'TRADER' SERVICE SHEET 230

EVER READY 5030

3-BAND BATTERY SUPERHET

A CLASS B output stage is used in the Ever Ready 5030 5-valve 3-band battery-operated superhet, the valve arrangement comprising a heptode frequency changer, a variable-mu hexode I.F. amplifier, used as a pentode, a double-diode triode, a triode driver and the double triode output valve.

The receiver covers a short-wave range of 19-50 metres and has provision for both a gramophone pick-up and an extension speaker.

CIRCUIT DESCRIPTION

Two alternative aerial input sockets: **A1** via coupling coil **L1,** to inductively coupled band-pass filter. Primary coils **L2** (M.W.) and **L3** (L.W.) are tuned by **C19**; secondary coils **L5** (M.W.) and **L6** (L.W.) are tuned by **C23.** On S.W. coupling is via condenser **C1** to single-tuned circuit **L4, C23.** From **A2** socket input is fed into the same circuits via a potentiometer **R1, R2** for the reception of powerful transmissions.

First valve (**V1, Osram metallised X22**) is a variable-mu heptode operating as frequency changer with electron coupling. Oscillator grid coils **L7** (S.W.), **L9** (M.W.) and **L11** (L.W.) are tuned by **C24**; parallel trimming by **C25** (S.W.), **C26** (M.W.) and **C27** (L.W.); series tracking by **C28** (M.W.) and **C29** (L.W.). Anode reaction coils **L8** (S.W.), **L10** (M.W.) and **L12** (L.W.).

Second valve (**V2, Ever Ready metallised K50N**), a variable-mu R.F. hexode, operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C30, L13, L14, C31** and **C32, L15, L16, C33.**

Intermediate frequency 455 KC/S.

Diode second detector is part of double-diode triode valve (**V3, Ever Ready metallised K23B**). Audio frequency component in rectified output is developed across load resistance **R10** and fed via I.F. stopper **R11,** A.F. coupling condenser **C12** and manual volume control **R12** to C.G. of triode section. Provision for connection of gramophone pick-up across volume control via **C12.** Fixed tone correction by **C11.**

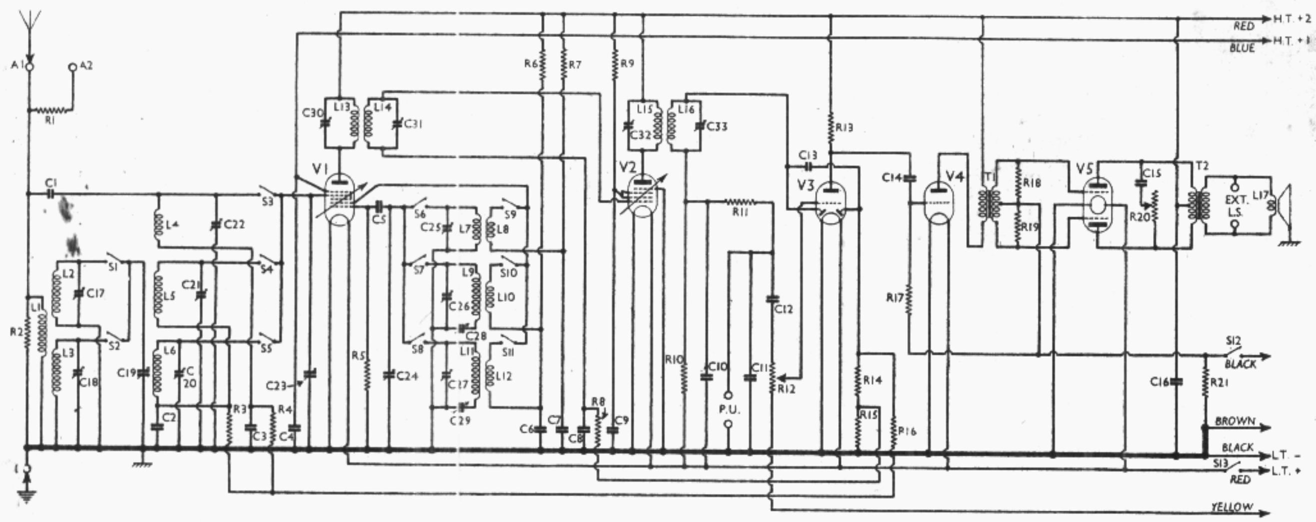
Second diode of **V3,** fed from **L16,** via coupling condenser **C13,** provides D.C. potentials which are developed across load resistances **R14** and **R15** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control.

Resistance-capacity coupling by **R13, C14** and **R17** between **V3** triode and triode driver valve (**V4, Ever Ready metallised K30E**) which is coupled to positive drive Class B valve (**V5, Ever Ready K33B**) by transformer **T1.** Provision for connecton of low impedance external speaker across secondary of output transformer **T2.** Variable tone control by R.C. filter **C15, R20.** Reservoir condenser **C16** is connected across the H.T. supply. **R21** is connected across the G.B. cells of the H.T. battery and is so valued as to discharge them at approximately the same rate as the rest of the battery.

COMPONENTS AND VALUES

CONDENSERS		Values (μF)
C1	Aerial circuit S.W. coupling ..	0·00001
C2	V1 tet. C.G. M.W. and L.W. decoupling	0·1
C3	Aerial circuit S.W. tracker ..	0·01
C4	V1 S.G. decoupling	0·1
C5	V1 osc. C.G. condenser ..	0·0001
C6	V1 osc. anode M.W. and L.W. decoupling	0·1
C7	V1 osc. anode S.W. decoupling	0·1
C8	V2 C.G. decoupling	0·1
C9	V2 S.G. decoupling	0·1
C10	I.F. by-pass	0·0002
C11	Fixed tone corrector	0·0001
C12	A.F. coupling to R12 ..	0·05
C13	V3 A.V.C. diode feed	0·00001
C14	V3 to V4 A.F. coupling ..	0·05
C15	Part of T.C. circuit	0·05
C16	H.T. reservoir condenser ..	2·0
C17‡	Band-pass primary M.W. trimmer	0·00004
C18‡	Band-pass primary L.W. trimmer	0·0001
C19†	Band-pass primary tuning ..	0·00054
C20‡	Band-pass secondary L.W. trimmer	0·0001
C21‡	Band-pass secondary M.W. trimmer	0·00004
C22‡	Aerial circuit S.W. trimmer ..	0·00004
C23†	Band-pass secondary tuning..	0·00054
C24†	Oscillator circuit tuning ..	0·00054
C25‡	Osc. circuit S.W. trimmer ..	0·00004
C26‡	Osc. circuit M.W. trimmer ..	0·00004
C27‡	Osc. circuit L.W. trimmer ..	0·0001
C28‡	Osc. circuit M.W. tracker ..	0·0006
C29‡	Osc. circuit L.W. tracker ..	0·0006
C30‡	1st I.F. trans. pri. tuning ..	—
C31‡	Ist. I.F. trans. sec. tuning ..	—
C32‡	2nd I.F. trans. pri. tuning ..	—
C33‡	2nd I.F. trans. sec. tuning ..	—

† Variable. ‡ Pre-set.



Circuit diagram of the Ever Ready 5030 3-band battery superhet. Note that **V2** is an R.F. hexode, connected to operate as a pentode.

EVER READY 5030—*Continued*

and **L15, L16** are in three screened units on the chassis deck.

External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (2-3 O) external speaker.

Trimmers.—All the trimmers except those of the I.F. transformers are adjusted through holes in the chassis deck, and are indicated in our plan chassis view.

Resistance Values.—Several of the resistors indicated by the makers as having values of 110,000 O, 510,000 O, 51,000 O, and 16,000 O, in our chassis were 100,000 O, 500,000 O, 50,000 O and 15,000 O types. This makes no appreciable difference to the working of the set, and either value can be used for replacement.

Valve V2.—This is a K50N R.F. hexode, connected to operate as a pentode. The base connections, with the pins numbered in the usual way, with No. 1 at the apex, and proceeding clockwise are: 1, metallising; 2, anode; 3, screen (G3); 4 and 5, filament; 6, suppressor grid (G4); 7, screen (G2); top cap, control grid (G1).

In this set the wiring is such that G2 and G3 are connected together (sockets 7 and 3), while metallising, suppressor and the L.T. negative sockets are connected together (sockets 1, 6 and 5).

Batteries.—The batteries supplied are: L.T., Ever Ready 2 V 30 AH celluloid-cased cell, type T304; H.T. and G.B., Ever Ready 136·5 V H.T. battery, type Portable 56, tapped from the negative end in 1·5 V steps up to 12 V, thence at bigger intervals.

Battery Leads and Voltages.—Black lead, spade tag, L.T. negative; red lead, spade tag, L.T. positive 2 V.

With regard to the H.T. and G.B. leads, care must be taken to connect these correctly. Since the battery is tapped from negative upwards, the negative socket actually becomes the highest negative G.B. connection; whilst the true H.T. negative connection is some volts positive to this. The plugs on the leads are marked with their actual positions on the recommended battery, and are as follows. The description in brackets shows the true function of each connection.

Black lead and plug in H.T.— socket of battery (*G.B.*-2); yellow lead and plug in H.T.+3 V socket (*G.B.*−1); brown lead and plug in H.T.+4½ V socket (*H.T.*−); blue lead and plug in H.T.+52 V socket (*H.T.*+1); red lead and plug in H.T.+136·5 V socket (*H.T.*+2).

CIRCUIT ALIGNMENT

I.F. Stages.—Short circuit the oscillator tuning coils by a wire across **C24.** Feed in a 455 KC/S signal between control grid (top cap) of **V1** and chassis, and adjust **C33, C32, C31** and **C30** in turn for maximum output, in the order given. Re-check, then remove the short on **C24.**

R.F. and Oscillator Stages.—With gang at maximum, pointer should be horizontal. Set **C28** approximately two-thirds in.

Switch set to M.W., tune to 214 m. on scale, feed a 214 m. (1,400 KC/S) signal into the **A1** and **E** sockets, and adjust **C26, C21** and **C17,** for maximum output.

Tune to 500 m. on scale, feed in a 500 m. (600 KC/S) signal and adjust **C28** for maximum output.

Return to 214 m. and re-adjust **C26, C21** and **C17,** then return to 500 m., and if the pointer does not indicate 500 m. when the signal is accurately tuned, re-adjust **C28** until it does. Check calibration at 214, 300 and 500 m.

Switch set to L.W., and set **C29** about one-third in. Tune to 1,200 m. on scale, feed in a 1,200 m. (250 KC/S) signal, and adjust **C27,** then **C20** and **C18,** for maximum output. Tune to 1,700 m. on scale, feed in a 1,700 m. (176·5 KC/S) signal, and adjust **C29** for maximum output. Return to 1,200 m., and re-adjust **C27, C20** and **C18,** then re-adjust **C29,** until the 1,700 m. signal is accurately tuned at 1,700 m. on the scale.

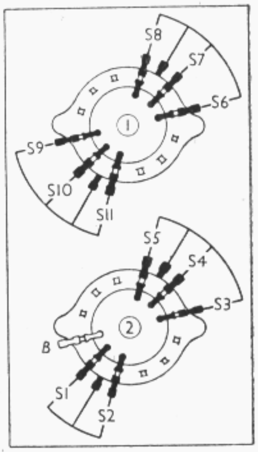
Switch set to S.W., and tune to 15 MC/S on scale. Screw **C25** right in, feed in a 15 M/CS (20 m.) signal, and slowly unscrew **C25** until the *first* output peak is reached. It is important that the second peak is *not* used. Next adjust **C22** for maximum output.

Feed in a 7·5 MC/S (40 m.) signal, tune it in, and adjust the end turn of **L4** (nearest the end of the coil former) for maximum output. Return to 15 MC/S, and re-adjust **C25** and **C22** if necessary.

SWITCH TABLE AND DIAGRAM

Switch	S.W.	M.W.	L.W.
S1	O	C	O
S2	O	O	C
S3	C	O	O
S4	O	C	O
S5	O	O	C
S6	C	O	O
S7	O	C	O
S8	O	O	C
S9	C	O	O
S10	O	C	O
S11	O	O	C

Switch diagrams, looking from the rear of the underside of the chassis.



MAINTENANCE PROBLEMS

Leakage on Resistance Panel

BAD distortion was very evident in a Marconiphone Q/286 radiogram. Low voltage on the anode of the MPT4 and a high voltage drop across the primary of the output transformer were quickly located. A new pentode gave no better results.

The grid coupling condenser was the first suspected component but was found to be O.K. Then the bias arrangements for the output valve were checked up; resistances, the speaker field, and the decoupling condensers were all correct in value.

A close examination was then made of the resistance panel and it was found to be slightly damp. An electrolytic condenser had been leaking, and a positive voltage was being applied to the grid of the output valve *via* the grid leak and the film of electrolyte.—A. L. Wheeler.

No Bias Resistor in Set

A NEW midget portable which was brought in for service, the complaint being no results, provided another instance of a manufacturer "slipping up."

The negative lead of a voltmeter was connected to the H.T.— plug as the most accessible point and the anode and screen voltages were found to be O.K., but the filaments of the valves were found to be just over 30 V positive with respect to the H.T.— plug.

As bias arrangements were automatic a resistance measurement was taken from H.T.— to L.T.—, the result being practically infinity. Although a bias decoupling condenser had been fitted, there was no bias resistor in the set!—A. L. Wheeler, Great Missenden.

Murphy A34

A MURPHY A34 developed a fault which took the form of a continuous whistle below 250 metres. Substitution of decoupling condensers and checking of coils and valves revealed no source of trouble.

As a last resource an increase of oscillator anode voltage was tried, by substituting a 50,000 O resistance in place of the usual 100,000 O oscillator anode feed resistance. This definitely cured the trouble and what is more, had no detrimental effect on the working of the set on other parts of the waveband.—R. J. Roper, Edgware.

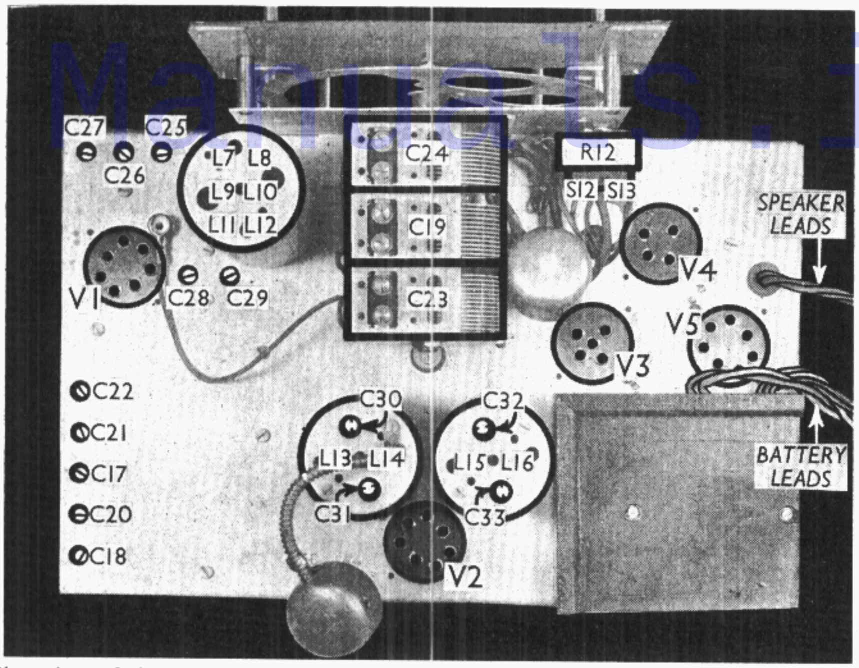
Unusual Cause of Crackle

INTERMITTENT noise similar to outside interference was experienced in a Pye T9. The A.F. side was found to be continuously quiet so that the trouble was in the R.F. end. Everything tested O.K. and new valves made no difference.

The set was returned to the makers and all suspected condensers and resistances were replaced but the trouble occurred after a week's use.

Eventually we replaced the mains transformer, although all voltages and insulation were O.K. This cured the trouble. Apparently the transformer was intermittently radiating R.F. interference which was picked up by the set.—A. Hayhurst, Sheffield.

Printed in Great Britain as a supplement to *The Wireless & Electrical Trader* for the proprietors and publishers, *The Trader Publishing Co., Ltd.*, Dorset House, Stamford Street, London, S.E.1, by Sanders Phillips & Co., Ltd., The Baynard Press, Chryssell Road, London, S.W.9. Every Saturday.



Plan view of the chassis. Note the various trimmers, adjusted through holes in the chassis deck.

	RESISTANCES	Values (ohms)
R1	A2 circuit potentiometer	100,000
R2		11,000
R3	V1 tetrode S.G. decoupling (M.W. and L.W.) ..	100,000
R4	V1 tetrode C.G. decoupling (S.W.)	100,000
R5	V1 osc. C.G. resistance ..	100,000
R6	V1 osc. anode M.W. and L.W. H.T. feed	50,000
R7	V1 osc. anode S.W. H.T. feed	15,000
R8	V2 C.G. decoupling	100,000
R9	V2 S.G. H.T. feed	100,000
R10	V3 signal diode load	510,000
R11	I.F. stopper	50,000
R12	Manual volume control ..	500,000
R13	V3 triode anode load	50,000
R14	V3 A.V.C. diode load resistances	500,000
R15		260,000
R16	V1 tet. A.V.C. line decoupling	500,000
R17	V4 C.G. resistance	500,000
R18	V5 C.G. circuit stabilisers	11,000
R19		11,000
R20	Variable tone control ..	50,000
R21	G.B. battery bleeder	430

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial M.W. and L.W. coupling coil	11·0
L2	Band-pass pri. M.W. tuning coil	1·5
L3	Band-pass pri. L.W. tuning coil	11·0
L4	Aerial circuit S.W. tuning coil	Very low
L5	Band-pass sec. M.W. tuning coil	1·5
L6	Band-pass sec. L.W. tuning coil	11·0
L7	Osc. S.W. tuning coil ..	Very low
L8	Osc. S.W. anode reaction ..	0·3
L9	Osc. M.W. tuning coil ..	1·8
L10	Osc. M.W. anode reaction ..	5·8
L11	Osc. L.W. tuning coil ..	5·25
L12	Osc. L.W. anode reaction ..	17·0
L13	1st I.F. trans. Pri. ..	6·5
L14	1st I.F. trans. Sec. ..	6·5
L15	2nd I.F. trans. Pri. ..	6·5
L16	2nd I.F. trans. Sec. ..	6·5
L17	Speaker speech coil	1·8
T1	Intervalve trans. Pri. ..	525·0
	Intervalve trans. Sec. total	340·0
T2	Output trans. Pri. total	550·0
	Output trans. Sec. ..	0·2
S1-S11	Waveband switches	—
S12	G.B. circuit switch	—
S13	L.T. circuit switch	—

DISMANTLING THE SET

Removing Chassis.—To remove the chassis from the cabinet, remove the four control knobs (pull off) and the four bolts (with washers) holding the chassis to the bottom of the cabinet. The chassis can now be withdrawn to the extent of the speaker leads, which should be sufficient for normal purposes.

To free the chassis entirely, unsolder the speaker leads and *when replacing*, note that the black lead goes to the earthing tag on one of the speaker fixing screws.

Removing Speaker.—If it is desired to remove the speaker from the cabinet, remove the four screws (with lock washers and washers) holding it to the sub-baffle and *when replacing*, see that the terminal panel is at the top and do not forget to replace the tag for the earthing lead on the top left-hand screw.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with a new battery reading 140 V on the H.T. section, on load. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 X22* ..	140	0·5	55	1·5
V2 K50N ..	140	2·0	40	0·6
V3 K23B	90	0·8	—	—
V4 K30E	138	1·8	—	—
V5 K33B	140†	1·6†	—	—

* Oscillator anode 55V, 1·3 mA.
† Each anode.

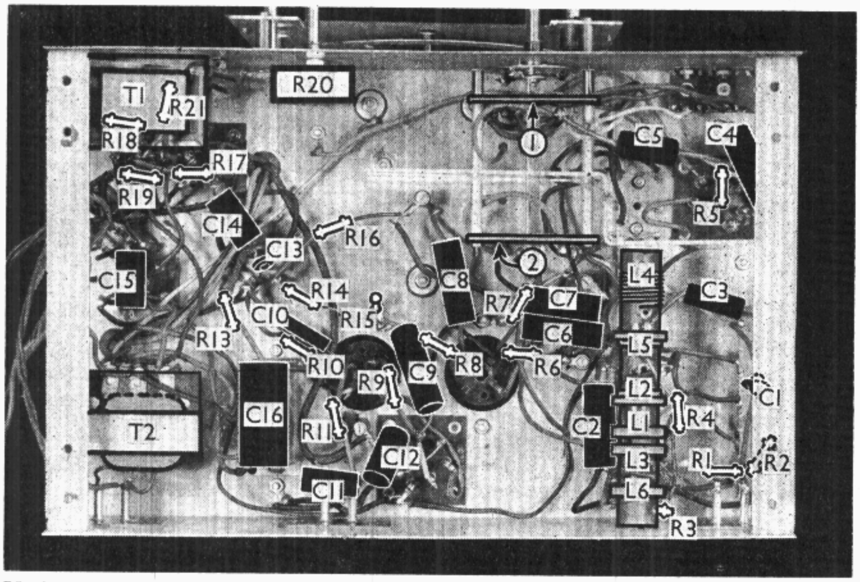
GENERAL NOTES

Switches.—**S1-S11** are the wavechange switches, ganged in two rotary units beneath the chassis. The units are indicated in our under-chassis view, and shown in detail in the diagram on page VIII. The table (page VIII) gives the switch positions for the three control settings, starting from fully anti-clockwise. O indicates open, and **C** closed.

S12 and **S13** are the Q.M.B. battery switches, ganged with the volume control **R12.** Looking from the top of the chassis, the upper two tags belong to **S12** and the lower two to **S13.**

Coils.—**L1-L6** are in a tubular unscreened unit beneath the chassis. **L7-L12** and the I.F. transformers **L13, L14**

Continued overleaf



Under-chassis view. The trimmers are not indicated here, but are all shown in the plan view. The switch diagrams are overleaf.