

BUSH - VTR103

Transistor Table

Transistor	Emitter (V)	Base (V)	Collector (V)
VT1 AF114	7.3	6.9	—
VT2 AF115	6.9	6.8	—
VT3 AF116	5.6	5.2	—
VT4 AF116	6.1	5.6	2.15
VT5 AF116	5.9	5.5	0.2
VT6 OC71	5.9	5.5	4.1
VT7 OC81D	5.95	—	0.35
VT8 OC81	8.9	8.75	—
VT9 OC81	8.9	8.75	—

CIRCUIT ALIGNMENT

Equipment Required.—An A.M. signal generator with the necessary frequency coverage modulated 30 per cent at 400c/s; an output wattmeter with a range of 0-200mW to match 3 ohms impedance; a non-metallic bladed type trimming tool; an Avo meter model 8, or both a D.C. valve voltmeter and a 0-50μA meter; a matched pair of 220kΩ

resistors for use in connection with the F.M. balance meter and a 10pF capacitor suitably mounted for use as an injector unit for the external aerial socket.

Alignment Notes.—For calibration purposes the receiver should be removed from the cabinet and the pointer replaced. Switch on the signal generator about 15 minutes before alignment. Disconnect the internal loudspeaker and connect the output wattmeter in its place.

Note: If at any time the output meter is connected without the speaker being disconnected, ensure that the power output from the receiver is never greater than 70mW or damage to the output transistors may result. Set the volume control to the maximum output position and the tone control to maximum treble (clockwise).

Adjust the signal generator as the circuits come into line to maintain an output of 50mW (20mW if the internal speaker is left connected).

A.M. I.F. Circuits.—Where two peaks occur, the one with the core nearer the outer of the former is correct.

1.—Switch to M.W. and set the tuning

pointer to 1,000 kc/s calibration dot.
2.—Feed in a 470kc/s modulated signal via a 0.1μF capacitor to the base of VT3 and adjust the cores of L27/L28 (location reference B3), L22/L23 (B2) and L16/L17 (C2) in that order for maximum output. Adjust each transformer once only. L17 and L23 are "top" adjustments and L16 and L22 "bottom" adjustments.

A.M. R.F. Circuits.—Ensure that the tuning pointer is in line with the horizontal datum line on the auxiliary calibration scale when the tuning gang is at maximum capacitance. Connect the signal generator via the series 10pF capacitor to the external aerial socket. Turn the volume control to maximum output.

1.—Switch to M.W. and set the tuning pointer to the 600kc/s calibration mark. Feed in a 600kc/s signal and adjust L15 (C2) for maximum output.
2.—Set the tuning pointer to 1,500kc/s, feed in a 1,500kc/s signal and adjust CT6 (C1) for maximum output.
3.—Repeat operations 1 and 2 for correct calibration.

Resistors			Capacitors			Coils*			Transformers*		
R1	560Ω	K7	C1	10pF	H4	C32	0.05μF	—	T1	{a	138.0
R2	27kΩ	K7	C2	47pF	K7	C33	250pF	—		b	57.0
R3	4.7kΩ	K7	C3	22pF	K7	C34	300pF	—		c	63.0
R4	560Ω	K7	C4	1,000pF	K7	C35	1,000pF	—	T2	{a	3.2
R5	6.8kΩ	K7	C5	5.6pF	K7	C36	330pF	—		b	3.6
R6	1.5kΩ	K7	C6	470pF	K7	C37	0.01μF	—		c	0.3
R7	6.8kΩ	B2	C7	1pF	K7	C38	0.01μF	—			
R8	27kΩ	B2	C8	1,000pF	K7	C39	8μF	—			
R9	1kΩ	F5	C9	1,000pF	K7	C40	0.01μF	1.0			
R10	120Ω	H6	C10	25pF	K7	C41	50pF	12.5			
R11	120kΩ	F4	C11	70pF	K7	C42	0.25μF	1.25			
R12	680Ω	G5	C12	70pF	K7	C43	0.04μF	0.5			
R13	2.2kΩ	B2	C13	150pF	G4	C44	350μF	0.5			
R14	220Ω	G6	C14	0.02μF	G4	C45	1,000pF	—			
R15	1kΩ	F6	C15	0.02μF	G5	C46	8μF	—			
R16	3.9kΩ	G6	C16	100μF	B3	C47	8μF	—			
R17	18kΩ	C3	C17	490pF	F4	C48	100μF	2.5			
R18	3.8kΩ	F6	C18	300pF	C2	C49	8μF	4.0			
R19	330Ω	C3	C19	180pF	B2	C50	0.01μF	4.0			
R20	8.2kΩ	C3	C20	300pF	C2	C51	100μF	—			
R21	56kΩ	C3	C21	180pF	B2	C52	0.25μF	—			
R22	330Ω	†	C22	556pF	G5	C53	0.02μF	—			
R23	1.8kΩ	C1	C23	3,300pF	G5	C54	0.02μF	4.0			
R24	18kΩ	C3	C24	0.05μF	G5	C55	0.02μF	4.0			
R25	15kΩ	F5	C25	180pF	C2	C56	0.1μF	—			
R26	82kΩ	F5	C26	300pF	B2	C57	350μF	—			
R27	1.2kΩ	F5	C27	0.05μF	G5	CV1	523pF	—			
R28	5.6kΩ	C3	C28	180pF	C2	CV2	523pF	—			
R29	8.2kΩ	F5	C29	300pF	B2	CT1	25pF	3.5			
R30	39kΩ	F6	C30	3,300pF	F5	CT2	10pF	0.5			
R31	470Ω	C1	C31	0.05μF	G5	CT3	40pF	2.5			
R32	330kΩ	F5				CT4	40pF	—			
R33	1kΩ	F5									
R34	150Ω	C3									
R35	5.6kΩ	D3									
R36	10Ω	D3									

- 4.—Switch to L.W. and set the tuning pointer to 214kc/s. Feed in a 214kc/s signal and adjust **CT5** (C1) for maximum output.
- 5.—Switch to M.W. and set the tuning pointer 1,500kc/s. Feed in a 1,500kc/s signal and adjust **CT3** (B1) for maximum output.
- 6.—Set the tuning pointer to 600kc/s, feed in a 600kc/s signal and adjust **L11** (D1) for maximum output.
- 7.—Repeat operations 5 and 6 for optimum gain at both points.
- 8.—Switch to L.W. and set the tuning pointer to 214kc/s. Feed in a 214kc/s signal and adjust **CT4** (B1) for maximum output.

Note: Although the M.W. aerial coil **L11** may be adjusted where necessary, the L.W. aerial coil **L9** should not be moved.

F.M. I.F. Circuits.—**L6** and **L7** are located inside the F.M. tuner unit. **L19**, **L21** and **L26** are "top" adjustments; **L18**, **L20** and **L24** are "bottom" adjustments.

Wire the two 220kΩ resistors in series and connect the outer ends between **TP2** and chassis. Connect the D.C. voltmeter between **TP2** and chassis i.e. in parallel with the resistors, positive terminal to chassis. Connect the 0.50μA meter between the junction of the 220kΩ resistors and **TP1**. Set **RV1** to its approximate mid-position. Adjust the signal generator during alignment to maintain an output of 0.5-1V on the D.C. meter.

- 1.—Switch the receiver to F.M. and set the tuning pointer to the 94Mc/s calibration mark. Connect the signal generator via a 0.1μF capacitor to the base of **VT3**.
- 2.—Feed in a 10.7Mc/s modulated signal and adjust **L24** (C3) for maximum deflection on the D.C. output meter. Adjust **L26** (C3) for zero output on the μA balance meter.
- 3.—Adjust **L20** (C2), **L21** (C2), **L18** (B2) and **L19** (B2) for maximum deflection on the D.C. output meter.
- 4.—Adjust **RV1** (C3) for minimum audio output with the volume control set to the maximum output position.

- 5.—Re-adjust **L24** for maximum deflection on the D.C. output meter.
- 6.—Transfer the signal generator to the external aerial socket. Feed in a 10.7Mc/s C.W. signal and adjust **L6** (A2) and **L7** (A2) for maximum deflection on the D.C. output meter.

F.M. R.F. Circuits.—Before calibrating the F.M. waveband ensure the tuner unit screening cover is securely in position. Remove the 220kΩ resistors and the 0.50μA balance meter but leave the D.C. output meter connected as for "F.M. I.F. Circuits." Connect the signal generator to the external aerial socket. Calibration is carried out by means of the pivoted lever core adjuster (see illustration of the F.M. tuning drive assembly in col. 1).

- 1.—Set the tuning pointer to 94Mc/s on the calibration scale and feed in a 94Mc/s C.W. signal. Slacken the hexagon headed locking screw and set the core adjuster for maximum deflection in the D.C. output meter, then re-tighten the locking screw.
- 2.—With the receiver and signal generator settings left as in operation 1, adjust the core of **L2** (A3) for maximum deflection on the D.C. output meter.
- 3.—Check the calibration at 87.5 and 100Mc/s.

Note: **CT1** and **CT2** are set at 94Mc/s during production and are not likely to require subsequent adjustment during alignment.

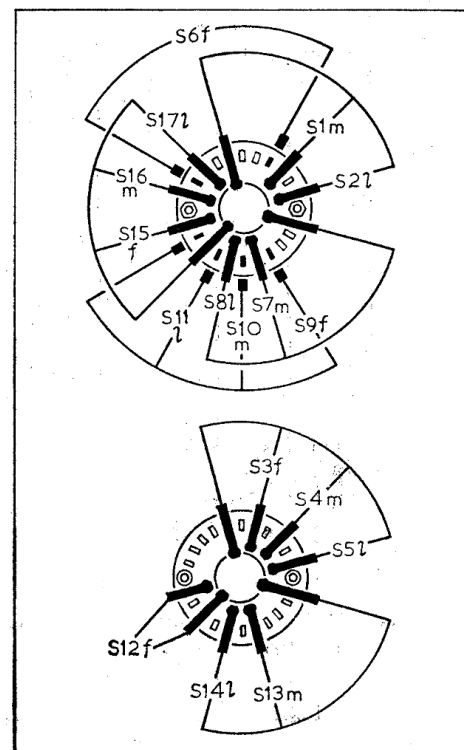
F.M. Tuning Drive Replacement.—If a breakage occurs in either the cord or the cores, the complete assembly should be replaced. The drive cord may be replaced as illustrated in col. 1 using the procedure outlined below.

Remove the chassis from the cabinet. Loosen and remove the two 6 BA bolts securing the pillars of the external aerial socket to the chassis and lift assembly clear. Loosen and remove the two 6 BA nuts securing the F.M. tuner unit cover and remove the cover.

Pull out the core stop from the tuning inductance former. Slacken the P.K. screw securing the tuner unit pulley bracket and move the bracket away from the core aperture. Unhook the drive cord from the return spring and withdraw drive cord cores. The new drive cord should be replaced as shown in col. 1.

When refitting the cord drive, ensure that the core stop is correctly located between the faces of the core plunger.

After reassembly set the tuning capacitor for maximum. Ensure that the tuning spindle collar is reset so that the core of **L5** just touches the core stop with no slack in the cord drive and with the pivoted core adjuster set to approximately the midway position. The pivoted lever core adjuster should be finally reset as described in the alignment procedure.



Outer (upper) and inner (lower) waveband switch wafers as they appear when looking from the front of the chassis

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