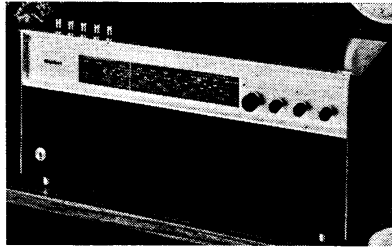


ERT SERVICE CHART 1805

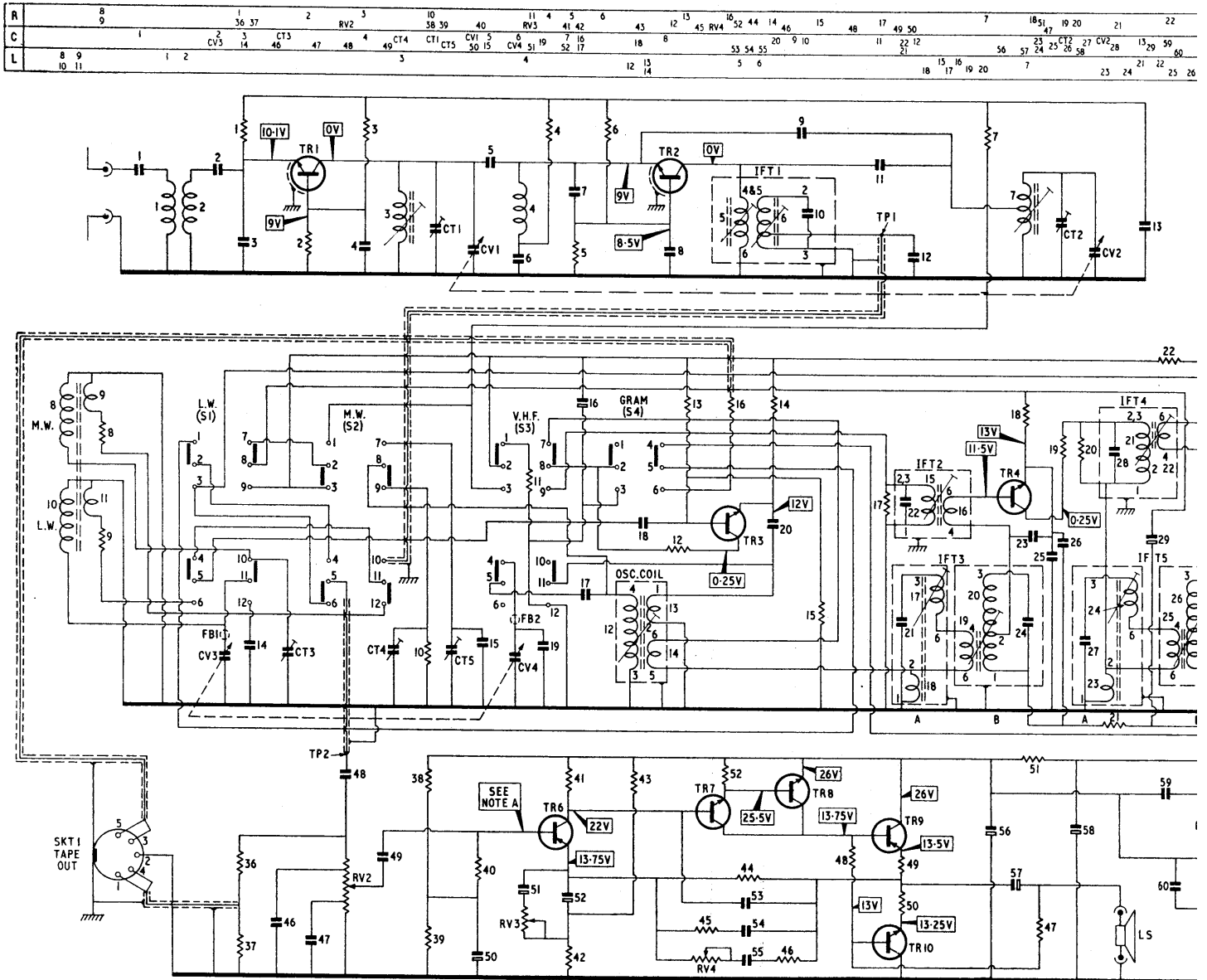


Mains operated AM/FM table radio. Bush VHF102 is housed in a sealed wooden case standing on four small aluminium feet fitted with non-scratch pads

BUSH VHF102 AM/FM mains table radio

Additional copies of this chart 25p, including postage. Payment with order please to ERT, Dorset House, Stamford Street, London SE1.

Below: circuit diagram of Bush VHF102 showing VHF tuner at the top, AM tuning and IF amplifiers in the centre and audio and power stages at the bottom. Voltages are approximate and measured under no-signal conditions with volume control at minimum using Avo 8 on 25V DC range where possible. All Voltages are negative to chassis



DESIGNED for mains operation only, model VHF102 AM/FM table radio receiver incorporates ten transistors, three semi-conductor diodes and a pair of silicon rectifiers in the power supply.

An internal ferrite rod aerial assembly is used for reception of long and medium wavebands and a folded dipole for VHF.

The receiver is housed in a sealed wooden case which forms an acoustic chamber. On the front of the case a padded speaker grille extends to the full width and above this, is the recessed tuning scale.

Projecting from the right-hand side of the scale are tuning, volume, bass and treble controls in that order.

Five push buttons located on the top left of the case are respectively, OFF, LW, MW, VHF and GRAM. The tape socket and external VHF aerial connectors are located at the rear of the case.

Mains. 200-240V 40-100Hz.

Consumption. 22W.

Wavebands. LW 1070-1900m (280-158kHz). MW 187-570m (1605-525kHz). VHF 88-108 MHz.

Transistors. TR1 VHF RF amplifier BF 222, TR2 VHF mixer/oscillator BF222, TR3 mixer/oscillator (AM), IF amplifier (FM) BF273, TR4 common IF amplifier BF274, TR5 common IF amplifier BF273, TR6 AF pre-amplifier BC153, TR7 BC132 and TR8 BC119UA compound driver stage, TR9 AD162 and TR10 AD161 output stage complementary pair.

Diodes. D1 and D2 ratio detector one each AA119, D3 AM detector OA90, D4 and D5 power supply rectifier one each BY126.

IF's. AM 470kHz, oscillator high. FM 10.7MHz oscillator low.

Aerials. AM internal ferrite rod assembly. FM folded dipole and external aerial socket.

Fuse. FS1 150mA anti-surge.

Pilot lamps. LP1, LP2, 6.5V 1W.

Speaker. 6 x 4in. (15 x 10cm) elliptical. Impedance 5ohm. Flux 14,000 lines per square centimetre using a ceramic magnet and a long throw voice coil.

Output. 10W music power at 1kHz.

Outlet. 5-pin DIN socket for tape recorder, also for playback including record player.

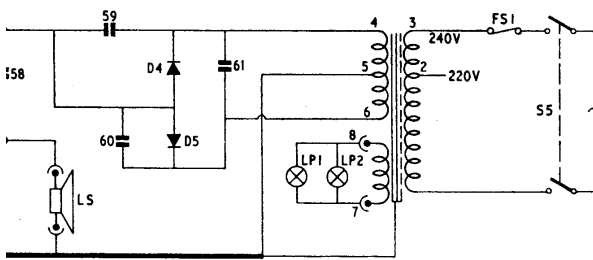
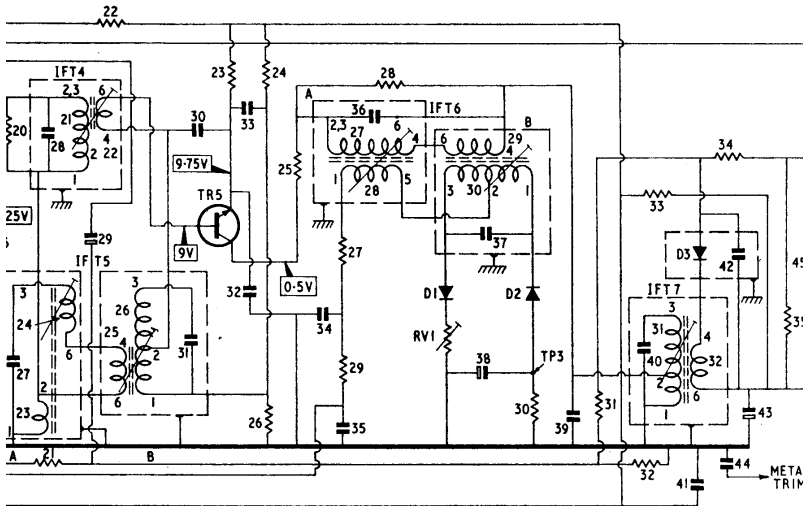
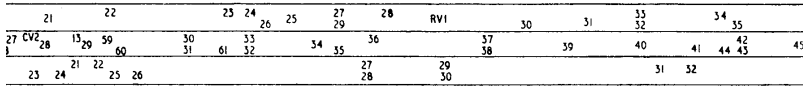
Dimensions. 8 1/2 x 18 1/8 x 6 1/2 in. (22 x 47.7 x 17.2cm).

Weight. 13 1/2 lb. (6kg).

Price. £45.38.

Manufacturer. Rank Bush Murphy Ltd.

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



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RESISTORS		CAPACITORS	
R1	680	C1	22pF
R2	120K	C2	82pF
R3	22K	C3	30pF
R4	1K	C4	10KpF
R5	4K7	C5	4.7pF
R6	1K5	C6	200pF
R7	470	C7	30pF
R8	470	C8	10KpF
R9	470	C9	4.7pF
R10	150K	C10	180pF
R11	3K3	C11	68pF
R12	270	C12	47pF
R13	3K3	C13	50KpF
R14	1K5	C14	120pF
R15	18K	C15	360pF
R16	390K	C16	80pF
R17	5K6	C17	430pF
R18	470	C18	10KpF
R19	270	C19	5.6pF
R20	5K6	C20	22KpF
R21	2K2	C21	250pF
R22	120	C22	150pF
R23	1K	C23	3KpF
R24	3K3	C24	250pF
R25	150	C25	47KpF
R26	5K6	C26	22KpF
R27	150	C27	250pF
R28	6K8	C28	150pF
R29	10K	C29	8uF
R30	18K	C30	3KpF
R31	18K	C31	250pF
R32	180K	C32	22KpF
R33	15K	C33	3KpF
R34	2K7	C34	200pF
R35	3K3	C35	2K2pF
R36	330K	C36	270pF
R37	680K	C37	47pF
R38	68K	C38	5uF
R39	91K	C39	500pF
R40	680K	C40	165pF
R41	27K	C41	100KpF
R42	39	C42	10KpF
R43	100K	C43	8uF
R44	10K	C44	1KpF
R45	5K6	C45	10KpF
R46	1K	C46	33KpF
R47	220	C47	150KpF
R48	6.8	C48	100KpF
R49	1	C49	47KpF
R50	1	C50	40uF
R51	1K2	C51	125uF
R52	3K3	C52	6.8uF
		C53	10uF
		C54	270pF
		C55	22KpF
		C56	3000uF
		C57	1000uF
		C58	160uF
		C59	1KpF
		C60	1KpF
		C61	100KpF

VARIABLES	
RV1	500 A1
RV2	250K B2
RV3	500 B1
RV4	200K B1

VARIABLES	
CT1	8pF
CT2	8pF
CT3	30pF
CT4	30pF
CT5	30pF
CV1	11pF
CV2	11pF
CV3	392pF
CV4	392pF

DISMANTLING

Disconnect the mains supply, free the two leads connected to the VHF aerial connector and remove case back.

Remove the plastics foam pad from the case—see footnote. Pull off the tuning, volume, bass and treble control knobs.

Place the case face downwards on a non-scratch work-surface then disconnect the pilot lamp connectors from the mains transformer and the speaker connectors from the case base.

Release the mains lead clamped to the case base and remove the VHF aerial and tape socket panel by unscrewing and removing the two 4BA nuts securing the panel to the case base.

Disengage ferrite rod aerial assembly from its mounting bracket.

Unscrew and remove one 4BA nut and one 4BA screw securing the chassis to the underside of the case and carefully lift the chassis out of the case.

Note: When reassembling it is important that the sealing rubber fitted round the push button, control spindles and VHF aerial/tape socket panel, also the plastics foam fitted round the edge of the back cover provide an adequate seal. When reassembled, the case must be a satisfactory sealed acoustic chamber.

SERVICE NOTES

Voltages indicated on the circuit diagram were measured under quiescent conditions with a model 8 Avometer switched to the 25V range. They are all negative with respect to chassis and the volume control was at minimum.

Note A. Do not measure voltage at the base of TR6 with an Avometer.

Drive cord replacement. To replace drive cord, first remove chassis as described under Dismantling. Fit replacement cord as illustrated. With tuning gang at maximum capacitance ensure that the pointer is in line with the datum marks at the low frequency end of the tuning scale.

MODIFICATIONS

The following variations are to be found in early receivers: TR4 was type BF273. TR6 was type BC154. C61 was not fitted. The addition of this capacitor reduces modulation hum on the long wave-band. FS1 was not fitted. Some receivers were fitted 180K ohm resistors across pins 1 and 3 of IFT3A and B also IFT5A and B.

ALIGNMENT

Equipment required. A signal generator to cover 214 to 1500kHz, 10.7MHz and 88 to 108MHz with provision for AM and FM as required, a power output meter to match 50hm impedance, an electronic voltmeter or 20,000ohm/V meter 0.2.5V DC, a 5.0.5µA meter, a 10in. diameter coupling loop in series with a resistor of a value to match the output impedance of the signal generator, a 100KpF capacitor and a matched pair of 50K ohm resistors.

Remove the back of the receiver case. All alignment adjustments may be made without further dismantling.

Disconnect speaker and connect power output meter in its place. Rotate volume control to maximum and maintain receiver output at 50mW by attenuating input signal level as necessary.

AM IF. Switch receiver to MW and tune to approximately 300m (1MHz). Feed in a 470kHz AM signal, via a 100KpF capacitor, between L8/9 and chassis.

Adjust once only IFT7, IFT5B, IFT5A, IFT3B and IFT3A in that order for maximum output. Disconnect signal generator.

AM RF. Terminate signal generator in RF coupling loop and place loop about two feet from the receiver with its plane at right-angles to the ferrite rod. Ensure that tuning pointer is in line with the datum marks at the low frequency end of tuning scale when the tuning gang is at maximum capacitance.

Switch receiver to MW, tune to 500m and feed in a 600kHz AM signal. Adjust L12/13/14 for maximum output.

Tune receiver to 200m and feed in a 1500kHz AM signal. Adjust CT4 for maximum output.

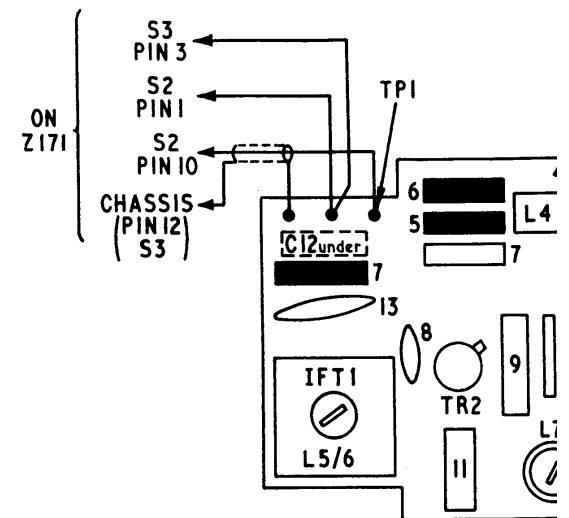
Repeat these adjustments until calibration is correct.

Tune receiver to 500m and feed in a 600kHz AM signal. Adjust position of L8/9 on ferrite rod for maximum output.

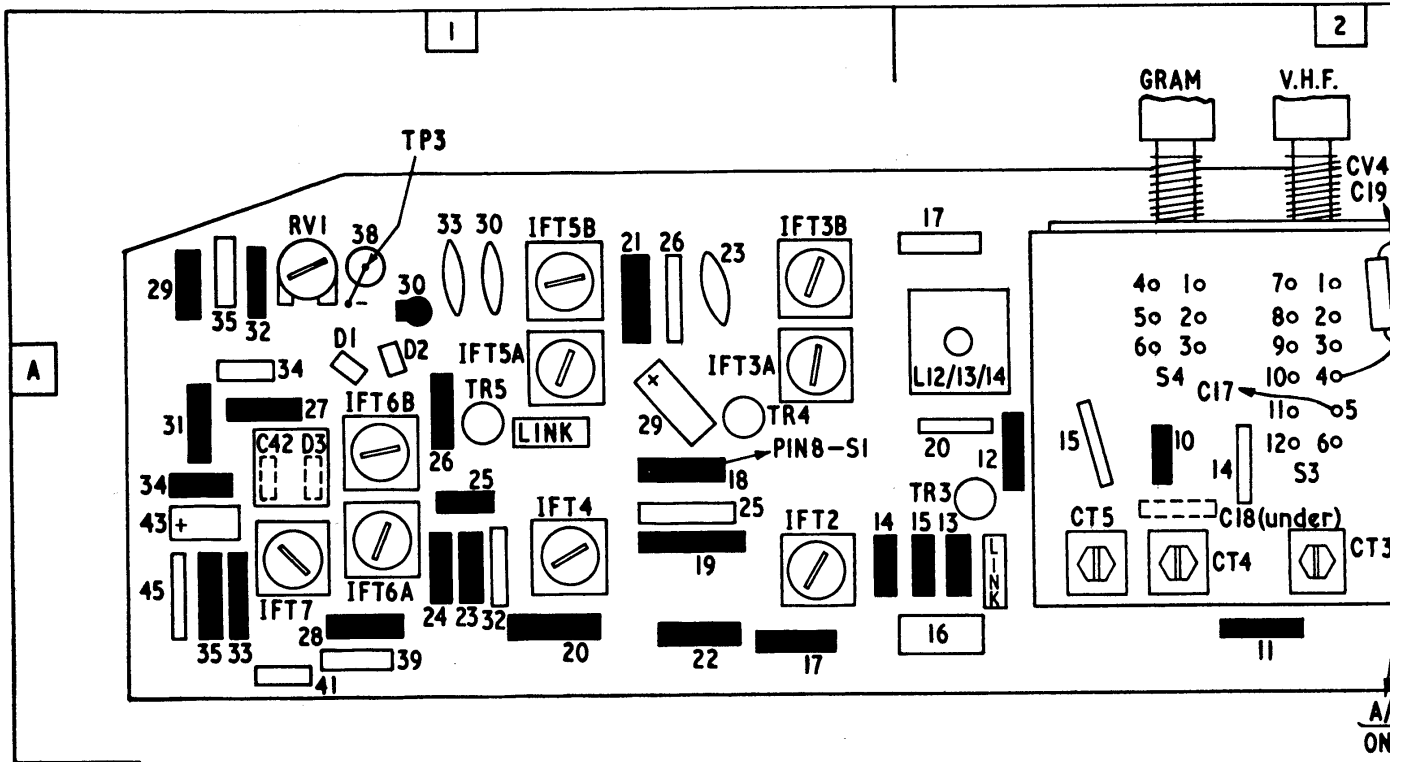
Tune receiver to 200m and feed in a 1500kHz AM signal. Adjust CT3 for maximum output.

Repeat these two adjustments until tracking is correct.

Switch receiver to LW, tune to 1400m and feed in a 214kHz AM signal. Adjust CT5 for maximum output while rocking tuning gang slightly in order to offset any pulling effects that might occur.



Below left: component layout on RF/IF panel. Top right: audio amplifier panel sho



L10/11 are set on ferrite rod during manufacture to have an inductance of 1.9mH and should not require further adjustment. If disturbed, adjust at 214kHz then check alignment of the medium wave-band.

FM IF. Connect the DC voltmeter across R30—negative to TP3, positive to chassis. Connect two 50K resistors in series and connect them in parallel with the voltmeter, then connect the balance meter (5.0-5μA) between TP2 and the junction of the two 50k resistors.

The input signal level should be maintained to produce an output of 1V DC on the voltmeter.

Lift off the magnetic screen fitted over IFT6.

Switch receiver to VHF and tune to

VHF unit viewed from component side. Note: Resistors R1-R7 and capacitors C2-C13 are mounted on this unit

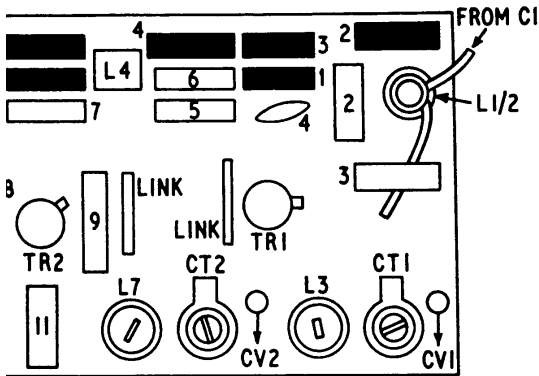
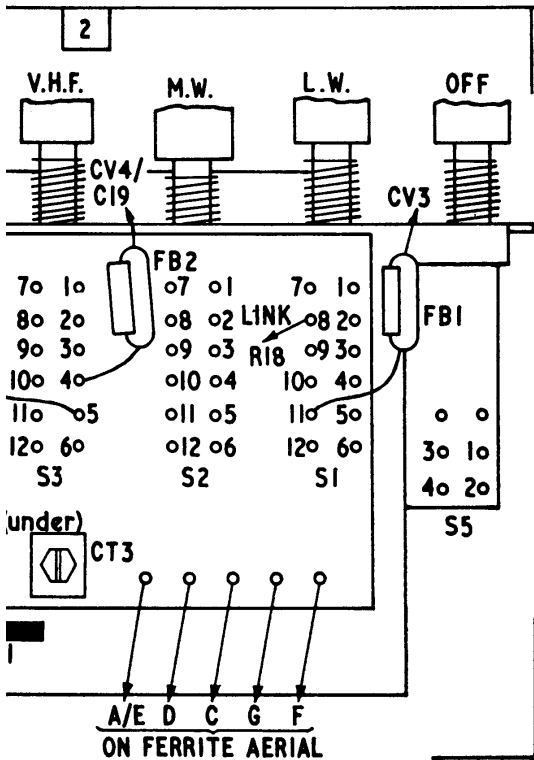


Fig. 1. Top right: routing diagram for tuning cord drive. Left: front panel showing component locations



approximately 94MHz. Set signal generator to 10.7MHz CW and feed the output to TP1 and chassis—across C12—ensuring not to short circuit the output leads of the generator to the centre pin of the tuner unit as it may cause damage to TR3.

Set RV1 to mid position and adjust IFT6A for maximum DC output and then, IFT6B for zero on balance meter.

Adjust IFT4 and IFT2 in that order for maximum DC output then readjust IFT6A for maximum DC output and IFT6B for zero on balance meter.

Switch signal generator to FM and adjust input to maintain 1V DC on voltmeter. Set volume control for an output of 50mW on the power output meter. Switch signal generator to AM and adjust RV1 for minimum audio output. Readjust IFT6B for zero on the balance meter then RV1 for minimum output on the output meter. Refit screen over IFT6.

VHF RF. The manufacturers state that during manufacture adjustments are made to the VHF tuner using special equipment. Further adjustments should not be made unless components are known to have been disturbed. If this is the case the following procedure should be applied.

Switch receiver to VHF and feed in a 10.7MHz CW signal to CV2. The DC

voltmeter and balance meter should be connected as for FM IF alignment.

Adjust L6 then L5 for maximum output on the DC voltmeter, maintaining the input level of the signal to produce 1V DC on the voltmeter. The outer peak for both coils is the correct one.

For calibration of the VHF band ensure that the screening cover of the tuner unit is securely in position and the tuning pointer is in line with datum marks when tuned to low frequency end of tuning scale.

Connect signal generator to the external VHF aerial connector.

Tune receiver to 88MHz and feed in an 88MHz CW signal. Adjust L7 for maximum DC output.

Tune receiver 108MHz and feed in a 108MHz CW signal. Adjust CT2 for maximum DC output.

Repeat these adjustments until calibration is correct.

Tune receiver to 92MHz and feed in a 92MHz CW signal. Adjust L3 for maximum DC output.

Tune receiver to 104MHz and feed in a 104MHz CW signal. Adjust CT1 for maximum DC output.

Repeat these adjustments until tracking is correct.

Disconnect test equipment.

