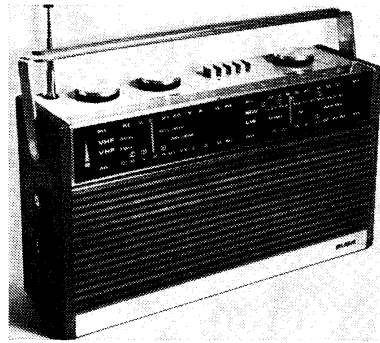


E R T

**SERVICE
CHART
1781**



Bush VTR172 portable radio has oiled teak cabinet with brushed aluminium trim

BUSH VTR172 'Merlin' portable radio

ELECTRICALLY identical, these battery operated portable radios are designed to cover the LW, MW and VHF bands plus the facility of a push button switch, preset to BBC1 on 247 metres.

The VTR172C has been made for the "Wireless for the Blind" organisation and has a non-tilting telescopic aerial, the top of which is protected by a smooth plastics moulding.

Both models are finished in teak with a chrome trim. The speaker is forward facing and mounted on a full width horizontally slotted grille. A divided tuning scale—VHF on the left and LW-MW on the right—is located above the grille, and a logging scale is incorporated.

Battery. One 9V PP9 or equivalent type.

Consumption. Quiescent current: AM 19mA; FM 25mA.

Wavebands. LW 1070-1900m (280-158kHz), MW 187-570m (1605-525kHz), VHF/FM 87.5-100MHz.

Transistors. TR1 RF amplifier (VHF/FM) BF 166, TR2 VHF mixer/oscillator BF 152, TR3 AM mixer/oscillator—FM IF amplifier BF 160, TR4 and TR5 common IF amplifiers BF 160, TR6 AF pre-amplifier BC113, TR7 AF output stage driver BC154, TR8 and TR9 Class B push-pull output AC128. Transistors 1-7 are Fairchild types, 8 and 9 Mullard.

Diodes. D1 and D2 FM discriminator OA79, D3 AM detector OA90.

IF. AM 470kHz., FM 10.7MHz.

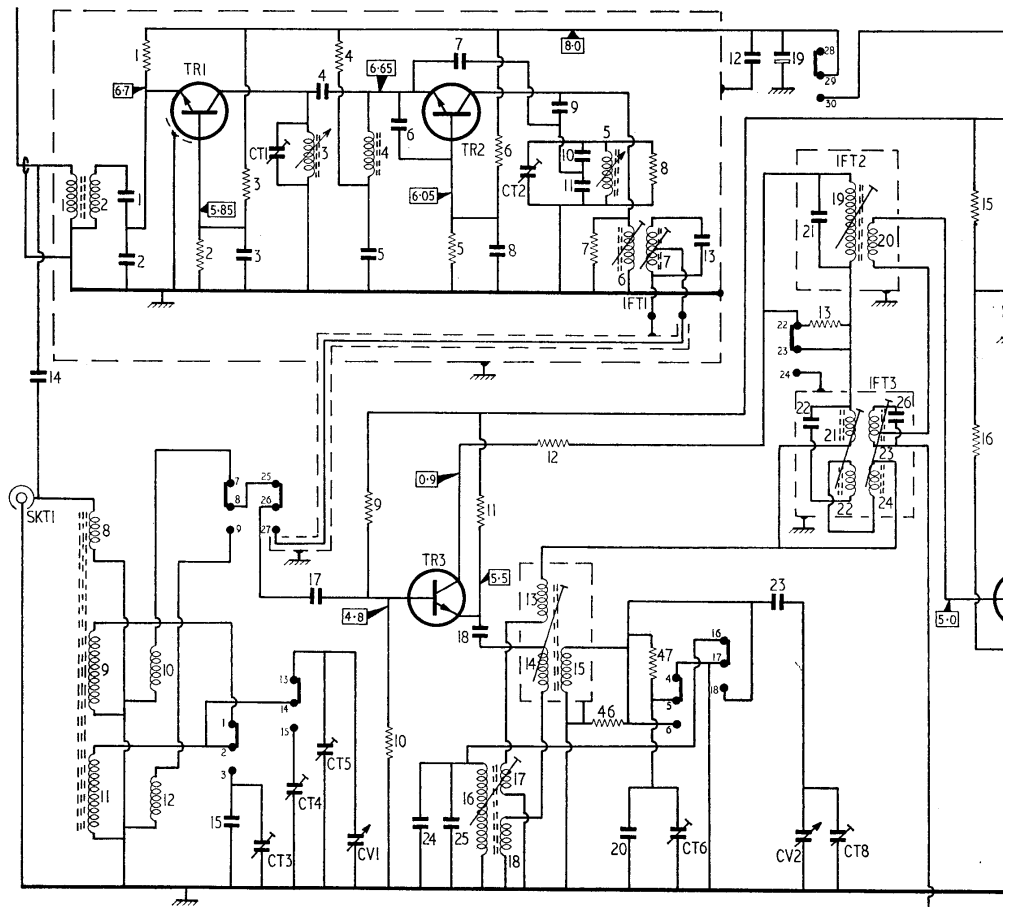
Aerials. An internal ferrite rod aerial assembly for LW and MW bands and a telescopic rod for VHF/FM. A car aerial socket serves all wavebands.

Speaker. 6x4in. (15x10cm) elliptical. Impedance 15ohm.

Output. 1W for 10 per cent total distortion.

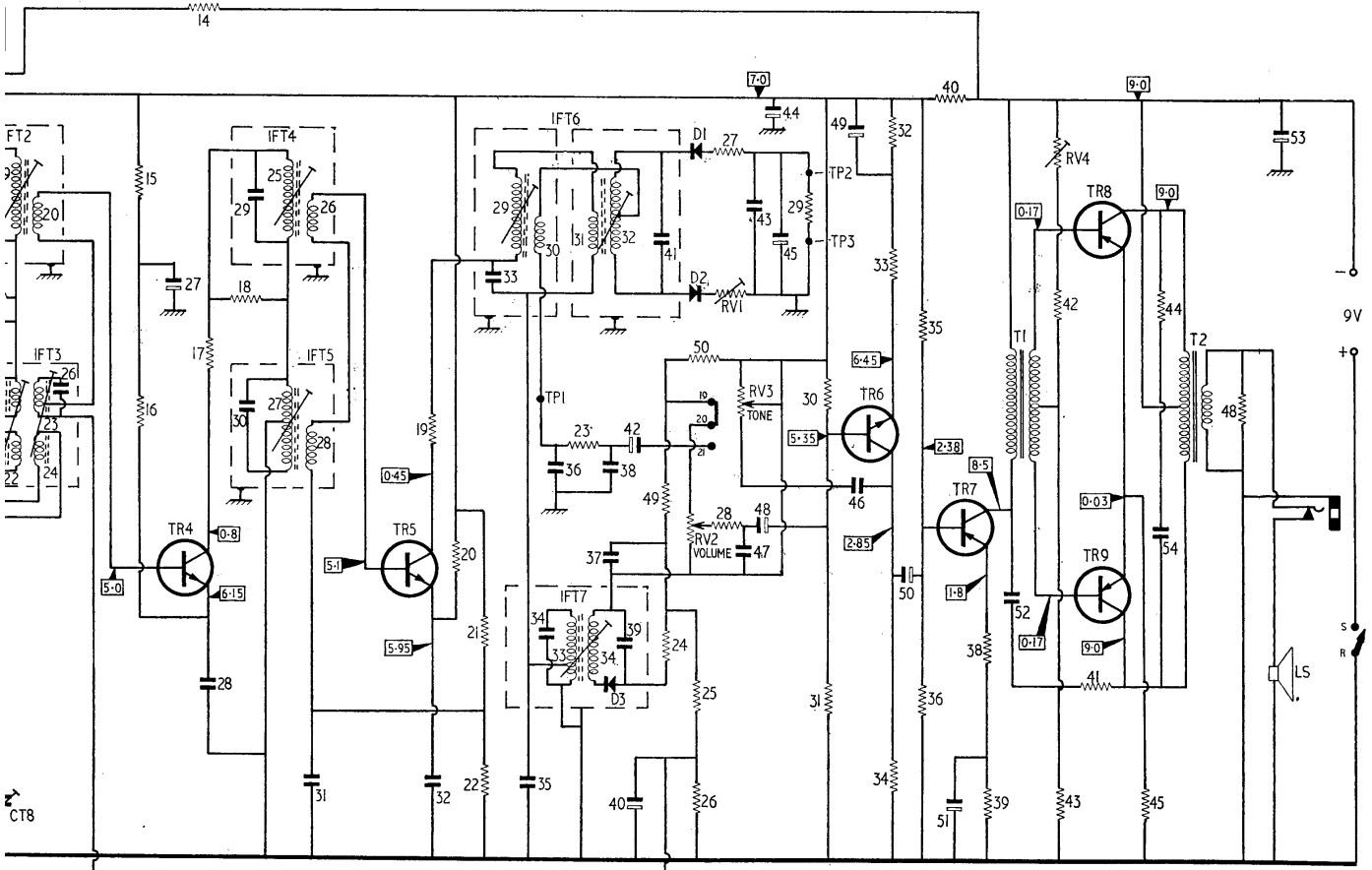
Outlet. A normally closed miniature jack for an earphone with an impedance of 20 to 1000ohm. Alternatively, this socket may be used for an external 15ohm speaker or for tape recording when

R	1	2	3	4	5	6	7	8	13	15																								
C	14	12	3	CT1	4	9	10	11	12	46	47	15	16																					
L	1	2	15	CT3	CT4	17	CT5	CV1	24	25	18	7	8	CT2	9	10	11	20	CT6	13	12	19	21	23	CV2	22	CT8	26	19	20	21	22	23	24



RESISTORS			R31			C3			C36		
R1	680	B1	82K	A2	1KpF	B1	330pF	B2			
R2	12K	B1	1K	A2	4.7pF	B1	10KpF	B2			
R3	4K7	B1	39	A2	47pF	B1	10KpF	B2			
R4	560	B1	R34	5K6	A2	C6	39pF	B1	10KpF	B2	
R5	4K7	B1	R35	18K	A2	C7	3.9pF	B1	10pF	B1	
R6	12K	B1	R36	10K	A2	C8	1KpF	B1	47pF	A1	
R7	12K	B1	R38	27	A2	C9	270pF	B1	5pF	A1	
R8	12K	B1	R39	390	A2	C10	47pF	B1	1KpF	B2	
R9	12K	A1	R40	330	A2	C11	47pF	B1	500pF	B2	
R10	27K	A1	R41	6K8	B2	C12	50KpF	B1	5pF	B2	
R11	1K2	A1	R42	6K8	A2	C13	70pF	B1	200KpF	A2	
R12	680	A1	R43	150	B2	C14	10pF	B1	20KpF	A2	
R13	6-8	A1	R44	150	B2	C15	56pF	A1	100pF	A2	
R14	150	A1	R45	3-3	A2	C17	10KpF	A1	100pF	A2	
R15	330	B1	R46	120K	A1	C18	20KpF	A1	100KpF	A2	
R16	330	B1	R47	220K	A1	C19	100pF	B1	200pF	B2	
R17	680	B1	R48	330	B2	C20	200pF	A1	150pF	A2	
R18	6K8	B2	R49	3K3	A2	C21	250pF	—	250pF	B2	
R19	270	B2	R50	2K7	A2	C22	300pF	—	300pF	A1	
R20	680	B2	VARIABLES			C23	330pF	A1	47pF	A1	
R21	5K6	B2	RV1	2K2	B2	C24	330pF	A1	—	—	
R22	15K	B1	RV2	5K	A2	C25	47pF	A1	—	—	
R23	3K9	B2	RV3	10K	A2	C26	250pF	—	250pF	B1	
R24	560	B2	RV4	2K2	A2	C27	100pF	B1	50KpF	B1	
R25	18K	B1	CAPACITORS			C28	50KpF	B1	25pF	B1	
R26	56K	B1	C1	82pF	B1	C29	150pF	—	80pF	A2	
R27	330	B2	C2	33pF	B1	C30	200pF	—	80pF	A1	
R28	1K5	A2	C31	50KpF	B1	C31	50KpF	B1	25pF	B1	
R29	18K	B2	C32	50KpF	B1	C32	270pF	—	80pF	A1	
R30	18K	A2	C33	—	—	C33	270pF	—	25pF	A1	
			C34	—	—	C34	165pF	—	80pF	A1	
			C35	—	—	C35	500pF	B2	25pF	B1	

15	14	17	18																					50	27	RV1	29	32	33	35	40	RV4	42	44					
16				19	20	21	22	23	24	25	26	28	RV3	30	31	34	36	38	39	43	41	45	48	53															
CT8	26	27	29	30	31	32	33	35	34	36	37	38	39	42	40	47	48	49	50	51	52	54	55																
19	20		25	26																									TI					T2					
2	23	24	27	28	29	30	31	32	33	34																									LS				



terminated in 15ohm. The internal speaker is muted when the plug is inserted.

Dimensions. 7¼ × 12⅝ × 3 7/16 in. (18.4 × 31.4 × 8.7cm).

Weight. 5lb (2.27kg) excluding battery.

Price. £30 9s.

Manufacturer. Rank Bush Murphy Ltd.

Service department. Drayton Road, Boreham Wood, Herts. Tel: 01-953 6151. Telex: 262741. Cables: Rankboom Boreham Wood.

DISMANTLING

Remove the bottom cover and disconnect battery. Unscrew and remove the two screws securing the case back. The back cover is removed by pulling downwards so that the retaining lugs are disengaged from their grommets.

Slacken the screw retaining the bottom of the telescopic aerial to the mounting panel and withdraw the aerial from the top of the case.

Unsolder earthing and aerial leads at the car aerial socket then unscrew and remove the three fixing screws and 4BA nut securing chassis to case.

To free the speaker/earphone socket

leads, remove the cable clamp secured to the case by the speaker fixing nut.

Lift the bottom of the chassis slightly and ease it out carefully to the extent of the connecting leads. For complete removal, unsolder the speaker/earphone socket leads from resistor R48.

When replacing reverse the above procedure.

VHF tuner unit removal. Disconnect leads to tags 1, 2, 5, 7 and 8. Rotate tuning gang to minimum capacitance and remove the locking screw on the VHF calibration adjuster. Slip the loop of the VHF tuning cord from the boss of the calibration adjuster. Unscrew and remove the five screws securing the unit to the main chassis.

When replacing the VHF tuner reverse the above procedure.

SERVICE NOTES

Output stage quiescent current adjustment. This adjustment should only be necessary if components in the output stage are replaced. The measurements that follow were made at an ambient temperature of 70degF (21degC).

Connect an ammeter in series with the battery and switch receiver to VHF/FM. Rotate volume control to minimum and adjust RV4 for a meter reading between 22 and 24mA.

An alternative method is to use a 20,000ohm/V meter switched to the 50µA DC range connected across R45 (observe correct polarity). Rotate volume control to minimum and adjust RV4 for 10.5µA through meter. This is equivalent to a voltage of 26.5mV across R45 and establishes 8mA through output stage transistors.

Drive cord replacement. Remove chassis as previously described. Carefully remove pointer from its carrier then unscrew and remove the two screws securing scale plate to chassis and lift the plate clear.

Prepare about 47in. of drive cord and fit in accordance with the diagram ensuring that 2½ turns are made round the tuning spindle.

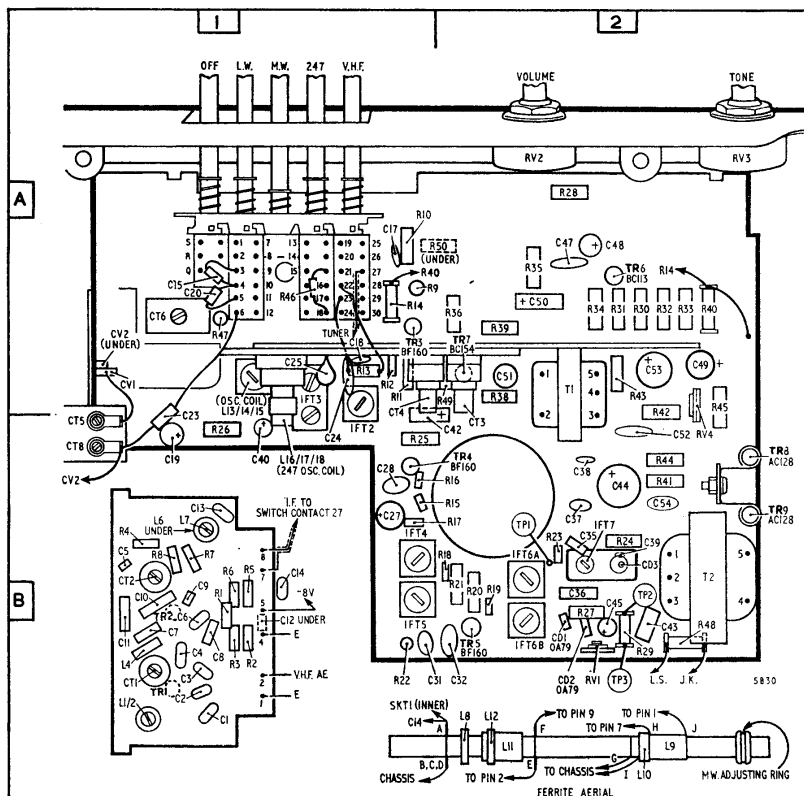
Refit pointer and check that with the tuning gang at maximum capacitance the pointer registers with the datum marks at the extreme right-hand end of the scale plate.

ALIGNMENT

Equipment required. An RF signal generator with an output impedance of 80ohm and the facility for amplitude modulation up to 50 per cent; three matching pads assembled as shown on alignment diagram, an audio output meter, a matched pair of 220K ohm resistors, a centre zero microammeter and a 20,000ohm/V DC meter with a 0-2.5V range.

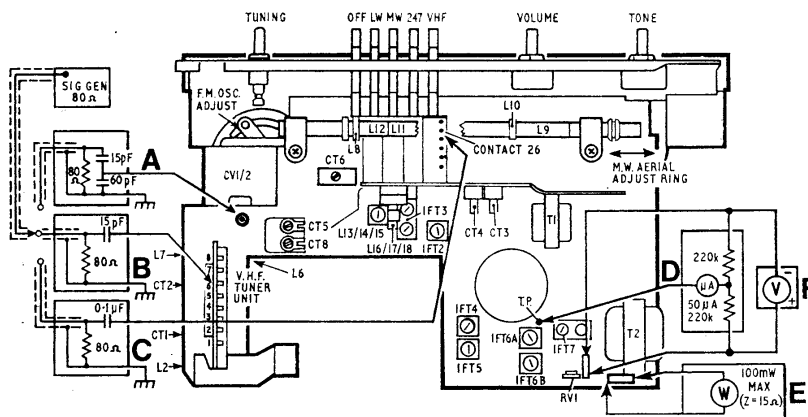
Rotate volume and tone controls fully clockwise and check that the battery supply is 9V. In order to prevent damage to the output transistors, the sound output meter E must have an impedance not less than 15ohm, and if connected across R48 as shown maximum output must not be allowed to exceed 100mW. As receiver sensitivity increases attenuate input signal so that an audio output of 50mW is maintained.

AM IF. Connect signal generator to C, switch receiver to MW and tune to 300m. Feed in a 470kHz AM signal and adjust IFT7, IFT5, and IFT3 (L23 and L21) in that order for maximum output. Disconnect signal generator.



Component layout of main chassis and FM tuner printed panel. Ferrite aerial windings are also indicated

Rear view of receiver showing alignment connection points and networks. Procedure is given in the text



AM RF. Connect signal generator to A, switch receiver to MW and tune to 500m. Feed in a 600kHz AM signal and adjust L13/14/15 for maximum output.

Tune receiver to 200m and feed in a 1500kHz AM signal. Adjust CT8 for maximum output.

Repeat the adjustments at 600kHz and 1500kHz until tracking is correct.

Tune receiver to 500m and feed in a 600kHz AM signal. Adjust ring adjacent to L9 on ferrite rod for maximum output.

Tune receiver to 200m and feed in a 1500kHz AM signal. Adjust CT5 for maximum output. Repeat the adjustments for L9 and CT5 for optimum tracking.

Switch receiver to 247. Note: For maximum accuracy of tuning of the "247" pre-set oscillator circuit, the manufacturers recommend wherever possible, the use of a signal generator that has been checked for calibration accuracy against the "247" transmission and modulated 50 per cent at 3kHz.

Feed in a 1mV 1214kHz AM signal at A and adjust L16/17/18 for minimum output then adjust CT4 for maximum output attenuating input signal as necessary. Finally, check the tuning of the receiver against the 247 transmission.

Switch receiver to LW, tune to 1400m and feed in 214kHz AM at A. Adjust CT6, check that L11 on ferrite rod is sealed in position and adjust CT3 for maximum output. Seal adjustment ring

adjacent to L9 and disconnect signal generator and output meter.

FM IF. Connect network D and meters F and E as shown on alignment diagram. Switch receiver to VHF/FM, tune to 94MHz and set balance control RV1 to mid-position. During the following procedures adjust the signal generator output level so that meter F reads between 0.5 and 1V.

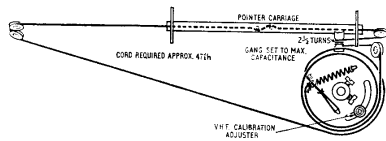
Feed in a 10.7MHz AM signal at C. Adjust IFT6A for maximum (F), IFT6B for zero (D), IFT4 and IFT2 for maximum (F). Increase signal generator output to 1mV and adjust RV1 for minimum output (E). Reduce signal generator output and readjust IFT6A for maximum (F) and

IFT6B for zero (D).

Transfer signal generator to B. Adjust L6, L7 (IFT1) and L6 again for maximum (F).

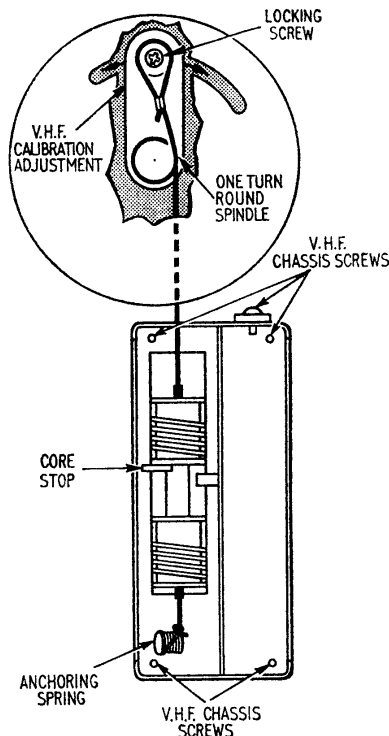
FM RF. Feed in a 94MHz AM signal at A and tune L3 with adjusting lever on drive cord drum, for maximum (F), then tighten locking screw. Adjust L2 for maximum (F).

Note: During manufacture adjustments to the VHF tuner unit are made at 94MHz and 10.7MHz using special sweep equipment. Further adjustment should not be made unless components are known to have been disturbed.



Cord drive routing diagram. Refer to Service Notes text for method of fitting

Details of the FM/VHF tuning drive system showing adjustment provided for calibration



Service Notes

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