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"TRADER" SERVICE SHEET
1021

ETRONIC EPZ4213

"Triplet" A.C./D.C./Battery Portable

NAMED the "Triplet" because it operates from A.C. or D.C. mains or self-contained batteries, the Etronic EPZ4213 is 4-valve 2-band portable superhet. The mains voltage range is 200-250 V, 40-100 c/s in the case of A.C. The waveband ranges are 190-500 m and 1,000-2,000 m. The chassis is mounted on a metal plate, which is provided with feet that take all the weight of the receiver.

Release date and original price: June 1950; £13 6s without batteries, plus tax.

CIRCUIT DESCRIPTION

Tuned frame aerial input to heptode valve **(V1, Osram X17)** which operates as frequency changer.

Oscillator grid coils **L3** (M.W.) and **L4** (L.W.) are tuned by **C26.** Parallel trimming by **C27** (M.W.), and **C5, C28** (L.W.). Series tracking by **C6** (M.W.) and **C7** (L.W.)

Second valve **(V2, Osram W17)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings.

Intermediate frequency 470 kc/s.

Diode signal detector is part of diode pentode valve **(V3, Osram ZD17).** Audio-frequency component in rectified output is developed across volume control **R7,** which acts as diode load, and is passed via **C12** to control grid of pentode section, which operates as A.F. amplifier.

D.C. potential developed across **R7** is fed back as bias, via decoupling circuit **R4** and **C1,** to F.C. and I.F. stages, giving automatic gain control.

Resistance-capacitance coupling by **R9, C16** and **R11** between **V3** and control grid or pentode output valve **(V4, Osram N18).**

For battery operation the filaments are connected in series, and power supplies are carried by switches **S11(B)** and **S13(B),** which close in that position as indicated by the suffix **(B).** For mains operation **S10(M), S12(M)** and **S14(M)** close. **S8** and **S9** are the normal "on/off" switches.

H.T. current on mains is supplied by half-wave metal rectifier **(MR1, SenTerCel DRM2),** which consists of two RM2 units connected in series for 200-250 V mains coverage. Smoothing by **R15, R16** and **R18** and electrolytic capacitors **C20, C21. R17** protects **MR1** from surge currents. Filament current is taken from the H.T. circuit, the filaments still being connected in series and fed via **R14.**

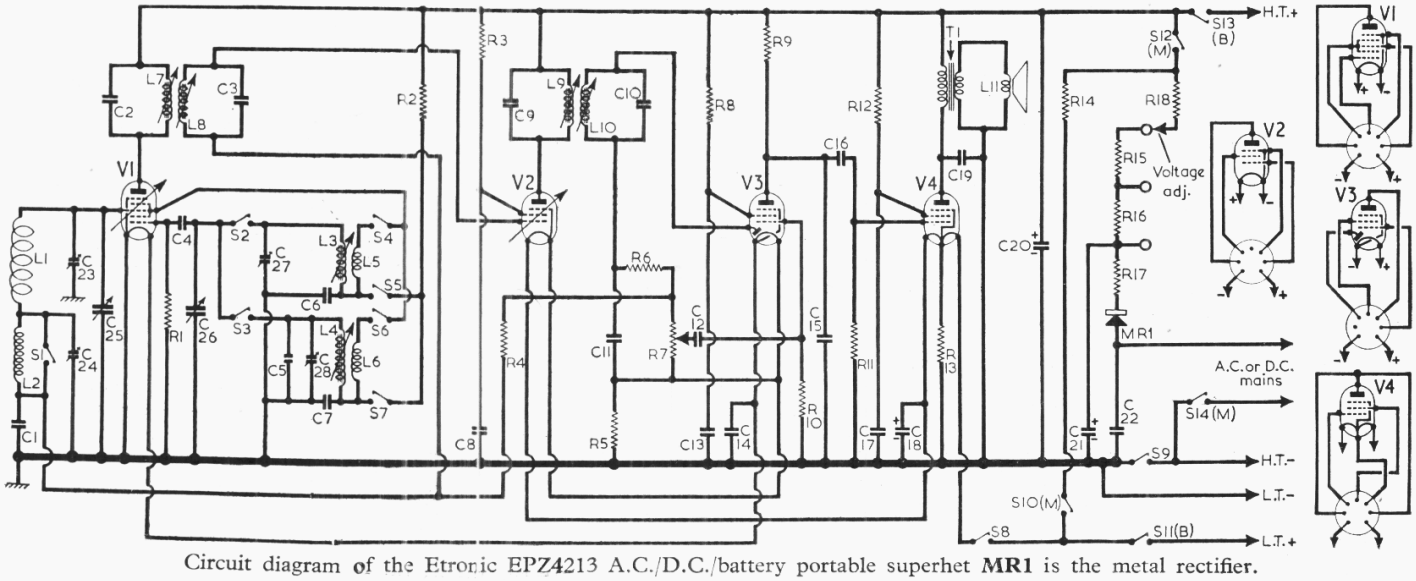
Grid bias is obtained from the filament voltage-drop, grid circuits being returned to appropriate points in the chain. **R5** and **R13** are shunts to by-pass the H.T. current past the filaments.

COMPONENTS AND VALUES

	RESISTORS	Values	Locations
R1	V1 osc. C.G. ...	100kΩ	D4
R2	Osc. anode feed ...	15kΩ	D4
R3	V2 S.G. feed ...	47kΩ	D4
R4	A.G.C. decoupling	2·2MΩ	D4
R5	Filament shunt ...	1kΩ	C4
R6	I.F. stopper ...	47kΩ	D4
R7	Volume control ...	500kΩ	B2
R8	V3 S.G. feed ...	3·3MΩ	D4
R9	V3 anode load ...	1MΩ	D4
R10	V3 C.G.	10MΩ	C4
R11	V4 C.G.	2·2MΩ	C4
R12	V4 S.G. feed ...	8·2kΩ	C4
R13	Filament shunt ...	1·8kΩ	C4
R14	Filament ballast ...	1·68kΩ	B1
R15	Ballast and H.T. smoothing ...	400Ω	B1
R16		410Ω	B1
R17		225Ω	B1
R18		1·4kΩ	B1

	CAPACITORS	Values	Locations
C1	A.G.C. decoupling	0·05μF	D4
C2	1st I.F. trans. tun.	120pF	A2
C3	1st I.F. trans. tun.	120pF	A2
C4	V1 osc. C.G. ...	0·002μF	D4
C5	L.W. fixed trim. ...	80pF	E3
C6	M.W. osc. tracker...	500pF	E3
C7	L.W. osc. tracker...	175pF	E4
C8	V2 S.G. decoup. ...	0·1μF	D4
C9	2nd I.F. trans. tun.	120pF	B2
C10	2nd I.F. trans. tun.	120pF	B2
C11	I.F. by-pass ...	100pF	D4
C12	A.F. coupling ...	0·005μF	D4
C13	V3 S.G. decoup. ...	0·01μF	D4
C14	Filament by-pass...	0·05μF	E4
C15	I.F. by-pass ...	100pF	C4
C16	A.F. coupling ...	0·02μF	C4
C17	V4 S.G. decoup. ...	0·1μF	C4
C18*	Filament by-pass...	50pF	A2
C19	Tone corrector ...	0·002μF	C4
C20*	H.T. smoothing	32μF	A2
C21*	H.T. smoothing	32μF	A2
C22	R.F. filter	0·01μF	C4
C23‡	M.W. aerial trim....	60pF	E4
C24‡	L.W. aerial trim. ...	60pF	E4
C25†	Aerial tuning ...	—	D4
C26†	Oscillator tuning ...	—	D4
C27‡	M.W. osc. trimmer	60pF	E3
C28‡	L.W. osc. trimmer	60pF	E3

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Etronic EPZ4213 A.C./D.C./battery portable superhet **MR1** is the metal rectifier.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Frame aerial ...	2·0	B1
L2	L.W. loading coil...	9·5	A1
L3	Oscillator tuning coils ...	2·6	E3
L4		13·0	E4
L5	Oscillator reaction coils ...	1·2	E3
L6		6·0	E4
L7	1st I.F. Pri. ...	10·0	A2
L8	trans. Sec. ...	10·0	A2
L9	2nd I.F. Pri. ...	10·0	B2
L10	trans. Sec. ...	10·0	B2
L11	Speech coil ...	2·0	D3
T1	O.P. trans. Pri.	500·0	D3
	Sec.	0·5	
S1-S7	Waveband switches	—	E4
S8, S9	Power sw., g'd R7...	—	B2
S10-S14	Mains/batt. sw. ...	—	C3
MR1	SenTerCel DRM2	—	C4

CIRCUIT ALIGNMENT

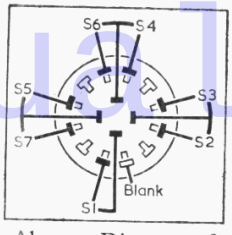
Remove chassis from carrying case and stand on its waveband-switch end on the bench.

I.F. Stages.—Connect output leads of signal generator, via an 0.1μF capacitor in the "live" lead, to control grid (pin 4) of **V1** and chassis. Switch set to M.W. and turn gang to maximum. Feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L10** (location reference B2), **L9** (D4), **L8** (A2) and **L7** (D4) for maximum output. Repeat these adjustments.

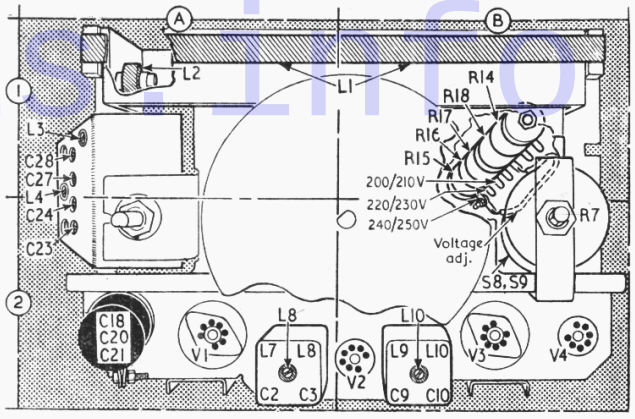
R.F. and Oscillator stages.—As the cursor line is marked on the scale window, which remains in the carrying case when the chassis is withdrawn, a strip of card should be cut and marked as shown in col. 3 to represent the cursor line. The card should be fitted over the control spindles, and the following alignment points read off against the cursor lines on to the scales below it. Check that with the gang at maximum capacitance the cursor lines on the card coincide with the ends of the tuning scales. Transfer signal generator leads to an aerial loop placed in close proximity to the frame aerial winding.

M.W.—Switch set to M.W., tune to 500 m on scale, feed in a 500 m (600 kc/s) signal and adjust **L3** (A1) for maximum output. Tune set to 200 m on scale, feed in a 200 m (1,500 kc/s) signal and adjust **C27** (A1) and **C23** (A2) for maximum output. Repeat these adjustments.

L.W.—Switch set to L.W., tune to 2,000 m on scale, feed in a 2,000 m (150 kc/s) signal and adjust the core of **L4** (A2) for maximum output. Tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal and adjust **C28** (A1) and **C24** (A2) for maximum output. Repeat these adjustments.



Above : Diagram of the waveband switch unit.

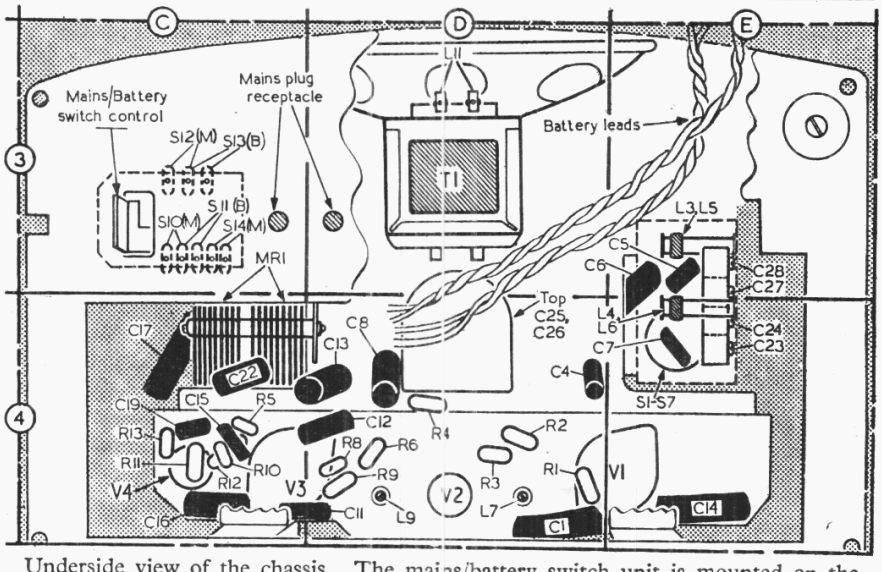


Right : Plan view of the chassis. The trimmers are extended on the left.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from a new set of batteries. When connected to 230 V A.C. mains the valve readings remained practically the same, and the reading taken across **C21** was 200 V. The set was tuned to the highest wavelength on the M.W. band, with the volume control at maximum. There was no signal input.

Valve	Anode		Screen	
	V	mA	V	mA
V1 X17	90	1·0	62	1·8
V2 W17	90	1·6	65	0·5
V3 ZD17	29	0·07	37	0·02
V4 N18	88	5·0	82	1·2



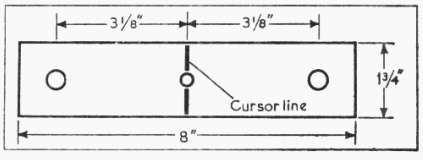
Underside view of the chassis. The mains/battery switch unit is mounted on the base plate.

Voltage readings were measured on an Avo Electronic Testmeter, and as there is no appreciable current drawn by this instrument allowance must be made for the current drawn by other types of meter. Chassis was the negative connection.

GENERAL NOTES

S1-S7 are the waveband switches, ganged in a single rotary unit at one end of the chassis. This is indicated in our underside chassis drawing, and shown in detail in the diagram above, where it is drawn as seen when viewed from the rear of an inverted chassis. It adopts this position in our chassis illustration.

In the M.W. position (control knob anti-clockwise) **S1, S2, S4** and **S5** close; in the L.W. position, **S3, S6** and **S7** close.



Dimensioned drawing of the substitute cursor-line panel.

S8, S9 are the Q.M.B. on/off switches, ganged with the volume control **R7.** They operate on mains or battery.

S10M, S11B—S14M are the mains/battery changeover switches, ganged in a spring-loaded slide-action unit mounted on the bottom cover-plate of the carrying case. The spring holds it in the mains position, and for battery operation the control is pushed sideways. This opens two parking holes for the mains plug, and when that is inserted it holds the switch in the battery position. At the same time it renders impossible the insertion of the mains plug into a mains socket while the set is switched to the battery position. Two pillars are provided on which to wind the cord.

Batteries.—Batteries recommended by the makers are: L.T., Ever Ready "Alldry" 31, 7.5 V; H.T., Ever Ready "Batrymax" B117, 90 V. To fit them, the receiver is stood upside down, and the metal cover is removed from the bottom plate. After removal of the old batteries, the press-button studs are connected to the new H.T. battery, and it is inserted into its receptacle upside-down, press-studs towards the front, where slots are cut into the base-plate to permit them to pass. The plug is similarly inserted, in the top of the L.T. unit, and that is then fitted upside-down with the plug forward of the centre-line of the battery. The batteries stand upright when the receiver is stood on its base again.

DISMANTLING THE SET

Removing Chassis.—Remove three control knobs (pull off) with felt washers;
stand set on its side, and remove four hexagon-head self-tapping screws (with washers) from the corners of the metal base plate;
the chassis may now be withdrawn, together with the base plate.

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