

Trader

SERVICE SHEET

Combining a four-waveband mains/battery AM/FM receiver with a mono cassette recorder, the Grundig C4100 and C4500 Radio Recorders are electrically identical. They vary only in external presentation. Wavebands covered are long and medium broadcast bands, using an internal ferrite aerial, the 19 to 51 short wave AM band and the VHF/FM broadcast band, for which an external telescopic aerial is used. AFC is operative on FM.

The cassette deck features automatic ferric/chrome equalisation switching, digital counter, automatic level control, and an oscillator switch to adjust the erase frequency. A built-in capacitor microphone is fitted.

Controls are slider for volume and tone, with press-button key switches along the top edge for receiver waveband and function selection, together with those for the tape deck, and rotary receiver tuning at one side.

Inputs can be accepted from an external microphone, with remote control of tape transport functions, or from an external amplifier or record player. Outputs available are for an external loudspeaker or an earphone for private listening.

Both the C4100 and the C4500 are housed in black plastics cabinet with silver trim, and fitted with a hinged carrying handle. Internal storage is provided for the fixed a.c. mains lead. The two recorders differ only in the receiver tuning scale, which is horizontal for the C4100, and vertical in the C4500.

Brief Specification

Power supply	Six HP11 (or equivalent) 1.5V batteries (9V d.c.) or 120/240V 50Hz a.c. mains
Consumption	9W (mains) Battery life approximately 13 hours (using cassette deck)
Fuse	800mA anti-surge (in mains input)

Radio and A/F unit

Wavebands	AM: LW 150 to 270kHz (1111 to 2069m) MW 510 to 1620kHz (185 to 588m) SW 6 to 16MHz (19 to 51m) FM: VHF 87.5 to 108MHz
Intermediate frequencies	AM: 460kHz FM: 10.7MHz
Transistors	AC121S, AC171K/Y, AC187K, AC188K, BC238, BC309, BC338, BF240, BF241 (four), BF314
Diodes	AA112 (two), BA124, BZ102/1V4, BZ102/2V1, D377 (two), 1N60, ZW10
AF Power output	2W sinewave (mains operation)
Output	Earphone (via jack)
Loudspeaker	5 $\frac{5}{8}$ x 3 $\frac{3}{4}$ (143 x 95mm) elliptical, impedance 4.5 ohms

Cassette deck

System	2-track mono
Tape speed	1 $\frac{7}{8}$ in (4.5cm) per second
Recording system	A.C. bias and erase
Wow and flutter	\pm 0.25 per cent
Frequency response	60kHz to 12kHz (with CRO2 tape)
Transistors	BC238 (two), BC328/75, BC308C, BC330C (two)
Diodes	D249 (two), D474 (three)
Inputs	External microphone (0.5mV into 15 kilohm) Radio (0.5mV into 15 kilohm)
Outputs	Record deck (20mV into 500 kilohm) External amplifier (1V into 15 kilohm)

Dimensions and weight

	Height	Width	Depth	Weight
	8 $\frac{1}{2}$ in (173mm)	13 $\frac{3}{4}$ in (311mm)	2 $\frac{1}{2}$ in (65mm)	8 lb 10oz (3.75kg)
Manufacturer	Grundig (G.B.) Ltd., Newlands Park, Sydenham, London, SE26 01-659 2468			

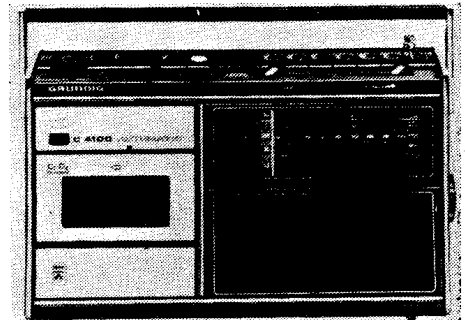
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Grundig

C4100 & C4500

Radio recorders

Part 1

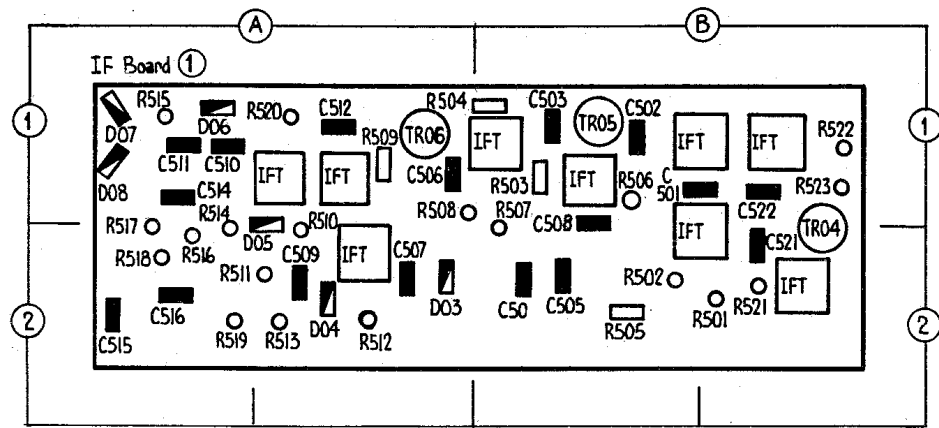


Dismantling

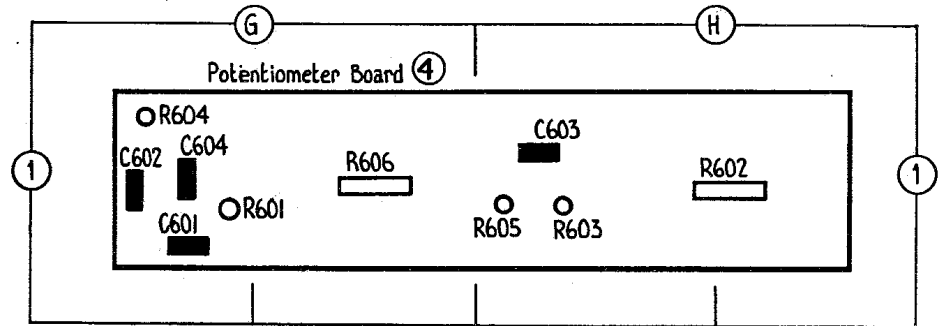
(see interior view diagram)

1. Disconnect the radio recorder from the mains supply (if in use), and remove battery compartment cover and batteries. Remove mains lead stowage cover and tuning knob.
2. Remove 3 screws A from cabinet bottom. Carefully separate cabinet front and back assemblies. Note that slider control knobs remain on cabinet front.
3. The receiver/audio output and mains power units are located in the back assembly, and the cassette deck and loudspeaker in the front part. Front and back assembly units are electrically connected by a cableform terminated in a 12-way edge connector entering the cassette deck, with separate removable tags for the loudspeaker. To completely separate front and back assemblies, therefore, remove adhesive tape to free cableform at cassette deck end, and withdraw 12-way connector. Ease off loudspeaker leads.
4. Individual assemblies are removed from cabinet front and back as follows:

Receiver chassis. Press inwards plastics lug W until lug escapes from front cabinet r.h. flange, lift chassis from r.h. end and ease out l.h. end from bracket holding output transistor heatsink. To remove chassis completely, ease off battery lead connectors from battery compartment, and unplug a.c. input leads from mains transformer. Free leads from moulded clips X and Y and battery condition meter. (See also Re-assembly notes.)



If board ▲



▲ Potentiometer board

▼ Interior view

Tuning dial assembly can be removed from receiver chassis for access to p.c. thus:

- (a) First turn tuning shaft until dial cursor lies coincident with datum marks on scale.
- (b) Carefully prise off inner plastics tuning dial pulley (keyed to tuning gang drive), press in plastics lug U, pull dial assembly to right, to free pulley, and carefully lift off. Do not move dial cursor unless absolutely necessary (but see Re-assembly notes.)

Mains transformer assembly. Prise out from plastic retaining lugs and ease transformer from mouldings. Access can then be gained to voltage adjustment switch and board.

Cassette deck. To expose soldered side of p.c. board, prise off screen by inserting screwdriver blade into slot S.

Cassette p.c. board. To remove, prise open plastics lugs R and ease up and out from bracket Q. Remove 7-way connector. (See Re-assembly notes.)

Cassette deck mechanical assembly. Release three screws P. Ease built-in microphone complete with p.c. board from cabinet front top. Remove assembly.

For details of dismantling cassette deck, see Part 2 of this Service Sheet (3211).

Re-assembly notes

1. **Cassette deck p.c. board.** (Check, before refitting board, that record/playback slide switch is in the playback position, and the changeover actuator is correctly engaged as the board is pressed down.)
2. **Receiver tuning dial assembly.** Before refitting, check that tuning drive shaft is turned fully anti-clockwise, and that dial cursor is aligned with scale datum

marks, before re-engaging drive pulley with shaft.

3. **Receiver chassis.** After refitting, check that all leads are replaced correctly, and wrapped into plastics retaining lugs X and Y.

4. When fitting together front and back cabinet assemblies, enter top part of back into top part of front first, checking that slider controls are correctly engaged with slider knobs before closing cabinet. Check also that no key switches are "trapped", preventing their free depression, and that battery condition meter is correctly located in top escutcheon.

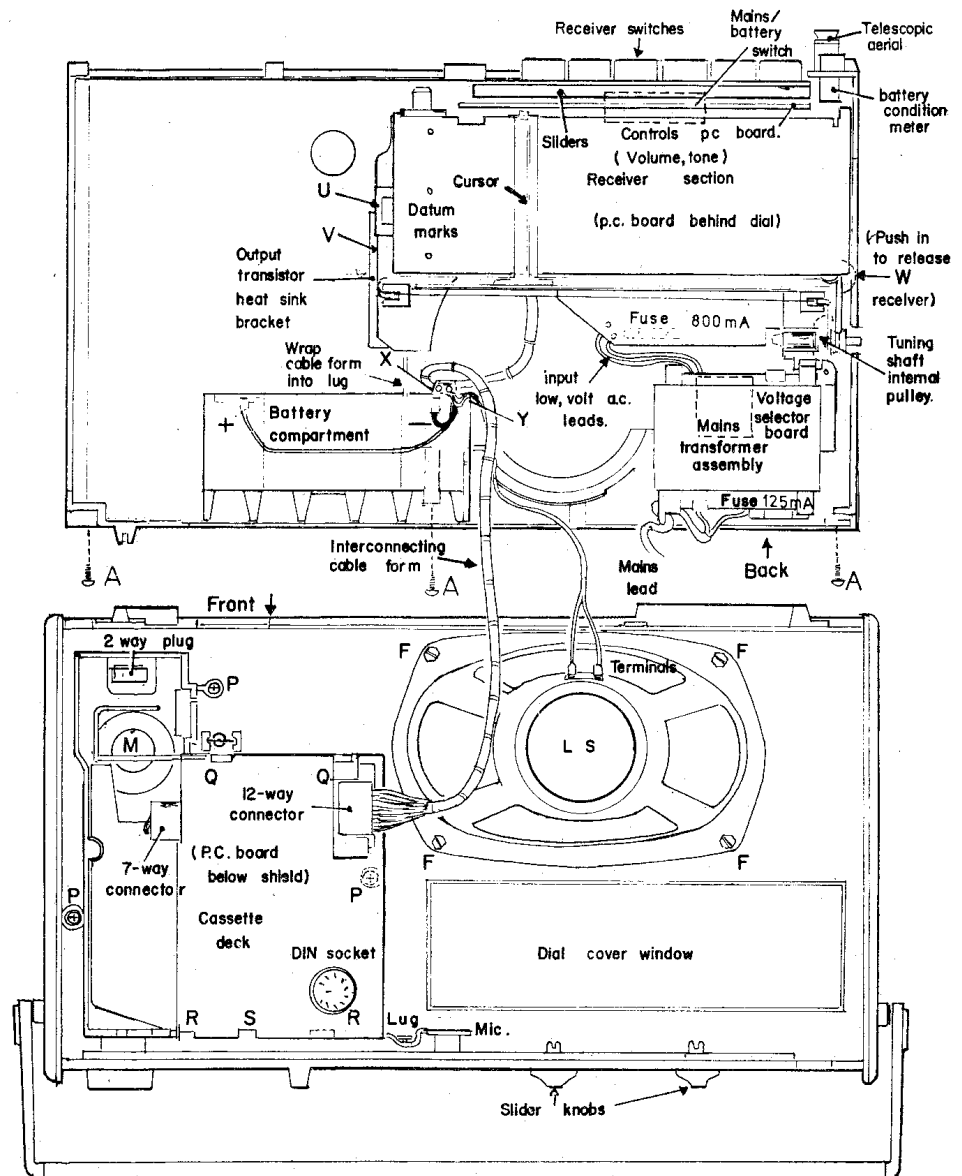
Adjustments (Electrical)

Power output stage quiescent current. With volume control at minimum, no signal, connect milliammeter into solder bridge "X" in **Tr012** collector circuit. Adjust preset **R644** for 7.5mA current.

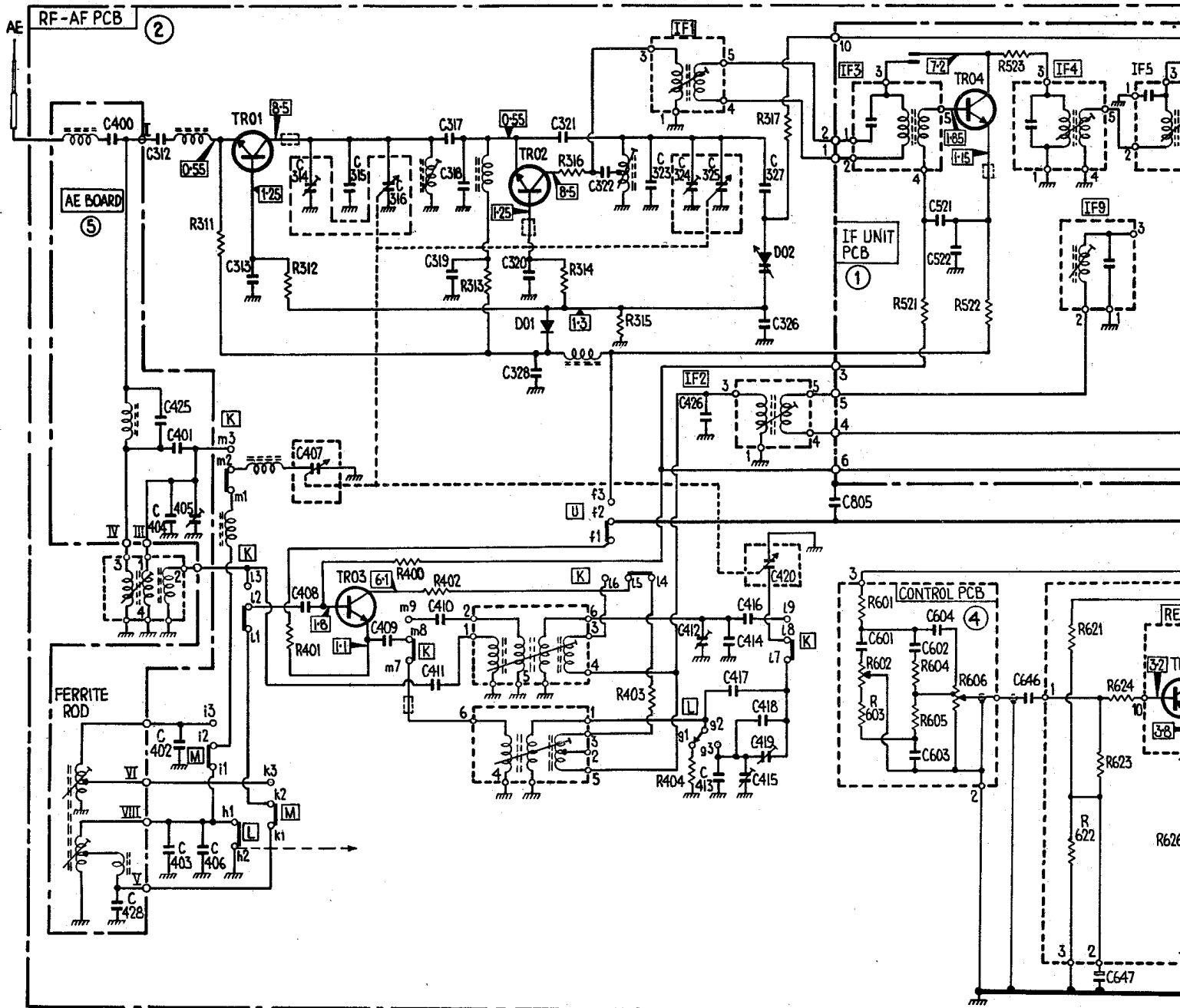
I.F. amplifier. Adjust preset **R505** to give 1.4V d.c. at **Tr06** emitter.

Battery condition indicator. With d.c. supply at 6.0V, depress meter switch and adjust preset **R808** until meter coincides with division between red and black areas of meter scale.

(for location of presets see Alignment diagram, in 'Trader' sheet 3211)



C	400	312	404	405	406	313	314	315	316	410	317	318	320	321	322	323	324	325	416	326	327	805	602	604	527	646	647										
R	428	402	425	401	403	311	407	408	409	411	319	328	328	314	315	403	404	412	426	417	415	104	420	601	603	521	601	602	603	604	521	606	522	523	621	623	624



Tuner, IF, AF circuit ▲

Resistor board ▼

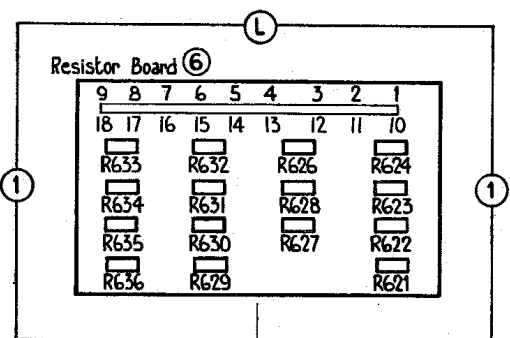
Resistors

R311	560Ω	D2	R510	6.8kΩ	A1	R621	120kΩ	L1	R701	2.2kΩ	Mic	C31
R312	1kΩ	D2	R511	10kΩ	A2	R622	68kΩ	L1	R702	1kΩ	board	C31
R313	820Ω	D2	R512	10kΩ	A2	R623	180kΩ	L1	R801	20Ω	J1	C32
R314	1kΩ	D2	R513	8.2kΩ	A2	R624	1kΩ	L1	R802	18Ω	C1	C32
R315	10kΩ	D2	R514	1kΩ	A1	R626	39Ω	L1	R803	180Ω	C2	C32
R316	150Ω	D2	R515	820Ω	A1	R627	15kΩ	L1	R805	47Ω	D2	C32
R317	100kΩ	D2	R516	10kΩ	A2	R628	1kΩ	L1	R806	33Ω	D2	C32
R400	6.8kΩ	D1	R517	10kΩ	A2	R629	6.8kΩ	L1	R807	2.7kΩ	D2	C32
R401	1.2kΩ	D1	R518	100kΩ	A2	R630	4.7kΩ	L1	R808	500Ω*	D2	C32
R402	1kΩ	D1	R519	1.8kΩ	A2	R631	5.6kΩ	L1	R809	33Ω	C1	C32
R403	1.5kΩ	D1	R520	56Ω	A1	R632	100Ω	L1				C32
R404	220kΩ	D1	R521	1kΩ	B2	R633	22Ω	L1				C40
R501	100kΩ	B2	R522	820Ω	B1	R634	10Ω	L1				C40
R502	3.3kΩ	B2	R523	1kΩ	B1	R635	8.2Ω	L1				C40
R503	470Ω	B1	R601	10kΩ	G1	R636	270Ω	L1				C40
R504	560Ω	B1	R602	250kΩ*	H1	R641	56kΩ	C1				C40
R505	500kΩ*	B2	R603	820Ω	H1	R642	150kΩ	C1				C40
R506	3.3kΩ	B1	R604	47kΩ	G1	R643	120kΩ	D1				C40
R507	1kΩ	B1	R605	1.5kΩ	H1	R644	50Ω*	C1				C40
R508	820Ω	A1	R606	100kΩ*	G1	R645	220Ω	C2				C40
R509	1kΩ	A1										C40

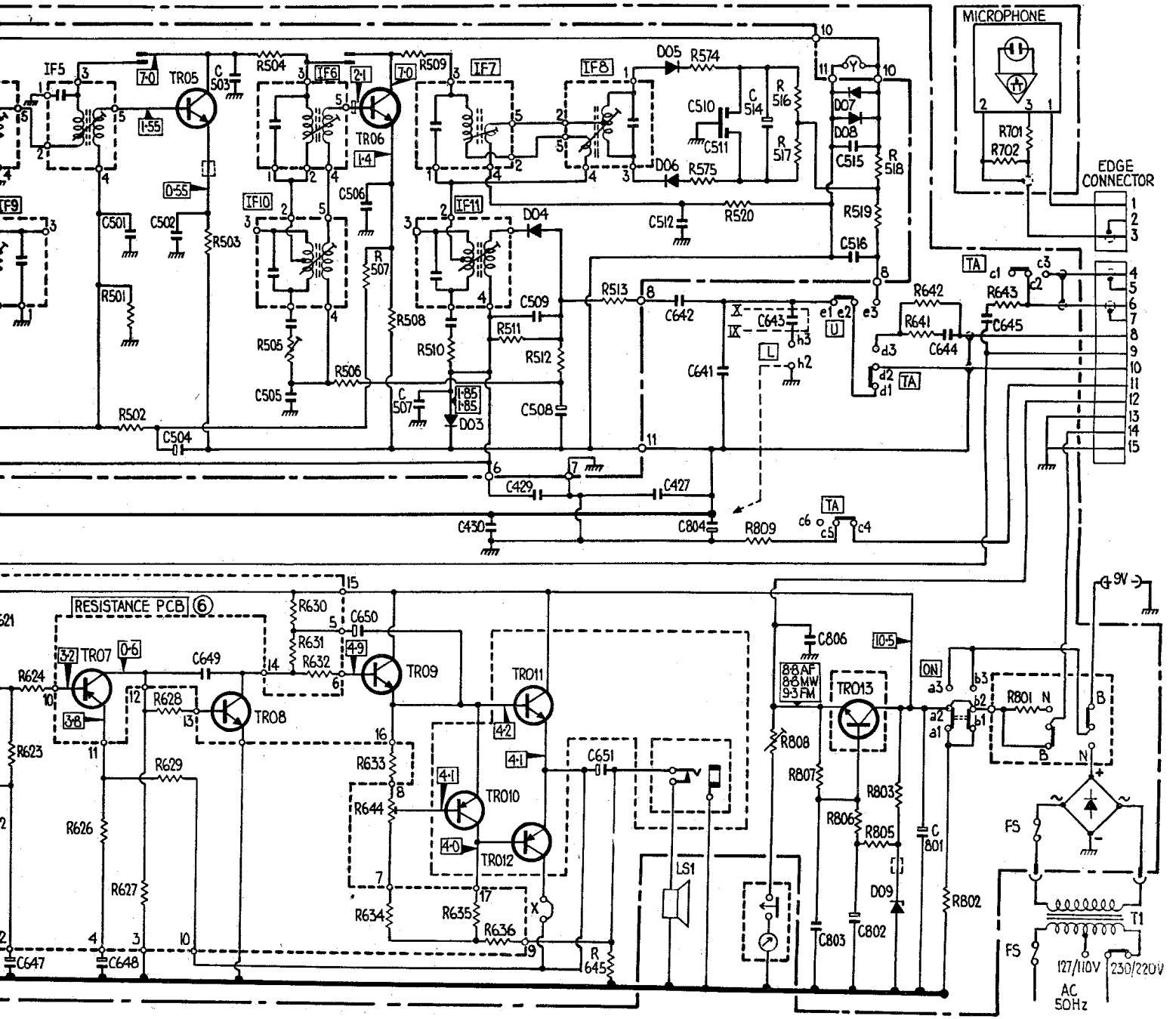
*Variable

Capacitors

C312	10pF	D2	C40
C313	470pF	D2	C40
C314	16pF*	D2	C40
C315	6.8pF	D2	C40
C316	12.5pF*	D2	C40
C317	3.3pF	D2	C40



647	648	501	502	649	505	506	507	430	509	508	651	512	804	510	514	643	803	801	644	645			
			504			650			429			427	642	511	641	806	516	802					
623	626	501	628	503	504	630	506	507	508	509	510	511	512	513	514	607	806	519	518	642	802	702	701
624		502	627	629	505	631	632	633	644	634	635	636	574	575	576	809	808	517	805	803	641		



Mic	C318	33pF	D2	C409	10nF	D1	C503	5.6pF	B1	C643	10nF	D1	Tr02	BF241	D2	Diodes	D01	BZ102/1V4	D2
board	C319	1nF	D2	C410	15nF	D1	C504	10µF	B2	C644	680pF	C1	Tr03	BF241	D1		D02	BA124	D2
J1	C320	470pF	D2	C411	27pF	D1	C505	47nF	B2	C645	0.1µF	C1	Tr04	BF241	B2	D03	BZ102/2V1	A2	
C1	C321	3.3pF	D2	C412	3.5-14pF*	D1	C506	47nF	A1	C647	22µF	C1	Tr05	BF241	B1	D04	1N60	A2	
C2	C322	150k*	D2	C413	200pF	D1	C507	0.33pF	A2	C648	47µF	C1	Tr06	BF240	A1	D05	AA112	A2	
D2	C323	3.3pF	D2	C414	15pF	D2	C508	10µF	B1	C649	220pF	C2	Tr07	BC309	C1	D06	AA112	A1	
D2	C324	16pF*	D2	C415	10-60pF*	D1	C509	10nF	A2	C650	220µF	C1	Tr08	BC238	C1	D07	D377	A1	
D2	C325	12.5pF*	D2	C416	1.8nF	D2	C510	560pF	A1	C651	1000µF	C2	Tr09	BC338	C1	D08	D377	A1	
D2	C326	1nF	D2	C417	280pF	D1	C511	560pF	A1	C641	3.3nF	C1	Tr010	AC121S	C2	D09	ZW10	C2	
C1	C327	6.8pF	D2	C418	6.8pF	D1	C512	47nF	A1	C646	0.15µF	C1	Tr011	AC187K	C2				
	C328	10nF	D2	C419	4.5-20pF	D1	C514	1µF	A1	C801	2200µF	C2	Tr012	AC188K	C2				
	C400	1nF	J1	C420	260pF*	D1	C515	0.33µF	A2	C802	470µF	C2	Tr013	AC176K/Y	D2				
	C401	2.2pF	J1	C425	12pF	J1	C516	3.3nF	A2	C803	1nF	D2							
	C402	3.5-13pF*	D1	C426	4.7nF	D1	C521	3.3nF	B1	C804	470µF	C1							
D2	C403	7.5pF*	D1	C427	470pF	C2	C522	3.3nF	B1	C805	470pF	C2							
D2	C404	10pF	J1	C428	1.5nF	J1	C601	15nF	G1	C806	47nF	C1							
D2	C405	4.5-20pF*	J1	C429	1.5nF	C2	C602	820pF	G1										
D2	C406	18pF	D1	C430	220pF	C1	C603	0.15µF	H1										
D2	C407	260pF*	D1	C501	6.8nF	B1	C604	68nF	G1										
D2	C408	10nF	D1	C502	47nF	B1	C642	22nF	C1										

Continued in "Trader" Service Sheet 3211

Trader

SERVICE SHEET

(Continued from "Trader" sheet 3210)

Alignment

Equipment required:

AM signal generator covering 260kHz to 15MHz;

FM signal generator covering 10.7MHz, 88 to 106MHz;

Sweep marker generator, marker centred at 10.7MHz;

Oscilloscope;

Suitable output meter (VTVM);

Input matching components as detailed in text.

Preliminaries

1. Alignment instructions assume a battery voltage of 9V d.c.
2. If any transistors in the I.F. stages have been replaced, adjust preset **R505** to give 1.4V at **Tr06** emitter before starting alignment.

3. Progressively reduce signal generator output as circuits come into alignment to avoid agc action.

4. Coil and trimmer references given correspond with those shown on the alignment diagram and the circuit.

AM

I.F. Stages

MW (select "MW")

1. Connect AM generator, tuned to 460kHz, modulated, to **Tr06** base. Connect oscilloscope via diode probe to **Tr06** collector.
2. Adjust AM IFT (I) for maximum display amplitude.
3. Transfer signal generator output to **Tr05** base. Adjust AM IFT (II) for maximum.
4. Transfer generator output to **Tr03** base. Adjust AM IFT's (III) and (IV) for maximum.

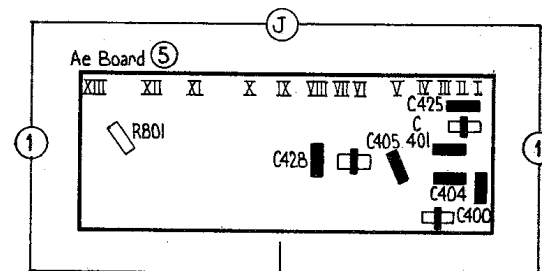
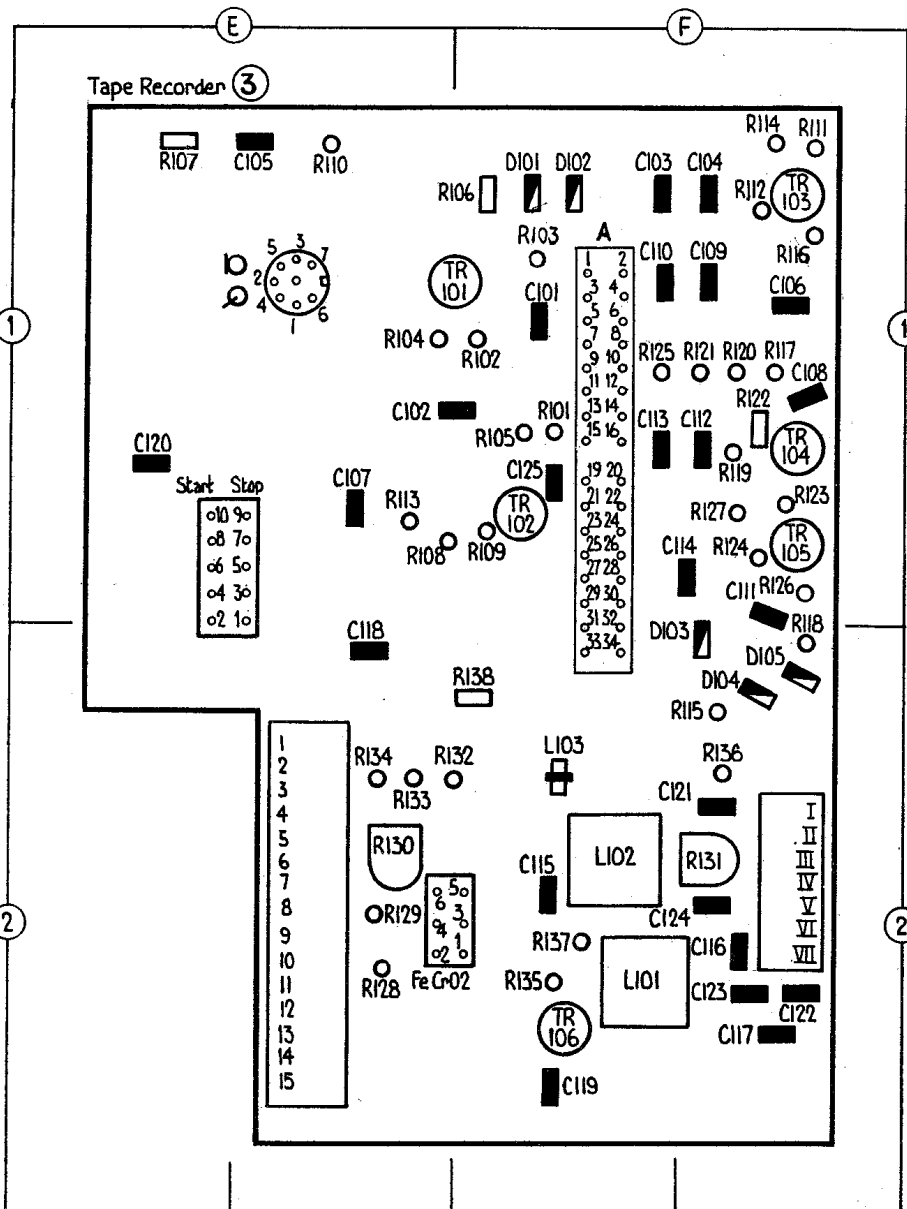
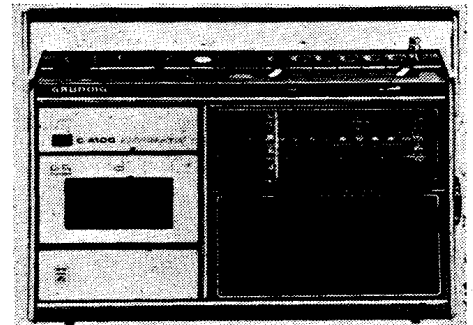
3211

Grundig

C4100 & C4500

Radio recorders

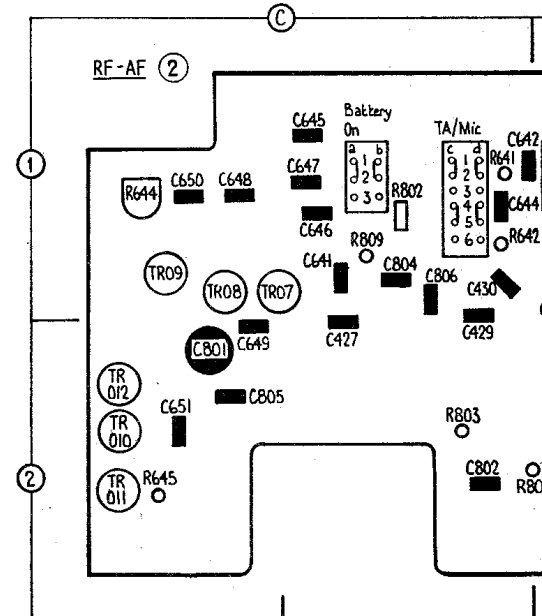
Part 2



Aerial board ▲

◀ Cassette deck board

RF/AF board ▼



R.F. Stages

SW (select "K/SW")

5. Connect AM signal generator via 15pF capacitor direct to telescopic aerial input. Connect VTVM (range 150mV) to **Tr03** emitter (contact M8).
6. Tune receiver and generator to 6.5MHz. Adjust SW oscillator coil (1) and then aerial coil (3) for 70 to 100mV meter reading.
7. Retune receiver and generator to 15MHz. Adjust SW oscillator trimmer (2) and then aerial trimmer (11) for 70 to 100mV meter reading.
8. Repeat steps 2 and 3 for optimum result.

MW (select "MW")

9. Inject signal from AM generator via dummy aerial or inductive loop to ferrite aerial. Connect VTVM to **Tr03** emitter.
10. Tune receiver and generator to 560kHz. Adjust MW oscillator coil (4) and then aerial coil (9) by sliding this along ferrite rod for 100 to 110mV meter reading.
11. Retune receiver and generator to 1450kHz. Adjust MW oscillator trimmer (5) and then aerial trimmer (10) for 100 to 110mV meter reading.
12. Repeat steps 10 and 11 for optimum result.

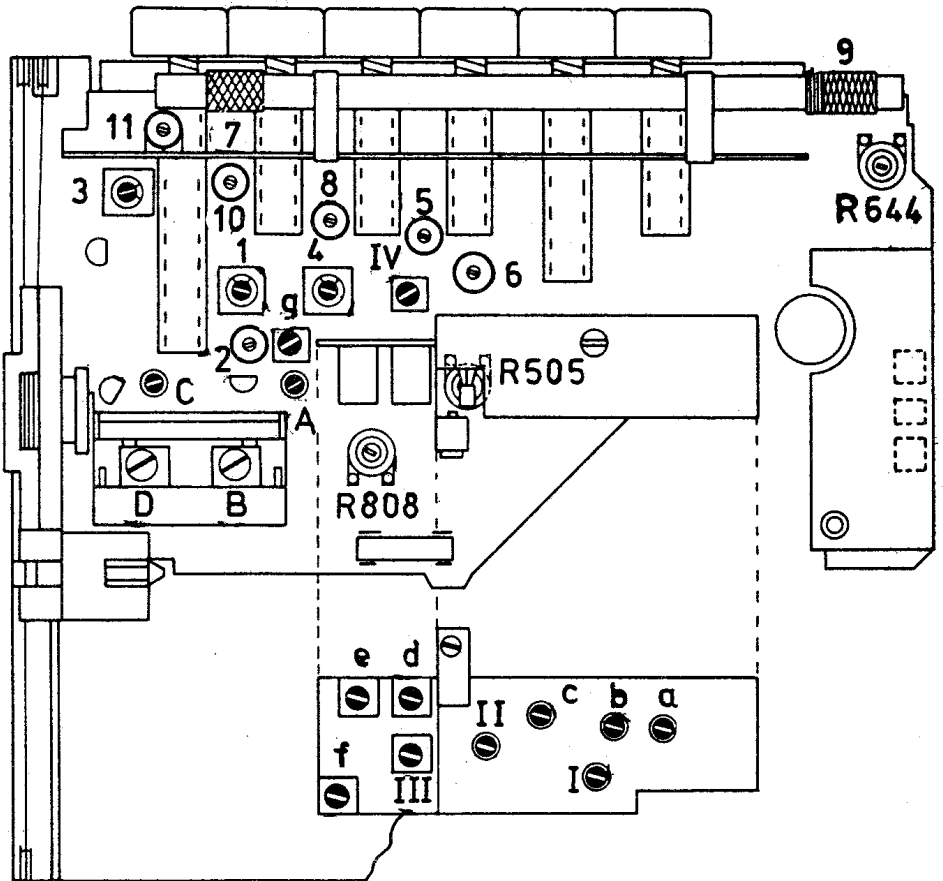
LW (select "LW")

13. With conditions as in 9 (for MW alignment), tune receiver and generator to 160kHz. Adjust LW oscillator trimmer (6) and then ferrite aerial coil (7) for 95 to 115mV meter reading.
14. Retune receiver and generator to 260kHz. Adjust LW aerial trimmer (8) for 95 to 115mV meter reading.
15. Repeat steps 13 and 14 for optimum result.

FM (select "U/FM")

I.F. Stages

1. Disable AFC by short-circuiting diodes **D07** and **D08** (link tags 10 and 11 on i.f. board connector, i.e. points Y on



▲ Alignment diagram

2. With approximately 20mV input to **Tr06** base (maximum sweep), adjust the secondary of FM IFT VIII (a), until 10.7MHz marker is in centre of linear section of "S" curve on display.
3. Reduce marker generator sweep range, but keep input level constant. Adjust the primary of FM IFT VII (b) for maximum amplitude at peak of waveform.
4. Transfer sweep generator output to **Tr05** base, and oscilloscope probe to **Tr06** collector.
5. Adjust FM IFT VI (c) for maximum amplitude and S-curve symmetry.
6. Transfer sweep generator output to **Tr04** base. Adjust FM IFT's V and VI (d) and (e) for maximum amplitude

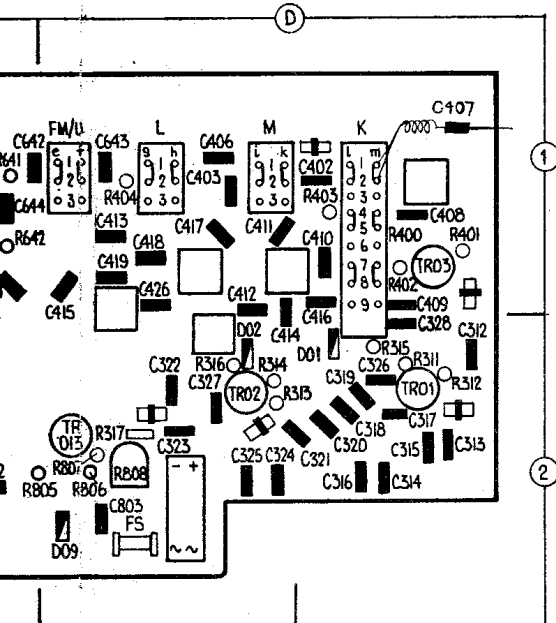
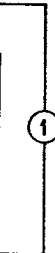
and S-curve symmetry.

7. Transfer sweep generator output to telescopic aerial input. Adjust FM IFT's III and I (f) and (g) for maximum amplitude and S-curve symmetry.

R.F. Stages

8. Connect FM signal generator to telescopic aerial input. Connect VTVM between **Tr02** emitter (junction with **R316**) and chassis.
9. Tune receiver and generator to 88MHz. Adjust FM oscillator coil (A) and then mixer coil (C) for 40 to 60mV meter reading.
10. Retune receiver and generator to 106MHz. Adjust FM oscillator trimmer **C324** (B) for 40 to 60mV meter reading.
11. Repeat steps 9 and 10 for optimum result.

NOTE: all superhet oscillators must operate with battery voltages down to 4.5V d.c.



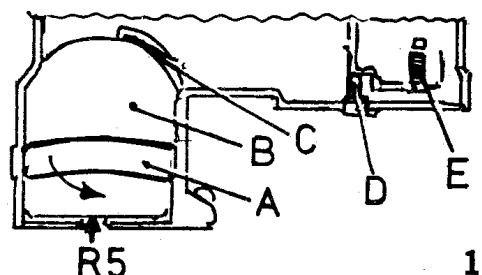
Cassette deck

Maintenance, adjustments, and dismantling for service.

Motor replacement (diagrams 1 and 2)
 Unsolder motor connections, unhook belt K, press down retaining spring A and turn this in the direction indicated. Ease out motor unit B. On fitting replacement, check tape speed and adjust if necessary using preset **R5**. Do NOT distort earthing spring C.

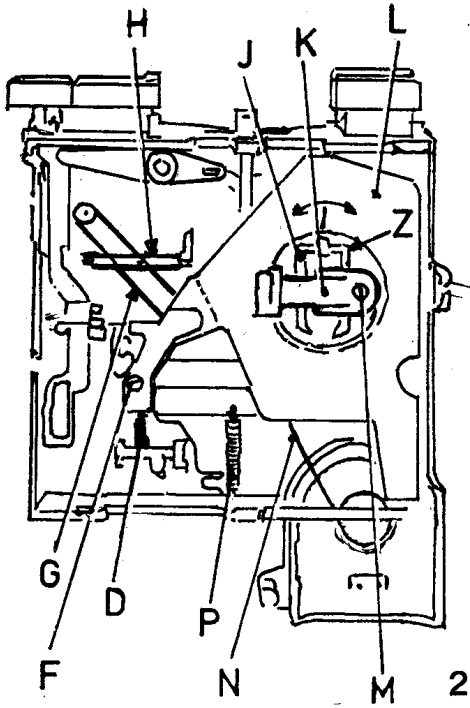
Drive belt replacement (diagrams 1 and 2)
 To change either of belts G or N, remove screw F, and take off bearing plate. Unhook springs P and E. On fitting new belt, check capstan axial play.

Switch S1 (diagram 2)
 Contact H of switch S1 must on START, START/RECORD and FAST FORWARD be lifted 0.1mm from supporting lug to close contact **S1** pair.



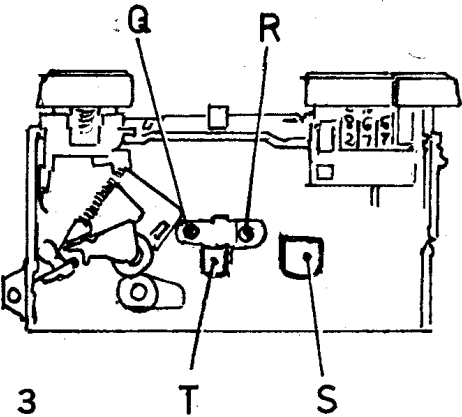
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C	120	125 408	106 107 101	105	105	107	414 413
R		101	102 103 107 104 105 106			108 109 110 113	115

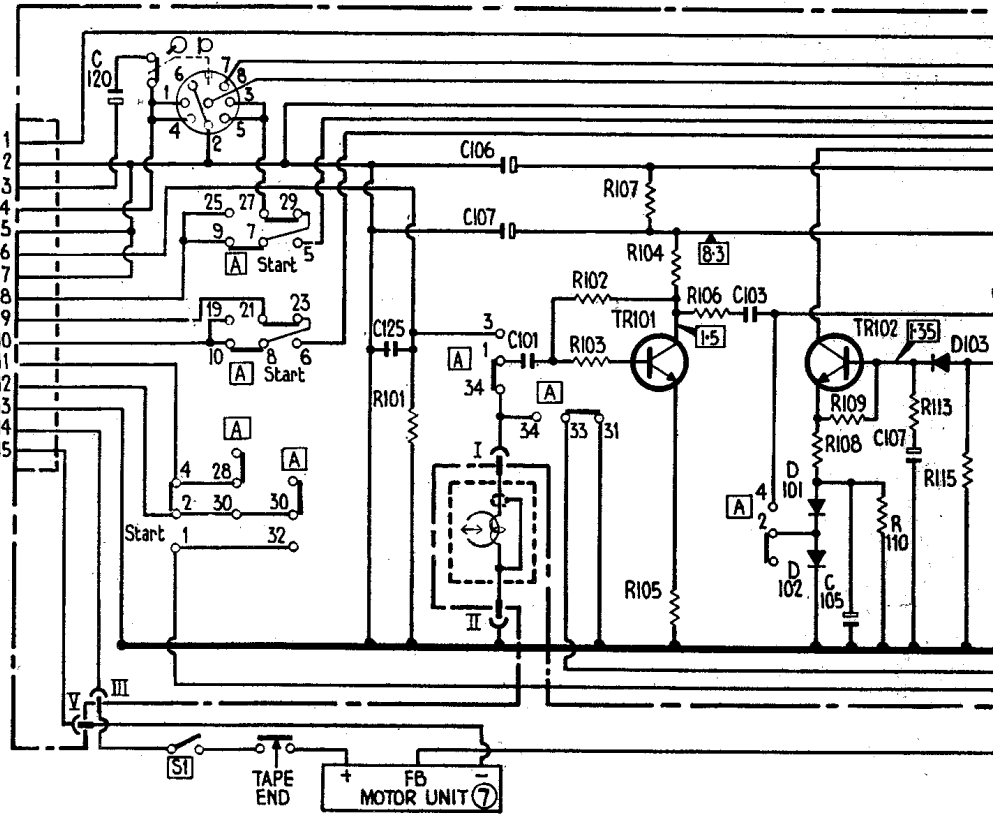


Flywheel (diagrams 2 and 3)
 Insert cassette, connect power to recorder, select START. Tape must not
 (a) Run out between sound shaft and pressure roller.
 (b) Fold over at top or bottom edges of tape guide forks.
 Adjust by bending bearing plate L at point Z with screwdriver while watching tape movement, viewing the unit from above.
 If tape runs upward – twist screwdriver blade anti-clockwise.
 If tape runs downward – twist screwdriver blade clockwise.

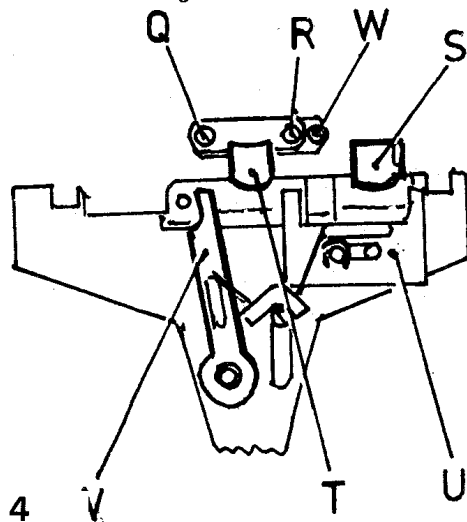
Flywheel axial play (diagram 2)
 Perform this adjustment following flywheel setting or after changing a belt. Insert a millimeter into the motor circuit. Check that flywheel J has distinct axial play. First tighten screw M on pressure piece K, until motor current increases by 15mA. Then slacken screw M until current is at minimum, and then re-tighten screw until current has increased by 2mA. Finally give screw an extra half-turn, and secure screw with varnish.



Changing heads (diagram 3)
 For soldering head connections, use an earthed soldering iron not greater than 6W. Erase head. S. Unsolder connections, and push head out from mounting. Press

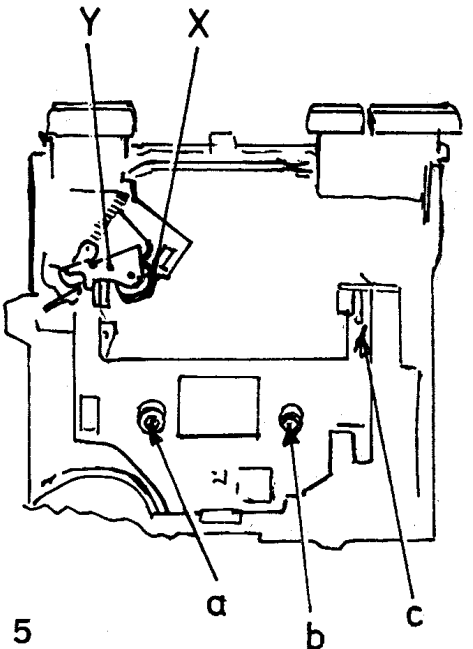


in new head up to "stop" moulding. Solder connections. Record/playback head. T. Unsolder connections, remove screw Q and slacken screw R. Turn head on bracket, and ease it from mounting.



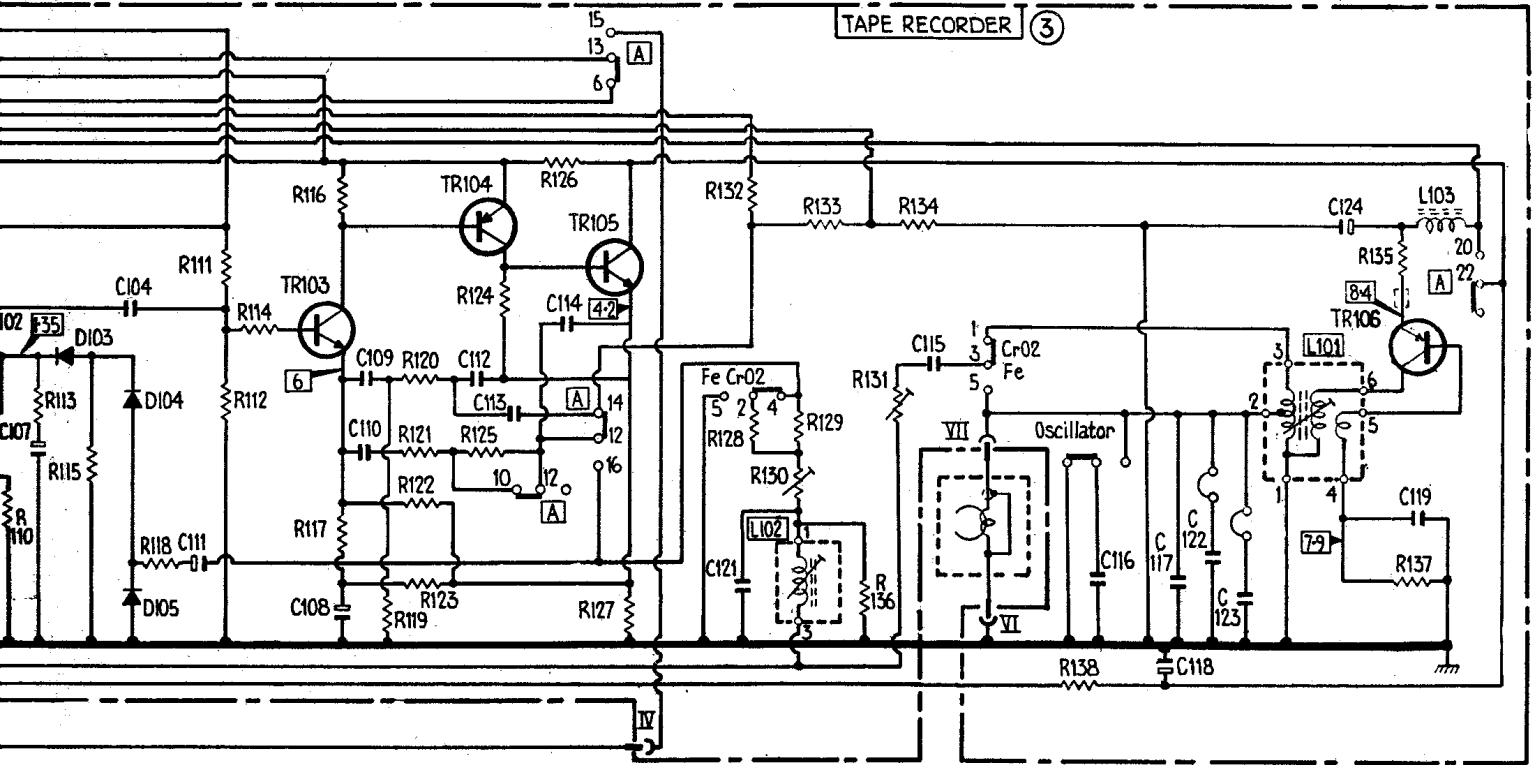
Head adjustment (diagram 4)
 Record/playback head. T. A Grundig gauge 3400-029.00 should be used for this adjustment.
 (a) Slacken screw W and fit gauge. Select START and push slider U to centre.
 (b) Press head carrier towards gauge and tighten screw W.
 (c) Next turn screw Q until feeler level V can be guided between tape guide forks. Head must be VISUALLY vertical.
 (d) Select STOP. Leave gauge in position, and insert test cassette, using 6.3kHz recording.

(e) Select START/PLAYBACK. With output meter across pins 3 and 2 of DIN socket, adjust screw R for maximum output. (This screw is also accessible through a hole in the cabinet above the cassette loader if the cassette deck has not been removed.)



Head cleaning (diagram 5)
 Heads, pressure roller X, capstan spindle, and drive wheel, mounted on hinged lever, should be cleaned, using petrol or methylated spirits, at regular intervals (e.g. 100 or 200 working hours) or after servicing.
Pressure roller (diagram 5)
 With START selected, pressure roller should exert 300 ± 50 gr. If roller is

107	414	415	418	419	111	108	109	110	112	113	114	121	115	116	118	117	122	123	124	119	C					
110	113	115	118	111	112	114	116	117	119	120	123	125	126	127	128	132	129	130	133	136	131	134	138	135	137	R



Cassette deck circuit

Components

Resistors

R1	1.8kΩ	K1
R2	1.2kΩ	K1
R3	510kΩ	K1
R4	2.4kΩ	K1
R5	1kΩ	K1*
R6	10kΩ	K1
R7	680Ω	K1

R8	10Ω	K1
R9	10Ω	K1
R10	560Ω	K1
R101	22kΩ	F1
R102	1MΩ	F1
R103	100Ω	F1
R104	27kΩ	E1
R105	820Ω	F1
R106	1.2kΩ	F1
R107	560Ω	E1
R108	100Ω	E1
R109	2.2MΩ	F1
R110	100kΩ	F1
R111	120kΩ	E1
R112	470kΩ	F1
R113	390Ω	E1
R114	330Ω	F1
R115	22kΩ	F2
R116	10kΩ	F1

R117	390Ω	F1
R118	3.3kΩ	F1
R119	6.8Ω	F1
R120	10Ω	F1
R121	1.5kΩ	F1
R122	82kΩ	F1
R123	56kΩ	F1
R124	22kΩ	F1
R125	100kΩ	F1
R126	470Ω	F1
R127	560Ω	F1
R128	27kΩ	E2
R129	15kΩ	E2
R130	10kΩ*	E2
R131	50kΩ*	F2
R132	22kΩ	E2
R133	33kΩ	E2
R134	10kΩ	E2
R135	2.2Ω	F2

R136	39kΩ	F2
R137	15kΩ	F2
R138	3.3Ω	F2

Capacitors

C1	3.3nF	K1
C2	47nF	K1
C3	0.33μF	K1
C4	3.3nF	K1
C5	10μF	K1
C6	47nF	K1
C7	3.9nF	K1
C8	10μF	K1
C101	0.68μF	F1
C102	220μF	E1
C103	0.33μF	F1
C104	0.1μF	F1
C105	100μF	E1
C106	220μF	F1

C107	47μF	E1
C108	33μF	F1
C109	0.22μF	F1
C110	18nF	F1
C111	0.68μF	F1
C112	1.5nF	F1
C113	47nF	F1
C114	0.68μF	F1
C115	120pF	F2
C116	3.9nF	F2
C117	10nF	F2
C118	470μF	E2
C119	82nF	F2
C120	10μF	E1
C121	330pF	F2
C122	1.2nF	F2
C123	1.2nF	F2
C124	22μF	F2
C125	330pF	F1

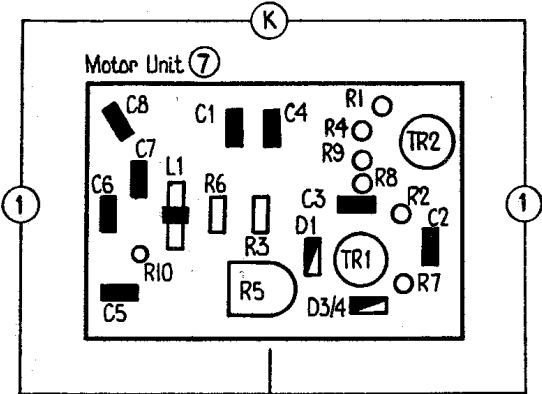
Transistors

Tr1	BC238B	K1
Tr2	BC238B	K1
Tr101	BC330C	F1
Tr102	BC330C	F1
Tr103	BC330C	F1
Tr104	BC308C	F1
Tr105	BC239C	F1
Tr106	BC328/25	F1

Diodes

D1		
D3	BZ102/	
D4	1V4	K1
D5		
D101	D249	F1
D102	D249	F1
D103	D484	F2
D104	D474	F2
D105	D474	F2

Motor unit board



damaged, then roller lever Y must be replaced.
Clutches (diagram 5)
 Winding moment of clutch (a), while lower half is driven and contactor is held, should be 33 ± 5 gr. Adjust by fitting a second washer if necessary. Basic clutch braking torque with START selected must be 2 to 4 gr.

Motor control circuit

