

The RF section uses separate oscillator and mixer tubes to allow maximum conversion gain over the short wave bands. The mixer and I.F. stages use 12SH7 high frequency type tubes and the sensitivity thus obtained is higher than normally obtained with an additional stage. Full AVC action is provided with both I.F. and mixer tubes controlled. Diode detection is used for maximum fidelity. The 12A6 beam power output is driven by the pentode section of the 12C8, giving adequate output. Inverse feedback is used from the voice coil winding to the 12A6 cathode, improving the frequency response.

The power supply uses a 5Y3 full wave rectifier and a husky, high quality varnish impregnated power transformer, with a metal cased filter condenser for adequate filtering and long life, thus providing full operating voltages for all tubes.

NOTE: If replacement of the 1626 oscillator tube is required, either another 1626, or a 12J5 tube may be used.

The band switching coil unit is assembled on a separate small chassis to simplify its construction resulting in one of the simplest coil turrets ever designed. The IF transformers are of the dual iron core tuned type which give the greatest gain per stage and are far more stable than the cheaper trimmer type usually supplied. The six inch calibrated slide rule dial has a 9 to 1 vernier drive to allow tuning of weak short wave signals.

Upon completion of the wiring, the tuned circuits must be aligned to produce maximum sensitivity and selectivity, and to calibrate the dial scale. If a signal generator is available (your own, or borrowed from a friend), follow the procedure as outlined. If a signal generator cannot be obtained, we suggest that you have your local radio service man align the receiver in accordance with the instructions in this manual.

For local reception, a short indoor antenna is generally sufficient. For best reception, a high outdoor antenna is recommended. The antenna should be connected to the antenna terminal (screw terminal nearest edge of chassis).

A ground connection may improve reception also, and should be tried if maximum performance is desired. For a good ground, use a COLD water pipe or a ground rod. Use as short and direct a wire as possible between the pipe or rod and the ground terminal (screw terminal farthest from edge of chassis).

A loudspeaker of the PM dynamic type with 3-4 ohm voice coil impedance should be connected to the set by attaching the two prong speaker plug to the speaker leads and plugging into the speaker socket. If a 6-8 ohm speaker is available, it may be used without materially affecting the performance. For best results in small cabinets, we recommend the Heathkit 5" speaker (Stock #320). If a larger cabinet is available, the Heathkit 8" speaker (Stock #325) will provide better reproduction of the lower register.

A record player or changer using a crystal type pickup cartridge may be connected to this receiver to provide superior reproduction of recordings. Connect the pickup by plugging the lead into the phono socket. If your player does not have the standard plug, remove existing plug and attach the phono plug supplied with the kit. Plug the line cord for the turn table motor into the 110V. outlet on the chassis.

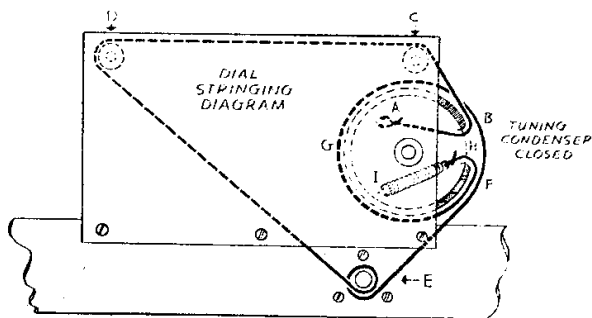
The phono-radio switch is combined with the tone control. Turning the control fully counter-clockwise connects the record player, while turning the control fully clockwise connects the radio circuits. Full use of the tone control is possible on either switch setting.

Four controls are provided on the front of the receiver. From left to right, they are the on-off switch and volume control, the phono-radio switch and tone control, the tuning control and the bandswitch.

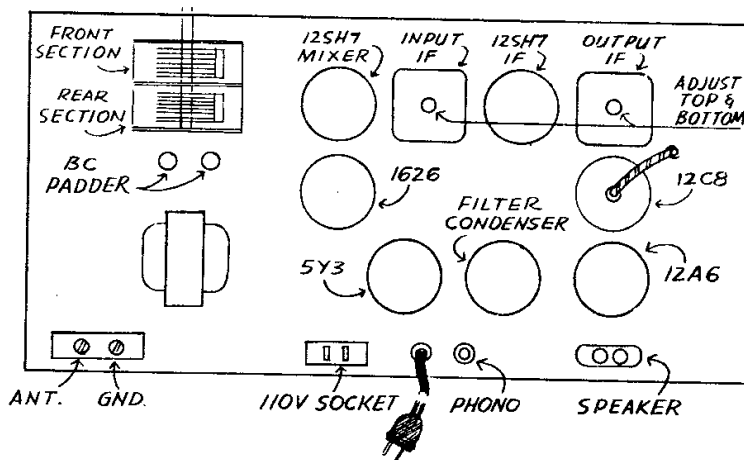
NOTE: The pilot light is connected in the rectifier circuit to permit the use of a standard pilot light bulb. The socket is, therefore, about 300 Volts above chassis. DO NOT TOUCH SOCKET WITH SET TURNED ON.

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MODEL AR-1



TOP VIEW OF CHASSIS SHOWING LOCATION OF TUBES - I.F. ADJUSTMENT SCREWS - B.C. PADDER (SEE COIL BRACKET PICTORIAL FOR S.W. - POLICE - B.C. ADJUSTMENT SCREWS)



**ALIGNMENT**

Connect a signal generator ground lead to the chassis. Connect the signal generator output ("hot") lead through a .01 MFD condenser to pin #4 on the 12SH7 IF socket (IF grid). Turn signal generator on and set to 456 kc. The signal, if modulated, may be observed by noting the loudness at the speaker, or on the scale of an output meter connected across the speaker terminals. If the signal is unmodulated it may be observed on the scale of a vacuum tube voltmeter connected across the volume control. With the volume and tone controls turned fully clockwise, turn the brass screws in the top and bottom of the output IF transformer for maximum indication. Use as low an indication as possible by reducing the output from the signal generator as the receiver sensitivity increases.

Without disturbing the signal generator dial, remove the .01 MFD condenser from pin #4 on the 12SH7 IF socket and connect to pin #4 on the 12SH7 mixer socket (mixer grid). Set band switch to center (BC) position. Remove 1626 (oscillator) tube from its socket. Adjust the brass screws in top and bottom of input IF transformer for maximum indication as described in step 23. Note: Do not adjust the output IF screws with the signal generator connected to the converter grid. This completes the IF alignment.

Replace the oscillator tube. Remove the generator from the converter grid. Connect the generator to the ANT. post through a 400 ohm resistor (used as dummy antenna). Set band-switch clockwise to SW position. Turn tuning condenser till fully unmeshed or open. Set signal generator to 20.5 MC. Adjust the SW oscillator trimmer for reception of signal. Then check if setting is correct by tuning signal generator to 21.412 MC. (approximately), where the image should be observed. If the second signal is found at a signal generator setting of 19.588 MC. (approximately), the SW oscillator trimmer should be unscrewed slightly until proper response is obtained. Now set signal generator to 18 MC. Tune receiver to receive this signal at 18 MC., and adjust SW antenna trimmer for maximum indication. This completes the SW alignment.

Set the bandswitch counter clockwise to the police band. Turn tuning condenser till fully unmeshed or open. Set signal generator to 5.6 MC. Adjust the police oscillator trimmer for reception of signal. Then check if setting is correct by tuning signal generator to 6.512 MC. (approximately), where the image should be observed. If the second signal is observed at a signal generator setting of 4.688 MC. (approximately), the police oscillator trimmer should be unscrewed until proper response is obtained. Now set signal generator to 5.0 MC. Tune receiver to receive this signal at 5.0 MC., and adjust police antenna trimmer for maximum indication. This completes the police band alignment.

Remove the 400 ohm resistor and use a 250 MMF condenser instead in series with the signal generator to the ANT. post. Set the bandswitch to center position (BC). Turn tuning condenser till fully unmeshed or open. Set signal generator to 1620 kc. Adjust the BC oscillator trimmer for reception of signal. Reset signal generator to 540 kc. Turn tuning condenser till fully meshed or closed. Adjust the BC Padder for maximum indication. Recheck the BC oscillator trimmer adjustment, as above. Set signal generator to 1500 kc. Tune receiver to receive this signal at 1.5 MC., and adjust BC antenna trimmer for maximum indication. This completes the alignment of the receiver.

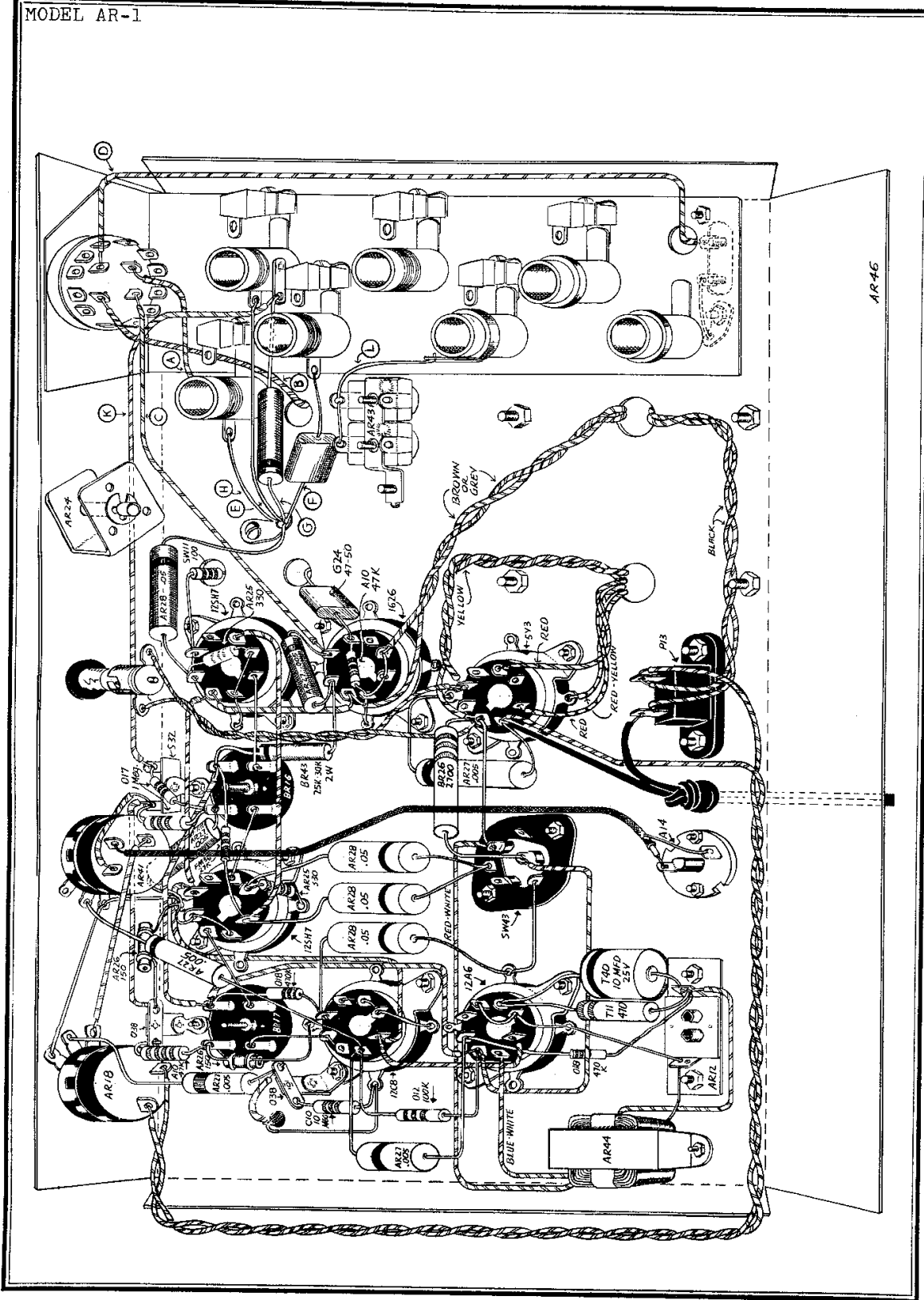
Check the voltages at the tube sockets. A table of approximate voltages is given below. These readings were obtained with a Heathkit VTVM with 11 megohms input resistance. Variations of plus or minus 15% may be expected.

Pin No.	1626	12SH7 Mixer	12SH7 I.F.	12C8	12A6	5Y3
1	0	0	0	0	0	
2	10-14 VAC	10-14 VAC	10-14 VAC	10-14 VAC	10-14 VAC	290-330
3	70-120	1-2	$\frac{1}{2}$ -1	50-90	280-320	
4	0	Slightly Neg.	Slightly Neg.	Slightly Neg.	220-260	300-340VAC
5	5-50 V Neg.	1-2	$\frac{1}{2}$ -1	Slightly Neg.	0	
6		120-150	120-150	25-50		300-340VAC
7	0	0	0	0	0	Tie Point
8	0	220-260	220-260	0	9-15	290-330

## HEATHKIT REPLACEABLE PARTS AVAILABLE

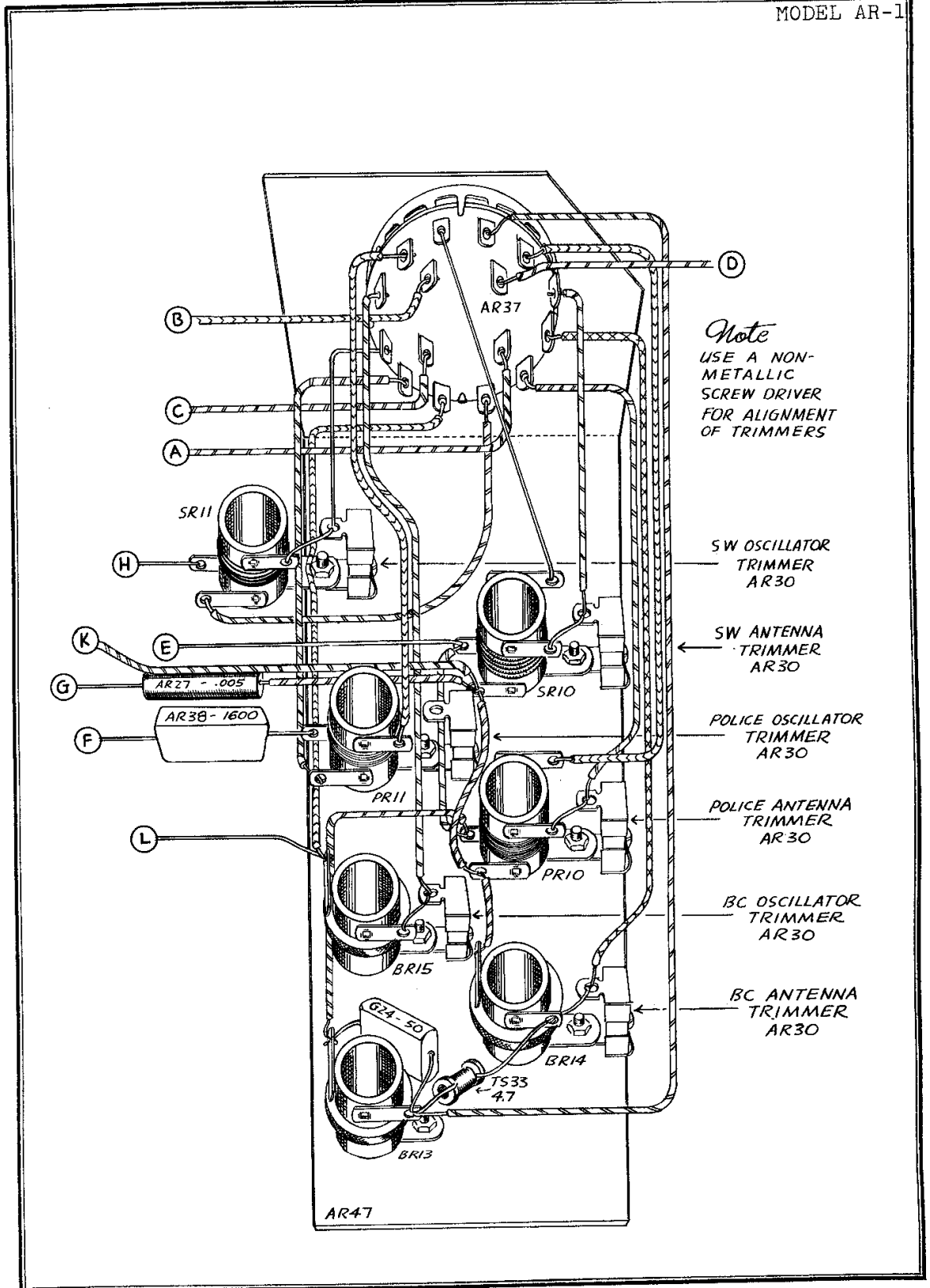
AR29 15-10 MFD--El. Cond. . . .  
 AR10 Dual Tuning Cond. . . . .  
 AR18 1 Meg. Control w. Sw. . . .  
 AR41 500 K. Control w. Sw. . . .  
 AR37 4 Pole 3 pos. Bandsw. . . .  
 BR16 Input IF Transformer . . . .  
 BR17 Output IF Transformer . . . .  
 BR24 Power Transformer. . . . .  
 AR44 Output Transformer. . . . .  
 BR13 Ant. Pri. (BC) Coil . . . . .  
 BR14 Ant. Sec. (BC) Coil . . . . .  
 BR15 Oscillator (BC) Coil. . . . .  
 PR10 Ant. (Police) Coil. . . . .  
 PR11 Oscillator (Police) Coil. . . .  
 SR10 Ant. (SW) Coil. . . . .  
 SR11 Oscillator (SW) Coil. . . . .  
 AR48 Panel . . . . .

MODEL AR-1



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## AR - 1 PARTS LIST

Part No.	Parts Per Kit	Description	Part No.	Parts Per Kit	Description
<b>Resistors</b>					
SW11	2	100 Ohm	AR32	6	Tube Sockets
AR25	1	330 Ohm	AR12	1	Speaker Socket
T11	1	470 Ohm 1 Watt	AR13	1	Speaker Plug
BR26	1	2,700 Ohm 2 Watt	A14	1	Phono Socket
FM36	1	27 K Ohm	A19	1	Phono Plug
BR43	1	25K-30K Ohm 2 Watt	P13	1	110V Socket
A10	2	47 K Ohm	C25A	1	Pilot Lamp Socket
O12	1	100 K Ohm	FM17	1	Dual Binding Post
O18	2	470 K Ohm	O38	2	Single Terminal Strip
O17	2	1 Megohm	S32	1	Dual Terminal Strip
C10	1	10 Megohm	<b>Sockets-Plugs-Terminal Strips</b>		
<b>Condensers</b>					
TS33	1	4.7 MMF Ceramic	AR42	1	Dial Drum Assembly
G24	2	47-50 MMF Mica	AR16	1	Dial Plate Assembly
AR26	2	150 MMF Ceramic	FM20	1	Dial Cord
AR38	1	1,600 MMF Mica	FM21	1	Dial Cord Spring
AR27	7	.005 MFD Paper	AR33	1	Dial Pointer
AR28	4	.05 MFD Paper	AR24	1	Drive Shaft Bracket
T40	1	10 MFD-25V. Electrolytic	AR21	1	Drive Shaft
AR29	1	15 - 10 MFD-450V Electro-	AR23	2	"E" Washers
AR30	6	3-30 MMF Trimmer	V48	4	Acorn Knobs
AR43	1	300-450 MMF Padder	<b>Dial Parts-Knobs</b>		
AR10	1	Dual tuning Condenser	BR24	1	Power
<b>Coils</b>					
BR13	1	Ant. Pri (BC)	AR44	1	Output
BR14	1	Ant. Sec. (BC)	<b>Transformers</b>		
BR15	1	Oscillator (BC)	<b>Screws-Nuts-Washers-Spacers</b>		
PR10	1	Antenna (Police)	O31	41	6-32 x $\frac{3}{8}$ Screws
PR11	1	Oscillator (Police)	IB48	1	6-32 x 1 Screw
SR10	1	Antenna (SW)	TC46	7	#6 x $\frac{3}{8}$ Sheet Metal Screws
SR11	1	Oscillator (SW)	G52	4	8-32 x $\frac{3}{8}$ Screws
BR16	1	Input IF Transformer	S22	43	6-32 Nuts
BR17	1	Output IF Transformer	TP16	4	8-32 Nuts
<b>Controls-Switches</b>					
AR18	1	1 Megohm with SPST Sw.	O33	4	Control Nuts
AR41	1	500K Ohm with SPDT Sw.	TS72	46	#6 Lockwashers
AR37	1	4 Pole 3 Pos. Bandswitch	BR36	4	#8 Lockwashers
<b>Tubes-Lamps</b>					
K42	1	1626 or 12J5 tube	O101	4	Control Lockwashers
AR31	2	12SH7 or 12SH7GT Tubes	FM18	1	8-32 x 3/16 Set Screw
K24	1	12C8 Tube	AR35	3	$\frac{1}{8}$ " Spacer
K23	1	12A6 or 12A6GT Tube	AR45	3	$\frac{3}{16}$ " Spacer
O66	1	5Y3GT Tube	AR36	5	$\frac{3}{8}$ " Spacer
O39	1	#47 Pilot Lamp	<b>Wire-Spaghetti</b>		
<b>Grommets-Wafer-Clip-Lugs</b>					
O35	1	3/8 Grommet	AR19	1	Line Cord
C24	1	7/16 Grommet	IB43	1	Length Bare Wire
SW43	1	Condenser Mounting Wafer	A21	1	Length Shielded Wire
K18	1	Grid Clip	O77	1	Roll Hookup Wire
O37	2	Solder Lugs	O81	1	Length Spaghetti
<b>CHASSIS PARTS</b>					
			AR46	1	Chassis
			AR47	1	Coil Mounting Bracket
			BR35	1	Panel
			BR19	4	Angle Brackets