

Philco Radio & Television Corp.

	Model: 90	Chassis:	Year: Pre October 1937
	Power:	Circuit:	IF:
	Tubes:		
	Bands:		

Resources

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Philco 37-660

To prevent reduction in sensitivity at the low-frequency end of the band, the 200-ohm resistor, No. 7, has been changed to 300 ohms, starting with Run No. 3. This change has been noted in the Parts List on page 7-37 of *Rider's Volume VII*, but it still shows as 200 ohms on the schematic, which will be found on the same page.

The lead connecting the suppressor grid to the cathode of the 6J7G i-f tube has been changed. It now runs from the suppressor grid to the junction of the sensitivity control, No. 23, and the secondary of the i-f transformer, No. 19.

Philco 37-116

Up to Run No. 4, a condenser was connected between the heater contact and ground of the 6K7G r-f tube. This condenser was removed starting with Run No. 4 to prevent hum modulation on Range 5. It is not shown on the schematic appearing on page 7-31, 7-32 of *Rider's Volume VII*.

Electrolytic condensers, Nos. 126 and 127, 8 mf., have been changed to 4 mf. Part No. 30-2174, starting with Run No. 5.

Starting with Run No. 6, the two 25,000-ohm resistors, Nos. 110 and 111, have been removed from the audio unit and relocated in the power unit near the 6B4G sockets.

To obtain the proper selectivity curve in the expanded position of the i-f expanding unit and to avoid regeneration, dress the plate lead (white) of the 6L7G tube as follows: The plate lead should lay across the 6L7G socket, then pass into the oscillator section close to the base; from here the wire must pass through the second aperture from the front of the r-f unit into the i-f unit.

To prevent clicks when tuning the bass compensation control on a very strong carrier, a 2-megohm resistor, Part No. 33-520339, was connected from the lug on which the 70,000-ohm resistor, No. 103, and the .008-mf. condenser, No. 104, are connected in the audio unit, to ground.

It will be noticed in the schematic on page 7-31, 7-32 of *Rider's Volume VII*, that two parts carry the same number: No. 135. One is the pilot light and this is the correct number for this part; the second is a switch, located on the schematic just below and to the left of the 6J5G AVC tube. The number of this switch should be 137. This number does not appear in

the list of parts on page 7-36, but the switch is used on the automatic dial mechanism and appears in the parts list under "Code 122" as "Plunger Stop and Switch Assembly, Part No. 45-2330."

Another switch located between Nos. 100 and 103 on the schematic with the wording "used in code 122 only," is used to short the audio system when using the automatic dial. This switch is located on the vernier drive assembly. The part numbers of the removable sections which contain the riveted contacts, are 45-2350 and 28-4110.

The magnetic tuning transformer has been changed. Its old part number was 32-2217 and its new number is 32-2361.

Philco 37-38

Starting with Run No. 4, the filament wiring of the 1D5G i-f. tube was reversed to improve the operation of the set. In Fig. 1 on page 7-18 of *Rider's Volume VII*, the "F+" of the 1D5G socket becomes "F—" and is grounded to the lug near the socket.

The 32,000-ohm resistor, No. 8 (see schematic on page 7-17 of *Rider's Volume VII*) has been replaced with one having a value of 51,000 ohms, Part No. 33-351339. The resistor is removed from the range switch assembly and is connected directly to the oscillator grid of the 1C7G tube and ground. This change was made to improve the sensitivity in the center of the broadcast band.

Philco 37-60

Run No. 2. The 1000-mf. condenser, No. 11, was changed to 250 mmf., Part No. 30-1032, and resistor No. 12 was changed from Part No. 33-351339 to No. 33-332339. This change was made to prevent relaxation oscillation.

Run No. 5. Refer to the Base View of the chassis on page 7-22 of *Rider's Volume VII*. The condenser No. 46 has been moved from the location shown—near the front—to the rear of the power unit. The tubular condenser No. 40 has been replaced with Part No. 8318-SU Bakelite condenser and mounted in the location from which No. 46 was removed.

Run No. 6. The suppressor grid of the 6K7G, i-f tube, is removed from ground and connected to the -2.5 negative tap of the bias resistor, No. 43. See schematic on page 7-19 of *Rider's Volume VII*.

Beginning with Run No. 9, the i-f transformers were changed. The first i-f transformer No. 15 now is Part No. 32-2274 and the second, No. 27, is Part No. 32-2276. The first i-f transformer has a stabilizing winding which is placed in series with the suppressor grid of the 6K7G i-f tube. The short or yellow lead is connected to the ground lug and the long lead to the suppressor grid.

Philco 37-61

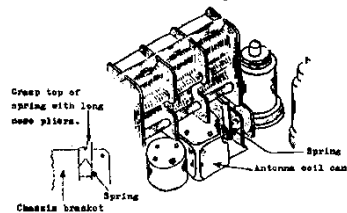
The changes applying to Philco Model 37-60 also apply to Model 37-61 with the exception of the first paragraph. The schematic diagram appears on page 7-23 in *Rider's Volume VII*.

Philco 90, 90A

Please make a note on page 84 of *Aligning Philco Receivers* that the i-f. peak of both chassis used in these models (with two 45s and one 47) is 175 kc. Note 1 on this page should read "175 kc. for both chassis." The correct i-f. peak is indicated on the schematics in *Rider's Manuals*.

Wells-Gardner 6K Series

If noise (not motor or vibrator) is encountered in this model, it may be due to the fact that the antenna transformer shield can is not grounding satisfactorily. The noise brought about by this condition is a popping or scratching, and will be heard only when the chassis is bumped or shaken.



By inserting a spring as shown above in the Wells-Gardner 6K series chassis, a good ground is assured for the antenna transformer shield.

This condition can easily be remedied without removing the chassis from the case by inserting a phosphor-bronze spring between the antenna coil can and the chassis bracket. This spring is inserted with a pair of long-nose pliers and the position after insertion is shown in the illustration.

For other data, see pages 7-20 and 7-21 in *Rider's Volume VII*.

Numbering of Philco Coils

For the purpose of identification, Philco coils are being code numbered. These numbers are stamped upon the mounting bracket before the part leaves the National Service Station. The following is a list of these coils (Dated Jan. 1952)

CODE NO.	PART NO.	USED IN MODELS	KEY NO. IN SERVICE BULLETIN DIAGRAM
1	3075A	511, 86, 87	○○○○
2	3075B	511, 86, 87	○○○○
3	3506B	65	①
4	3506A	65	②
5	3744A	95, 96	○○
6	3744B	95, 96	○○
7	3744C	95, 98	○○
8	3744D	95, 98	○○
9	03345	90 (Pentode Output)	①②
10	3884A	76, 77, 40, 41	○○○○
11	3884B	76, 77, 40, 41	○○○○
12	3884C	76, 77, 40, 41	○○○○
13	3894N	20, 21	○○○○
14	3894P	20, 21	○○○○
15	3894S	111, 112	○○○○
16	3894T	111, 112	○○○○
17	3894U	111, 112	○○○○
18	3894V	111, 112	○○○○
19	3894X	46, 46E	○○○○
20	3894Y	46, 46E	○○○○
21	4182A	30	①
22	4182B	30	②
23	03014	90 (all Models)	○○
24	03015	90 (all Models)	○○
25	03016	90 (all Models)	○○
26	03082	70, 35	○○
27	03083	70, 35	○○
28	03094	70	①
29	03233	50	②
30	03294	50	③
31	03320	35	④
32	03321	33	⑤
33	03360	90 (Pentode Output)	○○
34	03018	90 (45's Output)	○○
35	03009	90 (all Models), 35	○○
36	03038	111, 112	○○
37	03039	111, 112	○○
38	03040	111, 112	○○
39	03091	70, 35	○○
40	03092	70, 35	○○
41	03143	90 (45's Output)	○○
42	03784	45, 470, 480	①②
43	03850	51	③
44	03881	51	④
45	03882	51	⑤
46	03887	51	⑥
47	03886	51	⑦

Standard Compensating Condensers

The various compensating condensers used in the models 35, 70, 270, 370, 90, 112, and 212 have been changed so as to include a bakelite mounting board on which the code letter of the condenser appears. In the case of the I. F. compensating condensers, which have been used in conjunction with a parallel fixed condenser, the new compensating condensers have been increased in capacity so that the fixed condensers are no longer required. For replacement purposes, if desired, the new compensating condensers can be substituted on earlier sets for the earlier combination of a fixed and an adjustable condenser.

The low frequency compensating condensers have been changed with respect to the bakelite mounting, but their capacity remains unchanged, thereby requiring the parallel fixed condenser as in the past.

All of these new condensers can be identified by the letter which is stamped on the bakelite mounting board. For example part 04000-E has the letter E stamped over the surface of the mounting board; part 04000-F has the letter F stamped on the board.

The following table lists the part numbers of the various new condensers, their identification code letter, capacity range, where used, the superseded part number, and the part number of the parallel fixed condenser when one is still used.

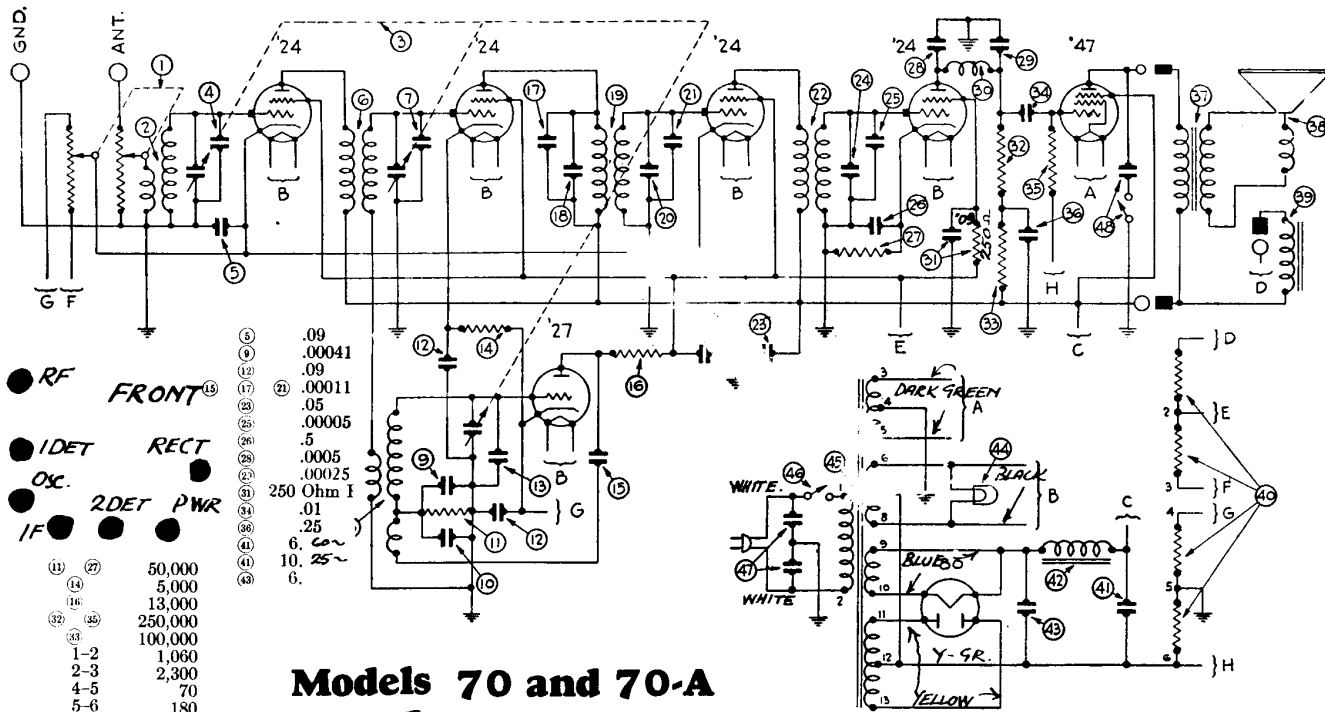
(#98 - Dated Sept. 1951)

Part Number	Identification Code Letter	Capacity Mmf.	Used on Models	Supersedes	Used with Fixed Condenser
04000-B	B	40-250	90 (Early and Late)	03050	4520 (700 mmf.)
04000-D	D	6-50	112, 212	3772-A	—
04000-E	E	5-30	112, 212	3968-A	—
04000-F	F	40-250	112, 212 370 70, 270	3772-B	4520 (700 mmf.)
04000-H	H	40-180	35 70*	03249	5120 (410 mmf.)
04000-J	J	40-180	70*, 270*, 370* 90* early	03051	—
04000-K	K	30-140	70*, 370*	03061	—
04000-L	L	30-140	270*	03262	—
04000-M	M	15-130	112*	3772-D	—
			35*	03411	—

*FIXED PARALLEL CONDENSER NOT REQUIRED

PHILCO RADIO & TELEVISION CORP.

Coil Numbering
Standard Compensating Condensers



- RF FRONT
 - 1DET RECT
 - OSC.
 - 2DET PWR
 - IF
- | | |
|---|---------|
| ① | 50,000 |
| ② | 5,000 |
| ③ | 13,000 |
| ④ | 250,000 |
| ⑤ | 100,000 |
| ⑥ | 1,060 |
| ⑦ | 2,300 |
| ⑧ | 170 |
| ⑨ | 180 |

Models 70 and 70-A

I.F. 260 Kc.

MODEL 270 AND 270-A RADIO-PHONOGRAPH

1931-32

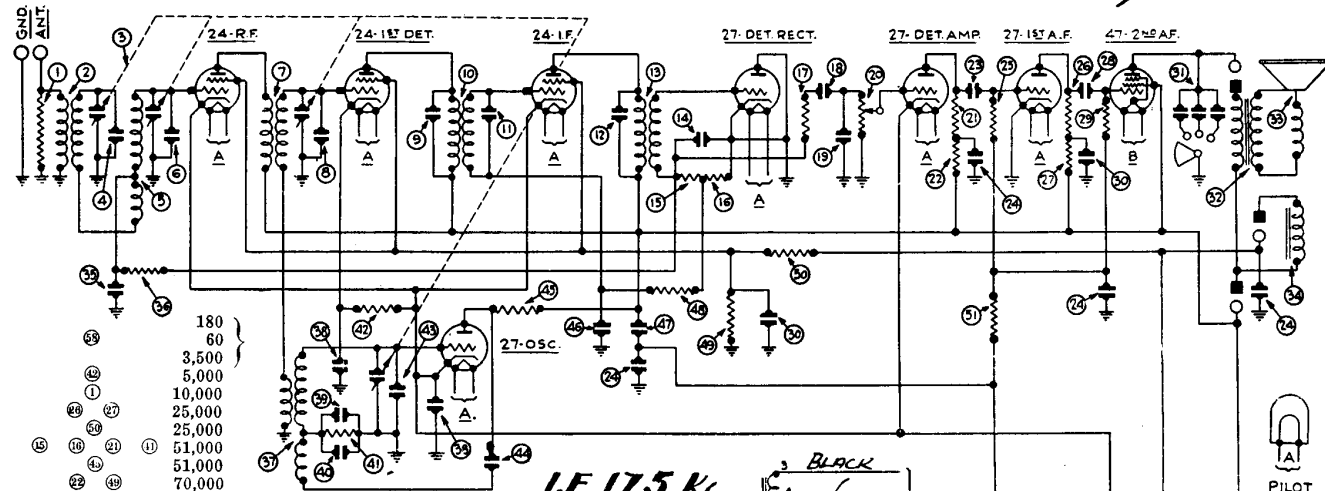
Circuit	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milli-amperes
1st R. F.	250	85	3.	19.5	3.
1st Det.	250	87	5.5	21.5	.5
Osc.	85	...	2.	19.5	2.5
1st I. F.	250	87	3.	19.5	3.
2nd Det.	105	75	6.	22.	.1
Audio	245	255	1.	...	...

Circuit	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milliamperes
R. F.	255	60	.25	20	2.4
Osc.	65	...	.6	20	3.6
1st Det.	250	64	6.0	24	.25
I. F.	270	76	.25	18	.4
Det. Rect.	0	...	0	17	0
Det. Amp.	140	...	.4	18	2.0
1st A. F.	45	...	.4	20	1.8
Output	220*	240*	1.0*	...	32.*

All readings taken with antenna disconnected and ground on. Volume Control on full.

*These readings must be taken from the underside of the chassis using test prods and leads unless the set checker is specially equipped for testing pentode tubes.

90-90a 175 Kc.



- | | |
|---|---------|
| ① | 180 |
| ② | 60 |
| ③ | 3,500 |
| ④ | 5,000 |
| ⑤ | 10,000 |
| ⑥ | 25,000 |
| ⑦ | 25,000 |
| ⑧ | 51,000 |
| ⑨ | 51,000 |
| ⑩ | 70,000 |
| ⑪ | 99,000 |
| ⑫ | 240,000 |
| ⑬ | 240,000 |
| ⑭ | 490,000 |
- RF FRONT
 - OSC
 - 1DET
 - IF
 - 2DET
 - PWR
 - DET AMP
 - DET-RECT

90 and 90-A

1931-32

FRONT

I.F. 175 Kc.

NOTE.

MODEL 90 WITH 2-47'S IN OUTPUT HAS 260 KC I.F.

Printed in Canada

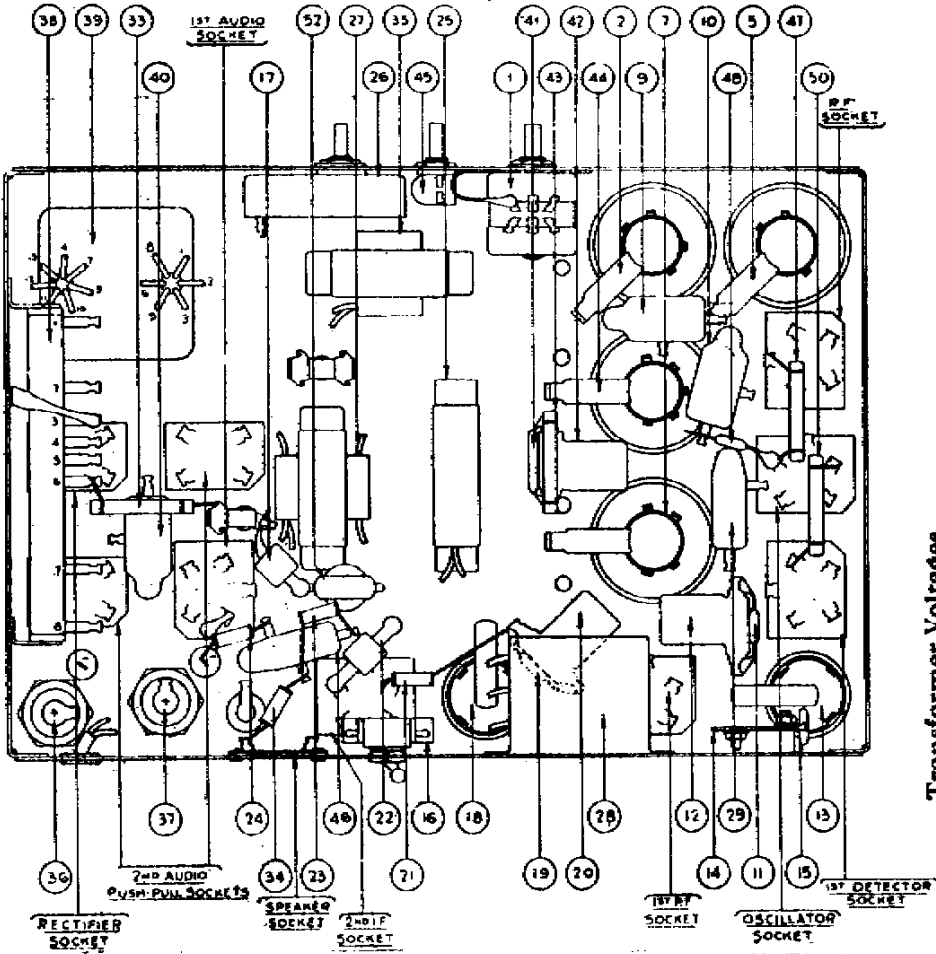
DATA SHEET

-Courtesy Philco Products Ltd. of Canada

PHILCO-11

MODEL 90, 90-A
(With 2-145s)
Chassis- Data

PHILCO RADIO & TELEVISION CORP.



Transformer Voltages

A.C. Volts	Color
105 to 125	Black (Small Gauge)
2.5	Black (Heavy Gauge)
2.5	Black with Yellow
2.5	Dark Green
2.5	Black with Green
2.5	Light Blue
5.0	Yellow
6.50	Yellow with Green

Terminals	Color
1-2	Black (Small Gauge)
3-6	Black (Heavy Gauge)
4	Black with Yellow
6-8	Dark Green
7	Black with Green
9-10	Light Blue
11-13	Yellow
12	Yellow with Green

No. on Figs.	Capacity	Color
1	.09 Double	Black Bakelite Container
14	.09 Double	Black Bakelite Container
15	.00011	Blue, Golden Yellow
16	.000035	Yellow and Green
17	.5	Metal Container
18	.25 Double (Black wires to Ground)	Metal Container
19	.5 (White wire to Ground)	Metal Container
20	.05	Black Bakelite Container
21	6.	Electrolytic Type
22	10.	Electrolytic Type
23	.015 Double	Black Bakelite Container
24	.0007	White, Golden Yellow
25	.001	Green and White

Resistor Data

No. on Fig.	Terminal	Power (Watts)	Resistance	Color Body—Tip—Dot
26	1-2	...	800	(Long Tubular)
	2-3	...	263	
	3-4	...	75	
	5-6	...	370	
	6-7	...	1,800	
	7-8	...	1,430	
	...	1.	13,000	
	...	.5	50,000
27	...	1.	50,000	Brown—Orange—Orange
	...	1.	250,000	
	...	.5	250,000
	...	.5	1,000,000

PHILCO RADIO & TELEVISION CORP.

MODEL 90, 90-A
(With 2-45s)
Schematic
Voltage

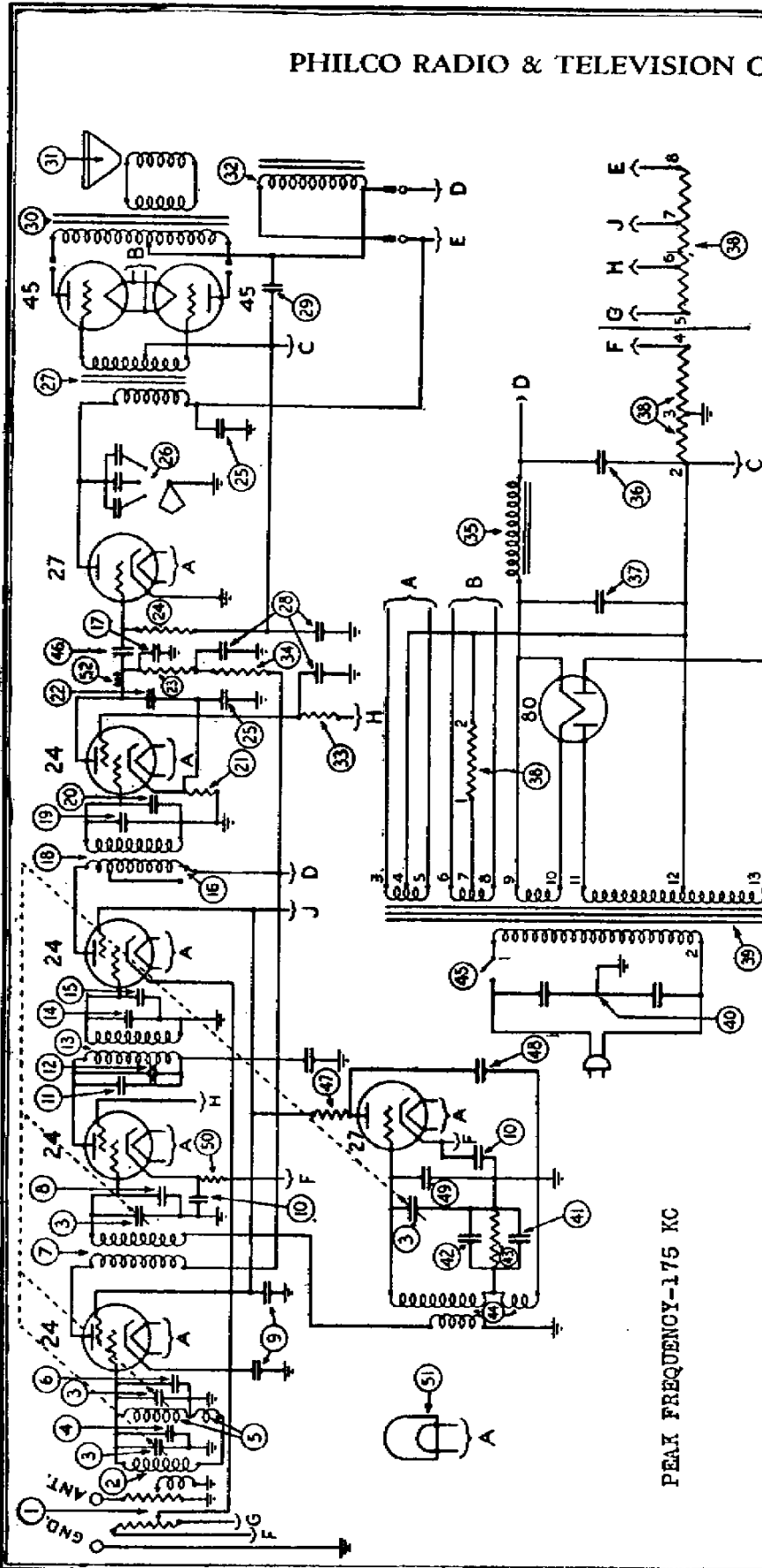
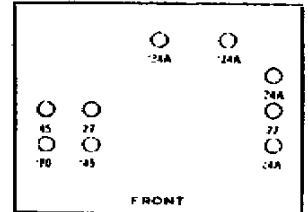


Table 1—Tube Socket Readings Taken with AC Set Tester, AC Line, 115 Volts

Tube Type	Circuit	Filament Voltage	Plate Voltage	Grid Voltage	Screen Grid Voltage	Cathode Voltage	Plate Milliamperes
24	1st R. F.	2.1	250	3.3	83	15	3
27	Osc.	2.1	60	1	15	15	2
24	1st Det.	2.1	250	5.5	23	15	5
24	1st I. F.	2.1	260	3.8	80	15	4.5
24	2nd Det.	2.1	48	3.7	42	15	3
27	1st Audio	2.1	140	.25	...	10	30
45	Audio	2.2	243	46	...	...	30
80	Rect.	4.5	...	46	...	...	30

All readings taken with antenna disconnected and ground on. Volume Control on full.

Models 90, 90A Early Type



PEAK FREQUENCY-175 KC

PHILCO RADIO & TELEVISION CORP.

MODEL 90, 90-A
(With 2-45s)
Parts List

RANGE SWITCH

The Range Switch, No. ① in Fig. 1, is placed in the NORMAL position when the Receiver is shipped. This gives great distance range and is the setting which will be found most satisfactory in practically all locations. In places far from broadcasting stations, however, the Range Switch may be changed to the MAXIMUM position. This will make the Receiver super-sensitive and will give extreme distance range. Do not use the Range Switch in the MAXIMUM position if there are one or more powerful broadcasting stations near you. In any location there will be less noise between stations with the Range Switch in the NORMAL position.

REPLACEMENT PARTS—MODELS 90 AND 90-A

No. on Figs. 3 and 4	Description	Part No.	No. on Figs. 3 and 4	Description	Part No.
①	Volume Control	5039	Ⓢ	Power Transformer (50 to 60 cycles)	4938
②	1st R. F. Transformer	03013	Ⓣ	Power Transformer (25 to 40 cycles)	4939
③	Gang Condenser—50 to 60 cycles	03001	Ⓤ	Condenser .015 M. F. (Double)	3793-E
	Gang Condenser—25 to 40 cycles	03078	Ⓥ	Condenser .0007 M. F.	Assembled 03050
④	Compensating Condenser (Part of Tuning Condenser Assembly)		Ⓦ	Compensating Condenser	
⑤	2nd R. F. Transformer	03014	Ⓧ	Resistor—50,000 Ohms	4237
⑥	Compensating Condenser (Part of Tuning Condenser Assembly)		Ⓨ	Oscillator Coil	03016
⑦	1st Det. Transformer	03015	Ⓩ	On-Off Switch	4095
⑧	Compensating Condenser (Part of Tuning Condenser Assembly)		ⓐ	Condenser .001 M. F.	5215
⑨	Condenser .09 M. F. (Double)	4989-C	ⓑ	Resistor—13,000 Ohms	3766
⑩	Condenser .09 M. F. (Double)	4989-B	ⓓ	Condenser .00011 M. F.	4519
⑪	Fixed Condenser .00011	Assembled 3772-C	ⓔ	Compensating Condenser (Part of Tuning Condenser Assembly)	
⑫	Compensating Condenser		ⓕ	Resistor—5,000 Ohms	3526
⑬	1st I. F. Transformer	03009	ⓖ	Pilot Bulb	8463
⑭	Compensating Condenser	Assembled 03051	ⓗ	R. F. Choke	03086
⑮	Fixed Condenser .00011		Ⓢ	Line Cord and Plug	L-943
⑯	Normal Maximum Switch	3116	Ⓣ	Tube Shield	03002
⑰	Condenser (.000035 mfd)	4990	Ⓤ	Knob (large) Dial Control	03063
⑱	2nd I. F. Transformer	03143	Ⓥ	Spring (Dial Knobs)	4147
⑲	Compensating Condenser	Assembled 03051	Ⓦ	Knobs (small) Tone and Volume Control	4959-A
⑳	Fixed Condenser .00011		Ⓧ	Knob (switch)	4290-A
㉑	Resistor—50,000 Ohms	4518	Ⓨ	Grid Clip	4897
㉒	Condenser .00035	4990	Ⓩ	Speaker Plug and Cable	L-1124-A
㉓	Resistor—250,000 Ohms	4410	ⓐ	Grommet for R. F. Transformer Shield	3747
㉔	Resistor—1,000,000 Ohms	4409	ⓑ	Rectifier Tube Socket	5026
㉕	Condenser .5 M. F. (Double)	03024	ⓓ	Four Prong Socket Assembly	4955
㉖	Tone Control	4037-A	ⓔ	Five Prong Socket Assembly	4956
㉗	1st Audio Transformer	4952	ⓕ	Speaker Socket	4957
㉘	Condensers 2 - .25 M. F. and 1 - .5 M. F.	03029	ⓖ	Volume Control Insulator	4092
㉙	Condenser .05 M. F.	3815-41	ⓗ	Volume Control Insulator	4286
㉚	Output Transformer:		Ⓢ	Fahnstock Clip	L-1126
	H ₁ (For Large Cone Assembly)	2848	Ⓣ	Mica for Gang Condenser Compensating Condenser	3473
	K ₁ (For Small Cone Assembly)	2766	Ⓤ	Insulating Washer for Compensating Condenser	3500
㉛	Voice Coil Assembly and Cone:		Ⓥ	Tuning Condenser Mounting Washer	3914
	H ₂ (Large Cone)	02997	Ⓦ	Tuning Condenser Mounting Washer	3915
	K ₂ (Small Cone)	02996	Ⓧ	Tuning Condenser Mounting Sleeve	3916
㉜	Speaker Field—Assembled with Pot and Frame (H ₂)	02986	Ⓨ	Spring for Tuning Condenser	4255
	Speaker Field—Assembled with Pot and Frame (K ₂)	02985	Ⓩ	Bezel	5009
㉝	Resistor—250,000 Ohms	3768	ⓐ	Complete Drive Bracket	03011
㉞	Resistor—250,000 Ohms	4410	ⓑ	Disc Dial Assembly	03031
㉟	Filter Choke	4951	ⓓ	Knob Spring—Volume, Tone, Dial	3262
㊱	Condenser 6 M. F. Electrolytic Type (50-60 cycles)	4916	ⓔ	Steel Washer (Chassis Mtg.)	5058
	Condenser 10 M. F. Electrolytic Type (25-40 cycles)	5142	ⓕ	Nut—Volume, Tone Control Switch	W-434
㊲	Condenser 6 M. F. Electrolytic Type (25-40) and (50-60) cycles	4916			
㊳	B. C. Resistor	4953			

Several changes in wiring and part numbers have been made in the Model 90. The filter choke part 4951 has been changed to part 4819, the same choke as used in Model 21. On the 50-60 cycle models, a .09 mfd condenser, part 4969-J, is connected across the filter choke, part 4819. On the 25 cycle models, this condenser should be .18 mfd, part 4969-H ungrounded. The two 240,000 resistors part 4410, numbers (32) and (35) should be of the Continental Carbon type. This is the resistor without metal ends.

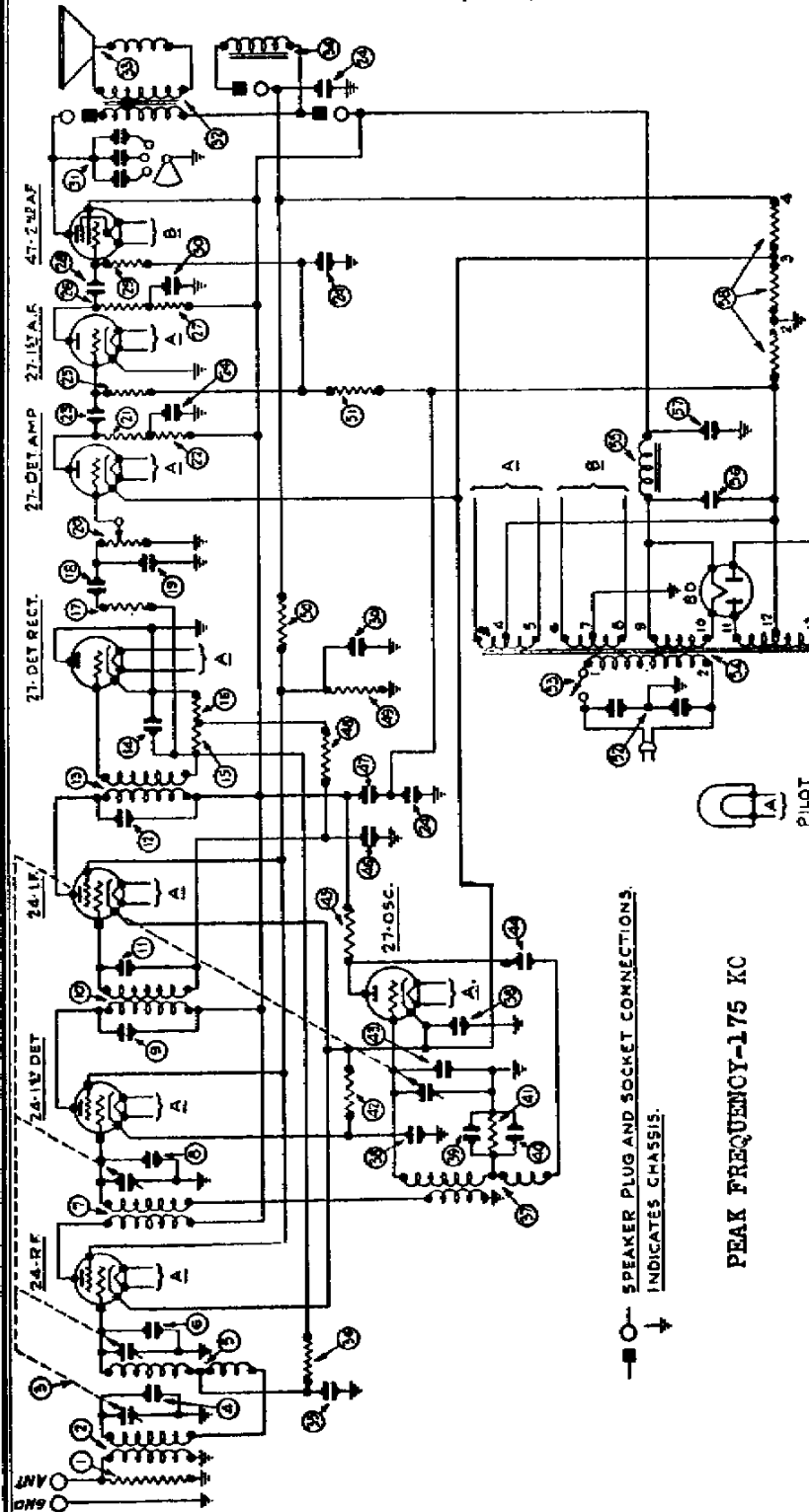
In the Model 90, a metal shield, part 03646, is placed in a bracket between the '47 and '80 tubes.

If electrolysis occurs on the insulation of the wire between the filter choke and one of the electrolytic condensers, unsolder the wire and cover with spaghetti.

MODEL 90, 90-A
(With 1-'47)
Schematic
Voltage

PHILCO RADIO & TELEVISION CORP.

(Above Serial No. 237,001)



—○— SPEAKER PLUG AND SOCKET CONNECTIONS.
— INDICATES CHASSIS.

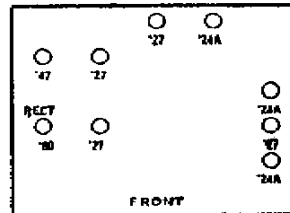
PEAK FREQUENCY-175 KC

Table 1—Tube Socket Readings Taken with AC Set Tester, AC Line, 115 Volts

Tube Type	Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milliamperes
24	R. F.	2.0	255	60	.25	20	2.4
27	Osc.	2.0	85	..	.6	20	3.6
24	1st Det.	2.0	260	64	6.0	24	.25
24	I. F.	2.0	270	76	.25	18	.4
27	Det. Rect.	2.0	0	..	0	17	0
27	Det. Amp.	2.0	140	..	.4	18	2.0
27	1st A. F.	2.0	45	..	.4	20	1.8
47	Output	2.0	220*	210*	1.0*	..	82*
80	Rectifier	4.5					

*All readings taken with antenna disconnected and ground on. Volume Control on full.
*These readings must be taken from the underside of the chassis using test prods and leads unless the set checker is specially equipped for testing pentode tubes.

Models 90, 90A, 90E Later Type



PHILCO RADIO & TELEVISION CORP.

MODEL 90,90-A
(With 1-'47)
Chassis-Data

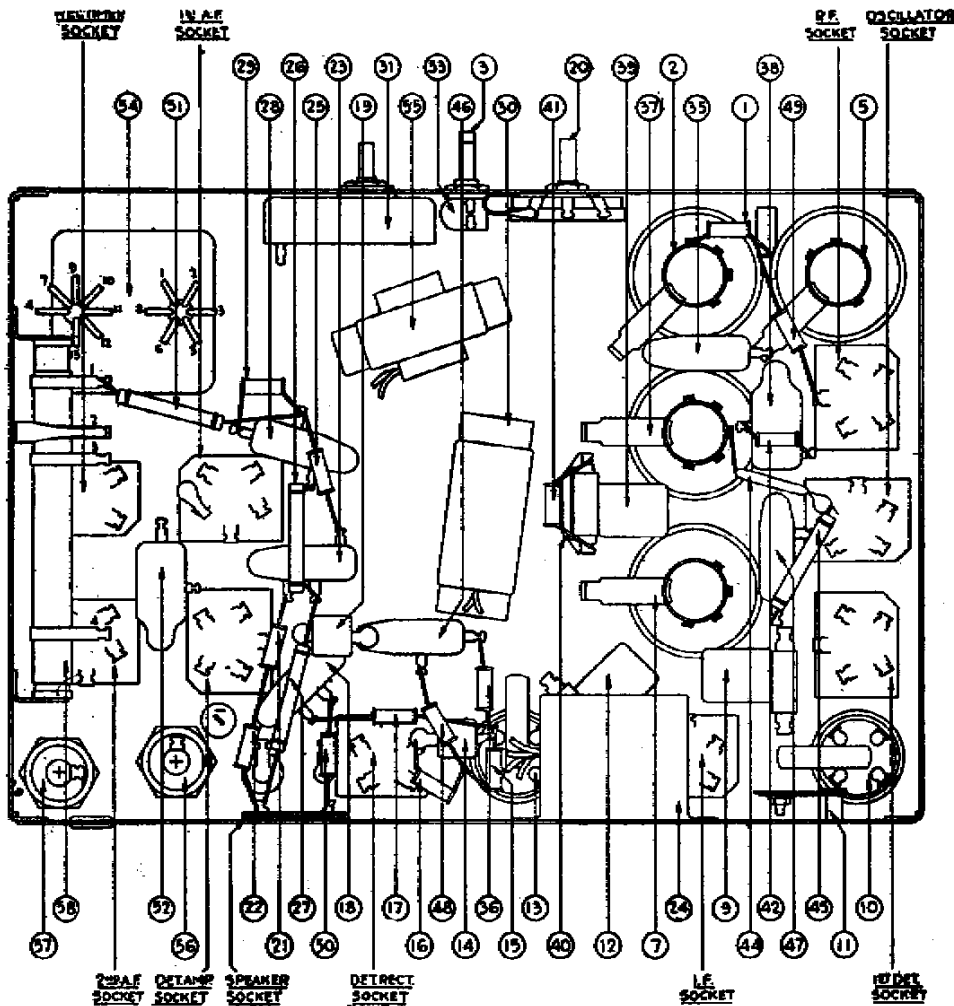


Table 2—Power Transformer Voltages

Terminals	A.C. Volts		Color
1-2	105 to 125	Primary	White
3-5	2.5	Heaters of 24 and 27 Tubes	Black
4	2.5	Center Tap of 3-5	Black with Yellow
6-8	2.5	Filament of 47 Tube	Dark Green
7	2.5	Center Tap of 6-8	Black with Green
9-10	5.0	Filament of 80 Tube	Light Blue
11-13	650.	Plates of 80 Tube	Yellow
12	...	Center Tap of 11-13	Yellow with Green

Table 3—Resistor Data

No. on Figs. 1 and 2	Terminal	Power (Watts)	Resistance (Ohms)	Color		
				Body	Tip	Dot
	{ 1-3 } { 2-3 } { 3-4 }	1. .5 1.0 .5 .5 1. .5 .5 .5 1. .5	130 60 3,580 5,000 10,000 25,000 25,000 51,000 51,000 70,000 99,000 240,000 240,000 490,000	(Long Tubular)		
			Green	Black	Red	
			Brown	Black	Orange	
			Red	Green	Orange	
			Red	Green	Orange	
			Green	Brown	Orange	
			Green	Brown	Orange	
			Violet	Black	Orange	
			White	White	Orange	
			Red	Yellow	Yellow	
Red	Yellow	Yellow				
Yellow	White	Yellow				

Table 4—Condenser Data

No. on Figs. 1 and 2	Capacity	Color
	.00011	Blue, Golden Yellow
	.00025	Yellow
	.01	Black Bakelite Container
	.015	Black Bakelite Container
	.05	Black Bakelite Container
	.09	Black Bakelite Container
	1-15, 25-1, 25-1	Metal Container
	1-18, 25-1, 25-1	Metal Container
	(50-60 Cycles) 4	Electrolytic Type
	(25-40 Cycles) 10	Electrolytic Type

MODEL 90,90-A
(With 1-47)
Test Data

PHILCO RADIO & TELEVISION CORP.

From Chassis To **Correct** **Incorrect**

Speaker field only 3,200 ohms Incorrect

Oscillator Control Grid 51,006.5ohms Includes section used in plate circuit BC-Osc K-Y

Oscillator Winding only 6.5ohms

Oscillator Cathode 60 ohms 61,000 ohms

Oscillator Plate to '47 Screen

'80 Anode to '80 Anode 199 ohms

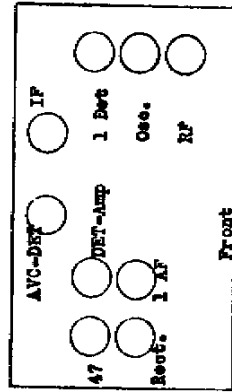
'80 Anode to Chassis 280 ohms

'80 Anode to '80 Fil 0 ohm FC

Note**

Fixed condenser between Det-Amp Plate and 1 AF-CG
Fixed condenser between 1 AF Plate and '47 Cg
Resistor of 99,000 between AVCX Cg wdg and coupling condenser to Det-Amp volume control

Across AC Plug 3.26 ohms BC across primary
AC plug to chassis 0 ohm BC- across primary



From Chassis To **Correct** **Incorrect**

All tubes out of sockets and AC plug disconnected from power supply.
Speaker field and output transformer disconnected.

Aerial 10.7 ohms Fixed resistor across antenna coil

RF Control Grid to First Selector Condenser Stator 13.4 ohms

RF-Control Grid to Chassis 592,000 ohms

RF Cathode 60 ohms

RF Screen Grid 20,280 ohms

RF Plate to 80 Fil 168.7 ohms

RF Plate to '47 Screen 18.7 ohms

1 Detector Control Grid 7.9 ohms

1 Detector Cathode 5,080 ohms

1 Detector Screen Grid 20,280 ohms

1 Detector Plate to '80 Fil 218 ohms

1 Detector Plate to '47 Screen 68 ohms

IF Control Grid 541,068 ohms

IF Cathode 60 ohms

IF Screen Grid 20,280 ohms

IF Plate to '47 Screen 70 ohms

AVCX Control Grid 110,080 ohms

AVCX Cathode 0 ohms

AVCX Plate 0 ohms

AVCX Cathode to Plate 0 ohms

Det-Amp Control Grid (V.C.Min)
DET-Amp Control Grid (V.C.Max)
Det-Amp Cathode high resistance - exact value unknown

Det-Amp Plate to '47 Screen 60 ohms

1 AF Control Grid 121,000 ohms

1 AF Cathode 490,180 ohms

1 AF Plate to '47 Screen 60,000 ohms

'47 Control Grid 480,000 ohms

'47 Screen Grid to '80 Fil 0 ohm

'47 Plate to Chassis 0 ohm

Output Transformer Primary only 462 ohms

Output Transformer Secondary only 0,106 ohm

BC- rf Cg wdg-Y
BC- AVCX wdg-Y
BC- if Cg wdg-Y
TC- rf Cg-Y
BC- Osc K-Y
BC- Field coil pocket-Y

TC- 1 D Cg-Y
BC- 1 D K-Y
BC- Osc K-Y
See RF Screen
TC- IF Tr

BC- IF Cg wdg-Y
TC- IF Tr

BC- AVCX Cg wdg-Y

BC- 25,000 ohms-Y
BC-'47 Cg resistor-Y

Tone control cond

-Tube Socket Readings Taken with AC Set Tester, AC Line, 115 Volts

Tube	Chassis	Plate	Grid	Control	Grid	Plate	Control	Plate	Control
54	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
55	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
56	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
57	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
58	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

All readings taken with antenna disconnected and ground on. Volume Control on full.
*Chassis to ground for the chassis during test. Plate and leads shown (the set checker is specially designed for testing portable tubes)

PHILCO RADIO & TELEVISION CORP.

MODEL 90, 90-A
(With 1-'47)
Parts List

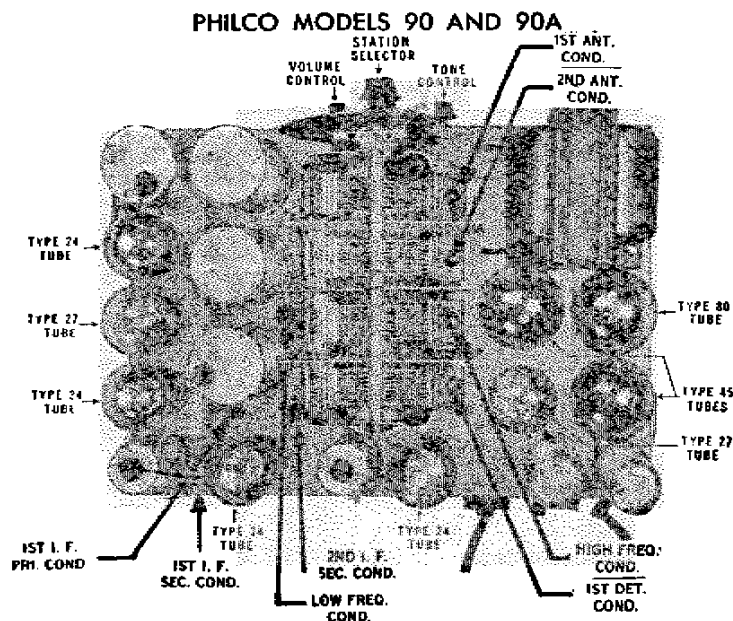
ADJUSTMENT OF MODELS 90 and 90-A

These Receivers are accurately adjusted at the Factory prior to their shipment. Under no circumstances are the adjusting condensers to be changed in the field. This alignment requires special oscillator equipment, which all Philco Distributors have. If for any reason the Receiver needs adjustment it must be returned to the Distributor's Service Department.

REPLACEMENT PARTS—MODELS 90 and 90-A RECEIVERS

(Above Serial No. 237,001)

No. on Figs. 3 and 4	Description	Part No.	No. on Figs. 3 and 4	Description	Part No.
①	Resistor (10,000 ohms)	4412	②	By-Pass Condenser (.09 mfd.) double	4989-G
②	First I. F. Transformer	03360	③	Compensating Condenser } Assembled	03050
③	Gang Condenser (50-60 cycles)	03001	④	Condenser (.0007 mfd.)	
④	Gang Condenser (25-40 cycles)	03078	⑤	Resistor (51,000 ohms)	4518
⑤	Compensating Condenser (part of gang condenser assembly)		⑥	Resistor (5,000 ohms)	5310
⑥	Second R. F. Transformer	03014	⑦	Compensating Condenser (part of tuning condenser assembly)	
⑦	Compensating Condenser (part of gang condenser assembly)		⑧	Condenser (110 mmf.)	4519
⑧	First Detector Transformer	03015	⑨	Resistor (51,000 ohms)	4237
⑨	Compensating Condenser (part of gang condenser assembly)		⑩	By-Pass Condenser (.05 mfd.)	3615-U
⑩	Compensating Condenser (First I. F. Primary)	03345	⑪	By-Pass Condenser (.05 mfd.)	2615-E
⑪	First I. F. Transformer	03009	⑫	Resistor (490,000 ohms)	4517
⑫	Compensating Condenser (First I. F. Secondary)	03315	⑬	Resistor (70,000 ohms)	5385
⑬	Compensating Condenser (Second I. F. Primary)	03317	⑭	Resistor (25,000 ohms)	4516
⑭	Second I. F. Transformer	03345	⑮	Resistor (240,000 ohms)	3768
⑮	Condenser (110 mmf.)	4519	⑯	Condenser (.015 mfd.) double	3793-E
⑯	Resistor (51,000 ohms)	4518	⑰	On-Off Switch	4095
⑰	Resistor (51,000 ohms)	4518	⑱	Power Transformer (50-60 cycles)	5362
⑱	Resistor (99,000 ohms)	4411	⑲	Power Transformer (25-40 cycles)	5363
⑲	By-Pass Condenser (.01 mfd.)	3903-M	⑳	Power Transformer (50-60 cycles, 220 volts)	5364
⑳	Condenser (.00025 mfd.)	3032	㉑	Choke	4951
㉑	Volume Control	5366	㉒	Condenser (6 mfd.) Electrolytic type (50-60 cycles)	4916
㉒	Resistor (51,000 ohms)	4518	㉓	Condenser (10 mfd.) Electrolytic type (25-40 cycles)	5142
㉓	Resistor (70,000 ohms)	5385	㉔	Condenser (6 mfd.) Electrolytic type (50-60 cycles)	4916
㉔	By-Pass Condenser (.01 mfd.)	3903-M	㉕	Condenser (10 mfd.) Electrolytic type (25-40 cycles)	5142
㉕	Condenser (1-1 mfd., 1-13 mfd., 2-25 mfd.)	03325	㉖	B. C. Resistor	5365
㉖	Resistor (240,000 ohms)	4410	㉗	Line Cord and Plug	L-943
㉗	Resistor (25,000 ohms)	3656	㉘	Tube Shield (Large)	03373
㉘	Resistor (25,000 ohms)	3656	㉙	Tube Shield (27 type)	5387
㉙	By-Pass Condenser (.01 mfd.)	3903-P	㉚	Pilot Bulb	3463
㉚	Resistor (240,000 ohms)	4410	㉛	Pilot Bracket Complete	03081-A
㉛	Condenser (.25 mfd., 1 mfd.)	03327	㉜	Knob (Large)	4958-A
㉜	Tone Control	4037-A	㉝	Knob (Small)	4959-A
㉝	Output Transformer	2673	㉞	Knob (Switch)	4290-A
㉞	Voice Coil Assembly and Cone: H ₂ (Large Cone)	02997	㉟	Spring (For small knobs)	4147
	K ₂ (Small Cone)	02996	㊱	Spring (For large knobs)	5262
㊱	Speaker Field (Assembled with pot and frame)		㊲	Grid Clip	4897
㊲	By-Pass Condenser (.05 mfd.)	3615-W	㊳	Five Prong Socket Assembly	4956
㊳	Resistor (490,000 ohms)	4517	㊴	Four Prong Socket Assembly	4955
㊴	Oscillator Coil	03016	㊵	Volume Control Insulator	4092
			㊶	Dial	5021
			㊷	Light Shield Screen	4937
			㊸	Bezel	5009

MODEL 90, 90-A
Alignment
PHILCO RADIO & TELEVISION CORP.


Adjusting the Model 90 Using a Jewell 560 Oscillator

Set up the Receiver for operation using standard tubes. Set the Normal-Maximum switch in the Normal position.

Intermediate Frequency Adjustment—Remove the tube shield. Remove the control grid clip of the first detector tube (Type 24 tube nearest back of the Receiver Chassis under the tube shield). Connect the "A" terminal of the oscillator to the control grid of the first detector tube. The "G" terminal must be connected to the Receiver Chassis. Turn the filament control of the oscillator on about $\frac{1}{2}$ the total movement. The middle switch must be turned to the intermediate position. The tuning control of the oscillator must be set for exactly 175 K.C., as indicated in the calibration data sent with the instrument.

Turn the volume control of the Receiver on full. Set the attenuator control so that an audible signal is received in the speaker. Connect the \pm and the low terminals of the output meter to the voice coil terminals of the speaker. Adjust the attenuator control for not more than $\frac{1}{2}$ full scale reading of the meter.

Using a Philco part No. 3164 fibre wrench, adjust the second I. F. secondary condenser for maximum reading in the output meter. Adjust the first I. F. secondary and then the first I. F. primary condensers for maximum reading in the output meter. Reduce the oscillator signal to prevent any damage to

the meter mechanism. Replace the grid clip on the first detector tube and replace the tube shield.

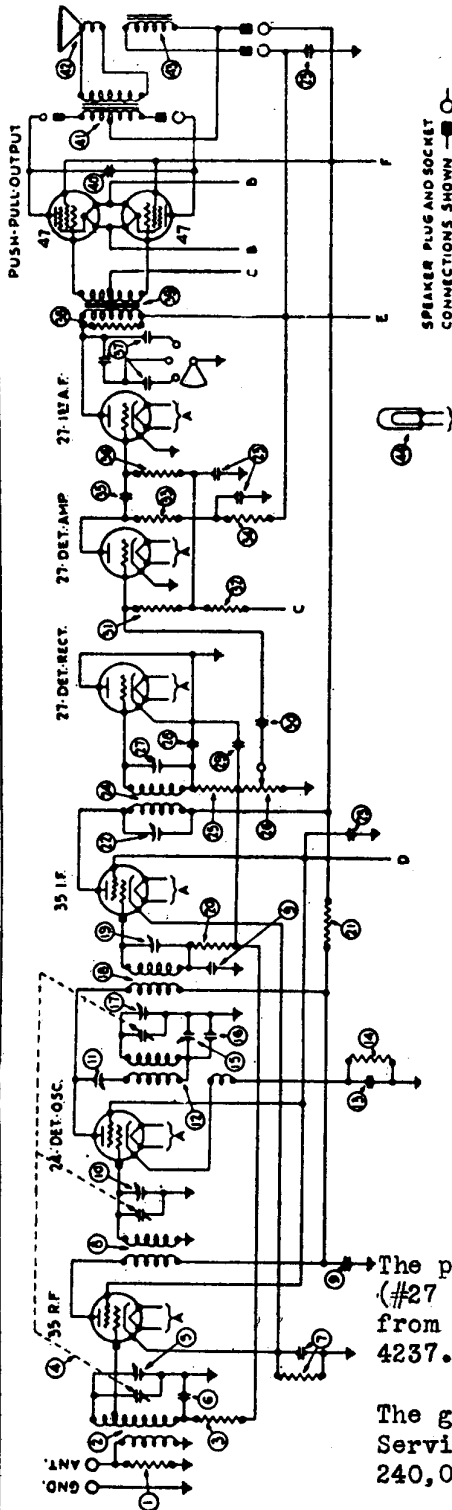
High Frequency Compensator—Connect the "A" and "G" terminals of the oscillator to the ANT and GND terminals of the Receiver. Do not change the oscillator setting. Tune the Receiver to exactly 140 and adjust the high frequency compensator for maximum reading in the output meter.

Antenna and Detector Condensers—With the Receiver and oscillator in the same setting, set the detector and antenna condensers for maximum reading in the output meter. If the Receiver is so far out of adjustment that the signal is extremely weak when adjusting the high frequency condenser it is advisable to temporarily check the adjustment of the detector and antenna condensers. Final adjustment of these condensers must be made as described.

Low Frequency Condenser—With the oscillator turned to broadcast frequency set the Philco scale at 60 and adjust the low frequency compensating condenser for maximum signal in the output meter. If the signal comes in off the 60 position on the Philco scale, set the Receiver slightly off the signal towards 60 and adjust the signal for maximum strength in this position. By repeating this, you will be able to bring the signal up to the 60 setting on the Philco scale.

PHILCO RADIO & TELEVISION CORP.

MODEL 90,90-A
(With 2-47s)
Schematic
Changes



PHILCO MODEL 90

Serial Nos. B-32001 to B-35000
and above B-53100

I-F Peak
260 kc.

New Speaker in Model 90

Attention is called to the fact that the speakers for the new Model 90 (serial nos. B-32001 to B-35,000 and above B-53,100) are not interchangeable with the speakers for the earlier Model 90 with the single pentode output tube. This is due to the fact that the output transformers are different. Part 2635 output transformer is required for the models with push pull pentode output tubes and part 2673 is required for the models with the single pentode output.

CHANGES IN MODEL 90-A (above serial No. 112,977) 25 cycle

The plate filter resistor of the last 27 tube (#27 in Service Bulletin No. 85) has been changed from 25,000 ohms, part 3656, to 51,000 ohms, part 4237.

The grid coupling resistor of the 47 tube (#29, in Service Bulletin No. 85) has been changed from 240,000 ohms, part 4410, to 99,000 ohms, part 4411.

The grid filter resistor for the last 27 and the 47 tubes (#51, in Service Bulletin No. 85) has been changed from 240,000 ohms, part 3768, to 490,000 ohms, part 3769.

MODEL 90, 90-A
(With 2-47s)

PHILCO RADIO & TELEVISION CORP.

Voltage - Data

Model 90 receivers are for operation on 100 to 130 volt, 50-60 cycle AC lines. This receiver is a nine tube superheterodyne with push-pull pentode output. Automatic volume control, 4 point tone control, super control screen grid tubes and combination first detector and oscillator tube are some of the additional features. The maximum power consumption is 100 watts.

Table 1—Tube Socket Readings Taken with A.C. Set Tester—A.C. Line 115 Volts

Tube		Filament Volts	Plate Volts	Control Grid Volts	Screen Grid Volts	Cathode Volts	Plate Milli-Amperes
Type	Circuit						
35	R.F.	2.5	225	0	38	6	4.2
24	Det.-Osc.	2.5	215	12	40	22	.5
35	I.F.	2.5	235	10	38	10	1.0
27	Det. Rectifier	2.5	...	...	...	10	...
27	Det. Amplifier	2.5	50	0	...	1	1.0
27	1st Audio	2.5	90	0	...	1	5.0
47	Output	2.5	210	10	225	...	31.
47		2.5	210	10	225	...	31.
80	Rectifier	5.0	225/plate	...	...	...	...

Above readings taken with volume control at maximum and dial turned to low frequency end

Table 2—Power Transformer Voltages

Terminals Figs. 1 and 2	A.C. Volts	Circuit	Color
1-2	115	Primary	White
4	...	Center Tap Heater	Black, Yellow Tracer
3-5	2.5	Heater	Black
6-8	2.5	Filament 47's	Dark Green
7	...	Center Tap Filament 47's	Black, Green Tracer
9-10	5.0	Filament 80	Light Blue
11-13	665	Plates 80	Yellow
12	...	Center Tap Plates 80	Yellow, Green Tracer

Table 3—Condenser Data

Nos. on Figs. 1 and 2	Capacity (Mfd.)	Container
20	.00011	Blue and Golden Yellow
15	.00041	Yellow and Orange
13	.0007	White and Golden Yellow
14	.001	Green and White
20	.01	Black Bakelite
25	.015	Black Bakelite
10	.05	Black Bakelite
9	.09	Black Bakelite
7	.09 & 200 Ohms	Black Bakelite
20	.15	Black Bakelite
20	2-.25, 2-.5	Metal
16	6.	Electrolytic
51	6.	Electrolytic

Table 4—Resistor Data

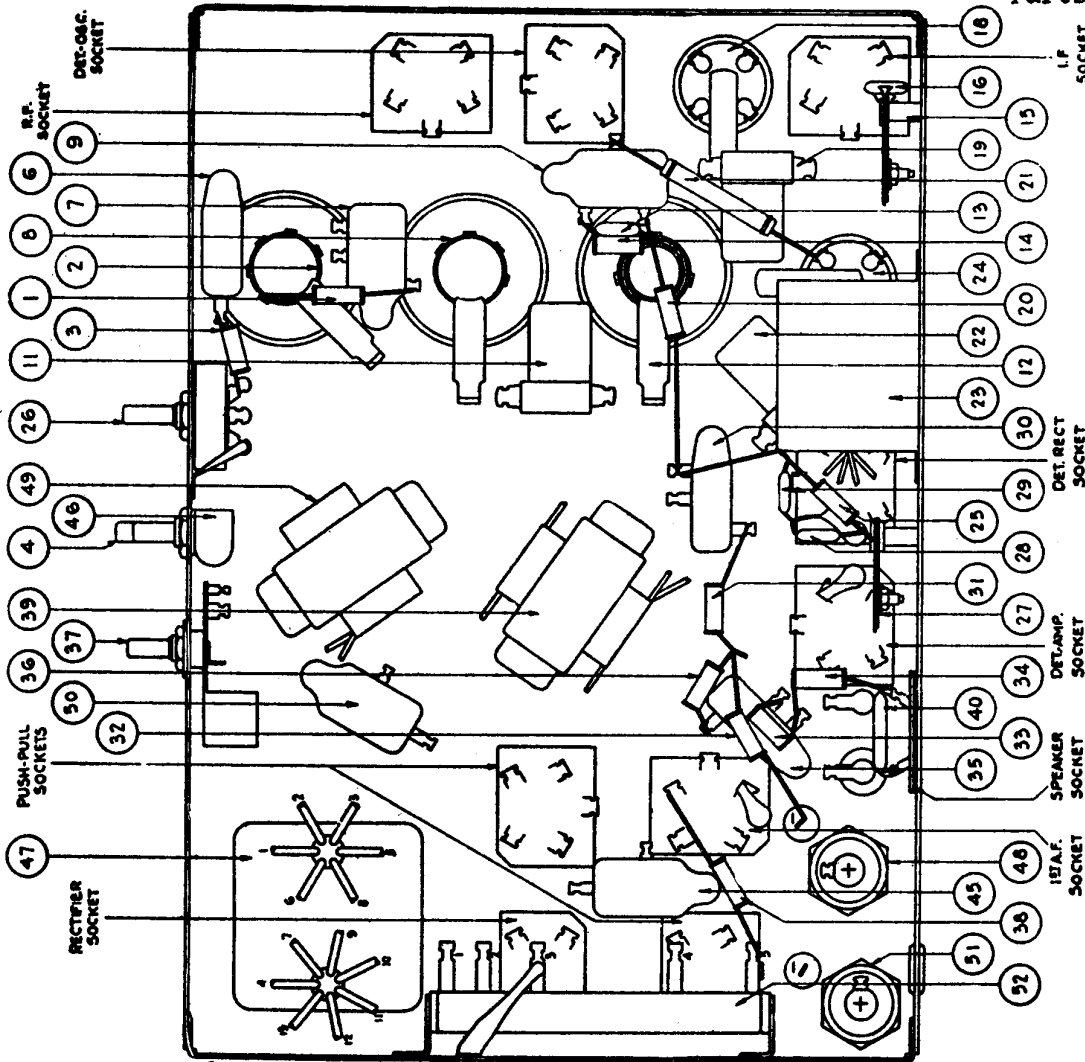
Nos. on Figs. 1 and 2	Power (Watts)	Resistance (Ohms)	Color			
			Body	Tip	Dot	
20 10 11 14 20 24 20 20 20 20 20 20 20 20 20	(Terminals)					
	1-2	205	Long Tubular			
	2-3	95				
	3-4	2,400				
	4-5	1,200				
	1.	1,000		Brown	Black	Red
	.5	10,000		Brown	Black	Orange
	.5	15,000		Brown	Green	Orange
	.5	25,000		Red	Green	Orange
	.5	51,000		Green	Brown	Orange
	.5	99,000		White	White	Orange
	.5	490,000		Yellow	White	Yellow
	.5	1,000,000		Brown	Black	Green

Model 90

(Serial Nos. B-32,001 to B-35,000 and Above B-53,100)

PHILCO RADIO & TELEVISION CORP.

MODEL 90,90-A
(With 2-147s)
Chassis
Parts List



PHILCO MODEL 90

Serial Nos. B-32001 to B-35000
and above B-53100

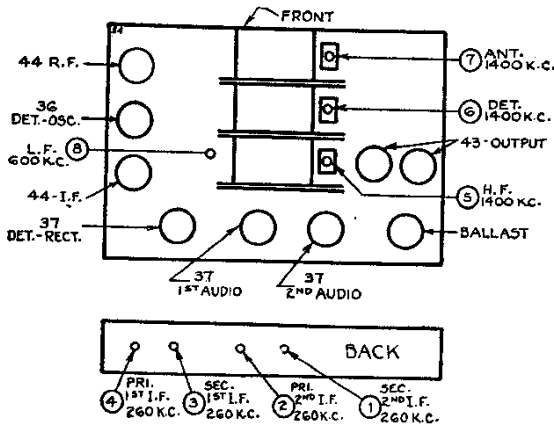
No. on Fig. 1 and 2	Description	Part No.		Part No.
1	Resistor (10,000 Ohms)	4412	10	First I.F. Transformer 04319
2	Antenna Transformer	04317	11	Compensating Condenser—First I.F. 04000-M
3	Resistor (1,000,000 Ohms)	4409	12	Resistor (1,000,000 Ohms) 4409
4	Tuning Condenser (50-60 cycles)	04309	13	Resistor (1,000 Ohms) 4590
5	Tuning Condenser (25-40 cycles)	04310	14	Compensating Condenser—Second I.F. Primary 04000-M
6	Compensating Condenser—Antenna—Part of Tuning Condenser Assembly	3615-L	15	Condenser (25-25, 2-.5 Mfd.) 04407
7	Condenser (.05 Mfd.)	4989-L	16	Second I.F. Transformer 04320
8	Condenser (.09 Mfd. and 200 Ohm Resistor)	3615-AJ	17	Resistor (99,000 Ohms) 4411
9	Detector Transformer	04408	18	Volume Control 6015
10	Condenser (.09 Mfd.)	3615-AJ	19	Compensating Condenser (Second I.F. Secondary) 04000-M
11	Compensating Condenser—Coupling	04000-M	20	Condenser (110 Mmf.) 4519
12	Oscillator Coil	04409	21	Condenser (110 Mmf.) 4519
13	Condenser (700 Mmf.)	4520	22	Condenser (.01 Mfd.) 3903-N
14	Resistor (15,000 Ohms)	6208	23	Resistor (1,000,000 Ohms) 4517
15	Compensating Condenser—Low Frequency	04000-B	24	Resistor (490,000 Ohms) 4516
16	Condenser (410 Mfd.)	5120	25	Resistor (25,000 Ohms) 4409
17	Compensating Condenser—High Frequency—Part of Tuning Condenser Assembly		26	Resistor (25,000 Ohms) 4409
			27	Condenser (.01 Mfd.) 3903-X
			28	Resistor (1,000,000 Ohms) 4409
			29	Tone Control 03137
			30	Resistor (51,000 Ohms) 4513
			31	Push-Pull Input Transformer AX64

MODEL 47
 PHILCO RADIO & TELEV. CORP. MODEL 48
 MODELS 90, 90A (with 1-47)
 Alignment, Trimmers

MODEL NO. 47

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.					
Control grid of det.-osc.	280 k.c.	60	...	1 ¹	Max.
"	"	"	...	2 ¹	Max.
"	"	"	...	3 ¹	Max.
"	"	"	...	4 ¹	Max.
Connect grid clip to det.-osc.					
Ant.*	1400 k.c.	140	...	5	Max.
"	"	"	...	6	Max.
"	"	"	...	7	Max.
"	600 k.c.	60	...	8 ²	Max.**
"	1400 k.c.	140	...	5	Max.

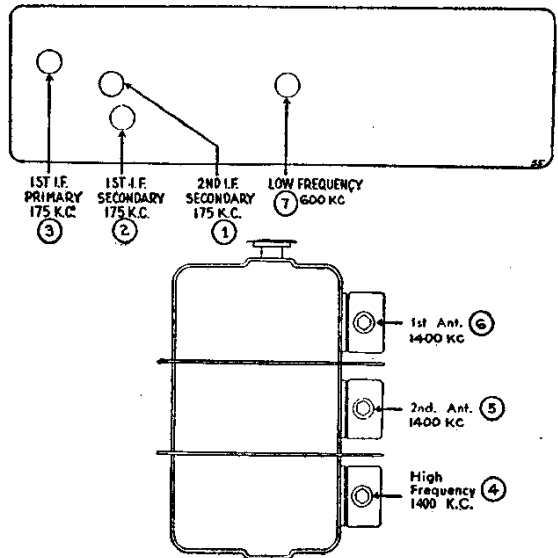
Note 1.—Accessible through holes in rear of chassis.
 Note 2.—Accessible through hole from top of chassis.
 * Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
 ** Adjust while rocking.



MODEL NO. 48

Signal Generator Connection	Signal Generator Frequency	Dial Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.				
Control grid of det.-osc.	175 k.c.	60	1	Max.
"	"	"	2	Max.
"	"	"	3	Max.
Connect grid clip to det.-osc.				
Ant.*	1400 k.c.	140	4	Max.
"	"	"	5	Max.
"	600 k.c.	60	6	Max.
"	1400 k.c.	140	7	Max.
"	"	"	4	Max.

* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.



MODEL NOS. 90, 90A, (with 1-47)

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 1st det.	Note 1	55	...	1	Max.
Control grid of 1st det.	"	"	...	2	Max.
"	"	"	...	3	Max.
Connect grid clip to 1st det.					
Ant.*	1400 k.c.	140	...	5	Max.
"	"	"	...	4	Max.
"	"	"	...	6	Max.
"	600 k.c.	60	...	7	Max.
"	1400 k.c.	140	...	8	Max.**
"	"	"	...	5	Max.

* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
 ** While rocking.
 Note 1.—175 k.c. for models with two 46s and 360 k.c. for models with one 47.

