

## COMPONENTS AND VALUES

RESISTANCES	Values (ohms)
R1 V1 pentode CG stabiliser ..	200
R2 V1 fixed GB resistance ..	300
R3 V1 osc. CG resistance ..	50,000
R4 Oscillator reaction stabiliser ..	300
R5 V1 osc. anode HT feed ..	20,000
R6 V1 SG HT feed ..	30,000
R7 V2 fixed GB resistance ..	1,000
R8 IF stopper ..	100,000
R9 Manual volume control ..	1,000,000
R10 V3 signal diode load ..	500,000
R11 V3 triode GB; AVC delay ..	1,000
R12 V3 triode anode decoupling ..	20,000
R13 V3 triode anode load ..	20,000
R14 V3 AVC diode load ..	1,000,000
R15 Variable tone control ..	100,000
R16 AVC line decoupling ..	1,000,000
R17 V4 CG resistance ..	250,000
R18 Part of fixed tone corrector ..	3,500
R19 V4 GB resistance ..	105
R20 V4 anode stabiliser ..	50
R21 V1 SG and osc. anode HT feed ..	10,000
R22 Heater circuit ballast, total ..	650*

\* Tapped at 150 Ω plus 120 Ω plus 380 Ω from mains end.

OTHER COMPONENTS	Approx. Values (ohms)
L1 Aerial IF filter coil ..	21·0
L2 Image filter coil ..	4·0
L3 Aerial SW coupling coil ..	0·3
L4 Aerial MW coupling coil ..	23·0
L5 Aerial LW coupling coil ..	60·0
L6 Aerial LW tuning coil ..	0·035
L7 Aerial MW tuning coil ..	2·4
L8 Aerial LW tuning coil ..	25·0
L9 Osc. circuit SW tuning coil ..	0·035
L10 Osc. circuit MW tuning coil ..	5·0
L11 Osc. circuit LW tuning coil ..	8·5
L12 Osc. SW reaction coil ..	0·6
L13 Osc. MW reaction coil ..	1·7
L14 Osc. LW reaction coil ..	2·2
L15 1st IF trans. { Pri... ..	8·9
L16 { Sec... ..	8·9
L17 2nd IF trans. { Pri... ..	8·9
L18 { Sec... ..	8·9
L19 Speaker speech coil ..	2·0
L20 Hum neutralising coil ..	0·25
L21 Speaker field coil ..	500·0
L22 Mains RF filter chokes {	3·0
L23 {	3·0
Tr Speaker input trans. { Pri... ..	260·0
Tr { Sec... ..	0·6
S1-S10 Waveband switches ..	—
S11 Mains switch, ganged R9 ..	—

S11 is the QMB mains switch, ganged with the volume control R9.

**Coils.**—All the coils, including those of the IF transformers, are unscreened. L1, and the second IF transformer L17, L18, are on the chassis deck, as are also the filter chokes L22, L23.

L2-L8 and L9-L14 are on two long tubular formers beneath the chassis, while the first IF transformer, L15, L16 is also beneath the chassis. All these coils are indicated in our under-chassis view.

**Scale Lamps.**—These are two Ever Ready MES types, rated at 6.2 V, 0.3 A. They are connected in series with the heater supply, one on either side of V5.

**External Speaker.**—Two sockets are provided on the internal speaker for a low resistance (about 2 Ω) external speaker.

**Condensers C28, C29.**—These are two dry electrolytics in a single carton on the chassis deck, having a common negative (black) lead. The red lead is the positive of C28 (8 μF) and the yellow the positive of C29 (24 μF).

**Condensers C12, C21, C25, C30.**—These are four dry electrolytics in a single carton beneath the chassis, with a common negative (black) lead. The positive leads are: yellow, C12 (2 μF); red, C30 (4 μF); green, C21 (6 μF); and blue, C25 (50 μF).

**Condenser C4.**—This consists of an insulated wire from C36 twisted round the lead from C34 to the top cap of V1, and taped up.

**Fuse F1.**—This consists of a length of 40 gauge copper wire connected between one of the mains connectors and one side of L22. It is indicated in our plan chassis view.

**Trimmers.**—All the trimmers except C35 and C37 are adjustable either from the front or the back of the chassis.

**Tone Control.**—R15 is normally fitted to the left hand side of the cabinet, but it is shown removed from this position in our plan chassis view.

**Mains Voltage Adjustment.**—Tappings are provided on R22 for this purpose.

**Valve V4.**—A double-diode pentode is used in this position, but the diode pins are blank.

**Model 512 AM Divergencies.**—The only differences in this model are that it has a moulded cabinet, and is not fitted with a variable tone control, so that C22 and R15 are omitted.

## VALVE ANALYSIS

Valve voltages and currents given in the table (col. 3) are those measured in our receiver when it was operating on AC mains of 227 V, using the centre tapping on the mains resistance. 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 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 FC13C	177 { 177 Oscil lator	1·4 { 2·9	72	2·7
V2 VP132t	85	2·9	—	—
V3 TDD13C	177	3·4	177	0·9
V4 PenDD-	82	2·1	—	—
V5 U1020f	155	68·0	177	13·0

† Cathode to chassis, 228 V. DC.

## GENERAL NOTES

**Switches.**—S1-S10 are the waveband switches, ganged in two rotary units beneath the chassis, which are indicated in our under-chassis view, and shown in detail in the diagrams on page viii.

The table (page viii) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and C closed.

CONDENSERS	Values (μF)
C1 Aerial isolating condenser ..	0·002
C2 Earth isolating condenser ..	0·05
C3 Aerial circuit LW trimmer ..	0·00005
C4 Small coupling ..	Very low
C5 V1 cathode by-pass ..	0·05
C6 V1 osc. CG condenser ..	0·00006
C7 AVC line decoupling ..	0·05
C8 Osc. circuit SW tracker ..	0·004
C9 Osc. circuit LW fixed trimmer ..	0·00006
C10 Osc. circuit LW fixed tracker ..	0·002
C11 Osc. reaction SW coupling ..	0·001
C12* V1 osc. anode decoupling ..	2·0
C13* V1 SG decoupling ..	2·0
C14 V2 SG decoupling ..	0·1
C15 V2 cathode by-pass ..	0·05
C16 AF coupling to V3 triode ..	0·01
C17 IF by-pass condensers {	0·00015
C18 {	0·00015
C19 Coupling to V3 AVC diode ..	0·00005
C20 IF by-pass condenser ..	0·0003
C21* V3 cathode by-pass ..	6·0
C22 Part of variable tone control ..	0·05
C23 V3 triode to V4 AF coupling ..	0·01
C24* V3 triode anode decoupling ..	2·0
C25* V4 cathode by-pass ..	50·0
C26 Part of fixed tone corrector ..	0·05
C27 Speaker frame isolating ..	0·002
C28* HT smoothing ..	8·0
C29* {	24·0
C30* {	4·0
C31 Mains RF by-pass ..	0·05
C32* Aerial IF filter tuning ..	—
C33* Image filter tuning ..	—
C34* Aerial circuit tuning ..	—
C35* Aerial circuit MW trimmer ..	—
C36* Oscillator circuit tuning ..	—
C37* Osc. circuit SW trimmer ..	—
C38* Osc. circuit MW trimmer ..	—
C39* Osc. circuit LW trimmer ..	—
C40* Osc. circuit MW tracker ..	—
C41* Osc. circuit LW tracker ..	—
C42* 1st IF trans. pri. tuning ..	—
C43* 1st IF trans. sec. tuning ..	—
C44* 2nd IF trans. pri. tuning ..	—
C45* 2nd IF trans. sec. tuning ..	—

\* Electrolytic. † Variable. ‡ Pre-set.

## FERRANTI 513 AM—Continued

### TABLE AND DIAGRAMS OF SWITCH UNITS

SWITCH	SW	MW	LW
S <sub>1</sub>	<b>C</b>	—	—
S <sub>2</sub>	—	<b>C</b>	—
S <sub>3</sub>	—	—	<b>C</b>
S <sub>4</sub>	—	—	<b>C</b>
S <sub>5</sub>	<b>C</b>	—	—
S <sub>6</sub>	<b>C</b>	<b>C</b>	—
S <sub>7</sub>	<b>C</b>	—	—
S <sub>8</sub>	<b>C</b>	<b>C</b>	—
S <sub>9</sub>	<b>C</b>	<b>C</b>	—
S <sub>10</sub>	<b>C</b>	—	—

### CIRCUIT ALIGNMENT

**IF Stages.**—Connect signal generator between the grid (top cap) of **V1** via a 0.01  $\mu$ F condenser and the earth terminal. Switch the set on, and turn volume control to maximum. Feed in a 450 KC/S signal, and adjust **C42**, **C43**, **C44** and **C45** in that order for maximum output.

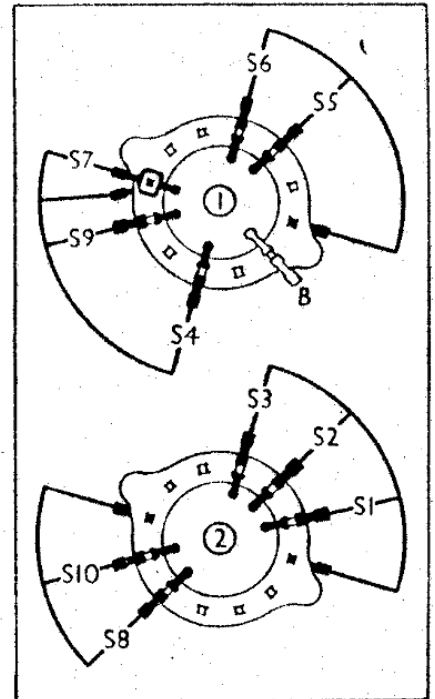
**RF and Oscillator Stages.**—**SW**—Connect signal generator via a SW dummy aerial to **A** and **E**. Switch set to SW, feed in an 18 MC/S (16.7 m) signal, turn gang to minimum, and adjust **C37** for maximum output. The correct peak is that produced with the lower trimmer capacity.

**MW**—Use a standard dummy aerial. Switch set to MW and keeping gang at minimum feed in a 200 m (1,500 KC/S) signal and adjust **C38** for maximum output, choosing the peak requiring the lower capacity.

Inject a 228 m (1,316 KC/S) signal, tune it in, and adjust **C35** for maximum output.

Tune to 500 m on scale, inject a 500 m (600 KC/S) signal, and adjust

Diagrams of the switch units, as seen from the rear of the underside of the chassis.



**C40** for maximum output, rocking the gang slightly for optimum results. Repeat the MW adjustments.

**LW**—Switch set to LW, feed in a 1,128 m (266 KC/S) signal, tune to 1,128 m on the scale, and adjust **C39** for maximum output, rocking the gang for optimum results. Feed in an 1,807 m (166 KC/S) signal, tune to 1,807 m on scale, and adjust **C41** for maximum output, again rocking the gang. Any adjustment of **C39** affects **C41** and vice versa, so continue adjusting these alternately until no further improvement in output is obtained.

**Image Filter.**—Keep set switched to LW, feed in a 261 m (1,149 KC/S) signal, tune in the image at about 1,200 m and adjust **C33** for *minimum* output.

**IF Filter.**—Feed in a 450 KC/S signal, switch set to MW and turn gang to maximum. Adjust **C32** for *minimum* output.