FEATURES

- Miniature Crystal Module
- 500mw RF Output Power
- Very High Frequency Stability
- Up To 20km Range (Direct Line Of Sight)
- 1-3km Range (Within Buildings)
- 15 Single Channel Versions Available
- Wide Tx Voltage Range 6.5 - 9v Dc
- Rx - Single Supply Voltage 5vdc
- Low Power Consumption
- Fast Response Time
- Standard TTL/CMOS Interface
- Mpt1329 Licence Exempt



DESCRIPTION

The R.F. Solutions 458MHz FM Transmitter and receivers are compact 'credit card' sized crystal controlled modules, capable of transmitting data up to 20 kilometres in direct line of sight, up to 1-3km within buildings.

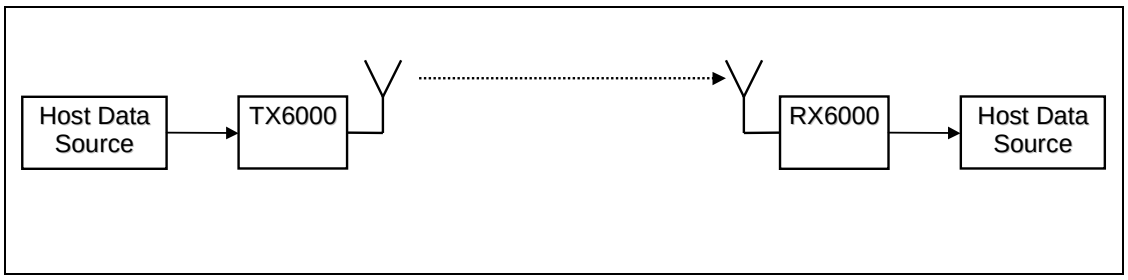
These modules are crystal controlled for frequency accuracy and are supplied tuned to one of 15 available channel frequencies.

The units are suitable for general purpose telemetry applications where small size and high data rates are needed. The module can transmit digital or analogue (GMSK, or FSK) data at up to 9600baud rate.

Supplied as a completed module, no modification or pre tuning is necessary. Connections are by gold plated pins on the module base, enabling the module to be socketed for interchangeability (e.g. for other frequency channels).

The radios have been designed to meet ETSI300-220, EN50081-1, EN50082-1 EMC directive and are DTI approved under MPT1329 for licence free use.

TYPICAL OPERATION



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Frequency of Operation

The TX/RX6000 modules operate on the 458.500MHz to 458.950MHz telemetry band. There are 15 channels within this band. The TX/RX6000 modules are supplied at one of these specific channel frequency bands. When ordering the modules, the exact frequency must be stated.

Ch No (Hex)	Frequency (MHz)
02	458.525
04	458.550
06	458.575
08	458.600
0A	458.625
0C	458.650
0E	458.675
10	458.700
12	458.725
14	458.750
16	458.775
18	458.800
1C	458.850
1E	458.875
20	458.900
22	458.925

Radio Propagation

With any radio system, there are a number of factors affecting the system performance. These are

- Transmitter power output
- Height of transmitter and receiver antenna
- Length of feeder cables to the antenna
- Type and efficiency of antenna
- Surrounding topography
- The weather

Antennas

The types of antenna we recommend for this Modem are;

Helical : The smallest, most compact antenna, has a gain of <1, designed for short ranges up to 2km

1/4 Wave Flexi : General purpose antenna with gain <1 gives slightly better range than Helical

Yagi : A highly directional antenna (Looks similar to a standard TV aerial). Typically has a gain of +3dB. The output power of a transmitter connected to a Yagi must be reduced in order to comply to the DTI specifications. This does however have the advantage of reducing the power consumed by the transmitter to achieve the same range. By connecting a Yagi to a receiver, the system range may be extended to 20km.

Note : Try to keep the feed wire to the antenna as short as possible, If the antenna is to be mounted some distance away low loss 50Ω co-axial cable should be used as the interconnection.

Power Supply

It is not advisable to use a switched mode power supply, either to drive the TX6000/RX600 module or within close proximity to it. Switched mode power supplies can produce high energy radio frequencies over a broad spectrum potentially causing interference with the operation of the Modem.

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Transmitter Connections : Pins on underside of Module

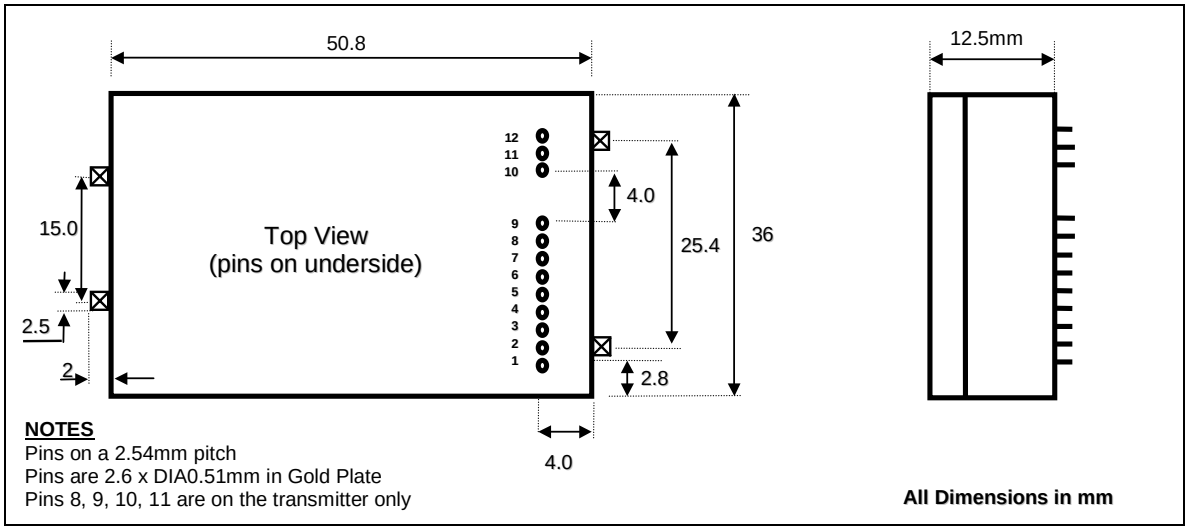
Pin	Description	Direction
1	Ground	Input
2	Modulation Input 500mVpk-pk +ve freq deviation	Input
3	Modulation Input 500mVpk-pk -ve freq deviation	Input
4	Digital Data input (TTL)	Input
5	Switched +5V (supply to Rx when used as transceiver)	Output
6	Test	Output
7	Regulated +5V	Output
8	Transmitter ON (Connect to Common to start the Transmitter)	Input
9	Supply Voltage to Module (7.2 - 9V)	Input
10	Receiver RF Output (for use in transceiver)	Output
11	Ground	Input
12	Antenna	Output

Receiver Connections : Pins on underside of Module

Pin	Description	Direction
1	Ground	Input
2	Receiver Signal Strength Indicator (RSSI) 0-2V Log Range	Output
3	Demodulated Output	Output
4	Test (unfiltered modulated output)	Output
5	+5V supply to Local Oscillator and RF Amplifier	Input
6	Digital Data Ouptut	Output
7	+5V supply to IF and LF Amplifiers	Input
11	Ground	Input
12	Antenna	Antenna

Power Save Mode

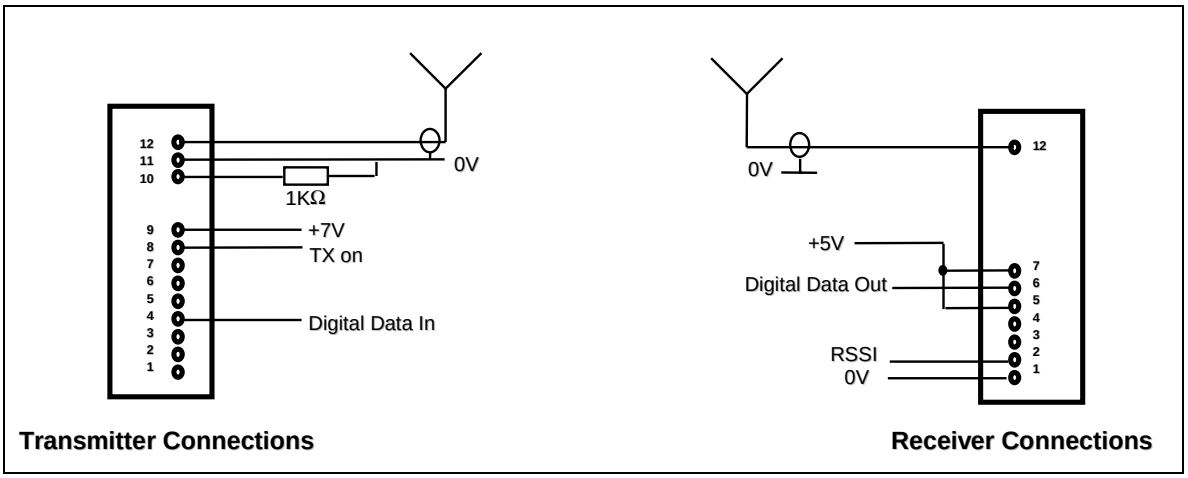
The receiver may be put into power save mode by removing the 5V supply to pin 5. The RSSI will still indicate a valid signal. After re-applying power to pin5 the data output will be valid within <5msecs.



Mechanical Details

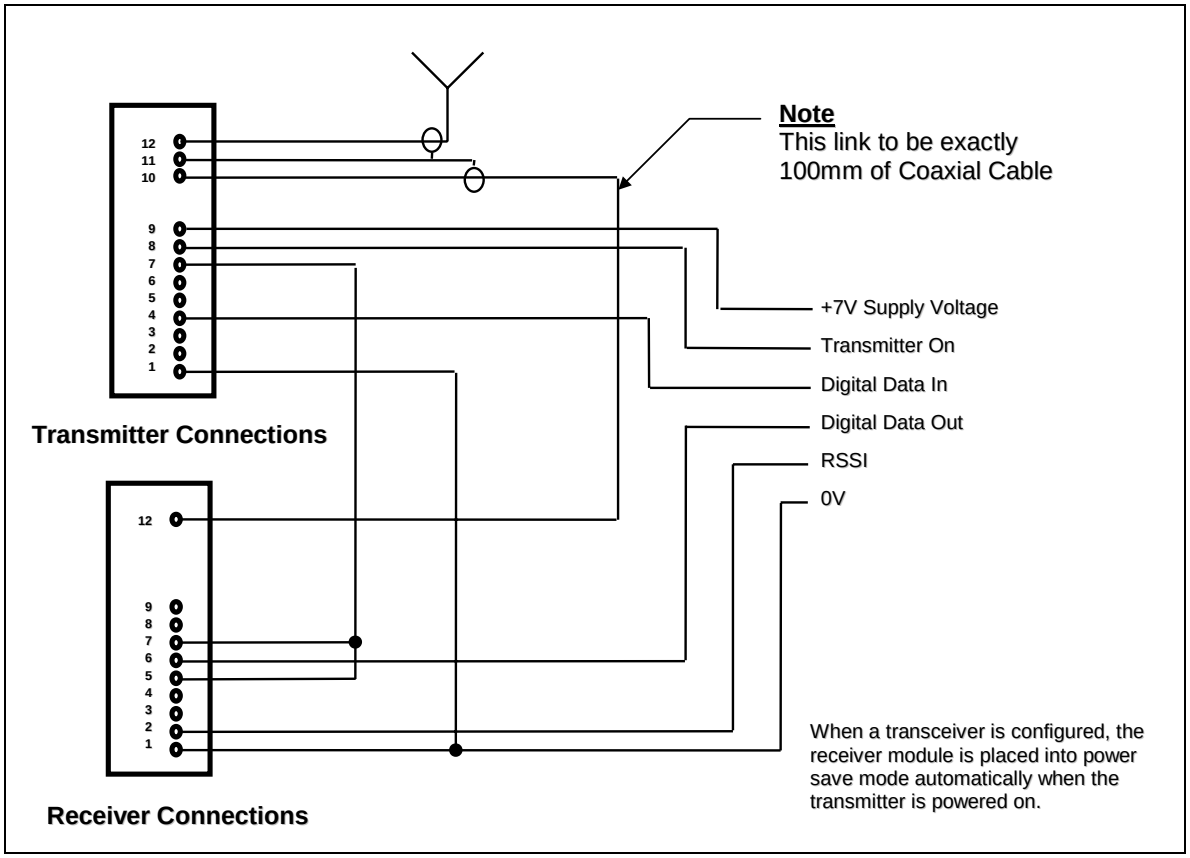
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Circuit Connections



Transmitter Connections **Receiver Connections**

Transceiver Application Connections



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ABSOLUTE MAXIMUM RATINGS

Storage Temperature.....-30 to +85^{o} Celsius.
Operating Temperature..... -25 to +55^{o} Celsius.

DIMENSIONS

Length = 36, Width = 51, Height = 12.5mm

Weight = 30grams

TECHNICAL SPECIFICATION

Ambient temperature = 25^{o} Celsius.

ELECTRICAL CHARACTERISTICS	MIN	TYPICAL	MAX	DIMENSION	NOTE
Transmission Frequency		458.850		MHz	
Channels		1			
Modulation					See Note 2
TRANSMITTER					
Supply Voltage	7		9	V	
Supply Current	150	170	200	mA	Transmitting
Radiated Power			500	mW	
Start up Time			5	mSecs	
Data Input (Logic Low)	0	0.2	0.8	V	TTL
Data Input (Logic High)	3.5	3.8	5	V	TTL
RECEIVER					
Supply Voltage	4.7	5	5.3	V	
Supply Current		15		mA	
Power Save Supply Current		500		µA	
Sensitivity	-122			dBm	
Modulation Output			5	Vpk-pk	
Data Ouput (Logic Low)	0	0.2	0.8	V	TTL
Data Ouput (Logic High)	3.5	3.8	5	V	TTL

Notes:

1. There are 15 channels in 5MHz sub-bands. The module is supplied at one fixed frequency.
2. Modulation used is F3D

PART No	DESCRIPTION	
TX6000-XXX	Transmitter 458MHz XXX = Frequency Channel	
RX6000-XXX	Receiver 458MHz XXX = Frequency Channel	

For more information or general enquiries, please call;

R. F. Solutions Ltd.,
Unit 3, 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

Web Page http://www.rfsolutions.co.uk

RF Solutions is a member of the Low Power Radio Association.

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