

### ULTRA TIGER MAINS SUPERHET (Cont.)

(V3) has the pick-up connections across a resistance at the low potential end of the secondary of the second L.F. transformer. A high value of anode coupling resistance is used and the filter to the output valve is by a .01 condenser.

The output pentode, AC/Pen, has a variable tone control in its grid circuit. This consists of a .002 mfd. condenser connected between chassis and the slider of the potentiometer grid leak. Tone compensation is by a resistance and capacity in series across the primary of the output transformer. A stabilising condenser is connected directly between the anode and chassis.

Mains equipment consists of a transformer and a full-wave, voltage-doubler metal rectifier with the speaker field in the positive H.T. lead. Two 8 mfd. electrolytic condensers are used for smoothing.

**Special Notes.**—Extra speaker must be of the low impedance type.

The screen potential for the second detector (V3) is taken from the cathode of the output valve (V4), which is 15 volts positive with relation to the chassis.

**Quick Tests.**—Between the following terminals on L.S. and chassis:—

- Top (H.T. unsmoothed), 340 volts.
- Bottom (H.T. smoothed), 270 volts.
- Between container of rear (insulated) electrolytic condenser and chassis, 170 volts.

This represents half the rectified voltage.  
**Removing Chassis.**—Remove knobs (grub screw), undo three screws underneath, and lift chassis out. Speaker leads are sufficiently long to allow examination.

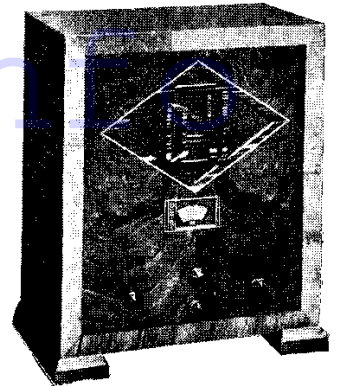
**General Notes.**—The layout of this chassis is fairly straightforward. The majority of the small components are mounted on small assembly panels, which we have numbered A1, A2, A3 and A4.

A1, beside V4 valveholder, carries (in order from the base plate) C11, R15, C10 and R14.

A2, behind V3, side next valve, C5, C4; side next back panel, R12, R8, R9 and R11.

A3, behind V2, R2, C1, R5 and C3.

A4, details are given in the diagram.  
 If a component on one of these requires replacement the two holding screws should



The Tiger four-valve plus rectifier superhet made by Ultra Electric Ltd.

### VALVE READINGS

V.C. Max.

Valve.	Type.	Electrode.	Volts.	M.A.
V1 ...	AC/SG	anode ...	250	See note
		screen ...	33	
V2 ...	AC/SGVM	anode ...	250	See note
		screen ...	62	
V3 ...	AC/SG	anode ...	*	See note
		screen ...	15**	
V4 ...	AC/Pen	anode ...	235	30
		aux. grid ...	252	5.5

\* Anode bend detector with high anode coupling resistance. Only very approximate readings can be taken.

\*\* This represents the bias on V4.  
 Note the inclusion of m.a. meter leads in series with the valve anode leads causes instability and precludes the taking of current readings under ordinary circumstances.

be removed and the assembly eased out. The screws are of the self-threading type.

The casing of C15 is insulated from the chassis, and this bush must be replaced if a new condenser has to be fitted.

**Replacing Chassis.**—Lay the screening tray in the bottom of the cabinet with the insulating strip to the metal rectifier end and lay the chassis on top of it. (The base of the chassis actually rests inside the lip of the tray.)

Replace the three screws underneath and the knobs.

## PORTADYNE RADIO'S P.B.5 PORTABLE

**Circuit.**—The H.F. valve, PM12A (V1), is preceded by a conventional frame aerial in which the long-wave section is short-circuited when the medium wave is in use. The circuit has a "local-distance" switch which connects a condenser of small value in series with the grid condenser and at the same time connects a balancing condenser across the H.F. tuning condenser. The anode

of the valve is coupled to the tuned grid of the next valve by a choke-condenser filter.

The detector valve, PM2DX (V2) has its grid leak taken to a tapping on a potentiometer across the filament supply to provide bias for the most sensitive operating condition of the valve. Swinging coil reaction is used and the anode H.T. circuit is decoupled. Coupling to the first L.F. valve is by parallel-fed transformer.

The first L.F. valve, PM2DX (V3) has a tone control in the grid circuit in the form of a condenser between the grid and chassis. This is operated by a switch.

Coupling to the second L.F. valve is by another parallel-fed transformer, the primary of which has a complete tone correction filter in series with it. The anode H.T. supply to this valve is also decoupled. The next valve, PM2DX (V4) (driver) is also coupled to the output by a typical Class B transformer.

The output is a Class B B21 (V5) and is compensated for high note distortion by a

condenser between one grid and earth, by a condenser between each anode and earth and by another between the anodes. The speaker is a permanent-magnet type.

**Special Notes.**—The screen potential for the H.F. valve is derived from the H.T. through the resistance R4, which is the decoupling resistance of the detector. When the screen voltage is approximately that of the H.T. battery the detector valve is not drawing any current.

A resistance R9 is connected across the  
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### RESISTANCES

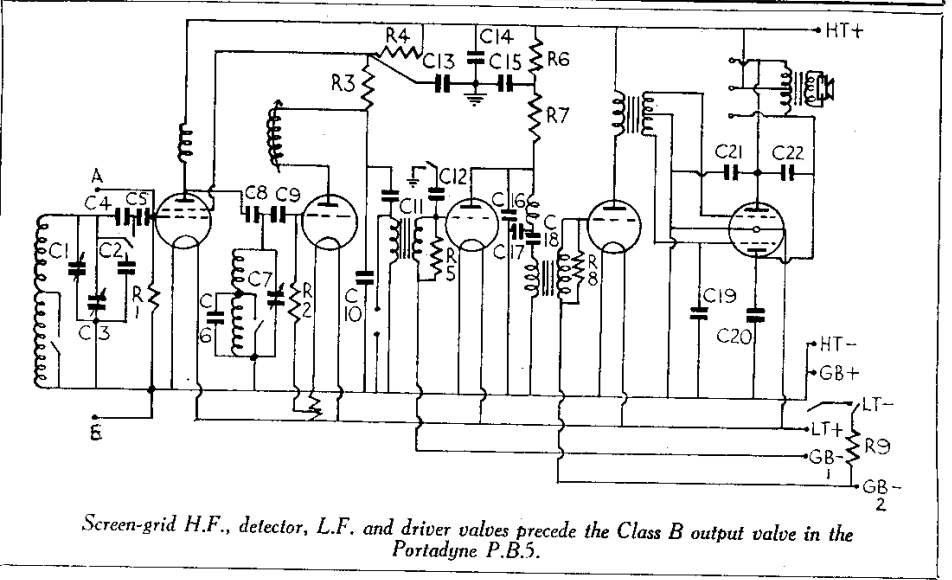
R.	Purpose.	Ohms.
1	V1 grid leak ...	1 meg.
2	V2 grid leak ...	1 meg.
3	V2 anode coupling to 1st LF trans. ...	30,000
4	V2 anode decoupling ...	50,000
5	Across secondary of 1st LF trans. ...	220,000
6	V3 anode decoupling ...	20,000
7	V3 anode coupling to 2nd LF trans. ...	20,000
8	Across secondary of 2nd LF trans. ...	220,000
9	Across GB battery ...	300
x	Across LW of V2 grid coil ...	250,000

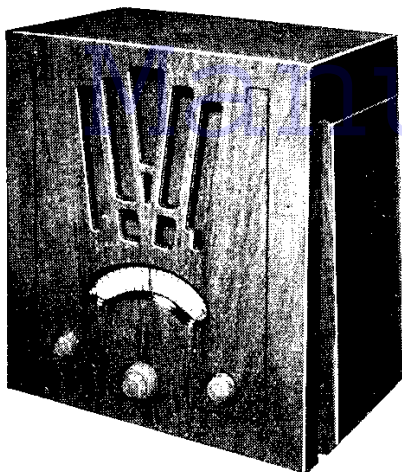
### CONDENSERS

C.	Purpose.	Mfd.
4	In series with C5 for local reception (twisted wire) ...	—
5	V1 grid condenser ...	.0001
6	L.W. padding condenser (twisted wire) ...	—
8	H.F. filter from anode V1 to grid coil of V2 ...	.0001
9	V2 grid condenser ...	.0001
10	V2 anode by pass condenser ...	.002
11	LF filter to 1st LF transformer ...	.1
12	Tone control in grid circuit V3 ...	.002
13	V1 screen and V2 anode decoupling ...	1
14	Across HT battery ...	1
15	V3 anode decoupling ...	1
16	Part of tone correction circuit ...	.001
17	Part of tone correction circuit ...	.001
18	Filter to 2nd L.F. transformer ...	.1
19	Tone compensating, in one grid of V5 ...	.01
20	Between one anode of V5 and earth ...	.01
21	Between other anode of V5 and earth ...	.002
22	Between V5 anodes ...	.004
x	Tone compensating in other grid ...	.01

### VALVE READINGS

Valve	Type.	Electrode.	Volts.	m.a.
1	PM12A	anode	117	.8
		screen	55	—
2	PM2DX	anode	38	.9
3	PM2DX	anode	70	1.2
4	PM2DX	anode	118	1.9
5	B21	each anode	130	—





A self-contained battery portable, the P.B.5 is a product of Portadyne Radio, Ltd. It is fitted with a moving-coil speaker and the controls include a local-distance switch.

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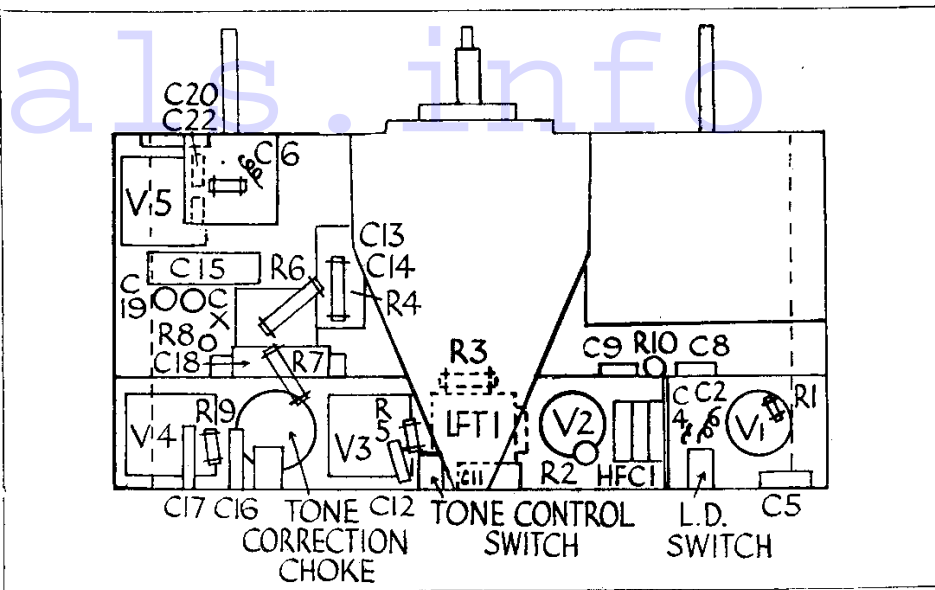
GB battery to compensate for drop in H.T. volts.

**Quick Tests.**—With m.a. meter in negative H.T. lead:—

- Current with no signal ... 7 m.a.
- " " moderate signal 8 "
- " " loud signal ... 10-12 m.a.

**Removing Chassis.**—Remove knobs (grub screw), four wood screws underneath cabinet, battery platform and brackets, and slide chassis out complete with frame aerial.

Unsolder the two frame aerial leads on left hand side (looking from rear) (top yellow, bottom red), and the screened lead from the tag on the right-hand side. Unsolder speaker leads.



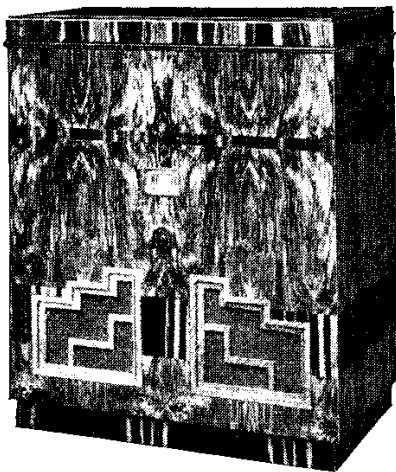
As the top-deck layout of the P.B.5 is straightforward only the underneath plan is given above.

Remove four screws holding chassis to base of frame, and lift chassis out carefully. Remove screen on switch side.

If any of the components on the inside of the chassis have to be repaired, it is more convenient to remove the gang condenser first. To do this, remove the three countersunk screws holding the condenser base plate to the chassis. Unsolder the two leads to the terminal on the rear condenser and the earthing lead. Ease the condensers out and unsolder the lead to the front condenser.

**General Notes.**—If the reaction control becomes loose, remove the lid on the interval valve coil box (the screws are threaded to the inside support and there are no nuts). Tighten the control by undoing the grub screw on the collar and re-tightening while pressing the collar against the spring.

**Replacing Chassis.**—Remember to replace screen. Lay the chassis inside the frame aerial and replace the four holding screws. Resolder the L.S. and frame aerial leads and replace the knobs.



Both the Decca Gramophone Co. Ltd., and its associated company, Brunswick Ltd., market this six valve radiogram.

**Circuit.**—This set is a superhet on the medium waves, and a "straight" receiver on the long. The terms used will apply to the superhet features.

The H.F. valve, VP4 (V1), is preceded by a tuned secondary aerial transformer. Bias is applied to the grid by a resistance in the cathode lead and by the A.V.C. voltage. Coupling to the next valve is by H.F. choke, and a free end winding wound with the tuned grid coil.

The first detector oscillator, AC/SG (V2), is used with reaction applied by a coupling coil in the cathode circuit. Wave-band switching causes the oscillator coil to be cut out of circuit, and the tuning is transferred to an L.W. transformer.

## DECCA SIX-VALVE SET

The I.F. valve, VP4 (V3), is coupled to the second detector by a band-pass I.F. transformer (I.F. frequency 183 KC) on the medium waves and by an untuned H.F. transformer on the long. Bias is supplied solely by the A.V.C. system.

For the second detector a double-diode triode, AC/HL/DD, is used as a detector and also to provide delayed and amplified A.V.C. The anode of the triode section is resistance capacity coupled to the output pentode.

This valve is a seven-pin AC/Pen. The manual volume control is a potentiometer across the grid input, but separated from the grid leak by the inclusion of a condenser, (C17, between the slider and the grid leak.

A tone correction circuit, consisting of C16, R18 and a small iron-cored choke, is connected across part of the V.C. resistance. Pentode compensation is provided by a .005 condenser directly between the anode and earth.

Bias for the valve is derived from a potentiometer across the L.S. field (in negative H.T. lead), consisting of R22, R21 and R23. The tapping between R21 and R23 provides the delay bias for the anode of the diode.

The output is fed to two speakers, which

have the speech coils connected in parallel, while the 1,000 ohm field coils are connected in series in the negative H.T. lead.

Mains equipment consists of a transformer, a full-wave indirectly-heated rectifier, IW3, and electrolytic smoothing condensers.

**Special Notes.**—The controls on this set are original. The large knob operates the tuning and the "gram" switch at the rear end of the ganging condenser. The small concentric knob controls the volume and by push-pull action the wave-change switch.

The tone remains the same whatever the setting of the V.C.

Visual tuning is obtained with dimming of the pilot lamp (on reception of a carrier) by means of altering the inductance of chokes in series with the A.C. supply to the lamps. This is brought about by having two chokes in series with the lamps on the same core as a much larger choke which is included in the H.T. supply to the controlled valves.

As the current to the valves decreases by the A.V.C. action the A.C. voltage drop through the lamp-chokes increases owing to the higher inductance brought about by the de-saturation of the core.

In the first models it was found that this might increase the risk of modulation hum, but in later models a 25 mfd. electrolytic condenser connected in place of C7 (nominally .1 mfd.) effectively cures this tendency.

**Quick Tests.**—Between casing of outer electrolytic condenser (—) and chassis (+), 135 volts.

Between second terminal from inside on L.S. transformer (—) and chassis (+), 135 volts (same point as above, i.e., H.T.—).

Between third terminal tag (+) and chassis (—), 287 (H.T. smoothed).

(Continued on next page.)

### VALVE READINGS

No signal.

Valve	Type	Electrode	Volts.	M.A.
1	VP4	anode ...	200	.5
		aux. grid ...	80	
		anode ...	200	.5
2	AC/SG	screen ...	80	
		anode ...	200	.5
		aux. grid ...	80	
3	VP4	anode ...	200	3.5
		aux. grid ...	80	
		anode ...	200	
4	AC/HL/DD	Triode anode ...	130	3.25
		anode ...	275	38-40
		AC/Pen anode ...	275	5-6
5	(7 pin)	aux. grid ...	275	
		anode ...	275	