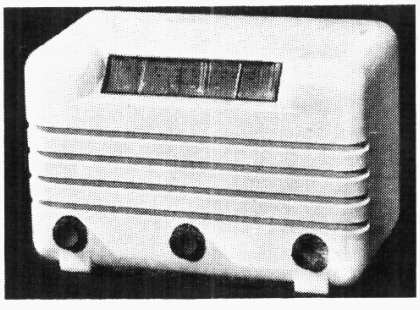
"TRADER" SERVICE SHEET

943

MASTERADIO D120

"Sandown" A.C./D.C. Superhet



DESIGNED to operate from A.C. or D.C. mains of 200-250 V, the Masteradio D120 is a small table superhet employing four valves (plus rectifier) and covering two wavebands. The waveband ranges are 190-550 m and 900-2,000 m. The differences in the export version, D110T, are explained overleaf.

Release date and original price: November 1949, £8 11*s.* 10*d., plus purchase tax.*

CIRCUIT DESCRIPTION

Input from attached aerial, via series capacitor **C1,** to coupling coil **L1** and single-tuned circuit **L2, C23** (M.W.), and direct to tapping on **L3** of single-tuned circuit **L3, C23** (L.W.) which precede a triode - hexode valve **(V1, Brimar 12K8GT),** a frequency changer with internal coupling.

Oscillator grid coils **L4** (M.W.) and **L5** (L.W.) are tuned by **C24.** Parallel trimming by **C25** (M.W.) and **C8, C26** (L.W.); series tracking by **C9** (M.W.) and **C10** (L.W.). Inductive reaction coupling by oscillator anode coils **L6** (M.W.) and **L7** (L.W.).

Second valve **(V2, Brimar 12K7GT)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C4, L8, C5, L9** and **C11, L10, L11, C12.**

Intermediate frequency 465 kc/s.

Diode second detector is part of double diode triode valve **(V3, Brimar 12Q7GT)** whose diode sections are strapped in parallel. Audio-frequency component in rectified output is developed across manual volume control **R5,** which is the diode load, and passed via A.F. coupling capacitor **C15** and C.G. resistor **R6** to grid of triode section which acts as A.F. amplifier. I.F. filtering by **C13, R4** and **C14** in diode circuit.

The D.C. potential developed across **R5** is tapped off and fed back via a decoupling circuit as G.B. to F.C. and I.F. valves giving automatic gain control.

Resistance-capicitance coupling by **R7, C16** and **R8,** between **V3** triode and beam tetrode output valve **(V4, Brimar 35L6GT).** Fixed tone correction by **C17** in tetrode anode circuit.

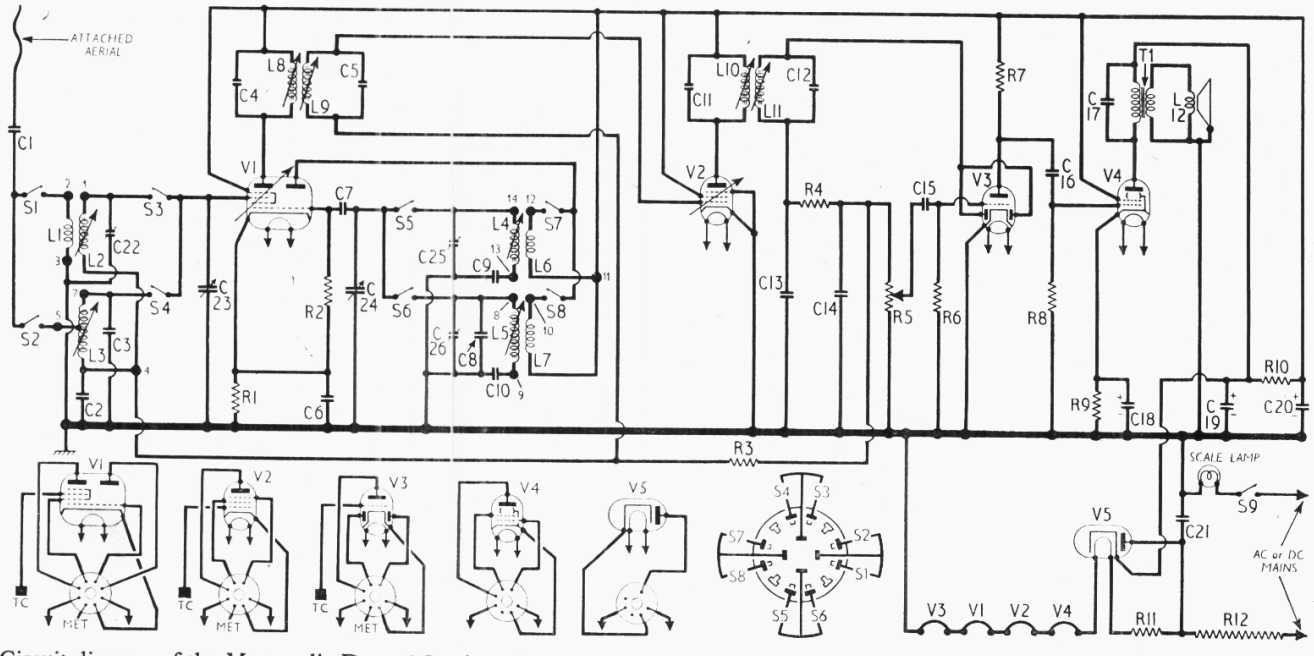
When the receiver is operated from A.C. mains, H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Brimar 35Z4GT)** which, with D.C. mains, behaves as a low resistance.

COMPONENTS AND VALUES

	RESISTORS	Values (ohms)	Locations
R1	V1 fixed G.B. ...	180Ω	F4
R2	V1 osc. C.G. ...	47kΩ	F3
R3	A.G.C. decoupling	1MΩ	E4
R4	I.F. stopper ...	47kΩ	E4
R5	Volume control ...	500kΩ	C3
R6	V3 triode C.G. ...	4.7MΩ	D4
R7	Triode anode load	100kΩ	D4
R8	V4 C.G.	220kΩ	D4
R9	V4 G.B.	180Ω	C4
R10	H.T. smoothing ...	1kΩ	C4
R11	Heater ballast ...	200Ω	C4
R12	Line cord resistor...	400Ω	C4

	CAPACITORS	Values	Locations
C1	Aerial series ...	100pF	F3
C2	A.G.C. decoupling...	0·05μF	F4
C3	L.W. fixed trim. ...	100pF	F4
C4	1st I.F. trans. tuning	82pF	A2
C5	1st I.F. trans. tuning	82pF	A2
C6	V1 cath. by-pass ...	0·05μF	F4
C7	V1 osc. C.G. ...	100pF	F3
C8	L.W. osc. fixed trim.	56pF	E3
C9	M.W. tracker ...	600pF	E3
C10	L.W. tracker ...	150pF	E3
C11	2nd I.F. trans. tuning	82pF	A2
C12	2nd I.F. trans. tuning	82pF	A2
C13	I.F. by-pass capacitors	100pF	D4
C14	I.F. by-pass capacitors	100pF	E4
C15	A.F. coupling capacitors	0·05μF	D3
C16	A.F. coupling capacitors ...	0·05μF	D4
C17	Tone corrector ...	0·01μF	C4
C18*	V4 cath. by-pass ...	25μF	C3
C19*	H.T. smoothing capacitors	30μF	B1
C20*	H.T. smoothing capacitors ...	30μF	B1
C21	R.F. by-pass ...	0·05μF	C4
C22‡	Aerial M.W. trim.	60pF	F4
C23†	Aerial tuning ...	420pF**	A2
C24†	Oscillator tuning ...	420pF**	A1
C25‡	Osc. M.W. trim. ...	60pF	E3
C26‡	Osc. L.W. trim. ...	60pF	E3

* Electrolytic. † Variable. ‡ Pre-set.
** "Swing" value, min. to max.



Circuit diagram of the Masteradio D120 "Sandown" superhet. The differences in the export version D110T are explained overleaf.

	OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Coupling coil ...		2·0	F3
L2	Aerial tuning coils		3·0	F3
L3			16·5	F3
L4	Oscillator tuning coils		2·0	E3
L5			7·0	E3
L6	Oscillator coupling coils		0·7	E3
L7			1·5	E3
L8	1st I.F. trans.	Pri.	16·5	A2
L9		Sec.	16·5	A2
L10	2nd I.F. trans.	Pri.	16·5	A2
L11		Sec.	16·5	A2
L12	Speech coil ...		3·0	B1
T1	Output trans.	Pri.	215·0	B1
		Sec.	0·4	
S1-S8	Waveband switches		—	F3
S9	Mains switch, ganged R5		—	C3

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (recessed grub screws); remove the four self-tapping screws (with washers) holding the chassis to the base of the cabinet.

The chassis and speaker may now be withdrawn as a single unit.

When Replacing, do not omit to cover the heads of the chassis retaining screws on the underside of the cabinet with insulating plaster.

GENERAL NOTES

Switches.—**S1-S8** are the waveband switches, ganged in a single rotary unit beneath the chassis. The unit is indicated in our underchassis view by an arrow, which shows the direction in which it is viewed in the diagram, inset beneath the circuit diagram overleaf, where it is shown in detail. **S1, S3, S5** and **S7** close on M.W., and **S2, S4, S6** and **S8** close on L.W.

S9 is the Q.M.B. mains switch ganged with the volume control **R5.**

Coils.—All the R.F. and oscillator coils are mounted beneath the chassis, in two compact units with their core adjustment rods projecting downwards. Their connecting tags are numbered **1** to **14** in the circuit diagram and in our underchassis view.

The I.F. transformers **L8, L9** and **L10, L11** are in two screened units on the chassis deck, their adjustments projecting from either end.

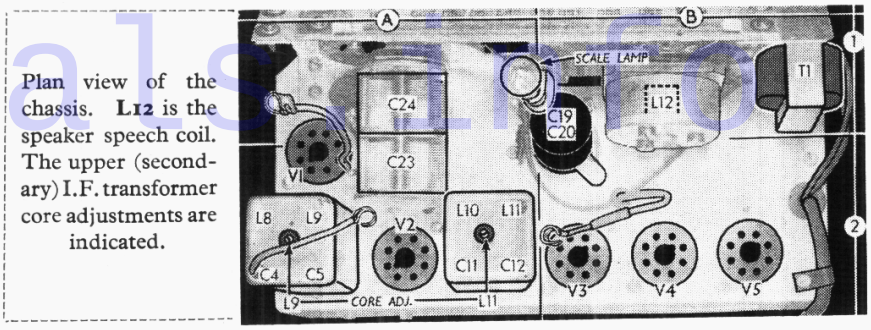
Scale Lamp.—This is a large clear spherical M.E.S. type, rated at 6.5 V, 0.3 A.

Drive Cord Replacement.—Four feet of cord is ample for replacement, and it follows a simple course which can be seen in the sketch (col. 2) where it is drawn as seen from the front (neglecting obstructions) when the gang is at maximum. The cord makes 3½ turns round the control spindle, and both ends of it are tied to the tension spring.

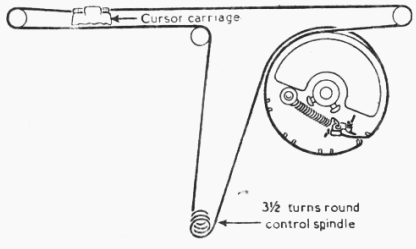
The cursor carriage is clamped on to the correct point on the cord as the final operation, and should be sealed with a little cement. It should be carefully noted that if the scale and its backing plate are removed the drive system will collapse.

Line Cord.—This consists of the normal twin wire and resistance element (in this case 400 Ω). The red lead, however, is left idle, although its chassis end is anchored to pin 6 of **V5** valveholder.

Chassis Divergencies.—**C16** and **C21,** which were each 0.05 μF in our chassis, may be 0.01 μF, while **C3** may be omitted in some chassis. Also, **R3** may be connected to the opposite side of **R4** to that shown in our diagram, at the junction of **R4** with **C13.**



Plan view of the chassis. **L12** is the speaker speech coil. The upper (secondary) I.F. transformer core adjustments are indicated.



The drive cord system, as seen from the front with the gang at maximum.

Export Model D110T.—The export version of the D120 is in general just like the basic model, but its wavebands are M.W. and S.W. instead of M.W. and L.W. The S.W. range is 16-52 m. It is also fitted with a voltage adjustment plug for 100 V mains, and the scale lamp is shunted by a bi-metal thermal delay switch.

When the adjustment plug is set for low-voltage mains, the line cord resistor **R12** is short-circuited. This is achieved by employing the third conductor in the mains lead, which in the D120 is unused.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from 220 V A.C. mains. The receiver was tuned to the lowest wavelength on the M.W. band, and the volume control was at maximum, but there was no signal input.

Except for cathode readings, all voltages were measured on the 400 V scale of a model 7 Avometer, chassis being the negative connection.

Valve	Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1 12K8GT	89	1·5	89	3·8	1·5
	Oscillator				
	89	2·5			
V2 12K7GT	89	8·7	89	2·7	—
V3 12Q7GT	44	0·35	—	—	—
V4 35L6GT	103	28·0	89	1·7	5·6
V5 35Z4GT	132†	—	—	—	107·0

† A.C.

CIRCUIT ALIGNMENT

I.F. Stages.—Connect signal generator, with an 0.1 μF capacitor in each lead, to control grid (top cap) of **V1** and chassis, leaving existing connector in position, switch set to M.W., and turn volume control to maximum and gang to minimum capacitance. Feed in a 465 kc/s (645.16 m) signal and adjust the cores of **L11, L10, L9** and **L8** (location reference A2) for maximum output. Repeat these adjustments.

R.F. and Oscillator Stages.—Instead of the normal practice of adjusting the oscillator and then the R.F. circuits of each band in turn, the manufacturers recommend that the oscillator adjustments for both bands should be carried out first, and then all the aerial circuit adjustments, as described below.

Oscillator Stages.—With the gang at maximum capacitance, the left-hand edge of the cursor should coincide with the final stroke of the "W" in L.W. and M.W. printed on the scale. It may be adjusted in position if the drum boss screws are slackened. Leave the signal generator leads connected as previously described.

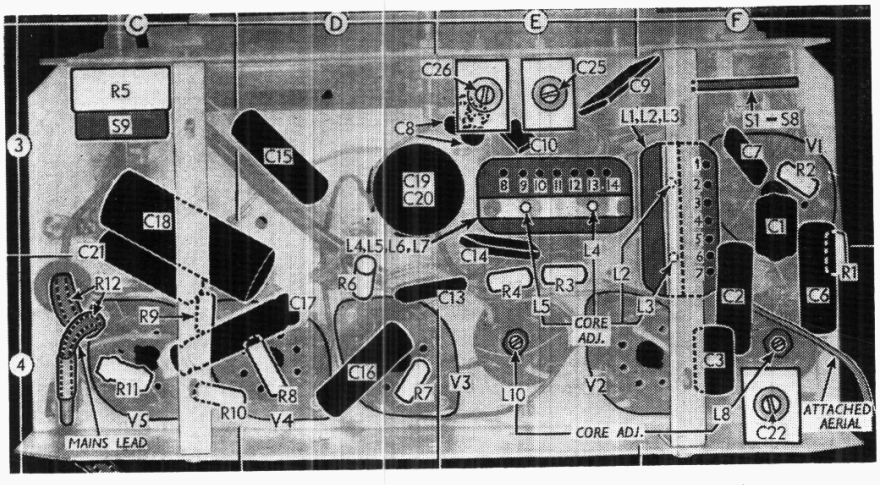
M.W.—With the set still switched to M.W., tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and adjust the core of **L4** (E3) for maximum output. Tune to 230 m on scale, feed in a 230 m (1,300 kc/s) signal, and adjust **C25** (E3) for maximum output. Repeat these adjustments until correct calibration is obtained.

L.W.—Switch set to L.W., tune to 1,396 m (just off 1,400 m) on scale, feed in a 1,396 m 215 kc/s) signal, and screw up **C26** (E3) to maximum capacitance then unscrew by one half turn, and adjust the core of **L5** (E3) for maximum output.

R.F. Stages.—Transfer "live" signal generator lead to receiver end of attached aerial, replacing the 0.1 μF isolating capacitor by one of 50 pf (0.00005 μF).

M.W.—Switch set to M.W., tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and adjust the core of **L2** (F3) for maximum output. Tune to 230 m on scale, feed in a 230 m (1,300 kc/s) signal, and adjust **C22** (F4) for maximum output. Repeat these adjustments until no improvement results.

L.W.—Switch set to L.W., tune to 1,396 m on scale. feed in a 1,396 m (215 kc/s) signal, and adjust the core of **L3** (F4) for maximum output.



Under-chassis view, in which all the R.F. and oscillator alignment adjustments are indicated. The coil unit connections are coded to agree with those in the circuit diagram.

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