

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
- » Site noise 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 Impedance	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.
Protection	Over-voltage, Reverse-voltage, & surge protection

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, Integrated 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 by the 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

IP68 *with dust caps installed

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