

CIRCUIT ALIGNMENT

A.M. I.F. 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 ± 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 μ 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 Ω 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.

A.M. R.F. and Oscillator Stages

- 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	C28	100pF	J4
C2	15pF	A1	C29	100pF	H3
C3	470pF	J3	C30	395pF	J3
C4	22pF	J3	C31	50pF	H3
C5	9.5pF	A1	C32	514pF	A1
C6	30pF	J3	C33	360pF	J3
C7	30pF	J3	C34	0.01μF	H4
C8	0.002μF	J3	C35	150pF	H3
C9	30pF	J4	C36	270pF	G3
C10	22pF	J3	C37	100pF	H4
C11	4.7pF	J4	C38	100pF	H3
C12	30pF	J4	C39	4.7pF	B1
C13	56pF	J4	C40	15pF	B1
C14	9.5pF	A2	C41	0.002μF	G4
C15	160pF	J4	C42	0.04μF	G4
C16	10pF	A2	C43	0.01μF	G3
C17	2,700pF	H4	C44	10pF	B2
C18	50pF	H4	C45	68pF	B2
C19	150pF	H3	C46	68pF	B2
C20	100pF	J3	C47	100pF	B1
C21	514pF	A1	C48	100pF	B1
C22	100pF	H4	C49	0.01μF	G4
C23	0.01μF	H4	C50	100pF	G3
C24	25μF	H4	C51	220pF	G3
C25	0.04μF	H4	C52	0.05μF	H4
C26	0.04μF	H3	C53	330pF	G4
C27	100pF	H4	C54	330pF	G4
			C55	4μF	G4

C56	8μF	F3
C57	0.005μF	G3
C58	0.02μF	F3
C59	25μF	G3
C60	0.01μF	G4
C61	0.01μF	F3
C62	0.002μF	G4
C63	100μF	F4
C64	0.02μF	F4
C65	0.005μF	F3
C66	50μF	F4
C67	32μF	D1
C68	32μF	D1

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	47Ω	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	180Ω	F4
R43	1.6kΩ	E3

Coils†

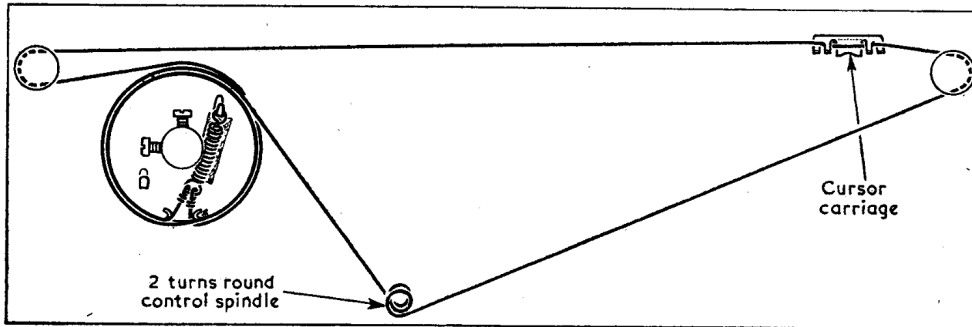
L1	—	—
L2	—	A1

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	—

Transformers†

T1	a	19.0	C1
	b	480.0	
	c	—	
T2	a	—	D2
	b	318.0	
	c	307.0	
	d	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 1/4 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	V
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.

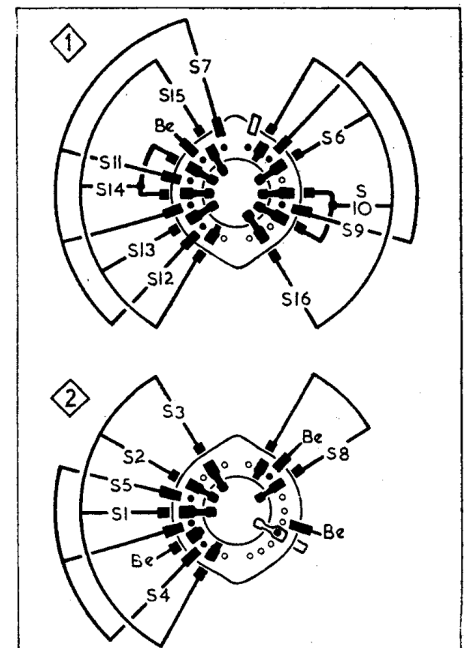
‡Cathode current 65.5mA.

§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	C	—
S6	C	—	—	C
S7	—	—	—	C
S8	—	—	—	C
S9	—	C	C	—
S10	—	C	C	—
S11	—	C	C	—
S12	—	—	—	C
S13	—	—	—	C
S14	—	C	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.