güralp

MINIMUS

CAPTURE. PROCESS. DISTRIBUTE.

> Ultra compact and low-power digitiser
> Compatible with analogue seismic or geophysical sensors
> Advanced software communications for quick and easy instrument and data management
> Hot-swappable and dual-redundant microSD storage
Choose from GPS, GLONAS or BeiDou precision timing sources
> Optional low-latency mode for Earthquake Early Warning

Minimus

The Güralp Minimus is a small, portable, 24-bit, four-channel digitiser packed with a host of features that make it the ideal plug-and-play solution for rapid deployments.

MINIMUS DIMENSIONS:

MINIMUS PROFILE SHOWN ACTUAL SIZE

MINIMUS SIMPLIFIES REMOTE GAIN SELECTION ON THE FORTIS

Multidisciplinary functionality with simple instrument and data management.

The Minimus can simultaneously accommodate an analogue seismic sensor; an infrasound input for capture of airborne shock; a digital Radian posthole or borehole feed; and its own internal MEMS accelerometer (2g - 16g selectable).

Integrated network connectivity allows the Minimus to be controlled remotely using Discovery, our proprietary software platform, or via a standard web browser. Discovery allows the user to identify the instrument IP address via a Cloud registry server without the need for static IP addresses.

Discovery also allows for simpler instrument and data management with access to hardware State-of-Health (SoH); data streaming; GPS location; response and calibration parameters.

For added confidence in the field, Güralp Vü, a Bluetooth App, displays waveforms, orientation, temperature and humidity data, for instant checking of installation integrity.

Key features

- 24-bit, four-channel digitiser
- Compact form measuring 99 mm × 136 mm × 39 mm and weighing just 0.61 kg
- Compatible with all analogue seismic sensors with voltage output
- Internal 2 g - 16 g MEMS accelerometer
- Simultaneously accommodate infrasound sensor and digital feed from Radian posthole or borehole
- Identification of IP address via Discovery and Cloud registry server
- Remote instrument and data management via Discovery
- Bluetooth Android App for installation integrity checking
- Low-latency mode for Earthquake Early Warning - ADC conversion and causal filtering in 6 µs, transmission using GDI protocol in < 1 ms (network dependent)
- Hot-swappable data storage and dual-redundant microSD cards
- Select from GPS, GLONAS or BeiDou precision timing sources
- Scream!™ compatible

Versatile streaming and filtering options.

Users can select sample rates of up to 5000 samples per second with the option to simultaneously stream multiple sample rates in addition to the recording rate.

Data is locally recorded in miniSEED (with metadata stored in dataless SEED format) and can be streamed in realtime using GCF (Scream!) or GDI format (Platinum).

For Earthquake Early Warning applications, the Minimus has a low-latency mode running causal filters alongside traditional acausal filters. ADC conversion and causal filtering is achieved in 6 micro-seconds, meaning network transmission using GDI protocol is achieved in less than 1 milli-second (network dependent).

Data storage is hot-swappable for uninterrupted data retrieval with dual redundant microSD cards to ensure data integrity.

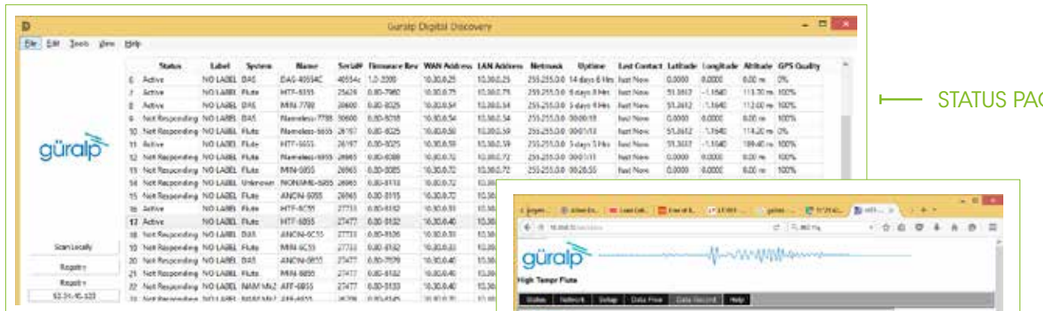
Encased in an environmentally sealed, hard anodized aluminum casing, the Minimus has an internal moisture sensor to alert you to any moisture ingress.

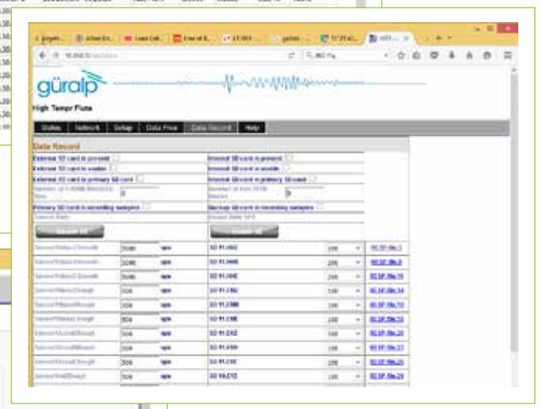
Applications

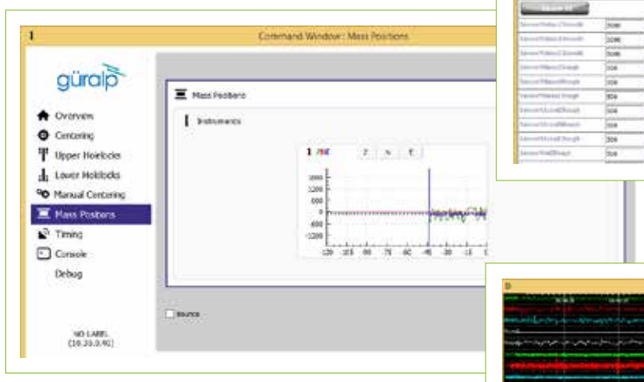
> Earthquake Early Warning Systems
> Volcanology
> Multi-scale seismic networks
> Structural health monitoring
> Hydrocarbon exploration
> Permanent reservoir monitoring
> Induced seismicity detection
> Explosion monitoring

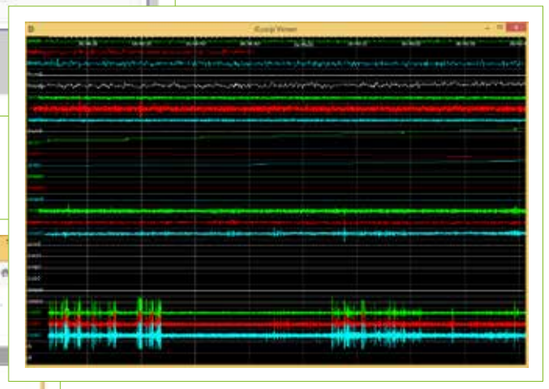
Minimus: Güralp Discovery Software

- Identify instrument IP address
- Access to hardware State of Health
- Select from GPS, GLONAS or BeiDou precision timing sources
- Data streaming control
- Response and calibration parameters
- Access instrument RESP (dataless SEED files)



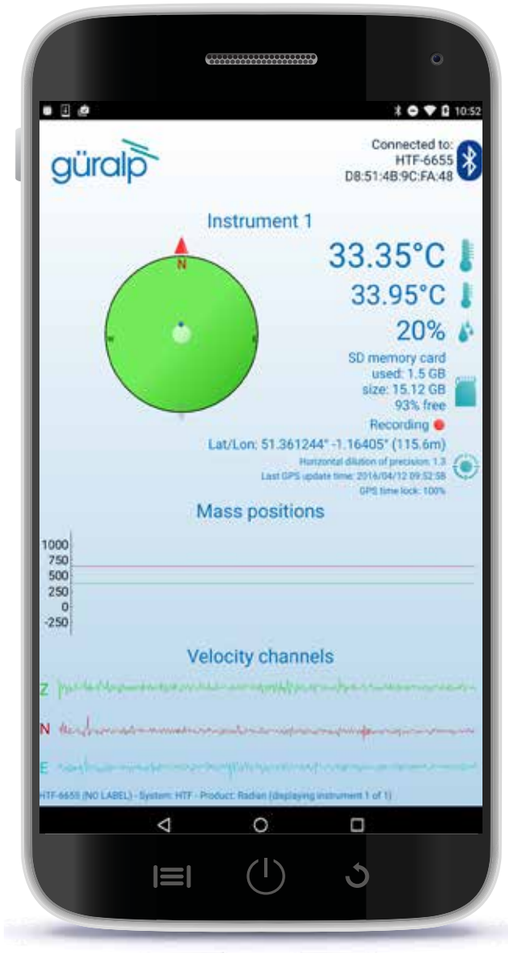






Minimus: Güralp Vü Bluetooth App

For efficient field deployments, Vü allows you to check the integrity of your installation instantaneously. Vü displays waveforms, orientation, temperature and humidity data without instrument disturbance.



Minimus

SPECIFICATIONS

SENSOR INPUTS	
Primary digitisation channels	Eight at 24 bits. 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	Three channels, ±10 V single-ended
Input impedence	6 kΩ
PERFORMANCE	
ADC converter type	Delta-sigma
ADC conversion delay	6 µs
Output format	32-bit
Dynamic Range	>128 dB at 100 samples per second
Gain drift	3 ppm / °C
Common-mode rejection	>110 dB
DATA PROCESSING	
Output rates available	1 sample per hour to 5000 samples per second, user-selectable
Decimation filters	÷2, ÷3, ÷4, ÷5 Causal / Acausal
Out-of-band rejection	>170 dB
Data transmission modes	Continuous and triggered
Trigger modes	STA/LTA, level
Selectable gain	Unity, ×2, ×4, ×8, ×12
TIMING AND CALIBRATION	
Timing source precision	Accuracy when GPS locked ±50 ns typical Accuracy when unsynchronised (without GPS) <1 ms per day
Timing sources	GPS, GLONAS, BeiDou, NTP (Network Timing Protocol)
Calibration signal generator	Sine, step or broadband noise, all with adjustable amplitude and frequency
OPERATION AND POWER USAGE	
Operating temperature	-20 to +80 °C
Relative humidity range	zero to 100 %
Power supply	9 - 36 V DC
Power consumption at 12 V DC	0.96 W (no GPS or Ethernet) 1.68 W (GPS with 10 Mb/s Ethernet output)
SOFTWARE PROTOCOLS	
Communication technologies supported	RS232, USB, Ethernet (10/100/1000BASE-T) with POE
Internet technologies supported	TCP/IP, HTTP, UDP
DATA COMMUNICATION	
Data recording formats	miniSEED (metadata stored in dataless SEED format)
Data streaming protocols (via Ethernet)	GCF (Scream!) and GDI-link (metadata sent in RESP / dataless SEED file formats)
Flash memory and storage	250 GB field-swappable microSD card flash storage (dual-redundant).

PHYSICAL CHARACTERISTICS	
Casing type	Environmentally sealed, hard anodised aluminium
Environmental sensor	Humidity and temperature
Weight	0.61 Kg (disconnected)
Dimensions	99 mm × 39 mm × 136 mm
Connector type	MIL-C-26482 Series 1: Analogue - 26 way Ethernet - RJ45 Power - 4 pin Digital - 10 pin GPS - 14 pin
Environmental protection	IP68 to 3 metres
Minimus package includes	Power cable, Ethernet cable and GPS/GLONAS/ BeiDou receiver

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