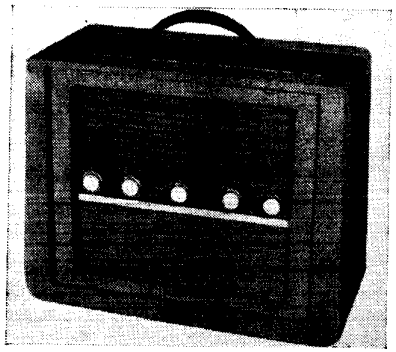
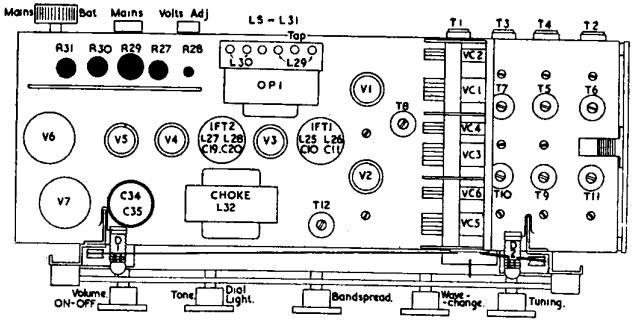
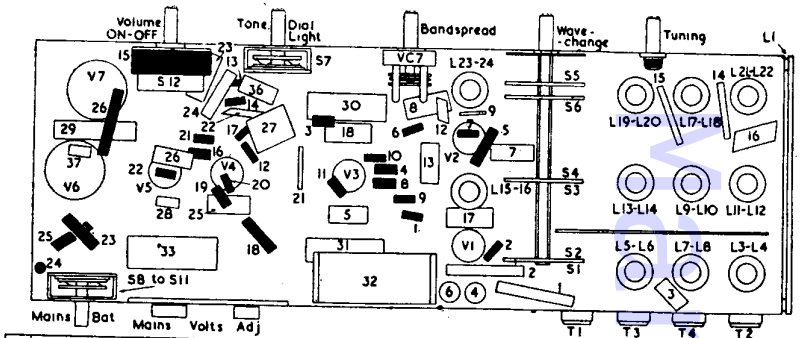
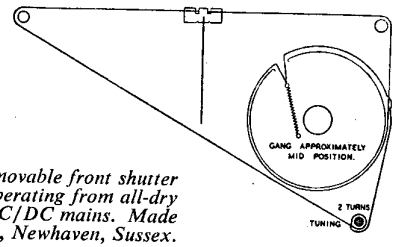
CHAMPION 781

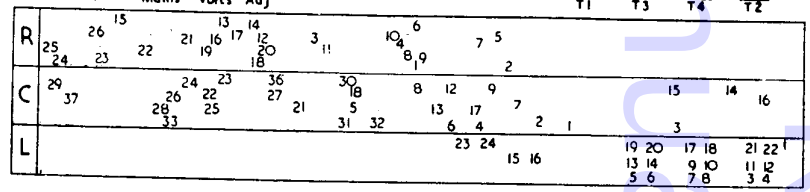
For text, see facing page.



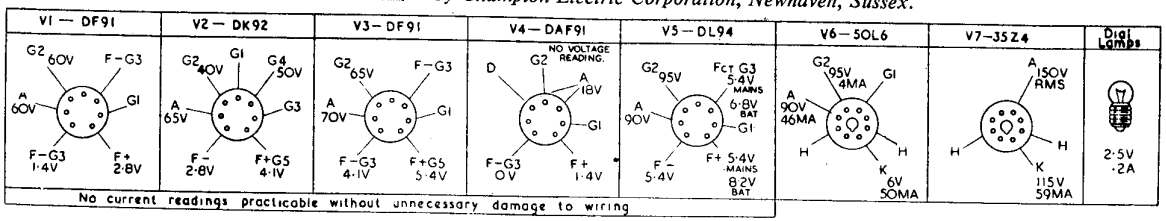








Seven - valve four - waveband AC/DC battery portable with RF stage, self-contained MW frame aerial, and telescopic SW aerial. Sockets for an external SW aerial and earth. SW bands have electrical bandspread with calibrated scale and knob for logging. Leatherette covered case fitted with carrying handle and removable front shutter with lock and key. Suitable for operating from all-dry batteries and 100-120, 200-250V AC/DC mains. Made by Champion Electric Corporation, Newhaven, Sussex.



RESISTORS

R	Ohms	Watts
1	4.7K	1/8
2	150	1/8
3	2.2M	1/8
4	2.2M	1/8
5	180	1/8
6	100K	1/8
7	27K	1/8
8	2.2M	1/8
9	10K	1/8
10	4.7K	1/8
11	220	1/8
12	47K	1/8
13	1.8M	1/8
14	470K	1/8
15	1M Potr. with DP switch	1/8
16	10M	1/8
17	150	1/8
18	3.3K	1/8
19	3.3M	1/8
20	470K	1/8
21	470K	1/8
22	470	1/8
23	15	1/8
24	Thermistor CZ3	
25	1.8K	1/2
26	100	1
27	350 WW	10W
28	Thermistor CZ2	
29	250 WW	12W
30	100 WW	5W
31	100 WW	5W

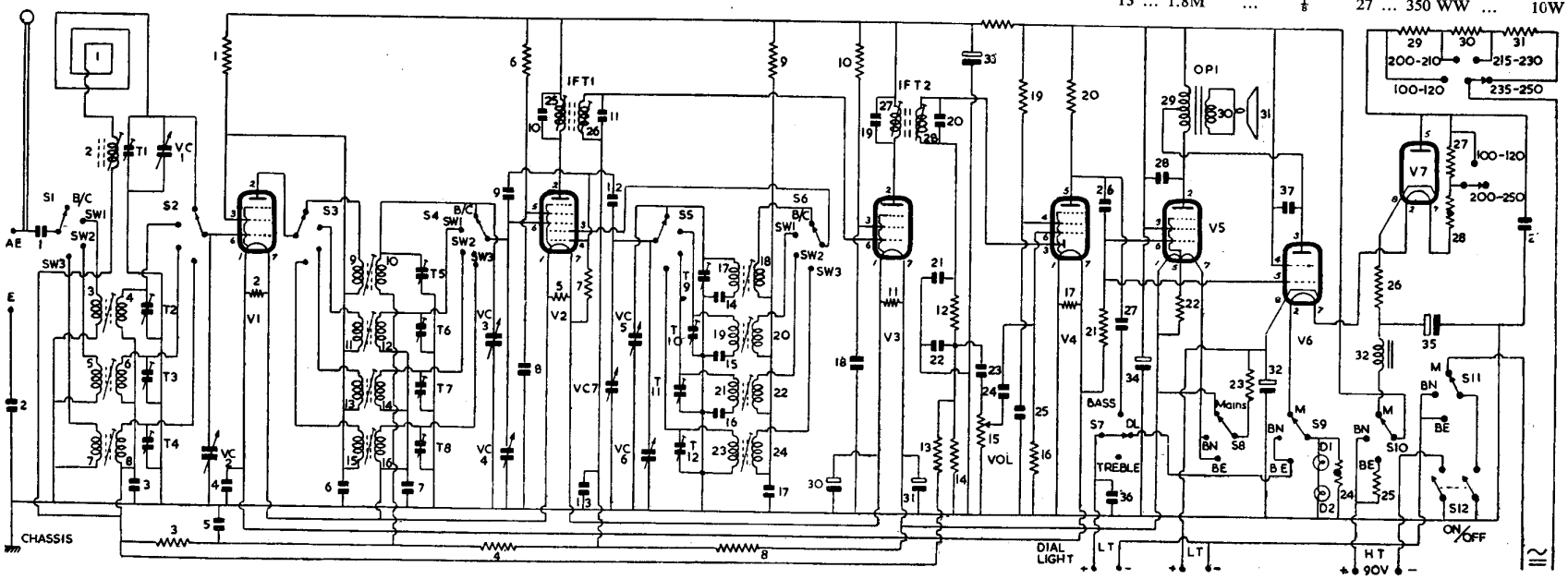
CAPACITORS

C	Capacity	Type
1	.002	Mica 1kV
2	.002	Mica 1kV
3	.05	Tubular 250V
4	.1	Tubular 150V
5	.05	Tubular 250V
6	.1	Tubular 150V
7	.1	Tubular 150V
8	.1	Tubular 150V
9	2.2pF	Silver Mica
10	100pF	Silver Mica
11	100pF	Silver Mica
12	100pF	Silver Mica
13	.05	Tubular 250V
14	550pF	Silver Mica
15	1000pF	Silver Mica
16	2000pF	Silver Mica
17	.1	Tubular 150V
18	.1	Tubular 150V
19	100pF	Silver Mica
20	100pF	Silver Mica
21	100pF	Silver Mica
22	100pF	Silver Mica
23	.01	Tubular 500V
24	.005	Tubular 350V
25	.1	Tubular 150V
26	.01	Tubular 500V
27	500pF	Silver Mica
28	.005	Tubular 350V
29	.01	Tubular 1kV
30	25	Electrolytic 25V
31	25	Electrolytic 25V
32	250	Electrolytic 12V
33	4	Electrolytic 150V
34	32	Electrolytic } 275
35	32	Electrolytic }
36	.01	Tubular 500V
37	.002	Tubular 350V

INDUCTORS

L	Ohms
1	.75
2	1
3	.5

(*Continued on facing page*)



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Removing timebase chassis. Remove cabinet hood. Remove rectangular back frame, which is fixed to the baseboard by two bolts, and to the top girders by one bolt in each girder. Unplug interconnecting leads.

Chassis is held at six points, one at rear, bolting into baseboard, one at top front of chassis bolting into the angle bracket projecting from front plate, two which bolt from flange on the front plate into front of the chassis, and two which bolt into deflector coil support bracket.

Removing RF chassis. Chassis fixing method is same as that used for timebase. When removing chassis care should be taken not to damage line amplitude choke, which is fixed to front panel.

Removing the knobs. Remove cabinet hood. The knobs are held by set screws which are accessible from behind the cabinet front.

Removing cabinet front. Remove cabinet hood and knobs. Remove four bolts holding cabinet front to baseboard (accessible from the bottom) and the two bolts holding the cabinet front to front plate. Disconnect speaker. Release two top girders from rear rectangular frame.

Removing controls. Remove front of cabinet as described above. All controls are then accessible but care must be exercised in withdrawing the leads through the chassis holes.

Removing line transformer screening can. The can is held by two wing nuts at the top. The CRT anode cap will pass through hole in can if the rubber grommet is removed.

Replacement of V17 (EY51). Remove line transformer screening can. Remove three transformer fixing bolts, but do not disconnect any leads. Gently lay transformer on its side on a block placed at the side of the chassis. **Note**—Anode and filament leads of EY51 are soldered into wax filled bushes in moulded former together with fine lead-out wires from transformer.

ALIGNMENT INSTRUCTIONS

Preliminary adjustments : set R46 (Interference limiter) fully anti-clockwise, and R38 (Sensitivity), R43 (Contrast), R25 (Volume) fully clockwise. Set attenuator plug in Direct position. Connect high-impedance 10V FSD valve voltmeter between cathode of CRT and chassis.

Rough IF. Feed sig/gen output, 37.5 ohms impedance, to gl V2, in series with a capacitance of 5,000pF, connected between grid and chassis. Apply 11.5 mc/s and trim core L19 (top); 9.6 mc/s and trim core L21 (top); 10.6 mc/s, core L16 (bottom); 10.6 mc/s, core L15 (top). Fringe model: 11.8 mc/s, trim L19 (top); 10.4 mc/s, L21 (top); 11 mc/s, core L16 (bottom); 11 mc/s, L15 (top).

Sound IF. Feed 8.5 mc/s to gl V2. Trim L11 L9 L8 for maximum on sound output meter, taking peak where the core is nearest chassis underside.

Sound rejectors. Inject 8.5 mc/s to gl V2. Short circuit L17 and trim L22 (bottom core) for minimum video output. Short L22 and trim L17 (bottom) for minimum.

Vision IF. Feed sig/gen output to gl V2. Inject 11.5 mc/s and trim L19 (top); 9.6 mc/s, trim L21 (top); 10.6mc/s, connect 680 ohm resistor in series with 1,000pF between anode V2 and chassis, and trim L16 (bottom). Finally connect damper between gl V7 and chassis, and trim L15 (top). Fringe model: 11.8 mc/s, L19 (top); 10.4 mc/s, L21 (top); 11 mc/s, L16 (bottom); 11 mc/s, L15 (top).

Oscillator. Inject sound frequency of required channel to aerial socket and trim C14 for maximum sound output, using a low input with volume control at maximum.

RF circuits. Connections to aerial socket to be from a source of 37.5 ohms impedance, connected between earth blade of aerial plug and right-hand pin (viewed from back of chassis), the left-hand pin being connected to the earth blade through 37.5 ohms. These connections must be shorter than 3cms. With input to aerial socket inject a frequency 1.5 mc/s lower than vision carrier frequency. Damp and trim for maximum video output as follows: damp to chassis at junction of L4 C7 and trim C10; damp to chassis gl V2 and trim C9; damp to chassis at junction of L1 C4 (that is not earthed to chassis) and trim C5; damp to chassis gl V1 and trim C4.

CHAMPION 781—*Continued*

CIRCUIT DESCRIPTION

AERIAL. On MW band aerial signal is obtained from frame L1 in series with loading coil L2. On SW bands aerial signal, from either the telescopic or external aerial, is fed through isolating capacitor C1 and switched by S1 to SW aerial coupling coils L3 (SW1) L5 (SW2) L7 (SW3). Earth socket is isolated from chassis by C2.

RF amplifier. Grid coils L1 L2 (MW) L4 (SW1) L6 (SW2) L8 (SW3), which are trimmed by T1 to T4 respectively, are switched by S2 across SW aerial tuning capacitor VC2 and connected to gl of RF amplifier V1. To tune over the required range the MW circuit is provided with an additional tuning capacitor VC1 which is permanently connected across L1 L2 and ganged to VC2.

AVC, decoupled by R13 C3, is fed through the tuned coils to V1. Screen voltage is obtained from anode circuit decoupling network R1 C6. Amplified signal at anode V1 is developed across L9 L11 L13 L15, the appropriate coupling coil being switched into the anode circuit by S3.

Frequency-changer is heptode V2. The inductively-coupled grid coils 110(MW) L12(SW1) L14(SW2) L16(SW3) which are trimmed by T5 to T8 respectively, are switched by S4 to SW tuning capacitor VC4 and connected to V2. Additional capacity to tune MW coil L10 is provided by VC3 permanently connected across the coil and ganged to VC4. AVC decoupled by R3 C5 is fed to g3 of V2 on MW band only. On the SW bands earthy ends of tuned coils are connected to V2 filament negative to maintain correct bias conditions. Primary L25 C10 of IFT1 is in the anode circuit.

Oscillator employs tuned-grid shunt-fed circuit. Grid coils L17 (MW) L19 (SW1) L21 (SW2) L23 (SW3), which are trimmed by T9 to T12 respectively and padded by C14 (MW) C15 (SW1) C16 (SW2), are switched by S5 to SW oscillator tuning capacitor VC6, and coupled by C12 to oscillator grid (g1) of V2. Automatic bias for grid is developed on C12 with R7 as leak. Additional capacity to tune MW coil L17 is provided by VC5 ganged to VC6.

Anode reaction voltages are developed from L18 (MW) L20 (SW1) L22 (SW2) L24 (SW3) which are switched by S6 in series with HT to oscillator anode (g2) of V2. Oscillator HT is voltage dropped and RF decoupled by R9 C17.

IF amplifier operates at 465kc/s. Secondary L26 C11 of IFT1 feeds signal, and AVC voltage decoupled by R4 C13, is fed to grid of IF amplifier V3. Screen voltage is obtained from R10 decoupling being given by C18. Primary L27 C19 of IFT2 is in the anode circuit.

Signal rectifier. Secondary L28 C20 of IFT2 feeds signal to diode anode V4. R14 is diode load and R12 C21 C22 form an IF filter.

AVC. The DC component of the rectified signal across R14 is fed through decoupling network R13 C3 to grid V1, through R3 C5 to grid V2 and through R4 C13 to grid V3. R8 R4 R3 R13 with diode load R14 form a potential dividing network across series connected filament V1 to V4. The AVC feeds to grids of V1 V2 and V3 are tapped from the potential divider at points which give voltages approximately equal to the voltages between their filaments and chassis.

AF amplifier. Rectified signal across R14 is fed by C23 to volume control R15 and thence by C24 to pentode AF amplifier section of V4. Automatic bias for grid is developed on C24 with R16 as leak. R20 is anode load.

Tone Control. A fixed degree of top cut is provided by S7 which in its Bass position connects C27 in series with C36 between anode V4 and chassis.

Output Stage (Battery operation). C26 feeds signal at anode V4 to grid of pentode output amplifier V5. The valve is biased by approximately 6V, this being the potential difference between centre tap of its filament, which is at high potential side of LT supply, and the earthy end of its grid resistor R21. Suppressor is internally connected to centre tap of filament. Primary L29 of output matching transformer OP1 is in the anode circuit. Fixed tone correction is by C28.

Output Stage (Mains Operation). Signal at anode V4 is fed by C26 to grid of beam-tetrode output amplifier V6, the grid load being R21 as in the case of V5. Cathode bias is obtained from voltage set up across filaments V1 to V4 which are connected in series with R23 between cathode V6 and chassis. Bias and filament voltage is decoupled by C32.

Section of primary L29 of output matching transformer OP1 is in the anode circuit with C37 giving fixed degree of tone correction. Secondary L30 of OP1 feeds signal from either V5 or V6 to a 5in. PM speaker L31.

HT of 90V is provided by two 45V Berec Batrymax type B104 batteries connected in series or, alternatively, from the mains. HT line of receiver is switched by S10 to either source of supply. In the Battery-Economy position of S10 a dropper resistor R25 is placed in series with HT feed to reduce slightly the current consumption to conserve the life of the HT batteries.

Mains HT is provided by indirectly-heated half-wave rectifier V7. Anode voltage is obtained from the mains direct on 100-120V supplies and through droppers R29 to R31 on 200-250V mains. Choke-capacity smoothing is by L32 C35 C34. R26 is current limiter and C29 prevents modulation hum. HT feed to V1 to V3 is further resistance-capacity smoothed by R18 C33.

Reservoir smoothing capacitor C35 should be rated to handle 150mA ripple current.

Heaters of V6 V7 are series connected with dial lights and thermal surge limiter R28 and fed from the input mains through dropper resistor R27. On 100-120V supplies R27 is shorted out by mains voltage adjusting plug. Dial lights are protected by shunt thermal surge limiter R24.

Dial lights. When the receiver is operated from batteries, provision is made to run dial lights from an entirely separate 4.5V Berec No. 28 battery. In the Dial Light position of tone control switch the series connected 2.5V lamps are switched by S9 through to S7 which connects them across the battery.

LT of 9V for the series-connected filaments of V1 to V5 is provided by two 4.5V Berec No. 28 batteries coupled in series. Battery is decoupled by C32 and filament current is fed through dropper R23 and switched by S8 to positive side of V5 filament. Negative side of battery is switched by S11 in either of its two battery positions, through the on/off switch S12 to chassis. R2 R5 R11 R17 and R22 are current bypass resistors to maintain correct voltage across each valve filament, whilst C30 C31 C4 provide smoothing and decoupling.

On mains operation V5 filament is switched out of circuit by S8 leaving filament of V1 to V4 connected in series with R23 and cathode V6, the total cathode current of which, being 50mA, ensures correct filament voltage.

S12 which is ganged to volume control spindle is on/off switch breaking both LT and HT battery negative leads to chassis when S11 is in either of its battery positions, and breaking HT battery negative lead and mains lead to chassis when S11 is in mains position.

Chassis Removal. Unfasten catch on front of cabinet and pull front flap forward and downward. It will then be free and the back will spring open. Lift back up slightly, this will release bottom retaining studs. Then ease back down, thus releasing two top retaining studs.

Unplug and remove HT and LT batteries. Remove aerial/earth socket panel from side of case (secured by two wood screws) and unsolder from aerial socket the SW telescopic aerial connecting lead. Remove slide-in battery compartment divisions and undo and remove the four screws securing LS baffle to front of case. Shelf with receiver chassis and LS baffle attached is now free to be withdrawn out of back of case. Finally unsolder LS leads from output transformer on chassis. Remove the four chassis-fixing bolts on underside of shelf.

TRIMMING INSTRUCTIONS

Apply signal as stated below	Tune receiver to	Trim in order stated for maximum output
(1) 465k/cs to g3 of V2 via dummy aerial	Set gang fully open	Cores L28, L27, L26 and L25
(2) 600kc/s to g3 of V2 via dummy aerial 2.5pF capacitor	MW Band 600kc/s	Cores L17/18, L9/10
(3) 1.5Mc/s as above	1.5Mc/s	T9, T5 and repeat 2 and 3
(4) 600kc/s to aerial socket	600kc/s	Cores L9/10, L2
(5) 1.5Mc/s as above	1.5Mc/s	T5, T1 and repeat 4 and 5
(6) 3Mc/s to g3 of V2 via dummy aerial and 2.5pF capacitor	SW1 Band 3Mc/s	Cores L19/20 L11/12
(7) 5Mc/s as above	5Mc/s	T10, T6 and repeat 6 and 7
(8) 3Mc/s to earial socket	3Mc/s	Cores L11/12, L3/4
(9) 5Mc/s as above	5Mc/s	T6, T2 and repeat 8 and 9
(10) 6Mc/s to g3 of V2 via dummy aerial and 2.5pF capacitor	SW2 Band 6Mc/s	Cores L21/22, L13/14
(11) 9.5Mc/s as above	9.5Mc/s	T11, T7 and repeat 10 and 11
(12) 6Mc/s to aerial socket	6Mc/s	Cores L13/14, L5/6
(13) 9.5Mc/s as above	9.5Mc/s	T7, T3 and repeat 12 and 13
(14) 11.5Mc/s to g3 of V2 via dummy aerial and 2.5pF capacitor	SW3 Band 11.5Mc/s	Cores L23/24, L15/16
(15) 18Mc/s as above	18Mc/s	T12, T8 and repeat 14 and 15
(16) 11.5Mc/s to aerial socket	11.5Mc/s	Cores L15/16, L7/8
(17) 18Mc/s as above	18Mc/s	T8, T4 and repeat 16 and 17

Model 781B

On this receiver SW1 band is replaced by a LW band covering 1000 to 2000 Metres. Operation 6 and 8 are carried out using 150kc/s and 7 and 9 using 300kc/s.

Notes

When carrying out operations 11, 13, 15 and 17, make quite sure that correct signal, not the image, is peaked when adjusting trimmers. This can easily be checked by tuning Sig/Gen. first to fundamental frequency, then to a higher frequency than fundamental by 930kc/s, and ensuring that the former gives the greater response.

INDUCTORS—*Continued*

L	Ohms
4 ... 1	
5 3	
6, 8, 14-16	Very Low
7 2	
9 ... 1.5	
10 ... 3.5	
11, 13	.25
12 ... .75	
17 ... 2	
18 ... 1	
19 ... .75	
20 ... .25	
21, 23, 24	Very Low
22 2	
25-28 ... 10.5	
29 ... 500 Tapped 150	
30 4	
31 ... 2.75	
32 ... 250	