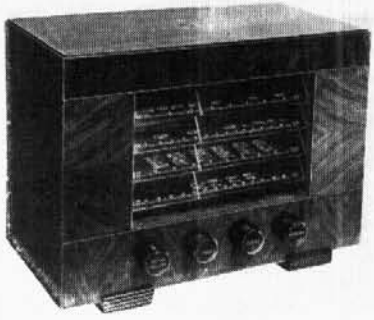
"TRADER" SERVICE SHEET

987

H.M.V. 1121

Four-Band A.C. Superhet



FOUR wavebands are covered in the H.M.V. 1121, a 4-valve (plus rectifier) superhet designed to operate from A.C. mains of 200-250 V, 50-100 c/s. The waveband ranges are 16-50 m (designated S.W.2, as marked on receiver), 50-187 m (S.W.1), 187-582.5 m, and 719-2,026 m.

Two export receivers employ what is virtually a similar chassis, but they both have five wavebands. They are the 5111 and the 5112. The waveband ranges of the 5111 are 15.5-20.5 m (S.W.3), 20.5-33 m (S.W.2), 33-100 m (S.W.1) and the same M.W. and L.W. coverage as the 1121.

The waveband ranges of the 5112 are 11-14.5 m (S.W.4), and the same S.W.3, S.W.2, S.W.1 and M.W. ranges as the 5111, with no L.W. band. Despite the small differences between these receivers, they are all sufficiently alike to be covered by this Service Sheet. The differences are explained overleaf.

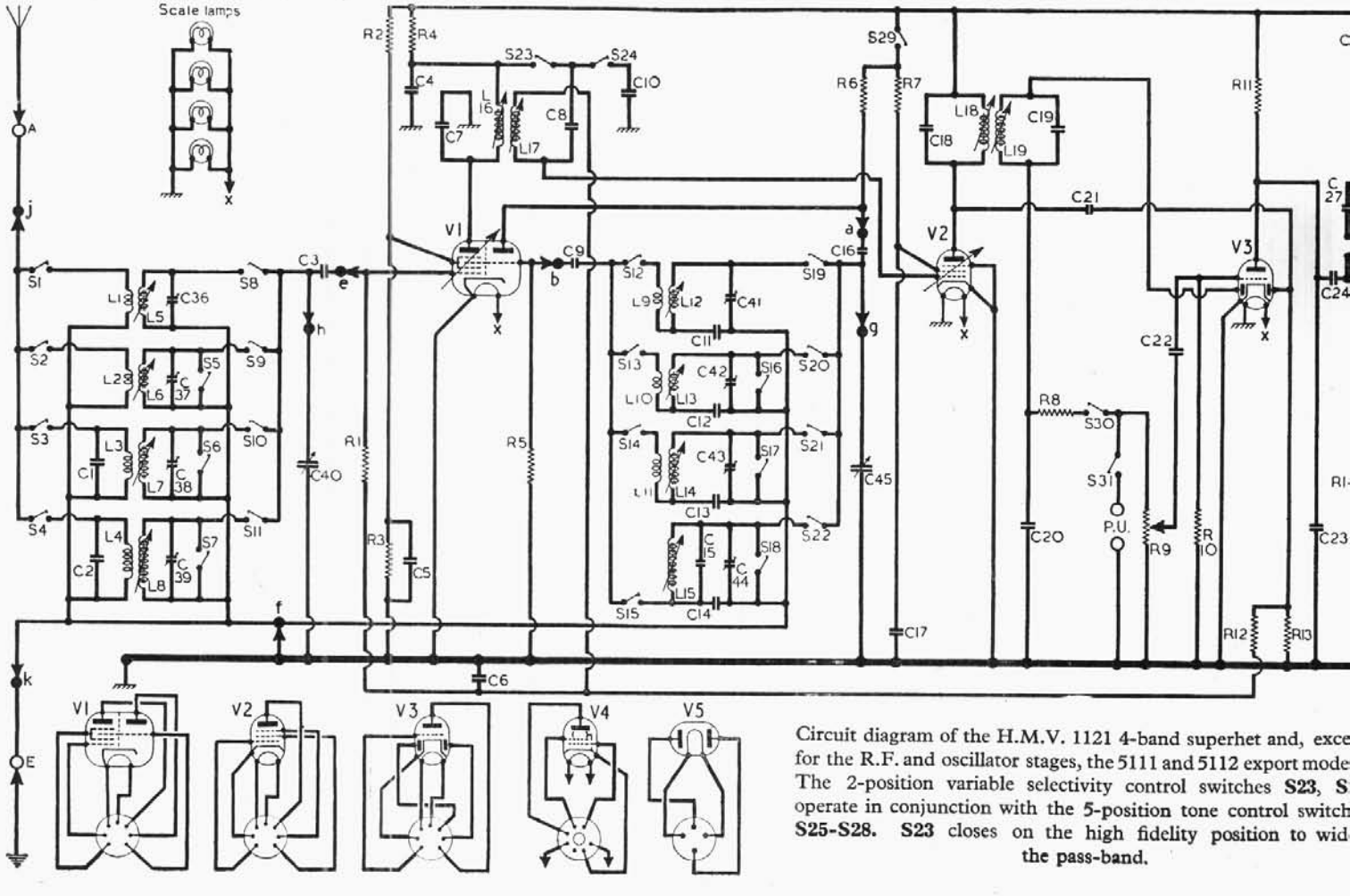
Release date and original price of 1121: September, 1950; £23 2s, plus purchase tax.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L1** (S.W.2), **L2** (S.W.1), **L3** (M.W.) and **L4** (L.W.) to single tuned circuits **L5, C40** (S.W.2), **L6, C40** (S.W.1), **L7, C40** (M.W.) and **L8, C40** (L.W.) which precede triode hexode valve **(V1, Marconi X78)** operating as frequency changer with internal coupling. **C1** shunts **L3** to move its resonance outside the band in use. Image rejection on L.W. by **C2** across **L4.**

Oscillator anode coils **L12** (S.W.2), **L13** (S.W.1), **L14** (M.W.) and **L15** (L.W.) are tuned by **C45.** Parallel trimming by **C41** (S.W.2), **C42** (S.W.1), **C43** (M.W.) and **C15, C44** (L.W.); series tracking by **C11** (S.W.2), **C12** (S.W.1), **C13** (M.W.) and **C14** (L.W.). Reaction coupling from grid on all bands across the common impedance of the trackers, with the addition of inductive coupling by **L9** (S.W.2), **L10** (S.W.1) and **L11** (M.W.).

Second valve **(V2, Marconi W77)** is an R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C7, L16, L17, C8** and **C18, L18, L19, C19. S24** opens and **S23** closes to widen the bandwith by bottom-coupling **C7, L16** and **L17, C8** across **C4.** For normal reception **S23** opens and **S24** closes, decoupling the primary and secondary circuits of the I.F. transformer



Circuit diagram of the H.M.V. 1121 4-band superhet and, exce for the R.F. and oscillator stages, the 5111 and 5112 export mode The 2-position variable selectivity control switches **S23, S** operate in conjunction with the 5-position tone control switch **S25-S28. S23** closes on the high fidelity position to wid the pass-band.

separately via the capacitors **C4** and **C10**.

Intermediate frequency 465 kc/s.

Diode signal detector is part of double diode triode valve **(V3, Marconi DH77)**. A.F. component in rectified output is developed across volume control **R9**, which is also the diode load, and is passed via **C22** to the grid of the triode section. Provision is made for the connection of a gramophone pick-up across **R9** via **S31**. **S29** and **S30** open in the Gram position to mute the radio. I.F. filtering by **C20**, **R8** and **C23**.

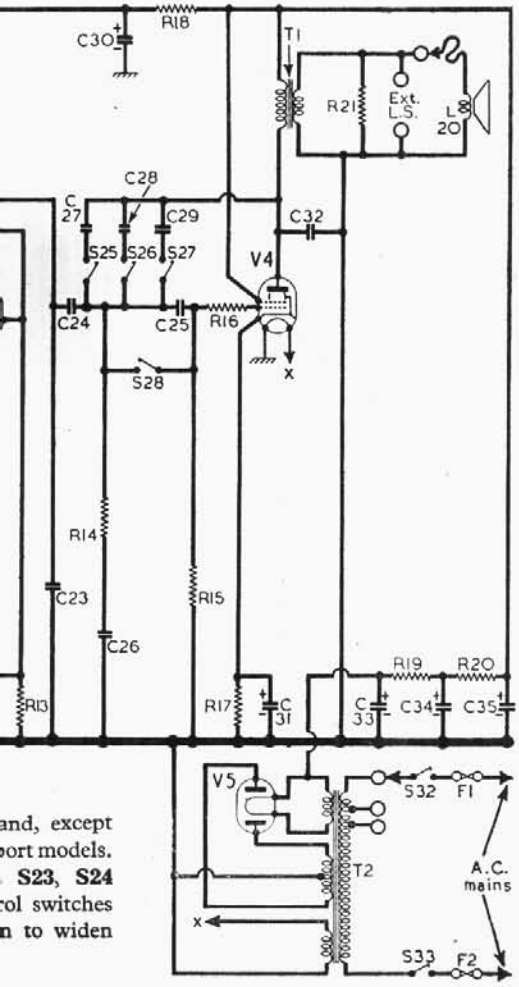
Second diode of **V3** is fed from **V2** anode via **C21** and provides D.C. potential which is developed across **R13** and fed back as bias to F.C. and I.F. stages, giving automatic gain control.

Resistance-capacitance coupling between **V3** triode and beam tetrode output valve **(V4, Marconi KT61)** by **R11**, **C24** and **R15**. Five position tone control by switches **S23-S28** which vary the I.F. bandwidth (as explained previously), give bass cut via **C25** and provide negative feed-back between **V4** anode and grid circuits via **C27**, **C28** and **C29**.

Provision is made for the connection of a low impedance speaker across **T1** secondary, and when this is used the internal speaker may be muted by pulling out the speaker plug from its socket. Load resistor **R21** is connected across the external speaker sockets to protect the output valve, should both speakers be disconnected.

H.T. current is supplied by full-wave rectifying valve **(V5, Marconi U10)**.

Smoothing by resistors **R19**, **R20** and electrolytic capacitors **C33**, **C34** and **C35**. Additional smoothing for **V1**, **V2** and **V3** by **R18** and electrolytic capacitor **C30**.



and, except port models. S23, S24 rol switches n to widen

COMPONENTS AND VALUES

	CAPACITORS	Values	Locations
C1	Image rejector	500pF	K8
C2	L.W. aerial shunt	220pF	K8
C3	V1 C.G.	220pF	L8
C4	Part tone control	0·015μF	G4
C5	V1 S.G. decoup.	0·047μF	G4
C6	A.G.C. decoup. ...	0·047μF	G3
C7, C8	1st I.F. trans. tuning	170pF, 170pF	B1, B1
C9	V1 osc. C.G. ...	47pF	L7
C10	Part tone control	0·015μF	G4
C11	S.W.2 osc. tracker	0·0039μF	K7
C12	S.W.1 osc. tracker	0·022μF	K6
C13	M.W. osc. tracker	470pF	K6
C14	L.W. osc. tracker	150pF	K6
C15	L.W. osc. trimmer	33pF	K6
C16	Osc. anode coup.	68pF	L6
C17	V2 S.G. decoup.	0·047μF	G4
C18, C19	2nd I.F. trans. tuning	170pF, 170pF	B2, B2
C20	I.F. by-pass ...	100pF	G5
C21	A.G.C. coupling ...	47pF	G5
C22	A.F. coupling ...	0·022μF	G4
C23	I.F. by-pass ...	100pF	F5
C24	A.F. coupling ...	0·05μF	F4
C25	Part tone control	470pF	F4
C26	Tone corrector ...	0·01μF	F4
C27, C28, C29	Tone control capacitors ...	15pF, 68pF, 200pF	F3, G3, G3
C30*	H.T. smoothing ...	8μF	B2
C31*	V4 cath. by-pass	50μF	F4
C32	Tone corrector ...	0·003μF	F3
C33*, C34*	H. T. smoothing ...	16μF, 8μF	B2, A1
C35*		16μF	A1
C36‡	S.W.2 aerial trim	—	L8
C37‡	S.W.1 aerial trim	—	L8
C38‡	M.W. aerial trim	—	K8
C39‡	L.W. aerial trim ...	—	K8
C40†	Aerial tuning ...	—	A2
C41‡	S.W.2 osc. trim	—	L7
C42‡	S.W.1 osc. trim	—	K7
C43‡	M.W. osc. trim ...	—	K7
C44‡	L.W. osc. trim ...	—	K6
C45†	Oscillator tuning	—	A2

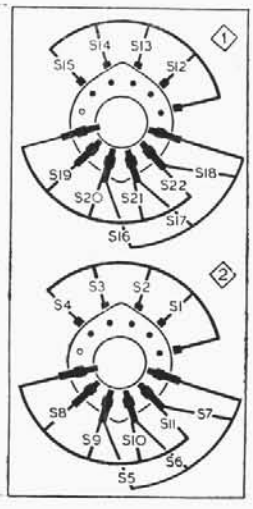
* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Aerial coupling coils		0·3	L8
L2			1·6	L8
L3			25·0	K8
L4			58·0	K8
L5	Aerial tuning coils		Very low	L8
L6			0·5	L8
L7			3·2	K8
L8			30·0	K8
L9	Oscillator reaction coils		0·3	L7
L10			0·5	K7
L11			2·1	K7
L12	Oscillator tuning coils		Very low	L7
L13			0·5	K7
L14			2·6	K7
L15			10·0	K6
L16	1st I.F. trans.	Pri.	6·0	B1
L17		Sec.	6·0	B1
L18	2nd I.F. trans.	Pri.	6·0	B2
L19		Sec.	6·0	B2
L20	Speech coil ...		4·3	—
T1	Primary		410·0	F3
	Secondary		0·3	
T2	Primary, total ...		35·0	D2
	H.T. sec., total ...		650·0	
	Rect. heater sec. ...		0·3	
	Valve heater sec. ...		Very low	
S1-S22	Waveband switches		—	H3
S23-S28	Tone switches ...		—	G3
S29-S31	Radio/Gram. switch		—	F5
S32, S33	Mains sw., g'd R9		—	F3
F1, F2	Mains fuses, 1 Amp.		—	D2

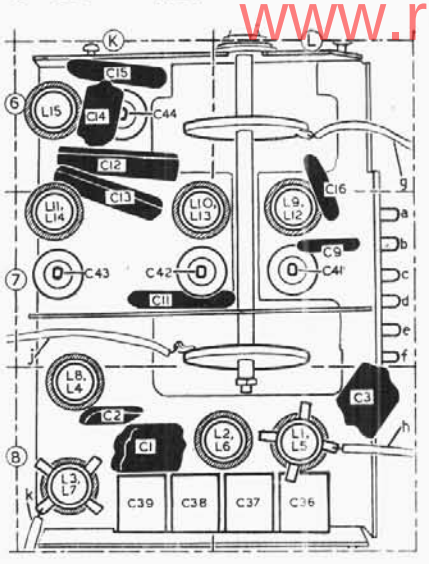
	RESISTORS	Values	Locations
R1	V1 C.G.	470kΩ	H4
R2, R3	H.T. potential divider	33kΩ, 22kΩ	H4, G4
R4	V1 H.T. decoup. ...	1·5kΩ	G3
R5	V1 osc. C.G. ...	47kΩ	H4
R6	V1 osc. H.T. feed ...	22kΩ	G4
R7	V2 S.G. feed ...	22kΩ	G4
R8	I.F. stopper ...	47kΩ	G4
R9	Volume control ...	500kΩ	F3
R10	V3 C.G.	4·7MΩ	G5
R11	V3 anode load ...	100kΩ	F5
R12	A.G.C. decoupling ...	470kΩ	G4
R13	A.G.C. diode load ...	1MΩ	F5
R14	Tone corrector ...	33kΩ	F5
R15	V4 C.G.	330kΩ	F4
R16	V4 grid stopper ...	47kΩ	F4
R17	V4 G.B.	100Ω	F4
R18	H.T. smoothing ...	2·2kΩ, 750Ω, 680Ω	G4, E3, A1
R19			
R20			
R21	T1 sec. shunt ...	22Ω	E5

Waveband Switch Diagrams and Table

Waveband switch unit diagrams, drawn as seen when viewed from the rear of an inverted chassis with the tuning assembly in position. Below the diagrams is the associated switch table.



Switch	S.W.2	S.W.1	M.W.	L.W.
S1	C	—	—	—
S2	—	C	—	—
S3	—	—	C	—
S4	—	—	—	C
S5	C	—	—	—
S6	C	C	—	—
S7	C	C	C	—
S8	C	—	—	—
S9	—	C	—	—
S10	—	—	C	—
S11	—	—	—	C
S12	C	—	—	—
S13	—	C	—	—
S14	—	—	C	—
S15	—	—	—	C
S16	C	—	—	—
S17	C	C	—	—
S18	C	C	C	—
S19	C	—	—	—
S20	—	C	—	—
S21	—	—	C	—
S22	—	—	—	C



The upper side of the tuning assembly, as seen when removed from an inverted chassis and turned over. Interconnecting leads are coded to agree with the circuit diagram coding overleaf.

CIRCUIT ALIGNMENT

With the chassis in the cabinet, the I.F. and R.F. adjustments can be made accessible by removing the base cover.

I.F. Stages.—Switch set to M.W., turn the volume control to maximum and the tone control to position 2. Connect signal generator output, via a 0.1 μF capacitor in the "live" lead, to control grid (pin 2) of **V1** and chassis. Connect a 30 kΩ damping resistor across **L19**, feed in a 465 kc/s (645.16 m) signal and adjust the core of **L18** (location reference B2) for maximum output. Connect damping resistor across **L18** and adjust the core of **L19** (G5) for maximum output. Remove damping resistor and adjust the cores of **L17** (H3) and **L16** (B1), in that order, for maximum output. When making the above adjustments, progressively reduce the input as the circuits come into line to avoid A.G.C. effects.

R.F. and Oscillator Stages.—If the adjustments are made with the chassis withdrawn from the cabinet, reference must be made to the substitute scale on the tuning drive drum, as the tuning scales remain fixed in the cabinet. The substitute scale is divided into nine inches and subdivided into sixteenths of an inch, readings being taken against the fixed wire pointer mounted on top of the gang. With the gang at maximum capacitance the pointer should coincide with the 9in mark on the substitute scale, or the cursor should coincide with the highest wavelength ends of the tuning scales.

In the following alignment instructions the substitute scale readings are given in brackets after the scale settings. Transfer signal generator leads, via a suitable dummy aerial, to **A** and **E** sockets.

S.W.2.—Switch set to S.W.2, tune to 50 m ($8\frac{7}{16}$in on substitute scale), feed in a 50 m (6 Mc/s) signal and adjust the core of **L12** (H3) for maximum output. Adjust the core of **L5** (H5) for maximum output, rocking the gang for optimum results. Re-tune to 50 m ($8\frac{1}{16}$in) and re-adjust the core of **L12** (H3) for maximum output. Tune to 16.8 m ($1\frac{3}{16}$in), feed in a 16.8 m (17.8 Mc/s) signal and adjust **C41** (H4) for maximum output. Adjust **C36** (H5) for maximum output, rocking the gang for optimum results. Re-tune to 16.8 m ($1\frac{3}{16}$in) and re-adjust **C41** (H4) for maximum output. Repeat these adjustments.

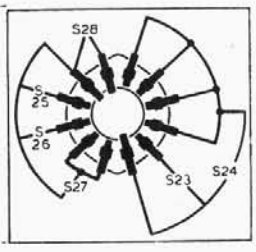
S.W.1.—Switch set to S.W.1, tune to 150 m ($6\frac{5}{8}$in), feed in a 150 m (2 Mc/s) signal and adjust the core of **L13** (H3) for maximum output. Adjust the core of **L6** (H5) for maximum output, rocking the gang to obtain optimum results. Re-tune to 150 m ($6\frac{5}{8}$in) and re-adjust the core of **L13** (H3) for maximum output. Tune to 54.5 m ($\frac{27}{32}$in), feed in a 54.5 m (5.5 Mc/s) signal and adjust **C42** (H4) for maximum output. Adjust **C37** (H5) for maximum output while rocking the gang to obtain optimum results. Re-tune to 54.5 m ($\frac{27}{32}$in) and re-adjust **C42** (H4) for maximum output. Repeat these adjustments.

M.W.—Switch set to M.W., tune to 510 m ($7\frac{3}{16}$in), feed in a 510 m (588 kc/s) signal and adjust the core of **L14** (J3) for maximum output. Adjust the core of **L7** (J5) for maximum output while rocking the gang for optimum results. Re-tune to 510 m ($7\frac{3}{16}$in) and re-adjust the core of **L14** (J3) for maximum output. Tune to 186.9 m ($\frac{7}{16}$in), feed in a 186.9 m (1,605 kc/s) signal and adjust **C43** (J4) for maximum output. Feed in a 210 m (1,427 kc/s) signal and adjust **C38** (J5) for maximum output while rocking the gang to obtain optimum results. Re-tune to 186.9 m ($\frac{7}{16}$in), feed in a 186.9 m (1,605 kc/s) signal and re-adjust **C43** (J4) for maximum output. Repeat these adjustments.

L.W.—Switch set to L.W., tune to 1,850 m ($7\frac{1}{2}$in), feed in a 1,850 m (162 kc/s) signal and adjust the core of **L15** (J3) for maximum output. Adjust the core of **L8** (J4) for maximum output while rocking the gang for optimum results. Re-tune to 1,850 m ($7\frac{1}{2}$in) and re-adjust the core of **L15** (J3) for maximum output.

Tone Switch Table

Diagram of the tone control switch unit. Below is the associated table.



Switch	1	2	3	4	5
S23	C	—	—	—	—
S24	—	C	C	C	C
S25	—	C	—	—	—
S26	—	—	C	—	—
S27	—	—	—	C	C
S28	C	C	C	C	—

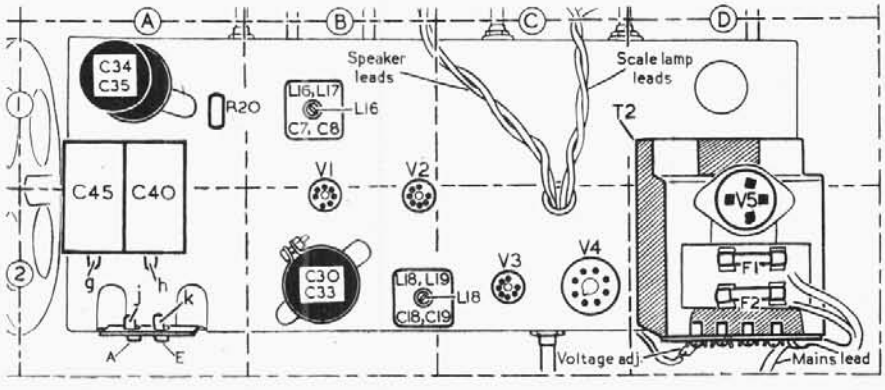
Tune to 850 m ($1\frac{1}{2}$in), feed in a 850 m (353 kc/s) signal and adjust **C44** (J3) for maximum output. Adjust **C39** (J5) for maximum output while rocking the gang to obtain optimum results. Re-tune to 850 m ($1\frac{1}{2}$in) and re-adjust **C44** (J3) for maximum output. Repeat these adjustments for maximum output.

GENERAL NOTES

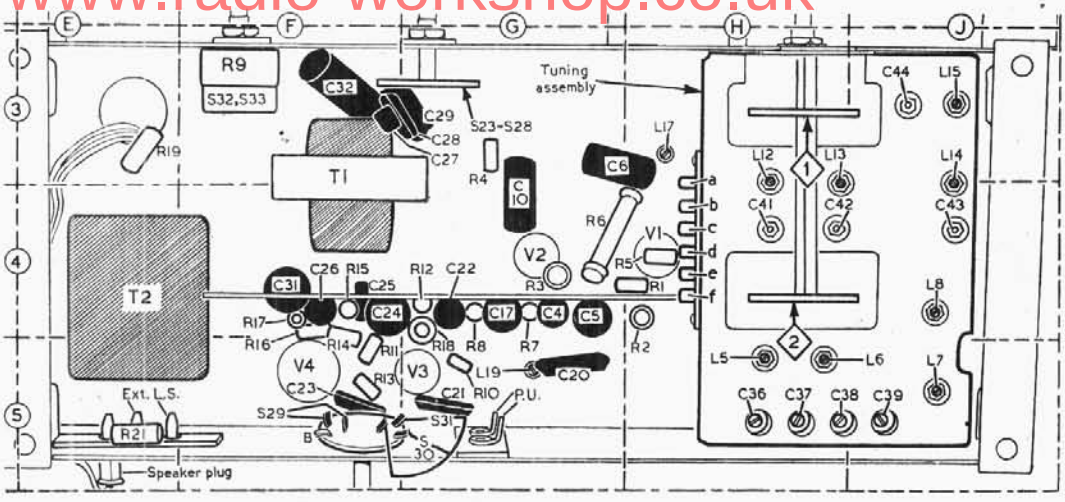
Switches.—**S1-S22** are the waveband switches, ganged in two rotary units beneath the chassis. These units are indicated in our under-chassis drawing by the numbers 1 and 2 in diamond surrounds, and they are shown in detail in the diagrams overleaf, where they are viewed from the rear of an inverted chassis.

The table below them gives switch positions for the four control settings, starting from the fully anti-clockwise position (S.W.2 band) of the control knob. A dash indicates open and **C,** closed.

S23-S28 are the tone control switches, ganged in a single rotary unit beneath the chassis. This is indicated in our under-chassis drawing and shown in detail in the diagram above. The table below it gives the switch positions for the five control settings, starting from the fully anti-clockwise position (setting No. 1, high fidelity) of the control knob. A dash indicates open, and **C,** closed.



Plan view of the chassis. The gang tags and the tags of the aerial panel are coded **g-k** to indicate connections from the tuning assembly.



Underside of the chassis, with the tuning assembly in position. The waveband switches are indicated here by the numbers **1** and **2** in diamond surrounds, and shown in detail in the diagrams in col. 6 overleaf. The inside of the tuning assembly is shown in col. 1 on this side of the sheet.

S29-S31 are the radio/gram change-over switches, ganged in a single rotary unit, mounted on the rear member of the chassis. In the anti-clockwise position of the control knob, **S29** and **S30** close, and the receiver is switched to radio. In the clockwise (gram) position, only **S31** closes.

Tuning Assembly.—All the components associated with the variable tuning circuits, with the exception of the tuning gang itself, are mounted on the tuning assembly, which can be removed for inspection. Instructions for removing it are given under "Dismantling The Set."

A drawing of the assembly, seen from its upper side after removal, appears in col. 1. The alignment adjustments are seen on its underside, and are indicated in our under-chassis drawing.

Scale Lamps.—There are four lamps, with large clear spherical bulbs and M.E.S. bases, rated at 6.8 V, 0.3 A. Those in our sample were of a special type marked "EMI 46938" and "Vitality 1031."

External Speaker.—Two sockets are provided at the rear of the chassis for the connection of a low impedance (about 5Ω) external speaker. A plug and socket device permits the internal speaker to be muted.

DRIVE CORD REPLACEMENT

About four yards of fine gauge nylon braided glass yarn is required for a new drive cord, and it should be run as shown in the sketch below, where the system is drawn as seen when viewed from the front right-hand corner of the chassis.

The simplest method is to turn the gang to maximum capacitance and slip a non-slip loop tied in one end of the cord over the anchor peg, and make the anti-clockwise excursion round the drive drum first. Thereafter the cord can be pulled against the gang stop until the run is completed.

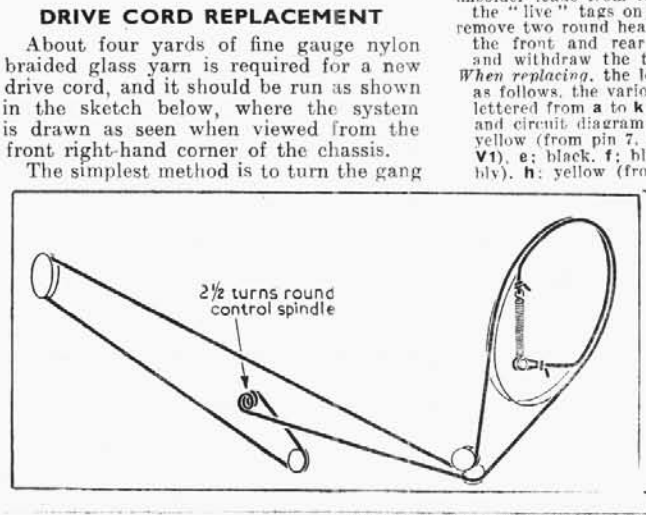
DISMANTLING THE SET

Removing Chassis.—Remove four control knobs (held by recessed screws passing through spindles);
remove cabinet base cover, held by three wood screws;
turn tuning spindle until cursor is in the centre of the tuning scale and release the drive cord from the clamping screw on the cursor carriage, now accessible through cabinet base;
remove four 2BA hexagonal-head bolts (with square washers and spring washers) holding chassis to cabinet;
remove four red painted transit bolts (if fitted);
release scale lamp leads from spring clips in top and sides of cabinet;
slacken the wood screws holding the scale lamp brackets to the top corners of the baffle, and lifting the brackets slightly, pull them back to clear the wood screws, and withdraw;
release the speaker leads from the spring clip at the top of the cabinet and unsolder the leads from the speech coil tags, withdrawing the chassis.

When replacing, the transit bolts should not be replaced, except for transport purposes. They should be packed inside the cabinet for use again when the receiver is transported.

Removing Tuning Assembly.—Unsolder five leads from the tag strip on the side of the assembly nearest to **V1** valveholder;
unsolder leads from **A** and **E** sockets and from the "live" tags on the tuning gang;
remove two round head self-tapping screws from the front and rear members of the chassis and withdraw the tuning assembly.

When replacing, the leads should be reconnected as follows, the various connecting points being lettered from **a** to **k** in the chassis illustrations and circuit diagram: white and **R6**, to tag **a**; yellow (from pin 7, **V1**), **b**; green (from pin 2, **V1**), **c**; black, **f**; blue, **g**; green (from assembly), **h**; yellow (from assembly), **j**; black, **k**.



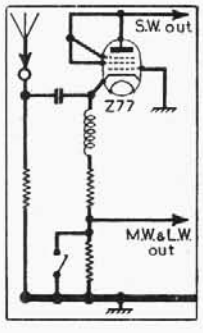
Sketch showing the tuning drive cord system, drawn as seen from the front right-hand corner of the chassis when the gang is at minimum capacitance.

EXPORT MODELS

Apart from the tuning circuits, the 5111 and 5112 receivers are like the 1121, and although the S.W. band R.F. and oscillator circuits are not covered at all in this Service Sheet, it can be used for service work on all other sections of the receiver.

One considerable difference occurs, however, in the aerial circuit, where an untuned earthed-grid ("grounded" grid) input valve is employed. Physically the valve and its associated components are accommodated in the space between the aerial panel and the tuning gang. The circuit is as shown in the accompanying diagram.

The S.W. aerial coupling coils are returned to H.T. positive line to provide a path for the H.T. current to the anode. On M.W. and L.W. they are short-circuited, while on S.W. the lower resistor in the cathode lead is short-circuited.



The earthed grid triode in the export models.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured on our receiver when it was operating from A.C. mains of 220 V, the voltage adjustment being set to the appropriate tapping. The set was tuned to the highest wavelength end of the M.W. band, with the volume control at maximum, but there was no signal input.

Voltage readings were made with an Avo Electronic TestMeter which causes no appreciable voltage drop, and allowance must be made for the current drawn by other meters. Chassis was the negative connection in every case.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
VI X78 ...	180	1·0	50	2·2	—
	Oscillator				
	100	3·5			
V2 W77 ...	180	7·0	140	1·8	—
V3 DH77	94	1·0	—	—	—
V4 KT61	210	30·0	220	7·0	4
V5 U10 ...	†280	—	—	—	300

† A.C., each anode.

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