

ULTRA - TR60, TR70

Intermediate frequency 471kc/s.

Transistor Table

Transistor	Emitter (V)	Base (V)	Collector (V)
TR1 PXA102	1.4	1.4	8.0
TR2 PXA101	1.6	1.6	8.1
TR3 PXA101	0.75	0.9	7.0
TR4 XB102	0.8	1.0	7.3
TR5 PXB103	1.2	1.4	8.2
TR6 PXC121	1.1	1.3	8.3
TR7 PXC121	3.0	3.1	3.5
TR8 PXB103	3.4	3.5	11.6
TR9 PXC121	2.3	2.4	11.6
TR10 PXC121	6.1	6.3	12.2
TR11 PXC121	6.1	6.3	12.2
TR12 PXC121	—	0.18	6.1
TR13 PXC121	—	0.18	6.1

* Model TR70.
† Model TR60.

Resistors

R1	220kΩ	B1
R2	33kΩ	D3
R3	8.2kΩ	C1
R4	3.3kΩ	E3
R5	390Ω	D3
R6	56kΩ	C2
R7	1kΩ	D4
R8	3.3kΩ	D3
R9	680Ω	D4
R10	15kΩ	D4
R11	3.3kΩ	D4
R12	1kΩ	D4
R13	2.2kΩ	D4
R14	8.2kΩ	D4
R15	1kΩ	D4
R16	5kΩ	A1
R17	330Ω	E4
R18	10kΩ	E4
R19	8.2kΩ	E4
R20	820Ω	E4
R21	4.7kΩ	E4
R22	1kΩ	C1
R23	1kΩ	B2
R24	1.6kΩ	E4
R25	51Ω	E4
R26	1.6kΩ	E4
R27	51Ω	E4
R28	4.7Ω	E4
R29	4.7Ω	E4
R30	270kΩ	E4
R31	22kΩ	—
R32	10kΩ	—

Capacitors

C1	—	B2
C2	—	C1
C3	330pF	B1
C4	100pF	B1
C5	0.04μF	C1
C6	0.04μF	D3
C7	400pF	C1
C8	400pF	C1
C9	0.02μF	E3
C10	8.2pF	B2
C11	—	B1
C12	—	B2
C13	—	B1
C14	0.04μF	D4
C15	13pF	D3
C16	0.08μF	D3
C17	400pF	C2
C18	400pF	C2
C19	10μF	C2
C20	0.04μF	D4
C21	25pF	D4
C22	250pF	C2
C23	0.04μF	D4
C24	0.02μF	C2
C25	0.05μF	D4
C26	10μF	C2
C27	100μF	C2
C28	50μF	B2

C29	50μF	D4
C30	0.004μF	E3
C31	100pF	E4
C32	0.004μF	—
C33	50μF	—
C34	100μF	—
C35	0.02μF	—

Coils*

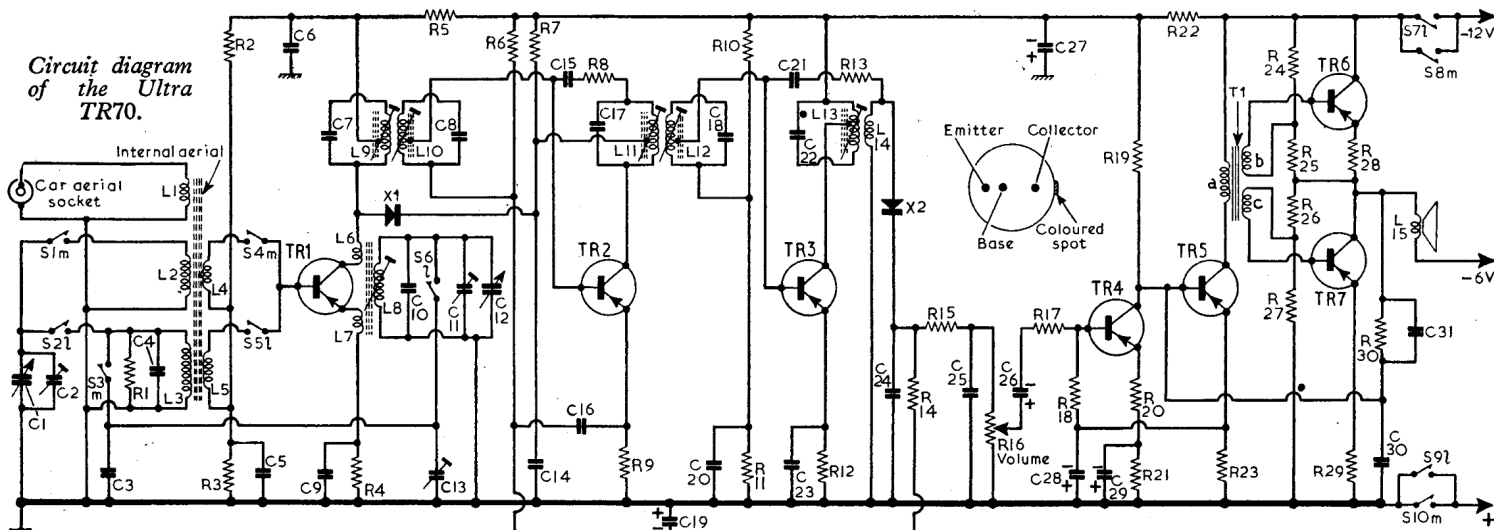
L1	—	B1
L2	1.5Ω	C1
L3	—	B1
L4	7.0Ω	A1
L5	1.0Ω	A1
L6	—	B1
L7	—	B1
L8	2.5Ω	B1
L9	3.5Ω	C1
L10	4.0Ω	C1
L11	3.5Ω	C2
L12	4.0Ω	C2
L13	3.0Ω	C2
L14	—	C2
L15	15.0Ω	—

Miscellaneous*

T1	a 150.0Ω	B2
	b 28.0Ω	
	c 28.0Ω	
X1	XD201	D3
X2	XD202	C2

* Approximate D.C. resistance in ohms.

Circuit diagram of the Ultra TR70.



CIRCUIT ALIGNMENT

Equipment Required.—A signal generator with a modulation depth of 30 per cent at 400 c/s; an output meter; an external coupling coil; a 0.1μF capacitor and a non-metallic screwdriver-type trimming tool. The coupling coil can be made by winding 14 turns 18 s.w.g. enamelled copper wire to a length of 1½ in. or a ½ in. dia. former.

Two peaks should be found when making adjustments to the I.F. transformers, and the one with the core nearer the outer of the former should be selected. Separate R.F. alignment is given for the TR60 which is carried out with the chassis mounted in the cabinet. During all alignment operations the signal generator attenuator should be set so that the reading on the output meter does not exceed 1V.

TR70

- 1.—Connect output meter across speech coil, taking care that the lower 6V battery is not short-circuited. Switch receiver to M.W., turn tuning gang to maximum capacitance

and volume control to maximum. Short-circuit L3 (location reference B1) and connect the "live" output lead of the signal generator, with the 0.1μF capacitor in series, to the base of TR1, the earthy lead to chassis.

- 2.—Feed in a modulated 471 kc/s signal and adjust L13, L12 (C2), L11 (D4), (C2), L10 (C1) and L9 (D3) in that order for maximum reading in the output meter, and repeat until no further improvement can be obtained. Remove short-circuit.
- 3.—Disconnect the signal generator from the receiver and connect the coupling coil across its output leads. With the tuning gang still at maximum capacitance, check that the cursor is in line with the extreme right-hand calibration marker. Readjust tuning to bring cursor in line with the 500m calibration marker.
- 4.—Feed in a 600 kc/s signal and with the coupling coil placed about 4in from the ferrite rod aerial, adjust L8 (B1), L2 (C1) for maximum output. L2 is adjusted by sliding it along the ferrite rod.
- 5.—Set cursor at 200m calibration marker. Feed in a 1,500 kc/s signal and adjust C11 (B1), then C2 (C1), for maximum output.
- 5.—Repeat operations 4 and 5.
- 7.—Switch receiver to L.W. and tune to 1,429m (calibration mark on scale). Feed in a

210 kc/s signal and adjust C13 (B1), then L3 (A1), for maximum output. L3 is adjusted by sliding it along the ferrite rod.

- 8.—Switch receiver to M.W. and tune it to 500m (calibration mark on scale). Feed in a 600 kc/s signal and check that L2 (C1) is in the optimum position.

TR60

Operations 1 and 2 are exactly the same as those required for TR70 already described.

- 3.—Disconnect the signal generator from the receiver and connect the coupling coil across its output leads. Tune receiver to 500m on scale.
- 4.—With the coupling coil placed about 4in from the ferrite rod, feed in a 600 kc/s signal and adjust L8 then L2 for maximum output. L2 is adjusted by sliding it along the ferrite rod.
- 5.—Tune receiver to 200m on scale. Feed in a 1,500 kc/s signal, adjust C11 and then C2 for maximum output.
- 6.—Repeat operations 4 and 5.
- 7.—Switch receiver to L.W. and tune it to 1,429m. Feed in a 210 kc/s signal and adjust C13 and L3 for maximum output. L3 is adjusted by sliding it along the ferrite rod.
- 8.—Switch receiver to M.W. and tune to 500m on scale. Feed in a 600 kc/s signal and check that L2 is in the optimum position.

GENERAL NOTES

Switches.—S1-S6 are the wavechange switches and S7-S10 are the battery supply switches. When the "off" button is pressed it merely releases the M.W. and L.W. buttons. The suffix letter "m" or "l" following the switch numbers in our sketch of the switch unit (location reference A2), and in the circuit diagram, indicates that the switch is closed on M.W. or L.W. respectively.

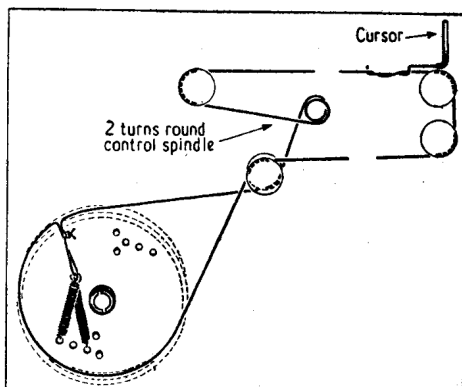


Diagram of the tuning drive system.