FM4 TUNER

INSTRUCTION BOOK

QUAD

QUAD FM4

Tuner

INSTRUCTION BOOK

CONTENTS

QUAD ELECTROACOUSTICS LTD.,
HUNTINGDON,
Cambs.,
PE18 7DB.

Telephone No.: Huntingdon (0480) 52561
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OIF45EC ISS 6

Accessories

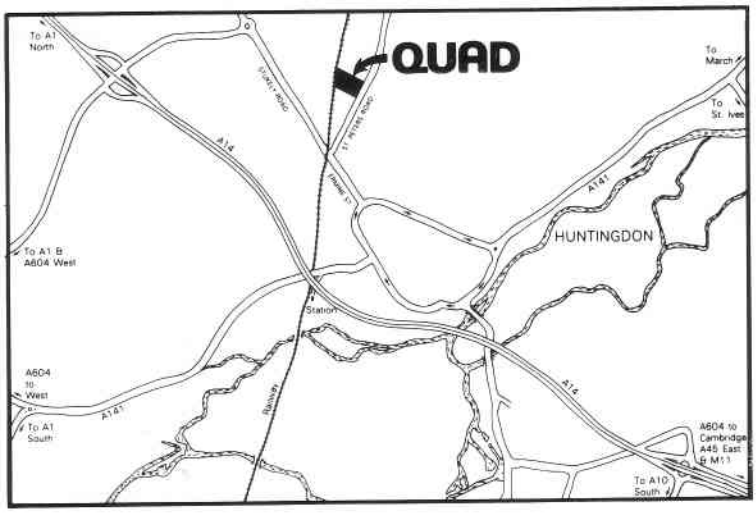
The FM4 is supplied with

1 x A.C. Lead	QSPESSA
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 Ω aerial.

Switch on.

Press [TUNE].

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

Press and hold [TUNE] 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.

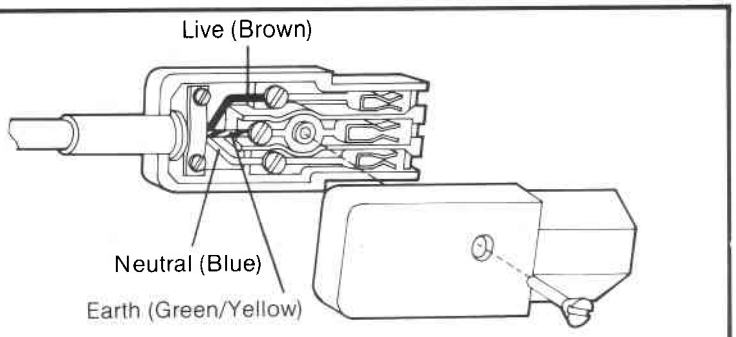


Fig. 1 A.C. Input Connector CEE22

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.

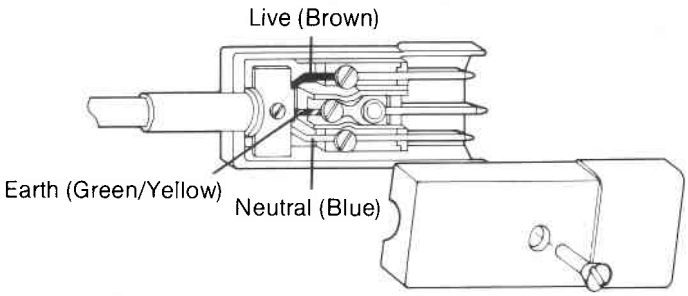


Fig. 3 A.C. Output Connector CEE22 cable ended plug.

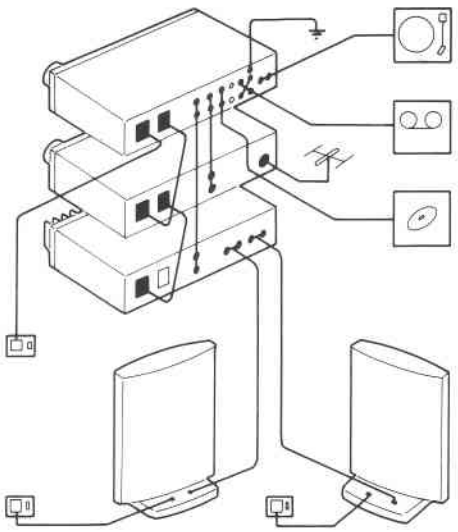


Fig. 4 A.C. and signal connections for a typical Quad installation.

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 [TUNE] 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 [TUNE] 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:-

[BBC 1] – For a fourth BBC VHF Channel (where available)

[BBC 2] – BBC Radio 1/2

[BBC 3] – BBC Radio 3

[BBC 4] – BBC Radio 4

[ILR 1] – Independent local Radio 1

[ILR 2] – Independent local Radio 2

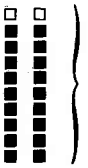
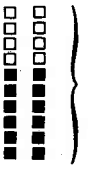
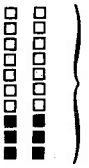
[BBC LR] – BBC Local Radio

FM4s supplied to the rest of the world have preset buttons marked [1] to [7].

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 dBF)	70dB
	100μV (40 dBF)	55dB
	10μV (20 dBF)	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 50μsec and for North America 75μsec. Normally this will have been correctly set prior to purchase but the 50μsec equalisation can be easily converted to 75μsec by adding a capacitor of 3.3nF 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

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

QUAD FM4

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
ENGLAND, ISLE OF MAN AND CHANNEL ISLANDS				
Belmont		88.8	90.9	93.1
Holme Moss		89.3	91.5	93.7
	98.8*			
Kendal		89.0	91.2	93.4
Morecambe Bay		90.0	92.2	94.4
Olivers Mount*		89.9	92.1	94.3
Pendle Forest		90.2	92.6	94.6
Scarborough† **		89.9	92.1	94.3
Sheffield (Crosspool)		89.9	92.1	94.3
Stanton Moor		89.8	92.0	94.2
Wensleydale		88.3	90.5	92.7
Wharfedale		88.4	90.6	92.8
Windermere		88.3	90.5	92.7
Les Platons (CI)		91.1	94.8	97.1
Manningtree*		88.1	90.3	92.5
North Hessary Tor		88.1	90.3	92.5
Okehampton		88.7	90.9	93.1
St. Thomas (Exeter)		89.0	91.2	93.4
Oxford		89.5	91.7	93.9
Peterborough		90.1	92.3	94.5
Bow Brickhill*	98.2	88.6	90.8	93.0
Cambridge (Madingley)		88.9	91.1	93.3
Pontop Pike		88.5	90.7	92.9
Chatton		90.1	92.3	94.5
Fenham		89.8	92.0	94.2
Weardale		89.7	91.9	94.1
Whitby		89.6	91.8	94.0
Redruth		89.7	91.9	94.1
Isles of Scilly		88.8	91.0	93.2
Ridge Hill		88.6	90.8	93.0
Rowridge		88.5	90.7	92.9
Newhaven*	99.3	89.7	91.9	94.1
Ventnor		89.4	91.7	93.8
Sandale		88.1	90.3	92.5
(See also Scotland)				
Douglas (IOM)		88.4	90.6	92.8
Sutton Coldfield		88.3	90.5	92.7
	98.4*			
Churchdown Hill		89.0	91.2	93.4
Ludlow		89.6	91.8	94.0
Northampton		88.9	91.1	93.3
Swingate (Dover)		90.0	92.4	94.4
Tacolneston		89.7	91.9	94.1
Wenvoe	98.7*	89.9	92.1	94.3
Barnstaple		88.5	90.7	92.9
Bath		88.8	91.0	93.2
Ilchester Crescent		89.3	91.5	93.7
Winter Hill		88.6	90.8	93.0
Wrotham		89.1	91.3	93.5
Brighton (Whitehawk Hill)		90.1	92.3	94.5
Caterham		89.7	91.9	94.1
Crystal Palace	104.8			
Guildford		88.1	90.3	92.5
High Wycombe		89.9	92.1	94.3
Kenley		88.4	90.6	92.8
Mickleham*		89.7	91.9	94.1
Wooburn*		88.3	90.5	92.7

WALES	R.1	R.1/2	R.3	R.4	R. Cymru
Blaenplwyf		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
Haverfordwest		89.3	91.5		93.7
Llanddona		89.8	92.0		94.2
Betws-y-Coed		88.2	90.4		92.6
Llangollen		88.9	91.1		93.3
Llandinam		90.1	92.3		94.5
Llanfyllin		89.1	91.3		93.5
Llanrhaeadr-ym-Mochnant		89.8	92.0		94.2
Long Mountain		89.6	91.8		94.0
Wenvoe	98.7*	89.9	92.1	94.3	96.8
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
Llandrindod 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		100.6
Varteg Hill		88.9	91.1		93.3
					R. Gwent
Blaenavon					95.1
Christchurch					95.9

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

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

Main stations shown in bold	R.1	R.1/2	R.3	R.4	R. Scotland
SCOTLAND					
Ashkirk		89.1	91.3		93.5
Innerleithen		89.5	91.7		93.9
Peebles		88.4	90.6		92.8
Black Hill*	98.6	89.9	92.1	95.8	94.3
Bressay		88.3	90.5		92.7
Darvel		89.5	91.7		93.9
Forfar		88.3	90.5		92.7
Pitlochry		89.2	91.4		93.6
Fort William		89.3	91.5		93.7
					98.9
Ballachulish		88.1	90.3		92.5
					97.7
Glengorm		89.5	91.7		93.9
					99.1
Kinlochleven		89.7	91.9		94.1
					99.3
Mallaig		88.1	90.3		92.5
					97.7
Oban (m)		88.9	91.1		93.3
					98.5
Keelylang Hill		89.3	91.5		93.7
Kirk o'Shotts†* **		89.9	92.1		94.3
Bowmore		88.1	90.3		92.5
Campbeltown		88.4	90.6		92.8
Girvan		88.9	91.1		93.3
Kirton Mailer		89.0	91.2		93.4
Lethanhill		88.3	90.5		92.7
Lochgilphead		88.3	90.5		92.7
					97.9
Millburn Muir		88.8†	91.0†		93.2
		88.3*	90.5*		92.7*
Port Ellen*		89.0	91.2		93.4
Rosneath		89.2	91.4		93.6
Rothesay		88.5	90.7		92.9
South Knapdale		89.3	91.5		93.7
					98.9
Strachur		88.6	90.8		93.0
					98.2
Meldrum		88.7	90.9		93.1
Durris		89.4	91.6		93.8
Tullich		90.1	92.3		94.5
Melvaig		89.1	91.3		93.5
					98.7
Penifiler		89.5	91.7		93.9
					99.1
Skriaig		88.5	90.7		92.9
					98.1
Rosemarkie		89.6	91.8		94.0
Grantown		89.8	92.0		94.6
Kingussie		89.1	91.3		93.5
Knock More		88.2	90.4		92.6
Rumster Forest		90.1	92.3		94.5
Sandale		88.1	90.3	92.5	94.7
Cambret Hill		88.7	90.9		93.1
Stranraer		89.7	91.9		94.1

	R.1	R.1/2	R.3	R.4	R. Ulster
NORTHERN IRELAND					
Brougher Mountain		89.4	91.6		93.8
Divis		90.1	92.3		94.5†
				94.5*	96.0*
Ballycastle		88.8	91.0	93.2	95.1
Kilkeel		89.4	91.6		93.8
Larne		89.1	91.3		93.5
Rostrevor Forest		88.6	90.8		93.0
Limavady		89.6	91.8	94.0	95.4
Londonderry		88.7	90.9		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

BBC LOCAL RADIO

AREA	Transmitter	Frequency (MHz)
R. Bedfordshire	Luton†	103.8
	Zouches Farm*	103.8
	Sandy Heath	95.5
	Bow Brickhill*	104.5
R. Bristol	Ilchester Crescent	94.9
	Mendip	95.5
	Bath	104.6
R. Cambridgeshire	Cambridge (Madingley)	96.0
	Peterborough	95.7
R. Cleveland	Bilsdale W. Moor	95.0
	Whitby	95.8
R. Cornwall	Caradon Hill	95.2
	Isles of Scilly	96.0
	Redruth	103.9
R. Cumbria	Sandale	95.6
(R. Furness)	Morecambe Bay	96.0
(R. Furness)	Kendal	95.2
(R. Furness)	Windermere	104.2
R. Derby	Derby	94.2
	Sutton Coldfield	104.5
	Stanton Moor	95.3
R. Devon	Huntshaw Cross	94.8
	North Hessary Tor	103.4
	Okehampton	96.0
	St. Thomas (Exeter)	95.8
BBC Essex	Great Braxted	103.5
	South Benfleet	95.3
R. Gloucestershire*	Stroud	95.0
	Churchdown Hill	104.7
R. Guernsey	Les Touillets	93.2
R. Hereford and	Ridge Hill	94.7
Worcester*	Great Malvern	104.0
R. Humberside	High Hunsley	95.9
R. Jersey	Les Platons	88.8
R. Kent	Swingate	104.2
	Wrotham	96.7
R. Lancashire	Hameldon Hill	95.5
	Lancaster	104.5
	Winter Hill	103.9
R. Leeds	Holme Moss	92.4
	Wharfedale	95.3

AREA	Transmitter	Frequency (MHz)
R. Leicester	Anstey Lane	95.1
R. Lincolnshire	Belmont	94.9
R. London	Crystal Palace	94.9
R. Manchester	Holme Moss	95.1
R. Merseyside	Allerton Park	95.8
R. Newcastle	Chatton	96.0
	Pontop Pike	95.4
	Fenham	104.4
R. Norfolk	Gt. Massingham	104.4
	Tacolneston	95.1
R. Northampton	Geddington	103.6
	Northampton	104.2
R. Nottingham	Colwick Park†**	103.8
	Mapperley Ridge*	103.8
	Fishponds Hill*	95.5
R. Oxford	Oxford	95.2
R. Sheffield	Holme Moss	104.1
	Sheffield (Crosspool)	88.6
R. Shropshire	Ludlow	95.0
	The Wrekin	96.0
R. Solent	Rowridge	96.1
R. Stoke-on-Trent	Alsagers Bank	94.6
R. Suffolk*	Manningtree	103.9
	Great Barton	104.6
R. Surrey and Berkshire*	Henley	94.6
	High Wycombe	104.9
	Guildford	104.6
R. Sussex	Brighton (Whitehawk Hill)	95.3
	Heathfield	104.5
	Reigate	104.0
	Newhaven*	95.0
R. Warwickshire*	Meriden	94.8
	Lark Stoke	103.7
R. Wiltshire*	Blunsdon	103.6
	Naish Hill	104.3
R. WM	Sutton Coldfield	95.6
R. York	Acklam Wold	103.7
	Oliver's Mount	95.5
	Woolmoor	104.3

* proposed but not in service at date of publication
† to be discontinued
** to be replaced by Mapperley Ridge

INDEPENDENT LOCAL RADIO

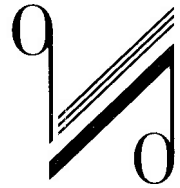
COMPANY AND AREA		Site	Frequency (MHz)
Radio Aire	(AIR)		
Leeds		Morley	96.3
Beacon Radio	(BEA)		
Wolverhampton & Black Country		Turners Hill	97.2
Shrewsbury & Telford		The Wrekin	103.1
BRMB Radio	(BBR)		
Birmingham		Lichfield	96.4
Radio Broadland	(BLD)		
Great Yarmouth & Norwich		Stoke Holy Cross	102.4
Capital Radio	(CAP)		
London-General & Entertainment		Croydon	95.8
Chiltern Radio	(CLT)		
Luton		Dunstable	97.6
Bedford		Sandy Heath	96.9
Northampton		Northampton	96.6
Radio City	(CTY)		
Liverpool		Allerton Park	96.7
Radio Clyde	(CLY)		
Glasgow		Black Hill	102.5
County Sound Radio	(COU)		
Guildford		Guildford	96.4
Devon Air Radio	(DEV)		
Exeter		St Thomas	97.0
Torbay		Beacon Hill	96.4
Downtown Radio	(DWN)		
Belfast		Black Mountain	97.4
Omagh & Enniskillen		Brougher Mountain	96.6
Londonderry		Londonderry	102.4
Limavady		Limavady	96.4
Essex Radio	(ESX)		
Southend		Benfleet	96.3
Chelmsford		Bakers Wood	102.6
Radio Forth	(FOR)		
Edinburgh		Craigkelly	97.3
GWR	(GWR)		
Bath		Bath	103.0
Bristol		Dundry	96.3
Swindon		Blunsdon	97.2
West Wiltshire		Naish Hill	102.6

COMPANY AND AREA		Site	Frequency (MHz)
Radio Hallam	(HAL)		
Sheffield & Rotherham		Tapton Hill	97.4
		Rotherham	96.1
Barnsley		Ardsley	102.9
Doncaster		Clifton	103.4
Hereward Radio	(HER)		
Peterborough		Gunthorpe	102.7
Invicta Radio	(INV)		
Maidstone & Medway		Bluebell Hill	103.1
East Kent		Dunkirk	102.8
		Wye (Ashford)	96.1
		Dover	97.0
		Thanet	95.9
LBC (London Broadcasting Company)			
London-News and Information		Croydon	97.3
Leicester Sound	(LEI)		
Leicester		Anstey Lane	103.2
Marcher Sound	(MAR)		
Wrexham & Deeside		Wrexham	103.4
Mercia Sound	(MER)		
Coventry		Shilton	97.0
Radio Mercury	(MRY)		
Reigate & Crawley		Reigate	102.7
		Horsham	97.5
Metro Radio	(MET)		
Tyne & Wear		Burnhope	97.1
Moray Firth Radio	(MFR)		
Inverness		Mounteagle	97.4
North Sound Radio	(NOR)		
Aberdeen		Granite Hill	96.9
Ocean Sound	(OCN)		
Portsmouth		Fort Widley	97.5
Southampton		Chillerton Down	103.2
Winchester		Winchester	96.7
Radio Orwell	(ORW)		
Ipswich		Foxhall Heath	97.1
Pennine Radio	(PEN)		
Bradford		Idle	97.5
Huddersfield & Halifax		Vicars Lot	102.5

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

INDEPENDENT LOCAL RADIO

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



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