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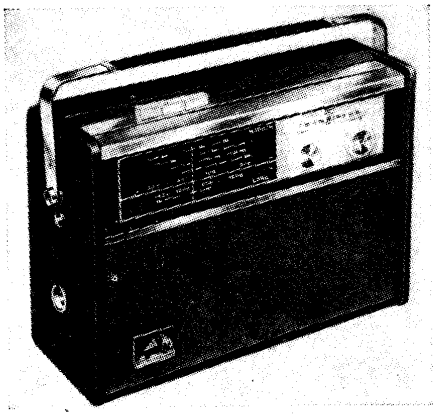
"TRADER" SERVICE SHEET

1515

H.M.V. 1424

2-waveband Portable



Appearance of the H.M.V. 1424

TWO printed circuit panels (one R.F. section and one audio section) provide the basis of the H.M.V. 1424 portable transistorized receiver. Designed to operate from a 9V battery it employs a high impedance 6in by 4in loudspeaker and has a power output of 600mW. Battery consumption is 20mA under average operating conditions.

Signal input is from an internal ferrite rod aerial, or from a car aerial which may be inserted into the socket provided for the purpose.

From a second socket the audio output direct from the detector is available and may be used to drive a tape recorder amplifier.

Waveband ranges are 183-556m (M.W.) and 1,136-2,040m (L.W.). Press-buttons are employed for waveband and battery on/off switching.

A total of seven transistors plus two crystal diodes are incorporated in a circuit which has a common negative (chassis) line.

Release date and original price: May 1961, £13 11s 8d. *Purchase tax extra.*

TRANSISTOR ANALYSIS

Voltage measurements normally made at transistor electrodes are not supplied by the manufacturer but a number of readings in various parts of the circuit are supplied and these are listed below. In most cases they refer to emitter potentials relative to the positive line and in these cases a correct reading will generally indicate that base and emitter potentials are in order. All measurements were made with a 20,000Ω/V meter. The receiver was connected to a new 9V battery. Voltage readings obtained were as follows: across **R3**, 1.0V; across **R7**, 740mV; across **R8**, 2.1V; across **R12**, 1.1V; across **R15**, 340mV; across **R17**, 1.3V; across **R21** 150mV.

To check that the local oscillator is operating correctly, measure the voltages across **R3** (TR1 emitter) and across **R2** (TR1 base). **TR1** emitter voltage should be approximately as in the list above (across R3) and its base voltage should be slightly more positive than the emitter. Failure to oscillate is indicated if the base is more negative than the emitter.

Total current consumption under no signal conditions is approximately 12mA. When a signal is applied this will rise to approximately 20mA at average listening level. No other current measurements should be attempted.

CIRCUIT DESCRIPTION

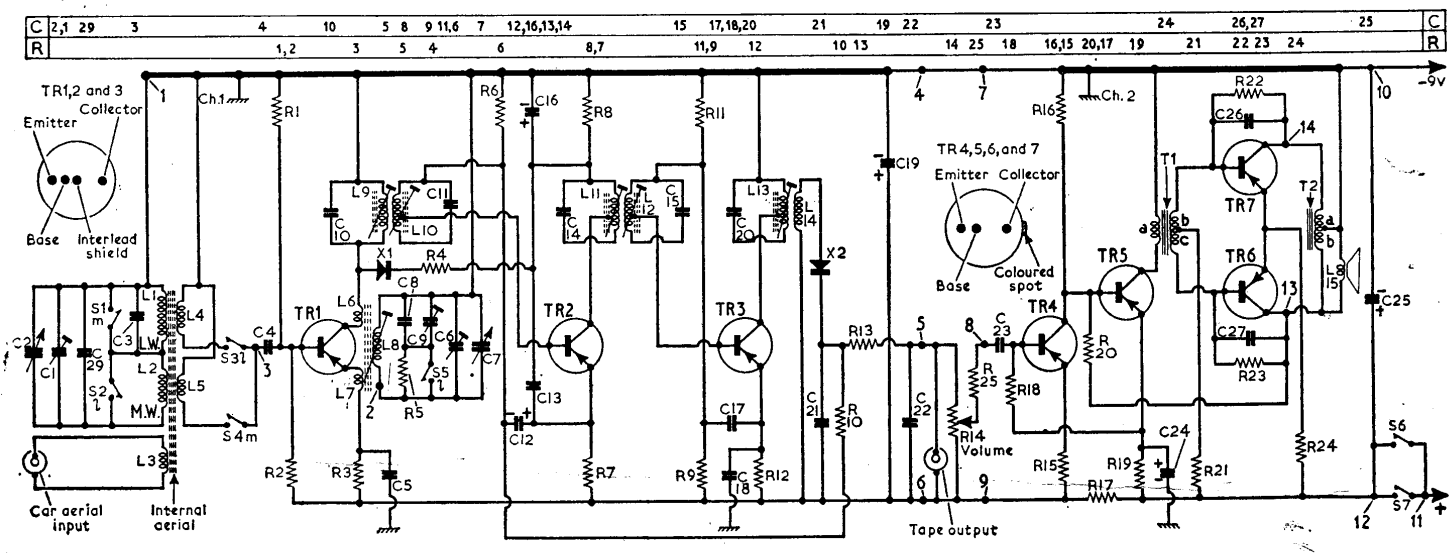
TR1 operates as a self-oscillating mixer and receives the signal input from the internal aerial **L1** and **L2** or from an external aerial via coupling winding **L3**. **S1** to **S4** select the appropriate coils for M.W. or L.W. reception. Base bias for **TR1** is derived from **R1** and **R2**.

(*Continued col.* 1 *overleaf*)

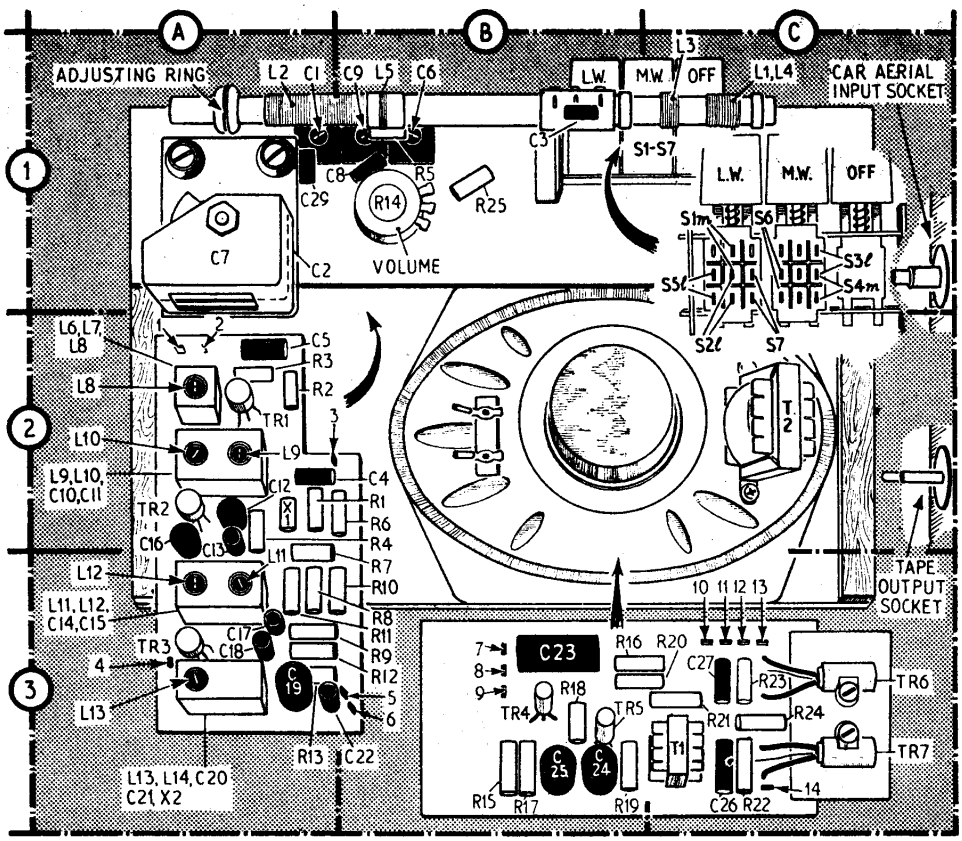
COMPONENT VALUES & LOCATIONS

Resistors		
R1	33KΩ	A2
R2	6·8kΩ	A2
R3	1kΩ	A2
R4	680Ω	A2
R5	150kΩ	B1
R6	56kΩ	B2
R7	680Ω	A3
R8	2·2kΩ	A3
R9	4·7kΩ	A3
R10	8·2kΩ	B3
R11	22kΩ	A3
R12	1kΩ	A3
R13	470Ω	A3
R14	5kΩ	B1
R15	330Ω	B3
R16	6·8kΩ	B3
R17	270Ω	B3
R18	18kΩ	B3
R19	820Ω	B3
R20	150kΩ	C3
R21	47Ω	C3
R22	8·2kΩ	C3
R23	8·2kΩ	C3
R24	4·7Ω	C3
R25	8·2kΩ	B1
Capacitors		
C1	40pF	A1
C2	420pF	A1
C3	100pF	B1
C4	5,000pF	A2
C5	0·02μF	A2
C6	40pF	B1
C7	149pF	A1
C8	300pF	B1
C9	40pF	B1
C10	500pF	A2
C11	500pF	A2
C12	8μF	A2
C13	0·04μF	A2
C14	500pF	A2
C15	500pF	A3
C16	2μF	A2
C17	0·02μF	A3
C18	0·02μF	A3
C19	350μF	A3
C20	250pF	A3
C21	0·01μF	A3
C22	0·04μF	A3
C23	0·25μF	B3
C24	100μF	B3
C25	100μF	B3
C26	0·01μF	C3
C27	0·01μF	C3
C28	—	†
C29	10pF	A1
Coils*		
L1	—	C1
L2	—	A1
L3	—	C1
L4	—	C1
L5	—	B1
L6	—	A2
L7	—	A2
L8	—	A2
L9	—	A2
L10	—	A2
L11	3·0	A3
L12	3·0	A3
L13	3·0	A3
L14	3·5	A3
L15	35·0	A3
Transistors		
TR1	AF117	A2
TR2	AF117	A2
TR3	AF117	A3
TR4	OC71	B3
TR5	OC81D	B3
TR6‡	OC81	C3
TR7‡	OC81	C3
Transformers*		
T1 a	260·0	B3
T1 b	55·0	B3
T1 c	55·0	B3
T2	—	C2
Miscellaneous		
X1	OA79	A2
X2	OA90	A3
S1-S7	—	C1

**Approximate D.C. resistance in ohms.*
‡*Matched pair.*
†*No component.*



Circuit diagram of the H.M.V. 1424 with R.F. and A.F. transistor codings inset. To preserve the grounded emitter appearance of the circuit, the diagram has been drawn with the common negative (chassis) line at the top. Decoupling capacitors **C5, C18** *and* **C24** *are connected to this line*



View from the rear of the receiver showing the I.F. and audio printed circuit panels lifted from their mountings and turned component side uppermost, as indicated by arrows. The press-button switches have also been moved out of position to illustrate their contacts.

Circuit Description—*continued*

Local oscillator coil **L8** is tuned by **C8, C9, C6** and **C7**, and is inductively coupled to **L6** and **L7** which provide feedback from collector to emitter. The 475kc/s intermediate frequency signal which appears in **TR1** collector is tuned-transformer coupled via **L9, L10** to the base of first I.F. amplifier **TR2**. Ouput from **TR2** is again tuned-transformer coupled via **L11, L12** to second I.F. amplifier **TR3** and the output from **TR3** is applied to detector diode **X2**.

Receiver overload protection is provided by diode **X1**. This is biased to conduct on large signal excursions in **TR1** collector effectively damping the collector circuits of **TR1** and **TR2**, in addition to A.G.C. action.

Audio Stages

X2 operates with slight forward bias to reduce its impedance at low signal level. This bias and the standing base bias for **TR2** is derived from the same potential divider network **R6, R10, R13** and **R14**. The positive D.C. potential developed across **R13, R14** due to diode signal current is fed back to **TR2** as A.G.C. bias. Also developed across **R14** which serves as the volume control is the rectified audio output from **X2** and this is passed on via stopper resistor **R25** and isolating capacitor **C23** to **TR4** which operates as audio amplifier. Bias for **TR4** is obtained from the potential developed across **TR5** stabilizing resistor **R19**, to provide correct operating conditions for the output stage.

Amplified output from **TR4** is applied to **TR5** which drives the push-pull output stage **TR6** and **TR7** via phase-splitting transformer **T1**. **TR6** and **TR7** receive negative feedback tone correction from collector to emitter via **R22, C26** and **R23, C27**. High impedance speaker coil **L15** functions as part of the load impedance.

CIRCUIT ALIGNMENT

Equipment Required.—An A.M. signal generator, 30 per cent modulated; an output meter with an impedance of 30-40Ω or an A.C. voltmeter with a suitable impedance (a model 8 Avometer would be suitable); an aerial coupling loop; a 0.1μF capacitor and a screwdriver trimming tool.

Alignment Notes.—If a 30-40Ω output meter is used it should be connected in place of the speaker speech coil **L15** but if an A.C. voltmeter is used as an output indicator, the speech coil should remain in circuit with the voltmeter connected across it.

The signal generator output should be adjusted throughout alignment so as to maintain the receiver output at approximately 50mW (1V A.C.) to prevent A.G.C. action. The R.F. tuned circuits are interdependent and M.W. adjustments should be made first.

1.—Switch receiver to M.W. and rotate tuning gang to minimum capacitance. Turn volume control to maximum. Connect the signal generator via the 0.1μF capacitor across **C2** (location reference A1).
2.—Feed in a modulated 475kc/s signal and adjust **L13** (A3), **L12, L11** (A3), **L10** and **L9** (A2) in that order for maximum output. Repeat until no further improvement can be obtained.
3.—Disconnect the signal generator from the receiver and connect its output leads directly across the coupling coil. Place the coil so that it is loosely coupled to the ferrite rod aerial.
4.—Tune receiver to 214m (calibration mark on scale). Feed in a 1,400kc/s signal and adjust **C6** (B1) and **C1** (A1) for maximum output.
5.—Tune receiver to 500m (mark on scale). Feed in a 600kc/s and adjust **L8** (A2). Then adjust **L2** by sliding adjusting ring (A1) along the ferrite rod for maximum output.
6.—Switch to L.W. and tune receiver to 1,364m (mark on scale). Feed in a 220kc/s signal and adjust **C9** (B1) and **L1** (C1) for maximum output. **L1** is adjusted by sliding it along the ferrite rod.

GENERAL NOTES

Dismantling.—Remove three screws, from the cabinet, two at the rear and one beneath.

Remove two screws from top escutcheon plate, one at either end. The receiver is now freed from the cabinet and by carefully pulling the waveband press-buttons forward, the baffle and scale panel may be lowered flat on to the bench, and withdrawn as far as the leads to the car aerial socket and audio output socket will allow.

Switches.—**S1-S5** are waveband switches, **S6** and **S7** are battery on/off switches. They are mounted in a press-button unit shown in location reference (C1). **S6** is closed on M.W. and **S7** is closed on L.W. When the off button is pressed, the depressed waveband button is released.

Suffix letter "*m*" or "*l*" following the switch number indicates that the switch closes on M.W. or L.W. respectively.

Battery.—Any one of following 9V batteries is suitable: Ever Ready PP9, Drydex DT9, G.E.C. BB29 or Vidor T6009.

Drive Cord Replacement.—Approximately 20 inches of nylon braided glass yarn is required for a replacement drive cord. The completed assembly will appear as illustrated in our diagram below when the new cord is fitted as follows:

Turn the tuning gang to maximum (fully meshed). Pull off volume and tuning knobs and remove scale by gently easing it forward. Remove scale backing plate by taking out two screws in the rear of the control panel. Tie one end of the cord to the tension spring and anchor the spring temporarily in the position shown in the illustration.

Guiding the cord round the underside of the inner one of the two adjacent small pulleys, make two and a half turns anti-clockwise round the drive drum, starting from the rear. On the final half-turn thread the cord inside the stud which is formed by two slots in the moulding. Continue out of the drive drum, round the underside of the outer small pulley and across to the left-hand small pulley. Pass the cord clockwise round the left-hand small pulley and return it to the tension spring. Tie the free end of the cord to the free end of the tension spring. Attach the cursor so that when the scale is replaced, it is in line with the calibration mark about 600m.

Modifications.—In some earlier receivers the following differences may be found: **C3** is 110pF not 100pF, **C8** is 320pF not 300pF, **C19** is 100μF not 350μF. Also a 470pF capacitor may be shunted across M.W. coupling coil **L5**.

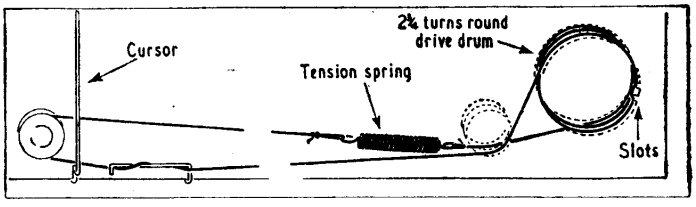


Diagram of the completed scale drive assembly. Directions for replacement of the drive cord are given in col. 3.

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