µSBT-100 S-Band Transponder

Space Micro has earned a strong reputation in the Space industry for innovative, affordable and high performance RF communication and digital computer products. We are an engineering driven small business focused on technology advancement and product implementation.

Space Micro's RF heritage began in 2006 with the award of the Air Force ANGELS and TACSAT-4 programs, and now includes SGLS and STDN Transponders/Transceivers, X/Ku/Ka-Band Transmitters and various other custom RF and power amplifier products. Space Micro recently completed design, development, qualification and deliveries for the NASA LADEE and NASA IRIS programs. In addition to the µSTDN, we also provided the mission critical X-Band Transmitter for IRIS. Our most recent award is for the development and delivery of a 1.2GB Ka-Band Transmitter for development in a manned orbiter scheduled for delivery 2014.

Originally designed by Comtech AeroAstro, µSBT-100 is a compact, lightweight S-Band transponder and can be ordered for STDN, SGLS, or USB protocols. It is designed to provide affordable and reliable telemetry and command uplink for many satellite applications. With a diplexer, the µSBT-100 transponder receives and transmits simultaneously. It is coherent (TX-RX) with greater coherency than required by AFSCN, NASA STDN and the European version networks. The µSBT-100 transponder is also capable of PRN (Psuedo Random Noise) ranging to better than required by all three agencies. Additionally, the µSBT-100 transponder can be used as a separate TX, a separate RX or as a transceiver. The unit includes latch-up detection and mitigation circuitry for applications with higher radiation exposure.

**Features**

- STDN, USB, SGLS protocols
- Optimized S/W/P
- Compatible with typical launch environments
- Radiation mitigation circuitry
- Flight heritage on MOST, ST-5 and NEOSSat
- Separate TX/RX slices for remote mounting on redundancy
### Specifications

#### Receiver
- **RF Input Dynamic Range:** -125 to -40 dBm
- **RX Carrier Tracking Range:** ±105 kHz
- **RX Carrier Acquisition Threshold:** -119 dBm
- **RX Noise Figure:** 8 dB
- **RX Carrier Acquisition Time:** <0.5 seconds

#### Transmitter
- **TX Frequency Stability:** ±20 ppm over temperature
- **Output Power:** Adjustable in 0.5W steps from 0.5W to 5W RF under software control
- **Ranging:** B/W: 100 Hz to 1 MHz (-3 dB)/turnaround UMI: 1:1 (±10%)
- **Uplink Modulation Index Interface:** 0.3 Rad peak (nominal)RS-422/EIA-485 software command interface

#### General
- **Input Voltage:** 22 to 39 Vdc with under/over voltage protection
- **Power Consumption**
  - **Receiver:** 3W
  - **Transmitter:** 34W
  - **Reverse Voltage:** 3A maximum for 10 seconds, 2A continuous
- **Output Protection:** No damage; open or short circuit
- **Thermal Monitoring:** Individual sensors and reporting from each of the three modules

#### Physical Characteristics
- **Dimensions:** 3.5” x 2” x 3”
- **Mass:** 660 grams
- **Environmental Conditions**
  - **Radiation:** 10 krads (si) box level (higher with increased shielding)
  - **Latch-Up:** Detection and mitigation circuitry included
  - **Vibration:** 14 G rms
  - **Pressure:** 10E-5 Torr to 1 Atmosphere

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