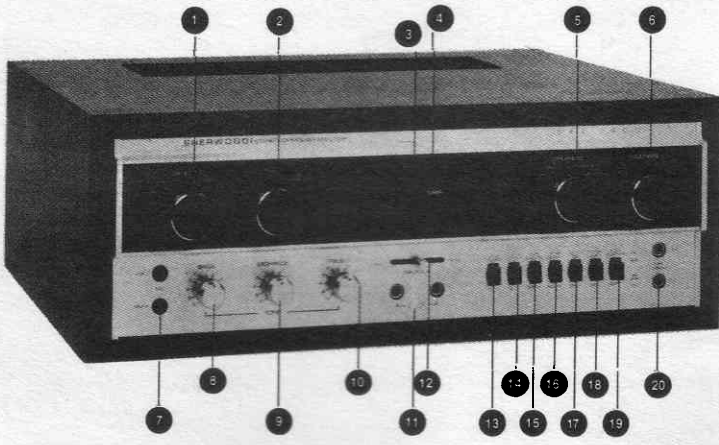


SEL 400

SHERWOOD

MODEL SEL-400

STEREO AMPLIFIER SERVICE MANUAL



1. **SELECTOR:**
Selects listening source: Mic, Phono 2, Phono 1, Tuner, Aux 1, or Aux 2.
2. **MODE:**
Provides for selection of Stereo, Stereo Reverse, Mono, Left, or Right Channels.
3. **POWER ON:**
Tells you that the amplifier is On.
4. **FUNCTION LIGHTS:**
Tells you the position of the Selector control.
5. **SPEAKERS:**
Selects Main speakers, Remotes, Both, or Off.

6. **LOUDNESS/VOLUME:**
Master Power ON/OFF and Volume Control. Also automatically adds bass compensation at low levels when the Loudness switch is depressed.
7. **MIC:**
Input jacks for Left and Right channel microphones.
8. **BASS:**
Increases Bass tones up to +16dB, decreases to -16dB.
9. **MIDRANGE:**
Increases Midrange tones up to +6dB, decreases to -6dB.
10. **TREBLE:**
Increases Treble tones up to +16dB, decreases to -16dB.

11. **STEREO PHONES:**
Two jacks for private listening with one or two sets of stereo headphones.
12. **BALANCE:**
Balances the relative volume levels of the Left and Right speakers.
13. **LOW FILTER:**
For removal of undesired low frequency material such as "rumble" from older recordings.
14. **HIGH FILTER:**
Cuts off scratch from records and background "hiss" from noisy FM stations.
15. **TAPE MONITOR:**
Permits monitoring during tape recording.
16. **tone DEFEAT:**
Disables the Tone Controls and automatically sets preamp response characteristic to "Flat".
17. **LOUDNESS COMPENSATION:**
Activates Loudness control compensation circuitry.
18. **DYNAQUAD:**
Activates Dynaquad 4-channel Matrix circuitry.
19. **4-CHANNEL ADAPTER:**
For connecting 4-channel decoder. Also doubles as second Tape Monitor.
20. **TAPE DUBBING:**
Permits recording to, or playing back from, a second tape recorder. Also, dubbing from one recorder to the other.

SHERWOOD SEL-400 SPECIFICATIONS*

Preamplifier:

- BASS CONTROL:** ±16dB @ 50Hz [with center detent].
- MIDRANGE CONTROL:** ±6dB @ 900Hz [with center detent].
- TREBLE CONTROL:** ±16dB @ 15,000Hz [with center detent].
- INPUT SENSITIVITY (and IMPEDANCE) @ 1000Hz:**
- Phono 1: 2.0mV, 4.5mV, & 9.0mV selectable (50K Ohm).
 - Phono 2: 2.0mV (50K Ohm).
 - Mic: 2.3mV (500 Ohm).
 - Tuner: 150mV (220K Ohm).
 - Aux 1: 150mV (220K Ohm).
 - Aux 2: 150mV (220K Ohm).
 - Tape Monitor: 150mV (220K Ohm).
 - Tape Dubbing: 150mV (220K Ohm).
 - 4-CH Adapter: 150mV (220K Ohm).

- INPUT CAPABILITY FOR 0.25% THD @ 1000Hz:**
- Phono 1 (with Input Sensitivity Selector Switch):
 - HI: 90mV.
 - MED: 120mV.
 - LO: 120mV.
 - Phono 2: 90mV.
 - Mic: 90mV.
 - Tuner: 6V.
 - Aux 1: 6V.
 - Aux 2: 6V.
 - Tape Monitor: 6V.
 - 4-CH Adapter: 6V.

- FREQUENCY RESPONSE:**
- Phono 1 & Phono 2: 30-15,000Hz ±1dB.
 - Aux 1, Aux 2, Mic, Tape Monitor, Tape Dubbing, & 4-CH Adapter: 20-20,000Hz ±1dB.

- OUTPUT LEVEL (and IMPEDANCE):**
- Record Out: 0 VU, 1mw, 775mV (600 Ohm).
 - Tape Dubbing: 150mV.
 - 4-CH Adapter: 150mV.
 - Preamplifier: 150mV (2.2K Ohm); Maximum Output: 5V.

- HUM AND NOISE:** [Signal to Noise] [IHF "A" Weighting]
- Phono 1: 65dB 75dB
 - Phono 2: 65dB 75dB
 - Aux 1 & Aux 2: 80dB 85dB
 - Tuner: 80dB 85dB
 - Volume Minimum: 90dB 100dB

* All specifications with 120VAC line.

- CROSSTALK:** Greater than -40dB, 20-20,000Hz.
- LOW FILTER:** 3dB @ 45Hz, 26dB @ 10Hz, 12dB/Octave.
- HIGH FILTER:** 3dB @ 7000Hz, 20dB @ 20,000Hz, 12dB/Octave.
- TOTAL HARMONIC DISTORTION:**
- Preamplifier only: Less than 0.01% @ 2V.
 - Record Output Amplifier: Less than 0.01% @ 5V.

Amplifier:

- POWER OUTPUT (RMS minimum - both channels driven) with no more than 0.25% Total Harmonic Distortion:**
- 85 watts per channel @ 8 ohms, from 20-20,000Hz.
 - 90 watts per channel @ 8 ohms, 1000Hz.
 - 120 watts per channel @ 4 ohms, 1000Hz.
- IHF POWER BANDWIDTH:** 5-40,000Hz.
- INPUT SENSITIVITY (and IMPEDANCE) @ 1000Hz:** 125mV (270K Ohm).
- DAMPING FACTOR:** 30 @ 8 ohms, from 20-20,000Hz.
- HUM AND NOISE:**
- Signal to Noise: 90dB.
 - IHF "A" Weighting: 100dB.
- FREQUENCY RESPONSE:** 7-100,000Hz, +0dB, -1dB.
- CROSSTALK:** Greater than -60dB, 20-20,000Hz.

General:

- POWER REQUIREMENTS:** 115-125VAC, 60Hz.
- AC OUTLETS ON CHASSIS:**
- Switched - 2: 100 watts maximum each outlet.
 - Unswitched - 1: 100 watts maximum.
- RATED POWER CONSUMPTION:** 35-450 watts.
- POWER FUSE:** 5 Amp, 3AG [Fast Acting Only].
- DIMENSIONS:** 16-9/16 long, 5 high, 14-1/4 deep.[inches].
- SHIPPING WEIGHT:** 33 lbs.

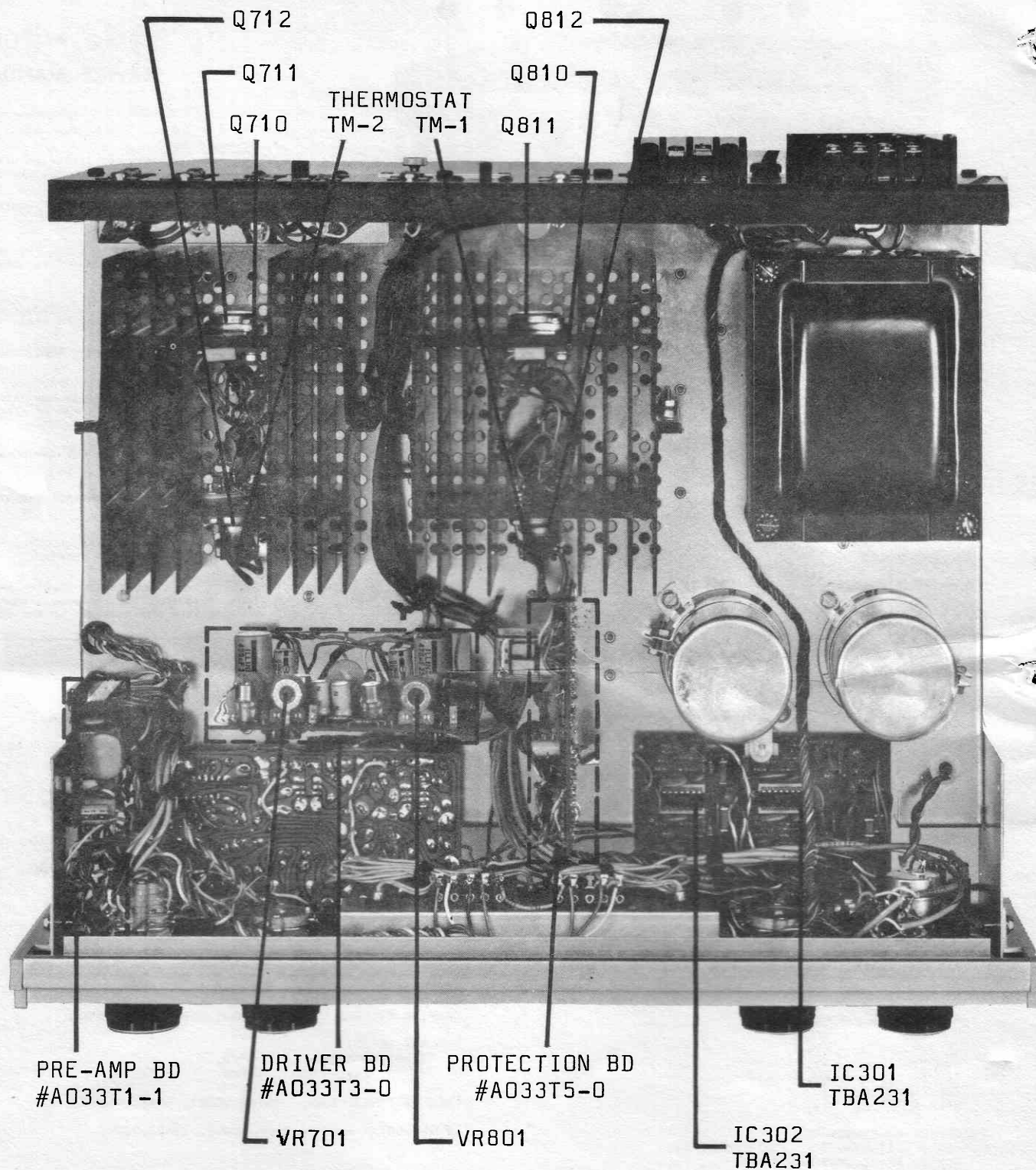


FIGURE 1 (TOP VIEW)

AMPLIFIER SERVICE INFORMATION

CONTENTS:	PAGE:
PARTS LOCATIONS [Fig. 1]	Inside Covers
AMPLIFIER SERVICING AND ADJUSTMENT	1
POWER SUPPLY SERVICING	4
AMPLIFIER ELECTRONIC RELAY PROTECTION AND SPEAKER SYSTEM CHECKS	4
ORDERING PARTS	Back Cover
PARTS LIST [See Supplements]	
SCHEMATIC DIAGRAM [See Supplements]	
CIRCUIT BOARD COMPONENT LAYOUT [See Supplements]	

AMPLIFIER SERVICING AND ADJUSTMENT:

NOTES:

1. For simplicity only the left channel and its related circuitry are described. The right channel is identical except for reference symbol numbers [see Schematic Diagram]. For parts locations, refer to Figure 1 on the inside covers.
2. As a convenience for fast component location, this manual contains detailed pictorials of all the printed circuit board assemblies. Reference to these drawings should aid considerably in a quick, accurate fault analysis of an existing malfunction.

USE OF A VARIAC:

It is imperative that a variable voltage line source [Variac] equipped with a line wattmeter to identify abnormal power consumption be used when servicing power amplifiers and associated power supply circuitry. With the Loudness volume control set at minimum, the power consumption should not exceed 30 watts as the voltage is increased by the Variac to the rated 120 VAC. If the power consumption begins to exceed 30 watts, do NOT increase the line voltage any further. Determine if the malfunction is in the power supply, the preamplifier or the amplifier section of the unit.

LINE FUSE AND INITIAL CIRCUIT CHECKS:

Verify that the line fuse is unopened and check idling power consumption. The main cause for abnormal power consumption, in order of decreasing occurrence, are:

1. Open or shorted amplifier output, driver or pre-driver transistors.
2. Open or shorted power supply diodes.
3. Shorted power transformer.

AMPLIFIER FAULT ANALYSIS:

If an amplifier channel is suspected, check circuit boards for burned parts and replace. Check all the transistors with an ohmmeter for opens or shorts and replace if defective.

WARNING: Some ohmmeters may damage sensitive solid-state devices. Whenever possible, use a high resistance range [at least RX10].

Use the centerpoint voltage [measured from the + speaker terminal to ground] as a guide. The centerpoint voltage should always be Zero \pm 50mV. Any deviation suggests shorted or open devices.

If channel operation is still faulty, verify that there are no shorted capacitors, open resistors, etc., on the board.

Inspect the underside of the board for shorted pads, broken connections, etc.

When the board is restored, readjust Output Bias [see below].

DISTORTION IN AMPLIFIER OUTPUT:

Distortion which exceeds the amplifier ratings [see Front Cover] may be due to the following:

1. Mismatched output transistors.
2. Defective (low-beta) driver transistors.
3. Incorrectly adjusted output transistor bias.

OUTPUT TRANSISTOR BIAS ADJUSTMENT:

Proper output transistor operation and output bias adjustment are most important to assure cool, low-distortion operation of the amplifier. Bias adjustment is necessary if the output transistors are replaced*, or if any of the transistors in the driver circuitry or the amplifier exhibits one or more of the following symptoms:

1. Overheating of the output transistors under normal operating conditions.
(Normal output transistor case temperatures are 30-35°C [82-95°F], quiescent operation at 25°C [78°F] ambient.)
2. Excessive low level Intermodulation Distortion (IMD) or Total Harmonic Distortion (THD) - more than 0.1% at 3.0 volts across 8 ohms.

* It is extremely important that the insulating washers used to separate the output transistors from their heat sink be unbroken and installed properly with silicon grease liberally applied to all surfaces in contact with each other. Make certain the emitter and base pins of the output transistors do not contact any part of the heat sink assembly.

NOTE: For the following tests, an 8 ohm load resistor must be connected to each of the two power amplifier [Speaker] output terminals.

SUGGESTED AMPLIFIER TEST BENCH SET-UP

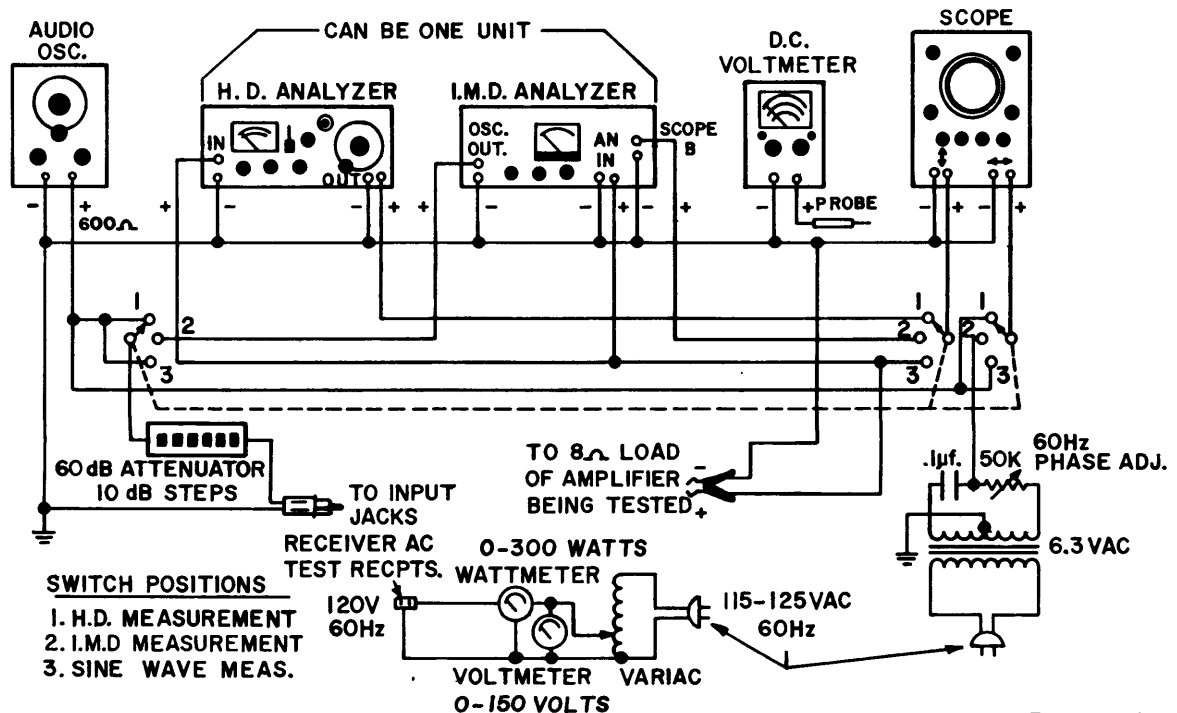
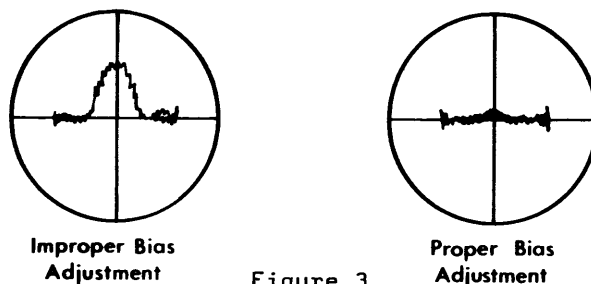


Figure 2

BIAS ADJUSTMENT USING AN INTERMODULATION DISTORTION (I.M.D.) ANALYZER:

1. Connect the amplifier for testing as in Figure 2.
2. Connect an Intermodulation Distortion Analyzer with a ratio of 4:1 using 60Hz and 7000Hz to the amplifier's Left AUX 1 input and set the SELECTOR switch to AUX 1.
3. Set the volume control to maximum and adjust the generator for an amplifier output of 3.0 volts across the 8 ohm load of the amplifier channel under test.
4. While observing the resultant distortion waveform, adjust the bias potentiometer [VR701] so that the crossover distortion is at the point of being eliminated [Class "AB"]. NOTE: Class "A" operation [Continued CCW rotation] causes the output transistors to draw excessive current and consequently overheat.
5. Repeat Steps 3 to 4 for the Right channel.

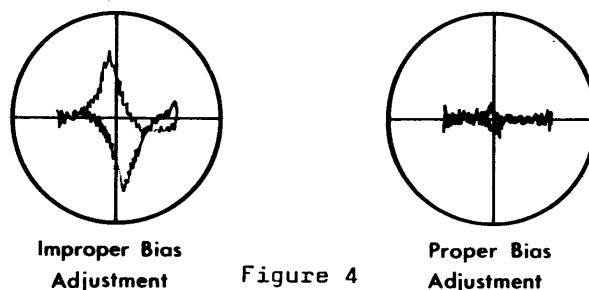


The following performance indicates a properly operating amplifier with both channels driven into 8 ohm loads:

1. Less than 0.1% Intermodulation Distortion [IMD] at 3.0V [typically 0.05%].
2. 85 watts of power per channel at no greater than 0.25% IMD.

BIAS ADJUSTMENT USING HARMONIC DISTORTION ANALYZER:

1. Connect the amplifier for testing as in Figure 2.
2. Connect an oscillator with less than .01% distortion at 1KHz to the amplifier's Left AUX 1 input and set the SELECTOR switch to AUX 1.
3. Set the volume control to maximum and adjust the oscillator for an amplifier output of 3.0 volts across the 8 ohm load of the amplifier channel under test.
4. Using the Harmonic Distortion Analyzer, looking at the distortion of the amplifier properly nulled, make the adjustment as follows: Adjust bias for Class "AB" operation by turning the bias potentiometer [VR701] so that the crossover is at the point of being eliminated. NOTE: Class "A" operation [continued CCW rotation] causes the output transistors to draw excessive current and overheat. Refer to Figure 4 below.
5. Repeat Steps 3 and 4 for the Right channel.



The following performance indicates a properly operating amplifier with both channels driven into 8 ohm loads:

1. Less than 0.1% THD at 3.0 volts [typically 0.05%].
2. 90 watts per channel at no greater than 0.25% THD [1KHz].
3. 85 watts per channel at no greater than 0.25% THD [20Hz - 20KHz].

BIAS ADJUSTMENT USING A LINE WATTMETER:

When test equipment required for previous bias adjustments is not readily available and adjustment is absolutely necessary, the following procedure may be used which requires only an accurate line wattmeter:

1. Turn the loudness control to minimum.
2. Adjust the bias potentiometers (VR701 & VR801) one at a time to the point at which the amplifier begins to cause a very slight increase in line wattage consumption.

POWER SUPPLY SERVICING AND FAULT ANALYSIS:

Power supply malfunctions are usually due to shorted or open power diodes X1-X4, zener diodes Z1-Z5, transistor Q1, or a defective power transformer.

The devices may be easily checked with an ohmmeter. The transformer's operation may be checked by measuring secondary voltages with the associated circuit legs disconnected.

AMPLIFIER ELECTRONIC RELAY PROTECTION AND SPEAKER SYSTEM CHECKS:

It is absolutely necessary in the design of a high powered amplifier to provide protection for both the amplifier AND the speaker load. The primary purpose of the relay protection circuit is to disconnect the speakers if a potentially damaging situation should occur.

If there is no output to the speaker, first check the speaker connections for shorted wires or a shorted speaker [speaker load resistance should not indicate less than 4 ohms resistance on an ohmmeter]. If the relay protection circuit is suspect, the following explanation of it's normal operational characteristics may be helpful.

The complementary darlington output transistors are load line limited, with the maximum current limited to 7.7A peak (equivalent to 120W @ 4 ohms). Signal voltages developed across the output transistor's emitter resistors R751 and R752 forward-bias transistors Q901 and Q902, shunting the output transistor's base drive signal.

The dual comparator, integrated circuit IC901, and associated sensing circuit is a bridge system which, in effect, measures the speaker line impedance. The comparator [left channel] Pin's 3 and 2 are biased so that Pin 3 is 0.3V positive with respect to Pin 2. With this condition, the comparator output voltage is high [26V]; hence, the bi-stable multivibrator transistors Q950 and Q951 activate the relay, connecting the speaker loads to the amplifier circuit. Also, because of this turn-on "delay", the AC Power turn-on pulse [speaker pops] are eliminated.

As the load impedance is reduced, with signal applied, a point is reached where this now rectified signal (due to diodes X912 & X940 for the Left Channel, and diodes X932 and X952 for the Right Channel) drives Pin 2 positive with respect to Pin 3. At this point the comparator output switches low [1V], causing the bi-stable relay driver to deactivate the relay, disconnecting the potentially dangerous load condition.

To reset the protection circuit, the AC Power must be turned off for approximately 10 seconds before again turning on the amplifier.

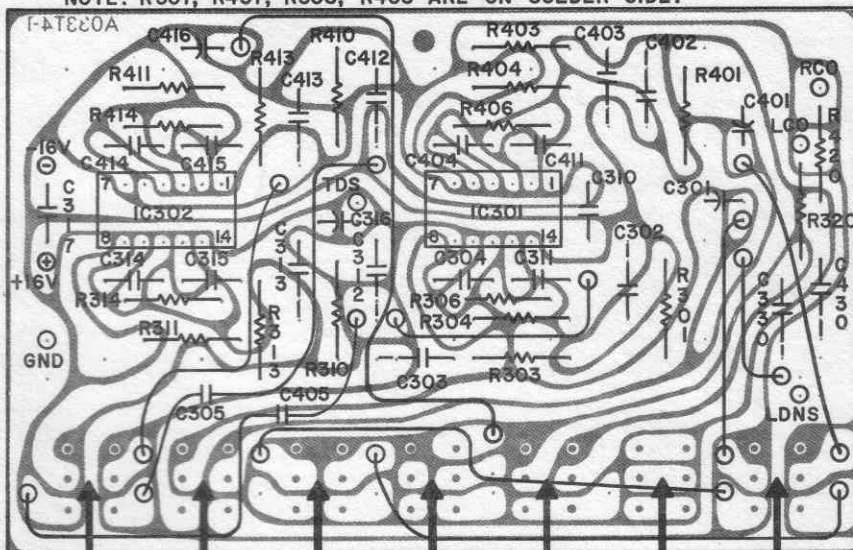
This protection circuit achieves variable current limiting, hence power limiting, as an inverse function of the amplifier load. The relay control circuits are separately triggered by each channel, but both shut down simultaneously. For example: power output is typically limited to 120 watts @ 4 ohms, 90 watts @ 3 ohms, 40 watts @ 2 ohms, and 5 watts @ 1 ohm. Normally, in a 1 ohm load condition [without this patented variable current limiting system], with current limiting only, the output transistors would be required to dissipate 300 watts, resulting in their instantaneous destruction.

Loudspeaker protection is also provided in the event that either a positive or negative DC voltage is developed at the amplifier speaker terminals.

Positive voltage protection: An amplifier malfunction resulting in a positive DC voltage at the speaker terminal has this voltage fed to the [-] inverting input of comparator IC901 through R915 [680K]. This causes IC901's output to switch low [typically 1V], clamping off transistor Q951, thereby deactivating the speaker load.

Negative voltage protection: If a negative voltage were to appear at the speaker terminal, such as would occur when a negative side driver or output transistor fails in a shorted mode, transistor Q910 will be clamped off. This permits a positive voltage from the 26 volt supply to be coupled through resistor R912 [270K], diode X911, and resistor R913 [470K] to the [-] inverting input of the comparator IC901. As was the case

NOTE: R307, R407, R308, R408 ARE ON SOLDER SIDE.

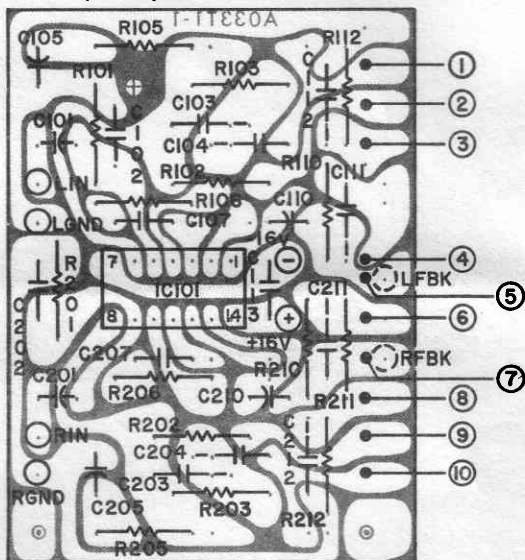


A033T4-I

- LOW FILTER OUT
- HIGH FILTER OUT
- TAPE MONTR NORM
- TONE DEFEAT NORM
- LOUD ON OFF
- DYNA QUAD OFF
- 4 CH ADAPTER NORM

- ⊖ LCO - TO VR341A & R347
- ⊖ RCO - TO VR341B & R348
- ⊖ +16V - B+ [5]
- ⊖ LDNS - TO LOUD ON SWITCH
- ⊖ TDS - TO TONE DEFEAT SWITCH
- ⊖ -16V - B- [7]

NOTE: R107, R207, R111 ARE ON SOLDER SIDE

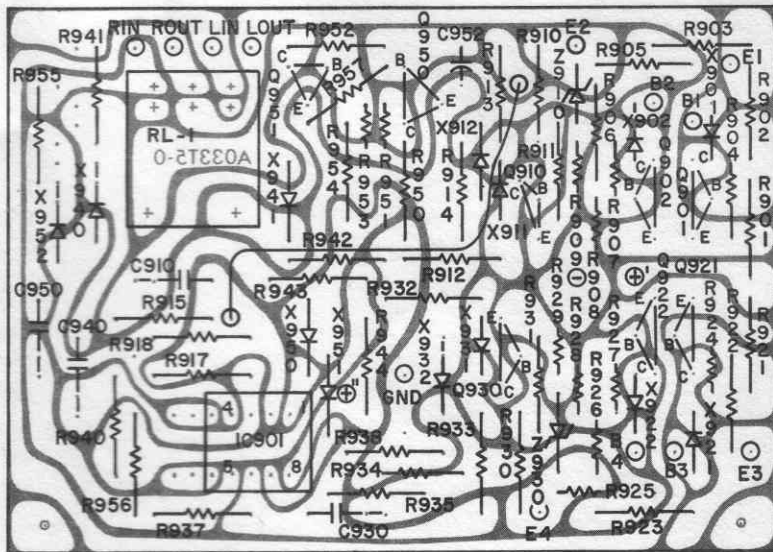


- ⊖ -16V - B- [7]
- ⊕ +16V - B+ [5]
- ⊖ LIN - LEFT INPUT
- ⊖ RIN - RIGHT INPUT
- ⊖ LFBK - FEEDBACK, TO SI SECTION 3
- ⊖ RFBK - FEEDBACK, TO SI SECTION 3

A033T1-I

MODEL SEL-400

4A41001-4A41550

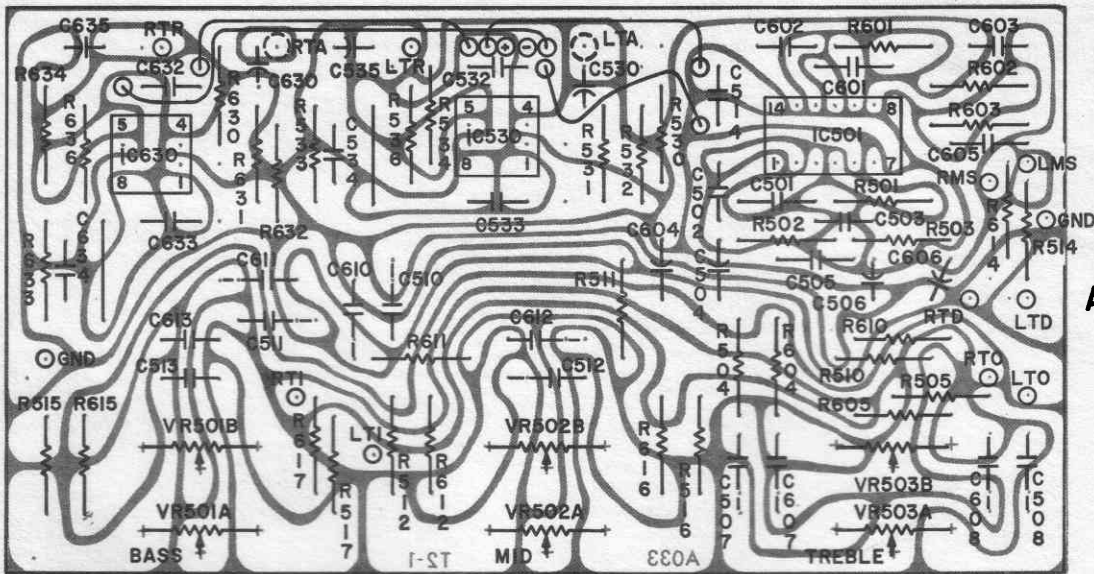


NOTE: C911 & C931 ARE ON SOLDER SIDE.

- ⊖ LIN - TO L750 (LEFT INPUT)
- ⊖ LOUT - TO S13 (LEFT OUTPUT)
- ⊖ EI - TO EMITTER OF Q711
- ⊖ BI - TO BASE OF Q711
- ⊖ E2 - TO EMITTER OF Q712
- ⊖ B2 - TO BASE OF Q712
- ⊖ RIN - TO L850 (RIGHT INPUT)
- ⊖ ROUT - TO S13 (RIGHT OUTPUT)
- ⊖ E3 - TO EMITTER OF Q811
- ⊖ B3 - TO BASE OF Q811
- ⊖ E4 - TO EMITTER OF Q812
- ⊖ B4 - TO BASE OF Q812

- ⊕' - +50V [4]
- ⊕'' - +26.4V [6]
- ⊖ - -50V [1]

A033T5-0



A033T2-1

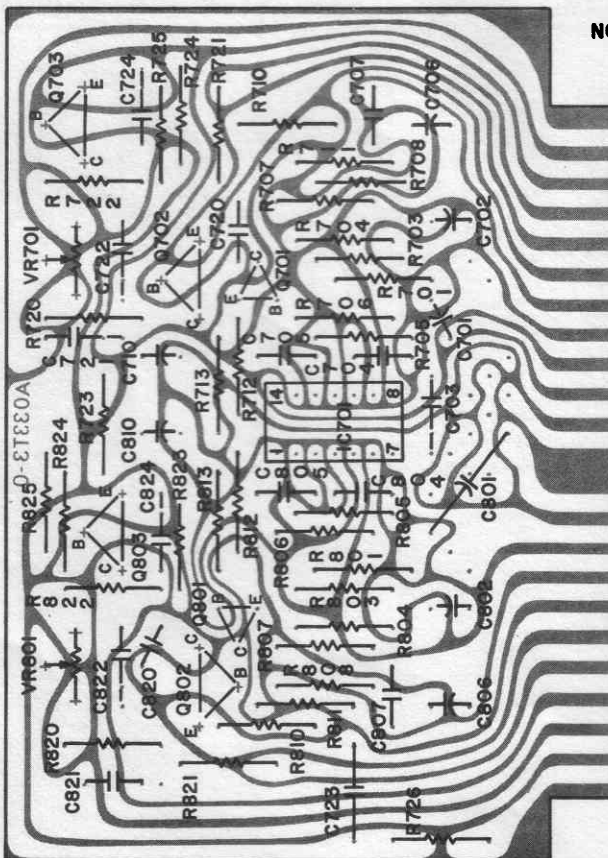
RIGHT CHANNEL CONNECTIONS

- ⊙ RTR - TO TAPE REC OUT
- ⊙ RTA - TO SELECTOR SW. & TP MON SW.
- ⊙ RTI - TO TONE DEFEAT SW; TONE IN
- ⊙ RTD - TO TONE DEFEAT SW.
- ⊙ RMS - TO MODE SWITCH
- ⊙ RTO - TO TONE DEFEAT SW; TONE OUT
- ⊙ - B+, +16V [5]

LEFT CHANNEL CONNECTIONS

- ⊙ LTR - TO TAPE REC OUT
- ⊙ LTA - TO SELECTOR SW. & TP MON SW.
- ⊙ LTI - TO TONE DEFEAT SW; TONE IN
- ⊙ LTD - TO TONE DEFEAT SW.
- ⊙ LMS - TO MODE SWITCH
- ⊙ LTO - TO TONE DEFEAT SW; TONE OUT
- ⊙ - B-, -16V [7]

NOTE: R505, R605, R518, R618, C515, C615 ARE ON SOLDER SIDE.



NOTE: R727 & R827 ARE ON SOLDER SIDE (SOME ON COMPONENT SIDE)

- TO BASE OF Q710
- TO BASE OF Q712
- TO COLLECTOR OF Q710
- TO BASE OF Q711
- TO B+, +50V
- TO L750 (LEFT CH. OUT)
- GROUND
- +16V
- TO MAIN AMP/NORM SW. (L. CH. IN)
- GROUND
- TO MAIN AMP/NORM SW. (R. CH. IN)
- TO B-, -16V
- GROUND
- TO L850 (RIGHT CH. OUT)
- TO B+, +50V
- TO BASE OF Q811
- TO COLLECTOR OF Q810
- TO BASE OF Q812
- TO BASE OF Q810
- TO B-, -50V

A033T3-0

SHERWOOD MODEL SEL-400 REPLACEMENT PARTS LIST

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

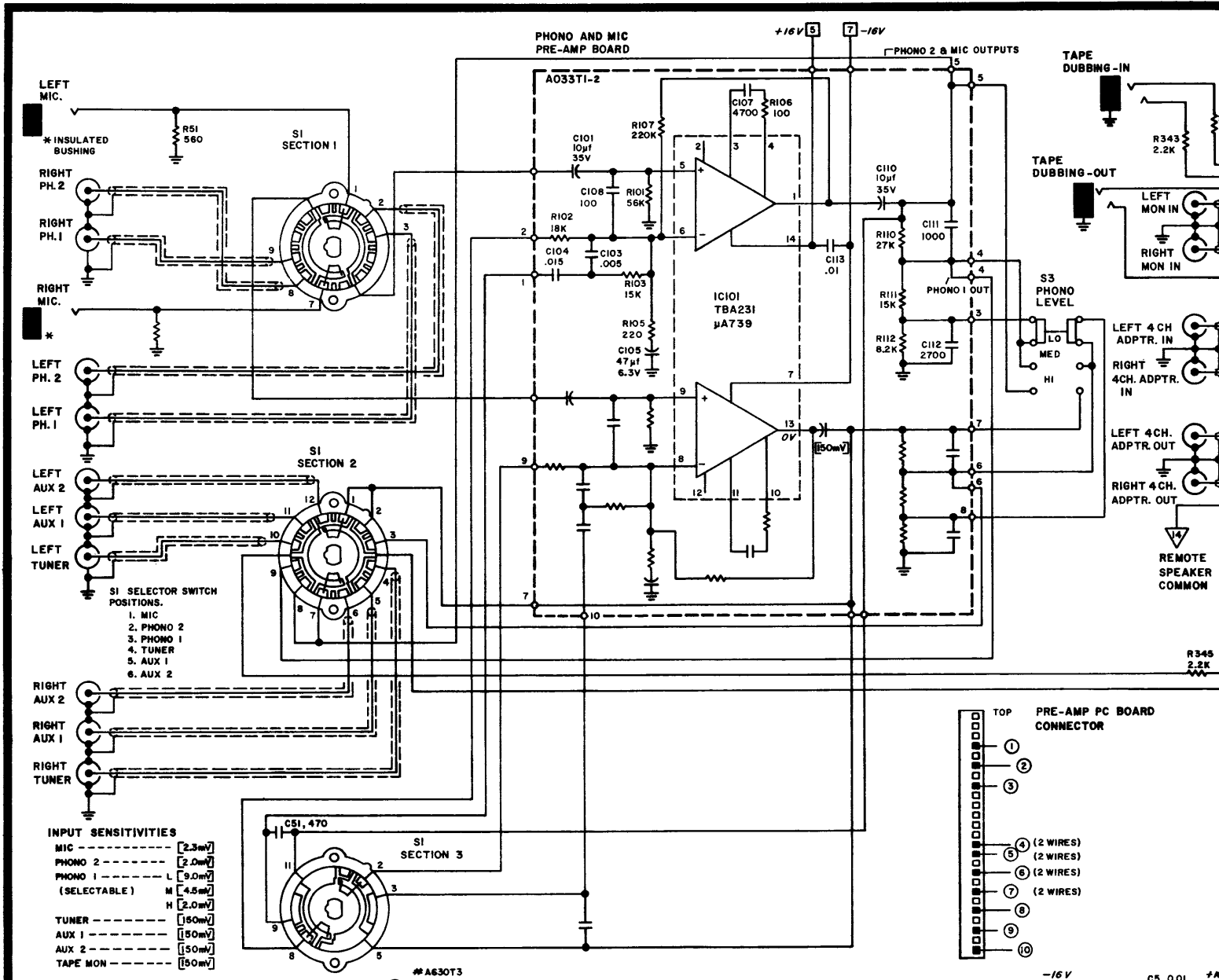
TRANSISTOR'S	REFERENCE NO.	PART NO.	LIST PRICE	TRANSFORMER'S	REFERENCE NO.	PART NO.	LIST PRICE
37649	Q1		\$1.94	Power, 115/125VAC, 60Hz		B9222T9	\$44.34
SPS5556/EN2484	Q701, 801		.90	*Power, Export, 115/234VAC, 50/60Hz		2B922T19X	
SPS637/RCA1A10	Q702, 802		2.18	<u>GENERAL ELECTRICAL COMPONENTS</u>			
SPS636/RCA1A09	Q703, 803		1.93	Fuse, 5 Amp, 3AG	F1	312005	.23
SJE667	Q710, 810		1.24	Lamps, Indicator	All	A630T3	.74
SJ1936 [Output, NPN]	Q711, 811		11.60	Relay, DPDT, 24V	RL1	A70DR1	9.70
SJ1937 [Output, PNP]	Q712, 812		12.60	Switch, Rotary	S1	A860T12	6.73
MPS-A20	Q901, 921		.40	Switch, Rotary	S11 [Selector]	A860T11	3.93
MPS-A70	Q902, 922		.45	Switch, Rotary	S11 [Mode]	A860T13	4.20
SPS2197	Q910, 930		.94	Switch, Slide, DPDT	S3 [Speaker]	A864R1	.72
S169	Q950, 951		.77	Switch, Slide, Mini	S12 [Phono Level]	A864R5	.72
				Switch, Slide, Mini	S14 [Mono Spkr]		

INTEGRATED CIRCUIT'S	REFERENCE NO.	PART NO.	LIST PRICE	MECHANICAL COMPONENTS	REFERENCE NO.	PART NO.	LIST PRICE
TBA-231/UA737	IC101, 301, 302		4.95	Escutcheon End Brackets (Pair)		A250R58L&R	7.00
CA3094AS	501, 701		4.90	Escutcheon (Less end brackets)		F250T10	15.57
RC4558	IC530, 630		2.87	Knob, Small w/Indicator [Bass, Mid-range, Treble]		B469X10	2.61
	IC901			Knob, Large w/Indicator [Selector, Mode, Speakers, Loudness/Volume]		B469X11	2.52

DIODES, SIGNAL, POWER & ZENER	REFERENCE NO.	PART NO.	LIST PRICE	MECHANICAL COMPONENTS	REFERENCE NO.	PART NO.	LIST PRICE
Signal, Silicon	X901, 902, 911, 912, 921, 922, 931, 932, 940, 950, 951, 952	B692X13	.53	Knob, Slide Control [Balance Control]		A469X15	1.04
Power [5A @ 300 PIV]	X1, 2, 3, 4	A692X19	2.43	Knob, Slide Control [Balance Control]		F642T8	7.43
Power [1.5A @ 100 PIV]	X941	A692T3	.68	Plexiglass Dark Panel, Escutcheon		F642T9	3.03
Zener [16VZ 5% 0.4W]	Z1, 2	A694X5	1.68	Vinyl "Function Light" Strip		A795R4	1.62
Zener [16VZ 5% 1W]	Z3, 5	A694X6	2.38	Jack, Stereo Headphones [Open circuit]		A795X3	1.23
Zener [27VZ 10% 0.4W]	Z4	A694X4	.59	Jack, Mono Phone, Insulated, [Open ckt]		A795X2	1.13
Zener [2.4VZ 5% 0.4W]	Z910, 930	A694X7	1.34	Fuse Post Assembly, Complete		A905T10	.81

ELECTROLYTIC CAPACITOR'S [PC unless otherwise specified]	REFERENCE NO.	PART NO.	LIST PRICE	MECHANICAL COMPONENTS	REFERENCE NO.	PART NO.	LIST PRICE
100 @ 30V [Axial]	C3, 6, 11	B120X25	.99	Barrier Strip, 2 Lug, Speakers		A905T11	1.49
500 @ 25V [Axial]	C7, 10	B120X31	1.31	Barrier Strip, 4 Lug, Speakers		A905T11	5.00
9000 @ 60V [Can]	C8, 9	A120T13	8.91	Shipping Carton & Poly End Caps		B130R50	24.95
100 @ 10V	C101, 535, 710	B120X37	.45	Cabinet, Walnut Vinyl Clad		W-12	
50 @ 15V	C105	B120X36	.60				
470 @ 25V	C706	B120X39	.77				
10 @ 35V	C952	B120X44	.68				

* Write for quotation on purchase or exchange of domestic transformer for export transformer.



LEFT MIC.
* INSULATED BUSHING
R51 560

RIGHT PH. 2
RIGHT PH. 1
RIGHT MIC.
*

LEFT PH. 2
LEFT PH. 1

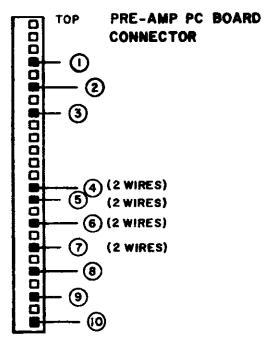
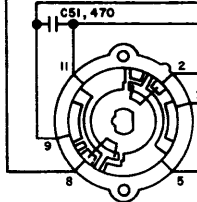
LEFT AUX 2
LEFT AUX 1
LEFT TUNER

S1 SELECTOR SWITCH POSITIONS.
1. MIC
2. PHONO 2
3. PHONO 1
4. TUNER
5. AUX 1
6. AUX 2

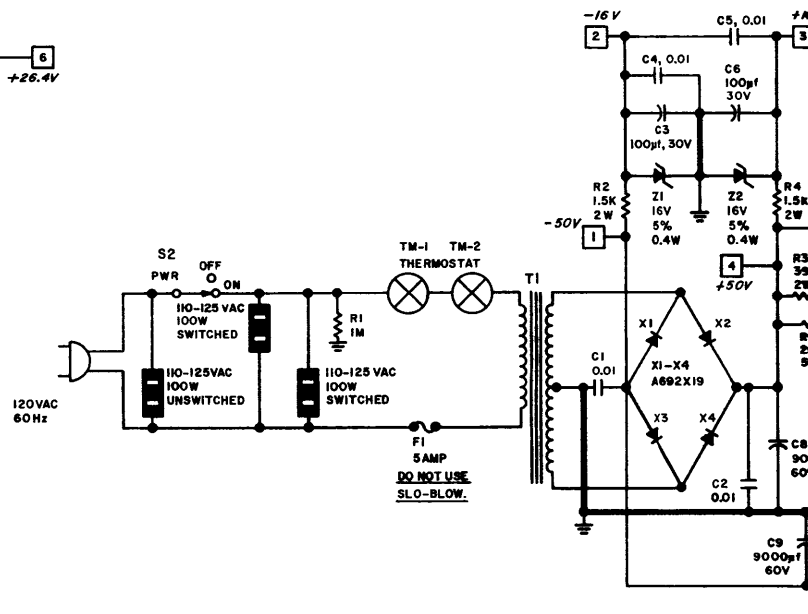
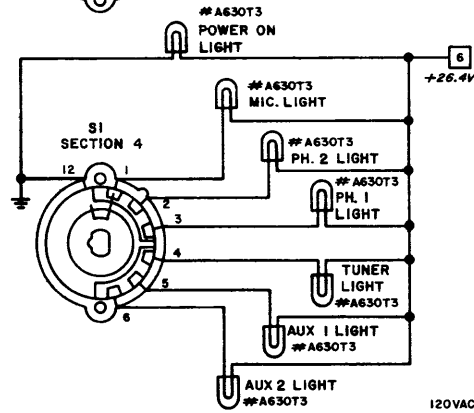
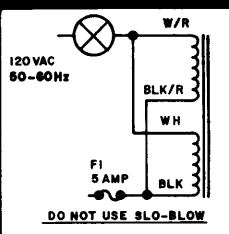
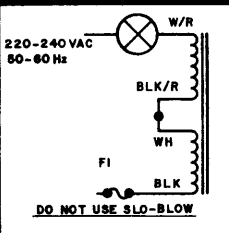
RIGHT AUX 2
RIGHT AUX 1
RIGHT TUNER

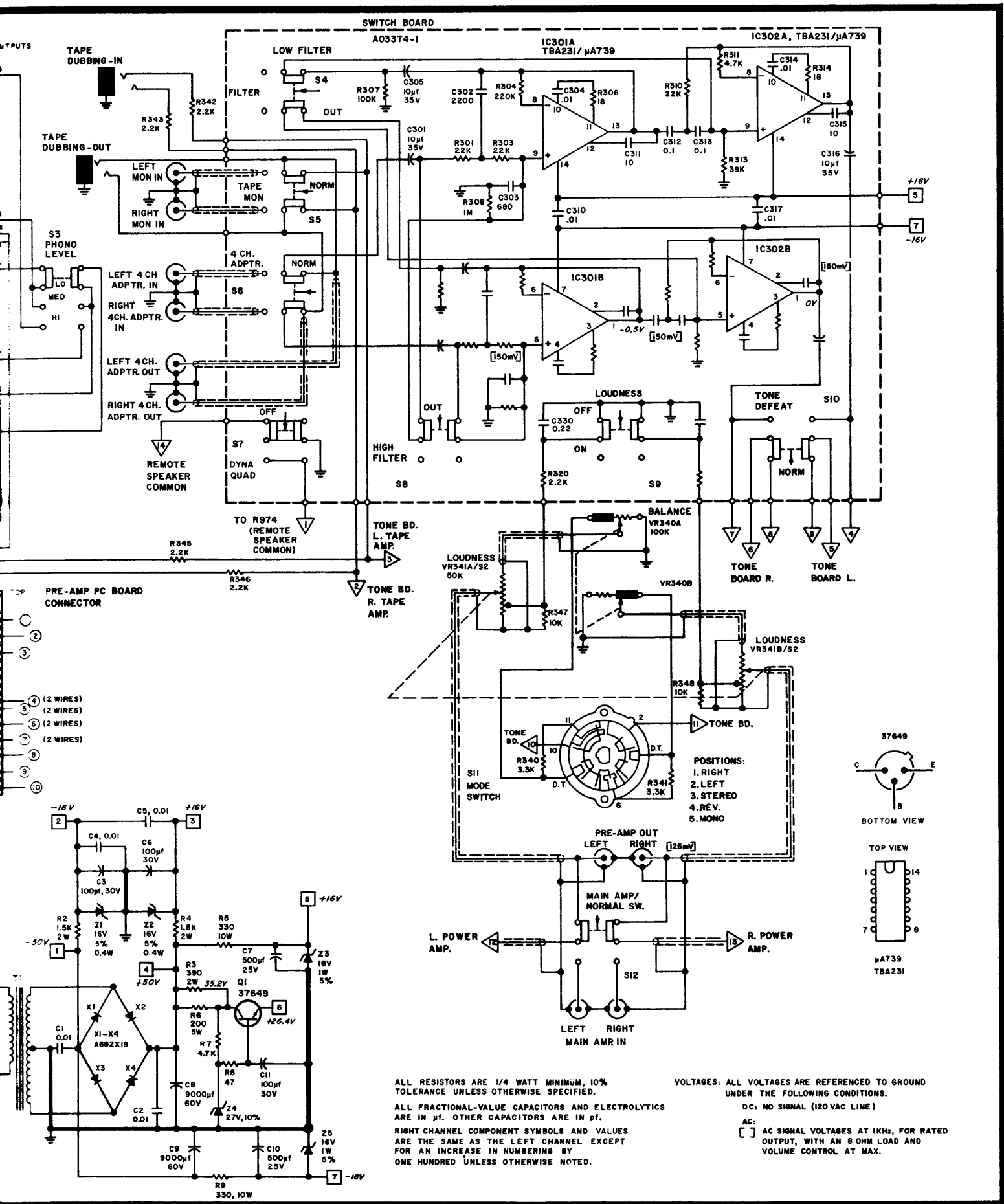
INPUT SENSITIVITIES

MIC	-----	[2.3mV]
PHONO 2	-----	[2.0mV]
PHONO 1	-----	[9.0mV]
(SELECTABLE)	M	[4.5mV]
	H	[2.0mV]
TUNER	-----	[50mV]
AUX 1	-----	[50mV]
AUX 2	-----	[50mV]
TAPE MON	-----	[50mV]



ALTERNATE PRIMARY CIRCUITS FOR EXPORT MODELS.





ALL RESISTORS ARE 1/4 WATT MINIMUM, 10% TOLERANCE UNLESS OTHERWISE SPECIFIED.

ALL FRACTIONAL-VALUE CAPACITORS AND ELECTROLYTICS ARE IN μ F. OTHER CAPACITORS ARE IN pF.

RIGHT CHANNEL COMPONENT SYMBOLS AND VALUES ARE THE SAME AS THE LEFT CHANNEL EXCEPT FOR AN INCREASE IN NUMBERING BY ONE HUNDRED UNLESS OTHERWISE NOTED.

VOLTAGES: ALL VOLTAGES ARE REFERENCED TO GROUND UNDER THE FOLLOWING CONDITIONS.

DC: NO SIGNAL (120 VAC LINE)

AC: [] AC SIGNAL VOLTAGES AT 1KHz, FOR RATED OUTPUT, WITH AN 8 OHM LOAD AND VOLUME CONTROL AT MAX.

SHERWOOD MODEL SEL-400 REPLACEMENT PARTS LIST (SER. NO. 4A41551 UP)

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

TRANSISTORS	REFERENCE NO.	PART NO.	LIST PRICE	TRANSFORMER'S	REFERENCE NO.	PART NO.	LIST PRICE
37649	Q1		\$1.94	Power, 115/125VAC, 60Hz		B922T9	\$44.34
SPS5556/EN2484	Q701, 801		.90	*Power, Export, 115/234VAC, 50/60Hz		2B922T9X	
SPS637/RCA1A10	Q702, 802		2.21				
SPS636/RCA1A09	Q703, 803		1.94				
SJE667	Q710, 810		1.26				
SJ1936 (Output, NPN)	Q711, 811		11.60				
SJ1937 (Output, PNP)	Q712, 812		12.60				
MPS-A20	Q901, 921		.41				
MPS-A70	Q902, 922		.45				
SPS2197	Q910, 930		.95				
S169	Q950, 951		.77				

INTEGRATED CIRCUITS

TBA-231/UA737	IC101, 301, 302		4.95
CA3094AE	501, 701		4.90
RC4558	IC530, 630		2.88
	IC901		

DIODES: SIGNAL, POWER & ZENER

Signal, Silicon	X901, 902, 911, 912, 921, 922, 931, 932, 940, 950, 951, 952	B692X13	.54
Power (5A @ 300 PIV)	X1, 2, 3, 4	A692X19	2.43
Power (1.5A @ 100 PIV)	X941	A692T3	.68
Zener (16VZ 5% 0.4W)	Z1, 2	A694X5	1.68
Zener (16VZ 5% 1W)	Z3, 5	A694X6	2.38
Zener (27VZ 10% 0.4W)	Z4	A694X4	.59
Zener (2.4VZ 5% 0.4W)	Z910, 930	A694X7	1.34

ELECTROLYTIC CAPACITORS (PC unless otherwise specified)

100 @ 30V (Axial)	C3, 6, 11	B120X25	.99
500 @ 25V (Axial)	C7, 10	B120X31	1.31
9000 @ 60V (Can)	C8, 9	A120T13	8.91
100 @ 10V	C535, 635, 710, 810	B120X37	.45
50 @ 15V	C105, 205	B120X36	.60
470 @ 25V	C706, 806	B120X39	.77
10 @ 35V	C101, 201, 952	B120X44	.68
250 @ 16V	C702, 802	B120X38	.68

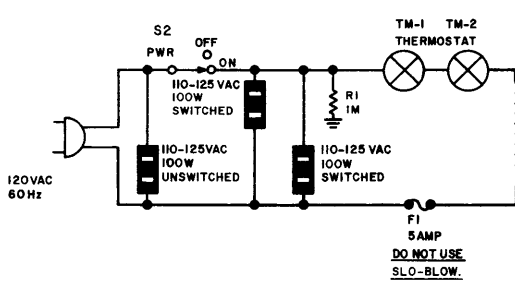
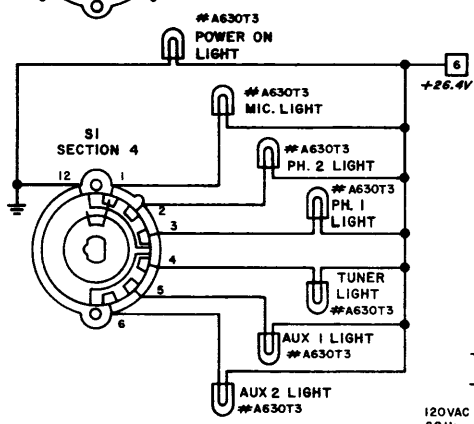
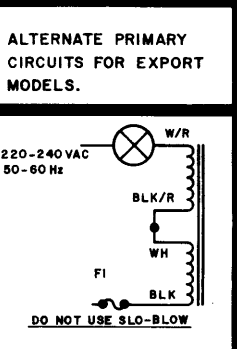
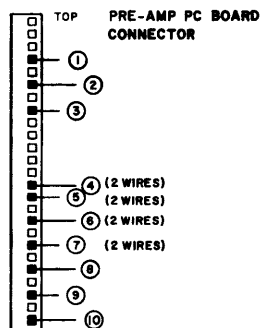
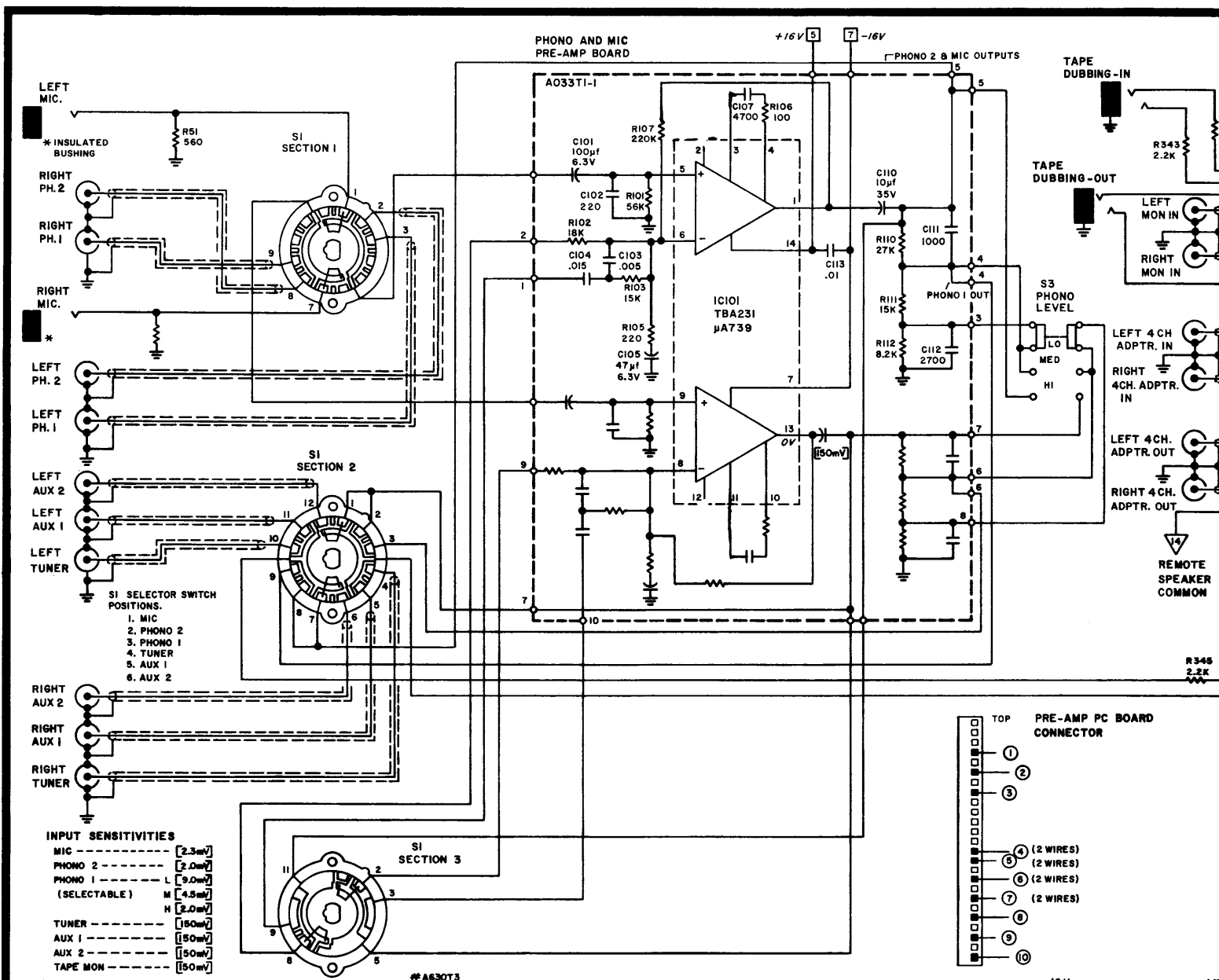
SHERWOOD ELECTRONIC LABORATORIES, INC., 4300 N. CALIFORNIA AVE., CHICAGO, ILLINOIS 60618 312-478-7300 8-75

GENERAL ELECTRICAL COMPONENTS	REFERENCE NO.	PART NO.	LIST PRICE
Fuse, 5 Amp, 3AG	F1	312005	.23
Lamps, Indicator	All (28V @ .04A)	A630T3	.74
Relay, DPDT, 24V	RL1	A700R1	9.70
Switch, Rotary	S1 (Selector)	A860T12	6.73
Switch, Rotary	S11 (Mode)	A860T11	3.93
Switch, Rotary	S13 (Speaker)	A860T13	4.20
Switch, Slide, DPTT	S3 (Phono Level)	A864R1	.72
Switch, Slide, Mini	S12 (Main Amp)	A864R5	.72
Switch, 7 Push-Button	S4, 5, 6, 7, 8, 9, 10	B866R6	8.54
Thermostat	TM1, 2	A701T4	2.25
Potentiometer, Slide	VR34D	A672T2	4.14
Potentiometer w/AC Sw	VR341/52	A671R7	5.68
Potentiometer, PC	VR501, 502	A670T15	3.24
Potentiometer, PC	VR503	A670T14	2.88
Potentiometer, Bias	VR701, 801	A675T13	.54

MECHANICAL COMPONENTS

Escutcheon End Brackets (Pair)	A250R58L&R	7.00
Escutcheon (Less end brackets)	F250T10	15.57
Knob, Small w/Indicator (Bass, Mid-range, Treble)	B469X10	2.61
Knob, Large w/Indicator (Selector, Mode, Speakers, Loudness/Volume)	B469X11	2.52
Knob, Slide Control (Balance Control)	A469X15	1.04
Plexiglass Dark Panel, Escutcheon Vinyl "Function Light" Strip	F642T8	7.43
Jack, Stereo Headphones (Open Circuit)	F642T9	3.03
Jack, Mono Phone, Insulated, (Open ckt)	A795R4	1.62
Fuse Post Assembly, Complete	A795X3	1.23
Barrier Strip, 2 Lug, Speakers	A796X2	1.13
Barrier Strip, 4 Lug, Speakers	A790T10	.81
Shipping Carton & Poly End Caps	A905T11	1.49
Cabinet, Walnut Vinyl Clad	B130R50	5.00
	W-12	24.95

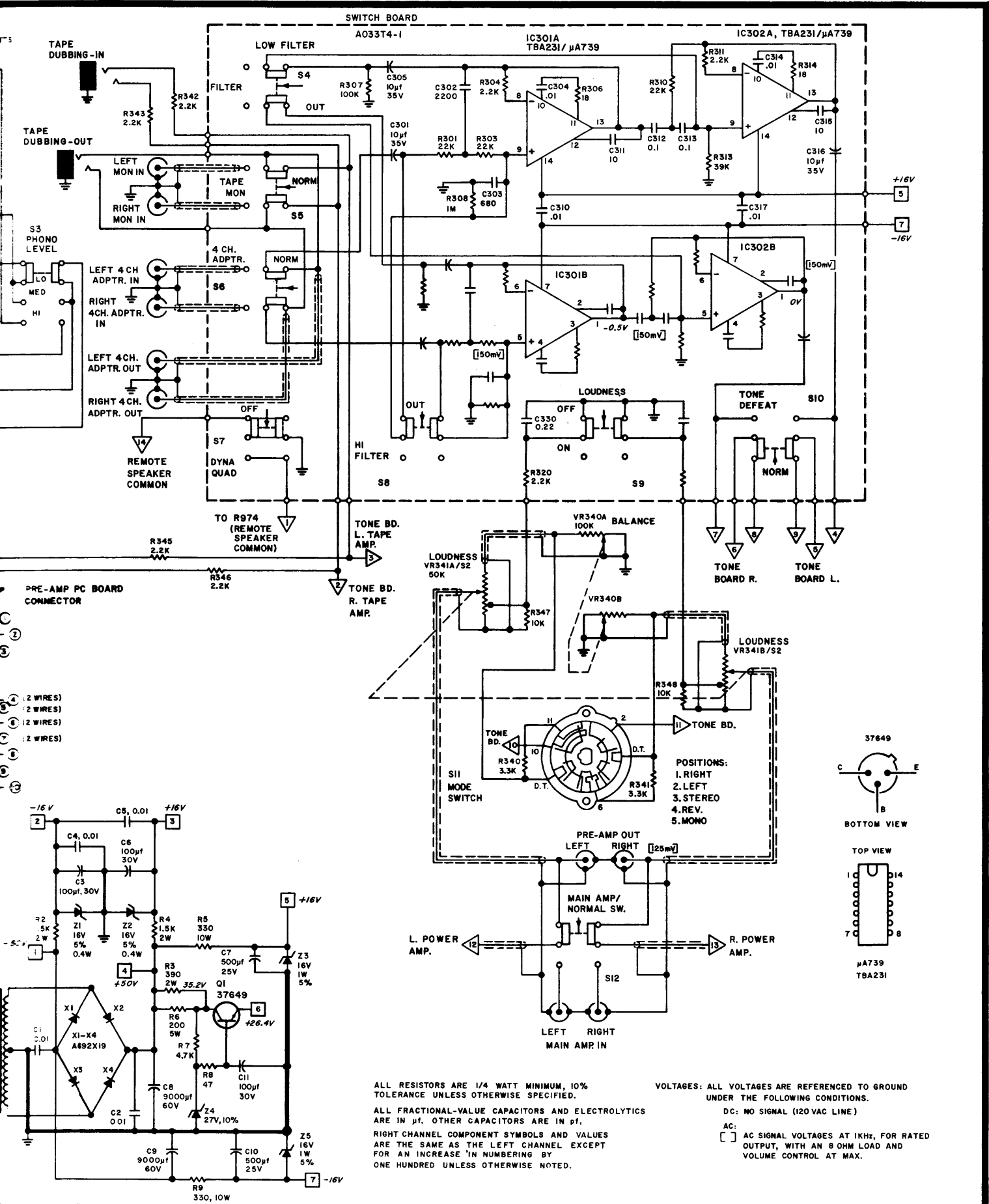
* Write for quotation on purchase or exchange of domestic transformer for export transformer.



SHERWOOD SEL-400
STEREO DYNAQUAD AMPLIFIER

CONTROL AMP./POWER SUPPLY SIDE

SERIAL NO. 4A41001 TO 4A41550



- ② (2 WIRES)
- ③ (2 WIRES)
- ④ (2 WIRES)
- ⑤ (2 WIRES)
- ⑥ (1 WIRE)
- ⑦ (1 WIRE)
- ⑧ (1 WIRE)
- ⑨ (1 WIRE)
- ⑩ (1 WIRE)

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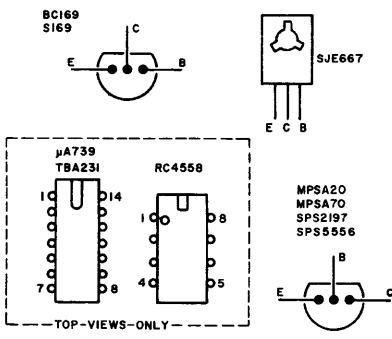
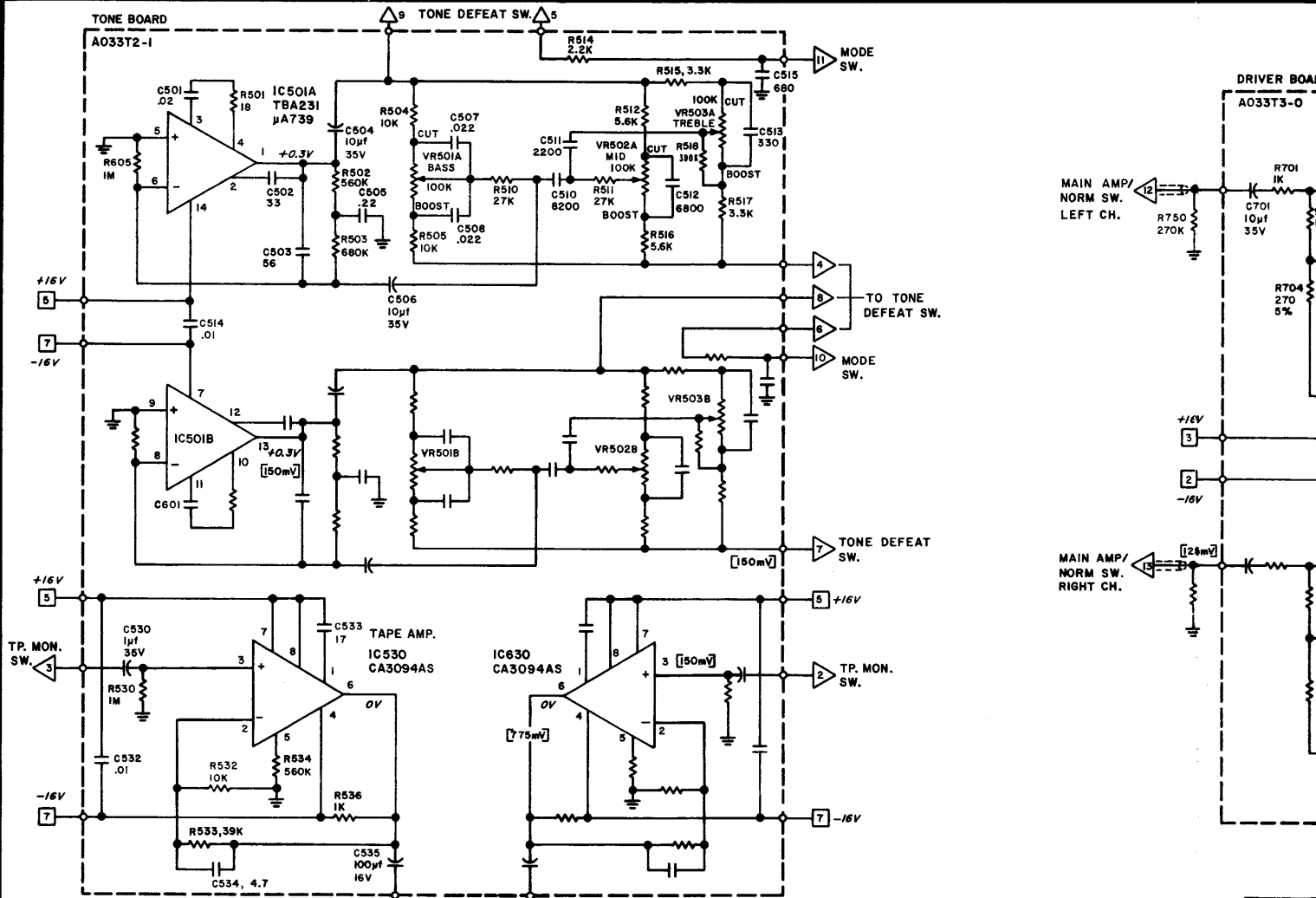
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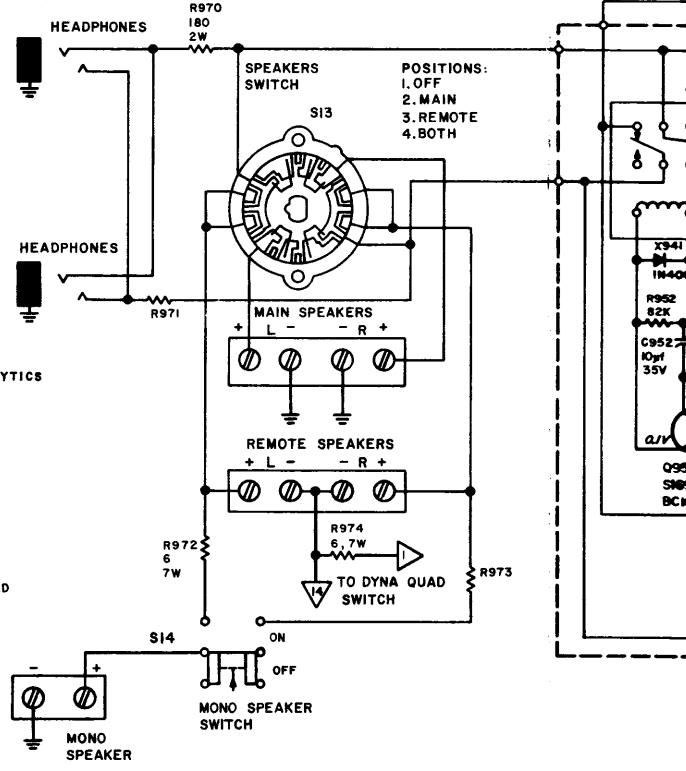
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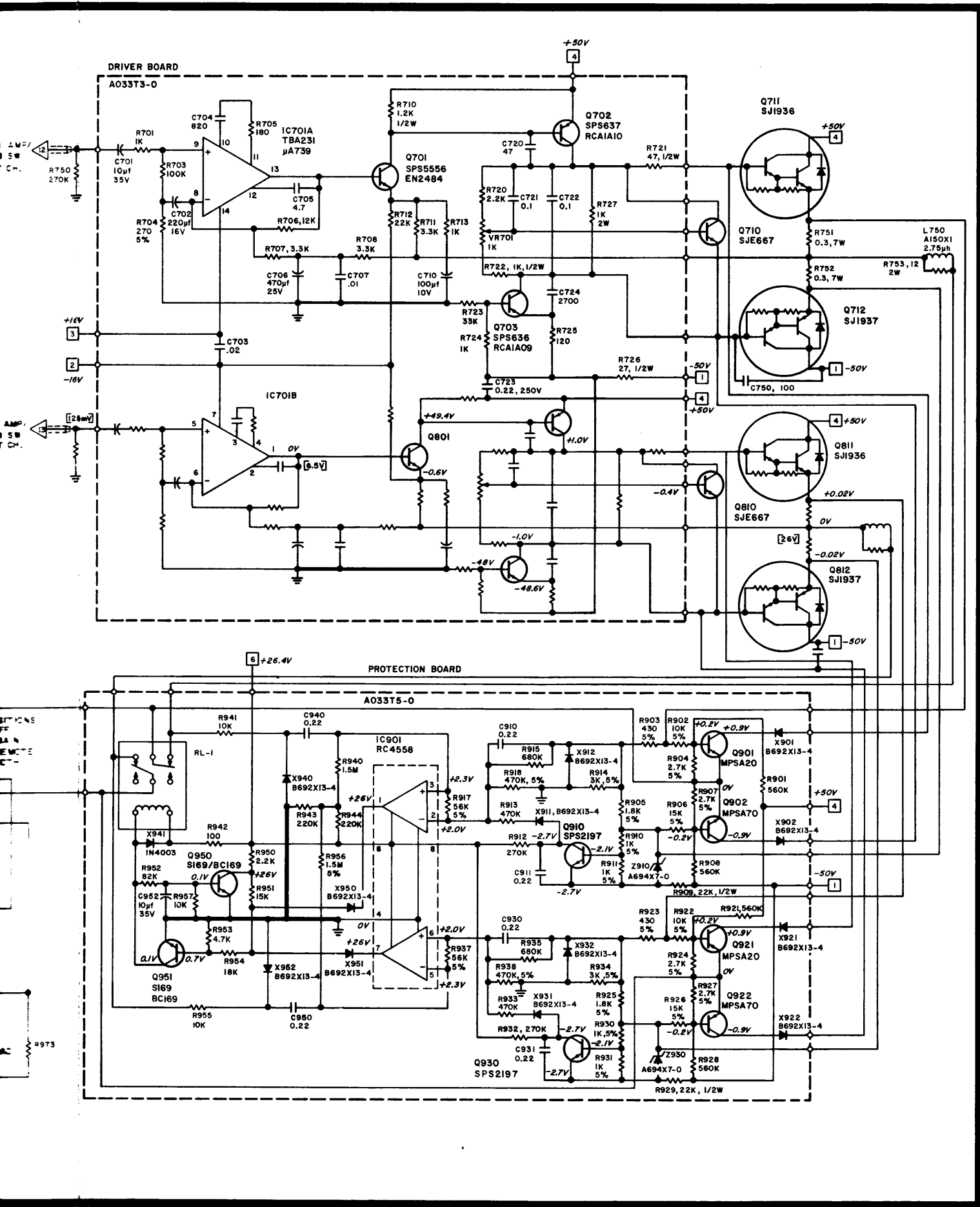
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SHERWOOD SEL-400
STEREO DYNAQUAD AMPLIFIER
 POWER AMP. & PROTECTION SIDE
 SERIAL NO. 4A41001 TO 4A41550



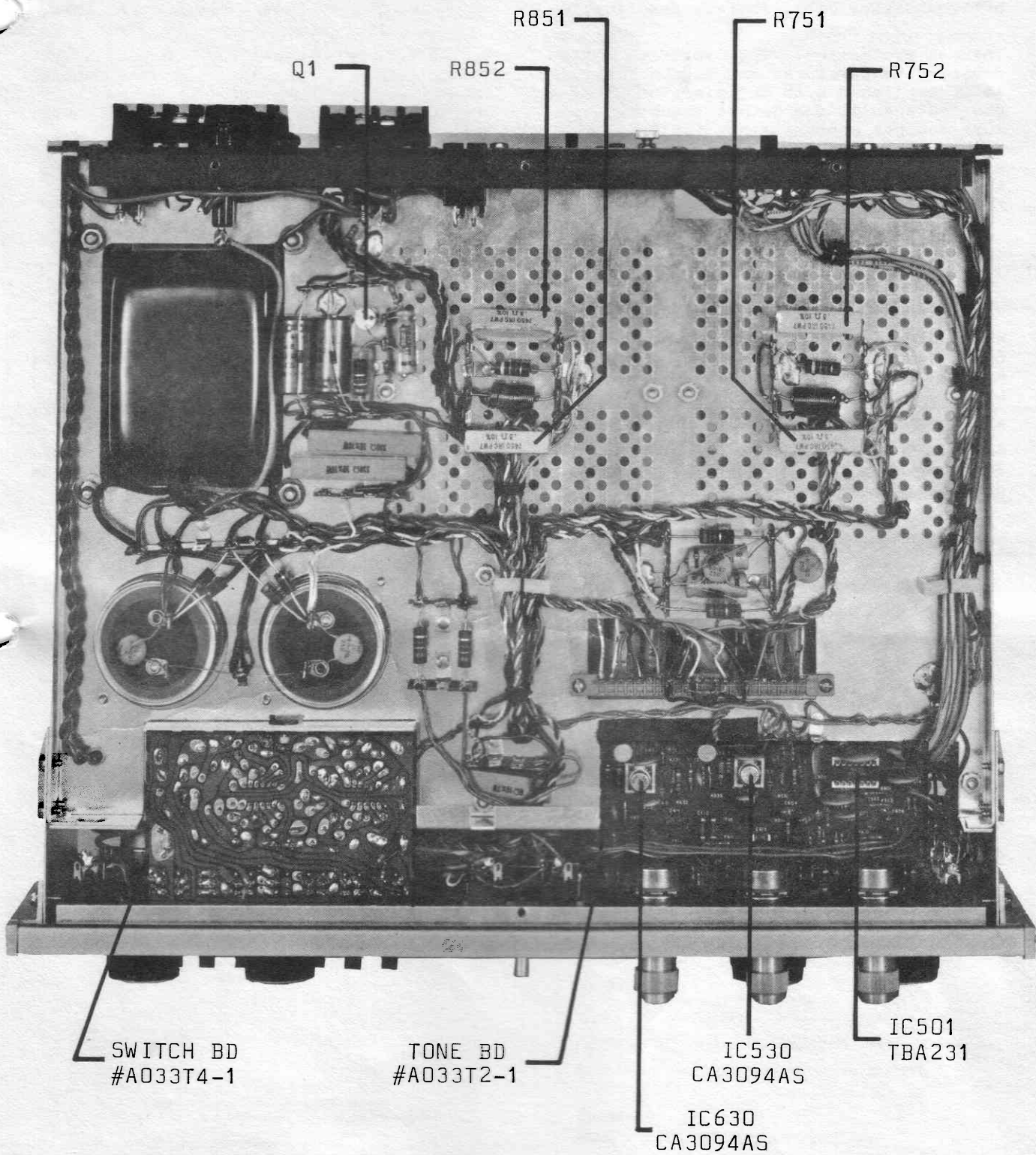


FIGURE 1 (BOTTOM VIEW)

in the positive voltage protection, the comparator's output now switches low, clamping off transistor Q951, thereby deactivating the relay and disconnecting the speaker load.

Thermal protection: The amplifier is also protected against excessive and potentially damaging temperatures due to abnormal load or environmental conditions. This protection is accomplished with two miniature thermal switches [one per amplifier channel] which are fastened to the output transistors. When the output transistor's operating temperature reaches approximately 130°C [270°F], the switch is thermally activated, opening it's contacts, thereby disconnecting the AC line voltage to the power transformer's primary, a POWER OFF condition. This open circuit condition now allows the temperature to drop. At approximately 100°C [210°F] the contacts close and the amplifier returns to a POWER ON condition.

ORDERING PARTS:

When ordering replacement parts, always include part numbers [see Parts List].

When defective parts are returned for replacement under warranty [Authorized Service Stations only] include a list, by part number and value, of the parts returned. Request either credit or replacement parts.

The return of entire circuit boards for replacement is normally not covered by warranty, except where component failure has resulted in physical damage to the board itself.

If a set or board cannot be repaired, return the complete amplifier to Sherwood Factory Service Laboratory, 4300 N. California Ave. Chicago, Illinois 60618. Include a complete description of the malfunction.

SHERWOOD ELECTRONIC LABORATORIES, INC.

4300 NORTH CALIFORNIA AVENUE, CHICAGO, ILLINOIS 60618 312-478-7300