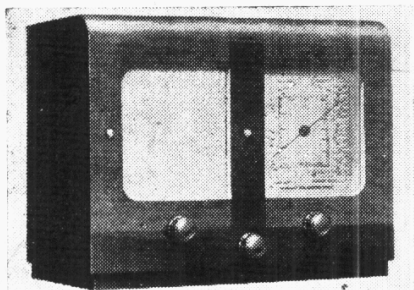


"TRADER" SERVICE SHEET
512

FERRANTI 539

ALL-DRY SUPERHET



THE Ferranti 539 receiver is a 4-valve 2-band all-dry table superhet, covering the MW and LW ranges. A standard type combined HT and LT battery is employed, and GB is automatic. The valves used are the Ferranti equivalents of the American 1.4V series.

Release date: August, 1939.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L2** (MW) and **L3** (LW) to single tuned circuits **L4**, **C19** (MW) and **L5**, **C19** (LW) which precede heptode frequency changer (**V1**, Ferranti 1A7G).

Oscillator grid coils **L6** (MW) and **L7** (LW) are tuned by **C20**. Parallel trimming by **C21** (MW) and **C4**, **C22** (LW); series tracking by **C5**, **C23** (MW) and **C6**, **C24** (LW). Reaction by coils **L8** (MW), **L9** (LW) and common impedance of trackers.

Second valve (**V2**, Ferranti 1N5G) operates as IF amplifier with tuned-primary, tuned-secondary transformer couplings.

Intermediate Frequency 450 KC/S.

Diode second detector is part of single diode triode valve (**V3**, Ferranti 1H5G). AF component in rectified output is developed across load resistance **R5** and passed via **C11** and manual volume control **R6** to CG of triode section. DC potential across **R5** is fed back via **R4**, **C1** as GB to FC and IF valves, giving AVC.

Resistance-capacity coupling by **R7**, **C13**, **R8** between **V3** triode and pentode output valve (**V4**, Ferranti 1C5G). Fixed tone correction by **C15**.

GB for **V4** is obtained automatically from drop along **R9** in negative HT lead to chassis.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with a new HT battery. The receiver was tuned to the lowest wavelength on the MW band, and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 400 V scale of the model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 1A7G	88	0.16	32	0.65
	Oscillator			
	62	1.0		
V2 1N5G	88	0.8	88	0.2
V3 1H5G	25	0.06	—	—
V4 1C5G	85	7.7	88	1.7

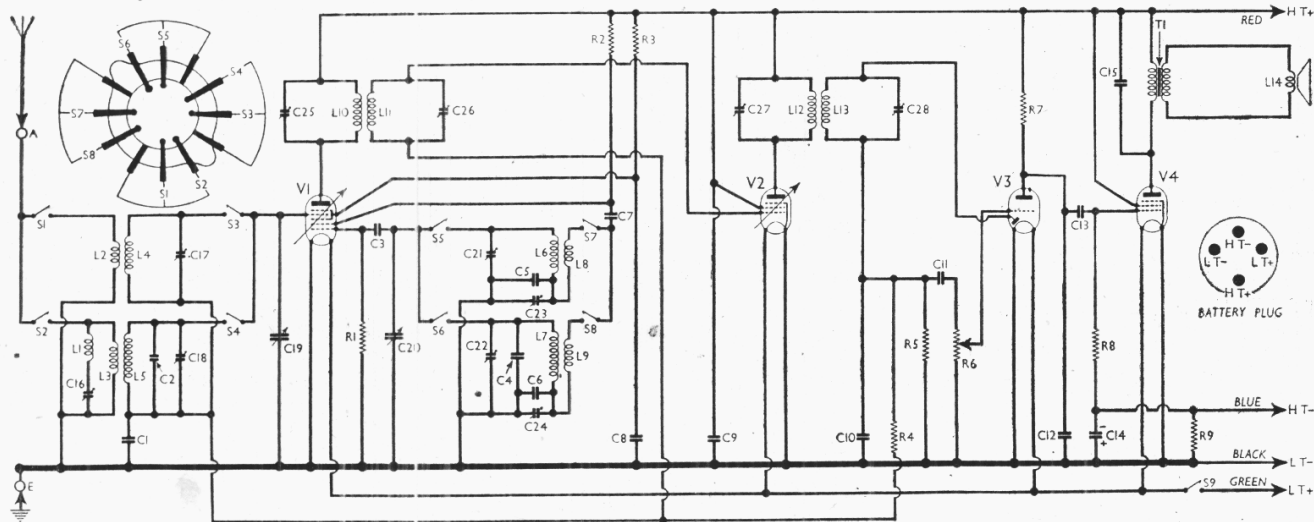
COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 osc. CG resistance ...	200,000
R2	V1 osc. anode HT feed ...	20,000
R3	V1 SG HT feed ...	75,000
R4	AVC line decoupling ...	4,000,000*
R5	V3 diode load ...	500,000
R6	Manual volume control ...	1,000,000
R7	V3 triode anode load ...	500,000
R8	V4 CG resistance ...	1,000,000
R9	V4 GB resistance ...	600

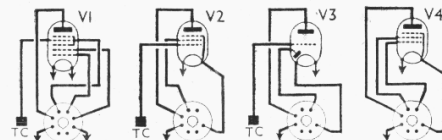
* Made up of two 2,000,000 Ω in series.

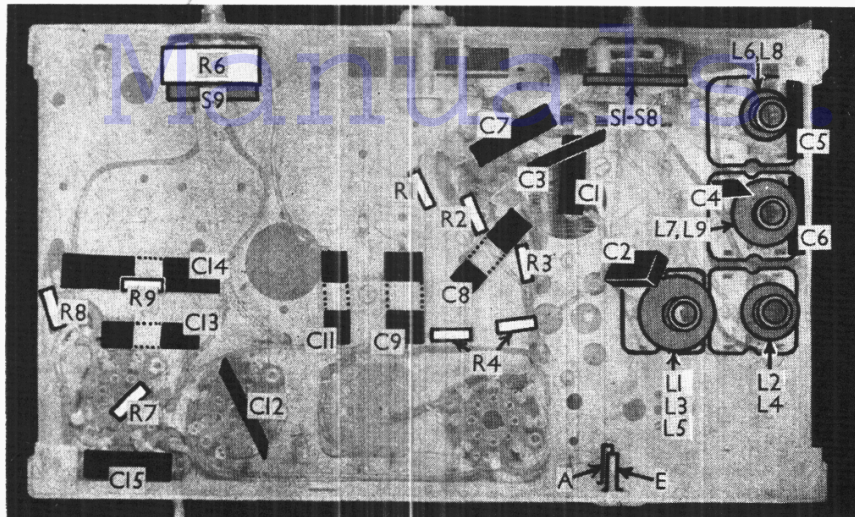
CONDENSERS		Values (μF)
C1	AVC line decoupling ...	0.05
C2	Aerial LW fixed trimmer ...	0.00005
C3	V1 osc. CG condenser ...	0.00015
C4	Osc. LW fixed trimmer ...	0.001
C5	Osc. MW fixed tracker ...	0.0004
C6	Osc. LW fixed tracker ...	0.00015
C7	V1 osc. anode coupling ...	0.002
C8	HT decoupling ...	0.1
C9	HT circuit RF by-pass ...	0.25
C10	IF by-pass ...	0.00018
C11	AF coupling to V3 triode ...	0.01
C12	IF by-pass ...	0.0003
C13	V3 triode to V4 coupling ...	0.01
C14*	Auto GB by-pass ...	6.0
C15	Fixed tone corrector ...	0.005
C16†	Aerial 261 filter tuning ...	0.00007
C17†	Aerial circ. MW trimmer ...	0.00002
C18†	Aerial circ. LW trimmer ...	0.00007
C19†	Aerial circuit tuning ...	—
C20†	Oscillator circuit tuning ...	—
C21†	Osc. circuit MW trimmer ...	0.00007
C22†	Osc. circuit LW trimmer ...	0.00007
C23†	Osc. circuit MW tracker ...	0.0002
C24†	Osc. circuit LW tracker ...	0.00007
C25†	1st IF trans. pri. tuning ...	0.0002
C26†	1st IF trans. sec. tuning ...	0.0002
C27†	2nd IF trans. pri. tuning ...	0.0002
C28†	2nd IF trans. sec. tuning ...	0.0002

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Ferranti 539 all-dry superhet. Inset are: top left, switch diagram; on right, battery plug, viewing free ends of pins; below, valve base diagrams.





Under-chassis view. The switch unit S1-S8 is indicated here, and shown in detail in the diagram at the top left-hand corner of the circuit overleaf. All the RF and oscillator coils are mounted on their trimmer units on the right.

COMPONENTS AND VALUES
(continued)

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial 261 m. filter coil...	4.5
L2	Aerial MW coupling ...	37.0
L3	Aerial LW coupling ...	65.0
L4	Aerial MW tuning ...	2.2
L5	Aerial LW tuning ...	26.0
L6	Osc. circuit MW tuning...	2.2
L7	Osc. circuit LW tuning...	12.0
L8	Oscillator MW reaction...	0.7
L9	Oscillator LW reaction...	5.0
L10	1st IF trans. { Pri. ...	8.5
L11		Sec. ...
L12	2nd IF trans. { Pri. ...	8.5
L13		Sec. ...
L14	Speaker speech coil ...	2.4
T1	Speaker input { Pri. ...	380.0
	trans. { Sec. ...	0.3
S1-S8	Waveband switches	—
S9	LT circuit switch, ganged R6 ...	—

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (pull off); withdraw battery shelf; remove the four fixing bolts (with washers). Chassis can now be withdrawn to the extent of the speaker leads.

To free chassis entirely, unsolder the two speaker leads.

When replacing, one metal washer goes either side of bottom of cabinet on each fixing bolt. Connect the speaker leads to tags 2 and 4, counting from either end of the panel on the transformer; the remaining three tags are blank.

Removing Speaker.—Remove the two nuts and one wood screw holding the speaker to front of cabinet.

When replacing, the transformer should point towards the bottom right-hand corner, viewed from the rear.

The wood screw holds the top of the speaker to the cabinet.

GENERAL NOTES

Switches.—S1-S8 are the waveband switches, in a single rotary unit beneath the chassis. It is indicated in our under-chassis view, and shown in detail in the diagram inset at the top left-hand corner of the circuit, where it is drawn as seen from the rear of the underside of the chassis. On MW (knob anti-clockwise) S1, S3, S5 and S7 are closed, and the others are open; on LW (knob clockwise) S2, S4, S6 and S8 are closed, and the

others open. S9 is the QMB LT circuit switch, ganged with the volume control R6.

Coils.—The aerial and oscillator circuit coils L1-L9 are in four unscreened tubular units beneath the chassis. The IF transformers L10, L11 and L12, L13 are in two screened units on the chassis deck with their associated trimmers.

Condenser C14.—This is a Ferranti tubular electrolytic, rated at 6 μ F, 12 V peak. It should be noted that the positive tag goes to chassis.

Pre-set Condensers.—All the RF and oscillator trimmer and tracker adjustments are reached through holes in the chassis deck, where they are grouped about the tuning gang. The IF trimmers are in their respective units.

Battery.—The battery fitted in our

model was an Ever Ready all-dry No. 3, a combined 1.5 V LT and 90 V HT dry battery.

Battery Connections.—A four-pin plug is used for connection to the HT and LT battery. The connections are indicated in the diagram of the plug, which is viewed from the free ends of the pins, on the right of the circuit. The colour coding of the leads to the plug is: LT negative, black; LT positive, blue; HT negative, blue; HT positive, red.

CIRCUIT ALIGNMENT

IF Stages.—Turn volume control and gang to maximum, and switch set to LW. Connect signal generator to control grid (top cap) of V1 via 0.05 μ F condenser, feed in a 450 KC/S (666.67 m) signal, and adjust C25, C26, C27 and C28 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 and, with gang at minimum, feed in a 200 m (1,500 KC/S) signal, and adjust C21 for maximum output. Feed in a 228 m (1,316 KC/S) signal, tune it in, and adjust C17 for maximum output.

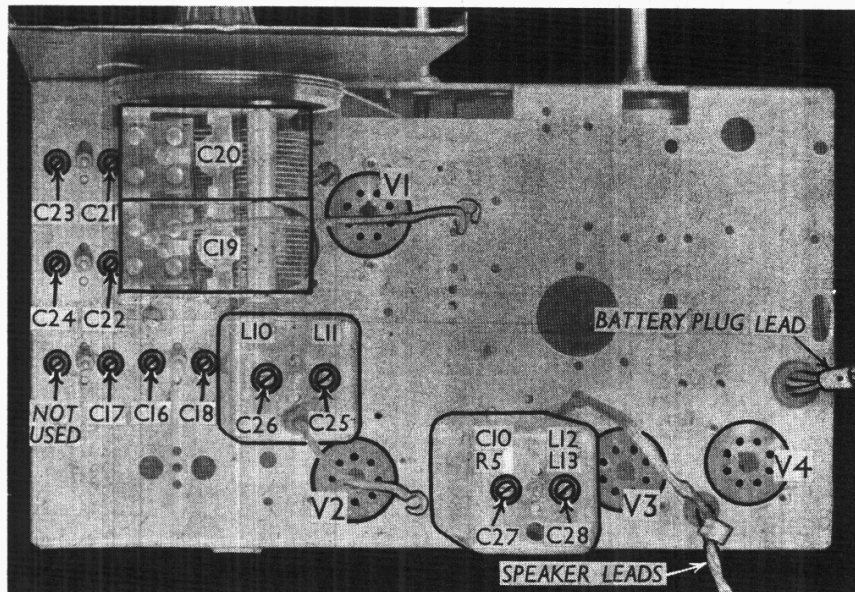
Feed in a 500 m (600 KC/S) signal, tune it in, and adjust C23 for maximum output, rocking the gang for optimum results. Repeat these adjustments.

LW.—Switch set to LW, tune to 1,128 m on scale, feed in a 1,128 m (266 KC/S) signal, and adjust C22, then C18, for maximum output.

Feed in a 1,800 m (166.5 KC/S) signal, tune it in, and adjust C24 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 C16 for minimum output.

Return to 1,128 m and readjust C22 and C18, then readjust C24 at 1,800 m. Repeat until no further improvement results.



Plan view of the chassis. All the trimmers are shown here, and are accessible when the chassis is mounted in its cabinet. One of the trimmers is unused.