

**CIRCUIT ALIGNMENT**

**A.M. I.F. Stages**

**A.M. R.F. and Oscillator Stages**

**Equipment Required.**—An accurately calibrated A.M. signal generator covering 200-1,500 kc/s, 10.7 Mc/s and 80-100 Mc/s for the alignment of the A.M. and F.M. stages (alternatively an F.M. signal generator with a deviation of  $\pm 100$  kc/s may be used for F.M. alignment at 10.7 Mc/s and 80-100 Mc/s); a 0-10 V high resistance D.C. voltmeter and a 0-100  $\mu$ A microammeter, or, if an F.M. signal generator is used for F.M. alignment, a 0-100 mW sound output meter should be used in place of the 0-10 V D.C. voltmeter; two accurately matched 100 k $\Omega$  resistors.

- 1.—Connect output of signal generator between chassis and control grid (pin 2) of V2b.
- 2.—Switch receiver to M.W. and turn gang to maximum capacitance. Feed in a 470 kc/s signal and adjust the cores of L22 (location reference B1), L21 (G3), L15 (B2) and L14 (H4) for maximum output.
- 3.—Repeat the adjustments in operation 2 until no further improvement results.

- 4.—Check that with gang at maximum capacitance, the cursor coincides with 100 on the substitute tuning scale printed along the front of the scale backing plate.
- 5.—Transfer signal generator leads, via standard dummy aerial, to A and E sockets. Switch receiver to M.W. and tune it to 79 on substitute scale.

**Capacitors**

C1	22pF	A1
C2	15pF	A1
C3	470pF	J3
C4	22pF	J3
C5	9.5pF	A1
C6	30pF	J3
C7	30pF	J3
C8	0.002μF	J3
C9	30pF	J4
C10	22pF	J3
C11	4.7pF	J4
C12	30pF	J4
C13	56pF	J4
C14	9.5pF	A2
C15	160pF	J4
C16	10pF	A2
C17	2,700pF	H4
C18	50pF	H4
C19	150pF	H3
C20	100pF	J3
C21	514pF	A1
C22	100pF	H4
C23	0.01μF	H4
C24	25μF	H4
C25	0.04μF	H4
C26	0.04μF	H3
C27	100pF	H4

C28	100pF	J4
C29	100pF	H3
C30	395pF	J3
C31	50pF	H3
C32	514pF	A1
C33	360pF	J3
C34	0.01μF	H4
C35	150pF	H3
C36	270pF	G3
C37	100pF	H4
C38	100pF	H3
C39	4.7pF	B1
C40	15pF	B1
C41	0.002μF	G4
C42	0.04μF	G4
C43	0.01μF	G3
C44	10pF	B2
C45	68pF	B2
C46	68pF	B2
C47	100pF	B1
C48	100pF	B1
C49	0.01μF	G4
C50	100pF	G3
C51	220pF	G3
C52	0.05μF	H4
C53	330pF	G4
C54	330pF	G4
C55	4μF	G4

**Resistors**

R1	27kΩ	J3
R2	1MΩ	J3
R3	15kΩ	J4
R4	22kΩ	H3
R5	33kΩ	J4
R6	47kΩ	H4
R7	1MΩ	H3
R8	390kΩ	H4
R9	100kΩ	H4
R10	10kΩ	H4
R11	22kΩ	J3
R12	22kΩ	H3
R13	2.2kΩ	H4
R14	47kΩ	J4
R15	1MΩ	G3
R16	56kΩ	G4

R17	390Ω	G3
R18	2.2kΩ	G3
R19	1MΩ	G3
R20	220kΩ	G3
R21	220kΩ	G3
R22	33kΩ	G4
R23	33kΩ	G4
R24	47kΩ	J4
R25	47kΩ	G4
R26	47kΩ	G4
R27	100kΩ	H4
R28	27kΩ	F4
R29	27kΩ	G4
R30	2.2MΩ	G3
R31	47kΩ	F3
R32	1MΩ	F3
R33	3.9kΩ	F4
R34	33kΩ	F3
R35	4.7kΩ	F3
R36	220kΩ	F4
R37	470kΩ	C1
R38	1kΩ	C1
R39	500kΩ	E3
R40	470kΩ	F3
R41	10kΩ	F4
R42	180kΩ	F4
R43	1.6kΩ	E3

**Coils†**

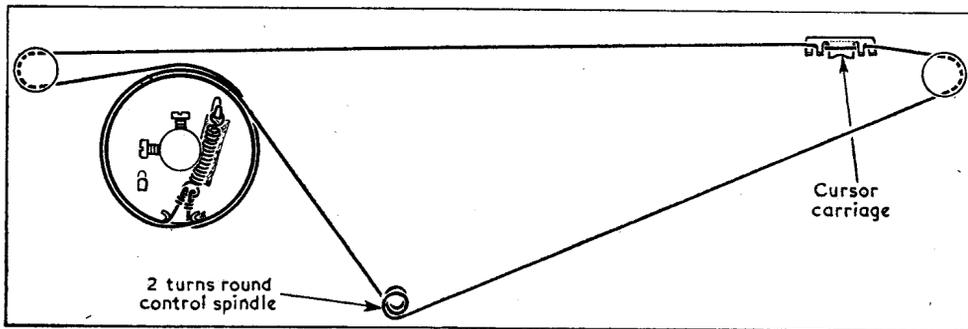
L1	—	—
L2	—	A1

L3	—	A1
L4	—	J3
L5	—	J3
L6	—	J3
L7	—	J4
L8	—	A2
L9	—	A2
L10	4.0	H3
L11	21.0	H4
L12	0.5	H3
L13	3.5	H3
L14	10.0	B2
L15	10.8	B2
L16	—	B1
L17	—	B1
L18	—	B2
L19	—	B2
L20	—	B2
L21	10.0	B1
L22	10.8	B1
L23	3.5	B1

**Transformers†**

T1	{ a 19.0	} C1
	{ b 480.0	
	{ c —	
T2	{ a 318.0	} D2
	{ b 307.0	
	{ c 30.5	

†Approximate D.C. resistance in ohms.



Sketch of the drive cord system as seen from the rear of an upright chassis with the gang set to minimum capacitance. About 50in of cord is required for a new drive.

- 6.—Feed in a 600 kc/s (500 m) signal and adjust the cores of **L13** (H3) and **L10** (H3) for maximum output.
- 7.—Tune receiver to 8 on scale, feed in a 1,500 kc/s (200 m) signal and adjust **C31** (H3) and **C18** (H4) for maximum output.
- 8.—Repeat operations 6 and 7 until calibration is correct at both ends of band.
- 9.—Switch receiver to L.W., feed in a 214 kc/s (1,400 m) signal and tune it in on receiver. Adjust the core of **L11** (H4) for maximum output.

**F.M. I.F. Stages**

- 10.—Switch receiver to F.M. and turn gang to maximum capacitance.
- 11.—Screw out the cores of **L8** (A2), **L16** (B1) and **L18** (B2) so that they are flush with the ends of the coil formers.
- 12.—Screw out the cores of **L9** (J4), **L17** (H3) and **L19** (G4) so that they are about ¼ inch in from the ends of the coil formers.
- 13.—If using A.M. signal generator, connect D.C. voltmeter across **C55** (G4). If using F.M. generator, connect sound output meter across "Ext. L.S." sockets.
- 14.—Connect signal generator, via 0.001 μF capacitor in live lead, to control grid (pin 2) of **V3** and chassis. Adjust output of signal generator during alignment so that output does not exceed 4 V on D.C. meter, or 50 mW on output meter. Keep signal generator leads and output meter leads well apart.
- 15.—Feed in an unmodulated 10.7 Mc/s signal (A.M. generator) or a signal of 10.7 Mc/s deviated by ±100 kc/s (F.M. generator) and adjust the core of **L18** (B2) for maximum output.
- 16.—Transfer live signal generator lead to junction of **L9**, **S4**. Adjust the cores of **L16** (B1) and **L17** (H3) for maximum output.
- 17.—Transfer live signal generator lead to cathode (pin 3) of **V1a**. Adjust the cores of **L8** (A2), **L9** (J4) for maximum output. Disconnect meter.

- 18.—Connect two 100 kΩ resistors in series across (**C55**). Connect 0.100 μA meter between junction of 100 kΩ resistors and junction of **R25**, **R26** (G4).
- 19.—Adjust the core of **L19** (G4) for zero reading on microammeter which will occur between two peaks of opposite polarity. Disconnect microammeter.

**F.M. R.F. and Oscillator Stages**

- 20.—Reconnect D.C. voltmeter across **C55** (for A.M. generator alignment) or reconnect output meter across "Ext. L.S." sockets (for F.M. generator alignment).
- 21.—Transfer signal generator leads to F.M. aerial sockets, connecting the earthy generator lead to the lower socket. Feed in an unmodulated signal if using A.M. generator, or a signal deviated by ±100 kc/s if using F.M. generator.
- 22.—Set **C12** (J4) to minimum capacitance, and set **C6** (J3) to mid-capacitance. Set the cores of **L5** (J3) and **L7** (J4) flush with the tops of their formers.
- 23.—Tune receiver to 19 on substitute tuning scale. Feed in a 99 Mc/s signal and adjust **C6** (J3) and **C12** (J4) for maximum output.
- 24.—Tune receiver to 83.5 on scale, feed in an 89 Mc/s signal and adjust the core of **L7** (J4) for maximum output.
- 25.—At the same frequency, adjust the core of **L5** (J3) for maximum output.
- 26.—Repeat operations 23, 24 and 25 until calibration is correct.
- 27.—With receiver still tuned to 83.5 on scale, feed in an 89 Mc/s signal and adjust the core of **L3** (A1) for maximum output.
- 28.—Repeat F.M. I.F. adjustments in operation 17, feeding in a 10.7 Mc/s signal.

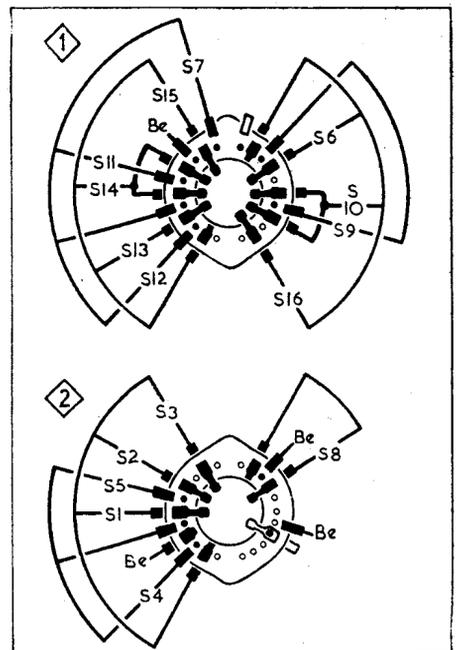
Valve	Anode		Screen		Cath.
	V	mA	V	mA	
V1 ECC85 { a...	55*	3.9*	—	—	—
{ b...	106*	3.3*	—	—	—
V2 ECH81 { a...	112	4.0	—	—	3.2
{ b...	215	1.25	85	3.2	3.2
V3 EF85...	198	9.5	130	1.7	4.1
V4 EABC80 { a-c	—	—	—	—	—
{ d	104	0.5	—	—	1.3
V5 EL84...	246	40.0	220	4.2	7.2
V6 EZ80	258†	—	—	—	262.0†
T.I. EM80	220‡	—	—	—	1.1

\*Receiver switched to F.M.  
 †A.C. reading, each anode.  
 ‡Cathode current 65.5mA.  
 §Target anode; cathode current 1.1mA.

**Drive Cord Replacement.**—About 50in of nylon braided glass yarn is required for a new drive cord. A loop should be tied at each end of the cord so that the length of the cord measured between the centres of the loops is 45in. The gang should be turned to minimum capacitance and one end of the cord attached to the tensioning spring on the drive drum. The cord should then be run off anti-clockwise round the drum as indicated in the sketch of the tuning drive system, which is drawn as seen from the rear of an upright chassis.

**Switch Table**

Switches	Gram.	L.W.	M.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	—	—	—



Diagrams of the band switch units. The associated switch table on the left gives the switch operations in the four control settings, starting with the control fully anti-clockwise.