SERVICING hi-fi and ASSOCIATED AUDIO EQUIPMENT

Includes service data on . . .

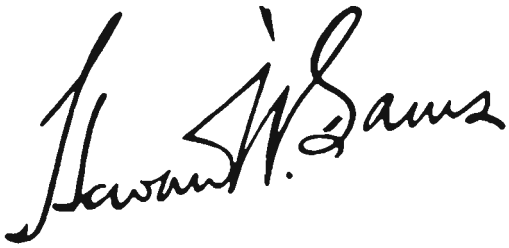
- preamplifiers and equalizers
- power amplifiers
- AM-FM tuners and receivers
- FM tuners
- public-address amplifiers

Also . . .

Special section on stereophonic home-music systems

A Howard W. Sams PHOTOFACT PUBLICATION — HF-2

$2.95



SERVICING HI-FI AND ASSOCIATED AUDIO EQUIPMENT

VOLUME 2

SERVICING HI-FI AND ASSOCIATED AUDIO EQUIPMENT

VOLUME 2

FIRST EDITION

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PREFACE

This is the second volume of a series published to meet the specific demands of the service industry and an ever-growing audience of technically-minded audiophiles. Thorough servicing procedures, using the famous Photofact technique, are given for a selected group of popular audio components.

The present volume covers twenty-seven models of high-fidelity power amplifiers, preamplifiers, AM-FM tuners and receivers, as well as public address amplifiers. A special section is included on the planning and installation of stereophonic home music systems — a subject of great current interest.

A handy index to both Volumes 1 and 2 of this series is provided for quick and easy reference to the various popular models covered. As this series of volumes grows, it will continuously provide invaluable servicing and maintenance data on the most significant Hi-Fi components and associated audio equipment.

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Home Music Systems

Part 1 — Typical Layouts and General Servicing Hints . . . . . Vol. 1
Part 2 — Stereo Home Music Systems . . . . . Vol. 2

PHOTOFACT Service Literature

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•"George Gott" GP30P	2	13
BROCINER		
Mark 30C	1	11
•30A	2	17
CHALLENGER		
CHA75	1	15
CRAFTSMEN		
CA-11	1	23
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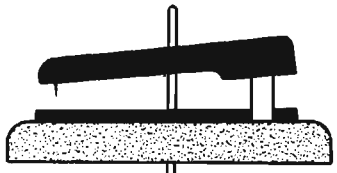
D200	1	89
•TA-120	2	73
KNIGHT		
•93SZ506	2	91
93SZ695	1	97
•93SZ738	2	91
94SX700	2	97
•94SX702	2	83
94SX703	1	103
•94SX708	2	97
•94SX711	2	83
MADISON FIELDING		
FM-15	1	111
MC INTOSH		
C-4, C-4P	1	117
•MC-60	2	103
NEWCOMB		
E-25	1	123
•H-25	2	109
PACEMAKER		
•PM20	2	115
2285	1	127
PEDERSEN		
AFM-6A	1	131
SCOTT (H. H.)		
•99-C	2	119
240	1	139
SHERWOOD		
•S-1000	2	125
STROMBERG-CARLSON		
AP-428	1	145
•AU-64	2	131
•SR-402	2	135
TECH-MASTER		
19	1	149
WHITLEY		
•"Murasonde" AP1000	2	143

•Indicates coverage in this issue.



SECTION 1 HOME MUSIC SYSTEMS

PART 2

Stereo Home Music Systems

- Stereo Recordings
- Stereo Broadcasts
- Stereo Playback Systems
- Playback of Stereo Tapes
- Playback of Stereo Disc Records
- Assembling a Stereo Home Music System
- Preamplifiers
- Amplifiers
- Loudspeakers

Stereo Home Music Systems

When a person hears a sound, he can usually judge its location and the distance to its source because of the sound perception gained from listening with two ears. A stereo (stereophonic) sound system endeavors to duplicate the "two ear" process and thereby it gives depth and naturalness to sound reproduction. When a person with normal hearing holds a hand over one ear, sounds seem unnatural and practically all depth perception is lost. This "one ear" hearing is similar to the usual single-channel, home music system because of this lack of stereo effect. Music can acquire unmistakable realness and depth (qualities difficult to describe) when reproduced by a good stereo sound system.

The stereo effect in a home music system is obtained by using two separate channels to drive two separate loudspeakers placed an appropriate distance apart. Although more channels are included in some stereo applications, most home music systems use only two channels to reproduce stereo recordings and broadcasts. This discussion will be concerned with two-channel systems.

Stereo Recordings

A simplified diagram of a typical recording arrangement for stereo is shown in Fig. 1. Two microphones, spaced a selected distance apart, pick up the sound from two different locations or angles to obtain the stereo effect in the sound pickup, similar to the way a person's two ears perceive depth and location when listening to a sound. The signal picked up by each microphone is fed to its own separate chan-

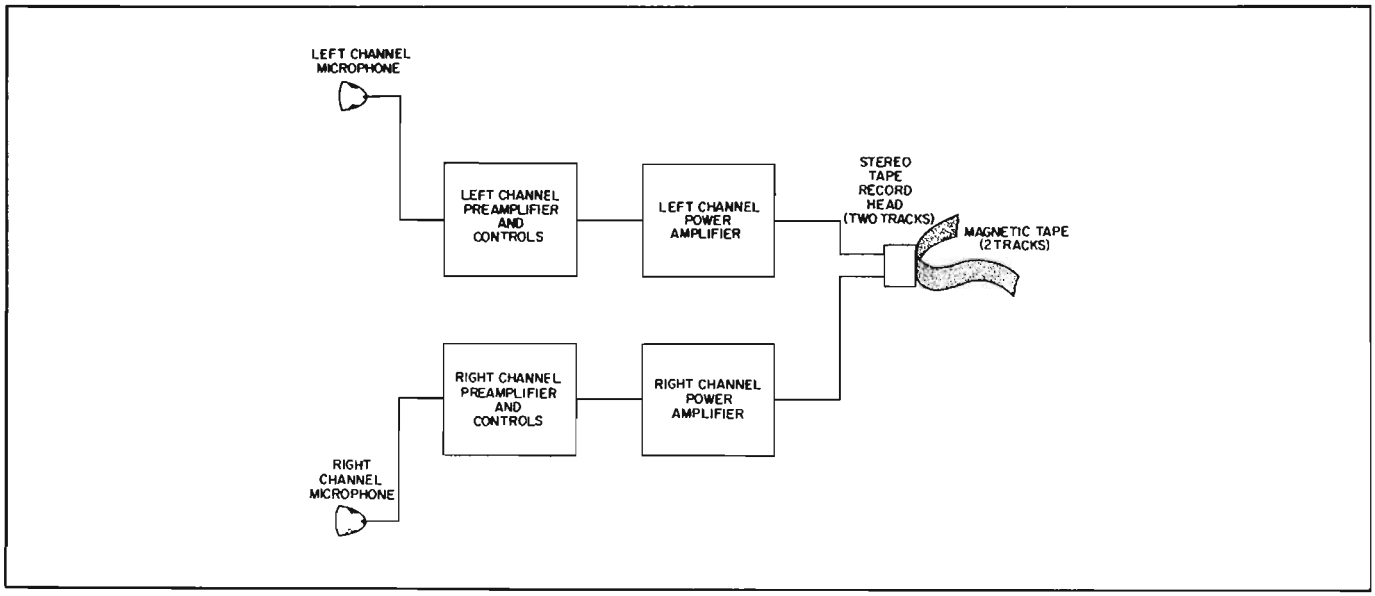


Fig. 1. Basic stereo recording arrangement.

nel and recorded on a separate track on the magnetic tape.

The dual-track stereo tape can be played back on a suitable stereo tape playback unit to reproduce the stereo program. The stereo tape is used with suitable recording equipment to cut stereo disc records for playback through stereo phonographs.

Stereo Broadcasts

The basic arrangement for stereo radio broadcasts is similar to the setup in Fig. 1. For broadcasts, the output from one channel is broadcast by an AM, FM, or (in some cases) TV transmitter, while the output from the other channel is broadcast by another AM, FM, or TV transmitter. A radio receiver is tuned to one broadcast station, and another receiver is tuned to the other station. The stereo effect will be heard if the loudspeakers of the two receivers are spaced properly.

FM multiplexing, where one FM station transmits two separate signals, would appear to be the most satisfactory and logical method for stereo broadcasts. At the receiving end, a single FM receiver is modified so that it will separate the two signals and feed them to the stereo channels of the reproducing system.

Stereo Playback Systems

A typical stereo playback system is diagrammed in Fig. 2. One channel is fed from one track of a stereo tape playback head, one section of a stereo phono pickup, or a radio receiver. The other channel is fed from the other track of the playback head, other section of phono cartridge, or second radio receiver.

Each channel is composed of the necessary preamplifier, amplifier, and loudspeaker. Duplicates of each section, to make identical channels, would be required in an ideal stereo system. In actual practice, many systems will never reach the ideal but will still possess stereo qualities and give improved reproduction when compared with monaural systems. Since the two channels should be balanced in both response and loudness, a master control is usually included in the system, as shown in Fig. 2. The loudspeakers must be spaced correctly in the listening room in order to produce the desired stereo effect; this is extremely important.

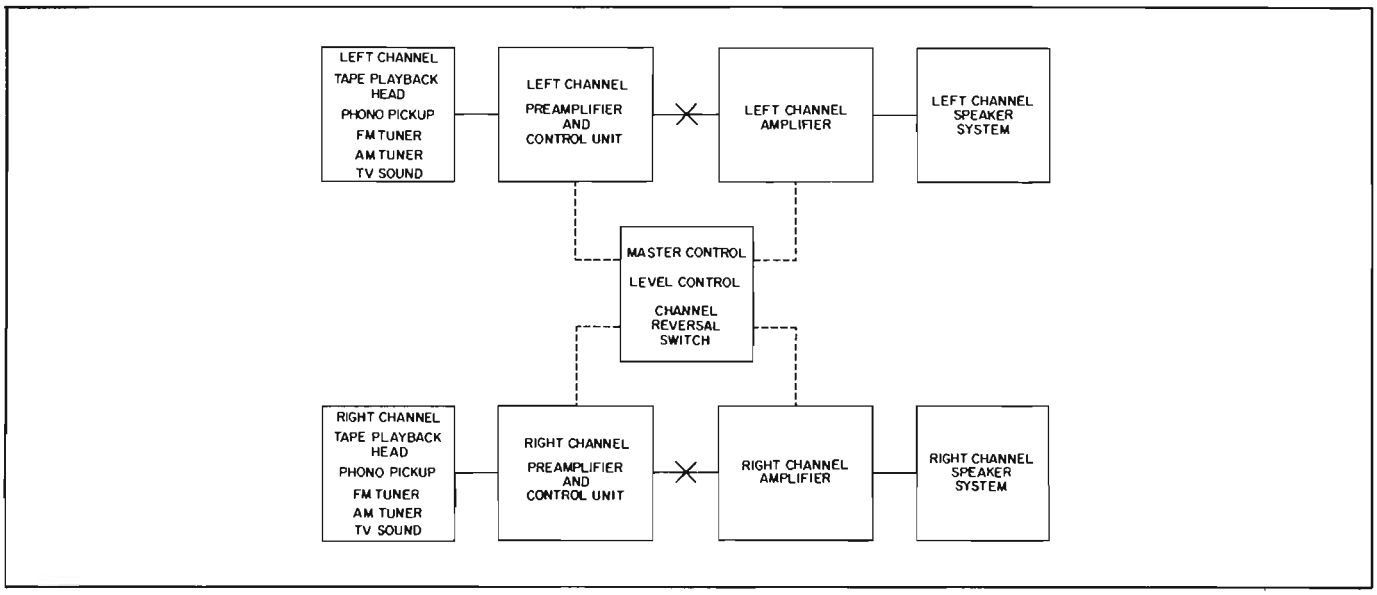


Fig. 2. Basic stereo playback arrangement.

Playback of Stereo Tapes

According to established standards, stereo tapes are now recorded "stacked", i.e. "in line", at a tape speed of 7 1/2 inches per second (ips). Many "staggered" stereo tapes have been produced, but they have now given way to the "stacked" arrangement.

Most tape recorder manufacturers supply complete stereo playback systems. Such systems are ready to operate when set up according to instructions supplied by the maker.

Some tape recorders are fitted with stereo heads to accommodate stereo tapes if an external amplifier and speaker are connected to the output of the second channel. Most units of this type are supplied with a built-in preamplifier for the second channel; therefore,

they can be easily connected to the external amplifier. By listening to one channel through the amplifier and speaker in the recorder and to the other channel through the external amplifier and speaker, stereo reproduction is accomplished.

Stereo conversion kits (including stereo head, preamplifier, and necessary miscellaneous items) are available for most monaural tape recorders. When properly installed, such kits place the converted recorders in the category discussed in the preceding paragraph.

Tape transport mechanisms and accessories are available for use in custom stereo music systems. The transport mechanism is mounted in its designated location and connected into the two channels of the stereo system with the preamplifiers and other accessories supplied by the manufacturers. Since these units are made for this purpose, no difficulties should be encountered, and it is only necessary to follow instructions.

Playback of Stereo Disc Records

Phonograph records have been the most popular source of program material for home music systems. More people are familiar with the handling and use of disc records than with any other type of recording. Stereo discs are the logical choice when converting most home music systems to stereo reproduction, because the turntable, pickup arm, and other equipment used in playing them are already included in the system.

The recording industry has adopted the 45/45 Westrex system as the standard for cutting stereo discs. Stereo records are normal in size and appearance. They are played at 33 1/3 rpm with a 0.7-mil stylus. A standard 33 1/3-rpm turntable and a stereo pickup installed in a standard record changer makes playing these stereo records simple.

Because the compliance of most standard monaural pickups is too low, stereo records should not be played with a monaural pickup. This insufficient compliance can destroy the modulation in the stereo record grooves.

Stereo phono pickup cartridges follow the same general styles and designs found in the same types of monaural cartridges made by the different manufacturers. Magnetic, ceramic, and other types are available. They vary in adaptability for use with certain specific pieces of equipment such as preamplifiers, and in whether or not they are suitable for use in record-changer arms. Choice of type and make still depends much upon personal preference and how much the purchaser is willing to spend, as is true when selecting a monaural cartridge.

Instead of the usual two terminals found on a monaural cartridge, a stereo cartridge has three (a "hot" terminal for each of the two channels and a common ground terminal) or four (a "hot" terminal and a ground terminal for each channel). When a stereo cartridge is installed in a standard monaural arm, a second shielded lead must be run from the second channel output terminals of the cartridge to the input of the second channel of the stereo system. Stereo pickup arms are equipped with the necessary connections and leads for both stereo channels.

Magnetic stereo cartridges, like magnetic monaural cartridges, require compensation and preamplification. The same preamplifiers and compensation networks are suitable for either type. The only difference is that two compensated preamplifiers or a dual-channel preamplifier must be used with a stereo cartridge to accommodate the two channels.

Characteristics of ceramic stereo and ceramic monaural cartridges are identical. Except for the two separate inputs and channels used with the stereo cartridge, input requirements are the same.

Standard microgroove records can be played with a stereo cartridge, and response and record wear will be normal. Some cartridge manufacturers claim reproduction is improved when their stereo cartridge is used to play monaural records. For playing 78-rpm records, "turnover" stereo cartridges are fitted with a 3-mil stylus in addition to the 0.7-mil stereo stylus.

Assembling a Stereo Home Music System

We have discussed some basic principles of stereo recording and sound reproduction. Particular attention has been given to stereo program material, its forms, and its sources. We will now discuss the assembling and operating of a sound system suitable for reproducing stereo signals.

Those who purchase and install a complete well-engineered stereo home music system will have most of their problems already solved, but those who wish to convert an existing monaural system to stereo will probably encounter some new problems. Explanation of the necessary requirements to be met by each section in the two stereo channels should answer most of the questions.

Preamplifiers

Anyone who has a good preamplifier giving satisfactory service in his monaural system should be able to use this preamplifier in one channel of a stereo system, because the specifications for a stereo preamplifier are practically identical to those for a monaural unit. Since two channels are required for stereo, either a dual-channel stereo preamplifier or two

separate single-channel preamps are used to make the two channels. Preamplifier requirements depend upon the stereo signal source.

For Stereo Tape

Most stereo tape recorders and playback transports have built-in or auxiliary playback preamplifiers connected to each track of the stereo playback head. The output of each head preamplifier is connected to an uncompensated high-impedance input in the main preamplifiers in each channel. Most preamplifiers have one or more suitable inputs and therefore can be used in one stereo channel.

For Stereo Records

A preamp equipped with an input suitable for use with a monaural magnetic input is suitable for use with one section of a magnetic stereo cartridge. In the same way, a preamp suitable for use with a ceramic monaural cartridge can be used with a ceramic stereo cartridge.

For Radio Tuners

The uncompensated high-impedance inputs on most preamplifiers are suitable for use with a radio tuner.

Many preamplifiers are equipped with channel selector switches, volume controls, and tone controls. Tone and volume controls will be used to balance the response and output of the separate stereo channels.

A master level control, shown with dotted connecting lines in Fig. 2, is convenient because volume can be adjusted by a single control without the inconvenience of readjusting separate channel controls. Master controls are available as separate attachments for use with two preamplifiers, or they may be a built-in feature of preamplifiers designed especially for stereo.

Amplifiers

There is no reason why an amplifier that is satisfactory in a monaural system will not be suitable for one channel of a stereo system. Sufficient power, low distortion and stable operation are just as important in a stereo system as they are in the usual monaural arrangement. Therefore, the same standards are used when selecting an amplifier for either stereo or monaural application.

Identical amplifiers in both channels are ideal for a stereo system, but different amplifiers can be used if both are good and if balanced operation and response can be obtained. Some unbalance can be tolerated without losing all of the stereo effect; however, the best stereo reproduction depends upon full-range, balanced response from both channels.

Loudspeakers

Loudspeakers and their placement in the listening room are extremely important when installing a stereo music system in a home.

When stereo equipment was first being developed for home use, three channels, with three speakers, were thought to be necessary for stereo reproduction. The third, or middle, channel was thought necessary to eliminate the "hole" or loss of sound midway between the two side speakers. This hole effect is noticeable when a two-channel stereo system is heard in a big auditorium or large room. Now, more experience with stereo systems has shown that in a small auditorium, or in the usual listening room, two channels (with speakers spaced properly) can sound the same as three channels.

Frequencies above 500 cps are much more directional than the low base frequencies below 500 cps. Therefore, the high tones tend to give most of the directional effects to stereo reproduction.

The best results during playback will be heard when identical full-range speakers are used to reproduce the stereo program. Yet because of the non-directional properties of very low tones, a stereo reproducing system can, if necessary, make use of unbalanced speakers. If one speaker cuts off below 500 cps, the lows from the other speaker will merge with the sound from the first to give the effect of full-range response from both, and the directional effects will still be provided by the frequencies above 500 cps. During recording, the low bass notes, being non-directional, are picked up by both microphones, so they are present in both channels of the stereo program material.

Experience has established the speaker placement shown in Fig. 3 to be one of the most satisfactory arrangements for stereo reproduction in the average listening room. Each speaker is placed flat against a long wall of the room and centered one-third of the distance from its adjacent corner. The area for best stereo listening is indicated by the double-shaded portion of the illustration.

The arrangement shown in Fig. 4 is recommended when the speakers are placed on a narrow wall of the listening room.

As a general rule, for best stereo reproduction the listener's location should be such that the angle formed by imaginary lines drawn between him and the two speakers is approximately 45 degrees. Consequently, the speakers should be placed farther apart if the listener moves farther away from the speakers.

At one time, corner speakers were considered best for stereo reproduction, but they are not favored now. In most cases when corner speakers are used, the area for best stereo effect is at the convergence of the sound beams directly in front of the speakers. This area where the stereo sounds best is quite small, as shown in Fig. 5. Since a corner speaker cannot be moved out of a corner and still operate properly, the arrangement in Fig. 6 is recommended by several manufacturers of corner speakers. The midrange and tweeter units of the speakers are oriented to beam down the side walls. Beaming the higher frequencies in this manner provides the necessary directional effect for stereo reproduction.

All reflections from surfaces in the room and the effects of doors and windows have been disregarded

in the speaker placement diagrams. These conditions, as well as the size and shape of the room and the room furnishings, must be considered when selecting positions for stereo speakers. Experimenting and shifting of speaker positions will reveal the best locations in any certain room.

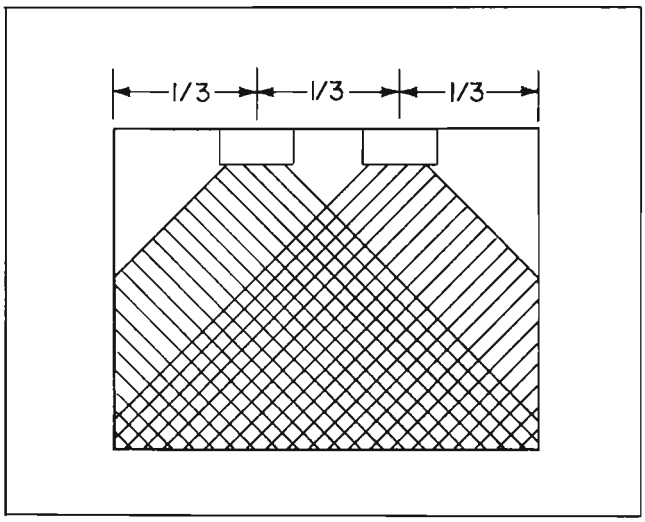


Fig. 3. Stereo speakers placed on long wall of listening room. Area for best stereo effect is indicated by double shading.

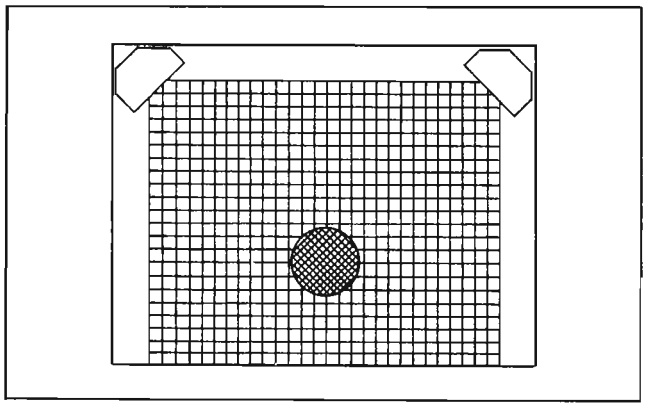


Fig. 5. Corner speakers placed in corners of listening room. Area for best stereo is restricted to small circle.

selecting correct positions for the speakers and the listener.

The sound level at which a stereo program is reproduced is also important. The normal sound level of the original will usually be the most satisfactory. If the level is gradually increased while listening to a stereo program, a point will usually be found where the sound suddenly becomes alive and real.

Many things play a part in determining just how effective stereo reproduction will sound. Placement of the microphones when the sound was picked up has a noticeable effect. Although placing of microphones is beyond control of the home music listener, the effects of the placement can be compensated for by

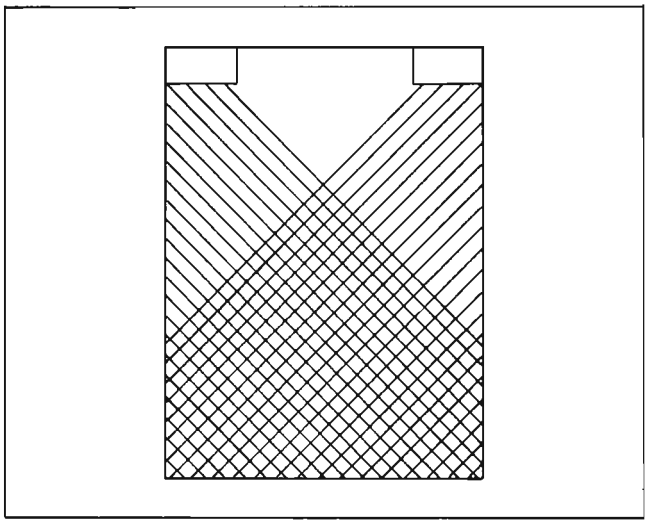


Fig. 4. Stereo speakers placed on short wall of listening room. Area for best stereo effect is indicated by double shading.

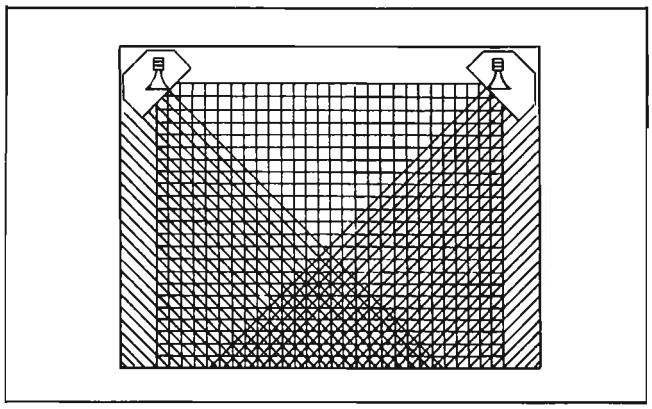
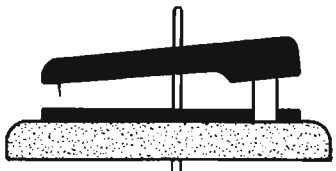


Fig. 6. High-frequency sections of corner speakers oriented for stereo directional effects.

Stereo reproduction is more than just directional effects. There is a depth and sense of aliveness difficult to describe. Effort and attention to some basic requirements are necessary when assembling a stereo home music system, but the result will be a most effective source of listening pleasure.



SECTION II

PHOTOFACT SERVICE LITERATURE COVERING 27 MODELS OF AUDIO EQUIPMENT

- PHOTOFACT Standard Notation Schematics
- Dial Cord Stringing Arrangements
- Resistance Charts
- Cabinet and Chassis Photographs
- Alignment Instructions
- Parts Lists and Replacement Data

TRADE NAME	Bell Sound Model 5615
MANUFACTURER	Bell Sound Systems, Inc., 555 Marion Road, Columbus 7, Ohio
TYPE SET	AC Operated Three Channel 15 Watt Audio Amplifier (Some versions may use a 3 Speed Manual Record Player Model 563-PT)
TUBES (Seven)	Types 5879 Mic 1 Preamplifier, 5879 Mic 2 Preamplifier, 12AX7 Tape Phono Preamp. - AF Amp., 12AX7 AF Amp. - Phase Inv., (2) 6V6GT Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .82 Amp. @ 117 Volts AC (83 Watts)

BELL SOUND
MODEL 5615

H387

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mic 1 Preamplifier	5879	
V2	Mic 2 Preamplifier	5879	
V3	Tape Phono Preamp. - AF Amplifier	12AX7	
V4	AF Amp. - Phase Inv.	12AX7	
V5	Output	6V6GT	
V6	Output	6V6GT	
V7	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BELL SOUND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	20	450		PR3-055	BBRQ0500	FP389.1	TMT-156	FMD-4520 MTH-5010	R2580 *
B	10	450							
C	100	50							
C2A	10	450		PR8450V1010	BBRT1145	TCD72	TDLD-26	FMD-4510	TVA-2722
B	10	450							
C3	150	15		PR850V150	BR1505	TC1502	TD-150-50	MT-15150	TVA-1311

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA BELL SOUND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C5	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C6	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C7	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C8	.001	400		P488N-001	D6-102	CUB6D1	GP-1000	GEM-621	6TM-D1	
C9	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C10	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C11	.001	400		P488N-001	D6-102	CUB6D1	GP-1000	GEM-621	6TM-D1	
C12	.0047	400		P488N-0047	D6-472	CUB6D47	GP-4700	GEM-6247	6TM-D47	
C13	47			1469-000047	D6-470	22R5Q47	ED-47		MS-447	10%
C14	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C15	.01	400		P488N-01	D6-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C16	.01	400		P488N-01	D6-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C17	180			1469-00018	D6-181	22R5T18	ED-180		MS-318	10%
C18	180			1469-00018	D6-181	22R5T18	ED-180		MS-318	10%

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA BELL SOUND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	B20066P143	B-76	A47-2meg-Z	Q13-139	U55	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1 *	SWE-12	76-1	U8-26	
R2A	500K	½	B20066P142	B-80	A47-500K-Z	Q13-133	U48	Phono
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	500K	½	B20066P142	B-80	A47-500K-Z	Q13-133	U48	Mic 2
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	250K	½	B20066P145	B-81	A47-250K-Z	Q13-130	U44	Mic 1
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	100Ω	2	B20066P141	WN-101	A43-100	WPK100	R11L	Hum Adj. (Wire wound)
B	Shaft			Not Req.	FK3-1/4	Not Req.	Not Req.	

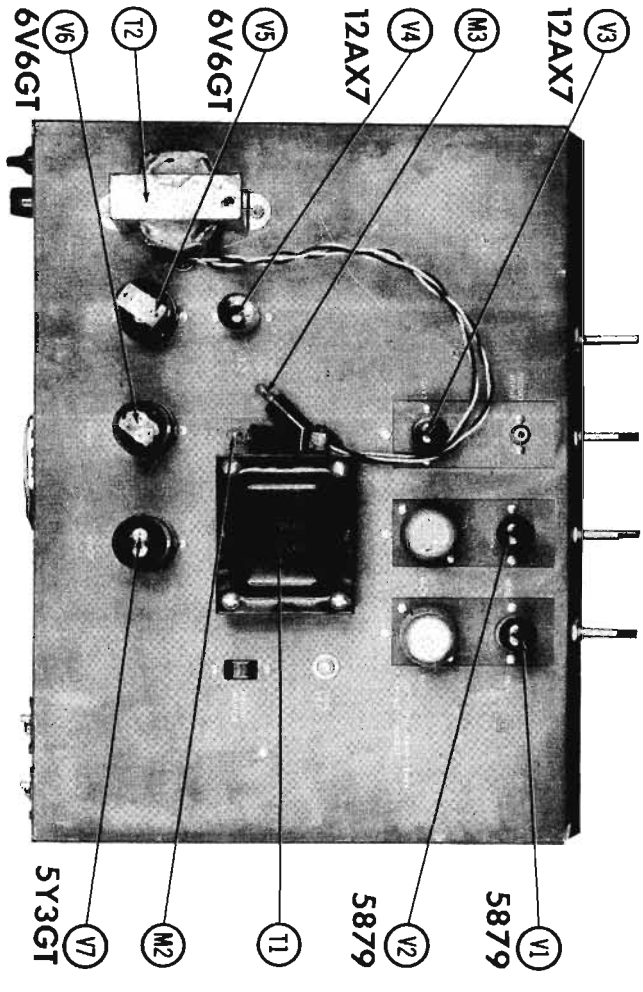
* Use KR-1 on Red Label control; use KB-1 on Blue Label control.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	BELL SOUND PART No.	NOTES
R6	2.2meg			
R7	150K			
R8	75K 5%			
R9	15K			
R10	2.2meg			
R11	150K			
R12	75K 5%			
R13	15K			
R14	1.2meg			
R15	150K			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	BELL SOUND PART No.	NOTES
R16	8200Ω			
R17	150K			
R18	150K			
R19	150K			
R20	180K			
R21	2700Ω			
R22	47K			
R23	270K			
R24	470K			
R25	5600Ω			
R26	560K			

ITEM No.	RATING OHMS	RATING WATT	BELL SOUND PART No.	NOTES
R27	1.2meg			
R28	220K			
R29	3300Ω			
R30	220K			
R31	270K			
R32	250Ω	5		
R33	270K			
R34	2200Ω	2		
R35	10K	1		
R36	10K	1		
R37	270K	1		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA BELL SOUND PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .62A	760VCT @ .100A	5V @ 2A	B20349 ①						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ 2.4A									

① Alternate Part #B20319

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA BELL SOUND PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	6500Ω CT	8Ω Tap @ 70Ω, 8Ω 8Ω, 4Ω	B20307							

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA BELL SOUND PART No. FUSE	BELL SOUND PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	3A 250V			312003. (3AG 3A 250V)	342001	AGC3	HKP

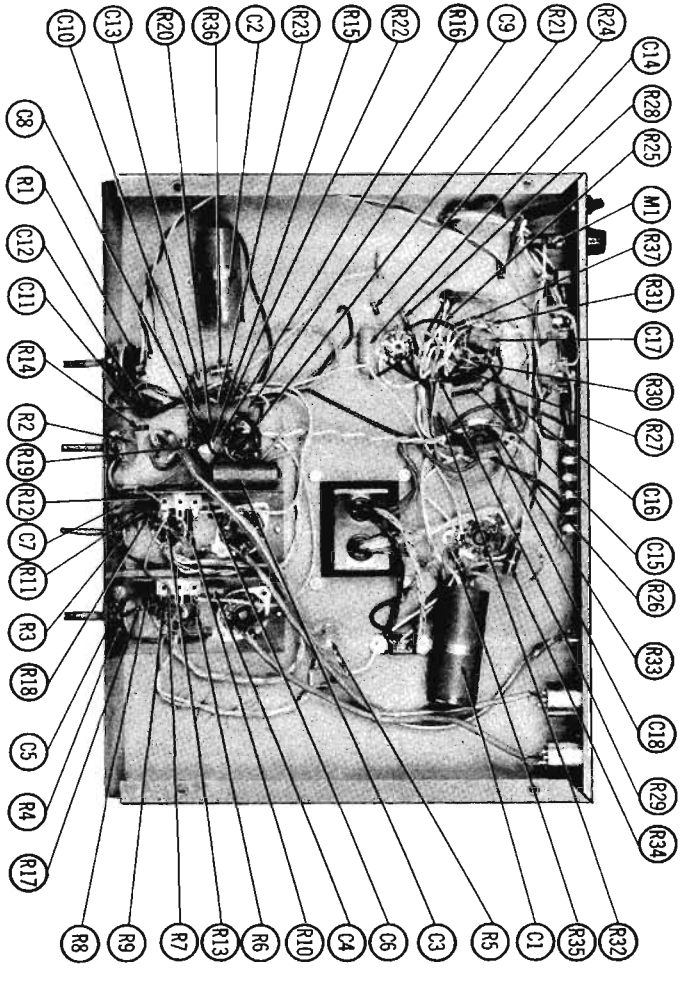
MISCELLANEOUS

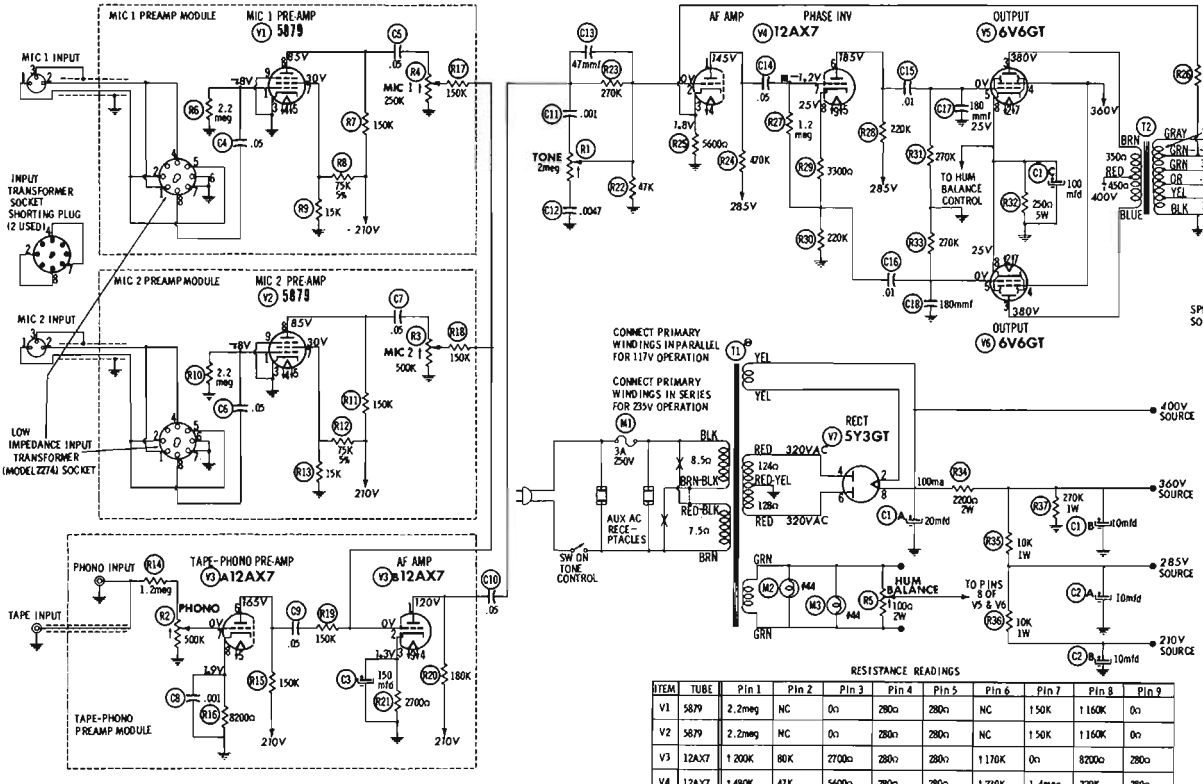
ITEM No.	PART NAME	BELL SOUND PART No.	NOTES
M2	Pilot Lamp		#44
M3	Pilot Lamp		#44

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8534 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1705-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

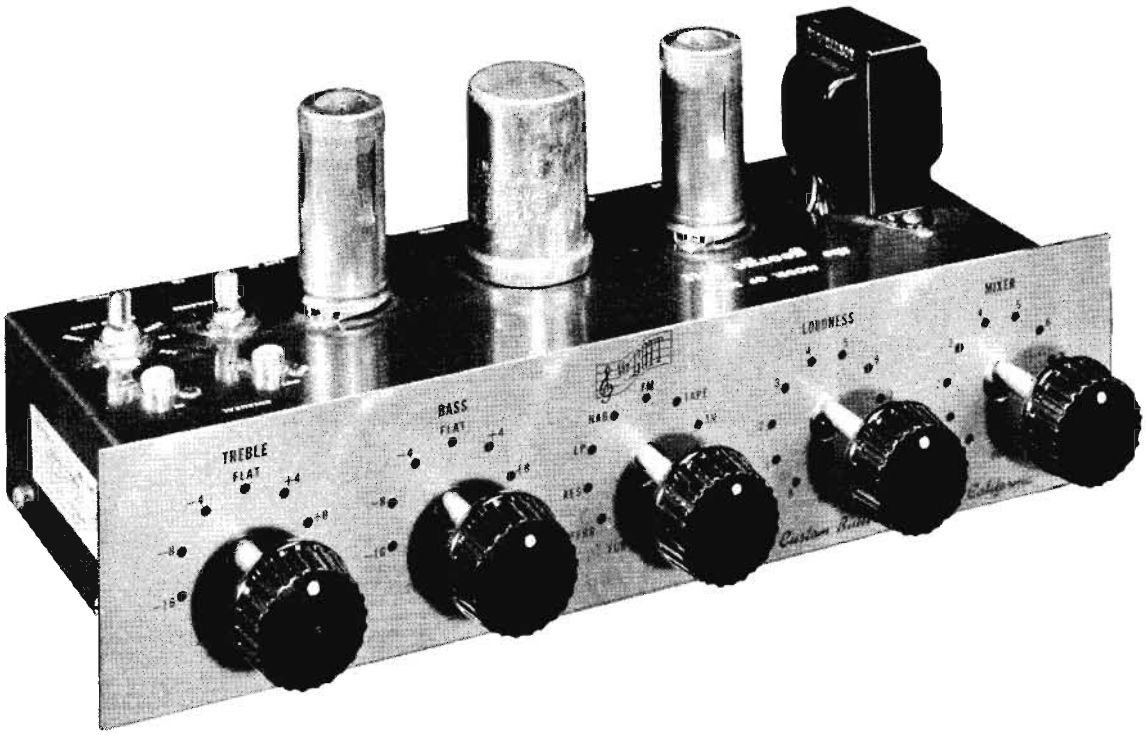
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	5879	2.2meg	NC	0Ω	280Ω	280Ω	NC	↑50K	↑160K	0Ω
V2	5879	2.2meg	NC	0Ω	280Ω	280Ω	NC	↑50K	↑160K	0Ω
V3	12AX7	↑200K	80K	2700Ω	280Ω	280Ω	↑170K	0Ω	8200Ω	280Ω
V4	12AX7	↑480K	47K	5600Ω	280Ω	280Ω	↑230K	1.4meg	220K	280Ω
V5	6V6GT	TP	280Ω	↑350Ω	↑2200Ω	270K	TP	280Ω	250Ω	
V6	6V6GT	TP	280Ω	↑450Ω	↑2200Ω	270K	TP	280Ω	250Ω	
V7	5Y3GT	NC	20K(Min)	TP	124Ω	TP	128Ω	NC	20K(Min)	

↑ MEASURED FROM PIN 8 OF V7
Ω MEASURED FROM PIN 8 OF V4
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958



BIGG OF CALIF.
MODEL "George Gott" GP 30P

TRADE NAME	Bigg of Calif. Model "George Gott" GP 30P
MANUFACTURER	Bigg of California, 2506 W. Washington Blvd., Los Angeles 18, California
TYPE SET	AC Operated Preamplifier
TUBES (Two)	Types 12AX7 Preamplifier, 12AX7 AF Amp.-Cathode Follower
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .15 Amp. @ 117 Volts AC

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	12AX7	

ITEM No.	USE	TYPE	NOTES
V2	AF Amp.-Cath. Follower	12AX7	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BIGG PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲20	400	Note 1	AFH4-11	DO476	FP474.5	TMQ-80	Q-270	TVL-4652
B	■10	350	Note 1				TD-10-450		
C	▲10	200	Note 1						
D	20	25	Note 1						

Note 1. In some versions C1B and C1C are 20MFD. C1D is not used.

FIXED CAPACITORS

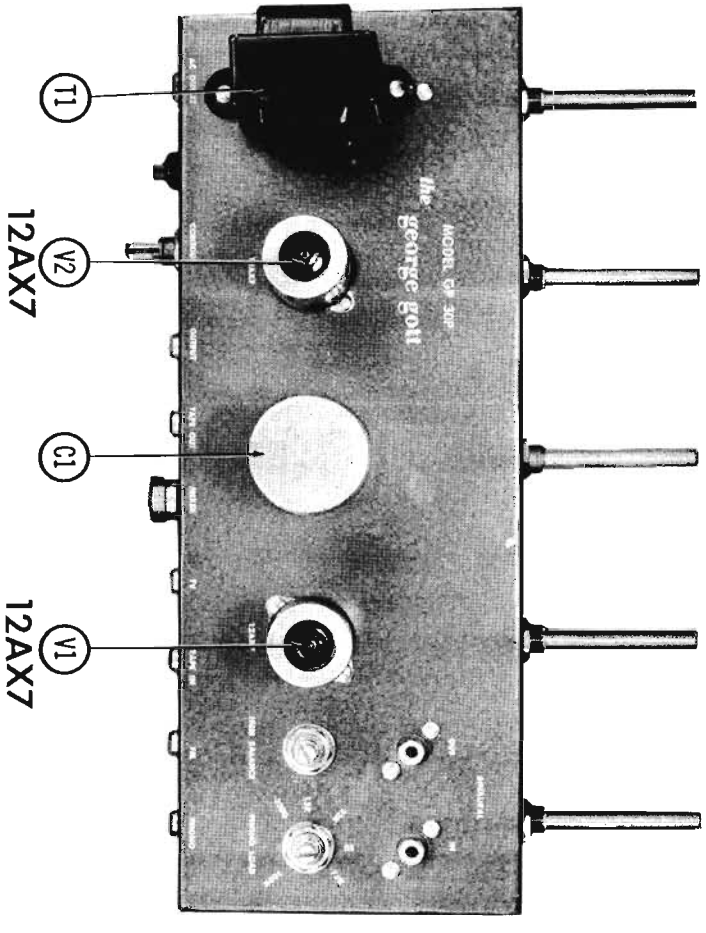
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA BIGG PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	3900	500		SI4000	D6-402	IW5D39	GP2-333-402	MC463	1FM-239	
C3	20000			BPD-02	DD-203	K085	817-02		5HK-S2	
C4	.05	600		BPD-05	DF-503	CUB685		PT615	6TM-S5	
C5	56			SI56	D6-560	TP31	GP1K-560	UC-5456	5GA-Q56	
C6	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C7	2000			BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C8	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C9	3900	500		SI4000	D6-402	IW5D39	GP2-333-402	MC463	1FM-239	
C10	3900	600		SI4000	D6-402	IW5D39	GP2-333-402	MC463	1FM-239	
C11	20000			BPD-02	DD-203	K085	817-02		5HK-S2	
C12	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C13	20000			BPD-02	DD-203	K085	817-02		5HK-S2	
C14	20000			BPD-02	DD-203	K085	817-02		5HK-S2	
C15	.1	400		P468N-1	DF-104	CUB4P1		PT401	4TM-P1	
C16	20000			BPD-02	DD-203	K085	817-02		5HK-S2	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA BIGG PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½		AB-59	A47-500K-S	Q11-133	U50	Treble Control
B	Shaft			AK-9	RS-3	PQ	Not Req.	Attach to R1A
R2A	500K	½		AB-59	A47-500K-S	Q11-133	U50	Bass Control
B	Shaft			AK-9	RS-3	PQ	Not Req.	Attach to R2A
R3A	500K	½		AB-60	A47-500K-Z	Q13-133	U48	Volume Control
B	Shaft			AK-9	RS-3	PQ	Not Req.	Attach to R3A
C	Switch			KB-1	SWE-12	76-1	U8-26	Attach to R3A
R4A	1Meg	½		AB-69	A47-1Meg-S	Q11-137	U54	Mixer Control
B	Shaft			AK-9	RS-3	PQ	Not Req.	Attach to R4A
R5A	100K	½		AB-41	A47-100K-Z	Q13-128	U39	Phono Load
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R5A
R6A	100K	½		AB-41	A 47-100K-Z	Q13-128	U39	Hum Balance
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R6A
R7A	250K	½		AB-50	A47-250K-S	Q11-130	U46	Contour Control
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R7A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BIGG PART No.	IRC PART No.	
R8	1800Ω	1		BTA-1800	
R9	270K	1		BTA-270K	
R10	680Ω	1		BTA-680	
R11	3.9Meg	1		BTA-3.9Meg	
R12	100K	1		BTA-100K	
R13	100K	1		BTA-100K	
R14	39K			BTS-39K	
R15	22K			BTS-22K	
R16	22K			BTS-22K	
R17	22K			BTS-22K	
R18	100K			BTS-100K	
R19	100K			BTS-100K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BIGG PART No.	IRC PART No.	
R20	390K	1		BTA-390K	Note 1
R21	100K	1		BTA-100K	
R22	1800Ω	1		BTA-1800	
R23	100K	1		BTA-100K	
R24	100K	1		BTA-100K	
R25	1Meg	1		BTA-1Meg	
R26	1800Ω	1		BTA-1800	
R27	100K	1		BTA-100K	
R28	27K	1		BTA-27K	Note 2
R29	27K	1		BTA-27K	Note 3
R30	47Ω	1		BTA-47	
R31	5.6	1		BW1-5.6	Note 4

Note 1. Some versions use 470K, 1W in this application.
Note 2. Some versions use 22K, 1W in this application.
Note 3. Some versions use 33K, 1W in this application.
Note 4. Some versions use 4.7Ω, 1W in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	BIGG PART No.	Halldarson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triod PART No.
T1	117VAC @.15A	120VAC @.015A	6.3VAC @.44A		T26R32	P9100	P-3048	PS-8415	26R32	

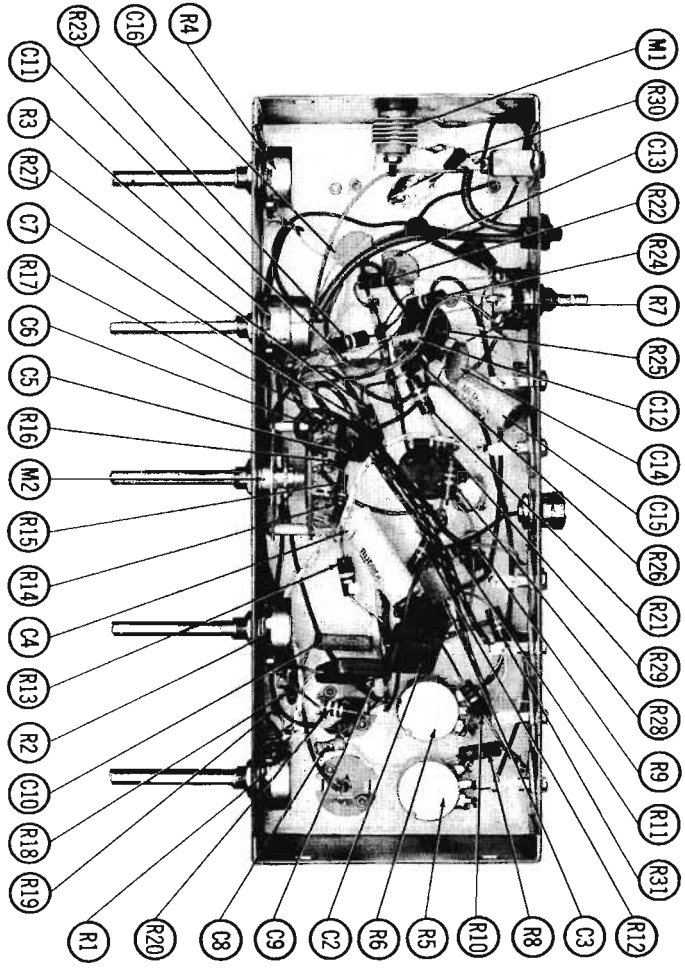
SELENIUM RECTIFIER

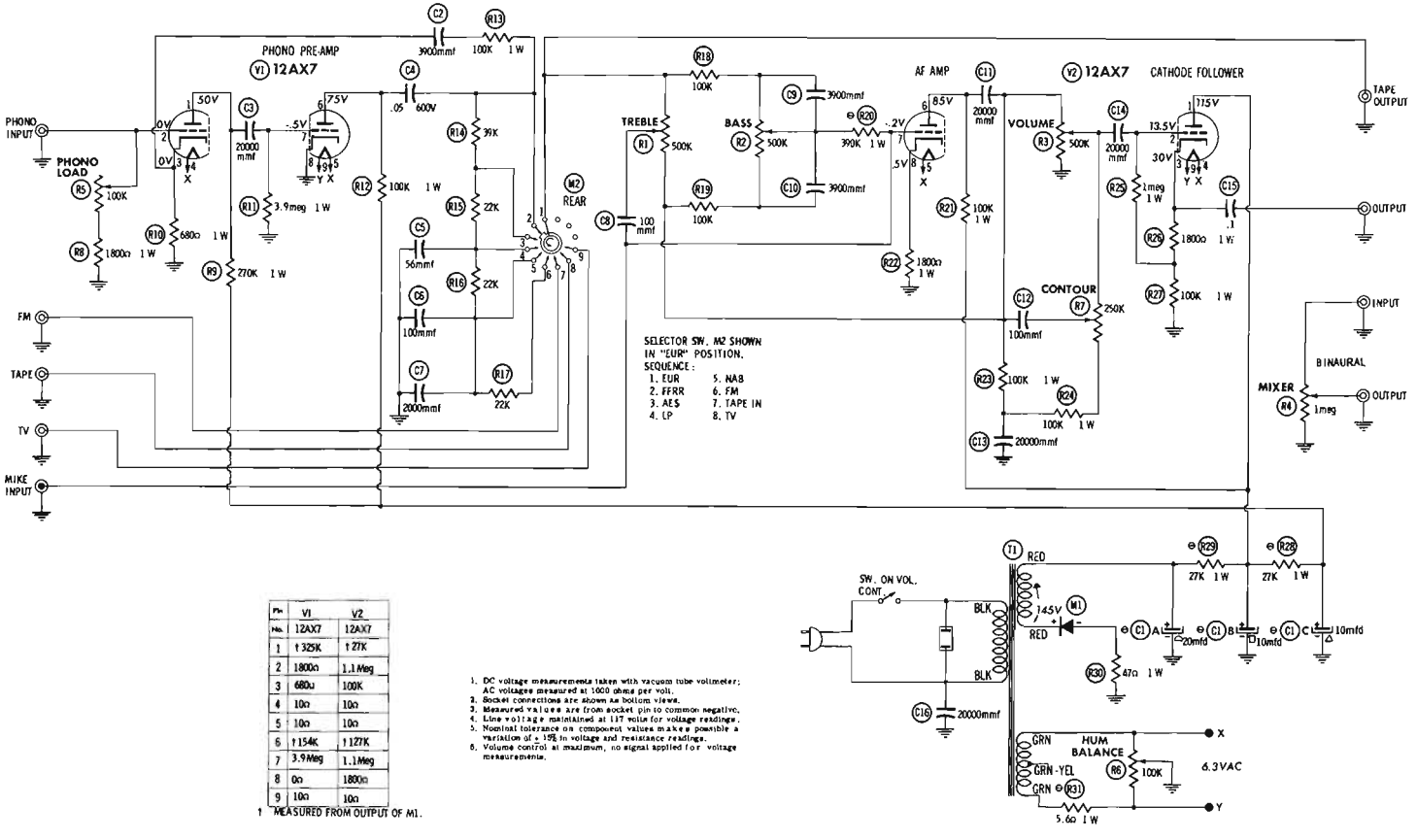
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	BIGG PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.015A		1002A	RS050	8835	871	50	

MISCELLANEOUS

ITEM No.	PART NAME	BIGG PART No.	NOTES
M2	Switch		Selector and record compensation (SP-11 position, rotary, wafer type)

CHASSIS—BOTTOM VIEW



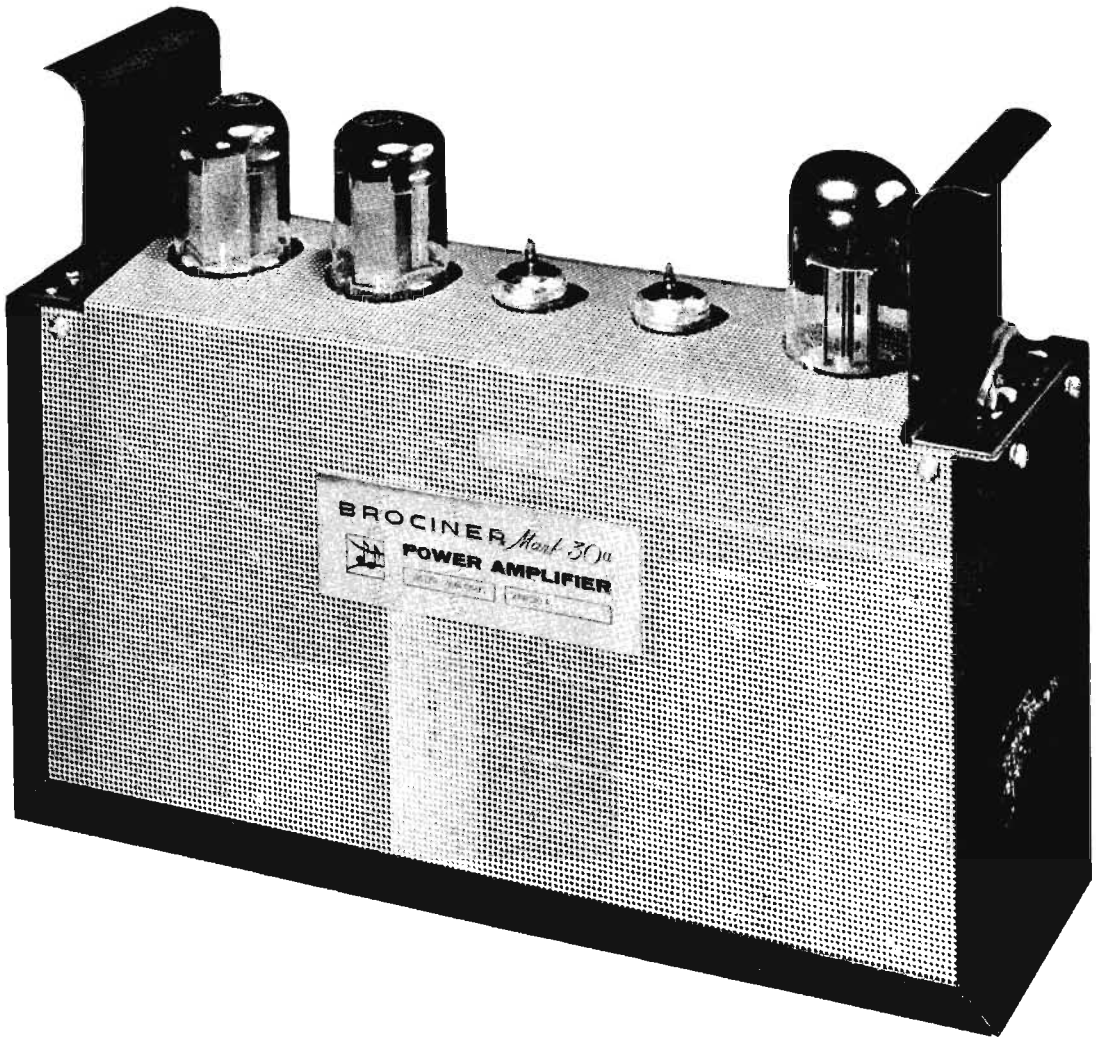


Pin No.	V1 12AX7	V2 12AX7
1	†325K	†27K
2	1800Ω	1.1Meg
3	680Ω	100K
4	10Ω	10Ω
5	10Ω	10Ω
6	†154K	†127K
7	3.9Meg	1.1Meg
8	0Ω	1800Ω
9	10Ω	10Ω

† MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION



TRADE NAME	Brociner Model Mark 30A
MANUFACTURER	Brociner Electronics Corp., 344 E. 32nd. St., New York 16, N.Y.
TYPE SET	AC Operated Audio Amplifier
TUBES (Five)	Types 12AX7 AF Amp.-Phase Inv., 12AX7 Driver, (2) 5881 Output, 5V4GA Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING 1.1 Amp. @ 117 Volts AC

BROCINER MODEL
Mark 30A

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp.-Phase Inv.	12AX7	
V2	Driver	12AX7	
V3	Output	5881	
V4	Output	5881	
V5	Rectifier	5V4GA	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	BROCINER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	8	600		PRS600V8	BRHV608	TC92	TD-8-600		TVA-1962
C2	8	600		PRS600V8	BRHV608	TC92	TD-8-600		TVA-1962
C3	16	500		PRS500V16	BR1650	TC83	TD-16-500		TVA-1905
C4	16	500		PRS500V16	BR1650	TC83	TD-16-500		TVA-1906
C5	100	50		PRS50V100	BR1005	TC3501	TD-100-50	MTH-5010	TVA-1310

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	BROCINER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	.02	400		BPD-02	DD-203	CUB4S2	ED-02	GEM-412	4TM-S2	
C7	120	500		NPO-8I120	D6-121	5R5T12	ED-120		MS-312	
C8	220	500		NPO-8I220	D6-221	5R5T22	ED-220		MS-322	Note 1
C9	.1	600		P686N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C10	.1	600		P686N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C11	.1	600		P686N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C12	.1	600		P686N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C13	.1	400		P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	

Note 1. Some versions may use 100MMF in this application.

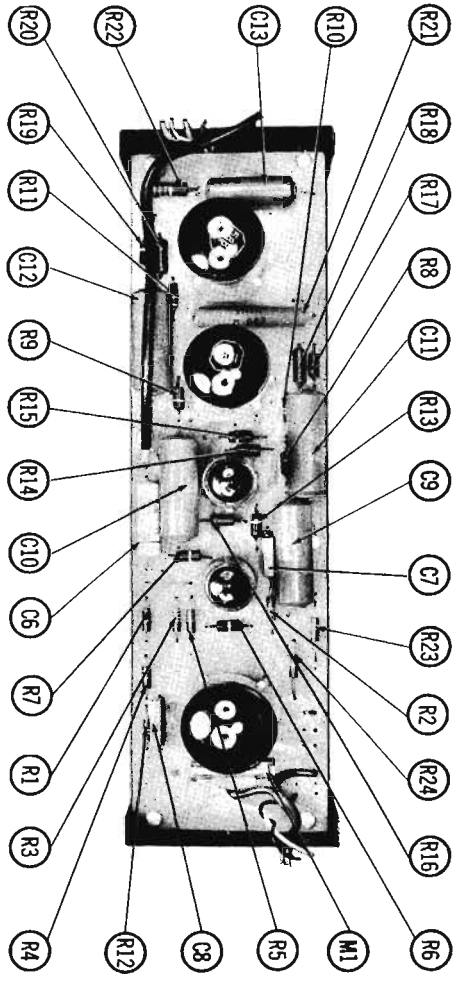
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BROCINER PART No.	IRC PART No.	
R1	1Meg			BTS-1Meg	
R2	15K			BTS-15K	
R3	330K			BTS-330K	
R4	560Ω			BTS-560	
R5	560Ω			BTS-560	
R6	100K			BTS-100K	Note 1
R7	100K			BTS-100K	Note 1
R8	27K			BTS-27K	Note 2
R9	27K			BTS-27K	Note 2
R10	470K			BTS-470K	Note 3
R11	470K			BTS-470K	Note 3
R12	15K			BTS-15K	
R13	100K	1		BTA-100K	
R14	1600Ω			BTS-1600	
R15	100K	1		BTA-100K	
R16	1600Ω			BTS-1600	
R17	100K			BTS-100K	
R18	1000Ω			BTS-1000	
R19	100K			BTS-100K	
R20	1000Ω			BTS-1000	
R21	250Ω	10		PWI0-250	
R22	180Ω	1		BTA-180	
R23	22K			BTS-22K	
R24	22K			BTS-22K	

Note 1. R6 and R7 are matched resistors.
Note 2. R8 and R9 are matched resistors.
Note 3. R10 and R11 are matched resistors.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	BROCINER PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @1.1A	780VCT @.137A	5VAC @ 2A	6.3VCT @ 2.5A	1127					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	BROCINER PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6700Ω	16Ω tap @ 8Ω, 4Ω	1129	H4103				S-142A①	① Drill new mounting hole.

FILTER CHOKE

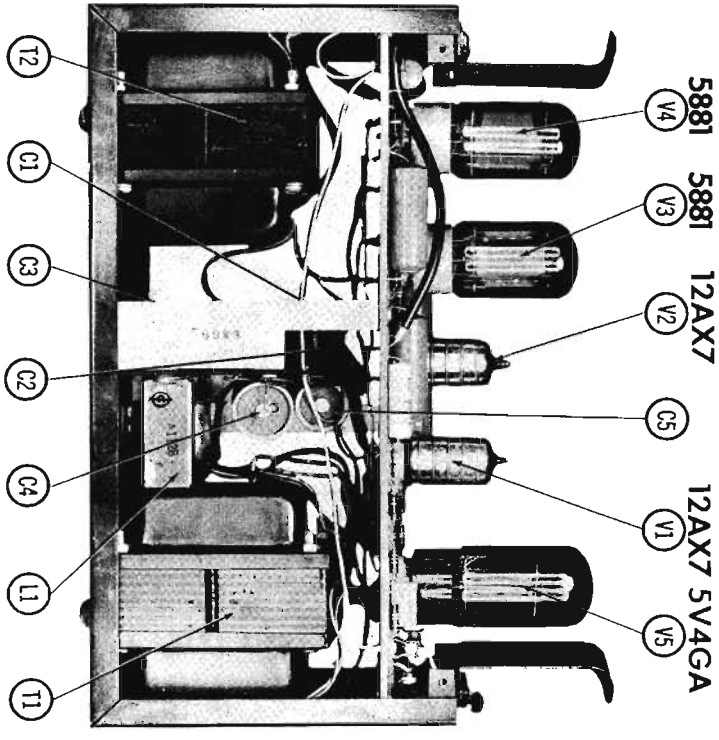
ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	BROCINER PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.137A	100Ω	4.2 HY	1128					

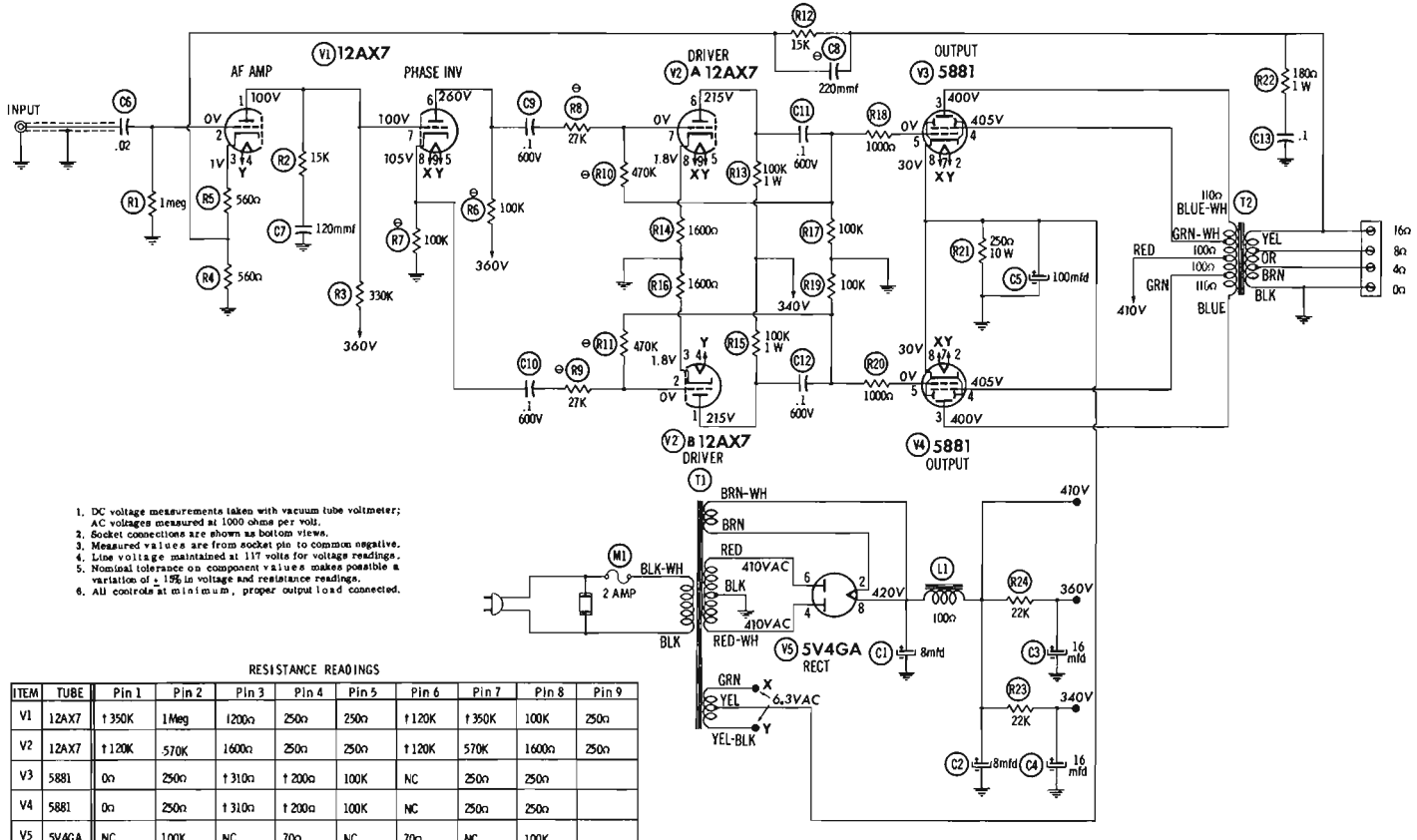
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			BROCINER PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V			312002, (3AG 2A	101001 *	AGC 2	4548 *

* Two required.

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	↑350K	1Meg	1200Ω	250Ω	250Ω	↑120K	↑350K	100K	250Ω
V2	12AX7	↑120K	570K	1600Ω	250Ω	250Ω	↑120K	570K	1600Ω	250Ω
V3	5881	0Ω	250Ω	↑310Ω	↑200Ω	100K	NC	250Ω	250Ω	
V4	5881	0Ω	250Ω	↑310Ω	↑200Ω	100K	NC	250Ω	250Ω	
V5	5V4GA	NC	100K	NC	70Ω	NC	70Ω	NC	100K	

↑ MEASURED FROM PIN 8 OF V5.
NC NO CONNECTION.

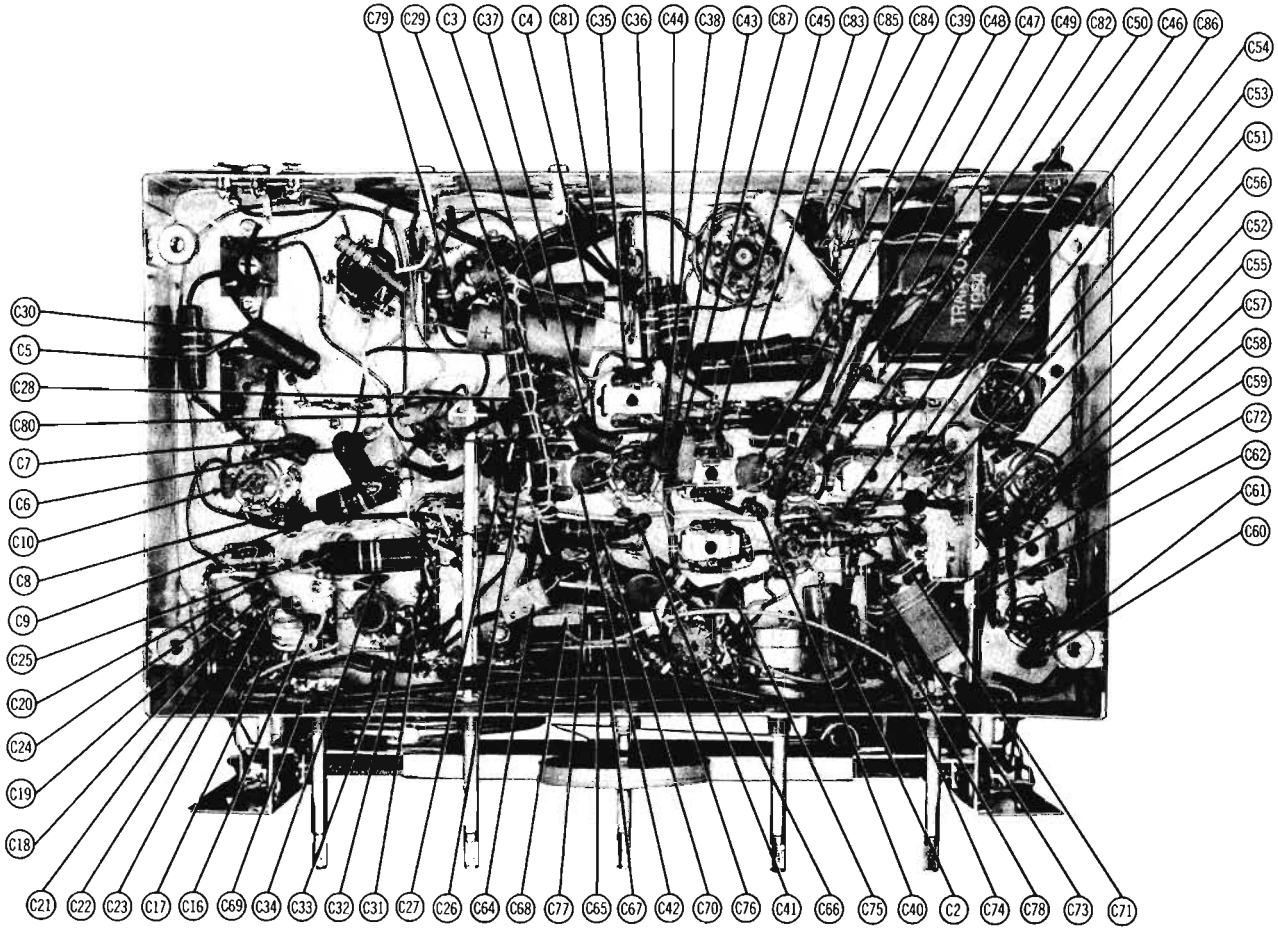
⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

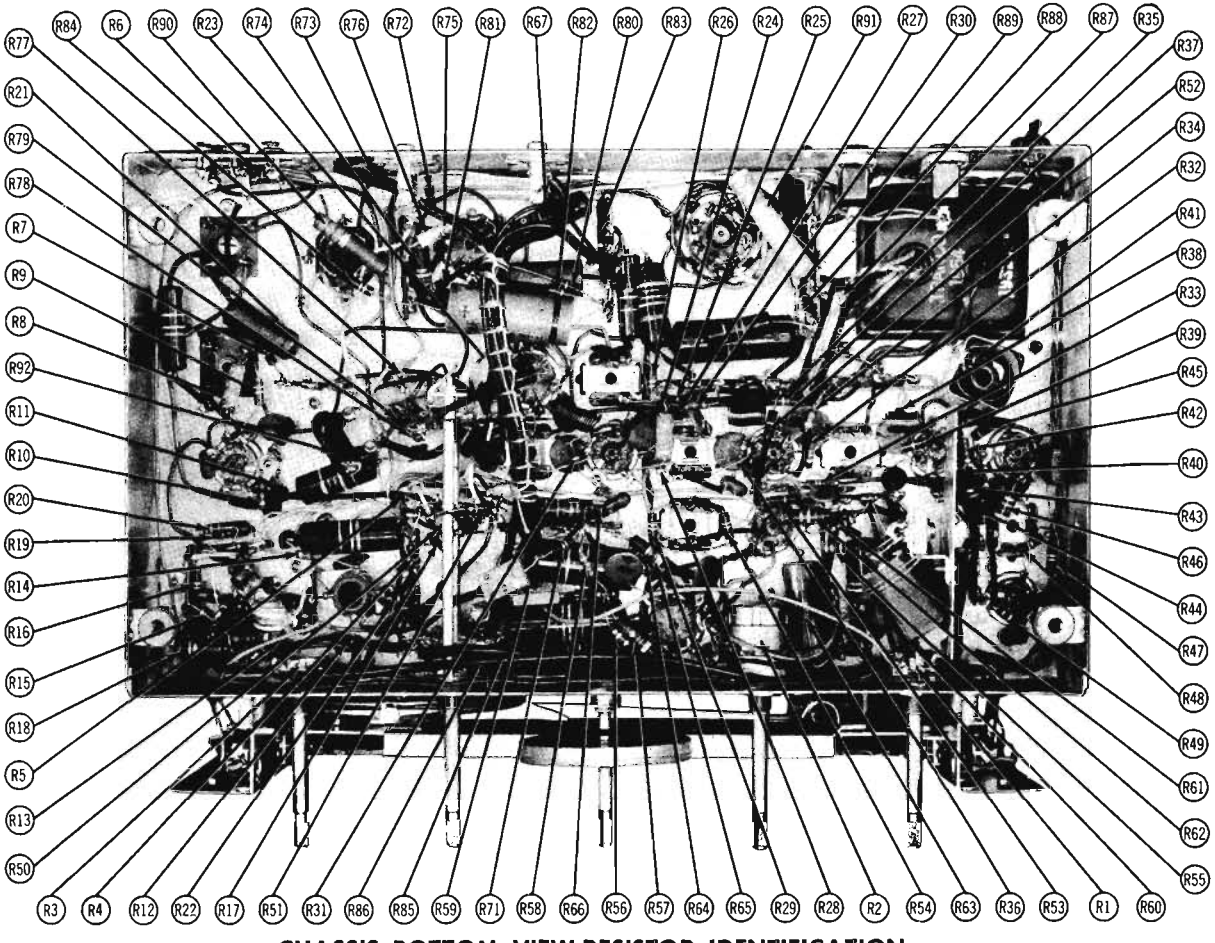
A PHOTOFACT STANDARD NOTATION SCHEMATIC

CRAFTSMEN
MODEL CT2

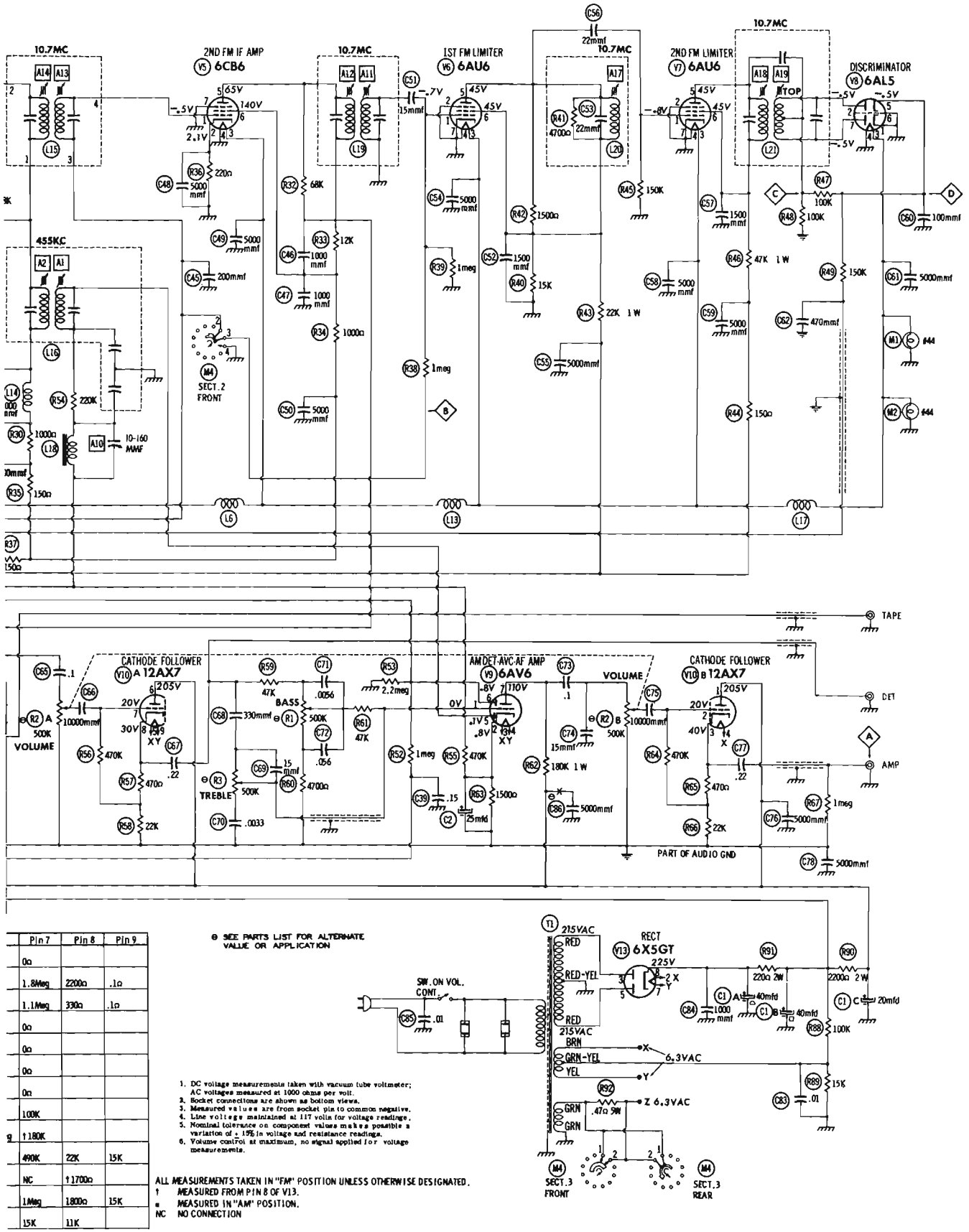
TRADE NAME	Craftsmen Model CT2		
MANUFACTURER	Radio Craftsmen Inc., 4323 W. Jefferson Blvd., Los Angeles 16, Calif.		
TYPE SET	AC Operated FM-AM Tuner		
TUBES	Thirteen		
POWER SUPPLY	105-125 Volts AC - 60 Cycles	RATING	.45 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	530KC - 1620KC	- FM	88MC - 108MC



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

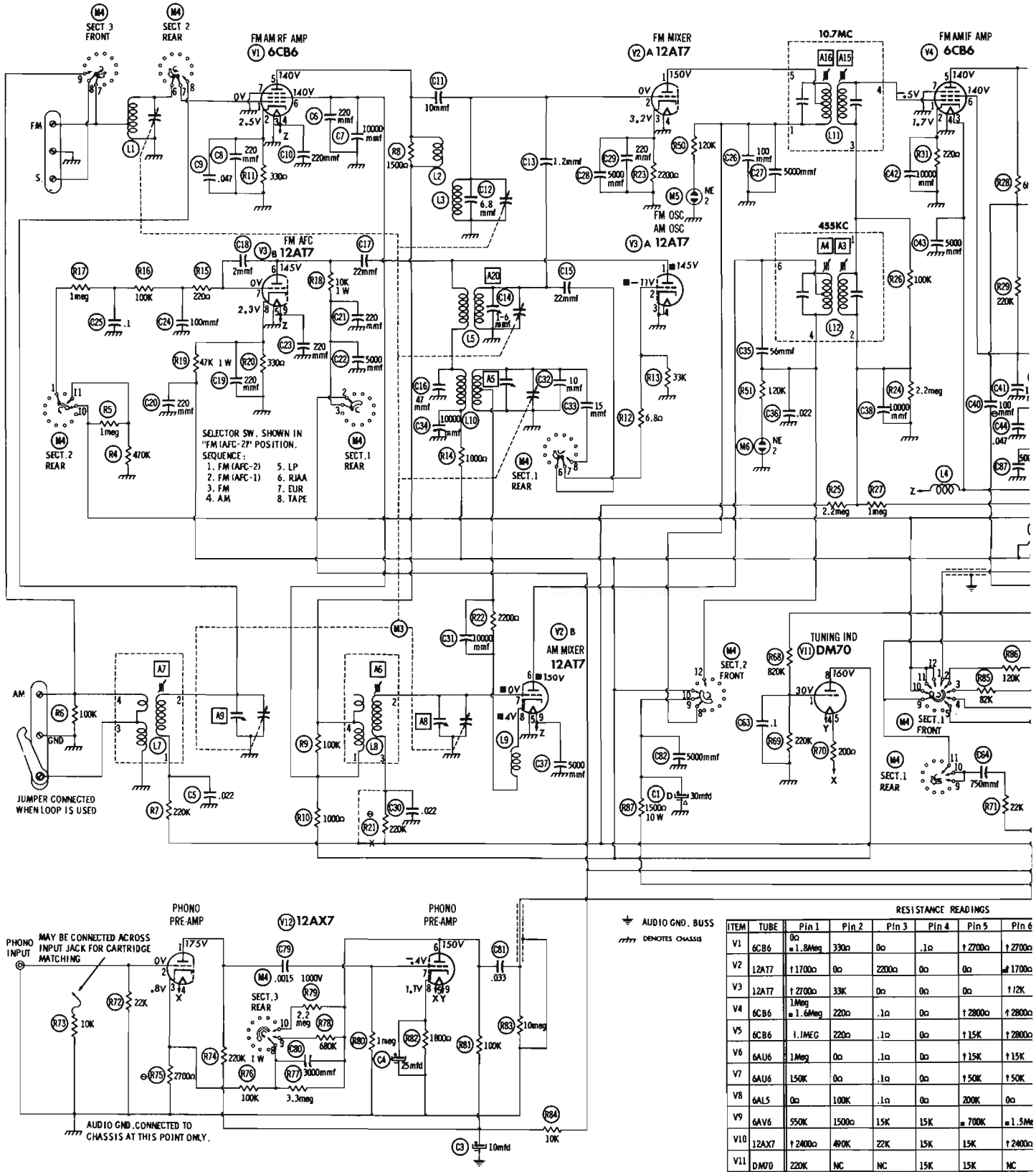


	Pin 7	Pin 8	Pin 9
	0Ω		
	1.8Meg	2200Ω	.1Ω
	1.1Meg	330Ω	.1Ω
	0Ω		
	0Ω		
	0Ω		
	0Ω		
	100K		
g	†180K		
	490K	22K	15K
	NC	†1700Ω	
	1Meg	1800Ω	15K
	15K	11K	

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
† MEASURED FROM PIN 8 OF V13.
▪ MEASURED IN "AM" POSITION.
NC NO CONNECTION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
V1	6CB6	0Ω = 1.8Meg	330Ω	0Ω	.1Ω	↑ 270ΩΩ	↑ 270ΩΩ
V2	12AT7	↑ 1700Ω	0Ω	2200Ω	0Ω	0Ω	↑ 1700Ω
V3	12AT7	↑ 2700Ω	33K	0Ω	0Ω	0Ω	↑ 12K
V4	6CB6	1Meg = 1.6Meg	220Ω	.1Ω	0Ω	↑ 2800Ω	↑ 2800Ω
V5	6CB6	1.1MEG	220Ω	.1Ω	0Ω	↑ 15K	↑ 2800Ω
V6	6AU6	1Meg	0Ω	.1Ω	0Ω	↑ 15K	↑ 15K
V7	6AU6	150K	0Ω	.1Ω	0Ω	↑ 50K	↑ 50K
V8	6AL5	0Ω	100K	.1Ω	0Ω	200K	0Ω
V9	6AV6	550K	1500Ω	15K	15K	= 700K	= 1.5Me
V10	12AX7	↑ 2400Ω	490K	22K	15K	15K	↑ 2400Ω
V11	DM70	220K	NC	NC	15K	15K	NC
V12	12AX7	↑ 230K	22K	2700Ω	15K	15K	↑ 110K
V13	6X5GT	NC	15K	100Ω	NC	105Ω	NC

A PHOTOFACT STANDARD NOTATION SCHEMATIC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	455KC (400~ Mod)	AM	Point of non-interference.	AC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	220MMF	High side to AM antenna input. Low side to chassis.	1500KC	"	1500KC	"	A5	"
3.	"	"	600KC	"	Tune to 600KC signal.	"	A6, A7	"
4.	"	"	1400KC	"	Tune to 1400KC signal.	"	A8, A9	"

10KC WHISTLE FILTER ADJUSTMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	220MMF	High side to AM antenna input. Low side to chassis.	1400KC (10KC Mod)	AM	Tune to 1400KC signal.	AC probe to point Ⓐ. Common to chassis.	A10	Adjust for MINIMUM deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (unmod)	FM	Point of non-interference.	DC probe to point Ⓑ. Common to chassis.	A11, A12, A13, A14, A15, A16	Adjust for maximum deflection.
7.	"	"	"	"	"	DC probe to point Ⓒ. Common to chassis.	A17, A18	"
8.	"	"	"	"	"	DC probe to point Ⓓ. Common to chassis.	A19	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference.	Vert. amp. to point Ⓑ. Low side to chassis.	A11, A12 A13, A14 A15, A16	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
7.	"	"	"	"	"	Vert. amp. to point Ⓒ. Low side to chassis.	A17, A18	"
8.	"	"	"	"	"	Vert. amp. to point Ⓓ. Low side to chassis.	A19	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A16 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	270Ω carbon resistor	High side thru 270Ω to FM antenna input. Low side to chassis.	106MC	FM	106MC	AC probe to point Ⓐ. Common to chassis.	A20	Adjust for maximum deflection.
10.	"	"	90MC	"	90MC	"	L1, L3	Adjust L1 and L3 for maximum deflection by compressing or expanding coil turns.

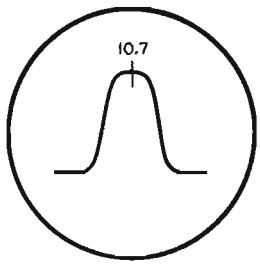


FIG. 1

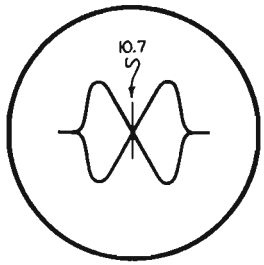
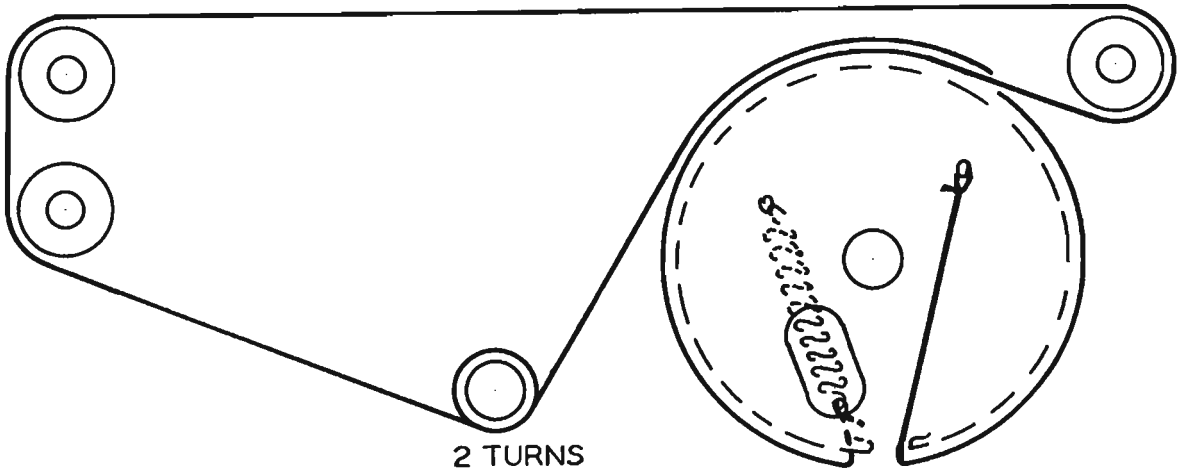


FIG. 2

TUNING GANG FULLY CLOSED



DIAL CORD DRIVE

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6CB6	
V2	FM Mixer-AM Mixer	12AT7	
V3	FM Osc.-AFC	12AT7	
V4	1st IF Amplifier	6CB6	
V5	2nd FM IF Amplifier	6CB6	
V6	1st FM Limiter	6AU6	
V7	2nd FM Limiter	6AU6	
V8	Discriminator	6AL5	
V9	AM Det-AVC-AF Amp.	6AV6	
V10	Cathode Follower	12AX7	
V11	Tuning Indicator	DM70	
V12	Phono Preamplifier	12AX7	
V13	Rectifier	6X5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Craftsmen PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	300	CEX-1	AFH4-02-10	DO020	FP419.5	TMT-23	T-180	TVL-4580
B	■40	300			BR2035		TD-20-350	MT-4540	
C	20	300							
D	▲30	300							
C2	25	25		PRS25V25	BR252	TC26	TD-25-25	FM-0225	TVA-1205
C3	10	250		PRS250V12	BR1225	TC52	TD-10-250	FM-2512	TVA-1504
C4	25	25		PRS25V25	BR252	TC26	TD-25-25	FM-0225	TVA-1205

FIXED CAPACITORS

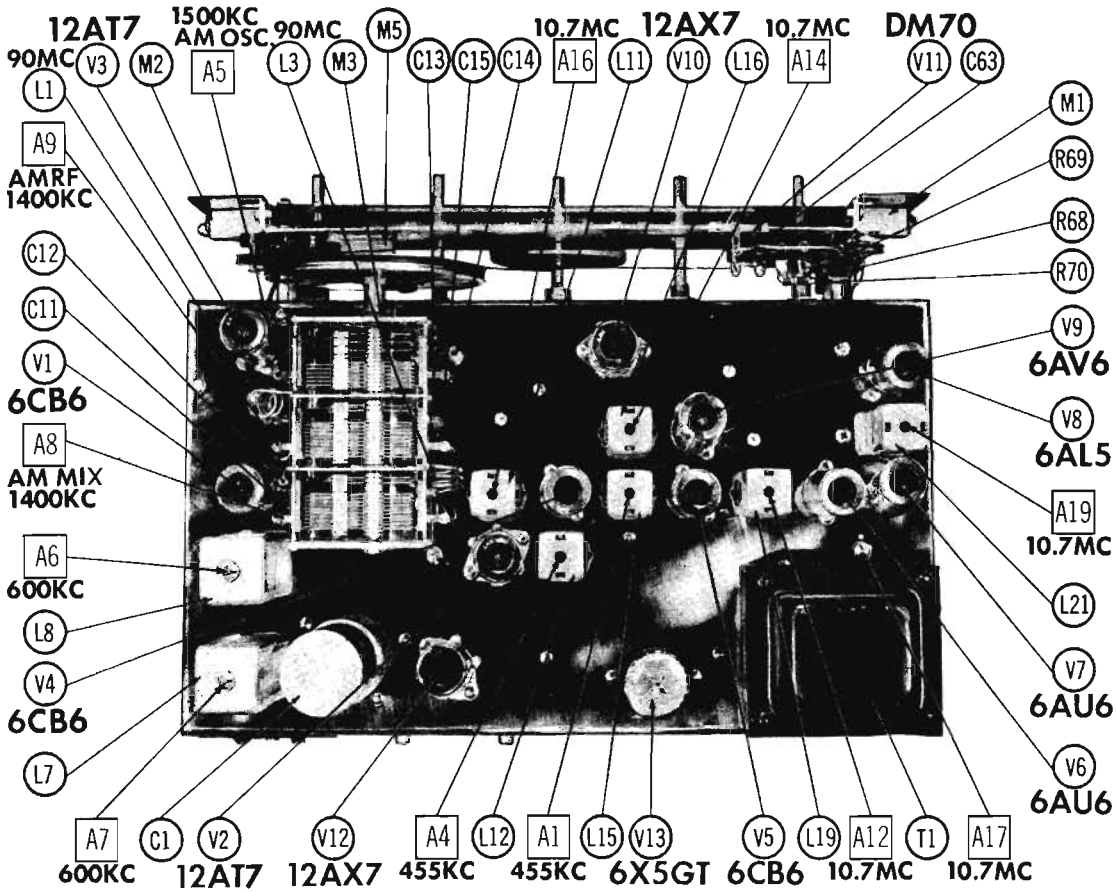
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Craftsmen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	.022	400								
C6	220			SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C7	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C8	220			SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C9	.047	400								
C10	220			SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C11	10			SI10	D6-100	TP09	GP1K-100	UC-531	5GA-Q1	
C12	8.8			NP0-SI6.8	TCZ-6R8	TZ08	NP0A-6R8	ZT-5568	5TCC-Q68	
C13	1.2									
C14	1-8		CEX-1		629-8		532-10			
C15	22			NP0-SI22	TCZ-22	TZ14	NP0K-220		5TCC-Q22	
C16	47			N750-SI47	TCN-47	TZ22	N750K-470	NT-5447	5TCU-Q47	
C17	22			NP0-SI22	TCZ-22	TZ14	NP0K-220		5TCC-Q22	
C18	2					Z005				
C19	220			SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C20	220			SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C21	220			SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C22	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C23	220			SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C24	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C25	.1	400								

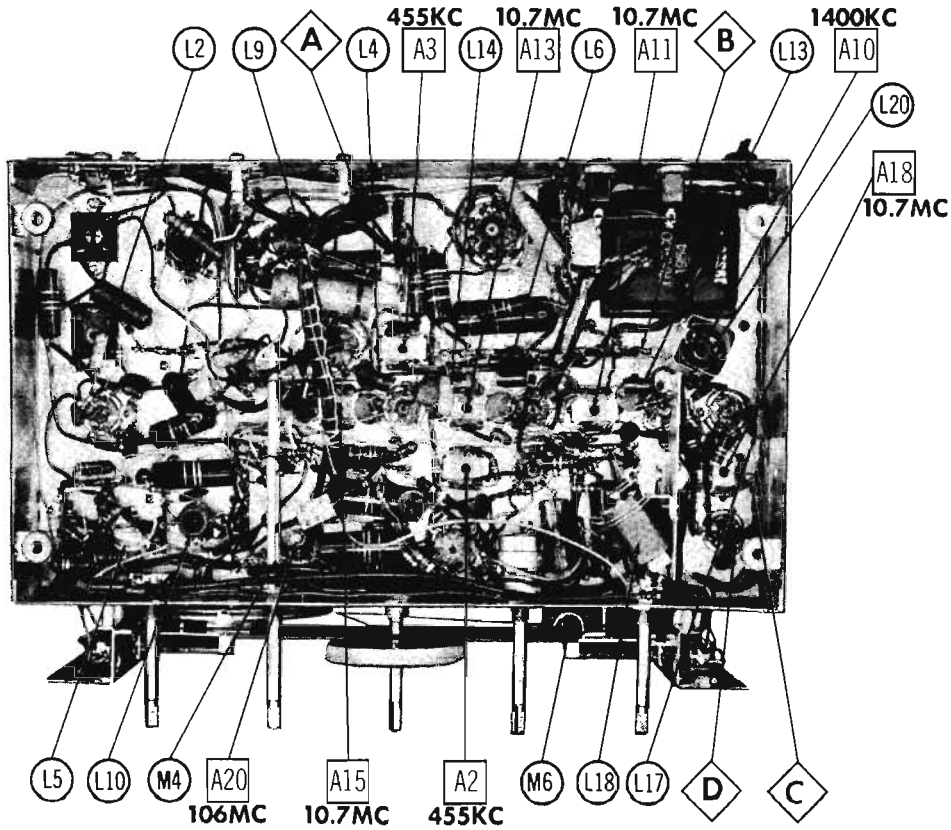
PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Craftsmen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C26	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C27	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C28	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C29	220			SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C30	.022	400								
C31	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C32	10			NP0-SI10	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q10	
C33	15			NP0-DI15	TCZ-15	Z021	NP0-150		5TCC-Q15	
C34	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C35	56			NP0-SI56	TCZ-56	Z036	NP0-337-680			
C36	.022	400								
C37	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C38	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C39	.15	400								
C40	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C41	1000			SI1000	D6-102	TP52	GP2L-102	UC-521	5GA-D1	
C42	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C43	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C44	.047	400								Note 1
C45	200			SI200	D6-201	TP38	GP2K-201	UC-532	5GA-T2	
C46	1000			BPD-001	DD-102	K089	801-001	DC521	5GA-D1	
C47	1000			SI1000	D6-102	TP52	GP2L-102	UC-521	5GA-D1	
C48	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C49	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C50	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C51	15			NP0-SI15	TCZ-15	TZ11	NP0K-150		5TCC-Q15	
C52	1500			BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C53	22			NP0-SI22	TCZ-22	TZ14	NP0K-220		5TCC-Q22	
C54	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C55	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C56	22			NP0-SI22	TCZ-22	TZ14	NP0K-220		5TCC-Q22	
C57	1500			BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C58	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C59	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C60	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C61	5000			BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C62	470			1469-00047	D8-471	5R5T47	811-471		MS-347	
C63	.1	200	CZW104MD							
C64	750	500		1464-00075		1R5T75	811-751		MS-375	
C65	.1	400								
C66	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C67	.22	400								
C68	330	500		1469-00033	D8-331	5R5T33	811-331		MS-333	
C69	15			NP0-SI15	D8-150	TZ11	831-150		5TCC-Q15	
C70	.0033	400		1464-0033		1R5D33			MS-233	
C71	.0056	400		1464-0056		1R5D58			MS-256	
C72	.056	400								
C73	.1	400								
C74	15			NP0-SI15	D8-150	TZ11	831-150		5TCC-Q15	
C75	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW INDUCTOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Craftsmen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C76	5000			BPD-005	DD-502	KD80	811-005	DC525	5HK-D5	
C77	.22	400								
C78	5000			BPD-005	DD-502	KD80	811-005	DC525	5HK-D5	
C79	.0015	1000								
C80	3000	500		1464-003		1R5D3		MCB461	M8-23	
C81	.033	400								
C82	5000			BPD-005	DD-502	KD80	811-005	DC525	5HK-D5	
C83	.01	400								
C84	1000			811000	D6-102	TP52	GP2L-102	UC-521	5GA-D1	
C86	.01	600								
C86	5000			BPD-003	DD-502	KD80	811-005	DC525	5HK-D5	Note 2
C87	5000			BPD-005	DD-502	KD80	811-005	DC525	5HK-D5	

Note 1: Some versions may use 4700MMF in this application.
Note 2: Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Craftsmen PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	238715	AB-50	A47-500K-Z	Q13-133	U48	Bass - Note 1
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R1A
R2A	500K	½	238727			Q13-133	UF55A	Volume (Panel) - Note 2
B	500K	½	Not Req.			M11-133	UR55L	Volume (Rear)
C	Shaft		Not Req.			Not Req.	D6-36	Attach to R2A
D	Switch		Not Req.			76-1	U8-26	Attach to R2B
R3A	500K	½	238715	AB-50	A47-500K-Z	Q13-133	U46	Treble - Note 3
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R3A

Note 1: Some versions may use an alternate control part no. 268028 in this application.
Note 2: Some versions may use an alternate control part no. 265017 in this application.
Note 3: Some versions may use an alternate control part no. 238016 in this application.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Craftsmen PART No.	IRC PART No.	NOTES
R4	470K			BTS-470K	
R5	1Meg			BTS-1Meg	
R6	100K			BTS-100K	
R7	220K			BTS-220K	
R8	1500Ω			BTS-1500	
R9	100K			BTS-100K	
R10	1000Ω			BTS-1000	
R11	330Ω			BTS-330	
R12	6.8Ω				
R13	33K			BTS-33K	
R14	1000Ω			BTS-1000	
R15	220Ω			BTS-220	
R16	100K			BTS-100K	
R17	1Meg			BTS-1Meg	
R18	10K	1		BTA-10K	
R19	47K	1		BTA-47K	
R20	330Ω			BTS-330	
R21	220K			BTS-220K	
R22	2200Ω			BTS-2200	
R23	2200Ω			BTS-2200	
R24	2.2Meg			BTS-2.2Meg	
R25	2.2Meg			BTS-2.2Meg	
R26	100K			BTS-100K	
R27	1Meg			BTS-1Meg	
R28	68K			BTS-68K	
R29	220K			BTS-220K	
R30	1000Ω			BTS-1000	
R31	220Ω			BTS-220	
R32	68K			BTS-68K	
R33	12K			BTS-12K	
R34	1000Ω			BTS-1000	
R35	150Ω			BTS-150	
R36	220Ω			BTS-220	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Craftsmen PART No.	IRC PART No.	NOTES
R37	150Ω			BTS-150	
R38	1Meg			BTS-1Meg	
R39	1Meg			BTS-1Meg	
R40	15K			BTS-15K	
R41	4700Ω			BTS-4700	
R42	1500Ω			BTS-1500	
R43	22K	1		BTA-22K	
R44	150Ω			BTS-150	
R45	150K			BTS-150K	
R46	47K	1		BTA-47K	
R47	100K			BTS-100K	
R48	100K			BTS-100K	
R49	150K			BTS-150K	
R50	120K			BTS-120K	
R51	120K			BTS-120K	
R52	1Meg			BTS-1Meg	
R53	2.2Meg			BTS-2.2Meg	
R54	220K			BTS-220K	
R55	470K			BTS-470K	
R56	470K			BTS-470K	
R57	470Ω 5%			BW½-470 5%	
R58	22K			BTS-22K	
R59	47K			BTS-47K	
R60	4700Ω			BTS-4700	
R61	47K 5%			BTS-47K 5%	
R62	180K	1		BTA-180K	
R63	1500Ω			BTS-1500	
R64	470K			BTS-470K	
R65	470Ω			BW½-470	
R66	22K			BTS-22K	
R67	1Meg			BTS-1Meg	
R68	820K			BTS-820K	
R69	220K			BTS-220K	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Craftsmen PART No.	IRC PART No.	NOTES
R70	200Ω 5%			BTS-200 5%	
R71	22K			BTS-22K	
R72	22K			BTS-22K	
R73	10K			BTS-10K	
R74	220K	1		BTA-220	
R75	2700Ω 5%		RFK272JA	MBC-2700 5%	Note 1
R76	100K 5%			BTS-100K 5%	
R77	3.3Meg 5%			BTS-3.3Meg 5%	
R78	680K 5%			BTS-680K 5%	
R79	2.2Meg 5%			BTS-2.2Meg 5%	
R80	1Meg			BTS-1Meg	
R81	100K			BTS-100K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Craftsmen PART No.	IRC PART No.	NOTES
R82	1800Ω			BTS-1800	
R83	10Meg			BTS-10Meg	
R84	10K			BTS-10K	
R85	82K 5%			BTS-82K 5%	
R86	120K 5%			BTS-120K 5%	
R87	1500Ω	10		PW10-1500	
R88	100K			BTS-100K	
R89	15K			BTS-15K	
R90	2200Ω	2		BTS-2200	
R91	220Ω	2		BW2-220	
R92	.47Ω	5	RZK47:KE		

Note 1: Special type resistor.

TRANSFORMER (POWER)

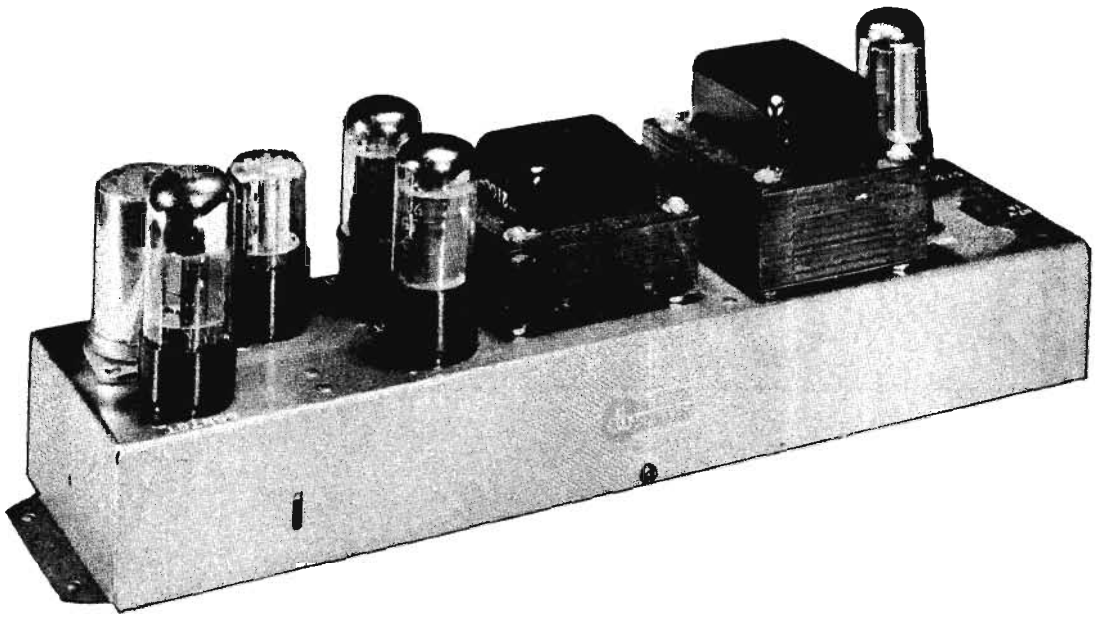
ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Craftsmen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .45A	430VCT @ .063A	6.3VCT @ 1.39A	6.3VAC @ 2.85A	529011					

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Craftsmen PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	0Ω		53A026				Tapped 3.3 Microhenries; IRC part #CLA
L2	RF Choke	3Ω		53A046				
L3	FM RF Coil	0Ω		51A001				
L4	Fil. Choke	0Ω		53X501	19-1000		4602	1 Microhenry
L5	FM Osc. Coil	0Ω	0Ω	53A025				
L6	Fil. Choke	0Ω		53X501	19-1000		4602	1 Microhenry *Tapped
L7	AM Ant. Coil	0Ω*	4.6Ω	53A031				
L8	AM RF Coil	90Ω	5.2Ω	51A003				
L9	Cathode Choke	2.5Ω		T-15	19-7100		6112	100 Microhenries * Tapped @ 1.3Ω
L10	AM Osc. Coil	1.4Ω	90Ω*	53A029				
L11	1st FM IF	.6Ω	.9Ω	50X024				
L12	1st AM IF	8.5Ω	18Ω	53X004				
L13	Fil. Choke	0Ω		53X501	19-1000		4602	1 Microhenry
L14	RF Choke	3Ω		53A046				3.3 Microhenries; IRC part #CLA
L15	2nd FM IF	1Ω	1Ω	50X026	16-3467	FM-254	1463	
L16	2nd AM IF	18Ω	18Ω	50X011	16-6770	BC-355	12-C6	
L17	Fil. Choke	0Ω		53X501	19-1000		4602	1 Microhenry
L18	10KC Filter	1.6K		663004				
L19	3rd FM IF	1Ω	1Ω	50X025	16-3487	FM-254	1463	
L20	FM Limiter	.5Ω		53A005				
L21	Discriminator	.8Ω	.90CT	50X003	17-3494	FM-253	1464	

MISCELLANEOUS

ITEM No.	PART NAME	Craftsmen PART No.	NOTES
M1	Dial Light		#44
M2	Dial Light		#44
M3	Tuning Cap.	CAX-1	8 Gang (AM Sections: 25-430MMF, 23-430MMF, 24-195MMF)
M4	Switch	SW-35	Selector & Phono Compensation (Rotary, Wafer Type)
M5	Neon Light		FM IF
M6	Neon Light		AM IF
A10	Trimmer Cap.	CVX-1	10KC Filter (10-160MMF)
	Knob	15A027	Bass, Treble & On-Off-Volume
	Knob	15A028	Tuning
	Knob	N-9	Selector
	Dial Pointer	82A002	
	Dial Glass	1N-61	



DAVID BOGEN
MODEL DO110

TRADE NAME	David Bogen Model DO110
MANUFACTURER	David Bogen Co., Inc., 29 Ninth Ave., New York 14, N. Y.
TYPE SET	AC Operated 12 Watt Audio Amplifier
TUBES (Five)	Types 6SN7GT AF Amplifier-Voltage Regulator, 6SL7GT AF Amplifier-Phase Inverter, (2) 6V6GT Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC - 60 Cycles RATING .56 Amp. @ 117 Volts AC

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp. -Volt Reg.	6SN7GT	
V2	AF Amp. -Phase Inv.	6SL7GT	
V3	Output	6V6GT	
V4	Output	6V6GT	
V5	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	David Bogen PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲10	450		AFH4-10	D009	FP434	TMQ-10	Q-030	TVL-4760
B	■10	450							
C	●10	450							
D	10	450							
C2	50	50		PRS50V50	BR505	TC39	TD-50-50	FM-0550	TVA-1308

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.22	400		P488N-22		CUB4P22		PT4022	4TM-P22	
C4	4700			BPD-0047	DD-472	K079	811-0047	UC-5247	5HK-D47	
C5	680			BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C6	100			BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C7	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C8	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C9	15			5115	D5-150	G021	831-150	UC-5415	5GA-Q15	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	David Bogen PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	V375A	AB-50	A47-500K-Z	QI3-133	U48	Volume
B	Shaft		Not Req.	AK-1	FK9-1/4	Not Req.	Not Req.	Attach to R1A

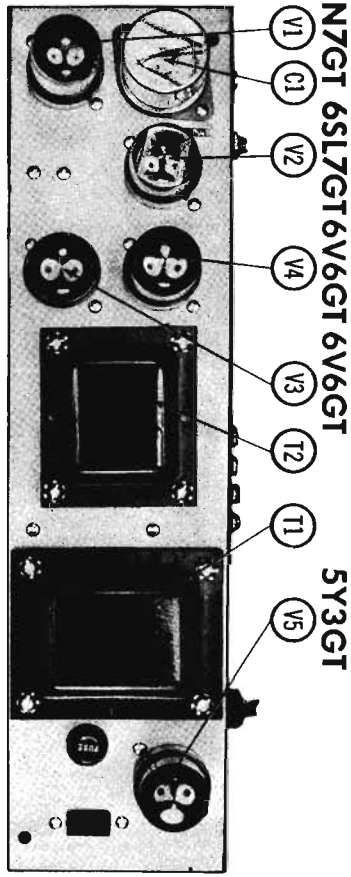
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	David Bogen PART No.	IRC PART No.	
R2	100K 5%			BTS-100K 5%	
R3	47K			BTS-47K	
R4	1500Ω 5%			BTS-1500 5%	
R5	47K			BTS-47K	
R6	1.2Meg			BTS-1.2Meg	
R7	3.3Meg			BTS-3.3Meg	
R8	470K			BTS-470K	
R9	470K			BTS-470K	
R10	12K			BTS-12K	
R11	2700Ω 5%			BTS-2700 5%	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	David Bogen PART No.	IRC PART No.	
R12	68K			BTS-68K	
R13	100K 5%			BTS-100K 5%	
R14	100K 5%			BTS-100K 5%	
R15	10K			BTS-10K	
R16	200K 5%			BTS-200K 5%	
R17	200K 5%			BTS-200K 5%	
R18	300Ω	7		PW7-300	
R19	20K 5%			BTS-20K 5%	
R20	51K 5%			BTS-51K 5%	
R21	1Meg			BTS-1Meg	
R22	8000Ω	7		PW7-8200	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .56A	700VCT @ .079A	5VAC @ 2A	6.3VCT @ 1.8A	T362-3	P9311	P-2952	PM-8409	24R04	R-11B

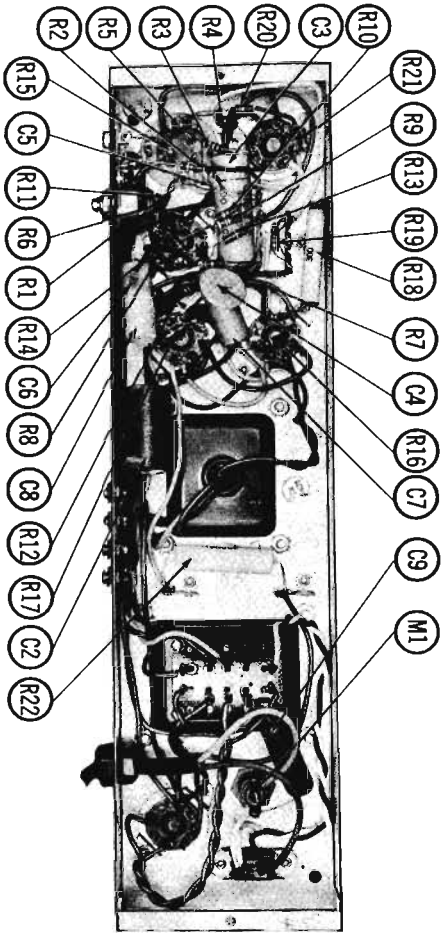
TRANSFORMER (AUDIO OUTPUT)

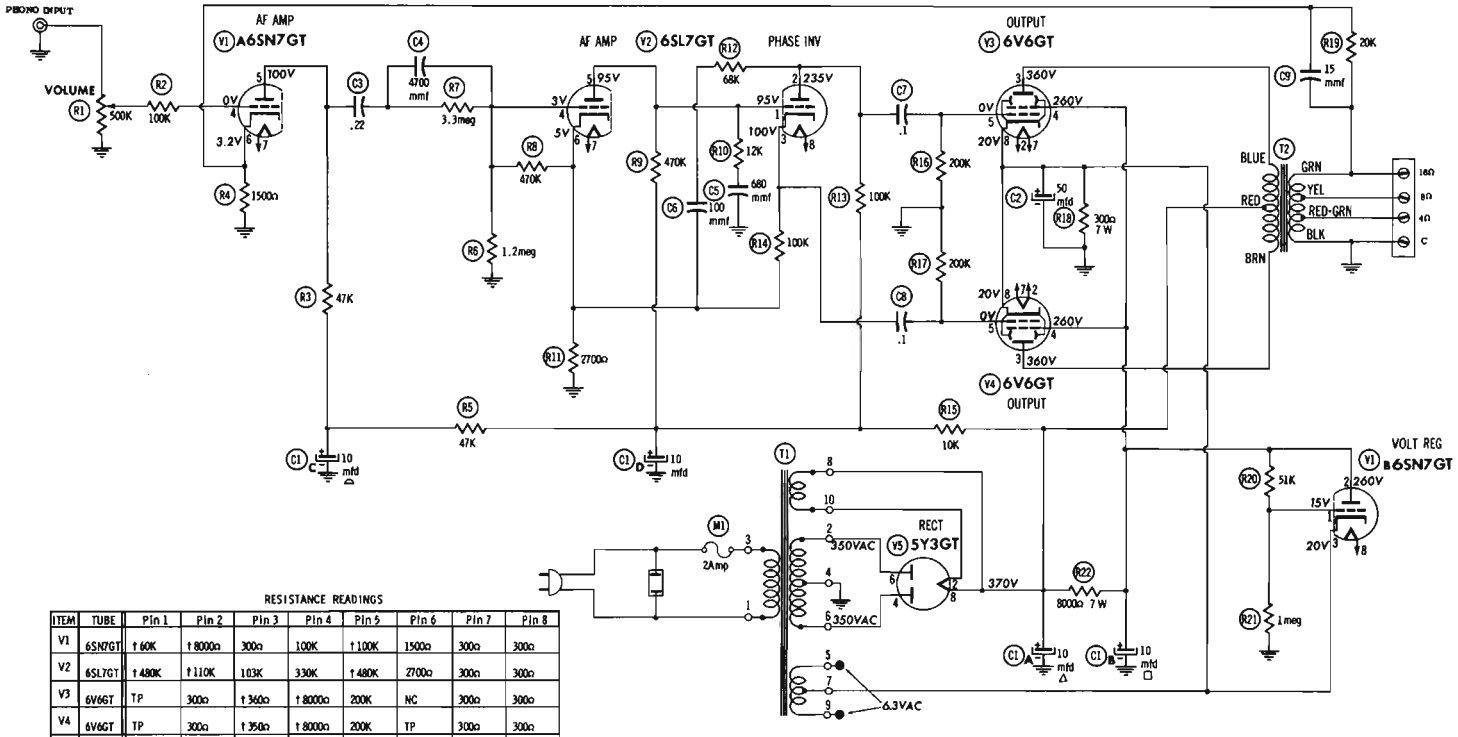
ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	11K	16Ω tap @ 8Ω tap @ 4Ω	T2106-1				22893 ①		① Fabricate Mounting

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			David Bogen PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	2A 125V			313002, (3AG-S/B-2A)	342001	MDL2	HKP

CHASSIS—BOTTOM VIEW





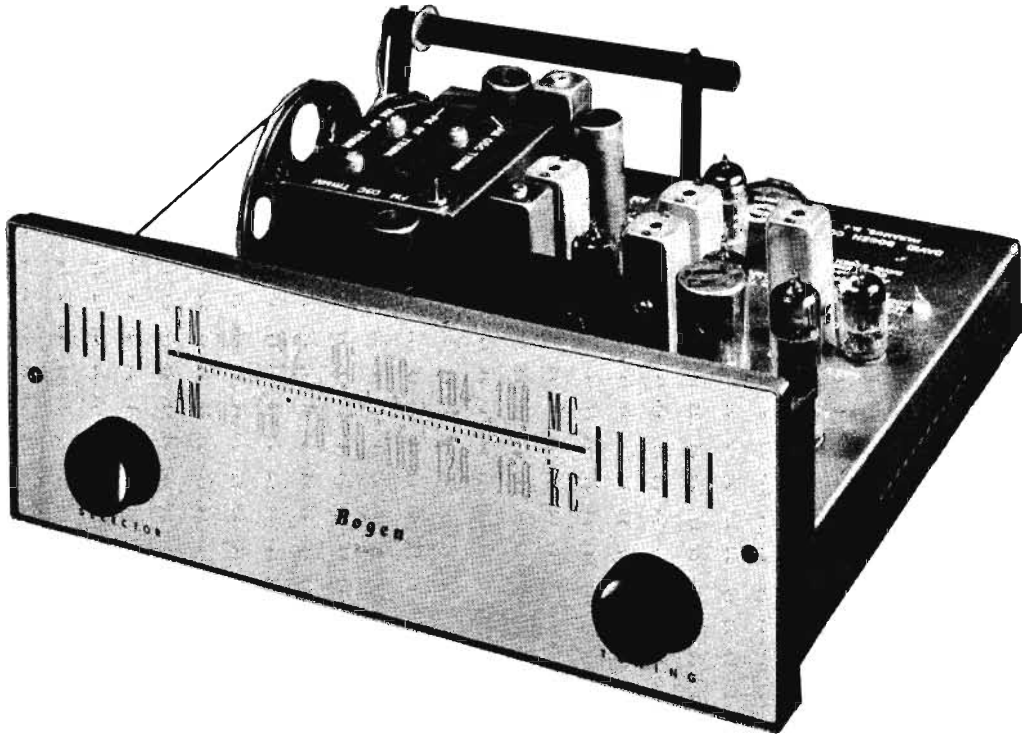
RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	6SN7GT	†60K	†8000Ω	300Ω	100K	†100K	1500Ω	300Ω	300Ω
V2	6SL7GT	†480K	†110K	103K	330K	†480K	2700Ω	300Ω	300Ω
V3	6V6GT	TP	300Ω	†360Ω	†8000Ω	200K	NC	300Ω	300Ω
V4	6V6GT	TP	300Ω	†350Ω	†8000Ω	200K	TP	300Ω	300Ω
V5	5Y3GT	NC	25K	NC	170Ω	NC	160Ω	NC	25K

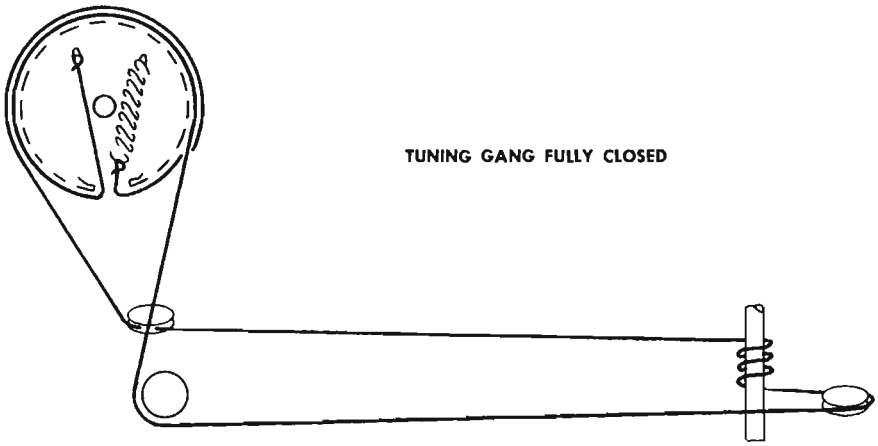
† MEASURED FROM PIN 8 OF V5.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC



TRADE NAME	David Bogen Model R620
MANUFACTURER	David Bogen Co., Inc., P. O. Box 500, Paramus, N. J.
TYPE SET	AC Operated FM-AM Tuner
TUBES (Eight)	Types 6AB4 FM RF Amplifier, 6AB4 FM Converter, 6BE6 AM Converter, 6BA6 1st FM-AM IF Amplifier, 6AU6 2nd FM IF Amp. -AM Det., 6AL5 Ratio Detector, 6C4 AF Amplifier, 6X4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .27 Amp. @ 117 Volts AC (27 Watts)

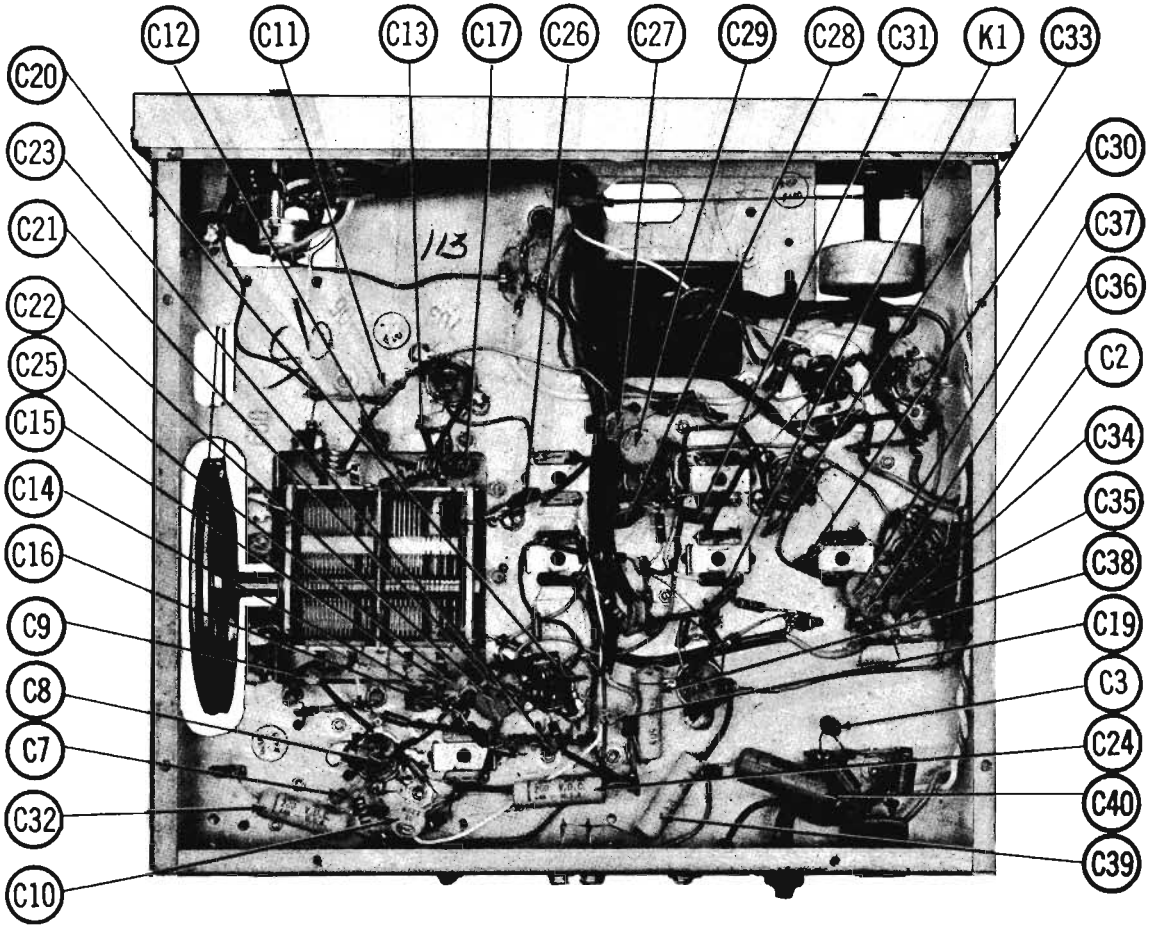


TUNING GANG FULLY CLOSED

DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

H125



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Align FM Section with Selector in AFC Out position.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	455KC (400~ Mod)	AM	Tuning gang fully open	DC probe thru 100K to point (A). Common to chassis	A1, A2, A3, A4	Adjust for maximum deflection.
2.	200MMF	High side to AM Antenna Terminal. Low side to chassis.	1500KC	"	Tune to 1500KC signal	"	A5, A6	"
3.	"	"	600KC	"	600KC	"	A7, A8	Adjust for maximum deflection. Repeat steps 2 & 3.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to pin 6 (grid) of 6AB4 (V2). Low side to chassis.	10.7MC (unmod)	FM	Point of non-interference	DC probe thru 100K to point (B). Common to chassis	A9, A10, A11, A12 A13	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe thru 100K to point (C). Common to chassis	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 6 (grid) of 6AB4 (V2). Common to chassis	10.7MC (450KC Swp)	FM	Point of non-interference	Vert Amp. thru 100K to point (B). Low side to chassis.	A9, A10, A11, A12, A13	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert Amp. thru 100K to point (C). Low side to chassis.	A14	Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	Fig. 3	Thru dummy to Antenna Terminals.	106MC	FM	106MC	DC probe thru 100KC to point (B). Common to chassis	A15, A16	Adjust for maximum deflection.
7.	"	"	90MC	"	90MC	"		Check for tracking. Repeat steps 6 & 7.

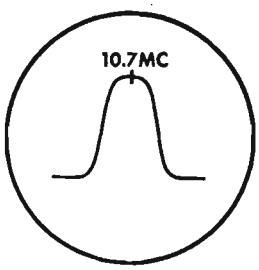


FIG. 1

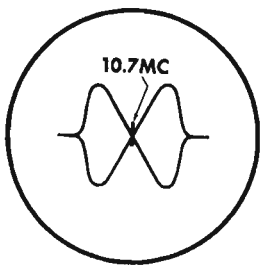


FIG. 2

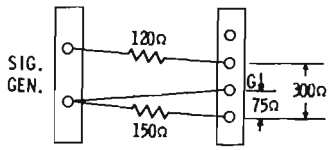
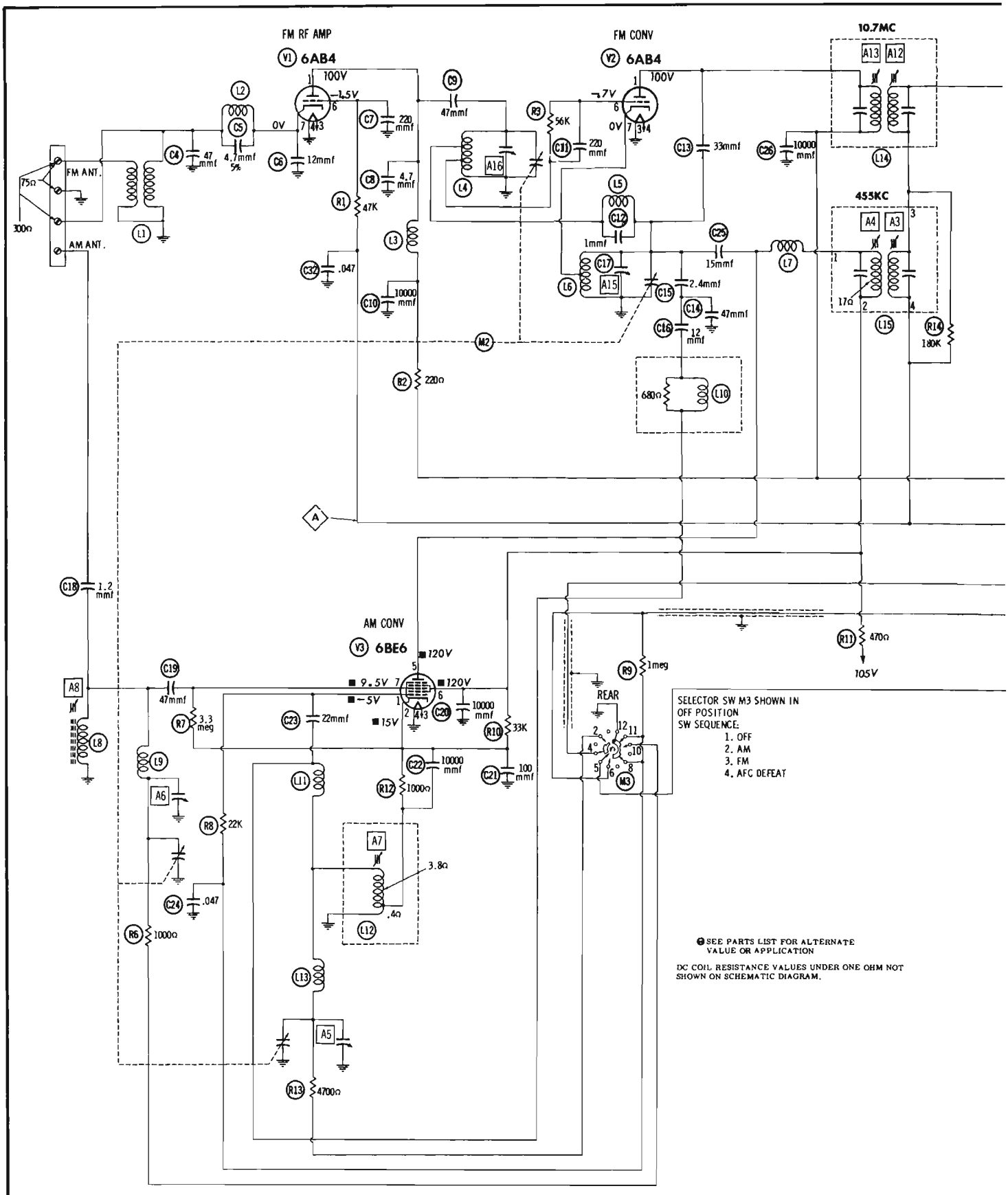
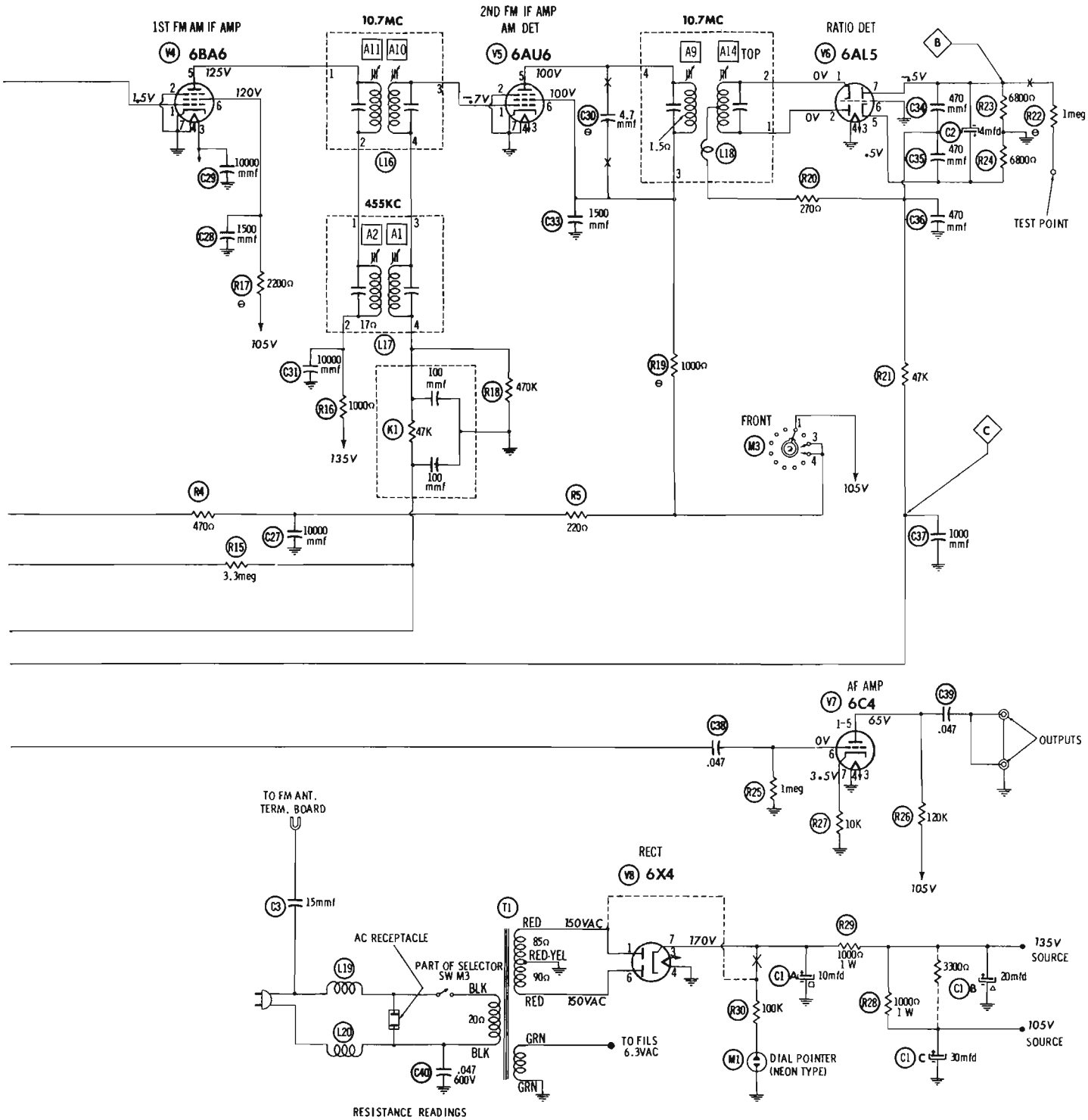


FIG.3



A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1957

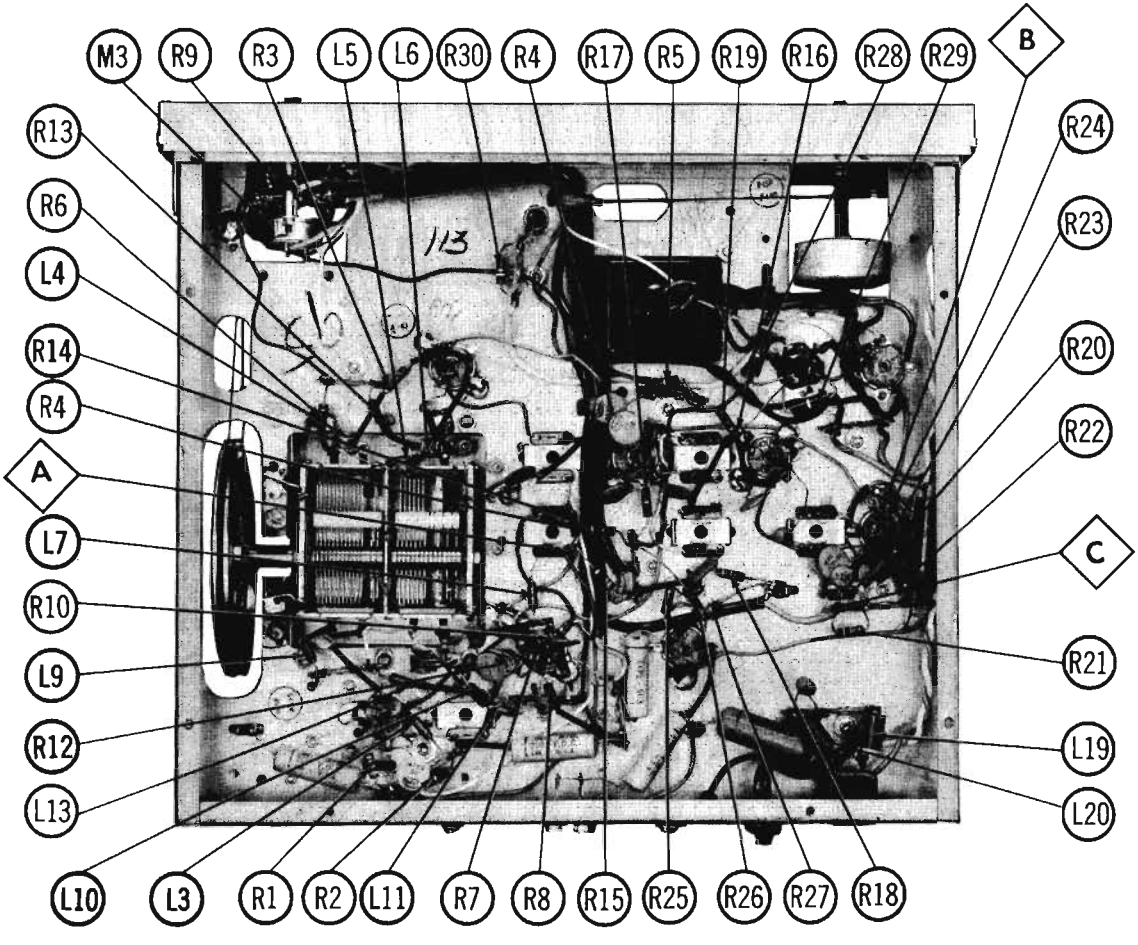


RESISTANCE READINGS

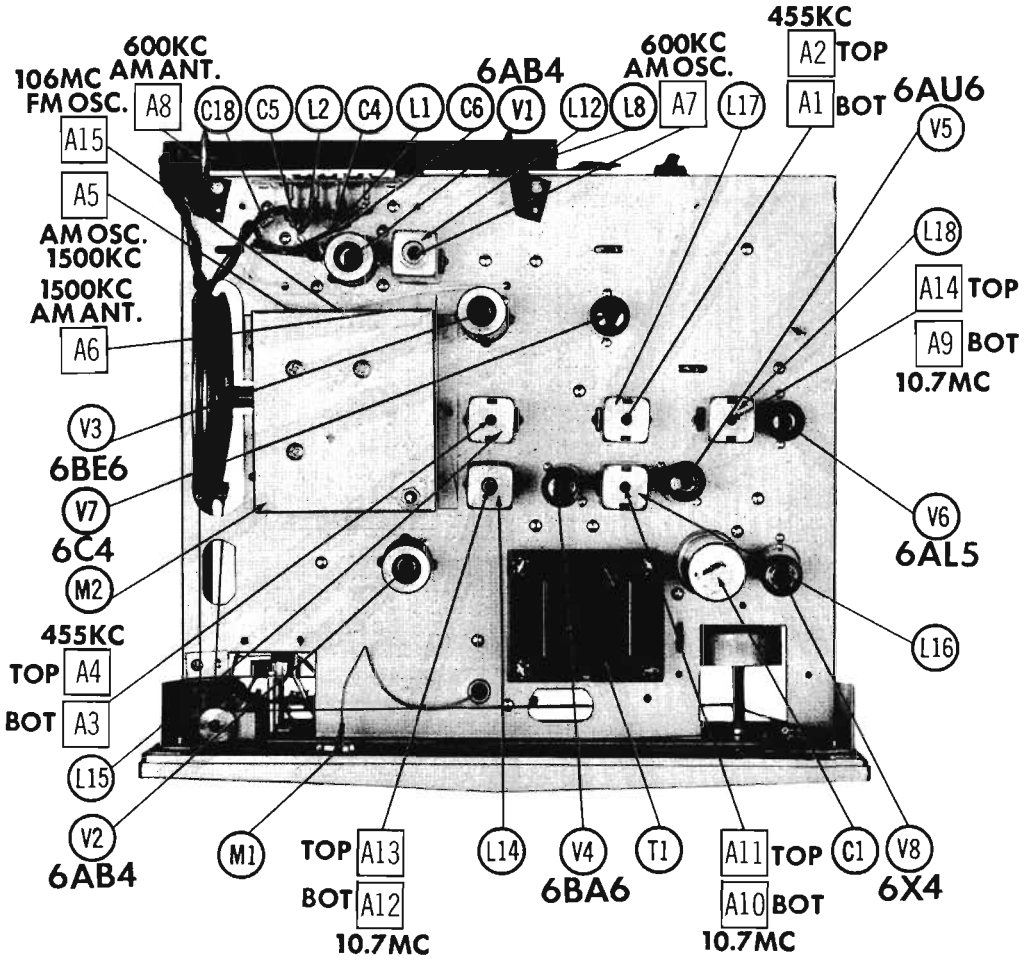
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6AB4	† 2900Ω	NC	.1Ω	0Ω	NC	3.9Meg	.1Ω
V2	6AB4	† 2700Ω	NC	0Ω	.1Ω	NC	56K	0Ω
V3	6BE6	▪ 22K	▪ 1000Ω	.1Ω	0Ω	▪† 2500Ω	▪† 2500Ω	▪ 3.3Meg
V4	6BA6	3.9Meg	0Ω	.1Ω	0Ω	† 2000Ω	† 4200Ω	0Ω
V5	6AU6	470K	0Ω	.1Ω	0Ω	† 3000Ω	† 3000Ω	0Ω
V6	6AL5	INF • 1Meg	INF • 1Meg	.1Ω	0Ω	6800Ω	0Ω	6800Ω
V7	6C4	† 120K	NC	.1Ω	0Ω	† 120K	1Meg	10K
V8	6X4	85Ω	NC	.1Ω	0Ω	NC	90Ω	20K(Min)

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
† MEASURED FROM PIN 7 OF V8
▪ MEASURED IN "AM" POSITION
• MEASURED IN "AFC DEFEAT" POSITION
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amplifier	6AB4	
V2	FM Converter	6AB4	
V3	AM Converter	6BE6	
V4	1st FM-AM IF Amp.	6BA6	
V5	2nd FM IF Amp. - AM Det.	6AU6	
V6	Ratio Detector	6AL5	
V7	AF Amplifier	6C4	
V8	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA David Bogen PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	⌯10	250		AFH3-18	CO140	FP231. 3	TMT-18	T-080	TVL-3537
B	⌯20	200				TC47			
C	30	150							
C2	4	15		SRE25V5	BBR4-50	TC30	TD-4-25	MT-0504	TVA-1303

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	15			BPD-000015	DD-150	L10Q15	ED-15	UC-5415	5GA-Q15	
C4	47			BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C5	4. 7			NPO-SI 4. 7	TCZ-4R7	C10V47C	TCO-4. 7	ZT-5547	5TCCB-V47	5%
C6	12			SI 12	DD-120	L10Q12	ED-12	UC-5412	5GA-Q12	
C7	220			BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	
C8	4. 7			NPO-SI 4. 7	TCZ-4R7	C10V47C	TCO-4. 7	ZT-5547	5TCCB-V47	
C9	47			BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C10	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C11	220			BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	
C12	L 0			NPO-SI 1. 0	TCZ-1		TCO-1		5TCCB-V1	
C13	33			BPD-000033	DD-330	L10Q33	ED-33	UC-5433	5GA-Q33	
C14	47			BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C15	2. 4									
C16	12			SI 12	DD-120	L10Q12	ED-12	UC-5412	5GA-Q12	
C17										
C18	1. 2									
C19	47			BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C20	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C21	100			BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C22	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C23	22			BPD-000022	DD-220	L10Q22	ED-22	UC-5422	5GA-Q22	
C24	. 047	200		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C25	15			BPD-000015	DD-150	L10Q15	ED-15	UC-5415	5GA-Q15	
C26	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C27	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C28	1500			BPD-0015	DD-152	BYA10D15	ED-0015	UC-5215	5HK-D15	
C29	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C30	4. 7			NPO-SI 4. 7	TCZ-4R7	C10V47C	TCO-4. 7	ZT-5547	5TCCB-V47	①
C31	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C32	. 047	200		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C33	1500			BPD-0015	DD-152	BYA10D15	ED-0015	UC-5215	5HK-D15	
C34	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C35	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C36	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C37	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C38	. 047	200		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C39	. 047	200		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C40	. 047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	

① Not used in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA David Bogen PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R1	47K			BTS-47K	
R2	220Ω			BTS-220	
R3	68K			BTS-68K	
R4	470Ω			BTS-470	
R5	220Ω			BTS-220	
R6	1000Ω			BTS-1000	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA David Bogen PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R7	3. 3Meg			BTS-3. 3Meg	
R8	22K			BTS-22K	
R9	1Meg			BTS-1Meg	
R10	33K			BTS-33K	
R11	470Ω			BTS-470	
R12	1000Ω			BTS-1000	
R13	4700Ω			BTS-4700	
R14	180K			BTS-180K	
R15	3. 3Meg			BTS-3. 3Meg	
R16	1000Ω			BTS-1000	
R17	2200Ω			BTS-2200	Note 1
R18	470K			BTS-470K	
R19	1000Ω			BTS-1000	Note 2
R20	270Ω			BTS-270	
R21	47K			BTS-47K	
R22	1Meg			BTS-1Meg	Note 3
R23	6800Ω			BTS-6800	
R24	6800Ω			BTS-6800	
R25	1Meg			BTS-1Meg	
R26	120K			BTS-120K	
R27	10K			BTS-10K	
R28	1000Ω	1		BTA-1000	
R29	1000Ω	1		BTA-1000	
R30	100K			BTS-100K	

Note 1. Some versions may use 470Ω in this application.
Note 2. Some versions may use 220Ω in this application.
Note 3. Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC @ .270A	300VCT @ .034A	6. 3VAC @ 2. 75A		T375-1B				22R38	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA David Bogen PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Trans	U452				
L2	FM Ant. Coupling Coil	U451	19-1000	BC-561	4602	1 Microhenry
L3	RF Choke	U420	19-1001	BC-562	4604	1. 7 Microhenry
L4	FM RF Coil	U449				
L5	RF Choke	U420	19-1001	BC-562	4604	1. 7 Microhenry
L6	FM Osc. Coil	U450A				
L7	RF Choke	U420	19-1001	BC-562	4604	1. 7 Microhenry
L8	Loop Stick	B452A				
L9	RF Choke	U420	19-1001	BC-562	4604	1. 7 Microhenry
L10	RF Choke	U439	19-1001 *	BC-562 *	4604 *	1. 5 Microhenry; wound on 680Ω Resistor
L11	RF Choke	U420	19-1001	BC-562	4604	1. 7 Microhenry
L12	AM Osc. Coil	U454				
L13	RF Choke	U420	19-1001	BC-562	4604	1. 7 Microhenry
L14	1st FM IF	H458	18-3487	FM-254	1463	
L15	1st AM IF	H297	18-6758	BC-352	12-C1	
L16	2nd FM IF	H355	18-3487	FM-254	1463	
L17	2nd AM IF	H297	18-6756	BC-353	12-C2	
L18	Ratio Det.	H387	17-3496	FM-255	1465	
L19	Line Choke	U503				2 Microhenries
L20	Line Choke	U503				2 Microhenries

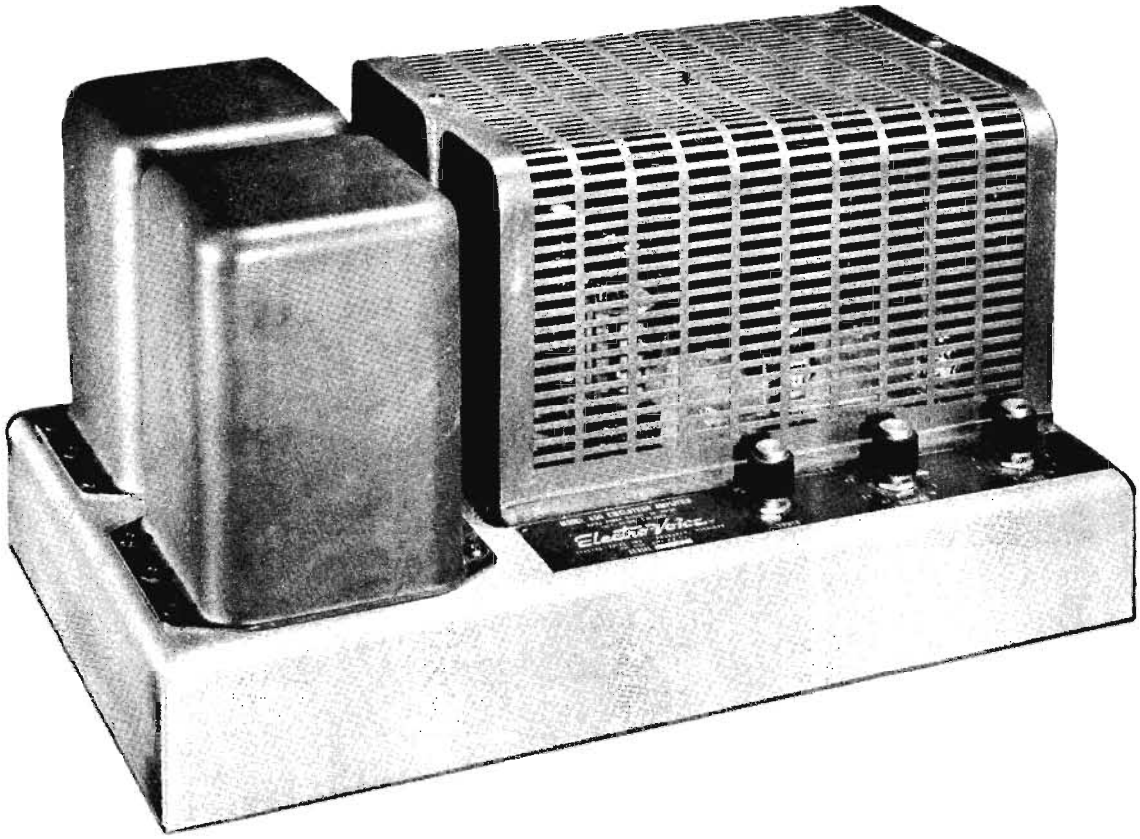
* Parallel with 680Ω Resistor

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	David Bogen PART No.	REPLACEMENT DATA
X1	Diode RF Filter	100MMF, 100MMF, 47K		Aerovox PA-97-1 Centralab PC-50 Cornell-Dubilier 1U-TM1 Erie 1403-01 Sprague D-1

MISCELLANEOUS

ITEM No.	PART NAME	David Bogen PART No.	NOTES
M1	Dial Pointer		Neon Bulb
M2	Tuning Cap	C638	4 Gang (AM Sections: Ant. 26-535MMF, Osc. 23-195MMF)
M3	Switch	8478	Selector (Rotary Wafer Type)



ELECTRO-VOICE
MODEL A50

TRADE NAME	Electro-Voice Model A50
MANUFACTURER	Electro-Voice, Inc., Buchanan, Mich.
TYPE SET	AC Operated 50 Watt Amplifier
TUBES (Six)	Types 12AX7 AF Amp.-Phase Inverter, 12BH7A Driver, (2) 6550 Output, (2) 5U4GB Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING 1.42 Amp. @ 117 Volts AC

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier-Phase Inverter	12AX7	
V2	Driver	12BH7A	
V3	Output	6550	
V4	Output	6550	
V5	Rectifier	5U4GB	
V6	Rectifier	5U4GB	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Electro-Voice PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	500	4247	AFH2-72	B053	FP288	TMD-62	D-275	R1495 *
B	▲40	500							
C2A	▲40	500	4247	AFH2-72	B053	FP288	TMD-62	D-275	R1495 *
B	▲40	500							
C3	20	450	4246	AFH1-50	A046	FP144	TM3-55	S-260	TVL-1714
C4	50	100	4242	PRS150V50	BR5015	TC49	TD-50-150	FM-1550	TVA-1414

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Electro-Voice PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	.1	200		P286N-1	DF-104	CUB2P1		PT401	2TM-P1	
C6	100			BPD-0001	DD-101	G042	801-0001	UC-531	5GA-T1	
C7	.022	400		BPD-02	DF-203	CUB4S2	617-02	PT4122	4TM-S22	
C8	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C9	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C10	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C11	.1	600		P668N-1	DF-104	CUB6P1		PT601	6TM-P1	
C12	.1	600		P668N-1	DF-104	CUB6P1		PT601	6TM-P1	
C13	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C14	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Electro-Voice PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	250K	½	J4686	B-51	A47-250K-Z	QI3-130	U44	Level
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	1Ω	2	K4686					Damping factor - wire wound
B	1600Ω	2						Damping factor - wire wound

RESISTORS

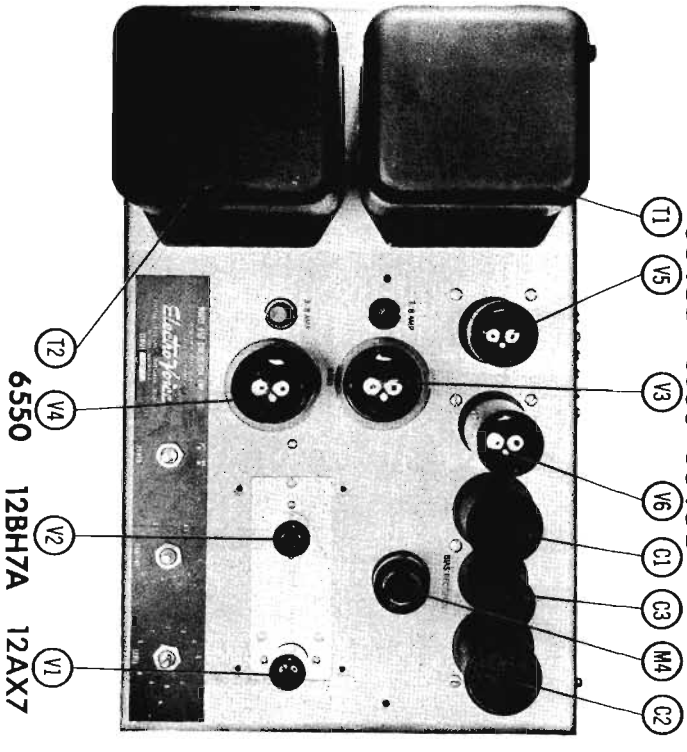
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Electro-Voice PART No.	IRC PART No.	NOTES
R3	270K		4689	BTS-270K	
R4	2.7Ω	1	4680	BW1-2.7	
R5	33K		4685	BTS-33K	
R6	1.2Meg		4658	BTS-1.2Meg	
R7	27K		4651	BTS-27K	
R8	470Ω		4654	BTS-470	
R9	27K		4651	BTS-27K	
R10	470K		4650	BTS-470K	
R11	470K		4650	BTS-470K	
R12	12K	2	4679	BTB-12K	
R13	12K	2	4679	BTB-12K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Electro-Voice PART No.	IRC PART No.	NOTES
R14	1200Ω		4658	BTS-1200	
R15	330K			BTS-330K	Note 1
R16	120Ω		4607	BTS-120	
R17	470K		4650	BTS-470K	
R18	470K		4650	BTS-470K	
R19	120Ω		4607	BTS-120	
R20	47K		4688	BTS-47K	
R21	2200Ω	2	46016	BTB-2200	
R22	2200Ω	2	46016	BTB-2200	
R23	220Ω		4664	BTS-220	
R24	56K		4652	BTS-56K	
R25	56K		4652	BTS-56K	

Note 1. Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Electro-Voice PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @1.42A	1080VCT @.057A	1080VCT @.077A	5VAC @3A	1582					
		SEC. 4	SEC. 5	SEC. 6						
		5VAC @3A	6.3VAC @4.2A	45V *						

* Bias Supply.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Electro-Voice PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1100Ω	16Ω tap @ 8Ω,4Ω	1681 ①						① Primary has taps for 70V winding.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	Electro-Voice PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.077A	94Ω	3.7 HY	1583	C5030		C-2325	20C84	
L2	.057A	94Ω	3.7 HY	1583	C5030		C-2325	20C84	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Electro-Voice PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3/8A 250V	20217		312.375 (3AG 3/8A)	342001	AGC 3/8	HKP
M2	3AG	3/8A 250V	20217		312.375 (3AG 3/8A	342001	AGC 3/8	HKP
M3	3AG	3A 125V	20144		313003. (3AG 8/B 3A)	342001	MDX3	HKP

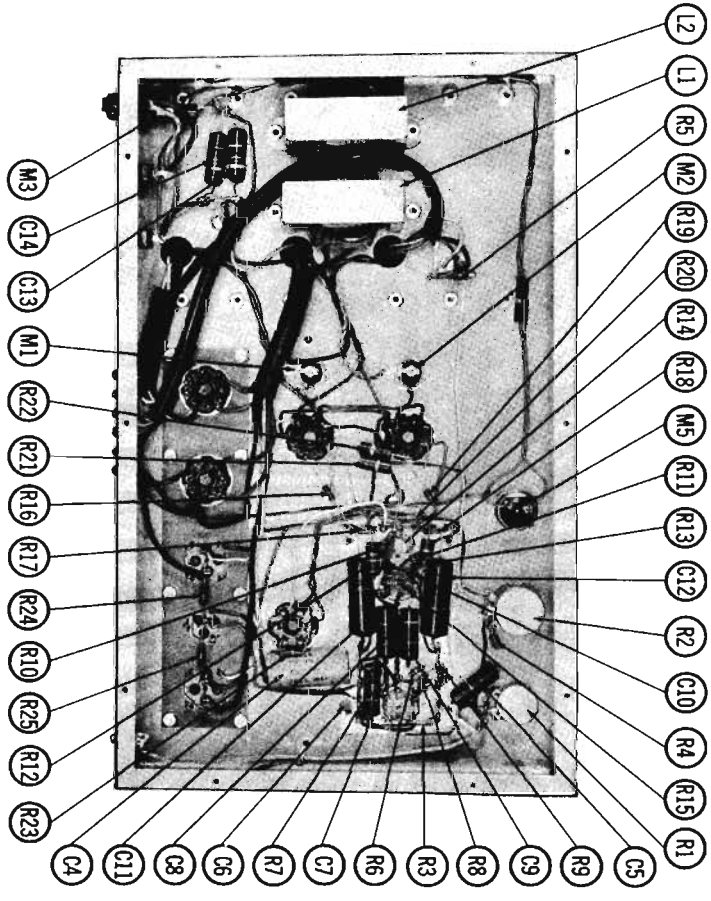
SELENIUM RECTIFIER

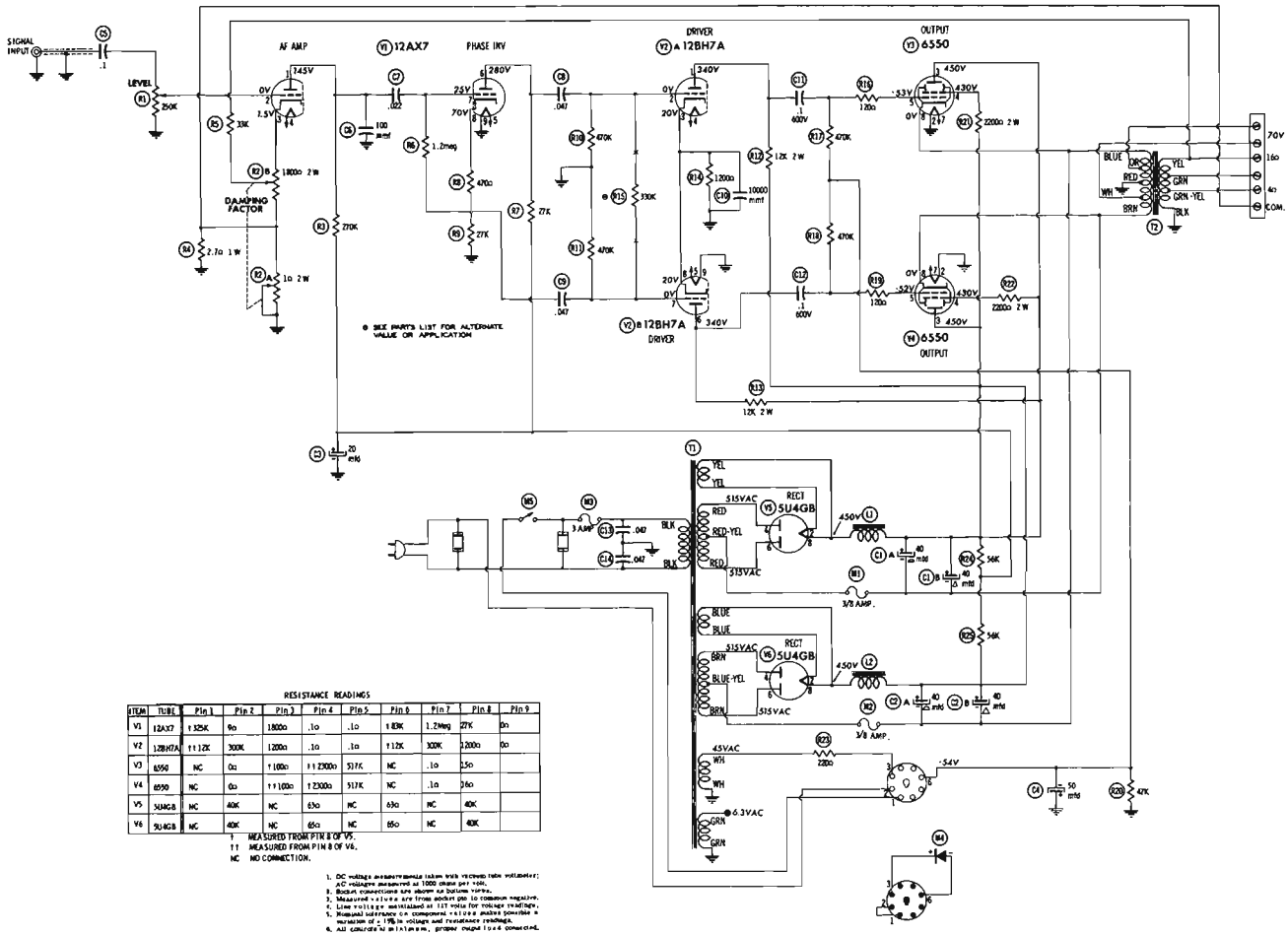
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Electro-Voice PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M4		8694	1159	CR-10	8820		10	

MISCELLANEOUS

ITEM No.	PART NAME	Electro-Voice PART No.	NOTES
M5	Switch	B5841	On-off (Power)

CHASSIS—BOTTOM VIEW





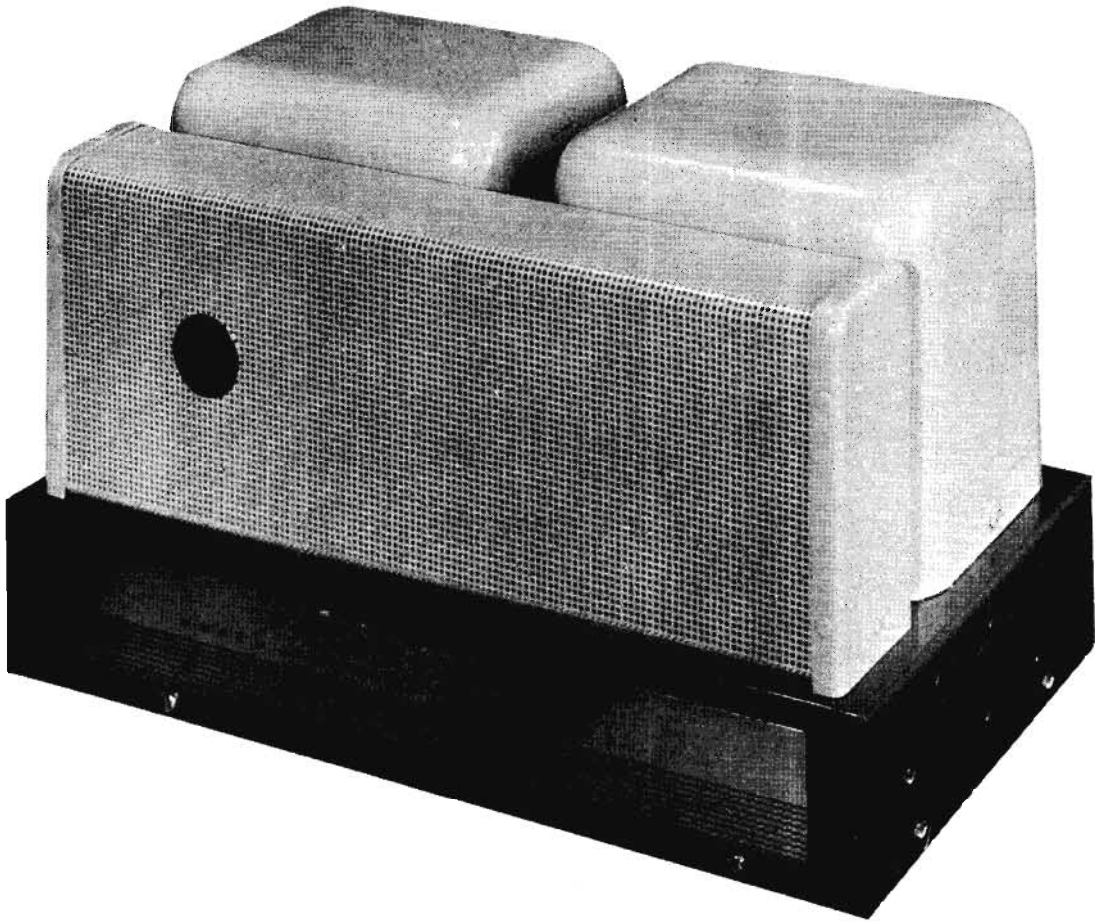
RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†325K	9Ω	1800Ω	.1Ω	.1Ω	†83K	1.2Meg	27K	0Ω
V2	12BH7A	††12K	300K	1200Ω	.1Ω	.1Ω	††12K	300K	1200Ω	0Ω
V3	6550	NC	0Ω	†100Ω	††2300Ω	517K	NC	.1Ω	250	
V4	6550	NC	0Ω	††100Ω	†2300Ω	517K	NC	.1Ω	260	
V5	5U4GB	NC	40K	NC	65Ω	NC	65Ω	NC	40K	
V6	5U4GB	NC	40K	NC	65Ω	NC	65Ω	NC	40K	

† MEASURED FROM PIN 8 OF V5.
†† MEASURED FROM PIN 8 OF V6.
NC NO CONNECTION.

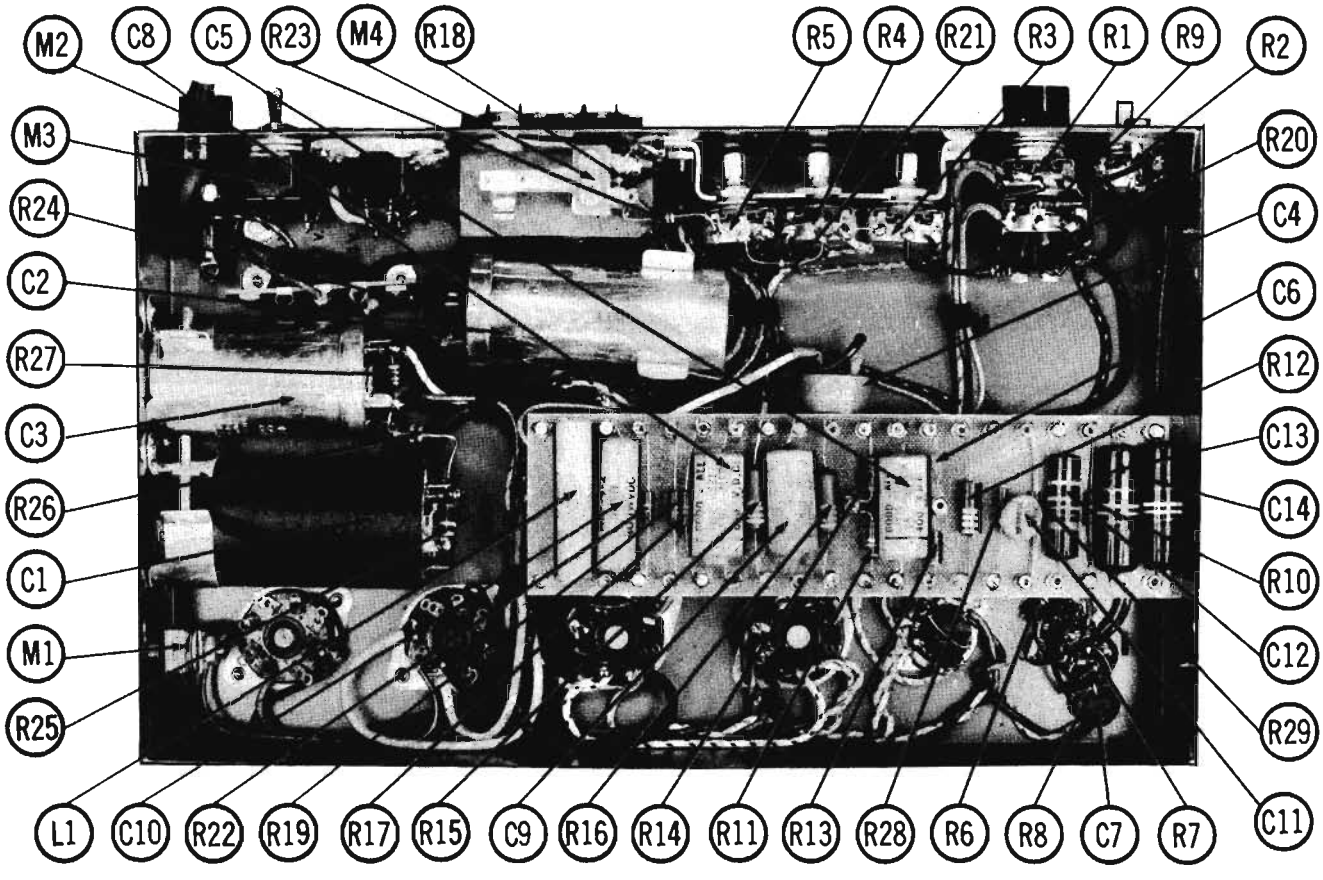
1. DC voltages measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC



FAIRCHILD
MODEL 275

TRADE NAME	Fairchild Model 275
MANUFACTURER	Fairchild Recording Equipment Co., 10-40 45th Ave., Long Island City 1, N. Y.
TYPE SET	AC Operated 65 Watt Audio Amplifier
TUBES (Six)	Types 6AB4 AF Amplifier, 12AV7 AF Amp. - Phase Inv., (2) 6550 Output, (2) 5V4G Rectifier
POWER SUPPLY	105-125 Volts AC - 50/60 Cycles RATING 1.1 Amp. @ 117 Volts AC (130 Watts)



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	6AB4	
V2	AF Amp. - Phase Inv.	12AV7	
V3	Output	8550	
V4	Output	8550	
V5	Rectifier	5V4G	
V6	Rectifier	5V4G	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	FAIRCHILD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	140	350	(Note 1)	AFH1-43-20	XA0415	FP247	TMS-62	S-230	TVL-1642
C2	140	350	(Note 2)	AFH1-43-20	XA0415	FP247	TMS-62	S-230	TVL-1642
C3A	▲40	450		AFH2-57	B0450	FP238	TMD-54	D-235	TVL-2764
B	▲40	450							
C4A	20	150		PRS150V2040	BBRD4215	TCD465	TDLD-5	FMD-302	TVA-2438
B	40	150							

Note 1. Some versions may use 90MFD in this application. Note 2. Not used in some versions.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	FAIRCHILD PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	.25	400		P488N-25		CUB4P25		GEM-4025	4TM-P25	
C6	68	1000		HVD-15-68	DD30-680	L10Q68	HD15-68	DC30468	5GA-Q68	(1)
C7	33			NP0-SI 33	TCZ-33	C10Q33C	TCO-33	ZT-5433	5TCC-Q33	(1) NP0
C8	.25	600		P688N-25		CUB6P25		GEM-6025	6TM-P25	
C9	.25	600		P888N-25		CUB8P25		GEM-6025	6TM-P25	
C10	.2	400		P488N-22		CUB4P22		GEM-402	4TM-P2	
C11	330	1000		HVD-15-330	DD30-331	L10T33	HD15-331	DC30333	5GA-T33	(2)
C12	.022	400		P488N-022	DD-203	CUB4S22	ED-02	GEM-4122	4TM-S22	(2)
C13	.012	200		P288N-015	DF-104	CUB4S1	ED-01	GEM-4112	4TM-S1	(2)
C14	.012	200		P288N-015	DF-104	CUB4S1	ED-01	GEM-4112	4TM-S1	(2)

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	FAIRCHILD PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2000Ω	½	A2206					Damping
B	500Ω	½						Damping
C	Switch							Damping
R2A	250K	½	BA2U-1760	AB-50	A47-250K-S	QU-130	U46	Gain
B	Shaft			AK-1	FKS-¼	RQ	Not Req.	
R3A	2.25Meg	½	BA2U-1759	AB-83	A47-2.5Meg-S	QU-239	U255	Current Balance
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R4A	50K	½	BA2U-1757	AB-31	A47-50K-S	QU-123	U35	Grid Balance
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R5A	5000Ω	½	BA2U-1758	AB-10	A47-5000-S	QU-114	U14	Bias Adjust
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	FAIRCHILD PART No.	NOTES
R6	150K			Note 1
R7	100K			Note 2
R8	22K			Note 3
R9	1200Ω 5%			
R10	220Ω 5%			
R11	470K			
R12	390K	1		
R13	39K			Note 3
R14	7500Ω 5%			
R15	43K 5%	1		Note 4
R16	43K 5%	1		Note 4
R17	22K 5%			
R18	3.3Ω	1		
R19	22K 5%			
R20	330K			
R21	8200Ω 5%			
R22	10K			
R23	10K			
R24	100K	1		Note 3
R25	100K	1		Note 3
R26	10K	1		
R27	47K			
R28	47K 5%			
R29	150K			Note 3

Note 1. Some versions may use 18K in this application.
Note 2. Some versions may use 270K in this application.
Note 3. Not used in some versions.
Note 4. R15 and R16 is a matched pair.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA FAIRCHILD PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ 1.1A	740VCT @ .010A Tap @ 75V @ .0035A	5VAC @ 4A	6.3VCT @ 4A	021999					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA FAIRCHILD PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	3600Ω CT	16Ω Tap @ 8Ω, 4Ω	022000						

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA FAIRCHILD PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Damping Choke					Note 1

Note 1. .7 Microhenry, wound in series on .33Ω 2W Resistor.

SELENIUM RECTIFIER

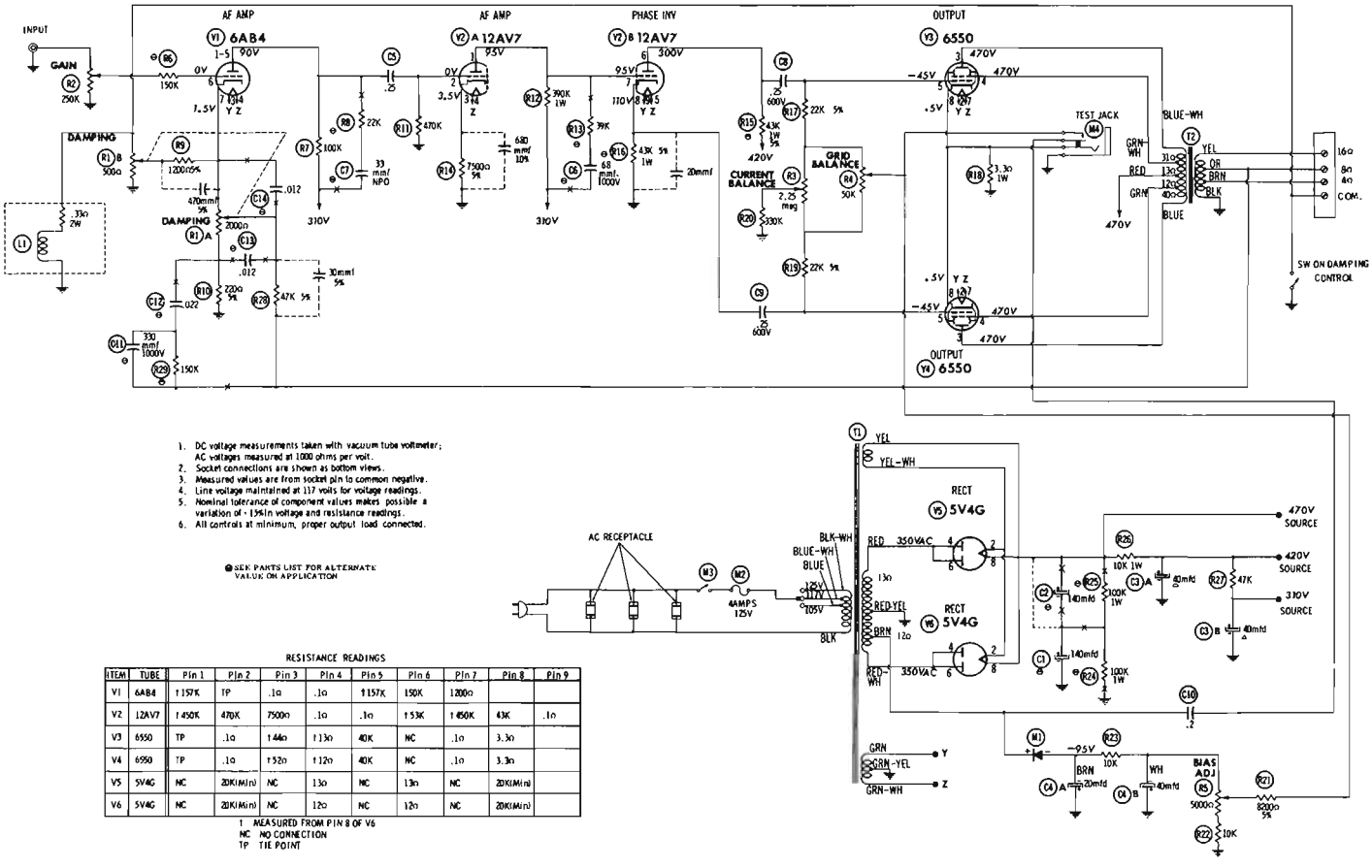
ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA FAIRCHILD PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.004A		1159	RS050	10	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA FAIRCHILD PART No. FUSE	FAIRCHILD PART No. HOLDER	UTTELFUSE PART No. FUSE	UTTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	3AG	4A 125V S/B			313004. (3AG 4A 125V) (Slo Blo)	342001	MDX4	HKP

MISCELLANEOUS

ITEM No.	PART NAME	FAIRCHILD PART No.	NOTES
M3	Switch		Power On-Off (Toggle)
M4	Test Jack		Balance Control Adjust



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

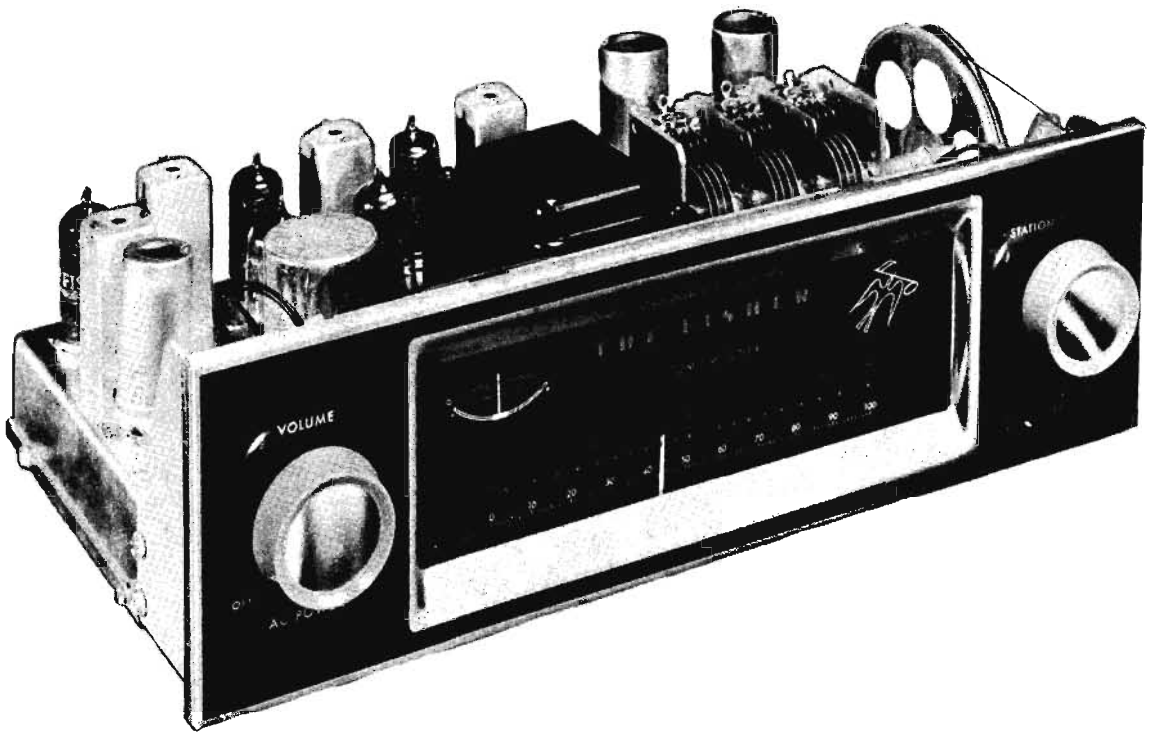
● SEE PARTS LIST FOR ALTERNATE VALUE ON APPLICATION

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AB4	†157K	TP	.1Ω	.1Ω	†157K	150K	1200Ω		
V2	12AV7	†450K	470K	7500Ω	.1Ω	.1Ω	†53K	†450K	63K	.1Ω
V3	6550	TP	.1Ω	†44Ω	†13Ω	40K	NC	.1Ω	3.3Ω	
V4	6550	TP	.1Ω	†52Ω	†12Ω	40K	NC	.1Ω	3.3Ω	
V5	5V4G	NC	20K(Min)	NC	13Ω	NC	13Ω	NC	20K(Min)	
V6	5V4G	NC	20K(Min)	NC	12Ω	NC	12Ω	NC	20K(Min)	

† MEASURED FROM PIN 8 OF V6
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

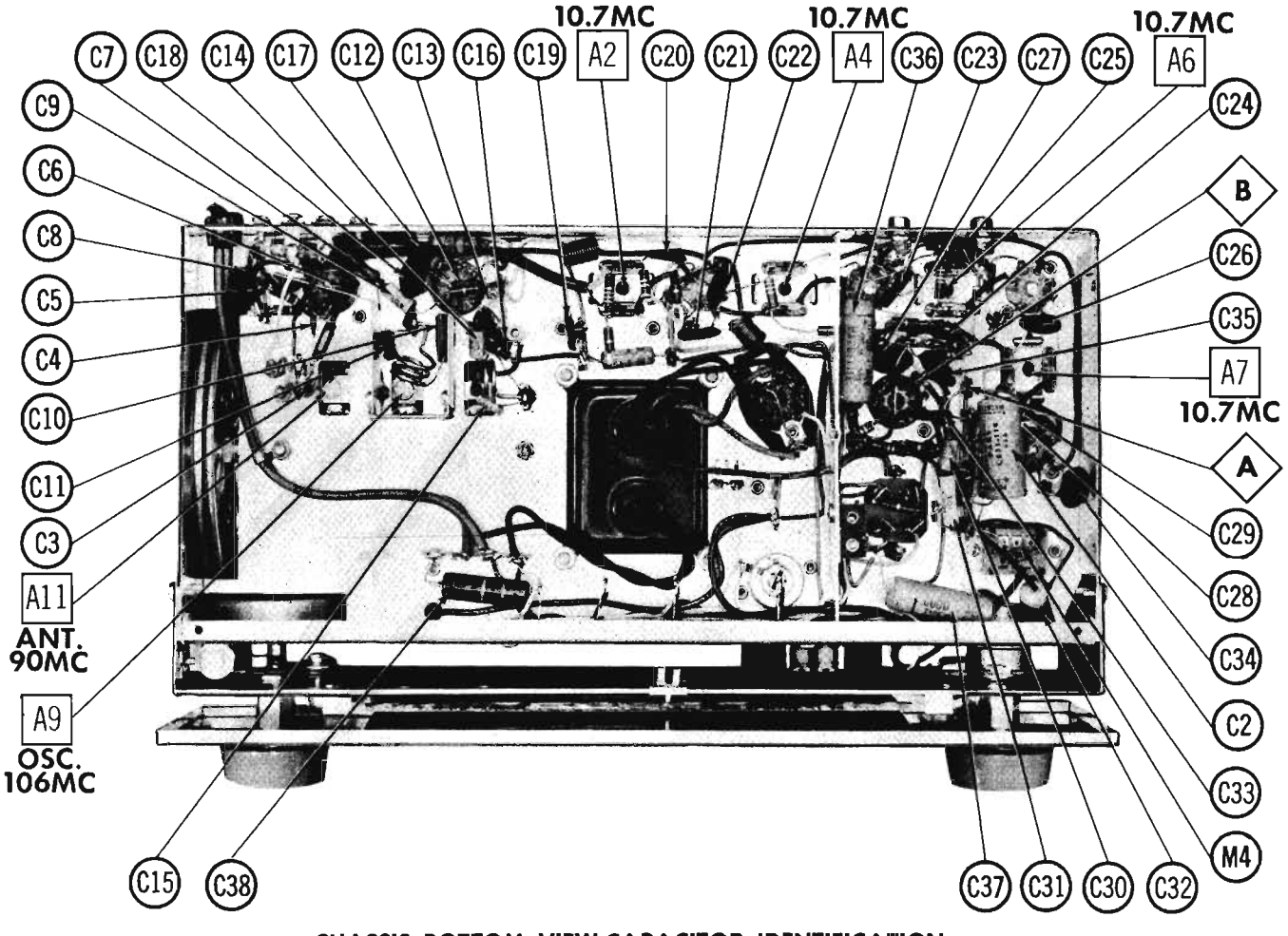


FISHER
MODEL FM-40

TRADE NAME	Fisher Model FM-40	
MANUFACTURER	Fisher Radio Corp., 21-21 44th Drive, Long Island City 1, N. Y.	
TYPE SET	AC Operated FM Tuner	
TUBES	Eight	
POWER SUPPLY	105-125 Volts AC - 50/60 Cycles	RATING . 37 Amp. @ 117 Volts AC
TUNING RANGE - FM	88MC - 108MC	

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

G619



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.		High side to ungrounded tube shield on 6U8 (V2). Low side to chassis.	10.7MC (unmod)	FM	Point of non-interference.	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4, A5, A6, A7	Adjust for maximum deflection.
2.		"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120Ω sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.		High side to ungrounded tube shield on 6U8 (V2). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference.	Vert. amp. to point Ⓐ. Low side to chassis.	A1, A2, A3, A4, A5, A6, A7	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
2.		"	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A8	Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
3.	270Ω carbon resistor	High side thru dummy to antenna terminal. Low side to chassis.	106MC	FM	106MC	DC probe to point Ⓐ. Common to chassis.	A9	Adjust for maximum deflection.
4.	"	"	90MC	"	90MC	"	L7	Adjust for maximum deflection by expanding or compressing coil turns.
5.	"	"	"	"	"	"	A10, A11	Adjust for maximum deflection.
6.	"	"	"	"	"	"	L6, L1	Adjust for maximum deflection by expanding or compressing coil turns.

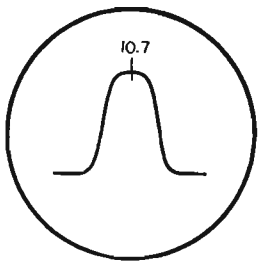


FIG. 1

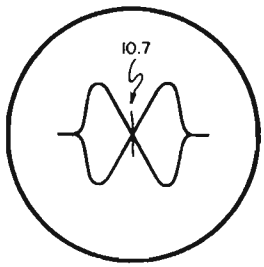
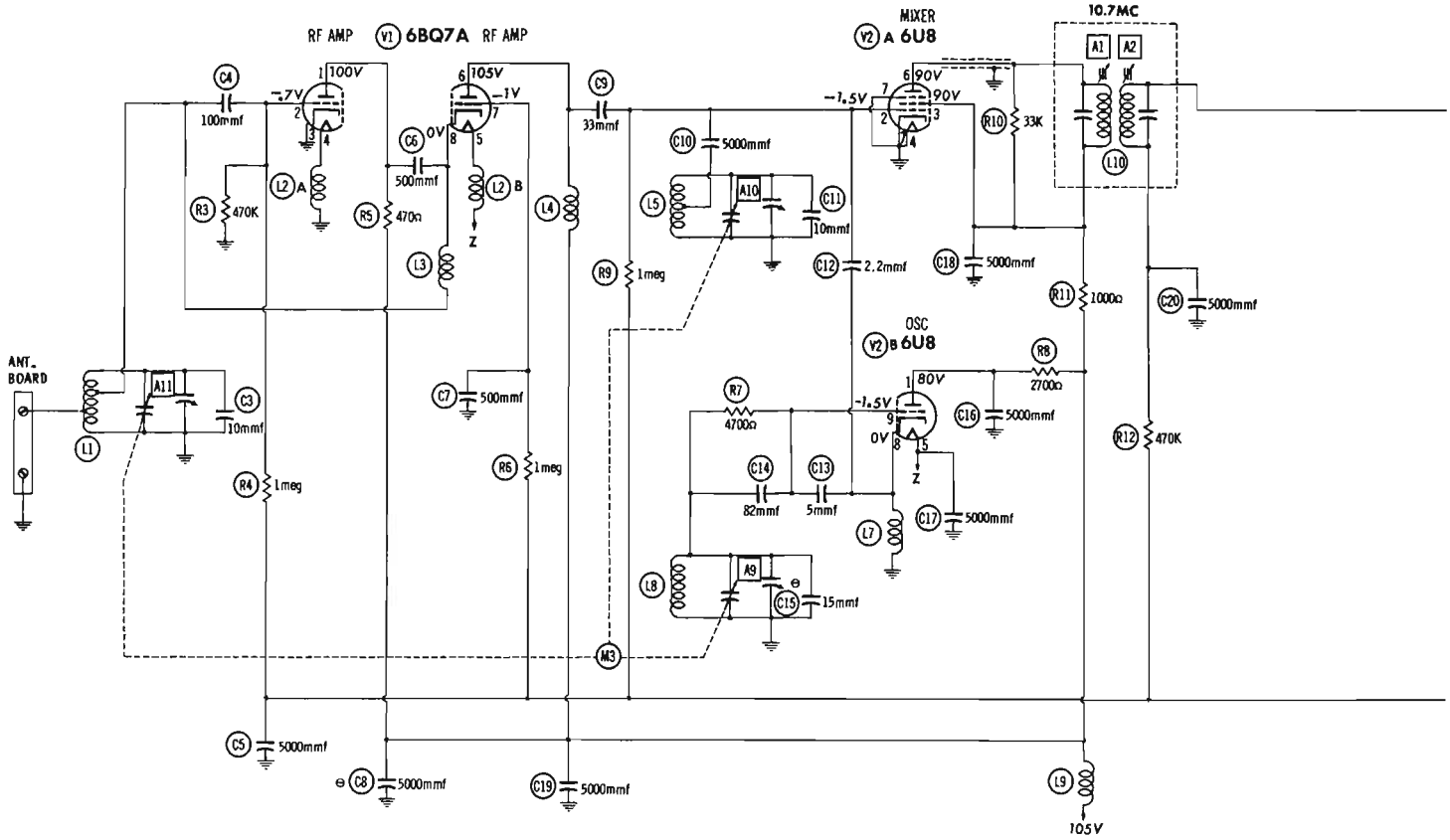
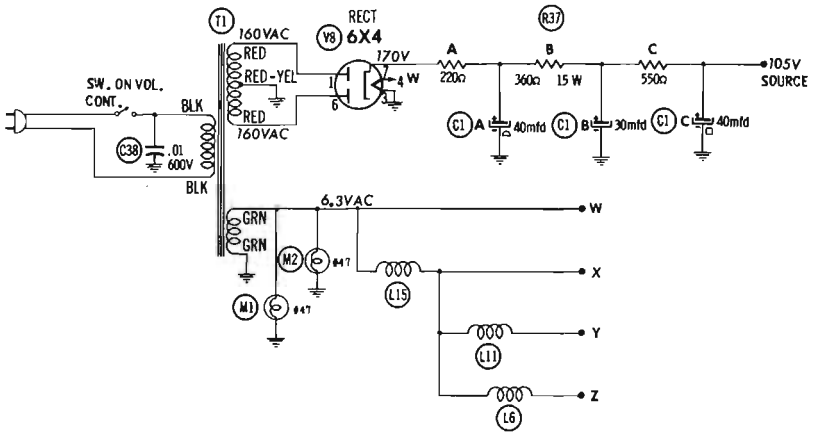


FIG. 2



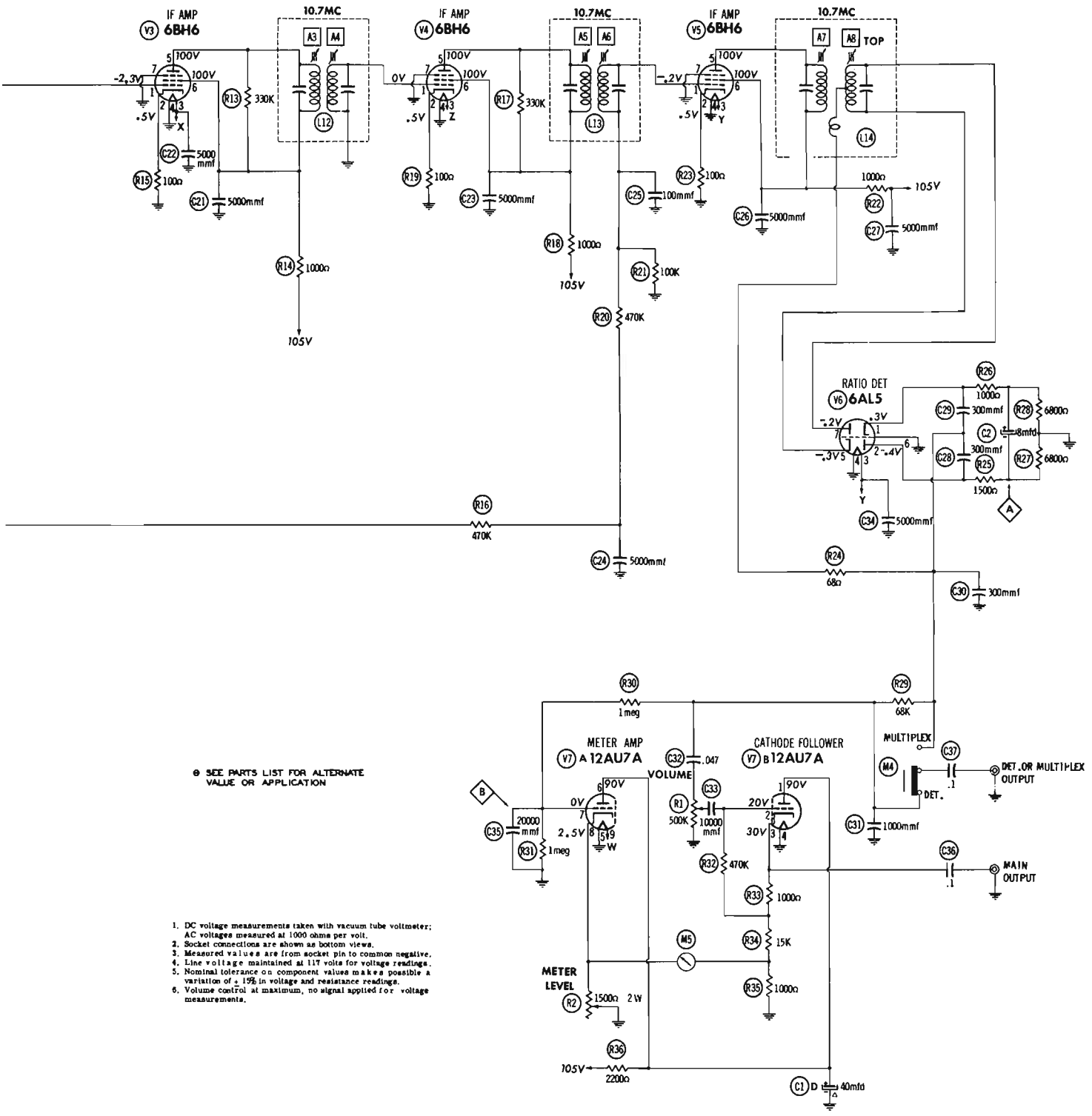


RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BQ7A	†1500Ω	400K	0Ω	.2Ω	.3Ω	†1200Ω	2Meg	.1Ω	0Ω
V2	6U8	†4000Ω	2Meg	†2000Ω	0Ω	.5Ω	†2000Ω	0Ω	2Ω	4700Ω
V3	6BH6	1Meg	100Ω	.1Ω	0Ω	†2000Ω	†2000Ω	0Ω		
V4	6BH6	.3Ω	100Ω	.1Ω	0Ω	†2000Ω	†2000Ω	0Ω		
V5	6BH6	100K	100Ω	.2Ω	0Ω	†2000Ω	†2000Ω	0Ω		
V6	6AL5	8000Ω	8000Ω	.2Ω	0Ω	2Meg	0Ω	2Meg		
V7	12AU7A	†3500Ω	500K	17K	0Ω	0Ω	†3500Ω	1Meg	300Ω	.4Ω
V8	6X4	110Ω	NC	0Ω	.1Ω	NC	110Ω	60K		

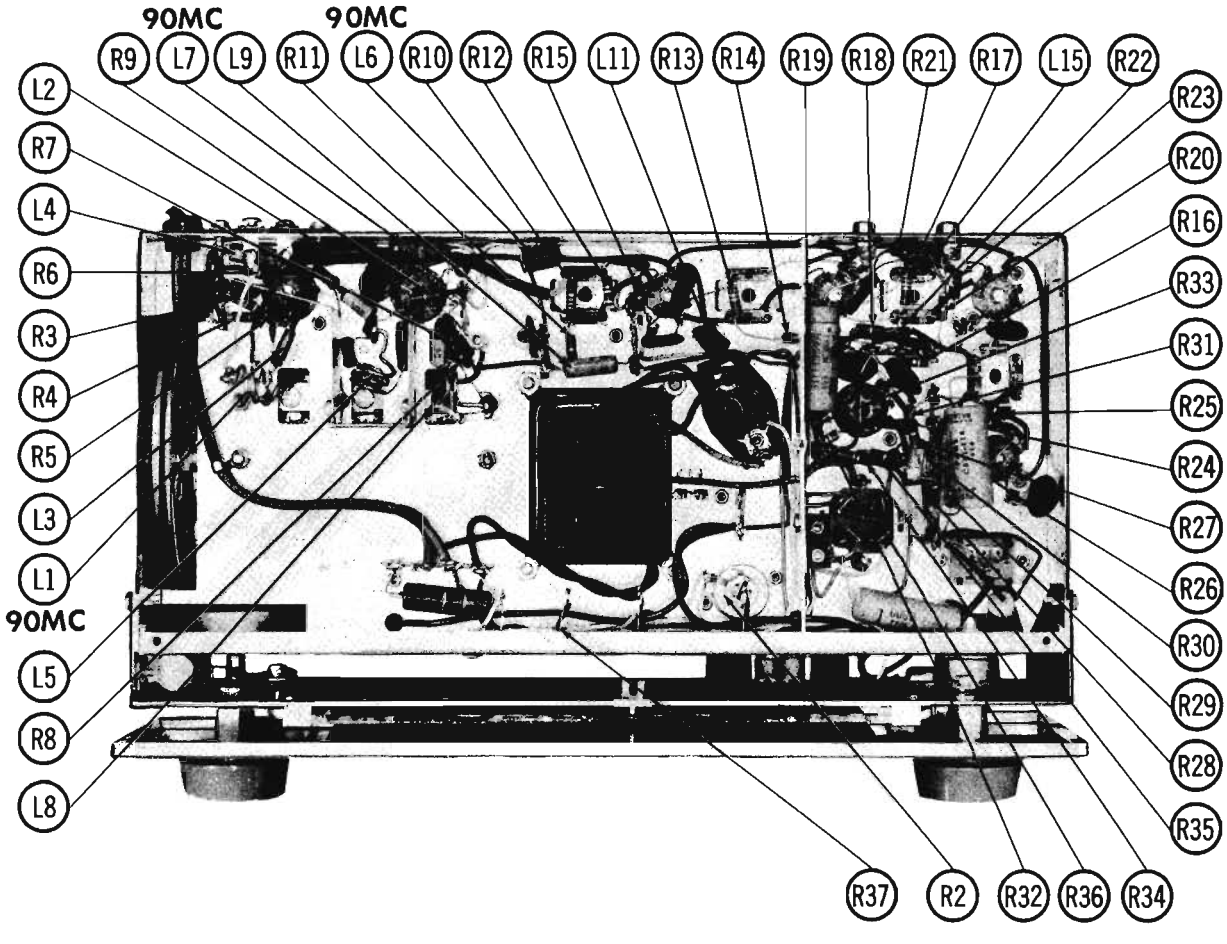
† MEASURED FROM PIN 7 OF V8.
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC



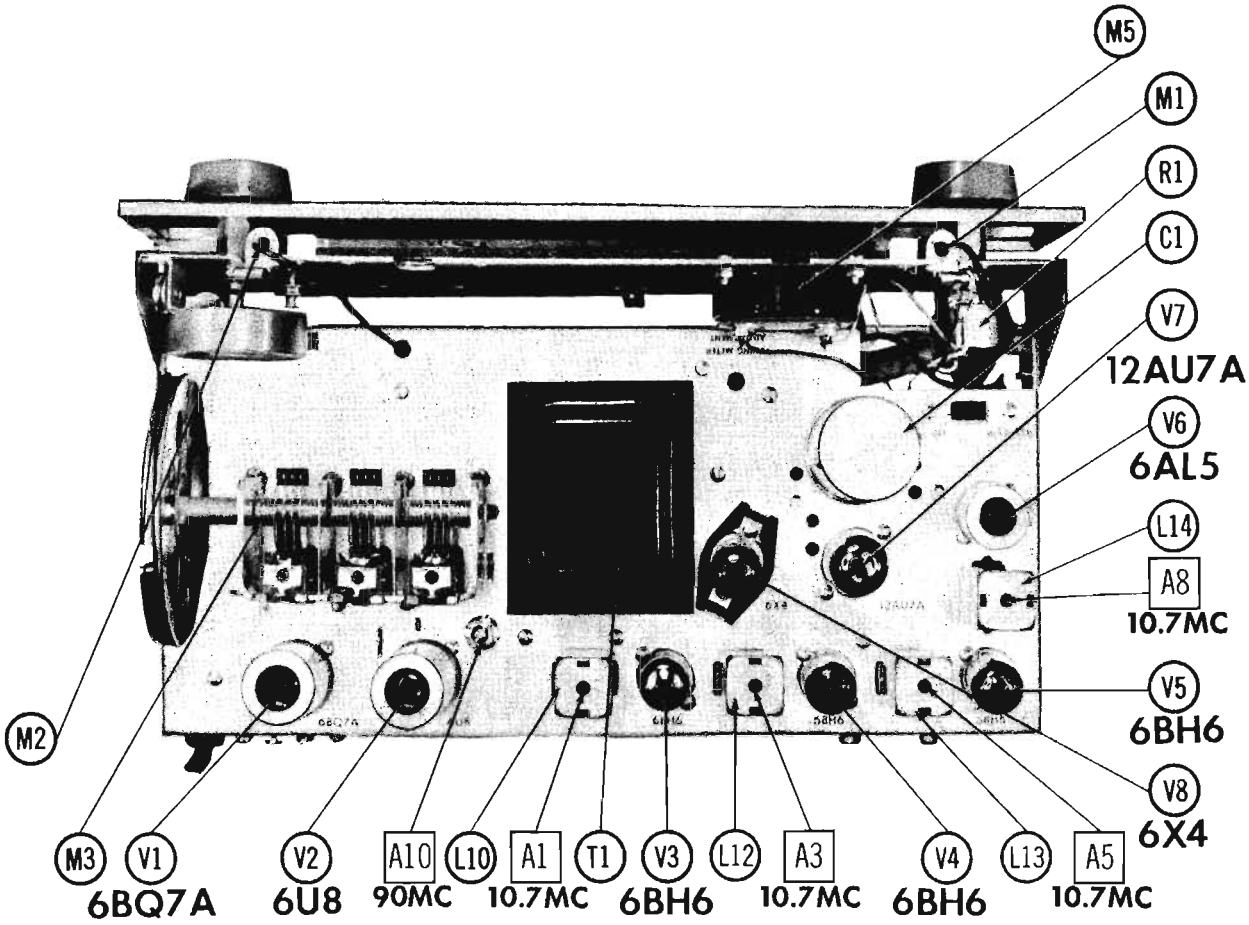
⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

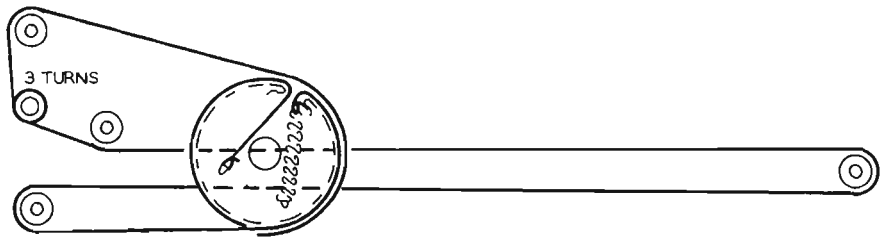
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

CHASSIS—TOP VIEW





TUNING GANG FULLY CLOSED

DIAL CORD STRINGING

PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BQ7A	
V2	Mixer-Oscillator	6U8	
V3	1st IF Amplifier	6BH6	
V4	2nd IF Amplifier	6BH6	
V5	3rd IF Amplifier	6BH6	
V6	Ratio Detector	6AL5	
V7	Meter Amplifier-Cathode Follower	12AU7A	
V8	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA FISHER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	250						T-085 MTD-4540	R2319*
B	30	200							
C	40	200							
D	40	200							
C2	8	50		PR850V10	BR105	TC32	TD-10-50	FM-0510	TVA-1304

* Non catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA FISHER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	10		CC20CH100G5	NPO-S110	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C4	100		C-577-121	DI-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C5	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC511	5HK-D5	
C6	500		C-1315	S1500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C7	500		C-1315	S1500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C8	5000		C-3336	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	Note 1
C9	33		CC21GP330M5	S133	D6-330	TP27	GP1K-330	UC-5433	5GA-Q33	
C10	5000		C-3336	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C11	10		CC20CH100G5	NPO-S110	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C12	2.2		C-3039	NPO-S12.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C13	5		CC20TJ050F5							
C14	82		CC21GP820K5	1469-000082	TCZ-82	TZ28	NP0-337-820			
C15	15									Note 2
C16	5000		C-3336							
C17	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C18	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C19	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C20	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C21	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C22	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C23	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C24	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C25	100		C-577-121	S100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C26	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C27	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C28	300		CC21GP301K5	1469-0003	D6-331	5R5T3	811-301	MCB241	MS-33	
C29	300		CC21GP301K5	1469-0003	D6-331	5R5T3	811-301	MCB241	MS-33	
C30	300		CC21GP301K5	1469-0003	D6-331	5R5T3	811-301	MCB241	MS-33	
C31	1000			1464-001		1ESD1	811-102	MCB255	MS-21	Note 3
C32	.047	200	C68P473M2	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C33	10000		CK62GP103V6	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C34	5000		CK62GP502V6	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C35	20000		C-556-122	BPD-02	DD-203	K085	817-02		5HK-S2	
C36	.1	200	C68P104M2	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C37	.1	200	C68P104M2	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C38	.01	600	C-2747	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	

Note 1: Not used in some versions.
Note 2: Some versions may use 11MMF in this application. (Part #CC20LK110K5).
Note 3: Some versions may use 1300MMF in this application. (Part #CC26GP132K5).

PARTS LIST AND DESCRIPTIONS (Continued)
CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FISHER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	1/2	R-50000-17				U48	Volume
B	Switch		Not Req.				US-26	Attach to R1A
R2	1500Ω	2	R-520-149		39-1500		FL-1.5K	Tuning Meter Level (Wire wound)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA FISHER PART No.	IRC PART No.	NOTES
R3	470K		RC20BF474K	BTS-470K	
R4	1Meg		RC20BF105K	BTS-1Meg	
R5	470Ω		RC20BF471K	BTS-470	
R6	1Meg		RC20BF105K	BTS-1Meg	
R7	4700Ω		RC20BF472K	BTS-4700	
R8	2700Ω		RC20BF272K	BTS-2700	
R9	1Meg		RC20BF105K	BTS-1Meg	
R10	33K		RC20BF333K	BTS-33K	
R11	1000Ω		RC20BF102K	BTS-1000	
R12	470K		RC20BF474K	BTS-470K	
R13	330K		RC20BF334K	BTS-330K	
R14	1000Ω		RC20BF102K	BTS-1000	
R15	100Ω		RC20BF101K	BTS-100	
R16	470K		RC20BF474K	BTS-470K	
R17	330K		RC20BF334K	BTS-330K	
R18	1000Ω		RC20BF102K	BTS-1000	
R19	100Ω		RC20BF101K	BTS-100	
R20	470K		RC20BF474K	BTS-470K	
R21	100K		RC20BF104K	BTS-100K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA FISHER PART No.	IRC PART No.	NOTES
R22	1000Ω		RC20BF102K	BTS-1000	
R23	100Ω		RC20BF101K	BTS-100	
R24	68Ω		RC20BF680K	BTS-68	
R25	1500Ω		RC20BF152K	BTS-1500	
R26	1000Ω		RC20BF102K	BTS-1000	
R27	6800Ω		RC20BF682K	BTS-6800	
R28	6800Ω		RC20BF682K	BTS-6800	
R29	68K		RC20BF683K	BTS-68K	
R30	1Meg		RC20BF105K	BTS-1Meg	
R31	1Meg		RC20BF105K	BTS-1Meg	
R32	470K		RC20BF474K	BTS-470K	
R33	1000Ω		RC20BF102K	BTS-1000	
R34	15K		RC20BF153K	BTS-15K	
R35	1000Ω		RC20BF102K	BTS-1000	
R36	2200Ω		RC20BF222K	BTS-2200	
R37A	230Ω	15	R-550-134		
B	360Ω				
C	550Ω				

TRANSFORMER (POWER)

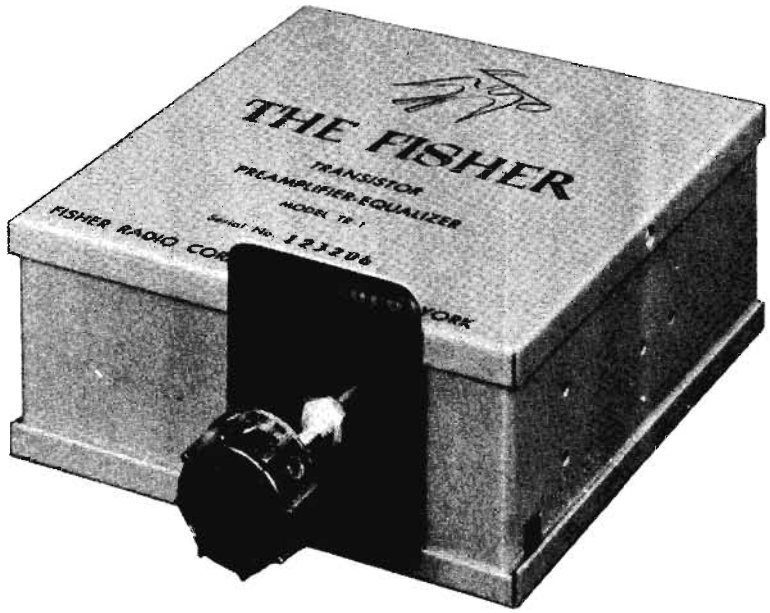
ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA FISHER PART No.	Hallidorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC @ .37A	380VCT @ .062ADC	6.3VAC @ 2.85A		T-567-111					

COILS (RF-IF)

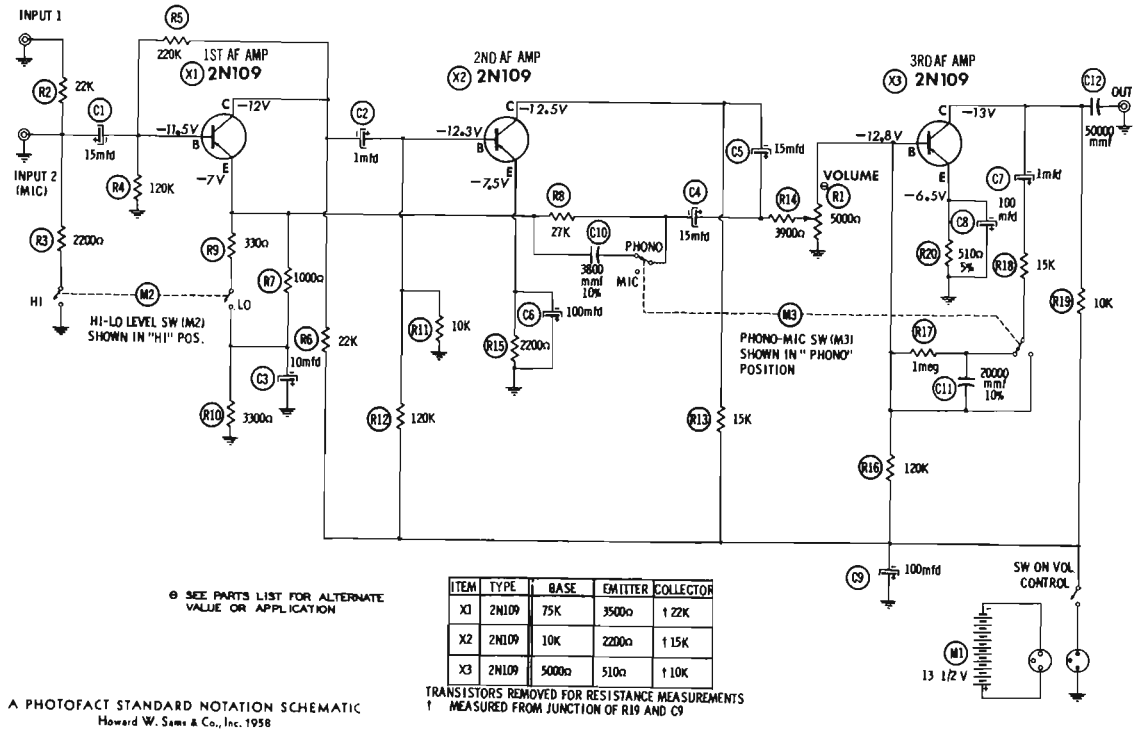
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA FISHER PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	0Ω		L-577-126				Tapped
L2A	Fil. Choke	0Ω						
B	Fil. Choke	0Ω						
L3	RF Choke	.1Ω		L-520-178	19-1002		4808	2 Microhenries
L4	RF Choke	1.8Ω		L-3352	19-1002		4606	2.2 Microhenries
L5	FM RF Coil	0Ω		L-577-127				Tapped
L6	Fil. Choke	0Ω		L-520-156	19-1000		4602	1.2 Microhenries
L7	Cathode Choke	1.8Ω		L-3352	19-1002		4606	2.2 Microhenries
L8	Osc. Coil	0Ω		L-577-128				
L9	RF Choke	1.8Ω		L-3352	19-1002		4606	2.2 Microhenries
L10	1st FM IF	.7Ω	.7Ω	ZZ-2987	18-3487	FM-254	1463	
L11	Fil. Choke	0Ω		L-520-156	19-1000		4602	1.2 Microhenries
L12	2nd FM IF	1.6Ω	.5Ω	ZZ-509-130				
L13	3rd FM IF	1.6Ω	.5Ω	ZZ-509-130				
L14	Ratio Det.	1.5Ω	.9OCT	ZZ-2986	17-3498	FM-255	1465	Tertiary winding = .4Ω
L15	Fil. Choke	0Ω		L-520-156	19-1000		4602	1.2 Microhenries

MISCELLANEOUS

ITEM No.	PART NAME	FISHER PART No.	NOTES
M1	Pilot Light	I-50009-1	#47
M2	Pilot Light	I-50009-1	#47
M3	Tuning Cap.	C577-112	3 Gang
M4	Switch	S-577-114	Detector - Multiplex (SPDT-Slide Type)
M5	Meter	M-550-132-2	Tuning Indicator



TRADE NAME	Fisher Model TR-1
MANUFACTURER	Fisher Radio Corp., 21-21 44th Drive, Long Island City 1, N. Y.
TYPE SET	Battery Operated 2 Channel Transistorized Preamplifier
POWER SUPPLY	13.5 Volts DC RATING 1.8MA @ 13.5 Volts DC



Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2N109	75K	3500Ω	† 22K
X2	2N109	10K	2200Ω	† 15K
X3	2N109	5000Ω	510Ω	† 10K

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS
† MEASURED FROM JUNCTION OF R19 AND C9

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

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PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N109	1st AF Amplifier	2N180	2N360	2N35	
X2	2N109	2nd AF Amplifier	2N180	2N360	2N35	
X3	2N109	3rd AF Amplifier	2N180	2N360	2N35	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	FISHER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	15	6	C-50051-3	PWE6015	NL15-6	TT6X15	ML20-6		TE-1089
C2	1	25	C-50051-1	PWE25001			ML1-25		R2581 *
C3	10	3	C-50051-2	PWE3010	NL10-3	TT3X10	ML10-6		TE-1053
C4	15	6	C-50051-3	PWE6015	NL15-6	TT6X15	ML20-6		TE-1089
C5	15	12	C-50051-4	XPP-12015	NL15-25	TT25X15	ML20-15		TE-1205
C6	100	3	C-50051-5	PWE3100	NL100-6	TT6X100	ML100-3		TE-1102
C7	1	25	C-50051-1	PWE25001			ML1-25		R2581 *
C8	100	3	C-50051-5	PWE3100	NL100-6	TT6X100	ML100-3		TE-1102
C9	100	15	C-584-121	PWE25100	BBR100-15				TE-1162

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	FISHER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C10	3800		C-584-115							10%
C11	20000		C-584-116							10%
C12	50000		C-558-122	BPD-05					TG-850	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	FISHER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	584-131					Volume & Switch ①

① Part #R584-111 may be used in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

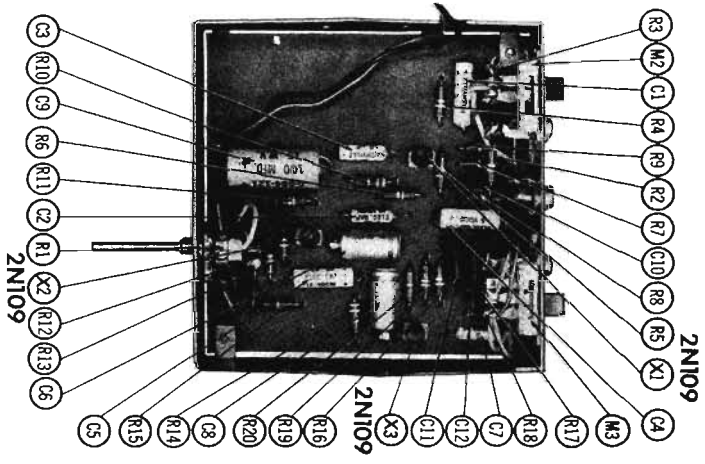
ITEM No.	RATING		FISHER PART No.	NOTES
	OHMS	WATT		
R2	22K		RC-20BF223K	
R3	2200Ω		RC-20BF222K	
R4	120K		RC-20BF124K	
R5	220K		RC-20BF224K	
R6	22K		RC-20BF223K	
R7	1000Ω		RC-20BF102K	
R8	27K		RC-20BF273K	
R9	330Ω		RC-20BF331K	
R10	3300Ω		RC-20BF332K	

ITEM No.	RATING		FISHER PART No.	NOTES
	OHMS	WATT		
R11	10K		RC-20BF103K	
R12	120K		RC-20BF124K	
R13	15K		RC-20BF153K	
R14	3900Ω		RC-20BF392K	
R15	2200Ω		RC-20BF222K	
R16	120K		RC-20BF124K	
R17	1meg		RC-20BF105K	
R18	15K		RC-20BF153K	
R19	10K		RC-20BF103K	
R20	510Ω 5%		R-20BF510J	

BATTERIES

ITEM No.	VOLTAGE	FISHER PART No.	REPLACEMENT DATA								NOTES
			BURGESS		EVEREADY		MALLORY		RAY-O-VAC		
			"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	
M1	13.5V			XX9		239		M-1900		1900	

CHASSIS—TOP VIEW



MISCELLANEOUS

ITEM No.	PART NAME	FISHER PART No.	NOTES
M2	Switch	S-584-112	Hi-Lo Level (Slide Type DPST)
M3	Switch	S-505-117	Phono-Mic (Slide Type DPDT)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	E-584-119	On-Off-Volume

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

GROMMES
MODEL 10PG

TRADE NAME	Grommes Model 10PG
MANUFACTURER	Precision Electronics, Inc., 9101 King Ave., Franklin Park, Illinois
TYPE SET	AC Operated 6 Channel 10 Watt Audio Amplifier
TUBES (Six)	Types 12AX7 Phono Preamplifier, 12AX7 AF Amplifier, 12AX7 AF Amp.-Phase Inverter, (2) 6V6GT Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-50/60 Cycles RATING .60 Amp @ 117 Volts AC (60 Watts)

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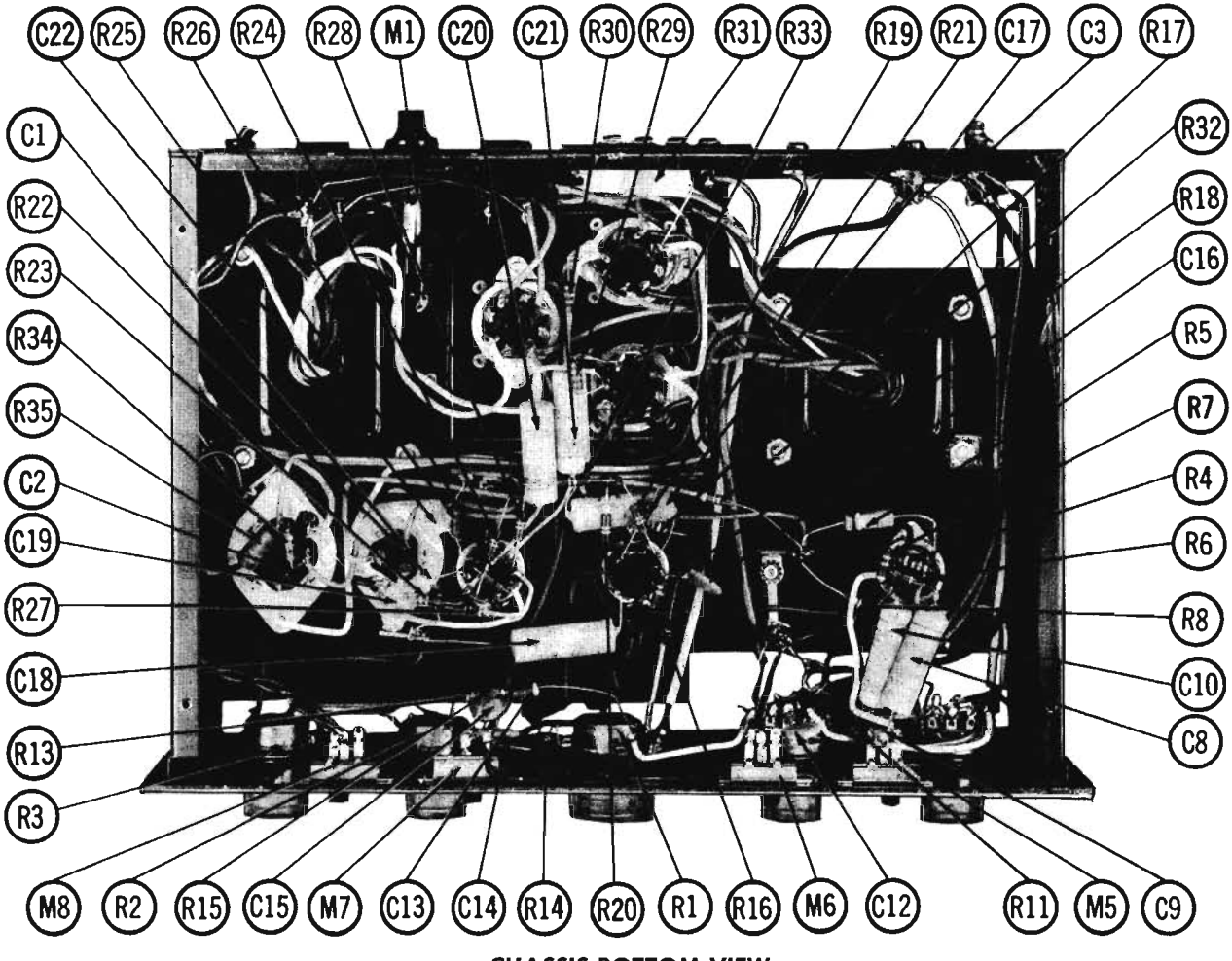


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Phono Preamplifier	12AX7	
V2	AF Amplifier	12AX7	
V3	AF Amp. - Phase Inv.	12AX7	

ITEM No.	USE	TYPE	NOTES
V4	Output	6V6GT	
V5	Output	6V6GT	
V6	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA GROMMES PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▫40	400		AFH4-117-48		FP367.5 TC62		Q-250 MTD-4510	R2519 *
B	▫30	350							
C	▲10	300							
D	20	25							
C2A	▫10	250		AFH3-86-90	B0200 BBR100-15	FP231 TC2501		T-378 MT-02100	R2518 *
B	▲10	250							
C	100	15							

* Non Catalog Item

FIXED CAPACITORS

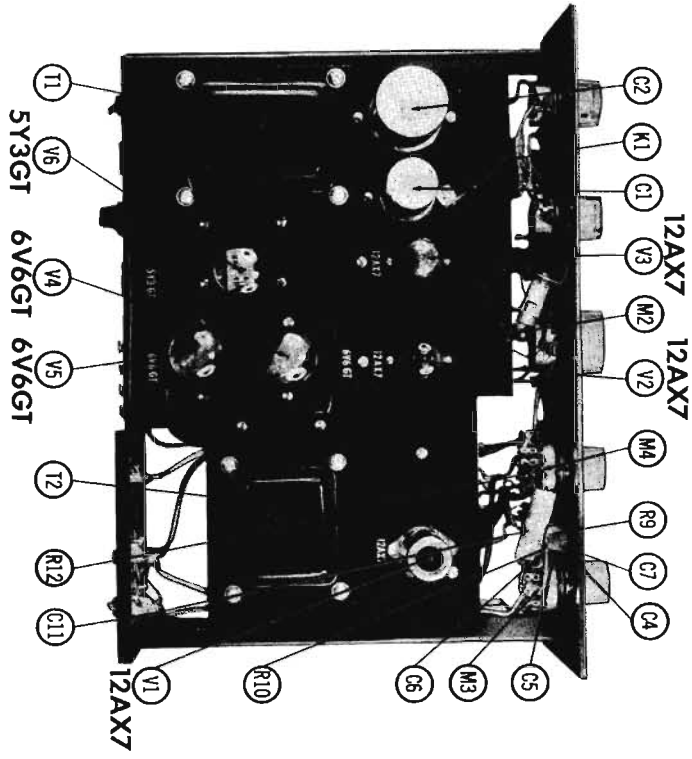
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

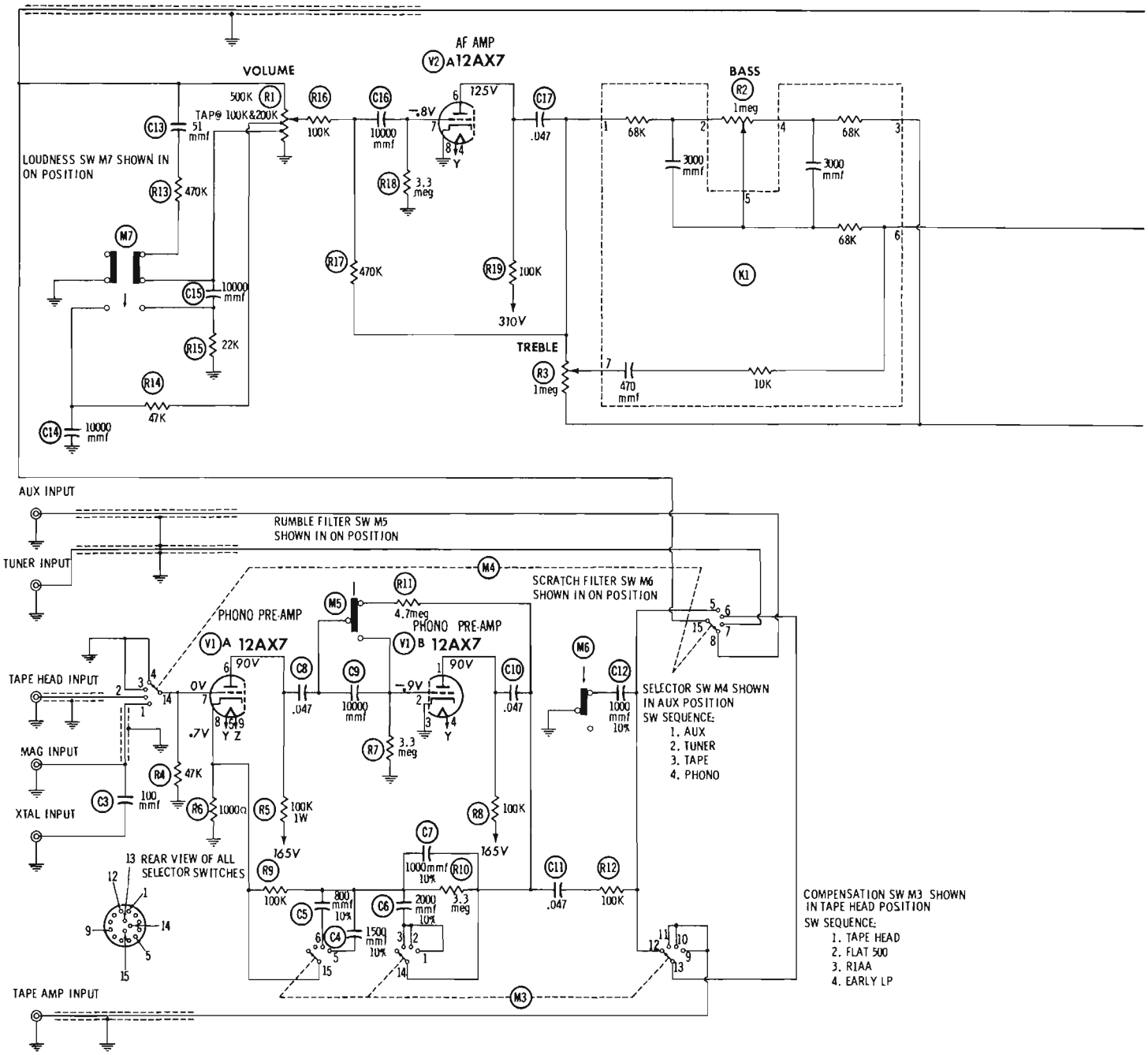
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA GROMMES PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	100			SI 100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C4	1500									10%
C5	800									10%
C6	2000									10%
C7	1000						ED-1000			10%
C8	.047	400		P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C9	30000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C10	.047	400		P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C11	.047	400		P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C12	1000						ED-1000			10%
C13	51					L10Q51				
C14	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C15	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C16	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C17	.047	400		P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C18	.047	400		P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C19	250				D6-251	L10T25	ED-250			10%
C20	.047	400		P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C21	.047	400		P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C22	1000						ED-1000			10%

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA GROMMES PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500K	½	M1C500K2T	BT-160		Q16-133XX	UDT-283	Volume, Tap @ 100K & 200K
R3A	1Meg	½	MTC-1M	B-69	A47-1Meg-S	Q11-137	U54	Bass
B	Shaft			Not Req.	RS-3	Not Req.	Not Req.	
R3A	1Meg	½	MTC-1M	B-69	A47-1Meg-S	Q11-137	U54	Treble
B	Shaft			Not Req.	RS-3	Not Req.	Not Req.	

CHASSIS—TOP VIEW

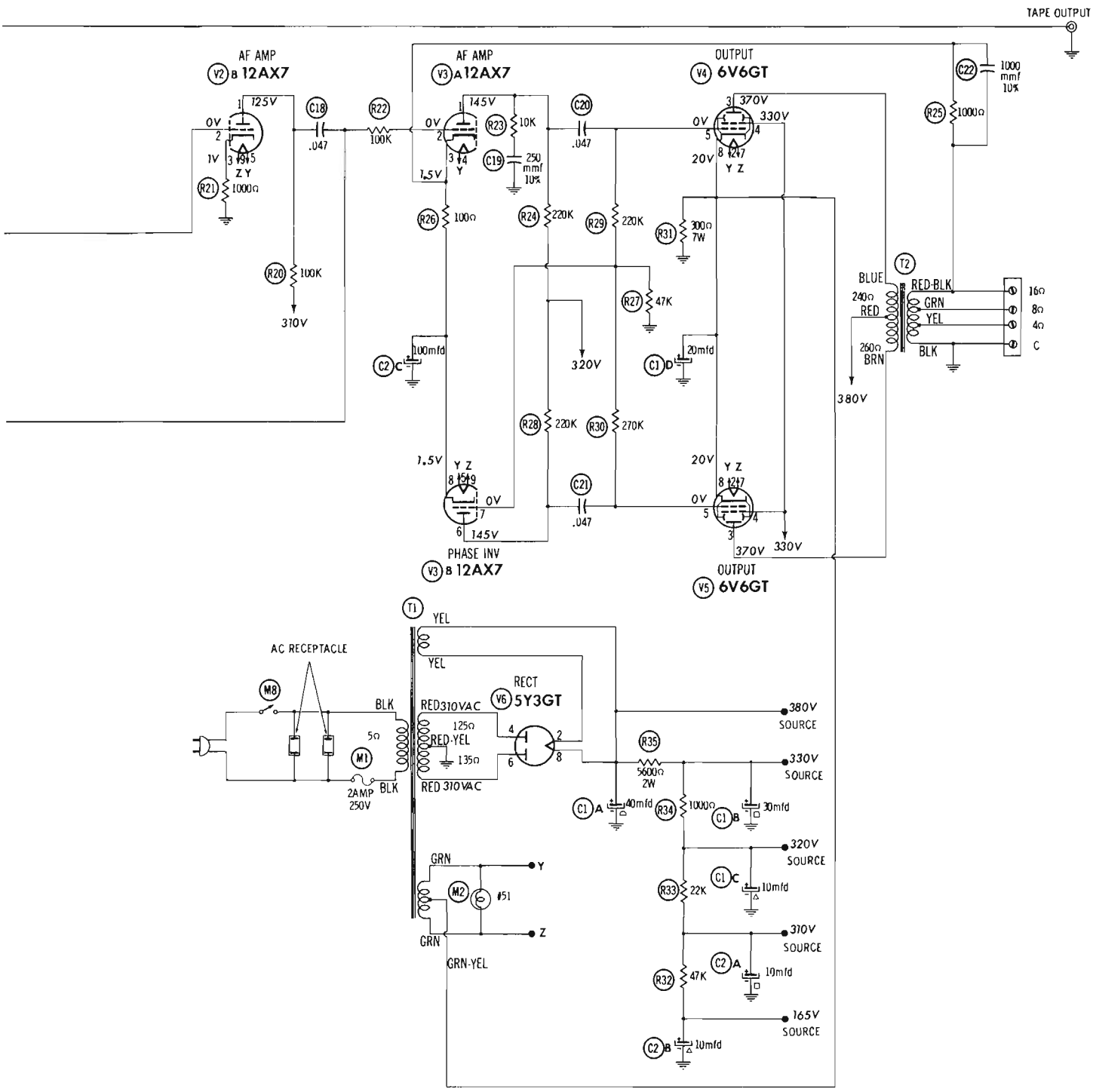




RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†175K	3.3Meg	0Ω	300Ω	300Ω	†175K	47K	1000Ω	300Ω
V2	12AX7	†128K	1.1Meg	1000Ω	300Ω	300Ω	†128K	3.3Meg	0Ω	300Ω
V3	12AX7	†225K	1.2Meg	1000Ω	300Ω	300Ω	†225K	47K	1100Ω	300Ω
V4	6V6GT	NC	300Ω	†240Ω	†5600Ω	265K	TP	300Ω	300Ω	
V5	6V6GT	NC	300Ω	†260Ω	†5600Ω	315K	NC	300Ω	300Ω	
V6	5Y3GT	NC	20K(Min)	NC	125Ω	NC	135Ω	NC	20K(Min)	

ALL MEASUREMENTS TAKEN IN "TAPE HEAD" POSITION
† MEASURED FROM PIN 8 OF V6
NC NO CONNECTION
TP TIE POINT



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	GROMMES PART No.	NOTES
R4	47K	1		
R5	100K			
R6	1000Ω			
R7	3.3Meg			
R8	100K			
R9	100K			
R10	3.3Meg			
R11	4.7Meg			
R12	100K			
R13	470K			
R14	47K			
R15	22K			
R16	100K			
R17	470K			
R18	3.3Meg			
R19	100K			

ITEM No.	RATING OHMS	RATING WATT	GROMMES PART No.	NOTES
R20	100K			
R21	1000Ω			
R22	100K			
R23	10K			
R24	220K			
R25	1000Ω			
R26	100Ω			
R27	47K			
R28	220K			
R29	220K			
R30	270K			
R31	300Ω	7		
R32	47K			
R33	22K			
R34	1000Ω			
R35	5600Ω	2		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .6A	870VCT @ .072A	5VAC @ 2A	6.3VCT @ 1.9A	TP-2L	P9307	P-2952	PM8409	24R02	R-11B

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	7400Ω CT	16Ω Tap @ 8Ω, 4Ω	T0-11L						

PARTS LIST AND DESCRIPTIONS (Continued)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	GROMMES PART No.	REPLACEMENT DATA
X1	Audio Coup. Net.	3000MMF, 3000MMF, 470MMF, 68K, 68K, 68K, 10K	819LB	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA GROMMES PART No. FUSE	GROMMES PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	2A 250V			312002. (3AG 2A)	342001	AGC2	HKP

MISCELLANEOUS

ITEM No.	PART NAME	GROMMES PART No.	NOTES
M2	Pilot Lamp		#51
M3	Switch		Compensator (Rotary Wafer Type)
M4	Switch		Selector (Rotary Wafer Type)
M5	Switch		Rumble Filter (Slide Type SPST)
M6	Switch		Scratch Filter (Slide Type SPST)
M7	Switch		Loudness (Slide Type DPST)
M8	Switch		On-Off (Slide Type SPST)

HARMAN-KARDON MODEL C300

HARMAN-KARDON
MODEL C300

TRADE NAME	Harman-Kardon Model C300
MANUFACTURER	Harman-Kardon, Inc., 520 Main St., Westbury, L. L, N. Y.
TYPE SET	AC Operated Audio Amplifier
TUBES (Eight)	Types 12AT7 Preamplifier, 12AT7 AF Amplifier, 12AT7 AF Amp-Phase Inverter, 12AU7 Driver, (2) 5881 Output, (2) 5Y3GT Rectifier
POWER SUPPLY	105-125 Volts AC - 60 Cycles RATING 1.03 Amp. @ 117 Volts AC

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G496

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	12AT7	
V2	AF Amplifier	12AT7	
V3	AF Amp. -Phase Inv.	12AT7	
V4	Driver	12AU7	

ITEM No.	USE	TYPE	NOTES
V5	Output	5881	
V6	Output	5881	
V7	Rectifier	5Y3GT	
V8	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	40	500	JE371201	AFH2-89	B050	FP474	TMD-61	S-300	TVL-1820
C2A	±20	450	JE371048		C159	FP437	TMD-77	D-370	R2288*
B	±20	450					TD-20-450	FM-4520	
C	±100	100							
C3A	±20	450	JE371047	AFH2-89	B050	FP434	TMD-61	Q-030	TVL-4750
B	±20	450							
C4A	250	50	JE371049						R2289*
B	250	50							

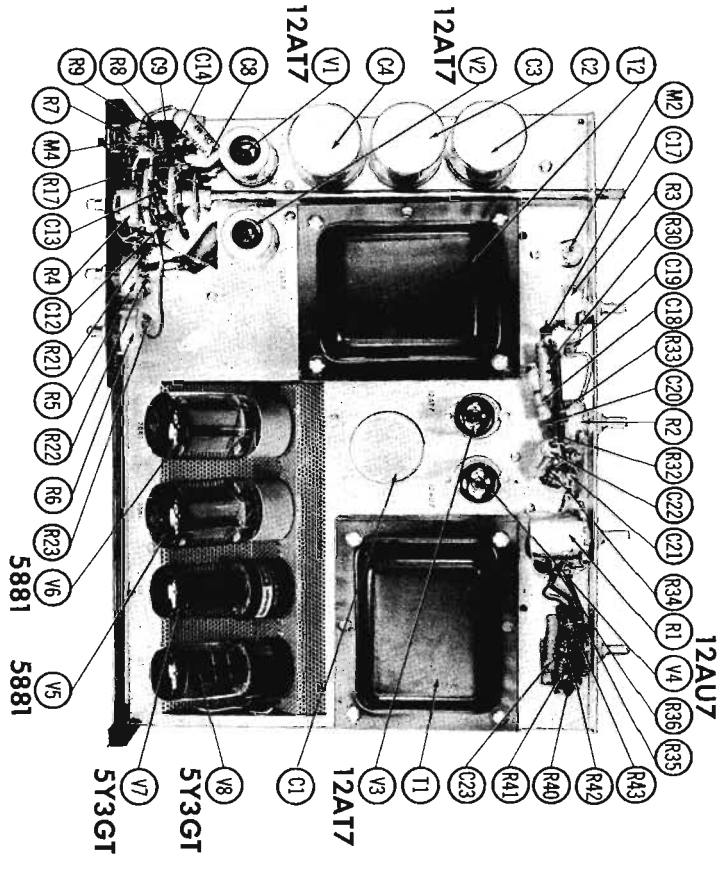
* Non catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	.05	200		BPD-05	DF-503	CUB285		PT415	2TM-S5	
C6	4700			SI4700	D6-472	TP63	GP2-333-472	UC-5247	5GA-D47	
C7	4700			SI4700	D6-472	TP63	GP2-333-472	UC-5247	5GA-D47	
C8	.05	200		BPD-05	DF-503	CUB285		PT415	2TM-S5	
C9	.05	200		BPD-05	DF-503	CUB285		PT415	2TM-S5	
C10	1000			SI1000	D6-102	TP52	GP2L-102	UC-521	5GA-D1	
C11	1000			SI1000	D6-102	TP52	GP2L-102	UC-521	5GA-D1	
C12	1000			SI1000	D6-102	TP52	GP2L-102	UC-521	5GA-D1	
C13	2200			SI2200	D6-222	TP57	GP2-333-222	UC-5222	5GA-D22	
C14	270			SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C15	.05	400		BPD-05	DF-503	CUB485		PT415	4TM-S5	
C16	.05	400		BPD-05	DF-503	CUB485		PT415	4TM-S5	
C17	10000			SI10000	D6-103	TP67	GP2-333-103	DC511	5HK-S1	
C18	10000			SI10000	D6-103	TP67	GP2-333-103	DC511	5HK-S1	
C19	270			SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C20	4700			SI4700	D6-472	TP63	GP2-333-472	UC-5247	5GA-D47	
C21	2200			SI2200	D6-222	TP57	GP2-333-222	UC-5222	5GA-D22	
C22	.02	200		BPD-02	DF-203	CUB2S2	817-02	PT412	2TM-S2	
C23	10000			SI10000	D6-103	TP67	GP2-333-103	DC511	5HK-S1	
C24	.02	200		BPD-02	DF-203	CUB2S2	817-02	PT412	2TM-S2	
C25	10			BPD-00001	DD-100	G018	831-100	UC-541	5GA-Q1	
C26	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C27	.25	400		P488N-25		CUB4P25		PT4025	4TM-P25	
C28	.25	400		P488N-25		CUB4P25		PT4025	4TM-P25	
C29	.05	400		BPD-05	DF-503	CUB485		PT415	4TM-S5	
C30	.05	400		BPD-05	DF-503	CUB485		PT415	4TM-S5	
C31	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C32	47			BPD-000047	DD-470	G033	831-470	UC-5447	5GA-Q47	
C33	.05	600		BPD-05	DF-503	CUB685		PT615	6TM-S5	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Harman-Kardon PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	RV371191					Loudness & Switch-Tap ⓐ 350K & 700K
R2A	1Meg	½	RV371190	AB-70	A47-1Meg-Z	Q13-137	U53	Bass
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A
R3A	1Meg	½	RV371190	AB-70	A47-1Meg-Z	Q13-137	U53	Treble
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R3A
R4A	500K	½	RV371031	AB-59	A47-500K-S	Q11-133	U50	Tuner Level
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R4A
R5A	500K	½	RV371031	AB-59	A47-500K-S	Q11-133	U50	Aux. 1 Level
B	Shaft		Not Req.	AK-4	FKS-½	Not Req.	Not Req.	Attach to R5A
R6A	500K	½	RV371031	AB-59	A47-500K-S	Q11-133	U50	Aux. 2 Level
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R6A

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Harman-Kardon PART No.	IRC PART No.	
R7	220K			BTS-220K	
R8	27K			BTS-27K	
R9	180K			BTS-180K	
R10	47K			BTS-47K	
R11	270K			BTS-270K	Note 1
R12	470Ω			BTS-470	Note 2
R13	1Meg			BTS-1Meg	
R14	270K			BTS-270K	
R15	1000Ω			BTS-1000	Note 3
R16	68K			BTS-68K	
R17	33K			BTS-33K	Note 4
R18	470K			BTS-470K	
R19	270K			BTS-270K	
R20	33K			BTS-33K	
R21	24K 5%			BTS-24K 5%	Note 5
R22	24K 5%			BTS-24K 5%	Note 5
R23	24K 5%			BTS-24K 5%	Note 5
R24	2.2Meg			BTS-2.2Meg	
R25	470K			BTS-470K	
R26	4700Ω			BTS-4700	
R27	470K			BTS-470K	
R28	150K			BTS-150K	
R29	390Ω			BTS-390	
R30	1Meg			BTS-1Meg	
R31	100K			BTS-100K	
R32	100K			BTS-100K	
R33	10K			BTS-10K	
R34	27K			BTS-27K	Note 5
R35	68K			BTS-68K	
R36	27K			BTS-27K	Note 5
R37	10K			BTS-10K	
R38	10K	2		BTB-10K	
R39	100K			BTS-100K	
R40	27K			BTS-27K	
R41	47K			BTS-47K	

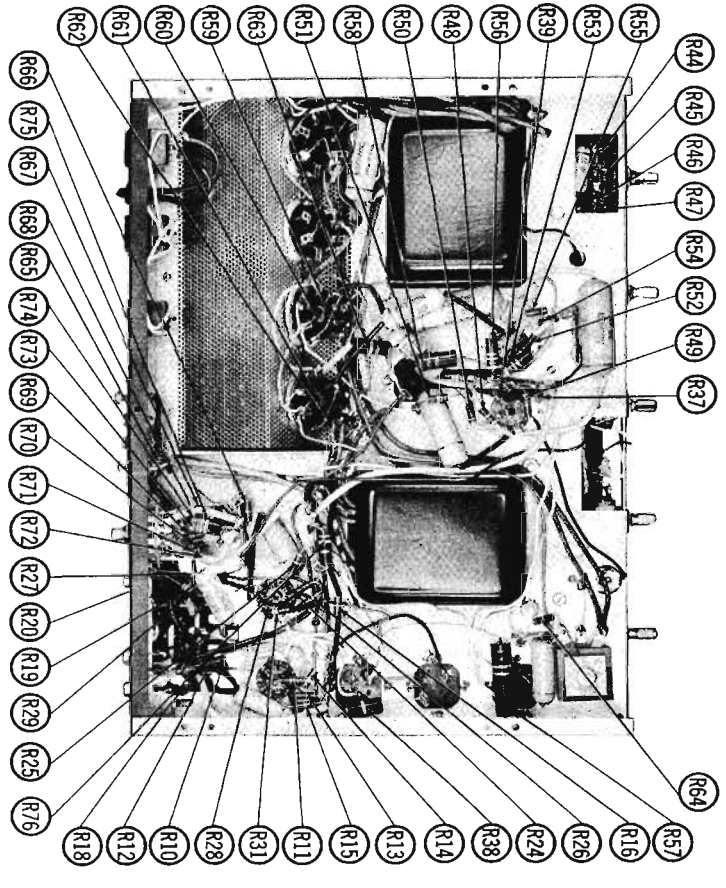
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Harman-Kardon PART No.	IRC PART No.	
R42	100K			BTS-100K	
R43	270K			BTS-270K	
R44	100K			BTS-100K	
R45	47K			BTS-47K	
R46	27K			BTS-27K	
R47	12K			BTS-12K	
R48	470K			BTS-470K	
R49	47K			BTS-47K	
R50	3300Ω			BTS-3300	
R51	47K			BTS-47K	
R52	1Meg			BTS-1Meg	
R53	47K	1		BTA-47K	
R54	560Ω			BTS-560	
R55	1Meg			BTS-1Meg	
R56	47K	1		BTA-47K	
R57	12K	2		BTB-12K	
R58	6800Ω	2		BTB-6800	
R59	1000Ω			BTS-1000	
R60	100K			BTS-100K	
R61	100K			BTS-100K	
R62	1000Ω			BTS-1000	
R63	120Ω	2		BTB-120	
R64	100K			BTS-100K	
R65	33K			BTS-33K	
R66	1000Ω			BTS-1000	
R67	12K			BTS-12K	
R68	24K 5%			BTS-24K 5%	Note 5
R69	100K			BTS-100K	
R70	270K			BTS-270K	
R71	470K			BTS-470K	
R72	.07Ω				Note 6
R73	.27Ω			BW½-.27	
R74	.27Ω			BW½-.27	
R75	.27Ω			BW½-.27	
R76	39Ω	1		BTA-39	

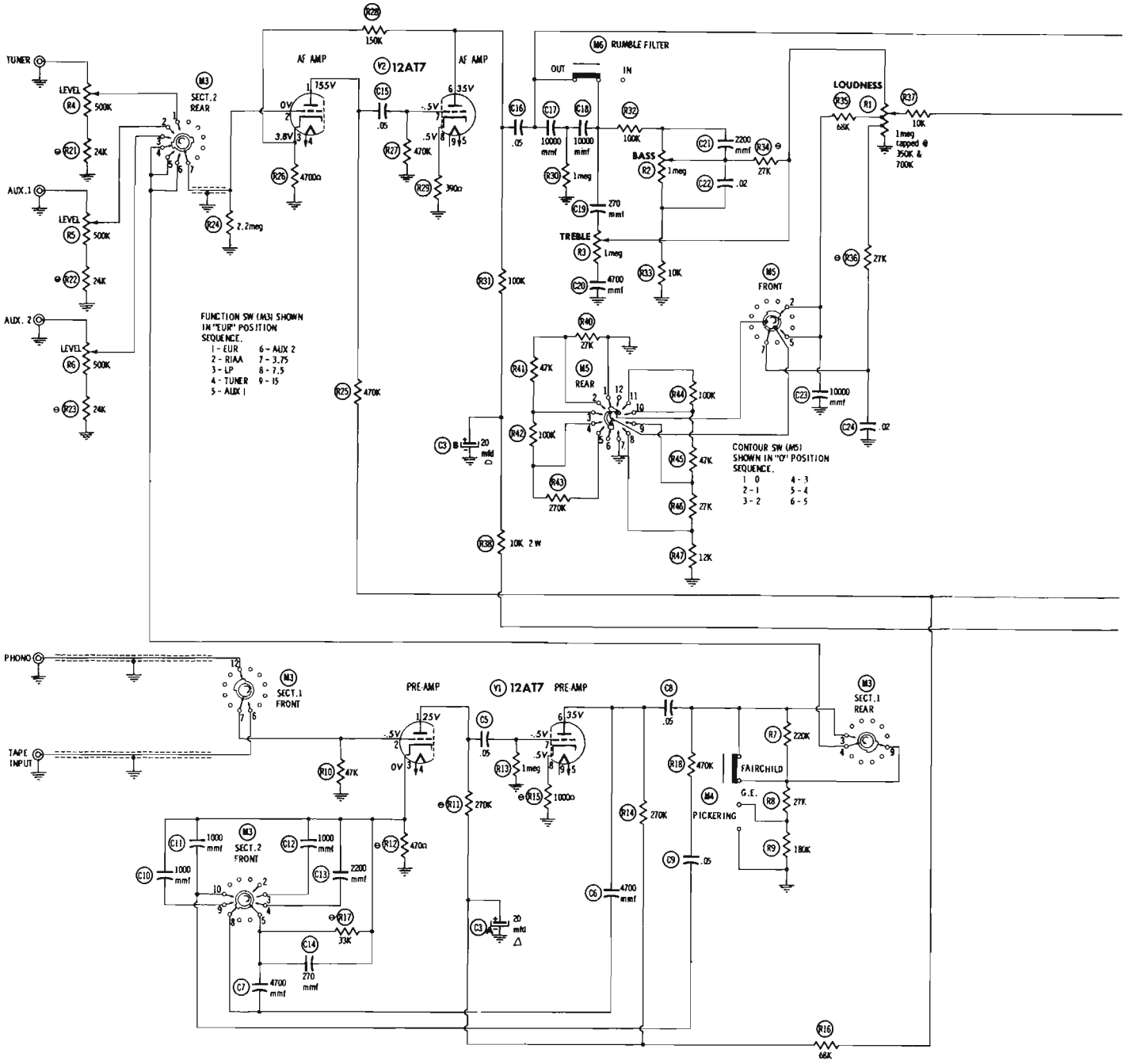
Note 1: Some versions use 100K in this application.
Note 2: Some versions use 560Ω in this application.
Note 3: Some versions use 1500Ω in this application.
Note 4: Some versions use 68K in this application.
Note 5: Some versions use 22K in this application.
Note 6: Special length of resistance wire.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC ⓐ1.03A	760VCT ⓐ.116A	5VAC ⓐ 4A	6.3VAC ⓐ2.55A SEC. 4 24VAC ⓐ.150A	FT371029					

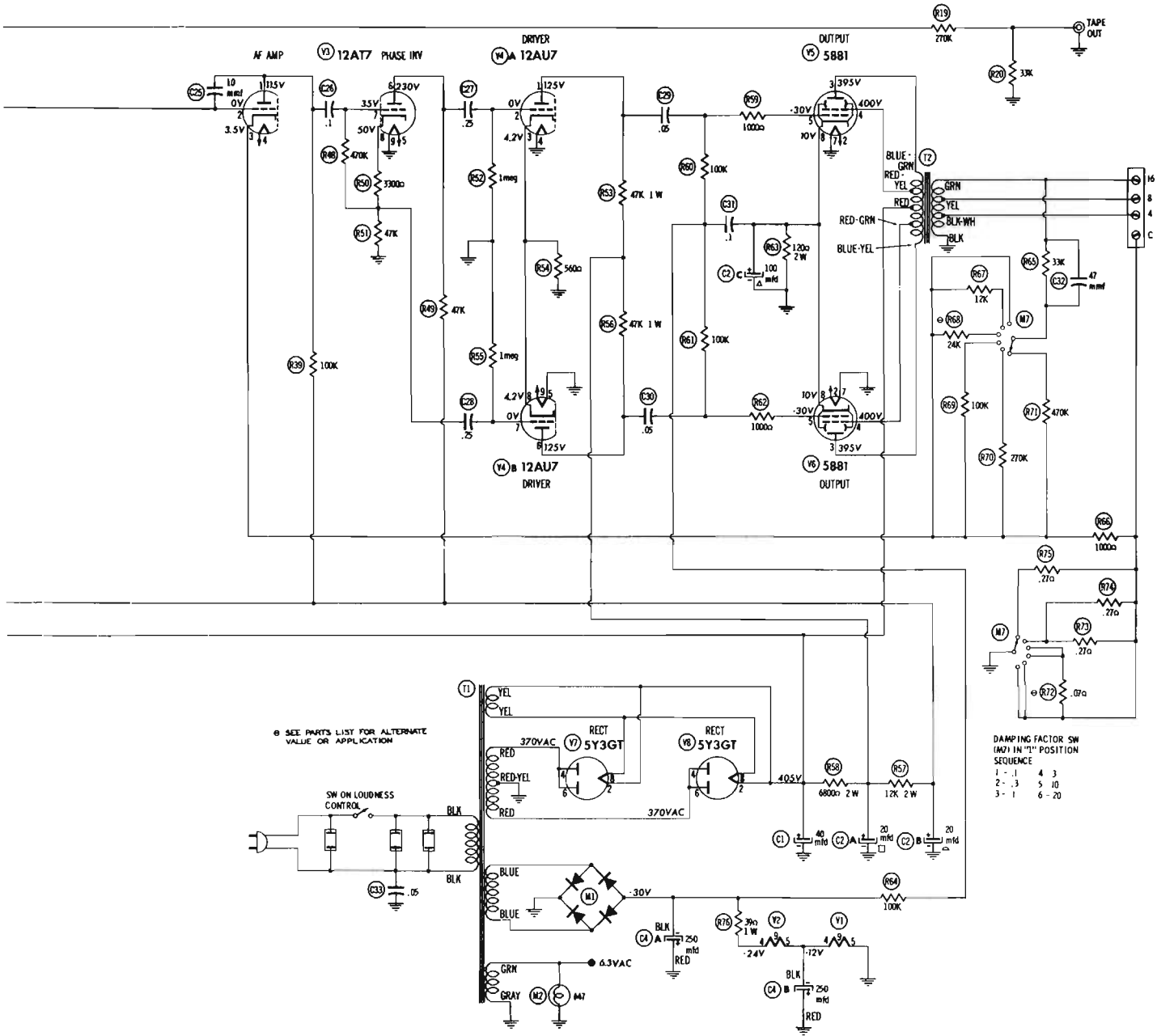
CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1956



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AT7	↑360K	47K	470Ω	12Ω	0Ω	↑360K	1Meg	1000Ω	NC
V2	12AT7	↑490K	200K	4700Ω	24Ω	12Ω	↑110K	470K	390Ω	NC
V3	12AT7	↑120K	11K	1000Ω	.1Ω	.1Ω	↑65K	517K	50K	0Ω
V4	12AU7	↑55K	1Meg	560Ω	0Ω	0Ω	↑55K	1Meg	560Ω	.1Ω
V5	5881	TP	.1Ω	↑140Ω	↑17Ω	200K	TP	0Ω	120Ω	
V6	5881	TP	.1Ω	↑160Ω	↑17Ω	200K	TP	0Ω	120Ω	
V7	5Y3GT	NC	16K	NC	90Ω	NC	90Ω	NC	16K	
V8	5Y3GT	NC	16K	NC	100Ω	NC	100Ω	NC	16K	

↑ MEASURED FROM PIN 2 OF V8.
NC NO CONNECTION
TP TIE POINT

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T2	6700Ω	16Ω tap② 8Ω tap② 4Ω	FT371028 ①						① Screen taps② 32ΩCT

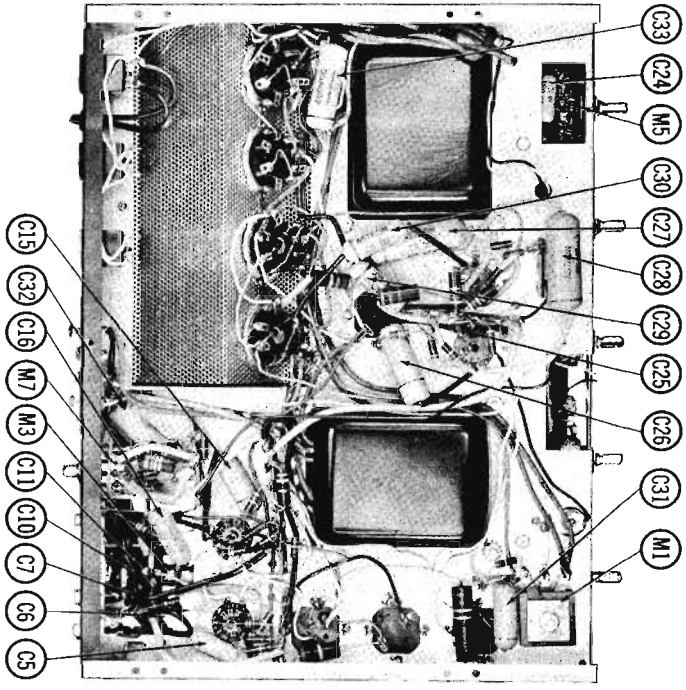
SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA Harman-Kardon PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.150A	Z371041	1015	A1B	B26D	M1B1E1G	154B	

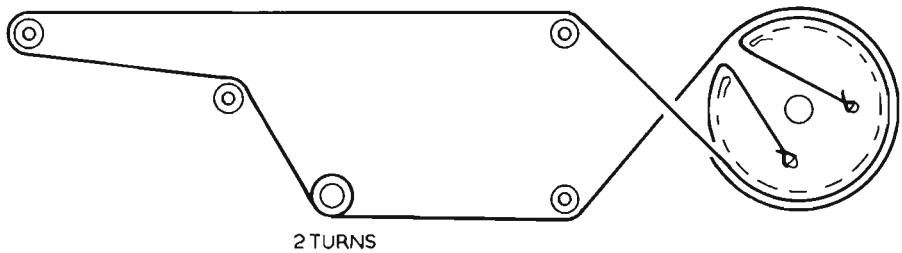
MISCELLANEOUS

ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M2	Dial Light		#47
M3	Switch	ER371326	Selector (Rotary, Wafer Type)
M4	Switch	ES371052	Phono Selector (3 Position-Slide Type)
M5	Switch	ER371192	Contour (Rotary, Wafer Type)
M6	Switch		Rumble Filter (SPST-Slide Type)
M7	Switch	ER371057	Damping (2 Pole-6 Position; Rotary, Wafer Type)
	Knob	P20778	Control (5 used)

CHASSIS—BOTTOM VIEW



TRADE NAME	Harman-Kardon Model TA-120		
MANUFACTURER	Harman-Kardon, Inc., 521 Main St., Westbury, L.I., N.Y.		
TYPE SET	AC Operated FM-AM Receiver		
TUBES	Fourteen		
POWER SUPPLY	105-125 Volts AC-60 Cycles	RATING	.8 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	535KC - 1650KC	FREQ. MOD.	88MC - 108MC

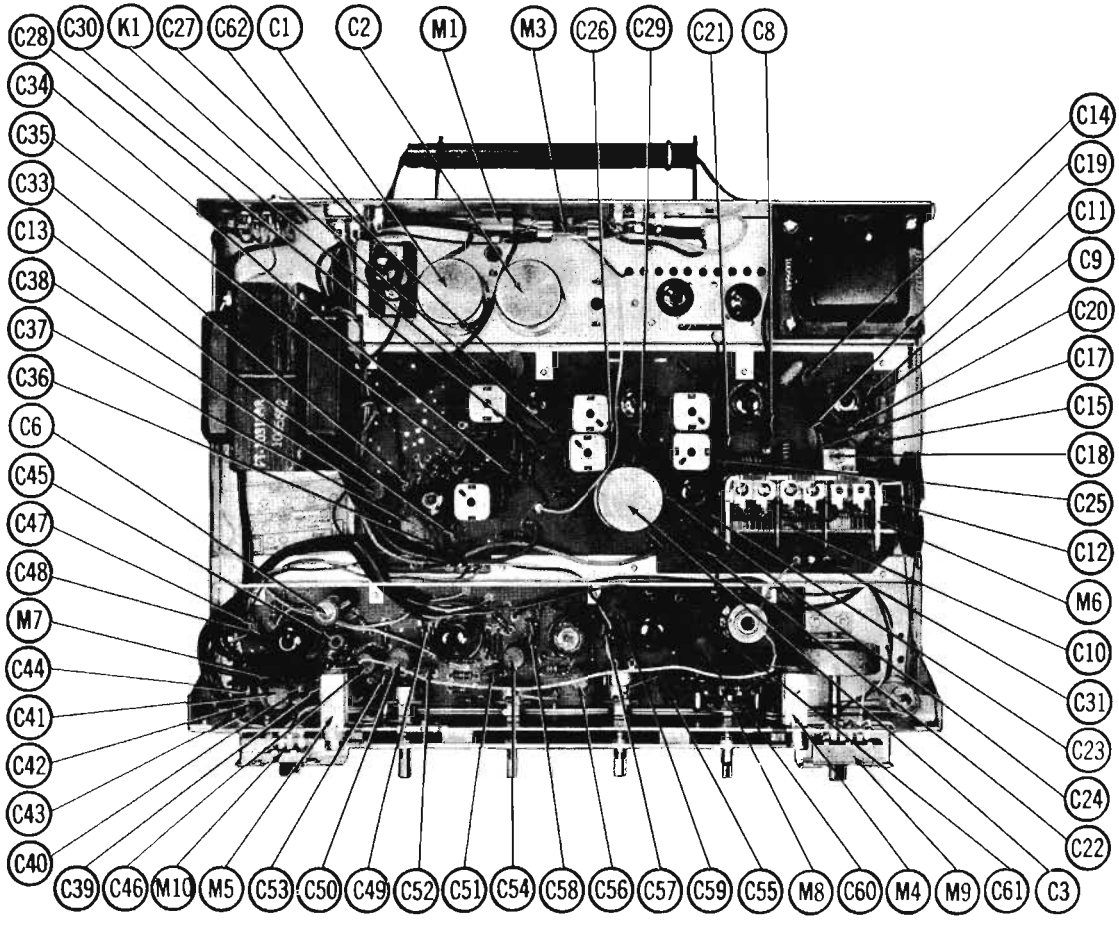


TUNING GANG FULLY CLOSED

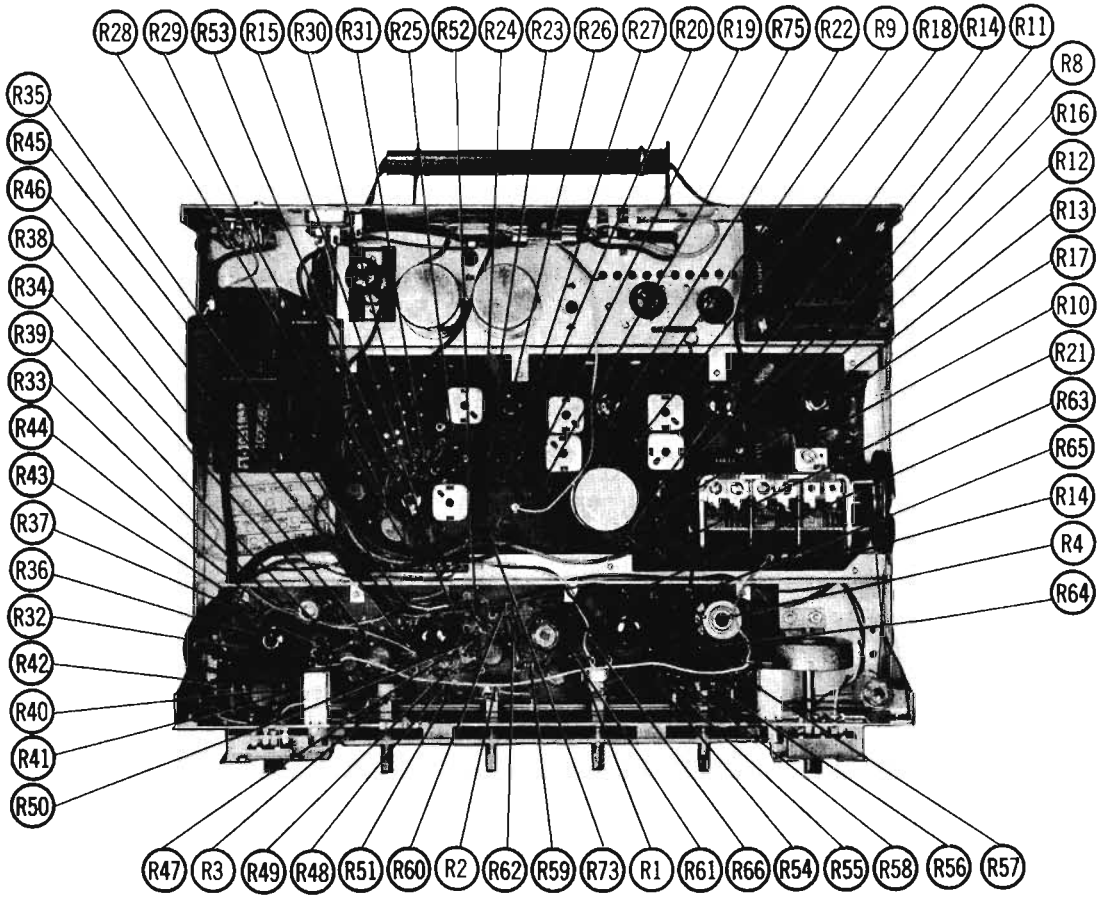
DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

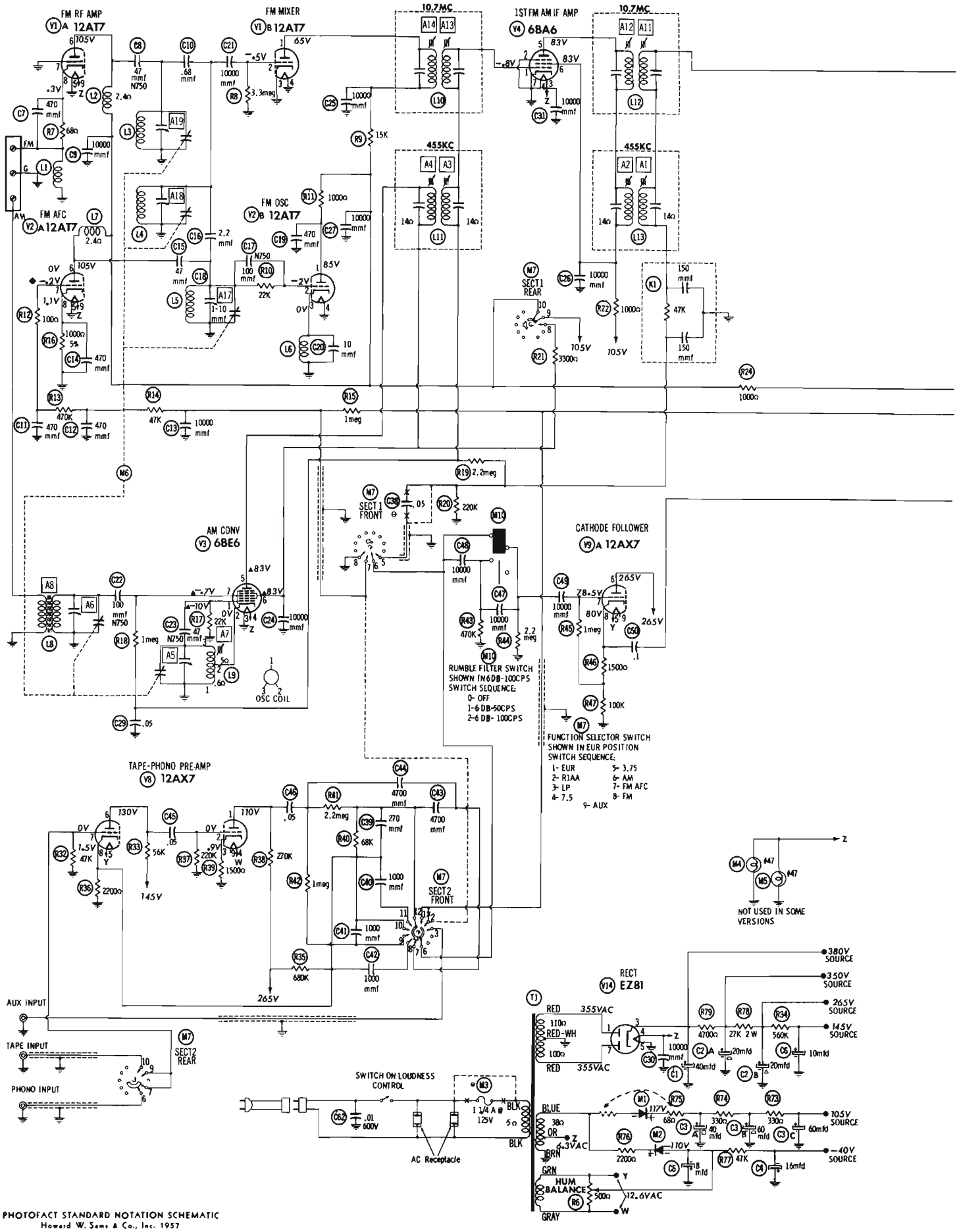
G989



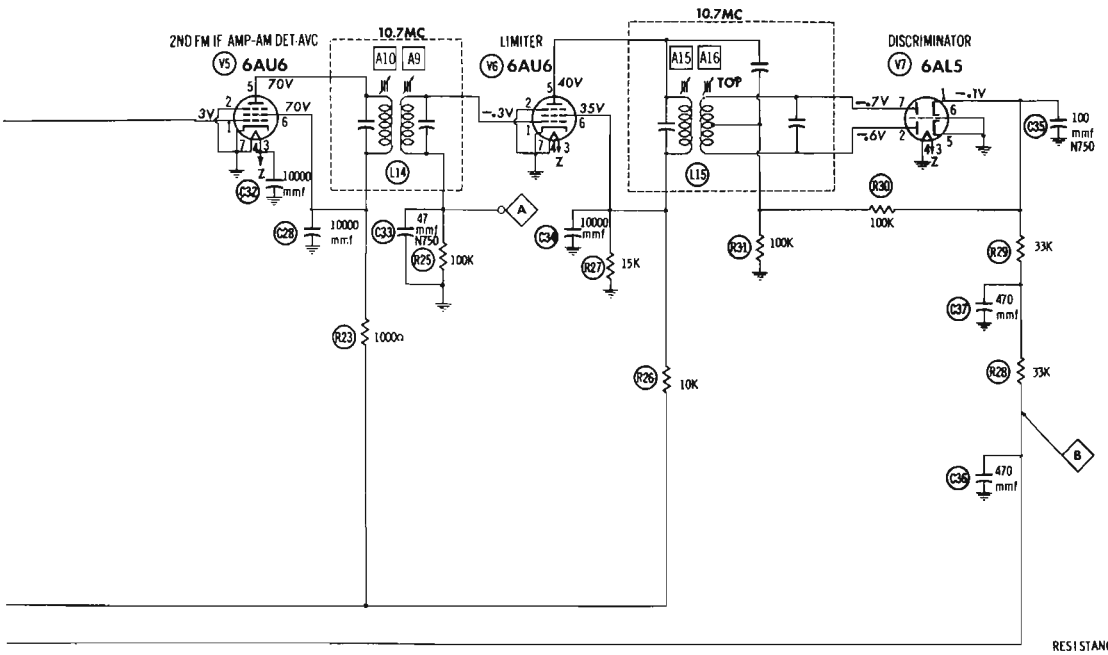
CHASSIS TOP VIEW - CAPACITOR IDENTIFICATION



CHASSIS TOP VIEW - RESISTOR IDENTIFICATION



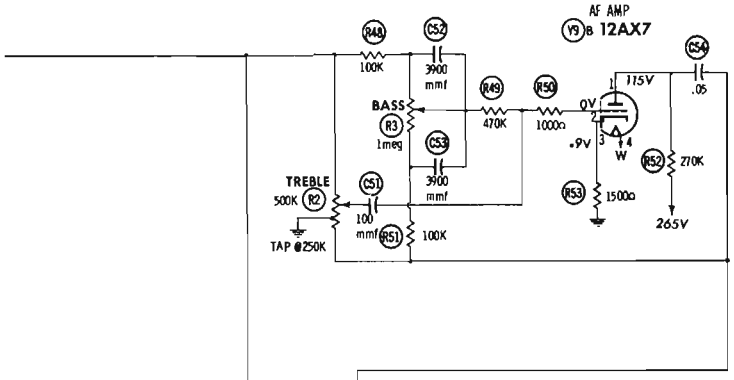
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1957



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

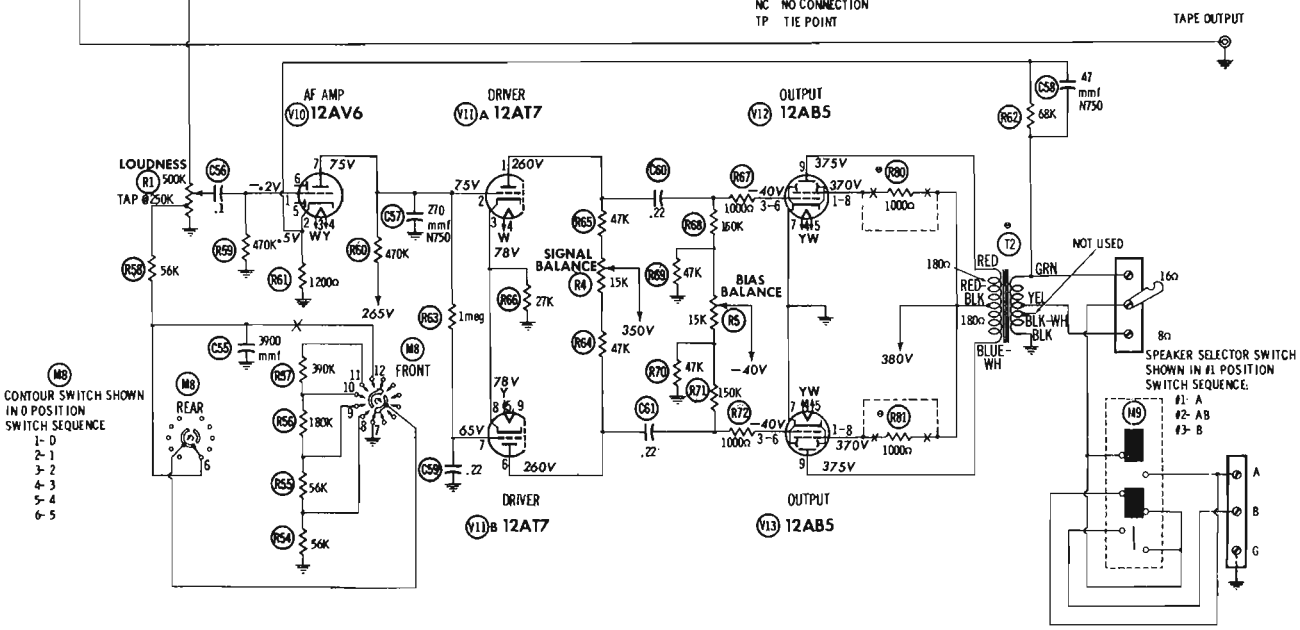
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AT7	††15K	3.3Meg	0Ω	0Ω	0Ω	††725Ω	0Ω	68Ω	.3Ω
V2	12AT7	††1700Ω	22K	.7Ω	0Ω	0Ω	††725Ω	• 1.7Meg	1000Ω	.3Ω
V3	6BE6	22K	.6Ω	0Ω	.3Ω	††▲4000Ω	††▲4000Ω	3.2Meg		
V4	6BA6	2.2Meg	0Ω	.3Ω	0Ω	††1725Ω	††1725Ω	0Ω		
V5	6AU6	265K	0Ω	.3Ω	0Ω	††2700Ω	††2700Ω	0Ω		
V6	6AU6	100K	0Ω	.3Ω	0Ω	††11K	††11K	0Ω		
V7	6AL5	0Ω	100K	.3Ω	0Ω	170K	0Ω	100K		
V8	12AX7	†300K	220K	1500Ω	22K	22K	†645K	47K	2200Ω	22K
V9	12AX7	†300K	650K	1500Ω	22K	22K	†30K	1Meg	100K	22K
V10	12AV6	470K	1200Ω	22K	22K	NC	NC	†500K		
V11	12AT7	†55K	† 500K	27K	22K	22K	†55K	†1.5 Meg	27K	
V12	12AB5	†1000Ω	TP	200K	22K	22K	200K	0Ω	†1000Ω	†180Ω
V13	12AB5	†1000Ω	NC	200K	22K	22K	200K	0Ω	†1000Ω	†180Ω
V14	EZ81	110Ω	NC	20K(Min)	.3Ω	0Ω	NC	100Ω	NC	NC

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
▲ MEASURED IN "AM" POSITION
• MEASURED IN "FM-AFC" POSITION
† MEASURED FROM PIN 3 OF V14
†† MEASURED FROM OUTPUT OF M1
NC NO CONNECTION
TP TIE POINT



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting. Treble control to extreme clockwise position.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.01MFD	High side to AM RF stator lug on tuning gang. Low side to chassis.	455KC (400%Mod.)	AM (Sharp)	1600KC	AC VTVM. Across speaker terminals	A1, A2, A3, A4	Adjust for maximum deflection.
2	"	High side to AM antenna terminal. Low side to chassis	1400KC	"	1400KC	"	A5, A6	"
3	"	"	600KC	"	600KC	"	A7, A8	Adjust for maximum deflection. Repeat steps 2 & 3.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	.01MFD	High side to FM RF stator lug on tuning gang. Low side to chassis.	10.7MC (unmod.)	FM (AFC off)	Point of non-interference	DC probe to point Ⓐ. Common to chassis.	A9, A10 A11, A12 A13, A14	Adjust for maximum deflection.
5	"	"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A15, A16	Detune A16. Adjust A15 for maximum deflection and A16 for zero reading will equal positive and negative deflection on either side of correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4	.01MFD	High side to FM RF stator lug on tuning gang. Low side to chassis	10.7MC (450KC swp)	FM (AFC-off)	Point of non-interference	Vert amp. thru 1Meg to point Ⓐ. Low side to chassis.	A9, A10 A11, A12, A13, A14	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5	"	"	"	"	"	Vert. Amp. thru 1Meg to point Ⓑ. Low side to chassis.	A15, A16	Adjust A16 so that 10.7MC occurs at center of crossover lines similar to Fig. 2. Retouch A15 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6	270Ω Carbon Resistor	High side to FM antenna terminal thru 270Ω. Low side to chassis.	106MC	FM (AFC off)	106MC	DC probe to point Ⓐ. Common to chassis.	A17, A18, A19	Adjust for maximum deflection.
7	"	"	90MC	"	90MC	"	L5, L4, L3	Adjust for maximum deflection by compressing or expanding coil turns. Repeat steps 6 & 7.

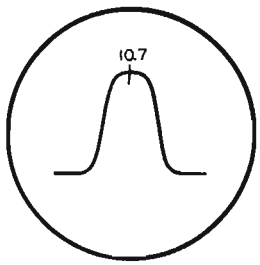


FIG. 1

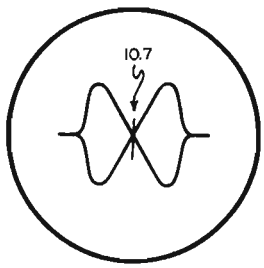
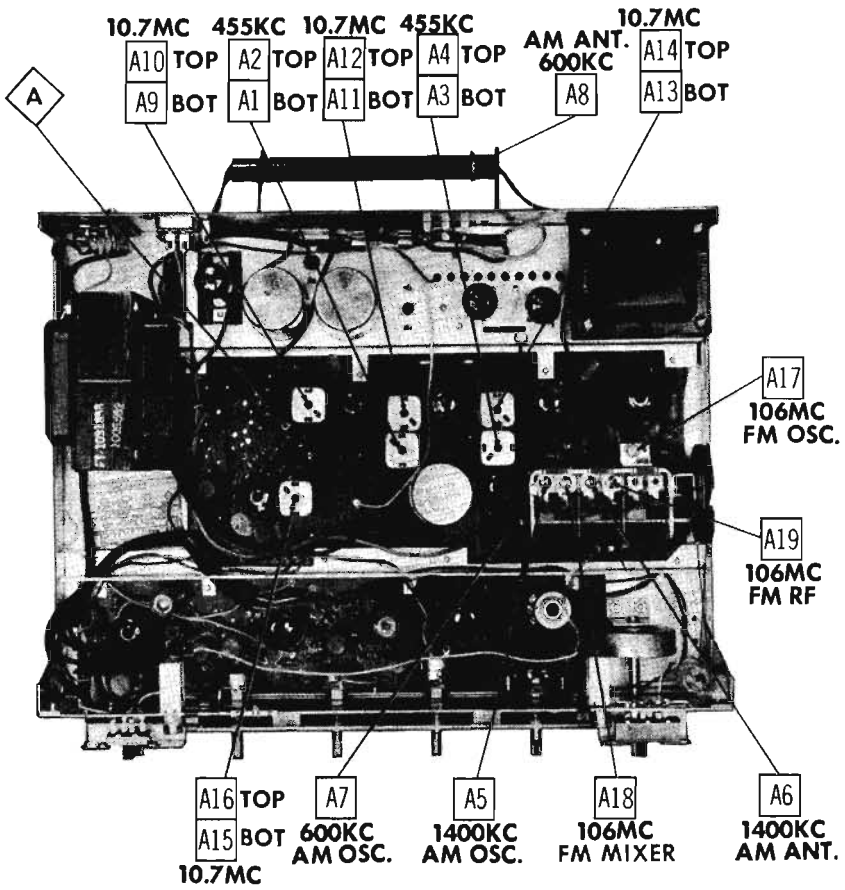
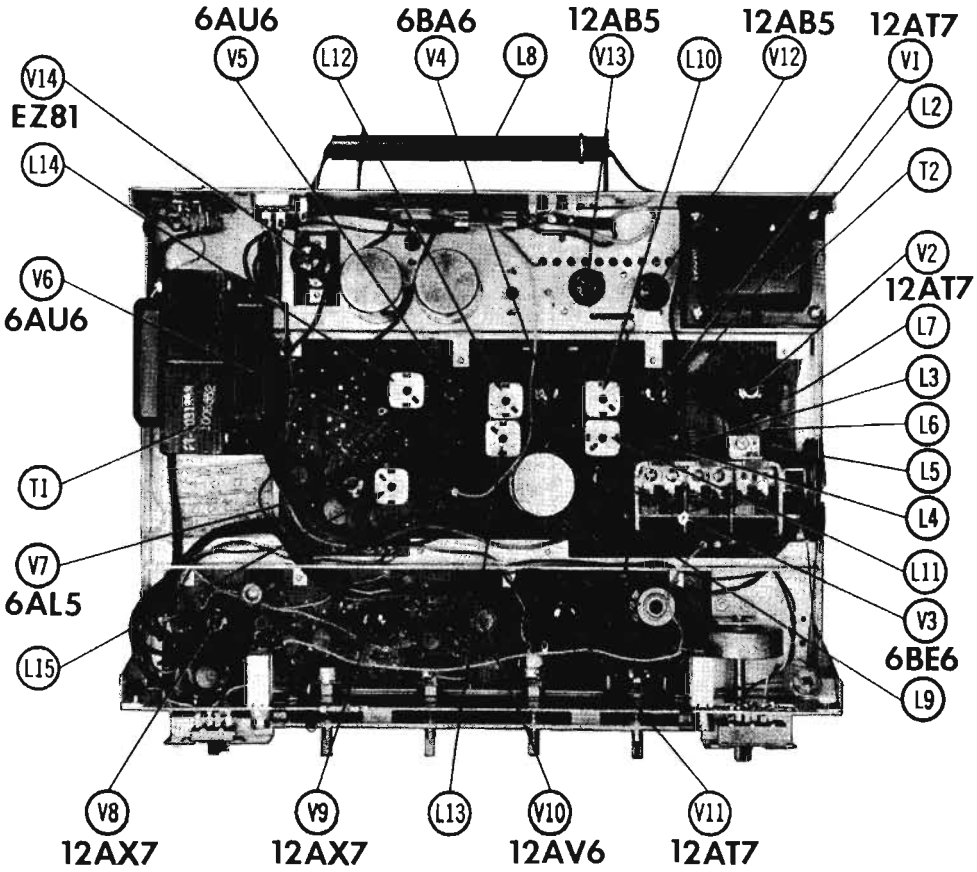


FIG. 2



CHASSIS TOP VIEW - ALIGNMENT IDENTIFICATION



CHASSIS TOP VIEW - TUBE AND TRANS. IDENTIFICATION

PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amp. -Mixer	12AT7	
V2	FM Osc. -AFC	12AT7	
V3	AM Converter	6BE6	
V4	1st. IF Amplifier	6BA6	
V5	2nd. FM IF Amp. - AM Det. -AVC	6AU6	
V6	Limiter	6AU6	
V7	Discriminator	6AL5	
V8	Tape-Phono Preamp.	12AX7	
V9	Cath. Follower-AF Amp.	12AX7	
V10	AF Amplifier	12AV6	
V11	Driver	12AT7	
V12	Output	12AB5	
V13	Output	12AB5	
V14	Rectifier	EZ81	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	HARMAN-KARDON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	40	475		AFEI-56-10	B0520	FP175 & TC82	TMD-61	S-300	TVL-1620
C2A	▲20	475		AFH2-69	B0500	FP173 & TC83	TMD-61	Q-070	TVL-2935
B	▲20	475							
C3A	■40	150			D0320				R2411 *
B	▲60	150							
C	60	150							
C4	16	150		PRS150V16	BBR16-150	TC44	TD-16-150	FM-1516	TVA-1409
C5	8	150		PRS150V8	BBR8-150	TC41	TD-8-150	FM-1508	TVA-1405
C6	10	150		PRS150V10	BBR10-150	TC42	TD-10-150	FM-1510	TVA-1406

* Non catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	Harmon-Kardon PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C7	470			SI 470	D8-471	LT6T47	GP-470	UC-5347	5GA-T47	
C8	47			N750-SI 47	TCN-47	C10Q47U	TC7-47	NT-5447	5TCU-Q47	N750
C9	10000			BPD-01	DD-103	BYA6SI	ED-01	DC511	5HK-SI	
C10	.68				TCZ-R68		TC0-.68			
C11	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C12	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C13	10000			BPD-01	DD-103	BYA6SI	ED-01	DC511	5HK-SI	
C14	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C15	47			BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C16	2.2			NP0-SI 2.2	TCZ-2R2	C10V22C	TC0-2.2		5TCCB-V22	NP0
C17	100			N750-SI 100	TCN-100	C10T1U	TC7-100	NT-531	5TCU-T1	N750
C18	1-10		JV20688							
C19	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C20	10			BPD-00001	DD-100	L10Q1	ED-10	UC-541	5GA-Q1	
C21	10000			BPD-01	DD-103	BYA6SI	ED-01	DC511	5HK-SI	
C22	100			N750-SI 100	TCN-100	L10T1U	TC7-100	NT-531	5TCU-T1	N750
C23	47			N750-SI 47	TCN-47	L10Q47U	TC7-47	NT-5447	5TCU-Q47	N750
C24	10000			BPD-01	DD-103	BYA6SI	ED-01	DC511	5HK-SI	
C25	10000			BPD-01	DD-103	BYA6SI	ED-01	DC511	5HK-SI	

PARTS LIST AND DESCRIPTIONS (Continued)
RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Harman-Kardon PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R33	56K			BTS-56K	
R34	560K			BTS-560K	
R35	680K			BTS-680K	
R36	2200Ω			BTS-2200	
R37	220K			BTS-220K	
R38	270K			BTS-270K	
R39	1500Ω			BTS-1500	
R40	68K			BTS-68K	
R41	2.2Meg			BTS-2.2Meg	
R42	1Meg			BTS-1Meg	
R43	470K			BTS-470K	
R44	2.2Meg			BTS-2.2Meg	
R45	1Meg			BTS-1Meg	
R46	1500Ω			BTS-1500	
R47	100K			BTS-100K	
R48	100K			BTS-100K	
R49	470K			BTS-470K	
R50	1000Ω			BTS-1000	
R51	100K			BTS-100K	
R52	270K			BTS-270K	
R53	1500Ω			BTS-1500	
R54	56K			BTS-56K	
R55	56K			BTS-56K	
R56	180K			BTS-180K	
R57	390K			BTS-390K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Harman-Kardon PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R58	56K			BTS-56K	
R59	470K			BTS-470K	
R60	470K			BTS-470K	
R61	1200Ω			BTS-1200	
R62	68K			BTS-68K	
R63	1Meg			BTS-1Meg	
R64	47K			BTS-47K	
R65	47K			BTS-47K	
R66	27K			BTS-27K	
R67	1000Ω			BTS-1000	
R68	150K			BTS-150K	
R69	47K			BTS-47K	
R70	47K			BTS-47K	
R71	150K			BTS-150K	
R72	1000Ω			BTS-1000	
R73	330Ω			BTS-330	
R74	330Ω			BTS-330	
R75	68Ω			BTS-68	
R76	2200Ω			BTS-2200	
R77	47K			BTS-47K	
R78	27K	2		BTS-27K	
R79	4700Ω			BTS-4700	
R80	1000Ω			BTS-1000	Note 1
R81	1000Ω			BTS-1000	Note 1

Note L Not used in some versions

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Harman-Kardon PART No.	Hallidorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC ② .8A	720VCT ② .074A	115V ② .022A Tap ② 6.3V ② 3.3A	12V ② 1A	FT1031858					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Harman-Kardon PART No.	Hallidorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T2	7500Ω CT	16Ω Tapped ② 8Ω, 4Ω	FT1021777 ①						① Alternate Part #FT1021707

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C26	10000			BPD-01	DD-103	BYA6S1	ED-01	DC5I1	5HK-S1	
C27	10000			BPD-01	DD-103	BYA6S1	ED-01	DC5I1	5HK-S1	
C28	10000			BPD-01	DD-103	BYA6S1	ED-01	DC5I1	5HK-S1	
C29	.05	200		BPD-05	DF-503	BC2S47J		ACE215	2SE-S47	
C30	10000			BPD-01	DD-103	BYA6S1	ED-01	DC5I1	5HK-S1	
C31	10000			BPD-01	DD-103	BYA6S1	ED-01	DC5I1	5HK-S1	
C32	10000			BPD-01	DD-103	BYA6S1	ED-01	DC5I1	5HK-S1	
C33	47			N750-S1 47	TCN-47	C10Q47U	TC7-47	NT-5447	5TCU-Q47	N750
C34	10000			BPD-01	DD-103	BYA6S1	ED-01	DC5I1	5HK-S1	
C35	100			N750-S1 100	TCN-100	C10T1U	TC7-100	NT-531	5TCU-T1	N750
C36	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C37	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C38	.05	200		BPD-05	DF-503	BC2S47J		ACE215	2SE-S47	Note 1
C39	270			BPD-00027	DD-271	L10T27	ED-270	UC-5327	5GA-T27	
C40	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C41	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C42	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C43	4700			BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5HK-D47	
C44	4700			BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5HK-D47	
C45	.05	200		BPD-05	DF-503	CUB255		GEM-215	2TM-S47	
C46	.05	400		BPD-05	DF-503	BC6S47J		ACE815	4SE-S47	
C47	10000			BPD-01	DD-103	BYA6S1	ED-01	DC5I1	5HK-S1	
C48	10000			BPD-01	DD-103	BYA6S1	ED-01	DC5I1	5HK-S1	
C49	10000			BPD-01	DD-103	BYA6S1	ED-01	DC5I1	5HK-S1	
C50	.1	200			DF-104	BC2P1J		ACE201	2SE-P1	
C51	100			BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C52	3900			BPD-004	DD-402	BYA10D4	ED-004	UC-524	5HK-D4	
C53	3900			BPD-004	DD-402	BYA10D4	ED-004	UC-524	5HK-D4	
C54	.05	400		BPD-05	DF-503	BC6S47J		ACE815	4SE-S47	
C55	3900			BPD-004	DD-402	LT6D4	ED-004	UC-524	5HK-D4	
C56	.1	200			DF-104	BC2P1J		ACE201	2SE-P1	
C57	270			N750-S1 270	TCN-270	L10T27U	TC7-270			N750
C58	47			N750-S1 47	TCN-47	L10Q47U	TC7-47	NT-5447	5TCU-Q47	N750
C59	.22	400				BC4P22J		ACE6022	4SE-P22	
C60	.22	400				BC4P22J		ACE6022	4SE-P22	
C61	.22	400				BC4P22J		ACE6022	4SE-P22	
C62	.01	600		BPD-01	DD-103	CUB6S1	GP-10000	GEM-611	6TM-S1	

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Harman-Kardon PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	1/2	RV1031879					Loudness, Tap @ 250K
B	Switch							
R2	500K	1/2	RV1031878					Treble, Tap @ 250K
R3	1Meg	1/2	RV1031877					Bass
R4	15K	1/2	RV1021725					Signal Balance
R5A	15K	1/2	RV1021708	AB-22	A47-15K-S	B11-118	TA153L	Bias Balance
B	Shaft			AK-1	FKS-1/4	TM1-K1t	Not req.	
R6A	500Ω	1/2	RV1021709	AB-4	A47-500-S	B11-103	TA52L	Hum Balance
B	Shaft			AK-1	FKS-1/4	TM1-K1t	Not req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Harman-Kardon PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R7	68Ω			BTS-68	
R8	3.3Meg			BTS-3.3Meg	
R9	15K			BTS-15K	
R10	22K			BTS-22K	
R11	1000Ω			BTS-1000	
R12	100Ω			BTS-100	
R13	470K			BTS-470K	
R14	47K			BTS-47K	
R15	1Meg			BTS-1Meg	
R16	1000Ω 5%			BTS-1000 5%	
R17	22K			BTS-22K	
R18	1Meg			BTS-1Meg	
R19	2.2Meg			BTS-2.2Meg	
R20	220K			BTS-220K	
R21	3300Ω			BTS-3300	
R22	1000Ω			BTS-1000	
R23	1000Ω			BTS-1000	
R24	1000Ω			BTS-1000	
R25	100K			BTS-100K	
R26	10K			BTS-10K	
R27	15K			BTS-15K	
R28	33K			BTS-33K	
R29	33K			BTS-33K	
R30	100K			BTS-100K	
R31	100K			BTS-100K	
R32	47K			BTS-47K	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Harman-Kardon PART No.	REPLACEMENT DATA MEISSNER PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA MILLER PART No.	NOTES
L1	FM Antenna Coil				4584	.24 Microhenry, IRC Part #CLA
L2	RF Choke					3.3 Microhenries, IRC Part #CLA
L3	FM RF Coil	GL78543				
L4	FM Mixer Coil	GL78543				
L5	FM Osc. Coil	GL781544				
L6	Cathode Choke		19-1000	BC-561	4602	1 Microhenry, IRC Part #CLA
L7	RF Choke					3.3 Microhenries, IRC Part #CLA
L8	Loop Stick *	GL1031936				* Ant. Tuning Ring Part #P481329
L9	AM Osc. Coil	GL121988				
L10	1st. FM IF	GT781491	18-3490			
L11	1st. AM IF	GT781493	18-6780	BC-358	13-PC1	
L12	2nd. FM IF	GT781570	18-3490			
L13	2nd. AM IF	GT781493	18-6780	BC-357	13-PC2	
L14	3rd. FM IF	GT781570	18-3490			
L15	Discriminator	GT781492	17-3491			

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Harman-Kardon PART No.	REPLACEMENT DATA	
K1	Det. Filter	150MMF, 150MMF, 47K		Aerovox	PA-98
				Centralab	PC-51
				Cornell-Dubilier	111TM2
				Erie	1403-02
				Sprague	D-2

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Harman-Kardon PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	NOTES
M1	.022A	Z781490	1002	RS0652	6S65	65	
M2	.002A	Z1021726	1159	CR20		10	

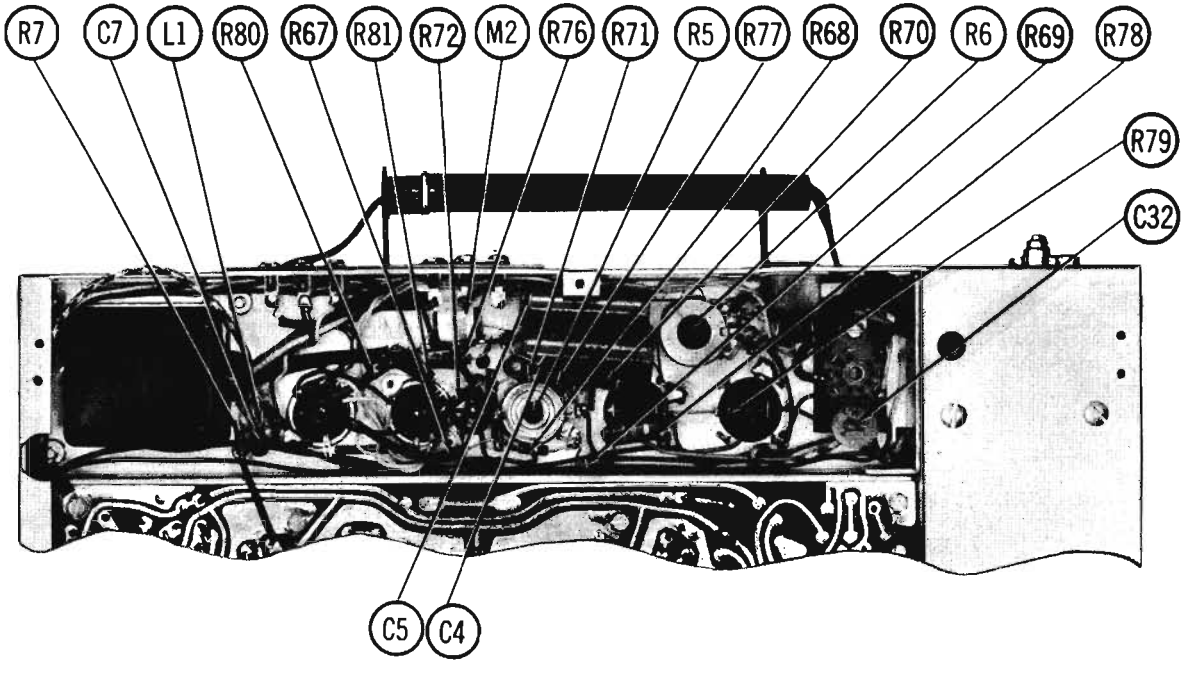
FUSE

ITEM No.	TYPE	RATING	REPLACEMENT DATA HARMAN-KARDON PART No. FUSE	HARMAN-KARDON PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M3	3AG	1 1/4 A 125V Slo Blo	(Note 1)		3131.25 (3AG-1 1/4 A Slo Blo)	357001	MDL 1 1/4	4405

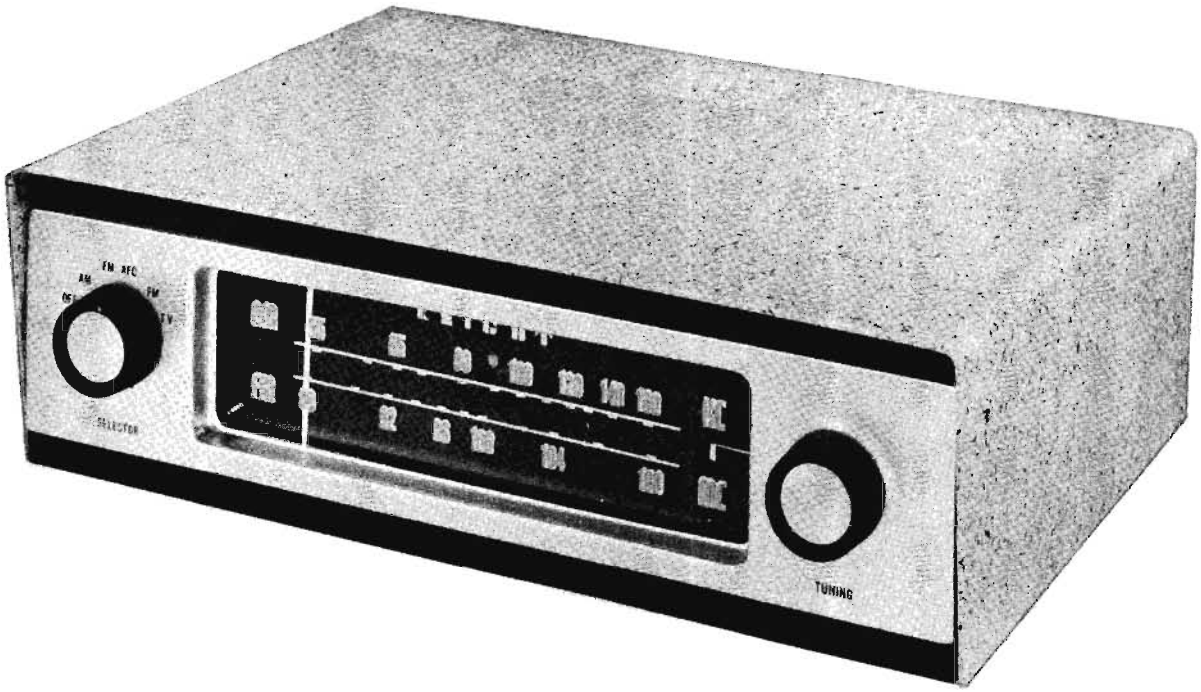
Note 1. Not used in some versions

MISCELLANEOUS

ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M4	Dial Light		#47
M5	Dial Light		#47
M6	Tuning Cap	JV811556	5 Gang (Alternate Part #JV1031886)
M7	Switch	ER1031742	Function, Rotary Wafer Type
M8	Switch	ER1021632	Contour, Rotary Wafer Type
M9	Switch		Speaker Selector, Slide Type
M10	Switch		Rumble Filter, Slide Type
	Printed Panel	PB11451D	RF-IF Chassis
	Printed Panel	P1021630E	Amplifier Chassis
	Knob	P22783	
	Knob	P20778	
	Dial Glass	P1031863	
	Pointer	P1031864	



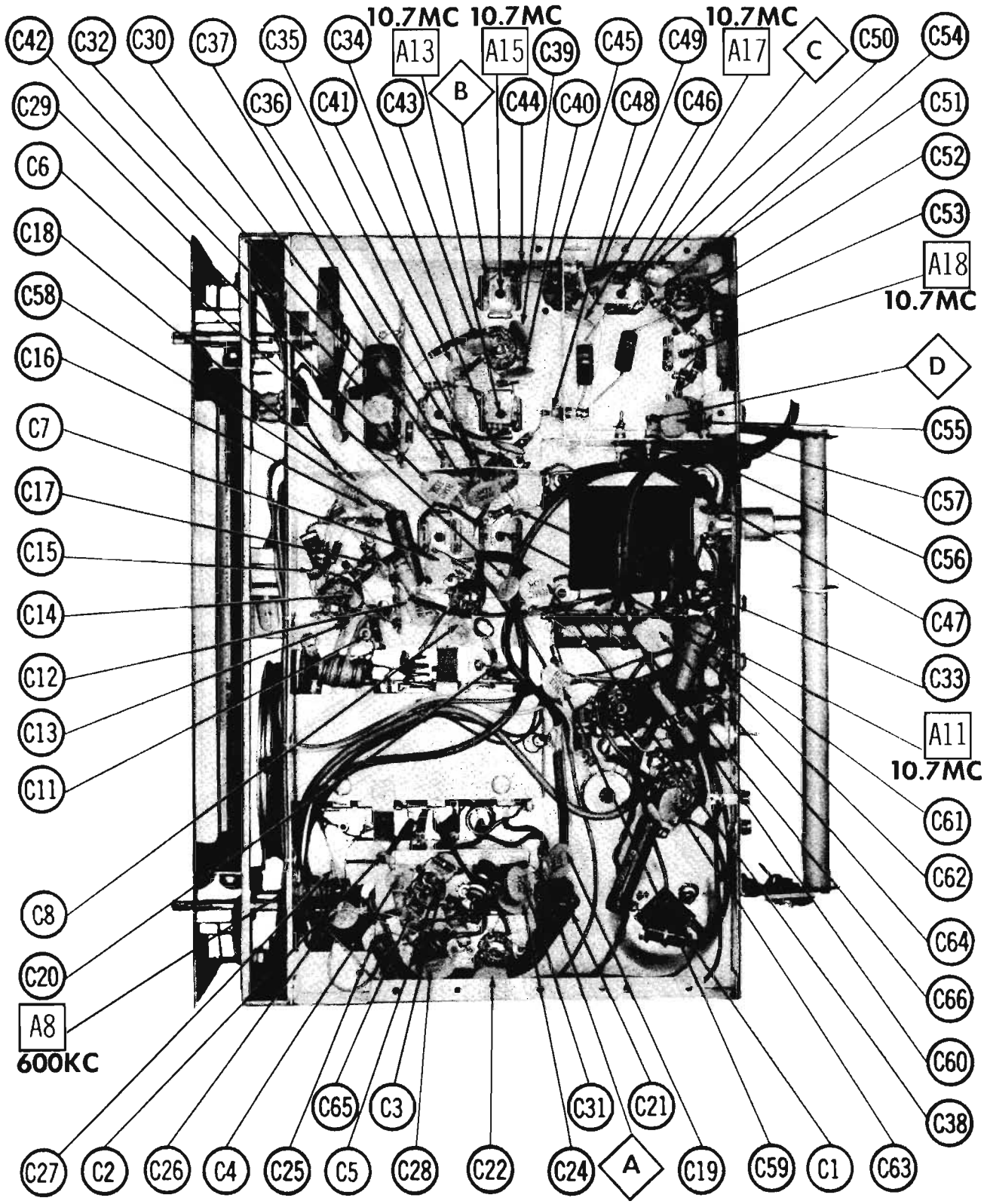
AMPLIFIER CHASSIS - BOTTOM VIEW



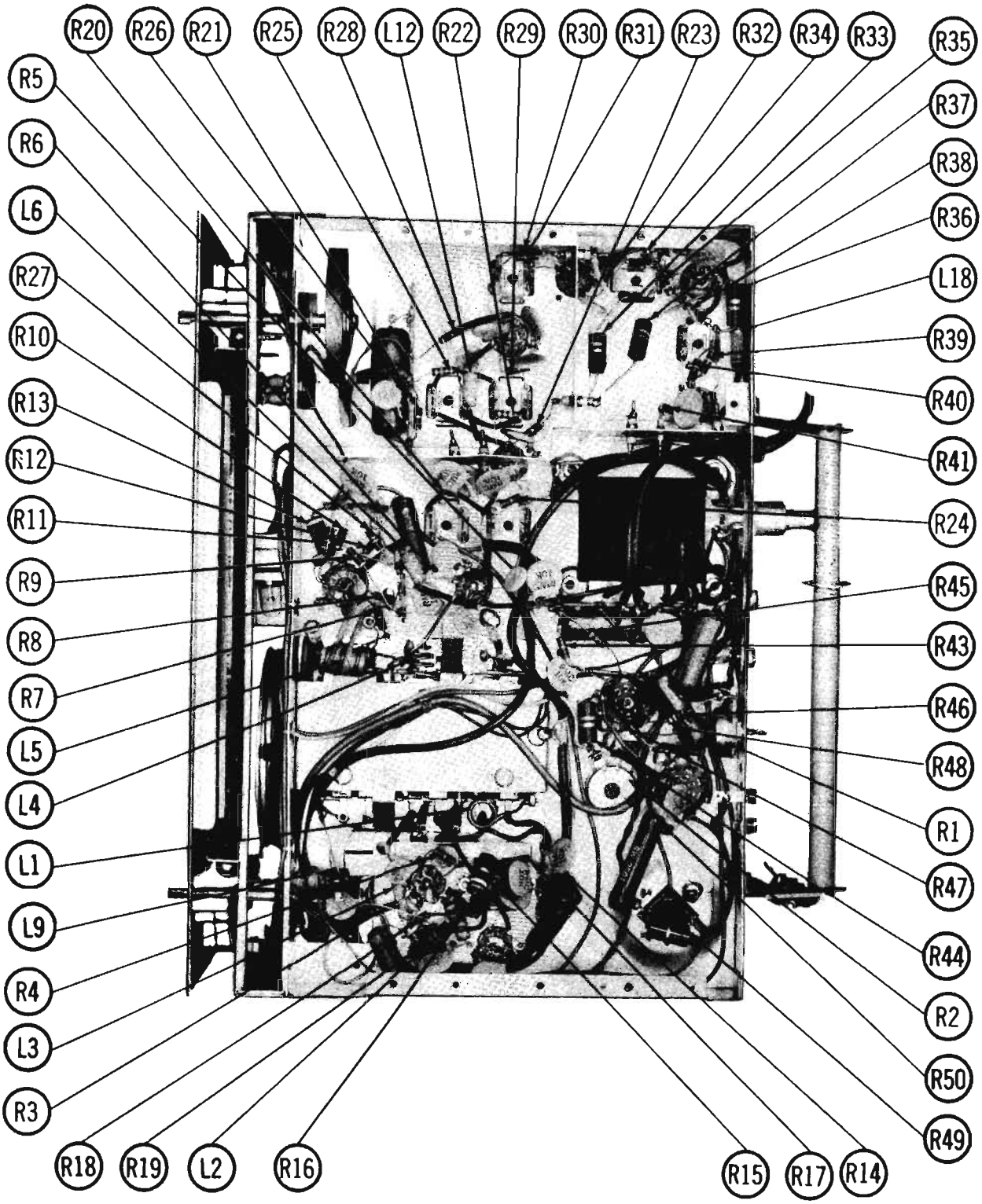
KNIGHT
MODELS 94SX702, 94SX711

TRADE NAME	Knight Models 94SX702, 94SX711		
SUPPLIER	Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill.		
TYPE SET	AC Operated FM-AM Tuner		
TUBES	Twelve		
POWER SUPPLY	105-125 Volts AC-60 Cycles	RATING	.5 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	550KC-1630KC	FREQ. MOD.	88MC-108MC

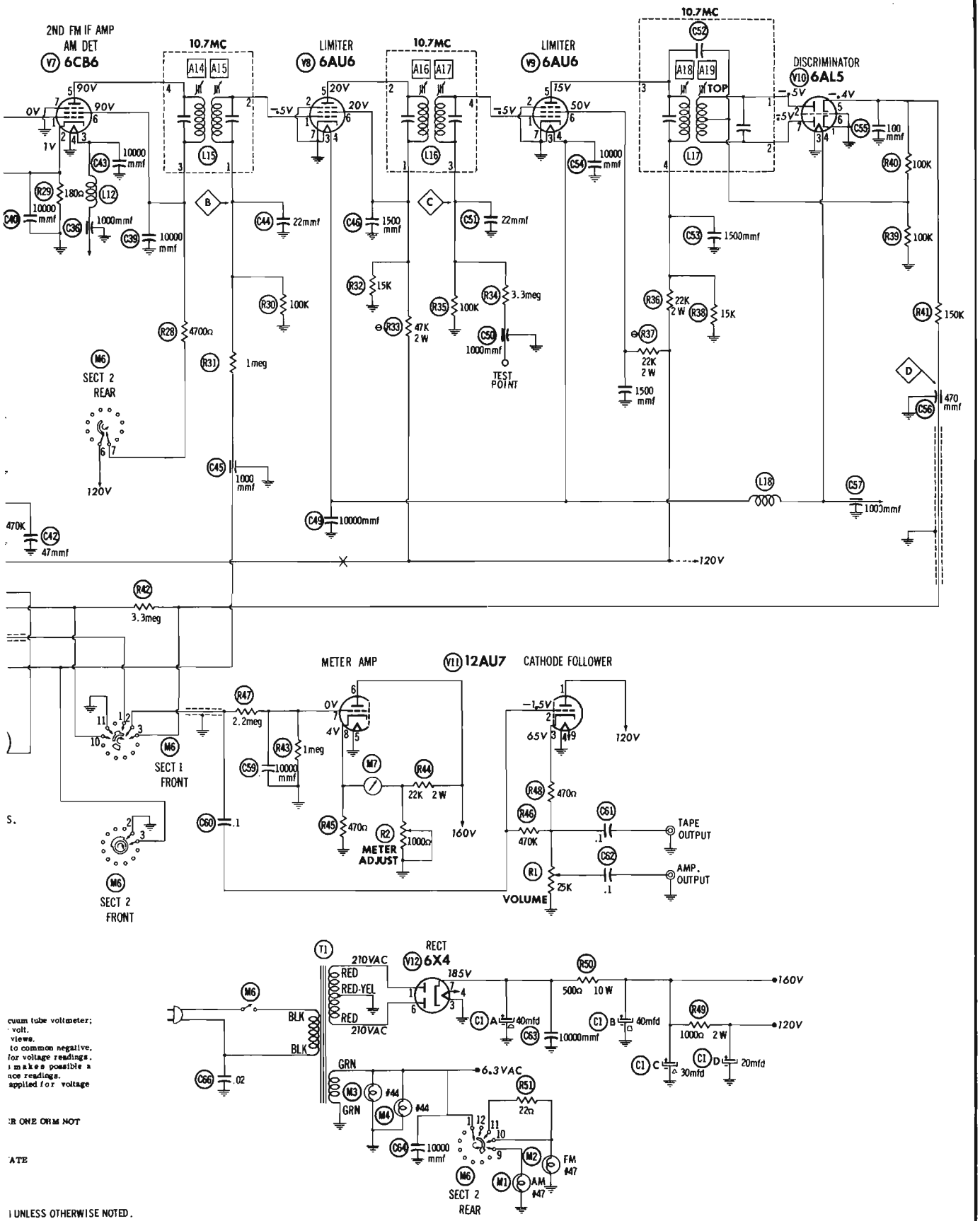
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



cuum tube voltmeter;
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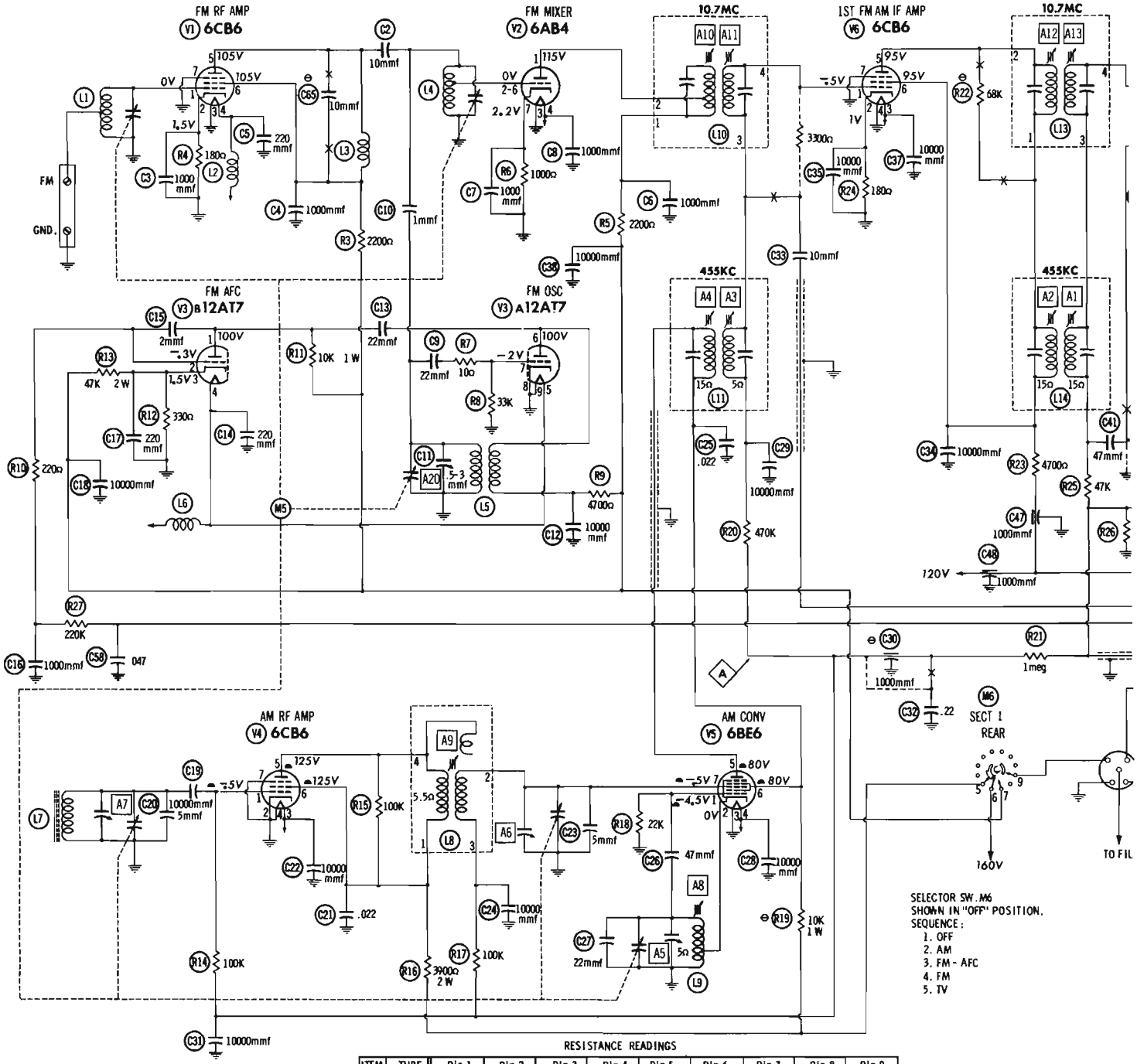
R ONE OHM NOT

ATE

UNLESS OTHERWISE NOTED.



SELECTOR SW. M6
SHOWN IN "OFF" POSITION.
SEQUENCE:
1. OFF
2. AM
3. FM - AFC
4. FM
5. TV

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CB6	0Ω	180Ω	0Ω	.1Ω	†2700Ω	†2700Ω	0Ω		
V2	6AB4	†2700Ω	0Ω	0Ω	.1Ω	TP	0Ω	1000Ω		
V3	12AT7	†11K	▲3.9Meg	330Ω	.1Ω	.1Ω	†5000Ω	33K	0Ω	0Ω
V4	6CB6	▬ 1.5Meg	0Ω	.1Ω	0Ω	▬ †4400Ω	▬ †4400Ω	0Ω		
V5	6BE6	22K	.6Ω	0Ω	.1Ω	▬ †11K	▬ †11K	▬ 1.5Meg		
V6	6CB6	1.9Meg	180Ω	.1Ω	0Ω	†6200Ω	†6200Ω	0Ω		
V7	6CB6	500K	180Ω	.1Ω	0Ω	▬ INF †6200Ω	▬ INF †6200Ω	0Ω		
V8	6AU6	100K	0Ω	0Ω	.1Ω	†40K	†40K	0Ω		
V9	6AU6	100K	0Ω	0Ω	.1Ω	† 23K	† 23K	0Ω		
V10	6AL5	0Ω	100K	0Ω	.1Ω	200K	0Ω	100K		
V11	12AU7	†1500Ω	500K	25K	0Ω	0Ω	†500Ω	700K	470Ω	.1Ω
V12	6X4	110Ω	NC	0Ω	.1Ω	NC	110Ω	20K		

1. DC voltage measurements taken with va
AC voltages measured at 1000 ohms per
2. Socket connections are shown as bottom
3. Measured values are from socket pin
4. Line voltage maintained at 117 volts
5. Nominal tolerance on component values
variation of ± 10% in voltage and resista
6. Volume control at maximum, no signal
measurements.

DC COIL RESISTANCE VALUES UNDE
SHOWN ON SCHEMATIC DIAGRAM.

● SEE PARTS LIST FOR ALTERN
VALUE OR APPLICATION

ALL MEASUREMENTS TAKEN IN "FM" POSITION
▬ TAKEN IN "AM" POSITION.
† MEASURED FROM PIN 7 OF V12.
▲ MEASURED IN "FM-AFC" POSITION.
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 6BE6 (V5). Low side to chassis.	455KC (400∿Mod)	AM	Point of non-interference	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	270Ω Carbon Resistor	High side thru 270Ω to AM antenna terminal. Low side to chassis.	1500KC	"	1500KC	"	A5	"
3.	"	"	1500KC	"	Tune to 1500KC signal	"	A6, A7	"
4.	"	"	600KC	"	600KC	"	A8	"
5.	"	"	600KC	"	Tune to 600KC signal	"	A9	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to pin 6 (grid) of 6AB4 (V2). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe to point Ⓑ. Common to chassis.	A10, A11, A12, A13, A14, A15	Adjust for maximum deflection.
7.	"	"	"	"	"	DC probe to point Ⓒ. Common to chassis.	A16, A17	"
8.	"	"	"	"	"	DC probe to point Ⓓ. Common to chassis.	A18	"
9.	"	"	"	"	"	"	A19	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
10.	"	"	10.725MC 10.675MC	"	"	"	A18	Vary generator frequency 25KC above and below 10.7MC. Meter deflection should be nearly equal above and below 10.7MC. If necessary, retouch A10 thru A17 until nearly equal meter deflections above and below 10.7MC are obtained.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to pin 6 (grid) of 6AB4 (V2). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point Ⓑ. Low side to chassis.	A10, A11, A12, A13, A14, A15	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
7.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A16, A17	"
8.	"	"	"	"	"	Vert. Amp. to point Ⓓ. Low side to chassis.	A18	"
9.	"	"	"	"	"	"	A19	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A18 for maximum amplitude and straightness of crossover lines. Proceed with alignment in step 11.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
11.	270Ω Carbon Resistor	High side thru 270Ω to FM antenna terminal. Low side to chassis.	108MC	FM	108MC	DC probe to point Ⓑ. Common to chassis.	A20, L5	Adjust for maximum deflection. (L5 is adjusted by compressing or expanding coil turns).
12.	"	"	88MC	"	88MC	"	L1, L4	Adjust for maximum deflection by compressing or expanding coil turns.

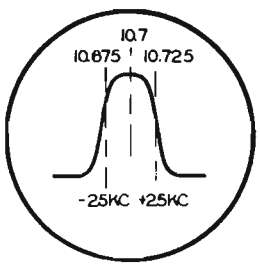


FIG. 1

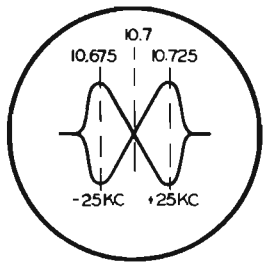


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amplifier	6CB6	
V2	FM Mixer	6AB4	
V3	FM Osc.-AFC	12AT7	
V4	AM RF Amplifier	6CB6	
V5	AM Converter	6BE6	
V6	1st. IF Amplifier	6CB6	

ITEM No.	USE	TYPE	NOTES
V7	2nd. FM IF Amp.-AM Det.-AVC	6CB6	
V8	1st. Limiter	6AU6	
V9	2nd. Limiter	6AU6	
V10	Discriminator	6AL5	
V11	Meter Amp.-Cath. Follower	12AU7	
V12	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA: KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	FYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	300				FP235	TMQ-3	D-130	R2366 *
B	●40	300				TC78	TD-20-350	MTD-2520	
C	▲30	250							
D	20	200							

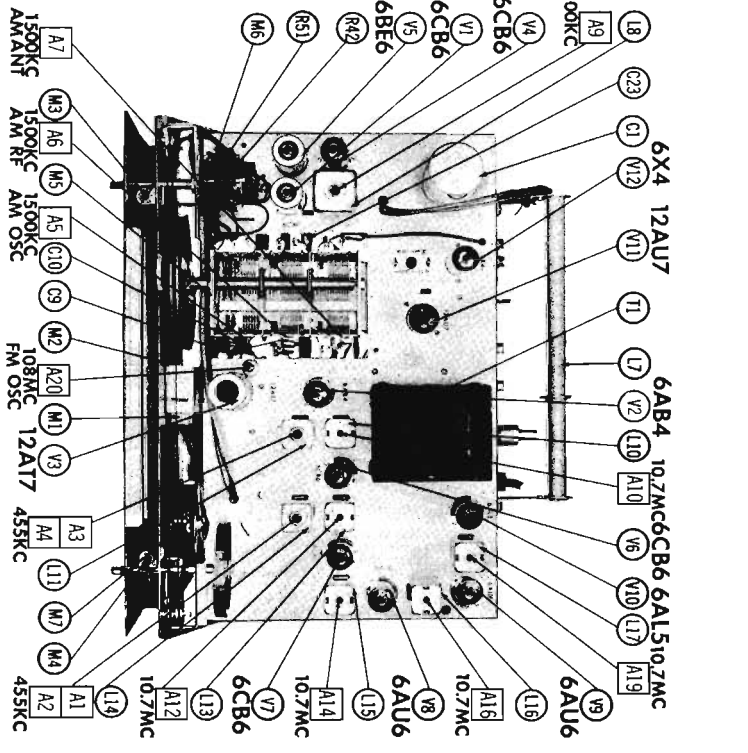
* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: KNIGHT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	10			NPO-SI 10	TCZ-10	Z018	TCO-10	ZT-541	5TCC-Q1	
C3	1000			BPD-001	DD-102	K069	ED-001	DC521	5HK-D1	
C4	1000			BPD-001	DD-102	K069	ED-001	DC521	5HK-D1	
C5	220			DI-220	DD-221	G051	ED-220	UC-5322	5GA-T22	
C6	1000			BPD-001	DD-102	K069	ED-001	DC521	5HK-D1	
C7	1000			BPD-001	DD-102	K069	ED-001	DC521	5HK-D1	
C8	1000			BPD-001	DD-102	K069	ED-001	DC521	5HK-D1	
C9	22			NPO-SI 22	TCZ-22	Z024	TCO-22		5TCC-Q22	
C10	1			NPO-SI 1	TCZ-1	C101C	TCO-1		5TCCB-V1	
C11	.5-3				529-3		3118-D	CT565A		
C12	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C13	22			NPO-SI 22	TCZ-22	Z024	TCO-22		5TCC-Q22	
C14	220			DI-220	DD-221	G051	ED-220	UC-5322	5GA-T22	
C15	2			NPO-SI 2.2	TCZ-2R2	Z005				
C16	1000			BPD-001	DD-102	K069	ED-001	DC521	5HK-D1	
C17	220			DI-220	DD-221	G051	ED-220	UC-5322	5GA-T22	
C18	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C19	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C20	5			NPO-SI 5	TCZ-4R7	Z011	TCO-5	ZT-555	5TCCB-V47	
C21	.022	200		BPD-02	DD-203	CUB2S22	ED-02	GEM-4122	2TM-S22	
C22	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C23	5			NPO-SI 5	TCZ-4R7	Z011	TCO-5	ZT-555	5TCCB-V47	
C24	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C25	.022	200		BPD-02	DD-203	CUB2S22	ED-02	GEM-4122	2TM-S22	
C26	47			NPO-SI 47	TCZ-47	Z033	TCO-47		5TCC-Q47	
C27	22			NPO-SI 22	TCZ-22	Z024	TCO-22		5TCC-Q22	
C28	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C29	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C30	1000			EF-001	MFT-1000				503C-D1	
C31	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C32	.22	200		P228N-22		CUB2S22		GEM-4022	2TM-P22	
C33	10			NPO-SI 10	TCZ-10	Z018	TCO-10	ZT-541	5TCC-Q1	
C34	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C35	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C36	1000			EF-001	MFT-1000				503C-D1	
C37	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C38	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C39	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C40	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C41	47			NPO-SI 47	TCZ-47	Z033	TCO-47		5TCC-Q47	
C42	47			NPO-SI 47	TCZ-47	Z033	TCO-47		5TCC-Q47	
C43	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C44	22			NPO-SI 22	TCZ-22	Z024	TCO-22		5TCC-Q22	
C45	1000			EF-001	MFT-1000				503C-D1	
C46	1500			BPD-0015	DD-152	K071	ED-0015	DC6215	5HK-D15	
C47	1000			EF-001	MFT-1000				503C-D1	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA KNIGHT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C48	1000			EF-001	MFT-1000				503C-D1	
C49	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C50	1000			EF-001	MFT-1000				503C-D1	
C51	22			NP0-S1 22	TCZ-22	Z024	TCO-22		5TCC-Q22	
C52	1500			BPD-0015	DD-152	K071	ED-0015	DC5215	5HK-D15	
C53	1500			BPD-0015	DD-152	K071	ED-0015	DC5215	5HK-D15	
C54	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C55	100			NP0-S1 100	TCZ-100	TZ30	TCO-100	ZT-531	5TCC-T1	
C56	470									
C57	1000			EF-001	MFT-1000				503C-D1	
C58	.047	200		BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C59	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C60	.1	200		P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C61	.1	200		P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C62	.1	200		P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C63	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C64	10000			BPD-01	DD-103	K082	ED-01	DC511	5HK-S1	
C65	10			BPD-00001	DD-100	L10Q1	ED-10	UC-541	5GA-Q1	
C66	.02	600		BPD-02	DF-203	CUB682	ED-02	GEM-612	6TM-S2	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA KNIGHT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	25K	½				B13-120 · TM2-KIT		Volume
B	Shaft							
R2A	1000Ω	½				B11-108	TAI3L	Meter Adjustment
B	Shaft					TM2-KIT	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA KNIGHT PART No.	IRC PART No.	NOTES
R3	2200Ω			BTS-2200	
R4	180Ω			BTS-180	
R5	2200Ω			BTS-2300	
R6	1000Ω			BTS-1000	
R7	10Ω			BTS-10	
R8	33K			BTS-33K	
R9	4700Ω			BTS-4700	
R10	220Ω			BTS-220	
R11	10K	1		BTA-10K	
R12	330Ω			BTS-330	
R13	47K	2		BTB-47K	
R14	100K			BTS-100K	
R15	100K			BTS-100K	
R16	3900Ω	2		BTB-3900	
R17	100K			BTS-100K	
R18	22K			BTS-22K	
R19	10K	1		BTA-10K	Note 1
R20	470K			BTS-470K	
R21	1Meg			BTS-1Meg	
R22	68K			BTS-68K	Note 2
R23	4700Ω			BTS-4700	
R24	180Ω			BTS-180	
R25	47K			BTS-47K	
R26	470K			BTS-470K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA KNIGHT PART No.	IRC PART No.	NOTES
R27	220K			BTS-220K	
R28	4700Ω			BTS-4700	
R29	180Ω			BTS-180	
R30	100K			BTS-100K	
R31	1Meg			BTS-1Meg	
R32	15K			BTS-15K	
R33	47K	2		BTB-47K	Note 3
R34	3.3Meg			BTS-3.3Meg	
R35	100K			BTS-100K	
R36	22K	2		BTB-22K	
R37	22K	2		BTB-22K	Note 4
R38	15K			BTS-15K	
R39	100K 5%			BTS-100K 5%	
R40	100K 5%			BTS-100K 5%	
R41	150K			BTS-150K	
R42	3.3Meg			BTS-3.3Meg	
R43	1Meg			BTS-1Meg	
R44	22K	2		BTB-22K	
R45	470Ω			BTS-470	
R46	470K			BTS-470K	
R47	2.2Meg			BTS-2.2Meg	
R48	470Ω			BTS-470	
R49	1000Ω	2		BTB-1000	
R50	500Ω	10		PW10-500	
R51	22Ω			BTS-22	

Note 1. 6800Ω, 2 W used in some versions.
Note 2. Not used in some versions.
Note 3. 22K, 2 W used in some versions.
Note 4. 82000Ω, 1 W used in some versions.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC @ .5A	390VCT @ .059A	6.3VAC @ 4.3A		LP-0244					

COILS (RF-IF)

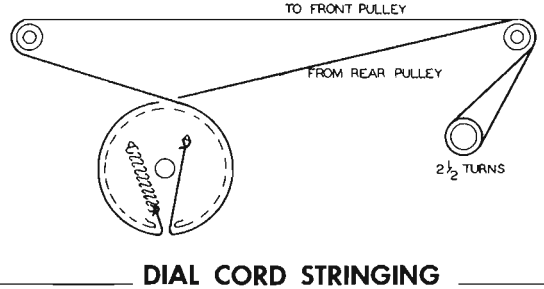
ITEM No.	USE	REPLACEMENT DATA KNIGHT PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Trans.	LW-0098				
L2	Fil. Choke		19-1007			.68 Microhenry, IRC part #CLA
L3	RF Choke					3.3 Microhenries, IRC part #CLA
L4	FM RF Coil	LW-0097				
L5	FM Osc. Coil	LW-0050				
L6	Fil. Choke		19-1007			.68 Microhenry
L7	Loop Stick	LW-0098				214 Microhenries
L8	AM RF Coil	LW-0074				212 Microhenries
L9	AM Osc. Coil	LL-0049			70-08C	120 Microhenries
L10	1st. FM IF	LR-0032	16-3487	FM-254	1463	Note 1
L11	1st. AM IF	LR-0041	16-6770	BC-355	12-C1	
L12	Fil. Choke		19-1007			.68 Microhenry, IRC part #CLA
L13	2nd. FM IF	LR-0043	16-3487	FM-254	1463	
L14	2nd. AM IF	LR-0041	16-6770	BC-355	12-C2	
L15	3rd. FM IF	LR-0043	16-3487	FM-254	1463	
L16	FM Limiter	LR-0043	16-3487	FM-254	1463	
L17	Discriminator	LQ-0179	17-3494	FM-253	1464	
L18	RF Choke		19-1007			.68 Microhenry IRC part #CLA

Note 1. Alternate Part #LR-0042.

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M1	Pilot Lamp		#47 (AM)
M2	Pilot Lamp		#47 (FM)
M3	Dial Lamp		#44
M4	Dial Lamp		#44
M5	Tuning Cap.	CV-102C	6 Gang (AM sections: 17-420MMF, 21-422MMF, 13-190MMF)
M6	Switch		On-off-selector (Rotary-wafer type)
M7	Meter		Tuning

TUNING GANG FULLY CLOSED



DIAL CORD STRINGING

KNIGHT
MODELS 93SZ506, 93SZ738

KNIGHT
MODELS 93SZ506, 93SZ738

TRADE NAME	Knight Models KN-3025 (93SZ506), KN-3125 (93SZ738)
SUPPLIER	Allied Radio Corp., 100 N. Western Ave., Chicago 80, Illinois
TYPE SET	AC - Battery Operated 5 Channel 25 Watt Audio Amplifier
TUBES (Seven)	Types ECC83/12AX7 (or) 12AD7 Mic 1 Preamp.-Mic 2 Preamp., 6AV6 AF Amplifier, ECC83/12AX7 (or) 12AD7 AF Amp.-Phase Inv., (2) 6L6GB Output, (2) 6X5GT Rectifier
POWER SUPPLY	110-120 Volts AC (or) 6 Volt Storage Battery (or) 12 Volt Storage Battery
RATING	.82 Amp. @ 117 Volts AC (or) 17 Amp. @ 6.3 Volts DC (or) 8.5 Amp. @ 12.6 Volts DC (85 Watts)

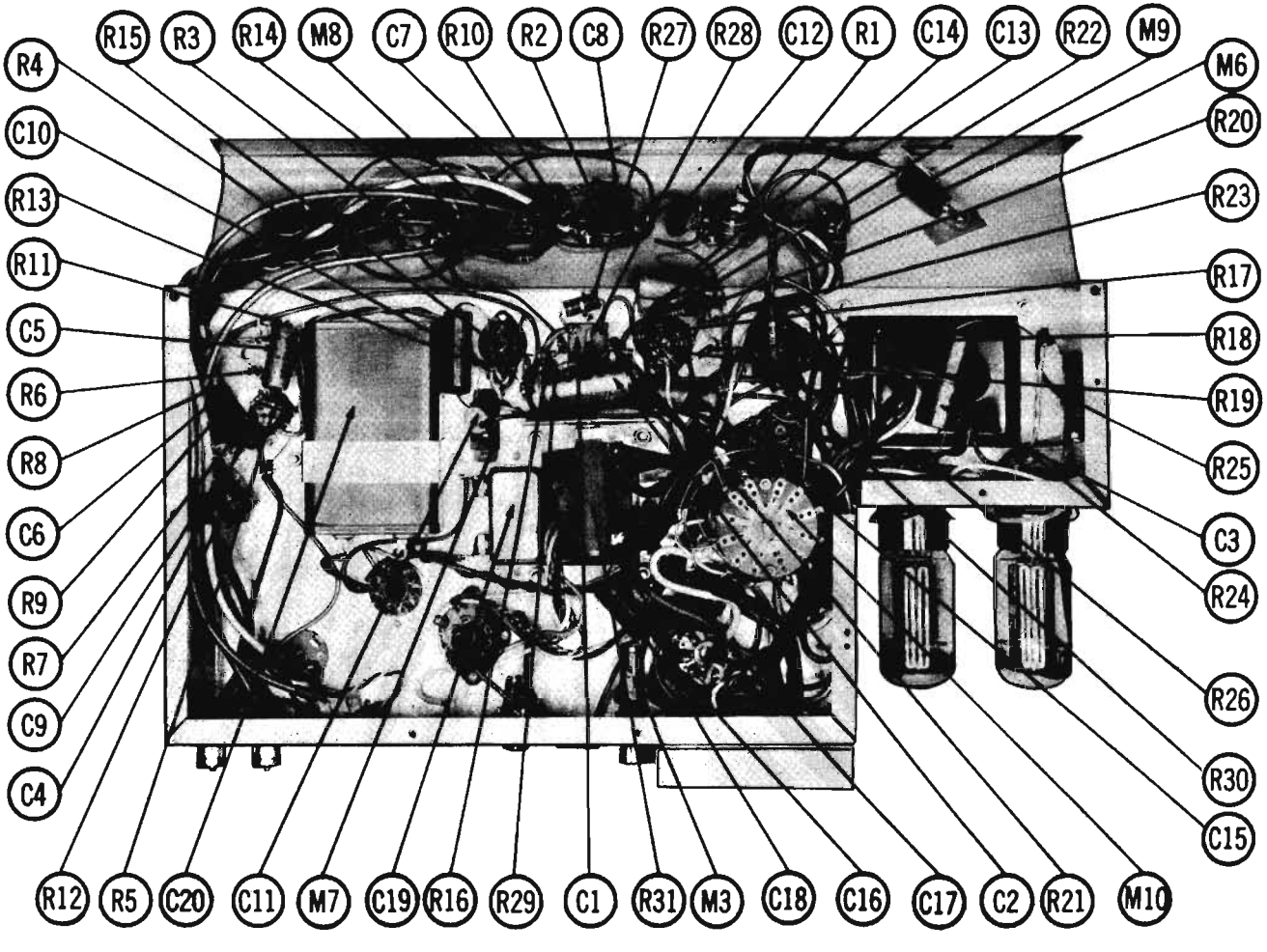
MODEL 93SZ738 HAS 4 SPEED MANUAL RECORD PLAYER

TRUMPET PROTECTOR SWITCH (M7)

To provide protection to trumpet speakers, the switch (M7) should be in the "ON" position. If no trumpet speakers are used, the switch should be in the "OFF" position to increase the low frequency response of the amplifier.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

H197



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mic 1 Preamp-Mic 2 Preamp	ECC83/ 12AX7	Note 1
V2	AF Amplifier	6AV6	
V3	AF Amp. -Phase Inv.	ECC83/ 12AX7	Note 1

ITEM No.	USE	TYPE	NOTES
V4	Output	6L6GB	
V5	Output	6L6GB	
V6	Rectifier	6X5GT	
V7	Rectifier	6X5GT	

Note 1. Some versions use 12AD7 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	450		AFH3-41	CO320	FP396.2	TMT-36	Q-055	TVL-3783
B	10	450							
C	10	450							
C2	8	450		PRS450V8	BR845	TC71	TD-8-450	MT-4508	TVA-1704
C3	35	50		PRS150V40	BR505	TC48	TD-40-150	MT-1540	TVA-1308

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA KNIGHT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.022	200		P288N-022	DD-203	CUB4S22	ED-02	GEM-4122	2TM-S22	
C5	.047	600		P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C6	.022	200		P288N-022	DD-203	CUB4S22	ED-02	GEM-4122	2TM-S22	
C7	.0033	600		P688N-0033	D6-332	CUB6D33	GP-3300	GEM-6233	6TM-D33	
C8	.01	200		P288N-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C9	.047	600		P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C10	.047	600		P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C11	1000			BPD-001	DD-102	BYA5D1	ED-1000	DC521	5HK-D1	
C12	.01	200		P288N-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C13	.047	600		P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C14	.047	600		P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C15	.047	600		P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C16	.47	100		P288N-47		CUB2P47		GEM-2047	2TM-P47	
C17	.47	100		P288N-47		CUB2P47		GEM-2047	2TM-P47	
C18	.47	100		P288N-47		CUB2P47		GEM-2047	2TM-P47	
C19	.5	400								
C20	4.0									

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA KNIGHT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	RP-105AC-C	B-70	A47-1Meg-Z	Q13-137	U53	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWE-12	76-1	US-26	
R2	4Meg	½	RP-405A					Phono 1 & 2, Tap @ 2Meg
R3A	1Meg	½	RP-105AC-C	B-70	A47-1Meg-Z	Q13-137	U53	Mic 2 - Mag.
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4A	1Meg	½	RP-105AD	B-70	A47-1Meg-Z	Q13-137	U53	Mic 1
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

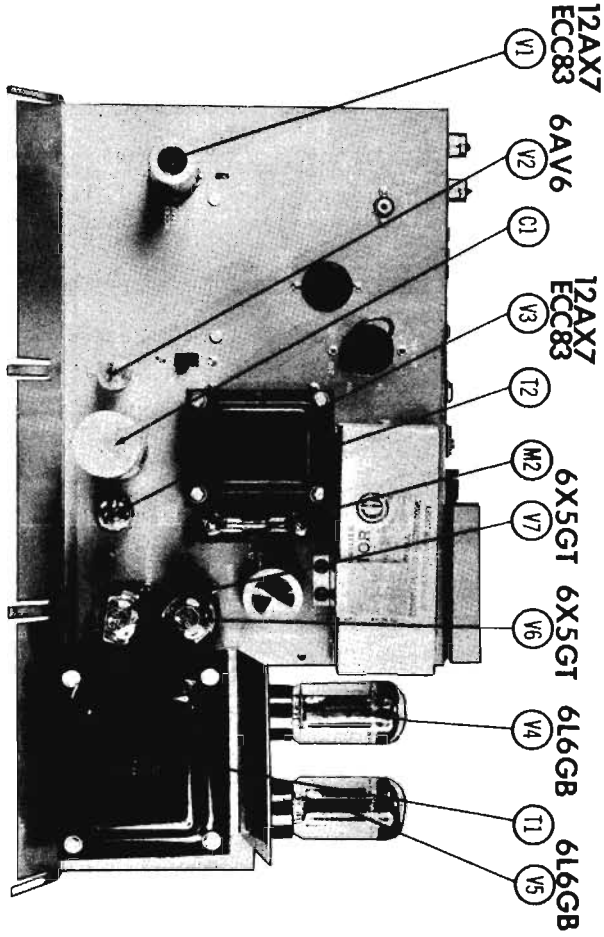
RESISTORS

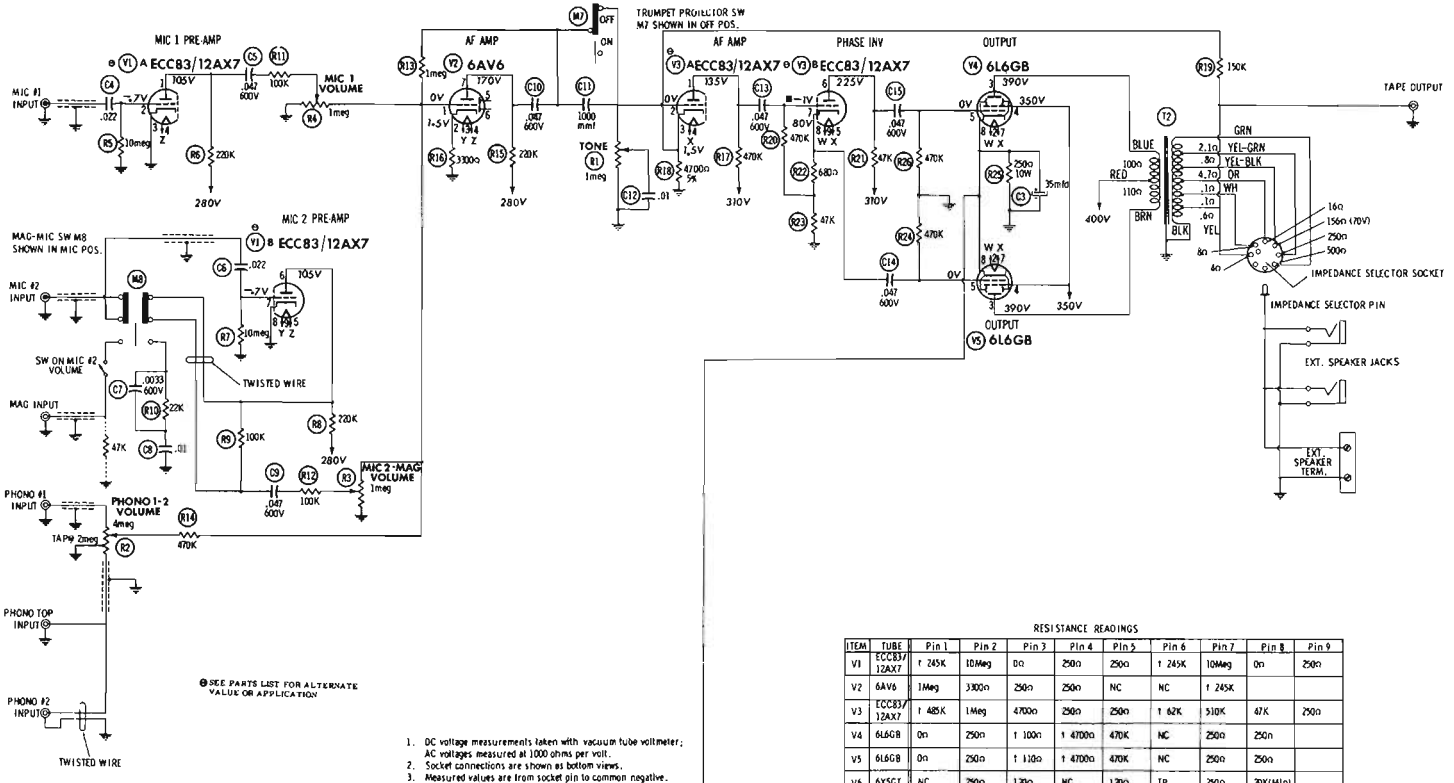
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	KNIGHT PART No.	NOTES
R5	10Meg			
R6	220K			
R7	10Meg			
R8	220K			
R9	100K			
R10	22K			
R11	100K			

ITEM No.	RATING OHMS	RATING WATT	KNIGHT PART No.	NOTES
R12	100K			
R13	1Meg			
R14	470K			
R15	220K			
R16	3300Ω			
R17	470K			
R18	4700Ω 5%			

CHASSIS—TOP VIEW



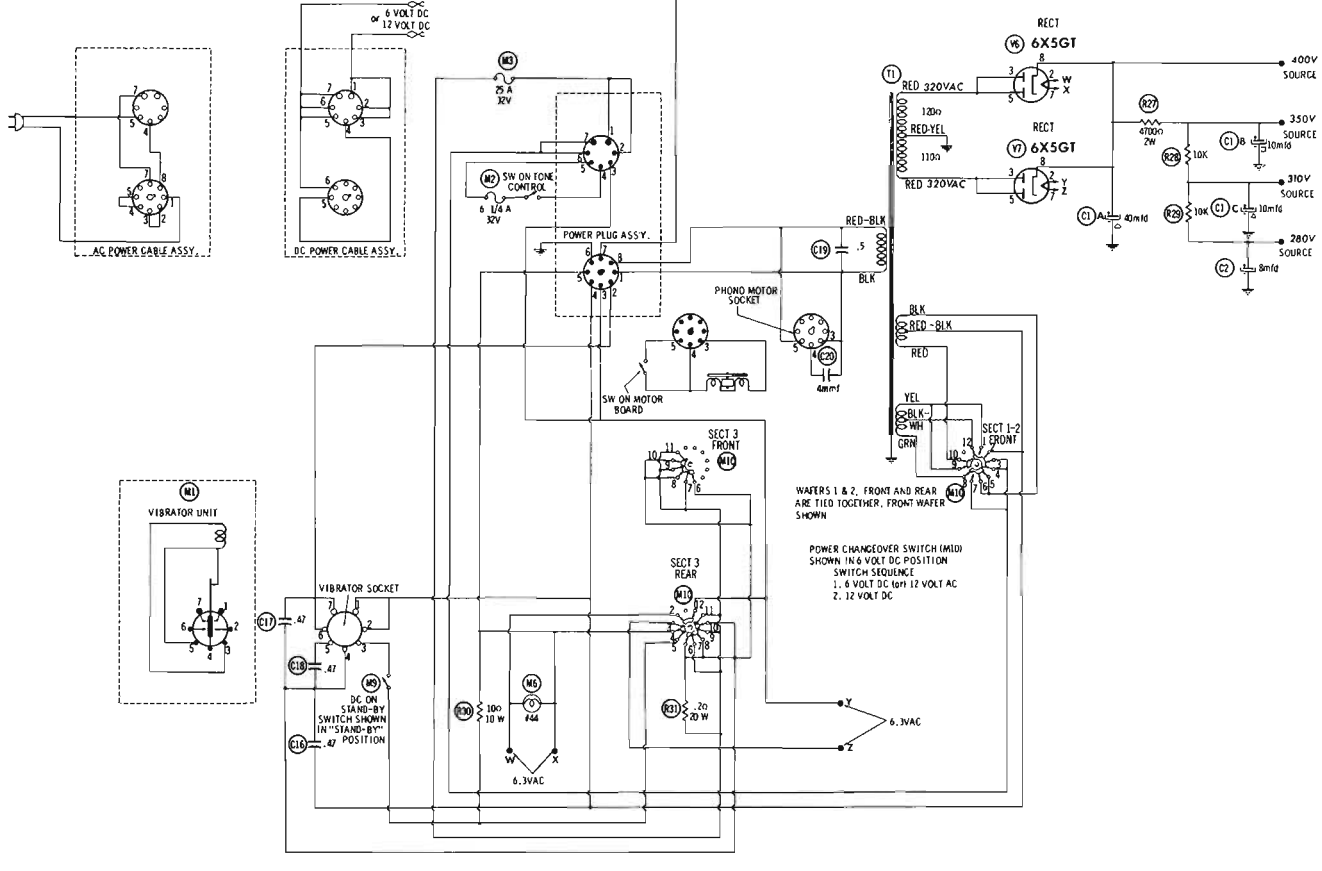


1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83/12AX7	† 245K	10Meg	0Ω	250Ω	250Ω	† 245K	10Meg	0Ω	250Ω
V2	6AV6	1Meg	3300Ω	250Ω	250Ω	NC	NC	† 245K		
V3	ECC83/12AX7	† 485K	1Meg	4700Ω	250Ω	250Ω	† 62K	510K	47K	250Ω
V4	6L6GB	0Ω	250Ω	† 100Ω	† 4700Ω	470K	NC	250Ω	250Ω	
V5	6L6GB	0Ω	250Ω	† 110Ω	† 4700Ω	470K	NC	250Ω	250Ω	
V6	6X5GT	NC	250Ω	120Ω	NC	120Ω	TP	250Ω	20K(Min)	
V7	6X5GT	NC	250Ω	110Ω	TP	110Ω	TP	250Ω	20K(Min)	

ALL MEASUREMENTS TAKEN WITH VOLTAGE SWITCH IN AC POSITION
† MEASURED FROM PIN 8 OF V7
= MEASURED FROM PIN 8 OF V3
NC NO CONNECTION
TP TIE POINT



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PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	KNIGHT PART No.	NOTES
R19	150K			
R20	470K			
R21	47K			
R22	680Ω			
R23	47K			
R24	470K			
R25	250Ω	10	RW2251-A	
R26	470K			
R27	4700Ω	2		
R28	10K			
R29	10K			
R30	10Ω	10	RW2100-B	
R31	.2Ω	20	RW3010AA	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA KNIGHT PART No.	Holldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC @.82A	680VCT @.120A	6.3VCT @.55A① or 6.3VCT @2.1A②	6.3VCT @.55A① or 6.3VCT @2.1A②	LP-0260					
	DC OPERATION									
	PRI. 1 6.3VCT @2.5A③ or 6.3VCT @3A④	680VCT @.120A								
	PRI. 2 6.3VCT @2.5A③ or 6.3VCT @3A④									

① 6V filament operation.
② 12V filament operation.
③ 6V input operation.
④ 12V input operation.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA KNIGHT PART No.	Holldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T2	6000Ω	500Ω Tap② 250Ω 70V,16Ω 8Ω,4Ω	LO-0151						

PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA KNIGHT PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	NOTES
M1	Interruptor (Parallel type)	6V(or) 12V	60~	JV-0021	6VB6UL		6VB6UL	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA KNIGHT PART No. FUSE	KNIGHT PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	3AG	6 1/4A 32V			3136.25 (3AG 6 1/4A 32V)	341001	MDL 6 1/4	HKP
M3	4AG	25A 32V			411025. (4AG 25A 32V)	456001	AGS25	4413

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA KNIGHT PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M4		55T * P-55-T	GD	56 * 2756	PT-2	* Tone arm complete with cartridge.

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

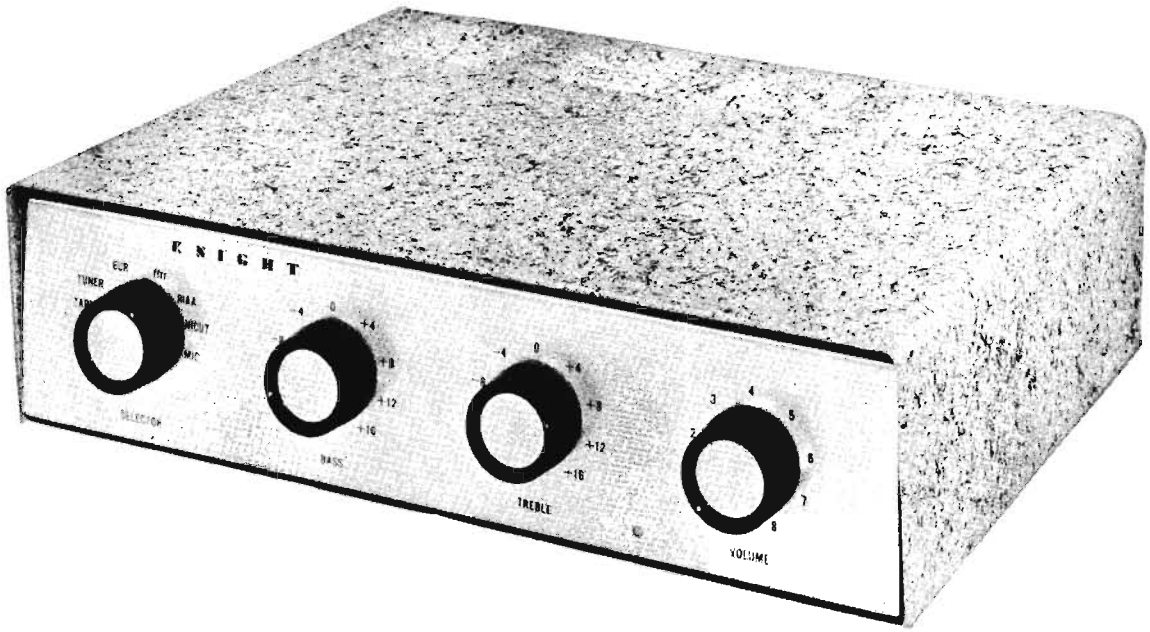
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA KNIGHT PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M5		† A-7I or †• A-7ISD or • A-7ID	• W-6TPA or † W-6TPS or †• W-6DS or • W-6TPD	• Metal † Jewel • Diamond

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M6	Indicator Lamp		#44
M7	Switch		Trumpet Protector (Slide Type SPST)
M8	Switch		Mic-Mag (Slide Type DPDT)
M9	Switch		DC ON-Stand By (Slide Type SPST)
M10	Switch	X-0305-B	Power Changeover (Rotary Wafer Type)



KNIGHT
MODELS 94SX700, 94SX708

TRADE NAME	Knight Models 94SX700, 94SX708
SUPPLIER	Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill.
TYPE SET	AC Operated 6 Channel 12 Watt Audio Amplifier
TUBES (Six)	Types 12AX7 (or) 12AD7 Preamplifier, 12AX7 Cath. Follower-1st. AF Amp., 12AX7 2nd. AF Amp.-Phase Inv., (2) 6V6GT Output, 5Y3GT Rectifier
POWER SUPPLY	105-130 Volts AC-50/60 cycles RATING .66 Amp. @ 117 Volts AC

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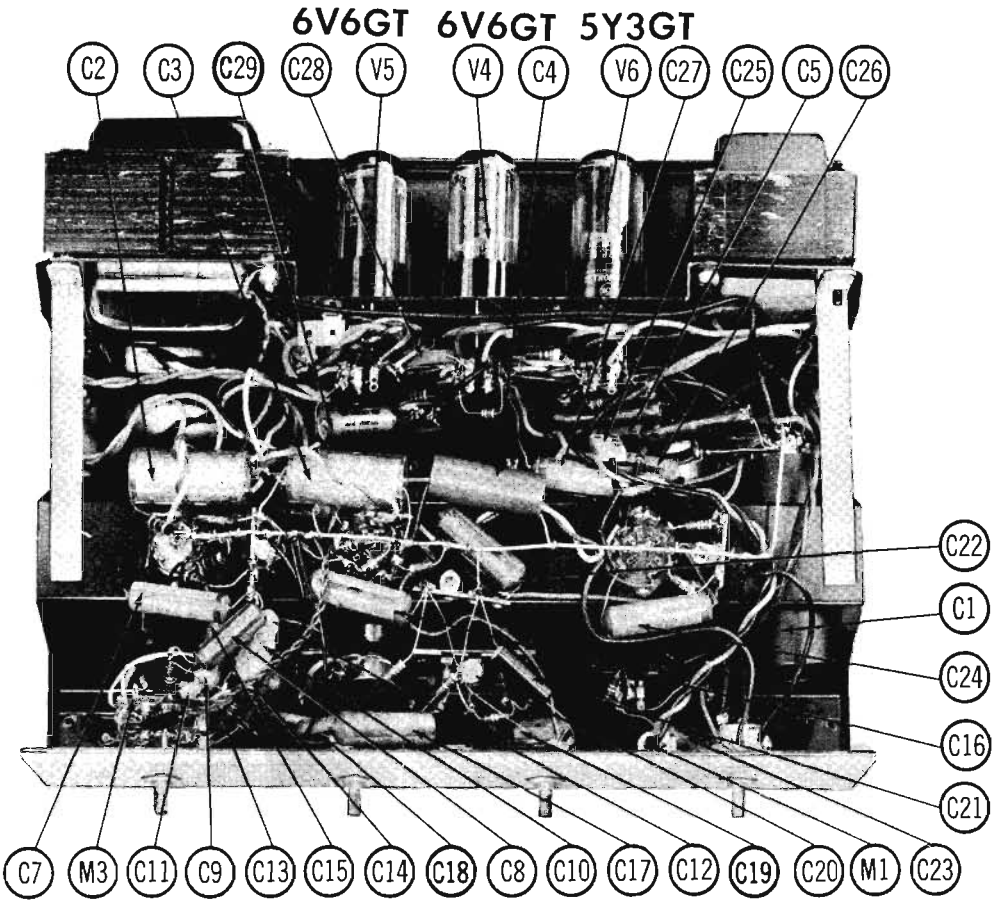
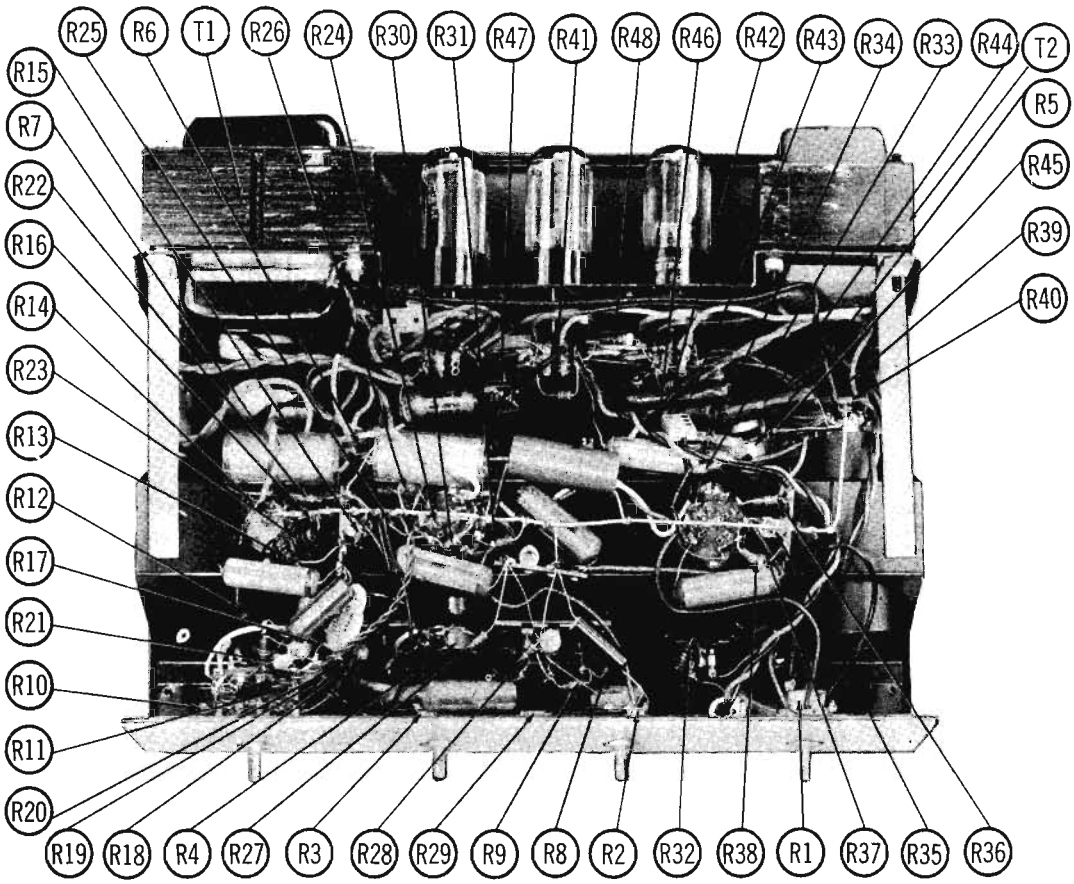


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	12AX7	Note 1
V2	Cath. Follower-1st. AF Amp	12AX7	
V3	2nd. AF Amp. -Phase Inv.	12AX7	
V4	Output	6V6GT	
V5	Output	6V6GT	
V6	Rectifier	5Y3GT	

Note 1. Type 12AD7 used in Model 94SX708.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	±40	450		AFH4-17	DO160	FP475.5	TMQ-17	Q-055	TVL-4771.3
B	±10	450							
C	±10	450							
D	10	450							
C2	8	450		PRS450V8	BR845	TC71	TD-8-450	FM-4508	TVA-1704
C3	8	450		PRS450V8	BR845	TC71	TD-8-450	FM-4508	TVA-1704
C4	35	50		PRS150V40	BR505	TC39	TD-50-50	FM-0550	TVA-1308
C5	35	50		PRS150V40	BR505	TC39	TD-50-50	FM-0550	TVA-1308
C6	8	450	(Note 1)	PRS450V8	BR845	TC71	TD-8-450	FM-4508	TVA-1704

Note 1. Used in Model 94SX708 only.

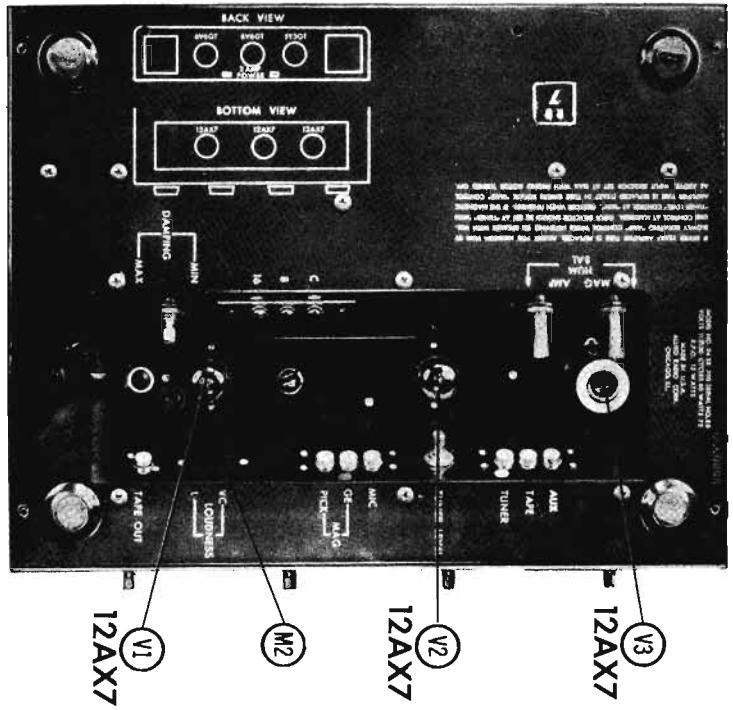
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	KNIGHT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	.033	600		BPD-03	DF-303	CUB6S33		GEM-6133	6TM-S33	
C8	.01	600		BPD-01	DD-103	CUB6S1		GEM-611	6TM-S1	
C9	270			S1270	DD-271	L10T27	ED-270	UC-5327	5GA-T27	
C10	4700			BPD-0047	D6-472	BYA10D47	GP-4700	UC-5247	5HK-D47	
C11	560			BPD-00056	DD-561	BYA10T56	ED-560	UC-5356	5GA-T56	
C12	2200			BPD-0022	D6-222	BYA10D22	GP-2200	UC-5222	5GA-D22	
C13	1000			BPD-001	DD-102	BYA8D1	ED-1000	DC521	5HK-D1	
C14	.0068	600		BPD-0068	D6-682	CUB6D68	GP-6800	GEM-6268	6TM-D68	
C15	.01	600		BPD-01	DD-103	CUB6S1	GP-10000	GEM-611	6TM-S1	Note 2
C16	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C17	.0056	600		BPD-0056	D6-562					
C18	.058	600								
C19	15			1469-000015		5R5Q15			MS-415	
C20	330			BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C21	.0033	600		BPD-0033	D6-332	CUB6D33	GP-3300	GEM-6233	6TM-D33	
C22	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C23	.01	600		BPD-01	DD-103	CUB6S1		GEM-611	6TM-S1	
C24	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C25	47			1469-000047		5R5Q47			MS-447	
C26	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C27	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C28	100			1469-0001		5R5T1			MS-S1	
C29	.02	800		BPD-02	DD-203	CUB6S2		GEM-612	6TM-S2	

Note 2. Model 94SX708 uses .1MFD in this application.

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	KNIGHT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½		BT-63	A47F4-500K	Q18-133X	UT-429	Volume - Tap ② 50K
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWE-12	78-1	US-26	
R2A	500K	½		AB-60	A47-500K-Z	Q13-133	U46	Treble
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	
R3A	500K	½		AB-60	A47-500K-Z	Q13-133	U46	Bass
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	
R4A	500K	½		AB-60	A47-500K-Z	Q13-133	U46	Tuner Level
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	
R5A	500Ω	½						Damping
B	Shaft							
C	Switch							
R6A	200Ω	1		VK-123	A43-200	VPK200	R250L	Hum balance amp. - wire wound
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R7A	200Ω	1		VK-123	A43-200	WPK-200	R250L	Hum balance Mag. - wire wound
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	KNIGHT PART No.	IRC PART No.	
R6	27K			BTS-27K	
R9	22K			BTS-22K	
R10	470K			BTS-470K	
R11	150K			BTS-150K	Note 1
R12	100K			BTS-100K	
R13	220K 5%			BTS-220K 5%	
R14	1500Ω 5%			BTS-1500 5%	
R15	22K			BTS-22K	Note 2
R16	470K			BTS-470K	
R17	100K			BTS-100K	
R18	68K			BTS-68K	Note 3
R19	68K			BTS-68K	
R20	68K			BTS-68K	
R21	68K			BTS-68K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	KNIGHT PART No.	IRC PART No.	
R22	47K 5%			DCC-47K 5%	Note 4
R23	1500Ω 5%			BTS-1500 5%	
R24	3.3Meg			BTS-3.3Meg	
R25	22K			BTS-22K	
R26	22K			BTS-22K	
R27	47K			BTS-47K	
R28	4700Ω			BTS-4700	
R29	47K			BTS-47K	
R30	220K			BTS-220K	
R31	1500Ω			BTS-1500	
R32	22K			BTS-22K	
R33	270K			BTS-270K	
R34	3000Ω 5%			BTS-3000 5%	
R35	470K			BTS-470K	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	KNIGHT PART No.	IRC PART No.	
R36	47K			BTS-47K	
R37	680Ω			BTS-680	
R38	47K			BTS-47K	
R39	4700Ω			BTS-4700	
R40	4700Ω			BTS-4700	
R41	470K			BTS-470K	
R42	470K			BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	KNIGHT PART No.	IRC PART No.	
R43	300Ω	4		PW4-300	Note 5
R44	3Ω	10		PW10-3	
R45	47Ω 5%			BTS-47	
R46	270Ω 5%	1		BTA-270	
R47	2200Ω	2		BTB-2200	
R48	4.7Ω			BW½-4.7	Note 6

Note 1. 470K used in Model 948X708 only.
Note 2. 100K used in Model 948X708 only.
Note 3. 3300Ω used in Model 948X708 only.
Note 4. 220K used in Model 948X708 only.
Note 5. Some versions may use 350Ω in this application.
Note 6. 6.8Ω used in Model 948X708 only.

TRANSFORMER (POWER)

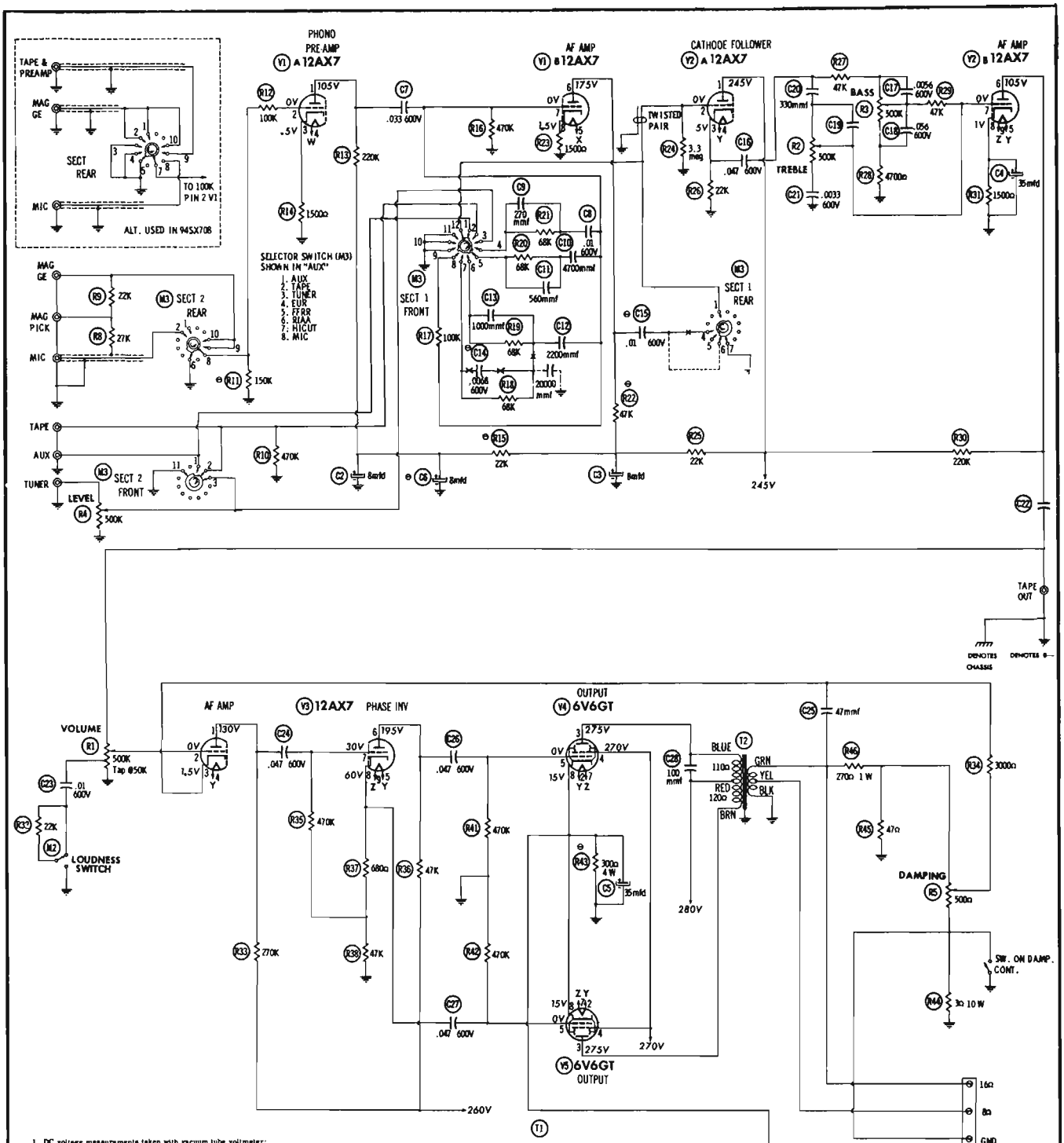
ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	130VAC tap ① 117VAC ② .66A	855VCT ③ .075A	5VAC ④3A	10.6VAC ⑤ .19A SEC. 4 6.3VAC ⑥1.75A	LP-0246					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	7600Ω CT	16Ω tap ⑦ 8Ω	LO-0136-H						

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M1	Dial Lamp		#47
M2	Switch		Loudness, Slide type (SPDT)
M3	Switch		Function Selector, wafer type (2 gang)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

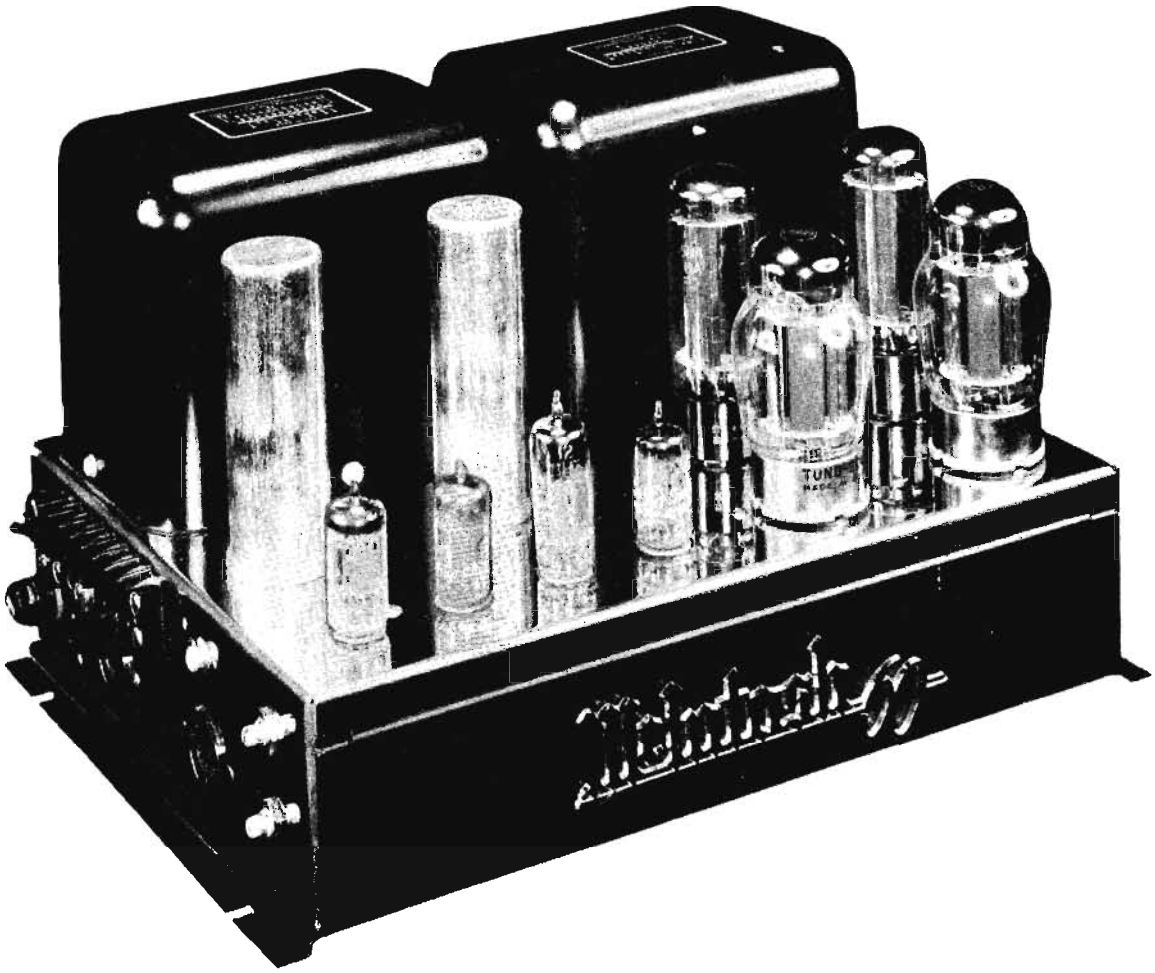
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†270K	100K	1500Ω	320Ω	320Ω	†80K	470K	1500Ω	320Ω
V2	12AX7	†11K	3.3Meg	22K	320Ω	320Ω	†230K	50K	1500Ω	320Ω
V3	12AX7	†275K	0Ω	3000Ω	320Ω	320Ω	†55K	500K	47K	320Ω
V4	6V6GT	TP	320Ω	†110Ω	†2200Ω	470K	TP	320Ω	300Ω	
V5	6V6GT	TP	320Ω	†120Ω	†2200Ω	470K	TP	320Ω	300Ω	
V6	5Y3GT	TP	20K	TP	100Ω	TP	110Ω	NC	20K	

ALL MEASUREMENTS TAKEN IN "AUX" POSITION.
† MEASURED FROM PIN 8 OF V6.
NC NO CONNECTION.
TP TIE POINT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC



MC INTOSH
MODEL MC-60

TRADE NAME	Mc Intosh Model MC-60
MANUFACTURER	Mc Intosh Laboratory, Inc., 320 Water St., Binghamton, N.Y.
TYPE SET	AC Operated 60 Watt Audio Amplifier
TUBES (Eight)	Types 12AX7 AF Amp.-Volt.Reg., 12AU7 AF Amp.-Phase Inv., 12BH7 AF Amp., 12AX7 Driver, (2) 6550 Output, (2) 5U4GA Rectifier
POWER SUPPLY	110-130 Volts AC-50/60 Cycles RATING 1.2 Amp. @ 117 Volts AC

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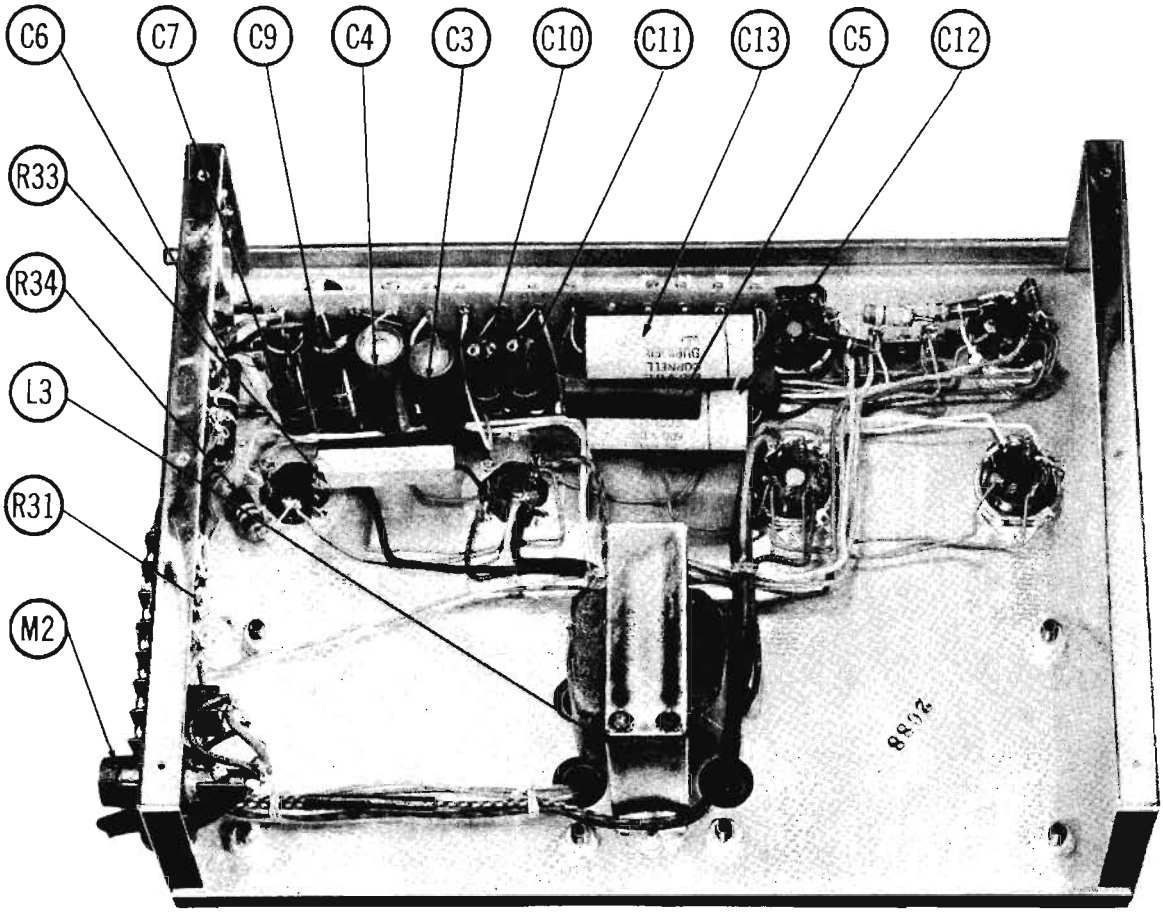
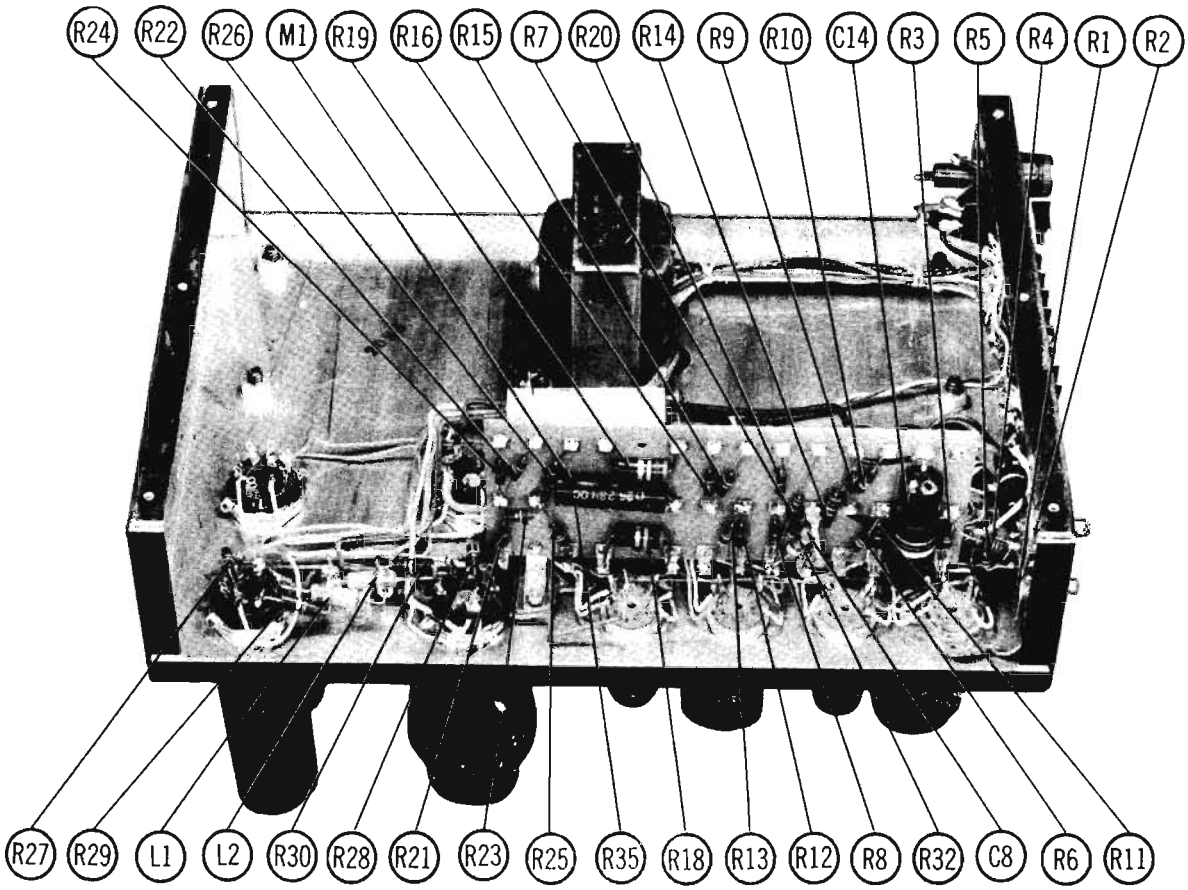


CHASSIS-BOTTOM VIEW



CHASSIS-BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp.-Voltage Reg.	12AX7	
V2	AF Amp.-Phase Inv.	12AU7	
V3	AF Amplifier	12BH7	
V4	Driver	12AX7	

ITEM No.	USE	TYPE	NOTES
V5	Output	6550	
V6	Output	6550	
V7	Rectifier	5U4GA	
V8	Rectifier	5U4GA	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA MC INTOSH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	500						T-160	R2309 *
B	▲80	450						D-270	
C	▲20	450							
C2A	▲40	500						T-160	R2309 *
B	▲80	450						D-270	
C	▲20	450							
C3	100	12	(Note 1)	PRS12V100	BBR100-12	TC250	TD-100-15	MTH-1210	TVA-1130
C4	8	250	(Note 2)	PRS250V8	BBR825	TC81	TD-8-250	FM-2508	TVA-1503
C5	10	450		PRS450V10	BR1045	TC72	TD-10-450	FM-4510	TVA-1705

Note 1. Chassis with serial numbers 500-1703 inclusive use 20MFD in this application.
Note 2. Chassis with serial numbers 500-1703 inclusive use .22MFD in this application.
* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

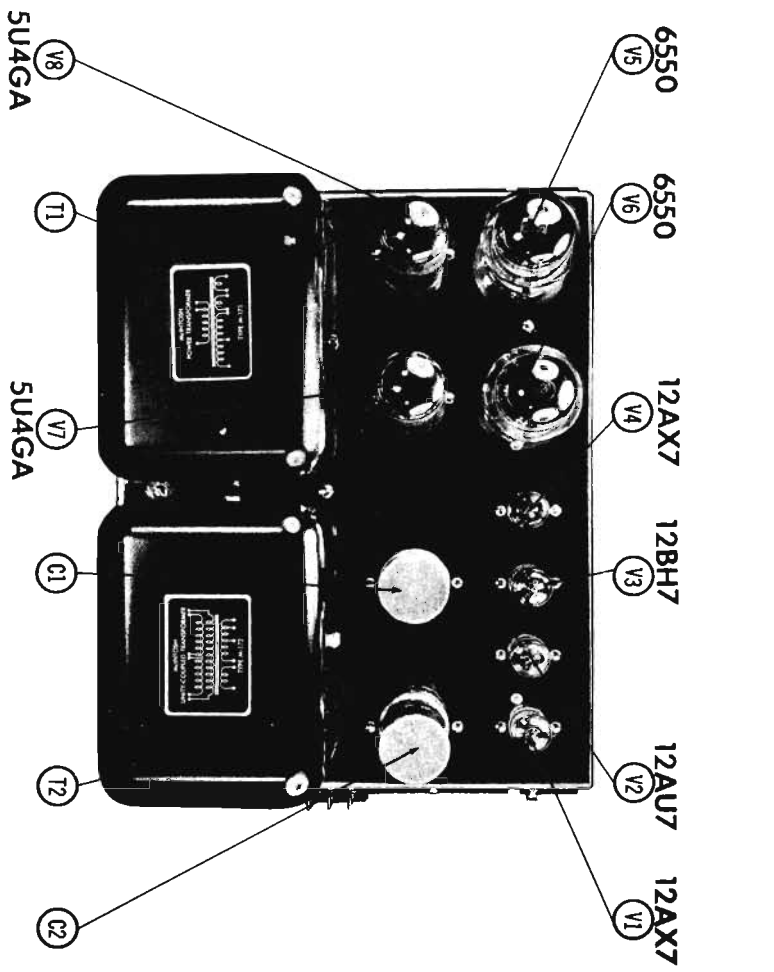
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA MC INTOSH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	.1	400		P466N-1	DF-104	CUB4P1		PT401	4TM-P1	
C7	.47	200		P288N-47		CUB2P47		PT4047	2TM-P47	
C8	470			1464-00047	D6-471	SR5T47	811-471		MS-347	
C9	.22	400		P488N-22		CUB4P22		PT4022	4TM-P22	
C10	.047	600		BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C11	.047	600		BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C12	.25	600		P688N-25		CUB6P25		PT6025	6TM-P25	
C13	.25	600		P688N-25		CUB6P25		PT6025	6TM-P25	
C14	.47	200		P288N-47		CUB2P47		PT4047	2TM-P47	Note 1

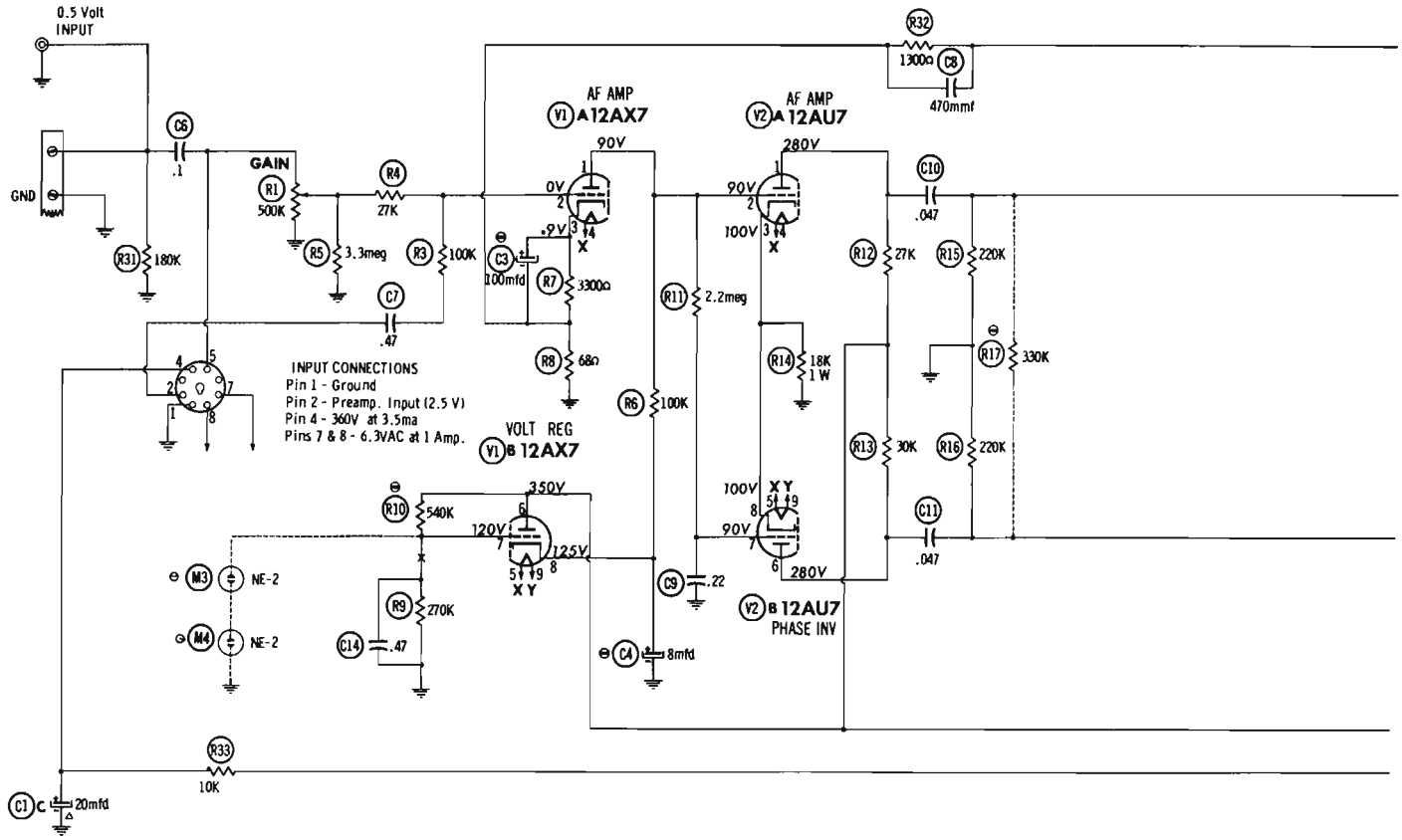
Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MC INTOSH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	50K	½	BY9859	BX-59	A47-500X-8	QI-133	U50	Gain
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R1A
R2A	250Ω	½	BB2859	AB-2		QI-201		Hum
B	Shaft		Not Req.	AK-1		Not Req.		Attach to R2A

CHASSIS—TOP VIEW





RESISTANCE READINGS

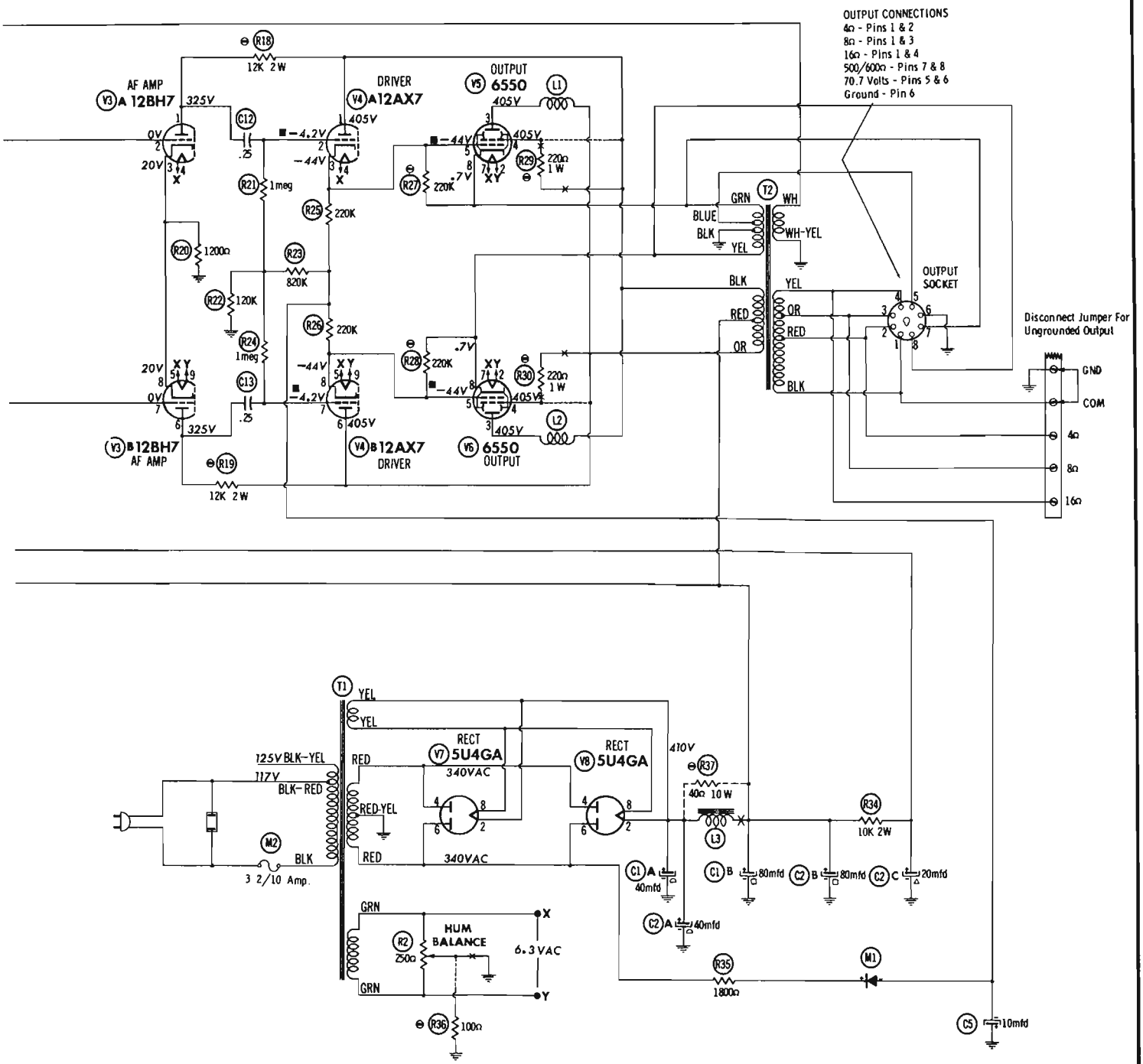
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	150K	27K	3300Ω	65Ω	65Ω	†10K	185K	19K	65Ω
V2	12AX7	†37K	1:	18K	65Ω	65Ω	†40K	2.3 Meg	18K	65Ω
V3	12BH7	†13K	220K	1200Ω	65Ω	65Ω	†13K	220K	1200Ω	65Ω
V4	12AX7	†50Ω	1.1Meg	140K	65Ω	65Ω	†53Ω	1.1Meg	140K	65Ω
V5	6550	0Ω	65Ω	†50Ω	†290Ω	140K	NC	65Ω	15Ω	
V6	6550	0Ω	65Ω	†53Ω	†290Ω	140K	NC	65Ω	12Ω	
V7	5U4GA	NC	19K	NC	20Ω	NC	19Ω	NC	19K	
V8	5U4GA	NC	19K	NC	20Ω	NC	19Ω	NC	19K	

■ CONTROL GRID VOLTAGE MEASURED FROM CATHODE
† MEASURED FROM PIN 8 OF V8.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC


OUTPUT CONNECTIONS
4Ω - Pins 1 & 2
8Ω - Pins 1 & 3
16Ω - Pins 1 & 4
500/600Ω - Pins 7 & 8
70.7 Volts - Pins 5 & 6
Ground - Pin 6
AF AMP
V3A 12BH7
DRIVER
V4A12AX7
OUTPUT
V5 6550
R18 12K 2W
C12
R21 1meg
R25 220K
R20 1200Ω
R23 820K
R22 120K
R24 1meg
R26 220K
C13
R19 12K 2W
R27 220K
R28 220K
R29 220Ω 1W
R30 220Ω 1W
L1
L2
T2
GRN
WH
BLUE
BLK
YEL
WH-YEL
OR
RED
OUTPUT SOCKET
Disconnect Jumper For Ungrounded Output
GND
COM
4Ω
8Ω
16Ω
V3B 12BH7
AF AMP
V4B 12AX7
DRIVER
V6 6550
OUTPUT
T1
125V BLK-YEL
117V
BLK-RED
RED-YEL
M2
3 2/10 Amp.
RECT
V7 5U4GA
340VAC
V8 5U4GA
410V
R37
40Ω 10W
L3
R34 10K 2W
C1A 40mfd
C1B 80mfd
C2B 80mfd
C2C 20mfd
C2A 40mfd
HUM BALANCE
R2 250Ω
6.3VAC
R35 1800Ω
M1
C5 10mfd
R36 100Ω

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MC INTOSH PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R3	100K			BTS-100K	
R4	27K			BTS-27K	
R5	3.3Meg			BTS-3.3Meg	
R6	100K			BTS-100K	
R7	330Ω			BTS-330	
R8	68Ω 5%			BTS-68 5%	
R9	270K 5%			BTS-270K 5%	Note 1
R10	560K 5%			BTS-560K 5%	Note 2
R11	2.2Meg			BTS-2.2Meg	
R12	27K 5%			BTS-27K 5%	
R13	30K 5%			BTS-30K 5%	
R14	18K	1		BTA-18K	
R15	220K			BTS-220K	
R16	220K			BTS-220K	
R17	330K			BTS-330K	Note 1
R18	12K	2		BTS-12K	Note 3
R19	12K	2		BTS-12K	Note 3
R20	1200Ω			BTS-1200	
R21	1Meg			BTS-1Meg	
R22	120K 5%			BTS-120K 5%	
R23	620K 5%			BTS-620K 5%	
R24	1Meg			BTS-1Meg	
R25	220K			BTS-220K	
R26	220K			BTS-220K	
R27	220K			BTS-220K	Note 4
R28	220K			BTS-220K	Note 4
R29	220Ω	1		BTA-220	Note 4
R30	220Ω	1		BTA-220	Note 4
R31	180K			BTS-180K	Note 4
R32	1300Ω 5%			BTS-1300 5%	
R33	10K	10		PW10-10K	
R34	10K	2		BTS-10K	
R35	1800Ω			BTS-1800	
R36	100Ω			BTS-100	Note 1
R37	40Ω	10		1 3/4A-40	Note 5

Note 1. Not used in some versions.
Note 2. In models with serial numbers from 500 to 1703 a 1.2Meg is used in this application.
Note 3. R18 and R19 are matched to within 1%.
Note 4. Not used in models with serial numbers from 500 to 1703.
Note 5. Use only in models with serial numbers from 500 to 1703.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA MC INTOSH PART No.	Hollidorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	125VAC tap ⓐ 117VAC ⓐ1.2A	680VCT ⓐ.118A	5VAC ⓐ 6A	6.3VAC ⓐ4.8A	M-171				26R25U ①	

① Tape 6.3V ⓐ.06A winding. Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA MC INTOSH PART No.	Hollidorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T2	610Ω	16Ω tap ⓐ 8Ω, 4Ω	M-172						

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MC INTOSH PART No.	REPLACEMENT DATA MEISSNER PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA MILLER PART No.	NOTES
L1	RF Choke	2Ω						2.7 Microhenries, IRC part #CLA
L2	RF Choke	.8Ω			19-1001		4604	1.5 Microhenries, IRC part #CLA

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 ~(~)	REPLACEMENT DATA MC INTOSH PART No.	Hollidorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
L3	.118A	37.5Ω	1.84 HY	M-174	C5037 ①	C-2974 ①	C-2325 ①	26C43 ①	C-17X ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

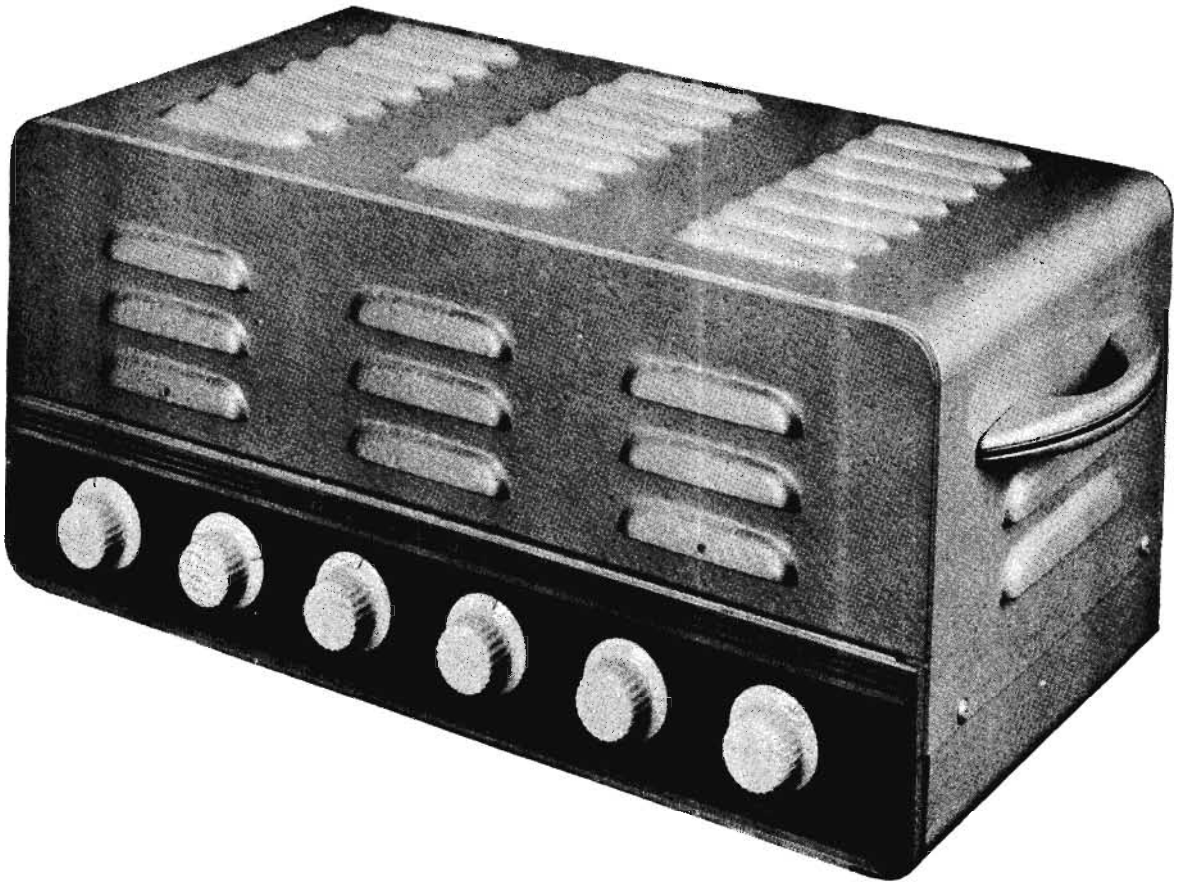
ITEM No.	RATING CURRENT	REPLACEMENT DATA MC INTOSH PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.003A	026-28HQC		V20HP		HXL30	026-28H-QC	

FUSES

ITEM No.	TYPE	RATING	MC INTOSH PART No. FUSE	MC INTOSH PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	3AG S/B	3 2/10A			31303.2 (3AG S/B 3 2/10A)	342001	MDL3 2/10	HKP

MISCELLANEOUS

ITEM No.	PART NAME	MC INTOSH PART No.	NOTES
M3	Neon Bulb		#NE2 (Voltage Regulator) Not used in some versions.
M4	Neon Bulb		#NE2 (Voltage Regulator) Not used in some versions.



NEWCOMB
MODEL H-25

TRADE NAME	Newcomb Model H-25
MANUFACTURER	Newcomb Audio Prod. Co., 6824 Lexington Ave., Hollywood 38, California
TYPE SET	AC Operated 4 Channel 25 Watt Audio Amplifier
TUBES (Eight)	Types 6SF5 Mic 1 Preamplifier, 6SF5 Mic 2 Preamplifier, 6SF5 Mic 3 Preamplifier, 6SJ7 AF Amplifier, 6SN7GTB AF Amp.-Phase Inv., (2)6L6GB Output, 5U4GB Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.1 Amp. @ 117 Volts AC (120 Watts)

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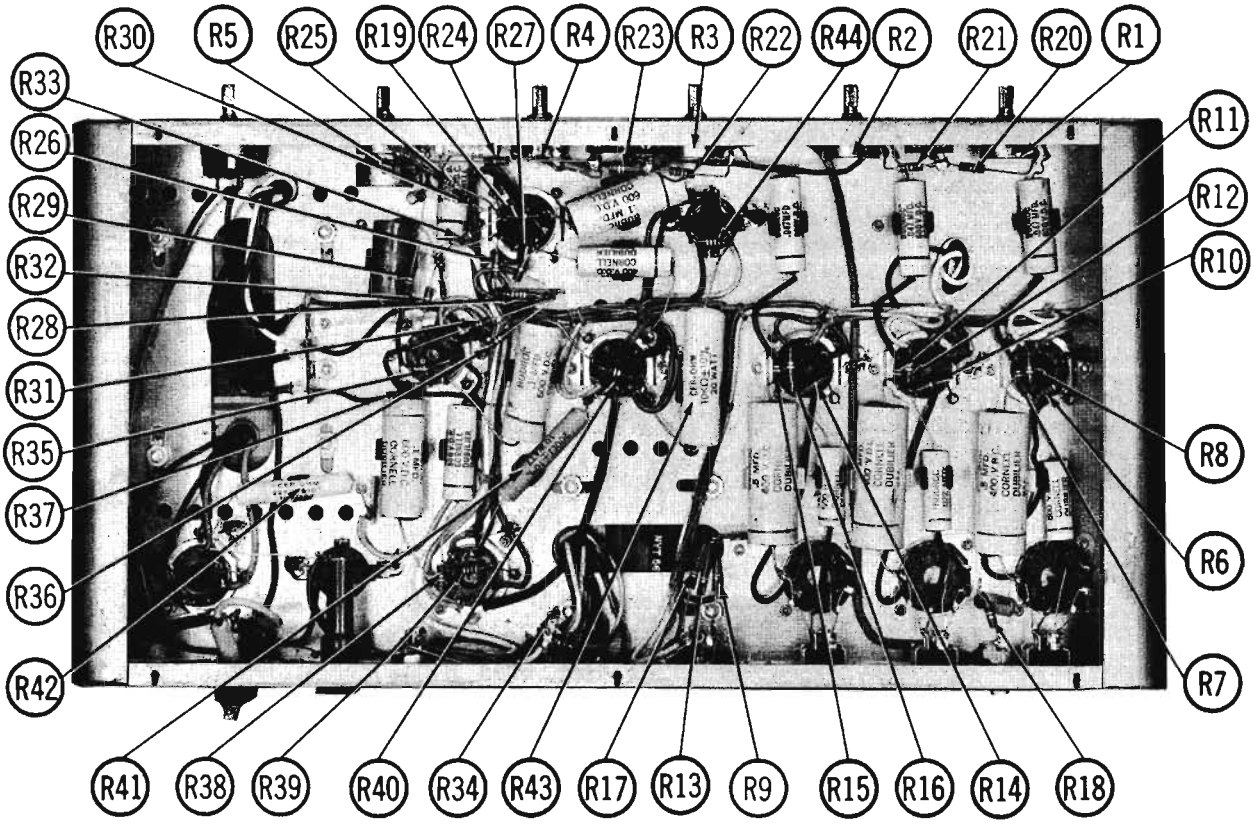
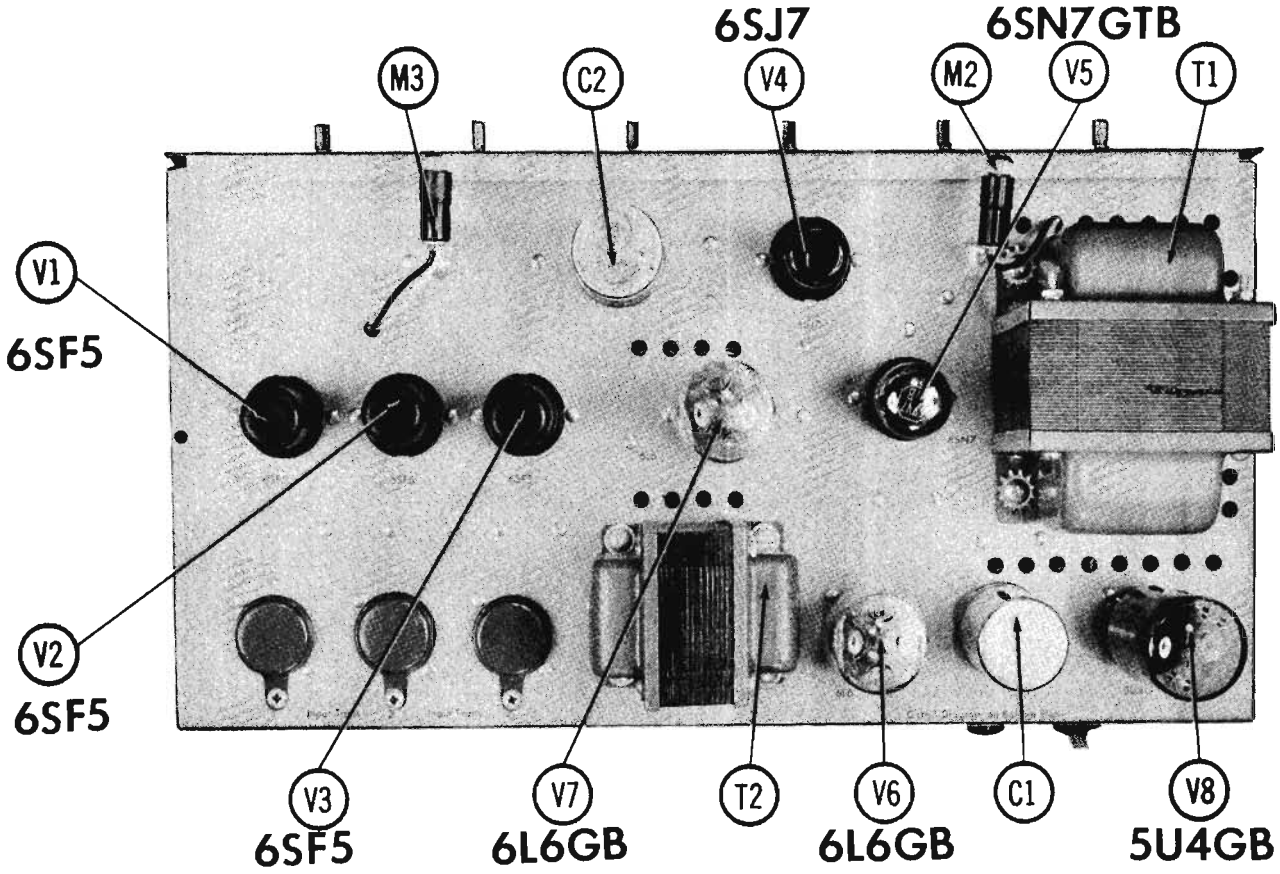
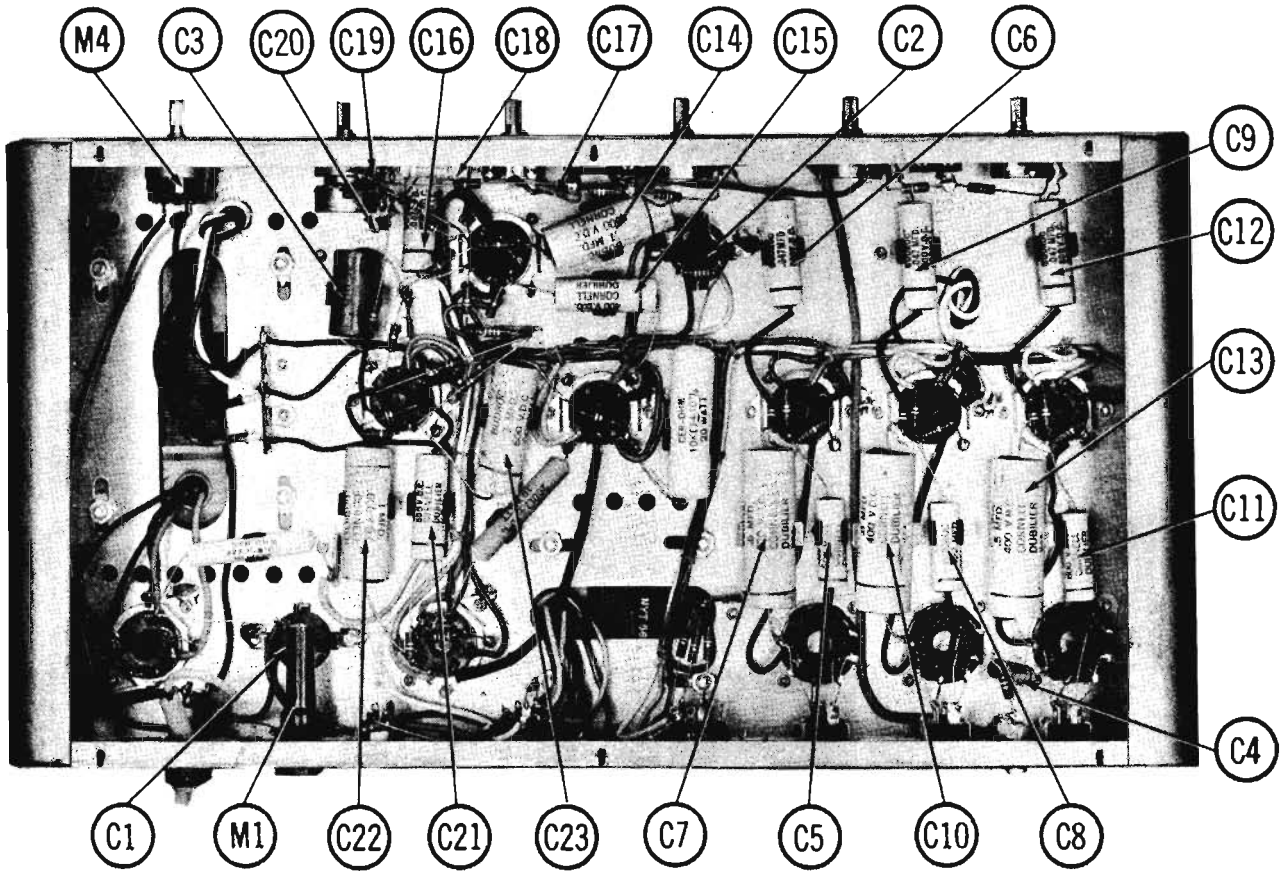


CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION



CHASSIS TOP VIEW



CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	MIC 1 Preamplifier	6SF5	
V2	MIC 2 Preamplifier	6SF5	
V3	MIC 3 Preamplifier	6SF5	
V4	AF Amplifier	6SJ7	
V5	AF Amp. -Phase Inv.	6SN7GTB	
V6	Output	6L6GB	
V7	Output	6L6GB	
V8	Rectifier	5U4GB	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA NEWCOMB PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲ 60	500	CE-33	AFH3-53	C0373	WP475.5		T-205	R2409*
B	▲ 10	475	①					MT-4710	
C2A	▲ 20	475	CE-30	AFH4-19-10		FP474.5		Q-070	R2405*
B	■ 10	475				TC30		MT-0525	
C	▲ 10	475							
D	25	50							
C3	25	50	CE-9	PRS50V25	BBR25-50	TC36	TD-25-50	MT-0525	TVA-1306

① Not used in this version

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA NEWCOMB PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.004	600	CP-66	P688N-004	D6-402	CUB6D4	GP-4000	GEM-6124	6TM-D4	
C5	.022	600	CP-47	P688N-022	DD-203	CUB6S22	ED-02	GEM-6122	6TM-S22	Note 1
C6	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C7	.5	400	CP-74	P488N-5		CUB4P5		GEM-405	4TM-P5	
C8	.022	600	CP-47	P688N-022	DD-203	CUB6S22	ED-02	GEM-6122	6TM-S22	Note 1
C9	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C10	.5	400	CP-74	P488N-5		CUB4P5		GEM-405	4TM-P5	
C11	.022	600	CP-47	P688N-022	DD-203	CUB6S22	ED-02	GEM-6122	6TM-S22	Note 1
C12	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C13	.5	400	CP-74	P488N-5		CUB4P5		GEM-405	4TM-P5	
C14	.1	600	CP-52	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C15	.1	400	CP-51	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C16	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C17	470		CM-25	S1470	D6-471	LT6T47	GP-470	UC-5347	5GA-T47	
C18	.004	600	CP-66	P688N-004	D6-402	CUB6D4	GP-4000	GEM-624	6TM-D4	Note 2
C19	1500		CM-27	S11500	D6-152	LT6D15	GP-1500	UC-5215	5GA-D15	
C20	470		CM-25	S1470	D6-471	LT6T47	GP-470	UC-5347	5GA-T47	
C21	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C22	.1	600	CP-52	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C23	.1	600	CP-52	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	

Note 1. Some versions may use .05mfd in this application

Note 2. Some versions may use .004mfd in this application

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA NEWCOMB PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	RV-41K	B-60	A47-500K-Z	Q13-133	U48	Channel 1 (Mike)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	500K	½	RV-41K	B-60	A47-500K-Z	Q-13-133	U48	Channel 2 (Mike)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	1meg	½	RV-83K	BT-71	A47F5-1meg	QVC-539X	UT-443	Channel 3 (Phono-Mike)
								Tap@500K
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4	6meg	½	RV-60K					Treble, Tap@500K
R5A	5meg	½	RV-57K					Bass
R5B	5meg	½						Bass

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	NEWCOMB PART No.	NOTES
R6	18meg		RR-140	
R7	270K		RR-31	
R8	270K		RR-31	
R9	180K		RR-29	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	NEWCOMB PART No.	NOTES
R10	18meg		RR-140	
R11	270K		RR-31	
R12	270K		RR-31	
R13	180K		RR-29	
R14	18meg		RR-140	
R15	270K		RR-31	
R16	270K		RR-31	
R17	180K		RR-29	
R18	100K		RR-27	
R19	10meg		RR-46	
R20	330K		RR-32	
R21	330K		RR-32	
R22	330K		RR-32	
R23	270K		RR-31	
R24	2.7meg		RR-41	
R25	330K		RR-32	
R26	560K		RR-34	
R27	2.2meg		RR-40	
R28	33K		RR-23	
R29	100K		RR-27	
R30	680K		RR-35	
R31	100K		RR-27	
R32	2200Ω		RR-10	
R33	220Ω		RR-2	
R34	3300Ω		RR-12	
R35	560K		RR-34	
R36	100K		RR-27	
R37	2700Ω		RR-11	
R38	270K		RR-31	
R39	33K		RR-23	
R40	270K		RR-31	
R41	200Ω	10	RR-100	
R42	2250Ω	10	RR-126	
R43	10K	20	RR-127	
R44	33K		RR-23	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA NEWCOMB PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117V @1.1A	720VCT @.170A	5V @3A	6.3VCT @6A	TR-201				22R07	R-18A

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA NEWCOMB PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T2	4500Ω CT	500ΩTap @250Ω 70V,18Ω 8Ω,&4Ω	TR-137						

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA NEWCOMB PART No. FUSE	NEWCOMB PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	2A 250V	FA-5		312002. (3AG 2A 250V)	341001	AGC2	HKP

MISCELLANEOUS

ITEM No.	PART NAME	NEWCOMB PART No.	NOTES
M2	Pilot Lamp	DL-5	#51
M3	Pilot Lamp	DL-5	#51
M4	Switch	SY-81	Power On-Off (SPST)

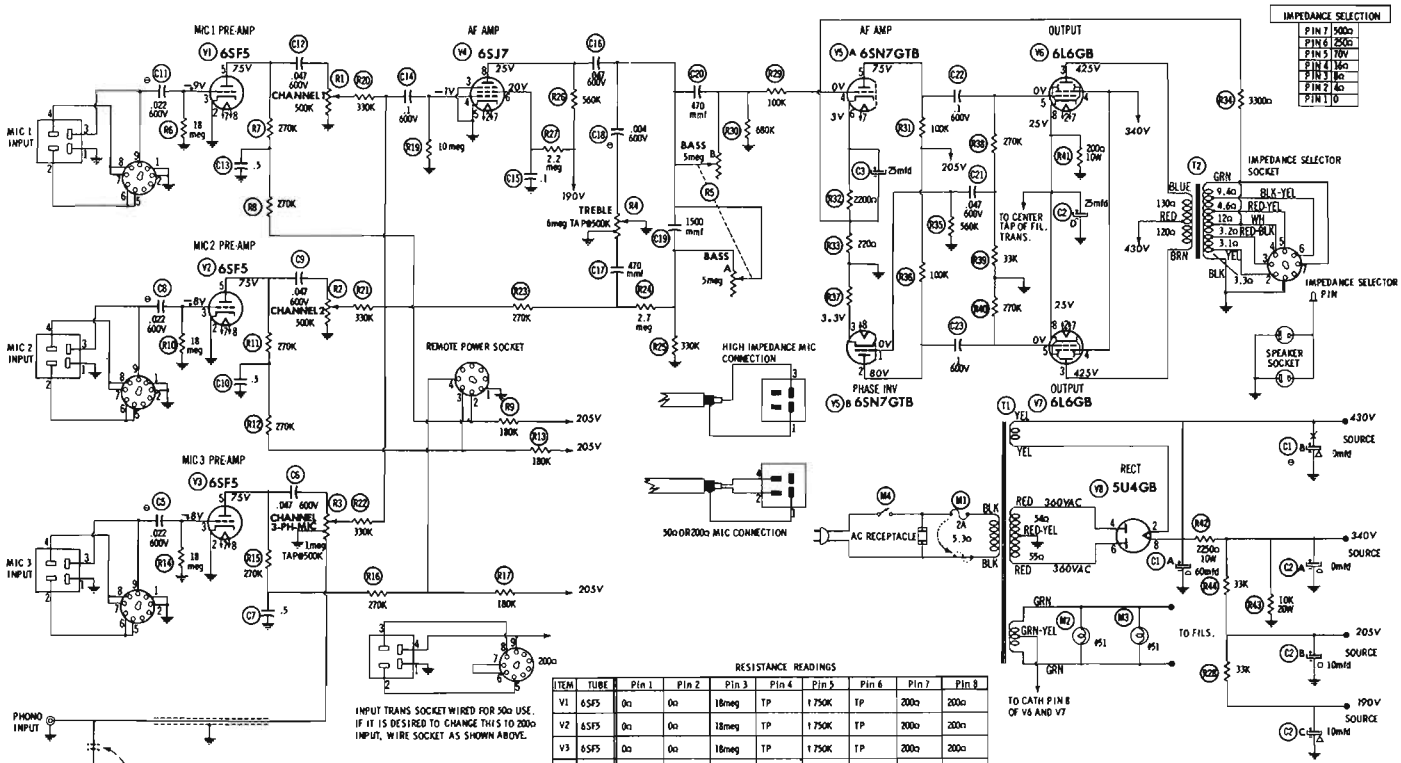
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	KA-15K	Ivory (8 used)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	6SF5	0Ω	0Ω	18meg	TP	†750K	TP	200Ω	200Ω
V2	6SF5	0Ω	0Ω	18meg	TP	†750K	TP	200Ω	200Ω
V3	6SF5	0Ω	0Ω	18meg	TP	†750K	TP	200Ω	200Ω
V4	6SJ7	0Ω	200Ω	0Ω	10meg	0Ω	2.2meg	200Ω	†570 K
V5	6SN7GTB	560K	†135K	2700Ω	650K	†135K	2400Ω	200Ω	200Ω
V6	6L6GB	0Ω	200Ω	†130Ω	†2250Ω	300K	TP	200Ω	200Ω
V7	6L6GB	0Ω	200Ω	†120Ω	†2250Ω	270K	NC	200Ω	200Ω
V8	5U4GB	0Ω	20K(min)	NC	54Ω	NC	55Ω	NC	20K(min)

† MEASURED FROM PIN 8 OF V8
NC NO CONNECTION
TP TIE POINT

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

TRADE NAME	Pacemaker Model PM 20
MANUFACTURER	Bell Sound Systems Inc., 555 Marion Road, Columbus 7, Ohio
TYPE SET	AC Operated 3 Channel 20 Watt Audio Amplifier
TUBES (Six)	Types 6AV6 Mic Preamplifier, 6AV6 AF Amplifier, 12AX7 AF Amp.-Phase Inv., (2) 6V6GT Output, 6AX5GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING .77 Amp. @ 117 Volts AC (78 Watts)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

H404

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mic Preamplifier	6AV6	
V2	AF Amplifier	6AV6	
V3	AF Amp. -Phase Inv.	12AX7	
V4	Output	6V6GT	
V5	Output	6V6GT	
V6	Rectifier	6AX5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	Bell Sound PART No.	REPLACEMENT DATA AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	20	450		PR3-055	BBRT1145	WT700	TDLD-28	T-700	R2580 *
B	10	450			BR1005		TD-100-50	MT-0550	
C	100	50							
C2A	10	450		PRS450V1010	BBRT1145	TCD72	TDLD-28	FMD-4510	TVA-2722
B	10	450							
C3	150	15		PRS50V150	BR1505	TC1502	TD-150-50	8055	R2586 *

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	Bell Sound PART No.	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	10000			BPD-01	DD-103	BYA5S1	ED-01	DC511	5HK-S1	
C5	10000			BPD-01	DD-103	BYA5S1	ED-01	DC511	5HK-S1	
C6	.05	400		P488N-05	DF-503	CUB485		GEM-415	4TM-S5	
C7	470			1484-00047	D6-471	5R5T47	ED-470		MS-347	10%
C8	.005	400						GEM-1635		10%
C9	.003	400						GEM-1623		10%
C10	10000			BPD-01	DD-103	BYA5S1	ED-01	DC511	5HK-S1	
C11	.05	400		P488N-05	DF-503	CUB485		GEM-415	4TM-S5	
C12	.05	400		P488N-05	DF-503	CUB485		GEM-415	4TM-S5	
C13	.001	1600		P1688N-001	DDI6-102	CUB16D1		GEM-1621	MB-D1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Bell Sound PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	B20066P140	B-70	A47-1meg-Z	Q13-137	U53	Mic
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2A	1meg	½	B20066P140	B-70	A47-1meg-Z	Q13-137	U53	Phono
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	100Ω	2	B20066P141	WN-101	A43-100	WPK-100	RL00L	Hum Balance -Wire wound
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	

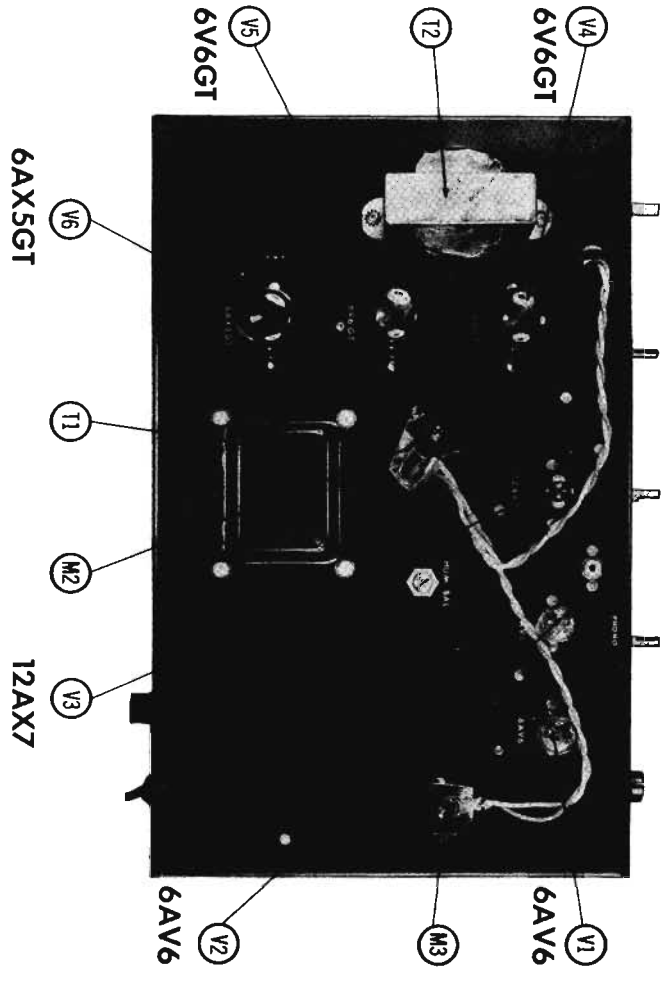
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Bell Sound PART No.	NOTES
R4	4.7meg			
R5	100K			
R6	270K			
R7	270K			
R8	270K			
R9	47K			
R10	3300Ω			
R11	68K			
R12	150K			
R13	470K			
R14	47K			
R15	47K			
R16	1meg			
R17	270K			
R18	470K			
R19	6800Ω 5%			
R20	910K 5%			
R21	2200Ω			
R22	1meg			
R23	220K			
R24	47K			
R25	3300Ω			
R26	220K			
R27	270K			
R28	250Ω	4		
R29	270K			
R30	1500Ω	1		Note 1
R31	1500Ω	1		Note 2
R32	470K			

Note 1. Some versions may use 2700Ω 2W in this application.
Note 2. Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	Bell Sound PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .77A	750VCT @ .090A	6.3V @ 3.6A	B-20297		P-2952		PM8409	24R04	R-11B

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Bell Sound PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5700Ω	70V tap @ 16Ω, 8Ω, 4Ω	B-20295		A-3028①					① Use 250Ω tap as 70V tap.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Bell Sound PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 125V S/B			313002. (3AG-2A-125V-S/B)	342001	MDL2	HKP

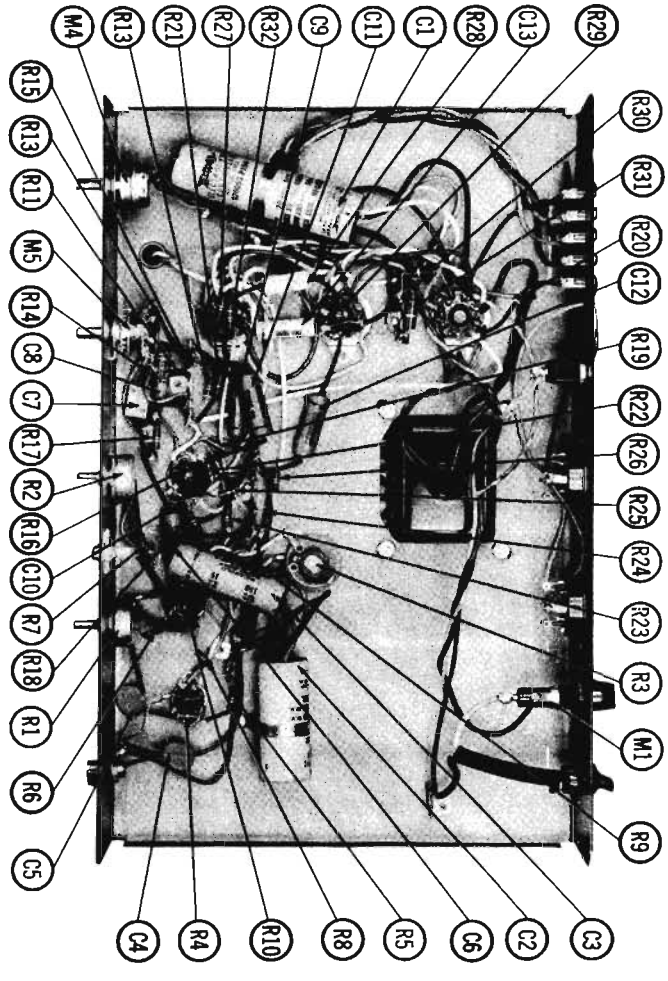
MISCELLANEOUS

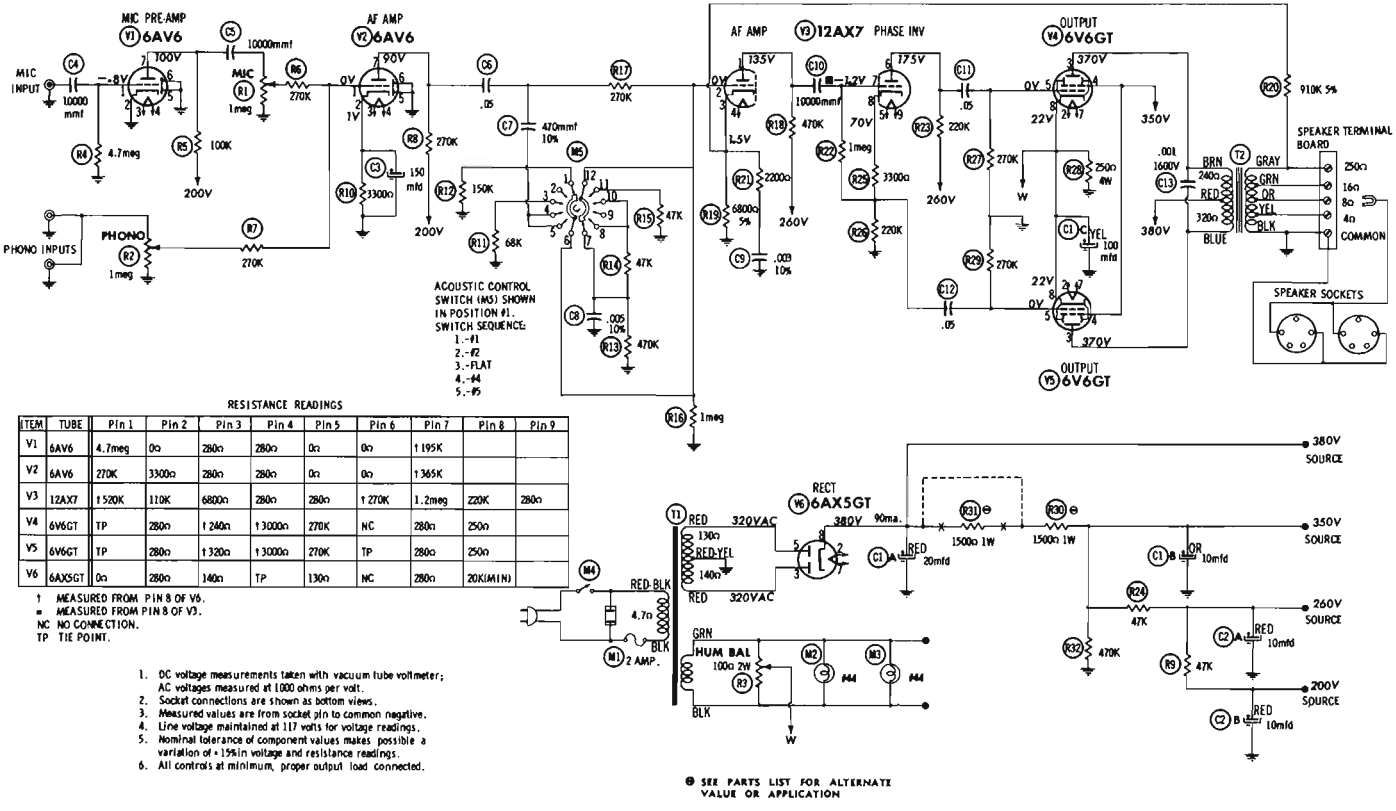
ITEM No.	PART NAME	Bell Sound PART No.	NOTES
M2	Pilot Lamp		#44
M3	Pilot Lamp		#44
M4	Switch		Power On-Off (SPST)
M5	Switch		Acoustic Control (Rotary wafer type)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8534 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AV6	4.7meg	0Ω	280Ω	280Ω	0Ω	0Ω	†195K		
V2	6AV6	270K	3300Ω	280Ω	280Ω	0Ω	0Ω	†365K		
V3	12AX7	†520K	110K	6800Ω	280Ω	280Ω	†270K	1.2meg	220K	280Ω
V4	6V6GT	TP	280Ω	†240Ω	†3000Ω	270K	NC	280Ω	250Ω	
V5	6V6GT	TP	280Ω	†320Ω	†3000Ω	270K	TP	280Ω	250Ω	
V6	6AX5GT	0Ω	280Ω	140Ω	TP	130Ω	NC	280Ω	20K(MIN)	

† MEASURED FROM PIN 8 OF V6.
▪ MEASURED FROM PIN 8 OF V3.
NC NO CONNECTION.
TP TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

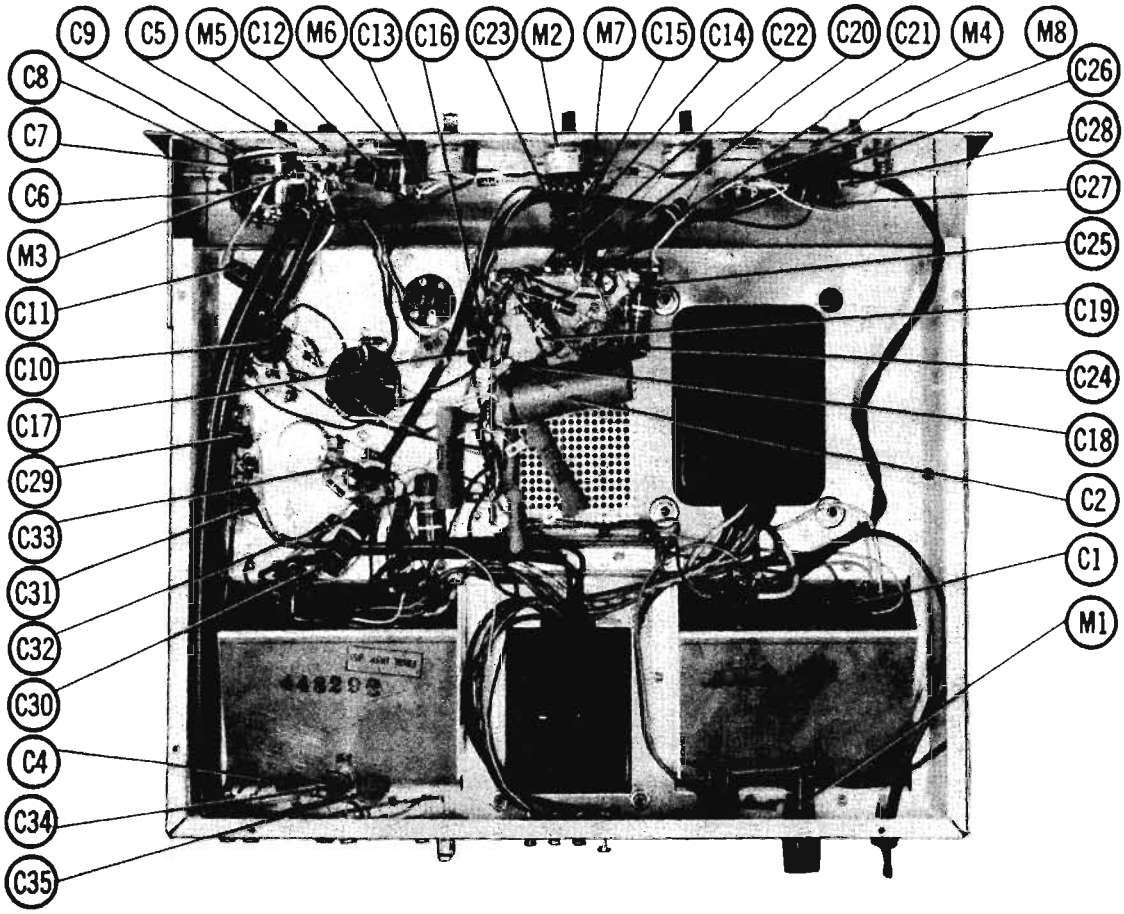
⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

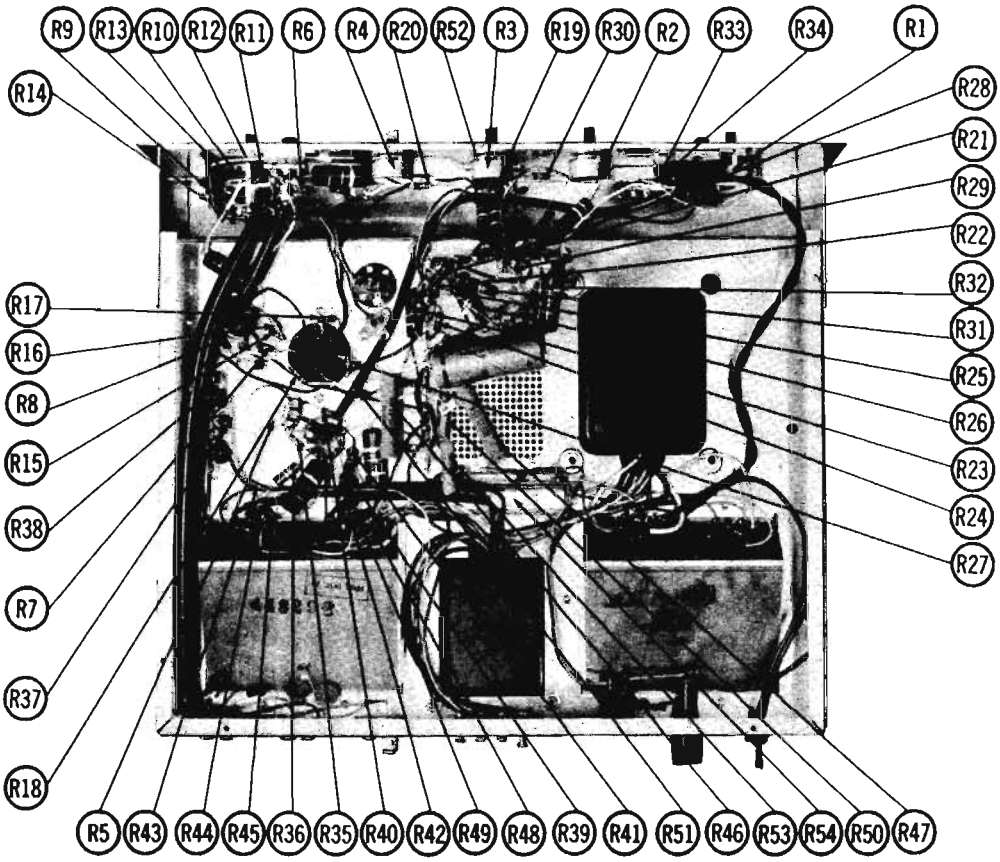
H. H. SCOTT
MODEL 99-C

TRADE NAME	H. H. Scott Model 99-C
MANUFACTURER	Hermon Hosmer Scott, Inc., 385 Putnam Ave., Cambridge 39, Mass.
TYPE SET	AC Operated 7 Channel Preamp.-Amplifier
TUBES (Six)	Types 12AX7 Phono Preamp.-AF Amp., 12AX7 AF Amplifier, 12AX7 AF Amplifier - Phase Inv., (2) 6L6GB Output., 5U4GA Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.04 Amp. @ 117 Volts AC (110 Watts)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana



CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Phono Preamplifier AF Amp.	12AX7	
V2	AF Amplifier	12AX7	
V3	AF Amp. - Phase Inv.	12AX7	
V4	Output	6L6GB	
V5	Output	6L6GB	
V6	Rectifier	5U4GA	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA H. H. SCOTT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲20	475		AFH4-19-20	DO170$_{▲}$5	FP475		T-205 MT-4720	TVL-4834
B	●20	475							
C	▲20	475							
D	20	475							
C2	50	100		PRS150V50	BR5015	TC49	TD-50-150	MT-1550	TVA-1414
C3A	▲10	450		AFH4-63	DQ880	FP376,6 TC26	TMQ-72	Q-295	R2439 *
B	●10	450							
C	25	25							
D	▲25	25							

* Non-Catalog Item.

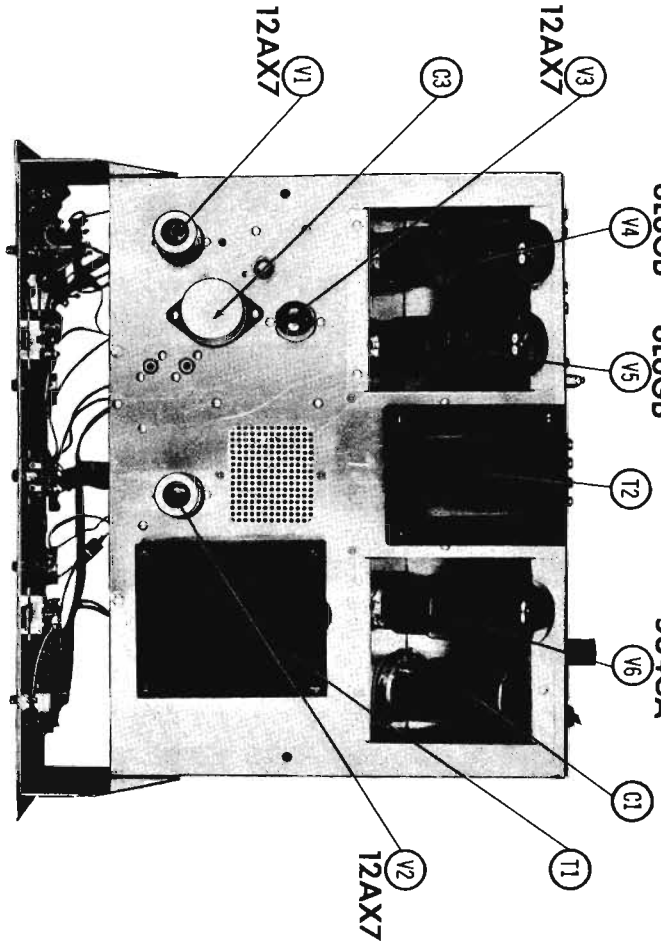
FIXED CAPACITORS

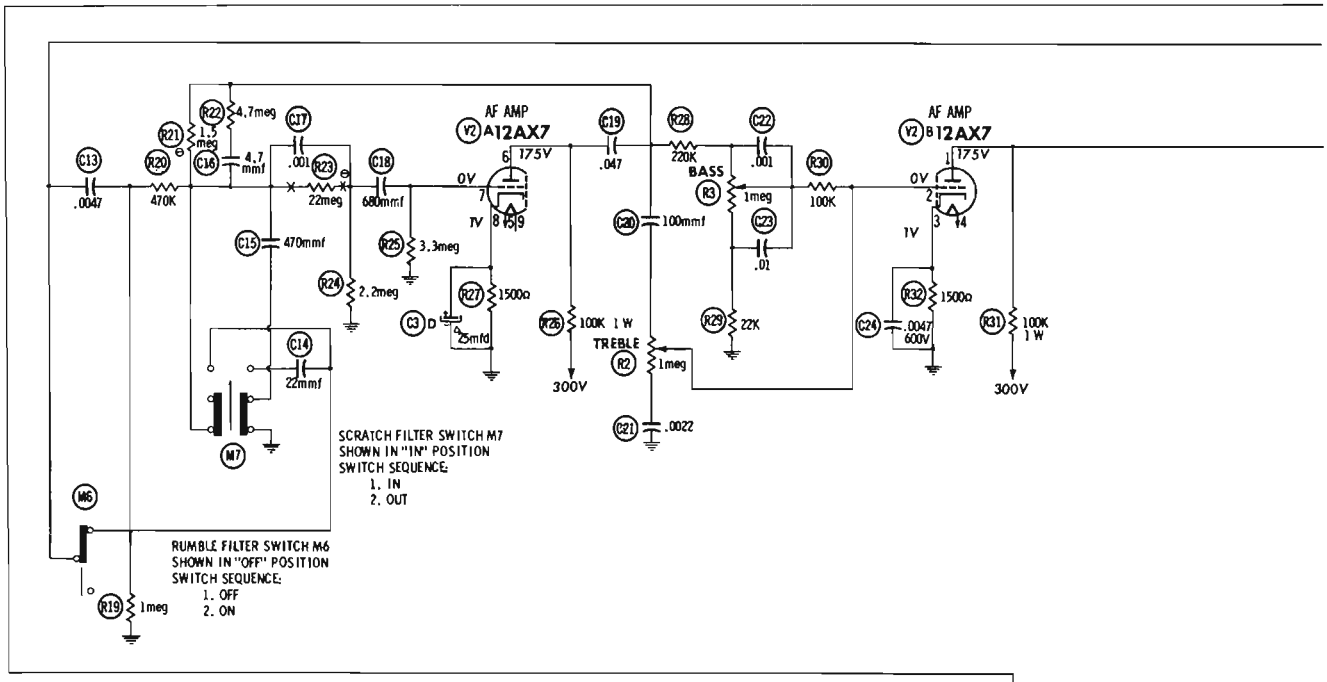
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

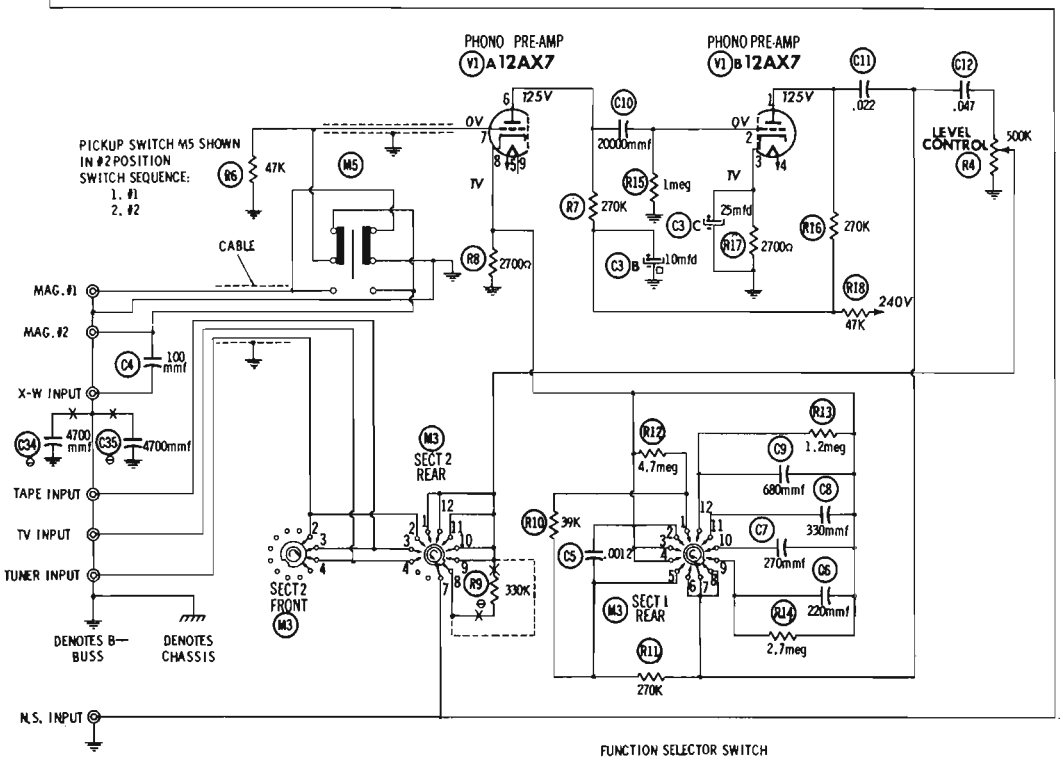
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA H. H. SCOTT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	100			1468-0001	DD-101	5W5T1	ED-100	UC-531	5GA-T1	
C5	.0012	400		811200	D6-122	LT6D12	GP-1200	UC-5212	5GA-D12	
C6	220			1466-00022	DD-221	5W5T22	ED-220	UC-5322	5GA-T22	
C7	270			1467-00027	DD-271	5W5T27	ED-270	UC-5327	5GA-T27	
C8	330			1467-00033	DD-331	5W5T33	ED-330	UC-5333	5GA-T33	
C9	680			1467-00068	DD-681	1W5T68	ED-680	UC-5368	5GA-T68	
C10	20000			BPD-02	DD-203	BYB682	ED-02		5HK-82	
C11	.022	400		BPD-02	DF-203	CUB4822	ED-02	GEM-6122	4TM-S22	
C12	.047	400		BPD-05	DF-503	CUB4847		GEM-4147	4TM-S47	
C13	.0047	400		BPD-0047	DD-472	CUB6D47	GP-4700	GEM-6247	6TM-D47	
C14	22			1468-000022	DD-220	5W5Q22	ED-22	UC-5422	5GA-Q22	
C15	470			1468-00047	DD-471	5W5T47	ED-470	UC-5347	5GA-T47	
C16	4.7			NPO-S14.7	TCZ-4R7	C10V47C	TCO-4.7	ZT-5547	5[illegible]CUB-V47	
C17	.001	400		BPD-001	DD-102	CUB6D1	ED-1000	GEM-421	6TM-D1	
C18	680			1468-00068	DD-681	1W5T68	ED-680	UC-5368	5GA-T68	
C19	.047	400		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C20	100			1468-0001	DD-101	5W5T1	ED-100	UC-531	5GA-T1	
C21	.0022	400		BPD-0022	D6-222	CUB6D22	GP-2200	GEM-6222	6TM-D22	
C22	.001	400		BPD-001	DD-102	CUB4D1	ED-1000	GEM-421	6TM-D1	
C23	.01	400		BPD-01	DD-103	CUB481	ED-01	GEM-411	4TM-S1	
C24	.0047	600		BPD-0047	DD-472	CUB6D47	ED-0047	GEM-6247	6TM-D47	
C25	.01	400		BPD-01	DD-103	CUB481	ED-01	GEM-411	4TM-S1	
C26	47			1468-000047	DD-470	5W5Q47	ED-47	UC-5447	5GA-Q47	
C27	.022	400		BPD-02	DF-203	CUB4822	ED-02	GEM-4122	4TM-S22	
C28	.01	400		BPD-01	DD-103	CUB481	ED-01	GEM-411	4TM-S1	
C29	100			1468-0001	DD-101	5W5T1	ED-100	UC-531	5GA-T1	
C30	.047	400		BPD-05	DF-503	CUB4847		GEM-4147	4TM-S47	
C31	330			1468-00033	DD-331	5W5T33	ED-330	UC-5333	5GA-T33	
C32	.047	400		BPD-05	DF-503	CUB4847		GEM-4147	4TM-S47	
C33	20000			BPD-02	DD-203	BYB682	ED-02		5HK-82	
C34	4700			BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5GA-D47	①②
C35	4700			BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5GA-D47	

① Not used in some versions.

CHASSIS—TOP VIEW

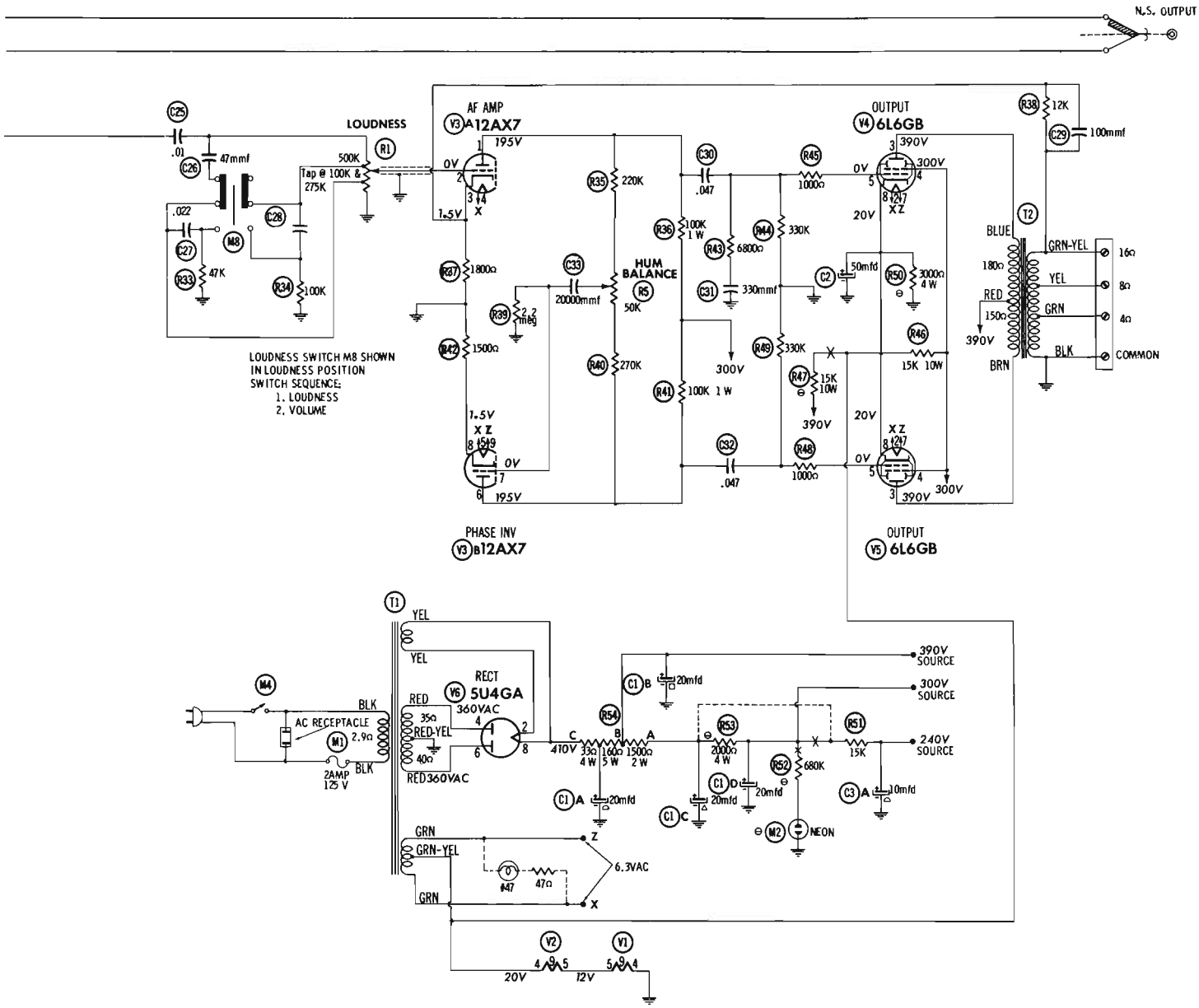






⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	† 335K	1Meg	2700Ω	0Ω	12Ω	† 335K	47K	2700Ω	6Ω
V2	12AX7	† 100K	120K	1500Ω	24Ω	12Ω	† 100K	3.3Meg	1500Ω	18Ω
V3	12AX7	† 100K	0Ω	1800Ω	24Ω	24Ω	† 100K	2.2Meg	1500Ω	24Ω
V4	6L6GB	0Ω	24Ω	† 370Ω	† 3650Ω	330K	TP	24Ω	3000Ω	
V5	6L6GB	0Ω	24Ω	† 340Ω	† 3650Ω	330K	TP	24Ω	3000Ω	
V6	5U4GA	NC	10K MIN	NC	35Ω	TP	40Ω	TP	10K MIN	

† MEASURED FROM PIN 2 OF V6.
TP TIE POINT.
NC NO CONNECTION.

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	H. H. SCOTT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	RCV-500KTT-3F	ABT-160		Q18-133XX	UDT-283	Loudness, Tap Ⓐ 100K & 275K
B	Shaft			AK-3		Not Req.	Not Req.	
R2A	1Meg	½	RCV-1Meg-3F	B-70	A47-1Meg-Z	Q13-137	U53	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	1Meg	½	RCV-1Meg-3F	B-70	A47-1Meg-Z	Q13-137	U53	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	500K	½	RCV-500K-3F	B-59	A47-500K-S	Q11-133	U50	Level
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	50K	½	RCV-50KL-3S	AB-31	A47-50K-S	Q11-123	SU-35	Hum Balance
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	H. H. SCOTT PART No.	IRC PART No.	
R6	47K			BTS-47K	
R7	270K			BTS-270K	
R8	2700Ω			BTS-2700	
R9	330K			BTS-330K	Note 2
R10	39K			BTS-39K	
R11	270K			BTS-270K	
R12	4.7Meg			BTS-4.7Meg	
R13	1.2Meg			BTS-1.2Meg	
R14	2.7Meg			BTS-2.7Meg	
R15	1Meg			BTS-1Meg	
R16	270K			BTS-270K	
R17	2700Ω			BTS-2700	
R18	47K			BTS-47K	
R19	1Meg			BTS-1Meg	
R20	470K			BTS-470K	
R21	1.5Meg			BTS-1.5Meg	Note 1
R22	4.7Meg			BTS-4.7Meg	
R23	22Meg			BTS-22Meg	Note 2
R24	2.2Meg			BTS-2.2Meg	
R25	3.3Meg			BTS-3.3Meg	
R26	100K	1		BTA-100K	
R27	1500Ω			BTS-1500	
R28	220K			BTS-220K	
R29	22K			BTS-22K	
R30	100K			BTS-100	

Note 1. Some versions may use 1.8Meg
Note 2. Not used in some versions

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	H. H. SCOTT PART No.	IRC PART No.	
R31	100K	1		BTA-100K	
R32	1500Ω			BTS-1500	
R33	47K			BTS-47K	
R34	100K			BTS-100K	
R35	220K			BTS-220K	
R36	100K	1		BTA-100K	
R37	1800Ω			BTS-1800	
R38	12K			BTS-12K	
R39	2.2Meg			BTS-2.2Meg	
R40	270K			BTS-270K	
R41	100K	1		BTA-100K	
R42	1500Ω			BTS-1500	
R43	6800Ω			BTS-6600	
R44	330K			BTS-330K	
R45	1000Ω			BTS-1000	
R46	15K	10		1 3/4A-15K	
R47	15K	10		1 3/4A-15K	Note 2
R48	1000Ω			BTS-1000	
R49	330K			BTS-330K	
R50	3000Ω	4		PW4-3000	Note 3
R51	15K			BTS-15K	
R52	680K			BTS-680K	Note 2
R53	2000Ω	4		PW4-2000	Note 4
R54A	1500Ω	2			
B	160Ω	5			
C	33Ω	4			

Note 3. Some versions may use 2000Ω 5W
Note 4. Some versions may use 4700Ω 2W

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	H. H. SCOTT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triod PART No.
T1	117VAC Ⓐ .97A	700VCT Ⓐ .130A	5VAC Ⓐ 3A	6.3VCT Ⓐ 2.1A	TR-10-3	P9315	P2953 ①	PM8411 ①	22R07	R-16B ①

① Fabricate Mounting.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	H. H. SCOTT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triod PART No.	
T2	7300Ω CT	16Ω tap Ⓐ 8Ω, 4Ω	TRA-10-14						

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			H. H. SCOTT PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 125V S/B			313002, (3AG 2A-S/B)	342001	MDL2	HKP

MISCELLANEOUS

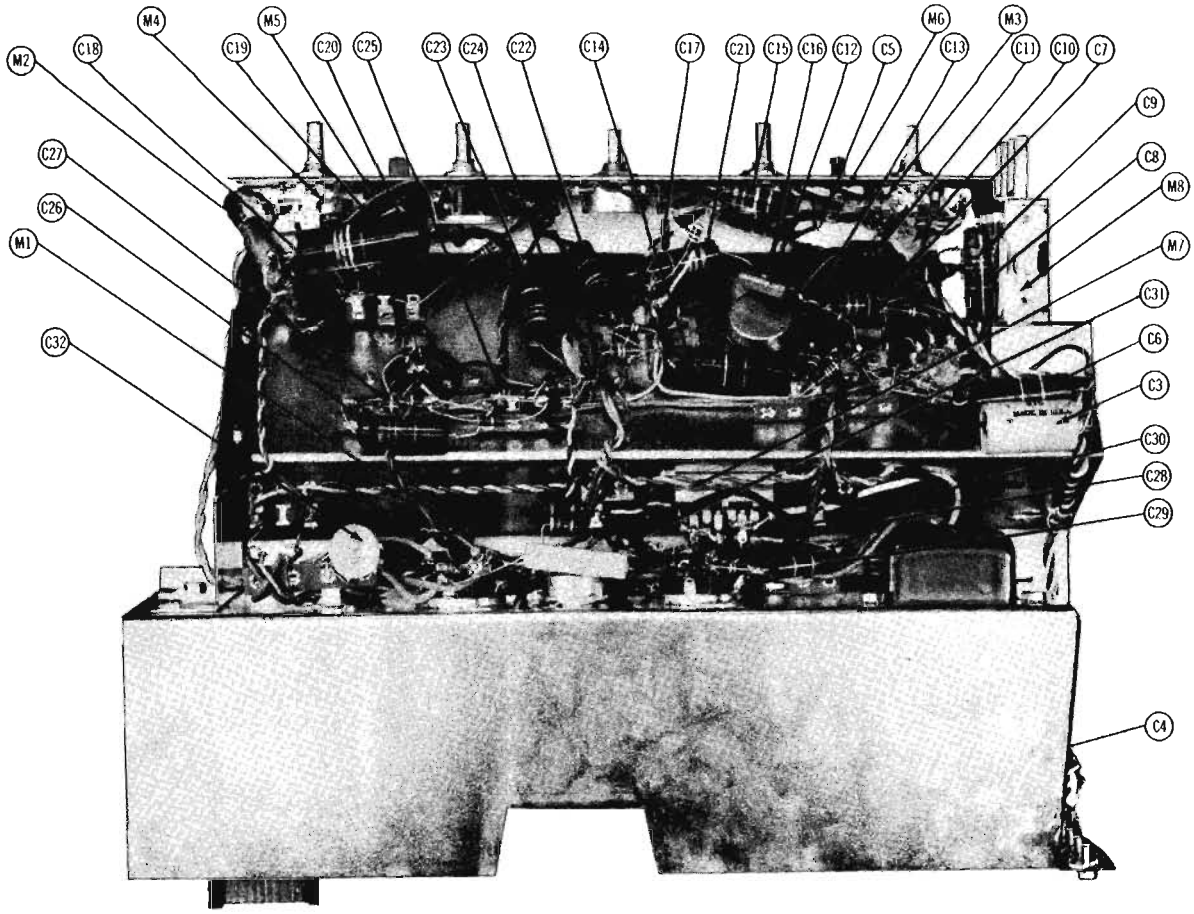
ITEM No.	PART NAME	H. H. SCOTT PART No.	NOTES
M2	Lamp ①		Indicator (Neon)
M3	Switch		Function (Rotary Wafer Type)
M4	Switch		On-Off
M5	Switch		Pickup (Slide Type - DPDT)
M6	Switch		Rumble Filter (Slide Type - SPDT)
M7	Switch		Scratch Filter (Slide Type - DPDT)
M8	Switch		Loudness - Vol. (Slide Type - DPDT)

① Not Used In Some Versions

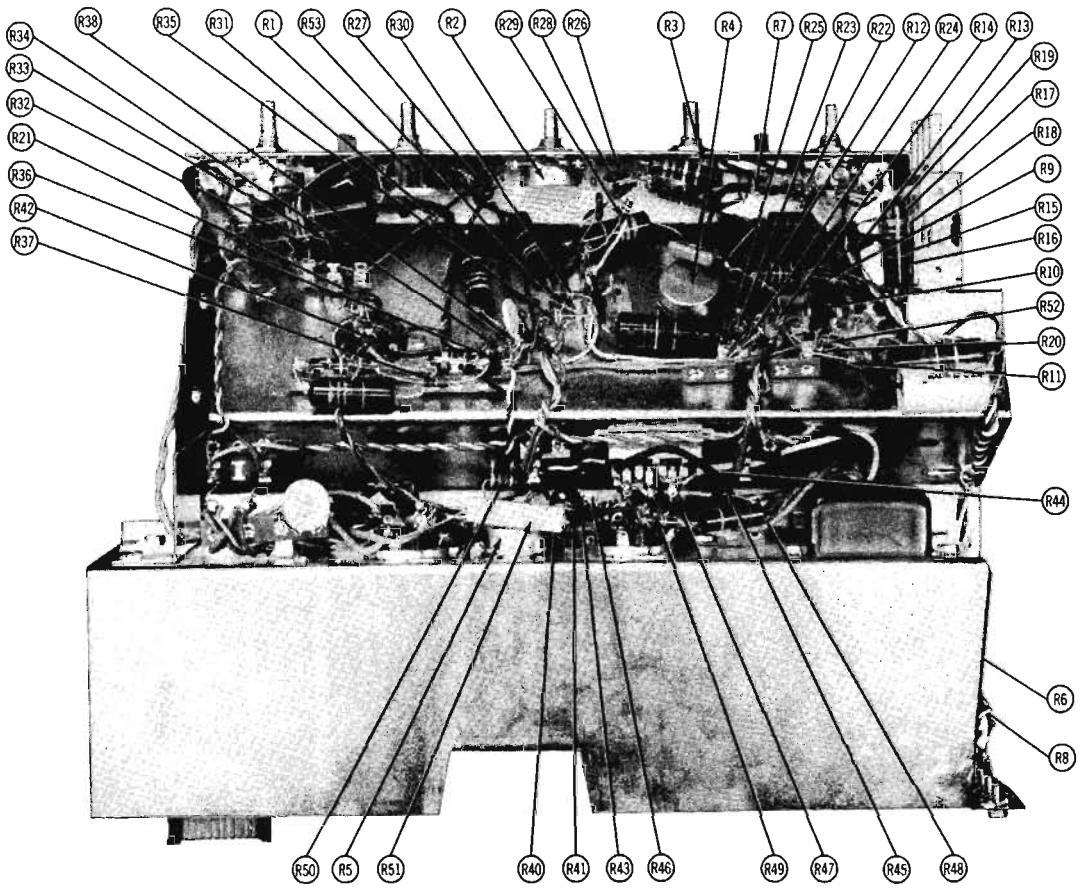
SHERWOOD
MODEL S-1000

TRADE NAME	Sherwood Model S-1000
MANUFACTURER	Sherwood Electronic Laboratories, Inc., 2802 W. Cullom Ave., Chicago 18, Ill.
TYPE SET	AC Operated 5 Channel Audio Amplifier
TUBES (Seven)	Types EF86/Z729 Preamplifier, 12AX7 1st. AF Amplifier, 12AX7 2nd. AF Amplifier, 12AU7A 3rd. AF Amp.-Phase Inv., (2) 6L6GB Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .55 Amp. @ 117 Volts AC

G673



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	EF86/ Z729	
V2	AF Amplifier	12AX7	
V3	AF Amplifier	12AX7	

ITEM No.	USE	TYPE	NOTES
V4	AF Amp. - Phase Inverter	12AU7A	
V5	Output	6L6GB	
V6	Output	6L6GB	
V7	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SHERWOOD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	⎓40	400		AFH4-85	BO450	FP369.1		T-715	R2323 *
B	⎓40	400			BR505				
C	⎓50	50							
C2A	⎓10	400		AFH2-47	BO390	FP231	TMD-41	D-200	R2322 *
B	⎓15	400						MT-4504	
C3	25	10		PRS25V25	BR252	TC26	TD-25-25	FM-0225	TVA-1205

* Non-catalog item.

FIXED CAPACITORS

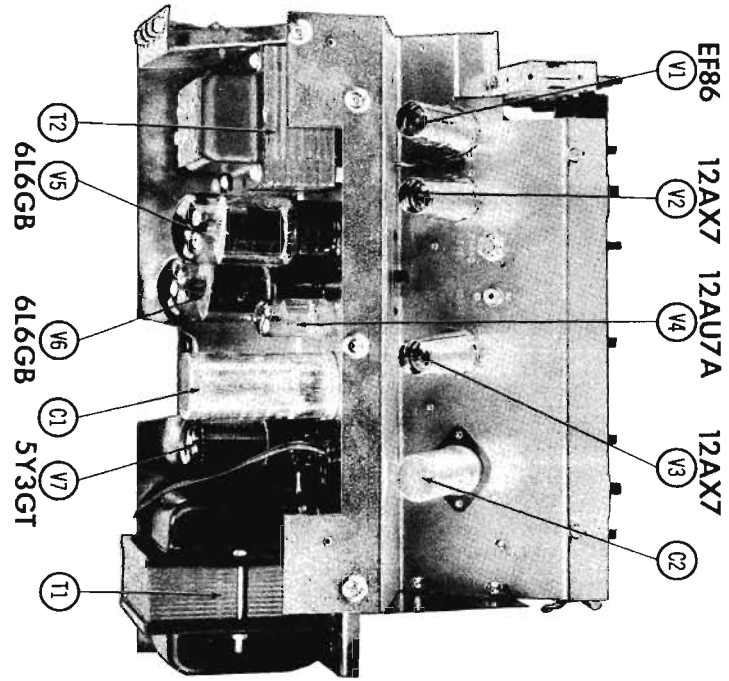
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

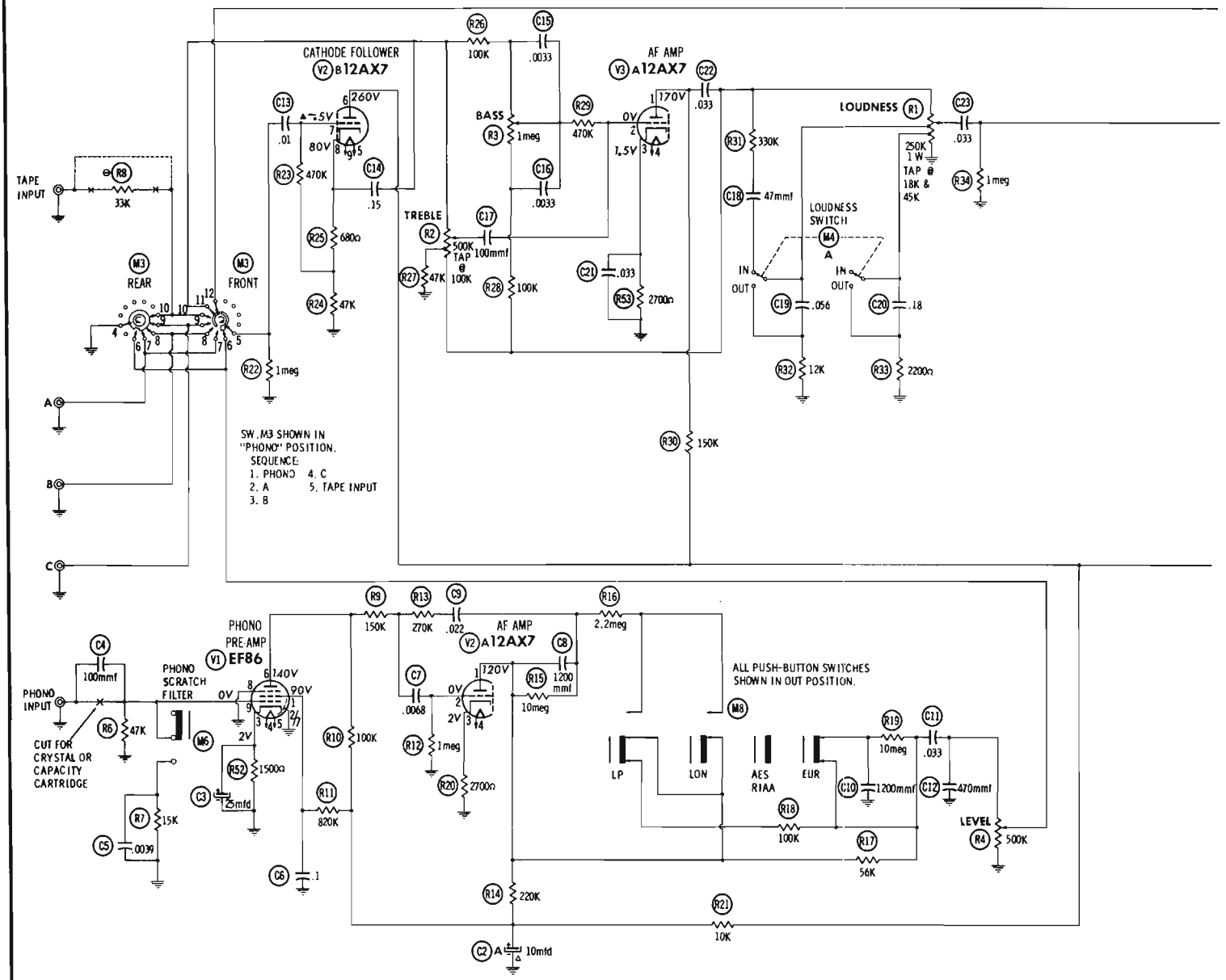
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA SHERWOOD PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	100	500		NP0-SI 100	D6-101	22R5T1	ED-100	MCB235	MS-31	
C5	.0039	400		1464-0039		1R5D39			MS-239	
C6	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C7	.0068	400		1464-0068					MS-368	
C8	1200			1464-0012		1R5D12	ED-1200		MS-212	
C9	.022	400		BPD-02	DF-203	CUB4S22	S17-02	PT4122	4TM-S22	
C10	1200			1464-0012		1R5D12	ED-1200		MS-212	
C11	.033	400		BPD-03	DF-303	CUB6S33		PT4133	6TM-S33	
C12	470	500		1464-00047	D6-471	5R5T47	ED-470		MS-347	
C13	.01	400		BPD-01	D6-103	CUB4S1	GP-10000	PT411	4TM-S1	
C14	.15	200		P388N-15		CUB2P15		PT4015	2TM-P15	
C15	.0033	400		1464-0033		1R5D33			MS-233	
C16	.0033	400		1464-0033		1R5D33			MS-233	
C17	100	500		NP0-SI 100	D6-101	22R5T1	ED-100	MCB-235	MS-31	
C18	47	500		NP0-SI47	D6-470	22R5Q47	ED-47	ZT-547	MS-447	
C19	.056	400								
C20	18	200								
C21	.033	400		BPD-03	DF-303	CUB6S33		PT4133	6TM-S33	
C22	.033	400		BPD-03	DF-303	CUB6S33		PT4133	6TM-S33	
C23	.033	400		BPD-03	DF-303	CUB6S33		PT4133	6TM-S33	
C24	2200			1464-0022		1R5D22			MS-222	
C25	.0039	400		1464-0039		1R5D39			MS-239	
C26	.033	400		BPD-03	DF-303	CUB6S33		PT4133	6TM-S33	
C27	.0047	400		BPD-0047	D6-472	CUB6D47	GP-4700	PT6247	6TM-D47	
C28	120	500		DI-00012	D6-121	5W5T12	GP-120	UC-5312	1FM-S12	
C29	.01	400		BPD-01	D6-103	CUB4S1	GP-10000	PT411	4TM-S1	
C30	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C31	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C32	5000	1000		HVD-15-1000	DD-502		1R5KV-472		10HK-D47	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SHERWOOD PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	250K	1	670A66					Volume Loudness tap ② 18K and 45K
R2A	500K	½	670A81	ABT-67			UT-430	Treble - tap ②180K
B	Shaft		Not Req.	AK-3			Not Req.	Attach to R2A
R3A	1Meg	½	670AB2	AB-89	A47-1Meg-S	Q11-137	U54	Bass
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	500K	½	670AB4	AB-60	A47-500K-Z	Q13-133	U48	Phono Level
B	Shaft		Not Req.	AK-1	FKS-1/4	SQ	Not Req.	Attach to R4A
R5A	1000Ω	½	670AB6	AB-5	A47-1000-S	Q11-108	U4	Hum Null
B	Shaft		Not Req.	AK-1	FKS-1/2	SQ	Not Req.	Attach to R5A

CHASSIS—TOP VIEW





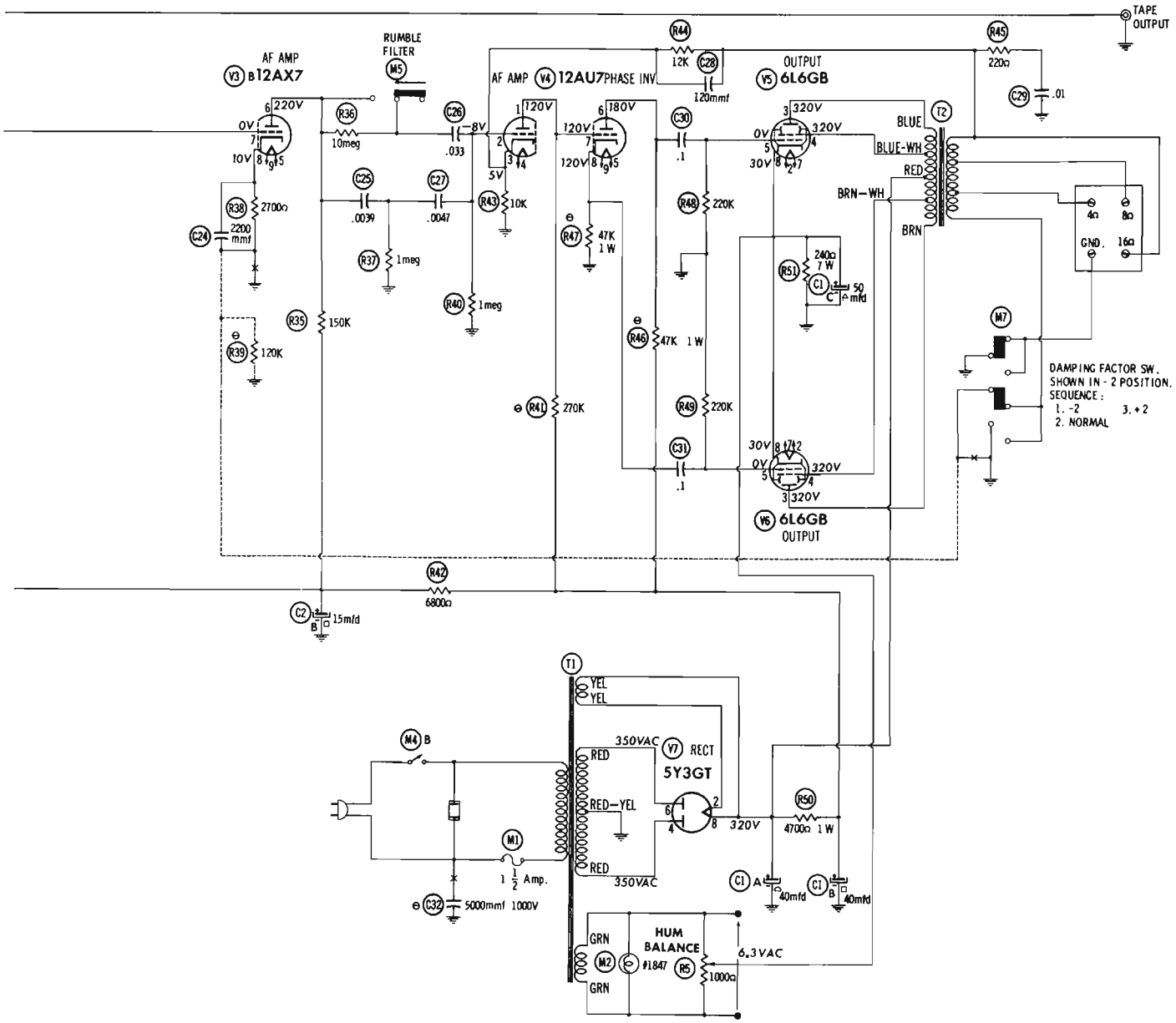
RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	Z729	†850K	0Ω	1500Ω	600Ω	600Ω	†130K	0Ω	0Ω	47K ▲ 11K
V2	12AX7	†250K	1Meg	2700Ω	600Ω	600Ω	†11K	500K	50K	600Ω
V3	12AX7	†170K	700K	2700Ω	600Ω	600Ω	†170K	1Meg	2700Ω	600Ω
V4	12AU7A	†275K	1Meg	10K	600Ω	600Ω	†50K	275K	47K	600Ω
V5	6L6GB	TP	600Ω	†11Ω	†2.5Ω	220K	NC	600Ω	240Ω	
V6	6L6GB	TP	600Ω	†11Ω	†2.5Ω	220K	TP	600Ω	240Ω	
V7	5Y3GT	NC	150K	NC	60Ω	NC	60Ω	TP	150K	

† MEASURED FROM PIN 8 OF V7.
▪ MEASURED WITH PHONO SCRATCH FILTER SWITCH CLOSED.
▲ MEASURED FROM PIN 8 OF V2.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SHERWOOD PART No.	IRC PART No.	
R6	47K			BTS-47K	
R7	15K			BTS-15K	
R8	33K			BTS-33K	Note 1
R9	150K			BTS-150K	
R10	100K			MBC-100K	
R11	820K			BTS-820K	
R12	1Meg			BTS-1Meg	
R13	270K			MBC-270K	
R14	220K			BTS-220K	
R15	10Meg			BTS-10Meg	
R16	2.2Meg			BTS-2.2Meg	
R17	56K			BTS-56K	
R18	100K			BTS-100K	
R19	10Meg			BTS-10Meg	
R20	2700Ω			BTS-2700	
R21	10K			BTS-10K	
R22	1Meg			BTS-1Meg	
R23	470K			BTS-470K	
R24	47K			BTS-47K	
R25	680Ω			BTS-680	
R26	100K			BTS-100K	
R27	47K			BTS-47K	
R28	100K			BTS-100K	
R29	470K			BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SHERWOOD PART No.	IRC PART No.	
R30	150K			BTS-150K	
R31	330K			BTS-330K	
R32	12K			BTS-12K	
R33	2200Ω			BTS-2200	
R34	1Meg			BTS-1Meg	
R35	150K			BTS-150K	
R36	10Meg			BTS-10Meg	
R37	1Meg			BTS-1Meg	
R38	2700Ω			BTS-2700	
R39	120K			BTS-120K	Note 1
R40	1Meg			BTS-1Meg	
R41	270K			BTS-270K	Note 2
R42	6800Ω			BTS-6800	
R43	10K 5%			BTS-10K	
R44	12K 5%			BTS-12K	
R45	220Ω			BTS-220	
R46	47K 5%	1		BTA-47K	Note 3
R47	47K	1		BTA-47K	Note 3
R48	220K			BTS-220K	
R49	220K			BTS-220K	
R50	4700Ω	1		BTA-4700	
R51	240Ω	7		PW7-250	
R52	1500Ω			BTS-1500	
R53	2700Ω			BTS-2700	

Note 1. Not used in some versions.
Note 2. Some versions may use 220K in this application.
Note 3. R46 and R47 are matched within 3%.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	SHERWOOD PART No.	Holldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triod PART No.
T1	117VAC @.55A	700VCT @.125A	5VAC @ 2A	6.3VAC @2.8A	922AB1			PC-8410		

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

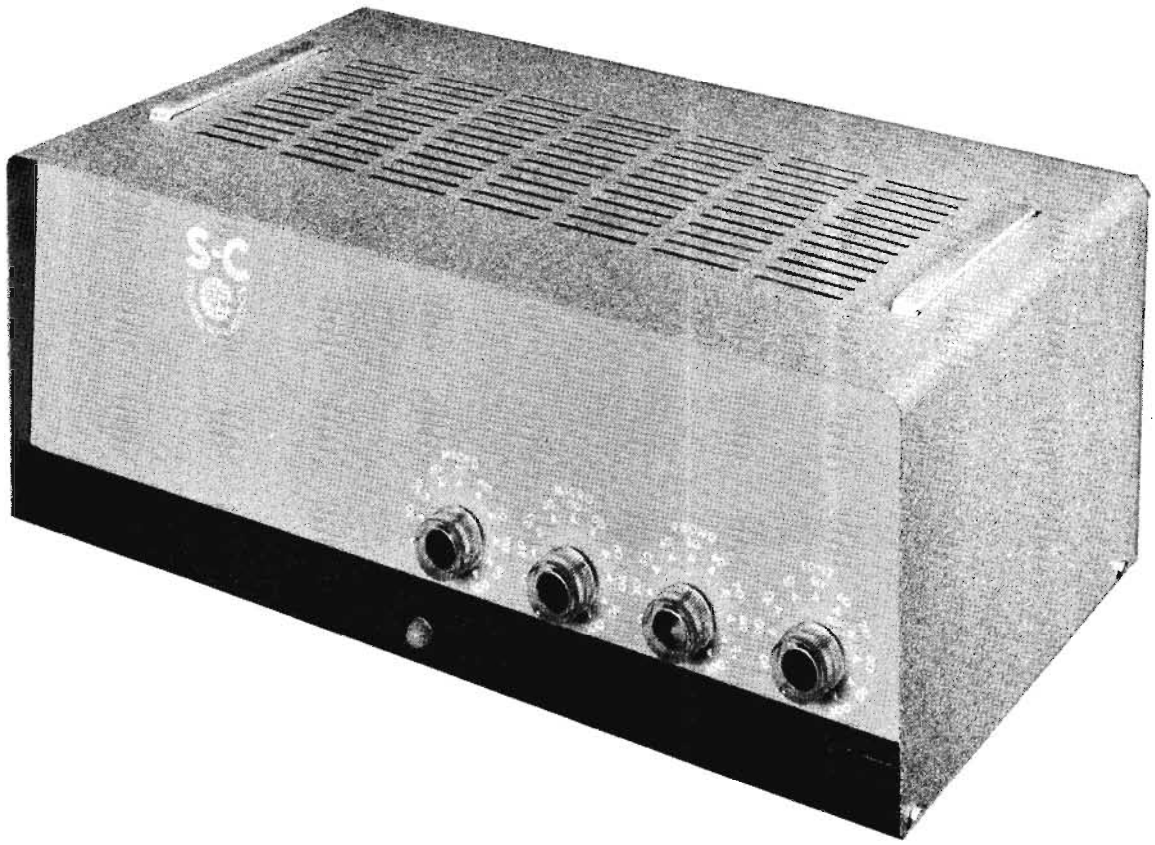
ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SHERWOOD PART No.	Holldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5500Ω	16Ω Tap @ 8Ω, 4Ω	920AB1						

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SHERWOOD PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	1½A 125V			3130I.5 (3AG - S/B-1½A)	342003	MDL 1½	HKP

MISCELLANEOUS

ITEM No.	PART NAME	SHERWOOD PART No.	NOTES
M2	Pilot Light		#1847. Some versions may use Type #47
M3	Switch		Selector (Rotary, wafer type)
M4A	Switch		Power (On-off) SPST (Rotary, wafer type)
B	Switch		Loudness (In-out) DPDT (Rotary, wafer type)
M5	Switch		Rumble Filter (SPST- Slide Type)
M6	Switch		Phono Scratch Filter (SPST-Slide Type)
M7	Switch		Damping Factor (3 position - Slide Type)
M8	Switch Assy.		Phono Equalization (Pushbutton slide type)



STROMBERG-CARLSON
MODEL AU-64

TRADE NAME	Stromberg-Carlson Model AU-64
MANUFACTURER	Stromberg-Carlson Co., Sound Div., 1400 N. Goodman St., Rochester 9, N. Y.
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES (Six)	Types 12AX7/ECC83 Mic 1 Preamp.-Mic 2 Preamp., 12AT7/ECC82 AF Amplifier, 6AV8 Phase Inverter, (2) 6L6GB Output, 5U4GB Rectifier
POWER SUPPLY	105-125 Volts AC-50/60 Cycles RATING .88 Amp. @ 117 Volts AC (95 Watts)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mic. 1 Preamp. - Mic. 2 Preamp.	12AX7/ ECC83	
V2	AF Amplifier	12AT7/ ECC82	

ITEM No.	USE	TYPE	NOTES
V3	Phase Inverter	6AV6	
V4	Output	6L6GB	
V5	Output	6L6GB	
V6	Rectifier	5U4GB	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Stromberg-Carlson PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	≈30	500	111632-000		BC630			D-275	R2629 *
B	≈30	500							
C2A	≈40	400	111001-002	PR4-155	BBRQ0170.5			T-180	R2598 *
B	30	350							
C	≈20	300							
C3	50	5		PR525V50	BBR50-5	TC29	TD-50-5	MT-0250	TVA-1100
C4	50	50	111634-000	PR550V50	BR505	TC39	TD-50-50	MT-0550	TVA-1308

* Non-catalog item.

FIXED CAPACITORS

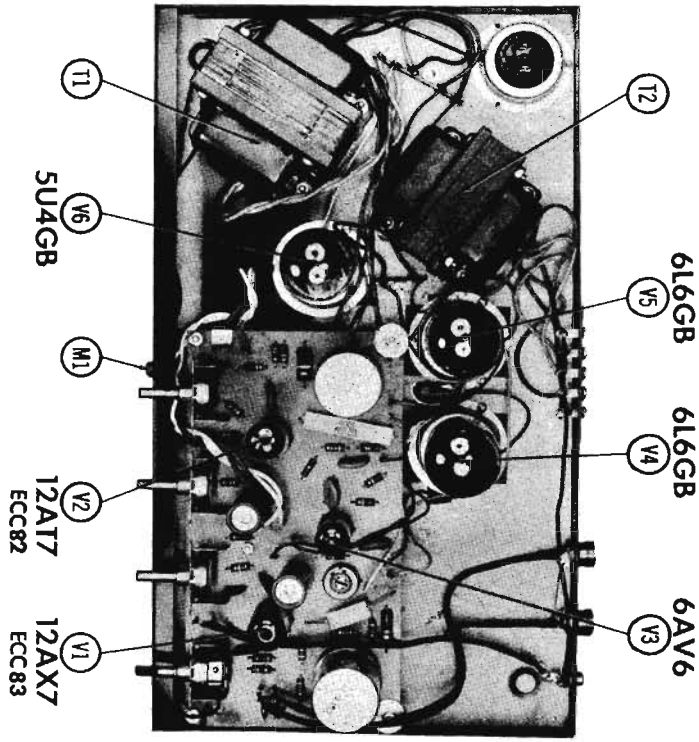
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	20000			BPD-02	DD-203	BYB682	ED-02		5HK-82	
C6	20000			BPD-02	DD-203	BYB682	ED-02		5HK-82	
C7	25000								TG-825	
C8	1500			BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C9	25000								TG-825	
C10	25000								TG-825	
C11	25000								TG-825	

CONTROLS

ITEM No.	RATING RESIST. ANCE	RATING WATTS	REPLACEMENT DATA Stromberg-Carlson PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500K	½	145655-000					Tone & Switch
R2	500K	½	145656-000					Phono Input
R3	500K	½	145656-000					Micro #2 Input
R4	500K	½	145656-000					Micro #1 Input
R5	100Ω	2	145664-000					Hum Adj. (Wire wound)

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	NOTES
R6	4.7Meg			
R7	470K			
R8	4.7Meg			
R9	470K			
R10	150K			
R11	470K			
R12	470K			
R13	470K			
R14	220K			
R15	2200Ω			
R16	150K			
R17	220K			
R18	3300Ω			

ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	NOTES
R19	120K			
R20	150K			
R21	47K			
R22	47K			
R23	1200Ω 5%			
R24	100K			
R25	100K			
R26	250Ω	5		
R27	5000Ω	10		
R28	100K	2		
R29	10K	1		
R30	47K			
R31	47K			

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC @ .88A	760VCT @ .100A	5VAC @ 3A	6.3VAC @ 3A	161803	P9316 ①	P-3155 ①	PC8411 ①	22R33 ①	R-18A ①

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T2	5300Ω CT	70V tap @ 16Ω, 8Ω, 4Ω	161361						

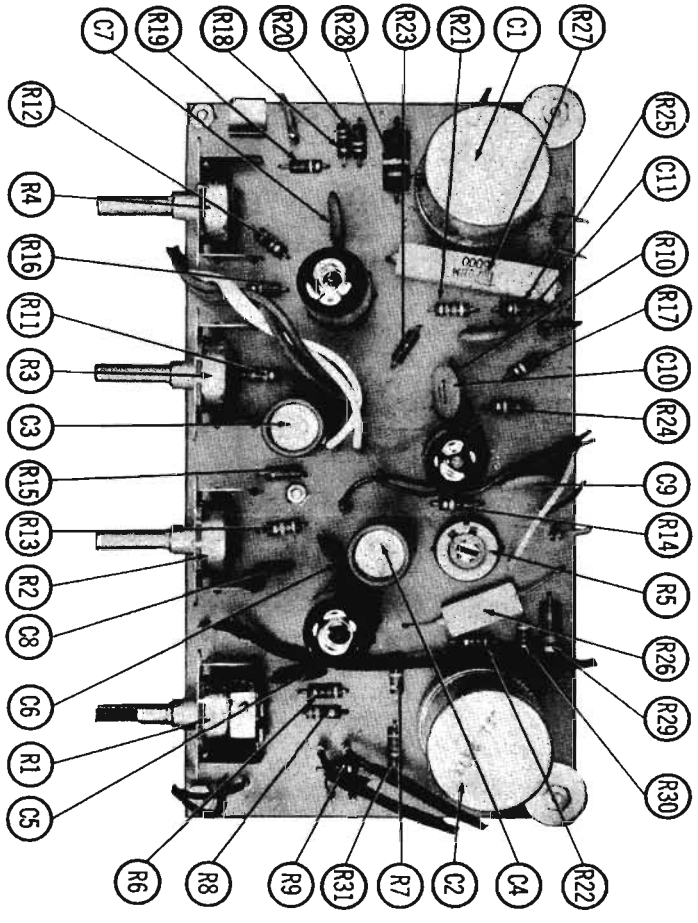
MISCELLANEOUS

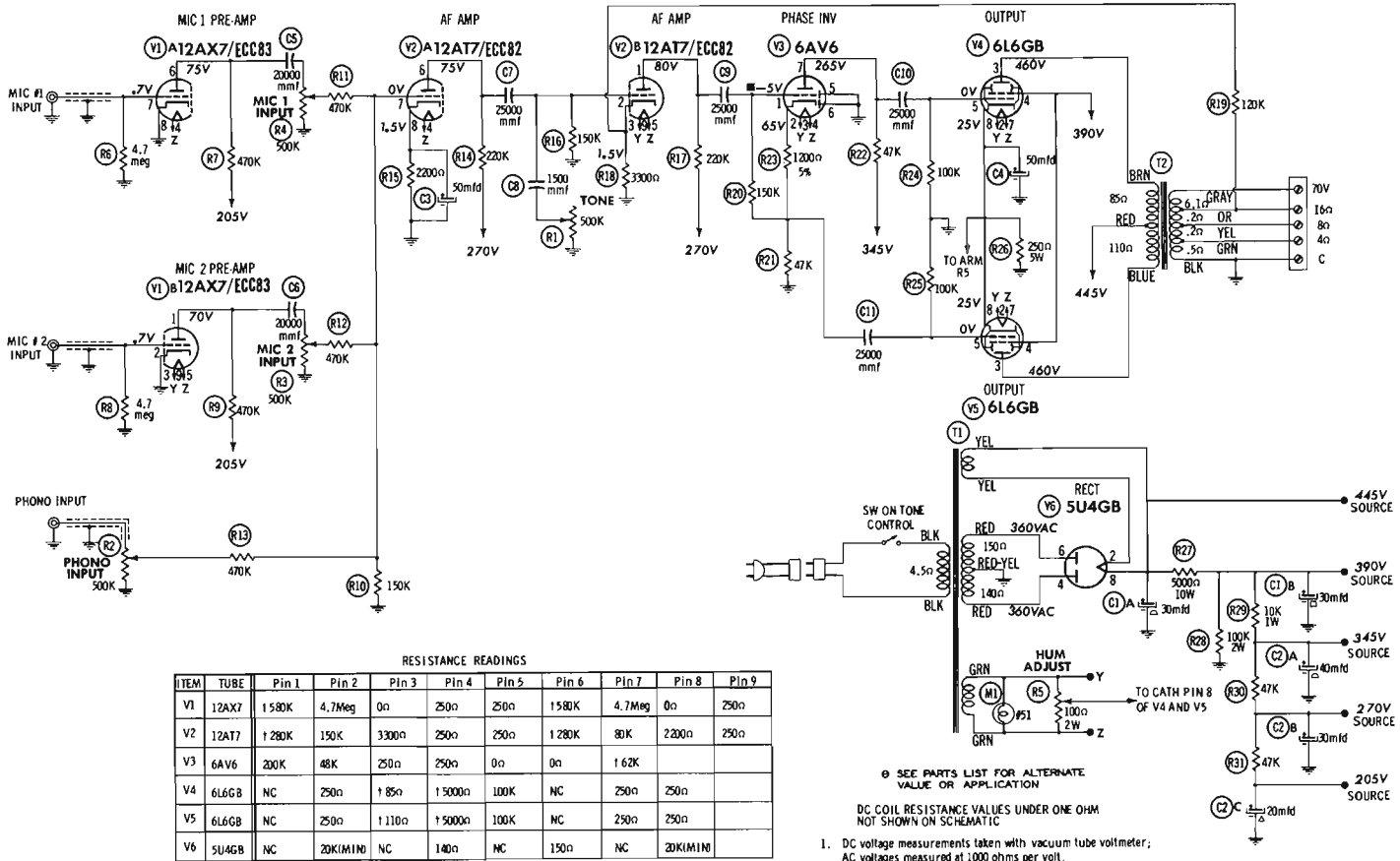
ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M1	Pilot Lamp		#51

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)

PRINTED BOARD





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†580K	4.7Meg	0Ω	250Ω	250Ω	†580K	4.7Meg	0Ω	250Ω
V2	12AT7	†280K	150K	3300Ω	250Ω	250Ω	†280K	80K	2200Ω	250Ω
V3	6AV6	200K	48K	250Ω	250Ω	0Ω	0Ω	†62K		
V4	6L6GB	NC	250Ω	†85Ω	†5000Ω	100K	NC	250Ω	250Ω	
V5	6L6GB	NC	250Ω	†110Ω	†5000Ω	100K	NC	250Ω	250Ω	
V6	5U4GB	NC	20K(MIN)	NC	140Ω	NC	150Ω	NC	20K(MIN)	

† MEASURED FROM PIN 8 OF V6.
■ MEASURED FROM PIN 2 OF V3.
NC NO CONNECTION.

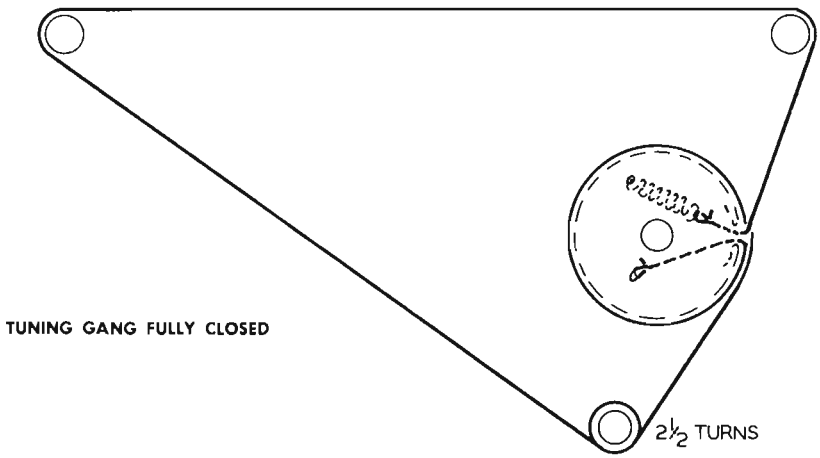
Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

TRADE NAME	Stromberg-Carlson Model SR-402	
MANUFACTURER	Stromberg-Carlson Co., Service Dept., 1700 University Ave., Rochester 10, N. Y.	
TYPE SET	AC Operated FM-AM Tuner	
TUBES	Fourteen	
POWER SUPPLY	105-125 Volts AC-50/60 Cycles	RATING .47Amp. @ 117 Volts AC (49 Watts)
TUNING RANGE-BROADCAST	540-1600KC	FREQ. MOD. 88-108MC



DIAL CORD STRINGING

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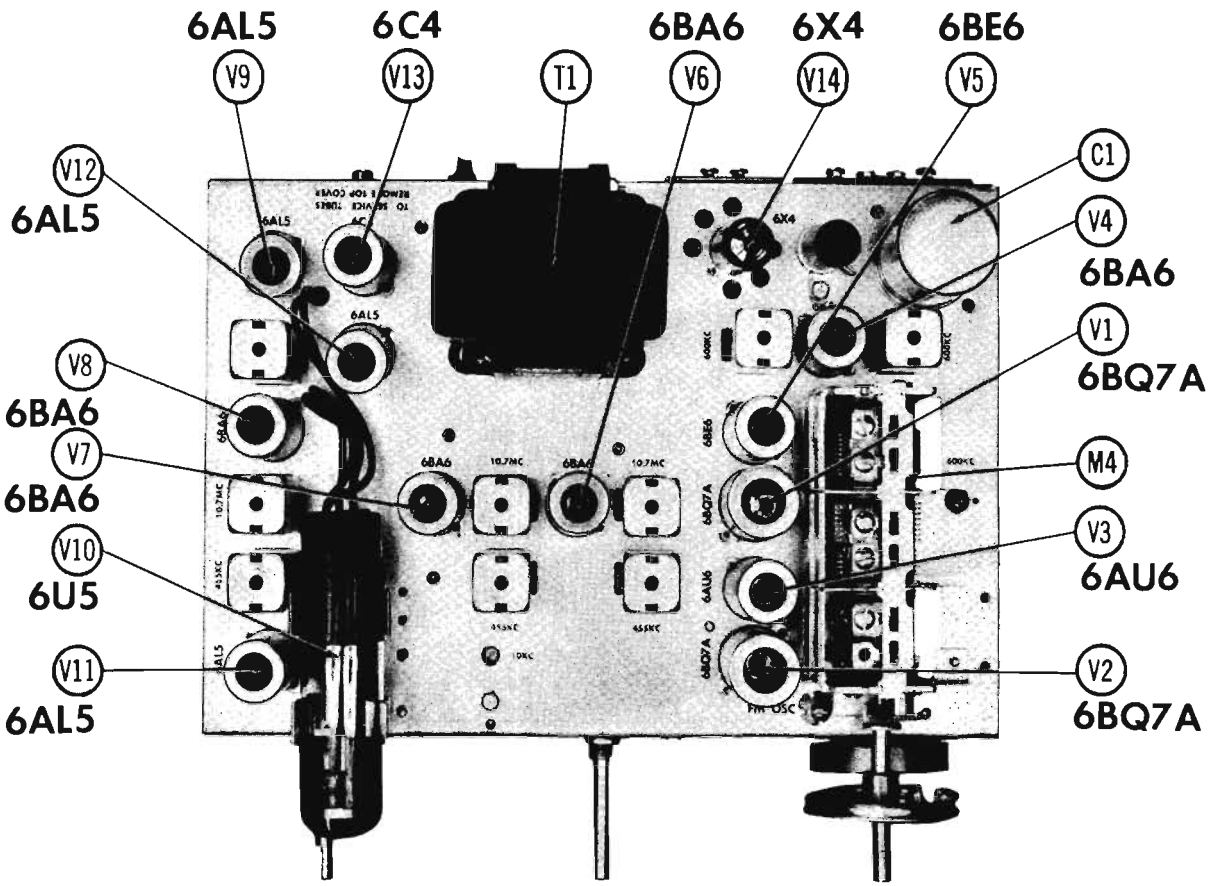
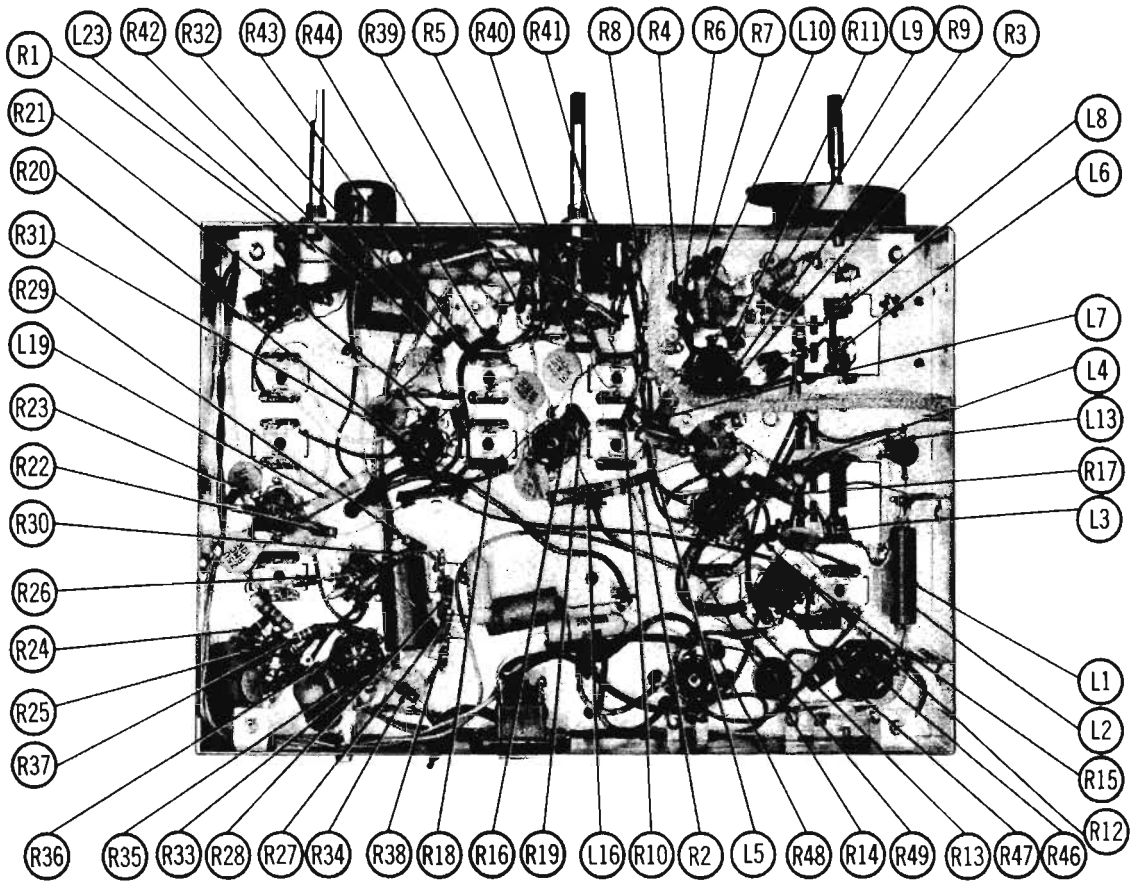
H236



CHASSIS TOP VIEW - TUBE IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amplifier	6BQ7A	
V2	FM Osc. - FM AFC	6BQ7A	
V3	FM Mixer	6AU6	
V4	AM RF Amplifier	6BA6	
V5	AM Converter	6BE6	
V6	1st FM-AM IF Amplifier	6BA6	
V7	2nd FM-AM IF Amplifier	6BA6	

ITEM No.	USE	TYPE	NOTES
V8	3rd FM IF Amplifier	6BA6	
V9	FM Diode Limiter	6AL5	
V10	Tuning Indicator	6U5	
V11	Ratio Detector	6AL5	
V12	AM Det-AVC Clamper	6AL5	
V13	AF Amplifier	6C4	
V14	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

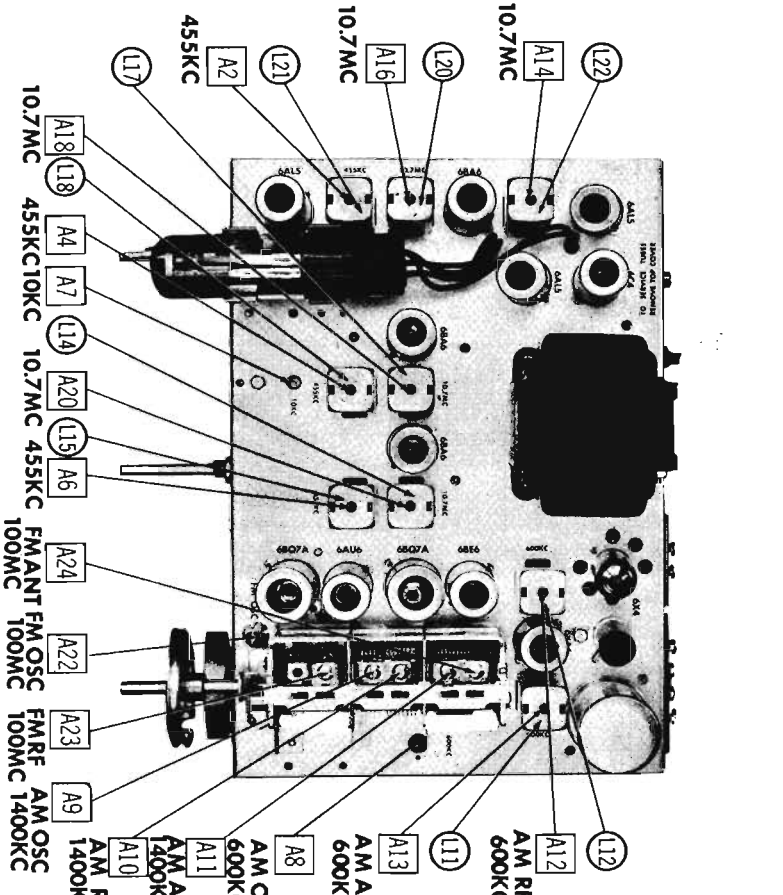
ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Stromberg-Carlson PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲ 30	250	111625	AFH4-02-10	D0022	FP419.5		T-085	TVL-4580
B	■ 30	250						MTD-4530	
C	▲ 40	200							
D	40	200							
C2	5	50		PR850V5	BBR5-50	TC30	TD-5-50	MMT-0505	TVA-1303

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C4	470			SI470	D6-471	LT6T47	GP-470	UC-5347	5GA-T47	
C5	10			NP0-SI10	TCZ-10	CTA6QIC	TC0-10	ZT-541	5TCC-QI	NP0
C6	100			SI100	D6-101	LT6-T1	GP-100	UC-531	5GA-T1	
C7	10			NP0-SI10	TCZ-10	CTA6QIC	TC0-10	ZT-541	5TCC-QI	NP0
C8	1.5-10		110853		629-10					
C9	10			N750-SI10	TCN-10	CTA6QIU	TC7-10	NT-541	5TCU-QI	N750
C10	2.2			NP0-SI2.2	TCZ-2R2	C10V22C	TC0-2.2		5TCCB-V22	
C11	1000			EF-001	MFT-1000				503C-D1	
C12	.1	200		P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C13	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C14	27			SI27	D6-270	LT6Q27	GP-27	UC-5427	5GA-Q27	
C15	1000			EF-001	MFT-1000				503C-D1	
C16	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C17	33			SI33	D6-330	LT6Q33	GP-33	UC-5433	5GA-Q33	
C18	1000			EF-001	MFT-1000				503C-D1	
C19	1000			BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C20	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C21	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C22	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C23	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C24	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C25	10			N750-SI10	TCN-10	CTA6Q1U	TC7-10	NT-541	5TCU-QI	N750
C26	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C27	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C28	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C29	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C30	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C31	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C32	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C33	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C34	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C35	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C36	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C37	30-270		110056							
C38	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C39	.22	200		P288N-22		CUB2P22		GEM-2022	2TM-P22	
C40	.001	600		P688N-001	D6-102	CUB6D1	GP-1000	GEM-621	6TM-D1	
C41	330			BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C42	330			BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C43	330			BPD-00033	DD-331	L10T33	ED-330	UC-5333	5GA-T33	
C44	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C45	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C46	.22	200		P288N-22		CUB2P22		GEM-2022	2TM-P22	
C47	.22	200		P288N-22		CUB2P22		GEM-2022	2TM-P22	
C48	.01	600		P688N-01	D6-103	CUB6S1	ED-01	GEM-611	6TM-S1	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Stromberg-Carlson PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2meg	½	145647	B-75	A47-2meg-Z		U55	Volume
B	Shaft			Not Req.	PS-3		Not Req.	
C	Switch			KB-1	SWE-12		US-26	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Stromberg-Carlson PART No.	NOTES
	OHMS	WATT		
R2	470K			
R3	10K	1		
R4	100Ω			
R5	10K			
R6	1000Ω			
R7	5600Ω			
R8	100Ω			
R9	100K			
R10	100Ω			
R11	2200Ω			
R12	1meg			
R13	10K			
R14	1000Ω			
R15	220Ω			
R16	10K			
R17	22K			
R18	1000Ω			
R19	68Ω			
R20	1000Ω			
R21	68Ω			
R22	1000Ω			
R23	68Ω			
R24	100K			
R25	10Meg			
R26	68Ω			

ITEM No.	RATING		Stromberg-Carlson PART No.	NOTES
	OHMS	WATT		
R27	10K 5%			
R28	10K 5%			
R29	2200Ω			
R30	68K			
R31	220K			
R32	2.2meg			
R33	470K			
R34	10K			
R35	680Ω			
R36	680Ω			
R37	470K			
R38	470K			
R39	470K			
R40	10K			
R41	5.6meg			
R42	470K			
R43	220K			
R44	220K			
R45	2.2meg			
R46	15K			
R47	330Ω	2		
R48	47K			
R49A	330Ω	25	149626	
B	1100Ω	25		

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V	420VCT	6.3V		161127					
	ⓐ .47A	ⓐ .050A	ⓐ4.5A							

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Stromberg-Carlson PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Trans.	114189	15-1082	TV-172		
L2	FM Ant. Trans.	114189	15-1082	TV-172		
L3	FM Ant. Coil	114191				
L4	Neutr. Coil	114193				1.8 Microhenries
L5	RF Choke	114693	19-1002	BC-563	4606	2.2 Microhenries; IRC Part #CLA
L6	FM RF Coil	114191				
L7	RF Choke	114729			4588	.47 Microhenries; IRC Part # CLA
L8	FM Osc. Coil	114190				
L9	RF Choke	114729			4588	.47 Microhenries; IRC Part # CLA
L10	RF Choke	114693	19-1002	BC-563	4606	2.2 Microhenries; IRC Part # CLA
L11	AM Ant. Trans.	114192				
L12	AM RF Trans.	114475				
L13	AM Osc. Coil	114188				
L14	1st FM IF	114363	16-3487	FM-254	1463	
L15	1st AM IF	114469				

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Stromberg-Carlson PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L16	Fil. Choke	114707			4588	.47 Microhenries; IRC Part # CL-1
L17	2nd FM IF	114363	16-3487	FM-254	1463	
L18	2nd AM IF	114469				
L19	Fil. Choke	114707			4588	.47 Microhenries; IRC Part # CL-1
L20	3rd FM IF	114363	16-3487	FM-254	1463	
L21	3rd AM IF	114468	16-6758	BC-353	12-C2	
L22	Ratio Det.	114467	17-3498	FM-255	1465	

10KC FILTER

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L23	0A	410Ω	1HY	161129 ①					

① Alternate Part #153005 and 161004

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Stromberg-Carlson PART No.	REPLACEMENT DATA	
K1	Diode RF Filter	100mmf, 100mmf, 47K	110478	Aerovox	PA-97-1
				Centralab	PC50
				Cornell-Dubilier	111TM-1
				Erie	1403-01
				Sprague	D-1

MISCELLANEOUS

ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M1	Dial Lamp		#47
M2	Dial Lamp		#47
M3	Dial Lamp		#47
M4	Tuning Cap	110060	6 Gang (AM Sections: Ant. 20-450mmf, RF10-365mmf, Osc. 12-130mmf)
M5	Switch	158688	Selector (Rotary Wafer Type)

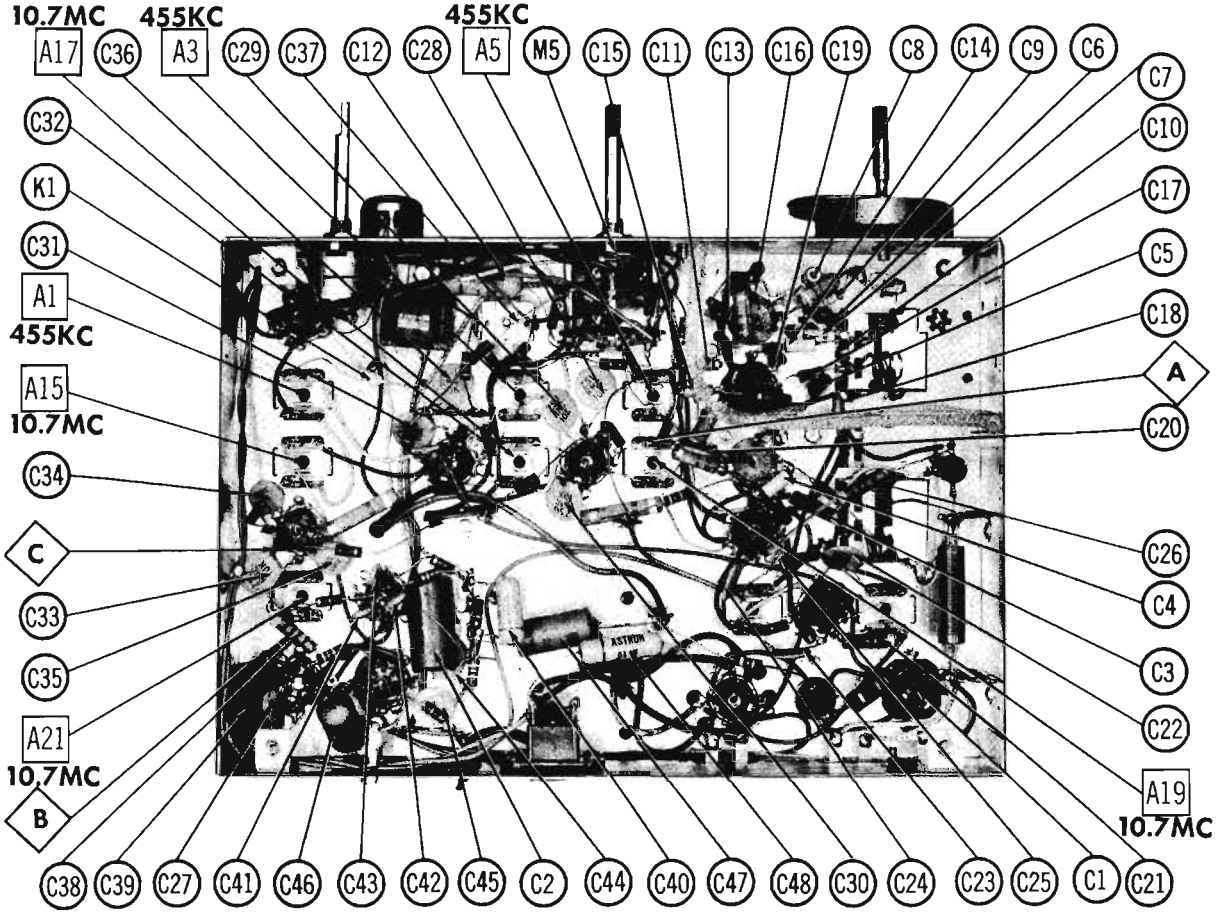
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

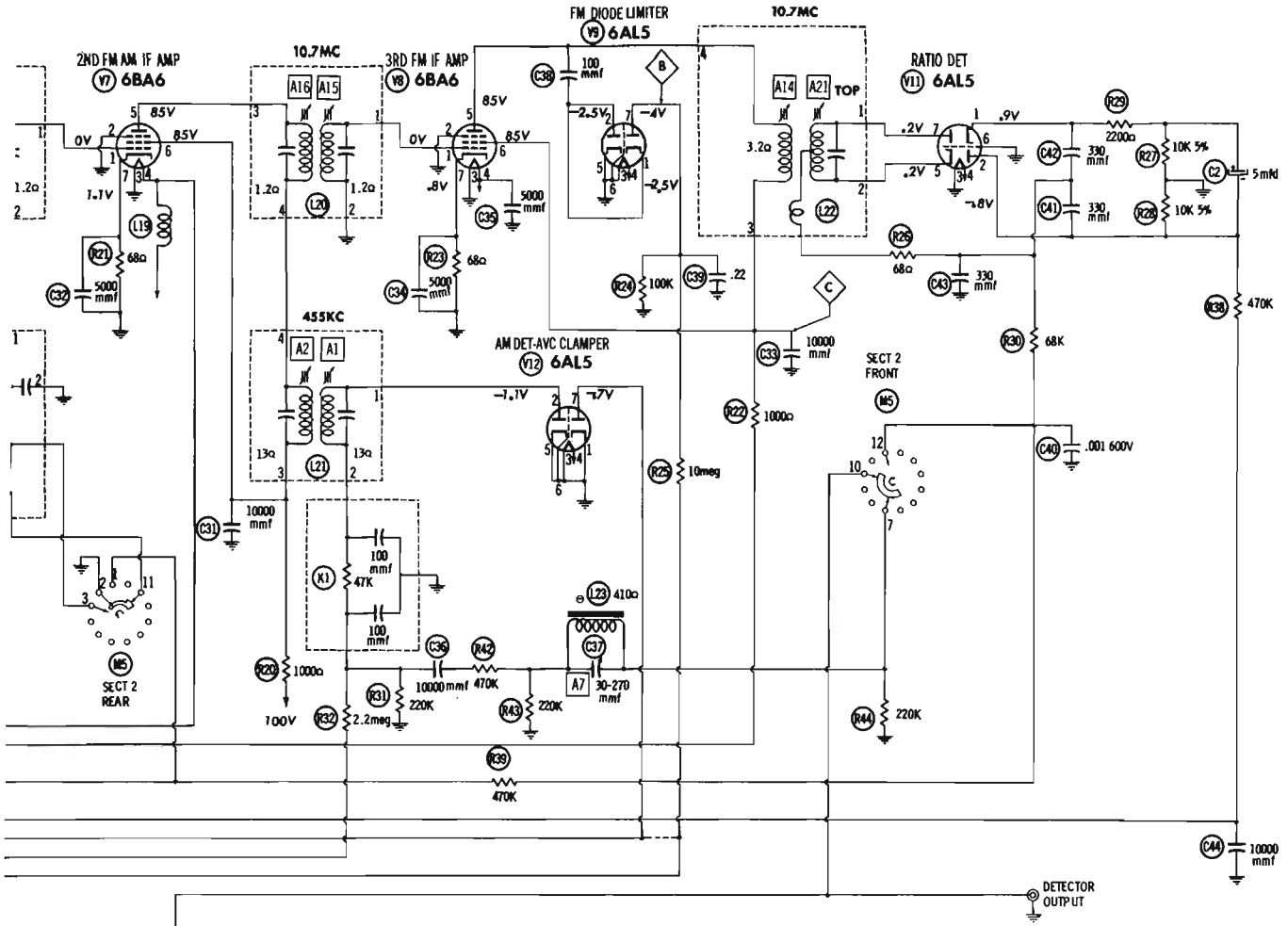
NAME	PART NO.	DESCRIPTION
Escutcheon	125634	Dial
Knob	134300	On-Off-Volume and Tuning (Plain)
Knob	134301	Selector (With Dot)
Knob	134307	On-Off-Volume and Tuning (Plain) Used in series 103 and later.
Knob	134306	Selector (With Dot) Used in series 103 and later
Dial Glass	122603	
Dial Pointer	144603	

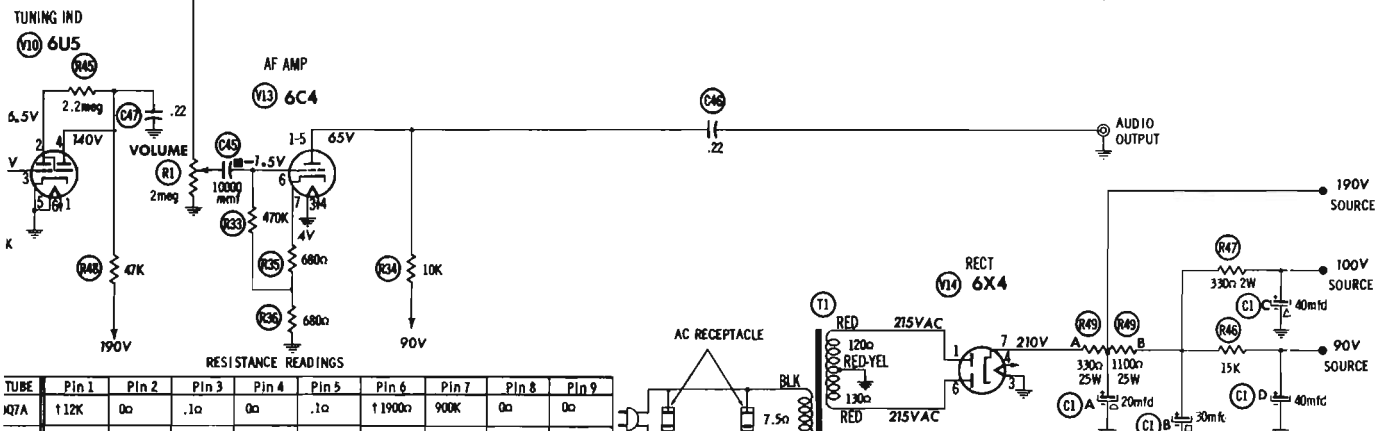
WIRING DATA

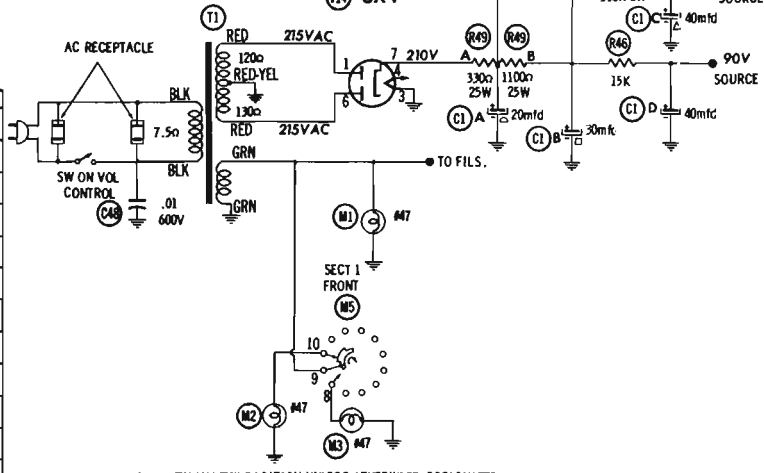
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



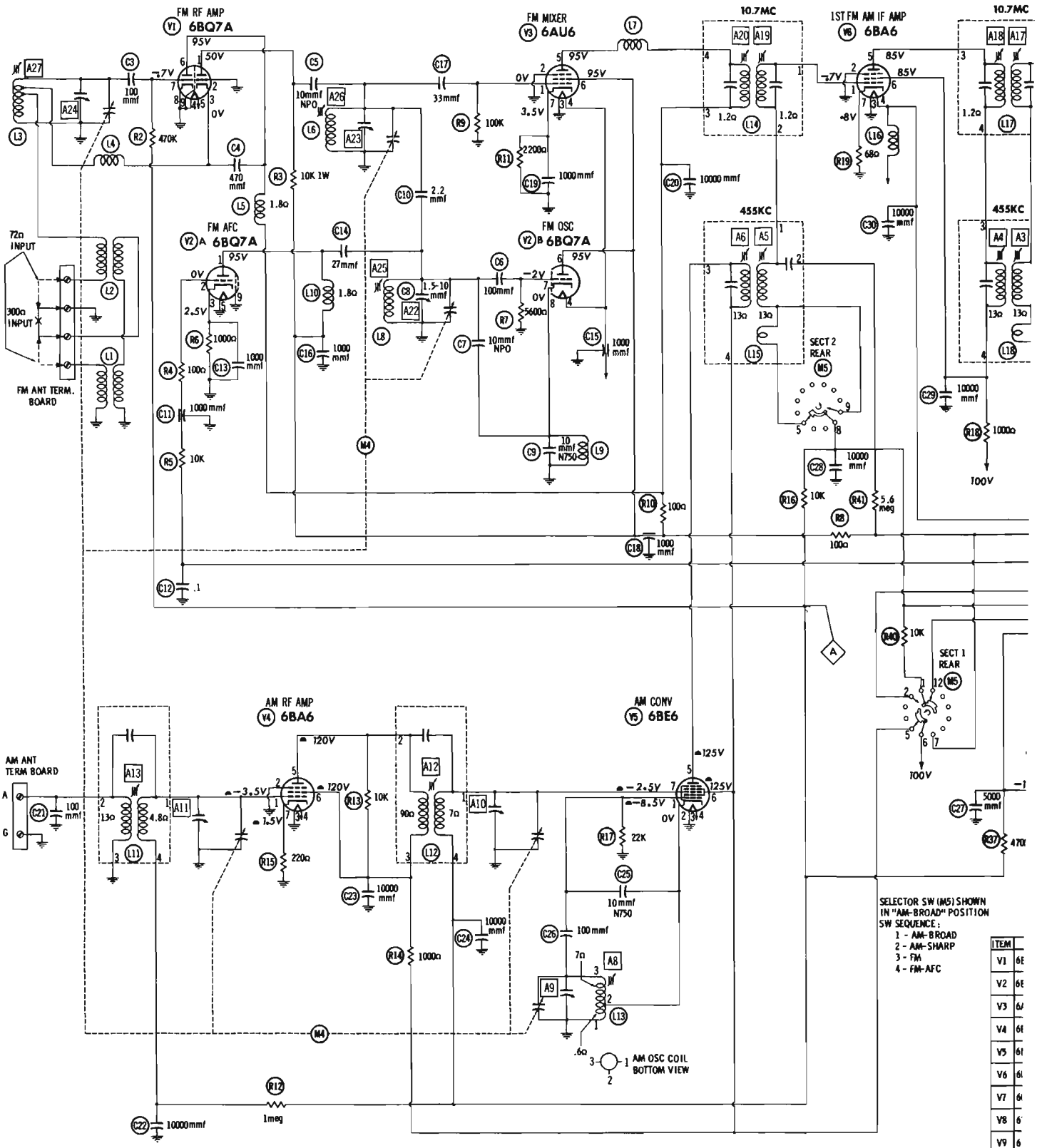




RESISTANCE READINGS

TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
6Q7A	↑12K	0Ω	.1Ω	0Ω	.1Ω	↑1900Ω	900K	0Ω	0Ω
6Q7A	↑1800Ω	2.3meg	1000Ω	.1Ω	0Ω	↑1800Ω	5600Ω	.2Ω	0Ω
6U6	100K	0Ω	0Ω	.1Ω	↑1900Ω	↑1800Ω	2200Ω		
6BA6	▪2.8meg	▪0Ω	0Ω	.1Ω	↑▪2700Ω	↑▪2700Ω	▪220Ω		
6BE6	▪22K	▪.6Ω	0Ω	.1Ω	↑▪1700Ω	↑▪1700Ω	▪1.8meg		
6BA6	400K	0Ω	0Ω	.1Ω	↑2700Ω	↑2700Ω	68Ω		
6BA6	14Ω	0Ω	0Ω	.1Ω	↑2700Ω	↑2700Ω	68Ω		
6BA6	1.2Ω	0Ω	0Ω	.1Ω	↑2700Ω	↑2700Ω	68Ω		
6AL5	INF	INF	0Ω	.1Ω	0Ω	0Ω	100K		
6AL5	12K	10K	0Ω	.1Ω	1.8meg	0Ω	1.8meg		
6AL5	0Ω	270K	0Ω	.1Ω	0Ω	0Ω	400K		
6C4	↑25K	470K	0Ω	.1Ω	↑25K	470K	1300Ω		
6X4	120Ω	NC	0Ω	.1Ω	NC	130Ω	20K(min)		
6U5	.1Ω	↑2.2meg	700K	↑47K	0Ω	0Ω			

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
▪ MEASURED IN "AM" POSITION
▪ MEASURED FROM PIN 7 OF V12
NC NO CONNECTION
TP TIE POINT



SELECTOR SW (M5) SHOWN IN "AM-BROAD" POSITION
SW SEQUENCE:
1 - AM-BROAD
2 - AM-SHARP
3 - FM
4 - FM-AFC

ITEM	
V1	6B
V2	6B
V3	6A
V4	6B
V5	6B
V6	6B
V7	6A
V8	6
V9	6
V10	6
V11	6
V12	6
V13	6
V14	6

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS

Volume control should beat maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning gang fully closed and set pointer to left edge of "55" on dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 6BE6 (V5). Low side to chassis.	455KC (Unmod)	AM (Sharp)	Point of non-interference. Low freq. end.	DC probe to point (A). Common to Chassis.	A1, A2, A3, A4, A5, A6	Adjust for maximum deflection.
2.	.1mfd	High side to pin 1 (grid) of 6BA6 (V7). Low side to chassis.	455KC (10KC Mod)	AM (Sharp)	Point of non-interference. Low freq. end.	AC VTVM Across detector output jack	A7	Adjust for MIMIMUM deflection.
3.	200mmf	Across AM Antenna terminals.	600KC (Unmod)	AM (Sharp)	600KC	DC probe to point (A) Common to Chassis	A8	Adjust for maximum deflection.
4.	200mmf	Across AM Antenna terminals.	1400KC	AM (Sharp)	1400KC	DC probe to point (A) Common to Chassis	A9, A10, A11	Adjust for maximum deflection.
5.	200mmf	Across AM Antenna terminals.	600KC	AM (Sharp)	600KC	DC probe to point (A) Common to Chassis	A8, A12, A13	Adjust for maximum deflection. Repeat steps 3 and 4 until no further improvement is noted.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6	.1mfd	High side to pin 1 (grid) of 6AU6 (V3). Low side to chassis.	10.7MC (Unmod.)	FM (No AFC)	100MC	DC probe to point (B) thru 10K. Common to chassis.	A14, A15 A16, A17 A18, A19 A20	Adjust for maximum deflection. Unshielded generator lead should not exceed 2".
7.	.1mfd	High side to pin 1 (grid) of 6AU6 (V3). Low side to chassis.	10.7MC (Unmod.)	FM (No AFC)	100MC	DC probe to Detector output jack. Common to chassis.	A21	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450 KC sweep. Use 120% sawtooth voltage in scope for horizonial deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6	.1mfd	High side to pin 1 (grid) of 6AU6 (V3). Low side to chassis.	10.7MC (450KC SWP)	FM (No AFC)	100MC	Vert. Amp. to point (C) thru .01mfd. Low side to chassis.	A14, A15 A16, A17 A18, A19 A20	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. Unshielded generator lead should not exceed 2".
7.	.1mfd	High side to pin 1 (grid) of 6AU6 (V3). Low side to chassis.	10.7MC (450 KC SWP)	FM (No AFC)	100MC	Vert. Amp. to point (C) thru .01mfd. Low side to chassis.	A21	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2 SLIGHTLY retouch A 14 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	2 120Ω Carbon resistors	Across FM Antenna terminals.	100MC (22.5 KC SWP)	FM (No AFC)	100MC	DC probe to point (A). Common to chassis.	A22, A23, A24	Adjust for maximum deflection.
9	2 120Ω Carbon resistors	Across FM Antenna terminals.	100MC (22.5KC SWP)	FM (No AFC)	See Remarks	DC probe to point (A). Common to chassis.	L3, L6, L8	Check calibration and sensitivity at 108MC, 106MC, 90MC, and 88MC. If variation is excessive, adjust L3, L6, and L8 for maximum deflection by compressing or expanding coil turns. Repeat steps 8 and 9 for proper tracking.

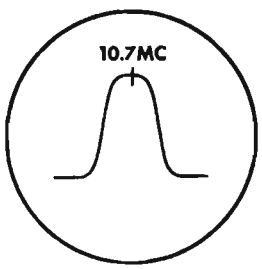


FIG. 1

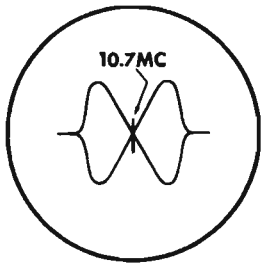
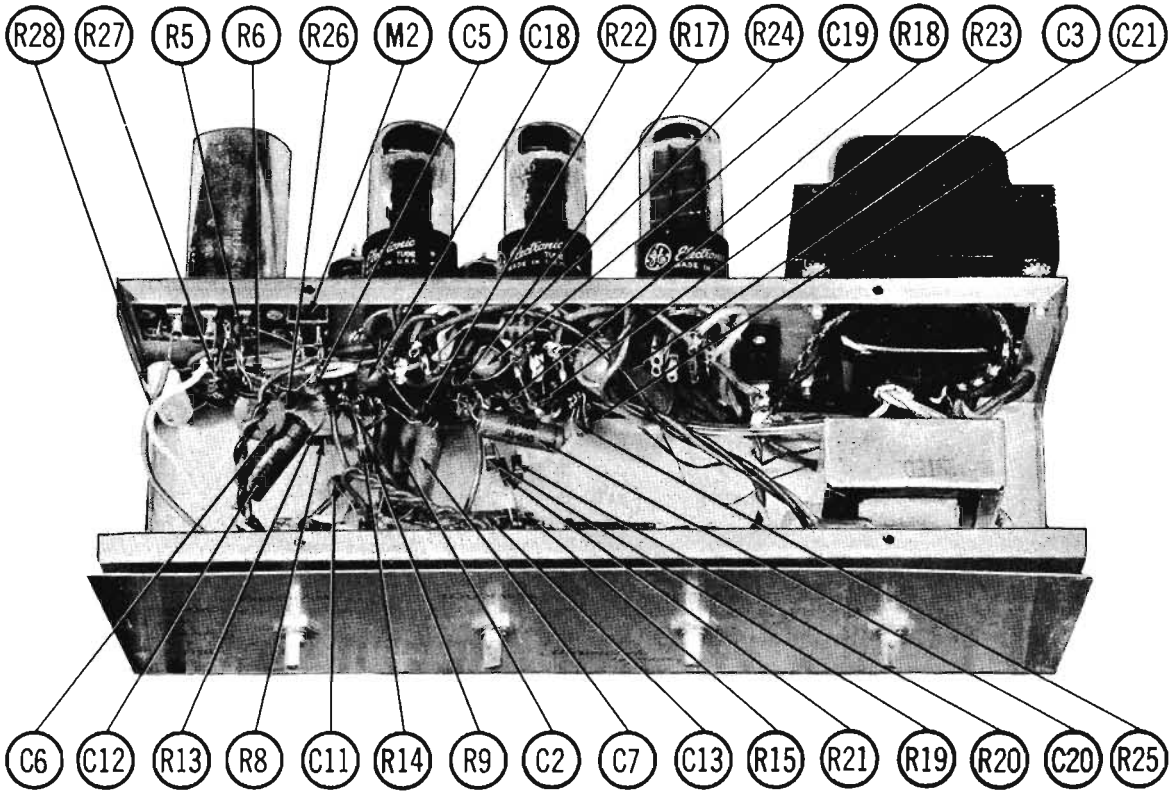


FIG. 2

WHITLEY MODEL
"Murasonde" AP1000

TRADE NAME	Whitley Model "Murasonde" AP1000	
MANUFACTURER	Whitley Electronics, Inc., Columbia City, Ind.	
TYPE SET	AC Operated 3 Channel Equalizer Preamplifier	
TUBES (Five)	Types 12AX7 Preamp.-AF Amp., 12AX7 AF Amp.-Phase Inv., (2) 6V6GT Output, 5Y3GT Rectifier	
POWER SUPPLY	110-120 Volts AC - 60 Cycles	RATING .55 Amp. @ 117 Volts AC (57 Watts)

G944



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamp. -1st AF Amp.	12AX7	
V2	2nd AF Amp. -Phase Inv.	12AX7	
V3	Output	6V6GT	

ITEM No.	USE	TYPE	NOTES
V4	Output	6V6GT	
V5	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA WHITLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲80	350		AFH4-94-75	BO340	FP377. 4		Q-055	R2388*
B	■55	350			BBRDU145	TC68		FMD-4530	
C	▲10	350							
D	10	350							
C2	50	25		PRS25V50	BBR50-25	TC29	TD-50-25	FM-0250	TVA-1206
C3	50	25		PRS25V50	BBR50-25	TC29	TD-50-25	FM-0250	TVA-1206
C4	5	50	(Note 1)	PRS50VNP4	BR1015 † BR1015 †	TC32 † TC32 †		MT-0510 † MT-0510 †	R2415*

Note 1: Non-polarized unit.
* Non catalog item.
† Connect negative leads together.

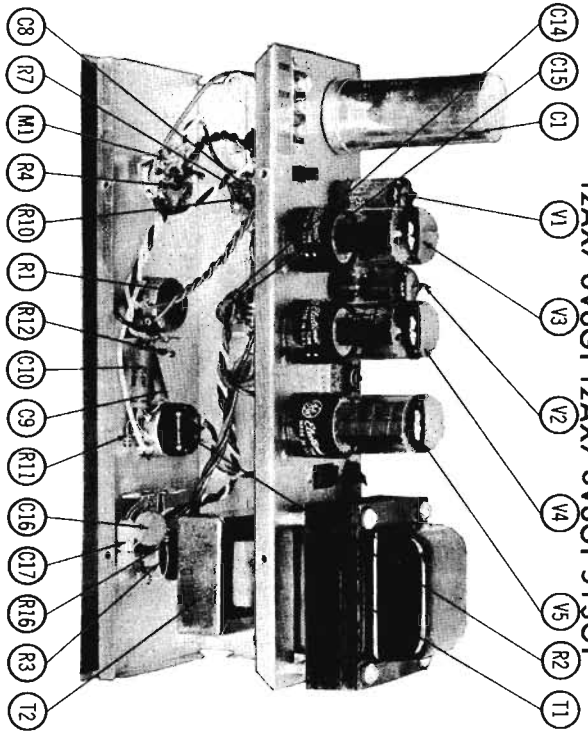
FIXED CAPACITORS

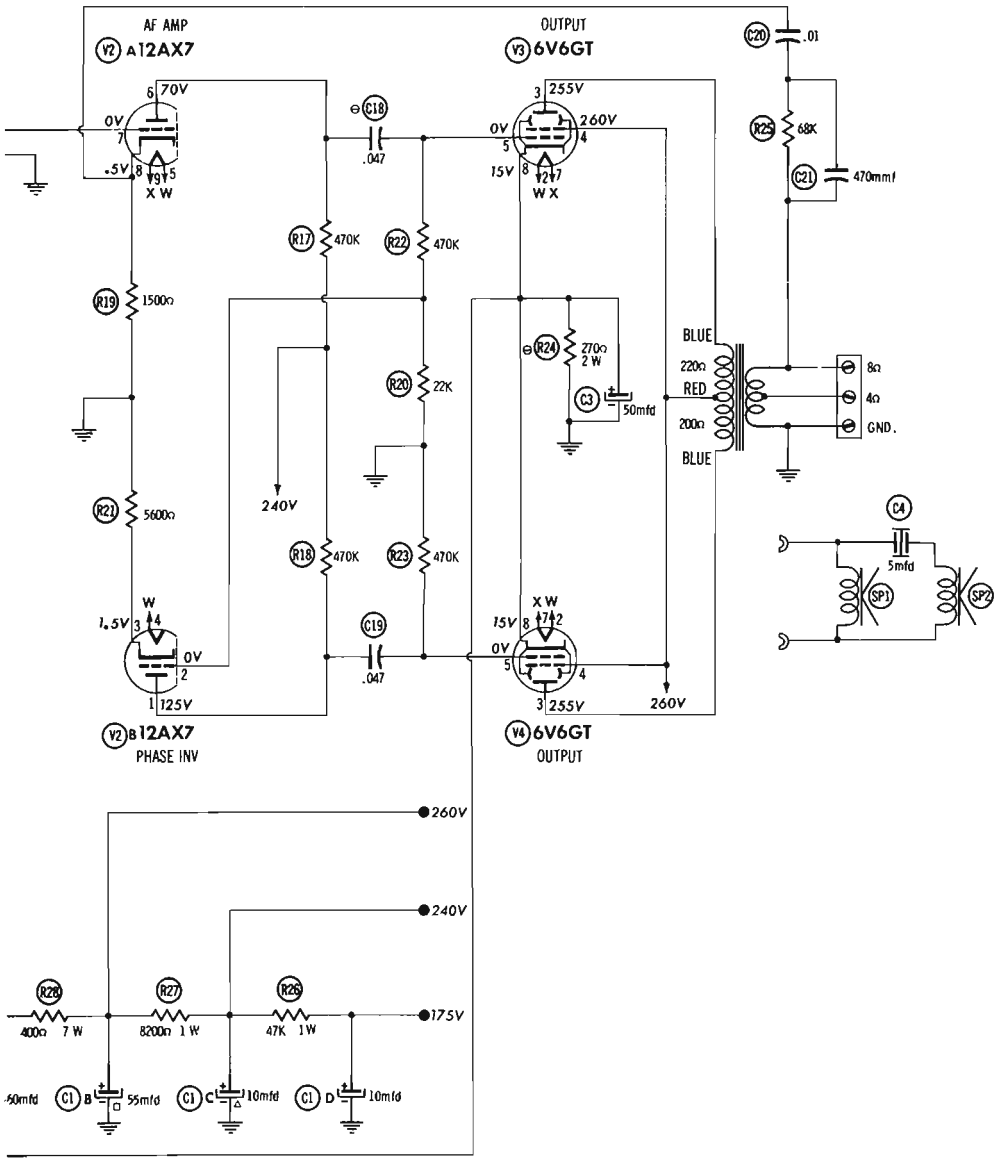
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

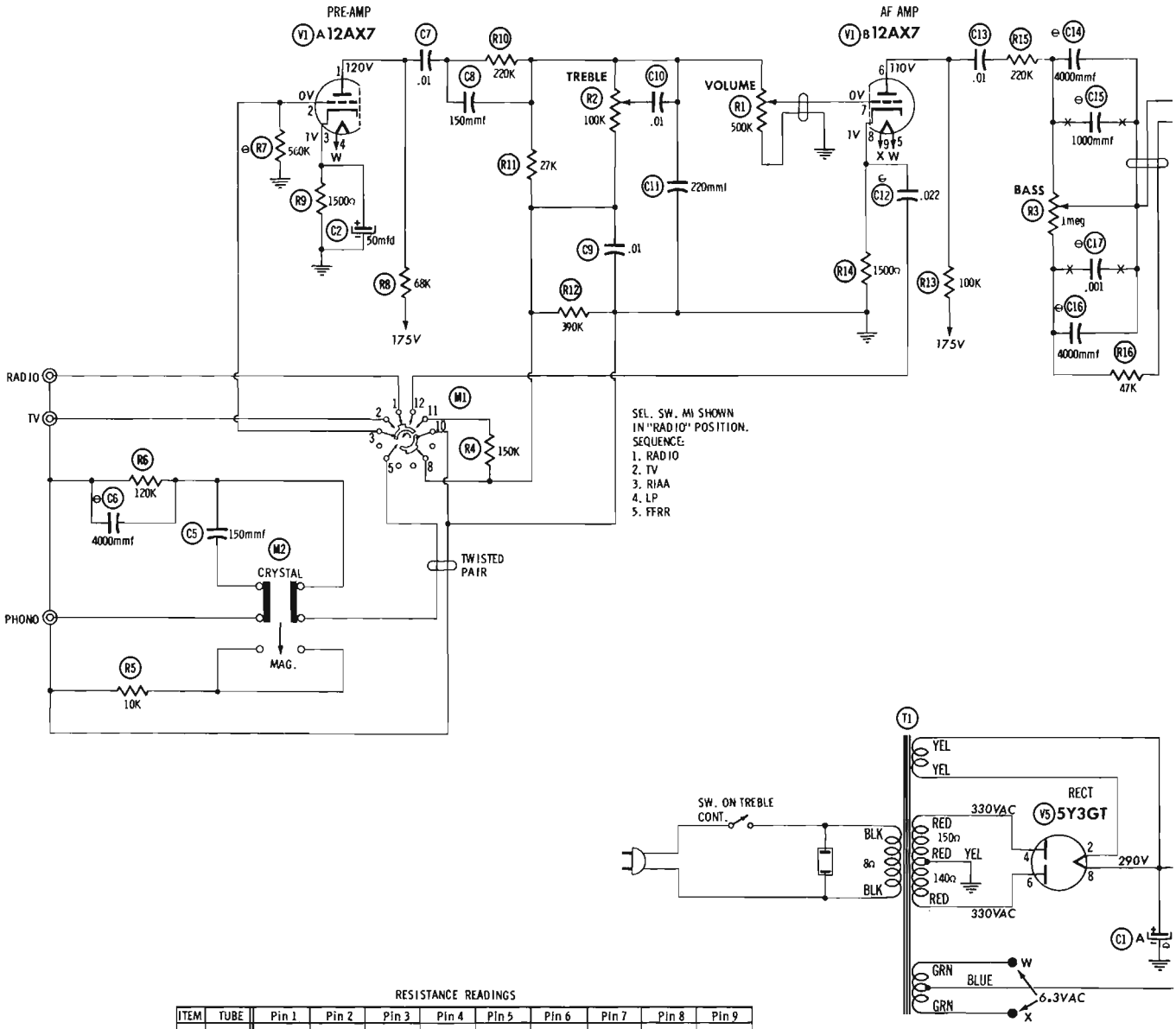
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA WHITLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	150			BPD-00015	DD-151	L10T15	ED-150	UC-5315	5GA-T15	
C6	4000			BPD-004	DD-402	BYA10D4	ED-004	UC-5240	5HK-D4	Note 1
C7	.01	400		BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C8	150			1498-00015	DD-151	5W5T15	ED-150	UC-5315	1FM-315	
C9	.01	400		BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C10	.01	400		BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C11	220			BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	
C12	.022	400		BPD-02	DD-203	CUB4S22	ED-02	GEM-4122	4TM-S22	Note 4
C13	.01	400		BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C14	4000			BPD-004	DD-402	BYA10D4	ED-004	UC-5240	5HK-D4	Note 2
C15	1000			BPD-001	DD-102	BYA6D1	ED-001	DC521	5HK-D1	Note 3
C16	4000			BPD-004	DD-402	BYA10D4	ED-004	UC-5240	5HK-D4	Note 2
C17	.001	600		BPD-001	DD-102	CUB6D1	GP-1000	GEM-621	6TM-D1	Note 3
C18	.047	400		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	Note 2
C19	.047	400		BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	Note 2
C20	.01	400		BPD-01	DD-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C21	470			BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	

Note 1: Some versions may use 4700MMF in this application.
Note 2: Some versions may use 5000MMF in this application.
Note 3: Not used in some versions.
Note 4: Some versions may use 20000MMF in this application.

CHASSIS—TOP VIEW




AF AMP
V2 A 12AX7
OUTPUT
V3 6V6GT
C20 .01
R25 68K
C21 470mmf
C18 .047
R17 470K
R22 470K
R19 1500Ω
R20 22K
R24 270Ω 2W
C3 50mfd
BLUE
220Ω
RED
200Ω
BLUE
8Ω
4Ω
GND.
C4 5mfd
SP1
SP2
R21 5600Ω
240V
R18 470K
R23 470K
C19 .047
260V
V2 B 12AX7
PHASE INV
V4 6V6GT
OUTPUT
260V
240V
175V
R28 400Ω 7W
R27 8200Ω 1W
R26 47K 1W
C1 B 55mfd
C1 C 10mfd
C1 D 10mfd



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†125K	560K	1500Ω	270Ω	270Ω	†160K	0Ω	1500Ω	270Ω
V2	12AX7	†480K	22K	5600Ω	270Ω	270Ω	†480K	47K	1500Ω	270Ω
V3	6V6GT	TP	270Ω	†620Ω	†400Ω	500K	NC	270Ω	270Ω	
V4	6V6GT	TP	270Ω	†600Ω	†400Ω	470K	TP	270Ω	270Ω	
V5	5Y3GT	NC	20K (Min)	NC	150Ω	NC	140Ω	NC	20K (Min)	

† MEASURED FROM PIN 8 OF V5.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

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PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	WHITLEY PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	220003	B-80	A47-500K-Z			Loudness
B	Shaft			Not Req.	FS-3			
R2A	100K	½	220001	B-40	A47-100K-S			Treble
B	Shaft			Not Req.	FS-3			
C	Switch			KB-1	SWE-12			
R3A	1Meg	½	220002	B-69	A47-1Meg-S			Bass
B	Shaft			Not Req.	FS-3			

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	WHITLEY PART No.	IRC PART No.	
R4	150K			BTS-150K	
R5	10K			BTS-10K	
R6	120K			BTS-120K	
R7	560K			BTS-560K	Note 1
R8	68K			BTS-68K	
R9	1500Ω			BTS-1500	
R10	220K			BTS-220K	
R11	27K			BTS-27K	
R12	390K			BTS-390K	
R13	100K			BTS-100K	
R14	1500Ω			BTS-1500	
R15	220K			BTS-220K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	WHITLEY PART No.	IRC PART No.	
R16	47K			BTS-47K	
R17	470K			BTS-470K	
R18	470K			BTS-470K	
R19	1500Ω			BTS-1500	
R20	22K 5%			BTS-22K 5%	
R21	5600Ω 5%			BTS-5600 5%	
R22	470K 5%			BTS-470K 5%	
R23	470K			BTS-470K	
R24	270Ω	2		BTS-270	Note 2
R25	68K			BTS-68K	
R26	47K	1		BTA-47K	
R27	8200Ω	1		BTA-8200	
R28	400Ω	7			

Note 1: Some versions may use 470K in this application.
Note 2: Some versions may use 250Ω, 2W in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	WHITLEY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC ⓖ .55A	610VCT ⓖ .070A	5V ⓖ 2A	6.3VCT ⓖ 1.44A		P9305		PM8408	22R04	R-9B

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	WHITLEY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	
T2	7000Ω CT	8Ω Tap ⓖ 4Ω	1895	21404 ①	A-3027	A-3831 ①	24S56 ①		① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	WHITLEY PART No.	QUAM PART No.	
SP1	5"	PM	10Ω	V5D6		
SP2	12"	PM	6-8Ω	V12J65	12A10X	

MISCELLANEOUS

ITEM No.	PART NAME	WHITLEY PART No.	NOTES
M1	Switch		Function Selector (Rotary, Wafer Type) (8 Pole, 5 Position)
M2	Switch		Mag-Xtal (Slide Type, DPDT)

SERVICING hi-fi and ASSOCIATED AUDIO EQUIPMENT

SERVICING HI-FI AND ASSOCIATED AUDIO EQUIPMENT

Contains complete information on the operation, circuitry, maintenance, replacement parts, and adjustments for late-model audio equipment. The following brand names are represented in this volume.

BELL SOUND	HARMON-KARDON
BIGG OF CALIF.	KNIGHT
BROCINER	McINTOSH
CRAFTSMEN	NEWCOMB
DAVID BOGEN	PACEMAKER
ELECTRO-VOICE	SCOTT (H. H.)
FAIRCHILD	SHERWOOD
FISHER	STROMBERG-CARLSON
GROMMES	WHITLEY

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