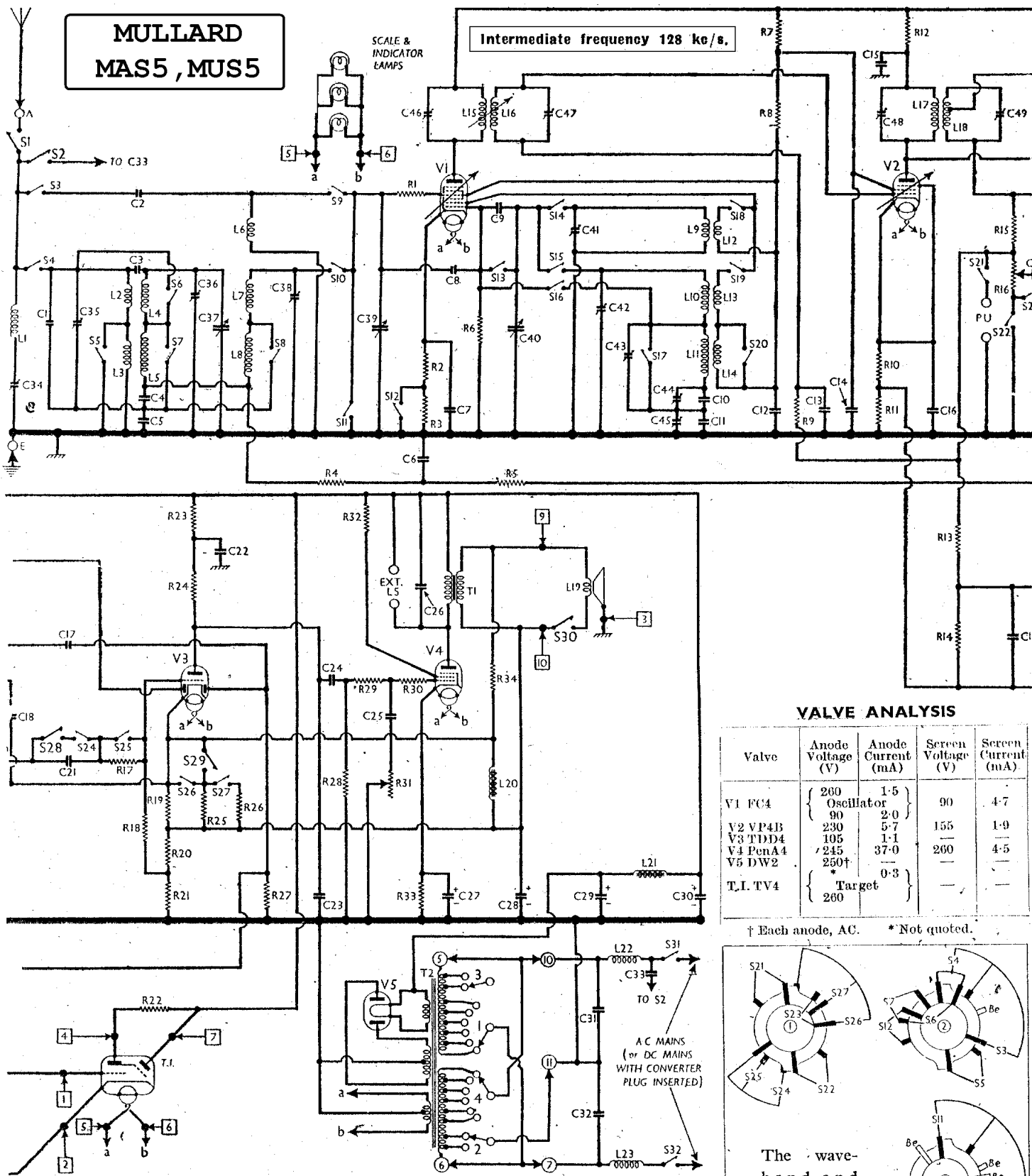


# MULLARD MAS5, MUS5

Intermediate frequency 128 kc/s.

SCALE &  
INDICATOR  
LAMPS

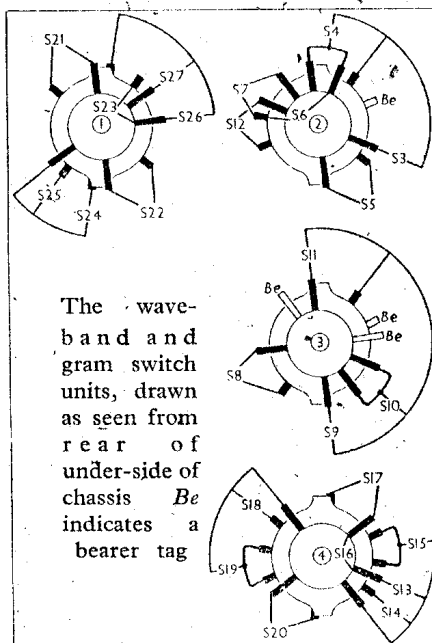


## VALVE ANALYSIS

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 FC4	200 90 Oscillator	1.5 2.0	90	4.7
V2 VP4B	230	5.7	155	1.9
V3 TD4	105	1.1	—	—
V4 PenA4	245	37.0	260	4.5
V5 DW2	250†	—	—	—
T.I. TV4	* Target 260	0.3	—	—

† Each anode, A.C.

\* Not quoted.



# MULLARD MAS5, MUS5

RESISTORS		Values (ohms)
R1	V1 hex. grid stopper ...	50
R2	V1 fixed GB resistors ...	250
R3	V1 fixed GB resistors ...	2,500
R4	V1 CG decoupling re- sistors ...	100,000
R5	V1 osc. CG resistor ...	100,000
R6	V1 osc. and V1, V2 SG's ...	50,000
R7	HT feed resistors ...	18,000†
R8	V2 CG decoupling ...	20,000
R9	V2 fixed GB resistors ...	1,600,000
R10	V2 fixed GB resistors ...	320
R11	V2 anode decoupling ...	800
R12	V2 anode decoupling ...	1,600
R13	T.L. CG feed resistors ...	5,000,000
R14	Part signal diode load ...	1,600,000
R15	Manual volume control ...	100,000
R16	V3 triode grid stopper ...	500,000
R17	V3 triode CG resistor ...	1,600,000
R18	Feed-back coupling ...	32
R19	V3 triode GB and AVC ...	3,200
R20	delay resistors ...	4,000
R21	T.L. anode HT feed ...	2,000,000
R22	V3 triode anode decou- pling ...	50,000
R23	V3 triode anode load ...	100,000
R24	Bass control resistors ...	32
R25	Bass control resistors ...	10
R26	V3 AVC diode load ...	500,000
R27	V4 CG resistor ...	800,000
R28	Part variable tone control ...	100,000
R29	V4 grid stopper ...	1,000
R30	Variable tone control ...	5,000,000
R31	V4 SG stopper ...	32
R32	V4 GB stopper ...	160
R33	Feed-back coupling ...	200
R34	Feed-back coupling ...	200

† Made up of two 32,000  $\Omega$  resistors in parallel.

CONDENSERS		Values ( $\mu$ F)
C1	Image suppressor ...	0.00002
C2	Aerial SW coupling ...	0.000016
C3	"Top" coupling ...	0.00001
C4	Band-pass coupling con- densers ...	0.016
C5	AVC line decoupling ...	0.025
C6	V1 cathode by-pass ...	0.1
C7	V1 cathode by-pass ...	0.05
C8	Neutralising coupling ...	0.000002
C9	V1 osc. CG condenser ...	0.0001
C10	Osc. fixed LW tracker ...	0.00065
C11	Osc. fixed MW tracker ...	0.001375
C12	V1 osc. and SG decoupl- ing ...	0.1
C13	V2 CG decoupling ...	0.1
C14	V2 SG decoupling ...	0.1
C15	V2 anode decoupling ...	0.1
C16	V2 cathode by-pass ...	0.1
C17	Coupling to V3 AVC diode ...	0.00001
C18	IF by-pass ...	0.0001
C19	T.L. CG decoupling ...	0.05
C20	AF coupling to V3 triode ...	0.002
C21	Bass control condenser ...	0.00025
C22	V3 triode anode decou- pling ...	0.5
C23	IF by-pass ...	0.0004
C24	AF coupling to V4 ...	0.02
C25	Part variable tone con- trol ...	0.008
C26	Fixed tone corrector ...	0.004
C27*	V4 cathode by-pass ...	25.0
C28*	V3 cathode by-pass ...	25.0
C29*	HT smoothing conden- sers ...	32.0
C30*	Mains RF by-pass con- densers ...	32.0
C31	Mains RF by-pass con- densers ...	0.002
C32	Mains aerial coupling ...	0.002
C33	Aerial IF filter tuning ...	0.0005
C34†	Image suppressor trim- mer ...	0.00017
C35†	B-P pri. MW trimmer ...	0.00003
C36†	Band-pass pri. tuning ...	0.0003
C37†	B-P sec. MW trimmer ...	0.00047
C38†	B-P sec. and SW aerial tuning ...	0.00003
C39†	Oscillator circuit tuning ...	0.00047
C40†	Osc. circuit SW trimmer ...	0.00047
C41†	Osc. circuit MW trimmer ...	0.00003
C42†	Osc. circuit LW trimmer ...	0.00003
C43†	Osc. circuit LW tracker ...	0.00017
C44†	Osc. circuit MW tracker ...	0.00017
C45†	1st IF trans. pri. tuning ...	0.00017
C46†	1st IF trans. sec. tuning ...	0.00017
C47†	2nd IF trans. pri. tuning ...	0.00017
C48†	2nd IF trans. sec. tuning ...	0.00017
C49†	2nd IF trans. sec. tuning ...	0.00017

\* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial IF filter coil ...	140.0
L2	Aerial coupling coils ...	25.0
L3	Band-pass primary coils ...	95.0
L4	Band-pass secondary coils ...	4.0
L5	Aerial SW tuning coil ...	40.0
L6	Band-pass primary coils ...	0.05
L7	Band-pass secondary coils ...	4.0
L8	Osc. SW tuning coil ...	37.0
L9	Osc. MW tuning coil ...	0.05
L10	Osc. LW tuning coil ...	10.0
L11	Osc. SW reaction coil ...	25.0
L12	Osc. MW reaction coil ...	30.0
L13	Osc. LW reaction coil ...	4.0
L14	1st IF trans. {Pri. ...	8.0
L15	1st IF trans. {Sec. ...	140.0
L16	2nd IF trans. {Pri. ...	140.0
L17	2nd IF trans. {Sec., total ...	135.0
L18	Speaker speech coil ...	5.0
L19	Feed-back coupling choke ...	7.0
L20	HT smoothing choke ...	385.0
L21	Mains RF filter chokes ...	2.0
L22	Output {Pri. ...	2.0
L23	Output {Sec. ...	310.0
T1	Output {Pri., total ...	0.4
T2	Mains {Heater sec. ...	72.0
S1, S2	Mains {Rect. heat. sec. ...	0.04
S3-S27	Mains {HT sec., total ...	0.17
S28, S29	Mains aerial switches ...	500.0
S30	Waveband and PU ...	—
S31, S32	switches ...	—
S28, S29	Bass control switches ...	—
S30	Speaker muting switch ...	—
S31, S32	Mains circuit switches ...	—

Switch	SW	MW	LW	Gram.
S3.	o	—	—	—
S4	—	o	o	—
S5	—	o	—	—
S6	o	—	—	—
S7	o	o	—	—
S8	o	o	—	—
S9	o	o	—	—
S10	o	o	—	—
S11	o	o	—	—
S12	o	o	—	—
S13	o	o	—	—
S14	o	o	—	—
S15	o	o	—	—
S16	o	o	—	—
S17	o	o	—	—
S18	o	o	—	—
S19	o	o	—	—
S20	—	—	—	—
S21	—	—	—	—
S22	o	—	—	—
S23	o	—	—	—
S24	o	—	—	—
S25	o	—	—	—
S26	o	—	—	—
S27	—	o	—	—

**MAS5 Modifications.**—With the excep-  
tion of the mains input circuit, the circuit  
diagram overleaf applies equally to the  
MAS5 and MUS5. In the MAS5, which  
is suitable only for AC mains operation,  
the primary winding is like that in *Ser-  
vice Sheet 540*, and the filter circuit **L22**,  
**L23**, **C31**, **C32** is omitted. HT sec. is 360 $\Omega$ .

## CIRCUIT ALIGNMENT

**NOTE.**—Apart from the usual equipment, a  
special 15 degree jig (Code No. M.09991741) will  
be required to adjust the gang to the standard  
setting point, and an auxiliary radio receiver on  
aperiodic amplifier will be needed to determine  
when the signal on **V1** hexode control grid  
reaches a maximum.

**IF Stages.**—When adjusting one winding of an  
IF transformer, a damping resistor must be con-  
nected across the other; or, if the ends of the  
winding are not easily accessible, the shunt  
may be connected between the appropriate  
anode (or grid) and chassis, via a 0.1 $\mu$ F con-  
denser. When applying the signal generator to  
the control grid of a valve, the top cap con-  
nector must remain in position. The monoknob  
control should be set to its top right-hand posi-  
tion: maximum gain and maximum band-width.  
Access to trimmers can be facilitated by stand-  
ing the receiver on its side.

Switch set to LW, short-circuit **R6**, and con-  
nect signal generator to control grid (top cap)  
of **V1** and chassis: Feed in a 128 kc/s (2,340 m)  
signal, apply a 25,000  $\Omega$  shunt to **L17**, adjust  
**C49** for maximum output, and remove shunt;  
apply a 10,000  $\Omega$  shunt to **L16**, adjust **C46** for  
maximum output, and remove shunt; apply the  
25,000  $\Omega$  shunt to **L18**, adjust **C48**, and remove  
shunt; apply 10,000  $\Omega$  shunt to **L15**, adjust **C47**,  
and remove shunt and the short-circuit from **R6**.

**RF and Oscillator Stages.**—Stand receiver on  
its base again and connect a good earth lead.  
Adjust **C34** nearly to its maximum position, and  
set the monoknob control to its top left-hand  
position: maximum gain and minimum band-  
width. Fit the 15 degree jig by slipping the boss  
over the locating pin just above the condenser  
spindle on the gang, and turn the gang towards  
its minimum position until the cross-bar bears  
on the boss of the jig. The vanes are now ad-  
vanced 15 degrees, which is the standard trim-  
ming position. Transfer signal generator leads,  
via a suitable dummy aerial, to **A** and **E** sockets.  
It should be noted that the oscillator frequency  
is 128 kc/s higher than the signal frequency on  
MW and LW, but 128 kc/s lower on SW.

**MW.**—Switch set to MW, feed in a 1,442 kc/s  
(208 m) signal, and adjust **C42**, then **C36** and  
**C38**, for maximum output. Short-circuit **R6**,  
couple **V1** hexode anode via a 0.000025 $\mu$ F con-  
denser to the aerial socket of the auxiliary re-  
ceiver, and transfer output meter to this  
receiver.

Feed in a 550 kc/s (545 m) signal, and adjust  
the gang of MUS5 receiver for maximum output  
on the auxiliary receiver. Disconnect auxiliary  
receiver and reconnect output meter to MUS5,  
removing short-circuit from **R6**. Now adjust  
**C45** for maximum output, and then repeat the  
208 m adjustments.

**LW.**—Switch set to LW, feed in a 395 kc/s  
(760 m) signal. Short-circuit **R6**, and reconnect  
auxiliary receiver as described for MW, tuning  
MUS5 for maximum output. Disconnect auxiliary  
receiver and remove short-circuit from **R6**, and  
adjust **C43** for maximum output.

Feed in a 160 kc/s (1,875 m) signal, short-  
circuit **R6** again, and connect up auxiliary  
receiver as before, tuning MUS5 for maximum  
output on the meter. Disconnect auxiliary  
receiver, remove short-circuit, and adjust **C44** for  
maximum reading on the output meter.

**SW.**—Switch set to SW, and turn the gang  
to bear on the jig. Feed in a 17 Mc/s (17.6 m)  
signal, and adjust **C41** for maximum output. If  
two positions are found, select that employing  
the greater trimmer capacity.

**IF Filter.**—Switch set to LW, and turn the  
gang to maximum capacity. Feed in a strong  
128 kc/s signal, and adjust **C34** for minimum  
output.

**Image Suppressor.**—Switch set to MW, feed in  
a 744 kc/s (403 m) signal, and tune it in. With-  
out altering the position of the gang, feed in a  
strong 1,000 kc/s (300 m) signal, and adjust **C35**  
for minimum output.