MOBILE RADIO

Maintenance Manual LBI30304A

series 2500, 503 & 502

COMMAND CONTROL CENTER

MONITOR SECTION

A8 & B8 Monitor Sections

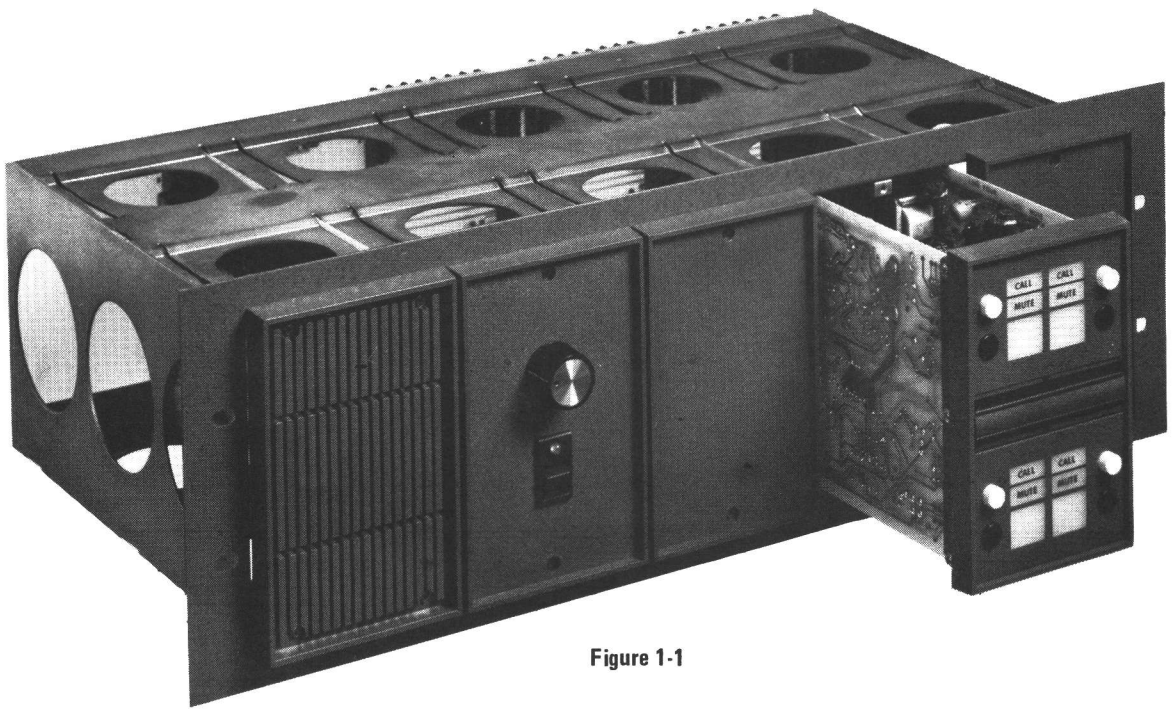

Figure 1-1

SPECIFICATIONS*

Speaker Output	5 watts, maximum
Distortion	Less than 1% at 1.25 watts; less than 1.5% at 5 watts
Frequency Response	
Monitor Module	+1 db, –3 db, 300 Hz to 10 KHz, 1 KHz reference
Speaker Amplifier	+1 db, –3 db, 300 Hz to 3 KHz, 1 KHz reference
Compressor Sensitivity	–30 dbm maximum. Output increases less than 3 db with 30 db increase above threshold of compression.
Power Consumption	
V_{CC} (13.5 volts)	Current = 40 mA + 150 mA per 4-line module, maximum
Lamp Current	35 mA per lamp, maximum
24-volt Supply	0.7 A maximum (full rated power to speaker)

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

GENERAL ELECTRIC

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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

This manual supplements the basic Maintenance Manual for the console, LBI30300, when the console includes Monitor Sections.

SEC/53371-001
MONITOR SECTIONS

The console may include optional Monitor Sections in any of the uncommitted turret ports. A Monitor Section may include units for monitoring up to 12 channels. A typical Section is shown in Figure 1-1.

Each Section consists of a card cage and Mother Board, a Speaker Module Assembly (SEC/53369-001), a Monitor Control Panel Assembly (SEC/53364-001), and one to three Monitor Modules. Major assembly parts and part numbers are listed in the service sheets section. Refer to the table of contents. Monitor Modules can be equipped for either two- or four-channel operation: channels designated 1 and 2 are monitored by Left Monitor Board (SEC/53270-001), and channels designated 3 and 4 are monitored by Right Monitor Board (SEC/53269-001).

The port and slot location of Monitor modules can be determined from the module model number. Model numbers are based on the Combination Nomenclature Table, Figure 1-2.

An overall block diagram of a typical Monitor Section is shown in Figure 1-3.

OPERATION & CIRCUIT ANALYSIS

MONITOR MODULE

SEC/53372-001, -002
MONITOR MODULE

Monitor Modules may be equipped to provide either two- or four-channel (2-line or 4-line) monitoring. A four-channel module (SEC/53372-001) includes both a Left Monitor Board (SEC/53270-001) and a Right Monitor Board (SEC/53269-001). A two-channel module (SEC/53372-002) uses only the Left Monitor Board.

1st digit	2nd digit	3rd digit	4th digit	5th digit	6th digit	7th digit	8th digit	9th digit	10th digit
CHANNELS PER MODULE	MODULE MARKING	OPTION	OPTION	OPTION	OPTION	OPTION	SYSTEM	PORT LOCATION	SLOT LOCATION
A 2 Channels	**8** Standard	**X** Standard	**R** Standard	**L** Standard	**T** Standard	**G** Standard	**8** Standard	**2** Port 2	**3** Slot 3
B 4 Channels	**9** Custom						**9** Special	**3** Port 3	**4** Slot 4
								4 Port 4	**5** Slot 5
								5 Port 5	**9** Spare
								6 Port 6	
								9 Spare	

Figure 1-2 - Combination Nomenclature

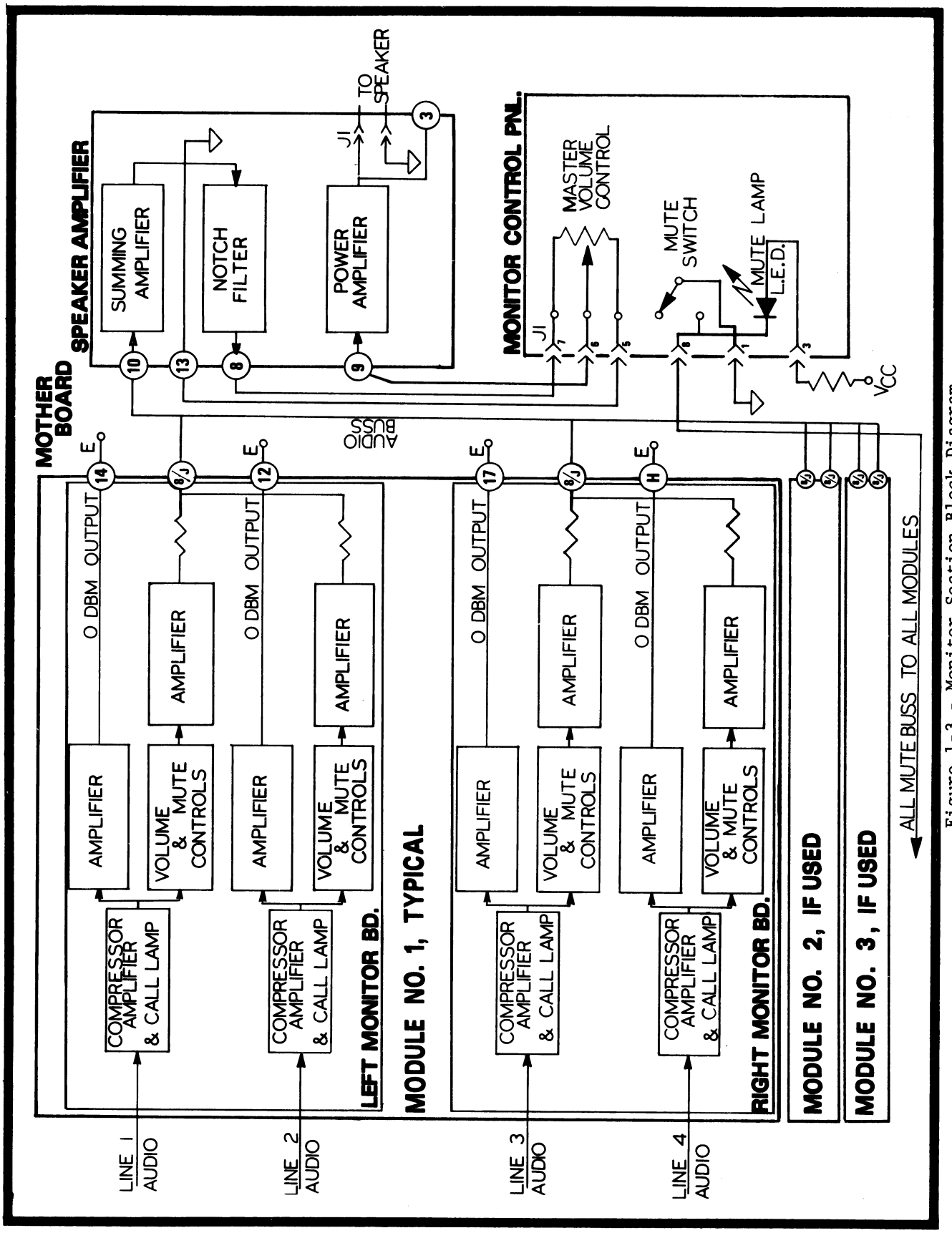

Figure 1-3 - Monitor Section Block Diagram

Mute switches for each channel are provided as standard controls. See Figure 1-1. The CALL display flashes when Receive audio is present. When depressed, the switch mutes the Receive audio on its channel, and illuminates the MUTE display. The mute level is internally adjustable.

In addition to Monitor boards, each module also includes fuse and lamp board assemblies. These assemblies, the module face assembly and miscellaneous hardware are shown in Figure 3-1.

SEC/53270-001
LEFT MONITOR BOARD

The Left Monitor Board controls channels one and two for each module position. An assembly diagram and circuit schematic are shown in Figures 3-2 and 3-3, respectively. A block diagram is shown in Figure 2-1.

CIRCUIT ANALYSIS

The audio processing circuit - one for each channel - consists of an input line-termination transformer, a compression amplifier and call lamp flasher oscillator, a buffered, constant-level audio output amplifier, and an adjustable audio output amplifier. The adjustable audio amplifier feeds the audio output buss, which is connected to the speaker amplifier. The level is controlled by the volume control and the mute level control.

Audio from telephone line 1 is coupled through line-termination transformer T2 to the compressor sensitivity control potentiometer R61. R65 makes the input termination equal to the 600-ohm telephone line characteristic impedance.

Audio from the wiper of R61 is applied to the compressor amplifier, which consists of R66, R67, R68, Q20, Q24 and the pin-4 and pin-5 output sections of integrated circuit U4. The three resistors and Q20 form a variable attenuator for incoming audio. When the input signal is below the threshold of compression, Q20 is completely cut off, and therefore presents a high impedance (low attenuation) between the input signal and audio ground. Under this condition, the gain of the first stage of U4 is relatively high. The signal at U4-5 (U4 pin 5) is amplified by the section of U4 with output at pin 4, and the resulting signal is rectified by CR7-CR8 and filtered by C40. The resulting DC voltage is applied to the base of Q24, which, in turn, drives the base of Q20. As the input signal level increases, the increasing voltage at the base of Q24 begins to turn Q24 on. This causes Q20 to conduct and shunt part of the input signal to audio ground, thereby effectively decreasing the gain of the first stage of U4. Once compression begins, an increase in the input signal level of 30 dB beyond the threshold of compression will cause less than 3 dB increase in the output.

The DC voltage from the compression amplifier detector circuit is also used to enable the call lamp flasher. The increasing DC level at the positive terminal of C40 turns on Q27. Q27 then cuts off Q28 and allows pin 4 of U6 (the reset input) to go high. This allows the timer to oscillate at about 3 hertz. The output of U6 controls lamp driver Q3.

The audio at U4-5 is amplified with a nominal gain of 5 by the section of U4 with output at pin 10. The audio at this point is coupled through C36 to the buffer-amplifier consisting of U4 (output at pin 9) and Q21. This auxiliary output is an essentially constant, 0 dBm signal, unaffected by the Volume and Mute controls, that can be used for custom requirements. The auxiliary audio for line 1 is connected through pin 14 to E20 on the Mother Board.

The audio at U4-10 also is coupled to the Mute and Volume controls, through C29, and then through either audio gate Q23 or Q22 to buffer amplifier Q25-Q26. Under normal conditions, with neither total mute nor partial mute activated, audio gate Q22 is turned on and Q23 is off. This couples the output of the Volume control to the buffer-amplifier. If partial mute is activated, Q23 is turned on and Q22 is off. This couples the audio through mute level control R64 to the buffer amplifier. The attenuation of audio is adjustable from less than 10 dB to greater than 40 dB, depending on the setting of R64. If the total mute circuit is activated, both Q22 and Q23 are turned off, completely isolating the audio signal from the buffer amplifier.

The output of the buffer amplifier is connected through summing resistor R94 to the audio buss at pins 8/J.

The mute circuits are controlled by inputs from the Mother Board, and by mute switch S1. Activation of S1, or a low signal at the partial mute input, pin H, or the All Mute input, pin 6, causes the output at U5-3 to go high and turn both Q2 and Q19 on. Q2 is the MUTE lamp driver. When Q19 conducts, it pulls the gate of field-effect transistor Q22 low. This turns Q22 off, which effectively disconnects the audio at the wiper of the Volume control from the output amplifier. The same signal also causes a high at pins 6 and 9 of U5. If the total mute input at board pin 4 is not activated, then U5-10 will be high. Consequently, U5-8 will be low which will turn off Q18 and allow Q23 to conduct audio from R64 to the output amplifier.

A low signal at pin 4 causes pins 3 and 6 of U5 to go high. This turns on Q18 and Q19, and turns off Q22 and Q23.

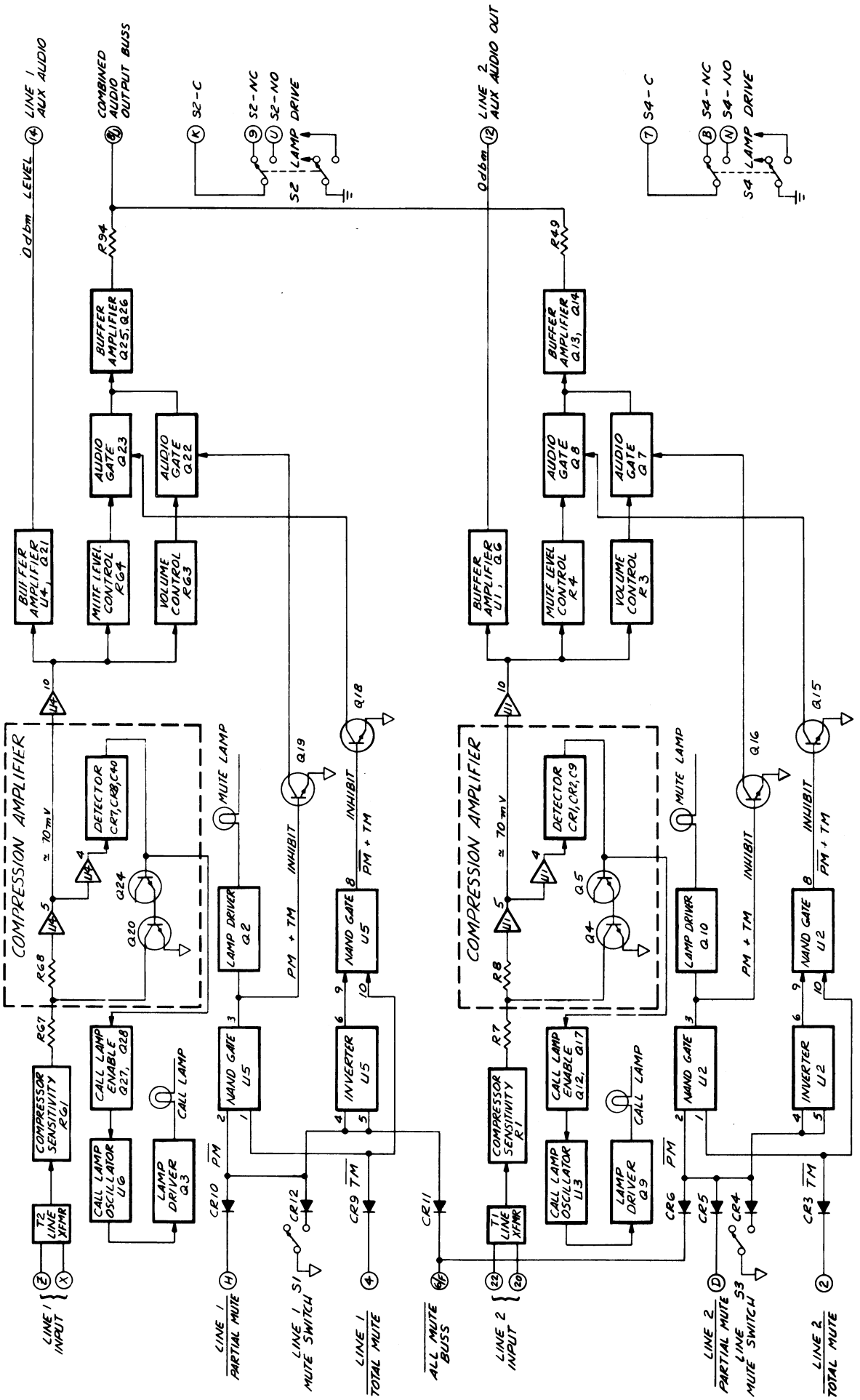

Figure 2-1 - Left Monitor Board Block Diagram

A DPDT switch may be mounted in position S2, and the common, normally open (NO) and normally closed (NC) contacts brought out to pads on the Mother Board. The other set of switch contacts can be used to control module indicator lamps.

The line-2 audio circuit operates the same as line 1, so it will not be described in detail. For line 2, amplifier U1 is used for the compressor amplifier and 0 dBm auxiliary audio amplifier. Auxiliary audio is connected through pin 12 to E23 on the Mother Board. Gate U2 is used to implement mute control logic. Output buffer amplifier Q13-Q14 drives the output audio buss (through R49).

Power for the Left Monitor Board is normally provided from the fused supply voltages on the Right Monitor Board. For a two-line module, however, the right board is replaced by a blank PC board. In this case, the fuses are connected to the supply lines at strapping pins on the left board, and the outputs from the fuses are strapped to appropriate pins on the left board.

SEC/53269-001
RIGHT MONITOR BOARD

The Right Monitor Board is used to monitor lines 3 and 4. An assembly diagram and circuit schematic are shown in Figures 3-4 and 3-5, respectively. A block diagram is shown in Figure 2-2.

CIRCUIT ANALYSIS

Circuit operation is identical to that of the Left Monitor Board described above. For line 3, integrated circuit U1 is used for the compression amplifier and 0 dBm amplifier. U2 provides mute logic, and U3 is the call lamp oscillator. Q6 and Q7 make up the output buffer amplifier that drives the audio buss (through R36). For line 4, U4 is the compressor and 0 dBm amplifier, U5 provides mute logic, U6 is the Call lamp oscillator, and Q20 and Q21 drive the audio buss (through R93). Auxiliary switches S2 and S4 can be added for line 3 and line 4, respectively.

MOTHER BOARD

SEC/53289-001
MONITOR SECTION MOTHER BOARD

The Mother Board performs two functions:

1. It provides for interconnection of common signals between modules, and between the modules and the Monitor Control Panel.

2. It provides termination points for incoming telephone lines, and for certain external control signals.

Assembly diagrams and an interconnecting diagram are shown in Figures 3-6 and 3-7, respectively.

The four telephone line pairs (assuming four are used) are connected to eight dedicated terminals on TB1 and TB2. The remaining six terminals of TB1 and TB2, as well as all seven terminals of TB3, are brought to wire pads on the Mother Board for special interconnection capability. Thus, a total of 13 special termination points are available for each Monitor Module.

Certain input and output signals from each monitor board are also terminated at wire pads on the Mother Board. These are made accessible for special applications. To use these signals, it is only necessary to connect a jumper wire from the appropriate signal wire pad to a wire pad from one of the terminal boards. The input and output signals are listed in the table below. The pad-outs are identical for each module location.

E No.*	Signal		From
E1	Line 4	Switch common	R. Monitor Bd., pin U
E2	Line 3	AUX Audio Output	R. Monitor Bd., pin 17
E3	Line 4	Switch NC contact	R. Monitor Bd., pin 18
E4	Line 4	Switch NO contact	R. Monitor Bd., pin V
E5	Line 3	Switch NO contact	R. Monitor Bd., pin W
E6	Line 3	Switch common	R. Monitor Bd., pin X
E7	Line 4	Xformer center tap	R. Monitor Bd., pin 21
E8	Line 3	Xformer center tap	R. Monitor Bd., pin Y
E9	Line 3	Switch NC contact	R. Monitor Bd., pin Z
E10	Line 2	Xformer center tap	L. Monitor Bd., Pin 21
E11	Line 1	Xformer center tap	L. Monitor Bd., pin Y
E12	Line 1	Switch NO contact	L. Monitor Bd., pin 17
E13	Spare		L. Monitor Bd., pin U
E14	External Function		TB1-3
E15	External Function		TB2-3
E16	External Function		TB1-4

(Table continued next page.)

E No.*	Signal		From
E17	External Function		TB2-4
E18	External Function		TB1-5
E19	External Function		TB2-5
E20	Line 1	AUX Audio Output	L. Monitor Bd., pin 14
E21	Spare		L. Monitor Bd., pin R
E22	Spare		R. Monitor Bd., pin 12
E23	Line 2	AUX Audio Output	L. Monitor Bd., pin 12
E24	Line 2	Switch NO contact	L. Monitor Bd., pin N
E25	Spare		R. Monitor Bd., pin 9
E26	Spare		R. Monitor Bd., pin K
E27	Line 1	Switch NC contact	L. Monitor Bd., pin 9
E28	Line 1	Switch common	L. Monitor Bd., pin K
E29	Line 3	TOTAL MUTE	R. Monitor Bd., pin 7
E30	Line 4	AUX Audio Output	R. Monitor Bd., pin H
E31	Line 2	Switch common	L. Monitor Bd., pin 7
E32	Line 1	PARTIAL MUTE	L. Monitor Bd., pin H
E33	Line 3	PARTIAL MUTE	R. Monitor Bd., pin 4
E34	Line 4	TOTAL MUTE	R. Monitor Bd., pin D
E35	Line 4	PARTIAL MUTE	R. Monitor Bd., pin 2
E36	Spare		R. Monitor Bd., pin B
E37	Line 2	TOTAL MUTE	L. Monitor Bd., pin 2
E38	Line 2	Switch NC contact	L. Monitor Bd., pin B
E39	Line 1	TOTAL MUTE	L. Monitor Bd., pin 4
E40	Line 2	PARTIAL MUTE	L. Monitor Bd., pin D
E41	External Function		TB3-1
E42	External Function		TB3-2
E43	External Function		TB3-3
E44	External Function		TB3-4
E45	External Fucntion		TB3-5
E46	External Function		TB3-6
E47	External Function		TB3-7

*E1 through E47 are located on the Mother Board behind each Monitor Module.

E NO.**	Signal	From
E48	ALL MUTE	J1-8
E49	Spare	E51
E50	Logic ground	J2-4
E51	Spare	E49
E52	Spare	adjacent, unmarked
E53	Spare	adjacent, unmarked
E54	Spare	adjacent, unmarked
E55	Spare	adjacent, unmarked
E56	Spare	Speaker Amplifier, pin 21
E57	Spare	Speaker Amplifier, pin 20
E58	Spare	Speaker Amplifier, pin 19
E59	Audio ground	Speaker Amplifier, pin 13
E60	Speaker Low	Speaker Amplifier, pin 18
E61	Speaker High	Speaker Amplifier, pin 3

**E48 through E61 are located on the Mother Board behind the Monitor Control Panel.

CONTROL PANEL

SEC/53364-001
MONITOR CONTROL PANEL

The Monitor Control Panel contains a master Volume control and All Mute switch. It is installed adjacent to the Speaker Amplifier, and connected to the Mother Board by a quick-disconnect cable.

A Monitor Panel circuit schematic is shown in Figure 3-8. The output from buffer amplifier U1 on the Speaker Amplifier Board is connected to the volume control pot. amplifier U1 on the Speaker Amplifier Board is connected to the volume control pot. (The Speaker Amplifier is described in Maintenance Manual LBI30300.) The wiper is then returned to pin 9 of the Speaker Amplifier Board. The NO contact of the All Mute switch connects to the Mother Board ALL MUTE buss, which goes to each monitor module. Activating the switch connects logic ground to the ALL MUTE buss. This causes the audio from all lines to be muted to a preset level. Logic ground is also connected to the cathode of the All Mute LED, causing it to be energized through the 820-ohm resistor on the Mother Board.

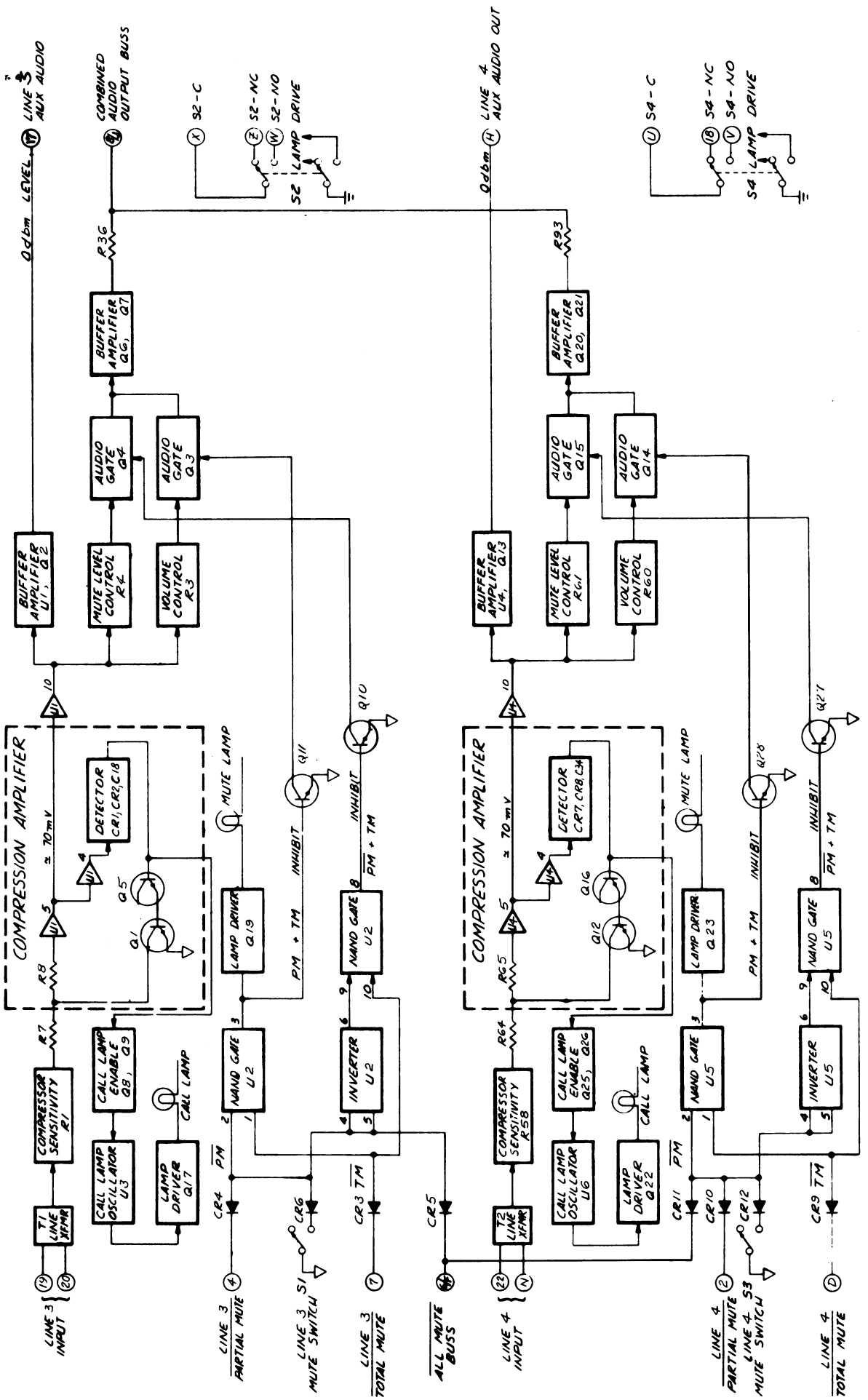

Figure 2-2 - Right Monitor Board Block Diagram

SPEAKER MODULE

SEC/53369-001
SPEAKER MODULE

The Speaker Module is installed in the far left slot of a Monitor Section card cage. The audio buss is connected to Speaker Amplifier Board SEC/53155-001, which is the only PC board of the Speaker Module. For a circuit analysis and other information about the Speaker Module, refer to Maintenance Manual LBI30300.

INSTALLATION INSTRUCTIONS

Refer to Installation Manual LBI30310, for general installation information, and for installation instructions for the Lightning Protection Assembly, SEC/50550-001.

Audio connections are made to the Monitor Modules at TB1 and TB2 as follows:

Line 1	TB1-7 and TB1-6
Line 2	TB1-7 and TB2-6
Line 3	TB1-2 and TB1-1
Line 4	TB2-2 and TB2-1

The Monitor Modules have been carefully adjusted at the factory, but some adjustments may be necessary for specific installations. These adjustments are described below.

COMPRESSOR SENSITIVITY ADJUSTMENT

Compressor sensitivity is adjusted at the factory for an input of 100 millivolts (-17.8 dBm) for threshold of compression. If a different sensitivity is desired, proceed as follows:

1. Remove the Monitor Module from the card cage, install extender boards SEC/53290-001 and SEC/53290-002, and connect the module to the extender boards.
2. Connect an AC VTVM between TP2 (Audio buss) and TP1 (Audio ground).
3. Connect a 1 kHz signal across the appropriate line input at TB1 or TB2. See above.
4. Adjust the compressor sensitivity control fully clockwise (maximum sensitivity).
5. Set the signal generator output level for the desired threshold of compression. Note the reading on the VTVM. (It will normally be approximately 85 millivolts for five watts output at maximum volume.)
6. Turn the compressor sensitivity control counterclockwise until the VTVM reading decreases two dB from the level obtained in step 5.

MUTE LEVEL ADJUSTMENT

Set up to adjust the Mute level as in steps one and two above.

1. Connect a 1 kHz tone to the appropriate line input. See above. Adjust the signal generator for a level of about 10 dB greater than threshold of compression.
2. Note the reading on the VTVM.
3. Operate the Mute switch for the appropriate line, or operate the All Mute switch on the Monitor Control Panel. Adjust the mute control, for the appropriate line, to obtain a reading on the VTVM that is less than the reading observed in step 2 by the desired amount.

INTERNAL VOLUME CONTROL

The internal volume control is set at the factory to provide a power output at the speaker of 5 watts when the master volume control on the Monitor Control Panel is fully clockwise. If a lower maximum power output is desired, the internal volume control can be adjusted as follows.

1. Remove the speaker panel from the card cage and disconnect the speaker from the speaker amplifier.
2. Connect a 3.3-ohm, non-inductive resistor across the output terminals of the speaker amplifier. Connect a VTVM across the resistor.
3. Remove the module from the card cage, install extender boards (SEC/53290-001 and SEC/53290-002), and connect the module to the extender boards.
4. Apply a 1 kHz tone to the appropriate line input, at a level of 10 dB above the threshold of compression.
5. Turn the master Volume control on the Monitor Control Panel fully clockwise.
6. Adjust the appropriate internal volume control for the desired maximum power output, as indicated on the VTVM. A table of power vs. voltage is given on the following page.

Volts (rms)	Power (watts)
1.28	0.5
1.82	1.0
2.03	1.25
2.57	2.0
3.15	3.0
3.63	4.0
4.00	5.0

For adjustments of the bias current and 2175 Hz notch filter, see Maintenance Manual LBI30300.

OPTIONAL CROSS MUTE:

All monitor lines can be partially muted, if desired, when the console TRANSMIT switch is activated. To accomplish this, make the following modification:

1. Solder a diode, 1N4148 or similar, between E48 and E49, with the cathode to E49.
2. Solder a jumper wire between E51 and E47 behind the slot 3 position.
3. Connect a jumper between TB3-7 of the slot 3 position and TB2-2 of the central control Mother Board (PTT switch normally open contact).

As a result of this modification, the ALL MUTE buss for the Monitor Mother Board will be pulled low through the added diode whenever the console PTT switch is operated.

If TOTAL mute of all monitor audio is required, make the following modifications:

A. For each monitor module position used, jumper E34, E29, E39, and E37 together.

B. For each monitor module position used, connect a diode from E37 to E47, with cathode to E47.

C. Jumper together TB3-7 for all monitor module positions used.

D. Connect a wire from TB3-7 of slot 3 position to TB2-2 of the central control Mother Board.

As a result of this modification, the TOTAL MUTE input for all monitor lines will be grounded through a diode whenever the console PTT switch is operated.

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

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TROUBLESHOOTING

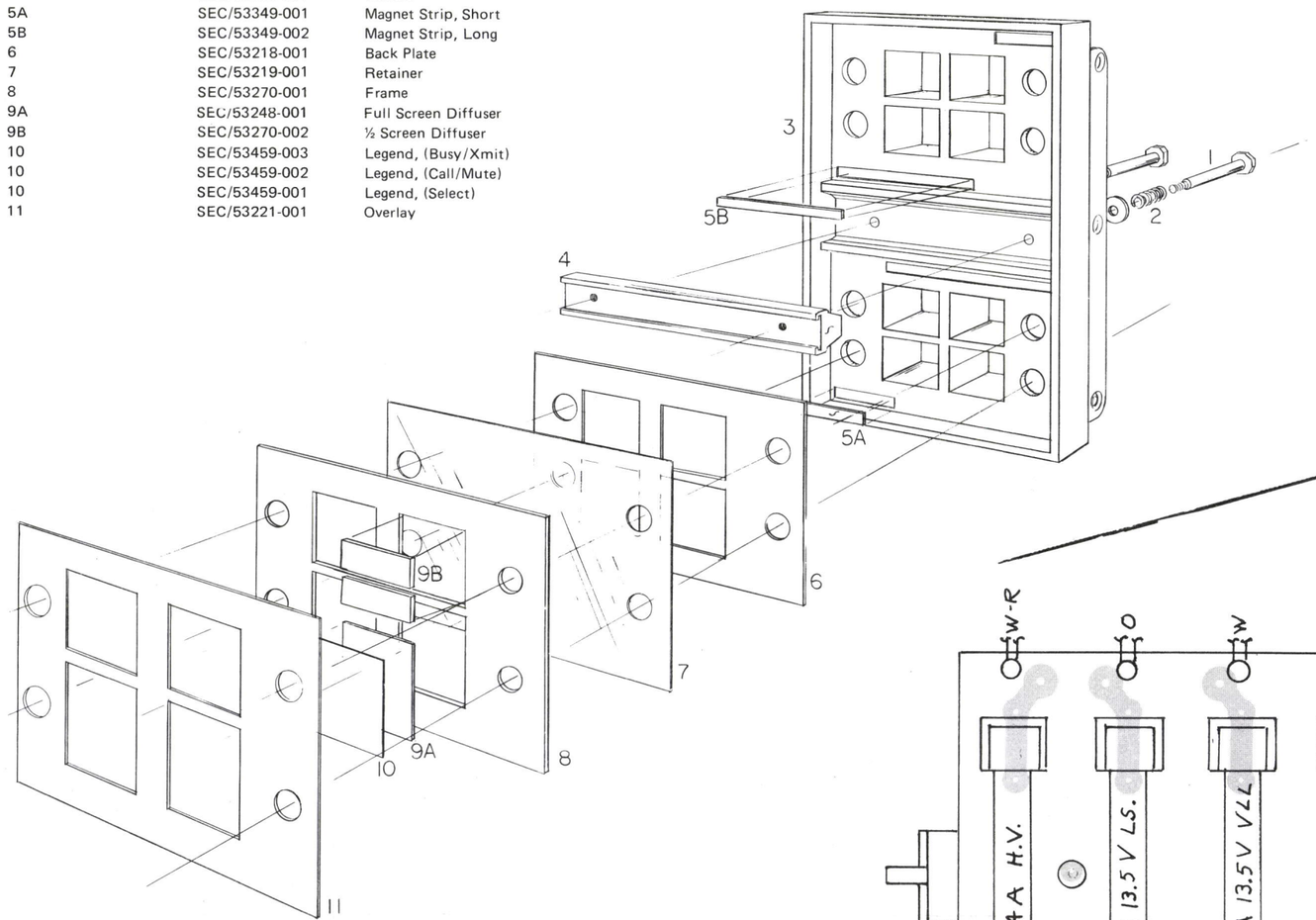
SYMPTOM:	PROCEDURE:
No speaker audio, but Call lamp indicates presence of audio on one or more lines.	Check for audio at TP2. If audio is present, check cable from J1 to Monitor Control Panel, and refer to troubleshooting procedure for Speaker Amplifier in the Series 2500 Maintenance Manual, LBI-30300. If audio is not present: Check status of mute signals. Check setting of Volume control. Check for shorts on Mother Board.

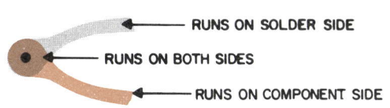
SYMPTOM:	PROCEDURE:
No speaker audio from one line, other lines normal.	Check internal volume control setting. Check Mute control status. Check for audio at the auxiliary 0 dbm output point of the defective channel. If audio is present, the problem is between the Volume control and Mute control point, and the audio output buss.

SYMPTOM:	PROCEDURE:
No Call lamp, audio present and normal.	Check logic level at pin 4 of call lamp oscillator IC when in compression. Level should be high. Check Call lamp and Call lamp-driver transistor.

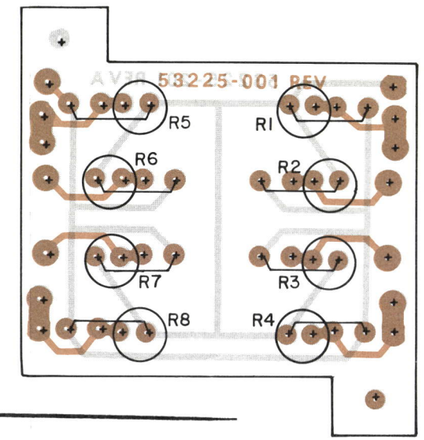
SYMPTOM:	PROCEDURE:
No Mute function on a particular line.	Check Mute level setting. Check gate voltage of audio gate transistors. Voltage should be about 14 volts when unmuted; 0 volt when muted. Check Mute logic.

ITEM	GE PART NO.	DESCRIPTION
1	SEC/53241-001	Stud, Handle
2	SEC/53244-001	Spring, Handle
3	SEC/53162-001	Module Face
4	SEC/53243-001	Handle
5A	SEC/53349-001	Magnet Strip, Short
5B	SEC/53349-002	Magnet Strip, Long
6	SEC/53218-001	Back Plate
7	SEC/53219-001	Retainer
8	SEC/53270-001	Frame
9A	SEC/53248-001	Full Screen Diffuser
9B	SEC/53270-002	½ Screen Diffuser
10	SEC/53459-003	Legend, (Busy/Xmit)
10	SEC/53459-002	Legend, (Call/Mute)
10	SEC/53459-001	Legend, (Select)
11	SEC/53221-001	Overlay





SYMBOL	GE PART NO.	DESCRIPTION
		——————————RESISTORS——————————
R1—R8	SEC/51016-202	2 Kohms, ¼W, 5% Carbon composition
		——————————SOCKETS, JACKS, RECEPTACLES——————————
–	SEC/25569-003	Socket, Pin
		——————————MISCELLANEOUS——————————
–	SEC/50507-020	Lamp, T-1 ¾, straight lead
–	SEC/50551-003	Color Filter, Amber Lens Cap
–	SEC/50551-002	Color Filter, red, Lens Cap



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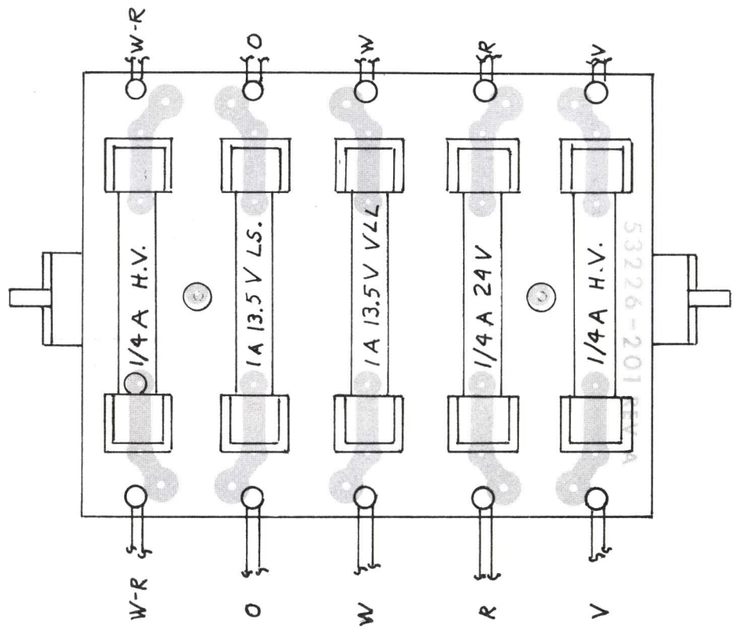
(53225-201, Rev. A)



(B53226-TAB)
(53226-201, Rev. A)

GE PART NO.	DESCRIPTION
	————SOCKETS, JACKS, RECEPTACLES————
SEC/24135-003	Receptacle
	————————MISCELLANEOUS————————
SEC/14820-011	Fuse, 1/4A Fast Blow, (24v, +150v, —150v)
SEC/14820-017	Fuse, 1A Fast Blow, (V_{CC}, Lamp Supply)
SEC/50503-001	Fuse Clip

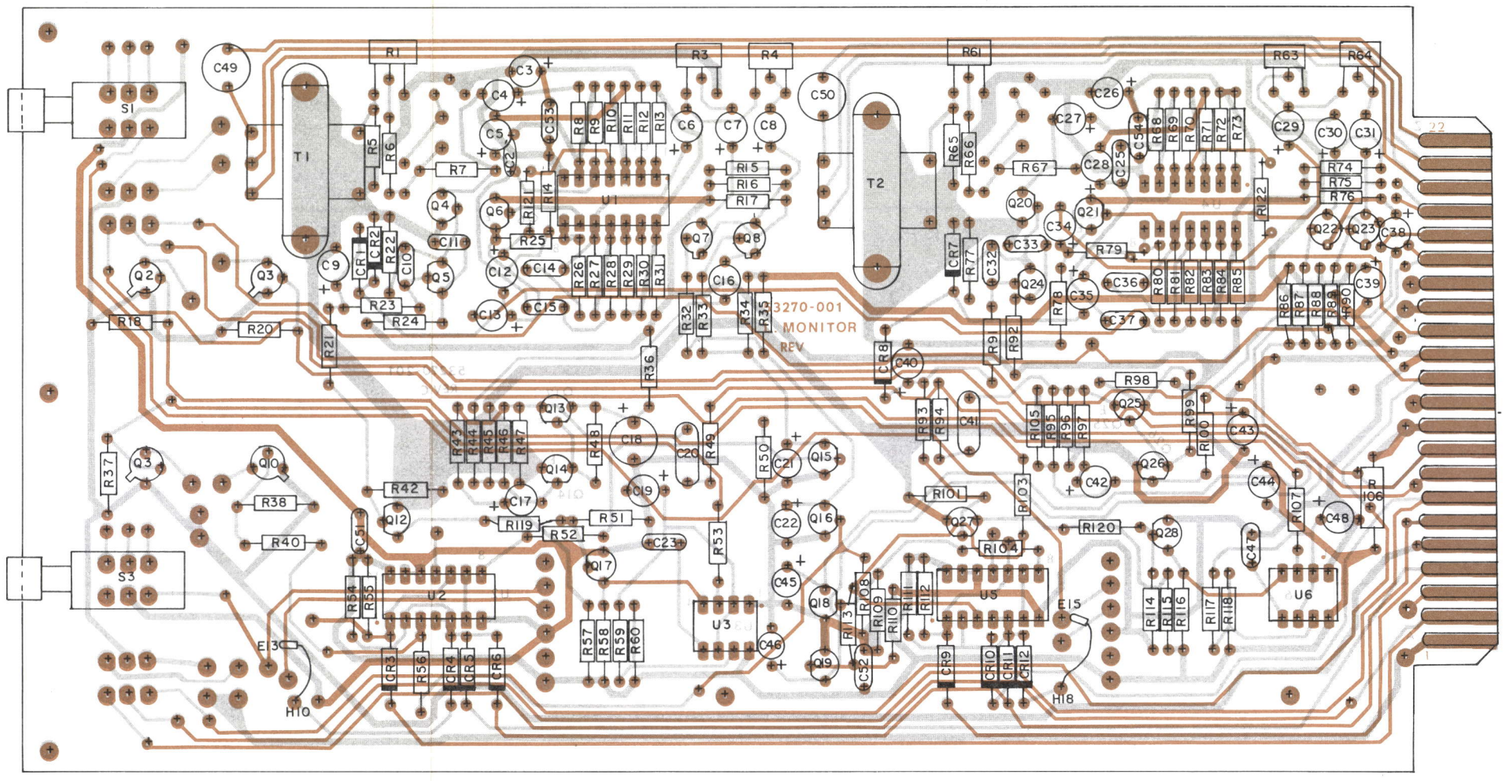
MODULE FACE ASSEMBLY, LAMP BOARD AND FUSE BOARD

Figure 3-1

SYMBOL	GE PART NO.	DESCRIPTION
	CAPACITORS	
C2, C10, C25, C32	SEC/25501-221	220 pF, 500 V, mica
C18, C43	SEC/25078-476	47 uF, 20 V, tantalum
C4, C7, C8, C12, C13, C16, C17, C27, C30, C31, C34, C35, C38, C42, C21, C22,		
C38, C42	SEC/25076-105	1 uF, 35 V, tantalum
C5, C6, C28, C29	SEC/25076-225	2.2 uF, 35 V, tantalum
C9, C40	SEC/25076-335	3.3 uF, 35 V, tantalum
C11, C23, C33, C47, C51-C54	SEC/25853-008	.01 uF, 100 V, ceramic disc
C14, C15, C36, C37	SEC/50102-007	0.1 uF, 50 V, polyester
C19, C39, C48	SEC/25076-685	6.8 uF, 35 V, tantalum
C20, C41	SEC/50102-009	.22 uF, 50 V, polyester
C3, C26, C44	SEC/25078-107	100 uF, 20 V, tantalum
C49, C50	SEC/24283-004	4 uF, 150 V, NP
	DIODES/RECTIFIERS	
CR1-CR12	SEC/15104-011	1N4148, silicon, small signal
	INTEGRATED CIRCUITS	
U1, U4	SEC/50705-001	LM3900, Quad Amplifier
U2, U5	SEC/50709-400	74C00, CMOS
U3, U6	SEC/50701-001	NE555 V, Timer
	INDUCTORS/TRANSFORMERS	
T1, T2	SEC/51427-001	Transformer, audio
	POTENTIOMETERS	
R1, R61	SEC/51100-8503	50 Kohms, cermet
R3, R63	SEC/51100-8502	5 Kohms, cermet
R4, R64	SEC/51100-8105	1 Mohm, cermet
	RESISTORS	
		(Resistors are ¼W, 5%, carbon composition unless otherwise described.)
R5, R14, R47, R65, R78, R96	SEC/51016-621	620 ohms
R6, R7, R8, R23, R66, R67, R68, R91	SEC/51016-512	5.1 Kohms
R9, R15, R16, R17, R54, R55, R69, R74, R75, R76, R111, R112, R34, R119, R120, R35, R86, R88	SEC/51016-104	100 Kohms
R10, R22, R32, R33, R70, R77, R87, R89	SEC/51016-185	1.8 Mohms
R11, R71	SEC/51016-204	200 Kohms
R12, R42, R72, R101	SEC/51016-395	3.9 Mohms
R13, R27, R57, R73, R81, R115	SEC/51016-224	220 Kohms
R18, R20, R37, R38, R50, R108, R109, R110	SEC/51016-103	10 Kohms
R21, R29, R83, R93	SEC/51016-564	560 Kohms
R24, R36, R90, R92, R98	SEC/51016-101	100 ohms
R25, R79	SEC/51016-334	330 Kohms
R26, R80	SEC/51016-154	150 Kohms
R28, R82	SEC/51016-333	33 Kohms
R30, R84	SEC/51016-684	680 Kohms
R31, R85	SEC/51016-100	10 ohms

SYMBOL	GE PART NO.	DESCRIPTION
R32, R33, R52, R56, R87, R89	SEC/51016-115	1 Mohm
R60, R86, R88, R104, R113, R118	SEC/51016-273	27 Kohms
R40, R44, R53, R100, R103, R107	SEC/51016-472	4.7 Kohms
R43, R49, R59, R94, R97, R117	SEC/51016-223	22 Kohms
R45, R105	SEC/51016-822	8.2 Kohms
R46, R51, R95 R114	SEC/51016-623	62 Kohms
R48, R99	SEC/51016-153	15 Kohms
R58, R116	SEC/51016-133	13 Kohms
R106	SEC/51017-100	10 ohms, ½W
R	SEC/51016-302	3 Kohms
	SOCKETS/JACKS/RECEPTACLES	
–	SEC/24135-003	Pin, receptacle

SYMBOL	GE PART NO.	DESCRIPTION
–	SEC/25290-014	IC Socket, 14-pin
–	SEC/25290-008	IC Socket, 8-pin
	SWITCHES	
S1, S3	SEC/51316-002	DPDT, Alternate Action
For S1, S3	SEC/51317-008	Push Button, gray
	TRANSISTORS	
Q2, Q3, Q9, Q10	SEC/51205-3053	2N3053 NPN
Q4, Q5, Q12, Q20, Q24, Q27	SEC/51205-5210	2N5210 NPN
Q6, Q13-Q19, Q21, Q25, Q26, Q28	SEC/51205-3904	2N3904 NPN
Q7, Q8, Q22, Q23	SEC/51205-3458	2N3458 FET

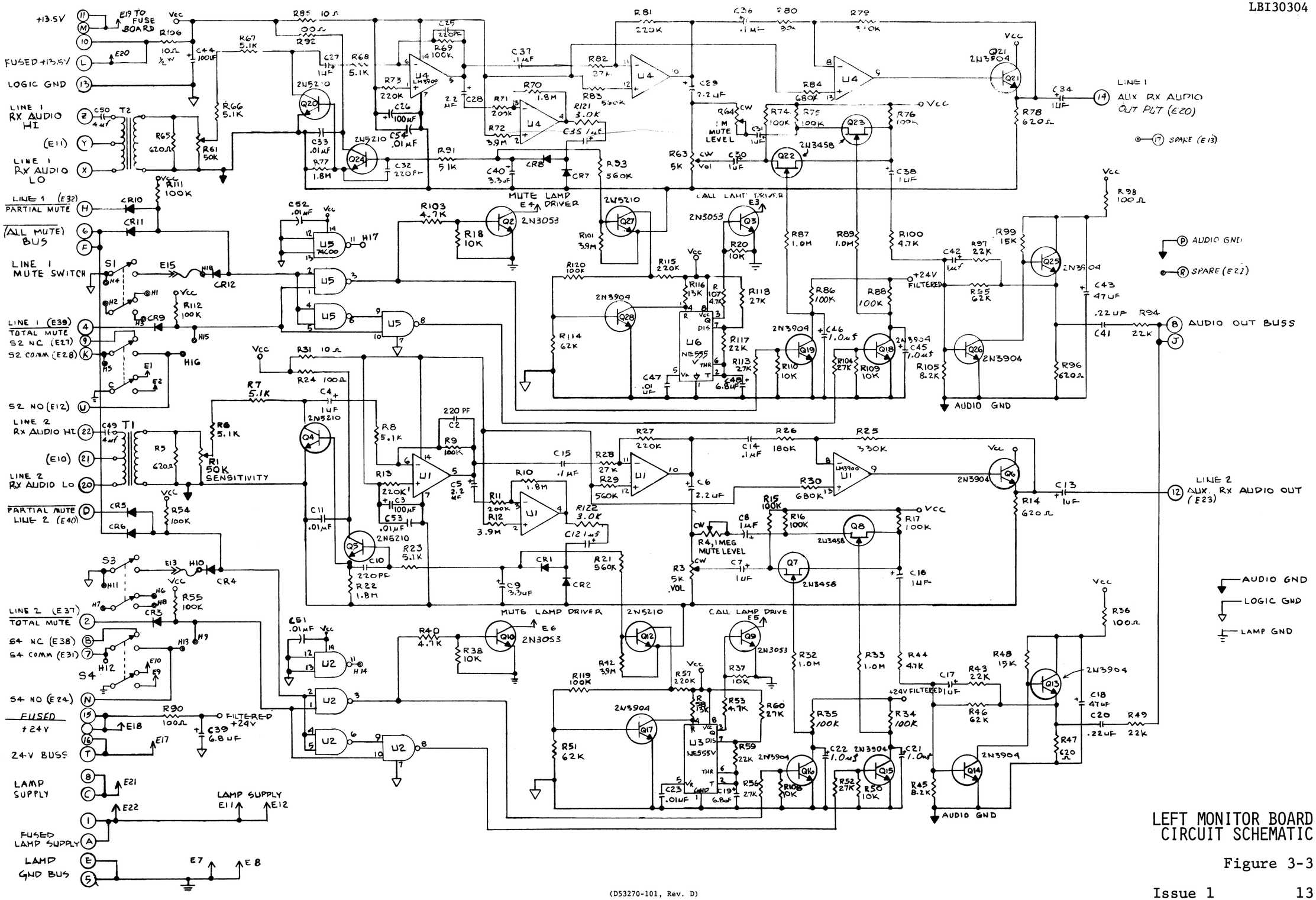


(D53270-030, Rev. G)
(53270-001, Rev. 0)
(53270-201, Rev. C)

LEFT MONITOR BOARD ASSEMBLY DIAGRAM

Figure 3-2

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



(D53270-101, Rev. D)

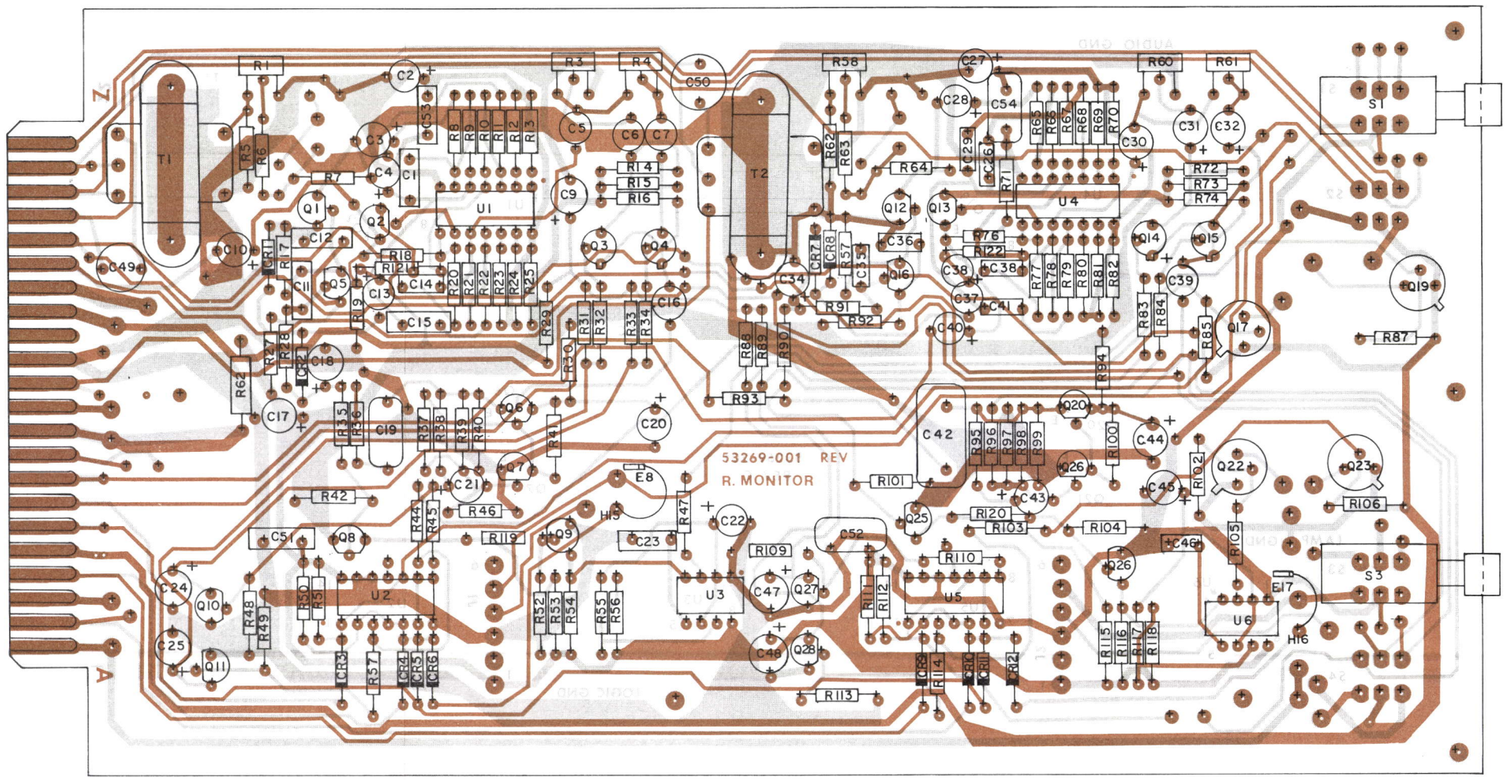
LEFT MONITOR BOARD CIRCUIT SCHEMATIC

Figure 3-3

SYMBOL	GE PART NO.	DESCRIPTION
	CAPACITORS	
C1, C11, C26, C35	SEC/25501-221	220 pF, 500 V, mica
C20, C44	SEC/25078-476	47 uF, 20 V, tantalum
C3, C6, C7, C10, C13, C16, C21, C28, C31, C32, C37, C39, C40,C43,C24, C25,C47,C48	SEC/25076-105	1 uF, 35 V, tantalum
C4, C5, C29, C30	SEC/25076-225	2.2 uF, 35 V, tantalum
C9, C22, C45	SEC/25076-685	6.8 uF, 35 V, tantalum
C12, C23, C36, C46, C51-C54	SEC/25853-008	.01 uF, 100 V, ceramic disc
C14, C15, C38, C41,	SEC/50102-007	.1 uF, 50 V, polyester
C2, C17, C27	SEC/25078-107	100 uF, 20 V, tantalum
C18, C34	SEC/25076-335	3.3 uF, 35 V, tantalum
C19, C42	SEC/50102-009	.22 uF, 50 V, polyester
C49, C50	SEC/24283-004	4 uF, 150 V, NP
	DIODES/RECTIFIERS	
CR1-CR12	SEC/15104-011	1N4148, silicon, small signal
	INTEGRATED CIRCUITS	
U1, U4	SEC/50705-001	LM3900, Quad Amplifier
U2, U5	SEC/50709-400	74C00, CMOS
U3, U6	SEC/50701-001	NE555 V, Timer
	INDUCTORS/TRANSFORMERS	
T1, T2	SEC/51427-001	Transformer, audio
	POTENTIOMETERS	
R1, R58	SEC/51100-8503	50 Kohms, cermet
R3, R60	SEC/51100-8502	5 Kohms, cermet
R4, R61	SEC/51100-8105	1 Mohm, cermet
	RESISTORS (Resistors are ¼W, 5%, carbon composition unless otherwise described.)	
R	SEC/51016-302	3 Kohms
R5, R19, R40, R62, R71, R99	SEC/51016-621	620 ohms
R6, R7, R8, R28, R63, R64, R65, R91	SEC/51016-512	5.1 Kohms
R9, R14, R15, R16, R50, R51, R66, R72, R73, R74, R111, R112, R89, R119, R120, R31, R33, R88	SEC/51016-104	100 Kohms
R10, R17, R32, R34, R67, R75, R83, R84	SEC/51016-185	1.8 Mohms
R11, R68	SEC/51016-204	200 Kohms
R12, R42, R69, R101	SEC/51016-395	3.9 Mohms
R13, R21, R53, R70, R78, R115	SEC/51016-224	220 Kohms
R18, R76	SEC/51016-334	330 Kohms
R20, R77	SEC/51016-154	150 Kohms
R22, R79	SEC/51016-333	73 Kohms
R23, R35, R80, R90	SEC/51016-564	560 Kohms
R24, R81	SEC/51016-684	680 Kohms
R25, R82	SEC/51016-100	10 ohms
R26	SEC/51017-100	10 ohms, ½W
R27, R29, R30, R92, R94	SEC/51016-101	100 ohms

SYMBOL	GE PART NO.	DESCRIPTION
R45, R56, R57, R110, R114, R118	SEC/51016-273	27 Kohms
R36, R38, R55, R93, R95, R117	SEC/51016-223	22 Kohms
R37, R44, R47, R96 R103, R105	SEC/51016-472	4.7 Kohms
R39, R52, R98, R104	SEC/51016-623	62 Kohms
R41, R100	SEC/51016-153	15 Kohms
R46, R97	SEC/51016-822	8.2 Kohms
R48, R49, R85, R87, R102, R106, R109, R113	SEC/51016-103	10 Kohms
R54, R116	SEC/51016-133	13 Kohms
R32, R34, R83, R84	SEC/51016-105	1 Mohms
	SOCKETS/JACKS/RECEPTACLES	
—	SEC/24135-003	Pin, receptacle
—	SEC/25290-014	IC Socket, 14-pin
—	SEC/25290-008	IC Socket, 8-pin

SYMBOL	GE PART NO.	DESCRIPTION
	SWITCHES	
S1, S3	SEC/51316-002	DPDT, Alternate Action
For S1, S3	SEC/51317-008	Push Button, gray
	TRANSISTORS	
Q1, Q5, Q8, Q12, Q16, Q25	SEC/51205-5210	2N5210, NPN
Q2, Q6, Q7, Q9, Q10, Q11, Q13, Q20, Q21, Q26, Q27, Q28	SEC/51205-3904	2N3904, NPN
Q3, Q4, Q14, Q15	SEC/51205-3458	2N3458, FET
Q17, Q19, Q22, Q23	SEC/51205-3053	2N3053, NPN

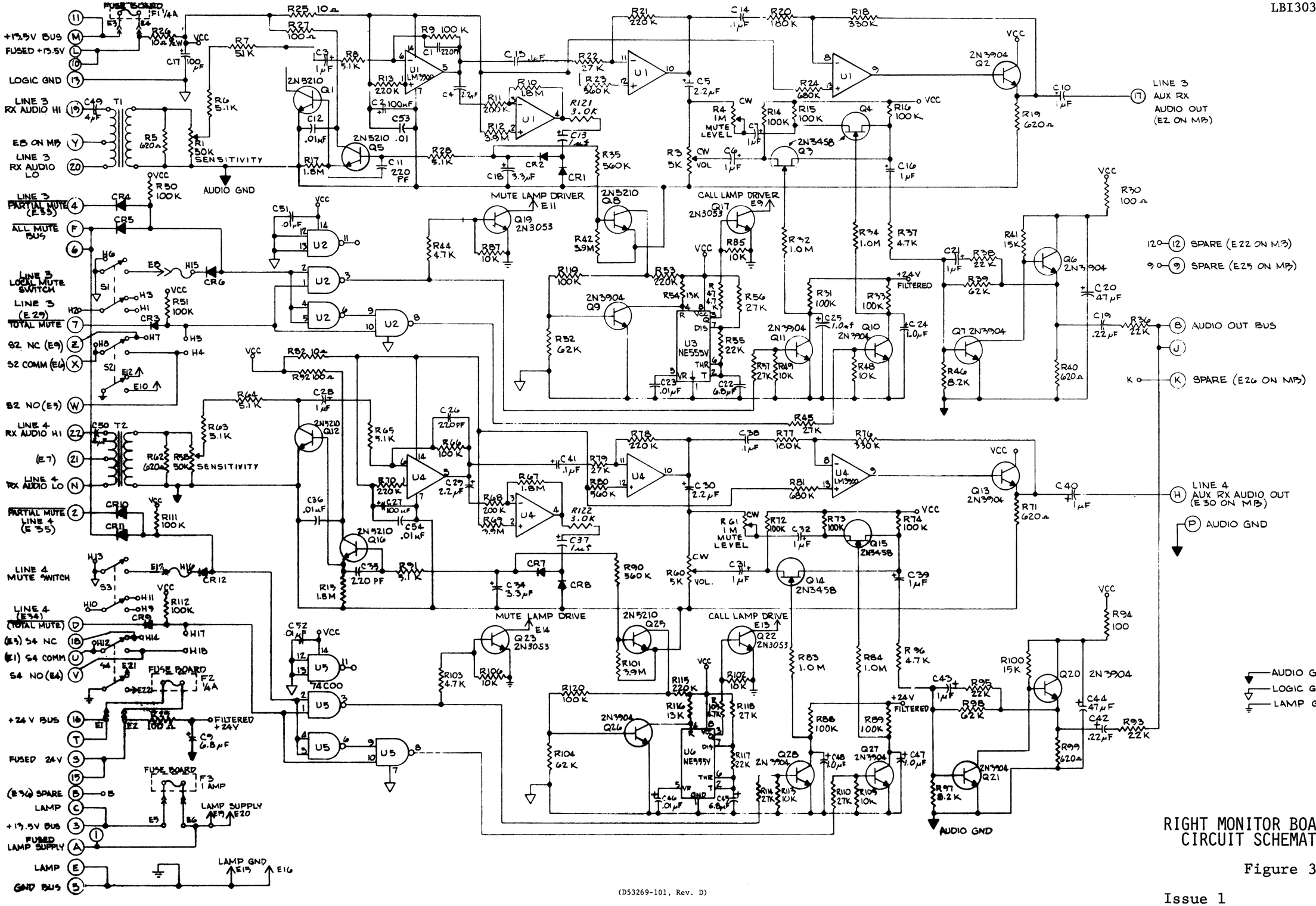


RIGHT MONITOR BOARD
ASSEMBLY DIAGRAM & PARTS LIST

Figure 3-4

(D53269-0301, Rev. C2)
(53269-001, Rev. 0)
(53269-201, Rev. C)

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



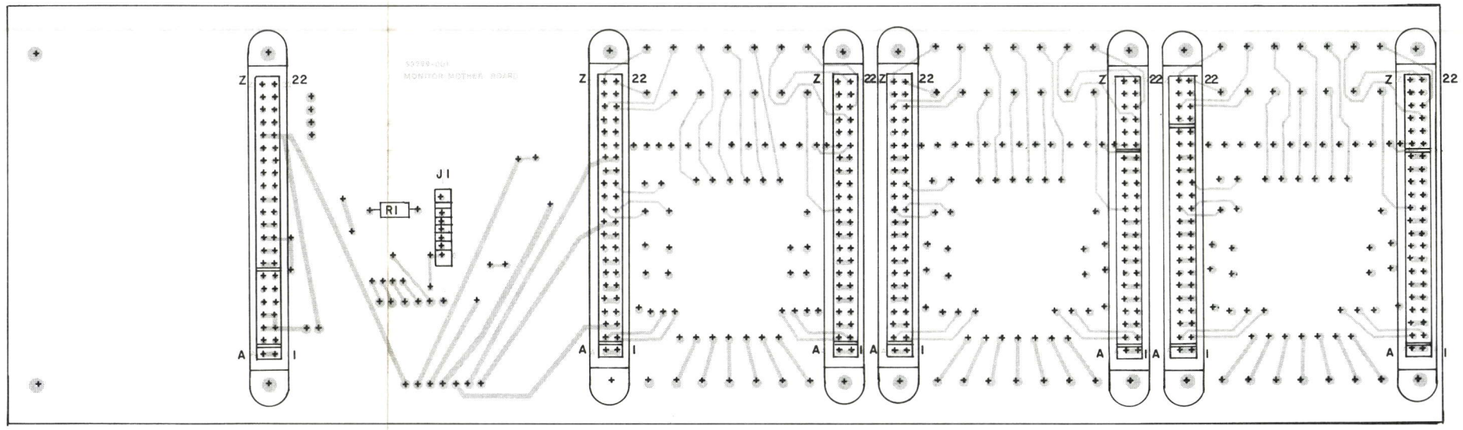
(D53269-101, Rev. D)

RIGHT MONITOR BOARD
CIRCUIT SCHEMATIC

Figure 3-5

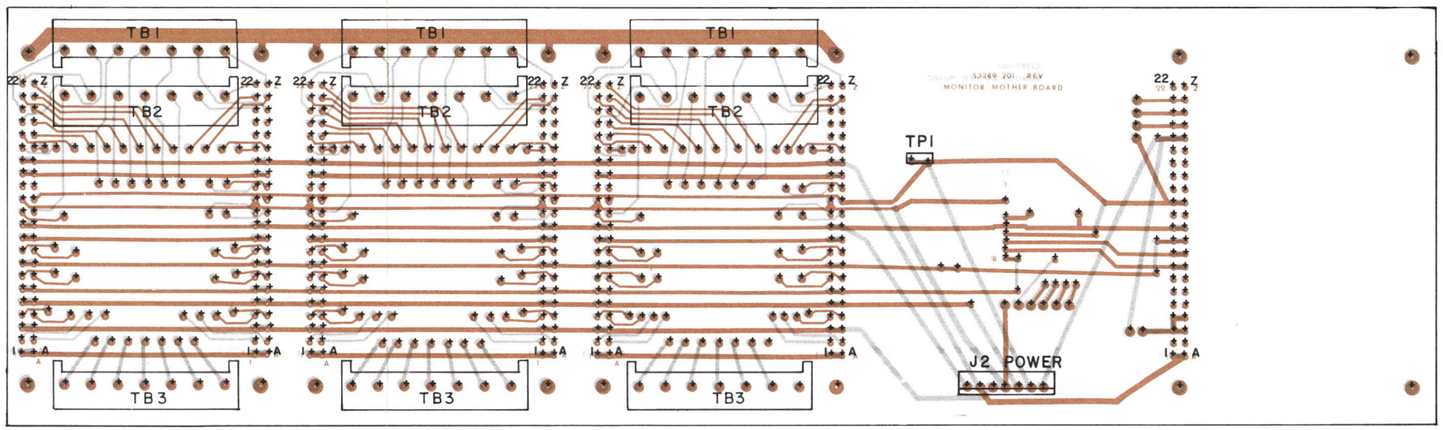
SYMBOL	GE PART NO.	DESCRIPTION
J2	SEC/50426-007	Connector, 7-pin
J1	SEC/50429-008	Connector, 8-pin
—	SEC/50432-044	Connector, PC board
—	SEC/50666-001	Key, polarizing
—	SEC/53289-201	Printed Circuit Board
R1	SEC/51017-821	Resistor, 820 ohms, ½ W, 5% carbon comp.
TB1-TB3	SEC/50542-007	Terminal Board, 7-terminal
TP1, TP2	SEC/50537-001	Test Point

FRONT SIDE

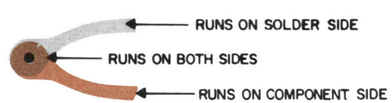


(D53289-301, Rev.0)
(53289-001, Rev. 0)

CIRCUIT SIDE

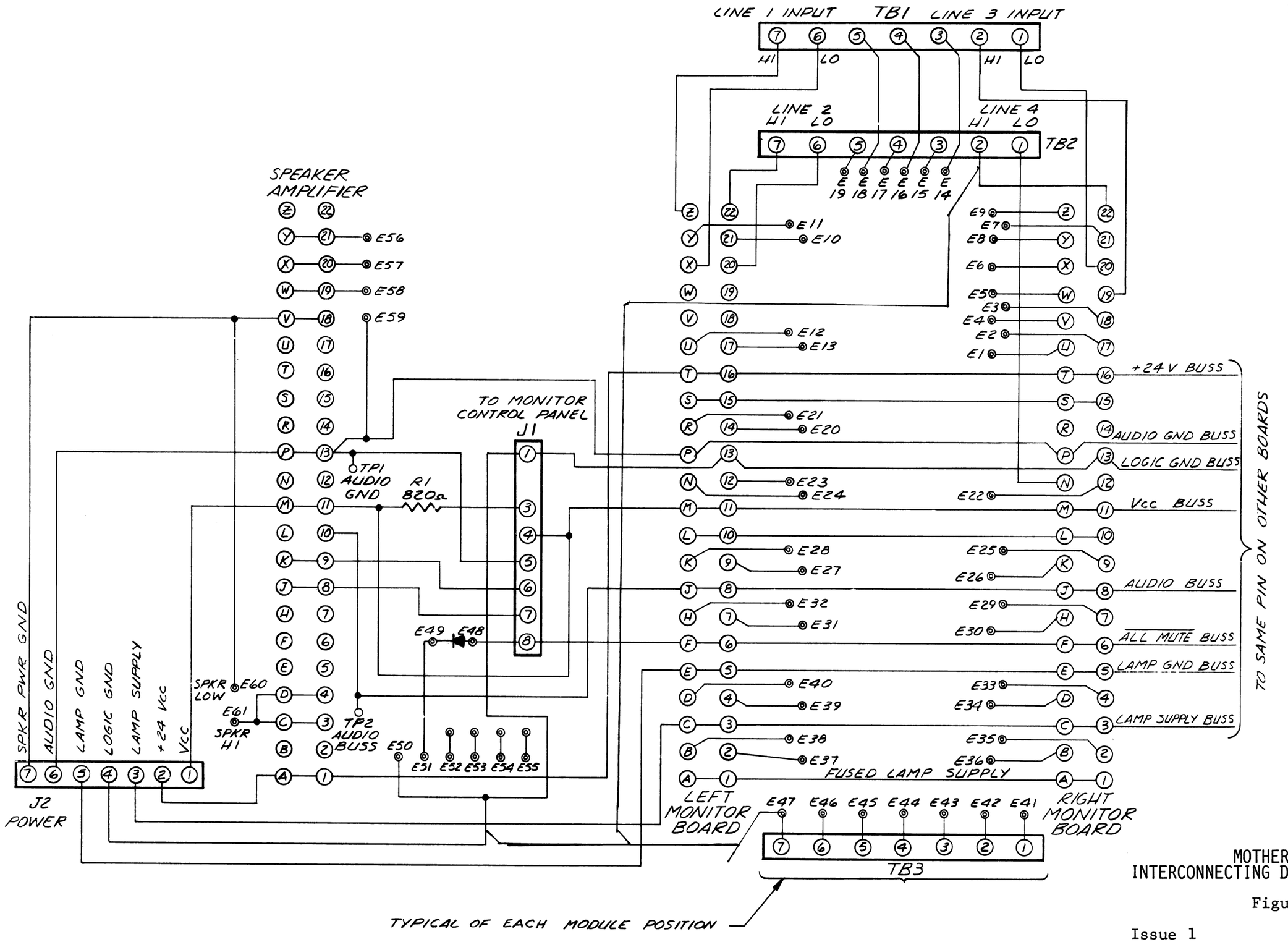


(D53289-301, Rev. 0)
(53289-001, Rev. 0)
(53290-201, Rev. 0)



MOTHER BOARD
ASSEMBLY DIAGRAM & PARTS LIST

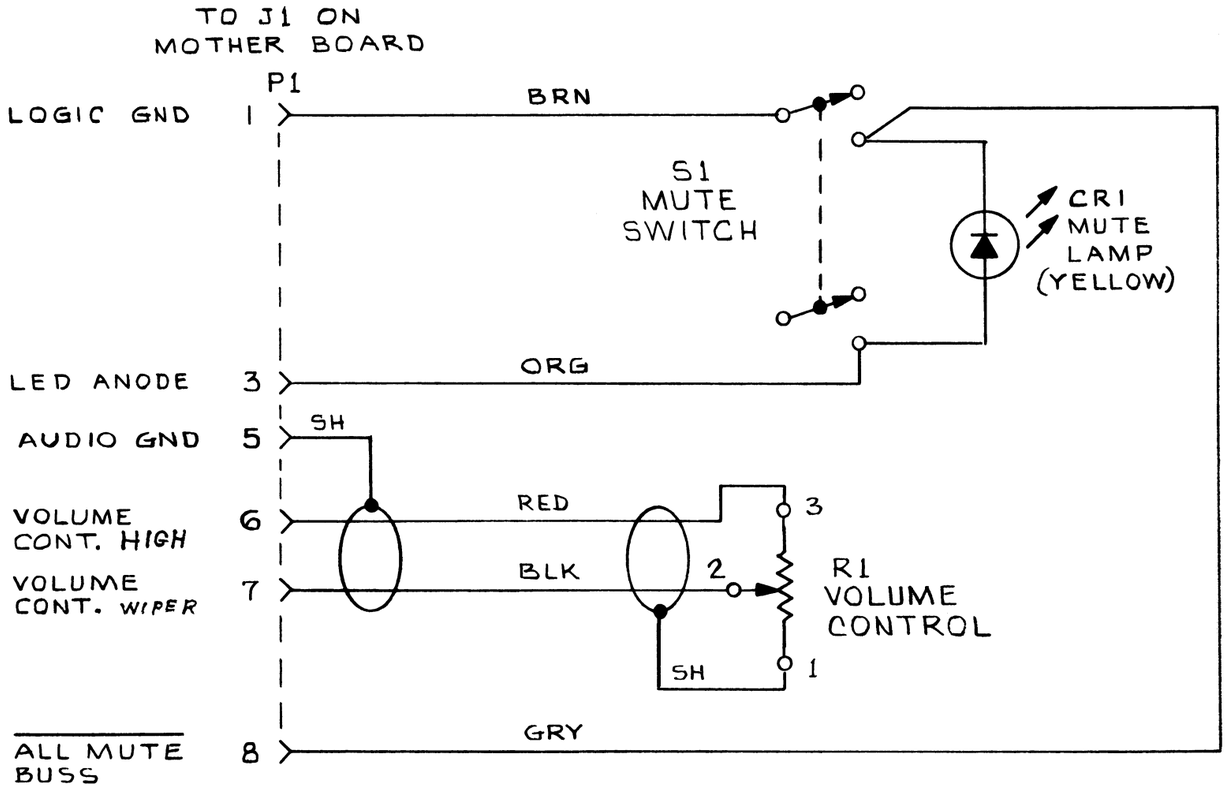
Figure 3-6



MOTHER BOARD
INTERCONNECTING DIAGRAM

Figure 3-7

(C53289-101, Rev. A)



(53364-101, Rev. A)

CONTROL PANEL
SCHEMATIC

Figure 3-8

QTY.	GE PART NO.	DESCRIPTION
----------	SEC/53364-001 ---	MONITOR CONTROL PANEL ----------
18"	SEC/24184-002	Cable, Shielded
1	SEC/50430-008	Connector, 8-pin (P1)
1	SEC/50552-001	Knob
1	SEC/51233-001	Light Emitting Diode, yellow (CR1)
1	SEC/53278-001	Panel, Monitor Control
1	SEC/51164-001	Potentiometer, 5 Kohms (R1)
1	SEC/53284-001	Plate, mounting
1	SEC/51319-5222	Switch, rocker, DPDT (S1)
----------	SEC/53371-001 ---	MONITOR SECTION----------
1	SEC/53146-001	Assembly, Card Cage
1	SEC/53289-001	Assembly, Mother Board
1	SEC/53364-001	Assembly, Control Panel
1	SEC/53369-001	Speaker Module
3	SEC/53163-001	Module Face, custom
1	SEC/53455-003	Cable, power
12	SEC/53149-001	Bracket, module mounting
2	SEC/53173-001	Support
----------	SEC/53372-001, -002	MONITOR MODULE----------

-001	-002		
1	–	SEC/53358-004	Assembly, Front Panel, 4-line module
–	1	SEC/53358-005	Assembly, Front Panel, 2-line module
1	1	–	Legend, handle
4	2	SEC/50550-001	Lightning Protector
–	1	SEC/53350-201	PCB Assembly, Blank, Right
1	1	SEC/53226-001	PCB Assembly, Fuse Board
1	1	SEC/53270-001	PCB Assembly, Left Monitor
1	–	SEC/53269-001	PCB Assembly, Right Monitor
4	6	SEC/53166-001	Plug, switch

MAJOR ASSEMBLIES
PARTS LISTS