

CIRCUIT DESCRIPTION

GUITAR AMPLIFIER MODEL 316A

The input stage utilizes a moderate g_m , low noise JFET in a common source configuration. The gain is set by the ratio of the drain to source load resistors. The source is switched at the input jack to change gain for the LO input. The HI input gain is $9.2X$ (19.3dB) \pm 1.2dB; the LO input gain is $32.4X$ (30.5dB) \pm 3.2dB set by the addition of R12 and C1. Diodes CR1 and CR2 clamp the gate of Q1 between ground and -18VDC to eliminate blow-out from large input signals. C3 provides RFI protection. Resistors R2 and R5 isolate the HI and LO inputs. With only one input used, the input impedance is set by R4 and R6 at 2.35 megohms.

Bias for Q1 is provided by the integrator A1B. Resistors R16 and R17 form a 7.5 volt reference; this is compared with the drain voltage of Q1. Feedback through R14 to the source of Q1 maintains the collector voltage within 250mV of the reference. The combination of R14 and C4 filters residual noise appearing at the output of A1B.

The MIDRANGE consisting of capacitors C8 and C9, potentiometer R10 and resistors R18 and R19 is a bridged-T network with a variable notch depth. The range of R10 allows a cut of 6 to 20dB at 600Hz.

The BASS and TREBLE control circuitry consists of Q4 and Q5 (part of IC1) and associated circuitry. Q4 is a source follower to provide a suitably low drive impedance for the tone controls. Nominal boost-cut at 100Hz and 5kHz is 12dB, with minimum effect and 0dB gain at 600Hz. Q5 drives the input volume control.

Integrated circuit A2B biases Q5. The drain voltage is compared with a reference and the gate voltage is adjusted through R21 to attain a drain voltage within 250mV of the reference R30 and R31. R29 and C14 are needed to prevent audio signals from appearing at the output of A2B.

Transistor Q6 provides reverb recovery gain of approximately 19dB at 1kHz; the source impedance of the pan is 10k ohms at 1kHz. Roll-off below 150Hz is provided by C18 and R27. This stage drives the reverb volume control.

Q2, Q3, Q7 and Q8 form the reverb driver. Q7 and Q8 are the direct coupled amplifier with a nominal wideband gain of 38dB. Emitter follower Q2 drives the reverb driver via C23; current source Q3 sets a quiescent current of 78mA through Q2 and provides adequate negative voltage swing to the pan. Inherently, the reverb driver is a voltage source. To achieve flat response from the reverb pan, since it is an inductive load (140 ohms at 1kHz), the drive coil must be driven from a current source. Current drive is approximated by setting the roll-off of C20 and R41 at 1.5kHz.

The reverb and input volume controls feed the mixer-distortion amplifier Q9, which is biased by R35 so that 5 VDC appears across it. This maximizes the gain concurrently with lowering headroom, producing a defined distortion threshold. Furthermore, the gain is somewhat more predictable with device variations than if the transistor were biased with a voltage source. The drains of Q9 are maintained at approximately half of the 5 VDC by feedback resistor R45.

The Signal Processor is supplied with well regulated -19.3 volts; the ripple is less than 5mV peak-to-peak. The -19.3 volt supply is derived from the power amplifier raw supply and is used for the reverb driver current source Q3 for the LED and for the Q1 auto-bias circuitry. Additionally, the -15 volt supply for the 4007 packages is derived from this supply by the voltage follower, A1A. Total current drain is 7.7mA from the -15 volt supply and 105mA from the -19 volt supply.

The power amplifier operates from a split supply of \pm 36.5 volts with no load; \pm 28.5V, 60 watts. A full wave bridge with 2200uf capacitors supplies this voltage.

The power amplifier is a tried and true differential input quasi-complimentary output design. The input transistors Q1 and Q2 operate at a current of 2mA. Input impedance is 33k set by R1 and the low frequency -3dB point is 50Hz, set by R1 and C1. Q1 drives the voltage gain stage, Q4, which operates at 12mA. Diodes CR1 and CR2 limit the maximum current in Q4 to 40mA during short circuit conditions.

The upper half of the output stage, Q7 and Q8, is a Darlington follower; the lower half, Q5 and Q6, is a PNP-NPN compound. Idle current is set by R9 which trims voltage source Q9 which is mounted to the heat sink to provide thermal tracking for the idle current.

Positive drive for the output stage is provided via Q4 load resistors. Capacitor C5, connected to resistors R11 and R10, tends to maintain a constant voltage across R10, thus a constant current through it.

Feedback from the output stage is applied to Q2 through R6; R6 and R5 set the gain of the power amplifier at 33.9dB. The low frequency roll-off is 5Hz set by C3 and R5. The large ratio of input to the feedback roll-off provides stable performance with highly unsymmetrical signals.

DISASSEMBLY INSTRUCTIONS

A. CHASSIS REMOVAL

1. Remove the upper rear panel by removing the four (4) Phillip head screws.
2. Remove the retaining screw that secures the power cord in place.
3. Remove the four (4) hexagon head screws from the underside of the cleats on which chassis rests. Remove chassis from the rear of the L3.

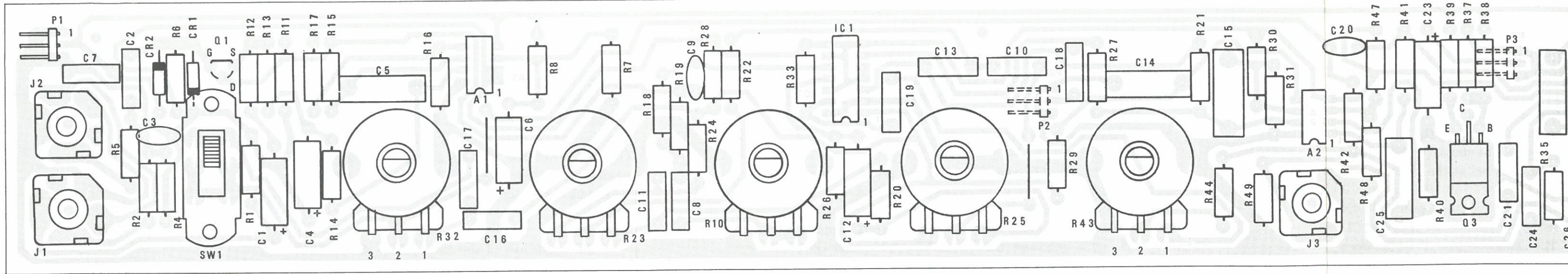
B. SPEAKER REMOVAL

1. Remove the four (4) nuts holding the speaker in place and disengage the speaker from its mount.

LABSERIE

L3 AMPLIFIER C
AND DISASSEMBLY

MODEL 316A



SIGNAL PROCESSING PRINTED CIRCUIT BOARD ASSEMBLY (996-042588-001)

AMPLIFIER FINAL ASSEMBLY (997-042754-001)
REPLACEMENT PARTS LIST

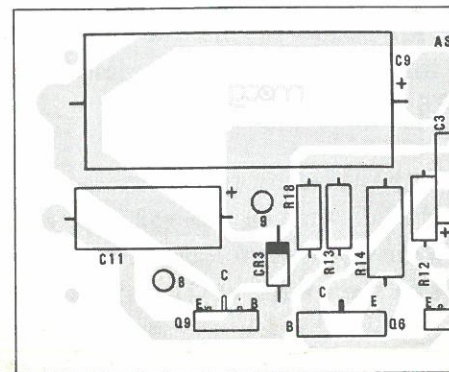
REF DESIG	PART NUMBER	DESCRIPTION	QTY
	996-042592-001	Printed Circuit Board Assembly, Power Amplifier	1
	996-042588-001	Printed Circuit Board Assembly, Signal Processor	1
F1	939-041320-003	Fuse, 2 Amp, Fast Blow	1
SW2	960-042753-001	Switch, Power, SPST	1
T1	954-042746-001	Transformer, Power	1
	802-045332-000	Nut, Keps, 6-32	1
	802-055442-000	Nut, Keps, 8-32	16
	806-045039-007	Screw, Machine, 6-32 x 7/16 in.	1
	806-055039-006	Screw, Machine, Blk, Pan Hd., 8-32 x 3/8 in.	1
	806-065039-008	Screw, Machine, Blk, Pan Hd., 10-32 x 1/2 in.	6
	806-065231-012	Screw, Machine, Flat Hd., N.P., 10-32 x 3/4 in.	2
	811-040239-016	Screw, Self Tapping, Blk, Flat Hd., No. 6 x 1 in.	8
	811-050532-012	Screw, Self Tapping, Oval Hd., Cad Pl., No. 8 x 3/4 in.	12
	816-040239-006	Screw, Self Tapping, Blk, Flat Hd., No. 6 x 3/8 in.	1
	902-040499-003	Nut, Tee, 10-32 x 1/2 in., OD	2
	902-040500-001	Nut, Tinnerman, No. 6 Type U	1
	902-040504-007	Nut, Hex., 3/8-32 NEF	4
	902-040591-001	Nut, Speed, Push-On	2
	902-041443-014	Nut, Clinch, Locking, 10-32	4
	903-042674-001	Screw, "Taprite", 4-40 x 1/4 in.	1
	903-042674-009	Screw, "Taprite", 6-32 x 3/8 in.	4
	903-042771-001	Screw, Pilot Point, 10-32 x 1/2 in.	4
	904-040495-016	Washer, Lock, Internal, No. 6	4
	904-040495-018	Washer, Lock, Internal, No. 10	6
	904-040495-021	Washer, Lock, Internal, 3/8 in.	4
	904-040598-015	Washer, Finishing, Blk, No. 6	8
	904-041390-009	Washer, Flat, No. 8 x 1/2 in. OD	11
	904-041391-010	Washer, Flat, Cad Plate, No. 10 x 3/4 in. OD	4
	904-041503-009	Washer, Flat, 3/8 in. ID	4
	906-040298-003	Housing, Terminal, CIS, 3 position	4
	906-041331-006	Fuse Block, Single	1
	910-040308-001	Contact, CIS	9
	910-041737-001	Lug, Spade, 250 Fast On	1
	910-041738-001	Terminal, 250 Fast On	6
	911-040189-001	Terminal Lug, Locking	1
	911-041986-001	Terminal, 205 Fast On	2
	913-042088-008	Label, Caution, 2 AMP	1
	913-042258-001	Logo, Lab Series	1
	914-042752-001	Damper, Foam, Neoprene	1
	916-042329-001	Bumper, Recessed	4
	930-042747-001	Handle Assembly, 7-1/2 in. Blk Vinyl	1
	935-042750-001	Reverb Pan	1
	957-041789-001	Power Cord, SVT, 18-3, 8 Pt.	1
	961-040681-002	Corner, 2 Arm, 1/2 in.	4
	961-042328-001	Glide, Metal	4
	964-040678-002	Guide, Printed Circuit Board	1
	969-042744-001	Washer, Lock, Internal, No. 10	6
	970-042637-001	Chassis, L3	1
	973-042748-001	Standoff, PCB 3/4 in., Richco TCBS, 12R	4
	976-040793-001	Cable Tie, Small	3
	976-041516-003	Strain Relief, Power Cord, Richco R5	1
	976-042040-001	Tab, Mounting	2
	976-042751-001	Bushing, Snap, 3/8 in ID, Blk Nylon	1
	978-042677-001	Cabinet Assembly	1
	985-042739-001	Speaker, 12 in. Diameter, 4 Ohm	1
	997-041304-001	Knob Assembly, Lab Series	6

SIGNAL PROCESSOR PRINTED CIRCUIT BOARD ASSEMBLY (996-042588-001)
REPLACEMENT PARTS LIST

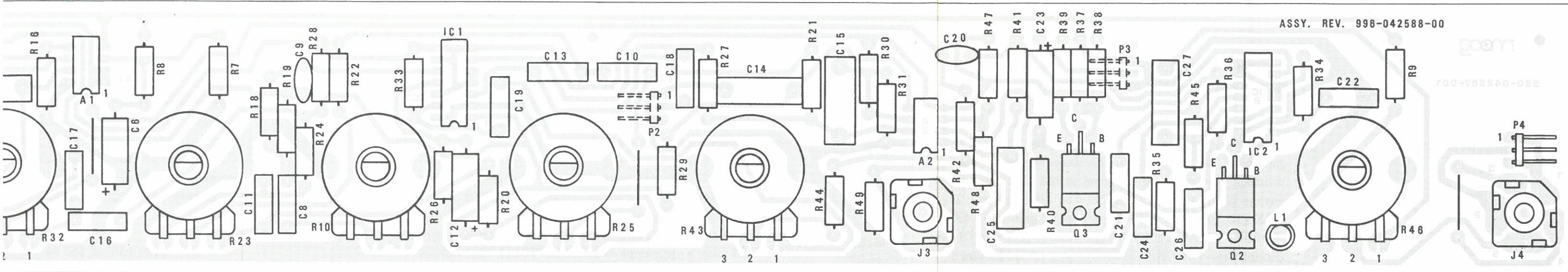
REF DESIG	PART NUMBER	DESCRIPTION	QTY
A1,A2	991-041084-001	Integrated Circuit, Dual Operational Amplifier, LM358N	2
C1,C4,C6,			
C12,C23	945-040209-015	Capacitor, Alum., Elect., 10 uf, 16V	5
C2,C13	946-041978-102	Capacitor, Polyester, 0.001 uf	2
C3	947-042020-101	Capacitor, Disc, 100 Pf	1
C5,C14,C15,			
C25,C27	946-041978-474	Capacitor, Polyester, 0.47 uf	5
C7,C16,			
C24	946-041978-104	Capacitor, Polyester, 0.1 uf	3
C8,C11	946-041978-223	Capacitor, Polyester, 0.022 uf	2
C9	947-042020-501	Capacitor, Disc, 500 Pf	1
C10	946-041978-152	Capacitor, Polyester, 0.0015 uf	1
C17	946-041978-472	Capacitor, Polyester, 0.0047 uf	1
C18,C22	946-041978-103	Capacitor, Polyester, 0.01 uf	2
C19	946-041978-333	Capacitor, Polyester, 0.033 uf	1
C20	947-042020-681	Capacitor, Disc, 680 Pf	1
C21	946-041978-153	Capacitor, Polyester, 0.015 uf	1
C26	946-041978-274	Capacitor, Polyester, 0.27 uf	1
CR1,CR2	919-041075-001	Diode, 1N4148, Alternate 1N914	2
IC1,IC2	991-041086-001	Integrated Circuit, CD4007AE	2
J1,J2,J4	910-041306-009	Jack, Phone, Double Closed, Switchcraft 114B	3
J3	910-041306-001	Jack, Phone, Open Circuit, Switchcraft 111	1
L1	939-041850-001	LED, Red, OPCA LSM-6L	1
P1 thru P4	910-042392-003	Header, Right Angle, 3 Pin, (0.100 centers), AMP640099-3	4
Q1	991-042659-001	Transistor, FET, PFS102	1
Q2,Q3	991-041049-005	Transistor, NPN, Power, TIP29, Lead Form	2
R1,R2,R5,R22	852-412473-001	Resistor, 47K Ohm, ± 5%, 1/4W	4
R4,R6,R21,R45	852-312475-001	Resistor, 4.7 Megohm, ± 5%, 1/4W	4
R7,R27,R36			
R42,R49	852-312104-001	Resistor, 100K Ohm, ± 5%, 1/4W	5
R8	852-312223-001	Resistor, 22K Ohm, ± 5%, 1/4W	1
R9	852-512152-001	Resistor, 1.5K Ohm, ± 5%, 1/2W	1
R10	925-041426-006	Resistor, Rotary, 50K Ohm, Log 10%	1
R11	852-312333-001	Resistor, 33K Ohm, ± 5%, 1/4W	1
R12	852-412471-001	Resistor, 470 Ohm, ± 5%, 1/4W	1
R13	852-312242-001	Resistor, 2.4K Ohm, ± 5%, 1/4W	1
R14	852-312102-001	Resistor, 1K Ohm, ± 5%, 1/4W	1
R15,R29,R40	852-312474-001	Resistor, 470K Ohm, ± 5%, 1/4W	3
R16,R17,R30,			
R31,R47,R48	852-312105-001	Resistor, 1 Megohm, ± 5%, 1/4W	6
R18,R19	852-312823-001	Resistor, 82K Ohm, ± 5%, 1/4W	2
R20,R28,			
R33,R34	852-312103-001	Resistor, 10K Ohm, ± 5%, 1/4W	4
R23,R25	925-041426-007	Resistor, Rotary, Linear, 100K Ohm	2
R24,R35	852-312223-001	Resistor, 22K Ohm, ± 5%, 1/4W	2
R26	852-312472-001	Resistor, 4.7K Ohm, ± 5%, 1/4W	1
R32,R43,R46	925-041426-002	Resistor, 25K Ohm, Rotary Log 10%	3
R37	852-312751-001	Resistor, 750 Ohm, ± 5%, 1/4W	1
R38,R41	852-312151-001	Resistor, 150 Ohm, ± 5%, 1/4W	2
R39	852-312390-001	Resistor, 39 Ohm, ± 5%, 1/4W	1
R44	852-312394-001	Resistor, 390K Ohm, ± 5%, 1/4W	1
SW1	960-041257-001	Switch, Slide, DPDT, UID	1
	816-040039-006	Screw, Self Tapping, No. 6B x 3/8 in.	2
	902-042525-001	Nut, Speed, No. 6, Type W	2
	980-042587-001	Printed Circuit Board	1

POWER SUPPLY AND POWER AMPLIFIER MODULE PRINTED CIRCUIT BOARD ASSEMBLY (996-042592-001)
REPLACEMENT PARTS LIST

REF DESIG	PART NUMBER	DESCRIPTION	QTY
C1,C6,C8	946-041978-104	Capacitor, Polyester, 0.1 uf	3
C2	946-041978-224	Capacitor, Polyester, 0.22 uf	1
C3	945-040209-041	Capacitor, Alum., Elect., 47 uf, 10V	1
C4	945-040209-036	Capacitor, Alum., Elect., 10 uf, 35V	1
C5	945-040209-017	Capacitor, Alum., Elect., 47 uf, 16V	1
C7	947-042020-101	Capacitor, Disc, 100 Pf	1
C9,C10	945-042760-001	Capacitor, Alum., Elect., 2200 uf, 40V	2
C11	945-040209-009	Capacitor, Alum., Elect., 100 uf, 25V	1
CR1,CR2	919-041075-001	Diode, 1N4148, Alternate 1N914	2
CR3	919-041277-001	Diode, Zener, 1N5250B	1
CR4,CR5,			
CR6,CR7	919-041157-001	Diode, Rectifier, MR502, Alternate GEA15B	4
Q1,Q2	991-042758-001	Transistor, NPN, MPS8598	2
Q3	991-041271-002	Transistor, NPN, With Clip, 2N3403, Lead Form	1
Q4,Q7	991-041049-006	Transistor, NPN, Power, TIP29B, Lead Form	2
Q5	991-041050-006	Transistor, PNP, Power, TIP30B, Lead Form	1
Q6,Q8	992-042759-001	Transistor, NPN, Power, TO3	2
Q9	991-041050-005	Transistor, PNP, Power, TIP30, Lead Form	1
R1	852-312333-001	Resistor, 33K Ohm, ± 5%, 1/4W	1
R2	852-312182-001	Resistor, 1.8K Ohm, ± 5%, 1/4W	1
R3	852-312153-001	Resistor, 15K Ohm, ± 5%, 1/4W	1
R4	852-312302-001	Resistor, 3K Ohm, ± 5%, 1/4W	1
R5	852-312681-001	Resistor, 680 Ohm, ± 5%, 1/4W	1
R6	852-312333-001	Resistor, 33K Ohm, ± 5%, 1/4W	1
R7	852-312471-001	Resistor, 470 Ohm, ± 5%, 1/4W	1
R8	852-312122-001	Resistor, 1.2K Ohm, ± 5%, 1/4W	1
R9	925-040275-011	Resistor, 470 Ohm, Trim Pot	1
R10	852-312102-001	Resistor, 1K Ohm, ± 5%, 1/4W	1
R11	852-512202-001	Resistor, 2K Ohm, ± 5%, 1/2W	1
R12,R13,R15	852-512150-001	Resistor, 15 Ohm, ± 5%, 1/2W	3
R14,R16	924-041258-008	Resistor, 0.22 Ohm, ± 5%, F.P., 2 W	2
R17	852-512100-001	Resistor, 10 Ohm, ± 5%, 1/2W	1
R18	852-512472-001	Resistor, 4.7K Ohm, ± 5%, 1/2W	1
	811-040036-010	Screw, Self Tapping, Type A, No. 6 x 5/8 in.	4
	902-040199-012	Nut, Self Clenching, 10-32	6
	903-042674-001	Screw, "Taprite", 4-40 x 1/4 in.	7
	904-042729-001	Washer, Insulated Shoulder	4
	905-042027-004	Rivet, Tubular, 1/8 in. Dia. by 3/16 in. lg.	2
	906-041256-001	Socket, Transistor TO3	2
	908-041332-001	Insulator, Mica TO3	2
	908-042730-001	Insulator, Mica Tip Trans.	4
	911-042030-006	Terminal Pin Tube	9
	934-041437-001	Heat Sink Compound	AR
	967-042745-001	Bracket, Angle	2
	968-042743-001	Coupler, Heat Sink	1
	980-042591-001	Printed Circuit Board	1



POWER SUPPLY AND POWER AMPLIFIER MODULE PRINTED CIRCUIT BOARD ASSEMBLY (996-042592-001)



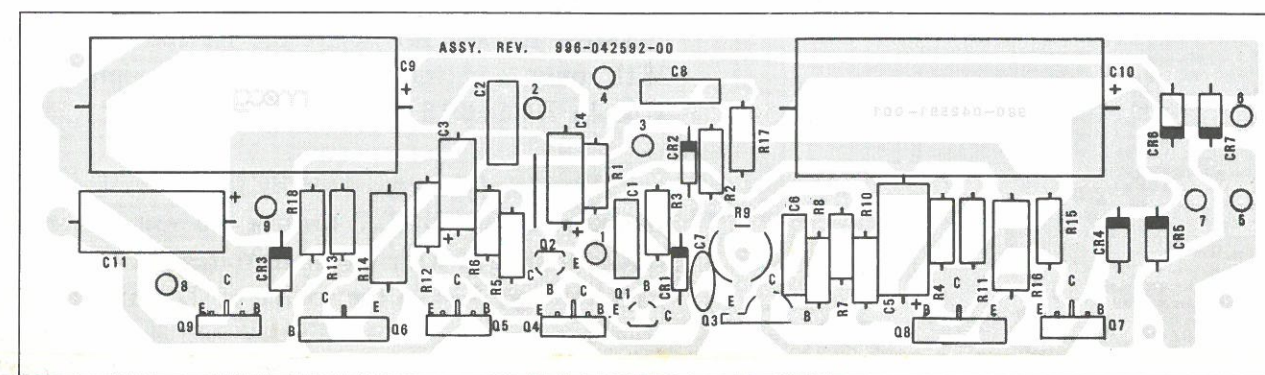
SIGNAL PROCESSOR PRINTED CIRCUIT BOARD ASSEMBLY (996-042588-001)

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REPLACEMENT PARTS LIST

QTY	REF DESIG.	PART NUMBER	DESCRIPTION	QTY
1	A1,A2	991-041084-001	Integrated Circuit, Dual Operational Amplifier, LM358N	2
1	C1,C4,C6,			
1	C12,C23	945-040209-015	Capacitor, Alum., Elect., 10 uf, 16V	5
1	C2,C13	946-041978-102	Capacitor, Polyester, 0.001 uf.	2
16	C3	947-042020-101	Capacitor, Disc, 100 Pf	1
1	C5,C14,C15,			
1	C25,C27	946-041978-474	Capacitor, Polyester, 0.47 uf	5
6	C7,C16,			
1	C24	946-041978-104	Capacitor, Polyester, 0.1 uf	3
2	C8,C11	946-041978-223	Capacitor, Polyester, 0.022 uf.	2
8	C9	947-042020-501	Capacitor, Disc, 500 Pf	1
12	C10	946-041978-152	Capacitor, Polyester, 0.0015 uf	1
1	C17	946-041978-472	Capacitor, Polyester, 0.0047 uf	1
2	C18,C22	946-041978-103	Capacitor, Polyester, 0.01 uf	2
4	C19	946-041978-333	Capacitor, Polyester, 0.033 uf	1
1	C20	947-042020-681	Capacitor, Disc, 680 Pf	1
2	C21	946-041978-153	Capacitor, Polyester, 0.015 uf.	1
4	C26	946-041978-274	Capacitor, Polyester, 0.27 uf	1
1	CR1,CR2	919-041075-001	Diode, 1N4148, Alternate 1N914	2
4	IC1,IC2	991-041086-001	Integrated Circuit, CD4007AE	2
4	J1,J2,J4	910-041306-009	Jack, Phone, Double Closed, Switchcraft 114B	3
4	J3	910-041306-001	Jack, Phone, Open Circuit, Switchcraft 111	1
6	L1	939-041850-001	LED, Red, OPCOA LSM-6L	1
4	P1 thru P4	910-042392-003	Header, Right Angle, 3 Pin, (0.100 centers), AMP640099-3	4
8	Q1	991-042659-001	Transistor, FET, PF5102	1
11	Q2,Q3	991-041049-005	Transistor, NPN, Power, TIP29, Lead Form	2
4	R1,R2,R5,R22	852-412473-001	Resistor, 47K Ohm, ± 5%, 1/4W	4
4	R4,R6,R21,R45	852-312475-001	Resistor, 4.7 Megohm, ± 5%, 1/4W	4
1	R7,R27,R36			
9	R42,R49	852-312104-001	Resistor, 100K Ohm, ± 5%, 1/4W	5
1	R8	852-312223-001	Resistor, 22K Ohm, ± 5%, 1/4W	1
1	R9	852-512152-001	Resistor, 1.5K Ohm, ± 5%, 1/2W	1
6	R10	925-041426-006	Resistor, Rotary, 50K Ohm, Log 10%	1
1	R11	852-312333-001	Resistor, 33K Ohm, ± 5%, 1/4W	1
2	R12	852-412471-001	Resistor, 470 Ohm, ± 5%, 1/4W	1
1	R13	852-312242-001	Resistor, 2.4K Ohm, ± 5%, 1/4W	1
1	R14	852-312102-001	Resistor, 1K Ohm, ± 5%, 1/4W	1
4	R15,R29,R40	852-312474-001	Resistor, 470K Ohm, ± 5%, 1/4W	3
1	R16,R17,R30,			
1	R31,R47,R48	852-312105-001	Resistor, 1 Megohm, ± 5%, 1/4W	6
1	R18,R19	852-312823-001	Resistor, 82K Ohm, ± 5%, 1/4W	2
1	R20,R28,			
4	R33,R34	852-312103-001	Resistor, 10K Ohm, ± 5%, 1/4W	4
4	R23,R25	925-041426-007	Resistor, Rotary, Linear, 100K Ohm	2
1	R24,R35	852-312223-001	Resistor, 22K Ohm, ± 5%, 1/4W	2
6	R26	852-312472-001	Resistor, 4.7K Ohm, ± 5%, 1/4W	1
1	R32,R43,R46	925-041426-002	Resistor, 25K Ohm, Rotary Log 10%	3
4	R37	852-312751-001	Resistor, 750 Ohm, ± 5%, 1/4W	1
3	R38,R41	852-312151-001	Resistor, 150 Ohm, ± 5%, 1/4W	2
1	R39	852-312390-001	Resistor, 39 Ohm, ± 5%, 1/4W	1
2	R44	852-312394-001	Resistor, 390K Ohm, ± 5%, 1/4W	1
1	SW1	960-041257-001	Switch, Slide, DPDT, UID	1
1		816-040039-006	Screw, Self Tapping, No. 6B x 3/8 in.	2
1		902-042525-001	Nut, Speed, No. 6, Type W.	2
6		980-042587-001	Printed Circuit Board	1

POWER SUPPLY AND POWER AMPLIFIER MODULE PRINTED CIRCUIT BOARD ASSEMBLY (996-042592-001)
REPLACEMENT PARTS LIST

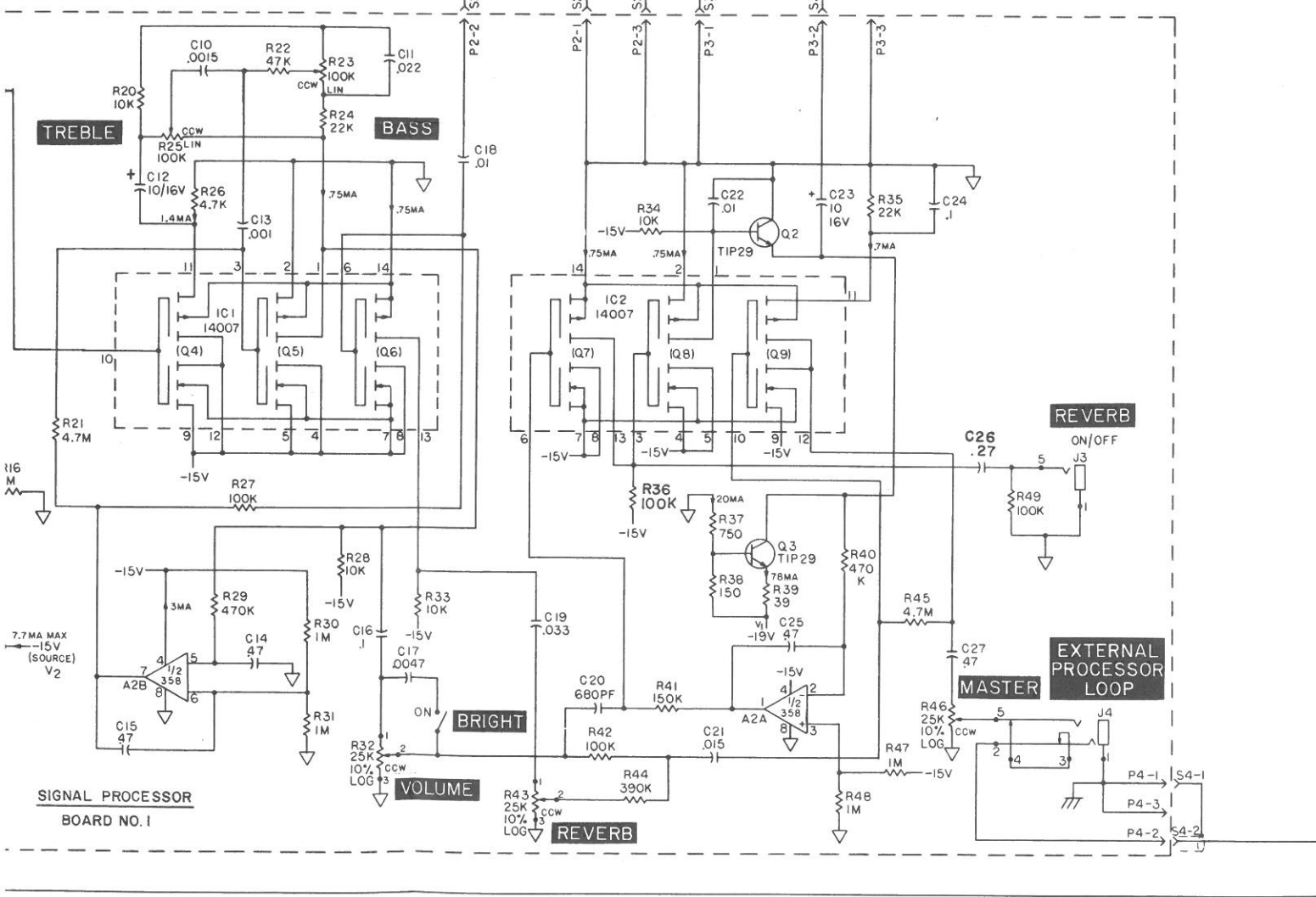
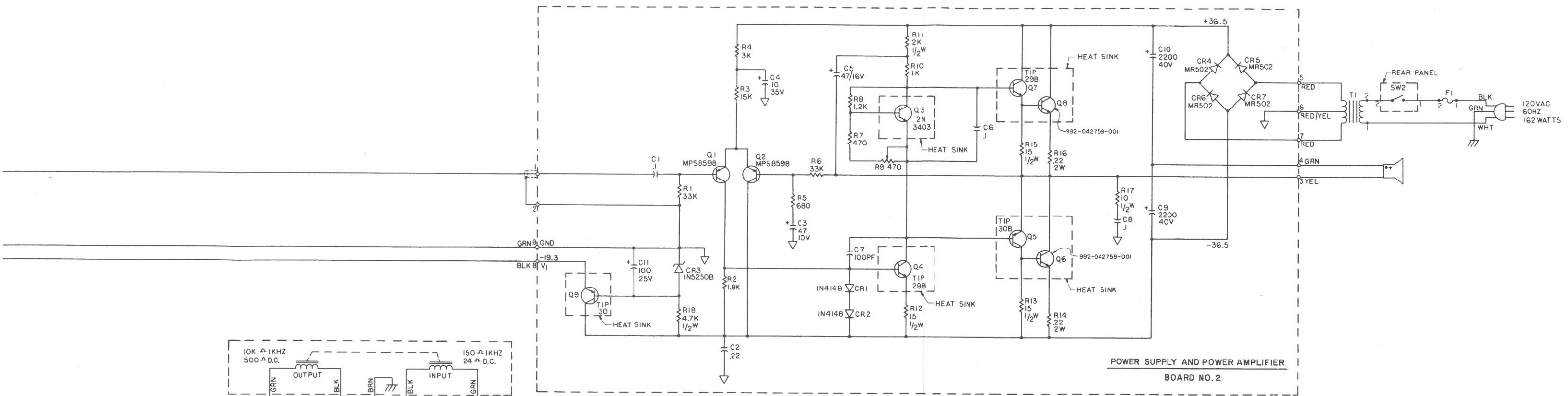
REF DESIG	PART NUMBER	DESCRIPTION	QTY
C1,C6,C8	946-041978-104	Capacitor, Polyester, 0.1 uf	3
C2	946-041978-224	Capacitor, Polyester, 0.22 uf	1
C3	945-040209-041	Capacitor, Alum., Elect., 47 uf, 10V	1
C4	945-040209-036	Capacitor, Alum., Elect., 10 uf, 35V	1
C5	945-040209-017	Capacitor, Alum., Elect., 47 uf, 16V	1
C7	947-042020-101	Capacitor, Disc, 100 Pf	1
C9,C10	945-042760-001	Capacitor, Alum., Elect., 2200 uf, 40V	2
C11	945-040209-009	Capacitor, Alum., Elect., 100 uf, 25V	1
CR1,CR2	919-041075-001	Diode, 1N4148, Alternate 1N914	2
CR3	919-041277-001	Diode, Zener, 1N5250B	1
CR4,CR5,			
CR6,CR7	919-041157-001	Diode, Rectifier, MR502, Alternate GEA15B	4
Q1,Q2	991-042758-001	Transistor, NPN, MPS8598	2
Q3	991-041271-002	Transistor, NPN, With Clip, 2N3403, Lead Form	1
Q4,Q7	991-041049-006	Transistor, NPN, Power, TIP29B, Lead Form	2
Q5	991-041050-006	Transistor, PNP, Power, TIP30B, Lead Form	1
Q6,Q8	992-042759-001	Transistor, NPN, Power, TO3	2
Q9	991-041050-005	Transistor, PNP, Power, TIP30, Lead Form	1
R1	852-312333-001	Resistor, 33K Ohm, ± 5%, 1/4W	1
R2	852-312182-001	Resistor, 1.8K Ohm, ± 5%, 1/4W	1
R3	852-312153-001	Resistor, 15K Ohm, ± 5%, 1/4W	1
R4	852-312302-001	Resistor, 3K Ohm, ± 5%, 1/4W	1
R5	852-312681-001	Resistor, 680 Ohm, ± 5%, 1/4W	1
R6	852-312333-001	Resistor, 33K Ohm, ± 5%, 1/4W	1
R7	852-312471-001	Resistor, 470 Ohm, ± 5%, 1/4W	1
R8	852-312122-001	Resistor, 1.2K Ohm, ± 5%, 1/4W	1
R9	925-040275-011	Resistor, 470 Ohm, Trim Pot	1
R10	852-312102-001	Resistor, 1K Ohm, ± 5%, 1/4W	1
R11	852-512202-001	Resistor, 2K Ohm, ± 5%, 1/2W	1
R12,R13,R15	852-512150-001	Resistor, 15 Ohm, ± 5%, 1/2W	3
R14,R16	924-041258-008	Resistor, 0.22 Ohm, ± 5%, F.P., 2 W	2
R17	852-512100-001	Resistor, 10 Ohm, ± 5%, 1/2W	1
R18	852-512472-001	Resistor, 4.7K Ohm, ± 5%, 1/2W	1
	811-040036-010	Screw, Self Tapping, Type A, No. 6 x 5/8 in.	4
	902-040199-012	Nut, Self Clinching, 10-32	6
	903-042674-001	Screw, "Taprite", 4-40 x 1/4 in.	7
	904-042729-001	Washer, Insulated Shoulder	4
	905-042027-004	Rivet, Tubular, 1/8 in. Dia. by 3/16 in. lg.	2
	906-041256-001	Socket, Transistor TO3	2
	908-041332-001	Insulator, Mica TO3	2
	908-042730-001	Insulator, Mica Tip Trans.	4
	911-042030-006	Terminal Pin Tube	9
	934-041437-001	Heat Sink Compound	AR
	967-042745-001	Bracket, Angle	2
	968-042743-001	Coupler, Heat Sink	1
	980-042591-001	Printed Circuit Board	1



POWER SUPPLY AND POWER AMPLIFIER MODULE PRINTED CIRCUIT BOARD ASSEMBLY (996-042592-001)

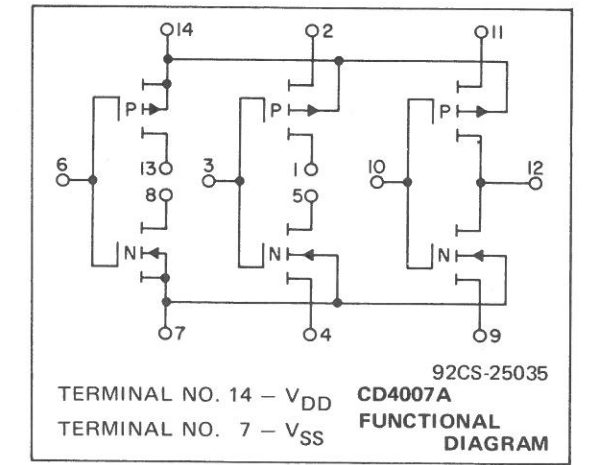
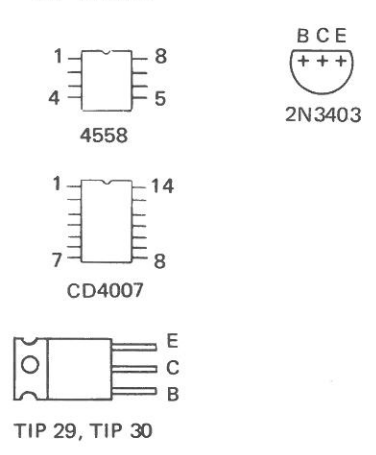
LABSERIES™

L3 AMPLIFIER COMPOSITE PARTS LOCATION
AND REPLACEMENT PARTS LIST



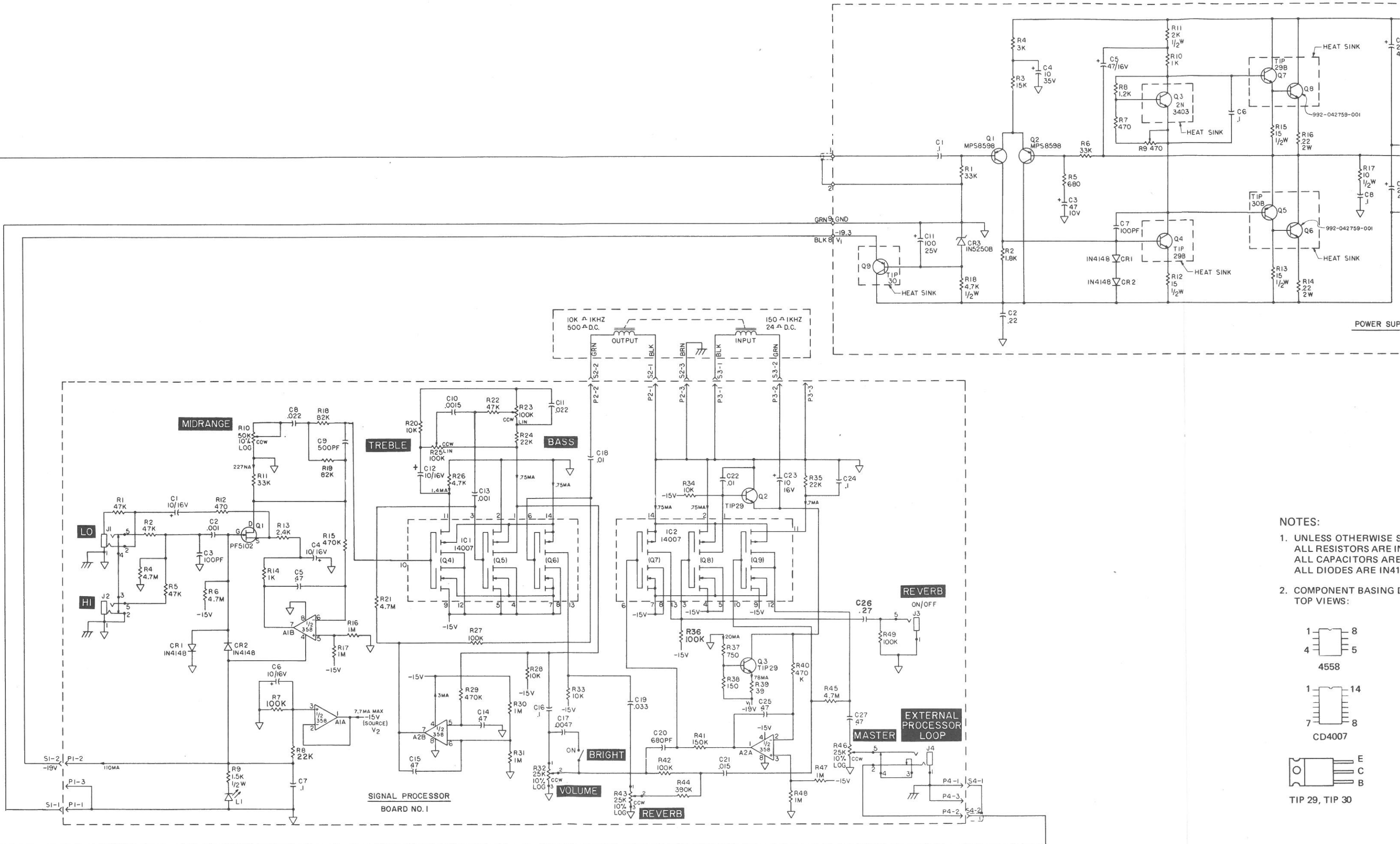
NOTES:

- UNLESS OTHERWISE SPECIFIED- ALL RESISTORS ARE IN OHMS 1/4W, ±5% ALL CAPACITORS ARE IN MFD (uf) ALL DIODES ARE IN4148.
- COMPONENT BASING DIAGRAMS, TOP VIEWS:



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**L3 AMPLIFIER COMPOSITE
SCHEMATIC**



- NOTES:
- UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE IN OHMS. ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 - COMPONENT BASING IS SHOWN IN TOP VIEWS:

