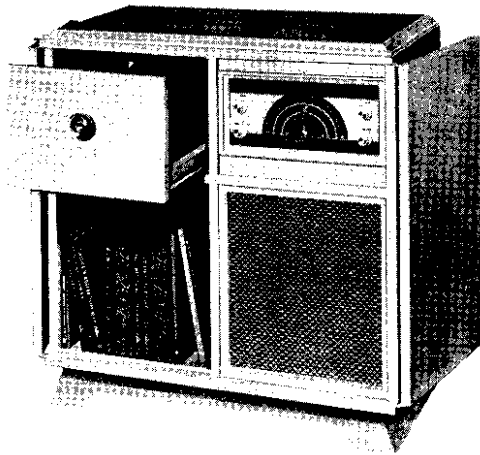
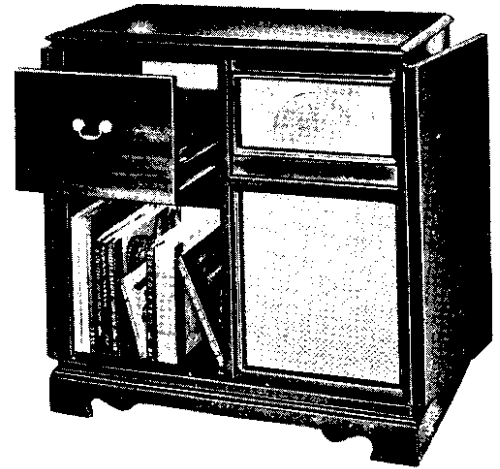


MODELS 537,
538, Ch. 168



MODEL 537
Modern Style
Oak Cabinet



MODEL 538
Traditional Style
Mahogany Cabinet

SPECIFICATIONS

Line Voltage	115V AC	60 cps	Record Changer	Automatically plays 1" stack of 7", 10", or 12" records at 33-1/3 rpm, 45 rpm, or 78 rpm.
Power Consumption	150 Watts		Cabinet*	
Tuning Ranges			Height	35"
AM	535 KC to 1650 KC		Width	33-1/4"
FM	88 MC to 108 MC		Depth	17-1/2"
Number of Tubes	14			
Audio Power Output	15 Watts			
Speaker Type	12" PM			

* Where there are slight variations in certain of the dimensions for the two models, the largest value is listed.

MAJOR COMPONENTS

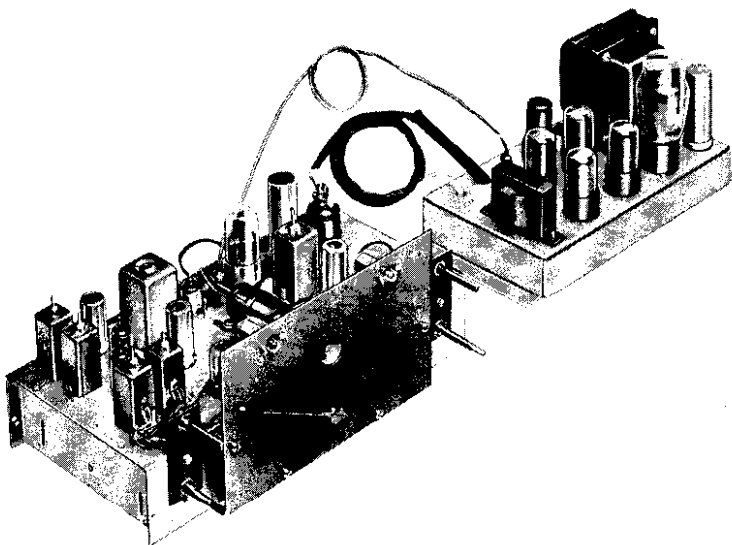


Figure 1. Chassis 168

Cabinet	
Model 537	7593
Model 538	7592
Radio Chassis	168
Speaker	9070
Antenna	
AM	55213
FM Assembly	55218
Record Changer	9078
Dial Glass	748
Backboard	3715
Record Changer Drawer	6659
Knobs	
Tuning	33517A
Off-On Treble Assembly	33516A
Volume	33517A
Band Switch	33517C
Bass	3656A

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538, Ch. 168

ELECTRICAL AND MECHANICAL DATA

Power Requirements:

Operating Voltage 115 V AC 60 cps
Watts 150

Tuning Range:

AM 535 KC to 1650 KC
FM 88 MC to 108 MC

Audio Power Output 15 Watts

Output Impedance 3.2 ohms at 400 cps

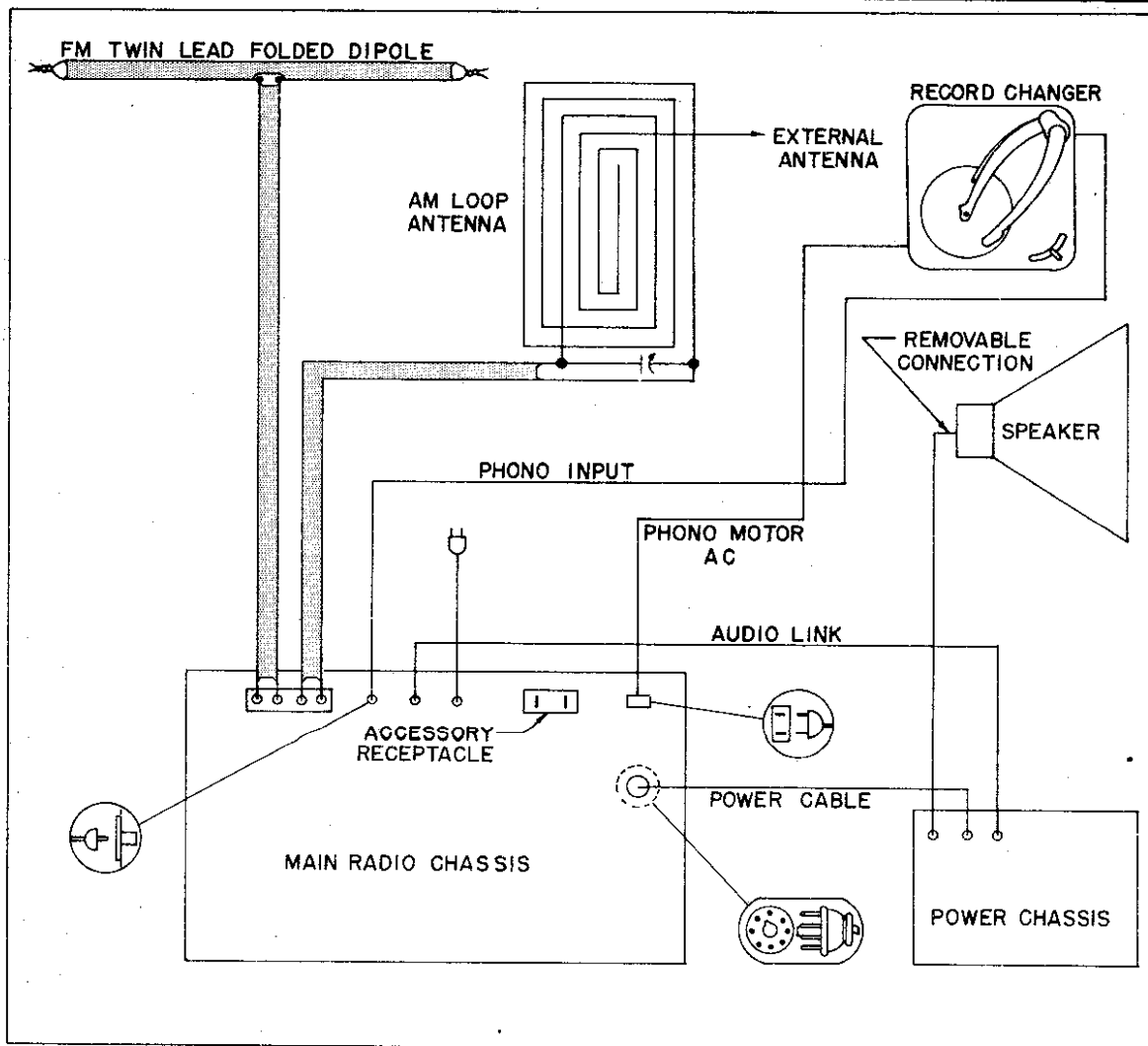
Intermediate Frequencies:

AM 455 KC
FM 10.7 MC

FM Antenna Input Impedance 300 ohms, balanced

TUBE COMPLEMENT

1	6BA6	AM RF Amplifier	V1
1	6BE6	AM Oscillator-Converter	V2
1	12AT7	FM Oscillator-Converter	V3A, V3B
1	6BA6	AM-FM 1st IF Amplifier	V4
1	6BA6	FM 2nd IF Amplifier	V5
1	6AL5	FM Ratio Detector	V6
1	6AT6	AM 2nd Detector, AVC, 1st Audio (AM and FM)	V7
1	6J5	2nd Audio Amplifier	V8
1	6J5	Audio Phase Inverter	V9
4	6K6GT	Audio Power Amplifiers	V10, V11, V12, V13
1	5U4G	Rectifier	V14
1	6E5	Tuning Indicator	V15



BLOCK DIAGRAM

Chassis 168 is a fifteen-tube combination AM-FM radio receiver, including tuning indicator and rectifier. The receiver uses an indoor loop antenna for normal AM reception; an external antenna may be used in very weak AM areas. It is designed to be used with an indoor FM antenna in normal signal areas and an outside FM antenna and a 300 ohm, balanced transmission line in weak signal areas. The indoor FM antenna is located in the receiver cabinet, and it should be disconnected from the FM antenna terminal posts when an outside antenna is used.

The physical make-up of chassis 168 consists of two units, as shown in figure 1. The unit on the right contains the power supply and power amplifier stages. The main unit, shown on the left side of the figure, contains the AM RF stage, AM and FM oscillator-converter stages, AM and FM IF stages, voltage amplifier stages, and tuning indicator. The main unit contains the dial mechanism. Dial stringing details are indicated in figure 3. Dial calibration appears on the dial glass mounted on the front of the cabinet. Calibration points needed during alignment are included on the dial background plate. These calibration points are indicated in figure 4.

The main unit is mounted in place horizontally on rubber shock mounts which rest on wooden blocks that are bolted in the cabinet from below the unit. The power unit is mounted horizontally below the main unit. It is shock mounted and held in place by a bolt at each corner.

CONTROLS

Operation of the VOLUME and TUNING controls is conventional. The BAND SWITCH has three positions for selecting one of the following: PHONO, AM radio, or FM radio. The PHONO position is selected with the switch in the extreme counterclockwise position, and the other two positions are selected in the order listed by clockwise rotation of the band switch control shaft.

The BASS and TREBLE controls are the dual type with the OFF-ON switch coupled to the TREBLE control. When the TREBLE control is in its extreme counterclockwise position, the receiver is turned off. Clockwise rotation of the TREBLE control shaft turns the receiver on and increases the treble tone. Extreme counterclockwise rotation of the BASS control shaft gives minimum bass, clockwise rotation giving increase in bass tone. Location of the controls is shown in figure 4.

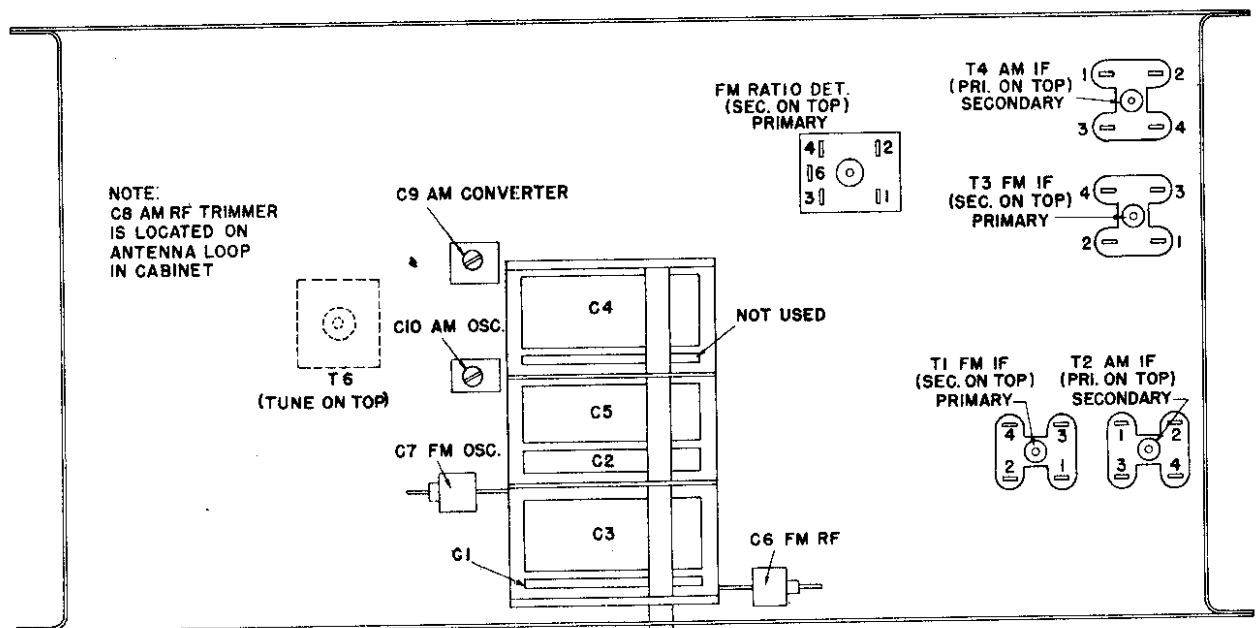


Figure 2. Trimmer Condenser Location - Bottom View

ALIGNMENT

This section describes the minimum equipment and procedure that is required to align the receiver satisfactorily. Before beginning alignment, the tuning condenser must be fully open, and the set should be allowed to warm up about 15 minutes. It is suggested that the alignment be performed on a metal-topped bench with generator, receiver, and voltmeter well bonded together. The bench area should be free of strong extraneous radiation.

Equipment:

CW Signal Generator capable of providing the frequencies listed in the table below. Must include audio modulating signal for AM alignment.

A voltmeter with at least a sensitivity of 20,000 ohms per volt (V.T.V.M. preferable). Should have AC scale.

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Two 100K ohm composition resistors.

Two 150 ohm composition resistors.

Procedure:

The AM section should be completely aligned before beginning the FM alignment. For AM alignment the generator is coupled to the receiver by placing the

"hot" lead next to the antenna loop so that lead and loop wire form a condenser. The voltmeter is connected across the voice coil and switched to a low AC scale. The coupling for FM alignment is two 150 ohm composition resistors, one in series with each generator lead. Before tuning the ratio detector transformer, solder two 100K ohm composition resistors in series from point "A", shown in figure 7, to ground. Remove them before aligning the FM RF section.

ALIGNMENT TABLE

Step No.	Band Switch Position	Signal Generator Frequency	Connect Signal To	Condenser Setting (See Fig. 4)	Voltmeter	Adjust	Instructions
1	AM	455 KC 400 cps Mod.	6BE6 V2 Pin 7	Full Open	Across Voice Coil	T2 Pri., Sec. T4 Pri., Sec.	Adjust for max. output. Use as low a signal input as possible.
2	"	1650 KC 400 cps Mod.	Antenna Loop as described above.	"	"	C10 AM Osc. Trimmer	"
3	"	1410 KC 400 cps Mod.	"	F	"	C8, C9 AM RF Trimmer	"
4	"	600 KC 400 cps Mod.	"	B	"	T6	Adjust for max. output.
5	"	"	"	"	"	Plates of C3	Bend plates as required. Adjust for max. reading.
6	FM	10.7 MC CW	FM Ant. Terminals	Full Open	Between point A and ground.	T1 Pri., Sec. T3 Pri., Sec. T5 Pri. only	Adjust for max. voltmeter reading.
7	"	"	"	"	Between junction of two 100K re- sistors added and point C.	T5 Sec.	Adjust for zero reading, using a low signal input to avoid overloading.
8	"	107 MC CW	"	G	Point A to ground.	C7 FM Osc. Trimmer	Remove 100K resistors. Adjust for max. reading. Make certain receiver osc. freq. is 10.7 MC above incoming signal freq.
9	"	"	"	"	"	C6 FM RF Trimmer	"
10	"	98 MC CW	"	D	"	Plates of C1	Bend plates as required. Adjust for max. reading.
11	"	90 MC CW	"	C	"	"	"

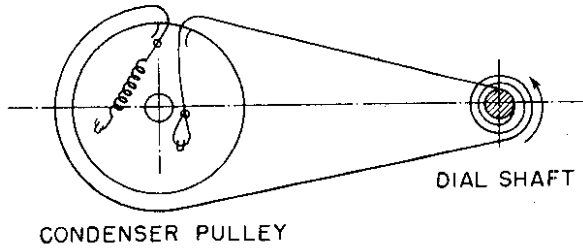


Figure 3. Dial Stringing

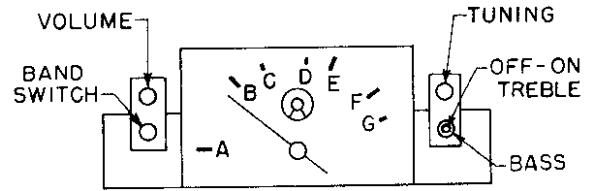


Figure 4. Location of Controls

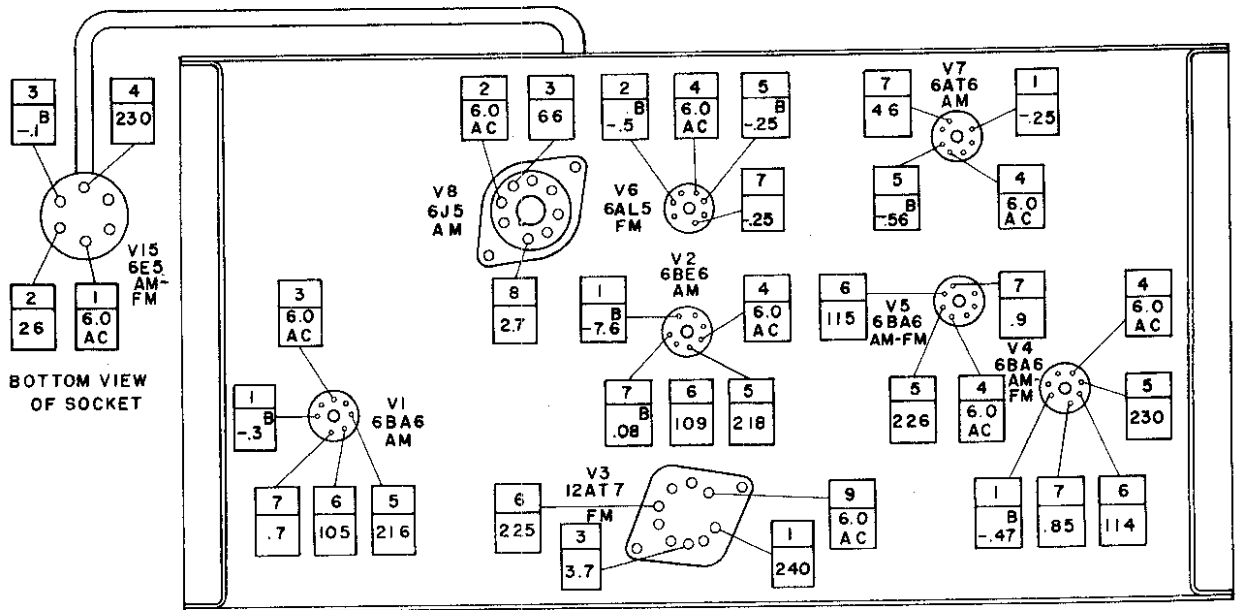


Figure 5. Pin Voltages of Main Unit

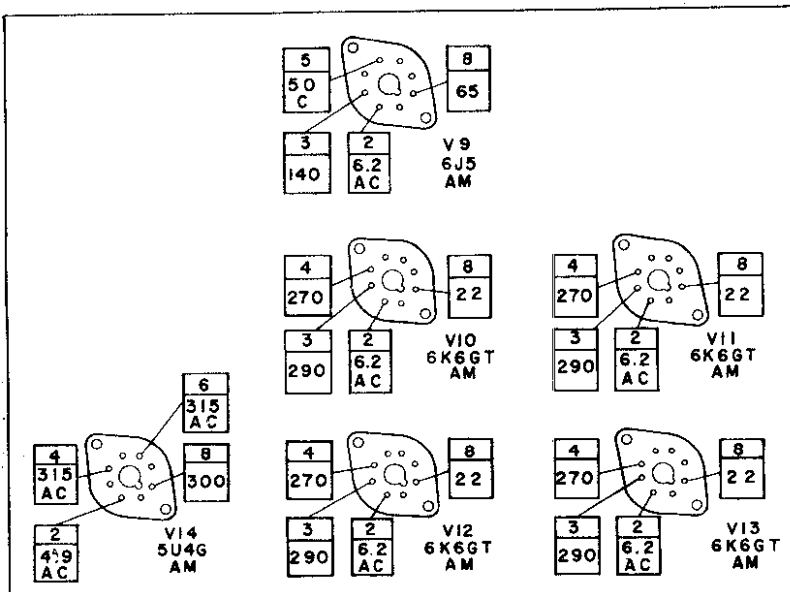


Figure 6. Pin Voltages of Power Unit

NOTES:

All voltages measured to chassis unless otherwise noted.

DC voltages measured with 20,000 ohm/volt meter.

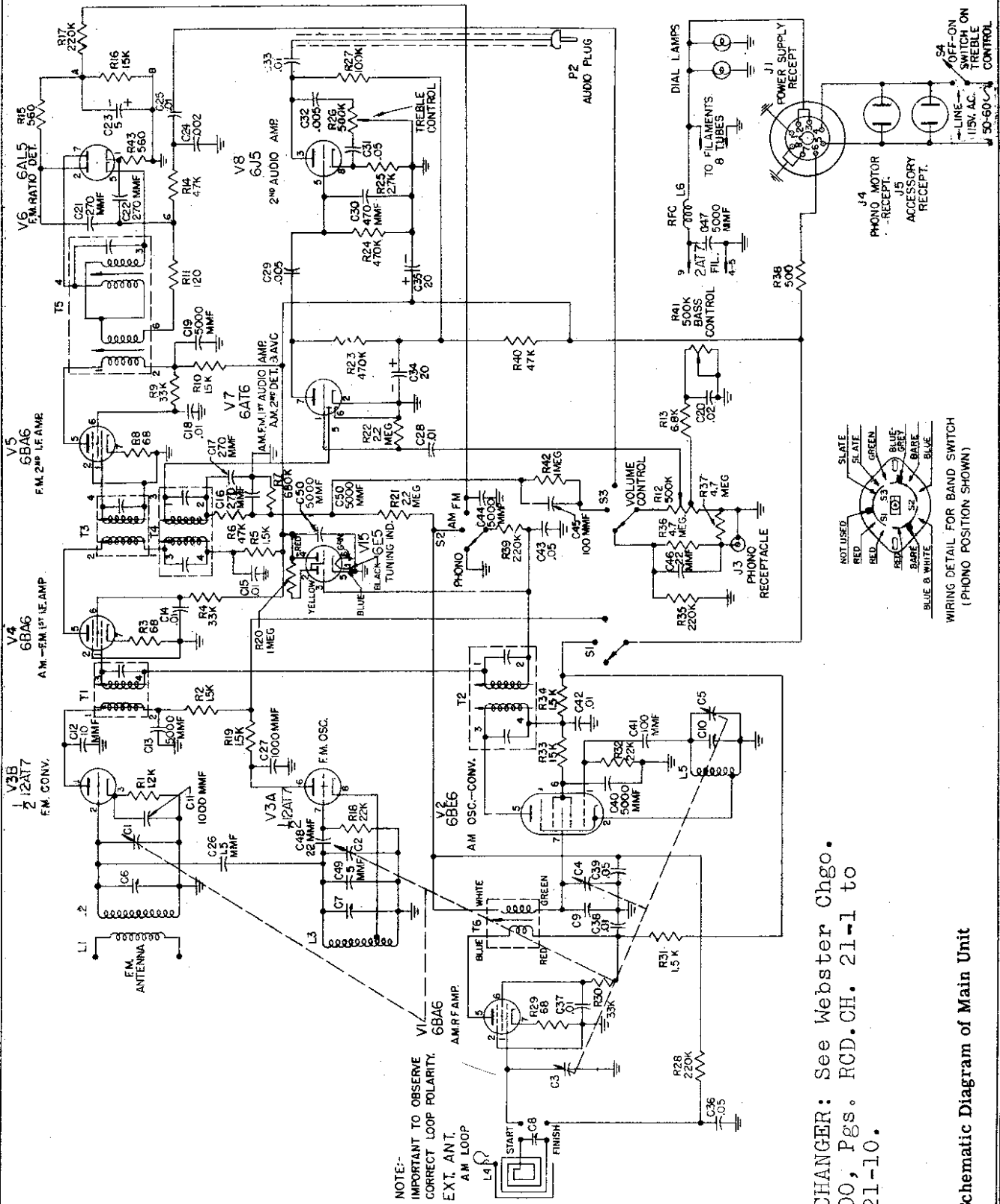
AC voltages measured with 1000 ohm/volt meter.

All measurements made with no signal input to receiver.

All pin voltages not indicated on diagram are at ground potential for all practical purposes.

- A Measured from pin 2 to pin 8
- B VTVM
- C 250 V. scale

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NOTE:-
IMPORTANT TO OBSERVE
CORRECT LOOP POLARITY.
EXT. ANT.
A.M. LOOP

RECORD CHANGER: See Webster Chgo.
Model 100, Pgs. RCD.CH. 21-1 to
RCD.CH.21-10.

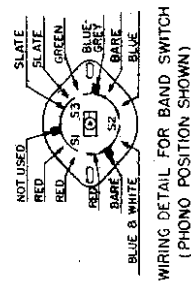


Figure 7. Schematic Diagram of Main Unit

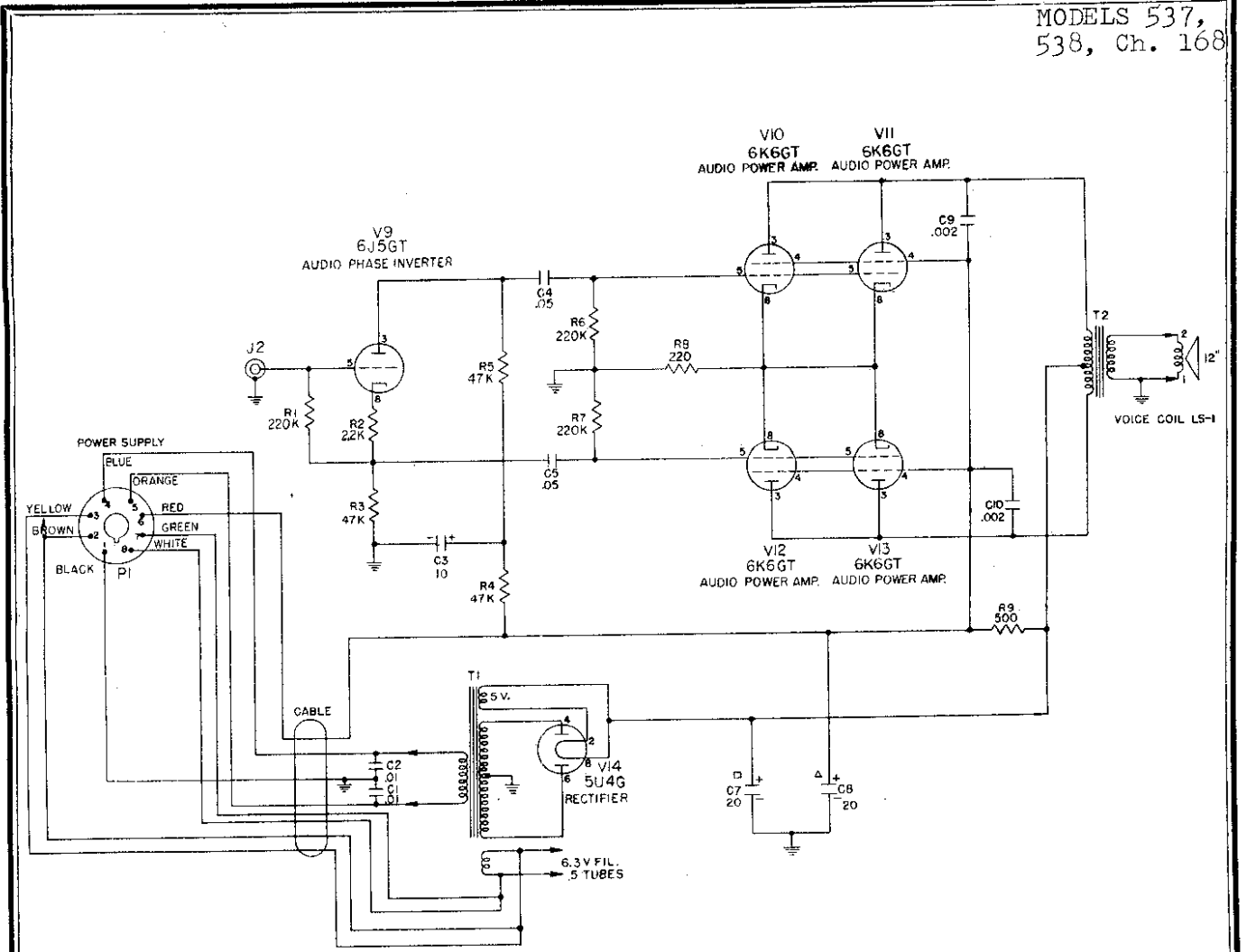


Figure 8. Schematic Diagram of Power Supply and Audio Section

PARTS LIST FOR POWER UNIT

SYMBOL	PART NO.	VALUE	TOL.	WATTS OR VOLTS	TYPE
C1	4105	.01		600 V	Paper
C2	4103	.01		600 V	Paper
C3	4203	10		450 V	Tubular Electrolytic
C4	4101	.05		400 V	Paper
C5	4101	.05		400 V	Paper
C6	(Not Used)				
C7	4231	20-20		450 V	Electrolytic
C8					
C9	4118	.002		600 V	Paper
C10	4118	.002		600 V	Paper
R1	4500	220K	20%		
R2	4512	2.2K	20%		
R3	4559	47K	10%		
R4	4504	47K	20%		
R5	4559	47K	10%		
R6	4500	220K	20%		
R7	4500	220K	20%		
R8	4706	220	20%	3 W	
R9	4700	500	10%	5 W	
T1	5001-4	Power Transformer			
T2	5108	Output Transformer			
P1	6212	Plug, Power Supply			

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PARTS LIST FOR MAIN UNIT

NOTES:

All values of capacity are microfarads unless otherwise noted.

All resistors are 1/2 watt composition type with values given in ohms unless otherwise specified.

SYMBOL	PART NO.	VALUE	TOL.	WATTS OR VOLTS	TYPE
C1 } C2 } C3 } C4 } C5 }	4411	3 Gang AM, FM (1 Section unused)			
C6	4318	Trimmer (FM Section)			
C7	4318	Trimmer (FM Section)			
C8	4313	Trimmer (Located on AM Antenna Loop)			
C9	4313	Trimmer (AM Section)			
C10	4313	Trimmer (AM Section)			
C11	4025	1000 mmf			Ceramic Hi-K
C12	4027	10 mmf	10%		Ceramic
C13	4029	5000 mmf			Ceramic Hi-K
C14	4112	.01		400 V	Paper
C15	4112	.01		400 V	Paper
C16	4001	270 mmf	20%		Mica
C17	4001	270 mmf	20%		Mica
C18	4112	.01		400 V	Paper
C19	4029	5000 mmf			Ceramic Hi-K
C20	4106	.02		400 V	Paper
C21	4001	270 mmf	20%		Mica
C22	4001	270 mmf	20%		Mica
C23	4209	5		50 V	Electrolytic
C24	4118	.002		600 V	Paper
C25	4112	.01		400 V	Paper
C26	4024	1.5 mmf	10%		Mica
C27	4025	1000 mmf			Ceramic Hi-K
C28	4112	.01		400 V	Paper
C29	4102	.005		600 V	Paper
C30	4003	470 mmf	20%		Mica
C31	4100	.05		200 V	Paper
C32	4102	.005		600 V	Paper
C33	4112	.01		400 V	Paper
C34 } C35 }	4200	20-20		450 V	Electrolytic
C36	4100	.05		200 V	Paper
C37	4112	.01		400 V	Paper
C38	4112	.01		400 V	Paper
C39	4100	.05		200 V	Paper
C40	4029	5000 mmf			Ceramic Hi-K
C41	4000	100 mmf	20%		Mica
C42	4112	.01		400 V	Paper
C43	4100	.05		200 V	Paper
C44	4029	5000 mmf			Ceramic Hi-K
C45	4000	100 mmf	20%		Mica
C46	4021	22 mmf	10%		N150 Ceramic
C47	4029	5000 mmf			Ceramic Hi-K
C48	4021	22 mmf	10%		N150 Ceramic
C49	4028	5 mmf	10%		N750 Ceramic
C50	4029	5000 mmf			Ceramic Hi-K
R1	4553	1.2K	20%		
R2	4534	1.5K	20%		
R3	4524	68	20%		
R4	4556	33K	20%	1 W	
R5	4534	1.5K	20%		
R6	4504	47K	20%		
R7	4555	680K	20%		
R8	4524	68	20%		
R9	4556	33K	20%	1 W	
R10	4534	1.5K	20%		
R11	4546	120	10%		
R12	4843	.5 meg.			Volume Control, tapped

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SYMBOL	PART NO.	VALUE	TOL.	WATTS OR VOLTS	TYPE		
R13	4557	6.8K	10%	1 W			
R14	4504	47K	20%				
R15	4507	560	10%				
R16	4521	15K	20%				
R17	4500	220K	20%				
R18	4501	22K	20%				
R19	4534	1.5K	20%				
R20	4513	1 meg.	20%				
R21	4502	2.2 meg.	20%				
R22	4502	2.2 meg.	20%				
R23	4506	470K	20%				
R24	4506	470K	20%				
R25	4519	2.7K	10%				
R26	4840	500K	20%			Dual Bass and Treble Controls	
R27	4511	100K					
R28	4500	220K					
R29	4524	68					
R30	4556	33K	20%			1 W	
R31	4534	1.5K	20%			1 W	
R32	4501	22K	20%				
R33	4539	15K	20%				
R34	4534	1.5K	20%	5 W			
R35	4500	220K	20%				
R36	4544	4.7 meg.	20%				
R37	4544	4.7 meg.	20%	5 W			
R38	4700	500	10%				
R39	4500	220K	20%				
R40	4504	47K	20%	Dual Bass and Treble Controls			
R41	4840	500K	20%				
R42	4513	1 meg.					
R43	4507	560	10%				

SYMBOL	PART NO.	DESCRIPTION
L1	5258	FM Antenna Primary
L2	5248	FM Antenna Secondary
L3	5247	FM Oscillator Coil
L4	5279	AM Loop Antenna
L5	5282	AM Oscillator Coil
L6	5266	RFC Filament Choke
T1	5284	FM 1st IF Transformer
T2	5286	AM 1st IF Transformer
T3	5285	FM 2nd IF Transformer
T4	5287	AM 2nd IF Transformer
T5	5288	FM Ratio Detector Transformer
T6	5289	AM RF Interstage Transformer
S1	6024	Band Change Switch (3 Pole - 3 Position Rotary)
S2		
S3		
S4		
P2	6203	Plug, Audio Output (Single Prong)
J3	518	Pointer, Dial
J4	6121	Receptacle, Phono
J5	6108	Receptacle, Phono Motor
	6108	Receptacle, Accessory
	6134	Socket, 9 Pin Miniature
	6123	Socket, 7 Pin Miniature
	6103	Socket, Octal
	6110	Socket, Pilot Lamp
	9507	Spring, Dial
	424	Strip, Antenna Terminal
	2224D	Plate, Dial Background
	6112	Socket, Tube with Cable (Eye Tube)
	9505	Pilot Lamp