

NUMBER 109

**'TRADER' SERVICE SHEETS**

**ULTRA 77**

**3-VALVE BATTERY RECEIVER**

four rose-head bolts holding the sub-baffle to the front of the cabinet, and remove the nuts and washers from the four bolts holding the speaker to the sub-baffle. *When replacing*, see that the speaker terminal strip is on the left.

**COMPONENTS AND VALUES**

Resistances		Values (ohms)
R1	V1 fixed G.B. resistance	2,200
R2	V1 gain control	30,000
R3	V1 anode circuit stabiliser	50
R4	V2 grid leak	1,000,000
R5	V2 anode load	120,000
R6	V3 C.G. resistance	1,000,000
R7	V3 anode circuit stabiliser	60

Condensers		Values (μF)
C1	Droitwich retractor coupling	0.00001
C2	V1 C.G. decoupling	0.1
C3	V1 S.G. by-pass	0.05
C4	H.F. coupling to L8, L9	0.00005
C5	V2 grid condenser	0.0003
C6	V2 anode H.F. by-passes	0.0001
C7	V2 to V3 L.F. coupling	0.0001
C8	V2 to V3 L.F. coupling	0.01
C9*	H.T. reservoir	2.0
C10	Tone corrector	0.002
C11†	Droitwich retractor tuning	0.0002
C12‡	Aerial circuit tuning	—
C13‡	Aerial circuit trimmer	—
C14‡	Reaction control	0.0005
C15‡	H.F. circuit tuning	—
C16‡	H.F. circuit trimmer	—

\* Electrolytic. † Variable. ‡ Pre-set.

**A** THREE-VALVE battery-operated chassis is fitted in the Ultra 77 receiver, which is provided with an adjustable Droitwich filter. No provision is made for using a gramophone pick-up or an extension speaker.

**CIRCUIT DESCRIPTION**

Two alternative aerial input connections **A1** direct and **A2** via Droitwich retractor **L1**, **C11** and coupling condenser **C1** to coupling coils **L2**, **L3**. Single-tuned circuit **L4**, **L5**, **C12** precedes variable-μ pentode H.F. amplifier (**V1**, Mazda metallised **VP215**). Gain control by variable potentiometer **R2** which varies G.B. applied.

Choke-fed tuned-grid coupling by **L6**, **C4**, **L8**, **L9** and **C15** to H.F. pentode detector (**V2**, Mazda metallised **SP215**) operating on grid leak system with **C5** and **R4**. Reaction is applied from anode by coil **L7** and controlled by variable condenser **C14**.

H.F. filtering in **V2** anode circuit by choke **L10** and by-pass condensers **C6**, **C7**. No provision for connection of gramophone pick-up.

Resistance-capacity coupling by **R5**, **C8** and **R6** to output pentode (**V3**,

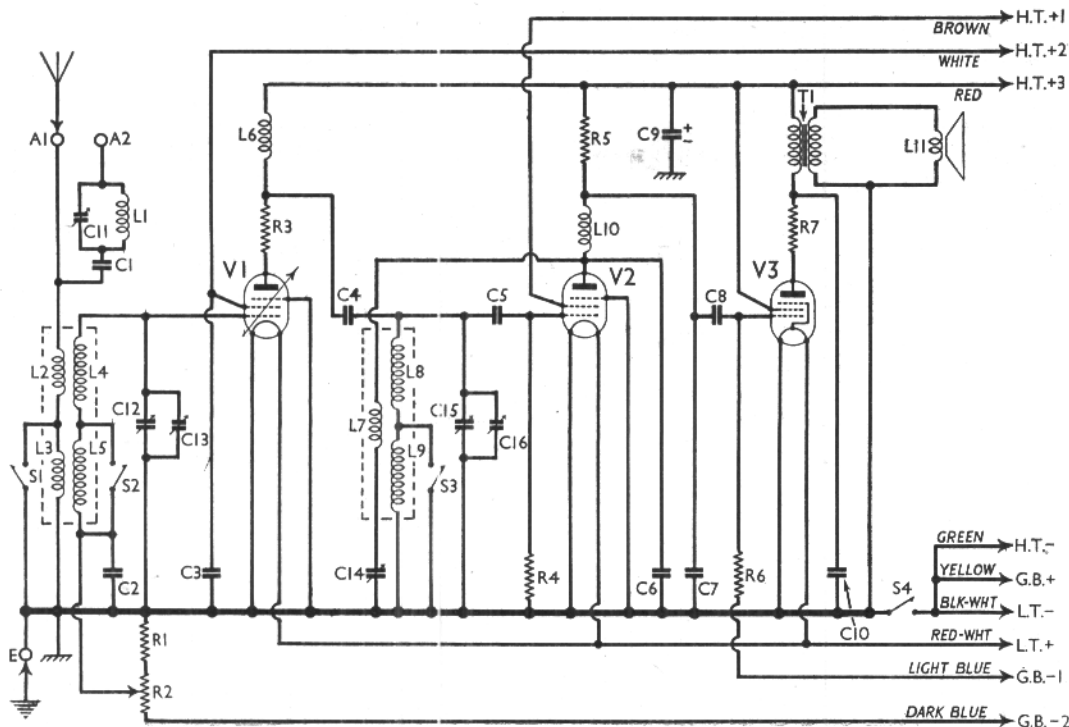
**Mazda Pen220**). Tone correction in anode circuit by fixed condenser **C10**. Coupling to speaker by output transformer **T1**. No provision for connection of external speaker.

**DISMANTLING THE SET**

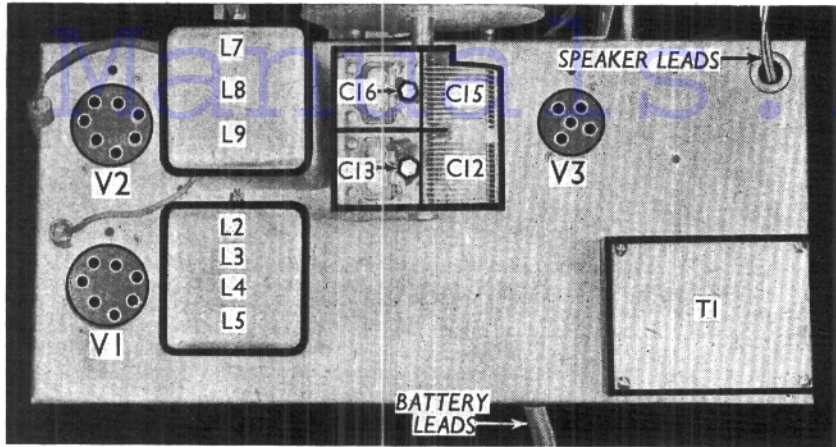
**Removing Chassis.**—In order to remove the chassis from the cabinet, it is first necessary to remove the back (four screws with washers), the four control knobs (recessed grub screws) and the three bolts (with washers) holding the chassis to the bottom of the cabinet. The chassis can now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes. *When replacing*, note that the knob with the red and green dot goes on the spindle of the wave-change switch and that the knob marked with an arrow goes on the reaction control.

To free the chassis entirely, remove the battery platform, untie the speaker dust bag and unsolder the leads from the speaker.

**Removing Speaker.**—If it is necessary to remove the speaker from the cabinet, remove the nuts and washers from the



Circuit diagram of the Ultra 77 3-valve battery receiver. L1 and C11 form the Droitwich retractor. L6 and L10 are H.F. chokes. The battery leads are colour-coded.



Plan view of the chassis. L1, L6 and L10 are beneath the chassis. T1, the output transformer, is mounted on the receiver chassis, and not on the speaker.

Other Components		Approx. Values (ohms)
L1	Droitwich rejector coil	11.3
L2	Aerial coupling coils	14.7
L3		73.3
L4	Aerial tuning coils	4.2
L5		12.0
L6	V1 anode H.F. choke	500.0
L7	Reaction coil	9.0
L8	H.F. circuit tuning coils	4.2
L9		12.0
L10	V2 anode H.F. choke	500.0
L11	Speaker speech coil	3.6
T1	Output transformer (Pri. Sec.)	400.0 0.15
S1-S3	Waveband switches	—
S4	L.T. switch, ganged R2	—

**VALVE ANALYSIS**

Valve voltages and currents given in the table (col. 2) were measured with the receiver operating from a new H.T. battery reading 128 V. The volume control was at maximum and the reaction control was at minimum, but there was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 VP215..	128	1.5	53	0.4
V2 SP215..	45	0.5	28	0.2
V3 Pen220	126	5.0	128	1.0

**GENERAL NOTES**

**Switches.**—The three wave-change switches S1-S3 are in a single unit, seen in the under-chassis view. All the switches are closed on the M.W. band and open on the L.W. band. The control has a third position (fully clockwise) which is not used.

S4 is the Q.M.B. L.T. switch, ganged with the gain control R2.

**Coils.**—The tuning coils L2-L5 and L7-L9 are in two screened units on the

chassis deck. L1 is the unscreened Droitwich rejector coil beneath the chassis, while the chokes L6 and L10 are also beneath the chassis.

**External Speaker.**—There is no provision for this, but a low resistance type (about 4 Ω) could be connected across the two tags on the internal speaker connecting strip.

**Batteries.**—Any good make of 2 V cell is recommended for L.T. use, provided it is capable of supplying a discharge current of 0.5 A.

The H.T. battery should be a 120 V type, and must have tapings at +24 V and +50 V. The G.B. battery should be a 9 V type.

Recommended H.T. batteries are: Siemens Full O'Power H3; or Full O'Power Cadet H120; Drydex H1006; Hellesens Witop; Pertrix 477; Grosvenor G120.

Recommended G.B. batteries are: Siemen's Full O'Power G2 or Full O'Power Cadet CG2; Drydex H100; Hellesen's Wiray; Pertrix 460; Grosvenor G9.

**Battery Leads and Voltages.**—Black, white tracer, L.T.—; Red, white tracer, L.T.+2 V; Green, H.T.—; Brown, H.T.+1, +24 V; White, H.T.+2, +50V; Red, H.T.+3, +120 V; Yellow, G.B.+; Light Blue, G.B.—1, —4.5 V; Dark Blue, G.B.—2, —9 V.

**Condenser C11.**—This is the pre-set trimmer for the Droitwich rejector, operated by a slotted screw at the rear of the chassis.

**Condensers C1, C4.**—These are two low capacity fixed condensers of the circular disk type.

**Screened Wires.**—Certain of the connecting wires are screened by a binding of braid-covered wire which is earthed.

**Chokes L6, L10.**—The connection disks at the end of these carry extra tags used merely as bearers.

Under-chassis view. C11 is adjustable through a hole in the rear of the chassis. C1 and C4 are small fixed condensers of the disc type. There are only three ganged wave-band switches, S1-S3.

