'TRADER' SERVICE SHEET

188

MARCONIPHONE 556

3-BAND A.C. SUPERHET

A SHORT-WAVE range of about 16-54 metres is covered by the Marconiphone 556 5-valve (plus rectifier) A.C. 3-band superhet.

A very similar chassis is incorporated in the 566 radio-gramophone, but this *Service Sheet* was prepared on a 556 table receiver.

CIRCUIT DESCRIPTION

Aerial input on M.W. and L.W. via socket **A** and trimming condenser **C34** to tappings on primary coils of capacity-coupled band-pass filter. Primary, **L1, L2,** tuned by **C35**; secondary **L6, L7,** tuned by **C39**; coupling by condenser **C2.** On S.W. aerial input is via socket **A,** or via sockets **A** and **A1** when a dipole aerial is used, to coupling coil **L4** and single-tuned circuit **L5, C39.**

First valve (**V1, Marconi metallised X41**) is a triode-hexode operating as frequency-changer with internal coupling. Oscillator grid coils **L8, L10, L12** are tuned by **C40**; parallel trimming by **C41** (S.W.), **C42** (M.W.), **C44** (L.W.); series tracking by **C10** (S.W.), **C11, C43** (M.W.), **C45** (L.W.); oscillator anode reaction coils **L9** (S.W.), **L11** (M.W.), **L13** (L.W.).

Single variable-mu R.F. pentode intermediate frequency amplifier (**V2, Marconi metallised VMP4G**) operates with iron-dust - cored tuned - primary tuned - secondary transformer couplings **C46, L14, L15, C47** and **C48, L16, L17, C49.**

Intermediate frequency 465 KC/S.

Diode second detector is part of separate double diode valve (**V3, Marconi metallised D41**). Audio-frequency component in rectified output is developed across **R15** and passed via I.F. stopper **R14,** coupling condenser **C18,** manual volume control **R17,** and I.F. stopper **R18** to C.G. of triode A.F. amplifier (**V4, Marconi metallised MH4**). Provision for connection of gramophone pick-up.

Second diode of **V3,** fed by **C20,** provides D.C. potential which is developed across **R16** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from drop along **V4** cathode resistance **R20.**

Resistance-capacity coupling by **R22, C25, R23** between **V4** and pentode output valve (**V5, Marconi MPT4**). Three-point tone control in C.G. circuit by resonant filter **L18, C23** (tuned to 5,000 C/S) and H.F. attenuation condensers **C26, C27.** Fixed tone correction in anode circuit by **C29.** Provision for connection of low-impedance external speaker across secondary of **T1.**

H.T. current is supplied by full-wave rectifying valve (**V6, Marconi U12**). Smoothing by speaker field coil **L21** and electrolytic condensers **C31, C32.**

DISMANTLING THE SET

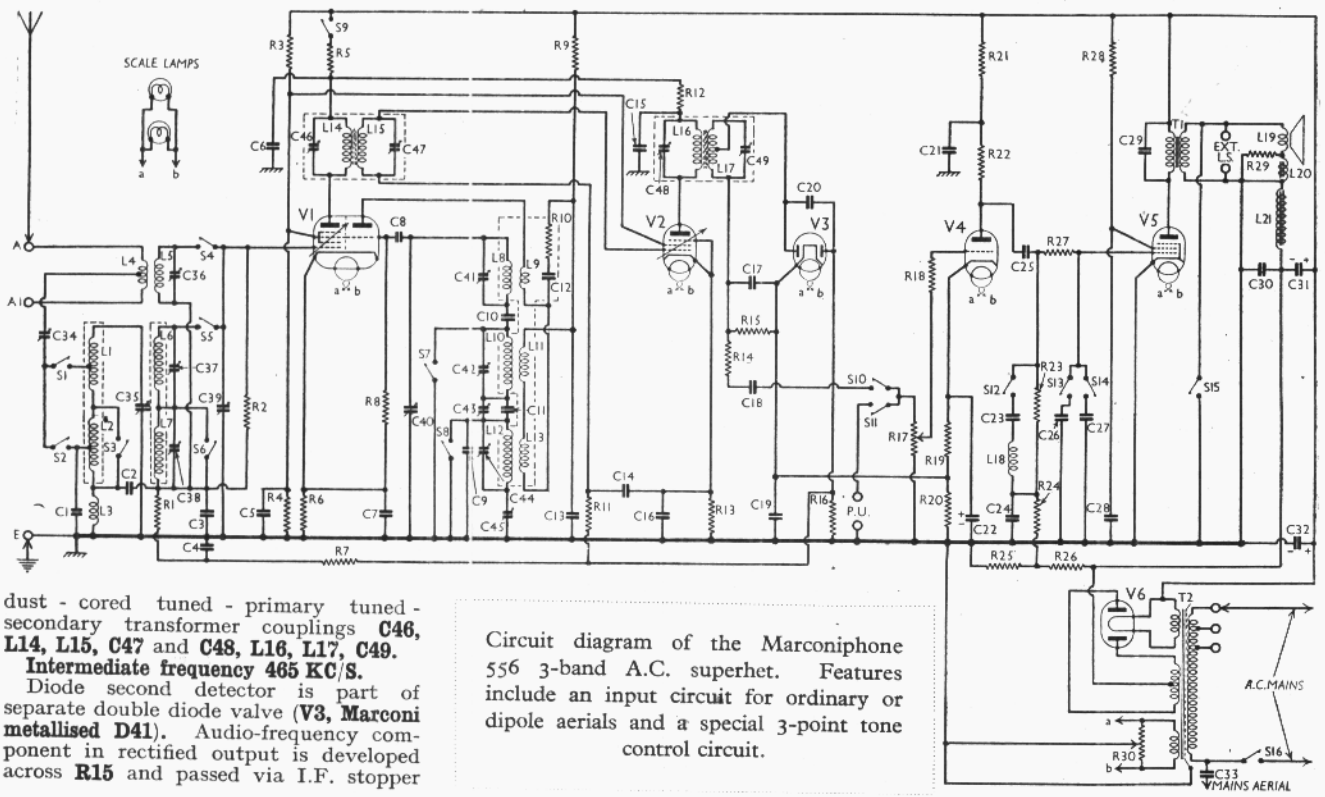
Removing Chassis.—To remove the chassis from the cabinet, first remove the knob from the gramophone switch at the back of the chassis (recessed self-tapping screw) and the cabinet back (five screws and spring washers). Now remove the volume control, wave-change switch and small tuning knobs (recessed self-tapping screws) and the other three knobs (pull off).

Next remove the four bolts (with lock washers and washers) holding the chassis to the bottom of the cabinet and free the speaker leads from the cleat on the sub-baffle. The chassis can then be withdrawn to the extent of the speaker leads, which should be sufficient for normal purposes.

To free the chassis entirely, free the mains lead from the cleat on the bottom of the cabinet and unsolder the speaker leads from the panel on the back of the chassis. *When replacing,* connect the leads as follows, numbering the tags from left to right :—1, yellow; 2, yellow/black; 3, black; 4, red/yellow; 5, red.

Removing Speaker.—If it is desired to remove the speaker from the cabinet, unsolder the leads from the panel on the input transformer and remove the two bolts (with washers) holding the speaker supporting bar to the fillets on the sides of the cabinet.

When replacing, see that the transformer is on the left, note that the tags are numbered and connect the leads as follows :—5, black; 6, yellow/black; 7, red; 8, red/yellow; 2, yellow.



Circuit diagram of the Marconiphone 556 3-band A.C. superhet. Features include an input circuit for ordinary or dipole aerials and a special 3-point tone control circuit.

COMPONENTS AND VALUES

	CONDENSERS	Values (μF)
C1	Aerial circuit shunt, L.W.	0·000035
C2	Band-pass coupling	0·0075
C3	V1 hexode C.G. decoupling	0·023
C4	V1 A.V.C. line decoupling	0·1
C5	V1, V2 S.G.'s by-pass	0·1
C6	V1 hexode anode decoupling	0·1
C7	V1 cathode by-pass	0·1
C8	V1 osc. C.G. condenser	0·00005
C9	Osc. L.W. trimmer	0·000023
C10	Osc. S.W. tracker	0·00285
C11	Osc. M.W. tracker	0·00035
C12	Osc. reaction stabiliser	0·00015
C13	Osc. anode decoupling	1·0
C14	V2 C.G. decoupling	0·1
C15	V2 anode decoupling	0·1
C16	V2 cathode by-pass	0·1
C17	I.F. by-pass	0·0001
C18	A.F. coupling to V4	0·1
C19	V3 cathode by-pass	0·1
C20	V3 A.V.C. diode feed	0·0001
C21	V4 anode decoupling	1·0
C22*	V4 cathode by-pass	25·0
C23	T.C. condenser	0·0023
C24	V5 C.G. decoupling	0·1
C25	V4 to V5 A.F. coupling	0·1
C26	T.C. condensers	0·0015
C27	T.C. condensers	0·005
C28	V5 aux. grid by-pass	1·0
C29	Fixed tone corrector	0·001
C30	Speaker field shunt	0·1
C31	H.T. smoothing	8·0
C32	H.T. smoothing	4·0
C33	Mains aerial coupling	0·00035
C34‡	Aerial circuit trimmer	—
C35†	Band-pass primary tuning	—
C36‡	Aerial circuit S.W. trimmer	—
C37‡	Band-pass sec. M.W. trimmer	—
C38‡	Band-pass sec. L.W. trimmer	—
C39†	Aerial S.W. and B.P. sec. tuning	—
C40†	Osc. circuit tuning	—
C41‡	Osc. circuit S.W. trimmer	—
C42‡	Osc. circuit M.W. trimmer	—
C43‡	Osc. circuit M.W. tracker	—
C44‡	Osc. circuit L.W. trimmer	—
C45‡	Osc. circuit L.W. tracker	—
C46‡	1st I.F. trans. pri. tuning	—
C47‡	1st I.F. trans. sec. tuning	—
C48‡	2nd I.F. trans. pri. tuning	—
C49‡	2nd I.F. trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTANCES	Values (ohms)
R1	V1 hexode C.G. decoupling	100,000
R2	V1 hexode C.G. resistance	3,500,000
R3	V1 and V2 S.G.'s H.T. potential divider	23,000
R4	V1 and V2 S.G.'s H.T. potential divider	23,000
R5	V1, V2 anodes decoupling	3,500
R6	V1 fixed G.B. resistance	230
R7	V1 A.V.C. line decoupling	500,000
R8	V1 osc. C.G. resistance	50,000
R9	V1 osc. anode decoupling	23,000
R10	V1 osc. reaction stabiliser	100
R11	V2 C.G. decoupling	500,000
R12	V2 anode decoupling	10,000
R13	V2 fixed G.B. resistance	230
R14	I.F. stopper	50,000
R15	V3 signal diode load	230,000
R16	V3 A.V.C. diode load	500,000
R17	Manual volume control	500,000
R18	V4 C.G. I.F. stopper	150,000
R19	V4 G.B. and A.V.C. delay voltage resistances	350
R20	V4 G.B. and A.V.C. delay voltage resistances	350
R21	V4 anode decoupling	35,000
R22	V4 anode load	35,000
R23	V5 C.G. resistance	100,000
R24	V5 C.G. decoupling	350,000
R25	V5 G.B. potential divider	50,000
R26	V5 G.B. potential divider	500,000
R27	V5 C.G. I.F. stopper	50,000
R28	V5 aux. grid H.T. feed	5,000
R29	Hum neut. coil shunt	1·0
R30	Hum control	48·5

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Band-pass primary coils	3·75
L2	Band-pass primary coils	14·0
L3	Modulation hum suppressor	72·0
L4	Aerial S.W. coupling coil	0·7
L5	Aerial S.W. tuning coil	0·25
L6	Band-pass secondary coils	3·2
L7	Band-pass secondary coils	13·3
L8	Osc. S.W. tuning coil	0·1
L9	Osc. S.W. reaction coil	1·0
L10	Osc. M.W. tuning coil	18·0
L11	Osc. M.W. reaction coil	2·5
L12	Osc. L.W. tuning coil	18·0
L13	Osc. L.W. reaction coil	2·0
L14	1st I.F. trans. Pri.	5·0
L15	1st I.F. trans. Sec.	6·0
L16	2nd I.F. trans. Pri.	5·0
L17	2nd I.F. trans. Sec.	5·0
L18	T.C. choke	270·0
L19	Speaker speech coil	4·0

	OTHER COMPONENTS (Continued)	Approx. Values (ohms)
L20	Hum neutralising coil	0·4
L21	Speaker field coil	2,620 0
T1	Speaker input trans. Pri.	570·0
T1	Speaker input trans. Sec.	0·6
T2	Mains trans. Pri. total	29·0
T2	Mains trans. Heater sec.	0·1
T2	Mains trans. Rect. fil. sec.	0·1
T2	Mains trans. H.T. sec. total	520·0
S1-8	Waveband switches	—
S9	Radio muting switch (gram.)	—
S10-11	Radio-gram. switches	—
S12-14	Tone control switches	—
S15	Speaker muting switch	—
S16	Mains circuit switch	—

VALVE ANALYSIS

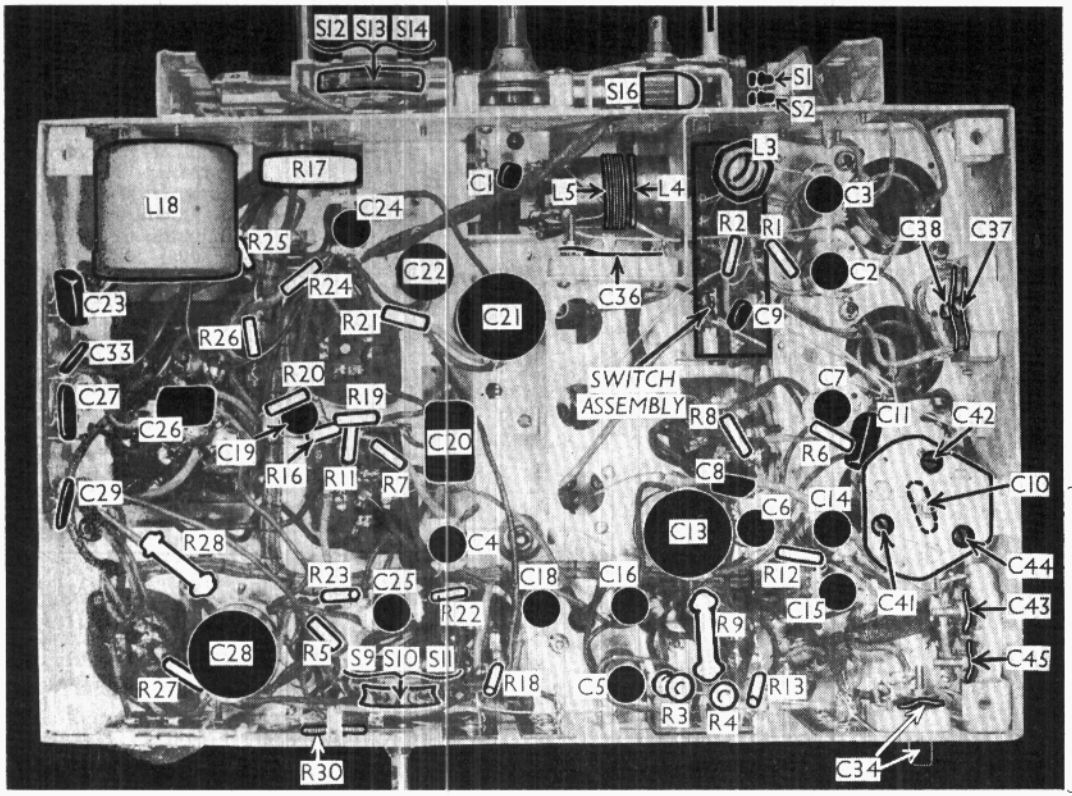
Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 220 V, using the 211-230 V tapping on the mains transformer. The set was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

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

If **V2** should become unstable when measurements are made in its screen circuit, as in our case, it can be stabilised by connecting a non-inductive 0.1 μF condenser from anode or grid to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 X41*	210	1·3	60	1·9
V2 VMP4G	170	3·4	60	2·7
V3 D41	—	—	—	—
V4 MH4	90	2·2	—	—
V5 MPT4	210	29·0	200	5·1
V6 U12	350†	—	—	—

* Oscillator anode, 120 V, 4.5 mA.
† Each anode, A.C.



Under-chassis view. Diagrams of the main switch assembly, and of **S9-S11** and **S12-S14**, are given overleaf. **S1** and **S2** are ganged with the main assembly. **C41, C42** and **C44** are in a single unit.

GENERAL NOTES

Switches.—S1-S8 and **S15** are the waveband and muting switches, in two units, ganged together. **S1** and **S2** are attached to the front of the chassis, while the remainder are in the unit behind the front of the chassis. These are indicated in the diagram on page VIII. The table (page VIII) gives the switch positions for the three control settings, starting from the fully anti-clockwise position. O indicates open, and C closed.

Continued overleaf

MARCONIPHONE 556—*Continued*

Switch	S.W.	M.W.	L.W.
S1	C	O	C
S2	O	C	O
S3	C	C	O
S4	C	O	O
S5	O	C	C
S6	O	C	O
S7	C	O	O
S8	C	O	O
S15	O	O	O

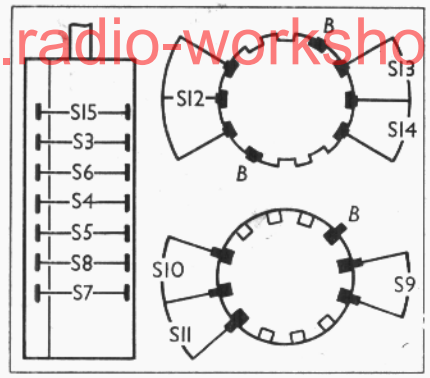
S15, of course, closes only between each final switch position.

S9-S11 are radio-gram switches, in a rotary unit at the back of the chassis. These are shown in the diagram on this page, where they are seen looking at the underside of the chassis, from the front. Note that only five tags are used, an extra one being blank and the remainder cut off. On radio **S9** and **S10** are *closed* and **S11** is *open*. On gram. **S9** and **S10** are *open* and **S11** is *closed*.

S12-S14 are the tone control switches, in a rotary unit at the front of the chassis. They are shown in the diagram on this page, where they are seen looking at the front of the chassis, the chassis being upside down. Six tags are used, and two extra ones are blank. In the anti-clockwise position of the control all switches are open; in the central position **S12** and **S13** are *closed*, and **S14** *open*; in the clockwise position **S12** and **S14** are *closed*, and **S13** *open*.

S16 is the Q.M.B. mains switch, mounted on the front of the chassis.

Coils.—L1, L2; L6, L7; and **L8-L13** are in three screened units on the chassis deck. The last of these also contains **R10** and **C12.** The choke **L3,** and the unscreened coil unit **L4, L5** are beneath the chassis.



Diagrams of the three switch units, viewed from positions described under "General Notes."

The I.F. transformers **L14, L15** and **L16, L17** are in two further screened units on the chassis deck, together with their trimmers at the backs of the screens, which are numbered from top to bottom in our plan chassis view. The second I.F. unit also contains **R14, R15** and **C17.**

L18 is in a metal can beneath the chassis.

Scale Lamps.—These are two Osram 4.0 V, 0.3 A M.E.S. types.

External Speaker.—Two sockets are provided at the rear of the chassis for a low resistance (4 O) external speaker.

Condensers C31, C32.—These are two dry electrolytics in a rectangular metal case on the chassis deck. They have a common positive (red) lead. The black lead to **T2** is the negative of **C31** (8μF).

Resistance R29.—This is mounted on the speaker unit, and is a spiralled wire, with yellow systoflex insulation, connected between tags 3 and 4.

Condenser C30.—This is also on the speaker unit, between tags 5 and 6.

CIRCUIT ALIGNMENT

I.F. Stages.—Set tone control fully clockwise, switch receiver to L.W., turn gang to maximum, and volume control fully clockwise. Remove lead from top cap of **V1,** and connect signal generator between top cap and chassis. Also connect temporarily a 100,000 O resistance between top cap and chassis.

Feed in a 465 KC/S signal, and adjust **C46, C47, C48** and **C49** for maximum output. Re-check these adjustments.

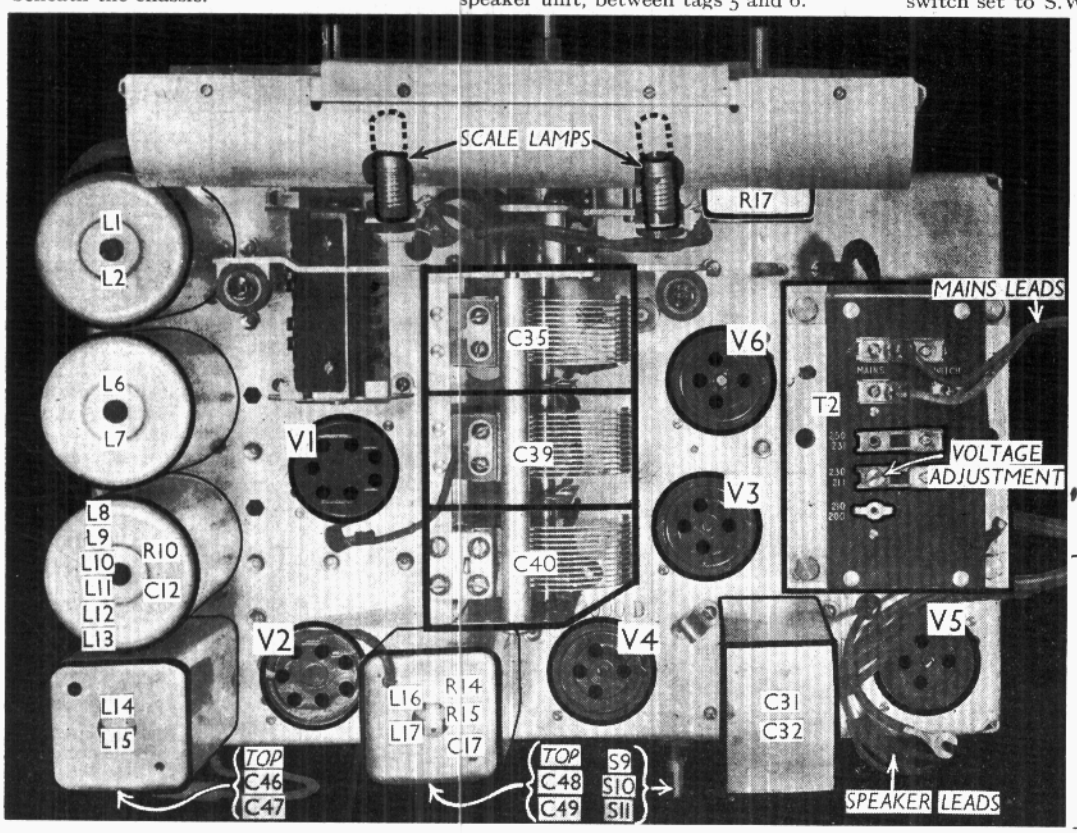
H.F. and Oscillator Stages.—The pointer should be horizontal at both minimum and maximum of the condenser, and the scale should be level and square in its frame and should read exactly 2,000 m. at condenser maximum.

M.W.—Connect signal generator between **A** and **E** sockets, via a dummy aerial device. Switch set to M.W. and tune to 200 m. on scale. Feed in a 200 m. signal, and adjust **C42,** then **C34,** for maximum output. Feed in a 220 m. signal, tune it in, then adjust **C37** for maximum output. Feed in a 550 m. signal, tune it in, and adjust **C43** for maximum output, rocking the gang meanwhile for optimum results. Repeat the adjustments at 200 and 220 m.

L.W.—Feed in a 740 m. signal, set receiver pointer to 200 m. on scale, but switch receiver to L.W. Adjust **C44** for maximum output. Feed in an 850 m. signal, tune it in, and adjust **C38** for maximum output. Feed in a 1,900 m. signal, tune it in, and adjust **C45** for maximum output, rocking the gang.

Switch set to M.W., tune to 200 m. on scale, feed in a 200 m. signal, and re-check the M.W. alignment.

S.W.—Connect signal generator to **A** socket, via a 400 O resistance, and **E.** Set pointer to 200 m. on the scale, switch set to S.W., and feed in a 16.9 m. signal. Adjust **C41,** then **C36,** for maximum output. If two peaks are found when adjusting **C41,** that involving lower trimmer capacity is correct. Feed in a 50 m. signal, tune it in, and adjust the inductance of **L5** by moving the loop of wire inside the former towards or away from the bottom of the coil until a peak reading is obtained. Return signal generator and receiver to 16·9m., and re-adjust **C36** for maximum output. Repeat the whole of the S.W. alignment.



Plan view of the chassis. The I.F. trimmers are numbered from top to bottom.

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