



icMDM-30 | TELEMETRY, TRACKING & COMMAND (TT&C) MODEM

Ingenicomm's icMDM-30 Telemetry, Tracking & Command (TT&C) Modem represents the next generation of low-cost, highly-scalable integrated modem solutions. The icMDM-30 combines Ingenicomm's proven Configurable Ground Systems (CGS) software framework with state-of-the-art digital signal processing components to deliver a full range of uplink and downlink IF-to-IP and IP-to-IF processing capabilities at data rates up to 30 Mbps per channel.

Telemetry, Tracking & Command

The icMDM-30 provides an optimized turn-key solution spacecraft telemetry, tracking and command applications, including dual-signal static/dynamic demodulation with integrated diversity combination, data/clock waveform recovery, uplink modulation, and single- and multi-session tracking/ranging measurement. The icMDM-30 supports a wide range of modulation formats, symbol rates, analog bandwidths, and data encodings, and provides industry-leading performance within 1 dB of theory for typical waveform modes.

Integrated Data Processing

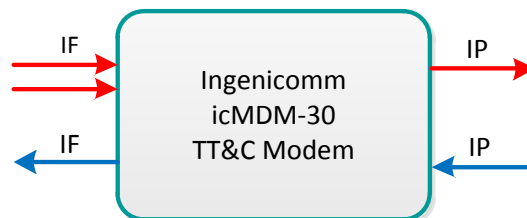
The capabilities of the icMDM-30 go beyond simple signal processing. By integrating Ingenicomm's full CGS software processing suite, the icMDM-30 enables users to take advantage of a full range of telemetry and command processing, decoding and de-encapsulation, data quality metric generation, test pattern verification, and link performance analysis capabilities. When deployed in prototyping and test environments, the CGS framework allows seamless integration of user-written software components, allowing custom data processing and archive manipulation capabilities to be easily added to the standard system.

Easy Local and Remote Configuration

The icMDM-30 can be controlled either locally or remotely via a highly flexible web-based graphical user interface. A full-featured command-line interface is also provided to allow easy scripting and automation, and service-oriented cluster management components are available to allow single-point control of multiple icMDM-30 systems simultaneously.

Robust Platform Architecture

The icMDM-30 is based on a robust enterprise-grade server architecture to provide component-level redundancy and high resiliency against failure. The system is highly scalable, and can be expanded to include additional interfaces and increased storage capacity as required.



Key Features

- Dual-signal demodulation and diversity combination
- Wide range of supported modulation schemes and signal characteristics
- Integrated ranging/tracking measurement and calculation
- Performance within 1 dB of theory for typical waveform configurations
- Telemetry and command format decoding and processing
- Raw and processed data recording and configurable playback
- Test pattern and user data simulation and verification
- Integrated error/noise simulation and link quality measurement
- Expandable to include additional IF or baseband interfaces

Ingenicomm, Inc. is a leading provider of ground and range equipment and enterprise engineering services for civil and commercial aerospace programs, as well as the defense and intelligence communities. To learn more about Ingenicomm's service and product offerings, visit <http://www.ingenicomm.net> or contact Ingenicomm at info@ingenicomm.net or +1-703-943-7236.



System Capabilities

Input and Output Interfaces

- 70 MHz analog IF via BNC
- Gigabit (10/100/1000) Ethernet
- Optional RS-422/TTL serial baseband

Supported Waveforms

- PM (digital or analog)
- PSK (BPSK/QPSK/OQPSK/AQPSK/UQPSK/UAQPSK)
- PM/PSK
- FM (digital or analog)
- PCM/FM

Frame Synchronization

- Selectable 64-bit synchronization pattern and mask
- Selectable frame size up to 8192 bytes
- Selectable check and flywheel strategies

PCM Code Conversion

- NRZ-L/M/S
- BiΦ-L/M/S

Encoding and Decoding

- Pseudo-randomization and de-randomization
- Reed-Solomon (255,223) or (10,6) decoding
- Convolutional/Viterbi (rate ½ or ¾) decoding
- CRC checksum verification

Telemetry Processing and Simulation

- CCSDS Conventional (version 1) and AOS (version 2) Transfer Frame processing
- CCSDS VCA and Bitstream service processing
- Fully configurable VCID and APID filtering and routing
- CCSDS, TDM, and ESA packet processing
- Database-driven telemetry decommutation and engineering unit conversion

Data Archiving and Playback

- Heuristic data presence detection and automated recording
- Segmented and multi-file recording
- Automatic time-tagging and aging of recorded files

Platform Specifications

- 3U 19" rack-mount chassis (5.2" x 17.7" x 25.5")
- Intel® Xeon® 3.1 GHz quad-core CPU
- 8 GB DDR3 1600 MHz ECC-registered RAM
- 3 70 MHz IF BNC connectors (2 input / 1 output)
- 2–4 Gigabit (10/100/1000) Ethernet ports
- 250 GB hot-swap RAID-1 system drive array
- 2–24 TB hot-swap RAID-0/1/5/6/10 archive drive array
- 22x DVD-RW optical drive
- 760 W triple-redundant (2+1) power supplies
- IPMI 2.0 remote management with dedicated NIC
- Red Hat® Enterprise Linux 6.2 or Windows® 7 Professional

Test Data Generation

- Fully configurable PRBS generation and verification
- Fixed and user-provided pattern generation and verification
- Single- and multi-bit burst error simulation
- AWGN and user-provided noise simulation
- Bit and packet error rate calculation

Latency Analysis

- Integrated receive and transmit rate detection
- Single- and multi-path delay calculation
- Multi-channel phase delay calculation

Monitoring and Control

- Local and remote command-line interface
- Web-accessible graphical user interface
- Fully integrated documentation and user help features
- Integrated scripting and automation
- Multi-instance and multi-system cluster management



The icMDM-30 modulator and demodulator boards are industry-leading digital signal processing components with an extensive history of operational deployments

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