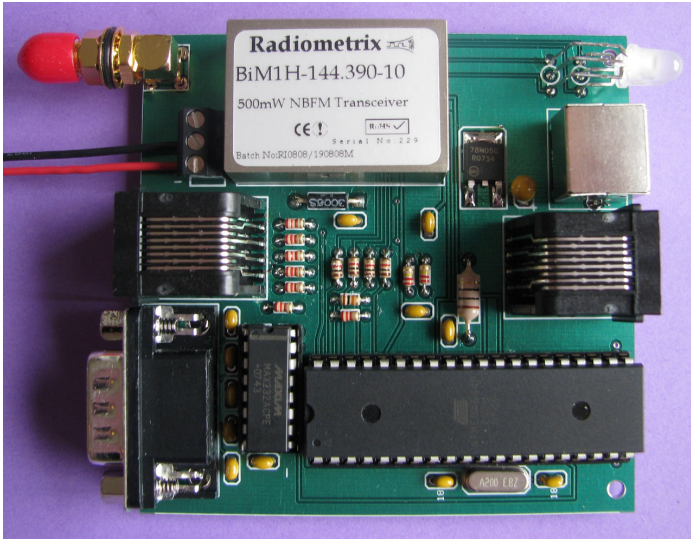


Micro-Trak TT4 Manual, VER 1.0

The Micro-Trak TT4 is a single channel, crystal controlled data transceiver operating on the North American APRS frequency, 144.390 MHZ.



The MT-TT4 utilizes a special configuration of the TinyTrak4 microprocessor, and a special version of the firmware to control the aspects of the transceiver that are unique to the MT-TT4. The MT-TT4 is shipped with the latest version of the standard firmware for the MT-TT4, and firmware versions for the regular TT4 will not work and should not be loaded into MT-TT4 processor.

New versions or special versions of firmware may be downloaded and installed in the MT-TT4 as they become available from Byonics. Refer to the TT4 manual for instructions on loading firmware and setting software values and parameters.

The MT-TT4 is equipped with the following Input/outputs:

Serial Ports

The MT-TT4 has two true RS-232 bidirectional serial ports available on the DB-9 connector. The primary port is intended for a computer input, and is wired with serial in and out in reverse with respect to a "normal" serial port. Pin 4 of the DB-9 connector follows the tradition of other TinyTrak and industry standard ports and makes a regulated +5 volts available to power a GPS. This means that for initial configuration and programming, you will need to use a null modem and gender changer to connect the MT-TT4 to your computers' serial port. Unlike the standard TT4, there is no provision for TTL level signals.

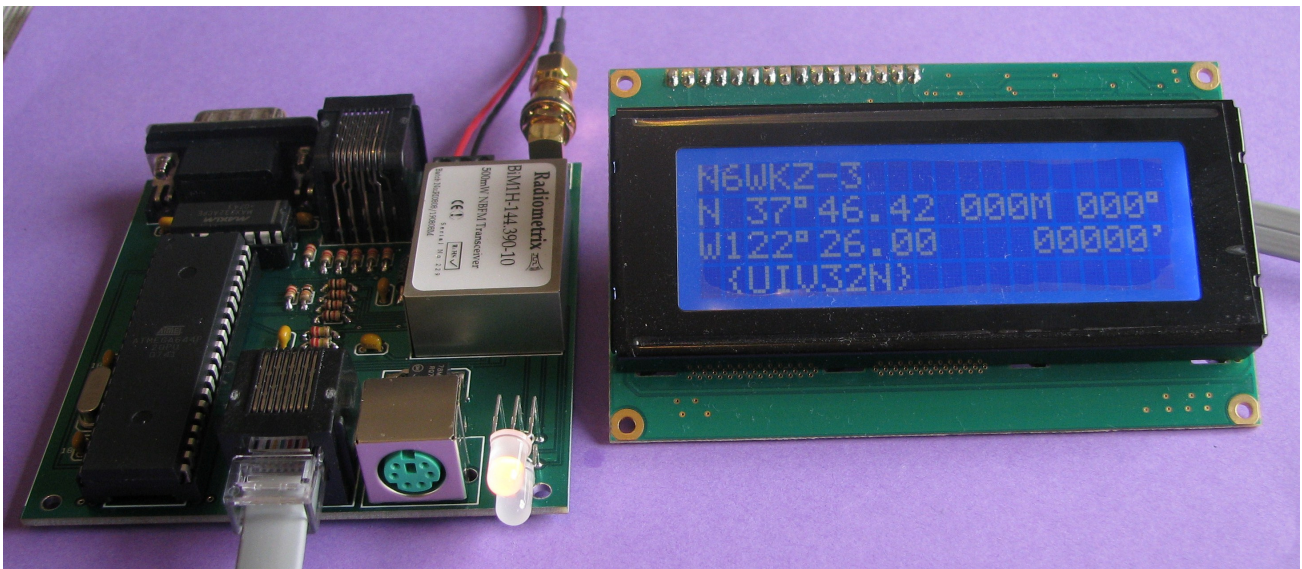
The secondary port uses pins 7 and 8 of the DB-9 connector, which are intended for a GPS, and shares a common ground with the primary port. Having multiple serial ports allows the MT-TT4 to be used with a GPS and computer or terminal simultaneously. Byonics offers a break out cable for the TT4 that will also work with the MT-TT4. The cable breaks out the serial ports to two separate DB-9 connectors.

LCD Port

The MT-TT4 has an RJ-45 output designed to drive the [CrystalFontz CFAH2004A-TMI](#) 20x4 backlight LCD displays. A daughter board is available from Byonics that will allow the LCD to be connected via a straight-through patch cord. The LCD module may be wired directly to an 8 conductor cable, and will require a 62 Ohm resistor mounted to the LCD to set the backlight contrast level.

LCD Port Pin assignments

RJ-45		Display
Pin 1	Ground	Pin 11
Pin 2	Pin 22 PORTC 0	Pin 12
Pin 3	Pin 23 PORTC 1	Pin 13
Pin 4	Pin 24 PORTC 2	Pin 14
Pin 5	Pin 25 PORTC 3	Pin 4
Pin 6	Pin 26 PORTC 4	Pin 6
Pin 7	Pin 27 PORTC 5	Pin 2 and Pin 15 through 62 Ohm resistor
Pin 8	V+ 5	



MT-TT4 Shown with Crystalfontz LCD

PS/2 Connector

The MT-TT4 has an input for a PS/2 style IBM PC keyboard. Future software versions will support different functionalities for the keyboard port.

Power Port

A three terminal input is provided for 9-15 volts DC input. The connections are marked on the board. There are two ground side connectors and a single V+ input. You may note that the telemetry input used for the system voltage is taken from after the polarity protection diode. This prevents accidental reverse polarity applied to the MT-TT4 from destroying the microprocessor. As a result of this, the MT-TT4 will report system voltages about .5 volts lower than the actual supply voltage in the telemetry reports.

Telemetry Port

An RJ-45 connector is used for a telemetry input ports. In addition to 5 telemetry inputs, the port has a ground, +5, and low-level audio output. Note that the audio output is unbuffered, so a high impedance amplifier should be use to drive an external audio speaker or output. Making a lower impedance connection may pull the audio level down to unacceptable levels and prevent decoding. This can be compensated for somewhat in the receiver amplifier (RXAMP) level command if necessary. From left to right:

RJ-45

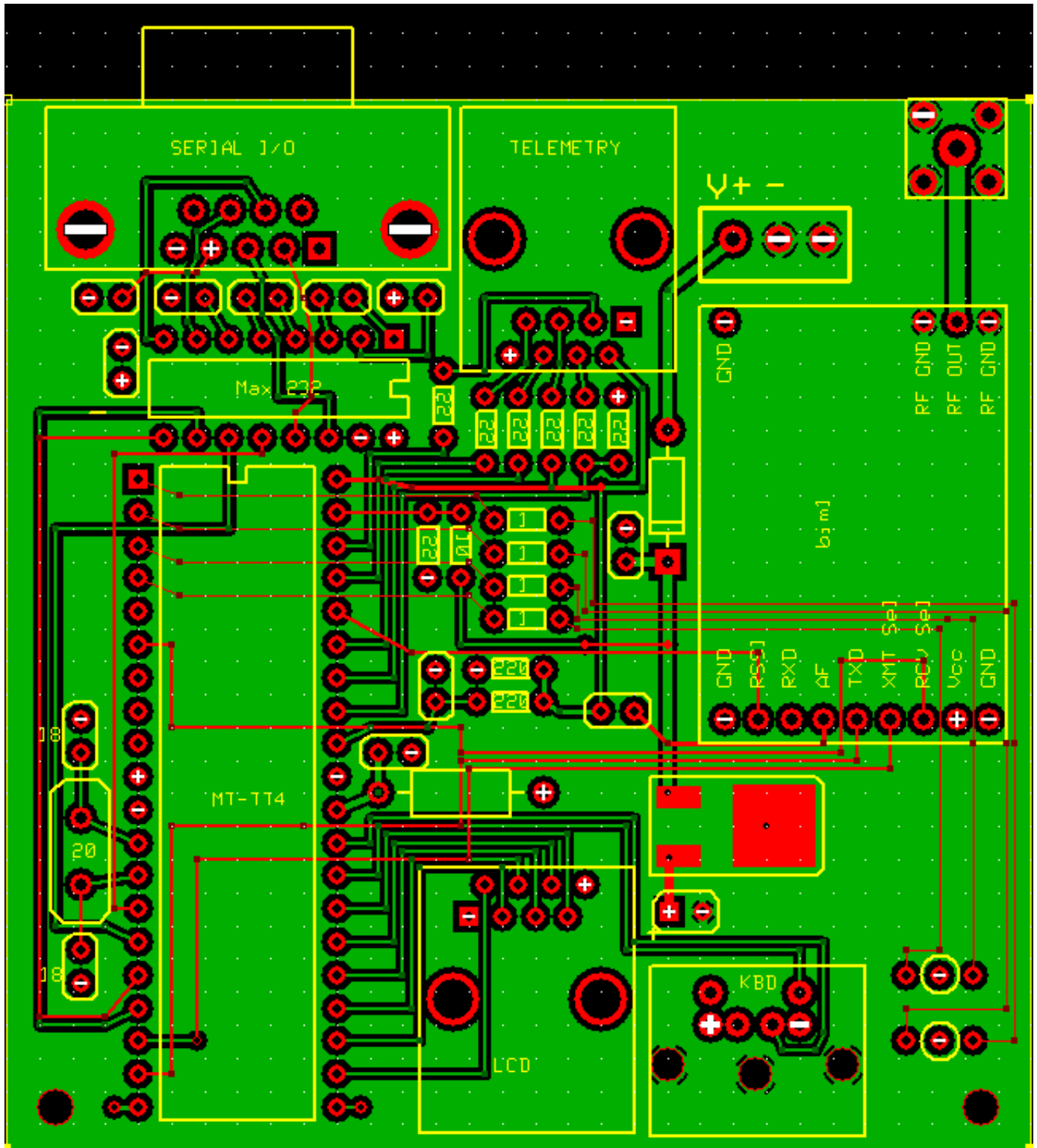
- Pin 1 Ground
- Pin 2 Audio out
- Pin 3 ATMEGA Pin 38 PA2
- Pin 4 ATMEGA Pin 33 PA7 (note; pull up resistor)
- Pin 5 ATMEGA Pin 34 PA6
- Pin 6 ATMEGA Pin 35 PA5
- Pin 7 ATMEGA Pin 37 PA3
- Pin 8 V+ 5

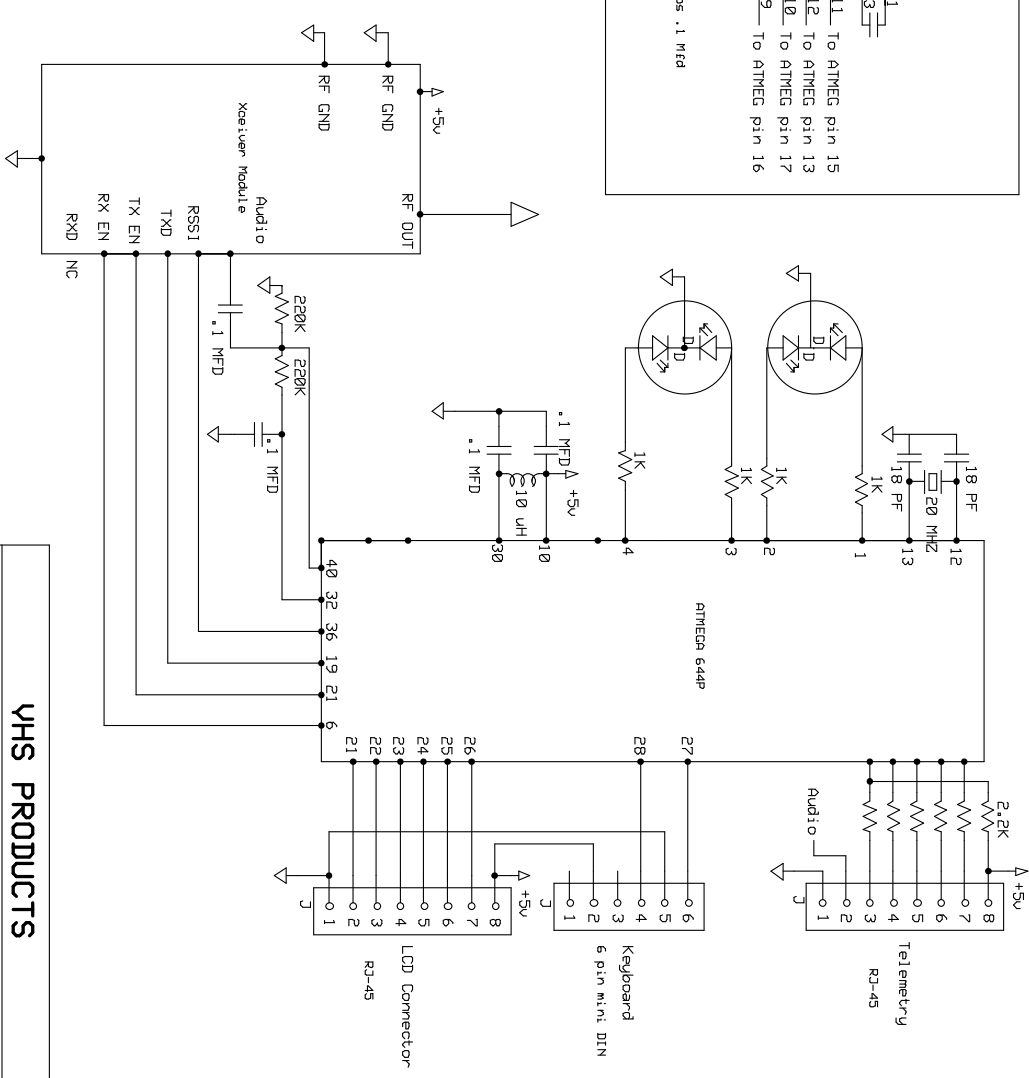
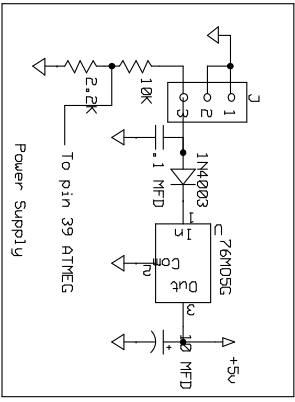
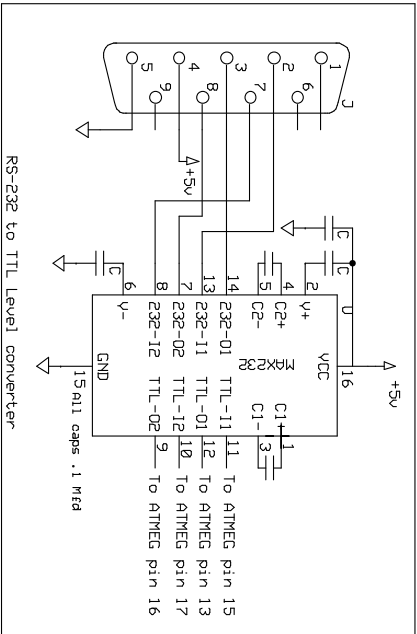
Note: ATMEGA Pin 36, PA4, is reserved for monitoring receiver signal strength.

RF Connector

An SMA connector is used for the transceivers input/output line. The Micro-Trak is designed to be operated into a 50 Ohm impedance load. The power output from the MT-TT4 is 500 milliwatts.

Printed Circuit Board layout





YHS PRODUCTS

Micro-Trak TT4

Rev 1.0
12/12/2008

A.R. Lord

1 of 1

Radio Frequency Specifications

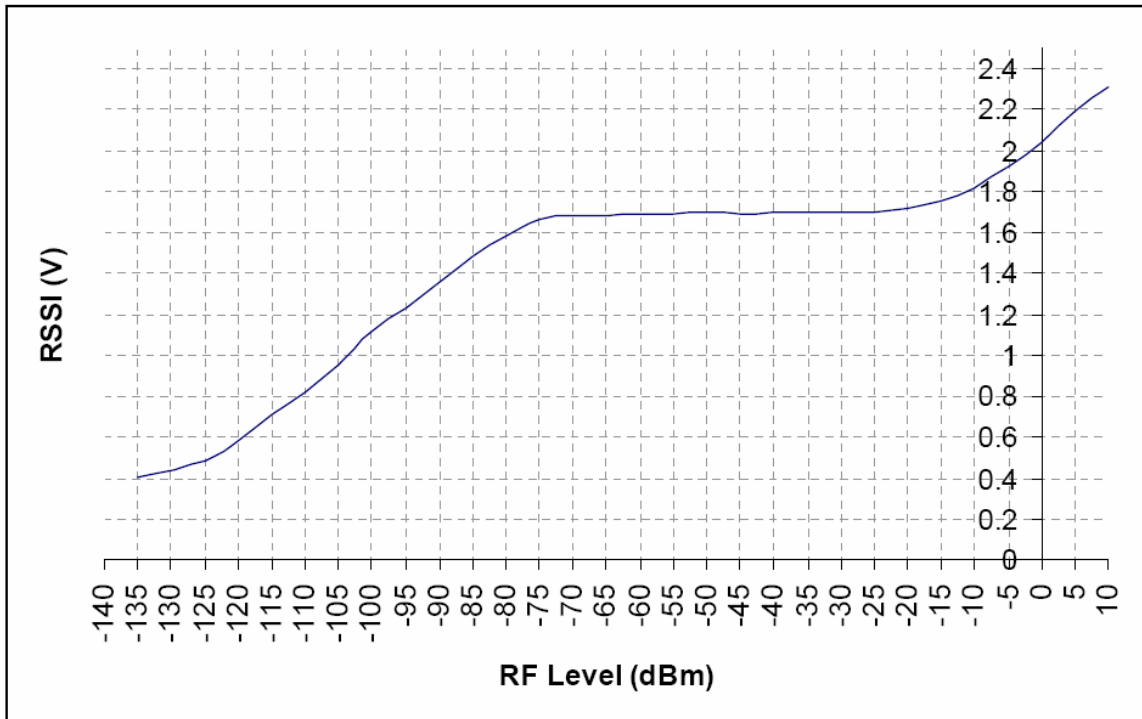
Transmitter

RF Power output	<+28 dBm
Spurious Emissions	-36 dBm
Adjacent channel Transmission power	-37 dBm
FM Frequency Deviation (peak)	+/- 3.5 kHz
Enable timing	8 ms
Current	280 mA @ 5 VDC

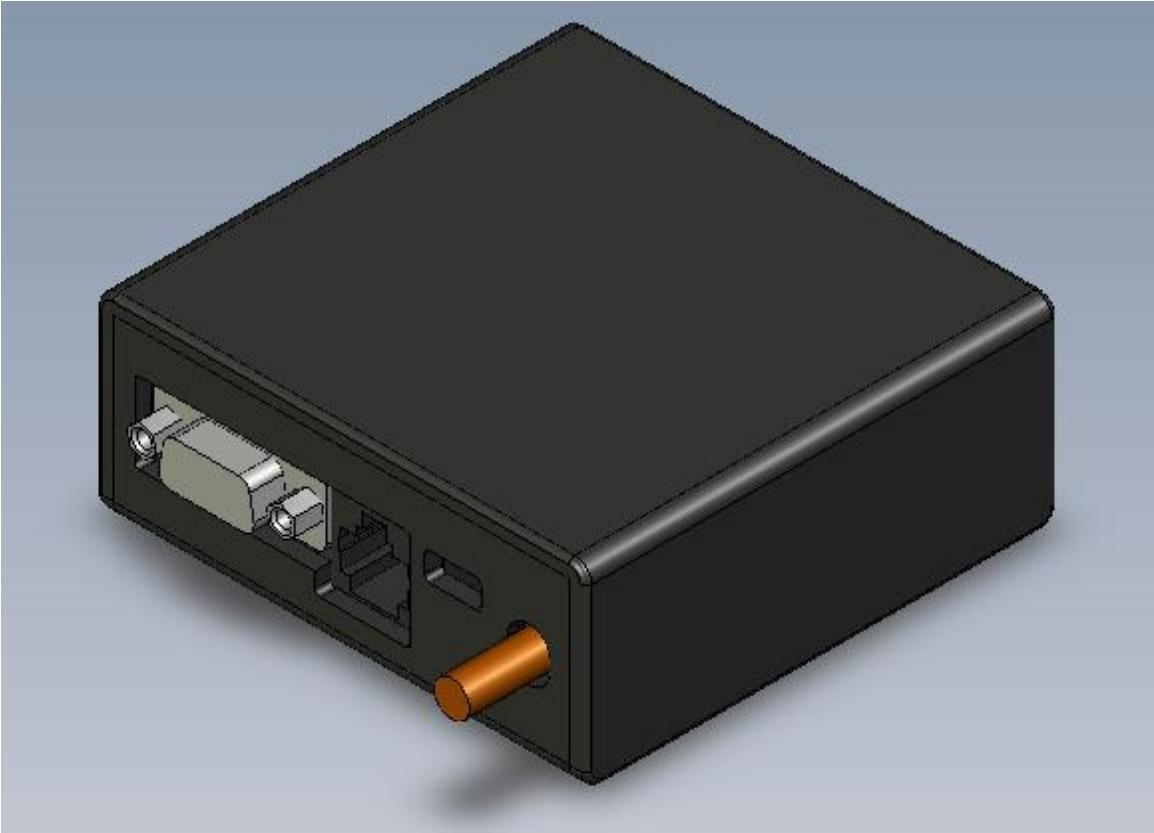
Receiver

RF sensitivity @ 2dB SINAD	-120 dBm
RF sensitivity @ 1ppm BER	-115 dBm
RSSI Threshold	-127 dBm
RSSI Range	60 dB
Blocking	88 dB
Image and Spurious emission	-70 dBm
Adjacent channel rejection	-70 dBm
LO Leakage, re-radiated	-60 dBm
Current	8 mA @ 5 VDC
Operating temperature	-10 to + 60 Centigrade

RSSI



Optional Enclosure



Optional enclosure scheduled for release in January 2009