BITBEAM

BBUHF TT&C Radio

General Information
The BBUHF is a half duplex UHF transceiver designed for high reliability, low speed communications for satellites in LEO and MEO. The BBUHF is ideal as an always-on command receiver, ranging beacon, and transmitter.

RF Specs
Half duplex communications @ 1.2 Kbps -> 115.2 Kbps
Optional higher speeds available
2-FSK, OOK, MSK, GFSK modulation
Rate ½ convolutional encoder
Optional Tx/Rx tuning available in the 398 - 452 MHz band
Saturated RF output Power 34 dBm.
Optional 1W version available
Rx sensitivity down to -115 dBm uncoded
Rx Noise Figure 1.36 dB
Selectivity: 30 KHz at 2.4 Kbaud
Doppler Tolerance: 15 kHz without external compensation
Frequency drift < 20 ppm over temperature

Power Consumption
4.9 ~ 5.1 VDC Supply (Absolute Limit 5.5VDC)
Receive mode: 130 mW
Transmit mode: 8.25 Watts for 2.6 Watt RF output

Environmental Performance
Operational between -40℃ ~ +80℃

Manufacturing Quality
IPC Class 3/A per IPC-6012 PCB fabrication.
Vacuum outgassing TML<1%, CVCM<0.1%

Software Interface
Microcontroller based
Example firmware & Interface software provided
RS-232 UART
Optional SPI interface
Optional I2C Interface
GPIO ports for sensors and command signals
Bitrates & packet protocols configurable on-air
Soft Viterbi FEC decoder
Optional AES 128 Encryption

The BBUHF firmware is delivered to the customer with the product. The firmware may be modified by the end user in order to add new functionality or customize the framing protocol. Example interface software is provided.

Mechanical
The radio is a single board measuring 1830 X 2000 X 225 mils, with a drop in edge mount SMA connector for the RF signal. Power and other signals go on a 24-pin through-hole 50 mil pitch micro header compatible with the Samtec FTSH series connectors. A faraday cage on top shields the board components. The back of the board has an exposed area for the addition of the required heatsink.
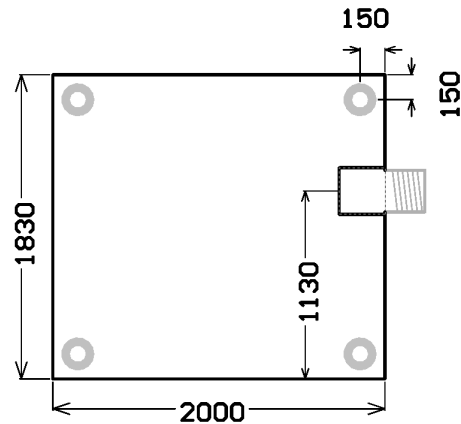

Figure 1: Board Dimensions

Pinout

Pin #	Function	Description
1	GND	Supply Ground
2	GND	Supply Ground
3	VCC_5	5V supply pin 1
4	VCC_5	5V supply pin 2
5	VCC_5	5V supply pin 3
6	VCC_5	5V supply pin 4
7	GND	Supply Ground
8	GND	Supply Ground
9	GPIO1	General purpose IO 1
10	GPIO2	General purpose IO 2
11	GPIO3	General purpose IO 3
12	EN	Radio Enable/Reset
13	GND	Ground
14	GND	Ground
15	USART0_1	UART0 RT or SPI0 CLK
16	USART0_2	UART0 CT or SPI0 SS
17	USART0_3	UART0 TX or SPI0 MOSI
18	USART0_4	UART0 RX or SPI0 MISO
19	GPIO4	General purpose IO 4
20	GPIO5	General purpose IO 5
21	TX_RX	Transmit/Receive indicator
22	RF_POUT	Output Power indicator
23	GND	Ground
24	GND	Ground

Available Part Numbers

Model Number	Description	Tx Band	Rx Band
BBUHF-0150	Space Operation Service UHF (Space to Earth)	401 MHz	450 MHz
BBUHF-5001	Space Operation Service UHF (Earth to Space)	450 MHz	401 MHz
BBUHF-3737	Amateur Satellite	437.4 MHz	437.4 MHz