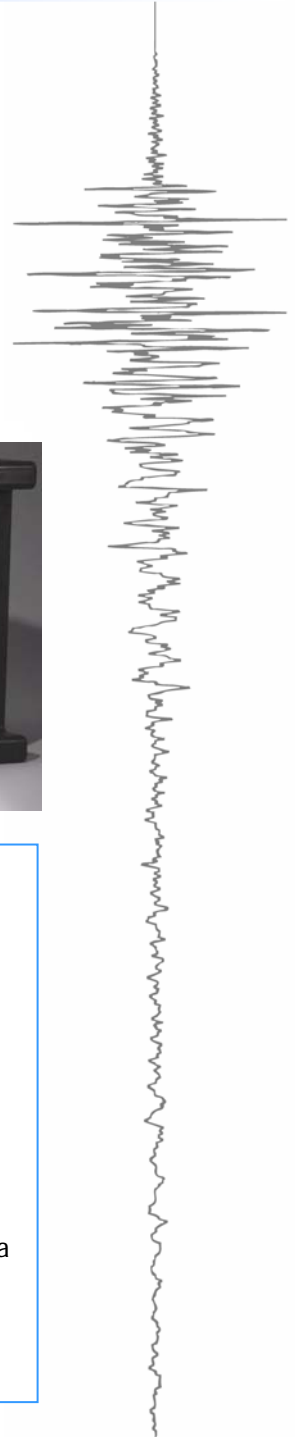


High Dynamic Range, IP Aware, Communication Centric Multi-channel Recorder!



Granite represents the next generation of Kinematics 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 Kinematics' 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 Kinematics instrumentation the Granite is designed and tested to ensure ultra-reliable operation in rugged field conditions.

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

GRANITE® Digital Recorder 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, 50, 100, 200, 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)

Trigger

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

Primary slot: Internal Compact Flash Slot
Secondary slot: Internal SD Card Slot
Storage Module: Additional User Accessible Compact Flash Slot
(Option) 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 DOS File System

Firmware

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: Kinematics EVT, MiniSEED, SAC, COSMOS, MATLAB, SUDS, SEISAN, ASCII
User interface: 1 10BaseT Ethernet Ports
1 RS232 (2nd Port/Modem Optional)
1 USB 1.1 Device
2 USB 2.0 Ports (1 OTG/1 Host) (optional in Storage Module)
1 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

Type: Oscillator digitally locked to GPS
GPS: Integrates completely with system, providing timing, internal oscillator correction and position information, optional power cycling.
Timing: Accuracy: <1 microseconds of UTC with GPS
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
LEDS: 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)

Communications

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

*Altus File Viewer**: Multiplatform program for rapid review of waveforms and event information.
Antelope: Comprehensive commercial network operational and mgmt system for medium and large networks
Earthworm: Comprehensive public domain network operational and management system for medium and large networks
NMS: Commercial PC-based network management system for small to medium sized networks via modem or real-time data
*RockTalk**: Multiplatform program for command and control
Rockhound: Commercial open architecture user-extensible real-time data collection and processing software that runs on a variety of computers
PSD: Commercial Pseudo Spectral Density software for earthquake data analysis
SMA: Commercial Strong Motion Analyst software for earthquake data analysis and processing
*K2COSMOS**: 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 other formats. Web Server for command and control, Optional Software Development Kit and Compilers. Contact Kinematics for other options.

*No charge

Environment

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

Physical

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