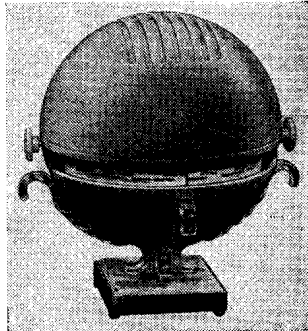


"TRADER" SERVICE SHEET

847

CHAMPION "VENUS"

A.C./D.C. SUPERHET for M.W. BAND



SHAPED to fit into a spherical plastic cabinet which is finished in various pastel shades of colour, the chassis of the Champion "Venus" receiver is a 4-valve (plus rectifier) single-band superhet, designed to operate from A.C. or D.C. mains of 200-250 V.

Although a frame aerial is fitted, provision is made for the connection of an external aerial, which may be joined to a flexible lead threaded through the main supporting pillar, with the mains lead.

The single band is M.W. for the home market, but for export purposes the wave-band can be chosen by the purchaser.

Release date and original price: October, 1947; £15 15s. plus purchase tax.

CIRCUIT DESCRIPTION

Tuned frame aerial input by L1, C21 precedes a triode hexode valve (V1, Brimar 12K8GT) operating as frequency changer, with electron coupling. Provision for the connection of an external aerial, via isolating capacitor C1.

Triode oscillator anode coil L3 is tuned by C23, with parallel trimming by C22 and series tracking by C6. Inductive reaction coupling to grid by L2, with additional capacitive coupling from the tracker C6, which is common to grid and anode circuits.

Second valve (V2, Brimar metal 12SK7) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary transformer couplings C2, L4, L5, C3 and C9, L6, L7, C10.

Intermediate frequency 465 kc/s.

Diode second detector is part of double diode triode valve (V3, Brimar 12Q7GT) whose diode sections are strapped in parallel. Audio-frequency component in rectified output is developed across manual volume control R7, and passed via coupling capacitor C13 and C.G. resistor R8 to grid of triode section, which operates as A.F. amplifier. I.F. filtering by C12, R6 in diode circuit and C14 in triode anode circuit.

D.C. potential developed across R6, R7 in series is tapped off and fed back, via a decoupling circuit R4, C8, as G.B. to I.F. valve, giving automatic volume control.

Resistance-capacitance coupling by R9, C15, R10 between V3 triode and beam tetrode output valve (V4, Brimar metal 12A6). Fixed tone correction in anode circuit by C16.

When the receiver is operated from A.C. mains, H.T. current is supplied by I.H.C. half-wave rectifying valve (V5, Brimar 35Z4GT) which, with D.C. mains, behaves as a low resistance. Smoothing by resistor R12 and electrolytic capacitors C17, C18, but the H.T. supply for V4 anode is obtained direct from the rectifier cathode.

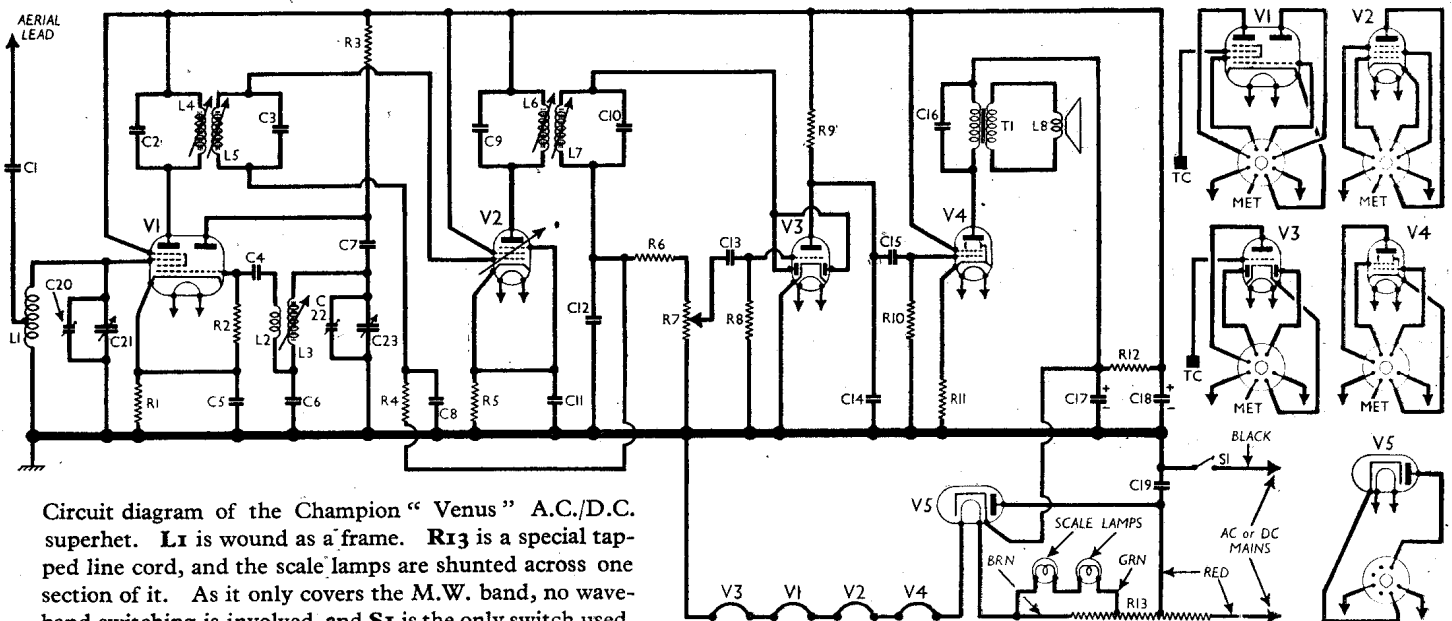
COMPONENTS AND VALUES

RESISTORS		Values (ohm.s)	Location
R1	V1 G.B. resistor ...	220	G7
R2	V1 osc. C.G. ...	47,000	H7
R3	Osc. H.T. feed ...	22,000	H7
R4	A.V.C. decoup. ...	1,000,000	G7
R5	V2 fixed G.B. ...	220	H8
R6	I.F. stopper ...	47,000	F7
R7	Volume control ...	500,000	D3
R8	V3 triode C.G. ...	4,000,000	D3
R9	V3 triode load ...	220,000	G8
R10	V4 C.G. resistor ...	470,000	F7
R11	V4 G.B. resistor ...	220	F7
R12	H.T. smoothing ...	2,700	G6
R13	Heater ballast ...	1,000†	F5

† Line cord, tapped at 200Ω + 400Ω + 400Ω from V5 heater.

CAPACITORS		Values (μF)	Location
C1	Aerial isolator ...	0.00035	C4
C2	1st I.F. transformer } tuning ...	0.0001	B3
C3	1st I.F. transformer } tuning ...	0.0001	E3
C4	V1 osc. C.G. ...	0.0001	B3
C5	V1 osc. by-pass ...	0.1	G6
C6	Osc. circ. tracker	0.000578	A2
C7	Osc. anode coup. ...	0.0001	B3
C8	A.V.C. decoup. ...	0.1	G7
C9	2nd I.F. trans. } former tuning ...	0.0001	B3
C10	2nd I.F. trans. } former tuning ...	0.0001	B3
C11	V2 cath. by-pass ...	0.1	G7
C12	I.F. by-pass ...	0.0003	G7
C13	A.F. coupling ...	0.01	D4
C14	I.F. by-pass ...	0.0003	F7
C15	A.F. coupling ...	0.01	F7
C16	Tone corrector ...	0.02	—
C17*	H.T. smoothing } capacitors ...	32.0	F6
C18*	H.T. smoothing } capacitors ...	32.0	G6
C19	R.F. by-pass ...	0.002	F5
C20†	Aerial trimmer ...	—	B2
C21†	Aerial tuning ...	—	B2
C22†	Osc. trimmer ...	—	B2
C23†	Osc. tuning ...	—	B2

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Champion "Venus" A.C./D.C. superhet. L1 is wound as a frame. R13 is a special tapped line cord, and the scale lamps are shunted across one section of it. As it only covers the M.W. band, no wave-band switching is involved, and S1 is the only switch used.

OTHER COMPONENTS		Approx. Values (ohms)	Location
L1	Frame aerial ...	1.5	D4
L2	Osc. reaction coil ...	1.4	A2
L3	Osc. tuning coil ...	3.8	A2
L4	1st I.F. trans. {	Pri. 12.5	B3
L5		Sec. 12.5	B3
L6	2nd I.F. trans. {	Pri. 12.5	B3
L7		Sec. 12.5	B3
L8	Speech coil ...	2.7	—
T1	Speaker trans. {	Pri. 350.0	—
S1	Mains switch, ganged R7 ...	0.3	—
			D3

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on A.C. mains of 225 V. Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 12K8GT	100	1.8	100	5.3
	Oscillator			
	57	1.4		
V2 12SK7	100	8.0	100	2.6
V3 12Q7GT	32	1.3	—	—
V4 12A6	151	11.0	100	0.7
V5 35Z4GT†	—	—	—	—

† Cathode to chassis, 155 V, D.C.

DISMANTLING THE SET

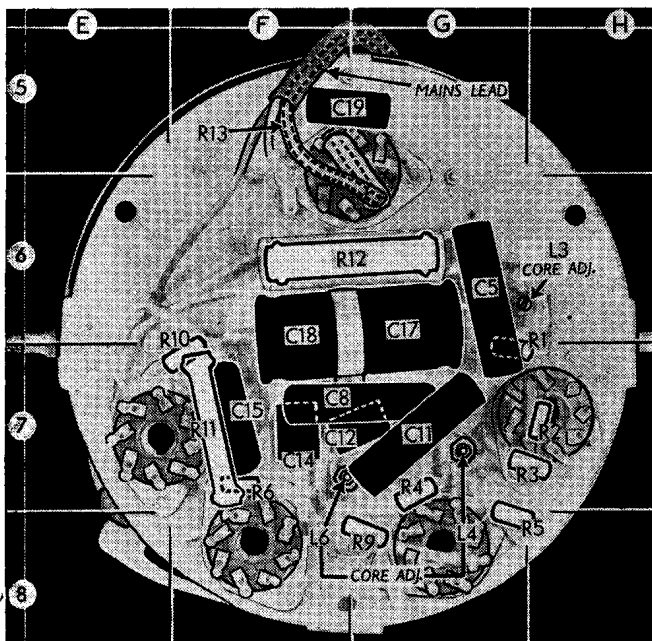
Removing Chassis.—Clasp the top half of the globe and rotate it carefully in a clockwise direction until the internal projections disengage from their catches, and lift off;

remove the two 6 B.A. screws (with washers) located on the periphery of the chassis, close to the scale lamp holders, and lift the chassis out of the lower half of the globe.

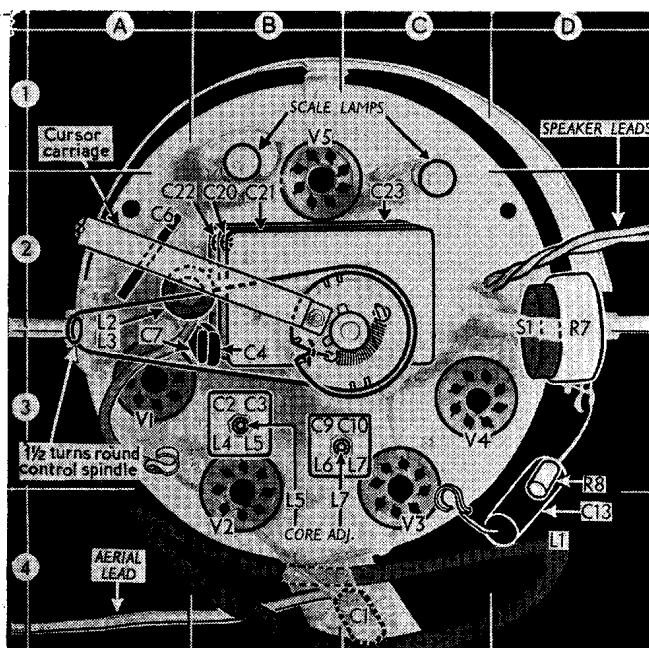
When replacing, the top half of the globe should be located so that the slots forming the speaker grille are at right angles to the scale, i.e., they run from back to front.

Removing Speaker.—The speaker is supported on three pillars standing on the chassis deck, and may be removed if the two leads are unsoldered and the three fixing nuts are removed.

When replacing, the cone should face upwards.



Plan view of the chassis, showing the course of the tuning drive cord, the gang being near minimum capacitance. C13 and R8 are mounted in the top cap lead to V3. L3 and the I.F. transformer primary core adjustments are beneath the chassis.



and the transformer should be just in front of a supporting pillar, near the volume control.

GENERAL NOTES

Switch S1.—The only switch involved is the Q.M.B. mains switch, which is ganged with the volume control R7.

Coils.—L1 is the frame aerial loop, mounted on a vertical fibre support at the rear of the chassis. The oscillator coils L2, L3 are in a single unscreened unit on the chassis deck beside the gang, their core adjustment projecting beneath the deck. A flexible lead from a tap on L1 hangs down inside the stem supporting the spherical case, for the connection of an external aerial, the two being presumably twisted together when used.

Scale Lamps.—These are two M.E.S. type lamps, with small clear spherical bulbs, rated at 2.5 V, 0.15 A. They are shunted by part of the line cord element.

Capacitor C16 is mounted on the

underside of the chassis. R12 is normally enclosed in a piece of sleeving. The C17, C18 unit is held in a rivetted clip.

speaker assembly, and does not appear in our chassis illustration.

Capacitors C17, C18.—These are two electrolytics in a single tubular metal container beneath the chassis, each rated at 32 μ F, 250 V D.C. working. The positive connections are brought out to end tags, of which the red one should be used as reservoir. The case forms the common negative, so that it must be clamped firmly in its metal clip to make a sound connection to chassis.

Drive Cord Replacement.—The tuning drive is very simple, and the path of the cord is shown in our plan view of the chassis. Both ends of the cord are tied to the free end of the spring, and there are 1/2 turns round the drive spindle groove.

CIRCUIT ALIGNMENT

I.F. Stages.—Connect signal generator, via an 0.1 μ F isolating capacitor in each lead, to control grid (top cap) of V1 and chassis. Feed in a 465 kc/s (645.16 m) signal, and adjust the cores of L4, L5, L6 and L7 (chassis locations G7 and B3) for maximum output, keeping the input low to avoid A.V.C. action.

R.F. and Oscillator Stages.—With the gang half-way open, the pointer should coincide with the 350 m calibration mark on the scale, i.e., the straight edges of the moving vanes should be in line with the centre-line of the brass pointer carrier arm. It may be adjusted in position by turning the drive drum on the gang spindle, after loosening its grub screws. Couple the signal generator output via a loop of wire set up at a distance of about a foot from the receiver.

M.W.—Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal and adjust the core of L3 (H6) for maximum output. Tune to 214 m on scale, feed in a 214 m (1,400 kc/s) signal, and adjust C22 (B2) and C20 (B2) for maximum output. An input signal of approximately 50 μ V should give 50 mW output.