NUMBER 103 **'TRADER' SERVICE SHEETS**

CLIMAX TCIII

3-VALVE A.C. RECEIVER

IN the Climax TCIII receiver a 3-valve (plus rectifier) chassis for A.C. mains operation is fitted, the circuit using a variable-mu pentode H.F. amplifier, a triode detector and a pentode output valve. Provision is made for a gramophone pick-up, a mains aerial and an extension speaker, a plug and socket device allowing the internal speaker to be cut out.

An alternative aerial socket brings a Droitwich rejector into circuit and there is also a two-position tone control switch at the back of the chassis.

CIRCUIT DESCRIPTION

Two alternative aerial input connections, **A1** *via* series condenser **C1** to M.W. coupling coil **L2** and tapping on L.W. section of band-pass filter primary, and **A2** direct to **L2**, but with series tuned filter **L1, C1** to earth. Band-pass primary **L3, L4** tuned by **C14**; secondary **L9, L10,** tuned by **C16**; coupling coils **L5, L6, L7, L8.**

First valve is a variable-mu pentode (**V1, Mullard metallised VP4A**) operating as H.F. amplifier. Gain control by variable cathode resistance **R4** which varies G.B.

Tuned-anode coupling by **L11, L12, C19** to triode detector (**V2, Mullard metallised 354V**) operating on grid leak system with **C4** and **R6.** Reaction is applied from anode by coils **L13, L14** and controlled by variable condenser **C18.** H.F. filtering in anode circuit by resistance **R9** and by-pass condenser **C6.** Provision for connection of gramophone pick-up in grid circuit by switch **S6.** On gramophone G.B. for **V2** is obtained from **R7.**

Resistance capacity coupling by **R8, C7** and **R10** to output pentode (**V3, Mullard Pen4VB**). Tone correction by fixed condensers **C9, C10** in anode circuit with two-point tone control by switch **S7.** Provision for connection of high-impedance external speaker across resistance **R12.** Plug and socket device enables internal speaker to be cut out and also allows both speakers to be used at once.

H.T. current is supplied by full-wave rectifier (**V4, Mullard DW3** or **IW3**). Smoothing by speaker field coil **L17** and dry electrolytic condensers **C11, C12.** Mains aerial coupling by condenser **C13.**

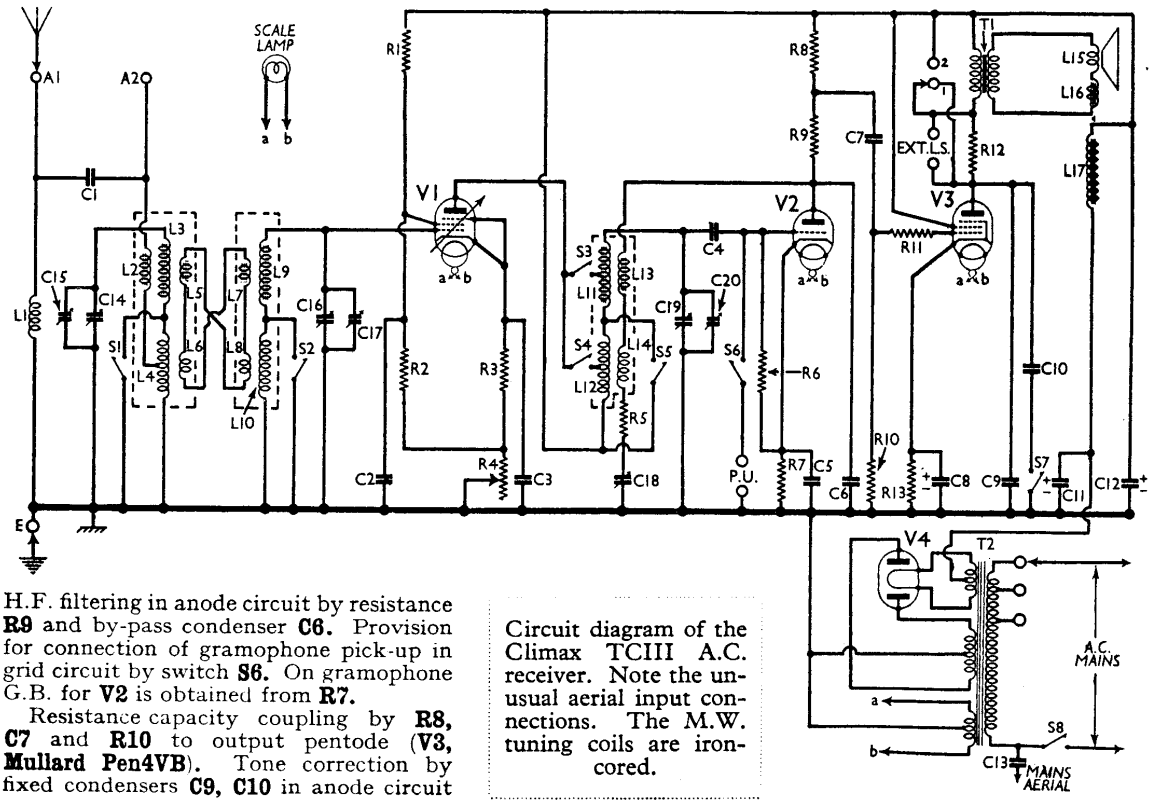
COMPONENTS AND VALUES

	Condensers	Values (μF)
C1	Aerial (A1) coupling	0·0003
C2	V1 S.G. by-pass	0·1
C3	V1 cathode by-pass	0·1
C4	V2 grid condenser	0·00005
C5	V2 cathode by-pass	0·1
C6	V2 anode H.F. by-pass	0·002
C7	L.F. coupling V2 to V3	0·1
C8*	V3 cathode by-pass	50·0
C9	Tone correctors	0·006
C10		0·006
C11*	H.T. smoothing	16·0
C12*		8·0
C13	Mains aerial coupling	0·001
C14†	Band-pass primary tuning	—
C15‡	Band-pass primary trimmer	—
C16†	Band-pass secondary tuning	—
C17‡	Band-pass secondary trimmer	—
C18†	Reaction control	0·0003
C19†	V1 anode circuit tuning	—
C20‡	V1 anode circuit trimmer	—

* Electrolytic † Variable ‡ Pre-set.

	Resistances	Values (ohms)
R1	V1 S.G. potential divider	20,000
R2		30,000
R3	V1 fixed G.B. resistance	250
R4	V1 gain control	5,000
R5	Reaction circuit stabiliser	200
R6	V2 grid leak	500,000
R7	V2 G.B. resistance (gram.)	500
R8	V2 anode load	40,000
R9	V2 anode H.F. stopper	6,000
R10	V3 C.G. resistance	500,000
R11	V3 C.G. H.F. stopper	250,000
R12	Ext. speaker shunt	50,000
R13	V3 G.B. resistance	140

	Other Components	Approx. Values (ohms)
L1	Aerial filter coil	12·0
L2	Aerial coupling coil (M.W.)	2·0
L3	Band-pass primary coils	1·5
L4		18·5
L5	Band-pass coupling coils	0·05
L6		3·0
L7		0·05
L8		3·0
L9	Band-pass secondary coils	1·5
L10		18·5
L11	V1 anode circuit tuning coils	1·5
L12		18·5
L13	Reaction coils	1·8
L14		5·0
L15	Speaker speech coil	2·1
L16	Hum neutralising coil	0·1
L17	Speaker field coil	2,000·0
T1	Speaker input trans. Pri.	250·0
	Speaker input trans. Sec.	0·25
T2	Mains trans. Pri. total	38·0
	Mains trans. Heater sec.	0·05
	Mains trans. Rect. fil. sec.	0·1
	Mains trans. H.T. sec. total	420·0
S1-S5	Waveband switches	—
S6	Gram. pick-up switch	—
S7	Tone control switch	—
S8	Mains switch	—



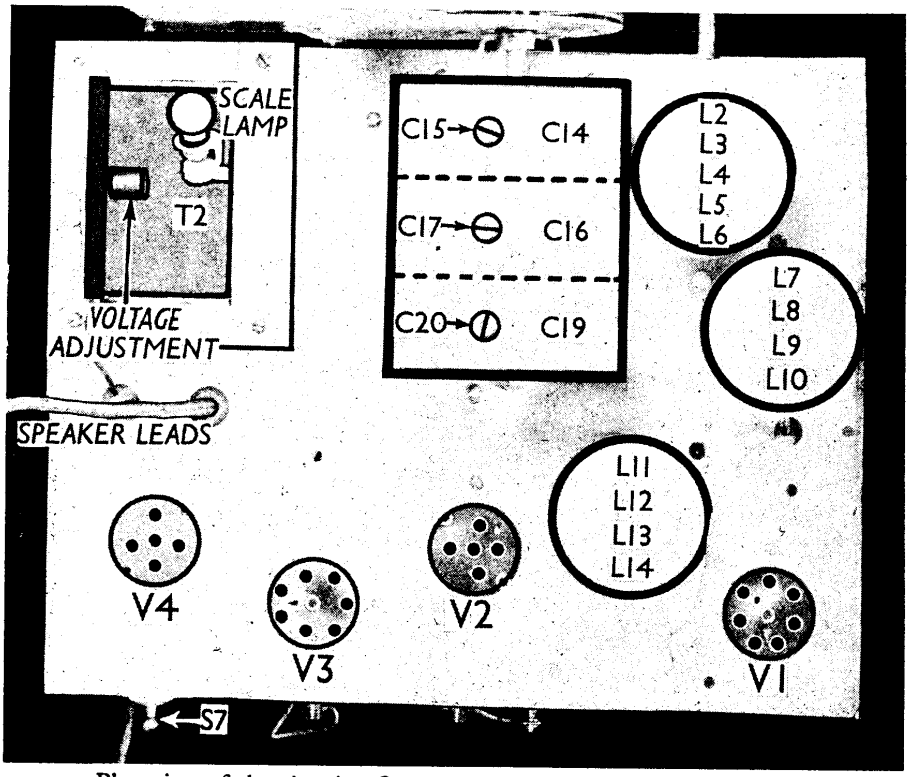
Circuit diagram of the Climax TCIII A.C. receiver. Note the unusual aerial input connections. The M.W. tuning coils are iron-cored.

DISMANTLING THE SET

Removing Chassis.—In order to remove the chassis from the cabinet it is necessary first to remove the back, the four control knobs (recessed grub screws) and the four bolts (with washers) holding the chassis to the bottom of the cabinet. Next free the speaker leads from the cleat on the side of the cabinet, when the chassis can be withdrawn to a sufficient extent to allow of normal repairs being carried out.

When replacing, do not forget the felt washer between the cabinet and the knob of the tuning control and fix the switch knob so that the white dot is on the right when the switch is in the medium wave position. Also note that the two cut-away washers for the chassis fixing bolts go to the left-hand side of the cabinet, when viewed from the back.

To free the chassis entirely, free the



Plan view of the chassis. S7 at the rear is the tone control switch.

speaker leads from the cleat on the top of the cabinet and unsolder them from the speaker. *When replacing*, connect the leads as follow, numbering the tags from left to right :—1, black ; 2, green ; 3 and 4, joined together, blue.

Removing Speaker.—To remove the speaker from the cabinet unsolder the leads to it and remove the four round-head wood screws (with washers) holding it to the sub-baffle. *When replacing the speaker*, see that the transformer is at the top.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 225 V, using the 220-230 V tapping on the mains transformer. 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 VP4A	263	4·0	125	1·9
V2 354V	80	4·0	—	—
V3 Pen4VB	251	40·0	263	4·2
V4 IW3	340†	—	—	—

† Each anode, A.C.

GENERAL NOTES

Switches.—S1-S5 are the waveband switches, and **S6** the pick-up switch, ganged together in a single unit beneath the chassis, and seen in our under-chassis view. The table (col. 2) gives the switch positions for the various control settings, O indicating open, and C, closed.

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

S7 is the Q.M.B. tone control switch, at the rear of the chassis. When the knob of this is down, **C10** is switched in circuit.

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

Coils.—L1 is unscreened, and is beneath the chassis, at the rear. **L2-L6, L7-L10** and **L11-L14** are in three screened units on the chassis deck.

Scale Lamp.—This is an Osram M.E.S. type, rated at 6.5 V, 0.3 A.

External Speaker.—Two sockets are provided at the rear of the chassis for a high resistance external speaker (6,500 O). A plug and socket device is fitted for switching. With the plug in socket 1, only the internal speaker is in use ; if in socket 2, only the external speaker is in use ; with the plug free, both speakers are operative.

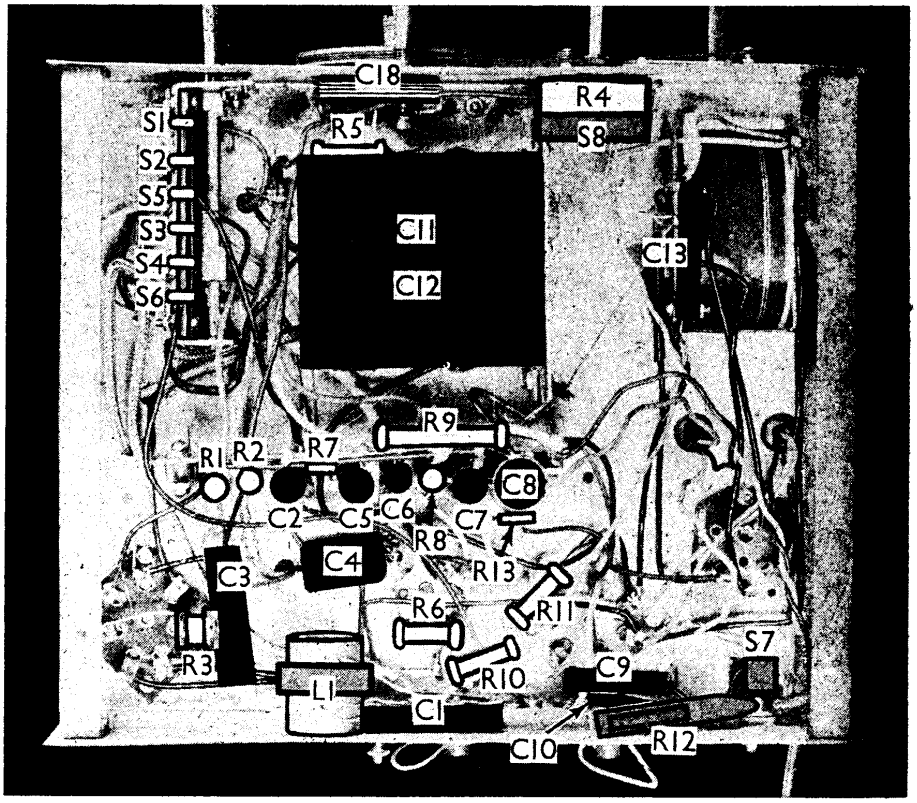
Resistances R3, R5, R7, R13.—These are all wire-wound, on paxolin formers.

Condensers C11, C12.—These are two dry electrolytics in a single unit, with a common negative (black) lead. The, positive of **C11** (16μF) is the yellow lead and the positive of **C12** (8 μF) the red lead.

Chassis Divergencies.—In earlier receivers the filter coil may be omitted. **V1** may have an H.F. choke in its anode circuit. **V2** may also have an H.F. choke, in place of **R9**.

Some models may have had tuned grid coupling between **V1** and **V2,** instead of the tuned anode type. In this case the bottom end of **L12** is connected to chassis, instead of to the H.T. positive line, while a .0001 μF coupling condenser is connected from the anode of **V1** to **S3** and **S4**.

Component Divergencies.—R2 may be 20,000 O, and **R11** may be 50,000 O. **C1** and **C4** may be .0001 μF, while **C6** may be .0005 μF.



Under-chassis view. The switches are clearly indicated. R12 is inside a piece of sleeving.