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GSR-24 Seismic Recorder / GSD-24 Seismic Digitiser

Features

- **Standard 2 GByte Removable Memory**
- **24 Bit Digitiser**
- **Bandwidth to 80 % of Nyquist**
- **Highest Dynamic Range**
- **GPS Time Receiver (Option)**
- **Continuous Data Stream Output**
- **On-Line Diagnostics and Self Checking System**
- **Quick Installation**
- **Sets New Standard in Price for 24 Bit Technology**

Outline

The GSR-24 Seismic Recorder is a high performance velocity and acceleration acquisition system. In combination with the Radio Telemetry Interface and the acquisition facilities a complete solution is now available on the market for seismic profiling, after shock studies, noise measurements and single station micro seismic networks.

Featuring the latest industrial standard 24 Bit high resolution digitiser the GSR-24 records signals over 132 dB dynamic range making it one of the most accurate and flexible portable recorders available on the marketplace. This highest performance allows to acquire micro seismic, broad band and strong motion signals in a single field unit.

The standard GSR-24 recorder allows 3 signals from either seismometers, accelerometers or geophones to be acquired using a three component 24 Bit Digitiser, a Control Card, a GPS receiver, a CPU and flash memory. The GSR-24 has a digitiser line output.

A separate Digitiser GSD-24 is available, which has the same features as the GSR-24, but no memory and therefore no recording facilities.

The line output from the GSR-24/GSD-24 is available for connection to a radio transmitter. This enables continuous data transmission back to base and at the same time as back up continuous recording.

A comprehensive package of advanced, windows-based analysis software is available. GeoDAS is included with the GSR-24 and can be used on-site for a first impression of the recorded data. SEISLOG is included in the Seismic Data Acquisition System consisting of a Laptop or PC and is the base of the recording function for the GSD-24. SEISLOG allows also the graphical display of the recorded data.

With the GeoDAS Data Analysis Package and SEISAN, we provide two dedicated analysis programs for earthquake and civil engineering as well as for seismologist.

The GSR-24 Seismic Recorder is the ideal compact and most cost effective 24 Bit approach.

Specifications GSR-24 Seismic Recorder / GSD-24 Seismic Digitiser

Set-up and Configuration
All the necessary parameter and configuration settings are selectable with the easy-to-use GeoDAS Windows program. The configuration of the GSR-24 is stored in an internal EEPROM which secures the configuration set-up independent of any backup battery requirements.

SEISLOG
The GSR-24/GSD-24 can be used as a seismic digitiser providing 1 second packaged data for direct recording in a PC running the SEISLOG software from Bergen University.

Data Analysis
The GeoDAS program provides basic time history data evaluation in the field. The GSR-24 supplies data in binary format or as ASCII files. The GeoDAS Data Analysis Package covers the requirements of detailed laboratory analysis for most earthquake and civil engineering applications. Any customary evaluation software package can of course be used as well.

Sensor
Various sensors suitable to your application are available. All sensors are housed in a compact case and easy to install and to level.

Güralp CMG-40T-1 1 second Seismometer

Frequency Response:	1 Hz to 80 Hz
Velocity output:	2 x 1000 Vs/m

Güralp CMG-5T Force Balance Accelerometer

Frequency Response:	DC to 100 Hz
Acceleration output:	+/- 2, 1, 0.5, 0.1 g
Dynamic range for 2 g F.S:	> 140 dB (0.005 to 0.05 Hz) > 127 dB (3 to 30 Hz)

Anti Aliasing Filter

Filter response type:	FIR Brickwall
Attenuation:	> 130 dB above Nyquist
Filter equation:	contact GeoSIG
Channel to channel skew:	Zero

Digitiser

Type:	3-Channel 24-Bit Sigma-Delta ADC
Dynamic Range:	132 dB @ 50 SPS 130 dB @ 100 SPS 128 dB @ 200 SPS
Resolution (peak to peak Noise)	21.9 Bit @ 50 SPS 21.6 Bit @ 100 SPS 21.2 Bit @ 200 SPS
Sampling rates:	50, 100, 200 SPS per channel
Bandwidth:	40 % of sampling rate
Input range:	±2.5 V or ±10 V DIFF
Type:	differential input
Channel to channel isolation:	127 dB

Data Recording

Pre-event-Time:	1 to 122 seconds (50 SPS) 1 to 66 seconds (100 SPS) 1 to 33 seconds (200 SPS)
Post-event-Time:	1 to 100 seconds

Triggering

Level Triggering

Lower band limit:	Drift compensated
Range:	0.01 to 100 % of full scale

STA/LTA Triggering

STA-Base:	0.1 to 10 seconds
LTA-Base:	1 to 100 seconds
STA/LTA-Ratio:	1 to 60 dB

On-Board Memory Card

Type:	Compact Flash
Recording time:	29 minutes per 2 MByte (@ 3 channels, 200 SPS)
Size:	2 GByte

Removable Memory Card (Standard)

Type:	Compact Flash (PC compatible without additional software)
Size:	2 GByte

Power Supply

Type:	Switched power supply
Internal battery:	Rechargeable, 12 VDC, 7.2 Ah Lead battery
Power consumption:	75 mA @ 12 VDC
Autonomy:	2 days
Charger:	90 - 260 VAC External Power Supply

Time Base

Standard clock accuracy:	20 ppm (10 min/year @ - 10 °C to + 50 °C)
External time interfaces:	GPS

Indicators

Green:	AC Power LED
Green:	Run/Stop LED
Yellow:	Event/Memory LED
Red:	Warning/Error LED
LCD display:	User selectable choice of display Parameters

Communication

Serial ports:	2 (1 for communication / continuos data stream, 1 for GPS)
Baud rates:	2400, 9600, 19200, 38400, 115200
Communication protocol:	TG protocol
Protocol securities:	Checksum and software handshaking
Communication:	PC/RS-232 port or modem
Modem operations:	Auto Dial

Environment / Housing

Operational temperature:	- 20 °C to + 70 °C
Storage temperature:	- 40 °C to + 85 °C
Humidity:	0 to 100 % RH (non condensing)
Type:	Aluminium housing
Size:	280 x 180 x 100 mm
Weight:	7.2 kg (incl. battery)
Protection:	IP65 (NEMA 12)
Housing Options (Large Housing with Handles):	
Size:	330 x 230 x 180 mm
Weight:	~10 kg (incl. battery)
Protection:	IP66 (optionally IP68)

TCP/IP Communication Option
Using a RS-232-TCP/IP device server, GSR-24 can be seamlessly integrated in a TCP/IP computer network for instrument setup and data acquisition. Doing so each GSR-24 can be assigned a unique IP Address.

Self Test
Permanently active, self monitoring and user selectable, periodical system test including comprehensive sensor, memory, filter, real time clock, battery level and hardware tests.

Seismic Switch / Warning Unit Option
The GSR-24 warning option provides four independent warning / error outputs (relay contacts) based on user selectable criteria. This option allows to configure the GSR-24 as a seismic switch.

Alarms:	2 relay contacts
Alarm levels:	0.1 to 100 % of full scale (User programmable)
Relay Hold-On:	1 to 60 seconds (User programmable)
Capacity:	The contacts are suitable for a low voltage control. In case large load must be switched then external relays should be implemented.
Max voltage:	125VAC / 125 VDC
Max current:	250 mA

Interconnection Capabilities
GeoSIG offers various interconnection options to achieve Common Time, Common Trigger and Communication networks. Please refer to relevant documentation under "Strong Motion Instrument Networks".