

Equipment Required.—An amplitude modulated signal generator covering the A.M. alignment frequencies 200-1,500kc/s and the F.M. alignment frequencies 10.7Mc/s and 87.5-100Mc/s; an audio output meter to match a 3Ω impedance; a Model 8 Avometer or D.C. valve voltmeter for use as a D.C. output meter; a 0-50/ μ A microammeter; two matched $47k\Omega$ resistors; a $1k\Omega$ resistor for use as a damping shunt; a 0.1μ F capacitor; and a non-metallic screwdriver-type trimming tool.

A.M. Alignment

1.—Remove the chassis from the cabinet as described under "Dismantling" in columns 5 and 6. Connect the audio output meter across T1 secondary winding, and the signal generator output between chassis

and V4 control grid (pin 2) via the 0.1μ F capacitor. Allow the generator and receiver to warm up for about 15 minutes before commencing the following operations. Each time an adjustment is made, reduce the generator output to maintain the audio output at 50mW.

- 2.—Switch the receiver to M.W. and tune it to 300m. Turn the volume control to maximum. Feed in a modulated 470kc/s signal and adjust the cores of L22 (D6) and L23 (C3) for maximum output.
- 3.—Transfer the generator output to V3 control grid (pin 2). Feed in a 470kc/s signal and adjust L17 (E6) and L18 (B3) for maximum output.
- 4.—Transfer the generator output to V2 control grid (pin 2). Feed in a 470kc/s signal and adjust L10 (F6) for minimum output.

5.—Loosely couple the signal generator to the receiver via a loop of insulated wire placed about 3 feet from the receiver. Check that with the tuning gang at maximum capacitance the cursor coincides with the dots at the right-hand ends of the tuning scale apertures.

- 6.—Tune the receiver to 500m. Feed in a modulated 600kc/s signal and adjust L13 (B3) for maximum output.
- 7.—Tune the receiver to 200m. Feed in a 1,500kc/s signal and adjust C34 (B2) and C18 (B1) for maximum output.
- 8.—Repeat operations 6 and 7.
- 9.—Switch the receiver to L.W. and tune it to 1,400m. Feed in a 214kc/s signal and adjust C32 (B2) and C17 (B1) for maximum output.

Valve Table

Valve	Anode (V)	Screen (V)	Cath. (V)
V1a UCC85	152 ¹	—	0.9
V1b UCC85	152 ¹	—	—
V2 UF89	75	68	—
V3a UCH81	80	72	—
V3b UCH81	92	—	1.0
V4 UF89	145	70	1.0
V5c UABC80	158	70	1.0
V6 UL84	142	81	—
V7 UY85	158	88	—
	55	—	—
	58	—	—
	188	104	6.9
	193	112	7.4
	200 ²	—	206.0
	229 ²	—	213.0

[†]Receiver on F.M. ^{*}Receiver on A.M.
¹Measured at junction of R3, R5. ²A.C. reading.

F.M. Alignment

- Before commencing the F.M. alignment procedure position the I.F. tuning cores as follows: **L11** (E6), **L12** (B3), **L15** (E6) and **L16** (B3) $\frac{1}{2}$ in inside the coil former; **L19** (C3) $\frac{1}{2}$ in inside the former; and **L20** (D6) $\frac{1}{2}$ in inside the former.
- Switch the receiver to F.M. and set the volume control to minimum. Connect the two matched 47k Ω resistors in series across **C53** (C2). Connect the Model 8 Avometer, switched to its 10V D.C. range, across **C53**, with positive meter terminal to chassis. Connect the signal generator output between chassis and **V3** control grid (pin 2) via the 0.1 μ F capacitor in its live output lead.
- For the following operations feed in an unmodulated 10.7Mc/s signal and adjust the generator output to maintain a 4V reading on the D.C. output meter. The correct tuning peak for the iron-dust cores is the first peak obtained from the adjusting end of the coil former, excepting **L19** which is set to the second peak in.
- Adjust **L19** (C3) for maximum reading on the D.C. output meter.
- Connect the 0.50 μ A microammeter between the junction of **R18**, **R19** (E6) and the junction of the two 47k Ω resistors. Adjust **L20** (D6) for a zero reading on the microammeter. This will occur mid-way between a positive and a negative peak.
- Connect the 1k Ω damping resistor across **L16** and adjust **L15** (E6) for maximum D.C. output.
- Connect the damping resistor across **L15** and adjust **L16** (B3) for maximum D.C. output. Remove the damping resistor.
- Transfer the signal generator to **V2** control grid (pin 2). Connect the damping resistor across **L12** and adjust **L11** (E6) for maximum D.C. output.
- Connect the damping resistor across **L11** and adjust **L12** (B3) for maximum D.C. output.
- Repeat operations 4 and 5.
- Transfer the signal generator to the F.M. aerial sockets. Connect the damping resistor across **L6** and adjust **L7** (F6) for maximum D.C. output.
- Tune the receiver to 87.5Mc/s. This coincides with the Third programme calibration mark on the M.W. tuning scale. Feed in an unmodulated 87.5Mc/s signal and adjust the cores of **L3** and **L4** (G7) for maximum output. This may be done by slackening the locking screw on the tuning drive drum and moving it along its curved slot. Then retighten the locking screw.
- Tune the receiver to 94Mc/s. Feed in a 94Mc/s signal and adjust the core of **L1** (A3) for maximum D.C. output. **C9** and **C11** are accurately aligned at the factory and should not be disturbed.

Resistors

R1	82 Ω	G7
R2	27 Ω	G7
R3	2.2k Ω	G7
R4	100k Ω	G7
R5	6.8k Ω	G7
R6	680k Ω	E5
R7	10k Ω	E5
R8	2.2k Ω	E6
R9	680k Ω	E6
R10	10k Ω	E6
R11	10 Ω	E6
R12	47k Ω	E6
R13	15k Ω	B2
R14	2.2k Ω	E5
R15	1k Ω	E6
R16	22k Ω	E6
R17	1k Ω	D6
R18	100 Ω	D6
R19	22k Ω	E6
R20	330k Ω	D6
R21	100k Ω	D6
R22	47k Ω	D6
R23	2.2M Ω	E6
R24	22k Ω	D6
R25	1M Ω	C1
R26	6.8M Ω	D6
R27	180k Ω	D5
R28	5.6k Ω	D5
R29	1M Ω	D5
R30	10k Ω	D5
R31	47k Ω	D5
R32	220 Ω	D5
R33	1.2k Ω	B2
R34	8.2k Ω	C1
R35	1.5k Ω	C1
R36	680 Ω	B1
R37	2.7k Ω	C1
R38	150 Ω	C1

Capacitors

C1	470pF	A2
C2	470pF	B3
C3	15pF	G7
C4	560pF	G7
C5	10pF	A3
C6	560pF	G7
C7	22pF	G7
C8	22pF	G7
C9	15pF	G7
C10	5.6pF	G7

C11	15pF	G7
C12	10pF	G7
C13	47pF	G7
C14	47pF	F6
C15	7,500pF	E4
C16	120pF	B2
C17	30pF	B1
C18	30pF	B1
C19	—	B2
C20	270pF	E5
C21	4,700pF	E5
C22	47pF	F5
C23	33pF	E6
C24	47pF	B3
C25	47pF	B3
C26	270pF	E6
C27	4,700pF	E6
C28	4,700pF	E6
C29	100pF	E6
C30	—	B2
C31	515pF	E6
C32	40pF	F6
C33	450pF	F6
C34	40pF	F6
C35	0.001 μ F	E6
C36	4,700pF	E6
C37	47pF	B3
C38	47pF	B3
C39	150pF	B3
C40	150pF	B3
C41	4,700pF	E6
C42	0.04 μ F	E6
C43	4,700pF	D6
C44	0.01 μ F	E5
C45	10pF	C3
C46	47pF	C3
C47	560pF	E6
C48	2,200pF	E6
C49	150pF	C3
C50	150pF	C3
C51	100pF	D6
C52	100pF	D6
C53	5 μ F	C2
C54	0.01 μ F	C1
C55	0.003 μ F	C1
C56	20 μ F	C2
C57	40 μ F	C2
C58	270pF	D6
C59	0.01 μ F	D5
C60	0.01 μ F	D5
C61	40 μ F	C2

C62	0.003 μ F	D5
C63	0.04 μ F	C1
C64	0.02 μ F	C1
C65	2,200pF	D6
C66	560pF	G7
C67	560pF	G7
C68	560pF	G7
C69	2,200pF	E5
C70	2,200pF	D6

Coils

L1	—	A3
L2	—	A3
L3	—	G7
L4	—	G7
L5	—	G7
L6	—	F6
L7	—	F6
L8	—	B1
L9	—	A1
L10	18.0	F6
L11	—	B3
L12	—	B3
L13	1.5	B3
L14	4.8	B3
L15	—	B3
L16	—	B3
L17	14.0	B3
L18	14.0	B3
L19	—	C3
L20	—	C3
L21	—	C3
L22	14.0	C3
L23	14.0	C3
L24	3.0	—
L25	—	D6
L26	—	G7

Miscellaneous

T1	$\left\{ \begin{array}{l} a \\ b \\ c \end{array} \right.$	$\left. \begin{array}{l} 600-0 \\ — \\ — \end{array} \right\}$ B2
Thermistor 1.	V1010	B1
Thermistor 2.	V1010	C1
FBI	—	G7
S1-S3	—	E5
S4, S5	—	C1

*Approximate D.C. resistance in ohms.

Switches.—Waveband switching is performed by a 3-position press-button unit, whose switch contacts are indicated in the diagram cols. 4, 5, on each side of the unit. The action of the switches is indicated by their suffixes. All the **S1** switches are operated by the L.W. button, **S2** switches by the M.W. button, and **S3** switches by the F.M. button.

If when its button is pressed a switch closes, its suffix letter is a, b, c, d, e or f; if it opens, its suffix letter is v, w, x, y or z. Thus **S2a** closes when the M.W. button is pressed, and **S2z** opens. **S3c** closes when the F.M. button is pressed, and **S3x** opens. **S1y** opens when its button is pressed, and **S1a** (in the oscillator circuit) closes.

These actions are reversed, however, when the button is released, so that when the L.W. or the F.M. button is depressed, for instance, the M.W. button is released, and its a, b buttons open, while its y, z buttons close. Thus the L.W. aerial coil **L9** is switched into circuit by the release of the M.W. button, because **S2z** then closes; but if the F.M. button is depressed to release the M.W. button, the set will receive F.M. programmes, not L.W., because **S3x** opens.

Cursor Drive Cord.—About 47 inches of nylon-braided glass yarn is required for a new cursor and main tuning drive. To replace the cord, first remove the chassis from the cabinet as described under "Dismantling" in col. 5. Then remove the control knobs, which are secured by 4BA cheese-head screws. Slacken the retaining clamps at each end of the tuning scale by loosening their Phillips head fixing screws (alternatively 6BA nuts) which are accessible from the rear of the chassis, and remove the scale.

Turn the gang to minimum and anchor the tension spring to the lug on the drive drum. Tie one end of the cord to the free end of the spring. Pass the cord through the slot in the drum and $\frac{1}{2}$ turn anti-clockwise round the drum. Then run the cord as indicated in the front view of the chassis. Finally, pass the cord $\frac{1}{2}$ turn anti-clockwise round the drum and tie it to the spring.

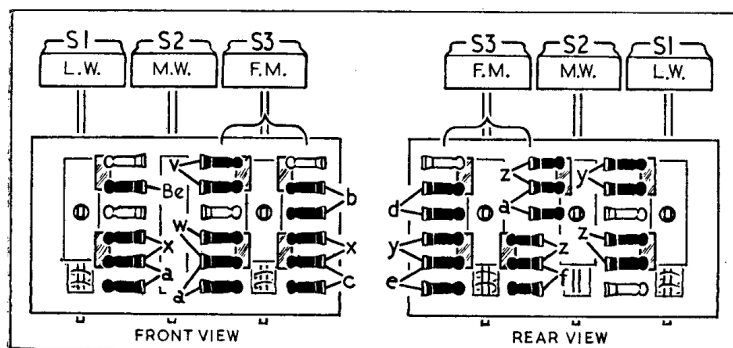
Reassemble tuning scale and adjust the cursor so that with the gang at maximum capacitance it coincides with the dots at the right-hand ends of the tuning scale apertures.

F.M. Drive Cord.—Should a breakage occur in any section of the F.M. drive cord, the manufacturers recommend that the complete drive cord and core assembly (Part No. CS62885) be replaced.

To replace the drive cord assembly, remove the front cover of the F.M. unit (seven 6BA screws) and set the tuning gang to minimum capacitance. Remove the screw and washer from the curved slot in the drive drum. Unhook the cord from the tension spring and the boss on the pivoted adjuster. Thread the new cord and core assembly through the formers of **L3**, **L4** and **L5** and run the cord as indicated in the front view illustration of the tuner unit (col. 6).

After reassembling, check that with the tuning gang at maximum capacitance the cursor coincides with the dots at the right-hand ends of the tuning scale apertures. Then adjust the cores of **L3**, **L4** and **L5** as described in operation 12 under "F.M. Alignment" (col. 3).

Scale Lamps.—These are two 6.3V, 0.1A lamps with clear spherical bulbs and M.E.S. bases.



BUSH - VHF80

Diagrams showing details of waveband switches. See also "General Notes."