

Pure tube warmth was the objective in designing the TS100 Stereo Tube Power Amp. With an all-tube circuit path, this objective has been met. A total of four 12AX7's tubes and four EL34 power output tubes deliver 50W per channel or 100W bridged of power to the speakers. From the mirrored chrome front panel, to the double sided, mil-spec FR4 circuit board, this amplifier offers total quality. Whether used as a guitar amplifier or as a home stereo amplifier, the tube purist can enjoy the sounds of the TS100.

GETTING STARTED QUICKLY

If you are like most players, you probably want to plug in your new amp and get started playing it right away. You can read the rest of the manual later to learn the finer points of operating your amp. You will need the TS100 amplifier, power cord. speaker cabinet, speaker cord and a signal source with cables. Plug the pre-amplifier output into the Channel 1 amplifier input. Plug the Channel 1 speaker output of the amplifier into the speaker cabinet. Select the correct impedance on the rear panel to match the speaker impedance. With the power and stand-by switches in the "OFF" position, plug the amplifier into the wall outlet. With all volumes down, turn on the pre-amplifier power and then the amplifier. After the tubes warm up, which takes about 30 seconds, turn on the "stand-by" switch. Increase the volume of the preamplifier and Channel 1 until desired loudness is reached.

RECEIVING INSPECTION—read before getting started

INSPECT YOUR UNIT FOR ANY DAMAGE which may have occurred during shipping. If any damage is found, please notify the shipping company and CARVIN immediately.

SAVE THE CARTON & ALL PACKING MATERIALS. In the event you have to re-ship your unit, always use the original carton and packing material. This will provide the best possible protection during shipment. CARVIN and the shipping company are not liable for any damage caused by improper packing.

SAVE YOUR INVOICE. It will be required for warranty service if needed in the future.

SHIPMENT SHORTAGE. If you find items missing, they may have been shipped separately. Please allow several days for the rest of your order to arrive before inquiring.

RECORD THE SERIAL NUMBER on the enclosed warranty card for your records. Keep your portion of the card and return the portion with your name and comments to us.

USA customers register online at: www.carvin.com/registration All other countries register online at: www.carvinworld.com/registration

TS100 TUBE POWER AMPLIFIER SPECIFICATIONS:

RMS Power:	50W per channel or 100W bridged				
Output Impedance:	4Ω , 8Ω , or 16Ω each channel (8Ω min. bridged)				
Channel Sensitivity:	1V for full output (full volume per channel)				
Preamp Tubes:	2 – 12AX7 (input buffer) 2 – 12AX7 (phase inverter)				
Power Amp Tubes:	4 – EL34 (2 per channel switchable to 5881/6L6)				
USA Model:	120VAC, 300VA				
Export Model:	230VAC, 300VA				
Dimensions:	3.5" High x 19" Wide x 10" Deep (2 rack spaces)				
	8.9 High x 48.2 Wide x 25.4 cm Deep				
Net Weight:	26 lbs (11.3 Kgs)				
Warranty:	1 Year (tubes 90 days.)				





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This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance

IMPORTANT! FOR YOUR PROTECTION, PLEASE READ THE FOLLOWING:

WATER AND MOISTURE: Appliance should not be used near water (near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc). Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings. POWER SOURCES: The product should be connected to a power supply only of the type described

in the operating instructions or as marked on the appliance.

GROUNDING OR POLARIZATION: Precautions should be taken so that the grounding or polarization is not defeated

POWER CORD PROTECTION: Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance. SERVICING: The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

FUSING: If your unit is equipped with a fuse receptacle, replace only with the same type fuse. Refer to replacement text on the unit for correct fuse type.

SAFETY INSTRUCTIONS (EUROPEAN)

The conductors in the AC power cord are colored in accordance with the following code. GREEN & YELLOW—Earth **BLUE**—Neutral BROWN-Live U.K. MAIN PLUG WARNING: A molded main plug that has been cut off from the cord is unsafe. NEVER UNDER ANY CIRCUMSTANCES SHOULD YOU INSERT A DAMAGED OR CUT MAIN PLUG INTO A POWER SOCKET.

LIMITED WARRANTY

Your Carvin product is guaranteed against failure for ONE YEAR unless otherwise stated. Carvin will service and supply all parts at no charge to the customer providing the unit is under war-Shipping costs are the responsibility of the customer. CARVIN DOES NOT PAY FOR PARTS ranty. OR SERVICING OTHER THAN OUR OWN. A COPY OF THE ORIGINAL INVOICE IS REQUIRED TO VERIFY YOUR WARRANTY. Carvin assumes no responsibility for horn drivers or speakers damaged by this unit. This warranty does not cover, and no liability is assumed, for damage due to: natural disasters, accidents, abuse, loss of parts, lack of reasonable care, incorrect use, or failure to follow instructions. This warranty is in lieu of all other warranties, expressed or implied. No representative or person is authorized to represent or assume for Carvin any liability in connection with the sale or servicing of Carvin products. CARVIN SHALL NOT BE LIABLE FOR INCI-DENTAL OR CONSEQUENTIAL DAMAGES.

SERVICE

In the USA, please call 800-235-2235 for a RMA # (return authorization number). Write this number on the box and enclose a description of the problem. Prepay to Carvin 12340 World Trade Drive, SD, CA 92128

Outside the USA, contact your dealer or go to http://www.carvinworld.com for your nearest service center. Include a written description of the problem with serial number and date of purchase.

HELP SECTION

1) AMP WILL NOT TURN ON

Check the power to the amp. Check for tripped circuit breakers, unplugged extension cords or powerstrip switches that may be turned off. Check the fuse. If a dark brownish color or no wire can be seen within the glass tube, then replace. The amp may be perfectly fine but occasionally a fuse may blow because of high AC voltage surges. After the fuse has been replaced with the proper Slow Blow value and if the fuse fails again, the amp will require servicing.

NO OUTPUT with POWER LIGHT ON 2)

Tubes damaged in shipping will be the primary reason for your amp to not function properly. Please give us a call to help guide you through this simple repair.

3) KEEP YOUR AMP LOOKING NEW

Use a damp cloth to wipe the controls on the front & rear chassis panels. Wipe the black vinyl covering with a damp cloth.



REFER SERVICING TO QUALIFIED SER-VICE PERSONNEL! THIS UNIT CON-SHOCK TAINS HIGH VOLTAGE INSIDE!

arts List for TS10	0	Carvin P/N	D7	DIODE RECT GEN 1N4007 1000V 1A	61-10000
UARD FAN PLAST	FIC 80x80mm	03-90080	D8	DIODE RECT GEN 1N4007 1000V 1A	61-10000
WR AC 3/16AWG	8' 2" W/PLUGS	05-01603	D9	DIODE RECT GEN 1N4007 1000V 1A	61-10000
ABLE RIBBON 24	AWG 4PIN 102MM	05-24102	F1	FUSEHOLDER CLIPS 3AG VERT MTG	23-03529
ABLE RIBBON 24	A 8P/16" W/HDR	05-68440	H1	CONNECT HEADER .086" 9 PIN	23-08609
ABLE ASSY, 5C 1	10MM	05-85611	H2	CONNECT HEADER .100" 2 PIN	23-10002
NOB CHROME W/	BLACK LINE	07-77710	H3A	CONNECT HEADER 8 PIN STRAIGHT	23-11008
ETAINING CLIP E	L34/5881	10-00034	H3B	CONNECT HEADER 8 PIN STRAIGHT	23-11008
HASSIS 2 SPACE	UNIVERSAL	10-10008E	H4A	CONNECT LEADER 4 PIN STRAIGHT	23-11004
NUNT PANEL 151	00	10-10111A 10-10117B	H5A	CONNECT HEADER 086" 5 PIN	23-11004
ID DCM POWER A	AMPS	10-82005	H5B	CONNECT HEADER 086" 5 PIN	23-08605
BANSERMER OUT	CPUT 60W	15-02066	J1	JACK 250 MONO PLASTIC W/INSER	21-51346
OWER TRANSFOR	RMER 120VAC	15-10714	J2	JACK .250 MONO PLASTIC W/INSER	21-51346
OCKER SWITCH 1	16A 250V AC	25-31351	J3	JACK .250 MONO PLASTIC W/INSER	21-51346
UBE POWER EL34	4	65-00034	J4	JACK .250 MONO PLASTIC W/INSER	21-51346
2AX7 PRE AMP T	UBE	65-00127	J5	JACK .250 MONO PLASTIC W/INSER	21-51346
AN DC24V 80mm	X 80mm X 25mm 4	70-02408A	J6	JACK .250 MONO PLASTIC W/INSER	21-51346
IANUAL IS100		76-10111A	K1	RELAY DPD1 2AMP@30V/5VDC COIL	70-05305
ABEL REAR IS10	U	//-10111A	P1	PUT VERT TRIMMER 20K 20%	71-22012
arte Liet for Brinte	d Circuit Cord		P11 D2	PUT VERT TRIWINER ZUK ZU%	71-22012
ef Des Descrintio	n oncuit Galu	Carvin P/N	P3	POT 16 "B" BX 250-54500K METAL POT 16 "B" BX 250-54500K METAL	71-14060
1 CAP POLY	1000UE 100VOLT 10%	46-10412	P4	POT 16 "R" BX 250-25A25K MTI	71-14050
10 CAP POLY		46-10212	P5	POT 16 "R" RX.250-25A25K MTL	71-14050
11 CAP POLY	.0470UF 400VOLT 10%	41-47343	PL1	RECEPTACLE AC W/FAST-ON CHASS	21-31100
12 CAP ELEC	82UF 500V 20%	42-82052	Q1	REGULATOR VOLTAGE 5 +V 1 AMP	60-78050-1
13 CAP ELEC	2,200 MFD 6.3V 20%	47-22260	QC1	TERMINAL VERT MALE PC MTG .250	06-40050
14 CAP ELEC	2,200 MFD 6.3V 20%	47-22260	QC10	TERMINAL 90dg MALE PC MTG .250	06-40060
15 CAP POLY	2.0047UF 400VOLT 10%	41-47242	QC11	TERMINAL 90dg MALE PC MTG .250	06-40060
16 CAP CERN	A 180PF 500VOLT 5%	45-18152	QC12	TERMINAL 90dg MALE PC MTG .250	06-40060
17 UAP UERN 19 CAD DOLV	/ 82PF 500V0LI 5%	45-82052	002	TERMINAL VERT MALE PC MTG .250	06-40050
10 CAFFULI 10 CAPPOLY	01000F 100V0E1 10%	40-10312	002	TERMINAL VENT MALE PO MITO .200	06-40050
2 CAP POLY	0010UF 100VOLT 10%	46-10212	0C28	TERMINAL 90dg MALE FC MTG 250	06-40060
20 CAP POLY	0010UF 100V0LT 10%	46-10212	003	TERMINAL VERT MALE PC MTG .250	06-40050
21 CAP ELEC	470 MFD 25VOLT 20%	47-47125	QC31	TERMINAL VERT MALE PC MTG .250	06-40050
22 CAP ELEC	1,000 MFD 25V 20%	47-10225	QC32	TERMINAL VERT MALE PC MTG .250	06-40050
23 CAP ELEC	1,000 MFD 25V 20%	47-10225	QC33	TERMINAL VERT MALE PC MTG .250	06-40050
24 CAP CERI	W 82PF 500VOLT 5%	45-82052	QC4	TERMINAL 90dg MALE PC MTG .250	06-40060
25 CAP CERM	A 250PF 500VOLI 5%	45-25152	QC5	TERMINAL 90dg MALE PC MTG .250	06-40060
26 CAP CERN	4 250PF 500V0LT 5%	45-25152	QC51	TERMINAL 90dg MALE PC MTG .250	06-40060
27 GAP GERN 28 CAP CERN	4 250PF 500V0LT 5%	40-20102	0052	TERMINAL 9000 MALE PC MTG .200	06-40060
3 CAP POLV	0047UF 400V0LT 10%	41-47949	0054	TERMINAL 90dg MALE PC MTG 250	06-40060
37 CAP POLY	1000UF 100VOLT 10%	46-10412	0004	TERMINAL 90dg MALE PC MTG .250	06-40060
39 CAP POLY	.0470UF 400VOLT 10%	41-47343	QC7	TERMINAL VERT MALE PC MTG .250	06-40050
4 CAP POLY	1000UF 100VOLT 10%	46-10412	QC8	TERMINAL 90dg MALE PC MTG .250	06-40060
40 CAP POLY	.0470UF 100V 10% PREP	46-47312-1	QC9	TERMINAL 90dg MALE PC MTG .250	06-40060
41 CAP CERM	/I 56PF 500VOLT 5%	45-56052	R1	RES 220.00KOHM .25W 5% CARBON	50-22055
42 CAP MYLI	R .0470UF 630VOLT 10%	41-47362	R10	RES 100.00KOHM .25W 5% CARBON	50-10055
43 CAP MYLI	R .0470UF 630V0LI 10%	41-47362	R11	RES 22.00KOHM .25W 5% CARBON	50-22045
44 GAP ELEG	47 IVIED 03VULI 20%	4/-4/001	n12 D12	RES 100.00K0HW 25W 5% CARDON	50-10055
40 CAPELEC	8211F 500V 20%	41-47302	R14	RES 220 00K0HM 25W 5% CARBON	50-22055
5 CAP CERM	4 56PE 500V0LT 5%	45-56052	B15	BES 220.00KOHM 25W 5% CARBON	50-22055
50 CAP ELEC	82UF 500V 20%	42-82052	R16	RES 68.00KOHM .25W 5% CARBON	50-68045
52 CAP ELEC	82UF 500V 20%	42-82052	R17	RES 100.00KOHM .25W 5% CARBON	50-10055
53 CAP MYLI	R .0470UF 630VOLT 10%	41-47362	R18	RES 47.00KOHM .25W 5% CARBON	50-47045
6 CAP POLY	.0470UF 100V 10% PREP	46-47312-1	R19	RES 100.00KOHM .25W 5% CARBON	50-10055
7 CAP MYLI	R .0470UF 630V0LT 10%	41-47362	R2	RES 220.00KOHM .50W 5% CARBON	52-22055
70 CAP CERM	A 180PF 500VOLT 5%	45-18152	R20	RES 220.00KOHM .25W 5% CARBON	50-22055
8 CAP MYLI	R .0470UF 630V0LI 10%	41-47362	R21	RES 220.00K0HM .50W 5% CARBON	52-22055
9 CAP ELEC	47 MFD 63VULI 20%	47-47061	R22	RES 100.00 OHM .25W 1% METAL	50-10021
	CT GEN 1N4007 1000V 1A	61-10000	R23		20-12032 50-10055
12 DIODE RE	CT GEN 1N4007 1000V 1A	61-10000	B25	RES 100.00 OHM 25W 1% METAI	50-10035
14 DIODE RE	CT GEN 1N4007 1000V 1A	61-10000	R26	RES 10.00KOHM .25W 5% CARBON	50-10045
15 DIODE RE	CT GEN 1N4007 1000V 1A	61-10000	R27	RES 4.70KOHM .25W 5% CARBON	50-47035
16 DIODE RE	CT GEN 1N4007 1000V 1A	61-10000	R28	RES 4.70KOHM .25W 5% CARBON	50-47035
2 DIODE RE	CT GEN 1N4007 1000V 1A	61-10000	R29	RES 100.00 OHM .25W 1% METAL	50-10021
3 DIODE RE	CT GEN 1N4007 1000V 1A	61-10000	R3	RES 1.50KOHM .25W 5% CARBON	50-15035
4 LED BLUE	DIFFUSED 3MM T-1.00	60-75350	R30	RES 4.70KOHM 1.00W 5% CARBON	53-47035
5 DIODE RE	CT GEN 1N4007 1000V 1A	61-10000	R31	RES 220.00K0HM .50W 5% CARBON	52-22055
b DIODE RE	GEN 1N4007 1000V 1A	b1-10000	R32	RES TUU.UUKUHM .25W 5% CARBON	50-10055

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		RISK	OF EL	ECTRIC	SHOCK
R33 R35 R36 R37 R38 R39 R4 R40 R41 R42 R43 R44 R45 R46 R47 R48 R47 R48 R47 R55 R50 R57 R56 R57 R56 R57 R56 R57 R56 R77 R70 R70 R72 R73 R74 R75 R79 R9 R91 R72 R75 R50 R51 R75 R55 R55 R55 R55 R55 R55 R55 R55 R55	RES 101 RES 210 RES 101 RES 201 RES 101 RES 101 RES 101 RES 101 RES 101 RES 101 RES 201 RES 20	RISK 3.00KOHM 3.00 OKKOHM 3.00 OHM 3.00 OHM 3.00 OHM 3.00 OHM 3.00 OHM 3.00 OHM	OF EL .25W 5% .25W 5	CARBON ARBON ARBON CARON CARBO	SHOCK S0-10055 50-2025 50-10055 50-10055 50-10055 50-10055 50-10055 50-20265 50-20265 50-20265 50-20265 50-20265 50-20265 50-20265 50-20265 50-20265 50-20265 50-20265 50-20265 50-20265 50-20265 50-20255
R53 R54 R55 R56 R57 R58 R6 R7 R70 R71 R72 R73 R74 R73 R74 R75 R76 R77 R78	RES 68 RES 100 RES 222 RES 2. RES 2. RES 2. RES 1. RES 1. RES 222 RES 4. RES 4. RES 350 RES 4. RES 350 RES 4. RES 350 RES 4. RES 350 RES 350 RES 350 RES 100 RES 100 R	.00K0HM).00K0HM 20K0HM 1 20K0HM 1 20K0HM 1 00K0HM 00K0HM 00K0HM 70K0HM 70K0HM 70K0HM 70K0HM 70K0HM 70K0HM 70K0HM 2.00 0HM 2.00 0HM 2.00 0HM	25W 5% (25W 5% (25W 5% (00W 5% (10W 10% 5 25W 5% (25W 5% (25W 5% (25W 5% (25W 5% S 5W 5% S 5W 5% S 25W 5% (25W 5%	CARBON CARBON CARBON CARBON SB SDOF ARBON CARBON CARBON CARBON CARBON CARBON SARBON B SDOF B SDOF B SDOF B SDOF B SDOF METAI	50-68045 50-10055 52-22055 53-22035 50-35010 50-10035 50-10035 50-22045 50-22045 50-47035 50-47035 56-35025 56-35025 56-35025 56-35025 56-35025 56-35025 56-35025 56-35025
R79 R8 R9 S1 S2 S3 S4 S5 S6 S8 V1 V2 V3 V4	RES 100 RES 100 RES 100 RES 560 RES 10 SWITCH SWITC	0.00 OHM 0.00 OHM 0.00 OHM 0.00 OHM 1 DP3T PC 1 DPDT SEI 1 DP3T PC 1 DPDT SEI 1 DPDT SEI 1 DPDT SEI 1 DPDT SEI 1 DPDT SEI 1 AL VERT F TUBE 9PI TUBE 9PI TUBE 9PI	25W 1/6 25W 5% 25W 5% 25W 5% 22W 5% MTG EXT F LECT PC E2 LECT PC E2 MTG EXT F SH PC MT(LECT PC E3 EML PC M 12AX7/E N 12AX7/E N 12AX7/E	VETAL CARBON XARBON XARBON 2C LEGS CT LEGS CT LEGS CT LEGS CT LEGS G LOCKNG KT LEGS TG .250 L84 L84 L84 L84	30-10021 50-10021 50-56025 50-56025 50-10045 25-76286 25-62656 25-62656 25-02201 25-62656 06-40040 23-91632 23-91632 23-91632 23-91632
V6 V7 V8 V9	SOCKET SOCKET SOCKET SOCKET	TUBE 8PI TUBE 8PI TUBE 8PI TUBE 8PI	N EL34/58; N EL34/58; N EL34/58; N EL34/58;	31/6L6 31/6L6 31/6L6 31/6L6	23-26400 23-26400 23-26400 23-26400

FRONT & REAR PANEL CONTROLS



FRONT PANEL

1. POWER

Turns on power to the unit.

2. STAND-BY

Turns on high voltage to the tubes. Usually, this switch should be off when the amp is initially powered on until the tube filaments warm up (30 seconds, or more). The amplifier should be switched to stand-by whenever the amp will not be used for a short amount of time (like a set break) to increase tube life.

3. VOLUME

Controls the amount of signal sent to the power amp, which controls the output level. Start with this control all the way down. Make sure the preamplifier is connected and turned on and it's level turned up. Bring the amplifier volume up to the desired loudness. Experimentation will be needed to get the correct volume balance between the preamplifier output and the amplifier output level. The amplifier should be turned up at least one half with the knob indicator lines running vertical. Note: When the amp is in bridge mode, Channel 1 will be the master volume control - Channel 2 volume will not function.

4. PRESENCE

Controls the amount of clarity or crispness in the 6kHz range. When this control is all the way down, the frequency response will essentially be flat. Bringing this control up will create a "bump" in the upper frequencies. Note: In bridge mode, track both Channel 1 and 2 presence knobs to the same position.

5. POWER LED

The blue LED indicates that the power supply has been turned on.

REAR PANEL

6. AC POWER AND FUSE

The detachable AC power cord is designed to operate with one type of voltage. Check the rear label above the AC connector for the proper voltage. Make sure the AC cord is securely inserted. If not, the power amp could become intermittent. Plug the AC cord into a grounded 3-prong power source. No attempt should ever be made to defeat, or use the amp without the ground connected. The fuse is internal to the unit. Replace only with the same type and rating.

7. SPEAKER OUTPUT JACKS

Two 1/4" speaker output jacks are provided for each channel. Each pair of jacks are wired in parallel. Set the impedance switch accordingly for each channel. The total impedance for each channel should not be less than 4Ω . Note: when in bridge mode, only Channel 1 output jacks will work and the impedance switch for each channel must set to half of the total speaker load impedance.

8. IMPEDANCE SELECTION SWITCH

Use the impedance switch to match the speaker load to the output transformers. This switch should be set to the equivalent load connected to the speaker outputs of each channel or loss of output power will result. The speaker output jacks are in parallel so if two 8Ω speakers are connected the total impedance would be 4Ω for that channel. Likewise if two 16Ω speakers are used, then move the impedance switch to 8Ω .

Note: when in the bridge mode, the impedance switch for each channel must be set to one half the total load impedance. This means for two 16 Ω or one 8 Ω speaker, set each channel to 4 Ω . If you are using one 16 Ω speaker, then set each channel to 8 Ω . The minimum impedance for the TS100 in bridged mode is 8 Ω .

9. BRIDGE/STEREO SWITCH

For mono 100W output, set this switch to "BRIDGE". If using the bridge mode, use the speaker outputs from Channel 1 only and use the Channel 1 volume control. If stereo operation is desired, set to "STEREO" mode. In this mode, both channels operate as separate 50W amplifiers and each channel's controls can be adjusted independently. Make sure the impedance switch is properly selected for each channel.

10. GROUND LIFT SWITCH

Many times amplifiers and preamps are connected in such a manner as to cause a grounded loop with the inputs which results in audible hum. To activate, press this switch in to lift the ground. If the hum has not been reduced, then try installing a Carvin MTF55 "Ground lifter" between the amplifier input and the signal.

11. PARALLEL INPUTS SWITCH

Pressing this switch in will split the signal that is plugged into the Channel 1 input to both Channel inputs. Channel 2 input will no longer function when this switch is activated.

12. CHANNEL INPUTS

A 1/4" unbalanced jack is used to deliver signal to each of the amplifiers channels. If it is desired to use the amplifier for home audio, an RCA to 1/4" adapter (Carvin #AD66) will most likely be needed. The amplifier can accept a wide range of signal levels.



POWER TUBE BIASING

(Note: Biasing should be left to a qualified technician due to the fact that lethal voltages near 500 volts are present inside the amplifier).

The TS100 can be set up to use either EL34's or 5881's (6L6GC) in each channel. If different tube type are used in each channel, the amp should only be used in STEREO mode

Inside the amplifier, on the component side of the power tube printed circuit card, are switches to select the tube type for each channel. Above those switches are markings that indicate the different tube types. Bias potentiometers are also near those switches for fine-tuning. Each side of the amplifier must be biased with ALL four power tubes installed.

a) Remove from the printed circuit board the red wires connecting from the output transformers to QC2 and QC16.

b) Two milliamp meters will be needed. Insert a milliamp meter in series with each of the red wires to the printed circuit board. Current can now be measured through both of the output transformers while no input signal is present. Make sure the leads don't touch anything such as the chassis, each other, or you- VERY HIGH VOLTAGES ARE PRESENT!

d) Make sure the bias select switch is in the correct position for the tube type and the meters are set to "mA" or milliamps.

e) Power up the amplifier – switch the stand-by switch on. Adjust the bias pots accordingly to obtain a 50mA reading on each of the milliamp meters. Leave the amp on for a few minutes making sure the readings don't change. Turn the amp off, leaving the standby switch on and let the residual high voltage bleed down. Remove the milliamp meters from the series connection and re-attach the red wires directly to QC2 and QC16 again. The amp is now correctly biased. CAUTION: The power supply capacitors will remain "charged" for a period of time after the amp has been turned off with voltages near 500 volts.

(If only volt meters are available, an alternate method of biasing can be used by substituting 1Ω , 1/2 watt resistors where the milliamp meters would be as described above. The voltage across each resistor should read 50mV corresponding to 50mA. The rest of the procedure outlined above is the same.)