

# FERRANTI 1737 AND 2037 CONSOLE

**T**HE 1737 is the *de luxe* model in the Ferranti range of receivers and employs a 4-valve (plus rectifier) A.C. all-wave superhet chassis, with a short-wave range of 19-53 m. The chassis is for mains of 200-250 V, 40-100 C/S, and has a triode output valve, a Magnascopic tuning scale, and provision for both a gramophone pick-up and an extension speaker.

An interesting point is that variable selectivity is included and is so arranged that when the tuning control is operated the control is automatically set to the position of highest selectivity.

An identical chassis is incorporated in the 2037 console receiver, but this *Service Sheet* was prepared on a 1737.

### CIRCUIT DESCRIPTION

Aerial input on M.W. and L.W. via coupling coils **L1**, **L2** to mixed coupled band-pass circuit. Primary coils **L3**, **L4** are tuned by **C29**; secondaries **L9**, **L10** are tuned by **C32**. Coupling by coil **L7** and common capacity **C2**. On short waves input is via coupling coil **L6** to single-tuned circuit **L8**, **C32**. Image suppression on M.W. and L.W. by coil **L5**.

First valve (**V1**, Ferranti metallised **VHT4**) is a heptode operating as frequency changer with electron coupling. Oscillator grid coils **L11** (S.W.), **L12** (M.W.) plus **L13** (L.W.) are tuned by **C33**; parallel trimming by **C36** (S.W.), **C34** (M.W.), and **C37** (L.W.); series tracking by **C7**, **C35** (M.W.) and **C8**, **C38** (L.W.). Anode reaction by coils **L14** (S.W.), **L15** (M.W.) plus **L16** (L.W.).

Second valve, a variable- $\mu$  R.F.

pentode (**V2**, Ferranti metallised **VPT4**), operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C39**, **L17**, **L18**, **C40** and **C41**, **L19**, **L20**, **C42**.

### Intermediate frequency 125 KC/S.

Diode second detector is part of double diode triode valve (**V3**, Ferranti **H4D** or **Mazda AC/HL/DD**). Audio frequency component in rectified output is developed across load resistance **R14** and passed via coupling condenser **C16**, link tag **X** to pick-up terminal (at rear of chassis) and manual volume control **R12** to C.G. of triode section which operates as A.F. amplifier. I.F. filtering by **R11**, **C17**, **C18**. Provision for connection of gramophone pick-up by terminals across **R12**, when radio is muted by removal of the link tag **X**.

Second diode of **V3**, fed via **C15** from **V2** anode, provides D.C. potentials which are developed across load resistances **R18**, **R19** and fed back through decoupling circuits as G.B. to F.C. (except on S.W.), and I.F. valves, giving automatic volume control. Delay voltage is obtained from drop along resistances **R15**, **R16** in cathode circuit.

Resistance-capacity coupling by **R17**, **C24** and **R22** between **V3** triode and triode output valve (**V4**, Ferranti **LP4** or **Marconi** or **Osram PX4**). Provision for connection of low impedance external speaker across secondary of internal speaker input transformer **T1**. Switch **S16** permits internal speaker speech coil circuit to be broken, thus muting the internal speaker if desired.

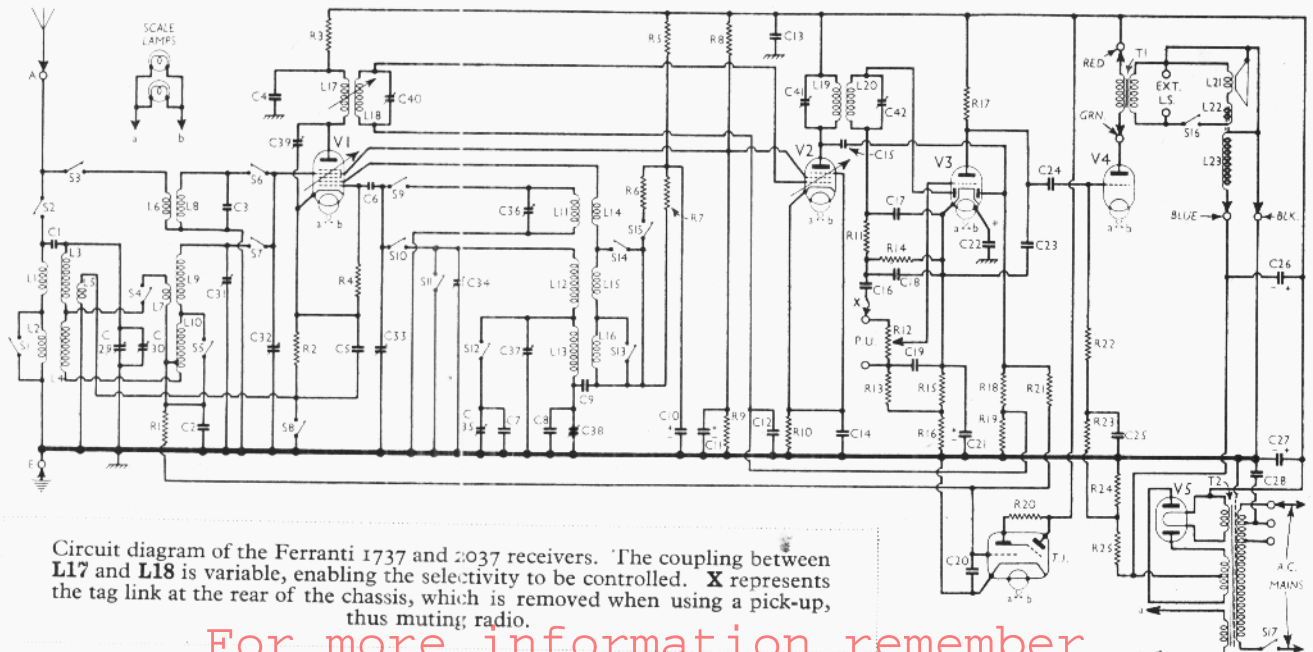
G.B. potential for **V4** is obtained from potential divider **R24**, **R25** connected across speaker field coil **L23** in H.T. negative lead to chassis.

Cathode-ray tuning indicator (**T.I.**, Ferranti **VFT4**), fed via decoupling circuit **R21**, **C20**, is operated by potential developed across A.V.C. diode load resistances **R18**, **R19**.

H.T. current is supplied by full-wave rectifier (**V5**, Ferranti **R4**). Smoothing by speaker field coil and dry electrolytic condensers **C26**, **C27**. R.F. filtering in H.T. circuit by **C13**.

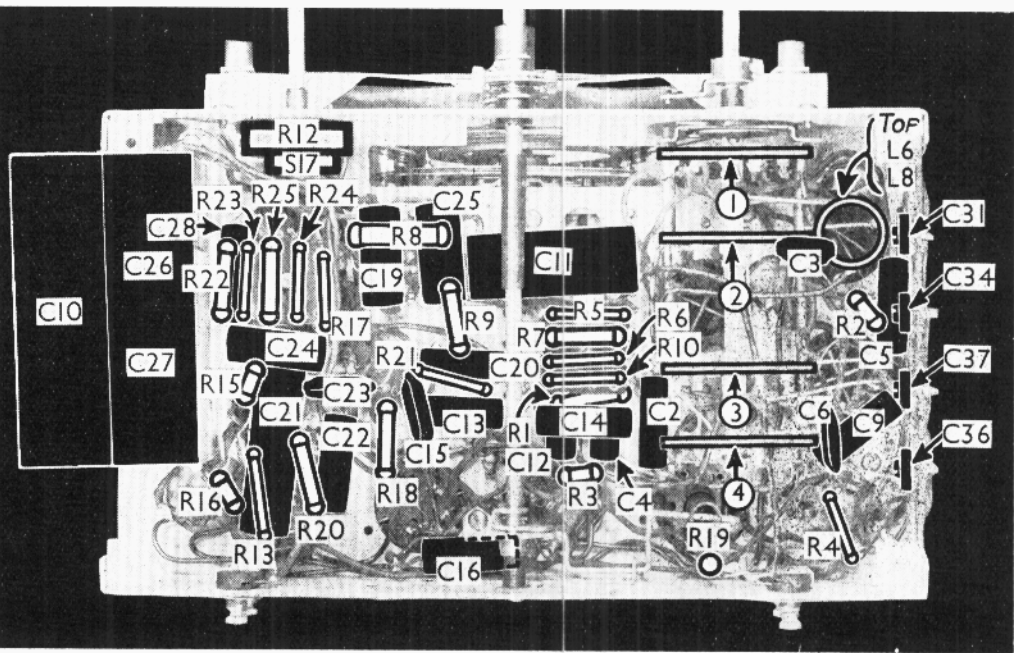
### COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 tetrode C.G. decoupling	250,000
R2	V1 fixed tet. G.B. resistance	300
R3	V1 tetrode anode H.T. feed	1,000
R4	V1 osc. C.G. resistance	100,000
R5	V1 osc. anode H.T. feed	30,000
R6	V1 osc. anode S.W. stabiliser	1,000
R7	V1 osc. anode M.W. and L.W. stabiliser	120,000
R8	V1, V2 S.G.'s potential divider	25,000
R9	V1, V2 S.G.'s potential divider	50,000
R10	V2 fixed G.B. resistance	600
R11	I.F. stopper	100,000
R12	Manual volume control	1,000,000
R13	V3 triode C.G. decoupling	100,000
R14	V3 signal diode load	500,000
R15	V3 triode G.B. and A.V.C. diode voltage resistances	1,700
R16	V3 triode anode load	8,000
R17	V3 triode anode load	40,000
R18	V3 A.V.C. diode load resistances	4,000,000
R19	V3 A.V.C. diode load resistances	1,000,000
R20	T.I. anode H.T. feed	1,000,000
R21	T.I. C.G. decoupling	1,000,000
R22	V4 C.G. resistance	250,000
R23	V4 C.G. decoupling	60,000
R24	Automatic G.B. potential divider	100,000
R25	Automatic G.B. potential divider	250,000



Circuit diagram of the Ferranti 1737 and 2037 receivers. The coupling between **L17** and **L18** is variable, enabling the selectivity to be controlled. **X** represents the tag link at the rear of the chassis, which is removed when using a pick-up, thus muting radio.

Under-chassis view. Diagrams of the four switch units are on page VIII. Note the four pre-set condensers on the right of the chassis. L6 and L8 are the aerial S.W. coils.



CONDENSERS		Values (μF)
C1	Aerial M.W. coupling condenser	0.000016
C2	Band-pass bottom coupling	0.05
C3	Aerial circuit S.W. trimmer	0.00001
C4	V1 tet. anode decoupling	0.1
C5	V1 cathode by-pass	0.05
C6	V1 osc. C.G. condenser	0.00005
C7	Osc. circuit M.W. fixed tracker	0.0037
C8	Osc. circuit L.W. fixed tracker	0.0005
C9	Osc. reaction additional coupling	0.01
C10*	V1 osc. anode decoupling	30.0
C11*	V1, V2 S.G.'s decoupling	4.0
C12	V2 C.G. decoupling	0.05
C13	H.T. circuit R.F. by-pass	0.1
C14	V2 cathode by-pass	0.1
C15	Coupling to V3 A.V.C. diode	0.00004
C16	A.F. coupling to V3 triode	0.02
C17	L.F. by-passes	0.00015
C18	V3 triode C.G. decoupling	0.00015
C19	T.I. C.G. decoupling	0.25
C20	V3 heater R.F. by-pass	0.05
C21*	V3 cathode by-pass	6.0
C22	V3 heater R.F. by-pass	0.002
C23	Fixed tone corrector	0.0003
C24	V3 triode to V4 A.F. coupling	0.02
C25	V4 C.G. decoupling	0.25
C26*	H.T. smoothing	8.0
C27*	H.T. smoothing	8.0
C28	Mains R.F. by-pass	0.002
C29†	Band-pass pri. tuning	—
C30†	Band-pass pri. M.W. trimmer	—
C31†	Band-pass sec. M.W. trimmer	—
C32†	Band-pass sec. and aerial S.W. tuning	—
C33†	Oscillator circuit tuning	—
C34†	Osc. circuit M.W. trimmer	—
C35†	Osc. circuit M.W. trimmer	—
C36†	Osc. circuit S.W. trimmer	0.0002
C37†	Osc. circuit L.W. trimmer	—
C38†	Osc. circuit L.W. trimmer	—
C39†	Osc. circuit L.W. tracker	0.0002
C40†	1st L.F. trans. pri. tuning	—
C41†	1st L.F. trans. sec. tuning	—
C42†	2nd L.F. trans. pri. tuning	—
C43†	2nd L.F. trans. sec. tuning	—

OTHER COMPONENTS (Continued)		Approx. Values (ohms)
L7	Band-pass coupling coil	0.2
L8	Aerial S.W. tuning coil	0.05
L9	Band-pass secondary coils	6.0
L10	Band-pass secondary coils	40.0
L11	Osc. circuit S.W. tuning coil	Very low
L12	Osc. circuit M.W. tuning coil	8-8
L13	Osc. circuit L.W. tuning coil	23.0
L14	Osc. circuit S.W. reaction	0.7
L15	Osc. circuit M.W. reaction	7.0
L16	Osc. circuit L.W. reaction	8.0
L17	1st L.F. trans. Pri.	85.0
L18	1st L.F. trans. Sec.	85.0
L19	2nd L.F. trans. Pri.	85.0
L20	2nd L.F. trans. Sec.	85.0
L21	Speaker speech coil	4.0
L22	Hum neutralising coil	0.25
L23	Speaker field coil	1,600.0
T1	Speaker input trans. Pri.	150.0
	Speaker input trans. Sec.	9.3
T2	Mains trans. Pri., total	35.0
	Mains trans. Heater sec.	0.05
	Mains trans. Rect. heat. sec.	0.1
	Mains trans. H.T. sec., total	380.0
S1-S15	Waveband switches	—
S16	Speaker muting switch	—
S17	Mains switch, ganged R12	—

**DISMANTLING THE SET**

**Removing Chassis.**—If it is desired to remove the chassis from the cabinet, remove the five control knobs (pull off), taking care not to lose the springs, and the four bolts (with washers) which hold the chassis to the bottom of the cabinet.

Now unplug the speaker leads from the panel on the mains transformer, when the chassis can be withdrawn from the cabinet.

When replacing, connect the speaker leads as follows, numbering the sockets from the front to the back of the chassis: —1, black; 2, red; 3, green; 4, blue.

**Removing Speaker.**—To remove the speaker from the cabinet, remove the nuts and spring washers from the four bolts holding it to the sub-baffle. When replacing, see that the transformer is on the right.

**VALVE ANALYSIS**

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 233 V, using the 230 V 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.

If V1 should become unstable when measurements are being made of its anode current, as in our case, it can be stabilised by connecting a non-inductive condenser of about 0.1 μF from grid (top cap) to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VHT1	247	2.0	69	3.4
	Oscil. lator	1.1		
V2 VPT1	55	3.2	69	1.5
V3 H4D	250	1.6	—	—
V4 LP4	162	1.6	—	—
V5 R4	242	54.0	—	—
	357†	—	—	—
T.I. VFT4	48	0.2	Target anode 250	2.1

† Each anode, A.C.

**GENERAL NOTES**

**Switches.**—S1-S15 are the waveband switches, in four rotary units beneath the chassis, which are indicated in our under-chassis view, and shown in detail in the diagrams on page VIII. The table (p. VIII) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and C closed.

S16 is the Q.M.B. internal speaker muting switch, of the rotary type, mounted on the bracket at the rear of the speaker magnet.

Continued overleaf

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial M.W. and L.W. coupling coils	15.0
L2	Aerial M.W. and L.W. coupling coils	70.0
L3	Band-pass primary coils	0.4
L4	Band-pass primary coils	40.0
L5	Image suppressor coil	0.4
L6	Aerial S.W. coupling coil	1.1

\* Electrolytic. † Variable. ‡ Pre-set.

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Radio

## FERRANTI 1737—Continued

**S17** is the Q.M.B. mains switch, ganged with the volume control **R12**.

**Coils.**—**L1-L5**; **L7, L9, L10**; **L11-L16** and the I.F. transformers **L17, L18** and **L19, L20** are in five screened units on the chassis deck. The **L11-L16** unit also contains the pre-set trackers **C35** and **C38** and the extra fixed condensers **C7** and **C8** which are connected in parallel with them. The I.F. units contain their associated trimmers, and the second also contains **R11, R14, C17** and **C18**.

**L6** and **L8** are unscreened, and are on a tubular former beneath the chassis, below the **L1-L5** unit. **L8** is the thick wire winding.

**Scale Lamps.**—There are two of these, one for the Magnascopic and main scales and the other for the waveband indicator. Both are Ever Ready 6.2 V, 0.3 A M.E.S. types, but the former has a tubular bulb, and the latter a spherical white painted bulb.

**External Speaker.**—Two terminals are provided on a bracket at the rear of the internal speaker for a low resistance (about 40) external speaker. On rotating **S16**, on the same bracket, the internal speaker can be muted.

**Condensers C26, C27.**—These are two 8  $\mu$ F dry electrolytics in a single carton beneath the chassis, with a common positive (red) lead. The black lead to **R24** and chassis is the negative of **C27**, and the black lead to **R25** the negative of **C26**.

**Condenser C10.**—This is a 30  $\mu$ F dry electrolytic in a carton which projects outside the chassis.

**Magnascopic Scale.**—Slight adjustment of the positions of the numbers thrown on the scale in a vertical direction, may

TABLE AND DIAGRAMS OF SWITCH UNITS

Switch	S.W.	M.W.	L.W.
S1		C	
S2		C	C
S3	C		
S4		C	
S5		C	
S6	C		
S7		C	C
S8	C		
S9	C		
S10	C		C
S11	C		
S12		C	
S13	C	C	
S14	C		
S15	C		

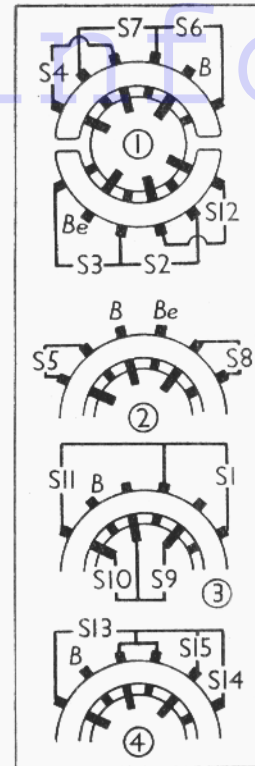
be made by the screw and lock-nut behind the bracket holding the mirror.

**Tuning Indicator.**—The VFT<sub>4</sub> C.R. tuning indicator has an octal base, and the electrode connections, also the colour coded wire connections to its holder are as follows, the figures representing the usual numbering for the pins and sockets: 1, blank; 2, blue/yellow, heater; 3, maroon, anode; 4, red, target; 5, green, grid; 6, blank; 7, yellow, heater; 8, blue, cathode.

**Variable Selectivity.**—The selectivity control, through a slotted cam and link motion slides **L17** towards or away from **L18**, thus varying the coupling and the selectivity of the stage. Tuning is best carried out at the maximum selectivity position, and a trip release device between the tuning and selectivity control spindles ensures that as soon as the tuning is altered, the selectivity automatically returns to maximum.

**Condenser C3.**—This is shown as variable in the makers' blue print, but is a small fixed condenser in our chassis.

**Condenser C22.**—The makers' blue print shows this connected to heater of **V4**, not **V3** as in our chassis.



Switch diagram, looking from the rear of the underside of the chassis. Be indicates a bearer tag, and B, a blank one.

## CIRCUIT ALIGNMENT

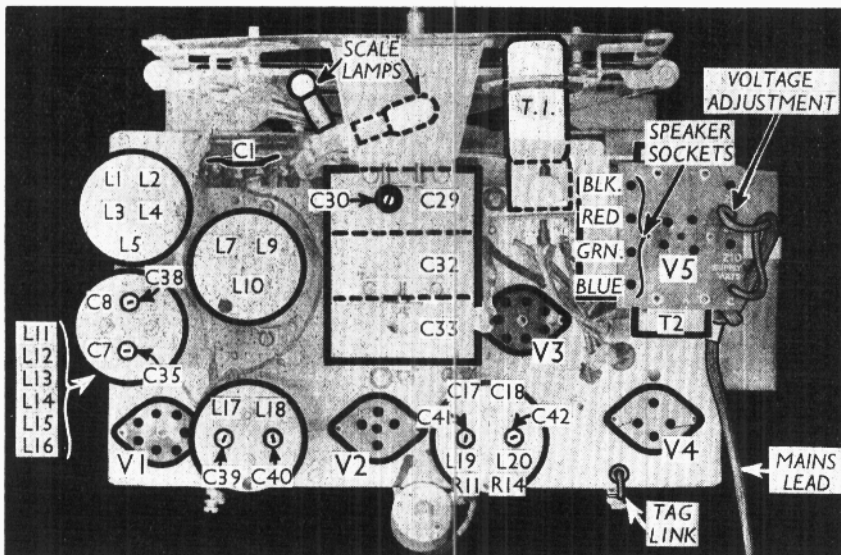
**I.F. Stages.**—Adjust signal generator to 125 KC/S and feed output between **V1** control grid (top cap) and chassis. Adjust trimmers **C42, C41, C40** and **C39**, in that order, to obtain maximum reading on output meter.

**R.F. and Oscillator Stages.**—Set tuning pointer to 200 m. with the condenser vanes fully out of mesh (anti-clockwise). Set wavechange switch to M.W. and tuning condenser to 228 m. and feed in a 228 m. signal between **V1** top cap and chassis. Screw oscillator trimmer **C34** to maximum (anti-clockwise) and then slowly clockwise until the second maximum peak output is obtained.

Now apply the 228 m. signal to **A** and **E** terminals via an artificial aerial or 0.0002  $\mu$ F condenser and adjust band-pass trimmers **C30, C31** for maximum output. Adjust tuning condenser and signal generator to 500 m. and adjust M.W. tracker **C35** for maximum output while rocking the gang.

Switch to L.W., tune to 1,000 m. on scale, feed in a 1,000 m. signal, and adjust **C37** for maximum output. Feed in an 1,800 m. signal, tune it in, and adjust **C38** for maximum output while rocking the gang.

Switch to S.W., set tuning condenser to 19.7 m. (marked by black line at top of scale), and feed in a 19.7 m. signal. Screw oscillator trimmer **C36** to maximum (anti-clockwise) and then slowly clockwise until second maximum peak output is obtained. To verify adjustment, turn tuning condenser slightly to right and the image output should be obtained.



Plan chassis view. The speaker lead sockets are colour coded. The tag link is marked X in the circuit diagram. Note the extra components in certain of the coil units.