separation. Set power supply to 26.5 ± 0.5 volts dc	
28	Set S13, S12 to ON	With octave band meter, determine that the bell output is above the alarm criterion (Fig. 703) in some octave band
29	Reduce power supply to 20.5 ± 0.5 volts dc	Use A scale meter setting. Verify 63 db minimum
30	Increase voltage to 31 ± 0.5 volts dc	Verify that bell operates for a minimum of 20 seconds
31	Set switches to OFF, disconnect test setup	

Functional Tests
Figure 704 (Sheet 3)

F. Perform Isolation Test per Fig. 705.

Step	Procedure	Required Results	Suspected Component
1	Measure resistance between P1-6 and P2-1	Greater than 100 KΩ (No continuity)	DS 3 Clacker No. 2
2	Measure resistance between P1-6 and P1-11	Greater than 100 KΩ (No continuity)	DS 2 Clacker No. 1
3	Measure resistance between P1-6 and P1-13	Greater than 100 KΩ (No continuity)	DS 1 Bell

Isolation Test
Figure 705

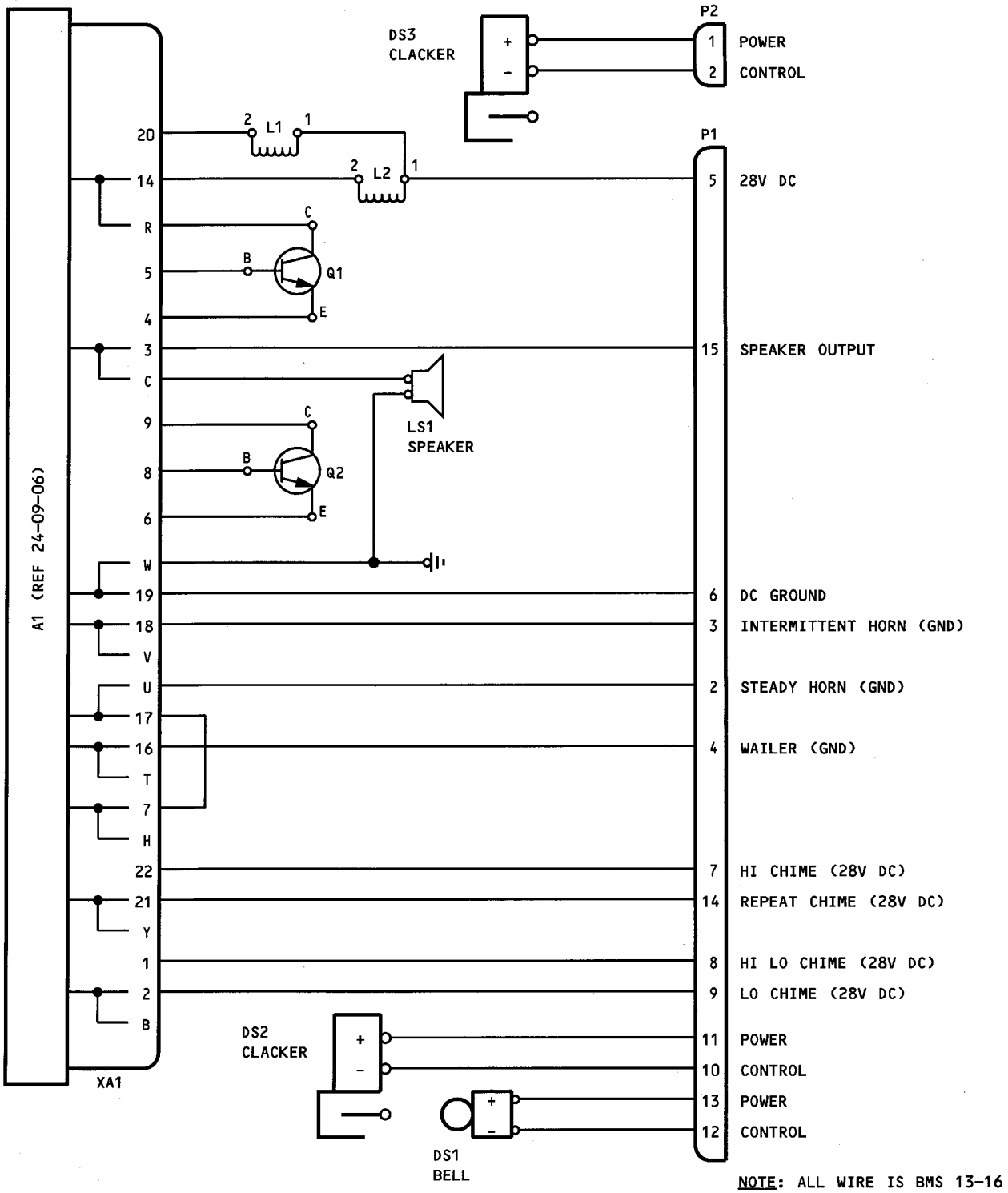
G. End of Test.

TROUBLE SHOOTING

1. If test failure occurs, check for defective connections and incorrect wiring before replacing components.

   NOTE: Trouble shooting is keyed to the functional test procedures.

Trouble	Possible Cause and Correction
Figure 704:	
Step 1	Verify 28 volts dc on terminals 2 of L1 and L2 If L1, L2 OK, Q1, Q2 or A2 defective, or speaker LS1
Step 2, insufficient volume	Replace A2. If fault persists, Q1, Q2, or speaker LS1 defective
Steps 3-20	A1
Steps 22-25	DS2
Step 26	DS3
Steps 27-30	DS1

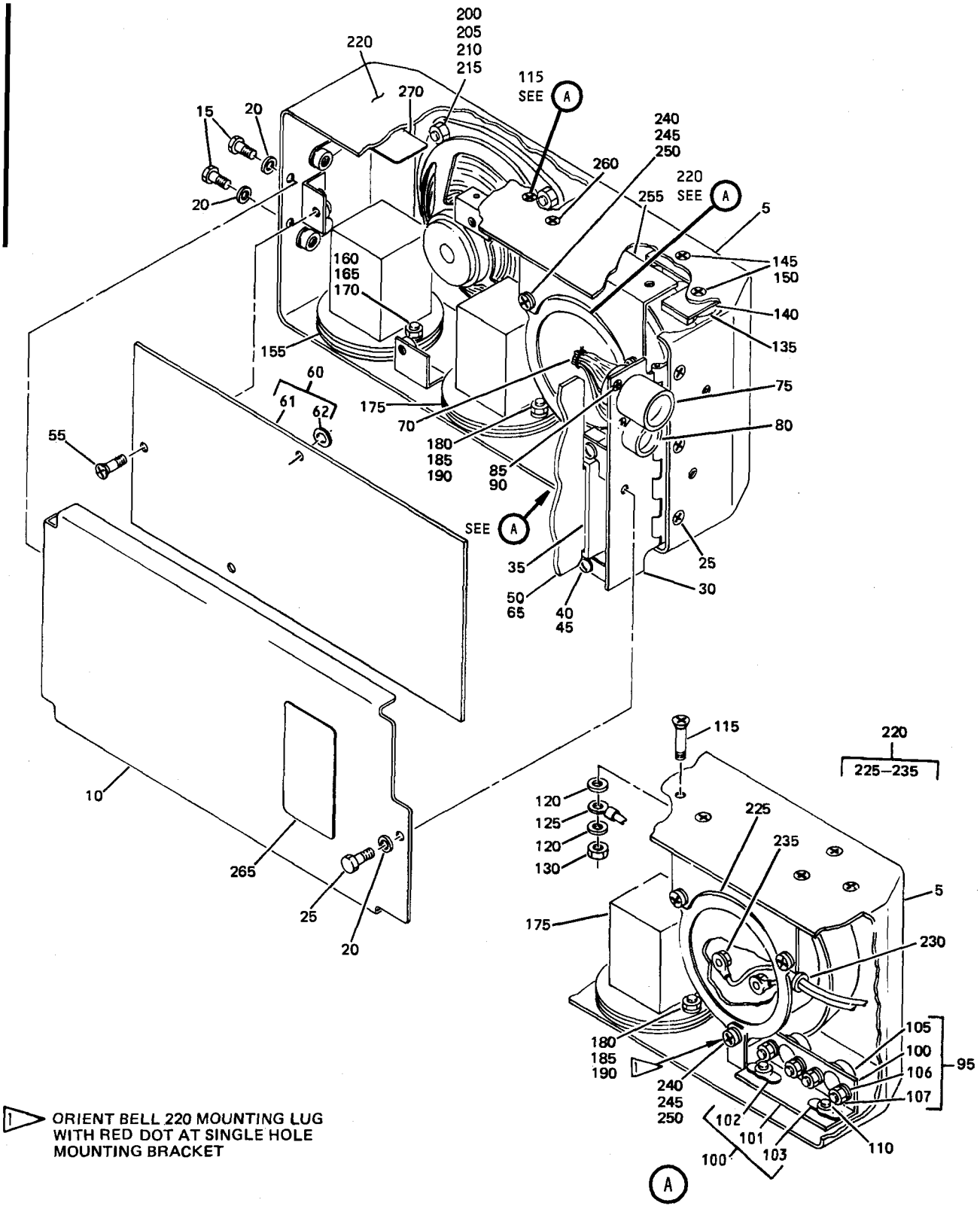


Schematic Diagram
Figure 801

326568

ILLUSTRATED PARTS LIST

V00779	TYCO ELECTRONICS CORP., 2800 FULLING MILL RD., MIDDLETOWN, PENNSYLVANIA 17057-3142
V07388	TOROTEL, INC., 620 LINDENWOOD DR., OLATHE, KANSAS 66062-1276
V34371	INTERSIL CORP., 1001 MURPHY RANCH RD., MILPITAS, CALIFORNIA 95035-5680
V74199	QUAM-NICHOLS CO., 234 E MARQUETTE ROAD, CHICAGO, ILLINOIS 60637-4031
V80248	OXFORD SPEAKER CO., 4237 W. 42ND PLACE, CHICAGO, ILLINOIS 60632-3921
V80252	FARADAY, INC., 805 S. MAUMEE ST., TECUMSEH, MICHIGAN 49286-9908
V95105	ROCKWELL INTERNATIONAL, INC., 3200 E. RENNER RD., RICHARDSON, TEXAS 75082-2402



1 ORIENT BELL 220 MOUNTING LUG WITH RED DOT AT SINGLE HOLE MOUNTING BRACKET

Aural Warning Box Assembly
Figure 1101

1551376

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-1	65C21854-2		AURAL WARNING BOX ASSY (POST SB 31-1030)		
5	69-41887-6		. CASE ASSY		1
-6	69-41887-7		. . CASE		1
-7	69-42116-5		. . BRACKET		1
-8	BACR15BB3D		. . RIVET		4
-9	69-42116-23		. . BRACKET ASSY		1
-9A	69-42116-22		. . . BRACKET		1
-9B	NAS686A06		. . . NUTPLATE		1
-9C	BACR15BB3D		. . . RIVET		2
-9D	69-42116-42		. . BRACKET ASSY		1
-9E	BACB2B010A0A0		. . . BRACKET		1
-9F	BACN10JN06		. . . NUTPLATE		1
-9G	BACR15BB3D		. . . RIVET		2
-9H	69-42116-44		. . BRACKET ASSY		1
-9I	BACB2B011A0D0		. . . BRACKET		1
-9J	BACN10KB06F		. . . NUTPLATE		1
-9K	BACR15BB3D		. . . RIVET		2
10	69-52889-8		. COVER ASSY		1
12	69-52889-10		. . INSULATOR		1
13	69-52889-9		. . COVER		1
15	NAS601-5P		. SCREW		2
20	AN960PD6L		. WASHER		3
25	NAS601-7P		. SCREW		4
30	69-42116-33		. HINGE ASSY		1
31	69-42116-35		. . HINGE		1
32	69-42116-38		. . BRACKET		1
33	69-42116-39		. . BRACKET		1
33A	BACR15BA4D		. . RIVET		4
34	BACN10JN06		. . NUTPLATE		4
34A	BACR15BB3D		. . RIVET		8
35	582557-1		. CONNECTOR, V00779		1
40	NAS601-9P		. SCREW		2
45	BACN10JC06		. NUT		2
50	69-52209-7		. PRINTED CIRCUIT ASSY		1
50	69-52209-5		. PRINTED CIRCUIT ASSY (OPT)		1
55	NAS601-10P		. SCREW		3
60	69-52891-1		. INSULATOR ASSY		1
61	69-52891-2		. . INSULATOR		1
62	NAS43DD1-6		. . SPACER		3
65	66168-2		. TERMINAL, V00779		AR

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
70	65-54499-24		. WIRE BUNDLE (SB 31-1030)		1
75	BACC45FN14-15P		. CONNECTOR		1
80	BACC45FN10-5P		. CONNECTOR		1
85	NAS600-4P		. SCREW		4
90	BACN10DN40		. NUT		4
95	65-54499-14		. HEATSINK ASSY		1
100	69-46116-26		. . BRACKET ASSY		1
101	69-46116-19		. . . BRACKET		1
102	BACR15BA3D		. . . RIVET		4
103	NAS697A06L		. . . NUTPLATE		2
105	2N1486		. . TRANSISTOR		2
106	NAS549L6		. . WASHER		4
107	MS35649-262		. . NUT		4
107A	MS25082-1		. . NUT (OPT)		4
-108	MS35338-42		. . WASHER, LOCK		4
-108A	NAS601-6P		. . SCREW		4
-108B	KH3464		. . CLAMP, V34371		2
-108C	K3479		. . INSULATOR, MICA, V34371		2
-108D	KH3479		. . WASHER, V34371		4
110	NAS601-5P		. SCREW		2
115	NAS601-9P		. SCREW		1
120	AN960D6L		. WASHER		2
125	BACT12AC		. TERMINAL		1
130	BACN10JC06		. NUT		1
135	MPF050-14B		. INDUCTOR, V95105		2
135	MPF050-14A		. INDUCTOR, V95105 (OPT)		2
135	P50-12C		. INDUCTOR, V07388 (OPT)		2
140	65-54499-9		. INSULATOR		2
145	BACS12BE02-9		. SCREW		2
150	BACN10DN26		. SCREW		2
155	9640		. CLACKER, V80252		1
160	NAS602-9P		. SCREW		2
165	AN960-8		. WASHER		2
170	BACN10JC08		. NUT		2
175	9640		. CLACKER, V80252		1
180	NAS602-9P		. SCREW		2
185	AN960-8		. WASHER		2
190	BACN10JC08		. NUT		2
195	5PC2-3		. SPEAKER, V80248		1
195	5PC2-4		. SPEAKER, V80248 (OPT)		1
195	5A1		. SPEAKER, V74199 (OPT)		1
200	NAS602-8P		. SCREW		4

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
205	AN960-8		. WASHER		4
210	BACN10JC08		. NUT		4
215	NAS43DD3-6		. SPACER		4
220	9717		. BELL ASSY, V80252		1
220	69-53815-4		. BELL ASSY (OPT)		1
225	9676		. . BELL, V80252		1
230	BACG20C13		. . GROMMET		1
235	BACT12AC3		DELETED		
240	NAS514P832-6		. SCREW		3
245	AN960PD8L		. WASHER		3
250	BACN10JC08		. NUT		3
255	69-42116-40		. BRACKET ASSY		1
-256	69-42116-41		. . BRACKET		1
-257	BACN10KB06F		. . NUTPLATE		2
-258	BACR15BA3D		. . RIVET		4
260	NAS601-5P		. SCREW		2
265	BAC27DCC254		. MARKER		1
270	BAC27DEX1216		. MARKER		1

- ITEM NOT ILLUSTRATED

FIG. 1101 REFERENCE DESIGNATION INDEX (SEE SCHEMATIC DIAGRAM)		
REFERENCE DESIGNATION	PART NUMBER	ITEM NO.
A1	69-52209-5	50
A1	69-52209-7	50
A2	69-63592-19	275
DS1	69-53815-4	220
DS1	9717	220
DS2	9640	155
DS3	9640	175
LS1	5PC2-3	195
LS1	5PC2-4	195
LS1	5A1	195
L1, L2	MPF050-14B	135
L1, L2	MPF050-14A	135
L1, L2	P50-12C	135
P1	BACC45FN14-15P	75
P2	BACC45FN10-5P	80
Q1, Q2	2N1486	105
XA1	582557-1	35