LBI4716E
(DF8414)

INSTRUCTIONS

FOR

BATTERY STANDBY ALARM TONE

OPTION 9503

(For MASTR® II Stations)

CONTENTS

DESCRIPTION

The BATTERY STANDBY ALARM TONE BOARD is used in conjunction with an auxiliary battery source. The board plugs into the Control Shelf and provides an audible tone to the station Audio Circuit to alert the operator when the primary source power fails and the station transfers to battery power.

The alarm circuit consists of a 1200 Hz oscillator, a highly assymetrical a stable multivibrator to gate the alarm tone for a period of up to 1.0 seconds every 30 seconds, and a line driver which includes an isolation transformer for direct line bridging.

CIRCUIT ANALYSIS

When the primary power source fails, the voltage at the Battery Standby input (C1) will fall to approximately 4 Volts and Q12 will turn on. Q12 turns on Q13 which turns off Q14.

The RUS INPUT goes high (>3V) when the receiver unsquelches. This turns on Q7 which turns on Q8. When Q8 is on, Q9 is turned on. With Q9 on the base of Q10 is held low, turning Q10 off.

With both Q10 and Q14 turned off, Q11 will be on, turning Q15 off. With Q15 off, the U1 Timer will operate. When the timer is operating U1-3 will go low (<1V) and momentarily turn on Q16, which turns on Q4, allowing Q4 to pass the Alarm Tone. With Q4 turned on, the 1200 Hz tone is passed to the line drivers Q5 and Q6. The line drivers apply the tone to the line through isolation transformer T2.

NOTE

The Battery Standby Alarm Tone is shipped from the factory with a jumper wire between H1 and H2 which requires an input power failure and an unsquelched receiver to send out an Alarm Tone. If the jumper is removed between H1 and H2 and added between H2 and H3, the Alarm Tone will be sent out with only an input power failure.

ADJUSTMENT

1. Ground J1214-7 on the Control Shelf to simulate a failure from the power line. Unsquelch the receiver with an on frequency signal.

2. Measure the level of the tone bursts at TB1201-10 and TB1201-11. These bursts should be the same level as the station audio (+11 dBm max.) at 1200 Hz, ±5.0 Hz. If necessary, adjust R7 on the Alarm Tone Board to obtain the desired level.

3. Adjust R42 on the Alarm Tone Board to obtain the desired tone burst period. This period is adjustable from 50 milliseconds to 1.0 second.

4. Adjust R40 on the Alarm Tone Board to obtain the desired tone burst repetition rate. This rate is adjustable from 5 seconds to 30 seconds.

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THESE INSTRUCTIONS COVER THE MODIFICATION OF THE CONTROL SHELF & ALARM TONE BOARD FOR MASTR II APPLICATIONS AS A BATTERY STANDBY ALARM.

FOR ALL APPLICATIONS:

1. AFFIX NAMEPLATE NP276173F TO 19C320703G1 CONTROL SHELF AS SHOWN, IN FRONT OF SLOT IN WHICH ALARM TONE BOARD IS TO BE INSTALLED.

IF FIFTH DIGIT OF STATION COMBINATION NUMBER IS R,T,U OR V J(EXTENDED LOCAL/TONE REMOTE) OR K (EXTENDED LOCAL/DC REMOTE): (ALARM TONE WITH 600 OHM AUDIO OUTPUT ON LINE)

1. INSTALL ALARM TONE MODULE IN FIRST POSITION FROM LEFT IF VACANT. IF THAT POSITION IS FILLED, INSTALL IN 2ND POSITION FROM LEFT.
2. INSTALL HARNESS 19B226296G1.
   - A. PLUG P1 INTO J1216 ON COMPONENT BOARD 19D417214 IF ALARM TONE BOARD IS IN 1ST POSITION FROM LEFT OR ONTO J1214 IF ALARM TONE BOARD IS IN 2ND POSITION FROM LEFT.
   - B. INSTALL OTHER END OF WIRE FROM P1-7 INTO PLUG P9-7 (PART OF STATION HARNESS 19C320811) AT STATION POWER SUPPLY. (SEE FIG. 1).
   - C. LOOSEN SCREWS AT TB1201-10 AND TB1201-11 ON COMPONENT BOARD 19D417214. INSTALL TERMINAL ON WIRE FROM P1-11 UNDER SCREW AT TB1201-10 AND INSTALL TERMINAL ON WIRE FROM P1-6 UNDER SCREW AT TB1201-11 AND TIGHTEN BOTH SCREWS.
3. REMOVE R47 300 Ω

   ON 19D417214G1 CONTROL SHELF, IF ALARM TONE MODULES ARE IN THE 2ND POSITION FROM LEFT, REMOVE THE JUMPER FROM H32 TO H33.

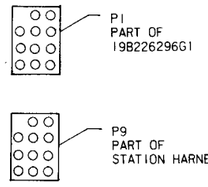


FIG. 1

IF FIFTH DIGIT OF STATION COMBINATION NUMBER IS Y (REPEATER) OR N (EXTENDED LOCAL/REPEAT): (ALARM TONE WITH 3000 OHM AUDIO OUTPUT ON MIC HIGH)

1. MODIFY ALARM TONE BOARD 19A130122.
   - A. MOVE P1 FROM J3 TO J1.
   - B. MOVE P2 FROM J4 TO J6.
2. INSTALL ALARM TONE MODULE IN FIRST POSITION FROM LEFT IF VACANT. IF THAT POSITION IS FILLED, INSTALL IN 2ND POSITION FROM LEFT.
3. INSTALL HARNESS 19B226296G1.
   - A. PLUG P1 INTO J1216 ON COMPONENT BOARD 19D417214 IF ALARM TONE BOARD IS IN 1ST POSITION FROM LEFT OR ONTO J1214 IF ALARM TONE BOARD IS IN 2ND POSITION FROM LEFT.
   - B. INSTALL OTHER END OF WIRE FROM P1-7 INTO PLUG P9-7 (PART OF STATION HARNESS 19C320811) AT STATION POWER SUPPLY. (SEE FIG. 1).
   - C. CUT OFF AND DISCARD WIRES FROM P1-11 AND P1-6, CUTTING AS CLOSE AS POSSIBLE TO P1.

   ON 19D417214G1 CONTROL SHELF, IF ALARM TONE MODULES ARE IN THE 2ND POSITION FROM LEFT, REMOVE THE JUMPER FROM H32 TO H33.

IF FIFTH DIGIT OF STATION COMBINATION NUMBER IS E (EXTENDED LOCAL): (ALARM TONE WITH OUTPUT ON VOL/SQ HI)

1. MODIFY ALARM TONE BOARD 19A130122.
   - A. MOVE P1 TO J7.
   - B. MOVE P2 TO J6.
   - C. ADD DA JUMPER FROM H19 TO H20.
2. INSTALL ALARM TONE MODULE IN FIRST POSITION FROM LEFT IF VACANT. IF THAT POSITION IS FILLED, INSTALL IN 2ND POSITION FROM LEFT.
3. INSTALL HARNESS 19B226296G1.
   - A. PLUG P1 INTO J1216 ON COMPONENT BOARD 19D417214 IF ALARM TONE BOARD IS IN 1ST POSITION FROM LEFT OR ONTO J1214 IF ALARM TONE BOARD IS IN 2ND POSITION FROM LEFT.
   - B. INSTALL OTHER END OF WIRE FROM P1-7 INTO PLUG P9-7 (PART OF STATION HARNESS 19C320811) AT STATION POWER SUPPLY. (SEE FIG. 1).
   - C. CUT OFF AND DISCARD WIRES FROM P1-11 AND P1-6, CUTTING AS CLOSE AS POSSIBLE TO P1.

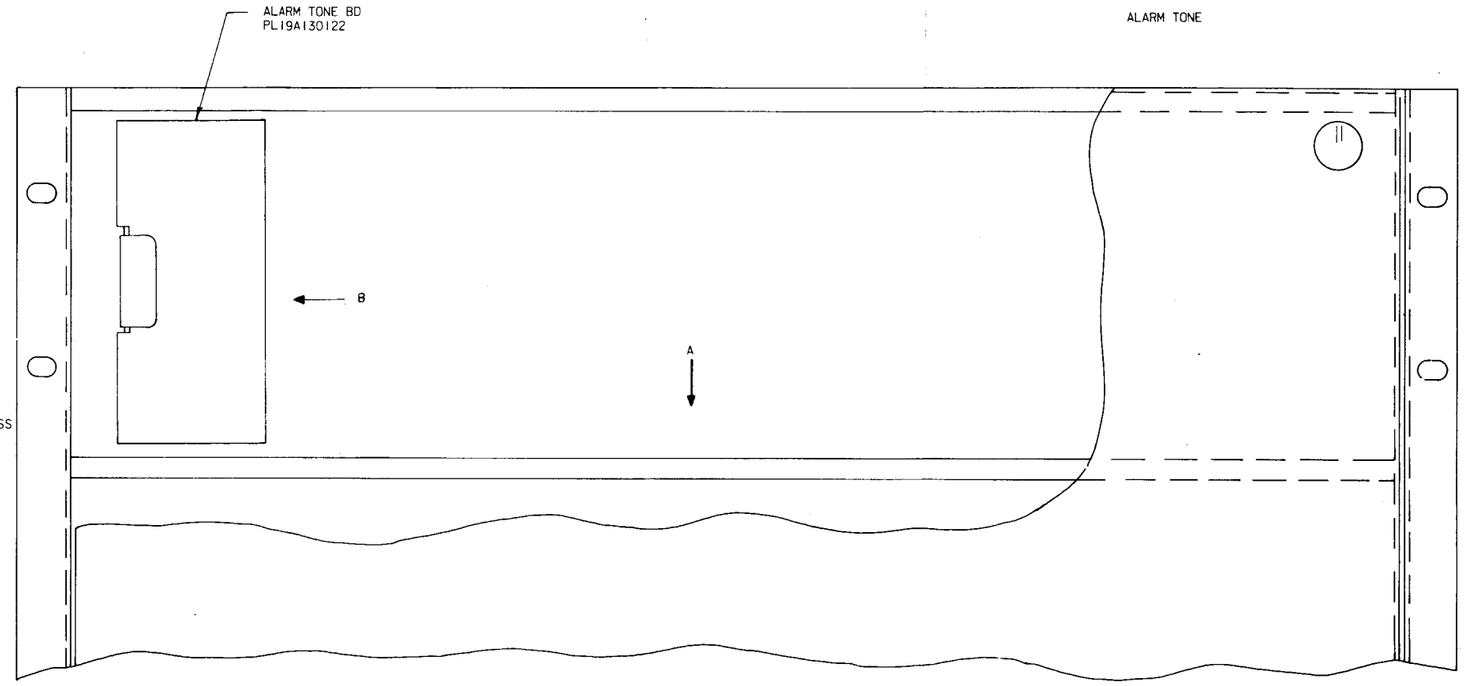
   ON 19D417214G1 CONTROL SHELF, IF ALARM TONE MODULES ARE IN THE 2ND POSITION FROM LEFT, REMOVE THE JUMPER FROM H32 TO H33.

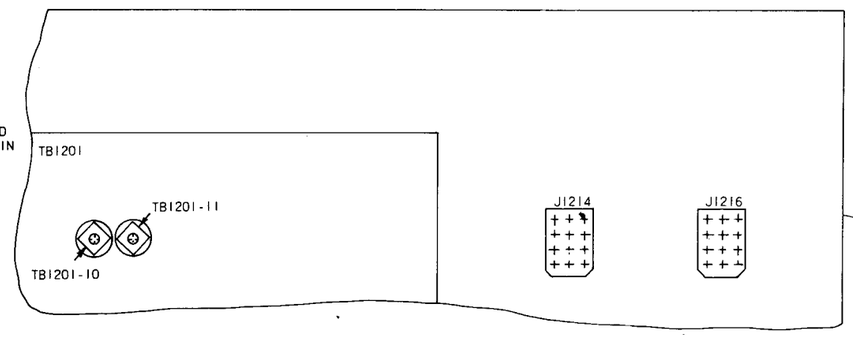
FOR FIELD MODIFICATION

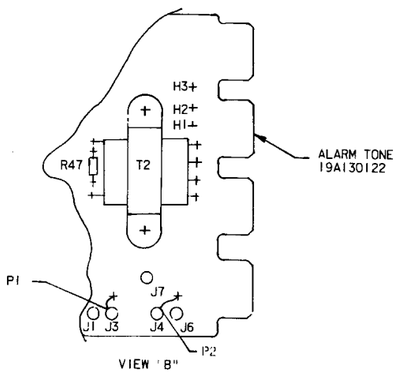
THIS OPTION AS SHIPPED REQUIRES BOTH A PRIMARY POWER FAILURE AND THE RECEIVER UNSQUELCHED BEFORE THE BATTERY ALARM TONE IS ACTIVATED. IF IT IS DESIRABLE TO ACTIVATE THE ALARM TONE IMMEDIATELY UPON TRANSFER TO BATTERY POWER, THE FOLLOWING FIELD MODIFICATIONS ARE REQUIRED:

1. REMOVE AND DISCARD JUMPER BETWEEN H1 AND H2 ON ALARM TONE BOARD.
2. INSTALL DA JUMPER BETWEEN H2 AND H3 ON ALARM TONE BOARD.

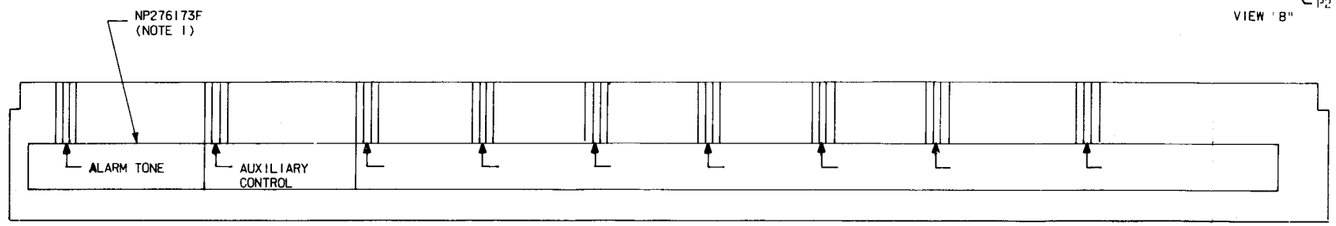
FOR ALL APPLICATIONS:
TEST PER - 19A129945.







VIEW "B"

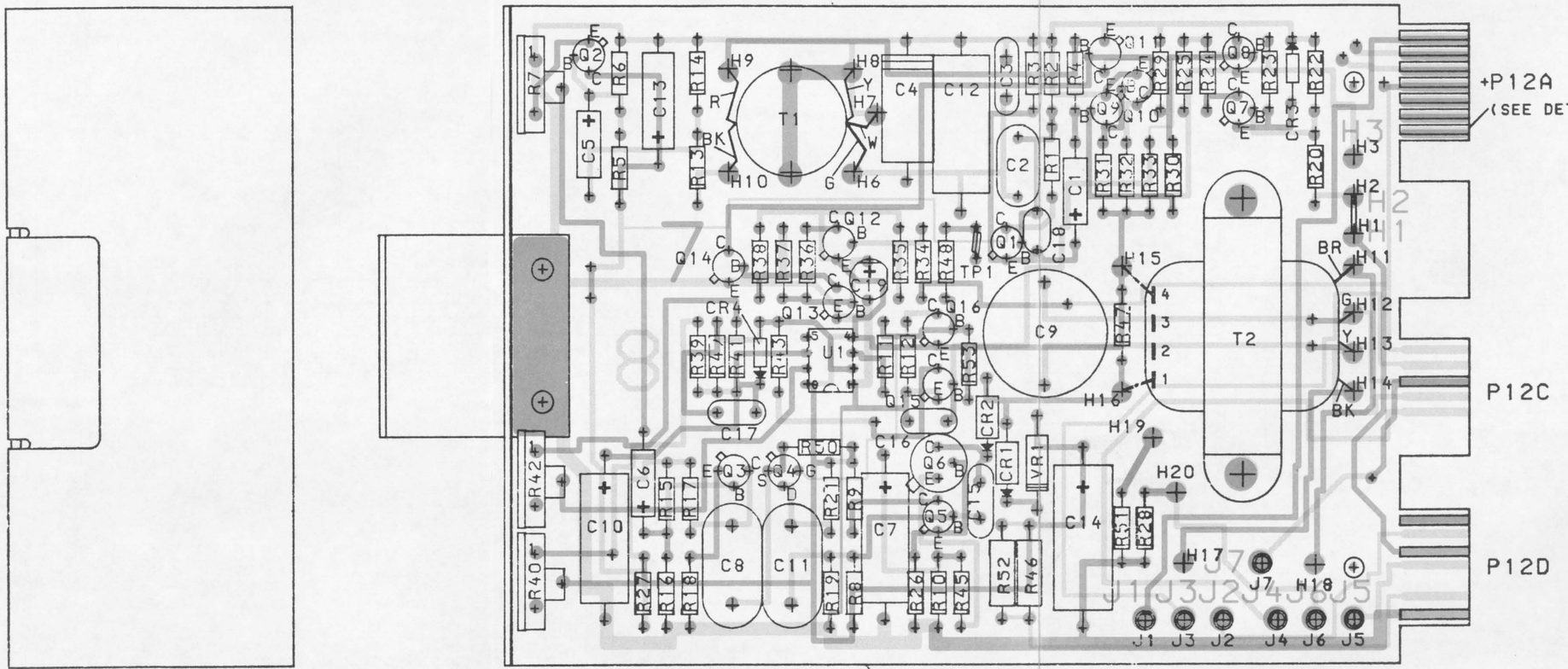


VIEW "A"

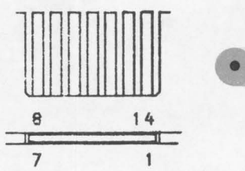
NOTES:
1. MOUNT NP276173F OVER AUXILIARY CONTROL PORTION OF EXISTING NP. ALIGN ARROW WITH CENTER OF GUIDE WITHIN .060.

MODIFICATION INSTRUCTIONS

BATTERY STANDBY ALARM TONE

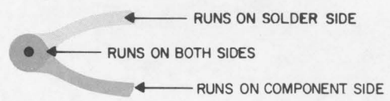


(19D417800, Rev. 9)
(19B226423, Sh. 1, Rev. 7)
(19B226423, Sh. 2, Rev. 8)



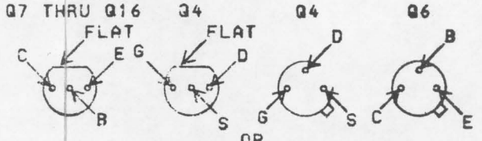
SOLDER SIDE
TYP. NUMBERING OF
CONTACT FINGERS.
ROTATED 90° CW

DETAIL "A"



LEAD IDENTIFICATION
FOR

Q1, Q2, Q3, Q5
Q7 THRU Q16



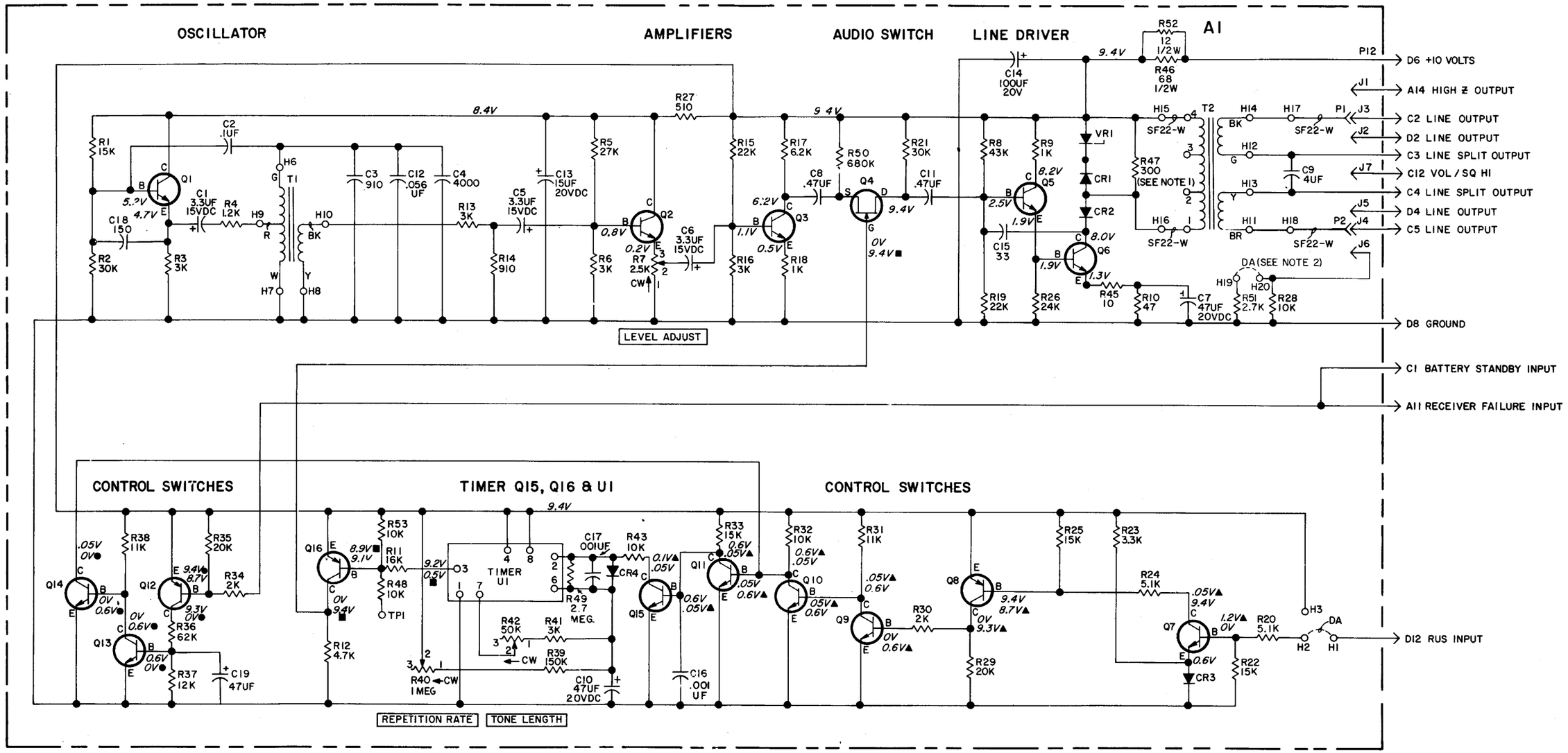
IN-LINE TRIANGULAR

TOP VIEW

NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

OUTLINE DIAGRAM

BATTERY STANDBY ALARM TONE BOARD
19A130122G1



IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
19A130122G1	G

NOTES
1. REMOVE IN REMOTE/REPEAT, REPEAT OR LOCAL REPEAT COMBINATIONS.
2. ADD JUMPER FROM H19 TO H20 IN LOCAL CONTROL COMBINATIONS.

VOLTAGE READINGS MEASURED WITH NO AC SIGNAL APPLIED
▲RUS INPUT HIGH
●BATTERY STANDBY HIGH
■ALARM TONE ON

(19D417610, Rev. 10)

SCHEMATIC DIAGRAM

BATTERY STANDBY ALARM BOARD
19A130122G1

PARTS LIST

LBI4717C

BATTERY STANDBY ALARM TONE
19A130122G1

SYMBOL	GE PART NO.	DESCRIPTION
A1		COMPONENT BOARD 19C320965G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C2	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C3	5496372P379	Ceramic disc: 910 pf ±10%, 500 VDCW, temp coef -4700 PPM.
C4	5496249P4000	Polystyrene: 4000 pf ±1.5%, 125 VDCW.
C5 and C6	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C7	5496267P15	Tantalum: 47 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C8	19A116080P111	Polyester: 0.47 µf ±10%, 50 VDCW.
C9	7486445P5	Electrolytic, non polarized: 4 µf +100% -10%, 150 VDCW.
C10	5496267P15	Tantalum: 47 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C11	19A116080P111	Polyester: 0.47 µf ±10%, 50 VDCW.
C12	19C307114P5602G	Polystyrene: 0.056 µf ±2%, 100 VDCW, temp coef -120±30 PPM.
C13	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C14	5496267P16	Tantalum: 100 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C15*	7489162P15	Silver mica: 33 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
		In REV D and earlier:
	7489162P41	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C16* and C17*	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. Added by REV B.
C18*	5494481P101	Ceramic disc: 150 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. Added by REV C.
C19*	19A134202P2	Tantalum: 47 µf ±20%, 6 VDCW. Added by REV G.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 and CR2	4037822P7	Silicon, 1000 mA, 800 PIV.
CR3 and CR4	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J6	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J7*	4033513P4	Contact, electrical: sim to Bead Chain L93-3. Added by REV C.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 and P2	4029840P1	Contact, electrical: sim to AMP 41854.
P12		(Part of printed board, 19D417600P1).
		- - - - - - - - - - TRANSISTRS- - - - - - - -
Q1 thru Q3	19A115910P1	Silicon, NPN; sim to Type 2N3904.
Q4	19A134137P1	N Type, field effect; sim to Type 2N3458.
Q5	19A115910P1	Silicon, NPN; sim to Type 2N3904.
Q6	19A115300P4	Silicon, NPN.
Q7	19A115910P1	Silicon, NPN; sim to Type 2N3904.
Q8	19A115852P1	Silicon, PNP; sim to Type 2N3906.
Q9 thru Q11	19A115910P1	Silicon, NPN; sim to Type 2N3904.
Q12	19A115852P1	Silicon, PNP; sim to Type 2N3906.
Q13 thru Q15	19A115910P1	Silicon, NPN; sim to Type 2N3904.
Q16	19A115852P1	Silicon, PNP; sim to Type 2N3906.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P153J	Composition: 15K ohms ±5%, 1/4 w.
R2	3R152P303J	Composition: 30K ohms ±5%, 1/4 w.
R3	3R152P302J	Composition: 3K ohms ±5%, 1/4 w.
R4	3R152P122J	Composition: 1.2K ohms ±5%, 1/4 w.
R5	3R152P273J	Composition: 27K ohms ±5%, 1/4 w.
R6	3R152P302J	Composition: 3K ohms ±5%, 1/4 w.
R7	19B209358P104	Variable, carbon film: approx 100 to 2.5K ohms ±10%, 0.2 w; sim to CTS Type X-201.
R8	3R152P433J	Composition: 43K ohms ±5%, 1/4 w.
R9	3R152P102J	Composition: 1K ohms ±5%, 1/4 w.
R10	3R152P470J	Composition: 47 ohms ±5%, 1/4 w.
R11	3R152P163J	Composition: 16K ohms ±5%, 1/4 w.
R12	3R152P472J	Composition: 4.7K ohms ±5%, 1/4 w.
R13	3R152P302J	Composition: 3K ohms ±5%, 1/4 w.
R14	3R152P911J	Composition: 910 ohms ±5%, 1/4 w.
R15	3R152P223J	Composition: 22K ohms ±5%, 1/4 w.
R16	3R152P302J	Composition: 3K ohms ±5%, 1/4 w.
R17	3R152P622J	Composition: 6.2K ohms ±5%, 1/4 w.
R18	3R152P102J	Composition: 1K ohms ±5%, 1/4 w.
R19	3R152P223J	Composition: 22K ohms ±5%, 1/4 w.
R20	3R152P512J	Composition: 5.1K ohms ±5%, 1/4 w.
R21	3R152P303J	Composition: 30K ohms ±5%, 1/4 w.
R22	3R152P153J	Composition: 15K ohms ±5%, 1/4 w.
R23	3R152P332J	Composition: 3.3K ohms ±5%, 1/4 w.
R24	3R152P512J	Composition: 5.1K ohms ±5%, 1/4 w.
R25	3R152P153J	Composition: 15K ohms ±5%, 1/4 w.
R26	3R152P243J	Composition: 24K ohms ±5%, 1/4 w.
R27	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R28	3R152P103J	Composition: 10K ohms ±5%, 1/4 w.
R29	3R152P203J	Composition: 20K ohms ±5%, 1/4 w.
R30	3R152P202J	Composition: 2K ohms ±5%, 1/4 w.
R31	3R152P113J	Composition: 11K ohms ±5%, 1/4 w.
R32	3R152P103J	Composition: 10K ohms ±5%, 1/4 w.
R33	3R152P153J	Composition: 15K ohms ±5%, 1/4 w.
R34	3R152P202J	Composition: 2K ohms ±5%, 1/4 w.
R35	3R152P203J	Composition: 20K ohms ±5%, 1/4 w.
R36*	3R152P623J	Composition: 62K ohms ±5%, 1/4 w.
		In REV F and earlier:
	3R152P202J	Composition: 2K ohms ±5%, 1/4 w.
R37*	3R152P123J	Composition: 12K ohms ±5%, 1/4 w.
		In REV F and earlier:
	3R152P303J	Composition: 30K ohms ±5%, 1/4 w.
R38	3R152P113J	Composition: 11K ohms ±5%, 1/4 w.
R39	3R152P154J	Composition: 150K ohms ±5%, 1/4 w.
R40	19B209358P112	Variable, carbon film: approx 10K ohms to 1 megohm ±20%, 0.25 w; sim to CTS Type X-201.
R41	3R152P302J	Composition: 3K ohms ±5%, 1/4 w.
R42	19B209358P108	Variable, carbon film: approx 2K to 50K ohms ±10%, 0.25 w; sim to CTS Type X-201.
R43	3R152P103J	Composition: 10K ohms ±5%, 1/4 w.
R44*	3R152P202J	Composition: 2K ohms ±5%, 1/4 w. Deleted by REV F.
R45	3R152P100J	Composition: 10 ohms ±5%, 1/4 w.
R46*	3R77P680J	Composition: 68 ohms ±5%, 1/2 w.
		In REV D and earlier:
	3R77P100J	Composition: 10 ohms ±5%, 1/2 w.
R47	3R152P301J	Composition: 300 ohms ±5%, 1/4 w.
R48	3R152P103J	Composition: 10K ohms ±5%, 1/4 w.
R49*	3R152P275J	Composition: 2.7 megohms ±5%, 1/4 w. Added by REV A.
R50*	3R152P684J	Composition: 680K ohms ±5%, 1/4 w. Added by REV C.
R51*	3R152P272J	Composition: 2.7K ohms ±5%, 1/4 w. Added by REV D.
R52*	3R77P120J	Composition: 12 ohms ±5%, 1/2 w. Added by REV E.
R53*	3R152P103J	Composition: 10K ohms ±5%, 1/4 w. Added by REV F.
		- - - - - - - - - - TRANSFORMERS - - - - - - -
T1	19B205360G5	Coil.
T2	19A115731P1	Audio freq: 300 to 6000 Hz, +1.0 dB; Power: +18 dBm; max DC 20 mA combined, Pri: 600 ohms, Sec 1 and 2: 600 ohms.
		- - - - - - - - - - TEST POINTS - - - - - - - - - -
TP1	19B211379P1	Spring (Test Point).
		- - - - - - - - INTEGRATED CIRCUITS - - - - - -
U1	19A116968P1	Linear, Dual In Line 8 Pin Mini Dip Package; sim to Signetics NE555V.
		- - - - - - - - - VOLTAGE REGULATORS - - - - - - -
VR1	19A116325P4	Zener: 5.0 w, 12 v. nominal.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	4036555P1	Insulator, washer: nylon. (Used with Q6).
	19D417384P2	Panel.
	19B219690G1	Handle.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter," which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - To improve performance. Added R49.

REV. B - To allow alarm tone to operate under strong RF Field (Transmitting). Added C16 and C17.

REV. C - To prevent tone from being applied to output all the time and improve audio switch. Added C18 and R50.

REV. D - To increase alarm tone output when used in local control stations. Added R51, H19 and H20.

REV. E - To improve frequency response of Voting Selector when used with Tone Failure Board Option. Changed C15 and R46. Added R52.

REV. F - To eliminate constant tone output and to stop the false failure indication. Added R53 and deleted R44.

REV. G - To improve operation. Changed R36 and R37. Added C19.