

"TRADER" SERVICE SHEET
1010

MASTERADIO D120 STAR

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

THE Masteradio D120 "Sandown Star" is a 4-valve (plus rectifier) 2-band superhet designed to operate from A.C. or D.C. mains of 200-250 V. It is fitted with a frame aerial, but provision is made for the connection of an external aerial. Waveband ranges are 190-550 m and 900-2,000 m.

This model can be distinguished from its predecessor of the same model number (covered in *Service Sheet 943*) by the imprint of a 6-point white star on the back cover and the use of a different complement of valves. An export model, D120T Star, employs a modified D120 chassis, the differences being described overleaf.

Release date and original price: July 1951, £10 7s 6d, plus purchase tax.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1**, **C23** (M.W.) or with loading **L2** (L.W.) to first valve (**V1**, **Brimar 12BE6**), a heptode operating as frequency-changer with electron coupling. For reception in areas of weaker signal strength a short flexible lead is provided which can be attached to an installed aerial or a "throw-out" lead.

Oscillator grid coils, **L3** (M.W.) and **L4** (L.W.), are tuned by **C24**. Parallel trimming by **C25** (M.W.) and **C6**, **C26** (L.W.); series tracking by **C7** (M.W.) and **C8** (L.W.). Inductive reaction coupling by cathode coils **L5** (M.W.) and **L6** (L.W.). Stabilization by **R3** and **R4**.

Second valve (**V2**, **Brimar 12BA6**) is a variable- μ R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C3**, **L7**, **L8**, **C4** and **C11**, **L9**, **L10**, **C12**.

Intermediate frequency 465 kc/s.

Diode signal detector is part of double diode triode (**V3**, **Brimar 12AT6**). Audio-frequency component in rectified output is

developed across volume control **R9**, which acts as diode load, and passed via A.F. coupling capacitor **C15** to grid of triode section. I.F. filtering by **C13**, **R7** and **C14** in diode circuit.

D.C. potential developed across **R9** is fed back via decoupling resistor **R8** as bias to F.C. and I.F. stages, giving automatic gain control. The A.G.C. line is connected to the second diode which prevents it from acquiring a positive potential.

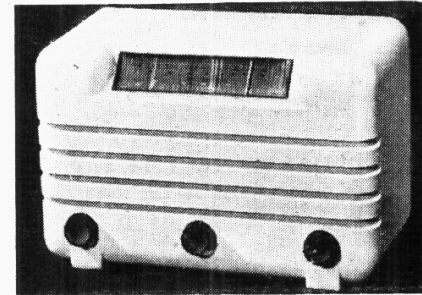
Resistance-capacitance coupling by **R11**, **C16** and **R12** between **V3** triode and beam pentode output valve (**V4**, **Brimar 35L6GT**).

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, on D.C. mains, behaves as a low resistance. Thermistor **R14** protects the scale lamp and valve heaters from current surges when switching on. Valve heaters, together with thermistor **R14**, ballast resistor **R15**, **R16** and scale lamp, are connected in series across the mains input. R.F. filtering by **C19**.

COMPONENTS AND VALUES

RESISTORS		Values	Locations
R1	V1 C.G. stopper ...	68 Ω	G3
R2	V1 osc. C.G. ...	22k Ω	G3
R3	M.W. osc. shunt ...	430 Ω	G3
R4	L.W. osc. shunt ...	1.5k Ω	G3
R5	A.G.C. decoupling ...	100k Ω	G4
R6	V2 G.B. ...	180 Ω	F4
R7	I.F. stopper ...	47k Ω	F4
R8	A.G.C. decoupling ...	1M Ω	E4
R9	Volume control ...	500k Ω	D3
R10	V3 C.G. ...	4.7k Ω	E4
R11	V3 anode load ...	100k Ω	E4
R12	V4 C.G. ...	220k Ω	E4
R13	V4 G.B. ...	180 Ω	D4
R14	Brimistor type CZ2 ...	—	D4
R15	Heater ballast ...	200 Ω	D4
R16		** 400 Ω	C2
R17	H.T. smoothing ...	1k Ω	E3

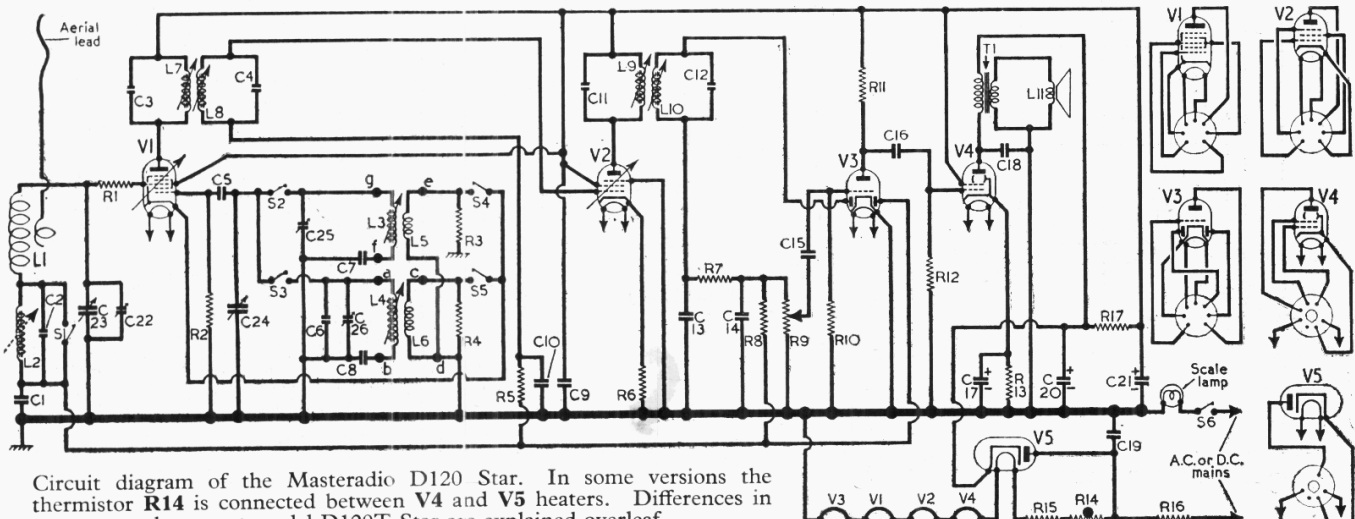
** Line cord.



The appearance of the Masteradio D120 "Sandown Star." Some cabinets have the maker's name written as a motif just beneath the scale panel.

CAPACITORS		Values	Locations
C1	A.G.C. decoupling ...	0.1 μ F	F4
C2	L.W. aerial shunt ...	40pF	G3
C3	1st I.F. trans. tuning ...	82pF	A2
C4		82pF	A2
C5	V1 osc. C.G. ...	100pF	G3
C6	L.W. osc. shunt ...	56pF	F3
C7	M.W. tracker ...	600pF	F3
C8	L.W. tracker ...	150pF	F3
C9	R.F. by-pass ...	0.01 μ F	G4
C10	A.G.C. decoupling ...	0.1 μ F	G4
C11	2nd I.F. trans. tuning ...	82pF	B2
C12		82pF	B2
C13	I.F. by-passes ...	100pF	F4
C14		100pF	F4
C15	A.F. coupling ...	0.01 μ F	E4
C16	A.F. coupling ...	0.01 μ F	E4
C17*	V4 G.B. ...	50 μ F	D4
C18§	Tone corrector ...	0.02 μ F	E4
C19	R.F. filter ...	0.01 μ F	D4
C20*	H.T. smoothing ...	40 μ F	B1
C21*		40 μ F	B1
C22†	M.W. aerial trim. ...	—	A1
C23†	Aerial tuning ...	—	A1
C24†	Oscillator tuning ...	—	A2
C25†	M.W. osc. trimmer ...	—	F3
C26†	L.W. osc. trimmer ...	—	F3

* Electrolytic. † Variable. ‡ Pre-set. § Two capacitors, 0.01 + 0.01 μ F, in parallel.



Circuit diagram of the Masteradio D120 Star. In some versions the thermistor **R14** is connected between **V4** and **V5** heaters. Differences in the export model D120T Star are explained overleaf.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Frame aerial ...	1-3	A1
L2	L. W. loading coil ...	39-0	A1
L3	Osc. tun. coils ...	1-7	F3
L4		6-5	F3
L5	Osc. reaction coils ...	1-0	F3
L6		1-5	F3
L7	1st I.F. trans. {Pri. ...	12-0	A2
L8		12-0	A2
L9	2nd I.F. trans. {Pri. ...	12-0	B2
L10		12-0	B2
L11	Speech coil ...	3-0	C1
T1	{Primary ...	150-0	C1
	{Secondary ...		
S1-S5	Waveband switches ...	—	G3
S6	Mains sw., g'd R9 ...	—	D3

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.

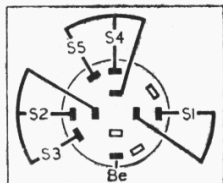


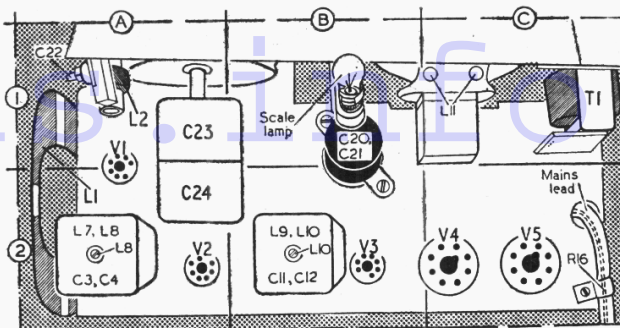
Diagram of the waveband switch unit as seen from the rear of an inverted chassis.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from A.C. mains of 230 V. The set was tuned to the highest wavelength end of M.W. with the volume control at maximum, but there was no signal input. Voltage readings were measured with an Avo Electronic TestMeter and as this instrument draws no appreciable current, allowances must be made for the current drawn by other meters. Chassis was the negative connection.

Valves	Anode		Screen		Cath.
	V	mA	V	mA	
V1 12BE6	110	1-4	110	10-0	—
V2 12BA6	110	5-0	110	1-6	1-4
V3 12AT6	60	0-45	—	—	—
V4 35L6 GT	125	32-0	110	2-4	7-0
V5 35Z4 GT	115†	—	—	—	130-0

† A.C. volts.



Plan view of the chassis. The frame aerial winding L1 is seen on the left.

GENERAL NOTES

Switches.—S1-S5 are the waveband switches, ganged in a two-position rotary unit beneath the chassis. The unit is indicated in our underside view of the chassis, and shown in detail in the diagram in col. 1, where it is viewed from the rear of an inverted chassis. S1, S2 and S4 close for M.W. operation (control knob anti-clockwise); for L.W. operation S3 and S5 close.

Scale Lamp.—This is an Osram lamp, with a large clear spherical bulb and an M.E.S. base, rated at 6.2 V, 0.3 A.

Drive Cord Replacement.—The tuning drive cord requires about four feet of high-grade flax fishing line, plaited and waxed, which should be run as shown in our sketch in col. 3, where the system is drawn as seen from the front (neglecting obstructions) when the gang is at maximum capacitance.

In case the drum groove should be so adjusted that it gets out of line with the extreme right-hand pulley in our sketch, a piece of springy piano wire with a loop at the end is used to guide the cord into the groove. The wire is fixed to the front end-plate of the gang, and its loop stands just above the drum in line with the groove. It is not shown in our sketch.

When running the cord, it should be fed through this loop as it passes from the right-hand pulley to the drum. A length of sleeving, about 3/16 in long, should be threaded on to the cord also. It is then used as a liner inside the cord grip on the cursor, and should be sealed with some kind of cement when finally adjusted.

Chassis Divergencies.—R3, which in our sample chassis was 480 Ω, may in other cases vary between 330 Ω and 470 Ω. R2 may be 25 kΩ, and R1 may be 56 Ω or 68 Ω. R14 may be connected between V5 and V4 heaters.

Line Cord.—This consists of two flexible stranded conductors and a resistance element (400 Ω in this case) making the normal 3-way line cord. The red lead, however, is not used. At the plug end it goes to the same pin as the resistance lead, where it helps to ensure good contact. At the receiver end it is anchored to pin 6 of V5 holder, which is otherwise a blank pin.

Export Model D120T Star.—This version of the D120 Star is in general like the basic model, but its wavebands are M.W. and S.W. instead

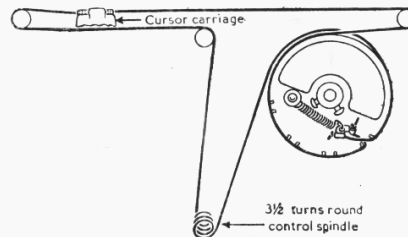
of M.W. and L.W. The S.W. range is 16-52 m. It is also fitted with a voltage adjustment plug for 100 V mains.

When the adjustment plug is set for low-voltage mains, the line cord resistor R16 is short-circuited. This is achieved by employing the third (red) conductor in the mains lead, which in the Home model is unused.

CIRCUIT ALIGNMENT

I.F. Stages.—Withdraw chassis and connect the output of the signal generator, via a 0.1 μF capacitor in the "live" lead, to control grid (pin 7) of V1 and chassis. Switch set to M.W., turn gang to minimum, feed in a 465 kc/s (645.16 m) signal and adjust the cores of L10 (location reference B2), L9 (F4), L8 (A2) and L7 (G4) 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



Sketch of the drive cord system, drawn as seen from the front of the chassis when the gang is at maximum capacitance.

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.

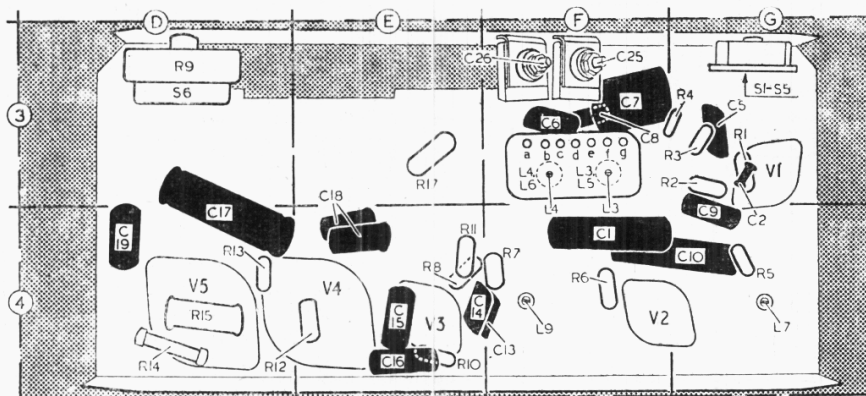
M.W.—With the set switched to M.W. tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and adjust the core of L3 (F3) for maximum output. Tune to 230 m on scale, feed in a 230 m (1,300 kc/s) signal and adjust C25 (F3) for maximum output. Repeat these adjustments until correct calibration is obtained.

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 (F3) to maximum capacitance then unscrew by one half turn, and adjust the core of L4 (F3) for maximum output.

R.F. Stages.—Transfer "live" signal generator lead to free end of attached aerial lead.

M.W.—Switch set to M.W., tune to 230 m on scale, feed in a 230 m (1,300 kc/s) signal and adjust C22 (A1) for maximum output.

L.W.—No aerial circuit L.W. adjustments are prescribed, L2 having been adjusted permanently at the works. If adjustment is necessary, however, its core should be set for peak output on the L.W. "Light" programme.



Underside view of the chassis. The tags of the coil unit L3-L6 are identified.