NUMBER SIXTY **'TRADER' SERVICE SHEETS**

EVER READY 5007

4-VALVE BATTERY SUPERHET

THE Ever Ready Model 5007 is a battery-operated superhet, employing an octode frequency changer, a pentode I.F. amplifier, a double diode triode for second detection, delayed A.V.C. and L.F. amplification, and a double-pentode Q.P.P. output stage.

At the back of the chassis is a sensitivity control, while among those on the front is a variable tone control which operates by attenuating the treble. The spindle of this also has a push-pull action, and when pulled out brings into circuit a condenser attenuating the bass.

CIRCUIT DESCRIPTION

Two alternative aerial connections to coupling coil **L1**, which has been designed to give almost equal efficiency on both M.W. and L.W. **A1** connection is for normal use; **A2**, connected via fixed series condenser **C1**, is used when receiver is operated in "swamp" areas. Band-pass input filter is inductively-coupled. Primary **L2, L3** tuned by **C16**; secondary **L4, L5** tuned by **C18**.

First valve (**V1, Ever Ready metallised K80A**) is an octode operating as frequency changer with electron coupling. Oscillator grid tuning coils **L6, L7** tuned by **C20** with specially-shaped vanes for tracking; anode reaction coil **L8**.

Second valve, a variable-mu H.F. pentode (**V2, Ever Ready metallised K50M**), operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **L9, L10** and **L11, L12**.

Intermediate frequency 127 KC/S.

Diode second detector forms part of double diode triode valve (**V3, Ever Ready metallised K23B**). Second diode, fed from **V2** anode by **C12**, provides D.C. potential which is developed across load resistance **R9** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from potential divider **R10, R11, R12** which also forms G.B. battery load. Variable potentiometer **R11**, included in potential divider, operates as sensitivity control by varying delay voltage and slight negative bias which is applied to rectifier diode in order to give a degree of inter-station noise suppression. In this way a form of quiet A.V.C. is obtained.

Audio-frequency output from rectifier diode is developed across manual volume control **R7** and passed by way of coupling condenser **C9** to grid of **V3** triode section, which operates as L.F. amplifier. Provision for connection of gramophone pick-up across **R7**.

Parallel-fed transformer coupling by **R15, C11** and **T1** to quiescent push-pull output stage, comprising a double-pentode valve (**V4, Ever Ready K77A**). Tone compensation in anode circuit by impedance-limiting filter **R17, C15**. Variable condenser **C27** in grid circuit operates as high-note attenuator; fixed condenser **C13**, working in conjunction with switch **S5**, attenuates bass response of receiver.

DISMANTLING THE SET

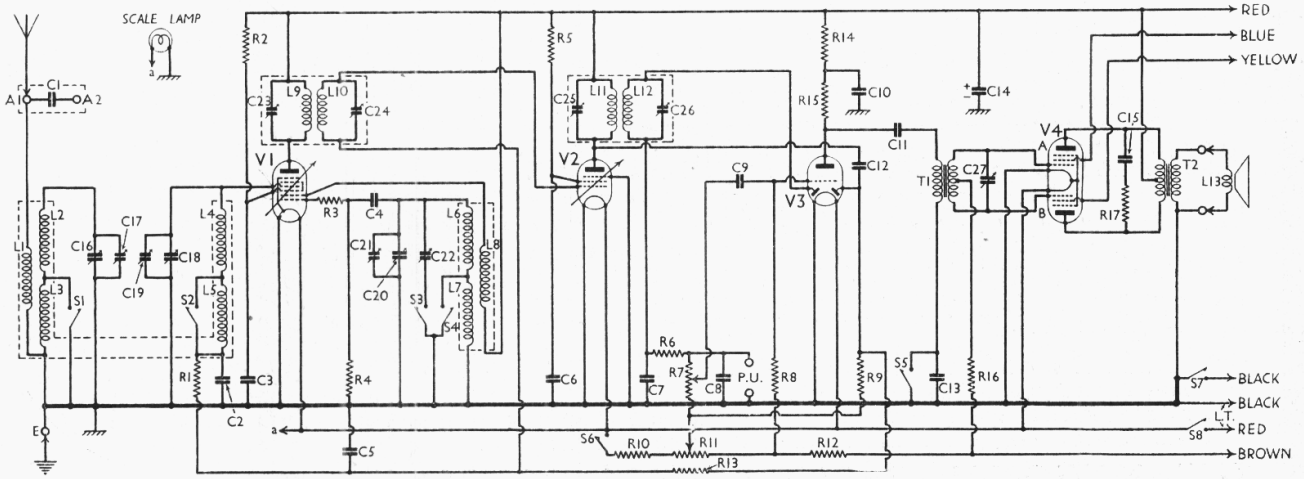
The cabinet bottom is detachable and enables most repairs to be carried out without removing chassis. It is held by four wood screws. *When replacing*, make sure that the plate makes contact with copper strip in one corner of cabinet, as it forms part of the electrical screening.

Removing Chassis.—Should this be necessary, disconnect and remove batteries. Withdraw plugs from speaker sockets and free battery leads from clip at side of cabinet. Remove the four control knobs (pull off), taking care not to lose the springs. Remove four bolts with large washers, which hold the chassis, the heads being accessible through holes in the cabinet bottom.

Removing Speaker.—Speaker may be removed by taking out the four bolts with ornamental heads, holding sub-baffle, first freeing speaker leads from clip on underside of H.T. battery platform.

COMPONENTS AND VALUES

	Resistances	Values (ohms)
R1	V1 pent. cont. grid decoupling	11,000
R2	V1 S.G.'s H.T. feed	160,000
R3	V1 osc. grid series resistance	1,100
R4	V1 osc. grid resistance	110,000
R5	V2 S.G. H.T. feed	110,000
R6	I.F. stopper	110,000
R7	Volume control and diode load	500,000
R8	V3 triode grid resistance	1,100,000
R9	V3 A.V.C. diode load	1,100,000
R10	G.B. potential divider, including sensitivity control (R11)	100 / 280 / 800
R12		
R13	A.V.C. circuit decoupling	1,100,000
R14	V3 triode anode decoupling	11,000
R15	V3 triode anode resistance	31,000
R16	V4 grid circuit stabiliser	66,000
R17	Part of tone comp. filter	16,000

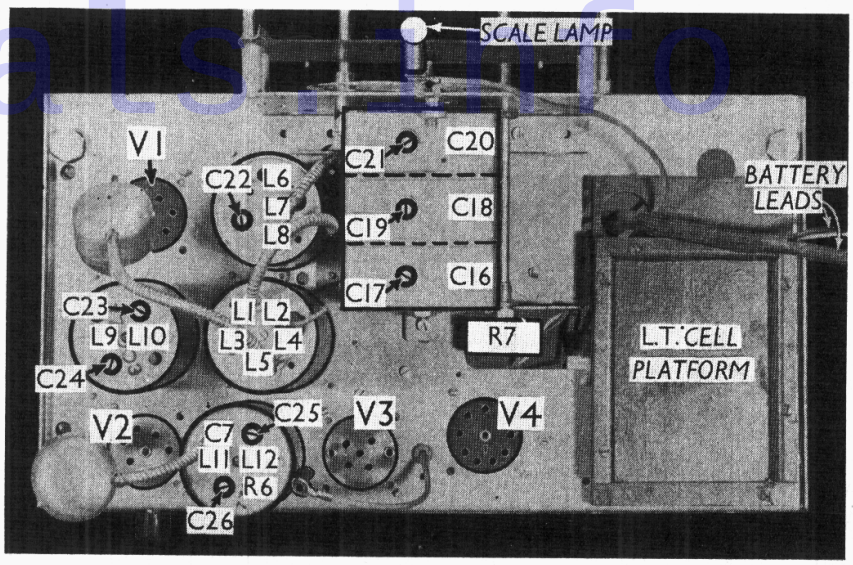


Circuit diagram of the Ever Ready Model 5007 battery superhet. V4 is a double-pentode, fitted with a 9-pin base. Note that L1-L5 are all contained in a single screening can, indicated by the dotted line.

	Condensers	Values (μF)
C1	Aerial series condenser	0·000015
C2	V1 pent. cont. grid decoupling	0·1
C3	V1 S.G.'s by-pass	0·1
C4	V1 osc. grid condenser	0·0001
C5	A.V.C. circuit decoupling	0·1
C6	V2 S.G. by-pass	0·1
C7	I.F. by-passes	0·0001
C8	I.F. by-passes	0·0001
C9	L.F. coupling to V3 triode	0·01
C10	V3 anode decoupling	0·5
C11	L.F. coupling to T1	0·1
C12	Coupling to V3 A.V.C. diode	0·0001
C13	Bass attenuator	0·01
C14*	H.T. reservoir	8·0
C15	Part of tone comp. filter	0·0025
C16	Band-pass primary tuning	—
C17‡	Band-pass primary trimmer	—
C18	Band-pass secondary tuning	—
C19‡	Band-pass secondary trimmer	—
C20	Oscillator tuning	—
C21‡	Oscillator main trimmer	—
C22‡	Oscillator L.W. trimmer	—
C23‡	1st I.F. trans. pri. tuning	—
C24‡	1st I.F. trans. sec. tuning	—
C25‡	2nd I.F. trans. pri. tuning	—
C26‡	2nd I.F. trans. sec. tuning	—
C27	Variable tone control	—

* Electrolytic. ‡ Pre-set condenser.

	Other Components		Values (ohms)
L1	Aerial coupling coil		24·0
L2	Band-pass primary coils		2·3
L3	Band-pass primary coils		15·0
L4	Band-pass secondary coils		2·3
L5	Band-pass secondary coils		15·0
L6	Oscillator tuning coil		2·9
L7	Oscillator tuning coil		3·3
L8	Oscillator anode coil		45·0
L9	1st I.F. trans.	Pri.	93·0
L10	1st I.F. trans.	Sec.	93·0
L11	2nd I.F. trans.	Pri.	42·0
L12	2nd I.F. trans.	Sec.	42·0
L13	Speaker speech coil		1·2
T1	Intervalve trans.	Pri.	1,000·0
	Intervalve trans.	Sec. total	8,500·0
T2	Output trans.	Pri. total	700·0
	Output trans.	Sec.	0·2
S1-S4	Waveband switches		—
S5	Bass attenuator switch		—
S6	G.B. pot. divider switch		—
S7	H.T. switch		—
S8	L.T. switch		—



Plan view of the chassis. Note that the I.F. unit L11, L12 also contains C7 and R6, while the oscillator unit contains the trimmer C22. The connections of V4 are given in a diagram overleaf.

VALVE ANALYSIS

Readings given in the following table of valve voltages and currents are those supplied by Ever Ready. They were taken with no signal input, and with new batteries. Voltage readings are with chassis as negative, using a high resistance voltmeter.

In the case of **V4,** the screen voltage for each section of the valve depends on the letters marked on the base and bulb. These letters, P, Q, R, S or T, correspond with similarly marked sockets on the special H.T. battery. The blue H.T. lead corresponds to the "A" section of the valve, and the yellow to the "B" section. In the case of our chassis, both "A" and "B" sections required the Q tapping (111V).

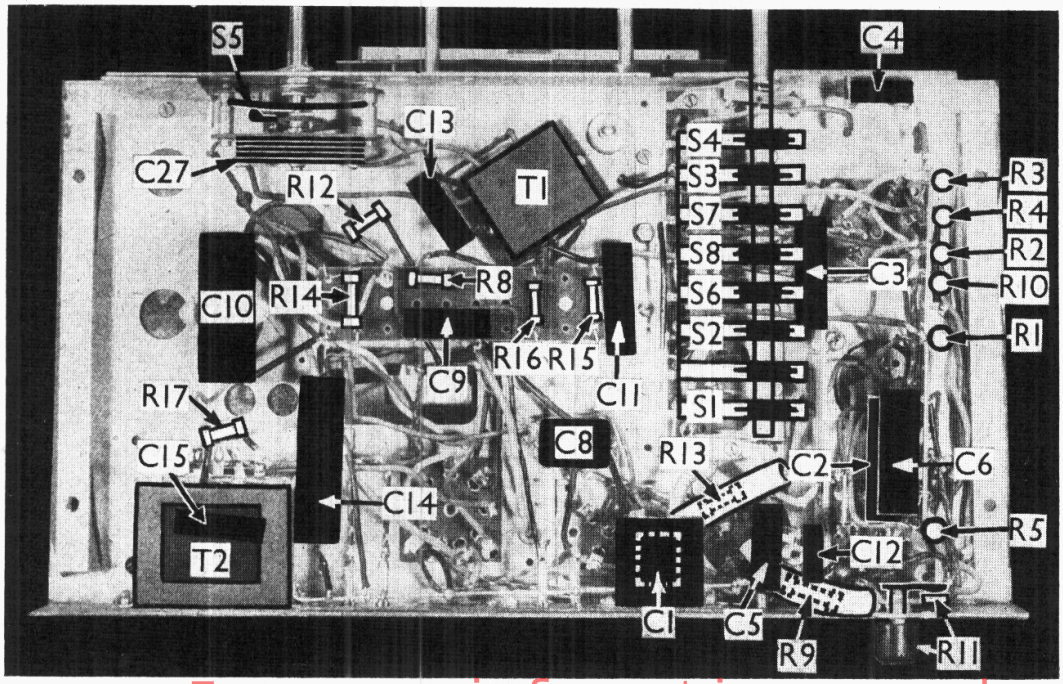
Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 K80A*	136·5	0·3	60	1·1
V2 K50M	136·5	0·9	100	0·3
V3 K23B	100·0	0·7	—	—
V4 K77A	136·5†	2·0†	111†‡	0·4†

* Osc. anode (G2) 136·5 V, 1·1 mA.
† Each section. ‡ In our chassis.

GENERAL NOTES

Switches.—S1, S2, S3, S4 are the waveband switches and **S6, S7, S8** the battery switches, ganged together in a single unit, seen in the under-chassis view. Note that the contact between **S1** and **S2** is not used. The table below gives the switch positions for the M.W. and L.W.

(*Continued overleaf*)



Under-chassis view. Note that there is an unused switch between S1 and S2. R9 and R13 are enclosed in empire tubing. S5 is the push-pull bass attenuator switch. C1 is within a small screening box.

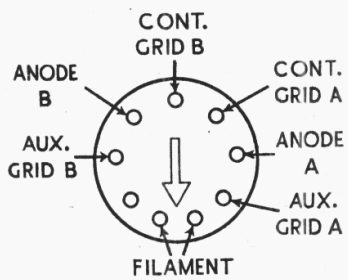
EVER READY 5007 (contd.)

settings. In the "off" position, **S6, S7** and **S8** are all open.

Position	S1	S2	S3	S4	S6	S7	S8
M.W.	C	C	O	C	C	C	C
L.W.	O	O	C	O	C	C	C

S5 is the bass attenuator switch, which closes when the tone control knob is pushed in.

Coils.—These are in four screened units on top of the chassis. One contains the signal frequency coils **L1-L5,** the second the oscillator coils **L6-L8** together with the oscillator L.W. trimmer, the third the 1st I.F. transformer and its trimmers, and the fourth the 2nd I.F. transformer, its trimmers, and also **R6** and **C7.**



Connections of V4, a double-pentode, looking at the underside of the base.

To remove the band-pass and oscillator coil screeens, remove the 4BA nuts holding the studs on the screens to the chassis. Unsolder from the tuning condenser the leads emerging from the tops of the screens, release the screened cable earthing clips, and withdraw the screens. In the case of the band-pass unit, the valve thimble connector screen must be removed from its lead before the coil screen can be completely removed. Similar remarks apply to the I.F. units. The brass rod projecting through the top of the oscillator coil screen is merely a positioning device, and is not a control of any sort.

Scale Lamp.—This is an Ever Ready M.E.S. type, rated at 2.5 V, 0.2 A.

External Speaker.—This can be used with internal speaker, or separately, by plugging the external speaker into the socketed plugs of the internal speaker, or by first removing the internal speaker plugs, and connecting the external speaker to the sockets at the back of the chassis. The external speaker should be of the low resistance type (1-2O).

Valve V4.—This double-pentode is fitted with a 9-pin base, the connections, looking at the underside, being given in a diagram on this page.

Battery Voltages.—The L.T. cell supplied is an Ever Ready Type T403 celluloid model. The combined H.T. and G.B. unit is an Ever Ready Portable No. 49 (136½ V H.T. plus 10½ V G.B.). The coding of the battery leads is: Black, H.T.—; Brown, −10½ V G.B.; Red, 136½ V H.T.; and Yellow and Blue, 103½ V to 133½ V, according to the lettering of **V4.** (See under Valve Voltages and Currents.)

CIRCUIT ALIGNMENT

The I.F. transformers should be adjusted before the band-pass and oscillator circuits.

A modulated signal of 127 KC/S is applied between **V1** control grid and chassis, via a 0.002 μF condenser. The lead to the control grid terminal is removed, and a 0.5 MO resistance is connected between the terminal and chassis. An output meter is connected across the primary of **T2.**

When adjusting the primary trimmer of either transformer, a 50,000 O resistance is connected across the secondary, and when adjusting the secondary, the resistance is transferred to the primary.

Adjust the trimmers in the following order: **C26, C25, C24, C23.**

To adjust the band-pass and oscillator circuits, rotate the gang condenser until the pointer is at the higher wavelength end of the scale. Push a flat-ended rod through the hole in the side of the gang condenser cover and against the vanes. Now rock the vanes by means of the rotor drive until it is felt that the rotors are fully in mesh. If the pointer does not lie between the two horizontal lines at the higher wavelength end of the scale, release the centre fixing screw and move the pointer into this position.

Apply a modulated signal of 196 m. to the aerial terminal, switch the receiver to the M.W. band, the gang condenser being rotated till the pointer is at the lower wavelength end of the scale.

Adjust the trimmers for maximum reading on the output meter in the following order: **C21, C19, C17.** Switch the receiver to the L.W. band, rotate the condenser drive until the pointer registers 1,300 m. Apply a signal of this wavelength, and adjust **C22** for maximum output.

Trimeasy Signal Generator

New Pye Service Aid

PYE RADIO, LTD., of Africa House, Kingsway, W.C.2, have just introduced a new modulated signal generator for service work, under the appropriate name "Trimeasy." It is priced at the low figure of £5 net, and is available at that price to Pye agents and dealers.

The generator is battery operated, with a self-contained 2 V L.T. cell, and two 9 V G.B. batteries for the H.T. supply. The valve employed in a Mazda PD220A Class B type, one section being used for radio frequency and the other for audio-frequency generation. Hartley circuits are incorporated.

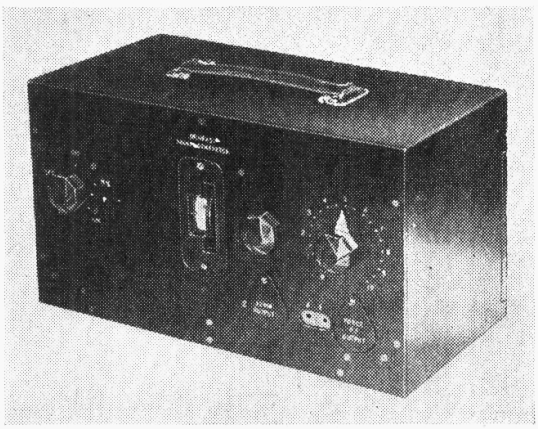
There are four wavebands, and the generator operates on fundamentals, not harmonics. The ranges are 196 m. to 540 m. (1531 KC/S to 555 KC/S); 800 m. to 2,200 m. (375 KC/S to 136 KC/S); 540 m. to 750 m. (556 KC/S to 400 KC/S) and 2,200 m. to 3,158 m. (136 KC/S to 93 KC/S). It will be seen that all normal requirements are covered, including the higher intermediate frequencies. An individually calibrated chart is provided, the accuracy being ±0.5 per cent.

The maximum r.f. output is about 60 mV, and a constant impedance attenuator provides a continuously variable output down to about 5 μV. In addition, there is available a fixed "force" output of about 3 V for use with defective or very badly aligned sets.

The maximum audio-frequency output is 2.5 V, the note having a frequency of about 400 c.p.s. An attenuator is also provided for this, and at its zero end a ganged switch cuts out the audio frequency altogether. There is apparently no provision for external modulation.

With the generator is supplied a special artificial aerial unit, having the constants of a typical receiving aerial (0.0002 μF, 0.00002 H and 25 O). There is also a very complete instruction book, which gives many hints on the use of the generator for trimming signal-frequency and I.F. circuits, checking scale calibration, comparing sensitivities, measuring wavelengths, checking A.F. amplifiers, checking loud-speakers, and fault location.

We illustrate the generator below, and its workmanlike appearance will be noted. Although we have not yet been able to test it, its specification is most attractive, and at £5 net it should be a very valuable addition to the service equipment on the market.



The Pye Trimeasy signal generator.