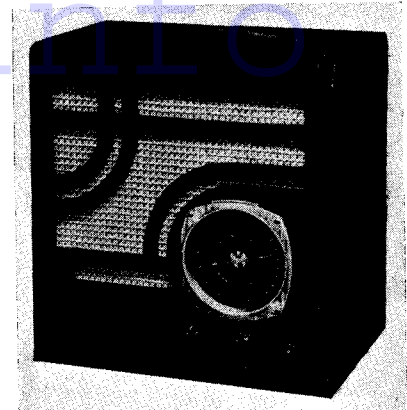


# BENSON ALL-WAVE CAMEO



The All-wave Cameo by Benson Radio Ltd., is a midget frame-aerial trans-portable suitable for A.C. or D.C. operation.

**CIRCUIT.**—The grid coils of V1, a triode hexode frequency changer, are frame windings L1, L2 and L3 supplying the input. A series grid resistance R1 is included to ensure stable oscillation, whilst the anode, oscillator anode and screen electrodes are also decoupled with the same object. The oscillator section of the receiver follows standard practice. It will be observed that coupling to an external aerial is provided to ensure adequate pick-up for short-wave reception in screened localities.

V1 is coupled to V2, an H.F. pentode operating as the I.F. amplifier, by means of a transformer tuned to 470 kc.

A further I.F. transformer effects the coupling between V2 and the strapped diodes of V3, a double diode triode. The diode load (R11) potentials feed the grid of the triode section of V3 via a coupling condenser and manual volume control and also provide the A.V.C. bias controlling V1.

V3 is resistance capacity coupled to V4, an output pentode, between anode and

cathode of which is connected a tone-control circuit consisting of a variable resistance and fixed condenser.

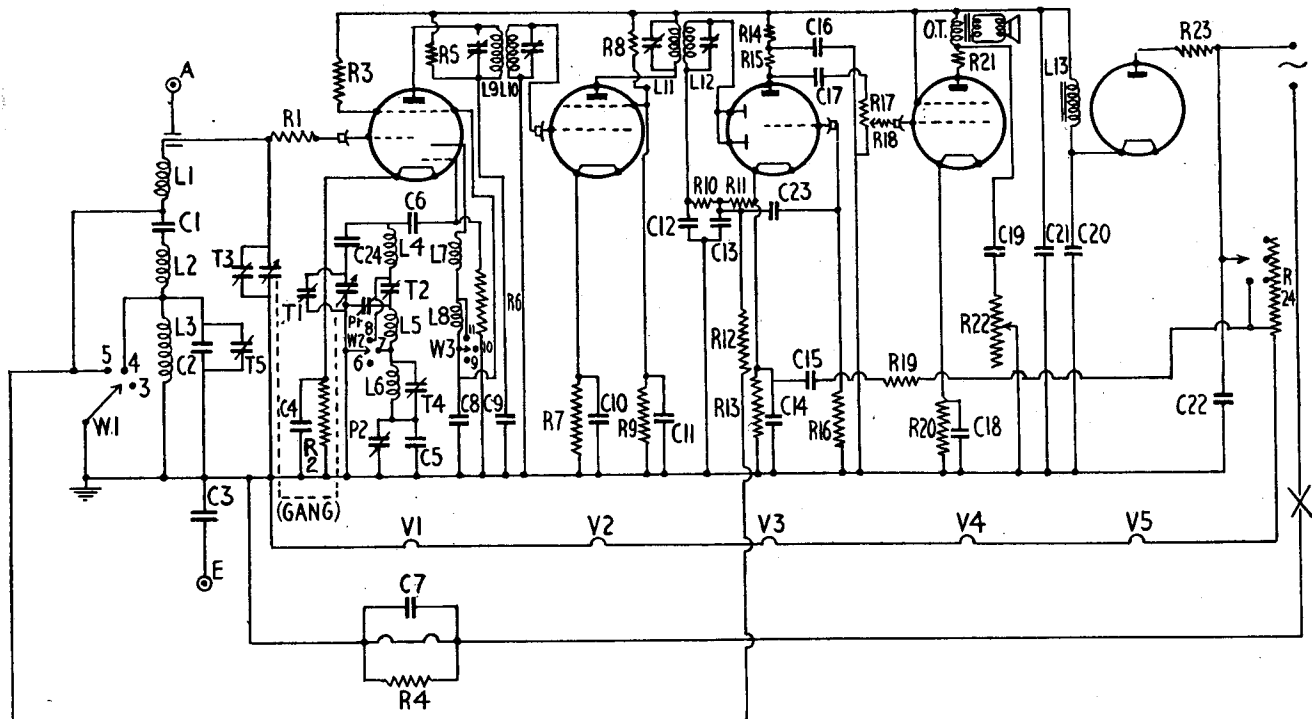
Mains equipment consists of a mains-adjustment resistance that also operates as a barretter, a half-wave rectifying valve V5, electrolytic smoothing condensers and a separate smoothing choke.

**Chassis Removal.**—Take off the back and the three grub-screw fixed control knobs. Then remove the two wood screws securing the metal brackets on the sides of the chassis deck to the sides of the cabinet.

Loosen the wood screw holding the bracket on the top of the wavelength scale and slide the bracket away from the scale. Unsolder the red and black flex leads from the speaker transformer and the bare

CONDENSERS		
C.	Purpose.	Mfds.
1	A.V.C. Isolator	.1
2	L.W. aerial fixed trimmer	.00004
3	Chassis isolating	.1
4	V1 cathode bias shunt	.1
5	L.W. osc. fixed padder	.00025
6	Osc. grid	.00004
7	Dial lamp shunt	25
8	V1 screen and osc. anode decoupling	.1
9	V1 anode decoupling	.1
10	V2 cathode bias shunt	.1
11	V2 screen decoupling	.1
12	H.F. by-pass	.0001
13	H.F. by-pass	.0003
14	V3 cathode bias shunt	.02
15	Mains suppressor	.0001
16	V3 anode decoupling	2
17	L.F. coupling	.01
18	V4 cathode bias shunt	50
19	Tone control	.05
20	H.T. smoothing	24
21	H.T. smoothing	8
22	Mains shunt	.1
23	L.F. coupling	.01
24	S.W. osc. fixed trimmer	.002

RESISTANCES		
R.	Purpose.	Ohms.
1	V1 series grid	50
2	V1 cathode bias	200
3	V1 screen and osc. anode decoupling	15,000
4	Dial lamps shunt	140
5	V1 anode decoupling	1,000
6	Osc. grid leak	25,000
7	V3 cathode bias	140
8	V2 screen ptr. (part.)	20,000
9	V2 screen ptr. (part.)	20,000
10	H.F. stopper	50,000
11	V3 diodes load	500,000
12	V1 A.V.C. decoupling	1 meg.
13	V3 cathode bias	2,000
14	V3 anode decoupling	10,000
15	V3 anode load	100,000
16	V3 grid leak	500,000
17	Volume control	500,000
18	V4 grid stopper	50,000
19	Mains suppressor resistance	1 meg.
20	V4 cathode bias	160
21	V4 anode stabiliser	50
22	Tone control	25,000
23	Rectifier safety resistance	50
24	Mains adjustment resistance	670



Short-wave reception is provided by the Cameo and there are external aerial and earth sockets in addition to the frame aerial. The circuit, as a whole, is entirely orthodox.

For more information remember

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earthing wire soldered to the transformer frame.

The chassis can then be withdrawn to the extent of sundry leads and is accessible for most purposes. If it be desired to operate the receiver in this position the leads to the speaker transformer should be extended and reconnected, or, alternatively, the speaker (secured by four wood screws) may be removed.

To completely remove the chassis the four leads to the frame aerial must be unsoldered from the tags on the side of the cabinet. When replacing, connect the red wire from the aerial gang (R1) to the tag below the other three tags and connect the red, green (sometimes blue) and black leads, in that order (counting from the front of the chassis to the rear), to the other three tags.

**Special Notes.**—The automatic voltage adjustment resistance at the rear of the chassis allows mains voltages of between 200 to 250 volts to be connected to the receiver. For 110-volt operation the resistance is cut out by connecting the flying lead to the tag at the lower end of the resistance.

A socket on the inside of the cabinet, located on the frame aerial structure, enables an external aerial to be connected to the receiver, and a socket at the rear

of the chassis is for connection to earth.

We would add our customary reminder that with a universal receiver the chassis itself is sometimes live and should not be earthed.

There are two dial-illuminating lights in screw-in holders located behind the wave-length scale. These have M.E.S. bases and are rated at 6.2 volts .3 amp.

In our particular chassis, C15 and R19 were not included. The L.W. fixed trimming condenser (aerial) C2 is contained in the frame aerial structure together with C1.

### Alignment Notes

**I.F. Circuits.**—Connect an output meter across the primary of the speaker transformer, taking the precaution of inserting a 2-mfd. condenser in series with one of the output meter leads.

Connect a service oscillator between the top grid cap of V1 and chassis. Switch receiver to M.W. band, set gang to maximum, volume to maximum, and tune to "high."

(Continued on page v.)

## Benson All-wave Cameo

**MODEL "ALL-WAVE CAMEO."**—Standard model for universal mains operation, 110-250 volts. Price 9 gns.

**DESCRIPTION.**—Midget transportable with self-contained frame aerials and incorporating a four-valve, plus rectifier, circuit.

**FEATURES.**—Contained in a wood cabinet with carrying strap. Full-visibility airplane-dial, calibrated in metres and station names. Separate frame for short waves. Provision for connecting an external aerial and earth for short-wave operation. Controls for tuning, wave selection and combined volume and master switch. Tone control at rear of chassis.

**LOADING.**—56 watts.

**Sensitivity and Selectivity.**

**SHORT WAVES (16-50 metres).**—Very good sensitivity for a portable set, easy handling, no noticeable drift. Sensitivity well maintained.

**MEDIUM WAVES (200-550 metres).**—Good gain and adequate selectivity with a reasonably clean background.

**LONG WAVES (900-2,000 metres).**—Very good gain and selectivity. Slight interference on Deutschlandsender. All main stations easily received.

**Acoustic Output.**

Well-balanced tone, crisp and clean response and reasonable low note radiation for a small portable receiver. General balance attractive.

### Replacement Condensers

**EXACT** replacement condensers for the All-wave Cameo are available from A. H. Hunt, Ltd., Garratt Lane, Wandsworth, London, S.W.18. For the block containing Cs 20, 21 and 16, there is unit 2517, 7s. 6d., and for C18, unit 2915, 1s. 9d.

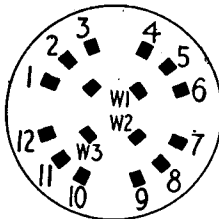
### WINDINGS (D.C. Resistances)

Winding.	Ohms.	Range.	Where Measured.
L1	.1	S.W.	R1 and R12.
L2	—	—	Inaccessible.
L3	15	L.W.	Across trimmer on frame.
L4	Low	S.W.	Across tags.
L5	1.5	M.W.	P1 and contact 7.
L6	3.5	L.W.	Across T3.
L7	Low	S.W.	Across tags.
L8	2.8	M.W.	Osc. anode and screen V1.
L9	5.7	—	Anode pin V1 and R5
L10	5.7	—	Top grid V2 and chassis.
L11	5.7	—	Anode pin V2 and H.T. line.
L12	5.7	—	R10 + C12 and diodes V3.
L13	280	—	Cathode of V5 and H.T. line.
O.T. prim	296	—	Across tags — speaker panel.

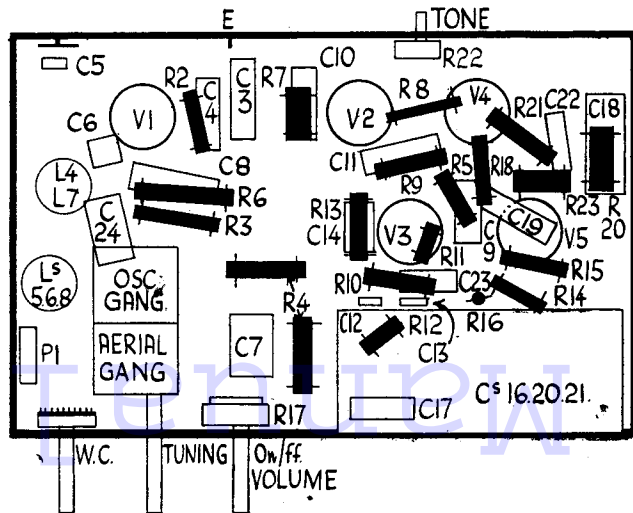
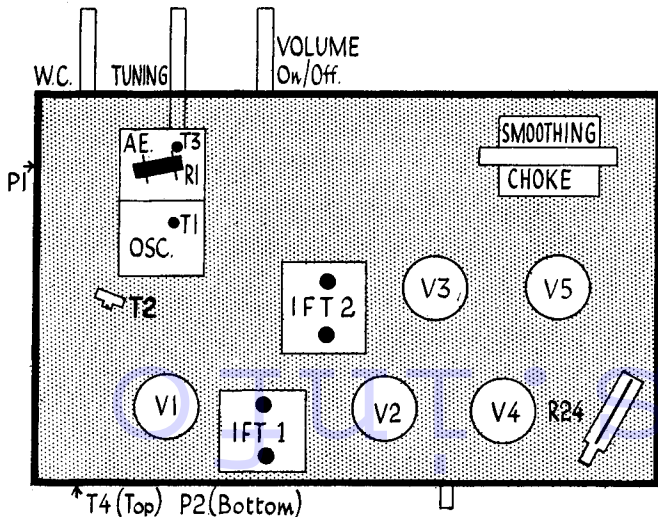
### VALVE READINGS

No signal, volume maximum, M.W. min. cap., 230 volt, A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
1	All Cossor. 202 STH	Anode ..	209	1.1
		Screen ..	80	4.2
		Osc. anode ..	80	4.3
2	13VPA ..	Anode ..	210	8
		Screen ..	90	2
		Osc. anode ..	80	1
3	202 DDT	Anode ..	180	37
		Screen ..	210	7
4	402 OT ..	Cathode ..	230	—



Left, the single switch unit with contacts numbered to correspond with the circuit diagram.



These diagrams identify the parts on top (left) and inside the chassis. The trimmers are accessible from above and from the side.