

# FM4 TUNER

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INSTRUCTION BOOK

QUAD

# QUAD FM4

## Tuner

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# INSTRUCTION BOOK

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*Quad is a registered trade mark*

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**OIF45EC ISS 6**

### Accessories

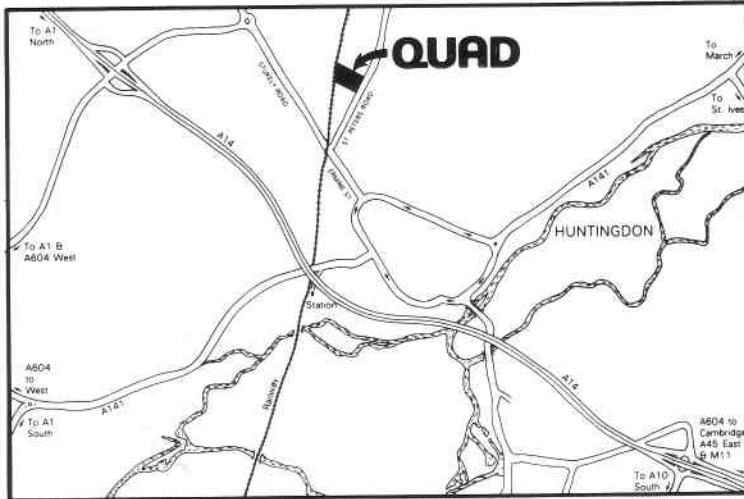
The FM4 is supplied with

1 x A.C. Lead	QSPSSA
1 x Signal Lead	QP2P2SA
1 x Aerial Connector	PPL734A

### Service

If servicing is required the tuner should be returned to the supplier, the distributor for the country of purchase or to Quad Electroacoustics Ltd. A brief note should be enclosed giving your name and address and the reason for returning it.

QUAD offers same-day service from Monday to Friday except for bank holidays. The map below shows where to find us. Please call 0480 52561 to make an appointment.



### IMPORTANT

THE CARDBOARD CARTON AND EXPANDED POLYSTYRENE PACK SHOULD BE RETAINED IN CASE THE UNIT HAS TO BE RETURNED TO THE MANUFACTURER OR DISTRIBUTOR FOR SERVICE.

### Guarantee

This tuner is guaranteed against any defect in material and workmanship for a period of twelve months from the date of purchase.

Within this period we undertake to supply replacement parts free of charge provided that failure was not occasioned by misuse, accident or negligence. Freight and labour costs are not covered unless by local agreement.

Within the U.K. the guarantee offered with this equipment does not limit the consumer's existing statutory rights. A separate guarantee card is not supplied with your Quad unit. Your guarantee begins on the day on which you take delivery.

Circuit diagrams and service data for this Quad product are available from the manufacturer or distributor for a small charge.

## INTRODUCTION

The Quad FM4 is a self powered stereo tuner covering the FM band (88 - 108 MHz) only and designed to be used in conjunction with Quad and similar high quality pre-amplifiers.

The entire operation of the tuner is controlled by a microprocessor so that the only controls on the tuner are an on/off switch, tuning knob, and pre-selector buttons.

Up to seven stations can be stored in the tuner's memory and recalled at the touch of a button.

Manual tuning is accomplished in the normal manner in the sense that the tuning knob is turned clockwise to move up the frequency band and vice versa. The frequency tuned is displayed digitally and a bar graph gives simultaneous indication of signal strength and centre channel tuning.

## BRIEF INSTRUCTIONS

Plug the A.C. and signal leads supplied into the Quad Control Units and FM4.

Connect a suitable 75  $\Omega$  aerial.

Switch on.

Press .

Tune in desired station. See list at the back of this book.

Press and hold  and press desired preset.

When red LED extinguishes and green LED lights, station is stored in the tuner's memory.

## INSTALLATION

The Quad FM4 may either be used free standing or mounted in a cabinet panel of up to 15 mm thick.

If it is to be panel mounted cut a rectangular aperture 312 mm x 56 mm in the panel.

Remove the two screws from the rear of the cover and slide the cover off.

Insert the tuner into the aperture from the front, replace the cover from the rear, insert the two screws and tighten until finger tight and then give one additional half turn to each screw to lock securely.

The tuner requires no ventilation.

## CONNECTIONS

The FM4 is supplied with leads and connectors for direct connection to the Quad Control Unit.

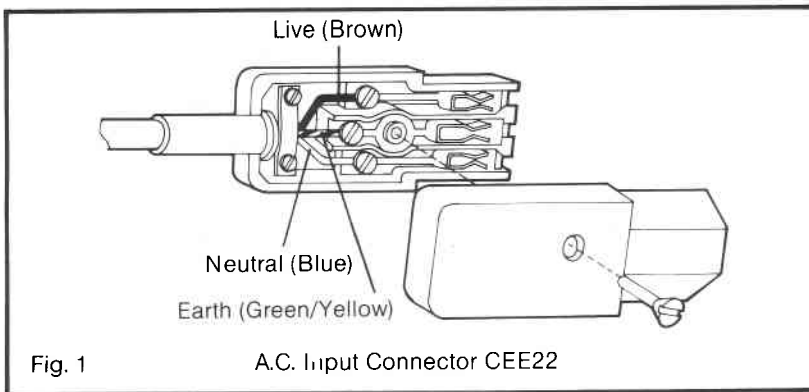
### A.C. Mains Supply

This tuner is designed to operate on one range of A.C. mains voltage only, 50 or 60 Hz, either 110/120 volts or 220/240 volts.

The designed operating voltage of the tuner is clearly marked on the back.

**BEFORE CONNECTING TO THE A.C. SUPPLY CHECK THAT THE VOLTAGE MARKED ON THE BACK CORRESPONDS WITH THAT OF THE A.C. SUPPLY.**

The A.C. mains input is via the standard 3-pin Euro connector supplied wired in accordance with the international code (see Fig. 1) and will normally be drawn from the outlet on the rear of the Quad pre-amplifier.



A surge-resisting fuse (63mA for 220/240V, 100mA for 110/120V) housed in the mains input receptacle in the rear panel provides the usual protection. To obtain access to the fuse, unplug the mains supply and use a small screwdriver to lever open the drawer carrying the fuse. (see Fig. 2).

If a replacement fuse has to be fitted, make sure that it is of the correct type. The marking will be T63mA (T100mA for 110V).

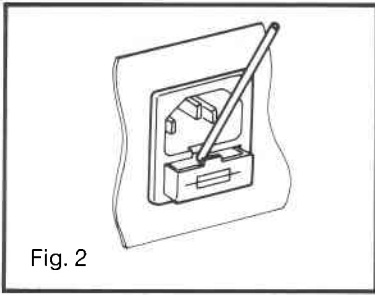


Fig. 2

An unswitched A.C. outlet supplies appropriate additional equipment and the shrouded plug supplied with the amplifier (wired as shown in Fig. 3) is for use with this outlet (see Fig. 4).

The maximum steady state current drawn from the A.C. outlet should not exceed 4 amps.

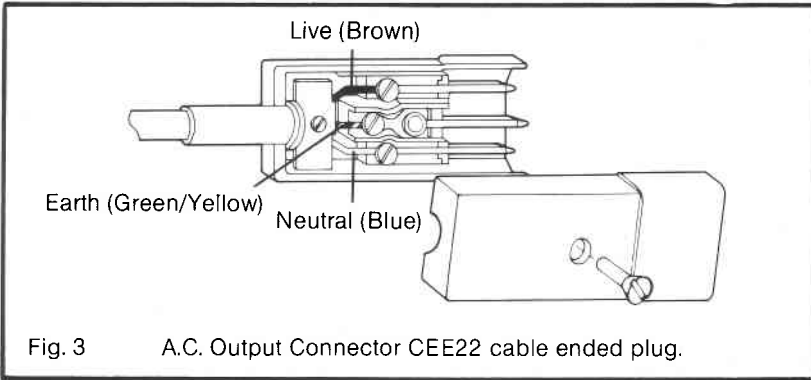


Fig. 3 A.C. Output Connector CEE22 cable ended plug.

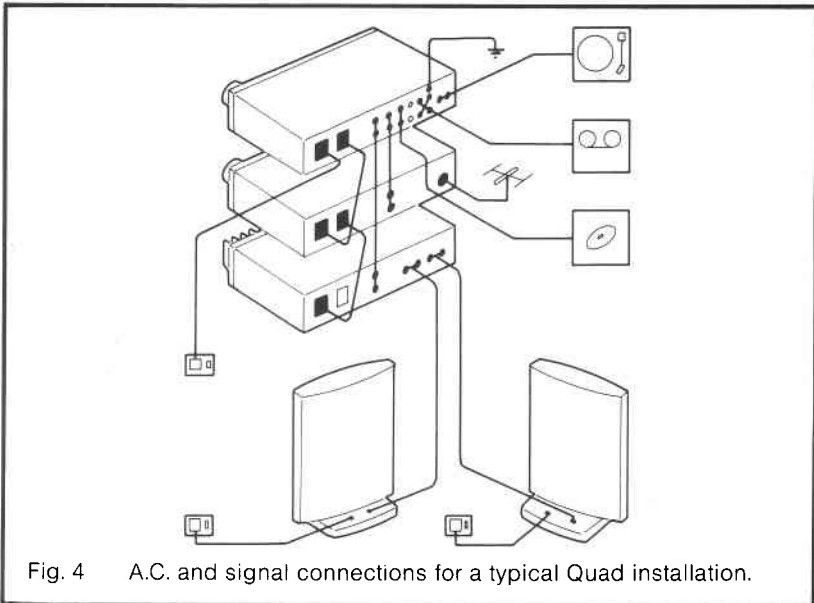


Fig. 4 A.C. and signal connections for a typical Quad installation.

### Aerial

The performance of the FM4 is entirely dependent upon the signal strength received from the aerial. Optimum signal to noise will be achieved with a signal strength of between 1mV and 100mV and not in excess of 500mV.

Your local aerial contractor or Quad dealer will be able to advise on the antenna system which will give the best results in your area, but in most cases a correctly orientated external multi-element array will give best results.

The FM4 is designed to operate from a standard 75Ω co-axial feeder, and indoor ribbon aerials should not be used.

### Output

Signal output is via phono sockets, clearly marked L (left) and R (right).

If the tuner is used with a Quad 33/34/44 control unit with a DIN input socket, you will need a 5-pin-DIN-to-2-phono-plugs lead. This may be obtained from QUAD, or your dealer by quoting part number QD5FP2A.

The output of the FM4 is nominally 100mV for 30% programme modulation.

### Controls

The Quad FM4 is equipped with an on/off switch, a tuning knob, seven preset station selection buttons, and a manual  button which is also used in conjunction with one of the preset station buttons to store a desired frequency in the tuner's memory.

The tuned frequency is displayed digitally and a twin bar graph provides simultaneous indication of signal strength and centre tuning. Stereo transmissions light the stereo indicator.

All other functions are controlled automatically by the microprocessor. With manual  selected interstation muting and AFC are switched out enabling all stations, whether strong or weak to be tuned in. When a preset station is selected the tuner is automatically muted until the desired station has been correctly tuned.

The FM4 remembers the last station used and automatically reverts to it when switched on.

The FM4 supplied in the U.K. is provided with preset station buttons marked:-

- For a fourth BBC VHF Channel (where available)

- BBC Radio 1/2

- BBC Radio 3

- BBC Radio 4

- Independent local Radio 1

- Independent local Radio 2


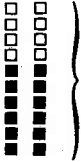
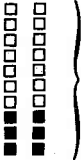
- BBC Local Radio

FM4s supplied to the rest of the world have preset buttons marked  to .

## OPERATION

### Manual tuning

Press the **TUNE** button. The red LED will light. Any desired frequency can be tuned using the tuning knob. Interstation muting and AFC are automatically switched out and all incoming stations can be tuned in however weak the signal. The bar graph indicates the signal strength of the station and when properly tuned both sections will be of equal height. If the left section is shorter than the right it is simply necessary to tune to the right and vice versa. When all but the top segments of the bar graph are lit the incoming signal strength is sufficient to provide optimum signal to noise. (Approximately 1 mV).

Bar Graph	Approximate Signal Strength	Signal/Noise Stereo
	1 mV (60 dB)	70dB
	100 μV (40 dB)	55dB
	10 μV (20 dB)	30dB

### Storing a Station

Once a station has been correctly tuned it can be stored on any of the preset positions simply by pressing and holding down the **TUNE** button and pressing the required pre-select button until the red LED extinguishes and the green LED of the chosen preset lights. This takes approximately one second. Both buttons are then released. The selected frequency is now stored in the tuner's memory and will be recalled whenever the pre-selected button is pressed. To change the frequency stored in any preset position select **TUNE**, tune in the desired station, press **TUNE** and hold, press the preset button until the green LED lights. The old station is deleted from the memory and the new one stored.

For example, to store Radio 3 Wrotham 91.3MHz on the preset **BBC 3** proceed as follows –

Press **TUNE**.

Tune to 91.3MHz. Observe that both sections of the bar graph are the same height, the height indicating signal strength (see page 7).

Press and hold **TUNE**.

Press **BBC 3** until the green LED lights.

Release **TUNE** and **BBC 3**.

A list of BBC and IBA transmitters and frequencies is given at the end of this book.

### Preset tuning

Once a transmitter frequency has been selected and stored in each of the seven preset memory positions, manual tuning will be an exception and operation of the tuner is extremely simple. Switch on the Quad Control Unit and the FM4. The Control Unit will automatically select RADIO and the FM4 will tune into the station last used. To select any of the other six preset stations press the appropriate pushbutton.

When the FM4 is switched off the memory is powered by a small battery which is recharged whenever the set is on. The memory will retain stored stations for about five years if the set is not used at all.

Under normal use the life of the battery is about ten years. If for any reason, the FM4 is not used for a long period, and the battery runs down it will be necessary to reload the memory with preset stations. The battery will be automatically recharged while the set is on. If the battery is flat the tuner automatically reverts to manual TUNE.

### Mono

When listening to a very weak station (typically 3 to 4 segments of the bar graph illuminated) a significant improvement in the signal to noise can be made by switching the Quad control unit to MONO and centring the balance control for minimum noise. Remember, however, to switch back to stereo when changing stations.

### De-Emphasis

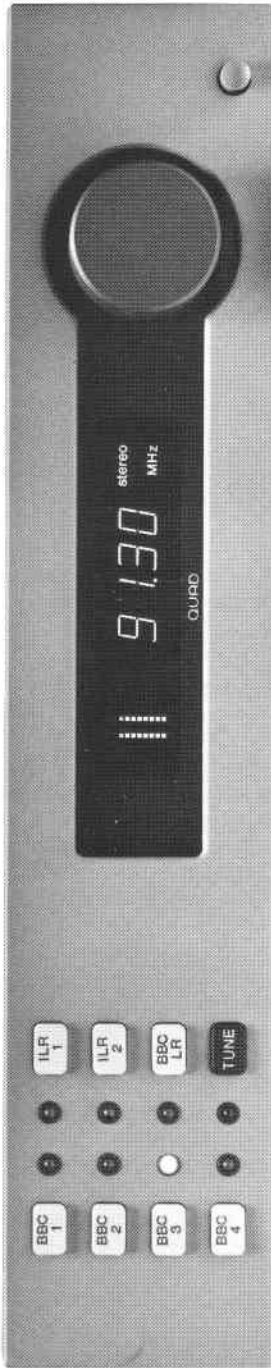
FM broadcasts are pre-emphasised (accentuation of the higher frequencies) prior to transmission and must be de-emphasised at the receiver to restore the correct tonal balance. (This is similar to the record equalisation procedure with discs). The correct de-emphasis for Britain and Europe is  $50\mu\text{sec}$  and for North America  $75\mu\text{sec}$ . Normally this will have been correctly set prior to purchase but the  $50\mu\text{sec}$  equalisation can be easily converted to  $75\mu\text{sec}$  by adding a capacitor of  $3.3\text{nF}$  in parallel with each of the existing correction capacitors C44 and C45. These additional capacitors may be most conveniently located on the underside of the printed circuit board.

### SPECIFICATION

<b>Frequency range</b>	88-108MHz
<b>Sensitivity</b> – 30dB quieting	Mono $1\mu\text{V}$
50dB quieting	Mono $2.7\mu\text{V}$
	Stereo $25\mu\text{V}$
<b>Full Limiting</b>	$< 1\mu\text{V}$
<b>Signal/Noise</b> – Input signal 1 kHz at 1 mV. A weighted	Mono 76dB
	Stereo 70dB
<b>Distortion</b> – Input signal 1 kHz $\pm$ 75kHz	Mono 0.15%
	Stereo 0.15%
$\pm$ 25kHz	Mono 0.05%
	Stereo 0.10%
<b>Selectivity</b>	53dB
<b>Capture Ratio</b>	1.5dB
<b>IF Rejection</b>	100dB
<b>AM Suppression</b>	60dB
<b>Image Rejection</b>	80dB
<b>Pilot Tone Suppression</b>	60dB
<b>Crosstalk at 1 kHz</b>	-40dB
<b>Frequency Response</b> – 20Hz-15kHz	+0 -1dB
<b>Output Level 30% Modulation</b>	100mV
<b>Source Impedance</b>	100 $\Omega$
<b>Recommended Load Impedance</b>	$> 20\text{k}\Omega$
<b>Aerial Input</b>	75 $\Omega$ unbalanced
<b>De-emphasis</b>	50 $\mu\text{Sec}$ or 75 $\mu\text{Sec}$
<b>Power Input</b>	100-125 or 200-250V. 50-60Hz 6VA.
<b>Dimensions</b>	321 mm wide 64mm high 207mm deep.
<b>Weight</b>	3Kg.

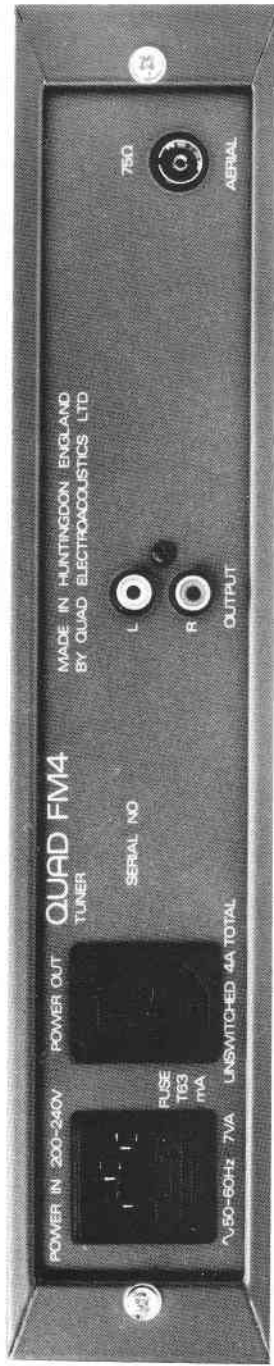
# QUAD FM14

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FRONT VIEW

# QUAD FM4



BACK VIEW

**B.B.C. VHF TRANSMITTERS IN THE U.K.**

Main stations shown in bold	R.1	R.1/2	R.3	R.4
<b>ENGLAND, ISLE OF MAN AND CHANNEL ISLANDS</b>				
<b>Belmont</b>	88.8	90.9	93.1	
<b>Holme Moss</b>	89.3	91.5	93.7	
Kendal	98.8*			
Morecambe Bay	89.0	91.2	93.4	
Olivers Mount*	89.9	92.1	94.3	
Pendle Forest	90.2	92.6	94.6	
Scarborough†**	89.9	92.1	94.3	
Sherfield (Crosspool)	89.9	92.1	94.3	
Stanton Moor	88.3	90.5	92.7	
Wensleydale	88.4	90.6	92.8	
Wharfedale	88.3	90.5	92.7	
Windermere	91.1	94.8	97.1	
<b>Les Platons (CI)</b>	88.1	90.3	92.5	
<b>Manningtree*</b>	88.1	90.3	92.5	
<b>North Hessary Tor</b>	88.7	90.9	93.1	
Okehampton	89.0	91.2	93.4	
St. Thomas (Exeter)	89.5	91.7	93.9	
<b>Oxford</b>	90.1	92.3	94.5	
<b>Peterborough</b>	88.6	90.8	93.0	
Bow Brickhill*	88.9	91.1	93.3	
Cambridge (Madingley)	88.5	90.7	92.9	
<b>Pontop Pike</b>	90.1	92.3	94.5	
Chatton	89.8	92.0	94.2	
Fenham	89.7	91.9	94.1	
Wearside	89.6	91.8	94.0	
Whitby	89.7	91.9	94.1	
<b>Redruth</b>	88.8	91.0	93.2	
Isles of Scilly	88.6	90.8	93.0	
<b>Ridge Hill</b>	88.5	90.7	92.9	
<b>Rowridge</b>	89.7	91.9	94.1	
Newhaven*	89.4	91.7	93.8	
Ventnor	88.1	90.3	92.5	
<b>Sandale</b>				
(See also Scotland)				
Douglas (IOM)	88.4	90.6	92.8	
<b>Sutton Coldfield</b>	88.3	90.5	92.7	
Churchdown Hill	89.0	91.2	93.4	
Ludlow	89.6	91.8	94.0	
Northampton	88.9	91.1	93.3	
<b>Swingate (Dover)</b>	90.0	92.4	94.4	
<b>Tacolneston</b>	89.7	91.9	94.1	
<b>Wenvoe</b>	89.9	92.1	94.3	
Barnstaple	88.5	90.7	92.9	
Bath	88.8	91.0	93.2	
Lichester Crescent	89.3	91.5	93.7	
<b>WINTER HILL</b>				
<b>Wrotham</b>	88.6	90.8	93.0	
Brighton (Whitehawk Hill)	89.1	91.3	93.5	
Caterham	90.1	92.3	94.5	
Crystal Palace	89.7	91.9	94.1	
Guildford	104.8			
High Wycombe	88.1	90.3	92.5	
Kenley	89.9	92.1	94.3	
Mickleham*	88.4	90.6	92.8	
Woburn*	89.7	91.9	94.1	
	88.3	90.5	92.7	
<b>WALES</b>				
<b>Blaenplwyf</b>	88.7	90.9	93.1	
Dolgellau	90.1	92.3	94.5	
Ffestiniog	88.1	90.3	92.5	
Llandyfriog	90.1	92.3	94.5	
Machynlleth	89.4	91.6	93.8	
Mynydd Pencarreg	89.7	91.9	94.1	
<b>Haverfordwest</b>	89.3	91.5	93.7	
<b>Llanddona</b>	89.8	92.0	94.2	
Beis-y-Coed	88.2	90.4	92.6	
<b>Llangollen</b>	88.9	91.1	93.3	
Llandnam	90.1	92.3	94.5	
Llanfyllin	89.1	91.3	93.5	
Llanrhaeadr-ym-Mochnant	89.8	92.0	94.2	
Long Mountain	89.9	92.1	94.3	
<b>Wenvoe</b>	98.7*			
Aberdare	89.2	91.4	93.6	
Abergavenny	88.7	90.9	93.1	
Blaenavon	88.5	90.7	92.9	
Brecon	88.9	91.1	93.3	
Carmarthen	88.9	91.1	93.3	
Carmel	88.4	90.6	92.8	
Ebbw Vale	88.4	90.6	92.8	
Kilvey Hill	89.5	91.7	93.9	
Llanrindod Wells	89.1	91.3	93.5	
Llanidloes	88.1	90.3	92.5	
Pontypool	89.2	91.4	93.6	
Ton Pentre*	88.8	91.0	93.2	
Varteg Hill	88.9	91.1	93.3	
Blaenavon				
Christchurch				

\* proposed but not in service at date of publication  
 † to be discontinued  
 \*\* to be replaced by Olivers Mount  
 \*\*\* to be replaced by Black Hill

**R. Cymnu**  
 93.1  
 94.5  
 92.5  
 94.5  
 93.8  
 94.1  
 93.7  
 94.2  
 92.6  
 93.3  
 94.5  
 93.5  
 94.2  
 96.8  
 93.6  
 93.1  
 92.9  
 93.3  
 93.3  
 92.8  
 92.8  
 93.9  
 93.5  
 92.5  
 93.6  
 100.6  
 93.3  
**R. Gwent**  
 95.1  
 95.9

**B. B. C. VHF TRANSMITTERS IN THE U. K.**

Main stations shown in bold

**SCOTLAND**

**Ashkirk**  
 Innerleithen  
 Peebles  
**Black Hill\***  
**Bressay**  
**Darvel**  
**Forfar**  
 Pitlochry  
**Fort William**  
 Ballachulish  
 Glengorm  
 Kinlochleven  
 Mallaig  
 Oban (m)  
**Keelylang Hill**  
**Kirk o' Shotts†\*\*\***  
 Bowmore  
 Campbeltown  
 Girvan  
 Kirtou Mailer  
 Lethanhill  
 Lochgilphead  
 Milburn Muir  
 Port Ellen\*  
 Rosneath  
 Rothesay  
 South Knapdale  
 Strachur

	R.1	R.1/2	R.3	R.4	R.Scotland
		89.1	91.3		93.5
		89.5	91.7		93.9
		88.4	90.6		92.8
	98.6	89.9	92.1	95.8	94.3
		88.3	90.5		92.7
		89.5	91.7		93.9
		88.3	90.5		92.7
		89.2	91.4		93.6
		89.3	91.5		93.7
		88.1	90.3		98.9
		88.1	90.3		92.5
		88.9	91.1		97.7
		89.3	91.5		93.3
		88.1	90.3		98.5
		88.1	90.3		94.3
		88.4	90.6		92.5
		88.9	91.1		92.8
		89.0	91.2		93.3
		88.3	90.5		93.4
		88.3	90.5		92.7
		88.8†	91.0†		92.7
		88.3*	90.5*		97.9
		89.0	91.2		93.2
		89.2	91.4		92.7*
		88.5	90.7		93.4
		89.3	91.5		93.6
		88.6	90.8		92.9
					93.7
					98.9
					93.0
					98.2

**Meldrum**  
 Durris  
 Tullich  
**Melvaig**  
 Penifiler  
 Skriaiag  
**Rosemarkie**  
 Grantown  
 Kingussie  
 Knock More  
**Rumster Forest**  
**Sandale**  
 Cambret Hill  
 Stranraer

	R.1	R.1/2	R.3	R.4	R.Scotland
		88.7	90.9		93.1
		89.4	91.6		93.8
		90.1	92.3		94.5
		89.1	91.3		93.5
		89.5	91.7		98.7
		88.5	90.7		93.9
		88.5	90.7		92.9
		89.6	91.8		98.1
		89.8	92.0		94.0
		89.1	91.3		94.6
		88.2	90.4		93.5
		90.1	92.3		92.6
		88.1	90.3	92.5	94.5
		88.7	90.9		94.7
		89.7	91.9		93.1
					94.1

**NORTHERN IRELAND**

**Brougher Mountain**  
**Divis**  
 Ballycastle  
 Kilkeel  
 Larne  
 Rostrevor Forest  
**Limavady**  
**Londonderry**

	R.1	R.1/2	R.3	R.4	R.Ulster
		89.4	91.6		93.8
		90.1	92.3	94.5*	94.5†
		88.8	91.0	93.2	96.0*
		89.4	91.6		95.1
		89.1	91.3		93.8
		88.6	90.8		93.5
		89.6	91.8	94.0	93.0
		88.7	90.9		95.4
					93.1

\* proposed but not in service at date of publication  
 † to be discontinued  
 \*\* to be replaced by Olivers Mount  
 \*\*\* to be replaced by Black Hill

# VHF TRANSMITTERS IN THE U.K.

## BBC LOCAL RADIO

AREA	Transmitter	Frequency (MHz)	Transmitter	Frequency (MHz)
R. Bedfordshire	Luton†	103.8	R. Leicester	95.1
	Zouches Farm*	103.8	R. Lincolnshire	94.9
	Sandy Heath	95.5	R. London	94.9
R. Bristol	Bow Brickhill*	104.5	R. Manchester	95.1
	Ilchester Crescent	94.9	R. Merseyside	95.8
	Mendip	95.5	R. Newcastle	96.0
	Bath	104.6		95.4
R. Cambridgeshire	Cambridge (Maddingley)	96.0	Fenham	104.4
	Peterborough	95.7	Gt. Massingham	104.4
R. Cleveland	Bilsdale W. Moor	95.0	Tacolneston	95.1
	Whitby	95.8	Geddington	103.6
R. Cornwall	Caradon Hill	95.2	Northampton	103.8
	Isles of Scilly	96.0	Colwick Park†**	103.8
	Redruth	103.9	Mapperley Ridge*	103.8
R. Cumbria	Sandale	95.6	Fishponds Hill*	95.5
(R. Furness)	Morecambe Bay	96.0	Oxford	95.2
(R. Furness)	Kendal	95.2	Holme Moss	104.1
R. Derby	Windermere	104.2	Sheffield (Crosspool)	88.6
	Derby	94.2	Ludlow	95.0
R. Devon	Sutton Coldfield	104.5	The Wrekin	96.0
	Stanton Moor	95.3	Rowridge	96.1
	Huntshaw Cross	94.8	Alsagers Bank	94.6
	North Hessary Tor	103.4	Manningtree	103.9
	Okehampton	96.0	Great Barton	104.6
BBC Essex	St. Thomas (Exeter)	95.8	Henley	94.6
	Great Braxted	103.5	High Wycombe	104.9
	South Benfleet	95.3	Guildford	104.6
R. Gloucestershire*	Stroud	95.0	Brighton (Whitehawk Hill)	95.3
	Churchdown Hill	104.7	Heathfield	104.5
R. Guernsey	Les Touillietts	93.2	Reigate	104.0
R. Hereford and	Ridge Hill	94.7	Newhaven*	95.0
Worcester*	Great Malvern	104.0	Meriden	94.8
R. Humberside	High Hunsley	95.9	Lark Stoke	103.7
R. Jersey	Les Platons	88.8	Blunsdon	103.6
R. Kent	Swingate	104.2	Naish Hill	104.3
	Wrotham	96.7	Sutton Coldfield	95.6
R. Lancashire	Hameldon Hill	95.5	Acklam Wold	103.7
	Lancaster	104.5	Oliver's Mount	95.5
	Winter Hill	103.9	Woolmoor	104.3
R. Leeds	Holme Moss	92.4		
	Wharfedale	95.3		

\* proposed but not in service at date of publication

† to be discontinued

\*\* to be replaced by Mapperley Ridge

VHF TRANSMITTERS IN THE U. K.

INDEPENDENT LOCAL RADIO

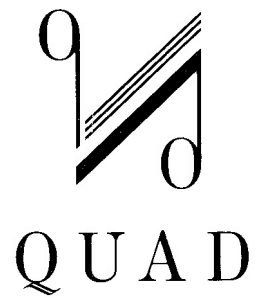
COMPANY AND AREA	Site	Frequency (MHz)	COMPANY AND AREA	Site	Frequency (MHz)
Radio Aire	(AIR)		Radio Hallam	(HAL)	
<b>Leeds</b>		96.3	<b>Sheffield &amp; Rotherham</b>		97.4
Beacon Radio	(BEA)		<b>Barnsley</b>		96.1
<b>Wolverhampton &amp; Black Country</b>		97.2	<b>Doncaster</b>		102.9
<b>Shrewsbury &amp; Telford</b>		103.1	Hereward Radio	(HER)	103.4
BRMB Radio	(BBR)		<b>Peterborough</b>		102.7
<b>Birmingham</b>		96.4	Invicta Radio	(INV)	
Radio Broadland	(BLD)		<b>Maldstone &amp; Medway</b>		103.1
<b>Great Yarmouth &amp; Norwich</b>		102.4	<b>East Kent</b>		102.8
Capital Radio	(CAP)				96.1
<b>London-General &amp; Entertainment</b>		95.8			97.0
Chiltern Radio	(CLT)				95.9
<b>Luton</b>		97.6	LBC (London Broadcasting Company)		97.3
<b>Bedford</b>		96.9	<b>London-News and Information</b>		103.2
<b>Northampton</b>		96.6	Leicester Sound	(LEI)	
Radio City	(CTY)		<b>Leicester</b>		103.4
<b>Liverpool</b>		96.7	Marcher Sound	(MAR)	
Radio Clyde	(CLY)		<b>Wrexham &amp; Deeside</b>		97.0
<b>Glasgow</b>		102.5	Mersia Sound	(MER)	
County Sound Radio	(COU)		<b>Coventry</b>		102.7
<b>Guildford</b>		96.4	Radio Mercury	(MRY)	97.5
Devon Air Radio	(DEV)		<b>Reigate &amp; Crawley</b>		97.1
<b>Exeter</b>		97.0	Metro Radio	(MET)	97.4
<b>Torbay</b>		96.4	<b>Tyne &amp; Wear</b>		97.4
Downtown Radio	(DWN)		Moray Firth Radio	(MFR)	
<b>Beifast</b>		97.4	<b>Inverness</b>		96.9
<b>Omagh &amp; Enniskillen</b>		96.6	North Sound Radio	(NOR)	
<b>Londonderry</b>		102.4	<b>Aberdeen</b>		97.5
<b>Limavady</b>		96.4	Ocean Sound	(OCN)	
Essex Radio	(ESX)		<b>Portsmouth</b>		97.1
<b>Southern</b>		96.3	<b>Southampton</b>		103.2
<b>Chelmsford</b>		102.6	Winchester	(ORW)	96.7
Radio Forth	(FOR)		Radio Orwell		97.1
<b>Edinburgh</b>		97.3	<b>Ipswich</b>		97.5
GWR	(GWR)		Pennine Radio	(PEN)	102.5
<b>Bath</b>		103.0	<b>Bradford</b>		97.1
<b>Bristol</b>		96.3	<b>Huddersfield &amp; Halifax</b>		97.5
<b>Swindon</b>		97.2			102.5
<b>West Wiltshire</b>		102.6			

**B. B. C. VHF TRANSMITTERS IN THE U. K.**

**INDEPENDENT LOCAL RADIO**

**COMPANY AND AREA**

Company and Area	Site	Frequency (MHz)
Piccadilly Radio	(PIC)	
<b>Manchester</b>	Saddleworth	103.0
Plymouth Sound	(PLY)	
<b>Plymouth</b>	Plympton	97.0
	Tavistock	96.6
Red Dragon Radio	(RDR)	
<b>Cardiff</b>	Wenallt	103.2
<b>Newport</b>	Christchurch	97.4
Red Rose Radio	(RRR)	
<b>Preston &amp; Blackpool</b>	Winter Hill	*97.3*
Saxon Radio	(SAX)	
<b>Bury St. Edmunds</b>	Great Barton	96.4
Savern Sound	(SEV)	
<b>Gloucester &amp; Cheltenham</b>	Churchdown Hill	102.4
<b>Stroud</b>	Stroud	103.0
Signal Radio	(SIG)	
<b>Stoke-on-Trent</b>	Alsagers Bank	102.6
Southern Sound	(SOU)	
<b>Brighton</b>	Brighton	103.5
<b>Newhaven</b>	Newhaven	96.9
Swansea Sound	(SWS)	
<b>Swansea</b>	Kilvey Hill	96.4
Radio Tay	(TAY)	
<b>Dundee</b>	Tay Bridge	102.8
<b>Perth</b>	Perth	96.4
Radio Tees	(TEE)	
<b>Teesside</b>	Blisdale	96.6
Radio Trent	(TRE)	
<b>Nottingham</b>	Colwick Wood	96.2
<b>Derby</b>	Quarndon	102.8
Two Counties	(TCR)	
<b>Radio (2CR)</b>	Poolo	97.2
<b>Bournemouth</b>	(VAL)	
Radio 210	Butts Centre	97.0
<b>Reading</b>	Hannington	102.9
<b>Basingstoke &amp; Andover</b>	(VKG)	
Viking Radio	High Hunsley	96.9
<b>Humberside</b>	(WST)	
West Sound	Darvel	96.7
<b>Ayr</b>	Girvan	97.5
Radio Wyvern	(WYN)	
<b>Hereford</b>	Ridge Hill	97.6
<b>Worcester</b>	Malvern	102.8



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