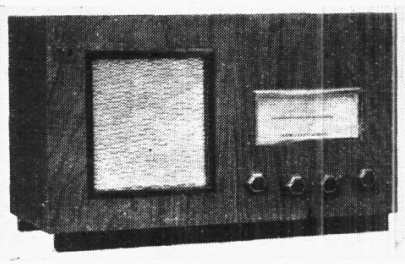
"TRADER" SERVICE SHEET

662

FERRANTI UNA

UNIVERSAL AC/DC TRF CONSOLETTE



DESIGNED for use with AC or DC mains of 200-250 V, the Ferranti Una Universal is a 3-valve (plus rectifier) 2-band TRF receiver.

A Droitwich rejector is included in one of the alternative aerial input leads, for use in districts close to the LW transmitter. The second aerial lead includes a series condenser on LW only. The heaters of the valves used are rated at 0.3 A.

Release date: September, 1935.
Original price: £8 18*s.* 6*d.*

CIRCUIT DESCRIPTION

Alternative aerial input, from socket **A1** via Droitwich rejector circuit **L1, C17,** or from **A2** socket via series condenser **C1** (LW only. **C1** is short-circuited by **S1** on MW), then via mains isolating condenser **C2** and coupling coils **L2, L3** to single-tuned circuit **L4** (MW), plus **L5** (LW), and **C18,** which precedes variable-mu RF pentode valve **(V1, Osram metallised W31)** operating as signal frequency amplifier with gain control by **R2.**

Tuned-secondary RF transformer coupling by **L6, L8, L9** and **C20** between **V1** and triode valve **(V2, Osram metallised H30),** which operates as grid leak detector with **C9** and **R6.** Reaction is applied from anode and controlled by variable condenser **C22.**

Resistance-capacity coupling by **R7, C11, R8,** via grid stopper **R9,** between **V2** and pentode output valve **(V3, Osram N31).** Fixed tone correction by **C12.**

When the receiver is operating from AC mains, HT current is supplied by IHC rectifying valve **(V4, Osram U30),** the two halves being connected in parallel to act as a half-wave rectifier. On DC mains, the valve behaves as a low resistance. Smoothing is effected by speaker field **L12** and dry electrolytic condensers **C14, C15.**

Valve heaters, together with scale lamp and ballast resistor **R11,** are connected in series across mains input circuit. Filter circuit comprising air-cored chokes **L13, L14** and condenser **L16** suppresses mains-borne interference.

COMPONENTS AND VALUES

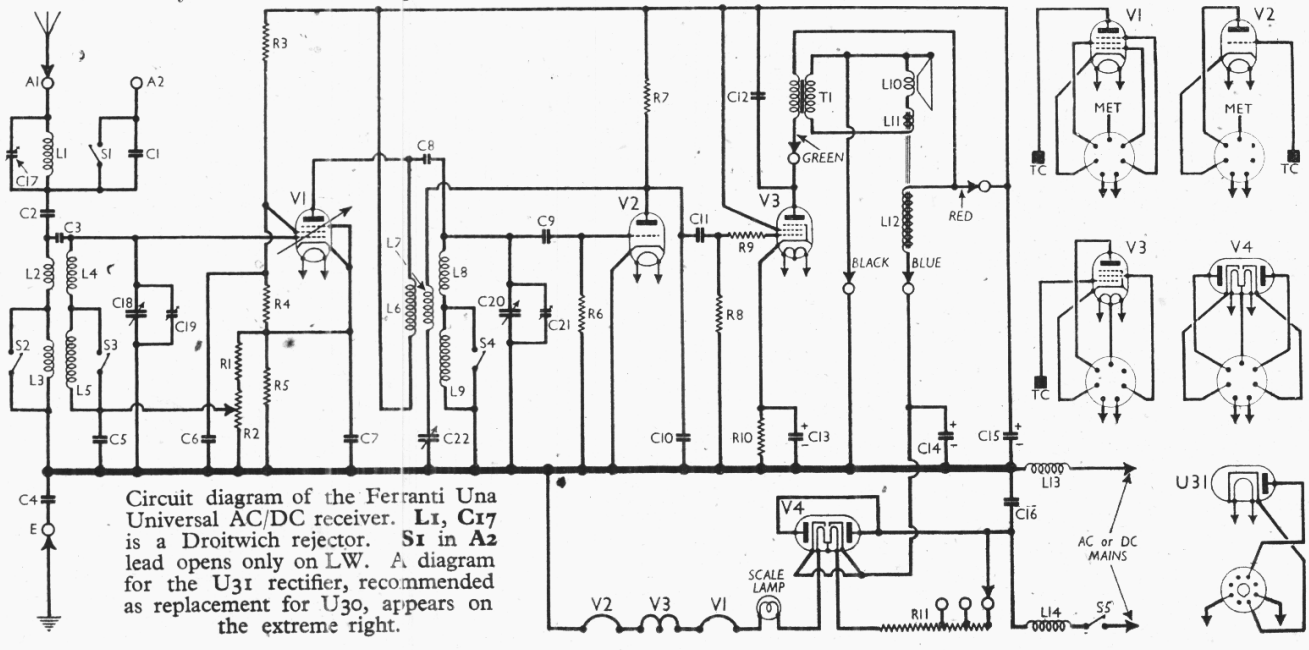
	RESISTORS	Values (ohms)
R1	V1 fixed GB resistor ...	300
R2	V1 gain control	50,000
R3	V1 SG and GB potential divider	30,000
R4		50,000
R5		30,000
R6	V2 grid leak	1,000,000
R7	V2 anode load	50,000
R8	V3 CG resistor	500,000
R9	V3 grid stopper ...	50,000
R10	V3 GB resistor	140
R11	Heater circuit ballast ...	547*

* Tapped at 380 Ω + 100 Ω + 67 Ω from V4 heater end.

	CONDENSERS	Values (μF)
C1	A2 series condenser ...	0·0003
C2	Aerial isolator	0.002§
C3	"Top" coupling ...	0·000005
C4	Earth isolator	0·05§
C5	V1 CG decoupling ...	0·05
C6	V1 SG decoupling ...	0·1
C7	V1 cathode by-pass ...	0·05
C8	"Top" coupling ...	0·000005
C9	V2 CG condenser ...	0·00015
C10	RF by-pass	0·0005
C11	V2 to V3 AF coupling ...	0·05
C12	Fixed tone corrector ...	0·01
C13*	V3 cathode by-pass ...	25·0
C14*	HT smoothing condensers	8·0
C15*		24·0
C16	Mains RF by-pass ...	0·1§
C17‡	Droitwich rejector tuning	—
C18†	Aerial circuit tuning ...	—
C19‡	Aerial MW trimmer ...	—
C20†	RF trans. sec. tuning ...	—
C21‡	RF trans. sec. MW trimmer	—
C22†	Reaction control ...	0·0003

* Electrolytic. † Variable. ‡ Pre-set. § 1,500 v. test.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Droitwich rejector coil ...	40·0
L2	Aerial coupling coils ...	10·0
L3		26·0
L4	Aerial tuning coils ...	6·0
L5		33·0
L6	RF trans. primary ...	35·0
L7	Reaction coil	10·0
L8	RF trans. secondary coils	6·0
L9		34·0
L10	Speaker speech coil ...	4·0
L11	Hum neutralising coil ...	0·5
L12	Speaker field coil ...	700·0
L13	Mains filter chokes ...	3·0
L14		3·0
T1	Speaker input trans. Pri. ...	250·0
	Sec. ...	0·3
S1–S4	Waveband switches ...	—
S5	Mains switch, ganged R2	—



Circuit diagram of the Ferranti Una Universal AC/DC receiver. **L1, C17** is a Droitwich rejector. **S1** in **A2** lead opens only on LW. A diagram for the U31 rectifier, recommended as replacement for U30, appears on the extreme right.

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VALVE ANALYSIS

Valve voltages and currents given in the table below are computed from information provided by the makers. Voltages were measured on the 300 V scale of a Ferranti AC/DC circuit tester (resistance 300,000 Ω) whose negative lead was connected to chassis.

The receiver was operating from AC mains of 220 V, 50 c/s, and there was no signal input.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 W31	220	3·0	95	2·0
V2 H30	90	2·4	—	—
V3 N31	215	35·0	220	6·0
V4 U30	255†	—	—	—

† Cathode to chassis, DC.

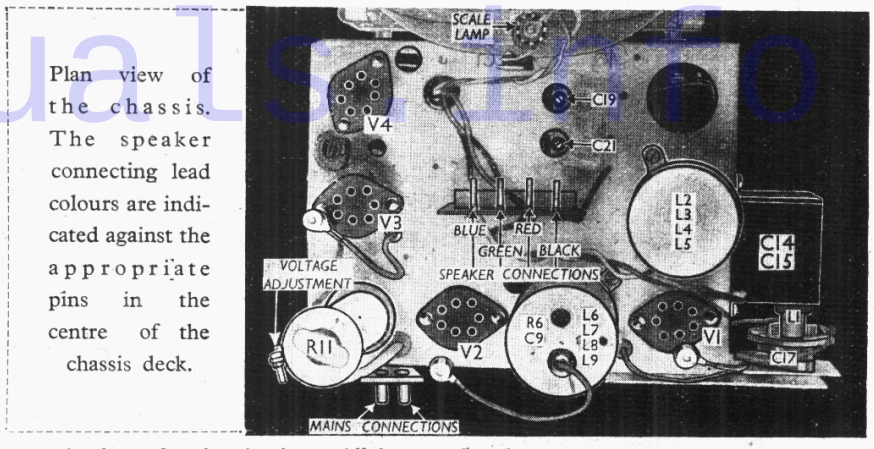
DISMANTLING THE SET

Removing Chassis.—Remore the four control knobs (pull off);
withdraw from the connecting panel in the centre of the chassis deck the four speaker connecting leads;
remove the four screws holding the chassis to the base of the cabinet, when the chassis may be withdrawn.
When replacing, the speaker leads should be replaced according to the arrangement shown in our plan view, where the lead colour is marked against each pin.

Removing Speaker.—Withdraw the connecting leads and remove the nuts from the four bolts holding the speaker to the sub-baffle.
When replacing, the transformer should be on top. Connect the leads as indicated in our plan view.

GENERAL NOTES

Switches.—S1-S4 are the waveband switches, ganged in a single rotary unit beneath the chassis. This is indicated in our under-chassis view, and shown in detail in the diagram (next col.) where it is drawn as seen in the direction of the arrow in the under-chassis view. All four switches close on MW (anti-clockwise position of the control spindle) and open on LW (clockwise).



Plan view of the chassis. The speaker connecting lead colours are indicated against the appropriate pins in the centre of the chassis deck.

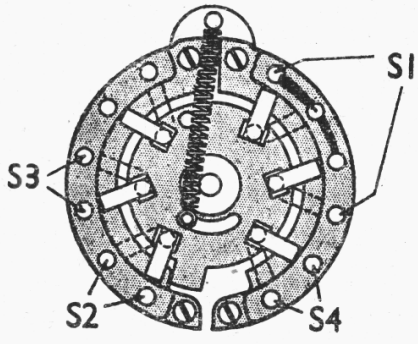


Diagram of the waveband switch unit, as seen when viewed from the rear of the underside of the chassis.

R5 is QMB mains switch, ganged with the gain control **R2.**

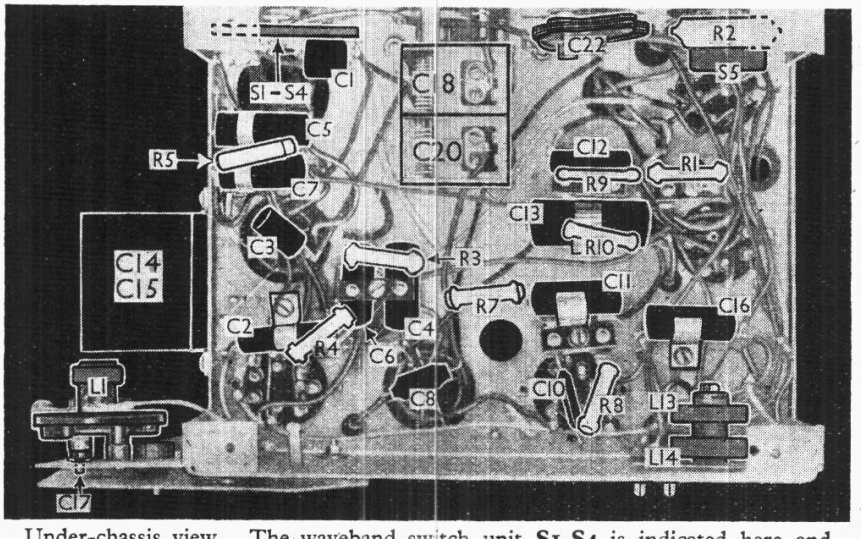
Coils.—The aerial, RF transformer and reaction coils are in two screened units on the chassis deck, **R6** and **C9** also being contained in the **L6-L8** unit. The Droitwich rejector coil **L1** and its tuning condenser **C17** are mounted on a metal plate at one end of the rear of the chassis. The mains RF filter chokes **L13, L14** are mounted together at the other end.

Scale Lamp.—This is an Osram "S" type lamp, with an MES base. It is rated at 6.5 V, 0.3 A.

Condensers C14, C15.—These are two electrolytics in a single cardboard container mounted on one side of the chassis. The red lead is the positive of **C14** (8 μF), and the yellow lead that of **C15** (24 μF). The black lead is the common negative connection.

Alternative Rectifier.—Where replacements are required for **V4,** the Osram U30 valve which is now obsolete, a suitable alternative is the Marconi or Osram U31, which, however, is fitted with an international octal base. It will, therefore, be necessary to replace the existing valveholder with an octal type, and wire it up accordingly. For this purpose, a diagram showing the base connections of the U31 is given in the bottom right-hand corner of the circuit diagram overleaf, just below that for the original valve.

Replacements for the N31, **V3,** will be made automatically by the KT31, which is an equivalent.



Under-chassis view. The waveband switch unit **S1-S4** is indicated here and shown in detail in the diagram in col. 2 above. **L1, C17** form a separate unit at one end of the chassis.

CIRCUIT ALIGNMENT

Connect the signal generator leads via a suitable dummy aerial to **A2** and **E** terminals. At the minimum and maximum position of the gang, the pointer should be equally close to either end of the scale. Turn the volume control to maximum, and the reaction control to minimum.

MW.—Switch set to MW, tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal and adjust **C21** and **C19** for maximum output. Now advance the reaction control to a point just short of oscillation, and readjust **C21,** then the reaction control, and so on, until optimum results are obtained. Check calibration at 300 m (1,000 kc/s) and 500 m (600 kc/s).

LW.—There are no LW adjustments, but the calibration and sensitivity should be checked at several points.

Droitwich Rejector.—This is best adjusted while receiving the undesired transmission, using the normal aerial at **A1** terminal. Tune it in well, and adjust **C17** for minimum output.

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