AFFINITY

CAPTURE. PROCESS. DISTRIBUTE.

Our most sophisticated and adaptable digital acquisition system yet

> Low power
> Switchable gain
> Fully interactive, fast user interface
> State of the art timing protocols
> Open development environment
> Remote control of seismometer

Affinity

The Güralp Affinity is a high-fidelity integrated digitiser and network communications unit that provides a convenient and expandable way of connecting analogue and digital instruments to your network.

The Affinity delivers low-power, high-quality digitisation with full 24-bit resolution. Designed for data quality and durability, the Affinity is a stable and robust Linux-powered unit with on-board storage and networking facilities. An advanced module directly controls power supply to peripherals and reports their voltages via state-of-health communications.

Packaged in a rugged, waterproof stainless steel casing, the Affinity is suitable for downhole and borehole deployment, or can be wall mounted for vault applications.

Key features

24-bit channels. Eight-channel
(6 primary, 2 auxiliary)

Exceptionally low noise:
>138dB of dynamic range @ 100 sps

16 environmental multiplexed ADC channels

STA/LTA, level and external triggers

High sampling rates of up to 4000 samples per second

Four (or eight) streams with individually selectable sample rates (continuous or triggered)

UTC time-stamped data using a low-power GPS receiver and state of the art timing protocols e.g. Precision Timing Protocol (PTP)

Multi-user Linux operating system with full network support

Remote configuration with on-board Web server
(HTTP and HTTPS)

Fixed 64 GB onboard storage

Optional external USB storage

Full remote control of digitiser parameters

Full remote control of broadband sensors, including remote lock, unlock and centre, via web server

Supports multiple data formats, including GCF, GDI, miniSEED, CD1.1 and SEEDlink

Built-in calibration signal generator: step, sine or broadband

Fully integratable with a wide range of multi-disciplinary sensors

Mass positions streamed in real-time at high sample rates

Switchable gain for individual channels

Open development environment

Applications

> Earthquake Early Warning Systems
> Multidisciplinary geophysical observatories
> Seismic and microseismic monitoring
> Borehole and posthole installations
> Dense array networks

Affinity

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SPECIFICATIONS

SENSOR INPUTS

Primary digitisation channels	4-channel full 24-bit ADC (3 primary; 1 auxiliary) or 8-channel full 24-bit ADC (6 primary; 2 auxiliary)
Input voltage	Differential input: 40 V peak-to-peak (± 20 V). Also compatible with single-ended inputs: 20 V peak-to-peak (± 10 V)
Optional environmental channels	8 multiplexed environmental channels ±10 V single-ended or 16 multiplexed environmental channels, ±10 V single-ended
Input impedence	113 kΩ

PERFORMANCE

ADC converter type	4th-order, single-bit, low-pass Σ-Δ
Output format	32-bit
Dynamic Range	>138 dB at 100 samples per second
Absolute accuracy	0.5 %
Common-mode rejection	>80 dB

DATA PROCESSING

Output rates available	1 to 4000 samples per second
Highest output capability	20,000 samples per second aggregate
Decimation filters	2, 4, 5, 2x4, 2x5
Anti-alias filters	3-pole
Low pass filters	FIR (other options available)
Out-of-band rejection	140 dB
Data transmission modes	Continuous and triggered
Trigger modes	STA/LTA, level, external, software

TIMING AND CALIBRATION

Timing source precision	<42 µs drift per hour when unsynchronised (without GPS) < 0.1 µs when GPS is connected
Timing sources	GPS, NTP and PTP
Calibration signal generator	Amplitude/frequency adjustable, sine, step or broadband noise

OPERATION AND POWER USAGE

Power supply	9 - 36 V DC*
Power consumption at 12 V DC	
4 channel	1.2 W (no GPS or ethernet)
	1.55 W (GPS with 10 Mb/s Ethernet output)
8 channel	1.5 W (no GPS or ethernet)
	1.85 W (GPS with 10 Mb/s Ethernet output)

Power voltage for operation of this unit only. Connection to additional instrumentation or use of longer cables may result in a higher input voltage requirement.

SOFTWARE PROTOCOLS

Operating system	Linux
Communication technologies supported	RS232, USB, Ethernet (10BASE-T / 100BASE-T) with POE
Internet technologies supported	TCP/IP, PPP, SSH, HTTP, HTTPS (others on request)
	Firewall and routing capabilities

DATA COMMUNICATION

Data recording formats	GCF and miniSEED
Seismic network protocols	Scream (Antelope/Earthworm), CD1.0/1.1, SEEDlink and others
Data storage	Fixed 64 GB onboard storage Optional external USB storage

PHYSICAL/ENVIRONMENTAL

Cold-start temperature range Operational temperature range	-25 to +60 °C -40 to +60 °C
Relative humidity range	zero to 100 %
Enclosure ingress protection	IP68 - protection against effects of prolonged immersion at 3 m depth for 72 hours
Enclosure/materials	Stainless steel cylinder
System weight	5.5 Kg (excluding GPS and cables)
Weight with mounting and carry bracket	6.1 Kg (excluding GPS and cables)
Dimensions - cylinder alone	274 mm × 114 Ø, excluding connectors and cables
Dimensions with mounting/ carrying bracket	304 mm × 160 mm × 130 mm, excluding connectors and cables
Standard accessories pack comprises	GNSS receiver (GPS) with 10 m Cable (10 way to 10 way); 3 m Power Cable (4 way to Pig-tail); 5 m Ethernet Cable (6 way to Ethernet plug 8P8C); 1.8 m GPIO serial console cable (12 way-USB type A plug); RS422 to RS232 GNSS (GPS) adaptor

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