Supplement to The Wireless & Electrical Trader, July 22, 1939

"TRADER" SERVICE SHEET

417

H.M.V. 1103, 1300

MARCONIPHONE 878, 883

THE H.M.V. 1103 is a four-valve (plus rectifier) AC 3-band press-button superhet. There are twelve press-buttons, including eight for pre-set stations.

The receiver is suitable for 195-255 V 50-100 C/S mains, has a short-wave range of 13·8-50 m, and provision for a pick-up and an external speaker.

A similar chassis is fitted in the model 1300 console, and in the Marconiphone 878 table and 883 console receivers, but this *Service Sheet* was prepared on an H.M.V. 1103.

Release dates: H.M.V. 1103, Marconiphone 878, 883, March, 1939; H.M.V. 1300, April, 1939.

CIRCUIT DESCRIPTION

All the switches in the press-button unit, with the exception of **S23** have been numbered and lettered in such a manner as to indicate their functions: all switches bearing the same number are operated by the same button; a suffix letter **a, b** or **c** indicates that the switch to which it is attached closes, while an **x, y** or **z** indicates that its switch opens, when its button is pressed; when the button is released, by pressing another button, the **a, b** and **c** switches open, and **x, y** and **z** switches close. **S23** closes during the movement of any button to mute the speaker during the operation.

Aerial input is via coupling coils **L3, L4** and (via image rejector circuit **L1, L2, C2**) **L5** to single-tuned circuits comprising coils **L6** (SW), **L7** (MW) and **L8** (LW) tuned manually by **C38** or automatically (MW and LW only) by pre-set trimmer condensers **C39** to **C46** via switches **S4a, S4b** to **S11a, S11b** according to which button is depressed.

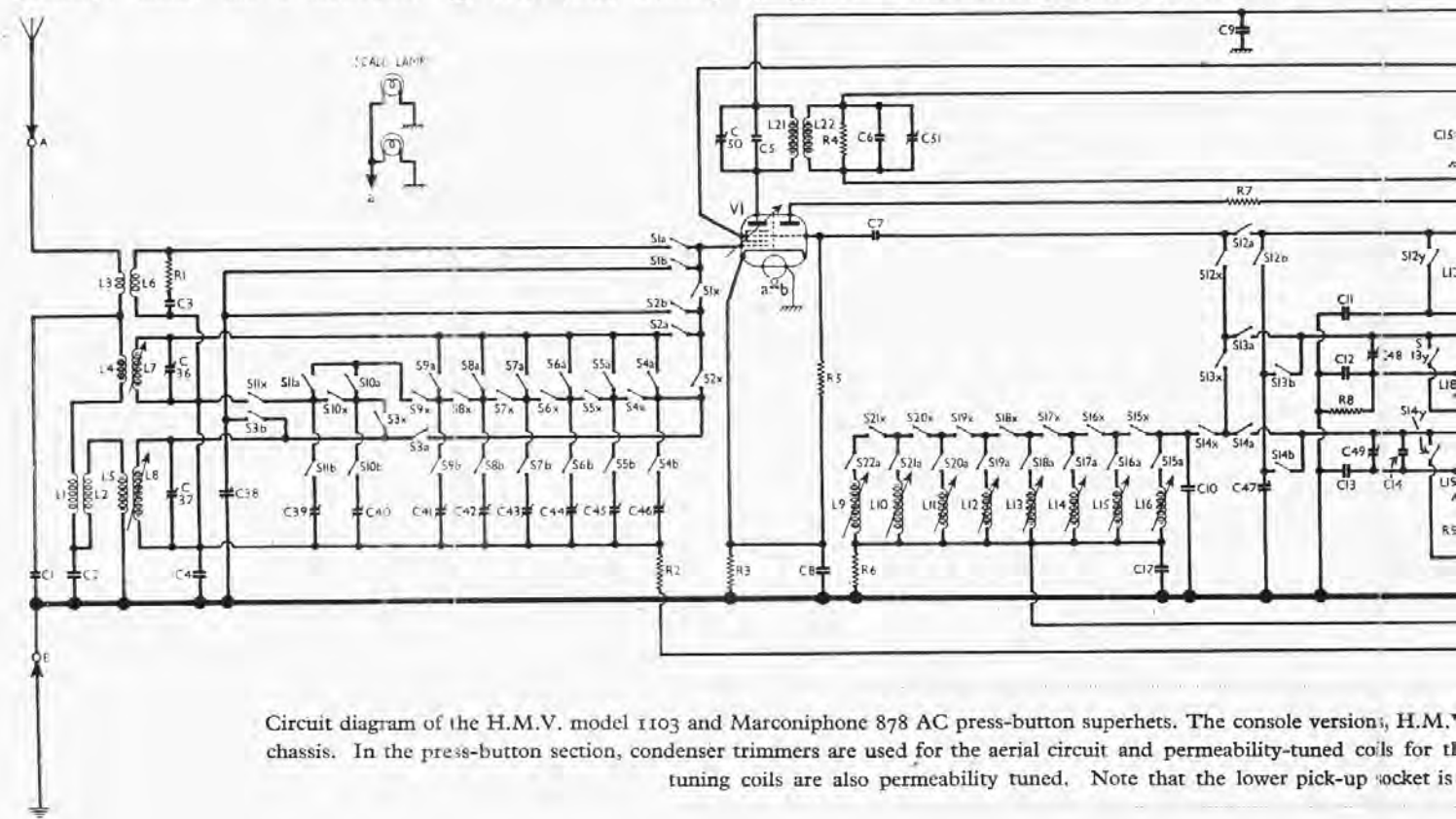
First valve (**V1, Marconi X65**) is a triode hexode operating as frequency changer with internal coupling. For manual operation, triode grid coils **L17** (SW), **L18** (MW) and **L19** (LW) are tuned by **C47**; parallel trimming by **C48** (MW) and **C14, C49** (LW); series tracking by **C11** (SW), **C12** (MW) and **C13** (LW). Reaction by direct coupling between anode and tuning coils via **C16** and switches **S12c** (SW), **S12z, S13c** (MW) and **S13z, S14c** (LW). On SW, additional coupling is obtained via **L20.**

For automatic operation, independent tuned circuits are employed comprising coils **L9** to **L16** tuned by fixed condenser **C10.** They are connected between the control grid (via **x** switches) and the anode (via **z** switches). The coil is selected by one of the switches **S15a** to **S22a,** according to which button is pressed.

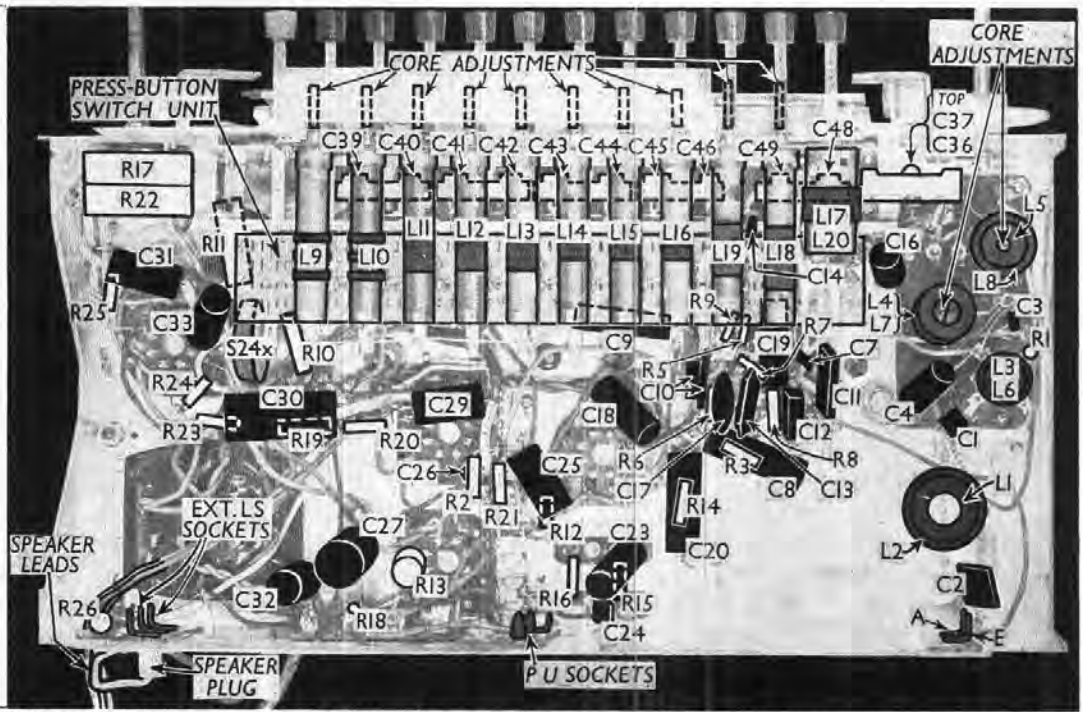
Second valve (**V2, Marconi KTW63**) is a variable-mu RF tetrode operating as intermediate frequency amplifier with iron-cored transformer couplings **C50, L21, L22, C51** and **C52, L23, L24, C53.**

Intermediate frequency 465KC/S.

Diode second detector is part of double



Circuit diagram of the H.M.V. model 1103 and Marconiphone 878 AC press-button superhets. The console version, H.M.V. chassis. In the press-button section, condenser trimmers are used for the aerial circuit and permeability-tuned coils for th tuning coils are also permeability tuned. Note that the lower pick-up socket is



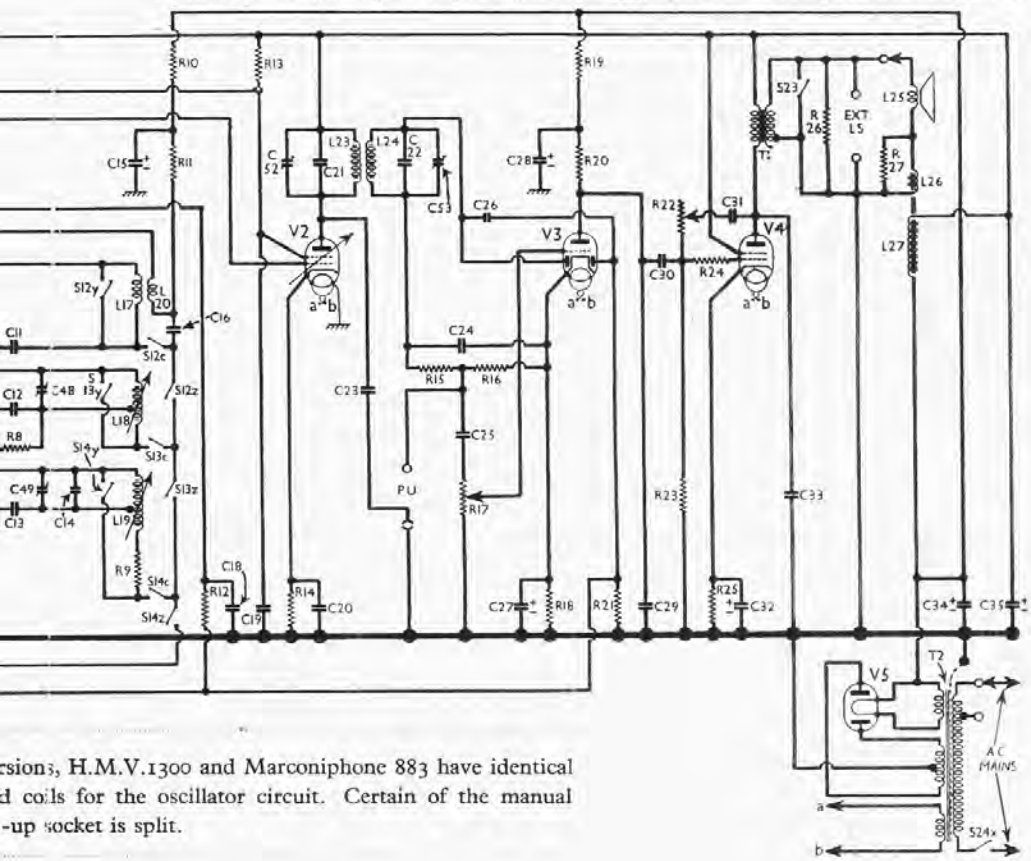
Under-chassis view. The core and trimmer adjustments are indicated. Diagrams of the press-button switch unit are in cols. 5 and 6 overleaf. **C10** consists of two condensers in parallel. Provision is made for muting the internal speaker by withdrawing the plug at the rear of the chassis.

diode triode valve (**V3, Marconi DH63**). Audio frequency component in rectified output is developed across load resistances **R15, R16** and passed via AF coupling condenser **C25** and manual volume control **R17** to CG of triode section, which operates as AF amplifier. Provision for connection of gramophone pick-up between top of **C25** and chassis. The chassis socket is split and the isolated half is connected via **C23** to **V2** anode, so that when a plug is inserted in the split socket, the two halves are connected together and thus **C23** mutes radio.

Second diode of **V3**, fed from **L24** via **C26**, provides DC potential which is developed across load resistance **R21** and fed back through decoupling circuits as GB to FC and IF valves, giving automatic volume control. Delay voltage is obtained from drop along **R18**.

Resistance-capacity coupling by **R20, C30** and **R23** between **V3** triode and tetrode output valve (**V4, Marconi KT63**). Variable tone control by **R22, C31** between grid and anode. Fixed tone correction by **C33** between anode and chassis. Provision for connection of low impedance external speaker across secondary of output transformer **T1**, while internal speaker may be muted by withdrawal of speaker plug. **S23** momentarily short-circuits **T1** secondary while any press-button is being operated.

HT current is supplied by full-wave rectifying valve (**V6, Marconi U50**). Smoothing by speaker field **L27** and dry electrolytic condensers **C31, C35**.



rsions, H.M.V.1300 and Marconiphone 883 have identical d coils for the oscillator circuit. Certain of the manual -up socket is split.

DISMANTLING THE SET

Removing Chassis. — A detachable bottom is fitted to the cabinet, upon removal of which access can be gained to the underside of the chassis. To remove the chassis from the cabinet, remove the three control knobs, the two round-head wood screws holding the scale assembly to the front of the cabinet, and the four bolts (with claw washers and lock washers) holding the chassis to the base of the cabinet, and slip the speaker leads from the cleat at the side of 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 the four leads from the speaker, and *when replacing*, connect them to the tags, on the larger paxolin panel, numbered as follows: 1, yellow; 2, black; 3, red/black; 4, red.

Removing Speaker.—To remove the speaker, unsolder the four leads and remove the three nuts (with washers) holding it to the sub-baffle, and *when*

replacing, see that the small paxolin panel is at the top and connect the leads as indicated previously.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	Aerial circuit SW damping	23
R2	V1 hexode CG decoupling	1,500,000
R3	V1 fixed GB resistance	350
R4	1st IF trans. sec. shunt	1,000,000
R5	V1 osc. CG resistance	50,000
R6	Auto osc. circuit damping	5,000
R7	V1 osc. anode stabiliser	150
R8	Osc. circuit MW damping	2,300
R9	Osc. LW reaction damping	1,000
R10	V1 osc. anode decoupling	23,000
R11	V1 osc. anode HT feed	23,000
R12	V2 CG decoupling	1,500,000
R13	V1 and V2 SG's HT feed	35,000
R14	V2 fixed GB resistance	350
R15	V3 signal diode load resistances	100,000
R16		500,000
R17	Manual volume control	2,000,000
R18	V3 triode GB and AVC delay	2,300
R19	V3 triode anode decoupling	50,000
R20	V3 triode anode load	150,000
R21	V3 AVC diode load	2,300,000
R22	Variable tone control	2,000,000
R23	V4 CG resistance	500,000
R24	V4 grid stopper	10,000
R25	V4 GB resistance	400
R26	T1 sec. artificial loading	50
R27	Hum neut. coil shunt	0·4

	CONDENSERS	Values (μF)
C1	Part aerial SW coupling	0·000015
C2	Part LW image rejector	0·00035
C3	Aerial circuit SW trimmer	0·000075
C4	V1 hexode CG decoupling	0·05
C5	1st IF transformer fixed trimmers	0·00005
C6		0·00005
C7	V1 osc. CG condenser	0·00005
C8	V1 cathode by-pass	0·1
C9	HT circuit RF by-pass	0·1
C10	Osc. auto circuit fixed tuning condenser	0·000158§
C11	Osc. circuit SW tracker	0·005
C12	Osc. circuit MW tracker	0·00055
C13	Osc. circuit LW tracker	0·00023
C14	Osc. circuit LW fixed trimmer	0·000075
C15*	V1 osc. anode decoupling	4·0
C16	V1 osc. anode coupling condensers	0·005
C17		0·0005
C18	V2 CG decoupling	0·05
C19	V1 and V2 SG's decoupling	0·1
C20	V2 cathode by-pass	0·1
C21	2nd IF transformer fixed trimmers	0·00013
C22		0·00013
C23	Radio muting on gram	0·05
C24	IF by-pass	0·0001
C25	AF coupling to V3 triode	0·0023
C26	Coupling to V3 AVC diode	0·000075
C27*	V3 cathode by-pass	50·0
C28*	V3 anode decoupling	4·0
C29	IF by-pass	0·001
C30	V3 triode to V4 AF coupling	0·1
C31	Part of variable tone control	0·001
C32*	V5 cathode by-pass	10·0
C33	Fixed tone corrector	0·0035
C34*	HT smoothing condensers	16·0
C35*		8·0
C36‡	Aerial circuit MW trimmer	—
C37‡	Aerial circuit LW trimmer	—
C38†	Aerial circ. manual tuning	—
C39‡	Aerial circuit LW auto tuning trimmers	—
C40‡		—
C41‡	Aerial circuit MW auto tuning trimmers	—
C42‡		—
C43‡		—
C44‡		—
C45‡		—
C46‡		—
C47†	Osc. circ. manual tuning	—
C48‡	Osc. circuit MW trimmer	—
C49‡	Osc. circuit LW trimmer	—
C50‡	1st IF trans. pri. tuning	—
C51‡	1st IF trans. sec. tuning	—
C52‡	2nd IF trans. pri. tuning	—
C53‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.
§ Two 0·000075 μF in parallel.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial LW image rejector coils	18·0
L2		10·0
L3	Aerial SW coupling coil	5·5
L4	Aerial MW coupling coil	0·6
L5	Aerial LW coupling coil	4·0
L6	Aerial SW tuning coil	0·1
L7	Aerial MW tuning coil	2·0
L8	Aerial LW tuning coil	9·5
L9	Oscillator circuit LW auto tuning coils	10·5
L10		10·5
L11	Oscillator circuit MW auto tuning coils	5·0
L12		5·0
L13		5·0
L14		4·0
L15		4·0
L16		4·0
L17	Osc. circuit SW tuning coil	0·1
L18	Osc. manual MW coil, total	4·5
L19	Osc. manual LW coil, total	11·0
L20	Oscillator SW reaction	0·6
L21	1st IF trans. Pri.	6·0
L22	Sec.	6·0
L23	2nd IF trans. Pri.	4·0
L24	Sec.	4·0
L25	Speaker speech coil	3·0
L26	Hum neutralising coil	0·5
L27	Speaker field coil	1,660·0
T1	Output trans. Pri.	280·0
	Sec.	0·6
T2	Mains trans. Pri., total	30·0
	Heater sec.	0·1
	Rect. heat. sec.	0·1
	HT sec., total	630·0
S1a, b, x to S3a, b, x	Aerial circuit waveband switches (manual tuning)	—
S4a, b, x to S11a, b, x	Aerial circuit auto tuning selector switches	—
S12a, b, c and S12x, y, z to S14a, b, c and S14x, y, z	Oscillator circuit waveband switches (manual tuning)	—
S15a, x to S22a	Osc. circuit auto tuning selector switches	—
S23	Speaker muting switch	—
S24x	Mains switch	—

VALVE ANALYSIS

Valve voltages and currents given in the table (col. 3) are those measured in our receiver when it was operating on mains of 231 V, using the 224-255 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the MW band and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

If, as in our case, **V2** should become unstable when its currents are being measured, it can be stabilised by connecting a non-inductive condenser (about 0·1 μF) between its top-cap and chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 X65	260	1·7	88	3·9
	Oscillator			
	110	5·2		
V2 KTW63	260	6·1	88	1·5
V3 DH63	114	1·0	—	—
V4 KT63	248	10·0	260	6·2
V5 U50	337†	—	—	—

† Each anode, AC.

GENERAL NOTES

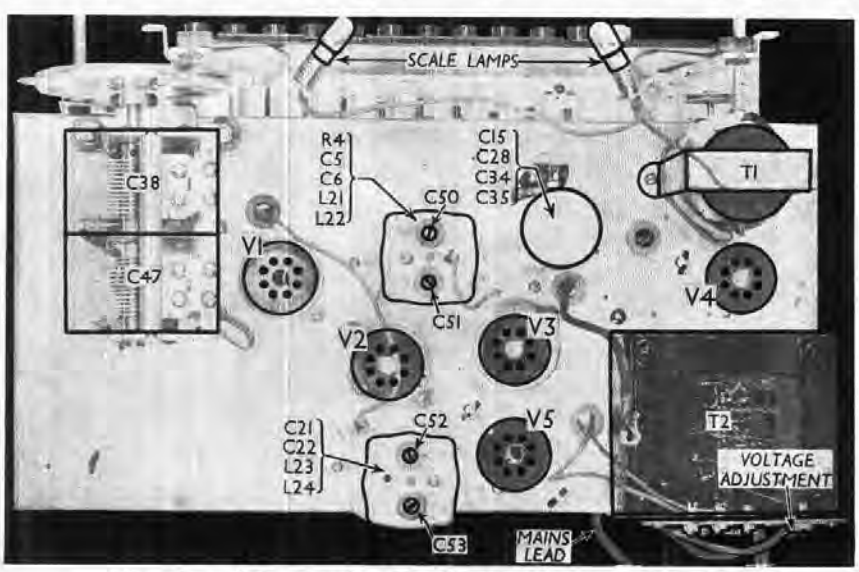
Switches.—All the switches are associated with the press-button unit. **S1a, b, x** to **S22a** are of the normal press-button type, those with **a, b,** or **c** suffixes closing when their button is pressed, and those with **x, y** or **z** suffixes opening when their button is pressed.

All these switches are indicated in the diagrams of each side of the press-button unit in cols. 5 and 6.

S23 is the speaker muting switch (shown in the lower of the two diagrams) which is normally open, but closes whilst any one of the press-buttons is being operated.

S24x is the QMB mains switch operated by the press-button numbered 1 ("Off"). It opens when the button is pressed, and switches the set off. Operation of any other button causes this switch to close, and switch the set on.

Coils.—**L1, L2; L3, L6; L4, L7** and **L5, L8** are in four units beneath the chassis, to the right of our under-chassis view. **L9-L16** are the eight permeability-tuned oscillator auto coils, in a row above the press-button unit. **L17, L20; L18**



Plan view of the chassis. The IF trimmers are indicated.

and **L19,** which are the oscillator manual coils, are in the same row, at the right-hand end in the under-chassis view. **L9-L16** and **L18, L19** all have adjustable iron cores.

The IF transformers **L21, L22** and **L23, L24** are in two screened units on the chassis deck, with their associated trimmers, and certain other components.

Scale Lamps.—These are two Osram MES types, rated at 6·5 V, 0·3 A. They have tubular bulbs.

External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (5Ω) external speaker. There is also another socket, into which a plug on a flying lead fits. On removal of this plug the internal speaker is muted.

Pick-up Connections.—Note that the lower pick-up socket is split, and when a plug is inserted **C23** is connected to chassis, thus muting radio.

Condensers C15, C28, C34, C35.—These are four dry electrolytics (500 V working) in a tubular metal case on the chassis deck. The case is the common negative; the red lead is the positive of **C34** (16 μF); the yellow lead is the positive of **C35** (8μF); the green lead to the junction of **R10, R11** is the positive of **C15** (4μF), while the green lead to the junction of **R19, R20** is the positive of **C28** (4μF).

Pre-Set Condensers.—The eight aerial auto trimmers, **C39-C46** are in four dual units in a row, adjustable from the front of the chassis. **C36, C37** and **C48, C49** are in two further dual units, also adjustable from the front of the chassis. The remaining trimmers are in the IF units on the chassis deck.

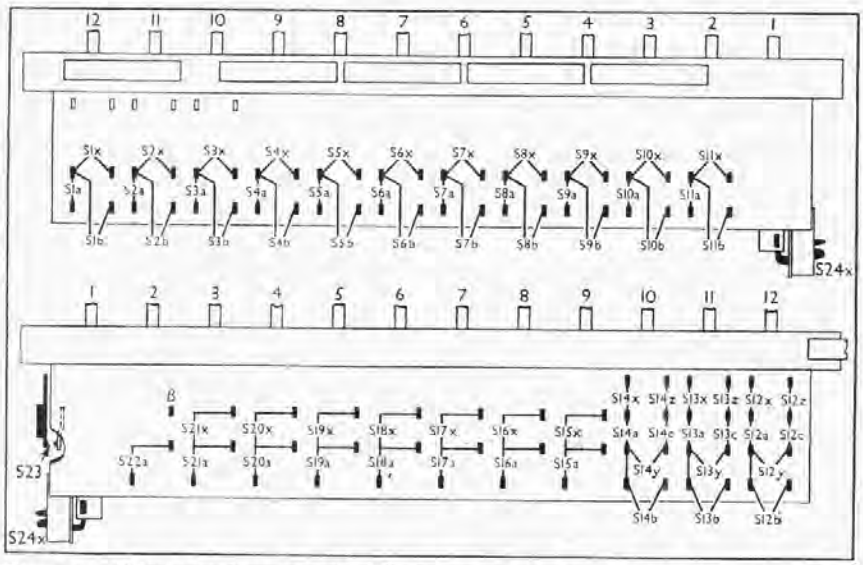
Condenser C10.—This consists of two 75 μμF condensers, one flat and one tubular, in parallel.

Press-Button Ranges

The wavelength ranges of the eight station buttons are given in the table below, the buttons being numbered in accordance with the moulded numbers on the escutcheon.

Button Nos.	Wavelength Ranges
2, 3	1,200—2,100 m
4, 5, 6	310—600 m
7, 8, 9	195—340 m

The setting of each button involves two tuning adjustments, one (above, and slightly to the right) for the aerial circuit trimmer, and the other (directly below) for the oscillator coil core.



Diagrams of the press-button unit. The lower one is drawn as seen from beneath the chassis, while the upper one shows the switches on the reverse side of the unit.

CIRCUIT ALIGNMENT

IF Stages.—Press LW button, turn tone control fully anti-clockwise, and turn gang condenser and volume control to maximum. Short-circuit **C47,** and connect signal generator, via a 0·1 μF condenser, to control grid (top cap) of **V1** and chassis, leaving existing top cap connection in place.

Feed in a 465 KC/S signal, and adjust **C50, C51, C52** and **C53** in turn for maximum output. Check these settings.

RF and Oscillator Stages.—Turn gang to maximum and see that the pointer registers accurately on the small mark below the LW calibration line at the bottom right-hand corner of the scale. If adjustment is necessary, slacken the two grub screws securing the drive disc to the condenser spindle. Connect signal generator to **A** and **E** sockets via a suitable dummy aerial, set tone control fully anti-clockwise, and volume control to maximum.

SW.—Switch set to SW, feed in a 50 m (6MC/S) signal, tune to 50 m on scale, and adjust loop of wire inside **L17** for maximum output. Feed in a 30 m (10 MC/S) signal, tune to 30 m on scale, and adjust loop of wire inside **L6** for maximum output. Repeat these adjustments.

MW.—Switch set to MW, and tune to 225 m on scale. Feed in a 225 m (1,333·3 KC/S) signal, and adjust **C48,** then **C36,** for maximum output. Tune to 530 m on scale, feed in a 530 m (566 KC/S) signal, and adjust the cores of **L18** and **L7** for maximum output. Unless these coils have been changed, little adjustment should be necessary. Repeat the MW adjustments.

LW.—Switch set to LW, tune to 850 m on scale, and feed in an 850 m (352·9 KC/S) signal. Adjust **C49,** then **C37,** for maximum output. Tune to 1,900 m on scale, feed in a 1,900 m (157·9 KC/S) signal, and adjust cores of **L19** and **L8** for maximum output if necessary. Repeat the LW adjustments.

Press-buttons.—Adjustments to the press-button trimmers should always be made after IF alignment and after any adjustments to the MW and LW aerial coils. Final press-button adjustments must be made on the aerial on which the set is to work.

Printed in Great Britain by Sanders Phillips & Co., Ltd., The Baynard Press, Chryssell Road, London, S.W.9.