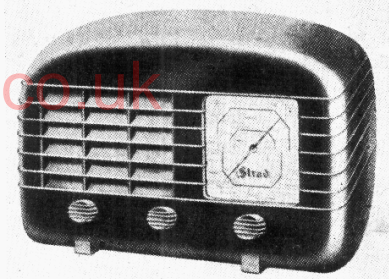


"TRADER" SERVICE SHEET

793

STRAD
PW461



VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was tuned to about 200 m. There was no signal input.

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

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TH41	212	0.65	60	3.6
	Oscillator			
V2 VP41	69	4.0	60	0.65
V3 HL42	212	2.9	—	—
V4 DD	27	0.65	—	—
V4 PEN45	205	32.0	212	7.1
V5 U6	267†	—	—	—

† Each anode, A.C.

COMPONENTS AND VALUES

RESISTORS		Values (ohms)
R1	Aerial circuit shunt ...	33,000
R2	V1 hex. C.G. decoupling ...	100,000
R3	V1 fixed G.B. resistor ...	330
R4	V1 osc. C.G. resistor ...	22,000
R5	V1 osc. C.G. stabiliser ...	150
R6	Osc. circ. M.W. damping ...	82
R7	V1 osc. anode H.T. feed ...	33,000
R8	I.F. stopper ...	100,000
R9	A.V.C. line decoupling ...	2,200,000
R10	V2, V3 C.G.'s decoupling ...	1,000,000
R11	Manual volume control ...	500,000*
R12	V3 C.G. resistor ...	1,000,000
R13	H.T. feed resistor ...	33,000
R14	V3 triode anode load ...	47,000
R15	V4 C.G. resistor ...	680,000
R16	V4 fixed G.B. resistor ...	180

* Centre tapped.

CAPACITORS

	Values (µF)	
C1	Aerial I.F. filter tuning ...	0.00056
C2	Aerial M.W. and L.W. ...	0.0005
C3	coupling capacitors ...	0.0024
C4	Aerial L.W. fixed trimmer ...	0.00022
C5	1st I.F. transformer tuning ...	0.00014
C6	capacitors ...	0.00015
C7	V1 cathode by-pass ...	0.1
C8	A.V.C. line decoupling ...	0.1
C9	Osc. circ. S.W. tracker ...	0.005
C10	Osc. circ. M.W. tracker ...	0.00035
C11	Osc. circ. L.W. tracker ...	0.00015
C12	Osc. L.W. fixed trimmer ...	0.000047
C13	V1 osc. anode coupling ...	0.0005
C14	V2, V3 C.G.'s decoupling ...	0.1
C15	H.T. decoupling ...	0.1
C16	2nd I.F. transformer tun- ...	0.00014
C17	ing capacitors ...	0.00015
C18	I.F. by-pass capacitors ...	0.0001
C19	I.F. by-pass capacitors ...	0.0001
C20	A.F. coupling to V3 C.G. ...	0.01
C21	A.F. coupling to V4 ...	0.01
C22*	V4 cathode by-pass ...	10.0
C23	Fixed tone corrector ...	0.005
C24*	H.T. smoothing capacitors ...	8.0
C25*	H.T. smoothing capacitors ...	16.0
C26†	Aerial S.W. trimmer ...	0.00004
C27†	Aerial M.W. trimmer ...	0.00004
C28†	Aerial L.W. trimmer ...	0.00008
C29†	Aerial circuit tuning ...	0.000443§
C30†	Osc. S.W. trimmer ...	0.00004
C31†	Osc. M.W. trimmer ...	0.00004
C32†	Osc. L.W. trimmer ...	0.00008
C33†	Oscillator circuit tuning ...	0.000443§

* Electrolytic. † Variable. ‡ Pre-set. § "Swing" values, minimum to maximum.

THE Strad PW461 is the first domestic radio receiver from R.M. Electric, Ltd. The set is a 4-valve (plus rectifier) 3-band superhet for A.C. mains of 200-250 V, 40-100 c/s.

CIRCUIT DESCRIPTION

Aerial input is via I.F. rejector L1, C1 and C2, L2, C3 to single-tuned circuits L3, C29 (S.W.), L4, C29 (M.W.) and L5, C29 (L.W.).

First valve (V1, Mazda metallized TH41) is a triode-heptode operating as frequency changer with internal coupling. Triode oscillator anode coils L9 (S.W.), L10 (M.W.) and L11 (L.W.) are tuned by C33. Parallel trimming by C30 (S.W.), C31 (M.W.) and C12, C32 (L.W.); series tracking by C9 (S.W.), C10 (M.W.) and C11 (L.W.), adjustments being made by variable iron-dust cores on all bands.

Reaction coupling by grid coils L6 (S.W.), L7 (M.W.) and L8 (L.W.), with additional coupling by the common impedance of the trackers. Second valve (V2, Mazda metallized VP41) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary transformer couplings.

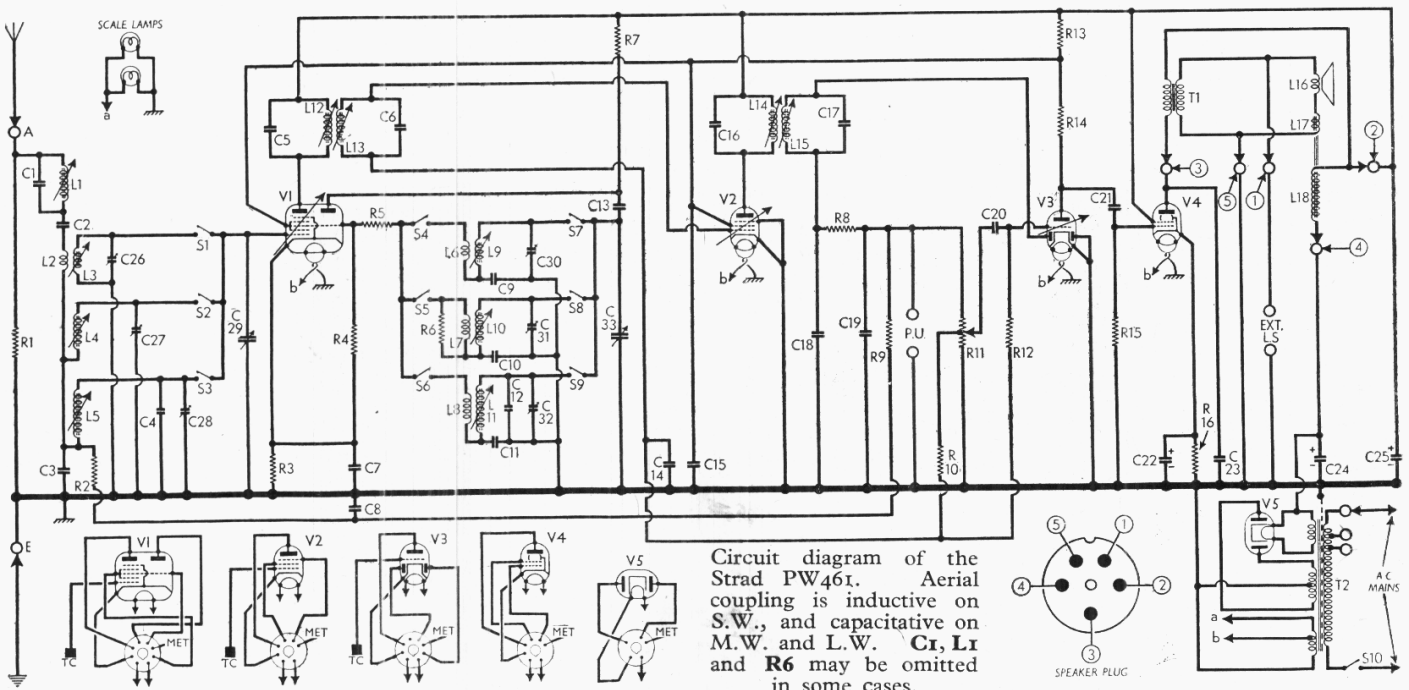
Intermediate frequency 465 kc/s.

Diode second detector is part of double diode triode valve (V3, Mazda metallized HL42DD), the second diode of which is strapped to cathode. Audio frequency component in rectified output is developed across volume control R11, and passed via C20 to C.G. of triode section.

D.C. potential developed across R11 is tapped off and fed back through decoupling circuits as G.B. to V1, V2 and V3, giving A.V.C., the line feeding V2 and V3 being taken from the centre-tap on R11. V3 triode has variable-mu characteristics.

Resistance-capacitance coupling by R14, C21 and R15 between V3 triode and beam tetrode output valve (V4, Mazda metallized PEN45).

H.T. current is supplied by I.H.C. full-wave rectifying valve (V5, Mazda metallized UU6). Smoothing by speaker field L18 and dry electrolytic capacitors C24 and C25.



Circuit diagram of the Strad PW461. Aerial coupling is inductive on S.W., and capacitive on M.W. and L.W. C1, L1 and R6 may be omitted in some cases.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial I.F. filter coil	3.7
L2	Aerial S.W. coupling coil	9.5
L3	Aerial S.W. tuning coil	Very low
L4	Aerial M.W. tuning coil	3.7
L5	Aerial L.W. tuning coil	15.0
L6	Osc. S.W. reaction coil	8.5
L7	Osc. M.W. reaction coil	0.4
L8	Osc. L.W. reaction coil	1.2
L9	Osc. S.W. tuning coil	Very low
L10	Osc. M.W. tuning coil	2.1
L11	Osc. L.W. tuning coil	5.2
L12	1st I.F. trans.	Pri. ... 7.0
L13		Sec. ... 7.0
L14	2nd I.F. trans.	Pri. ... 7.0
L15		Sec. ... 8.0
L16	Speaker speech coil	2.3
L17	Hum neutralising coil	0.15
L18	Speaker field coil	1,400.0
T1	Output trans.	Pri. ... 215.0
		Sec. ... 0.3
T2	Mains Heater sec., total trans. Rect. heat. sec. H.T. sec., total	Pri., total ... 50.0
		Heater sec., total ... 0.1
		Rect. heat. sec. ... 0.2
S1-S9	Waveband switches	580.0
S10	Mains switch, ganged R11	—

GENERAL NOTES

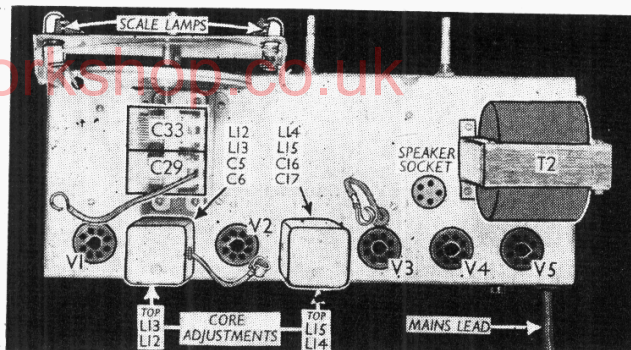
Switches.—S1-S9 are the waveband switches in a rotary unit inside the tuning assembly beneath the chassis. Its position is indicated approximately in our under-chassis view, but in the diagram in col. 3, where the switch unit is drawn in detail, it is seen the other way up. This is because it cannot be seen until the assembly has been removed, and the natural way to view it then is to stand the assembly on its true underside, which forms a flat base. It is then viewed from the rear.

The table below gives the switch positions for the three control settings, starting from the fully anti-clockwise position of the control. A dash indicates open, and **C**, closed.

Switch	S.W.	M.W.	L.W.
S1	—	—	—
S2	—	—	—
S3	—	C	—
S4	—	C	C
S5	—	C	—
S6	—	—	C
S7	—	C	—
S8	—	—	C
S9	—	—	C

Coils.—The R.F. and oscillator coils, together with the waveband switch unit and other components, are all enclosed in a screened assembly beneath the chassis, but their positions are shown through the cover in our under-chassis view, as though it had been removed. Trimming adjustments are accessible through holes in the plate forming the underside of the assembly. Instructions for removing the

Plain view of the chassis. The positions of the I.F. core adjustments, at the rear of the cans, are approximately indicated by arrows.



assembly are given under "Dismantling the Set."

Scale Lamps.—These are two Osram M.E.S. type lamps, with clear, straight-sided bulbs, rated at 6.2 v, 0.3 A. They are fed from a tapping on the heater winding of the mains transformer, although in early models they may be fed directly across the whole winding.

External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (2-3 Ω) external speaker.

Capacitors C24, C25.—These are two electrolytics in separate tubular metal containers beneath the chassis. C24 is rated at 8 μF, 420 v peak working; C25 rated at 16 μF, 350 v peak working. Both ratings are for temperatures up to 60° C. The max. working voltage falls at higher temperatures.

DISMANTLING THE SET

The cabinet is fitted with a small detachable bottom cover, upon removal of which (three countersunk head captive screws) access may be gained to the R.F. and oscillator core adjustments.

Removing Chassis.—Remove the three control knobs (pull off) from the front of the cabinet; withdraw the speaker plug from its socket on the chassis deck;

remove the six round-head bolts (with washers) holding the chassis to the bottom of the cabinet, when the chassis may be withdrawn.

Removing Speaker.—Remove the four cheese-head bolts (with lock washers) securing the speaker to the sub-baffle.

When replacing, the transformer should be on the left.

Removing Tuning Assembly.—Unsolder at the ends remote from the assembly the five coloured leads connecting the tuning unit to the chassis;

remove the two round-head bolts (with nuts and lock washers) holding the assembly to the front chassis member, and ease it carefully past the group board and out of the chassis.

When replacing, the five coloured leads should be reconnected to the chassis as follows: blue, to the stiff wire from the front section of the gang (C33) which emerges from a hole in the chassis deck; green, to a similar wire from

the rear section (C29); and yellow, to R5; black, to C2, and white to the junction of C3 and R2.

CIRCUIT ALIGNMENT

I.F. Stages.—Remove existing top cap connector of V1 and connect signal generator via a 0.01 μF series capacitor and 100,000 Ω parallel resistor to chassis. Turn volume control to maximum and short circuit C33. Feed in a 465 kc/s (645.16 m) signal, and adjust the cores of both I.F. transformers for maximum output, keeping the signal generator output low to avoid A.V.C. action. Replace top cap connector.

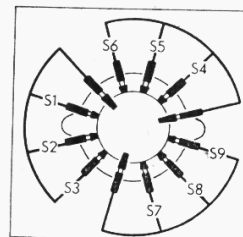
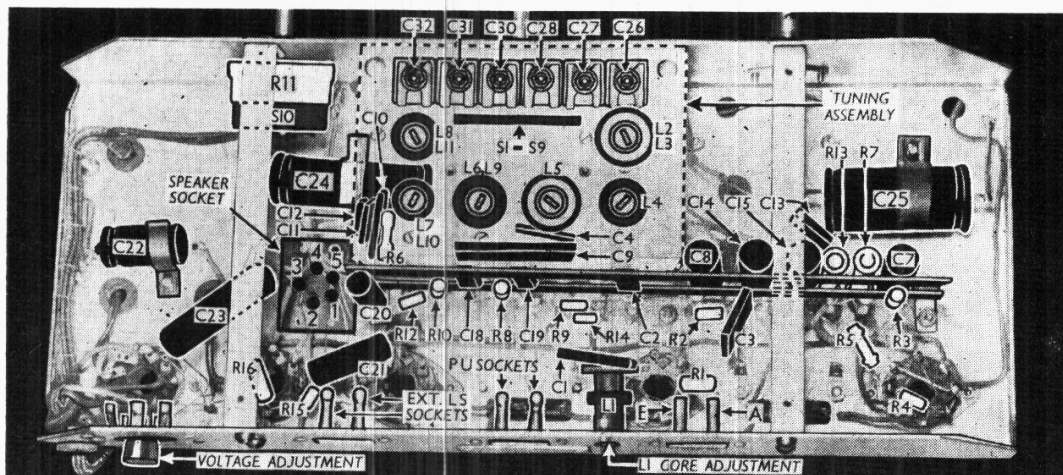
R.F. and Oscillator Stages.—With the gang at maximum, the pointer should be horizontal with the longer half pointing to the right. Adjustments are accessible through the bottom of the cabinet if the coverplate is removed.

M.W.—Connect signal generator to A and E terminals via a dummy aerial. Switch set to M.W., tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust C31, then C27, for maximum output. Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal and adjust cores of L10, then L4, for maximum output. Repeat the 200 m and 500 m adjustments until there is no further improvement.

L.W.—Switch set to L.W., tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust C32, then C29, for maximum output. Tune to 2,000 m on scale, feed in a 2,000 m (150 kc/s) signal, and adjust cores of L11, then L5, for maximum output. Repeat the 1,000 m and 2,000 m adjustments until there is no further improvement.

S.W.—Switch set to S.W., tune to 20 m on scale, feed in a 20 m (15 Mc/s) signal, and adjust C30, then C26, for maximum output. If the signal appears at two positions of C30, select that with the lesser capacitance. Set pointer to 50 m, feed in a 50 m (6 Mc/s) signal, and adjust cores of L9, then L3, for maximum output. Repeat the 20 m and 50 m adjustments until there is no further improvement.

I. F. Rejector.—Switch set to M.W., tune to 550 m on scale, feed in a strong 465 kc/s signal, and adjust L1, at rear of chassis, for minimum output.



Above: The switch unit, drawn in the position explained in the text. Left: Under-chassis view. The components inside the tuning assembly are drawn as though seen through the cover. Actually, only the adjustments are visible.