LBI30708C
(DF4098)

INSTRUCTIONS
FOR
SECUR-IT TONE BOARD 19D424051G1

TABLE OF CONTENTS

DESCRIPTION

The Secur-it Tone Board is used in MASTR® II Base Station Tone Control systems for detecting the Secur-it tone (2175 Hz) when present on the audio pair and enabling the function control circuits.

ADJUSTMENT

The potentiometer R96 is adjusted at the factory and doesn't normally need adjusting. If R96 has to be adjusted in the field proceed as follows: apply a 1000 ±5 Hz signal @ 0 dBm to input A8 with TP7 grounded. Connect an oscilloscope to output A10. Adjust R96 for an output voltage of 6.0 Volts (+50 mV) peak to peak.

CIRCUIT ANALYSIS

When the Secur-it tone is transmitted from the remote control console, the signal is connected to the LINE AUDIO path A8. The line audio is passed through an active high-pass filter composed of AR1-A, R3, R4, C1 and C2. This filter eliminates AC hum present in the signal and rejects the low-frequency components of line noise.

The output of AR1-A is coupled through C3 to the Pre-filter composed of AR1-B, R6, R7, L1 and C31. The filter is broadly tuned to the 2175 Hz Secur-it tone frequency. AR2-A is a gain stage with feedback limiting to prevent saturation of the stage when high level signals are present. AR2-B and its associated components (C36, CR14, CR15, R8, R9, R93, VR4 and VR5) form a precision limiter which provides a symmetrical signal with controlled amplitude for the input to the HI-Q Filter.

Before Secur-it tone detection occurs, Q7 is conducting and the gain of AR2-B is determined by R9 in parallel with R10. After Secur-it tone detection, Q8 switches Q7 off. This allows the gain of AR2-B to increase so that the transmit hold tone (which is sent on the line from the remote control console at 30 dB below the Secur-it tone level) may be detected. The HI-Q Filter, operating at a Q of approximately 300, discriminates against other signals and high-level noise on the line.

The Secur-it tone detector is composed of Q2, Q3 and Q5. Q2 begins conducting when peaks of the HI-Q Filter output signal exceed the reference voltage at the base of Q3. Conduction of Q3 operated Q5. The collector of Q5 rises to near the positive supply voltage, indicating the presence of the Secur-it tone on the line.

The output of AR1-A is coupled to AR4-A by C21. AR4-A and AR4-B amplify all line signals and these stages provide symmetrical limiting. The output of AR4-B is connected to the Activity Check circuit through C24. Q9, Q10 and Q12 function in the same manner as the tone detector. The output at the collector of Q12 is inverted by Q11, providing a low at its collector. Feedback from Q11 through R72 to Q10 provides snap action for this detector.

When the Secur-it tone is detected, the output from Q5 is applied through R48 and CR5 to the base of Q16, forcing its collector low. This low is applied to Q20, turning Q20 off. The resulting high at the collector of Q20 is connected to the AUDIO MUTE lead D2.

The low at the output of Q16 is applied to CR7 through R52. When the collector of Q16 is low, the collector Q11 is also low. The low at Q11 is applied to CR8 through R53. Under these conditions, Q17 is turned off. The high at the collector of Q17 turns on Q4 and Q8. This high is also applied to pin 1 of U1-A. Conduction of Q4 shifts the reference voltage at the base of Q3 to provide hysteresis in the tone detection function. Conduction of Q8 turns off Q7, increasing the gain of AR2-B.

DETECTOR DISABLE lead D11 is normally high and is connected to pin 2 of U1-A. The resultant low output of NAND gate U1-A triggers the Window One-Shot (U1-B, U1-C and U1-D). Operation of the One-Shot provides the low DET output at D7, keying the transmitter. A low from the Transmitter Control Board applied to D4 will immediately reset the WINDOW ONE-SHOT after the transmit function tones are detected. Q18 is turned off and the resultant high at the collector of Q18 is inverted by U1-D, applying a low to the base of Q14. Turning Q14 off unclamps the Limited Audio Amplifier (Q13, Q15 and Q21), allowing audio to pass through the amplifier to the LIMITED AUDIO lead A10.

The LIMITED AUDIO is connected to the tone detectors in the tone function modules. A positive output from the Window One-Shot at pin 6 of U1-B is fed back to Q16, holding on the 2175 Hz detect signal during the 40 ms function tone period.

The Secur-it tone will be followed by a function tone. If a transmit function is selected at the remote control console the 40 ms function tone period will be followed by the low level 2175 Hz hold tone. The increased gain of AR2-B insures that the hold tone will be detected, providing a continuous output at D7 and allowing the transmitter to remain keyed.

When the remote control function is complete, all tones will be removed from the line. The Activity Check circuit will drop out within approximately 25 ms, returning the AUDIO MUTE lead D2 and the DET lead D7 to their initial condition. The tone detector will drop out within 200 ms, returning the Secur-it Tone Board to its quiescent state.

FET Q6, together with switch Q16, form an audio phase cancellation circuit. LINE AUDIO is taken from the primary of the line transformer on the Audio Board. If the station receiver is active when the remote control audio is applied to the line, the 180 degree phase difference at the base of the line driver transistor on the Audio Board is used to help cancel received audio into the Secur-it Tone Board. This makes it easier to detect the speaker line audio. When Q16 is turned on, Q6 is turned off. This eliminates the phase cancellation signal.

GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

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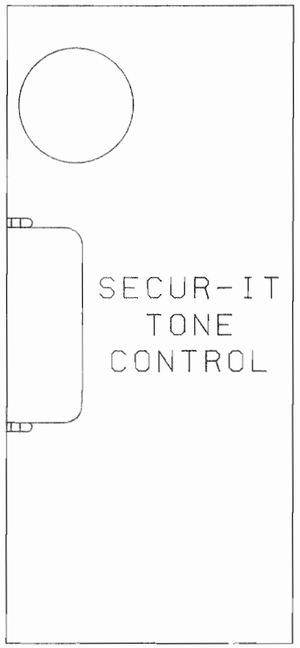
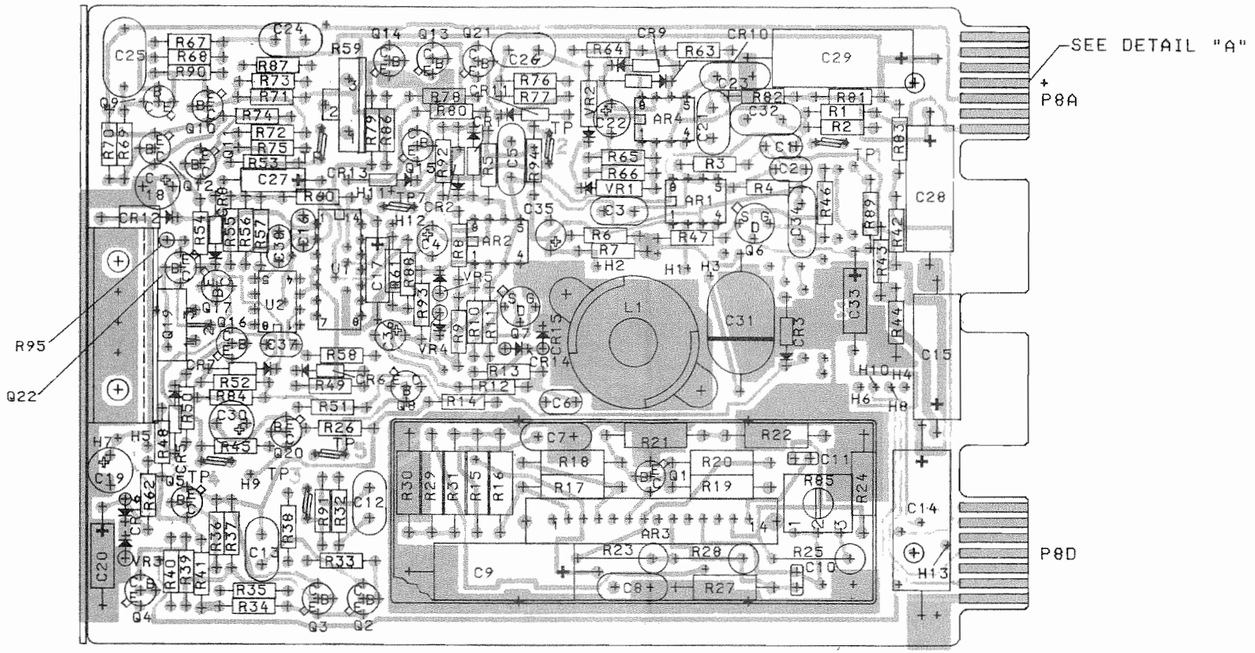
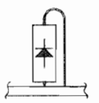




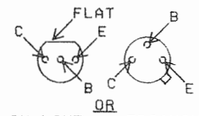


MOUNTING FOR
VR4, VR5,
CR14, AND CR15

(19D424053, Rev. 11)
(19B227495, Sh. 1, Rev. 8)
(19B227495, Sh. 2, Rev. 8)

REFER TO WIRING DIAGRAM FOR THE FOLLOWING CONNECTIONS		
FROM	TO	WIRE
L1-BK	H1	
L1-GY OR R	H2	
L1-Y	H3	
H4	H5	SN22-W
H6	H7	SN22-O
H8	H9	SN22-BR
H10	H11	SN22-G
H12	H13	SF24-W

LEAD IDENTIFICATION
FOR Q1-Q5, Q8-Q10 & Q20-Q22



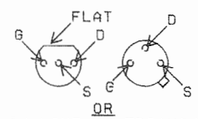
OR

IN-LINE TRIANGULAR

TOP VIEW

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

LEAD IDENTIFICATION
FOR Q6 & Q7



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IN-LINE TRIANGULAR

TOP VIEW

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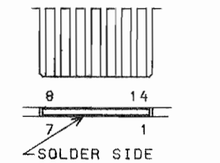
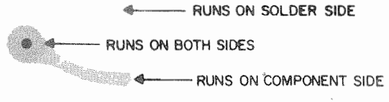


SOLDER SIDE
TYP. NUMBERING OF
CONTACT FINGERS.

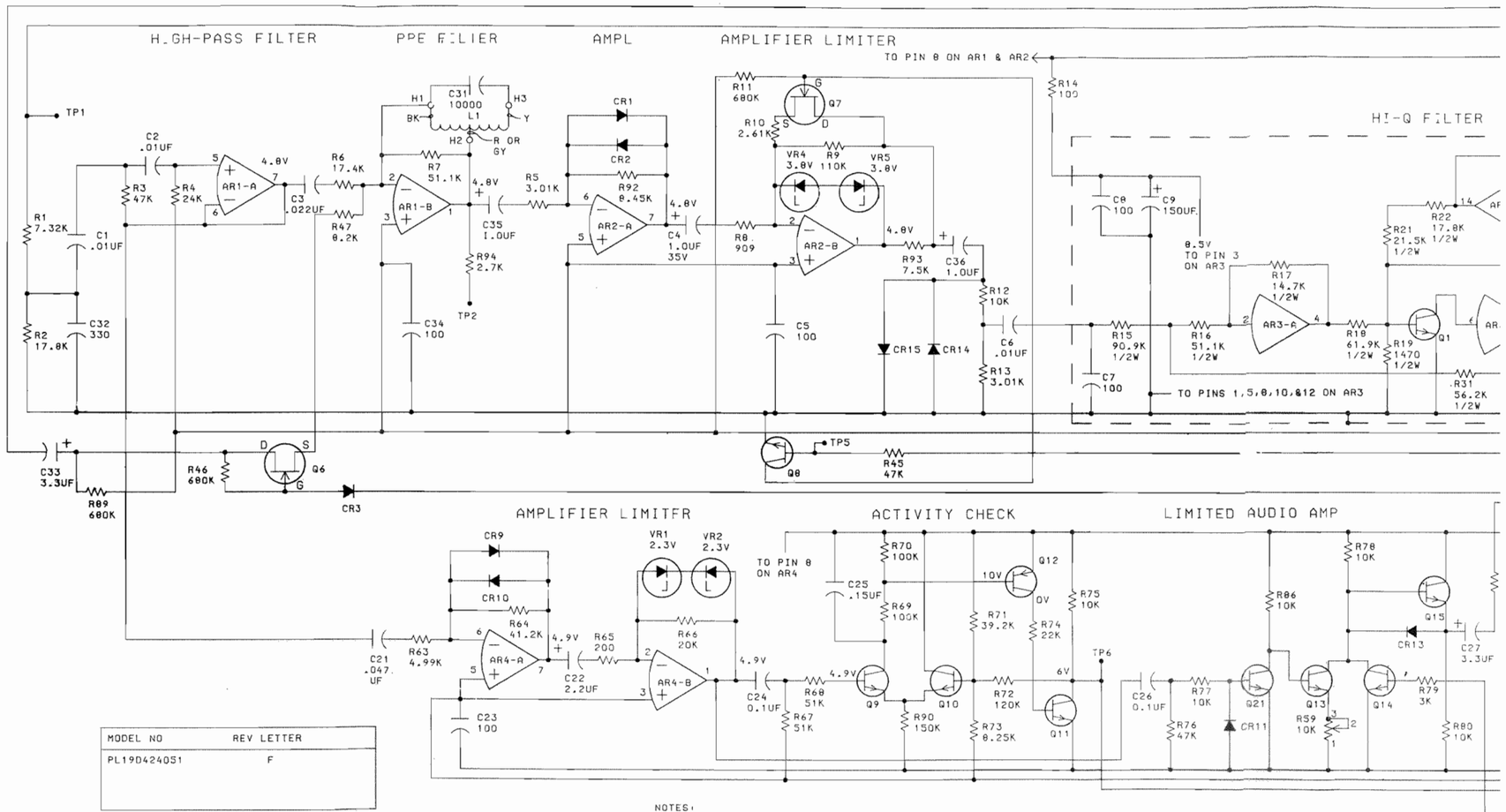
DETAIL "A"

ROTATED 90 DEG.
CLOCKWISE



OUTLINE DIAGRAM

SECUR-IT TONE BOARD
19D424051G1

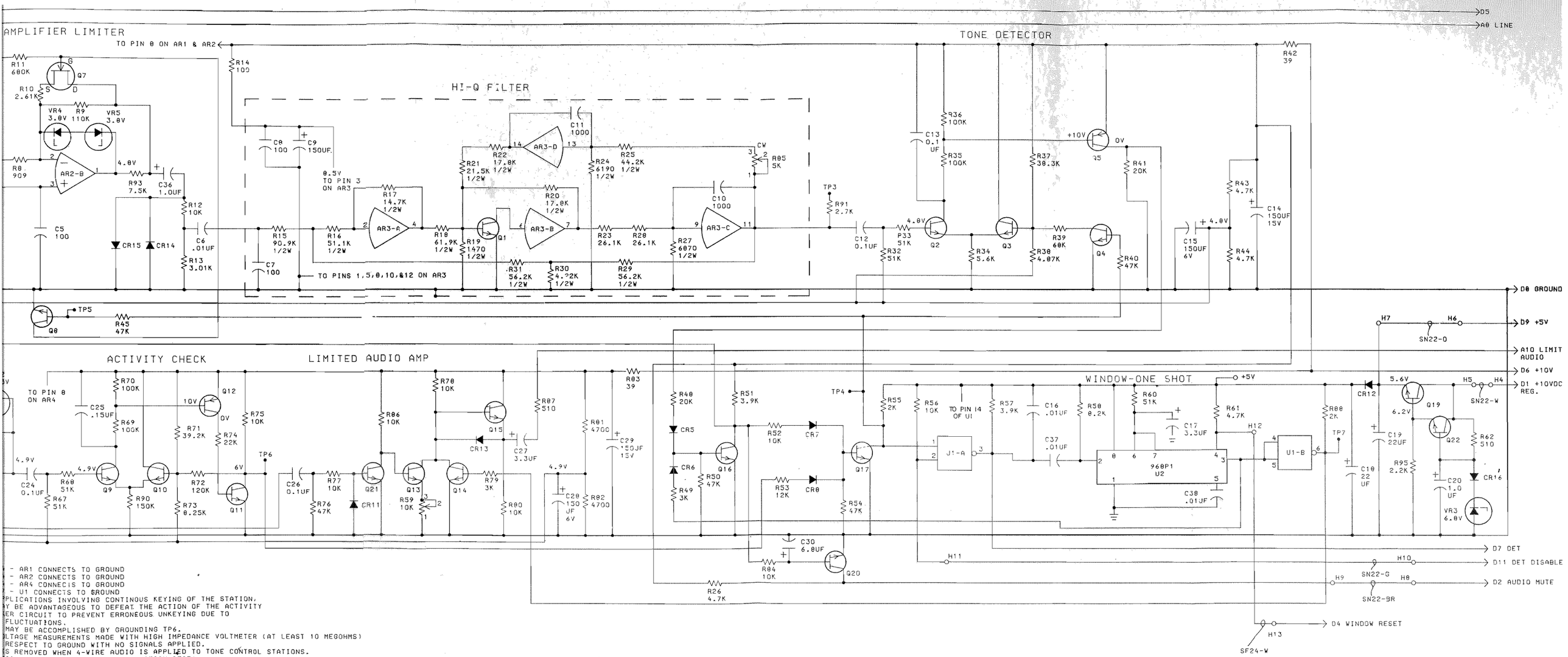


MODEL NO	REV LETTER
PL19D424051	F

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.

NOTES:
1. PIN 4 - AR1 CONNECTS TO GROUND
   PIN 4 - AR2 CONNECTS TO GROUND
   PIN 4 - AR4 CONNECIS TO GROUND
   PIN 7 - U1 CONNECTS TO GROUND
2. IN APPLICATIONS INVOLVING CONTINOUS KEYING OF THE STATION, IT MAY BE ADVANTAGEOUS TO DEFEAT THE ACTION OF THE ACTIVITY CHECKER CIRCUIT TO PREVENT ERRONEOUS UNKEYING DUE TO LINE FLUCTUATIONS.
   THIS MAY BE ACCOMPLISHED BY GROUNDING TP6.
3. DC VOLTAGE MEASUREMENTS MADE WITH HIGH IMPEDANCE VOLTMETER (AT LEAST 10 MEGOHMS) WITH RESPECT TO GROUND WITH NO SIGNALS APPLIED.
4. C33 IS REMOVED WHEN 4-WIRE AUDIO IS APPLIED TO TONE CONTROL STATIONS. (STATION COMB. # VII - D OR L OR OPTION 9507)

1-REC 3-AN75372 5-AN78267 7-AN80764
2-AN71733 4-AN75483 6-RECORD



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- U1 CONNECTS TO GROUND

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(19R622235, Rev. 11)

SCHEMATIC DIAGRAM

SECUR-IT TONE BOARD
19D424051G

Issue 4

PARTS LIST

LBI30276C

SECUR-IT TONE BOARD
19D424051G1
REV F

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
AR1 and AR2	19A116754P1	Linear: Dual In-Line 8- Pin Minidip package; sim to T1, SN72558 NSC.
AR3	19D416710G1	Hybrid Amplifier.
AR4	19A116754P1	Linear: Dual In-Line 8- Pin Minidip package; sim to T1, SN72558 NSC.
		- - - - - - - - - CAPACITORS - - - - - - - - - -
C1 and C2	19A700234P7	Polyester: 0.01 µf ±10%, 50 VDCW.
C3	19A700234P9	Polyester: 0.022 µf ±10%, 50 VDCW.
C4	19A701534P4	Tantalum: 1 µf ±20%, 35 VDCW.
C5	19A700105P34	Mica: 100 pf ±5%, 500 VDCW; sim to Electro Motive Type DM15.
C6	19A700234P7	Polyester: 0.01 µf ±10%, 50 VDCW.
C7 and C8	19A700105P34	Mica: 100 pf ±5%, 500 VDCW; sim to Electro Motive Type DM15.
C9	5496267P12	Tantalum: 150 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C10 and C11	19B209475P1	Ceramic: 1000 pf ±1%, 100 VDCW; sim to Erie 8121-M100 COG-102F.
C12 and C13	19A143477P27	Polyester: 0.1 µf ±10%, 50 VDCW.
C14	5496267P12	Tantalum: 150 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C15	5496267P3	Tantalum: 150 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C16	19A700234P7	Polyester: 0.01 µf ±10%, 50 VDCW.
C17	5496267P409	Tantalum: 3.3 µf ±5%, 15 VDCW; sim to Sprague Type 150D.
C18 and C19	19A701534P8	Tantalum: 22 µf ±20%, 15 VDCW.
C20	5496267P17	Tantalum: 1.0 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C21	19A700234P11	Polyester: 0.047 µf ±10%, 50 VDCW.
C22	19A701534P5	Tantalum: 2.2 µf ±20%, 20 VDCW.
C23	19A700105P34	Mica: 100 pf ±5%, 500 VDCW.
C24	19A143477P27	Polyester: 0.1 µf ±10%, 50 VDCW.
C25	19A116080P108	Polyester: 0.15 µf ±10%, 50 VDCW.
C26	19A143477P27	Polyester: 0.1 µf ±10%, 50 VDCW.
C27	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C28	5496267P3	Tantalum: 150 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C29	5496267P12	Tantalum: 150 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C30	19A143486P1	Tantalum: 6.8 µf ±20%, 6 VDCW.
C31	19C307114P1002G	Polystyrene: 0.01 µf ±2%, 100 VDCW, temp coef -120±30 PPM/°C.
C32	7489162P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C33	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C34	19A700105P34	Mica: 100 pf ±5%, 500 VDCW; sim to Electro Motive Type DM15.
C35 and C36	19A701534P4	Tantalum: 1 µf ±20%, 35 VDCW.
C37 and C38	19A116080P101	Polyester: 0.01 µf ±10%, 50 VDCW.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1 thru CR3	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR5 thru CR11	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR12	4037822P1	Silicon, 1000 mA, 400 PIV.
CR13 thru CR15	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR16*	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV. Added by REV C.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1	19B205354G6	Coil.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P8		(Part of printed board 19D424052P1).
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A116774P2	Silicon, NPN; sim to Type 2N5210.
Q2 thru Q4	19A115910P1	Silicon, NPN; sim to Type 2N3947.
Q5	19A115852P1	Silicon, PNP; sim to Type 2N3251.
Q6 and Q7	19A134137P6	N Type, field effect.
Q8 thru Q11	19A115910P1	Silicon, NPN; sim to Type 2N3947.
Q12	19A115852P1	Silicon, PNP; sim to Type 2N3251.
Q13 thru Q18	19A115910P1	Silicon, NPN; sim to Type 2N3947.
Q19	19A116118P1	Silicon, NPN.
Q20 and Q21	19A115910P1	Silicon, NPN; sim to Type 2N3947.
Q22*	19A115910P1	Silicon, NPN; sim to Type 2N3947. Added by REV A.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	19A701250P284	Metal film: 7.3K ohms ±1%, 1/4 w.
R2	19A701250P325	Metal film: 17.8K ohms ±1%, 1/4 w.
R3	19A700106P103	Composition: 47K ohms ±5%, 1/4 w.
R4	3R152P243J	Composition: 24K ohms ±5%, 1/4 w.
R5	19A701250P247	Metal film: 3K ohms ±1%, 1/4 w.
R6	19A701250P324	Metal film: 17.4K ohms ±1%, 1/4 w.
R7	19A701250P369	Metal film: 51.1K ohms ±1%, 1/4 w.
R8	19C314256P29090	Metal film: 909 ohms ±1%, 1/4 w.
R9	19C314256P21103	Metal film: 110K ohms ±1%, 1/4 w.
R10	19A701250P241	Metal film: 2.6K ohms ±1%, 1/4 w.
R11	3R152P684J	Composition: 680K ohms ±5%, 1/4 w.
R12	19A701250P301	Metal film: 10K ohms ±1%, 1/4 w.
R13	19A701250P247	Metal film: 3K ohms ±1%, 1/4 w.
R14	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.
R15	19C314256P39092	Metal film: 90.9K ohms ±1%, 1/2 w.
R16	19C314256P35112	Metal film: 51.1K ohms ±1%, 1/2 w.
R17	19C314256P31472	Metal film: 14.7K ohms ±1%, 1/2 w.
R18	19C314256P36192	Metal film: 61.9K ohms ±1%, 1/2 w.
R19	19C314256P31471	Metal film: 1.47K ohms ±1%, 1/2 w.
R20	19C314256P31782	Metal film: 17.8K ohms ±1%, 1/2 w.
R21	19C314256P32152	Metal film: 21.5K ohms ±1%, 1/2 w.
R22	19C314256P31782	Metal film: 17.8K ohms ±1%, 1/2 w.
R23	19A116793P2612	Metal film: 26.1K ohms ±1%, 1/4 w.
R24	19C314256P36191	Metal film: 6.19K ohms ±1%, 1/2 w.
R25	19A116793P4422	Metal film: 44.2K ohms ±1%, 1/4 w.
R26	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w.
R27	19C314256P36811	Metal film: 6.8K ohms ±1%, 1/2 w.
R28	19A116793P2612	Metal film: 26.1K ohms ±1%, 1/4 w.
R29	19C314256P35622	Metal film: 56.2K ohms ±1%, 1/2 w.
R30	19C314256P34221	Metal film: 4.2K ohms ±1%, 1/2 w.
R31	19C314256P35622	Metal film: 56.2 ohms ±1%, 1/2 w.
R32 and R33	3R152P513J	Composition: 51K ohms ±5%, 1/4 w.
R34	19A700106P81	Composition: 5.6K ohms ±5%, 1/4 w.
R35 and R36	19A700106P111	Composition: 100K ohms ±5%, 1/4 w.
R37	19A701250P357	Metal film: 38.3K ohms ±1%, 1/4 w.
R38	19A701250P267	Metal film: 4.8K ohms ±1%, 1/4 w.
R39	19A700106P107	Composition: 68K ohms ±5%, 1/4 w.
R40	19A700106P103	Composition: 47K ohms ±5%, 1/4 w.
R41	3R152P203J	Composition: 20K ohms ±5%, 1/4 w.
R42	19A700106P29	Composition: 39 ohms ±5%, 1/4 w.
R43 and R44	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w.
R45	19A700106P103	Composition: 47K ohms ±5%, 1/4 w.
R46	3R152P684J	Composition: 680K ohms ±5%, 1/4 w.
R47	19A700106P85	Composition: 8.2K ohms ±5%, 1/4 w.
R48	3R152P203J	Composition: 20K ohms ±5%, 1/4 w.
R49	3R152P302J	Composition: 3K ohms ±5%, 1/4 w.
R50	19A700106P103	Composition: 47K ohms ±5%, 1/4 w.
R51	19A700106P77	Composition: 3.9K ohms ±5%, 1/4 w.
R52	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R53	19A700106P89	Composition: 12K ohms ±5% 1/4 w.
R54	19A700106P103	Composition: 47K ohms ±5%, 1/4 w.
R55	3R152P202J	Composition: 2K ohms ±5%, 1/4 w.
R56	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R57	19A700106P77	Composition: 3.9K ohms ±5%, 1/4 w.
R58	19A700106P85	Composition: 8.2K ohms ±5%, 1/4 w.
R59	19B209358P106	Variable, carbon film: approx 300 to 100K ohms ±10%, 1/4 w; sim to CTS Type X-201. Added by REV D.
R60	3R152P513J	Composition: 51K ohms ±5%, 1/4 w.
R61	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w.
R62	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R63	19A701250P268	Metal film: 4.9K ohms ±1%, 1/4 w.
R64	19A701250P360	Metal film: 41.2K ohms ±1%, 1/4 w.
R65	19A701250P130	Metal film: 200 ohms ±1%, 1/4 w.
R66	19A701250P330	Metal film: 20K ohms ±1%, 1/4 w.
R67 and R68	3R152P513J	Composition: 51K ohms ±5%, 1/4 w.
R69 and R70	19A700106P111	Composition: 100K ohms ±5%
R71	19A701250P358	Metal film: 39.2K ohms ±1%
R72	3R152P124J	Composition: 120K ohms ±5%
R73	19A701250P289	Metal film: 8.25K ohms ±1%
R74	19A700106P95	Composition: 22K ohms ±5%
R75	19A700106P87	Composition: 10K ohms ±5%
R76	19A700106P103	Composition: 47K ohms ±5%
R77 and R78	19A700106P87	Composition: 10K ohms ±5%
R79	3R152P302J	Composition: 3K ohms ±5%
R80	19A700106P87	Composition: 10K ohms ±5%
R81 and R82	19A700106P79	Composition: 4.7K ohms ±5%
R83	19A700106P29	Composition: 39 ohms ±5%
R84	19A700106P87	Composition: 10K ohms ±5%
R85	19A116559P102	Variable, cermet: 5K ohms CTS Series 360.
R86	19A700106P87	Composition: 10K ohms ±5%
R87	3R152P511J	Composition: 510 ohms ±5%
R88	3R152P202J	Composition: 2K ohms ±5%
R89	3R152P684J	Composition: 680K ohms ±5%
R90	3R152P154J	Composition: 150K ohms ±5%
R91	19A700106P73	Composition: 2.7K ohms ±5%
R92	19A701250P290	Metal film: 8.45K ohms ±1%
R93	3R152P752J	Composition: 7.5K ohms ±5%
R94	19A700106P73	Composition: 2.7K ohms ±5%
R95*	19A700106P71	Composition: 2.2K ohms ±5% REV A.
R96*	19B209358P106	Variable, carbon film: appr ±10%, 1/4 w; sim to CTS Type
		- - - - - - - - - - TEST PO
TP1 thru TP7	19B211379P1	Spring (Test Point).
		- - - - - - - - INTEGRATED C
U1	19A134305P1	Digital: Quad 2-Input Posit
U2	19A116968P1	Linear, timer: Dual In-Line Package; sim to Signetics SA
		- - - - - - - - VOLTAGE REGU
VR1 and VR2	4036887P1	Zener: 500 mW, 2.3 v. nom.
VR3*	4036887P48	Zener: 500 mW, 6.8 v. nom.
		Earlier than REV A:
	4036887P6	Zener: 500 mW, 6.5 v. nomin
VR4 and VR5	4036887P3	Zener: 500 mW, 3.8 v. nomin
		- - - - - - - - - - MISCELLA
	19B219690G1	Handle assembly.
	19A129383P1	Heat sink. (Used with Q19).
	19A700115P3	Insulator, plate. (Used wit
	19A700068P1	Insulator, bushing. (Used w
	19B201074P204	Tap screw, Phillips POZIDRIV (Secures L1).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

N	SYMBOL	GE PART NO.	DESCRIPTION
1/2 w.	R69 and R70	19A700106P111	Composition: 100K ohms ±5%, 1/4 w.
1/2 w.			
1/2 w.	R71	19A701250P358	Metal film: 39.2K ohms ±1%, 1/2 w.
1/2 w.	R72	3R152P124J	Composition: 120K ohms ±5%, 1/4 w.
1/2 w.	R73	19A701250P289	Metal film: 8.25K ohms ±1%, 1/4 w.
1/2 w.	R74	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
1/2 w.	R75	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
1/4 w.	R76	19A700106P103	Composition: 47K ohms ±5%, 1/4 w.
1/2 w.	R77 and R78	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
1/4 w.			
1/4 w.	R79	3R152P302J	Composition: 3K ohms ±5%, 1/4 w.
1/2 w.	R80	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
1/4 w.	R81 and R82	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w.
1/2 w.			
1/2 w.	R83	19A700106P29	Composition: 39 ohms ±5%, 1/4 w.
1/2 w.	R84	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
1/4 w.	R85	19A116559P102	Variable, cermet: 5K ohms ±20%, 0.5 w; sim to CTS Series 360.
1/4 w.	R86	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
1/4 w.	R87	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
	R88	3R152P202J	Composition: 2K ohms ±5%, 1/4 w.
1/4 w.	R89	3R152P684J	Composition: 680K ohms ±5%, 1/4 w.
1/4 w.	R90	3R152P154J	Composition: 150K ohms ±5%, 1/4 w.
1/4 w.	R91	19A700106P73	Composition: 2.7K ohms ±5%, 1/4 w.
1/4 w.	R92	19A701250P290	Metal film: 8.45K ohms ±1%, 1/4 w.
1/4 w.	R93	3R152P752J	Composition: 7.5K ohms ±5%, 1/4 w.
1/4 w.	R94	19A700106P73	Composition: 2.7K ohms ±5%, 1/4 w.
%, 1/4 w.	R95*	19A700106P71	Composition: 2.2K ohms ±5%, 1/4 w. Added by REV A.
, 1/4 w.	R96*	19B209358P106	Variable, carbon film: approx 300 to 10K ohms ±10%, 1/4 w; sim to CTS Type X-201. Added by REV D
%, 1/4 w.			- - - - - - - - - TEST POINTS - - - - - - - - -
%, 1/4 w.	TP1 thru TP7	19B211379P1	Spring (Test Point).
, 1/4 w.			
1/4 w.			- - - - - - - - INTEGRATED CIRCUITS - - - - - - -
1/4 w.	U1	19A134305P1	Digital: Quad 2-Input Positive-Nand Gate.
%, 1/4 w.	U2	19A116968P1	Linear, timer: Dual In-Line 8-Pin Mini Dip Package; sim to Signetics SA555N.
, 1/4 w.			
1/4 w.			- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
%, 1/4 w.	VR1 and VR2	4036887P1	Zener: 500 mW, 2.3 v. nom.
, 1/4 w.			
%, 1/4 w.	VR3*	4036887P48	Zener: 500 mW, 6.8 v. nom.
5%, 1/4 w.			Earlier than REV A:
5%, 1/4 w.		4036887P6	Zener: 500 mW, 6.5 v. nominal.
pprox 300 to 100K ohms ype X-201. Added by REV D.	VR4 and VR5	4036887P3	Zener: 500 mW, 3.8 v. nominal.
%, 1/4 w.			
5%, 1/4 w.			
%, 1/4 w.			- - - - - - - - - MISCELLANEOUS - - - - - - - - -
%, 1/4 w.		19B219690G1	Handle assembly.
1%, 1/4 w.		19A129383P1	Heat sink. (Used with Q19).
, 1/4 w.		19A700115P3	Insulator, plate. (Used with Q19).
, 1/4 w.		19A700068P1	Insulator, bushing. (Used with Q19).
%, 1/4 w.		19B201074P204	Tap screw, Phillips POZIDRIV®; No. 4-40 x 1/4. (Secures L1).

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 correct over-voltage problem. Added R95 and Q22. Changed VR3.

REV. B - To prevent the tone control modules from falsing on noise when the PTT switch is operated at the remote control unit. A jumper is connected from terminal D4 to Pin 10 of VI-C in the WINDOW ONE-SHOT.

REV. C - To make provisions for adding a Pot. Added H14, H15 and H16.

REV. D - To prevent the tone control modules from falsing on non-transmit functions. Added R96 Pot.

REV. E - To improve performance of limited audio amplifier, changed R96 and relocated. R96 was 19B209358P103 variable, carbon film: approx 50 to 1000 ohms ±10%, 0.2 W; Sim to CTS Type A-201.

REV. F - Changed from DTL ICs to TTL ICs. Added C37, C38, U2. Deleted Q18, R96. Q18 was 19A116755P1, Silicon, NPN: Sim to Type 2N3947.

R96 was 19B209358P103: Variable, carbon film, approx 50 to 1000 ohms ±10%, 0.2 W, Sim to CTS Type X-201.

Changed R57-R61. R57 was 3R152P202J, composition: 2K ohms ±5%, 1/4 W. R58 was 19A700106P77, composition: 3.9K ohm ±5%, 1/4 W.
R59 was 3R152P752-J, composition: 7.5K ohms, ±5%, 1/4 W.
R60 was 19A700106P79, Composition: 4.7K ohms ±5%, 1/4 W.
R61 was 19C314256P26982, Metal film, 69.8K ohms ±1%, 1/4 W.

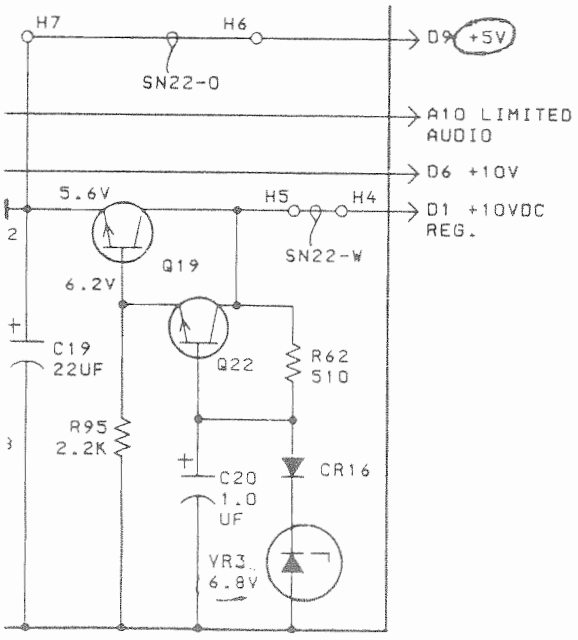
ADDENDUM TO LBI30708C

This addendum describes Revision Letter changes that are not yet included in the publication.

SECUR-IT TONE BOARD 19D424051G1

REV. G- REGULATED 5-VOLT LINE IS RUNNING CLOSE TO 5.6 VOLTS RESULTING IN INTERMITTENT OPERATION OF TTL LOGIC. U1 OPERATION ERRATIC AT LOW TEMPERATURES. VR3 CHANGED FROM 4036887P48 TO 19A701920P1, SILICON DIODE AND U1 CHANGED FROM 19A700037P301 TO 19A700037P1 INT. CIRCUIT.

Change VR3 and D9 as follows:
From:



To: