

COMPONENTS AND VALUES

RESISTANCES	Values (ohms)
R1	V1 osc. CG resistance .. 50,000
R2	1st IF trans. damping on auto .. 50
R3	V1 osc. anode HT feed .. 10,000
R4	V1, V2 SG's HT feed .. 40,000
R5	IF stopper .. 100,000
R6	V3 signal diode load .. 500,000
R7	Manual volume control .. 1,000,000
R8	V3 triode anode load .. 250,000
R9	Part V3 triode GB circuit .. 10,000
R10	HT potential divider resist- .. 20,000
R11	ances .. 250
R12	AVC line decoupling .. 1,000
R13	V3 AVC diode load .. 2,000,000
R14	Variable tone control .. 2,000,000
R15	Part of fixed tone corrector .. 500,000
R16	V1 CG resistance .. 20,000
R17	V1 GB resistance .. 500,000
R18	V1, V2, fixed GB; part AVC .. 450
R19	delay .. 50
R20	V4 anode stabiliser .. 100
R21	V1 osc. anode and V1, V2 SG .. 10,000
R22	HT feed resistances .. 10,000

CONDENSERS	Values (μF)
C1	Aerial LW fixed trimmer .. 0.00005
C2	1st IF trans. pri. trimmer .. 0.00009
C3	1st IF trans. sec. trimmer .. 0.00009
C4	Small coupling .. Very low
C5	AVC line decoupling .. 0.05
C6	V1 osc. CG condenser .. 0.0001
C7	HT circuit RF by-pass .. 0.1
C8	Osc. circuit SW tracker .. 0.004
C9	Osc. circuit LW fixed trimmer .. 0.0001
C10	Osc. circuit MW fixed tracker .. 0.0004
C11	Osc. circuit LW fixed tracker .. 0.00015
C12	V1 osc. anode coupling .. 0.001
C13	V1, V2 SG's decoupling .. 0.1
C14	2nd IF trans. pri. trimmer .. 0.00009
C15	2nd IF trans. sec. trimmer .. 0.00009
C16	Coupling to V3 AVC diode .. 0.00005
C17	IF by-pass .. 0.00018
C18	V3 cathode RF by-pass .. 0.05
C19	IF by-pass .. 0.00018
C20	AF coupling to V3 triode .. 0.02
C21*	V3 cathode AF by-pass .. 6.0
C22	Part of variable tone control .. 0.005
C23	V3 triode to V4 AF coupling .. 0.02
C24	V4 CG IF by-pass .. 0.0004
C25	Part of fixed tone corrector .. 0.01
C26*	V4 cathode by-pass .. 50.0
C27*	HT smoothing .. 12.0
C28*	.. 4.0
C29*	.. 4.0
C30*	.. 12.0
C31	Mains RF by-pass .. 0.002
C32†	Aerial IF filter tuning ..
C33†	Aerial 261 m filter tuning ..

CONDENSERS (Continued)	Values (μF)
C34†	Aerial circuit SW trimmer ..
C35†	Aerial circuit MW trimmer ..
C36†	Aerial circuit LW trimmer ..
C37†	Aerial circuit manual tuning ..
C38†	Oscillator circuit manual tuning ..
C39†	Osc. circuit MW trimmer ..
C40†	Osc. circuit LW trimmer ..
C41†	Osc. circuit SW trimmer ..
C42†	Osc. circuit LW tracker .. 0.0002
C43†	Osc. circuit LW tracker .. 0.00007
C44†	1st IF trans. pri. tuning .. 0.00007
C45†	1st IF trans. sec. tuning .. 0.00007
C46†	2nd IF trans. pri. tuning .. 0.00007
C47†	2nd IF trans. sec. tuning .. 0.00007
C48	Automatic tuning aerial coupling .. 0.00001
C49†	AUTOMATIC TUNING UNIT aerial
C50	Oscillator
C51†	Aerial
C52	Oscillator
C53†	Aerial
C54	Oscillator
C55†	Aerial
C56	Oscillator
C57†	Aerial
C58	Oscillator
C59†	Aerial
C60	Oscillator
C61†	Aerial
C62	Oscillator
C63†	Aerial
C64	Oscillator
C65†	Aerial
C66	Oscillator
C67†	Aerial
C68	Oscillator
C69†	Aerial
C70	Oscillator
C71†	Aerial
C72	Auto osc. circuit temperature compensating condenser .. 0.00004

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS	Approx. Values (ohms)
L1	MW aerial IF filter coil .. 35.0
L2	LW aerial 261 m filter coil .. 5.0
L3	Aerial SW coupling coil .. 0.25
L4	Aerial MW coupling coil .. 35.0
L5	Aerial LW coupling coil .. 65.0
L6	Aerial SW tuning coil .. Very low
L7	Aerial MW tuning coil .. 2.5
L8	Aerial LW tuning coil .. 25.0
L9	Osc. circuit SW tuning coil .. 0.05
L10	Osc. circuit MW tuning coil .. 5.0
L11	Osc. circuit LW tuning coil .. 12.0
L12	Oscillator SW reaction .. Very low
L13	Oscillator MW reaction .. 1.5

OTHER COMPONENTS (Continued)	Approx. Values (ohms)
L14	Oscillator LW reaction .. 3.0
L15	1st IF trans. pri. .. 9.5
L16	Part IF trans. coupling on auto .. 0.8
L17	1st IF trans. sec. .. 9.5
L18	2nd IF trans. { Pri. .. 9.5
L19	{ Sec. .. 9.5
L20	Speaker speech coil .. 2.0
L21	Hum neutralising coil .. 0.25
L22	Speaker field coil .. 1,000.0
L23	Aerial automatic tuning cir- .. 85.0
L24	cuit coils .. 1.15
L25	Oscillator automatic tuning circuit coil, total .. 9.5
T1	Speaker input trans. { Pri. .. 220.0
	{ Sec. .. 0.4
T2	Mains trans. { Pri., total .. 45.0
	{ Heater sec. .. 0.2
	{ Rect. heat. sec. .. 0.2
	{ HT sec., total .. 450.0
S1-S3	Manual waveband switches ..
S5-S12	Auto manual change switches ..
S14	Radio gram change switches ..
S23-S32	Scale/auto indicator lamps ..
S33	switches ..
S34-S35	Mains switch, gauged R7 ..
S36-S38	Auto selector switches ..
S39-S50	..

VALVE ANALYSIS

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 X63	290	2.7	75	2.1
V2 6K7G	155	4.0	75	0.9
V3 6Q7G	290	3.9	75	0.9
V4 6F6G	80	0.5	290	6.8
V5 5Y3G	275	38.0	290	6.8
	358†			

† Each anode, AC.

Valve voltages and currents given in the table above are those measured in our receiver when it was operating on mains of 227 V, using the centre tapping on the mains transformer. 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.

FERRANTI 515PB—Continued

GENERAL NOTES

Switches.—S1-S37 are ganged in four rotary units beneath the chassis. These are indicated in our under-chassis view, and shown in detail in the diagrams in col. 3. The table (col. 3) gives the switch positions for the five control settings, starting from fully anti-clockwise. A dash indicates open, and C closed.

S38 is the QMB mains switch, ganged with the volume control R7.

S39-S50 are the auto-selector switches incorporated in the push-button unit. Each button controls two of the switches, which close when the button is depressed. The switches are shown in detail in a separate view of the auto unit.

Coils.—L1 is on the chassis deck, and the remainder of the RF and oscillator coils, including those used solely in the automatic tuning circuits (L23-L25), are beneath the chassis. The IF transformers L15-L17 and L18, L19 are in two screened units on the chassis deck. Each contains a number of additional components.

Scale and Indicator Lamps.—These are three Osram MES type bulbs, rated at 6.5 V, 0.3 A. They have small bulbs (type S).

External Speaker.—Two sockets are provided on the internal speaker connection panel for a low impedance (2 to 3 Ω) external speaker.

Condensers C27, C30.—These are two 12 μF dry electrolytic types, in a large tubular unit fitted to one side of the chassis. The black lead is the common negative, the red lead to V5 holder is the positive of C27, and the other red lead the positive of C30.

Condensers C28, C29.—These are two 4 μF dry electrolytic types, in a carton beneath the chassis having a common negative (black) lead. The red lead to the junction of R21 and R22 is the positive of C28, and the red lead to the junction of R22 and R3 is the positive of C29.

Auto Unit.—The three connections to the auto unit are indicated by the letters A to C in the under-chassis view, the view of the auto-unit, and the circuit diagram.

Ten different station groupings, each embodying six out of fourteen alternative stations, are available. The values of the aerial and oscillator circuit fixed trimmers for these stations are given in a table in col. 2, and the types of pre-set trimmers used are also indicated.

CIRCUIT ALIGNMENT

IF Stages.—Turn volume control to maximum, gang condenser to minimum, and switch set to LW. Connect signal generator to control grid (top cap) of V1 (via a 0.05 μF fixed condenser) and chassis. Feed in a 450 KC/S signal, and adjust C44, C45, C46 and C47 for maximum output.

RF and Oscillator Stages.—Connect signal generator via a suitable dummy aerial to A and E sockets.

MW.—Switch set to MW, keep gang at minimum, feed in a 200 m (1,500 KC/S) signal and adjust C39 for maximum output. Feed in a 228 m (1,316 KC/S) signal, tune it in, and adjust C35 for maximum output.

Feed in a 500 m (600 KC/S) signal, tune it in, and adjust C42 for maximum output, rocking the gang for optimum results.

Turn gang to maximum, feed in a 450 KC/S signal, and adjust C32 for minimum output.

AUTOMATIC TRIMMER CAPACITIES

Pre-set stations	Aerial Circuit		Oscillator Circuit	
	Fixed	Pre-set	Fixed	Pre-set
R. Normandie	—	Y	0.000212	X
L. Nat.	0.000035	Y	0.000016	X
Stagshaw	0.000035	Y	0.000016	X
West Reg.	0.000055	Y	0.000028	X
Mtd. Reg.	0.000065	Y	0.000035	X
N. Ireland	0.000075	Y	0.00004	X
Lond. Reg.	0.00012	Y	0.000062	X
Welsh Reg.	0.00016	Y	0.000082	X
Scot. Reg.	0.00018	Y	0.000093	X
Hilversum	0.000215	Y	0.00011	X
N. Reg.	0.00027	Y	0.00013	X
Athlone	0.00041	Y	0.000184	X or Y
Luxembourg	0.00311	Y	0.00052	Y
Droitwich	0.00441	Y	0.000585	Y

X trimmers are special silvered ceramic types.

Y trimmers are all 0.00005 μF maximum.

Repeat the 200, 228 and 500 m adjustments.

LW.—Switch set to LW, tune to 1,128 m on scale, feed in a 1,128 m (266 KC/S) signal, and adjust C40, then C36, for maximum output.

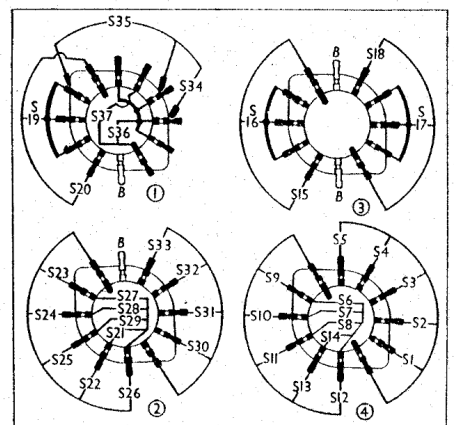
Feed in a 1,800 m (166.5 KC/S) signal, tune it in, and adjust C43 for maximum output, while rocking the gang for optimum results.

Tune to 1,200 m on scale, feed in a strong 261 m (1,149 KC/S) signal, and adjust C33 for minimum output.

Return to 1,128 m and re-adjust C40 and C36, then re-adjust C43 at 1,800 m. Repeat until no further improvement results.

SW.—Switch set to SW, and use a SW dummy aerial. Turn gang to minimum, feed in a 16.67 m (18 MC/S) signal, and adjust C41 for maximum output. The peak requiring the least trimmer capacity is the correct one. Now tune to 20 m on the scale, feed in a 20 m (15 MC/S) signal, and adjust C34 for maximum output.

Switch	SW	MW	LW	Auto	Gram
S1	C	—	—	—	—
S2	—	C	—	—	—
S3	—	—	C	—	—
S4	—	—	—	C	—
S5	—	—	—	—	C
S6	—	C	—	C	C
S7	C	C	C	C	C
S8	—	C	—	C	C
S9	C	—	—	—	—
S10	—	C	—	—	—
S11	—	—	C	—	—
S12	—	—	—	—	C
S13	—	—	—	C	—
S14	C	C	C	—	C
S15	—	—	—	C	—
S16	C	C	C	—	—
S17	C	C	C	—	C
S18	—	—	—	C	—
S19	C	C	C	—	—
S20	—	—	—	C	—
S21	C	C	C	—	C
S22	—	—	—	C	—
S23	C	—	—	—	—
S24	—	C	—	—	—
S25	—	—	C	—	—
S26	—	—	—	—	C
S27	—	C	C	C	C
S28	C	C	C	C	C
S29	C	C	—	C	C
S30	C	—	—	—	—
S31	—	C	—	—	—
S32	—	—	C	—	—
S33	—	—	—	C	—
S34	C	C	C	C	—
S35	—	—	—	—	C
S36	C	C	C	—	C
S37	—	—	—	C	—



Switch diagrams, as seen from the rear of the underside of the chassis.