MOBILE RADIO

MASTR Progress Line

MONITOR PANEL Model 4EC77A10-14

Maintenance Manual LBI-3984G

DF-4082

4EC77A10-14

SPECIFICATIONS *

Model Numbers 4EC77A10 4EC77A11 4EC77A12 4EC77A13 4EC77A14	Stations Monitored Two Three Four Five Six
Audio Output	Greater than 10 watts Less than 1-1/2% distortion @ 5 watts.
Frequency Response	+1/2 to -3 dB, 200 to 10,000 Hz, reference 1000 Hz.
Compression Range	With audio input increase of 30 dB beyond start of compression, output level increased less than 3 dB.
Input and Output Impedance	600 ohms
Temperature Range	-30°C to +60°C (-22°F to +140°F)
Power Requirements	80 watts, 117 VAC, 50/60 Hz.

*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

FIGURES

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

General Electric Monitor Panels Models 4EC77A10-14 are designed for use in the turret left-section of a Radio Control Center. Electrical components and plug-in modules are mounted on a 19-inch drawer-type chassis which can easily be removed from the turret for maintenance and servicing.

Monitor Panels are available for monitoring up to six individual 600-ohm audio lines from monitor receivers and/or base stations. Individual line termination, compressor amplifier, light flasher, mute and volume control circuits are provided for each audio channel. Normally the outputs of two compressor amplifiers are combined to feed a common speaker amplifier and speaker, therefore, a maximum of three speaker amplifiers and three speakers are used in the panel.

Printed circuit board techniques, silicon transistors and other solid state devices are designed into the basic modules of the panel to assure maximum reliability.

External connections are made to the panel at terminal boards TB861-TB865 located on the back of the panel. Power cable W855 connects to AC power through a convenience outlet on the console turret.

ADJUSTMENT

The following procedure should be used when making adjustments to the circuits of the Monitor Panel. Figure 1 shows the location of the adjustable components.

LINE INPUT AND LIGHTER FLASHER

The line input (or threshold of compression) and light flasher must be set for <u>each</u> line input to the Monitor Panel. Start with any line, for the order of adjustment is not important. <u>Do not</u> select the line (or station) from the turret center section while making the adjustment.

PROCEDURE:

1. Apply a 1 kHz, -20 dBm signal from a 600 ohm source to Line 1 on TB2 (see LBI-4159 for connection information). If TB2 is not used, apply signal source to Line 1 on TB861 of the monitor panel.

2. Set the LINE ADJ control R3 on the COMP/LIGHT FLASHER module for an output of 0.8 VDC measured from J1 (green jack) to chassis ground.

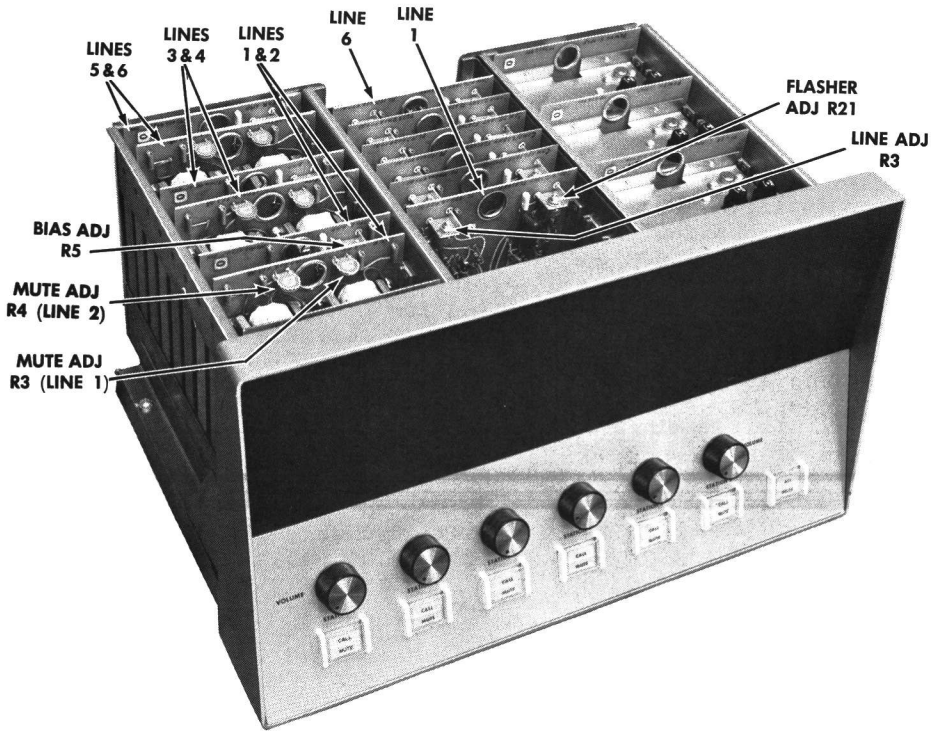


Figure 1 - Monitor Panel Adjustments

3. Measure the level across the speaker associated with Line 1.

4. Increase level of input tone to +10 dBm. Level as measured across speaker should not increase more than 3 dB from that level previously measured with a -20 dBm input signal at the line input.

5. Adjust Flasher Control R21 until the CALL lamp for Line 1 just starts to flash. (If later flasher fails to operate with voice input, readjust R21 using voice input).

6. Repeat Steps 1 thru 5 for each line.

MUTE CONTROL

Mute Controls R3 (Lines 1, 3, 5) and R4 (Lines 2, 4, 6) on the Line Termination Module have been set at the factory for 40-dB muting. They may be readjusted for any desired muting level between 0 and 40-dB in the following manner.

1. Select the mute function for the desired station with the CALL/MUTE switch on the front of the Monitor Panel.

2. Apply a 300 MV RMS signal at 1000 Hz to the audio pair for the selected station.

3. Adjust the Mute Control (R3 or R4) for the desired mute level.

SPEAKER AMPLIFIER BIAS CONTROL

The Bias Control (R5) on each Speaker Amplifier Module is pre-set at the factory and should not require further adjustment. However, if adjustment is necessary, use the following procedure.

1. Remove the Speaker Amplifier from its position in the module mounting frame, and install the Extender in its place.

2. Install the Speaker Amplifier in the connector provided on the Extender.

3. Remove jumpers between J2 & J3 and J4 & J5 on the Extender.

4. Connect a DC milliammeter between J2 and J3.

5. With no signal input, adjust BIAS ADJ Control R5 for a meter reading of 20 mA.

6. Remove the Extender and reinstall the Speaker Amplifier in the mounting frame.

CIRCUIT ANALYSIS

The Monitor Panel is used to monitor up to six incoming lines (600-ohm) from base stations and/or monitor receivers. The panel contains Line Termination, Compressor Amplifier/Light Flasher, Speaker Amplifier, All Mute, and Power Supply Modules which plug into connectors on the module mounting frame.

A VOLUME control and CALL/MUTE switch are provided for each incoming line. An ALL MUTE switch is also provided and when operated mutes all incoming signals to the speakers of the Monitor Panel.

MONITORING CIRCUITS

Channel 1 for each line input is monitored automatically by circuits of the Monitor Panel, except when a line is selected from the Control Panel (center section). Since the monitoring function for each line is similar, only line 1 is described in the following text and shown in Simplified Diagram Figure 2.

Audio from line 1 is connected to TB2-1 and -2 in back of the Radio Control Center Console and routed through the harness wiring to TB861-1 and -2 on the Monitor Panel. From here the signal is connected through line matching transformer T1 (on the Line Termination Module) to the Compressor Amplifier/Light Flasher Module. Outputs are provided from the Compressor Amplifier/Light Flasher Module to the station 1 CALL lamp (which flashes to signal the operator of an incoming call) and the VOLUME control.

If the CALL/MUTE switch (for line 1) is in the CALL position, the audio is connected from the volume control through contacts 1 and 2 of the CALL/MUTE switch to the All Mute Module. Then the signal is connected through normally closed contacts of the all mute relay and through normally closed contacts of the line select relay (on the Line Termination Module) to the Speaker Amplifier input. The output of the Speaker Amplifier drives loudspeaker LS801.

If the CALL/MUTE switch is in the MUTE position (mute light on) or if the ALL MUTE function is selected (all mute light on), the output from the Compressor Amplifier is connected to the Speaker Amplifier through station 1 muting adjustment R3. This control is adjustable and may be set to provide any desired muting level between 0 and 40 dBm.

When line 1 is selected from the Control Panel (center section), line select relay K1 on the Line Termination Module energizes and transfers line 1 to line transformer T801 on the Control Panel (see Figure 2).

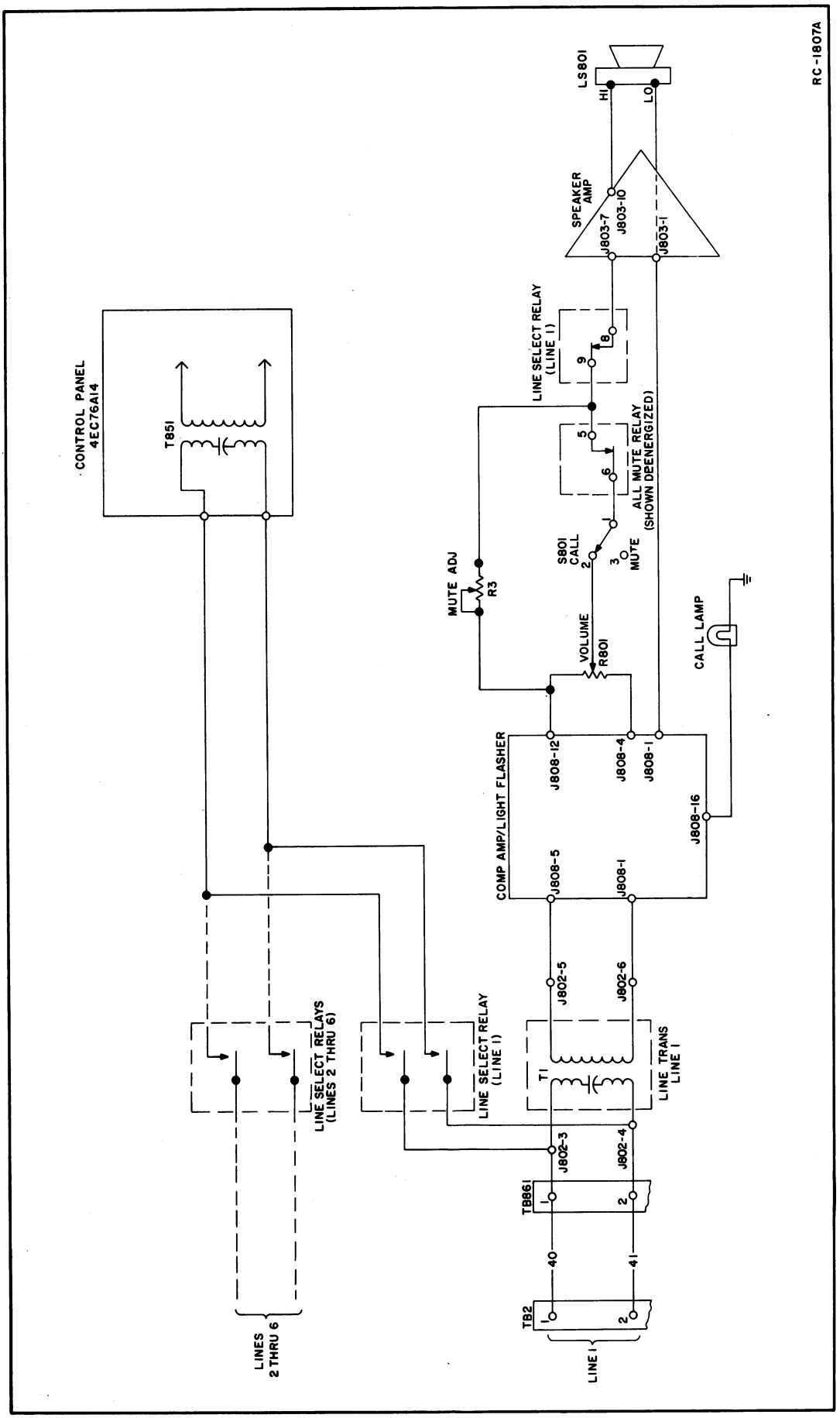


Figure 2 - Simplified Diagram of Line 1 Monitoring Circuits

Also, relay K1 disables the line 1 monitoring function of the Monitor Panel by breaking the Speaker Amplifier input circuit. All other line inputs will continue to be monitored through circuits of the Monitor Panel.

LINE TERMINATION MODULE

Line Termination Modules 19D402983-G1 (single-line input) and 19D402983-G2 (dual-line input) contain the line transformers, relays and mute controls required for matching the input of the 600-ohm lines to the Monitor Panel circuits and transferring lines from monitor to control applications. Normally dual-line modules are used, however, one single-line module is used if an odd number of lines are to be monitored.

The transfer of a line input from the Monitor Panel to the Control Panel is accomplished by two relays on the Line Termination Module. These relays are operated by an associated station select switch (momentary-action push button) on the Control Panel as shown in Figure 3.

Assume that the STATION 1 select switch is pressed. Line relays K1 & K3 energize and become locked-in through contacts 6 & 7 of K1 and normally closed contacts 1 & 2 of each station select switch. Pressing a second station select switch will release the station 1 relays and operate a second set of relays to select another station.

COMPRESSOR AMPLIFIER/LIGHT FLASHER MODULE

The Compressor Amplifier/Light Flasher Module prevents speaker "blasting" caused by variations in line input levels. Outputs are provided from this module to the associated Speaker Amplifier Module and CALL lamp.

Compressor Amplifier

The compressor amplifier circuit consists of gain control stage Q1, high gain audio amplifiers Q2 through Q5 and DC amplifier Q6.

When audio is applied to the compressor amplifier, resistor R4 and the AC impedance of transistor Q1 act as a voltage divider for the AC input signal. The output of Q1 is amplified by a four stage, direct-coupled amplifier (Q2 through Q5). Both AC and DC feedback in the amplifier circuit provides for extremely stable operation.

Transistor Q5 provides outputs for the Speaker Amplifier, Light Flasher, and DC amplifier Q6. The output for the DC amplifier is rectified by detector CR1, filtered by C4, then amplified by Q6 and fed back to the base of gain control transistor Q1.

The amount of DC feedback to the gain control stage determines the AC impedance of Q1. When the input level rises, the AC amplifier output starts to increase. The output is detected, amplified and fed back to the base of Q1. The increase in feedback reduces the AC impedance of Q1 which decreases the audio voltage to the AC amplifier, keeping the amplifier output constant.

When the audio input decreases, the output of the AC amplifier starts to decrease, reducing the feedback to Q1. This

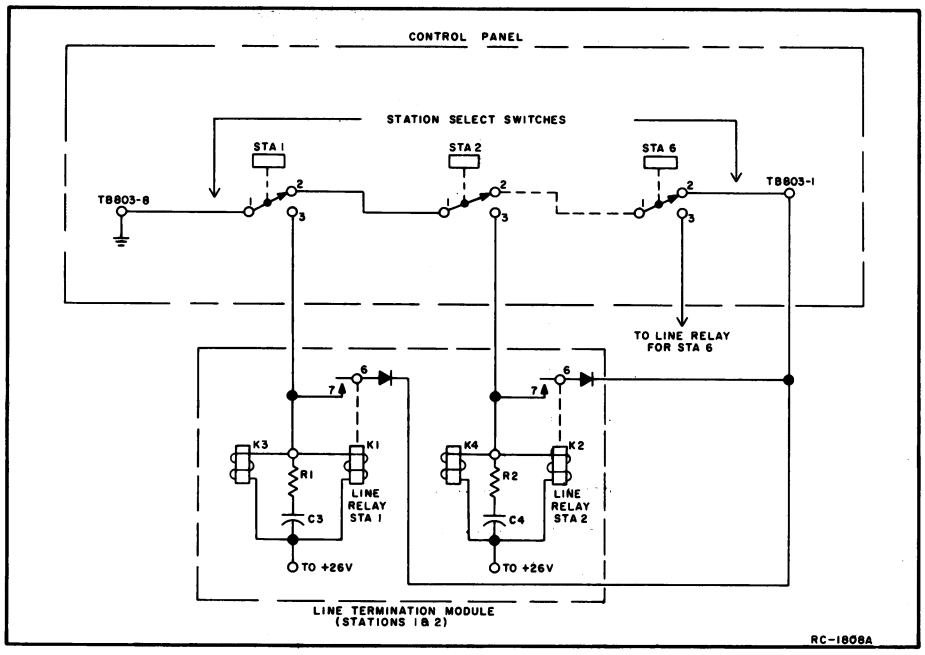


Figure 3 - Line Relay Operation

raises the AC impedance of Q1 and increases the audio voltage to the AC amplifier, keeping the amplifier output constant.

Light Flasher

A sample of the audio output from AC amplifier Q5 (on the compressor amplifier) is connected to the light flasher through FLASHER ADJ R21. Q7 amplifies the audio and provides an output to the base of DC amplifier Q8. The DC amplifier conducts on the positive half cycles to build a positive charge on C10. This turns on Q9 which triggers relaxation oscillator Q10 and Q11. Each time Q11 in the oscillator conducts, the CALL lamp (connected in Q11 collector circuit) flashes to indicate the presence of audio.

When a station is selected from the control panel, its associated flasher is disabled during the transmit function. Operating the console push-to-talk switch grounds the base of Q8 through diode CR2. This holds Q8 off to prevent flasher operation.

SPEAKER AMPLIFIER MODULE

The Speaker Amplifier Module is a dual-input amplifier, consisting of transistors Q1-Q6, that provides up to 10-watts of audio output for the loudspeaker.

Audio is connected to the base of Q1 through R10 or R11 and C5. The output of Q1 is applied to driver transistors Q3 and Q4 and then to Class B power amplifiers Q5 and Q6. The PA output is connected through C3 to drive the loudspeaker.

Q2 provides a slight forward bias to the base circuit of driver transistors Q3 and Q4 to prevent cross-over distortion. The bias is controlled by R5 which is set at the factory for optimum circuit performance (refer to the Adjustment Section).

POWER SUPPLY MODULE

The Power Supply Module operates from a 117 VAC input and provides regulated outputs of +13.5 and +26 volts. The 26-volt output supplies power for the Speaker Amplifier Module, relays on the Line Termination Module, and the indicator lamps on the CALL/MUTE switch. The 13.5 volt output provides power for the Compressor Amplifier/Light Flasher Module. Each Power Supply Module is capable of supplying circuits associated with monitoring two lines.

Full-wave rectification is provided by diodes CR1-CR4. Zener diodes CR5 & CR7 and transistors Q1 & Q2 regulate the 26-volt output while zener diode CR6 regulates the 13.5-volt output. Jacks J1 (ground), J2 (13.5 volts) and J3 (26 volts) are provided for metering the power supply outputs.

ALL MUTE MODULE

The All Mute Module contains relay K1 which, when operated, mutes all monitor amplifier inputs. An ALL MUTE switch is provided on the front of the Monitor Panel for operating K1. The All Mute relay also operates when the push-to-talk switch is pressed, to mute automatically all monitor amplifiers during the transmit cycle.

MAINTENANCE

The Monitor Panel is designed for ease of maintenance and repair. All major units are plug-in modules. Finger holes are provided in the ends of the modules to facilitate removal from the panel. For service of the individual modules, refer to the appropriate schematic and outline diagrams.

An extender is provided to permit testing and troubleshooting of the modules. Due to the added wire lengths, the extender may increase noise levels or cause unstable operation of the amplifiers. Because of this, the extender should be used only when necessary.

REMOVING THE MONITOR PANEL FROM THE TURRET

To test or replace a plug-in module or to perform other service operations, remove the monitor panel from the turret housing as described below.

1. Grasp the front edges of the panel and pull the panel forward until the stop is reached.

2. To completely remove the panel from the turret, lift the panel to clear the stop and pull forward. No electrical disconnections are required to set the panel on the desk top.

INDICATOR LAMP REPLACEMENT

Replace defective push-button switch lamp as follows:

1. Grasp the switch lens (nameplate) and pull forward to remove the indicator assembly and gain access to the indicator lamps.

2. Remove the defective indicator lamp from its socket by pressing on the bulb end, and install the new lamp.

3. Reinstall the indicator assembly. The assembly must be in the extended configuration shown in Figure 4 (see Page 6) before it can be reinstalled in the panel.

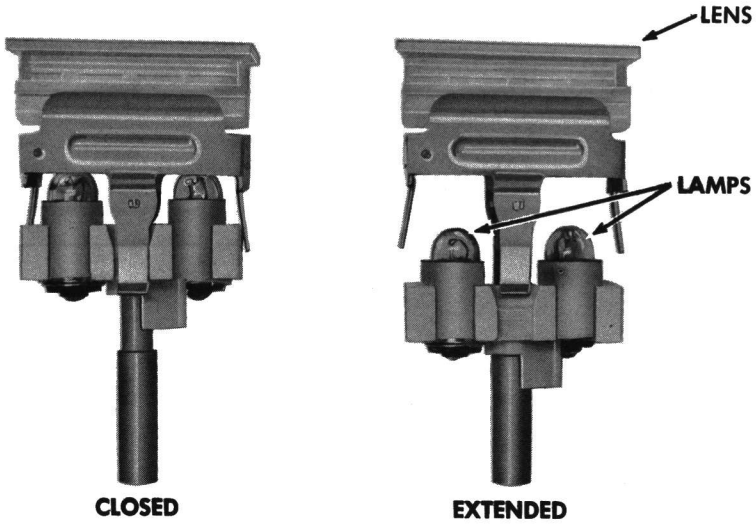
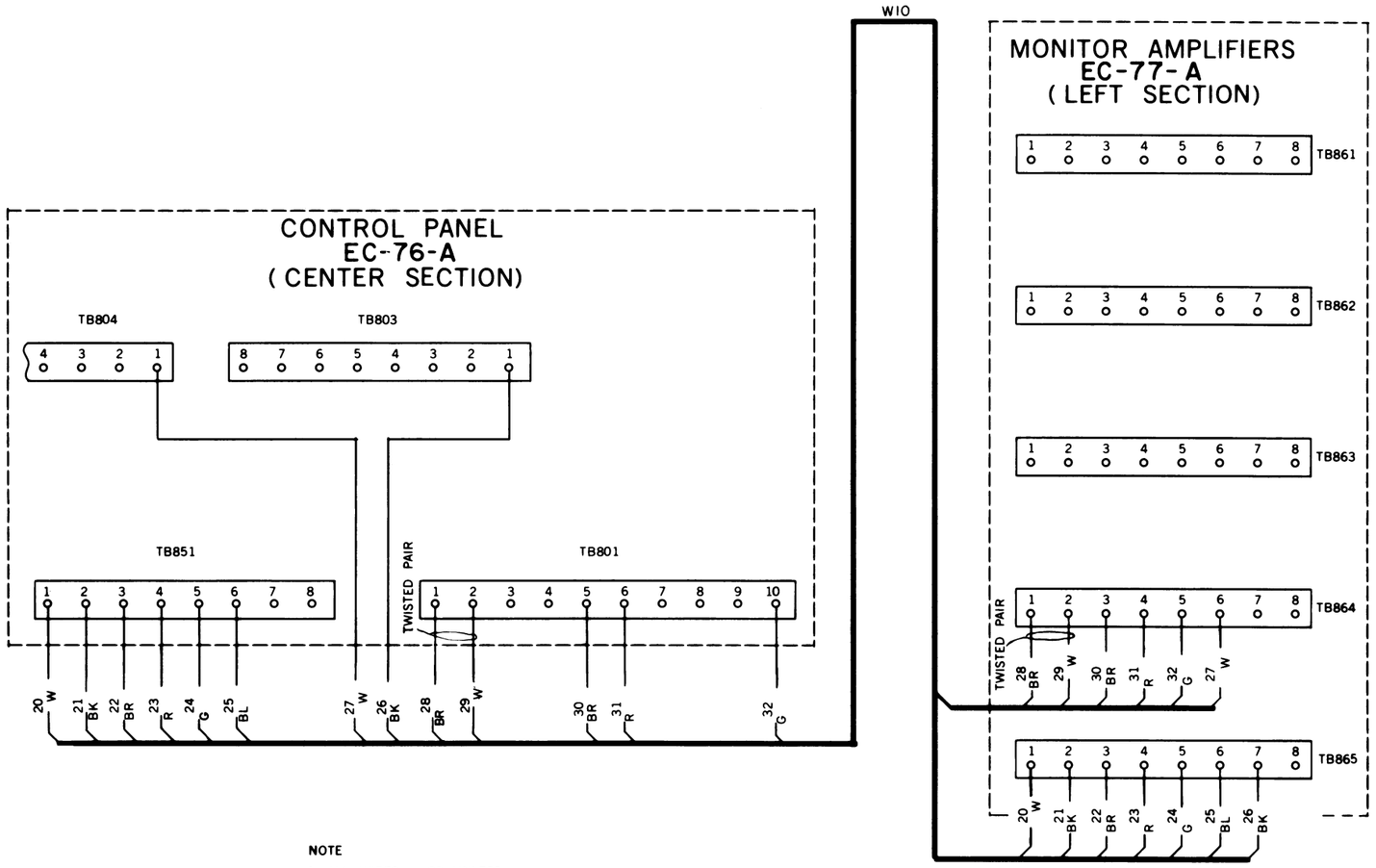


Figure 4 - Switch Indicator Assembly



NOTE

1. ALL WIRES V20 UNLESS OTHERWIRE SPECIFIED

(19C311646, Rev. 3)

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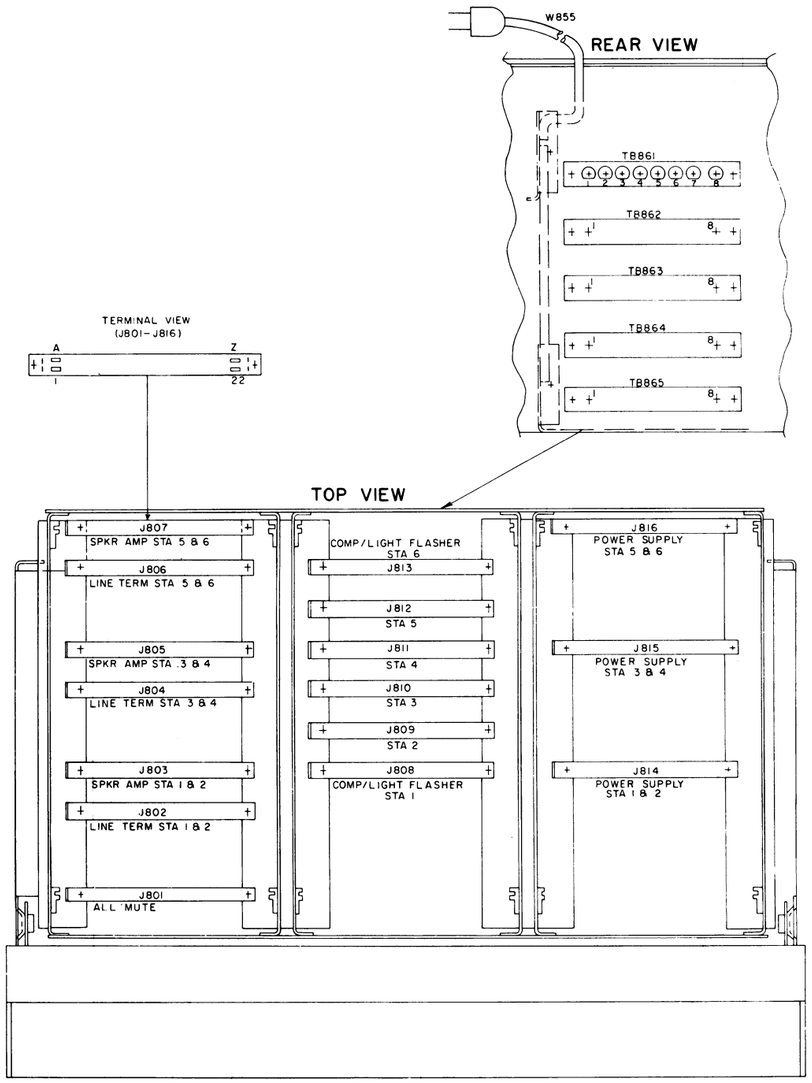
INTERCONNECTION DIAGRAM

MONITOR PANEL TO CONTROL PANEL



(19D413302, Rev. 0)

OUTLINE DIAGRAM

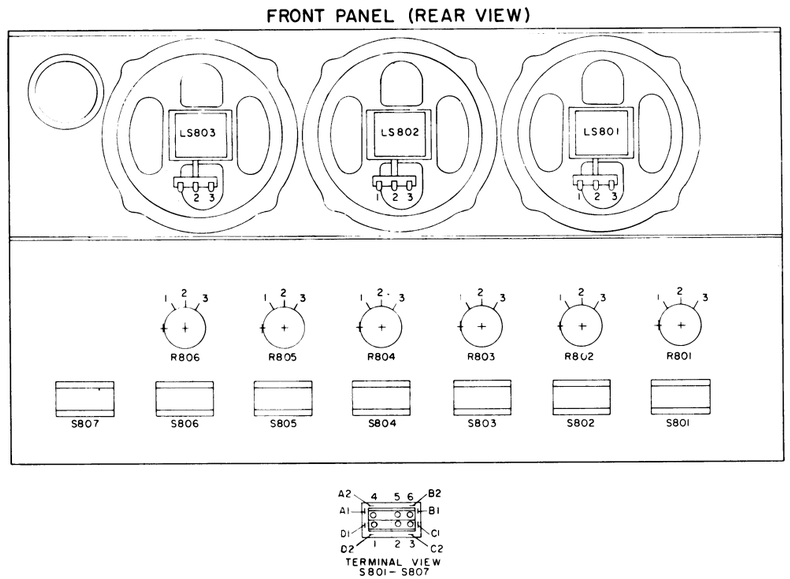
MONITOR PANEL
19E500875-G1

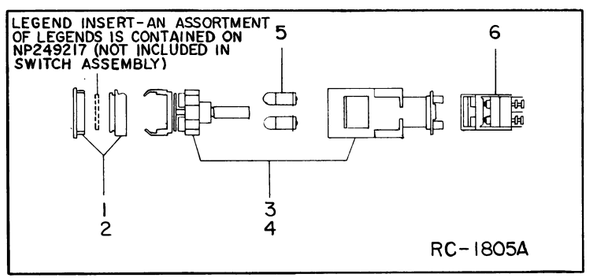
PRODUCTION CHANGES

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 - Monitor Panel 19E500875G1

To distribute load on power supplies and provide isolation. Add CR802, CR803 and CR804.





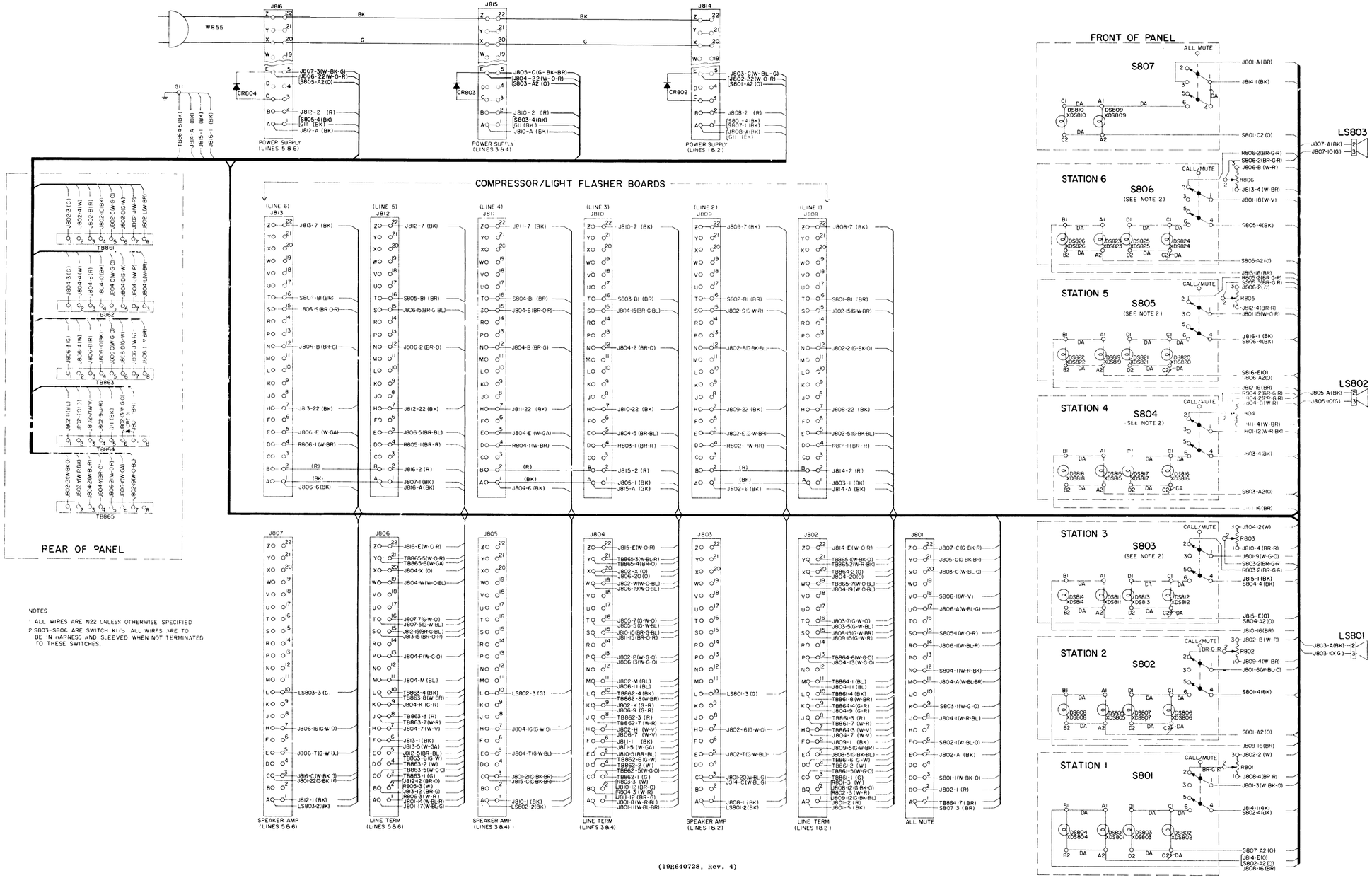
PARTS LIST

LBI-4012A

MONITOR PANEL
19E500875G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR801	4037822P1	Silicon.
CR802* thru CR804*	4037822P1	Silicon. Added by REV A.
		- - - - - - - - - INDICATING DEVICES - - - - - - - -
DS801 thru DS826		(See RC-1805).
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - -
J801 thru J816	5496085P4	Connector, printed board: 44 contacts; sim to Methode 6044-1155-00.
		- - - - - - - - - - LOUDSPEAKERS - - - - - - - - - -
LS801 thru LS803	5491260P7	Permanent magnet, 5-inch: 3.2 ohms ±10% voice coil imp, 15 w max operating, 385 Hz ±15% resonance, paper dust cap; sim to Jensen Model P5-VA.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R801 thru R806	5496870P11	Variable, carbon film: 5000 ohms ±20%; sim to Mallory LC(5K).
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S801 thru S807		(See RC-1805).
		- - - - - - - - - TERMINAL BOARDS - - - - - - - -
TB861 thru TB865	7117710P8	Phen: 8 terminals; sim to Cinch 80.
		- - - - - - - - - - CABLES - - - - - - - - - -
W855	4036441P7	Power: approx 7 feet long, with 2-contact plug.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS801 thru XDS826		(See RC-1805).
		SWITCH ASSEMBLY 19B216214G1 S801-S806 19B216214G2 S807 (RC-1805)
1	19C307029P15	Pushbutton-Lens. (Used with S801-S806).
2	19C307029P4	Pushbutton-Lens. (Used with S807).
3	19C307029P17	Actuator-Holder (Includes XDS801-XDS808, XDS811-XDS826).
4	19C307029P16	Actuator-Holder (Includes XDS809 and XDS810).
5	19C307037P26	Lamp, incandescent: 28 v; sim to GE 387. (DS801-DS826).
6	19C307029P11	Switch, push: lighted, 2 circuits, SPDT each, alternate action, 5 amps at 250 VAC; sim to Micro Switch 2D26. (S801-S807).
		MECHANICAL PARTS
	19A115837P1	Knob, push on. (Used with R801-R806).
	19D402906G1	Speaker Grille.
	19C311304P1	Dummy switch.
	19C307029P3	Retainer. (Used with S801, S802, S807 and dummy switches).
	19A115873P1	Bumper. (Located on bottom back edge of Control Panel).
	19A115873P1	Bumper. (Located on bottom front edge of Control Panel).
	19B205762P1	Locking pin. (Part of Control Panel latch assembly).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



NOTES

1. ALL WIRES ARE N22 UNLESS OTHERWISE SPECIFIED
2. S803-S806 ARE SWITCH KITS. ALL WIRES ARE TO BE IN HARNESS AND SLEEVED WHEN NOT TERMINATED TO THESE SWITCHES.

(DF-4083)

(19R640728, Rev. 4)

SCHEMATIC DIAGRAM

MONITOR PANEL
19E500875-G1

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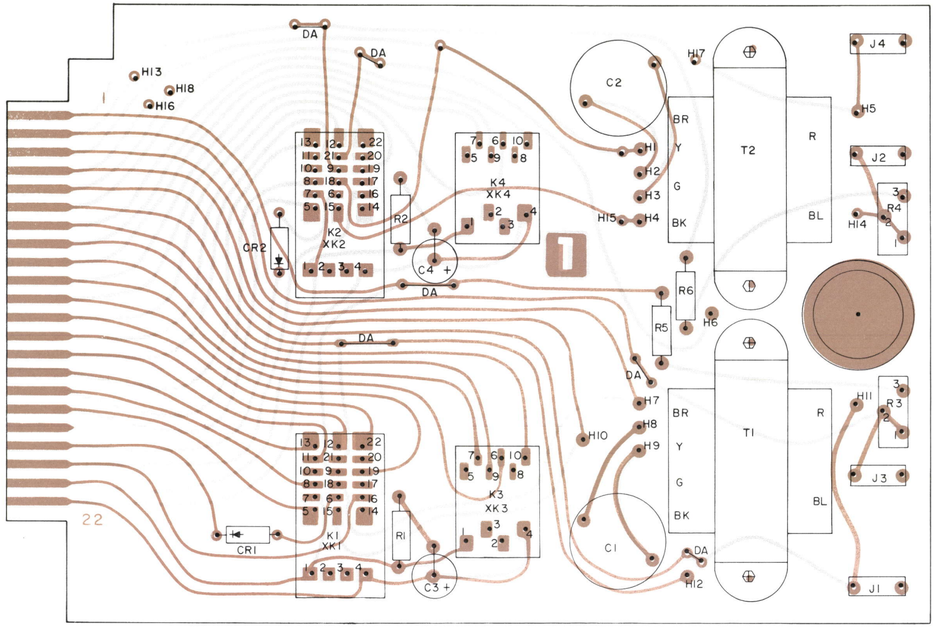


(19D413298, Rev. 0)
(19C311495, Sh. 1, Rev. 1)
(19C311495, Sh. 2, Rev. 1)

RUNS ON SOLDER SIDE
RUNS ON BOTH SIDES
RUNS ON COMPONENT SIDE

OUTLINE DIAGRAM

LINE TERMINATION MODULE
19D402983-G1 & -G2

PARTS LIST

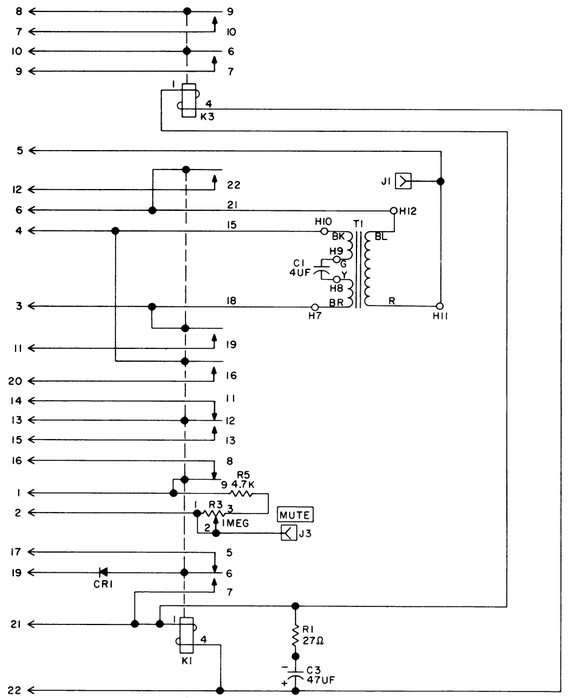
LBI-4014

LINE TERMINATION BOARD
19D402983-G1 and G2

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 and C2	7486445-P5	Electrolytic, non polorized: 4 µf +150% -10%, 150 VDCW.
C3 and C4	5496267-P20	Tantalum: 47 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	4037822-P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1	19B201341-P6	Jack, tip: green nylon; sim to Amp 3-582118.
J2 and J3	19B201341-P7	Jack, tip: blue nylon; sim to Amp 3-582118.
J4	19B201341-P6	Jack, tip: green nylon; sim to Amp 3-582118.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1 and K2	19C307010-P14	Armature: 24 VDC nominal, 1.5 w max operating, 430 ohms ±15% coil res, 6 form C contacts; sim to Allied Control T154-X-743.
K3 and K4	5491595-P3	Armature: 1.5 w operating, 700 ohms ±15% coil res, 2 form C contacts; sim to Allied Control T154-X-101.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	3R77-P270K	Composition: 27 ohms ±10%, 1/2 w.
R3 and R4	19B209358-P112	Variable, carbon film: approx 2000 ohms to 1 megohm ±20%, 0.25 w; sim to CTS Type X-201.
R5 and R6	3R77-P472K	Composition: 4700 ohms ±10%, 1/2 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1 and T2	19A115672-P1	Audio freq: 300 to 6000 Hz, Pri: 9.0 ohms ±15% DC res, Sec 1: 15 ohms ±15% DC res, Sec 2: 15 ohms ±15% DC res.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XK1 and XK2	19B209172-P1	Relay, phen: 22 contacts; sim to Allied Control 30054-20.
XK3 and XK4	5491595-P6	Relay: 10 contacts; sim to Allied Control 30054-.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	5491595-P8	Retainer. (Used with K1 and K2).
	5491595-P9	Retainer. (Used with K3 and K4).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SINGLE-LINE TERMINATION
19D402893-G1



(19C311606, Rev. 1)

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.

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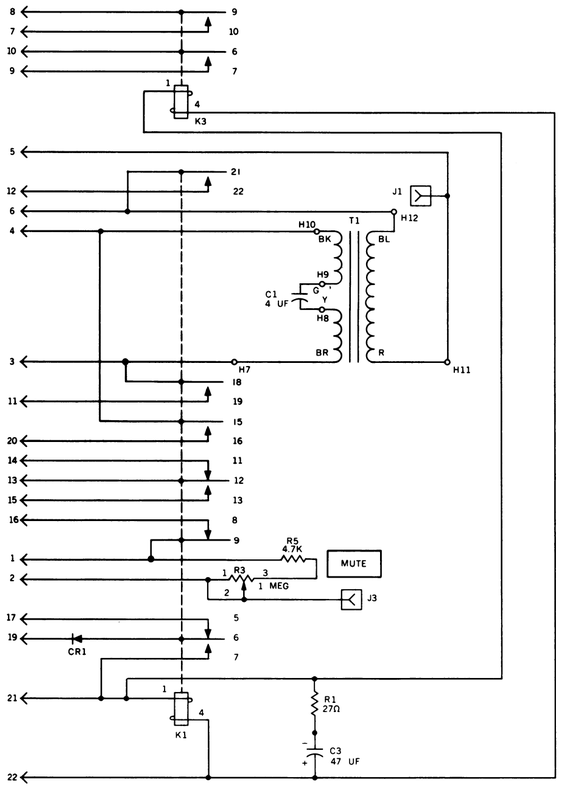
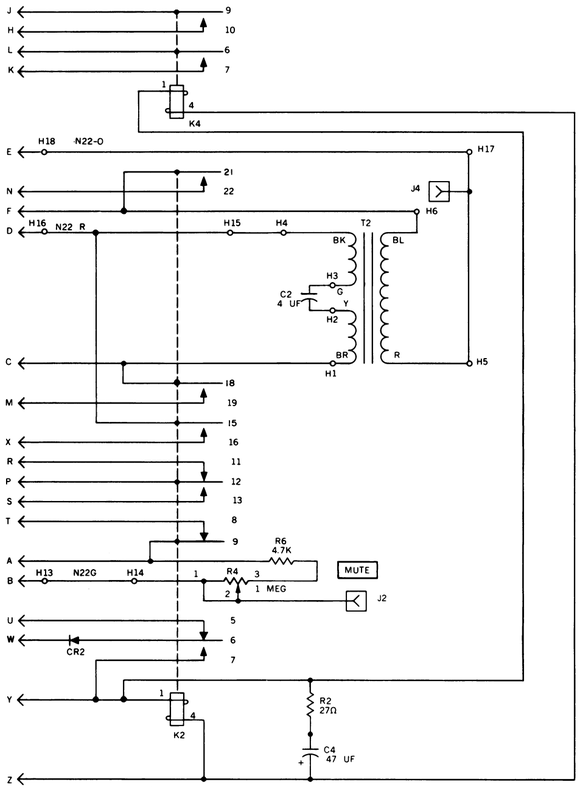
PL19D402983G1	



DUAL-LINE TERMINATION
19D402893-G2



(19D402992, Rev. 1)

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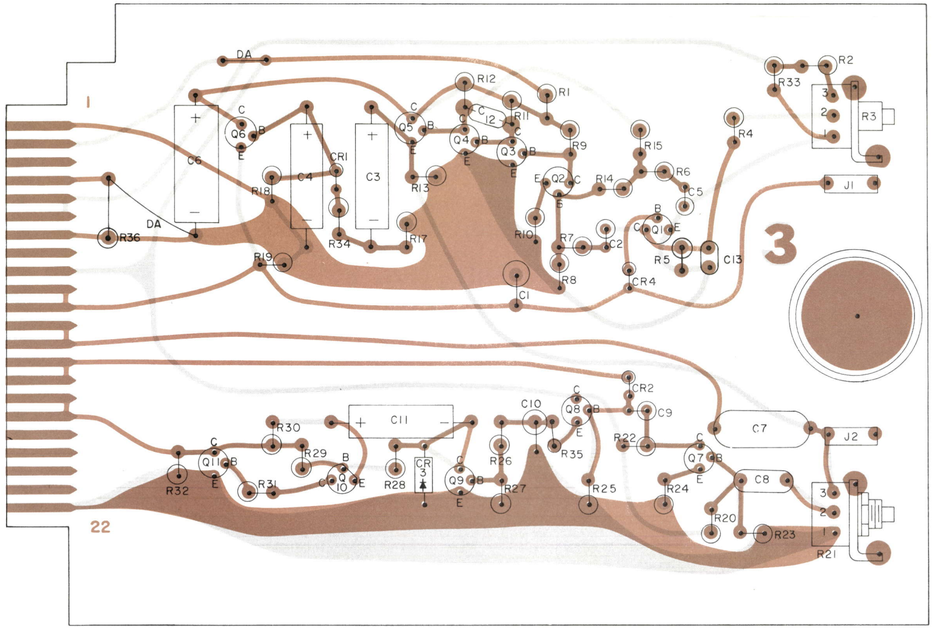
THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
PL19D402983G2	

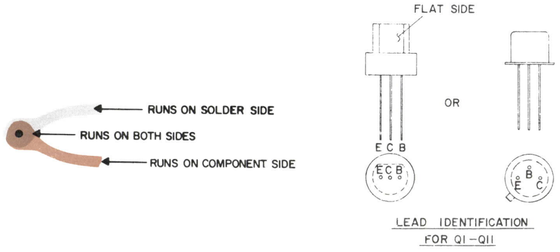
(DF-4083)

SCHEMATIC DIAGRAM

LINE TERMINATION MODULE
19D402983-G1 & -G2



(19D413300, Rev. 3)
(19C311530, Sh. 1, Rev. 3)
(19C311530, Sh. 2, Rev. 3)



LEAD IDENTIFICATION
FOR Q1-Q11

OUTLINE DIAGRAM

COMPRESSOR AMPLIFIER/LIGHT FLASHER
19D402977-G1

PARTS LIST

LBI-4013D

COMPRESSOR AMPLIFIER AND LIGHT FLASHER
19D402977G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C2	5496267P17	Tantalum: 1.0 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C3	5496267P7	Tantalum: 100 µf ±20%, 10 VDCW; sim to Sprague Type 150D.
C4	5496267P3	Tantalum: 150 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C5	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C6	5496267P12	Tantalum: 150 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C7	19A116080P10	Polyester: 0.33 µf ±20%, 50 VDCW.
C8	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C9	5496267P17	Tantalum: 1.0 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C10	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C11	5496267P19	Tantalum: 22 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C12	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C13*	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW. Added by REV D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	19A115250P1	Silicon.
CR3	4037822P1	Silicon.
CR4	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1	19B201341P6	Jack, tip: green nylon; sim to Amp 3-582118.
J2	19B201341P5	Jack, tip: yellow nylon; sim to Amp 3-582118.
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q1 thru Q9	19A115889P3	Silicon, NPN; sim to Type 2N2712.
Q10	19A115768P1	Silicon, PNP; sim to Type 2N3702.
Q11	19A115300P2	Silicon, NPN; sim to Type 2N3053.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R2	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R3	19C300124P2	Variable, carbon film: 0.1 megohm ±20%, 1/8 w; sim to PR Mallory MLC.
R4*	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w.
		Earlier than REV A:
	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R5	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R6*	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
		In REV A and earlier:
	3R77P911J	Composition: 910 ohms ±5%, 1/2 w.
R7	3R77P332K	Composition: 3300 ohms ±10%, 1/2 w.
R8	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R9	3R77P394K	Composition: 0.39 megohm ±10%, 1/2 w.
R10	3R77P331K	Composition: 330 ohms ±10%, 1/2 w.
R11	3R77P393K	Composition: 39,000 ohms ±10%, 1/2 w.
R12	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R13	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R14	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w.
R15	3R77P104J	Composition: 0.10 megohm ±5%, 1/2 w.
R17	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R18	3R77P104K	Composition: 0.10 megohms ±10%, 1/2 w.
R19	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R20	3R77P104K	Composition: 0.10 megohm ±10%, 1/2 w.
R21	19C300124P10	Variable, carbon film: 10,000 ohms ±20%, 1/8 w; sim to PR Mallory MLC.
R22	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R23	3R77P113J	Composition: 11,000 ohms ±5%, 1/2 w.
R24	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R25	3R77P683K	Composition: 68,000 ohms ±10%, 1/2 w.
R26	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R27 and R28	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R29	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R30 and R31	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R32	3R77P911J	Composition: 910 ohms ±5%, 1/2 w.
R33	3R77P361J	Composition: 360 ohms ±5%, 1/2 w.
R34	3R77P201J	Composition: 200 ohms ±5%, 1/2 w.
R35*	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w. Added by REV C.
R36*	3R77P101K	Composition: 100 ohms ±10%, 1/2 w. Added by REV E.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A121876P1	Support. (Used with R3 and R21).
	4036555P1	Insulator, disc. (Used with Q11).

*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.

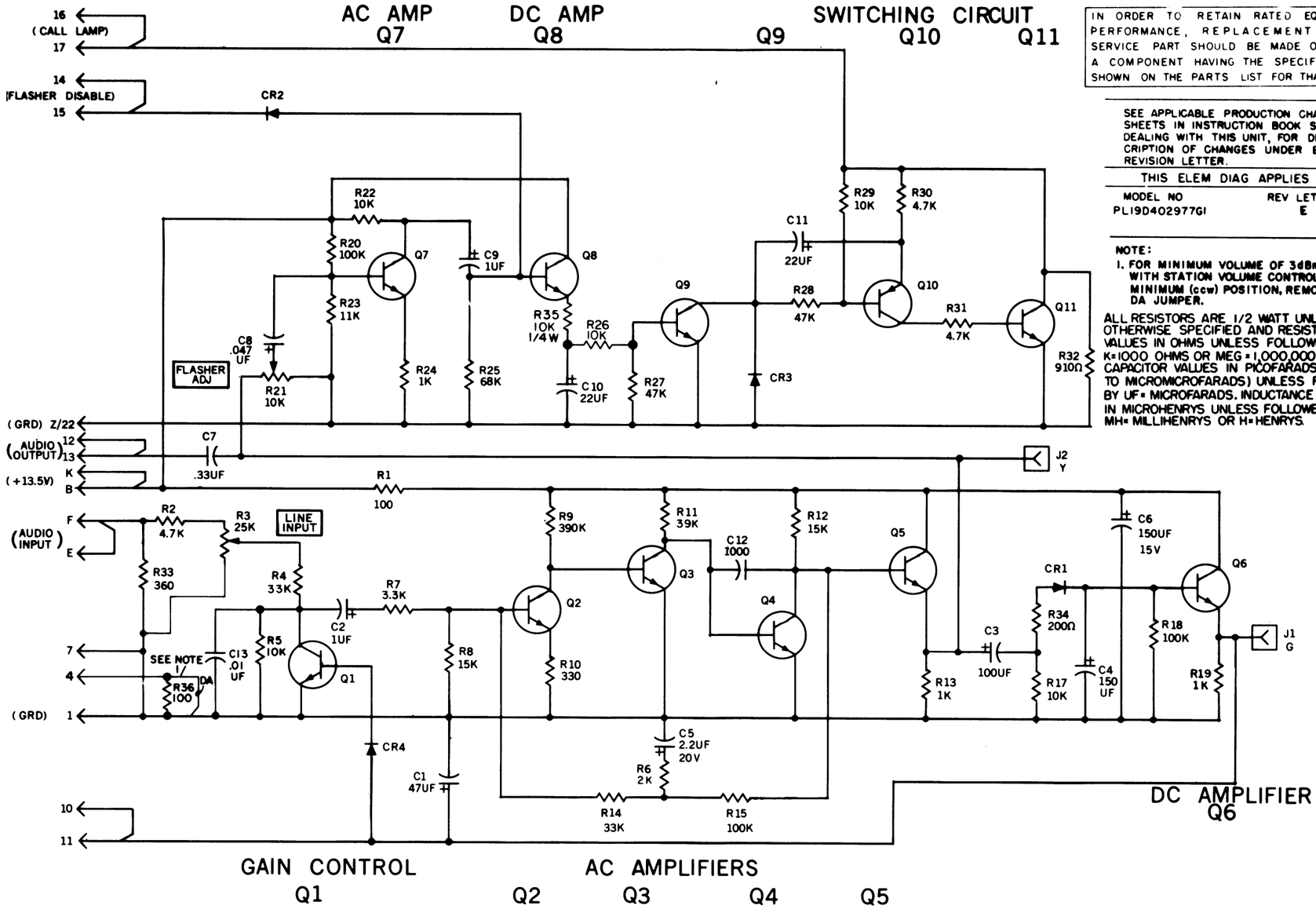
REV. A - To increase line level sensitivity to operate with line levels as low as -20 dBm. Changed R4.

REV. B - To reduce distortion. Changed R6.

REV. C - To stop the call lamp from falsing when operating the transmit/intercom switches. Added R35.

REV. D - To prevent interference from local radio stations. Added C13.

REV. E - To provide minimum volume level control for DC series consoles. Added R36.



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
PLI9D402977G1	E

NOTE:

1. FOR MINIMUM VOLUME OF 3dBm ±3dB WITH STATION VOLUME CONTROL IN MINIMUM (ccw) POSITION, REMOVE DA JUMPER.

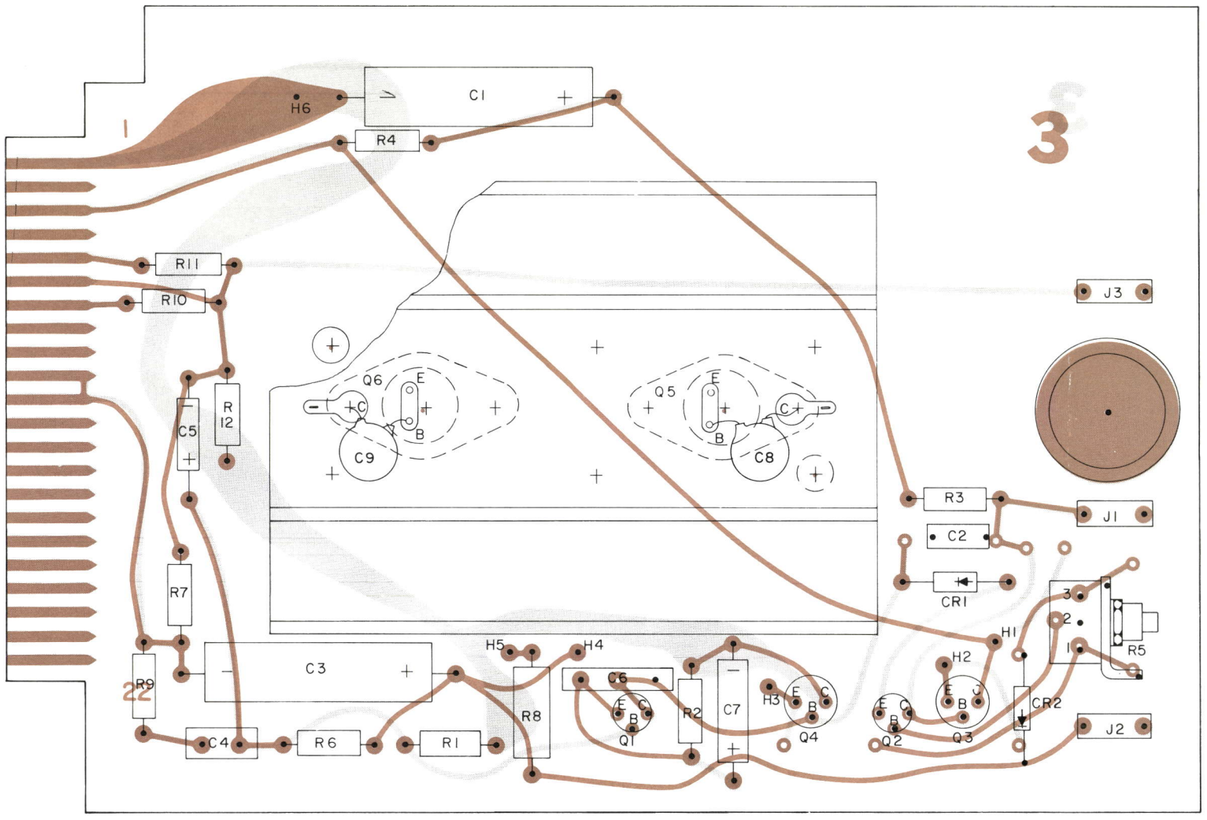
ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

(DF-4083)

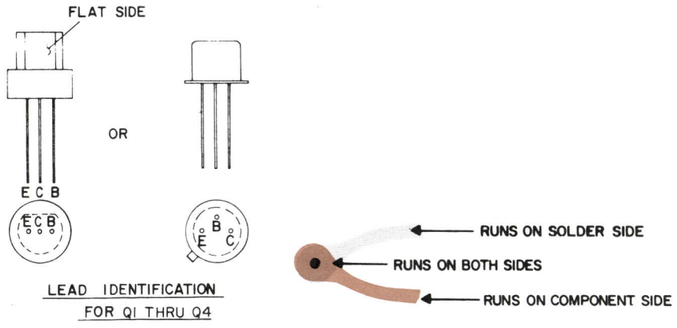
(19C311626, Rev. 6)

SCHEMATIC DIAGRAM

COMPRESSOR AMPLIFIER/LIGHT FLASHER
19D402977-G1



(19D413299, Rev. 1)
(19C311499, Sh. 1, Rev. 3)
(19C311499, Sh. 2, Rev. 3)



LEAD IDENTIFICATION FOR Q1 THRU Q4

OUTLINE DIAGRAM

SPEAKER AMPLIFIER MODULE
19D402982-G1

PARTS LIST

LBI-4018B

SPEAKER AMPLIFIER
19D402982G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A115680P6	Electrolytic: 50 µf +150% -10%, 50 VDCW; sim to Mallory Type TT.
C2*	5496267P17	Tantalum: 1.0 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
		In REV A and earlier:
	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C3	19A115680P10	Electrolytic: 200 µf +150% -10%, 18 VDCW; sim to Mallory Type TT.
C4	7489162P44	Silver mica: 510 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C5	5496267P1	Tantalum: 6.8 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C6*	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		In REV A:
	7774750P13	Ceramic disc: 0.01 µf +100% -0%, 500 VDCW.
		Earlier than REV A:
	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C7	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C8* and C9*	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. Added by REV A.
C10*	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. Added by REV B.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	19A115775P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1	19B201341P5	Jack, tip: yellow nylon; sim to Amp 3-582118.
J2	19B201341P7	Jack, tip: blue nylon; sim to Amp 3-582118.
J3	19B201341P6	Jack, tip: green nylon; sim to Amp 3-582118.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q2	19A115720P1	Silicon, NPN.
Q3	19A115300P1	Silicon, NPN; sim to Type 2N3053.
Q4	19A115706P1	Silicon, PNP.
Q5*	19A116118P3	Silicon, NPN.
		In REV A and earlier:
	19A115527P1	Silicon, NPN.
Q6*	19A116375P2	Silicon, PNP.
		In REV A and earlier:
	19A115792P1	Silicon, PNP.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R77P682K	Composition: 6800 ohms ±10%, 1/2 w.
R2	3R77P131J	Composition: 130 ohms ±5%, 1/2 w.
R3	3R77P202K	Composition: 2000 ohms ±10%, 1/2 w.
R4	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R5*	19B209358P105	Variable, carbon film: approx 75 to 5000 ohms ±10%, 0.25 w; sim to CTS Type X-201.
		In REV A and earlier:
	19C300124P15	Variable, carbon film: 200 ohms ±20%, 1/8 w; sim to PR Mallory MLC.
R6	3R77P563K	Composition: 56,000 ohms ±10%, 1/2 w.
R7	3R77P303J	Composition: 30,000 ohms ±5%, 1/2 w.
R8	19B209022P7	Wirewound: 0.47 ohms ±5%, 2 w; sim to IRC Type BWH.
R9	3R77P392K	Composition: 3900 ohms ±10%, 1/2 w.
R10 and R11	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R12	3R77P114K	Composition: 0.11 megohm ±10%, 1/2 w.
R13* and R14*	3R77P151J	Composition: 150 ohms ±5%, 1/2 w. Added by REV B.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	4036555P1	Insulator, disc. (Used with Q3 and Q4).
	19B216210P1	Heat sink, large. (Used with Q5 and Q6).
	19B216210P2	Heat sink, small. (Used with Q5 and Q6).
	19A121876P1	Support. (Mounts R5).
	7147306P2	Bushing, insulated. (Used with Q5).
	19A116023P1	Insulator. (Used with Q5).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

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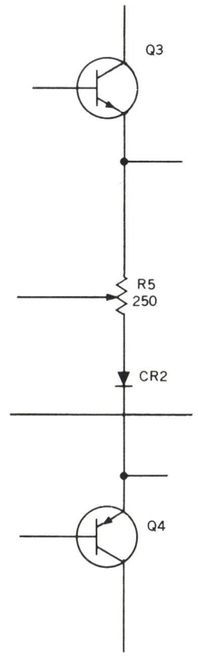
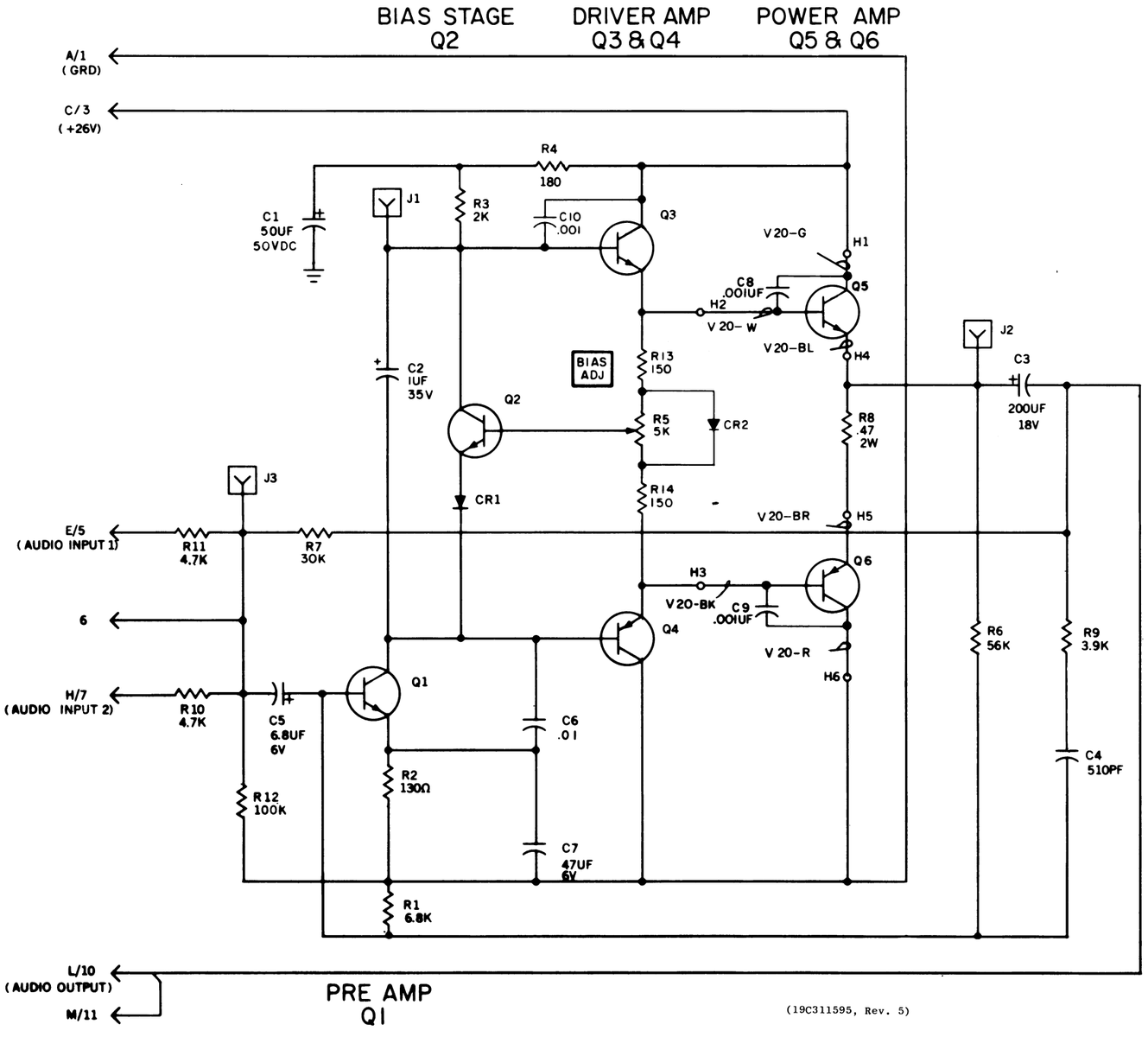
SPEAKER AMPLIFIER 19D402982-G1

REV. A - To improve the bias adjustment. Changed C6. Added C8 and C9.

REV. B - To incorporate a new transistor, improve bias adjustment, and prevent oscillation. Changed Q5 and Q6.

Schematic was:





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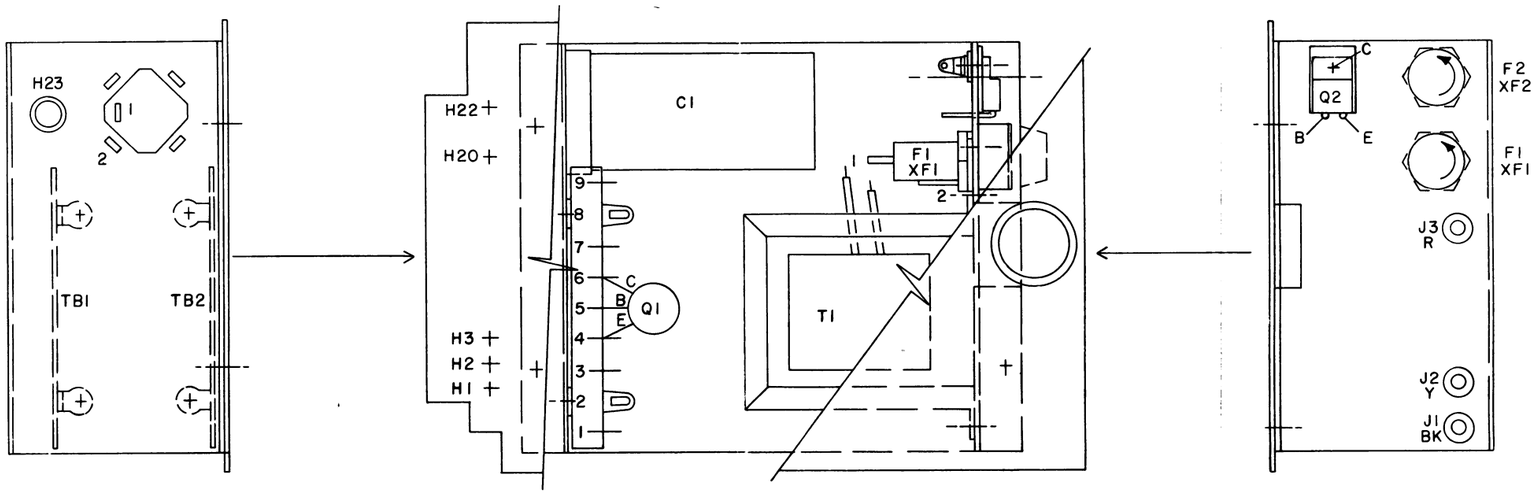
SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
PL19D402982	B

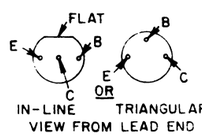
(DF-4083)

SCHEMATIC DIAGRAM

SPEAKER AMPLIFIER MODULE
19D402982-G1



LEAD IDENTIFICATION FOR Q1



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

(19C317188, Rev. 1)

OUTLINE DIAGRAM

POWER SUPPLY MODULE
19D402984-G1

PARTS LIST

LBI-4015A

POWER SUPPLY
19D402984G1

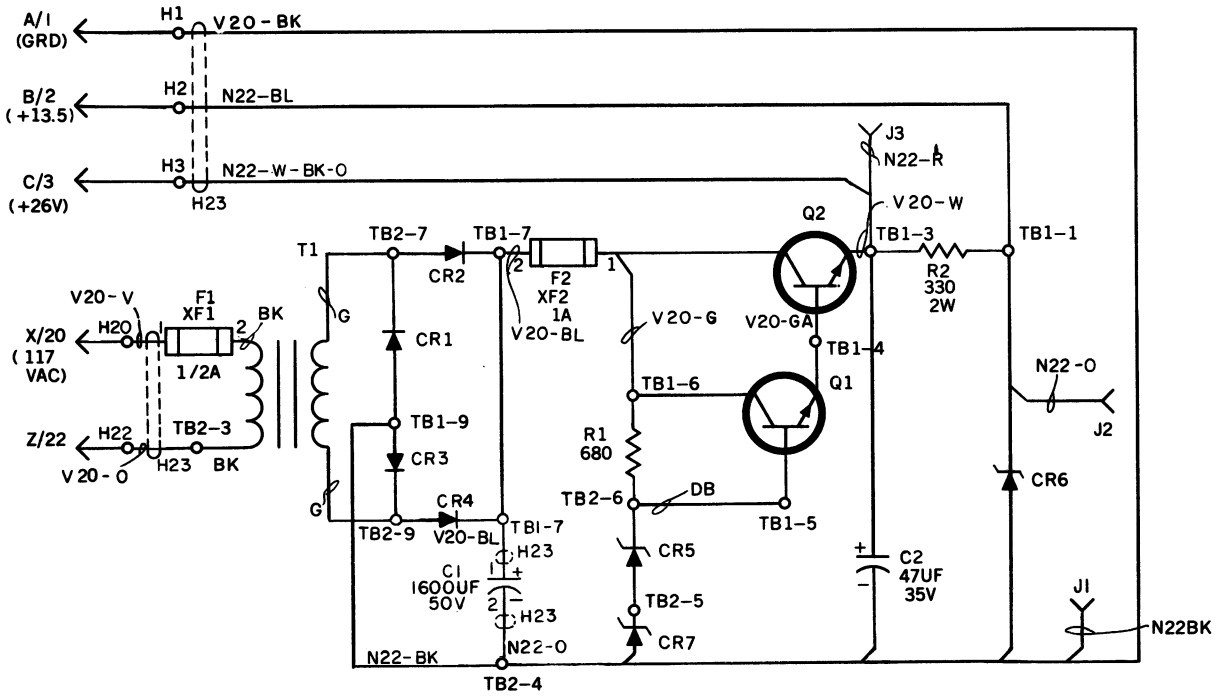
SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	7476442P20	Electrolytic, twist-prong: 1600 µf +250-10%, 50 VDCW; sim to PR Mallory WP-068.
C2	5496267P20	Tantalum: 47 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
		- - - - - - - - - DIODES AND RECTIFIERS - - - - -
CR1 thru CR4	4037822P1	Silicon.
CR5	4036887P10	Silicon, Zener.
CR6	19A115008P24	Silicon, Zener.
CR7	4036887P10	Silicon, Zener.
		- - - - - - - - - - - - FUSES - - - - - - - - - - -
F1	7487942P3	Slow blowing: 1/2 amp at 250 v; sim to Bussman MDL-1/2.
F2	1R16P3	Quick blowing: 1 amp at 250 v; sim to Bussman AGC-1.
		- - - - - - - - - JACKS AND RECEPTACLES - - - - -
J1	7150763P1	Jack, tip, stake-in: black nylon body; sim to Alden Products 110BC.
J2	7150763P5	Jack, tip, stake-in: yellow nylon body; sim to Alden Products 110BC.
J3	7150763P2	Jack, tip, stake-in: red nylon body; sim to Alden Products 110BC.
		- - - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115300P1	Silicon, NPN; sim to Type 2N3053.
Q2*	19A116118P3	Silicon, NPN.
		Earlier than REV A:
	19A115527P1	Silicon, NPN.
		- - - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P681K	Composition: 680 ohms ±10%, 1/2 w.
R2	3R77P331K	Composition: 330 ohms ±10%, 1/2 w.
		- - - - - - - - - - - TRANSFORMERS - - - - - - - -
T1	19B209188P1	Power, step-down: Pri: 117 v, 50/60 Hz, Sec: 25.2 v, 1 amp.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1 and TB2	7775500P25	Phen: 9 terminals.
		- - - - - - - - - - - SOCKETS - - - - - - - - - - -
XF1 and XF2	19B209005P1	Fuseholder, post type, phen: 15 amps at 250 v; sim to Littelfuse 342012.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A116023P1	Insulator. (Used with Q2).
	7147306P2	Bushing, insulated; sim to H. H. Smith Inc 2150. (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 description of parts affected by these revisions.

REV. A - Power Supply (19D402984-G1)
To incorporate new transistor. Changed Q2.



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

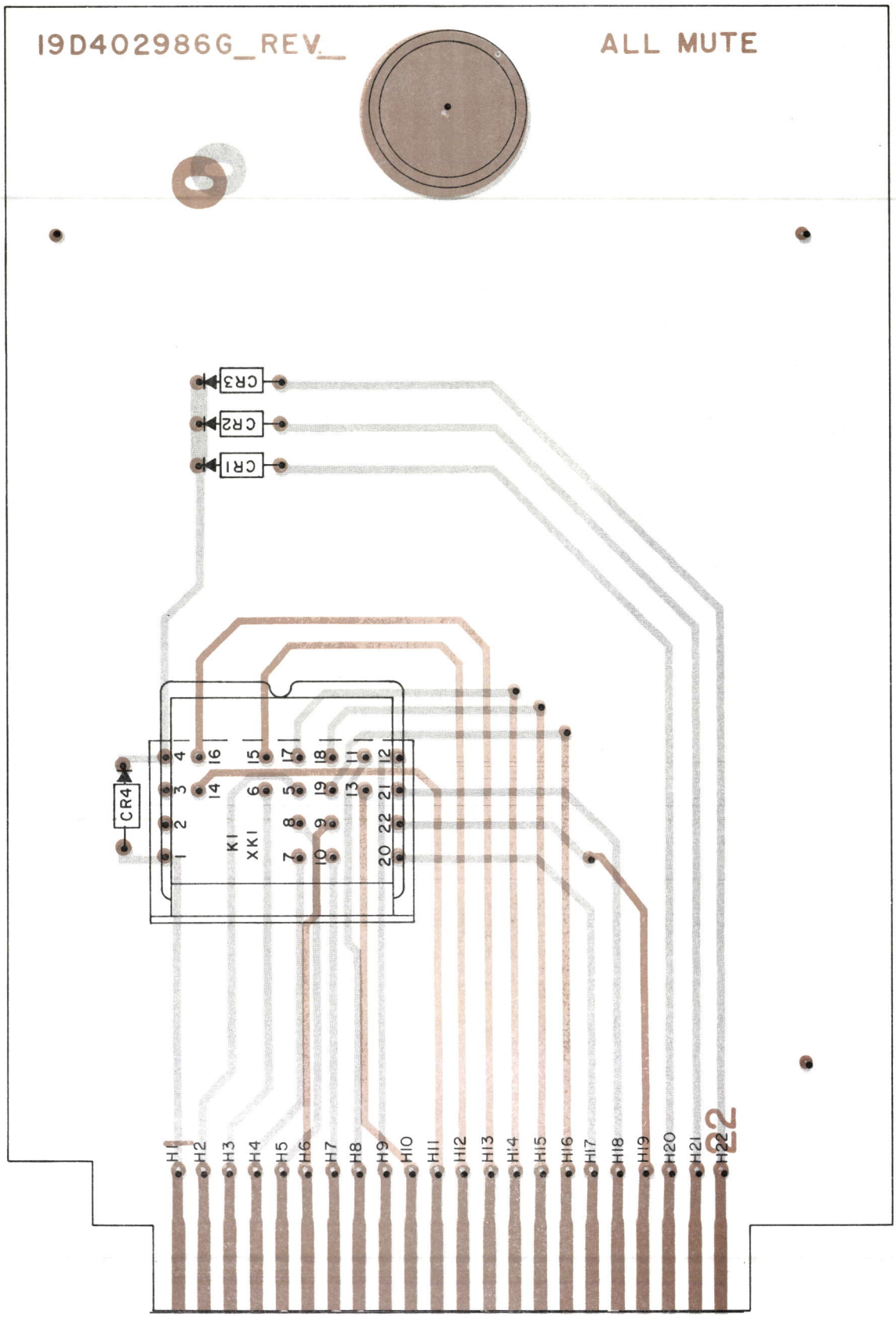
THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
PL19D402984	

(19B216222, Rev. 3)

(DF-4083)

SCHEMATIC DIAGRAM

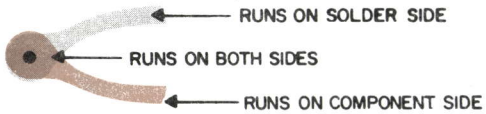
POWER SUPPLY MODULE
19D402984-G1

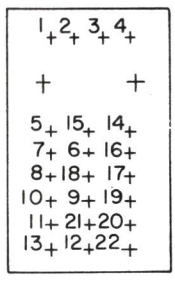


(19D413297, Rev. 1)
(19D423264, Sh. 2, Rev. 0)
(19D423264, Sh. 3, Rev. 0)

OUTLINE DIAGRAM

ALL MUTE MODULE
19D402986-G1





TERMINAL VIEW OF XK1

PARTS LIST

LBI-4016B

ALL MUTE BOARD
19D402986G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 thru CR4	4037822P1	Silicon.
		- - - - - - - - - - - RELAYS - - - - - - - - - - -
K1	19C307010P14	Armature: 24 VDC nominal, 1.5 w max operating, 430 ohms ±15% coil res, 6 form C contacts; sim to Parelco R10-E250-1.
		- - - - - - - - - - SOCKETS - - - - - - - - - - -
XK1*	19B209574P1	Relay, socket: 22 contacts; sim to Potter and Brumfield No. 27E170.
		Earlier than REV A:
	19B209172P2	Relay, phen: 22 contacts; sim to Allied Control 30054-20.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A127216P1	Support. (Used with K1).
	19A115368P1	Retainer. (Used with K1).

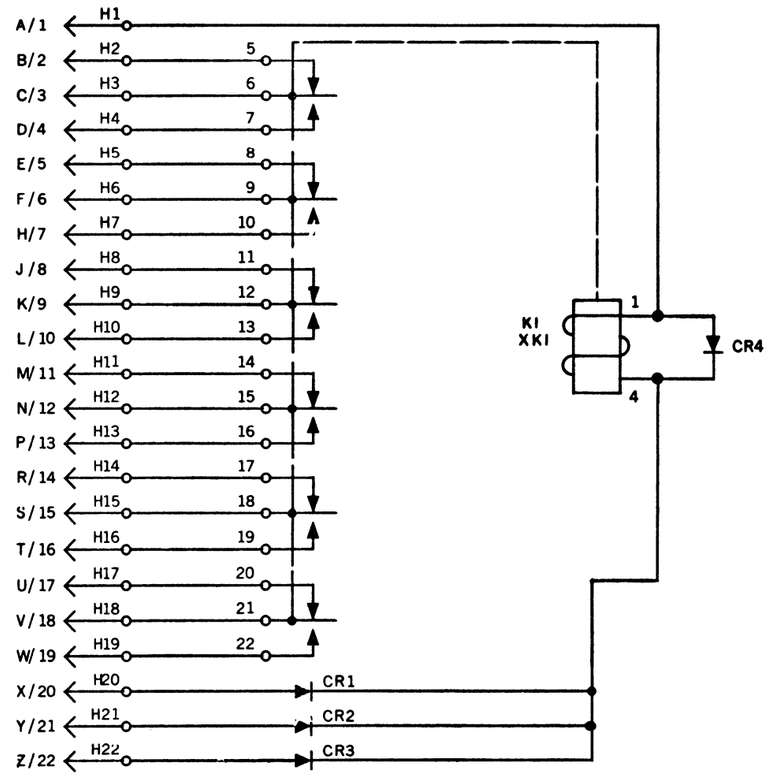
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

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 - All Mute Module 19D402980G1

To eliminate mechanical interference with speaker.
Change XK1 and Printed Wire Board.



(19B216216, Rev. 3)

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.

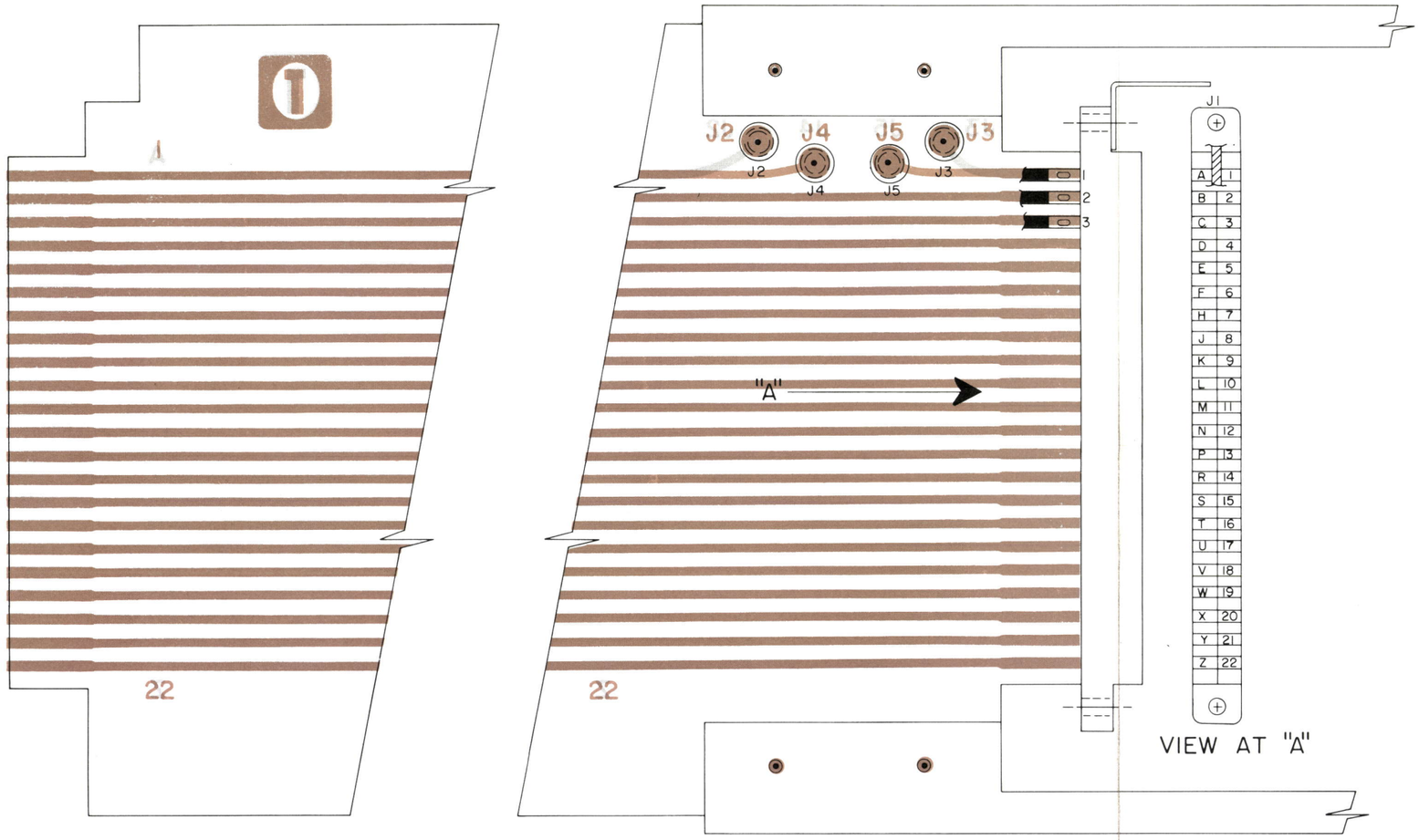
THIS ELEM DIAG APPLIES TO

MODEL NO	REV LETTER
PL19D402986	▲

SCHEMATIC DIAGRAM

ALL MUTE MODULE
19D402986-G1

(DF-4083)

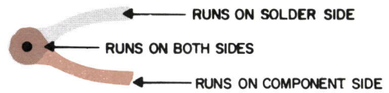


(19C317185, Rev. 0)
(19D402961, Sh. 1, Rev. 1)
(19D402961, Sh. 2, Rev. 1)

OUTLINE DIAGRAM

EXTENDER BOARD
19D402980-G1

20 Issue 3



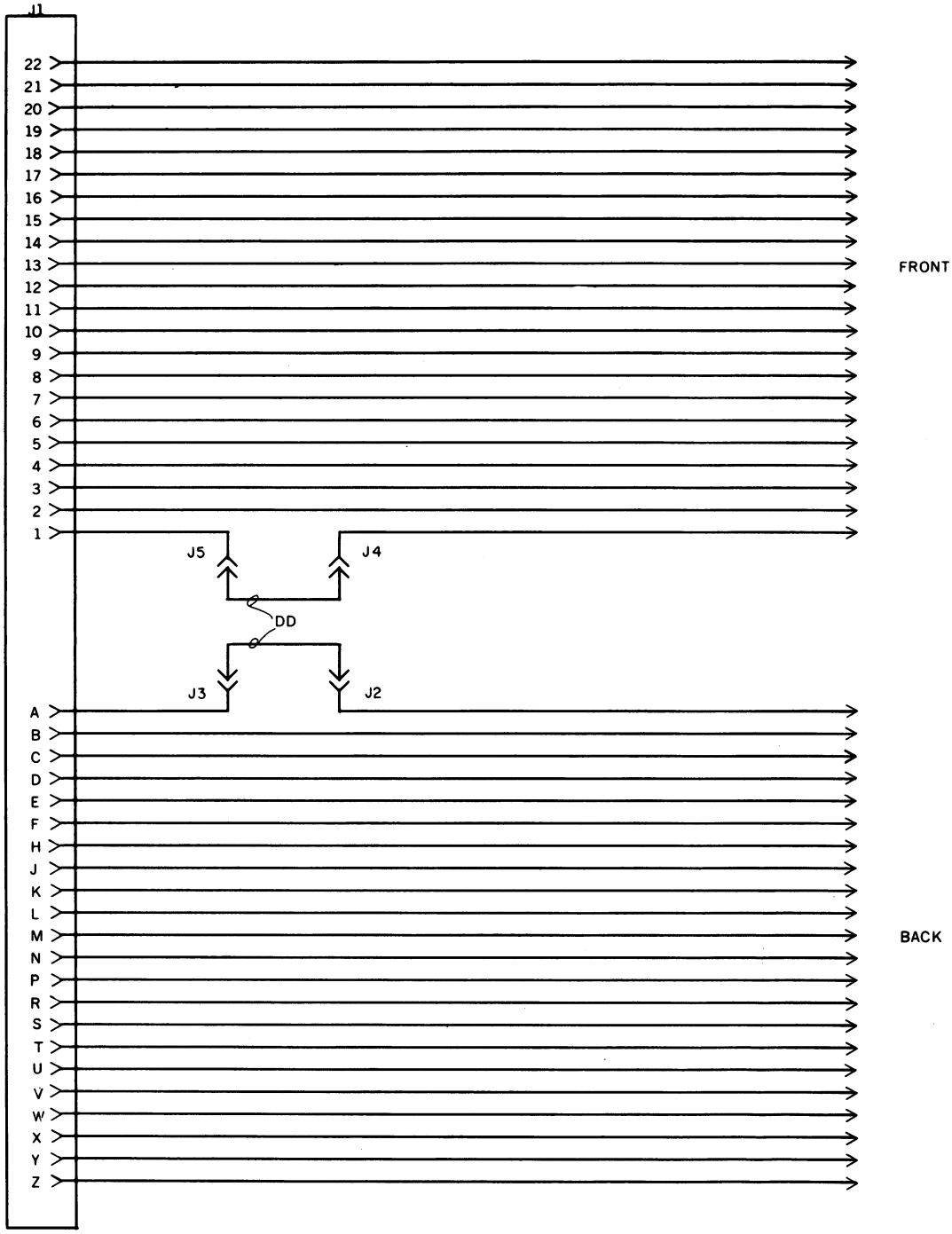
PARTS LIST

LBI-4017A

EXTENDER BOARD
19D402980G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1	5496085P4	Connector, printed board: 44 contacts; 5 amps at 600 VRMS; sim to Methode 6044-1155-00.
J2 thru J5	4029830P1	Jack, test: printed board, nylon; sim to Raytheon B8436401-166-G6-black.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



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
PLI9D402980	

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.

SCHEMATIC DIAGRAM

EXTENDER BOARD 19D402980-G1

(19C311588, Rev. 2)

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-3984

DF-4083

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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