"TRADER" SERVICE SHEET

JOY'S RADIO SERVICE



HE Ferranti 115 is provided with a heater HE Ferranti 115 is provided with a heater transformer, but is otherwise designed on the lines of an A.C./D.C. receiver. It is a 4-valve (plus rectifier) 3-band superhet operating from A.C. mains only of 200-250 V, 50-100 c/s. The waveband ranges are 16-50 m, 190-570 m and 1,000-2,000 m. There is an export model 1151 which is the same in general as the Home model, but it has tappings for 105-115 V, 120-135 V and 200-255 V mains and is fitted with a 1 A fuse. Release date and original price: July 1951 [16 9s 2d plus purchase tax.

CIRCUIT DESCRIPTION

Aerial input via coupling coils L2 (S.W.), L3 (M.W.) or L4 (L.W.) to single tuned circuits L5, C36 (S.W.), L6, C36 (M.W.) and L7, C36 (L.W.) which precede triode hexode valve (V1, Mullard ECH42) operating as frequency changer with internal coupling. I.F. filtering by L1, C2. Oscillator grid coils L8 (S.W.), L9 (M.W.) and L10 (L.W.) are tuned by C37. Trimming by C38 (S.W.), C39 (M.W.) and C11, C40 (L.W.); series tracking by C12 (S.W.), C13 (M.W.) and C14 (L.W.).

tracking by C12 (S.W.), C13 (M.W.) and C14 (L.W.).

Second valve (V2, Mullard EF41) is a variable mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings C6, L14, L15, C7 and C17, L16, L17, C18

Intermediate frequency 470 kc/s.

Diode signal detector is part of double diode triode valve (V3, Mullard EBC41). Audio frequency component in rectified output is developed across diode load R9 and passed via C23, volume control R10 and C24 to grid of triode section. I.F. filtering by C19, R8, C20. Provision is made for the connection of a gramophone pick-up across C23, R10 via S20 which closes in the gram position of the waveband control.

Second diode of V3 is fed via C21 from V2

band control.

Second diode of V3 is fed via C21 from V2 anode, and the resulting D.C. potential developed across load resistor R15 is fed back as bias to V1 and V2 giving automatic gain control.

Resistance-capacitance coupling by R13, C25 and R16 between V3 triode anode and pentode

output valve (V4, Mullard EL41). Variable tone control in grid circuit by R16, R17, G26, G27. Negative feed-back, developed across R22, pro-

Negative feed-back, developed across R22, provides fixed tone correction.

H.T. current is supplied by I.H.C. full-wave rectifying valve (V5, Mullard EZ40) whose anodes are connected together via surge limiting resistors R20, R21, to form a half-wave rectifier. Smoothing by R23, R24 and electrolytic capacitors C29, C30, C31.

Heater transformer T2 supplies the heaters of all the valves, including V5, from a single secondary winding. The scale lamp is connected to tapping a.

COMPONENTS AND VALUES

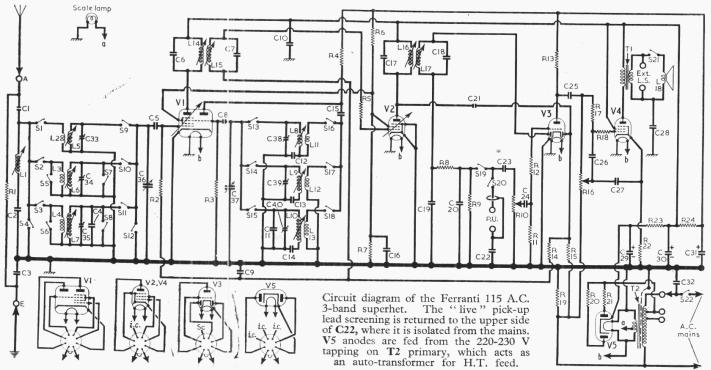
RESISTORS	Values	Loca- tions
R1	33kΩ 1MΩ 47kΩ 22kΩ 3.3kΩ 27kΩ 100kΩ 1MΩ 22MΩ 1MΩ 22MΩ 1MΩ 220kΩ 1MΩ 220kΩ 100kΩ 470kΩ 100kΩ 470kΩ 100	F5 F4 F5 F4 E5 E4 E2 E4 E4 E4 E4 E4 E4 E4 E4 E4 E4 E4 E4 E4

	CAPACITORS	Values	Loca- tions
C1	Aerial series	$0.001 \mu F$	F5
C2	I.F. filter tune	30pF	F5
C3	Chassis isolator	$0.02 \mu F$	F5
C4	L.W. aerial trim,	$100 \mathrm{pF}$	F5
C5	V1 C.G	200pF	G5
C6	} 1st I.F. trans. {	100pF	B2
C7	\ \tuning \\	100pF	B2
C8	V1 osc, C.G	$50 \mathrm{pF}$	A2
C9	A.G.C. decoupling	$0.1\mu F$	E4
C10	H.T. by-pass	$0.1 \mu F$	E4
C11	L.W. osc. trim	150pF	F3
C12	S.W. osc. tracker	$0.004 \mu F$	F3
C13	M.W. osc. tracker	520pF	G4
C14	L.W. osc. tracker	200pF	G3
C15	Osc. anode coup	200pF	F5
C16	S.G. decoupling	$0.1\mu F$	E4
C17	2nd I.F. trans.	100pF	B2
C18	} tuning {	300pF	B2
C19	TE by pages	100pF	E5
C20	I.F. by-passes {	100pF	E5
C21	A.G.C. coupling	$50 \mathrm{pF}$	E5
C22	P.U. isolator	$0.02 \mu F$	E4
C23) . ($0.01 \mu F$	E3
C24	A.F. couplers	$0.01 \mu F$	E4
C25]	$0.005 \mu F$	D4
C26	Bort tone control	$0.002 \mu F$	$\overline{D4}$
C27	Part tone control	$200 \mathrm{pF}$	D4
C28	Ext. L.S. isolator	$0.02\mu F$	E5
C29*		$32\mu F$	B1
C30*	H.T. smoothing	$32\mu F$	B1
C31*] ,	$16\mu F$	Bi
C32	Mains R.F. by-pass	$0.02 \mu F$	E3
C33‡	S.W. aerial trim	50pF	B2
C34‡	M.W. aerial trim	$50 \mathrm{pF}$	A2 .
C35‡	L.W. aerial trim	50pF	A2
$C36\dagger$	Aerial tuning	- L	A1
C37†	Oscillator tuning	-	A1
C38‡	S.W. osc. trim	50pF	B1
C39‡	M.W. osc. trim.	$50 \mathrm{pF}$	B1
C40‡	L.W. osc. trim.	50pF	B1

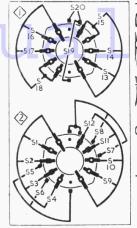
* Electrolytic.

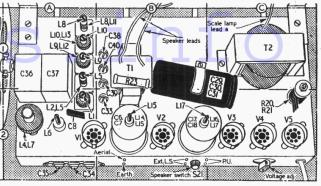
† Variable.

‡ Pre-set.



ОТН	HER COMPONENTS	Approx. Values (ohms)	Loca- tions
L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11 L12 L13 L14 L15 L16 L17 L18 T1 T2 S1-S20 S21 S22	Aerial coupling coils Aerial tuning coils Oscillator tuning coils coils	18·0 30·0 48·0 10·0 10·0 10·0 10·0 10·0 10·0 10·0	A2 A1 G5 A2 A1 G5 A2 A1 A1 A1 A1 A1 B2 B2 B2 B2 B2 C1 G3 B2 D3
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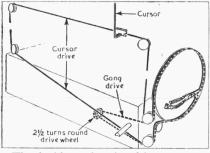




Waveband switch diagrams (left) and plan view of the chassis (above). The waveband switches are viewed from the rear of an inverted chassis, and the associated table is below them in col. 2.

GENERAL NOTES

Switches .- \$1-\$18 are the waveband switches, and \$19, \$20 are the radio/gram change-over switches, ganged in two rotary units. These are indicated in our underside illustration of the chassis, and shown in detail in the diagrams inset beside the plan view, where they are drawn as seen from the rear of an inverted chassis. The table below them gives the switch



The double-cord tuning drive system, drawn as seen from the front righthand corner.

positions for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and C,

Scale Lamp.—This is rated at 6.2 V, 0.3 A and has a large clear spherical bulb and an M.E.S. base. It is connected via a blue lead from the mains transformer to a tapping on the heater secondary winding.

External speaker.—Two sockets are provided at the rear of the chassis for the connection of a low impedance $(2\cdot3\,\Omega)$ external speaker.

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Switches	S.W.	M.W.	L.W.	Gram
S1	С	_	<u>, , , , , , , , , , , , , , , , , , , </u>	
S2		C		
S3			С	_
S4				C
S5	C			
S6	С	C		
S7	CCC			
88	С	C	-	
89	С			
S10		С	C	
S11			С	_
S12				C
S13	C			_
S14		C		
S15			U	
S16	C	c		
S17		C		
S18		garane.	C	-
S19	С	C	C	-
S20				С

A screw-type switch \$21 permits the internal

A screw-type switch \$21 permits the internal speaker to be muted.

Drive Gord Replacement.—There are two separate drive cords, one for the gang and one for the cursor. About four feet of nylon braided glass yarn is required for the gang drive, and about six feet for the cursor drive. They should be run as shown in the accompanying sketch, where both systems are drawn together as seen when viewed from the front right-hand corner of the chassis when the gang is at maximum capacitance. The lengths quoted allow plenty for tying off.

CIRCUIT ALIGNMENT

Remove chassis from cabinet and stand it on its mains transformer end on the bench. Check that the mains lead is connected so that the chassis is not "live."

1.F. Stages.—Switch receiver to L.W., turn gang to maximum and connect output of signal

1

generator, via an 0.1 µF capacitor, to control
grid (pin 6) of V1 and chassis. Feed in a
470 kc/s (638.3 m) signal and adjust the cores
of L17, L16, L15 and L14 (location references
B2, E5, F5) for maximum output. Repeat these
adjustments until no further improvement re-
sults. It should be noted that two peaks are
obtainable when adjusting the cores, the correct
one being with the core set further out from
the coil.
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obtainable when adjusting the cores, the correct one being with the core set further out from the coil.

R.F. and Oscillator Stages.—As the tuning scale remains fixed in the cabinet when the chassis is withdrawn, reference must be made during alignment to the substitute scale printed on the side of the tuning drive drum. The calibration frequencies on this scale are read off against the wire cursor which is bolted to the chassis. Check that with the gang at maximum capacitance this cursor coincides with the vertical line marked "LMS" on the substitute scale. Transfer signal generator leads, via a suitable dummy aerial, to A and E sockets.

M.W.—Switch receiver to M.W., tune to 600 kc/s on the substitute scale, feed in a 600 kc/s (500 m) signal and adjust the cores of L9 (A1) and L6 (A2) for maximum output. Tune receiver to 1,500 kc/s, feed in a 1,500 kc/s (200 m) signal and adjust the core of L1 (A2) for minimum output. Tune receiver to highest wavelength end of scale, feed in a 470 kc/s (638.3 m) signal and adjust the core of L1 (A2) for minimum output. L. W.—Switch set to L. W., tune to 186.6 kc/s, feed in a 166.6 kc/s (1,800 m) signal and adjust the cores of L10 (A1) and L7 (G4) for maximum output. Tune receiver to 266 kc/s, feed in a 266 kc/s (1,128 m) signal and adjust C40 (B1) and C55 (A2) for maximum output. Repeat these operations.

S. W.—Switch receiver to S.W., tune to 6.6 Mc/s mark on substitute scale, feed in 6.67 Mc/s (20 m) signal and adjust C40 (B1) and C35 (A2) for maximum output. If two peaks are found with L8, adjust to the peak with the core further out. Tune receiver to 15 Mc/s, feed in a 15 Mc/s (20 m) signal and adjust C40 (B1) and C43 (B2) for maximum output. If two peaks are found when adjusting C38, it should be set to the lower capacitance peak. Repeat these adjustments.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' information, and were measured under no-signal conditions. Voltage readings were measured with a Model 7 Avometer, chassis being the negative connection in every case.

	Anode		Screen		Cath.
Valve	v	mA	V	mA	V
V1 ECH42 V2 EF41 V3 EBC41 V4 EL41 V5 EZ40	$\begin{cases} 230 & \text{Osci} \\ 0\text{Sci} \\ 110 & 230 & \text{66} \\ 216 & 220 \\ \end{cases}$	$\left\{ \begin{array}{c} 2 \cdot 4 \\ 4 \cdot 0 \\ 3 \cdot 6 \\ 0 \cdot 55 \\ 29 \cdot 0 \end{array} \right\}$	70 70 230	2·3 1·1 4·0	

† A.C. reading.

(D)	(F)	(F)(F)	(G)
3 RI6 522	RIO C32	C12 -C23	
R24 C26 C25 C27 R17 R13		R2 R6 C1	
Mains lead (5) V4	RIS RI4 RE 0	C15 C3 C4 C2 C2 C2 R5 C4 C2 R5 C4 C2 R5 C4	64 L3,L6
TT 1 '1 1 ' 0.			4 4 4 4 4

Underside drawing of the chassis. The switch units 1 and 2 are shown in detail above.

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