



Granite represents the next generation of Kinometrics multi-channel recorders. Offering high dynamic range on up to 36 channels and with exemplary timing accuracy and spectral purity, the Granite again advances the standards of seismic data recording.

Complementing the outstanding data fidelity of this unit is a very low power operation and a new suite of communication capabilities offering multiple real time data streams to multiple clients. Built on Kinometrics' new Rock platform, Granite is easy to integrate with other Rock & Quanterra instruments allowing users to develop highly flexible monitoring solutions.

Since only a web browser is required to modify the parameters, Granite offers greatly enhanced ease of use over existing instruments to change operation parameters, change recording and telemetry modes & formats, view or retrieve recorded files. Functions can be accessed worldwide via a WAN, or via local wireless interface with the optional Bluetooth interface.

As with all Kinometrics instrumentation the Granite is designed and tested to ensure ultra-reliability.

Granite

High Dynamic Range, IP Aware, Communication Centric Multi-channel Recorder

FEATURES

- Up to 36 channels at ~130dB dynamic range
- Record and communicate multiple sample rates
- Multiple data formats and telemetry protocols
- Power Management for ultra-low power operation
- Designed for low total cost of ownership
- Extensive state-of-health monitoring, including input and system voltages, internal temperature, humidity, communication link diagnostics
- Rugged aluminum extruded case designed for 1m drop and 1m temporary immersion (IP67)
- Optional Terminal strips for easy sensor connection
- Designed for RoHS Compliance and easy re-cycling
- Transient and EMI/RFI protection on all connections
- System Status LEDs

SPECIFICATIONS

Input Channels

Sensor channels: 12, 24 or 36 (Other configurations available)
 Input level: 5Vpp, 10Vpp, 40Vpp Differential Input

Data Acquisition

Type: Individual 24-bit Delta Sigma converter per channel with Black Fin DSP on each 4 Channel board

Anti-alias filter: Double Precision FIR Filter Causal/Acausal; >140 dB attenuation at output Nyquist

Dynamic range: 200 sps ~127 dB (RMS noise to RMS clip - Typical)
 100 sps ~130 dB (RMS noise to RMS clip - Typical)

Frequency response: DC to 80 Hz @ 200 sps

Sampling rates: 1, 10, 20, 50, 100, 200, 250, 500, 1000 sps (2000 sps available depending on output format)

Channel skew: None – simultaneous sampling of all channels

Acquisition modes: Continuous, triggered, time windows

Output data format: 24 bit signed (3 bytes) in user selectable format

Parameter calculations: Calculations of key parameters in real-time

Real time digital output: Ethernet or RS-232 output of digital stream (contact factory for available formats)

Power: Power consumption: <100mW (active)

I/O and Display

Power input: Mil-style connector for DC power input, external battery connection, 1-W power LAN

RS-232/USB input: Mil-style connector with full RS-232C interface with modem control, USB 1.1 Device connection, RS232 Console connector

Ethernet Connection: 10 Base-T Ethernet Interface

EMI/RFI protection: All I/O lines EMI/RFI and transient protected

LED: System, power and event status, Ethernet Link & Data

Power Supply

Type: Internal high efficiency switched power supply and battery charger system

Input: 8-18 VDC 4W (typical) for 12 channels

Int. Charger Operation: 15.5VDC Required

Ext. Power Module: Input 100-250 VAC 50/60 Hz Output 15.5 VDC

Internal Battery Charger: Digitally temperature compensated output for VRLA battery with reverse protection and deep discharge recovery.

Fuses: None uses resettable Polyswitch protection

Batteries: External Valve Regulated Lead Acid (VRLA) Battery Optional battery housing.

Current drain: ~335ma @12V (12 Channel System)

SPECIFICATIONS

Trigger

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|---------------------|--|
| Type: | IIR bandpass filter (three types available) |
| Trigger selection: | Independently selected for each channel |
| Threshold trigger: | Selectable from 0.01% to 100% of full scale |
| Trigger voting: | Internal, external and network trigger votes with arithmetic combination |
| Additional trigger: | STA/LTA, Time Window |

Storage

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| Primary slot: | Internal Compact Flash Slot, std 4GB up to 64GB |
| Secondary slot: | Internal SD Card Slot |
| Storage Module: (Option) | Additional User Accessible Compact Flash Slot Accessible SD Card Slot (Replaces internal slot) Hard Drive (Additional Option) |
| Recording capacity: | Approximately 42 kB per channel per minute on Memory Card of 24-bit data @ 200 sps. |
| Recording format: | Main CF Card Linux EXT3 Removable Media FAT32 File System |

Firmware

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| Type: | Multi-tasking operating system supports simultaneous acquisition and interrogation; boot loader allows remote and optionally automatic firmware upgrades |
| System control: | Configure sample rate, filter type, trigger type and voting, maintains communications and event storage |
| Supported File Formats: | Kinometrics EVT, MiniSEED, SAC, COSMOS, MATLAB, SUDS, SEISAN, ASCII |
| User interface: | 1 x 10BaseT Ethernet Ports 1 x RS232 (2 nd Port/Modem Optional) 1 x USB 1.1 Device 2 x USB 2.0 Ports (1 OTG/1 Host) (optional in Storage Module) Bluetooth Interface (optional) |
| Intelligent alerting: | System can be configured to initiate communications when an event is detected or if an auto-diagnostic failure occurs |
| Auto-diagnostics: | System can be configured to continuously check system voltages, temperature, humidity, and timing system integrity |
| Rapid setup: | Unit can be configured from parameter file stored on Compact Flash |

Timing

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| Type: | Oscillator digitally locked to GPS or <i>RockNet</i> |
| GPS: | Integrates completely with system, providing timing, internal oscillator correction and position information, optional power cycling. |
| <i>RockNet</i> : | Shared timing for two units over CAT-5 cable |
| Timing: | Accuracy: <1 microseconds of UTC with GPS |

Communications

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| Ethernet interface: | Real Time Telemetry (Multiple destinations TCP/IP Protocol), Parameter set up, and event retrieval (FTP/SFTP) |
| RS-232 interface: | Real Time Telemetry (Multiple destinations TCP/IP Protocol), Parameter set up, and event retrieval |
| Modem: | Remote access, initiated by user or by the Granite. Optional |

Support Software

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| <i>Altus File Viewer</i> *: | Multiplatform program for rapid review of waveforms and event information. |
| <i>Antelope</i> : | Comprehensive commercial network operational and mgmt system for medium and large networks |
| <i>Earthworm</i> : | Comprehensive public domain network operational and management system for medium and large networks |
| <i>NMS</i> : | Commercial PC-based network management system for small to medium sized networks via modem or real-time data |
| <i>RockTalk</i> *: | Multiplatform program for command and control |
| <i>Rockhound</i> : | Commercial open architecture user-extensible real-time data collection and processing software that runs on a variety of computers |
| <i>PSD</i> : | Commercial Pseudo Spectral Density software for earthquake data analysis |
| <i>SMA</i> : | Commercial Strong Motion Analyst software for earthquake data analysis and processing |
| <i>K2COSMOS</i> *: | Conversion software from Altus EVT file format to COSMOS v1.20 format (COSMOS format can also be produced natively from the Granite) |
| Miscellaneous: | Format converters to ASCII and other formats. Web Server for command and control, Optional Software Development Kit and Compilers. Contact Kinometrics for other options. |

*No charge Environment

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|------------------------|----------------------------|
| Operating temperature: | -20° to 70°C Operation |
| Humidity: | 0-100% RH (Non-condensing) |

Physical

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|-------------------|---|
| Size & Weight: | Granite 12 ~ 19"(L) x 7.5"(D) x 6.8"(H) 16lbs Granite 24, 36 ~ 19"(L) x 7.5"(D) x 13.6"(H) 32lbs |
| Enclosure Rating: | IP67 Equivalent |
| Environmental: | RoHS Compliant Unit |

*Specifications subject to change without notice