



GAIACODE

Designs, Manufactures and Deploys
Advanced geophysical event detection
systems.

The **Digital SIGMA** is a compact and robust digital FBA triaxial accelerometer with an exceptional performance, suitable for local and regional recording and for earthquakes engineering applications.



Figure 1. **Digital SIGMA**.

The **Digital SIGMA** is based on a truly rectilinear suspension system. The analogue accelerometer has an extremely large dynamic range and a three channels 24 bit acquisition system is incorporated to exploit the full dynamic range of the sensor.

The low and high gain outputs are set digitally using the (PGA) Programmable Gain Amplifiers of the three channels acquisition system. Nominally the high gain output are set to have a 12 times larger output than

the low gain output. Full-scale low and high gain sensitivity is digitally user-selectable on individual channels of the digitizer.

Technical Specifications.

Sensor:

- Triaxial orthogonal (ZNE) force feedback
- Sensitivity: User-selectable by web interface from $\pm 0.5g$, $\pm 1g$, $\pm 2g$ and $\pm 4g$.
- Dynamic Range: $>150dB$.
- Response: DC to 350Hz. (-3dB point)
- Self noise set by the gain: $0.15\mu m/s^2/\sqrt{Hz}$

Digitiser:

- Resolution: 24 bit per channel.
- Dynamic range: $>134dB@100sps$.
- ADC: Delta-Sigma.
- Channels: 3 independent channels.
- Sample rate: Up to 1000sps, user-selectable: 1, 10, 20, 50, 100, 200, 250, 500, 1000 sps.
- Data Storage: internal 32GB non-volatile, supports more than 100,000 writings.
- Configurable recording modes: Continuous, triggering STA/LTA and threshold for each channel selectable between 0.01% and 100% of full scale.

Control:

- Remote calibration.
- Calibration signal generator: Sine, step, square and pseudo-random.
- Automatic offset correction.

Timing:

- Integrated GPS receiver with internal TCXO oscillator.
- Time base Precision TCXO locked (frequency correction) to GPS without any adjustments.
- NTP (Network Time Protocol).
- External GPS antenna with 10m cable.

Electrical and Power:

- Consumption: <3W.
- Power supply: 9 to 36VDC with reverse voltage, over/under voltage protection.
- All output and digital inputs are transient protected against EMI/RMI.

Physical:

- Pressure jacket material: Hard anodised aluminium, with O ring seals.
- Operating temperature: -20 to 80°C.
- Environmental protection: IP68.
- Humidity: 0-100%.
- Leveling bubble.
- Anchor and legs for leveling.
- Case diameter: 141mm.
- Case height: 161mm.
- Weight: 3.4kg.

Data Outputs:

- Communication: 1x Ethernet 10/100BaseT RJ45, 1x Serial (RS-232), 1x USB 2.0.
- Protocols: SEEDLink, SSH, UDP, TCP/IP (multiple destinations)
- Recording format: PCF and miniSEED.
- Software and web server interface (Google Chrome compatible) for data acquisition, visualization and setup parameters in SITU and remotely.

- Telemetry over modem / radio up to 115 Kbps.
- Real time data streaming via SEEDLink compatible with Seisan, SeisComp and Earthworm; supports up to 2 connections simultaneously.
- Configurable Data output formats and IP ports.
- State-Of-Health (SoH): voltage, internal temperature, humidity, communications, mass position and GPS position and monitoring.

Additional information included:

- Calibration sheet with poles and zeros and other parameters.
- User manual including pin out for all connections.
- All connection cables included.
- 1 year warranty.



Figure 2. Digital SIGMA base.

For more information contact us:

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Specifications are subject to change without prior notice and images are illustrative.