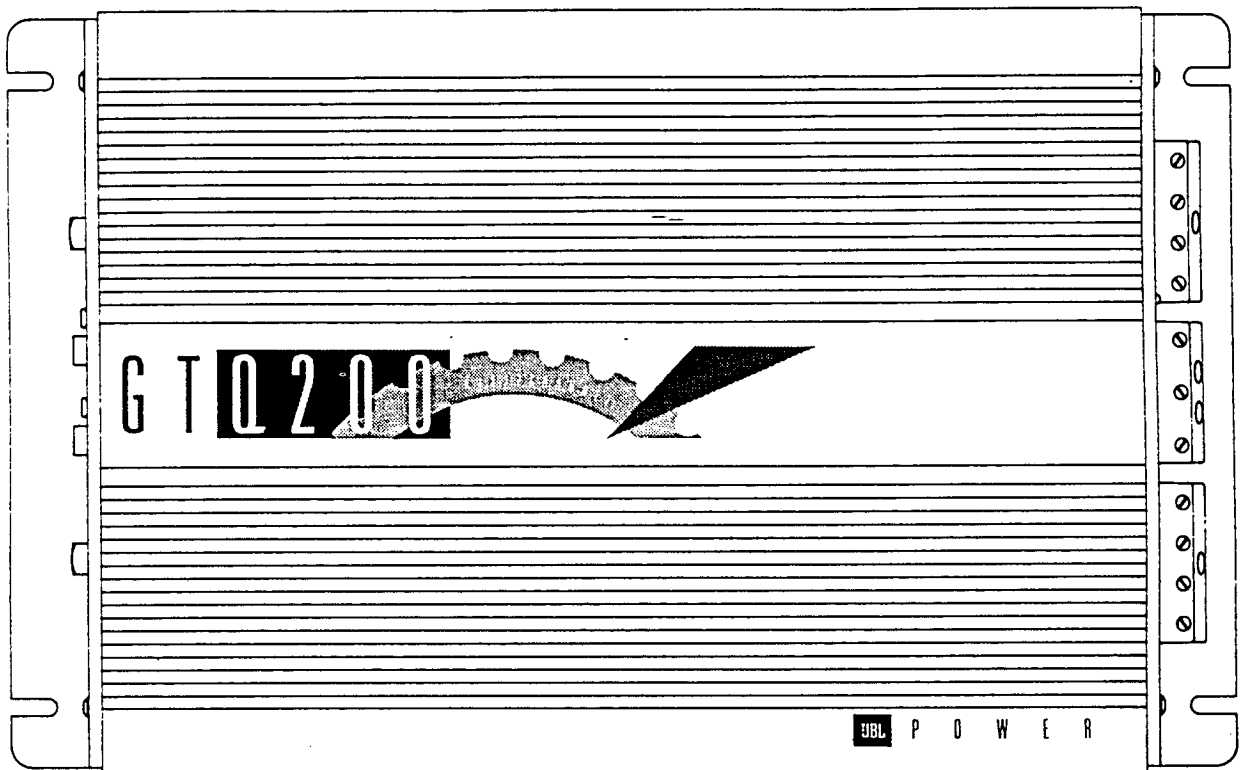
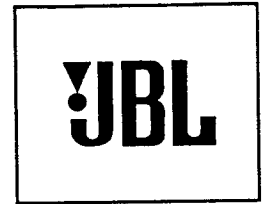


# GTQ200 4/3/2 CHANNEL AUTOMOTIVE POWER AMPLIFIER TECHNICAL MANUAL



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## JBL GTQ200 POWER AMPLIFIER FEATURES

### **Minimal Negative Feedback**

All amplifiers require some form of negative feedback to minimize distortion and stabilize the amplifier. Too much feedback, however, increases the Transient Intermodulation Distortion (T.I.M.), and reduces its musicality. JBL's Minimal Negative Feedback design provides just enough feedback to stabilize the amplifier., remove DC offset, and offer excellent Total Harmonic Distortion (T.H.D.) characteristics.

### **No Current Limiting**

Current Limiting circuitries used in conventional power amplifiers may cause premature clipping and inferior transient response under demanding conditions. The absence of current limiters in the audio sections of JBL power amplifiers ensures low Transient Intermodulation Distortion, excellent transient response, and superb sonic quality.

### **Built-in Bi-amp Crossover**

A built-in switchable electronic crossover network at 80 Hz, 12dB per octave, configures one pair of the amplifiers channels into a low-pass subwoofer driver, while setting up the other pair to power a pair of high-pass tweeter/midrange satellites. The network can be switched off to allow full-range signal amplification.

### **4/3/2 Channel Operation**

These amps can be used as a:

- a) 4 channel set-up, driving 4 full-range speakers, or a bi-amped system powering a pair of subwoofers and a dual satellite system.
- b) 3 channel system, producing its stereo rated power into one pair of its channels, and its bridged power into the third channel. This combination is perfect for a single subwoofer, dual tweeter/midrange satellite set-up.
- c) 2 channel amplifier, producing its bridged power rating per channel. The amplifier can be used as full range, or crossed over (using a JBL GTX4 or GTX2 electronic crossover).

### **Quiet Start Circuitry**

Special turn on and turn off circuitry have been implemented to prevent amplifier turn on and turn off pops.

### **Pulse Width Modulation (PWM) DC-to-DC Switching Mode Power Supplies**

Provides excellent power output throughout the audio bandwidth. Its' soft clipping characteristics ensure superb transient response and musicality.

### **Third Order (18dB per octave) Capacitive/Inductive Power Supply Input and Output Filtering**

For low radio frequency interference (RFI) and excellent immunity to system noises such as alternator whine.

### **Fully Complementary, Discrete Output Circuitry**

The use of independent output transistors in the audio and power supply section provide excellent reliability and high current capability for accurate transient response. A fully complementary audio section offers superb sonic performance.

### **Full Protection Circuitry**

All JBL amplifiers are protected against over-temperature, over-current, over-voltage, input overload, and DC offset. These special circuitries protect the amplifier from installation errors and unfriendly environmental conditions. However, none of these protection systems is in the signal path. They cannot interfere with the sonic performance of the amplifier.

## **JBL GTQ200 POWER AMPLIFIER SPECIFICATIONS**

1. Minimum Power Output into 4 ohms, 4-channel mode, 1% THD:

**20 Hz: 35 Watts x 4**

**1 kHz: 35 Watts x 4**

**20 kHz: 35 Watts x 4**

2. Minimum Power Output into 2 ohms, 4-channel mode, 1% THD:

**1 kHz: 50 Watts x 4**

3. Minimum Power Output into 4 ohms, 2-channel bridged mode, 1% THD:

**1 kHz: 100 Watts x 2**

4. Maximum THD at 1 watt into 4 ohms, 4-channel mode:

**20 Hz: 0.3% (30 kHz LPF)**

**1 kHz: 0.3% (400 Hz HPF, 30 kHz LPF)**

**20 kHz: 0.3% (400 Hz HPF, 30 kHz LPF)**

5. Minimum Signal-to-Noise Ratio into 4 ohms, inputs shorted, Gain Controls at Min., 4-channel mode:

**90 dBA**

6. Input Sensitivity, Gain Control at maximum:

**150 mV  $\pm$ 25%**

7. Minimum Channel Separation, referenced to 37 watts into 4 ohms, 4-channel mode:

**1 kHz: 45 dB**

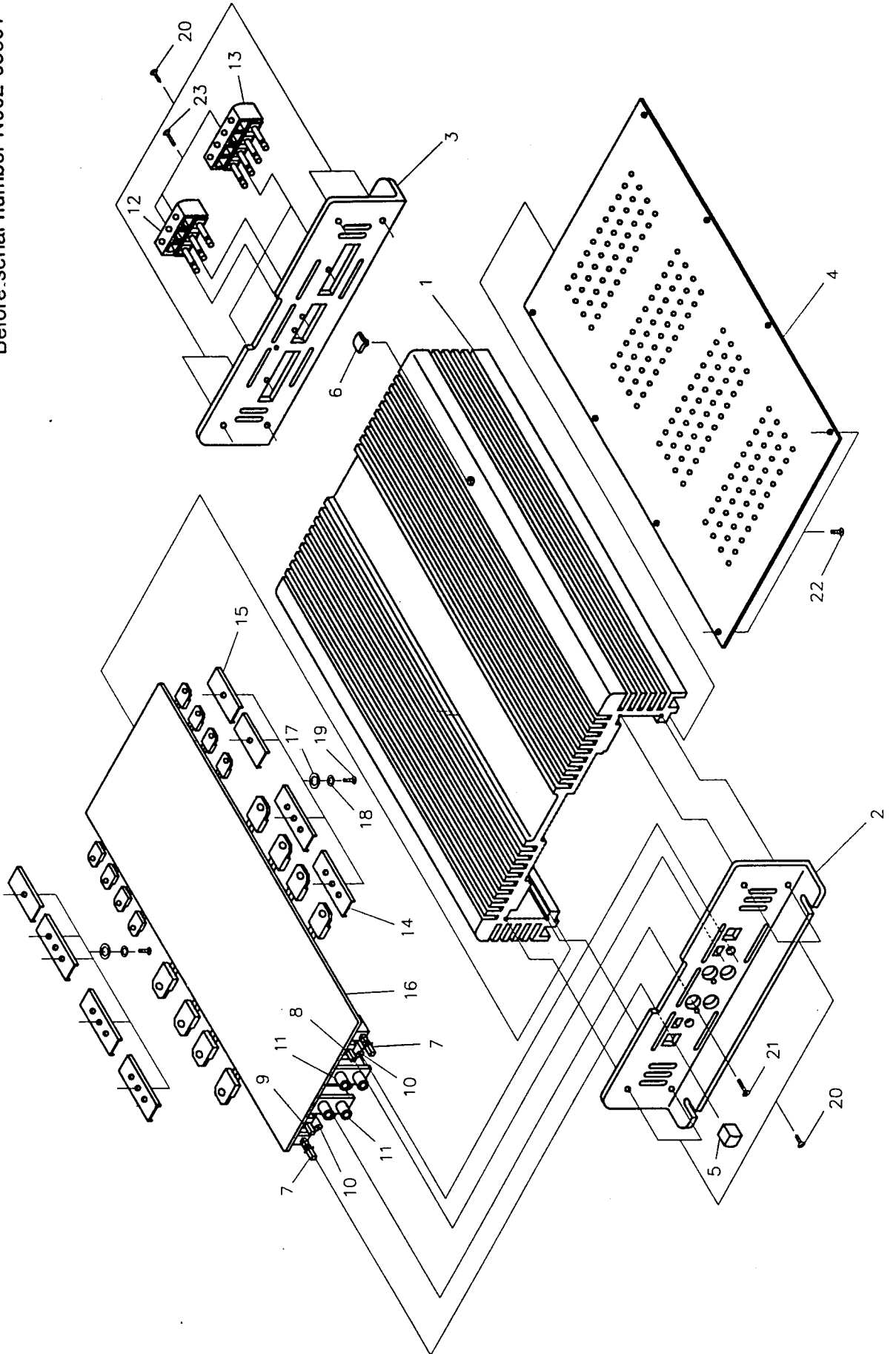
8. Gain Control Range, from MIN to MAX, 1 watt, 4-channel mode:  
**1 kHz: 20 dB  $\pm$  20%**
9. Output Level Deviation into 4 ohms, 1 watt, 1 kHz reference, 4-channel mode:  
**20 Hz: -3 dB or less**  
**1 kHz: 0 dB (reference)**  
**20 kHz: -3 dB or less**
10. Crossover Cutoff Frequency, into 4 ohms, 4-channel mode, -3 dB point:  
**High-pass (reference 1 kHz): 80 Hz  $\pm$ 15%**  
**Low-pass (reference 30 Hz): 80 Hz  $\pm$ 15%**
11. Current Consumption, 4 ohms, 4-channel mode, 1 kHz signal, 14.4V battery:  
**35 Watts x 4: 30 A or less**  
**No Input Signal: 3 A or less**

### GTQ200 DISASSEMBLY PROCEDURE

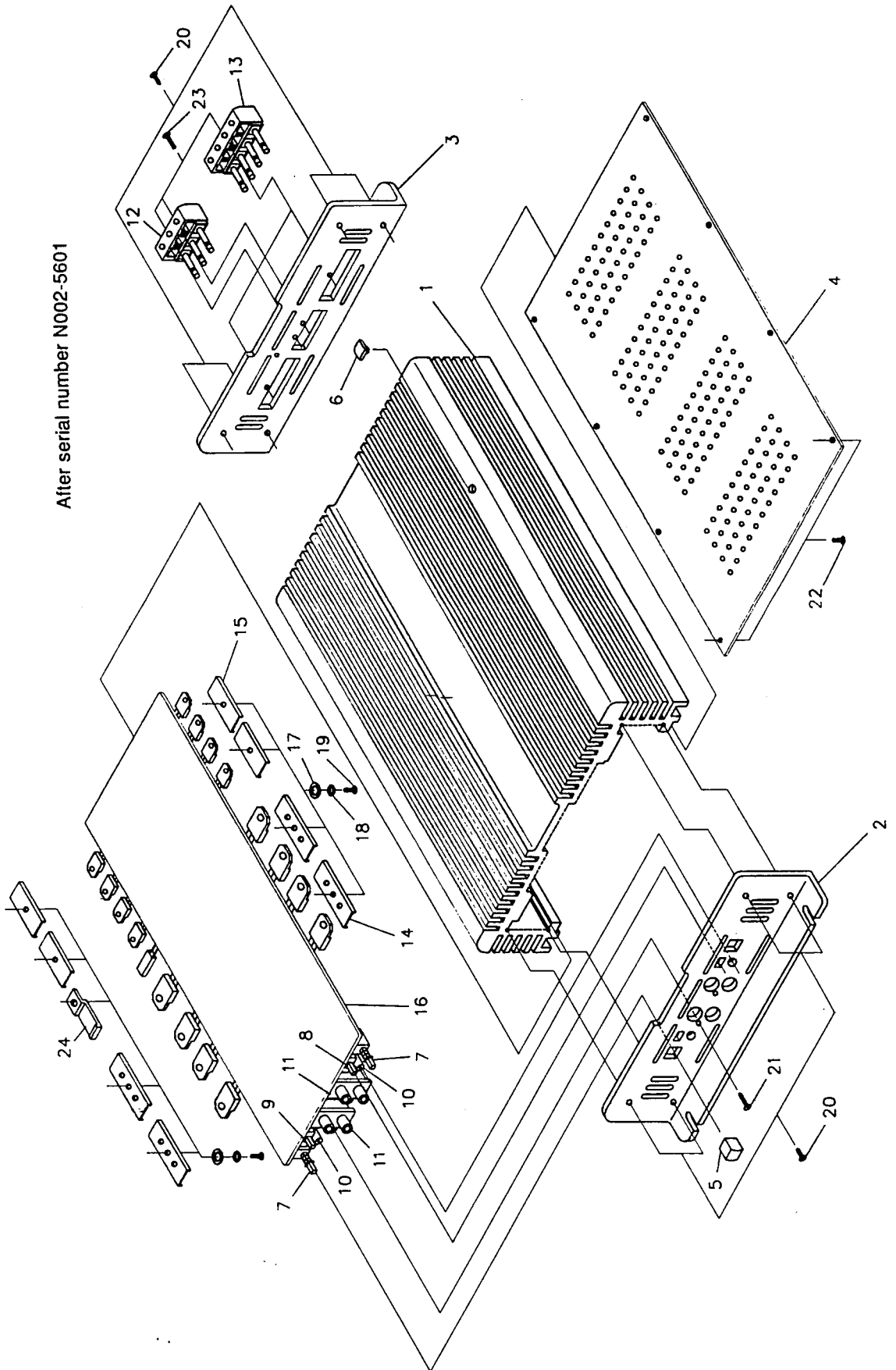
**Note:** REFER TO EXPLODED VIEW FOR PARTS DESIGNATION.

1. Remove 8 screws (22) securing bottom plate (4).
2. Remove bottom plate to expose main P.C. board assembly.
3. To remove main P.C. board assembly from chassis/heat sink assembly:
  - a) Remove 2 phillips screws (21) from RCA input jacks.
  - b) Remove 4 T-10 torx screws (20) from opposite end of chassis (3).
  - c) Remove 9 screws (19) that secure heat sink brackets (14, 15) to chassis.
  - d) Main P.C. board will now lift out of chassis. Care should be taken to protect leads of red L.E.D. that extend beyond P.C. board. During reassembly, align the red L.E.D. to the correct position before securing panel.

Before serial number N002-05601

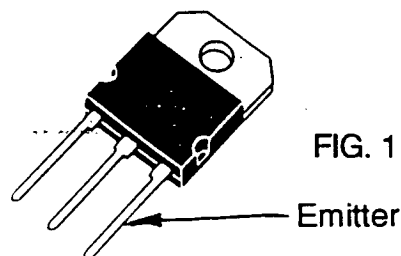


After serial number N002-5601



## GTQ200 Idling Current Adjustment Procedure:

1. To perform this test, you will need a AC-to-DC Power Supply (adjustable for voltages of 0 to +15 volts, and capable of at least 3A current draw), a DVM (digital voltmeter), and a Phillips head jeweler's screwdriver set.
2. Disconnect all speaker wiring from the amp. This adjustment is made without any speakers or loads.
3. Laying the amplifier down on its back, Remove the bottom cover of the amplifier.
4. Before you connect the amp to the DC power supply, turn the power supply on, and adjust its voltage to approximately 14.40 volts. Make sure that the current adjustment knob (if equipped), is at its maximum (no current protection).
5. Turn off the power supply, and connect BAT(+) and REM terminals of the amp to the (+) terminal of your power supply. Use an external 3A fuse on the battery line for protection. Connect the GND terminal of the amp to the (-) terminal of your power supply.
6. Turn on the power supply, and make sure the amp is turned on. Using the DVM, check that the voltage between the BAT(+) and GND terminals of the amp is 14.40 volts DC.
7. To re-set the idling current, you will need to adjust one of the four variable resistors that control idling current (VR2, VR3, VR5, VR6), one at a time. Please use the proper Phillips head jeweler's screwdriver. These potentiometers are very delicate. Do not force them past their stops in either direction. Furthermore, allow the amp 30 seconds between adjustments to stabilize.





8. Connect the voltmeter's positive (+) probe to the emitter leg of Q2. Connect the negative (-) probe of the DVM to the emitter leg of Q3. The emitter is the rightmost leg on these transistors when their bare metal tabs are pointing up (see Fig. 1).

9. Let the amp stabilize, make sure that the BAT(+)-to-GND voltage is still 14.40V DC, and check the idling voltage reading. If necessary, slowly adjust VR2 so that the reading is between 10 and 14 mV. After making adjustment, let the amp stabilize again, and recheck/readjust as necessary.

10. Connect the voltmeter's positive (+) probe to the emitter leg of Q6. Connect the negative (-) probe of the DVM to the emitter leg of Q7. The emitter is the rightmost leg on these transistors when their bare metal tabs are pointing up (see Fig. 1).

11. Let the amp stabilize, make sure that the BAT(+)-to-GND voltage is still 14.40V DC, and check the idling voltage reading. If necessary, slowly adjust VR3 so that the reading is between 10 and 14 mV. After making adjustment, let the amp stabilize again, and recheck/readjust as necessary.

12. Connect the voltmeter's positive (+) probe to the emitter leg of Q10. Connect the negative (-) probe of the DVM to the emitter leg of Q11. The emitter is the rightmost leg on these transistors when their bare metal tabs are pointing up (see Fig. 1).

13. Let the amp stabilize, make sure that the BAT(+)-to-GND voltage is still 14.40V DC, and check the idling voltage reading. If necessary, slowly adjust VR5 so that the reading is between 10 and 14 mV. After making adjustment, let the amp stabilize again, and recheck/readjust as necessary.

14. Connect the voltmeter's positive (+) probe to the emitter leg of Q14. Connect the negative (-) probe of the DVM to the emitter leg of Q15. The emitter is the rightmost leg on these transistors when their bare metal tabs are pointing up (see Fig. 1).

15. Let the amp stabilize, make sure that the BAT(+)-to-GND voltage is still 14.40V DC, and check the idling voltage reading. If necessary, slowly adjust VR6 so that the reading is between 10 and 14 mV. After making adjustment, let the amp stabilize again, and recheck/readjust as necessary.

REV: N	MODEL: GTQ200	REVISE DATE: SEPT. 9, 1992		
PART 'NO.	REFERENCE NO.	CODE	DESCRIPTIONS	QTY
*** P.C.B. SECTION ***				
1-18-110	R135	RES	1/4W+-5% PS 10 OHM	1
1-18-147	R139,R140,R141,R143, R144,R145,R125		1/4W+-5% PS 47 OHM	7
1-18-310	R2,R12,R17,R32,R42,R47, R62,R72,R77,R92,R102, R107,R123,R124,R138, R142,R146		1/4W+-5% PS 1K OHM	17
1-18-318	R14,R44,R74,R104,R137		1/4W+-5% PS 1.8K OHM	5
1-18-322	R133,R147		1/4W+-5% PS 2.2K OHM	2
1-18-330	R5,R35,R65,R95		1/4W+-5% PS 3K OHM	4
1-18-333	R16,R46,R76,R106		1/4W+-5% PS 3.3K OHM	4
1-18-347	R23,R24,R53,R54,R83,R84, R113,R114		1/4W+-5% PS 4.7K OHM	8
1-18-351	R13,R43,R73,R103		1/4W+-5% PS 5.1K OHM	4
1-18-391	R8,R68		1/4W+-5% PS 9.1K OHM	2
1-18-410	R3,R4,R6,R7,R27,R33, R36,R37,R57,R63,R64, R66,R67,R87,R93,R96, R97,R117,R122,R126, R127,R128,R129,R132,R121		1/4W+-5% PS 10K OHM	25
1-18-412	R1,R31,R61,R91		1/4W+-5% PS 12K OHM	4
1-18-415	R38,R98		1/4W+-5% PS 15K OHM	2
1-18-416	R15,R34,R45,R75,R94,R105		1/4W+-5% PS 16K OHM	6
1-18-418	R30,R60,R90,R120		1/4W+-5% PS 18K OHM	4
1-18-427	R131		1/4W+-5% PS 27K OHM	1
1-18-456	R11,R18,R22,R26,R41,R48, R52,R56,R71,R78,R82,R86, R101,R108,R112,R116		1/4W+-5% PS 56K OHM	16
1-18-462	R134		1/4W+-5% PS 62K OHM	1
1-18-510	R130		1/4W+-5% PS 100K OHM	1
1-18-547	R21,R25,R51,R55,R81,R85, R111,R115		1/4W+-5% PS 470K OHM	8
1-19-110	R29,R59,R89,R119		1/2W+-5% PS 10 OHM	4
1-19-210	R136		1/2W+-5% PS 100 OHM	1
1-31-443	R9,R39,R69,R70,R99,R100		1/4W+-1% METAL FILM 43K OHM	6
1-31-488	R10,R40		1/4W+-1% METAL FILM 88K OHM	2
1-20-110	R58,R28,R88,R118		1W+-5% METAL OXIDE 10 OHM	4
1-22-002	R19,R20,R49,R50,R79,R80, R109,R110		3W+-5% WIRE WOUND 0.22 OHM	8
1-16-022	C110,C111,C112,C113	C. CAP	50V+-10% 22PF	4
1-16-033	C25,C75		50V+-10% 33PF	2
1-16-047	C4,C5,C24,C54,C55,C74, C15,C35,C65,C85		50V+-10% 47PF	10
1-16-122	C93,C94		50V+-10% 220PF	2
1-16-147	C2,C11,C22,C31,C52,C61, C72,C81		50V+-10% 470PF	8
1-10-333	C8,C9,C28,C29,C41,C42, C43,C44,C59,C79	M. CAP	100V+-10% 0.033UF	10
1-10-368	C58,C78		100V+-10% 0.068UF	2
1-10-468	C107		100V+-10% 0.0068UF	1

REV: N	MODEL: GTQ200	REVISE DATE: SEPT. 9, 1992		
PART NO.	REFERENCE NO.	CODE	DESCRIPTIONS	QTY
*** PCB SECTION ***				
1-12-010	C14, C34, C64, C84	E. CAP	50V+-20% 5X11 1UF	4
1-12-110	C1, C3, C7, C10, C21, C23, C27, C30, C51, C53, C57, C60, C71, C73, C77, C80, C20, C40, C70, C90		16V+-20% 5X11 10UF	20
1-12-110A	C45		35V+-20% 5X11 10UF	1
1-12-220	C12, C32, C62, C82, C92		16V+-20% 8X12 220UF	5
1-12-247	C6, C26, C56, C76, C105		16V+-20% 8X14 470UF	5
1-12-247A	C109		25V+-20% 10X16 470UF 105c	1
1-12-522	C47, C49		35V+-20% 16X30 2200UF 105c	2
1-12-522A	C95, C98, C99, C102		35V+-20% 16X30 2200UF 85c	4
1-14-091	C13, C16, C17, C18, C19, C33, C36, C37, C38, C39, C46, C48, C50, C63, C66, C67, C68, C69, C83, C86, C87, C88, C89, C91, C96, C100, C103, C104, C106, C108	MONO	50V+-20% 0.1UF(ECO4WD0104M)	30
1-04-010	L4, L5, L6, L7	COIL	SPRING COIL 1mmx13Ts 6.35mm	4
1-09-421	IC2, IC3, IC7, IC8	IC	BA4560	4
1-09-561	IC11		GL494 / TL594	1
1-09-022	IC1, IC6		LM833	2
1-09-021	IC4, IC5, IC9, IC10		uPC1298	4
1-07-004	Q19	TRA	9014C	1
1-07-005	Q18		9015C	1
1-07-103	Q1, Q5, Q9, Q13		2N3904	4
1-07-107	Q4, Q8, Q12, Q16		MPS A06	4
1-07-109	Q17, Q20, Q24		MPS A56	3
1-06-005	D1, D8, D15, D22, D29	ZENER	1/2W+-5% 15V	5
1-06-107	D33		1/2W+-5% 12V	1
1-05-001	D2, D3, D9, D10, D16, D17, D23, D24, D30	DIODE	IN4001	9
1-05-006	D36		IN5400	1
1-05-009	D4, D5, D6, D7, D11, D12, D13, D14, D18, D19, D20, D21, D25, D26, D27, D28, D31, D32, D34, D35		IN4148	20
1-01-330A	L2, L3	COIL	D=1mm 12Tsx1 w/ T22FT25 CHC.	2
1-01-330B	L1	COIL	D=1.6mm 12Tsx2 w/T22FT25 CHC	1
1-01-405A	T1	COIL	EE-41 FERRITE CHC, (NKO45)	1
1-05-007	Q29	RECT	CTU 21R	1
1-05-008	Q28		CTU 21S	1
1-07-200	Q21, Q22, Q23, Q25, Q26, Q27	P. TRA	IRF540 / MTP36ND06E	6
1-08-009	Q2, Q6, Q10, Q14	P. TRA.	TIP 141	4
1-08-010	Q3, Q7, Q11, Q15		TIP 146	4
1-25-150	LD1	LED	MRB31D RED LED	1
1-26-350	VR2, VR3, VR5, VR6	RES.	SEMI-FIXED 5KR MURATA HORI	4
1-27-405	TH1		THERMO SW. 17AM203A5-4	1

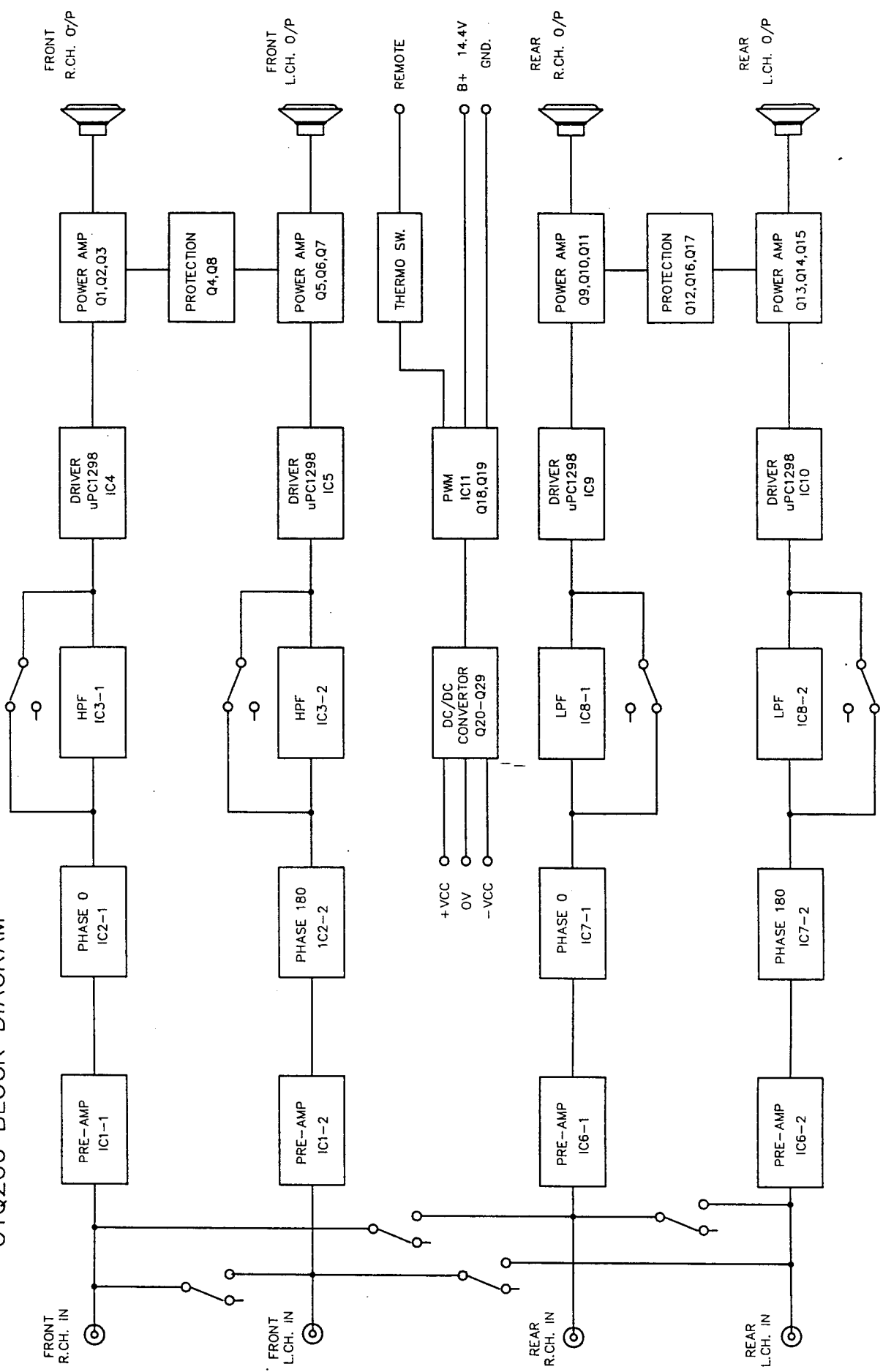
MECHANICAL PARTS LIST

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PART NO.	REFERENCE NO.	CODE	DESCRIPTIONS	QTY
3-61-014	1	PANEL	2034B-4 HEAT SINK L=305mm	1
3-61-001	2		2018B-1 FRONT PANEL	1
3-61-012	3		2034B-2 REAR PANEL	1
3-61-013	4		2034B-3 BOTTOM COVER	1
3-61-008	5		2018B-8 SWITCH KNOB	2
3-61-009	6		2018B-9 BADGE	1
1-27-150	7	P.SW	EX13EQ13	2
1-27-017	8	SL.SW	4P2T SK-42D01G6	1
1-27-016	9		2P2T SK-22D03G6	1
1-26-016	10	F.VR	RK1241210 20KAx2 L=15mm NEW	2
1-43-012	11	JACK	B217 2RCA JACK BD,GOLD-PLATE	2
3-61-025A	12	T'NAL	POWER TERMINAL ASSEMBLY	1
3-61-005A	13		SPEAKER TERMINAL ASSEMBLY	2
3-42-010	14	BKT.	1841-5 TRA.BKT. 3 HOLES	4
3-42-011	15		1841-5B TRA.BKT. 1 HOLE	4
3-56-001B	16	PCB	2034 MAIN BD.304x116x1.6FR4	1
1-37-130	17	S&W	M3 FLAT WASHER ZNC	9
1-37-230	18		M3 SPRING WASHER ZNC	9
1-35-314	19		3x14 TTB-PH ZNC	9
1-35-307	20		TORX T10 TTB-BTN 3x10 TIN	8
1-35-308	21		TTB-PH 3x10 TIN	2
1-35-305	22		MSB 3x6 TIN	8
1-35-381	23		MSP 3x20 TIN	4
3-20-009	24		1730-9 THERMO SW. HOLDER	1

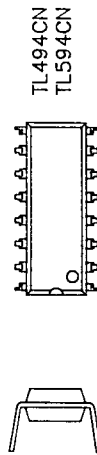
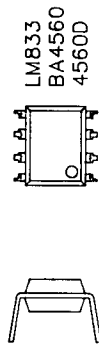
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GTQ200-1	1		GTQ200 SET	1
GTQ200-2	2		GIFT BOX	1
2034-P1	3		INNER BOX 2034 P1	1
2034-P2	4, 5		INNER PAD 2034 P2	2
1-29-108	5A		FUSE LAMP 30A	1
1-36-120	5B		10x5/8 PA BZ	4
1-37-150	5C		M5 FLAT WASHER BZ	4
1-37-250	5D		M5 SPRING WASHER BZ	4
GTQ200-3	6		OWNER'S MANUAL	1
GTC-001	6A		WARRANTY CARD	1
1-50-034A	7		GTQ200/400 FUSE WIRE SET	1
			+ 30A FUSE SET	
1-50-022	7A		WIRE, BLACK 915mm (15+15)	1

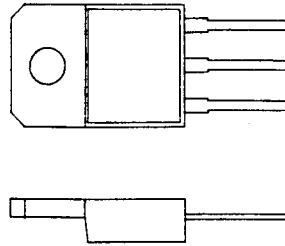
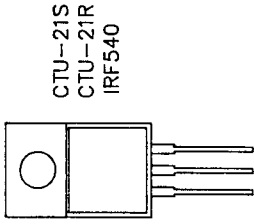
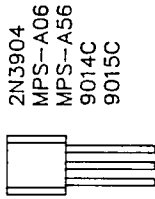
# GTQ200 BLOCK DIAGRAM



DETAIL OF IC'S



DETAIL OF TRANSISTORS



GTQ-200  
 TYPICAL AT IC PINS

MEASUREMENT REQUIRED  
 MEASUREMENT METER: DIGITAL MULTI METER  
 POWER SOURCE: DC +14.4V  
 INPUT: NO SIGNAL INPUT

PIN NO. IC NO.	1	2	3	4	5	6	7	8
IC1,IC6	0V	0V	0V	-15V	0V	0V	0V	+15V
IC2,IC7	0V	0V	0V	-15V	0V	0V	0V	+15V
IC3,IC8	0V	0V	0V	-15V	0V	0V	0V	+15V

PIN NO. IC NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
IC4,IC5 IC9,IC10	30V	30V	21.5V	0V	0V	-26.8V	-1.6V	1.1V	-30V	-30V	-0.8V	0.8V	N.C.	N.C.

PIN NO. IC NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC11	0V	2.5V	0.05V	0V	1.5V	3.5V	0V	11.2V	4.8V	4.8V	11.2V	13.5V	5V	5V	3.7V	2.5V

TYPICAL AT TRANSISTOR PINS  
 TRANSISTORS (UNIT: VOLTS)

PIN NO. TRA.NO.	E	B	C
Q1,Q5 Q9,Q13	1.1V	-1V	-1.6V
Q2,Q6 Q10,Q14	30V	0.8V	0V
Q3,Q7 Q11,Q15	30V	-0.8V	-0V
Q4,Q8 Q12,Q16	28V	0V	0V

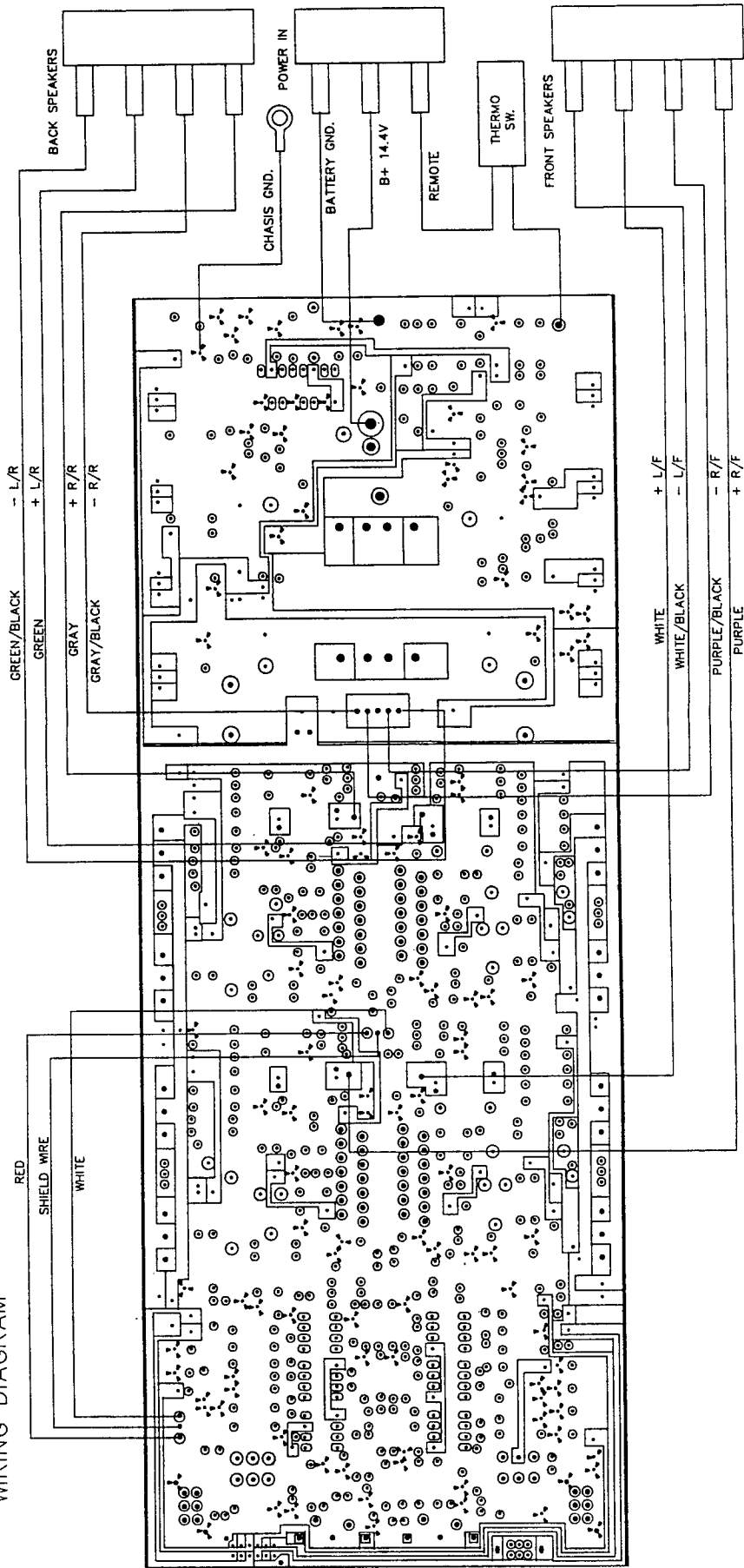
TRANSISTORS (UNIT: VOLTS)

PIN NO. TRA.NO.	E	B	C
Q17	30V	30V	0.05V
Q18	13.6V	13.6V	0.06V
Q19	0V	0.06V	13.6V
Q20,Q24	4.5V	4.8V	0V

TRANSISTORS (UNIT: VOLTS)

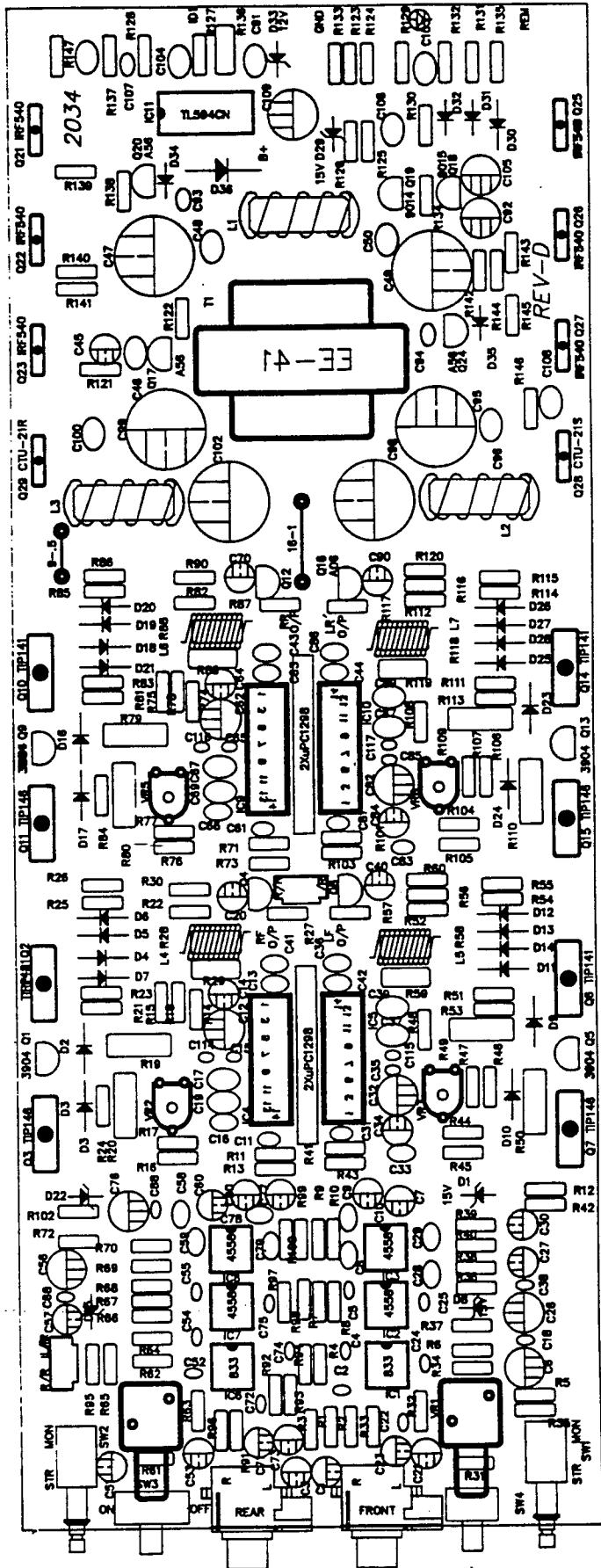
PIN NO. TRA.NO.	E	B	C
Q21,Q22 Q23	0V	4.5V	14.4V
Q25,Q26 Q27	0V	4.5V	14.4V

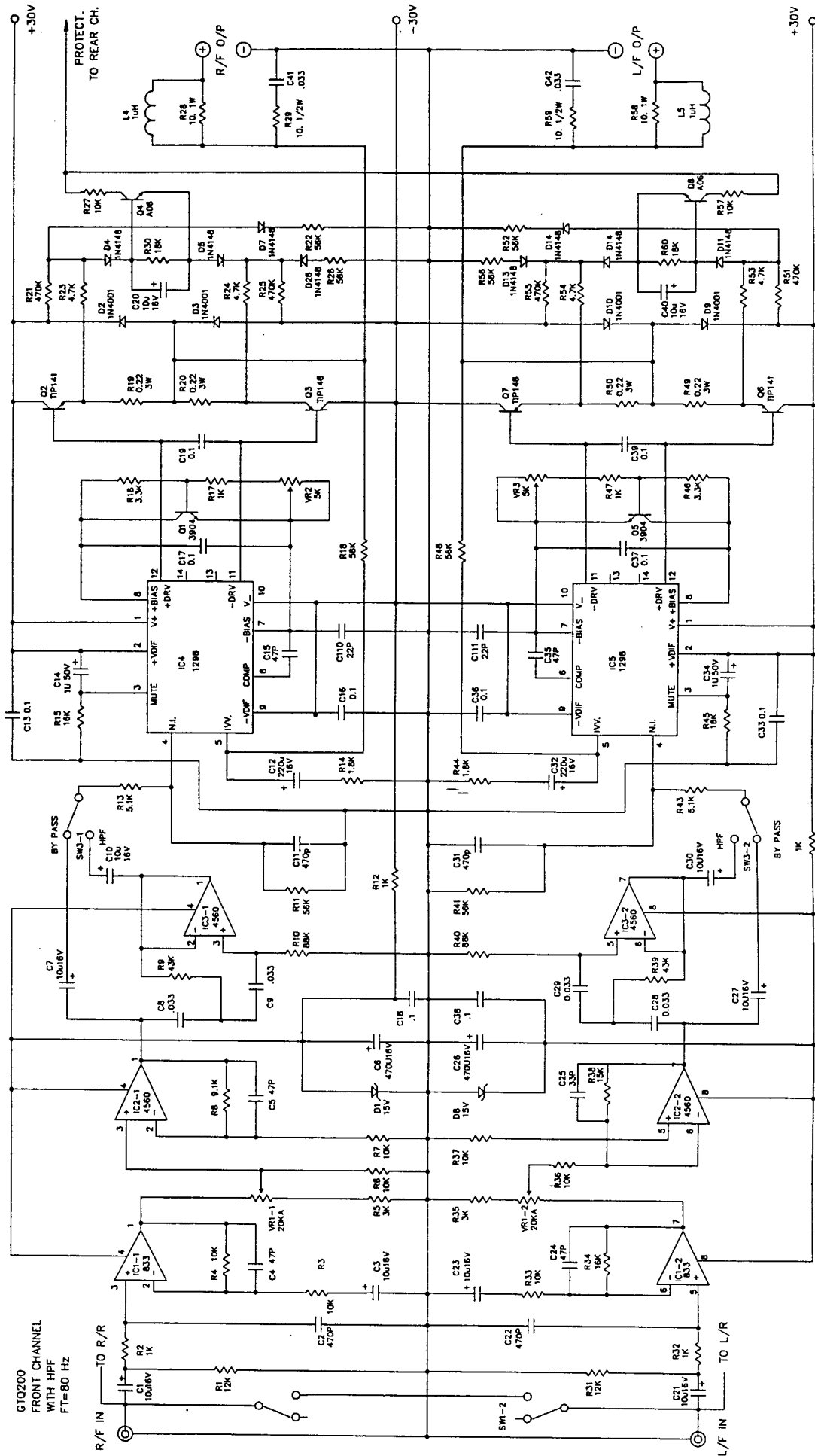
GTQ200  
WIRING DIAGRAM

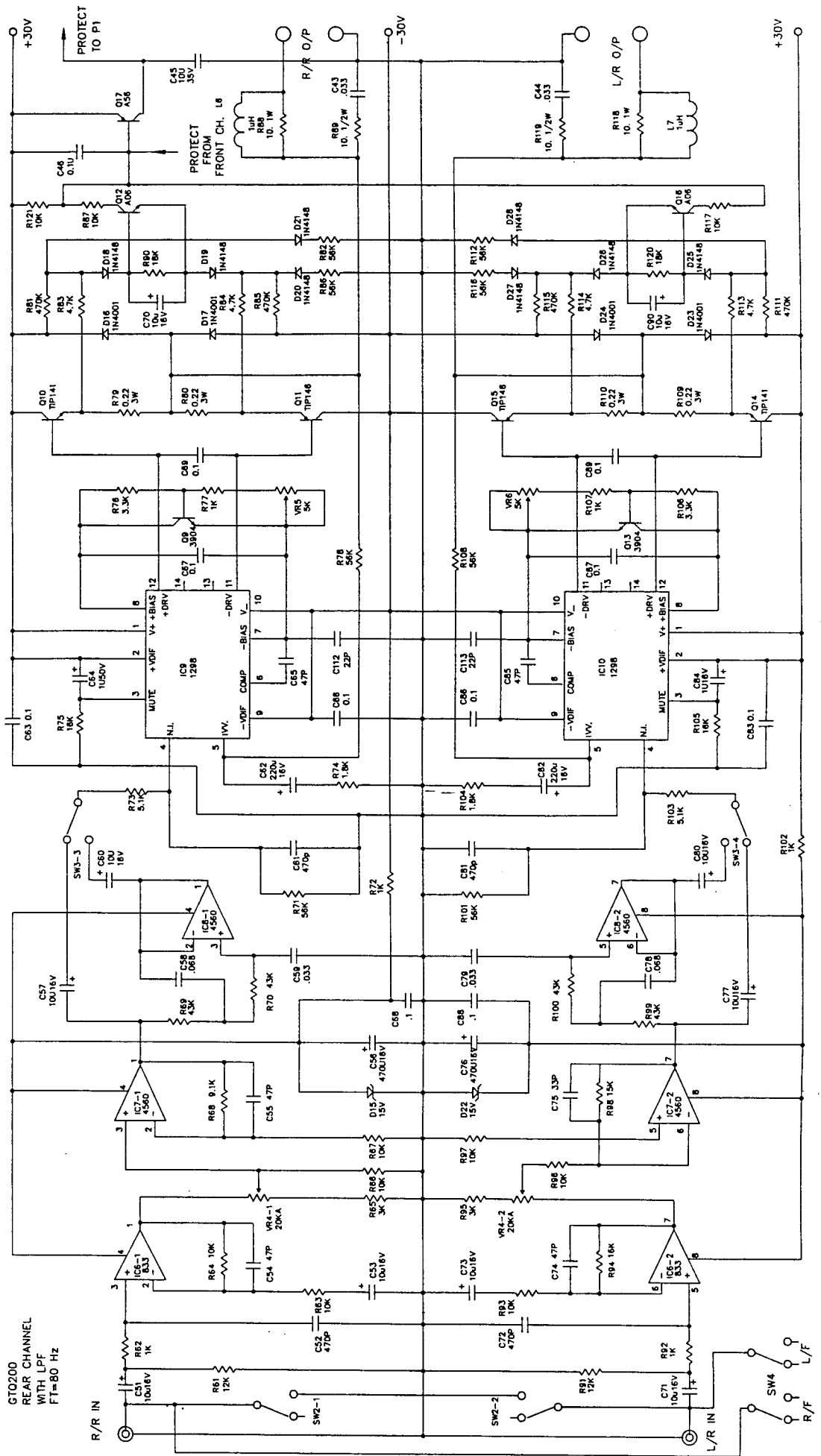




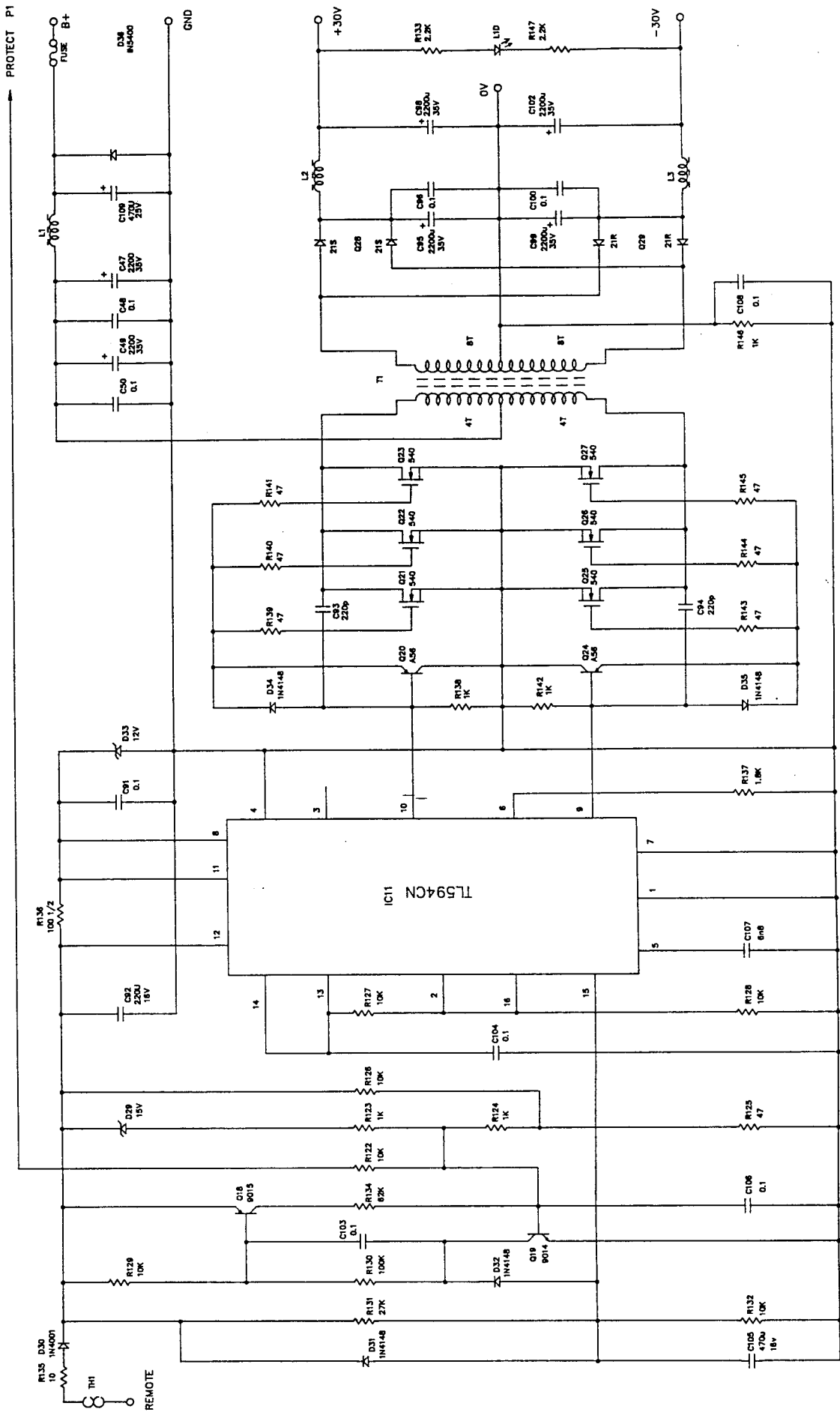
# GTQ200 PC BOARD LAYOUT

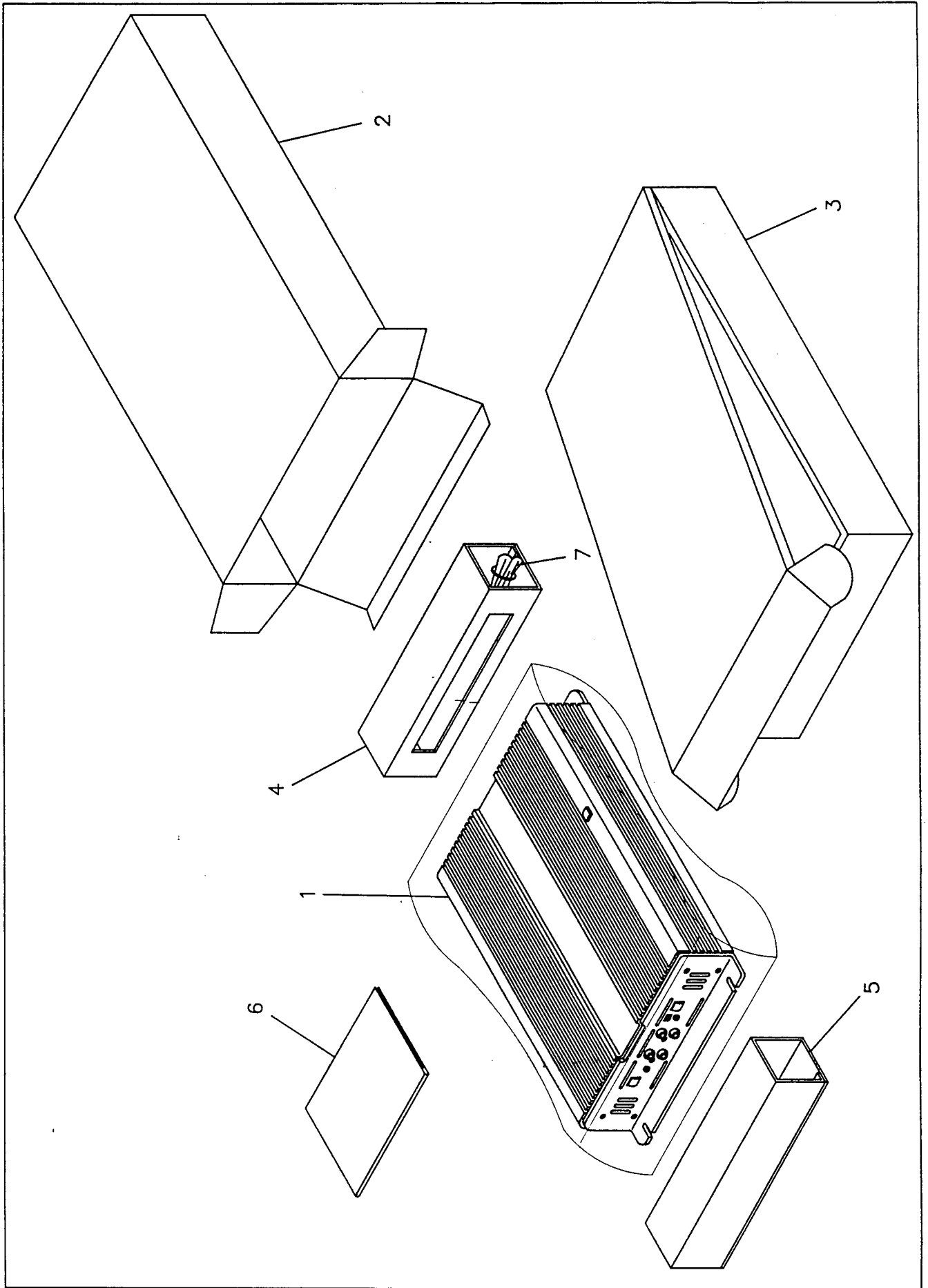






GTQ200 SCHEMATIC DIAGRAM  
DC/DC SECTION





# GTQ200 WIRING DIAGRAM

