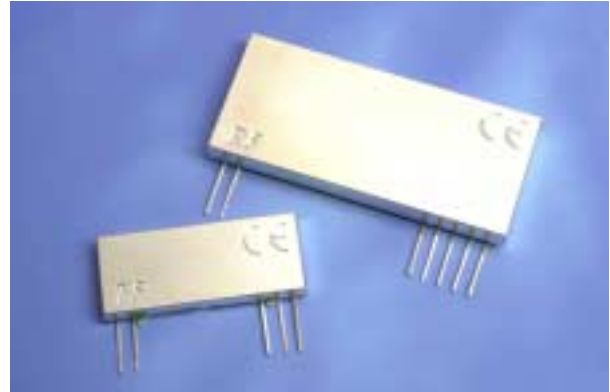


## Features

- MINIATURE SIL PACKAGE
- FULLY SHIELDED
- DATA RATES UP TO 128KBITS/S
- RANGE UPTO 400 METRES
- SINGLE SUPPLY VOLTAGE
- INDUSTRY PIN COMPATIBLE



## QFMT5-434

- TEMP RANGE -20°C to +55°C
- NO ADJUSTABLE COMPONENTS
- GOOD SHOCK RESISTANCE
- TEMPERATURE COMPENSATED RF OUTPUT

## QFMR5-434

- HIGH SENSITIVITY
- ANALOGUE, DIGITAL OUTPUTS
- SIGNAL STRENGTH OUTPUT (RSSI)
- ON BOARD AGC
- SINGLE CONVERSION FM SUPER-HET
- DOUBLE RF FILTERING (INC. SAW FRONT END)

## Applications

- VEHICLE ALARM SYSTEMS
- REMOTE GATE CONTROLS
- GARAGE DOOR OPENERS
- DOMESTIC AND COMMERCIAL SECURITY

## General Description

The QFMT5 and QFMR5 data link modules are miniature UHF radio modules, which enable the implementation of a simple telemetry link upto 400 metres, and at data rates of up to 128Kbit/s

The QFMT5 and QFMR5 modules 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, these modules are ideal for use in portable battery powered wireless applications.

## Connection Diagram

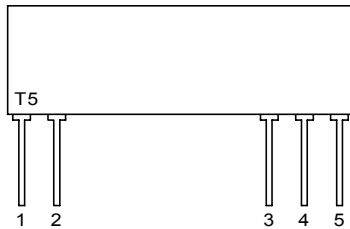


Figure 1: Transmitter

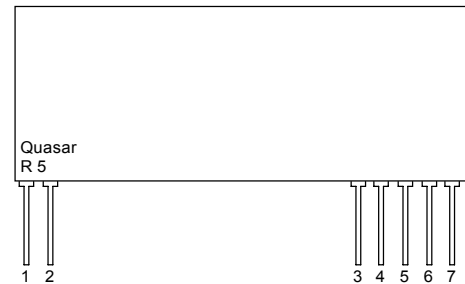


Figure 2: Receiver

## 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 (pin2)

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.

## Ordering Information:

Part No	Description
QFMT5-418	SIL Transmitter 418.00 MHz
QFMT5-434-5	SIL Transmitter 433.92 MHz 5v
QFMT5-434-3	SIL Transmitter 433.92 MHz 3v

### RF IN (pin 1)

50Ω RF input from antenna, connect using shortest possible route. This input is isolated from the internal circuit using the air gap of the front end SAW RF filter

### RF GND (pin 2)

RF ground connection, preferable connected to a solid plane.

### RSSI (pin 3)

The Received Signal Strength Indicator provides a DC output voltage proportional to the RF input signal. The amplitude of the RSSI voltage increases with increasing RF signal strength.

### GND (pin 4)

Connect to power supply ground.

### V<sub>CC</sub> (pin 5)

+Ve supply pin. Operation from a 5V supply able to source 6mA at less than V<sub>p-p</sub> ripple.

### AF (pin 6)

Audio frequency output.

### DATA OUT (pin 7)

CMOS compatible output. This may be used to drive external decoders.

Part No	Description
QFMR5-434	SIL Receiver 433.92 MHz

## Absolute Maximum Ratings: Transmitter QFMT5

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)	±50V @ < 10MHz , +20dBm @ > 10MHz

## Electrical Characteristics: Transmitter T5

	pin	Min.	typ.	Max.	units	notes
<b>DC LEVELS</b>						
Supply voltage	3	4.5	5.0	5.5	Volts	
<b>Current &amp; RF POWER</b>						
433.92 MHz						
Supply current @ V <sub>CC</sub> = 5V	3			12	mA	1
RF power	2		9	+12	dBm	1
<b>RF &amp; Data</b>						
2 <sup>nd</sup> harmonic			-50		dBc	1
Harmonics @ > 1GHz			-46		dBc	1
Initial frequency accuracy			±50		KHz	
Overall frequency accuracy			±75		KHz	
Modulation bandwidth @ -3dB			10		KHz	
Modulation distortion (THD)					%	
Power up time to full RF			10		µs	
Data rate				50000	bits/s	
Data pulse width		40			µs	

**Note 1:** measured into a 50Ω impedance

## Absolute Maximum Ratings: Receiver QFMR5

Operating temperature:	-10°C to +55°C
Storage temperature:	-40°C to +100°C
Supply Voltage (pin 5)	7V
RF Input (pin 1)	+20dBm

## Electrical Characteristics: Receiver R5

	Pin	min.	typ.	Max.	units	notes
<b>DC LEVELS</b>						
Supply voltage	5	4.5	5.0	5.5	Volts	
Supply current			4.8		mA	
Supply ripple		-	-	10	mV <sub>p-p</sub>	
Data output high		4.0			V	
Data output low				0.5	V	
<b>RF</b>						
RF sensitivity			-107		dBm	
IF Bandwidth			230		KHz	
Initial signal accuracy			±22		KHz	
Max. RF input			20		dBm	
<b>E.M.C</b>						
Spurious responses upto 1GHz			<60		dB	
LO leakage, conducted			<60		dBm	
LO leakage, radiated			<60		dBm	
<b>Dynamic Timings</b>						
Power up to stable data <i>(With RF signal present)</i>			tba		mS	
Signal to stable data <i>(With power supply already on)</i>			tba		mS	
Power up to valid RSSI <i>(With RF signal present)</i>			tba		mS	
Mark : space ratio			50		%	
Bit rate		100		50000	bps	

## 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

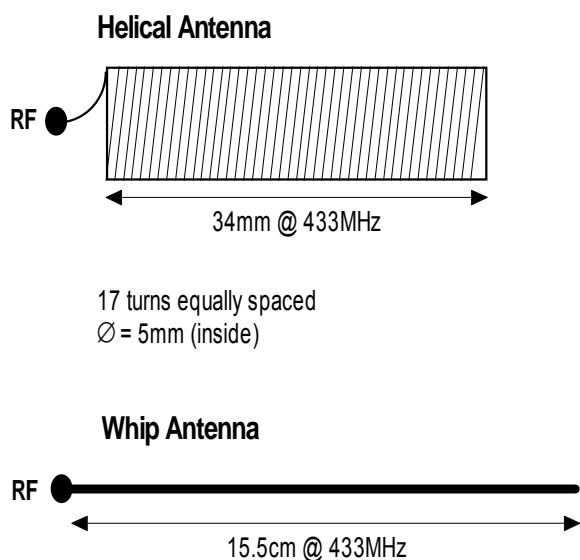


Figure 3: Antenna Configurations To Be Used With The QFMT5 & QFMR5 Modules

## Application Circuit

The application circuits show how the QFMT5 transmitter and the QFMR5 receiver can easily be integrated into a system to form a wireless link.

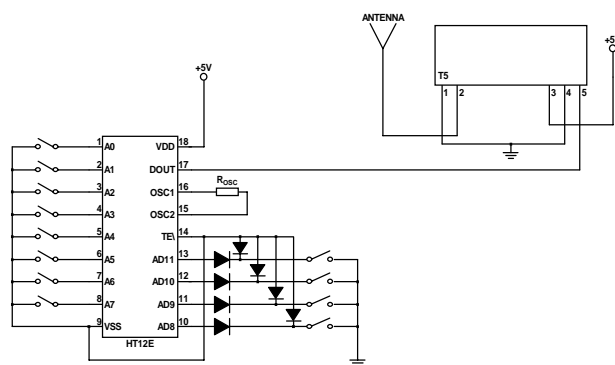


Figure 4: QFMT5 Transmitter Application Circuit

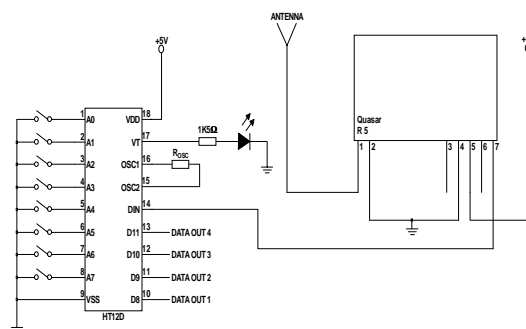


Figure 5: QFMR5 Receiver Application Circuit

## RSSI Values:

The QFMR5 RSSI output provides a DC output proportional to the RF input signal. The table below shows the typical RSSI value depending on the Rf signal strength.

RF Signal Strength / dBm	RSSI / V
-110	tba
-100	
-90	
-80	
-70	
-60	
-50	
-40	
-30	
-20	

## Mechanical Dimensions

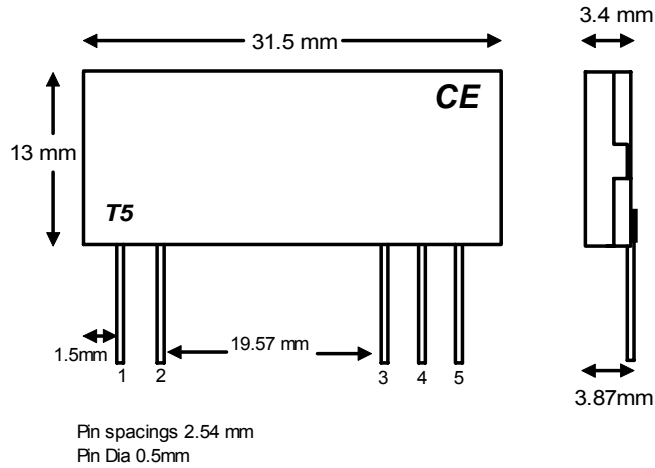


Figure 6: Transmitter

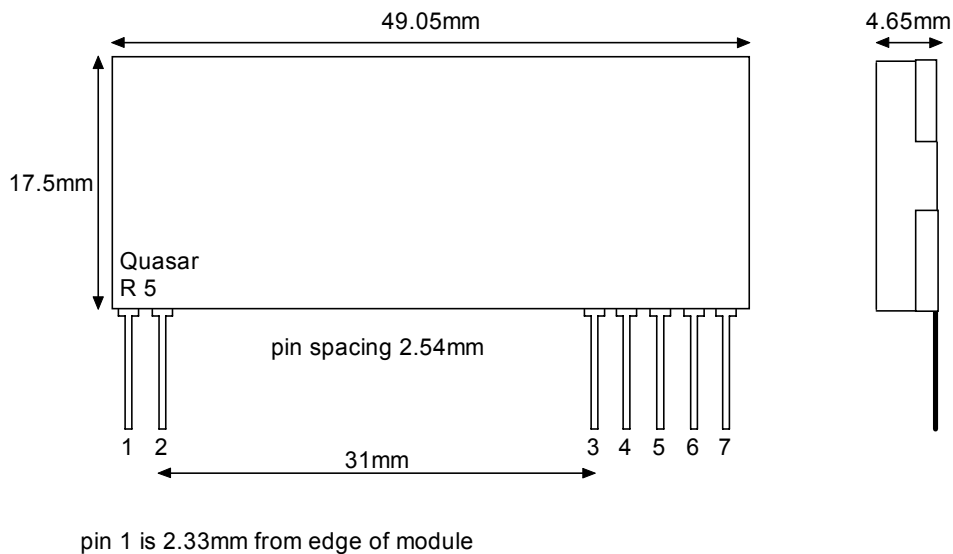


Figure 7: Receiver