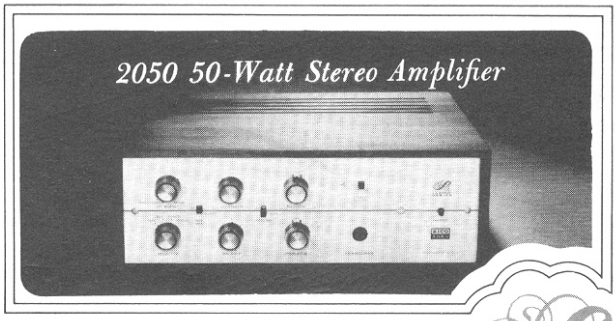
EICO

maintenance manual



Classic Series

$1

EICO *131-01 39th Ave. Flushing, N. Y. 11354 Cable Address: EICOKITS, N. Y.*

Specifications

POWER: 50 watts IHF music, 44 watts continuous (total). IM Distortion (each channel): 2% at 22 watts, 1% at 17 watts, 0.2% at 5 watts, 0.1% at 2 watts. Harmonic Distortion (each channel): 0.5% at 17 watts, 40 cps-20kc; 0.3% at 5 watts, 30 cps-20kc. IHF power bandwidth at rated continuous power, 0.8% harmonic distortion: 30 cps-20kc. Frequency Response: ±1db 10 cps-40kc. Speaker Outputs: 8 and 16 ohms. Inputs: Mag. phono or adapted ceramic phono, tuner, tape, auxiliary. Sensitivity: 1.7mv phono, 190mv others. Noise: 70db below average phono cartridge output (10-15mv), 80db down on others. Power Requirements: 120V, 60 cps; 160 watts (no signal). Size (HWD): 5-5/8" x 15-7/8" x 11-5/8".

Service

general

No substitutions are permitted for the tube types used in this amplifier. All the tube types used are distributed nationally, but replacements can be obtained directly from EICO, if desired.

To facilitate servicing, remedial and trouble-shooting procedures have been provided. D-C operating voltages have been provided in a chart on the schematic diagram. Please note the section of additional trouble-shooting procedures for defective NEWLY-COMPLETED KITS.

CONNECTION PROCEDURES & ADJUSTMENTS FOR MINIMUM HUM

See "AC Line Cords & Hum" on page 10, and the section on adjusting the hum balance controls R51 (Channel 1 amplifier) and R52 (Channel 2 amplifier) on pages 6 and 7 in the MANUAL OF OPERATION.

Hum, of course, may be present in the output of sources connected to the amplifier, or arise due to improper connections to the amplifier. If there is excessive hum at any input, disconnect the input cable and short the input jack to the chassis. If the hum disappears, the trouble is not in the amplifier.

trouble-shooting

A. ADDITIONAL TROUBLE-SHOOTING PROCEDURES FOR DEFECTIVE NEWLY-COMPLETED KITS

If the newly-completed kit does not operate properly, do not neglect the following checking procedures which usually correct 90% of the difficulties that may be encountered.

I. Inspection.

a. To catch any wiring errors, check the entire wiring, step by step, against the wiring instructions and the wiring diagrams. If possible, have a friend check the wiring with you. Often, a person is unable to detect his own errors because he misinterprets an instruction.

b. Check that all connections are properly soldered. There should be no unsoldered connections or cold solder connections. A cold solder connection is due to insufficient heating and evidenced by a dull lump of solder on the connection. A good connection indicating that solder has flowed freely is evidenced by a shiny coating on the terminal and all the wires connecting to it. If a connection appears uncertain, reheat it to obtain the result just described, using a small amount of additional solder.

solder has flowed freely over and formed a shiny coating on the terminal and all the wires connecting to it. If a connection appears uncertain, reheat it to obtain the result just described, using a small amount of additional solder.

c. Check for accidental shorts between terminals that are not connected together.

d. Check the insulation on crossing leads. The insulation should not be melted away enough to cause crossing leads to short to each other.

e. Check shielded leads for shorts between the shield and the inner conductor due to melted inner insulation or a shield strand touching the inner conductor or connecting lug.

f. Check for wrong tube placement, or accidental shorting of leads or parts to the bottom plate; also blown fuse, or line cord plug making improper contact in outlet.

II. Measurements & Testing.

a. Check all d-c operating voltages and power supply a-c voltages with a VTVM or 20,000Ω/V VOM.

b. An ohmmeter may be used for continuity testing or resistance measurements with the unit disconnected from the a-c power line and filter capacitors discharged.

c. A signal tracer may be used to check all signal paths.

III. Specific Problems.

a. Hum: Check solder connections to ground on filter capacitors, potentiometers, etc.; check lead dress (keep signal leads away from filaments and other power transformer leads); check for ground connections not as specified in the construction steps and figures, or an accidental ground connection to the wiring point on the chassis; check for a defective tube or filter capacitor; check for tube shield not making electrical contact to base.

b. Distortion: Check for wrong connection or defective output tube; check for incorrect wiring or defect in output circuitry.

c. Noise: Tap suspected resistors lightly with the eraser end of a pencil to determine which is noisy; clean tube sockets; replace noisy tube.

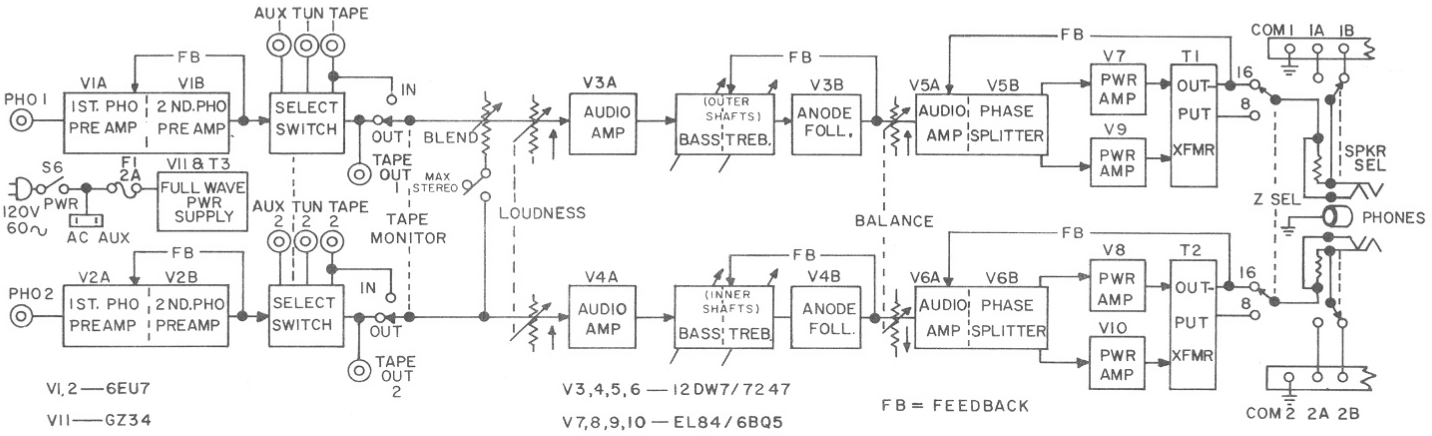
B. GENERAL TROUBLE-SHOOTING CHART

NOTES: a. Most tubes show a bright glow when the unit is on. This is normal and does not indicate a defect.

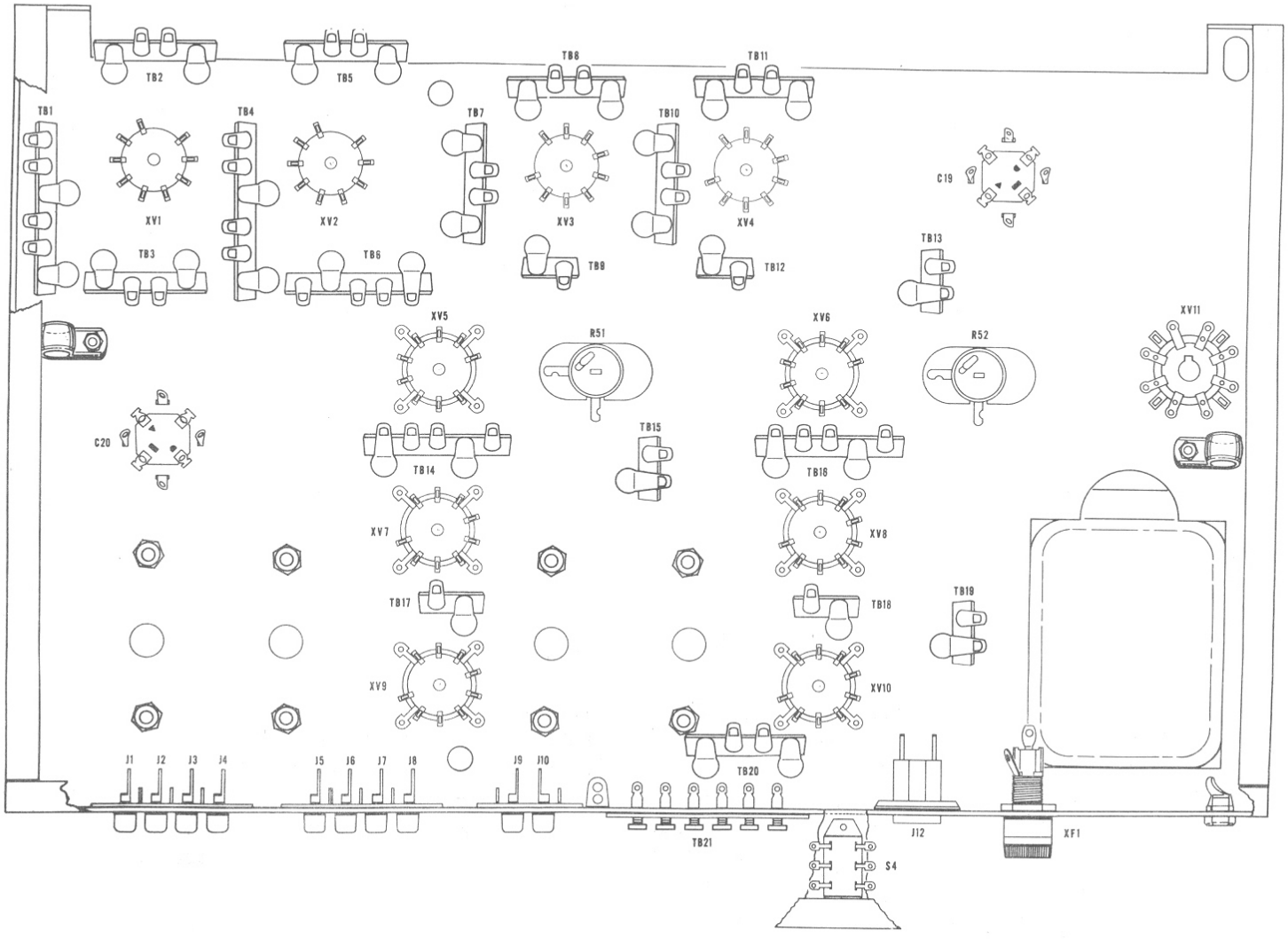
b. This amplifier, as does any amplifier, has a certain residual noise level that appears at the output terminals even when the LOUDNESS control is turned to minimum. With high efficiency loudspeakers, this residual noise level may be audible as a slight hiss. It does not indicate any defect in the amplifier.

c. The transformers used in this unit run at a temperature less than 195°F, despite the fact that the temperature safety limit is much higher (221°F). Although 195°F is cool for a transformer, it is very hot to the touch. Transformers which seem too hot when touched with the hand, are usually good and are actually not overheating. Output transformers usually run cooler than power transformers. Some output transformers may run hotter than is accountable to the internally generated heat, due to being located near hot components such as the output tubes, rectifier tube, and the power transformer.

Block Diagram



Bottom View of Chassis



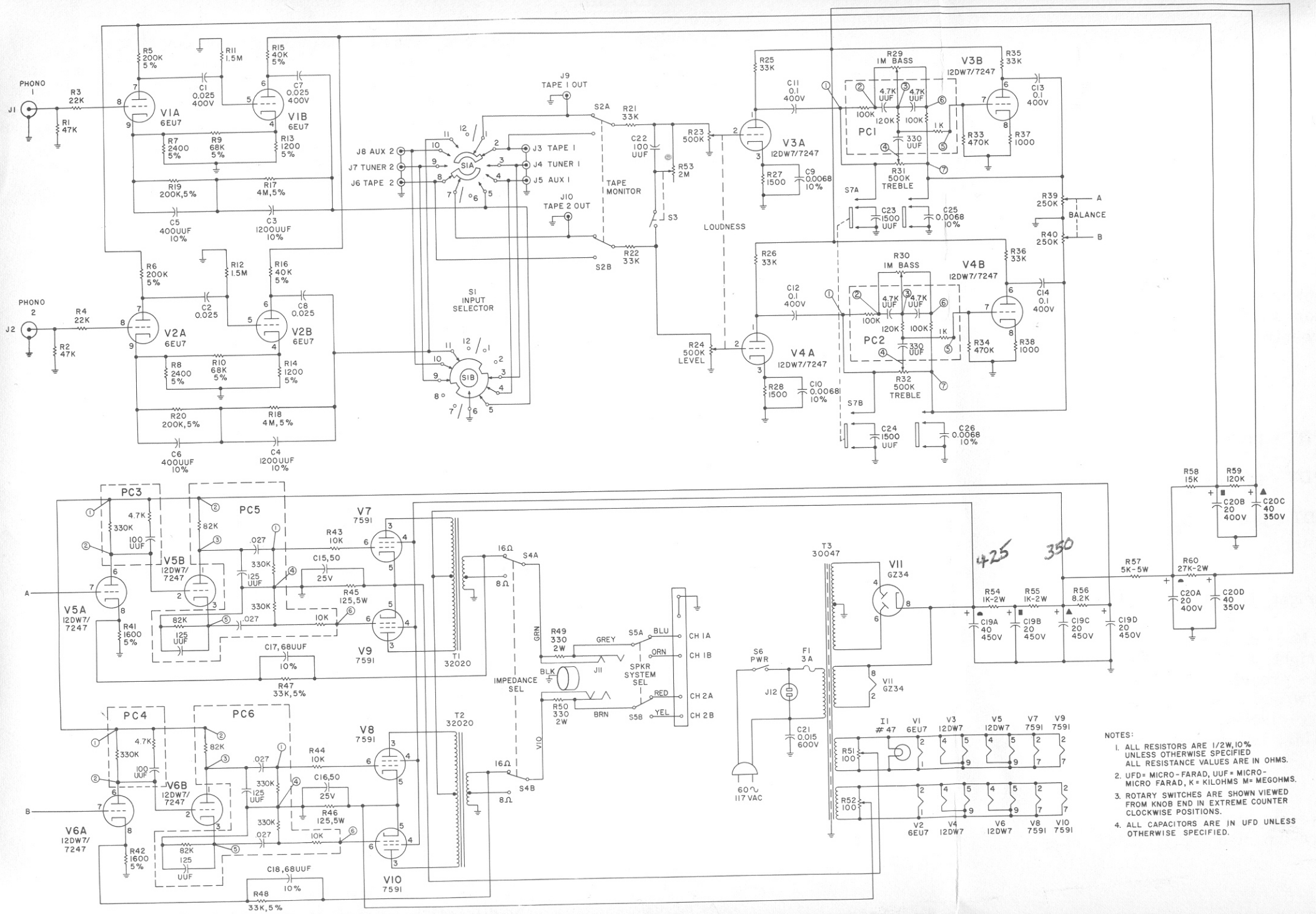
General Trouble-Shooting Chart

SYMPTOM	CAUSE	REMEDY
Amplifier causes power line fuse to blow. Power line fuse blows again with V11 out of its socket.	Line cord, J12, primary or high voltage secondary windings of T3 shorted internally or externally (wiring).	Replace or repair.
Amplifier causes power line fuse to blow. Power line fuse does not blow again with V11 out of its socket.	Defective V11, C19, V7, V8, V9, V10; T1 or T2 primary shorted internally or externally.	Replace or repair.
Any or half of tube filaments not lit.	Open tube filament. Open lead from one end of the 6.3V windings of T3. One 6.3V winding of T3 open.	Replace or repair.
Output tube bias too high (resulting in distorted output waveform).	Open R45, R46.	Replace or repair.
DC voltage at V11, cathode (pin 8) is incorrect as specified below.		
a) No voltage.	Defective V11. C19 shorted internally or externally.	Replace Replace or repair.
b) High voltage.	Connection from C19 to pin 8 of V11 is broken. Connection to center tap of h.v. secondary winding of T3 open. Output tubes V7, V8, V9, V10 over-biased or not drawing current. May result from open R45, R46.	Repair Check possible causes and replace or repair. Check possible causes and repair.
c) Low voltage.	Excessive current drain in amplifier. Defective V11.	Replace
Excessive hum on mag. phono.	V1 or V2 defective. Fil. leads dressed too close to grid lead. Tube shield not making electrical contact to base or base not making electrical contact to chassis. Shielding and grounding of wiring to input jacks not exactly as instructed and shown in drawings.	Replace Dress fil. leads away from grid lead. Check and correct. Correct
Excessive noise on mag. phono.	V1 and V2 socket contacts dirty. Noisy V1 or V2. Noisy resistor.	Clean thoroughly with solvent. (Safe-Tee Solvent F.O. 178) Replace Check by tapping and replace.
Sustained oscillations.	Poor dress of output transformer T1 or T2 leads.	Dress all input leads and T1, T2 leads away from each other. Keep T1, T2 leads away from input jacks.
Sustained microphonics on mag. phono.	V1 or V2 defective.	Replace
Hum on all inputs.	V3, V4, V5, V6 defective, not properly shielded, or dirty sockets and contacts. V7-V9 or V8-V10 unbalanced pairs. Dress of power transformer T3 leads.	Replace, correct, or clean. Try interchanging or replacing tubes. Correct

Replacement Parts List

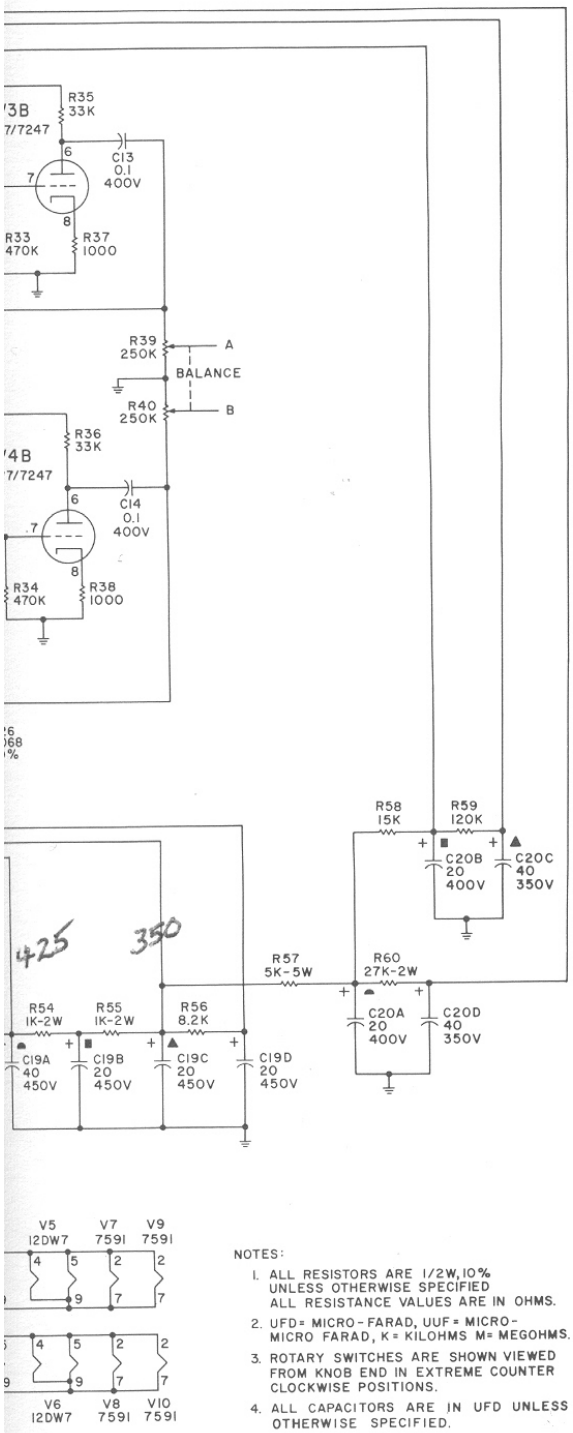
SYM. NO.	STOCK#	DESCRIPTION
	CAPACITORS	
C1, 2, 7, 8	22517	disc, .025ufd, 400V, GMV
C3, 4	22520	disc, .0012ufd, 500V, 10%
C5, 6	22538	disc, 400uuf, 500V, 10%
C9, 10	22523	disc, .0068ufd, 10%
C11, 12, 13, 14	20039	paper, .1ufd, 400V, 10%
C15, 16	23007	elec., 50ufd, 25V
C17, 18	22509	disc, 100uuf, 500V, 10%
C19, 20	24012	elec., can 40, 3 x 20ufd, 450V
C21	20078	molded, .015ufd, 600V, 10%
C22	22509	disc, 100uuf, 500V, 10%
	JACKS	
J1-4, J5-8	50020	input, quad. w/50021 insulation - pre-riveted
J9-10	50011	input, dual w/50012 insulation - pre-riveted
J11	50040	headphones
J12	50016	A.C. receptacle - pre-riveted
	POTENTIOMETERS	
R23, 24	18100	dual, 500KΩ, audio
R29, 30	18101	concentric, 1MΩ, linear carbon
R31, 32	18102	concentric, 500KΩ, linear carbon
R39, 40	18103	dual, 250KΩ, carbon
R51, 52	19016	100Ω, wire wound
R53/S3	18104	2MΩ, linear w/SPST
	PRINTED CIRCUITS	
PC1, 2	29751	tone control
PC3, 4	29755	amplifier load
PC5, 6	29754	phase invert
	RESISTORS	
	ALL RESISTORS ARE 1/2 WATT, 10% UNLESS OTHERWISE SPECIFIED	
R1, 2	10428	47KΩ
R3, 4	10424	22KΩ
R5, 6, 19, 20	11526	200KΩ, 1/2 watt, 5%
R7, 8	11512	2400Ω, 1/2 watt, 5%
R9, 10	11523	68KΩ, 1/2 watt, 5%
R11, 12	10455	1.5MΩ
R13, 14	11533	1200Ω, 1/2 watt, 5%
R15, 16	11520	40KΩ, 1/2 watt, 5%
R17, 18	11532	4MΩ, 1/2 watt, 5%
R21, 22	10426	33KΩ
R25, 26, 35, 36	11546	3KΩ, 1/2 watt, 5%
R27, 28	10442	1500Ω
R33, 34	10431	470KΩ

SYM. NO.	STOCK#	DESCRIPTION
R37, 38	10432	1000Ω
R41, 42	11542	1600Ω, 1/2 watt, 5%
R43, 44	10400	10KΩ
R45, 46	14602	125Ω, 5 watt, 5%
R47, 48	11546	33KΩ, 1/2 watt, 5%
R49, 50	10970	330Ω, 2 watt, 10%
R54, 55	10964	1000Ω, 2 watt, 10%
R56	10452	8200Ω
R57	14513	5000Ω, 5 watt, 5%
R58	10416	15KΩ
R59	10444	120KΩ
R60	10957	27KΩ, 2 watt, 10%
	SOCKETS	
XV1, 2, 3, 4	97027	9 pin w/shield support - pre-riveted
XV5, 6	97025	9 pin bottom support - pre-riveted
XV7, 8, 9, 10, 11	97032	octal - pre-riveted
	SWITCHES	
S1	60121	rotary
S2, 5	62023	slide, DPDT - pre-riveted
S3	18104	On R53
S4	62000	slide, DPDT - pre-riveted
S6	64005	ON-OFF
S7	62024	slide, 4PDT - pre-riveted
	TERMINAL STRIPS	
TB1, 4	54062	4 post, 2 right, D.M. - pre-riveted
TB2, 3, 5, 7, 8, 10, 11, 20, 22	54048	2 post, D.M. - pre-riveted
TB6, 14	54061	3 post, 1 right, D.M., left ground - pre-riveted
TB9, 12, 17, 18	54000	1 post left - pre-riveted
TB13, 15, 19	54013	1 post left w/gnd. - pre-riveted
TB21	54517	6 post - pre-riveted
TB16	54065	2 post, D.M., left ground - pre-riveted
	TRANSFORMERS	
T1	30067	power - pre-mounted
T2, 3	32020	output - pre-mounted
	TUBES	
V1, 2	90091	tube, 6EU7
V3, 4, 5, 6	90061	tube, 12DW7/7247
V7, 8, 9, 10	90073	tube, 7591
V11	90044	tube, 5AR4/GZ34



NOTES:

1. ALL RESISTORS ARE 1/2W, 10% UNLESS OTHERWISE SPECIFIED ALL RESISTANCE VALUES ARE IN OHMS.
2. UFD= MICRO-FARAD, UUF= MICRO-MICRO FARAD, K= KILOHMS M= MEGOHMS.
3. ROTARY SWITCHES ARE SHOWN VIEWED FROM KNOB END IN EXTREME COUNTER CLOCKWISE POSITIONS.
4. ALL CAPACITORS ARE IN UFD UNLESS OTHERWISE SPECIFIED.



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OPERATING VOLTAGES
(DC Except Where Noted)

PINS	V1, V2	V3, V4	V5, V6	V7, V8 V9, V10	V11
1	13*	85	195	--	--
2	13*	0	112	13*	425
3	--	3	118	415	--
4	1.5	13*	13*	350	335 VAC
5	0	13*	13*	13*	--
6	200	125	112	0	335 VAC
7	95	0	0	13*	--
8	0	0.85	0.9	350	425
9	0.85	13*	13*		

*Filament Bias Voltage

Note: Measurements with LOUDNESS control set at MINIMUM.