REFTEK
SYSTEMS INC.

WRANGLER-S

SEISMIC RECORDER

Data First

The Wrangler-S expands the Wrangler™ Seismic Data Acquisition ecosystem with a new design that expands on the data first design philosophy that has characterized Reftek recorders for the last 50 years. Data can be recorded in miniSEED or MRF format. The Wrangler-S adds user-friendly features while significantly reducing power consumption. Featuring a high-performance 32-bit A/D with 141+ dB of dynamic range and expanded gain options of 1,2,4,8,16,32 or 64x gain. User selectable resolution option provides for bandwidth optimization with no loss of dynamic range. The integration of an OLED screen makes configuration and confirmation of status possible at a quick glance, while an integrated Wi-FI antenna allows for quick connection to your device's Web Interface (WebUI) through any Wi-Fi enabled PC or phone at a glance through your internet browser.

Reftek Reliability

A fully waterproof enclosure, houses the recorder electronics along with two forms of onboard storage; a removable USB drive - easily user accessible in an independently sealed compartment, and an 8 GB SEEDlink ring buffer attached to the main CPU. All Wrangler ecosystem cables are fully compatible with the Wrangler-S, which is available with 3 or 6 input channels. Each channel connector includes 6 configurable digital sensor control lines and 6 auxiliary sensor data inputs.

Timely Data

The Wrangler-S includes a highly stable temperature-compensated oscillator for time tagging data that can be supplemented with NTP, PTP or GNSS (GPS) timing. The Wrangler S uniquely includes the ability to site a GNSS antenna up to 1000 ft away from the recorder without a repeater or fiber optic conversion of signals. This is advantageous for large structures or when operating underground. The Wrangler is available with simultaneous SEEDlink and RTP telemetry protocols, both of which can connect to multiple destinations for time-critical applications. SEEDlink packets are user adjustable in latency for EEW applications. Smart network timing and triggering features are also available.

BENEFITS

- >141 dB typical (wideband) dynamic range delivers detailed event data, for high-quality scientific analysis
- Ultra low-latency data suited for Earthquake Early Warning systems
- 2" OLED display for status feedback
- Built-in SEEDlink server provides robust data transmission
- 8 GB of dedicated non-volatile memory means a large data transmission ring buffer, just in case a communication outage occurs
- Environmentally protected removable mass storage, makes swapping USB drives effortless
- Small and lightweight for easy backpack deployments
- Low power for operating off of a battery
- Precise and accurate timing
- High-precision TCXO disciplined by an external GNSS receiver
- PTP and NTP compatible.

RELIABLE PERFORMANCE FOR:

- Earthquake Early Warning
- Local and regional broadband seismic networks
- Induced seismicity monitoring
- Aftershock and portable deployments
- Microzonation surveys

SPECIFICATIONS

A/D CONVERTER	
Type	32-bit Delta Sigma A/D converters Configurable 24 and 30 bit output resolutions
Dynamic Range	>141 dB typical (wideband) @100 sps, > 142 dB (0.1 Hz to 40 Hz)
Input Channels	3 or 6
Gain Selection	x1, x2, x4, x8, x16, x32 and x64
Input Full Scale	40 Vpp @ x1 gain
Input Impendance	24 Kohms, 0.002 uFd, differential @ x1, 2x and 4x 1.8 Mohms, 0.002 uFd, differential @ x8, x16, x32 and x64
Sample Rates	4000, 1000, 500, 250, 200, 125, 100, 50, 40, 20, 10, 5, 1, 0.1 sps
Multiple Sample Rates	Supported for rates in the group 1000, 200, 100, 50, 40, 20, 10, 5, 1, 0.1
Sampling	Simultaneous on all channels
FIR Filter	~140 dB down in the stopband

TIME BASE	
Type	GNSS Receiver with Internal Disciplined Oscillator
Accuracy with GNSS	±10 µsec after validated 3-D Fix and Locked
Free-Running Accuracy	0.1 ppm over the temp. range of 0°C to 50°C 0.2 ppm from –20 °C to 0 °C
Alternate Time Sources	PTP or NTP

POWER	
Input Voltage	9–30 VDC
Average Power (3 channels, no communication, no GNSS)	0.64 Watts
Average Power (3 channels, no communication, GNSS duty cycle)	0.67 Watts
Average Power (3 channels, with communication, GNSS duty cycle)	0.85 Watts
Average Power (6 channels, no communication, no GNSS)	0.72 Watts
Average Power (6 channels, no communication, GNSS duty cycle)	0.76 Watts
Average Power (6 channels, with communication, GNSS duty cycle)	0.95 Watts
Low Voltage Disconnect	User-programmable. Additional hardware cut-off fixed at 9.0 Volts
Reset	Resettable via WebUI, Magnet Wand, or external connector pin.

RECORDING	
Format	Miniseed, MRF
Transmission	SeedLink Server, RTP, Jopens 6.0 (Simulcasting)
Trigger Types	Continuous, STA/LTA, Time, External, Cross, Level and Vote (0.0001 to 4g)
Data Products	On-board Calculation of: PGA, PGV, PGD, MMI, PEIS, JMA (email notifications available)
Internal Capacity	8 Gb internal Flash memory data buffer
External Capacity	Removable 8, 16, 32 or 64 GB USB drive

COMMUNICATIONS	
Ethernet	10/100 Base-T, TCP/IP, UDP/IP, FTP, RTP DHCP, Static, Link-Local
WiFi	Access-point mode for local command and control, Intergrated Antenna
WebUI	Accessible via WiFi or Ethernet

AUXILIARY CHANNELS	
Inputs	6 per Channel Connector (3 for Mass Position and 3 auxiliary inputs)
Resolution	16-bit A/D Converter
Full Scale	±10 V Single-ended input mode, ±10 V Differential input mode
Sampling Rate	10, 1, or 0.1 sps

SENSOR CONTROL	
Cal Signal	16-bit DAC
Cal Waveforms	Pre-defined waveforms including Sine, Step, Noise, Swept Sine signals. Custom waveforms can be uploaded bythe user.
Control Signals	6 per channel connector: Including Lock, Unlock, Center, Calibration Enable, Damping, UVW
Automatic Mass Recentering	User settable thresholds, interval & retries
Sensor ID	One-wire

MECHANICAL	
Switch	Magnetic Switch for WiFi & LED wakeup
Size	5.2" W x 8.4" L x 3.5" H
Weight	2.6 lbs
Watertight Integrity	IP67
Humidity	0 to 100%
Shock	Survives a 1 meter drop on any axis
Transportation	Survives MIL-STD-810G transportation test
Screen Display	2.08" OLED 256 x 64 pixels
Operating & Storage Temp	–40°C to 70°C

CERTIFICATIONS	
Compliance	CE, FCC, RoHS