

FERRANTI Models 147, 147S, 149, 194, 347, 447

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General Description : Five-valve (including rectifier), three-waveband superheterodyne receiver with provision for two pre-selected stations. Models 347 (console) and 447 have feed-back circuits incorporated, Model 147S has a different S.W. range; modified loudspeaker connections are used in Model 194; otherwise the models are basically similar.

Power Supply : A.C. mains, 200–250 volts (110-volt tapping on export models).

- Wavebands :**
1. Manual tuning S.W. 16.5–52 m.
 2. Manual tuning M.W. 200–550 m.
 3. Manual tuning L.W. 1000–2000 m.
 4. Pre-set tuning M.W. 200–340 m.
 5. Pre-set tuning M.W. 320–560 m.

In Model 147S the 16.5–52-m. band is replaced by a 100–200-m. band.

Intermediate Frequency : 465 kc/s.

Valves : Ferranti (V₁) 6K8G(T) *; (V₂) 6K7G(T) *; (V₃) 6Q7G(T) *; (V₄) 6V6G *; (V₅) R52.

Dial Lights : Three 6.5 volts, 0.3-amp. types.

External Loudspeaker : Impedance approximately 2.5 ohms. The internal speaker can be muted.

Notes : The metal can of C₁₅ must be effectively insulated from the chassis, and the condition of the cellophane insulating material should be checked. The effect of a short-circuit at this point is to remove bias voltage from V₁ and V₂. Test that correct voltage appears across R₁₉.

The paths taken by the I.F.T. leads to the anodes of V₁ and V₂ are important, and re-arrangement may cause I.F. instability. Correct routes are : (1) The yellow lead from I.F.T.1 is taken behind the mounting clip for C_{35/36} and then between this clip and the mounting clip for C₁₅ to anode pin of valveholder (V₁). (2) The yellow lead from I.F.T.2 is taken towards V₃ valveholder and then bent against (not around) the side of nearby tag panel support pillar nearest to V₂ and V₃ valveholders and from thence to anode pin of valveholder (V₂). I.F. instability may also be caused by failure of C₂.

L.F. instability can be caused by re-arrangement of the blue lead from I.F.T.2 to C₂₉. This lead should be well pressed down and run between C₃₀ and the side of the chassis. Also check C_{35/36}, V₃ and V₄. Intermittent instability may be caused by failure of C₂.

Alignment Procedure : An output meter should be connected via a 0.1-μF. series capacitor across the primary of the loudspeaker-input transformer; the input signal should be adjusted to give a reading of 10–20 volts on this meter. The factory seals on the I.F. transformer cores may be

* Some Model 147 and 149 receivers are fitted with four Mullard valves : (V₁) ECH₃₅; (V₂) EF39; (V₃) EBC33; (V₄) EL33. These valves are not interchangeable with the Ferranti types, and the circuits have been slightly modified to permit their use.

softened with a soldering-iron. When adjusting these cores use a screw-driver with a blade that exactly fits the slots, as the cores are brittle and must be handled with care.

I.F. : Inject a 465-kc/s. signal via a 0.1- μ F. capacitor to grid (top cap) of V₁. Tune receiver to 2000 m. and rotate volume control to maximum gain. Adjust L₂₃, L₂₂, L₁₃ and L₁₂ for maximum response. Seal cores with soft wax.

R.F. : Check that with gang fully meshed, the tuning pointer lies horizontal and in line with two markings above the 550-m. position on M.W. scale. Connect signal generator to A and E sockets via dummy aerial.

I.F. Trap : Tune receiver to 550 m., inject strong 465-kc/s. signal and adjust core L₁ (P₁) for minimum output.

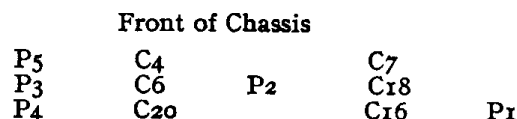
M.W. : Adjust C₁₈ at 200 m. (1500 kc/s.). Adjust C₆ at 228 m. (1316 kc/s.). Adjust cores L₁₆ (P₂), L₅ (P₃) at 500 m. (600 kc/s.). Repeat until no further improvement can be obtained.

L.W. : Adjust C₂₀ at 1000 m. (300 kc/s.). Adjust C₄ at 266 kc/s. (1128 m.). Adjust cores L₁₈ (P₄), L₇ (P₅) at 1800 m. (167 kc/s.). Repeat all adjustments until no further improvement can be obtained.

Image Rejector : Inject strong 1214-kc/s. (247-m.) signal and tune this in on L.W. band. Reduce the output to a minimum by altering the relative positions of the "live" connecting leads to L₆ and L₇.

S.W. : Use 400-ohm non-inductive resistor as dummy aerial. Adjust C₁₆ at 16.67 m. (18 Mc/s.) with pointer at 200-m. mark on M.W. scale and with C₁₆ at the lesser capacitance position. Adjust C₇ at 20 m. (15 Mc/s.). Adjust tracking leads at 45 m. (6.67 Mc/s.). These leads comprise those from L₁₄ to wave-switch and from L₃ to wave-switch. Repeat all adjustments until no further improvement can be obtained.

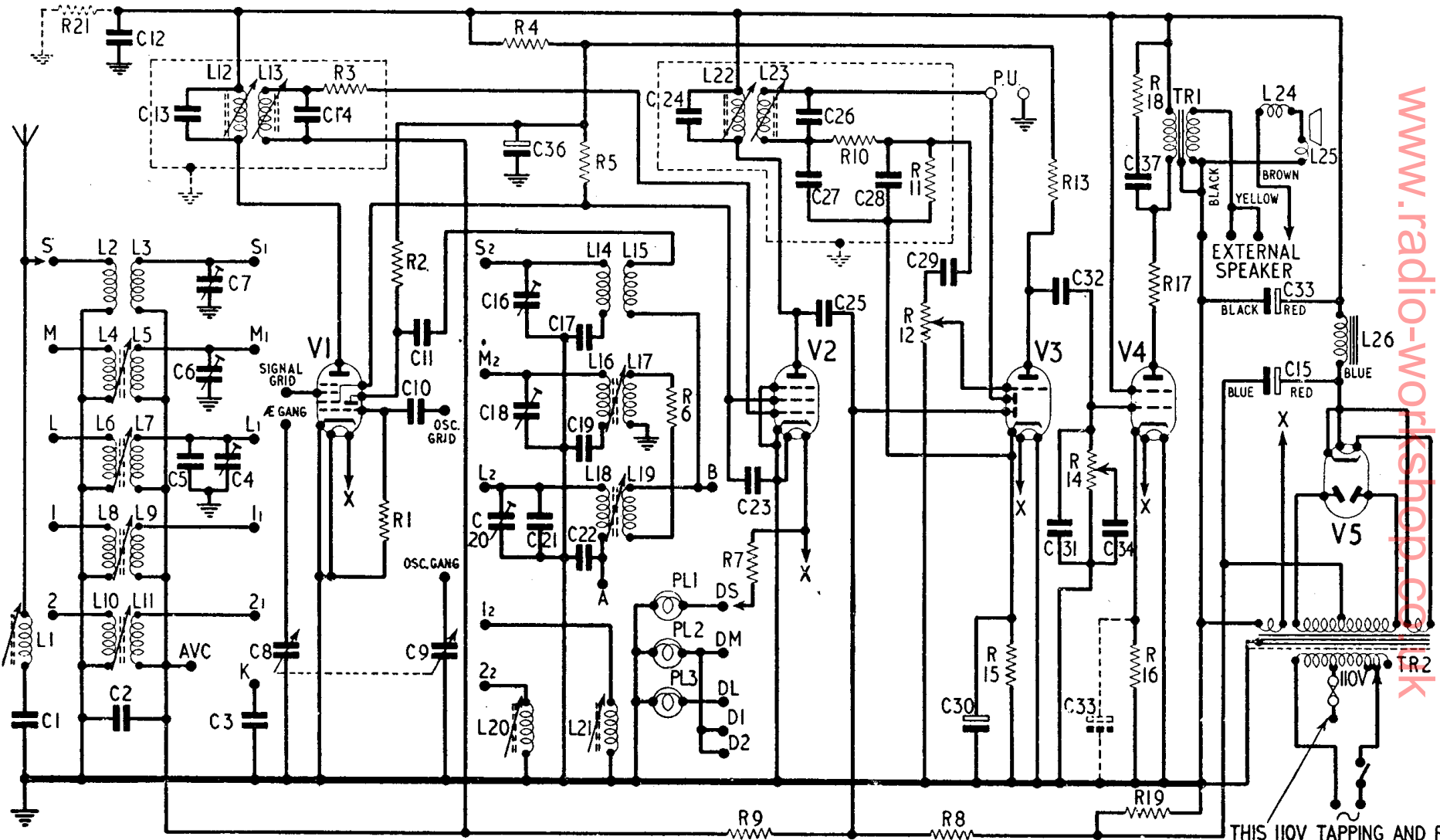
Lay-out of Trimmers : Alignment controls are accessible from above the chassis and appear approximately as follows :



Pre-set Tuning : The pre-set tuning arrangement enables a single powerful or local station to be pre-selected on each of the ranges (200-340 m., 320-560 m.). Adjustment may be carried out by tuning to signals from the stations concerned. Rough wavelength tuning scales are provided.

Note : Any alteration to the L.W. oscillator alignment will affect the pre-set tuning.

CIRCUIT DIAGRAM—PERRANTI MODEL 147



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MODEL 147

Component Values:

Capacitors.

C1	30 pF.
C2	0.1
C3	120 pF. (1%)
C4	5-40 pF.
C5	50 pF.
C6	5-40 pF.
C7	5-40 pF.
C8	Front Section
C9	Rear Section
C10	100 pF.
C11	0.001 (750 v.)
C12	0.1
C13	105 pF.
C14	105 pF.
C15	16 (500 v.)
C16	5-40 pF.
C17	0.004
C18	5-40 pF.
C19	500 pF. (1%)
C20	5-40 pF.
C21	100 pF.
C22	130 pF. (1%)
C23	0.1

C24	90 pF.
C25	50 pF.
C26	105 pF.
C27	150 pF.
C28	150 pF.
C29	0.02 (500 v.)
C30	50 (12 v.)
C31	400 pF.
C32	0.05 (500 v.)
C33 *	50 (15 v.)
C34	0.01 (500 v.)
C35	12 (500 v.)
C36	4 (500 v.)
C37	0.005 (1000 v.)

Resistors.

R1	47k ($\frac{1}{2}$ W.)
R2	22k ($\frac{1}{2}$ W.)
R3	2.2k ($\frac{1}{2}$ W.)
R4	6.8k (1 W.)
R5 †	15k (1 W.)
R6	470

R7	7 (Wire)
R8	2.2M
R9	2.2M
R10	100k
R11	470k
R12	1M (Pot.)
R13 †	100k
R14	500k (Pot.)
R15	2.2k
R16 †	270 (1 W.)
R17	100
R18	22k ($\frac{1}{2}$ W.)
R19 †	47 ($\frac{1}{2}$ W.)
R5	22k 1 W.
R13	68k $\frac{1}{2}$ W.
R16	150 1 W.
R19	56 $\frac{1}{2}$ W

D.C. Resistances (ohms.).

L1	37
L2	Very Low
L3	Very Low

L4	40
L5	3
L6	66
L7	27
L8	Very Low
L9	5.6
L10	Very Low
L11	8
L12	9
L13	9
L14	Very Low
L15	Very Low
L16	5
L17	Very Low
L18	12
L19	4
L20	4
L21	3
L22	9
L23	9
L24	Very Low
L25	2.5
L26	1000

* Omitted when Mullard valves are fitted.

† Values changed when Mullard valves are fitted.