

## FEATURES

- 24-bit delta sigma A/D converter, 4th generation seismic recorder
- 3 or 6 channels
- Events only telemetry capable
- Earthworm exporter

The SMART Series of instruments represent the logical solution for seismological data acquisition: a common design for a digitizer, portable recorder, and strong motion recorder (the all-in-one solution). The traditional difference between these instruments vanishes, a strong motion recorder can now simultaneously record continuously weak motion data on a large selection of media: up to **240GB hard disks**, **64GB Compact Flash memory**, etc. All units are telemetry ready using the **CD1.1** protocol (with authentication by internal Fortezza cryptocard) or the **Earthworm** protocol. Very low power consumption is supplemented by a complete set of serial and Ethernet communication ports. **The removable and hot-swappable enclosure** has a **USB2.0** port for very fast data download. A **SEEDLink** plug-in is also available.

## THE SMART-SERIES

**MODEL SMART-24D® Digitizer**  
**MODEL SMART-24R® Recorder**  
**MODEL SMART-24B Borehole Digitizer**

Portable version



Borehole version



# SMART-24 SERIES SPECIFICATIONS

## DATA ACQUISITION

<b>Number of inputs</b>	3 or 6 channels
<b>Input type</b>	Balanced differential with transient protection suitable for both passive and active sensors
<b>Input range</b>	5Vp-p, 20Vp-p and 40Vp-p bipolar differential, 2x1 Mohm
<b>Gain</b>	Software selectable: x1, x2, x4, x8, x16, x32, x64
<b>Common mode rejection</b>	Greater than 90 dB
<b>Digitizer</b>	Over sampled 24-bit Delta Sigma ADC with digital signal processing, 1 per channel
<b>Anti-alias filter</b>	Brickwall digital FIR filter, cutoff at 80% of and 130 dB down at output Nyquist frequency. Causal filter optional.
<b>Dynamic range</b>	Up to 138 dB
<b>Intermodulation distortion</b>	Less than -110 dB
<b>Sample rates</b>	1, 5, 10, 20, 40, 50, 100, 125, 200, 250, 500, 1000, 2000 sps primary sample rates
<b>Noise</b>	~1 count RMS at up to 200 sps

## ACQUISITION MODES

<b>Continuous</b>	User selected start time, ring buffer or until storage full
<b>Timed</b>	16 user programmable recording windows
<b>Triggered</b>	Threshold, STA/LTA (updating or non-updating), and external
<b>Pre-event length</b>	Up to 32,768 data samples
<b>Post-event length</b>	Up to remaining data storage
<b>On board memory</b>	192 MB

## DATA STORAGE (SMART-24R® ONLY)

<b>Type</b>	Up to 240 GB hard disk, up to 64 GB industrial grade Compact Flash memory, 1 or 2 partitions
<b>Recording format</b>	Standard FAT32 file system, drives readable directly on a PC, format converters available for 32-bit SUDS, SAC, SEG-Y, SEISAN, MatLab, miniSEED, CSS3.0 and SEED

## INTERNAL RECORDING (ALL VERSIONS)

Option for two PC Card slots for Compact Flash storage, non-removable, accessible by any ftp client.

## TIMING

<b>Accuracy</b>	<±10 microseconds of UTC with GPS lock
<b>Stability</b>	0.5 PPM (when unlocked)
<b>GPS duty cycle</b>	User programmable GPS power on/off cycle times

## INTERFACES

<b>Indicators</b>	Large graphic LCD, protected
<b>Communications</b>	2xRS232, Ethernet, USB2.0 for the removable enclosure
<b>GPS</b>	Dedicated RS-422 serial port
<b>Power</b>	Main power and external battery
<b>Other I/O</b>	5 or 8 12-bit analog inputs, external trigger in/out, 1 PPS in/out
<b>Calibration</b>	Pulse, sine wave, white noise, random binary, step functions, and shorted input
<b>Telemetry</b>	- <u>CD1.1</u> protocol, 4 independent profiles to 4 different IP servers; - <u>Earthworm</u> protocol on 1 profile; - 64MB internal buffer for backfill; - continuous, events only or both

## POWER

<b>Input</b>	10 to 16 VDC
<b>Power consumption</b>	~1 watt average (3 channels @ 100 sps and GPS power cycling)

## PHYSICAL

<b>Construction</b>	Portable rugged molded case or extruded aluminum, all IP67
<b>Size</b>	4.1 in (105 mm) w x 10.35 in (263 mm) l x 13.65 in (347 mm)
<b>Weight (24D only)</b>	8.5 lbs (3.9 kg)
<b>Operating temperature</b>	-20°C to +70°C
<b>Humidity</b>	0 to 100% (IP67)

Removable enclosures

