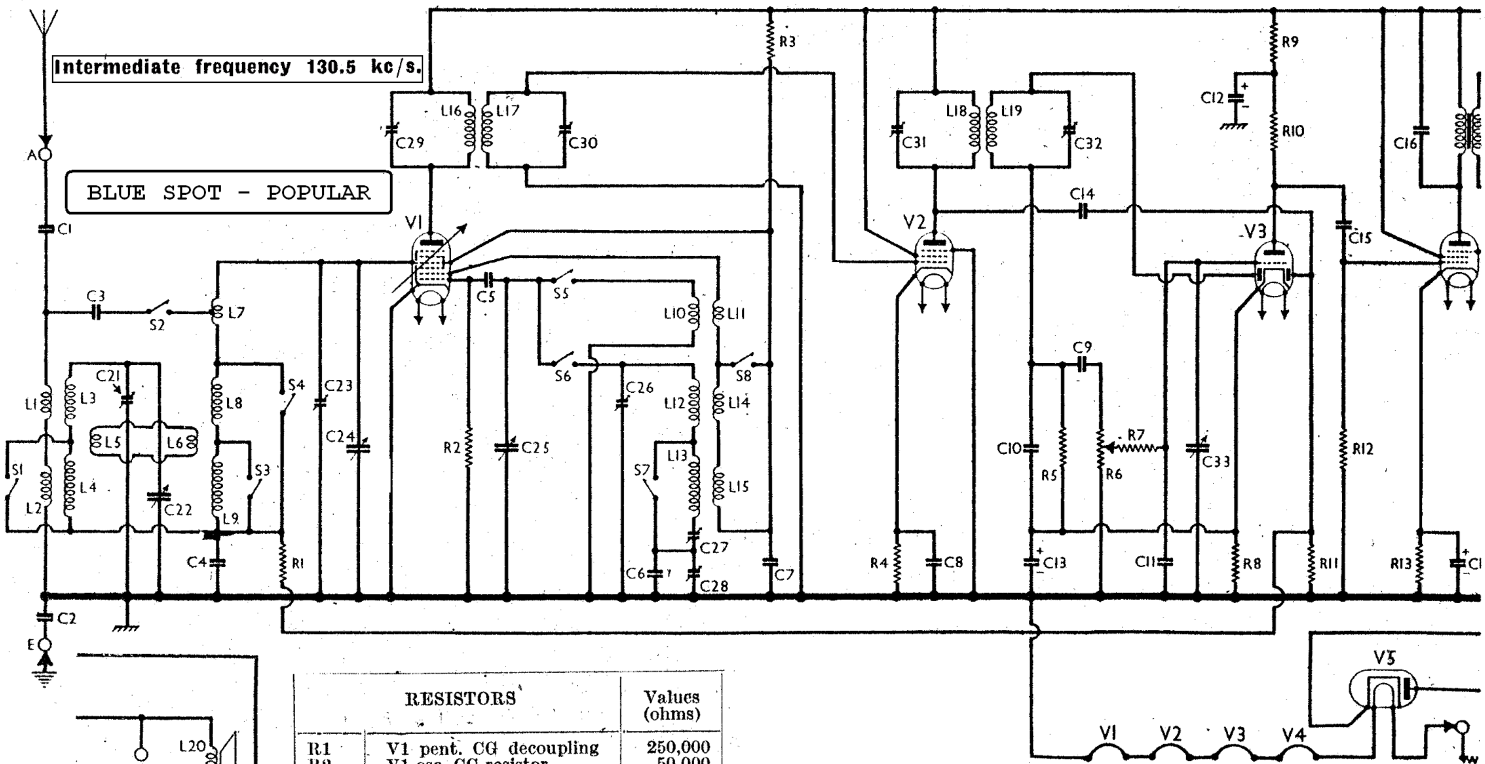

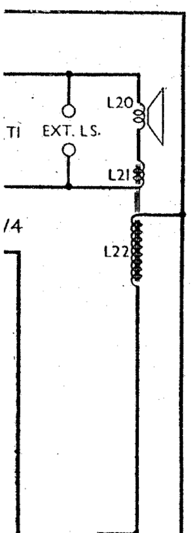

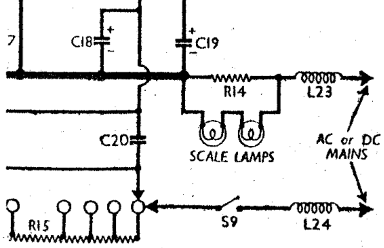

	RESISTORS	Values (ohms)
R1	V1 pent. CG decoupling	250,000
R2	V1 osc. CG resistor ...	50,000
R3	V1 SG and osc. HT feed	10,000
R4	V2 GB resistor	300
R5	V3 signal diode load ...	1,000,000
R6	Manual volume control	1,000,000
R7	IF stopper and part tone control	1,000,000
R8	V3 GB and AVC delay...	1,000
R9	V3 triode anode decoupling	10,000
R10	V3 triode anode load ...	50,000
R11	V3 AVC diode load ...	1,000,000
R12	V4 CG resistor	250,000
R13	V4 GB resistor	150
R14	Scale lamps shunt ...	20
R15	Heater circuit ballast ...	760†

† Tapped at 50 Ω + 425Ω + 100Ω + 100Ω + 85Ω from V5 heater end.

	CAPACITORS	Values (μF)
C1	Aerial isolator	0·0005
C2	Earth isolator	0·1
C3	Aerial SW coupling ...	0·0005
C4	V1 pent. CG decoupling	0·1
C5	V1 osc. CG capacitor ...	0·0001
C6	Osc. fixed MW tracker ...	0·0015
C7	V1 HT feed decoupling	0·1
C8	V2 cathode by-pass ...	0·1
C9	V3 triode AF coupling...	0·0005
C10	IF by-pass capacitors ...	0·0001
C11	IF by-pass capacitors ...	0·0001
C12*	V3 triode anode decoupling	2·0
C13*	V3 cathode by-pass ...	50·0
C14	V3 AVC diode coupling...	0·0001
C15	AF coupling to V4 ...	0·1
C16	Fixed tone corrector ...	0·005
C17*	V4 cathode by-pass ...	50·0
C18*	HT smoothing capacitors	16·0
C19*	HT smoothing capacitors	16·0
C20	Mains RF by-pass ...	0·05
C21‡	B-P pri. MW trimmer ...	0·000035
C22†	Band-pass pri. tuning ...	0·000456
C23‡	B-P sec. MW trimmer ...	0·000035
C24†	Band-pass sec. tuning ...	0·000456
C25†	Oscillator circuit tuning	0·000456
C26‡	Osc. circ. MW trimmer...	0·000035
C27‡	Osc. circ. LW tracker ...	0·00075
C28‡	Osc. circ. MW tracker ...	0·00075
C29‡	1st IF trans. pri. tuning	0·000175
C30‡	1st IF trans. sec. tuning	0·000175
C31‡	2nd IF trans. pri. tuning	0·000175
C32‡	2nd IF trans. sec. tuning	0·000175
C33†	Variable tone control ...	0·0005

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. values (ohms)
L1, L2	Aerial coupling coils, total	4·5
L3	Band-pass primary coils	2·6
L4	Band-pass primary coils	28·5
L5	Band pass coupling coils...	Very low
L6	Band pass coupling coils...	Very low
L7	Aerial SW tuning coil ...	Very low
L8	Band-pass secondary coils	2·3
L9	Band-pass secondary coils	28·0
L10	Osc. SW tuning coil ...	Very low
L11	Osc. SW reaction coil ...	0·2
L12	Osc. MW tuning coil ...	2·2
L13	Osc. LW tuning coil ...	20·0
L14, L15	Oscillator MW and LW reaction coils, total ...	3·5
L16	1st IF trans. Pri. ...	65·0
L17	1st IF trans. Sec. ...	65·0
L18	2nd IF trans. Pri. ...	65·0
L19	2nd IF trans. Sec. ...	65·0
L20	Speaker speech coil ...	1·6
L21	Hum neutralising coil ...	0·1
L22	Speaker field coil ...	650·0
L23	Mains RF filter chokes ...	3·2
L24	Mains RF filter chokes ...	3·2
T1	Speaker input trans. Pri. ...	360·0
	Speaker input trans. Sec. ...	0·5
S1–S8	Waveband switches ...	—
S9	Mains switch, ganged R6...	—

VALVE ANALYSIS

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VO13	192	2·9	102	5.4
	Oscillator 102	Oscillator 3·3		
V2 VP13B	192	6·7	192	2·1
V3 DDT13	75	1·8	—	—
V4 PP36	178	41·0	192	5·3
V5 V30	240†	—	—	—

† Cathode to chassis, DC.

Switches.—S1-S8 are the waveband switches, ganged in a single three-position rotary unit beneath the chassis. The switches are individually identified in our under-chassis view, while the switch positions for the three control settings are shown in the table below, starting from the SW position of the control spindle and turning clockwise. A dash indicates open, and **C** closed.

Switch	SW	MW	LW
S1	C	C	—
S2	C	—	—
S3	C	C	—
S4	C	—	—
S5	C	—	—
S6	—	C	C
S7	C	C	—
S8	C	—	—

BLUE SPOT - POPULAR

Chassis Divergencies.—Apart from the alternative arrangement of **R15,** several other modifications may be found. **C1** may be 0.01 μF, instead of 0.0005 μF.

V4 may be a Mullard Pen 36C valve. The scale lamps shown in our information may be omitted, and a high-voltage lamp substituted for them.

When this is done, **R14** is short-circuited, and an MES lampholder on a small bracket is bolted to the rear member of the tuning gang, through which the holder shell is connected to chassis. The "pip" contact of the holder is taken via a flying lead to the voltage adjustment tapping on **R15,** where it might well be fixed permanently to, say, the 210 V setting lug.

A suitable lamp would be the Ismay type C, rated at 230 V, 10 W.

Where the Pen 36C valve is used as **V4,** the suppressor will, of course, be returned internally to the cathode instead of pin 1. No wiring modification is necessary.

Some chassis employed a Tungsram DD13, and in these models the circuit will be like that shown for the radiogram, but the gram switching will be omitted and **V2** not operate as an AF amplifier.

RADIOGRAM MODIFICATIONS

In the radiogram version the chassis is modified to permit the IF amplifier **V2** to operate as an AF pre-amplifier for the pick-up. The double diode triode valve **V3** is replaced by a double diode valve **(Tungsram DD13),** and the AF output on gram from **V2** is fed via the manual volume control directly to **V4.** On radio, the circuit is little different from our diagram overleaf except that the triode section of **V3** is omitted and the output from the diode circuit is fed via **R6** directly to the output valve.

The gramophone motor is connected to the mains input circuit, but normally an AC motor is fitted. Unless, therefore, a universal motor has been fitted, **the radiogram must not be connected to DC mains** until the motor has been disconnected, when the receiver may be used on radio only.

The revised part of the circuit is shown in the diagram in cols. 1 and 2 opposite.

Components occupying the same positions and having the same values as in the receiver diagram overleaf still bear the same numbers. Other components in the radiogram circuit bear numbers higher than the highest in the tables (col. 6 overleaf and col. 1 opposite); their values are given in the table below.

The pick-up is inserted in the return lead from **V2** CG, between **L17** and chassis, and **S14** short-circuits it on radio. **V2** operates as a triode, the screen acting as an anode with **R17** as load resistor. **R16** and **C34** decouple the circuit.

The AF output is coupled via **C35, S12** and **R6, R7, C33** to **V4** CG.

S10, S11, S13 and **S14** close on radio, while **S12** opens. On gram, the positions are reversed.

In order to obtain delay bias for AVC, **V3** cathode is taken to the junction of **R18** and **R19,** which form a potential divider across the HT circuit.

Physically, the radio/gram change-over switch is an additional unit fitted centrally on the front member of the chassis.

Additional Components

Resistors		Capacitors	
R16	... 10,000Ω	C34	... 2μF
R17	... 50,000Ω	C35	... 0·1μF
R18	... 100,000Ω	C36	... 0·1μF or 0·25μF
R19	... †50,000Ω		

† May be 15,000Ω.

CIRCUIT ALIGNMENT

IF Stages.—Connect signal generator to control grid (top cap) of **V1** and **E** socket, feed in a 130.5 kc/s (2,299 m) signal, and adjust **C32, C31, C30** and **C29** for maximum output, keeping the volume control at maximum and the input signal low to avoid AVC action. The output should now be checked at 5 kc/s above and below 130.5 kc/s (135.5 kc/s and 125.5 kc/s), where the output readings should be approximately equal. If they are not, repeat the adjustments.

RF and Oscillator Stages.—Transfer signal generator leads to **A** and **E** sockets, via a suitable dummy aerial. With the gang at maximum, the pointer should cover the 50 m mark on the SW scale.

MW.—Switch set to MW, tune to 250 m on scale, feed in a 250 m (1,200 kc/s) signal, and adjust **C26,** then **C21** and **C23** for maximum output. If two peaks are found for **C26,** select that involving the lesser trimmer capacity.

Feed in a 500 m (600 kc/s) signal, tune it in, and adjust **C28** for maximum output while rocking the gang for optimum results.

LW.—Switch set to LW, feed in a 1,900 m (158 kc/s) signal, tune it in, and adjust **C27** for maximum output while rocking the gang for optimum results.