



## SPECIFICATIONS

### Channels

Obsidian:	3 +1 sensor channels w/internal sensor
Sensor type:	Triaxial EpiSensor force balance accelerometer, Orthogonally oriented, Internal
Full scale range:	User selectable at $\pm 2g$ or $\pm 4g$
Bandwidth:	DC to 200 Hz
Dynamic range:	155 dB+
Calibration & test:	Calibr. Coil Functional Test; Calibr. Coil Response Test
Input level:	5Vpp, 10Vpp, 40Vpp Differential Input

### Data Acquisition

Type:	Individual 24-bit Delta Sigma converter per channel bandwidth-optimized 32-bit data path
Anti-alias filter:	Double Precision FIR Filter Causal/Acausal; >140 dB attenuation at output Nyquist
Dynamic range:	200 sps ~127 dB (RMS clip to RMS noise - Typical) 100 sps ~130 dB (RMS clip to RMS noise - Typical)
Frequency response:	DC to 80 Hz @ 200 sps
Sampling rates:	1, 10, 20, 50, 100, 200, 250, 500, 1000, 2000, 5000 sps
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, including JMA intensity
Real time digital output:	Ethernet or RS-232 output of digital stream

### 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

### Timing

Type:	Oscillator digitally locked to GPS/GNSS or PTP: Integrates completely with system, providing timing, internal oscillator correction and position information.
Shared timing:	3 Ports for shared timing for multiple local units
Accuracy:	<1 microseconds of UTC with GPS/GNSS or PTP

### Storage

Data slot:	Internal SDHC Card Slot, standard 32 GB
System slot:	Internal SDHC Card Slot, 4 GB
Recording capacity:	Approximately 42 kB per channel per minute on Memory Card of 24-bit data @ 200 sps. (33 days of 4x200sps recording on 8GB Data card)
SDHC Format:	Linux EXT4
Data:	Offloaded automatically to removable thumb drives connected to a USB host port. Parallel recording (mirroring) data on an external USB thumb drive.

### 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 (over modem, radio, etc.), Parameter set up, and event retrieval
Modem:	Built in modem, Remote access, initiated by user or by the Obsidian
Telemetry:	Real-time data via DFS, SEEDLink, Earthworm, Antelope compatible ORB server, or Altus SDS protocols.

### Instrument Software

Type:	Multi-tasking operating system supports simultaneous acquisition and interrogation; allows remote and automatic firmware upgrades
Security:	Supports SSH and SSL
System control:	Configure sample rate, filter type, trigger type and voting, maintains communications and event storage
File formats:	Kinemetrix EVT, MiniSEED, SAC, COSMOS, MATLAB, SUDS, SEISAN, ASCII, others
Intelligent alerting:	Initiate communications when an event is detected or if an auto-diagnostic failure occurs
Auto-diagnostics:	Continuously check system voltages, temperature, humidity, and timing system integrity
Rapid setup:	Can be configured from a parameter file
System timing:	Supports PTP Slave and PTP Master timing (Using Internal GPS as Master clock), NTP and External 1PPS

### I/O and Display

Power input:	Mil-style connector for DC power input, external battery connection, Power over Ethernet (Option)
Interfaces:	10/100 BaseT Ethernet Port
(M12 connectors)	3 x USB 2.0 Host Ports USB 2.0 Device 3 x RS-232 DFS Port (RS232) Linux Console (RS232) POTS Modem 3 x Time/Power Ports (1PPS In/Out, Switched Power) GPS Antenna (TNC)
EMI/RFI protection:	All I/O lines EMI/RFI and transient protected
LED:	System, power and event status, Ethernet Link & Data



## SPECIFICATIONS

### Power Supply

Type:	Internal high efficiency switched power supply and battery charger system with extensive SOH outputs
DC input:	9-28 VDC (>15.5VDC for Battery Charger Operation)
External AC/DC:	Universal Input 100-250 VAC 50/60 Hz
Power module:	Output 15.5 VDC
Internal battery charger:	Digitally temperature compensated output for External Valve Regulated Lead Acid (VRLA) batteries with reverse protection and deep discharge recovery.
Fuses:	None. Uses resettable Polyswitch protection
Current drain:	Current drain: 215ma @12V (w/o 4th channel sensor)

### Environment

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

### Physical

Size: 13.25" (L) x 7.25" (D) x 6.8" (H)  
Enclosure rating: IP67 Equivalent  
Environmental: RoHS Compliant Unit

### Support Software

File Viewer:	Multiplatform program for rapid review of waveforms and event information.
Antelope:	Comprehensive commercial network operational and management system for medium and large networks
Earthworm:	Comprehensive public domain network operational and management system for medium and large networks
Rock Monitor professional:	Rock network operation and monitoring tool
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 Obsidian)
Miscellaneous:	Format converters to ASCII and other formats. Web Server for command and control, Optional Software Development Kit and Compilers. Contact Kinemetrics for other options.