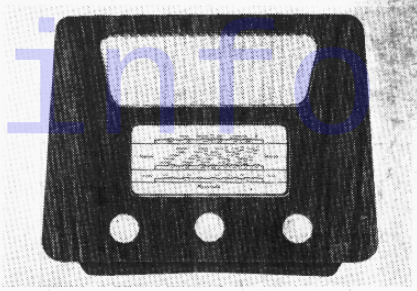
"TRADER" SERVICE SHEET

1121

MASTERADIO

D153 "Chepstow"



Appearance of the Masteradio D153.

EMPLOYING a small "baffle" type cabinet, the Masteradio D153 "Chepstow" is a 4-valve (plus rectifier) 3-band transportable superhet, designed to operate from A.C. or D.C. mains of 100-110V and 200-240V, 50 c/s in the case of A.C. The chassis-mounted frame aerial is used for M.W. and L.W. reception only, an external aerial and earth being necessary for S.W. operation. The waveband ranges are 16-50m, 200-550m and 1,000-2,000m.

Release date and original price: September 1953, £12 13s 7d. Purchase tax extra.

COMPONENTS AND VALUES

	RESISTORS	Values	Locations
R1	V1 G.B.	180Ω	G3
R2	V1 osc. C.G. ...	47kΩ	G3
R3	V1 osc. anode feed	22kΩ	G4
R4	V2 G.B.	180Ω	F4
R5	I.F. stopper ...	47kΩ	F4
R6	A.G.C. decoupling	1MΩ	G4
R7	Volume control ...	500kΩ	D3
R8	V3 C.G.	4·7MΩ	E4
R9	V3 anode load ...	100kΩ	F4
R10	V4 C.G.	220kΩ	E4
R11	V4 G.B.	180Ω	D4
R12	H.T. smoothing ...	1kΩ	E3
R13	Surge limiter ...	15Ω	E4
R14	Thermistor CZ2A	—	D4
R15*	Ballast resistor ...	535Ω	C2

* Tapped at 85Ω + 300Ω + 150 Ω from R14.

	CAPACITORS	Values	Locations
C1	Chassis isolator ...	0·01μF	G4
C2	Aerial series ...	0·001μF	G3
C3	L.W. aerial trim....	100pF	G3
C4	A.G.C. decoupling	0·1μF	G4
C5	1st I.F. trans tuning	82pF	A2
C6		82pF	A2
C7	V1 osc. C.G. ...	56pF	G3
C8	M.W. osc. tracker	600pF	F3
C9	L.W. osc. tracker	150pF	F3
C10	L.W. osc. trimmer	100pF	F3
C11	Osc. anode coup. ...	50pF	G3
C12	2nd I.F. trans.	82pF	B2
C13	tuning ...	82pF	B2
C14	I.F. by-passes ...	100pF	F4
C15		100pF	F4
C16	A.F. couplings ...	0·01μF	E4
C17		0·01μF	E4
C18	Tone corrector ...	0·02μF	E4
C19*	H.T. smoothing ...	30μF	B1
C20*		30μF	B1
C21	Mains R.F. filter...	0·01μF	E3
C22‡	S.W. aerial trim. ...	70pF	G3
C23‡	M.W. aerial trim.	70pF	A1
C24†	Aerial tuning ...	—	A2
C25‡	S.W. osc. trim. ...	70pF	G3
C26‡	M.W. osc. trim. ...	70pF	F3
C27‡	L.W. osc. trim. ...	70pF	F3
C28†	Oscillator tuning...	—	A1

*Electrolytic. †Variable. ‡Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	Aerial coupling coils	—	G3
L2		—	A2
L3	S.W. tuning coil...	—	G3
L4	Frame aerial ...	1·0	A1
L5	L.W. loading coil	18·0	G4
L6	Oscillator reaction coils	—	F3
L7		—	F3

(*Continued col. 3*)

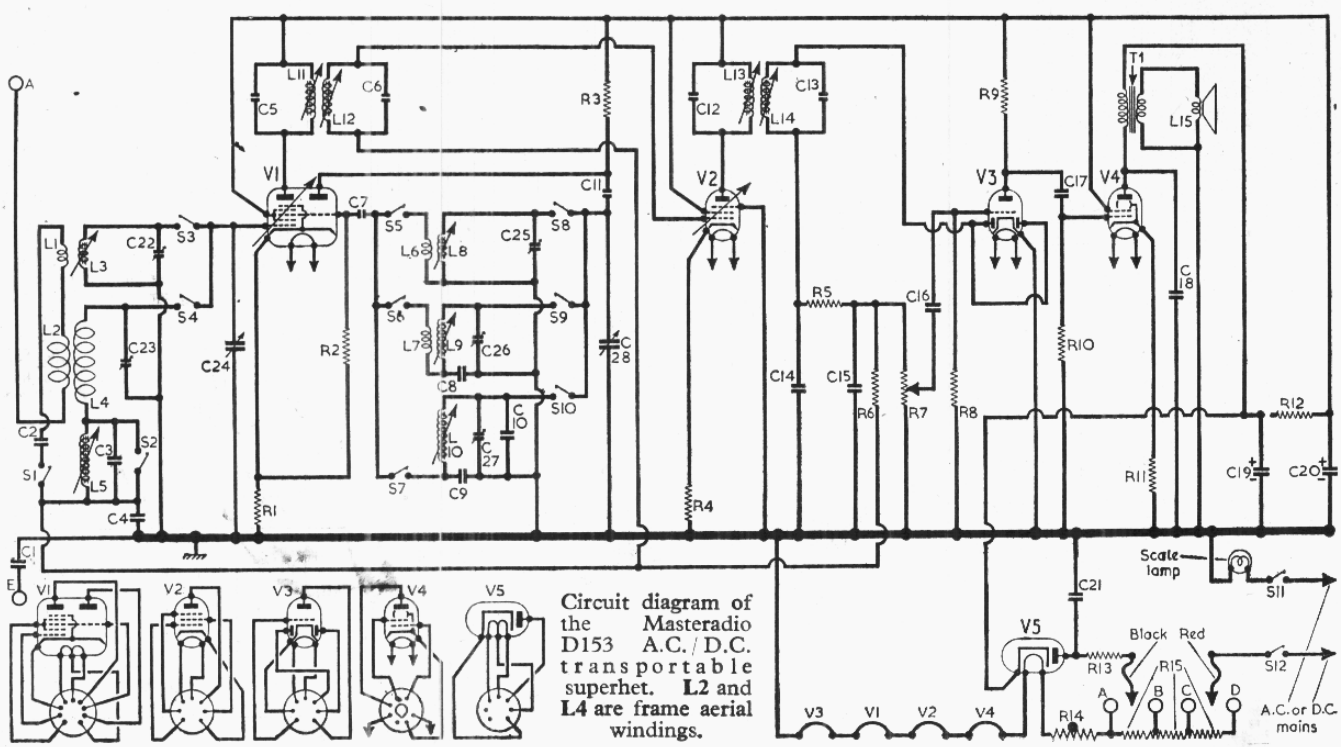
	OTHER COMPONENTS (*Continued*)	Approx. Values (ohms)	Locations
L8	Oscillator tuning coils	—	F3
L9		2·0	F3
L10		8·0	F3
L11	1st I.F. trans.	Pri. 13·0	A2
L12		Sec. 13·0	A2
L13	2nd I.F. trans	Pri. 13·0	B2
L14		Sec. 13·0	B2
L15	Speech coil ...	2·2	—
T1	O.P. trans.	Pri. 120·0	—
		Sec. —	—
S1-S10	Waveband switches	—	G3
S11, S12	Mains sw., g'd R7...	—	D3

CIRCUIT DESCRIPTION

Tuned frame aerial input on M.W. by **L4, C24** and on L.W. by **L4,** loading coil **L5,** and **C24.** For S.W. reception an external aerial is necessary and is coupled via **L2, L1, C2** and **S1** to single-tuned circuit **L3, C24.** An external aerial may also be used on M.W. and L.W., when it is capacitance-coupled to the tuned circuits by frame aerial coupling coil **L2,** switch **S1** being open.

First valve **(V1, Brimar 12AH8)** is a triode heptode valve operating as frequency changer with internal coupling. Oscillator anode coils **L8** (S.W.), **L9** (M.W.) and **L10** (L.W.) are tuned by **C28.** Parallel trimming by **C25** (S.W.), **C26** (M.W.) and **C10, C27** (L.W.); series tracking by **C8** (M.W.) and **C9** (L.W.). Reaction

(*Continued col. 1 overleaf*)



Circuit diagram of the Masteradio D153 A.C./D.C. transportable superhet. **L2** and **L4** are frame aerial windings.

Circuit Description—*continued.*

coupling from grid circuit by **L6** (S.W.), **L7** (M.W.) and the common impedance of tracker **C9** (L.W.). Additional coupling on M.W. across tracker **C8**.

Second valve **(V2, Brimar 12BA6)** is a variable-mu R.F. pentode operating as frequency changer with tuned transformer couplings **C5, L11, L12, C6** and **C12, L13, L14, C13.**

Intermediate frequency 470 kc/s.

Diode signal detector is part of double diode triode valve **(V3, Brimar 12AT6),** the two diodes being connected as one. Audio frequency component in rectified output is developed across volume control **R7,** which acts as diode load, and is passed via **C16** to the triode section. I.F. filtering by **C14, R5** and **C15.**

D.C. potential developed across **R7** is fed back as bias to **V1** and **V2,** giving automatic gain control.

Resistance-capacitance coupling by **R9, C17** and **R10** between **V3** and pentode output valve **(V4, Brimar 35L6GT).** Tone correction in the anode circuit by **C18** and in the cathode circuit by the negative feed-back voltage developed across **R11.**

H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Brimar 35W4).** Smoothing by **R12** and electrolytic capacitors **C19, C20.** Valve heaters, together with **R14 (Brimistor CZ2A),** ballast resistor **R15** and the scale lamp, are connected in series across the mains input.

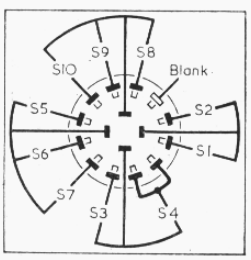


Diagram of the waveband switches as seen from the rear of an inverted chassis.

Switch	S.W.	M.W.	L.W.
S1	C	—	—
S2	—	C	—
S3	C	—	—
S4	—	C	C
S5	C	—	—
S6	—	C	—
S7	—	—	C
S8	C	—	—
S9	—	C	—
S10	—	—	C

GENERAL NOTES

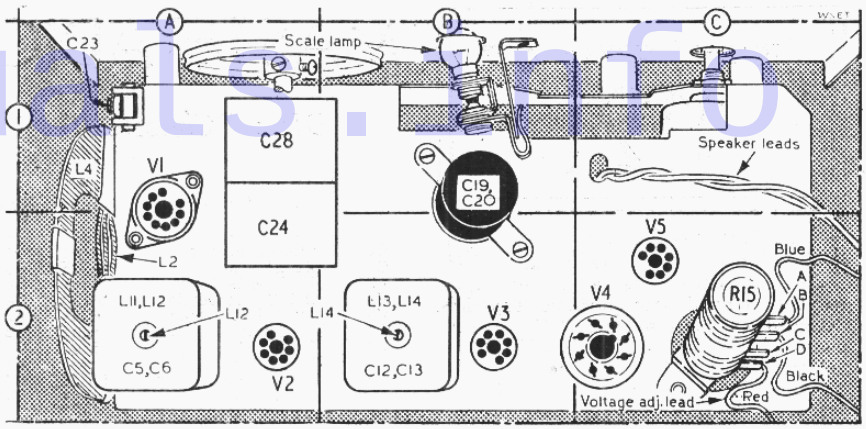
Switches.—**S1-S10** are the waveband switches, ganged in a single 3-position rotary unit beneath the chassis. This unit is indicated in our under chassis illustration and shown in detail in the diagram (seen above), where it is drawn as seen from the rear of an inverted chassis. The associated switch table (also above) shows the switch operations for the three control settings, starting with the control knob fully anti-clockwise. A dash indicates open, and **C** closed.

Voltage Adjustment.—For 220-240 V mains supply, the red voltage adjustment lead, indicated in the plan view of the chassis and in the circuit diagram overleaf, is connected to the bottom tag "D" of ballast resistor **R15,** and the black lead is connected to tag "B." For 200-220 V mains supply, the red lead is connected to tag "C" and the black lead to tag "B," and for 100-110 V mains supply both leads are connected to tag "A."

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

C19, C20.—These were both 30 μF capacitors in our receiver, but they may be 40 μF each.

Drive Cord Replacement.—About 33 inches of high-grade flax fishing line is required for a new drive cord, which should be run as shown in the sketch below. This sketch is drawn as seen from the rear of the chassis with the gang at maximum capacitance.



Plan view of chassis, showing the tappings and leads on the heater ballast resistor **R15.**

CIRCUIT ALIGNMENT

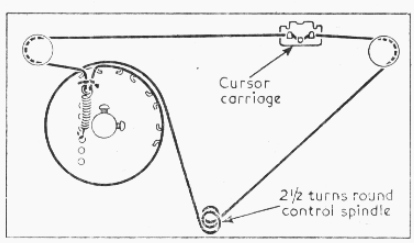
I.F. Stages.—Switch receiver to M.W. and tune to a point at the highest wavelength end of the band where there is no signal pick-up. Connect output of signal generator, via an 0.01 μF capacitor in each lead, to control grid (pin 1) of **V2** and chassis. Feed in a 470 kc/s (638.3m) signal and adjust the cores of **L14** (location reference B2) and **L13** (F4) for maximum output. Repeat these adjustments. Transfer signal generator "live" lead to control grid (pin 2) of **V1.** Feeding in a 470 kc/s signal, adjust the cores of **L12** (A2) and **L11** (G4) for maximum output.

R.F. and Oscillator Stages.—With the gang at minimum capacitance check that the cursor coincides with the lowest wavelength ends of the tuning scales.

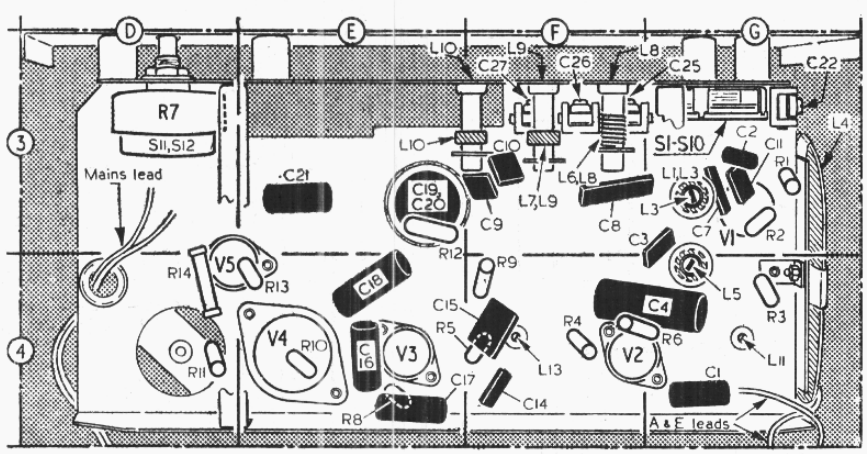
L.W.—Switch receiver to L.W. and tune to 2,000 m. Disconnect the A.G.C. lead joining **L12** to the L.W. loading coil **L5,** and connect the signal generator output, using a low-impedance (2-3 Ω) termination, to the junction of **L5, S1** and to chassis. Feed in a 2,000 m (150 kc/s) signal and adjust the core of **L10** (F3) for maximum output. Tune receiver to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust **C27** (F3) for maximum output. Tune receiver to 1,400 m, feed in a 1,400 m (214.3 kc/s) signal and adjust the core of **L5** (G4) for maximum output.

M.W.—Switch receiver to M.W. and tune to 500 m. With the signal generator connected as for L.W. alignment, feed in a 500 m (600 kc/s) signal and adjust the core of **L9** (F3) for maximum output. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C26** (F3) for maximum output. Tune receiver to 230 m, feed in a 230 m (1,304 kc/s) signal and adjust **C23** (A1) for maximum output. Repeat these adjustments until no improvement results.

S.W.—Switch receiver to S.W. and tune to 50 m. Reconnect A.G.C. lead, and connect output of signal generator, via a dummy aerial, to **A** and **E** clips. Feed in a 50 m (60 Mc/s) signal and adjust the core of **L8** (F3) for maximum output. Tune receiver to 16 m, feed in a 16 m (18.75 Mc/s) signal and adjust **C25** (G3) for maximum output. Tune receiver to 42 m, feed in a 42 m (7.143 kc/s) signal and adjust the core of **L3** (G3) for maximum output. Tune receiver to 16 m, feed in a 16 m (18.75 Mc/s) signal input.



Above: Sketch of the drive cord system.
Below: Underside view of the 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 235 V, the voltage adjustment being set to the 220/240 V tapping. The receiver was tuned to the high wavelength end of M.W., with no signal output.

Voltages were measured with an Avo Electronic Testmeter, and as this instrument has a high internal resistance, allowance should be made for the current drawn by other types of meter. Chassis was the negative connection.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 12AH8	96	2·6	96	4·5	2·0
	Oscillator				
	46	2·0			
V2 12BA6	96	4·9	96	3·6	1·5
V3 12AT6	65	0·36	—	—	—
V4 35L6GT	112	30·0	96	2·0	6·0
V5 35W4	145*	—	—	—	116·0†

*A.C. reading. †Cathode current, 49 mA.

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