

QUAD

FM4 Tuner

Instruction Book

QUAD FM4

Tuner

INSTRUCTION BOOK

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Quad is a registered trade mark

Stock No. OIF4E1C

Accessories

The FM4 is supplied with

- 1 x A.C. Lead
- 1 x Signal Lead
- 1 x A.C. output connector
- 1 x Aerial Connector

Service

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

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. Labour and carriage 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.

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 44 and FM4.

Connect a suitable 75 Ω 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 tuners memory.

INSTALLATION

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

The Quad FM4 is fitted with special non-slip feet. These are protected during manufacture and transit by plastic film which should be removed before the FM4 is placed in position on a shelf or on top of the Quad 44.

If the Quad FM4 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 the tuner is just held in position 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 44.

A.C. Mains

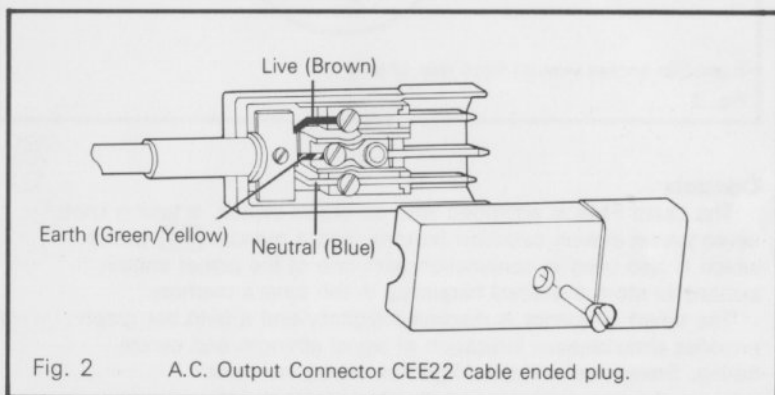
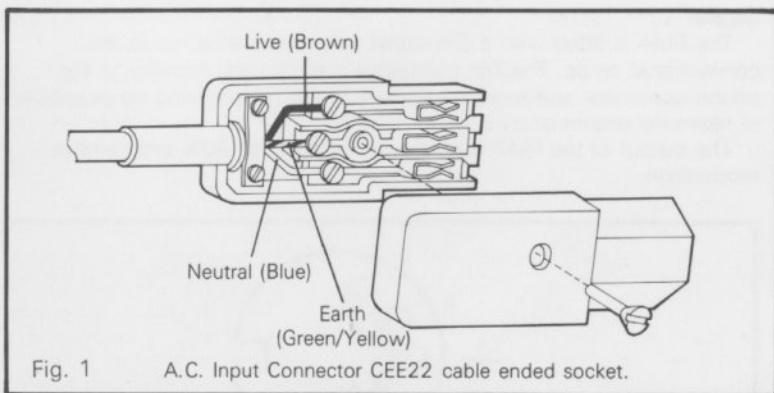
Important. Before connecting the FM4 to the A.C. supply ensure that the voltage selector is correctly set. The voltage selector is located on the rear panel, see fig. (5), and can be set to either 200-240/100-120V position with a small screwdriver.

The most convenient way to provide A.C. power to the FM4 is from one of the switched A.C. outlets on the back of the Quad 44 and the FM4 is supplied with a short interconnecting cable which connects directly to one of these outlets. The FM4 may then be left switched on permanently and will be ready for use whenever the Quad 44 is switched on. There is no harm in having the FM4 switched on when not required and there are positive benefits.

Note that on Quad 44s prior to serial no. 19000 shuttered sockets are used and it will be necessary to change the shrouded male CEE22 plug on the A.C. cable supplied for an un-shrouded plug supplied with earlier 44s.

Important. Under no circumstances should the unshrouded male plug be inserted into a CEE22 socket. It is possible to insert the Earth pin into the live supply with obvious consequences.

The FM4 is fitted with an additional non-switched A.C. outlet and a shrouded male CEE22 plug is supplied in the accessory pack which can be used to supply A.C. mains to another piece of equipment. Thus up to four units, e.g. power amplifier, tuner, turntable and tape recorder, can be powered from the Quad 44.



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.

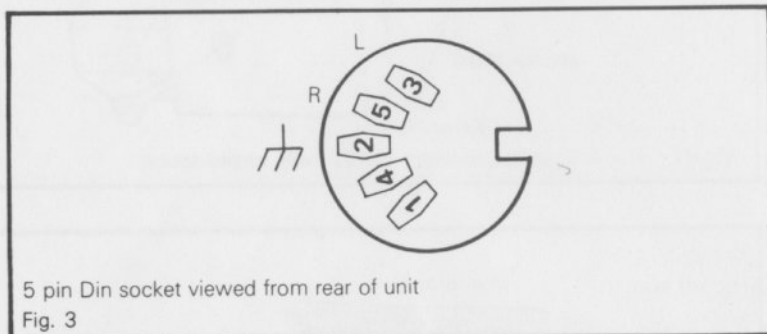
Your local aerial contractor is the best person to consult, but in most cases a correctly orientated external multi-element array will give best results.

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

Signal

The FM4 is fitted with a Din signal output socket wired in the conventional sense. The Din connector is electrically superior to the phono connector and more convenient in use, there being no possibility of reversing channels.

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.


 – In anticipation of a fourth BBC VHF Channel

 – 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 red  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 1mV).

Bar Graph	Approximate Signal Strength	Signal/Noise Stereo
	1mV (60 dB)	70dB
	100μV (40 dB)	55dB
	10μV (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 red **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** 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** until the green LED lights.

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

A complete 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. Switching on the 44 will switch on the FM4. The 44 will automatically select RADIO and the FM4 will tune into the station last used. To tune into 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 44 BAL/MONO switch to MONO and centring the balance control for minimum noise. Remember, however, to switch back to BAL when changing stations.

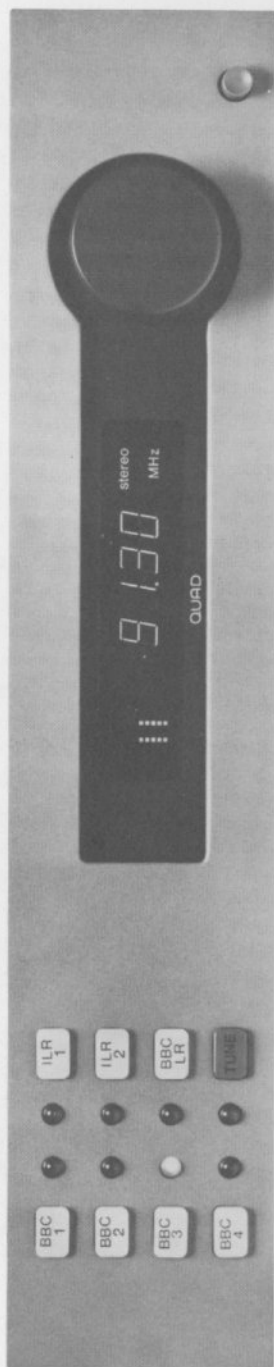
De-Emphasis

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 3.3nF 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 $1\mu\text{V}$
50dB quieting	Mono $2.7\mu\text{V}$ (8dBf)
	Stereo $25\mu\text{V}$ (28dBf)
Full Limiting	$< 1\mu\text{V}$
Signal/Noise – Input signal 1kHz at 1mV. A weighted	Mono 76dB
	Stereo 70dB
Distortion – Input signal 1kHz \pm 75kHz	Mono 0.15%
	Stereo 0.15%
	\pm 25kHz Mono 0.05%
	Stereo 0.10%
Selectivity	53dB
Capture Ratio	2.5dB
IF Rejection	100dB
AM Suppression	60dB
Image Rejection	80dB
Pilot Tone Suppression	60dB
Crosstalk at 1kHz	40dB
Frequency Response – 20-15kHz	+0 -1dB
Output Level 30% Modulation	100mV
Source Impedance	100 Ω
Recommended Load Impedance	$> 20\text{k}\Omega$
Aerial Input	75 Ω unbalanced
De-emphasis	50 μSec or 75 μSec
Power Input	100-125 or 200-250V. 50-60Hz 6VA.
Dimensions	321mm wide 64mm high 207mm deep.
Weight	3Kg.

QUAD FM4



FRONT VIEW

Fig. 4

QUAD FM4



BACK VIEW

Fig. 5

VHF TRANSMITTERS IN THE U.K.

Area	Transmitter	B.B.C.				B.B.C. Local Radio		Independent Local Radio	
		1/2	3	4					
London & South East	Wrotham	89.1	91.3	93.5	Radio London	94.9	Capital Radio	95.8	
	Oxford	89.5	91.7	93.9	Radio Kent	96.7	LBC	97.3	
	Swingate	90.0	92.4	94.4	Radio Oxford	95.2	Radio 210	97.0	
Midlands	Sutton Coldfield	88.3	90.5	92.7	Radio Birmingham	95.6	BRMB Radio	94.8	
	Churchdown Hill	89.0	91.2	93.4	Radio Derby (main)	96.5	Mercia Sound	95.9	
	Hereford	89.7	91.9	94.1	Radio Derby (relay)	94.2			
	Northampton	88.9	91.1	93.3	Radio Leicester	95.1	Centre Radio	97.1	
					Radio Nottingham	95.4	Radio Trent	96.2	
				Radio Stoke-on-Trent	96.1	Beacon Radio	97.2		
East Anglia	Peterborough	90.1	92.3	94.5			Hereward Radio	95.7	
	Cambridge	88.9	91.1	93.3	Radio Norfolk	95.1	Radio Orwell	97.1	
	Tacolneston	89.7	91.9	94.1			Essex Radio	95.3	
South	Rowridge	88.5	90.7	92.9	Radio Brighton	95.3	Two Counties Radio	97.2	
	Brighton	90.1	92.3	94.5	Radio Solent	96.1	Radio Victory	95.0	
	Ventnor	89.4	91.7	93.8					
West	Wenvoe †	89.95	96.8	92.125	Radio Bristol	95.5	Severn Sound	95.0	
	Wenvoe *	89.9	92.1	94.3					
	Bath	88.8	91.0	93.2					

B.B.C. Local Radio

B.B.C. Local Radio

B.B.C.

Area	Transmitter	B.B.C.				Independent Local Radio
		1/2	3	4		
South West	Les Platons	91.1	94.75	97.1		DevonAir Radio
	North Hessary Tor	88.1	90.3	92.5		(St. Thomas)
	Barnstaple	88.5	90.7	92.9		(Beacon Hill)
	Okehampton	88.7	90.9	93.1		Plymouth Sound
	Redruth	89.7	91.9	94.1		
	Isles of Scilly	88.8	91.0	93.2		
North	Belmont	88.8	90.9	93.1		Pennine Radio
	Holme Moss	89.3	91.5	93.7		Radio Aire
	Scarborough	89.9	92.1	94.3		Radio Hallam
	Sheffield	89.9	92.1	94.3		(Tupton Hill)
	Wensleydale	88.3	90.5	92.7		(Rotherham)
						96.0 94.6
North West	Holme Moss	89.3	91.5	93.7		Radio City
	Douglas	88.4	90.6	92.8		Piccadilly Radio
	Kendal	88.7	90.9	93.1		Marcher Sound/ Sain-Y-Gororau
	Morecambe Bay	90.0	92.2	94.4		
	Windermere	88.6	90.8	93.0		
						96.7 97.0 95.4
North East	Pontop Pike	88.5	90.7	92.9		Metro Radio
	Chatton	90.1	92.3	94.5		
	Weardale	89.7	91.9	94.1		Radio Tees
	Whitby	89.6	91.8	94.0		
	Sandale	88.1	90.3	94.7		
						95.6 96.3 96.6 95.4
					97.0	

Independent Local Radio

B.B.C. Local Radio

B.B.C.

Area	Transmitter	1/2	3	Radio Ulster	96.0
N. Ireland	Divis	90.1	92.3	94.5	Downtown Radio
	Ballycastle	89.0	91.2	93.4	
	Brougher Mountain	88.9	91.1	93.3	
	Kilkeel	88.8	91.0	93.2	
	Larne	89.1	91.3	93.5	
	Londonderry	88.3	90.55	92.7	
	Maddybenny More	88.7	90.9	93.1	
	Newry +	88.6	90.8	93.0	
	Newry South *	89.5	91.7	93.9	
	Rostrevor Forest *	88.6	90.8	93.0	

Area	Transmitter	1/2	3	Radio Scotland	96.9
Scotland	Kirk o'Shotts	89.9	92.1	94.3	North Sound
	Ashkirk	89.1	91.3	93.5	
	Ayr	88.7	90.9	93.1	
	Bowmore	88.1	90.3	92.5	
	Campbeltown	88.6	90.8	93.0	
	Forfar	88.3	90.5	92.7	
	Girvan	88.9	91.1	93.3	
	Innerleithen *	88.4	90.6	92.8	
	Lethanhill *	88.3	90.5	92.7	
	Lochgilphead	88.3	90.5	92.7	
	Millburn Muir	88.8	91.0	93.2	
	Peebles *	88.7	90.9	93.1	
	Perth	89.0	91.2	93.4	
				Radio Tay (Tay Bridge) (Perth)	
				Radio Forth	
				Radio Clyde	
				Moray Firth Radio	

Independent Local Radio

B.B.C. Local Radio

B.B.C.

Area Transmitter 1/2 3 Radio Scotland

Scotland

Pitlochry	89.2	91.4	93.6
Port Ellen	89.4	91.6	93.8
Rosneath	89.2	91.4	93.6
South Knapdale	89.3	91.5	93.7
Strachur	88.6	90.8	93.0
Toward	88.5	90.7	92.9
Meldrum	88.7	90.9	93.1
Bressay	88.3	90.5	92.7
Orkney	89.3	91.5	93.7
Thrumster	90.1	92.3	94.5
Rosemarkie	89.6	91.8	94.0
Ballachulish	88.1	90.3	92.5
Fort William	89.3	91.5	93.7
Glengorm	89.5	91.7	93.9
Grantown	89.8	92.0	94.6
Kingussie	89.1	91.3	93.5
Kinlochleven	89.7	91.9	94.1
Mallaig	88.1	90.3	92.5
Meivaig	89.1	91.3	93.5
Oban	88.9	91.1	93.3
Penfilier	89.5	91.7	93.9
Skriaig	88.5	90.7	92.9
Sandale	88.1	90.3	92.5
Cambret Hill	88.7	90.9	93.1
Stranraer	89.5	91.7	93.9

Independent Local Radio

B.B.C. Local Radio

B.B.C.

Area	Transmitter	1/2	3	Radio Cymru	Independent Local Radio
Wales	Blaenplwyf	88.7	90.9	93.1	
	Dolgellau	90.1	92.3	94.5	Cardiff Broadcasting
	Ffestiniog	88.1	90.3	92.5	Swansea Sound
	Llandyfriog *	90.1	92.3	94.5	
	Llanrhaeadr-ym- Mochnant	89.8	92.0	94.2	
	Mynydd Pencarreg *	89.7	91.9	94.1	
	Haverfordwest	89.3	91.5	93.7	
	Llanddona	89.6	91.8	94.0	
	Betws-y-Coed	88.2	90.4	92.6	
	Llandinam	90.1	92.3	94.5	
	Llangollen	88.85	91.05	93.25	
	Long Mountain	89.6	91.8	94.0	
	Wenvoe +	89.95	96.8	94.3	
	Wenvoe *	89.9	92.1	96.8	
	Abergavenny *	88.6	90.8	93.0	
	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		
Ystalyfera *	88.9	91.1	93.3		

* Not in service at date of publication
+ Transmission to be discontinued

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