

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.

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	Coupling to V3 AVC diode	0.00015
C19	IF by-pass condenser	0.00005
C20	V3 cathode by-pass	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*	HT smoothing	24.0
C30*	HT smoothing	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.

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 SW 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	1st IF trans. { Sec... }	8.9
L17	2nd IF trans. { Pri... }	8.9
L18	2nd IF trans. { 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	Mains RF filter chokes	3.0
T1	Speaker input trans. { Pri... }	260.0
T1	Speaker input trans. { Sec... }	0.6
S1-S10	Waveband switches	—
S11	Mains switch, ganged R9	—

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 { 85 Oscil. lator }	1.4 { 2.9 }	72	2.7
V2 VP132†	177	3.4	177	0.9
V3 TDD13C	82	2.1	—	—
V4 PenDD-102†	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.

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.

FERRANTI 513 AM—Continued

TABLE AND DIAGRAMS OF SWITCH UNITS

SWITCH	SW	MW	LW
S ₁	C	—	—
S ₂	—	C	—
S ₃	—	—	C
S ₄	—	—	C
S ₅	C	—	—
S ₆	C	C	—
S ₇	C	—	—
S ₈	C	C	—
S ₉	C	C	—
S ₁₀	C	—	—

CIRCUIT ALIGNMENT

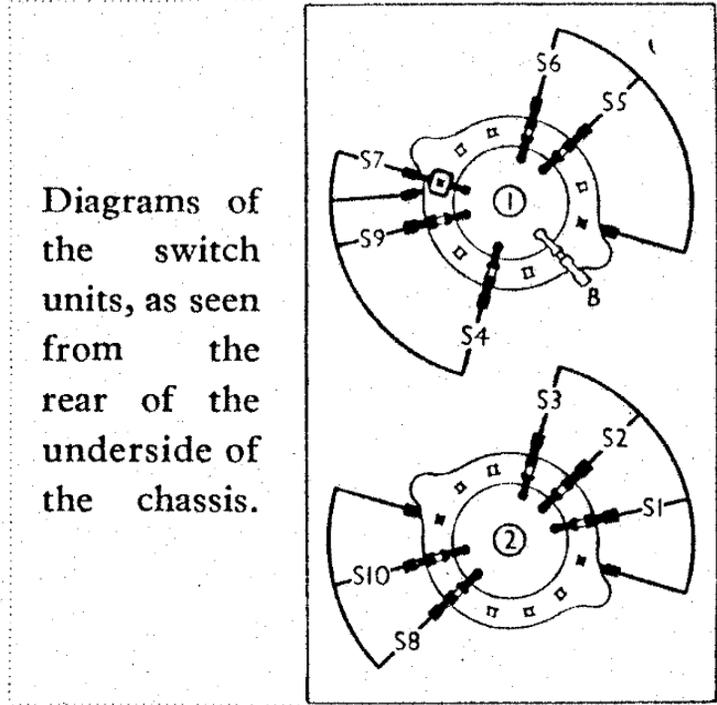
IF Stages.—Connect signal generator between the grid (top cap) of **V1** via a 0.01 μ F condenser and the earth terminal. Switch the set on, and turn volume control to maximum. Feed in a 450 KC/S signal, and adjust **C42**, **C43**, **C44** and **C45** in that order for maximum output.

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



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.