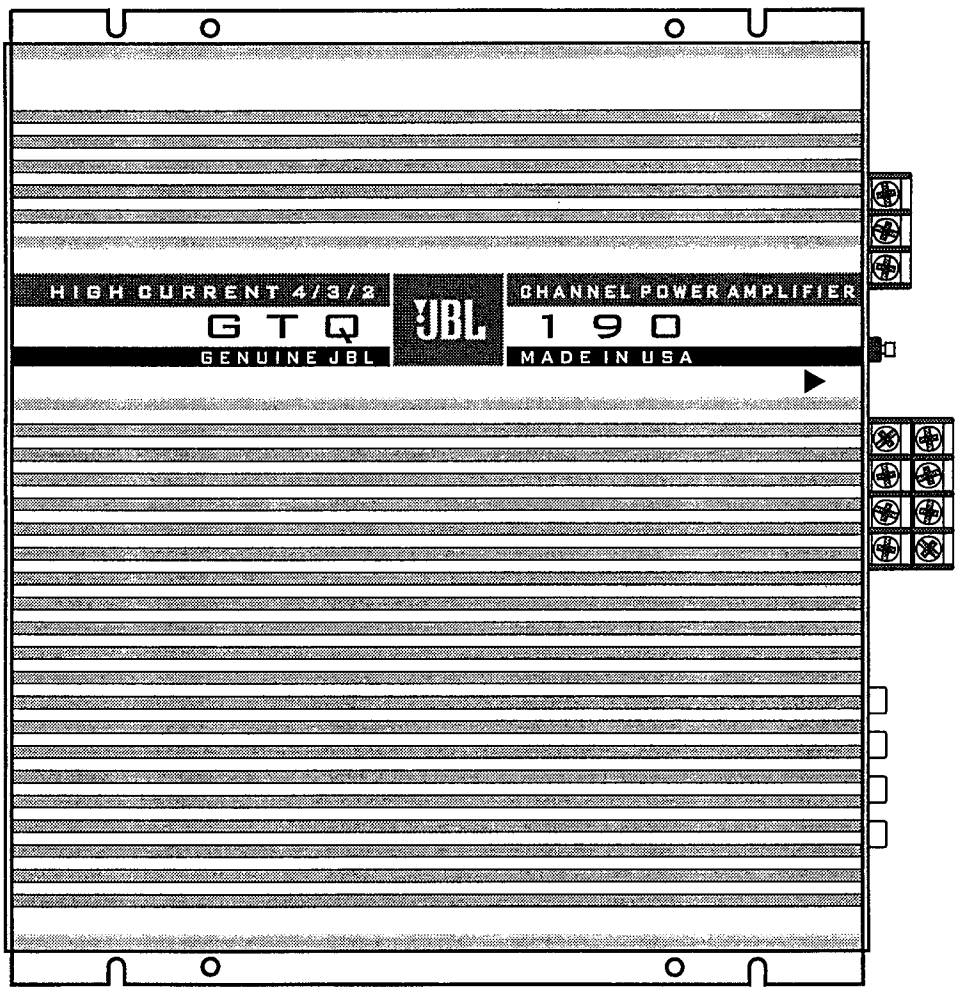
GTQ190

4/3/2 CHANNEL AUTOMOTIVE POWER AMPLIFIER

TECHNICAL MANUAL



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JBL Consumer Products Inc.
250 Crossways Park Drive
Woodbury, N.Y. 11797
1-800-336-4JBL in the USA

A Harman International Company

Part No.: 1112-GTQ190 Rev A

Table of Contents

SPECIFICATIONS

Number of Channels	4, 3, 2
4 Ohms Stereo	35W x 4
2 Ohms Stereo	50W x 4
4 Ohms Bridged	100W x 2
T.H.D. @ 4 Ohms rated power	0.05%
Frequency Response	10Hz - 40kHz (+0, -1db)
Signal to Noise Ratio	100dBA
Slew Rate	10V/us
Channel Separation (dB)	>65dB
Damping Factor	>200
Crossover Slope	18dB
Fuse Size	30Amp 32Volt ATC Type Fuse
Line Level Sensitivity	100mV - 4V
Speaker Level Sensitivity	400mV - 8V
Operating Range	11V - 16V
External Dimensions	
Length	10" (254mm)
Width	8" (203mm)
Depth	2" (51mm)
Weight	10.2lbs (4.6kg)

JBL continually strives to improve its products. New materials, production methods and design refinements are introduced into existing models without notice as a routine expression of our design philosophy. For this reason, GTQ Series Multichannel Automotive Amplifiers may differ in some respect from their published specifications and descriptions, but will always equal or exceed the original specifications unless otherwise stated.

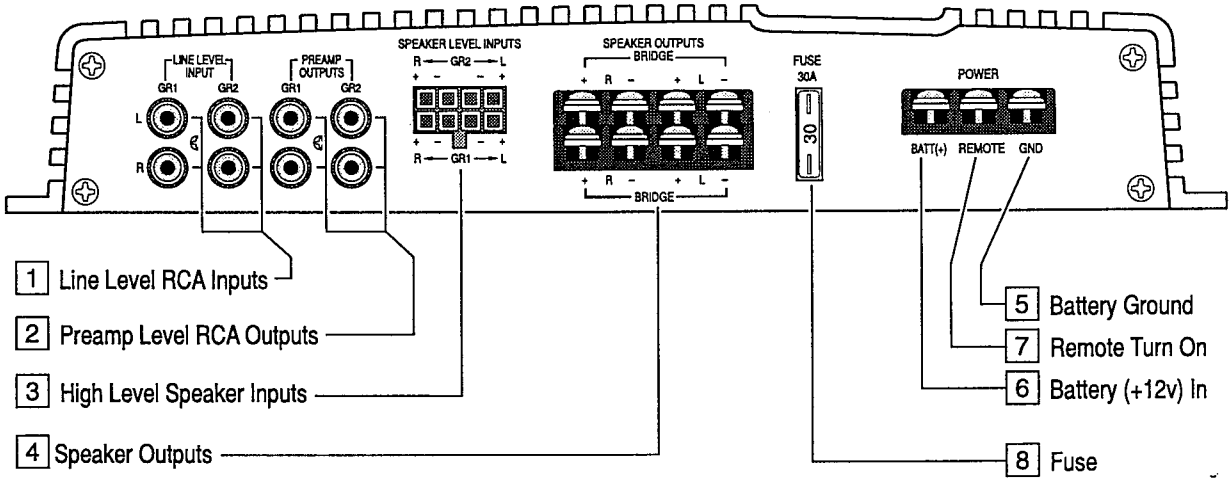
Features

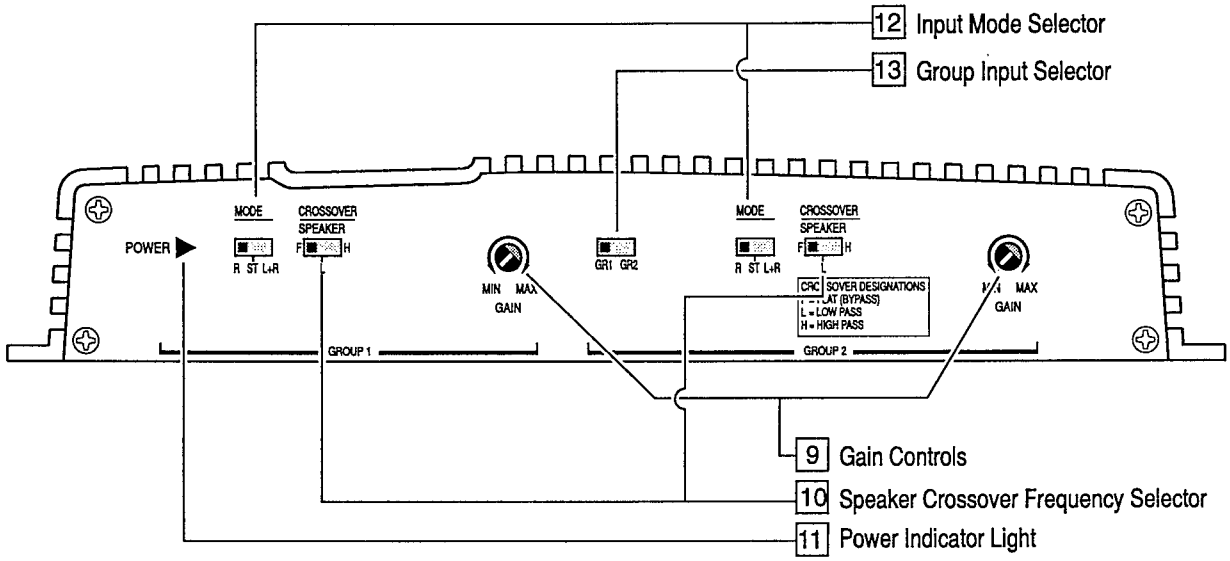
- 4, 3 or 2-Channel Operation.
- Simultaneous Stereo + Mono Operation.
- Advanced Mosfet Oversized Floating Rail Power Supply
- Discrete Darlington Output Array.
- High Current Low Impedance Design.
- Common-Sense Turn-On (no remote wire needed when using Universal Interface.
- Full Programmable 18dB per Octave Crossover (Low-Pass, High-Pass, Thru Pass).
- Preamp Output for System Building.
- Crossovers on Preamp Outputs for the ultimate system building.
- Multiple Head unit Ready.
- Switchable Bass Boost.
- JBL's Proprietary Gold Plated Input and Output Connectors.
- Continuously Adjustable gain Controls.
- Bridgeable.

Test Conditions and Notes

- Power testing is completed using 4 Ohm, 250 Watt resistors (such as the Dale RH-250 250W, 4 ohm, 1% resistor).
- The distortion meter, scopes, and any other test equipment used to test the amplifier should be ground isolated to prevent ground loop noise problems.
- In some situations, it may be necessary to connect the ground of the distortion meter to the RCA ground terminal on the amplifier in order to prevent ground noise problems and obtain the correct THD measurements.
- Signal to Noise ratio is measured versus the rated power into 4 ohms using an A weighted meter with the gain control set to the minimum position.
- Frequency response measurements can be taken at 1 watt or rated power. Reference levels should be established at 1 kHz with all crossovers in the "flat" or "off" position.
- Crossover frequency measurements should be taken at 1 watt output for the speaker outputs and 0.5 V output on the preamp outputs. The specification is taken relative to the 40 Hz output on the Low Pass filter and relative to the 1 kHz output on the high pass filter. Right and Left channel reference levels should be reestablished for each measurement.

Controls and Connections





Controls and Connections

1. Preamp-Level Input Connector - Use these connectors for line (preamp) level inputs to the amplifier.

2. Preamp-Level Output Connector - Use these outputs to send the signal to additional amplifiers.

3. Speaker-Level Input Connector - Use this connector for speaker level input signals. A wire harness is supplied for use with this connector. See "Typical System Configuration" section (page 5) for wiring instructions. This input also includes JBL's Common Sense input circuitry which turns the amplifier on as soon as the high powered head unit connected to this input is turned on.

4. Speaker Output Connector - Connect speaker wiring to these connectors. See "Wiring" directions for more information.

5., 6., 7. Power Connector - Connection for power wires. See Wiring Instructions on Page 5 for more information.

8. Fuse - One 30 Amp ATC type fuse.

9. Gain Controls - Use these controls to adjust the gain of the amplifier channel group.

10. Speaker Crossover Switches - These switches control the built-in crossovers that are connected to each group's power amplifier circuitry. Set the switch to F (flat) for full band operation on a group. Set this switch to L (low) to activate the low pass filter on the selected amplifier for subwoofer use in conjunction with a high-pass filtered input signal to create a bandpass crossover (for a midrange or midbass driver). Set the switch to H (high) to activate the high-pass filter for use with satellite speakers or tweeters on an amplifier group.

11. Power Indicator LED (on amp chassis end) - LED steadily illuminates for normal operation. LED blinks when protection circuitry is engaged, and during power-up.

12. Mode Switches - These switches are used to set the input mode for both preamp and speaker-level inputs (to drive speaker output groups). Set the switch to Stereo for normal operation on the group using individual left and right inputs. Set this switch to L to drive both the left and right outputs with only a single input on the left jack. Set the switch to "L+R" to sum the left and right inputs for a mono output on the group. These switches do not affect the preamp outputs. **Note**: L+R and L settings bypass the imaging enhancer.

13. Group 2 Input Switch - This switch is used to select which inputs will drive Group 2 of the amplifier. Put the switch in position "GR 1" to allow Group 2 to be driven by the Group 1 inputs. Put the switch in the "GR 2" position to drive Group 2 with the Group 2 inputs.

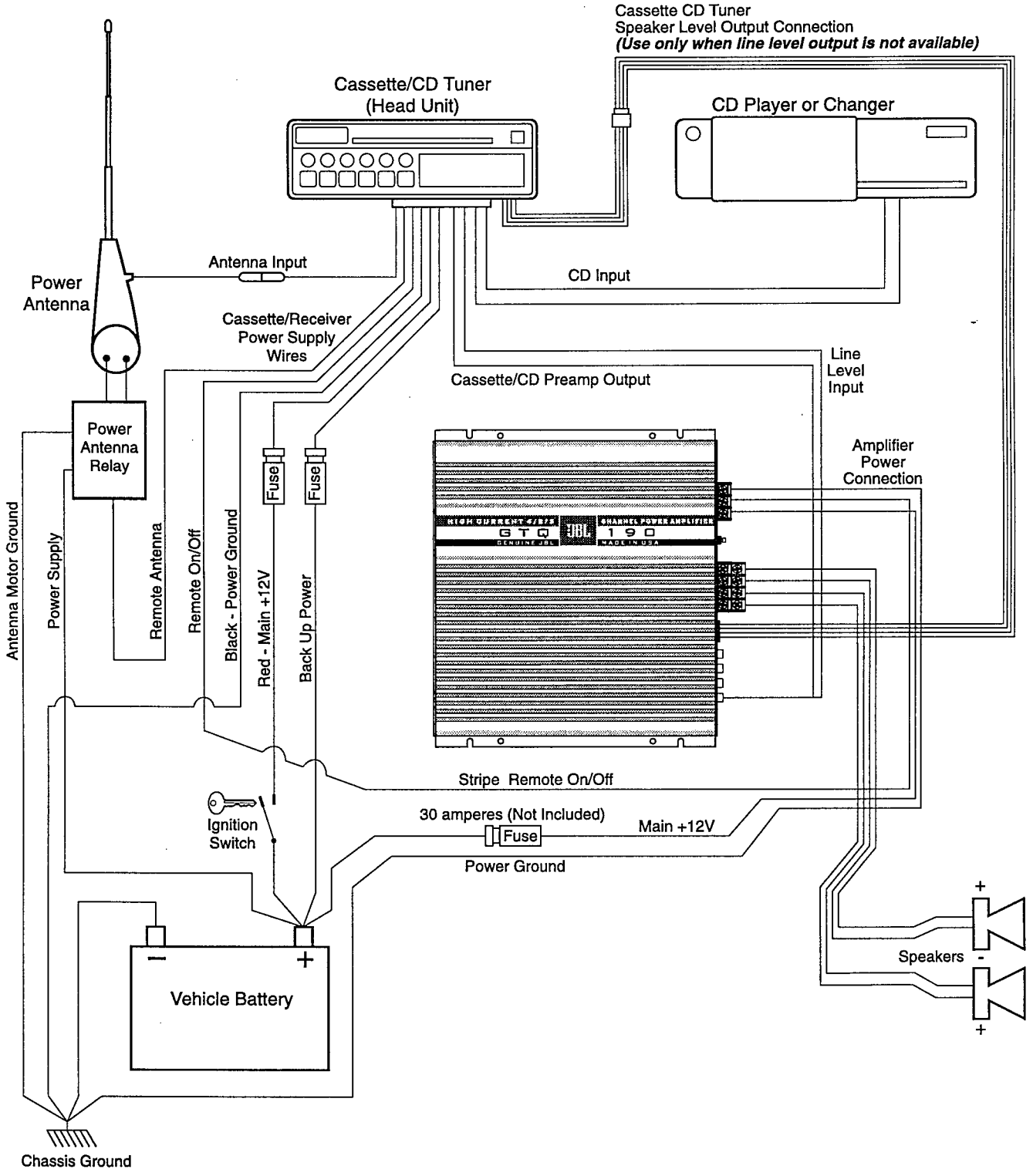
Crossover Frequency Adjustments

The GTQ190 amplifier includes built-in frequency selectable crossovers. One crossover is connected in series with the amplifier circuitry and the other crossover is connected to the preamp level output jacks. These crossovers can be set in either the F (full bandwidth operation), L (subwoofer operation), or H (satellite operation).

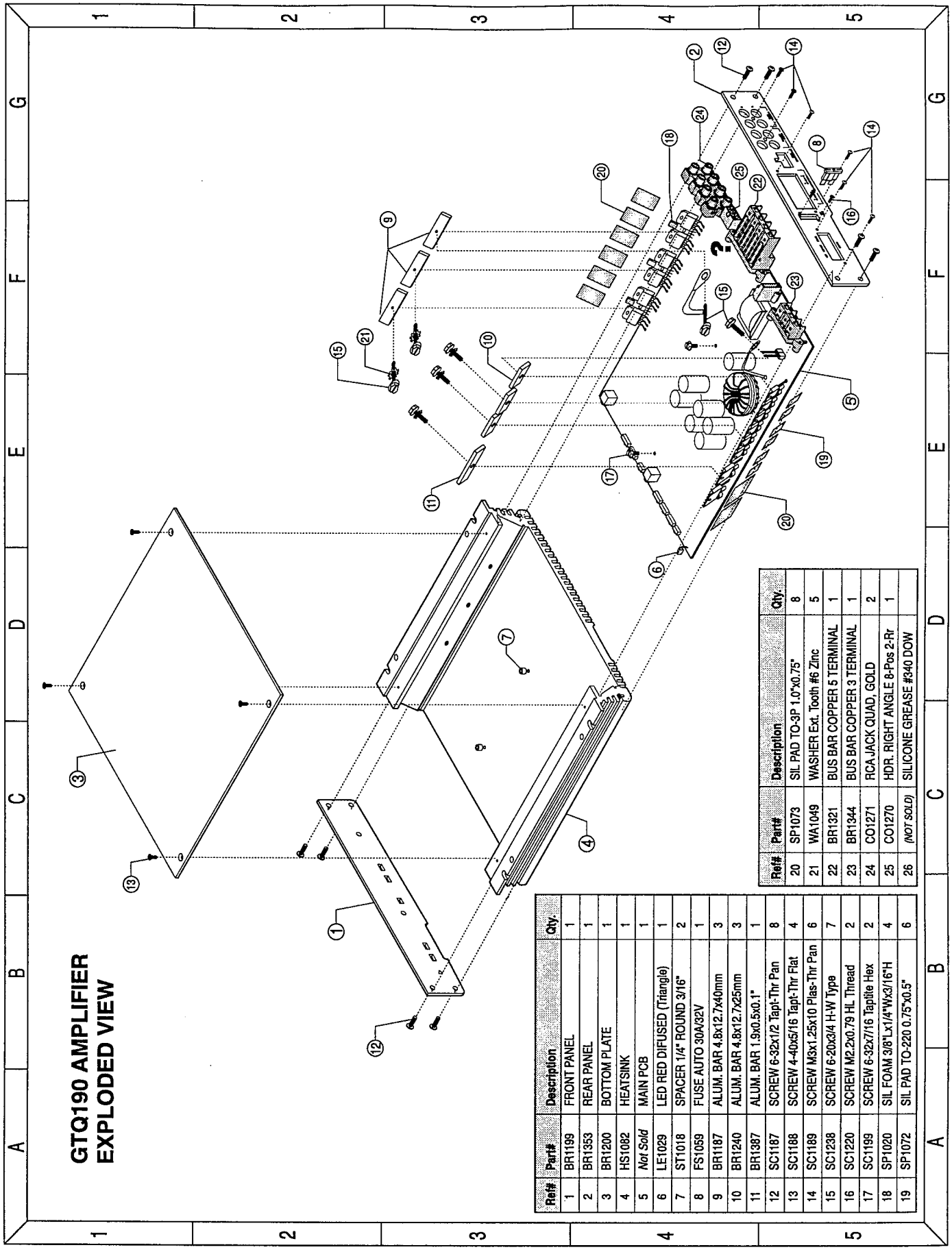
Mounting Positions

Place the amplifier in the installation location. Use a pen or pencil to mark the mounting screw hole locations. Set the amplifier aside and drill the holes for the mounting screws. (Note: If the surface you are mounting the amp to is covered with carpeting or upholstery, cut a small "x" in the material at each screw hole location before drilling the holes. This will help prevent tearing or stretching of the material and carpet fibers from being pulled out.) Set the amplifier in position and align the holes on its side with the holes previously drilled. Put washers on the sheet metal screws provided and drive them into the mounting panel. Tighten the screws evenly until the unit is solidly mounted.

Typical System Configuration



GTQ190 Mechanical Exploded View



Ref#	Part#	Description	Qty.
1	BR1199	FRONT PANEL	1
2	BR1353	REAR PANEL	1
3	BR1200	BOTTOM PLATE	1
4	HS1082	HEATSINK	1
5	*Not Sold*	MAIN PCB	1
6	LE1029	LED RED DIFUSED (Triangle)	1
7	ST1018	SPACER 1/4" ROUND 3/16"	2
8	FS1059	FUSE AUTO 30A/32V	1
9	BR1187	ALUM. BAR 4.8x12.7x40mm	3
10	BR1240	ALUM. BAR 4.8x12.7x25mm	3
11	BR1387	ALUM. BAR 1.9x0.5x0.1"	1
12	SC1187	SCREW 6-32x1/2 Tapt-Thr Pan	8
13	SC1188	SCREW 4-40x5/16 Tapt-Thr Flat	4
14	SC1189	SCREW M3x1.25x10 Plas-Thr Pan	6
15	SC1238	SCREW 6-20x3/4 H-W Type	7
16	SC1220	SCREW M2.2x0.79 HL Thread	2
17	SC1199	SCREW 6-32x7/16 Taptite Hex	2
18	SP1020	SIL FOAM 3/8"Lx1/4"Wx3/16"H	4
19	SP1072	SIL PAD TO-220 0.75"x0.5"	6
20	SP1073	SIL PAD TO-3P 1.0"x0.75"	8
21	WA1049	WASHER Ext. Tooth #6 Zinc	5
22	BR1321	BUS BAR COPPER 5 TERMINAL	1
23	BR1344	BUS BAR COPPER 3 TERMINAL	1
24	CO1271	RCA JACK QUAD, GOLD	2
25	CO1270	HDR. RIGHT ANGLE 8-Pos 2-Rr	1
26	*(NOT SOLD)*	SILICONE GREASE #340 DOW	

REF. NO.	PART NO.	DESCRIPTION	QTY
R6, 8, 17, 17G, 23A, 23B	RS1701	SMD 10KΩ 5% 1/8W 120 PI	14
R6A, 6B, 6C, 6D, 7A, 7B	RS1868	W/W 0.1Ω 5% 5W RAD	8
R8A, 8B, 8C, 8D	RS1724	SMD 6.8KΩ 5% 1/8W	4
R9A, 9B, 9C, 9D, 33, 99	RS1705	SMD 4.7KΩ 5% 1/8W 12 PI	6
R10A, 10B, 10C, 10D	RS1878	SMD 10Ω 5% 1/8W 120P	4
R12	RS1258	C/F 2.20KΩ 5% 1/4W 120	1
R12A, 12B, 12C, 12D, 139	RS1706	SMD 47KΩ 5% 1/8W 120	5
R13A, 13B, 13C, 13D	RS1869	W/W 15Ω 5% 5W RAD	4
R15, 15G, 16, 16G	RS1830	SMD 200Ω 5% 1/8W 12 P	4
R32A, 32B, 32C, 32D, 33A	RS1872	SMD 51KΩ 5% 1/8W 120 P	16
R96, 97	RS1722	SMD 470Ω 5% 1/8W 12	2
R120, 121, 122, 124	RS1717	SMD 100Ω 5% 1/8W 12 PI	4
VR1, VR1G	RS1227	POT. 100KΩ DUAL CTR. DET	2
Miscellaneous			
BB1	BR1321	BUS BAR COPPER 5 TERMINAL	1
BB2	BR1344	BUS BAR COPPER 3 TERMINAL	1
CONN1	CO1270	HDR. RIGHT ANGLE 8-POS 2-RR	1
F1	FS1061 FH1001	FUSE AUTO 30A/32V FUSE HOLDER RIGHT ANGLE	1 1
FB1-6, 13	CC1028	FERRITE BEAD	7
L1A, 1B, 1C, 1D	SA0000012	AIR CORE INDUCTOR .38uH	4
L4	SA0100021	INPUT INDUCTOR 300uH	1
LED1	LE1029	LED RED DIFUSED TRIANGLE	1
P1, 3	CO1280	CONNECTOR HEADER RT. ANGLE 4-POSITION	2
P2	CO1279	CONNECTOR HEADER RT. ANGLE 3-POSITION	1
P301	CO1247	CONNECTOR HEADER RT. ANGLE 8-POSITION	1
P301	CO1267	CONNECTOR HEADER RT. ANGLE 2-POSITION	1
POWER CONNECTOR	CO1233	CONNECTOR 3-POSITION GOLD TERMINAL	1
SPKR OUT CONNECTOR	CO1235	CONNECTOR 8-POSITION GOLD TERMINAL	1
RCA1, 2	CO1271	RCA JACK QUAD, GOLD	2
SCR1	TY1000	MCR22-2 TO-92 PACKAGE T/R	1
SW1	SW1011	SWITCH 2P2T HORIZONTAL	1
SW2, 2G, 3, 3B	SW1013	SWITCH 2P3T HORIZONTAL	4
T1	SA0111421	POWER TRANSFORMER GTQ190	1
TH1	SA0114321 IM1138	THERMISTOR ASSY. SLEEVING SHRINK PVC 3/32	1
1.5"	TH1006 WI1557	NTC THERMISTOR 10KΩ @ 25 WIRE 26AWG 7x34 UL1007 BLK.	1
SILICONE GREASE	MS1004	SILICONE GREASE #340 DOW (NOT STOCKED)	

CROSSOVER MODULE (2 EACH)

AMOUNTS LISTED ARE FOR EACH MODULE

Capacitors			
C300, 303, 306, 309	CP1177	POLY FILM 0.22µF 5% 63V	4
C301, 304, 307, 310	CP1426	POLY FILM 22nF 5% 63V	4
C302, 305, 308, 311, C312, 313	CP1426	SMD 0.1µF 20% 50V Z5U	6
Intergrated Circuits			
IC300	IC1052	TL072 QUAD OP-AMP, DIP	1
Resistors			
R301, 307	RS1918	SMD 9.1KΩ 5% 1/8W	2
R302, 308	RS1914	SMD 82KΩ 5% 1/8W 120 P	2
R303, 309	RS1919	SMD 910Ω 5% 1/8W 120 P	2
R304, 310	RS1831	SMD 7.5KΩ 5% 1/8W	2
R305, 311	RS1915	SMD 75KΩ 5% 1/8W 120 P	2
R306. 312	RS1917	SMD 750Ω 5% 1/8W	2

GT DRIVER (4 EACH)

AMOUNTS LISTED ARE FOR EACH MODULE

Capacitors			
C1	CP1563	SMD 150pF 5% 50V	1
C3, 13	CP1475	SMD 33pF 5% 50V NPO 12 P	2
C2, 10	CP1557	SMD 56pF 5% 50V NPO 12 P	2
C4, 5, 14	CP1496	SMD 100pF 10% 50V X7R P	3
C6	CP1411	ALUM. ELECT. 100µF 20% 16V PI	1
C7, 8, 9, 11, 12	CP1426	SMD 0.1µF 20% 50V Z5U PI	5

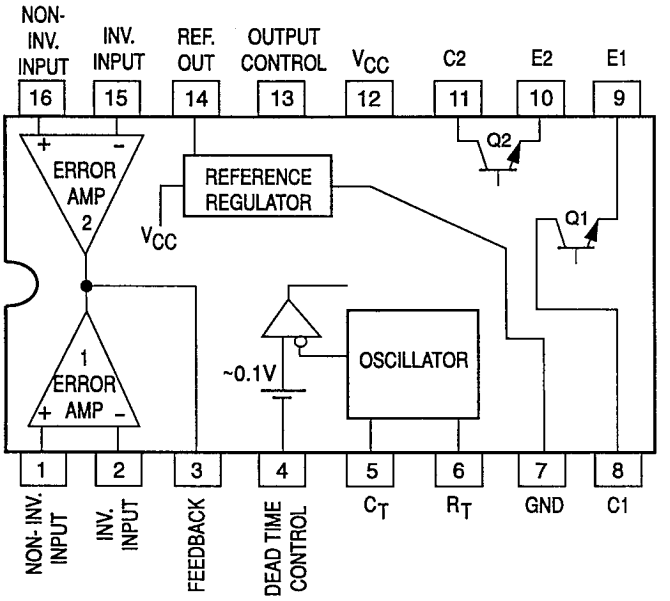
REF. NO.	PART NO.	DESCRIPTION	QTY
Diodes			
D1	DI1132	1N4148	1
Integrated Circuits			
IC1	IC1040	NJM318 OP-AMP	1
Resistors			
J1	RS1779	SMD ZERO Ω JUMPER 120 PI	1
R1, 12	RS1806	SMD 18KΩ 5% 1/8W 120 PI	2
R2, 6, 10,	RS1701	SMD 10KΩ 5% 1/8W 120 P	3
R3, 11, 21, 22	RS1700	SMD 1KΩ 5% 1/8W 12 P	4
R4, 15	RS1702	SMD 100KΩ 5% 1/8W 120 PI	2
R5, 9	RS1829	SMD 160Ω 5% 1/8W 120 P	2
R7, 8	RE1722	SMD 470Ω 5% 1/8W 120 P	2
R13, 14	RS1703	SMD 2.2KΩ 5% 1/8 W 120 PI	2
R17, 20	RS1725	SMD 15KΩ 5% 1/8W 120 P	2
R18, 19	RS1831	SMD 7.5KΩ 5% 1/8W T/ P	2
RN1, 1G, 2, 2G	RS1900	RES. NETWORK 7-33KΩ DIP	4
VR1, VR1G	RS1227	POT. 100KΩ DUAL CTR. DET	2
Transistors			
Q1	TR1131	DTC114TK SMD XSTR NPN 10K	1
Q2	TR1167	2N5551 NPN XSTR TO-92	1
Q3	TR1166	2N5401 PNP XSTR TO-92	1
Q4	TR1125	2SA1037K SMD XSTR PNP CP	1
Q5	TR1108	2SC2412K SMD XSTR NPN CP	1

PWM MODULE

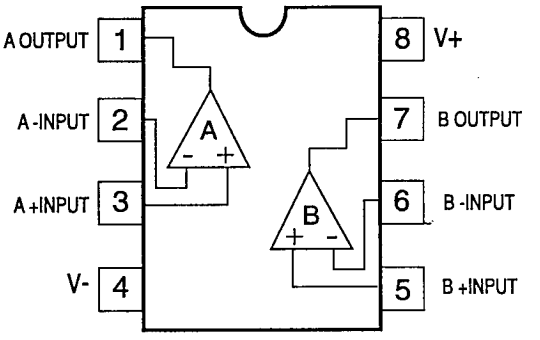
REF. NO.	PART NO.	DESCRIPTION	QTY
Capacitors			
C1	CP1434	CAP. CERAMIC 2700.00 pF ±10% 100V	1
C2, 3, 4	CP1426	CAP. CERAMIC 0.10 µF ±20% 50V	3
C19	CP1565	CAP. ALUM EL. 22 µF ±20% 10V 85°C A/P RADIAL LEAD	1
Integrated Circuits			
IC1	IC1002	PWN CONT. MODULE 16 PIN DIP	1
Resistors			
R1	RS1878	RES. F/CHIP 10.00 Ω 5% 1/8W T/R 1206	1
R2	RS1700	RES. F/CHIP 1.00 KΩ 5% 1/8W T/R 1206 PKG.	1
R3	RS1733	RES. F/CHIP 510.00 Ω 5% 1/8W T/R 1206 PKG.	1
R4	RS1724	RES. F/CHIP 6.80 KΩ 5% 1/8W T/R 1206 PKG.	1
R5	RS1702	RES. F/CHIP 100.00 KΩ 5% 1/8W T/R 1206 PKG.	1
R6	RS170	RES. F/CHIP 4.70 KΩ 5% 1/8W T/R 1206 PKG.	1
R7	RS1783	RES. F/CHIP 12.00 KΩ 5% 1/8W 1206 T/R	1
R8	RS1703	RES. F/CHIP 2.20 KΩ 5% 1/8W T/R 1206 PKG.	1
R9, 11	RS1701	RES. F/CHIP 10.00 KΩ 5% 1/8W T/R 1206 PKG.	2
R10	RS1709	RES. F/CHIP 680.00 Ω 5% 1/8W T/R 1206 PKG.	1
R12, 13	RS1826	RES. F/CHIP 27.00 Ω 5% 1/8W T/R 1206	2
R14	RS1711	RES. F/CHIP 220.00 Ω 5% 1/8W T/R 1206 PKG.	1
R15	RS1877	RES. F/CHIP 4.30 KΩ 5% 1/8W T/R 1206	1
J1	RS1779	RES. F/CHIP 0.0 Ω 5% 1/8W 1206 T/R	1
Transistors			
Q1	TR1010	PNP SIGN 40V/600mA TO-92 T/R RXT2907A	1
Q2	TR1063	NPN 40V/600mA TO-92 RXT2222A	1

Integrated Circuit Diagrams

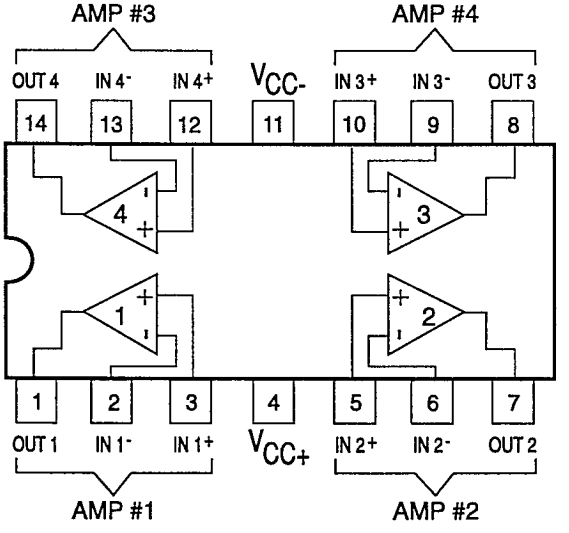
IC1002 (TL494) PWM IC



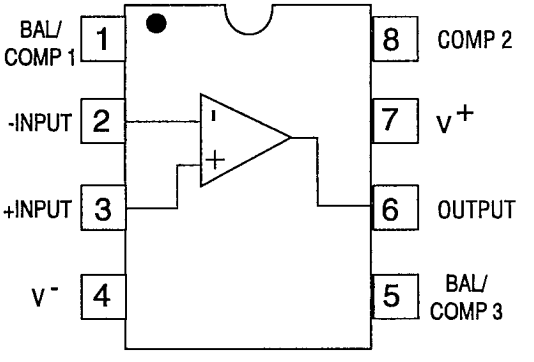
IC1175 (NJM5532), IC1041 (TL072) DUAL OP-AMP



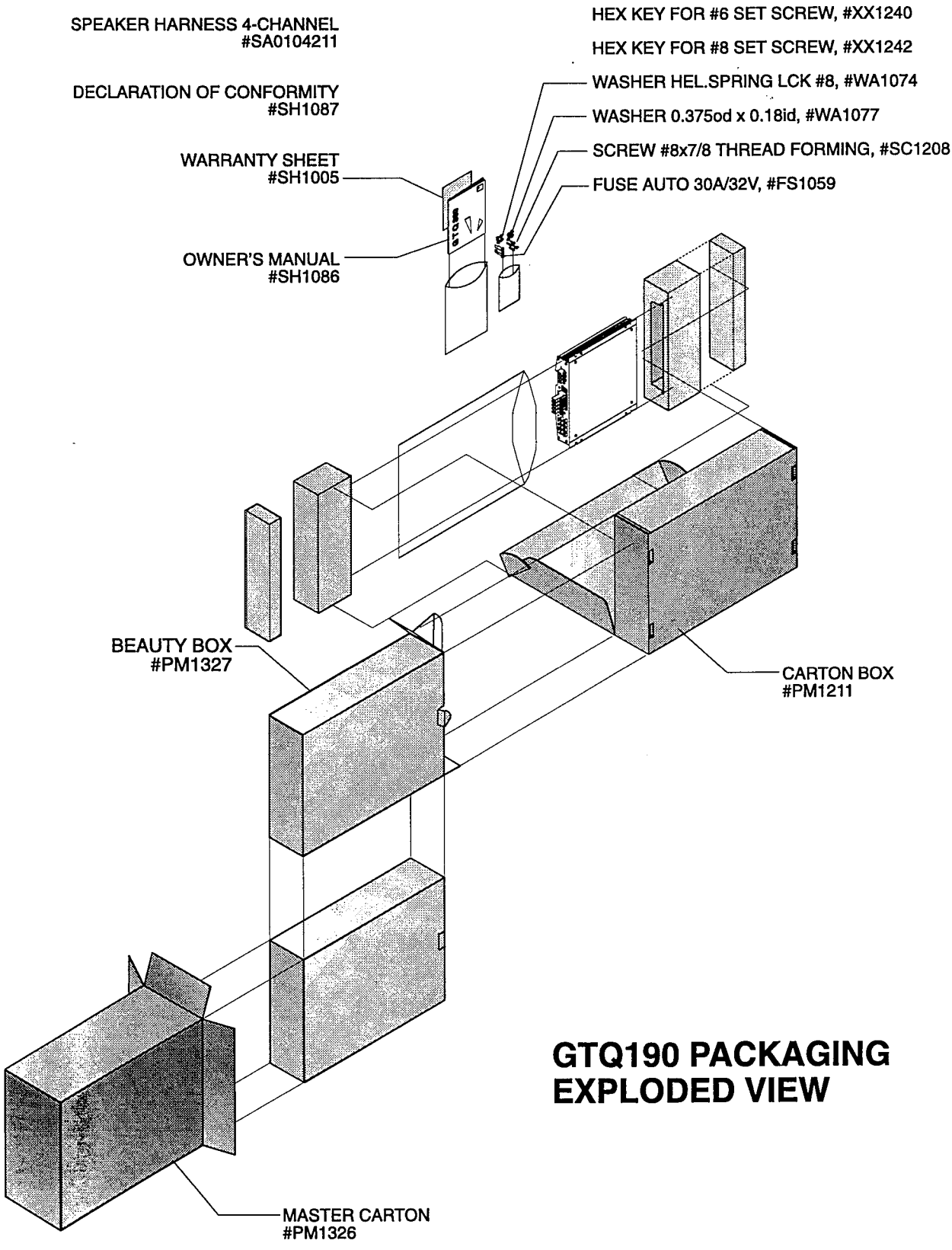
IC1162 & IC1052 (TL074) QUAD OP-AMP



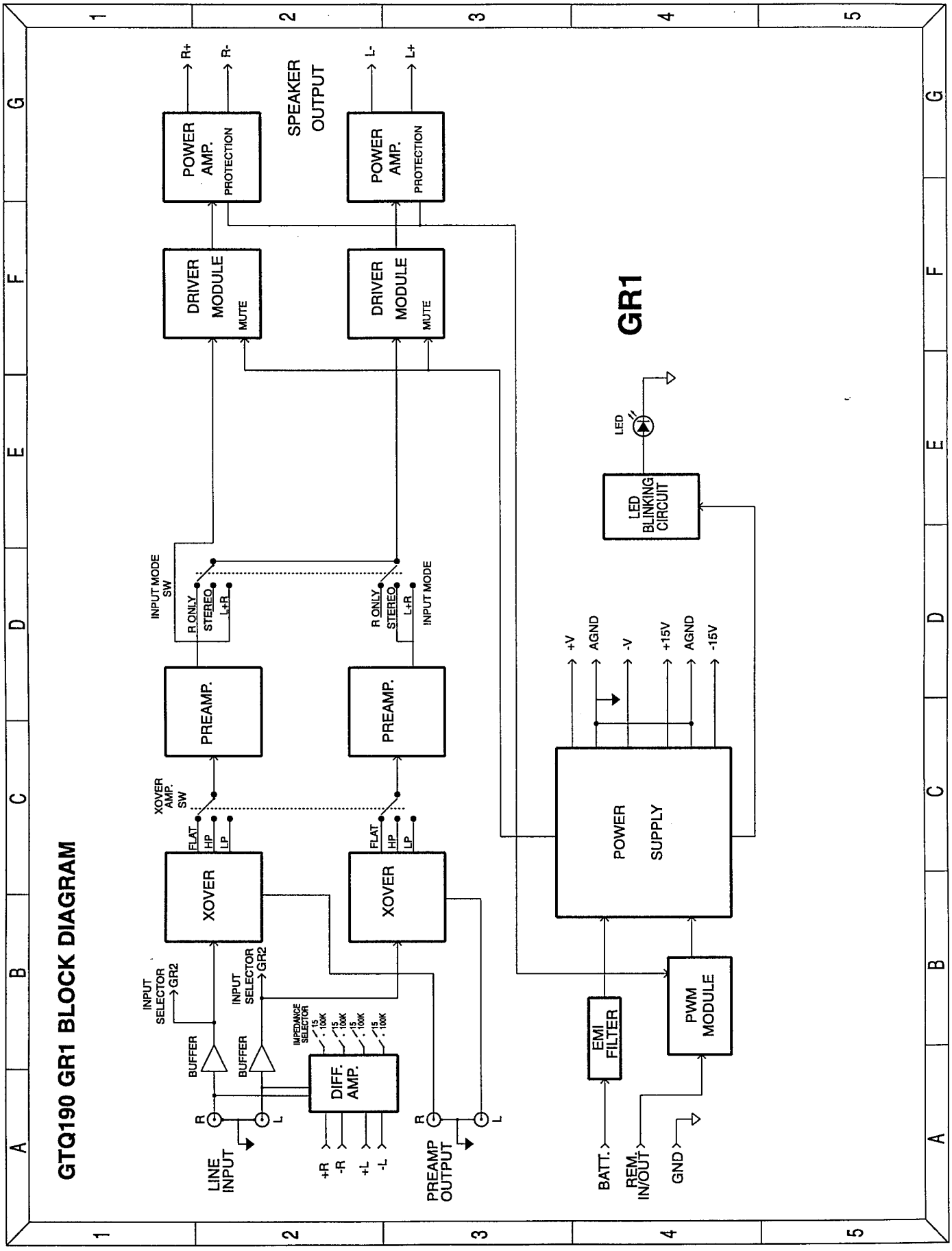
IC1040 (NJM318) OP-AMP



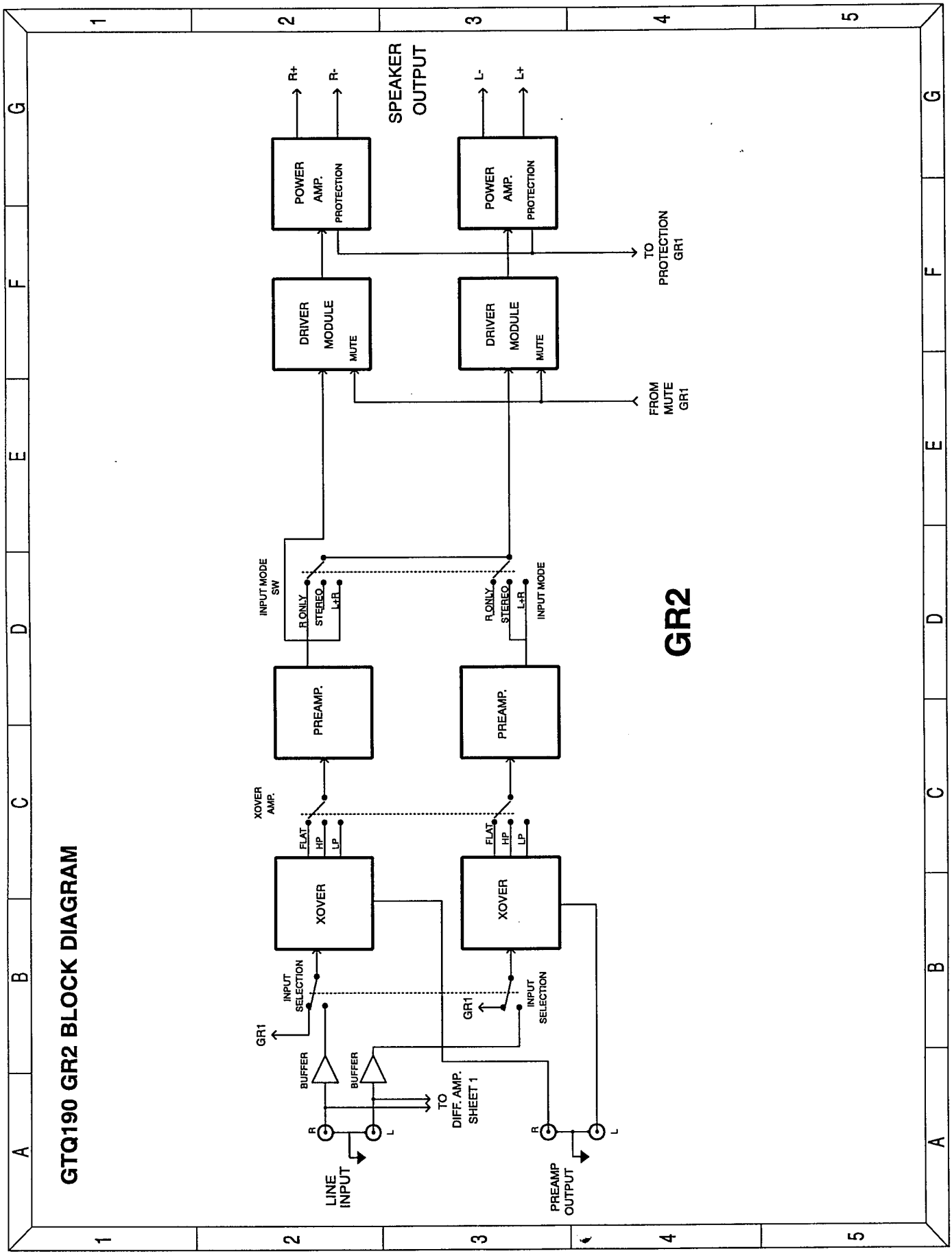
Packaging Exploded View



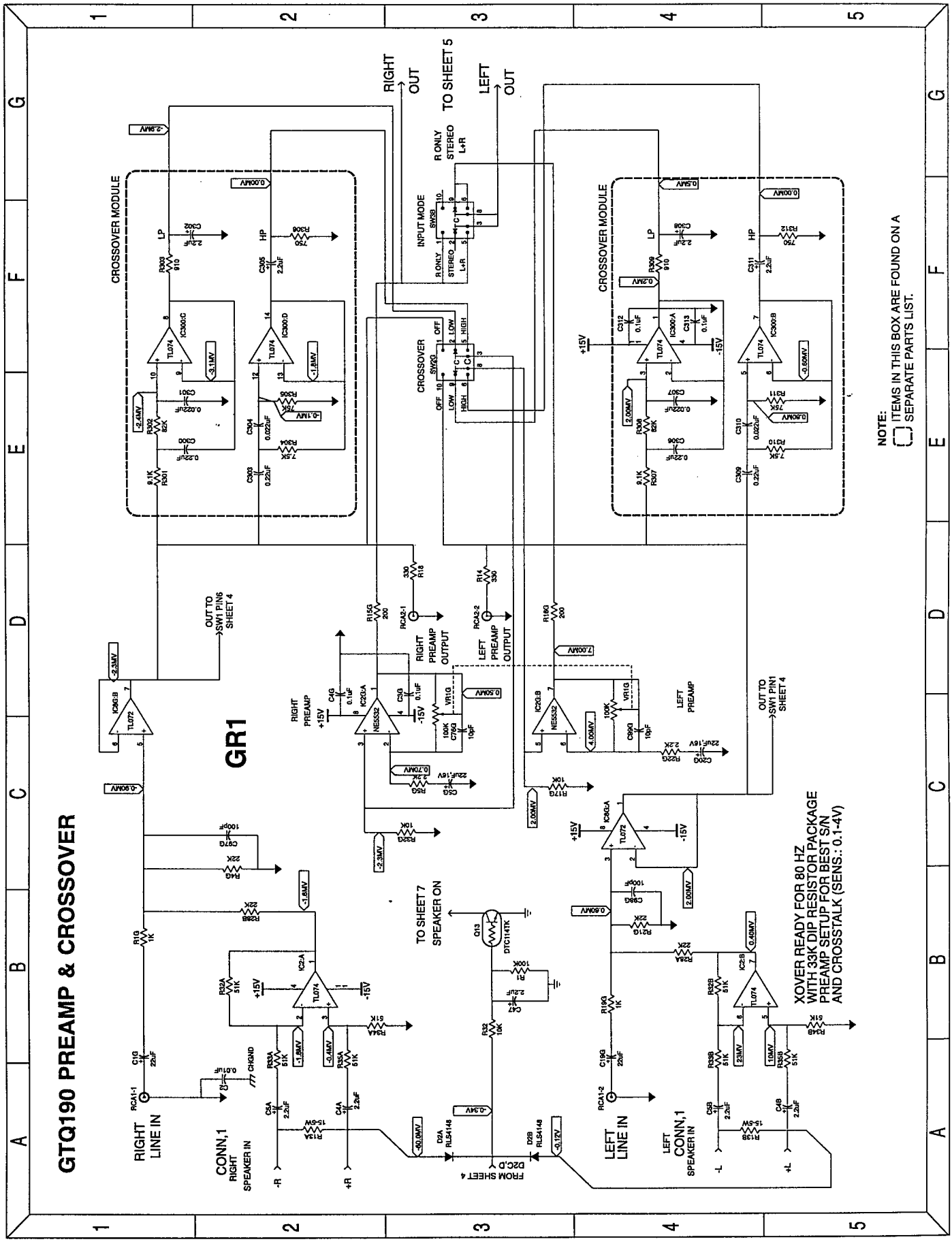
GTQ190 GR1 Block Diagram (sheet 1)



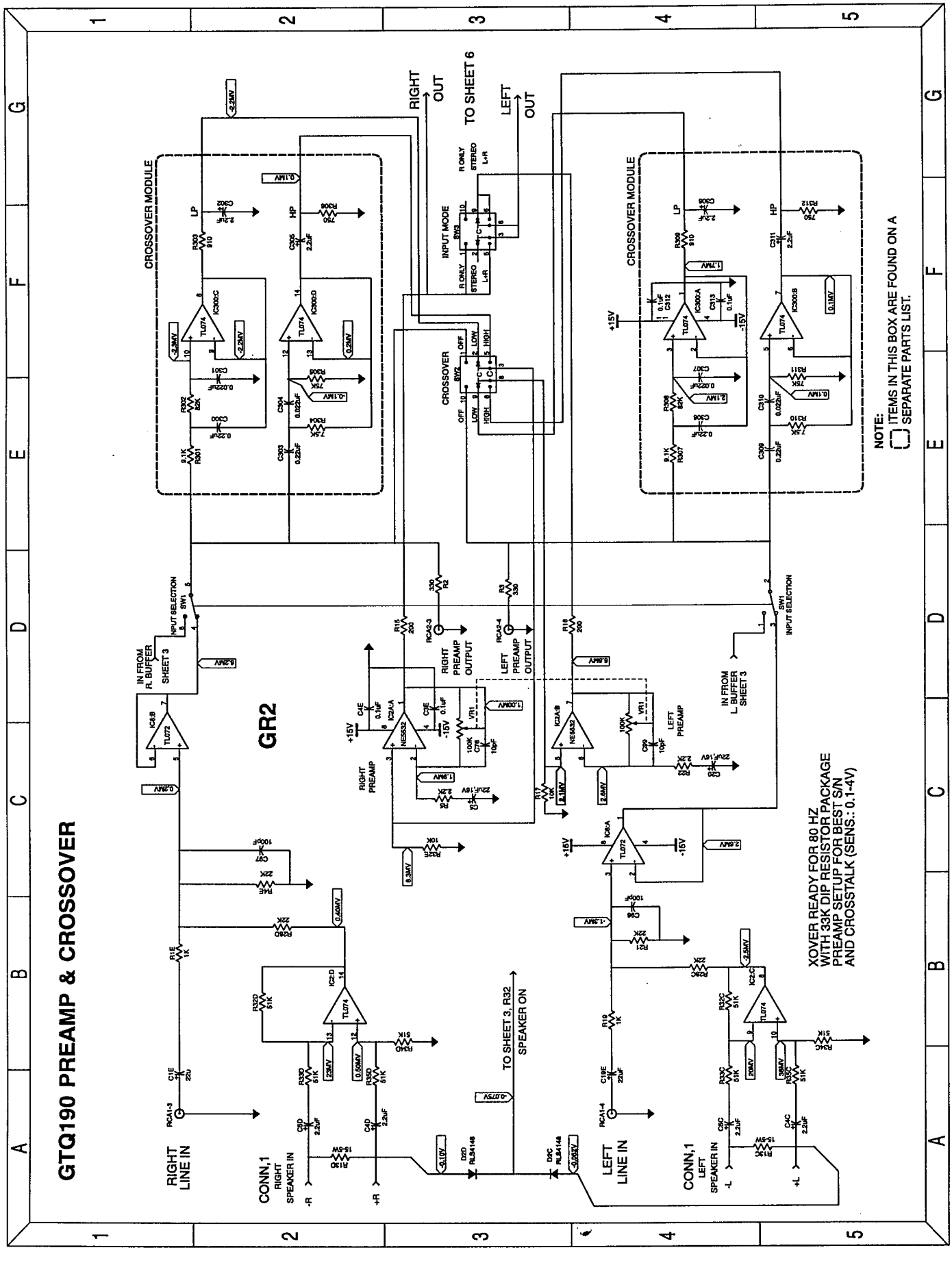
GTQ190 GR2 Block Diagram (sheet 2)



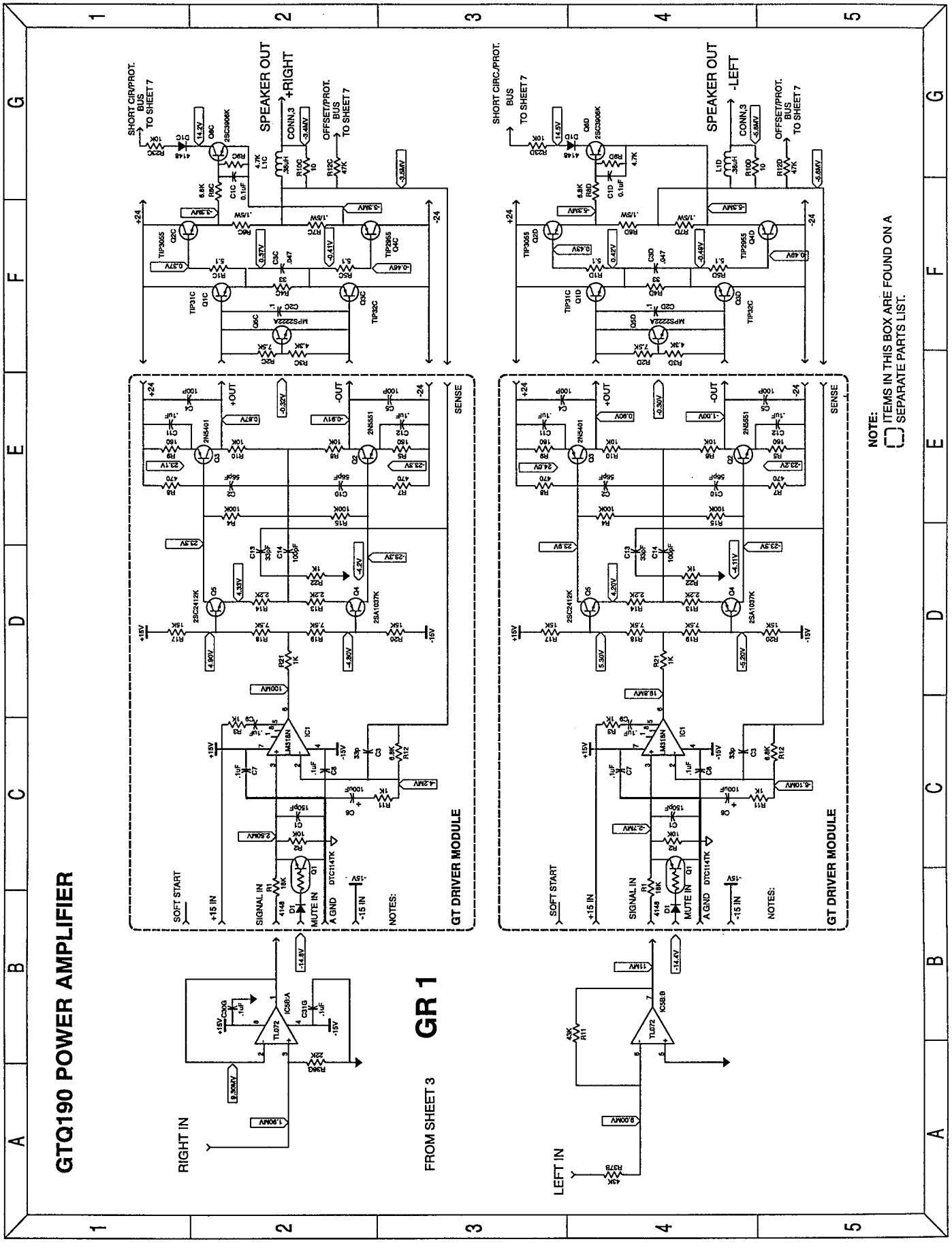
GTQ190 GR1 Preamp & Crossover (sheet 3)



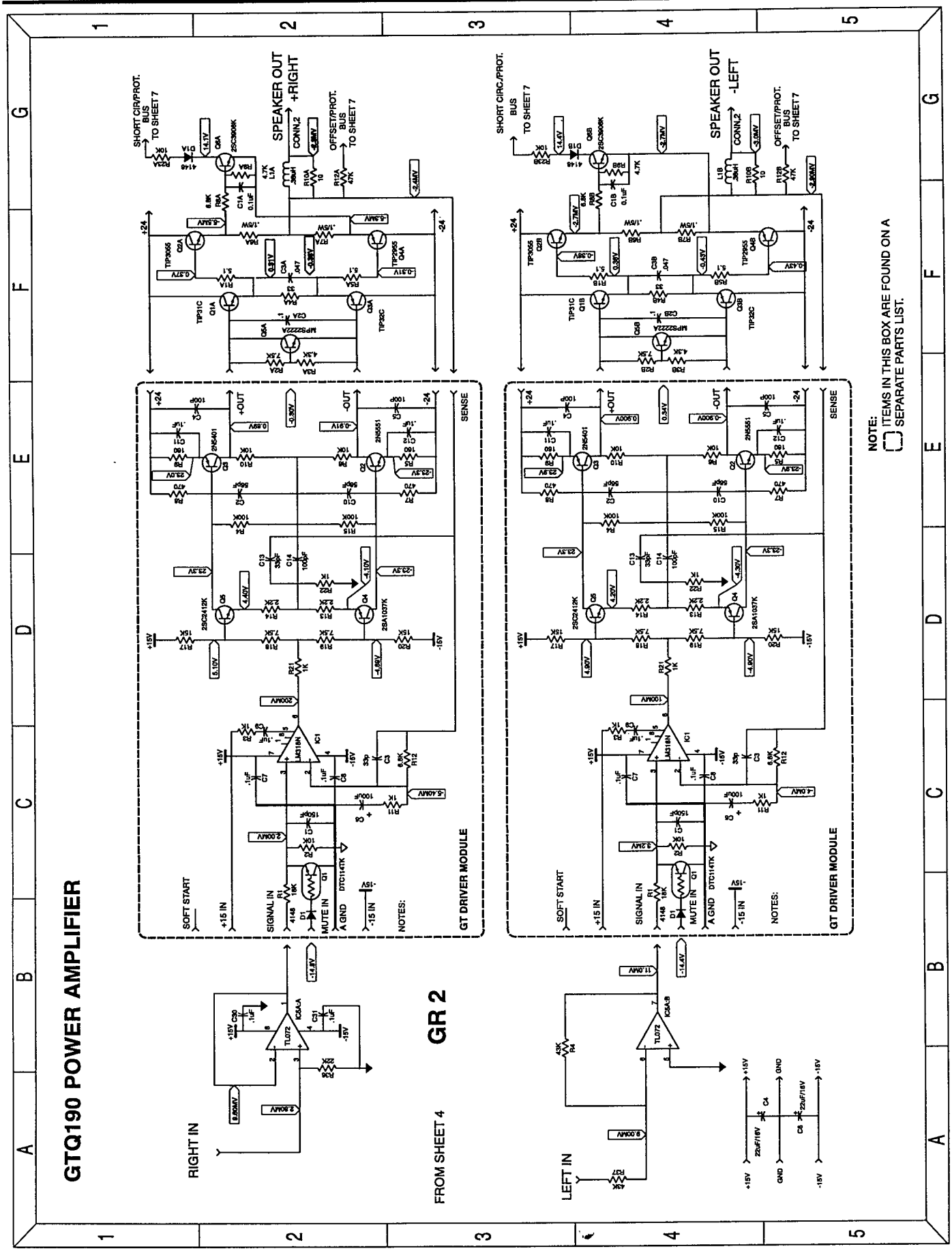
GTQ190 GR2 Preamp & Crossover (sheet 4)



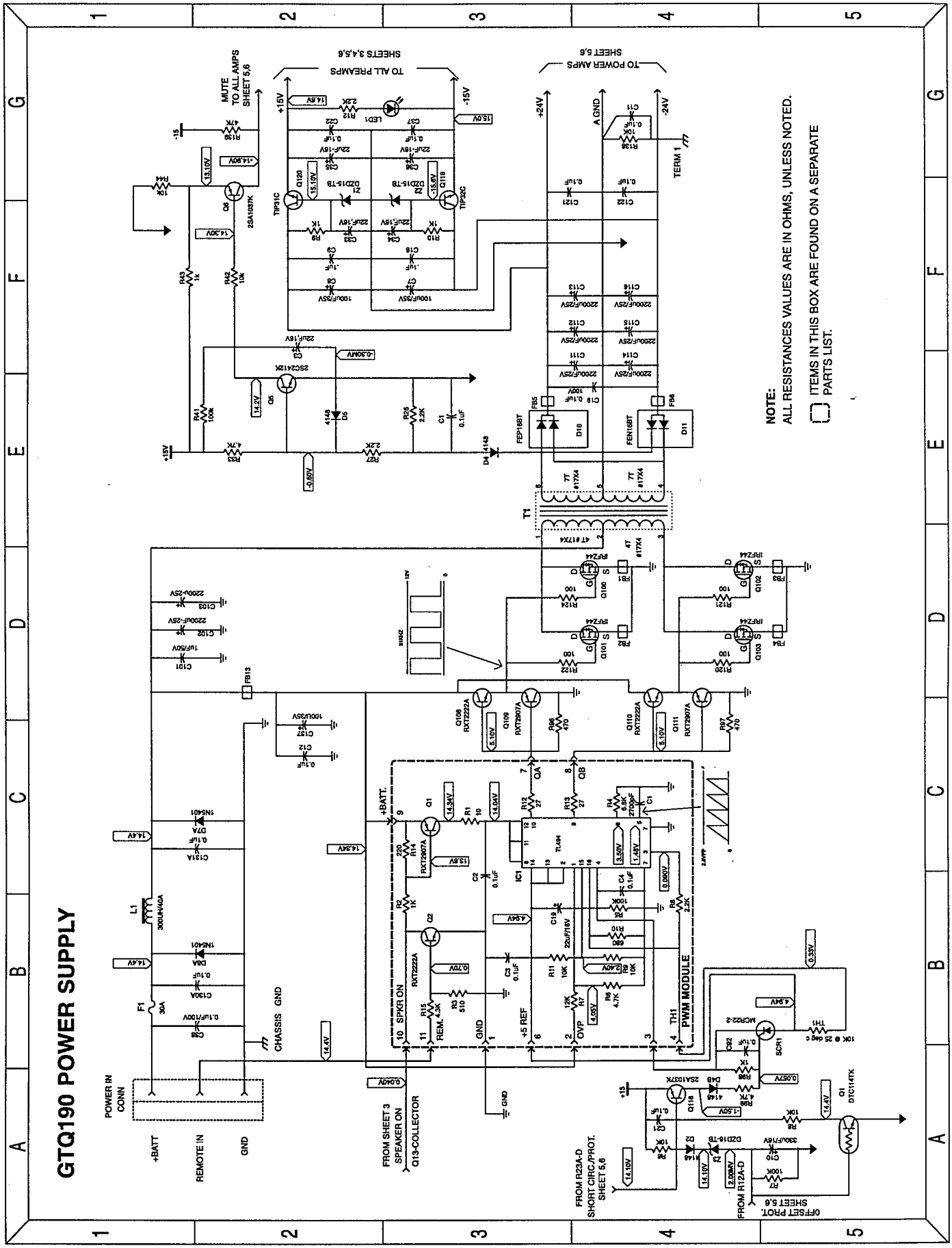
GTQ190 GR1 Power Amplifier (sheet 5)



GTQ190 GR2 Power Amplifier (sheet 6)

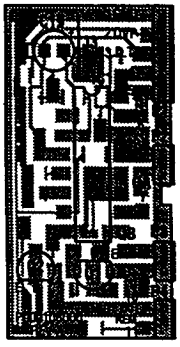


GTQ190 Power Supply (sheet 7)

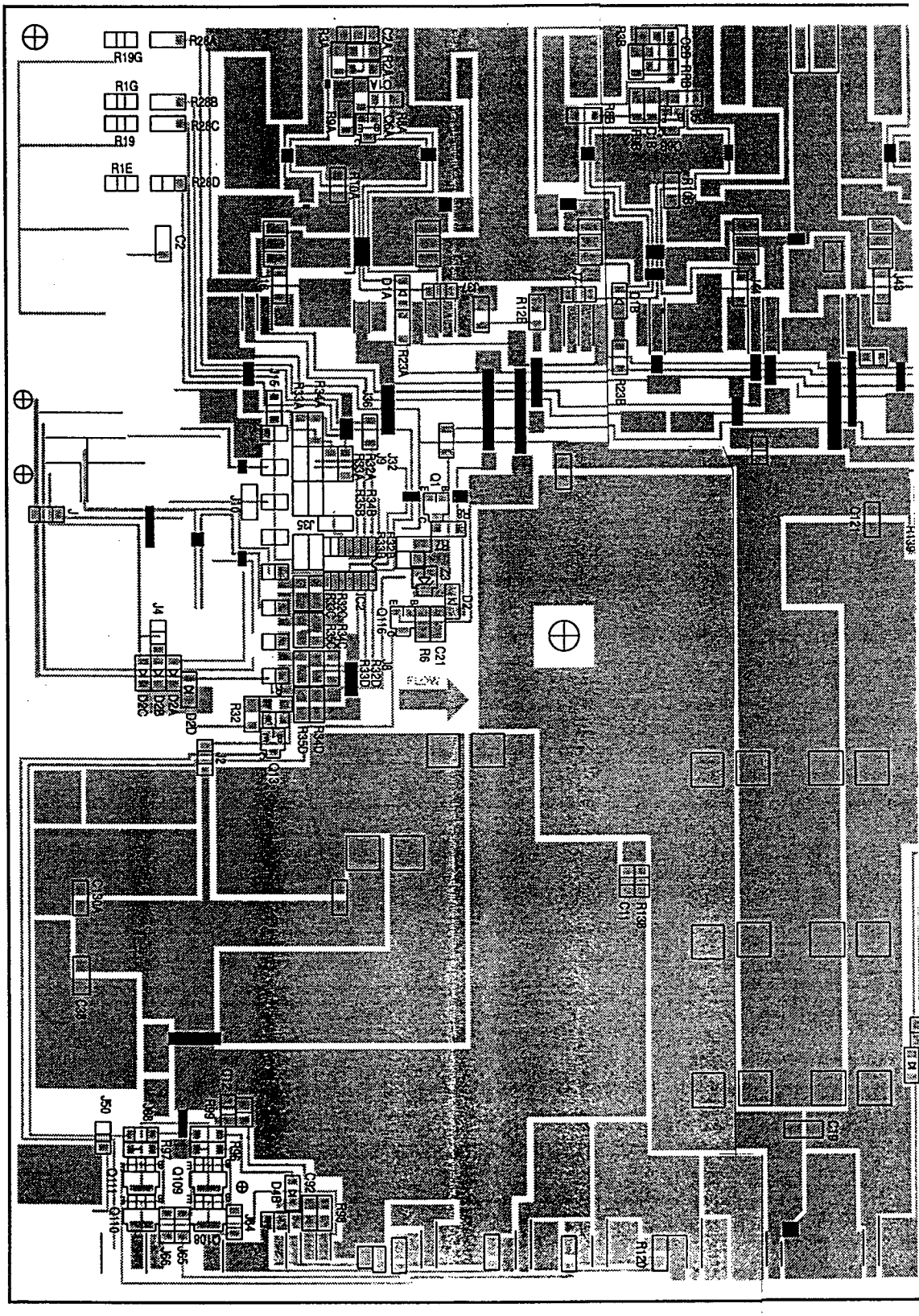


GTQ190 PRINTED CIRCUIT BOARD (BOTTOM VI

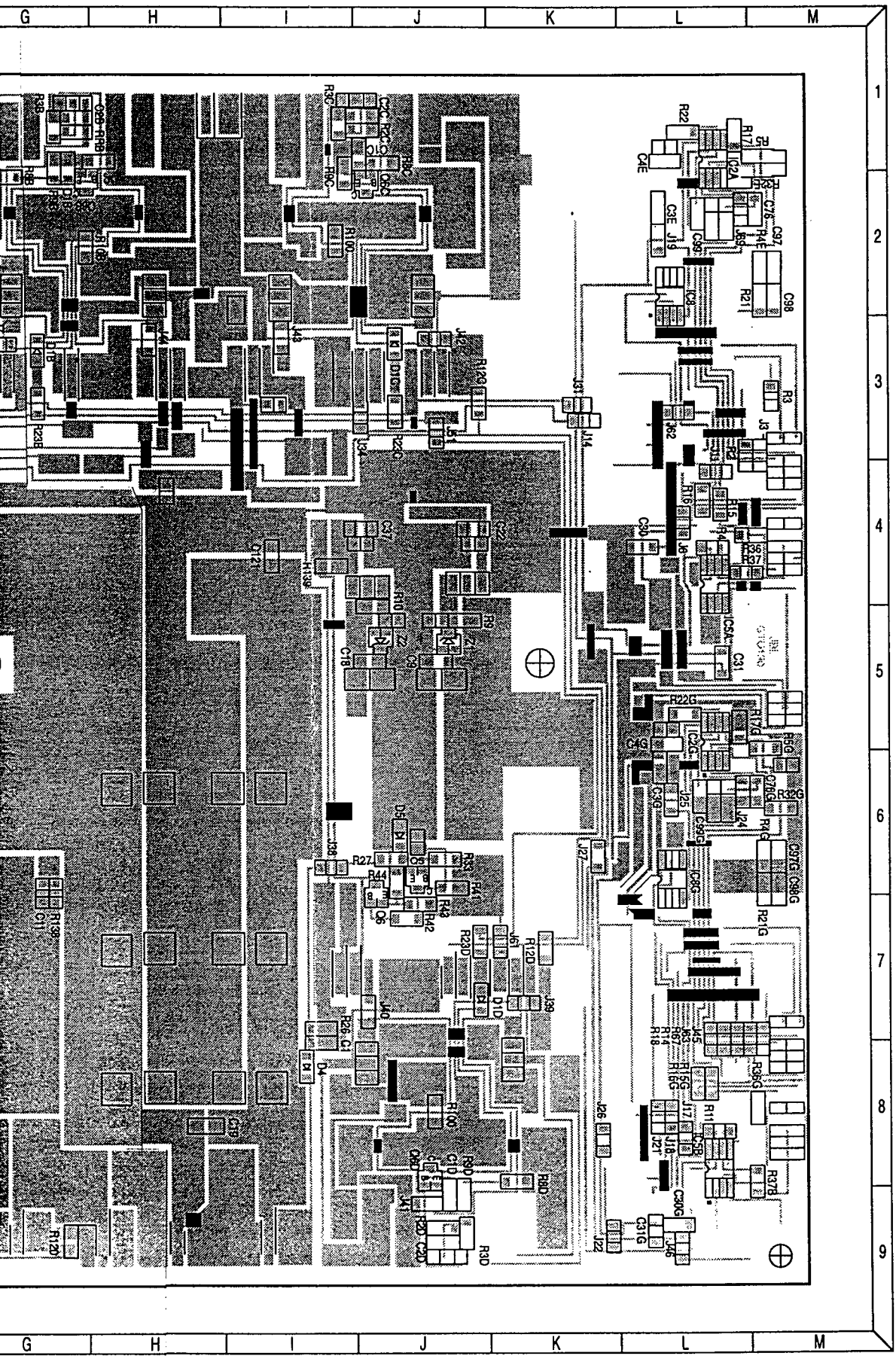
PWM PCB Module
(Single Sided)



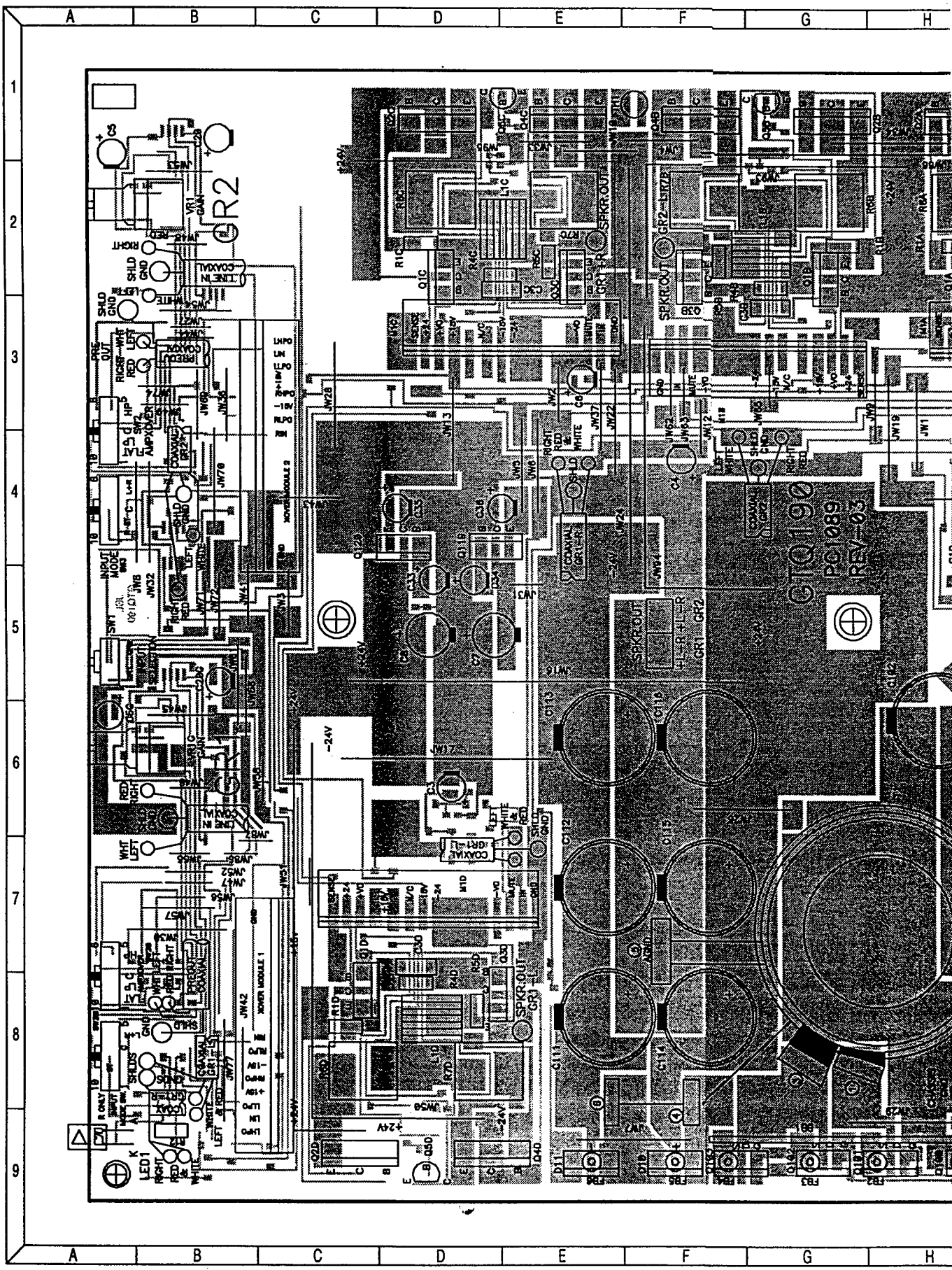
Bottom View



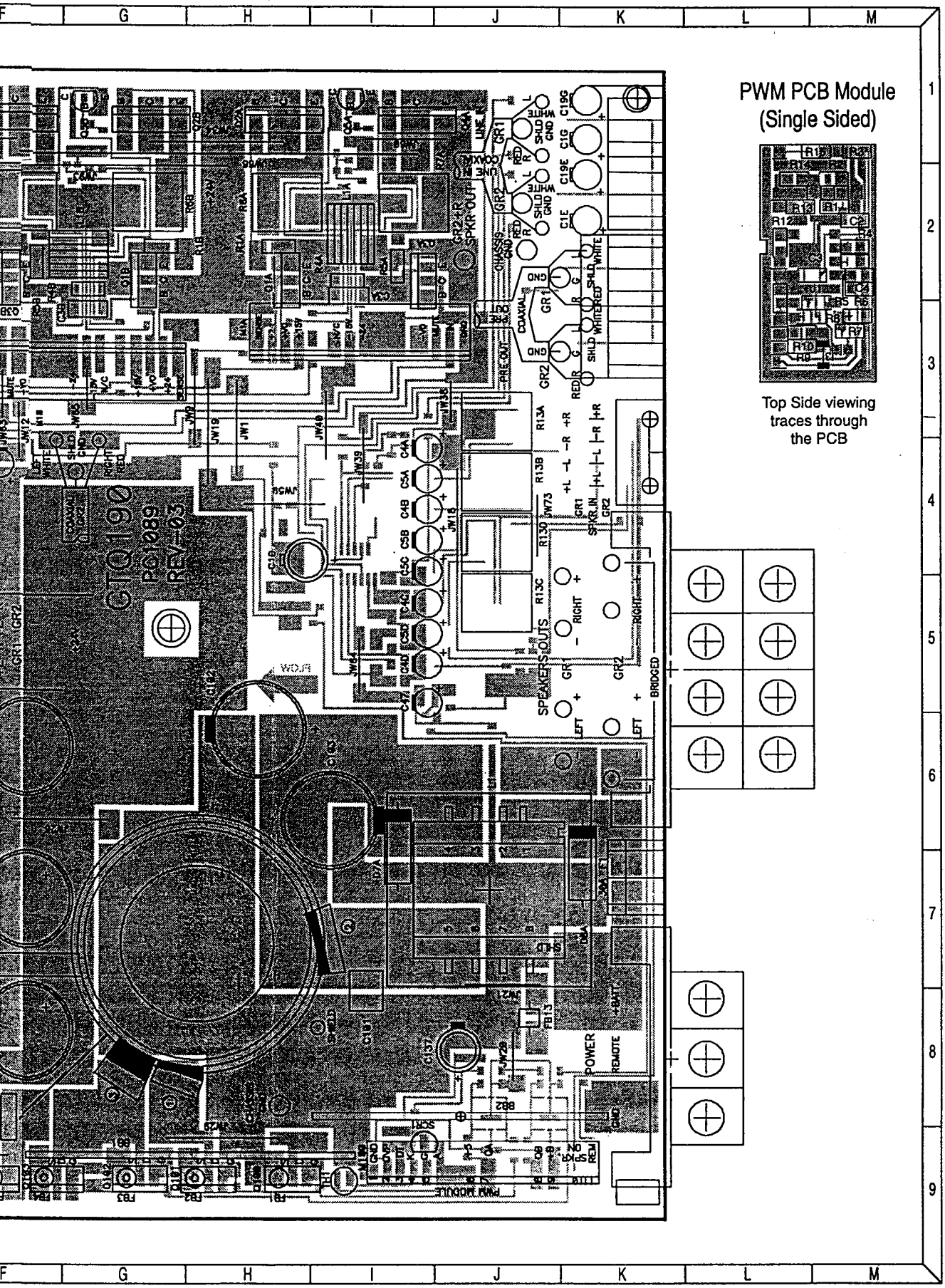
CUIT BOARD (BOTTOM VIEW)



GTQ190 PRINTED CIRCUIT BOARD



NTED CIRCUIT BOARD (TOP VIEW)



PWM PCB Module
(Single Sided)

Top Side viewing traces through the PCB