

NEXT GENERATION

BROADBAND ACQUISITION SYSTEM

TAU T - 8CH - 24R MK1

TAU T - MK1 high resolution digitizer measures 100mm by 500mm by 185mm as an 8-channel high resolution scientific digitizer.



TAU T - MK1 can be effectively used in permanent or short term multidisciplinary scientific experiments such as:

- Single or large scale seismic networks
- Earthquake Early Warning Systems (EEWS)
- Volcanology
- Infrasound array networks
- Structural health monitoring
- Applications where “Seismic-Switch” is required
- Hydrocarbon exploration
- Permanent reservoir monitoring
- Induced seismicity detection
- Explosion monitoring
- Borehole seismology
- Vertical seismic profiling
- Cross hole seismic experiment
- Micro-seismic monitoring
- Strain-Gauge experiments

The main design principle of the digitiser is to be used as high resolution acquisition digitiser and also to measure and control all aspects of Multidisciplinary Seismic Station activities.

In addition to the 8 high precision 24 bit digitiser channels, there are a further 6 analogue input channels to monitor the station parameters or activities.

The product specifications and the stated data are subject to change without prior notice.

TAU generates two separate streams of data, one based on FIR “a-causal” filter while the other stream is based on Causal filter. In addition to the acausal and causal filter outputs, a separate Low Latency Data LLD is also transmitted with minimum latency, as small as 0.1 Seconds for 100 s/s LLD stream. The LLD applies to 6 channels of 8 channel analogue inputs of TAU digitiser.

TAU Digitiser can output the following user selectable sample rates: 1,2,5,10,20,40,50,100,125,200,250,500,1000. FOUR (4) different sample rates per channel can be outputted concurrently. This feature allows the digitiser to be deployed for multidisciplinary Seismic applications.

The digitizer 8 channels inputs have adjustable gain stage PGA providing versatile high dynamic range analogue input stage. Each Channel PGA gain can be GAIN controlled independently. The 4th channel of the digitiser is connected to the

Digitiser calibration signal. This channel measures accurately the calibration signal outputted from the digitizer as the sensor calibration signal.

Many software packages are available to monitor, display and store TAU data. Examples of software packages that can be used are:

- Earthworm
- SWARM
- SEISGRASM2K
- SeisComp3/4
- jAmaseis
- **GaiaCode software Packages: PC based,**
 - Sensor and/or digitiser Configuration-Control
 - MiniSeed Data Storage
 - Gaia format & Low latency Data
 - Data Display

CONNECTOR OPTIONS AND CONFIGURATIONS:



The digitizer is offered with different types of connectors including Mil Spec compatible with MIL-C-26482 specifications as shown.

The digitizer is also delivered with waterproof GaiaCode “D” design low-cost waterproof connectors. The enclosure is waterproofed with “O” ring seals, can be inserted at a depth of 2 meters of water.

In both connector arrangements the SD storage card can be removed with ease as the SD Card is slotted behind a sealed removable aperture.



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TECHNICAL SPECIFICATIONS

Analogue Input: 8 independent Channel 24 BIT data inputs. All inputs are Differential with transient protection. ± 20 V standard, (40V PP).

Options: 40 V,20 V,10V,5V,1V without (PGA). Other options are available depending on signal source characteristic.

Analogue Input Impedance: 51 K Ω , Other options are available. With 1 Pole Low-Pass antialiasing Filter.

Configurable Preamplifier (PGA): Gain settings *1, *2, *4, *8 *12. Each channel independently controlled.

Analogue Input Signal Source:

- Active broadband seismometers,
- Electromagnetic seismometers: (Short period-Geophones),
- Rotational seismometers, Microbolometers, Strain Stress sensors. Multidisciplinary-sensors.

The spare input channels can be allocated to either broad band sensor or other sensors requiring high resolution measurements.

Can be used for High resolution tilt meters and Infrasound sensors.

Suitable to digitise Broadband velocity sensor mass position outputs.

State of health signal Inputs: Up to 9 further analogue input Channels are available. Full scale ± 20 V standard. Selectable sample rates.

Digital Inputs/Outputs:

CAN Bus: Control Area Network (CAN) Allows communication without a Host computer. Many digitizer modules can be connected in series for array network.

RS232 Serial input: Control and acquire digital data. Interface to e.g.: Weather stations, digital infrasound sensors, digital strain/stress gauges.

Logic Control Lines: Calibration enable, Lock--Unlock—Center

Independent latching relays: Used to switch (ON-OFF) Machinery, as a Seismic Switch.

Analogue Output Signal Source.

24 bit buffered output DAC with adjustable amplitude.

Wave forms: Square, Sine, Step, Pulse with duty cycle and frequency control and Pseudo random signals. Generated with an internal synthesizer.

Operational Performance: Independent 8 24-bit Delta Sigma Digitizer.

Dynamic Range:

Sample rate: 1K Hz: -122.2dB, at:100 Hz: -134.5 dB, at: 10 Hz -138.4dB. (Full scale P-P to RMS Shorted input Noise)

Gain Accuracy: $\pm <0.5\%$, each channel calibrated.

Sample rates: User selectable sample rates: 1 2,5,10,20,40,50,100, 125,200,250,500,1000. Four separate same rates are available concurrently.

Decimation Filter Options: Causal (minimum phase) and a-causal (linear phase) filters, Applicable to all the sample rates and concurrently available. Four separate same rates are available concurrently and can be mixed with Causal and a-causal output options.

Digital filters: User selectable, high pass and band pass digital filters.

DATA STORAGE

Format: MiniSEED and PCF (Proprietary data Format)

Internal Memory: 8 G Byte

Removable Media: SD Card 32 G Byte.

TRIGGERS:

Threshold trigger with high-pass filter. User selectable high pass filter.

STA/LTA: Band passed ratio-metric trigger. Concurrently available in addition to continuous data streams.

PHYSICAL:

SD card, removable, behind a waterproof storage cavity.

LED Indicators: TCP/IP activity.

Time Synchronization

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Time Source: GPS, GNSS, NTP or internal source.

GPS: Maximum 50 meters cabling.

NTP: NTP option software selectable.

Timing Accuracy: $\pm < 80$ Nanoseconds

GPS Unit: External GPS Receiver with RS232 Interface, 1 pps output. Powered through digitizer, 9 to 36 Volt Operation.

Format: NMEA

USER INTERFACES:

Available interfaces: 10/100 Base-Ethernet, USB, Serial.

IP Addressing: Static, dynamic (DHCP) or local IP.

Protocols: UDP/IP unicast/multicast.

Power Supply: +9 - +36 V DC, Galvanically Isolated analogue input stage. Polarity protected, over voltage protection with transient suppression.

Power Consumption: 1.5 W with max 1000sps and TCP/IP. <1 Watt without TCP/IP No communication.



PHYSICAL CONNECTION:

Analogue sensor: Male 26 Way. Mil.circular/
Shell size: 16

Power Connector: Male 10 Way. Mil. circular/
Shell size: 12. Also used for USB and Serial coms.

GPS Connector: Female 10 Way. Mil. circular/
Shell size: 12

Ethernet Connector: RJ-45, Gaiacode Connector.

Mechanical Parameters

Enclosure: Anodized Aluminum and engineering plastics.

Humidity: 0 to 100%

Rated to IP 68 with potted and mated connectors.

Operating temperature: -20 to 80 °C

GPS temperature specification: -40 to 80 centigrade.

Weight: 1.2 Kg

Dimensions: 185mm*100mm*50mm.

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