

# Trader

## SERVICE SHEET

Combining a 4-waveband AM/FM receiver with a mono cassette recorder, with a 2W a.f. output, the mains or battery operated National Panasonic RF-5310LBE includes a meter performing the three functions of battery condition, signal strength and recording level indicator, a built-in capacitor microphone, and a "sleep" automatic delayed switch-off feature.

Wavebands covered are long, medium and short AM, using an internal ferrite aerial for L and M bands, and the VHF/FM broadcast band, which shares for reception with the AM SW band an external telescopic aerial. The tuner unit includes AM and FM tuners, common IF and demodulator stages.

The cassette recorder section includes all circuitry for recording and playback, together with a common audio output stage for radio and recorder. Automatic stop with a rewind "memory" feature is used for the "sleep" control. By feeding the radio audio output through the recorder playback amplifier, selecting tape playback, setting a selector switch, the receiver output will continue to be heard for so long as the tape is winding, when the automatic stop will switch off both recorder and receiver. This feature also allows monitoring of the receiver output while recording.

Other features include manual ferric/chrome tape switching, pause control, DIN in/out socket (plugging into which switches out the built-in microphone), inputs for external microphone, 9V d.c., and external AM aerial and earth, outputs to earphone or external loudspeaker. Changeover from battery to mains operating is effected by a manual switch.

The complete RF-5310LBE is housed in a black-finish plastics cabinet with silver trim, and a carrying handle. Internal stowage for the fixed mains lead is provided. Accessories included are an earphone, and a jumper lead for connection of an external AM aerial.

**IMPORTANT.** The version of the RF-5310 described in this "Trader" sheet is the RF-5310**LBE**, which is that for the U.K. This differs from the standard European **LBS** model, in that, to conform with U.K. electrical safety standards, the mains power unit is modified and rated at 240V 50Hz a.c. only.

### Brief Specification

Power supplies	240V 50Hz a.c. mains or six HP2 (or equivalent) 1.5V batteries (9V d.c.) or 9V d.c. (from external source)
Consumption	10W maximum (using a.c. mains)
Fuse	1A anti-surge miniature cartridge
<b>Radio tuner</b>	
Wavebands	AM: LW 145 to 285kHz (1060 to 2000m) MW 520 to 1610kHz (186 to 577m) SW 5.9 to 18MHz (16.7 to 50m) FM: 87.5 to 108MHz
Intermediate frequencies	AM: 455kHz FM: 10.7MHz
Transistors	2S1359 (five), 2SC1674
Diodes	OA90 (five), 1S2687AA
Inputs	External AM aerial and earth

### Cassette recorder and AF amplifier

System	2-track mono
Tape speed	1½ in (4.5cm) per second
Recording system	A.C. bias and erase
Transistors	2SC828, 2SC900 (two), 2SC945 (four), 2SC1568 (two)
Diodes	OA90 (four), 1S1210M, RVD10DC1 (two), EYV320D1R2J2 (two)
Inputs	9V d.c. (via jack) Microphone (10 kilohm) (via jack) External amplifier or record player (100 kilohm) (via 5-pin DIN socket)
Outputs	External amplifier (via 5-pin DIN socket) Earphone (8 ohms) (via jack)
Loudspeaker	5½ inch (140mm) round, impedance 8 ohms

### Dimensions and weight

Height	Width	Depth	Weight*
9¼ in (235mm)	12¾ in (320mm)	4 in (120mm)	7 lb 15oz (3.6kg)

\* less batteries

Manufacturer Matsushita Electrical Industrial Co. Ltd., Osaka, Japan.  
U.K. Distribution and Service National Panasonic (U.K.) Ltd., 107 to 109 Whitby Road  
Trading Estate, Slough, Berks SL1 3DR. Slough 34522

# 3217

## National Panasonic

### RF-5310 LBE

#### Radio Recorder



### Dismantling

(see interior view diagram)

1. Remove battery cover and batteries, disconnect mains lead from a.c. supply if in use. Remove cassette.
2. Remove tuning, volume, bass, treble, selector switch, waveband and oscillator fine tuning control knobs.
3. Remove four screws A, B from back cover. (Two self-tapping A in rear, two threaded B along bottom rear edge.)
4. Carefully ease off back cover, unplug leads to external AM aerial and telescopic aerial inputs, unclean cable-forms, and lay back cover flat below main cabinet as shown in diagram.
5. Note that main chassis is in cabinet front, with mains power pack in back cover.
6. To remove main chassis:
  - (a) Release eight coppered screws, C, D, E. Note that self-tapping screw D is longer than other self-tapping screws C, and that screw E is threaded. Top central screw C has a washer.
  - (b) Press Eject key to open cassette loading flap, disengage eject catch, and carefully ease out chassis, lifting from bottom edge first and easing control shafts out from top escutcheon.
  - (c) To remove chassis completely, free meter (slacken screw F to

release clamp), ease out internal microphone, disconnect leads from mains power pack, and unsolder loudspeaker leads.

**7. To part tuner and cassette deck chassis, and free cassette deck p.c. board:**

(a) Remove four screws G. Take care not to disturb setting of selector switch SW2, and note that upper l.h. screw G secures an earth tag. Bracket L holds l.h. edge of p.c. board. R.h. lower screw G also secures screen.

**8. To remove tuner p.c. board:**

(a) Turn tuning shaft fully clockwise, until dial pointer is at r.h. end of scale.

(b) Remove screw H (on front side of tuner) to free drive drum from tuning gang.

(c) Remove three screws J from p.c. board on tuner rear side.

(d) Carefully lift off p.c. board. (See also re-assembly notes.)

**9. Loudspeaker** – release four screws K to free clamps.

**10. Mains power pack board** – release two screws M.

**11. Mains transformer, switch SW13, d.c. input socket** – remove sub-chassis after releasing screw N

**12. Mains lead** – free clamp (screw Q), free mains lead tagboard (screws P), unsolder leads from tagboard.

**13. Telescopic aerial** – remove screw R, pull out aerial from within cabinet.

**Re-assembly notes**

**1. Refitting tuner p.c. board**

(a) Check that tuning gang shaft is turned fully clockwise, and that dial pointer is at r.h. end of scale.

(b) Refit screws J, and then screw H. Check for full travel of dial pointer.

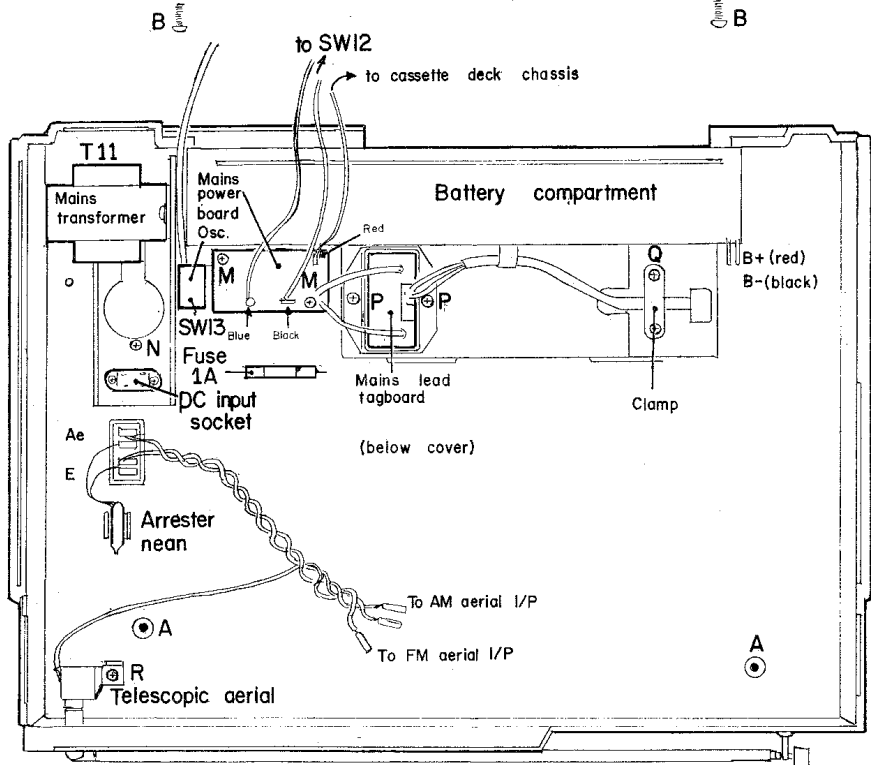
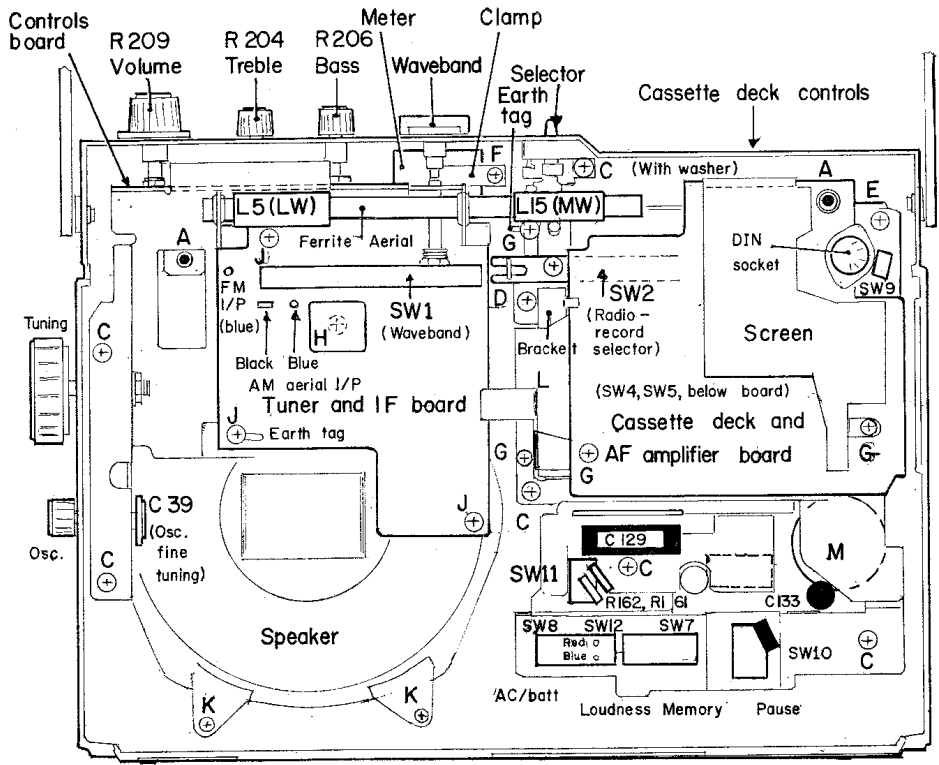
**2. When refitting main chassis, check the following:**

(a) Fit centre long self tapping screw D first, after ensuring that eject mechanism is re-engaged with cassette loading flap.

(b) Ensure that bracket L lug engages cassette deck p.c. board l.h. edge.

(c) Replace all other screws C and E, but do not tighten home until all functions have been checked, in case chassis is strained.

(d) Check also that selector switch SW2 operates correctly. If, for example, radio can only be heard in the centre "Sleep" position, with the cassette deck running, then slacken screw holding switch toggle pivot to slide strip, and readjust slider travel.



Interior view ▲

Controls board ▼

**Alignment**

(see alignment diagram)

Equipment required

AM signal generator covering 145kHz to 18MHz, modulation 400Hz, 30 per cent;  
FM signal generator covering 10.7MHz, 87 to 108MHz;

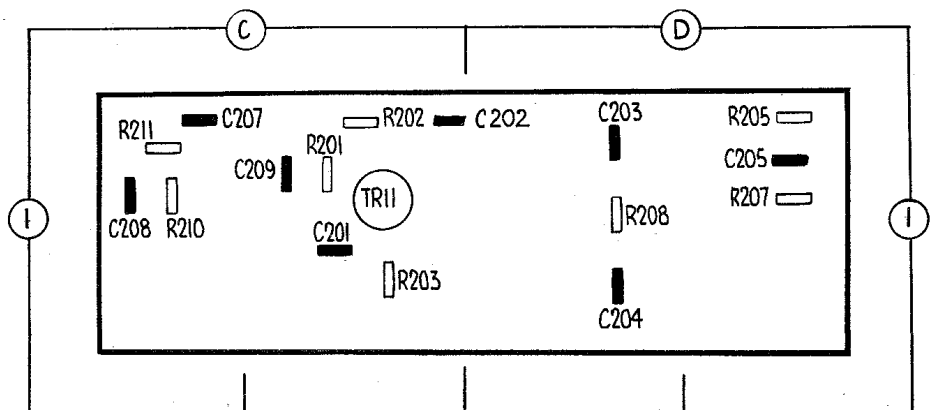
Sweep marker generator, sweeping 400kHz;

Oscilloscope;

Suitable output meter (VTVM);

Inductive loop;

Sundry input matching components as detailed in text.



**Preliminaries**

- (a) Perform alignment using 9V d.c. power source.
- (b) Set volume, bass and treble controls fully clockwise, loudness switch OFF, oscillator switch to 1, selector switch to RADIO, tape selector switch to NORMAL, and oscillator fine tuning trimmer to centre of travel.

**AM**

**I.F. Stages**

1. Select "MW". Inject AM i.f. signals via inductive loop to ferrite aerial. Connect output meter across loudspeaker terminals.
2. Tune signal generator to 455kHz, modulation 400Hz. Set receiver tuning scale to 600kHz (or no-signal point nearest that frequency).
3. Adjust AM IFT's **T8**, **T4** and **T3** (in that sequence) for maximum output.

**R.F. Stages**

NOTE. For LW and MW, inject r.f. signals via inductive loop to ferrite aerial; for SW inject signals to test point TP1 (telescopic aerial input) via a 10pF capacitor.

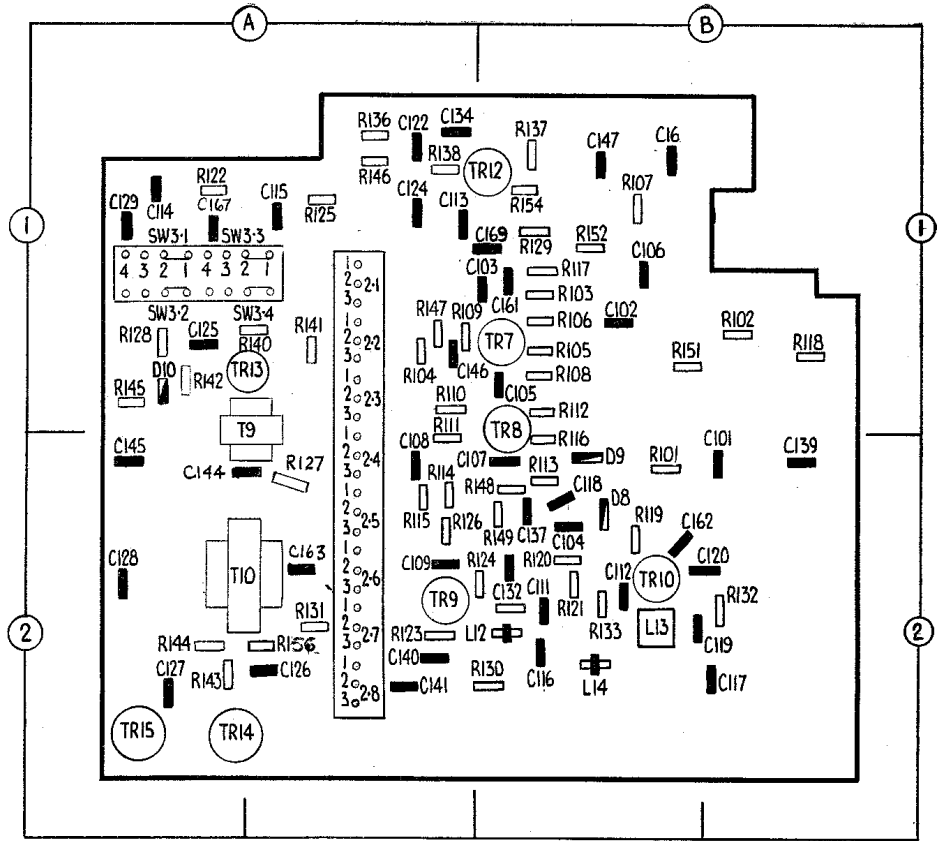
1. Tune generator and receiver to 145kHz; adjust LW oscillator coil **L8** for maximum.
2. Retune generator and receiver to 285kHz; adjust LW oscillator trimmer **C30** for maximum.
3. Repeat steps 1 and 2 for optimum results.
4. Tune signal generator and receiver to 145kHz; adjust LW aerial coil **L5** (by sliding this along ferrite rod) for maximum.
5. Retune generator and receiver to 285kHz; adjust LW aerial trimmer **C12** for maximum.
6. Repeat steps 5 and 6 for optimum result.

**MW (select "MW")**

7. Tune generator and receiver to 550kHz; adjust MW oscillator coil **L9** for maximum.
8. Retune generator and receiver to 1500kHz; adjust MW oscillator trimmer **C30** for maximum.
9. Repeat steps 7 and 8 for optimum result.
10. Tune receiver and generator to 550kHz; adjust MW aerial coil **L15** (on ferrite rod) for maximum.
11. Retune generator and receiver to 1500kHz; adjust MW aerial trimmer **C13** for maximum.
12. Repeat steps 10 and 11 for optimum result. Seal ferrite aerial coils **L5** and **L15**.

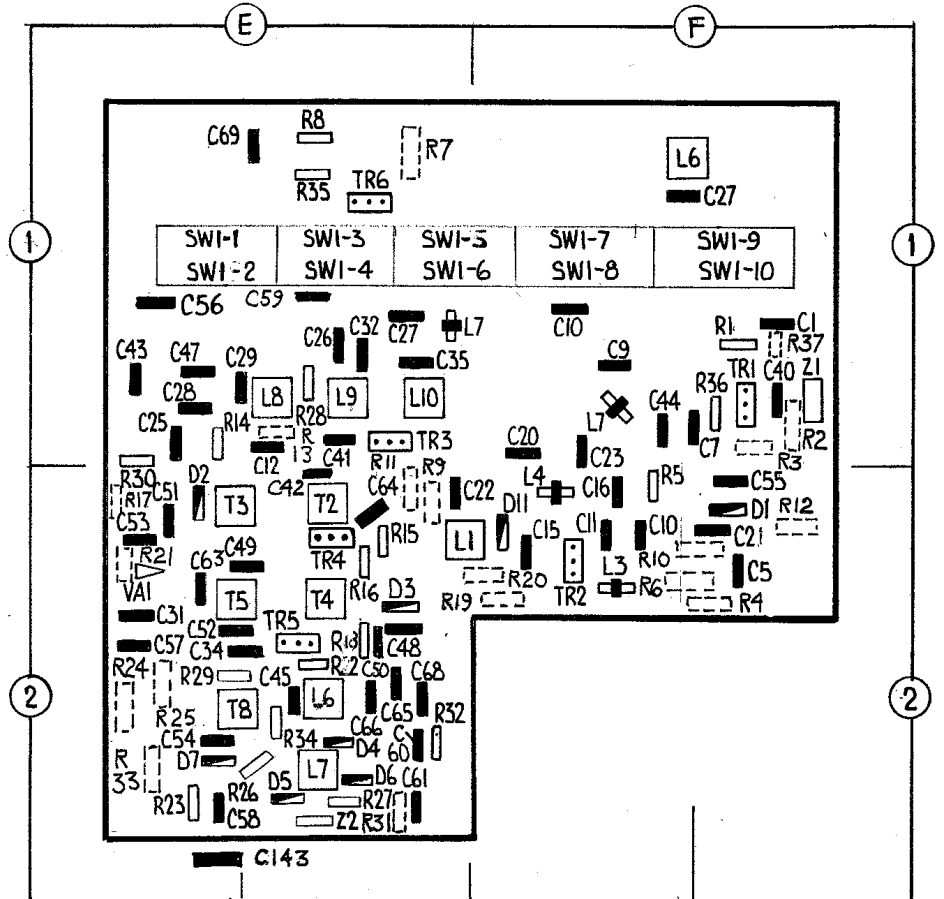
**SW (select "SW")**

13. Tune generator and receiver to 6MHz; adjust SW oscillator coil **L10** for maximum.
14. Retune generator and receiver to 18MHz; adjust SW oscillator trimmer **C36** for maximum.
15. Repeat steps 13 and 14 for optimum result.
16. Tune generator and receiver to 6MHz; adjust SW aerial coil **L6** for maximum.



▲ Cassette deck and AF amplifier board

Tuner and IF board ▼



(continued overleaf)

Alignment (continued)

- Retune generator and receiver to 18MHz; adjust SW aerial trimmer **C14** for maximum.
- Repeat steps 16 and 17 for optimum result.

FM  
(Select "FM")

I.F. Stages

- Connect FM signal generator, tuned to 10.7MHz, via sweep generator, sweeping 400kHz, to test point TP8 (junction **R41/C10**) via a 0.001µF capacitor. Set receiver dial pointer to 90MHz on FM scale (or nearest no-signal point to that frequency). Connect oscilloscope to test point RP2 (junction **R32/C16**).

- resistor in series. Connect generator earth lead to RP8 (external AM earth socket). Connect output meter across loudspeaker terminals.
- Tune generator and receiver to 87.2MHz, and set dial pointer to low frequency end of FM scale. Adjust FM oscillator coil **L4** for maximum output.
- Tune signal generator to 90MHz, and tune receiver into signal. Adjust FM aerial coil **L2** for maximum.
- Retune generator and receiver to 106MHz; adjust FM oscillator trimmer **C16** and aerial trimmer **C3** for maximum. (NOTE: for adjustment steps 2, 3 and 4 there can be three peak points; tune always to the centre point.)
- Repeat steps 2, 3 and 4 for optimum result.

R133	10Ω	B2	C64	3pF	E2
R135		B2	C65	1.5pF	E2
R136	100kΩ	A1	C66	2pF	E2
R137	390Ω	B1	C68	0.022µF	E2
R138	2.2kΩ	A1	C69	0.022µF	E1
R139	680kΩ	B1	C101	0.22µF	B2
R140	330Ω	A1	C102	100µF	B1
R141	150Ω	A1	C103	0.47µF	B1
R142	1kΩ	A1	C104	47µF	B2
R143	0.47Ω	A2	C105	1µF	B1
R144	100Ω	A2	C106	10µF	B1
R145	47kΩ	A1	C107	100pF	A2
R146	680Ω	A1	C108	0.022µF	A2
R147		A1	C109	0.0047µF	A2
R149	2.2kΩ	B2	C110	0.0022µF	B2
R151	47kΩ	B1	C111	1500pF	B2
R152	47kΩ	B1	C112	0.01µF	B2
R154	47Ω	A2	C113	220µF	A1
R156	22Ω	A2	C114	0.0022µF	A1
R161	22kΩ (on		C115	0.001µF	A1
R162	150Ω SW11)		C116	330pF	B2
R201	1MΩ	C1	C117	47µF	B2
R202	6.8kΩ	C1	C118	0.01µF	B2
R203	150Ω	C1	C119	0.047µF	B2
R204	50kΩ	*	C120	0.01µF	B2
R205	4.7kΩ	C1	C122	1µF	A1
R206	50kΩ	*	C124	470µF	A1
R207	1.5kΩ	C1	C125	470µF	A1
R208	4.7kΩ	C1	C126	0.0068µF	A2
R209	50kΩ	*	C127	0.01µF	A2
R210	10kΩ	C1	C128	470µF	A2
R211	10kΩ	C1	C129	2200µF	A1‡
			C132	100µF	B2
			C133	100µF	B2

\* controls see interior view and alignment diagram

Capacitors

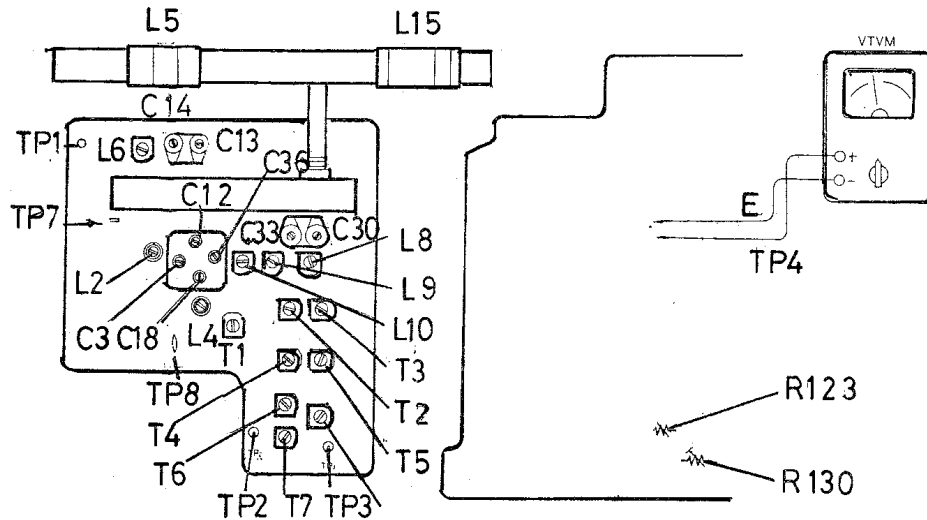
C1	0.022µF	F1	C134	470µF	A1
C2		Tuning	C137	1µF	B2
C3	Trimmer	—	C139	0.001µF	B2
C4	15pF	—	C140	3.3µF	A2
C5	4pF	F2	C141	220µF	A2
C6	10pF	E2	C143	0.22µF	F2
C7	0.001µF	F1	C144	3.3µF	A2
C8	Tuning	—	C145	47µF	A2
C9	39pF	F1	C146	0.047µF	A1
C10	0.001µF	F1	C147	100µF	B1
C11	56pF	F2	C161	100pF	B1
C12	Trimmer	E1	C162	0.0068µF	B1
C13	Trimmer	—	C163	100pF	A2
C14	Trimmer	—	C164	0.01µF	B1
C15	10pF	F2	C167	330pF	B2
C16	0.001µF	F2	C184	0.001	
C17	Tuning	—		Mains pcb	
C18	Trimmer	—	C201	0.033µF	C1
C19	10pF	Tuning	C202	0.1µF	C1
			C203	0.01µF	D1
C20	12pF	F2	C204	0.022µF	D1
C21	0.01µF	F2	C205	0.068µF	D1
C22	0.01µF	E2	C207	0.1µF	C1
C23	0.001µF	F2	C208	0.001µF	C1
C24	0.01µF	—	C209	100pF	C1
C25	0.0033µF	E1		‡ See also interior view	
C26	0.001µF	E1			
C27	0.001µF	E1			
C28	180pF	E1			
C29	100pF	E1			
C30	Trimmer	—			
C31	0.022µF	E2			
C32	300pF	E1			
C33	Trimmer	—			
C34	0.01µF	E2			
C35	3300pF	E1			
C36	Trimmer	—			
C38	Tuning	—			
C39	Osc. Trimmer	—			

Transistors

Tr1	2SC1674	F1
Tr2	2SC1359	F2
Tr3	2SC1359	E1
Tr4	2SC1359	E2
Tr5	2SC1359	E2
Tr6	2SC1359	E1
Tr7	2SC900	B1
Tr8	2SC900	B1
Tr9	2SC828	A2
Tr10	2SC945	B2
Tr11	2SC945	C1
Tr12	2SC945	B1
Tr13	2SC945	A1
Tr14	2SC1568	A2
Tr15	2SC1568	A2

Diodes

D1	1S2687AA	F2
D2	OA90	E2
D3	OA90	E2
D4	OA90	E2
D5	OA90	E2
D6	OA90	E2
D7	OA90	E2
D8	OA90	B2
D9	OA90	B2
D10	1S1210M	A1
D11	OA90	F2
Se1	RVD10DC1*	
Se2	(rectifier)*	
	* Mains p.c.b.	
Va1	EYV320D1R2J2	E2
Va2	EYV320D1R2J2	E2



Alignment diagram ▲

- Adjust FM IFT's **T6**, **T5**, **T2** and **T1** (in that sequence) for maximum amplitude and S curve symmetry between ±100 kHz markers on display.
- Adjust discriminator **T7** until 10.7MHz marker is at zero point on S-curve in display centre.

R.F. Stages

- Connect modulated FM generator r.f. output to TP1 (telescopic aerial input) via dummy aerial pad comprising a 50 ohm resistor across the generator output terminals and a second 50 ohm

Adjustments

Meter

- Set selector switch to RADIO ON, volume to maximum, and use 9V d.c. input. Tune to no signal point on dial.
- Adjust preset **R123** until meter pointer reads "0" (i.e. full clockwise deflection).

Recording bias

- Connect VTVM positive lead to test point TP4 (junction switch section **SW2-2** and **R104**), and negative lead to test point TP "E".
- Adjust preset **R130** for 5.5mV on VTVM.

Components

Resistors

R1	470kΩ	F1	R18	47Ω	E2	R36	33Ω	F1	R115	100kΩ	A2
R2	12kΩ	F1†	R19	2.2kΩ	F2†	R37	100kΩ	F1†	R116	10Ω	B1
R3	2.2kΩ	F1†	R20	330Ω	F2†		† printed resistor		R117	3.3kΩ	B1
R4	1.2kΩ	F2†	R21	470Ω	E2†				R118	6.8kΩ	B1
R5	100kΩ	F1	R22	150Ω	E2	R101	470Ω	B2	R119	22kΩ	B2
R6	10kΩ	F2†	R23	1kΩ	E2	R102	470kΩ	B1	R120	10kΩ	B2
R7	5.6kΩ	E1†	R24	10kΩ	E2†	R103	1kΩ	B1	R121	10kΩ	B2
R8	1.2kΩ	E1	R25	4.7kΩ	E2†	R104	10Ω	A1	R122	220kΩ	A1
R9	150Ω	E2†	R26	1kΩ	E2	R105	680kΩ	B1	R123	1kΩ	A2*
R10	100kΩ	F2†	R27	1kΩ	E2	R106	470kΩ	B1	R124	3.3kΩ	B2
R11	3.3kΩ	E2†	R28	22Ω	E1	R107	270kΩ	B1	R125	4.7kΩ	A1
R12	100kΩ	F2†	R29	220Ω	E2	R108	6.8kΩ	B1	R126	6.8kΩ	A2
R13	1kΩ	E1†	R30	2.7kΩ	E2	R109	1kΩ	A1	R127	22kΩ	A2
R14	10Ω	E1†	R31	1kΩ	E2†	R110	6.8kΩ	A1	R128	22kΩ	A1
R15	47Ω	E2	R32	470kΩ	E2	R111	10Ω	A1	R129	100Ω	B1
R16	100Ω	E2	R33	100kΩ	E2†	R112	1MΩ	B1	R130	500Ω	B2*
R17	560Ω	E2†	R34	3.8kΩ	E2	R113	2.2kΩ	B2	R131	220Ω	A2
			R35	1.5kΩ	E1	R114	6.8kΩ	A2	R132	22kΩ	B2



111	49	50	65	116	51	141	52	66	53	84	45	54	124	132	57	58	56	59	61	60	68		
110	114	117	201	162	204	113	117	119	147	207	208	122	63	163	194	125	133	127	128	145	143	164	129
127	15	122	17	16	29	204	205	18	132	21	162	22	136	23	34	24	25	26	27	142	31	32	
161	19	20	128	20	128	130	206	208	129	154	210	137	165	146	138	35	30	144	143	156			
121	201	202	203	130	207	131	209	133	211														
T3				T4	T5					T8	T6											T11	T10
L12				L12	L14																		

