MOBILE RADIO

MASTR Progress Line

SHARED REMOTE EQUIPMENT (OPTIONS 7622, 7623 & 7624)

Maintenance Manual LBI-3781C
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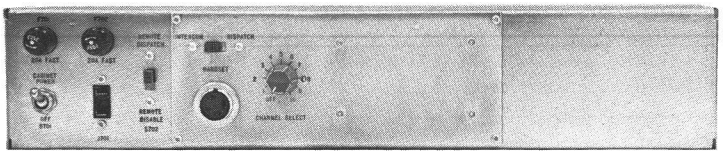
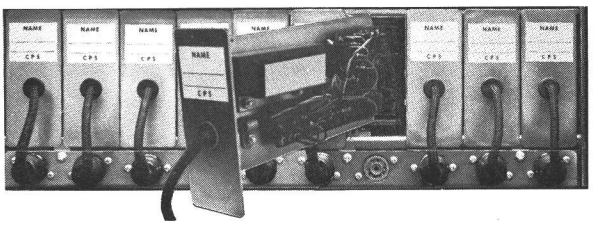
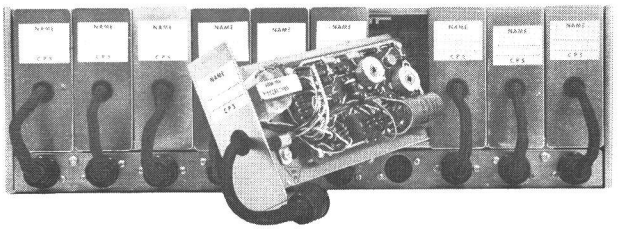
PF-5032



POWER CONTROL PANEL & INTERCOM PANEL



TONE PANEL & TONE MODULES



REMOTE PANEL & LINE CONTROL MODULES

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)
Audio Input from Line	-12 dBm to +18 dBm
Audio Output to Line	Adjustable to +12 dBm
Monitor Control Current	6 mA (+35 V applied at console)
Transmit Control Current	15 mA (+105 V applied at console)

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

SHARED REMOTE EQUIPMENT

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

WARNING

Under no circumstances should any person 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.

EQUIPMENT INDEX

EQUIPMENT	IDENTIFICATION NUMBER
OPTION 7622:	
TONE PANEL	19D402486-G1
REMOTE PANEL	19D402744-G1
POWER CONTROL PANEL	19C303870-G1
INTERCOM PANEL	19C303869-G1
BLANK PANEL	19C303957-P2
HANDSET	4EM26A10
SPEAKER	4EZ16A21
OVERLAY HARNESS	19A121317-G8
OPTION 7623: (ONE FOR EACH USER)	
LINE CONTROL MODULE (USED IN REMOTE PANEL)	19B205201-G1
TONE MODULE (USED IN TONE PANEL)	19D402608-G1
TONE NETWORK (USED IN TONE MODULE)	19B205280-G1 thru G26
OPTION 7624:	
CABLE (25-FOOT)	19A122512-P1

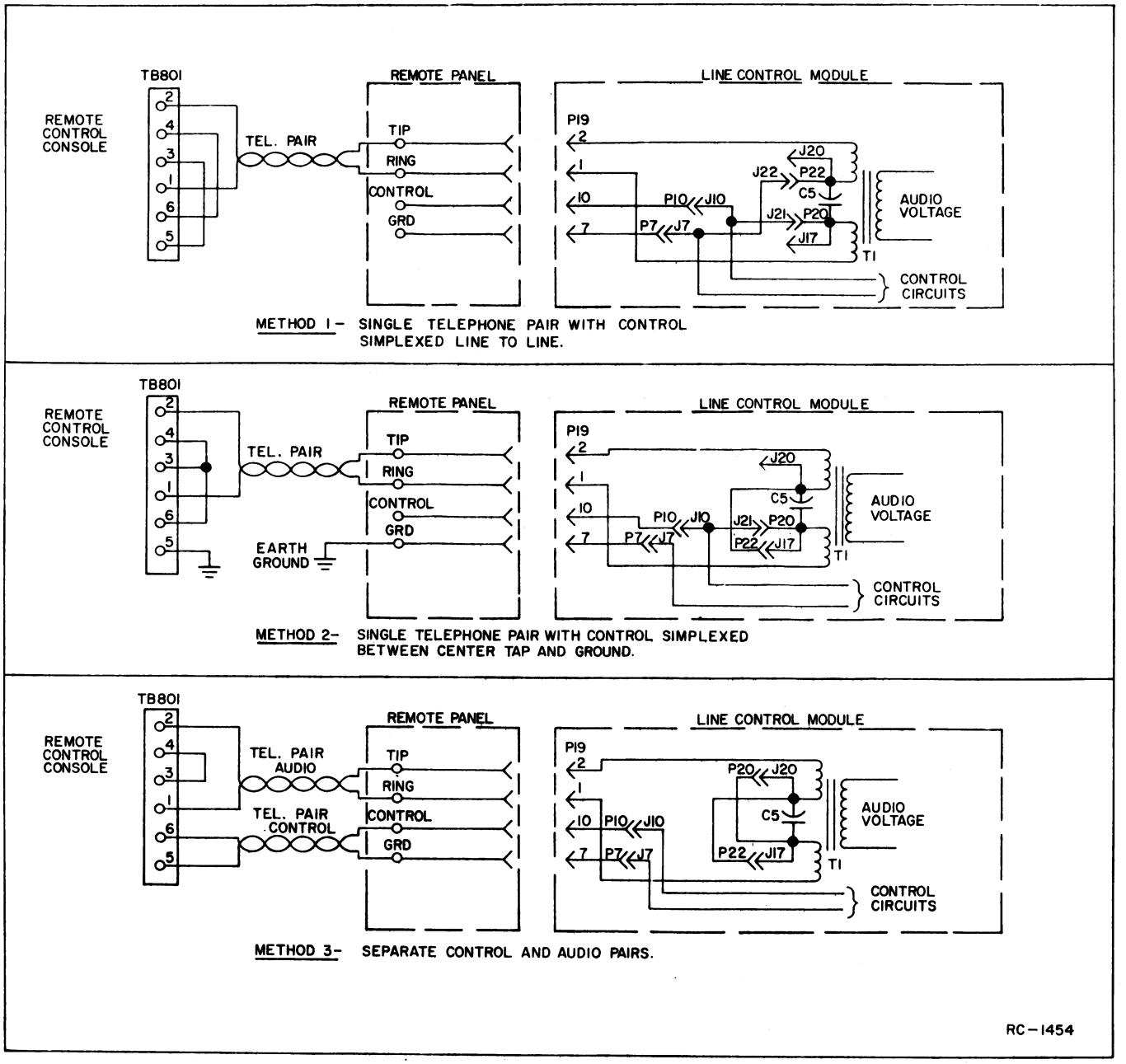


Figure 1 - Telephone Line Connections

DESCRIPTION

The General Electric Shared Remote Station combination is capable of providing Channel Guard Remote Service for up to 10 different users (or fleets) sharing the same RF frequency. The station is compatible with systems using Transistorized Control Console Model 4EC71A10, (Model Series TC), Remote Control Unit Model 4EC28A1 or other remote control consoles that provide a similar interface. Positive control voltages of 35 and 105 VDC are necessary for monitoring and transmit functions, and separate remote lines and associated control consoles are required for each user. However, several control consoles for the same user may be paralleled on the same remote line.

Individual Tone Mobules provide each user with a separate Channel Guard tone frequency, permitting private communication between a remote dispatcher and other units in his own system. A combination encoder/decoder generates tones for transmission to the mobiles, and identifies the tone present in incoming RF signals to select the proper remote line output. Each user has a separate Line Control Module and Tone Module for providing the DC control and audio switching functions that are required in remote control operation.

An Intercom Panel is provided for communication between the Shared Remote Station and selected mobiles or remote control consoles.

An optional 25-foot cable, containing 27 wire pairs, is available for making connection between the telephone line terminations and the Shared Remote Station.

CONTROL METHODS

Three types of telephone line connections are commonly used in remote control applications (see Figure 1). Before choosing one of these methods, consider both the cost and the performance of each, as one method may be available at a considerably lower rate. In addition, some local telephone companies offer no choice, but will provide an audio pair and a control pair. The chart at the bottom of this page contains information to assist in selecting the Control Method and type of telephone line to be leased.

After selecting a Control Method, connect the telephone lines to the Remote Panel and make proper jumper connections on the associated Line Control Module as illustrated in Figure 1. (The Line Control Module is shipped with jumpers connected for separate audio and control pairs).

The lines carrying the control voltages must be connected to corresponding terminals at the Remote Control Console and the Remote Panel. (The positive connection must be made to the CONTROL terminal on the Remote Panel and the negative connection must be made to the GROUND terminal). To identify each end of one of the wires, temporarily connect one of the wires at the Remote Panel to a good earth ground and measure the resistance of each wire to ground at the Remote Control Console. The grounded wire will show a resistance to ground. The other wire will show an open circuit.

Method	Description	Advantages or Disadvantages
1	One matallic pair: for both audio and control voltages with control voltage simplexed from line-to-line.	Economical; dependable where earth currents may be large, or where a good earth ground cannot be obtained; keying clicks will be heard in paralleled Remote Control Unit.
2	One metallic pair: for both audio and control voltages with control voltage simplexed from line-to-ground.	Economical; earth ground currents (encountered near power company sub-stations) may interfere with control functions; keying clicks minimized.
3	Two telephone pairs: one for audio voltage and one for control voltage (metallic pair).	Provides best performance; keying clicks will not be heard; least susceptible to earth ground currents which may interfere with control functions.

ADJUSTMENT PROCEDURE

Adjust the station transmitter, receiver, power supply and antenna matching unit according to instructions in the Remote Station Maintenance Manual. Check that all power line, telephone line and ground connections have been made and that associated Remote Control Consoles are properly aligned. Then make the following adjustments.

TRANSMIT AUDIO LEVEL

1. Feed a 1000-Hz tone into the microphone jack on an associated Remote Control Console.
2. Key the microphone at the Control Console and adjust the 1000-Hz source to obtain a +18 dBm output (or desired level) from the Control Console. Do not change any adjustments on the Control Console.
3. Adjust R10 (TRANS AUDIO ADJ) of the associated Line Control Module for 300 millivolts at the common audio jack (J63) on the Remote Panel.

NOTE

For paralleled Remote Control Consoles, apply the tone on the console having the largest line loss and adjust R10 (TRANS AUDIO ADJ) according to the foregoing step. It will then be necessary to adjust the Line Output Control on the remaining console(s) to produce the same level at the transmitter.

4. Set R31 (TRANS MOD INPUT ADJ) on the Remote Panel for 200 millivolts RMS at MOD INPUT Jack (J62) on the Remote Panel.
5. Unkey the Control Console microphone.
6. Select a mid-range Tone Module (mid-range frequency with respect to other modules in the station) with Channel Select Switch S1 on the Intercom Panel. Then key the transmitter from the Intercom Panel and adjust the transmitter Channel Guard modulation control for ±0.75 kHz transmitter deviation.
7. Perform steps 1, 2 and 3 for each Line Control Module supplied in the station.

RECEIVE AUDIO LEVEL

1. Connect a 1000-microvolt test signal, modulated by 1000 hertz at ±3.3 kHz deviation, to the receiver antenna jack.
2. Adjust R8 (REC AUDIO ADJ) on the Remote Panel for 300 millivolts at the common audio jack (J63) of the Remote Panel.
3. Adjust R8 (RECEIVED LINE LEVEL) on each Line Control Module for +12 dBm (See Note) at associated tip and ring terminals.

NOTE

Caution must be used when operating on leased lines owned by telephone companies. Many of these companies set maximum levels less than +12 dBm to prevent cross talk between cable pairs. When necessary, R8 may be adjusted to this lower level.

VOLUME CONTROL

The Volume Control on the station power supply should be set for a comfortable listening level while personnel are at the station and turned down when the station is unattended.

SYSTEM OPERATION

Communications involving the Shared Remote Station can be established from a remote control console, a mobile unit or the Shared Remote Station. Typical station operation for each situation is described in the following paragraphs.

REMOTE-TO-MOBILE

Before contacting his mobile units, a remote dispatcher should monitor the station to make certain that the channel is clear. When a positive 35-volt potential is applied from the remote control console, an audio gating circuit in the associated Line Control Module operates and audio from a "common" audio bus is connected to the remote control console monitoring circuits. If the channel is clear, the dispatcher may then contact the desired mobiles.

When a positive 105-volt potential is applied from the remote control console, a switching circuit on the associated Line Control Module (consisting of a zener diode and transistor) operates. The transistorized switch activates circuits for audio gating, tone keying and station transmitter keying. Figure 2 presents a block diagram representation of remote to mobile communication.

MOBILE-TO-REMOTE

A signal received from a mobile unit is fed from the station receiver output to

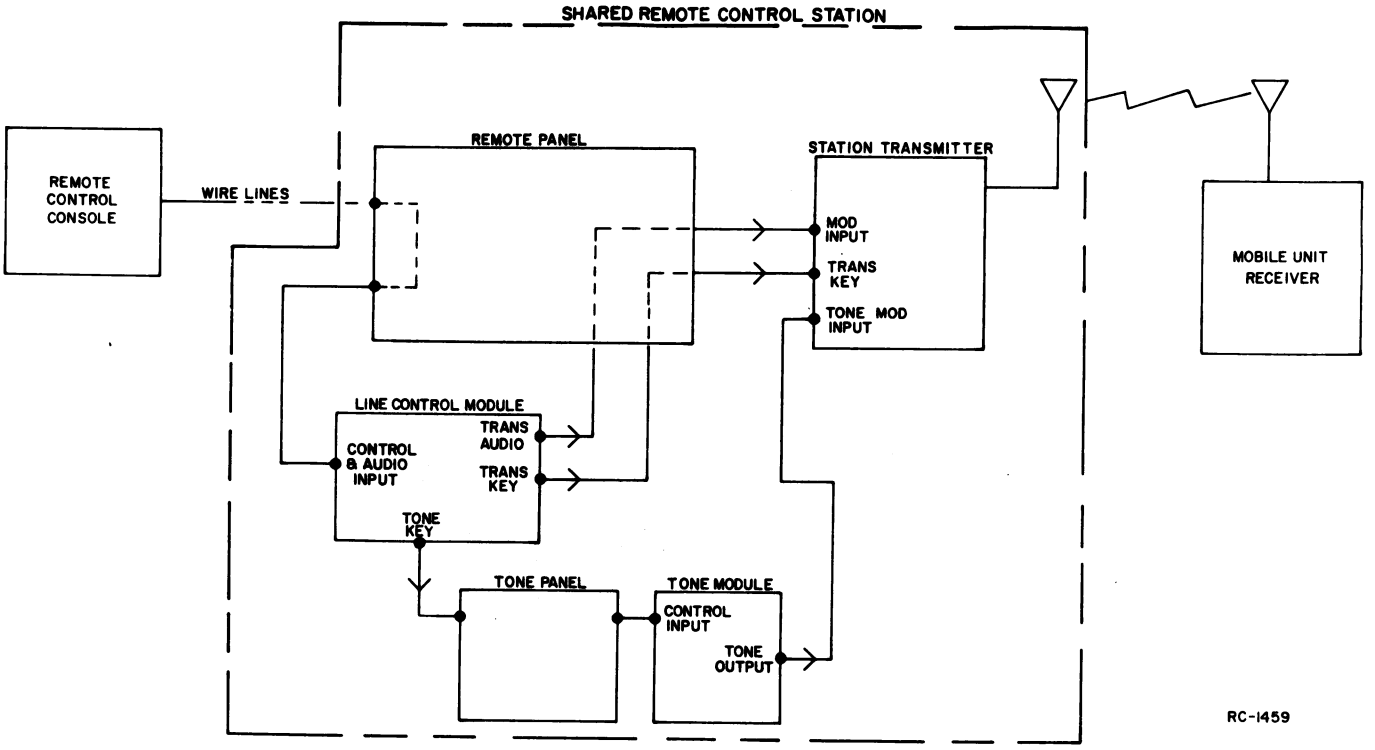


Figure 2 - Remote-To-Mobile Operation

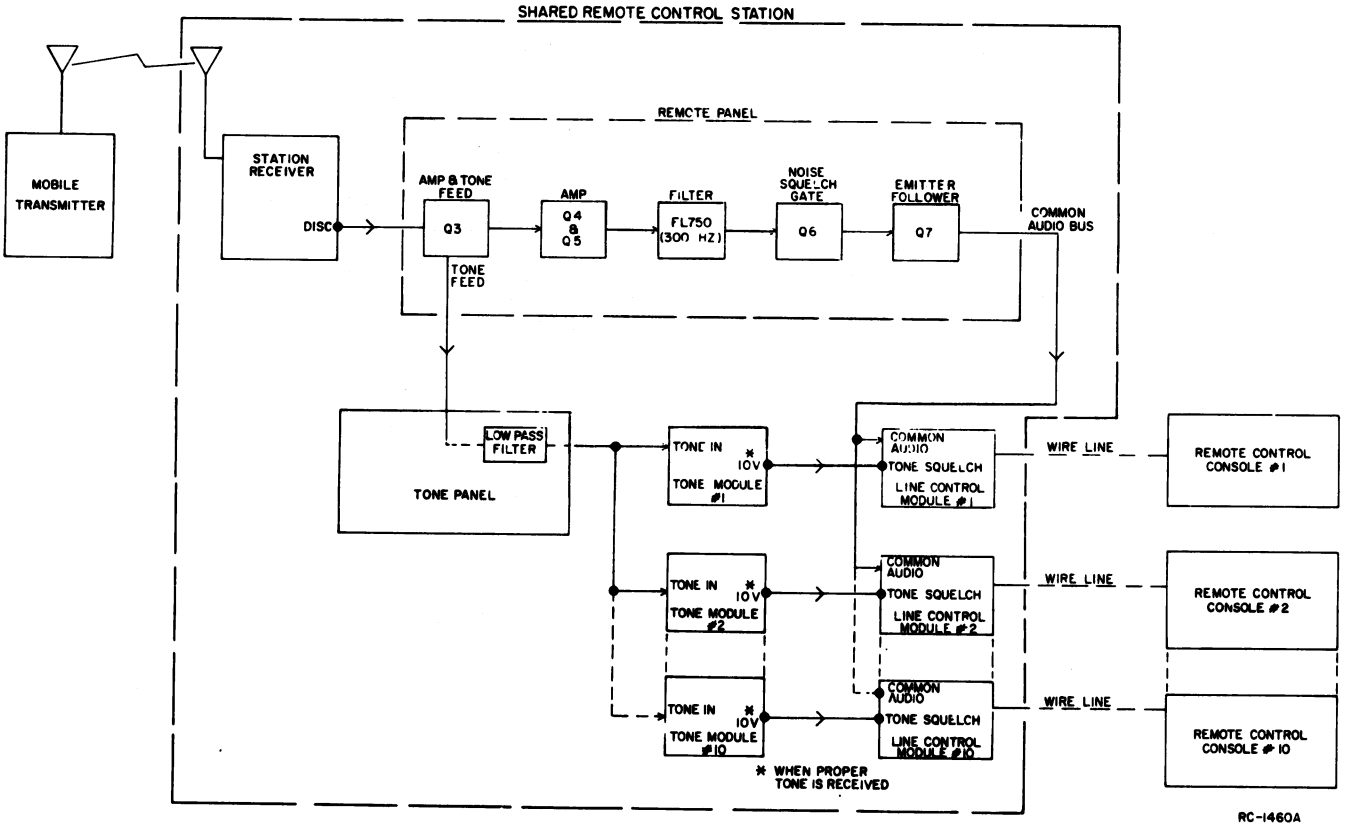


Figure 3 - Mobile-To-Remote Operation

the Remote Panel. This panel provides audio outputs to the Tone Panel (for the tone control function) and to a "common" audio circuit which connects to all Line Control Modules (see Figure 3).

A low pass filter in the Tone Panel eliminates voice frequencies and passes the Channel Guard tone frequencies into the Tone Modules containing the tone networks. A tone coded signal that matches one of the tone frequency networks actuates a gating circuit to apply +10 volts to the associated Line Control Module. The 10 volts operate an audio gating circuit permitting audio to pass from the "common" audio circuit to an amplifier in the Line Control Module and out to the remote audio line.

STATION-TO-REMOTE (INTERCOM) OR REMOTE/MOBILE (DISPATCH)

A serviceman can communicate from the Shared Remote Station to selected mobiles and/or the associated remote control console. The Intercom Panel provides a jack for handset connection, a rotary switch for channel selection and a slide switch for INTERCOM or DISPATCH selection. Station "common" audio (protected only by noise squelch) is always connected to the handset earpiece for monitoring purposes.

To communicate with a remote console operator, the serviceman must select the desired channel and place the slide switch in the INTERCOM position. Pressing the PTT switch on the handset causes 10-volts to be applied from the Intercom Panel to the selected Line Control Module. This voltage operates an audio gate and permits audio from the Intercom Panel to pass through the Line Control Module to the remote audio line.

If communication with a particular group of mobile units is desired, the serviceman must select the desired channel and place the slide switch in the DISPATCH position. When the PTT switch is pressed, a signal is applied through contacts of the slide switch for keying the station transmitter. Audio is applied to the transmitter modulator input as well as the associated remote audio line.

CIRCUIT ANALYSIS

TONE PANEL

The Tone Panel contains low-pass filter, amplifier, and gating circuits and provisions for inserting up to 10 slide-in Tone Modules. Each Tone Module contains a tone frequency network operating at a Channel Guard frequency within the 71.9 to 203.5 Hz range.

Transmit Function

When a transmit signal (+105 volts) is received from a remote control console, a signal (+1 volt) for tone keying is connected from the associated Line Control Module to a corresponding connector on the Tone Panel (for example, Line Control Module #1 connects to J30).

A tone keying signal at J30 operates Tone Module #1 and +10 volts is connected to the base of Q21 on the Tone Panel causing Q21 to conduct. The resulting positive voltage (+10 volts) at the emitter of Q21 is connected through R65 to turn on CR8, allowing tone from the Tone Module to pass through C28 and R75 to the base of amplifier Q13. Q13 and Q1 amplify the signal while de-emphasis is provided by C1, R2, C3 and R10. The output signal at J96 produces a constant transmitter deviation at all transmitting frequencies. The tone gate hold circuit, consisting of Q18, Q19 and Q20 is used only in repeater functions.

Receive Function

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. Tones from the filter are coupled through C20 to the base of amplifier Q14. The output of Q14 is limited by diodes CR5 and CR6, then 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.

The Tone Module containing the correct frequency network operates and provides +10 volts to the base of a gating transistor (Q21-Q30). The selected gating transistor (Q21 for example) conducts and the resulting +10 volts at its emitter is coupled to J1. J1 is connected to Line Control Module #1 and the +10 volts actuate a gating circuit for connecting station audio to the associated remote wire line.

TONE MODULE AND FREQUENCY NETWORK

Decoder Operation

Tone signals from the Tone Panel are connected to the base of amplifier Q1. The signal from Q1 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 connected from the collector to base of Q1 through the Tone Frequency Network at all frequencies except the network frequency, therefore, Q1 will amplify only at the network frequency.

The tone output from high-gain amplifier Q1-Q2 is connected through emitter follower Q3 to the base of Q4. Amplified by Q4, the signal is isolated from the detector circuit (CR4-CR5) by emitter follower Q5. CR4 and CR5 produce a DC voltage proportional to the signal from 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 at P8-9. The tone output appearing at P8-1 is not used during the receive function.

Encoder Operation

When a control signal (ground) is connected to P8-6, C5 charges through R36 and R37, producing a negative going signal at the base of Q8. Q8 conducts and a surge of current is connected to the Tone Frequency Network, starting oscillation. CR3 is forward biased by the control signal at P8-6, thus, reducing the resistance of the Q1-Q2 feedback loop circuit and permitting sustained oscillation at the tone network frequency. The tone output of emitter follower Q3, connected to P8-1, is used for modulating the station transmitter.

When the control signal is removed from P8-6, a stop circuit (CR6 and C6) operates to stop oscillation of Q1-Q2.

A tone TEST Switch (S1) is provided on the front of the Tone Module. Moving this switch to the right keys to the tone oscillator.

REMOTE PANEL

The Remote Panel provides mounting facilities for up to 10 Line Control Modules as well as control and audio interfere between the modules and other station equipment. Wire lines from associated remote control consoles are connected to the panel.

Receive Function

Signals from the station receiver are connected through J36 to the base of amplifier Q3, which provides dual outputs for tone control and voice audio applications. The emitter output is applied through J38 to the Tone Panel while the collector output is connected through REC AUDIO ADJ control R8 and a de-emphasis network (R12 and C6) to the base of Q4. Q4 and Q5 amplify the signal and supply an output to FL750 which filters out the tone frequencies. The noise gate circuit (Q6 and CR4) following FL750 passes audio when carrier is being received; that is, Q6 is cut off causing CR4 to be forward biased and the signal passes through CR4 to emitter follower Q7. The output of Q7 connects to the Intercom Panel audio input circuit and to the "common" audio circuits of the Line Control Modules.

Transmit Function

Audio from the Intercom Panel or selected Line Control Module is connected during transmit to the base of Q9. The signal is amplified by Q9 and connected to the base of Q8. (C11 couples a portion of Q9 output to the base of Q7 to provide an output, for monitoring purposes, to the Intercom Panel and "common" audio circuits of the Line Control Modules). Audio for the station transmitter modulator is taken from R31 (TRANS MOD INPUT ADJ) in the emitter circuit of Q8.

Transistors Q11 and Q10 provide transmitter control and keying. During transmit, a low positive potential from the Line Control Module which is transmitting (or the Intercom Panel) shunts the bias on the base of Q11, causing it to cut off. The resulting increase in Q10 base current turns on Q10. When Q10 conducts, it operates the transmit relay to key the station transmitter and provides a path through CR8 to insure CR4 (receive audio gate) is reverse biased.

Q1 and Q2 provide a regulated 10-volt output for certain transistors in the Remote Panel and Tone Panel. Q2 is the regulator pass transistor and Q1 is the sensing transistor.

LINE CONTROL MODULE

The Line Control Module contains amplifier, audio gating, level control, and transmitter control circuits required for each remote control console.

The base of amplifier Q1 is connected to the "common" audio circuit for the Line Control Modules through gating diode CR1. Normally CR1 is reverse biased, blocking all signals. It is forward biased during intercom operation, when tone associated with the particular channel is received, or when a monitor signal is received from the associated remote control console. (Monitor function connects 35 volts at J10 or J21 to forward bias CR7 and CR1, intercom function connects +10 volts to J9 to forward bias CR1, and tone function connects +10 volts to J8 to forward bias CR6 and CR1.) For each function, audio is applied through CR1 to the base of Q1, which amplifies the signal and provides an output to line transformer T1. RECEIVE LINE LEVEL Control R8 adjusts the output of Q1.

Transmit control requires +105 volts at J10 or J21. In this case, zener diode CR9 operates to turn on Q2. When Q2 conducts, its collector approaches ground potential to forward bias CR3, CR4, CR10 and CR11 and to cut off Q1. Diodes CR10 and CR11 operate tone and station transmitter keying circuits, respectively. CR3 and CR4 complete the audio circuit for modulating the station transmitter. R10 is the TRANSMIT AUDIO ADJ control.

INTERCOM PANEL

The Intercom Panel provides a jack (J1) for handset connection, a rotary switch (S1) for channel selection and a slide switch (S2) for INTERCOM-DISPATCH selection.

Audio for the handset earpiece is taken from the "common" audio line and connected to the base of Q2. The output of Q2 connects to the handset earpiece, permitting monitoring of all remote transmissions on the channel. Emitter follower Q1 provides impedance matching between the handset microphone and the transmit audio bus.

When the microphone PTT button is pressed, Q3 is turned off and the positive voltage at its collector (approximately 10 volts) is applied through S1 to the selected Line Control Module for audio gating purposes. Diodes CR3 and CR4 are forward biased while the PTT switch is operated. Ground potential is connected through CR3 for station transmitter keying (transmitter is keyed only if DISPATCH is selected) and through CR4 for tone encoder keying.

POWER CONTROL PANEL

The Power Control Panel contains the station AC power switch (S701) and fuses (F701 and F702). A REMOTE DISABLE - REMOTE DISPATCH switch (S702) is provided for remote lock-out to protect service personnel against transmitter keying from a remote control console.

MODIFICATIONS

The Station Transmitter, Receiver and Power Supply are modified as described below to make them compatible with the Shared Remote Equipment. If the station transmitter is equipped with an Integrated Circuit Oscillator Module (ICOM), the tone panel is also modified.

Receiver

A #22-G-BK-BL wire with bead chain terminal (A4029840-P2) is connecetd between J21 (on AUDIO & SQUELCH BOARD) and J443-20. This connection is necessary for controlling the Noise Gate circuit on the Remote Panel.

Transmitter

The Transmitter Exciter is modified as in standard Channel Guard applications. Also, two-conductor shielded cable (19B205478-G1) is connected from terminals 10 and 15 of J101 to J7 and J8 on the Exciter Board as shown in Figure 4.

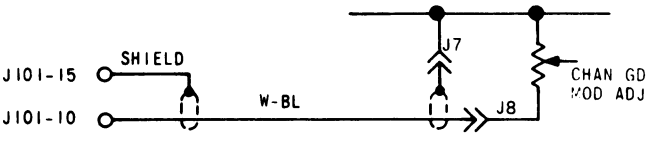


Figure 4 - Transmitter Tone Cable Connections

Power Supply

1. The wires shown connected to P443-19 and -20 are reversed. That is, the BR-G-BL wire connects to P443-20 and the G-BK-R wire connects to P443-19.

2. A two-conductor shielded cable (7134854-P5) is connected between P101 and TB501 as shown in Figure 5 to couple tone through the Power Supply to the Transmitter input.

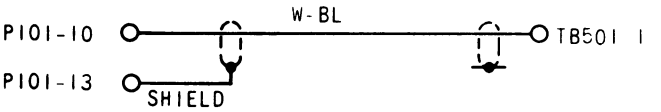


Figure 5 - Power Supply Tone Cable Connections

Tone Panel 19D402486-G1

When the station transmitter is equipped with an ICOM Module, A601 on the tone panel contains a 19B216215-G1 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.

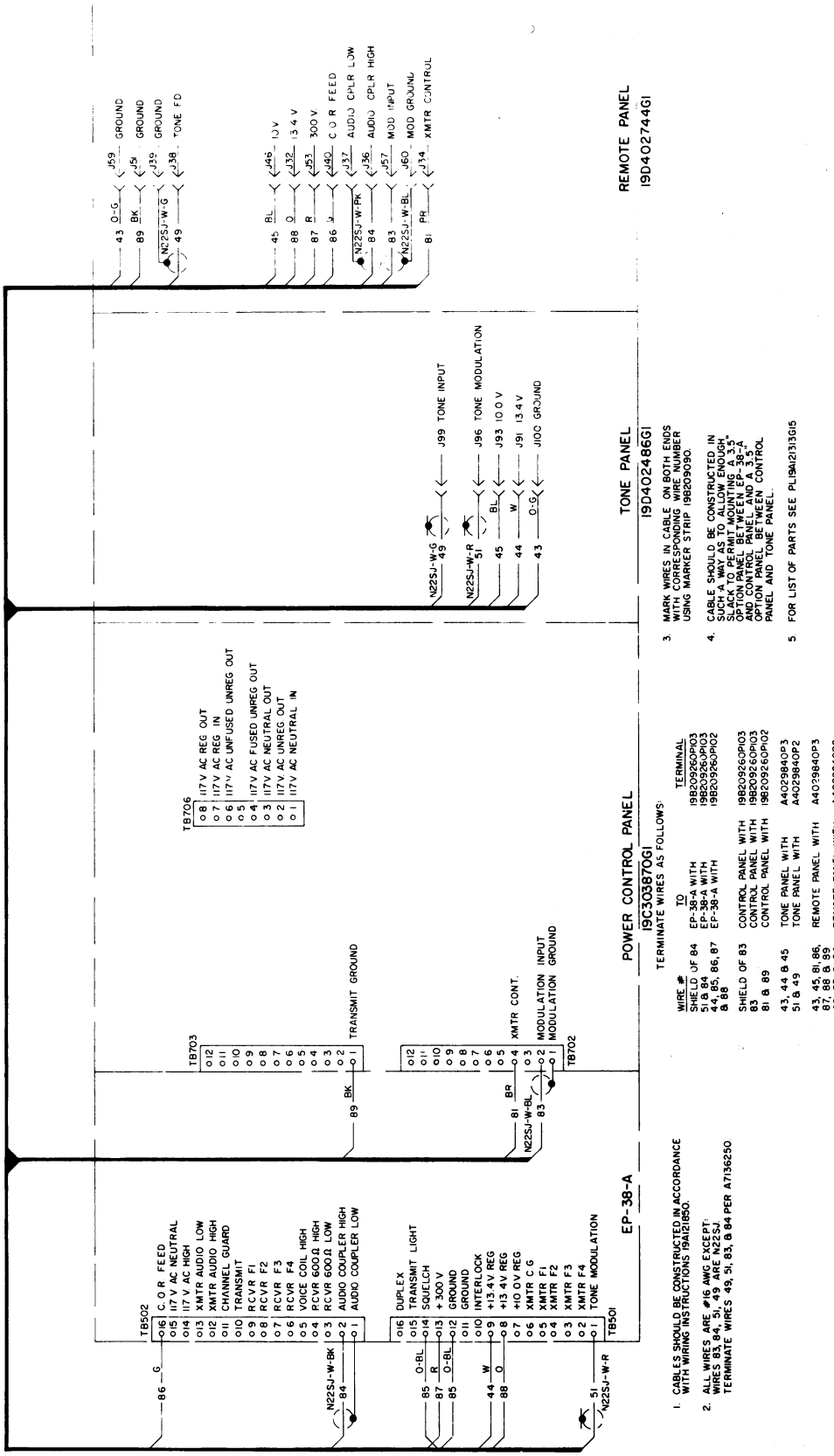
MAINTENANCE

Servicing procedures for the station transmitter, receiver and power supply are outlined in the unit Maintenance Manuals.

Troubleshooting and servicing procedures that are unique to the Shared Remote Station are described in the following Troubleshooting Procedure Chart.

TROUBLESHOOTING PROCEDURE

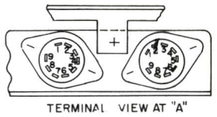
SYMPTOM	PROCEDURE
One individual mobile cannot contact Remote Control Console. All other mobiles on same frequency OK.	Check mobile transmitter for proper Channel Guard frequency and tone deviation.
One fleet of mobiles (with a common Channel Guard frequency) cannot contact the Remote Control Console. Other fleets (with other Channel Guard frequencies) OK.	(a) Check tone frequency network, in the associated Tone Module, for proper Channel Guard tone frequency.
	(b) If network frequency is correct, check for tone at pin 1 of Tone Module and check for approximately 2 VDC (no tone) and 10 VDC (with tone) at pin 9.
	(c) If tone appears at pin 1 but no DC at pin 9, check Q5, Q6 and Q7. If both tone and DC voltage are not present, check Q1. Q2 and Q3. When tone and DC are ok, go to step d.
	(d) Check for tone at Q13-B and +DCV at J8 of the associated Line Control Module with tone applied. If no tone is measured, check tone gate stage (Q21-Q30) on the Tone Panel.
No mobiles can contact the Remote Control Console.	(a) Check for voltage swing of 0 to +1.5 to 2 VDC at J36 on Remote Panel. If voltage swing in not obtained, check receiver. If receiver is ok see step b.
	(b) Check for audio at common audio jack J63 on Remote Panel (or at handset earpiece). If audio is present see step c. If no audio is present check for approximately +7.0 volts at Q6-C (Noise Gate) on Remote Panel. Then check Q3, Q4, Q5, Q7 and FL750.
	(c) Check for a tone signal at pin 8 of all Tone Modules with a mobile signal being received. If no tone is present, trace signal through stages Q9, Q11, Q14 and Q17.
Remote Control Console(s) on one remote line cannot key transmitter. Consoles on other remote lines OK.	Check for proper control voltage (approximately +100 volts) associated Line Control Module. If voltage is correct, check CR9, Q2 and CR3 of the Line Control Module.
Remote Control Console(s) on one remote line can key transmitter but cannot contact mobiles. Consoles on other remote lines OK.	(a) Check for approximately ±0.75 kHz transmitter tone deviation. If deviation is not present, see step b; if deviation is present, see step c.
	(b) Check for tone output at pin 1 of the associated Tone Module when the station transmitter is keyed. If tone is present at pin 1, check appropriate tone gate stage (Q21-Q30) on the Tone Panel.
	(c) If transmitter is keyed and tone is correct but no voice signals are transmitted, check CR3, C6, R10, R11, C7, and CR4 on the associated Line Control Module.
No Remote Control Consoles can contact the mobiles.	(a) If transmitter does not key, check for approximately 1.5 volts at J34 of the Remote Panel while attempting to key. If voltage is incorrect, check Q10 and Q11 on the Remote Panel. If voltage is correct, check transmitter.
	(b) If transmitter does key but no tone is transmitted, check Q1 and Q13 on Tone Panel.
	(c) If transmitter keys and tone is correct but no voice signals are transmitted, check Q8 and Q9 on the Remote Panel.



INTERCONNECTION DIAGRAM

(19D402734, Rev. 4)

SHARED REMOTE EQUIPMENT



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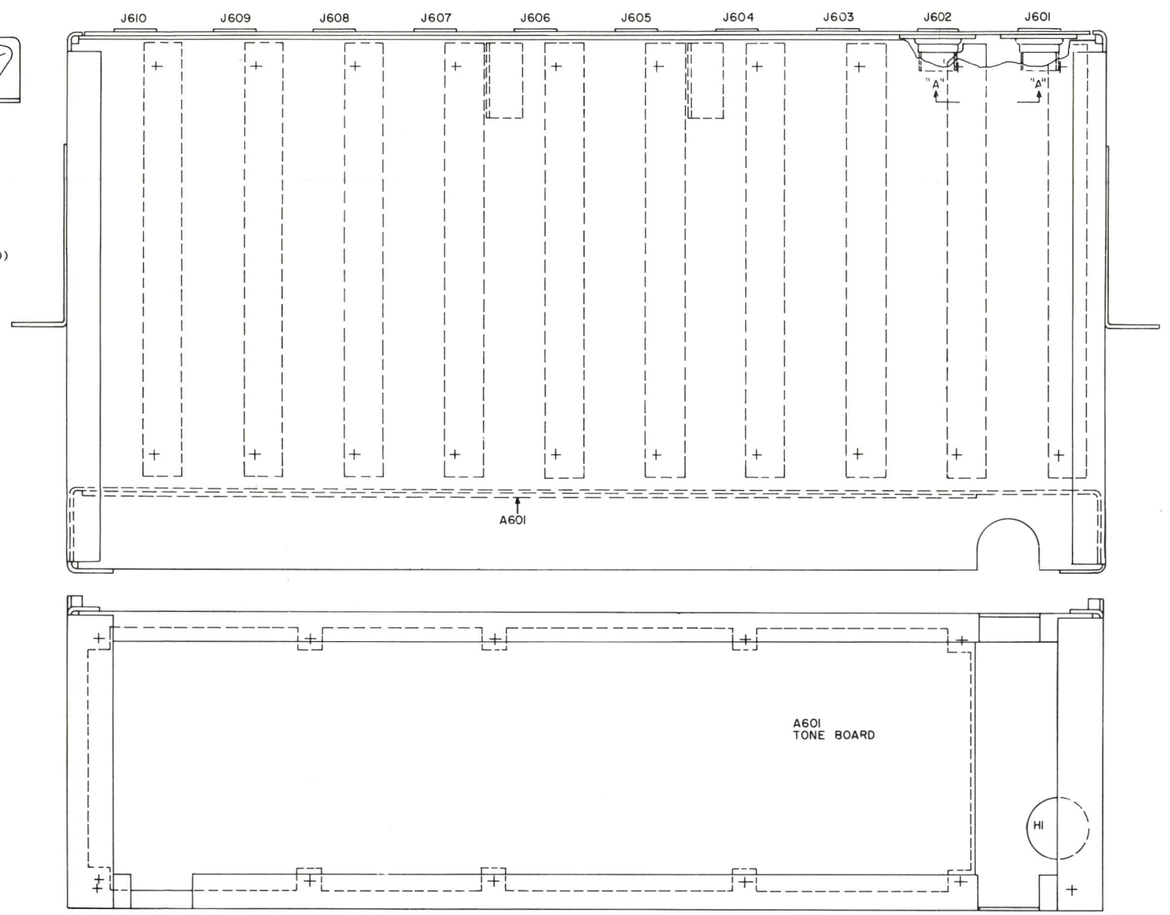
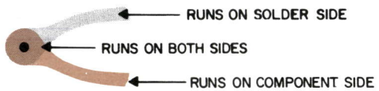


A601



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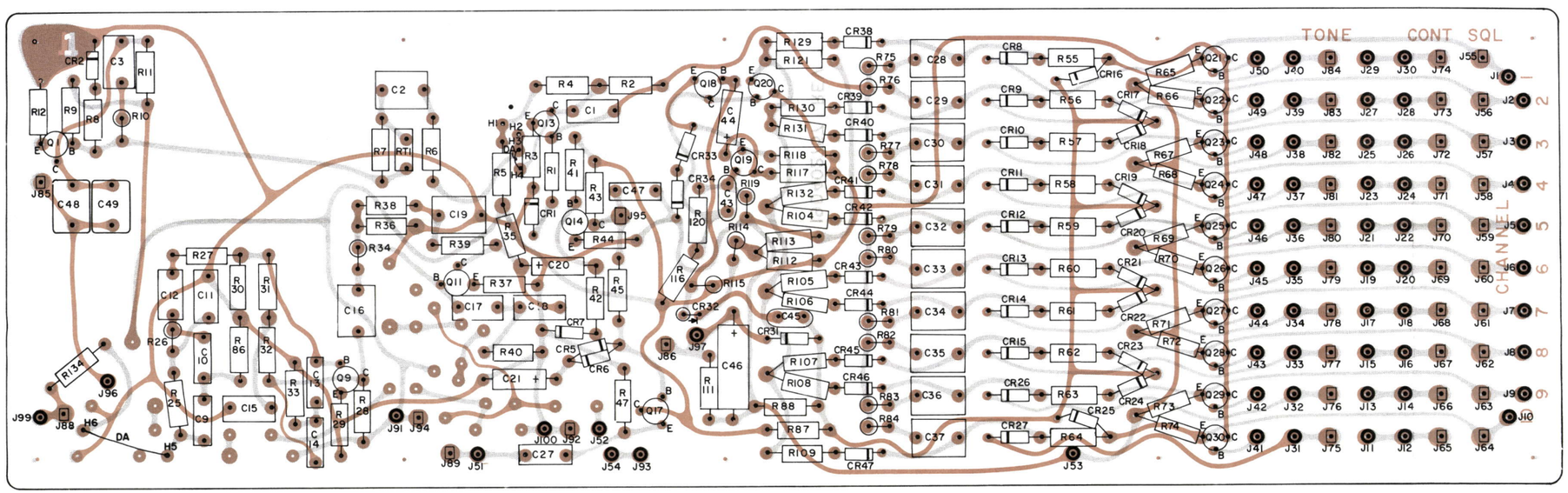
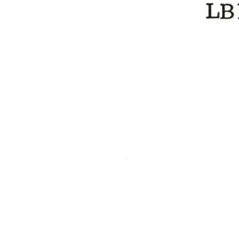




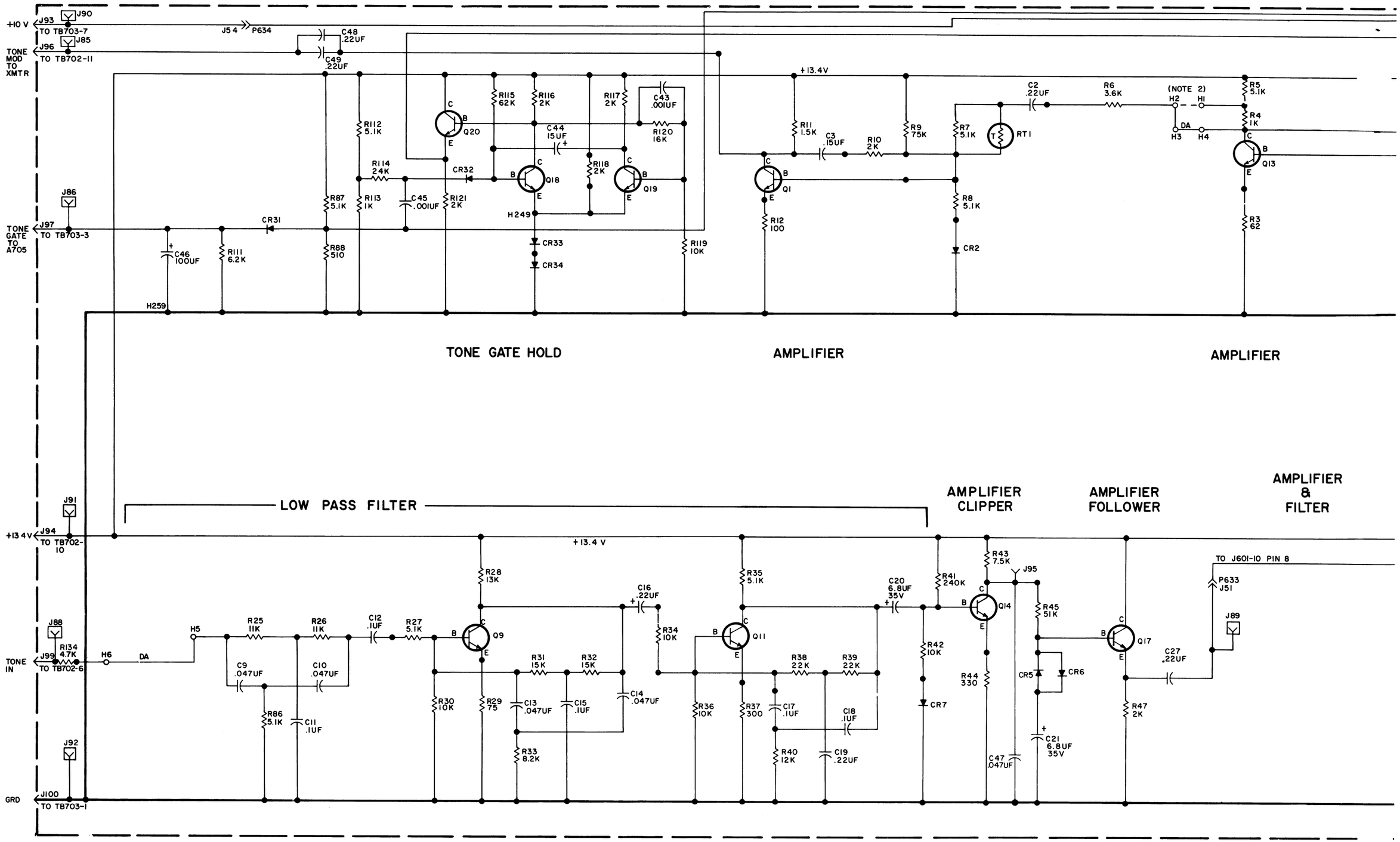
LEAD IDENTIFICATION
FOR Q1 THRU Q30

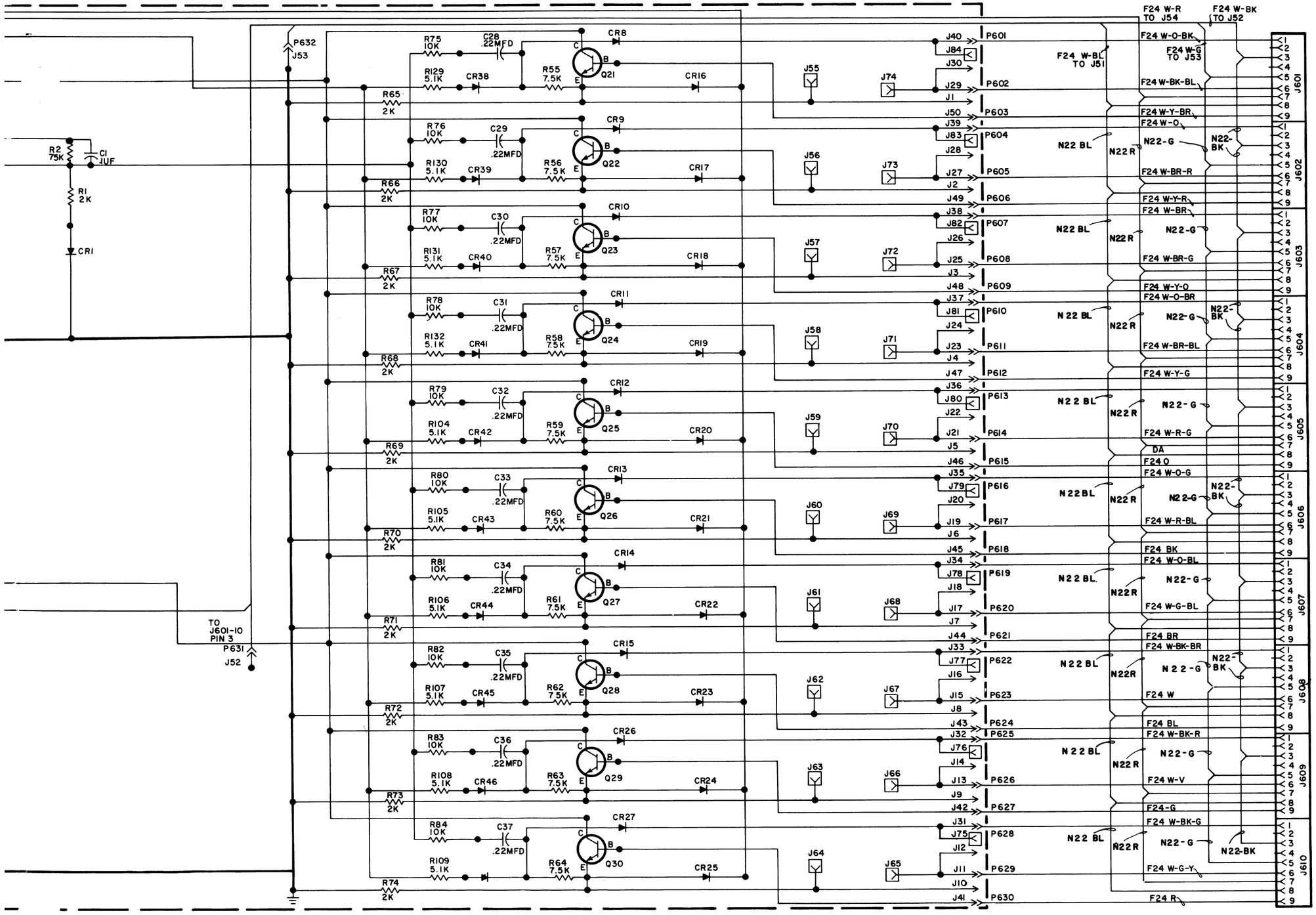
NOTE: COLOR BAND INDICATES CATHODE END OF DIODES.

OUTLINE DIAGRAM

TONE PANEL PL-19D402486-G1

(RC-1489C)


+10 V
J93
TO TB703-7
J90
J96
TO TB702-11
J85
TONE MOD TO XMTR
J54
P634
C48 .22UF
C49 .22UF
+13.4V
R112 5.1K
R115 62K
R116 2K
R117 2K
C43 .001UF
R120 16K
Q20
C44 15UF
R114 24K
CR32
Q18
R118 2K
Q19
R87 5.1K
R113 1K
C45 .001UF
R121 2K
H249
R119 10K
R11 1.5K
C3 .15UF
R10 2K
R9 75K
C2 .22UF
R6 3.6K
(NOTE 2)
H2
HI
DA
H3
H4
R5 5.1K
R4 1K
Q13
R7 5.1K
RT1
Q1
R8 5.1K
R12 100
R3 62
CR2
J86
J97
TO TB703-3
CR31
C46 100UF
R111 6.2K
R88 510
CR33
CR34
H259
TONE GATE HOLD
AMPLIFIER
AMPLIFIER
LOW PASS FILTER
AMPLIFIER CLIPPER
AMPLIFIER FOLLOWER
AMPLIFIER & FILTER
J91
+13.4V
J94
TO TB702-10
+13.4 V
R28 13K
C16 .22UF
R35 5.1K
C20 6.8UF 35V
R41 240K
R43 7.5K
J95
TO J601-10 PIN 8
P633
J51
J88
TONE IN
J99
TO TB702-6
R134 4.7K
H5
H6
DA
R25 11K
R26 11K
C12 .1UF
R27 5.1K
Q9
R34 10K
Q11
R42 10K
Q14
R45 51K
J89
C9 .047UF
C10 .047UF
R31 15K
R32 15K
R38 22K
R39 22K
CR7
R44 330
CR5
CR6
R86 5.1K
C11 .1UF
R30 10K
R29 75
C13 .047UF
C15 .1UF
C14 .047UF
R36 10K
R37 300
C17 .1UF
C18 .1UF
R33 8.2K
R40 12K
C19 .22UF
C47 .047UF
C21 6.8UF 35V
Q17
C27 .22UF
R47 2K
J92
GRD
J100
TO TB703-1



BOARD, TONE
PLI9D402615G2

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

SCHEMATIC DIAGRAM

TONE PANEL PL-19D402486-G1

(19R620746, Rev. 5)

PARTS LIST

LBI-3690A

TONE PANEL
PL-19D402486-G1
REV B

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - SUBASSEMBLIES - - - - - - - - -
A601		TONE BOARD PL-19D402615-G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C2	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW.
C3	19B209243-P8	Polyester: 0.15 µf ±20%, 40 VDCW.
C8*	5496267-P14	Tantalum, dry solid: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D. (Deleted by Rev B).
C9* and C10*	5491189-P304	Polyester: .047 µf ±5%, 50 VDCW. In Models of Rev A and earlier:
	19B209243-P5	Polyester: .047 µf ±20%, 40 VDCW.
C11*	5491189-P306	Polyester: 0.1 µf ±5%, 50 VDCW. In Models of Rev A and earlier:
	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C12	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C13* and C14*	5491189-P304	Polyester: .047 µf ±5%, 50 VDCW. In Models of Rev A and earlier:
	19B209243-P5	Polyester: .047 µf ±20%, 40 VDCW.
C15*	5491189-P306	Polyester: 0.1 µf ±5%, 50 VDCW. In Models of Rev A and earlier:
	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C16	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW.
C17* and C18*	5491189-P306	Polyester: 0.1 µf ±5%, 50 VDCW. In Models of Rev A and earlier:
	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C19*	19B209243-P109	Polyester: 0.22 µf ±10%, 40 VDCW. In Models of Rev A and earlier:
	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW.
C20 and C21	5496267-P18	Tantalum, dry solid: 6.8 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C22* and C23*	19B209243-P1	Polyester: .01 µf ±20%, 40 VDCW. (Deleted by Rev B).
C24* and C25*	7774750-P5	Ceramic disc: .0015 µf +100% -0%, 500 VDCW. (Deleted by Rev B).
C26*	7774750-P8	Ceramic disc: .0033 µf +100% -0%, 500 VDCW. (Deleted by Rev B).
C27 thru C37	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW.
C43	7774750-P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW.
C44	5496267-P14	Tantalum, dry solid: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C45	7774750-P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW.
C46	5496267-P16	Tantalum, dry solid: 100 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C47*	19B209243-P5	Polyester: .047 µf ±20%, 40 VDCW. (Added by Rev A).
C48* and C49*	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW. (Added by Rev A).
CR1 and CR2	19A115250-P1	Silicon.
CR5 thru CR27	19A115250-P1	Silicon.
CR31 thru CR34	19A115250-P1	Silicon.
CR38 thru CR47	19A115250-P1	Silicon.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J1 thru J54	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J55 thru J86	4031537-P1	Terminal: sim to Alden Products 654T.
J88 and J89	4031537-P1	Terminal: sim to Alden Products 654T.
J91	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J92	4031537-P1	Terminal: sim to Alden Products 654T.
J93	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J94 and J95	4031537-P1	Terminal: sim to Alden Products 654T.
J96 thru J101	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q4*	19A115123-P1	Silicon, NPN; sim to Type 2N2712. (Deleted by Rev B).
Q9	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q10*	19A115123-P1	Silicon, NPN; sim to Type 2N2712. (Deleted by Rev B).
Q11	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q13 and Q14	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q17 thru Q30	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R2	3R77-P753J	Fixed composition: 75,000 ohms ±5%, 1/2 w.
R3	3R77-P620J	Fixed composition: 62 ohms ±5%, 1/2 w.
R4	3R77-P102J	Fixed composition: 1000 ohms ±5%, 1/2 w.
R5	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R6	3R77-P362J	Fixed composition: 3600 ohms ±5%, 1/2 w.
R7 and R8	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R9	3R77-P753J	Fixed composition: 75,000 ohms ±5%, 1/2 w.
R10	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R11	3R77-P152J	Fixed composition: 1500 ohms ±5%, 1/2 w.
R12	3R77-P101J	Fixed composition: 100 ohms ±5%, 1/2 w.
R20*	3R77-P272J	Fixed composition: 2700 ohms ±5%, 1/2 w. (Deleted by Rev B).
R21*	3R77-P363J	Fixed composition: 36,000 ohms ±5%, 1/2 w. (Deleted by Rev B).
R22*	3R77-P102J	Fixed composition: 1000 ohms ±5%, 1/2 w. (Deleted by Rev B).
R23*	3R77-P511J	Fixed composition: 510 ohms ±5%, 1/2 w. (Deleted by Rev B).
R24*	3R77-P201J	Fixed composition: 200 ohms ±5%, 1/2 w. (Deleted by Rev B).
R25* and R26*	3R77-P113J	Fixed composition: 11,000 ohms ±5%, 1/2 w.
		In Models of Rev A or earlier:
	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R27	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R28	3R77-P133J	Fixed composition: 13,000 ohms ±5%, 1/2 w.
R29	3R77-P750J	Fixed composition: 75 ohms ±5%, 1/2 w.
R30	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R31 and R32	3R77-P153J	Fixed composition: 15,000 ohms ±5%, 1/2 w.
R33	3R77-P822J	Fixed composition: 8200 ohms ±5%, 1/2 w.
R34	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R35	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R36	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R37	3R77-P301J	Fixed composition: 300 ohms ±5%, 1/2 w.
R38 and R39	3R77-P223J	Fixed composition: 22,000 ohms ±5%, 1/2 w.
R40	3R77-P123J	Fixed composition: 12,000 ohms ±5%, 1/2 w.
R41	3R77-P244J	Fixed composition: 0.24 megohm ±5%, 1/2 w.
R42	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R43	3R77-P752J	Fixed composition: 7500 ohms ±5%, 1/2 w.
R44	3R77-P331J	Fixed composition: 330 ohms ±5%, 1/2 w.
R45	3R77-P513J	Fixed composition: 51,000 ohms ±5%, 1/2 w.
R47	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R48*	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w. (Deleted by Rev B).
R49* and R50*	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w. (Deleted by Rev B).
R51*	3R77-P200J	Fixed composition: 20 ohms ±5%, 1/2 w. (Deleted by Rev B).
R52* and R53*	3R77-P153J	Fixed composition: 15,000 ohms ±5%, 1/2 w. (Deleted by Rev B).
R54*	3R77-P682J	Fixed composition: 6800 ohms ±5%, 1/2 w. (Deleted by Rev B).
R55 thru R64	3R77-P752J	Fixed composition: 7500 ohms ±5%, 1/2 w.
R65 thru R74	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R75 thru R84	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R86*	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
		In Models of Rev A or earlier:
	3R77-P472J	Fixed composition: 4700 ohms ±5%, 1/2 w.
R87	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R88	3R77-P511J	Fixed composition: 510 ohms ±5%, 1/2 w.
R104 thru R109	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R111	3R77-P622J	Fixed composition: 6200 ohms ±5%, 1/2 w.
R112	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R113	3R77-P102J	Fixed composition: 1000 ohms ±5%, 1/2 w.
R114	3R77-P243J	Fixed composition: 24,000 ohms ±5%, 1/2 w.
R115	3R77-P623J	Fixed composition: 62,000 ohms ±5%, 1/2 w.
R116 thru R118	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R119	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R120	3R77-P163J	Fixed composition: 16,000 ohms ±5%, 1/2 w.
R121	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R129 thru R132	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R134*	3R77-P472J	Fixed composition: 4700 ohms ±5%, 1/2 w. In Models of Rev A and earlier:
	3R77-P101K	Fixed composition: 100 ohms ±10%, 1/2 w. (Added by Rev A).
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT1	5490828-P21	Rod: 1250 ohms ±10%, 0.38 w max; sim to Globar Type 492H-11.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J601 thru J610	7480532-P11	Connector, tube, phen: 9 pins; sim to Elco 04-902-27.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P601 thru P634	4029840-P2	Contact, electrical: sim to AMP 42827-2.

*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 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 C9-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.

PARTS LIST

LBI-3690A

TONE PANEL
PL-19D402486-G1
REV B

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - SUBASSEMBLIES - - - - - - - - -
A601		TONE BOARD PL-19D402615-G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C2	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW.
C3	19B209243-P8	Polyester: 0.15 µf ±20%, 40 VDCW.
C8*	5496267-P14	Tantalum, dry solid: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D. (Deleted by Rev B).
C9* and C10*	5491189-P304	Polyester: .047 µf ±5%, 50 VDCW.
		In Models of Rev A and earlier:
	19B209243-P5	Polyester: .047 µf ±20%, 40 VDCW.
C11*	5491189-P306	Polyester: 0.1 µf ±5%, 50 VDCW.
		In Models of Rev A and earlier:
	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C12	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C13* and C14*	5491189-P304	Polyester: .047 µf ±5%, 50 VDCW.
		In Models of Rev A and earlier:
	19B209243-P5	Polyester: .047 µf ±20%, 40 VDCW.
C15*	5491189-P306	Polyester: 0.1 µf ±5%, 50 VDCW.
		In Models of Rev A and earlier:
	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C16	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW.
C17* and C18*	5491189-P306	Polyester: 0.1 µf ±5%, 50 VDCW.
		In Models of Rev A and earlier:
	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW.
C19*	19B209243-P109	Polyester: 0.22 µf ±10%, 40 VDCW.
		In Models of Rev A and earlier:
	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW.
C20 and C21	5496267-P18	Tantalum, dry solid: 6.8 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C22* and C23*	19B209243-P1	Polyester: .01 µf ±20%, 40 VDCW. (Deleted by Rev B).
C24* and C25*	7774750-P5	Ceramic disc: .0015 µf +100% -0%, 500 VDCW. (Deleted by Rev B).
C26*	7774750-P8	Ceramic disc: .0033 µf +100% -0%, 500 VDCW. (Deleted by Rev B).
C27 thru C37	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW.
C43	7774750-P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW.
C44	5496267-P14	Tantalum, dry solid: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C45	7774750-P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW.
C46	5496267-P16	Tantalum, dry solid: 100 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C47*	19B209243-P5	Polyester: .047 µf ±20%, 40 VDCW. (Added by Rev A).
C48* and C49*	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW. (Added by Rev A).

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 and CR2	19A115250-P1	Silicon.
CR5 thru CR27	19A115250-P1	Silicon.
CR31 thru CR34	19A115250-P1	Silicon.
CR38 thru CR47	19A115250-P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J54	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J55 thru J86	4031537-P1	Terminal: sim to Alden Products 654T.
J88 and J89	4031537-P1	Terminal: sim to Alden Products 654T.
J91	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J92	4031537-P1	Terminal: sim to Alden Products 654T.
J93	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J94 and J95	4031537-P1	Terminal: sim to Alden Products 654T.
J96 thru J101	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q4*	19A115123-P1	Silicon, NPN; sim to Type 2N2712. (Deleted by Rev B).
Q9	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q10*	19A115123-P1	Silicon, NPN; sim to Type 2N2712. (Deleted by Rev B).
Q11	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q13 and Q14	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q17 thru Q30	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R2	3R77-P753J	Fixed composition: 75,000 ohms ±5%, 1/2 w.
R3	3R77-P620J	Fixed composition: 62 ohms ±5%, 1/2 w.
R4	3R77-P102J	Fixed composition: 1000 ohms ±5%, 1/2 w.
R5	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R6	3R77-P362J	Fixed composition: 3600 ohms ±5%, 1/2 w.
R7 and R8	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R9	3R77-P753J	Fixed composition: 75,000 ohms ±5%, 1/2 w.
R10	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R11	3R77-P152J	Fixed composition: 1500 ohms ±5%, 1/2 w.
R12	3R77-P101J	Fixed composition: 100 ohms ±5%, 1/2 w.
R20*	3R77-P272J	Fixed composition: 2700 ohms ±5%, 1/2 w. (Deleted by Rev B).
R21*	3R77-P363J	Fixed composition: 36,000 ohms ±5%, 1/2 w. (Deleted by Rev B).
R22*	3R77-P102J	Fixed composition: 1000 ohms ±5%, 1/2 w. (Deleted by Rev B).

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - RESISTORS(Cont'd) - - - - - -
R23*	3R77-P511J	Fixed composition: 510 ohms ±5%, 1/2 w. (Deleted by Rev B).
R24*	3R77-P201J	Fixed composition: 200 ohms ±5%, 1/2 w. (Deleted by Rev B).
R25* and R26*	3R77-P113J	Fixed composition: 11,000 ohms ±5%, 1/2 w.
		In Models of Rev A or earlier:
	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R27	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R28	3R77-P133J	Fixed composition: 13,000 ohms ±5%, 1/2 w.
R29	3R77-P750J	Fixed composition: 75 ohms ±5%, 1/2 w.
R30	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R31 and R32	3R77-P153J	Fixed composition: 15,000 ohms ±5%, 1/2 w.
R33	3R77-P822J	Fixed composition: 8200 ohms ±5%, 1/2 w.
R34	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R35	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R36	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R37	3R77-P301J	Fixed composition: 300 ohms ±5%, 1/2 w.
R38 and R39	3R77-P223J	Fixed composition: 22,000 ohms ±5%, 1/2 w.
R40	3R77-P123J	Fixed composition: 12,000 ohms ±5%, 1/2 w.
R41	3R77-P244J	Fixed composition: 0.24 megohm ±5%, 1/2 w.
R42	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R43	3R77-P752J	Fixed composition: 7500 ohms ±5%, 1/2 w.
R44	3R77-P331J	Fixed composition: 330 ohms ±5%, 1/2 w.
R45	3R77-P513J	Fixed composition: 51,000 ohms ±5%, 1/2 w.
R47	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R48*	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w. (Deleted by Rev B).
R49* and R50*	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w. (Deleted by Rev B).
R51*	3R77-P200J	Fixed composition: 20 ohms ±5%, 1/2 w. (Deleted by Rev B).
R52* and R53*	3R77-P153J	Fixed composition: 15,000 ohms ±5%, 1/2 w. (Deleted by Rev B).
R54*	3R77-P682J	Fixed composition: 6800 ohms ±5%, 1/2 w. (Deleted by Rev B).
R55 thru R64	3R77-P752J	Fixed composition: 7500 ohms ±5%, 1/2 w.
R65 thru R74	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R75 thru R84	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R86*	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
		In Models of Rev A or earlier:
	3R77-P472J	Fixed composition: 4700 ohms ±5%, 1/2 w.
R87	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R88	3R77-P511J	Fixed composition: 510 ohms ±5%, 1/2 w.
R104 thru R109	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R111	3R77-P622J	Fixed composition: 6200 ohms ±5%, 1/2 w.
R112	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R113	3R77-P102J	Fixed composition: 1000 ohms ±5%, 1/2 w.
R114	3R77-P243J	Fixed composition: 24,000 ohms ±5%, 1/2 w.
R115	3R77-P623J	Fixed composition: 62,000 ohms ±5%, 1/2 w.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - RESISTORS(Cont'd) - - - - - -
R116 thru R118	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R119	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R120	3R77-P163J	Fixed composition: 16,000 ohms ±5%, 1/2 w.
R121	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R129 thru R132	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R134*	3R77-P472J	Fixed composition: 4700 ohms ±5%, 1/2 w.
		In Models of Rev A and earlier:
	3R77-P101K	Fixed composition: 100 ohms ±10%, 1/2 w. (Added by Rev A).
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT1	5490828-P21	Rod: 1250 ohms ±10%, 0.38 w max; sim to Globar Type 492H-11.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J601 thru J610	7480532-P11	Connector, tube, phen: 9 pins; sim to Elco 04-902-27.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P601 thru P634	4029840-P2	Contact, electrical: sim to AMP 42827-2.

PRODUCTION CHANGES

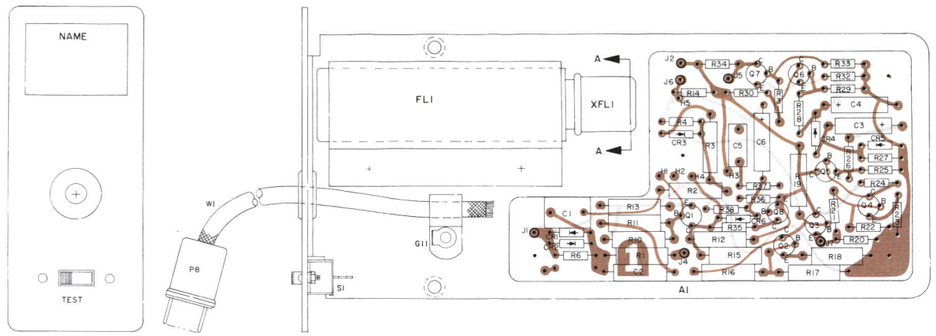
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

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

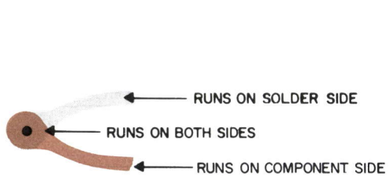
REV. B - To change response of bandpass filter to prevent voice blocking and faulting. Changed C9-C11, C13-C15, C17-C19, R25, R26, R86 and R134. Deleted C8, C22-C26, Q4, Q10, R20-R24 and R48-R54. Added jumper from R134 to junction of R25/C9.

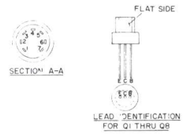
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

OUTLINE DIAGRAM

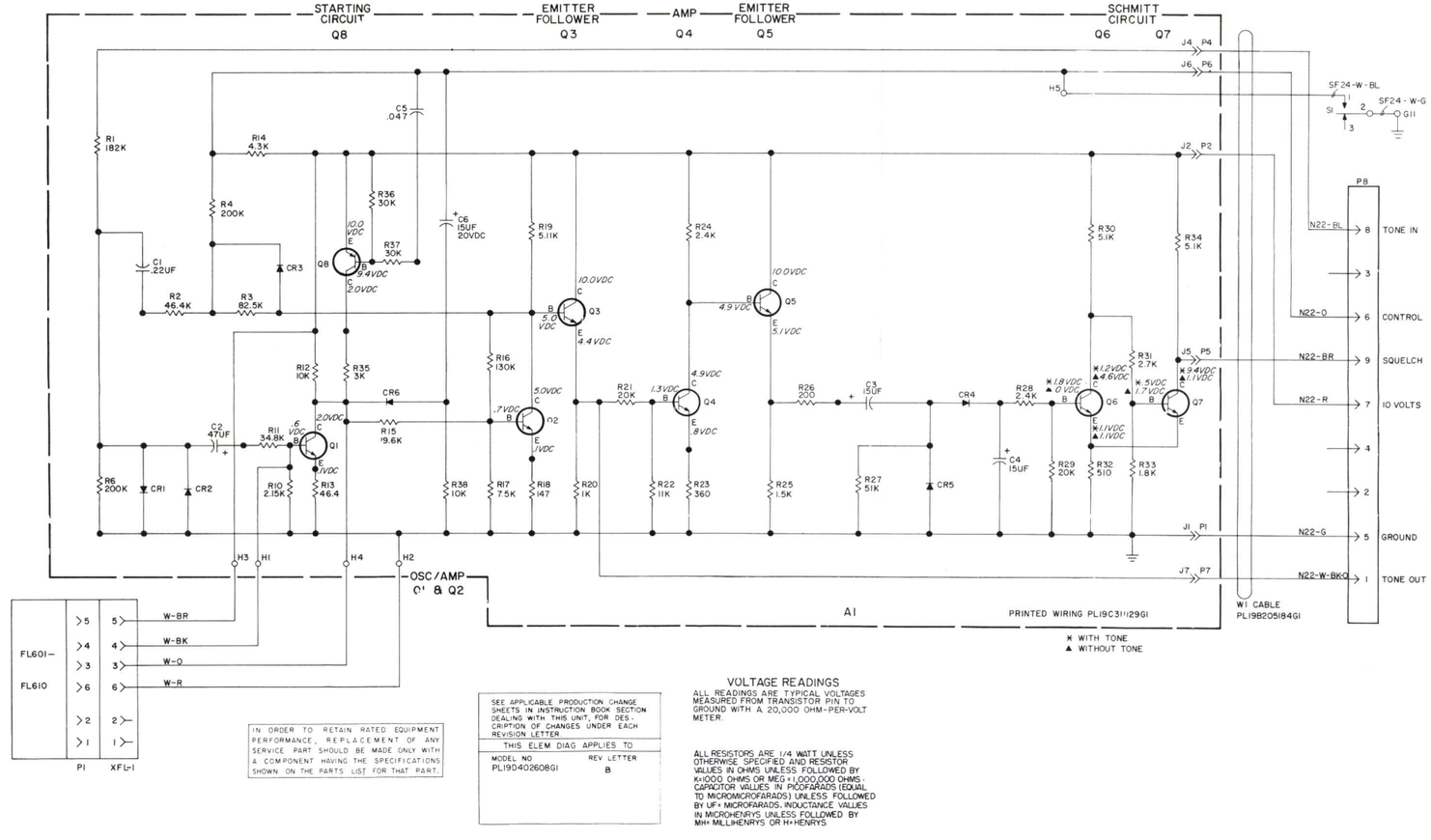


(19D402825, Rev. 1)
(19C311120, Sh. 1, Rev. 1)
(19C311120, Sh. 2, Rev. 1)





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
PLI9D402608G1	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
PL-19D402608-G1

PARTS LIST

LBI-3700B

TONE MODULE
19D402608-G1
REV B

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - SUBASSEMBLIES - - - - - - - - -
A1*		COMPONENT BOARD 19C311129-G1 (Added by REV A)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19B209243-P109	Polyester: 0.22 µf ±10%, 50 VDCW.
C2	5496267-P2	Tantalum, dry solid: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C3 and C4	5496267-P14	Tantalum, dry solid: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C5	19A115028-P111	Polyester: .047 µf ±20%, 200 VDCW.
C6	5496267-P14	Tantalum, dry solid: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 and CR2	5494922-P1	Silicon; sim to Type 1N456.
CR3 thru CR6	19A115250-P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 and J2	4033513-P16	Contact, electrical: sim to Bead Chain R52-1.
J4 thru J7	4033513-P16	Contact, electrical: sim to Bead Chain R52-1.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115362-P1	Silicon, NPN; sim to Type 2N2925.
Q3	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q4	19A115362-P1	Silicon, NPN; sim to Type 2N2925.
Q5 thru Q7	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q8	19A115768-P1	Silicon, PNP; sim to Type 2N3702.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	5495948-P426	Deposited carbon: 182,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R2	5495948-P365	Deposited carbon: 46,400 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R3	5495948-P389	Deposited carbon: 82,500 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R4	3R152-P204J	Fixed composition: 0.2 megohm ±5%, 1/4 w.
R6	3R152-P204J	Fixed composition: 0.2 megohm ±5%, 1/4 w.
R10	5495948-P233	Deposited carbon: 2150 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R11	5495948-P353	Deposited carbon: 34,800 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R12	5495948-P301	Deposited carbon: 10,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R13	5495948-P65	Deposited carbon: 46.4 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R14	3R152-P432J	Fixed composition: 4300 ohms ±5%, 1/4 w.
R15	5495948-P329	Deposited carbon: 19,600 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R16	5495948-P412	Deposited carbon: 130,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R17	5495948-P285	Deposited carbon: 7500 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R18	5495948-P117	Deposited carbon: 147 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R19	5495948-P269	Deposited carbon: 5110 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R20	3R152-P102J	Fixed composition: 1000 ohms ±5%, 1/4 w.
R21	3R152-P203J	Fixed composition: 20,000 ohms ±5%, 1/4 w.
R22	3R152-P113J	Fixed composition: 11,000 ohms ±5%, 1/4 w.
R23	3R152-P361J	Fixed composition: 360 ohms ±5%, 1/4 w.
R24	3R152-P242J	Fixed composition: 2400 ohms ±5%, 1/4 w.
R25	3R152-P152J	Fixed composition: 1500 ohms ±5%, 1/4 w.
R26	3R152-P201J	Fixed composition: 200 ohms ±5%, 1/4 w.
R27	3R152-P513J	Fixed composition: 51,000 ohms ±5%, 1/4 w.
R28	3R152-P242J	Fixed composition: 2400 ohms ±5%, 1/4 w.
R29	3R152-P203J	Fixed composition: 20,000 ohms ±5%, 1/4 w.
R30	3R152-P512J	Fixed composition: 5100 ohms ±5%, 1/4 w.
R31	3R152-P272J	Fixed composition: 2700 ohms ±5%, 1/4 w.
R32	3R152-P511J	Fixed composition: 510 ohms ±5%, 1/4 w.
R33	3R152-P182J	Fixed composition: 1800 ohms ±5%, 1/4 w.
R34	3R152-P512J	Fixed composition: 5100 ohms ±5%, 1/4 w.
R35	3R152-P302J	Fixed composition: 3000 ohms ±5%, 1/4 w.
R36 and R37	3R152-P303J	Fixed composition: 30,000 ohms ±5%, 1/4 w.
R38	3R152-P103J	Fixed composition: 10,000 ohms ±5%, 1/4 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19B209040-P7	Slide: SPDT, 0.5 amp at 125 v; sim to Continental-Wirt Type G-132. (Added by REV B)
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL1	7768887-P17	Tube, phen: 7 pins; sim to Elco 04-710-02.
		IN MODELS EARLIER THAN REV A
		COMPONENT BOARD 19C303864-G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19B209243-P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C2	5496267-P2	Tantalum, dry solid: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C3 and C4	5496267-P14	Tantalum, dry solid: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 and CR2	5494922-P1	Silicon; sim to Type 1N456.
CR3 thru CR5	4036936-P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J7	4033513-P16	Contact, electrical: sim to Bead Chain R52-1.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115362-P1	Silicon, NPN; sim to Type 2N2925.
Q3	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q4	19A115362-P1	Silicon, NPN; sim to Type 2N2925.
Q5 thru Q7	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	5495948-P426	Deposited carbon: 182,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R2	5495948-P365	Deposited carbon: 46,400 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R3	5495948-P389	Deposited carbon: 82,500 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R4	3R77-P204J	Fixed composition: 0.2 megohm ±5%, 1/2 w.
R5	5495948-P438	Deposited carbon: 243,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R6	5495948-P430	Deposited carbon: 200,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R10	5495948-P233	Deposited carbon: 2150 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R11	5495948-P353	Deposited carbon: 34,800 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R12	5495948-P301	Deposited carbon: 10,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R13	5495948-P65	Deposited carbon: 46.4 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R14	3R77-P432J	Fixed composition: 4300 ohms ±5%, 1/2 w.
R15	5495948-P329	Deposited carbon: 19,600 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R16	5495948-P412	Deposited carbon: 130,000 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R17	5495948-P285	Deposited carbon: 7500 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R18	5495948-P117	Deposited carbon: 147 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R19	5495948-P269	Deposited carbon: 5110 ohms ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R20	3R77-P102J	Fixed composition: 1000 ohms ±5%, 1/2 w.
R21	3R77-P203J	Fixed composition: 20,000 ohms ±5%, 1/2 w.
R22	3R77-P113J	Fixed composition: 11,000 ohms ±5%, 1/2 w.
R23	3R77-P361J	Fixed composition: 360 ohms ±5%, 1/2 w.
R24	3R77-P242J	Fixed composition: 2400 ohms ±5%, 1/2 w.
R25	3R77-P152J	Fixed composition: 1500 ohms ±5%, 1/2 w.
R26	3R77-P201J	Fixed composition: 200 ohms ±5%, 1/2 w.
R27	3R77-P513J	Fixed composition: 51,000 ohms ±5%, 1/2 w.
R28	3R77-P242J	Fixed composition: 2400 ohms ±5%, 1/2 w.
R29	3R77-P203J	Fixed composition: 20,000 ohms ±5%, 1/2 w.
R30	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
R31	3R77-P272J	Fixed composition: 2700 ohms ±5%, 1/2 w.
R32	3R77-P511J	Fixed composition: 510 ohms ±5%, 1/2 w.
R33	3R77-P182J	Fixed composition: 1800 ohms ±5%, 1/2 w.
R34	3R77-P512J	Fixed composition: 5100 ohms ±5%, 1/2 w.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL1	7768887-P17	Tube, phen: 7 pins; sim to Elco 04-710-02.
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL1		TONE FREQUENCY NETWORK 19B205280
	19B205280-G1	71.9 Hz
	19B205280-G2	77.0 Hz
	19B205280-G3	82.5 Hz
	19B205280-G4	88.5 Hz
	19B205280-G5	94.8 Hz
	19B205280-G6	100.0 Hz
	19B205280-G7	103.5 Hz
	19B205280-G8	107.2 Hz
	19B205280-G9	110.9 Hz
	19B205280-G10	114.8 Hz
	19B205280-G11	118.8 Hz
	19B205280-G12	123.0 Hz
	19B205280-G13	127.3 Hz
	19B205280-G14	131.8 Hz
	19B205280-G15	136.5 Hz
	19B205280-G16	141.3 Hz
	19B205280-G17	146.2 Hz
	19B205280-G18	151.4 Hz
	19B205280-G19	156.7 Hz
	19B205280-G20	162.2 Hz
	19B205280-G21	167.9 Hz
	19B205280-G22	173.8 Hz
	19B205280-G23	179.9 Hz
	19B205280-G24	186.2 Hz
	19B205280-G25	192.8 Hz
	19B205280-G26	203.5 Hz
		- - - - - - - - - - CABLES - - - - - - - - - -
W1		CABLE 19B205184-G1
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 and P2	4036634-P2	Contact, electrical: sim to AMP 42429-2.
P4 thru P7	4036634-P2	Contact, electrical: sim to AMP 42429-2.
P8		Includes the following:
	5491563-P4	Shell, connector: sim to Methode C860-1V.
	5491563-P2	Connector, phen: 9 pins; sim to Methode M860.

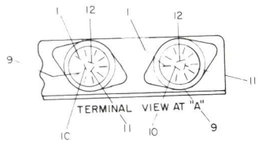
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PRODUCTION CHANGES

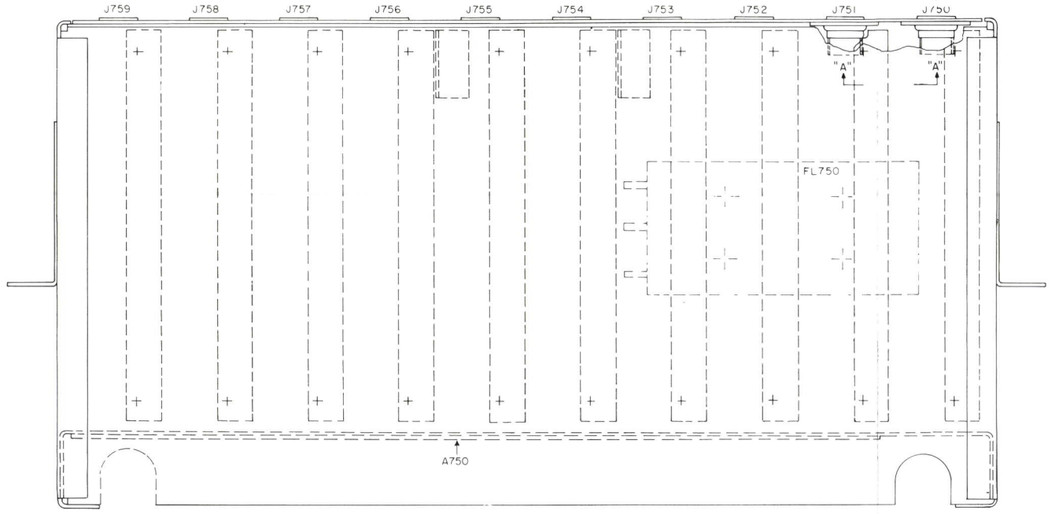
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

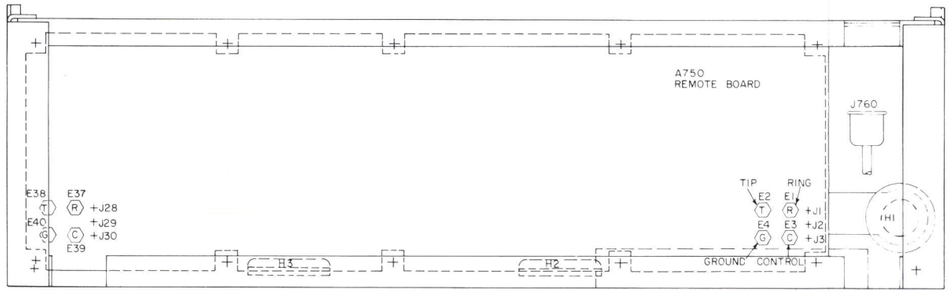
REV. A - To make Tone Module compatible with Shared Remote Equipment. Changed Component Board A1.

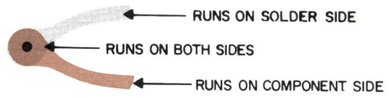
REV. B - To provide test switch. Added S1.



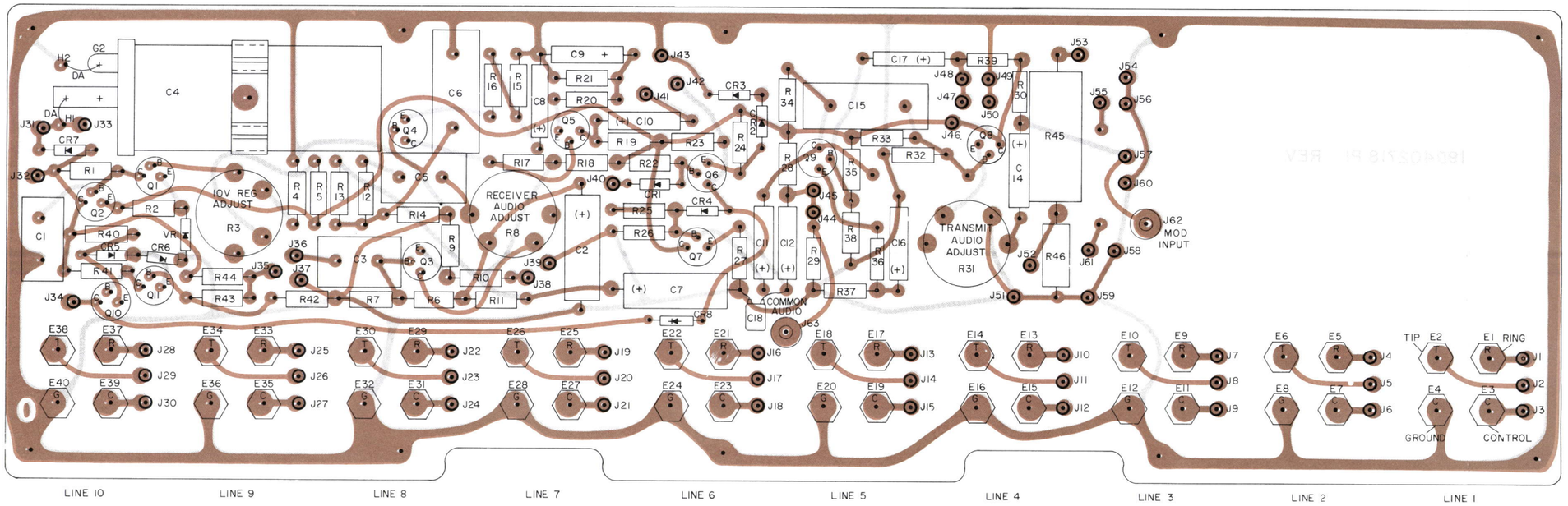
(19D402824, Rev. 0)

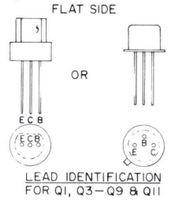






(19D402822, Rev. 1)
(19D402719, Sh. 1, Rev. 0)
(19D402719, Sh. 2, Rev. 0)





OUTLINE DIAGRAM

REMOTE PANEL 19D402744G1

RC-1497A

XMIT CONTROL Q11

XMIT KEY Q10

10 VOLT REGULATOR Q1 - Q2

AMPLIFIER Q3

AMPLIFIER Q4 - Q5

XMIT MOD INPUT J57

XMIT CONT J34

13.4 V J32

TO AMPL MOD 12.8V J31

W-V 12.8V P780 J33

BL P781 J35

GRD J60

CR7 CR8 CR5 CR6

R44 1K R41 300 R40 4700 R43 4700 R42 2K

R1 300 R2 910 R5 620 R4 620 R3 1000 10-VOLT REG ADJ

C1 .1 C2 100 UF C3 .22 C4 1000 UF C5 .22 C6 33 C7 100 UF C10 22UF

VR1 5.4V

Q2 13.4V C 10.0V E B 10.7V

Q10 1.0V 2.0V B C 13.4V 1.5V E 1.3V

Q11 1.4V 0.3V B C 1.0 2.0V E 10.7V

Q1 10.7V C B 6.1V E 5.4V

Q3 2.8V B C 5.6V E 2.2V

Q4 2.8V B C 5.1V E 2.0V

Q5 5.1V B C 7.0V E 4.5V

REC AUDIO ADJ CW

R6 180K R8 5K R11 470 R12 10K R13 110K R17 6800 R18 330 R19 750 R7 100K R10 2K R9 3K R14 47K R16 470 R15 3K R21 1100 R20 56 C8 47 C9 47

H1 I G2 H2

J38 TONE FEED

J39 GRD

J36 AUDIO CPL HI

J37 GRD

TO INTERCOM PANEL

J760

1 W-R
2 W-R-BL
3 W-O-BL
4 W-BR-BL
5 W-BL-R
6 W-O-R
7 W-R-BK
8 W-G-O
9 W-BL-G
10 W-BK-O

H1 H3 H2

REMOTE LINE 10 — TIP RING — E38 E37 J28 P777 — J29 P778 — GRD CONTROL — E40 E39 J30 P779

REMOTE LINE 9 — TIP RING — E34 E33 J25 P774 — J26 P775 — GRD CONTROL — E36 E35 J27 P776

REMOTE LINE 8 — TIP RING — E30 E29 J22 P771 — J23 P772 — GRD CONTROL — E32 E31 J24 P773

REMOTE LINE 7 — TIP RING — E26 E25 J19 P768 — J20 P769 — GRD CONTROL — E28 E27 J21 P770

REMOTE LINE 6 — TIP RING — E22 E21 J16 P765 — J17 P766 — GRD CONTROL — E24 E23 J18 P767

REMOTE LINE 5 — TIP RING — E18 E17 J13 P762 — J14 P763 — GRD CONTROL — E20 E19 J15 P764

REMOTE LINE 4 — TIP RING — E14 E13 J10 P759 — J11 P760 — GRD CONTROL — E16 E15 J12 P761

J759 (H3 / HI)

CONTROL	10	O
TIP	2	G
RING	1	R
INTERCOM	9	W-BK-O
XMIT KEY	3	BL
30V	11	BR
COMMON AUDIO	6	W
12.8V	12	W-V
XMIT AUDIO	4	N22SJ W-G
GRD	7	BK
TONE KEY	5	G-BK-BR
TONE SQL	8	G-BK-O

P799 J10 TONE PANEL — HI P800 J12 TONE PANEL

OTHERWISE SAME AS J759 (NOTE 4)

J758 (H3 / HI): W-BL-G — BR-G-BL — G-BK-BL — HI P798 J9 TONE PANEL — HI P802 J14 TONE PANEL

OTHERWISE SAME AS J759

J757 (H3 / HI): W-G-O — BR-G — G — HI P797 J8 TONE PANEL — HI P803 J16 TONE PANEL

OTHERWISE SAME AS J759

J756 (H3 / HI): W-R-BK — BR-G-R — G-BK-R — HI P796 J7 TONE PANEL — HI P804 J18 TONE PANEL

OTHERWISE SAME AS J759

J755 (H3 / HI): W-O-R — BR-O — G-W-O — HI P795 J6 TONE PANEL — HI P805 J20 TONE PANEL

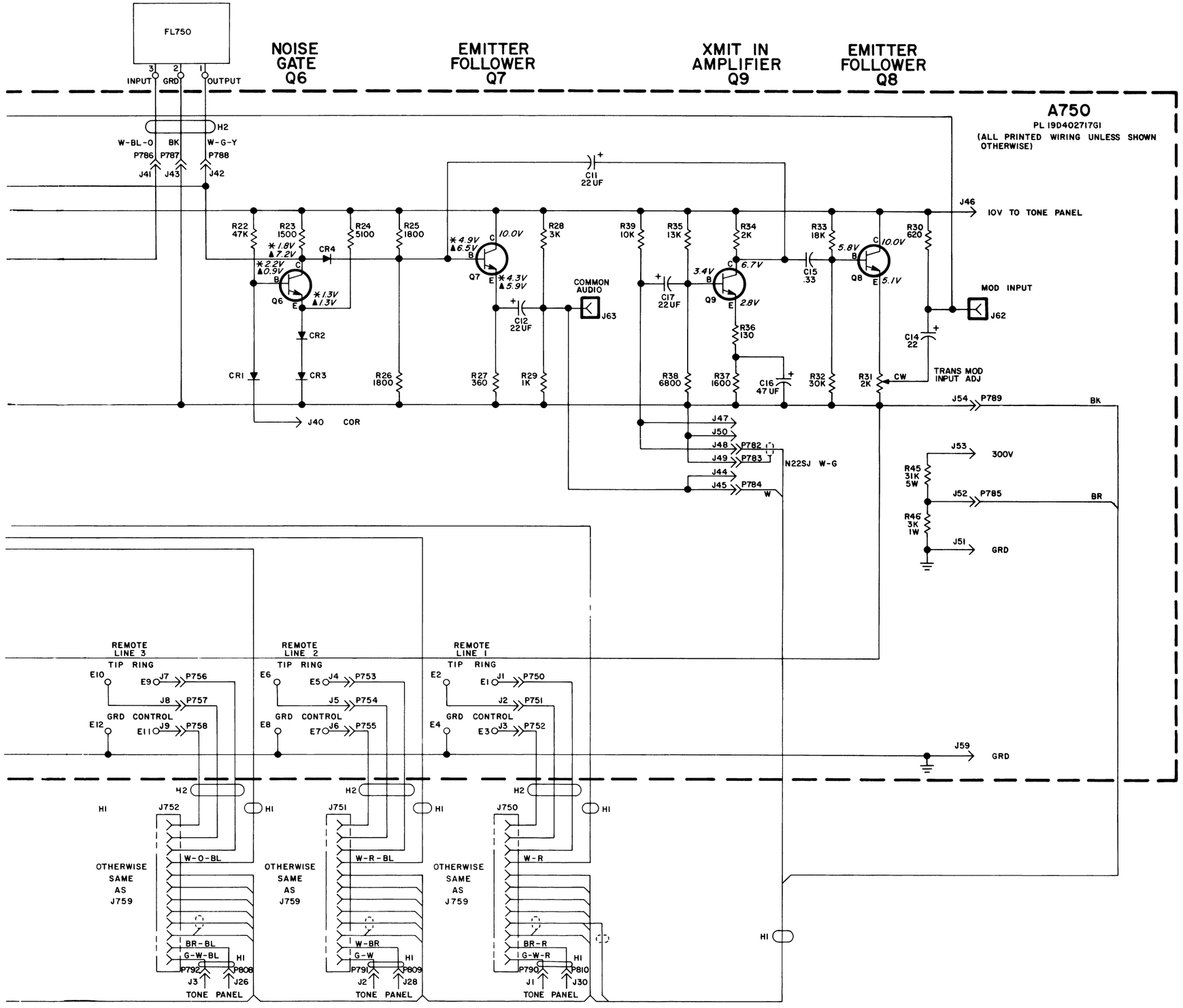
OTHERWISE SAME AS J759

J754 (H2 / HI): W-BL-R — BR-O-R — G-R — HI P794 J5 TONE PANEL — HI P806 J22 TONE PANEL

OTHERWISE SAME AS J759

J753 (H2 / HI): W-BL-BR — BR-G-W — G-W-BR — HI P793 J4 TONE PANEL — HI P807 J24 TONE PANEL

(19R620765, Rev. 5)



(19R620765, Rev. 5)

NOTES:

1. ALL WIRE TO BE N22 PER A4035031, UNLESS OTHERWISE SPECIFIED.
   ALL N22SJ W-G SHIELDED WIRE TO BE A7134854P4.
   TERMINATE N22SJ W-G WIRE PER A7136250.
2. CONNECTIONS TO FL750 & J750-J760 TO BE SOLDERED.
   ALL OTHER CONNECTIONS TO BE MADE PER TERMINAL A4029840P2.
3. MARK ALL CONNECTIONS TERMINATED WITH A4029840P2 WITH MARKER 19B209090 TO AGREE WITH PLUG NUMBERS.
4. EACH SHIELDED WIRE CONNECTING J750-J759 MUST HAVE THE SHIELD CONNECTED TO PIN 7 ON ONE END ONLY.

VOLTAGE READINGS

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

● XMIT KEYED
■ XMIT NOT KEYED
▲ WITH SIGNAL APPLIED
* WITHOUT SIGNAL APPLIED

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

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.

SCHEMATIC DIAGRAM

REMOTE PANEL 19D402744G1

RC-1498A

PARTS LIST

LBI-3744A

REMOTE PANEL
19D402744G1

SYMBOL	GE PART NO.	DESCRIPTION
A750		REMOTE BOARD 19D402717G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A115028P114	Polyester: 0.1 µf ±20%, 200 VDCW.
C2	5496267P7	Tantalum: 100 µf ±20%, 10 VDCW; sim to Sprague Type 150D.
C3	19A115028P116	Polyester: 0.22 µf ±20%, 200 VDCW.
C4	7772415P8	Electrolytic, twist-prong: 1000 µf +250% -10%, 15 VDCW; sim to Mallory Type WPO39.
C5	19A115028P116	Polyester: 0.22 µf ±20%, 200 VDCW.
C6	19A115028P117	Polyester: 0.33 µf ±20%, 100 VDCW.
C7	5496267P7	Tantalum: 100 µf ±20%, 10 VDCW; sim to Sprague Type 150D.
C8 and C9	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C10 thru C12	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C14	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C15	19A115028P117	Polyester: 0.33 µf ±20%, 100 VDCW.
C16	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C17	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C18*	19A116080P103	Polyester: 0.022 µf ±10%, 50 VDCW. Added by REV A.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 thru CR4	19A115250P1	Silicon.
CR5 thru CR7	4037822P1	Silicon.
CR8	19A115250P1	Silicon.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J17	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J19 thru J61	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J62 and J63	4037265P3	Jack, tip: green phenolic body; sim to Component Mfg Service A-1128.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q2	19A115300P1	Silicon, NPN; sim to Type 2N3053.
Q3 thru Q9	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q10	19A115300P1	Silicon, NPN; sim to Type 2N3053.
Q11	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P301J	Composition: 300 ohms ±5%, 1/2 w.
R2	3R77P911J	Composition: 910 ohms ±5%, 1/2 w.
R3	19B209113P3	Variable, wirewound: 1000 ohms ±20%, 2.5 w; sim to CTS Series 110.
R4 and R5	3R77P621J	Composition: 620 ohms ±5%, 1/2 w.
R6	3R77P184J	Composition: 0.18 megohm ±5%, 1/2 w.
R7	3R77P104J	Composition: 0.1 megohm ±5%, 1/2 w.
R8	19B209113P7	Variable, wirewound: 5000 ohms ±20%, 2.5 w; sim to CTS Series 110.
R9	3R77P302J	Composition: 3000 ohms ±5%, 1/2 w.
R10	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R11	3R77P471J	Composition: 470 ohms ±5%, 1/2 w.
R12	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R13	3R77P114J	Composition: 0.11 megohm ±5%, 1/2 w.
R14	3R77P473J	Composition: 47,000 ohms ±5%, 1/2 w.
R15	3R77P302J	Composition: 3000 ohms ±5%, 1/2 w.
R16	3R77P471J	Composition: 470 ohms ±5%, 1/2 w.
R17	3R77P682J	Composition: 6800 ohms ±5%, 1/2 w.
R18	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R19	3R77P751J	Composition: 750 ohms ±5%, 1/2 w.
R20	3R77P560J	Composition: 56 ohms ±5%, 1/2 w.
R21	3R77P112J	Composition: 1100 ohms ±5%, 1/2 w.
R22	3R77P473J	Composition: 47,000 ohms ±5%, 1/2 w.
R23	3R77P152J	Composition: 1500 ohms ±5%, 1/2 w.
R24	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R25 and R26	3R77P182J	Composition: 1800 ohms ±5%, 1/2 w.
R27	3R77P361J	Composition: 360 ohms ±5%, 1/2 w.
R28	3R77P302J	Composition: 3000 ohms ±5%, 1/2 w.
R29	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R30	3R77P621J	Composition: 620 ohms ±5%, 1/2 w.
R31	19B209113P6	Variable, wirewound: 2000 ohms ±20%, 2.5 w; sim to CTS Series 110.
R32	3R77P303J	Composition: 30,000 ohms ±5%, 1/2 w.
R33	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R34	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R35	3R77P133J	Composition: 13,000 ohms ±5%, 1/2 w.
R36	3R77P131J	Composition: 130 ohms ±5%, 1/2 w.
R37	3R77P162J	Composition: 1600 ohms ±5%, 1/2 w.
R38	3R77P682J	Composition: 6800 ohms ±5%, 1/2 w.
R39	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R40	3R77P472J	Composition: 4700 ohms ±5%, 1/2 w.
R41	3R77P301J	Composition: 300 ohms ±5%, 1/2 w.
R42	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R43	3R77P472J	Composition: 4700 ohms ±5%, 1/2 w.
R44	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R45	7478711P46	Wirewound: 31,000 ohms ±5%, 7 w; sim to Sprague Type 454E.
R46	3R78P302J	Composition: 3,000 ohms ±5%, 1 w.
		- - - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1	4036887P5	Silicon, Zener.
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL750	19C304143G1	High Pass. 300 Hz.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - -
J750 thru J760	19A115738P1	Connector, phen: 12 pins; sim to Alcon Metal Products Type 983.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P750 thru P782	4029840P2	Contact, electrical: sim to AMP 42827-2.
P783	4029840P1	Contact, electrical: sim to AMP 41854.
P784 thru P810	4029840P2	Contact, electrical: sim to AMP 42827-2.
		HARNESS ASSEMBLY 19D402744G2 (Includes J750-J810)
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	4036555P1	Insulator, washer: nylon. (Used with Q2, 10 in 19D402717G1).
	5490407P16	Grommet, rubber. (Used in 19D402744G1).
	5491563P4	Cover, connector: sim to Methode C860-1V. (Used with J760 in 19D402744G1).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

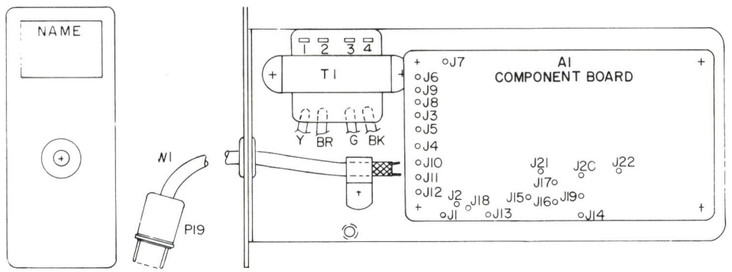
PRODUCTION CHANGES

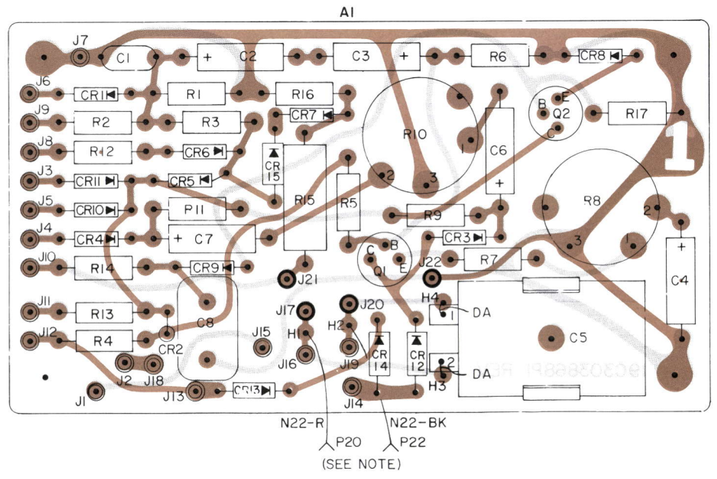
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - 19D402717G1
To prevent Q7 from oscillating.
Added C18.

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.

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.



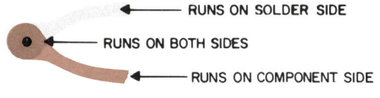


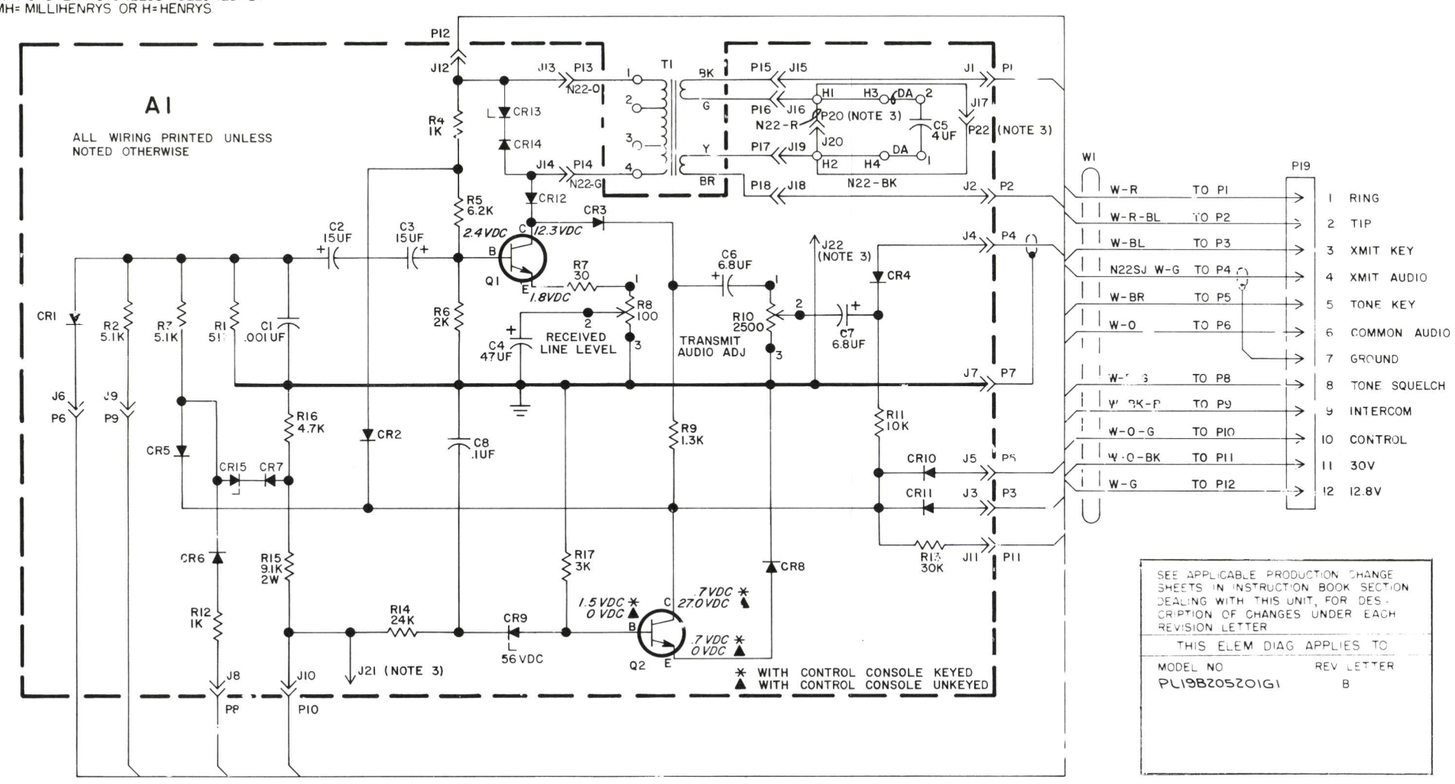
NOTE: UNIT IS SHIPPED CONNECTED FOR SEPARATE AUDIO & CONTROL PAIRS (P20 CONNECTED TO J20 & P22 CONNECTED TO J17).

FOR SINGLE PAIR WITH CONTROL VOLTAGE SIMPLEXED LINE TO GROUND, CONNECT P20 TO J21 & P22 TO J17.

FOR SINGLE PAIR WITH CONTROL VOLTAGE SIMPLEXED LINE TO LINE, CONNECT P20 TO J21 & P22 TO J22.

(19C311230, Rev. 1)
(19B205197, Sh. 1, Rev. 1)
(19B205197, Sh. 2, Rev. 1)





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
PL19B205201G1	B

NOTES:

1. SOLDER CONNECTIONS TO T1 TERMINAL 1 & 4.
2. TERMINATE ALL WIRES FROM T1 WITH TERMINAL A4036634P2.
3. UNIT IS SHIPPED CONNECTED FOR SEPARATE AUDIO & CONTROL PAIRS (P20 CONNECTED TO J20 & P22 CONNECTED TO J17).

   FOR SINGLE PAIR WITH CONTROL VOLTAGE SIMPLEXED LINE TO GROUND, CONNECT P20 TO J21 & P22 TO J17.

   FOR SINGLE PAIR WITH CONTROL VOLTAGE SIMPLEXED LINE TO LINE, CONNECT P20 TO J21 & P22 TO J22.

VOLTAGE READINGS

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

(19C303914, Rev. 4)

SCHEMATIC & OUTLINE DIAGRAM

LINE CONTROL MODULE 19B205201G1

PARTS LIST

LBI-3745A

LINE CONTROL MODULE
19B205201G1

SYMBOL	GE PART NO.	DESCRIPTION
A1		COMPONENT BOARD 19C303749G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	7774750P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW.
C2 and C3	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C4	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C5	7486445P1	Electrolytic: 4 µf +100% -10%, 150 VDCW.
C6 and C7	5496267P18	Tantalum: 6.8 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C8	19A115028P114	Polyester: 0.1 µf ±20%, 200 VDCW.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 thru CR6	19A115250P1	Silicon.
CR7 and CR8	4037822P1	Silicon.
CR9	4036392P5	Silicon, Zener; sim to Type 1N732.
CR10 and CR11	19A115250P1	Silicon.
CR12*	4037822P2	Silicon. Added by REV A.
CR13*	19A116325P4	Silicon, Zener; sim to Type 1N5349. Added by REV B.
CR14*	4037822P2	Silicon. Added by REV B.
CR15*	4036887P6	Silicon, Zener. Added by REV B.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J1 thru J22	4033513P16	Contact, electrical: sim to Bead Chain R52-1.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P20	4036634P1	Contact, electrical: sim to AMP 42428-2.
P22	4036634P1	Contact, electrical: sim to AMP 42428-2.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115300P1	Silicon, NPN; sim to Type 2N3053.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P513J	Composition: 51,000 ohms ±5%, 1/2 w.
R2 and R3	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R4	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R5	3R77P622J	Composition: 6200 ohms ±5%, 1/2 w.
R6	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R7	3R77P300J	Composition: 30 ohms ±5%, 1/2 w.
R8	19B209113P5	Variable, wirewound: 100 ohms ±20%, 2.5 w; sim to CTS Series 110.
R9	3R77P132J	Composition: 1300 ohms ±5%, 1/2 w.
R10	19B209113P2	Variable, wirewound: 2500 ohms ±20%, 2.5 w; sim to CTS Series 110.
R11	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R12	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R13	3R77P303J	Composition: 30,000 ohms ±5%, 1/2 w.
R14	3R77P243J	Composition: 24,000 ohms ±5%, 1/2 w.
R15	3R79P912J	Composition: 9100 ohms ±5%, 2 w.
R16	3R77P472J	Composition: 4700 ohms ±5%, 1/2 w.
R17	3R77P302J	Composition: 3000 ohms ±5%, 1/2 w.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P13 thru P18	4036634P2	Contact, electrical: sim to AMP 42429-2.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1	19A115731P1	Audio freq: 0.3-6 KHz, Pri 1-4: 22 ohms ±15% DC res, Pri 2-3: 12.5 ohms ±15% DC res, Sec 1: 13 ohms ±15% DC res, Sec 2: 13 ohms ±15% DC res.
		- - - - - - - - - - - CABLES - - - - - - - - - - -
W1		CABLE 19B205203G1
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 thru P12	4036634P1	Contact, electrical: sim to AMP 42428-2.
P19	19A115738P2	Plug, phen: 12 pins; sim to Alcon Metal Products Type 984.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	4036555P1	Insulator, washer: nylon. (Used with Q1, 2 in 19C303749G1).
	7763541P3	Clip, spring tension. (Used with W1 in 19B205201G1).
	5490407P29	Grommet: rubber. (Used with W1 in 19B205201G1).
	5491563P4	Connector shell. (Part of W1).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

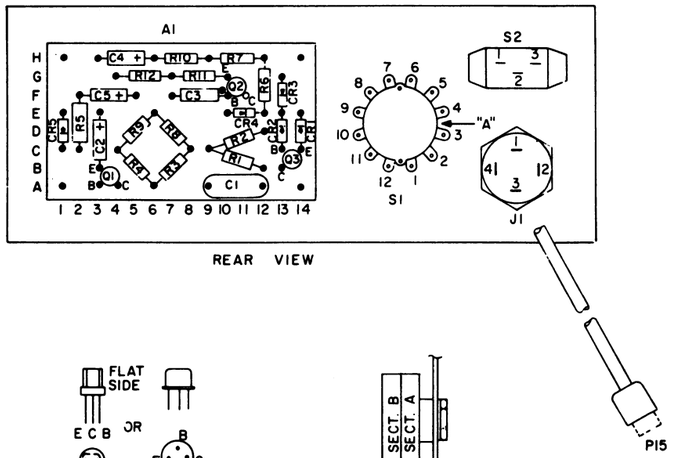
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

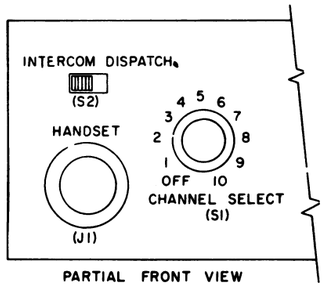
REV. A - 19B205201G1
To add Lightning Protection.
Added CR1 and CR2.

REV. B - 19B205201G1
To reduce noise when control is simplexed line to ground.
Deleted CR1 and CR2.

19C303749G1
Added CR13, CR14, and CR15.

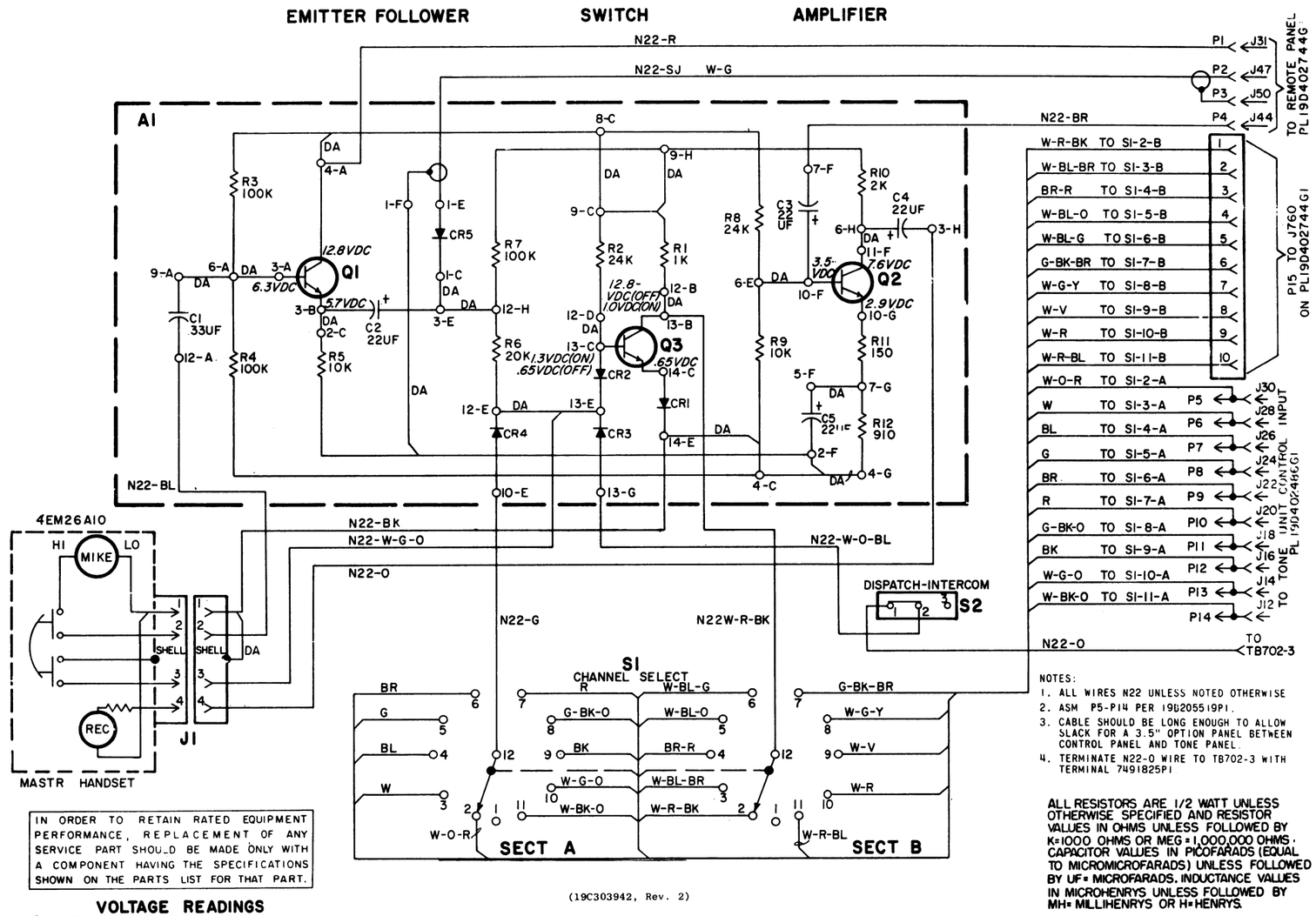
OUTLINE DIAGRAM





(19C311250, Rev. 0)

SCHEMATIC DIAGRAM



NOTES:
1. ALL WIRES N22 UNLESS NOTED OTHERWISE
2. ASM P5-P14 PER 19B205519P1.
3. CABLE SHOULD BE LONG ENOUGH TO ALLOW SLACK FOR A 3.5" OPTION PANEL BETWEEN CONTROL PANEL AND TONE PANEL.
4. TERMINATE N22-O WIRE TO TB702-3 WITH TERMINAL 7491825P1

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.

(19C303942, Rev. 2)

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.

VOLTAGE READINGS

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

SCHEMATIC & OUTLINE DIAGRAM

INTERCOM PANEL PL-19C303869-G1

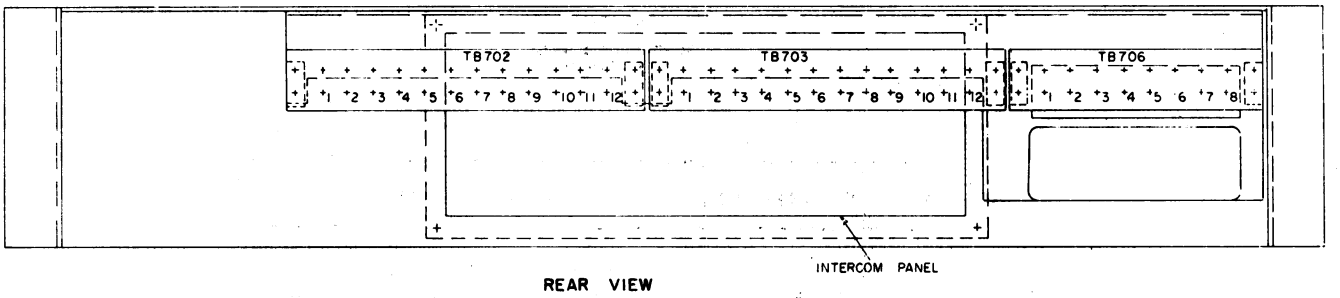
PARTS LIST

LBI-3747

INTERCOM PANEL
PL-19C303869-G1

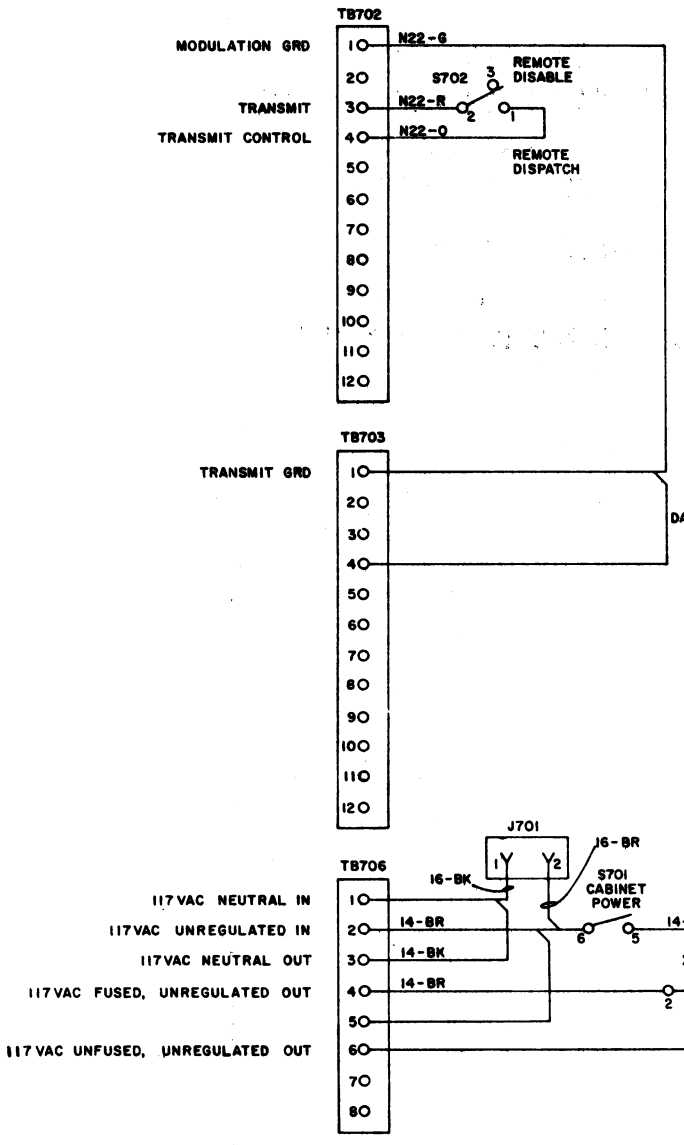
SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - - SUBASSEMBLIES - - - - - - - - - -
A1		COMPONENT BOARD PL-19B205170-G1
		- - - - - - - - - - - CAPACITORS - - - - - - - - - - -
C1	5491459-P9	Polyester: 0.33 µf ±10%, 50 VDCW.
C2 thru C5	5496267-P10	Tantalum, dry solid: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1 thru CR5	19A115250-P1	Silicon.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1 and P2	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P3	4029840-P3	Contact, electrical: sim to AMP 42101-2.
P4	4029840-P2	Contact, electrical: sim to AMP 42827-2.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 thru Q3	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - - RESISTORS - - - - - - - - - - -
R1	3R77-P102K	Fixed composition: 1000 ohms ±10%, 1/2 w.
R2	3R77-P243J	Fixed composition: 24,000 ohms ±5%, 1/2 w.
R3 and R4	3R77-P104K	Fixed composition: 0.1 megohm ±10%, 1/2 w.
R5	3R77-P103K	Fixed composition: 10,000 ohms ±10%, 1/2 w.
R6	3R77-P203J	Fixed composition: 20,000 ohms ±5%, 1/2 w.
R7	3R77-P104K	Fixed composition: 0.1 megohm ±10%, 1/2 w.
R8	3R77-P243J	Fixed composition: 24,000 ohms ±5%, 1/2 w.
R9	3R77-P103K	Fixed composition: 10,000 ohms ±10%, 1/2 w.
R10	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R11	3R77-P151K	Fixed composition: 150 ohms ±10%, 1/2 w.
R12	3R77-P911J	Fixed composition: 910 ohms ±5%, 1/2 w.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1	7117934-P2	Connector, chassis: 4 female contacts; sim to Amphenol 91-PC4F.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P5 thru P14	4033348-P1	Contact, electrical: sim to Bead Chain M 125-34.
P15	19A115738-P2	Connector, phen: 12 pins; sim to Alcon Metal Products Type 984.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19C307060-P5	Rotary: 2-section, 2-pole, 11-position, non--shorting contacts, 0.75 amp at 125 VAC; sim to CTS 222-A17445-2.
S2	7145098-P3	- - - - - - - - - - SWITCHES(Cont'd) - - - - - - Slide: SPDT, 0.75 amp at 125 VAC or 0.5 amp at 125 VDC; sim to Stackpole SS-32.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	PL-4039182-G1	Knob. (Used with S1).
	5491563-P4	Cover, connector: sim to Methode C850-1V. (Used with P15).

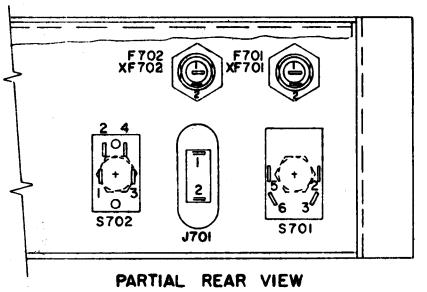
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.



REAR VIEW

SCHEMATIC DIAGRAM





PARTIAL REAR VIEW

NOTES:
1. SOLDER ALL ELECTRICAL CONNECTIONS.
2. TERMINATE ALL WIRES TO S701 WITH 19B209151P1.

(19C311251, Rev. 1)

(19C311099, Rev. 3)

SCHEMATIC & OUTLINE DIAGRAM

POWER CONTROL PANEL PL-19C303870-G1

PARTS LIST

LBI-3746

POWER CONTROL PANEL
PL-19C303870-G1

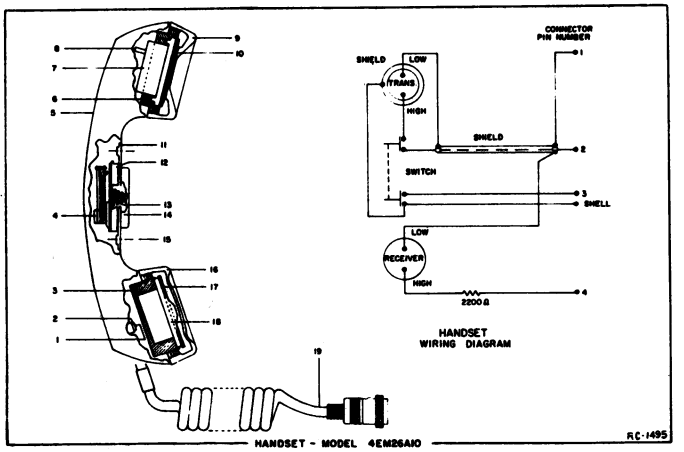
SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - - - FUSES - - - - - - - - - - -
F701 and F702	7484390-P5	Quick blowing; 20 amps at 250 v; sim to Bussmann ABC-20.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J701	7128081-P1	Connector, phen: 3 contacts; sim to Cinch 54A12844.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S701	7109677-P1	Toggle: DPST, 12 amps at 125 v; sim to Arrow--Hart and Hegeman 82143-V.
S702	7145098-P3	Slide: SPDT, 0.75 amp at 125 VAC or 0.5 amp at 125 VDC; sim to Stackpole SS-32.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB702 and TB703	19C301086-P8	Feed-thru, phen: 12 terminals; sim to G-E CR151D75412AB.
TB706	19C301086-P6	Feed-thru, phen: 8 terminals; sim to G-E CR151D75408AB.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XF701 and XF702	19B209008-P1	Fuseholder, post type, phen: 15 amps at 250 v; sim to Littelfuse 342012.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

HANDSET
MODEL 4EM26A10

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - -MISCELLANEOUS- - - - - - - - - -
		(REFER TO RC-1495)
1		Self tap screw, bind head: No. 4 x 5/16.
2		Cable clamp. Shure Brothers 53A532.
3		Shield. Shure Brothers 53A341.
4		Switch. Shure Brothers 90A925.
5		Handle. Shure Brothers 90A971.
6		Adapter. Shure Brothers 65A230.
7		Magnetic controlled cartridge. Shure Brothers 99A562.
8	3R77-P222K	Resistor, composition: 2200 ohms ±10%, 1/2 w.
9		Receiver cap. Shure Brothers 65A199A.
10		Washer. Shure Brothers 34A321.
11		Escutcheon. Shure Brothers 53A536A.
12		Actuator. Shure Brothers 53A556.
13		Spring. Shure Brothers 44A140.
14		Plunger bar. Shure Brothers 65B206A.
15		Flat head screw, socket cap: No. 4-40 x 1/4.
16		Transmitter cap. Shure Brothers 65A197A.
17		Washer. Shure Brothers 34A309.
18		Magnetic controlled cartridge. Shure Brothers 99A86.
19		Cable and plug. Shure Brothers 90AB619.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

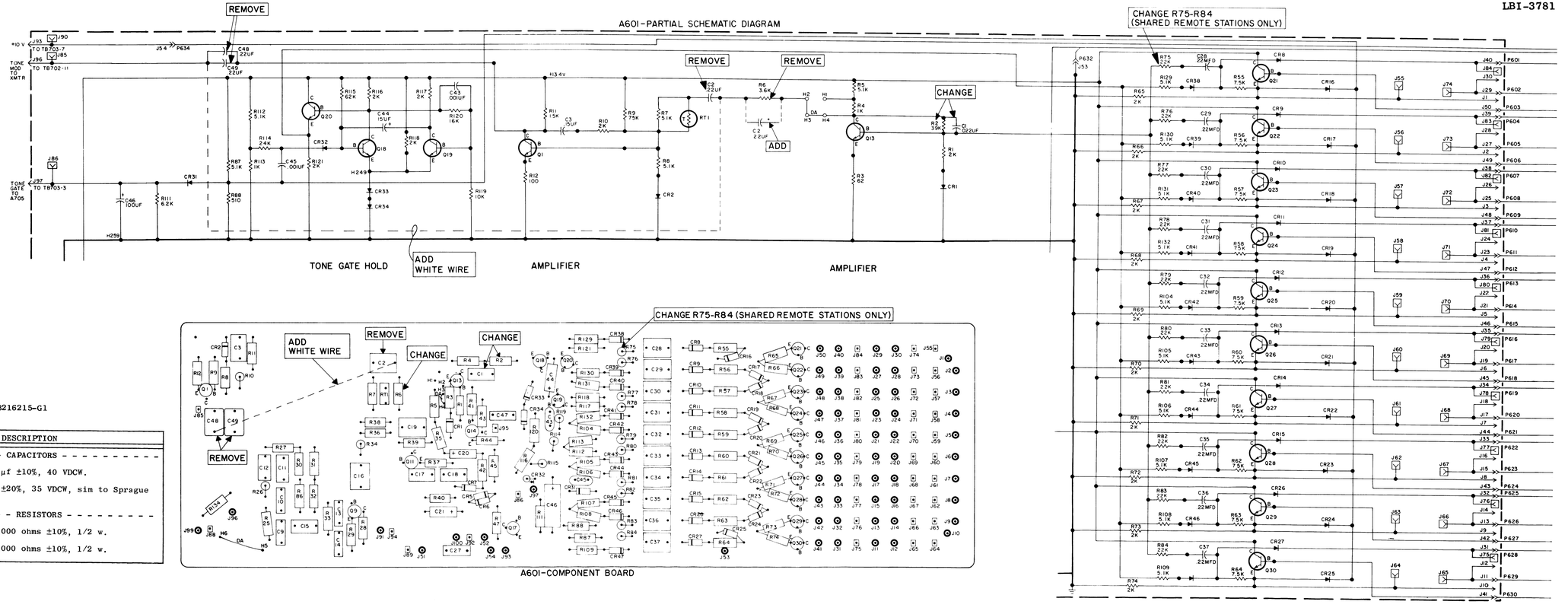


SCHEMATIC & OUTLINE DIAGRAM

HANDSET MODEL 4EM26A10

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 19B216215-G1
(FOR USE WITH ICOM EQUIPPED TRANSMITTERS)

RC-1624A

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.

MAINTENANCE MANUAL

LBI-3781

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC

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