

NUMBER FIFTY-TWO  
(VOLUME TWO)

# 'TRADER' SERVICE SHEETS

## BURNDEPT MODEL CN230

ALL-WAVE UNIVERSAL SUPERHET

**T**HE Burndept Model CN230 is a universal receiver for use on A.C. mains of 200-250 V., 50-100 c.p.s., or on 200-250 V. D.C. mains. Besides the usual M.W. and L.W. ranges, it has a S.W. range of 17-51 metres.

The circuit on the M.W. and L.W. ranges comprises a variable-mu screened pentode H.F. amplifier, screened pentode detector and pentode output. On the S.W. range, the initial stage of H.F. amplification is not used.

The receiver is fitted with a barretter, and no adjustment for mains voltage is necessary.

### CIRCUIT DESCRIPTION

Two alternative aerial connections, A1 ("Night Aerial") via pre-set series condenser **C18**, and A2 ("Day Aerial"), to fixed series condenser **C1** and coupling coil **L1**. Single tuned input circuit **L2**, **L3**, **C19** precedes variable-mu pentode H.F. amplifier (**V1**, Mazda metallised **VP 1321**). Gain controlled by variable cathode resistance **R4** which varies G.B. applied.

Tuned-anode coupling by **L7**, **L8**, **C22** to H.F. pentode detector (**V2**, Mullard metallised **SP13C**) operating on grid leak system with **C6** and **R5**. Reaction is applied to anode coils by coil **L6**, and controlled by variable condenser **C21**.

On the short-wave band **V1** is not used for amplification, but merely as coupling between aerial and the S.W. tuning coil **L4**. Switch **S2** is open while **S1** is closed to connect aerial to control grid of **V1**. Switch **S7** is also open to cut out M.W. and L.W. tuning coils, while **S6** is closed to connect the S.W. coil in the detector

grid circuit. **S4** short circuits M.W. and L.W. reaction coil and leaves only the S.W. coil **L5** in circuit.

H.F. filtering in the detector anode circuit is effected by choke **L9** and condensers **C8**, **C9**.

Resistance-capacity coupling by **R7**, **C11** and **R8**, to pentode output valve (**V3**, Mazda Pen **3520**), which operates with fixed tone compensation by condenser **C13**.

When the receiver is used with A.C. mains, H.T. current is supplied by a half-wave rectifying valve (**V4**, Brimar **1D5**). With a D.C. supply, the valve behaves as a low resistance. Smoothing is effected by the speaker field winding **L10** and large-capacity dry electrolytic condensers **C14**, **C15**.

The heaters of all valves are connected in series together with two scale lamps and an automatic voltage regulating barretter (**Philips C1**) across the mains supply. H.F. chokes **L13** and **L14** and condenser **C17** form an efficient mains disturbance eliminator.

### COMPONENTS AND VALUES

Resistances		Values (ohms)
R1	V1 S.G. and anode pot. divider	5,000
R2		50,000
R3	V1 fixed G.B. resistance	150
R4	V1 gain control	10,000
R5	V2 grid leak	1,000,000
R6	V2 S.G. H.T. feed	1,000,000*
R7	V2 anode resistance	250,000
R8	V3 grid resistance	250,000
R9	V3 grid H.F. stopper	100,000
R10	V3 G.B. resistance	150

\* In our chassis. May be 750,000 Ω.

Condensers		Values (μF)
C1	Aerial series condenser, fixed	0.0005
C2	Earth blocking condenser	0.02
C3	V1 cathode by-pass	0.1
C4	V1 S.G. by-pass	0.1
C5*	V1 S.G. and anode decoupling	8.0
C6	V2 grid condenser	0.0001
C7	V2 S.G. by-pass	0.1
C8	V2 anode H.F. by-passes	0.0001
C9		0.0002
C10	H.T. line by-pass	0.5
C11	L.F. coupling to V3	0.01
C12*	V3 cathode resistor by-pass	25.0
C13	V3 anode tone compensator	0.005
C14*	H.T. smoothing	24.0
C15*		16.0
C16	V4 anode-cathode by-pass	0.02
C17	Mains by-pass	0.01
C18	Aerial series condenser, pre-set	—
C19	Aerial circuit tuning	—
C20	Aerial circuit trimmer	—
C21	Reaction condenser	0.0005
C22	V1 anode circuit tuning	—

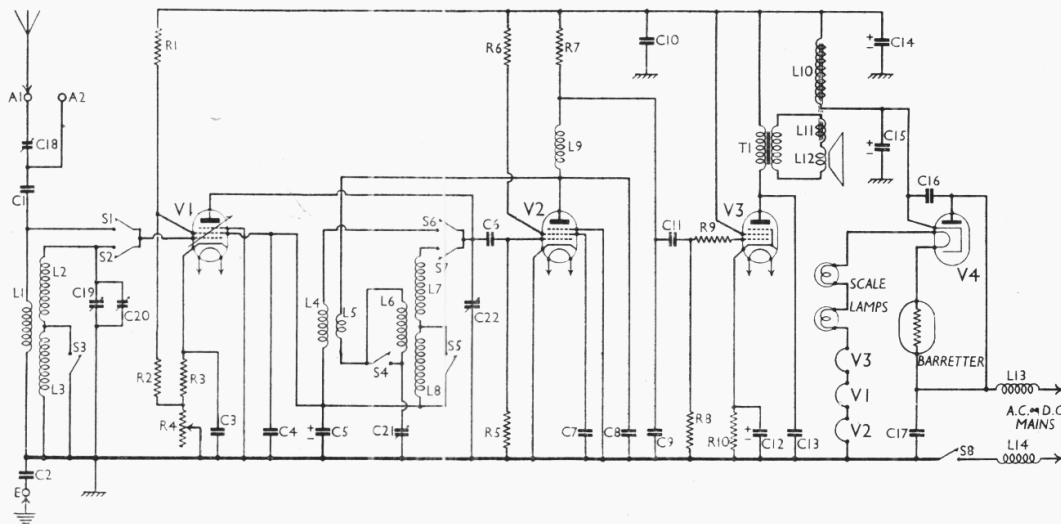
\* Dry electrolytics.

Other Components		Values (ohms)
L1	Aerial coupling coil	3.7
L2	Aerial tuning coils	2.2
L3		22.0
L4		0.05
L5	Short-wave reaction coil	0.25
L6	M.W. and L.W. reaction coil	3.7
L7	V1 anode tuning coils	2.2
L8		22.0
L9	V2 anode H.F. choke	165.0
L10	Speaker field winding	820.0
L11	Hum neutralising coil	0.1
L12	Speaker speech coil	2.4
L13	Mains filter chokes	6.0
L14		6.0
T1	Speaker input trans.	700.0
Sr-S7	Waveband switches, ganged	—
S8	Mains switch, ganged R4	—

### DISMANTLING THE SET

Most under-chassis repairs can be carried out by removing the detachable wooden base of the cabinet (4 wood screws). It may be necessary also to unsolder the lead attached to the metal screening plate.

**Removing Chassis.**—If this is necessary, remove knobs (grub screws), then unscrew the four metal screws and washers holding chassis to base of cabinet.



Circuit diagram of the Burndept Model CN230 all-wave universal superhet. L4 and L5 are the S.W. coils, V1 not being used as an amplifier on this waveband.

Unsolder lead to screening plate on the base of cabinet. Chassis may now be withdrawn to extent of speaker leads. To remove it entirely, unsolder speaker leads from the speaker terminal panel and earthing tag. When replacing, the colour code is: Green lead, chassis frame earthing tag; Red lead, bottom F tag; Blue lead, No. 1 tag; Black lead, No. 3 and top F tag. Do not forget to re-solder earthing lead to screening plate.

**Removing Speaker.**—It is best to remove this complete on its sub-baffle, with the electrolytic condenser block, by undoing the four wood screws holding the baffle in position.

### VALVE ANALYSIS

The voltage and current readings listed in the table are those given by Burndep't for an average chassis working on 230 V 50 c.p.s. A.C. mains under "no signal" conditions, with the gain control **R4** at maximum and reaction at minimum.

All voltages were measured on the 1,200 V scale of an Avometer, chassis being negative in each case.

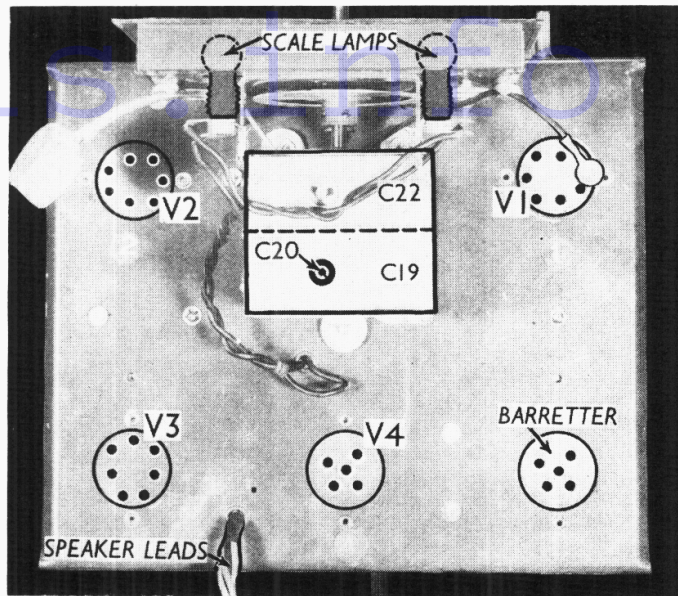
Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 VP13Z1	140	5.4	140	1.5
V2 SP13C	48	0.5	32	0.15
V3 Pen 3520	170	40.0	200	8.0
V4 1D5*	—	—	—	—

\* Cathode to chassis 250 V D.C.

### GENERAL NOTES

**Coils.**—The tuning coils are in three unscreened units, located beneath the

Plan view of the chassis. C20 is the trimmer of C19, the aerial tuning condenser.



chassis. All the individual coils are indicated in our under-chassis view.

In our chassis, the M.W. windings are of Litz wire, but later models may have solid wire windings, in which case the resistances may differ from those given in our table.

Also beneath the chassis will be found the two mains filter chokes **L14**, **L15**, and the detector H.F. choke, **L9**.

**Switches.**—The wavechange switches, **S1-S7**, are in one unit, seen in the under-chassis view, where each switch is

clearly marked. Note that although the unit fitted has eight switches, only seven are actually used, the blank one being next to **S3**. The table below gives the switch positions for the various wavebands. O signifies open, and C, closed.

Switch	S.W.	M.W.	L.W.
S1	C	O	O
S2	O	C	C
S3	O	C	O
S4	C	O	O
S5	O	C	O
S6	C	O	O
S7	O	C	C

**S8** is the Q.M.B. mains switch, ganged with the volume control **R4**.

**Scale Lamps.**—There are two of these, in series with the heaters and the barretter. Each is an Osram M.E.S. type, rated at 6.2 V, 0.3 A. The lamp-holders are on clips which fit on brackets at the back of the tuning scale assembly.

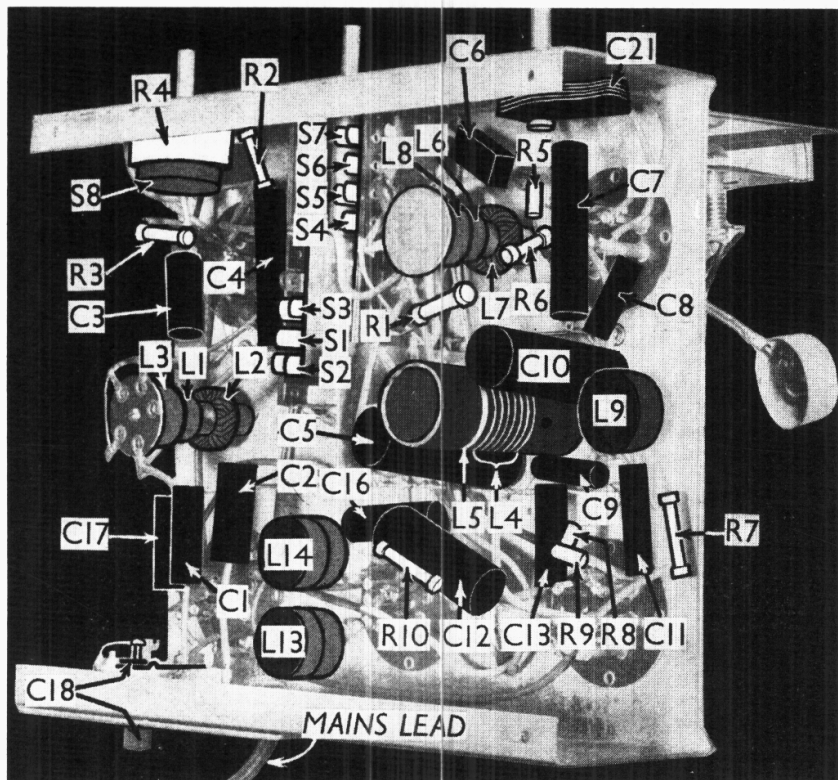
**Trimmer C20.**—There is only one trimmer on the 2-gang condenser, and this is on the aerial tuning section, **C19**.

**Condenser C18.**—This is a pre-set aerial series condenser, associated with the "night" aerial socket. It is adjustable by means of a small knob at the rear of the chassis.

**Condensers C14, C15.**—These are two dry electrolytics in a single unit, fitted to the speaker sub-baffle by a metal strap. They have a common negative (black) lead, while the positive of **C14** (24μF) is the red lead, and the positive of **C15** (10μF) is the yellow lead. The condenser block is a T.C.C. type, rated at 300 V peak working, 350 V surge.

**Chassis Modifications.**—It is understood that certain modifications are to be made to this set. New solid wire (not Litz) coils will be fitted. Resistances will be: M.W. sections, 4.2 O; L.W. sections, 8.5 O; coupling or reaction coil, 1.2 O.

In addition, choke **L9** will be replaced by a 10,000 O resistance, and a few of the condensers and resistances may be altered slightly in value.



Three-quarter sub-chassis view. All the components are clearly marked, including the various switches.