

### CIRCUIT ALIGNMENT

**Equipment Required.**—A signal generator covering the A.M. alignment frequencies of 200-1,500kc/s and the F.M. alignment frequencies of 10.7Mc/s and 87.5-100Mc/s; an A.C. voltmeter for use as audio output meter; a Model 8 Avometer or a D.C. valve voltmeter for use as D.C. output meter; an 0-50 $\mu$ A microammeter; two matched 47k $\Omega$  resistors; a 1k $\Omega$  resistor for use as a damping shunt; a 0.1 $\mu$ F capacitor; and a non-metallic screwdriver-type trimming tool.

As the tuning scale remains fixed to the cabinet when the chassis is removed for alignment purposes, calibration marks are punched on the cursor carriage rail. These calibration marks are identified with their corresponding frequencies in the sketch shown in col. 4. Check that with the gang at maximum capacitance the cursor coincides with the datum point on the cursor carriage scale.

The chassis should be connected to the mains via an isolating transformer. Where this is not available, ensure that the chassis is connected to the neutral side of the mains. No earth connection, either direct or through earthed equipment, should be made to the receiver. Connect the signal generator to the appropriate points in the circuit via a 0.1 $\mu$ F isolating capacitor in its live output lead.

#### A.M. Alignment

- 1.—Connect the audio output meter across L25. Connect the signal generator output between chassis and V4 control grid (pin 2).
- 2.—Feed in a modulated 470kc/s signal and adjust the cores of L23 (F4) and L24 (B1) for maximum output.
- 3.—Transfer the signal generator to V2b control grid (pin 2). Feed in a modulated 470kc/s signal and adjust the cores of L19 (B1), L18 (G4), L15 (C1) and L14 (G4) for maximum output.
- 4.—Transfer the signal generator to the junction of C17, C18 (H3). With the receiver switched to M.W., tune it to 500m. Feed in a modulated 600kc/s

signal and adjust the core of L10 (D2) for maximum output.

- 5.—Tune the receiver to 200m. Feed in a modulated 1,500kc/s signal and adjust C25 (G3) for maximum output.
- 6.—Loosely couple the signal generator to L8 (B2). With the receiver still tuned to 200m, feed in a 1,500kc/s signal and adjust C16 (H3) for maximum output.
- 7.—Repeat operations 4, 5 and 6.
- 8.—Reconnect signal generator to the junction of C17, C18. Switch the receiver to L.W. and tune it to 1,400m. Feed in a modulated 214kc/s signal and adjust C23 (G3) for maximum output.
- 9.—Loosely couple the signal generator output to L9 (C2). With the receiver still tuned to 1,400m, feed in a 214kc/s signal and adjust C15 (H3) for maximum output. Disconnect signal generator and audio output meter.

#### F.M. Alignment

- 1.—Switch the receiver to F.M. Connect the two 47k $\Omega$  resistors in series between chassis and point X (location reference F4). Connect the Model 8 Avometer (10V range) or D.C. valve voltmeter between chassis and point X, positive terminal to chassis.
- 2.—Connect signal generator output, via the 0.1 $\mu$ F capacitor in its live lead, between chassis and V2b control grid (pin 2).
- 3.—For the following operations, feed in an unmodulated 10.7Mc/s signal and adjust the output of the signal generator to maintain a 4V reading on the D.C. output meter. The correct tuning peak for the iron-dust tuning cores is the first peak obtained from the adjusting end of the coil former, excepting L20 which is set to the second peak in.
- 4.—Adjust the core of L20 (B1) for maximum reading on the D.C. output meter.

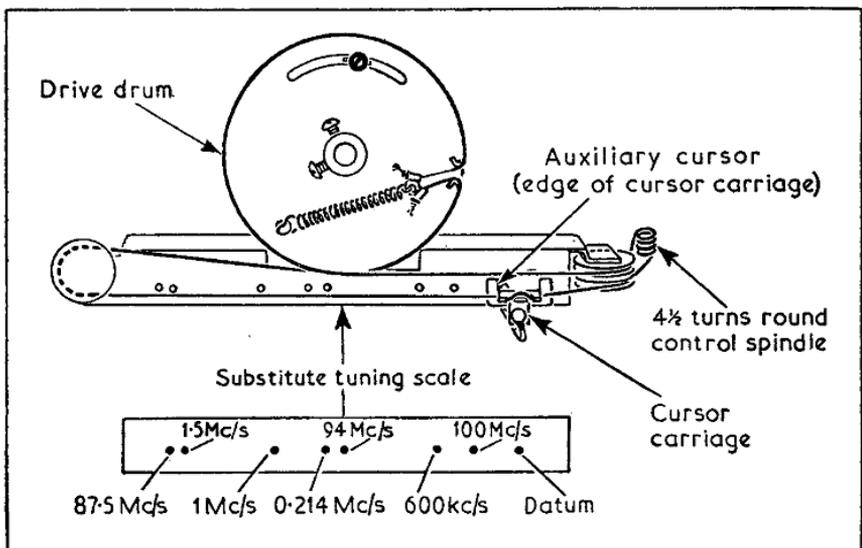
- 5.—Connect the 0-50 $\mu$ A microammeter between the junction of R20, C48 (F4). Adjust L21 (F4) for a zero reading on the microammeter; this will occur midway between a positive and negative-going peak.

- 6.—Connect the 1k $\Omega$  damping resistor across L17 (B1) and adjust L16 (G4) for maximum D.C. output.
- 7.—Connect the damping resistor across L16 and adjust L17 for maximum D.C. output.
- 8.—Connect the damping resistor across L13 (C1) and adjust L12 (G4) for maximum D.C. output.
- 9.—Connect the damping resistor across L12 and adjust L13 for maximum D.C. output.
- 10.—Repeat operations 4 and 5.
- 11.—Transfer the signal generator to the F.M. aerial sockets. Adjust L7 (D1) and L6 (J5) for maximum D.C. output.
- 12.—Tune the receiver to 87.5Mc/s on the auxiliary tuning scale. Feed in an unmodulated 87.5Mc/s signal and adjust the cores of L3, L4 by means of the screw on the gang drum (location reference B2), which should be slackened off and moved along its curved slot until a position giving a maximum reading on the D.C. output meter is obtained. Tighten the locking screw.
- 13.—Tune the receiver to 94Mc/s. Feed in an unmodulated 94Mc/s signal and adjust the core of L2 (D1) for maximum D.C. output. C8 and C10 are accurately aligned at the factory with special equipment. No instructions are therefore given for adjusting these trimmers.

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Resistors											
R1	150Ω	J5	C13	47pF	D1	C67	560pF	J5			
R2	2.2kΩ	J5	C14	140pF	H3	C68	560pF	J5			
R3	100kΩ	J5	C15	80pF	H3	C69	560pF	J5			
R4	6.8kΩ	J5	C16	40pF	H3	C70	0.002μF	G4			
R5	680kΩ	H3	C17	528pF	C1	<b>Coils*</b>					
R6	47kΩ	H4	C18	560pF	H3	L1	—	D1			
R7	150Ω	H4	C19	0.02μF	H4	L2	—	D1			
R8	33kΩ	H4	C20	47pF	H4	L3	—	J5			
R9	18kΩ	H4	C21	515pF	H3	L4	—	J5			
R10	22kΩ	C1	C22	528pF	C1	L5	—	J5			
R11	1kΩ	G4	C23	80pF	G3	L6	—	D1			
R12	18kΩ	H4	C24	450pF	H4	L7	—	D1			
R13	150Ω	G4	C25	40pF	G3	L8	0.5	B2			
R14	22kΩ	B1	C26	0.003μF	H4	L9	14.0	C2			
R15	1kΩ	G4	C27	1μF	H4	L10	—	D2			
R16	2.2MΩ	G3	C28	47pF	C1	L11	—	D2			
R17	39kΩ	F4	C29	47pF	C1	L12	—	C1			
R18	150Ω	F4	C30	0.002μF	G4	L13	—	C1			
R19	1kΩ	F4	C31	110pF	C1	L14	14.0	C1			
R20	100Ω	F4	C32	110pF	C1	L15	14.0	C1			
R21	47kΩ	F4	C33	0.01μF	G4	L16	—	B1			
R22	2.2MΩ	G3	C34	0.04μF	G4	L17	—	B1			
R23	22kΩ	F3	C35	0.02μF	G4	L18	14.0	C1			
R24	180kΩ	G3	C36	47pF	B1	L19	14.0	C1			
R25	500kΩ	A2	C37	47pF	B1	L20	—	B1			
R26	1kΩ	F3	C38	0.002μF	G4	L21	—	B1			
R27	15MΩ	E4	C39	110pF	C1	L22	—	B1			
R28	220kΩ	E4	C40	110pF	C1	L23	14.0	B1			
R29	4.7kΩ	F3	C41	0.002μF	F3	L24	14.0	B1			
R30	1MΩ	E4	C42	0.01μF	F4	L25	2.5	—			
R31	15kΩ	E3	C43	0.02μF	F4	L26	—	G3			
R32	4.7kΩ	E4	C44	0.04μF	F4	L27	—	J5			
R33	10kΩ	†	C45	0.01μF	F4	<b>Other Components*</b>					
R34	1kΩ	A2	C46	10pF	B1	T1	{ a 5.5 b 600.0 c 0.46	‡			
R35	220Ω	E4	C47	47pF	B1	Therm. 1	CZ1	A1			
R36	30Ω	F3	C48	470pF	F4	FB1	†	J5			
R37	160Ω	A2	C49	110pF	B1	S2—S6	—	H3			
R38	200Ω	A2	C50	110pF	B1	S1, S7—S10	}	H4			
R39	200Ω	A2	C51	100pF	F4	S11, S12,			}	G4	
			C52	100pF	F3	S14—S17					
<b>Capacitors</b>			C53	470pF	F3	S18—S21	—	G3			
C1	470pF	D1	C54	5μF	F3	S22, S23	—	A2			
C2	470pF	D1	C55	0.04μF	F3						
C3	560pF	J5	C56	0.01μF	E4						
C4	10pF	D1	C57	50μF	B2						
C5	560pF	J5	C58	50μF	B2						
C6	22pF	J5	C59	2μF	E4						
C7	22pF	J5	C60	2,200pF	E4						
C8	15pF	J5	C61	0.01μF	E4						
C9	5.6pF	J5	C62	0.1μF	E3						
C10	15pF	J5	C63	0.01μF	†						
C11	47pF	J5	C64	0.01μF	†						
C12	10pF	J5	C65	0.05μF	A1						
			C66	0.01μF	E4						

\*Approximate D.C. resistance in ohms.  
† Ferrite bead.  
‡ Mounted on speaker baffle



Sketch of the tuning drive system, drawn as seen with the gang at maximum capacitance, with below it, a diagram in which the calibration points seen on the cursor carriage are identified.

### VALVE ANALYSIS

Valve voltages given in the table below are those derived from the manufacturers' information. They were measured on the 10V and 1,000V ranges of a Model 7 Avometer, chassis being the negative connection in every case. Except where otherwise indicated, the receiver was switched to F.M.

Valve	Anode (V)	Screen (V)	Cath. (V)
V1 UCC85	155	—	1.3
V2 UCH81	140	—	—
	90 <sup>1</sup>	—	1.5
V3 UF89	165	70	1.5
V4 UF89	165	70	1.3
V5d UABC80	165	75	1.4
V6 UL84	60	—	—
V7 UY85	185	135	10.5
	*	—	220.0

<sup>1</sup>Receiver switched to M.W.  
\*No reading quoted.

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