

[•] albris_{GMS series} User Manual



GeoSIG Ltd, Wiesenstrasse 39, 8952 Schlieren, Switzerland Phone: + 41 44 810 2150, Fax: + 41 44 810 2350 info@geosig.com, www.geosig.com



Disclaimer

GeoSIG Ltd reserves the right to change the information contained in this document without notice. While the information contained herein is assumed to be accurate, GeoSIG Ltd assumes no responsibility for any errors or omissions.

Copyright Notice

No part of this document may be reproduced without the prior written consent of GeoSIG Ltd. Software described in this document is furnished under a license and may only be used or copied in accordance with the terms of such a license.

Trademark

All brand and product names mentioned are trademarks or registered trademarks of their respective holders.

All rights reserved.

GeoSIG Ltd

Switzerland

Table of Contents

Ap	plicat	bility of This Manual	9
Wa	arning	is and Safety	10
Ge	eoSIG	Cybersecurity Recommendations	11
Sy	mbols	s and Abbreviations	14
1	Intro	duction	15
2	Incor 2.1 2.2	ning InspectionDamage During ShipmentWarranty2.2.1Limitation of Warranty	16 16 16 16
3	Desc 3.1 3.2 3.3 3.4	Power Supply	17 18 19 20 21 21 21
4	Insta 4.1 4.2 4.3	Site Selection. .	22 22 22 22 23 23 23 24 24
5	Quicl 5.1 5.2 5.3 5.4 5.5 5.6	Preparation Set sensor full scale Set sensor full scale Set sensor full scale No Stations Configured at first Start Up Set sensor full scale Adding New Stations Set sensor full scale Configuration of Data Server Set sensor full scale	25 26 31 31 32 34
6	Princ 6.1 6.2 6.3 6.4	Normal Operation	37 37 38 40 41
7	Netw 7.1 7.2 7.3 7.4 7.5	Network Settings through the Web Interface.	42 44 45 45 47



	8.1	Accessing the Web Interface
	8.2	The Home Panel and the General Navigation
	8.3	Device Configuration
		8.3.1 Data Acquisition Configuration.
		8.3.2 Configuration Manager
		8.3.3 Network Configuration
		8.3.4 Web Interface Configuration
	8.4	State of Health
	0.4	8.4.1 Error Status
		8.4.3 Hardware Status
		8.4.4 Software Status
		8.4.5 Maintenance
	8.5	Data Explorer.
	8.6	Help
		8.6.1 Online Help
		8.6.2 Contact GeoSIG Service
9	Deta	iled Configuration of the Instrument 66
	9.1	Switch ON and OFF the Instrument
	9.2	General Comments to the Configuration
	-	9.2.1 Change Configuration by the Web Interface
		9.2.2 Change Configuration by GeoDAS
		9.2.3 Changing Configuration by the Console
		9.2.4 Explanation of the Structure in the Manual
	0.0	
	9.3	
		9.3.1 In the Web Interface or by GeoDAS
		9.3.2 Via Local Serial Console
		9.3.3 LSB factor
		9.3.4 Channel Naming
	9.4	Configuration of Data Streams
		9.4.1 In the Web Interface or by GeoDAS
		9.4.2 Via Local Serial Console
		9.4.3 Set up of Data Streams
	9.5	Trigger Settings
		9.5.1 In the Web Interface or by GeoDAS
		9.5.2 Via Local Serial Console
		9.5.3 STA/LTA trigger
		9.5.4 Trigger Weight
	0.0	
	9.6	Preset Trigger Settings
		9.6.1 In the Web Interface or by GeoDAS
		9.6.2 Via Local Serial Console
	9.7	File Storage and Policy 90
		9.7.1 In the Web Interface or by GeoDAS
		9.7.2 Via Local Serial Console
	9.8	Communication Parameters
		9.8.1 In the Web Interface or by GeoDAS
		9.8.2 Via Local Serial Console
	9.9	Miscellaneous Parameters
		9.9.1 In the Web Interface or by GeoDAS
		9.9.2 Via Local Serial Console
	9.10	
	9.10	
	• • • •	9.10.2 Via Local Serial Console
	9.11	GeoSIG Options
		9.11.1 Via Local Serial Console
	9.12	Other Options in the Instrument Main Menu
		9.12.1 Control Requests

10.1 10.2 10.3 10.4 10.5	Flash Images and Boot Options	118 118 118 118 118 119
11 Firm	ware Upgrade	120
Append	ices	122
Append A.1 A.2 A.3	ix A Connector Pinouts POWER Connector ETHERNET Connector CONSOLE Connector	123 123 123 123
Append B.1 B.2	ix B Remote Access to the Instrument over SSH SSH Clients for Linux OS SSH Clients for Windows OS	124 124 125
B.3 B.4	SFTP access for Windows OS	125 126 127
Append	ix C GeoDAS Settings	128
C.1	Configuration of Stations	128 129 129
C.2 C.3	Configuration of Server Parameters Instrument Control in GeoDAS C.3.1 More Information (State of Health of the Instrument).	130 131 131
	C.3.2Instrument SetupC.3.3Cancel Pending Request.C.3.4Instrument Communication Interface	132 132 132
C.4	Open recorded miniSEED files in GeoDAS	133 134 135
Index		136



Table of Tables

1	Indicators description	20
2	The overall error states shown in the Web Interface	51
3	Explanation table structure	68
4	Channel configuration menu structure	72
5	Data streaming configuration menu structure	76
6	Trigger settings configuration menu structure	85
7	Preset trigger configuration menu structure	89
8	File Storage and Policies menu structure	92
9	Communication Parameters menu structure	96
10	Server Parameters menu structure	97
11	Miscellaneous Parameters menu structure	105
12	Time Synchronization Parameters Menu Structure	109
13	GeoSIG options menu structure	111
14	Other options in the main menu	112
15	Control requests	115
16	Comparison of test and configuration menu users	119

List of Figures

1 2 3	Instrument housing17Instrument with all connectors. Antennas are not mounted18Power supply21
4	Direct installation on wall or floor 23
5 6 7 8 9 10 11 12 13 14 15 16	GeoDAS terminal25"No stations configured" message at startup of GeoDAS31Instrument wizard31Quick Login Window32List of all stations found - single station left, multi-selection right side32Configuration and overview of the stations32Data server parameter33Instrument setup34Web Interface of the selected instrument34Communication parameters35Edit Communication parameters35Edit Server parameters36
17 18 19 20 21	Normal operation in a network37Upload of seismic events and download of requests from the server38Behaviour on Events: Upload of extracted events39Firmware upgrade40Connection to backup server in case connection to main server fails41
22 23 24 25 26	Configuration of network interface43Configuring Stations screen44Edit Network settings44Configuration of wired Ethernet44Configuration of wired Ethernet44Configuration of wired Ethernet44
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45	The login screen of the instrument at 192.168.30.17649The home panel of the web interface50Configuration main menu52Configuration panels53Configuration Manager screen54Choose new file to upload54Configuration file is now uploaded55File is uploaded55Network Configuration Screen56Web Interface Configuration Screen56Recording Status Screen57Error Status Screen56Nativare Status Screen56Software Status Screen66Software Status Screen61The Maintenance Screen62Seismometer Control63Download the GMSalbris User Manual65Contact information65
46 47 48 49 50	Instrument setup67Configure Number of Channels68Edit Channel Parameters70Configure number of Output Streams72Edit Stream Parameters74



51 52 53 54 55 56 57 58 59 60 61	Channels of Digitizers Stations: Data Streams Data stream window Configure number of trigger sets Edit Trigger Parameters Overview of trigger weight and trigger time frame Configure number of Preset Triggers Edit Preset Triggers File Storage Settings Communication Parameters	78 78 79 80 81 86 87 88 90 93 94
62 63 64 65 66 67	Miscellaneous Parameters Edit Miscellaneous Parameters Time synchronization Parameters Edit Time synchromization Parameters Edit Time synchromization Parameters Edit Time synchromization Parameters Select Instrument Control Edit Time synchromization Interface	98 99 106 107 120 120
68 69 70 71 72 73	Pending upgrade on the server	120 121 124 125 125 126 126
74 75 76 77 78 79 80 81 82	Configuration Stations	128 129 129 130 131 131 132 134 134

Applicability of This Manual

GMSalbris Instruments are constantly being improved. Although the manual you receive along with your instrument corresponds to the actual software versions, **you are advised to check www.geosig.com periodically for the most recent version of this document**, and especially after performing any software upgrades. This manual is based on the following software and firmware versions:

Component	Description	Required version or higher
GeoDAS Data acquisition and analysis software on the computer		2.40
armdas	Data acquisition software of the instrument	28.02.04
SUP Power supervisor		90.01.10
DSP Digital signal processor		128.05.15
Web Interface	Web Interface	1.14
Linux OS	Kernel Version	4.9.52

Warnings and Safety

STATIC ELECTRICITY

The instrument and its sensor unit (if available) contain CMOS devices, and when serviced care must be taken to prevent damage due to static electricity. This is very important to ensure long-term reliability of the unit. Such risk exists when both the housing lid and the internal panel are removed.

INSTALLATION SITE

This instrument is designed for highly specialized applications. If installed in publicly accessible areas it is the responsibility of the instrument owner to ensure that the device is installed in a safe and secure manner.

The instrument should be installed in a well ventilated place and when possible be protected from direct sunlight and heat.

The housing provides no protection against explosive atmosphere. The instrument must not be operated without necessary protective measures (e.g. EX-proof housing) in an area where explosive gases could be present.

CLEANING

Disconnect the power from the instrument prior to cleaning. Do not remove the housing lid during cleaning. Wipe all exterior surfaces with a damp cloth. Use mild detergent if required. No water should be used if cleaning inside the instrument is required.

GeoSIG Cybersecurity Recommendations

GeoSIG instruments, as described in their documentation, have built-in security and safety features against unauthorised access or use. However, ultimately it is the user's responsibility to ensure the safe and secure usage of our instruments based on their actual implementation. No factory delivered solution can fit each and every possible scenario. The user is advised herein that once you connect a device to a network, you are also connecting that network to that device. It is the responsibility of the user to take appropriate precautions so that all devices should be adequately hardened, such as with individual strong passwords, and should have their traffic monitored and managed via appropriate security features, such as firewalls. Also, non-critical devices should be segmented away from networks that contain sensitive information.

Compliance with a well-defined security procedure helps protect not only an individual device, but also other devices connected through the network. Such procedure would be intended to prevent exploitation of an individual device's resources by unauthorized individuals, including the use of such device to attack other systems on the network or the Internet.

The following recommendations can be considered in establishing such a security procedure:

1. Physical access restriction

All devices must be restricted from unauthorised physical access and a well-defined physical access procedure shall be utilised.

2. No Unattended Console Sessions

Except for the devices which are physically secured, no unattended console sessions shall be left running.

3. No Unattended Network Sessions

No unattended user interface sessions shall be left running towards any device accessed through its network interface.

4. Use of a Firewall

For a network that has any connection to the outside world, a hardware firewall must be running and configured to block all inbound traffic that is not explicitly required for the intended use of the network and the connected devices. The user can also consider limiting outbound traffic.

Any communication ports that are required for the operation must be protected.

5. No Unnecessary Services or Ports

If a service or port is not necessary for the intended purpose or operation of the device, that service must not be running and the port must be closed. (e.g. if seedlink server is running, but not used, turn it off)

6. Use of authentication

Network and console device access must require authentication by means of strong and individualised passwords per device (no passe-partout passwords).

Wireless access must require strong encryption to associate (such as WPA2), or some other strong mechanism to keep casual users near the access point from using it to get full access to the network. WEP or MAC address restrictions do not meet this requirement.

7. Password complexity and security

When passwords are used, they must meet the specifications similar to below:

All default passwords must be changed at time of initial access or latest at deployment into service.

Passwords MUST:

contain eight characters or more contain characters from AT LEAST two of the following three character classes:

Alphabetic (e.g., a-z, A-Z) Numeric (i.e. 0-9)



Punctuation and other characters (e.g., !@#%^&*()_+|~-=\'{}[]:";'<>?,./)

8. Privileged Accounts

Privileged and super-user accounts (Administrator, root, etc.) must not be used for non-administrator activities. A secure mechanism to escalate privileges with a standard account is acceptable to meet this requirement. Network services must run under accounts assigned the minimum necessary privileges.

9. No Unencrypted Authentication

All network-based authentication must be strongly encrypted. In particular, insecure services such as Telnet, FTP, SNMP, POP, and IMAP must not be used or must be replaced by their encrypted equivalents.

10. Software / Firmware updates

Networked devices must only run software/firmware that are updated according to supplier's guidelines. A periodical check of any available updates from the supplier must be sought.

Please contact GeoSIG Ltd if you require any further advice or clarification.



Symbols and Abbreviations

ADC	Analog to Digital Converter
ARM	Main processor
armdas	GeoSIG data acquisition software
Bootloader	First program executed when unit starts
CF	Compact Flash, memory card using Flash memory
Compact Flash	See CF
DSP	Digital Signal Processor in charge of controlling the ADCs
GSIAFW	GeoSIG data acquisition software.
EEW	Earthquake Early Warning
Flash	Program storage memory device. It contains the Linux file system in Read Only mode and some block areas under direct control of main program or bootloader
FTP	File Transfer Protocol
GPS	Global Positioning System
GUI	Graphical User Interface
IMAP	Internet Message Access Protocol
LAN	Local Area Network, a simple branch of private network using private IP address. It could have or not have access to Internet (WAN)
NTP	Network Time Protocol
POP	Post Office Protocol
PPS	Pulse Per Second
RAM	Random Access Memory
RTC	Real Time Clock
SD	Secure Digital Memory Card
SNMP	Simple Network Management Protocol
SPS	Samples Per Second
SSH	Secure Shell
SSID	Service Set Identifier. This is the identifier name of a wireless network.
STP	Shielded Twisted Pair
SUP	Supervisor in charge of controlling the power management.
Telnet	Teletype network
USB	Universal Serial Bus
UTP	Unshielded Twisted Pair
VPN	Virtual Private Network
WAN	Wide Area Network. It is a network connection established between 2 LAN or a LAN and a server over the internet (usual case) or through a rented link.
WPA	Wi-Fi Protected Access. It is a secure specification that allows users to access information instantly via wireless link. It is a more modern and secure link than the WEP type.
WEP	Wired Equivalent Privacy
	Important information related to the current section.
	Caution. Refer to the instructions next to the marking, or refer to the relevant section of this user manual.
	Direct current. This symbol indicates a direct current (DC) power line derived from an alternating current (AC) power source.
<u> </u>	Earth terminal.
≟ (€	CE. This symbol indicates that the device conforms to all legal requirements needed to achieve free movement and sale of the product through the European Economic Area (EEA).

Economic Area (EEA).

1 Introduction

Dear Valued GeoSIG Customer, thank you for purchasing this product.

These instruments have been optimised to meet the requirements of the majority of customers out of the box and may have even been delivered tailored to your needs. In any case, to be able to get the most out of our product, please carefully study this manual, its appendices and referenced manuals, as well as any other documents delivered with it.

This is a reliable and easy-to-use device, and at the same time a sophisticated product that requires care, attention and know-how in configuring, installing, operating and maintaining.

GeoSIG continually improves and enhances capabilities of all products. There may be several other connectivity, hardware or software options for the instrument, which are not covered in this manual. Refer to separate documentation from GeoSIG about available options or ask GeoSIG directly.



2 Incoming Inspection

All instruments are carefully inspected both electrically and mechanically before they leave the factory. Please check if all received items correspond with the packing list and your order confirmation. In case of discrepancy please contact GeoSIG or your local representative immediately.

2.1 Damage During Shipment

If requested at the time of order, all instruments can be insured prior to shipment. If you receive a damaged shipment and shipping insurance was previously arranged you should:

- · Report the damage to your shipper immediately
- Inform GeoSIG or your local representative immediately
- · Keep all packaging and shipping documents

Insurance claims may be void if the above procedure is not followed.

2.2 Warranty

GeoSIG Ltd (hereafter GeoSIG) warrants hardware and software products against defects in materials, workmanship and design for the defined period in the relevant contract or offer, starting from date of shipment and 5 years parts and maintenance support commitment. If GeoSIG receives notice of such defects during the warranty period, GeoSIG shall at its option either repair (at factory) or replace free of charge hardware and software products that prove to be defective. If GeoSIG is unableâĂŤwithin a reasonable timeâĂŤ to repair or replace any cabinet to a condition as warranted, buyer shall be entitled to a refund of the purchase price upon return of the cabinet to GeoSIG. 50% of freight charges on shipments of warranty repairs or replacements will be borne by GeoSIG (normally one way freight).

2.2.1 Limitation of Warranty

The foregoing guarantee shall not apply to defects resulting from:

- · Improper or inadequate maintenance by buyer
- Buyer supplied software or interfacing
- · Unauthorised modification or misuse
- · Operation and storage outside of the environmental specifications of the instrument
- · Related to consumables or batteries
- Improper preparation and installation at site.

3 Description

The GMSalbris is a full featured compact accelerograph. Well-established performances of our true electromechanical force balance accelerometer AC-7x series and our low noise powerful recorder GMS series are now merged together as a state-of-the-art instrument. Highly optimised cost of ownership and user-friendly design make the GMSalbristhe perfect choice for any application.

3.1 Housing

The compact and robust design allows GMSalbris to be used as part of a large deployment for EEW, as well as giving the ability to stream real-time data and record with multiple filtering options and embedded adjustable triggering algorithms. It is an asset in damage estimation and disaster management.

GMSalbris monitors ground motion in three orthogonal axes. It is a compact and robust instrument, designed for large scale deployment for indoor and outdoor installation.

This instrument can be floor or wall mounted, see chapter 4.

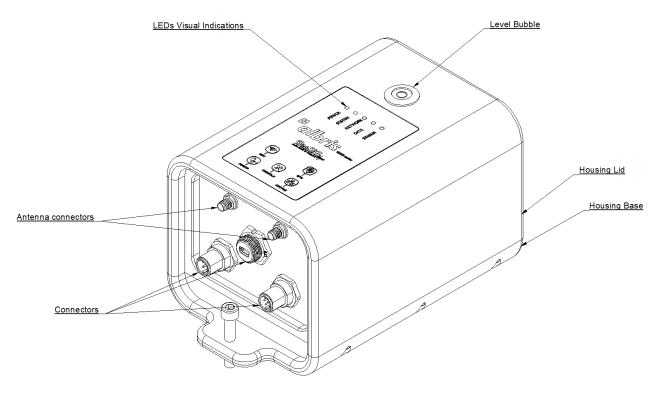


Figure 1: Instrument housing



3.2 Connectors

The instrument has up to three connectors and two antenna plugs on front of housing:

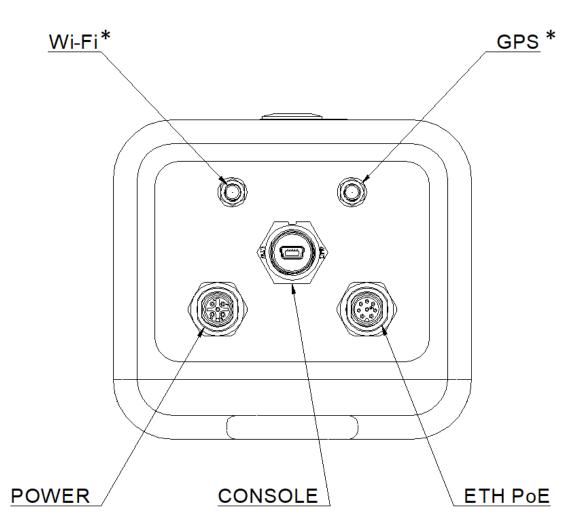


Figure 2: Instrument with all connectors. Antennas are not mounted

* an asterisk near a connector means that this connector is optional

3.2.1 Standard External Connectors

These connectors always will be assembled:

- POWER Connection to the power supply module of the instrument or to an external battery.
- ETH PoE Connection with Ethernet cable to a LAN. The cable connection is dominant over the Wi-Fi link. As soon as the cable connector is plugged in the instrument ETHERNET socket, the Wi-Fi module will be turned off, even if the RJ45 connector at the end of the cable is not plugged into any socket.
- CONSOLE Connection to the console (Only for service or maintenance purpose)

3.2.2 Optional External Antennas

- Wi-Fi Antenna connector for wireless network.
- GPS Antenna connector for optional internal GPS receiver.



3.3 Visual Indicators

The instrument includes five LEDs to indicate information about its status. POWER, SYSTEM, NETWORK, DATA and SENSOR LEDs are visible from outside. Table 1 describes in detail the meaning of the LEDs activity.

LED LED state		Instrument status
POWER	Green solid	Power is available from AC/DC power supply or from PoE
	White solid	Linux OS is starting up
	White flashing	Data acquisition software is starting up
	Green flashing	Operational and synchronized to local time source (RTC)
SYSTEM	Blue flashing	Operational and synchronized to external time source (NTP or GPS)
	Yellow flashing	Operational but a warning has been issued
	Red flashing	Operational but an error has been detected
	neu nasning	Instrument is not turning on because of high temperature. See 9.1
	Red solid	Data acquisition software has stopped
	Green solid	Network connection is available
NETWORK	Blue flashing	Data transmission in progress
	Red solid	Network error
	Green solid	No events recorded in the memory
DATA	Yellow flashing	An event is being recorded
	Blue solid	Events are recorded in the memory
	White flashing	Data acquisition is being configured
	Green solid	Data acquisition is ready
SENSOR	Blue flashing	Data acquisition in progress
	Yellow flashing	Non critical data acquisition problem occurred
	Red flashing	Critical data acquisition problem occurred

Table 1: Indicators description

3.4 Power Supply

3.4.1 Choice of Power Supply

The main power should be provided to the instrument from a 9 to 48 VDC supply. The optional AC/DC power module provides 15 VDC at 1.2A unless otherwise specified. The AC entry is compatible with 110 / 60 Hz or 230 / 50 Hz network without any adjustment. The block has a C7 connector and can use any standard power cord with such connector. The power module and the power cord supplied are both CE and UL approved. The power module must be connected to AC with a 2-wire power cable providing Phase and Neutral.

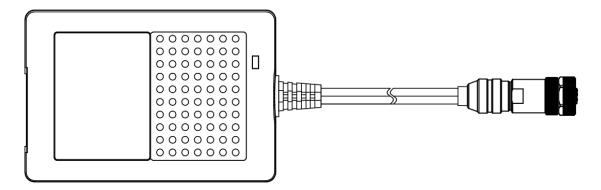


Figure 3: Power supply

The following parts will be included in a shipment in addition to the instrument:

- Ethernet cable, category 5 cable for 10/100 Mbit network with a suitable connector for the instrument, 2 meters of cable and a standard RJ45 connector. Other cable lengths are available by request.
- · Console cable for use on the external CONSOLE connector

3.4.2 Optional Accessories

The following parts can be ordered additionally and will be added if specified at order time:

- External power supply module, 100 to 230 VAC / 50-60 Hz, CE and UL approved
- AC power cable, depending on the shipping address with European, US or Swiss power plug
- **GPS** time code receiver antenna with 5 meter cable, other cable length on request. GPS is an option as the time can also be synchronised through the network using NTP
- · Wi-Fi module and antenna
- Any spare antennas

4 Installation

This section lists the procedures involved in installation of the instrument. The procedures will be outlined as steps to be performed in the field or in-house prior to deploying the instrument in the field.

4.1 Site Selection

4.1.1 Environmental Considerations

The choice of an installation site for a seismic event recorder is similar in most respects to that of a regular continuous recording seismic station.

Although the instrument is housed in a solid, weatherproof case, it should be installed in a place free from direct sunlight, precipitation, the danger of falling materials in the event of a severe earthquake and the risk of tampering or vandalism if the unit is to be left unattended.

There are also special considerations for event recorder installations. It is important to select the site and set the trigger level to avoid unwanted data recording, such as vibration from machinery, highway traffic, aircraft, waves, etc. It is wise to check the instrument frequently during the first several days of operation after each set-up, to see if there are previously unsuspected sources of noise which are triggering the instrument and using up the memory.

You should make note at this point of any cultural or environmental sources of noise and vibration around the selected site, which may cause false triggers of the recording mechanism. These will have to be considered when setting the trigger parameters.

The operating temperature of the instrument itself is -20 $^{\circ}$ C to +70 $^{\circ}$ C. Nevertheless, if any additional internal or external accessories/modules with lower operating temperature ranges are used, the operating temperature of the combined system will be then limited by the temperature characteristics of these accessories/modules.

4.1.2 Power Supply Considerations

The instrument may be powered from a 115 / 230 VAC supply through an external AC/DC converter which provides 9 to 48 VDC output, from an external battery, or optionally from solar panels.

- If the supply in the field will be from a 115 / 230 VAC supply, you need to connect the VAC cable from the external AC/DC to the power source only. The instrument operates continuously, providing a trickle charge to the internal battery, if supplied. The VAC supply must consist of Phase and Neutral.
- If the supply in the field will be from a 9 to 48 VDC supply, you need to connect the power cable from instrument to the power source only.
- It is highly recommended to check and configure the instrument for the correct time, trigger and other relevant settings in the lab, prior to the installation (see chapter 5). It may then be carried to the remote site and then connected to the VAC power through the external AC/DC converter or directly to the VDC power supply. After powered the instrument starts automatically (see chapter 9.1), the instrument runs with the pre-configured parameters. This reduces the amount of time needed to configure in the field an important consideration in the case of an adverse condition.

4.1.3 Communication Considerations

An Ethernet connection or Wi-Fi signal must be present to have data communication. If the instrument uses an NTP Server as time source, please make sure that an internet connection is available and the network settings are properly set in the instrument. If the instrument is used as a stand-alone recording station, a notebook with an Ethernet connector can be used for downloading the data on a regular basis. In a network the stations will upload the data to the configured server.

4.2 Installation



For your convenience a training video explaining the installation of the instrument is available at www.geosig.com→ Support→ 'How To ...' Videos

Many times the locations of seismic equipment are highly exposed to electrical disturbances caused by lightning or by the industrial environment. Although the instrument contains over voltage protection, it may sometimes be necessary to use additional surge protectors for the equipment. Contact GeoSIG or your local representative for more information.

4.2.1 Mounting the Instrument

4.2.1.1 Space requirements for the installation

Minimum surface area requirements:

130 x 240 mm

4.2.1.2 Direct mounting of the instrument

The instrument is designed to be directly installed on any flat surface like a structural wall or the floor.

Drill one hole with 11 mm diameter in the concrete with a typical depth of 50 mm for the supplied M8 screws (A) and anchor (B). If another model is used, please adapt the hole dimensions accordingly. Clean the hole area of the dust. Insert the anchor into the hole. Level the recorder with the three leveling screws (C) supplied with help of level bubble.

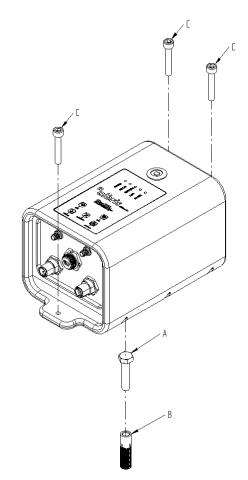


Figure 4: Direct installation on wall or floor

4.2.2 Installing other Components, Options, Accessories

For installation of other components options or accessories please refer to the specified option manual.

4.3 First Start and Communication Setup

With the instrument correctly fixed on the ground or on the wall please proceed with chapter 5 for the first start-up and configuration.

5 Quick Start Up

This chapter is intended to configure simple communication between the instrument and *GeoDAS* software running on a Windows workstation, working as data server.



It is assumed that the GeoDAS software is already installed on a computer. If not, please do the installation first with help of the GeoDAS User Manual before proceeding.

5.1 Preparation

- Make sure the instrument is powered by the provided power supply. The instrument will start when power supply is applied. The POWER indicator should be solid green when external power source is available
- Make sure the instrument is connected to a LAN by the supplied Ethernet cable.
- If provided, the internal battery is already plugged in at the time of shipment and it's not needed to open the device for connection.



In case there is no LAN available, the Ethernet cable can be connected directly to a computer. For this a crossed Ethernet cable is needed; please contact GeoSIG. Nevertheless in modern computers normally it works as well with the supplied patch cable. In any case the instrument and the computer must be configured to have a fixed IP. Please follow the procedure to adjust these settings.

- Connect the instrument to a USB port of your computer by using a standard Mini USB patch cable.
- Open any terminal program and choose the appropriate COM port. Set baud rate to 115200. Alternatively open GeoDAS, go to Tools → Terminal ... and choose the appropriate COM Port and baud rate. Then Press Connect.

If terminal is opened after the boot of the device, press enter and the menu should appears.

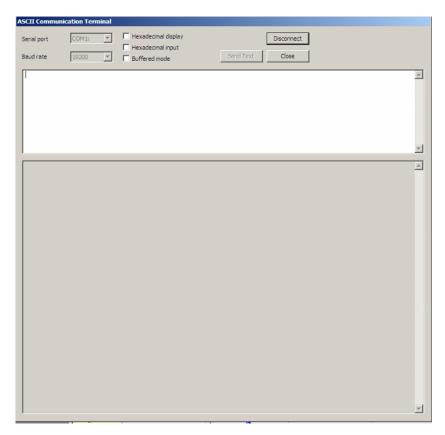


Figure 5: GeoDAS terminal



· Keep the terminal open for the next step.

5.2 Set sensor full scale

By default, the sensor is configured to have Âś 2g of fullscale. The fullscale of GMSalbriscan be selected by software, choosing one of the following ranges:

- Âś 2.5 V or Âś 0.5 g
- Âś 5.0 V or Âś 1.0 g
- Âś 10.0 V or Âś 2.0 g
- Âś 20.0 V or Âś 4.0 g

The configuration of the full scale of the sensor can be change in "Test and Initial Configuration Mode"

- If the instrument is on and running, send the command to reboot the instrument, otherwise switch on the instrument (See chapter 9.1).
- Press 'Ctrl + Z' as soon the following message appears on the console to enter the test mode.

The following menu will appear (see chapter 10 for details):

• The full scale configuration can be update only by Powerful User or Administrator

• By default no passwords are set, so press 'W' or 'A' to enter the Powerful User Mode or Administrator Mode, and then 'K' to enter the menu Instrument hardware parameters settings.

```
Hardware Configuration Menu
```

mar a.	ward comriburation menu	
A)	Instrument type	GMSalbris
B)	Digitizer input range	+/-20V or +/-1g
C)	Number of sensors	1
D)	Sensor parameters	->
E)	Standard Wi-Fi module	No
	Lantronix Wi-Fi module	No
	Rack mounted slave board	No
	Wireless time sync module	No
	Internal analog modem	No
J)	Cellular modem	None
K)	Number of alarm boards	0
	Seismometer control	No
N)	Interconnection interface	Disabled
Q)	Remote sensors	No
	Battery test resistor installed	Yes
S)	GPS receiver	Yes
T)	Product Key	XXXXX-XXXXX-XXXXX-XXXXX
Se	lect <a><t>. <esc> to exit</esc></t>	

• Press '**B**' to change the configuration.¹ If the displayed configuration does not match your desired settings, press the '**B**' repeatedly until the correct configuration is shown.

¹Any change of full scale means that the LSB value must be updated in the channel configuration, see chapter **Configuration of the Channels** 9.3 and LSB value in the subsection 9.3.3



• Then press 'ESC' to quit this menu and then press 'S' to save the change

Configuration is complete. (S)ave, (D)iscard or continue (E)diting?

• As soon the following menu appears, press '5' to start the instrument.

```
Access level: Administrator
Flash Images and Boot Options:
L - List flash images
 \ensuremath{\mathbb{Q}} - Reset instrument configuration to the user default
 {\tt V} - Reset instrument configuration to the factory default
 5 - Boot now
 X - Reboot the instrument
 Y - Power off
Hardware Setup and Monitor:
K - Instrument hardware parameters
 N - Network settings
 T - Battery installation dates
Security:
 0 - Set password
 J - Reset all passwords
-->
```

Network settings of the instrument can be changed during startup of the instrument. By default the instrument has a dynamic IP.

- If the instrument is on and running, send the command to reboot the instrument, otherwise switch on the instrument (See chapter 9.1).
- Press 'Ctrl + Z' as soon the following message appears on the console to enter the test mode.

The following menu will appear (see chapter 10 for details):

• By default no passwords are set, so press '**U**' to enter the User Mode, and then '**N**' to enter the menu Network settings.

```
==== Network Settings ====
---- Primary network interface ----
Configure network interface (Y/N)? Y
Static IP address (1=YES, 0=AUTO)? (0 = 0x0):
```

- Select 'Y' to change the settings and then select if the instrument should have a static or a dynamic IP by pressing '1' (Static) or '0' (dynamic). In case a dynamic IP is chosen, a DHCP server must be available in the network to provide the IP settings.
- In case a static IP is selected, an additional message will appear asking for the instrument IP address, instrument network mask and instrument gateway IP. If you don't know these parameters please ask your network administrator.
- If the instrument has a Wi-Fi module, a second interface menu appears. Here static or dynamic IP can be chosen and the available Wi-Fi networks can be scanned. Please see chapter 7.4 for details.

```
---- Wireless network interface ----
Configure network interface (Y/N)? Y
Static IP address (1=YES, 0=AUTO)?
```

• If the instrument is connected to the Internet via a PPP connection (cellular or analog modem), then the APN and password must be configured. See chapter 7.4 for details.

```
---- PPP Communication ----
Edit Analog Modem settings (Y/N)? Y
Phone number of the service provider [T313001]:
Login [demo]:
Password [demo]:
Updating configuration...
PPP settings have been updated
Edit Cell Modem settings (Y/N)? N
```

 The instrument allows access to the operating system from remote over SSH. This feature is not needed for normal operation of the instrument and can be disabled in case of security concerns. By default it is enabled; to disable press '1'.



```
---- Miscellaneous parameters ----
Disable remote login over ssh (1=Yes, 0=Enable)? (0 = 0x0):
```

• It's highly recommended to put a recovery server IP address and recovery server port. The instrument will contact this server every Recovery server contact interval in case the connection to the main data server (configured in the configuration of the instrument) is not possible anymore. This could happen, for example, if a configuration file with wrong server settings were accidentally uploaded to an instrument.

```
Recovery server IP address (192.168.10.107):
Recovery server port (3456 = 0xD80):
Recovery server contact interval, hours (24 = 0x18):
Enable NTP daemon (0=No, 1=Yes)? (1 = 0x1):
```

• As soon the following menu appears, press '5' to start the instrument.

```
Access level: User

---- Flash Images and Boot Options ----

L - List flash images

Q - Reset instrument configuration to the user default

V - Reset instrument configuration to the factory default

5 - Boot now

X - Reboot the instrument

Y - Power off

---- Hardware Setup and Monitor ----

N - Network settings

---- Security ----

O - Set password

--->
```

• Start GeoDAS (if not already done), to add the instrument in its configuration



5.3 No Stations Configured at first Start Up

- The following steps require GeoDAS version 2.24 or higher. If you have an older version download the newest release from **www.geosig.com** → **Support** → **Downloads**
- When GeoDAS is started for the first time, it will ask to add stations in its configuration.
- Click Yes

No Stations Configured	×
GeoDAS has detected no stations in its current configuration. Would you like to add them now?	
<u>Y</u> es <u>N</u> o	

Figure 6: "No stations configured" message at startup of GeoDAS



If there are already stations configured in GeoDAS, this window will not appear. Please press the wizard button in the GeoDAS menu

An exported GeoDAS configuration is in the USB stick that gets shipped with the instrument

5.4 Adding New Stations ...

Make sure the computer is connected to the same network as the instrument and in the same IP range.

 In the following window, select My instrument other than GSR is connected to the local network and press Next >

Adding New Station			
Please select one of the options below and click the Next button to continue:			
$\ensuremath{\mathbb{C}}$ My GSR instrument is connected to a serial port of this computer			
\bigcirc I have the configuration file of my instrument(s) provided by manufacturer			
○ I would like to configure the new station manually			
• My instrument other than GSR is connected to the local network			
Next > Cancel			

Figure 7: Instrument wizard

Enter the Serial number of the instrument and press Login >. It is also possible to add more than one station by entering only a fragment of the serial number which is similar on all instruments. For example if there are the serial numbers 100210, 100211 and 100234. By entering '1002' all the stations will be added. By putting '10021' just the stations <u>100210</u>, <u>100211</u> will be added.





Figure 8: Quick Login Window

• All the found stations will be listed, press Finish to add them to GeoDAS

		ion will be added or meters and restart		Finish button to			will be added or up eters and restart Ge	dated. Press the Finis oDAS.	h button to
Na	Instrument	Serial Number	IP Address		Name	Instrument	Serial Number	IP Address	
GS000	GMS-XX	100210	192.168.10		GS001	GMS-XX	100482	192.168.10	
					GS001	GMS-XX	100487	192.168.10	
					GS001	GMS-XX	100485	192.168.10	
					GS001	GMS-XX	100486	192.168.10	
				10	G\$001	CMS_VV	100490	102 168 10	
		< Bad	k Finish	Cancel			< Back	Finish	Cancel

Figure 9: List of all stations found - single station left, multi-selection right side

5.5 Configuration of Data Server

- Proceed to the menu *Settings* → *Configure Stations* ...
- The following window will appear where all the instruments are listed in the area 1. To add stations make a right click and choose *Add Station to current configuration*. Please see chapter C.1 for details.

figuring St	tations								
Configured GS	R Stations				Adding New GSR St	ation			
Station	Instrument	Channel Type	Operation Mode	Main Board S/N	Board S/N 1. Enter the unique station name (up to 5 characters)				
BUYAD FARGE HVHRB HYBAD SINOB	GSD-24 GSD-24 GSD-24 GSD-24 GSD-24	Direct Link (COM12) Direct Link (COM14) Direct Link (COM14) Direct Link (COM12) Direct Link (COM13)	Recorder + Data Recorder + Data Recorder + Data Recorder + Data Recorder + Data	104684 104676 103182 104682 104686	3. Enter serial num	of instrument from the ber of the main board word to login to the ins	(optional)	Unknown 💌	
STTRB TUZ01 YAKUP YALST	G5R-18 G5D-24 G5D-24 G5R-18	Direct Link (COM1) Direct Link (COM14) Direct Link (COM13) Direct Link (COM1)	Recorder Recorder + Data Recorder + Data Recorder	107013 104669 104678 0	5. Re-type the san 6. Configure comm	ne password to confirm unication channel		Channel	
<				>	 Specify work op Add new station 	tions to the list of existing	ones	Options Add Now	
iMS and CR-6 Station	iplus Stations	Serial Number	Firmware		nfigured IP	Public IP	Network Interface	Status	
ARMOO	GMS-XX	100578	Unknown		2.168.1.37	Unknown	Unknown	C	
CR6PL	GMS-XX	123456	Unknown		2.168.20.18	Unknown	Unknown	c	
GS000	GMS-XX	100210	Unknown		2.168.1.37	Unknown	Unknown	c	
G5003	GMS-XX	111222	Unknown		2.168.1.29	Unknown	Unknown	č	
GSTST	GMS-XX	100580	21.07.00		0.0.0.0	Unknown	Unknown	č	
the second s									

Figure 10: Configuration and overview of the stations

- Press the button Server... When the window below appears, enter the following data:
 - My server IP address IP of your computer
 - Server port

Select a user defined port, use **3456** by default

Network Settings My server IP address 0.0.0.0 Server port 3456 Timeout, seconds 40	Do not delete received S	utes) considered as warning 30 or error 360 State-of-Health files right after processing er than data arriving from stations, days 0
Event Declaration and Processing Declare seismic network events based on the arr Minumum number of stations required to trigger in ord Data Conversion Convert groups of data files of the declared se	er to declare a seismic event	livered their event files recorded within certain time frame 3 Network time frame, seconds 3 Data Requests
Convert any single data files with prefixes		Pre-event time interval, sec 0
Output format of the converted data	SEISAN	Total length of data fragment, sec 0

Figure 11: Data server parameter

In most cases you do not need to enter an IP address. It may only be needed if your computer has several network cards, and you would like to communicate to instruments connected only to one subnetwork. Otherwise you may leave the default zero IP address 0.0.0.0 If you don't know how to find out your IP address, follow these steps:

- Click Start \rightarrow Run \rightarrow type **cmd**, then press **OK**

Run		? ×	○ C(WINDOWS)system32(cmd.exe Higrosoft Windows XP Upretion 5.1,26881 CC) Logowight 195, ZMMI Higrosoft Corp.	
	Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.		to) Lappergnt ING zwai hitrazoit topp. G:\Decuments and Settingu\meys)m	
Open:	cmd	•		
	OK Cancel Browse.			
nter th	ne command ' ipconfig ', then your	· IP ap	opears	
ernet	; adapter Local Area Connecti	on:		

- Type **exit**

- · Write down the IP and port you have configured
- Press OK two times to exit again to the main window of GeoDAS



5.6 Basic Configuration of the Instrument

• In the window Stations: General Information make a *right click* on the station name and select *Instrument Setup...*

Station	Code	Instrument	Channel Type	Status Updated	Files	Free Memory	Last Eve
<u>M</u> ore <u>I</u> nstr	nt Manager Information ument Setup ble File Opera		TCP: 192.168.10.80	Never	0 (0)	ОК	No Inform
– Clea Clea Can d	Batch Multi-Setup Clean Batch Queue Clean SMS Queue Cancel Pending Requests GMS Control						
E <u>x</u> po Upda	figure Station ort Configurat ate Coordinat anced <u>I</u> nform	tion tes					

Figure 12: Instrument setup

• A window showing the Web Interface will appear.

Please fill in your Credentials: Username: Password:
login

Figure 13: Web Interface of the selected instrument

• To be able to adjust the configuration of the instrument it is required to authenticate oneself to the device. The default login credentials are: Username: *admin*, password: *123456*. Then press *login*

• Go to *Configuration* → *Communication Parameters*.

Home	Configuratio	Status and Maintena	ince Data	Explorer Help	Logout	
Data Ac	quisition	Configuration Manager	Network	Web Interface		
Main n	nenu					
Station	description			GeoSIG Station		1
Station	code			GSGMS		1
Location	n description			Default location		1
Seismic	network code			GS		1
Number	of Channels			3		
Number	of Output Stream	ns		0		
Number	of Trigger Sets			2		
Number	of Preset Trigge	rs		0		
Channe	I Parameters			>>		
Trigger	Parameters			>>		
File Stor	rage and Policy			>>		
Commu	nication Parame	lers		>>		
Miscella	ineous Paramete	rs		>>		
Sensors	and Virtual Cha	nnels		>>		
GeoSIG	Options			>>		
Time sy	nchronization			>>		
L		Back	Load from Devi	ce Save Changes A	pply and Restart	

Figure 14: Communication parameters

- Tick the flag *Contact Remote Servers* to configure a connection to a remote server.
- Go to Server Parameters

Home Configuration Status	and Maintenance D	ata Explorer Help	Logout	
Data Acquisition Configuration	Manager Network	Web Interface		
Main menu Communication				
Contact remote servers				1
Number of servers		1		
Time interval, sec		10		1
Maximum files per session		10		1
Connect if there are new files		ø		0
Server Parameters		>>		
Server mode for other instruments				()
SeedLink server		ø		1
Accept connections		ø		0
Try next server on any transfer error				•
L	Back Load from D	evice Save Changes	Apply and Restart	

Figure 15: Edit Communication parameters



- Configure the Server IP address and press. The default Server port is 3456 and should be kept.
- Then press Save and Restart.

Iome Configuration Status and Ma	intenance Data Explorer I	Help Logout	
Data Acquisition Configuration Manag	er Network Web Interfac	ce	
Main menu Communication Server			
Server IP Address	192.168.30.4	15	
Protocol	Custom		• ()
Port	3456		1
Transfer timeout, sec	20		(]
Network triggers			1
Keep connected to the server	V		()
Server port for permanent links	54204		
Always connect to this server			1
Connect failures before network error	0		
Ba	ack Load from Device Save Cha	nges Apply and Restart	

Figure 16: Edit Server parameters

- Under Protocol, select Custom and add the default Port: 3456.
- Then press Apply and Restart.
- After the instrument has restarted it is ready for operation and can be configured according to chapters 8 and 9.

6 Principle of Operation of the Instrument

This chapter gives an overview of the normal operation of the instrument in a network or as a standalone unit.

6.1 Normal Operation

During normal operation the instruments are installed on sites and connected to a data server over Ethernet or Internet. The instrument checks in a defined interval whether there are any requests or firmware updates ready for pick up on the server. Additionally - and if configured - the instrument uploads the ringbuffer files (from continuous recording) and the state of health files to the data server.

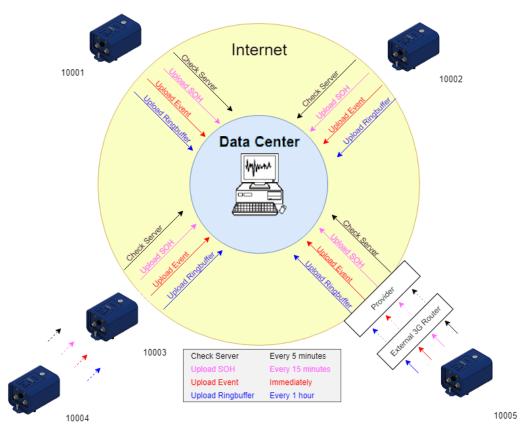


Figure 17: Normal operation in a network

6.2 Behaviour on a Seismic Event

In the event of an earthquake with vibrations above the trigger threshold, the instrument will record the event and immediately upload it to the data server (see Figure 18). In case some of the stations are too far away from the epicentre to trigger, the data can still be collected from all instruments:

- A data request will be placed on the server
- All instruments will download the request during the next time checking the server (see Figure 19)

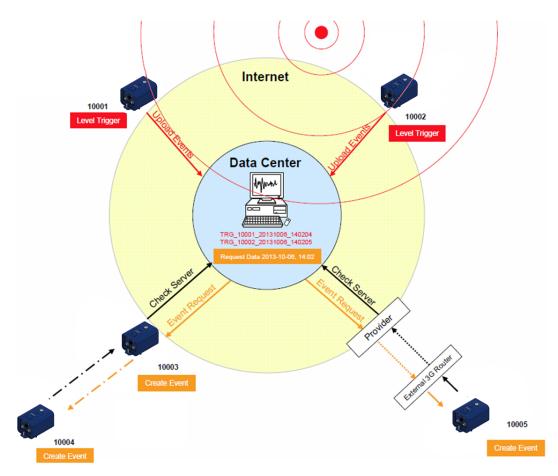


Figure 18: Upload of seismic events and download of requests from the server

• All instruments will create an event at the time listed inside the data request and extract these data out of the ringbuffer data.

• The extracted event file will be uploaded to the data server (see Figure 19)

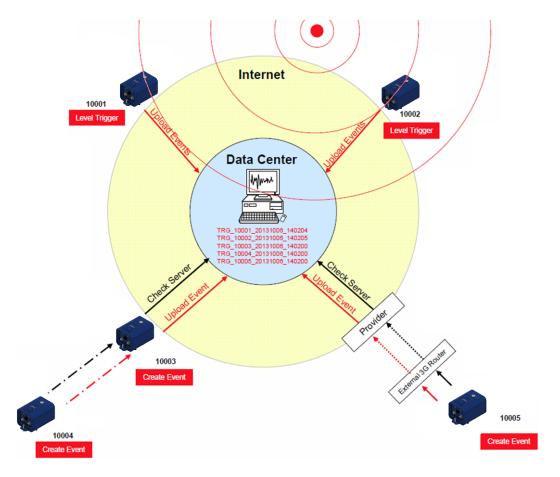


Figure 19: Behaviour on Events: Upload of extracted events



6.3 Firmware and Configuration Upgrade

In case of a firmware upgrade, the new firmwares can be easily put on the server. All instruments will recognise the new firmware during the next server checkup, download and install it. See chapter 11 for details about the firmware upgrade. The same happens also with new configurations. In case the option "Keep connection to the server" is enabled under Server Parameters (see chapter 9.8 for details), then the instrument will keep the channel open so that it is possible to configure the instrument via the Web Interface without knowing the IP address of the instrument. See chapter 8 for details.

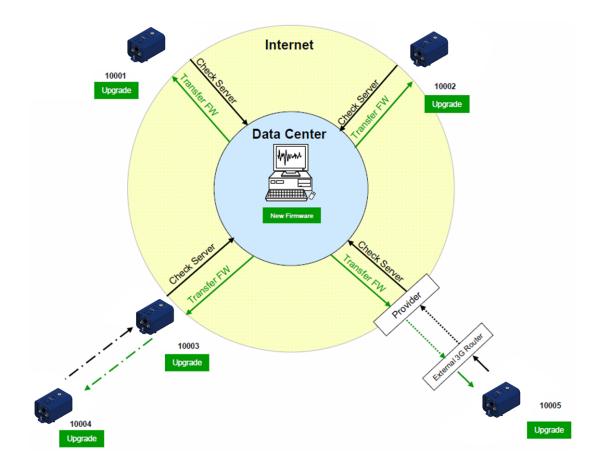


Figure 20: Firmware upgrade

6.4 Backup Server

It might be that the instrument is not able to contact the main data server anymore: either because it is down or a wrong server has been configured. For example, this can happen if a configuration file with wrong server settings is uploaded accidentally to an instrument. In this case the instrument will contact the backup server that has been configured in the test and configuration menu. Therefore the configuration of the backup server is very important and should not be ignored. For more information how to set the backup server see chapter **??**.

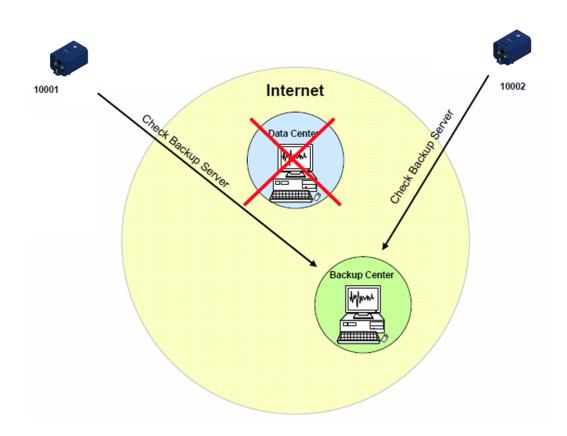


Figure 21: Connection to backup server in case connection to main server fails



7 Network Settings

The network configuration is the same whether using a wired network or wireless network. The specific settings related to the wireless network configuration via the local console are described in chapter 7.4.

7.1 Network Settings through the Web Interface

- To open the Web Interface please do one of the following two steps:
 - In the window Stations: General Information of GeoDAS make a right click on the station name and click on Instrument Setup... or
 - Open your browser and enter the IP address of the instrument (see chapter 7.5 for details) in the address bar of your browser.
- To be able to adjust the configuration of the instrument it is required to authenticate oneself to the device. The default login credentials are: Username: *admin*, password: *123456*
- Go to the tab *Configuration* → *Network Configuration*. The following screen can be seen (pictured below).
- Adjust the wired Ethernet settings under *eth0*. In case the instrument has a second wireless Wi-Fi interface, then additionally available Wi-Fi networks can be scanned or all parameters can be manually adjusted.
- Click Save Network Configuration to Device.

uisition	Configuration Manager	Network	Web Inte	rface					
ork I <u>nterfa</u>	ce Information	_							
hO					_	_			
Current (Configuration (eth0)								
Name				tive Confi		ı			
IPv4 Addre IPv4 Netma	ask		255	2.168.30.1 5.255.255.	0	_	eth0		
IPv6 Addre IPv6 Netma	ask		ffff:	0::8e8e:76 ffff.ffff.ffff.:		e7a			
Interface Ty Interface is			Bro Yes	adcast			wired	l Ethe	rnet
Loopback I MAC Addre			No 8C	:8E:76:00:	3E:7A				
Change S	Saved Configuration (eth	10)							
Interface Ty	уре		Wired						
Network Co	onfiguration		Static				¥		
IP Address			192	168	. 30	.176			
Netmask			255	255	.255	.0			
Gateway IF	5		192	168	.30	.5			
	DNS Server			168	.0				
			192						
Alternate D	INS Server		192	. 168	. 0	.1			
an0									
Current (Configuration (wlan0)								
Name Access Poi	int/Cell			tive Confi		1			
Access Poi ESSID			Not GS	t-Associate _Wifi		1			
Access Poi ESSID Encryption Fragment t	key hreshold		Noi GS off off	t-Associate _Wifi	ed				
Access Poi ESSID Encryption Fragment t Frequency	key hreshold		Noi GS off Fre	t-Associate -Wifi equency:2.	ed .437 GHz				
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma	key hreshold ess ask		Noi GS off Fre 169 255	t-Associate Wifi equency:2. 9.254.32.5 5.255.0.0	ed .437 GHz				
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma Interface Ty	key hreshold Iss ask ype		Noi GS off Fre 169 255	t-Associate -Wifi equency:2. 9.254.32.5 5.255.0.0 badcast	ed .437 GHz				
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma Interface Ty Interface is Loopback I	key hreshold iss sk ype Active interface		Noi GS off Fre 169 255 Bro Yes No	t-Associate Wifi equency:2. 9.254.32.5 5.255.0.0 padcast	ed .437 GHz i2				
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma Interface Ty Interface is	key hreshold iss sk ype Active interface		Noi GS off Fre 169 255 Bro Yes No 00:	t-Associate quency:2. 0.254.32.5 5.255.0.0 padcast 0D:F0:BF:	ed .437 GHz i2		wlan)	
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Addre Interface Ti Interface is Loopback I MAC Addre Mode Power Man	key hreshold iss ask ype Active nterface ess nagement		Noi GS off Fre 165 Bro Yes No 00: Ma off	t-Associate Wifi equency:2. 0.254.32.5 5.255.0.0 padcast 0D:F0:BF: naged	ed .437 GHz i2		wlan	-	
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma Interface is Loopback I MAC Addre MAC Addre	key hreshold iss ask ype Active nterface ess nagement		Noi GS off Fre 165 255 Bro Yes No 00: Ma off off	t-Associati quency:2. 9.254.32.5 5.255.0.0 padcast 0D:F0:BF: naged	ed .437 GHz i2) ess W	′i-Fi
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma Interface Ti Interface Ti Interface Ti Loopback I MAC Addre Mode Power Man Retry Tx-Power	key hreshold iss ask ype Active nterface ess nagement nold		Noi GS off Fre 165 Bro Yes No 00: 01 Ma off Ion 20	t-Associati Wifi 2quency:2. 0.254.32.5 5.255.0.0 vadcast 0D:F0:BF: naged g limit:7 dBm	437 GHz 2 :2 :21:E1			-	′i-Fi
Access Poi ESSID Encryption Fragment th Frequency IPv4 Addre IPv4 Netma Interface Tis Loopback I MAC Addre Mode Power Man RTS thresh Retry Wifi Protoc	key hreshold iss ask ype Active nterface ess nagement nold	anO)	Noi GS off Fre 165 Bro Yes No 00: 01 Ma off Ion 20	t-Associati - Wifi equency:2. 9.254.32.5 5.255.0.0 padcast 0D:F0:BF: naged g limit:7	437 GHz 2 :2 :21:E1			-	′i-Fi
Access Poi ESSID Encryption Fragment th Frequency IPv4 Addre IPv4 Netma Interface Tis Loopback I MAC Addre Mode Power Man RTS thresh Retry Wifi Protoc	key hrreshold ess ask ype Active interface ess nagement nold ol Saved Configuration (wla	an0)	Noi GS off Fre 165 Bro Yes No 00: 01 Ma off Ion 20	t-Associati Wifi 2quency:2. 0.254.32.5 5.255.0.0 vadcast 0D:F0:BF: naged g limit:7 dBm	437 GHz 2 :2 :21:E1			-	′i-Fi
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netmi Interface Ti MAC Addre Mode Power Mar RTS thresh Retry Tx-Power Wifi Protoc	key hreshold iss ask ype Active interface ess nagement hold ol Saved Configuration (wfa	an0)	Noi GS off 166 255 Bro Ves No 00: Ma off Ion 20 IEE	t-Associati Wifi 2quency:2. 0.254.32.5 5.255.0.0 vadcast 0D:F0:BF: naged g limit:7 dBm	437 GHz 2 :2 :21:E1		Wirel	-	′i-Fi
Access Poi ESSID Encryption Fragment I Frequency IPv4 Addre IPv4 Netme Interface T Interface T MAC Addre Mode Power Man RTS thresh Retry Tx-Power Wifi Protoc Change S Interface T Network Co	key hreshold iss ask ype Active nterface ess nagement nold ol Saved Configuration (whe ype onfiguration	an0)	Noi GS off 166 255 Bro Yes No 00: 00: 00: 01 00 00: 01 00 100 20 20	t-Associati Wifi 2quency:2. 0.254.32.5 5.255.0.0 vadcast 0D:F0:BF: naged g limit:7 dBm	437 GHz 2 :2 :21:E1			-	′i-Fi
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma Interface Ti Loopback I MAC Addre Mode Power Man RTS thresh Retry Tx-Power Wifi Protoc	key hreshold iss ask ype Active interface ess nagement hold ol Saved Configuration (wfa		Noi GS off 166 255 Bro Ves No 00: Ma off ion 20 IEE	t-Associati Wifi 2quency:2. 0.254.32.5 5.255.0.0 vadcast 0D:F0:BF: naged g limit:7 dBm	437 GHz 2 :2 :21:E1		Wirel	-	′i-Fi
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma Interface Ti Loopback I MAC Addre Mode Power Man RTS thresh Retry Tx-Power Wifi Protoc	key hreshold iss ask ype Active interface ess nagement ool ol Saved Configuration (what ype onfiguration Parameters rch Open Wireless Networks		Noi GS off 166 255 Bro Ves No 00: Ma off ion 20 IEE	L-Associativ Wifi 2.254.32.5 5.255.0.0 vadcast s 0D:F0:BF: naged g limit:7 dBm EE 802.11t	437 GHz 2 :2 :21:E1		Wirel	-	′i-Fi
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma Interface Ti Loopback I MAC Addre Mode Power Man RTS thresh Retry Tx-Power Wifi Protoc Change S Interface Ty Network Cd Sear ESSID	key hreshold iss ask ype Active interface ess nagement ool ol Saved Configuration (what ype onfiguration Parameters rch Open Wireless Networks		Noi GS Off Off 255 Bro Ves No 00: Ma off Ion 20 IEE Wiff DHCP	L-Associativ Wiffi equency:2. 3.254.32.5 5.255.0.0 yadcast 0D:F0:BF: naged g limit:7 dBm EE 802.111	437 GHz 2 :2 :21:E1		Wirel	-	′i-Fi
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma Interface Ti Loopback I MAC Addre Mode Power Man RTS thresh Retry Tx-Power Wifi Protoc Change S Interface Ty Network Cd Sear ESSID	key hreshold ss ask ype Active interface ess aggement nold ol Saved Configuration (whe ype onfiguration Parameters rch Open Wireless Networks) popology		Noi GS off off Fre 169 255 Bro 00: Ma off Ion 20 00: Ma 00: Wifi Ion 20 00: Ma 0 Ma 0	L-Associativ Wiffi equency:2. 3.254.32.5 5.255.0.0 yadcast 0D:F0:BF: naged g limit:7 dBm EE 802.111	437 GHz 2 :2 :21:E1		Wirel	-	′i-Fi
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netma Interface T MAC Addre Mode Power Man RTS thresh Mode Power Man RTS thresh Retry Tx-Power Wifi Protoc Change S Interface T Network Co Wifi I Sear ESSID Wifi To Encryp	key hreshold iss ask ype Active interface ess nagement ool Saved Configuration (what ype onfiguration Parameters rch Open Wireless Networks o popology ption		Noi GS Off Off 255 Bro 00: Ma off Off Ion 20 IEE Wifi DHCP	L-Associativ Wiffi equency:2. 3.254.32.5 5.255.0.0 yadcast 0D:F0:BF: naged g limit:7 dBm EE 802.111	437 GHz 2 :2 :21:E1		Wirel	-	'i-Fi
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netmi Interface Ti MAC Addre Power Mar RTS thresh Retry Tx-Power Wifi Protoc Change S Interface Ty Network Co Sear ESSID Wiff To Encryp	key hreshold ss ask ype Active interface ess aggement nold ol Saved Configuration (whe ype onfiguration Parameters rch Open Wireless Networks) popology		Noi GS Off Off 255 Bro 00: Ma off Off Ion 20 IEE Wifi DHCP	L-Associative Wiffi equency:2. 2.254.32.5 5.255.0.0 vadcast 0D:F0:BF: naged g limit:7 dBm g limit:7 dBm i ucture	437 GHz 2 :2 :21:E1		Wirel	-	'i-Fi
Access Poi ESSID Encryption Fragment t Frequency IPv4 Addre IPv4 Netmi Interface Ti MAC Addre Power Mar RTS thresh Retry Tx-Power Wifi Protoc Change S Interface Ti Network Co Wifi To Encryp	key hreshold ask ype Active interface ess nagement nold ol Saved Configuration (what ype onfiguration Parameters rch Open Wireless Networks o) oppology otion		Noi GS off off Fre 166 255 Bro 00; Ma off Ion 20 IEE Wifi DHCP GS_Wifi Infrastru WPA2	L-Associative Wiffi equency:2. 2.254.32.5 5.255.0.0 vadcast 0D:F0:BF: naged g limit:7 dBm g limit:7 dBm i ucture	ed 437 GHz 22 :21:E1 bgn		Wirel	-	'i-Fi

Figure 22: Configuration of network interface



7.2 Network Settings through GeoDAS

• Under Settings click on Configure Stations..., the following window appears:

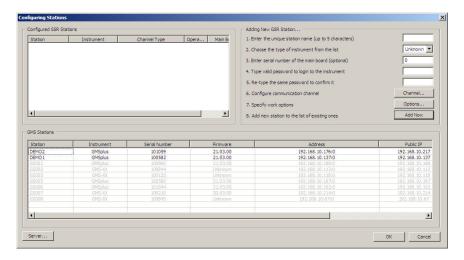


Figure 23: Configuring Stations screen

• Make a right click on the station name and choose Edit Network Settings of Instrument

Station		Instrument	Se	rial Num	
GS000 GS004	Generate Ri	equests for Configurat	ion Files	101059	
GS007	Edit Networ	k Settings of Instrume	nt	021	
Zug4	9 2011/108 - 60 - 6	n ann anns i <u>s</u> e a	6	066	
Zug5	Add Station	to Current Configurat	ion	066	
Zug6	Add New St	ation Manually		066	
Zug7	Remove Stations from Configuration				
GS001				- 345	
	Load Config	uration from File			
	Save Config	juration to File		-	
4	Export to C	SV			

Figure 24: Edit Network settings

• Adjust all the network parameters in the following screen wherein the **Primary Network interface** is the wired Ethernet, and Embedded Wi-Fi interface is the wireless network interface.

Instrument Network Settings	×
Network interface Primary Network Interface MAC address 00:50:C2:77:40:03 No bridged WrFi	MAC address 00:00:00:00:00 Firmware
TCP/IP Settings An IP address is obtained automatically from the DHCP server Assigned static IP address 192 168.55 100	Network topology Infrastructure Channel O Security type None Encryption
Network mask 255.255.0	Key index
Default gateway 132.168.55.100	C Hexadecimal key C Password (up to 64 characters)

Figure 25: Configuration of wired Ethernet

letwork interface Embedded W	-Filnterface	Wi-Fi Settings	
IAC address 00:0D:F0:A7	CF:2F No bridged Wi-Fi	MAC address 00:0D:F0:A	7:CF:2F Firmware N/A
TCP/IP Settings		Network name (SSID)	GSO_ENG
An IP address is obtained aut	omatically from the DHCP server	Network topology	astructure 💌 Channel 🛛 4
Assigned static IP address	192.168.10.191	Security type WPA2	Encryption CCMP
Network mask	255.255.255.0	Key index	Authentication Open
Default gateway	192.168.10.254	C Hexadecimal key (32 bytes)	 Password (up to 64 characters)

Figure 26: Configuration of wired Ethernet

7.3 Wired Ethernet settings through the local Console

Please see chapter ?? for details.

7.4 Wireless Settings through the local Console

- To power on the device, connect it directly to a power source (PoE or power supply). Then it will then boot up automatically.
- Press 'Ctrl + Z' as soon the following message appears on the console to enter the test mode.

The following menu will appear (see chapter 10 for details):

Level	Shortcut	Password	Description
User	Ctrl+U	None	Basic operations only
Powerful User	Ctrl+W	None	Also hardware options and pre-selected tests
Administrator	Ctrl+A	None	Also manual tests and altering the FLASH memory conten

• By default, no passwords are set, so press '**U**' to enter the User Mode, and then '**N**' to enter the menu Network settings and proceed until the following menu appears:

---- Wireless network interface ----Static IP address (1=YES, 0=AUTO)?

- Select if the instrument should have a static or a dynamic IP address by pressing '1' (Static) or '0' (Dynamic). If a dynamic IP address is chosen, a DHCP server must be available in the network to provide the IP address settings.
- If a static IP address is selected, an additional message will appear asking for the *Instrument IP address, Instrument network mask and Instrument gateway IP address.* If you don't know these parameters please ask your network administrator.
- By pressing '*E*' the instrument scans the available networks and lists them. Choose the network to connect by pressing the **number** next to the network SSID or press '*C*' to configure the network settings manually.

```
GeoSIG
swiss made to measure whether
46 / 136
```

```
      Scanning wireless networks.

      N

      N
      Network SSID

      Mode
      Encryption

      Channel
      Level,%

      1
      GSO_ENG

      Infrastructure
      WPA2
      1

      81
      1

      Enter the number of a network above, <S>can again or <C>onfigure manually:
```

• If the network is encrypted, please enter the network key.

```
Passphrase (8-63 ASCII) or a 64-character hex key (ad43Fd2d22):
```

- · Adjust the other parameters concerning the SSH or recovery server if required.
- When the instrument tries to connect to the network, this can take a while. Please be patient until the following menu appears again:

```
Access level: User

--- Flash Images and Boot Options ---

L - List flash images

Q - Reset instrument configuration to the user default

V - Reset instrument configuration to the factory default

5 - Boot now

X - Reboot the instrument

Y - Power off

--- Hardware Setup and Monitor ---

N - Network settings

--- Security ---

O - Set password

--->
```

• Press '5' to continue the boot process of the instrument.

7.5 Get IP from Instrument

• To get the IP from the instrument please press 'I' in the main menu to access the System information menu.

```
Main menu:
C - Configuration ->
M - Messages ->
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
T - File statistics
I - System information ->
S - Shell command
U - Control requests ->
R - Restart firmware
Z - Reboot instrument
Q - Quit
```

• Press 'N' to view the Network information

```
System information:
    View alarm status
B - View RTC status
C - View SUP information
D - View DSP information
E - View NTP status
    View DSA status
    View GPS information
    View wireless sensors
I - List firmware images
J - View firmware container information
K - View constant parameters
L - View thread list
M - View trim values
N - View network information
R - View relay information
```



• Please see the IPs of the wired Ethernet (*eth0*) and the wireless Ethernet (*wlan0*) listed and marked here in red.

Network inter	faces:
eth0 Lin	k encap:Ethernet HWaddr 00:50:C2:77:42:8E
ine	t addr:192.168.10.133 Bcast:192.168.10.255 Mask:255.255.255.0
ine	t6
UP	BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX	packets:71 errors:0 dropped:1 overruns:0 frame:0
TX	packets:16 errors:0 dropped:0 overruns:0 carrier:0
col	lisions:0 txqueuelen:1000
	bytes:6538 (6.3 KiB) TX bytes:1678 (1.6 KiB)
Int	errupt:21 Base address:0x4000
lo Lin	k encap:Local Loopback
ine	t addr:127.0.0.1 Mask:255.0.0.0
ine	t6 addr: ::1/128 Scope:Host
UP	LOOPBACK RUNNING MTU:16436 Metric:1
RX	packets:3 errors:0 dropped:0 overruns:0 frame:0
	packets:3 errors:0 dropped:0 overruns:0 carrier:0
col	lisions:0 txqueuelen:0
	bytes:172 (172.0 B) TX bytes:172 (172.0 B)
wlan0 Lin	k encap:Ethernet HWaddr 00:0D:F0:8E:05:DF
ine	t addr: <mark>192.168.10.94</mark> Bcast:192.168.10.255 Mask: <mark>255.255.255.0</mark>
ine	t6 addr: fe80::20d:f0ff:fe8e:5df/64 Scope:Link
UP	BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX	packets:2333 errors:0 dropped:95 overruns:0 frame:0
TX	packets:636 errors:0 dropped:0 overruns:0 carrier:0
	lisions:0 txqueuelen:1000
RX	bytes:271699 (265.3 KiB) TX bytes:737148 (719.8 KiB)

8 The Web Interface

The instrument can be configured over a Web Interface. To be able to use the Web Interface, it is necessary that the following criteria are fulfilled:

- The IP address of the device has to be known (see chapter 7.5) or the flag *Keep connection to the server* under *Server Parameters* (see chapter 9.8 for details) must be enabled (set to Yes).
- In case the flag *Keep connection to the server* is disabled, the port 80 of the device has to be accessible, from the accessing computer. This usually means that the instrument is in the same network as the accessing computer and no firewall mechanism separates the two.
- A current browser version has to be available on the accessing computer.

8.1 Accessing the Web Interface

- To access the instrument please follow one of the following two steps.
 - In the window *Stations: General Information* of GeoDAS make a right click on the station name and click on *Instrument Setup...*, as can be seen previously in Figure 12, or
 - Open your browser and enter the IP-Address (e.g. 192.168.30.176) of the device in the address bar of your browser.



Figure 27: The login screen of the instrument at 192.168.30.176

To be able to adjust the configuration of the instrument or access its data, it is required to authenticate oneself to the device. This can be done by entering a valid username and corresponding password in the fields of the same name and pressing the "login" button.

The default login credentials are:

- Username: admin
- Password: 123456

The default password can be changed as described in the chapter 8.3.4 of this manual.



The Web Interface can be disabled under Network settings in the Administrator mode of the test and configuration menu. See chapter 10 for details.



8.2 The Home Panel and the General Navigation

After the login process has ended, the screen shown in Figure 28 becomes visible. The width of the Web Interface is optimised for a screen width of 1024 pixels. If the width of the browser window is smaller than that, it might be necessary to scroll horizontally.



Figure 28: The home panel of the web interface

As can be seen in Figure 28, each screen in the web interface is separated into three sections:

- 1. **The Navigation Bar:** The navigation bar allows accessing all screens within the web interface. The navigation bar is further separated into two parts. The top bar is the primary navigation panel which is visible from all screens. The currently active tab is marked white, while all other inactive tabs are blue. By changing from one tab to another, the secondary navigation panel becomes active. This secondary navigation tab allows to switch between the actual screens within a primary navigation bar.
- 2. **The Content Section:** This section will contain all information and configuration options. Most interaction will take place in this part.
- 3. **The Device State Summary:** On the left side the Station Description and Serial Number is displayed to identify the current instrument you are working on. On the right side the device state summary describes the overall status of the instrument. The states that are possible are listed in Table 2. By clicking on the overall state, information on the actual problems will be displayed. More detailed information on the error states are provided in the menu item "State of Health" as described in chapter 8.4.

Symbol	Meaning	Description				
\checkmark	No errors or warnings re- ported from the device.	As there seem to be no issues, no action is required.				
	A warning is reported from the device	There seems to be an issue in this module. Al- though it seems not to be critical, it is recommended to check why this warning is displayed and take ac- tions to resolve it.				
•	A error is reported from the device	An error has occurred and it is required to check for the cause of the problem and resolve it in order to avoid limited functionality.				

Table 2: The overall error states shown in the Web Interface

8.3 Device Configuration

The configuration screen of the Web Interface gives access to all configuration options, the configuration management of the Data Acquisition Software as well as the Network Configuration and the Web Interface itself.

Loading the configuration can take a few seconds. During this time at the right corner of the browser *Loading...* is displayed. Please be patient till the screen shown in Figure 29 appears.

Loading.

Home C	configuration	Status and Maintenand	ce Data E	Explorer Help	Logout	
Data Acquisit	tion Con	figuration Manager	Network	Web Interface		
Main menu						
Station descri	iption			albris GeoSIG Ltd		
Station code				ALB01		1
Location desc	cription			Schlieren		•
Seismic netwo	ork code			СН		
Number of Ch	nannels			6		
Number of Ou	utput Streams			2		
Number of Tri	igger Sets			2		
Number of Pro	eset Triggers			1		
Channel Para	ameters			>>		
Stream Paran	neters			>>		
Trigger Paran	neters			>>		
Parameters of	f Preset Trigger	s		>>		
File Storage a	and Policy			>>		
Communicatio	on Parameters			>>		
Miscellaneous	s Parameters			>>		
GeoSIG Optic	ons			>>		
Time synchro	nization			>>		
		Back Lo	ad from Devic	se Save Changes	Apply and Restart	
vice type: rial number: ation code:		Device date and time: Station description:	Thu Jun 27 1 albris GeoSlo		Device State Summary	Context Help

Figure 29: Configuration main menu

8.3.1 Data Acquisition Configuration

The **Data Acquisition** sub menu provides access to the data of the current configuration of the data acquisition software. As depicted in Figure 30, the content of this tab is divided into two sections:

- The Configuration Panel: This is main part of the armdas Configuration screen. Within this part of the screen all the values of the configuration of the selected Configuration Menu Item can be adjusted. Most options will provide a help button in the form of white question mark on blue ground on the right part of this section. By clicking on it information will be displayed over the option. Please note that the only way to restore the original values of the fields after making changes to them is by using the "Load from Device" Button in the Action Panel.
- 2. The Action Panel: This panel is providing the option to either reload the current configuration from the device (to discard changes or load changes done by another user) or to save the edited configuration to the device or to save the edited configuration to the device and restart the data acquisition software. Saving and restarting will interrupt the current recording for about 20 seconds. During this time triggers will not be executed either. Please note that if the device is configured to use a DHCP server, the address might change during the saving of the configuration which will make the web interface inaccessible under the old address.

Home Configuration	Status and Maintenanc	e Data Explore	r Help	Logout	
Data Acquisition Con	figuration Manager	Network Web	Interface		
Main menu					
Station description		albris	GeoSIG Ltd		
Station code		ALB0	1		
Location description		Schlie	eren		1
Seismic network code		СН			
Number of Channels		6			
Number of Output Streams		2			
Number of Trigger Sets		2			
Number of Preset Triggers		1			
Channel Parameters		>>			
Stream Parameters		>>			
Trigger Parameters		>>			
Parameters of Preset Trigge	rs	>>			
File Storage and Policy		>>			
Communication Parameters		>>			
Miscellaneous Parameters		>>			
GeoSIG Options		>>			
Time synchronization		>>			1
I	Back Los	ad from Device Sa	ave Changes Ap	ply and Restart	2
evice type: GMSalbris rial number: 123456 ation code: CH.ALB01	Device date and time: Station description:	Thu Jun 27 11:11:54 albris GeoSIG Ltd	4 2024	Device State Summary	Context Help 🧃

Figure 30: Configuration panels



8.3.2 Configuration Manager

As described in the previous chapter, the *Data Acquition* screen only allows configuring the currently used configuration. The *Configuration Manager* screen described in this chapter allows managing several configurations, changing the current configuration, uploading a new configuration and so on. As depicted in Figure 31, the screen is divided into three sections:

- The Configuration List: This list contains all configurations currently available on the main storage media. The *Current Configuration* is always listed here. This configuration can be copied and downloaded but not renamed, removed or made the current configuration (as it is already the current). As depicted in Figure 31, these options become available to other configurations stored on the device (in this example after uploading a file to the device). When pressing **Use as Current Configuration** it will store this configuration as the *Current Configuration*. The existing configuration will be overwritten and the instrument restarted. Note that only the *Current Configuration* can be edited in the *Firmware* screen. The other configuration files will remain untouched. The *Current Configuration* can be saved in a file by pressing *Copy*.
- User Default Panel: With the *Reset To Default*, the *Current Configuration* will be overwritten by the user default (see command SETDEFCFG in the chapter 9.12.1) and the instrument will be restarted. The *Current Configuration* can be saved as the user default by pressing the button *Make Current*

	Home Configura	ation Status and Mainte	nance Data E	Explorer Hel	p Logout				
	Data Acquisition	Configuration Manager	Network	Web Interface					
	Manage armdas Configurations								
1	File Name Current Configuratio		ast Status Change 10:43:47 2018		ename Use as Curren ot Allowed Not Allowed	t Configuration Delete Not Allowed			
	Backup_20180828.x	ml 31.8 KiB Tue Aug 2	8 11:43:33 2018	Сору	Rename Use as Curre	ent Configuration Delete			
2	Choose File No Upload	file chosen							
3	Reset to the User	Default Config Make curre	ent Config the Use	r Default Config					

Figure 31: Configuration Manager screen

3. The Upload Panel: While the Configuration List allows downloading configurations from the device by clicking on the name, this part of the screen provides the possibility to upload a configuration to the web interface by selecting a configuration file and using the Upload Configuration Button. As can be seen in Figure 32, after a successful upload a new file is shown in the Configuration List and the name of the newly available configuration is written at the top of the list. (The name of new configuration will be created from a random string followed by "_config.xml"). The configuration can then be changed by clicking on Rename. Note that the upload panel might look different depending on the browser in use.

File Name	File Size	Time of Last Status Change	Сору	Rename	Use as Current Configuration	Delete		
Current Configuration	24.3 KiB	Wed Jan 10 15:32:46 2018	Сору	Not Allowed	Not Allowed	Not Allowed		
Backup 20180110.xml	24.3 KiB	Wed Jan 10 15:27:32 2018	Сору	Rename	Use as Current Configuration	Delete		
wt9T8cdM_config.xml	28.4 KiB	Wed Jan 10 15:38:01 2018	Сору	Rename	Use as Current Configuration	Delete		
Choose file No file chosen								

Figure 32: Choose new file to upload

To upload a file, click on **Choose File** and select the configuration file to upload.

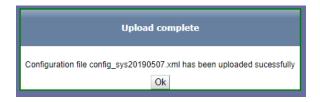


Figure 33: Configuration file is now uploaded

In figure 33, click on **OK** to finalize the upload.

Home	Configura	ation S	Status and Maintena	nce Data	Explorer	Help	Logout		GeoSIG
Data Ac	quisition	Configur	ation Manager	Network	Web Ir	nterface			
Configu	ration File N	ame	Last	Modified		Comment			
Current	Configuration		Sat J	un 5 17:38:32 20	032	Currently active of	configuration		
config s	ys20190507.	xml	Tue N	1ay 7 14:04:04 2	2019	Created by GMS	ela Version 21.13.02-a	1605	
		Сору	Rename Delete	Make Cu	urrent	Reset to Defa	ult Make Default	Comment	
Upload	ling Config	juration Fi	les						
	e File No								

Figure 34: File is uploaded

The red circle in the figure 34 shows the configuration file which was uploaded.

8.3.3 Network Configuration

8.3.3.1 Wired Ethernet

The *Network Configuration* screen provides the possibility to change the network configuration of all network interfaces of the instrument. For the standard instrument only one network interface is available: the Ethernet interface, which is present in all devices. (This interface is marked as "ETHERNET" in Figure). This interface can be configured in the section of the screen that is marked with the red number "1" in Figure 35. The top part of that framed, red section describes the current configuration of the interface. The part below allows changing this configuration. The name of this network interface is traditionally *eth0*.

8.3.3.2 Wi-Fi Wireless Ethernet

Some devices contain an additional wireless interface. If this is the case, a second configuration panel is shown in the Network Configuration screen as can be seen Figure 35 (marked with the red number "2"). As with the default Ethernet interface the section surrounded by the red frame is split in two parts, where the top part defines the current settings and the bottom part provides the possibility to change the configuration. Additionally to the standard network settings like IP Address, Netmask, Gateway and so on, the actual wireless settings can be adjusted and open wireless networks scanned. The name of this network interface is traditionally *wlan0*.



Aco	uisition Configuration Manager Ne	twork Web Interface	
etwo	ork Interface Information		
et	hO		
	Current Configuration (eth0) Name IPv4 Address IPv4 Netmask	Active Configuration 192.168.30.176 255.255.255.0	eth0
	IPv6 Address IPv6 Netmask Interface Type Interface is Active Loopback Interface MAC Address	fe80::8e8e:76ff.fe00:3e7a fff.ffff.ffff.fff: Broadcast Yes No 8C:8E:76:00:3E:7A	Wired Ethernet
L	Change Saved Configuration (eth0)		
L	Interface Type	Wired	
L	Network Configuration	DHCP	T
	lan0		
	Current Configuration (wlan0)		
	Name Access Point/Cell ESSID Encryption key Fragment threshold Frequency IPv4 Address IPv4 Address Interface Type Interface is Active Loopback Interface MAC Address Mode Power Management RTS threshold Retry Tx-Power Wifi Protocol	Active Configuration Not-Associated GS_Wifi off Frequency:2.437 GHz 169.254.32.52 255.255.0.0 Broadcast Yes No 00:0D:F0:BF:21:E1 Managed off Iong limit:7 20 dBm IEEE 802.11bgn	wlan0 Wireless Wi-Fi
L	Interface Type	Wifi	
L	Network Configuration	DHCP	▼
	Wifi Parameters		
	Search Open Wireless Networks		
	ESSID	GS_Wifi	
	Wifi Topology	Infrastructure	▼
	Encryption	WPA2	T
	WPA and WPA2 Parameters		
	Кеу Туре	Password	
L	Password (8 to 63 Characters)	****	

Figure 35: Network Configuration Screen

8.3.4 Web Interface Configuration

The *Web Interface Configuration* screen allows configuring all settings related to the Web Interface. At the moment, this solely consists of the possibility of changing the password for the login. To change the password press *Change*. The current password has to be known.

The default login credentials are:

Username: admin
 Decoverd: 100.150

Home	Configuration	Status and Maintenance	Data Explorer	Help	Logout	
Data Ac	quisition Con	figuration Manager Net	work Web Int	erface		
Web I	nterface Configu	ration				
Change	admin password		Change	Password		

Figure 36: Web Interface Configuration Screen



8.4 State of Health

The State of Health (SOH) menu item provides all information related to the error status of the device as well as the status of the available hardware and software versions.

8.4.1 Error Status

As depicted in Figure 37, this screen provides basic information about the device (area 2) as well as the error status for each module (area 3). The summary of this SOH information is visible at the bottom of each page as the *Device State Summary*, described in chapter 8.2. Additionally it is possible to download the State of Health information as a file in XML format and clear the errors (area 1).

Home	Configuration	Status and Maintenance	Data Explore	r Help I	Logout GeoS	IG
Error	s and Warnings	Recording Status Ha	ardware Softw	ware Maintenance		
		1 Clea	r Errors Downloa	d SOH Information as File		
Tim	e Information					
SOH	Generation Time:		Tue M	ay 7 12:21:34 2019		
Dev	ice Identity Inform	nation				
Devi	ce Model:		GMSe	la		
Seria	al Number:		10402	2		
Stati	on Description:		GeoSI	G Station		
Stati	on Code:		Ela01			
Netw	vork Code:		GS			
Erro	ors and Warnings					
Even	nt Storage		\checkmark	Configuration (Non-Critical)		
Even	nt Storage Quota			File Index		
Conf	iguration Parameters			General Status (Non-Critical	0:	
Syste	em Calls			Time Synchronisation (Non-	Critical)	
File (Operations (opening)			Ringbuffer Operations (Non-	-Critical)	
File (Operations (deleting)		\checkmark	Network (Non-Critical)		
Files	ystem Requests		\checkmark	File Transfer (Non-Critical)		
Firm	ware Ressources		\checkmark	I2C Bus		
Mem	ory Allocation		\checkmark	RTC Status (Non-Critical)		
Flast	h Memory		\checkmark	Data Processing		
User	Requests		\checkmark	Alarm Handling		
Com	munication with Servers	s		Wind Sensor (if any)		
Hard	lware Ressources			NTP Synchronsiation (Non-O	Critical)	
DSP	Status			NTP Synchronsiation	\checkmark	
DSP	Buffer			Sensor Offset		
Ring	buffers			Mesage Queue Interface		
File \	Writing			Sensor Status	\checkmark	
Netw	vork			Hardware Status		
Gene	eral State			Digital Sensors (if any)	\checkmark	
File F	Reading			Main Battery (if any)		
				Main Battery (non-critical)		

Figure 37: Error Status Screen

The modules in area 3 can have one of the states defined in Table 2.

8.4.2 Recording Status

This screen provides all information on the recording and time synchronisation status of the device. As depicted in Figure 38, this screen contains information on the number of events, the timing and synchronisation status of the device, as well as information about the GPS quality and the GPS position of the instrument.

Home	Configuration	Status and Mainter	nance	Data Explorer	н	lelp	Logout	
Errors and	Warnings	Recording Status	Hardy	ware Softw	are	Maintenance		
				Download SOH I	nformat	ion as File		
Recordin	ng Status							
Total numb	er of stored ever	nt files:		0				
Queued Ev	/ents:			0				
Time of Las	st Detected Even	ıt:		Thu Jar	n 1 00:00	0:00 1970		
Timestamp	of the oldest Da	ita:		Tue Apr	r 16 12:3	8:11 2019		
Synchron	nisation Statu	ıs						
Device Syr	nchronises to:			NTP				
Synchronis	sation Status:			Freewh	eeling			
Max. Synch	hronisation Inver	val		0				
NTP Synch	hronisation Failur	'es:		0				
Pulse Dete	cted:			True				
Source Val	id:			False				
Autolock E	nabled:			True				
Last Lock 1	Time:			Tue Ma	ıy 7 12:2	1:29 2019		
Time Elaps	sed since last loc	k:		3h				
Drift Rate o	of the Clock, PPS	3:		0.3				
GPS Status	S:			Unavail	lable			

Figure 38: Recording Status Screen



8.4.3 Hardware Status

The *Hardware Status* provides such information as uptime, available disk space, the device temperature and so on. Information about the available hardware options in the instrument, such as Alarm Boards, Wi-Fi Modules and Modems can be found in the section *Hardware Configuration Status*.

Home Configuration	Status and Maintenar	nce Data	a Explorer	Help	Logout	
Errors and Warnings	Recording Status	Hardware	Software	Mainter	nance	
		Downlo	ad SOH Infor	mation as File	•	
Hardware Status		_	_	_		
Linux Uptime at Site Genera	tion:				21 hours, 11 minutes, 39 seconds	
Last Reboot Time:			Fri Jun 21 0	8:51:48 2019		
The Reason for the last Shu	tdown:		upgrade CF	G		
Time of the last shutdown:			Fri Jun 21 0	8:51:38 2019		
Environment Temperature:			35.70°C			
Available Disk Space:			7.15 GiB			
Free Disk Space:			6.18 GiB			
AC power input:			ON			
Current Voltage (V):			15.18			
Voltage Limits (V):			Switch-off:	10.72 Switch-or	n: 12.74	
Minimum Measured Voltage	(V):		0.00			
Battery-1 voltage (V):			13.23			
Battery-2 voltage (V):			0.02			
Primary DC/DC converter ou	itput voltage:		15.23			
Input Voltage to the primary	DC/DC converter (V):		13.47			
Sensor power supply (V):			15.78			
Hardware Configuratio	on Status					
Last Incoming File from Serv	/er:		CFG_20000	07_20190513_	133010.xml	
Last Configuration Time:			Mon Apr 30	13:49:50 2018		
Source of Configuration:			WebGUI ve	rsion 1.9-r0-61	-g9b36	
Configuration Type:			Current			
Number of Channels:			6			
Alarm Board enabled:			NO			
Standard Wi-Fi Module enab	oled:		NO			
Sensor Control Module enab	oled:		NO			
Cell Modem available:			None			
Configured Recovery Server	r.		0.0.0.0:196	75		
Recovery Server Contact Int	erval:		24			
Main Battery Installation Dat	e:		2018-04-30	T00:00:00.000	+00:00	

Figure 39: Hardware Status Screen

8.4.4 Software Status

The Software Status screen contains information on the Software Versions.

Home	Configuration	Status and Maintenance	Data	Explorer	Help	Logout	
Errors a	nd Warnings	Recording Status Har	rdware	Software	Maintenance		
			Downlo	ad SOH Informa	ation as File		
Softw	are Versions			_	_		
Webinte	erface Version:			1.9-r14			
Firmwa	re Version:			21.13.02-a160	95		
Operati	ng System Version:			unknown			
DSP Ve	rsion:			128.03.08-a02	2		
Supervi	sor Version:			90.01.03-a02			
Choo	are Upgrade se File No file ch d Software	osen					

Figure 40: Software Status Screen

The section Software Upgrade allows to download firmware directly through the Web Interface.

• Click on *Choose File*, select a firmware to upgrade and click on *Upload Software*.



8.4.5 Maintenance

As shown in Figure 41, the Maintenance screen manage the data file, start a trigger, get SOH file and sending signal-related requests to the data acquisition software.

Home Configuration	Status and Maintenance	Data Explorer	Help	Logout	
Errors and Warnings	Recording Status Hard	ware Softwa	ire Maintei	nance	
🔝 Data Management					
File Deletion	All files (Al	L)	▼ 2019-05-07	00 :00	Delete
Trigger by request and create	e a data file Trigger No	No triggers conf	figured		1
▽Status and Informat	ion				
Request actual status of the	system in a file Update SC	H Information	Download SOH I	ile	•
✓Miscellaneous Reque	ests				
Synchronise instrument time	with PC time Local Time	▼ Tue May 07 20	19 15:20:15 GMT	+0200 Synchronise	<u>(</u>)
Request Test Pulse from Ser	Isor Send Test	Pulse			1
Request a Baseline Correction	Remove D	C from Signal			1
Battery maintenance comma	nd Set main b	attery installation	date 🔻 20	19-05-07 🛛 👮	Set Date
Send any command					Send (1

Figure 41: The Maintenance Screen

The Data Management section allows to manage the files and start a trigger

- File deletion allows to user to delete all or a specific type of file.
- Trigger by request and create a data file can start a trigger by click on Trigger Now.

The Status and information section allows to update or download the SOH file.

• Request actual status of the system in a file allows to user to delete all or a specific type of file. It sends a request to the instrument to execute sellcheck and update its state of health. It may take a while to complete, and then you can download updated information in a SOH file.

The *Miscellaneous Requests* section allows to do different tasks:

- Synchronise instrument time with PC time: If your instrument does not have a GPS and does not connect to NTP servers, you can set its time from your browser. The method is not very precise.
- Send a Test Pulse: By sending this request, a test pulse will be executed. The sensor should then respond accordingly and thus provide information about its status.
- **Remove DC from Signal:** By sending this request, a baseline correction will be applied to the signal and therefore the DC will be removed. A DC on the signal can be caused by e.g. a slight misalignment of the sensor.
- Battery maintenance command: if your instruemnt has internal battery, you must update this information every time when you replace it.
- Send any command: Type any known command supported by firmware and press Send.

If the Seismometer Control option is available, it is possible to control the mass from this window as can be seen in Figure 42. The following commands are supported:

- Lock: Locks the seismometer.
- Unlock: Unlocks the seismometer. After unlocking, the sensor automatically centres its mass.
- Center: Centring of the mass

During all controls, the field *Current Mass Position* shows current mass positions of the channels East-West, North-South and Vertical in mV. Feedback about the progress and status information can be found under *Seismometer Control Output*.

Sensor Control		
Sensor Lock:	Lock	()
Sensor Unlock:	Unlock	()
lass Center:	Center	1
urrent Mass Position, mV:	No Data yet	1
Seismometer Control Output		
No Output yet		
ৰ		Þ





8.5 Data Explorer

The Data Explorer provides the possibility to gather information on the files stored on the SD or CF card. The file types are separated into three different file types:

- Automatically Detected Events (Event- and Calibration files)
- Manually Triggered Events and Request Data (Event- and Calibration files)
- · Status and Information (SOH- and Log-files)
- Ringbuffers (Ringbuffer files)

With the menu at the top of the Data Explorer it is possible to switch between the file types listed above. For each listed file, the information on its file size and the last modification time are displayed. The files can be sorted according to the file name, size or modification date. By clicking on the file name, the file can be downloaded.

F	lome	Configuration	Status and Maintenance	Data Explorer	Help	Logout	GeoSIG
	Download						
	Data Exp	lorer - No files	of this type in Data/	_			
	Automatio	ally Detected Ev	rents F	Reload) The Table wil			
	Manually	ally Detected Events Triggered Events d Information	ents and Requested Data	🖌 Туре	🔨 Size	e 🛛 🔩 Modification Date	*
	Ringbuffe						

Figure 43: The Data Explorer Screen

8.6 Help

The Help Menu provides help if there are any problems with the device or the Web Interface.

8.6.1 Online Help

On this screen, the current version of the GMSalbris User Manual can be downloaded from the device. This manual contains additional information on the instrument, which is not provided in the interface itself.

Но	ome C	Configuration	Status and Maintenance	Data Explorer	Help	Logout	
0	online Help	Contact (GeoSIG Service				
•	Online Hel	þ					
	For further in User Manual		device please download the ma	anual:			

Figure 44: Download the GMSalbris User Manual

8.6.2 Contact GeoSIG Service

This screen provides information on how to contact GeoSIG service in the case of problems. The links provided on this screen will only work if access to the Internet is available.

Home Co	nfiguration	Status and Maintenance	Data Explorer	Help	Logout	
Online Help	Contact G	GeoSIG Service				
Contact Info	ormation					
	eb site: http://v	www.geosig.com/ pport.geosig.com/				

Figure 45: Contact information

9 Detailed Configuration of the Instrument

9.1 Switch ON and OFF the Instrument

The instrument operates as follows:

- As soon as any power source is available, from the AC/DC power adapter or the PoE, the instrument will
 automatically start.
- The *SYSTEM* indicator changes to solid white indicating that the operating system is starting up and then it is flashing white indicating that the data acquisition software is starting up. See Table 1 for details about the LED indications.

To turn the instrument **OFF** properly and to avoid any undesired remote power-off, the instrument service console must be used.

- Connect the USB cable on the CONSOLE port of the device (See chapter 3.2)
- Open any terminal program and choose the appropriate COM port. Baud rate is 115200. Alternatively open GeoDAS, go to *Tools* → *Terminal*... and choose the COM Port. As Baud rate select *115200*. Then Press *Connect*. Press enter and the main menu will be displayed.
- Navigate the menu to *U Control requests* → *8 Halt the system for manual power off*
- The instrument will be halted and shut down. After the following lines are printed on the console, the power can be disconnected. If the user does not remove power within 20 minutes, the device will power on again.

```
Unmounting local filesystems...
reboot: Power down
gs-mgms-sup sup0: system halted
gs-mgms-sup sup0: disconnect power or push the power button now,
otherwise restart will happen
```

9.2 General Comments to the Configuration

All the configuration changes can be done either over the network by the Web Interface and GeoDAS or on the instrument itself using a standard Mini USB patch cable on the internal Micro USB connector and a terminal program.

9.2.1 Change Configuration by the Web Interface

- Open an Internet browser and enter the IP address of the device in the address bar of your browser.
- Login with the username: admin and the password: 123456

See chapter 8 for the full explanation of the Web Interface.

9.2.2 Change Configuration by GeoDAS

- In the window *Stations: General Information* make a *right click* on the station name.
- GeoDAS is opening the default Internet browser. The Web Interface of the instrument will appear. See chapter 8 for the full explanation of the Web Interface.

Station	Code	Instrument	Channel Type	Status Updated	Files	Free Memory	Last Eve
Gonn Even <u>More</u> <u>Instr</u> Disat <u>B</u> atd Clear Clear	t Manager Information. ument Setup. Ile File Opera Multi-Setup. I Batch Queu In SMS Queue	GMS-XX tions	TCP: 192.168.10.80	Never	0 (0)	ок	No Infor
GMS <u>C</u> onf E <u>x</u> po <u>U</u> pda	el Pending <u>R</u> e Control igure Stations rt Configurat ite Coordinat inced <u>I</u> nforma	s ion es					

Figure 46: Instrument setup

9.2.3 Changing Configuration by the Console

- Connect the GMSalbris to a serial port of your computer and switch on the instrument if not already done.
- In GeoDAS go to *Tools* → *Terminal...* and choose your COM Port. As Baud rate select *115200*. Then Press *Connect*. Any terminal application of your choice can be used alternatively.
- Press < Enter> the following menu appears:

```
Main menu:
C - Configuration ->
M - Messages ->
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
T - File statistics
I - System information ->
S - Shell command
U - Control requests ->
R - Restart firmware
Z - Reboot instrument
Q - Quit
```

 To configure armdas, from GMSalbris console, press 'C' and <*Enter>*. If you are asked, select to edit the *current configuration*, by pressing 'C' again.

```
Configuration selection:
A - Active (creates temp config with current values from memory) ->
C - Current (loads config from config.xml) ->
F - File (take config from specified file) ->
Select <A>...<F>. <Esc> to exit
```

- · Change the configuration as described in the following chapters
- Press <*Esc*> to leave the configuration menu. If asked, select *save as current configuration*, by pressing 'C'

Save as (C)urrent, save to a (F)ile or e(X)it without saving?

9.2.4 Explanation of the Structure in the Manual

As the parameters in the configuration sometimes depend on each other, not all parameters are shown all the time. The configuration is also sorted in several sub-menus. Therefore the menu is explained as following:

Pa	ramet	er in the menu	<i>Possible selections</i> or 'User selectable'	Explanation	
Sn	vitch-l	Parameter	<i>Possible selections</i> or 'User selectable'	Explanation: The following three lines depend on the selection and are only visible if not set to ' No '	
		Parameter is only visible itch-Parameter has been Yes	<i>Possible selections</i> or 'User selectable'	Explanation	
		Parameter is only visible itch-Parameter has been Yes	<i>Possible selections</i> or 'User selectable'	Explanation	
	isible if Switch- een set to Yes	Parameter in the Submenu	<i>Possible selections</i> or 'User selectable'	Explanation	
	Submenu, only visible if Switch- Parameter has been set to Yes	Parameter in the Submenu	<i>Possible selections</i> or 'User selectable'	Explanation	
	Para	ameter in the Submenu	<i>Possible selections</i> or 'User selectable'	Explanation	
nu	Para	ameter in the Submenu	<i>Possible selections</i> or 'User selectable'	Explanation	
Submenu	Switch-Parameter in the Submenu		<i>Possible selections</i> or 'User selectable'	Explanation	
		This Parameter is only visible if Switch-Parameter has been set to Yes	<i>Possible selections</i> or 'User selectable'	Explanation	

Table 3: Explanation table structure

9.3 Configuration of the Channels

9.3.1 In the Web Interface or by GeoDAS

• In the field *Configuration* → *Number of Channels* the total number of channels must be configured first.

Home Config	uration	Status and Maintena	ince Dat	a Explorer Help	Logout	
Data Acquisition	Con	figuration Manager	Network	Web Interface		
Main menu	_		_			
Station description				GeoSIG Station		
Station code				GSGMS		1
Location descriptio	n			Default location		
Seismic network co	ode			GS		
Number of Channe	els			3		
Number of Output	Streams			0		
Number of Trigger	Sets			1		
Number of Preset	Triggers			0		
Channel Paramete	rs			>>		
Trigger Parameters	3			>>		
File Storage and P	olicy			>>		
Communication Pa	rameters			>>		
Miscellaneous Para	ameters			>>		
Sensors and Virtua	al Channel	s		>>		
GeoSIG Options				>>		
Time synchronizati	on			>>		
L		Back	Load from De	vice Save Changes	Apply and Restart	

Figure 47: Configure Number of Channels



• Go to *Configuration* → *Channel Parameters* to edit the channel parameters. See Table 4 for additional information.

Home	Configuration	Status and Maintenan	ce Data	a Explorer Help	Logout	
Data Ac	quisition	Configuration Manager	Network	Web Interface		
No Da	ta source	Channel name	Location	code l	Maintain the ringbuffer	Online preprocessing
1 IN	T-ADC-\$01-C01	C01	LC	,	Yes	None
	T-ADC-S01-C02	C02	LC		Yes	None
3 IN	F-ADC-S01-C03	C03	LC		res	None
		ters of the related item are dis				last clicked row is displayed in bold and I to all selected rows
Data so	urce			INT-ADC-S01-C01		T
Channel	Iname			C01		(]
Location	1 code			LC		()
Source	data unit			g		()
LSB fact	tor			2.50986e-07		(]
Samplin	g rate, sps			1000		()
Negative	e axis					()
Offset co	ompensation					()
Maintain	the ringbuffer					()
Online p	reprocessing			None		• ()
Decimat	tion and peaks			None		• ()
		Back L	oad from Dev	vice Save Changes	Apply and Restart	

Figure 48: Edit Channel Parameters

9.3.2 Via Local Serial Console

• Press 'E' to select the number of channels. By default three channels are configured as most sensors have three channels normally.

```
Configuration
```

A)	Station description	GeoSIG Station
B)	Station code	GSGMS
C)	Location description	Default location
D)	Seismic network code	GS
E)	Number of Channels	3
F)	Number of Output Streams	0
G)	Number of Trigger Sets	1
H)	Number of Preset Triggers	0
I)	Channel Parameters	->
K)	Trigger Parameters	->
M)	File Storage and Policy	->
N)	Communication Parameters	->
0)	Miscellaneous Parameters	->
S)	GeoSIG Options	->
T)	Time synchronization	->

• Press 'I' to get to the *Channel Parameters* menu to adjust the settings of the channels. The following menu appears:

• Each channel can be adjusted according to your wishes. To change the channels press '+' or '-'. The following parameters can be adjusted:

Data source	The source of the channel can be defined				
	INT-ADC-Sxx-Cxx	See chapter 9.3.4			
	EXT-ADC-Sxx-Cxx				
	DATACHAN	Virtual channels Vector sum of two channels Vector sum of three channels			
	DATAVSUM				
	DATAVSU3				
Source channel name	User selectable	The source of the virtual channel can be any other channel			
Second source channel	User selectable	In case of the vector sum a second or third source has to be selected			
Third source channel	User selectable				
Channel name	User selectable	The channel name in the record is a combination of the location code and channel name			
Location code	User selectable				
Source data unit	User selectable	Data unit of the selected channel			
LSB factor	User selectable	LSB factor, depending on the connected sensor. See chapter 9.3.3 for details.			
Sampling rate, sps	20, 40, 50, 100, 125, 200, 250, 500, 1000, 2000*, 2500*, 5000*	Sampling rate of the selected channel. Additional sampling rates can be derived by configuring a decimation factor in the decimation and peaks option. (*) Not supported in all models.			
Negative axis	Yes	Inversion of the axis is enabled			
	No	Inversion of the axis is disabled			
Offset compensation	Yes	Compensation is enabled			
	Νο	Compensation is disabled			
		Detail behavior of the offset compensation can be configured as described in chapter 9.9.2			
Maintain Ringbuffer	Yes	Permanent recording is enabled			
	Νο	Permanent recording is disabled			
Decimation and peaks	The data can be decim	nated, or just peaks can be stored			
Online Decimation	Decimation	Additional down sampling of the data			
	Peak Values	Peak values of the data within a certain interval			
	Average Values	Average values of the data within a certain interval			
Decimation factor	User selectable	The signal will be decimated by the selected factor. E.g. if the sample rate is 50 and the decimation factor 10, then the output sample rate is 5 SPS. Be aware that no anti-aliasing filtering is done prior to decimation!			
Interval of calculation, sec	User selectable	The Peak or Average values of the signal within the time defined in the Interval of averaging will be written into the ringbuffer with the specified Output			
Output sampling interval, sec	User selectable	sampling interval in [seconds]. Interval of averaging should be equal or higher than the Output sampling interval.			

Table 4: Channel configuration menu structure

9.3.3 LSB factor

This section defines the calculation of the LSB value for the GMSalbris that has to be configured in the Channel Parameters.

The GMSalbris can be provided with 4 different full scale: $\pm 0.5g$, $\pm 1g$, $\pm 2g$ or $\pm 4g$. The actual full scale can't be changed by the user and it is reported on the label attached on the device. The instrument is shipped with the correct LSB value which is calibrated according to the device full scale and it reported on the calibration test record. The nominal values are reported on the following values:

- \pm 0.5g instrument \rightarrow LSB = 0.634931559097E-07 (g/count)
- \pm 1g instrument \rightarrow LSB = 1.269863118194E-07 (g/count)
- \pm 2g instrument \rightarrow LSB = 2.539726236388E-07 (g/count)
- \pm 4g instrument \rightarrow LSB = 5.079452472776E-07 (g/count)

9.3.4 Channel Naming

The naming of the channels is organised as following: all internal sensors start with **INT-ADC**, all external sensors with **EXT-ADC**.

xxx-ADC-Syy-Czz

ххх	Source	INT	Internal Sensor
		EXT	External Sensor
уу	Sensor	3ch: S01	
		6ch: S01,S02	
ZZ	Channel	C01 C03	

For example if there are two external sensors connected, the following channels are available:

EXT-ADC-S01-C01 EXT-ADC-S01-C02 EXT-ADC-S02-C03 EXT-ADC-S02-C01 EXT-ADC-S02-C02 EXT-ADC-S02-C03



9.4 Configuration of Data Streams

9.4.1 In the Web Interface or by GeoDAS

• In the field *Configuration* → *Number of Output Streams* the total number of output streams must be configured first so that the *Stream Parameters* menu appears.

Home	Configurat	ion	Status and Maintena	nce Dat	a Explorer Help	Logout	
Data Acc	quisition	Config	uration Manager	Network	Web Interface		
Main m	ienu						
Station of	lescription				GeoSIG Station		
Station of	ode				GSGMS		1
Location	description				Default location		()
Seismic	network code				GS		1
Number	of Channels				3		
Number	of Output Stre	ams			1		
Number	of Trigger Set	S			1		
Number	of Preset Trig	gers			0		
Channel	Parameters				>>		
Stream F	Parameters				>>		
Trigger F	parameters				>>		
File Stor	age and Polic	y			>>		
Commu	nication Paran	neters			>>		
Miscella	neous Parame	ters			>>		
Sensors	and Virtual Cl	nannels			>>		
GeoSIG	Options				>>		
Time syr	nchronization				>>		
L			Back	Load from De	vice Save Changes	Apply and Restart	

Figure 49: Configure number of Output Streams

• Go to *Configuration* → *Stream Parameters* to edit the stream parameters. See Table 5 for additional information.

Home Configura	ation Status and Maintena	ince Data Explorer	Help Log	jout GeoSiG
Data Acquisition	Configuration Manager	Network Web In	terface	
Main menu Stre	eam			
Stream name		Stream	_1	(ì
Stream type		GSBU		• ()
Port configuration		>>		
Channels in the strea	am	3		
List of streamed char	nnels	>>		
Data frames per pack	ket	5		
CRC32 protected pac	ckets			1
Number of padding b	oytes	0		
	Back	Load from Device Save	Changes Apply and Re	estart

Figure 50: Edit Stream Parameters

9.4.2 Via Local Serial Console

• Press 'F' to select the Number of Output Streams. One output stream can have several channels.

```
Configuration
```

```
A) Station description ..... GeoSIG Station
B) Station code ..... GSGMS
C) Location description ..... Default location
D) Seismic network code ..... GS
E) Number of Channels ..... 3
F) Number of Output Streams ..... 1
G) Number of Trigger Sets ..... 1
H) Number of Preset Triggers ..... 0
I) Channel Parameters ..... ->
J) Stream Parameters ..... ->
K) Trigger Parameters ..... ->
M) File Storage and Policy ..... ->
N) Communication Parameters ..... ->
0) Miscellaneous Parameters ..... ->
S) GeoSIG Options ..... ->
T) Time synchronization ..... ->
```

 Press 'J' to get to the Stream Parameters menu to adjust the settings of the output streams. The following menu appears:

```
Configuration | Stream

A) Stream name ...... Stream_1

B) Stream type ..... GSBU

C) Port configuration ..... ->

D) Channels in the stream ..... 3

E) List of streamed channels ... ->

F) Data frames per packet ..... 5 (0x05)

G) CRC32 protected packets ..... No

H) Number of padding bytes .... 0 (0x00)
```

• Each output stream can be adjusted according to your wishes. To change the output stream press '+' or '-'. The following parameters can be adjusted:

'+' :	and '	-' can be used to chang	e between the cha	nnels			
Stre	eam I	name	User selectable	Name of the output stream			
Stre	eam t	type	GSBU	Streaming possibly in GSBU format only			
	Cor	nmunication Port	TCP/IP	Streaming over the network			
ис	Protocol		TCP(SERVER)	GeoDAS software or any other client supporting the selected protocol connects to the IP address config- ured under 'IP Address' for data streaming			
guratic		Network Port	User selectable	Server port listening for incoming connections			
Port configuration	nbituos trod		1200 2400 4800 9600 19200 38400 57600 115200	Baud rate of the serial data stream. Make sure that the serial port of the computer is configured to the same baud rate.			
Cha	annel	Is in the stream	User selectable	Number of channels which should be streamed			
s	'+' a	and '-' can be used to c	hange the channe	S			
List of streamed channels		signed channel name	User selectable	Depending on the number of channels, for every channel a different source can be selected; the source can be selected by pressing ' A '.			
	Data frames per packet		User selectable	Specifies the packet length of the streams (one data frame is equal to 200 ms). For example if '5' is selected, then every second a packet with the last second of data will be sent.			
CR	C32 µ	protected packets	Yes	Enable CRC32 protection for the stream			
Nui	mber	of padding bytes	<i>No</i> User selectable	Disable CRC32 protection for the stream Add the specified number of padding bytes to the stream			

Table 5: Data streaming configuration menu structure

9.4.3 Set up of Data Streams

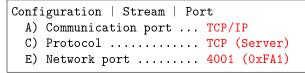
This chapter will describe how to set up an instrument for data streaming.

9.4.3.1 In the Web Interface or by GeoDAS

- Connect to the Web Interface and configure the number of the Data Streams in the field *Configuration* → *Number of Output Streams*. One output stream can have several channels.
- Go to *Configuration* → *Stream Parameters* to adjust the settings of the output streams.

9.4.3.2 Via Local Serial Console

- Connect to the instrument and press 'F' to select the Number of Output Streams. One output stream can have several channels.
- Press 'J' to get to the Stream Parameters menu to adjust the settings of the output streams.
- Adjust the settings according to chapter 9.4. Carefully select the settings in the Port Configuration. If you
 want to stream over Ethernet, choose TCP/IP and TCP (Server).



Baud rate

Home	Configurati	on	Status and Maintena	nce Dat	a Explorer	Help	Logout		
Data Acq	uisition	Config	uration Manager	Network	Web Int	erface			
Main m	enu Strea	ım Po	rt						
Commun	ication port				TCP/IP			Ŧ	
Protocol					TCP (Se	erver)		•	1
Network	port				4001				
			Back	Load from De	vice Save	Changes A	pply and Restart		

• If you want to stream over the SERIAL port on the front of the instrument, choose ttyS03.



115200

Back Load from Device Save Changes Apply and Restart

Ŧ

0



• Open *GeoDAS* and go to the menu *Settings* → *Channels of Digitizers...* The following window appears:

Name (three-letter code) D01	1 - A	Add/Modify	Remove	Station	Stream	Full Scale	Unit	HW Channel	DC Correction	F
Name (unree-letter code)		Add/Modity	Remove	V D0100	111	Full Scale		Unit A, Ch 1	Disabled	FI
Type GeoSIG D 183 Digitizer	▼ San	mpling rate	200 🔽	✓ D0100	112	1	g	Unit A, Ch 2	Disabled	
Type GeoSIG D 183 Digitizer	▲ 3an	inpingrate	200 💌	✓ D0100	113	1	ĝ	Unit A, Ch 3	Disabled	
Digitizer Link Type				✓ D0101	121	1	g	Unit B, Ch 1	Disabled	
Digitizer Eink Type				✓ D0101	122	1	g	Unit B, Ch 2	Disabled	
C Local COM or USB port	M7: - Bau	ud rate 1	115200 -	✓ D0101 ✓ D0102	123 131	1	g	Unit B, Ch 3 Unit C, Ch 1	Disabled	
]-		V D0102 V D0102	131 132	1	g	Unit C, Ch 1 Unit C, Ch 2	Disabled	
				+ 00102						
Configured station FIEL Data packets arrive from a remote	LD <u>–</u> Ren	CP: 192. 168. 10	0	¥ D0102	133	1	g	Unit C, Ch 3	Disabled	
C Configured station FIEU C Data packets arrive from a remol	LD v Ren ote computer (virtu	emote port	0 Setup	♥ D0102	133	1	g	Unit C, Ch 3	Disabled	
Configured station FIEL C Data packets arrive from a remol Data packets are forwarded to a re Forward data to serial ports	LD	emote port	0 Setup		133	•	g	Unit C, Ch 3	Disabled	
Configured station FIEL C Data packets arrive from a remol Data packets are forwarded to a re Forward data to serial ports	LD	emote port	0 Setup	✓ D0102	133	1	g	Unit C, Ch 3	Disabled	4
C Configured station FIEU C Data packets arrive from a remol	LD Rer obte computer (virtu remote computer t mnecting at	mote port ual digitizer)	0 Setup	<		•	-		Disabled	4

Figure 51: Channels of Digitizers

- · Adjust the Name, choose any three-letter code for the data stream
- Select as Type the GeoSIG Packet Digitizer
- Press Add/Modify
- Make sure the selected *Sample rate* is the same as in the instrument.
- Choose either the *Local COM port* (if connected over RS-232) or the *Remote host IP address and port* (if connected over Ethernet). The instrument's IP address must be known.
- Check the flag Use channel parameters provided by the digitizer.
- Press OK.
- After a restart of GeoDAS, the window Stations: Data Streams appears:

Geo	SIG Data Acquisition Syste	m - [Stations: Data Str	eams]									-	o ×
🗳 File	Edit View Analyse	Settings Tools Wi	ndow Help										- 8
	- 🏲 🖬 🗗	× •											
ê 🖉	\$\$\$\$\$ \$ \$\$\$\$\$\$\$	++ ++ + + +	: 0 # ==	L L L L									
tation	and Stream	Format	Block Time	GPS status	Lost Data (%)	Trigger	DC Offset	Amplitude	Start Time	Files	Size	Comment	
÷.	ocal Streams , MGMS	3 ch 24 bit 100	08:03:03	No Lock	0	OFF	-0.00658 V -0.000675 V	-0.00904 V -0.00822 V 0.0072 V	Unknown	0	0	Ok	
ė-		24 bit 500 sps	08:14:24	No Lock	0	OFF	-0.00325 mm/s	0.0283 mm/s	Unknown Invalid	0	0	Ok Ok	
	LCC05	24 bit 500 sps	08:14:24	No Lock	ō	OFF	-0.0031 mm/s	0.0203 mm/s	Invalid	ő	ő	Ok	
		24 bit 500 sps	08:14:24	No Lock	0	OFF	0.000144 mm/s	0.016 mm/s	Invalid	0	0	Ok	
to Acc	auisition System is ready										OnLine: 0 OffLine	2 600	DAS 2.30



• To view the data make a right click on the station name (here TST00) and select **Data Monitor**

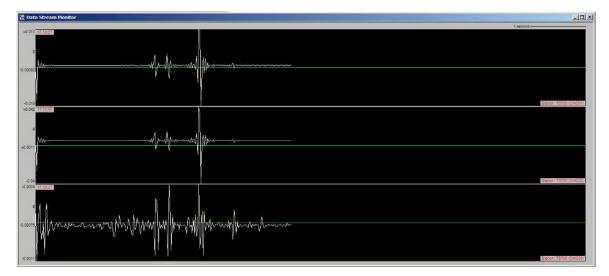


Figure 53: Data stream window



9.5 Trigger Settings

The instrument allows having several triggers with independent sources in parallel.

9.5.1 In the Web Interface or by GeoDAS

• Go to *Configuration* → *Number of Trigger Sets* and configure the number of the desired Trigger Sets.

Home Configuration St	tatus and Maintenance	Data Explorer	Help	Logout	GeoSIG swiss made to measure
Data Acquisition Configura	ation Manager N	letwork Web In	terface		
Main menu					
Station description		GeoSIG	Station		()
Station code		GSGMS	3		1
Location description		Default	location		1
Seismic network code		GS			1
Number of Channels		3			
Number of Output Streams		1			
Number of Trigger Sets		2			
Number of Preset Triggers		0			
Channel Parameters		>>			
Stream Parameters		>>			
Trigger Parameters		>>			
File Storage and Policy		>>			
Communication Parameters		>>			
Miscellaneous Parameters		>>			
Sensors and Virtual Channels		>>			
GeoSIG Options		>>			
Time synchronization		>>			
	Back Load	d from Device Save	e Changes Ap	ply and Restart	

Figure 54: Configure number of trigger sets

• To edit a trigger go to *Configuration* → *Trigger Parameters*. See Table 6 for additional information.

lome	Configuratio	n Status and Mainten	ance Dat	ta Explorer	Help	Logout		GeoSIG
Data Acc	quisition	Configuration Manager	Network	Web Inter	face			
No Trig	ggerset name	Trigger source	Trigger tim	e frame, sec	Co	ount trigger votes by	Ev	vent recording
1 Tri	gger1	Local triggers	3		Ch	annels	Ye	s
2 Trig	gger2	Local triggers	3		Ch	annels	Ye	IS
The above	e table displays : param	several main parameters. Cli eters of the related item are	ick a row to sele displayed in the	ect it. Hold the C panel below. M	trl button to odification o	select multiple rows. The select multiple rows of any parameter is appled	he last clicked row lied to all selected	is displayed in bold and rows
Main m	1 <mark>enu Trigg</mark> e	erset 1 of 2						
Triggerse	et name			Trigger1				1
Trigger s	ource			Local trigg	jers		¥	1
Trigger ti	ime frame, sec			3				1
Count tri	gger votes by			Channels			¥	I
Minimum	number of vote	95		1				1
Monitore	d channels			3				
Trigger c	hannel settings			>>				
Event re	cording							 Image: A set of the set of the
Preeven	t, seconds			5				
Postever	nt, seconds			5				1
Maximur	m event duration	i, seconds		30				1
Stored cl	hannels			6				
List of st	ored channels			>>				
Contribu	te to network tri	ggers						1
		Back	Load from De	vice Save C	hanges	Apply and Restart		

Figure 55: Edit Trigger Parameters



9.5.2 Via Local Serial Console

• Press 'G' to select the Number of Trigger Sets

Confi	iguration
A)	Station description GeoSIG Station
B)	Station code GSGMS
C)	Location description Default location
D)	Seismic network code GS
E)	Number of Channels 3
F)	Number of Output Streams 1
G)	Number of Trigger Sets 1
H)	Number of Preset Triggers 0
I)	Channel Parameters
J)	Stream Parameters
K)	Trigger Parameters>
M)	File Storage and Policy>
N)	Communication Parameters>
0)	Miscellaneous Parameters>
S)	GeoSIG Options
T)	Time synchronization

• Press 'K' to get to the *Trigger Parameters* menu to adjust the settings of the triggers. The following menu appears. In case the number of trigger sets is set to '0' this menu can not be selected.

Confi	guration Triggerset	
A)	Triggerset name	Trigger1
B)	Event recording	No
D)	Alarm activation	No
E)	SMS Alarm Configuration	No
I)	Trigger time frame, sec	3 (0x03)
K)	Monitored channels	3
L)	Trigger settings	->
0)	Be a source of network triggers (received from LAN)	No
P)	Activate on network triggers (received from LAN)	No
Q)	Be a source of network triggers (Interconnection)	No
R)	Activate on network triggers (Interconnection)	No

• Each trigger set can be adjusted according to your wishes. To change the trigger set press '+' or '-'. The following parameters can be adjusted:

riaae	erset		e used to change betv <i>e</i>	User selectable	Name of the trigger set
			ime, sec	User selectable	See chapter 9.5.5 for details
	er sol			Network voting logic Local triggers	Choose the trigger source
	pport triggers through terconnection			Yes	This recorder will broadcast a Network Trig ger Alert (in case the instrument is intercon nected over RS-485 with other instruments as soon as this triggerset becomes active. No trigger through interconnection
ins	Serial numbers of networked instruments			User selectable	Whitespace or comma separated list of in struments which contribute to the Networ voting logic.
	Contribute to network triggers			User selectable	If this option is active, this recorder wi broadcast a Network Trigger Alert
			hannels	User selectable	Number of channels which will be mon tored by the selected trigger set
Col	Count trigger votes by Minimum number of votes			Channels Channel weight Sensor Station	Choose one trigger vote in this list
				User selectable	Define the number of incoming network trig gers of the same name that have to be ob served in order to make this device trigger
		-	ed channel name	User selectable	Configure the first Data Source for the channel.
	Trig	gger	filter	Yes No	Trigger filter is used as defined under Filte Parameters Trigger filter is not used
			Filter type	Highpass	A Highpass will attenuate all frequencie
				Lowpass	below a defined frequency. A Lowpass will attenuate all frequencie above a defined frequency.
ettings				Bandpass	A Bandpass will attenuate all frequencie below a defined frequency and above a defined frequency.
Trigger channel se		Filter parameters	Filter order	User selectable	Defines how much the attenuation in creases per decade below the Low Fre quency Corner respectively above the Hig Frequency Corner. The attenuation in creases by the filter order multiplied with 2 dB. User can choose between these values [2-4-6-8-10-12]
		L	Flow, Hz	User selectable	The Low Frequency Corner of the filter the point where the attenuation is 3 dB. Be low this frequency, attenuation will increas depending on the Filter Type
			Fhigh, Hz	User selectable	The High Frequency Corner of the filter the point where the attenuation is 3 dE Above this frequency, attenuation will in crease depending on the Filter Type

Level Trigger Threshold (channel units) Min. level exceedance, sec STA/LTA Trigger STA/LTA trigger ratio STA/LTA detrigger ratio Min. ratio exceedance,	Yes No User selectable User selectable Vser selectable User selectable User selectable User selectable	Level trigger is enabled Level trigger is disabled As soon the data is above the configured threshold the trigger is activated The threshold or STA/LTA ratio has to be ex- ceeded at least for the configured time in seconds to active the trigger STA/LTA trigger is enabled STA/LTA trigger is disabled Length of STA time window, seconds Length of LTA time window, seconds As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured STA/LTA ratio again the trigger is deacti-	
(channel units) Min. level exceedance, sec STA/LTA Trigger STA time frame, sec LTA time frame, sec STA/LTA trigger ratio STA/LTA detrigger ratio	User selectable User selectable Yes No User selectable User selectable User selectable	As soon the data is above the configured threshold the trigger is activated The threshold or STA/LTA ratio has to be ex- ceeded at least for the configured time in seconds to active the trigger STA/LTA trigger is enabled STA/LTA trigger is disabled Length of STA time window, seconds Length of LTA time window, seconds As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured	
(channel units) Min. level exceedance, sec STA/LTA Trigger STA time frame, sec LTA time frame, sec STA/LTA trigger ratio STA/LTA detrigger ratio	User selectable Yes No User selectable User selectable User selectable User selectable	threshold the trigger is activated The threshold or STA/LTA ratio has to be ex- ceeded at least for the configured time in seconds to active the trigger STA/LTA trigger is enabled STA/LTA trigger is disabled Length of STA time window, seconds Length of LTA time window, seconds As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured	
Min. level exceedance, sec STA/LTA Trigger STA time frame, sec LTA time frame, sec STA/LTA trigger ratio STA/LTA detrigger ratio	Yes No User selectable User selectable User selectable	The threshold or STA/LTA ratio has to be ex- ceeded at least for the configured time in seconds to active the trigger STA/LTA trigger is enabled STA/LTA trigger is disabled Length of STA time window, seconds Length of LTA time window, seconds As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured	
sec STA/LTA Trigger STA time frame, sec LTA time frame, sec STA/LTA trigger ratio STA/LTA detrigger ratio	Yes No User selectable User selectable User selectable	ceeded at least for the configured time in seconds to active the trigger STA/LTA trigger is enabled STA/LTA trigger is disabled Length of STA time window, seconds Length of LTA time window, seconds As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured	
STA/LTA Trigger STA time frame, sec LTA time frame, sec STA/LTA trigger ratio STA/LTA detrigger ratio	No User selectable User selectable User selectable	seconds to active the trigger STA/LTA trigger is enabled STA/LTA trigger is disabled Length of STA time window, seconds Length of LTA time window, seconds As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured	
STA time frame, sec LTA time frame, sec STA/LTA trigger ratio STA/LTA detrigger ratio	No User selectable User selectable User selectable	STA/LTA trigger is enabled STA/LTA trigger is disabled Length of STA time window, seconds Length of LTA time window, seconds As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured	
STA time frame, sec LTA time frame, sec STA/LTA trigger ratio STA/LTA detrigger ratio	No User selectable User selectable User selectable	STA/LTA trigger is disabled Length of STA time window, seconds Length of LTA time window, seconds As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured	
LTA time frame, sec STA/LTA trigger ratio STA/LTA detrigger ratio	User selectable User selectable User selectable	Length of STA time window, seconds Length of LTA time window, seconds As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured	
LTA time frame, sec STA/LTA trigger ratio STA/LTA detrigger ratio	User selectable User selectable	Length of LTA time window, seconds As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured	
STA/LTA trigger ratio STA/LTA detrigger ratio	User selectable	As soon the data is above the configured STA/LTA ratio the trigger is activated As soon the data is below the configured	
STA/LTA detrigger ratio		STA/LTA ratio the trigger is activated As soon the data is below the configured	
	User selectable	As soon the data is below the configured	
		•	
Min. ratio exceedance,		vated	
sec	User selectable	The threshold or STA/LTA ratio has to be exceeded at least for the configured time in seconds to active the trigger	
Clamp LTA during event	Yes	As soon the data is below the configured STA/LTA ratio again the trigger is deactivated	
	No		
		See chapter 9.5.4 for details	
recording		An event file will be recorded on a trigger No event file will be recorded on a trigger	
event	-	Pre-Event time, seconds	
		Post-Event time, seconds	
event duration, sec	User selectable	Maximum duration of an event in seconds. After this time, an event file will be closed	
Processing	PGM parameters	An event file will be processed and a sum- mary report will be created	
	-	The event file will not be processed	
		Number of channels, which should be stored into an event file in case of a trigger	
Assigned channel name	User selectable	Depending on the number of channels, for every channel a different source can be selected; the source can be selected by pressing ' A '.	
	Channel trigger weight, % recording event t-event . event duration, sec Processing channels '+' and '-' can be used to chang	No Channel trigger weight, % User selectable recording Yes recording Yes No User selectable event User selectable event duration, sec User selectable Processing PGM parameters No User selectable event duration, sec User selectable Processing PGM parameters No User selectable event duration User selectable Processing PGM parameters Vo User selectable	

Alarn	n acti	vation	Yes	An alarm relay will be activated on a trigger
-		e in case alarm relay	No	No alarm relay will be activated on a trigger
	card is installed)			This option has an effect only in case the instrument has internal alarm relays
Alé	Alarm output to activate		AL1, AL2,	select the alarm output you want to activate in case of a trigger. (*) Not available in all models
			AL3*, AL4*	
Ala	Alarm deactivation delay		User selectable	Time in seconds the alarm relay deacti- vates again after the signal falls below the trigger threshold. Can be compared to the post event time for the recording
		cknowledge	User selectable	Digital input to acknowledge and reset the alarm. See appendix A
Se	Send SOH upon alarm activation		Yes	Defines whether a SOH information will be cre-
			No	ated and transferred to the server upon alarm deactivation
SMS	-		Yes No	An SMS will be sent upon a trigger No SMS will be sent upon a trigger
				ular modem is connected to the instrument.)
uo	Nu	mber of Recipients	User selectable	The number of recipients of the SMS alarm can be selected
ati		'+' and '-' can be used to c		
SMS Alarm Configuration	Recipient	Recipient	User selectable	Phone number of the recipient. Use num- bers only, no '+' or any other character al- lowed. The recipient can be selected by pressing 'A'.

 Table 6: Trigger settings configuration menu structure

9.5.3 STA/LTA trigger

The STA/LTA (Short Time Average/Long Time Average) ratio trigger computes the short term and long term averages of the input (sensor) signal. When the STA exceeds a pre-selected multiple of the LTA (STA/LTA ratio), the instrument begins to record data. The advantage of this trigger type is that the trigger sensitivity adapts to the seismic background signal. With an increasing noise level the trigger sensitivity decreases. The probability of having a false trigger due to noise will be minimised if a long STA averaging time is selected. Obviously, the STA should not be chosen longer than the shortest event of interest. In addition, the STA should be shorter than the pre-event time. If not, the initial portion of an event may not be recorded. During the steady state of the system, the STA and the LTA will be nearly equal. The shorter STA averaging period, the more quickly it will change with the input.

9.5.4 Trigger Weight

To activate a trigger the total trigger weight must be equal or bigger than 100%. By default all channels have a weight of 100%, which means if a threshold is exceeded on one channel only, then the trigger is activated. If the trigger weight were reduced on all channels to 50%, then at least on two channels the threshold would have to be exceeded to reach 100% (50% + 50%) and activate the trigger. See Figure 56 for details.



9.5.5 Trigger Time Frame

Depending on the settings, it can be that threshold must be exceeded on two or more channels to activate the trigger. The time of the threshold-exceedances might be slightly different on the channels, especially if two sensors are connected and installed on different places. To make sure that even due to this time difference the trigger is working a *trigger time frame* can be defined. See Figure 56 for details.

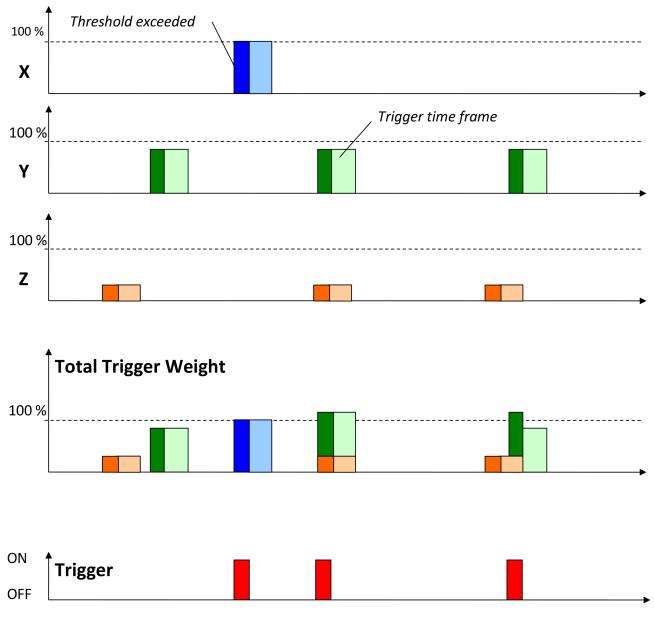


Figure 56: Overview of trigger weight and trigger time frame

9.6 Preset Trigger Settings

The instrument allows having several predefined triggers, e.g. time triggers in parallel.

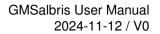
9.6.1 In the Web Interface or by GeoDAS

• In the field *Configuration* → *Number of Preset Triggers* the total number of the preset triggers must be configured first so that the *Parameters of Preset Triggers* menu appears.

Home	Configuration	Status and Maintenanc	e Data Ex	xplorer Help	Logout	
Data Acc	uisition Con	figuration Manager	Network	Web Interface		
Main m	enu					
Station d	escription		C	GeoSIG Station		0
Station c	ode		(GSGMS		1
Location	description		l	Default location		1
Seismic	network code		C	GS		•
Number	of Channels		:	3		
Number	of Output Streams			1		
Number	of Trigger Sets			1		
Number	of Preset Triggers		1	2		
Channel	Parameters			>>		
Stream F	arameters			>>		
Trigger F	arameters			>>		
Paramet	ers of Preset Trigger	s		>>		
File Stor	age and Policy			>>		
Commur	ication Parameters			>>		
Miscellar	neous Parameters			>>		
Sensors	and Virtual Channel	s	[>>		
GeoSIG	Options			>>		
Time syn	chronization			>>		
L		Back Lo	ad from Device	Save Changes	Apply and Restart	

Figure 57: Configure number of Preset Triggers

• Go to *Configuration* → *Parameters of Preset Triggers* to adjust the parameters of the preset triggers. See Table 7 for additional information.



Ge	0	SIC	Jure W WAN
SWISS IT	aae u	meas	ure יןי
88	/ 1	36	5

Hom	е	Configura	tion	Status and Maintenand	ce Data	Explorer	Help	Logout	
Data	a Acqui	sition	Cont	figuration Manager	Network	Web Inter	face		
No	Prese	t trigger i	name	First trigget type			Stored channe	Is Store data of	virtual channels
1	Trigg	er1		After Startup			1	No	
2	Trigge	er2		After Startup			1	No	
_		para	ameters	of the related item are dis				ct multiple rows. The last cli / parameter is applied to all	cked row is displayed in bold and selected rows
Ma	in mei	nu Tîm	eTable	Trigger 1 of 2					
Pre	eset trigg	er name				Trigger1			
Firs	st trigget	type				After Start	tup	•	
Du	ration, s	econds				30			1
Tot	al numb	er of trigge	irs			1			
Sto	ored cha	nnels				1			
List	t of store	ed channel	s			>>			
L				Back Lo	oad from Devi	ce Save C	hanges Apply	y and Restart	

Figure 58: Edit Preset Triggers

9.6.2 Via Local Serial Console

• Press 'H' to select the Number of Preset Triggers

Configuration
A) Station description GeoSIG Station
B) Station code GSGMS
C) Location description Default location
D) Seismic network code GS
E) Number of Channels 3
F) Number of Output Streams 1
G) Number of Trigger Sets 1
H) Number of Preset Triggers 1
I) Channel Parameters
J) Stream Parameters
K) Trigger Parameters
L) Parameters of Preset Triggers>
M) File Storage and Policy>
N) Communication Parameters>
O) Miscellaneous Parameters>
S) GeoSIG Options
T) Time synchronization

• Press 'L' to get to the *Parameters of Preset Triggers* menu to adjust the settings of the preset triggers. The following menu appears only if the *number of preset triggers* is higher than '**0**'.

Configuration | TimeTableTrigger A) Preset trigger name Trigger1 B) First trigger type After Startup H) Duration, seconds 30 (0x1E) I) Total number of triggers 1 (0x01) O) Stored channels 1 P) List of stored channels ->

• Each trigger set can be adjusted according to your wishes. To change the preset trigger set press '+' or '-'. The following parameters can be adjusted:

' +'	and '-' can be used to chang	e the preset triggers			
Pre	eset trigger name	User selectable	Name of the preset trigger set		
Fir	st trigger type	Manual Trigger	A trigger is activated/stopped by the user command TRIGGERNOW/STOPTRIGGER sent either from the console or remotely from a server		
		After Event	A trigger is activated after recording of any event file		
		After Startup	First trigger is activated after the instrument startup		
		, Date and Time	First trigger is activated at the defined date/time		
		Hardware Trigger	The trigger is activated by hardware		
	Duration, sec	User selectable	The duration the scheduled trigger will be active		
	Delay after event, sec	User selectable	If After Event is selected, then the time between the end of the event to the beginning of the activation of the preset trigger can be configured		
	Pre-event, sec	User selectable	If After Event is selected, duration of the pre-event		
ĺ	Post-event, sec	User selectable	If After Event is selected, duration of the post-event		
ĺ	First trigger time, year	User selectable	Date and time of the first trigger		
	First trigger time, month	User selectable			
	First trigger time, day	User selectable			
	First trigger time, hour	User selectable			
	First trigger time, minute	User selectable			
	Total number of triggers	User selectable	After reaching the configured number of triggers the preset trigger will not be activated anymore		
Sto	ored channels	User selectable	Number of channels which should be stored into an event file in case of a trigger		
S	'+' and '-' can be used to ch	ange the preset trigg	ers		
List of stored channels	Assigned channel name	User selectable	Depending on the number of stored channels different sources can be selected. Select the source by pressing ' A '.		
			figuration monu structuro		

Table 7: Preset trigger configuration menu structure



9.7 File Storage and Policy

It can be configured in the instrument how all the files should be treated.

9.7.1 In the Web Interface or by GeoDAS

• Go to *Configuration* → *File Storage and Policy*

Home Configuration	Status and Maintena	ince Data Explo	rer Help	Logout	
Data Acquisition	Configuration Manager	Network W	eb Interface		
Main menu					
Station description		Ge	oSIG Station		
Station code		GS	GMS		
Location description		Def	ault location		
Seismic network code		GS			
Number of Channels		3			
Number of Output Stream	ns	0			
Number of Trigger Sets		1			
Number of Preset Trigge	rs	0			
Channel Parameters		>>			
Trigger Parameters		>>			
File Storage and Policy		>>			
Communication Paramet	ers	>>			
Miscellaneous Paramete	rs	>>			
Sensors and Virtual Char	nnels	>>			
GeoSIG Options		>>			
Time synchronization		>>			
L	Back	Load from Device	Save Changes A	pply and Restart	

Figure 59: File Storage Settings

- Parameters for the following file types can be configured (see Filetypes in Table 8)
 - SOH State of health information and requested data files
 - LOG System log files
 - TRG Events and PGM files
 - RBF Ringbuffer files
 - MAN Scheduled manual recordings
 - MSC Miscellaneous files
- See Table 8 for more information about the parameters which can be configured.

9.7.2 Via Local Serial Console

Conf	iguration	
(A)	Station description	GeoSIG Station
B)	Station code	GSGMS
C)	Location description	Default location
D)	Seismic network code	GS
F)	Number of Output Streams	1
G)	Number of Trigger Sets	1
H)	Number of Preset Triggers	1
I)	Channel Parameters	->
J)	Stream Parameters	->
K)	Trigger Parameters	->
L)	Parameters of Preset Triggers	->
M)	File Storage and Policy	->
N)	Communication Parameters	->
0)	Miscellaneous Parameters	->
S)	GeoSIG Options	->
T)	Time synchronization	->

• To adjust the settings of the file storage, press 'M'; the File Storage and Policy menu will appear.

- Parameters for the following file types can be configured (see Filetypes in Table 8)
 - SOH State of health information and requested data files
 - LOG System log files
 - TRG Events and PGM files
 - RBF Ringbuffer files
 - MAN Scheduled manual recordings
 - MSC Miscellaneous files
- See Table 8 for more information about the parameters which can be configured.

Sys	System reserved spaceUser selectableAmount of memory reserved for the operain [Mb]. Keep 12 Mb by default.		Amount of memory reserved for the operating system in [Mb]. Keep 12 Mb by default.	
the length of one ringbuff		Permanent data will be stored in ringbuffer files; here the length of one ringbuffer file in minutes can be specified. After this time the file will be closed and a new one started.		
	Disk space quota	User selectable	Reserved memory on the SD/CF-Card for the SOH files in [%]	
	If over quota Delete oldest files		In case the reserved memory is full the oldest files will be deleted first	
	Life time	User selectable	After the configured time in [days] the files will be deleted from the SD/CF-Card	
Filetypes	SectorTransfer priorityNever Transfer Low Mid High HighestTransfer orderNewest first		In case a lot of files have to be transferred, the priority of the file upload can be configured here. If Never Transfer is configured, then no files will be uploaded.	
			Most recent files are transferred first	
		Oldest first	Most old files are transferred first	
	Delete transferred	Yes	Files will be deleted after upload to the server	
		No	Files will be not deleted after upload to the server	

Table 8: File Storage and Policies menu structure

• Additionally the system log files can be compressed. This can be separately enabled under the menu point D) *System log files*:

Compress files	Yes	Files will be sent gzip-compressed (.gz)
	No	Original text files will be sent (default)

• State of health and event files have two more configuration options:

Transfer protocol	Standard (Custom)	Default option. This protocol also is used to transfer any other types of files.
	HTTPS	This option can be used to upload data files to the HTTPS servers only. Downloads are not supported.
Directory for uploads	User selectable	Name of the directory on the HTTPS server where up- loaded files will be placed

9.8 Communication Parameters

This chapter explains how to set up the server parameters.

9.8.1 In the Web Interface or by GeoDAS

• Go to *Configuration* → *Communication Parameters*

Home	Configura	ation	Status and Maintena	ance Da	ata Explorer	Help	Logout	
Data Ac	Data Acquisition Configu		nfiguration Manager	Network	Web Inte	erface		
Main n	menu							
Station	description				GeoSIG	Station		•
Station of	code				GSGMS			•
Location	on description				Default lo	ocation		•
Seismic	c network code	e			GS			1
Number	er of Channels				3			
Number	er of Output Str	reams			0			
Number	er of Trigger Se	ets			2			
Number	er of Preset Tri	ggers			0			
Channe	el Parameters				>>			
Trigger	Parameters				>>			
File Sto	orage and Poli	icy			>>			
Commu	unication Para	imeters			>>			
Miscella	aneous Param	neters			>>	•		
Sensor	Sensors and Virtual Channels			>>				
GeoSIC	G Options				>>			
Time sy	ynchronization	1			>>			
			Back	Load from D	evice Save	Changes Ap	pply and Restart	

Figure 60: Communication Parameters

- Tick the flag *Contact remote servers* to configure a connection to a remote server.
- · Configure the number of servers to contact in the field Number of servers
- Then go to *Server Parameters* to adjust the parameters as shown in the Table 9.
- In case the instrument should act as Server for other GMS instruments, tick the flag *Server mode for other instruments* and follow the steps as described in chapter 9.8.2.1



Home Configuration Status a	nd Maintenance	Data Explorer	Help	Logout	
Data Acquisition Configuration	Manager Netw	ork Web Inter	face		
Main menu Communication					
Contact remote servers					1
Number of servers		1			
Time interval, sec		10			()
Maximum files per session		10			1
Connect if there are new files		V			1
Server Parameters		>>			
Server mode for other instruments					1
SeedLink server					1
Accept connections					1
Try next server on any transfer error					1
L	Back Load fro	m Device Save C	hanges Appl	y and Restart	

Figure 61: Edit Communication Parameters

9.8.2 Via Local Serial Console

```
Configuration
 A) Station description ..... GeoSIG Station
 B) Station code ..... GSGMS
 C) Location description ..... Default location
 D) Seismic network code ..... GS
 E) Number of Channels ..... 3
 F) Number of Output Streams ..... 1
 G) Number of Trigger Sets ..... 1
 H) Number of Preset Triggers ..... 0
 J) Stream Parameters ..... ->
 K) Trigger Parameters ..... ->
 M) File Storage and Policy ..... ->
 N) Communication Parameters ..... ->
 0) Miscellaneous Parameters ..... ->
 S) GeoSIG Options ..... ->
 T) Time synchronization ......->
```

• Press 'N' to get to the *Communication Parameters* menu to adjust the settings of the file storage. The following menu appears:

• The following parameters can be adjusted:



Cont	act remote servers	Yes	The instrument connects to the configured data server(s)
		No	The instrument does not connect to any data servers
Νι	Imber of servers	User selectable	Number of data servers. If the instrument cannot connect to the first data server it will connect to the second data server; if this one is down it con- nects to the third and so on. Scanning of servers stops after first successful connection.
Ti	me interval, sec	User selectable	Interval of connection to data servers in seconds
Ma	aximum files per session	User selectable	Maximum number of files, which will be uploaded during one session. Although data servers support concurrent connections, this parameter helps distributing the load of data processing by the server among several instruments.
Co file	onnect if there are new es	Yes	Instrument connects to the server if there are new files recorded and ready to be transmitted.
		Νο	Instrument connects to the server if there are new files recorded and ready to be transmitted. Instrument does not connect to the server if there are new files. It just connects periodically as defined with the parameter Time interval .
	Server IP Address	User selectable	IP address of the data server
	Protocol	Custom	Default protocol of communication
		HTTPS	This protocol can be selected only if you upload SOH and/or EVT files to HTTPS servers
	Port	User selectable	If Custom: Communication port of the data server
	Transfer timeout, sec	User selectable	Instrument gives up trying to contact the server after the configured timeout in seconds.
	Network triggers	Yes	Triggers are sent to the server for event detection as described in chapter C.2
		No	Triggers are not sent to the server
ters	Connect through PPP	Yes	Instrument connects to the data through PPP link
Iramet	link	Νο	Instrument does not connect to the data server through PPP
Server Parameters	Number of failures to give up	User selectable	Number of trials until giving up
Se	Keep connected to the server	Yes No	Instrument connects to the data through PPP link
	Server port for permanent links	User selectable	The port which should be used to keep the con- nection between the server open
	Always connect to this server	Yes	Instrument will always try connecting to this server, even if a file has already been delivered to another server
		No	Disable this function
	Connect failures before network error	User selectable	Number of failure before displays network error

	er mode for other uments	Yes	The instrument acts as a data server for other in- struments. See chapter 9.8.2.1 for more details
		No	The instrument does not act as a data server.
	onnect by requests om clients	Yes	Instrument connects to the server if there are new files recorded and ready to be transmitted.
		Νο	Instrument doesn't connect to the server if there are new files recorded and ready to be transmitted.
Po	rt for incoming	User selectable	Port for incoming connections.
co	nnections		Other instruments have to set the same port un- der Server parameters
Se	cure authentication	Yes	Secure authentication (SSL encryption) enabled.
		No	Secure authentication (SSL encryption) disabled
Nu	umber of clients	User selectable	Number of clients that this server can used
	'+' and '-' can be used to cl	hange between the	e servers
	Client IP Address	User selectable	IP of the client instrument which connects to this instrument.
Clients Parameters	Client serial number	User selectable	Serial number of the client instrument. Use 000000 to allow instruments with any serial numbers to connect.
Par	Transfer timeout, sec	User selectable	Network timeout in seconds.
lients	Data forwarding	Yes	Data from the data server will be forwarded to the client instruments and the other way round.
0		No	Data will not be forwarded.
	Network triggers	Yes	Triggers are sent to the server for event detection as described in chapter C.2
		No	Triggers are not sent to the server
Seed	Link server	Yes	SeedLink server is enabled for all data chan- nels, and data streams can be received by any SeedLink client from the instrument's IP.
		No	The instrument does not act as a Seedlink server.
Acce	pt connections	Yes	Allows GeoDAS to connect to the instrument. Works only if the IP address of the instrument is known and reachable.
		No	Do not accept connections from new clients
-	ext server on any fer error	Yes	If Yes, In case of communication error contact the next server out of the list of Configured Servers.
		No	Don't try to contact the next server

Table 9: Communication Parameters menu structure

9.8.2.1 Instrument acts in the Server Mode

The instrument can be configured to act as a server. In this case other instruments can upload their files to this instrument. The server-instrument can then forward the data to a main server by another communication medium. For example, two instruments (clients) upload their files to the instrument-server, which forwards the data to a GeoDAS server by the cellular modem.

The serial numbers and IP addresses of all client instruments must be configured in the server so that requests

from GeoDAS can be correctly forwarded.

This setup is not recommended, as it creates a big load for the server instrument. Special care must be taken during design and setup. Whenever possible, all instruments shall have a direct communication path to the GeoDAS server.

Serve	er mode	Yes	The instrument acts as a data server for other in- struments
		No	The instrument does not act as a data server
Po	rt for incoming connections	User selectable	Port for incoming connections. Other instruments have to set the same port under Server parameters.
Se	cure authentication	Yes	Secure authentication (SSL encryption) enabled
		No	Secure authentication (SSL encryption) disabled
	'+' and '-' can be used to cha	nge between the c	lients
Ş	Client IP Address	User selectable	IP address of the client instrument which con- nects to this instrument
Client Parameters	Client serial number	Custom	Serial number of the client instrument. Use 000000 to allow instruments with any serial numbers to connect
nt P	Transfer timeout	User selectable	Network timeout in seconds
Cliei	Data forwarding	Yes	Data from the data server will be forwarded to the client instruments and the other way round.
		No	Data will not be forwarded
	Network triggers	Yes	Network triggers will be sent to the server
		No	Network triggers will not be sent to the server

Table 10: Server Parameters menu structure



9.9 Miscellaneous Parameters

The Baseline Correction, State of Health files, messaging and debugging can be adjusted under this menu.

9.9.1 In the Web Interface or by GeoDAS

• Go to *Configuration* → *Miscellaneous Parameters*

Home	Configura	tion	Status and Maintenar	nce D	ata Explorer	Help	Logout			
Data Acc	luisition	Conf	iguration Manager	Network	Web Int	erface				
Main menu										
Station of	lescription				GeoSIG	Station				
Station of	ode				GSGMS					
Location	description				Default I	ocation				
Seismic	network code	I			GS					
Number	of Channels				3					
Number	of Output Str	eams			0					
Number	of Trigger Se	ts			1					
Number	of Preset Trig	gers			0	0				
Channel	Parameters				>>					
Trigger F	Parameters				>>					
File Stor	age and Polic	;y			>>					
Commu	nication Para	neters			>>					
Miscella	neous Param	eters			>>					
Sensors	and Virtual C	hannels			>>					
GeoSIG	Options				>>					
Time syr	chronization				>>					
L			Back	Load from D	evice Save	Changes A	oply and Restart			

Figure 62: Miscellaneous Parameters

Home	Configura	ation	Status and Maintena	nce Data	Explorer H	elp Logout		GeoSIG
Data Acc	quisition	Con	figuration Manager	Network	Web Interface	l.		
Main n	nenu Mis	cellane	:0 U 5	_				
Offset d	etection time	sec			10			①
Offset co	prrection time	, sec			5			1
Offset co	prrection cou	nts			1			1
MiniSEE	D record len	gth			512		¥	1
Extende	d MiniSEED	format						1
State of	health				>>			
Test con	figuration				>>			
Messagi	ng and debu	gging			>>			
Instrume	ent configurat	ion optic	ns		>>			
Time for	sending dail	y logfile,	hour		0			1
Time for	sending dail	y logfile,	minute		0			1
Signal p	rocessing				>>			
			Back	Load from Dev	ice Save Chan	ges Apply and Restart	t	



Adjust the parameters as shown in the Table 11.

9.9.2 Via Local Serial Console

```
Configuration
 A) Station description ..... GeoSIG Station
 B) Station code ..... GSGMS
 C) Location description ..... Default location
 D) Seismic network code ..... GS
 E) Number of Channels ..... 3
 F) Number of Output Streams ..... 1
 G) Number of Trigger Sets ..... 1
 H) Number of Preset Triggers ..... 1
 I) Channel Parameters ..... ->
 J) Stream Parameters ..... ->
 K) Trigger Parameters ..... ->
 L) Parameters of Preset Triggers ... ->
 M) File Storage and Policy ..... ->
 N) Communication Parameters ..... ->
 0) Miscellaneous Parameters ..... ->
 S) GeoSIG Options ..... ->
 T) Time synchronization ..... ->
```

• Press 'O' to get to the *Miscellaneous Parameters* menu to adjust time synchronisation, offset detection, and other settings. The following menu appears:



Configuration Miscellaneous
A) Offset detection time, sec 10 (0x0A)
B) Offset correction time, sec 5 (0x05)
C) Offset correction counts 1 (0x01)
D) MiniSEED record length
E) Extended MiniSEED format Yes
H) State of health \ldots
I) Test configuration $\dots \dots \dots \dots \dots \dots \dots ->$
J) Messaging and debugging
K) Instrument configuration options $\dots \dots ->$
L) Time for sending daily logfile, hour 0 (0x00)
M) Time for sending daily logfile, minute 0 (0x00)
S) Signal processing

The following parameters can be adjusted:

Offset detection time, sec	User selectable	Time in seconds, which the input values is mea- sured after startup to define the offset. This 'static' offset will then compensate all channels with acti- vated offset compensation.
Offset correction time, sec	User selectable	The instrument continuously takes the average over the number of seconds specified. If this value is pos- itive it will subtract the number of Offset Correction Counts defined below. If the value is negative, the Offset Correction Counts will be added to the sig- nals. This is only active for channels where the off- set compensation is activated and is used to com- pensate 'dynamic' offset which changes over time (E.g. because of temperature changes).
Offset correction counts	User selectable	The number of counts which will be added to the sig- nal, respectively removed from the signal, depend- ing on the signum of the continuously calculated av- erage over the Offset Correction Time
MiniSEED record length	User selectable	Length of one data block inside the miniSEED file. In most applications, the default value 512 shall be kept.
Extended MiniSEED format	Νο	MiniSEED files do not include any additional in- formation. This option shall be used only if you face any problems in reading extended format of miniSEED files with your customized software.
	Yes (default)	MiniSEED files include configuration and state of health information, which is encapsulated into the blockettes 2000. When you open such files with GeoDAS, there is no need to enter LSB factors and units. This feature is supported from GeoDAS ver- sion 2.21.
Include SOH information in miniSEED	Yes	Include SOH information in each MiniSEED file as Blockette 2000 record.
	No (default)	Do not include SOH information in each MiniSEED file as Blockette 2000 record.
Include configuration in miniSEED	Yes	Include current config.xml information in each MiniSEED file as Blockette 2000 record

Swiss made to measure	
101 / 136	

	S	OH report type	None Standard	No SOH file will be created SOH files will be created and uploaded to the server according to the settings in chapter 9.7
		SOH reporting interval, days	User selectable	If Standard selected, defines the interval between the SOH reports in days, hours and minutes
		SOH reporting interval, hours	User selectable	
		SOH reporting interval, minutes	User selectable	
		Time of the first	Startup	First SOH report will be created at startup
		SOH report	Random	Time of the first SOH is random. This is to avoid all instruments using the network at the same time.
alth			User defined	First SOH report will be created at the user defined time.
State of health		First SOH report time, hours	User selectable	If User defined is selected, defines the hour and minute of the first SOH report
Sta		First SOH report time, minutes	User selectable	
	A	ctivate alarm on	Yes	Activates an alarm relay in case of an error.
	e	rrors or	No	Alarm relay will not be activated in case of an error.
		ctivate alarm when ystem is inactive	Yes	Alarm relay is activated in case armdas is not run- ning.
			No	Alarm relay will not be activated.
		Error and inactivity	AL1	Select the alarm relay if at least one of the condition
		alarm output	AL2	above is <i>Yes</i>
			AL3	
			AL4	

	Acti	ivate alarm on	Yes	Alarm relay is activated in case armdas is not run-
	erro	ors		ning.
			Νο	Alarm relay will not be activated.
		ctivate alarm on elected error only	Yes	Selected alarm relay is activated on selected errors only. See below options
		-	No	Selected alarm relay is activated on all errors.
		Alarm on file-	Yes	Enable the alarm of filesystem errors
		system errors	Νο	Disable the alarm of filesystem errors
		Alarm on memory	Yes	Enable the alarm of memory errors
		errors	No	Disable the alarm of memory errors
		Alarm on timing	Yes	Enable the alarm of timing errors
		errors	No	Disable the alarm of timing errors
-		Alarm on DSP	Yes	Enable the alarm of DSP errors
nea		errors	Νο	Disable the alarm of DSP errors
State of health (continued)		Alarm on network	Yes	Enable the alarm of network errors
(co		errors	Νο	Disable the alarm of network errors
alth		Alarm on disk	Yes	Enable the alarm of disk errors
hei		errors	Νο	Disable the alarm of disk errors
e ol		Alarm on aux	Yes	Enable the alarm of aux errors
Stat		errors	Νο	Disable the alarm of aux errors
		Alarm on processing	Yes	Enable the alarm of processing errors
		errors	No	Disable the alarm of processing errors
		Alarm on misc	Yes	Enable the alarm of misc hardware errors
_		hardware errors	Νο	Disable the alarm of misc hardware errors
	-	nitor state of current o sensors	Yes	It monitors the sensor offset for its valid range. If sensor offset is outside of its valid range a sensor failure error message will be issued.
			No	Disable the monitor state of the current loop sensor
	Sen	d SOH on changing	Yes	Enable send SOH on changing error state.
	erro	or state	No	Disable send SOH on changing error state
	Sen	d SOH on changing	Yes	Enable send SOH on changing warning state
	war	ning state	No	Disable send SOH on changing warning state

	Ту	/pe of periodic sensor	None	No test pulse is generated	
	te	st	Pulse	Test pulse is generated periodically and automati- cally, depending on the following settings	
		Sensor test interval,	User selectable	Interval between two sensor tests	
		days			
		Time of the first test	Startup	First test will be done at start-up, next after the de- fined interval.	
u			Random	Time of the fist test is random. This is to avoid, that all instruments in a network are doing the test in ex- actly the same moment and are not able to record events normally at the same time.	
atio			User defined	First test will be done at the user defined time.	
Test Configuration		First test report	User selectable	If User defined is selected, defines the hour and	
onf		time, hours		minute of the first test report	
st C		First test report	User selectable		
Te		time, minutes			
		Activate alarms on sensor test	Normal	An alarm is activated only if an amplitude of the test pulse is above the related threshlold.	
			Never	The alarms are not activated on tests	
			Always	An alarm is activated upon every test.	
		Record test files	Normal	A file is recorded only if an amplitude of the test pulse is above the trigger threshlold.	
			Never	Test files are not recorded	
			Always	A file is recorded upon every test.	
		Prefix for names CAL_		Test files will be created with this prefix	
		of test files TRG_			



	Console messages	Yes	Enable console message		
		No	Disable console message		
	Debug: memory	Yes	Enable debug message: memory allocation		
	allocation	No	Disable debug message: memory allocation		
	Debug: system and	Yes	Enable debug message: system and processes		
	processes	No	Disable debug message: system and processes		
	Debug: flash memory	Yes	Enable debug message: flash memory		
		No	Disable debug message: flash memory		
	Debug: configuration	Yes	Enable debug message: configuration		
		No	Disable debug message: configuration		
	Debug: network links	Yes	Enable debug message: network links		
		No	Disable debug message: network links		
	Debug: data streams	Yes	Enable debug message: data streams		
bu		No	Disable debug message: data streams		
Messaging and debugging	Debug: data sources	Yes	Enable debug message: data sources		
ebu		No	Disable debug message: data sources		
p pu	Debug: ring buffers Yes		Enable debug message: ring buffers		
g ar		No	Disable debug message: ring buffers		
gin	Debug: event triggers	Yes	Enable debug message: event triggers		
SSa		No	Disable debug message: event triggers		
Me	Debug: time	Yes	Enable debug message: time synchronisation		
	synchronisation	No	Disable debug message: time synchronisation		
	Debug: file manager	Yes	Enable debug message: file manager		
		No	Disable debug message: file manager		
	Debug: cryptographic	Yes	Enable debug message: cryptographic info		
	info	No	Disable debug message: cryptographic info		
	Debug: hardware related	Yes	Enable debug message: hardware related info		
	info	No	Disable debug message: hardware related info		
	Debug: external hardware	Yes	Enable debug message: external hardware		
		No	Disable debug message: external hardware		
	Debug: JMA early	Yes	Enable debug message: JMA early warning		
	warning	No	Disable debug message: JMA early warning		
ио	Enable autodetection	Yes	Instrument can automatically be found by GeoDAS		
Instrument configuration options	of the instrument	Νο	in the LAN. Instrument can not automatically be found by Geo- DAS.		

Time for sending daily		User selectable	If transfer is activated as described in chapter 8.7,	
logfile, hour			the daily logfile will be sent to the server at this hour of the day. This can be adjusted to avoid that all instruments send the logfile at exactly the same time	
Time for sending daily		User selectable		
logf	ile, minute			
Kee	o modem	Yes	Keep the external cell modem always powered	
alwa	lys powered			
		No	Turning it on only when required	
	tup time for	User selectable	Time the system will wait for the Cellular modem to	
	ılar modem		start up	
	nect time for	User selectable	Time the system will wait for the Cellular modem connect to the provider	
cellu	Ilar modem			
	DSP mode set delay [s]	User selectable	After startup, the instruments internal clock is roughly synchronized against a foreign network time source (NTP) and time is pushed to the DSP. During this initial time period the DSP will use this foreign time to do sampling while synchronizing to an exter- nal time-source such as GPS. After this initial time period the DSP will be switch to the external time- source.	
	DSP sync behaviour	Dilate	The DSP is supposed to drift against to correct time, i.e., an offset of the reported and actual time is noted in each record of the mini-seed file. No interrup- tions of waveform processing occurs but it can take some hours until synchronization has been com- pleted. This mode is ideal for building monitoring.	
al processing		Wrap	Upon switchinhg the time-source, the DSP stops waveform processing, re-synchronizes the ADC clocks and restarts waveform processing. This mode is only recommended when long drift times are undesirable.	
Signal	DSP snap window [ms]	User selectable	Specifies the maximum allowed time difference the DSP can drift to obtain synchronization with an ex- ternal time-source, in case the instrument was run- ning for a long period of time on its internal RTC, e.g., after GPS failure. If the time difference be- tween the DSPs internal clock and the external time source is larger than the specified amount, the DSP will perform a time-warp and waveform processing will be restarted.	
	Waveform processing	Slow	Once per second waveform processing is executed which allows sampling rates as low as 1 SPS.	
	style	Standard	This is the default mode on all GeoSIG instruments and supports sampling rates as low as 5 SPS.	
		Real-time	The scheduler guarantees an execution rate of 50 times per second for waveform processing making this mode ideal for applications in the early warning field.	



9.10 Time synchronization

- 9.10.1 In the Web Interface or by GeoDAS
 - Go to *Configuration* → *Time synchronization*

Home	Configura	ation	Status and Maintenar	nce Da	ata Explorer	Help	Logout	
Data Acq	quisition	Conf	figuration Manager	Network	Web Inte	erface		
Main m	nenu				_	_		
Station d	description				GeoSIG	Station		
Station c	:ode				GSGMS			1
Location	description				Default lo	ocation		1
Seismic I	network code	е			GS			
Number	of Channels				3			
Number	of Output St	reams			0			
Number	of Trigger Se	ets			1			
Number	of Preset Tri	ggers			0			
Channel	Parameters				>>			
Trigger P	Parameters				>>			
File Stora	age and Poli	су			>>			
Commun	nication Para	meters			>>			
Miscellar	neous Param	neters			>>			
Sensors	and Virtual (Channels			>>			
GeoSIG	Options				>>			
Time syn	nchronization	1			>>			
			Back	Load from D	evice Save	Changes A	pply and Restart	

Figure 64: Time synchronization Parameters

Adjust the parameters as shown in the Table 12.

lome	Configuratio	n Status and Mainter	nance Dat	a Explorer Help	Logout	
Data Aco	quisition	Configuration Manager	Network	Web Interface		
Main n	nenu Time S	Synchronization				
Time so	urce			AUTO	•	1
NTP ser	ver 1			0.pool.ntp.org]
NTP server 2				1.pool.ntp.org		
NTP server 3				2.pool.ntp.org]
NTP ser	ver 4			3.pool.ntp.org		
NTP ser	ver query interv	al, sec		60		
NTP req	uests in a row			4		
NTP que	ery intervals per	RTC update		1		
NTP syr	chronisation tim	eout warning, min		240		
NTP syr	chronisation tim	eout error, hours		12		
NTP ma	ximum error, se	c		0.1		
GPS rec	eption timeout,	min		30		
GPS che	eck interval in N	TP mode, min		60		
GPS che	eck duration in N	ITP mode, sec		120		
RTC wa	tchdog timeout,	sec		1200		
Send SC	OH upon RTC st	atus change				1
Offset to	UTC, minutes			120	•	
Use IAN	A timezone map	oping				1
Use ISO	timestamp forn	natting				•
		Back	Load from De	vice Save Changes Ap	ply and Restart	

Figure 65: Edit Time synchromization Parameters

9.10.2 Via Local Serial Console

Configuration		
A) Station descript	ion	GeoSIG Station
B) Station code		GSGMS
C) Location descrip	tion	Default location
D) Seismic network	code	GS
E) Number of Channe	ls	3
F) Number of Output	Streams	1
G) Number of Trigge	r Sets	1
H) Number of Preset	Triggers	1
I) Channel Paramete	rs	->
J) Stream Parameter	°S	->
K) Trigger Paramete	rs	->
L) Parameters of Pr	eset Triggers	->
M) File Storage and	Policy	->
N) Communication Pa	rameters	->
0) Miscellaneous Pa	rameters	->
S) GeoSIG Options .		->
T) Time synchroniza	tion	->

• Press 'T' to get to the *Time synchronization* menu to adjust the time synchronisation parameters. The following menu appears:

Confi	iguration Time Synchronization	
A)	Time source	AUTO
B)	NTP server 1	0.pool.ntp.org
C)	NTP server 2	1.pool.ntp.org
D)	NTP server 3	2.pool.ntp.org
E)	NTP server 4	3.pool.ntp.org
F)	NTP server query interval, sec	60 (0x3C)
G)	NTP requests in a row	4 (0x04)
H)	NTP query intervals per RTC update	1 (0x01)
I)	NTP synchronisation timeout warning, min \ldots	240 (0xF0)
J)	NTP synchronisation timeout error, hours \ldots	12 (OxOC)
K)	NTP maximum error, sec	0.1
L)	GPS reception timeout, min	30 (Ox1E)
M)	GPS check interval in NTP mode, min	60 (Ox3C)
N)	GPS check duration in NTP mode, sec	120 (0x78)
0)	RTC watchdog timeout, sec	1200 (0x4B0)
P)	Send SOH upon RTC status change	No
S)	Offset to UTC, minutes	120
T)	Use IANA timezone mapping	Yes
U)	Use ISO timestamp formatting	Yes

Time source	RTC	RTC is not synchronizing itself to any source. It will keep it's own time which might differ from other devices or the actual time.
	GPS	RTC is synchronising to the, optionally, connected GPS, which allows very good time synchronisation between devices with other GPS enabled devices.
	NTP	RTC is synchronising to a NTP server.
	Αυτο	RTC synchronises to NTP in case GPS is not avail- able. This is a good option for GPS and Ethernet enabled devices, where the GPS reception might be lost from time to time.
	NET1PPS	RTC is synchronizing to the 1PPS signal. This sig- nal can be received by the optional 433 MHz wire- less module or the interconnection network. (This option needs a device which is broadcasting its time by 433 MHz.)
NTP server 1	User selectable	IP of the primary NTP Server.
NTP server 2	User selectable	IP of the secondary NTP Server.
NTP server queryUser selectableinterval, sec		Interval time in seconds the NTP server is contacted by the instrument.
NTP requests in a row	User selectable	Every time the instrument is contacting the NTP server the configured number of requests will be sent. For service and advanced user only, only change the default value if you know what you are doing.
NTP query intervals per RTC update	User selectable	Specifies the number of NTP synchronizations until the RTC is updated. The default is to update the RTC after each synchronization with a NTP server.
NTP synchronisation timeout warning, min	User selectable	Raise a warning if synchronization with the NTP server was not possible for the given amount of time. Default is 240minutes.

NTP synchronisation timeout error, hours	User selectable	Raise an error if synchronization with the NTP server was not possible for the given amount of time. Default is 12hours.		
NTP maximum error, sec	User selectable	If the current RTC time differs more than this time limit in [seconds] from the NTP time, the RTC time will make a time jump to the NTP time. Otherwise the time will be tuned slowly. For service and ad- vanced user only, only change the default value if you know what you are doing		
GPS reception timeout, min	User selectable	If GPS signal is lost, after this time in [minutes] the RTC will change its synchronisation method to NTP		
GPS check interval in NTP mode, min	User selectable	If the time synchronisation is in the 'Auto" mode, and the RTC is synchronized to the NTP (because the GPS signal has been lost) the instruments checks in the configured interval if the GPS is available again (minutes)		
GPS check interval in NTP mode, sec	User selectable	If the time synchronisation is in the 'Auto" mode, and the RTC is synchronized to the NTP (because the GPS signal has been lost) the instruments checks for the configured time duration if the GPS is avail- able again (seconds))		
RTC watchdog timeout, User selectable sec		If armdas is not running for this amount of time, there will be a hard reset of the device. Only change this setting if you really know what you are doing! Wrong settings could render your device unusable without GeoSIG support. The value of 0 disables the Watchdog.		
Send SOH upon RTC status change	Yes	In case RTC status changes, a SOH message will be uploaded to the server.		
	No	In case RTC status changes, no SOH will be send		
Offset to UTC, minutes User selectab		Difference between the local time and Coordinated Universal Time (UTC). The default is to use UTC as time reference.		
Use IANA timezone	Yes	Use Time Zone to set instrument time		
mapping	No	Don't use Time Zone to set instrument time		
Use ISO timestamp	Yes	Use ISO 8601 in all files name including offset		
formatting	No	Don't use ISO 8601 in all files name including offset		

Table 12: Time Synchronization Parameters Menu Structure

The system has a Real Time Clock (RTC) that maintains internal time when the unit is turned off. During normal operation the RTC is responsible for providing the most accurate time possible to the system and performing time synchronization with other available external time sources as:

- · GPS time code receiver on the GPS interface
- NTP (Network Time Protocol) server from the wired or wireless Ethernet interface

It also keeps under control the sampling clock of the ADCs and self-calibrates its oscillator against temperature and aging when it is connected with an accurate external time signal.

The DSP receives a continuous 1 PPS signal from the RTC with the best possible accuracy of the RTC, including temperature compensation, based on the saved coefficients. The DSP will sync the sampling clock with this 1 PPS signal to have accurate sample timing.



9.10.2.1 Temperature compensation

RTC uses the internal temperature sensor of the micro-controller to define the current operating temperature. When good time synchronization occurs, typically using a GPS, the RTC checks its own drift against the signal of the GPS and adds the correction coefficients in a trim table. With a NTP time source, the accuracy is worse but the same process occurs with more averaging and on longer period of time.

During factory test, all the coefficients are initialized to the room temperature coefficient using a GPS. After installation on site, the unit will learn the correction parameters according to the ambient conditions at site and also according to the aging of the oscillator.

9.11 GeoSIG Options

This menu and the functions under it are subject to change. The user should not use or rely on any features under this menu without consulting GeoSIG.

9.11.1 Via Local Serial Console

Conf	iguration	
(A)	Station description	GeoSIG Station
B)	Station code	GSGMS
C)	Location description	Default location
D)	Seismic network code	GS
E)	Number of Channels	3
F)	Number of Output Streams	1
G)	Number of Trigger Sets	1
H)	Number of Preset Triggers	1
I)	Channel Parameters	->
J)	Stream Parameters	->
K)	Trigger Parameters	->
L)	Parameters of Preset Triggers	->
M)	File Storage and Policy	->
N)	Communication Parameters	->
0)	Miscellaneous Parameters	->
S)	GeoSIG Options	->
T)	Time synchronization	->

• Press 'S' to get to the *GeoSIG Options* menu to enter Product key for EEW applications, enable/disable and configure waveform injection and other GeoSIG specific features.

• The following parameters can be adjusted:

Enable real-time waveform message queue		Yes	Enable the real-time waveform message queue.
		No	Disable the real-time waveform message queue.
Product Key (required for U early warning) U		User selectable	If purchased, enter the product key for early warn- ing options. The product key is of the form XXXX- XXXX-XXXX-XXXX-XXXXX.
rm tor	Enable waveform source	User selectable	Enable waveform inject from files (0disable, 1first file, 2second file, 3third file.
Waveform Simulator	Source 1	User selectable	Path for first waveform source.
Wa	Source 2	User selectable	Path for second waveform source.
	Source 3	User selectable	Path for third waveform source.

Table 13: GeoSIG options menu structure



9.12 Other Options in the Instrument Main Menu

Next to the edit of the instrument configuration, there are other actions possible from the main menu shown below:

- Main menu: C - Configuration -> M - Messages -> X - Display errors (0) and warnings (0) W - Clear errors and warnings T - File statistics I - System information -> S - Shell command U - Control requests -> R - Restart firmware
- Z Reboot instrument
- Q Quit

	Action or command	Description	
С	Configuration →	Change of the configuration of the instrument. See chapter 9 for details.	
М	Messages →	Possible to configure what kind of messages are shown in the console.	
X	Display errors (n) and warnings (m)	Shows present errors and warnings.	
W	Clear errors and warnings	Clears all errors and warnings.	
Τ	File statistics	Displays information about files and the memory usage.	
1	System information \rightarrow	Displays information about the status of the instrument.	
S	Shell command	Allows executing a Linux shell command from <i>armdas</i> . For advanced users only.	
U	Control requests →	See chapter 9.12.1 for details.	
R	Restart	Restarts the instrument, e.g. after a change of the configura- tion.	
Ζ	Restart	Reboots the instrument.	
Q	Quit	Stops <i>armdas</i> data acquisition and exits to the Linux console. For advanced users only.	

Table 14: Other options in the main menu

9.12.1 Control Requests

Several actions can be initiated by the user:

• In the main menu press 'U' to enter the Control requests menu.

```
Main menu:
C - Configuration ->
M - Messages ->
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
T - File statistics
I - System information ->
S - Shell command
U - Control requests ->
R - Restart firmware
Z - Reboot instrument
Q - Quit
```

• Type the letter of the request you want to execute from the list below:

```
Data requests, triggering:
A - Request N seconds of ringbuffer data, starting from the indicated date and time
B - Activate manual trigger to start recording
C - Deactivate manual trigger
Status and information:
D - Generate SOH file with the current state-of-health information
E - Force uploading current logfile to a server
F - Enable debug log messages, see the manual for details
G - Disable debug log messages, see the manual for details
Service and recovery:
H - Set date and time of the last transferred file to the indicated ones
I - Erase the entire data storage. Use it as a last resort!
J - Make hardware reboot of the instrument
K - Reset errors and warnings of the instrument
L - Retrieve trim table values
M - Reset trim table
{\tt N} - Calibrate temperature correction using current temperature Tcur in C
0 - Make current configuration as the user default one
P - Reset to the user default configuration
Q - Delete one group of files or all files
R - Date and time settings
8 - Halt the system for manual power off
Sensor test and calibration:
V - Generate a sensor test pulse
W - Remove offsets from signals
Direct request:
X - Exit, run the package manager, upgrade and reboot
Y - Initiate hotswap of storage media
Z - Send user request
Simulation and testing:
[ - Run pre-configured seismic event
Select <A>...<W>. <Esc> to exit
```

See details in Table 15

Letter	Request	Description			
Data re	Data requests, triggering:				
A	GETEVT YYYY-MM-DD HH:MM:SS N	The instrument creates an event with the length of N seconds from the ringbuffer data, starting from the indicated date and time and uploads the data to the server if configured (see chapter 9.8).			
В	TRIGGERNOW [trigger_name]	Activate a manual trigger to start recording, the manual trigger must be configured as described in the chapter 9.6			
С	STOPTRIGGER [trigger_name]	Deactivates the manual trigger			
Status	and information:				
D	GETSOH	The instrument generates a SOH file with the current state-of-health information and uploads to the server if configured (see chapter 9.8).			
E	GETLOG	The instrument uploads today's logfile to the server.			
F	SETMSG flags	Enables/disables debug log messages. For service			
G	CLRMSG flags	only, do not change			
Service	and recovery:				
H LASTDT YYYY-MM-DD HH:MM:SS Set date and time of the last transf		Set date and time of the last transferred file			
		The instrument saves the date and time of the latest uploaded file and will not upload any file which is created before this date and time. Under normal conditions this will be never the case. But if the time is changed backwards by the user - e.g. from 10:00 to 06:00 - the instrument will not upload any data till 10:00 again. So the time of the last transferred file can be adjusted here and should be set to 06:00 in this example.			
I	FORMAT	Formats the data storage media. All data will be lost, and instrument will be restarted.			
J	REBOOT	Performs full reboot of the instrument			
К	RESETERR	Reset errors and warnings of the instrument			
L	GETTRIM	The instrument will upload a SOH file contain- ing the actual values from the RTC trim table. The latest SOH file can be found under \\Geo- DAS_DATA\StatusFiles\InfoSOH.xml			
М	CLEARTRIM	The instrument will clear the RTC trim table			
N	TCAL <tcur></tcur>	Calibration of the internal temperature sensor by applying the actual temperature in °C. The RTC uses temperature to learn.			

0	SETDEFCFG	Makes the current instrument configuration as user default one. Whenever you change parameters of the instrument, they are saved in the non-volatile instrument memory as Current Configuration, and used to set all parameters of the data acquisition at startup. But if due to some reason the current configuration gets corrupted, and GMS cannot load or cannot process it, the Default Configuration file, which is created by this command, will be used in- stead. Note that Default Configuration is compiled from the actual parameters of the running system, and therefore it is already approved by GMS and is supposed to be correct. Thus, we recommend send- ing this command to the instrument after you are sure that your GMS is started with the latest config-
		uration correctly and everything works as expected. The default configuration can also be set and re- stored in the Web Interface, see chapter 8.3.2
Р	RSTUSRDEF	Reset the instrument to its user default configura- tion.
Q	DELETE <file_prefix all="" or=""> [YYYY- MM-DD [HH:MM]]</file_prefix>	Delete one group of files or all groups of files from the compact flash card. One can request to delete only files that are older than the specified date (and optionally time).
R		Enter the Date and time settings. The Main battery installation date and the current RTC date and time can be changed from this submenu.
8	Halt the system	Halt the instrument for the manual device power off .
Sensor	test and calibration:	
V	TSTSENSOR 1 [REC=TRG YES NO] [ALARM=TRG YES NO]	The instrument generates a sensor test pulse. Op- tional parameters REC and ALARM specify whether a file will be recorded during test and whether an alarm will be generated in case an alarm board is present. Parameters TRG, YES and NO correspond to the modes Normal, Always and Never described in the section 9.9.2
W	REMOVEDC	Remove offsets from signals
Direct r	request:	
Х		For service and advanced user only.
Y		For service and advanced user only.
Z		For service and advanced user only.
Simula	tion and testing:	
[For service and advanced user only.

Table 15: Control requests



10 Test and Configuration Menu

The test and configuration menu can only be accessed locally at the instrument over the serial cable.

- To power on the device, connect it directly to a power source (PoE or power supply). Then it will then boot up automatically.
- Press <*Ctrl>* + 'Z' as soon as the following message appears on the console to enter the test and configuration mode:

Press Ctrl+Z to enter the test mode.....

• The test and configuration menu has three access levels.

```
Level Shortcut Password Description
User Ctrl+U None Basic operations only
Powerful User Ctrl+W None Also hardware options and pre-selected tests
Administrator Ctrl+A None Also manual tests and altering the FLASH memory content
Your level [U/W/A] or press B to boot now:
```

The test and configuration menu has three access levels as outlined above: User, Powerful User and Administrator, and each level can be protected by a password. Instead of pressing $\langle Ctrl \rangle + Z'$, one can press $\langle Ctrl \rangle + U'$, $\langle Ctrl \rangle + W'$ or $\langle Ctrl \rangle + A'$ to bypass the above messages and to proceed directly to a menu of the desired level. The Administrator has access to the most complete menu but the majority of functions are not used for the standard instrument operation, and therefore they are not described here in detail. The useful options are highlighted and described below.

```
Access level: User

---- Flash Images and Boot Options ----

L - List flash images

Q - Reset instrument configuration to the user default

V - Reset instrument configuration to the factory default

5 - Boot now

X - Reboot the instrument

Y - Power off

---- Hardware Setup and Monitor ----

N - Network settings

---- Security ----

O - Set password

--->
```

swiss made to measure which. 117 / 136

```
Access level: Powerful User
```

```
--- Flash Images and Boot Options ---
L - List flash images
Q - Reset instrument configuration to the user default
V - Reset instrument configuration to the factory default
5 - Boot now
X - Reboot the instrument
Y - Power off
--- Hardware Setup and Monitor ---
K - Instrument hardware parameters
N - Network settings
T - Battery installation dates
--- Security ---
O - Set password
J - Reset all passwords
--->
```

```
Access level: Administrator
--- Flash Images and Boot Options ---
L - List flash images
{\tt Q} - Reset instrument configuration to the user default
V - Reset instrument configuration to the factory default
5 - Boot now
X - Reboot the instrument
Y - Power off
--- Hardware Setup and Monitor ---
K - Instrument hardware parameters
N - Network settings
T - Battery installation dates
--- Test Functions ---
P - Test RTC
M - Test GPS
--- Security ---
0 - Set password
J - Reset all passwords
-->
```

10.1 Flash Images and Boot Options

L	List flash images	Lists all the current firmware in the image
Q	Reset instrument configuration to the user default	Forces the instrument to load the user default configuration. See description of the command SETDEFCFG in the chapter 9.12.1
V	Reset instrument configuration to the factory default	Forces the instrument to load the factory default settings
5	Boot from the default image	Exits the test and configuration menu and starts the instrument normally
X	Reboot the instrument	Forces the watchdog to completely restart the instrument
Y	Power off	Forces the watchdog to switch off the instrument

10.2 Hardware Setup and Monitor

K	Instrument hardware parameters	Checks what HW is installed in the instrument and adjust the number of sensors
N	Network settings	Enters the menu to adjust the network settings (dynamic or fixed IP, subnet and gateway, DNS servers), the PPP settings, enable/disable the SSH and Web Interface and configure the backup server. For details see chapter ??
Τ	Battery installation dates	Whenever you install a new battery, you must set the installation dates using this menu.

10.3 Test Functions

Ρ	Test RTC	Runs an automatic check of the RTC
М	Test GPS	Allows user to the see the NMEA messages of the GPS and to initialise the GPS receiver.

10.4 Security

0	Set password	Sets the password to prevent unauthorised access to the current level of the test and configuration menu.
J	Reset all passwords	Resets all passwords below the levels of access

• Leave the test and configuration menu by pressing '5' or 'Y'

10.5 Comparison of User Permissions

	User	Powerful User	Administrator
Flash Images and Boot Options			
List Flash images	Х	Х	X
Reset instrument configuration to the user default	Х	Х	Х
Reset instrument configuration to the factory default	Х	Х	Х
Boot now	Х	Х	Х
Reboot the instrument	Х	Х	Х
Power off	Х	Х	Х
Hardware Setup and Monitor			
Instrument hardware parameters		Х	X
Network settings	Х	Х	Х
Battery installation dates		Х	X
Test Functions			
Test RTC			X
Test GPS			Х
Security			
Set password	Х	Х	Х
Reset passwords		Х	Х

Table 16: Comparison of test and configuration menu users



11 Firmware Upgrade

All the firmware for

- · Linux operating system
- armdas firmware
- DSP
- SUP

can be upgraded by the user by using GeoDAS as described in the following chapters. The firmware will be released only as a complete package, containing all the firmware listed above. Please see *www.geosig.com* \rightarrow *Support* \rightarrow *Downloads* to download the latest firmware release package.

Even if there is no known case of data loss during the upgrade, we recommend backing up all recorded data and the configuration before starting the upgrade.

After any firmware upgrade, the configuration and the correct function of the instrument should be fully verified.

If the instruments are configured to contact a server, it is possible to upgrade all or specific instruments remotely using GeoDAS. Before trying to upgrade remotely, be sure the instruments have a working network connection to the server. To proceed with the firmware upgrade, please take the following steps:

• Make a right click on the Station in the GeoDAS main window and select Instrument Control...

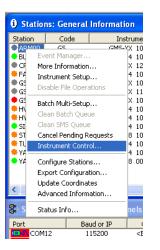


Figure 66: Select Instrument Control

• A list box will appear.

Communication Interface - ARM00					
Action or a com	mand	Send a Request 💽 💌	Send		
Request and pa		Request a File Request Configuration Menu Options Request Network Configuration			
Sends a user re	quest to the ins	Request Recorder Configuration Request Trim Table	w		
User request	GETEVT	neset min rable	IM-DD HH:MM:SS N		
Requests N seconds of ringbuf		Send an Upgrade Send Binary Network Configuration	nd time		
		Send Network Configuration Send Recorder Configuration			

Figure 67: instrument Communication Interface

- Select the item Send an Upgrade
- Press on the button Browse ... to select the required firmware. Select a firmware container with the extension *.*gsfw* or a *.*zip* archive containing several update packages.
- If the file is selected, press the **Send** button. GeoDAS identifies the firmware and asks for confirmation. Please double check that the correct firmware has been selected.

Warning	:
2	You are about to send an upgrade for RTC Firmware, version 80.00.19. Continue?
	Yes <u>N</u> o

• Upon pressing the **Yes** button, the firmware will be placed in the Outgoing directory, so that it can be collected by the instrument(s) upon next connection.

🕄 Stations: G	eneral In	formation								
Station	Code	Instrument	Channel Type	Status Updated	Files	Free Memory	Last Event	Voltage	Current Activity	
●GS000	DEMO_	GMS-XX	TCP: 192.168.10.80	13, 10, 2010 at 19:08:38	0 (0)	971940K (98	27.09.2010	AC, DC	Not connected. Pending: DSP_100210_20101014_072658.hex	
I										

Figure 68: Pending upgrade on the server

• As soon as the instrument has downloaded the new firmware, the text *Pending: xxx.gsfw* disappears. The instrument will verify the firmware and once the upgrade process is finished, the instrument will restart.

When the instrument software receives such a file it checks the actual version and, only if the file contains more recent firmware than the existing one, it will start the upgrade. After the upgrade, the new firmware will be in "trial" mode and a reboot is done. If the reboot and instrument operation is correct, the new firmware will be accepted. If the instrument reboots through its watchdog because the firmware was faulty, the previous firmware version will be used and the system will be restored to its state before the upgrade.

Downgrades to the older firmware versions might be required in some specific cases. This is possible, too. Please contact GeoSIG support for the exact procedure of such downgrade.



Appendices

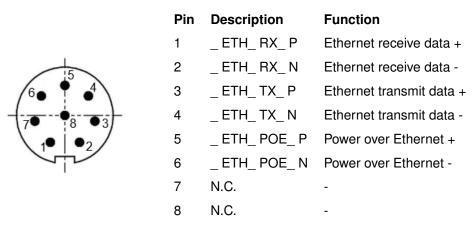
Appendix A Connector Pinouts

A.1 POWER Connector

	Pin	Description	Wire color	Function
4 3	1	_EXT_SUP+	BLACK	External device power supply 12 [VDC]
	2	EXT_GND	Strip	Power return for external device
	3	_BAT_EXT_SUP+	NONE	External Power battery Positive 3.7 [VDC]
	4	_BAT_EXT_SUP-	NONE	External Power battery return
	5	_ BAT_ EXT_ NTC	NONE	External Power battery NTC (if exists)

Mating Type: Binder 713/763 Series, cable connector female, 5 pole

A.2 ETHERNET Connector



Mating Type: Binder 713/763 Series, cable connector female, 8 pole

A.3 CONSOLE Connector



Mating Type: Amphenol LTW Series, cable connector male, 5 pole

Appendix B Remote Access to the Instrument over SSH



The following chapter is for advanced users only. Warranty will be void if something is damaged by user during changes in the root file system.

Secure Shell (SSH) is a network protocol for secure data communication, remote shell services or command execution and other secure network services between two networked computers that it connects via a secure channel over an insecure network: a server and a client (running SSH server and SSH client programs, respectively).

The armdas console cannot be shown through the SSH. This is a limitation of the armdas firmware.

The instrument supports all types of remote access through SSH. User can connect from his PC by SSH client program to the SSH server of the instrument. Simple SSH client program can be used for this purpose. Use root as login and swiss as the password, as shown:

Login: root Password: swiss

Sign '#' is a command prompt where you can type console commands.

The password can be changed by passwd command.

Warranty will be void in case password is changed and forgotten.

B.1 SSH Clients for Linux OS

For the Ubuntu or other Debian-like GNU/Linux OS, SSH client program, with command line interface, can be installed by command

\$ sudo apt-get install openssh-client

To login into the instrument console, "ssh root@192.168.1.10" command can be issued from any terminal emulator as following figure shows:



Figure 69: Command line SSH client at terminal emulator

Alternatively, the PuTTY SSH client with GUI interface can be installed by command

\$ sudo apt-get install putty

This software can be found in a menu **Applications** \rightarrow **Internet** \rightarrow **PuTTY SSH Client** and its configuration dialog looks like:

×	PuTTY Configuration
Category:	Basic options for your PuTTY session
Session	Specify the destination you want to connect to
Logging	Host <u>N</u> ame (or IP address) <u>P</u> ort
 Terminal 	192.168.1.10 22
Keyboard Bell	Connection type: ○ Raw ○ Telnet ○ Rlogin ● SSH ○ Serial
Dea	
Features ▼ Window Appearance	Load, save or delete a stored session Saved Sessions
Behaviour Translation Selection Colours Fonts	Default Settings
 Connection Data 	Ų
Ргоху	Close window on exit:
Telnet	 Always Never Only on clean exit
Rlogin	
N CCI I	3
About	Open Cancel

Figure 70: Configuration window of PuTTY

IP address 192.168.1.10 from examples above should be changed to the real IP address of the instrument.

B.2 SSH Clients for Windows OS

The same PuTTY as for GNU/Linux OS or alternatively TeraTerm software can be used for Windows OS to have remote access to the instrument by means of SSH.

Its connection window is shown below

Tera Term: Ne	w connectio	n	×
⊙ TCP/<u>I</u>P		192.168.1.10 ☑ Hist <u>o</u> ry ○ Telnet	TCP gort#: 22
		⊙ <u>S</u> SH ○ Other	SSH <u>v</u> ersion: SSH2 v Proto <u>c</u> ol: UNSPEC v
O S <u>e</u> rial	Po <u>r</u> t:		
	ОК	Cancel	Help

Figure 71: TeraTerm Connection Window

The PuTTY software for Windows OS operates the same as PuTTY for Linux OS.

The PuTTY software can be downloaded from https://www.chiark.greenend.org.uk/~sgtatham/putty/

The TeraTerm software can be downloaded from http://ttssh2.osdn.jp/



B.3 SFTP access for Windows OS

Session	Session					
Stored sessions	Host name:		Port number:			
Environment Directories	192.168.1.10 22					
SSH Preferences	User name:	Password:				
	root	•••••				
	Protocol <u>F</u> ile protocol:	SFTP 🗾 🔽 Allow S	CP <u>f</u> allback			
			Select c <u>o</u> lo			
Advanced options						

WinSCP is an open source free SFTP client for Windows. Its main function is the easy file transfer between a local computer and the instrument.

Figure 72: WinSCP login window

To connect to the instrument put the IP address of the GMSalbris and enter the following user name and password:

Login:	root
Password:	swiss

mmcblk0p1 - root@192.168	.10.19 - WinS	CP C										_ 🗆 🗙
Eile Commands Mark Session	<u>View</u> <u>H</u> elp											
Address 🗁 /media/mmcblk0p1												- 🖂
← + → + 🔁 🙆 🚮 🚱		🐨 🌶 📑 🛃	a 🔤 🧬 😫	s 📀 🖗								
🔹 📼 • 🔢 🚳 • 🚼 🛛 De		- 1 55										
Croots Din Doot Doot dev	Data gsiafw.bin	FromServer metwork.conf	Incoming	Logfiles params.bin	Outgoing e websoh.xml	Ringbuffers	System	ToServer	Config.mnu	config.xml	config_sys.xml	
realroot - realr												
0 B of 712 KiB in 0 of 16	.,									SFTP-	3 🗐 1	6:03:38

Figure 73: Explorer mode of WinSCP when connected to the instrument

It is then possible to browse through the available data on the instrument and copy files from or to the computer. The file structure is described in the following chapter.

The WinSCP can be downloaded from here: https://winscp.net/eng/download.php

B.4 File Structure of the Instrument

On the instrument the files are organized as following

\media\mmcblk01\	in case an SD card is installed
… Data∖	Event files
Ringbuffers	Permanent recording files
Logfiles	Log files of armdas

The filenames contain the following information

XXX_SNSNSN_YYYYMMDD_HHMMSS.ext	Extension	.ext .msd .xml .txt .bin	Depending on file type MiniSEED containing waveform data SOH and PGM information LOG and ERR files MMA packets (special for Korean market)
	Time	HH MM SS	Hour Minutes Seconds
	Date	YYYY MM DD	Year Month Day
	S/N	SNSNSN	Six digit serial number of instrument
	Туре	XXX TRG USR TTT CAL MAN RBF LOG SOH PGM ERR	Depending on file type Event trigger User request Time table trigger File with test pulse Manual trigger Permanent recording Log files State of Health information PGM information of event Error messages

Appendix C GeoDAS Settings

C.1 Configuration of Stations

To be able to communicate with the instrument, GeoDAS must act as a server. This chapter should help to find the correct settings.

• Open GeoDAS and Go to the menu *Settings* → *Configure Stations...*, the following window will appear:

GMS and CR-6plus Stations Station Instrument Serial Number Firmware Configured IP Public IP Network Interface Status	FARGE HVHRB HYBAD SINOB STTRB TUZ01 YAKUP	GSD-24 Direct Link GSD-24 Direct Link GSD-24 Direct Link GSD-24 Direct Link GSD-24 Direct Link GSD-24 Direct Link GSD-24 Direct Link	k (COM14) Recorder + Datastream k (COM12) Recorder + Datastream k (COM13) Recorder + Datastream nk (COM1) Recorder + Datastream	104676 103182 104682 104686 107013 104669 104678	 3. Enter serial numb 4. Type valid passw 5. Re-type the sam 6. Configure community 7. Specify work optical 		(optional) trument n it	Channel Options Add Now
ARM00 GM5-XX 100578 Unknown 192.168.1.37 Unknown Unknown C CR6PL GM5-XX 123456 Unknown 192.168.20.18 Unknown Unknown C G5000 GM5-XX 100210 Unknown 192.168.1.37 Unknown Unknown C G5003 GM5-XX 111222 Unknown 192.168.1.29 Unknown Unknown C G515T GM5-XX 100580 21.06.10 0.0.0.0 192.168.1.37 Ethernet network Lo CR	Station ARM00 CR6PL S5000 S5003	Instrument Se GMS-XX GMS-XX GMS-XX GMS-XX	100578 Unknown 123456 Unknown 100210 Unknown 111222 Unknown	192. 192. 192. 192. 192.	168.1.37 168.20.18 168.1.37 168.1.29	Unknown Unknown Unknown Unknown	Unknown Unknown Unknown Unknown	c c c c

Figure 74: Configuration Stations

Area	Торіс	Description
1	Configured GSR Stations	Details about the configured GSR-xx and GCR-xx stations. Check separate <i>GeoDAS Manual</i> for details.
2	Instrument Stations	 Details about the configured instruments. All instruments connected to the same network will be listed in grey. Station name can be changed by a double click on the field you want to change. The column <i>Instrument</i> and <i>Serial Number</i> shows the instrument type and its serial number. The <i>Firmware</i> column shows the firmware version of the main data acquisition firmware. The <i>Public IP</i> shows from where the instrument is connected to the server. In case the instrument is behind a router or firewall, then this IP address will be shown. Network settings can be done according to chapter 7. If one wants to connect manually to the instrument, then GeoDAS will try the address and port listed under <i>Address</i>. The last column in the table is <i>Status</i>, which is indicated by one or more letters, which are the following: N - New instrument C - already Configured earlier A - Altered parameters R - actual settings were Received from the instrument
3	Server Settings	For configuration of the Server, see chapter C.2

C.1.1 Add a new Instrument

All instruments connected to the same network will be listed in grey. To add one of these stations into the current configuration do the following:

- Select the instrument and make a *right click*
- · Click on Add Station to Current Configuration
- Press OK

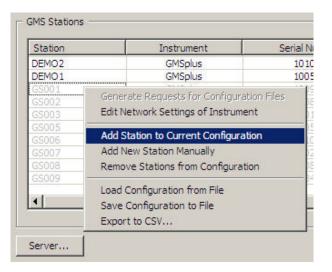


Figure 75: Add Station to Current Configuration

If the instrument is not in the local network and cannot directly be accessed, then press *Add New Station Manually* and enter the serial number of the instrument.

C.1.2 Remove an Instrument

To remove one of the stations of the current configuration do the following:

- · Select the instrument and make a right click
- Click on Remove Station from Configuration
- Press OK

Station		Instrument	Ser
DEMO2		GMSplus	
DEMO1 GS001 GS002		Requests for Configuration F vork Settings of Instrument	iles
GS003 GS005 GS006	Add Station to Current Configuration Add New Station Manually Remove Stations from Configuration		
GS007			
GS008 = GS009	Load Configuration from File Save Configuration to File Export to CSV		

Figure 76: Remove Station from Current Configuration





C.2 Configuration of Server Parameters

• Press the button *Server...*, the window below appears:

Station Server Parameters					
Network Settings My server IP address 0.0.0.0 Server port 3456 Timeout, seconds	Miscellaneous Options Station inactivity period (minutes) considered as warning 30 or error 360 Do not delete received State-of-Health files right after processing Life time of any files other than data arriving from stations, days				
Event Declaration and Processing Declare seismic network events based on the amount of stations triggered and delivered their event files recorded within certain time frame Minumum number of stations required to trigger in order to declare a seismic event 3 Network time frame, seconds 3 Data Conversion Image: Convert groups of data files of the declared seismic network events Data Requests Image: Request data of declared events from all stations Pre-event time interval, sec 0 Image: Request data of declared events from all stations SEISAN database name Image: Request data files after successful conversion Image: Request data files after successful conversion					
More	OK Cancel				

Figure 77: Station server parameters

Group of Controls	Description
Network Settings	<i>IP address and port</i> of the server, i.e. computer which Geo- DAS is running on as well as the network <i>Timeout</i> in seconds. If server has several network interfaces but connections from in- struments are expected from only one of them, then its IP ad- dress must be specified. Otherwise, leave it zero, which means that GeoDAS accepts incoming connection at any interface. The timeout is used to decide when to terminate current network con- nection if the remote party does not respond within the indicated time interval.
Miscellaneous Options	Network error is declared if an instrument did not communicate with GeoDAS within the indicated period of time. Make sure that this parameter is higher that the communication interval set in the instrument as described in chapter 9.8
	If <i>State-of-health forwarding interval</i> is set to nonzero value, then SOH reports are collected within this period of time and only then are forwarded. You can also choose not to delete SOH reports after processing. If this option is selected, all received state of health reports remain in the directory <i>\\Geo-DAS_DATA\StatusFiles \InfoSOH\</i>
Event Detection	GeoDAS can be instructed to analyse event data files received from configured instruments to see if they belong to the same earthquake and to declare an event if it is so. You need to enable the option Declare and process triggers of seismic network in order to do so.
	A network event is declared if at least <i>Minimum number of sta- tions triggered</i> within the <i>Network time frame</i> . Received event files can be converted to Seisan format and stored in Seisan database on the same computer.
Customised Data Processing	This is not a standard feature of GeoDAS. Therefore please check the GeoDAS Manual and contact GeoSIG for further details if you need to use this functionality.

C.3 Instrument Control in GeoDAS

By making a right click on the station name in the window *Stations: General Information*, several options become available to control and check the instrument. See the figure below:

i) Statio	ns: Genera	Information	
Station	Code	Instru	me
APMOO	as .	CMS-YX	10
	ent Manager.		10
	ore Informatio		12
🗧 F4 🛛 In	strument Setu	D	10
€G Di	sable File Oper	ations	
- G		X	
🜻 GS 🛛 Ba	itch Multi-Setu	p X	10 10
<mark>●</mark> H\ □	ean Batch Que		10 10
	ean SMS Oueu		10
- 51	ancel Pending I		10
	strument Cont		10
🔶 Yé 🔡	strument Cont		10
🔶 YA 🛛 Co	onfigure Statio	ns 8	00
E>	port Configura	ation	
Up	date Coordina	ates	
Ac	dvanced Inform	nation	
🍔 S St	atus Info	ne	
Port	B	aud or IP	(
COM COM	12	115200	<8

Figure 78: Instrument control of the station in GeoDAS

C.3.1 More Information... (State of Health of the Instrument)

The status of the instruments can be easily checked if the instrument is set up to transfer periodically the SOH file to the server. (See details about SOH configuration in chapter 8.4 and 9.8).

• Make right click on the Station in the GeoDAS main window and select *More Information...*, the following window will appear:



Information Area	Description
Status date and time	Before analysing the SOH data always make sure that the SOH files are current ones by checking the time and date here.
Firmware	Here the firmware versions of all components can be viewed.
File and Memory	Information about events and available memory
Configuration and Restarts	Date and time of the last restart, the last configuration change and the last shutdown are shown. Additionally the reason of the last shutdown is indicated.
Miscellaneous	Ambient temperature, measured inside the instrument. Other information may appear here, depending on the firmware version of the instrument.
Errors and Warnings	List of all errors and warnings of the instrument
Timing and GPS	Status of the RTC and the related GPS information if a GPS receiver is con- nected and configured
Power	Status of the power supply and the battery voltages

C.3.2 Instrument Setup...

See chapter 9.2.2 for details.

C.3.3 Cancel Pending Request

The pending requests on the server, as shown in the Figure 68, can be canceled by the user.

C.3.4 Instrument Communication Interface

• Make a right click on the Station in the GeoDAS main window and select *Instrument Control...*; the following window will appear:

Communication Interface - ARM00				
Action or a comr	mand	Send a Request 📃 💌	Send	
Request and parameters		Request a File Request Configuration Menu Options Request Network Configuration		
Sends a user request to the ins		Request Recorder Configuration Request Trim Table	w	
User request	GETEVT	Reset Error State Reset Trim Table	IM-DD HH:MM:SS N	
Requests N seconds of ringbuf		Send an Upgrade Send Binary Network Configuration	nd time	
		Send Network Configuration Send Recorder Configuration		

Figure 80: Instrument Communication Interface

Action or command	Description
Request a File	Request a file from the instrument (the full path to the file must be specified)
Request Configuration Menu Options	The instrument uploads the structure of the configuration menu and saves the file in \\GeoDAS_DATA\Config\Stationname.mnu. This file is needed for offline configuration of the instrument as described in chapter 9.2.1
Request Network Configuration	The instrument uploads the network settings of the instrument and saves the file in \\GeoDAS_DATA\Config\Stationname.net
Request Recorder Configuration	The instrument uploads the configuration of the instrument and saves the file in \\GeoDAS_DATA\Config\Stationname.xml. This file is needed for offline configuration of the instrument as described in chapter 9.2.1
Request Trim Table	The instrument will upload a SOH file containing the actual values from the RTC trim table. The latest SOH file can be found under \\GeoDAS_DATA\StatusFiles\InfoSOH.xml
Reset Error State	The instrument will clear all errors and warnings.
Reset Trim Table	The instrument will clear the RTC trim table.
Send a Request	Sends a user request to the instrument. For details see chapter 9.12.1
Send a Script	The instrument will download and execute the attached script. This function is for advanced users only, as it can seriously damage the instrument if the script is not written correctly.
Send an Upgrade	The instrument will download the attached file, which can be any type of the firmware, namely: Bootloader, RTC, DSP, main firmware and or the entire Linux image. For more details about the upgrade of the firmware, see chapter 11.
Send Binary Network Configuration	The instrument will download binary network configuration file from the server.
Send Network Configuration	The instrument will download the attached manually adjusted net- work configuration file from the server.
Send Recorder Configuration	The instrument will download the attached manually adjusted recorder configuration from the server.

C.4 Open recorded miniSEED files in GeoDAS

The system is recording miniSEED files (.MSD). For viewing such files, GeoDAS can be used. As the signal is stored inside the miniSEED file in counts, a scaling factor has to be applied when opening the data. If an *Extended format of MiniSEED* files is used (see the chapter 9.9), scaling factors are applied by GeoDAS automatically, and you may skip the information below.

- Open GeoDAS
- Open recorded mini-seed file from the menu $\textit{File} \rightarrow \textit{Open...}$

Event files are stored under: Ringbuffer files are stored under:	\\GeoDAS_DATA\Data\STATION_NAME \\GeoDAS_DATA\DataStreams\STATION_NAME
Testpulses are stored under:	\\GeoDAS_ DATA \Incoming\NNNNNN



• When you open a '.MSD' file with *GeoDAS*, the following dialog box for scaling factor appears:

Parameters of miniSEED	files		
Channel name	Default	Add	
Physical units	9	Remove	
Counts per physical unit	2516582		
🦳 Open different channels i	n the same graph windov	v	
Note: all channels must have same sampling rate and their data sets must overlap in time			
✓ Always use the current parameters by default			
		ОК	

Figure 81: GeoDAS miniSEED parameters

• The values *Physical unit* and *Counts per physical unit* must be set for correct display data in GeoSIG software GeoDAS. The values can be calculated as described in chapter C.4.2.



The user has the possibility to tick "Always use the current parameters" because the unit gets send with the miniseed file

- Press OK
- If instead of the scale prompt you get directly the graph, to get back the prompt each time you open a miniSEED file, use menu: Analyse → Parameters... → Parameters of miniSEED files and press Edit:

Parameters of the Analysis Functions			
Select the	function from the list and click the button to edit the d	efault	
Function	Parameters of miniSEED files	Edit	
		Exit	

Figure 82: GeoDAS analysis parameters

• Now the dialog box for scaling factor should be seen. Enter the correct values, close and reopen the file you want to see. You will be prompted again for scale; just press OK as the scale is now correct.

C.4.1 Save predefined Scaling Factors

The scaling factor set under Counts per physical unit is always valid for all channels in the same miniSEED file. If the channels have different physical units (e.g. if a six-channel instrument with two different types of sensors is used) a scaling factor for each channel separately can be defined.

To define a scaling factor for a specific channel, enter the full channel name (e.g. LCAX1) in the *filed Channel* name and press *Add*

All channels which are not specifically defined are converted with the scaling factor saved under Default.

C.4.2 Calculation of the Scaling Factors

The scaling factor is the inverse of the LSB value.

$$Scaling factor = \frac{1}{LSB}$$

See section 9.3.3 for details about how to calculate the LSB factor.

Index

Α

Accessories	
Optional	. 18
Adding New Stations	28
Alarm	. 82
Relays	82
SMS	. 82
Antennas	. 16

В

Backup Server	<mark>38</mark>
Battery	19
Installation Dates	112, 115
Behaviour on a Seismic Event	35

С

Cellular Modem 19, 8	-
Channel Naming7	'n
-	
Communication Interface	
Configuration 6	63
File Storage and Policy8	37
Channels6	6
Communication	90
Data Streams7	1
Preset Trigger 8	34
Trigger	
Connectors 1	
External 1	6
Console	20
Control Requests 11	

D

Data Explorer	61
Data Server	29

Ε

Environmental Considerations	19
Event 7	7, 86

F

File Structure	. 124
Firmware and Configuration Upgrade	37
Firmware Upgrade	.117
full scale	23

G

•	
GeoDAS Settings	125
GNSS	19
GPS	19

|

Installation	19
IP Address	26

Μ

mmcblk01		. 124
More Information	Menu	. 128

Ν

13	
Network Settings	39
Get IP from Instrument	14
Wired Ethernet	52
Network Trigger	93
Normal Operation	34
NTP 1	9

Ρ

-	
Post-Event Time	81
Power Supply	, <mark>12</mark> 9
Pre-Event Time	81
Preset Trigger	84
Principle of Operation	34

Q

Quick Start		22
-------------	--	----

S	
Scaling Factor	
SFTP	
Site Selection	
SSH	26, 43, 115, 121
State of Health (SOH)	55, 95, 127
Switch ON/OFF	63

Т

Temperature Calibration	111
Terminal	22, 63
Test and Configuration Menu	113
Administrator	114
Powerful User	114
User	113
Time synchronization	103
V	
Visual Indicators	17

W

Warranty	.13, 12	21
Web Interface	6	33