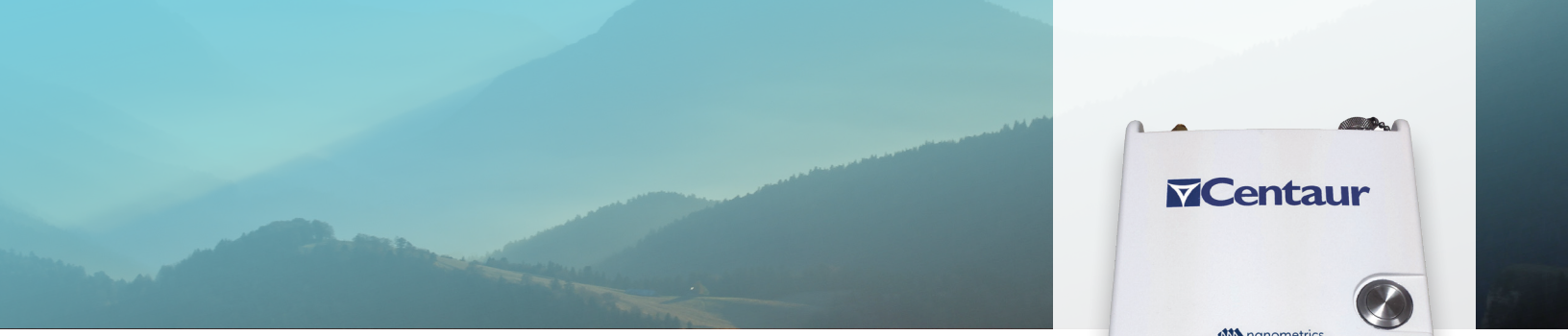

CENTAUR
A TRULY MODERN DIGITAL RECORDER

The best digital recorder on the market just got better

The Centaur is an all-in-one digitizer, recorder, and telemetry instrument with advanced on-board data processing capable of data manipulation and detecting events in the field. Whether your deployment is portable or permanent, standalone or networked, the choice of digital recorder has never been easier.

Exceptional Performance

- True 24-bit performance, 3 channels simultaneously sampled
- Dual sample rates of up to 5000 sps supports high- and low-frequency applications
- Hot-swap SD media card up to 64 GB for gap-free data retrieval
- Onboard 8 GB memory is field-expandable up to 64 GB by adding an internal SD card
- Support for GNSS, PTP (Precision Time Protocol) or NTP time sources and can also act as a timing master
- High accuracy voltage and current source calibration signal generator
- Sensor calibration using fully configurable sine and pseudo random binary waveforms or playback of user defined calibration files

Reliability

- Redundant, fail-safe data archive with field swap capability
- Rugged, waterproof field enclosure for harsh environments, rated for continuous submersion (IP68)
- Excellent protection for ESD & lightning surge

Onboard data processing

- Data backfill in case of communication interruptions
- Fully configurable lowpass, highpass and bandpass digital filtering
- The Centaur with Authentication (models CTR4-3A & CTR4-6A/S) has built-in hardware authentication of CD-1.1 message formats, providing a fully-integrated, compact solution ideally suited for test ban verification regimes
- User configurable onboard 3-D data rotation for orientation correction of Azimuth and tilt rotation

Centaur
CTR4 series

Centaur is ideal for multidisciplinary science involving geophysical sensor applications. Available with 3 or 6 channels, which support sensors such as seismometers, microbarometers, and weather stations.

The extensive configurability is available via a web interface, which also provides real-time state of health and waveform viewing.

TECHNICAL SPECIFICATIONS CENTAUR (CTR4 SERIES)

Specifications subject to change without notice

SENSOR INPUTS

Channels: Available with 3 or 6 channel inputs
Sampling: Simultaneous on all 3 or 6 channels
Resolution: 24 bits per channel, full 24-bit range to clip level
Input voltage range (Peak-to-peak differential):
- 40 V, 20 V, 10 V, 4 V, 2 V, 1 V (standard)
- 10 V, 5 V, 2.5 V, 1 V, 0.5 V, 0.25 V (high-gain)

Input Impedance: 40 kΩ (standard digitizer)
1.8 MΩ (high-gain digitizer)

SENSOR COMPATIBILITY

Sensor Types: Broadband seismometers, short period geophones, and microbarometers
Control Lines: 6 per connector – typically used for calibration enable, mass center, mass lock/unlock, XYZ/UVW select
Sensor Power:
- Supply power pass-through to sensor (9-36 VDC, 1A)
- Over-current and surge protected

Auto Mass Centering: Configurable thresholds, intervals, retries
Serial Interface: Supports digital management of Nanometrics sensors and connectivity to weather stations

DIGITIZER PERFORMANCE & CAPABILITIES

Type: True 24-bit ADC per channel
Accuracy: Nominal gain accuracy within ±0.5%
Dynamic Range: 142 dB @ 100 sps, 135 dB @ 500 sps (full-scale peak to RMS shorted-input noise)
Preamp Gain:
- Standard: 1x, 2x, 4x, 10x, 20x, 40x
- High Gain: 4x, 8x, 16x, 40x, 80x, 160x

Sample Rates: 1, 2, 5, 10, 20, 40, 50, 80, 100, 125, 200, 250, 500, 1000, 2000, 5000 sps
Dual Sample Rates: A second sample rate can be selected from the sample rates above
Decimation Anti-Aliasing Filter:
- Selectable linear phase (noncausal) or minimum phase (causal)
- -140 dB (linear phase) or -120 dB (minimum phase) at Nyquist frequency, 0 dB at 80% Nyquist

Digital Filters:
- User-configurable low-pass and high-pass
- 1st to 5th order, 0.1 mHz to Nyquist
- Different filters may be configured for primary and secondary sample rates and Sensor A and B

Orientation Correction: User configurable onboard 3-D data rotation for correcting azimuth and tilt

RECORDING (CONTINUOUS)

Formats: MiniSEED
Internal Memory: 8 GB internal memory (expandable to 16, 32 or 64 GB)
Removable Media: SD Card up to 64 GB

RECORDING (EVENTS)

Triggers: Bandpassed STA/LTA, threshold
Captured Data: MiniSEED, ASCII
Data Products: Peak Ground Motion (i.e PGA, PGV, PGD) statistics calculated on the instrument

CALIBRATION

Signal Source: 16-bit DAC with 30 ksps output
Calibration Mode
- Voltage source, 1% accuracy from ±10V to ±5mV
- Current source, 1% accuracy from ±30mA to ±30uA

Waveforms: Synthesized sine, PRB signals
Playback user defined calibration files
User controllable amplitude, frequency, pulse width, duration, lead-in and lead-out silence

STATE-OF-HEALTH INPUTS

Channels: 3 singled-ended inputs, ±5 V range, 50 kΩ input impedance
Sampling Interval: Configurable from 1 to 3600 seconds
Accuracy: 18 bits effective resolution

DATA RETRIEVAL

File Transfer: Via Ethernet, optional WiFi or Ethernet-connected DSL, VSAT, cellular, radio
Media Exchange: SD card field-swappable during continuous recording with no loss of data
Response Metadata: Generate and download full digitizer/sensor response files in RESP or Dataless SEED format

DATA STREAMING

Continuous: Seismic data and State-of-Health data
Formats: SeedLink (not available when authenticating), Nanometrics NP, authenticating models have CD-1.1
Events: Triggered event data: email, secure file transfer, other options available

TIMING - GNSS & PRECISION NETWORK TIMING

Timing System: Internal DCXO clock disciplined to selectable timing source
Timing Source: Select from GNSS, PTP (Precision Timing Protocol), NTP or free-running
Timing Server: Serve PTP or NTP time to other Centaur, Titan SMA/EA or Meridian
Timing Accuracy: <5 µsec (GNSS Always on)
<100 µsec (GNSS duty cycled, PTP or local NTP)
GNSS Receiver: Internal 32 channel GNSS receiver
GNSS Power: Selectable: always on, duty cycled or off

LOCAL USER INTERFACE

Removable Media: SD card protected in waterproof media bay
External LEDs: System status, Ethernet link, time quality, media card status, sensor A & B
Buttons: WiFi wakeup, media eject, system shutdown

COMMUNICATIONS

Web-based Graphical UI: Supports standard PC, tablet and mobile devices. Used for waveform and state-of-health monitoring, configuration, maintenance, sensor management and calibration, downloading data and events.

COMMUNICATIONS (CONT'D)

Interfaces: 10/100 Base-T Ethernet, WiFi (optional), Serial via USB (USB unavailable on Authenticating models)
IP Addressing: Static, dynamic (DHCP) or link-local IP
Protocols: UDP/IP unicast/multicast, HTTP data streaming

POWER

Power Supply: 9-36 VDC isolated input
Protection: Electronic resettable fuse design, lightning surge, reverse battery and short circuit protection
Battery Manager: User-configurable low voltage shutdown and restart thresholds

POWER USAGE (TYPICAL)

3 chan. (standard): 850 mW
6 chan. (standard): 1.2 W
Ethernet: Add 0.2 W for 10 Base-T, 0.3 W for 100 Base-T
High Gain: Add 0.2 W for every 3 high-gain channels
Authentication: Authenticating models add 1.2 W if enabled

CONNECTORS

Sensor: 26-pin Mil. circular, shell size 16, female
Power: 3-pin Mil. circular, shell size 8, male
Ethernet: Watertight RJ-45
USB: 2.0 Type A receptacle behind media bay door (USB unavailable on Authenticating models)
GNSS Antenna: TNC (female) with 3.3V supply for active antenna
State-of-Health: 4-pin Mil. circular, shell size 8, female

PHYSICAL CHARACTERISTICS

Housing: Aluminum
Weather Resistance: Rated to IP68 with connectors mated
Humidity: 0 to 100%
Operating Temperature: -20°C to +60°C
(Ultra-low temperature option available. Please contact Nanometrics.)
Storage Temperature: -40°C to +70°C
Weight:2.1 kg (3-channel), 2.2 kg (6-channel), 2.2 kg (CTR4-3A), 2.4 kg (CTR4-6A/S)
Size: 196 mm (L) x 137 mm (W) x 88 mm (H), except CTR4-6A/S which is 196 mm (L) x 137 mm (W) x 93 mm (H)

CENTAUR WITH AUTHENTICATION MODELS: CTR4-3A, 6A/S

Streaming: CD1.1 format
Digital Signature:
Hardware authentication provides
- Digital Signature Algorithm (DSA, SHA-1) and
- Elliptic Curve Digital Signature Algorithm (ECDSA P-256, SHA-256)
- Authentication on Sensor A only

Tamper Detection: Authenticating models have case tamper switch or 3 external switches via SOH connector

Contact a product expert Toll Free: 1 855 792 6776 | sales_mkt@nanometrics.ca

nanometrics

Strategic intelligence fueled by science

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