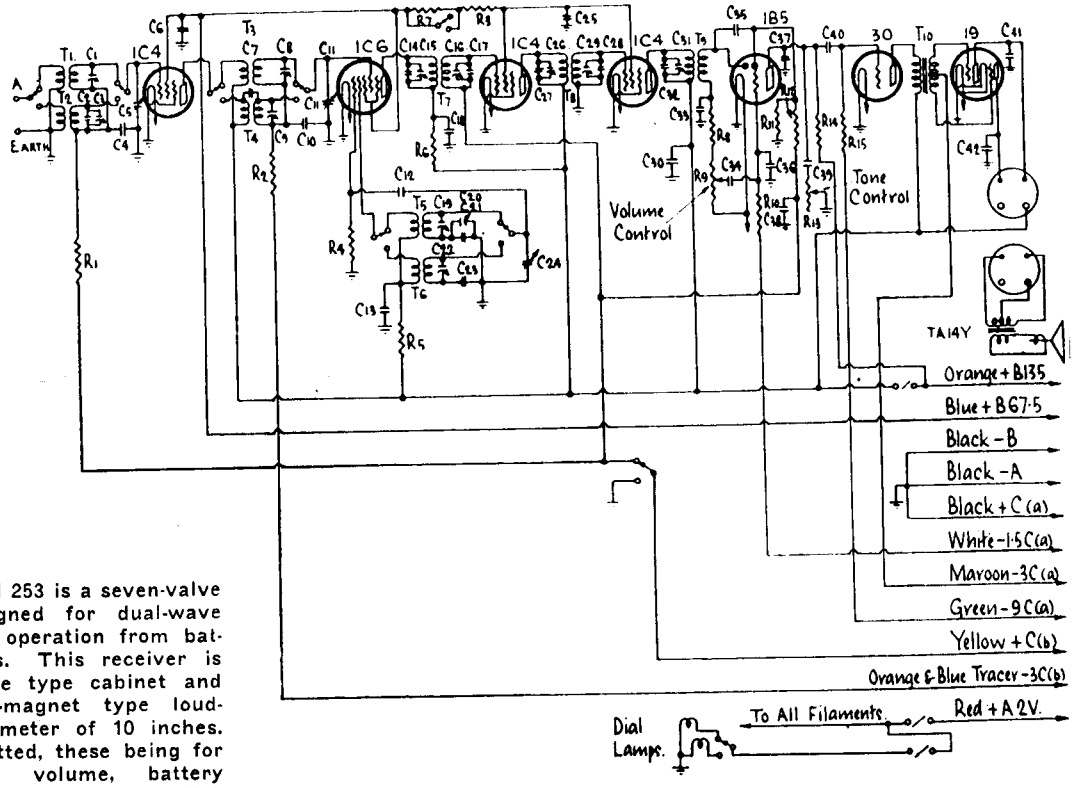
"Radiola" Battery-Operated Dual-Wave Model 253



RADIOLA model 253 is a seven-valve receiver designed for dual-wave coverage and operation from battery power supplies. This receiver is housed in a console type cabinet and uses a permanent-magnet type loudspeaker with a diameter of 10 inches. Five controls are fitted, these being for tone (continuous), volume, battery switching (with third position for dial-lamp control), tuning (with automatic reverse-type vernier), and wave-change.

The battery equipment required for this receiver comprises a 2-volt accumulator (normal drain, 0.86 A.), three 45 v. dry batteries (total of 135 v. with standing drain of 15 mA.), and two bias batteries. The first of the latter is a 9 volts unit and is tapped at 1.5, 3, and 9 volts; this unit is designated as "(a)" in the connections shown on the circuit diagram. The second unit, designated as "(b)," is a 4½ volts unit of which only the first two cells are in use. This bias battery "floats" on the A.V.C. line on "broadcast" in order to provide additional bias for the 1C6 converter. On short waves, the positive side of this battery is disconnected from the A.V.C. line and returned direct to earth, thus placing a fixed bias of −3 volts on the 1C6. Careful note should be taken of this arrangement and precautions taken to ensure that bias battery "(b)" is not bridged to bias battery "(a)" in any way.

The remainder of the circuit is fairly straightforward. Note should be taken of the fact that an extra resistor (R7) is switched in series with the screen supply to the two I.F. amplifier valves when the receiver is adjusted for broadcast operation, and also that the second I.F. amplifier operates on zero bias. The I.F. used is exactly **460 KC.** A final point of interest is found in the permanent application of high-tension voltage to the plate of the 1B5. This is to avoid "switching-on" surges which might tend to damage the audio driver (type 30) and is common to all battery receivers in the Radiola range for 1936. In order to accomplish this, the 1B5 plate load resistor (R14) is wired to the 135 v. side of the H.T. switch.

COMPONENT VALUES

The abbreviation "P.N.," followed by a number, which appears after some of the following component indices, is the official A.W.A. part number and exact replacements may be obtained by quoting this number when ordering.

All resistor values are designated by the standard R.M.A. (U.S.A.) colour code. Mica condenser values are stamped thereon in **micromicrofarads**, and paper condenser values are marked in **microfarads.**

COILS.

T1, T2 (P.N. 2018)—Aerial coil assembly; **T3, T4** (P.N. 2021—2360)—R.F. coil assembly; **T5, T6** (P.N. 2387)—Osc. coil assembly; **T7** (P.N. 1752)—1st I.F. trans.; **T8** (P.N. 1753)—2nd I.F. trans.; **T9** (P.N. 1938)—3rd I.F. trans., note that this unit has an untuned secondary; **T10** (P.N. 2376)—Audio driver trans., type TA 1899.

RESISTORS.

R1, R2, R3, R7, R8—100,000 ohms, 1/3 W.; **R4**—60,000 ohms, 1/3 W.; **R5**—10,000 ohms, 1/3 W.; **R6**—300 ohms, 1/3 W.; **R9** (P.N. 1507)—500,000 ohms volume control; **R10, R11, R12**—1¾ megohms, 1/3 W.; **R13** (P.N. 1668)—300,000 ohms tone control; **R14**—250,000 ohms, 1W.; **R15**—500,000 ohms, 1/3 W.

CONDENSERS.

C1, C3, C8, C9, C19, C22—5/20 mmfd. mica trimmers; **C2, C7**—10 mmfd. mica; **C4, C10, C13, C18, C34, C38, C40**—0.05 mfd. paper; **C5, C11, C24** (P.N. 1754)—sections of 3-gang tuning condenser; **C6, C25**—0.1 mfd. paper; **C12**—50 mmfd. mica; **C14, C17, C27, C28**—180 mmfd. mica; **C15, C16, C26, C29, C31**—10/50 mmfd. mica trimmers; **C20, C21** (P.N. 1153)—broadcast padder assembly, composed of 10/50 mmfd. mica trimmer and 390 mmfd. mica fixed in parallel; **C23**—2,800 mmfd. mica, short wave padder; **C30**—0.5 mfd. paper; **C32**—130 mmfd. mica; **C33, C36**—200 mmfd. mica; **C35, C37**—700 mmfd. mica; **C39**—0.01 mfd. paper; **C41, C42**—0.005 mfd. paper.

OPERATING VOLTAGES.

The following measurements of Radiola 253 operating voltages were made with a "1,000 ohm per volt" meter between earth and the socket contact indicated. The wave-change switch was adjusted for broadcast operation and the receiver was detuned from any signal. Exceptions to the above are found in the readings given for the converter, second detector and audio driver grid voltages; the I.F. amplifier screen voltages; and the second detector plate voltage. In each of these cases the resistance present in the circuit is such that an accurate indication is not obtainable with a normal voltmeter. For an accurate indication, a vacuum-tube voltmeter

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should be employed; if this is impracticable, the plate current reading given may be accepted as a reliable indication of the operating conditions.

1C4, R.F. Amplifier. Plate, 135 v.; screen, 67.5 v.; grid, zero bias. Plate current, 3 mA.

1C6, Frequency Converter. Plate, 135 v.; screen, 67.5 v.; grid, —3 v. Plate current, 1.5 mA. Osc. anode, 100 v. Osc. anode current, 3 mA.

1C4 (2), 460 KC. I.F. Amplifiers. Plate, 135 v.; screen, 40 v.; grid, zero bias. Plate current, 1 mA.

1B5, Detector, A.V.C. Rectifier and Audio Amplifier. Plate, 70 v.; grid, —1.5 v. Plate current, 0.25 mA.

30, Audio Driver. Plate, 130 v.; grid, —9 v. Plate current, 3 mA.

19, Class "B" output stage. Plate, 130 v.; grid, —3 v. Plate current, 3 mA. (total).

It should be noted that the negative grid bias for the frequency converter is obtained from the "floating" bias battery which is designated as "(b)" on the circuit diagram.