



Radio Service Bulletin—No. 36

Models 20 and 20-A Receivers

Model 20 Receivers are for Operation on 105-125 volt, 50-60 cycle AC Lines.
 Model 20-A Receivers are for Operation on 105-125 volt, 25-60 cycle AC Lines.

Bulletin 28 covers the first few weeks' production of Models 20 and 20-A. These Receivers can be identified as having one or two compensating condensers. The later models have three compensating condensers fastened to the tuning condenser housing and are covered by Bulletin 36.

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

Tube		Filament Voltage	Plate Voltage	Grid Voltage	Screen Grid Voltage	Cathode Voltage	Plate Milliamperes
Type	Circuit						
24	1st R. F.	2.3	250	3.0	90.0	12	4.5
24	2nd R. F.	2.3	250	3.0	90.0	11	4.5
24	Detector	2.3	35	1.0	2.0	8	....
27	1st Audio	2.3	120	1.0	....	8	3.0
71-A	{ 2d Audio } { Push-Pull }	5.0	215	50.0	....	....	18.0
71-A		5.0	215	50.0	....	....	18.0
80	Rectifier	5.0	....	....	....	....	36/Plate

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

Table 2—Power Transformer Voltages

Terminals	A. C. Volts	
1—2	2.5	Heaters of 24 and 27 Tubes
3—4	105 to 125	Primary
7—8	5.0	Filament of 71-A Tubes
5	....	Center Tap of 7—8
10—11	5.0	Filament of 80 Tube
9—12	650	Plates of 80 Tube
6	....	Center Tap of 9—12 and 1—2

Table 4—Condenser Data

No. on Figs. 3 and 4	Capacity MFD
(16)	.00025
(19)	.01
(5) (6) (22)	.05
(8)	.05 with 250-ohm resistor winding
(14)	.25 (two sections)
(13)	.5

Table 3—Resistor Data

No. on Figs. 3 and 4	Terminal	Resistance	Color
(25)	{ 1—2 } { 2—3 } { 3—4 } { 5—6 } { 6—7 }	{ 1,400 } { 187 } { 75 } { 2,470 } { 975 }	Long Tubular
(12)		50,000	Orange
(18)		100,000	Silver Gray
(15)		250,000	White
(17) — (20)		500,000	Battleship Gray

Model 20—Filter Condenser—Part No. 4235

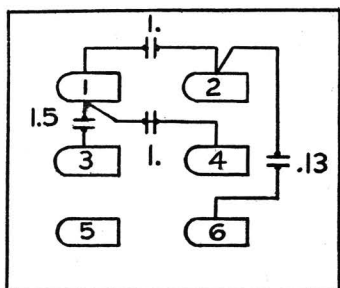


Fig. 1

Model 20-A—Filter Condenser—Part No. 4269

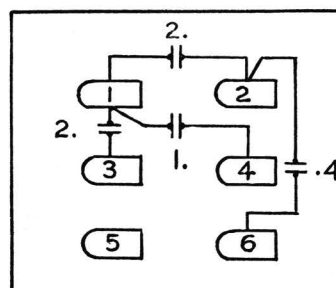


Fig. 2

Models 20 and 20-A

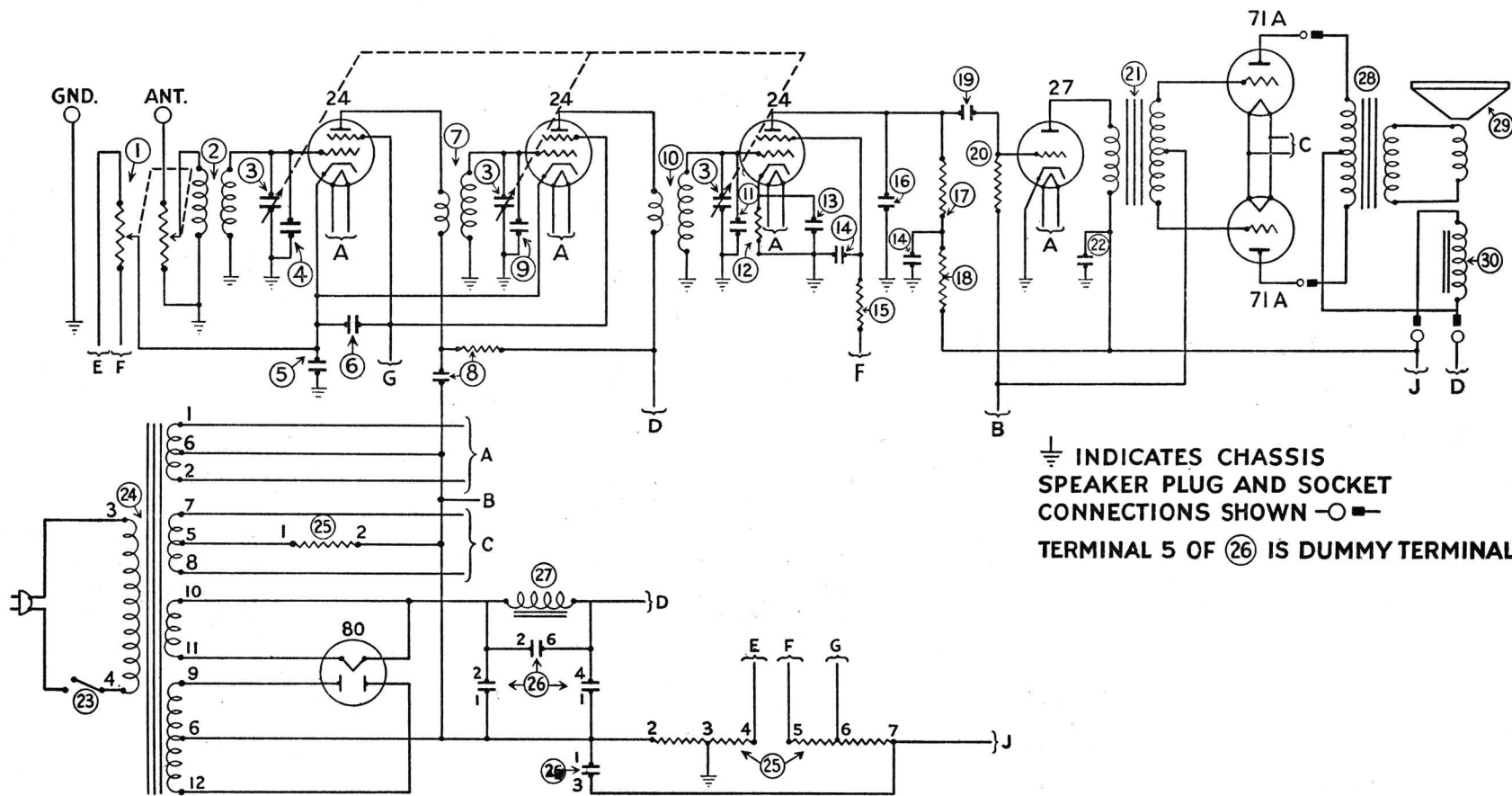


Fig. 3

Models 20 and 20-A

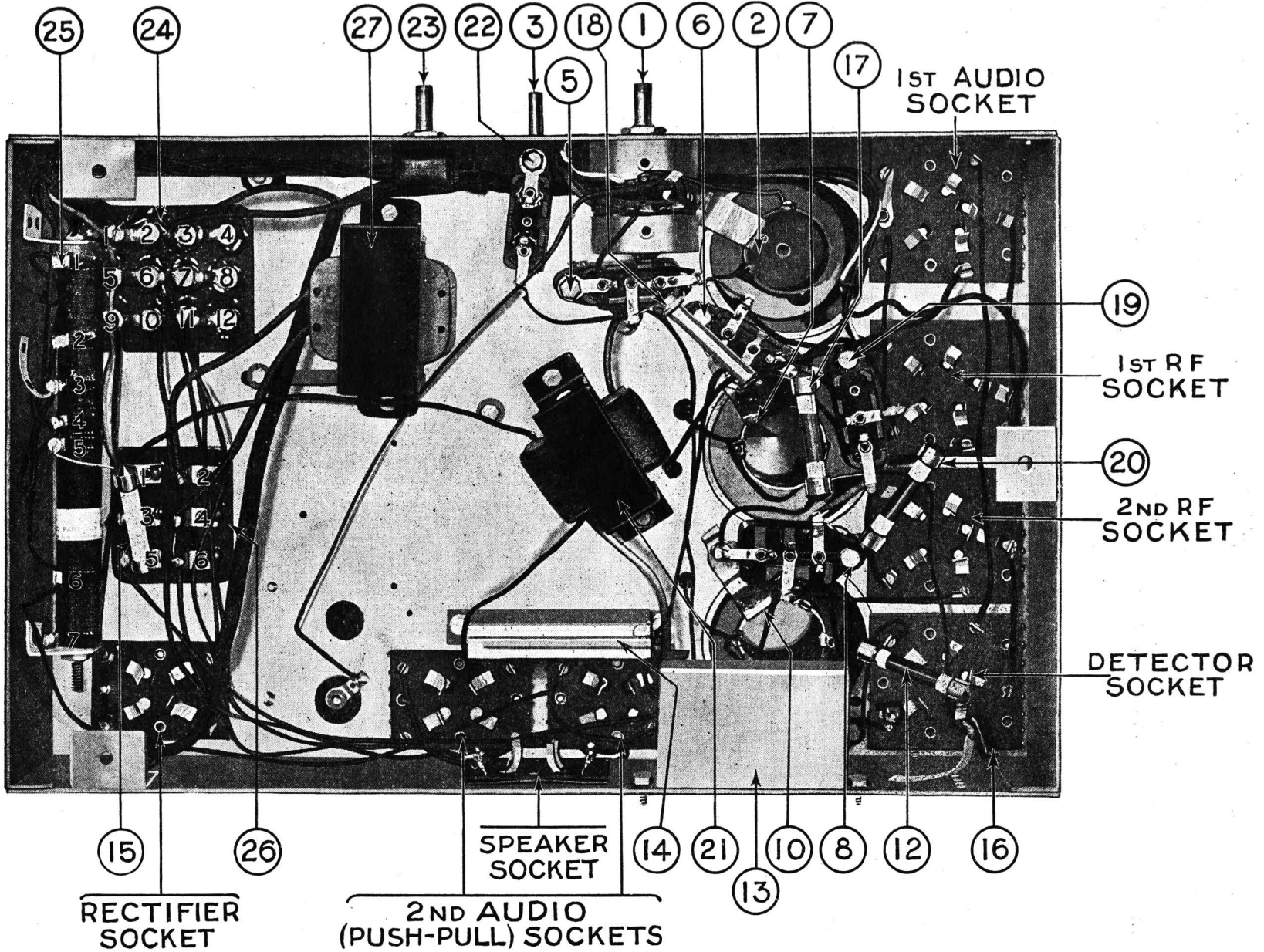


Fig. 4

DIFFERENT CIRCUIT ARRANGEMENT FOR MODEL 20-A

Model 20-A for use on 25-60 cycle lines is wired differently than the Model 20. The plate supply lead for the two 24 R. F. Tubes is taken from the low side of the Speaker field Coil. The lead "D" to the 24 tubes should be changed to "J" for the Model 20-A only. This will change the plate voltage from 250 volts to 115-125 volts. The plate current readings will also be lower than those given in the table.

COMPENSATING

Compensating condensers in all Philco Models are carefully adjusted at the Factory and ordinarily need not be readjusted.

If at all necessary to readjust,—a good oscillator, such as described in our earlier Service Manuals, should be used. With the Receiver and oscillator set up for operation, and the volume control of the Receiver turned on full—adjust the oscillator signal to a frequency between 1200 and 1400 kilocycles or 120 and 140 on the Philco scale. Tune the Receiver sharply to the signal and then reduce the oscillator signal so that it is barely audible in the Speaker.

Using the special fibre wrench, adjust the third compensating condenser to that point at which the maximum signal is heard in the Speaker, then adjust the second and finally the first condenser in the same manner, always adjusting for that position which gives the maximum signal.

After the adjustments are completed tune the Receiver to several broadcast programs to make sure that the stations are tuned in at the proper place on the tuning scale.

REPLACEMENT PARTS—MODELS 20 and 20-A RECEIVERS

No. on Figs. 3 and 4	Description	Part No.	No. on Figs. 3 and 4	Description	Part No.
①	Volume Control	4094	②③	On-off Switch	4095
②	First R. F. Transformer	3884-N	②④	Power Transformer (50-60 cycle)	4234
③	Tuning Condenser	4200-A		Power Transformer (25-60 cycle)	4268
④	First Compensating Condenser (Part of Tuning Condenser Assembly)		②⑤	B. C. Resistor	4230
⑤	By-Pass Condenser (.05)	3615-J	②⑥	Filter Condenser (50-60 cycle)	4235
⑥	By-Pass Condenser (.05)	3615-M		Filter Condenser (25-60 cycle)	4269
⑦	Second R. F. Transformer	3884-P	②⑦	Filter Choke	4231
⑧	By-Pass Condenser (.05) and Resistor	3615-K	②⑧	Push-Pull Output Transformer	2766
⑨	Second Compensating Con- denser (Part of Tuning Condenser Assembly)		②⑨	Voice Coil and Cone	2769-B
⑩	Third R. F. Transformer	3884-P	③⑩	Field Coil	2768
⑪	Third Compensating Con- denser (Part of Tuning Condenser Assembly)			Speaker Plug and Cord	L-1124-A
⑫	Resistor (50,000)	4237		Four-Prong Socket Assembly	3977-A
⑬	By-Pass Condenser (.5)	3583		Speaker Socket	3977-B
⑭	By-Pass Condenser (double .25)	3557		Five-Prong Socket Assembly	3979-A
⑮	Resistor (250,000)	3768		R. F. Tube Shield	4228-A
⑯	By-Pass Condenser (.00025)	3082		Volume Control Insulators	4092
⑰	Resistor (500,000)	3769		Volume Control Insulators	4286
⑱	Resistor (100,000)	3767		Tuning Condenser Dial Scale	4261
⑲	Condenser (.01)	3903-F		A. C. Cord	L-943-A
⑳	Resistor (500,000)	3769		Knob (Large)	4289-A
㉑	Push-Pull Input Transformer	4232		Knob (Small)	4290-A
㉒	By-Pass Condenser (.05)	3615-L		Cabinet	34000
				Bezel Plate	4252
				Fahnstock Clip	L-1126
				Finishing Rosettes	4267
				Speaker Mounting Screws (three used)	W-493
				Speaker Mounting Screws (one used)	W-483
				Chassis Hold-Down Bolts	W-490
				Feet	W-353

Note:—R. F. Transformers ②, ⑦ and ⑩ should not be confused with R. F. Transformers ②, ⑤, ⑧ and ⑫ on Bulletin 28. They are not interchangeable.

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