

THE Hafler SE120

SERVICE MANUAL



HAFLER
A DIVISION OF
ROCKFORD CORPORATION
613 SOUTH ROCKFORD DRIVE TEMPE, ARIZONA 85281

SPECIFICATIONS

POWER RATING:

Less than 0.006% total harmonic distortion at any power level up to 60 watts continuous average power per channel into 8 ohms at any frequency between 20 Hz and 20 kHz with both channels driven.

IM DISTORTION (IHF):

Less than 0.005% from 1 to 60 watts, each channel, into 8 ohms.

TYPICAL THD AT 60 WATTS INTO 8 OHMS:

20 Hz: 0.002%
1 kHz: 0.002%
20 kHz: 0.006%

FREQUENCY RESPONSE INTO 8 OHMS:

-3dB, 4Hz to 200kHz at 1 watt.
+0dB, -0.5dB, 10Hz to 40kHz at 60 watts.

TYPICAL CHANNEL SEPARATION:

20Hz: > 75dB
1kHz: > 85 dB
20kHz: > 65dB

SIGNAL TO NOISE RATIO, UNWEIGHTED:

Exceeds 100dB referred to 60 watts into 8 ohms.

INPUT IMPEDANCE: 22,000 ohms

INPUT SENSITIVITY:

1.1 volts rms for 60 watts into 8 ohms.

DAMPING FACTOR:

100 to 1kHz into 8 ohms, 50 to 10kHz into 8 ohms.

POWER CONSUMPTION:

60 watts both channels into 8 ohms: 300 VA
Quiescent: 60 VA

SIZE: 3-1/4" high plus 1/2" feet, 17" wide, 9" deep.
(83 mm high plus 152 mm, 432 mm wide,
229 mm deep.)

NET WEIGHT: 18 lbs. (8.2 kg)

SHIPPING WEIGHT: 20 lbs. (9.1 kg)

ALL SPECIFICATIONS SUBJECT TO CHANGE
WITHOUT NOTICE.

FEATURES

Stereo/Mono Channel Operation:

The SE120 delivers 60 watts continuous average power per channel into 8 ohms. It can be bridged for single channel operation producing up to 120 watts of power into 16 ohms.

Input Mode Selector:

This switch will allow the user to specify the input signal to the amplifier.

A. Stereo Mode:

This allows the right and left channels to reach their designated amplifier channels. This mode will deliver more than 60 watts into an 8 ohm load.

B. Mono Mode:

The SE120 can be operated in a bridged mode which drives both channels with the same signal and combines to deliver more than 150 watts into 8 ohms. This disables the right channel input and routes the signal through the left channel.

Construction:

The simplified construction of the SE120 improves reliability and results in consistent performance. The heavy duty case construction on the SE120 will provide years of durability and trouble free protection.

Gold Plated RCA Input Connectors:

This provides the most accurate signal transmission and lowest possible loss. Gold-plated terminals are immune to signal deterioration with time that can be caused by corrosion in the connectors.

Speaker Output and Power Connectors:

For minimum loss power transfer, high definition and oxidization resistance.

Protection System:

The SE120 is equipped with a unique protection system that constantly monitors the temperature of the output devices and takes corrective action to prevent damage to the amplifier as a result of excessive overheating.

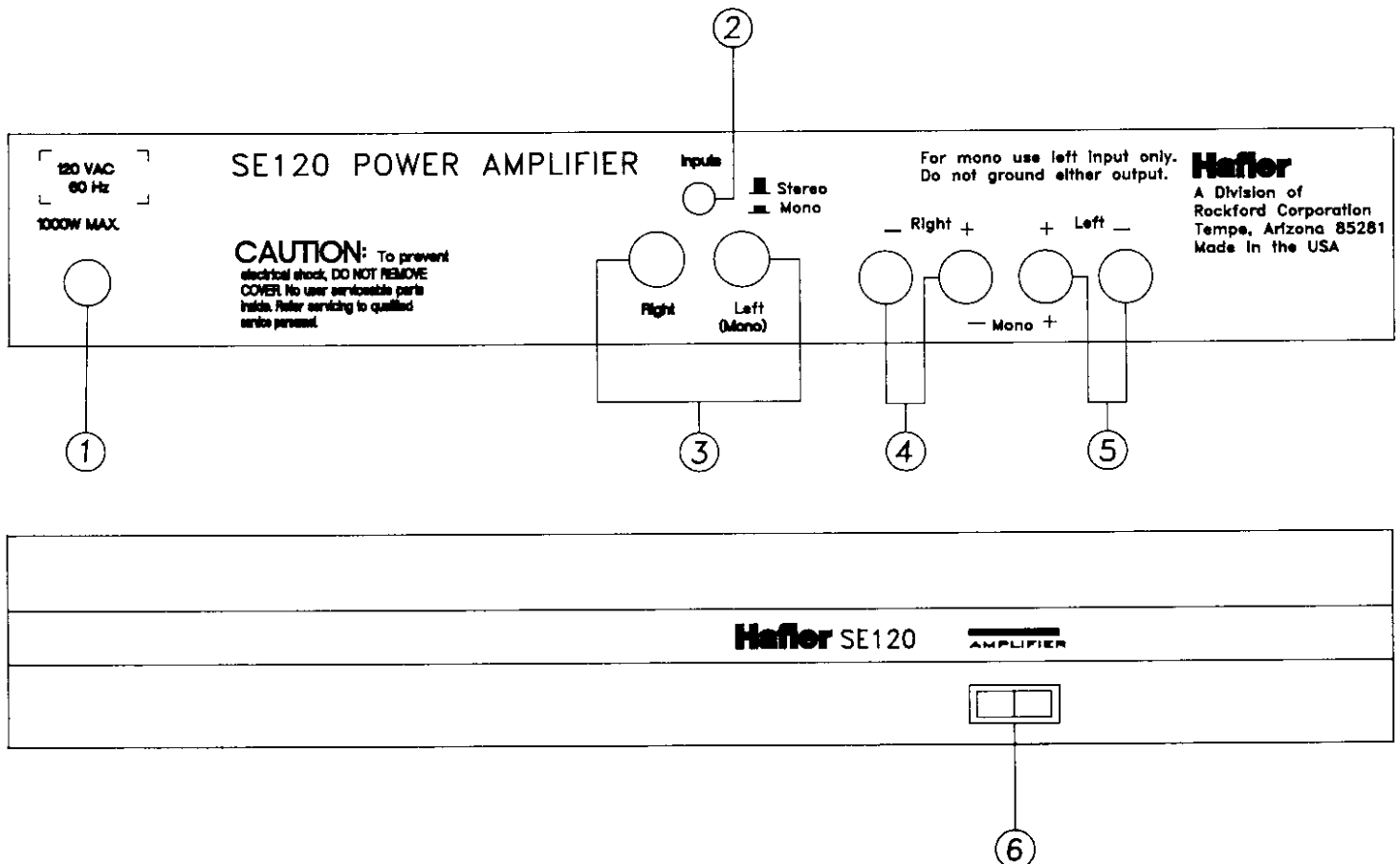
SWITCHES AND TERMINALS

1. AC power input
2. Input mode selector switch
3. RCA input connectors
4. Right speaker output terminals
5. Left speaker output terminals
6. On/Off switch

SWITCH SETTINGS

Input Mode Selector Switch #2.

- a. When used as a two channel stereo system the input switch is set in the out position.
- b. When used as a MONO or one channel or bridged system the input switch is set to the in position.



LINE CONNECTIONS AND SWITCHING

The SE120 is normally wired for use on 120V AC power lines, as in the U.S.A. If your line voltage is different, you will need the special Hafler export power transformer which accommodates many other line voltages. Be sure your amplifier is wired for your line voltage before you plug it in.

The SE120's power switch may be left on, and the amplifier switched remotely by connecting its line cord to the preamplifier (or other control center) which provides a switched AC outlet. Make sure that the control device can supply a current of 5 amperes to the SE 120, in addition to the current required by any other switched units. You may instead connect the amplifier directly to a wall outlet, and control it with its own front panel power switch.

CONNECTING CABLES

INPUT:

Conventional shielded cables, often supplied with preamplifiers, may connect the control center to the amplifier's input jacks. Be sure the cables are not frayed or loosely connected to the plugs, and that the plug's outer shield connection is tight on the jack, to avoid hum. If you wish to install the SE120 more than a few feet from the preamplifier, the permissible cable length to avoid loss of high frequencies is determined by the preamplifier's output impedance and the internal capacitance of the cable. If the output impedance is 600 ohms or less, as with Hafler preamplifiers, and the cable capacitance is less than 50 picofarads per foot, up to 50- feet is acceptable. Ordinary stereo interconnecting cables often have higher capacitance, however, so a good quality low capacitance shielded wire should be used. When making long runs, keep the left and right cables close together, and avoid running them parallel to power wiring to reduce the likelihood of hum pickup.

OUTPUT:

The wires which connect the speakers to the amplifier should be of sufficient size to preserve the SE120's high damping factor. is satisfactory for up to 15 feet if your speakers are of 8 ohms or higher impedance. A heavier gauge (or larger) wire should be used with 4 ohm speakers or 8 ohm speakers at a greater distance. Special loudspeaker cables which have adequate thickness to accommodate long runs are usually available from audio dealers. The SE120's red and black outputs accept standard banana plug connectors, including the double ones with 3/4" spacing. These are the most convenient to use if you will be disconnecting the speakers occasionally. The terminals will also clamp a spade lug, or a bare wire through the hole in the center post. Be sure there are

no frayed wire ends which could touch adjacent terminals or the chassis. Tin bare wire ends with solder to secure all strands.

PHASING:

Consistent phase relationships are important when connecting speakers in order to enable full bass reproduction as well as midrange and high frequency time alignment. To be sure all speakers in a system are wired in phase to the amplifier, each ground or - speaker terminal should be connected to its black ground terminal on the SE 120 and the speakers + terminal to the corresponding red binding post. Speaker connecting cable identifies one wire from the other by the color of the wire, or by marking or coloring the insulation. NOTE: In the special case of monophonic operation of the SE 120, (described later) different speaker connections are employed.

GROUNDING:

The black output terminals of the SE120 are connected together internally and grounded to the chassis. This facilitates the use of external devices which use a common ground connection, such as some headphone junctionboxes. You must be sure that the ground or shield connection from such a device goes to a black terminal on the SE1 20. NOTE: No such connection may be made when the SE120 is connected for bridged mono operation.

CONVENTIONAL STEREO CONNECTIONS

It is best to make all connections with the SE120 switched off. Each of the stereo speakers connects to one horizontal pair of red and black outputs, as identified left or right on back of the SE 120. The input signals connect to the corresponding input jacks, and the mono/stereo switch should be set to stereo.

CONNECTIONS FOR MONOPHONIC OPERATION

When you wish to drive a single loudspeaker with increased power capability, the SE120 can be operated in a bridged mode which drives both channels with the same signal and combines their output to deliver more than 120 watts into 16 ohms. In this arrangement, the speaker is connected only to the two red output terminals. The left red terminal is + and the right red terminal is the - connection. **NO CONNECTIONS MAY BE MADE TO ANY BLACK TERMINAL!!** Set the Input Mode Selector switch to mono, and connect the input signal to the left channel input only. **IMPORTANT NOTE:** Never use a speaker with an impedance of less than 8 ohms when operating the SE120

in the bridged mono mode. The increased current could overheat the amplifier.

OPERATION

The pilot lamp in the power switch will glow whenever power is applied to the SE120. If it does not light, check for a blown AC line fuse.

The SE 120 is equipped with a unique protection system that constantly monitors the temperature of the output devices and takes corrective action to prevent damage to the amplifier as a result of excessive overheating. Under most conditions, the SE120 heatsinks will dissipate the heat required to maintain safe operating temperatures, and the unit will play continuously. If the amplifier is driven at high volumes into speakers with an impedance of less than 8 ohms, and/or there is inadequate ventilation, the heatsinks could heat to a level that would cause the protection circuitry to shut off the amplifier for a short time (normally less than 15 seconds) to prevent damage. The SE120 will return to normal operation, and if the overheating condition is still present, the cycle will repeat. In this case, check the surroundings of the unit to insure sufficient air flow around the heatsinks and through the vent holes. Otherwise, check the load impedance connected to the outputs to see if it is far below 8 Ohms.

FUSES:

The SE120 is supplied with a 5 Ampere Slo-Blo AC line fuse and four power supply fuses. If one of these fails, it is usually indicative of a fault which will require professional service.

Bias current adjustment for the SE 120 needs to be performed in the following manner:

1. No signal applied to the input, no load on the output of the amplifier.
2. Line voltage to the amplifier should be set at the nominal value for the area.
3. Adjust one channel at a time.
4. With the unit off, remove either the + or - rail fuse in the right channel. Insert the ammeter across the fuse holder. Make sure that the ammeter is set at its highest current scale.
5. Turn the unit on and, after the unit has warmed up for approximately one minute, adjust the ammeter reading for 100mA. Turn the unit off. Allow the unit to discharge before removing the ammeter and replacing the fuse.
6. Repeat steps 4 and 5 for the left channel.

TRANSISTOR VOLTAGE VALUES-

DC volts with respect to circuit ground, no signal applied.

NAME	Emitter	Base	collector
Q1	-.755	-.130	51.5
Q2	-.756	-.159	51.7
Q3	52.3	51.7	51.5
Q4	52.3	51.8	51.8
Q5	51.4	50.9	-12.90
Q6	52.1	51.5	50.5
Q7	51.0	50.4	1.294
Q8	-1.157	-.532	1.314
Q9	-51.4	-50.7	-1.151
Q10	-.578	-1.153	-53.5
Q11	.711	1.303	53.5
Q14	-.737	-.126	51.5
Q15	-.755	-.130	51.5
Q16	-.756	-.159	51-7
Q17	52.3	51.7	51.5
Q18	52.3	51.8	51.5
Q19	51.4	50.9	-12.90
Q20	52.1	51.5	50.5
Q21	51.0	50.4	1.294
Q22	-1.157	-.532	1.314
Q23	-51.4	-50.7	-1.151
Q24	-.578	-1.153	-53.5
Q27	-.518	-.088	-53.8
Q28	-.737	-.126	51.5
	Source	Gate	Drain
Q12	.778	.087	53.8
Q13	-.518	-.088	-53.8
Q25	.778	.087	53.8
Q26	-.518	-.088	-53.8

IC VOLTAGE VALUES

IC

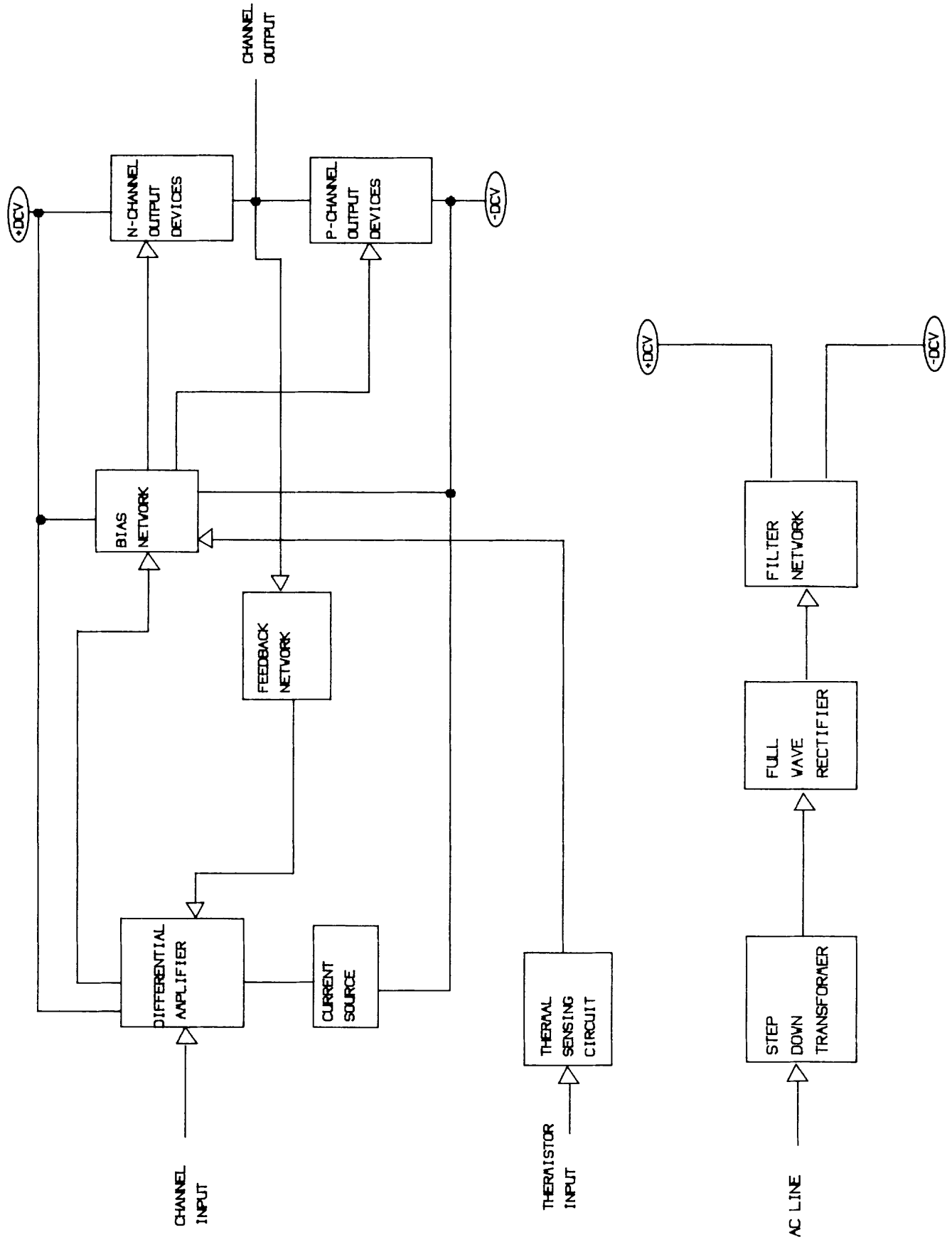
PIN

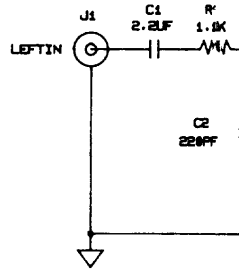
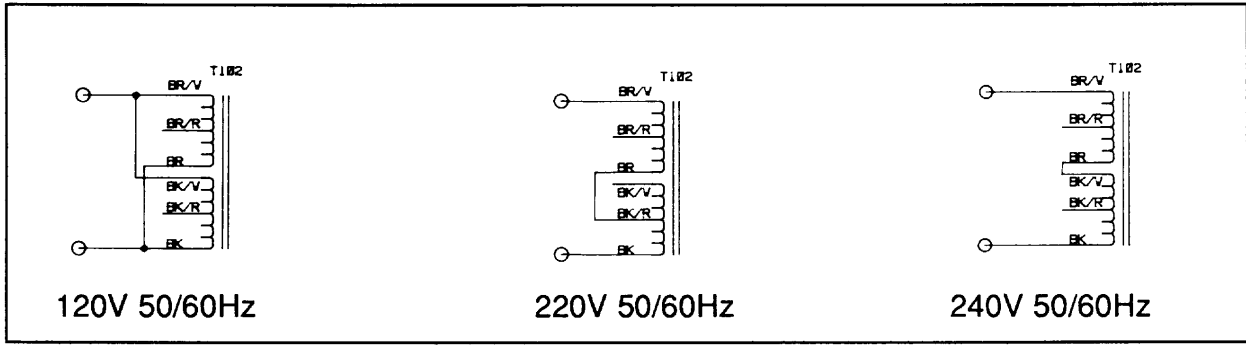
1.	-48.9
2.	-52.2
3.	-49.7
4.	-53.9
6.	-52.1
7.	-48.7
8.	-38.5

-DCV -54.0

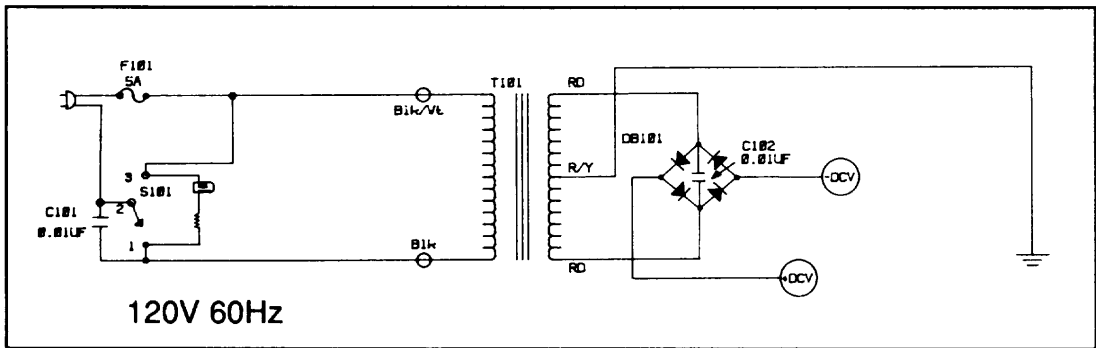
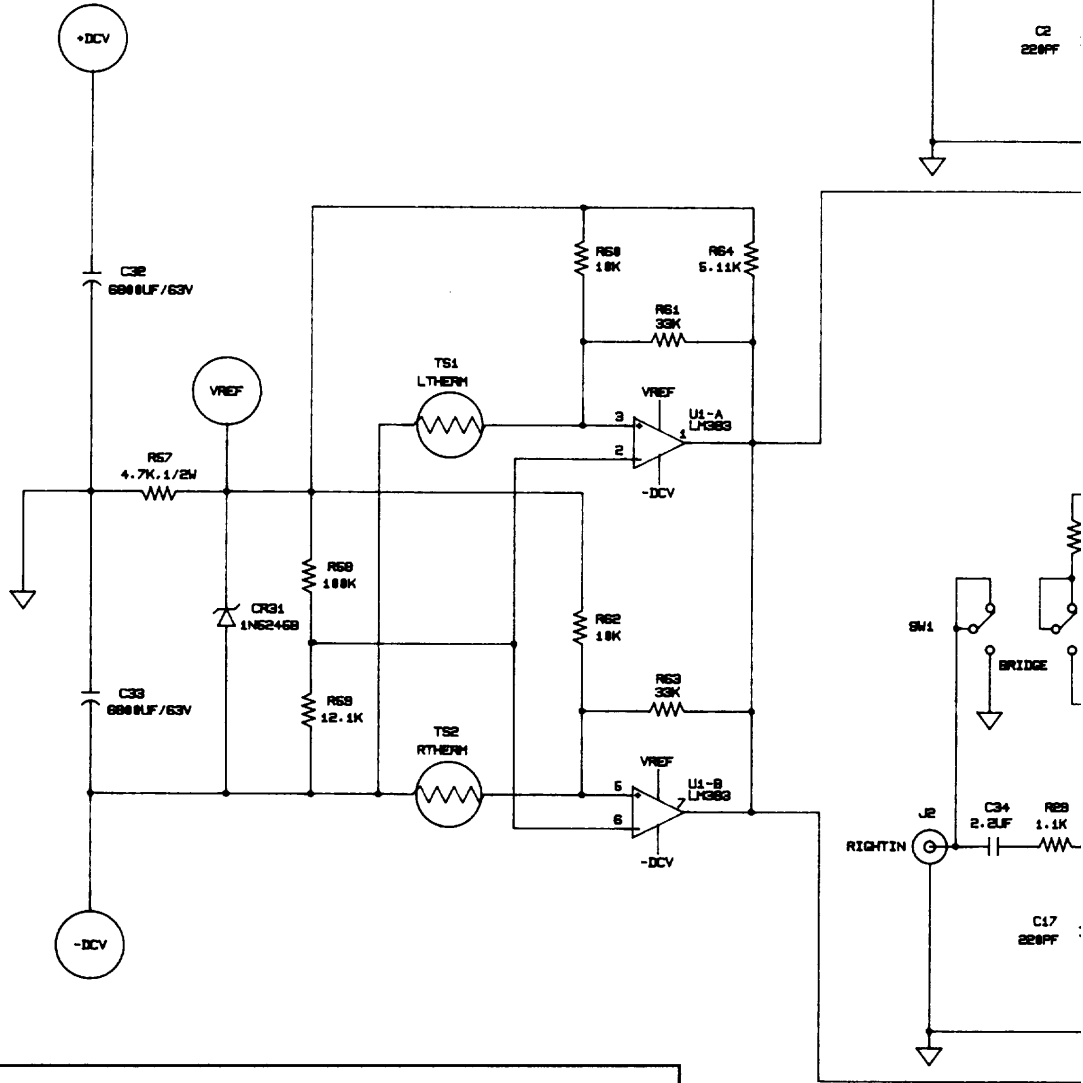
+DCV 54.0

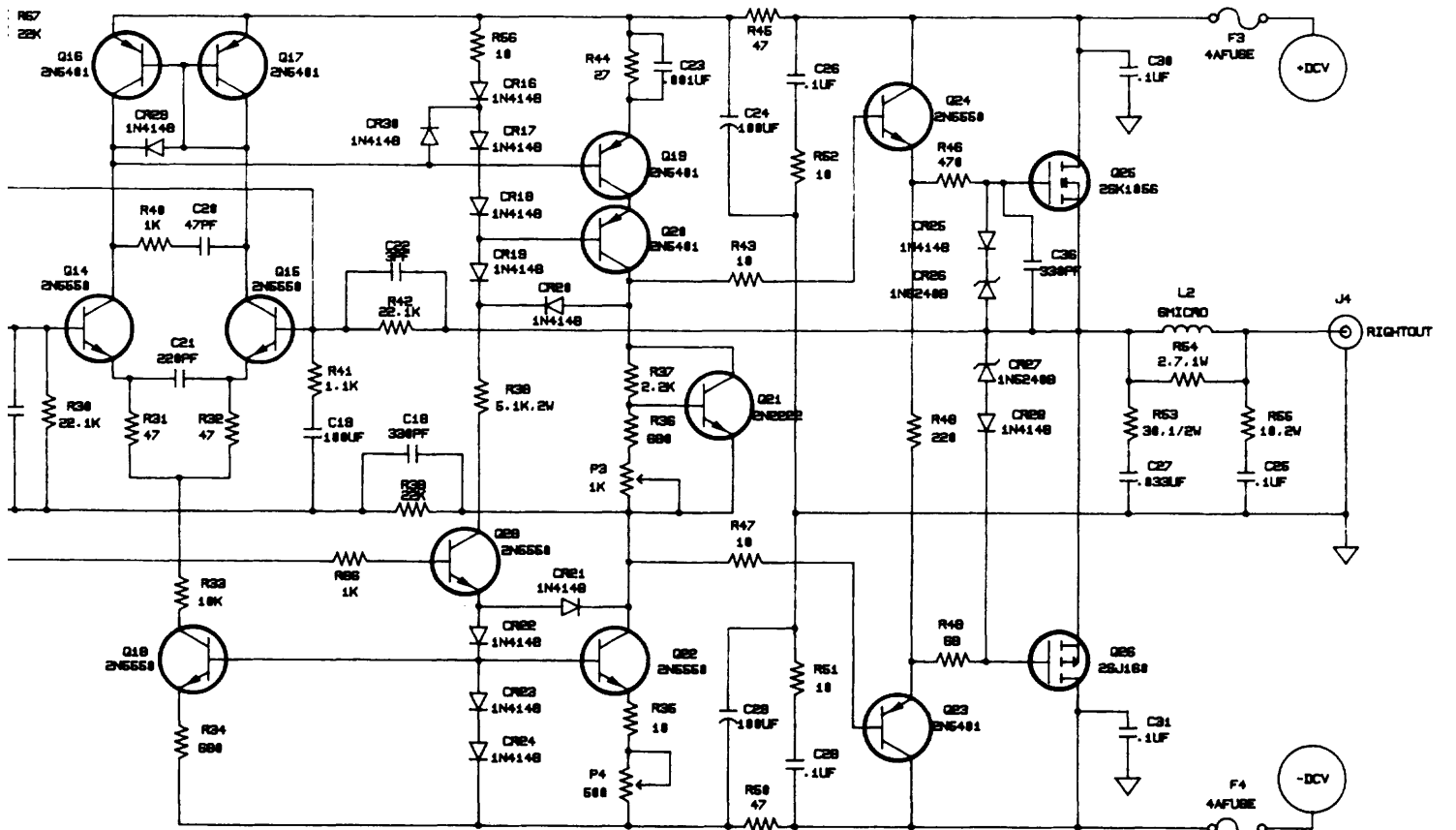
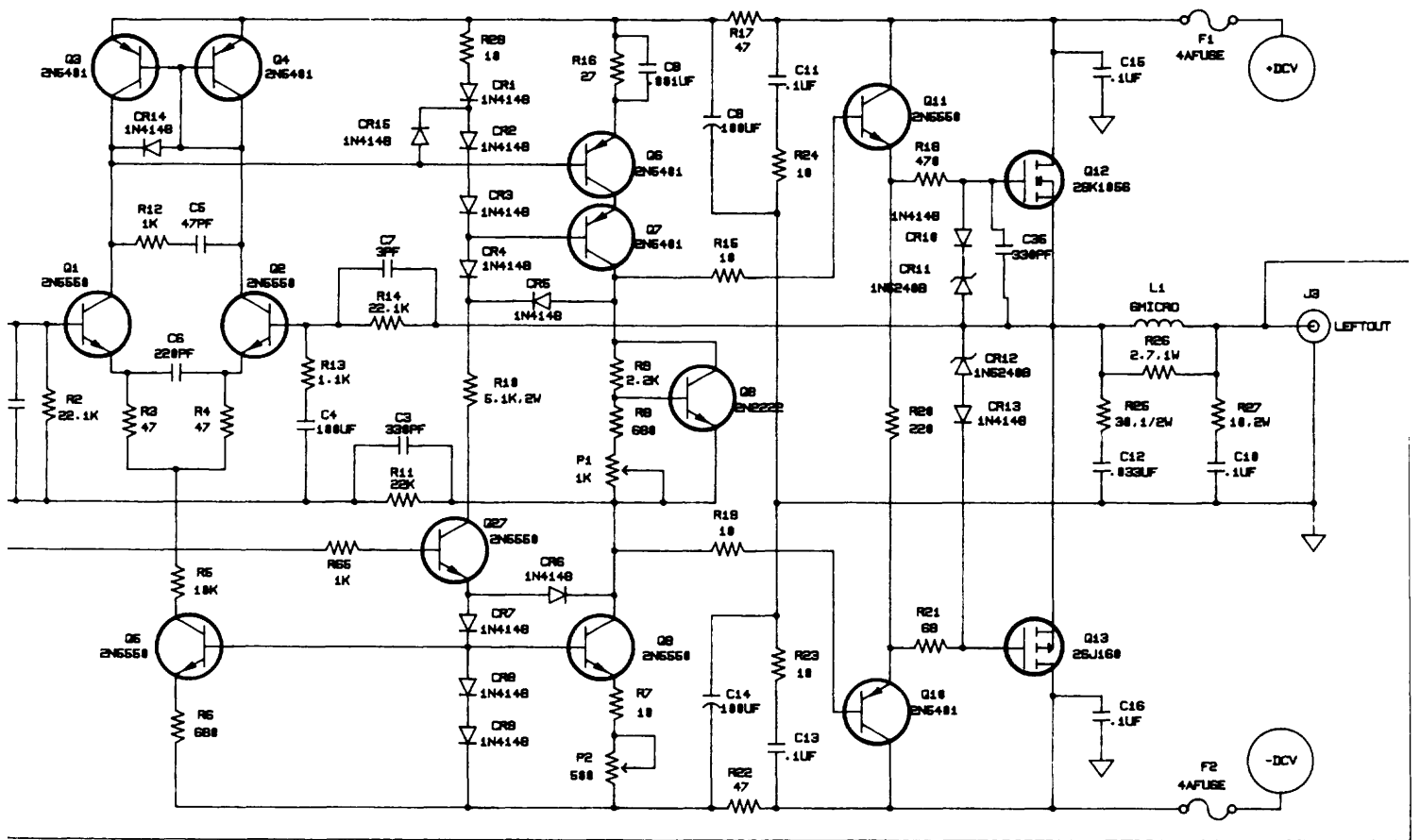
SE120 BLOCK DIAGRAM



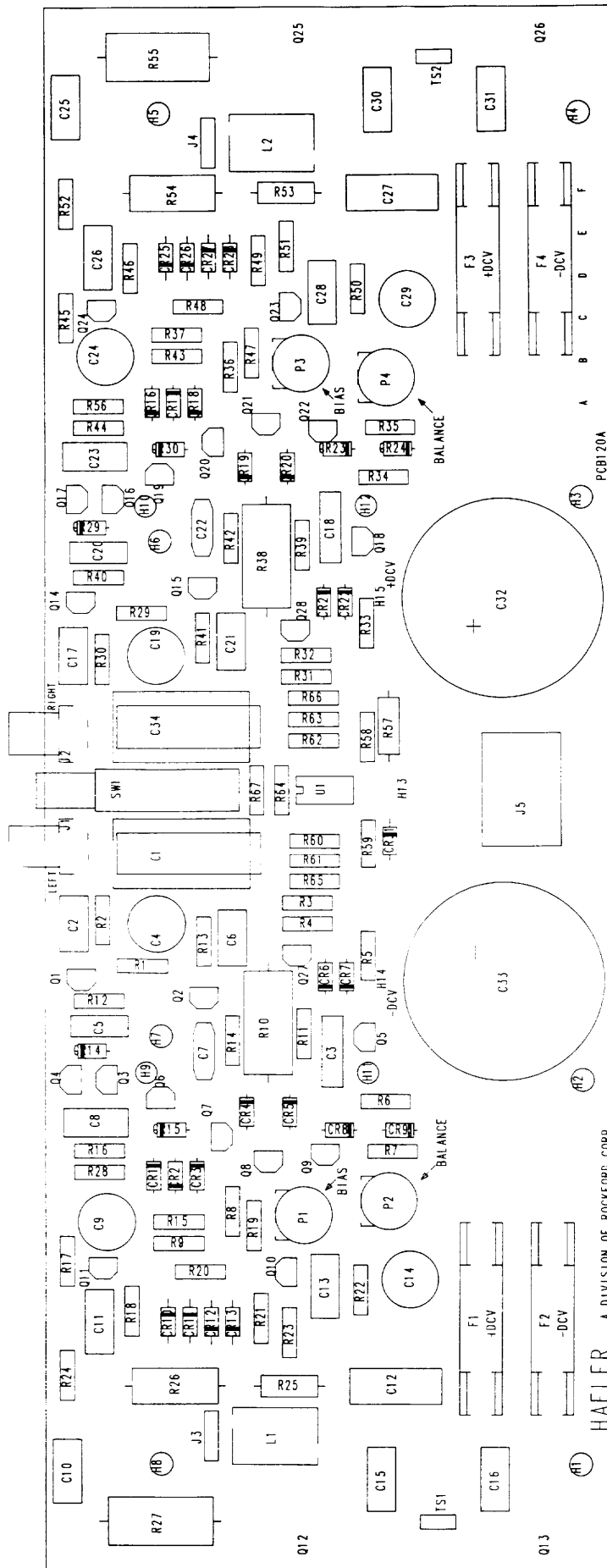


**SE120
SCHEMATIC
DIAGRAM**





PC58 BOARD LAYOUT



H16 H17 H18 H19 H20 H21

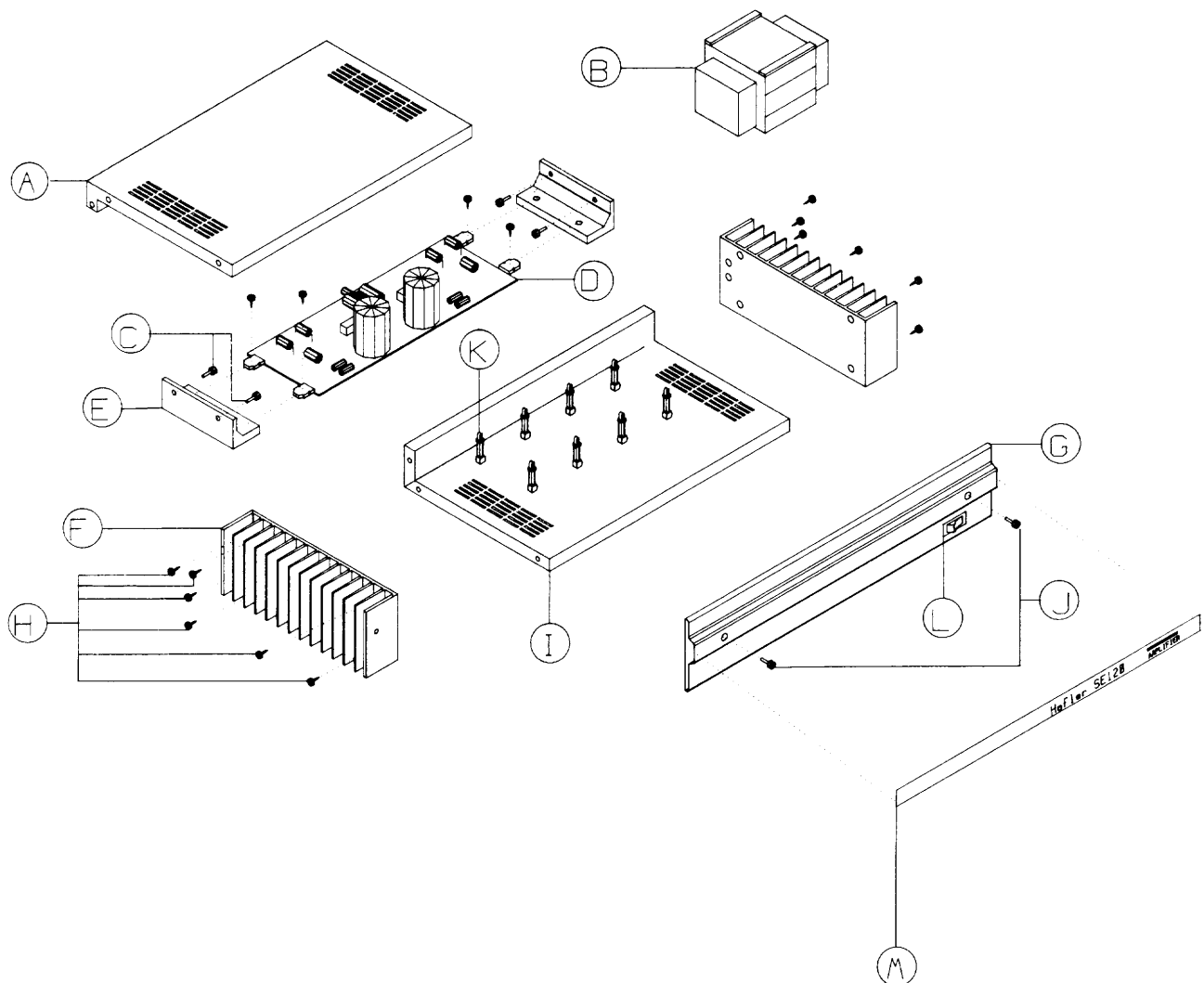
COMPONENT SIDE

HAFLER A DIVISION OF ROCKFORD CORP.

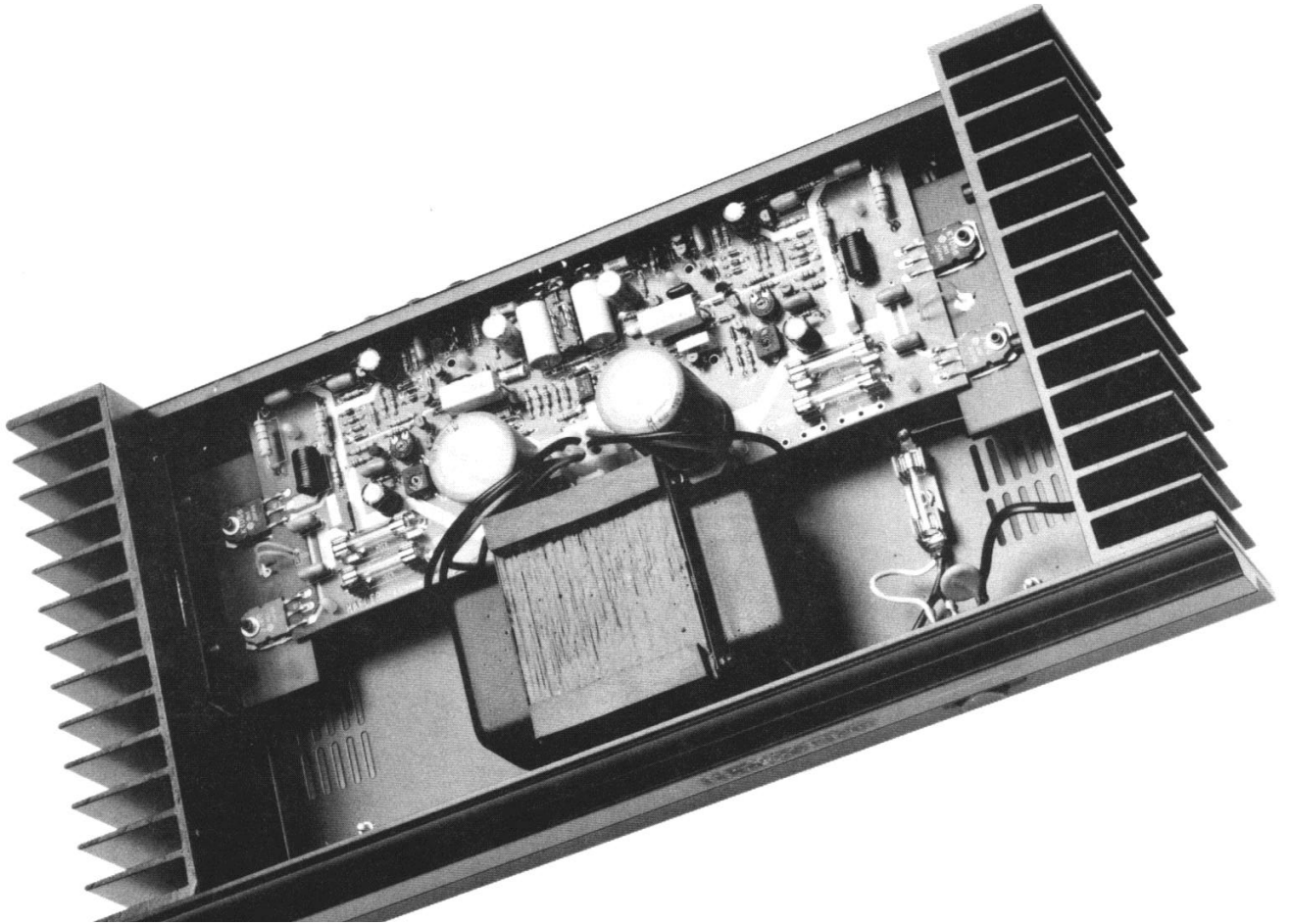
SYMBOL NOa	PART DESCRIPTION	PART NO.	SYMBOL NO.	PART DESCRIPTION	PART NO.
RESISTORS			TRANSISTORS		
R1	1.1kOhms, 1/4w, 1% Metal Film	RMP/4-1101	C30	0.1 mfd,100v, 20%, Polyester	CP-104A
R2	22.1 k Ohms, 1/4 w, 1% Metal Film	RMP/4-2212	c31	0.1 mfd, 100v, 20%, Polyester	CP-104A
R3	47 Ohms, 1/4x, 5% Carbon Film	RC/4-470	C32	68W mfd, 10/75% Polar/Electrolytic	CER-698D
R4	47 Ohms, 1/4x, 5% Carbon Film	RC/4-470	C33	68W Mfd, 1 0/75% Polar/Electrolytic	CER-688D
R5	10k OhmS,1/4w, 1% Metal Film	RMP/4-1002	C34	2.2 mfd, 50v, 20%, Polypropylene	CPP-205C
R6	680 Ohms, 1/4w, 5% Carbon Film	RC/4-681	c35	330 pf, 500v, Mica Cap	CM-331
R7	10 Ohms, 2w, 5% Metal Film	RM2-100	C36	330 pf, 500v, Mica Cap	CM-331
R8	680 Ohms, 1/4w, 5% Carbon Film	RC/4-681	CI01	0.01 mfd, 100v, 20%, Polyester	CP-103/20
R9	2.2k Ohms, 1/4w, 5% Carbon Film	RC/4-222	CI02	0.01 mfd, 1 00v, 20%, Polyester	CP-103A
R10	5.1 k Ohms, 5w, 5% Wire Wound	RWB5-502	TRANSISTORS		
R11	22k Ohms, 1/4w, 5% Carbon Film	RC/4-223	01	2N5550 NPN Transistor	SSH-613
R12	1 .Ok Ohms, 1/4w, 5% Carbon Film	RC/4-102	Q2	2N5550 NPN Transistor	SSH-613
R13	1.1kOhms, 1/4w, 1% Metal Film	RMP/4-1101	Q3	2N5401 PNP Transistor	SSH-708
R14	22.1 k Ohms, 1/4w, 1% Metal Film	RMP/4-2212	Q4	2N5401 PNP Transistor	SSH-708
R15	10 Ohms, 1w, 5% Metal Film	RM2-100	a 5	2N5550 NPN Transistor	SSH-613
R16	27 Ohms, 1/4w, 5% Carbon Film	RC/4-270	Q6	2N5401 PNP Transistor	SSH-708
R17	47 Ohms, 1/4w, 5% Carbon Film	RC/4-470	Q7	2N5401 PNP Transistor	SSH-708
R18	470 Ohms, 1/4w, 5% Carbon Film	RC/4-471	Q8	2N2222 NPN Transistor	SSH-611
R19	10 Ohms, 2w, 5% Metal Film	RM2-100	Q9	2N5550 NPN Transistor	SSH-613
R20	220 Ohms, 1/4w, 5% Metal Film	RC/4-221	010	2N5401 PNP Transistor	SSH-708
R21	68 Ohms, 1/4w, 5% Carbon Film	RC/4-680	Q11	2N5550 NPN Transistor	SSH-613
R22	47 Ohms, 1/4w, 5% Carbon Film	RC/4-470	012	2SK1056 N-Channel MOSFET	SSH-710
R23	10 Ohms, 2w, 5% Metal Film	RM2-100	Q13	2SJ160 P-Channel MOSFET	SSH-709
R24	10 Ohms, 2w, 5% Metal Film	RM2-100	a14	2N5550 NPN Transistor	SSH-613
R25	30 Ohms, 1/2w, 5% Carbon Film	RC/2-300	Q15	2N5550 NPN Transistor	SSH-613
R26	2.7 Ohms, 1w, Metal Film	RM1-027	016	2N5401 PNP Transistor	SSH-708
R27	10 Ohms, 2w, 5% Metal Film	RM2-100	a17	2N5401 PNP Transistor	SSH-708
R28	10 Ohms, 2w, 5% Metal Film	RM2-100	018	2N5550 NPN Transistor	SSH-613
R29	1.1k Ohms, 1/4w, 1% Metal Film	RMP/4-1101	Q19	2N5401 PNP Transistor	SSH-708
R30	22.1k Ohms, 1/4w, 1% Metal Film	RMP/4-2212	Q20	2N5401 PNP Transistor	SSH-708
R31	47 Ohms, 1/4w, 5% Carbon Film	RC/4-470	M 1	2N2222 NPN Transistor	SSH-611
R32	47 Ohms, 1/4w, 5% Carbon Film	RC/4-470	Q22	2N5550 NPN Transistor	SSH-613
R33	10k Ohms, 1/4w, 1% Metal Film	RMP/4-1002	Q23	2N5401 PNP Transistor	SSH-708
R34	680 Ohms, 1/4w, 5% Carbon Film	RC/4-681	Q24	2N5550 NPN Transistor	SSH-613
R35	10 Ohms, 2w, 5% Metal Film	RM2-100	Q25	25K1056N-Channel MOSFET	SSH-710
R36	680 Ohms, 1/4w, 5% Carbon Film	RC/4-681	Q26	25J160 P-Channel MOSFET	SSH-709
R37	2.2k Ohms, 1/4w, 5% Carbon Film	RC/4-222	Q27	2N5550 NPN Transistor	SSH-613
R38	5.1 k Ohms, 5w, 5% Wire Wound	RWB5-502	Q28	2N5550 NPN Transistor	SSH-613
R39	22k Ohms, 1/4w, 1% Metal Film	RC/4-223	DIODES		
R40	1 .Ok Ohms, 1/4w, 5% Carbon Film	RC/4-102	CR1	1 N4148 Silicon Diode	SS-162
R41	1.1kOhms, 1/4w, 1% Metal Film	RMP/4-1101	CR2	1 N4148 Silicon Diode	SS-162
R42	22.1kOhms, 1/4w, 1% Metal Film	RMP/4-2212	CR3	1N4148 Silicon Diode	SS-162
R43	10 Ohms, 2w, 5% Metal Film	RM2-100	CR4	1 N4 148 Silicon Diode	SS-162
R44	27 Ohms, 1/4w, 5% Carbon Film	RC/4-270	CR5	1N4148 Silicon Diode	SS-162
R45	47 Ohms, 1/4w, 5% Carbon Film	RC/4-470	CR6	1 N4148 Silicon Diode	SS-162
R46	470 Ohms, 1/4w, 5% Carbon Film	RC/4-471	CR7	1N4148 Silicon Diode	SS-162
R47	10 Ohms, 2w, 5% Metal Film	RM2-100	CR8	1 N4148 Silicon Diode	SSI62
R48	220 Ohms, 2w, 5% Metal Film	RC/4-221	CR9	1 N4148 Silicon Diode	SS-162
R49	68 Ohms, 1/4w, 5% Carbon Film	RC/4-680	CR10	1N4148 Silicon Diode	SS-162
R50	47 Ohms, 1/4w, 5% Carbon Film	RC/4-470	CR11	1N5204B 10v, 1/2w, 5% Zener	SSH-600
R51	10 Ohms, 2w, 5% Metal Film	RM2-100	CR12	1 N5204B 1 0v, 1/2w, 5% Zener	SSH-600
R52	10 Ohms, 2w, 5% Metal Film	RM2-100	CR13	1N4148 Siliin Diode	SS-162
R53	30 Ohms, 1/2w, 5% Carbon Film	RC/2-300	CR14	1N4148 Silicon Diode	SS-162
R54	2.7 Ohms, 1w, Metal Film	RM1-027	CR15	1N4148 Siliin Diode	SS-162
R55	10 Ohms, 2w, 5% Metal Film	RM2-100	CR16	1N4148 Silicon Diode	SS-162
R56	10 Ohms, 2w, 5% Metal Film	RM2-100	CR17	1N4148 Silicon Diode	SS-162
R57	4.7kOhms, 1/2w, 5% Carbon Film	RC/2-472	CR18	1N4148 Silicon Diode	SS-162
R58	100kOhms, 1/4w, 1% Metal Film	RMP/4-1003	CR19	1N4148 Silicon Dii	SS-162
R59	12.1 Ohms, 1/4w, 1% Metal Film	RMP/4-1212	CR20	1N4148 Silicon Diode	SS-162
R60	10kOhms, 1/4w, 1% Metal Film	RMP/4-1002	CR21	1N4148 Silicon Diode	SS-162
R61	33k Ohms, 1/4w, 5% Carbon Film	RC/4-333	CR22	1N4148 Silicon Diode	SS-162
R62	10k Ohms, 1/4w, 5% Carbon Film	RC/4-100	CR23	1N4148 Silicon Diode	SS-162
R63	33k Ohms, 1/4w, 5% Carbon Film	RC/4-333	CR24	1N4148 Silicon Diode	SS-162
R64	5.11 k Ohms, 1/4w, 1% Metal Film	RMP/4-5111	CR25	1N4148 Silicon Diode	SS-162
R65	1 k Ohms, 1/4w, 1% Metal Film	RC/4-1002	CR26	1N5204B 10v, 1/2w, 5% Zener	SSH-600
R67	22k Ohms, 1/4w, 5% Carbon Film	RC/4-223	CR27	1N5204B 10v, 1/2w, 5% Zener	SSH-600
CAPACITORS			CR28	1N4148 Silicon Diode	SS-162
C 1	2.2 mfd, 50v, 20%, Polypropylene	CPP-205C	CR29	1N4148 Silicon Diode	SS-162
c 2	220 pfd, 75v, 10%, Polypropylene	CPP-221	CR30	1N4148 Silicon Diode	SS-162
c 3	330 pfd, 630v, 3%, Dii Mica	CM-331	CR31	1 N5245B 15v, 1/2w, 5% Zener	SS-212
C4	100 mfd, Non-Polar Radial	CERNP-107	TRANSFORMERS		
c5	47 pfd, 650v, 3%, Dipped Mica	CM470	T101	Domestic Transformer	TT-P125
C6	220 pfd, 75v, 10% Polypropylene	CPP-221	T102	Export Transformer	TT-P125E1A
c 7	3 pfd, 500v, Dipped Mica	CM-030	THERMISTORS		
C8	0.001 mfd, 250v, 10%, Polypropylene	CPP-102	TS1	ThermistorMEPCO#2322-640-63103	SSH-730
c9	100 mfd, 50v, 20%, Polar/Electrolytic	CER-107C	TS1	ThermistorMEPCO#2322-640-63103	ssh-n-730
C 10	0.1 mfd, 100v, 20%, Polyester	CP-104A	FUSES		
C11	0.1 mfd, 100v, 20%, Polyester	CP-104A	F1	4A, AGC/3AG	FS-004
C12	0.33 mfd, 160v, 10%, Polypropylene	CPP-333	F2	4A, AGC/3AG	FS-004
C13	0.1 mfd, 100v, 20%, Polyester	CP-104A	F3	4A, AGC/3AG	FS-004
C14	100 mfd, 50v, 20%, Polar/Electrolytic	CP-104A	F4	4A, AGC/3AG	FS-004
C15	0.1 mfd, 100v, 20%, Polyester	CER-107C	F101	5A Slo-BloAGC Fuse	FS-005SB
C16	0.1 mfd, 100v, 20%, Polyester	CM470	MISCELLANEOUS		
C17	220 pfd, 75v, 10%, Polypropylene	CPP-221	P1	1 k Ohms, variable	RVH-102
C18	330 pfd, 630v, 3%, Dipped Mica	CM-331	P2	500 Ohms, variable	RVH-501
C19	100 mfd, Non-Polar Radial	CERNP-107	P3	1 k Ohms, variable	RVH-102
C20	47 pfd, 650v, 3%, Dipped Mica	CM470	P4	500 Ohms, variable	RVH-501
c21	220 pfd, 75v, 10%, Polypropylene	CPP-221	L1	6 Microhenry, inductor	TT-6.0
C22	3 pfd, 500v, Dipped Mica	CM-030	L2	6 Microhenry, inductor	TT-6.0
C23	0.001 mfd, 250v, 10%, Polypropylene	CPP-102	DB101	Diode Bridge, 25A	SSH-629
C24	100 mfd, 50v, 20%, Polar/Electrolytic	CER-107C	S101	3-way switch	SWH-144
C25	0.1 mfd, 100v, 20%, Polyester	CP-104A			
C26	0.1 mfd, 100v, 20%, Polyester	CP-104A			
C27	0.33 mfd, 160v, 10%, Polypropylene	CPP-333			
C28	0.1 mfd, 100v, 20%, Polyester	CP-104A			
C29	1 00 mfd, 50v, 20%, Polar/Electrolytic	CER-107C			

CABINET ASSEMBLY PARTS LIST

REFERENCE NO.	PART NO.	DESCRIPTION
A.		Cover- SE120
B.		SE120 Domestic transformer screw SE120 Export transformer
C.		#10-32x1/2hex socket head screw
D.		PC-58 board kit- SE120
E.		L-bracket - SE120
F.		Painted heatsink- SE1 20
G.		Faceplate- SE120
H.		(6) 1/2 sm hex socket head screw
I.		Chassis- SE120
J.		#10-32x1/2 hex socket head screw
K.		Standoff post
L.		On/off switch
M.		SE 120 overlay



**OPEN FACE VIEW
OF SE120**



PACKING ASSEMBLY PARTS LIST

SYMBOL NO.	PARTNO.	DESCRIPTION
A.	INSTAPACK	PACKING FOAM
B.	LIT-I 20M	SE1 20 INSTRUCTION MANUAL
C.	FG-SE120	120 AMPLIFIER
D.	PM-701	BOX-SE1 20
	LIT-WAR	WARRANTY CARD

