"TRADER" SERVICE SHEET

981

VIDOR 396

A.C. Mains/Battery Portable

DESIGNED to operate from self-contained dry batteries or from A.C. mains of 200-250 V, 40-100 c/s (but not from D.C. mains) the Vidor CN396 is a suitcase-type portable 2-band superhet employing four all-dry battery valves and a mains rectifier. A warning device causes the speaker to howl if the lid is closed while the set is switched on.

The CN396A is almost identical with the CN396, but the method of fixing the chassis in the case is a little different. The waveband ranges in both models are 186-550 m and 1,100-1,870 m.

Release date and original price: November, 1949; £12 19s 4d, increased February, 1951, to £13 16s 7d. Purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, C29** (L.W.) precedes a heptode valve **(V1, Mullard DK91)** which operates as frequency changer with internal coupling. For M.W. operation frame aerial **L2** is connected in parallel with **L1.**

Oscillator grid coil **L3** (M.W.) is tuned by **C30.** For L.W. operation **C10** is shunted across **L3.** Parallel trimming by **C31** (M.W.); series tracking by **C9.** Inductive reaction coupling on M.W. and L.W. by **L4.**

Second valve **(V2, Mullard DF91)** is an R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C5, L5, L6, C6** and **C14, L7, L8, C15.**

Intermediate frequency 456 kc/s.

Diode signal detector is part of diode pentode valve **(V3, Mullard DAF91).** A.F. component in rectified output is developed across manual volume control **R9** and passed via A.F. coupling capacitor **C18** to control grid of pentode section which operates as A.F. amplifier. I.F. filtering by **C16, R8, C17** in diode circuit and **C20** in pentode circuit.

D.C. potential developed across **R8, R9** is fed back as bias to F.C. valve, giving automatic gain control. The I.F. bias is fixed.

Resistance-capacitance coupling by **R11, C21** and **R15** between **V3** pentode and pentode output valve **(V4, Mullard DL94).** Fixed tone correction by **C22** in anode circuit, and by negative feed-back between **V3** and **V4** anodes via **R14.**

For battery operation, power supplies are carried by switches **S4(B)** and **S5(B),** which close in the battery positions. For A.C. mains operation **S4(M), S5(M)** and **S6(M)** close instead. H.T. current is then supplied by **I.H.C.** full-wave rectifying valve **(V5, Mullard EZ41).** Smoothing by **R20** and electrolytic capacitors **C26, C27.** Filament current is also taken from the H.T. circuit, the series connected filaments being fed via **R18, R19. C24** and **C25** ensure a smooth D.C. supply to the filaments which are shunted by **R6, R12** and **R16** to by-pass the H.T. current.

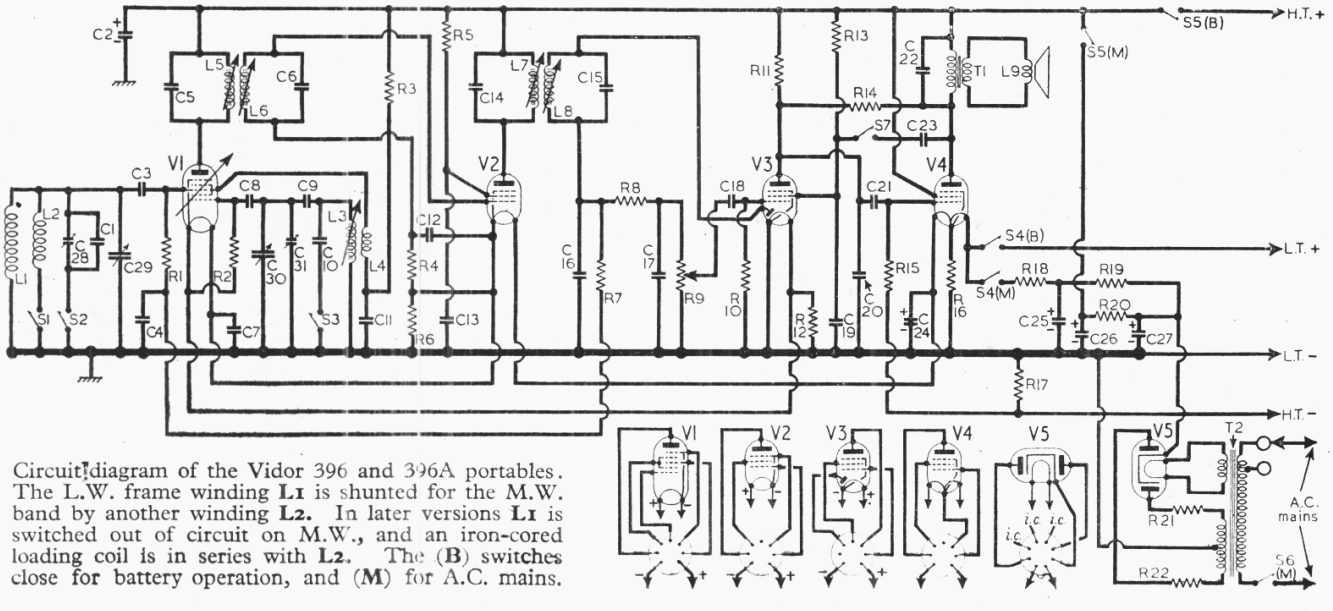
When the lid of the carrying case is closed **S7,** comprising the lid stay and two springs, also closes, causing positive feed-back via **C23** between **V4** anode and **V3** screen grid and producing a warning note in the speaker if the set is still switched on.

COMPONENTS AND VALUES

	CAPACITORS	Values	Locations
C1	L.W. trimmer ...	130pF	D3
C2*	H.T. decoupling ...	2μF	C2
C3	V1 C.G.	100pF	D3
C4	A.G.C. decoup. ...	0·05μF	E3
C5	1st I.F. trans. tuning ...	65pF	B2
C6	1st I.F. trans. tuning ...	65pF	B2
C7	Filament by-pass ...	0·1μF	E3
C8	V1 osc. C.G. ...	100pF	D3
C9	Tracker	635pF	E4
C10	L.W. trimmer ...	540pF	E4
C11	Osc. anode decoup.	0·1μF	B1
C12	V2 G.B. decoup. ...	0·01μF	E3
C13	V2 S.G. decoup. ...	0·1μF	B1
C14	2nd I.F. trans. tuning ...	65pF	C2
C15	2nd I.F. trans. tuning ...	65pF	C2
C16	I.F. by-passes ...	100pF	F3
C17	I.F. by-passes ...	100pF	D5
C18	A.F. coupling ...	0·001μF	G4
C19	V3 S.G. decoup. ...	0·05μF	G3
C20	I.F. by-pass ...	65pF	G3
C21	A.F. coupling ...	0·01μF	G3
C22	Tone corrector ...	0·001μF	G4
C23	Alarm coupling ...	0·02μF	G4
C24*	L.T. smoothing ...	200μF	B2
C25*	L.T. smoothing ...	25μF	H6
C26*	H.T. smoothing ...	40μF	H6
C27*	H.T. smoothing ...	40μF	H6
C28‡	L.W. aerial trim....	50pF	A1
C29†	Aerial tuning ...	§523pF	A2
C30†	Osc. tuning ...	§523pF	A1
C31‡	M.W. osc. trimmer	50pF	A1

	RESISTORS	Values	Locations
R1	V1 C.G.	4·7MΩ	E3
R2	V1 osc. C.G. ...	100kΩ	E3
R3	Osc. anode feed ...	22kΩ	F4
R4	V2 C.G.	4·7MΩ	E3
R5	V2 S.G. feed ...	100kΩ	F3
R6	Fil. shunt ...	1kΩ	E3
R7	A.G.C. decoup. ...	2·2MΩ	F3
R8	I.F. stopper ...	100kΩ	F3
R9	Volume control ...	1MΩ	D5
R10	V3 C.G.	4·7MΩ	G4
R11	V3 anode load ...	270kΩ	G4
R12	Fil. shunt ...	270Ω	G4
R13	V3 S.G. feed ...	1MΩ	G3
R14	Neg. f-b	6·8MΩ	G3
R15	V4 C.G.	2·2MΩ	G3
R16	Fil. shunt ...	1·8kΩ	G3
R17	V4 G.B.	150Ω	F3
R18	L.T. Smoothing ...	700Ω	J6
R19	L.T. Smoothing ...	1·5kΩ	J6
R20	H.T. smoothing ...	2·7kΩ	H6
R21	Surge limiters ...	100Ω	J6
R22	Surge limiters ...	100Ω	J6

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



Circuit diagram of the Vidor 396 and 396A portables. The L.W. frame winding **L1** is shunted for the M.W. band by another winding **L2.** In later versions **L1** is switched out of circuit on M.W., and an iron-cored loading coil is in series with **L2.** The **(B)** switches close for battery operation, and **(M)** for A.C. mains.

OTHER COMPONENTS			Approx. Values (ohms)	Locations
L1	L.W. frame aerial ...		15·0	—
L2	M.W. frame aerial		2·0	—
L3	Osc. tuning coil ...		1·5	E4
L4	Osc. reaction ...		1·3	E4
L5	1st I.F. trans.	Pri.	20·0	B2
L6	1st I.F. trans.	Sec.	20·0	B2
L7	2nd I.F. trans.	Pri.	20·0	C2
L8	2nd I.F. trans.	Sec.	20·0	C2
L9	Speech coil ...		3·2	G5
T1	O.P. trans.	Pri.	580·0	G4
		Sec.	Very low	
T2	Primary, total ...		150·0	H5
	H.T. sec. total ...		200·0	
	heater sec. ...		0·8	
S1-S6	W'band and power switches ...		—	D4
S7	Alarm switch ...		—	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted by the manufacturers and were taken with the receiver connected to **A.C.** mains and the mains adjustment set to the appropriate tapping. The volume control and gang were turned to maximum but there was no signal input. Voltage readings were taken on the 1,000 V range of a Model 7 Avometer, chassis being the negative connection. Readings taken with the receiver operating from a new set of batteries were slightly lower than those in the table.

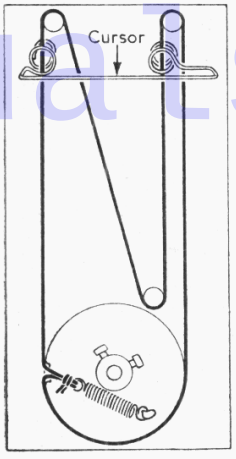
Valves	Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1 DK91 ...	83	0·21	41	1·4	—
V2 DF91... ...	83	1·0	32	0·34	—
V3 DAF91 ...	11	0·18	14	0·5	—
V4 DL94... ...	81	4·4	83	0·78	—
V5 EZ41 ...	122*	—	—	—	108

* Each anode, A.C.

DISMANTLING THE SET

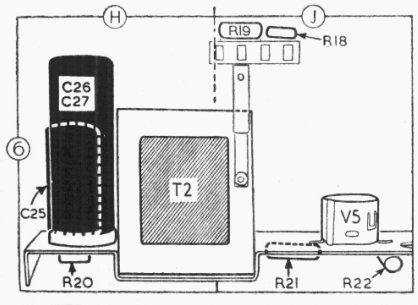
Removing Chassis.—Lift up the battery compartment cover, unplug H.T. and L.T. leads and remove batteries;
remove two small metal brackets, secured by screws to inside edges of lid;
release lid stay from left-hand side of lid, held by single screw, and prise out frame aerial cover from inside of lid;
unsolder the three aerial leads from their tags inside the lid;
release mains lead from clip in right-hand front corner of battery compartment;
slacken the two large knurled-head nuts, accessible through the battery compartment, which hold the chassis to the front and back of the carrying case;
slide the chassis to the right, unclipping the two leads, now made accessible, from the lid stay switch.

When replacing, the left-hand frame aerial tag should have the lead from **S1** connected to it, the central tag takes the earth lead, and the right-hand tag the lead from **C28.**



Left: The cursor cord drive system, as seen from the front after removing the chassis unit.

Removing Speaker.—Unsolder the two leads from the tags on the output transformer; remove the two 4BA nuts, with shake-proof washers, holding the speaker to the metal panel, and withdraw speaker.



The power unit, viewed in roughly the same position as the under-chassis view below.

When replacing, the output transformer should be at the back, furthest away from the controls, and the blue speaker lead should be connected to the same tag as **C22, C23.**

GENERAL NOTES

Switches.—**S1-S3** are the waveband switches, and **S4(B)-S6(M)** are the battery/mains changeover switches, ganged in two six-position rotary units. These are indicated in our underside view of the chassis, and shown in detail in the diagrams inset beside it.

The control knob is continuously rotatable, and has two "off" positions; then on one side of each "off" position are the M.W. and L.W. positions for battery operation, while on the other side are the same waveband positions for mains operation.

In both M.W. positions **S1** is closed, and in both L.W. positions **S2** and **S3** are closed. For battery operation, **S4(B)** and **S5(B)** close; or for mains operation **S4(M), S5(M)** and **S6(M)** close, as indicated by the lettered suffixes.

Batteries.—The L.T. unit is a Vidor type L5048 dry battery rated at 7.5 V. It is fitted with a 2-pin socket, of which the thicker pin is the positive. The H.T. unit is a Vidor type L5512, rated at 90 V. It is fitted with a non-reversible 3-pin socket, of which the centre pin is used only for location.

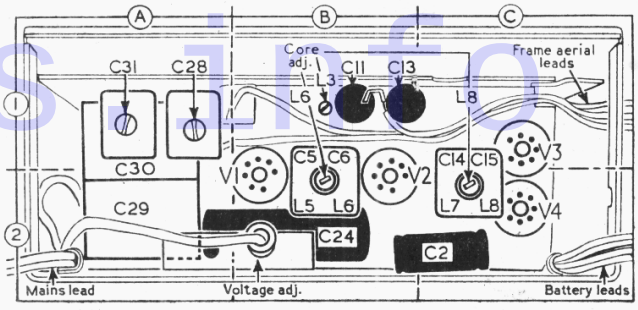
Chassis Divergencies.—In late versions the practice of shunting the L.W. frame winding with the M.W. winding for M.W. operation, as in our sample, has been abandoned, and independent frame windings are used, an additional switch being provided on the waveband switch unit to switch the L.W. winding in and out of circuit.

In these versions, also, an iron-cored loading coil is connected in series with the bottom end of the M.W. frame winding. The core is adjusted during alignment at the same frequency as **L3.**

In the LN396A, two domed feet beneath the carrying case have to be unscrewed before the chassis can be withdrawn.

Cursor Drive Cord Replacement.—About 30 inches of high-grade plaited and waxed flax fishing line is needed for a new cord, and it is run as shown in the sketch inset beside the plan chassis view above, which is drawn as seen from the front with the gang at maximum.

To gain access to the drive it is necessary to dismount the chassis from the metal panel on which it is mounted. It is held only by three 4BA nuts and two control knobs, but it is advisable to disconnect several leads going to other units in order to obtain freedom of movement.



Above: View of the chassis deck, showing the upper side of the valve holders. All trimmers are shown.

CIRCUIT ALIGNMENT

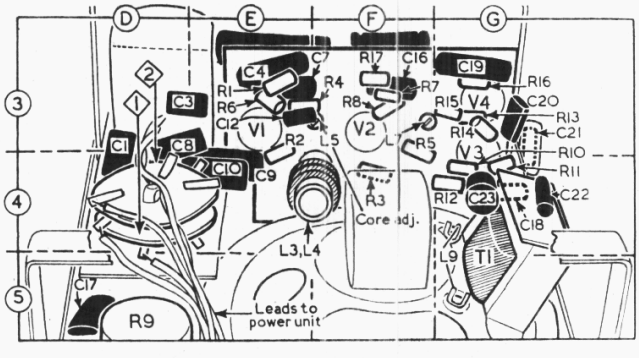
To gain access to the core and trimmer adjustments the chassis should be removed from its carrying case. Before aligning the I.F. stages the cores should be carefully freed by melting the wax with which they are sealed.

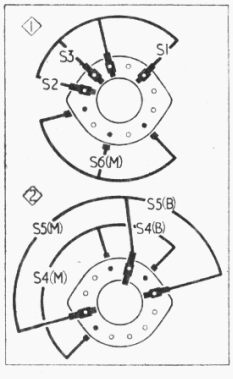
I.F. Stages.—Switch set to L.W., tune to 2,000 m on the scale and turn volume control to maximum. Connect the "live" side of **C30** to chassis, and the signal generator, via a 100pF capacitor in the "live" lead, to **V1** control grid (pin 6) and chassis. Feed in a 456 kc/s (657.8 m) signal and adjust the cores of **L8** (location reference C2), **L7** (F3), **L6** (B1) and **L5** (F3) for maximum output, reducing the input as the circuits come into line to avoid A.G.C. action. Re-seal the cores with soft wax.

R.F. and Oscillator Stages.—Check that with the gang at maximum capacitance, the cursor coincides with the 550 m mark on the M.W. scale.

M.W.—Switch set to M.W., remove the short-circuit from **C30** and transfer the signal generator leads to frame aerial, placing them in close proximity to the windings in the lid of the carrying case. Tune to 200 m (1,500 kc/s) on scale, feed in a 200 m (1,500 kc/s) signal and adjust **C31** (A1) for maximum output. Tune set to 550 m, feed in a 550 m (545.45 kc/s) signal and adjust the core of **L3** (B1) for maximum output, "rocking" the gang slightly after each adjustment. Repeat these adjustments.

L.W.—Switch set to L.W., tune to 1,200 m, feed in a 1,200 m (250 kc/s) signal and adjust **C28** (A1) for maximum output.





Left: Three-quarter underside view of the chassis assembly, with the power unit removed, seen from one side to show the underside of the valve holders. *Right:* Waveband and mains/battery switch units, viewed from the same direction.

Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1.