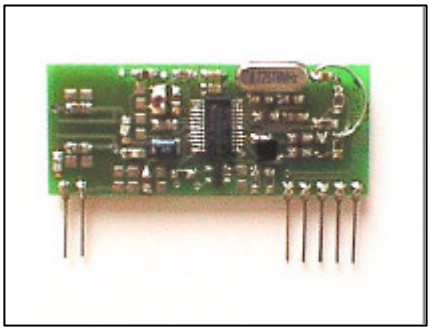
QM Receiver Module

QFMR2-XXX & QFMR3-XXX

Features



- MINIATURE SIL PACKAGE
- UNIQUE QM (QUASI AM/FM) DESIGN
- SELECTIVE FRONT END FILTERS TO HELP COMBAT INTERFERENCE
  - QFMR2 UTILISES PASSIVE FRONT END FILTER
  - QFMR3 UTILISES SAW FRONT END FILTER (Improved Interference Rejection)
- DATA RATES UP TO 10KBITS/S
- OPTIMAL RANGE 300m (433.92 MHz Version)
- 433.92 / 868 / 916.5 MHz VERSIONS
- VERY HIGH SENSITIVITY (-100 dBm)
- VERY LOW CURRENT CONSUMPTION
- SINGLE 5V SUPPLY
- HIGH SELECTIVITY (20KHz B/W Possible)
- IMMUNE FROM FM THRESHOLD EFFECT

Applications

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

Compatible Transmitter Modules

- QFMT1-XXX (see data sheet QFMT1)
- QTRC1-XXX Transceiver (see data sheet QTRC1)

General Description

The QFMRX-XXX miniature receiver 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 Quasar transmitter modules

Available for operation at 433.92, 868 and 916.5 MHz these modules are able to receive at distances of up to 1Km (433.92 MHz version).

The QFMRX-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, the module is ideal for use in portable battery powered wireless applications

Absolute Maximum Ratings: Receiver

Operating temperature:	-40°C to +85°C
Storage temperature:	-40°C to +100°C
Supply Voltage (pin 5)	10V
Data input (pin 7)	10V
RF Input (pin 1)	0 dBm

Electrical Characteristics: Receiver

	pin	min.	typ.	max.	units	notes
DC LEVELS						
Supply voltage		4.5	5	5.5	V	
Supply current			2		mA	
Supply ripple		-	-	10	mV_{P-P}	
Data output high			=>4.5		V	
Data output low			<= 0.5		V	
RF						
RF sensitivity			-100		dBm	
IF Bandwidth			600		KHz	
Initial frequency accuracy			±50		KHz	
Max R.F. input			-20		dBm	
E.M.C.						
Spurious responses upto 1GHz			<60		dB	
LO leakage, conducted			<60		dBm	
LO leakage, radiated			<60		dBm	
DYNAMIC TIMING						
Power up to stable data *(With RF signal present*			15		mS	
Signal to stable data *(With power supply already on)*			12		mS	
Mark:space ratio			50		%	
Bit rate		20		10000	bps	

Connection Details

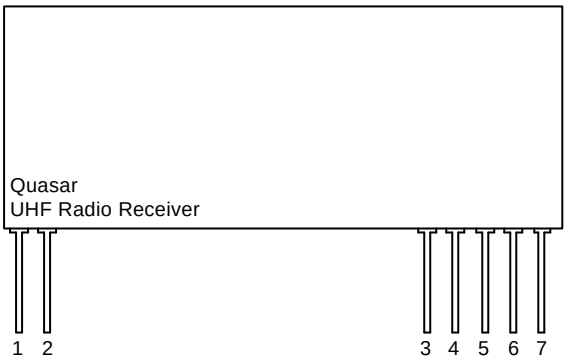


Figure 1: Quasar Receiver

Pin Description:

RF IN *(pin 1)*
50Ω RF input from antenna, connect using shortest possible route. Capacitively isolated from internal circuit.

RF GND *(pin 2)*
RF ground connection, preferably connected to a solid ground plane.

RSSI *(pin 3)*
The Received Signal Strength Indicator provides a DC output voltage proportional to the RF input signal

UNCONNECTED *(pin 4)*

V_{CC} *(pin 5)*
+Ve supply pin. Operation from a 5V supply able to source 2mA at less than 10mV_{P-P} ripple.

RSSI *(pin 6)*
The Received Signal Strength Indicator provides a DC output voltage proportional to the RF input signal

DATA OUT *(pin 7)*
CMOS compatible output. This may be used to drive external decoders.

General Information

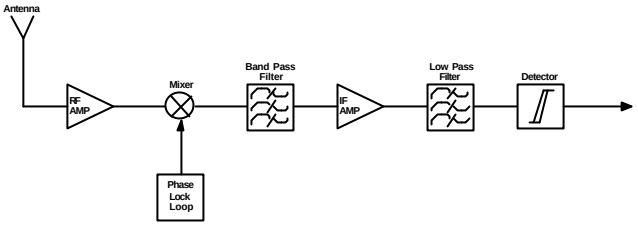


Figure 2: Quasar Receiver Block Diagram

The Quasar receiver module is a quasi AM/FM superhet receiver capable of handling data rates of up to 10Kbits/s. With an on board data buffer, phase locked loop and high Q front end RF filter a –100 dBm sensitivity is achieved.

The QFMR2-XXX uses a passive front end filter whereas the QFMR3-XXX use a very selective saw front end filter to help combat the effects of the new Tetra mobile system and other sources of interference. A comparison of the filters is shown in Figure 3

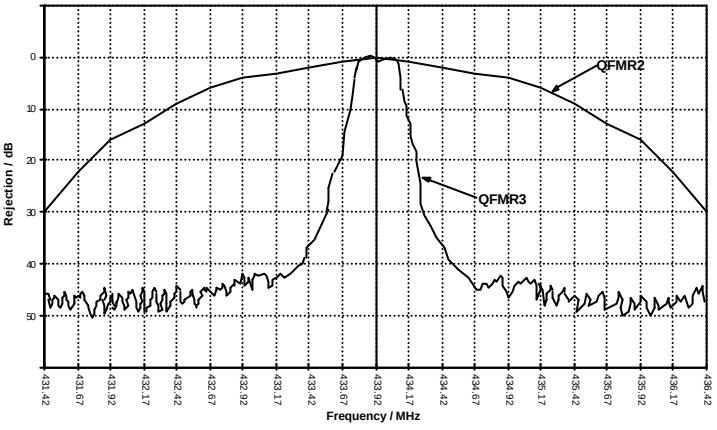


Figure 3: QFMR2 and QFMR3 Front End Filter Comparison

Utilising the quasi AM/FM modulation technique and the latest phase locked loop receiver technology with one of the compatible Quasar transmitter modules will yield a highly efficient wireless link.

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 @ ¼ wavelength (15.5cm @ 433.92MHz). Further range may be achieved if the ¼ 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

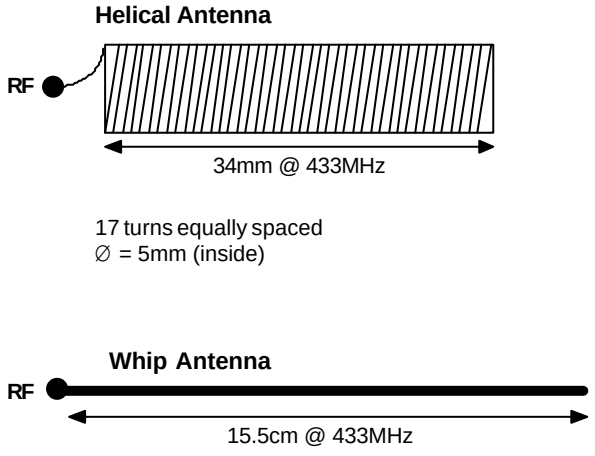


Figure 4: Antenna Configurations To Be Used With The Quasar QM Transmitter Module

Application Circuit

The application circuit shows how the Quasar QM receiver can easily be integrated into a system to form a wireless link.

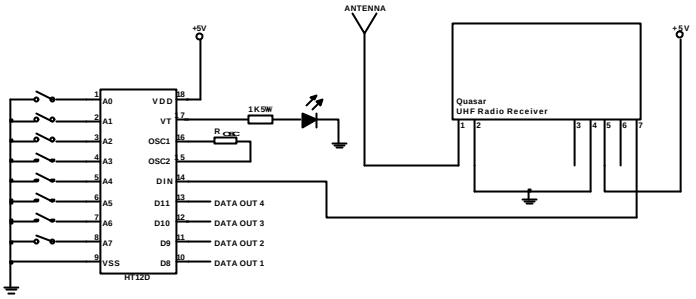


Figure 5: Quasar QM Receiver Application Circuit

RSSI Values

The QMRX 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	2.17
-100	2.20
-90	2.33
-80	2.53
-70	2.76
-60	3.00
-50	3.18
-40	3.25
-30	3.26
-20	3.27

Mechanical Dimensions

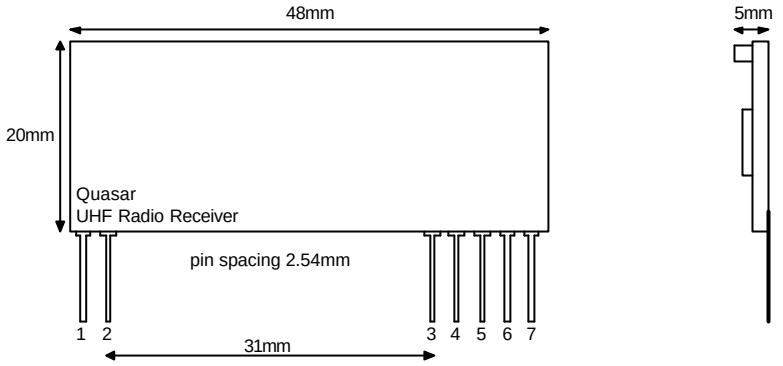


Figure 6: Quasar Receiver

Ordering Information

Standard Product;

Part No	Description
QFMR2-418	SIL Receiver 418MHz
QFMR2-434	SIL Receiver 434MHz
QFMR2-868	SIL Receiver 868MHz
QFMR3-418	SIL Receiver (High End) 418MHz
QFMR3-434	SIL Receiver (High End) 434MHz
QFMR3-868	SIL Receiver (High End) 868MHz

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