AFFINITY

CAPTURE. PROCESS. DISTRIBUTE.

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.

KEY FEATURES

- > 31-bit analogue-to-digital conversion
- > Option of four or eight primary digitisation channels
- > Ultra-low noise at 139 dB of dynamic range at 100 samples per second
- > 8 or 16 multiplexed environmental channels
- > Fully interactive, fast user interface
- > State of the art timing protocols
- > On-board Web server (HTTP and HTTPS) for full remote configuration of digitizer parameters and broadband sensors
- > Supports DSA data authentication scheme

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.

AFFINITY DIGITISER AND NETWORK COMMUNICATIONS UNIT
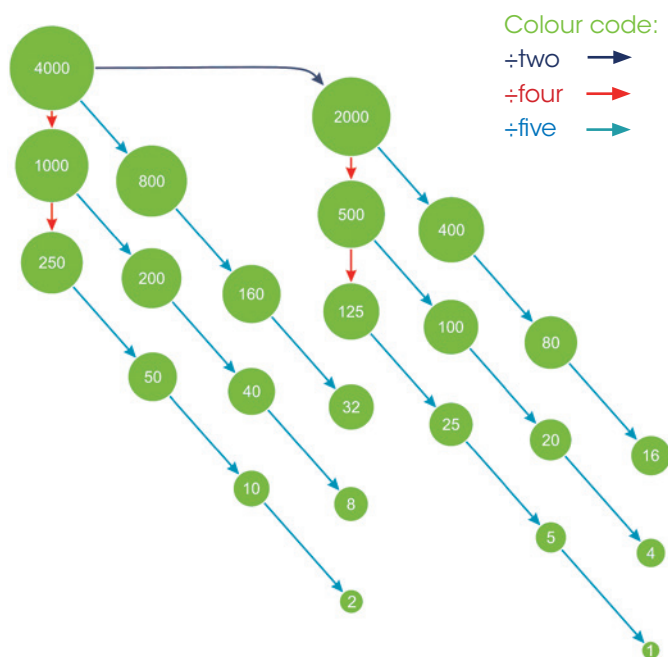
REMOVABLE LIFTING AND MOUNTING BRACKET

274 mm

The Affinity delivers high-quality digitisation with 31-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.

For applications where data verification is critical the Affinity also supports Digital Signature Algorithm (DSA) scheme data authentication.

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

Sample rates and decimation

The Affinity has a simple decimation model which uniquely maps each output sample rate to a single filter chain configuration. The available output rates are shown below:

Colour code:
÷two ⟶
÷four ⟶
÷five ⟶

Key features

Four, low-noise, 31-bit analogue-to-digital conversion (ADC) channels (three primary plus one auxiliary)

An eight-channel version (six primary plus two auxiliary) is also available

Ultra-low-noise: 138 dB of dynamic range at 100 samples per second

8 or 16 environmental multiplexed ADC channels

Triggering/events subsystem capabilities including STA/LTA, level (threshold), software triggers, per-channel voting and peer-to-peer network voting

Four concurrent output sample rates up to 4,000 samples-per-second

UTC time-stamped data using a low-power GNSS receiver and state of the art timing protocols, Precision Time Protocol (PTP) and Network Time Protocol (NTP)

Multi-user Linux operating system (Platinum) with full network support

On-board Web server (HTTP and HTTPS) allows full remote configuration of digitizer parameters and broadband sensors, including remote lock, unlock and centre

Fixed 64 GB onboard storage with additional connection for external USB storage

Records in GCF and miniSEED

Supports DSA scheme data authentication

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

Fully integratable with a wide range of multi-disciplinary sensors

Specifications independently verified by Sandia Laboratories

Applications

> Multidisciplinary geophysical observatories
> Seismic monitoring
> Borehole and vault installations
> Dense array networks

Affinity

güralp

SPECIFICATIONS

SENSOR INPUTS	
Primary digitisation channels	4-channel 31-bit ADC (3 primary; 1 auxiliary)or 8-channel 31-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.
Anti-alias filters	3-pole
Low pass filters	FIR (other options available)
Out-of-band rejection	140 dB
Data transmission modes	Continuous
Triggered data	Retrievable using event t able in the Affinity web page. User selectable pre and post event time.
Trigger modes	STA/LTA, level (threshold), 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	GNSS, PTP and NTP
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)
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, GDI-Link 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, GLONASS, BeiDou, Galileo) 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

In the interests of continual improvement with respect to design, reliability, function or otherwise, all product specifications and data are subject to change without prior notice.

DAS-AFT-0001 Issue D