GENERAL DYNAMICS
Mission Systems

Space Qualified SGLS TT&C Transponder

TOR Compliant, S-Band TT&C Transponder

- Fully Aerospace TOR compliant (parts, materials, and processes)
- Radiation Hardened for the harsh Medium Earth Orbit (MEO) and for use in Strategic nuclear environment (EMP and prompt dose tolerant)
- SGLS/AFSCN compatible: 1 or 2 kbps uplink data-rate, 32 kbps downlink data-rate on 1.7 MHz subcarrier with commandable forward error correction mode
- Interfaces to the KG-327 cryptographic unit for uplink (command) decryption and downlink (telemetry) encryption, including red/black encryption boundary
- Operating modes commanded via latching relays for reliable operation

General Dynamics' Space Ground Link System (SGLS) Tracking, Telemetry and Command (TT&C) Transponder provides compatibility with the Air Force Space Control Network (AFSCN) SGLS telemetry and command formats in a single, highly reliable unit. The unit operates at uplink command rates of 1 kbps and 2 kbps (automatically detected) and provides downlink telemetry data rates up to 32 kbps on a 1.7 MHz subcarrier. Coherent operation, including ranging, is selectable via command, as is rate 1/2, constraint length 7 convolutional encoding.

For signal security the unit provides interfaces to the KG-327 cryptographic unit for uplink decryption and downlink encryption. This highly reliable transponder has been designed for the demands of space including missions in low Earth orbit (LEO), medium Earth orbit (MEO) and geosynchronous Earth orbit (GEO) . Being fully compliant to Aerospace Parts, Materials and Processes TOR requirements* results in lower life-cycle costs by reducing the probability of parts issues impacting spacecraft integration and test efforts.

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Receiver Features

- Operating mode: SGLS/AFSCN including Ternary FSK
- Noise figure:< 4.0 dB
- Operating Frequency: 1760 to 1840 MHz
- Acquisition: - Auto acquisition (± 100 kHz)

Transmitter Features

- 7W TX power
- Operating Frequency: 2200 to 2300 MHz
- Data Rates: up to 32 kbps on 1.7 MHz subcarrier
- Meets NTIA mask
- Can be configured as a non-coherent transceiver or coherent transponder
- R 1/2, K=7 convolutional encoder
- Coherent ranging
- Automatic Transmitter Turn On capability with uplink signal

Interface

- 1553B SV interface
- RF connectors are SMA-F
- Non-RF connectors are sub-miniature D
- Digital interfaces are differential RS-422 compatible line drivers and receivers
- Operating modes commanded via latching relays
- DC power
- 68-71 VDC
  - < 15 Watts receive-only mode
  - < 45 Watts full duplex
- Analog telemetry
  - Voltage Monitor
  - Receiver AGC
  - RX frequency offset
  - Temperature Monitors (passive thermistors)
  - RF Output Power Monitor
- Hard-line baseband command interface for spacecraft checkout
- Interface to standard cryptographic equipment (e.g, KG327)

Physical/Environmental

- Size: 8.7" x 7.6" x 6.9" (Including mounting feet, connectors and semi-rigid cables)
- Weight: 17.5 lbs.
- EMI/ EMC: MIL-STD-461C
- Radiation hardened for natural and man made environments
- Radiation
  - 100 kRad
  - EMP Tolerant
  - Prompt Dose
- Vibration: 17.2 Grms (Qualification level)
- Shock: 1123 G Peak, 1723 Hz
- Temperature: -34° C to +71° C

Customization

- Further customization is available, please contact us to discuss your unique requirements.

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