

## CIRCUIT ALIGNMENT

**Equipment Required.**—A signal generator, modulated 30 per cent at 400c/s and covering the frequency range 150kc/s-100Mc/s; an A.C. voltmeter for use as audio output meter; a 20,000 $\Omega$ /V D.C. voltmeter or a D.C. valve voltmeter for use as D.C. output meter; a damping unit comprising a 470 $\Omega$  resistor and a 0.01 $\mu$ F capacitor connected in series; two matched 100k $\Omega$  resistors; an 80 $\Omega$  resistor; a 0.01 $\mu$ F capacitor; and a screwdriver-type trimming tool.

The adjustment of the F.M. oscillator balancing capacitor C8 will require the use of an R.F. valve voltmeter or, alternatively, a detector circuit used in conjunction with the 20,000 $\Omega$ /V meter. The detector may be made up as shown in the diagram in col. 2 overleaf.

As the tuning scale remains fixed to the cabinet when the chassis is removed for alignment purposes, a centimetre alignment scale is provided on the tuning scale backing plate as shown in the sketch of the tuning drive system in cols. 1, 2 below. The right-hand edge of the right-hand tuning cursor is then used as the pointer. With the tuning gang at maximum capacitance the right-hand edge of the tuning pointer should coincide with the 1.1cm calibration point on the centimetre scale.

When the chassis is inside the cabinet and with the tuning gang at maximum capacitance, the middle of each cursor should coincide with the righthand ends of the tuning scale apertures.

## A.M. Alignment

- 1.—Connect the audio output meter across T1 secondary winding. Connect the signal generator via the 0.01 $\mu$ F capacitor to V4 control grid (pin 2). Switch the receiver to M.W. and turn the volume control and tuning gang to maximum. At all times during the A.M. alignment operations adjust the signal generator attenuator so that the A.F. output meter reading does not exceed 1.2V A.C.
- 2.—Unscrew the core of L26 (C1). Feed in a modulated 470kc/s signal and adjust the cores of L27 (G4) and L26 for maximum output. Do not readjust L27.

- 3.—Connect the signal generator, via the 0.01 $\mu$ F capacitor, across C19 (J3). Unscrew the core of L21 (B1). Feed in a modulated 470kc/s signal and adjust the cores of L22 (H4) and L21 for maximum output. Do not readjust L22.

- 4.—Connect the signal generator to the A.M. aerial socket via a dummy aerial. Tune the receiver to 3.75cm (500m). Feed in a 600kc/s signal and adjust the cores of L17 (B1) and L12 (A2) for maximum output. In some receivers the former of L12, L13 is inverted and the core positions interchanged.
- 5.—Tune the receiver to 12.1cm (220m). Feed in a 1,364kc/s signal and adjust C33 (G3) and C19 (J3) for maximum output.
- 6.—Repeat operations 4 and 5.
- 7.—Switch the receiver to L.W. and tune it to 4.9cm (1,700m). Feed in a 176.5kc/s signal and adjust the cores of L18 (H3) and L13 (J4) for maximum output.

## Resistors

R1	82Ω	K5
R2	4.7kΩ	A1
R3	1MΩ	K5
R4	470kΩ	H3
R5	10kΩ	A2
R6	470kΩ	J4
R7	22kΩ	H4
R8	150Ω	H4
R9	27kΩ	H4
R10	180Ω	H4
R11	220Ω	H4
R12	150Ω	H3
R13	27kΩ	H4
R14	4.7kΩ	H4
R15	47kΩ	G4
R16	82Ω	G4
R17	3.3kΩ	G4
R18	100kΩ	G4
R19	2.2MΩ	G3
R20	100kΩ	G3
R21	330Ω	F4
R22	2.7MΩ	G4
R23	270kΩ	G4
R24	18kΩ	F4
R25	470kΩ	A1
R26	1MΩ	H4
R27	1MΩ	F3
R28	330kΩ	G3
R29	10MΩ	F4
R30	100kΩ	F4
R31	150kΩ	F4
R32	250kΩ	E3
R33	470kΩ	F4
R34	22kΩ	F4
R35	8.2kΩ	F4
R36	220Ω	F4
R37†	1.35kΩ	C1
R38	6.8kΩ	F3
R39	3.9kΩ	F3
R40	150Ω	F3

## Capacitors

C1	22pF	K5
C2	22pF	K5
C3	0.001μF	A1
C4	470pF	K5
C5	16.5pF	B1
C6	500pF	K5
C7	56pF	K5
C8	8pF	A1

C9	22pF	K5
C10	1,800pF	A2
C11	15pF	K5
C12	16.5pF	B2
C13	0.005μF	A1
C14	0.001μF	A1
C15	1,800pF	A2
C16	4.7pF	K5
C17	2.7pF	J4
C18	40pF	H3
C19	15pF	J3
C20	120pF	H4
C21	0.04μF	J4
C22	390pF	H4
C23	514pF	B1
C24	0.01μF	H4
C25	0.04μF	H4
C26	82pF	H4
C27	390pF	H4
C28	270pF	H4
C29	15pF	G3
C30	82pF	G3
C31	40pF	G3
C32	82pF	H4
C33	15pF	G3
C34	8.2pF	B2
C35	456pF	B1
C36	0.01μF	H4
C37	0.01μF	G3
C38	15pF	B2
C39	15pF	B2
C40	150pF	B1
C41	150pF	B1
C42	0.01μF	G4
C43	0.04μF	G4
C44	0.01μF	G4
C45	0.04μF	G3
C46	15pF	C2
C47	100pF	C2
C48	100pF	C2
C49	390pF	G4
C50	150pF	C1
C51	150pF	C1
C52	82pF	G3
C53	82pF	G3
C54	470pF	G4
C55	0.04μF	G3
C56	5μF	F4
C57	0.005μF	G3
C58	100pF	G3
C59	0.04μF	F3
C60	0.1μF	F4

C61	1,800pF	G4
C62	0.02μF	F3
C63	470pF	F4
C64	0.01μF	F4
C65	50μF	E4
C66	50μF	E4
C67	0.01μF	E3
C68	50μF	F4
C69	0.5μF	F3

## Coils\*

L1-L5	—	K5
L6	—	A1
L7	—	K5
L8	—	K5
L9	—	H4
L10	50-0	J4
L11	—	H4
L12	3-0	J4
L13	30.0	J4
L14	—	H3
L15	—	B1
L16	—	H3
L17	6-0	B1
L18	12-2	B1
L19	—	B2
L20	—	B2
L21	6-5	B1
L22	6-5	B1
L23	1-3	C2
L24	—	C2
L25	—	C2
L26	6-5	C1
L27	6-5	C1
L28	—	—

## Miscellaneous\*

T1	$\left\{ \begin{array}{l} \text{a} \\ \text{b} \\ \text{c} \end{array} \right\}$	$\left\{ \begin{array}{l} 11.5 \\ 550.0 \\ - \end{array} \right\}$	C1
T2	$\left\{ \begin{array}{l} \text{a} \\ \text{b} \\ \text{c} \\ \text{d} \\ \text{e} \end{array} \right\}$	$\left\{ \begin{array}{l} 157.0 \\ 150.0 \\ - \\ - \\ 22.6 \end{array} \right\}$	D1
S1-S17	—	—	H3
S18-S23	—	—	G3
S24, S25	—	—	E3

\*Approximate D.C. resistance in ohms.  
†Two 2.7kΩ's in parallel.

- 7.—Connect the damping unit across L7 (A2). Feed in a 10.7Mc/s signal and adjust L8 (J4) for maximum output.
- 8.—Connect the damping unit across L8 (J4). Feed in a 10.7Mc/s signal and adjust the core of L7 (A2) for maximum output.
- 9.—Connect the signal generator to the V.H.F. aerial sockets via the 80Ω termination. Tune the receiver to 5.25cm (91Mc/s). Feed in a 91Mc/s signal and adjust L5 (J4) for maximum output.
- 10.—Disconnect the signal generator and connect the R.F. meter, switched to its 1V range, between V1 anode (pin 5) and chassis. Tune the receiver to 10.9cm and adjust C8 (A1) for minimum reading on the R.F. meter. Then disconnect the R.F. meter and replace the tuner unit side cover.
- 11.—Reconnect the signal generator, terminated with the 80Ω resistor, to the V.H.F. aerial sockets. Tune the receiver to 5.25cm (91Mc/s). Feed in an unmodulated 91Mc/s signal and adjust L5 (J4), L3 (J3) and L1 (J3) for maximum output.

Valve	Anode (V)	Screen (V)	Cath. (V)
V1 6F12	155	155	0.8
V2 EC92	150	150	0.8
V3a 6C9	33	—	—
V3b 6C9	140	—	1.7
V4 6F18	68	—	1.4
V5c 6LD12†	195	100	1.7
V6 6P1	175	100	1.4
V7 UU9	173	76	0.9
T.I. EM81	169	73	0.9
	62	—	—
	248	207	7.6
	248	202	7.4
	257†	—	257.0
	43	—	—
	51	—	—

\*Measured with receiver switched to A.M.  
†Measured with receiver switched to F.M.  
‡Alternative EABC80  
§A.C. reading

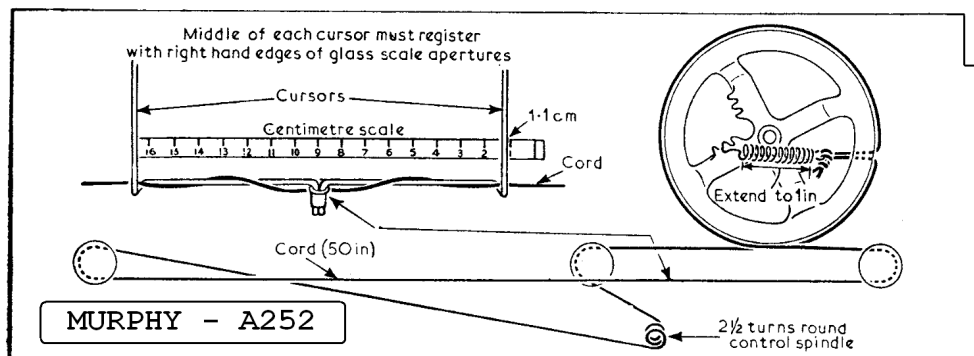


Diagram of the tuning drive system and the cm scale used in circuit alignment.

- 8.—Tune the receiver to 13.35cm (1,000m). Feed in a 300kc/s signal and adjust C31 (G3) for maximum output.
- 9.—Repeat operations 7 and 8.
- 10.—Switch the receiver to S.W. and tune it to 3.15cm (44.8m). Feed in a 6.7Mc/s signal and adjust the cores of L16 (H3) and L11 (H4) for maximum output.
- 11.—Tune the receiver to 11.8cm (19.7m). Feed in a 15.23Mc/s signal and adjust C29 (G3) for maximum output. Then adjust C18 (H3) for maximum output while rocking the tuning control.
- 12.—Repeat operations 10 and 11. Disconnect the generator and output meter.

## F.M. Alignment

- 1.—Connect the D.C. output meter, switched to its 10V range, across C56 (F4), positive terminal to chassis. Remove the side cover from the F.M. tuner unit (three self-tapping screws) and connect the signal generator via the 0.01μF capacitor to V1 control grid (pin 1).
- 2.—Switch the receiver to V.H.F. Turn the tuning gang to maximum and the volume control to minimum. Feed in an unmodulated 10.7Mc/s signal and adjust L23 (C2) for maximum output. Then adjust the signal generator attenuator to obtain an 8V reading on the D.C. output meter. If necessary, roughly adjust the cores of L7, L8, L19 and L20 to obtain this reading.
- 3.—Connect the two 100kΩ resistors in series

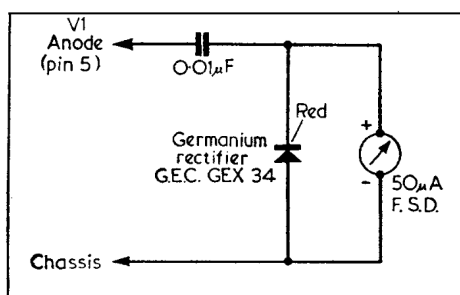
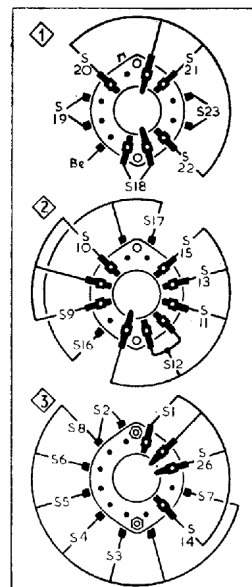


Diagram of the R.F. meter required for F.M. alignment, operation 10.

- across C56 (F4). Connect the D.C. output meter between the junction of the two 100kΩ resistors and the junction of C49, R18 (G4). Without altering the signal generator attenuator setting, feed in a 10.7Mc/s signal and adjust the core of L24 (G4) for zero reading on the D.C. output meter.
- 4.—Remove the two 100kΩ resistors, and reconnect the D.C. output meter across C56, positive terminal to chassis. Connect the damping unit across L19 (B2). Feed in a 10.7Mc/s signal and adjust the core of L20 (H4) for maximum output.
- 5.—Connect the damping unit across L20. Feed in a 10.7Mc/s signal and adjust the core of L19 (B2) for maximum output.
- 6.—Remove the damping unit and repeat operation 2.

## Switch Table

Switches	Gram.	L.W.	M.W.	S.W.	F.M.
S1	—	—	—	—	C
S2	—	—	—	—	C
S3	—	—	—	—	C
S4	—	—	—	—	C
S5	—	—	—	—	C
S6	—	—	—	—	C
S7	—	—	—	—	C
S8	—	—	—	—	C
S9	—	—	—	—	C
S10	—	—	—	—	C
S11	—	—	—	—	C
S12	—	—	—	—	C
S13	—	—	—	—	C
S14	—	—	—	—	C
S15	—	—	—	—	C
S16	—	—	—	—	C
S17	—	—	—	—	C
S18	—	—	—	—	C
S19	—	—	—	—	C
S20	—	—	—	—	C
S21	—	—	—	—	C
S22	—	—	—	—	C
S23	—	—	—	—	C
S26	—	—	—	—	C



Diagrams of the waveband switches.