





#### APTURE. PROCESS, D STRIBUTE.



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**

- > Option of four or eight primary digitisation channels
- > Ultra-low noise at 138 dB of dynamic range at 100
- > 8 or 16 multiplexed environmental channels
- > State of the art timing protocols
- > On-board Web server (HTTP and HTTPS) for full remote configuration of digitizer parameters and broadband sensors
- Supports ECDSA 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.



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 Elliptic Curve Digital Signature Algorithm (ECDSA) scheme data authentication.

### 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:



#### Applications

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

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.

#### 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 samplesper-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 ECDSA 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

# Affinity



## 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 ( $\pm$ 20 V). Also compatible with single-ended inputs: 20 V peak-to-peak ( $\pm$ 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 $\Sigma$ - $\Delta$
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	$<\!\!42\mu s$ drift per hour when unsynchronised (without GPS)
	$< 0.1 \mu s$ 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	2
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.

Т

Güralp Systems Limited Midas House Calleva Park Aldermaston Reading RG7 8EA United Kingdom

+44 118 981 9056

F +44 118 981 9943 E sales@guralp.com

www.guralp.com

SOFTWARE PROTOCOLS Operating system Linux Communication technologies RS232, USB, Ethernet (10BASE-T / 100BASE-T) supported Internet technologies supported TCP/IP, PPP, SSH, HTTP, HTTPS (others on request) Firewall and routing capabilities DATA COMMUNICATION Data recording formats GCF and miniSEED Scream! (Antelope/Earthworm), CD1.0/1.1, SEEDlink, GDI-Link and others Seismic network protocols Data storage Fixed 64 GB onboard storage Optional external USB storage Data authentication Elliptic Curve Digital Signature Algorithm scheme data authentication PHYSICAL/ENVIRONMENTAL -25 to +60 °C Cold-start temperature range -40 to +60 °C Operational temperature range Relative humidity range zero to 100 % IP68 - protection against effects of prolonged Enclosure ingress protection immersion at 3 m depth for 72 hours Enclosure/materials Stainless steel cylinder 5.5 Kg (excluding GPS and cables) System weight Weight with mounting and carry 6.1 Kg (excluding GPS and cables) bracket Dimensions - cylinder alone 274 mm  $\times$  114 Ø, excluding connectors and cables Dimensions with mounting/  $304 \text{ mm} \times 160 \text{ mm} \times 130 \text{ mm}$ , excluding carrying bracket connectors and cables Standard accessories pack 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 comprises 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.

