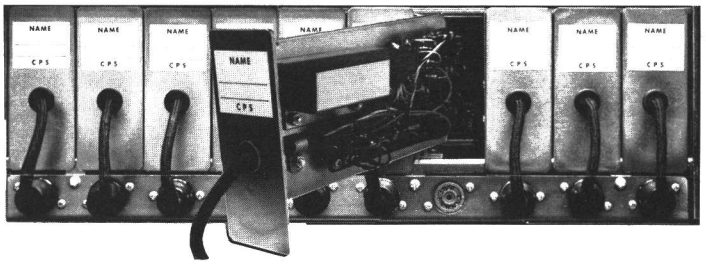
MOBILE RADIO

MASTR Progress Line

SHARED REPEATER PANEL (OPTIONS 7466 & 7646



Maintenance Manual LBI-4586

DF-5032

SHARED REPEATER PANEL

SPECIFICATIONS *

Tone Frequencies	71.9 to 203.5 Hz
Tone Frequency Stability	±0.2%
Decoder Response (threshold bandwidth)	3% ± 0.5% of Tone Frequency
Audio Response	300 to 3000 Hz
Temperature Range	-30°C to +60°C (-22°F to +140°F)

Option No.	Description	Used With
7466	Tone Panel 19D402486G1	MASTR Professional Progress Line Repeater Station
7646	Tone Module 19D402608G1 and Tone Network 19B205280G1 thru G34	Tone Panel Option 7466

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Specification Sheet for the complete specifications.

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

WARNING

No one should be permitted to handle any portion of the equipment that is supplied with high voltage; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS.

DESCRIPTION

The General Electric Shared Repeater is a Channel Guard Repeater Station combination capable of providing repeater service for up to 10 different users (or fleets) sharing the same radio frequency. The Shared Repeater provides each user with a separate Channel Guard tone frequency, permitting him to hear only those calls from other units in his own system.

Encoder/Decoder modules are used to identify the tone frequency of each RF modulated signal -- and to re-transmit the message to the user's mobiles. Normally, the first signal received will be decoded and re-transmitted before the next message is received. In some instances, however, a stronger signal may override a signal that is already in the process of being re-transmitted by the station.

SYSTEM OPERATION

A signal received from a mobile unit by the repeater station is fed into the Audio Amplifier on the control shelf and to the Tone Panel low pass filter (Figure 1).

The low-pass filter eliminates voice frequencies and feeds the Channel Guard tone frequencies into the tone modules containing the tone frequency networks FL601 thru FL610. A tone coded signal that matches one of the tone frequency networks will activate Tone Controlled switch 19D416864G1 to trigger the Drop-out Delay Timer and key the transmitter.

The Drop-out Delay Timer decreases the number of transmitter "ON-OFF" cycles by keeping the transmitter keyed for a predetermined delay period after the receiver squelches loosing the COS voltage. The delay period can be set for 0.5 to 5 seconds. If the receiver is unsquelched at any time during the delay period loosing the COS voltage the transmitter stays keyed without interruption. After the delay time lapses and no signal is applied to the receiver, loosing COS voltage, the transmitter keying circuit is de-energized and the transmitter turns off.

Tone from the frequency matching network is also fed into the transmitter to modulate the RF signal. The tone/voice-modulated signal is then received by the user's Channel Guard mobile receiver.

Signals received by the Repeater Station that are not modulated by one of the station Channel Guard frequencies will be

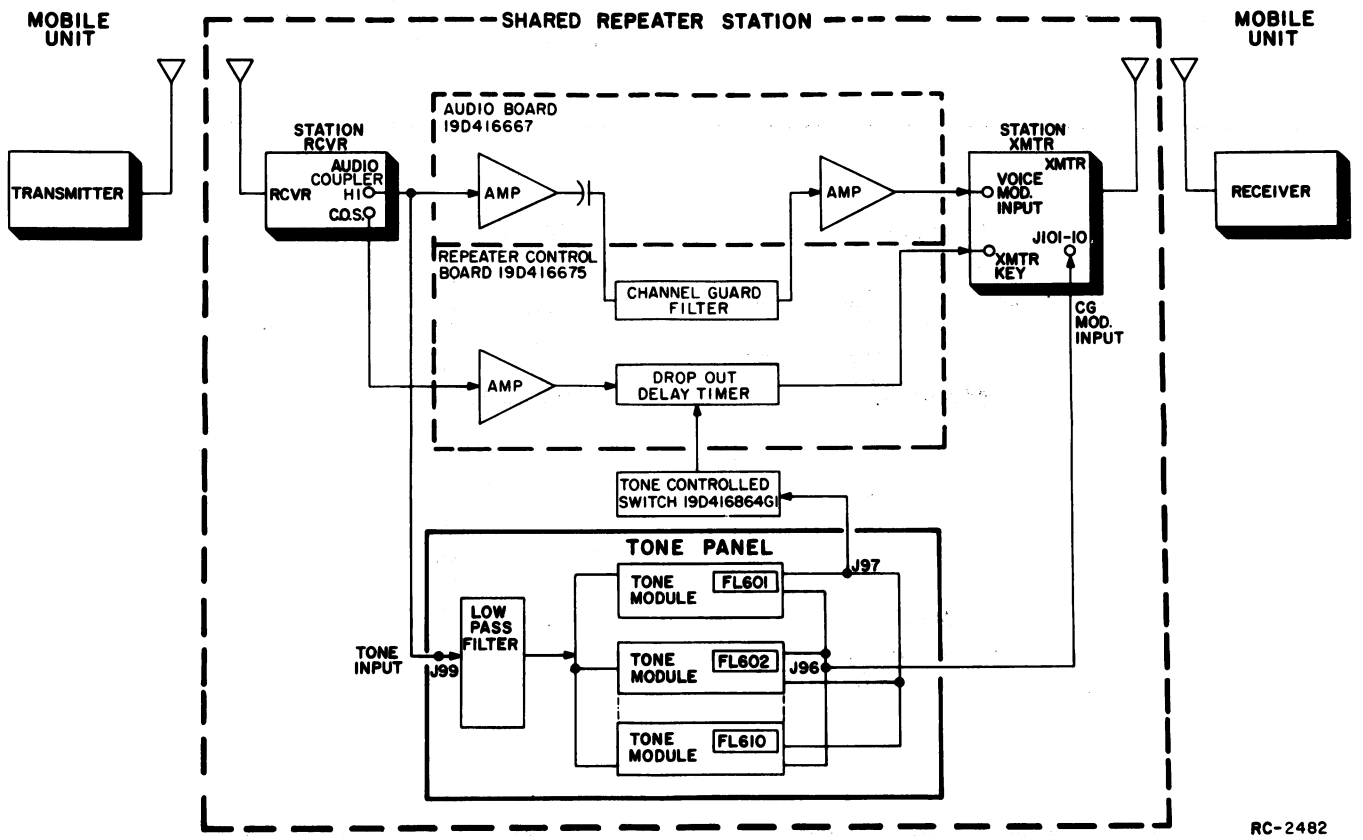


Figure 1 - Shared Repeater Block Diagram

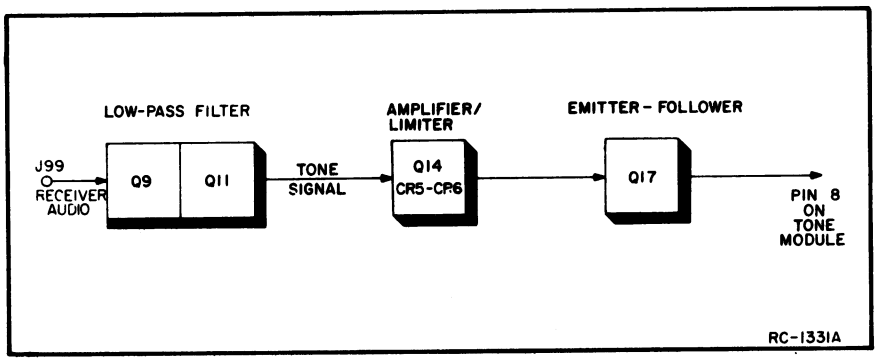


Figure 2 - Low-Pass Filter/Amplifier Block Diagram

attenuated by the tone frequency networks (FL601-FL610).

CIRCUIT ANALYSIS

TONE PANEL

The Tone Panel circuit board contains the tone gate, low-pass filter, amplifiers, tone gate hold circuits, and provisions for inserting up to 10-slide-in Tone M dules. Each tone module contains a tone frequency network operating at a Channel Guard frequency within the 71.9 to 203.5 Hz range.

Low-Pass Filter

Audio from the station receiver is fed to a low-pass filter on the Tone Panel. The filter blocks the voice frequency signals and allows the Channel Guard tones to pass (Figure 2).

Amplifier and Emitter-Follower

Tones from the low-pass filter are coupled through C20 to the base of amplifier Q14. Signals are limited by diodes CR5 and CR6, and fed to the base of emitter-follower Q17. Following Q17, the signals are coupled to Pin 8 of each Tone Module to drive the frequency networks.

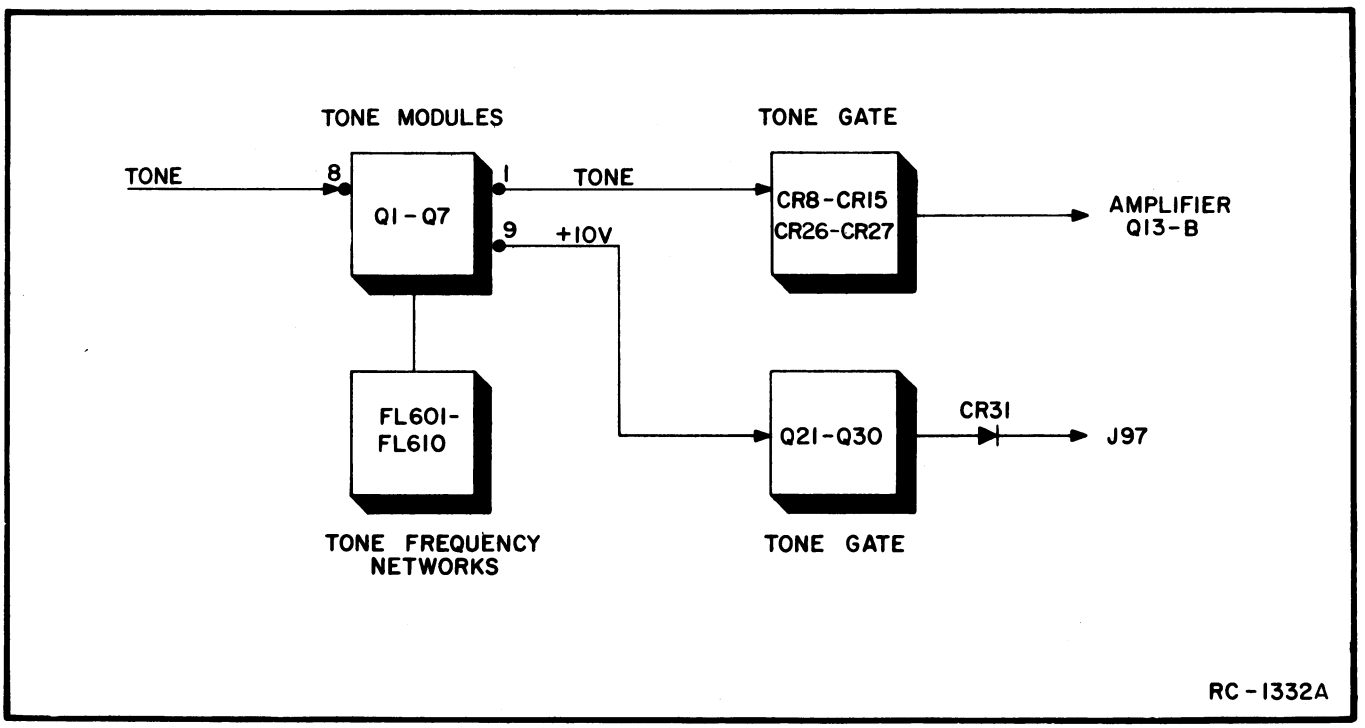


Figure 3 - Tone Gate/Tone Module Block Diagram

Tone Gate

The +10 Volts from a tone module will fire only 1 of the tone gate transistors (Q21-Q30) located on the Tone Panel.

The resulting positive voltage (+10 Volts) at the emitter of Q21 (for example) will then produce a voltage drop across R65 to turn on CR8, allowing the output of the tone module to pass through C28 and R75 to the base of amplifier Q13. The +10 Volts at the emitter of Q21 is coupled through diodes CR16 and CR31 to activate Tone Controlled Switch 19D416864G1 (Figure 3).

Amplifiers

The tone signal from the operating tone gate stage is amplified by Q13 and Q1 with de-emphasis provided by R2, C1, C3 and R10. The amplified output signal at J96 will produce a constant transmitter deviation at all transmitting frequencies.

NOTE

If the station transmitter contains an Integrated Circuit Oscillator Module (ICOM), amplifier Q1 and the de-emphasis circuits are bypassed. See RC-1624.

Tone Gate Hold

Transistors Q18 and Q19 form a one-shot multivibrator timing circuit to keep the tone path from module to transmitter open during sudden fades or tone drop-outs. Assume, for example, that tone module with FL601 is functioning and diode CR8 is turned on by tone gate Q21. If the tone input to FL601 momentarily disappears, the DC voltage at tone module pin 9 will drop back to low value, cutting Q31 OFF. A negative-going edge at C45 will momentarily bias the base of Q18 negative through diode CR32, causing the collector voltage at Q18 to rise toward +10 Volts, as Q18 turns off.

The positive voltage at the collector of Q18 turns Q20 ON, and the positive voltage produced at Q20 emitter feeds thru R129 and CR38 to keep tone gate diode CR8 on for the duration of the Q18-Q19 timing cycle. The positive voltage to the Tone Controlled Switch (at J97) is maintained during this interval by the decay time constant of C46 with R111, and the input impedance of the Tone Controlled Switch.

TONE MODULE AND FREQUENCY NETWORK

Tone signals from the Tone Panel are fed to the base of amplifier Q1. The audio signal from the amplifier is fed to the base of common-emitter amplifier Q2, providing a 180° phase shift through R3, R2 and C1 for the positive feedback necessary to provide high gain in Q1-Q2.

Negative feedback is provided through the Tone Frequency Network from the collector to the base of Q1 at all frequencies, except at the tone network frequency. Q1 will amplify only at the network frequency. The positive feedback from C1 increases the gain of Q1-Q2. Protection against noise falsing is provided by the incoming noise signal to Q1. (Figure 5).

The tone output from emitter follower Q3 is fed to the tone gate stage on the Tone Panel and to the base of amplifier Q4. Amplified by Q4, the signal is isolated from the CR4-CR5 detector circuit by emitter-follower Q5. When the DC potential is above the threshold level of trigger circuit Q6-Q7, Q6 will turn ON and Q7 will turn OFF, thereby producing a +10 Volt output. The Q8 circuit is used in Remote operations only.

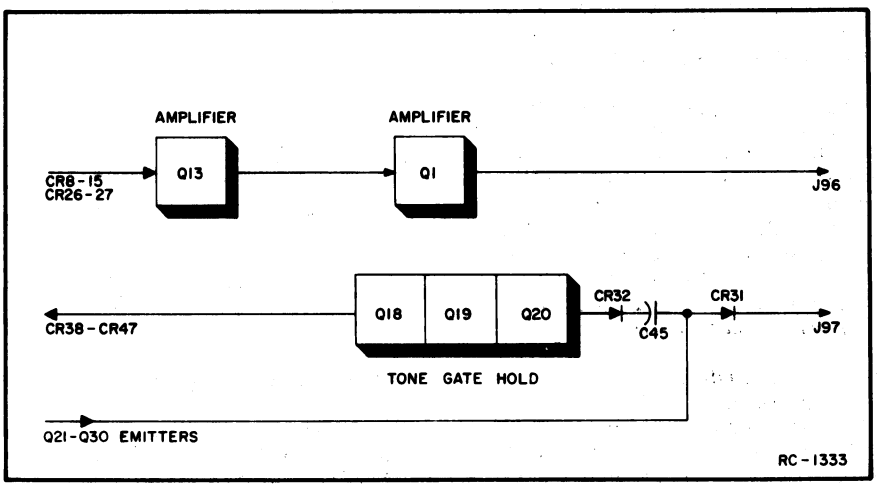


Figure 4 - Amplifier/Tone Gate Hold Block Diagram

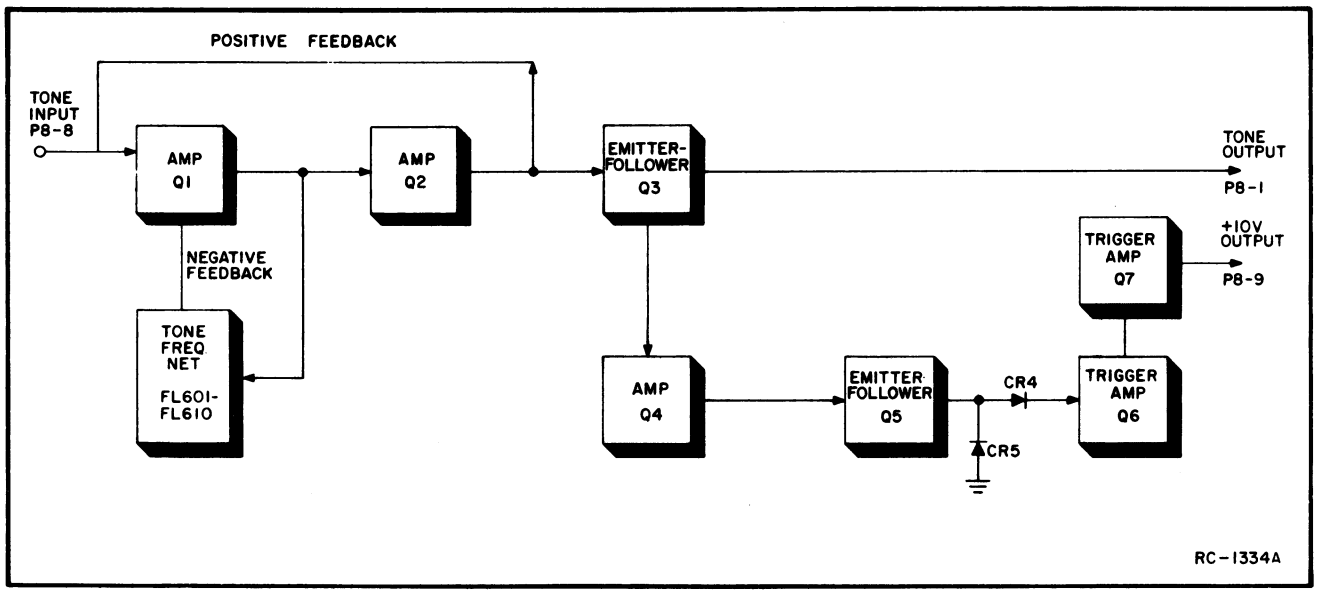


Figure 5 - Tone Module Block Diagram

TONE CONTROLLED SWITCH/10-VOLT REGULATOR
(Part of Control Shelf)

Tone Controlled Switch

The Tone Controlled Switch will operate only when a greater than +6 Volt signal is fed into it from the tone gate stage of the Tone Panel. The voltage input turns on Q4 to activate the carrier-operated switch or relay, keying the transmitter. Zener diode VR2 prevents Q3 from turning on until the proper operating voltage is received from the Tone Panel.

10-Volt REGULATOR

The regulator supplies a regulated +10 Volts to the Tone Panel, Tone Modules, and the Tone Frequency Networks. The regulator is supplied by a 12.6 regulated voltage taken from the EP-38-A Power Supply.

If the voltage at the collector of Q1 starts to increase, the voltage at the base of Q3 increases. This causes Q3 to conduct harder. This brings the base of Q2 down, causing Q2 to conduct less. This results in an increase at the Base of Q1. Q1 thus conducts less, causing the voltage at the collector of Q1 to remain the same. The opposite condition results if the voltage at the collector of Q1 starts to decrease.

Zener diode VR1 provides a voltage reference for the regulator. R3 and R5 form a voltage divider that can be varied by potentiometer R3 to set the output voltage to exactly +10 Volts. C1 is used to prevent high frequency oscillation and C2 is a filtering capacitor. R8 is a bleeder resistor for C2 when the load is removed from the 10 Volt regulator.

MODIFICATIONS

The station transmitter, power supply and control panel are modified for Shared Repeater Operation. If the station transmitter is equipped with an Integrated Circuit Oscillator Module (ICOM), the tone panel is also modified.

Transmitter

The Transmitter Exciter has been modified as in Channel Guard applications. A two-conductor shielded cable (19B205478G1) has been connected from terminals 10 and 15 of J101 to J7 and J8 on the Exciter Board as shown in Figure 6. This cable couples the tone signal to the transmitter tone modulator circuit. Refer to the transmitter Modification Drawing on page 19.

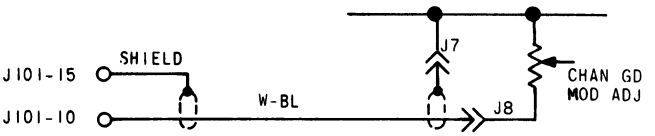


Figure 6 - Transmitter Tone Cable Connections

Tone Control Switch & 10-Volt Regulator

Tone Controlled Switch 19D416864G1 has been installed and connected as shown on the Outline and Schematic Diagram on Page 9.

Tone Panel 19D402486G1

When the station transmitter is equipped with an ICOM Module, A601 on the tone panel contains a 19B216215G1 Modification Kit. The modification produces the flat audio response required for modulating an ICOM equipped transmitter. Installation Diagram RC-1624 describes the modification and provides a tone panel circuit diagram showing the modification kit installed. Refer to the Tone Panel Installation on Page 20.

Audio Board

The Audio Board was modified as shown on Page 19.

Control Shelf and Repeater Control Board

The Control Shelf and Repeater Control Board were modified as shown on Page 18.

MAINTENANCE

The Transmitter, Receiver and Power Supply are essentially standard and servicing should be performed according to the standard techniques outlined in the unit Maintenance Manuals. The Repeater Control Board 19D416675G4 and Audio Board 19D416667G1 are part of the Base Station Control Shelf (LBI-4490).

TONE OUTPUT LEVELS

The tone levels applied to the transmitter modulator (measured at J85 on the tone panel) are shown in the following chart. These levels are used for transmitters without Integrated Circuit Oscillator Modules (ICOM's). When the transmitter is equipped with an ICOM, the tone panel is modified according to RC-1624 to provide a flat output (approximately 1 Volt) at J85 over the entire range of tone frequencies.

Tone Frequency	Minimum Output at J85*
71.9 Hz	1.0 V
74.4 Hz	0.95 V
77.0 Hz	0.9 V
79.7 Hz	0.86 V
82.5 Hz	0.8 V
85.4 Hz	0.76 V
88.5 Hz	0.71 V
91.5 Hz	0.68 V
94.8 Hz	0.66 V
97.4 Hz	0.61 V
100.0 Hz	0.6 V
103.5 Hz	0.57 V
107.2 Hz	0.54 V
110.9 Hz	0.5 V
114.8 Hz	0.47 V
118.8 Hz	0.44 V
123.0 Hz	0.42 V
127.3 Hz	0.38 V
131.8 Hz	0.36 V
136.5 Hz	0.33 V
141.3 Hz	0.31 V
146.2 Hz	0.29 V
151.4 Hz	0.27 V
156.7 Hz	0.26 V
162.2 Hz	0.24 V
167.9 Hz	0.22 V
173.8 Hz	0.2 V
179.9 Hz	0.19 V
186.2 Hz	0.18 V
192.8 Hz	0.17 V
203.5 Hz	0.15 V

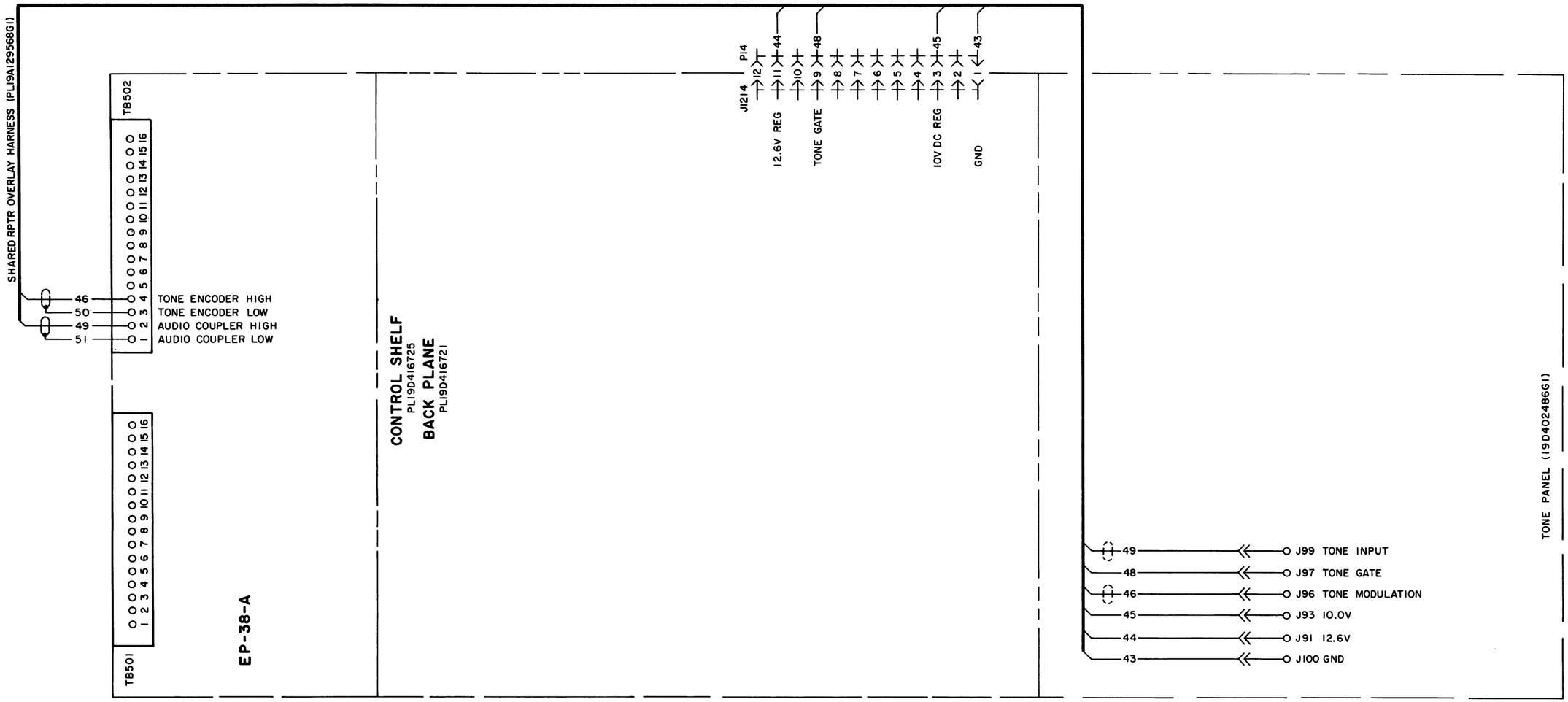
* In Volts, measured with AC-VTVM

TROUBLESHOOTING

Troubleshooting and servicing those units that are unique to the Shared Repeater Station are described in the following Troubleshooting Procedure Chart.

TROUBLESHOOTING PROCEDURE

SYMPTOM	CHECK THE FOLLOWING:
One individual mobile cannot operate Repeater Station. All other mobiles on same frequency OK.	Mobile transmitter for proper Channel Guard frequency and tone deviation.
One fleet of mobiles (with a common Channel Guard frequency) cannot operate Repeater. Other fleets (with other Channel Guard frequencies) OK.	I - TONE MODULE AND TONE FREQUENCY NETWORK
	a. That tone frequency network corresponds to proper Channel Guard tone frequency.
	b. For tone of proper frequency at pin 8 and amplified tone at pin 1 of tone module.
	c. For approximately 2 VDC (no tone) and 10 VDC (with tone) at pin 9.
	d. If tone appears at pin 1, but no DC at pin 9, check Q5, Q6 and Q7.
	e. If tone or DC voltage do not appear, check Q1, Q2, and Q3.
	f. Substitute a replacement network, if necessary.
	g. If tone and DC are both OK, go to Step II.
	II - TONE PANEL
	a. For tone at Q13-B and +DCV at J97 with the tone applied.
	b. Tone gate stage (Q21-30) and associated diodes, if no tone is measured in Step II-a.
Repeater is keyed by mobiles, but does not re-transmit any tones.	a. Tone amplifiers Q13 and Q1.
	b. Cabling to EP-38-A, TB502-4.
	c. Modulator circuit of transmitter.
No mobiles can key transmitters.	a. For voltage swing of 0 to +1.5 2 VDC at TB502-16 on EP-38-A. Also audio should be heard from test speaker when mobile comes on. If not, check receiver.
	b. If receiver is OK, jumper across H7 and H8 on Repeater Control board. When mobile is received, transmitter should key and be voice modulated (but not necessarily tone modulated). If not, check 5-second delay, 3-minute timer, and transmitter keying circuits.
	c. If transmitter operates as in Step b above with jumper, then measure voltage at J1214-P9 on Control Shelf. If voltage swings from approximately 1 VDC to 6 VDC or more with tone signal applied, the trouble is in Tone Controlled Switch (19D416864G1) Q4. If voltage does not swing up, go to Step d.
	d. For a tone signal at pin 8 of all tone modules with a mobile signal being received. If no signal is present, trace signal through stages Q9, Q11, Q14, and Q17.



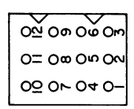
INSTRUCTIONS:
1. CABLES SHOULD BE CONSTRUCTED IN ACCORDANCE WITH WIRING INSTRUCTIONS 19A121850.
2. CABLE SHOULD BE CONSTRUCTED IN SUCH A WAY AS TO ALLOW ENOUGH SLACK TO PERMIT MOUNTING A 3.50" OPTION PANEL BETWEEN EP-38-A & CONTROL SHELF AND A 3.50" OPTION PANEL BETWEEN CONTROL SHELF AND TONE PANEL.
3. ALL WIRES ARE #18 AWG EXCEPT WIRES 46, 49, 50 & 51 WHICH ARE N22SJ-G.

TERMINATE WIRES AS FOLLOWS:

WIRE #		TERMINAL
43	AT CONTROL SHELF	5496809P18
44,45 & 48	AT CONTROL SHELF	5496809P17
46,49,50 & 51	AT EP38-A	19B209260P103
43,44,45 & 48	AT TONE PANEL	4029840P1
46 & 49	AT TONE PANEL	4029840P2

TERMINATE N22SJ-G WIRES AT EP-38-A PER 713650.

4. MARK WIRES IN CABLE ON BOTH ENDS WITH CORRESPONDING WIRE NUMBER USING MARKER STRIP 19B209090.

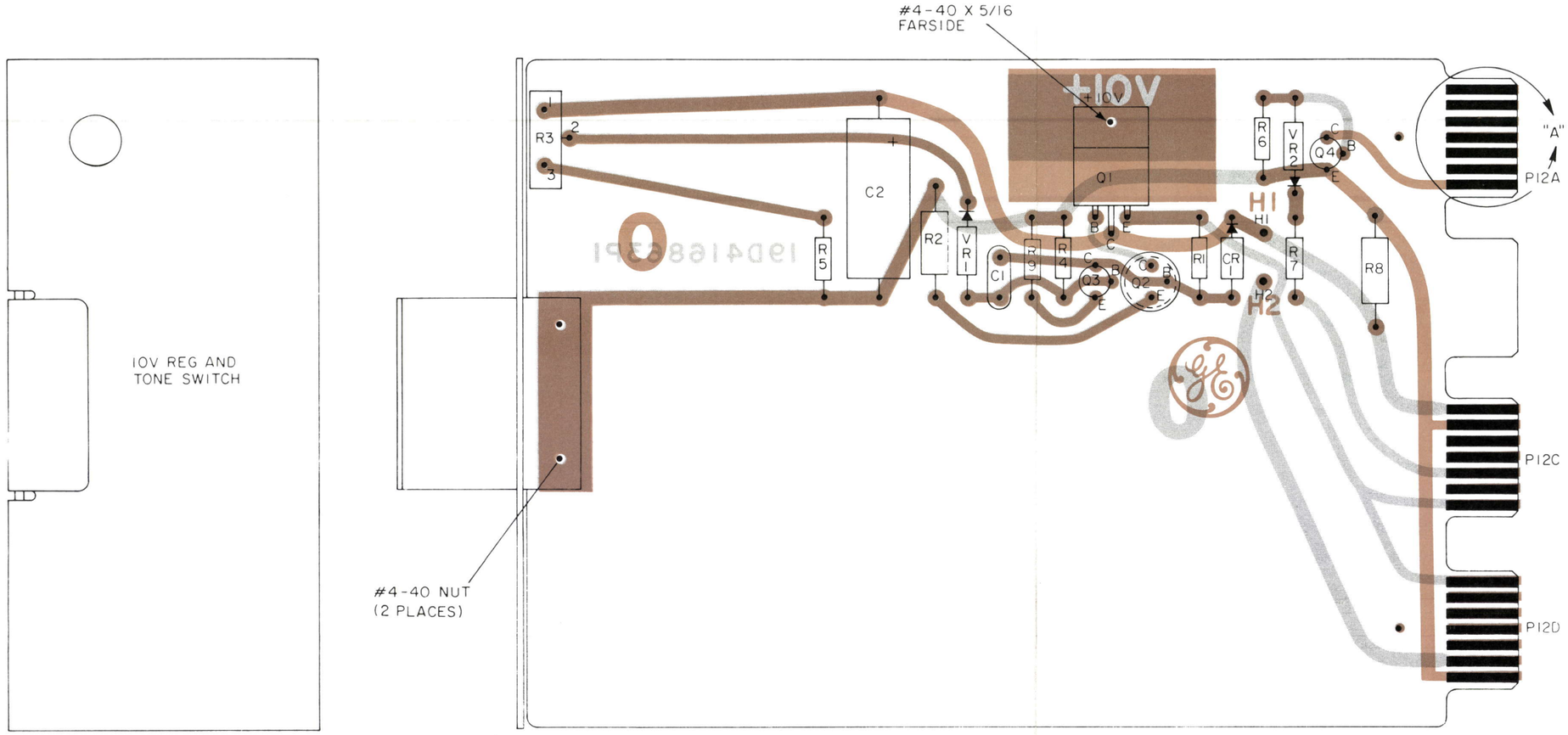


(19D416884, Rev. 0)

INTERCONNECTION DIAGRAM

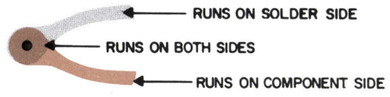
SHARED REPEATER

Issue 1

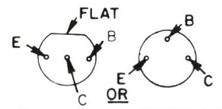


(19D417653, Rev. 0)
(19D416863, Sh. 2, Rev. 0)
(19D416863, Sh. 3, Rev. 0)

DETAIL "A"
TYP. NUMBERING OF CONT. FINGERS



LEAD IDENTIFICATION
FOR Q3 & Q4

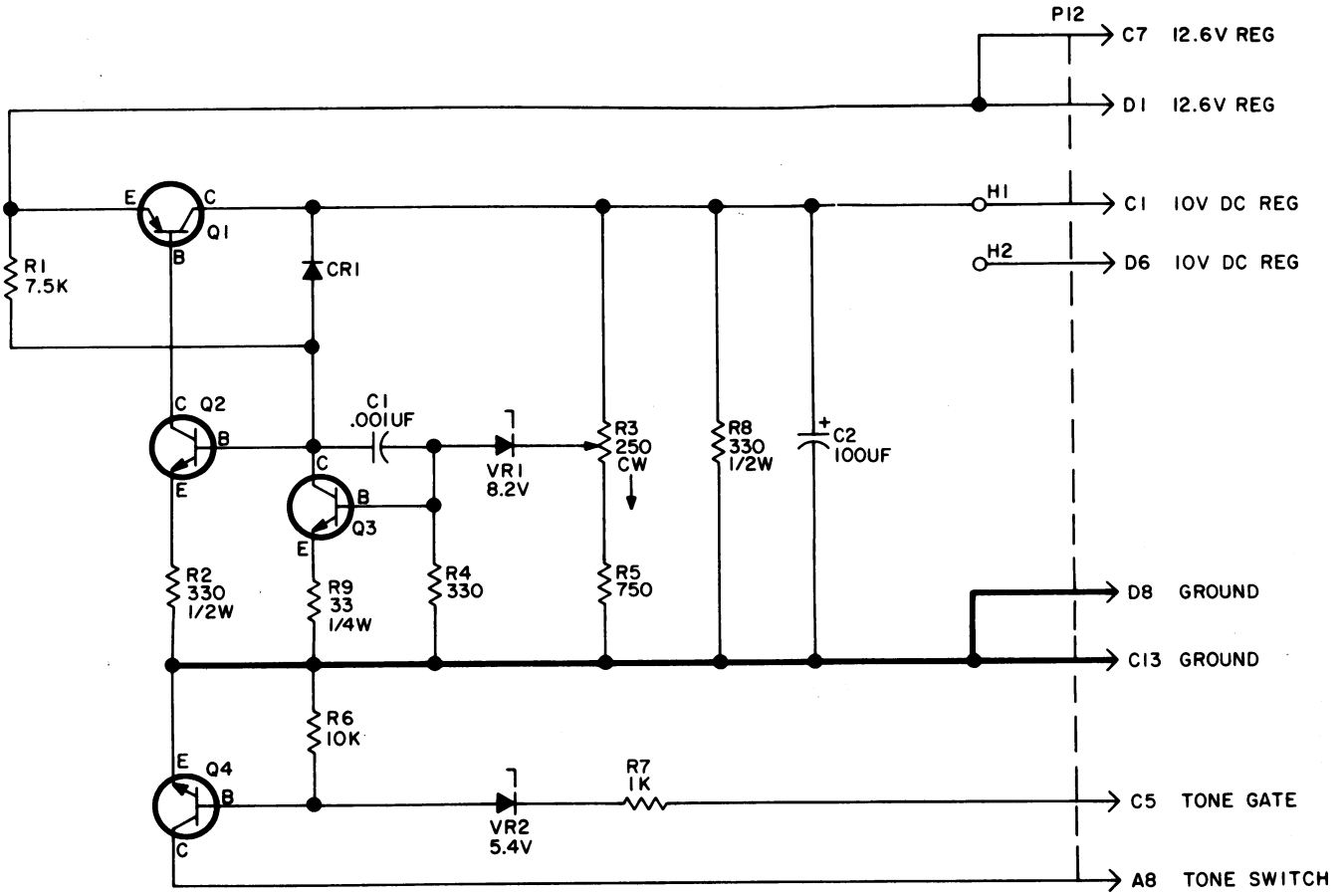


VIEW FROM LEAD END

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

OUTLINE DIAGRAM

TONE CONTROLLED SWITCH AND
10-VOLT REGULATOR 19D416864G1



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
PL19D416864G1	A

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.

(19C320404, Rev. 2)

SCHEMATIC DIAGRAM

TONE CONTROLLED SWITCH
AND 10-VOLT REGULATOR
19D416864G1

PARTS LIST

LBI-4587

TONE CONTROLLED SWITCH
AND
10 VOLT REGULATOR
19D416864G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C2	19A115680P7	Electrolytic: 100 µf +150% -10%, 15 VDCW; sim to Mallory Type TT.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1	4037822P1	Silicon.
CR2*	19A115250P1	Silicon. Deleted by REV A.
		- - - - - - - - - - - PLUGS - - - - - - - - - -
P12		(Part of printed wiring board 19D416863P1).
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A116375P1	Silicon, PNP.
Q2	19A115300P1	Silicon, NPN; sim to Type 2N3053.
Q3 and Q4	19A115889P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P752J	Composition: 7500 ohms ±5%, 1/4 w.
R2	3R77P331K	Composition: 330 ohms ±10%, 1/2 w.
R3	19B209358P101	Variable, carbon film: approx 25 to 250 ohms ±10%, 0.2 w; sim to CTS Type X-201.
R4	3R152P331J	Composition: 330 ohms ±5%, 1/4 w.
R5	3R152P751J	Composition: 750 ohms ±5%, 1/4 w.
R6	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R7	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R8	3R77P331K	Composition: 330 ohms ±10%, 1/2 w.
R9	3R152P330J	Composition: 33 ohms ±5%, 1/4 w. Added by REV A.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1	4036887P40	Silicon, Zener.
VR2	4036887P6	Silicon, Zener.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	4036555P1	Insulator, washer: nylon. (Used with Q2).

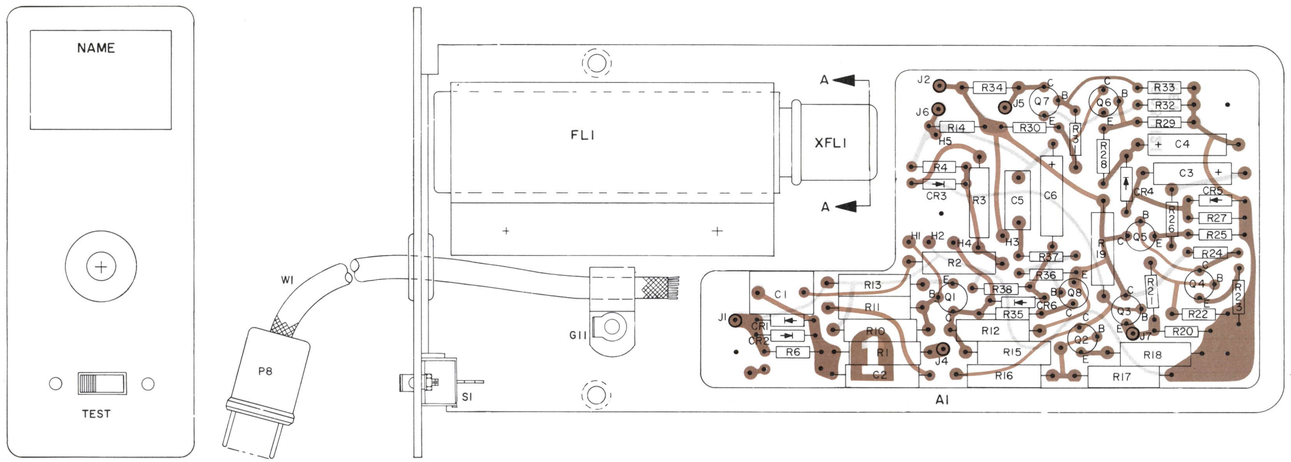
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

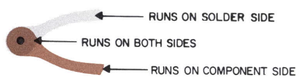
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

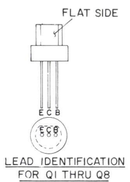
REV. A - To provide a 10 Volt setting with changing parameters of Q1. Replaced CR2 with R9.

OUTLINE DIAGRAM

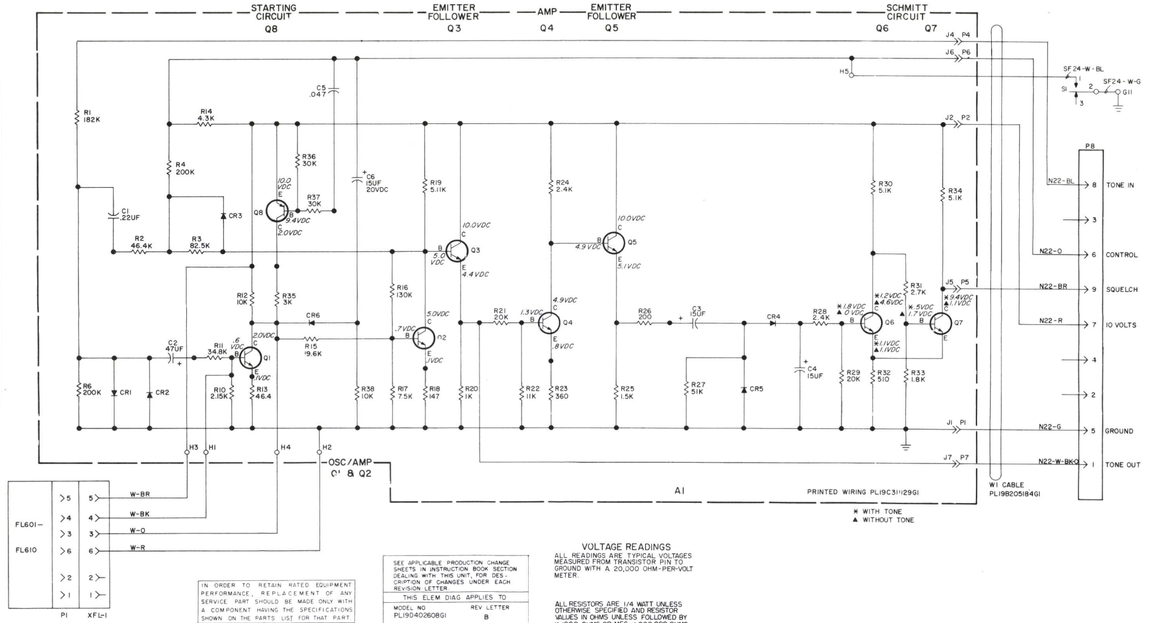


(19D402825, Rev. 1)
(19C311120, Sh. 1, Rev. 1)
(19C311120, Sh. 2, Rev. 1)





SCHEMATIC DIAGRAM



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.

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
PLI9040260BG1	B

VOLTAGE READINGS

ALL READINGS ARE TYPICAL VOLTAGES MEASURED FROM TRANSISTOR PIN TO GROUND WITH A 20,000 OHM-PER-VOLT METER.

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.

(19D402762, Rev. 3)

SCHEMATIC & OUTLINE DIAGRAM

TONE MODULE & TONE FREQUENCY NETWORK
19D402608G1

PARTS LIST

LBI-3700C

TONE MODULE
19D402608G1

SYMBOL	GE PART NO.	DESCRIPTION
A1*		COMPONENT BOARD 19C311129G1 (Added by REV A)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW.
C2	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C3 and C4	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C5	19A115028P111	Polyester: .047 µf ±20%, 200 VDCW.
C6	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	5494922P1	Silicon; sim to Type 1N456.
CR3 thru CR6	19A115250P1	Silicon.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J1 and J2	4033513P15	Contact, electrical: sim to Bead Chain R40-1A.
J4 thru J7	4033513P15	Contact, electrical: sim to Bead Chain R40-1A.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 and Q2	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q3	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q4	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q5 thru Q7	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q8	19A115768P1	Silicon, PNP; sim to Type 2N3702.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	5495948P426	Deposited carbon: 182,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R2	5495948P365	Deposited carbon: 46,400 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R3	5495948P389	Deposited carbon: 82,500 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R4	3R152P204J	Composition: 0.2 megohm ±5%, 1/4 w.
R6	3R152P204J	Composition: 0.2 megohm ±5%, 1/4 w.
R10	19A116278P233	Metal film: 2150 ohms ±2%, 1/2 w.
R11	19A116278P353	Metal film: 34,800 ohms ±2%, 1/2 w.
R12	19A116278P301	Metal film: 10,000 ohms ±2%, 1/2 w.
R13	19A116278P65	Metal film: 46.4 ohms ±2%, 1/2 w.
R14	3R152P432J	Composition: 4300 ohms ±5%, 1/4 w.
R15	19A116278P329	Metal film: 19,600 ohms ±2%, 1/2 w.
R16	19A116278P412	Metal film: 130,000 ohms ±2%, 1/2 w.
R17	19A116278P285	Metal film: 7500 ohms ±2%, 1/2 w.
R18	19A116278P117	Metal film: 147 ohms ±2%, 1/2 w.
R19	19A116278P269	Metal film: 5110 ohms ±2%, 1/2 w.
R20	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R21	3R152P203J	Composition: 20,000 ohms ±5%, 1/4 w.
R22	3R152P113J	Composition: 11,000 ohms ±5%, 1/4 w.
R23	3R152P361J	Composition: 360 ohms ±5%, 1/4 w.
R24	3R152P242J	Composition: 2400 ohms ±5%, 1/4 w.
R25	3R152P152J	Composition: 1500 ohms ±5%, 1/4 w.
R26	3R152P201J	Composition: 200 ohms ±5%, 1/4 w.
R27	3R152P513J	Composition: 51,000 ohms ±5%, 1/4 w.
R28	3R152P242J	Composition: 2400 ohms ±5%, 1/4 w.
R29	3R152P203J	Composition: 20,000 ohms ±5%, 1/4 w.
R30	3R152P512J	Composition: 5100 ohms ±5%, 1/4 w.
R31	3R152P272J	Composition: 2700 ohms ±5%, 1/4 w.
R32	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R33	3R152P182J	Composition: 1800 ohms ±5%, 1/4 w.
R34	3R152P512J	Composition: 5100 ohms ±5%, 1/4 w.
R35	3R152P302J	Composition: 3000 ohms ±5%, 1/4 w.
R36 and R37	3R152P303J	Composition: 30,000 ohms ±5%, 1/4 w.
R38	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL1	7768887P17	Tube, phen: 7 pins; sim to Elco 04-710-02.
		IN MODELS EARLIER THAN REV A
		COMPONENT BOARD 19C303864G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19B209243P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C2	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C3 and C4	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1 and CR2	5494922P1	Silicon; sim to Type 1N456.
CR3 thru CR5	4036936P1	Silicon.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J1 thru J7	4033513P16	Contact, electrical: sim to Bead Chain R52-1.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 and Q2	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q3	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q4	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q5 thru Q7	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	5495948P426	Deposited carbon: 182,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R2	5495948P365	Deposited carbon: 46,400 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R3	5495948P389	Deposited carbon: 82,500 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R4	3R77P204J	Composition: 0.2 megohm ±5%, 1/2 w.
R5	5495948P438	Deposited carbon: 243,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R6	5495948P430	Deposited carbon: 200,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R10	5495948P233	Deposited carbon: 2150 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R11	5495948P353	Deposited carbon: 34,800 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R12	5495948P301	Deposited carbon: 10,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R13	5495948P65	Deposited carbon: 46.4 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R14	3R77P432J	Composition: 4300 ohms ±5%, 1/2 w.
R15	5495948P329	Deposited carbon: 19,600 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R16	5495948P412	Deposited carbon: 130,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R17	5495948P285	Deposited carbon: 7500 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R18	5495948P117	Deposited carbon: 147 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R19	5495948P269	Deposited carbon: 5110 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R20	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R21	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w.
R22	3R77P113J	Composition: 11,000 ohms ±5%, 1/2 w.
R23	3R77P361J	Composition: 360 ohms ±5%, 1/2 w.
R24	3R77P242J	Composition: 2400 ohms ±5%, 1/2 w.
R25	3R77P152J	Composition: 1500 ohms ±5%, 1/2 w.
R26	3R77P201J	Composition: 200 ohms ±5%, 1/2 w.
R27	3R77P513J	Composition: 51,000 ohms ±5%, 1/2 w.
R28	3R77P242J	Composition: 2400 ohms ±5%, 1/2 w.
R29	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w.
R30	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R31	3R77P272J	Composition: 2700 ohms ±5%, 1/2 w.
R32	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
R33	3R77P182J	Composition: 1800 ohms ±5%, 1/2 w.
R34	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL1	7768887P17	Tube, phen: 7 pins; sim to Elco 04-710-02.
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL1		TONE FREQUENCY NETWORK 19B205280
	19B205280G1	71.9 Hz
	19B205280G2	77.0 Hz
	19B205280G3	82.5 Hz
	19B205280G4	88.5 Hz
	19B205280G5	94.8 Hz
	19B205280G6	100.0 Hz
	19B205280G7	103.5 Hz
	19B205280G8	107.2 Hz
	19B205280G9	110.9 Hz
	19B205280G10	114.8 Hz
	19B205280G11	118.8 Hz
	19B205280G12	123.0 Hz
	19B205280G13	127.3 Hz
	19B205280G14	131.8 Hz
	19B205280G15	136.5 Hz
	19B205280G16	141.3 Hz
	19B205280G17	146.2 Hz
	19B205280G18	151.4 Hz
	19B205280G19	156.7 Hz
	19B205280G20	162.2 Hz
	19B205280G21	167.9 Hz
	19B205280G22	173.8 Hz
	19B205280G23	179.9 Hz
	19B205280G24	186.2 Hz
	19B205280G25	192.8 Hz
	19B205280G26	203.5 Hz
	19B205280G30	74.4 Hz
	19B205280G31	7.97 Hz
	19B205280G32	85.4 Hz
	19B205280G33	91.5 Hz
	19B205280G34	97.4 Hz
S1*	19B209040P7	- - - - - - - - - - SWITCHES - - - - - - - - - - Slide: SPDT, 0.5 amp at 125 v; sim to Continental-Wirt Type G-132. (Added by REV B).
		- - - - - - - - - - CABLES - - - - - - - - - -
W1		CABLE 19B205184G1
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 and P2	4036634P2	Contact, electrical: sim to AMP 42429-2.
P4 thru P7	4036634P2	Contact, electrical: sim to AMP 42429-2.
P8		Includes the following:
	5491563P4	Shell, connector: sim to Methode C860-1V.
	5491563P2	Connector, phen: 9 pins; sim to Methode M860.

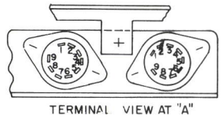
PRODUCTION CHANGES

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.

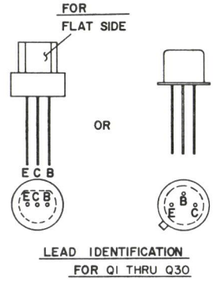
REV. A - To make Tone Module compatible with Shared Remote Equipment. Changed Component Board A1.

REV. B - To provide test switch. Added S1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

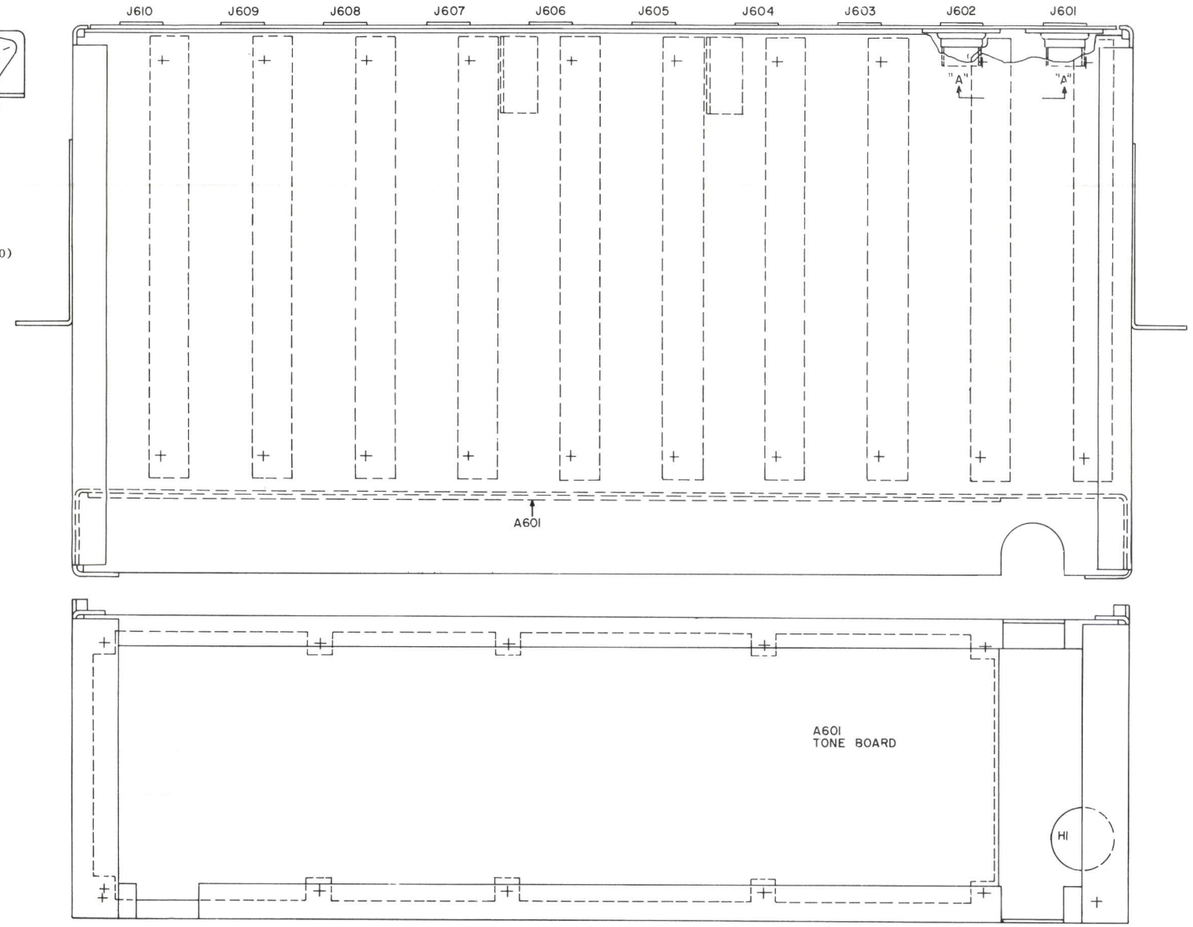


(19D402823, Rev. Rev. 0)

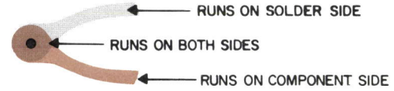


LEAD IDENTIFICATION
FOR Q1 THRU Q30

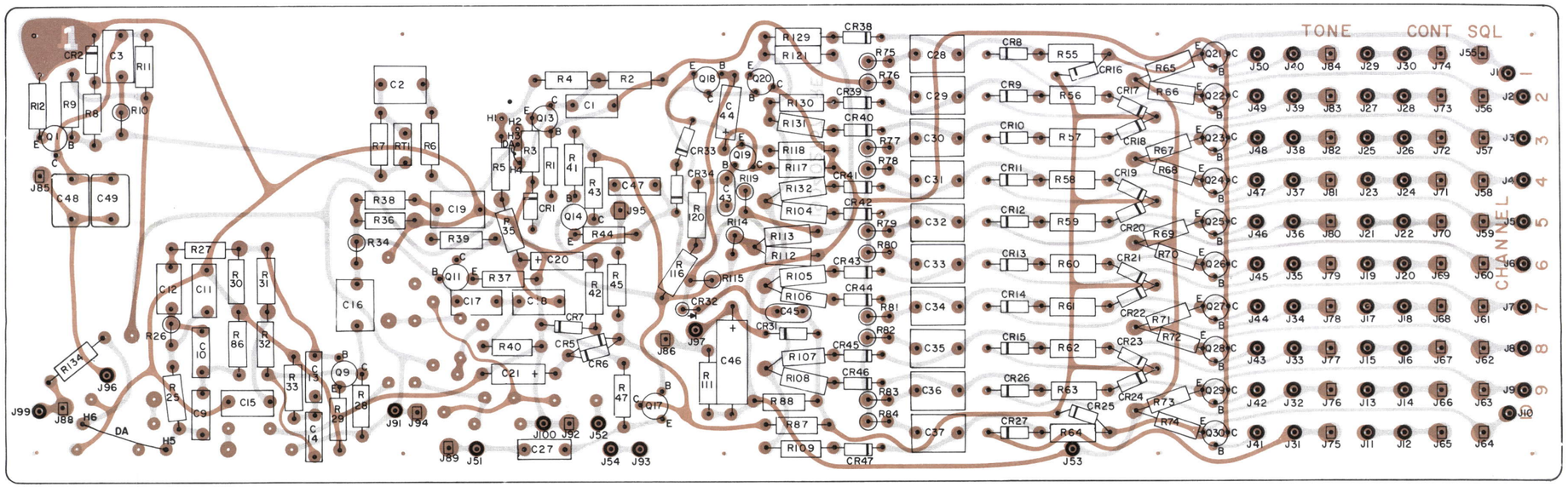
NOTE: COLOR BAND INDICATES CATHODE END OF DIODES.



A601



(19D402741, Rev. 4)
(19D402756, Sh. 1, Rev. 1)
(19D402756, Sh. 2, Rev. 1)



OUTLINE DIAGRAM

TONE PANEL 19D402486G1

BOARD, TONE
PL19D402615G2

NOTES:

1. ALL CIRCUITS PRINTED WIRING EXCEPT WHERE OTHERWISE SHOWN.
2. IN SHARED REMOTE STATION APPLICATIONS, DA WIRE IS REMOVED FROM BETWEEN H3 AND H4 AND CONNECTED BETWEEN H1 AND H2.

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 1/2 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
19D402486G1	B

(19R620746, Rev. 7)

SCHEMATIC DIAGRAM

TONE PANEL 19D402486G1

PARTS LIST

LBI-3690B

TONE PANEL
19D402486G1

SYMBOL	GE PART NO.	DESCRIPTION
A601		TONE BOARD 19D402815G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C2	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C3	19A116080P8	Polyester: 0.15 µf ±20%, 50 VDCW.
C8*	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D. (Deleted by REV B).
C9* and C10*	19A116080P205	Polyester: .047 µf ±5%, 50 VDCW.
		In Models of REV A and earlier:
	19B209243P5	Polyester: .047 µf ±20%, 50 VDCW.
C11*	19A116080P207	Polyester: 0.1 µf ±5%, 50 VDCW.
		In Models of REV A and earlier:
	19B209243P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C12	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C13* and C14*	19A116080P205	Polyester: .047 µf ±5%, 50 VDCW.
		In Models of REV A and earlier:
	19B209243P5	Polyester: .047 µf ±20%, 50 VDCW.
C15*	19A116080P207	Polyester: 0.1 µf ±5%, 50 VDCW.
		In Models of REV A and earlier:
	19B209243P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C16	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C17* and C18*	19A116080P207	Polyester: 0.1 µf ±5%, 50 VDCW.
		In Models of REV A and earlier:
	19B209243P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C19*	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW.
		In Models of REV A and earlier:
	19B209243P9	Polyester: 0.22 µf ±20%, 40 VDCW.
C20 and C21	5496267P18	Tantalum: 6.8 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C22* and C23*	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW. (Deleted by REV B).
C24* and C25*	7774750P5	Ceramic disc: .0015 µf +100% -0%, 500 VDCW. (Deleted by REV B).
C26*	7774750P8	Ceramic disc: .0033 µf +100% -0%, 500 VDCW. (Deleted by REV B).
C27 thru C37	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C43	7774750P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW.
C44	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C45	7774750P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW.
C46	5496267P16	Tantalum: 100 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C47*	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW. (Added by REV A).
C48* and C49*	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW. (Added by REV A).

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 and CR2	19A115250P1	Silicon.
CR3 thru CR27	19A115250P1	Silicon.
CR31 thru CR34	19A115250P1	Silicon.
CR38 thru CR47	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J54	403551394	Contact, electrical: sim to Bead Chain L83-3.
J55 thru J86	403153791	Terminal: sim to Alden Products 654T.
J88 and J89	403153791	Terminal: sim to Alden Products 654T.
J91	403551394	Contact, electrical: sim to Bead Chain L83-3.
J92	403153791	Terminal: sim to Alden Products 654T.
J93	403551394	Contact, electrical: sim to Bead Chain L83-3.
J94 and J95	403153791	Terminal: sim to Alden Products 654T.
J96 thru J101	403551394	Contact, electrical: sim to Bead Chain L83-3.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q4*	19A115123P1	Silicon, NPN; sim to Type 2N2712. (Deleted by REV B).
Q9	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q10*	19A115123P1	Silicon, NPN; sim to Type 2N2712. (Deleted by REV B).
Q11	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q13 and Q14	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q17 thru Q20	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P203J	Composition: 2000 ohms ±5%, 1/2 w.
R2	3R77P753J	Composition: 75,000 ohms ±5%, 1/2 w.
R3	3R77P620J	Composition: 62 ohms ±5%, 1/2 w.
R4	3R77P103J	Composition: 1000 ohms ±5%, 1/2 w.
R5	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w.
R6	3R77P362J	Composition: 3600 ohms ±5%, 1/2 w.
R7 and R8	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w.
R9	3R77P753J	Composition: 75,000 ohms ±5%, 1/2 w.
R10	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R11	3R77P152J	Composition: 1500 ohms ±5%, 1/2 w.
R12	3R77P101J	Composition: 100 ohms ±5%, 1/2 w.
R20*	3R77P272J	Composition: 2700 ohms ±5%, 1/2 w. (Deleted by REV B).
R21*	3R77P363J	Composition: 36,000 ohms ±5%, 1/2 w. (Deleted by REV B).
R22*	3R77P103J	Composition: 1000 ohms ±5%, 1/2 w. (Deleted by REV B).
R23*	3R77P511J	Composition: 510 ohms ±5%, 1/2 w. (Deleted by REV B).

SYMBOL	GE PART NO.	DESCRIPTION
R24*	3R77P201J	Composition: 200 ohms ±5%, 1/2 w. (Deleted by REV B).
R25* and R26*	3R77P113J	Composition: 11,000 ohms ±5%, 1/2 w.
		In Models of REV A or earlier:
	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R27	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w.
R28	3R77P133J	Composition: 13,000 ohms ±5%, 1/2 w.
R29	3R77P750J	Composition: 75 ohms ±5%, 1/2 w.
R30	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R31 and R32	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R33	3R77P823J	Composition: 8200 ohms ±5%, 1/2 w.
R34	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R35	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w.
R36	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R37	3R77P301J	Composition: 300 ohms ±5%, 1/2 w.
R38 and R39	3R77P223J	Composition: 22,000 ohms ±5%, 1/2 w.
R40	3R77P123J	Composition: 12,000 ohms ±5%, 1/2 w.
R41	3R77P244J	Composition: 0.24 megohm ±5%, 1/2 w.
R42	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R43	3R77P753J	Composition: 7500 ohms ±5%, 1/2 w.
R44	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R45	3R77P513J	Composition: 51,000 ohms ±5%, 1/2 w.
R47	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R48*	3R77P302J	Composition: 3000 ohms ±5%, 1/2 w. (Deleted by REV B).
R49* and R50*	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w. (Deleted by REV B).
R51*	3R77P300J	Composition: 30 ohms ±5%, 1/2 w. (Deleted by REV B).
R52* and R53*	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w. (Deleted by REV B).
R54*	3R77P682J	Composition: 6800 ohms ±5%, 1/2 w. (Deleted by REV B).
R55 thru R64	3R77P752J	Composition: 7500 ohms ±5%, 1/2 w.
R65 thru R74	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R75 thru R84	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R86*	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w.
		In Models of REV A or earlier:
	3R77P472J	Composition: 4700 ohms ±5%, 1/2 w.
R87	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w.
R88	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
R104 thru R109	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w.
R111	3R77P623J	Composition: 6200 ohms ±5%, 1/2 w.
R112	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w.
R113	3R77P103J	Composition: 1000 ohms ±5%, 1/2 w.
R114	3R77P243J	Composition: 24,000 ohms ±5%, 1/2 w.
R115	3R77P623J	Composition: 62,000 ohms ±5%, 1/2 w.
R116 thru R118	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.

SYMBOL	GE PART NO.	DESCRIPTION
R119	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R120	3R77P163J	Composition: 16,000 ohms ±5%, 1/2 w.
R121	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R129 thru R132	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w.
R134*	3R77P472J	Composition: 4700 ohms ±5%, 1/2 w.
		In Models of REV A and earlier:
	3R77P101K	Composition: 100 ohms ±10%, 1/2 w. (Added by REV A).
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT1	5490828P21	Bod: 1250 ohms ±10%, 0.38 w max; sim to Globar Type 492B-11.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J601 thru J610	7480532P11	Connector, tube, phen: 9 pins; sim to Elco 04-903-27.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P601 thru P634	4029840P2	Contact, electrical: sim to AMP 42827-2.

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.

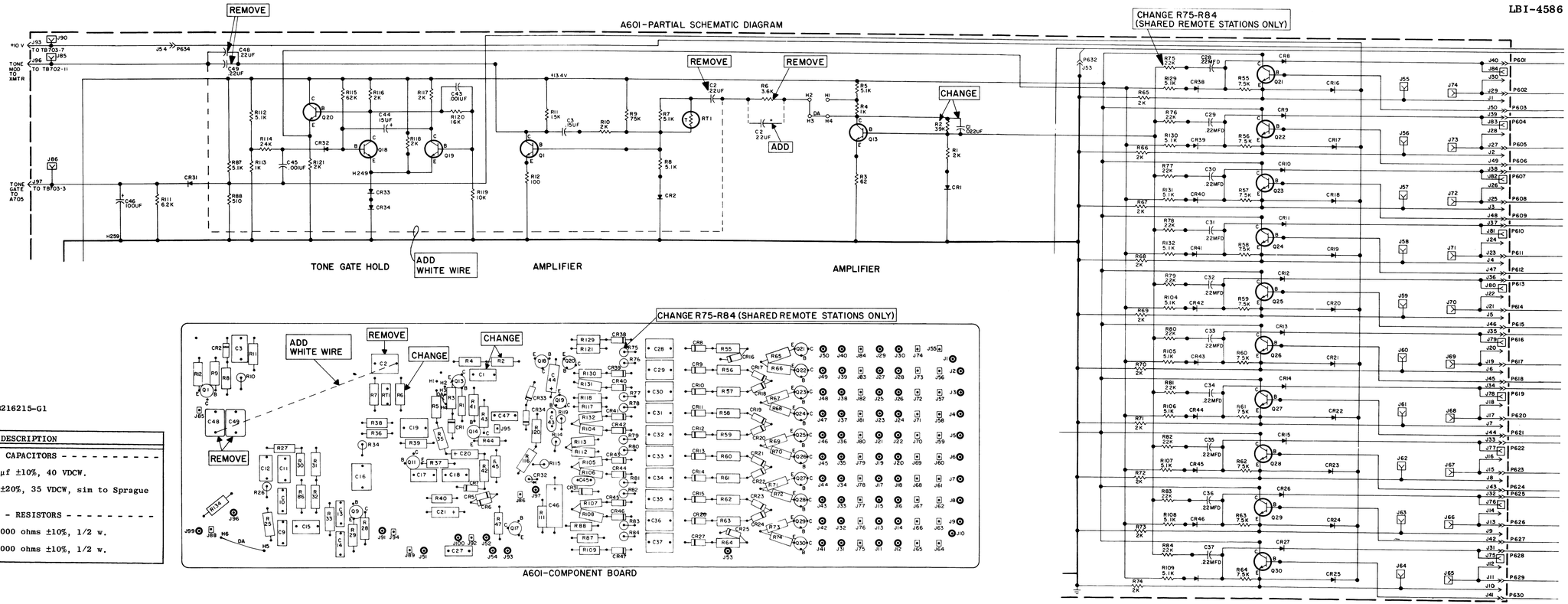
REV. A - To adjust input level and to improve attenuation of filter. Added C47-C49 and R134.

REV. B - To change response of bandpass filter to prevent voice blocking and faulting. Changed C8-C11, C13-C15, C17-C19, R25, R26, R86 and R134. Deleted C8, C22-C26, Q4, Q10, R20-R24 and R48-R54. Added jumper from R134 to junction of R25/C9.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

MODIFICATIONS:

1. Remove C2, C48 & C49.
2. Replace C1 (.1μf) with .022μf capacitor.
3. Replace R2 (72,000 ohm) with 39,000 ohm resistor.
4. Replace R6 with 22μf capacitor.
5. Connect 5N 22-W wire as shown on printed board and schematic diagrams.
6. Shared Remote Stations Only
   Replace resistors R75-R84 (10,000 ohms) with 22,000 ohm resistors.



PARTS LIST

MODIFICATION KIT 19B216215-G1

QUANTITY	GE PART NUMBER	DESCRIPTION
		- - - - - - - - - CAPACITORS - - - - - - - - -
1	19B209243-P103	Polyester: .022 μf ±10%, 40 VDCW.
1	5496267-P19	Tantalum: 22 μf ±20%, 35 VDCW, sim to Sprague Type 150D.
		- - - - - - - - - RESISTORS - - - - - - - - -
1	3R77-P393K	Composition: 39,000 ohms ±10%, 1/2 w.
10	3R77-P223K	Composition: 22,000 ohms ±10%, 1/2 w.

INSTALLATION INSTRUCTIONS

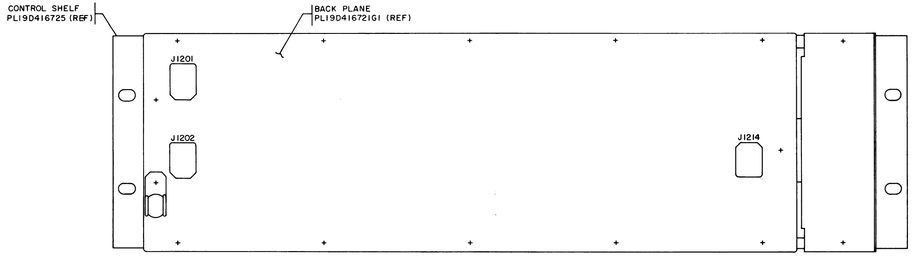
TONE PANEL MODIFICATION KIT 19B216215G1
(FOR USE WITH ICOM EQUIPPED TRANSMITTERS)

THESE INSTRUCTIONS COVER THE MODIFICATION OF THE CONTROL SHELF & REPEATER CONTROL BOARD FOR SHARED REPEATER APPLICATIONS.

INSTRUCTION FOR MODIFICATION OF REPEATER CONTROL BOARD 19D416675.

INSTRUCTIONS:

1. REMOVE REPEATER BOARD FROM SHELF.
2. REMOVE JUMPER BETWEEN HOLE 7 AND HOLE 8.
3. REMOVE JUMPER BETWEEN HOLE 1 AND HOLE 2.
4. REMOVE JUMPER BETWEEN HOLE 3 AND HOLE 4.
5. ADD JUMPER OF #22 AWG BUS WIRE BETWEEN HOLE 1 AND HOLE 4. INSULATE WITH SLEEVING TO PREVENT SHORTS.
6. REPLACE REPEATER CONTROL BOARD IN SHELF.

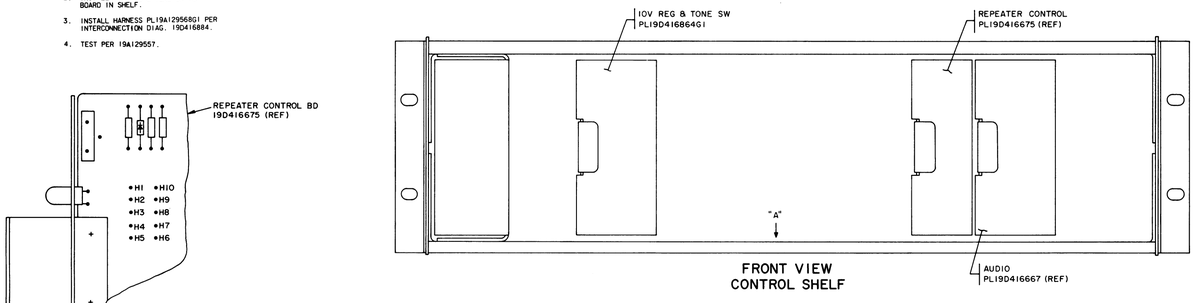


BACK VIEW

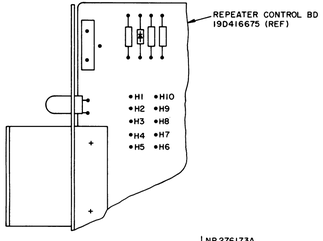
INSTRUCTIONS FOR MODIFICATION OF CONTROL SHELF 19D416725.

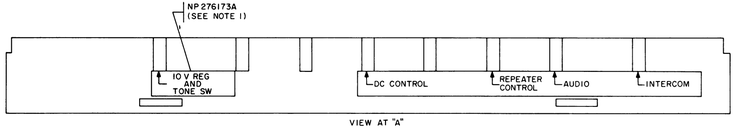
INSTRUCTIONS:

1. AFFIX NAMEPLATE NP 276173A TO SHELF AS SHOWN
2. INSTALL 10V REG & TONE SWITCH BOARD IN SHELF.
3. INSTALL HARNESS PL19A129568G1 PER INTERCONNECTION DIAG. 19D416884.
4. TEST PER 19A129557.



FRONT VIEW
CONTROL SHELF





VIEW AT "A"

NOTES:
1. ALIGN ARROW WITH CENTER OF GUIDE WITHIN .060.

MODIFICATION INSTRUCTIONS

(19D416879, Rev. 1)

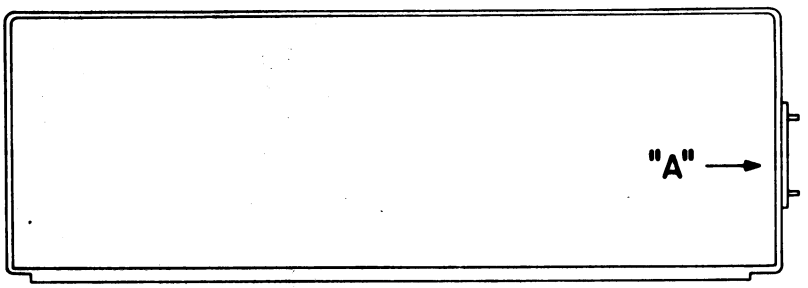
CONTROL SHELF & REPEATER CONTROL BOARD

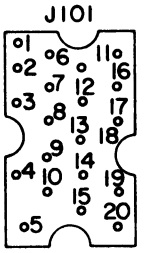
THESE INSTRUCTIONS COVER THE INSTALLATION OF THE PLI9B205478GI CABLE IN THE TRANSMITTER FOR CHANNEL GUARD OPERATION.

INSTRUCTION FOR INSTALLATION OF PLI9B205478GI CABLE.

INSTRUCTION:

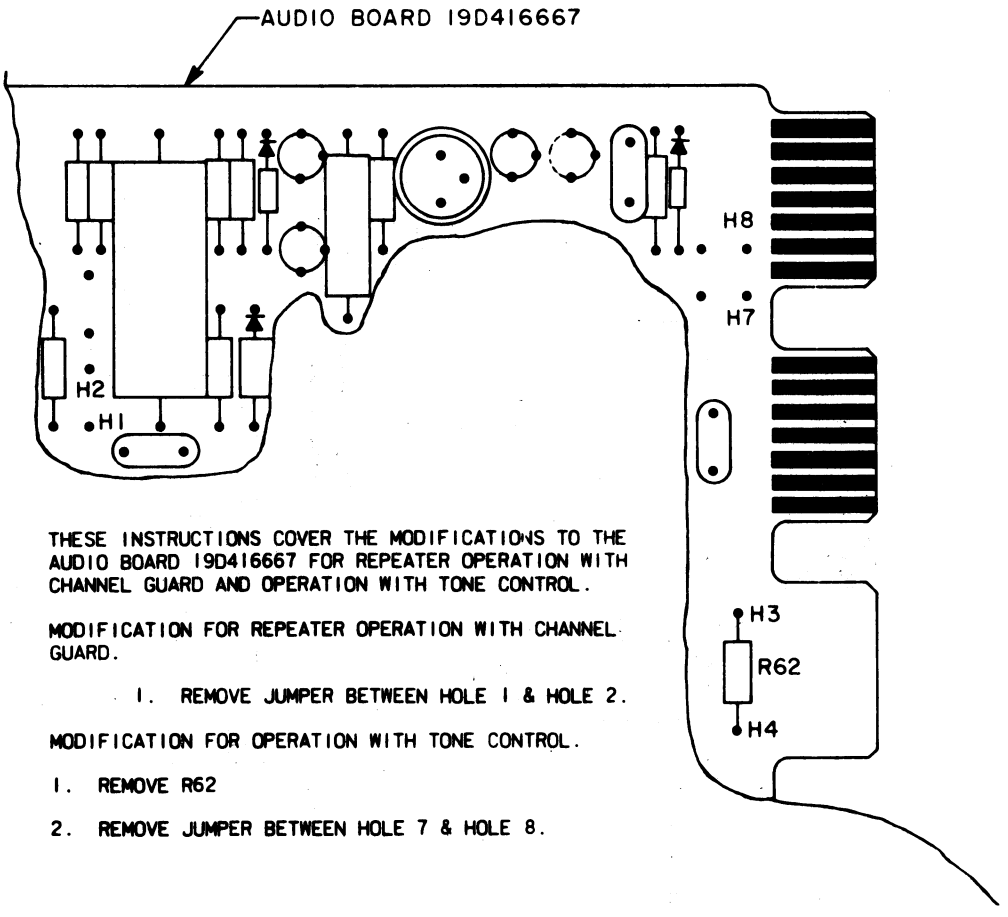
1. INSTALL EXCITER BOARD MODIFICATION KIT I9AI22313 ACCORDING TO INSTALLATION INSTRUCTIONS I9B205440.
2. SOLDER THE W-BL WIRE OF CABLE I9B205478GI TO JI0I-I0. SOLDER THE SHIELD TO JI0I-I5.
3. CONNECT THE W-BL WIRE END WITH CONNECTOR TO J8 ON THE EXCITER BOARD. CONNECT THE SHIELD TO J7. SPOT TIE THE CABLE TO EXISTING HARNESS AS NECESSARY FOR NEAT DRESS.





VIEW AT "A"

(19B219832, Rev. 2)



THESE INSTRUCTIONS COVER THE MODIFICATIONS TO THE AUDIO BOARD I9D416667 FOR REPEATER OPERATION WITH CHANNEL GUARD AND OPERATION WITH TONE CONTROL.

MODIFICATION FOR REPEATER OPERATION WITH CHANNEL GUARD.

1. REMOVE JUMPER BETWEEN HOLE 1 & HOLE 2.

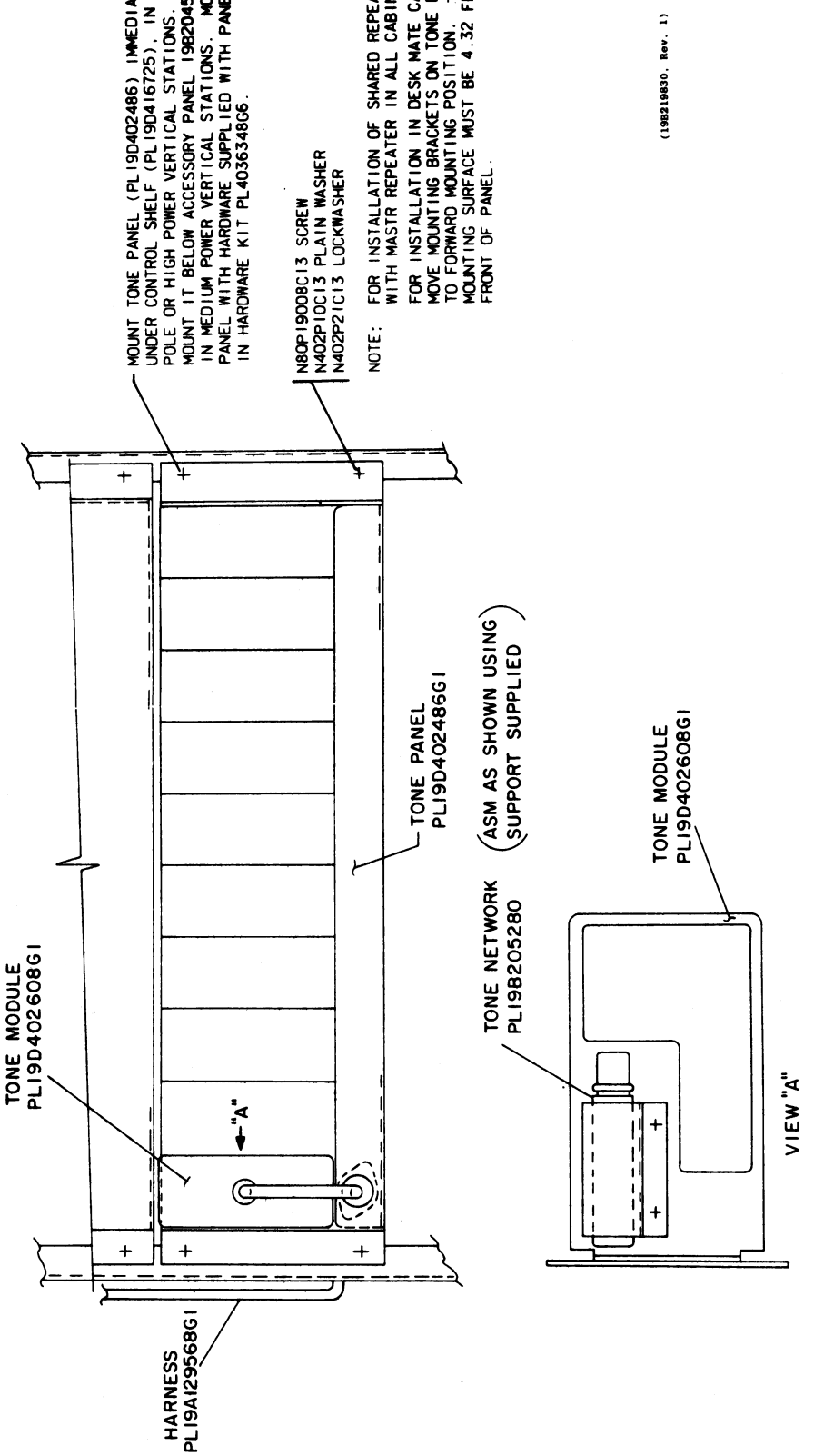
MODIFICATION FOR OPERATION WITH TONE CONTROL.

1. REMOVE R62
2. REMOVE JUMPER BETWEEN HOLE 7 & HOLE 8.

(19B219806, Rev. 1)

MODIFICATION INSTRUCTIONS

TRANSMITTER AND AUDIO BOARD



INSTALLATION INSTRUCTIONS

TONE PANEL

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

Service parts may be obtained from Authorized GE Communication Equipment Service Stations or through any GE Radio Communication Equipment Sales Office. When ordering a part, be sure to give:

1. GE Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

DF-5032

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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