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# GeoSIG

ISO 9001 certified

# GSS-24 / 18 / 16 / 12 Multichannel Data Acquisition System

## Features

❐ **Ready to implement Newest Communication Technologies: Configuration with Global System Mobile (GSM) communication shown on the right**

❐ **From 3 up to 12 Channel Data Acquisition**

❐ **From 1 up to 4 Triaxial Digitiser/Recorder Modules**

❐ **Available for 12 Bit, 16 Bit, 18 or 24 Bit**

❐ **LED and LCD Status Indication**

❐ **On-Line Surveillance, Diagnostics and Self Checking System**

❐ **Detailed Analysis Tool with dedicated GeoDAS Data Analysis Package Module**

❐ **Extremely Wide Application Field, Complete Versatility**



## Outline

The GSS is a 3, 6, 9 or 12 channel data acquisition system, which can be equipped with 1 up to 4 triaxial 12, 16, 18 or 24 Bit digitiser/recorder modules. Several sensors can be used like seismometers, geophones, accelerometers or other sensors having a voltage or current output. One sensor can be mounted internally, whereas up to four sensors can be connected externally.

The GSS stores the event data in battery-maintained static CMOS RAM or ATA compact flash memory card. Frequency response depends on the sampling rate chosen. The instrument has several digital low pass filters which may be chosen from a menu during set-up.

During normal operation the GSS continuously amplifies, filters and converts sensor inputs to digital form and passes these to a pre-event memory. When the specified triggering criteria have been met, the instrument begins recording the data from the pre-event memory. By selecting the correct length of the pre-event memory, the operator can ensure that the entire event, including the first arrival, will be recorded.

Trigger algorithms include Short Term Average (STA) to Long Term Average (LTA) ratio triggering and level triggering. The (STA/LTA) ratio trigger computes the short term and long term signal averages fifty times per second (every 0.02 seconds). When the STA exceeds a pre-selected multiple of the LTA, the GSS begins recording data. The level trigger continuously compares the incoming signal to a selected threshold and triggers when its value exceeds the threshold. The triggering parameters and set points are set by the menu driven set-up program GeoDAS.

Recorded data include the sensor data, clock/timing information and instrument set-up information. Data are stored in CMOS static RAM memory with power maintained by internal and/or external batteries or on-board Flash Memories.

The GSS can be configured by connecting a personal computer with an RS-232 communications port. Use of a portable computer enables the operator to both set-up the unit and to perform a complete in-the-field check of the system from the sensor to the data storage memory. Access to recorded data is also possible via computer connection. High-speed communication (up to 115200 Baud) capability allows data to be extracted very quickly.

With the communication software program, running on any IBM compatible personal computer, set-up and retrieving of recorded data is performed. Set-up and data access may also be accomplished remotely through the use of modems.

# Specifications GSS-24 / 18 / 16 / 12

**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 **GSS** are stored on internal EEPROM which secure the configuration set-up independent of any back-up battery requirements.

**Data Analysis**
The **GeoDAS** program provides basic time history data evaluation in the field. The **GSS** supplies data available 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 in trade evaluation software package can of course be used as well.

**Sensor**
The sensors are housed in a compact case with a single bolt mount, easy to install and to level with three levelling screws. Also available as a standard option is a current loop interface (0 to 20 mA) for signal transfer over long distances as well as a gain selection to expand the signal range.

**AC-63 Force Balance Accelerometer**
| | |
|---|---|
| Frequency Response: | DC to 100 Hz |
| Largest signal: | ± 2 g Std. (± 1, ± 4 g optional) |

**AC-23 Geophone-based Accelerometer**
| | |
|---|---|
| Frequency Response: | 0.2 Hz to 50 Hz |
| Largest signal: | ± 2 g Std. (±1, ±0.5, ±0.2 g optional) |

**CMG-5T Güralp™ Accelerometer**
| | |
|---|---|
| Frequency response: | DC to 100 Hz |
| Largest signal: | ± 2 g |

**VE-23 Velocity Sensor**
| | |
|---|---|
| Frequency response: | 4.5 Hz to 315 Hz |
| Largest signal: | ± 100 mm/s |

**VE-13 Velocity sensor**
| | |
|---|---|
| Frequency response: | 1 Hz to 315 Hz |
| Largest signal: | ± 100 mm/s |

**Digitizer**
| | |
|---|---|
| A/D Converter: | 12 Bit, 16 Bit, 22 Bit, 24 Bit |
| Least significant bit: | 0.025 % of full scale |
| Sampling rates[1]: | (800), (400), 200, 100, 50 SPS per channel |
| Bandwidth: | 315, 100, 50, 25, 12.5 Hz |
| Oversampling factor: | 1, 2, 4, 8 |
| Memory[1]: | 512 kByte (standard) to 2 MByte (expanded) |

**Data Recording**
| | |
|---|---|
| Pre-event-Time[2]: | 1 to 20 seconds |
| Post-event-Time: | 1 to 100 seconds |
| Compression factor: | 2.5 typically |

**Triggering**
**Level Triggering:**
| | |
|---|---|
| Lower band limit: | 0.1 Hz (20 dB / decade) |
| Upper band limit: | 12 Hz (40 dB / decade) |
| Range: | 0.1 to 100 % of full scale |

**STA/LTA Triggering:**
| | |
|---|---|
| STA-Base[3]: | 0.1 to 10 seconds |
| LTA-Base[3]: | 1 to 100 seconds |
| STA/LTA-Ratio: | 1 to 60 dB |

**Memory**
| | |
|---|---|
| Addressable memory: | 16 MByte per module card |
| Recording time: | 25 minutes / Mbyte (@ 3 channels, 200 SPS) |

[1]: Depends on AD converter

[2]: Depends on sampling rate

[3]: GSS-18 only

**Solid state memory for RMC-12 / 16:**
| | |
|---|---|
| Type: | CMOS SRAM (Lithium back-up) |
| Size: | 128 Kbytes - 2 Mbytes |

**Solid state memory for RMC-18 / 24:**
| | |
|---|---|
| Type: | On-board Flash Memory 16, 32 or 64 Mbytes |

**Power Supply**
| | |
|---|---|
| Type: | Switched power supply |
| Internal battery: | Rechargeable, 12 VDC, 27 Ah Lead battery |
| Autonomy: | 4 days divided by No. of RMC Cards |
| AC voltage: | 80 - 264 VAC |
| DC voltage: | 12 VDC |
| Power consumption: | 1.5 W per RMC @ 12 VDC typically |

**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, 1 for GPS) |
| Baud rates: | 1200, 2400, 4800, 9600, 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 % (non condensing) |
| Type: | Aluminium housing |
| Size up to 12 channels (4 x 3 axis or 12 x 1 axis): | 400 x 400 x 240 mm |
| Weight: | Approx. 30 kg (incl. battery) depending on amount of channels |
| Protection: | IP65 |

**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 **GSS** warning option provides two independent warning / error outputs (relay contacts) based on user selectable criteria. This option allows to configure the **GSS** as a seismic switch.

| | |
|---|---|
| Alarms: | 2 relay for 2 alarm levels |
| Alarm levels: | 0.1 to 100 % of full scale (User programmable per axis) |
| Relay Hold-On | 1 to 60 seconds (User Programmable) |