



## Features

- Miniature SIL Package
- Unique QM (Quasi AM/FM) Design
- Data Rates Up To 10kbits/S
- Optimal Range 200m
- 433.92 / 868 / 916.5 MHz Versions
- Saw Stabilised Quasi AM/FM Transmission
- 3 To 9 Volt Supply Voltage
- Industry Pin Compatible
- Unique Modulation Scheme (High Interference Rejection)
- Approved To En 300-220-1

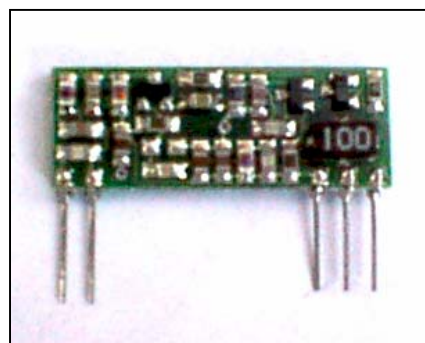
## Applications

- Vehicle Alarm Systems
- Remote Gate Controls
- Garage Door Openers
- Domestic And Commercial Security

## General Description

The QFMT1-XXX miniature transmitter UHF radio module enables the implementation of a simple telemetry link at data rates of up to 10Kbit/s when used with one of the compatible receiver modules.

Available for operation at 433.92, 868 and 916.5 MHz these modules are able to transmit at distances of up to 200m (433.92 MHz version).



## Compatible Receiver Modules

- QMR1-XXX (see data sheet QMR1)
- QFMR2-XXX (see data sheet QFMRX)
- QFMR3-XXX (see data sheet QFMRX)
- QTRC1-XXX Transceiver (see data sheet QTRC1)

The QFMT1-XXX module will suit one-to-one and multi-node wireless links in applications including building and car security, remote industrial process monitoring and computer networking. Because of its small size and low power requirements, this module is ideal for use in portable battery powered wireless applications



## Absolute Maximum Ratings: Transmitter

Operating temperature: -20°C to +55°C  
Storage temperature: -40°C to +100°C

Supply Voltage (pin 3) 10V  
Data input (pin 5) 10V  
RF Out (pin 2)  $\pm 50V$  @ < 10MHz , +20dBm @ > 10MHz

## Electrical Characteristics: Transmitter

	pin	min.	Typ.	max.	units	notes
<b>DC LEVELS</b>						
Supply voltage	3	3.0	7.0	9.0	Volts	
<b>Current &amp; RF POWER</b>						
433.92						
Supply current @ $V_{CC} = 5V$ (data low/high)	3			3/12	mA	1
RF power @ $V_{CC} = 5V$	2		0	+8	dBm	1
868						
Supply current @ $V_{CC} = 5V$ (data low/high)	3			5/16	mA	1
RF power @ $V_{CC} = 5V$	2		0	+3	dBm	1
916.5						
Supply current @ $V_{CC} = 5V$ (data low/high)	3			5/16	mA	1
RF power @ $V_{CC} = 5V$	2		0	+3	dBm	1
<b>RF &amp; Data</b>						
2 <sup>nd</sup> harmonic			-50		dBc	1
Harmonics @ > 1GHz			-46		dBc	1
Initial frequency accuracy			$\pm 75$		KHz	
Overall frequency accuracy			$\pm 100$		KHz	
FM deviation ( $\pm$ )			10		KHz	
Modulation bandwidth @ -3dB			20		KHz	
Modulation distortion (THD)					%	
Power up time to full RF			10		$\mu s$	
Data rate		100		20000	bits/s	
Data pulse width		100			$\mu s$	

**Note 1:** measured into a 50 $\Omega$  impedance



## Connection Details

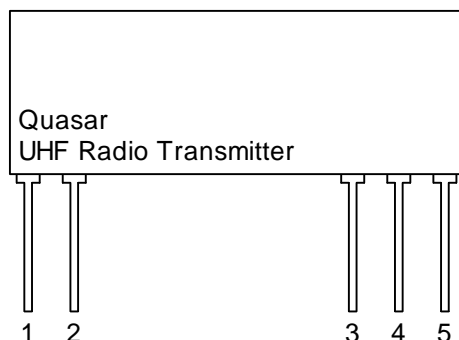


Figure 1: Transmitter

## General Information

The transmitter module implements a unique quasi AM/FM modulation scheme that puts the baseband data signal onto the RF carrier in two different ways. Firstly the carrier is shifted in frequency (typically 20 KHz) which generates the normal FSK spectrum, but simultaneously the RF carrier is also amplified thus yielding the ASK spectrum.

Utilising the quasi AM/FM modulation technique with one of the compatible receivers will yield a highly efficient wireless link.

## Pin Description:

### RF GND (*pin 1*)

RF ground pin, internally connected to pin 4 (0V). This pin should ideally be connected to the nearest ground plane (e.g. coax braid, main PCB ground plane etc.)

### RF OUT (*pin 2*)

50Ω RF antenna output. To achieve best results the antenna impedance must match that of the module.

### V<sub>CC</sub> (*pin 3*)

+Ve supply pin (3.0 to 9.0 volts). The module will generate RF when V<sub>CC</sub> is present. It is strongly recommended that a 100nF capacitor decouples the supply rail as close as possible to this pin.

### GND (*pin 4*)

Supply and data ground connection, connected to pin 1.

### Data IN (*pin 5*)

This input has an impedance of 47KΩ and should ideally be driven by a CMOS logic drive or compatible. The drive circuitry should be supplied with the same supply voltage as the Tx module.

**Note:** Because of the way Quasi Modulation operates the QMR1 and the QFMT1 will not work reliably in close proximity to each other.



## Application Information

### Antenna Design

The design and positioning of the antenna is as crucial as the module performance itself in achieving a good wireless system range. The following will assist the designer in maximising system performance.

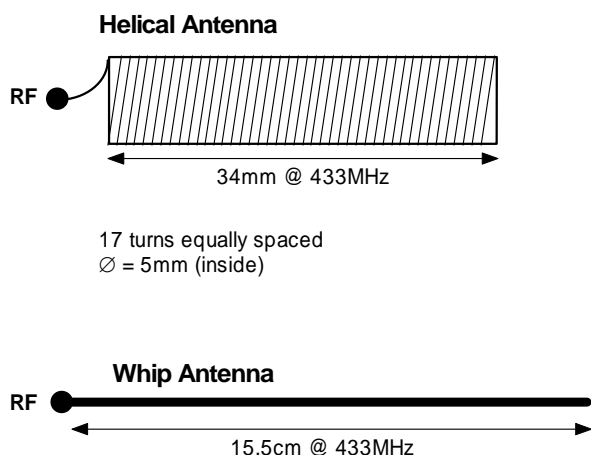
The antenna should be kept as far away from sources of electrical interference as physically possible. If necessary, additional power line decoupling capacitors should be placed close to the module.

The antenna 'hot end' should be kept clear of any objects, especially any metal as this can severely restrict the efficiency of the antenna to receive power. Any earth planes restricting the radiation path to the antenna will also have the same effect.

Best range is achieved with either a straight piece of wire, rod or PCB track @  $\frac{1}{4}$  wavelength (15.5cm @ 433.92MHz). Further range may be achieved if the  $\frac{1}{4}$  wave antenna is placed perpendicular in the middle of a solid earth plane measuring at least 16cm radius. In this case, the antenna should be connected to the module via some 50 ohm characteristic impedance coax

## Application Circuit

For detail application information please see datasheet DS600



**Figure 2: Antenna Configurations To Be Used With The QM Transmitter Module**



## Mechanical Dimensions

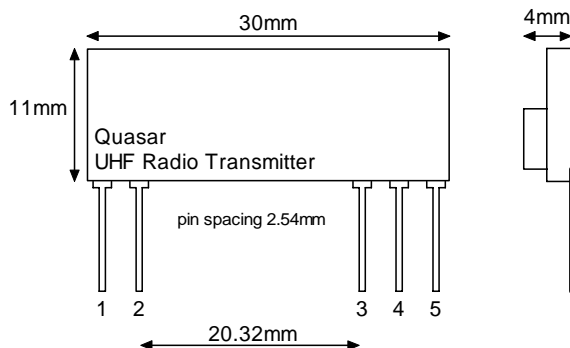


Figure 4: Transmitter

## Ordering Information

### Standard Product;

Part No	Description
QFMT1-434	SIL Transmitter 434MHz
QFMT1-868	SIL Transmitter 868MHz
QFMT1-916	SIL Transmitter 916MHz

Should you require further assistance please contact :

**R F Solutions Ltd.,  
Unit 21, Cliffe Industrial Estate,  
South Street, Lewes,  
E. Sussex. BN8 6JL, England**

**Tel: +44 (0)1273 898 000**

**Fax: +44 (0)1273 480 661**

**Email : [sales@rfsolutions.co.uk](mailto:sales@rfsolutions.co.uk)**

**<http://www.rfsolutions.co.uk>**

Information contained in this document is believed to be accurate , however no representation or warranty is given and no liability is assumed by R.F. Solutions Ltd. With respect to the accuracy of such information. Use of R.F.Solutions as critical components in life support systems is not authorised except with express written approval from R.F.Solutions Ltd.