

15-WATT AMPLIFIER

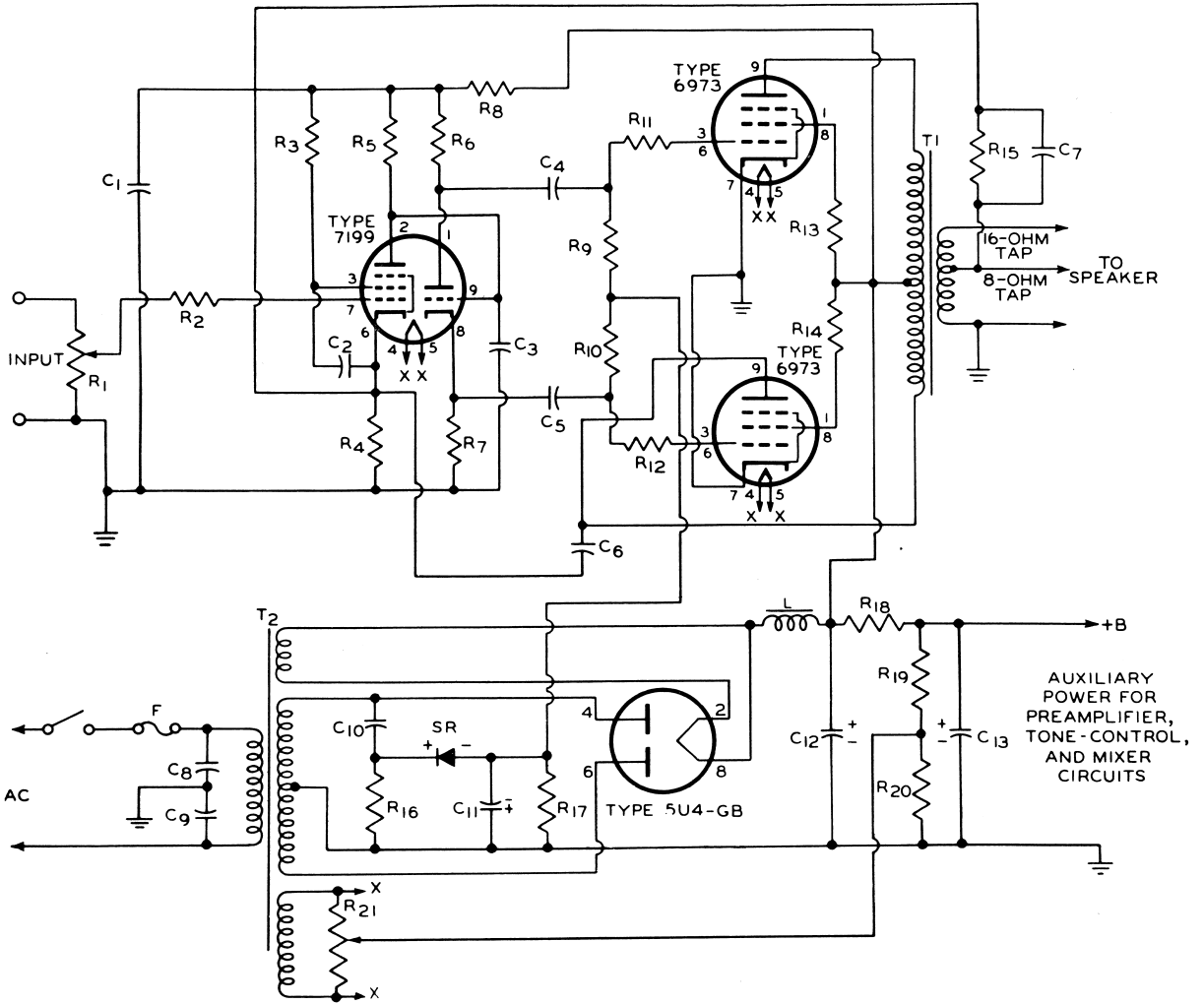


Fig. 1

DC VOLTAGE MEASUREMENT CHART

TYPE	PIN NUMBER								
	1	2	3	4	5	6	7	8	9
5U4-GB	—	+305	—	360 ac	—	360 ac	—	+305	—
6973	+300	—	-25	+50	+50	-25	0	+300	+295
7199	+210	+78	+40	+50	+50	+1	0	+85	+78

PERFORMANCE SPECIFICATIONS

Sensitivity: 1.2 volts rms for 15 watts output;

Hum and Noise: 84 db below 15 watts with input shorted;

Frequency Response: Flat $\pm \frac{1}{2}$ db from 20 cps to 60000 cps;

Total Harmonic Distortion: 0.4% at 15 watts;

Intermodulation Distortion: 1.5% at 15 watts.

All voltages $\pm 20\%$ measured from pin to ground with no signal input, using AWA Volttohmystr or similar instrument.

HUM-BALANCE ADJUSTMENT

Short-circuit the audio-input terminals of the amplifier. Connect the amplifier to the ac line and adjust the hum-balance potentiometer (R21) for minimum hum from the loudspeaker.

PARTS LIST

C1: 40 μf , 450 volts
 C2, C4, C5: 0.25 μf
 C3, C6: 3.3 μf , 600 volts
 C7: 150 μf
 C8, C9: 0.05 μf , 600 volts
 C10: 0.02 μf , 600 volts
 C11: 100 μf , 50 volts
 C12: 80 μf , 450 volts
 C13: 40 μf , 450 volts
 F: Fuse, 3 amperes
 L: Filter Choke, 3 h., 160 ma., 75 ohms or less
 R1: Potentiometer, 1 megohm
 R2: 10000 ohms
 R3: 0.82 megohm

R4: 820 ohms
 R5: 0.22 megohm
 R6, R7: 15000 $\pm 5\%$ ohms, 2 watts
 R8: 3900 ohms, 2 watts
 R9, R10: 0.1 megohm
 R11, R12: 1000 ohms
 R13, R14: 100 ohms
 R15: 8200 ohms
 R16: 15000 ohms, 1 watt
 R17: 68000 ohms
 R18: 4700 ohms, 2 watts
 R19: 0.27 megohm, 1 watt
 R20: 47000 ohms
 R21: Potentiometer, 100 ohms
 SR: Selenium Rectifier, 20 ma., 135 volts rms
 T1: Output Transformer for matching impedance of voice coil to 6600-ohm plate-to-plate load.
 T2: Power Transformer, 360-0-360 volts rms, 120 ma.

NOTE

All resistors 0.5 watt, $\pm 10\%$, unless specified.
 All capacitors 400 volts, unless specified.

30-WATT AMPLIFIER

PERFORMANCE SPECIFICATIONS

Sensitivity: 1 volt rms for 30 watts output;
Hum and Noise: 84 db below 20 watts with input shorted;
Frequency Response: Flat ± 0.5 db from 15 cps to 40000 cps;
Total Harmonic Distortion: 0.7% at 30 watts;
Intermodulation Distortion: 1.5% at 30 watts.

DC VOLTAGE MEASUREMENT CHART

TYPE	PIN NUMBER								
	1	2	3	4	5	6	7	8	9
5U4-GB	—	+400	—	375 ac	—	375 ac	—	+400	—
7027-A	+390	0	+390	+390	-30	-30	0	0	—
7199	+280	+105	+45	0	0	+1.1	0	+115	+105

All voltages $\pm 20\%$ measured from pin to ground with no signal input, using AWA Volttohmystr or similar instrument.

HUM-BALANCE ADJUSTMENT

Short-circuit the audio-input terminals of the amplifier. Connect the amplifier to the ac line and adjust the hum-balance potentiometer (R19) for minimum hum from the loudspeaker.

PARTS LIST

C1: 25 μf , 50 volts
 C2: 22 μf , 600 volts
 C3: 80 μf , 600 volts
 C4, C5: 0.25 μf , 600 volts
 C6: 0.01 μf , 600 volts
 C7, C8: 0.05 μf , 600 volts
 C9, C11: 40 μf , 600 volts
 C10: 100 μf , 50 volts
 C12: 20 μf , 450 volts
 F: Fuse, 3 amperes
 R1: Potentiometer, 1 megohm
 R2: 10000 ohms
 R3: 220000 ohms
 R4: 820 ohms
 R5: 10 ohms
 R6: 180000 ohms
 R7: 15000 $\pm 5\%$ ohms, 2 watts
 R8: 15000 $\pm 5\%$ ohms, $\frac{1}{2}$ watt

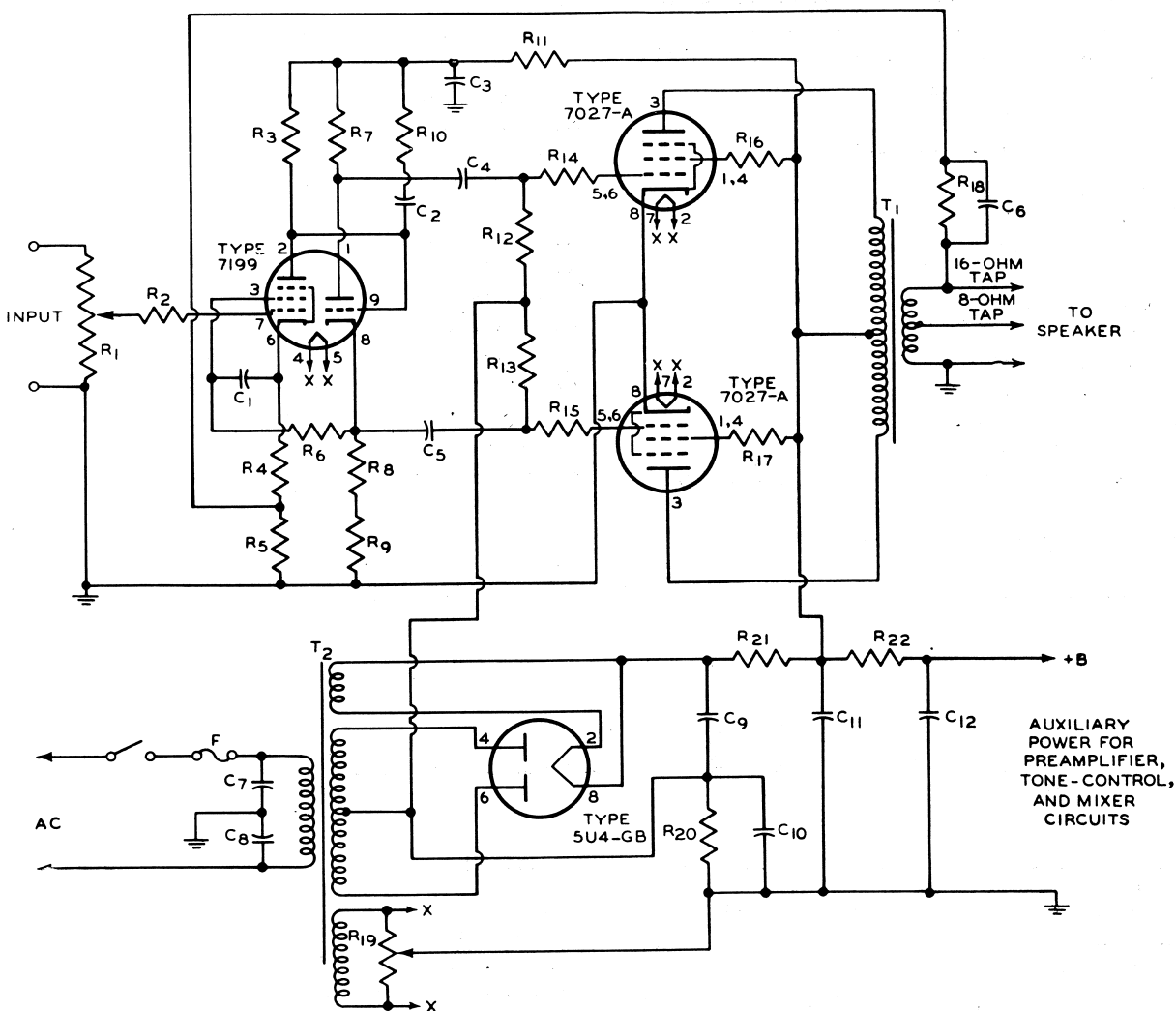


Fig. 2

R9: 1000 ohms
 R10: 22000 ohms
 R11: $2000 \pm 10\%$ ohms, 2 watts
 R12, R13: 100,000 ohms
 R14, R15: 1000 ohms
 R16, R17: 56 ohms
 R18: 270 ohms
 R19: Potentiometer, 100 ohms, $\frac{1}{2}$ watt

R20: $220 \pm 10\%$ ohms, 10 watts
 R21: $50 \pm 10\%$ ohms, 10 watts
 R22: $10,000 \pm 10\%$ ohms, 2 watts
 T1: Output Transformer for matching impedance of voice coil to 5000-ohm plate-to-plate load.
 T2: Power Transformer, 375-0-375 volts rms, 160 ma.

NOTE

All resistors 0.5 watt, $\pm 10\%$, unless otherwise specified.

All capacitors 400 volts unless otherwise specified.

50-WATT AMPLIFIER

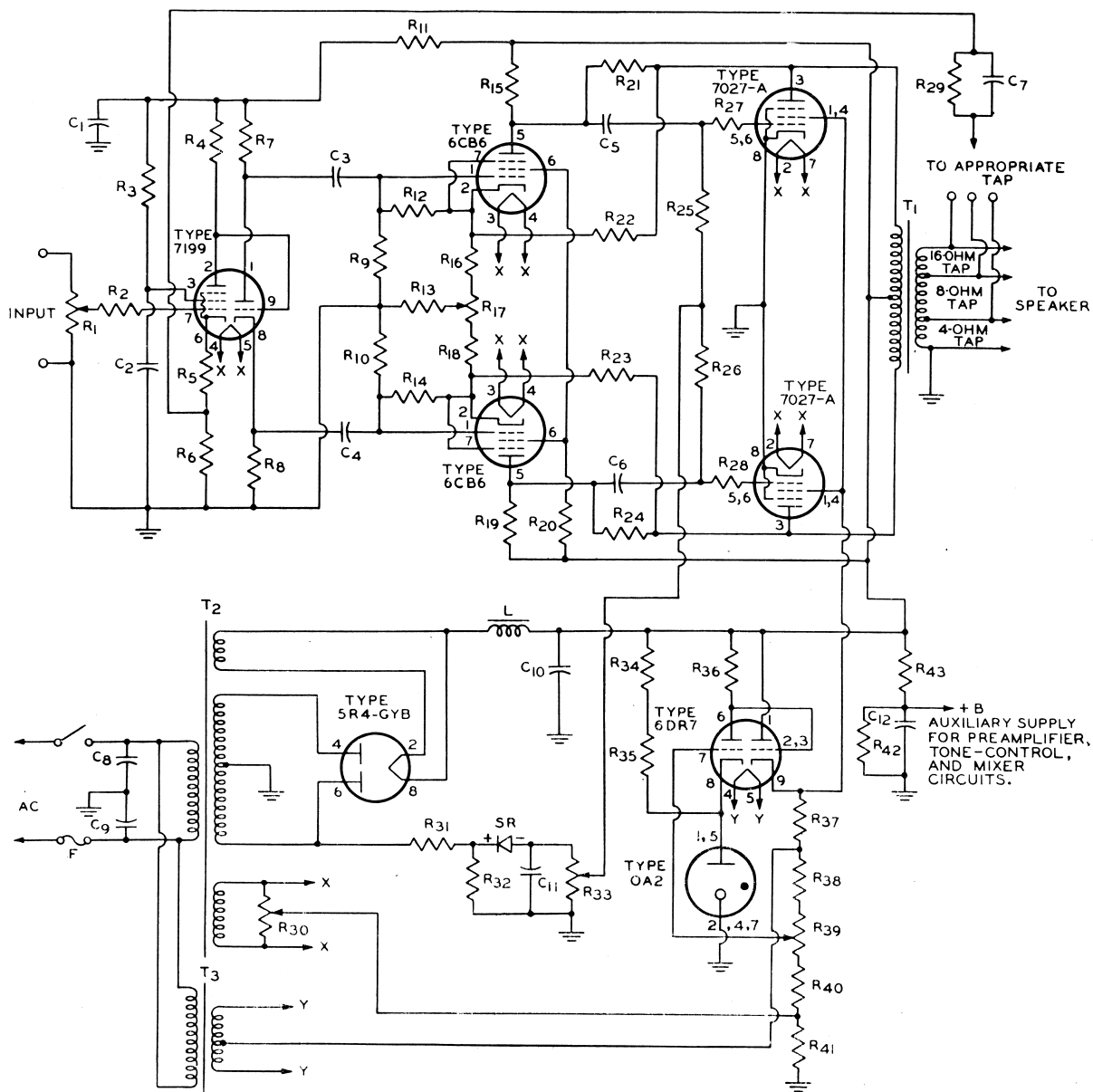


Fig. 3

PERFORMANCE SPECIFICATIONS

Sensitivity: 0.4 volts rms for 50 watts output;

Hum and Noise: 70 db below 50 watts with input shorted;

Frequency Response: Flat ± 1 db from 10 to 50000 cps;

Total Harmonic Distortion: 0.1% at 50 watts;

Intermodulation Distortion: 1% at 50 watts.

PRELIMINARY ADJUSTMENTS

To avoid possible damage to the valves and components in the output stage of the 50-watt power amplifier shown in Fig. 3, and to minimize

hum, the following adjustments should be made before this amplifier is placed in operation.

(1) Remove the 5R4-GYB rectifier from its socket and connect a dc voltmeter between B minus and the junction of R25 and R26, with the positive lead of the meter on B minus. Set the meter on a range which provides a full-scale reading of at least 50 volts.

(2) Connect the amplifier to the ac power line and adjust the bias-control potentiometer (R33) until the meter reads 40 volts. Disconnect the amplifier from the power line, and remove the meter.

(3) Set the dc voltmeter to a range which provides a full-scale reading of at least 500 volts, and connect it between B minus and Pin 9 of the 6DR7 socket, with the negative lead of the meter on B minus. Connect the loudspeaker to the audio-output terminals of the amplifier. Replace the 5R4-GYB rectifier in its socket.

(4) Connect the amplifier to the ac line, and, after approximately one minute, adjust the grid-No. 2-voltage-control potentiometer (R39) until the meter reads 400 volts. Disconnect the amplifier from the ac line and remove the meter.

(5) Short-circuit the audio-input terminals of the amplifier. Connect the amplifier to the ac line and adjust the heater-balance potentiometer (R30) for minimum hum from the loudspeaker.

(6) Remove the short circuit from the audio-input terminals of the amplifier and set the volume control at its maximum clockwise (maximum-volume) position. Adjust the ac-balance control (R17) for minimum hum from the loudspeaker.

DC VOLTAGE MEASUREMENT CHART

TYPE	PIN NUMBER								
	1	2	3	4	5	6	7	8	9
0A2	+150	0	—	0	+150	—	0	—	—
5R4-GYB	—	+460	—	600 ac	—	600 ac	—	+460	—
6CB6	+3	+6	+65	+65	+175	+120	+6	—	—
6DR7	+460	+360 to +400	+360 to +400	+250	+250	+360 to +400	+125 to +150	+150	+400
7027-A	+400	+65	+450	+400	-40	-40	+65	0	—
7199	+335	+110	+55	+65	+65	+1.3	0	+120	+110

All voltages $\pm 20\%$ measured from pin to ground with no signal input, using AWA VoltOhmyst or similar instrument.

PARTS LIST

- C1, C2: 40 μf , 450 volts
 C3, C4: 0.02 μf
 C5, C6: 1 μf
 { 4-ohm tap; 0.002 μf
 C7: { 8-ohm tap; 0.0015 μf
 { 16-ohm tap; 0.001 μf
 C8, C9: 0.05 μf , 600 volts
 C10: 20 μf , 600 volts
 C11: 100 μf , 150 volts
 C12: 40 μf , 450 volts
 F: Fuse, 5 amperes
 L: Filter Choke, 8 h., 250 ma., 60 ohms or less
 R1: Potentiometer, 0.5 megohm
 R2: 4700 ohms
 R3: 0.82 megohm
 R4: 0.22 megohm
 R5: 820 ohms
 R6: 10 ohms
 R7, R8: 15000 ohms, 2 watts
 R9, R10: 1.5 megohms
 R11: 33000 ohms, 2 watts
 R12, R14: 1.3 megohms
 R13: 47 ohms
 R15, R19: 0.15 megohm
 R16, R18: 390 ohms
 R17: 500 ohms
 R20: 0.15 megohm, 1 watt
 R21, R24: 0.33 megohm, 1 watt
 R22, R23: 0.12 megohm, 2 watts
 R25, R26: 0.1 megohm
 R27, R28: 4700 ohms
 R29: { 4-ohm tap; 600 ohms
 { 8-ohm tap; 820 ohms
 { 16-ohm tap; 1200 ohms
 R30: Potentiometer, 100 ohms
 R31: 0.12 megohm
 R32, R34, R35, R37: 33000 ohms, 2 watts
 R33: Potentiometer, 50000 ohms
 R36: 0.27 megohm, 1 watt
 R38: 10000 ohms, 1 watt
 R39: Potentiometer, 25000 ohms, 2 watts
 R40: 15000 ohms, 2 watts
 R41: 12000 ohms, 2 watts
 R42: 0.22 megohm, 2 watts
 R43: 22,000 ohms, 2 watts
 SR: Selenium Rectifier, 20 ma., 135 volts rms
 T1: Output transformer for matching impedance of voice coil to 5000-ohm plate-to-plate load.
 T2: Power transformer, 600-0-600 volts rms, 200 ma.
 T3: Filament transformer, 6.3 volts centre-tapped, 1 ampere.

NOTE

All capacitors 400 volts, unless otherwise specified.
 All resistors 0.5 watt, $\pm 10\%$, unless otherwise specified.