REF TEK
SYSTEMS INC.

WRANGLER

SEISMIC RECORDER

Extreme Data Quality

The Wrangler is REF TEK's latest generation universal broadband seismic recorder featuring a 32-bit A/D performance boost and boasting a large dynamic range.

This enhanced dynamic range enables the Wrangler to record very small vibrations from seismic sensors, providing detailed data for scientific analysis. Available with 3 or 6 input channels, the Wrangler is a universal seismic recorder that works with most seismic sensors available today.

The Wrangler features new generation sensor control functionality, including six digital sensor control lines and an analog output for sensor calibration signals. The Wrangler includes an additional 32-bit A/D which is dedicated for recording the output calibration signal.

Communications

Featuring a Seedlink server, you can set up your system so that it will automatically import Miniseed data straight into your analysis software. The REF TEK Wrangler recorder has a large non-volatile internal memory providing a substantial data buffer for when theconnection is not available, or for when you require historical data from the recorder.

With smart setup options, the REF TEK Wrangler gives you a choice between automatic data transfer of Seedlink data or the option to transmit ultra low latency data for Earthquake Early Warning applications (EEW). For EEW applications simply set up your Wrangler so that it sends data via REF TEK's RTPD software in near real-time to your EEW software resulting in quick decision making when it's necessary.

Simple Web UI

The Wrangler comes with the latest in network technology including an inbuilt Web user interface (WebUI), which allows you to have fully secured command-and-control of the unit either in the field or when you are back in the office, without requiring additional software. Local connection is easily established using Wrangler's built-in WiFi, enabling you to manage the unit directly with a phone or tablet.

BENEFITS

- Greater than 142 dB dynamic range delivers detailed event data, for high-quality scientific analysis
- Ultra low-latency data suited for Earthquake Early Warning systems
- 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
- 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 SAR A/D converters
Dynamic Range	>142 dB @100 sps
Input Channels	3 or 6
Gain Selection	x1 and x64
Input Full Scale	40 Vpp @ x1 gain, 0.625 Vpp @ x64 gain
Input Impendance	26 Kohms, 0.002 uFd, differential @ x1 2 Mohms, 0.002 uFd, differential @ x64
Common Mode Rejection	>90 dB
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 70°C 0.2 ppm from –30 °C to 0 °C
Alternate Time Sources	PTP or NTP
POWER	
Input Voltage	9–30 VDC
Average Power (3 channels, no communication, GNSS duty cycle)	1.4 Watts
Average Power (3 channels, with communication, GNSS duty cycle)	1.7 Watts
Average Power (6 channels, no communication, GNSS duty cycle)	2.0 Watts
Average Power (6 channels, with communication, GNSS duty cycle)	2.3 Watts
Low Voltage Disconnect	User-programmable. Additional hardware cut-off fixed at 9.0 Volts
RECORDING	
Format	Miniseed, MRF
Transmission	SeedLink Server, RTP
Trigger Types	Continuous, STA/LTA, Level, Vote, Time, External and Cros
Internal Capacity	8 Gb internal Flash memory data buffer
External Capacity	Removable 8, 16, or 32 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
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-ended 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, along with playback of user uploaded .wav files
Cal Signal Recording	Additional 32-bit ADC dedicated to recording the calibration output signal
Control Signals	6 per channel connector: Including Lock, Unlock, Center, Calibration Enable, Damping, UVW
Automatic Mass Recentering	User settable thresholds, interval & retries
Sensor ID	Interfaces with REF TEK sensors
MECHANICAL	
LEDs	16 status LEDs including Input Power, GNSS/Time, USB, Acquisition and Link status
Switch	Magnetic Switch for WiFi & LED wakeup
Size	5.2" W x 8.4" L x 3.5" H
Weight	3 lbs
Watertight Integrity	IP68
Humidity	0 to 100%
Shock	Survives a 1 meter drop on any axis
Transportation	Survives MIL-STD-810G transportation test
Operating Temp	–30°C to 70°C
Storage Temp	–30°C to 70°C
CERTIFICATIONS	
Compliance	CE, FCC, RoHS