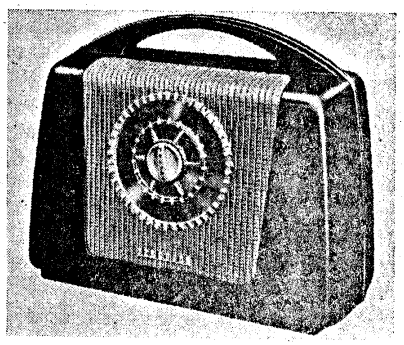
"TRADER" SERVICE SHEET

1243

FERGUSON 342BU

4-valve 2-band A.C./D.C./A.D. Portable



EMPLOYING an internal ferrite rod aerial, the Ferguson 342BU is a 2-band 4-valve (plus metal rectifier) mains/battery portable superhet. It is designed to operate either from all-dry batteries or from A.C. or D.C. mains of 200-250 V, 40-100 c/s, in the case of A.C. The waveband ranges are 194-561 m and 1,088 to 1,918 m.

Release date and original price: September 1955, £12 17s 9d. Batteries and purchase tax extra.

CIRCUIT DESCRIPTION

Aerial input by **L1** and loading coil **L3** which shunts **L2** (M.W.), and **L1, L2** (L.W.). Coils **L1** and **L2** are mounted at opposite ends of a length of ferrite rod to form the M.W. and L.W. internal aerial. Aerial tuning by **C4**.

First valve **(V1, Mullard DK96)** is a heptode valve operating as frequency changer with electron coupling. A single oscillator tuning coil **L6** is employed, and for L.W. operation is shunted by **C13**. Parallel trimming by **C12** (M.W.) and **C14** (L.W.); series tracking by **C10, C15.**

Second valve **(V2, Mullard DF96)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned tranformer couplings **C7, L4, L5, C8** and **C16, L8, L9, C17.**

Intermediate frequency 470 kc/s.

Diode signal detector is part of diode pentode valve **(V3, Mullard DAF96).** Audio frequency component in its rectified output is developed across volume control **R8,** which acts as diode load, and is passed via **C19** to pentode section which operates a A.F. amplifier.

D.C. component developed across **R8** is fed back as bias to **V1** and **V2** giving automatic gain control. D.C. standing bias for **V1** and **V2** is derived from potential divider formed by **R22, R8** and **R7.**

Resistance-capacitance coupling by **R11, C22** and **R12** between **V3** and pentode output valve **V4 (Mullard DL96).** Tone correction by **C23.** Resistors **R17, R18, R20** and **R21** by-pass the H.T. currents past the valve filaments.

For mains operation, switches **S6 (M)** and **S7 (M) close.** H.T. current is supplied by metal rectifier **MR1 (Westinghouse 18RA11161).** H.T. smoothing by **R14,** voltage adjustment **R15** and electrolytic capacitors **C24, C25.** Filament current is derived from the H.T. circuit via ballast resistor **R13. V4** deserves its grid bias from its position in the filament chain.

For battery operation, switches **S8 (B)** and **S9 (B)** close. Grid bias for **V4** is developed across **R19** in the H.T. negative circuit.

GENERAL NOTES

Switches.—S1-S5 are the band switches, ganged in a single rotary unit on the control panel. The unit is indicated in the plan illustration of the chassis and shown in detail in the diagram inset in the top left-hand corner of the circuit diagram below. With the band control turned fully anti-clockwise for L.W. operation **S3, S5** close. For M.W. operation **S1, S2, S4** close.

S6(M)-S9(B) are the mains/battery switches which are operated by inserting or withdrawing the mains connector to the receiver. For mains operation, switches **S6 (M)** and **S7 (M)** close as indicated by the suffix (M). For battery operation, switches **S8 (B)** and **S9 (B)** close. The individual switch contacts are identified in the mains connector in the underchassis illustration.

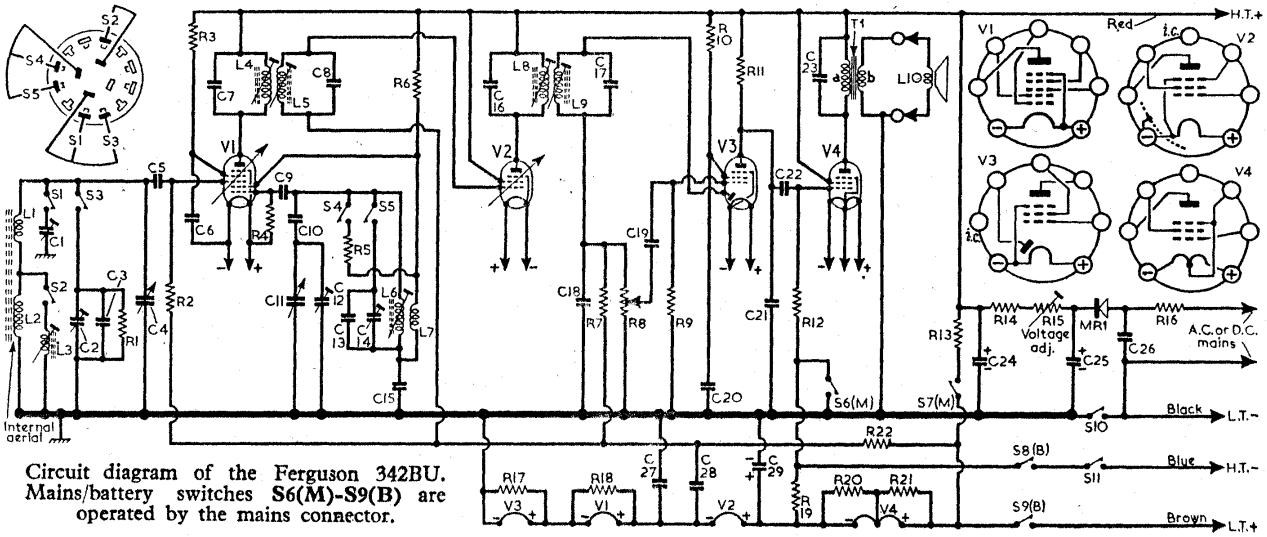
Voltage Adjustment R15.—This is accessible through the base of the receiver. In earlier models the panel covering this control must first be removed, but in later models this is not necessary as a hinged flap is provided in the panel. The correct setting of the control is indicated by a scale calibrated in 10 V steps between 200 V and 250 V.

(*continued col. 1 overleaf*)

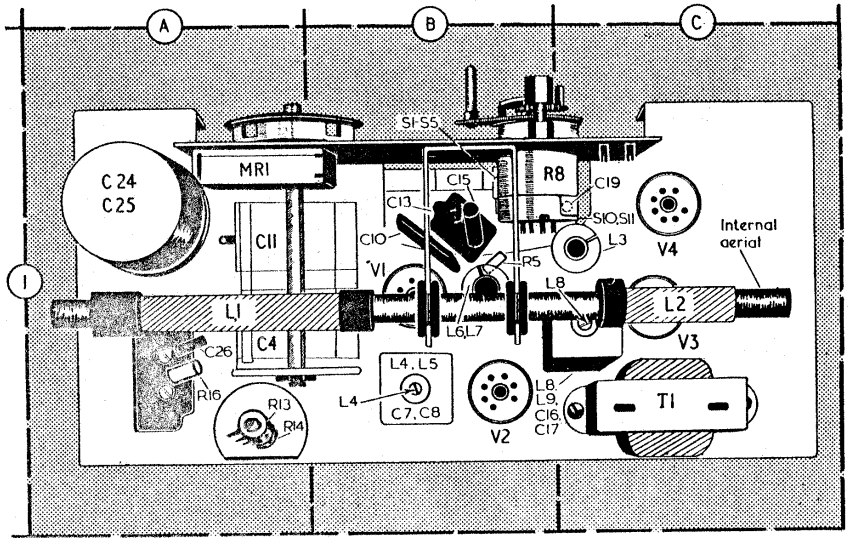
RESISTORS		Values	Locations
R1	L.W. aerial shunt	100kΩ	E2
R2	V1 C.G.	2·2MΩ	E3
R3	V1 S.G. feed	100kΩ	F3
R4	V1 osc. C.G.	27kΩ	F3
R5	M.W. osc. limiter	100kΩ	B1
R6	Osc. anode feed	33kΩ	F3
R7	A.G.C. decoupling	2·2MΩ	E3
R8	Volume control	1MΩ	B1
R9	V3 C.G.	10MΩ	D3
R10	V3 S.G.	6·8MΩ	E3
R11	V3 anode load	2·2MΩ	E3
R12	V4 C.G.	2·2MΩ	D2
R13	Filament ballast	3kΩ	A1
R14	H.T. smoothing	2·25kΩ	A1
R15	Voltage adj.	1·5kΩ†	F3
R16	Surge limiter	500Ω	A1
R17	Filament H.T. shunts	330Ω	E2
R18	Filament H.T. shunts	1kΩ	F2
R19	V4 G.B.	560Ω	E2
R20	Filament H.T. shunts	240Ω	D2
R21	Filament H.T. shunts	330Ω	D2
R22	V1, V2 G.B.	6·8MΩ	D3

†Wire-wound variable potentiometer, Colvern CL901.

CAPACITORS		Values	Locations
C1	M.W. aerial trim.	50pF	E2
C2	L.W. aerial trimmers	50pF	E2
C3	L.W. aerial trimmers	160pF	E2
C4	Aerial tuning	528pF	A1
C5	V1 C.G.	100pF	E2
C6	V1 S.G. decoupling	0·01μF	F2
C7	1st I.F.T. tuning	200pF	B1
C8	1st I.F.T. tuning	200pF	B1
C9	V1 osc. C.G.	100pF	E2
C10	Osc. tracker	660pF	B1
C11	Oscillator tuning	528pF	A1
C12	M.W. osc. trim.	50pF	F2
C13	L.W. osc. trimmers	460pF	B1
C14	L.W. osc. trimmers	50pF	F2
C15	Osc. tracker	0·005μF	B1
C16	2nd I.F.T. tuning	200pF	C1
C17	2nd I.F.T. tuning	200pF	C1
C18	I.F. by-pass	100pF	E3
C19	A.F. coupling	0·001μF	C1
C20	V3 S.G. decoupling	0·01μF	D3
C21	I.F. by-pass	30pF	D3
C22	A.F. coupling	500pF	D3
C23	Tone correction	0·003μF	E2
C24	H.T. smoothing	50μF	A1
C25	H.T. smoothing	50μF	A1
C26	Mains R.F. by-pass	0·002μF	A1
C27	Filament by-pass	0·5μF	E3
C28	A.G.C. decoupling	0·01μF	F3
C29	Filament by-pass	100μF	D3



Circuit diagram of the Ferguson 342BU. Mains/battery switches **S6(M)-S9(B)** are operated by the mains connector.



Left: Plan illustration of chassis.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Internal aerial coils	—	A1
L2	Internal aerial coils	3·5	C1
L3	M.W. loading coil	0·5	C1
L4	1st I.F.T. Pri.	8·0	B1
L5	1st I.F.T. Sec.	8·0	B1
L6	Oscillator tuning	2·0	B1
L7	Oscillator reaction	—	B1
L8	2nd I.F.T. Pri.	8·0	C1
L9	2nd I.F.T. Sec.	8·0	C1
L10	Speech coil	2·5	—
T1	O.P. trans. a	600·0	C1
	O.P. trans. b	—	—
MR1*	H.T. rectifier	—	A1
S1-S5	Band switches	—	B1
S6(M)-S9(B)	Mains/battery sw.	—	G3
S10-S11	On/off sw., g'd R8	—	B1

* Westinghouse 18RA11161.

General Notes—*continued*

Drive Cord Replacement.—About 24 inches of nylon braided glass yarn is required for a new drive cord. Set the control drive drum and bracket so that its pin is at 3 o'clock as indicated in the sketch of the drive cord system in column 3, where it is viewed from front of upright chassis. Turn the gang to maximum capacitance and tie off one end of the cord to the gang drive drum boss. Take the cord out through the slot in the drum at 5 o'clock and run on as shown in the sketch. Finally, slacken the gang drive drum fixing screws and with the gang fully closed, rotate the drum clockwise until the "V" notch in the control drum bracket coincides with the locating hole in the panel behind it. Tighten fixing screws.

Batteries.—H.T., Ever Ready B126, Drydex Drymax 526, or Oldham KL26, rated at 90 V; L.T., Ever Ready Alldry 38, Drydex H1187, or Oldham K782, rated at 7.5 V.

CIRCUIT ALIGNMENT

Apparatus Required.—A signal generator covering the range of 200-1,600 kc/s; an output meter; two 0.01 μF isolating capacitors.

I.F. Stages

1.—Remove chassis from cabinet (see dismantling instructions).
2.—Connect output of signal generator via an 0.01 μF capacitor in each lead, between chassis and the junction of **C4, C5.**
3.—Connect output meter across **T1** secondary winding.
4.—Switch receiver to M.W. and turn gang to maximum. Feed in a 470 kc/s signal and adjust the cores of **L9** (location reference E3), **L8** (C1), **L5** (F3) and **L4** (B1) for maximum output.
5.—Repeat the adjustments in operation 4 until no further improvement results, reducing the input as the circuits come into line to prevent A.G.C. operation.

R.F. and Oscillator Stages

6.—Replace chassis in cabinet, leaving off the battery holders and the base cover.
7.—Couple output of signal generator to receiver by laying the output leads near the ferrite rod aerial.
8.—Check that with gang at maximum capacitance, the cursor coincides with the brown dot at the high wavelength end of the scale.
9.—Switch receiver to M.W., and tune it to brown calibration dot at left-hand end of tuning scale.
10.—Feed in a 1,540 kc/s signal and adjust **C12** (F2) for maximum output.
11.—Turn gang to maximum capacitance, feed in a 535 kc/s signal and adjust the core of **L6** (E3) for maximum output.
12.—Feed in a 1,400 kc/s signal, tune it in on receiver, and adjust **C1** (E2) for maximum output.
13.—Feed in a 535 kc/s signal, tune it in on receiver, and adjust the core of **L3** (E2) for maximum output.
14.—Repeat operations 12 and 13 until no further improvement results.
15.—Switch receiver to L.W. and tune it to red calibration dot at 1,400 m. Feed in a 214.3 m signal and adjust **C14** (F2) and **C2** (E2) for maximum output.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' information. They were measured on a receiver operating from A.C. mains of 230 V with the voltage adjustment control correctly set. Readings obtained when the receiver was operating from a new set of batteries were approximately the same.

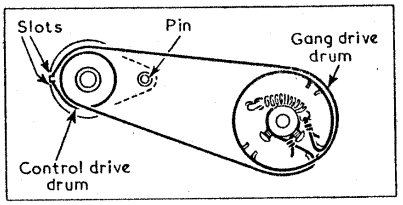
Voltages were measured on the 250 V range of a Model 8 Avometer, chassis being the negative connection. The voltage measured across **R19** was 4.1 V (negative connection to junction **R12, R19**). The filament current was 25 mA.

Valve	Anode		Screen	
	V	mA	V	mA
V1 DK96 ...	85	0·6	70	*
	Oscillator			
	30	1·6		
V2 DF96 ...	85	1·2	85	0·5
V3 DAF96 ...	17	*	18·5	*
V4 DL96 ...	81·5	4·8	85	0·9
MR1† ...	213‡	—	—	—

* Less than 0·5 mA. † Westinghouse 18RA11161. ‡ A.C. voltage.

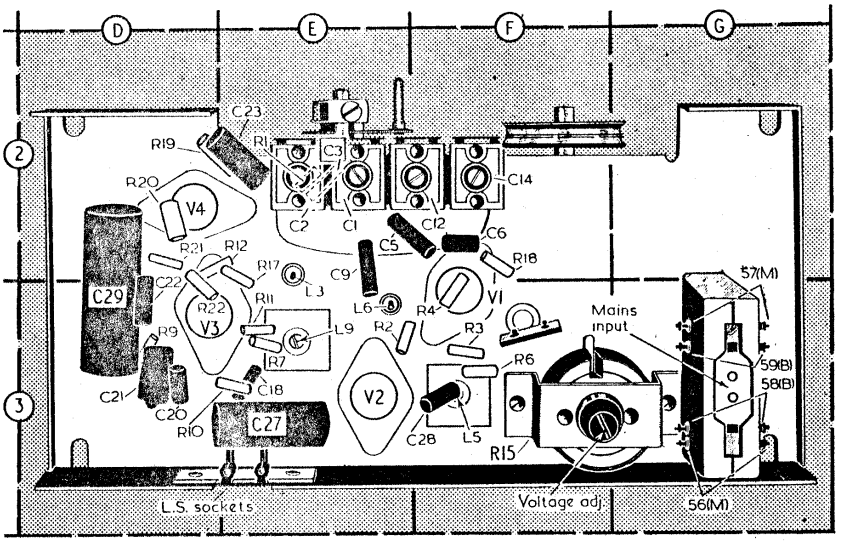
DISMANTLING

Removing Chassis.—Place receiver on its back and remove sliding base panel;
remove cardboard battery compartment by bending its edges inwards clear of the cabinet sides (in earlier models the compartment was secured by three self-tapping screws);
remove control knobs. The two outer discs are held in position by the volume control knob; by inserting the end of a screwdriver under the bushes of the control knobs from the inside of the cabinet, and levering against the front edge of the chassis, the knobs can be prised off;
remove single 6BA screw securing chassis to front of cabinet, and four self-tapping screws securing it to lugs on the inside of the cabinet, and withdraw chassis.



Above: Sketch of the drive cord system.

Below: Underside illustration of chassis.



Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1.