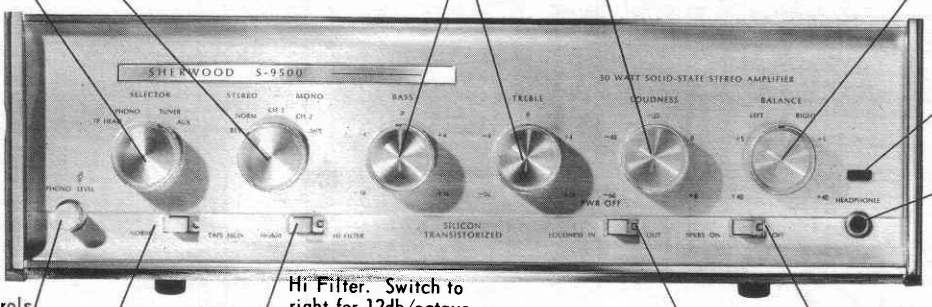
S-9500 50 WATT ALL SILICON

INTEGRATED TRANSISTOR AMPLIFIER



Function Switch controls stereo or mono operation.

Selects left and right input channel simultaneously.

Tone controls for both channels. Adjustment of the Bass or Treble control knob will vary the tone of both channels simultaneously.

Main control for Power on-off and Loudness of both channels. Automatically boosts bass at low levels (if switch below at "Loudness In").

Controls left-to-right stereo balance

Pilot Light

Stereo headphone jack

Phono Gain. Controls preamp level only.

Hi Filter. Switch to right for 12db/octave attenuation of undesired tones such as record "scratch".

Speaker "on-off" switch. Normally set to left, will disconnect speakers when switched to right.

Tape Monitor Switch. Normally set to left, will connect in tape monitor jack on rear if switched to right.

Loudness Compensation Switch. Normally set to left, will remove circuit which boosts bass at low settings of Loudness control if switched to right.

DESIGN-CENTER SPECIFICATIONS*

INPUTS:
6 high level (2 tape monitor), 2 (RIAA) Phono-preamp., 2 (NAB) tapehead preamp.

POWER OUTPUT: Stereo–Each channel 25 watts music power (20 watts continuous) at 1.5% IM distortion (60c:7kc/4:1).

OUTPUTS: 4 to 16-ohm left and right spkr.; stereo headphone and record output.

INVERSE FEEDBACK: 45db.

DAMPING FACTOR: 15:1 at 8 ohms.

FREQUENCY RESPONSE:
(20w) 20cps to 20kc ±1db.

TONE CONTROL RESPONSE:
Flat setting, 20 cps to 20 kc ±1 db.

TONE CONTROL RANGE:
15 kc, 15db. boost or cut.
40 cps. 16db. boost or cut.

MAX. INPUT CAPABILITY:
Phono: 35mv. for less than .1% dist.
Radio: 2.8v. for less than .1% dist.

PREAMP. EQUALIZER CURVES:
AES/RIAA phono and NAB tape.

SENSITIVITY:
Radio–0.25v. Phono–1.8mv.
Tape head–.8mv. (PH and TP inputs are adjustable with Phono Gain control).

MAX. HUM and NOISE:
Vol. control min., 90db. (weighted) below rated output. Tuner input (controls maximum), 80db. (weighted) below rated output. Phono input (controls flat), 70db. below rated output.

INTERCHANNEL CROSSTALK:
Better than - 45db at 1 kc.

POWER CONSUMPTION:
115-125v, 60 cps; 10 to 100 watts fused.

TRANSISTOR COMPLEMENT:
20 silicon transistors
2 silicon rectifiers

SIZE: 11 x 12½ x 4 in. high.

SHIPPING WEIGHT: 20 lbs.

**All specifications with 120V AC line.*

TURN PAGE FOR COMPLETE SERVICE INFORMATION

VOLTAGE CHECKS

Preliminary checks of the D.C. voltages present at various points in the S-9500 can prove useful in locating defective components. They are inconclusive, however, in determining if transistors are operating properly in all aspects. They can only indicate whether the transistor is open, shorted or functioning, not how well the transistor is functioning.

IN GENERAL:

- Correct voltages indicate a functioning transistor.
- The same voltage at the collector and emitter indicates a shorted transistor.
- Full supply voltage on the collector and no voltage on the emitter indicates an open transistor.

OUTPUT TRANSISTOR BIAS

Of all the specifications which require checking to ascertain correct performance of the S-9500, proper output transistor operation is the most important and critical. Adjustment of the output transistor bias is necessary if output transistors are replaced*, or the amplifier exhibits one or more of the following symptoms:

1. Overheating of the output transistors under normal operating conditions.
2. Excessive low level Intermodulation Distortion — more than 0.1% at 1.5 volts across 8 ohms (0.28 watt output).

Adjustment of output transistor bias should then proceed as follows:

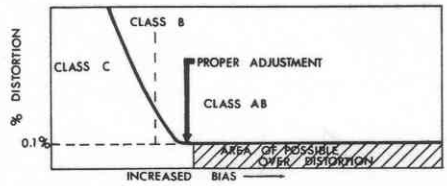


FIG. 1

1. Turn amplifier off.
2. Set balance pots (R52 and R152) to mechanical center and bias pots (R60 and R160) fully counter-clockwise.
3. Connect D.C. voltmeter of at least 3% known accuracy to the hot side of the appropriate channel's output capacitor.
4. Turn amp. on and adjust balance pot (R52 or R152) so that exactly 1/2 B+ voltage is on the output capacitor.
5. Turn volume control to maximum. Connect an Intermodulation Distortion analyzer to the amplifier aux. input and adjust the analyzer output for an amplifier output of 1.5V across 8 ohms. (Because the output stages have been set into heavy class "B" operation by the "pre-setting" in Step 2, a class "B" notch in the distortion waveform will be obvious.) Adjust the bias pot (R60 or R160) for **minimum distortion** as shown in Fig. 1.

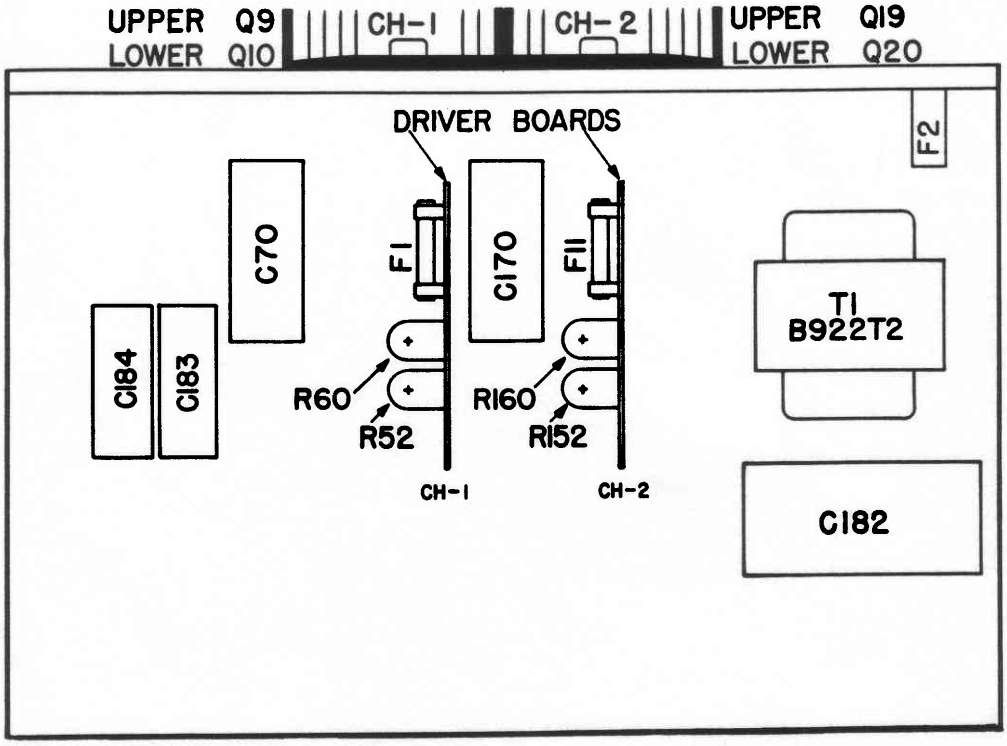
   IMPORTANT: Misadjustment of the bias pot can cause heavy class "A" operation of the output transistors, causing them to overheat.
6. The following performance indicates a properly operating output stage:
   - Typically 0.1% I.M. distortion at 1.5V across 8 ohms.
   - Typically 1% I.M. distortion at 10V across 8 ohms.
   - 20 watts of power per channel, before clipping; both channels operating.

* It is extremely important that the mica insulating washers used to separate the output transistors from their heat-sinks be unbroken and installed properly, with silicon grease liberally applied to all surfaces in contact with each other. Also, make certain the emitter and base pins of the output transistors do not contact any part of the heat-sinks. (See parts list, Page 6A.)

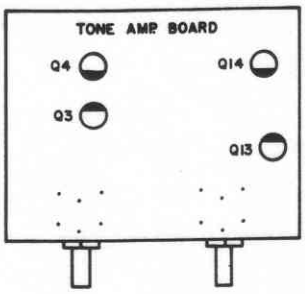
NOTE: The fuses located on each channel's driver board protect the output transistors against very heavy transients or short circuits. They should be replaced with identical fuses when blown.

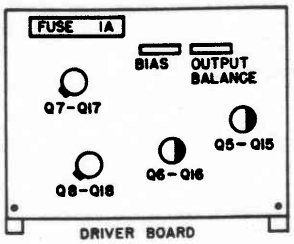
PULL OUT FOR CHASSIS LAYOUT ——————→

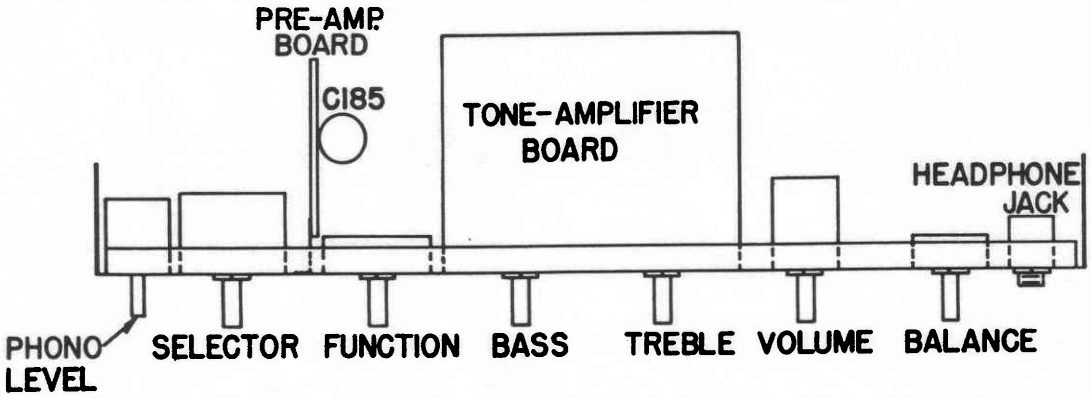
S-9500 CHASSIS LAYOUTS

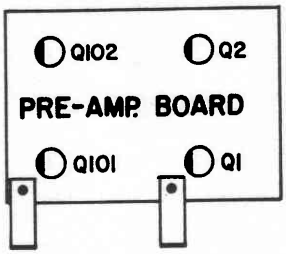


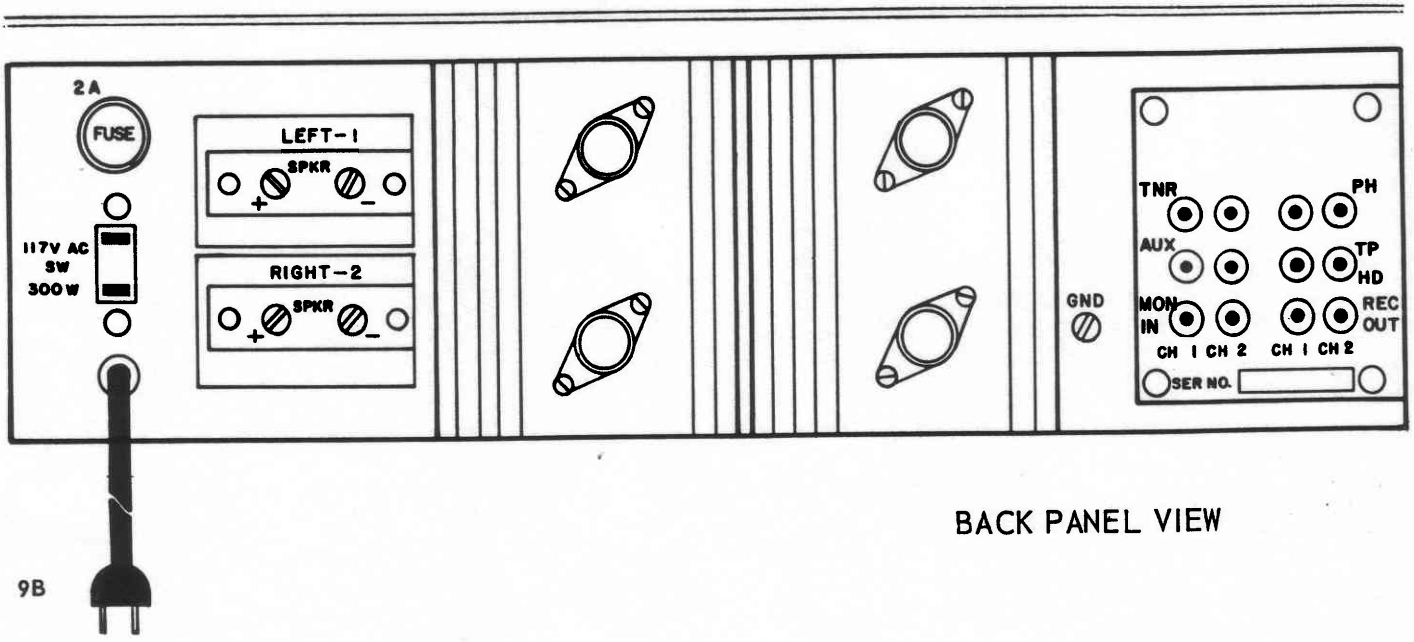
(ALL P-C BOARDS VIEWED FROM TRANSISTOR SIDE)











BACK PANEL VIEW

S-9500 PARTS LIST

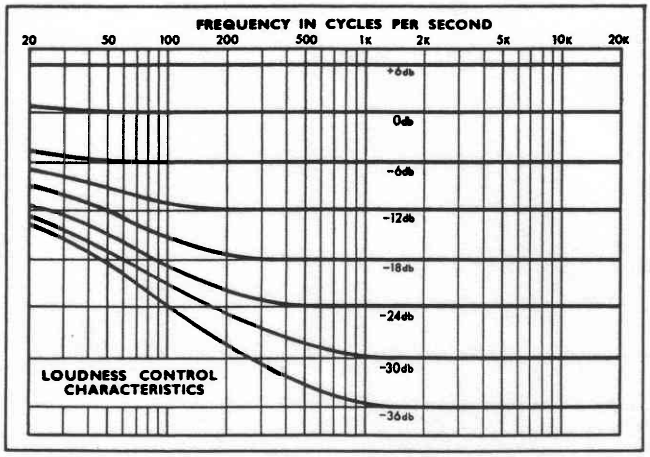
TRANSISTOR	PART NO.		COST PER UNIT	LIST
Low Signal–No Dot	2N3391 A			1.49
Low Signal–Yellow Dot	2N3392			1.31
Low Signal–Org. Dot	2N3393			1.26
Pre-Driver	2M3416			3.69
PNP Driver	SL3101			6.08
NPN Driver	4JX7A995			3.60
Output	S354			6.75

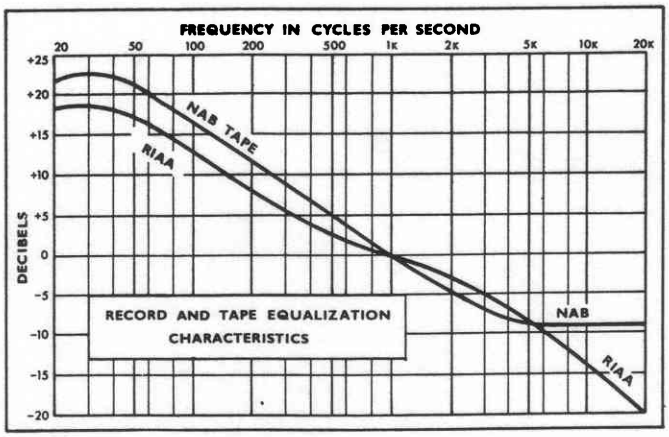
You will note that all transistors used in the S-9500 are color-coded with a dot or mark of some color prominently located on the top of their case. (Some transistors have no mark, but this also is identification.) When ordering replacement transistors, it is imperative that you indicate not only its part no., but the color dot on the transistor body: red, yellow, none, etc. This is particularly important when replacing output transistors.

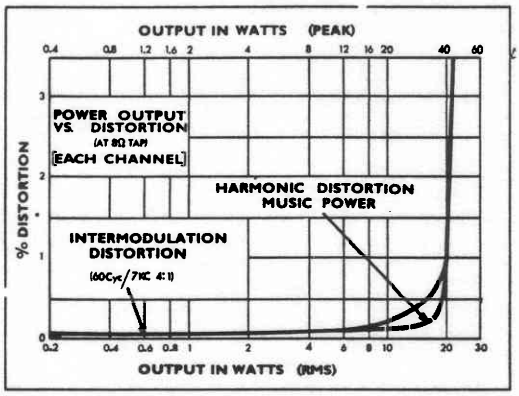
DESCRIPTION	PART NO.	COST PER UNIT	LIST
.5 μf @ 50V	B120X3		.59
1 μf @ 15V	B120X1		.63
5 μf @ 5V	B120X4		.63
5 μf @ 20V	B120X6		.63
20 μf @ 5V	B120X12		.63
20 μf @ 50V	B120X14		.53
100 μf @ 3V	B120X24		.53
500 μf @ 25V	B120X31		1.31
500 μf @ 40V	B120X29		1.80
1 μf @ 15V	B120X5		.63
1500 μf @ 35V	A120T7		3.38
1500 μf @ 65V	A120T8		3.74
Mica Insulator	A021F2		.09
Phono P-C Bd.	A031T7		3.33
Pre-Amp P-C Bd.	A031T5		3.83
Driver P-C Bd.	A031T6		2.48
Fuse, 1 Amp.	312001		.14
Fuse, 2 Amp.	312002		.14
Knob (Blue Dot)	A460L7-4		.50

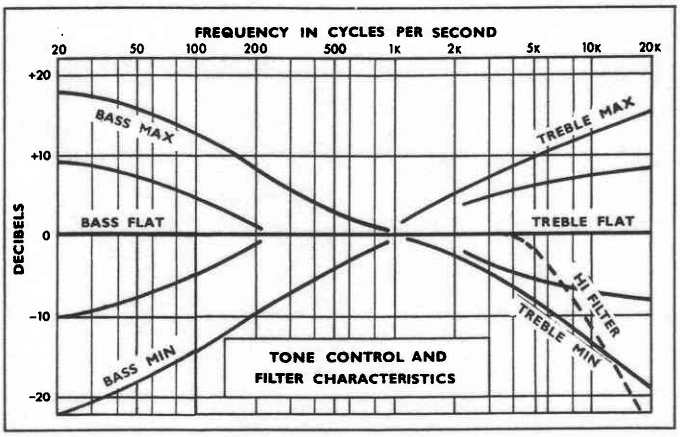
DESCRIPTION	PART NO.	COST PER UNIT	LIST
Knob (Org. Dot)	A460L10-4		.54
Knob (Phono Level)	A460B5-2		.15
Bass Control	A670T5		2.52
Treble Control	A670T6		2.52
Volume Control	A671T1		3.42
Balance Control	A670T7		.81
Phono Level Control	A670T3		1.80
P-C Pot. 500Ω	A675T1		.90
P-C Pot. 150K	A675T2		.90
Germanium Diode	A691M3		.27
B+ Rect.	A692T3		1.13
Output Trans. Skt.	A790T3		.15
Driver Trans. Skt.	A790T4		.25
Headphone Jack	A795L1		1.04
Fuse Post	A796X1		.75
Function Switch	A860K5-1		1.62
Selector Switch	A860K3-6		4.19
Slide Switch	A864T4		.59
Power Transformer	B922T2-2		10.65

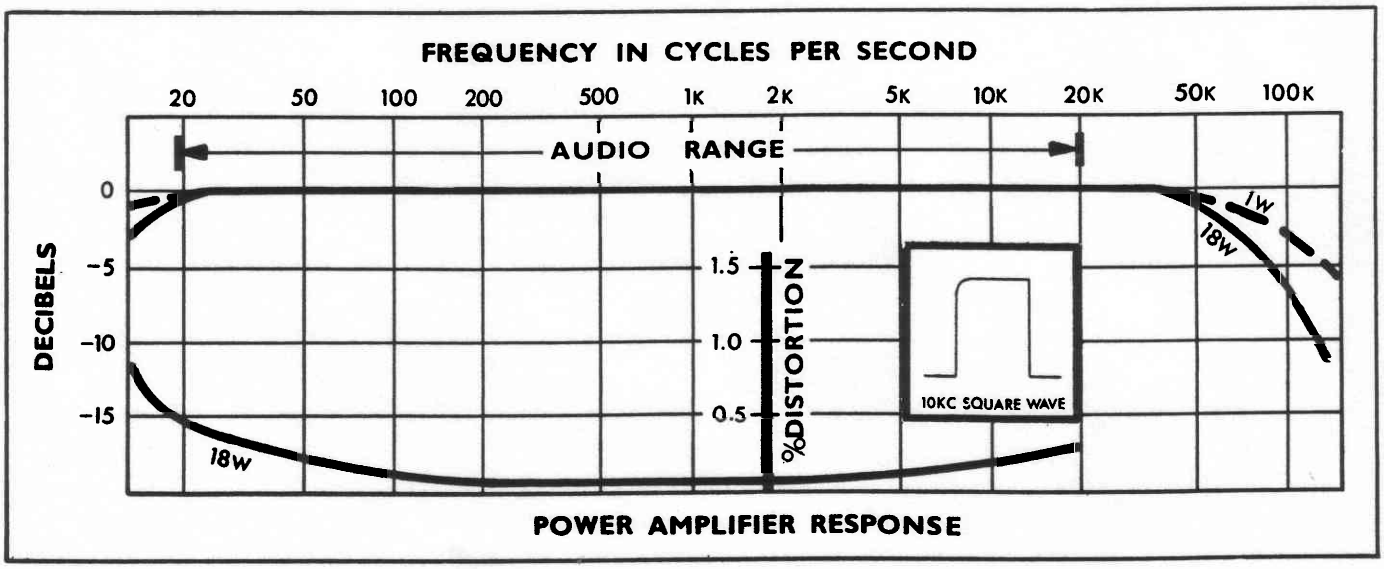
S-9500 PERFORMANCE GRAPHS

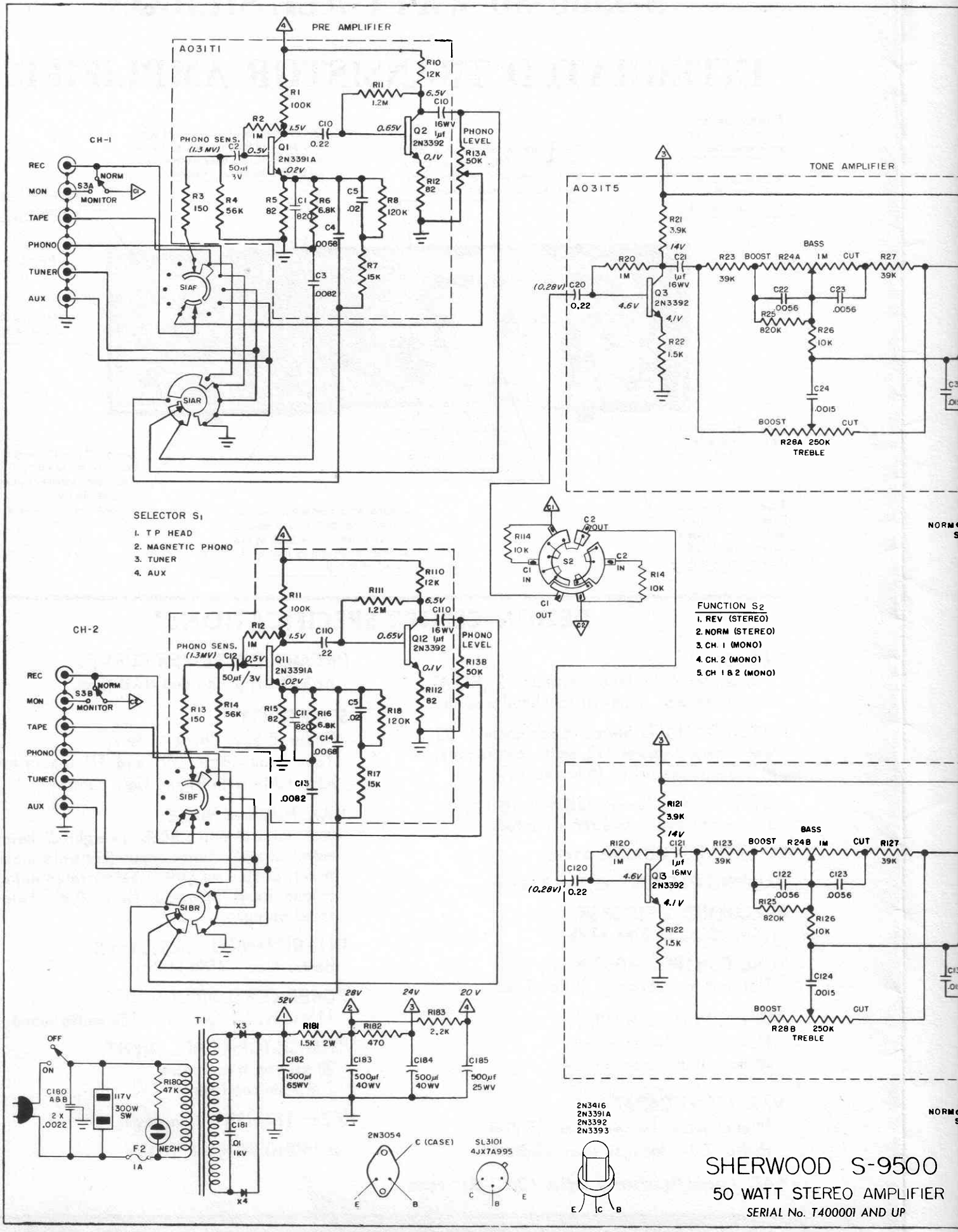








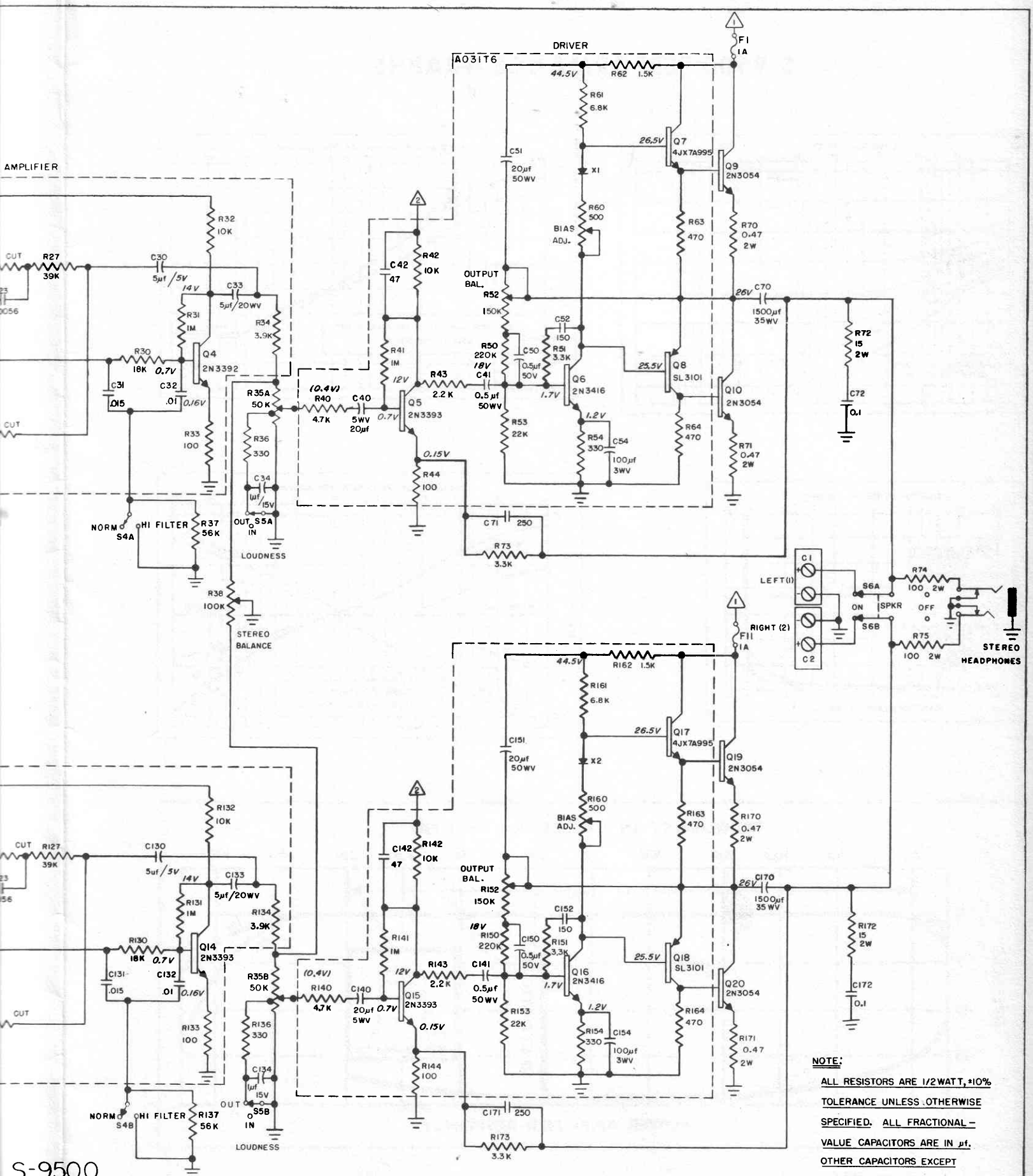




SHERWOOD S-9500

50 WATT STEREO AMPLIFIER

SERIAL No. T400001 AND UP



S-9500

O AMPLIFIER

001 AND UP

NOTE:

ALL RESISTORS ARE 1/2 WATT, ±10% TOLERANCE UNLESS OTHERWISE SPECIFIED. ALL FRACTIONAL-VALUE CAPACITORS ARE IN µf. OTHER CAPACITORS EXCEPT ELECTROLYTICS ARE IN pf.