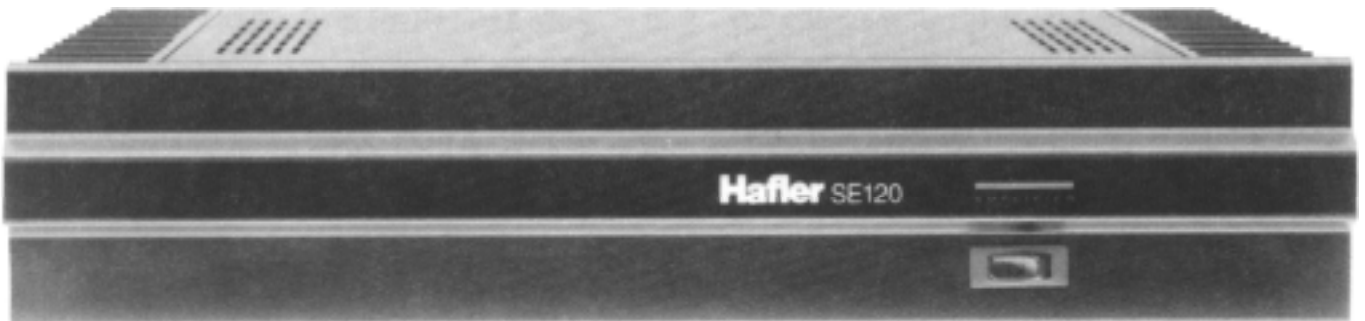


THE Hafler SE120

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 SE1 20 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.

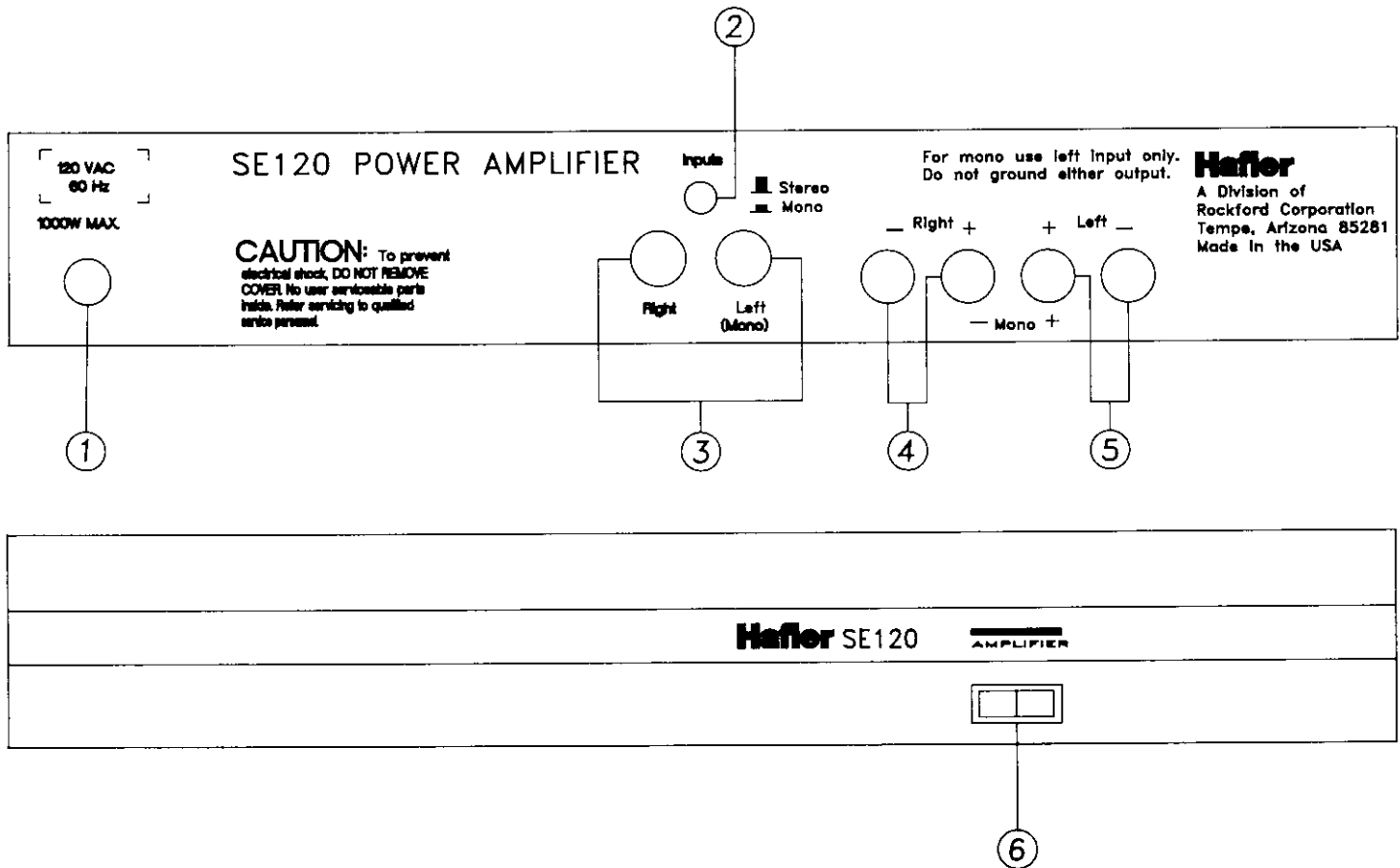
SWITCHES AND TERMINALS

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.

- When used as a two channel stereo system the input switch is set in the out position.
- 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 |

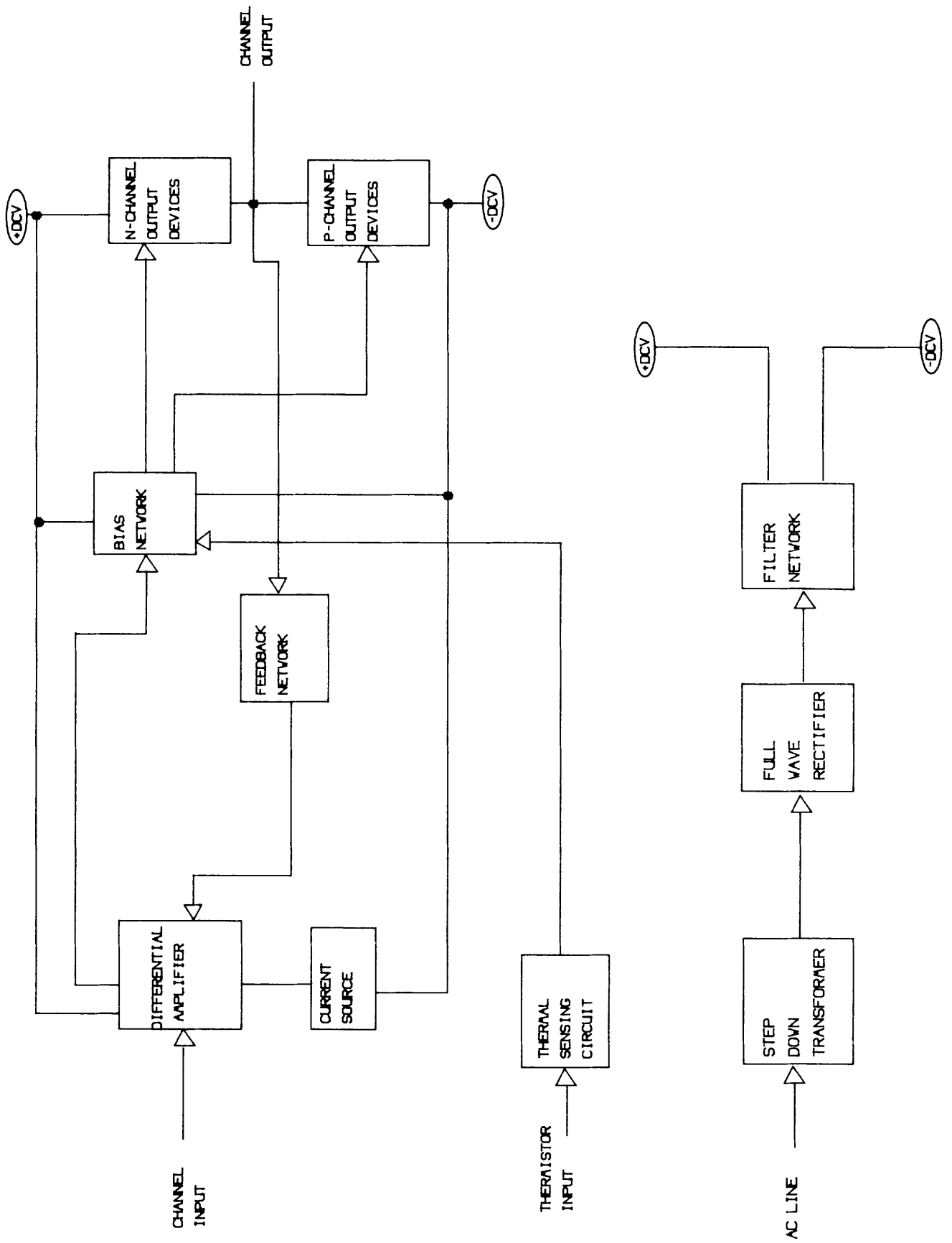
IC VOLTAGE VALUES

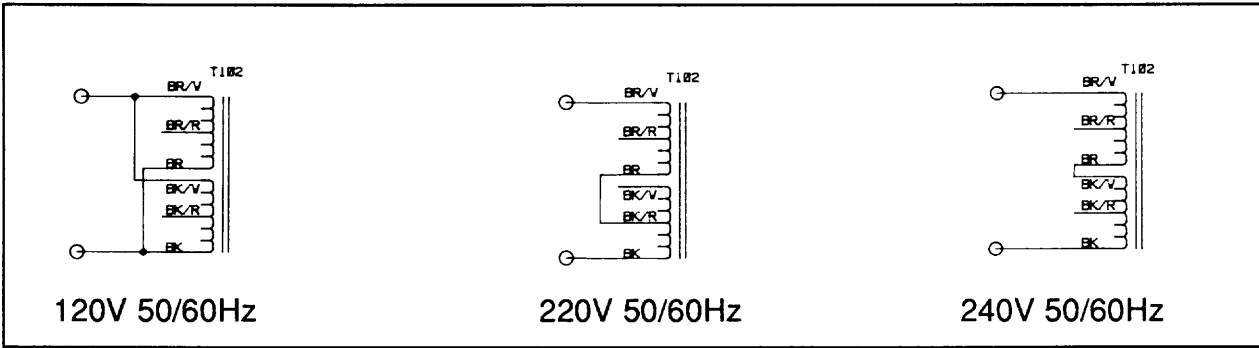
IC

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

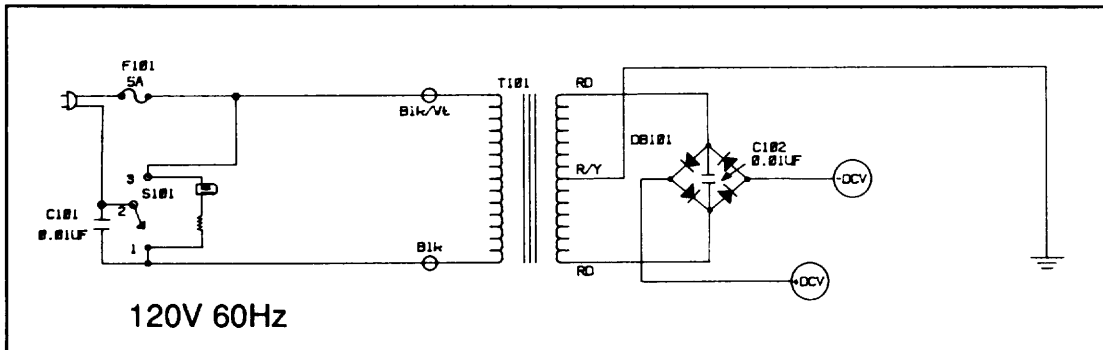
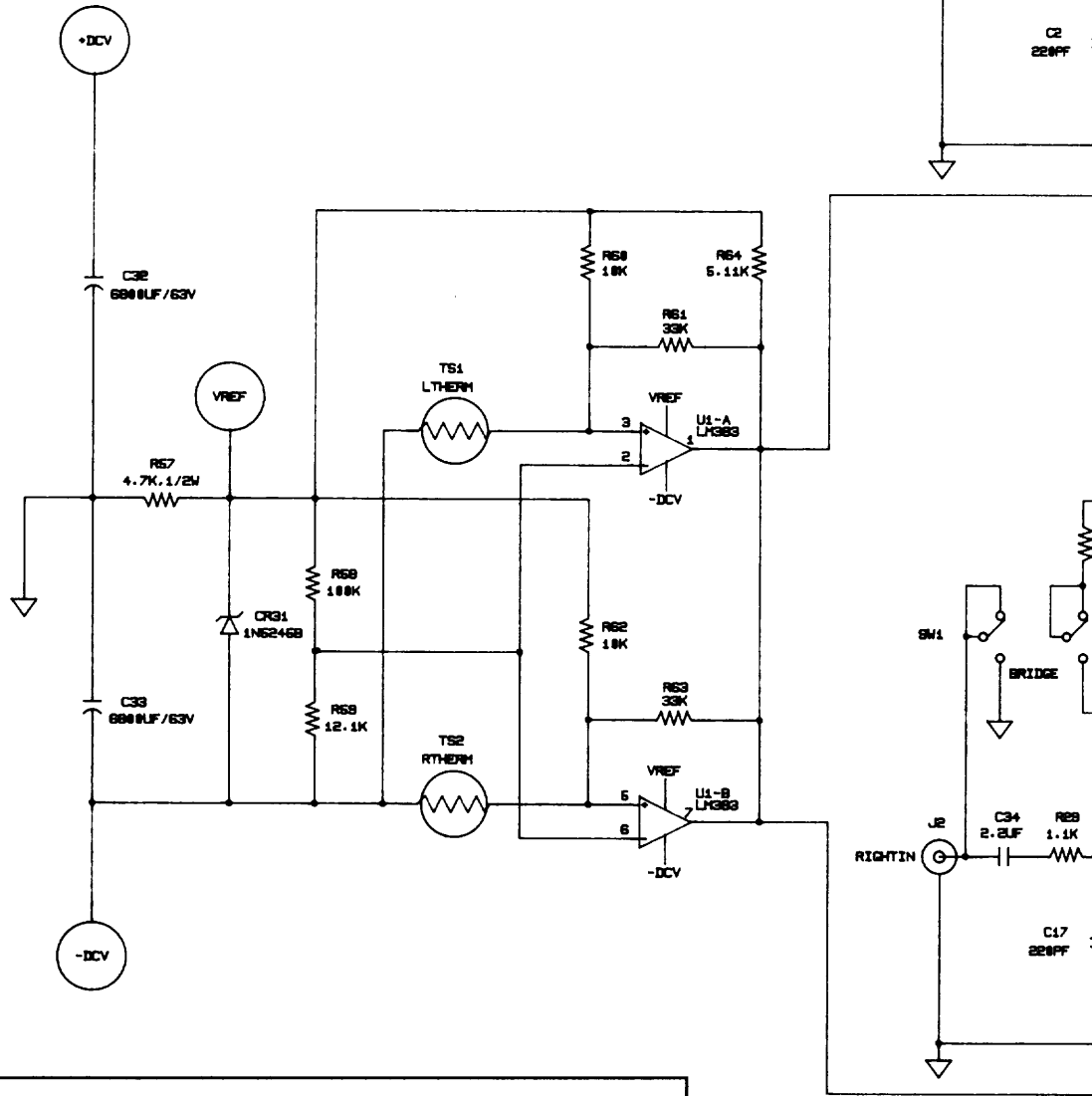
-DCV -54.0
+DCV 54.0

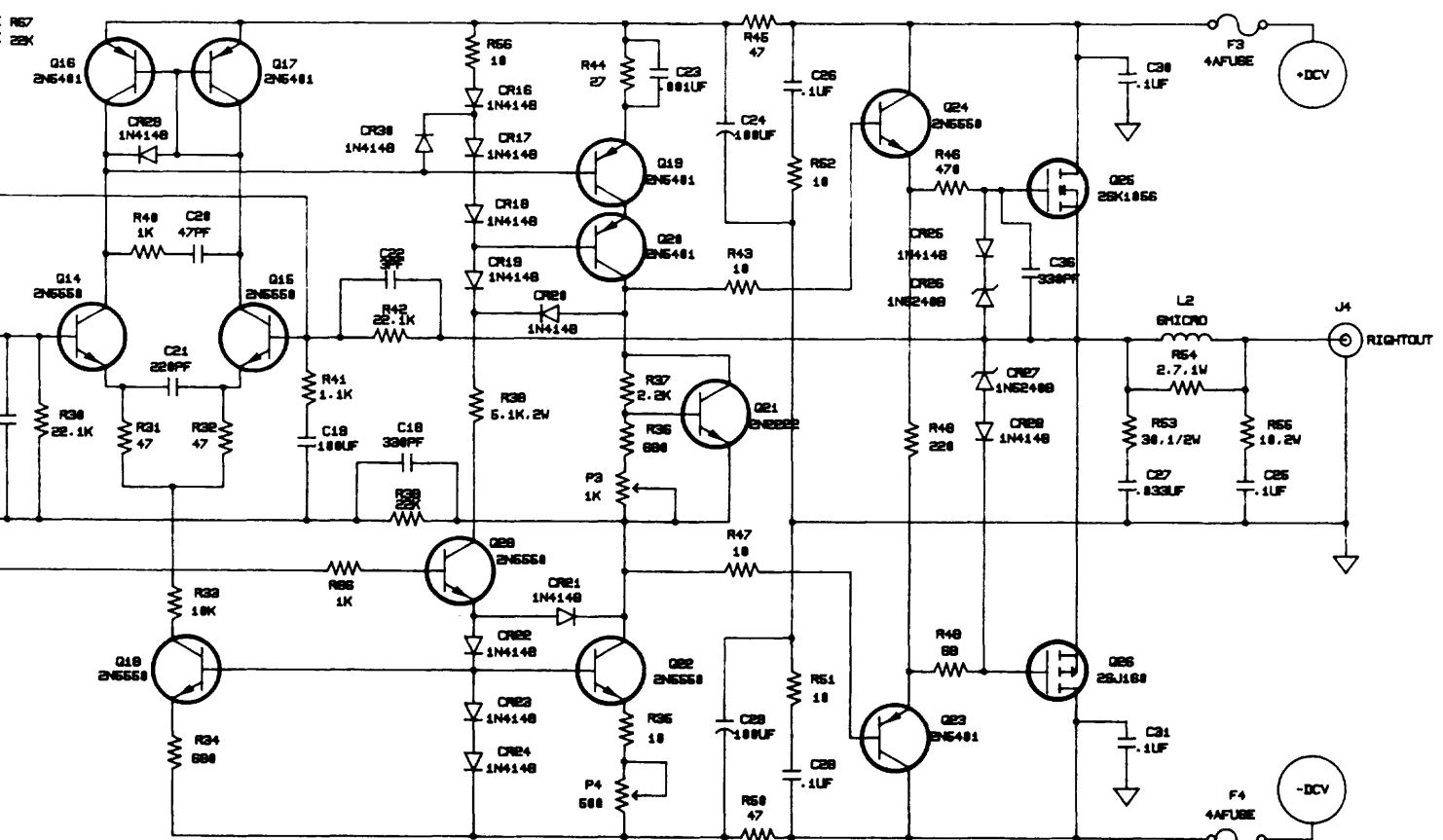
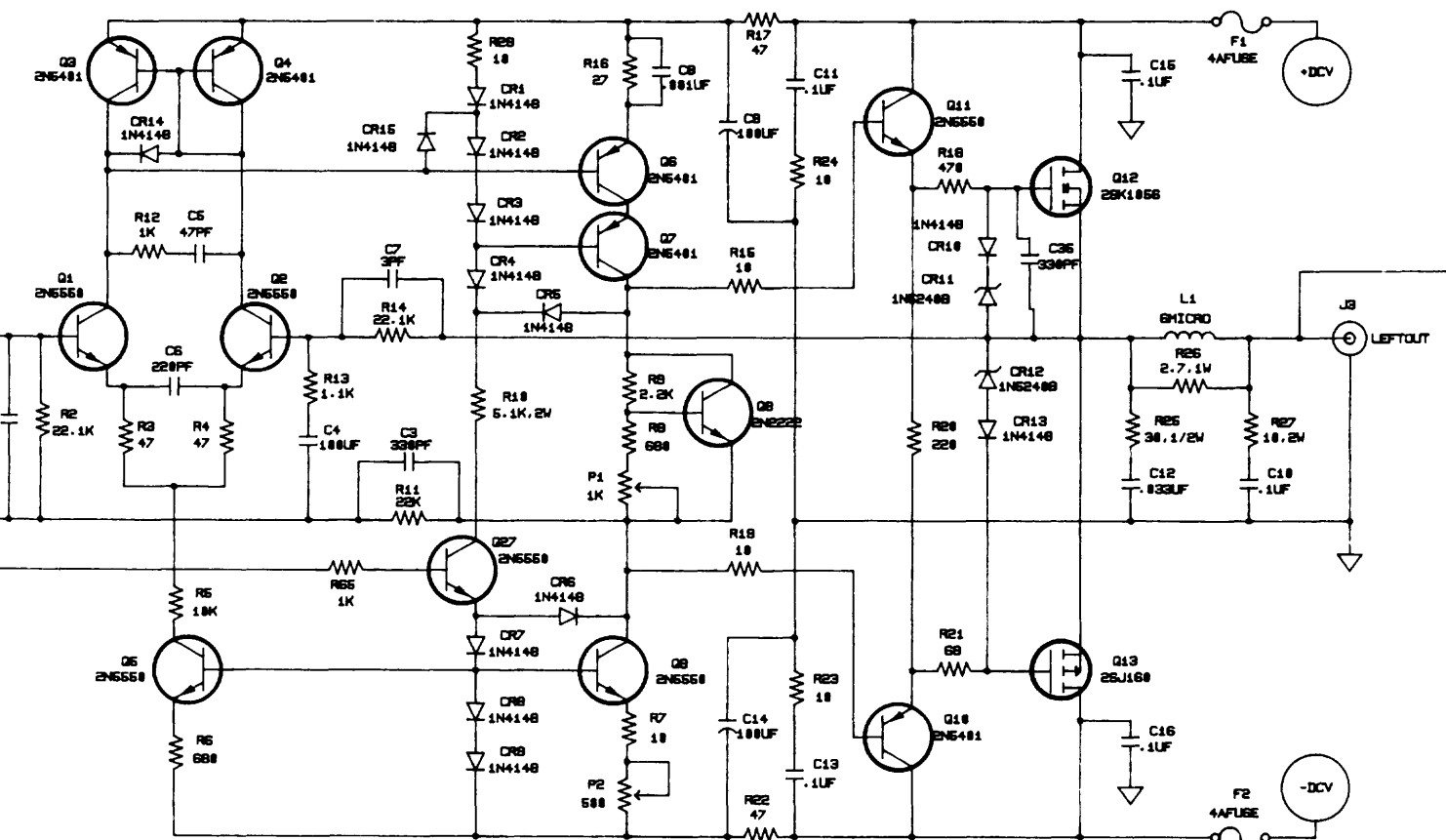
SE120 BLOCK DIAGRAM



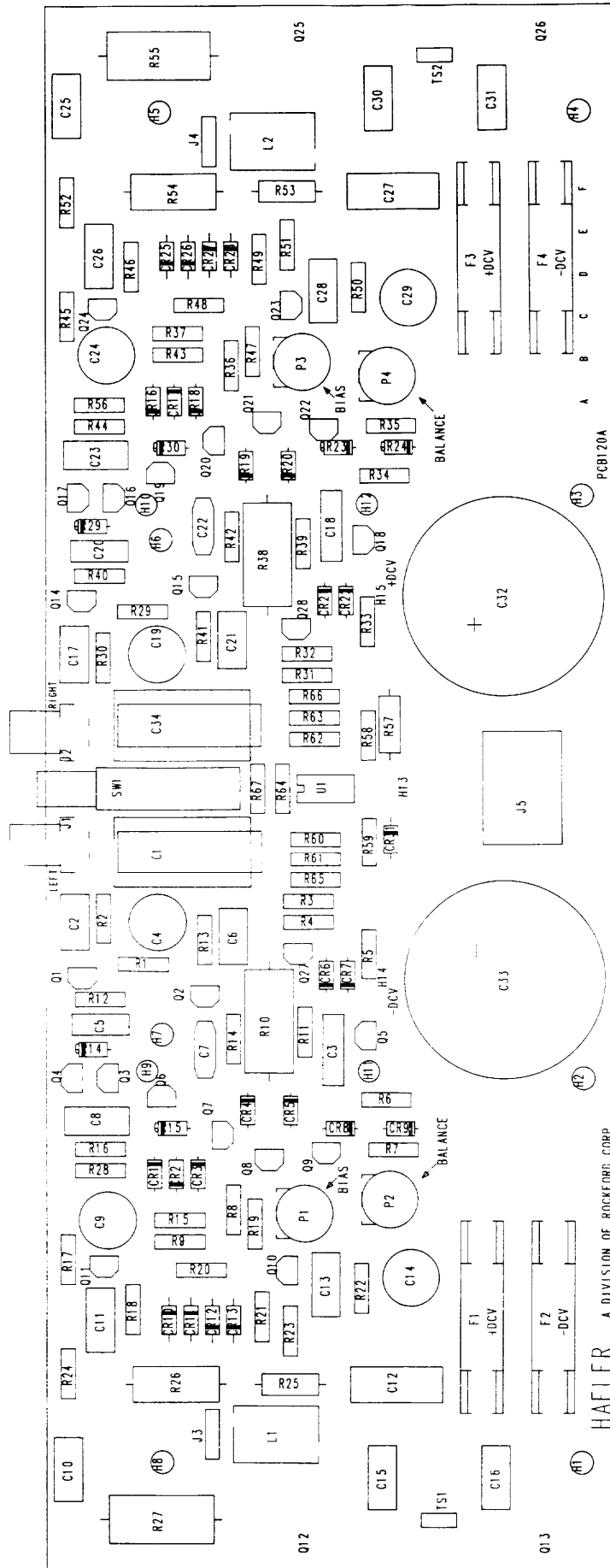


**SE120
SCHEMATIC
DIAGRAM**





PC58 BOARD LAYOUT



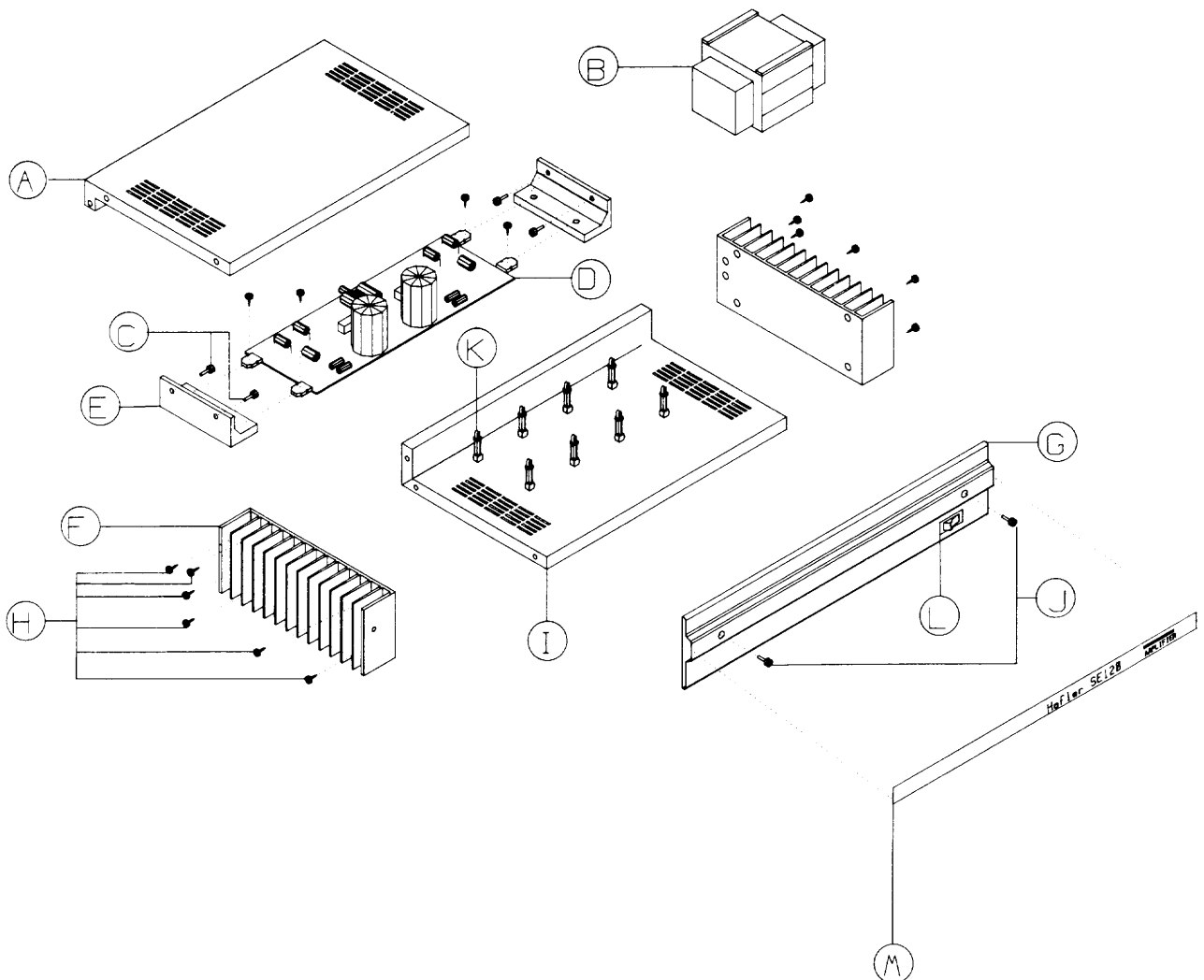
H16 H17 H18 H19 H20 H21

COMPONENT SIDE

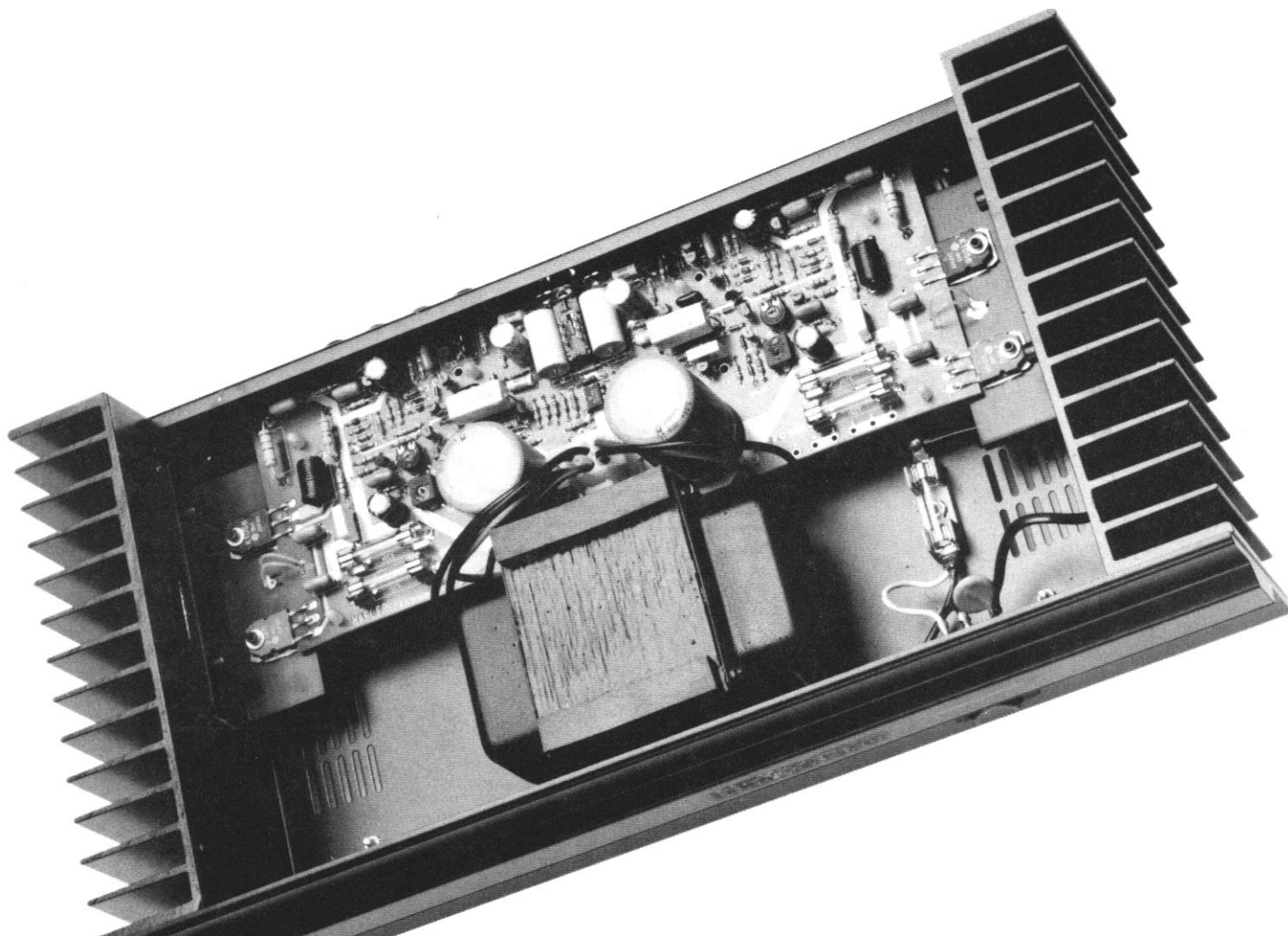
| SYMBOL NOa | PART DESCRIPTION | PART NO. | SYMBOL NO. | PART DESCRIPTION | PART NO. |
|-------------------|--|------------------|----------------------|---|------------|
| RESISTORS | | | | | |
| R1 | 1.1kOhms, 1/4w, 1% Metal Film | RMP/4-1101 | C30 | 0.1 mfd, 100v, 20%. Polyester | CP-104A |
| R2 | 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 | C101 | 0.01 mfd, 100v, 20%, Polyester | CP-103/20 |
| R9 | 2.2k Ohms, 1/4w, 5% Carbon Film | RC/4-222 | C102 | 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 | 1.0k Ohms, 1/4w, 5% Carbon Film | RC/4-102 | Q2 | 2N5550 NPN Transistor | SSH-613 |
| R13 | 1.1k Ohms, 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 | 1.0k Ohms, 1/4w, 5% Carbon Film | RC/4-102 | CR1 | 1 N4148 Silicon Diode | SS-162 |
| R41 | 1.1k Ohms, 1/4w, 1% Metal Film | RMP/4-1101 | CR2 | 1 N4148 Silicon Diode | SS-162 |
| R42 | 22.1k Ohms, 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 N4148 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 | 1N4148 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 10v, 1/2w, 5% Zener | SSH-600 |
| R52 | 10 Ohms, 2w, 5% Metal Film | RM2-100 | CR13 | 1N4148 Silicon 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 Silicon 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 | 4.7k Ohms, 1/2w, 5% Carbon Film | RC/2-472 | CR18 | 1N4148 Silicon Diode | SS-162 |
| R58 | 100k Ohms, 1/4w, 1% Metal Film | RMP/4-1003 | CR19 | 1N4148 Silicon Diode | SS-162 |
| R59 | 12.1 Ohms, 1/4w, 1% Metal Film | RMP/4-1212 | CR20 | 1N4148 Silicon Diode | SS-162 |
| R60 | 10k Ohms, 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 | | | | | |
| C 1 | 2.2 mfd, 50v, 20%, Polypropylene | CPP-205C | CR28 | 1N4148 Silicon Diode | SS-162 |
| c 2 | 220 pfd, 75v, 10%, Polypropylene | CPP-221 | CR29 | 1N4148 Silicon Diode | SS-162 |
| c 3 | 330 pfd, 630v, 3%, Dii Mica | CM-331 | CR30 | 1N4148 Silicon Diode | SS-162 |
| C4 | 100 mfd, Non-Polar Radial | CERNP-107 | CR31 | 1 N5245B 15v, 1/2w, 5% Zener | SS-212 |
| c5 | 47 pfd, 650v, 3%, Dipped Mica | CM470 | TRANSFORMERS | | |
| C6 | 220 pfd, 75v, 10% Polypropylene | CPP-221 | T101 | Domestic Transformer | TT-P125 |
| c 7 | 3 pfd, 500v, Dipped Mica | CM-030 | T102 | Export Transformer | TT-P125E1A |
| C8 | 0.001 mfd, 250v, 10%, Polypropylene | CPP-102 | THERMISTORS | | |
| c9 | 100 mfd, 50v, 20%, Polar/Electrolytic | CER-107C | TS1 | ThermistorMEPCO#2322-640-63103 | SSH-730 |
| C 10 | 0.1 mfd, 100v, 20%, Polyester | CP-104A | TS1 | ThermistorMEPCO#2322-640-63103 | ssn-730 |
| C11 | 0.1 mfd, 100v, 20%, Polyester | CP-104A | FUSES | | |
| C12 | 0.33 mfd, 160v, 10%, Polypropylene | CPP-333 | F1 | 4A, AGC/3AG | FS-004 |
| C13 | 0.1 mfd, 100v, 20%, Polyester | CP-104A | F2 | 4A, AGC/3AG | FS-004 |
| C14 | 100 mfd, 50v, 20%, Polar/Electrolytic | CER-107C | F3 | 4A, AGC/3AG | FS-004 |
| C15 | 0.1 mfd, 100v, 20%, Polyester | CP-104A | F4 | 4A, AGC/3AG | FS-004 |
| C16 | 0.1 mfd, 100v, 20%, Polyester | CP-104A | F101 | 5A Slo-BloAGC Fuse | FS-005SB |
| C17 | 220 pfd, 75v, 10%, Polypropylene | CPP-221 | MISCELLANEOUS | | |
| C18 | 330 pfd, 630v, 3%, Dipped Mica | CM-331 | P1 | 1 k Ohms, variable | RVH-102 |
| C19 | 100 mfd, Non-Polar Radial | CERNP-107 | P2 | 500 Ohms, variable | RVH-501 |
| C20 | 47 pfd, 650v, 3%, Dipped Mica | CM470 | P3 | 1 k Ohms, variable | RVH-102 |
| c21 | 220 pfd, 75v, 10%, Polypropylene | CPP-221 | P4 | 500 Ohms, variable | RVH-501 |
| C22 | 3 pfd, 500v, Dipped Mica | CM-030 | L1 | 6 Microhenry, inductor | TT-6.0 |
| C23 | 0.001 mfd, 250v, 10%, Polypropylene | CPP-102 | L2 | 6 Microhenry, inductor | TT-6.0 |
| C24 | 100 mfd, 50v, 20%, Polar/Electrolytic | CER-107C | DB101 | Diode Bridge, 25A | SSH-629 |
| C25 | 0.1 mfd, 100v, 20%, Polyester | CP-104A | S101 | 3-way switch | SWH-144 |
| 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 | 100 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 |

