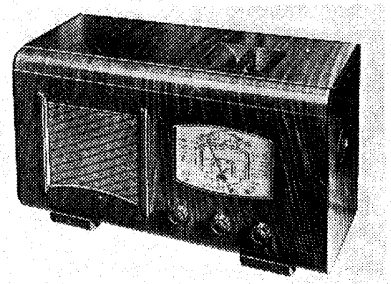
'TRADER' SERVICE SHEET

351

VIDOR 302

AND BURNDEPT 299



A MECHANICAL type of press-button tuning covering six stations is included in the Vidor 302 receiver, in addition to the ordinary manual tuning. The set is a 4-valve (plus rectifier) AC 4-band superhet covering short-wave ranges of 13·5-51 m (referred to below as SW1) and 50-180 m (SW2).

An identical chassis is fitted in the Burndept 299.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L1** (SW1), **L2** (SW2), **L3** (MW) and **L4** (LW) to single-tuned circuits **L5, C29** (SW1), **L6, C29** (SW2), **L7, C29** (MW) and **L8, C29** (LW) which precede triode-hexode valve (**V1, Mazda metallised AC/TH1**) operating as frequency changer with internal coupling. Triode oscillator anode coils **L13** (SW1), **L14** (SW2), **L15** (MW) and **L16** (LW) are tuned by **C37**; parallel trimming by **C33** (SW1), **C34** (SW2), **C35** (MW) and **C10, C36** (LW); series tracking by **C7** (SW1), **C30** (SW2), **C8, C31** (MW) and **C9, C32** (LW). Reaction by grid coils **L9** (SW1), **L10** (SW2), **L11** (MW), and **L12** (LW).

Second valve (**V2, Mullard metallised VP4B**) is a variable-mu RF pentode operating as intermediate amplifier with tuned-primary tuned-secondary transformer couplings **C38, L17, L18, C39** and **C40, L19, L20, C41.**

Intermediate frequency 473 KC/S.

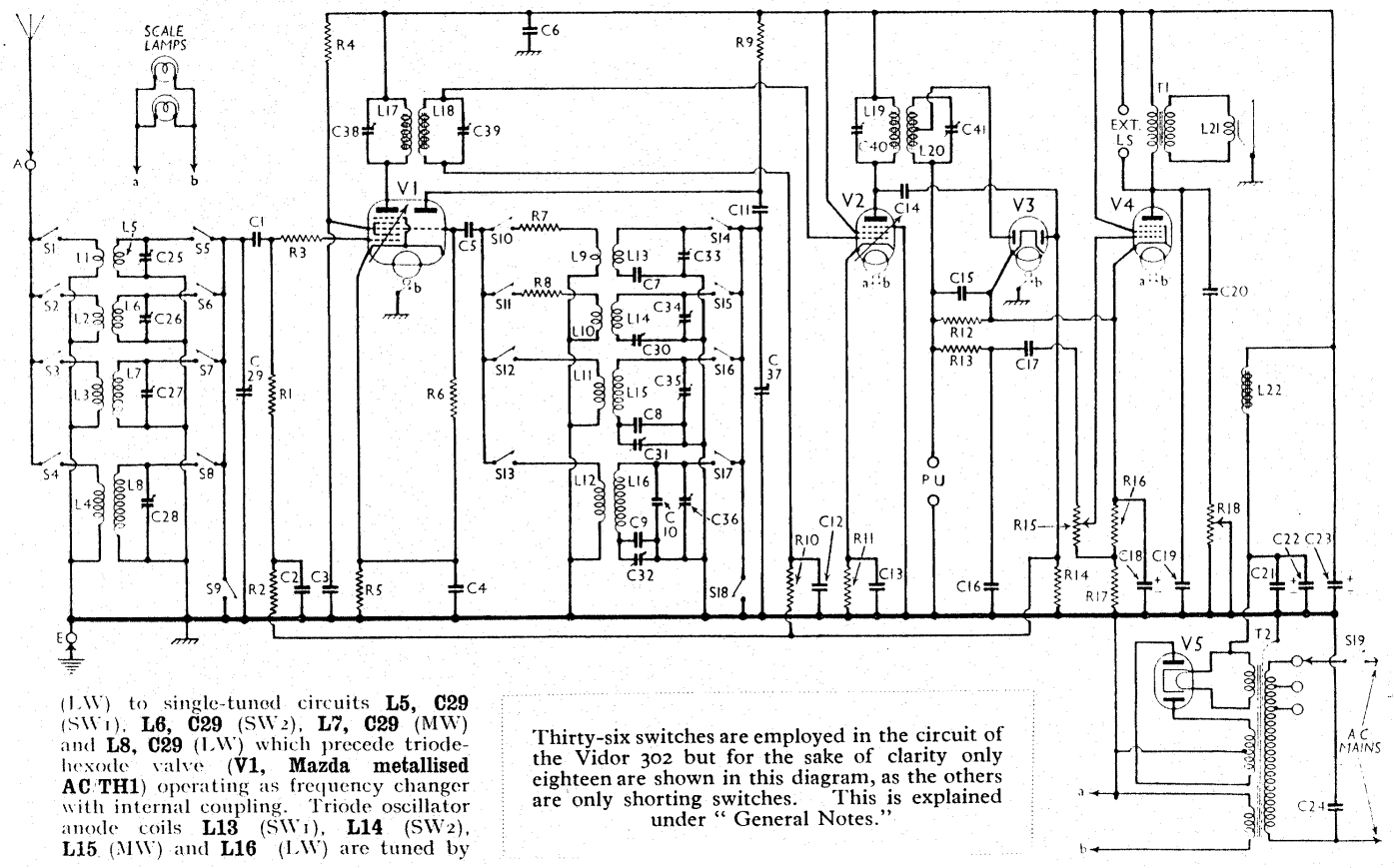
Diode second detector is part of separate double diode valve (**V3, Mullard metallised 2D4A**). Audio frequency component in rectified output is developed across load resistance **R12** and passed via IF stopper **R13,** AF coupling condenser **C17** and manual volume control **R15** to **CG** of pentode output valve (**V4, Mullard PenA4**). Fixed tone correction by **C19** and variable tone control by **C20, R18** in anode circuit.

Second diode of **V3,** fed from **V2** anode via **C14,** provides DC potential which is developed across load resistance **R14** and fed back through decoupling circuits as GB to FC and IF valves, giving automatic volume control. Delay voltage is obtained from drop along resistances **R16, R17** in **V4** cathode lead to chassis.

HT current is supplied by IHC full-wave rectifying valve (**V5, Brimar R2** or **R3**). Smoothing by iron cored choke **L22** and dry electrolytic condensers **C22, C23.**

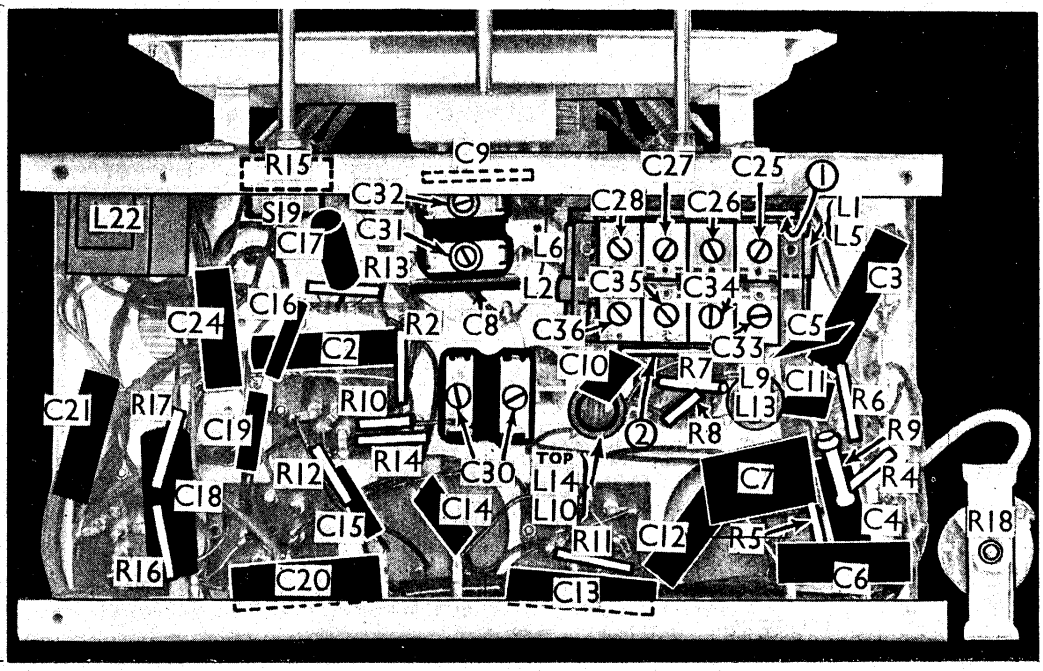
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 hexode CG resistance ..	500,000
R2	V1 hexode CG decoupling ..	500,000
R3	V1 hexode CG stabiliser ..	50
R4	V1 SG HT feed	20,000
R5	V1 fixed GB resistance ..	200
R6	V1 osc. CG resistance ..	50,000
R7	Osc. SW1 reaction stabiliser ..	100
R8	Osc. SW2 reaction stabiliser ..	250
R9	V1 osc. anode HT feed ..	30,000
R10	V2 CG decoupling	500,000
R11	V2 fixed GB resistance ..	200
R12	V3 signal diode load	500,000
R13	IF stopper	10,000
R14	V3 AVC diode load	1,000,000
R15	Manual volume control ..	500,000
R16	V4 GB and AVC delay resistances	150
R17		100
R18	Variable tone control ..	50,000



Thirty-six switches are employed in the circuit of the Vidor 302 but for the sake of clarity only eighteen are shown in this diagram, as the others are only shorting switches. This is explained under "General Notes."

The two wavechange switch units are below the trimmers shown in the top right-hand corner of this underchassis view, and diagrams are given on page IV. **R18** is the variable tone control and is actually mounted on the right-hand side of the cabinet.



	CONDENSERS	Values (μF)
C1	V1 hexode CG condenser	0·0001
C2	V1 hexode CG decoupling	0·1
C3	V1 SG decoupling	0·1
C4	V1 cathode by-pass	0·1
C5	V1 osc. CG condenser	0·0002
C6	HT circuit RF by-pass	0·1
C7	Osc. circuit SW1 tracker	0·005
C8	Osc. circuit MW fixed tracker	0·0005
C9	Osc. circuit LW fixed tracker	0·00015
C10	Osc. circuit LW fixed trimmer	0·00004
C11	V1 osc. anode coupling	0·0002
C12	V2 CG decoupling	0·1
C13	V2 cathode by-pass	0·1
C14	Coupling to V3 AVC diode	0·0001
C15, C16	IF by-pass condensers	0·0001, 0·0005
C17	AF coupling to V4	0·05
C18*	V4 cathode by-pass	25·0
C19	Fixed tone corrector	0·005
C20	Part of variable tone control	0·05
C21	V5 heater RF by-pass	0·01
C22*, C23*	HT smoothing	16·0, 24·0
C24	Mains RF by-pass	0·01
C25‡	Aerial circuit SW1 trimmer	—
C26‡	Aerial circuit SW2 trimmer	—
C27‡	Aerial circuit MW trimmer	—
C28‡	Aerial circuit LW trimmer	—
C29†	Aerial circuit tuning	—
C30‡	Osc. circuit SW2 tracker	—
C31‡	Osc. circuit MW tracker	—
C32‡	Osc. circuit LW tracker	—
C33‡	Osc. circuit SW1 trimmer	—
C34‡	Osc. circuit SW2 trimmer	—
C35‡	Osc. circuit MW trimmer	—
C36‡	Osc. circuit LW trimmer	—
C37†	Oscillator circuit tuning	—
C38‡	1st IF trans. pri. tuning	—
C39‡	1st IF trans. sec. tuning	—
C40‡	2nd IF trans. pri. tuning	—
C41‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial SW1 coupling coil	0·6
L2	Aerial SW2 coupling coil	0·4
L3	Aerial MW coupling coil	1·2
L4	Aerial LW coupling coil	97·0
L5	Aerial SW1 tuning coil	Very low
L6	Aerial SW2 tuning coil	0·35
L7	Aerial MW tuning coil	2·1
L8	Aerial LW tuning coil	9·0
L9	Oscillator SW1 reaction	0·4
L10	Oscillator SW2 reaction	38·0

	OTHER COMPONENTS (*Continued*)	Approx. Values (ohms)
L11	Oscillator MW reaction	60·0
L12	Oscillator LW reaction	1·5
L13	Osc. circuit SW1 tuning coil	0·05
L14	Osc. circuit SW2 tuning coil	0·3
L15	Osc. circuit MW tuning coil	5·75
L16	Osc. circuit LW tuning coil	4·6
L17, L18	1st IF trans. Pri. / Sec.	5·0, 5·0
L19, L20	2nd IF trans. Pri. / Sec., total	5·0, 5·0
L21	Speaker speech coil	2·6
L22	HT smoothing choke	400·0
T1	Speaker input trans. Pri. / Sec.	450·0, 0·4
T2	Mains trans. Pri., total / Heater sec. / Rect. heat .sec. / HT sec., total	40·0, 0·05, 0·1, 520·0
S1-18	Waveband switches	—
S19	Mains switch, ganged R15.	—

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (four countersunk-head wood screws) gives access to most of the components beneath the chassis.

Removing Chassis.—If it should prove necessary to remove the chassis from the cabinet, remove the three knobs at the front of the cabinet (recessed grub screws) and the tone control knob at the side of the cabinet (recessed grub screw), and unscrew the nut holding the tone control and escutcheon.

Now swivel out of the way the straps holding the top plate of the press-button unit to the top of the cabinet, unsolder the speaker leads and remove the four bolts (with lock and claw washers) holding the chassis to the bottom of the cabinet.

Next withdraw the wooden spacing bars from under the chassis, when, by tilting the back upwards, the chassis can be withdrawn.

When replacing, connect the speaker leads as follows, noting that the tags are numbered:—1, black (and red from electrolytic); 2, red (and yellow from electrolytic); 3, blue. The green lead (and the black from the electrolytic) go to the earthing tag on the speaker frame. Do not forget to fit the felt washers on the spindles before replacing the knobs.

Removing Speaker.—To remove the speaker from the cabinet, unsolder the leads and remove the nuts and lock washers from the four screws holding the speaker to the sub-baffle. *When replacing*, see that the transformer is at the bottom and connect the leads as above.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 234 V, using the 230 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 AC/TH1	220 / Oscillator / 86	3·0 / 3·7	92	6·5
V2 VP4B	220	10·0	220	3·8
V3 2D4A	—	—	—	—
V4 PenA4	208	25·0	220	3·7
V5 R2	240†	—	—	—

† Each anode, AC.

GENERAL NOTES

Switches.—The wavechange and gramophone switches **S1-S18** are in two ganged rotary units beneath the chassis, indicated in our under-chassis view, and shown in detail in the diagrams on page IV. It will be noted on examining the actual units that each has a large plate

Continued overleaf

VIDOR 302—*Continued*

on the rotor which shorts together all the switches, except the two in use in each unit. In the radio positions the shorted switches are also earthed. On gram. the tuned input circuit and the tuned oscillator anode circuit are earthed for radio muting purposes.

The makers' diagram shows the two contacts which are marked blank (B) in our diagrams connected to chassis. This modification would add two switches which would earth the aerial coupling and oscillator grid circuits on gram.

In our circuit and switch diagrams we have omitted the switches formed by the centre plates for the sake of clarity. If they were included the number of switches would rise from eighteen to thirty-six.

The table (col. 2) gives the switch positions for the five control settings, starting from fully anti-clockwise. A dash indicates *open*, and **C** *closed*.

S19 is the QMB mains switch, ganged with the volume control, **R15.**

Coils.—**L1, L5**; **L2, L6**; **L9, L13** and **L10, L14** are on four tubular unscreened units beneath the chassis. **L3, L4, L7, L8**; **L11, L12, L15, L16** and the IF transformers **L17, L18** and **L19, L20** are in four screened units on the chassis deck. The choke **L22** is beneath the chassis.

Scale Lamps.—These are two MES types, rated at 4·0 V, 0·3 A.

External Speaker.—Two sockets are provided at the rear of the chassis for a high impedance external speaker.

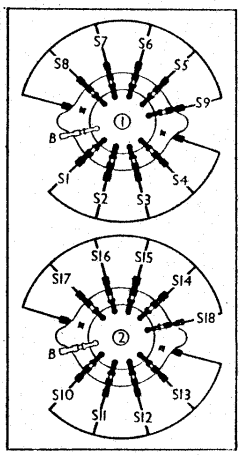
Condensers C22, C23.—These are two dry electrolytics in a single carton, screwed to the bottom of the cabinet. The black lead to the earthing tag on the speaker chassis is the common negative. The yellow lead to tag 2 on **T1** is the positive of **C22** (16μF), while the red lead (to tag 1) is the positive of **C23** (24μF).

Chassis Divergencies.—The suppressor grid of **V2** may be returned to cathode, not chassis.

TABLE AND DIAGRAMS OF THE SWITCH UNITS

Switches	Gram (G)	SW1 (1)	SW2 (2)	MW (3)	LW (4)
S1	—	C	—	—	—
S2	—	—	C	—	—
S3	—	—	—	C	—
S4	—	—	—	—	C
S5	—	C	—	—	—
S6	—	—	C	—	—
S7	—	—	—	C	—
S8	—	—	—	—	C
S9	C	—	—	—	—
S10	—	C	—	—	—
S11	—	—	C	—	—
S12	—	—	—	C	—
S13	—	—	—	—	C
S14	—	C	—	—	—
S15	—	—	C	—	—
S16	—	—	—	C	—
S17	—	—	—	—	C
S18	C	—	—	—	—

The makers' diagram shows an AVC line decoupling resistance (0·5 MO) which was not in our chassis.



Diagrams of the switch units, drawn as seen when looking from the rear of the under-side of the chassis. The table on the left shows the switch positions for the five control settings.

CIRCUIT ALIGNMENT

For alignment the volume control should be at maximum. With the gang fully meshed the pointer should coincide with the two ends of the wavelength scales.

IF Stages.—Remove the grid connector from the top of **V1,** and connect signal generator to top cap of the valve and chassis, with a 0·25 MO resistance shunted across these two points. Short **C37.**

Feed in a 473 KC/S (634·2 m) signal, and adjust **C41, C40, C39** and **C38** in that order for maximum output. Repeat with low signal input, and check by swinging generator from 468 to 478 KC/S, noting that resonance occurs at 473 KC/S.

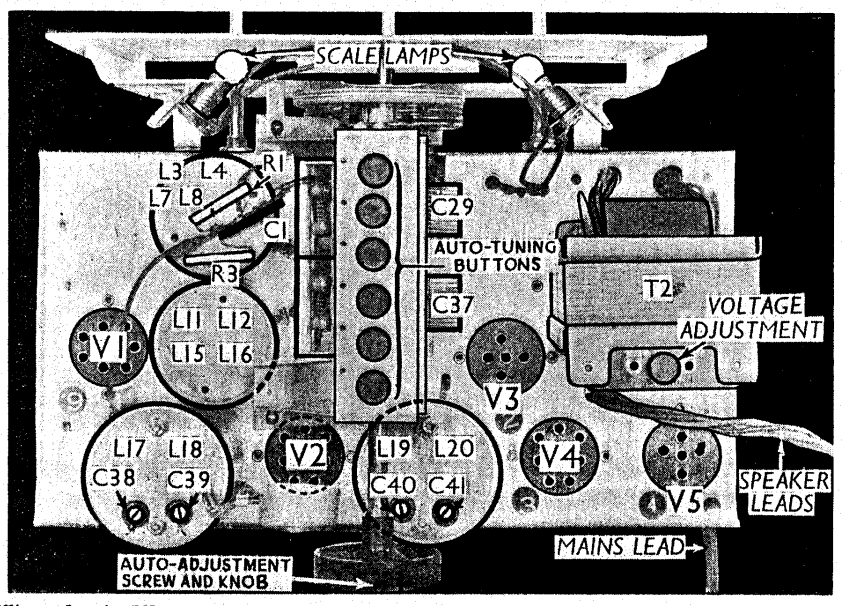
Remove short from **C37** and replace normal top cap of **V1.**

RF and Oscillator Stages.—Connect signal generator to **A** and **E** sockets.

Switch set to LW, tune to 750 m on scale, feed in a 750 m signal, and adjust **C36,** then **C28** for maximum output. Feed in a 2,000 m signal, tune it in on receiver, and adjust **C32** for maximum output, rocking the gang slightly for optimum results. Re-trim **C36** and **C28** and re-track **C32** until no further improvement results.

On the MW (3) band and SW2 (2) band a similar procedure is adopted. On MW adjust **C35** and **C27** at 200 m, and **C31** at 550 m. On SW2, adjust **C34** and **C26** at 50 m, and **C30** at 170 m.

On the SW1 (1) band, there is no variable tracker, so **C33** and **C25** are adjusted at 13·5 m. Trimming is very critical on this band, and care must be taken to see that the pressure of the trimming tool is not affecting the process. If a dummy aerial is used with the signal generator, it should be replaced by a 40 $\mu\mu$F fixed condenser on the SW1 band.



Those for the IF transformers are the only trimmers accessible from the top of the chassis.

PRESS-BUTTON UNIT

The system used in this set was fully described and illustrated in Part 3c of the series of articles on Automatic Tuning, published in *Radio Maintenance*, dated May 28, 1938. It is also given in the *ABC of Automatic Tuning*, pages 2 and 3. The makers' instructions for setting stations are as follows:

Behind the cabinet will be found a large knob, in the centre of which is a slotted screw. Hold the knob and undo the screw about one turn with a coin. Decide upon the six stations desired for push button tuning and select the one with the lowest wavelength. Carefully tune to this station and then depress the push button to its fullest extent. Now tune to the next station and depress the second button, and so on until each station has been tuned and its button set. To make quite certain all selected stations are accurately in tune, check each again. *It is important to commence and finish setting and checking on the station with the lowest wavelength required.*

These settings must now be locked, and to do this tune the receiver to 350 m, then while holding the large knob at the back of the cabinet tighten the slotted screw.

The above operations must be repeated when changing a button setting, always remembering to check the existing unchanged settings before again locking the slotted screw.

It is essential that the buttons must be fully pushed down to tune accurately. Incidentally, push-button tuning is only intended for the MW and LW ranges.