

## **ALLEGATO 2 - SCHEDE TECNICHE DEI PRINCIPALI COMPONENTI DELLA STRUMENTAZIONE DI MONITORAGGIO**



OBSIDIAN

# Obsidian

## **Next Generation of Web Based, High Dynamic Range, GPS/PTP Ready Accelerographs**

Ready for the *right tool* for the job?

The **Obsidian** accelerograph is Kinematics' NEW product matched to Kinematics' exemplary EpiSensor accelerometer performance. It represents a new paradigm in open-architecture seismic data acquisition systems defining the *World's Next Generation* of seismic products.

It is designed to give you the flexibility required by the earthquake monitoring solutions of tomorrow capturing very-small to very-large earthquake sequences with a single sensor while being the *most versatile* accelerograph of today. No more and no less than you need.

You expect outstanding data fidelity and spectral purity. High accuracy data timing is of course required. But it goes beyond that. There are several standard recorded data formats to select from, or you can add your own. On the fly processing of parametric data using your algorithms. Interface to major data center software packages using *their* protocols. For timing use GPS where it makes sense and/or PTP when several units are connected via Ethernet along with DC power.

And when you're ready to get into Earthquake Early Warning Systems (EEWS), the **Obsidian** is ready too. Balance communications bandwidth and data latency with not one but two mechanisms to deliver *ultra-low* latency data.

Why struggle with limited keypads and hard to read displays when you're usually not there anyway? Access the system using your favorite web browser remotely or locally and wirelessly. Where it makes sense to retrieve data locally, do it with a simple thumb drive without commands or buttons.

And for those whose job it is to maintain the station we developed Streamlined Station Maintenance (SSM) that allows you to use your browser to log maintenance activities such as software updates, site inspections, or battery replacements right on the unit. These logs can be automatically uploaded to your data center for archiving, reducing paper work in the field.

Choose from a suite of built-in Kinematics features, add-on packages from trusted providers or expand the capabilities of the system yourself. It's the *open-architecture* seismic data acquisition system!

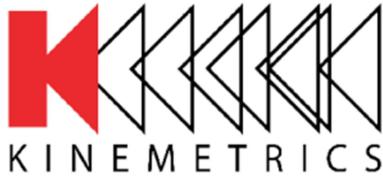
Quanterra and Kinematics data acquisition products provide *data availability* of over 99% in several large networks year after year. Our users will tell you so.



### FEATURES

- 3 +1 sensor channels w/internal EpiSensor triaxial deck
- 24-bit Delta Sigma converter, one per channel
- Matched to Kinematics outstanding EpiSensor accelerometer performance
- Built-in GPS, built-in PTP
- Record and communicate multiple sample rates
- Multiple data formats and telemetry protocols
- Ultra-Low latency data for Earthquake Early Warning Systems
  - \* 0.1sec data packet
  - \* 0.01sec DFS at 100sp
- Streamlined Station Maintenance (SSM)
- Data offloaded automatically to removable thumb drives connected to a USB host port. Parallel recording (mirroring) data on an external USB thumb drive.
- Wireless communications via USB based Wi-Fi
- Extensive state-of-health monitoring, including input and system voltages, internal temperature, humidity, communication link diagnostics
- Application Programming Interface (API) to develop your own add-on software modules. You can customize real-time data processing, file formats, stream data using your own protocol, shape data with a custom filter, and so on.
- IP Security through SSH and SSL
- Transient and EMI/RFI protection on all connections
- System Status LEDs
- Rugged aluminum extruded case designed for 1m drop and 1m temporary immersion (IP67)
- Designed for RoHS Compliance and easy re-cycling
- Designed for the lowest Total Cost of Ownership (TCO)

Continued



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## 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
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 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

Timing: accuracy: <1 microseconds of UTC with GPS 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. USB drives format: FAT32

### 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.

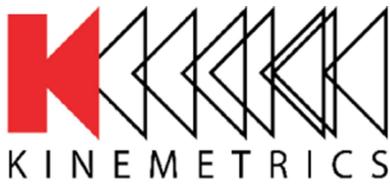
### Instrument Software

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:	Kinemetrics 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 (1 PPS In/Out, Switched Power)
EMI/RFI protection:	All I/O lines EMI/RFI and transient protected
LED:	System, power and event status, Ethernet Link & Data

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## 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

Altus 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
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 Obsidian)
Miscellaneous:	Format converters to ASCII and other formats. Web Server for command and control, Optional Software Development Kit and Compilers. Contact Kinematics for other options.

Specifications subject to change without notice

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05-01-18



**Basalt 4X/8X** represents the next evolution in Kinematics Multi-Channel Recorder Instrumentation. Offering exceptional high dynamic range, matched to Kinematics' outstanding **EpiSensor** accelerometer performance, and with exemplary timing accuracy and spectral purity, the **Basalt 4X/8X** again advances the standards of strong motion data recording. Complementing this outstanding data fidelity is a new suite of communication capabilities offering multiple real time data streams to multiple clients.

As a member of Kinematics **Rock** platform, the **Basalt 4X/8X** is easy to integrate with other **Rock** and Quanterra instruments allowing users to develop highly flexible earthquake monitoring solutions.

The **Basalt 4X/8X** offers greatly enhanced ease of use over existing instruments as only a web browser is required to modify operation parameters, change recording and telemetry modes and formats, view or retrieve recorded files. Functions can be accessed worldwide via a WAN, or via a local wireless interface with the optional Bluetooth interface.

## SPECIFICATIONS

### Channels

Basalt: 3 +1 sensor channels digital recorder  
Also available with 2 x (3+1) channels (Basalt8X)

Input level: 5Vpp, 10Vpp, 40Vpp Differential Input

### Data Acquisition

Type: Individual 24-bit Delta Sigma converter per channel with Black Fin DSP  
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, 2000 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 (contact factory for available formats)

## Basalt 4X/8X

High Dynamic Range, IP Aware,  
Communication Centric  
Multi-Channel Accelerograph

## FEATURES

- 3 +1 sensor channels recorder (Basalt4X) or 2 x (3+1) sensor channels recorder (Basalt8X)
- 24-bit Delta Sigma converter, one per channel
- Built-in GPS
- Record and communicate multiple sample rates
- Multiple data formats and telemetry protocols
- Power Management for ultra-low power operation
- Rugged aluminum extruded case designed for 1m drop and 1m temporary immersion (IP67)
- Extensive state-of-health monitoring, including input and system voltages, internal temperature, humidity, communication link diagnostics
- Optional Terminal strips for easy sensor connection
- Transient and EMI/RFI protection on all connections
- System Status LEDs
- Designed for RoHS Compliance and easy re-cycling
- Designed for low total cost of ownership

### 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  
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: ~145ma @12V (w/o sensors)

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## SPECIFICATIONS

### 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

### 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, standard 4 GB up to 64 GB  
Secondary slot: Internal SD Card Slot  
Storage Module: (Option) Additional User Accessible Compact Flash Slot  
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 x 10BaseT Ethernet Port  
3 x RS-232  
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

Type: Oscillator digitally locked to GPS or RockNet  
GPS: Integrates completely with system, providing timing, internal oscillator correction and position information.  
RockNet: Shared timing for two units over CAT-5 cable  
Timing: Accuracy: <1 microseconds of UTC with GPS  
Power: Power consumption: <100mW (active)

### 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 Basalt

### 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 and 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)

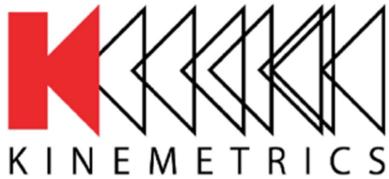
### Physical

Size & Weight: Basalt4X: 14" (L) x 5.5" (D) x 6.8" (H), 10 lbs  
Basalt8X: 19" (L) x 7.5" (D) x 6.8" (H), 16lbs

Enclosure Rating: IP67 Equivalent

Environmental: RoHS Compliant Unit

\*Specifications subject to change without notice



Advancement through Innovation

# ETNA 2

## ETNA 2

### Next Generation of Web Based, Cost Effective, Strong Motion Accelerographs

Kinematics' **ETNA** accelerograph established the world's standard for strong motion recording for almost two decades with more than 6000 installations worldwide. The **ETNA 2** represents the next generation of ETNA-class accelerographs offering NEW and cost effective, web based monitoring capabilities paired with another Kinematics' established world standard, the exemplary **EpiSensor** accelerometer.

The ETNA 2 is easy to use since it was designed around the Rockhound application software first implemented on the Basalt instruments and continued now on the new Obsidian instruments.

ETNA 2 offers the most essential accelerograph features supporting a wide range of earthquake monitoring applications in a small, lightweight, and simple to use package. If you are interested in Earthquake Early Warning, in structural monitoring, in aftershocks surveys or even in induced earthquake monitoring related to oil and gas, and geothermal fluid injection activities, the ETNA 2 is the right product for you.

And for those whose job it is to maintain large number of stations, we implemented Streamlined Station Maintenance (SSM) that allows you to use your browser to log maintenance activities such as software updates, site inspections, or battery replacements right on the unit. These logs can be automatically uploaded to your data center for archiving, reducing paper work in the field, and eliminating human error.



### FEATURES

- 3 sensor channels with an internal EpiSensor triaxial deck
- 24-bit Delta Sigma converter, one per channel
- Matched to Kinematics outstanding EpiSensor accelerometer performance
- Built-in GPS and PTP timing options
- Record and communicate multiple sample rates
- Earthquake Early Warning low latency 0.1s packets ready
- Multiple telemetry protocols: ORB natively or public domain Earthworm and SeedLink
- Streamlined Station Maintenance (SSM)
- Data offloaded automatically to removable thumb drive connected to the USB host port. Parallel recording (mirroring) data on an external USB thumb drive.
- Wireless communications via USB based Wi-Fi or cellular modem
- State-of-health monitoring, including input and system voltages, internal temperature, communication link diagnostics, available storage
- IP Security through SSH and SSL
- Reverse voltage protection and self resettable fuses
- System Status LEDs
- Surviving temporary immersion at 1 m depth (rated IP67)
- Designed for RoHS Compliance and easy re-cycling
- Designed for the lowest Total Cost of Ownership (TCO)

Continued



Advancement through Innovation

ETNA 2



## SPECIFICATIONS

### Sensor

Type:	Triaxial EpiSensor force balance accelerometers, orthogonally oriented, internal
Full scale range:	User selectable at $\pm 1g$ , $\pm 2g$ or $\pm 4g$
Bandwidth:	DC to 200 Hz
Dynamic range:	155 dB+
Offset:	Factory set, software re-zeroing

### Digitizer

Channels:	3 sensor channels for the internal sensors
Dynamic range:	$\sim 130$ dB at 100 sps (defined as RMS dipt to RMS shorted-input noise) or $\sim 139$ dB at 100 sps (defined as full scale peak to peak to RMS shorted-input noise)
Primary sample rates:	1, 10, 20, 50, 100, 200, 250, 500 sps
Secondary sample rates:	A second lower sample rate can be selected from the primary sample rates above
Acquisition modes:	Continuous (ring buffer) and triggered
Calibration & test:	Pulse and Sensor Response Test

### Trigger

Trigger selection:	Independently selected for each channel Internal Threshold, selectable from 0.01% to 100% of full scale or STA/LTA algorithm
Trigger voting:	Internal and network trigger votes with arithmetic combination

### Timing

Type:	Oscillator digitally locked to GPS or to PTP master
Timing: accuracy:	<1 microseconds of UTC with GPS locked

### Storage

Data storage:	Internal SDHC Card, 32 GB
System storage:	Internal SDHC Card, 2 GB
Data:	Offloaded automatically to removable thumb drive connected to the USB host port. Parallel recording (mirroring) data on an external USB thumb drive. File formats: MiniSEED, EVT, and ASCII
	USB drive file system: FAT32

### Interfaces and Digital Control

Interfaces:	1 x Ethernet 10/100BaseT (M12 connectors)
	1 x USB 2.0 Device Port for data access 1 x USB 2.0 Host Port for peripherals 1 x RS-232 for factory use only
Relays:	2 x SPDT relays, software configurable
LEDs:	System, power and event status, Ethernet Link

### Communications

Ethernet interface:	Real Time Telemetry (Multiple destinations TCP/IP Protocol), web server for parameter setup, event retrieval via FTP/SFTP; supports Point of Contact (POC) name service
Protocols:	Modem: External, cellular or POTS, connected via the USB 2.0 Host Interface; consult factory for details Real-time data streaming via Antelope compatible ORB server or via public domain SEEDLink and Earthworm protocols
State-Of-Health:	Input voltage, Super Capacitor voltage, Time synchronization, internal temperature, available storage
Low latency:	1s and 0.1s data packets i.e., for EEWs applications
Data visualization:	Waveform Viewer for continuous waveform display and File Viewer for triggered event display; consult factory for other support software

### Power Requirements

Consumption:	<3W operational
Voltage range:	9-28 VDC
Protections:	Reverse voltage, over/under voltage, self resettable fuses

### Physical

Mounting:	Central bolt, 3 adjustable feet, air bubble leveling
Dimensions:	6" x 6" x 3" (15cm x 15 cm x 7.5cm)
Volume:	1.6 liters
Weight:	3.3 lbs. (1.5 kg)

### Environmental

Temperature range:	-20° to 70°C operational
Humidity:	0-100% RH (non-condensing)
Enclosure rating:	IP67

Specifications subject to change without notice



## AirLink® RV50X Industrial LTE Gateway

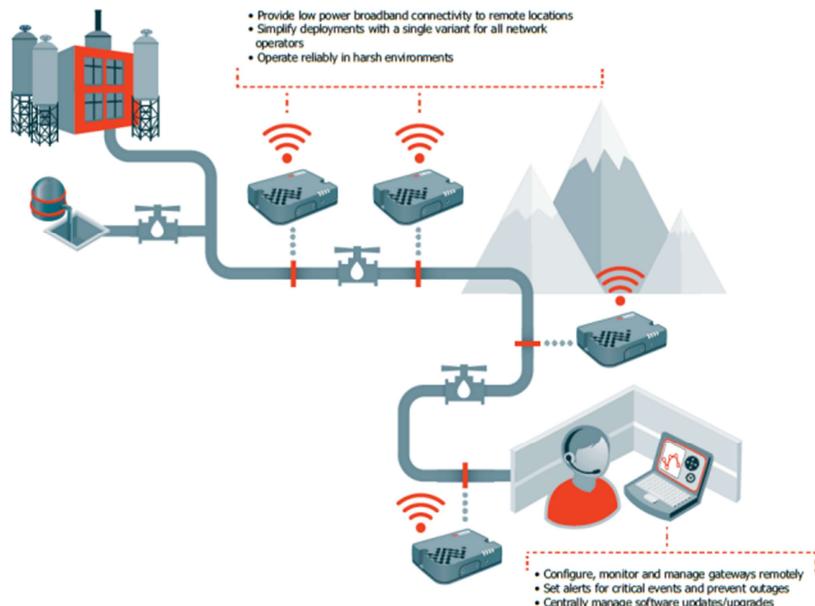
### FEATURES

- LTE performance at 2G power consumption (less than 1W in idle mode)
- State-of-the-art LTE coverage spanning 21 LTE frequency bands worldwide
- Two product variants cover the globe
- Fully automatic network operator switching: just insert the SIM
- Provides network connectivity via Ethernet, Serial and USB
- Remote configuration, software update, and monitoring with cloud-based AirLink Management Service (ALMS) or on-premises with AirLink Mobility Manager (AMM)
- Dual-SIM functionality to enable automatic failover between SIMs (CANADA/EMEA/APAC)
- Meets industrial-grade certifications including Class 1 Div 2, MIL-STD-810G, IP64 ingress protection
- Supports up to 5 VPN tunnels for secure cellular communications
- Events Engine for alert reporting to third party server platforms
- Application Framework (AAF) offers real-time onboard data processing; RV50X's dual-core processor provides added performance for advanced edge computing applications.
- GPS for tracking equipment

### Industrial Grade, LTE-Advanced Performance, Low Power

The AirLink RV50X is the industry's lowest power and most rugged LTE gateway. Simple to install and easy to manage, this industrial-grade gateway is designed to connect critical assets and infrastructure. Ideal for energy, utilities and smart-city applications, the RV50X provides real-time remote connectivity for SCADA, distribution management systems and metering.

With the lowest power consumption available on the market, the RV50X dramatically reduces infrastructure costs when running on battery or solar power. The RV50X supports an extensive range of LTE bands worldwide, and its LTE-Advanced capabilities deliver up to 300 Mbps downlink speeds. For deployments in areas with limited LTE coverage, the RV50X provides fallback to 3G networks. Furthermore, the RV50X provides programmability to enable edge computing applications, using the ALEOS Application Framework (AAF).





## AirLink RV50X Industrial LTE Gateway Datasheet

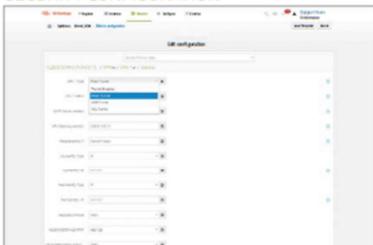
### DASHBOARD



### MONITOR CONNECTIVITY



### SECURITY CONFIGURATION



### SOFTWARE UPGRADES/UPDATES



### RUGGED DESIGN FOR DEMANDING ENVIRONMENTS

The RV50X is designed to withstand harsh industrial conditions, and is capable of surviving 5 V brownouts and spikes from -600 VDC to 200 VDC.

Certified as Class I Div 2, it is ideal for hazardous environments. The die cast aluminum housing is sealed to meet IP64 for resistance to dust and water ingress.

The RV50X is tested to meet and exceed the MIL-STD-810G specification for shock, vibration, temperature and humidity. The built-in power supply protection make it suitable for harsh electrical environments such as compressors, generators, and excavators.

### ULTRA-LOW POWER CONSUMPTION

The RV50X offers best-in-class power consumption combined with LTE performance, and is optimized for battery and solar applications. It is the industry's only LTE gateway with 2G power consumption, operating at 900 mW in idle mode. For 3G deployments migrating to LTE, the RV50X will work with existing power infrastructure, eliminating the need to invest in replacement solar panels or batteries. Standby Mode provides additional protection for batteries by dropping power consumption to 53 mW, and can be triggered by timers, low voltage detection or I/O.

### SIMPLIFIED DEPLOYMENT

The RV50X automatically configures the radio based on the SIM, which provides versatility and simplicity when changing operator networks.

Ideal for global deployments, the RV50X provides worldwide LTE coverage with just two product variants; one for North America and EMEA, and one for Asia-Pacific.

### BEST-IN-CLASS REMOTE MANAGEMENT

Network Management solutions for the RV50X allow over-the-air registration, configuration and software updates, and can be deployed either as a cloud-based service, or as a licensed software platform in the enterprise data center. Both options provide a centralized and remote view of an entire fleet and enable simplified management, control and monitoring of connected RV50Xs and critical infrastructure.

AirLink Management Service (ALMS) is a secure, centralized cloud-based service that remotely monitors and manages signal strength, network technology and location. ALMS provides dashboards with up-to-date views of an entire deployment, and custom alerts to monitor and report critical events, to increase efficiency and prevent downtime.

AirLink Mobility Manager (AMM) is a licensed, unified software platform which can



## BENEFITS

- Provides LTE broadband connectivity to remote locations and in harsh environments
- Ultra-low power consumption, ideal for solar or battery powered installations
- Maximizes longevity of deployed equipment and protects investments with LTE
- Improves ROI by supporting multiple network operators without additional hardware costs
- Powerful remote management solutions
- Built-in, class-leading voltage transient protection provides superior reliability and continuous operation
- Proven reliability and over 2 million AirLink routers and gateways deployed
- Industry leading warranty includes support, software updates and advance replacement

be deployed in the enterprise data center, and provides a consolidated network view of an entire fleet, using a virtual dashboard to monitor, report, manage, and troubleshoot all mobile resources as required.

## INSTANT INTEGRATION

The RV50X is designed to install directly into existing infrastructure. Offering both serial and Ethernet connectivity, it can be used to connect devices like PLCs and RTUs, and transmit a wide variety of protocols like Modbus/DNP3 with ease. RV50X can also be integrated directly into existing management systems via SNMP.

## INTELLIGENCE AT THE EDGE

The RV50X provides an application framework which allows customers to apply intelligence at the edge of the network. The RV50X offers a dual core processor which enhances the performance of edge applications.

## SECURE INDUSTRIAL COMMUNICATIONS

The RV50X supports secure communications to multiple back-end systems by providing up to five concurrent VPN sessions. Remote authentication management allows enterprise-grade systems to manage access to devices in the field. Port filtering and trusted IP protect the devices connected to RV50Xs from unwanted access. Secure signing and authentication of software images offers end-to-end protection of the software upgrade process, protecting the RV50X against unwanted malware.

## RV50X

	North America & EMEA	Asia Pacific
LTE CATEGORY		
Peak D/L		Cat 6
Peak U/L		(Up to 300 Mbps DL) (Up to 50 Mbps UL)
4G LTE	2100(B1), 1900(B2), 1800(B3), AWS(B4), 850(B5), 2600(B7), 900(B8), 700(B12), 700(B13), 800(B20), 1900(B25), 850(B26), 700(B29), TDD B41	2100(B1), 1800(B3), 850(B5), 2600(B7), 900(B8), 850(B18), 850(B19), 1500(B21), 700(B28), TDD 38, TDD 39, TDD 40, TDD 41
3G HSPA/HSPA+	2100(B1), 1900(B2), 1800(B3), AWS(B4), 850(B5), 900(B8)	2100(B1), 850(B5), 800(B6), 900(B8), 1700(B9), 850(B19),
Frequency Bands*	Frequency Bands*	
3G TD-SCDMA		
Frequency Bands*		B39
APPROVALS		
Regular	FCC, IC, PTCRB, R&TTE, GCF, CE	RCM, IRF/JPA, Anatel
Carrier	Verizon, AT&T, T-Mobile USA, Southern Linc, Sprint, US Cellular, Rogers, Telus, Bell	Telstra
PART NUMBERS	1103052	1103045 1103973 (China)

\*For carrier specific band support please refer to the hardware user guide.

## Sierra Wireless

### AIRLINK RV50X

Specification	
<b>HOST INTERFACES</b>	10/100/1000 Ethernet (RJ45) RS-232 serial port (DB-9) USB 2.0 Micro-B Connector 3 SMA antenna connectors (primary, diversity, GPS) Active GPS antenna support
<b>INPUT/OUTPUT</b>	Configurable I/O pin on power connector <ul style="list-style-type: none"> <li>Digital Input ON Voltage: 2.7 to 36 VDC</li> <li>Configurable Pull-up for dry contact input</li> <li>Digital Open Collector Output &gt; sinking 500 mA</li> <li>Analog Input: 0.5-36 VDC</li> </ul>
<b>LAN (ETHERNET/USB)</b>	DNS, DNS Proxy DHCP Server IP Passthrough VLAN Host Interface Watchdog PPPoE
<b>SERIAL</b>	TCP/UDP PAD Mode Modbus (ASCII, RTU, Variable) PPP DNP3 Interoperability
<b>NETWORK AND ROUTING</b>	Network Address Translation (NAT) Port Forwarding Host Port Routing NEMO/DMNR VRRP Reliable Static Route Dynamic DNS Policy Routing Verizon ANTM IPv6 Gateway
<b>VPN</b>	IPSec, GRE, and OpenVPN Client Up to 5 concurrent tunnels Split Tunnel Dead Peer Detection (DPD) Multiple Subnets
<b>EVENTS ENGINE</b>	Custom event triggers and reports Configurable interface, no programming Event Types: Digital Input, Network Parameters, Data Usage, Timer, Power, Device Temperature and Voltage Report Types: RAP, SMS, Email, SNMP Trap, TCP (Binary, XML, CSV) Event Actions: Drive Relay Output
<b>DIMENSIONS</b>	119 mm x 34 mm x 85 mm (94 mm including connectors) 4.69 in x 1.34 in x 3.35 in (3.70 in including connectors)
<b>SECURITY</b>	Remote Authentication (LDAP, RADIUS, TACACS+) DMZ Inbound and Outbound Port filtering Inbound and Outbound Trusted IP MAC Address Filtering PCI compatible
<b>APPLICATION FRAMEWORK</b>	ALEOS Application Framework (AAF) LUA Scripting Language Eclipse-based IDE Integrated with AirVantage® Dual-Core Processing
<b>SATELLITE NAVIGATION (GNSS)</b>	12 Channel GPS and GLONASS Receiver Acquisition Time: 1 s Hot Start Accuracy: <2 m (50%), <5 m (90%) Tracking Sensitivity: -145 dBm Reports: NMEA 0183 V3.0, TAIP, RAP, XORA Multiple Redundant Servers Reliable Store and Forward
<b>NETWORK MANAGEMENT</b>	Secure network management applications available in the cloud or licensed platform in the enterprise data center Fleet wide firmware upgrade delivery Router configuration and template management Router staging over the air and local Ethernet connection Over-the-air software and radio module firmware updates Device Configuration Templates Configurable monitoring and alerting Remote provisioning and airtime activation (where applicable)
<b>GATEWAY MANAGEMENT INTERFACES</b>	ALMS Local web user interface AT Command Line Interface (Telnet/SSH/Serial) SMS Commands SNMP
<b>POWER</b>	Input Voltage: 7 to 36 VDC LTE Idle Power: 900mW (75 mA @ 12VDC) Standby Mode Power: 53 mW (4.4 mA @ 12 VDC) triggered on low voltage, I/O or periodic timer Low voltage disconnect to prevent battery drain Built-in protection against voltage transients including 5 VDC engine cranking and +200 VDC load dump Ignition Sense with time delay shutdown Configurable features and ports to optimize power consumption
<b>ENVIRONMENTAL</b>	Operating Temperature: -40°C to +70°C / -40°F to +158°F Storage Temperature: -40°C to +85°C / -40°F to +185°F Humidity: 90% RH @ 60°C Military Spec MIL-STD-810G conformance to shock, vibration, thermal shock, and humidity IP64 rated ingress protection
<b>INDUSTRY CERTIFICATIONS</b>	Safety: IEC66 Certification Bodies Scheme (CB Scheme), UL 60950 Vehicle Usage: E-Mark (UN ECE Regulation 10.04), ISO7637-2, SAE J1455 (Shock & Vibration) Hazardous Environments: Class 1 Div 2 Environmental: RoHS, REACH, WEEE
<b>SUPPORT AND WARRANTY</b>	Includes 1st Year AirLink Complete: <ul style="list-style-type: none"> <li>AirLink Management Service (ALMS)</li> <li>Direct 24/7 Technical Support</li> <li>3-year standard warranty; optional 2-year warranty extension</li> </ul> 1-day Accelerated Hardware Replacement available through participating resellers
<b>ACCESSORIES</b>	In the Box: DC Power Cable and Quick Start Guide Other Accessories (sold separately): 2000579 AC Adapter, 12V/DC 6000659 DIN Rail Bracket For antenna options visit: <a href="http://sierrawireless.com/antennas">sierrawireless.com/antennas</a>

#### About Sierra Wireless

Sierra Wireless (NASDAQ: SWIR) (TSX: SW) is the leading IoT solutions provider that combines devices, network and software to unlock value in the connected economy. Companies globally are adopting IoT to improve operational efficiency, create better customer experiences, improve their business models and create new revenue streams. Whether it's a solution to help a business securely connect edge devices to the cloud, or a software/API solution to help manage processes associated with billions of connected assets, or a platform to extract real-time data to make the best business decisions, Sierra Wireless will work with you to create the right industry-specific solution for your next IoT endeavor. Sierra Wireless has more than 1,300 employees globally and operates R&D centers in North America, Europe and Asia. For more information, visit [www.sierrawireless.com](http://www.sierrawireless.com).

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