'TRADER' SERVICE SHEET 269

BURNDEPT 276 AND VIDOR 284

TWO short-wave ranges of 13·5-51 and 50-180 m. are covered by the Burndept 276 4-valve (plus rectifier) A.C./D.C. 4-band superhet. It is suitable for mains of 200-260 V (50-100 C/S in the case of A.C.), and has provision for both a gramophone pick-up and an extension speaker.

An identical chassis is fitted in the Vidor 284 receiver, but this *Service Sheet* was prepared on a Burndept 276.

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1** and coupling coils **L1** (S.W.1), **L3** (S.W.2), **L5** (M.W.) and **L7** (L.W.) to single-tuned circuits **L2, C30** (S.W.1), **L4, C30** (S.W.2), **L6, C30** (M.W.) and **L8, C30** (L.W.), which precede triode hexode valve (**V1, Mazda metallised TH2320**), operating as frequency changer with internal coupling. Triode oscillator anode coils **L10** (S.W.1), **L12** (S.W.2), **L14** (M.W.) and **L16** (L.W.) are tuned by **C38**; parallel trimming by **C34** (S.W.1), **C35** (S.W.2), **C36** (M.W.) and **C10, C37** (L.W.); series tracking by **C9** (fixed—S.W.1), **C31** (S.W.2), **C32** (M.W.) and **C33** (L.W.). Reaction by grid coils **L9** (S.W.1), **L11** (S.W.2), **L13** (M.W.) and **L15** (L.W.).

Second valve (**V2, Mullard metallised VP13C**) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C39, L17, L18, C40** and **C41, L19, L20, C42**. **Intermediate frequency 473 KC/S.**

Diode second detector is part of separate double diode valve (**V3, Mullard metallised 2D13C**). Audio frequency component in rectified output is developed across load resistance **R13** and passed via I.F. stopper **R12,** A.F. coupling condenser **C18** and manual volume control **R15** to C.G. of pentode output valve (**V4, Mullard Pen36C**). Fixed tone correction in anode circuit by **C20.** Provision for connection of high-impedance external speaker across primary of internal speaker transformer **T1.** Provision for connection of gramophone pick-up between **R13** and isolating condenser **C15.**

Second diode of **V3,** fed via **C14** from **V2** anode, provides D.C. potential which is developed across load resistance **R14** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from drop along **R16, R17** in **V4** cathode lead.

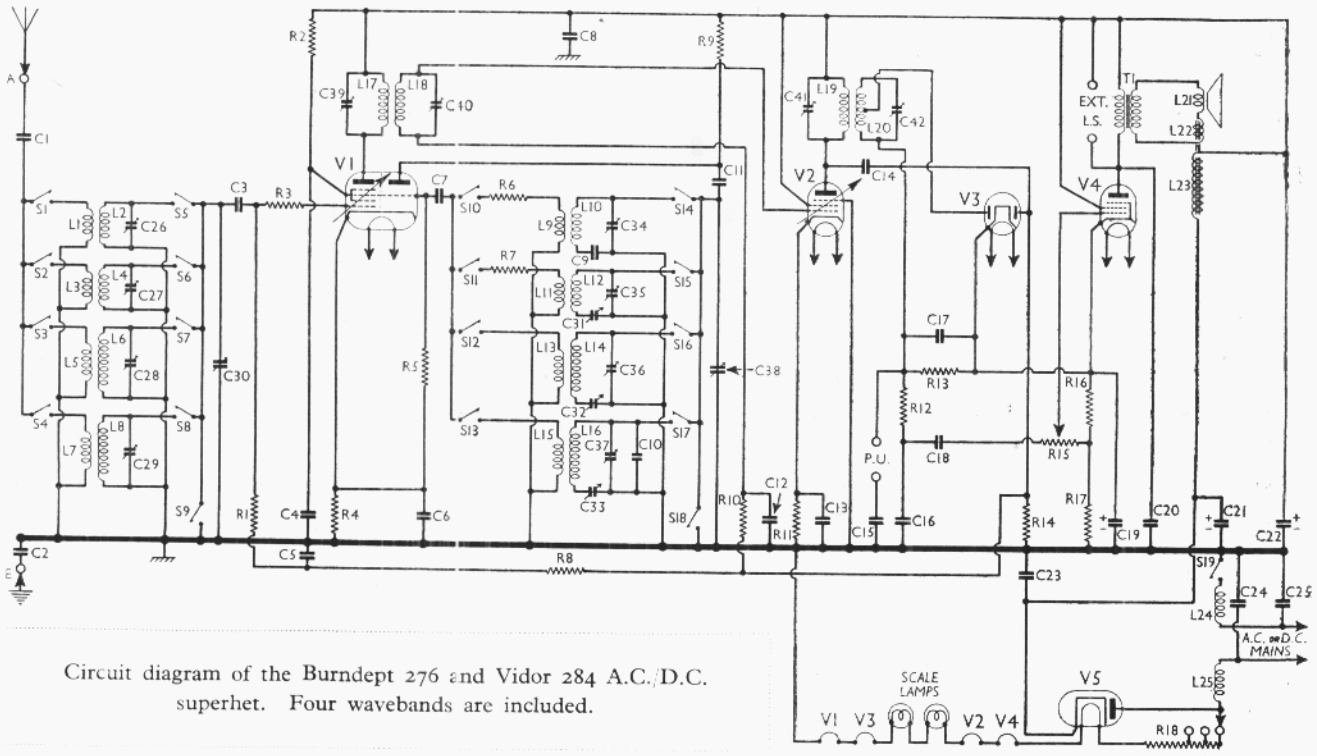
When the receiver is used on A.C. mains H.T. current is provided by half-wave rectifying valve (**V5, Brimar 1D5**) which, with D.C. supplies, behaves as a low resistance. Smoothing is effected by speaker field **L23** and dry electrolytic condensers **C21, C22.** R.F. filtering in H.T. circuit by **C8** and **C23** and in mains input circuit by chokes **L24, L25** and condensers **C24, C25.**

Valve heaters and scale lamps are connected in series together with tapped ballast resistance **R18** across mains input circuit.

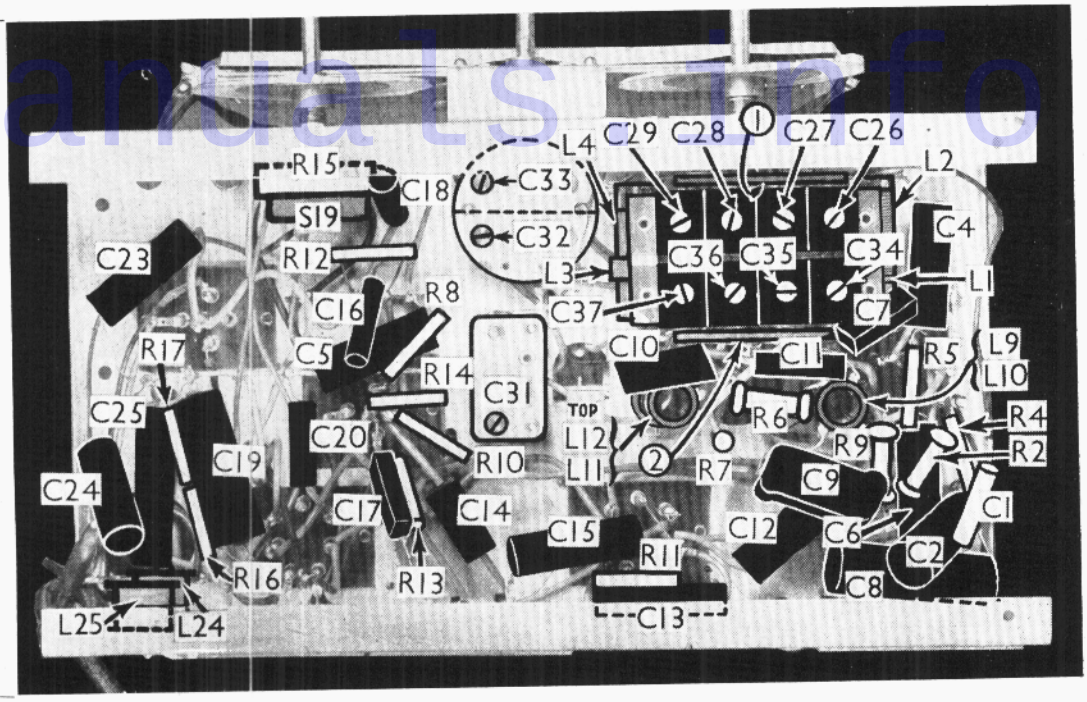
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 hexode C.G. resistance ..	500,000
R2	V1 S.G. H.T. feed	20,000
R3	V1 hexode C.G. stopper ..	50
R4	V1 fixed G.B. resistance ..	200
R5	V1 osc. C.G. resistance ..	50,000
R6	Osc. circuit S.W. 1 stabiliser ..	50
R7	Osc. circuit S.W.2 stabiliser ..	250
R8	V1 A.V.C. line decoupling ..	500,000
R9	V1 osc. anode H.T. feed ..	30,000
R10	V2 C.G. decoupling	500,000
R11	V2 fixed G.B. resistance ..	200
R12	I.F. stopper	10,000
R13	V3 signal diode load	500,000
R14	V3 A.V.C. diode load	1,000,000
R15	Manual volume control ..	500,000
R16	V4 G.B., A.V.C. delay	150
R17		100
R18*	Heater circuit ballast, total ..	535

* 335 Ω plus 100 Ω plus 100 Ω.



Circuit diagram of the Burndept 276 and Vidor 284 A.C./D.C. superhet. Four wavebands are included.



Under-chassis view. Note the various pre-set condensers arranged in a group. There are four unscreened tubular coil units, each carrying two coils. **L24** and **L25** are R.F. chokes in the mains input circuit.

	CONDENSERS	Values (μF)
C1	Aerial series condenser	0·001
C2	Earth blocking condenser	0·1
C3	V1 hexode C.G. condenser	0·0001
C4	V1 S.G. decoupling	0·1
C5	V1 hex. C.G. decoupling	0·1
C6	V1 cathode by-pass	0·1
C7	V1 osc. C.G. condenser	0·0002
C8	H.T. R.F. by-pass	0·25
C9	Osc. circuit S.W.1 tracker	0·005
C10	Osc. circuit L.W. trimmer	0·00005
C11	V1 osc. anode coupling	0·0002
C12	V2 C.G. decoupling	0·1
C13	V2 cathode by-pass	0·1
C14	Coupling to V3 A.V.C. diode	0·0001
C15	P.U. isolating condenser	0·01
C16	I.F. by-passes	0·0005
C17	I.F. by-passes	0·0001
C18	A.F. coupling to V1	0·05
C19*	V4 cathode by-pass	25·0
C20	Fixed tone corrector	0·005
C21*	H.T. smoothing	16·0
C22*	H.T. smoothing	24·0
C23	V5 cathode R.F. by-pass	0·01
C24	Mains circuit by-passes	0·01
C25	Mains circuit by-passes	0·01
C26‡	Aerial circuit S.W.1 trimmer	—
C27‡	Aerial circuit S.W.2 trimmer	—
C28‡	Aerial circuit M.W. trimmer	—
C29‡	Aerial circuit L.W. trimmer	—
C30†	Aerial circuit tuning condenser	—
C31‡	Osc. circuit S.W.2 tracker	—
C32‡	Osc. circuit M.W. tracker	—
C33‡	Osc. circuit L.W. tracker	—
C34‡	Osc. circuit S.W.1 trimmer	—
C35‡	Osc. circuit S.W.2 trimmer	—
C36‡	Osc. circuit M.W. trimmer	—
C37‡	Osc. circuit L.W. trimmer	—
C38‡	Osc. circuit tuning condenser	—
C39‡	1st I.F. trans. pri. tuning	—
C40‡	1st I.F. trans. sec. tuning	—
C41‡	2nd I.F. trans. pri. tuning	—
C42‡	2nd I.F. trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial S.W.1 coupling coil	0·65
L2	Aerial S.W.1 tuning coil	0·05
L3	Aerial S.W.2 coupling coil	0·45
L4	Aerial S.W.2 tuning coil	0·4
L5	Aerial M.W. coupling coil	1·1
L6	Aerial M.W. tuning coil	2·1
L7	Aerial L.W. coupling coil	100·0
L8	Aerial L.W. tuning coil	9·0
L9	Osc. S.W. 1 grid coil	0·5

	OTHER COMPONENTS (*Continued*)	Approx. Values (ohms)
L10	Osc. anode S.W.1 tuning coil	Very low
L11	Osc. S.W. 2 grid coil	40·0
L12	Osc. anode S.W.2 tuning coil	0·3
L13	Osc. M.W. grid coil	65·0
L14	Osc. anode M.W. tuning coil	4·0
L15	Osc. L.W. grid coil	1·5
L16	Osc. anode L.W. tuning coil	4·6
L17	1st I.F. trans. Pri.	5·0
L18	1st I.F. trans. Sec.	5·0
L19	2nd I.F. trans. Pri.	5·0
L20	2nd I.F. trans. Sec., total	5·0
L21	Speaker speech coil	1·9
L22	Hum neutralising coil	0·1
L23	Speaker field coil	820·0
L24	Mains circuit R.F. filter chokes	6·0
L25	Mains circuit R.F. filter chokes	6·0
T1	Speaker input trans. Pri.	460·0
T1	Speaker input trans. Sec.	0·3
S1 S18	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 under-chassis components.

Removing Chassis.—If it should be necessary to remove the chassis from the cabinet, remove the three control knobs (recessed grub screws) and remove the felt covering the two back feet on the cabinet, exposing two bolts (with washers), which remove. Remove the other two bolts (with washers) holding the chassis to the bottom of the cabinet, when the chassis can be withdrawn to the extent of the speaker leads, which should be sufficient for normal purposes.

To free the chassis entirely, unsolder the speaker leads and, *when replacing*, connect them as follows:—F, red; 3, blue; 2 and F joined together, black. The green lead goes to the earthing tag on one of the speaker fixing screws.

Removing Speaker.—To remove the speaker from the cabinet, unsolder the leads to it and remove the nuts and lock washers from the four screws holding it to the sub-baffle. *When replacing*, see that the transformer is on the right, connect the leads from the chassis as above and the leads from the electrolytic block as follows:—Red, F and 1 joined together: Yellow, F; Black, earthing tag on speaker fixing screw.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on A.C. mains of 227 V, using the 220-240 V tapping on the mains resistance. 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.

If **V2** should become unstable when measurements of its anode current are being made, as in our case, it can be stabilised by connecting a non-inductive condenser of about 0·1 μF from grid (top cap) to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TH2320	193 Oscillator 82	2·1 3·1	78	4·9
V2 VP13C	193	10·0	193	3·5
V3 2D13C	—	—	—	—
V4 Pen36C	173	40·0	193	6·4
V5 1D5†	—	—	—	—

† Cathode to chassis, 252 V D.C.

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 on the rotor which shorts together all the

Continued overleaf

BURNDEPT 276—*Continued*

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.

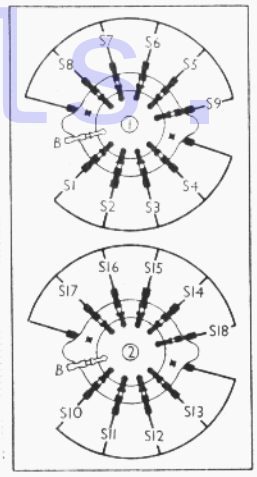
In our circuit and switch diagrams we have omitted the switches formed by the centre plates for the sake of clarity. If they were included the total number of wavechange and gramophone switches would rise from eighteen to thirty-six.

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

Switch	Gram. (G)	S.W.1 (1)	S.W.2 (2)	M.W. (3)	L.W. (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	—	—	—	—

S19 is the Q.M.B. mains switch, ganged with the volume control, **R15**.

Coils.—**L1, L2**; **L3, L4**; **L9, L10** and **L11, L12** are on four tubular unscreened units beneath the chassis. **L5-L8, L13-L16,** and the I.F. transformers **L17, L18** and **L19, L20** are in four screened units on the chassis deck. The chokes **L24** and **L25** are on the inside of the rear member of the chassis.



Switch diagrams, as seen looking from the rear of the underside of the chassis.

Scale Lamps.—These are two M.E.S. types, rated at 6·0 V, 0·3 A.

External Speaker.—Two sockets are provided at the rear of the chassis for a high impedance external speaker, and it should be noted that these are "live."

Condensers C21, C22.—These are two dry electrolytics in a single carton, mounted in a clip fitted to the inside of the cabinet. The black lead to the earthing tag on the speaker chassis is the common negative. The yellow lead to the bottom field tag on **T1** is the positive of **C21** (16μF), while the red lead (to tag 1) is the positive of **C22** (24μF).

Chassis Divergencies.—The suppressor grid of **V2** may be returned to cathode, not chassis. **C20** may be across the primary of **T1**, and not from anode of **V4** to chassis.

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.

I.F. 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 **C38**.

Feed in a 473 KC/S (634·2 m.) signal, and adjust **C42, C41, C40** and **C39** 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 exactly at 473 KC/S.

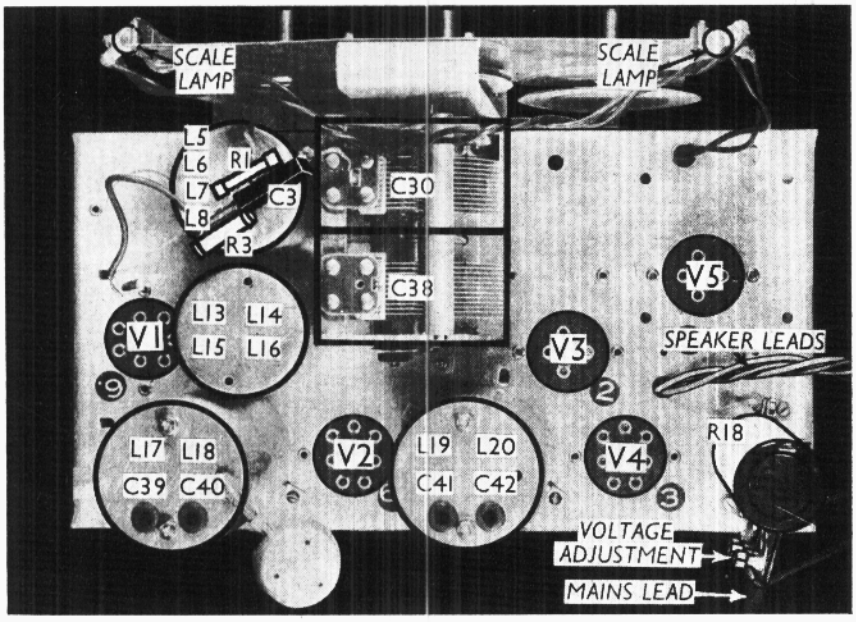
Remove short from **C38** and replace normal top cap of **V1**.

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

Switch set to L.W., tune to 750 m. on scale, feed in a 750 m. signal, and adjust **C37**, then **C29** for maximum output. Feed in a 2,000 m. signal, tune it in on receiver, and adjust **C33** for maximum output, rocking the gang slightly for optimum results. Re-trim **C37** and **C29** and re-track **C33** until no further improvement results.

On the M.W. (3) band and S.W.2 (2) band a similar procedure is adopted. On M.W., adjust **C36** and **C28** at 200 m., and **C32** at 550 m. On S.W.2, adjust **C35** and **C27** at 50 m., and **C31** at 170 m.

On the S.W.1 (1) band, there is no variable tracker, so **C34** and **C26** 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 S.W.1 band.



Plan view of the chassis. Note the components above the **L5–L8** coil unit.

MAINTENANCE PROBLEMS

H.M.V. 801 Volume Control Fault

I RECENTLY serviced an H.M.V. Model 801 which "made noises." Knocking the massive cabinet produced the only too familiar noises typical of a faulty valve.

I soon found it was not quite so easy—switching to gram. eliminated the R.F. portion of the set, but I then found that the slightest touch anywhere on the chassis, valves or cabinet produced the noise. Unable to tie it down to any one valve, after much patient tapping and shaking of leads I arrived at the volume control.

In this model the control is mounted on a bracket away from the chassis and the fairly long leads are each metal shielded. They were individually tested for intermittent S/C or O/C without result. I then carefully examined the control itself and found that a badly punched rivet was causing imperfect contact between the soldering tag and the carbon track inside the control. The slightest vibration caused the leads from the chassis to move the tag sufficiently to produce the noise.—R. H. PILLING, BLACKPOOL.