"TRADER" SERVICE SHEET

983

ETRONIC EMU4214

"Midgetronic" A.C./D.C. Midget

AN unusual design is used in the Etronic "Midgetronic" receiver, whose model No. is EMU4214. It is a 3-valve (plus rectifier) 2-band superhet designed to operate from A.C. or D.C. mains of 200-250 V, but it has no I.F. stage. A double triode operates as detector and A.F. amplifier, and pre-set reaction is provided. The waveband ranges are 190-550 m and 900-2,200 m.

Release date and original price: October, 1950; £7 17s 6d plus purchase tax.

CIRCUIT DESCRIPTION

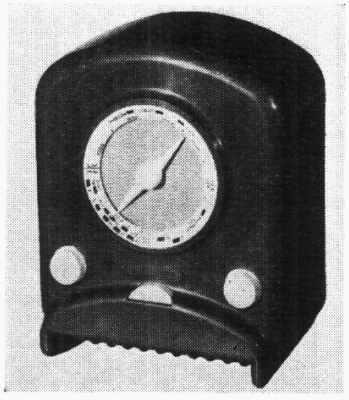
Input from attached aerial via isolating capacitor **C1** and coupling coils **L1** (M.W.), **L2** (L.W.) to single tuned circuits **L3, C20** (M.W.) and **L3, L4, C20** (L.W.) which precede triode-hexode valve **(V1, Brimar 12K8GT)** operating as frequency changer with internal coupling.

Oscillator grid coils **L5** (M.W.), **L6** (L.W.) are tuned by **C21.** Parallel trimming by **C22** (M.W.); series tracking by **C8** (M.W.) and **C8, C9** (L.W.). Inductive reaction coupling from anode by **L7** (M.W.) and **L8** (L.W.)

Intermediate frequency 470 kc/s

V1 is coupled by tuned I.F. transformer **C3, L9, L10, C4** to section **a** of double triode valve **(V2, Brimar 12SL7)** which operates as leaky-grid signal detector with **R4** and **C7** and A.F. amplifier (section **b**). Pre-set reaction coupling by **C23** and **L11** between **V2a** anode and the I.F. transformer. R.F. filtering by **R7, C12.** The rectified signal is developed across **R4,** and the amplified A.F. component at the anode of **V2a** is resistance-capacitance coupled to the control grid of **V2b** by **R6, C11** and volume control **R10.** The A.F. signal is further amplified by **V2b** and resistance-capacitance coupled to the pentode output valve **(V3, Brimar 12A6)**

(Continued col. 1 overleaf)



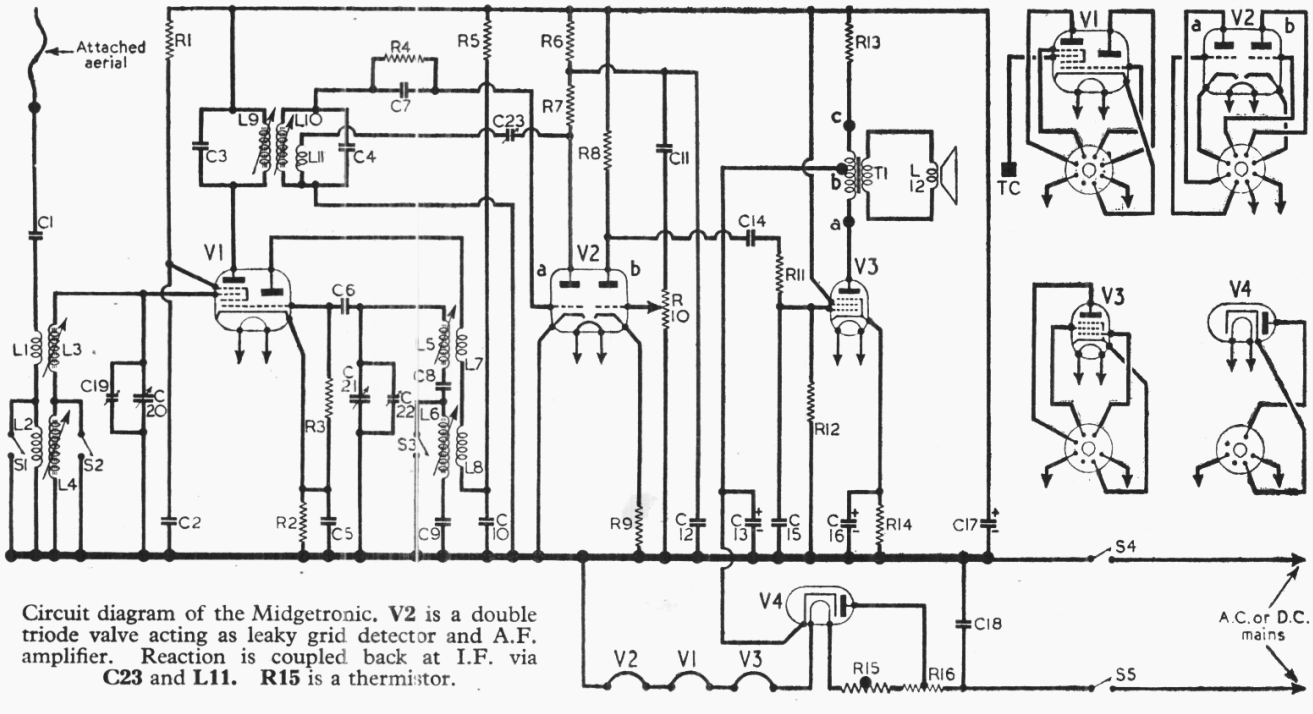
COMPONENTS AND VALUES

	CAPACITORS	Values	Locations
C1	Aerial series ...	0·01μF	E4
C2	V1 S.G. decoup. ...	0·1μF	F3
C3	I.F. transformer...	100pF	A1
C4	tuning	100pF	A1
C5	V1 cath. by-pass...	0·1μF	F3
C6	V1 osc. C.G. ...	100pF	G3
C7	V2 C.G.	100pF	A1
C8	M.W. tracker ...	350pF	G3
C9	L.W. tracker ...	100pF	G3
C10	Osc. anode decoup.	0·1μF	G3
C11	A.F. coupling ...	0·005μF	F4
C12	I.F. by-pass ...	400pF	G4
C13*	H.T. smoothing ...	32μF	A1
C14	A.F. coupling ...	0·01μF	E4
C15	Tone corrector ...	100pF	D4
C16*	V3 cath. by-pass ...	50μF	A1
C17*	H.T. smoothing ...	32μF	A1
C18	R.F. by-pass ...	0·01μF	D3
C19‡	M.W. aerial trim....	35pF	F2
C20†	Aerial tuning ...	—	F2
C21†	Osc. tuning ...	—	F3
C22‡	M.W. osc. trim. ...	35pF	F3
C23‡	Reaction trimmer...	40pF	E4

* Electrolytic. † Variable. ‡ Pre-set.

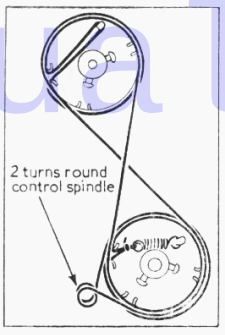
	RESISTORS	Values	Locations
R1	V1 S.G. feed ...	33kΩ	G4
R2	V1 G.B.	330Ω	G3
R3	V1 osc. C.G. ...	47kΩ	G3
R4	V2 C.G.	1MΩ	A1
R5	Osc. anode feed ...	22kΩ	G3
R6	V2a anode load ...	220kΩ	G3
R7	R.F. filter ...	22kΩ	G4
R8	V2b anode load	220kΩ	G4
R9	V2b G.B. ...	4.7kΩ	F4
R10	Volume control ...	100kΩ	D2
R11	Tone corrector ...	68kΩ	E4
R12	V3 C.G.	470kΩ	D4
R13	H.T. smoothing ...	4.7kΩ	E4
R14	V3 G.B.	330Ω	D4
R15	Brimistor, type CZ1	—	D3
R16	Heater ballast ...	*1,025Ω	B1

* Tapped at 280Ω + 745Ω from S5.

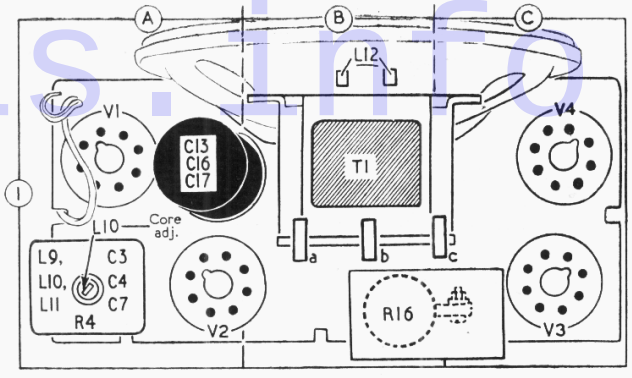


Circuit diagram of the Midgetronic. **V2** is a double triode valve acting as leaky grid detector and A.F. amplifier. Reaction is coupled back at I.F. via **C23** and **L11. R15** is a thermistor.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Aerial coup. coils ...	21·0	E3
L2		100·0	D2
L3	Aerial tuning coils	7·0	E3
L4		27·0	D2
L5	Osc. tuning coils ...	2·0	G2
L6		3·4	G2
L7	Osc. reaction coils...	3·7	G2
L8		11·5	G2
L9	I.F. trans. Pri. ...	6·5	A1
L10	Sec. ...	6 5	A1
L11	Reaction coil ...	3·0	A1
L12	Speech coil ...	2·6	B1
T1	Primary, a-b ...	450·0	B1
	Primary, b-c ...	23·0	
	Secondary ...	0·3	
S1-S3	Waveband switches	—	G2
S4, S5	Mains sw., g'd R10	—	D3



Drive cord system, seen from front.



Plan view of the chassis. **R16** is housed in a metal shield.

Circuit Description—*continued*

by **R8, C14, R12** and tone correctors **R11, C15.**

H.T. current is supplied by I.H.C. half-wave rectifying valve **(V4, Brimar 35Z4).** Smoothing by electrolytic capacitors **C13, C17** and resistor **R13,** residual hum being neutralised by passing the current through part of the primary winding of the output transformer **T1.** Valve heaters, together with ballast resistor **R16** and surge limiting thermistor **R15,** are connected in series across the mains input. R.F. filtering by **C18.**

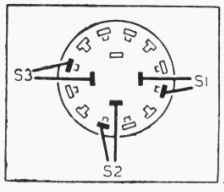


Diagram of the waveband switch unit, seen from the rear of an inverted chassis.

CIRCUIT ALIGNMENT

I.F. Stages.—Switch set to M.W. and turn gang and volume control to maximum. Connect signal generator via a 0.1μF capacitor in the "live lead" to control grid (top cap) of **V1** and chassis. Feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L9** and **L10** (location references G4, A1) for maximum output. Repeat these adjustments.

R.F. and Oscillator Stages.—As the tuning scale remains in the cabinet when the chassis is removed, a dummy scale should be made by holding transparent paper against the scale in the cabinet and marking off the following alignment points; 1,600 m, 500 m and 200 m. The dummy scale should also have the horizontal line dividing the two wavebands marked on it, and when it is placed in position over the pointer spindle, this line should coincide with the pointer when the gang is at maximum capacitance. The pointer can be adjusted if the two fixing screws in the pointer drum are slackened. Transfer "live" signal generator lead to aerial lead.

M.W.—Tune to 500 m mark on dummy scale, feed in a 500 m (600 kc/s) signal and adjust the cores of **L5** (G2) and **L3** (E2) for maximum output. Tune to 200 m mark, feed in a 200 m (1,500 kc/s) signal and adjust **C22** (F3) and **C19** (F2) for maximum output. At the same frequency adjust **C23** (E4), increasing its capacitance until a point is reached just short of oscillation. Repeat these adjustments.

L.W.—Switch set to L.W., tune to 1,600 m mark, feed in a 1,600 m (187.5 kc/s) signal and adjust the cores of **L6** (G2) and **L4** (D2) for maximum output. Repeat these adjustments.

DISMANTLING THE SET

Removing Chassis.—Pull off the volume and waveband control knobs and the pointer from the front of the cabinet;
lay the set face downwards and remove the three self-tapping Phillips screws, situated at the bottom and sides of the front chassis member which hold the chassis to the cabinet;
withdraw the chassis, complete with tuning knob.
When replacing, the cursor should coincide with the black and the red line dividing the two wavebands with the gang at maximum capacitance.

GENERAL NOTES

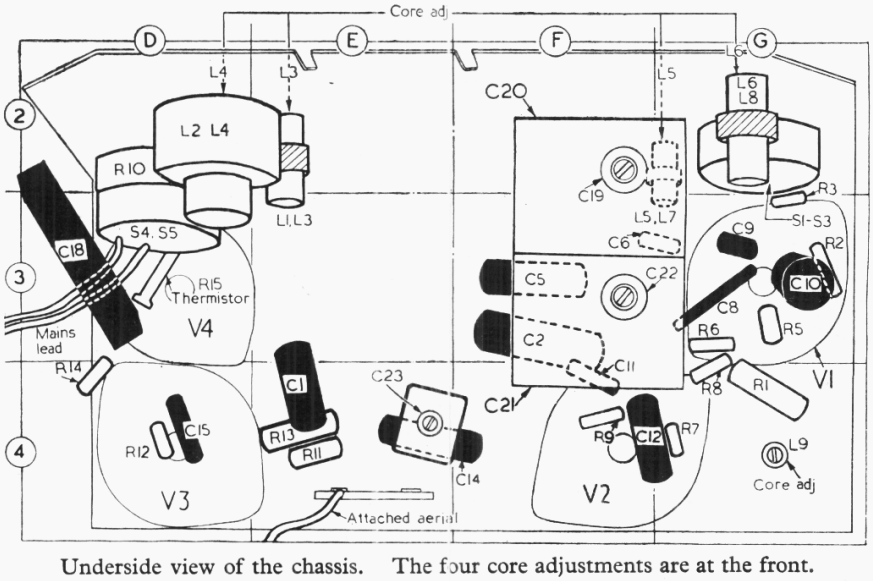
Switches.—S1-S3 are the waveband switches, ganged in a single rotary unit mounted on the vertical chassis member. This is indicated in our underside drawing of the chassis, and shown in detail in the diagram in col. 1, where it is viewed in the same direction. All three switches close on M.W. and open on L.W.
S4, S5 are the Q.M.B. mains switches, ganged with the volume control **R10.**
Drive Cord Replacement.—About three feet of high-grade fishing line, plaited and waxed, is required for a new drive cord, which should be run as shown in the sketch below. It is convenient to start with the gang at minimum capacitance, and take the anti-clockwise turn from the spring on the gang drum first, pulling against the stop.
To adjust the pointer, turn the gang to maximum, when the pointer should be horizontal. It may be adjusted if the two fixing screws in the boss of the pointer drum are slackened.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured on our receiver when it was operating from A.C. mains of 225 V. The receiver was switched to M.W. and the gang and volume control were at maximum, but there was no signal input.
Voltage readings were measured with an Avo Electronic Testmeter, which causes no appreciable voltage drop, and allowances must be made for the current taken by other meters. Chassis was the negative connection.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 12K8GT	150	1·1	60	2·5	2·3
	Oscillator				
	65	3·0			
V2 12SL7 a	70	0·4	—	—	—
V2 12SL7 b	100	0·25	—	—	1·3
V3 12A6	195	16·0	150	2·0	6·6
V4 35Z4	182†	—	—	—	200·0

† A.C. reading.



Underside view of the chassis. The four core adjustments are at the front.

Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1