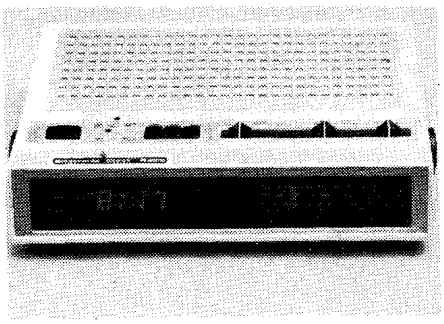
Supplement to Electrical and Electronic TRADER 11 April 1979

Trader SERVICE SHEET

3359

Bush 5500AH and 5500BH

Clock radios



Both the AH and BH versions of the Bush 5500 mains-operated digital clock radio are identical in external appearance and presentation. They differ only in that the BH version can be preset to display the month and date as well as the normal hours and minutes. To achieve this, the "snooze" switch also acts as a display changer, i.e. from time to date, and the IC used to drive the clock display is different from that used in the AH version. These differences in circuit are indicated on the circuit diagram, which is that of the BH version. The display is a red LED digitron type, the brilliance of which can be continuously varied from dim to bright by an external control. A 12-hour display is standard.

Conventional clock radio controls are fitted — slow and fast running time setting switches (also used to set up the date in the BH version), with a "time set" switch which locks the running controls out of operation when the switch is set to "run", "snooze", and alarm delay switching, and a choice of radio or buzzer alarm (with high or low loudness levels).

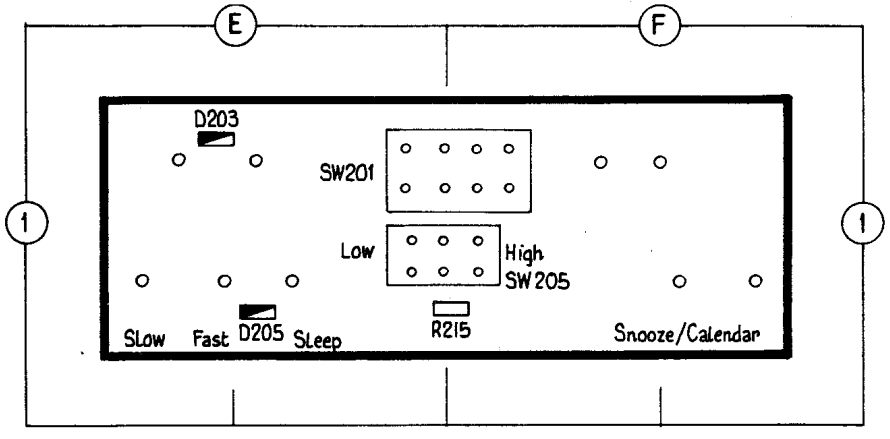
The radio tuner covers the long and medium wave AM bands using an internal ferrite aerial, and the VHF FM broadcast band. A throwout wire aerial is provided.

Both versions of the Bush 5500 are housed in a low profile white and silver plastics cabinet, with black and white trim and controls. The loudspeaker is mounted in the cabinet top.

Brief Specification

Power supply	240V 50Hz a.c. mains			
Radio tuner wavebands	AM: LW 145 to 260kHz (1150 to 2000m) MW 510 to 1620kHz (185 to 589m) FM: VHF 87.2 to 104.5MHz			
Intermediate frequencies	AM: 470kHz FM: 10.7MHz			
Transistors 9 Integrated circuits 2 Diodes 17	(see components list for details)			
Audio output	560mW			
Loudspeaker	3in (76mm) diameter round, impedance 8 ohms			
Dimensions and weight	*Height*	*Width*	*Depth*	*Weight*
	3½in (88mm)	11⅞in (310mm)	7in (177mm)	3lb (1.2kg)
UK Manufacturer	Rank Radio International, Ernesettle, Saltash, Plymouth, 0752 364311			
UK Service	Watton Road, Ware, Herts SG12 0AE. Ware (0920) 3966			

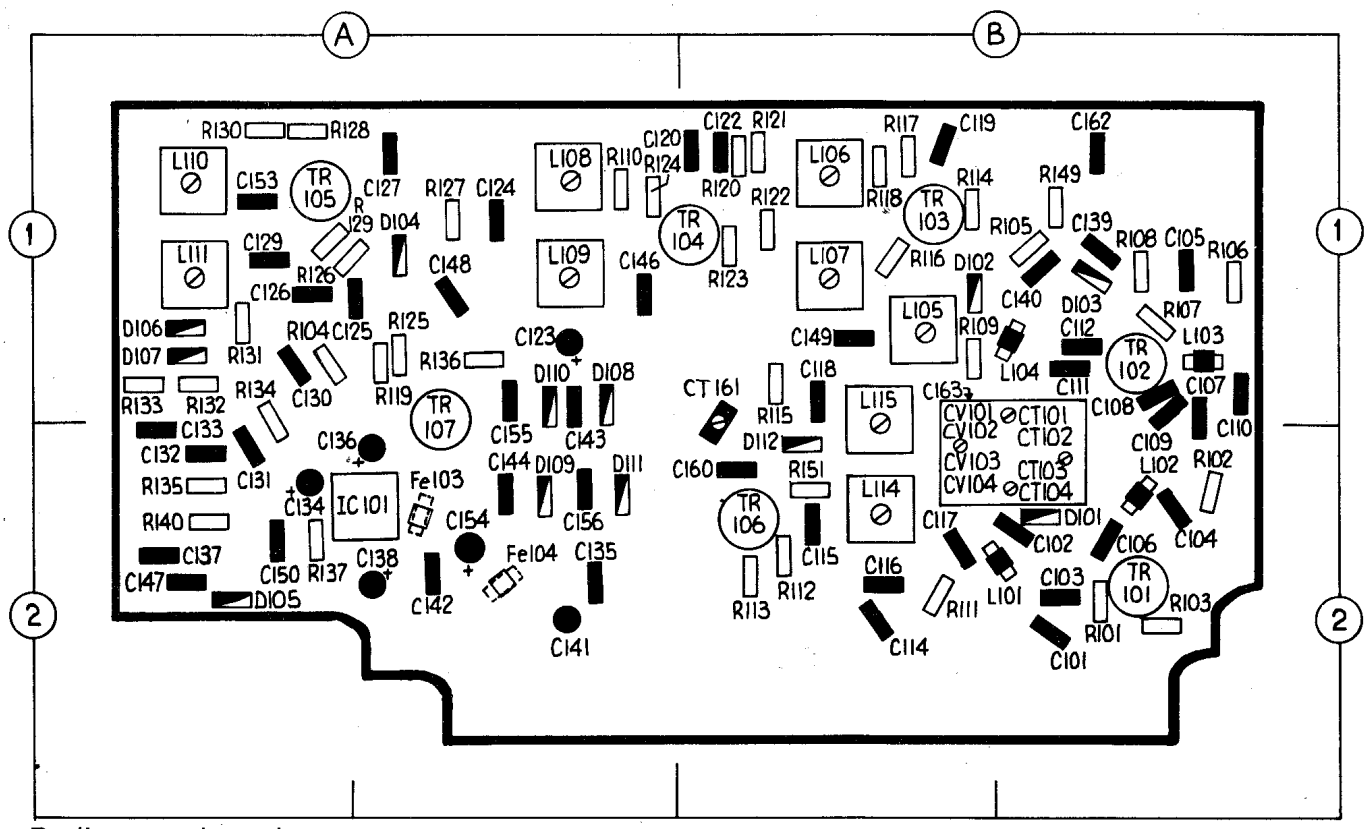
Switch board



Dismantling

(see interior view diagram)

1. Disconnect clock radio from mains supply, and invert the cabinet on to a protective resilient surface.
2. Remove 3 round-headed screws entering holes A from recesses in cabinet bottom, and three short countersunk screws entering holes B along bottom front edge.
3. Carefully lift the bottom clear of the cabinet top to extent of leads. In the bottom part are mounted the mains tranformer, mains lead and clamp, and the throwout aerial terminal.
4. *To remove the radio tuner chassis* from the cabinet top:
   (a) Ease off the volume, waveband switch and alarm switch control knobs.
   (b) Remove 3 screws C from the moulded chassis stays.
   (C) Remove 2 screws D from the tuner p.c. board.
   (d) Lift out the chassis complete with the switches and volume control.
5. To remove the tuner p.c. board from the chassis, release additional screw E.
6. *To remove the clock unit boards:*
   (a) Ease out the front escutcheon from the slots in the cabinet side front ends.
   (b) This gives access to 2 screws G which hold the display unit and logic board to the escutcheon.
   (c) The switch board, containing SW201 and SW205, can be removed after releasing 4 screws F.



Radio tuner board

7. *Dimmer potentiometer R217* can be removed after releasing 2 screws H to free the bracket.
8. *The loudspeaker* is held by two clamps secured by screws J.
9. *The mains transformer* T9 is held to the cabinet bottom by 2 screws; the mains lead clamp and the throwout aerial terminal are each held by a single screw.

Alignment

Equipment required

AM signal generator covering 145 to 1620kHz, modulated 30%.

FM signal generator, covering 87 to 105Mhz, modulated 330%, deviation ±22.5kHz.

Sweep marker generator, covering 10.7Mhz ±100kHz, marker at 10, 7MHz.

Oscilloscope.

Suitable output meter (VTVM).

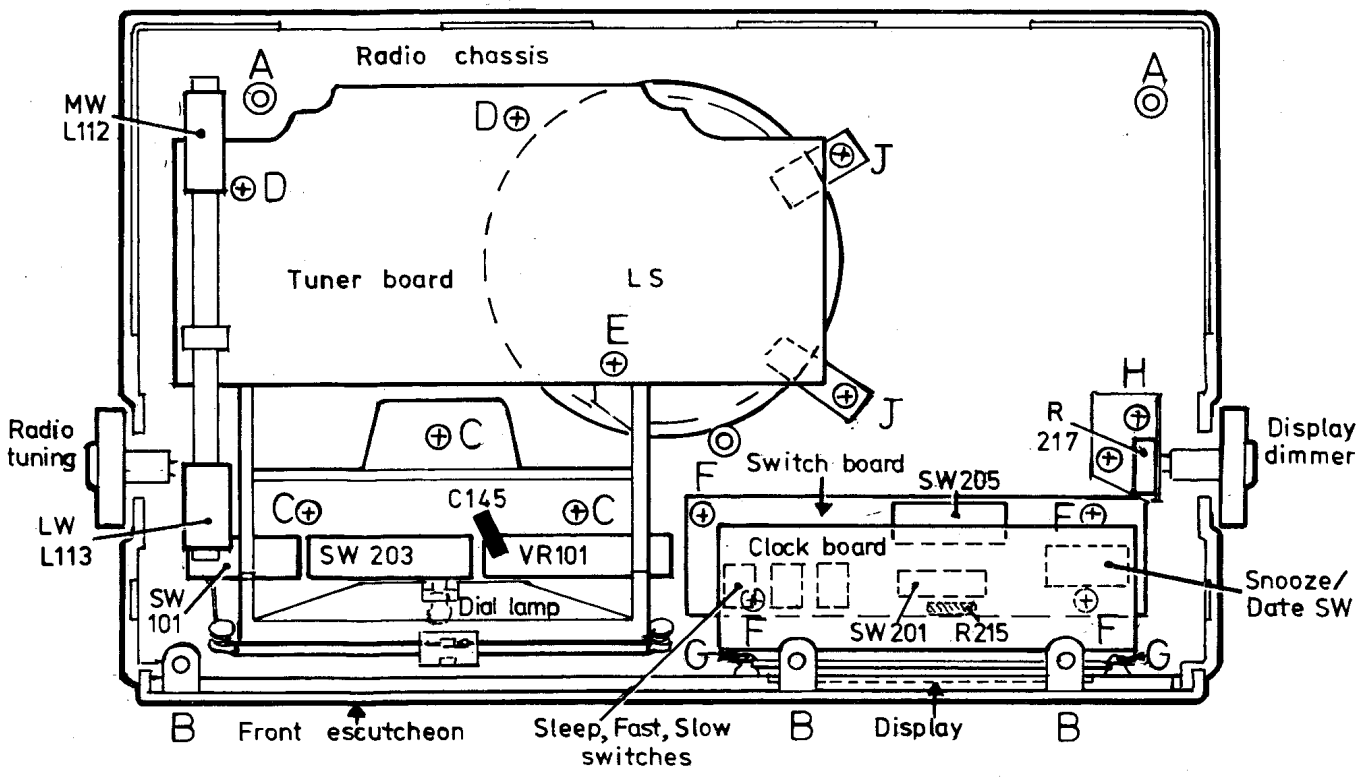
Input matching components as detailed in text.

Preliminaries

Allow receiver and test equipment to warm up before starting alignment. Progressively reduce signal input as

(continued overleaf)

Interior view (cabinet top, inverted) BH version.



Alignment *(continued)*

circuits come into alignment to avoid agc action on AM, "limiting" on FM. See interior view and tuner p.c. board diagrams for locations of coils, trimmers test connection points.

Procedure

AM

I.F. Stages

Select "MW", connect AM signal generator output, modulated, with generator tuned to 470kHz, to MW aerial coil input (tuning gang AM aerial section **CV103).**

Connect oscilloscope probe to volume control **VR101** slider. Tune receiver to high frequency end of scale (or to no signal point).

Adjust MW IFT's **L109, L107,** and **L115** for maximum amplitude and symmetrical response curve about 470kHz.

R.F. Stages

Connect AM signal generator output via an inductive loop to ferrite aerial. Connnect output meter across loudspeaker terminus.

MW (select "MW").

1. Tune signal generator to 510kHz, receiver to low frequency end of scale. Adjust MW oscillator coil **L114** for maximum.
2. Retune signal generator to 1620kHz, receiver to high frequency end of scale. Adjust MW oscillator trimmer **CT104** for maximum.
3. Repeat steps 1 and 2 for optimum result.
4. Tune signal generator and receiver to 600kHz. Adjust MW aerial coil **L112** (by sliding this along ferrite rod) for maximum.
5. Retune generator and receiver to 1400kHz. Adjust MW aerial trimmer **CT103** for maximum.
6. Repeat steps 4 and 5 for optimum result.

LW (select "LW")

7. Tune signal generator to 145kHz, receiver to low frequency end of scale. Adjust LW oscillator trimmer **CT161** for maximum.
8. Retune generator to 260kHz, receiver to high frequency end of scale. Check that output level is similar to that obtained in step 7.
9. Repeat steps 7 and 8 for optimum result.
10. Tune signal generator and receiver to 160kHz. Adjust LW aerial coil **L113** (on ferrite rod) for maximum.
11. Retune generator and receiver to 250kHz. Check that output level is similar to that obtained in step 10.
12. Repeat steps 10 and 11 for optimum result.

FM (select "VHF")

I.F. Stages

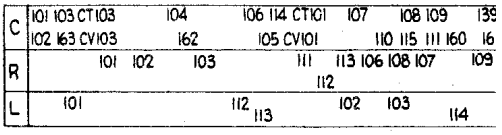
Connect sweep marker generator, sweeping 10.7MHz ±100kHz, to tuning FM oscillator section **CV102.** Tune receiver to low frequency end of scale or to no signal point. Connect, oscilloscope to volume control **VR101** slider. Detune **L111.**

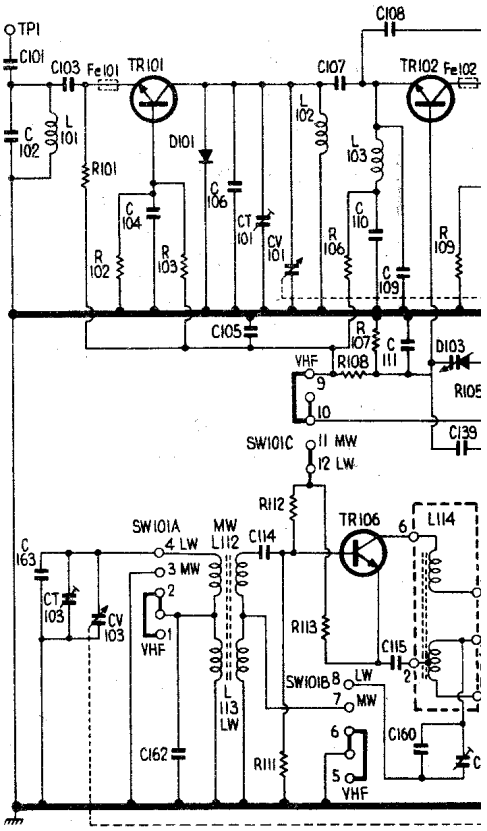
1. Adjust FM **IFT's L110, L108, L106** and **L105,** in that order, for maximum amplitude and symmetry of response curve on display.
2. Adjust discriminator coil **L111** and readjust **L110** to obtain symmetrical "S" curve with the straight part passing through zero at 10.7MHz.

R.F. Stages

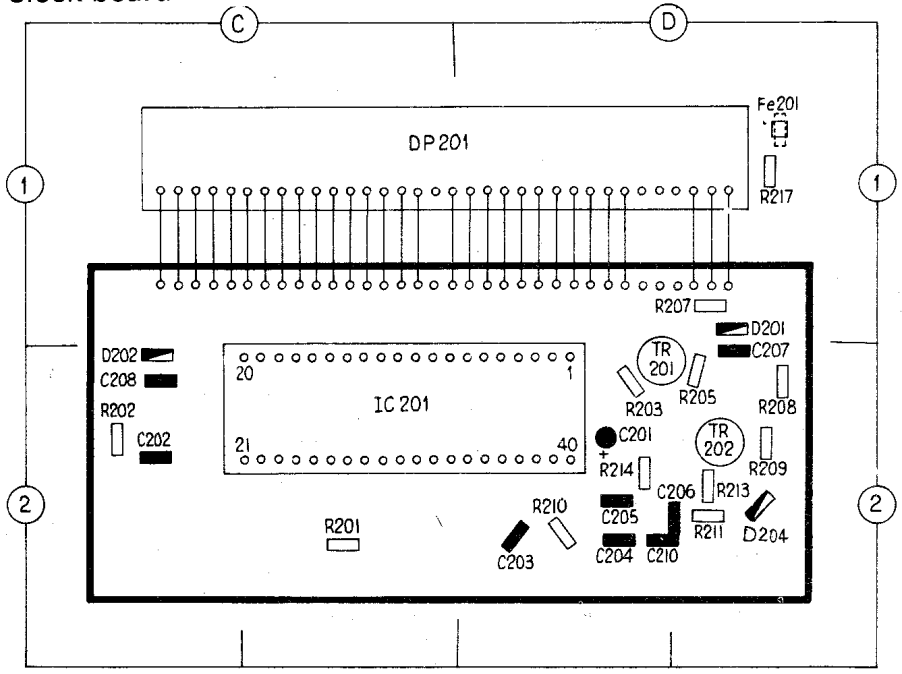
Connect FM signal generator, modulated, deviation ±22.5kHz, via a 50 ohm dummy aerial between the FM aerial input TP1 (outer end of **C101**) and chassis. Connect output meter across loudspeaker terminals.

1. Tune signal generator to 87.2MHz, receiver to low frequency end of scale. Adjust FM oscillator coil **L104** (by varying turns spacing) for maximum.
2. Retune signal generator to 104.5MHz, receiver to high frequency end of scale. Adjust FM oscillator trimmer **CT102** for maximum.
3. Repeat steps 1 and 2 for optimum result.
4. Tune signal generator and receiver to 90MHz. Adjust FM aerial coil **L102** for maximum.
6. Retune generator and receiver to 102MHz. Adjust FM aerial trimmer **CT101** for maximum.
7. Repeat steps 6 and 7 for optimum result.





Clock board



Components

Resistors

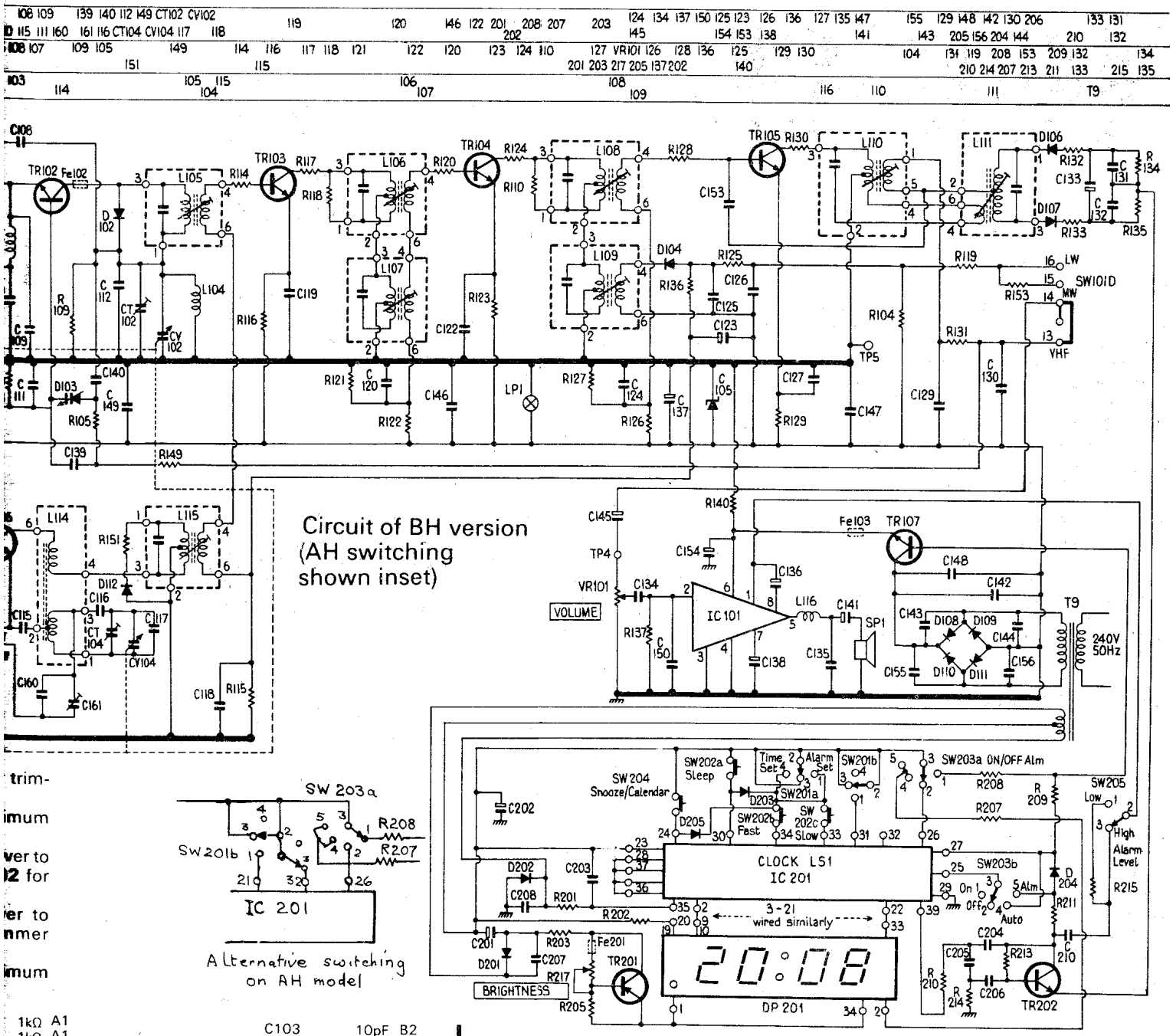
R101	1.2kΩ	B2
R102	22kΩ	B2
R103	8.2kΩ	B2
R104	2.2kΩ	A1
R105	470kΩ	B1
R106	3.3kΩ	B1
R107	8.2kΩ	B1
R108	4.7kΩ	B1
R109	1.5kΩ	B1
R110	39kΩ	A1
R111	12kΩ	B2
R112	5.6kΩ	B2
R113	2.2kΩ	B2
R114	150Ω	B1
R115	47kΩ	B1
R116	680Ω	B1
R117	470Ω	B1
R118	22kΩ	B1
R119	2.2kΩ	A1
R120	150Ω	B1
R121	22kΩ	B1
R122	10kΩ	B1
R123	1kΩ	B1
R124	470Ω	A1
R125	2.2kΩ	A1
R126	5.6kΩ	A1
R127	10kΩ	A1
R128	100Ω	A1
R129	1kΩ	A1
R130	1kΩ	A1
R131	1kΩ	A1
R132	1kΩ	A1
R133	1kΩ	A1
R134	3.9kΩ	A1
R135	3.9kΩ	A2
R136	10kΩ	A1
R137	10kΩ	A2
R140	82Ω	A2
R149	1MΩ	B1
R151	10kΩ	B2
R153	5.6kΩ	Wave
R201	220Ω	C2
R202	680Ω	C2
R203	4.7Ω	D2
R205	4.7kΩ	D2
R207	220Ω	D1
R208	4.7kΩ	D2
R209	3.7kΩ	D2
R210	47kΩ	D2
R211	22kΩ	D2
R213	2.2MΩ	D2
R214	47kΩ	D2
R215	680Ω	F1

Potentiometers

R217	50kΩ	D1
VR101	10kΩ	Volun

Capacitors

C101	10pF	B2
C102	50pF	B2



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1kΩ	A1	
1kΩ	A1	
1kΩ	A1	
3.9kΩ	A1	
3.9kΩ	A2	
10kΩ	A1	
10kΩ	A2	
82Ω	A2	
1MΩ	B1	
10kΩ	B2	
5.6kΩ	Waveband switch	
220Ω	C2	
680Ω	C2	
4.7Ω	D2	
4.7kΩ	D2	
220Ω	D1	
4.7kΩ	D2	
3.7kΩ	D2	
47kΩ	D2	
22kΩ	D2	
2MΩ	D2	
47kΩ	D2	
680Ω	F1	

rs

50kΩ	D1
10kΩ	Volume

10pF	B2	
50pF	B2	

C103	10pF	B2
C104	10nF	B2
C105	40nF	B1
C106	30pF	B2
C107	4pF	B1
C108	6pF	B1
C109	30pF	B2
C110	500pF	B1
C111	10nF	B1
C111	27pF	B1
C114	20nF	B2
C115	20nF	B2
C116	270pF	B2
C117	10pF	B2
C118	20nF	B1
C119	20nF	B1
C120	20nF	A1
C122	20nF	B1
C123	10uF	A1
C124	20nF	A1
C125	10nF	A1
C126	10nF	A1
C127	20nF	A1
C129	5nF	A1
C130	5nF	A1
C131	300pF	A2
C132	300pF	A2
C133	4.7uF	A2
C134	1uF	A2
C135	2nF	A2

C136	10uF	A2
C137	470uF	A2
C138	10uF	A2
C139	40nF	B1
C140	15pF	B1
C141	220uF	A2
C142	1000uF	A2
C143	20nF	A2
C144	20nF	A2
C145	1uF	int. view
C146	40nF	A1
C147	40nF	A2
C148	40nF	A1
C149	40nF	B1
C150	20nF	A2
C153	2pF	A1
C154	220uF	A2
C155	20nF	A2
C156	20nF	A2
C160	230pF	B2
C162	62pF	B1
C163	10pF	B1
C201	220uF	C2
C202	1000uF	C2
C203	10nF	C2
C204	2nF	C2
C205	1nF	C2
C206	2nF	C2
C207	20nF	D2

C208	20nF	C2
C210	2nF	D2

Variable capacitors

CV101	Trimmer	B1
CV102	Trimmer	B2
CV103	Trimmer	B2
CV104	Trimmer	B2
CT101	Trimmer	B1
CT101	Trimmer	B2
CT102	Trimmer	B2
CT103	Trimmer	B2
CT161	20pF	B2

Transistors

Tr101	ED1502B	B2
Tr102	ED1502B	B1
Tr103	ED1502C	B1
Tr104	ED1502E	B1
Tr105	ED1502E	A1
Tr106	ED1502C	B2
Tr107	NA21X-1	A1
Tr201	ED1802	D2
Tr202	ED1402	D2

Integrated circuits

IC101	LM386N (BH)	A2
IC101	MM5387 (AH)	
IC201	EA7317B	C2

Diodes

D101	CDG23	B2
D102	1N60	B1
D103	1S2139C	B1
D104	CDG21	A1
D105	WZ054	A2
D106	1N60	A1
D107	1N60	A1
D108	1N4001	A1
D109	1N4001	A2
D110	1N4001	A1
D111	1N4001	A2
D112	CDG23	B2
D201	1N4001	D1
D202	1N4001	C2
D203	1N4148	E1
D204	1N4148	D2
D205	1N4148	E1

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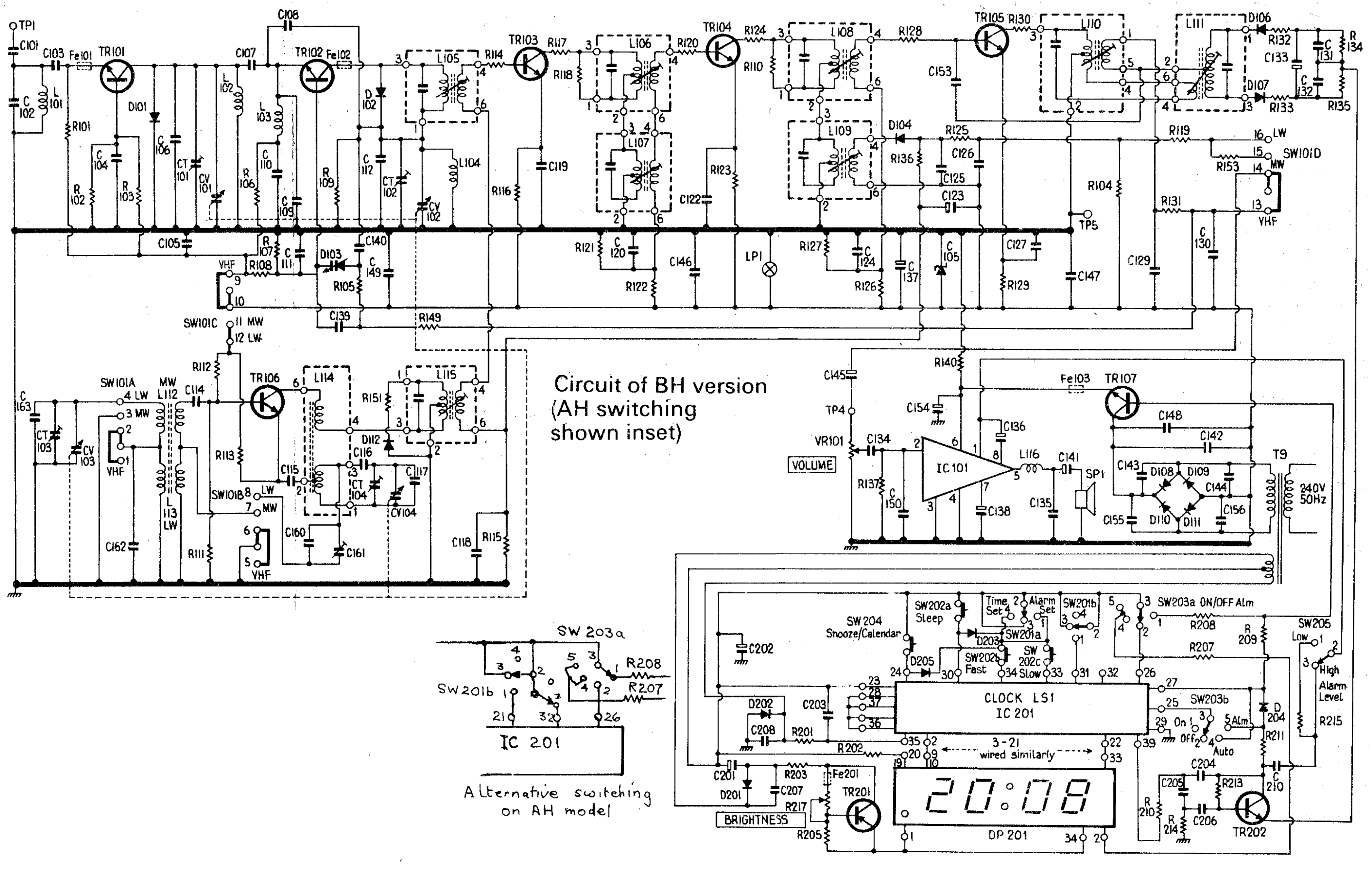

Circuit of BH version (AH switching shown inset)