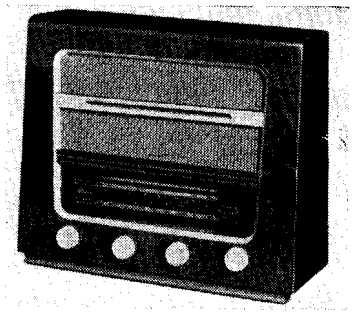
"TRADER" SERVICE SHEET

991

ETRONIC ETA5316



DESIGNED to operate from A.C. mains only of 200-250V, 50 c/s, the Etronic ETA5316 is a 4-valve (plus rectifier) 3-band superhet. The waveband ranges are 15-51 m, 190-550m and 1,000-2,000m. Provision is made for the connection of a gramophone pick-up, which may be left connected permanently, and an external speaker.

There is an A.C./D.C. version of this receiver, called the ETU5316, and this is covered separately in Service Sheet 992.

Release date and original price: October, 1950; £15 11s 5d. Purchase tax extra.

CIRCUIT DESCRIPTION

Aerial input via coupling coil **L1** (S.W.) and "bottom" capacitance coupling **C2** (M.W. and L.W.) to single tuned circuits **L2, C29** (S.W.), **L3, C29** (M.W.) and **L4, C29** (L.W.). Modulation hum is bypassed by **R1.**

First valve **(V1, Brimar 7S7)** is a triode-hexode operating as frequency changer with internal coupling. Oscillator anode coils **L7** (S.W.), **L8** (M.W.) and **L9** (L.W.) are tuned by **C33.** Parallel trimming by **C30** (S.W.), **C31** (M.W.) and **C10, C32** (L.W.); series tracking by **C7** (S.W.), **C8** (M.W.) and **C9** (L.W.). Reaction coupling from grid across the common impedance of the trackers, with the addition of inductive coupling by **L5** (S.W.) and **L6** (M.W.). Stabilization by **R6.**

Second valve **(V2, Brimar 7B7)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C3, L10, L11, C4** and **C13, L12, L13, C14.**

Intermediate frequency 470 kc/s.

Diode signal detector is part of double-diode triode valve **(V3, Brimar 6Q7GT).** A.F. component in rectified output is developed across volume control **R11,** which acts as the diode load, and is passed via **C17** to the grid of the triode section. I.F. filtering by **C16, R10, C18** and **C19.** Provision is made for the connection of a gramophone pick-up across **R11** via **S10,** which closes in the "Gram." position of the waveband switch. D.C. potential developed across **R10, R11** is fed back as bias to F.C. and I.F. valves, giving automatic gain control.

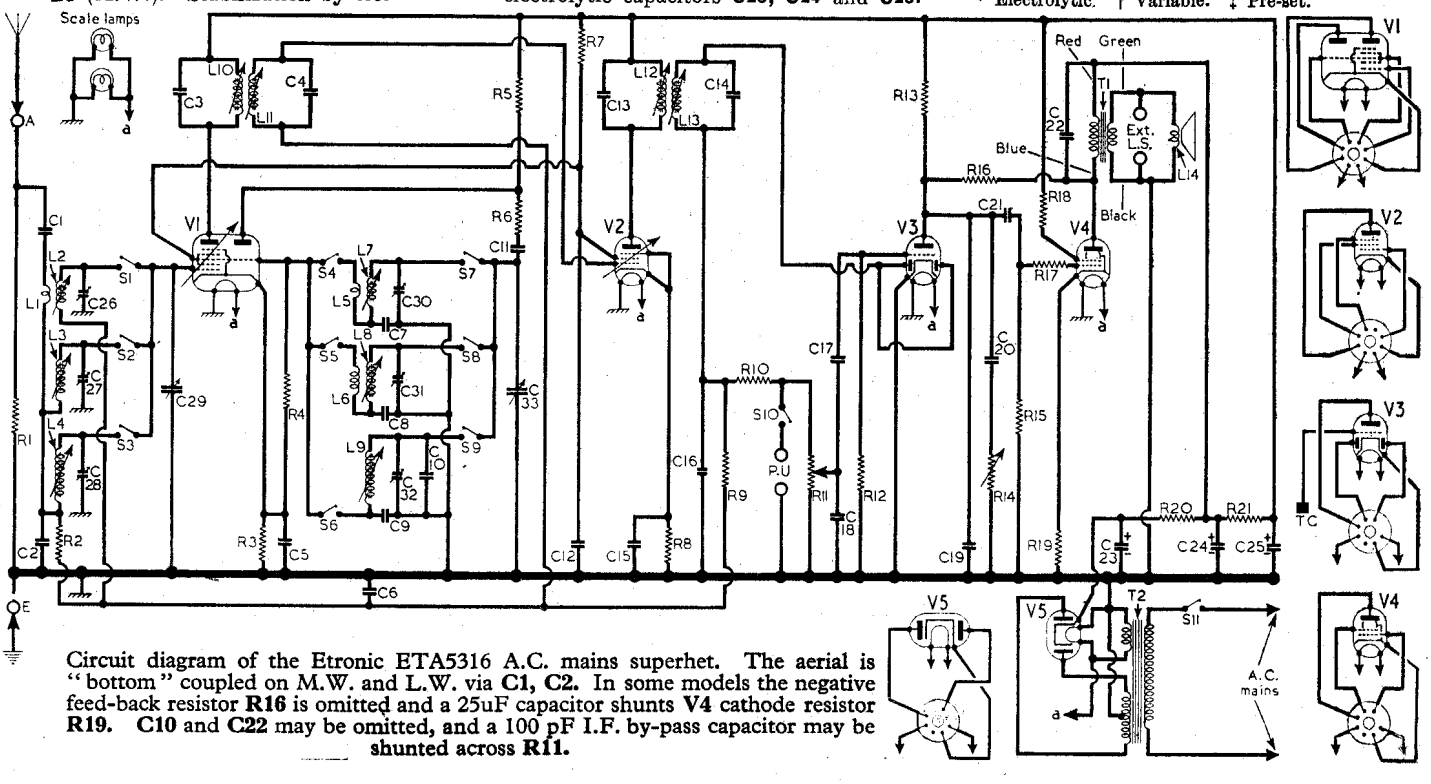
Resistance-capacitance coupling by **R13, C21** and **R15** between **V3** triode and beam tetrode output valve **(V4, Brimar 6V6GT).** Variable tone control by **C20** and **R14.** Tone correction by **C22** and by negative feed-back between **V3** and **V4** anodes via **R16.** Grid and screen-grid stoppers **R17, R18** suppress parasitic oscillation developing in **V4.**

H.T. current is supplied by I.H.C. full-wave rectifying valve **(V5, Brimar 6X5GT)** whose heater is fed from the same winding on **T2** as the other valves. Smoothing by resistors **R20, R21** and electrolytic capacitors **C23, C24** and **C25.**

COMPONENTS AND VALUES

	CAPACITORS	Values	Locations
C1	Aerial series ...	0·002μF	G4
C2	Aerial coupling ...	0·0032μF	G4
C3	1st I.F. trans. tuning ...	120pF	A2
C4	1st I.F. trans. tuning ...	120pF	A2
C5	V1 cath. by-pass	0·1μF	G4
C6	A.G.C decoupling	0·05μF	F4
C7	S.W tracker ...	0·0025μF	G4
C8	M.W tracker ...	410pF	G3
C9	L.W. tracker ...	150pF	G4
C10	L.W. trimmer ...	150pF	G3
C11	Osc. anode coup.	50pF	G4
C12	H.T. decoupling	0·1μF	F4
C13	2nd I.F. trans. tuning ...	120pF	B2
C14	2nd I.F. trans. tuning ...	120pF	B2
C15	V2 cath. by-pass	0·1μF	F4
C16	I.F. by-pass ...	100pF	F3
C17	A.F coupling ...	0·005μF	E3
C18	I.F. by-passes ...	100pF	E3
C19	I.F. by-passes ...	400pF	E4
C20	Part tone control	0·01μF	E4
C21	A.F coupling ...	0·01μF	E4
C22	Tone correction ...	0·01μF	E3
C23*	H.T smoothing ...	16μF	B1
C24*	H.T smoothing ...	16μF	B1
C25*	H.T smoothing ...	16μF	B1
C26‡	S.W. aerial trim.	—	G3
C27‡	M.W. aerial trim.	—	G3
C28‡	L.W. aerial trim.	—	G4
C29†	Aerial tuning ...	—	A1
C30‡	S.W osc. trimming	—	G3
C31‡	M.W. osc. trimming	—	G3
C32‡	L.W. osc. trimming	—	G4
C33†	Oscillator tuning	—	A2

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Etronic ETA5316 A.C. mains superhet. The aerial is "bottom" coupled on M.W. and L.W. via **C1, C2.** In some models the negative feed-back resistor **R16** is omitted and a 25uF capacitor shunts **V4** cathode resistor **R19. C10** and **C22** may be omitted, and a 100 pF I.F. by-pass capacitor may be shunted across **R11.**

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RESISTORS		Values	Locations
R1	Aerial shunt ...	4·7kΩ	G4
R2	A.G.C. decoup. ...	10kΩ	G4
R3	V1 G.B.	220Ω	G4
R4	V1 osc. C.G. ...	47kΩ	G4
R5	Osc. anode feed ...	33kΩ	G4
R6	Stabilizer ...	47Ω	G4
R7	H.T. feed	33kΩ	F4
R8	V2 G.B.	330Ω	F4
R9	A.G.C. decoup. ...	2·2MΩ	F4
R10	I.F stopper ...	56kΩ	F3
R11	Volume control ...	500kΩ	E3
R12	V3 C.G.	10MΩ	E4
R13	V3 anode load ...	220kΩ	E4
R14	Tone control ...	270kΩ	D3
R15	V4 C.G.	470kΩ	E4
R16	Neg. feed-back ...	470kΩ	E4
R17	V4 stoppers ...	47kΩ	E4
R18		100Ω	E4
R19	V4 G.B.	250Ω	D4
R20	H.T smoothing ...	1kΩ	E3
R21		3·3kΩ	F3

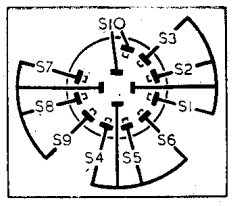
OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	S.W. coupling coil...	Very low	G3
L2	Aerial tuning coils	Very low	G3
L3		4·4	G3
L4		34·0	G4
L5	S.W. reaction coil	Very low	G3
L6	M.W. reaction coil	1·0	G3
L7	Oscillator tuning coils	Very low	G3
L8		5·0	G3
L9		12·0	G4
L10	1st I.F trans Pri.	10·0	A2
L11	Sec.	10·0	A2
L12	2nd I.F. trans Pri.	10·0	B2
L13	Sec.	10·0	B2
L14	Speech coil ...	2·5	—
T1	Primary ...	240·0	—
	Secondary ...	0·5	—
T2	Primary ...	60·0	—
	H.T. sec., total ...	500·0	C2
	Htr. secondary ...	0·1	—
S1-S10	Waveband switches	—	G3
S11	Mains sw., g'd R14	—	D3

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturer's information. Readings were taken with the receiver tuned to the highest wavelength end of M.W. and the volume control at maximum.

Valve	Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1 7S7 ...	175	1·9	70	2·2	1·5
	Oscillator				
	100	4·0			
V2 7B7 ...	175	7·5	70	2·0	2·0
V3 6Q7GT	70	0·35	—	—	—
V4 6V6GT	225	43·0	180	3·0	9·0
V5 6X5GT	250†	—	—	—	280·0

† A.C., each anode.



Above. Diagram of the waveband switch unit, with the associated table below.

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

GENERAL NOTES

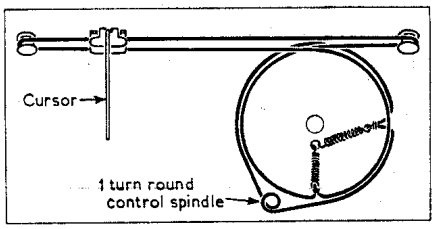
Switches.—S1-S9 are the waveband switches, and **S10** is the gram pick-up switch, ganged in a single 4-position rotary unit beneath the chassis. This is indicated in our underside drawing of the chassis, and shown in detail in the diagram inset beside the plan drawing, where it is drawn as seen from the rear of an inverted chassis.

The table below it gives switch positions for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and **C**, closed.

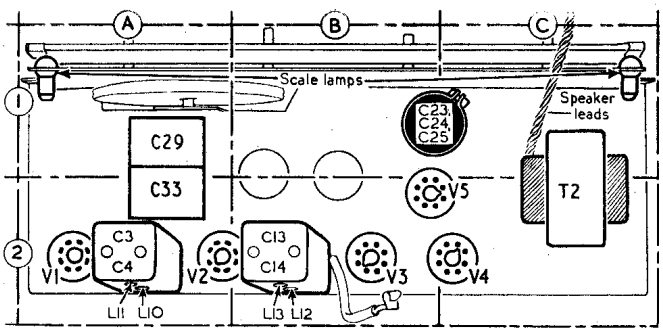
S11 is the Q.M.B. mains switch, ganged with the tone control **R14**.

Scale Lamps.—These are two Osram M.E.S. type lamps, with small clear spherical bulbs, rated at 6.5 V, 0.3 A.

External Speaker.—Two sockets are provided at the rear of the chassis for the connection of a low impedance (about 3-4 Ω) external speaker.



Sketch of the tuning drive system, as seen from front, showing both cords.



Plan view of the chassis. No voltage adjustment tappings are provided on the mains transformer **T2.**

Drive Cord Replacement.—Two cords of different material are used in this receiver: the drum drive, which requires about 18 inches of fine gauge nylon braided glass yarn; and the cursor drive, which requires about 42 inches of fine gauge plaited flax fishing line.

The course taken by the two cords is clearly indicated in the sketch in col. 2, where the tuning drive system is drawn as seen from the front, but in order to gain access to the gang drum it is necessary to remove the metal plate forming the front member of the chassis structure.

To do this, remove the glass scale panel (spring clips at corners), remove the fixing nuts and lock washers from the tone control and volume control spindle bushes, and remove the four self-tapping screws holding the metal front plate to the rest of the chassis. The drive system is then exposed as shown in our sketch.

DISMANTLING THE SET

Removing Chassis.—Remove four control knobs (pull-off) with felt washers;
unsolder two leads from the speaker speech coil tags, and two leads from the tag strip on the right of the output transformer;
remove three hexagonal head, self-tapping chassis bolts (with washers) and withdraw chassis.

When replacing, the black and green speaker leads should go to the speech coil tags on the left and the red and blue leads to the tags on the right of the output transformer.

CIRCUIT ALIGNMENT

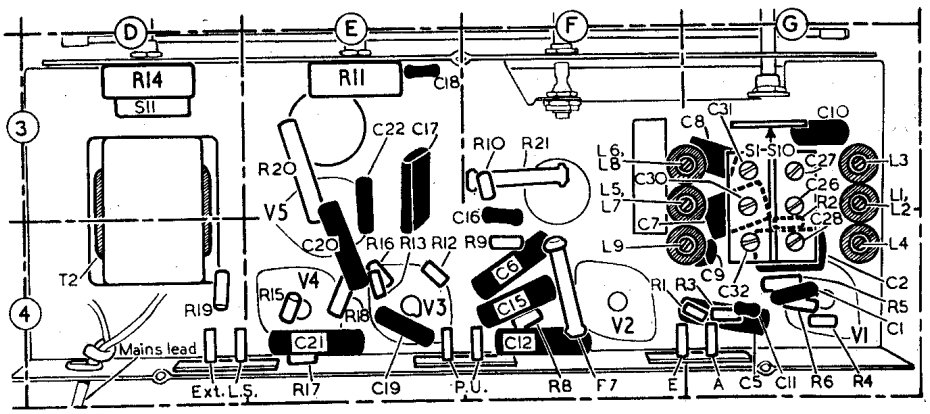
I.F. Stages.—Switch set to M.W., turn gang to maximum and set tone and volume controls fully clockwise. Connect the output from the signal generator, via a 0.1 μF capacitor in the "live" lead, to control grid (pin 6) of **V2** and chassis. Feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L13, L12** (location reference B2) for maximum output. Transfer "live" signal generator lead to control grid (pin 6) of **V1,** and adjust the cores of **L11, L10** (A2) for maximum output. Repeat these adjustments.

R.F. and Oscillator Stages.—Remove chassis from cabinet and check that with the gang at maximum capacitance, the cursor coincides with the highest wavelength ends of the tuning scales. Transfer the signal generator leads, via a suitable dummy aerial, to **A** and **E** sockets.

L.W.—Switch set to L.W., tune to 2,000 m, feed in a 2,000 m (150 kc/s) signal and adjust the cores of **L9** (G4) and **L4** (G4) for maximum output. Tune to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust **C32** (G4) and **C28** (G4) for maximum output. Repeat these adjustments.

M.W.—Switch set to M.W., tune to 500 m, feed in a 500 m (600 kc/s) signal and adjust the cores of **L8** (G3) and **L3** (G3) for maximum output. Tune to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C31** (G3) and **C27** (G3) for maximum output. Repeat these adjustments.

S.W.—A dummy aerial consisting of a non-inductive 400 Ω resistor should be connected in series with the "live" signal generator lead. Switch set to S.W., tune to 50 m, feed in a 50 m (6 Mc/s) signal and adjust the cores of **L7** (G3) and **L2** (G3) for maximum output. Tune to 20 m, feed in a 20 m (15 Mc/s) signal and adjust **C30** (G4) and **C26** (G4) for maximum output, "rocking" the gang slightly while adjusting **C26** to obtain optimum results. Repeat these adjustments.



Underside drawing of the chassis. A diagram of the **S1-S10** unit is inset above.

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