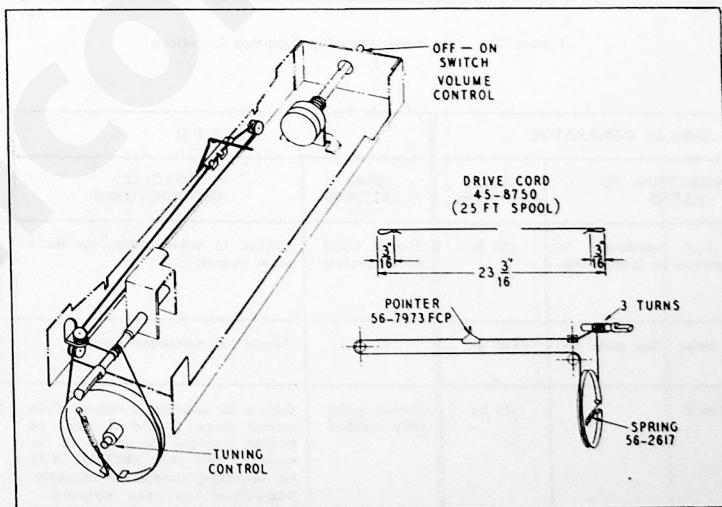


# PHILCO RADIO MODEL 51-631

## SPECIFICATIONS

CABINET .....	Plastic, personal portable
CIRCUIT .....	Four-tube superheterodyne plus selenium rectifier
FREQUENCY RANGE .....	540—1620 kc.
AUDIO OUTPUT	
A-C Operation .....	150 mw.
Battery Operation .....	75 mw.
OPERATING VOLTAGE .....	117 volts, a.c./d.c., or 1.5-volt "A" battery and 67.5-volt "B" battery
POWER CONSUMPTION	
A-C Operation .....	11 watts
Battery Operation .....	9.5 ma. from 67.5-volt "B" battery 250 ma. from 1.5-volt "A" battery
AERIAL .....	Built-in high-impedance loop with iron core: provision for connecting external aerial.
INTERMEDIATE FREQUENCY .....	455 kc.
PHILCO TUBES (4) .....	1R5 converter, 1U4 i-f ampl., 1U5 det.-a.v.c.-1st audio, 3V4 output



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Figure 1. Drive-Cord Installation Details

### ALIGNMENT PROCEDURE

**DIAL POINTER**—With tuning-condenser plates fully meshed, set pointer to coincide with first index hole above pointer.

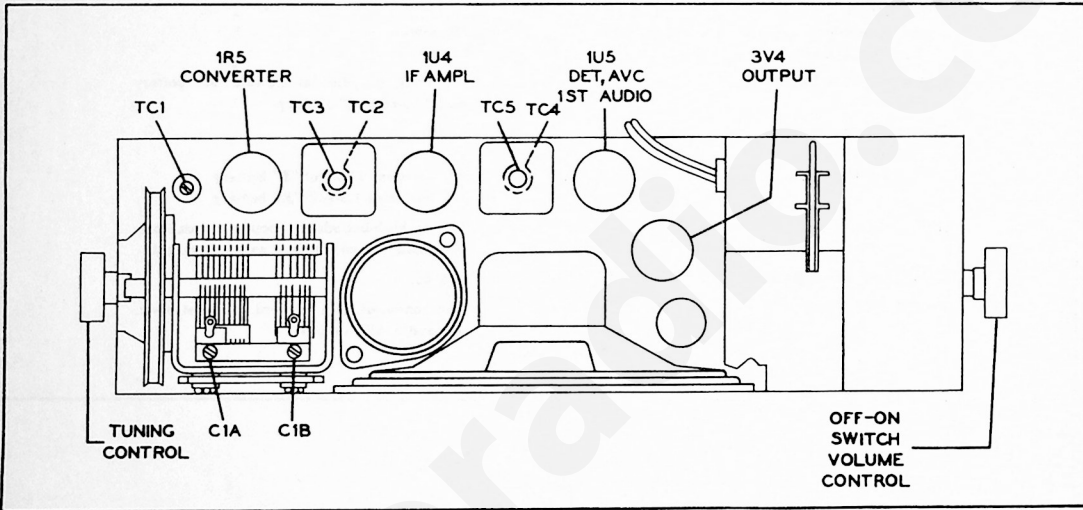
**OUTPUT METER**—Connect across speaker voice coil terminals.

**SIGNAL GENERATOR**—Connect signal generator as indicated in chart. Use modulated output.

**RADIO CONTROLS**—Set volume control to maximum. Set tuning control and signal-generator frequency as indicated in chart.

**OUTPUT LEVEL**—During alignment, signal-generator output must be attenuated to maintain output-meter reading below .5 volt.

**NOTE:** While the radio is being aligned, the batteries (if used) should be in the same position with respect to the chassis and loop as they are in the cabinet.



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Figure 2. Top View, Showing Trimmer Locations

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through .1- $\mu$ f. condenser to antenna section of tuning condenser.	455 kc.	Tuning gang fully meshed	Adjust, in order given, for maximum output.	TC5—2nd i-f sec. TC4—2nd i-f pri. TC3—1st i-f sec. TC2—1st i-f pri.
2	Radiating loop. See note below.	1620 kc.	1620 kc.	Adjust for maximum output.	C1B—osc. trimmer C1A—aerial trimmer
3	Same as step 2.	535 kc.	Tuning gang fully meshed	Adjust for maximum output; then repeat steps 2 and 3 until no further increase in output is obtained. This step SHOULD NOT be necessary unless the oscillator transformer has been replaced.	TC1—osc. core

**RADIATING LOOP:** Make up a six-to-eight turn, 6-inch-diameter loop, using insulated wire; connect to signal-generator leads, and place near radio loop aerial.



## REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (\*) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
C1	Condenser, tuning gang, 2-section	31-2735-2
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, neutralizing, 1.5 $\mu\text{f.}$	30-1221-3
C3	Condenser, a-v-c by-pass, .05 $\mu\text{f.}$	61-0122*
C4	Condenser, i-f by-pass, .1 $\mu\text{f.}$	61-0113*
C5	Condenser, d-c blocking, 47 $\mu\text{f.}$	62-051009001*
C6	Condenser, dual ceramic	30-1239
C6A	Condenser, osc. B+ by-pass, .004 $\mu\text{f.}$	Part of C6
C6B	Condenser, grid by-pass, .004 $\mu\text{f.}$	Part of C6
C7	Condenser, temperature compensation, 7.5 $\mu\text{f.}$	30-1224-65
C8	Condenser, filament by-pass, 22 $\mu\text{f.}$	45-3505-49
C9	Condenser, neutralizing, 2.2 $\mu\text{f.}$	30-1221-4
C10	Condenser, ceramic, 4-section	30-1237
C10A	Condenser, d-c blocking, .001 $\mu\text{f.}$	Part of C10
C10B	Condenser, screen by-pass, .01 $\mu\text{f.}$	Part of C10
C10C	Condenser, d-c blocking, .002 $\mu\text{f.}$	Part of C10
C10D	Condenser, grid by-pass, 220 $\mu\text{f.}$	Part of C10
C11	Condenser, tone compensation, .004 $\mu\text{f.}$	61-0179*
C12	Condenser, electrolytic, filament by-pass, 50 $\mu\text{f.}$ , 25v	30-2417-12
C13	Condenser, electrolytic, 3-section	30-2568-39
C13A	Condenser, filter, 40 $\mu\text{f.}$ , 150v	Part of C13
C13B	Condenser, filter, 10 $\mu\text{f.}$ , 150v	Part of C13
C13C	Condenser, filter, 50 $\mu\text{f.}$ , 150v	Part of C13
C14	Condenser, line by-pass, .047 $\mu\text{f.}$	45-3505-45*
CR1	Selenium rectifier, 75 ma. at 117 volts	34-8003
LA1	Loop aerial	32-4455
LS1	Speaker, 4-inch p-m	36-1637
R1	Resistor, grid return, 3.3 megohms	66-5338340*
R2	Resistor, grid return, 100,000 ohms	66-4108340*
R3	Resistor, bias, 680 ohms	66-1688340*
R4	Resistor, leakage, 150,000 ohms	66-4158340*
R5	Resistor, oscillator dropping, 22,000 ohms	66-3228340*
R6	Resistor, grid return, 3.3 megohms	66-5338340*
R7	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R8	Volume control (with off-on switch) 1 megohm	33-5566-21
R9	Resistor, grid return, 4.7 megohms	66-5478340*
R10	Resistor, screen dropping, 4.7 megohms	66-5478340*
R11	Resistor, plate load, 1 megohm	66-5108340*
R12	Resistor, grid return, 2.2 megohms	66-5228340*
R13	Resistor, bias, 820 ohms	66-1828340*
R14	Resistor, filament dropping and filter, 2100 ohms (center-tapped)	33-3445
R15	Resistor, filter, 820 ohms	66-1828340*
R16	Resistor, current limiting, 120 ohms	33-1334-14
R17	Resistor, bias, 1500 ohms	66-2158340*
R18	Resistor, bias, 330 ohms	66-1338340*
S1	Switch, off-on	Part of R8
T1	Transformer, oscillator	32-4453
T2	Transformer, output	32-8434
W1	Line cord	

Reference Symbol	Description	Service Part No.
WS	Wafer switch, voltage change-over	42-1925
Z1	Transformer, 1st i-f	32-4160-4A
Z2	Transformer, 2nd i-f	32-4454-1A

## MISCELLANEOUS

Description	Service Part No.
Cabinet	10799
Baffle and cloth assembly	40-7884
Fastener (4)	W2235-7FA9
Battery holder and loop assembly	76-5740
Battery cradle and rivet assembly	
Handle	56-7940FCP
Bushing (2)	
Hinge (l.h.)	56-7915
Hinge (r.h.)	56-7915-1
Screw (2)	W2537-15FA1
Knob (2)	54-4773
Pointer	56-7973F
Scale	54-5087
Cable and connector assembly, battery	41-3988
Insulator, electrolytic-condenser mounting	27-9509
Mount, rubber, tuning gang (3)	27-4099-3
Spring, drive cord	56-2617
Socket, tube, 1R5 and 1U4 (2)	27-6203
Socket, tube, 1U5 and 3V4 (2)	27-6203-12
Tube shield, 1U5	56-3978-1FA3
Tuning shaft	56-7906FA42

## CORRECTIONS TO PARTS LIST

Reference Symbol	Description	Service Part No.
W1	Line cord	41-3821-6
	Battery cradle and rivet assembly	76-5740
	Bushing (2)	54-4776-1

## ADDITIONS TO PARTS LIST

Reference Symbol	Description	Service Part No.
	Cabinet, maroon	10799-1
	Cabinet, red	10799-2
	Cabinet, blue	10799-3
	Cabinet, green	10799
	Cabinet back, green	54-4767
	Cabinet back, maroon	54-4767-1
	Cabinet back, red	54-4767-2
	Cabinet back, blue	54-4767-3



## PRODUCTION CHANGES

## Run 2

1. To improve sensitivity, the following changes were made:

2. R1, 3.3 megohms, was removed.

3. R2 was changed to 68,000 ohms, Part No. 66-3688340\*. Its filament end was disconnected from pin 7 of the 1R5, and connected to pins 1 and 5 of the 1U4.

4. R3 was changed to 470 ohms, Part No. 66-1478340\*, and was removed from between pin 7 of the 1R5 and B-. The filament lead from pins 1 and 5 of this tube to B- was removed, and R3 was wired from pins 1 and 5 to B-.

5. C6A was removed from between B- and the junction of R5 and terminal 1 of T1, and its value was changed to .005  $\mu$ f., Part No. 30-1238-1. The connection from the ungrounded side of C6B to terminal 2 of Z1 was opened, and C6A was inserted, in series with C6B.

6. C6B was changed to .005  $\mu$ f., Part No. 30-1238-1. Its grounded end was removed from B-, and was connected to terminal 1 of T1.

7. The filament lead between pin 7 of the 1R5 and pins 1 and 5 of the 1U4 was connected to the junction of C6A and C6B.

8. R6 was removed, and was connected from terminal 2 of Z1 to pins 1 and 5 of the 1U4.

## SERVICE HINT

The black "A" lead from lug 3 of the on-off switch should be checked for lead dress. The insulation on lead could be cut by lug 4; this would cause the tube filaments to be lit continuously, and would run down the battery or burn out the tubes. This lead must be dressed away from lug 4 and the edge of the hole in the chassis.