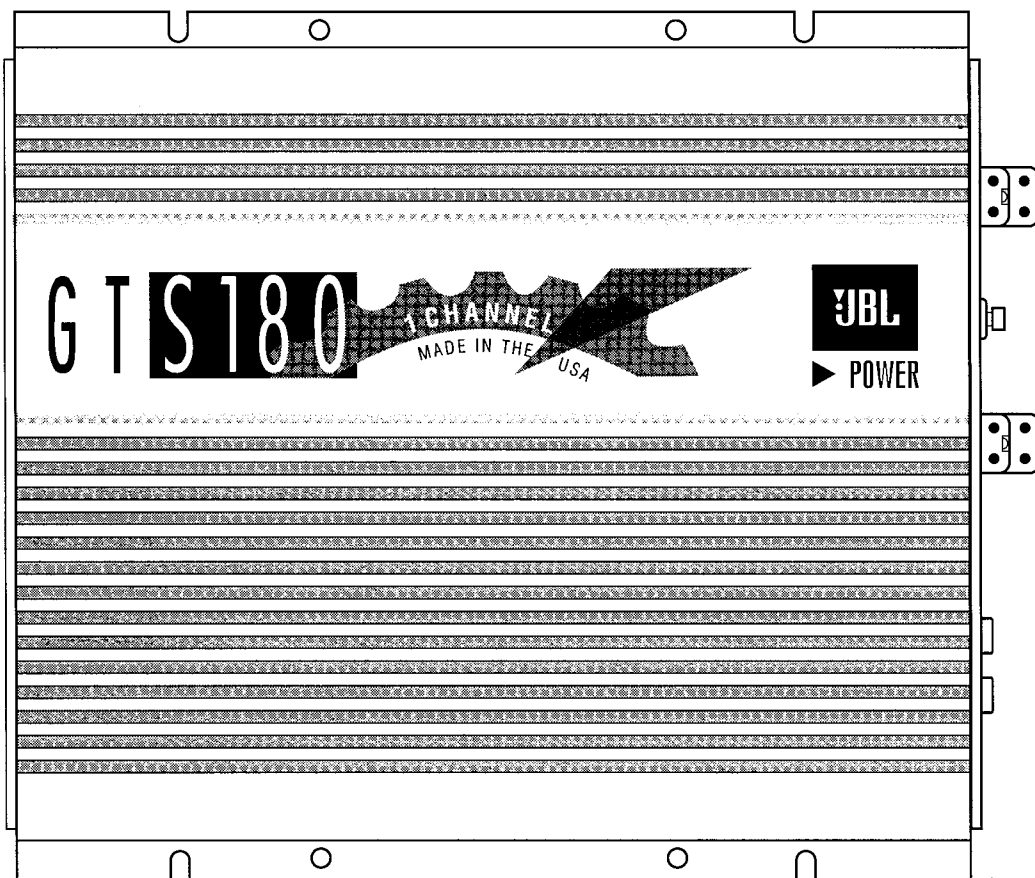


GTS180/GTS180x

2/1 CHANNEL AUTOMOTIVE

POWER AMPLIFIER

TECHNICAL MANUAL



JBL Consumer Products Inc.
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Woodbury, N.Y. 11797
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H A Harman International Company

Part No.: GTS180SM Rev A

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GTS180 Specifications

Power Output (20Hz - 20kHz, 14.4V Battery Voltage,	60 watts x 2 (4 Ohms, 0.05% THD)	Minimum Speaker Impedance	
	90 watts x 2 (2 Ohms, 0.08% THD)	Single Ended (Non-Bridged)	2 Ohms
	180 Watts x 1 (4 Ohms, 0.08% THD)	Bridged	4 Ohms
Signal to Noise Ratio	100dBA	Built in Electronic Crossover Frequency and Slope	18dB per Octave Low-Pass Filter, Frequency Chips Available from 50-5kHz Factory Setting: 80Hz
Frequency Response	10Hz - 50kHz (+0 - 1dB) 20Hz - 20kHz (+0 - 0.1dB)		18dB per Octave High-Pass Filter, Frequency Chips Available from 50-5kHz Factory Setting: 80Hz
Damping Factor	>200	Bass Boost Frequency and Magnitude	+4dB at 40Hz
Slew Factor	>5	Power Requirement	11 to 16V DC Negative Ground
Line Level Input Sensitivity (For Rated Power)	100mV - 4V RMS (500mV at Center Detent)	Fuse Size	30 Amp ATC Type Fuse
Speaker Level Input Sensitivity (For Rated Power)	200mV - 8V RMS (1V at Center Detent)	Size (L x W x H)	11-1/8" x 9-1/4" x 2" (282mm x 235mm x 51mm)
Preamp Output Sensitivity Preamp Input: Speaker Input:	4V in for 4V out 4V in for 2V out	Weight	8 lbs. 12oz. (4 kg)
Maximum Preamp Output Voltage	4V	Speaker Level Input Mating Connector	Molex Mini-Fit Jr. # 39-01-2045-P Metal Pins: 39-00-0039
Line Level Input Impedance	10k Ohms		
Speaker Level Input Impedance	15 Ohms or 100k Ohms (Selectable By Internal Jumpers)		

Features

- Bridgeable 2/1 Channel Operation.
- Simultaneous Stereo + Mono Operation.
- Built-in Staggered 18dB/Octave Frequency Selectable High-Pass and Low-Pass Crossover.
- Preamp Output with Frequency Selectable High-Pass and Low-Pass Crossover.
- No Current Limiting.
- Oversized Floating Rail (OFR) MOSFET Switch-Mode Power Supply
- Common Sense 2-way Turn-on
- Stealth Remote Silent Turn-On Circuitry with Power-On Indicator
- Continuously Adjustable Gain Controls.
- Capable of Single-Ended Operation Into 2-Ohm Loads.
- Fully Complementary, Direct-Coupled, Discrete Power Amplifier Circuitry.
- Gold Plated RCA Input Connectors.
- Gold Plated Power and Speaker Connections.
- Third order, (18dB per Octave) Capacitive/Inductive Power-Supply Filtering.
- Input Mode Switching.

Controls and Connections

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

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

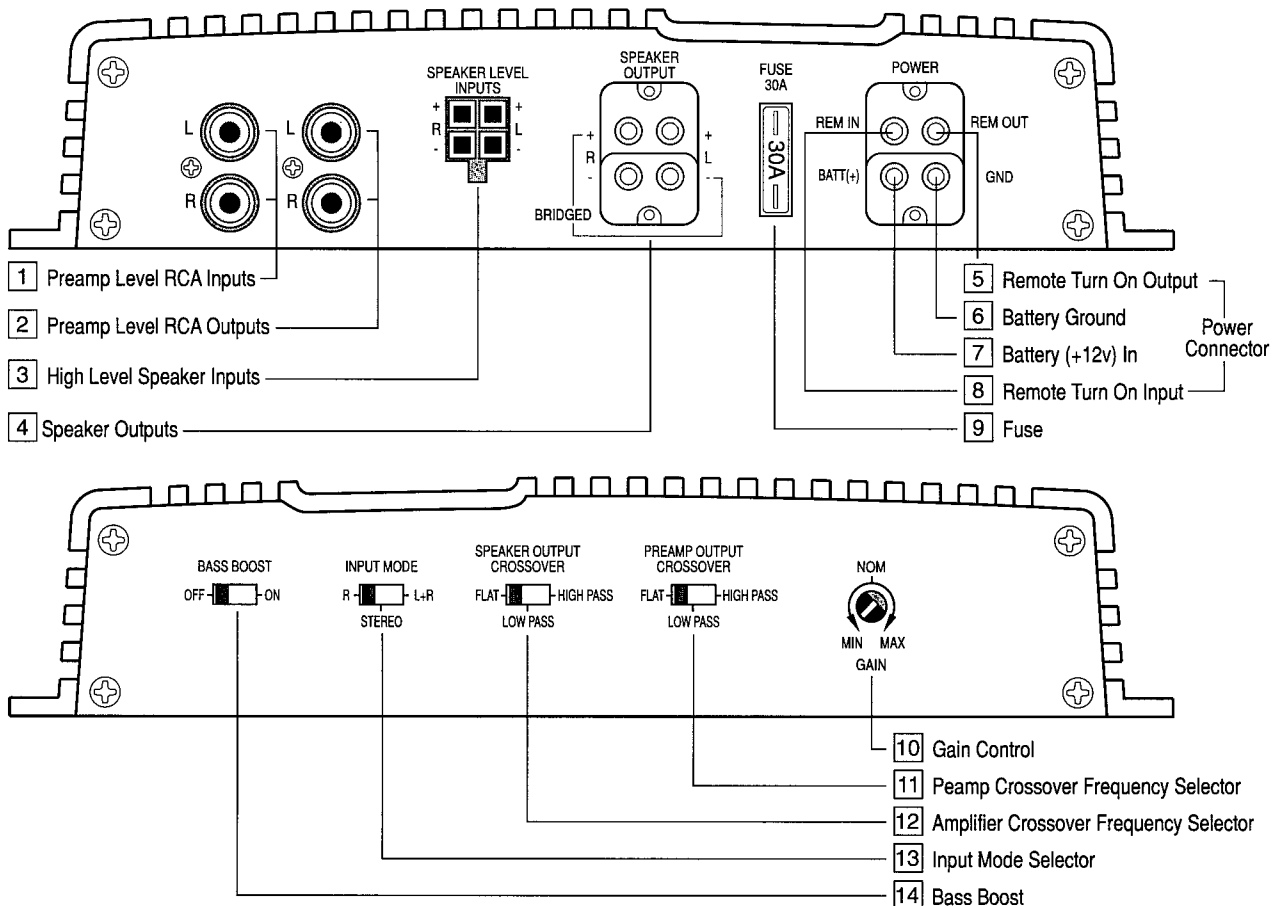
3. Speaker-Level Input Connector - Use this connector for speaker level input signals. A wire harness is supplied for use with this connector. This input also includes JBL's Common Sense input circuitry which turns the amplifier on as soon as a high powered head unit connected to this input is turned on.

4. Speaker Output Connector - Connect speaker wiring to this connector. See "System Configuration Diagram" on page 4 for more information.

5., 6., 7., 8., Power Connector - Connection for power wires. See "System Configuration Diagram" for information on proper connections.

9. Fuse - 30 AMP ATC type fuse for the GTS180.

10. Gain Control - Use this control to adjust the input sensitivity of the amplifier.



11. Preamp-Output Crossover Switch - This switch controls the built-in crossover that is directed to the preamp-output connectors. Set the switch to "Flat" for full band operation. Set this switch to "Low-Pass" to activate the low-pass filter on the preamp output (for subwoofer use). Set the switch to "High-Pass" to activate the high-pass filter for use with satellite speakers on the preamp outputs.

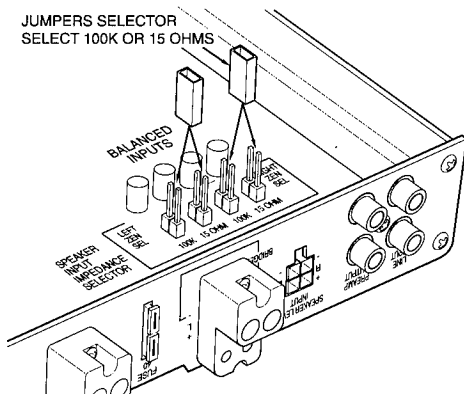
12. Speaker Output Crossover Switch - This switch controls the built-in crossover that is connected to the power amplifier circuitry. Set the switch to "Flat" for full band operation. Set this switch to "Low Pass" to activate the low pass filter on the amplifier (for subwoofer use). Set the switch to "High Pass" to activate the high pass filter for use with satellite speakers.

13. Input Mode Selector - This switch is used to set the input mode for both preamp and speaker-level inputs. Set this switch to Stereo for normal operation using both left and right inputs. Set this switch to R to drive both the left and right output channels with only a single input on the right channel. Set this switch to "L+R" to sum the left and right inputs for a mono output on both amplifier channels. The input mode selection switch does not affect the preamp outputs.

14. Bass Boost Switch - This activates a built-in Bass Boost circuit used to increase low-bass output.

Power Indicator LED (on chassis top) - LED steadily illuminates for normal operation. LED blinks when protection circuitry or muting is engaged and during initial power-up.

Figure 1.



Internal Adjustments

Speaker-Level Input Impedance Adjustments

The speaker level inputs of the GTS180 come factory set with 100K ohm input impedance. This will provide the lowest distortion operation from the speaker outputs of most modern head units by reducing the power the amplifier in the head unit must deliver to practically nothing. The resulting signal will practically be as free from noise and distortion as a preamp-level connection. On some older, or lower-priced head units, this load will not facilitate proper fader operation. To allow for this, we have provided the ability to change the input impedance of the speaker-level inputs to 15 ohms.

This is accomplished by connecting the jumpers as shown in Figure 1.

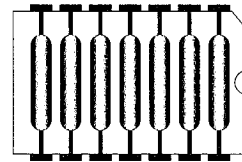
Crossover Frequency Adjustments

The GTS180 amplifier include 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.

The crossover frequencies are set by "chips" inside the amplifier. These "chips" are simply a set of resistors, connected across the pins and molded into a single package. The crossover frequencies may be changed to any value desired by changing the resistor network.

Frequency	Resistor Value	JBL Part Number
50Hz	47K Ω	1-23-750
80Hz	33K Ω	1-23-817
120Hz	22K Ω	1-23-820
200Hz	12K Ω	1-23-821
250Hz	10K Ω	1-23-810
375Hz	6.8K Ω	1-23-822
500Hz	4.7K Ω	1-23-815
650Hz	3.9K Ω	1-23-823
2.5kHz	1K Ω	1-23-824
5kHz	470 Ω	1-23-816

Custom "Chip" Construction



Each resistor in the package has the same value.

If you know the crossover frequency you want, you can calculate the resistor value necessary by solving the following equation:

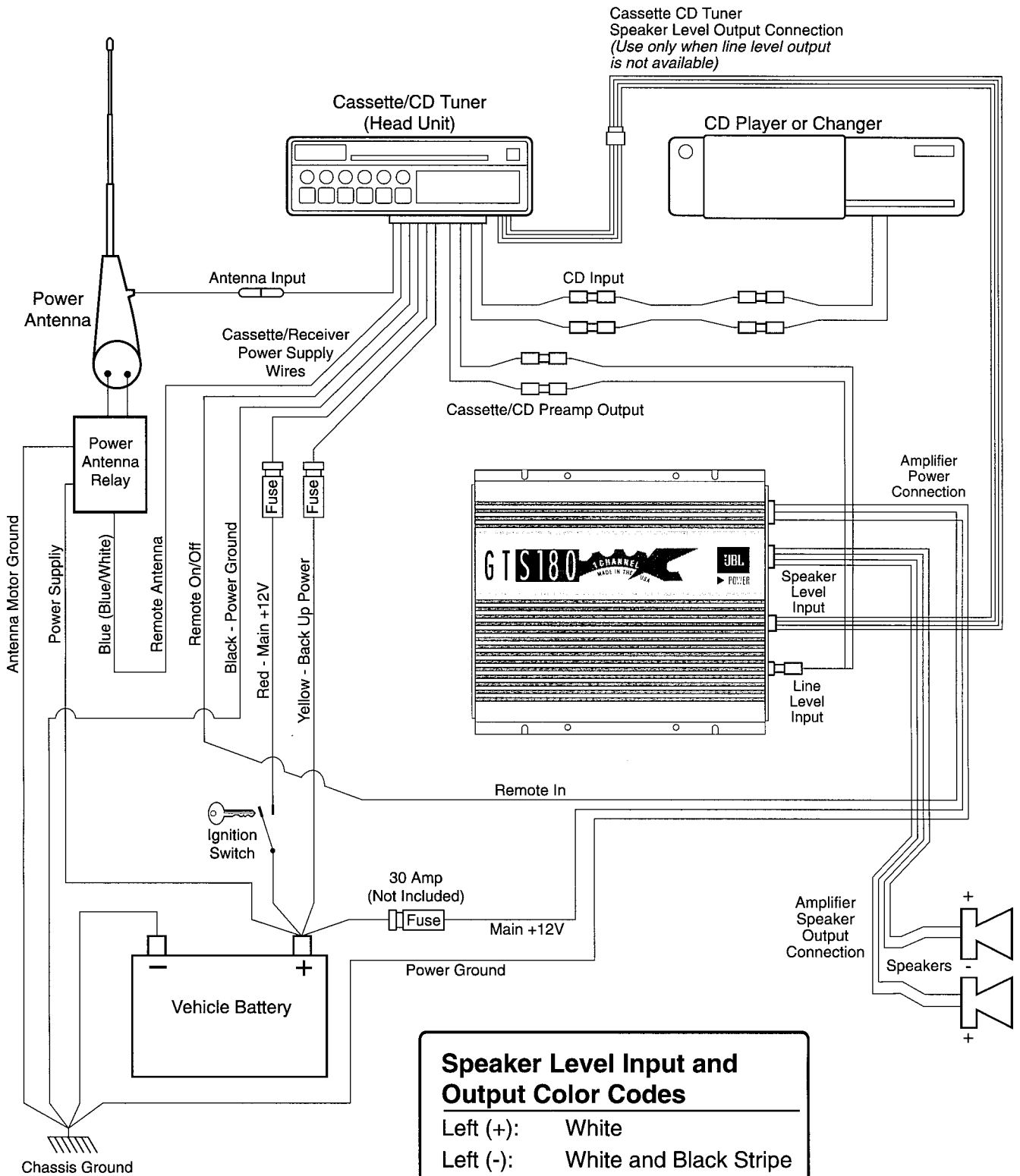
$$\text{Resistor Value in Ohms} = \frac{2,500,000}{\text{Crossover Frequency in Hz}}$$

Use the following equation if you have a resistor pack of a known value, and want to find its crossover frequency:

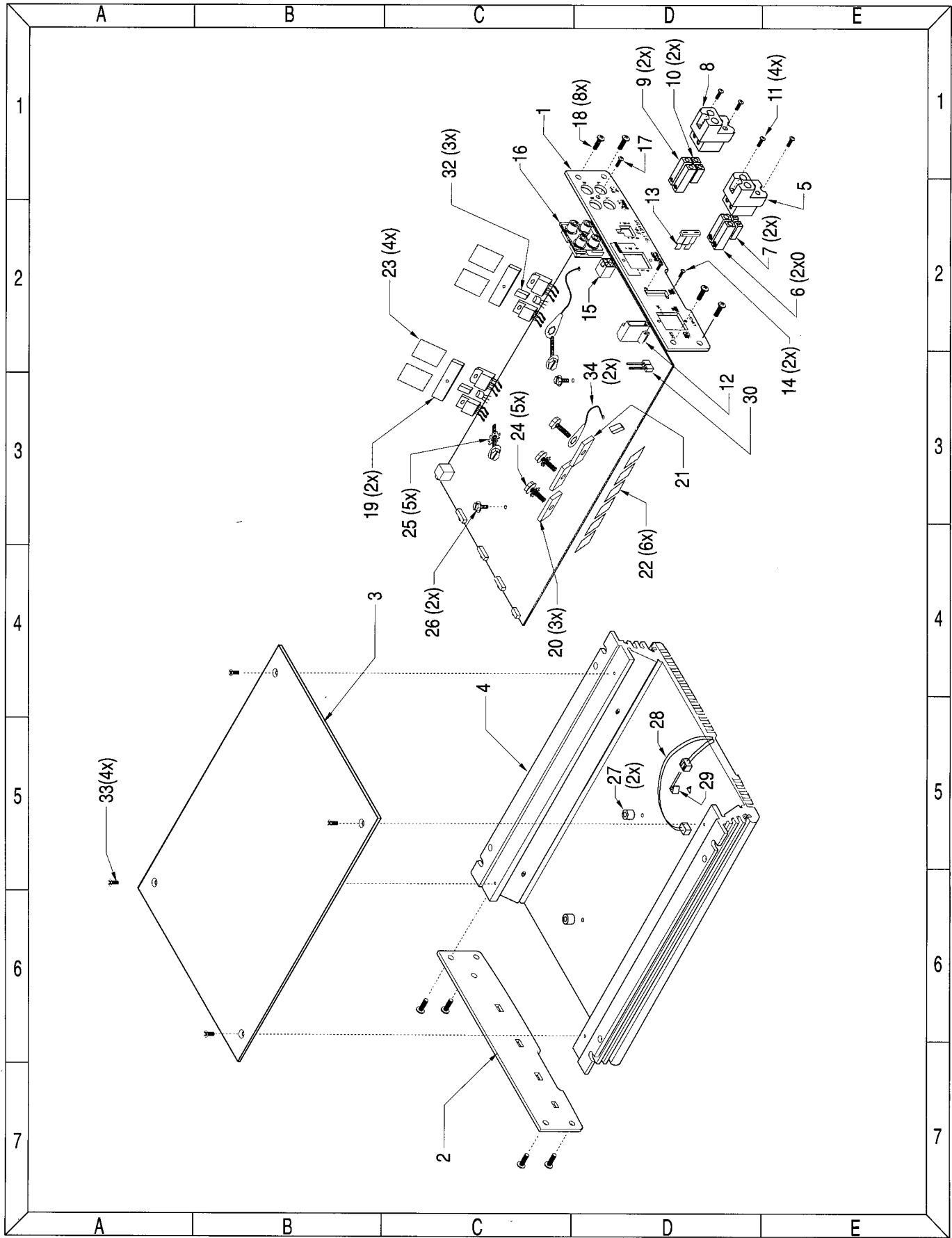
$$\text{Resistor Value in Hz} = \frac{2,500,000}{\text{Crossover Resistor Value in Ohms}}$$

To build "chips" from discrete resistors, solder the resistors to a standard 14-pin "DIP Header" according to the diagram. If a DIP Header is not available, you may bend the leads of 1/4"-watt resistors 90 degrees, trim them to 1/8"-length, and insert them directly into the chip socket.

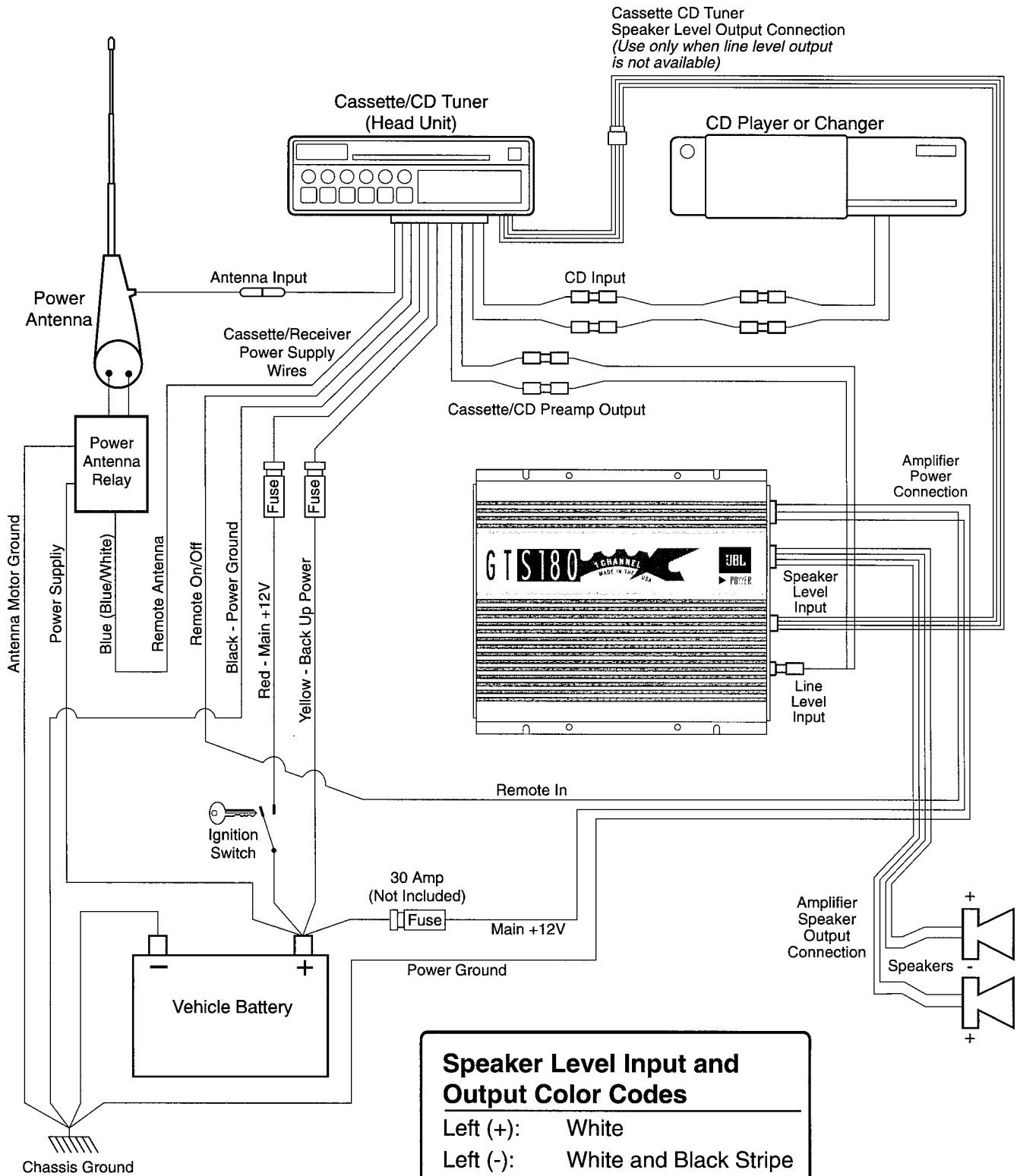
Typical System Configuration



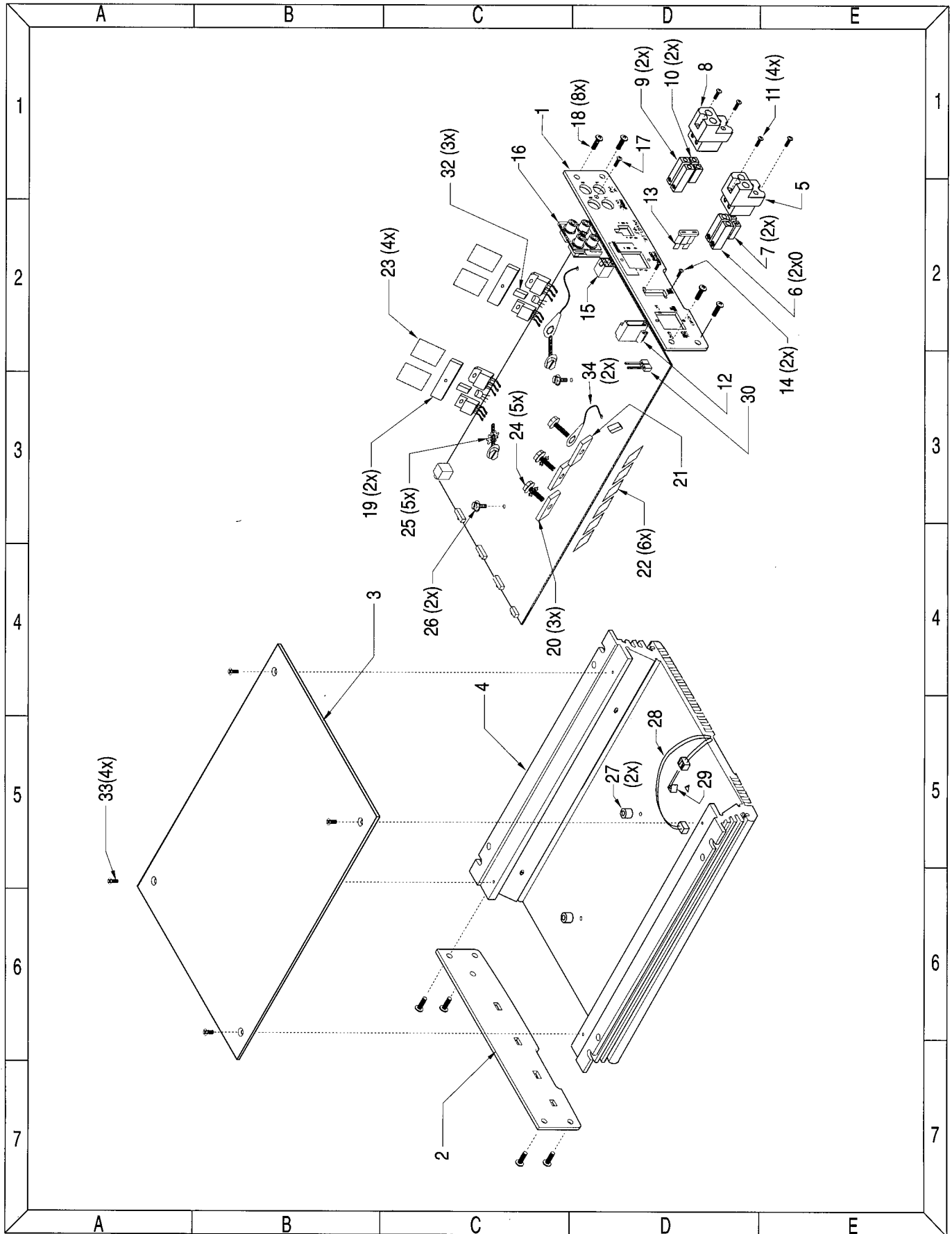
Mechanical Exploded View



Typical System Configuration



Mechanical Exploded View

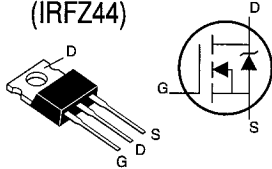


GTS180 Unit Mechanical Parts

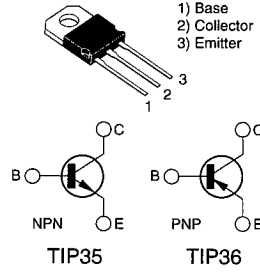
REF. No.	DESCRIPTION	PART No.	QNTY.			
1	FRONT BRACKET FOR GTS180	BR1311	1	24	SC 6-32x 3/4 CUTT-THR, HEX WASHER HEAD, POINT F, ZINC F.	SC1192 5
2	REAR BRACKET FOR GTS180	BR1319	1	25	WASHER EXT. TOOTH	WA1049 5
3	BOTTOM PLATE 13" LONG GTS180	BR1320	1	26	SC 6-32x 3/8 TAPTITE, HEX WASHER HEAD, ZINC FSH	SC1194 3
4	HEATSINK FOR GTS180 10" LENGTH 9" WIDTH	HS1088	1	27	1/4 ROUND SPACER	ST1018 3
5	POWER CONNECTOR, 4 POS, 8 AWG 2X-TOP, 2X-BOTTOM	CO1264	1	28	HARNESS FOR LED	XX1192 1
6	LOWER POWER ALUMINUM BAR, AWG 8, GOLD PLATED	BR1289	2	29	LED RED DIFUSED (TRIANGLE SHAPE)	LE1029 1
7	UPPER POWER ALUMINUM BAR, AWG 16, GOLD PLATED.	BR1288	2	30	CONNECTOR HEADER	CO1284 2
8	SPEAKER OUTPUT CONNECTOR 2-CH 4 POSITIONS	CO1259	1	31	GROUND HARNESS	XX1198 2
9	LOWER SPEAKER ALUMINUM BAR, AWG 16, GOLD PLATED	BR1284	2	32	SILICONE SPONGE WITH ACYRILC PRESSURE SENSITIVE ADHESIVE	SP1076 2
10	UPPER SPEAKER ALUMINUM BAR, AWG 16, GOLD PLATED.	BR1285	2	33	SC 4-40x5/16 TAPT-THR FRAT PHI HEAD, ZINC FSH	SC1188 4
11	SC 4-40x 7/16 TAPT-THR, PAN PHI HEAD, NICKEL FSH	SC1090	4	The following parts are not shown on the exploded view		
12	FUSE HOLDER		1		SC 8-32x 1/4 HEX SOCKET SET	SC1202 4
13	FUSE 30 AMP 32 VOLT ATC TYPE		1		SCREW,FLAT POINT,ALLOY STEE GOLD FLASH, USED WITH BR1289	
14	SC M2.2x0.79x7.5 HIGH/LOW-THR PAN PHI HEAD, NICKEL FSH	SC1220	2		SILICONE FOAM WITH ACRYLIC PRESSURE SENSITIVE ADHESIVE	SP1020 3
15	HEADER MOLEX	CO1270	1		SC 6-32x 1/4 HEX SOCKET SET	SC1200 12
16	RCA CONNECTOR	CO1255	1		SCREW, FLAT POINT,ALLOY STEEL, GOLD FLASH	
17	SC M3x1.25x10 PLAS-THR, PAN PHI HEAD, NICKEL FSH	SC1189	1		SC 6-32x 3/8 HEX SOCKET SET	SC1201 4
18	SC 6-32x 1/2 TAPT-THR, PAN PHI HEAD, NICKEL FSH	SC1187	8		SCREW, FLAT POINT,ALLOY STEEL, GOLD FLASH	
19	ALUMINUM BAR 4.8x12.7x40mm	BR1187	2		SILICONE GREASE #340 DOW ON TRANSISTORS	MS1004
20	ALUMINUM BAR 4.8x12.7x25.4 MM.	BR1240	2			
21	ALUMINUM BAR 4.8x12.7x35.0mm.	BR1250	1			
22	SIL PAD INSULATOR TO-220 WITH ADHESIVE 0.75"x0.5"	SP1072	6			
23	SIL PAD INSULATOR TO-3P WITH ADHESIVE 1.000" x 0.750"	SP1073	12			

IC Voltage Diagrams

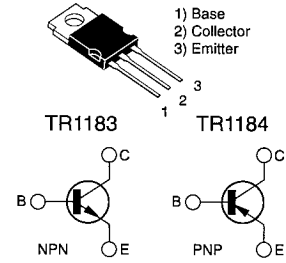
TR1131, TR1157
(IRFZ44)



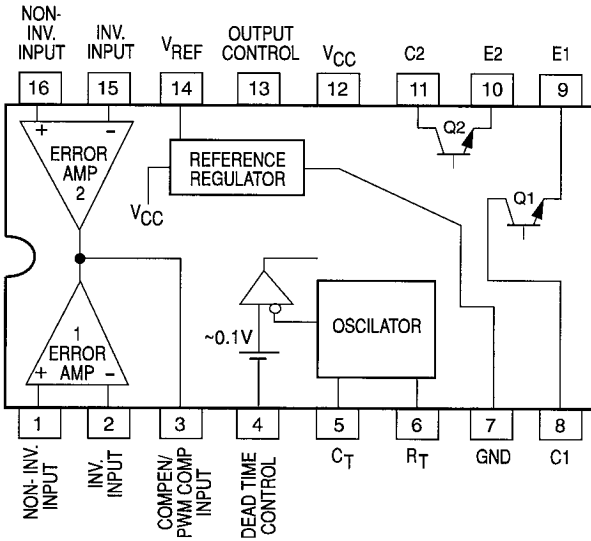
TR1057 & TR1061



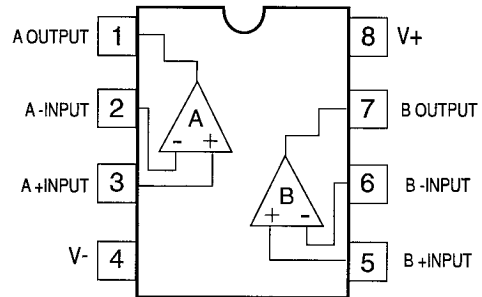
TR1183 & TR1184



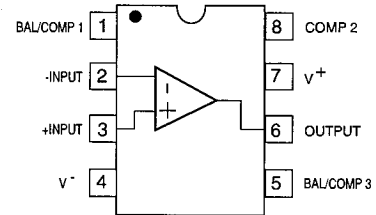
IC1002 (TL494)



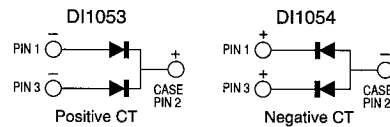
IC1041, IC1175



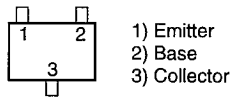
IC1040



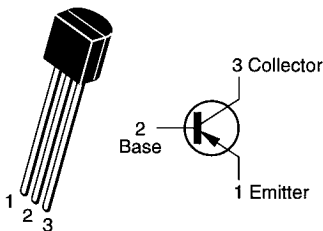
DI1053 (FEP16BT),
DI1054 (FEN16BT)



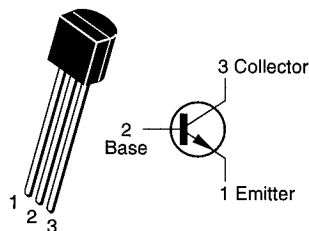
TR1157



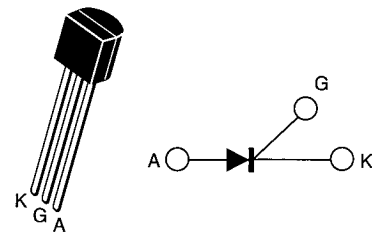
TR1010 (MPS2907),
TR1166 (2N5401)



TR1063 (MPS2222A),
TR1167 (2N551)



TY1000



GTS180 PCB's (Bottom Side)



PWM PCB

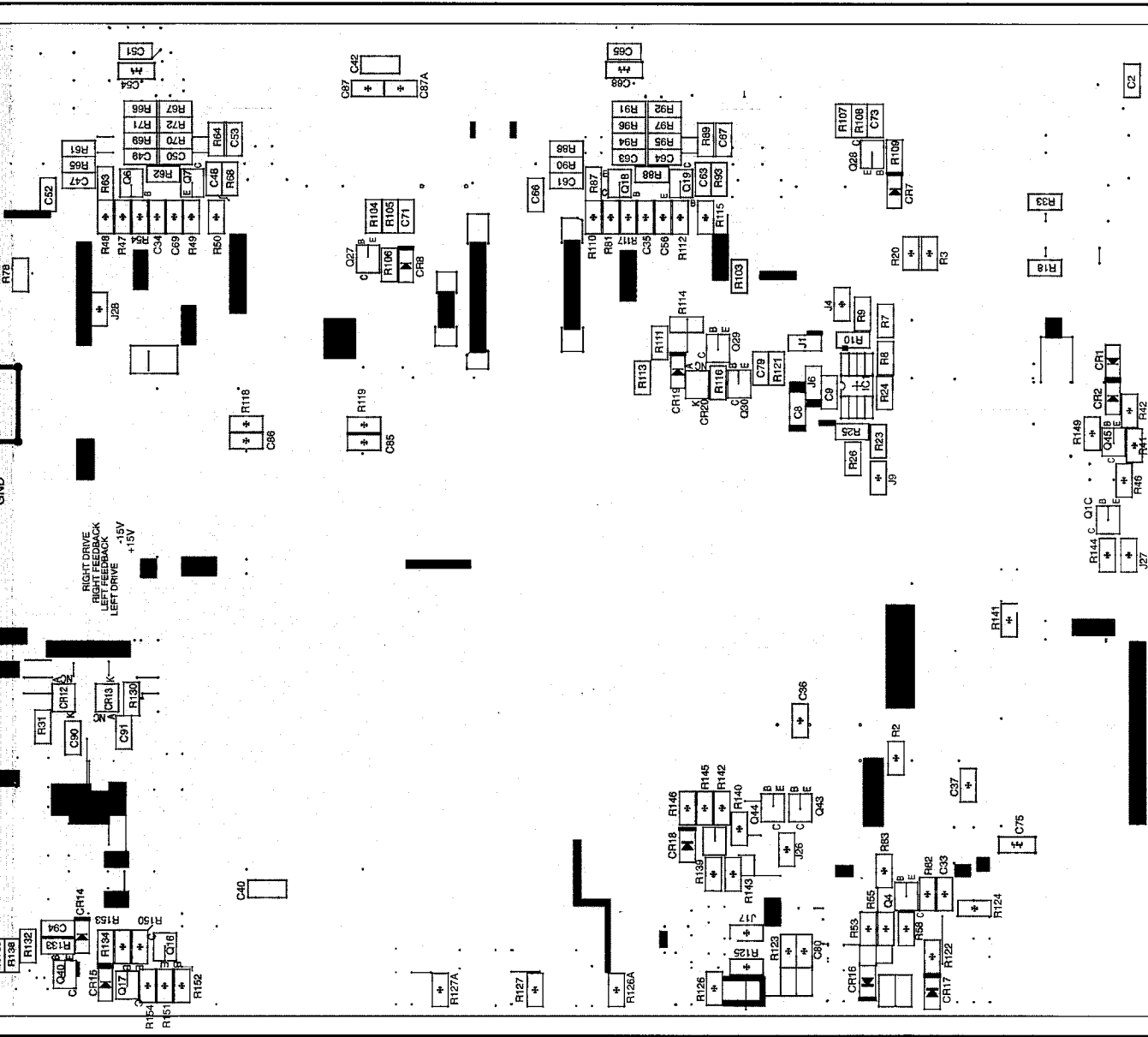
Main PCB

BOTTOM VIEW OF PCB AS VIEWED THROUGH THE TOP

NOTE: Reference designators have been re...

GTS180 PCB's (Bottom Side)

Main PCB



WED THROUGH THE TOP

NOTE: Reference designators have been reversed for readability

1
2
3
4
5
6
7
8
9

GTS180 Electrical Parts List

GTS180 MAIN PCB ASSEMBLY

REFERENCE No.	DESCRIPTION	PART NO.	QNTY.	REFERENCE No.	DESCRIPTION	PART NO.	QNTY.
				C12, 25	CAP. POLY FIL 0.015 μ F \pm 5% 63V 85°C T/R RADIAL LEAD METALLIZED LS=5mm (*WIMA, MKS2.015/63/5TR16.5, SIEMENS, B32529-.015/5/63/J16)	CP1534	2
Capacitors							
C78	CAP. POLY FIL 1.0 μ F \pm 10% 50V RADIAL T/R LS=5.0mm (*PANASONIC, ECQV1H105JZ5, ECQV1H105JL5)	CP1126	1	C10, 13, 23, 26	CAP. POLY FIL 0.082 μ F \pm 5% 63V 85°C T/R RADIAL LEAD METALLIZED LS=5mm (*WIMA, MKS2.082/63/5T/R16.5 SIEMENS, B32529-.082/5/63/J16)	CP1535	4
C11, 15, 24, 28	CAP. POLY FIL 0.22 μ F \pm 5% 63V 85 DEG C T/R RADIAL (*WIMA MKS2.22/63/5 T/16, SIEMENS, B32529-.22/5/63/J16)	CP1177	4	C29, 32	CAP. POLY FIL 0.047 μ F \pm 5% 63V 85°C T/R RADIAL LEAD F=5.0mm (*WIMA, MS2.047/63/5T/R16.5 SIEMENS, B32529-.047/5/63/J16)	CP1539	2
C14, C27	CAP. POLY FIL 0.22 μ F \pm 5% 63V 85 DEG C T/R RADIAL LEAD METALLIZED (*WIMA, MKS2.022/63/5T/R16, SIEMENS, B32529-.022/5/63/J16)	CP1178	2	C76, 99	CAP. CERAMIC 10.00pF \pm 5% 50V NPO T/R 1206 PKG (*KEMET, C1206C100J5GAC, AVX, 12061A100JATRA)	CP1542	2
C1, 92, 93, 5, 19, 20, 95, 102, 103	CAP. ALUM EL. 22.00 μ F \pm 25% 25V 5x11 RADIAL AMNOPACK F=2.5mm LS=2.5mm (*SAMHWA, 1SG1EAB226MAS05011, SAMSUNG, CESSL1H220M0511AB)	CP1352	9	C88, 89	CAP. ALUM EL. 100.00 μ F \pm 20% 35V 85°C RADIAL LEAD F=5.0mm (*SAMSUNG, CESSL1V1010812AA, CESSL1V1010812AD)	CP1547	2
C77, 77A	CAP. ALUM EL. 2200.00 μ F \pm 20% 25V 105°C RADIAL LEAD (*NIC, NRE- L222M25V18X16, ELNA, RJ3-25V222MT5)	CP1355	2	C40, 42	CAP. CERAMIC 0.10 μ F \pm 20% 100V Z5U T/R 1210 PKG. (*AVX, 12101C104MATMA, KEMET, C1210C104M1RAC)	CP1552	2
C72, 104, 46, 60	CAP. ALUM EL. 100.00 μ F \pm 20% 16V 85°C A/P RADIAL LEAD 6.3x7 T/R LS=2.0mm F=2.5mm (*SAMHWA, 1SK1CAB107MAS6L007, NICHICON, USR1C101MCA1TP)	CP1411	4	C49, 50, 63, 64	PAC CERAMIC 56.00pF \pm 5% 50V NPO T/R 1206 PKG (*KEMET, C1206C560J5GAC, AVX, 12061A560JATMA)	CP1557	4
C6, 7, 21, 22, 100, 101, 18, C38	CAP. ALUM EL. 2.20 μ F \pm 20% 50V 85°C A/P RADIAL LEAD 4x7 T/R LS=1.5mm, F=2.5mm (*SAMSUNG, CESSM-1H2R2M0407RC, SAMHWA, 1SS1HAB225MAS04007)	CP1415	8	Diodes			
C90, 91, 71, C2-4, 8, 9, 16, 17, 30, 31, 36, 37, 43, 44, 47, 48, 51, 57, 58, 61, 62, 65, 70, 73, 74, 79, 80	CAP. CERAMIC 0.10 μ F \pm 20% 50V Z5U T/R 1206 PKG (*AVX, 12065E104MATRA, KEMET, C1206C104M5UAC)	CP1426	29	CR9, CR9A	RECTIFIER DIODE 3A/200V MAX 100V MIN T/R (*GI, 1N5401, TAITRON, 1N5401)	DI1005	2
C85, 86, 94, 75, 54, 68	CAP. CERAMIC 0.10 μ F \pm 20% 50V Z5U T/R 1206 PKG (*AVX 12065E104MATRA, KEMET, C1206C104M5UAC)	CP1426	6	CR3, CR4, CR5, CR6	DIODE FAST REC. 1A 100V AXIAL (*GI, UF4002, MOTOROLA, MUR110RL)	DI1010	4
C41, 55, 45, 59 56, 69	CAP. CERAMIC 33.00pF \pm 5% 50V NPO T/R 1206 (*KEMET, C1206C330J5GAC, AVX, 12061A330JATRA)	CP1475	6	CR10	DUAL RECTIFIER 100V 16A COMMON CATHODE (*G.I., FEP16BT/CT, D.I., SF162C)	DI1053	1
C52, 53, 66, 67, 97, 98, 34, 35, 33	CAP. CERAMIC 100.00pF \pm 10% 50V X7R T/R 1206 (*KEMET, C1206C101J5GAC, AVX, 12061A101KATRA)	CP1496	9	CR11	DUAL RECTIFIER 100V 16A COMMON ANODE (*G.I., FEN16BT/CT, D.I., SF162A)	DI1054	1
C111, 112, 113 114, 115, 116	CAP. ALUM EL. 1800.00pF \pm 20% 35V V 105°C T/R RADIAL LEAD I RIPPLE MIN=2A, 18x25, BULK (*NICHICON, UPL1V182MRH6, UCC, LXF35VB182M18X25LL)	CP1225	6	CR1, 2, 7, 8, 16, 14, 15, 17, 18, 19, 21, 22	DI, RECTIFIER SWITCH 80V/15mA MELF OR LL-34 PKG. T/R CATHODE ON HOLE SIDE (*SANYO, LFBO1-CT1, ROHM, RLSA148-TE11)	DI1132	12
				CR12, 13	DI ZENER 15V/200mW/5% CP OR SOT-23 PKG. T/R 1-PIN SIDE ON FEED HOLE SIDE (SMD) (*SANYO, DZD15-TB, KEC, Z02W15-RTR)	DI1150	2
				CR20	DI, ZENER 16V/200mW/5% CP or SOT-23 PKG. T/R 1-PIN SIDE ON FEED HOLE SIDE (SMD) (*SANYO, DZD16-TB, KEC, Z02W16-RTR)	DI1167	1

REFERENCE No.	DESCRIPTION	PART NO.	QNTY.	REFERENCE No.	DESCRIPTION	PART NO.	QNTY.
Fuse				R14, R31	RES. F/CHIP 56.00K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-56K-5%, MATSUSHITA, ERJ-8GEYJ563S)	RS1713	5
FS1	FUSE HOLDER RIGHT ANGLE PC MOUNT (FOR AUTO FUSE) (*EMUDEN, H0458)	FH1001	1	R104, 107	RES. F/CHIP 8.20K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-8.2K-5%, MATSUSHITA, ERJ-8GEYJ822S)	RS1713	5
	FUSE AUTO 30A/32V (*LITTELFUSE, 257 030)	FS1059	1	R124, 125, 61, 64, 86, 89	RES. F/CHIP 470.00K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-8.2K-5%, MATSUSHITA, ERJ-8GEYJ822S)	RS1722	6
Intergrated Circuits				R47, 50, 81, 115, 118, 119	RES. F/CHIP 470.00 Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-15K-5%, MATSUSHITA, ERJ-8GEYJ153S)	RS1725	6
IC6, 7	HIGH PERFORMANCE OP-AMP PIN DIP PKG (*SGS, LM318N, T.I., LM318P)	IC1040	2	R12, 29	RES. F/CHIP 27.00K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-27K-5%, MATSUSHITA, ERJ-8GEYJ273S)	RS1726	2
IC1, 3, 4, 5, 8, 9	IC DUAL LOW-NOISE JFET-INPUT OP-AMP 0° to 70°C, SMD SO-8 or DMP-8 PKG. (*T.I., TL072CDR, SGS, TL072CDT)	IC1041	6	R140, 145	RES. F/CHIP 270.00K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-270K-5%, MATSUSHITA, ERJ-8GEYJ274S)	RS1730	2
IC2	IC HIGH PERFORMANCE DUAL LOW-NOISE OP-AMP SMD DMP-8 PKG T/R RIN-1 ON FEED HOLE SIDE (*JRC, NJM5532M-TE3)	IC1175	1	R18, 33	RES. F/CHIP 330.00 Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-330-5%, MATSUSHITA, ERJ-8GEYJ331S)	RS1731	2
Resistors				R149	RES. F/CHIP 1.00M Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-1M-5%, MATSUSHITA, ERJ-8GEYJ105V)	RS1786	1
R129	RES. C/F 470.00 Ω 5% 1/2W T/R (*SEI, CFI/1-470-5%, PIHER, 1/2W/5%/470)	RS1539	1	J1-J128	RES. F/CHIP 0.00 Ω 5% 1/8W T/R 1206 PKG. (*SEI, ZERO OHM JUMPER 120, MATSUSHITA, ERJ-8GEYOR00S)	RS1779	28
R1, 19, 43, 45, 53 54, 60, 85, 117 120, 123, 128, 130, 131, 137, 141, 142, 143, 144, 153	RES. F/CHIP 1.00K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-1K-5%, MATSUSHITA, ERJ-8GEYJ102S)	RS1700	20	R82	RES. F/CHIP 2.70K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-2.7K-5%, MATSUSHITA, ERJ-8GEYJ272V)	RS1790	1
R2, 17, 32, 41, 46 52, 59, 71, 72 80, 84, 96, 97, 106, 109, 116, 121, 136, 138, 146, 150, 152	RES. F/CHIP 10.00K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-10K-5%, MATSUSHITA, ERJ-8GEYJ103S)	RS1701	22	R51, 79, 58	RES. F/CHIP 18.00K Ω 5% 1/8W T/R 1206 (*SEI, RMC1/8-18K-5%, MATSUSHITA, ERJ-8GEYJ183S)	RS1806	3
R114, 135, 69, 70, 94, 42, 95, 139,	RES. F/CHIP 100.00K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8- 100K-5%, MATSUSHITA, ERJ-8GEYJ104S)	RS1702	8	R65, 68, 90, 93	RES. F/CHIP 160.00 Ω 5% 1/8W T/R 1206 (*SEI, RMC1/8-160-5%, MATSUSHITA, ERJ-8GEYJ161S)	RS1829	4
R133, 134, 151, 5, 62, 63, 87, 88, 22	RES. F/CHIP 2.20K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-2.2-5%, MATSUSHITA, ERJ-8GEYJ222S)	RS1703	9	R15, 16	RES. F/CHIP 200.00 Ω 5% 1/8W T/R 1206 (*SEI, RMC1/8-200-5%, MATSUSHITA, ERJ-8GEYJ201S)	RS1830	2
R3, 4, 11, 20, 21, 28, 36, 40, 55	RES. F/CHIP 22.00K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-22K-5%, MATSUSHITA, ERJ-8GEYJ223S)	RS1704	9	R66, 48, 49, 110, 91, 112	RES. F/CHIP 7.50K Ω 5% 1/8W T/R 1206 (*SEI, RMC1/8-7.5K-5%, MATSUSHITA, ERJ-8GEYJ752S)	RS1831	6
R105, 108, 132, 122	RES. F/CHIP 4.70K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-4.7K-5%, MATSUSHITA, ERJ-8GEYJ472S)	RS1705	4	R76, 77, 101, 102	RES. WIRE WO. 0.10 Ω 5% 5.0W RADIAL LS-5mm (*HANDO, RQR5-0.1 Ω -5%, K-TRONICS, VM5-0.1 Ω -5%)	RS1868	4
R13, 30, 44, 111, 113	RES. F/CHIP 47.00K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-47K-5%, MATSUSHITA, ERJ-8GEYJ473S)	RS1706	5	R6, 27	RES. WIRE WO. 15.00 5% 5.0W WELDED CONSTRUCTION, RADIAL LS=0.02 BULK (*HANDO, RQR5-15 Ω -5%, K-TRONICS, VM5-15 Ω -5%)	RS1869	2
R34, 35, 37, 38, 39	RES. F/CHIP 43.00K Ω 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8-43K-5%, MATSUSHITA, ERJ-8GEYJ433S)	RS1712	5	R83	RES. F/CHIP 5.10K Ω 5% 1/8W T/R 1206 (*SEI, RMC1/8-5.1K-5%, MATSUSHITA, ERJ-8GEYJ512S)	RS1871	1

REFERENCE No.	DESCRIPTION	PART NO.	QNTY.	REFERENCE No.	DESCRIPTION	PART NO.	QNTY.
R10, 23, 24, 25, 26 7, 8, 9	RES. F/CHIP 51.00KΩ 5% 1/8W T/R 1206 (*SEI, RMC1/8-51K-5%, MATSUSHITA, ERJ-8GEYJ513S)	RS1872	8	Q1, 2, 15, 29, 45	NPN SWCH 50V/100mA 10K— CP OR SMT T/R 1-PIN SIDE ON FEED HOLE SIDE (SMD) (*SANYO, 2SC3859-TB, ROHM, DTC114TKA-T146)	TR1131	5
R67, 92	RES. F/CHIP 4.30KΩ 5% 1/8W T/R 1206 (*SEI, RMC1/8-4.3K-5%, MATSUSHITA, ERJ-8GEYJ432S)	RS1872	2	Q34, 34A 35, 35A	FET POWER 60V/35A/0.028 OHM TO-220 PKG. (*SGS, STP50N06, MOTOROLA, IRFZ44)	TR1157	4
R103, 78	RES. F/CHIP 10.00Ω 5% 1/8W T/R 1206 (*SEI, RMC1/8-10 OHM-5%, MATSUSHITA, ERJ-8GEYJ100S)	RS1878	2	Q8, 20	PNP SIGN 150V/600mA/ 625mW TO-92 T/R (*MOTOROLA, 2N5401RLRA, NATIONAL, 2N5401RA(TR)	TR1166	2
R154	RES. F/CHIP 220.00KΩ 5% 1/8W T/R 1206 (*SEI, RMC1/8-220K-5%, MATSUSHITA, ERJ-8GEYJ224S)	RS1891	1	Q9, 21	NPN SIGN 160V/60mA/ 625mW TO-92 T/R (*MOTOROLA, 2N5551RLRA, NATIONAL, 2N5551RA(TR)	TR1167	2
RN1, RN2	RES. F/CHIP 4.30KΩ 5% 1/8W T/R 1206 (*BOURNS, 4114-001-333-MARKED)	RS1900	2	Q11, 23	NPN POWER 100V/3A/40W TO-220 (*SGS, TIP31C, SAMSUNG, TIP31C)	TR1183	2
R73, 98	RES. C/F 33.00W 5% 1/4W T/R OR AMOPACK (*SEI, CF1/4-33-5%, PIHER, 1/4 W/ 5% / 33 OHM)	RS1902	2	Q12, 24	PNP POWER 100V/3A/40W TO-220 (*SGS, TIP32C, SAMSUNG, TIP32C)	TR1184	2
R126, 126A, 127 127A	RES. F/CHIP 47.00W 5% 1/8W T/R 1206 (*SEI, RMC1/8-47-5%, MATSUSHITA, ERJ-8GEYJ470S)	RS1903	4	Q27, 28	NPN SIGN 80V/50mA/SOT23/SMT 100 ≤ B ≤ 390 T/R 1-PIN SIDE ON FEED HOLE SIDE (SMD) (*ROHM, 2SC3906K-T146R, ALLEGRO, TMPTA06LT)	TR1209	2
R74, 75, 99, 100	RES. C/F 5.10Ω 5% 1/4W T/R AXIAL or AMMOPACK (*SEI, CF-1/4-5.1 OHM-5%, PIHER, 1/4 W/ 5% / 5.10 OHM)	RS1916	4	Q31, 3	SCR TO 92 PACKAGE T/R (*MOTOROLA, MCR22-2 RLRA, MCR22-2)	TY1000	2
R56, 57, 147, 148	RES. F/CHIP 2.20MW 5% 1/8W T/R 1206 PKG. (*SEI, RMC1/8- 2.20M-5%, MATSUSHITA, ERJ-8GEYJ225S)	RS1968	4	Miscellaneous			
Transistors				CHASSIS GND	GROUND HARNESS ASSY. 2.5"L	UA0007	2
Q33, 37, 38, 5	PNP SIGN 40V/600mA TO-92 T/R GENERAL PURPOSE LS=5.00mm (*MOTOROLA, MPS2907ARLRA, NATIONAL, PN2907ARA)	TR1010	4	BB1	BUS BAR (*CLEMENS, BR1270)	BR1270	1
Q13, 25	TRANSISTOR NPN, 100V, 25A, HFE MIN=10 (15A,4V), TO-218 PKG POWER TRANSISTOR (*SGS, TIP35C, MOSPEC, TIP35C)	TR1057	2	FB1, 1A, 2A, 3, 4 5, 8, 9, 2	FERRITE BEAD (*FAIR-RITE, 2673000101)	CC1028	9
Q14, 26	TRANSISTOR PNP 100V, 25A, HFE MIN=10 (15 A 4V), TO-218 PKG. POWER TRANSISTOR (*SGS, TIP36C, MOSPEC, TIP36C)	TR1061	2	FB6, FB7	FERRITE BEAD ASSEMBLY (*HCM, UA0160 01)	UA0160	2
Q10, 22, 32, 36, 39	NPN SIGN 40V/600mA TO-92 T/R 1W (*MOTOROLA, MPS2222ARLRA, NATIONAL, PN2222ARA)	TR1063	5	HD1, 2, 3, 4	PIN HEADER STRAIGHT 2-POSITION 0.100" SPACING (*MOLEX, 22-58-15-2, or 22-58-4020)	C01258	4
Q6, 18, 40, 16, 42 43, 44	NPN AF 30V/ 150mA CP OR SMT 200 ≤ B ≤ 400 T/R 2-PIN SIDE ON FEED HOLE SIDE (*SANYO, 2SC4639-6-TA, ROHM, 2SC2412K-T147Q/R)	TR1108	7	HD2, 4	CONNECTOR JUMPER 0.1" 2-POS. (*MOLEX, 15-38-1024)	C01285	2
Q7, 19, 30, 41, 4 17	PNP AF 30V/150mA CP OR SOT-23 OR SMT 200 ≤ B ≤ 400 2-PIN SIDE ON FEED HOLE SIDE (SMD) (*SANYO, 2SA1781-6-TA, PHILIPS, BC858B)	TR1125	6	JK1	CONNECTOR RCA JACK 4 POSITON PC MOUNT GOLD PLATED RED-TOP WHITE-BOTTOM, 34mm WIDTH (*DAE-RYUNG, JA0400721G)	C01274	1
				JK2	5569-N RIGHT ANGLE HEADER WITH MTG. PEGS. 94V-2, 4 CIRCUITS (*MOLEX, 39-30-1040)	C01075	1
				L1, L2	INDUCTOR AIR CORE 0.38uH ASSY. (*HCM, UA0087 00)	UA0087	2
				L3	COMMON MODE INDUCTOR FOR GTS180, GTS300, GTS600 & GTH400 (*HCM, UA0089 03)	UA0089	1
				LED1	STRAIGHT HEADER, NYLON 6/6 UL 94V-0, TIN PLATED BRASS PINS 2 CIRCUITS (*MOLEX, 53253-0210)	CO1304	1

REFERENCE No.	DESCRIPTION	PART NO.	QNTY.
LED HARNESS	LED HARNESS ASSEMBLY LENGTH: 5.5" AWG #26 (*HCM, UA0214 00)	UA0214	1
RN1, RN2	CONNECTOR IC SOCKET 14-PIN (*ASSMAN, AR14-HZL)	C01277	2
SW4	NON SHORTING HORZ. MICRO-SLIDE SWITCH, 2P2T, 3.5mm MTG. HEIGHT, 2.5mm TERMINAL LENGTH (*PANASONIC, ESD11H220)	SW1011	1
SW1, 2, 3	NON SHORTING HORZ. MICRO-SLIDE SWITCH, 2P3T, 3.5mm MTG. HEIGHT, 2.5mm TERMINAL LENGTH (*PANASONIC, ESD11H230)	SW1013	1
T1	POWER TRANSFORMER (*HCM, UA0162 00)	UA0162	1
TH1	NTC THERMISTOR 10K Ω @ 25°C RADIAL (*FENWAL, 142-103LAG-RB1)	TH1006	1
VR1	RES. POT. 100.00K Ω DUAL GANG DETENT AT CENTER-15K, A TAPER SHAFT LENGTH=8mm DIA.=3mm SLOT STYLE, BUSHING=6mm; WITHOUT TAP (*ALPS, K09220, TOCOS, TP96G01, 85A104X2)	RS1227	1

* Manufacturer and Manufacturer's Part Number

PWM MODULE (MA0007)

REFERENCE DESIGNATOR	DESCRIPTION	PART NUMBER	QNTY.
Capacitors			
C1	CAP. CERAMIC 2700.00 pF \pm 10% 100V X7R T/R 1206 PKG.	CP1434	1
C2, 3, 4	CAP. CERAMIC 0.10 μ F \pm 20% 50V Z5U T/R 1206 PKG.	CP1426	3
C19	CAP. ALUM EL. 22 μ F \pm 20% 10V 85°C A/P RADIAL LEAD 5 X 11 T/R LS=2.0mm, F=2.5mm	CP1565	1
Integrated Circuits			
IC1	PWN CONTROL MODULE 16 PIN DIP	IC1002	1
Resistors			
R1	RES. F/CHIP 10.00 Ω 5% 1/8W T/R 1206	RS1878	1
R2	RES. F/CHIP 1.00 K Ω 5% 1/8W T/R 1206 PKG.	RS1700	1

REFERENCE No.	DESCRIPTION	PART NO.	QNTY.
R3	RES. F/CHIP 510.00 Ω 5% 1/8W T/R 1206 PKG.	RS1733	1
R4	RES. F/CHIP 6.80 K Ω 5% 1/8W T/R 1206 PKG.	RS1724	1
R5	RES. F/CHIP 100.00 K Ω 5% 1/8W T/R 1206 PKG.	RS1702	1
R6	RES. F/CHIP 4.70 K Ω 5% 1/8W T/R 1206 PKG.	RS1705	1
R7	RES. F/CHIP 12.00 K Ω 5% 1/8W 1206 T/R	RS1783	1
R8	RES. F/CHIP 2.20 K Ω 5% 1/8W T/R 1206 PKG.	RS1703	1
R9, 11	RES. F/CHIP 10.00 K Ω 5% 1/8W T/R 1206 PKG.	RS1701	2
R10	RES. F/CHIP 680.00 Ω 5% 1/8W T/R 1206 PKG.	RS1709	1
R12, 13	RES. F/CHIP 27.00 Ω 5% 1/8W T/R 1206	RS1826	2
R14	RES. F/CHIP 220.00 Ω 5% 1/8W T/R 1206 PKG.	RS1711	1
R15	RES. F/CHIP 4.30 K Ω 5% 1/8W T/R 1206	RS1877	1
J1	RES. F/CHIP 0 Ω 5% 1/8W 1206 T/R	RS1779	1

Transistors

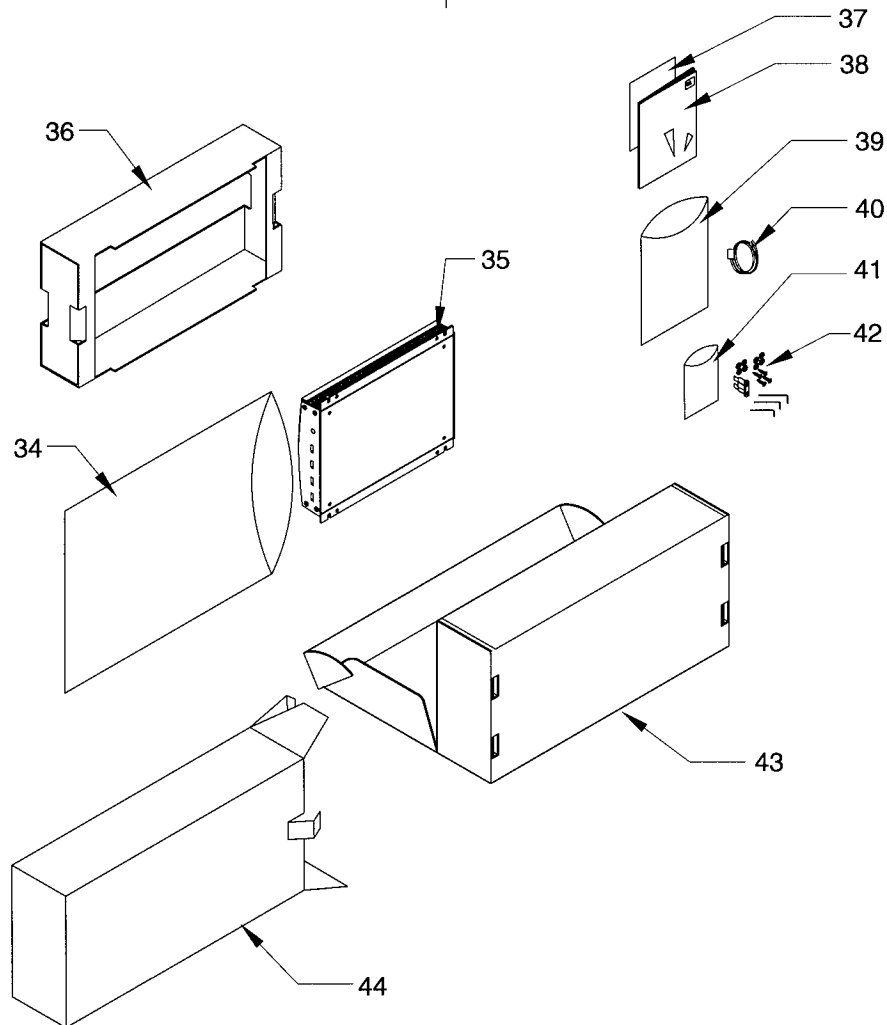
Q1	PNP SIGN 40V/600mA TO-92 T/R GENERAL PURPOSE LS=5.0mm	TR1010	1
Q2	NPN SIGN 40V/600mA TO-92 T/R 1W	TR1063	1

Miscellaneous

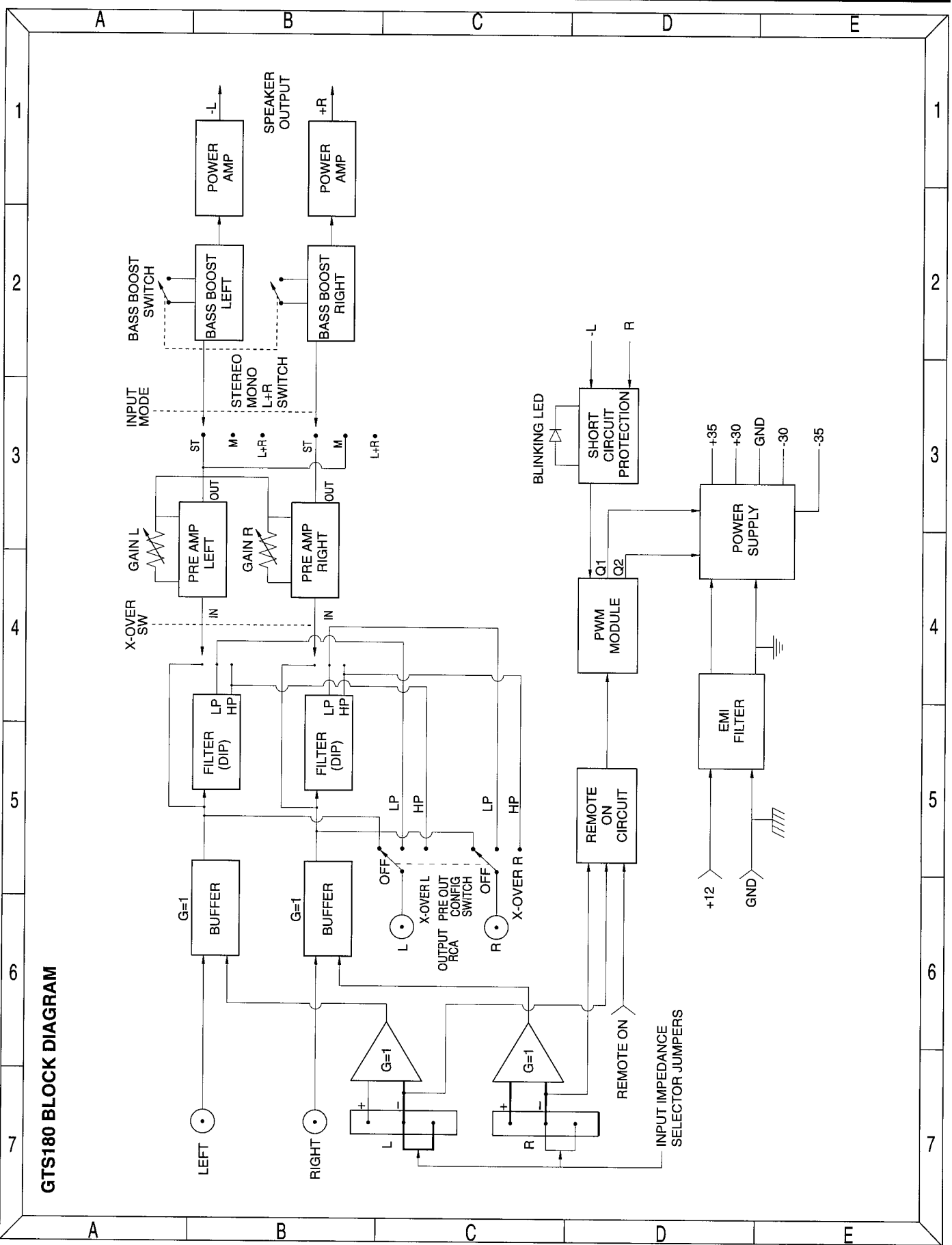
P1	CONNECTOR SINGLE ROW HEADER RIGHT ANGLE 5-PIN 0.1" CENTERS TIN PLATED OR BETTER.	CO1249	1
P2, 3, 4	CONNECTOR SINGLE ROW HEADER RIGHT ANGLE 2-PIN 0.1" CENTERS TIN PLATED OR BETTER	CO1267	3
	BLANK PC BOARD FOR PWM MODULE 1.4576 SQ.IN. CEM-1 1-SIDED	PC1080	1
J3	WIRE #22 BARE SOLID TIN ELECTROLYTIC, SOFT DRAWN AND TIN-PLATED COPPER.	WI1553	0.042 FT

GTS180 Package Parts List

REF. No.	DESCRIPTION	PART NO.	QNTY.			
34	PLASTIC BAG 14" x 20"x 0.0015"	PM1224	1	42	1/16 SHORT ARM HEX KEY FOR #6 SET SCREW	XX1240 1
35	GTS180 UNIT	A00003	1	42	.050 SHORT ARM HEX KEY FOR #4 SET SCREW	XX1241 1
36	INTERNAL FILLER FOR JBL GTS180	PM1206	1	42	5/64 SHORT ARM HEX KEY FOR #8 SET SCREW	XX1242 1
37	WARRANTY SHEET/CONSUMER SURVEY	SH1005	1	43	CARTON BOX FOR JBL GTS180 AND AMPLIFIER UNIT	PM1209 1
38	OWNER'S MANUAL FOR GTS180	SH1073	1	44	BEAUTY BOX FOR JBL GTS180	PM1288 1
39	PLASTIC BAG 9"LX12"WX0.0015"T WITH RECYCLABLE LOGO, BAG FOR OWNERS MANUAL	PM1029	1			
40	SPEAKER HARNESS 4POSITIONS DUAL ROW, AWG #18 (16X30) LENGTH 1.0FT	UA0143	1		Not shown in exploded view	
41	PLASTIC BAG FOR ACCESSORIES 4"L X 4"W X 0.0015"T WITH RECYCLABLE LOGO	PM1221	2		SERIAL NUMBER BAR CODE LABEL FOR GT SERIES AMPLIFIERS,	LB1223 3
42	FUSE AUTO 30A/32V	FS1059	1		LABEL MODEL NUMBER FOR GTS180	LB1226 1
42	WASHER HELICAL SPRING LOCK #8 NICKEL FINISH	WA1075 WA1074	4		CE LABEL, 3/4 X 1/2" PAPER WITH ADHESIVE	LB1250 1
42	SC #8 x 7/8 THREAD FORMING MOUNTING SCREWS	SC1208	4		3/4" ROUND, WHITE, PAPER BOND MATERIAL WITH ADHESIVE	LB1255 1
42	0.375 OD x 0.180 OD x 0.060 Tk PLAIN WASHER, NYLON 66, FLAME RETARDANT	WA1077	4		DECLARATION OF CONFORMITY GTS180	SH1080 1

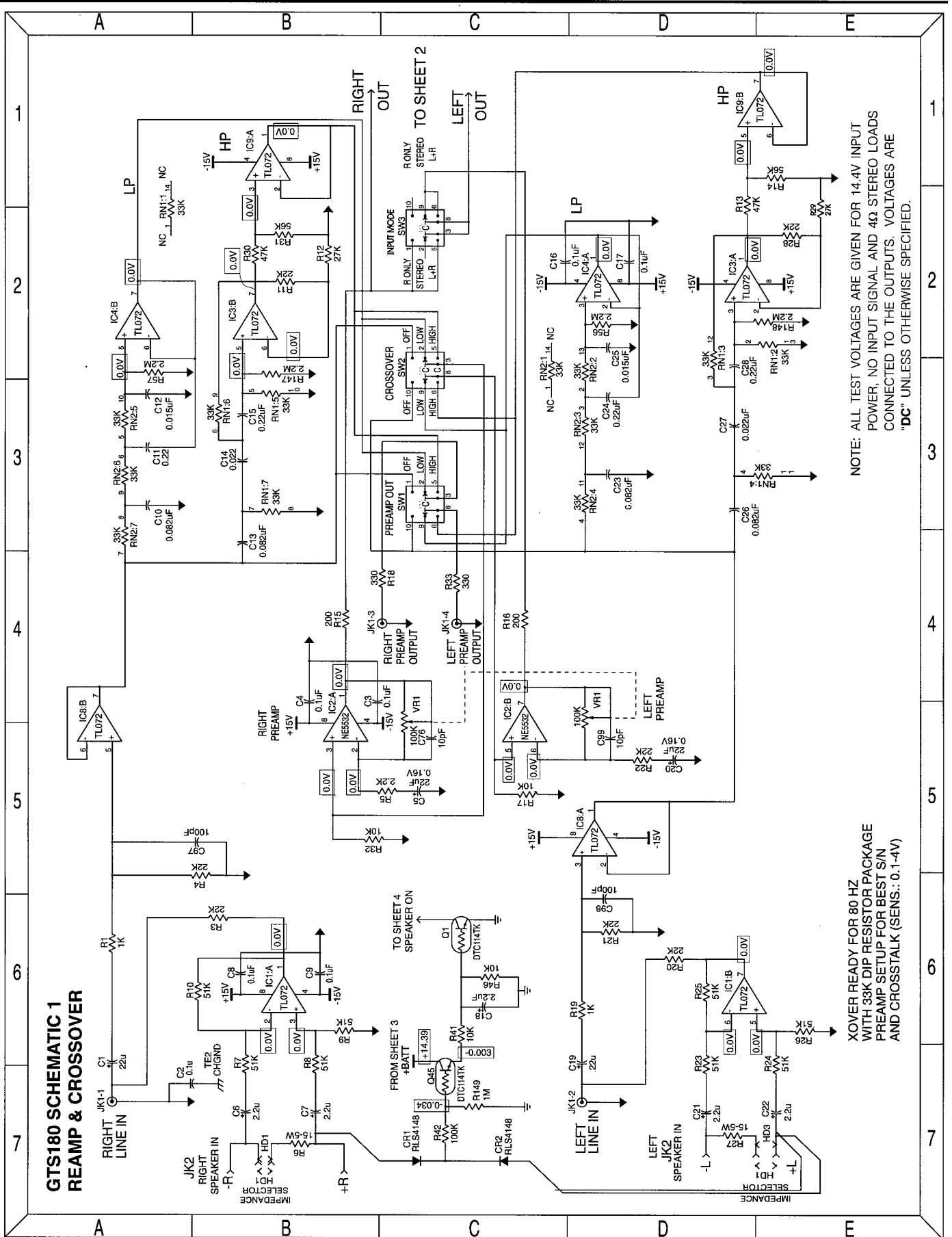


GTS180 Block Diagram



GTS180 BLOCK DIAGRAM

GTS180 Schematic Diagram 1

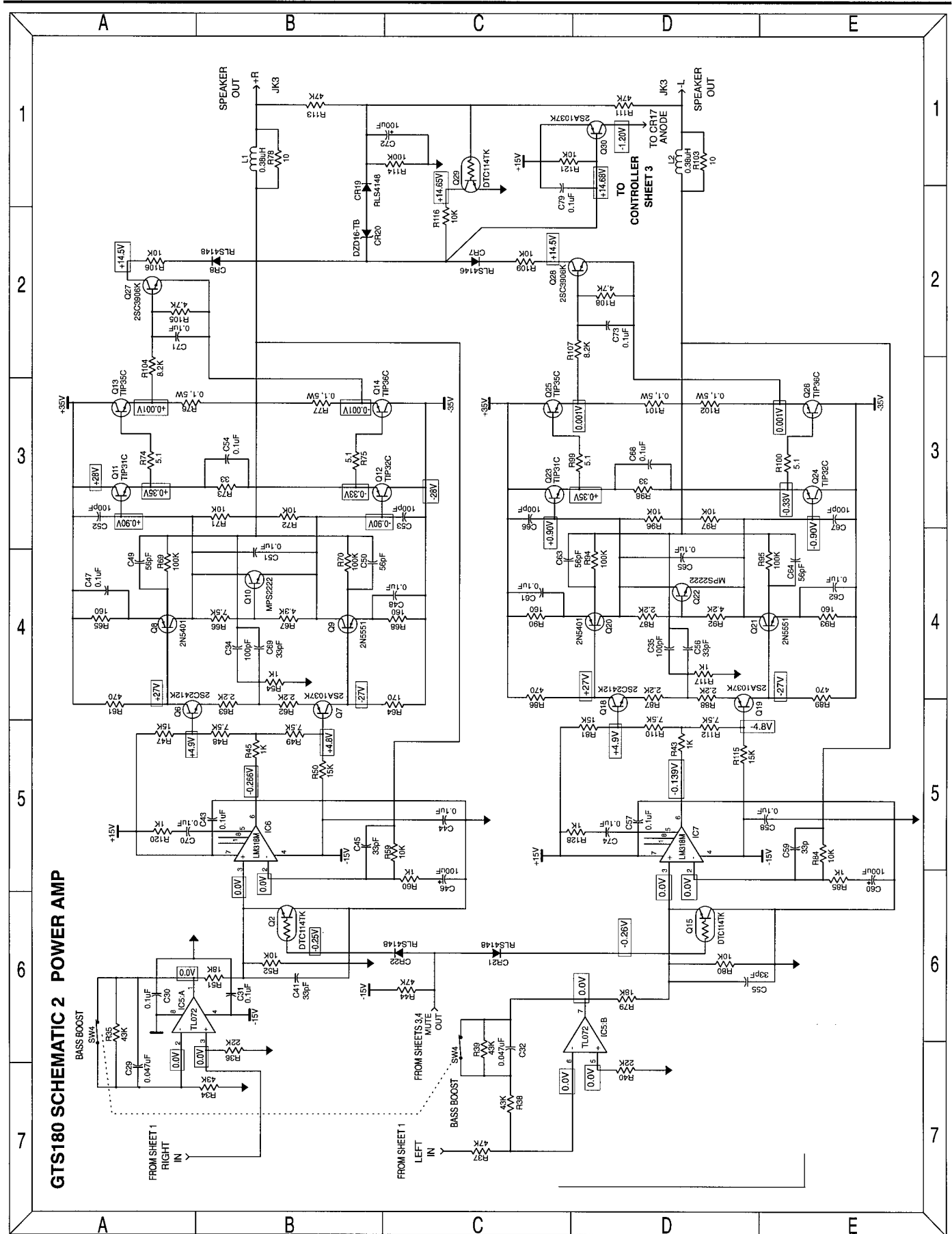


**GTS180 SCHEMATIC 1
REAMP & CROSSOVER**

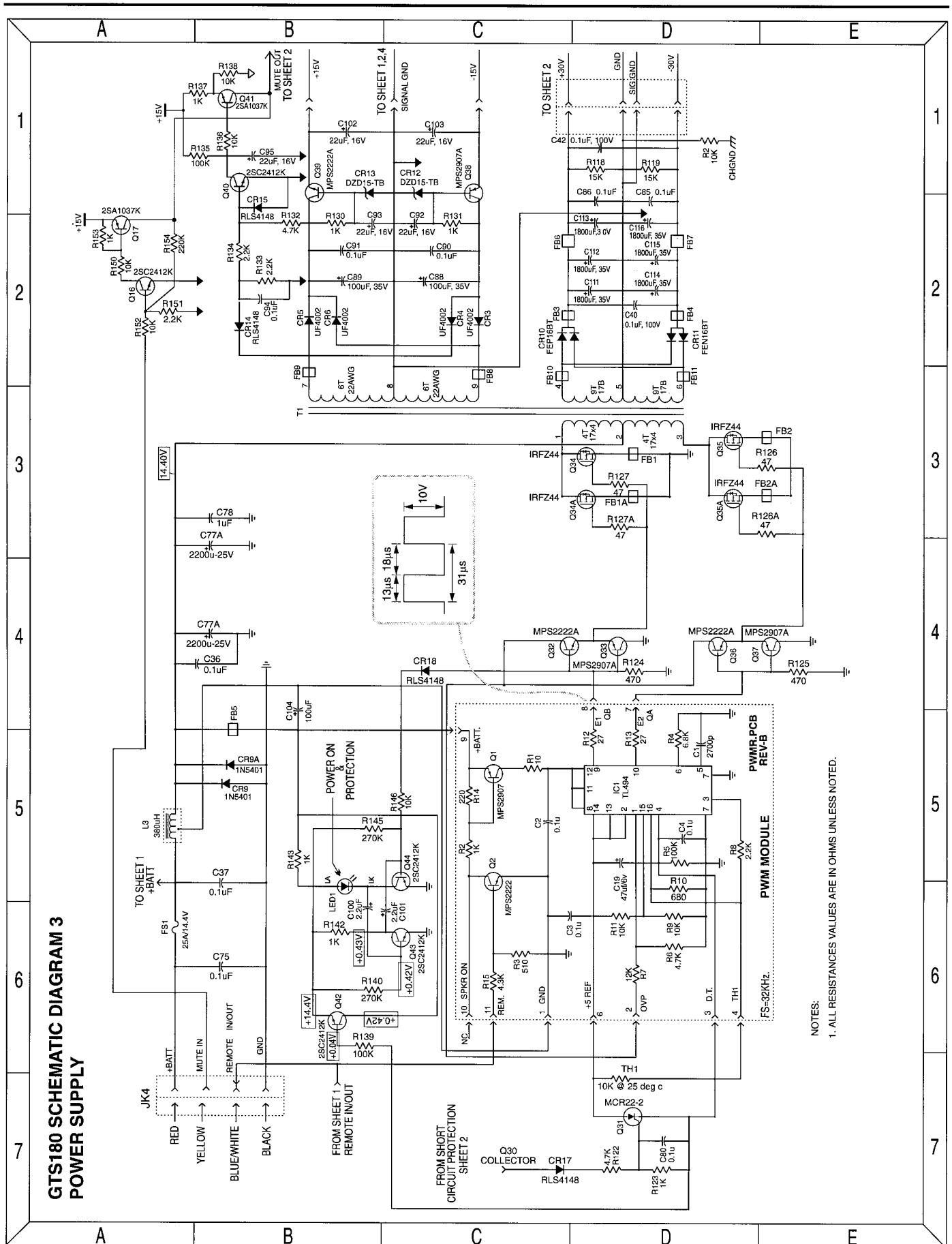
NOTE: ALL TEST VOLTAGES ARE GIVEN FOR 14.4V INPUT POWER, NO INPUT SIGNAL AND 4Ω STEREO LOADS CONNECTED TO THE OUTPUTS. VOLTAGES ARE "DC" UNLESS OTHERWISE SPECIFIED.

COVER READY FOR 80 HZ WITH 33K DIP RESISTOR PACKAGE PREAMP SETUP FOR BEST S/N AND CROSSTALK (SENS.: 0.1-4V)

GTS180 Power Amplifier Schematic Diagram 2



GTS180 Power Supply Schematic Diagram 3



**GTS180 SCHEMATIC DIAGRAM 3
POWER SUPPLY**

NOTES:
1. ALL RESISTANCE VALUES ARE IN OHMS UNLESS NOTED.

GTS180 Schematic Diagram 4

