

# SUPREME ALL-DRY AP 4

Four-valve, two-waveband superhet in small portable case, with self-contained aerial, and for operation from all-dry batteries. This receiver was made in America and may be taken as largely typical of imported all-dry sets.

**Circuit.**—The aerial is coupled to V1, the frequency-changer, via a series capacity, the grid tuning circuit consisting of a frame aerial winding with a section which is shorted out on M.W. The bottom of the loop is returned to the A.V.C. line.

The oscillator section of V1 is straight-forward, there being a single anode reaction winding. The tuned circuits are in the grid circuit with R2 and C4 as the grid leak and condenser.

Each of the two oscillator circuits has separate trimmers and padders, and

it will be noted that the long wave capacities remain in circuit on the medium band.

Trimmer-tuned I.F. transformers link up the I.F. amplifier V2 and the single-diode-triode, V3.

The volume control, R6, is the diode load. R5, C5 and C6 are an H.F. filter. The demodulated L.F. is passed on to the grid of the triode section via C7.

R3 and R4 form a potentiometer across R6 and tap off a part of the steady demodulation voltages for application to V1 and V2 for automatic volume control.

R8, C9 and R9 form the coupling to V4, the output pentode. R9 is returned to H.T. negative, but the filament of the valve is at L.T. negative potential by the voltage drop across R10, which the H.T. current must pass through to return to H.T. negative. V4 is, therefore, biased by the drop across R10.

C8 and C10 are H.F. and L.F. filters, and C11 is an electrolytic which decouples the H.T. battery. L.T. is obtained from a 1.5 v. dry cell and H.T. from a 90 v. unit. The receiver should operate until the voltages fall to 1.05 and 63 respectively.

Valves: detail valve readings are not necessary. The types used are: V1 1A7GT; V2, 1N5GT; V3, 1H5GT; and V4, 1Q5GT.

## GANGING

**I.F. Circuits.**—Inject modulated 456 kc signal to V1 grid via .01 mfd. Adjust four I.F. trimmers for maximum on an output meter. Keep input signal low to prevent A.V.C. operating.

**Long Waves.**—This band must be adjusted first and the trimmers then left alone during M.W. adjustments.

Inject by connecting generator to small loop of wire placed some inches from the set.

Inject 1,800 m., and adjust T1 for maximum while "rocking" receiver tuning knob slightly. Inject 1,200 m., tune to 1,200 m., and adjust T2 for maximum.

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## CONDENSERS

C	Mfds.	C	Mfds.
1	.0005	7	.01
2	.05	8	.0001
3	.05	9	.01
4	.0001	10	.001
5	.0001	11	8
6	.0001		

## RESISTANCES

R	Ohms.	R	Ohms.
1	50,000	6	.5 meg.
2	200,000	7	2 meg.
3	2 meg.	8	1 meg.
4	2 meg.	9	2 meg.
5	50,000	10	500

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chassis. Stop V2 oscillating by shorting cathode to top of R7—C18.

Inject 119 kc. modulated to V4 via .1 mfd. Adjust T1 for minimum reading and T2 for peak between two minimum points. Repeat adjustments, which, with T1, are critical.

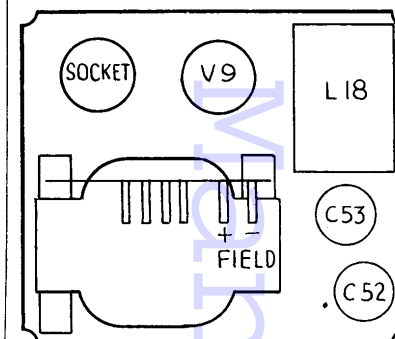
Inject to V2 grid. Switch set to L.W. and connect damping 100,000 ohms ( $\frac{1}{2}$ -watt) and .1 mfd. in series between V4 grid and chassis. Adjust T3 for minimum. Transfer damping to V2 anode and adjust T4 for minimum.

**A.T.C. Circuits.**—See that switch S8 (front of tuning gang) is open. Remove milliammeter from V1 anode and insert in V3 anode circuit, connecting .1 mfd. from anode to chassis. Remove leads from fifth tag from rear of main condenser bank and connect the ends together (leads to R14 and V3 outer grid). Connect V2 cathode to chassis.

Inject 120.5 kc. to V4 grid. Adjust T5 for minimum reading. Inject 117.5 kc. and adjust T6 for maximum. Check that adjustments are correct by seeing that no change occurs when 119 kc. is injected.

Recheck I.F. circuits.

**M.W. Band.** Connect cathodes of V6 and V7. Short S8, inject 230 m. to aerial, tune to 230 m. and adjust T7, T8, T9, T10 for maximum on output meter.



The rectifier valve of the A28C is located on a separate power chassis.

**L.W. Band.** Inject and tune 1,200 m. and adjust T11, T12, T13, T14.

When chassis is back in cabinet re-adjust T7 and T11 for accurate calibration on the two bands.

**Image Rejection.** Join V6, V7 cathodes. Inject strong 333 m. signal to aerial, tune set to 480 m. Short S8. With erinoid tool, adjust screw at top of band-pass secondary grid coil for minimum on output meter.

## Ballast Tube Substitute

OWING to the shortage of ballast tubes for American midget receivers (types C9266, etc.), I have found the following method of substitution very satisfactory.

I remove the burnt-out ballast tube and connect the end of the line cord to the dial light tap pin. An extra length of line cord is then added to the existing one, the additional value being calculated by adding the heater voltages of all the valves and the dial light, subtracting this from 110 and multiplying the result  $3\frac{1}{2}$ .

It will be seen that by using this method the dial light is in series with the heater chain and so acts as a fuse.—VANNI SCARFI, Newport, Mon.

The length of line cord required for a job can be ascertained before cutting off if one lead from the ohmmeter is fitted with a sharp probe to penetrate the insulation. With strange cords it is not safe to assume a certain resistance per length.—J. C., Lewes.

## WINDINGS

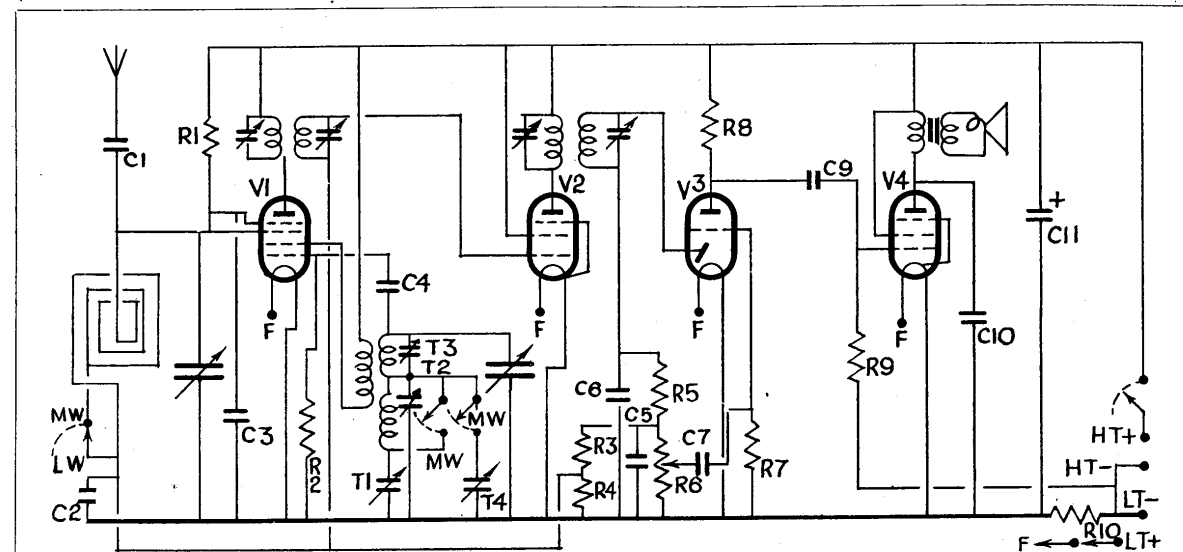
L	Ohms.	L	Ohms.
0	.1	16	48
1	1.2	17	7
2	8.5	18	200
3	4.2	19	40
4	10.5	20	40
5	2.5	21	31
6	.2	22	31
7	4.2	23	17.5
8	10.5	24	17.5
9	13.5	25	300
10	4.2	26	.2
11	.11	27	.2
12+13	2.5	28	12/15
14	3.5	29	240
15	7.5	30	1,400

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Repeat these adjustments until no further improvement results and calibration is as accurate as possible.

**Medium Waves.**—Tune to 200 m., inject 200 m. and adjust T3 for maximum.

Tune to 500 m., inject 500 m. and adjust T4 while rocking gang slightly. Repeat these two adjustments.



The circuit is representative of American "all-dry" two-waveband portables produced for this country. The arrangement is superhet with loop aerial and automatic volume control.