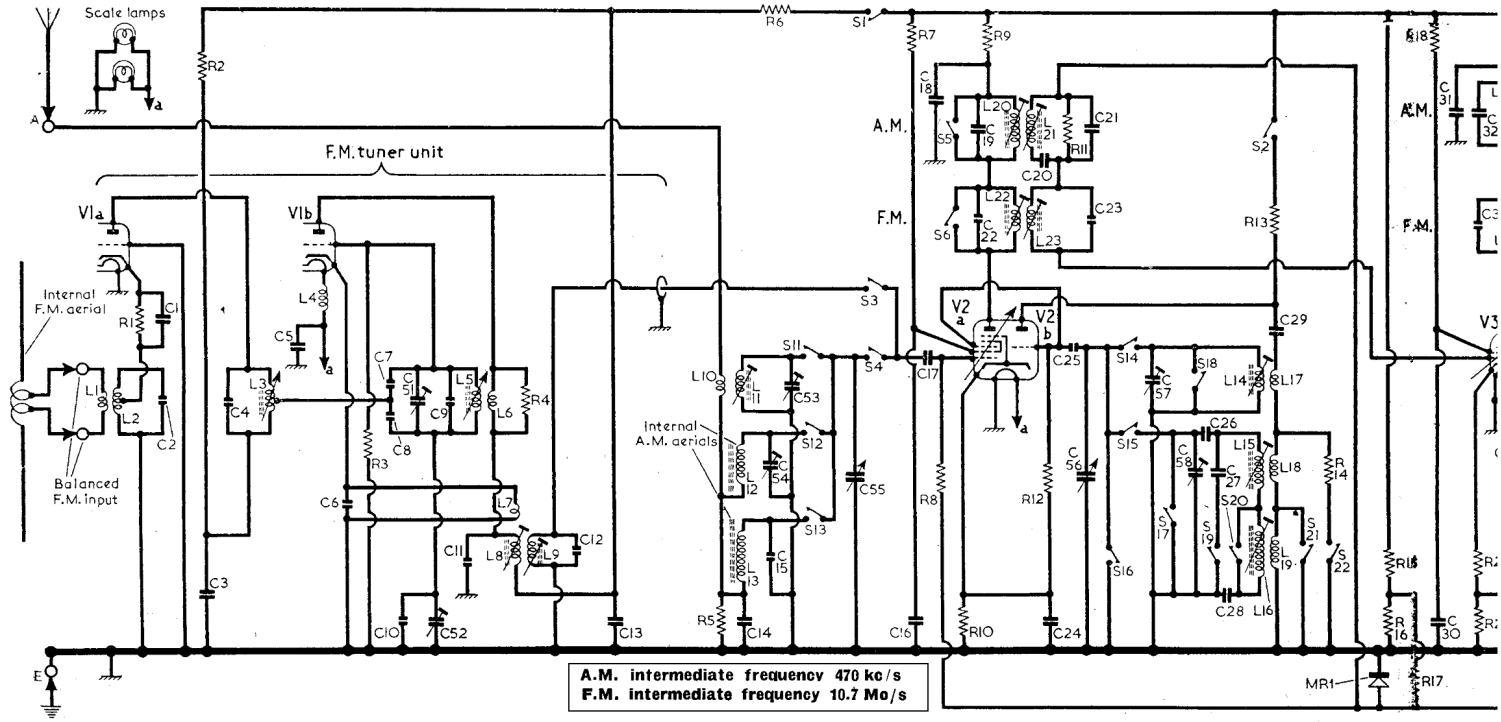
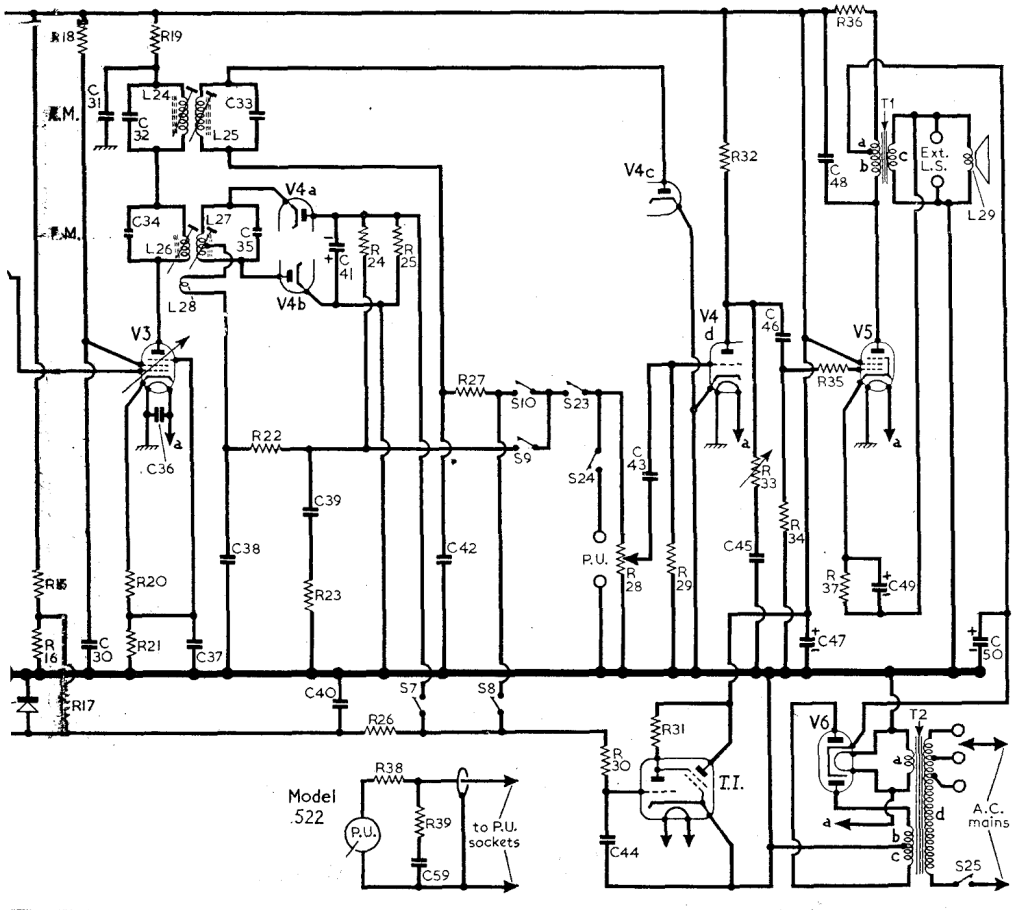


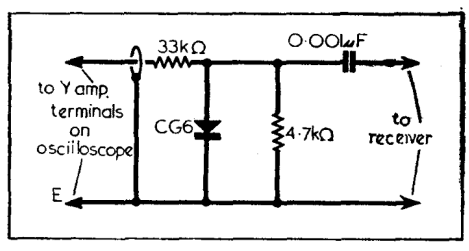


CAPACITORS		Values	Locations
C1	V1a cath. by-pass	0·003μF	H4
C2	F.M. aerial tuning	24pF	H4
C3	V1a H.T. decoup.	0·003μF	H4
C4	F.M. R.F. trim. ...	18pF	H4
C5	R.F. by-pass ...	0·001μF	H4
C6	V1b cath. by-pass	82pF	H4
C7	F.M. osc. trimmers	22pF	H4
C8		22pF	H4
C9		22pF	H4
C10	Part osc. neut. ...	4pF	H4
C11	1st F.M. I.F. trans. tuning	33pF	H4
C12		22pF	H4
C13	H.T. decoupling	0·001μF	H4
C14	A.M. Aerial coupling	0·005μF	F2
C15	L.W. aerial trim.	75pF	G2
C16	V2a S.G. decoup.	0·003μF	G3
C17	V2a C.G.	0·001μF	G3
C18	V2a H.T. decoup.	0·003μF	F3
C19	1st A.M. I.F. trans. tuning	150pF	A1
C20		220pF	A1
C21		500pF	A1
C22	2nd F.M. trans. tuning	22pF	A1
C23		22pF	A1
C24	V2 cath. by-pass	0·01μF	G3
C25	V2b A.M. osc. C.G.	47pF	G3
C26	M.W. osc. tracker	440pF	G3
C27	L.W. osc. trimmer	100pF	G3
C28	L.W. osc. tracker	492pF	G2
C29	V2b reaction coup	100pF	G3
C30	V3 S G. decoup.	0·003μF	F3
C31	V3 H.T. decoup.	0·003μF	F3
C32	2nd A.M. I.F. trans. tuning	150pF	B1
C33		150pF	B1
C34	3rd F.M. I.F. trans. tuning	8·2pF	B1
C35		51pF	B1
C36	R.F. by-pass ...	0·01μF	F3
C37	V3 cath.	0·1μF	F3
C38	F.M. A.F. load ...	500pF	E3
C39	Part de-emphasis...	0·002μF	E3
C40	A.G.C. decoupling	0·1μF	F3
C41*	D.C. reservoir ...	5μF	E3
C42	I.F. filter ...	100pF	F3
C43	A.F. coupling ...	0·01μF	E3
C44	T.I. decoupling ...	0·003μF	E2
C45	Part tone control...	0·01μF	D2
C46	A.F. coupling ...	0·01μF	E3
C47*	H.T. smoothing ...	32μF	A1
C48	Tone corrector ...	0·001μF	E3
C49*	V5 cath. by-pass	25μF	E2
C50*	H.T. smoothing ...	32μF	A1
C51‡	F.M. osc. trim. ...	—	H4
C52‡	F.M. osc. neut. ...	—	H4
C53‡	S.W. aerial trim.	—	G2
C54‡	M.W. aerial trim.	—	G2
C55†	Aerial tuning ...	—	A1
C56†	Osc. tuning ...	—	A1
C57‡	S.W. osc. trim. ...	—	G2
C58‡	M.W. osc. trim. ...	—	G2
C59	P.U. tone corrector	0·005μF	—

*Electrolytic. †Variable. ‡Pre-set.

Valve		Anode V	Screen V	Cath. V
V1 6AQ8	a	85†	—	*
	b	80†	—	—
V2 6AJ8	a	230	70	2·0
	b	80	—	2·0
V3 6BY7...		210	80	1·5
V4 6AK8	a-c	—	—	—
	d	50	—	—
V5 6BQ5...		270	230	8·0
V6 6V4 ...		255‡	—	290·0
T.I. 65ME...		Anode, 20V; target 230V.		

* No reading quoted. ‡ A.C. reading.
† Receiver switched to F.M.



Circuit of diode probe used for alignment.

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RESISTORS		Values	Location
R1	V1a G.B.	100Ω	H4
R2	V1a H.T. decoup.	2·2kΩ	H4
R3	F.M. osc. C.G. ...	56kΩ	H4
R4	F.M. osc. stabilizer	1·2kΩ	H4
R5	A.M. aerial shunt	1kΩ	G2
R6	H.T. decoupling ...	15kΩ	F3
R7	V2a S.G. decoup.	33kΩ	G3
R8	V2a C.G.	470kΩ	G3
R9	H.T. decoupling ...	2·2kΩ	F3
R10	V2 G.B.	220Ω	G3
R11	I.F. shunt ...	470kΩ	F3
R12	A.M. osc. C.G. ...	47kΩ	G3
R13	Osc. anode feed ...	33kΩ	G3
R14	S.W. osc. stabilizer	100Ω	G3
R15	A.G.C. delay bias	1MΩ	F2
R16	A.G.C. delay bias	150kΩ	F2
R17	A.G.C. delay bias	10MΩ	F3
R18	V3 S.G. H.T. feed	68kΩ	F3
R19	V3 anode decoup.	2·2kΩ	F3
R20	V3 G.B.	33Ω	F3
R21	V3 G.B.	120Ω	F3
R22	De-emphasis ...	56kΩ	E3
R23	De-emphasis ...	56kΩ	E2
R24	Balancing	560kΩ	E3
R25	D.C. load ...	27kΩ	E3
R26	A.G.C. decoupling	2·2MΩ	F3
R27	A.M. I.F. stopper	47kΩ	E3
R28	Volume control ...	500kΩ	D2
R29	V4d C.G.	6·8MΩ	E3
R30	T.I. decoup. ...	4·7MΩ	E3
R31	T.I. load	470kΩ	C1
R32	V4d anode load ...	680kΩ	E3
R33	Tone control ...	500kΩ	D2
R34	V5 C.G.	470kΩ	E3
R35	V5 C.G. stopper ...	47kΩ	E3
R36	H.T. smoothing ...	2kΩ	F2
R37	V5 G.B.	180Ω	E3
R38	P.U. tone correctors	100kΩ	—
R39	P.U. tone correctors	100kΩ	—

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	F.M. aerial coupling coils ...	—	H4
L2	F.M. aerial coupling coils ...	—	H4
L3	F.M. R.F. coil ...	—	H4
L4	Heater choke ...	—	H4
L5	F.M. osc. tuning ...	—	H4
L6	F.M. osc. reaction	—	H4
L7	F.M. F.B. coil ...	—	H4
L8	1st FM. I.F. Trans. Pri.	1·0	H4
L9	1st FM. I.F. Trans. Sec.	1·0	H4
L10	S.W. aerial coup....	—	G2
L11	A.M. aerial tuning coils	—	G2
L12	A.M. aerial tuning coils	0·25	A1
L13	A.M. aerial tuning coils	3·5	A1
L14	A.M. osc. tuning coils	—	G3
L15	A.M. osc. tuning coils	3·5	G3
L16	A.M. osc. tuning coils	6·0	G3
L17	A.M. osc. reaction coils	0·5	G3
L18	A.M. osc. reaction coils	2·5	G3
L19	A.M. osc. reaction coils	4·0	G3
L20	1st A.M. I.F. trans. Pri.	10·5	A1
L21	1st A.M. I.F. trans. Sec.	10·5	A1
L22	2nd F.M. I.F. trans. Pri.	1·0	A1
L23	2nd F.M. I.F. trans. Sec.	1·0	A1
L24	2nd A.M. I.F. trans. Pri.	10·0	B1
L25	2nd A.M. I.F. trans. Sec.	10·0	B1
L26	3rd F.M. I.F. trans. Pri.	1·0	B1
L27	3rd F.M. I.F. trans. Sec.	0·5	B1
L28	3rd F.M. I.F. trans. Tert.	—	B1
L29	Speech coil ...	2·5	—
T1	O.P. trans. a ...	50·0	
	O.P. trans. b ...	550·0	B1
	O.P. trans. c ...	0·7†	
T2	Mains trans. a ...	0·25	
	Mains trans. b ...	115·0	C1
	Mains trans. c ...	115·0	
	Mains trans. d, total	21·5	
MR1*	A.G.C. delay diode	—	F3
S1-S10	A.M./F.M. switches	—	F3
S11-S24	A.M. waveband switches ...	—	G2
S25	Mains sw., g'd R33	—	D2

* S.T.C. type M1. † 1·7Ω in model 522.

CIRCUIT ALIGNMENT

Equipment Required.—A frequency-modulated signal generator or "wobbulator," such as the Cossor model 1324, with an output impedance of 70-80Ω; a diode probe, if not provided with the wobbulator, comprising a crystal diode **(B.T.-H. CG6)**, two resistors, 4.7 kΩ and 33 kΩ, and an 0.001μF capacitor, connected as shown in the diagram (col. 4); an oscilloscope; an accurately calibrated spot-frequency signal generator; an output meter.

F.M. I.F. Stages.—Connect oscilloscope leads, via diode probe, to **V3** anode (pin 7) and chassis. Switch receiver to F.M. Detune **L26** (location reference **F3**) and **L27** (B1) by screwing the cores half-way out of the coil formers. If when making the following core adjustments, two peaks are found, the core should be set to the peak nearer the adjusting end of the coil can.

The signal generator should be used to provide marker pips on the response curves obtained during alignment. Its output should be connected to the signal generator terminals on the wobbulator, or, if these are not provided, to the output leads of the wobbulator via a 470Ω series resistor. The shape of the marker pip can be improved by connecting an 0.002μF-0.005μF capacitor across the input terminals to the oscilloscope "Y" amplifier.

Connect output of wobbulator to **V2a** control grid (pin 2). Adjust the wobbulator to sweep from 10.4 Mc/s to 11.0 Mc/s (centre frequency 10.7 Mc/s, with ± 300 kc/s deviation), and adjust the cores of **L22** (F3) and **L23** (A1) until a response similar to curve 1 in the set of oscilloscope traces (column 6) is obtained on the oscilloscope.

Partially remove the valve screening can from **V1**, and inject a signal into the valve by connecting the wobbulator "live" lead to the can. Alternatively, the can may be completely removed, and the wobbulator connected to a loop of wire twisted round the valve.

Feed in a 10.7 Mc/s signal, deviated by ± 300 kc/s, detune **L9** (H4) until three-quarters of its core is exposed and adjust the core of **L8** (H4) until a response, similar to curve 2, is obtained on the oscilloscope.

Then adjust the core of **L9**, while reducing the output of the wobbulator, to obtain a response on the oscilloscope similar to curve 3. During this adjustment, care should be taken to avoid slight peaking to one side of the response.

Transfer oscilloscope "live" lead, less the diode probe, to the top of the volume control. If the gain of the oscilloscope is not sufficient then it should be connected across **R34.** Leave **L27** (B1) and adjust the core of **L26** (F3) to obtain a response on the oscilloscope similar to curve 4. Repeat the adjustment to the core of **L23** given in the third paragraph of these instructions. Finally adjust the core of **L27** to obtain a response on the oscilloscope similar to curve 5.

A.M. I.F. Alignment.—Switch receiver to M.W., and turn gang to its mid-position. Connect the output meter to the external speaker sockets. Connect the signal generator output leads to **V1a** control grid (pin 2) and chassis. Feed in a 470 kc/s signal and adust the cores of **L25** (B1), **L24** (F3), **L21** (A1) and **L20** (F3) for maximum output. Repeat these adjustments until no further improvement results.

F.M. R.F. and Osoillator Stages.—Connect output of wobbulator to the F.M. aerial sockets. Check that the screening cover of the F.M. tuner unit is securely held in position by its fixing screw. Check that with the gang at maximum capacitance, the cursor coincides with the "Max" mark at the high wavelength ends of the tuning scales.

Feed in a 103.5 Mc/s signal, deviated by ± 100 kc/s. With the oscilloscope leads connected across the volume control (or with low gain oscilloscope across **R34),** pull out the core of **L5** (H4) by means of its drive cord to its full extent (until the core nearly touches the drive pulley) and adjust **C51** (H4)

Finally, tune the receiver to 91 Mc/s, feed in a 91 Mc/s signal, deviated by ± 100 kc/s, and adjust the core of **L5** by rotating the bush on the tuning gang spindle (slacken the fixing screws, location A1) until a response, similar to curve 6, is obtained on the oscilloscope. Adjust the core of **L3** (A1) in the same manner for maximum response on the oscilloscope.

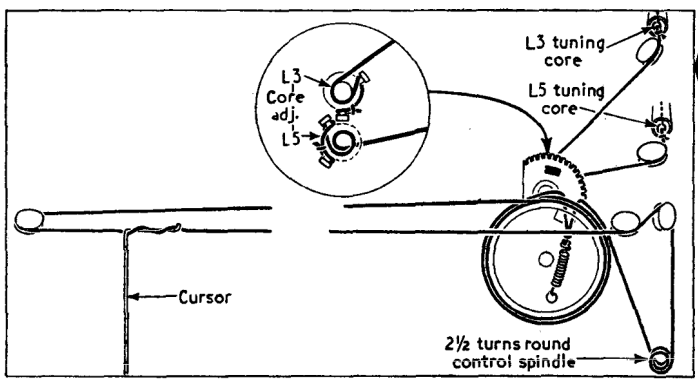
A.M. R.F. and Osoillator Stages.—Connect output meter to the external speaker sockets. Connect the signal generator, via a dummy aerial, to the A.M. **A** and **E** sockets. If two peaks are found when adjusting a trimmer, it should be set to the one involving the lower capacitance. If two peaks are found when making a core adjustment it should be set to the peak farther away from the adjusting end.

S.W.—Switch receiver to S.W. and tune to 18 Mc/s. Feed in an 18 Mc/s signal and adjust **C57** (G2) and **C53** (G2), while rocking the gang for maximum output. Tune receiver to 6 Mc/s, feed in a 6 Mc/s signal and adjust the cores of **L14** (G3) and **L11** (G2) for maximum output. Repeat the adjustments to **C57, C53** at 18 Mc/s.

M.W.—Switch receiver to M.W., and tune to "M" mark at 198m on tuning scale. Feed in a 193m (1,550 kc/s) signal and adjust **C58** (G2) and **C54** (G2) for maximum output. Tune receiver to "M" mark at 522m on tuning scale, feed in a 522m (575 kc/s) signal and adjust the core of **L15** (G3) for maximum output. Adjust the inductance of the M.W. internal aerial coil **L12** (A1) for maximum output at this frequency by moving its adjustment section along the ferrite rod. Repeat these adjustments until no further improvement results.

L.W.—Switch receiver to L.W. and tune to "L" mark at 1,875m on tuning scale. Feed in a 1,875m (160 kc/s) signal and adjust the core of **L16** (G3) for maximum output. Adjust the inductance of the L.W. aerial coil **L13** (A1) for maximum output at this frequency by sliding first the main section of the coil along its ferrite rod core for coarse adjustment, and finally its small adjustment section for fine adjustment. Repeat these adjustments until no further improvement results.

Switches	Gram	L.W.	M.W.	S.W.	F.M.
S11	—	—	—	C	—
S12	—	—	C	—	—
S13	—	C	—	—	—
S14	—	—	—	C	—
S15	—	C	C	—	—
S16	C	—	—	—	C
S17	—	—	—	C	—
S18	C	C	C	—	—
S19	—	C	—	—	—
S20	—	—	C	—	—
S21	—	—	C	—	—
S22	—	—	—	C	—
S23	—	C	C	C	C
S24	C	—	—	—	—



Sketch of the drive cords for the cursor, gang and F.M. tuning cores.

Switches	Gram	L.W.	M.W.	S.W.	F.M.
S11	—	—	—	C	—
S12	—	—	C	—	—
S13	—	C	—	—	—
S14	—	—	—	C	—
S15	—	C	C	—	—
S16	C	—	—	—	C
S17	—	—	—	C	—
S18	C	C	C	—	—
S19	—	C	—	—	—
S20	—	—	C	—	—
S21	—	—	C	—	—
S22	—	—	—	C	—
S23	—	C	C	C	C
S24	C	—	—	—	—

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