New TT&C Modem Enhances Performance, Reduces Costs

Overview

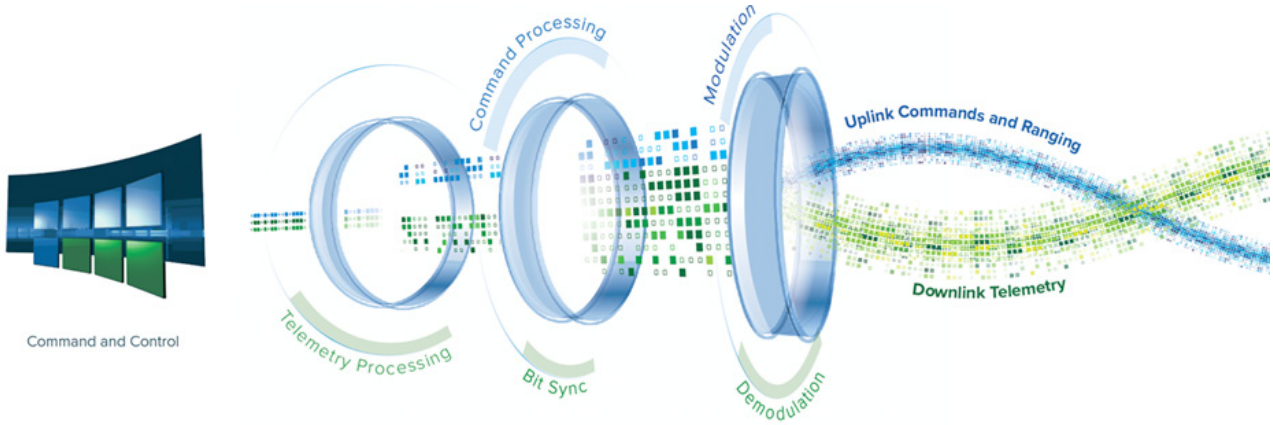
Unlike most TT&C modems, the XR1 modem is field repairable improving operational efficiency by minimizing the downtime and expense incurred in sending a unit back to the manufacturer for necessary repairs. Additionally, the XR1 can provide telemetry, tracking and command for two satellites simultaneously if required or desired. This capability can reduce the operational footprint, the number of modems required and overall operational expenses for satellite operators.

XR1 is the latest edition of the Kratos modem that has flown hundreds of satellites over the past 14 years for many U.S. Defense and civil agency programs where security and reliability are critical.

Due to its performance and economic efficiency, the XR1 is an ideal solution for new satellites and/or ground stations and, as it is compatible with most common satellite buses, will operate seamlessly alongside other modems in existing operations. Engineered to reduce operational costs and enhance troubleshooting, the XR1 supports traditional analog and newer digital IF signaling, scales economically with modular software and firmware and available Information Assurance (IA) hardening enhances security. Built for applications spanning the lifecycle of the satellite–from assembly and test, to launch and on-orbit checkout, to full operation–the XR1 TT&C Modem empowers satellite management with confidence.

Key Benefits

- *Drop-in replacement*
- *Minimize downtime with field repair*
- *Support two satellites simultaneously*
- *Standard and user defined ranging*
- *Local/remote access with web interface*
- *Chassis real-time monitoring*
- *Internal Built-in-Test (BIT)*
- *Enhance security with IA hardening*
- *Increase reliability with dual power supplies*



The XR1 can provide telemetry, tracking and command for two satellites simultaneously if required or desired.

Phone: 443.539.5330 • EMail: Sales@Kratos-ISI.com • Web: www.Kratos-ISI.com

Product Description

The XR1 delivers 70 MHz IF for TT&C functions and supports a wide range of modulation and demodulation signal processing modes, including: BPSK/PM, BPSK/FM, FSK/FM, Tone Ranging, and Direct PSK (BPSK, QPSK, and OQPSK).

Key Specifications

Modulation (Transmit)

- Number of Channels: 2
  - IF Output Frequency: 50 MHz to 90 MHz
  - VSWR: 1.35.1
  - Tuning resolution: < 0.1 Hz
  - IF Output Power Level: < -70 dBm to 0 dBm
  - Spurious: < -70 dBc
- Commanding or Telemetry Simulation
- BPSK/PM or BPSK/FM
  - Symbol Rate: 7 bps to 2 Mbps
  - Number of Subcarriers (Per Channel): 1
  - Subcarrier frequency: 1 kHz to 4 MHz
  - Modulation Index (PM): 0.0 to 3.0 Radians
  - Frequency Deviation (FM): 0 to 4 MHz
- Direct PSK (BPSK/QPSK/OQPSK)
  - Symbol Rate: 7 bps to 20 Mbps
- PCM Coding: NRZ-L,M,S, and BIØ-L,M,S
- Convolutional Encoding: Rate ½, k=7
- FSK/FM
  - Symbol Rate: 7 bps to 10 kbps
  - FSK Tone (0/1) Frequency: 100 Hz to 100 kHz
  - Execute Tone Frequency: 100 Hz to 100 kHz
- Analog input: FM/PM

Demodulation

- Number of Channels: 4
  - IF input frequency: 50 MHz to 90 MHz
  - Noise Figure: < 7 dB
  - VSWR: 1.35:1
  - Tuning resolution: < 0.1 Hz
  - IF input power level: < -100 dBm to -10 dBm
  - Acquisition range: 1 MHz
  - Maximum Doppler range: < 10 kHz/sec
  - Channel 1: Telemetry or Command Echo
  - Channel 2: Telemetry
  - Channel 3: Telemetry or Command Echo
  - Channel 4: Telemetry
- BPSK/PM or BPSK/FM
  - Symbol Rate: 7 bps to 2 Mbps
  - Number of Subcarriers (Per Channel): 2
  - Subcarrier frequency: 1 kHz to 4 MHz
  - Modulation Index (PM): 0.0 to 3.0 Radians
  - Frequency Deviation (FM): 0 to 4 MHz
- Direct PSK (BPSK/QPSK/OQPSK)
  - Symbol Rate: 7 bps to 20 Mbps
- Viterbi Decoding: Rate ½, k=7,
- Reed-Solomon Decoding: (225, 223)
  - Interleave: 0 to 8

Tone Ranging

- Major Tone Frequency: 0 to 500,000 Hz
- Minor Tone Frequency: 0 to 100,000 Hz
- Standards: ESA, ESA-Like, USB, User Defined (up to 10 tones)
- Modulation Index (PM): 0.0 to 3.0 Radians
  (FM): 0 to 4 MHz

Frequency Reference

- External or internally generated 10 MHz

Monitoring and Control

- Ethernet TCP/IP remote M&C interface
- Web-based GUI

I/O

- 70 MHz I/F input/output
- IRIG-B (No Year Info) AM modulated input, NASA 36
- 1 PPS input
- Baseband analog input/output
- Network, Serial (RS-422 and TTL)s
  - Ternary/Binary command data & clock input
  - Simulated telemetry data & clock input

Environmental

- 0 ºC to 50 ºC operating, -10 ºC to 60 ºC storage
- 10% to 90% relative humidity

Mechanical and Power

- 2U 19" rack-mount unit
- 120/240V, 47 Hz to 63 Hz, 3.5 A max