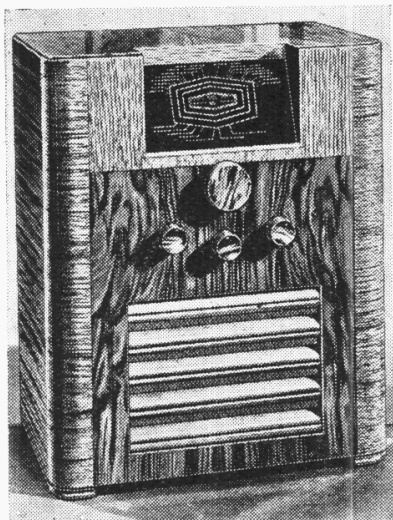


“TRADER” SERVICE SHEET

420

INVICTA A49

AC SUPERHET



THE Invicta A49 is a 3-valve (plus rectifier) AC superhet covering four wavebands. The SW ranges are 13.5 to 52 m (referred to as SW1 in this Service Sheet) and 50 to 200 m (referred to as SW2).

There is provision for an external speaker, and for a gramophone pick-up,

the latter being switched by a fifth position on the waveband switch control.

The receiver is suitable for AC mains of 200-250 V, 40-100 C/S.

Release date : May, 1939.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L1** (SW1), **L2** (SW2) and **L3** (MW and LW) to single tuned circuits **L4**, **C30** (SW1), **L5**, **C30** (SW2), **L6**, **C30** (MW) and **L7**, **C30** (LW). On MW, coupling is assisted by small condenser **C1** connected between **L3** and **L6**.

First valve (**V1**, Mullard **ECH2**) is a triode-hexode operating as frequency changer with internal coupling. Triode oscillator anode coils **L12** (SW1), **L13** (SW2), **L14** (MW) and **L15** (LW) are tuned by **C33**; parallel trimming by **C8**, **C31** (MW) and **C9**, **C32** (LW); series tracking by **C10** (SW1), **C11** (SW2) and **C12** (MW and LW). Reaction by grid coils **L8** (SW1), **L9** (SW2), **L10** (MW) and **L11** (LW). The CG resistance **R3** and condenser **C7** are in the low-potential end of the reaction circuit.

Second valve (**V2**, Mullard **EF9**) is a variable- μ pentode operating as IF amplifier with tuned-primary tuned-secondary transformer couplings **C3**, **L16**, **L17**, **C4** and **C15**, **L18**, **L19**, **C16**.

Intermediate frequency 465 KC/S.

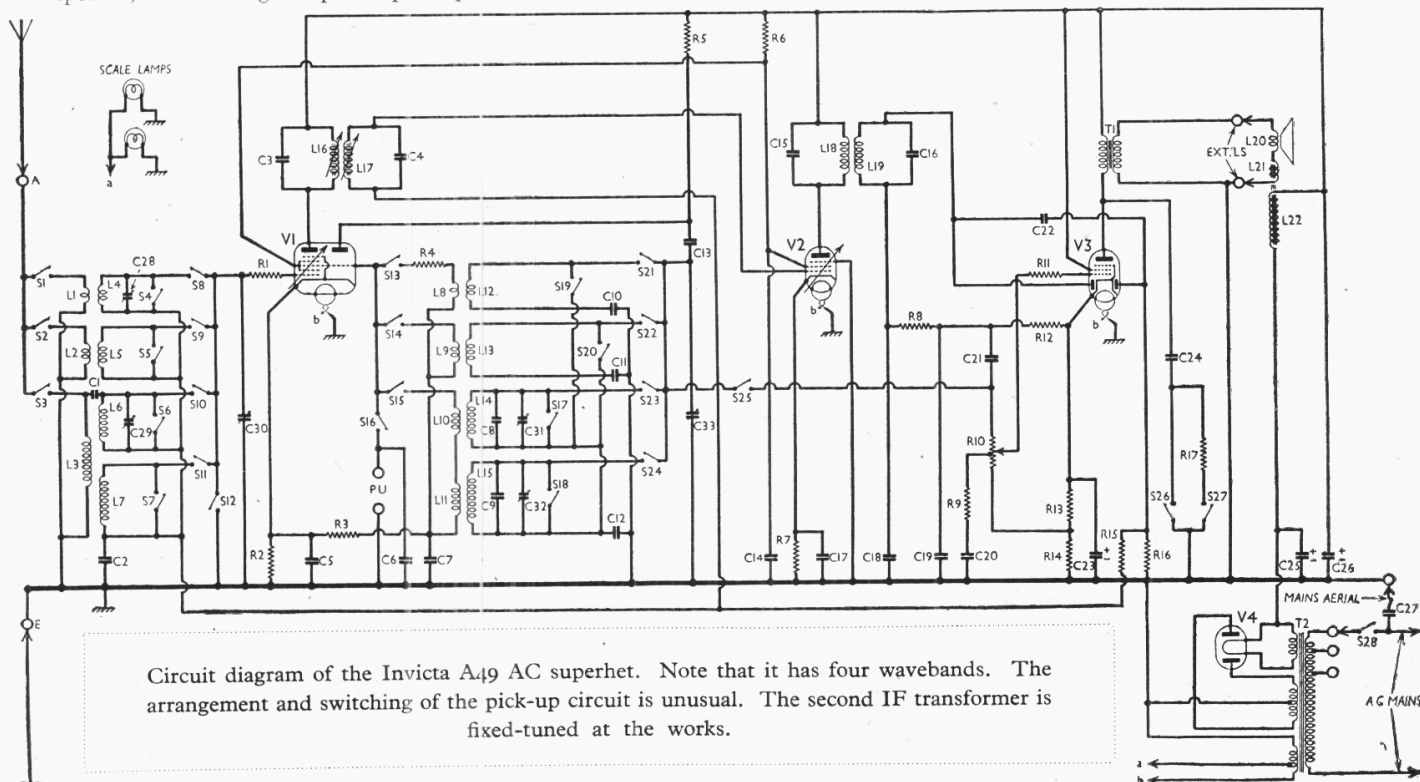
Diode second detector is part of double

diode pentode output valve (**V3**, Mullard **EBL1**). Audio frequency component in rectified output is developed across load resistance **R12** and passed via AF coupling condenser **C21**, manual volume control **R10** and grid stopper **R11** to CG of pentode section.

For operation with a gramophone pick-up, a pair of sockets is provided in the grid circuit of the triode section of **V1** via **S16**. When the switch control is turned to the “Gram” position, **S16** and **S25** close, and **V1** triode section becomes an AF amplifier with **R5** as its anode load resistance and **C13** as its output coupling condenser. Thus the pick-up output is handed on via **C13** and **S25** to the volume control, across which it is developed in amplified form.

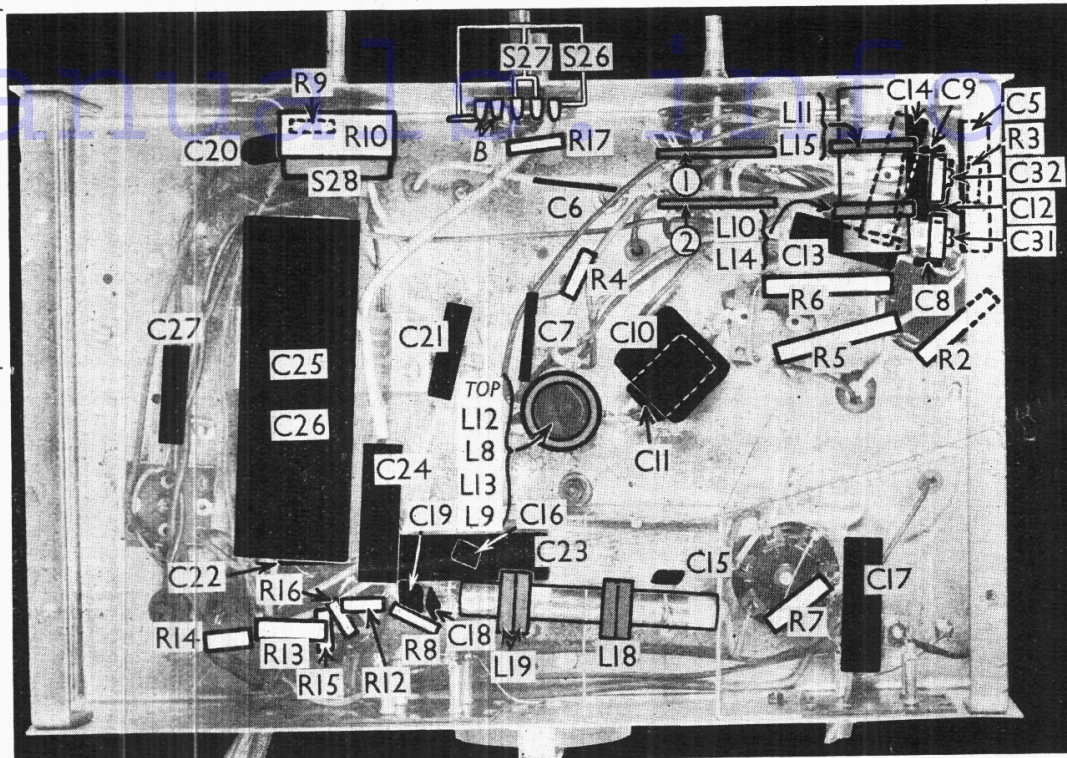
A tone-compensating circuit **R9**, **C20** is connected between the centre-tap on **R10** and chassis.

IF filtering by **C18**, **R8** and **C19** in diode circuit. Three-position tone control in pentode anode circuit by **C24**, **R17** and switches **S26**, **S27**. Either or both of the switches may be opened. Provision for connection of low impedance external speaker by sockets across secondary of the output transformer **T1**. As these sockets are used also to connect the internal speaker, the plugs of the latter are provided with a further socket each, so that both speakers may be operated



Circuit diagram of the Invicta A49 AC superhet. Note that it has four wavebands. The arrangement and switching of the pick-up circuit is unusual. The second IF transformer is fixed-tuned at the works.

Under-chassis view. The tone control switch tags are indicated, while the two rotary switch units are shown in detail over-leaf.



together if desired.

Second diode of **V3**, fed from **L19** via **C22**, provides DC potential which is developed across load resistance **R16** and fed back through a decoupling circuit to FC and IF valves, giving automatic volume control. Delay voltage, together with GB for pentode section, is developed across resistances **R13** and **R14** in cathode lead to chassis.

HT current is supplied by full-wave rectifying valve (**V4**, Mullard **AZ1**). Smoothing by speaker field **L22** and dry electrolytic condensers **C25** and **C26**. A mains aerial connection is provided via **C27**. When this is not in use, the plug is inserted in a second earth socket, so that **C27** becomes a mains RF filter.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 pentode CG stabiliser ..	47
R2	V1 fixed GB resistance ..	150
R3	V1 osc. CG resistance ..	22,000
R4	Osc. SW1 reaction stabiliser ..	47
R5	V1 osc. anode HT feed ..	22,000
R6	V1, V2 SG's HT feed ..	22,000
R7	V2 fixed GB resistance ..	330
R8	IF stopper ..	60,000
R9	Part of tone compensator ..	60,000
R10	Manual volume control ..	1,000,000*
R11	V3 pentode CG stopper ..	100,000
R12	V3 signal diode load ..	500,000
R13	V3 pent. GB and AVC delay potential divider resistances {	150
R14		330
R15	AVC line decoupling ..	1,000,000
R16	V3 AVC diode load ..	1,000,000
R17	Part of tone control ..	3,300

* Centre-tapped.

CONDENSERS		Values (μF)
C1	Part of MW aerial coupling ..	0.000006
C2	V1 pentode CG decoupling ..	0.1
C3	1st IF transformer fixed tuning condensers {	0.0001
C4		0.0001
C5	V1 cathode by-pass ..	0.1
C6	Gram PU shunt ..	0.00015
C7	V1 osc. CG condenser ..	0.00015
C8	Osc. circuit MW fixed trimmer ..	0.00002
C9	Osc. circuit LW fixed trimmer ..	0.00026
C10	Osc. circuit SW1 tracker ..	0.005
C11	Osc. circuit SW2 tracker ..	0.0013
C12	Osc. circuit MW and LW tracker ..	0.000657
C13	V1 osc. anode coupling ..	0.1
C14	V1, V2 SG's decoupling ..	0.1
C15	2nd IF transformer fixed tuning condensers {	0.0001
C16		0.0001
C17	V2 cathode by-pass ..	0.1

CONDENSERS (Continued)		Values (μF)
C18	IF by-pass condensers ..	0.00015
C19		0.00015
C20	Part of tone compensator ..	0.005
C21	AF coupling to V3 pentode ..	0.005
C22	Coupling to V3 AVC diode ..	0.00002
C23*	V3 cathode by-pass ..	20.0
C24	Part of tone control ..	0.05
C25*	HT smoothing condensers ..	8.0
C26*		8.0
C27	Mains aerial coupling ..	0.001
C28†	Aerial circuit SW1 trimmer ..	0.00003
C29†	Aerial circuit MW trimmer ..	0.00003
C30†	Aerial circuit tuning ..	0.000554
C31†	Osc. circuit MW trimmer ..	0.00003
C32†	Osc. circuit LW trimmer ..	0.00003
C33†	Oscillator circuit tuning ..	0.000554

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial SW1 coupling coil ..	0.3
L2	Aerial SW2 coupling coil ..	1.8
L3	Aerial MW and LW coupling ..	65.0
L4	Aerial SW1 tuning coil ..	Very low
L5	Aerial SW2 tuning coil ..	0.3
L6	Aerial MW tuning coil ..	3.6
L7	Aerial LW tuning coil ..	13.3
L8	Oscillator SW1 reaction ..	50.0
L9	Oscillator SW2 reaction ..	85.0
L10	Oscillator MW reaction ..	10.0
L11	Oscillator LW reaction ..	12.0
L12	Osc. circuit SW1 tuning coil ..	Very low
L13	Osc. circuit SW2 tuning coil ..	0.4
L14	Osc. circuit MW tuning coil ..	2.0
L15	Osc. circuit LW tuning coil ..	2.8
L16	1st IF trans. { Pri. ..	7.0
L17		Sec. ..
L18	2nd IF trans. { Pri. ..	9.5
L19		Sec. ..
L20	Speaker speech coil ..	1.8
L21	Hum neutralising coil ..	0.15
L22	Speaker field coil ..	2,000.0
T1	Output trans. { Pri. ..	310.0
	Sec. ..	0.15
T2	Mains { Pri., total ..	24.0
	Heater sec., total ..	0.15
	Rect. heat. sec., total ..	0.1
	HT sec., total ..	730.0
Sr-S15	Waveband switches ..	—
S17-S24	Gram pick-up switches ..	—
S16, S25	Tone control switches ..	—
S26, S27	Mains switch, ganged R10 ..	—
S28		—

DISMANTLING THE SET

Removing the Chassis.—Remove the four control knobs (pull off) from the front of the cabinet, and the four bolts (with one metal and one rubber washer, a brass sleeve and a rubber bush, each) holding the chassis to the shelf inside the cabinet, when the chassis can be withdrawn to the extent of the speaker leads which is sufficient for normal purposes.

To free the chassis entirely, unsolder three leads from the connecting panel on the speaker and three leads from the panel on the speaker transformer, and withdraw the speech coil plugs from the speaker sockets at the rear of the chassis.

When replacing, connect the red lead to the top tag of the panel on the speaker; the black lead (together with a black lead from the speaker transformer) to the bottom tag, and plug the speech coil leads into the sockets on the chassis. The three remaining leads should be connected to the panel on the speaker transformer as follows: brown, to the top left-hand tag; yellow to the top right-hand tag; green to the bottom right-hand tag. Note that two felt washers are fitted between each control knob and the cabinet.

Removing Speaker.—Unsolder the leads from the top and bottom tags on the panel on the speaker transformer, withdraw the speech coil plugs from the speaker sockets at the rear of the chassis, and remove the four hexagon nuts holding the speaker to the sub-baffle.

When replacing, see that the connecting panel is on the right and connect the leads as previously indicated.

Removing Speaker Transformer.—Unsolder the four connecting leads from the panel on the transformer and remove the

