The Synchronization Experts.

User Manual

Meinberg Device Manager

2020-06-13

Meinberg Funkuhren GmbH & Co. KG

Lange Wand 9

31812 Bad Pyrmont

Table of Contents

1. Licence Agreement

Please read carefully the terms and conditions of this licence agreement before installing, copying or using the licensed software.

Meinberg Device Manager End-User Licence Agreement

Meinberg Funkuhren GmbH & Co. KG
9 Lange Wand
Bad Pyrmont 31812
Germany
Phone: +49 (0) 52 81 / 93 09 - 0
Fax: +49 (0) 52 81 / 93 09 – 230

This End-User License Agreement (EULA) is a legal agreement between you (physical person or legal entity) and the company Meinberg Funkuhren. It concerns the Meinberg Funkuhren Software product mentioned above with the corresponding software module, media, printed materials and electronical documentation. By installing, copying and using the Meinberg Device Manager in other purposes, you agree on the terms of this EULA. This License Agreement represents the entire arrangement of the program between you and Meinberg Funkuhren (as Licensor) and replaces all prior recommendations, representations and agreements between the parties. If you do not agree with the terms of this License Agreement, then don't install or use the Meinberg Device Manager. The Meinberg Device Manager is protected by copyright and international copyright treaties, as well as by other intellectual property laws and treaties. The Meinberg Device Manager is licensed and not sold.

1. LICENSE GRANT

The Meinberg Device Manager is licensed as follows:

(a) Installation anduse. The Meinberg Device Manager grants you the rights to install and to use copies of the Meinberg Device Manager on your computer, provided that your computer is running with a properly licensed copy of the operating system for which the Meinberg Device Manager was developed.
(b) Backup copies. For backup and archival purposes, necessary copies of the Meinberg Device Manager may be made.

2. DESCRIPTION OF OTHER RIGHTS AND LIMITATIONS

(a) Information about the maintenance of copyright. You can't remove or change the copyright notices of any Meinberg Device Manager copies.
(b) Distribution. You are not allowed to share registered copies of the Meinberg Device Manager with third parties. Demo versions are available on the Meinberg Funkuhren website. They can be downloaded and shared for free.
(c) Prohibition of reverse engineering, decompiling and disassembly. You are not authorized to reverse engineer, to decompile and to disassembly the Meinberg Device Manager, except when may be expressly permitted by applicable law (and only insofar).
(d) Support services. You can obtain support services for the Meinberg Device Manager (Support lines) from the company Meinberg Funkuhren. Any further software code provided to you as a part of the Support Services, is a part of the Meinberg Device Manager and is subject to the terms and conditions of this EULA.
(f) Compliance with applicable regulations. You must comply with all applicable regulations regarding the use of the Meinberg Device Manager.

3. TERMINATION

Without prejudice to any other rights, Meinberg Funkuhren is entitled to terminate this EULA if you violate its provisions. In such a case, you are obliged to destroy all the copies of the software and all its modules.

4. COPYRIGHT

All titles, including but not limited to copyright, in and around the Meinberg Device Manager and its copies, are property of Meinberg Funkuhren. All titles and intellectual property rights in and to the content that may be accessed using the Meinberg Device Manager, are the property of their respective content owners and may be protected by copyright or other intellectual property laws and treaties. This EULA does not grant you any rights for using such contents. All rights that are not expressly granted are reserved by Meinberg Funkuhren.

5. NO WARRANTY

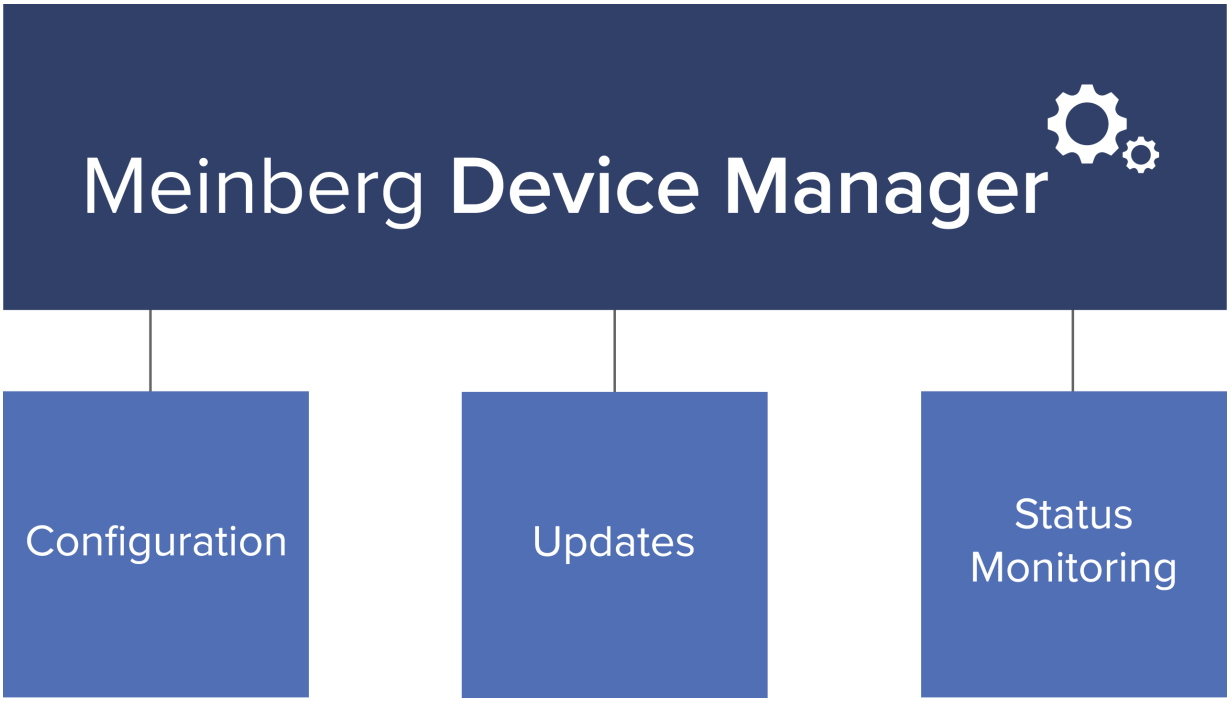
Meinberg Funkuhren rejects expressly any warranty for the Meinberg Device Manager. The Meinberg Device Manager is provided “as is” without any warranty of any kind, either express or implied, including, but not limited to, the warranties of merchantability, non-infringement or suitability for a particular purpose. Meinberg Funkuhren assumes no liability or responsibility for the accuracy or completeness of the information, texts, graphics, links or other elements within the Meinberg Device Manager. Meinberg Funkuhren offers no warranty concerning any damage which may be caused by the transmission of computer viruses, worms, time bombs, logical bombs or any other computer programs. Meinberg Funkuhren disclaims any warranty or assurance with respect to authorized users or third parties.

6. LIABILITY

Meinberg is never responsible for any damage resulting from the use of “the Authorized User” or its inability to use the Meinberg Device Manager (including, without restrictions, lost profits, business interruption or lost data, also if Meinberg Funkuhren was advised that there might be a possibility of such damages. Meinberg Funkuhren is never responsible for any loss of data or for any indirect, special, incidental, consequential or any other damages caused by breach of contract. Meinberg Funkuhren assumes no responsibility regarding the content of the Meinberg Device Manager or any part of it, including but not limited to errors or omissions, insults, violations of publicity rights, trademark law, business interruption, personal injury, loss of privacy and moral rights or the disclosure of confidential information.

2. About the MEINBERG Device Manager

The absolute control over your MEINBERG modules and assembly groups



The MEINBERG Device Manager is a special program developed by our software experts for a simple management of your MEINBERG stand-alone modules, as well as of the compatible assembly groups.

The program offers you many possibilities such as configuring, monitoring in real-time and updating all your MEINBERG modules and assembly groups which have a serial or a network interface.

This user manual is a systematically structured guide which familiarizes you with all the important functions of the MEINBERG Device Manager.

3. About this manual

3.1. Symbols used

This symbol refers to additional and useful information about the Meinberg Device Manager.

This symbol warns you, inter alia, about the incorrect use of the Meinberg Device Manager or points out that only trained personnel is allowed to change some of its default settings.

3.2. Using Meinberg Device Manager

This user manual contains necessary information which is needed for using correctly the Meinberg Device Manager.

This user manual explains how to use the Meinberg Device Manager. It is intended for the technical staff responsible for installing, putting into operation, maintaining and troubleshooting the Meinberg products. The level of this manual is also intended for people who are already familiar with the Meinberg products.

3.3. List of Figures

3.4. List of Tables

3.5. List of abbreviations

AFNOR	Association Francaise de Normalisation time codes
AC	Alternating Current
ASCII	American Standard Code for Information Interchange
BMC	Best Master Clock
BMCA	Best Master Clock Algorithm
BNC	Bayonet Neil Councilman connector
Bps	Bytes per second
bps	Bits per second
CAT5	Standard Network Cable
CET	Central European Time
CLI	Command Line Interface
DARS	Digital Audio Reference Signal
DB9	Connector do type D-sub miniature
DC	Direct Current
DCF77	Is a longwave time signal. DCF77 stands for D=Deutschland (Germany) C=long wave signal, F=Frankfurt, 77=frequency: 77.5 kHz. DCFMARK Single pulse with a programmable date and time
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Server
DSCP	Differentiated Services Code Points
DST	Daylight Saving Time
E1	European digital transmission signal at 2.048 MHz used in telecommunication networks.
E2E	End-to-end
ETH	Ethernet
FD	Frequency Deviation
FTP	File Transfer Protocol
FW	Firmware
GE / GbE	Gigabit Ethernet
GLONASS	Global Navigation Satellite System from Russian Aerospace Defence Forces
GM	Grandmaster
GND	Ground (Connector)
GNSS	Global Navigation Satellite System (GPS, GLONASS, Galileo, Beidou)
GOAL	GPS Optical Antenna Link
GPIO	General Purpose Input Output
GPS	Global Positioning System (USA)
GSM	Global System for Mobile Communications
HMI	Human-Machine Interface
HP	Horizontal Pitch - is a unit measure the horizontal width of rack mounted electronic equipment
HPS	High Performance Synchronization PTP/NTP/SyncE GBit module
HSR	High-availability Seamless Redundancy
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
IEC	International Electrotechnical Commission
IED	Intelligent Electronic Devices
IEEE	Institute of Electric and Electronic Engineers
IEEE 1588	Protocol for high precision synchronization in nanosecond range (PTP)
IP	Internet Protocol
IP 20	Protection Class 20
IRIG	Inter-range instrumentation group time codes
LCD	Liquid Crystal Display
LED	Light-Emitting Diode
LINUX	Unix-like multi-user computer operating system
LIU	Line Interface Unit- an module for generation E1/T1 Signals, both MBit/s (framed) and Clock (unframed)
LNE	Local Network Extension, additional Ethernet Ports
MAC	Media Access Control
MD5	Message-Digest cryptographic hash function
MESZ	Middle European Summer Time
MEZ	Middle European Time
MIB	Management Information Base
MRS	Multi Reference Source
MSF	Time signal transmitter in Anthorn, UK
NIST	National Institute of Standards and Technology
NMEA	Communication standard from National Marine Electronics Association
NTP	Network Time Protocol
NTPD	NTP Daemon
OSV	Original Shipped Version (Firmware)
OUT	Output
P2P	Peer-to-Peer
PLC	Programmable Logic Controller
PLL	Phase Locked Loop
PLT	Power Line Time
PPM	Pulse per Minute

PRP	Parallel Redundancy Protocol
PPS	Pulse per Second
PPH	Pulse per Hour
PTB	Physical - Technical Institute Braunschweig / Germany
PTP	Precision Time Protocol
RAM	Random Access Memory
REF	Reference Time
RF	Frequency of radio waves, from 3kHz to 300GHz
RG58	Standard coaxial cable used to connect an antenna and a receiver
RJ45	Ethernet Connector with 8 conductors
RMC	Remote Monitoring Control
RoHS	Restriction of Hazardous Substances
RPS	Redundant Power Supply
RS232/485	Serial port levels
RSC	Redundant Switch Control unit
RX	Receiving Data
SBC	Single Board Computer
SDU	Signal Distribution Unit
SHA-1	Secure Hash Algorithm 1
SMB	Subminiature coaxial connector
SNMP	Simple Network Management Protocol
SNTP	Simple Network Time Protocol
SMTP	Simple Mail Transfer Protocol
SPS	Standard Positioning System
SSH	Secure SHell network protocol
SSU	Synchronization Supply Unit, specific clock used in telecommunication networks
SSM	Sync Status Messages, clock quality parameters in telecommunication networks.
ST	Bayonet-lock connector
Stratum	Value defines the NTP hierarchy
SYSLOG	Standard for computer data logging
TAI	Temps Atomique International
TACACS	Terminal Access Controller Access Control System
TCG	Time Code Generator
TCR	Time Code Receiver for IRIG A/B, AFNOR or IEEE1344 codes
TD	Time Deviation
T1	North American telecommunication signal at 1.544 MHz frequency
TCP	Transmission Control Protocol
TTL	Transistor-to-Transistor Logic
TTL	Time to Live
TX	Data Transmission
U	Unit - is a unit measure the vertical height of rack mounted electronic equipment.
UDP	User Datagram Protocol
UMTS	Universal Mobile Telecommunications System
UNIX	Multitasking, multi-user computer operating system
UTC	Universal Time Coordinate
VLAN	Virtual Local Area Network
WWVB	Time signal radio station Fort Collins, Colorado (USA)
XMR	External Multi-Reference

4. System requirements for the Meinberg Device-Manager

The Meinberg Device-Manager is compatible for the following operating systems:

Windows all versions from Windows 7

Linux Ubuntu / Mint Linux / Debian / SUSE Linux / CentOS

Older versions, before Windows 7 are not supported.

5. Installation

5.1 Download

You can download the MEINBERG Device Manager from the MEINBERG homepage, free of charge.
To download your program, click on the following links:

Meinberg Device Manager

For Windows systems
https://www.meinberg.de/download/utils/windows/Meinberg Device-Manager setup.exe

For Linux systems
https://www.meinberg.de/download/utils/linux/Meinberg Device-Manager.tar.gz

5.2 Installation

Open the downloaded set-up file of the Meinberg Device Manager and follow the instruction from the screen.

A 18 MB memory capacity is needed for the Meinberg Device Manager

6. Starting Meinberg Device Manager

If you connect a module/ assembly group with the Meinberg Device Manager for the first time, you can make a preliminary selection of the connection type.

While establishing the connection, only the modules/ assembly groups with the previously selected connection type will be displayed and scanned.

Figure 1: Connection type

Choose how many modules/ assembly groups you want to connect to the Meinberg Device Manager.

Depending on your selection, modules/ assembly groups will be differently displayed on the start screen.

Up to two devices will be displayed in single view.

More than two devices will be displayed in a tree-structured view.

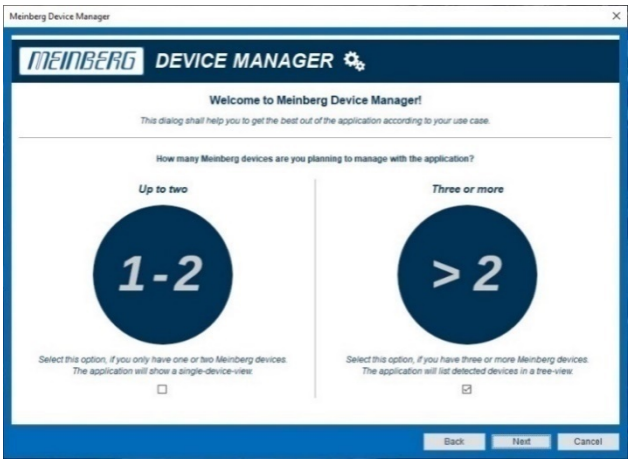


Figure 2: Number of devices

Search for the connected modules/ assembly groups. By clicking on the magnifier icon, the program will search the connected modules/ assembly groups and they will be displayed in the adjacent window.

The number of the detected devices will also be displayed.

Select the modules/ assembly groups which are to be managed using the application.

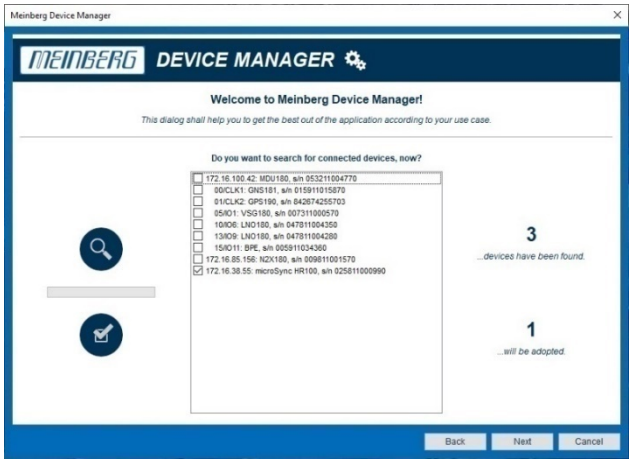


Figure 3: Search connected devices

Activate the checkbox and encrypt the file containing your user-defined configurations (e.g. passwords and stored IP addresses) by assigning a password.

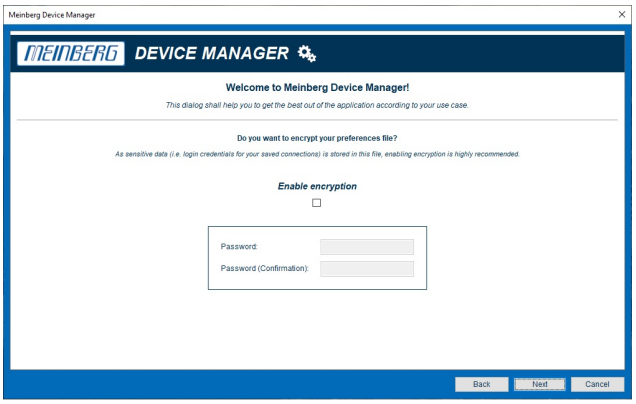


Figure 4: Encryption

At the first start of the Meinberg Device Manager you can make basic settings such as the initial or periodic search for modules/assemblies.

Figure 5: Additional options

After you have made all the settings, click ***OK*** to start the Device Manager.

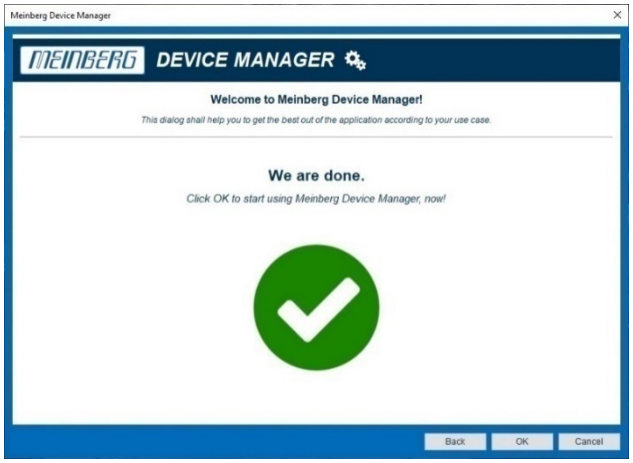


Figure 6: Connection done

If some connections to the modules/ assembly groups were saved, the Meinberg Device Manager will try to restore them during the new starting.

Figure 7: Restore saved connections

6.1 Updates

To use the full functionality for configuration and status monitoring of your Meinberg products, we recommend to always use both the latest version of the Device Manager and the latest firmware version for your product.

Update the Meinberg Device Manager

If there is a new version of the Device Manager available, you will be informed about it e.g. when starting the program and are able to install the new version by clicking on "Yes". This will overwrite the older version.

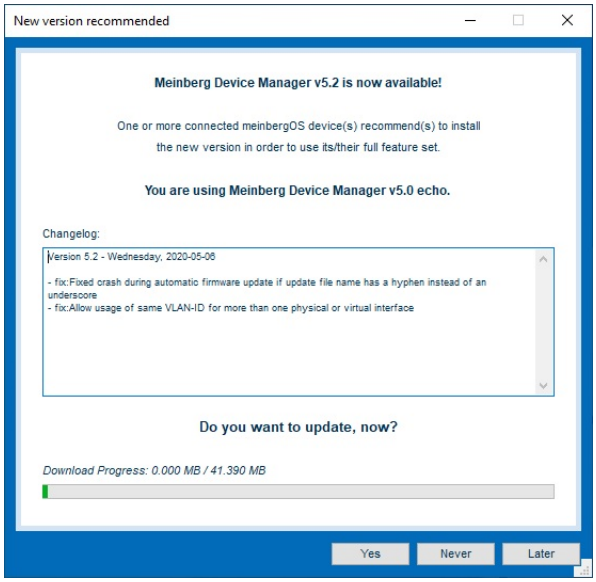


Figure 8: Update Device Manager

Update of the Firmware

If there is a new firmware version for connected modules/assemblies available, you will be informed about it e.g. at program start and may download the new version by clicking on "Yes".

Connected modules on which the update is to be installed can be selected in the next dialog window.

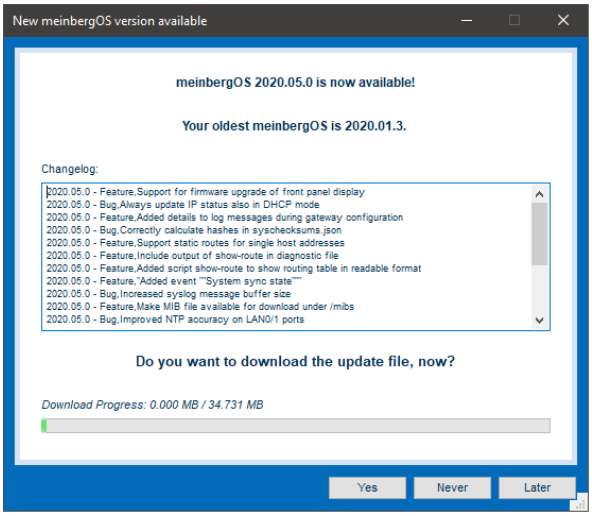


Figure 9: Update Firmware

7. The start screen of the Meinberg Device Manager

7.1 Tree structual view

After starting the Meinberg Device Manager, you automatically reach the start screen. (figure 7)
It offers you a first overview of the important functions of the program.

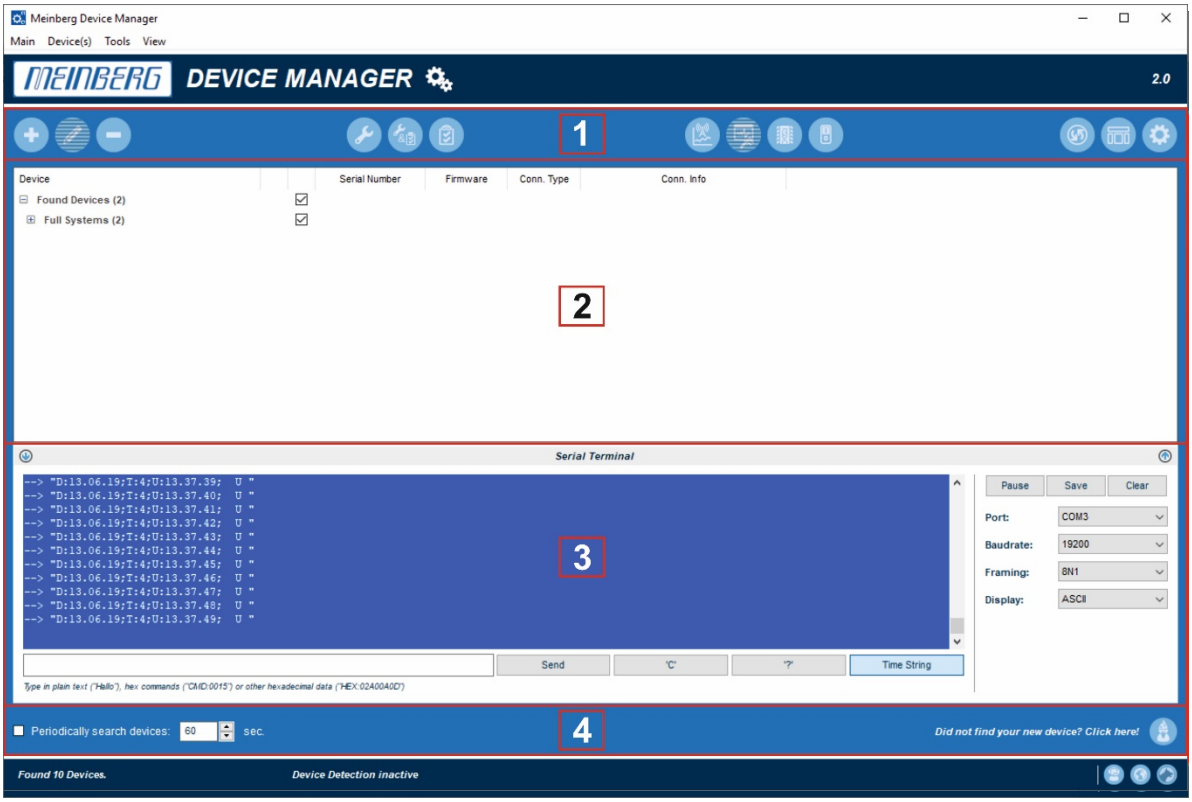


Figure 10: Startscreen of the Meinberg Device Manager

7.1.1 Beschreibung des Startbildschirms - Baumstrukturelle Ansicht

The menu bar (1)

In this area of the start screen, you can find important menu options for configuring, updating and monitoring the status of your connected modules/assembly groups. The following table displays individual symbols and their basic functions.

Symbol	Menu item	Function
	Add Device	Adding a module/assembly group manually
	Edit Connection Settings	Changing the connection parameters (e.g. IP)
	Remove Device	Removing the selected modules/assembly groups
	Configure Device	Configuring the selected modules/assembly groups
	Configure Device & Show Status	Configuring and displaying the status of the selected modules
	Show Device Status	Displaying the status of the selected modules/assembly groups.
	Show GNSS Statistics	Statistical records of all satellite information
	Calibrate Oszillator	Setting the oscillator frequency
	Firmware Update	Updating the selected modules/assembly groups (via serial port)
	Reboot Device	Restarting the selected modules/ assembly groups
	Search Device	Network scanning the connected modules/ assembly groups per UDP Broadcast and attempting to connect to all serial ports.
	Switch to Single View	Switching from tree view to single view of the module/ assembly group.
	User Preferences	Custom setting of the program.

Table 1: Menu items of the Meinberg Device Managers

The module overview (2)

The module overview displays all connected modules in a tree-structured list, and they can also be selected. The list also displays basic information about them, such as the serial number, hostname/firmware version, type of connection (network, serial) and connection parameters such as IP and MAC address.

By right-clicking on the module/ assembly group, a dialog window opens. The most important configuration menus are displayed in a list and can be selected.

The serial terminal (3)

This field displays the serial output (e.g. time string) of a module/ assembly group.

You can also use the text box to send requests as text, hex or hexadecimal to the module/assembly group, in order to trigger the transmission of a time string.

Example based on a request to the FDM.

To retrieve the serial number, enter the request **"SN!"** in the text field. The following string which consists of a serial number and software version, will be sent via the COM0 port.

SN: 041110000990 REV:01.00/01<CR><LF>

Button	Function
Pause/Resume	Stop the serial output by clicking on **Pause**. Click on **Resume**, to continue.
Save	Save the current contents of the terminal windows as a txt-file.
Clear	Delete the content of the terminal window.
Port	Select the COM port whose output is to be displayed in the terminal window.
Baud rate	Select the baud rate you want
Framing	Select the framing you want
Display	Choose between the forms of presentation ASCII and HEX character encoding.
Send	Send the previously entered request (text, hex, hexadecimal) to the serial port of the module/ assembly group.
'C'	If the **Com mode** of the serial interface is set to Sysplex 1, you can send a "C" o the reference clock, in order to activate the transmission of the SYSPLEX string every second.
'?'	If the Com mode is set to "On request only (?)", you can send a "?" to the reference clock which sends a time string.
Time String	Send a second serial time string to the serial port of the module/ assembly group.

Table 2: Functions of the serial terminal

Miscellaneous (4)

In this field you can find the Automatic device detection function, for searching and updating the connected modules/ assembly groups automatically, as well as the Network Configuration Wizard which allows an initial connection to a module/ assembly group.

7.2 Single View

You have the possibility to switch between the tree-structured view and the single view of the start page.

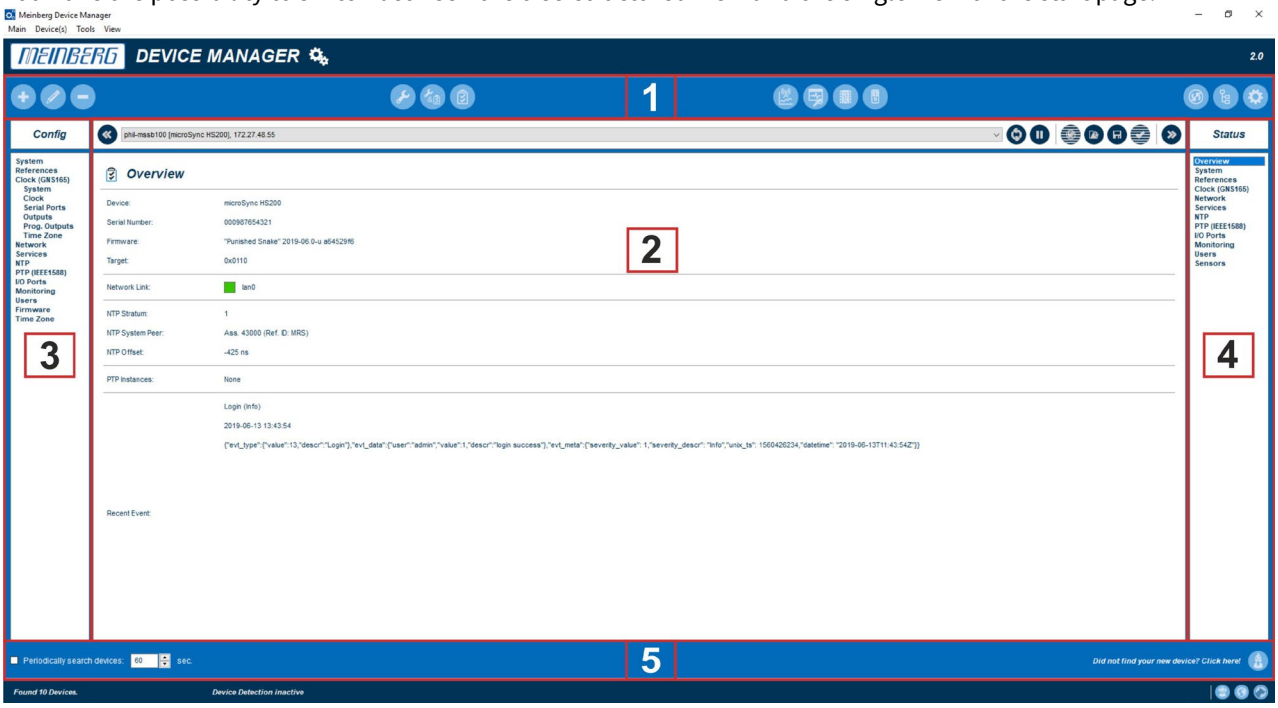


Figure 11: Start screen "Single view"

7.2.1 Description of the start screen single view

Menu field (1)

This view offers you the same menu options as in the tree-structured view.

Detail view (2)

Symbol	Menu item	Function
	Reconnect	Renews the connection to the selected module/ assembly group.
	Halt/Revive Connection	**Halt** →pauses the connection to the module/assembly group for example to enable a serial port for receiving a time string. **Revive** →establishes once again the connection to the module/ assembly group.
	Revoke all configuration changes	Resets all configuration changes that have not been applied yet.
	Load multiple subject configurations	Loads all configurations stored in a file
	Save multiple subject configurations	Saves all configurations in a file
	Apply all configuration changes	Applies all configuration changes
	Go to next device	Moves to the next module/ assembly group of the list.
	Go to previous device	Moves to the previous module/ assembly group of the list.

Table 3: Menu items "Single view"

Description

First, select the module/ assembly group from the drop-down menu. The configuration menus supported by the module/ assembly group can be selected in section (3). The area (4) lists all status menus. In the area (2) the menu details are displayed, and the module/assembly can be configured, or its status information can be read.

Miscellaneous (5)

This section displays the Automatic Device Detection, for automatic search and ongoing updating of connected modules/assembly groups, as well as the Network Configuration Wizard, which allows an initial connection to a module/assembly group.

7.3 Group View

In addition to the Single View and Tree View, there is now a separate view "Group View" for the (freely definable) device groups.

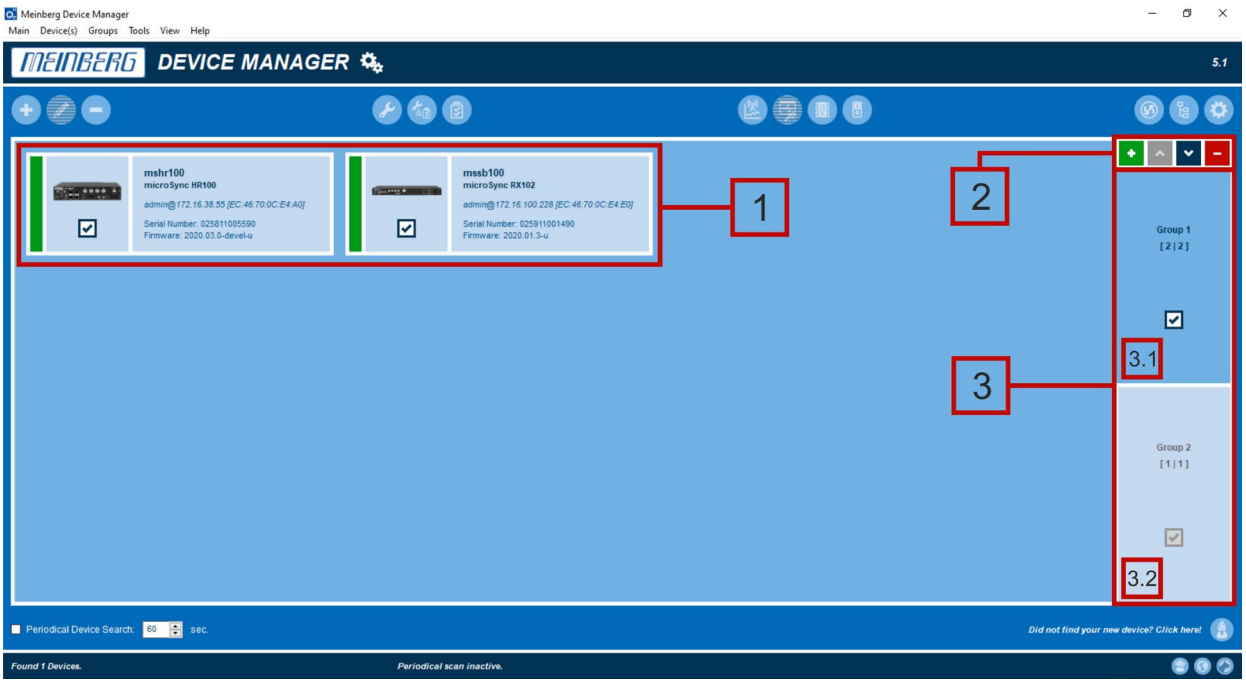


Figure 12: Group View Startscreen

Group members (1)

Connected systems are shown with a picture. Important parameters such as IP, serial number and firmware of the individual group members are visible at first view. In the " Group View ", you can also double-click on a group member to open its configuration and status menu.

Function buttons (2)

Symbol	Button	Function
	Add Group	Create a new group
	Move Upwards	Move the active group upwards
	Move Downwards	Move the active group downwards
	Delete Group	Delete the active group

Table 4: Functions group view

Group overview (3)

The active group **(3.1)** is displayed without a frame, inactive groups **(3.2)** are highlighted by a frame.

7.3.1 Create a custom group

1. First click on the ***"Add Group"*** button

2. In the New Group dialog box, assign a name and an index for the new custom group. The new group appears in the group overview.

3. Right-click on the system you want to add to a custom group.

4. Select ***„Attach To“*** and:

- Assign the system to an already created group (e.g. Group 1)
- Click ***"New Group..."*** to create a new group for the selected system.

Another possibility is to add a device to a group or switch from one to another by "drag and drop". To do so, click on the device and drag it with the mouse pointer to the group you want.

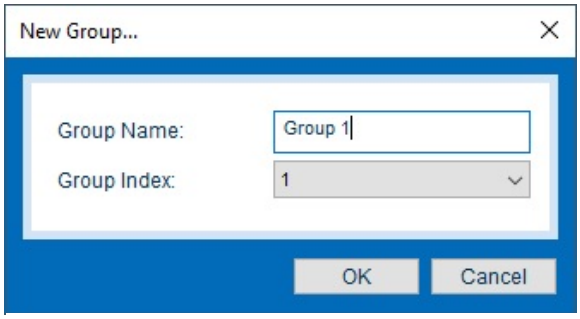


Figure 13: New group – Group view

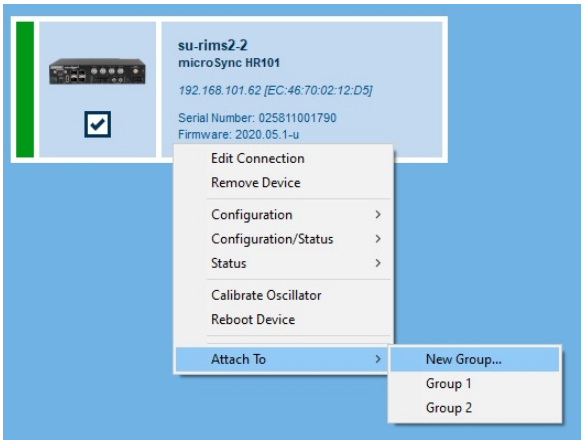


Figure 14: Attach To - Group view

Additional Functions

Right-click on the system and select the group e.g. ***"Group (Group 1)"*** of the system in the dialog window.

Select:

Detach Device

To delete the system from the group

Delete Group

To delete the group the system belongs to.
Right-click the group in the group overview and select ***"Delete Group "***.

Edit Group

To change the group name and group index make a right-click on the group in the group overview and select ***"Edit Group"***.

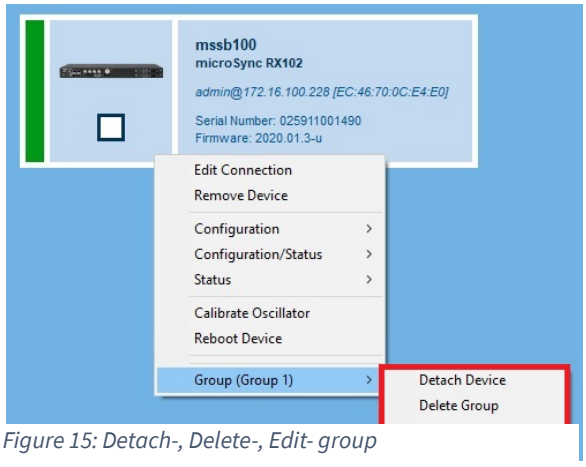


Figure 15: Detach-, Delete-, Edit- group

IMS-Systems

The configuration as well as the status monitoring of modular systems and their modules works in the ***"Group View"*** as follows

1. Check the box to select the entire system.
2. To select single or multiple IMS- Modules, click the arrow and select them by click.

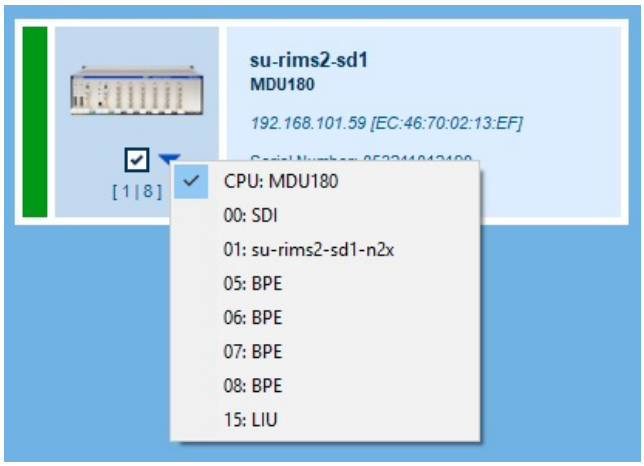


Figure 16: IMS-Systems - Group view

8. Establishing a connection

Connecting the device

Make sure that the module is connected to your computer or to the network via a serial or network port and is in the same physical network.

You have the possibility to find and access the connected modules/assembly groups using the Meinberg Device Manager. This is explained below.

8.1 Search Devices 

By clicking on the ***Search Devices*** button, all available Meinberg modules/ assembly groups which have a serial or network interface, are scanned by the Meinberg Device Manager and displayed in a list.

- The detected modules are displayed as green dots.
- The undetected modules are displayed as red dots.
- The modules whose password or password/username combination is unknown are marked with a red x.

8.2 Automatic Search

The Search Devices function works via UDP broadcast. Therefore, it may happen that only devices which are in the same subnet as the operating system, can be found.

This function is deactivated while the program is booting. For the activation of the search function, check the “automatic device detection” box from field nr. 4 (other functions) of your start screen.

Activated	The program looks automatically for the new connected modules/ assembly groups, every 60 seconds. This function is saved and is available while restarting the program.
Deactivated	The new connected modules are no longer detected automatically. The status of the connected module is no longer cyclic but is updated only while the users are interacting.

8.3 Establishing a manual connection

If the connected module can't be found automatically, a connection can be established manually via the **Add Device** button.

8.3.1 Establishing a serial connection

Configuration

1. Click on the ***Add Device*** button

The drop-down menu offers a selection of Meinberg products supported by the Device Manager and their connection types (serial, network, others...).

2. Select the connection type ***Serial***
3. Enter the serial connection parameters**.**
4. You can assign a custom alias for each module/assembly group

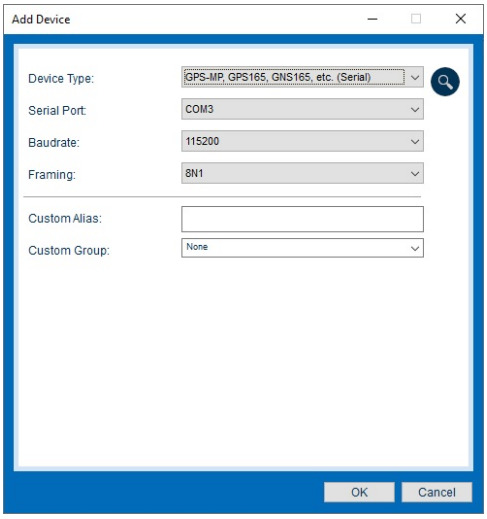


Figure 17: Establishing a serial connection

The serial parameters are known

For establishing a serial connection, select the connected port, the baud rate and the used framing.

The serial parameters are unknown

Use the ***detect serial parameters*** function.

All the available combinations of the port, baud rate and the framing, will be tested. The first configuration will be used, by means of which a connection can be made.

If a suitable combination is found, it will be displayed by the **Success** window.

After confirming the next two windows, the component to which you want to connect is displayed in a list.

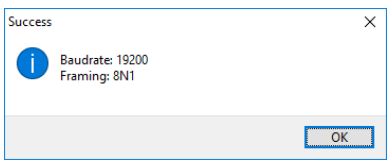


Figure 18: Connection parameters

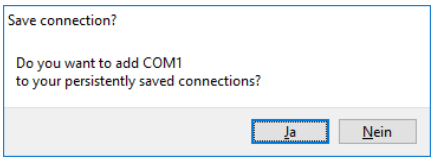


Figure 19: Save connection

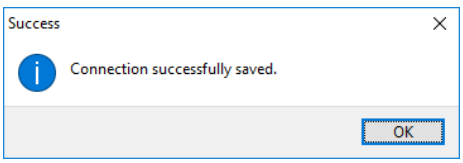


Figure 20: Successfully saved

8.3.2 Establishing a network connection

Configuration

1. Click on the ***Add Device*** button.

The drop-down menu offers a selection of Meinberg products supported by the Device Manager and their connection types (serial, network, others...).

2. Select the **Network** connection type.

3. Enter the IPv4 address of the connected module/assembly group for which a connection must be established.

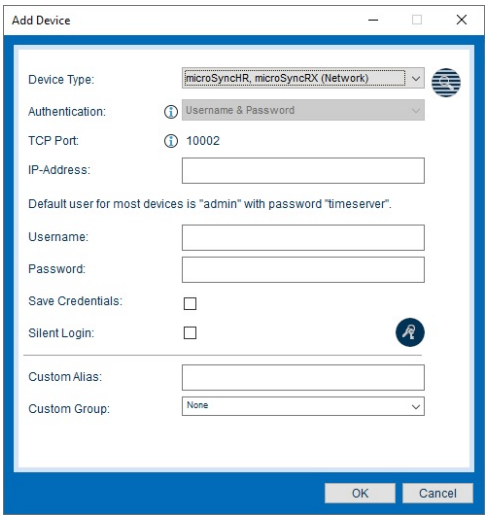


Figure 21: Establishing network connection

The change of the password for modules/assembly groups with advanced authentication (e.g. microSYNC). There are modules/assembly groups that are exclusively secured by a password (e.g. N2x, RSC). You can change the password only via 19.1 Network Configuration.

Parameter	Value
Authentication Selecting the authentication method. The **Username & Password** option is only supported for modules with MeinbergOS.	Click and open the drop-down menu and choose between **Password only** and **Username & Password**
TCP Port This TCP port is used to communicate with your Meinberg module. Please make sure it is open in your firewall configuration.	**Passwort only** TCP Port 10001 **Username & Passwort** TCP Port 10002
Username (Optional) Entering the username. This allows the Meinberg Device Manager to authenticate with your Meinberg module/assembly group.	Enter a username for your Meinberg module/ assembly group **Default usernames for meinbergOS modules:** ▪ admin ▪ info ▪ status
Password Entering a password. This allows the Meinberg Device Manager to authenticate with your Meinberg module/assembly group.	Enter a password for your Meinberg module/ assembly group **Default password** Password only mbg

Parameter	Value
Silent Login Allowing Meinberg Device Manager not to ask for the username and password by every log-in.	Check the „**Silent Login”** box.
Custom Alias Assign a custom alias for better identification of individual systems/modules in Device Manager.	Assign a custom alias for each module/assembly group
Custom Group Assign the module/assembly to a group.	Open the drop-down menu and select a group you want.

8.3.3 Changing your network password

To change the password for the currently logged user, click on the following symbol:

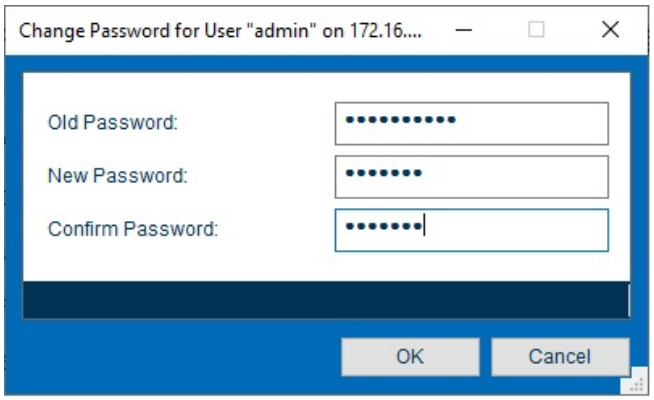


Figure 22: Change network password

Parameter	Value
Old Password	Enter the old password
New Password	Enter the new password
Confirm Password	Confirm the new password with a new entry and accept the changes by clicking on ***OK***.

8.3.4 Login for modules with advanced authentication (meinbergOS)

1. Click on the module to select it
2. Afterwards, click on the Configure Device(s) or Show Device(s) status from the menu bar.
3. The **User Login** dialog box opens automatically. (Fig. 15)

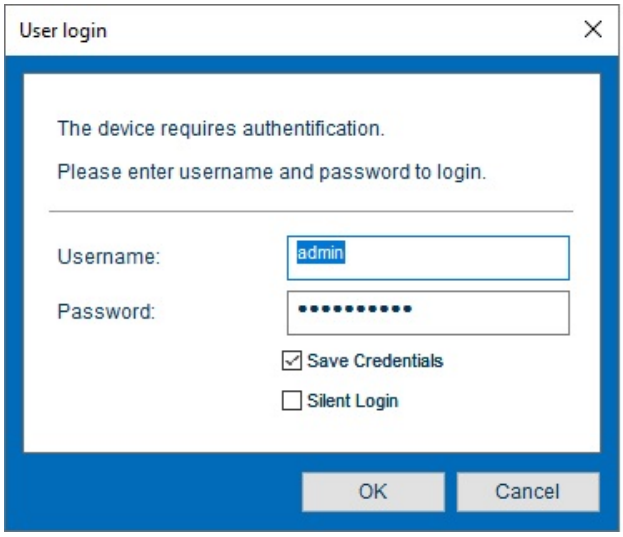


Figure 23: User login for meinbergOS

Parameter	Value
Username Entering the username. This allows the Meinberg Device Manager to authenticate with your Meinberg module/assembly group.	Enter a username for your Meinberg module/ assembly group. **Default usernames for the MeinbergOS modules:** ▪ admin ▪ info ▪ status
Password Assigning a password to secure the selected module/assembly group from unauthorized access.	Enter a password for your Meinberg module/ assembly group. **Default password:** Password only mbg Username admin Passwort timeserver
Save Credentials You have the possibility to save your login credentials.	Check the **Save Credentials** box.
Silent Login Allowing Meinberg Device Manager not to ask for the username and password by every log-in.	Check the **Silent Login** box.

Host key verification

To enable a safe connection to the module/assembly group via SSH, you must add the used key to your “Known” hosts. This ensures that the module/assembly group can be permanently identified as a trusted communication partner.

To confirm this, please click on the ***Yes*** button in the following dialog box:

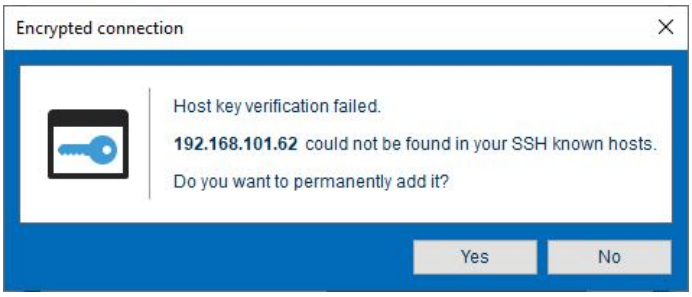


Figure 24: Host key verification

8.4 Connection with the „Network Configuration Wizard “

The "Network Configuration Wizard" allows a step by step connection to your Meinberg module/ assembly group.

Currently this function is supported only by the N2X module.

Opening the Network Configuration Wizard

The wizard is to be found in the field **„Miscellaneous 4“**of your start screen, on the right side. Click on the button to open it. The configuration process is gradually explained below:

Description

Button	Function
Cancel	By clicking on the button, you may cancel the „Network Configuration Wizard “.
Previous	By clicking on the button, you get to the previous field.
Next	By clicking on the button, you get to the next field.

Table 5: Functions “Network configuration wizard”

Configuration

1. **MAC address**

   Enter the 12-digit MAC address which may be found on your Meinberg module. To continue, confirm the entry by clicking on **“Next”**.

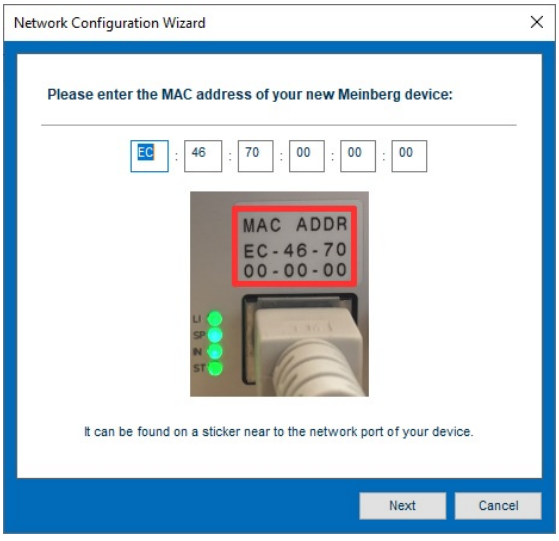


Figure 25: Enter a MAC address

2. **Hostname**

   Enter a hostname for your module or leave the field empty. To continue, confirm the entry by clicking on **“Next”.**

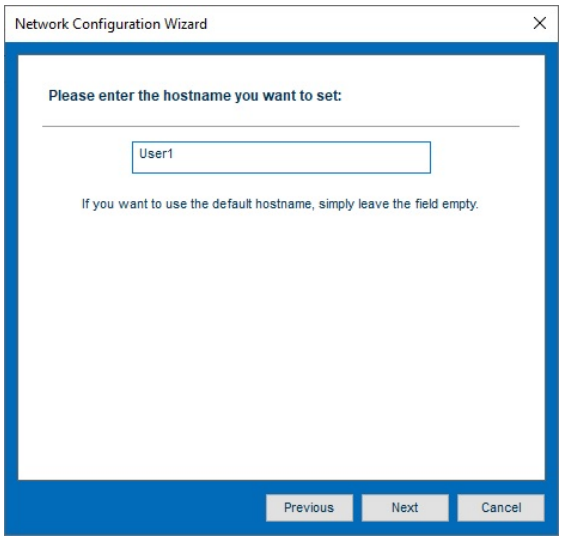


Figure 26: Assignment of a host name

3. **Static IP or DHCP**

   „NO “ for static IP

   „YES “ for DHCP

   To continue, confirm the entry by clicking on “Next”.

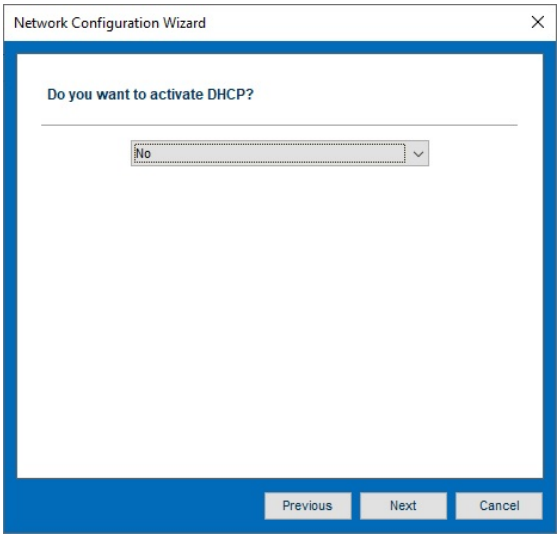


Figure 27: DHCP

When assigning the IP address via Wizard, pay attention to the following:

- The PC and the corresponding module/assembly group must be physically connected in the same network.
- An IP configuration via a gateway/ router is not possible.
- A transmission of broadcast packets in the network is generally blocked and not allowed.

4. Static IP

Enter the IP address, the netmask, the gateway in the fields, and if necessary, the DNS server. To continue, confirm the entry by clicking on ***"Next"*.**

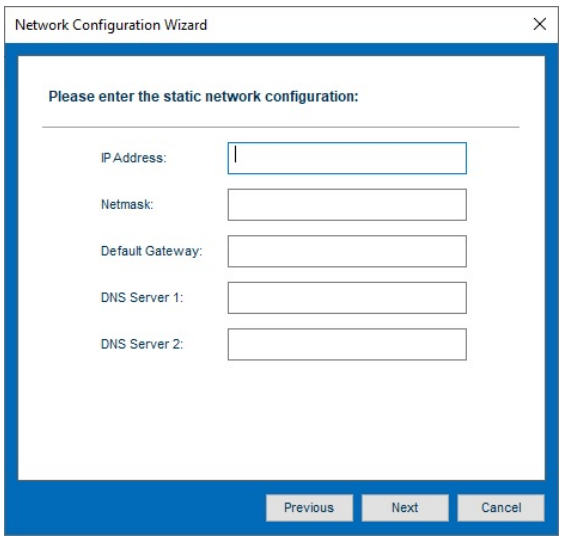


Figure 28: Assignment of a static IP

5. DHCP Client

The DHCP client is activated. Click on ***"Next"*** to continue.

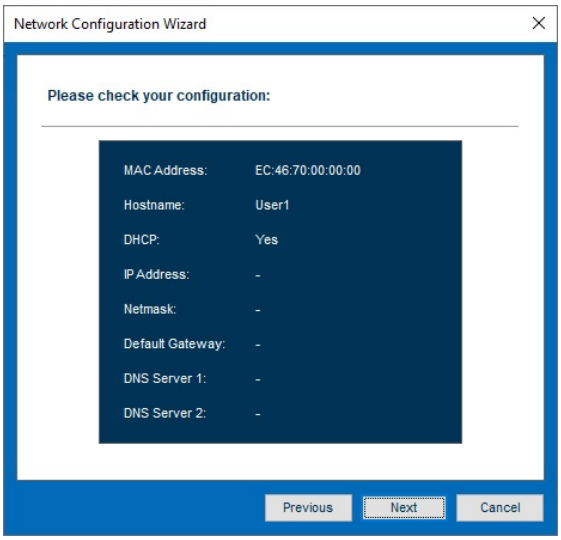


Figure 29: Configuration check

6. Access Control Override (ACO)

On the front panel of your module/ assembly group, the **„ACO”** button is to be found.

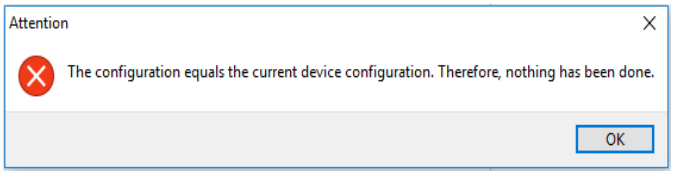
Confirm the configuration by clicking on this button. To continue, confirm the entry by clicking on ***“Apply”*.**

A successful configuration will be confirmed when the **“Success”** window is displayed.

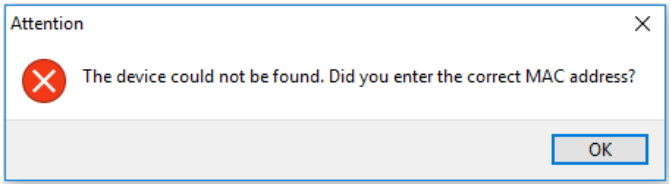
Figure 30: Access Control Override (ACO)

8.4.1 Error recovery in the Network Configuration Wizard

This configuration you set is the current network configuration of the device, so no changes have been made.



The device could not be found with the MAC address you entered. Check out if you entered the MAC address correctly and if the device is in the same subnet as your computer.



8.5 Edit Connection Settings 

In the **Edit Connection Settings** menu, connection parameters for the serial or network connection, such as baud rate, framing or the password to be used for network access, can be changed to already listed modules/assembly groups.

There are two possibilities to reach the menu:

1. First select the module/ assembly group and then click the **Edit Connection Settings** button.
2. You can also reach the **Edit Connection Settings** menu by double-clicking on the listed module.

The configuration of the connection parameters is identical to the procedure explained in 8.3 Establishing a manual connection.

8.6 Remove Device 

If you want to delete modules/ assembly groups from the list displayed on the start screen, you can do it by clicking on the “Remove Device” button. The deleted components will be removed only from the start screen but will continue to operate.

1. Select the module/ assembly group you want.
2. To delete it, click on the **“Remove Device”** button.

9. Start screen of the configuration menu

9.1 Device Configuration Menu

If you established a successful connection with the required module/ assembly group, you will be able to see it in the tree-structured list of your start screen. Individual modules of the assembly group (e.g. an MDU) will be visible by clicking on **+** and will be able to be selected.

Depending on what module/assembly group was selected, there are many configuration possibilities available. It is also possible the selection of more modules/assembly groups, in order to configure and to update them simultaneously or to view their status.

1. Select the appropriate module/ assembly group, then click on the **Configure Device(s)** button.
2. You reach automatically the **Device Configuration menu**. (Fig. 17, e.g. GNS181 module)

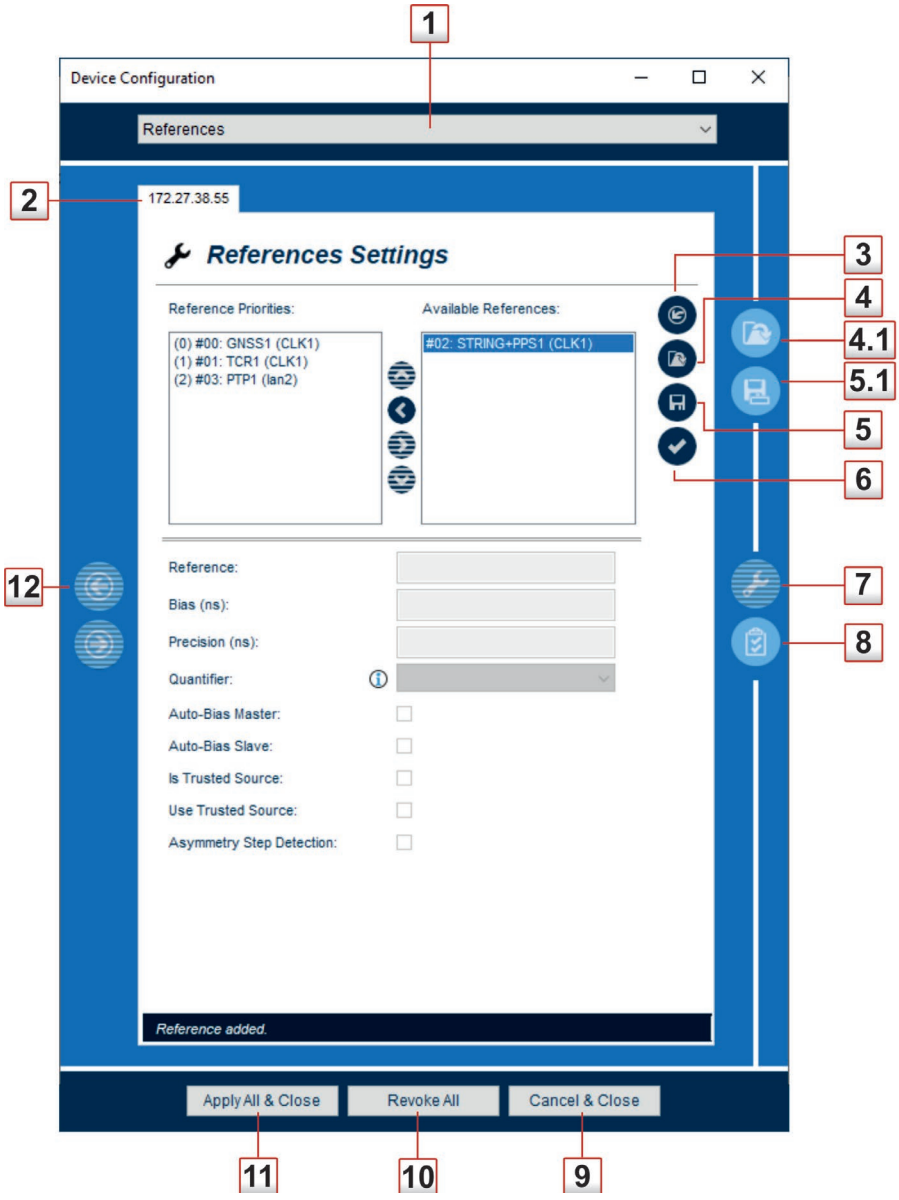


Figure 31: Functions of the configuration menu

9.1.1 Short description of the basic functions

The configuration menus of each module provide following basic functions.

No.	Symbol	Button/ menu item	Function
1	---	Feature menu	Selecting the available features
2	---	Module display	Displaying the selected modules
3		Restore Configuration	Resetting the configuration changes that weren't applied yet
4		Load Configuration	Loading a feature configuration that was previously saved from a file
4.1		Load All Feature Configuration	Loading all feature configurations that were saved in a file
5		Save Configuration	Saving a configuration in a file
5.1		Save All Feature Configuration	Saving all configurations in a file
6		Apply Configuration	Applying all the configuration changes that were made
7		Show/Hide Configuration	Opening the configuration menus of a module
8		Show/Hide Status	Opening the status menu of a module
9	Apply All & Close	Apply All & Close	Applying all made configuration changes and closing the window
10	Revoke All	Restore All	Resetting all the configuration changes that weren't applied yet
11	Cancel & Close	Cancel & Close	Canceling and closing
12		Add Configuration Panel	Displaying another module (when selecting more modules)

Table 6: Basic functions of the configuration menu

Please note that the configuration changes made to the module will not be applied until they have not been saved.

Click on **„Apply** or **Apply All & Close "**

9.2 Matrix Configuration menus

This matrix displays the available configuration menus of the respective Meinberg modules/assemblies.

Module/ assemblies	Menu / Module	System	Clock	Ref Sources	References	Network	PTP	PTP (IEEE1588)	NTP	Serial Ports	Outputs	Inputs	I/O Ports	Prog. Outputs	Timezone	FDM	User Capture	GPIO	Monitoring	Services	Users	Firmware
Input modules	GPS	x	x							x	x	x		x	x							
	GNS	x	x	x						x	x	x		x	x							
	GNS-UC	x	x	x						x	x	x		x	x							
	PZF 180	x	x	x						x	x	x		x	x							
	TCR	x	x	x						x		x		x	x							
	N2X	x	x	x		x	x		x	x	x			x	x							
	SDI	x																				
Output modules	FDM	x								x	x				x	x						
	BPE	x																				
	SCG	x																x				
	VSG	x													x			x				
	LNO	x																				
Assembly groups	MDU	x				x																
	microSync^{HR}	x			x	x	x	x	x				x		x				x	x	x	x
	microSync^{RX}	x			x	x	x	x	x				x		x				x	x	x	x
	GPS180xHS	x	x							x					x							
	GPS 165	x								x	x			x	x							
	DCF600HS	x	x							x	x			x	x							

Table 7: Menu Matrix - Configuration

10. Multiple selection

This feature offers you the possibility to configure, to update and to monitor simultaneously the status of the previously selected modules/ assembly groups. You have to create a uniform configuration once and you can use it on all selected devices simultaneously. The process of updating modules with a new firmware is also enormously accelerated by this feature. The simultaneous monitoring of the status (e.g. of several GPS modules) offers you an optimal overview of their current status.

Description

After selecting various e.g. GPS 180 modules, the program determines the subset of common features of the modules. These are available in the drop-down menu.

Basic functions

- The tab **All** offers you the possibility to configure both modules/ assembly groups, simultaneously.
- If only one of two modules/ assembly groups must be configured, click on the corresponding tab.
- To display each module/ assembly group in separate windows, e.g. in order to compare the changes made to each of them, click on the following symbol: 

10.1 Description of the symbols used

The configuration parameters of one or more modules/ assembly groups have been changed to another tab, but not saved yet. In order to configure other modules/ assembly groups, please save or undo these changes before proceeding.

The configurations of the selected modules/assembly groups are not identic. Check the differences by clicking on the tabs which correspond to the devices.

The configuration cannot be changed in this field. Please use the right configuration window to change the settings of your modules/assembly groups.

10.2 Configuration

1. Select the appropriate module/ assembly group.
2. Select the required function in the menu area of the start screen, (Configure Device(s), Show Device(s) Status)
3. The selected menu opens.
4. Selected modules/ assembly groups are displayed in tabs.
5. Click and open the drop-down menu, then select the required menu.
6. Make the necessary changes and confirm them with ***Apply Configuration*** or **Apply All & Close.**

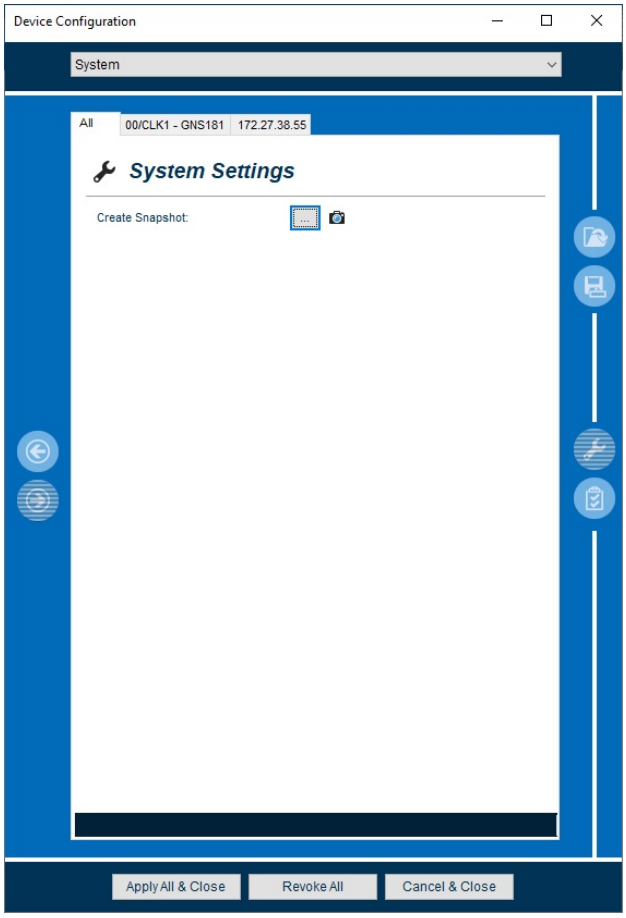
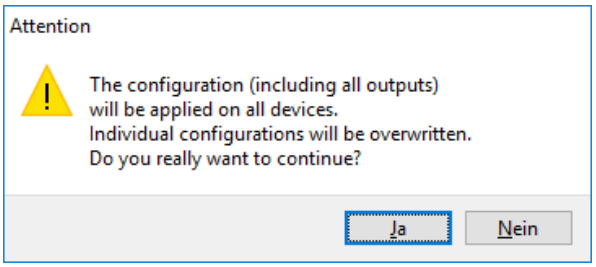


Figure 32: Multiple selection- Configuration

The window below warns that the configuration parameters you have (including all outputs) will be applied to all selected devices. Individual configurations will be overwritten.

Click on ***Yes*** to apply the configuration on all selected devices.



10.3 Status Monitoring

Description

The program displays all supported menus of the selected modules/assemblies. The modules/assemblies that support a selected menu are displayed as tabs (Fig. 25, red mark). For example, if you select three modules, only one of which supports the menu **“Network”**, it will be displayed.

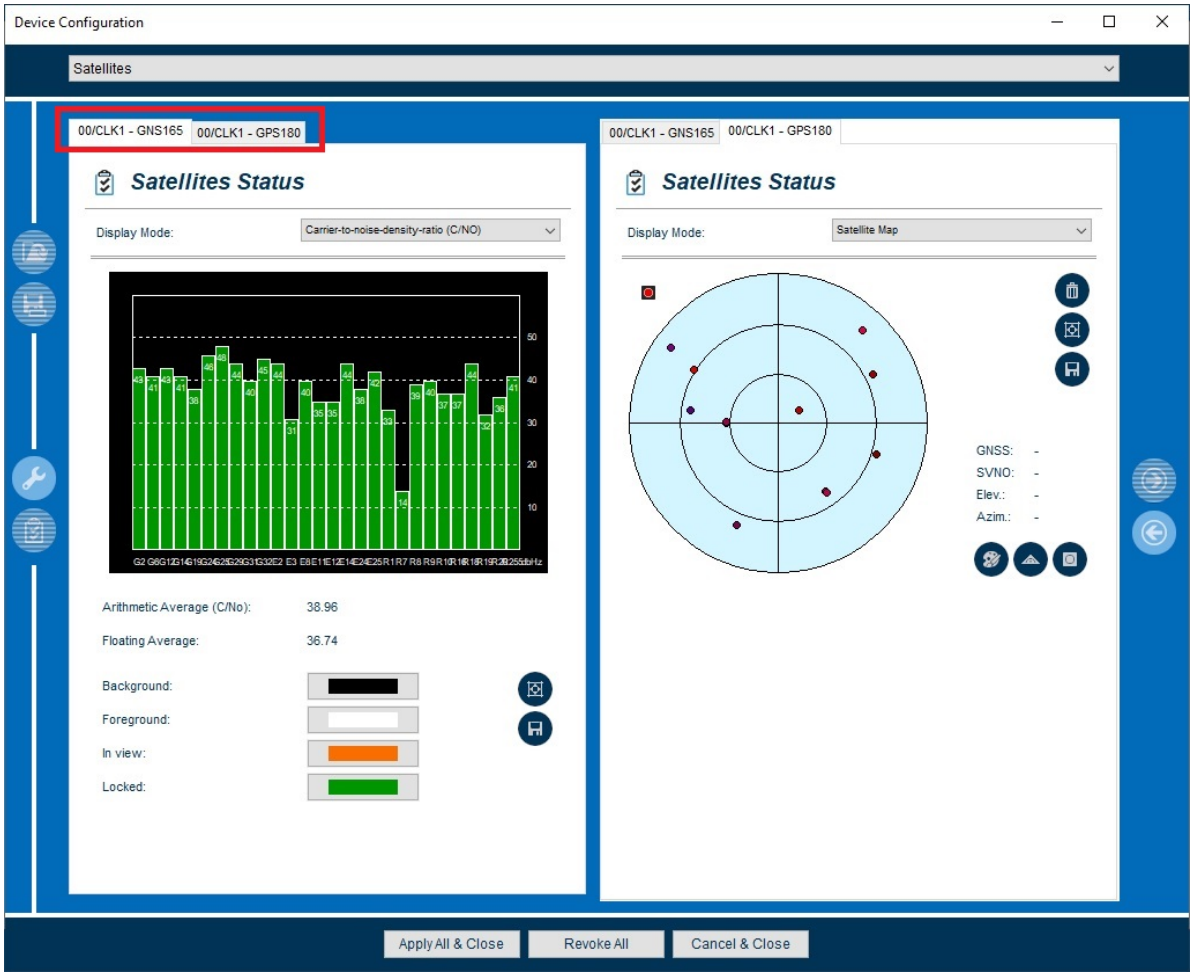


Figure 33: Multiple Selection - Status Monitoring

11. Start screen of the status menu

11.1 Device Status Menu

If you established a successful connection to the required module, you will be able to see it in the tree-structured list of your start screen. Individual modules from the assembly group (e.g. from an MDU) will be visible by ***clicking*** on **+** and will be able to be selected. Depending on the selected module, there are many configuration possibilities available.

It is also possible to select more modules/assembly groups, in order to view their status simultaneously.

1. Select the module/ modules you want, and then ***click*** on the **Show Device(s) Status** button.
2. You reach automatically the **Overview** menu of the selected assembly group, and in that way, you receive an initial overview about its status.

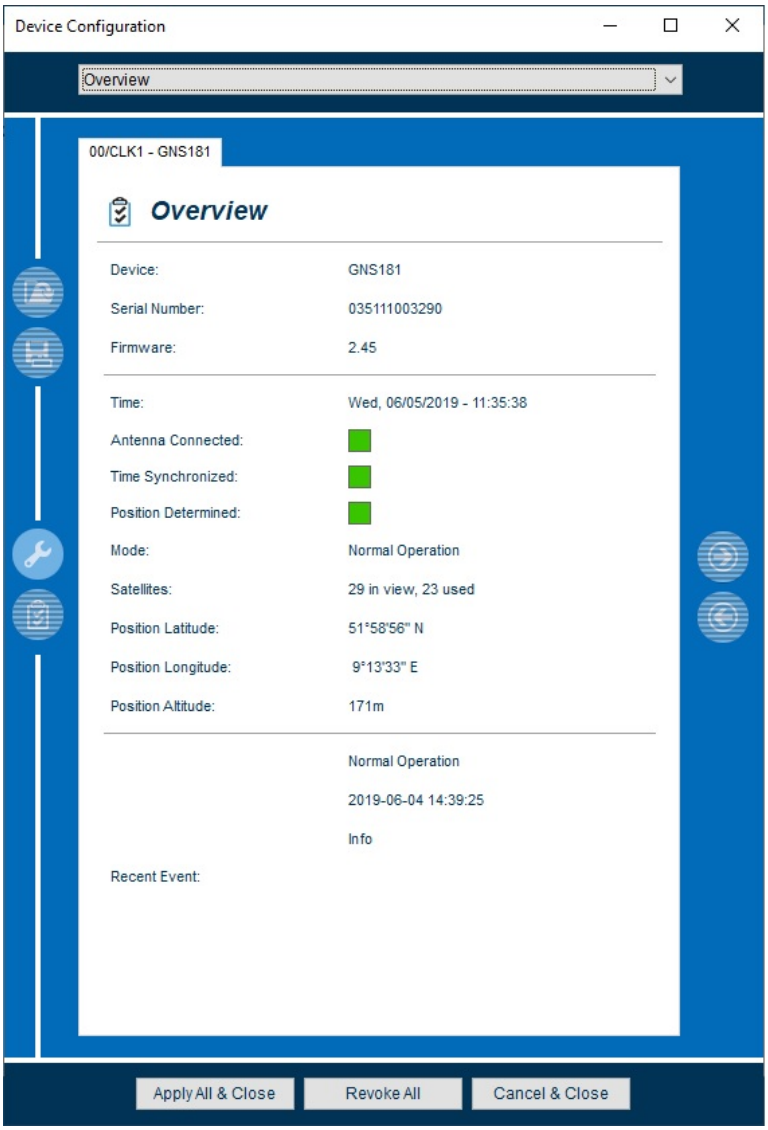


Figure 34: Overview menu - Statusmonitoring

11.2 Matrix Status Menus

This matrix shows the available menus for status monitoring of the respective Meinberg modules/assemblies.

Modul/Assembly	Menu / Modul	Overview	System	References	Clock	Satellites	Ref Sources	Network	PTP	PTP (IEEE1588)	NTP	I/O Ports	FDM	User Capture	Event Log	Sensors	GPIO	Services	Monitoring	Users
Input modules	GPS	x	x			x	x	x								x	x	x		
	GNS	x	x			x	x	x								x	x	x		
	GNS-UC	x	x			x	x	x								x	x	x		
	PZF 180	x																		
	TCR		x			x	x	x								x	x	x		
	N2X	x	x			x		x	x		x		x			x	x	x		
	SDI		x																	
Output -modules	FDM		x												x			x		
	BPE		x															x		
	SCG		x															x	x	
	VSG		x															x	x	
	LNO		x															x		
Assemblies	MDU		x						x									x		
	microSync^{HR}	x	x	x				x			x	x				x		x	x	x
	microSync^{RX}	x	x	x				x			x	x				x		x	x	x
	GPS180xHS	x	x			x	x													
	GPS 165						x										x			
	DCF600HS		x			x														

Table 8: Matrix - Status menus

12. Assemblies

12.1 Assemblies configuration

Description

This menu allows you to configure both modules and entire assembly groups.

1. Select the necessary assembly group.
2. Click on the **Configure Device(s)** button.
3. You reach automatically the **„System"** menu of the selected assembly group.

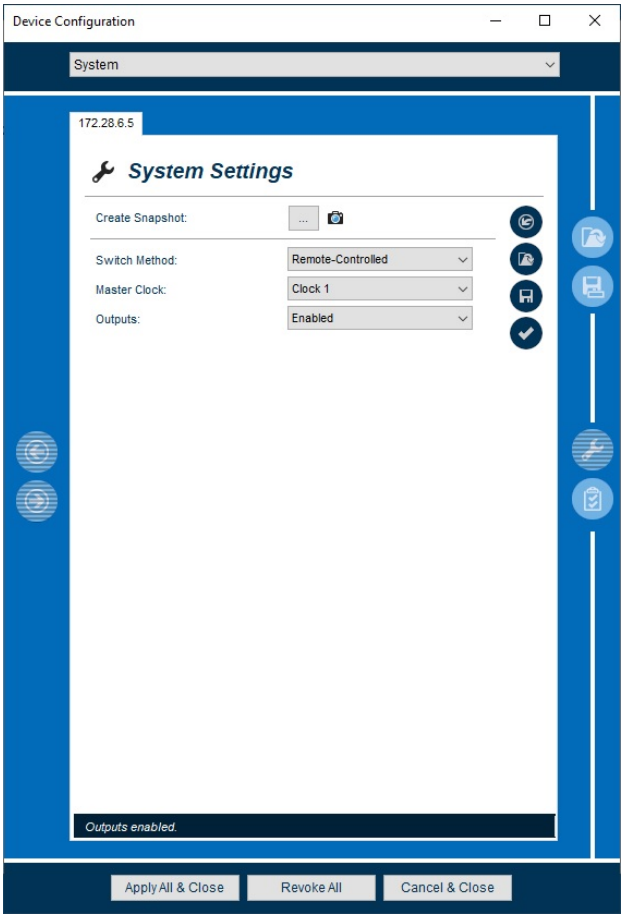


Figure 35: MDU – System menu

In the feature menu (drop-down menu), you have also the possibility to choose between the features available for the assembly group.

The following explains the feature menus which are supported by the **MDU** assembly and their configuration options.

Depending on the assembly, the menus offer various configuration options.

MDU

Parameter	Value
Create Snapshot You have the possibility to save the current configuration of your module/assembly as a text file (zip-format). If needed, you can provide this file to the MEINBERG support service, to solve the problem in case of failure.	Click on the button to save the file.

Parameter	Value
Switch Method You can configure the installed receiver and the provided signal outputs both on the front panel as well as via the Meinberg Device Manager.	Select the appropriate configuration option from the drop-down menu.
Master Clock For the assembly groups equipped with redundant receivers, you have the possibility to select a receiver, manually. This is then responsible for the synchronization of the assembly group.	Open the drop-down menu and select the master clock you want.
Outputs You can enable or disable the outputs provided by the clock (Clock1/Clock2), such as PPS, 10 MHz	Open the drop-down menu and select: **"Disabled"** outputs disabled **"Enabled"** outputs enabled

When the signals are disabled, they will no longer be distributed to the remaining cards in the system (no 10MHz, no PPS, no time string, etc...). As a result, a smooth operation is no longer guaranteed.

Network Configuration

see. chapter 19.1 Network Configuration

12.2 Assembly groups status

Description

The **„Overview"** menu of an assembly group (microSync see fig. 28) provides important status information about the assembly group you selected.

Depending on its type, various status information is displayed.

1. Select the assembly group you want.
2. Click on the **Show Device(s) Status** button.
3. You automatically reach the Overview menu of the selected assembly group.

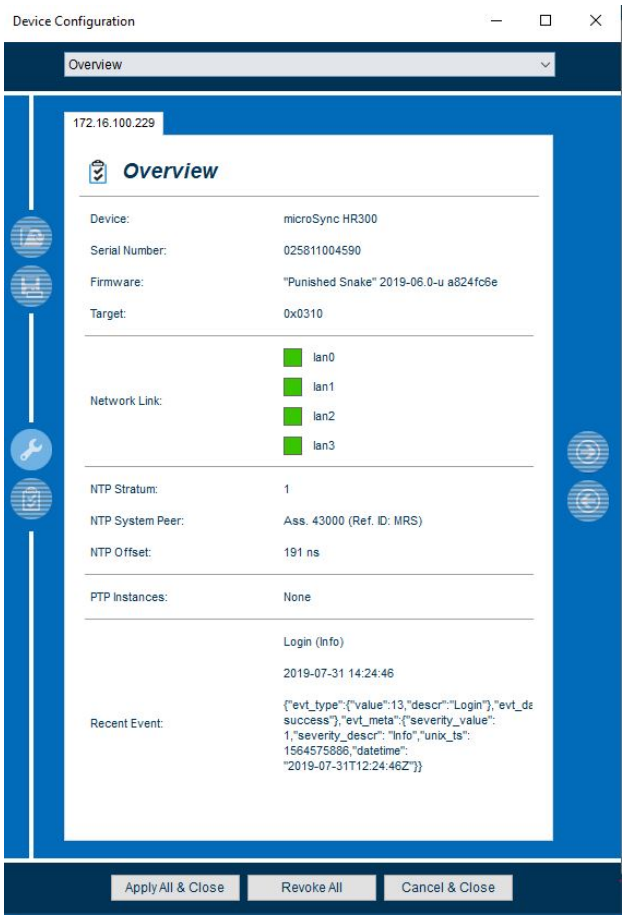
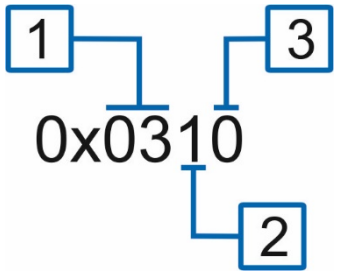


Figure 36: microSync – Overview menu

Here are explained the feature menus supported by the **microSync^{HR}300** assembly group and its status monitoring options.

12.2.1 Overview

Parameter	Value
Device	Name of the selected assembly
Serial Number	The serial number of the selected assembly

Parameter	Value
Firmware	The firmware of the selected assembly group.
Target	With the help of this number a CPU board can be exactly identified.  **1**: The number (03) represents the CPU board, in this case microSync single board. **2**: The third number (1) represents the generation. **3**: The fourth (0) represents the variant. The target number ensures that Meinberg provides you with the correct software update.
Network Link	The network link of the available LAN interfaces. Link active Link inactive
NTP Stratum	Displays the current stratum of the NTP.
NTP System Peer	Displays the numeric value of the NTP Peer.
NTP Offset	Displays the determined offset of the NTPD at the time of a reference time source.
PTP Instances	Displays the configured PTP-instances.
Recent Event	Displays the last status of the receiver

12.2.2 System

Description

The **System** menu of an assembly group (Fig. 22 MDU) offers you important status information about the assembly group you selected. Depending on its type, various status information is displayed.

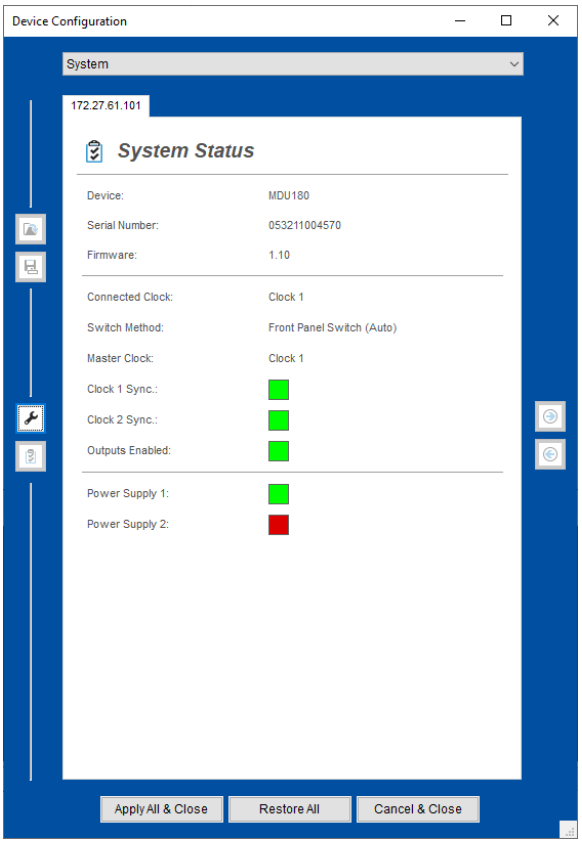


Figure 37: MDU – System menu

Parameter	Value
Device	The name of the assembly group
Serial Number	The serial number of the selected assembly group
Firmware	The firmware of the selected assembly group
Connected Clock	The name of the connected receiver
Switch Method	The selection method of the Master Clock
Master Clock	The previously selected Master Clock
Clock 1 Sync	Synchronization status of Clock 1 synchronous  asynchronous 
Clock 2 Sync	Synchronization status of Clock 2 synchronous  asynchronous 

Parameter	Value
Outputs Enabled	**Status of the output** Enable  Disable 
Power Supply 1	**Status of the power supply 1** connected  not connected 
Power Supply 2	**Status of the power supply 2** connected  not connected 

13. Overview

After selecting the menu, you reach the main page of the **Overview** menu.

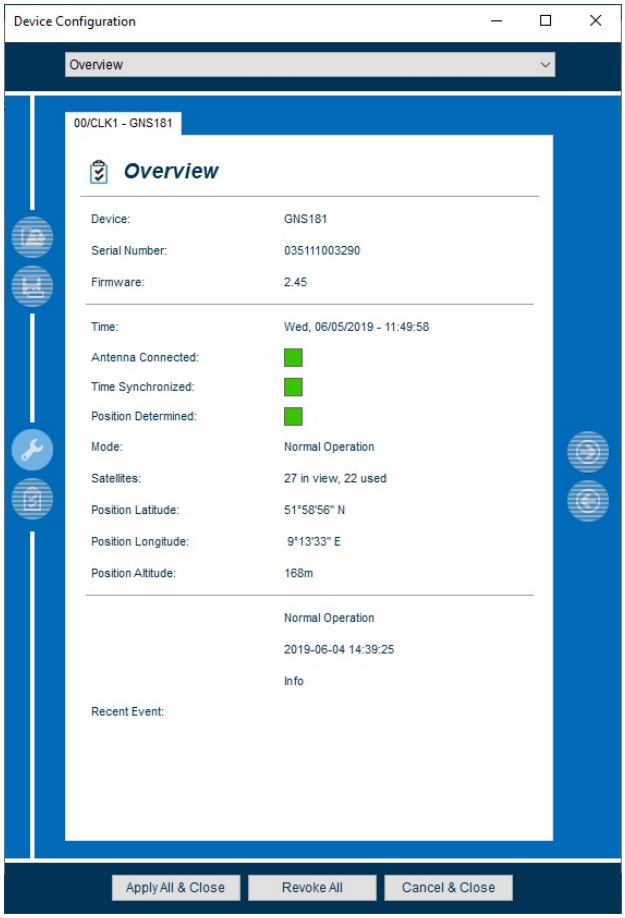


Figure 38: GNS181 – Overview menu

Description

This menu offers you an initial overview of the selected module's status. Depending on the type of module, various status information is displayed.

1. For this purpose, select the listed module on the Meinberg Device Manager main page.
2. Click on the **Show Device(s) status** button.
3. You will automatically reach the **Overview menu** of the selected module.

Individual options of the Status Monitoring are explained below:

Parameter	Value
Device	Displays the selected module.
Serial Number	Displays the serial number.
Firmware	Displays the current firmware.
Time	Displays the time of the previously configured Time zone.
Antenna Connected	Shows whether the antenna is connected or not.
Time Synchronized	Shows whether the module is synchronous or not.

Parameter	Value
Position Determined	Shows whether the position of the receiver was determined or not.
Mode	Displays the status of the module.
Satellites	Displays the status of the detected satellites
Position Latitude	Displays the latitude of the receiver.
Position Longtitude	Displays the longitude of the receiver.
Position Altitude	Displays the altitude of the receiver.
User Capture	Displays the timestamp of the event that was triggered at the capture input of the selected assembly/module. **N/A** no event captured
Recent Event	Displays the recent status of the receiver.

14. System

14.1 System Configuration

After selecting the menu, you reach the main page of the **System Settings**.

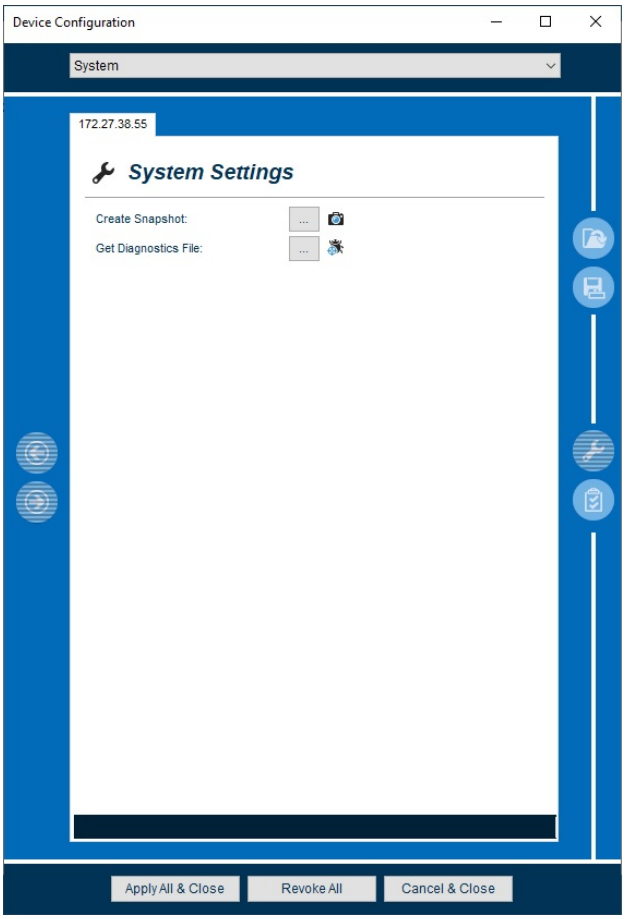


Figure 39: System menu - Configuration

Description

The **"System"** menu offers you the possibility to change the default settings of the previously selected module, for example to update the firmware or to generate a diagnostic file.

Select the assembly group listed on the start page and click on the **Configure Device(s) button.**

Individual configuration options are explained below.

Parameter	Value
Create Snapshot The Meinberg Device Manager reads all configurations and statuses and converts them into text files. You have the option to save the changes made to your device as a text file (zip-format). You can provide it to the Meinberg Support Department, if required.	Click on the button and save the file in the appropriate folder.
Get Diagnostic File You have the option to save the changes made to your device as a diagnose file (tar. gz-format). You can provide it to the Meinberg Support Department, if required.	Click on the button and save the file in the appropriate folder.

14.2 System Status

After selecting the menu, you reach the main page of the **System Status.**

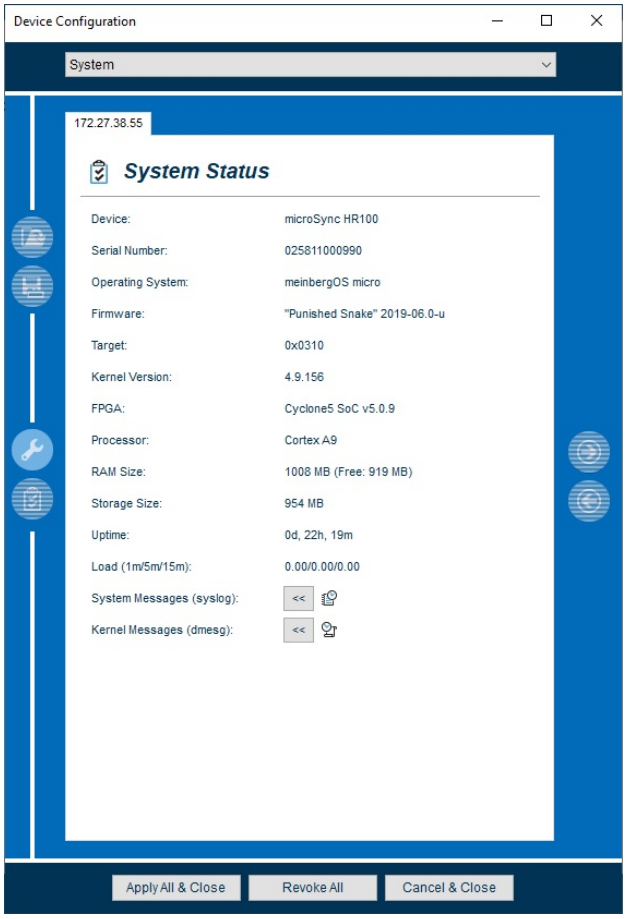


Figure 40: microSync HR100 – System menu

Description

Important system information about your module can be found here. This image displays, for example, the system status of an microSync^{HR}100. Various parameters are displayed. Depending on the module, the range of these configuration parameters can vary.

Individual possibilities for the status monitoring are explained below.

Parameter	Value
Device	The name of the selected module/ assembly group.
Serial Number	The serial number of the selected module/ assembly group.
Operating system	The operating system of the module/ assembly group.
Firmware	The firmware of the selected module/ assembly group.
Target The description can be found in the chapter 12.2.1 Overview	

Parameter	Value
Kernel Version	Kernel version of the selected module.
FPGA	FPGA mounted on the selected module.
Processor	Processor mounted on the selected module.
RAM Size	Size of the mounted RAM.
Storage Size	Size of the memory.
Uptime	Operating time (hours, minutes, seconds) of the module/assembly group.
System Messages Allows you to view system messages (syslog) in detail and to change system settings	To view the System Messages, click on 
Kernel Messages (dmesg) MeinbergOS Allows you to display kernel messages (dmesg) in detail and to change system settings.	To view the kernel messages, click on 

System Messages (syslog)

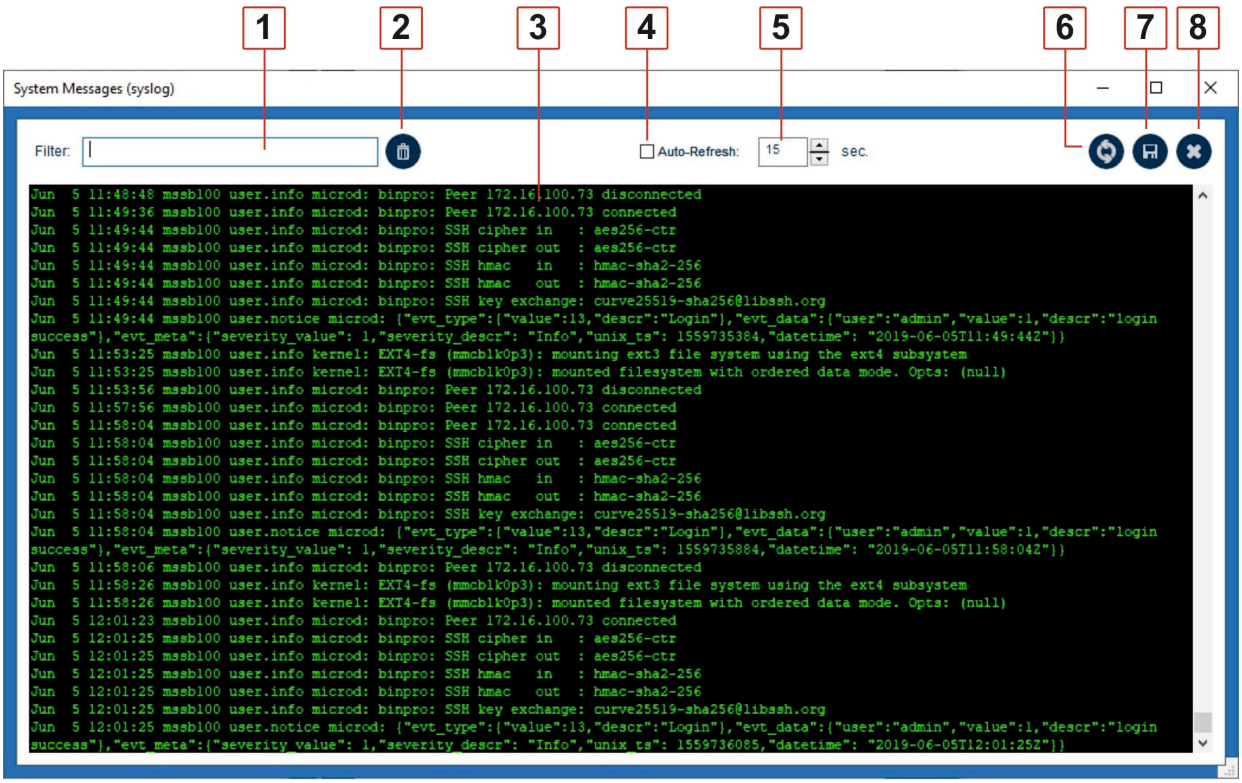


Figure 41: Syslog messages (syslog)

No.	Symbol	Button/Menu option	Function
1	---	Filter	Filtering the system messages by entering keywords
2		Erase Filter	Deleting the filter
3	---	Display	Showing all system messages
4	---	Auto Refresh	Enabling the "automatic update" function
5	---	Timer	The frequency of updating the system messages
6		Refresh	Updating the system messages manually
7		Save Output	Saving the system messages
8		Close Window	Closing the window

Table 9: Menu items (syslog)

Kernel Messages (dmesg)

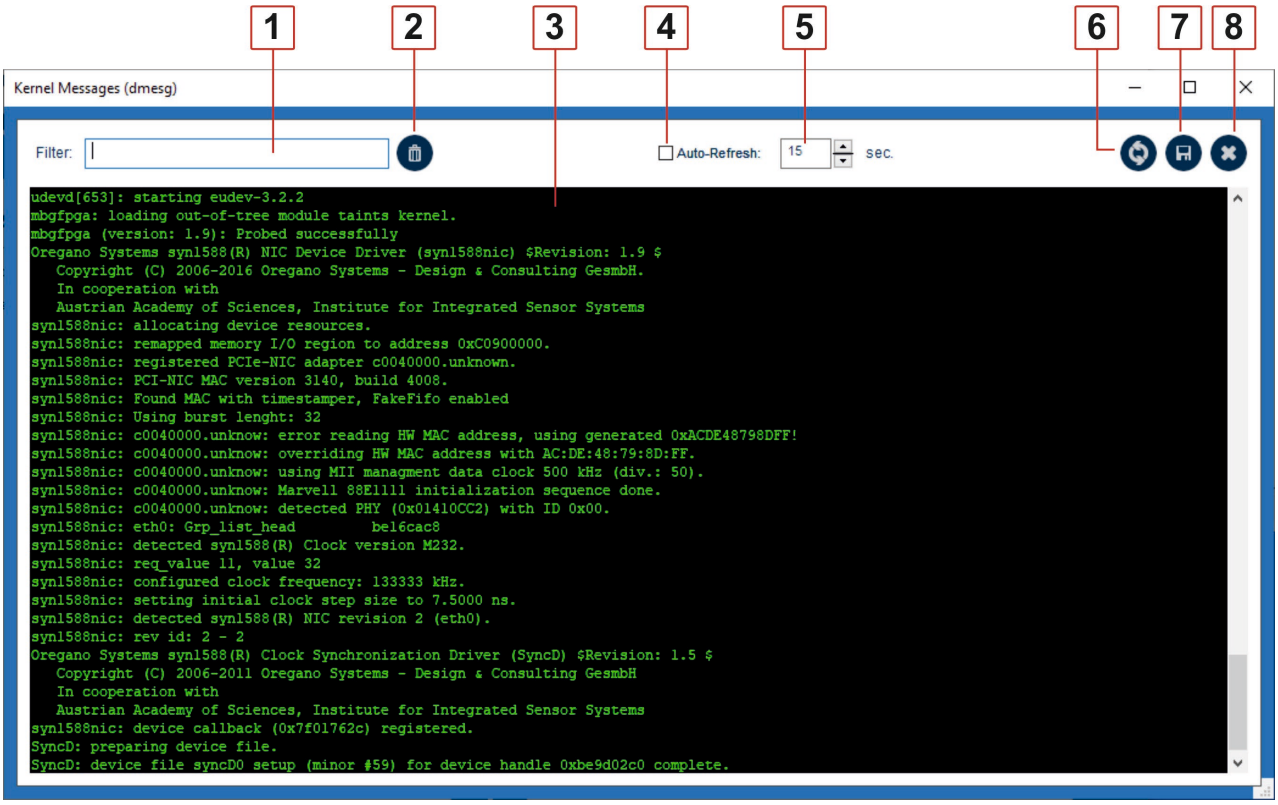


Figure 42: Kernel messages (dmesg)

No.	Symbol	Button/Menu option	Function
1	---	Filter	Filtering the system messages by entering keywords
2		Erase Filter	Deleting the filter
3	---	Display	Showing all system messages
4	---	Auto Refresh	Enabling the "automatic update" function
5	---	Timer	The frequency of updating the kernel messages
6		Refresh	Updating the system messages manually
7		Save Output	Saving the kernel messages
8		Close Window	Closing the window

Table 10: Menu items (dmesg)

15. Clock

15.1 Clock configuration

After selecting the menu, you reach the main page of the **Clock Settings**.

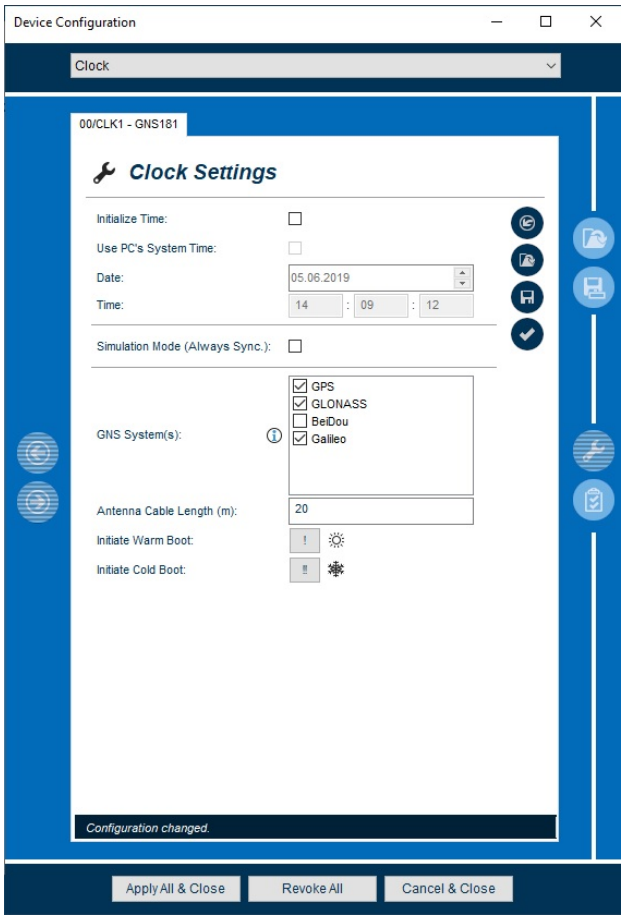


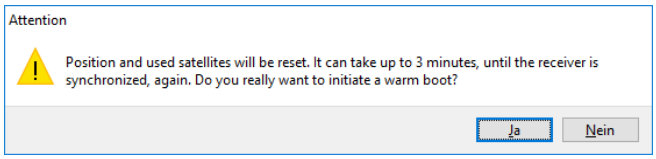
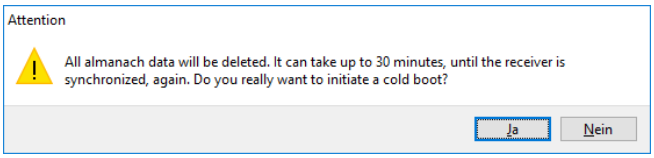
Figure 43: Clock - configuration

Description

In this menu you can change the default settings of your assembly group's receiver, such as selecting various satellite systems for the receiver of our assembly group, with the condition that the receiver supports at least one of the global satellite systems.

Individual configuration options are explained below.

Parameter	Value
Initialize Time Entering the date and the system time of the receiver module, manually.	Check the box to enable the function.
Use PC´s System Time The system time of the PC on which mbgdevman is running can be used to set the time on the module or assembly.	Check the box to enable the function.
Date / Time Set the time of your module's receiver to a specific date and time, manually.	Enter the date and time you want. The date and time must be specified in ISO format.

Parameter	Value
Simulation Mode (Always Sync) Using the receiver as a stand-alone module or in an assembly group without a connected antenna, without losing the SYNC status.	Check the box to enable the function. **Caution:** This function muss be used exclusively in exceptional cases, for example in a leap second test.
GNS System Depending on the type of the receiver, you have the possibility to select various satellite systems to which your receiver module should synchronize.	Click and open the drop-down menu and select the combination of the satellite systems. **Note:** The receiver allows the simultaneous use of up to three supported GNS systems, but not the combination of GPS, GLONASS and BeiDou.
Antenna Cable Length (m) The signal transmission time of the cable is affected by its length and can cause a delay time of the signal of approx. 5ns/m cable length at the receiver.	To compensate for this delay time, enter the length of the cable used. This should not exceed the specified maximum length, depending on the cable type [1].
Initialize Warm Boot **(just for satellite receivers)** Switching the receiver to Warm Boot mode. This may be necessary if the device is operated at a location several hundred kilometers from the last location.	1. To initialize the Warm Boot, click on  2. Click on „Yes” to confirm the initialization.
Initialize Cold Boot (only for satellite receivers) You have the possibility to reinitialize all satellite system values. All satellite data will be deleted. Please note that it takes the receiver about 30 min to read the information about the satellites and to end the Cold Boot mode.	1. To initialize the Cold Boot, click on  2. Click on „Yes” to confirm the initialization.

Note: The warm and the cold boot can be also initialized by the system, automatically. This is for example when the receiver doesn't have enough satellites "in view" the device is in warm boot and the almanac is older than three weeks.

[1] H155 70m / RG58 = 300m / RG213 = 700m

15.2 Clock Status

After selecting the menu, you reach the main page of the **Clock Status**.

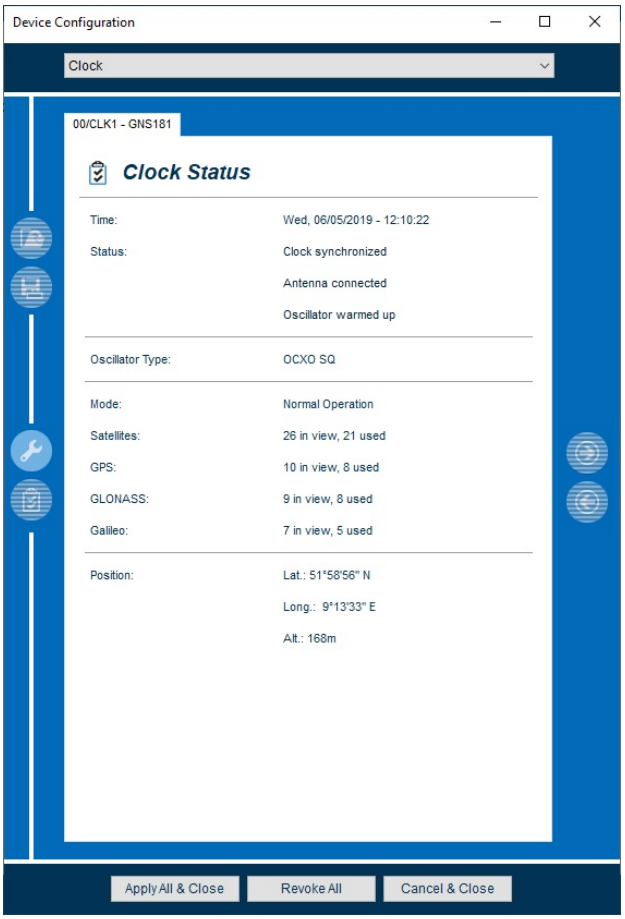


Figure 44: Clock - Status monitoring

Description

The clock status keeps you up to date with important status messages about your receiver module.

This menu includes the synchronization status of your module, the satellite systems which are used and their number of visible satellites.

Individual options of status monitoring are explained below.

Parameter	Value
Time	Displays the current system time.
Status	Displays various status information of the receiver, such as synchronization status, antenna connection and oscillator status.

Module status
The status messages of many Meinberg modules and assembly groups have been standardized. The status messages „Antenna disconnected” and „Position not verified” can be also displayed on an N2x180 device. That means that a network cable is not connected, or a high-quality time source is not available yet.

Parameter	Value
Oscillator Type	Displays the type of installed oscillator.
Mode	The synchronization mode in which the selected receiver is currently located: e.g. normal operation, Cold Boot or Warm Boot.
Satellites All status messages are displayed in real time.	The total number of the available satellites of all GNS systems used for synchronization.
GPS/GLONASS/Galileo/BeiDou	Below the „Satellites" parameter, information about each previously configured satellite system is displayed. **e.g. 10 in view, 9 used** Ten theoretically visible satellites (calculation based on almanac data and antenna position), nine satellites currently receivable and used for synchronization (e.g. by shading)
Position	This value indicates the current, exact location of the receiver of your module/assembly.

16. Satellites

16.1 Satellites Status of GNS

After selecting the menu, you reach the main page of the **“Satellites Status”.** Depending on the receiver module, the status menu is displayed differently.

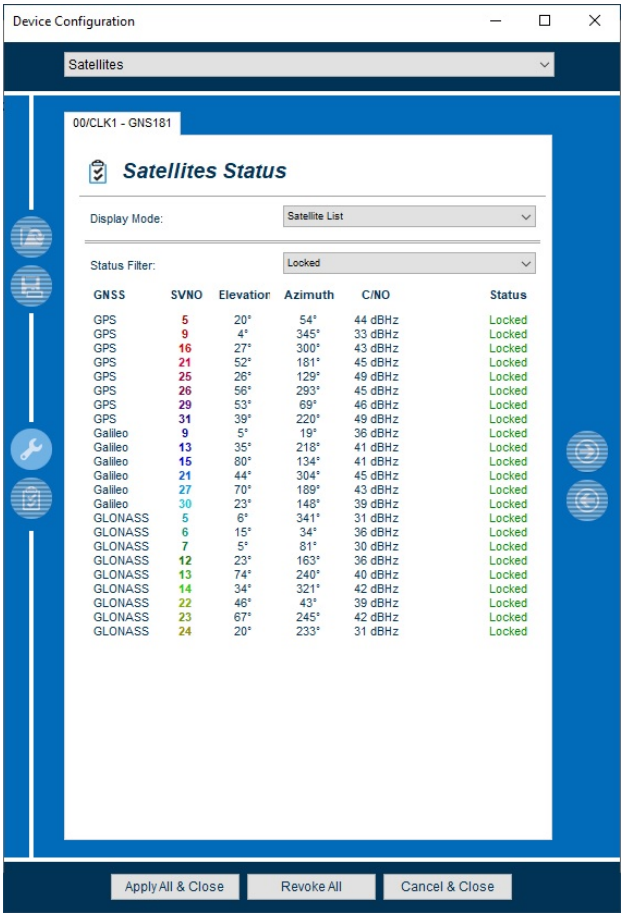


Figure 45: Satellite Status (Satellite List)

Description

You have the possibility to monitor the status of the satellite system previously configured in the **“Clock Settings”.** You can also select from a variety of representation methods, which are explained below.

Display Modi

Satellite List
Detailed information of the satellites is displayed in a list.

Satellite Map
The constellation of the visible satellites is displayed in a graphic.

Satellite Signal (C/NO)
The signal quality (carrier-to-noise-density ratio) of all the available satellites is displayed in a bar diagram.

Averanged C/NO
The average signal quality of all available satellites is displayed in a chart.

16.1.1 Display Mode Satellite List

Parameter	Value
Status Filter Filter the satellites according to the status.	Open the drop-down menu and select from three different status filters and select the status information that is important for you.

Possible status filters

Status	Description
All	Displays all satellites
In View	Displays the satellites that are currently in view
Locked	The satellites used for synchronization are displayed with the status “OK”.

Table 11: Satellite – Status Filter

Parameter	Value
GNSS Satellite systems to which the listed satellite belongs.	Displays the individual satellite systems in a list.
SVNO The index number (ID) of the satellites	The color representation serves recognizing the satellites on the satellite map. The tracks of the satellites are displayed in the corresponding color.
Elevation The angle between the horizontal line and the imaginary line between the satellite and the observer (elevation).	This angle is indicated in degrees.
Azimuth The angle between the satellite’s orbital plane and the north direction.	The azimuth (longitudinal angle) is indicated in degrees.
C/NO (carrier-to-noise-density ratio) Indicates the signal noise ratio of the received signal of the satellite	This value is indicated in dBHz
Status Indicates the synchronization status of the receiver for the satellite	Possible statuses are explained in table 9.

16.1.2 Display Mode *Satellite Map*

Description

To view detailed information about each satellite, place the mouse pointer over the points (satellites) displayed on the **Satellite Map.**

Required details are displayed on the right side of the status page.

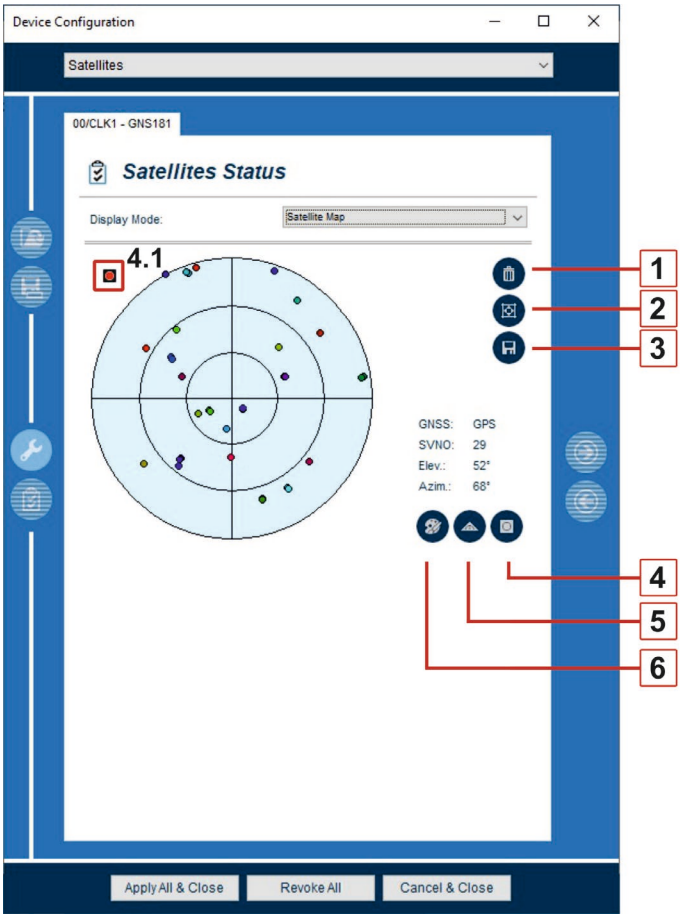


Figure 46: Satellite – Satellite Map

Short description of the basic functions

The following basic functions provide the status menu.

No.	Symbol	Button	Function
1		Clear Satellite Map	Deletes all recorded satellite tracks
2		Enlarge Graph	Enlarges the display
3		Save Satellite Map/Satellite Signal Graph	Saves the current satellite data
4		Enable/Disable Persistent Mode	Enables/disables the satellite orbits. *When the function is disabled, the bitmap will be completely redrawn after each update (every 6 seconds for the GPS receiver and every 3 seconds for the GNS receiver).*
4.1		Anzeige „Persistent Mode “	Shows if the „Persistent Mode” is active
5		Show/Hide Grit	Shows and hides the grit patterns
6		Change Background Colour	Changes the background color

Table 12: Menu items – Satellite Map

16.1.3 Display Mode Satellite Signal (C/NO)

Description

In this display mode, the signal quality (carrier-to-noise-density ratio) of all the available satellites is displayed in the form of a bar diagram. The height of the bars indicates the reception quality of the respective satellite.

Individual customization

In the lower part of the status menu, you have the possibility to customize the color of the display.

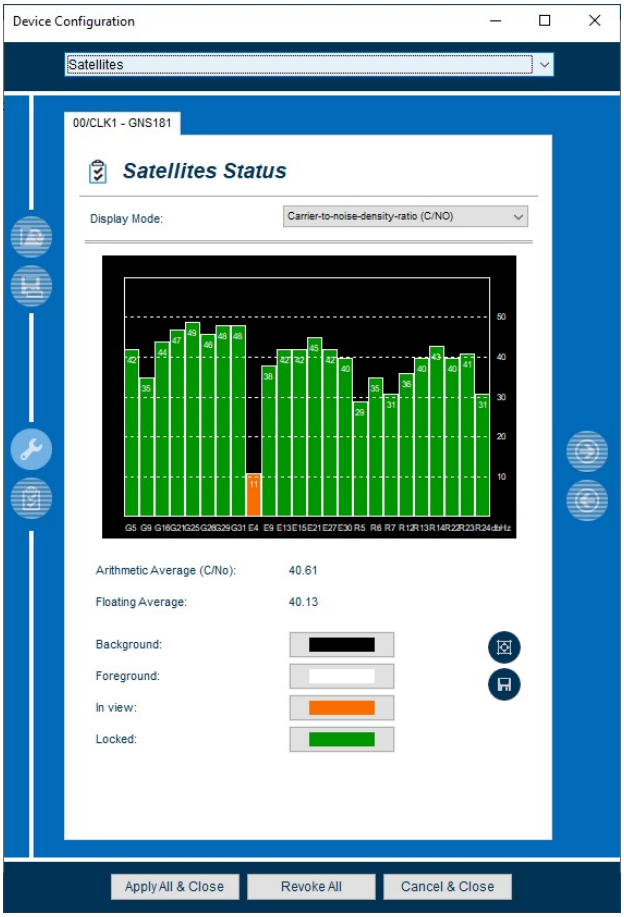


Figure 47: Satellite - Signal (C/NO)

You will find the description of the parameters **Arithmetic Average (C/NO)** as well as **Floating Average** here.

Parameter	Value
Background You have the possibility to change the background color of the graphic.	Open the menu and select the color you want and confirm the choice by clicking on ***OK***.
Foreground You have the possibility to change the foreground color of the graphic.	Open the menu and select the color you want and confirm the choice by clicking on ***OK***.
In view You can change the color of the bar display of the satellites which are in view of the receiver's antenna.	Open the menu select the color you want and confirm the choice by clicking on ***OK***.
Locked You can change the color of the bar display of the satellites to which the receiver has synchronized.	Open the menu and select the color you want and confirm the choice by clicking on ***OK***.

16.1.4 Display Mode Averaged C/NO

Description

The mode **„Average C/NO”** displays in real time the average signal quality (carrier-to-noise-density ratio) of all available satellites.

For an explanation of the basic functions, see here.

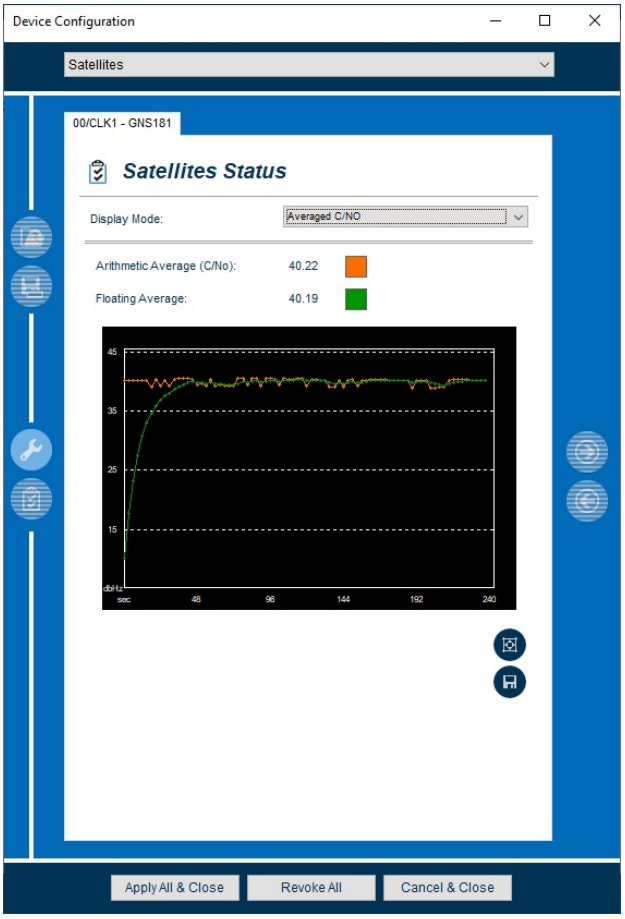


Figure 48: Satellite - Average (C/NO)

Parameter	Value
Arithmetic Average (C/NO)	Displays the arithmetic mean value (orange) of all available satellites' signal quality (dbHZ).
Floating Average	Displays the floating mean value (green) of the signal quality (dbHZ) of all available satellites.

16.2 Satellites Status GPS

After selecting the menu, you reach the main page of the **“Satellites Status”.**

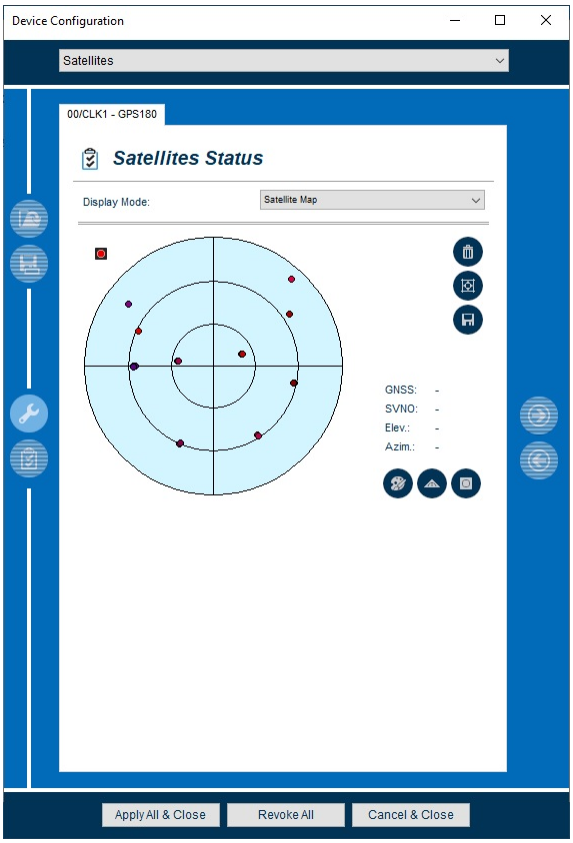


Figure 49: Satellite – Status GPS Satellites

Description

You have the possibility to monitor the status of the GPS satellite system previously configured in the **„Clock Settings“**. There are various status filters available for you in the drop-down menu.

Basic functions are described here.

Status Filter

Choose from five different status filters and select the status information that is important for you

Status	Description
All	Displays all satellites.
N/A	Displays the satellites which are not available.
In View	Displays the satellites which are currently in view.
Not in view	Displays the satellites which are not in view.
OK	The satellites which are used for synchronization are displayed with the status “OK”. In addition, these are charted on the display.

Table 13: Status Filter GPS Satellites

Parameter	Value
GNSS	Displays the type of the satellite systems
SVNO	The index number (ID) of the satellites.
Elevation	This angle is indicated in degrees.
Azimuth	The azimuth (longitudinal angle) is indicated in degrees.

Parameter	Value
Doppler	The frequency shift of the received signal due to the relative speed between the satellite and the observer.
Status	The satellite status that was previously configured in the status filter, is displayed.

17. Reference Sources

17.1 Reference sources configuration

After selecting the menu, you reach the main page of the **Reference Sources Settings**.

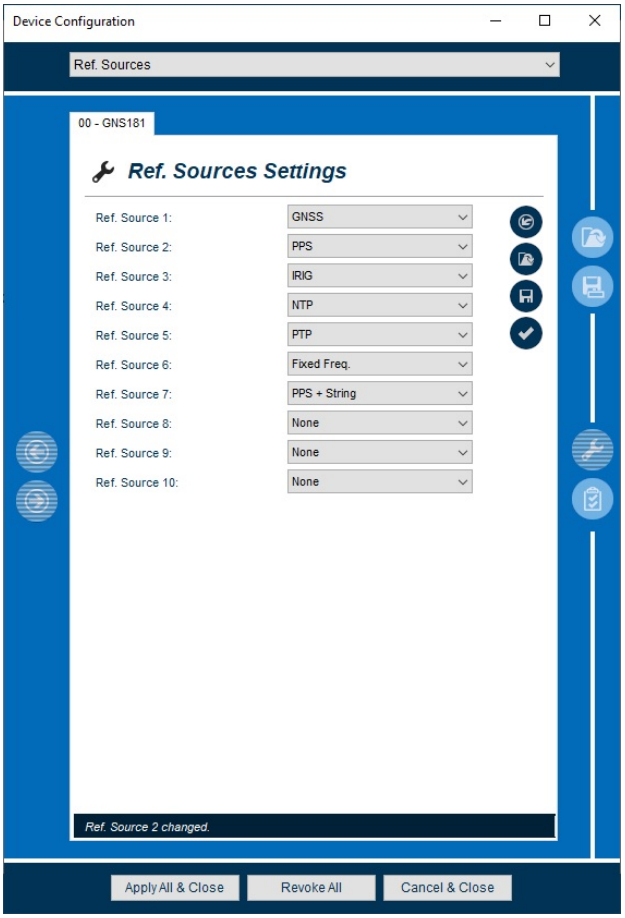


Figure 50: Ref Sources - Configuration

Description

This menu displays in a list all reference sources available for your module/ assembly group. Moreover, you have the possibility to prioritize the available sources.

Individual configuration options are described below.

Parameter

Ref. Source
The available reference sources are supposed to be configured in descending order of the signals' accuracy. In case of fault or failure of a reference source, an automatic switching to the next precise reference source occurs.

Value

Open the drop-down menu and select the appropriate reference source.

Repeat the selection for further reference sources.

Example (according to the precision of the sources).

Ref. Source 1	GNSS	100ns
Ref. Source 2	PPS plus string	100ns
Ref. Source 3	PTP IEEE 1588	100ns
Ref. Source 4	external NTP server	100µs

17.2 Reference Sources Status

After selecting the menu, you reach the main page of the **Ref. Sources Status.**

Figure 51: Ref. Sources – Status Monitoring

Description

This menu offers you the possibility to receive important status information about the previously configured reference sources of your module/ assembly group.

Individual options of status monitoring are explained below.

Parameter

Ref. Source x

Value

Displays in a list the previously configured reference sources and shows important status information.

Parameter	Status	Description
Ref. Source x	Not applicable	Type of the reference source
Status	No Connection or No Signal	The reference source is not available
	Signal available	The reference source is available
	Is Master	The reference source is used to synchronize the system
	Is Locked	The system is synchronous with the reference source
	Is Accurate	Basic precision of the synchronization is reached
Offset	Not applicable (n.a)	Estimated difference between the individual reference clock and the system time.

Table 14: Status of the Reference Sources

18. References

18.1 References Configuration

After selecting the menu, you reach the main page of the **References Settings**.

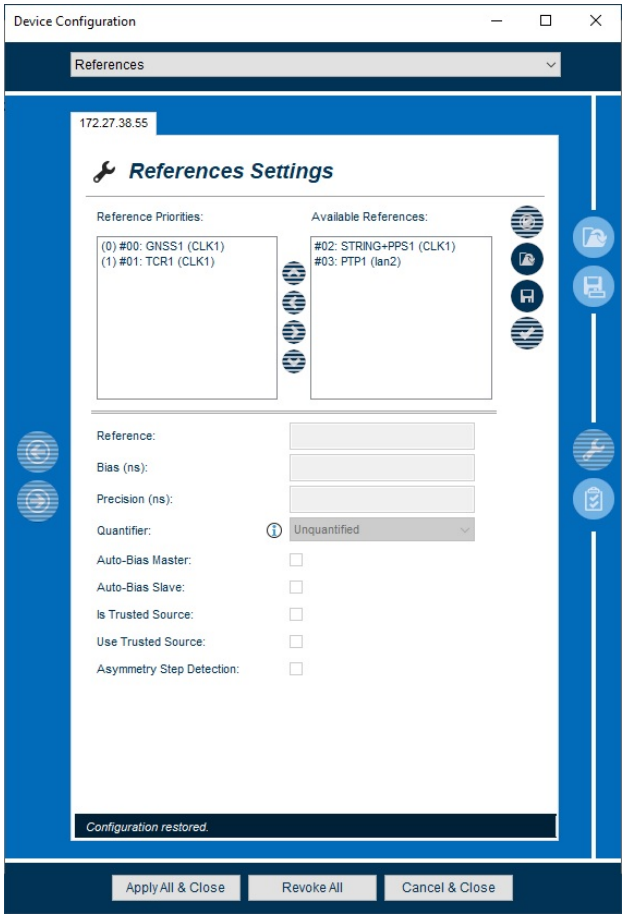


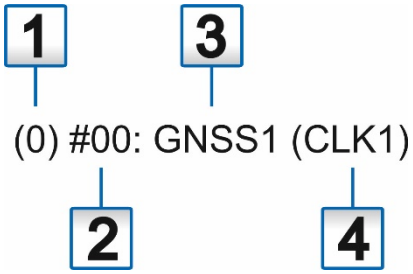
Figure 52: References- Configuration

Description

This menu offers you the possibility to configure the available reference sources of your meinbergOS modules/ assembly groups.

You can define a bias (fixed offset) and a precision value for each of these reference sources. Then the holdover time between the current and the next reference source is calculated.

Representation of the reference sources.



No.	Description
1	Priority
2	ID of the reference source
3	Type of the reference source
4	The module/ assembly group which provides the reference source.

Table 15: Description of the visualization

Functions of the buttons

Nr.	Button	Function
1		Moving the selected reference source by one position up in the priority list.
2		Moving the selected reference source by one position down in the priority list.
3		Moving the selected reference source from the priority list to the list of available reference sources.
4		Moving the selected reference source from the list of available reference sources to the priority list.

Table 16: Description of the buttons

The individual configuration options are explained below.

Parameter	Value
Reference	Displays the currently selected reference source.
Bias (ns) This parameter specifies a constant time offset for this time source, which is considered when compared to other time sources.	Enter the offset (ns) in the field or leave it at the default value of “0”.
Precision This parameter determines the basic precision of this time source. When switching between different time sources, this value and the accuracy class of the oscillator are used to determine a holdover time after which the actual switching takes place. Usually it doesn't make much sense to switch from a more precise time source to a less precise one immediately after the precise time source has lost synchronization. Instead, the more accurate time source will continue to be used if the time error caused by the drift in holdover is less than the basic precision of the next best available time source. In turn, a switch is made immediately if a higher priority time source with a better "Precision" value becomes available.	Enter the Precision value (ns) in the field, or leave it at the default value of 0. If the "Precision" value is 0, no holdover interval is calculated, and switches always occur immediately. (Precision of the next reference) / (Precision of the current master) * constant [s] The „constant“ depends on the quality of the internal oscillator.
Quantifier This parameter defines a kind of accuracy class that is only used in redundant MRS systems to avoid unnecessary switching between the active and passive clock. As long as both the active and passive MRS clocks have the same "Quantifier" value, no switching occurs, even if the currently used time source of the passive clock has a higher priority than the currently used time source of the active clock.	Open the drop-down menu and select a quantifier. The parameter will not be displayed and will not be able to be configured for the reference sources which don’t support the quantifier.

Parameter	Value
Auto-Bias Master If the "Auto-Bias Master" option is activated, this time source can be used to automatically determine constant time offsets of other reference sources that have activated the "Auto-Bias Slave" option.	Check the box to set the selected module as an Auto-Bias master.
Auto-Bias Slave If this function is activated, a possible static time offset of the time source can be compensated by measuring against a source where the 'Auto Bias Slave' function is activated.	Check the box to set the selected module as an Auto-Bias slave.
Is Trusted Source This means that the reference source (e.g. GNSS) selected as “Is trusted source” is considered a trusted source. For example, if a GNSS exceeds the precision of 100ns, a new reference source is selected as the trusted source.	Check the box to set the selected reference signal as a “Trusted Source”.
Use Trusted Source This function turns on a consistency check against the reference sources that have activated the 'Is Trusted Source' function.	Check the box to set the selected reference signal as “Use Trusted Source”.
Asymmetrie Step Detection The asymmetry step detection is used to detect time jumps. If this function is activated, the clock no longer follows a time jump but tries to keep its current phase. For this, the time offset of the source (BIAS) is remeasured.	Check the box to activate the „Asymmetrie step detection”.

18.2 References Status

After selecting the menu, you reach the main page of the **References Status.**

Description

This menu allows you to get important status information about the available reference sources.

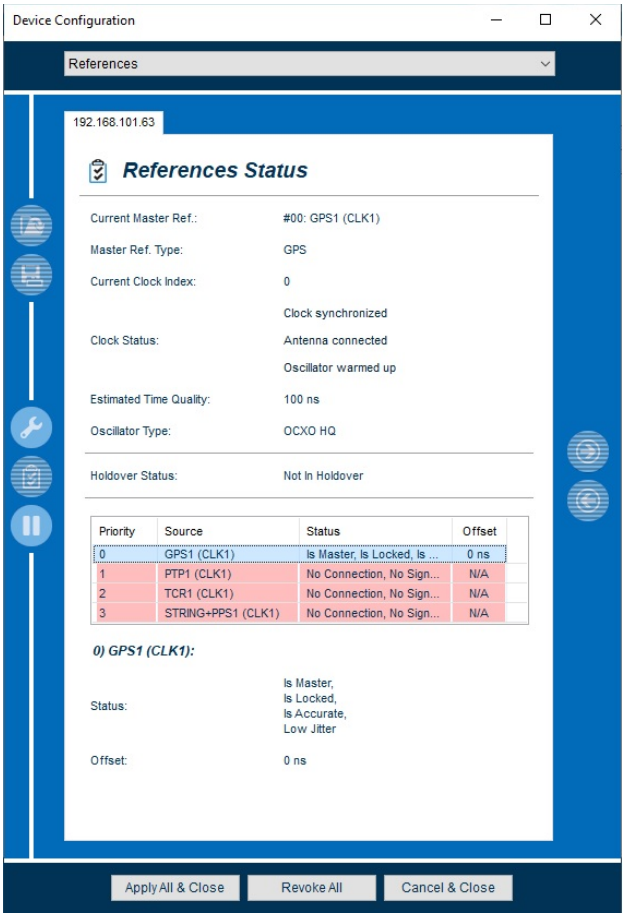
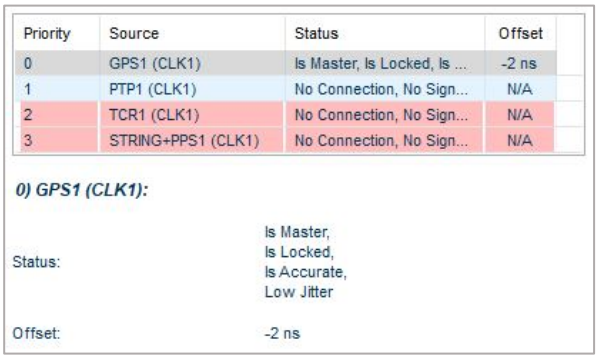


Figure 53: References – Status Monitoring

Individual configuration options of the status monitoring are described below.

Parameter	Value
Current Master Ref.	Displays the currently selected reference source which was set as a Master.
Master Ref. Type	Displays the type of the selected reference source.
Current Clock Index	Displays the index number which the reference source has in the priority list. (e.g. GNSS „0“)
Clock Status	Displays various status information of the receiver, such as synchronization status, antenna connection and oscillator status.
Estimated Time Quality	Displays the approximate (presumed) time quality of the reference clock based on the currently selected reference source as an absolute value (e.g. 100ns).
Oscillator Type	Displays the type of the incorporated oscillator.

Parameter	Wert
Holdover Status	Displays if the reference receiver is in the holdover mode.
Ref. Source You can select from the available reference sources to see their status information.	By "clicking" on a reference source, its status information is displayed. 
Ref. Source Status (see table 12) 17.2 Ref. Sources Status	
Offset (see table 12) 17.2 Ref. Sources Status	

19. Network

19.1 Network configuration

After selecting the menu, you reach the main page of the **Network Settings**.

Description

This menu offers you the possibility to change the default network settings of the selected module/assembly group.

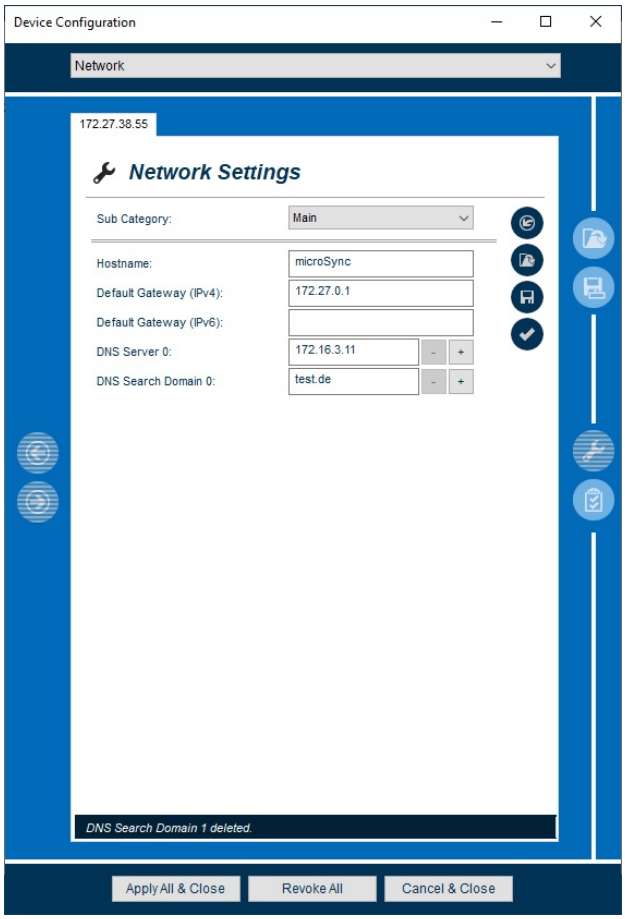


Figure 54: Network - Configuration

Subcategories

Select Main to change the default settings of the selected module/assembly group, or Interfaces- to configure each network interface. The menu Extended is also available for several modules/assembly groups.

Individual configuration options are explained below.

19.1.1 Subcategory Main

Parameter	Value
Hostname The hostname is the unique identifier of your module in network. **(FQDN is possible).**	Enter a hostname for your module or leave the field empty.
Default Gateway (IPv4) You can change the default settings of a system-wide gateway which is to be used for the IPv4. A gateway must be configured only if the network traffic is to be routed between several logical networks (subnets), i.e. if your module is to communicate with other devices outside the subnets. The cross-network data traffic in the subnetwork must be activated via the gateway	Enter a valid IPv4 gateway address.
Default Gateway (IPv6) You can change the default settings of an interface specific gateway which is to be used for the IPv6 This is to be made only if the IP of the interface is not in the same subnet as the standard gateway.	Enter a valid IPv6 gateway address Please use no host name!
DNS Server 0 This resolves the hostname to an IP address, and thus enables the assignment of hostname to IP address. The configuration of a DNS server is necessary if a hostname is mentioned elsewhere as the address of a network user. (e.g. External NTP server).	Enter the DNS Server's valid IP address. Click on **+** to add a DNS Server (0…n) and on **−**-to remove it.
DNS Search Domain 0 The preferred /prioritized domain in which the DNS servers should try to perform name resolution.	Enter the name of the DNS search domain Click on **+** to add a DNS search domain and on **−** to remove it.

19.1.2 Subcategory Interfaces

Description

This menu offers you the possibility to change the default settings of the selected module/assembly group's network interface.

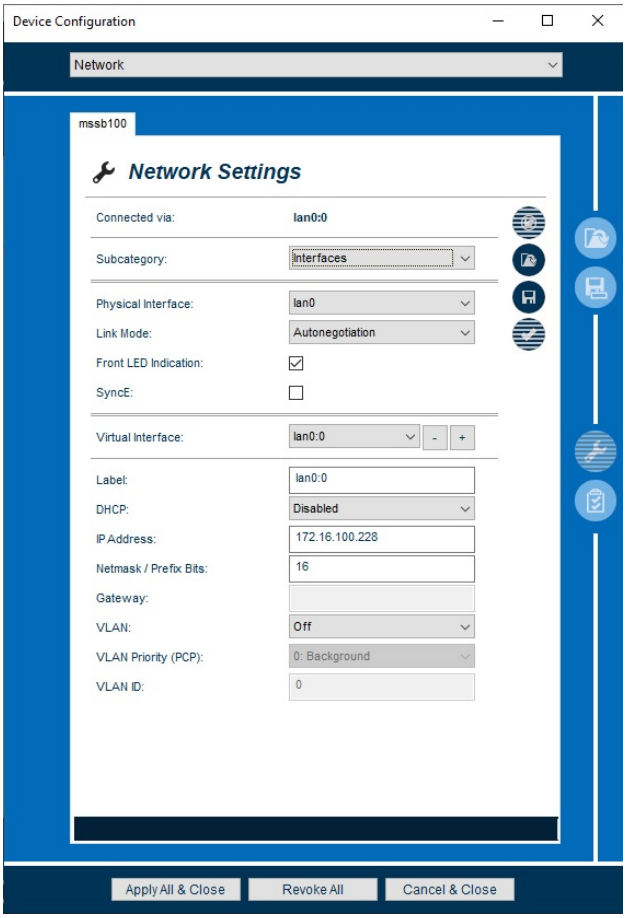


Figure 55: Network – Network Interfaces

Individual configuration possibilities are described below.

Parameter	Value
Physical Interface Available physical network interfaces are displayed in a list and can be selected.	Open the drop-down menu and select the network interface to be configured.
Link Mode (meinbergOS) You can configure the parameters for the connection speed and the duplex mode of the selected virtual network port here.	Open the drop-down menu select from seven available modes (depending on the module/ assembly groups): ▪ Auto negotiation (automatic detection) ▪ Mbit/half duplex ▪ 10Mbit/full duplex ▪ 100 Mbit/half duplex ▪ 100 Mbit/full duplex ▪ 1000Mbit/half duplex ▪ 1000Mbit/full duplex The interfaces are configured by default with "autonegotiation".

Parameter	Value
Front LED Indication The link status of the individual interfaces can be visually displayed via the front LED.	Description in table 16

LED Indication	Network Status	Front-LED-Status
not activated	---	yellow
activated for e.g. LAN 0 interface	Link up	green
activated for e.g. LAN 0 interface	Link down	red
activated for interfaces (e.g. LAN 0 + LAN1)	LAN 0 Link up LAN 1 Link up	green
activated for interfaces (e.g. LAN 0 + LAN1)	LAN 0 Link up LAN 1 Link down	red

Table 17: Front LED Indication

SyncE

Specific SyncE parameters can be configured after the activation of SyncE

Parameter	Value
Quality Level Detection (QLD) The quality level of the incoming or outgoing signal is transported or evaluated via the ESMC (Ethernet Synchronisation Message Channel) messages when the QLD is activated. If the source is used for system synchronization, the quality level is routed to the outputs.	Open the drop-down menu and select: Enable QLD activated Disable QLD deactivated
SDH Network Option The values selected for the quality levels depend on the SDH network options, Option 1 for SDH, E1-based systems or Option 2 for SONET, T1-based systems.	Open the drop-down menu and select the SDH-network option you want.
Fixed Input SSM Fixed quality level of the SyncE input signal.	Open the drop-down menu and select the quality level you want.
Fixed Output SSM Fixed quality level of the SyncE output signal.	Open the drop-down menu and select the quality level you want.

Parameter	Value
Minimum Input SSM This allows you to select the minimum SSM level of the incoming signal (e.g. QL-SSU-B) that is still acceptable as an input signal. If the clock reports a lower quality level (e.g. QL-EEC1/SEC) than the configured minimum SSM level, the system will not use it for synchronization.	Open the drop-down menu and select the minimum quality level like QL-PRC or QL-SSU-A you want to use
Local Priority Use the priority to define which port and thus which input signal is generally preferred (for clock selection).	Enter the priority you want: 0 highest priority 255 lowest priority
RJ-45 Gbit Clock Mode A port can act as slave or master. For SFP ports with fibre optic connection, synchronization works automatically in both directions, so no configuration is required	Open the drop-down menu and select the mode:

Mode	Role of the port
Disabled	not assigned
Automatic	Port automatically selects role
Forced Master	Forced „Master“
Forced Slave	Forced „Slave“
Preferred Master	Preferred „Master“
Preferred Slave	Preferred „Slave“

Parameter	Value
Virtual Interface You can add a multitude of virtual IP addresses to each physical interface.	Open the drop-down menu and select the network interface to be configured. By clicking on **+** further virtual network interfaces can be added. They can also be selected in the drop-down menu.
Label You can enter an individual text description for the virtual network interface previously selected in the **Virtual Interface.**	Enter the text description you want
DHCP Activation/ deactivation of the DHCP service. If a DHCP client is enabled, the fields for the static Ip configuration will be disabled. The opposite is in the case, if the DHCP client is disabled.	Static IP or DHCP: **„Disabled”** for static IP **„IPv4“** for DHCP **„IPv6“** for DHCP

DHCP disabled

Description

If you selected the function „Disabled” from the drop-down menu, the following fields would be enabled and can be configured.

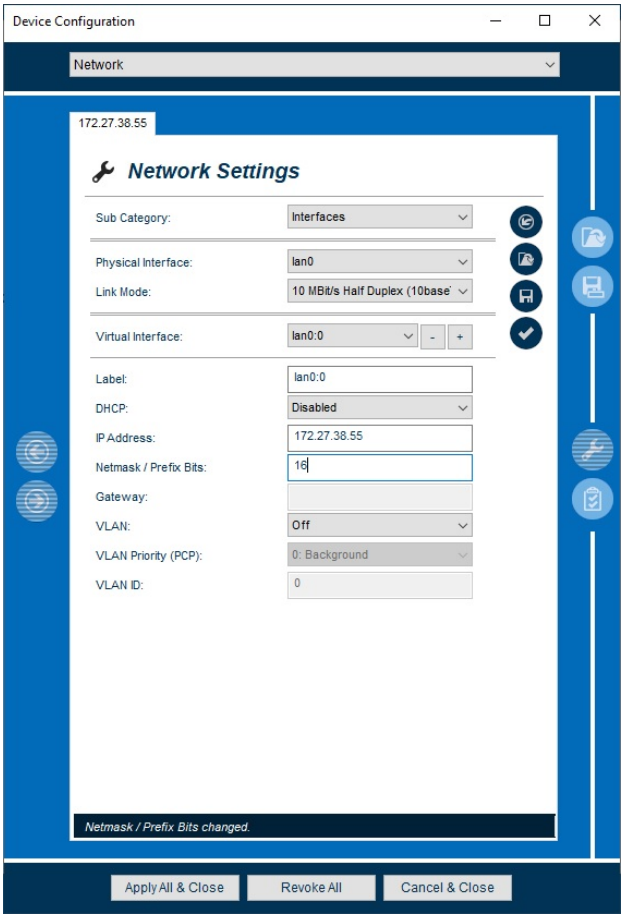


Figure 56: Network – Interfaces (DHCP disabled)

Individual configuration possibilities are described below.

Parameter	Value
IP Address An IP address for the virtual interface can be assigned here.	Enter a valid IPv4 or IPv6 address
Netmask / Prefix Bits You can configure the subnet mask for the previously set IP address.	Please enter the number of bits which define the network part of the IP address: ▪ 24 Prefix Bits of the IPv4 ≙ 255.255.255.0 (Class C net) ▪ 24 Prefix Bits of the IPv6 netmask ≙ ffff:ff::0

Parameter	Value
Gateway Here you can configure a gateway (if supported) specifically for the selected virtual interface.	Enter a valid IPv4 or IPv6 gateway.
VLAN Activate the VLAN for the selected virtual interface.	Select between: **„On“** VLAN activated **„Off“** VLAN deactivated

VLAN ON

Specific VLAN parameters become configurable after activating the VLAN.

Parameter	Value
VLAN Priority (PCP) You have the possibility to prioritize the VLAN packets.	Open the drop-down menu and set the priority between a low priority, value 1 and a high priority, value 7.
VLAN ID A 12-bit worth (0…4096) that allows the separation of the VLAN network traffic in different VLANs and a clear classification of the VLAN packets.	Enter a valid VLAN ID.

19.1.3 Subcategory Bonding

Description

This menu allows you to bond physical network ports (LAN interfaces). Depending on the mode used, e.g. redundancy for the network ports are created or a higher bandwidth can be reached.

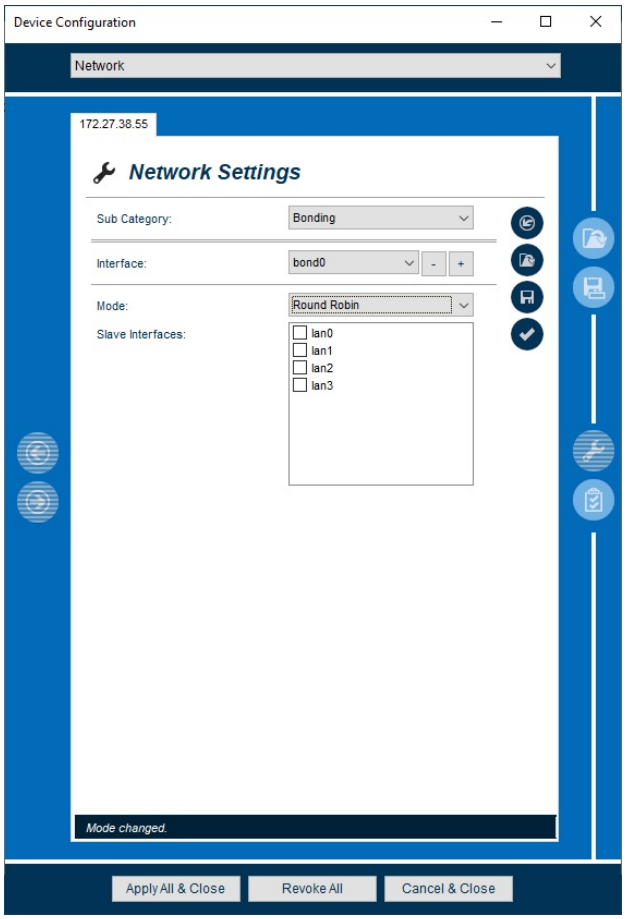


Figure 57: Network - Bonding

Individual configuration options are explained below.

Parameter	Value
Interface Select the number of the bonding interface to which you want to assign slave interfaces.	Open the drop-down menu and select the bonding interface. Bei clicking on **+** further bonding interfaces can be added. They can also be selected in the drop-down menu.
Mode Depending on the application and the given network structure, you have the possibility of selecting various bond modes.	Select the mode in which the bonding driver should work.
Slave Interfaces You can set the network ports that belong to the bond interface previously selected in the Interface parameter.	Check the box of one or more network ports.

Description of the Bond modes

Mode	Description
Round Robin	The packets are sent in sequential order via slave interfaces. All the interfaces must be connected to the same switch. The switch ports must be combined into one trunk. ***This mode contains load balancing and fault tolerance.***
Active Backup	This mode provides redundancy. There is always only one interface of the Bond interface active. If the active slave fails, the next slave takes over. The network cards can be connected via various switches. The MAC address of the bond is to be seen just on the active port. The bandwidth of the interfaces can be different. ***This mode contains no load balancing, but only fault tolerance.***
XOR	The interface for the transmission is established by exclusive. All interfaces must be connected to the same switch. The switch ports must be combined into one trunk. ***This mode contains load balancing and fault tolerance.***
Broadcast	The packets are sent on all interfaces. The interfaces must be connected to the same switch. The switch ports must be combined into one trunk. ***This mode contains no load balancing, but only fault tolerance.***
802.3ad (LACP)	The „Bond" is generated dynamically via the Link Aggregation Control Protocol. All slave interfaces must have the same configurations for the speed and duplex mode and will be used according to the specifications of the Standard 802.3ad. In addition, all slave interfaces must be connected to the same switch. The switch must support the 802.3ad (LACP) and the ports must be configured accordingly. ***This mode contains load balancing and fault tolerance.***

Table 18: Network – Bond Modes

19.1.4 Subcategory Extended

Description

You have the possibility to add your own network configurations in the shell script (window). These are applied automatically at each configuration modification, subsequent to

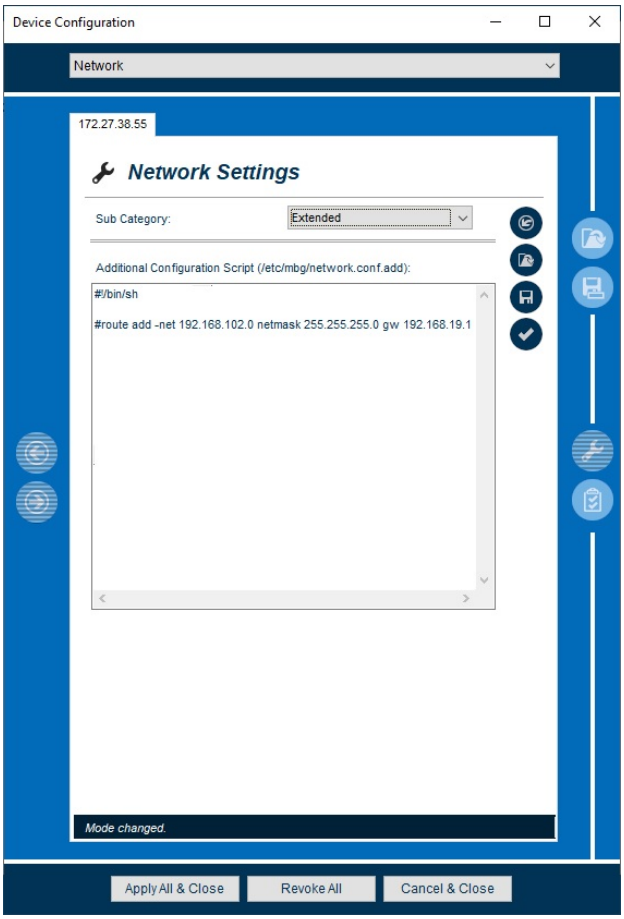


Figure 58: Network – Extended configurations

For example, you have the possibility to configure static network routes.

The „Bangline" must stay intact. In addition, just the standard shell will be supported, but not the bash or the dash shells.

19.2 Network Status

After selecting the menu, you reach the main page of the **Network Status**.

Description

Here you can find detailed information about the status of your network module.

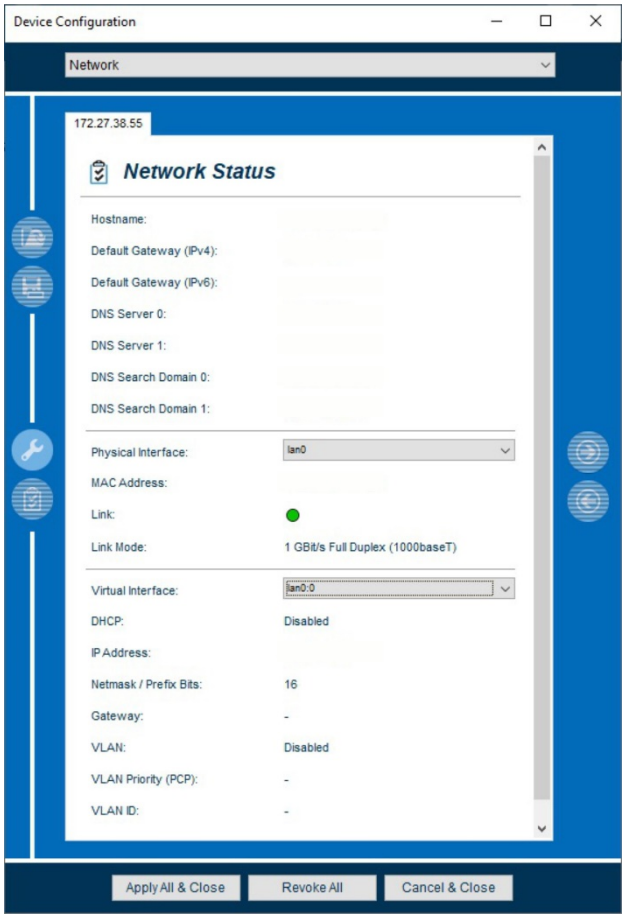


Figure 59: Network – Network Status Monitoring

By manual changes via SSH or the "Extended Shell-Script", the status can deviate from the actual configuration.

Individual possibilities of the status monitoring are explained below.

Parameter	Value
Hostname	Displays the previously configured hostname.
Default Gateway (IPv4)	Displays the previously configured IPv4 gateway address.
Default Gateway (IPv6)	Displays the previously configured IPv6 gateway address.
DNS Server	Displays the previously set IP of the DNS Server.
DNS Search Domain	Displays the previously set DNS Search Domain.

Parameter	Value
Physical Interface	Displays the name of the currently selected physical interface or of the bond interface. Open the drop-down menu and select the network interface or bond whose status you want to monitor. The following parameters offer you detailed status information.
MAC Address	Displays the MAC addresses belonging to the physical network interface.
Link	The status of the physical network interface is displayed: **active link** green **inactive link** red
Link Mode	Displays the previously configured Link Mode.
Mode	Displays the mode configured for the selected bonding interface.
Assigned Interface	Displays the slave interfaces that have been assigned to the bond interface.
Virtual Interface	Open the drop-down menu and select once again the virtual network interface whose status you want to monitor. The subsequent parameters offer detailed information about the status of the selected network interface.
DHCP	Shows whether the DHCP is activated or deactivated.
IP Address	Displays the IP address that was set up before or that was assigned via DHCP
Netmask /Prefix Bits	Depending on the configuration, displays the Netmask/ Prefix Bits.

The IP Address and Netmask/Prefix Bits parameters are dependent on the extended sh script settings.

Parameter	Value
Gateway	Displays the previously set gateway.
VLAN	Shows whether the VLAN is activated or deactivated. **Enabled** VLAN activated **Disabled** VLAN deactivated
VLAN Priority (PCP)	Displays the prioritization of the VLAN packets.
VLAN ID	Displays the previously configured VLAN ID.

20. PTP

20.1 PTP Configuration

After selecting the menu, you reach the main page of the **PTP settings**.

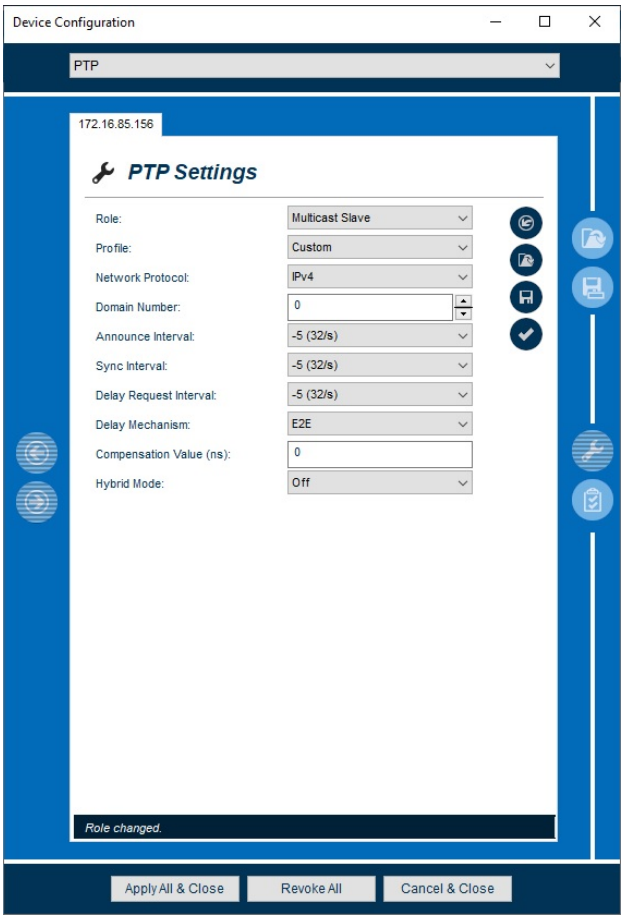


Figure 60: PTP - Configuration

Description

This menu offers you the opportunity to change important default PTP settings of the selected module/ assembly group. The amount of the configuration options depends on the module/assembly.

Role

Select the appropriate role for the PTP Stack. Depending on the selection, additional menu items which can be configured will be visible.

Possible roles are:

- Multicast Slave
- Unicast Slave
- Multicast Master
- Unicast Master
- Multicast Auto
- UC'+'MC Master

PTP Profiles

You have the option to choose between different profiles. Depending on the profile, the parameters of the corresponding standard will be predefined. The explanation of each profile can be found in the table below.

Industry	Profile	Description
⋮	Custom	By selecting the „Custom“ profile you have the option to freely configure all PTP-Parameters.
Default Profiles	Default E2E IEEE 1588-2008	Default profile defined in IEEE 1588-2008 standard with end-to-end delay mechanism. Available in Multicast and Unicast mode.
	Default P2P IEEE 1588-2008	Default profile defined in IEEE 1588-2008 standard with peer-to-peer delay mechanism. Available in multicast mode.
Power Profiles	C37.238-2011 (Power)	Preconfigured PTP settings of the module/assembly for the use of the IEEE 1588 Precision Time Protocol in Power System applications, for precise time distribution and clock synchronization in electrical networks with an accuracy of 1's.
	C37.238-2017 (Power)	Preconfigured PTP settings of the module/assembly for the use of the IEEE 1588 Precision Time Protocol in Power System applications, for precise time distribution and clock synchronization in electrical networks with an accuracy of 1's.
	IEC/IEEE 61850-9-3 (Power)	Preconfigured PTP settings of the module/assembly for the power utility profile IEC/IEEE 61850-9-3, for precise time distribution and clock synchronization in electrical networks with an accuracy of 1's.
Telecom Profiles	ITU-T. G.8265.1 (Telecom)	Preconfigured PTP settings of the module/assembly for module/assembly applications in the telecom industry for frequency synchronization.
	ITU-T. G.8275.1	Preconfigured PTP settings of the module/assembly for applications in the Telekom area for phase and time synchronization with PTP support on the network.
	ITU-T. G.8275.2	Preconfigured PTP settings of the module/assembly for applications in the Telekom area for phase and time synchronization with partial PTP support on the network.
	DOCSIS 3.1	Preconfigured PTP settings of the module/assembly for cable network operators (Data-Over-Cable Service Interface Specifications), which is based on the Telecom ITU-T G.8275.1 profile.
Broadcast Profiles	IEEE 802.1AS	Preconfigured PTP settings, for module/assembly applications in the AVB and TSN areas.
	AES67 Media	Preconfigured PTP settings of the module/assembly in the AES67 standard. For synchronization of IP-based audio network products based on existing standards such as AES67 or RAVENNA.
	SMPTE ST 2059-2	Preconfigured PTP settings for using the module/assembly to synchronize IP-based video and audio products in a professional broadcast environment.

Table 19: PTP Profiles

20.1.1 Role Multicast Slave

Parameter	Value
Network Protocol You can choose from network protocol options: **UDP/IPv4 (Layer 3)** IP frames with IPv4 headers. UDP-based communication **UDP/IPv4 (Layer 3)** IP frames with IPv6 header. UDP-based communication **IEEE 802.3/Ethernet (Layer 2):** Ethernet frames based on slave and master MAC addresses.	Open the drop-down menu and select between the network protocols UDP/IPv4, UDP/IPv6 and IEEE 802.3.
Domain Number A PTP domain is a logical group of PTP devices within a physical network defined by the same domain number. PTP devices to communicate with each other must be configured with a unique domain number.	Use the arrow buttons to select the **domain number** you want.
Announce Interval Specifies the rate for sending **Announce Messages** between masters. This is used to select the current GM (Best Master Clock Algorithm).	Open the drop-down menu and select from the available settings.
Sync Interval Specifies the rate for sending sync messages from a master to a slave.	Open the drop-down menu and select from the available settings: from -5 (32/s) to 5 (1/32s) **supported by some modules:** -7 (128/s) to 7 (1/128s)
Delay Request Interval Specifies the rate of how often delay measurements are initiated from a slave to the master. For a master, this setting corresponds to the limit that this master allows as the maximum delay request rate with a slave.	Open the drop-down menu and select from the available settings: from -5 (32/s) to 5 (1/32s) **supported by some modules:** -7 (128/s) to 7 (1/128s)

Parameter	Value
Delay Mechanism Two options are possible: **E2E (End-to-End)** Delay messages are sent directly from a slave to the master (two end nodes). **Peer-to-Peer (P2P)** Each device (a peer) in the network exchanges peer-delay messages with its neighbor node. The P2P mechanism can only be used in 1588 PTP-enabled networks where all network nodes support and have enabled the P2P mechanism.	Open the drop-down menu and select a delay mechanism for your PTP- network.
Compensation Value This parameter can be used to compensate for a known asymmetry.	Enter a value for PTP delay asymmetry compensation in nanoseconds. The value must be positive if the distribution time from master to slave is longer than the distribution time from slave to master.
Hybrid Mode in this mode, ptp messages (sync, follow, and announce) are sent in multicast while the delay request and delay response messages are sent in unicast.	Open the drop-down menu and select: **„on “** to activate the Hybrid Mode **„off “** to deactivate the Hybrid Mode

20.1.2 Role Unicast Slave

Parameter	Value
Network Protocol see role „Multicast Slave“	
Domain Number see role „Multicast Slave “	
Compensation Value (ns) see role „Multicast Slave “	
Unicast Master You can configure multiple unicast masters for a slave. If the primary master is not reachable, the slave selects the secondary master (Alternate Master).	Open the drop-down menu and choose: **#0** primary master **#1** secondary master
Address Here you have the option to enter the IP address of the previously configured Unicast Master.	Enter a valid IP- adress
Clock ID PTP Clock ID of the GM	Enter the clock ID of the master. alternatively you can use the default wildcard ID (FF:FF:FF:FF:FF:FF:FF:FF)FF) to allow any clock ID.
Announce Interval see role „Multicast Slave “	
Sync Interval see role „Multicast Slave “	
Delay Request Interval see role „Multicast Slave “	
Transmission Duration (sec) Validity period of a Unicast package subscription (Announce/Sync/Delay Request) in seconds. The slave tries to log on to the master again with a package subscription shortly before the validity period expires.	Enter the time of validity in seconds.

20.2 PTP Status

After selecting the menu, you reach the main page of the **PTP status**.

Description

The PTP status provides you with all the important information about your previously configured PTP parameters.

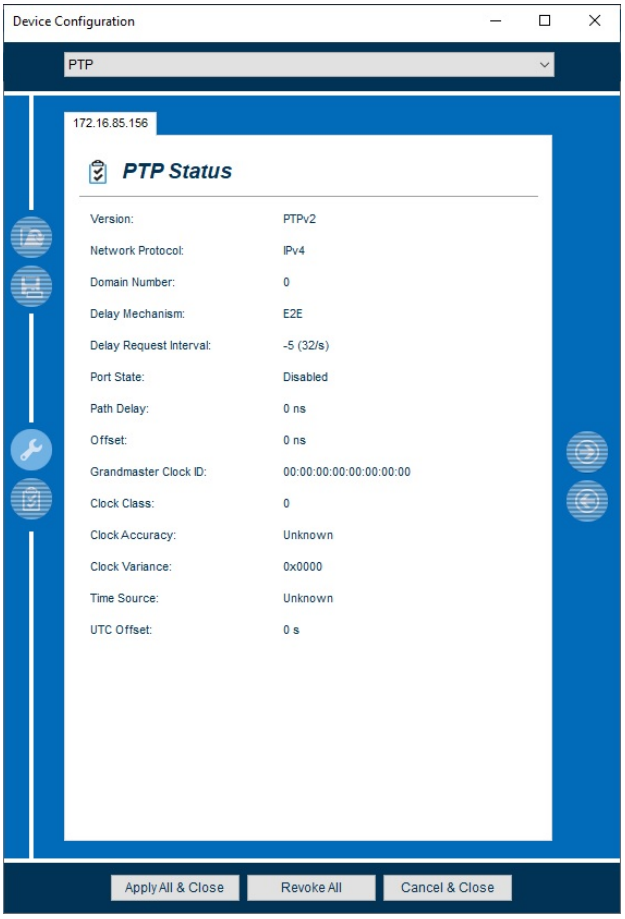


Figure 61: PTP – Status Monitoring

The following is a detailed explaining the individual options for status monitoring.

Parameter	Value
Version	Displays the version of the PTP standard.
Network Protocol	Displays the selected network protocol.
Domain Number	Displays the previously configured domain number.
Delay Mechanism	Displays the previously configured delay mechanism.
Delay Request Interval	Displays the previously configured delay request interval.

Possible status of the PTP Port

Port State

Displays the status of the previously configured PTP Port.

Status	Description
Uninitialized	The PTP module boots, the software daemon is not yet started, the IP address is not yet assigned.
Initializing	In this state, the port initializes its datasets, hardware, and communications settings.
Stopped	The PTP service was stopped or not started after a startup due to a missing link on the PTP port or an unsynchronized master clock.
Listening	The port either waits for the Announce Receipt timeout to declare itself as master or for an Announce massage to be received by a master.
preMaster	A short transition state while the port becomes the master.
Master	The port is currently master
Passive	The port is in passive mode. In this case, another master clock is active in the PTP domain. The port can take the master status if it determines, based on the BMCA (Best Master Clock algorithm) that there is no better master in the PTP domain
Uncalibrated	The port is configured as a slave and has already found a suitable GM in the PTP domain. The PTP instance is waiting to calculate the path delay to a GM and set the PTP clock to the GM using the calculated offset
Slave	The port is in slave state and has fully calculated its offset and delay to GM.

Table 20: PTP – Status of PTP Ports

Parameter	Value
Path Delay	The calculated Path Delay between slave and master (E2E) or to the next PTP-Peer (P2P).
Offset	The current offset of the local PTP-time at the reference time of the GM.
GM Clock ID	PTP Clock ID of the GMs.
Clock Class	PTP Clock Class of the currently selected PTP GM. This value is used in the BMCA.
Clock Accuracy	The phase accuracy of the active GM at the reference time used by the GM (e.g. GPS). This value is used in the BMCA.
Clock Variance	Maximum possible variance of the time base. Calculated based on the "Allan deviation". This value depends on the oscillator installed in the device. This value is used in the BMCA.
Time Source	The type of time source used by the GM.
UTC Offset	This value represents the current offset to PTP time, based on TAI for calculation, of UTC.

21. PTP (IEEE1588)

21.1 PTP (IEEE1588) Configuration

After selecting the menu, you reach the main page of the **PTP (IEEE) Settings.**

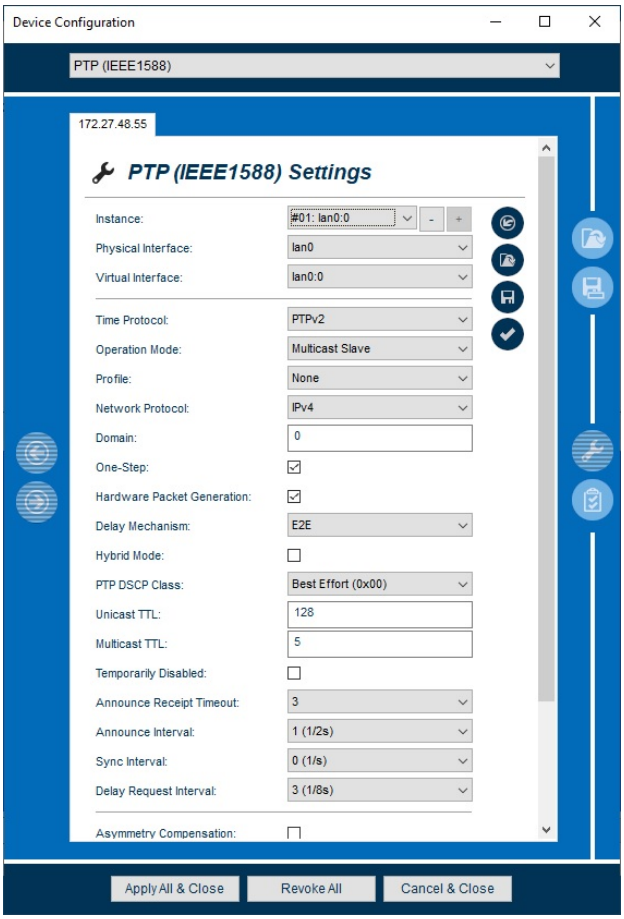


Figure 62: PTP IEEE - Configuration

Description

This menu offers you the possibility to configure all PTP parameters of your module/ assembly group which support the PTP IEEE1588. Depending on the module/ assembly group, the scope of this configuration possibilities is different.

The configuration possibilities are explained below.

Parameter	Value
Instance Configured PTP instances are displayed in a list and can be selected.	Select the instance to be configured. By clicking on **+**, various instances can be added or by clicking on **-**, they can be deleted. These can be also selected in the drop-down menu

Parameter	Value
Physical Interface Select a physical interface for the previously selected instance.	Select a physical network interface.
Virtual Interface You can assign a virtual interface to the previously selected physical port.	Select a virtual interface.
Time Protocol Select the time protocol which will be supported by the selected module/ assembly group.	Select a time protocol.
Operation Mode Select the corresponding mode which the PTP stack has to take. Depending on the selection, further specific parameters can be configured.	Select an operation mode.
Profile You have the possibility to choose between various sectoral PTP profiles (see tab. 17, p. 92). Depending on the profile, the parameters defined in the standards are preset.	Select a PTP profile.
Network Protocol You can select **UDP/IPv4 (Layer 3)** IP Frames mit IPv4 Header. UDP basierte Kommunikation **IEEE 802.3/Ethernet (Layer 2):** Ethernet frames based on MAC addresses of Slave and Master.	Select the requested protocol. ***After selecting the IPv6 protocol, the parameter IPv6 Multicast Slave Scope will be available.***
Domain PTP modules which act as slaves and should synchronize with a certain master in a physical network, have to be assigned to a logical group. This is done by assigning a unique domain number which has to be the same for the Slave and for the Master belonging to him.	Enter a valid domain number
Ipv6 Multicast Scope The prefix of IPv6 multicast addresses specifies their size. A special scope in case of multicast mode can be selected here.	Select a range of validity.

Parameter	Value
One-Step In "one-step mode", the precise time stamp is sent as part of the PTP packet and not as in "two-step mode" in a second "Follow-up" packet.	Check the box to activate the “One-Step” parameter. Per default, this parameter is deactivated.
Hardware Packet Generation In this mode the PTP packets are generated directly by the FPGA and not by the PTP software. This achieves a much higher client capacity and packet rate. This mode is only usable in combination with the "One-Step" Clock Mode.	Check the box to activate the “Packet Generator” parameter. Per default, this parameter is deactivated.
Delay Mechanism The description of this parameter is to be found in the **Role Multicast Slave** chapter.	Choose between the E2E and P2Pn “Delay Mechanisms”
Hybrid Mode (Delay Mechanism E2E) In this mode, the PTP messages (Sync, Follow and Announce) are sent in Multicast, while the Delay Request and Delay Response messages are sent in Unicast.	Check the box to activate the “Hybrid Mode”. This parameter is per default deactivated and can be activated only when the “Packet Generator” was activated.
PTP DSCP Class You have the possibility to prioritize the PTP packets by selecting a DSCP class. The information about the “DSCP Class” is inserted in a header of an IPv4 packet. Routers can evaluate this information and treat the PTP packet as a prioritized one.	Select the requested PTP- DSCP class.
Unicast TTL The parameter is only relevant if Unicast PTP is configured. the TTL describes the number of hops (e.g. routers) that a packet can pass before it is discarded.	Enter a custom TTL value in the field or leave it at the default value of 64.
Multicast TTL The PTP Multicast traffic is not routed by default and this value is defined by the PTP standard as “1”. However, you have the possibility to enter a customized value.	Enter a customized TTL value in the field or leave it at the default value of 1.
Temporarily disabled You have the possibility to disable this instance temporarily.	Check the box to disable the instance temporarily.

Parameter	Wert
Priority 1 It can happen that the current GM will lose its GPS reference, will disconnect because of a switch failure or will not be able to continue working as GM. Priority 1 is then the first parameter used by the Standard BMCA, and after that a new GM will be selected. You have also the possibility to configure your own PTP network priority for the BMCA.	Enter a customized value for Priority 1. It is recommended not to change the default value for not influencing the selection of the best GM by means of BMCA.
Fixed Quality The description of configurable parameters is to be found in the **Fixed Clock Quality** chapter.	
Priority 2 Priority 2 is consulted by the Standard BMCA shortly after the Clock Class, the Clock Accuracy and the Clock Variance, in order to determine a new GM. This parameter may, allow system integrators to give priority to one GM to another GM with the same accuracy.	Cannot be changed just in a few profiles.
Announce Receipt Timeout Specifies the rate for the “Announce Timeout Messages”. This is usually 2-10 times as high as the Announce Interval, with a default value of 3. During this time, the BMCA procedure should choose the current GM.	Select a customized value for the „Announce Receipt Timeout” or leave it at the default value of 3.
Announce Interval Specifies the rate for sending “Announce Messages” between Masters. This is for selecting the current GM (Best Master Clock Algorithm).	Select a customized value for the “Announce Interval” or leave it at the default value of 1 (1/2s).
Sync Interval Gives the rate for sending Sync messages from a master to a slave.	Select a customized value for the „Sync Interval” or leave it at the default value of 0 (1/s).
Delay Request Interval (Slave) Specifies the rate of how often delay measurements should be initiated from a slave to the master.	Select a customized value for the „Delay Request Interval” or leave it at the default value of 3 (1/8s).
Peer Delay Request Interval (P2P) Specifies the rate of how often delay measurements should be initiated.	The value is preconfigured and not configurable.
Min. Delay Request Interval (Master/E2E) Specifies the limit that this master allows as the maximum delay request rate with a slave.	Select a custom value for the "Min. Delay Request Interval" or leave it at the default value of 3 (1/8s).

Parameter	Value
Unicast Master You have the possibility to configure more Unicast Masters for a Slave. If the primary Master is not reachable, the Slave selects the secondary one (Alternate Master).	Open the drop-down menu and select: **#0** primary Master **#1** secondary Master
Master Address The IP address of the system that serves the slave systems as GM	Enter a valid IP address for the GM.
Master Clock ID For the GM clock to have an explicit identity, a 64-Bit “Master Clock ID” is assigned. This contains up to 8,8-bit clock identities which are usually based on MAC addresses.	Enter a valid Master Clock ID. If this is unknown or not defined, the following will be applied: FF:FF:FF:FF:FF:FF:FF:FF
Master Port ID A clock that has multiple PTP ports (such as a Boundary Clock) numbers the ports with the port ID.	Enter a valid master port ID. If this is unknown or undefined, FF:FF is used here.
Announce Interval By clicking on **Announce Interval** you reach the description of this parameter.	
Sync Interval By clicking on **Sync Interval** you reach the description of this parameter.	
Delay Request Interval By clicking on **Delay Request Interval** you reach the description of this parameter.	
Transmission Duration (sec.) By clicking on **Transmission Duration** you reach the description of this parameter.	

Parameter	Value
Asymmetrie Compensation Due to various influences, there may be delays between the runtimes of the PTP packets between master and slave and slave and master. There may be several causes for such asymmetry: ▪ Differences in connection speed between master and slave ▪ Differences in the fiber lengths of the data cables when using separate fibers for the two directions. Delay in fiber optics = 5 ns/m 1 m difference in length = 2.5 ns asymmetry half of the difference between the distribution times.	Activate the checkbox to enable "Asymmetry Compensation". By default, this parameter is deactivated.
Compensation Value (ns) This parameter can be used to compensate for a known asymmetry.	Enter a value for PTP delay asymmetry compensation in nanoseconds. The value must be positive if the distribution time from master to slave is longer than the distribution time from slave to master.
Timescale Indicates which application-specific timescale is synchronized. **PTP Standard (TAI):** According to the standard, the TAI time scale is used in the PTP timestamps. TAI is a linear time frame with no discontinuities, such as inserted leap seconds in the UTC timescale. A unit of time is based on SI second. **Arbitary (ARB):** This timescale is determined by the user.	Select the timescale you want.
Log Level You can use the log levels to define the minimum log level. The higher the log level is set, the more detailed the system events are saved.	Select the Log Level you want. 0 (Error) 1 (Warning) 2 (Notice) 3 (Info) 4 (Debug)

PTPv1 Hardware Compatibility Sync messages are filled with zero bytes to reach the size of the PTPv1 packet size. This is necessary for certain PTP hardware.	Activate the checkbox to enable "PTPv1 Hardware compatibility". By default, this parameter is disabled.
Management Messages The PTP Stack can respond to PTP management messages to provide information about the current state.	Click on the checkbox to disable the "Management Messages". By default, this parameter is activated.
Packet Counters This option can be used to count the PTP packets that have been sent or received since the PTP stack was started.	Click on the checkbox to disable the "Packet Counters". By default, this parameter is activated

21.1.1 Profile specific parameters

Profile SMPTE ST 2059-2

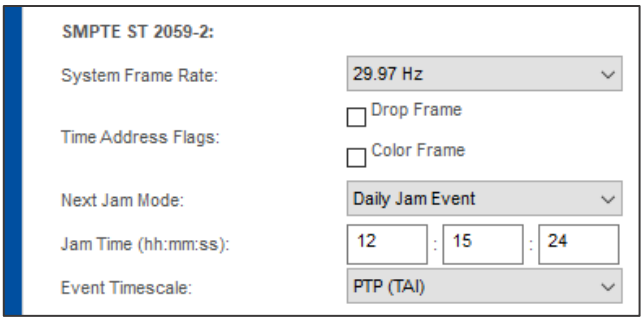


Figure 63: SMPTE ST 2059-2 - Configuration

System Frame Rate
Enter the refresh rate**.**

Select a frame rate for your specific application.

The following refresh rates can be selected.

- 24 frames/sec (film High Definition, 2k, 4k, 6k)
- 25 frames/sec (PAL Europa System, Brazil, Argentina and SECAM)
- 29.97 (30x1000-1001) frames/sec (NTSC American system (US, Canada, Mexico, Colombia, etc...)
- 30 frame/sec (HDTV-SD)

Time Address Flags
You can configure both Drop Frame and Color Frame.

Activate the checkbox to activate the bit 0 "Drop Frame".

0: Non-drop-frame

1: Drop-frame

Activate the checkbox to activate bit 1 "Color Frame".

0: Not in use

1: In use

Next Jam Mode
The jam is the event in which a discontinuity is inserted into the sequence of the time code to eliminate the accumulated displacement between time code and actual time. This is the case with the NTSC procedure, for example.

Choose from different Jam Modes for your specific application.

Parameter	Value
Jam Date You have the option to set a date for the "Single Jam Event".	Enter a date.
Jam Time (hh:mm:ss) You have the option to set a time for both the Daily Jam Event and the "Single Jam Event".	Enter a time.
Event Timescale Indicates which application-specific timescale is used for the Jam Event.	Select a timescale.

Profile IEEE C37.238-2011

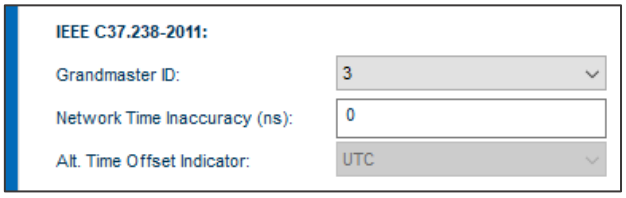


Figure 64: Profil IEEE C37.238-2011 - Configuration

Grandmaster ID In Power Profile C37.238-2011, a 1-byte ID must be assigned to the Grandmaster.	Choose an ID between 3 and 254
Network Time Inaccuracy (ns) The Network Time Inaccuracy indicates the expected inaccuracy between master and slave, so that the slave can make a statement at the end of the synchronization chain about the probable accuracy.	Usually the starting value of the Grandmaster is the basic accuracy of the PTP output to UTC, i.e. 100 ns
Alt. Time Offset Indicator Here a time zone can be set, which allows a slave to calculate the current local time.	You can select either UTC or from a list of preset time zones.

ITU-T G.8275.1:

Figure 65: ITU G.8275.1 - Configuration

MAC Address The ITU-T. profile G. 8275.1 allows the PTP Messages to configure a "forwardable" or "non-forwardable" multicast destination address.	Select the desired Multicast Destination address.

21.1.2 Fixed Clock Quality

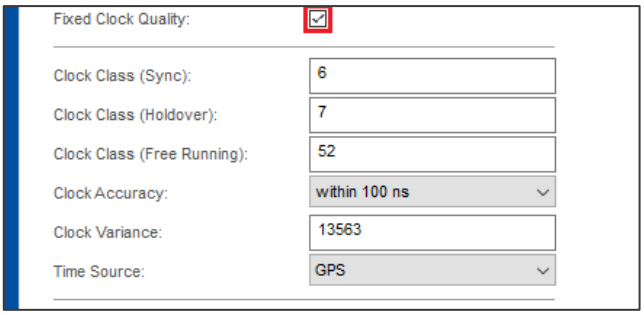


Figure 66: Fixed Clock Quality - Configuration

Activate the checkbox to activate the "Fixed Clock Quality". By enabling this parameter, the parameters used in the Best Master Clock algorithm can be manually overwritten. This function allows a "simulation mode" for the PTP output

Clock Class (Sync) Clock Class value in synchronous state.	Enter a value of 0-255.
Clock Class (Holdover) Clock Class value in the holdover.	Enter a value of 0-255.
Clock Class (Free Running) Clock Class value in freewheel.	Enter a value of 0-255.
Clock Accuracy Simulated clock accuracy.	Select one of the default values.
Clock Variance You have the option to configure the maximum possible variance of the time base. This value depends on the installed oscillator and is used in the BMCA.	Enter the value to simulate in this field.
Time Source You have the option to select different time sources to promote by the GM.	Select a time source.

21.2 PTP (IEEE1588) Status

After selecting the menu, you will be taken to the home page of the **PTP IEEE1588 Status**.

Description

This menu can be found in all important PTP status messages of your module/assembly that support PTP IEEE1588

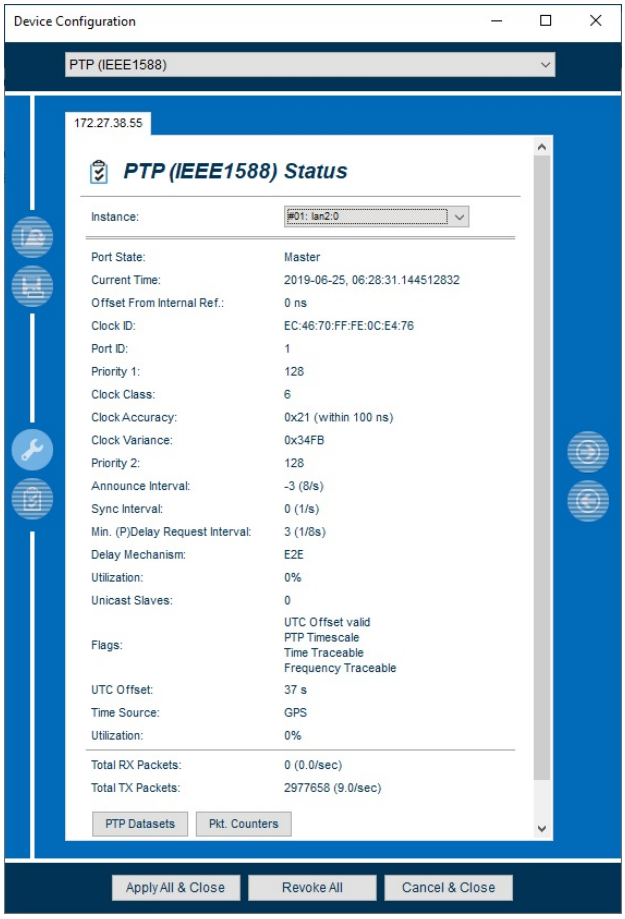


Figure 67: PTP IEEE – Status Monitoring

The following is a detailed explaining the individual options for status monitoring.

Parameter	Value
Instance	Select the PTP instance whose status information you want to view.
Port State	Displays the PTP port state of the currently selected instance.
Current Time	Displays the current date and time of the port.
Offset from Internal Ref.:	Displays the offset to the internal reference source.
Clock ID	Displays the clock ID of the PTP instance.
Port ID	Displays the port ID of the PTP instance

Parameter	Value
Priority 1	Displays priority 1 for the BMCA.
Clock Class	Displays the PTP Clock Class of the currently selected PTP GM.
Clock Accuracy	Displays the phase accuracy of the active GM at the reference time used by the GM
Clock Variance	Displays the maximum possible variance of the time base calculated based on the "Allan deviation". This value depends on the oscillator type.
Priority 2	Displays priority 2 for the BMCA.
Announce Interval	Displays the rate for sending Announce Messages.
Sync Interval	Displays the rate for sending sync messages from a master to a slave.
Min. (P) Delay Request Interval	Displays the limit of a master for a slave's delay request messages.
Delay Mechanism	Displays the currently configured delay mechanism.
Utilization	Displays the percentage utilization of the PTP port
Unicast Slaves	Displays the number of connected PTP clients.
Flags	Displays the current value of the PTP flags (for example, validity of the UTC offset, timescale used)
UTC Offset	Displays the current offset from UTC to PTP time.
Time Source	Displays the time source used for PTP.
Total RX Packets	Displays the cumulative number of PTP packets received.
Total TX Packets	Displays the cumulative number of PTP packets sent

21.2.1 Datasets

This menu provides you with extensive status monitoring of all parameters, the datasets defined in the PTP IEEE 1588.

To view the PTP datasets, click PTP Datasets

Current Dataset:

Parameter	Value
Steps removed	Displays the value of the "Steps Removed" parameter. This indicates how many PTP Boundary Clocks are between master and slave.
Offset from Master	Displays the calculated offset to the currently used PTP master. Only valid in slave mode.
Mean Path Delay	Displays the calculated path delay between slave and master (E2E) or to the next peer (P2P).

Parent Dataset:

Parameter	Value
Parent Clock ID	Displays the Clock ID of the currently in use master. This may differ from the clock ID of the GM in the case of a PTP Boundary Clock.
Parent Port ID	Displays the PTP port ID of the currently in use master.
Parent Stats	Indicates whether the offset scaled log variance and clock phase change rate statistical values of the current master have been measured and are valid.
Grandmaster Priority 1	Displays the priority 1 of the GM.
Grandmaster Priority 2	Displays the priority 2 of the GM.
Grandmaster Clock Class	Displays the clock class of the GM.
Grandmaster Clock Accuracy	Displays the phase accuracy of the active GM at the reference time used by the GM.
Grandmaster Clock Variance	Displays the maximum possible variance of the time base.
Grandmaster Clock ID	Displays the Clock ID of the GM

Default Dataset:

Parameter	Value
Number PTP	Displays the number of ports capable of PTP.
Two Step	Displays the currently used clock mode (One Step/Two Step).
Slave only	Indicates whether the PTP port is operating in slave-only mode. In this case, he can never become a master.
Priority 1	Displays priority 1 for the BMCA.
Priority 2	Displays priority 2 for the BMCA.
Clock Class	Displays the PTP Clock Class of the currently selected PTP GM.
Clock Accuracy	Displays the phase accuracy of the active GM at the reference time used by the GM.
Clock Variance	Displays the maximum possible variance of the time base calculated based on the "Allan deviation".

Parameter	Value
Clock Identity	Displays the PTP Clock ID of the module/assembly.
Domain Number	Displays the number of the PTP domain.

Time Properties Dataset:

Parameter	Value
Current UTC Offset	Displays the current offset from UTC to PTP time.
Leap 61	Indicates whether a positive leap second has been announced.
Leap 59	Indicates whether a negative leap second has been announced.
UTC Offset Valid	Indicates whether the specified UTC offset is valid and can be used to calculate UTC.
PTP Timescale	Indicates whether the PTP timescale (TAI) is used.
Time Traceable	Indicates whether the time used can be traced back to a primary time source. To do this, the "Time Traceable" and "UTC Offset Valid" flags listed above must be set to **true.**
Frequency Traceable	Indicates whether the frequency can be traced back to a primary time source.
Time Source	Displays the currently used time source (e.g. GPS, NTP.

Port Dataset:

Parameter	Value
Port Identity	Displays the identity of the PTP port. This consists of Clock ID and PTP Port ID (separated by "/").
Port State	Displays the current PTP port state (e.g. Listening, Uncalibrated, Slave, Master).
Minimum Delay Req. Interval	Displays the Minimum Delay Request Interval.
Peer Mean Path Delay	Displays the calculated path delay to the next peer (P2P).
Announce Interval	Displays the rate for sending Announce Messages.
Announce Receipt Timeout	Displays the number of "Announce messages that are missed" before a master becomes active itself or reevaluate its PTP port status.
Sync Interval	Displays the rate for sending sync messages from a master to a slave.
Delay Mechanism	Displays the currently configured delay mechanism.
Minimum PDelay Req. Interval	Shows the minimum supported (peer) delay request interval at which connected PTP slaves are allowed to send requests.
Version Number	Shows the PTP version number used

21.2.2 Packet Counter Statistics

The Device Manager displays a statistical record of all sent and received PTP packets of the previously selected module/assembly.

To view the PTP Packet Counter Statistics, click 

Received Data (RX)

Parameter	Value
RX Total	The total number of messages received.
RX Announce	The number of Announce Messages received.
RX Sync	The number of sync messages received.
RX Follow up	The number of follow-up messages received.
RX Delay Request	The number of Delay Request Messages received.
RX Delay Response	The number of Delay Response Messages received.
RX PDelay Request	The number of PDelay Request Messages received.
RX PDelay Response	The number of PDelay Response Messages received.
RX PDelay Follow up	The number of PDelay Follow up messages received.
RX Signalling	The number of signalling messages received.
RX Management	The number of management messages received.
RX Management Errors	The number of Management Error Messages received.

Transmitted Data (TX)

Parameter	Value
TX Total	The total number of Announce Messages sent.
TX Announce	The number of Announce Messages sent.
TX Sync	The number of sync messages sent.
TX Follow up	The number of follow-up messages sent.
TX Delay Request	The number of Delay Request Messages sent.
TX Delay Response	The number of Delay Response Messages sent.
TX PDelay Request	The number of PDelay Request Messages sent.
TX PDelay Response	The number of PDelay Response Messages sent.
TX PDelay Follow up	The number of PDelay Follow up messages sent.
TX Signalling	The number of signalling messages sent.
TX Management	The number of management messages sent.
TX Management Errors	The number of Management Error Messages sent.

Announce Receipt Timeouts
Displays the number of Announce timeouts. That is, the number of periods in which the configured Announce Receipt timeout has been exceeded.

22. NTP

22.1 NTP Configuration

After selecting the menu, you reach the main page of the **NTP Settings.**

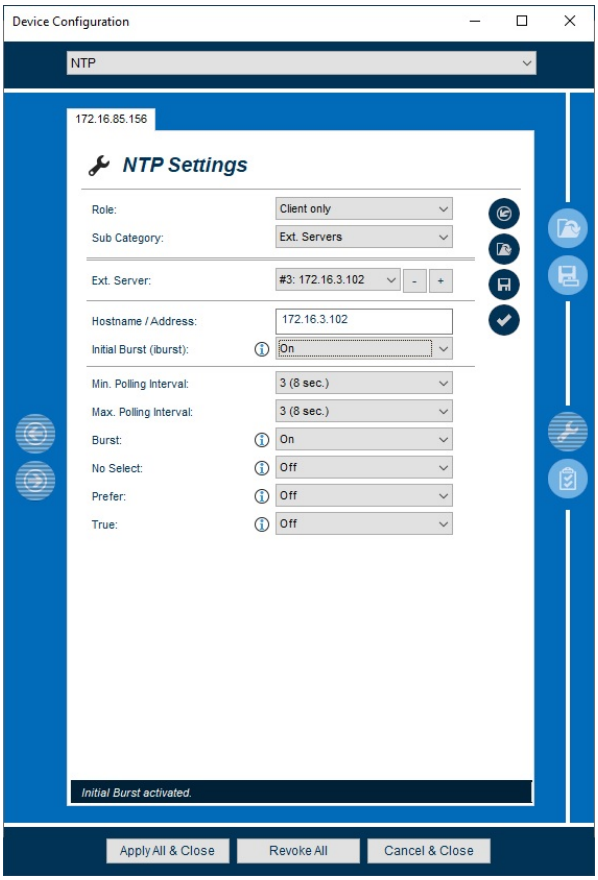


Figure 68: NTP - Configuration

Description

This menu offers you the possibility to configure important NTP parameters. The type and number of the configurable parameters depend on the module/ assembly group you have selected.

Individual configuration options are described below.

Parameter	Value
Role Indicates which role the NTP takes. Depending on the NTP software used, the selection of the role can be limited to Client only or Server only and cannot be changed. Various default values are preset for the modules and assembly/groups. **Client only role (e.g. N2X):** Can be only NTP client. **Server only: (e.g. mycroSync)** Can be only NTP server. **Client & Server:** Can be both NTP client and server and can be synchronized via external NTP server and can transmit the time to the Clients	Open the drop-down menu and select the requested role.

Parameter	Value
Subcategory You have the possibility to choose between various categories in order to configure your NTP server or client in detail. This is further described in detail in the NTP chapter.	Open the drop-down menu and select the subcategory to be configured.

22.1.1 Ext. Server

Parameter	Value
Ext. Server (Client Only) The external servers are other NTP servers which can be reached via network. Additional properties can be set for each entry in the list of external servers. The most important are Hostname / Address and Initial Burst. ***Other parameters should be changed just in exceptional cases***.	Open the drop-down menu and select the external server. By clicking on **+**, you can add new servers to the list and by clicking on **-** they can be deleted.
Hostname / Address You have the possibility to enter a hostname or an IP address of an external server.	Enter a hostname or an IP address.
Min. Polling Interval The polling interval indicates at what interval requests are sent to the time source. The min. Polling Interval value indicates the lower limit up to which the NTP client may vary.	Open the drop-down menu and select a polling interval between **8sec and 1024 sec**.
Max. Polling Interval The polling interval indicates at what interval requests are sent to the time source. The max. polling interval value indicates the upper limit up to which the NTP client may be adjusted.	Open the drop-down menu and select a polling interval between **8sec and 1024 sec**.

Parameter	Value
Burst If you enable burst, the ntpd will send 8 packets every 2 seconds at each request cycle, instead of just one. This is only necessary in exceptional cases, e.g. if a query is made via telephone line (Automated Computer Time Service, ACTS) or "Dial In", or if the query is made exclusively at very long-time intervals. **Result:** With this configuration, a connection would only be established explicitly at each query cycle. This takes a long time and causes a large time error. The burst then causes further queries if the connection has already been established. The time error for the subsequent packets is now considerably less than for the first packet. When used with "normal" NTP servers, burst is usually not necessary. For public NTP server operators, use by a client is considered "abusive."	Open the drop-down menu and select: **On** burst active **Off** burst deactivated ***(recommended)*** This parameter is disabled by default.
Initial Burst (iburst) If the iburst parameter is used for an external server, multiple queries are sent to that NTP server at short intervals only when the program starts. This significantly reduces the time to the first-time synchronization. Therefore, this setting should always be turned on ("**On**").	Open the drop-down menu and select: **On** iburst enabled ***(recommended)*** **Off** iburst disabled This parameter is disabled by default.
No Select Indicates that the marked server is normally polled, though never used to track its own system time. Therefore, this parameter should only be enabled only if an external NTP server is to be monitored. This includes, for example, monitoring the reachability or the time offset of the NTP server	Open the drop-down menu and select: **On** no select enabled **Off** no select disabled ***(recommended)*** This parameter is disabled by default.
Prefer Marks the server as preferred for the synchronization in the case when the calculated delays, offsets and the quality parameters of the server are the same. See this page for more information.	Open the drop-down menu and select: **On** prefer enabled **Off** prefer disabled ***(recommended)*** This parameter is disabled by default.

Parameter

True
By marking the server as „true chimer", the calculated delay and offset will always be indicated as correct, regardless of the commonly used selection algorithms, and the server will always be considered as a precise time source.

When the **true** parameter is activated **,** it allows the ntpd to have a massive impact on selecting the "best" time sources, leading to unwanted results.

In addition, the following links:

Server Commands and Options
http://doc.ntp.org/current-stable/confopt.html#option

Mitigation Rules and the 'prefer' Keyword
http://doc.ntp.org/current-stable/prefer.html#prefer

Value

Open the drop-down menu and select:

On true enabled

Off true disabled ***(empfohlen)***

This parameter is disabled by default.

22.2 NTP Configuration (MeinbergOS)

Description

This menu offers you the possibility to configure important NTP parameters of your selected Meinberg OS modules/ assembly groups.

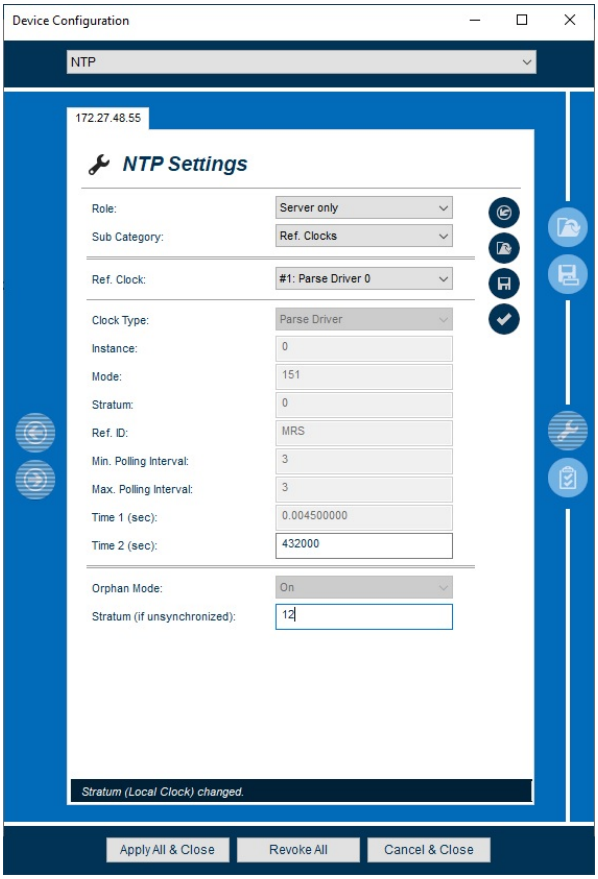


Figure 69: NTP – Configuration MeinbergOS

Subcategory

You have the possibility to choose between various **subcategories** in order to configure your Meinberg OS module/ assembly group. This is explained below.

Subcategory	Description
Ext. Servers	Configuring external NTP servers in the network.
Ref. Clocks	Configuring radio clocks, GPS receivers etc. as a time source.
Symmetric Keys	Configuring symmetric keys for authenticated time synchronization.
Trusted Keys	Selecting the trusted keys from the list of all configured symmetric keys. If the device receives a query with an untrusted key, this query will be rejected.
Extended	Adding further custom NTP configuration parameters. The default ntpd configuration syntax should be used.

Table 21: NTP – Subcategories

22.2.1 Subcategory Ref. Clocks

Parameter	Value
Ref. Clock Selecting a reference receiver for the previously configured NTP.	#1 Parse Driver 0
Clock Type	Displays the previously selected Ref. Clock.
Instance Possible values for the instance of a reference clock are the values 0 to 3 for each reference clock type.	**PARSE-Ref. Clock** 0,1,2,3 **NMEA-Ref. Clock** 0,1,2,3 **SHM-Ref. Clock** 0,1,2,3
Mode It depends on the ref. clock type which values for “Mode” are possible. For a NMEA ref. clock, the value is interpreted differently than in a PARSE ref. clock or SHM ref. clock.	Indicates the current value for the selected ref. clock type.
Stratum The stratum value for Ref. Clocks should always be "0". Otherwise there is the possibility that there may be problems with the display of the refid, which is interpreted depending on the stratum. Only the local clock as ref. clock is an exception. In case this is used, the stratum value should be adjustable according to the planned use..	Indicates the stratum value for the ref. clock.
Ref. ID This can only be configured if the Ref. Clock Stratum has 0 (default). The Ref. ID is interpreted and displayed as text.	The refid can in principle be any text with up to 4 characters in length for ref. clocks.
Min. Polling Interval See 22.1 NTP Configuration	
Max. Polling Interval See 22.1 NTP Configuration	

Parameter	Value
Time 1 This parameter is used to compensate the constant time offset of a Ref. Clock.	Specifies the compensating value in seconds.
Time 2 For the parse driver, this value specifies a trust time if Flag 1 is set. The value time2 should only be set in this case to adjust the trust time. A "trust time" is not supported for the Ref. Clock if the NMEA driver, the shared memory driver or another driver is used for the Ref. Clock instead of the PARSE driver. There are Refclock drivers which do not support the Trust-Time. Therefore, the given values may have a different meaning.	Specifies the trust time in seconds.
Orphan Mode The orphan mode is a “fallback” when for example a GPS receiver has no reception. Some NTP clients expect that the stratum value of tis server changes to a worse value as long as a GPS reception is not possible. However, for NTP v4 clients this is not necessary and can even be counterproductive. The client recognizes the increasing **root dispersion value** in the server’s answers that its time is drifting and can then switch to another server if one is available. **Orphan Mode** http://doc.ntp.org/current-stable/orphan.html	The value is static and cannot be changed. **Orphan Mode on** **Orphan Mode off**
Stratum (if unsynchronized) The value of this parameter indicates the stratum value that NTP uses to report to the network when the service is asynchronous an the trusttime has expired. You have the option to change the stratum value to a worse stratum. However, this should not be changed by default.	Enter a user-defined value in the field or leave it at the default value of 12.

22.2.2 Subcategory Symmetric Keys

Description

This menu allows you to configure symmetric keys for authenticated NTP time synchronization. The keys can be used both when communicating with NTP clients and when communicating with an external server.

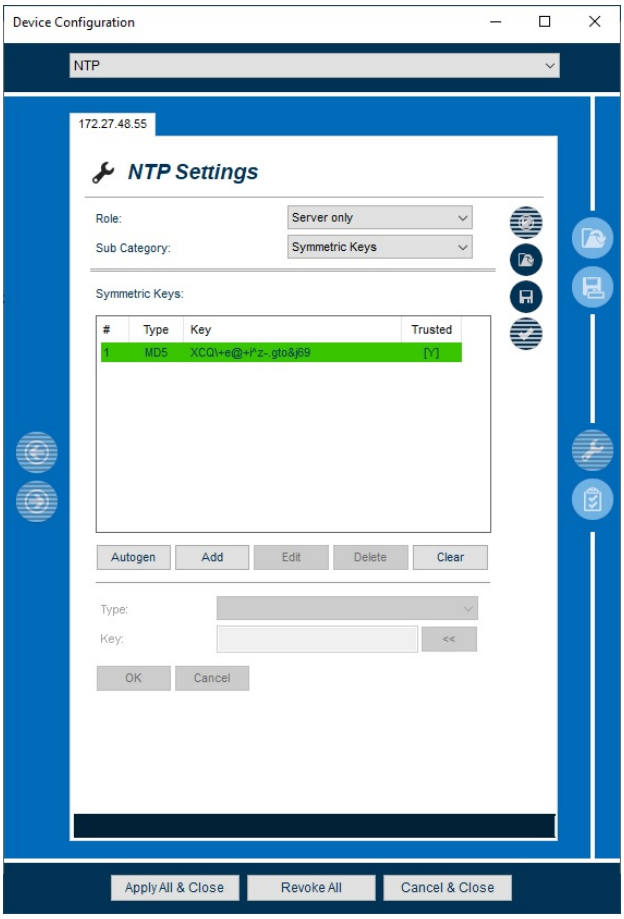


Figure 70: NTP – Configuration (Symmetric Keys)

Autogen

By clicking on the “Autogen” button, the system automatically generates 10 MD5 keys and 10nSHA1 keys. The keys are marked by default as not trustable. In order for an NTP client to use one of these keys for authentication, the key must be manually marked as trusted via the subcategory “trusted keys”.

Add

The „Add” button can be used to configure symmetric keys, manually. The system supports MD5 and SHA1 keys. Using the whitelist function, each key can be bound to up to 10 IP addresses. If the whitelist entries are configured, the access to the whitelist entries is restricted. If no whitelist entries are configured, the key can be used by all clients.

Edit

The „Edit” button can be used to edit a symmetric key selected from the list.

Delete

The „Delete” button can be used to delete a symmetric key selected from the list.

Clear

The „Clear” button can be used to delete the entire key list.

Ok

By clicking on „OK” you can add the created key to the “Symmetric Key” list.

Cancel

By clicking on „Cancel” the functions “Role” and “Subcategory” are released and the selection of the lower menu options is disabled.

Parameter	Value
Type You have the possibility to select between MD5 and SHA1.	Click on the drop-down menu and select the necessary key type.
Key You have the possibility to generate a new symmetric key.	Click on << to generate a new key.

22.2.3 Subcategory Trusted Keys

Description

This menu offers you the possibility to mark the “symmetric keys” configured in the “Symmetric Keys” menu as trusted. If the device receives an NTP request with an untrusted key, the request will be rejected.

This window lists the trusted keys which were previously added in the “Symmetric Keys” menu.

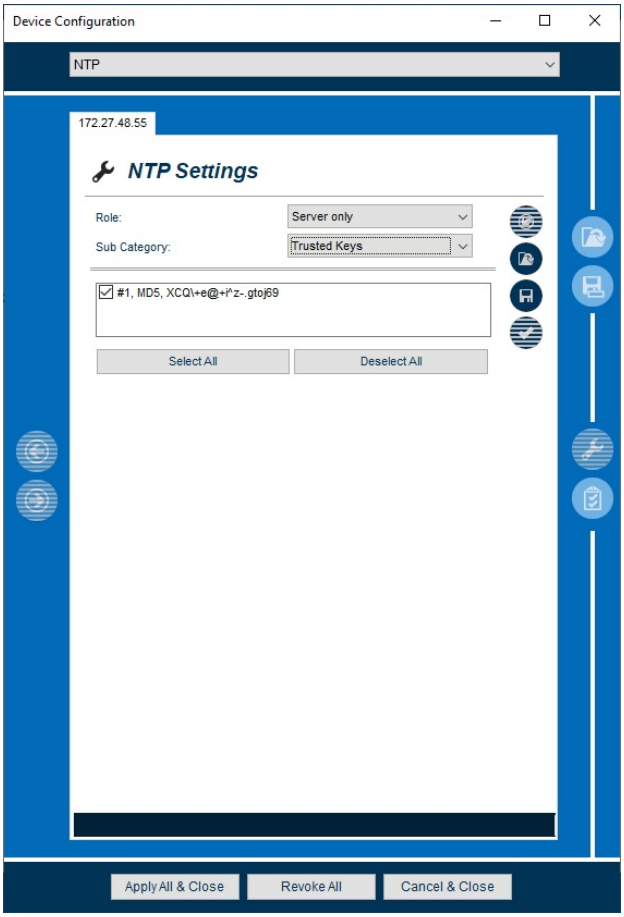


Figure 71: NTP – Configuration (Trusted Keys)

Select All

By clicking on **Select All**, all keys from the list are marked as trustable.

Deselect All

By clicking on **Deselect All**, all keys from the list are marked as not trustable.

22.2.4 Subcategory Extended

Description

This menu offers you the possibility to add your own configurations which are not available in the configuration menus. These are added to ntp.conf after applying the actual configuration.

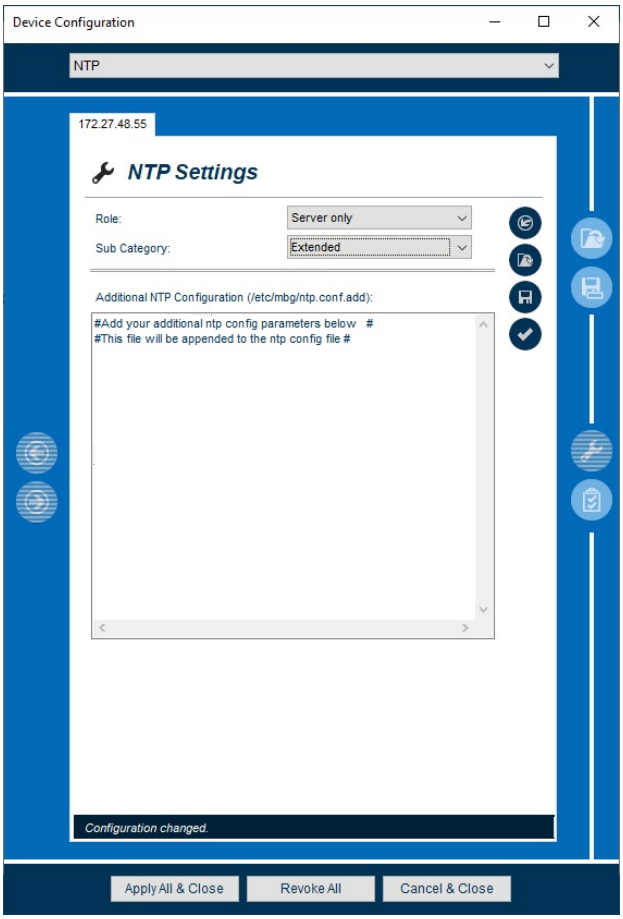


Figure 72: NTP – Configuration (Extended)

Parameter	Value
Additional NTP Configuration	Enter your own additional configuration parameter.

22.3 NTP Status

Description

The various submenus provide wide status information about the current NTP service.

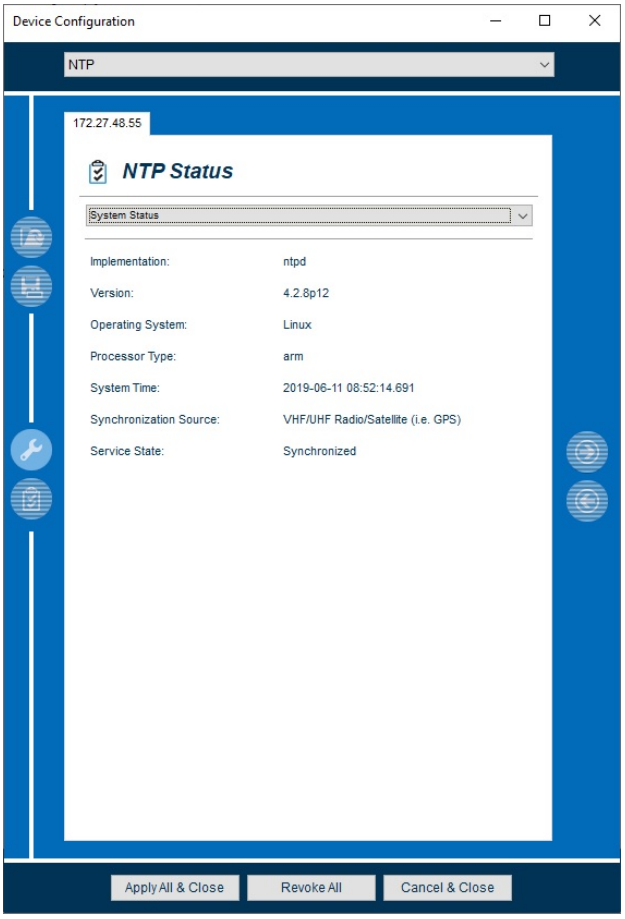


Figure 73: NTP- Status (System Status)

22.3.1 System Status

This submenu provides general information about the NTP system status.

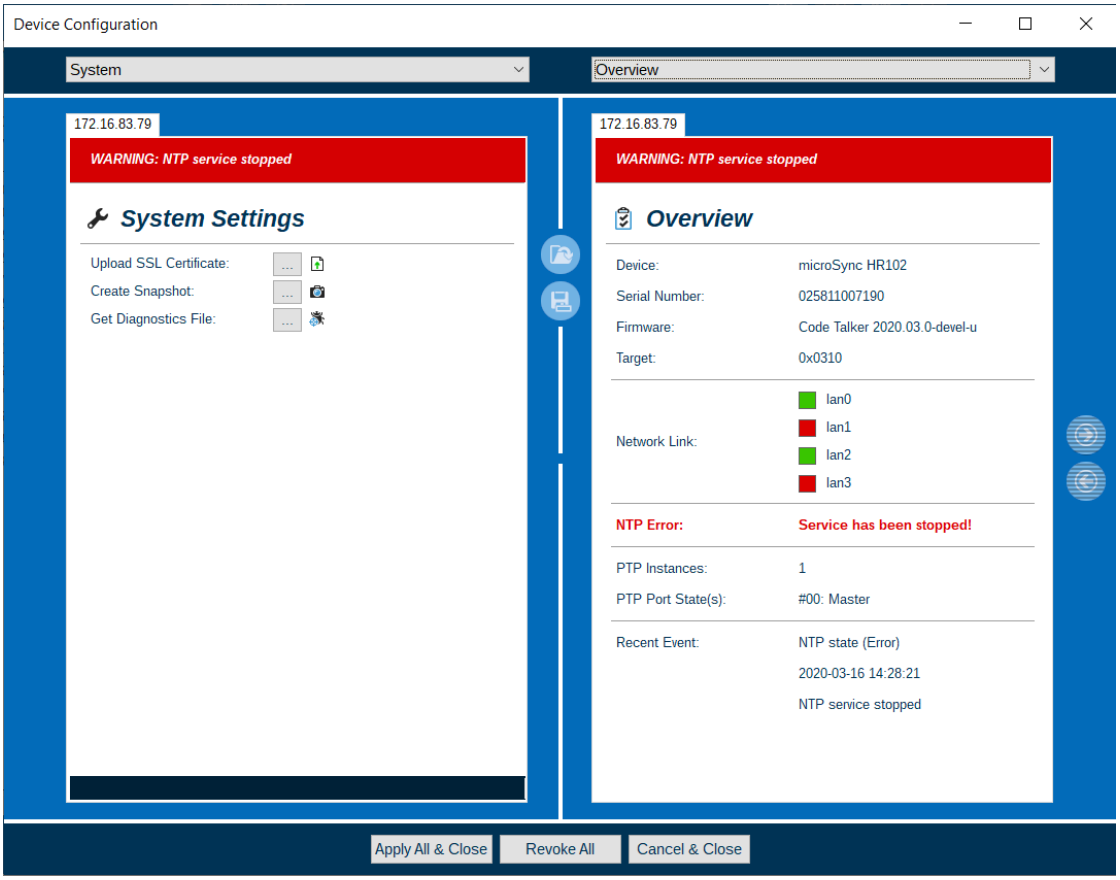
Parameter	Value
Implementation In many Meinberg devices the program ntpd is used, which is the freely available, complete reference implementation of the NTP protocol. The ntpd can be used as an NTP client to synchronize its own system time but can also work as a server to make its synchronized system time available to other NTP clients on the network. If the full functionality of ntpd is not required, however, slimmer implementations such as mbgntp are also used, which may only assume the role of a client or only the role of a server and do not fully support all features of ntpd.	Displays the type of the ntp implementation.

Parameter	Value
Version	Displays the version of the ntpd.
Operating System	Displays the system on which the ntpd daemon is running.
Processor Type	Shows the type of processor installed.
System Time	Displays the system time.
Synchronization Source	Displays the source to which the system is currently synchronizing.
Service State	Displays the status of the ntpd.

NTP Stopped

The banner **"WARNING: NTP service stopped"** in the status menu "Overview", indicates that the NTPD has been stopped. This can be caused, among others, by manually changing the system time or by switching to another time source, which then causes a time jump of > 1000 seconds (panic threshold). In this case the NTP service must be restarted.

1. To do this, go to the Services Settings menu.
2. Select NTP in the drop-down menu.
3. Click on the button  to start the NTP service.



22.3.2 NTP Status

Description

This submenu provides detailed NTP status information about your module/ assembly group.

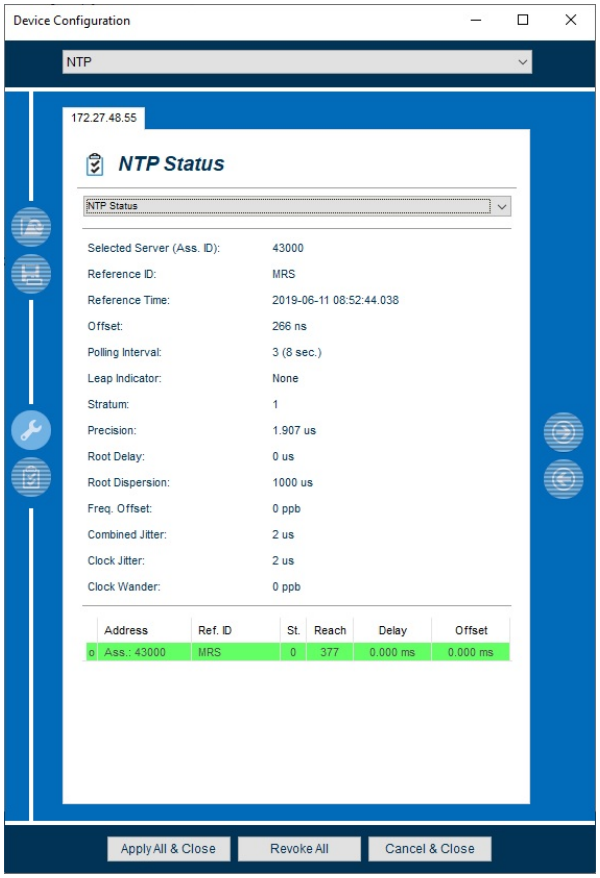


Figure 74: NTP – Status (NTP Status)

Parameter	Value
Selected Server (Ass. ID) The **association ID** is the unique numerical value used by the ntpd to identify a configured time source (NTP server or ref. clock) in a list. However, the numerical values change by each ntpd restart.	Displays the numerical value of the association ID
Reference ID The „refid" indicates the nature of a time source and is purely informative. If the time source is an NTP server in the network which is reached via a IPv4 address, this address will be directly displayed. However, if the server is reached via an IPv6 address, the full address will be too long. Then a hash value is formed via the IPv6 address which is displayed as an IPv4 address. If the time source is a radio clock, a text ID of up to 4 characters will be displayed, but even in special situations, the "refid" may be a short text such "INIT" or "STEP".	Displays the time reference of the NTP peer.

Parameter	Value
Reference Time	Displays the reference time of the server's last update.
Offset	Displays the estimated offset between the own system time and its reference time.
Polling Interval	Shows at which intervals a query is sent to a particular time source.
Leap Indicator	The leap indicator indicates whether a time source is synchronous or not and whether a leap second has been announced. The following values are possible: **0** The time source is synchronous, no leap second announced. **1** The time source is synchronous, positive leap second announced. **2** The time source is synchronous, negative leap second announced. **3** The time source is **not** synchronous.
Stratum The Stratum value indicates at which position of the hierarchy level a certain NTP service is located. A radio clock (Ref. clock), as a main time source, has a stratum value of 0. An NTP service which receives the time directly from the radio clock, becomes then a stratum 1 server and the clients of this server-stratum 2, etc. In this way it is prevented that a timing loop arises in which the first device of the chain is synchronized again with the last device of the chain. The stratum value 16 has a special function and indicates that a time source is not synchronous and therefore cannot provide an accurate time. Unlike the use of this term in telecommunications, the stratum value in NTP does not indicate an absolute accuracy class.	Displays the current stratum value of the NTP.
Precision This parameter specifies the resolution needed for the time of a time source to be read, e.g. nanoseconds, microseconds or milliseconds. This does not refer to the accuracy of a time source, but a high time resolution is a requirement for achieving high accuracy.	Displays the current precision value.
Root Delay This parameter refers to the entire delay which adds up over the different hierarchy levels of the time synchronization up to the highest, original time source	Displays the current "root delay"

Parameter	Value
Root Dispersion This is an estimated value and indicates how large the time offset is over the various hierarchy levels of time synchronization up to the top, original time source. In normal operation, the value is small, but if no time source is available, the value will steadily increase to indicate that your own time is drifting and moving more and more from the original reference time.	Displays the current time offset.
Freq. Offset The time is derived from a specific clock frequency, but each clock has a more or less big offset of its nominal frequency. This frequency offset must be determined and compensated so that the derived time does not drift away. In addition to the average frequency offset of a clock generator, the actual frequency offset also changes with the temperature.	Displays the current frequency offset.
Combined Jitter Each time source has its own specific jitter when queried. When using various time sources, the combined jitter is computed from the weighted jitter of each time source.	Displays the current Combined Jitter.
Clock Jitter Every time a single source of time is queried, a certain time elapses before the query arrives at the time source and the answer is received. The jitter is the deviation of the delay from the average delay of the individual queries. The smaller the jitter, the more accurate the time difference and the time drift can be determined and compensated.	Displays the current Clock Jitter.
Clock Wander This parameter refers to the case when the clock frequency of a time source changes relatively slowly, e.g. due to the changes in the temperature of the housing and the environment. These changes must be determined and compensated, just like the frequency offset, in order to reach a high time accuracy.	Displays the current value of the Clock Wander.

22.3.3 o| Ref. Clock 0 (43000, MRS)

This submenu offers you the possibility to receive detailed status information of the NTP reference receiver.

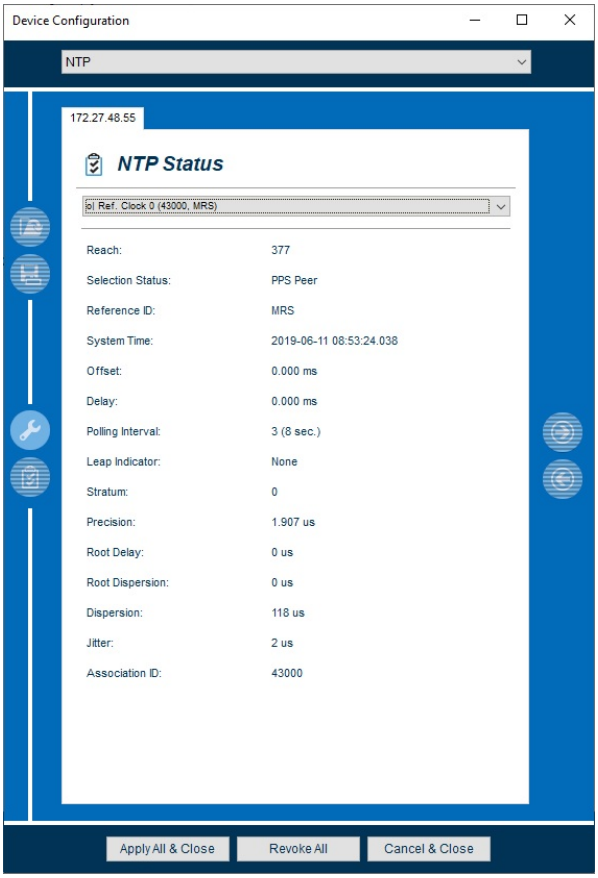


Figure 75: NTP - Status (o|Ref. Clock 0)

Parameter	Value
Reach	Displays the status of the last 8 queries as an octal value. The value “377” means that the last 8 queries were successful.
Selection Status	Shows how the ntpd evaluates the current time source using the "Tally Codes".
Reference ID See **NTP Status**	
System Time	Displays the system time.
Offset	Shows the determined offset of the own system time at the time of a reference time source.
Delay	Shows the average duration of a query, for queries over the network this is the runtime of the NTP packet.
Polling Interval	Specifies the time intervals (sec.) at which a specific time source is queried.

Parameter	Wert
Leap Indicator See NTP Status	
Stratum See NTP Status	Displays the stratum value of the reference source
Precision See NTP Status	
Root Delay See NTP Status	
Root Dispersition See NTP Status	
Dispersion	Displays the dispersion value. This represents the maximum error of the local clock relative to the reference clock.
Jitter See NTP Status ***Clock Jitter***	
Association ID See NTP Status	

23. Serial Ports

23.1 Serial Ports Configuration

After selecting the menu, you reach the main page of the **Serial Ports Settings.**

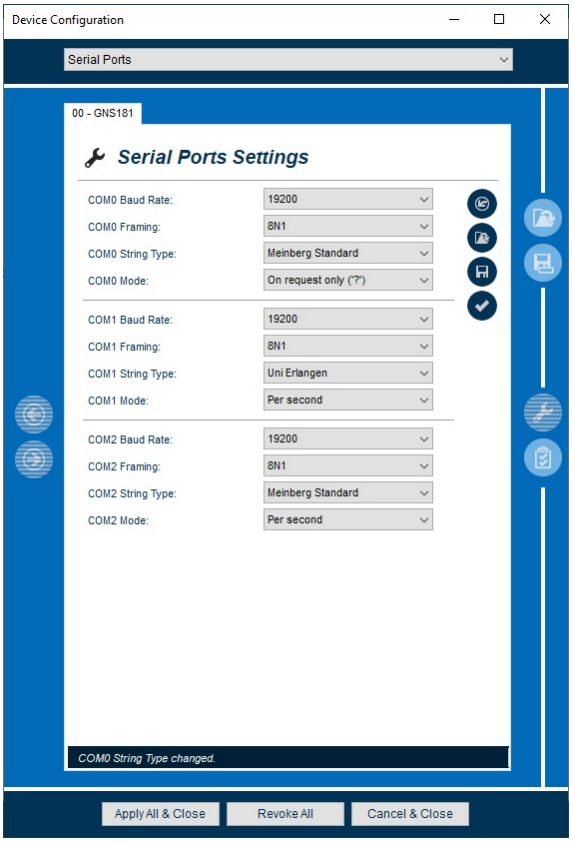


Figure 76: Serial Ports - Configuration

Description

In this this menu, the available **serial ports** of the selected module are displayed and can be configured.

Individual configuration options are described below.

Parameter	Value
COM x Baud Rate The baud rate is the transmission rate of the serial time string.	Open the drop-down menu and select the appropriate baud rate.
COM x Framing The framing represents the format of the data to be transmitted.	Open the drop-down menu and select the appropriate framing.
COM x String Type You have the possibility the choose from a multitude of time strings. These are represented as ASCII codes and can be displayed in the serial terminal of the start screen.	Open the drop-down menu and select the appropriate string type.
COM x Mode You can select the interval at which the previously configured time string is to be sent.	Open the drop-down menu and select how the time string is to be sent (every second, every minute, upon request).

24. Inputs

24.1 Inputs Configuration

After selecting the menu, you reach the main page of the **Inputs Settings.**

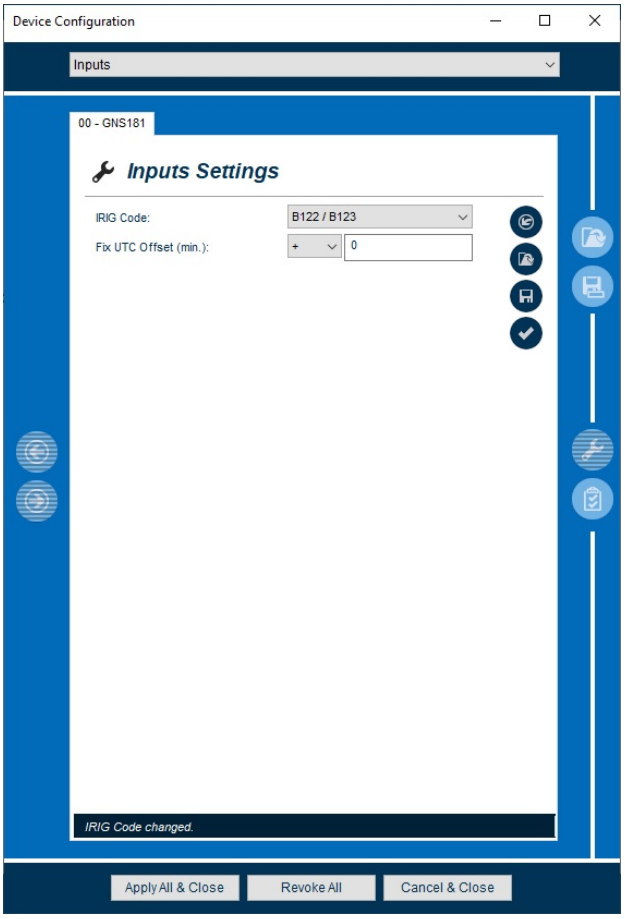


Figure 77: Input - Configuration

Description

This menu offers you the possibility to change the default settings of various IRIG codes, which can serve as a reference signal for the module/ assembly group (**only for MRS systems**).

Overview of the IRIG Time Codes

Timecode	Description
IRIG B002	100pps, PWM-DC-signal, no carrier, BCD time of year
IRIG B122	100pps, AM-sinus signal, 1 kHz carrier frequency, BCD time of year
IRIG B003	100pps, PWM-DC-signal, no carrier, BCD time of year, SBS time of day
IRIG B123	100pps, AM-sinus signal, 1kHz sinus carrier, BCD time of year, SBS time of day
IRIG B006	100 pps, PWM-DC-signal, no carrier, BCD time-of-year, Year
IRIG B126	100 pps, AM sinus signal, 1 kHz carrier frequency, BCD time-of-year, Year
IRIG B007	100 pps, PWM-DC-signal, no carrier, BCD time-of-year, Year, SBS time-of-day
IRIG B127	100 pps, AM sinus signal, 1 kHz carrier frequency, BCD time-of-year, Year, SBS time-of-day

Timecodes	Description
IEEE1344	Code. acc. to IEEE1344-1995, 100pps, AM sinus signal, 1kHz carrier, BCD time of year, SBS time of day, IEEE1344 Extensions for date, time zone, summer/winter time and leap second in Control Function Segment
C37.118	the same as IEEE1344, but with a rotated sign bit for the UTC offset
AFNOR[1]	Code acc. to NFS-87500, 100pps, AM sinus signal, 1kHz carrier, BCD time of year, full date, SBS time of day

Table 22: Input – IRIG time codes

Individual configuration options are described below.

Parameter	Value
IRIG Code Depending on the module/ assembly group, you can select the incoming time codes.	Open the drop-down menu and select the appropriate IRIG time.
Fix UTC Offset (min) Depending on the time code used, it has a constant time offset to UTC. This time offset must be configured here, for the clock to convert the received time into UTC.	Open the drop-down menu and select a positive **+** or a negative offset **-**. Enter the value of the offset in the field.

25. Outputs

25.1 Outputs Configuration

After selecting the menu, you reach the main page of the **Output settings**.

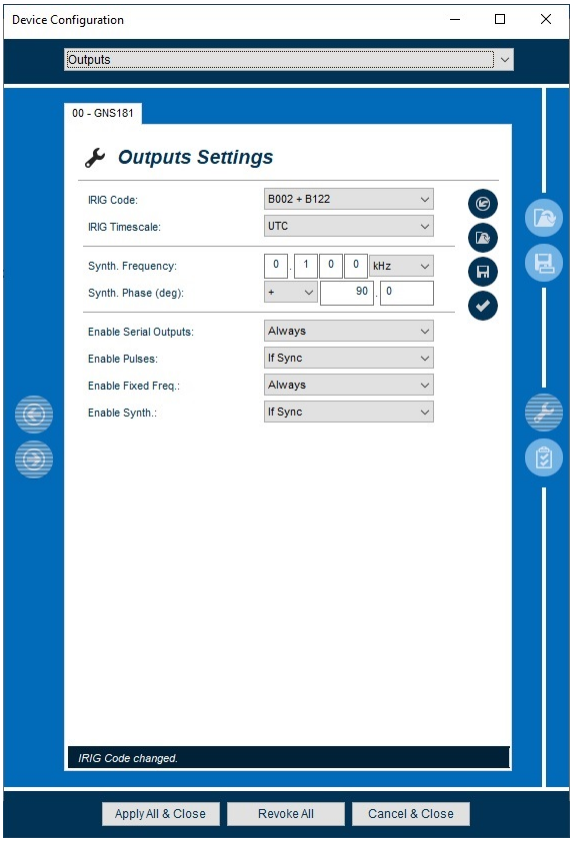


Figure 78: Output - Configuration

Description

This menu offers you the possibility to change the default settings of various IRIG codes, which can serve as an output signal for the module/ assembly group.

It is also possible to determine the frequency and the phase of the synthesizer, as well as the time of the output signal's activation.

The explanation of various time codes is to be found in the 24.1 Input Configuration chapter.

Individual configuration options are explained below.

Parameter	Wert
IRIG Code Depending on the module/ assembly group, you can select the outcoming time code.	Open the drop-down menu and choose the appropriate IRIG time code you.
IRIG TFOM (nur bei IEEE 1344, C37.118) A 4-bit **Time Figure of Merit (TFOM)** code that represents the accuracy of the generated IRIG signal. TFOM 0 means the highest accuracy and TFOM 15 (hex) – the lowest accuracy.	Open the drop-down menu: **Enabled** TFOM is activated **Disabled** TFOM is deactivated

TFOM

The following table describes various values for TFOM:

Nr.	Wert	Nr.	Wert
0	TQ_LOCKED_TO_UTC	**7**	TQ_WITHIN_1_MS
1	TQ_WITHIN_1_NS	**8**	TQ_WITHIN_10_MS
2	TQ_WITHIN_10_NS	**9**	TQ_WITHIN_100_MS
3	TQ_WITHIN_100_NS	**10**	TQ_WITHIN_1_S
4	TQ_WITHIN_1_US	**11**	TQ_WITHIN_10_S
5	TQ_WITHIN_10_US	**15**	TQ_CLOCK_FAILURE
6	TQ_WITHIN_100_US		

Table 23: Output – IRIG TFOM

Parameter	Wert
IRIG Timescale The time code is available either as UTC or as local time is calculated using the configuration applied in the following menu item: 28.1 Time Zone Configuration	Open the drop-down menu and select the appropriate time zone.
Synth. Frequency The output frequency of the incorporated synthesizer can be configured here.	1. Enter in the fields the required frequency of 1/3 Hz to 10 MHz in digits. 2. in the first drop down menu, you have the possibility to select various gradations. 3. If wanted, select a gradation (e.g. 1/8, 1/4,….) 4. In the second drop down menu, you can select the unit from Hz to MHz. By entering the frequency of 0 Hz, the synthesizer may switch off.
Synth. Phase (deg) The phase of the incorporated synthesizer can be configured in order to determine the time of your zero crossing.	Open the drop-down menu and select a positive **+** or negative **-** phase shift. Enter the phase position of the set frequency in the range of - 180° bis + 180° with a resolution of 0,1. The delay of the output signal becomes larger while the phase angle increases. If a frequency of more than 10 kHz has been set, the phase cannot be changed.

Parameter	Value
Enable Serial Outputs You can set the mode how the serial time string ist o be sent. This can be previously configured in 23.1 Serial Ports Konfiguration.	Open the drop-down menu and select: **Always** The time string is sent immediately after switching on the module. **if sync** The signal is sent only after the receiver has successfully synchronized for the first time to one of the incoming signals.
Enable Pulses If fixed frequency and/or pulse outputs are available for your module, you can set the mode how they are to be send.	Open the drop-down menu and select: **Always** The signal is enabled immediately after power-up. **if sync** The signal is enabled only after the receiver has successfully synchronized for the first time on the incoming signals.
Enable Fixed Freq. You can set the mode how the fixed frequency is to be sent.	Open the drop-down menu and select: **Always** The fixed frequency is enabled immediately after power up. **if sync** The fixed frequency is enabled only after the receiver has successfully synchronized for the first time on the incoming signals.
Enable Synth You can set the mode how the synthesizer frequency is to be sent.	Open the drop-down menu and select: **Always** The synth. frequency is enabled immediately after power up. **if sync** The synth. frequency is enabled only after the receiver has successfully synchronized for the first time on the incoming signals.

26 I/O Ports

26.1 I/O Ports configuration

After selecting the menu, you reach the main page of **I/O Ports Settings.**

Description

This menu offers you an overview of the available interfaces and optical status displays of your Meinberg OS modules/ assembly groups. These are displayed in a front view.

The buttons  and  can be used to enlarge the display image up or to reduce it.

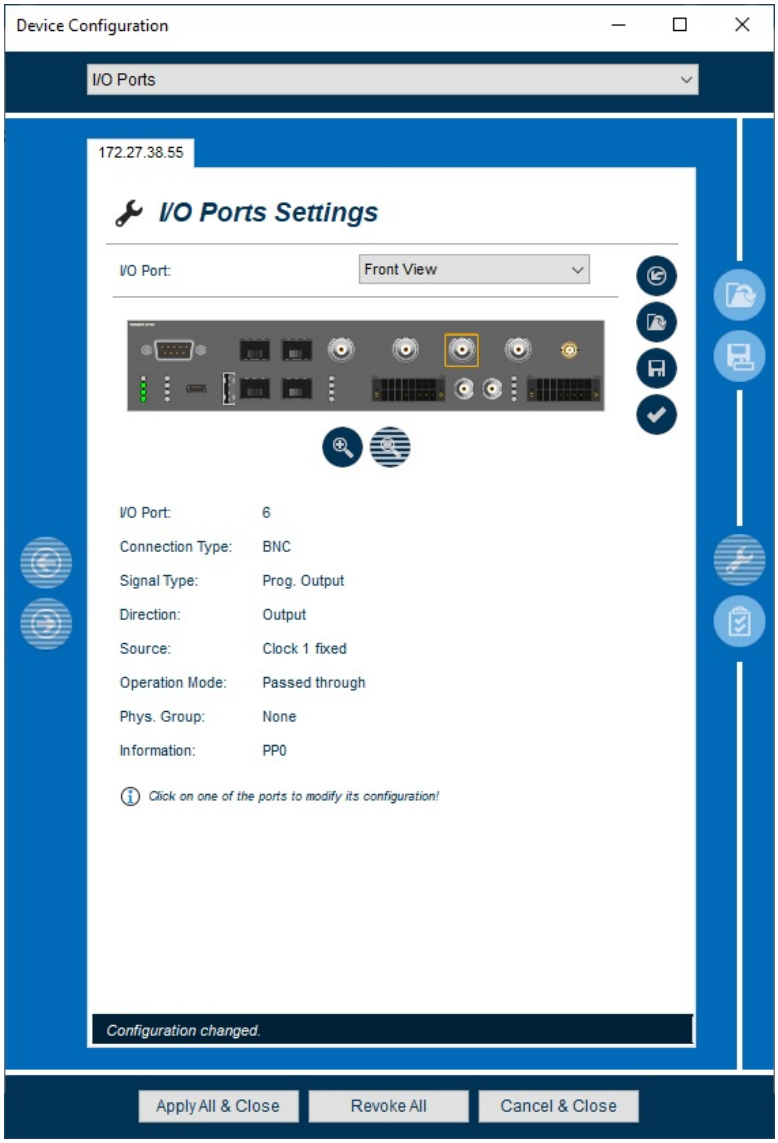


Figure 79: I/O Ports - Configuration

26.1.1 I/O Port

You have the possibility to select every interface and display the connected Meinberg OS modules/ assembly groups by clicking on the corresponding graphical representation or the selecting in the drop-down list.

After selecting, the menu of the interface opens, and this can be configured. Some interfaces, for example the outputs which are assigned with fixed signals, as well as the LEDs, cannot be configured.

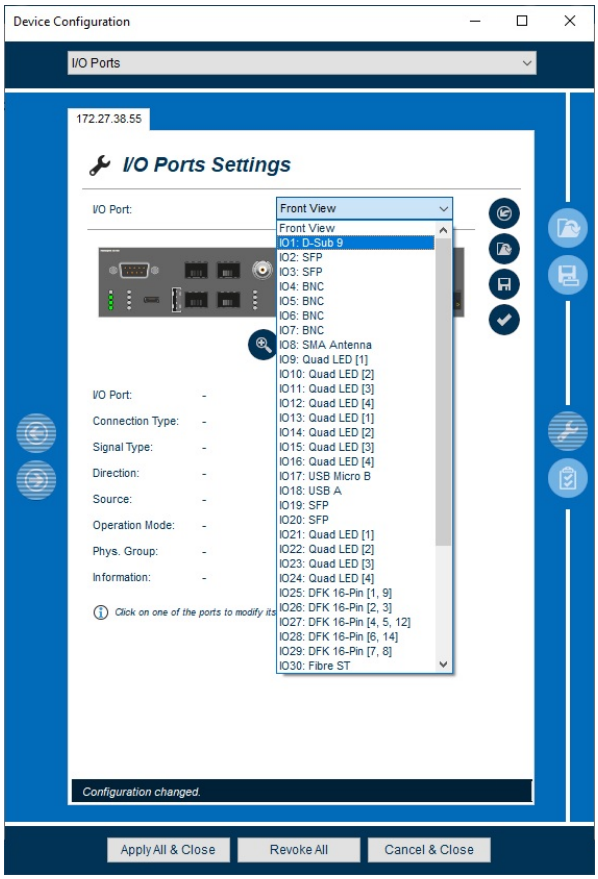


Figure 80: I/O Ports – (List selection)

Information about interfaces

The following parameters are identical for all available interfaces. Depending on the interface, the values are displayed specifically (see the examples based on a microSync^{HR}).

Parameter	Value
Type Displays the provided signal from the interface or display.	Using the example of a microSync^{HR}300: **IO4: BNC** 10 MHz sine In **IO5: BNC** PPS In **IO25: DFK 16-Pin** PP5 TTL
Direction Indicates whether the interface functions as input or output or as input and output.	Using the example of a microSync^{HR}300: **IO8: SMA Antenne** Input **IO10: Quad LED** Output **IO18: USB A** Input/output

Parameter	Value
Source Displays the signal source of the interface or display.	Using the example of a microSync^{HR}300: **IO4: BNC** (10 MHz sine In) External **IO1: D-Sub 9** (COM 0) Clock 1 fixed **IO10: Quad LED** (Network) Static
Operation Mode Displays how the signals of the source are sent.	Using the example of a microSync^{HR}300: **IO8: SMA Antenne** Passed through **IO10: Quad LED** Always enabled

26.1.2 Configuration size

Many parameters of meinbergOS modules/ assembly groups can be configured directly in the **I/O Ports Settings** menu.

By clicking on e.g. pin 3 or 11 of the X1 interface, you have the possibility to configure the programmable pulses (see fig.)

In addition, you can reach menus via links (see fig.), in order to configure the network ports of the microSync.

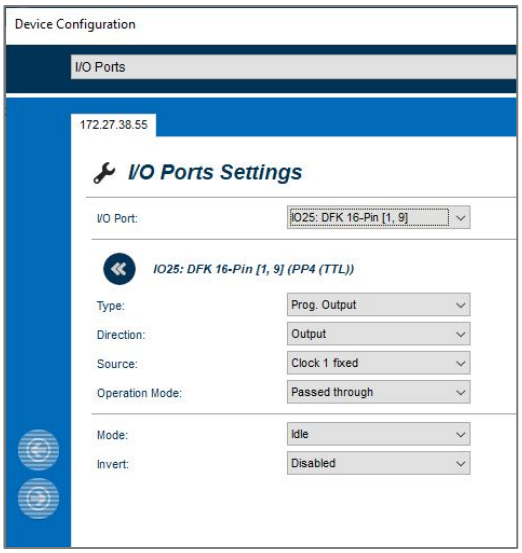


Figure 81: I/O Ports (DFK 16-Pin)

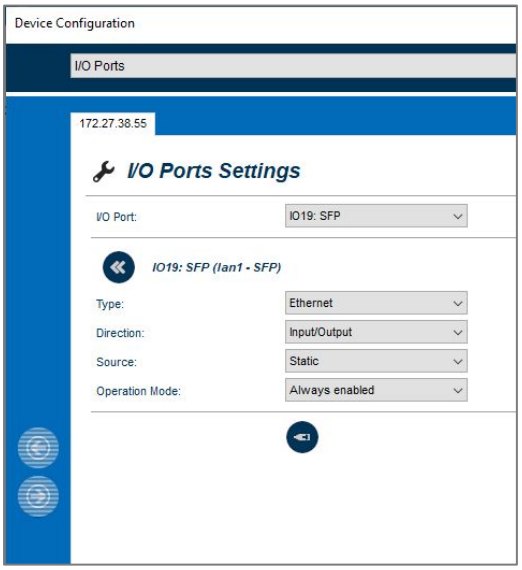


Figure 82: I/O Ports (SFP)

26.2 I/O Ports Status

After selecting the menu, you reach the main page of **I/O Ports settings.**

Figure 83: I/O Ports – Status Monitoring

Description

This menu offers you detailed status information about the I/O ports of your Meinberg OS system.

To display the status information, move the mouse pointer over the representation of the respective interface.

Parameter	Value
I/O Port	Displays the consecutive number of the interface.
Connection Type	Displays the type of the interface.
Signal Type	Displays the signal type of the interface
Information	Displays the name of the system's interface. e.g. COM 0

Parameter	Value
Phys. Group	Displays the physical group in which the port is located. The microSync´s RJ45 and SFP ports are located in the same physical group. This is statically determined by hardware wiring. Both represent the LAN 0 port. However, just one port can be active at the same time.
Phys. Group State	Displays the status of the port within the group. In the group of SFP and RJ45 ports, one of the two ports are Master (active). The other is “Passive”. The RJ45 port is Master if no SFP module is plugged into the SFP slot. As soon as the SFP port detects a link, the RJ45 port will be “Passive”.
Log. Group	Displays the logical group of the port over which the mouse pointer is located.
Log. Group State	Displays the state of the logical group.
Status Bits	Displays available status information of the port.

27. Programmable Outputs

27.1 Programmable Outputs Configuration

After selecting the menu, you reach the main page of the **Prog. Outputs Settings.**

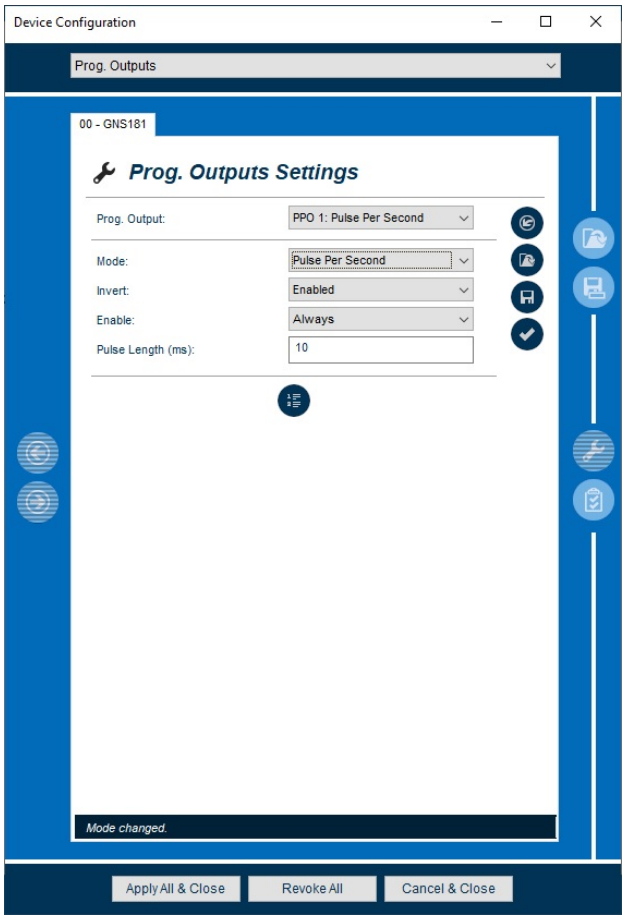


Figure 84: Prog. Output - Configuration

Description

If our module/ assembly group has programmable outputs, they can be configured with up to four freely configurable output signals. A wide variety of programmable signals are for you available.

Accessible, programmable signals can be displayed in a list or can be selected in the drop-down menu.

Drop-Down view

List view

Individual configuration options are described below.

Parameter	Value
Prog. Output Depending on the module, various programmable outputs are for you available.	Open the drop-down menu and select the output which must be configured.
Mode You have the possibility to select from various output signals. **(module dependent)**.	Open the drop-down menu and select the appropriate signal.
Invert You can enable or disable the inversion of a signal. This parameter is not configurable for each signal.	Open the drop-down menu. **Disable** The signal will not be inverted. **Enable** The signal will be inverted.

Parameter	Value
Enable When the previously selected signal is to be enabled, it can be here configured.	Open the drop-down menu and select: **Always** The programmed output signals will be immediately sent after the module/ assembly group is switched on. **if sync** The programmed output signals will be sent only after the receiver has successfully synchronized for the first time to one of the incoming signals.

Description of the modes.

The configuration options of the individual modes are explained below.

Mode	Value
Idle While selecting IDLE, the programmable outputs will be in idle mode.	The generated signal can be inverted, otherwise no further configurations are possible. An inversion of a disabled output causes a permanent activation of the signal.
Timer With this mode, three switch-on and switch-off times can be programmed for each output. These times refer to the set system time.	**Timer 0 On (hh:mm:ss)** Enter the desired switch-on time with hour:minute:second. **Timer 0 Off (hh:mm:ss)** Enter the desired switch-off time with hour:minute:second.
Single Shot Just one output pulse with a defined length can be generated once a day.	**Pulse Length (ms)** Enter the length of the pulse. This can be set between 10 milliseeconds and 10 seconds in steps of 10 ms. **Event Time (hh:mm:ss)** Enter the desired time at which the pulse with the value "Time" is generated.
Cyclic Pulse In this mode, a recurring output pulse with a defined length is output at preconfigured intervals. The pulse output is synchronized at 0:00 local time so that the first pulse of a day always occurs at midnight.	**Pulse Length (ms)** Enter the duration of the impulse. This can be set between 10 milliseconds and 10 seconds in steps of 10 ms. **Cycle (hh:mm:ss)** The value of "Cycle" determines the time between two consecutive pulses. This cycle time must be entered as hours, minutes and seconds.

Mode	Value
Pulse per Second Impulses of defined length are output once per second.	**Pulse Length (ms)** Enter the duration of the impulse. This can be set between 10 milliseconds and 10 seconds in 10 ms increments.
Pulse per Minute Impulses of defined length are output once per minute.	**Pulse Length (ms)** Enter the duration of the impulse. This can be set between 10 milliseconds and 10 seconds in 10 ms increments.
Pulse per Hour Impulses of defined length are output once per hour.	**Pulse Length (ms)** Enter the duration of the impulse. This can be set between 10 milliseconds and 10 seconds in steps of 10 ms.
DCF77 Marks A simulated DCF77-Mark telegram is output on the selected outputs. The generated time code refers to the local time zone.	**Timebase** Shows you the time base to which the DCF77 Mark signal refers. **Timeout (min)** The DCF simulation can be deactivated when the clock is free running. Specify the delay (in minutes) to disable the DCF simulation with the value "Timeout". The DCF simulation is never stopped when the delay value is zero.

Sync Modes

Three different modes can be selected for the output of the synchronization state of the clocks.

Position Ok The Position OK mode activates the output if the receiver has enough satellites to calculate its position.	An inversion of the signal can be configured, otherwise no further configurations are possible.
Time Sync In the "Time Sync" mode, the respective output is activated as soon as the time base of the internal clock has been synchronized with the incoming signal.	An inversion of the signal can be configured, otherwise no further configurations are possible.
All Sync The "All Sync" mode executes a logical AND function of the two states mentioned above, i.e. the output is only activated when the position can be calculated, and the internal time base is synchronized with the GPS timing.	An inversion of the signal can be configured, otherwise no further configurations are possible.

Mode	Value
DCLS Time Code The configuration for the **„DCLS Time Code“** can be found in the menu 25.1 Outputs Configuration.	
Serial Time String A serial time string is issued.	The time string previously set in the **"Serial Ports Settings"** for the serial interface **COM 1** is issued.
DCF77-like M59 A modified DCF77 code is issued.	With this DCF77 code a 500 ms long pulse is output in the 59th second instead of a pause.
10 MHz Frequency A frequency of 10 MHz will be issued.	An inversion of the signal can be configured. No further configurations are possible.
Synthesizer Frequency The configuration for the **„Synthesizer Frequency“** can be found in the menu 25.1 Outputs Configuration.	
Time Slots per Minute	**Time Slots** Defined Time Slots can be set in the Time Slot mode. **Slot Length Reduction (ms)** Here you have the possibility to set a premature switch-off time. This can be set in the area configure between 50ms and 500ms to avoid overlapping of two time slots. **Example:** Number of Time Slots = 10 Slot Length Reduction = 500ms Time slots 1 and 2 are activated (0 - 6s and 6 - 12s). In fact, however, the outputs switch from 0 - 11,5s. **Active Time Slots** Shows all Time Slots that were previously selected under the Time Slots item. Check the box to activate this option.
PTTI 1PPS If this mode is selected, a non-inverted PPS of 20 microseconds length will be issued.	

28. Time Zone

28.1 Time Zone configuration

After selecting the menu, you reach the main page of **Time Zone Settings**.

Description

This menu allows you, for example, to configure the time zone, as well as the daylight-saving time (DST), if wanted. The internal time zone of the module/ assembly group and the time of the NTP are always UTC.

> These parameters also affect the serial output lines and the time code outputs (IRIG).

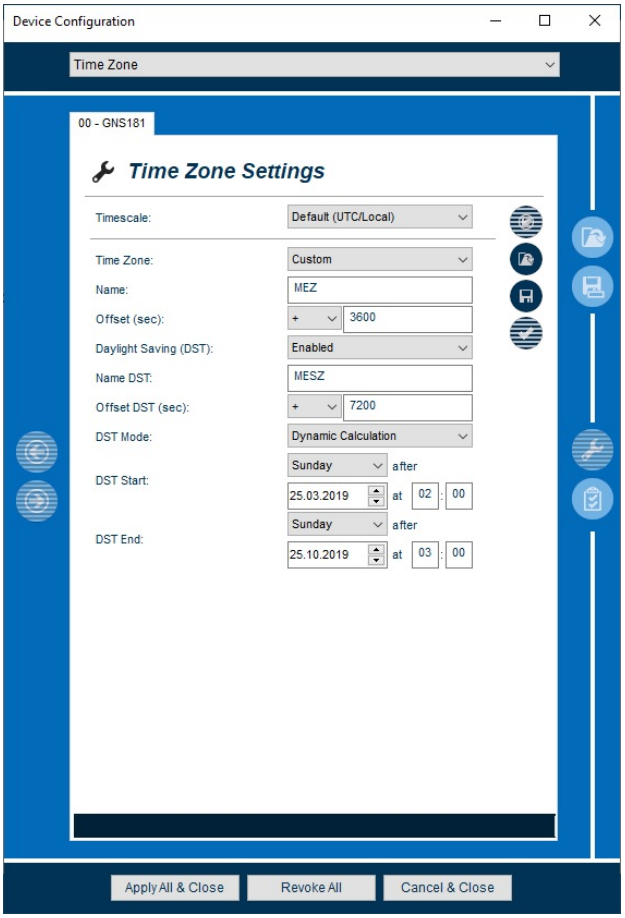


Figure 85: Time Zone - Configuration

Configuration info

Some modules/ assembly groups have the option of choosing from various timescales, such as GPS or TAI.

In this case, the individual configuration of the time zone is not possible. The standard timescale is set to UTC/local.

GPS Time Scale

UTC Coordinated universal time (including leap seconds which are constantly updated.

GPS Since January 1st, 1980- GPS system time: monotone timescale without leap seconds. Includes the leap seconds from 1970 to 1980.

TAI Since January 1st, 1970- international atomic time: monotone timescale without leap seconds. The difference to GPS time is 19 seconds.

The parameters of the time zones **UTC, CET/CEST, EET/EEST** are non-adjustable and cannot be configured. You have also the possibility to create a Time Zone **Custom** profile and to configure all the parameters individually.

28.1.1 Time Zone Custom

Individual configuration options are explained below.

Parameter	Value
Name The time zone can be named, individually.	Enter an individual name for your time zone.
Offset (sec) The offset is used to determine a deviation from UTC time.	Open the drop-down menu and select a positive **+** or a negative **–** offset from the UTC time. Enter the offset to UTC in seconds.
Daylight Saving (DST) You can enable or disable the daylight saving time.	Open the drop-down menu, then select: **Enabled** (standard settings) To enable the DST and to configure further parameters. **Disabled** To disable the DST and to hide further parameters.
Name DST The DST can be named individually.	Enter an individual name for your DST.
Offset DST (sec) The DST also requires the settings of an offset at UTC time.	Click and open the “Drop Down” menu and select a positive **+** or a negative **–** offset from the UTC time. Enter the offset of the DST in seconds, at UTC time.
DST Mode The configuration of the DST can be further customized by selecting a weekday for the start and the end.	Click and open the drop-down menu and select: **Dynamic Calculation** The switching takes place on the selected day of the week, on or after the configurated date (e.g. CEST: first Sunday on or after 25.10, respectively 25.10.) Therefore, the configuration must be made just once, and the corresponding date will be automatically calculated every year. **Fixed Date** The switching takes place on the configured date and must be reconfigured every year.
DST Start Depending on the location of the module/assembly group, the start of the DST can be configured individually.	Enter an individual date for the DST´s start.
DST End Depending on the location of the module/assembly group, the end of the DST can be configured, individually.	Enter an individual date for the DST´s end.

29. FDM

29.1 FDM Configuration

After selecting the menu, you reach the main page of **FDM Settings**.

Description

This menu offers a variety of options for configuring your FDM module, such as the mains frequency to be monitored, time deviation limits, the initial time deviation and the analog outputs.

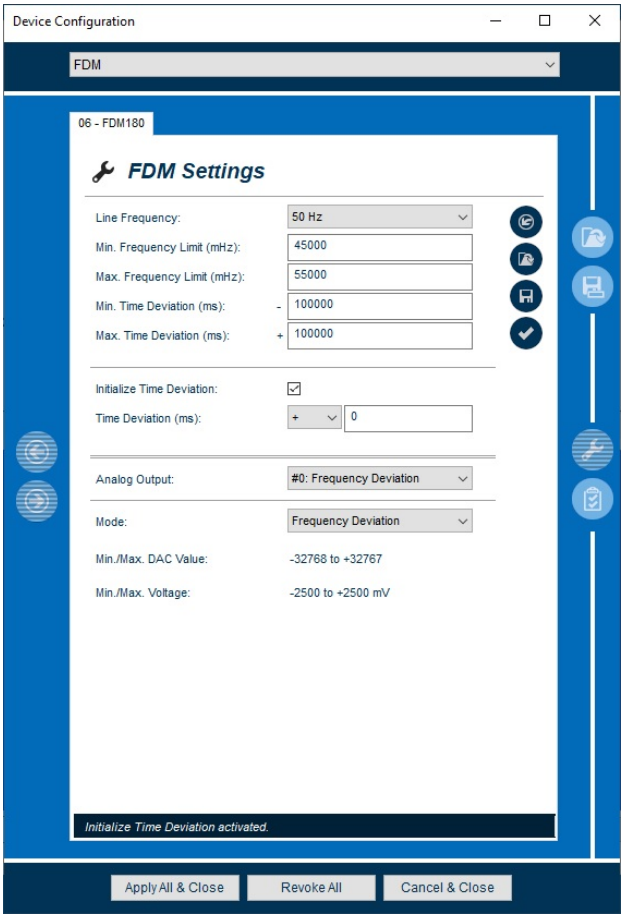


Figure 86: FDM - Configuration

Individual configuration options are described below.

Parameter	Value
Line Frequency With the FDM you have the possibility to monitor different mains frequencies.	Open the dropdown menu and select the mains frequency to be monitored.
Min. Frequency Limit (mHz) A minimum frequency can be specified for monitoring the mains frequency.	Enter the desired frequency minimum limit in mHz.
Max. Frequency Limit (mHz) A maximum frequency can be specified for monitoring the mains frequency.	Enter the desired frequency maximum in mHz.

Parameter	Value
Min. Time Deviation (ms) In addition to the frequency, the time is also derived from the mains frequency. The time difference, i.e. the deviation of this calculated time from the REF, has the long-term accuracy of the reference and is therefore suitable for precise monitoring of the frequency stability. The time difference is output via one of the serial interfaces of the module.	Enter the maximum negative deviation from the reference time.
Max. Time Deviation (ms) In addition to the frequency, the time is also derived from the mains frequency. The time difference, i.e. the deviation of this calculated time from the REF, has the long-term accuracy of the reference and is therefore suitable for precise monitoring of the frequency stability. The time difference is output via one of the serial interfaces of the module.	Enter the maximum positive deviation from the reference time.
Initialize Time Deviation (ms) Preconfigure the time difference to an initial value. By clicking in the checkbox, the parameter "Time Deviation" becomes active and can be configured	Open the dropdown menu and select **+** to configure a positive frequency deviation or **-** to configure a negative frequency deviation. Enter the value of the time deviation in digits (ms) in the field.
Analog Output The time difference as well as the determined frequency is output via a serial interface and additionally as an analog voltage value via a DAC.	Open the dropdown menu and select the analog output to be configured.
Mode Here you have the option of outputting the deviations on the previously selected analog output as voltage.	Open the dropdown menu and choose: **Time Deviation** Output of the time deviation as voltage. **Frequency Deviation** Output of the frequency deviation as voltage.
Min./Max. DAC Value	Shows the resolution of the DAC´s, with 16bit.
Min./Max. Voltage	Shows the min./max. Values of the analog voltage value. In the case of the FDM180 **+ 2.5V** - **- 2.5V.**

DAC Value	Voltage in V
+ 32768	+ 2,5V
0	0 V
- 32768	- 2,5V

29.2 FDM Status

After selecting the menu, you reach the main page of **FDM Status**.

Description

This menu allows you to get detailed information about the status of your FDM module.

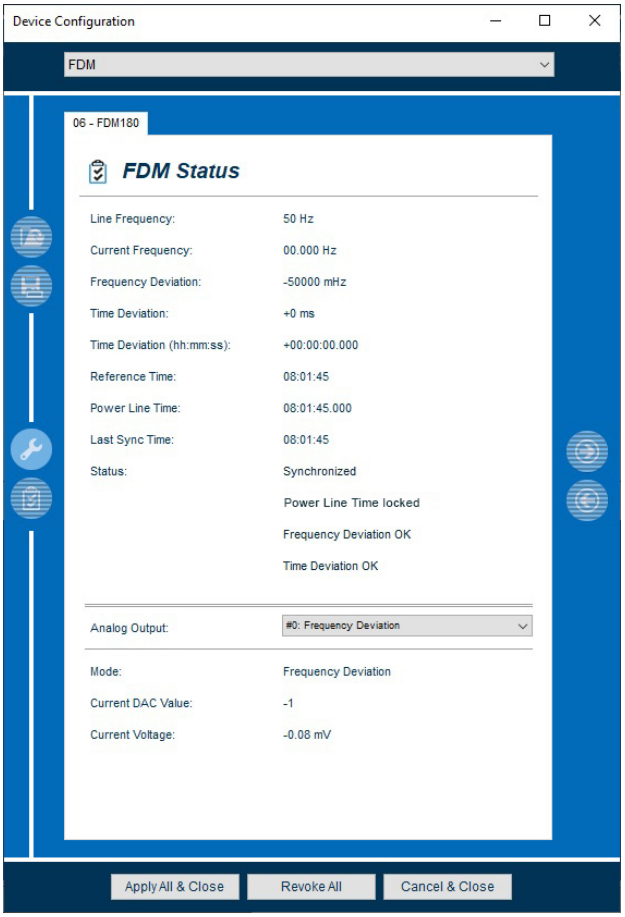


Figure 87: FDM – Status Monitoring

The individual options for status monitoring are explained in more detail below.

Parameter	Value
Line Frequency	Displays the configured mains frequency to be monitored.
Current Frequency	Displays the current mains frequency in Hertz (Hz).
Frequency Deviation	Displays the current deviation from the mains frequency in millihertz (mHz).
Time Deviation	Displays the current deviation from the reference time in milliseconds (ms).
Time Deviation (hh:mm:ss)	Displays the current deviation from the reference time in the format (hours:minutes:seconds).
Reference Time	Displays the current reference time of the upstream receiver.
Power Line Time	Displays the mains time based on the mains frequency.

Parameter	Value
Last Sync Time	Displays the time stamp of the last received reference time of the upstream clock. If the reference clock becomes asynchronous, the last valid time stamp is displayed here. This allows you to determine the time from which the FDM was in free run mode.

Status

Displays various status information of the FDM module such as synchronization status, frequency and time deviation.

Possible status displays:

Status	Description
Synchronized	FDM is synchronous to reference time
Not Synchronized	FDM is asynchronous to reference time
Power Line Time locked	FDM set to network time
Power Line Time not locked	FDM not set to network time
Frequency Deviation OK	Min./Max. frequency limit not exceeded
Frequency Deviation Overflow	Min./Max. frequency limit exceeded
Time Deviation OK	Min./Max. time limit not exceeded
Time Deviation Overflow	Min./Max. time limit exceeded

Table 24: FDM – Possible states

Parameter	Value
Analog Output	Open the dropdown menu and select the analog output from whose status information should be displayed.
Mode	The mode in which the previously selected analog output is located will be displayed.
Current DAC Value	Displays the current DAC value of the previously selected analog output.
Current Voltage	Displays the current voltage of the previously selected analog output.

Status information about the Serial Terminal

You can display the status of your FDM module in the FDM status menu. In addition, it is possible to display important status information of the analog outputs in the Serial Terminal.

Figure 88: FDM – Serial terminal

30. User Capture

30.1 User Capture Configuration

After selecting the menu, you reach the main page of the **User Capture Settings.**

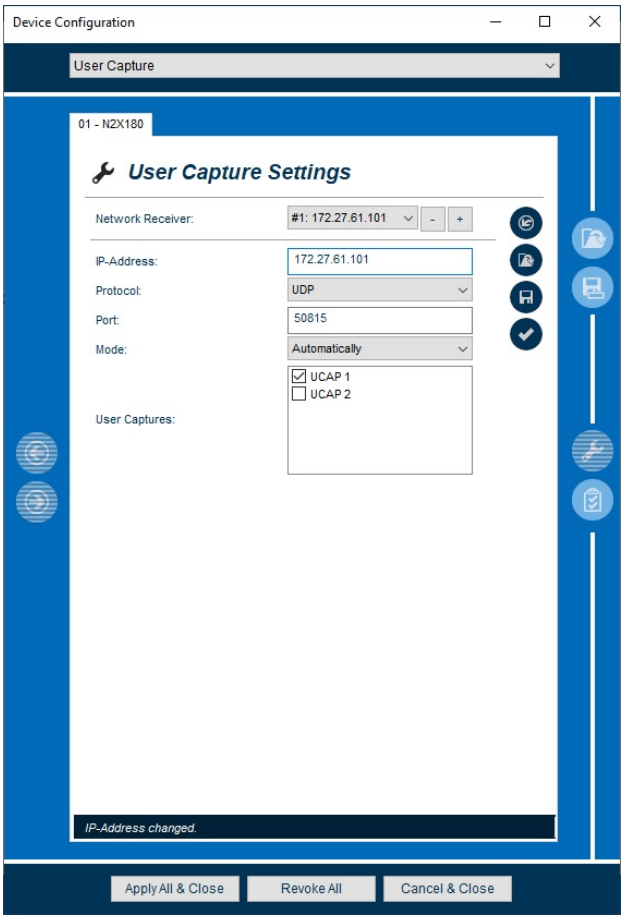


Figure 89: User Capture - Configuration

Description

This menu offers you the possibility to configure a network receiver. In that way, the events (captures) can also be read via network.

Individual configuration possibilities are described below:

Parameter	Value
Network Receiver Select the network receiver to be configured.	Open the drop-down menu and select the network receiver to be configured. By clicking on **+**, further network receivers can be added, and by clicking on **-** these can be removed. These can also be selected in the drop-down menu.
IP-Address The IP address of the events' receiver.	Enter a valid IPv4 address for the receiver

Parameter	Value
Protocol The network protocol to be used for the transmission of the events.	Open the drop-down menu and select an appropriate protocol.
Port The port of the receiver belonging to the network protocol.	Enter a valid port.
Mode The mode of sending events to the network receiver.	Click and open the drop-down menu, then select the appropriate mode.
User Captures You can select which port of the module/ assembly group should capture the incoming event with a timestamp.	Check the box to select the appropriate port.

30.2 User Capture Status

After selecting the menu, you reach the main page of the **User Capture Status.**

Description

This menu displays the status information of the recorded (captured) events.

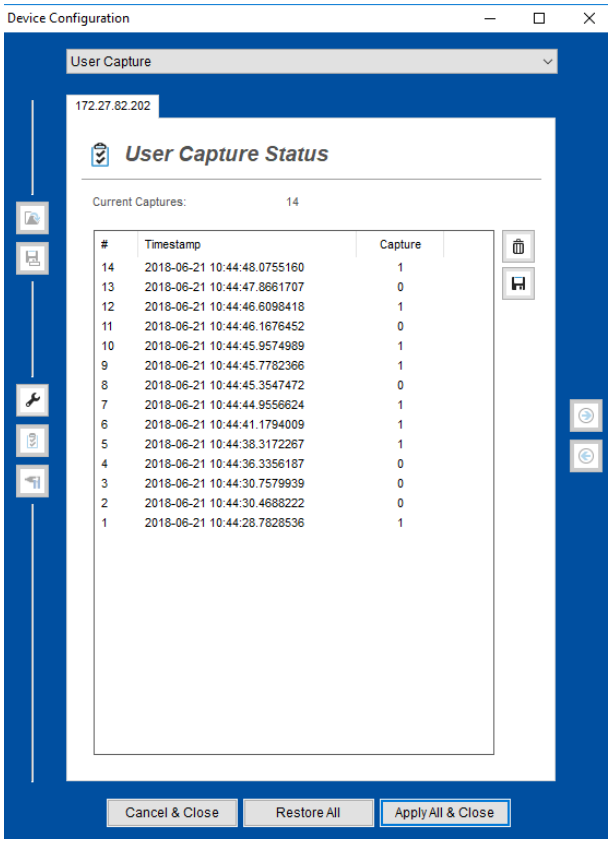


Figure 90: User Capture – Status monitoring

Individual options of status monitoring are described below:

Parameter	Value
#	Displays the consecutive number of the events.
Timestamp	Displays the moment of the event based on the timestamp.
Capture	Displays in which port the event was captured.

31. GPIO

31.1 GPIO configuration

After selecting the menu, you reach the main page of the **GPIO Settings.**

Figure 91: GPIO – Configuration (Video Out)

Description

You have the possibility to choose from various signals.

Video Out

You have the possibility to configure various SD and HD video signals.

Digital Audio Out

You have the possibility to select form various audio signals.

31.1.1 Video Out

Parameter	Value
Format Depending on the output, you have the option to choose from various video formats.	Open the drop-down menu and select the appropriate video format.
Epoch Start epoch of the video signals.	Open the drop-down menu and select the appropriate epoch.
Phase Offset (ns) The phase offset can be in 10ns steps. For example, a value of 22ns is rounded down to 20ns.	Open the drop-down menu, then select: for a positive offset **+** for a negative offset **-** Enter an appropriate offset.

31.1.2 Digital Audio Out

Parameter	Value
Type You have the possibility to choose between various audio formats.	Click and open the drop-down menu and select the appropriate audio format.

31.1.3 Studio Clock Out

Parameter	Value
Enabled You have the possibility to enable or disable the output signal.	Check the box to enable the output signal.
Base Frequency You can select a base frequency of the „**Word Clock Signals**“	Open the drop-down menu and select an appropriate base frequency
Scale To obtain the appropriate output frequency, select the factor with which the previously set base frequency is multiplied.	Open the drop-down menu and select an appropriate multiplier. **Example:**

Parameter	Value
Output	3
Status	Enabled
Base frequency	48 kHz
Factor	1/8
Output 48 kHz x 1/8 = **6kHz**	

31.2 GPIO Status

After selecting the menu, you reach the main page of the **GPIO Status.**

Description

You can get detailed information about the status of the previously saved GPIO settings.

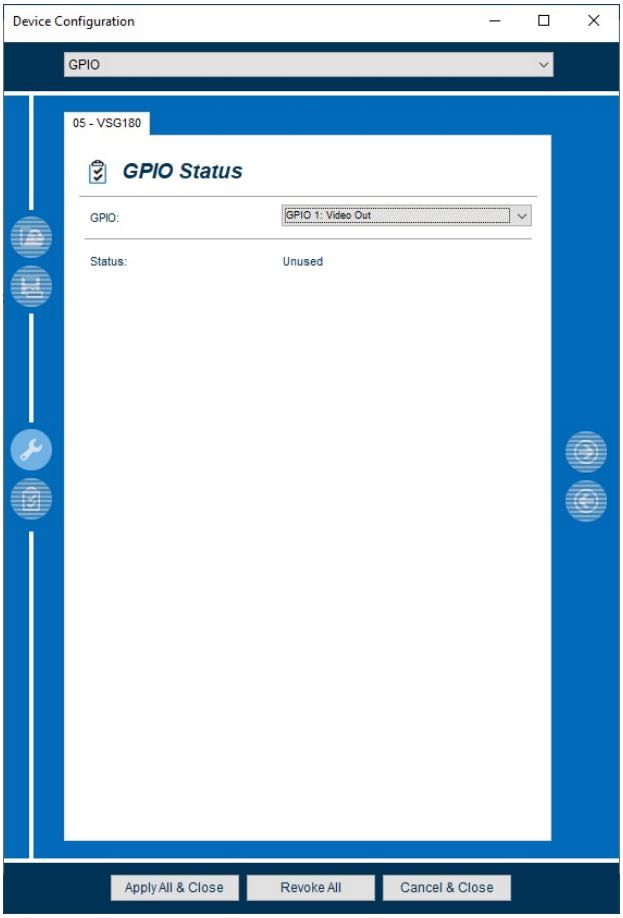


Figure 92: GPIO – Status monitoring

Individual options of status monitoring are described below.

Parameter	Value
GPIO	Open the drop-down menu and select the output signal whose status is to be displayed.
Status	Displays the status of the previously selected output signal. **Enabled** activated **Disabled** deactivated **Unused** not configured

32. Monitoring

32.1. Monitoring Configuration

After selecting the menu, you reach the main page of the **Monitoring Settings.**

Description

This menu allows you to make settings for the monitoring and alarming of the module/assembly. Depending on the module/assembly, there are various submenus for configuring the preferred type of monitoring.

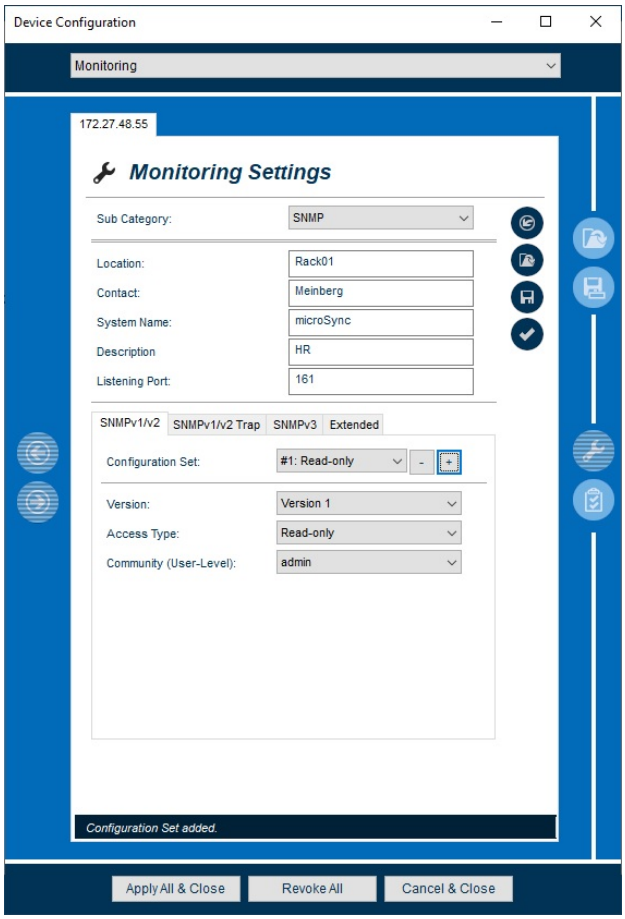


Figure 93: Monitoring – Configuration (SNMP)

You can choose between two different sub-categories.

32.1.1 Subcategory SNMP

The individual configuration options are explained in more detail below.

Parameter	Value
Location	Enter the location of your module/assembly here (e.g. server room)
Contact	Enter contact information for your module/assembly here (e.g. administrator)
System Name	Enter the system name of your module/assembly here (z.B. microSync^{HR})

Parameter	Value
Description	Enter a description for your module/assembly.
Listening Port	Enter a “**Listening Port**” for your module/assembly.

SNMP Modi

In the SNMP subcategory in the lower part of the menu, you can choose between three different SNMP modes. Basic information about each mode and configuration is explained below.

SNMPv1/v2

Settings for SNMP protocol version 1 and 2c, for active requesting of SNMP objects from another (monitoring) system.

SNMPv1/v2 Trap

Settings for SNMP protocol versions 1 and 2c, for sending alarms (traps) to another (monitoring) system, which can expect and process alarms.

SNMPv3

Settings for SNMP protocol version 3 for active requesting of SNMP objects from another (monitoring) system

Extended

Additional manual configuration options.

SNMPv1/v2

Description

This tab allows you to configure the network protocols SNMP v1 and SNMP v2.

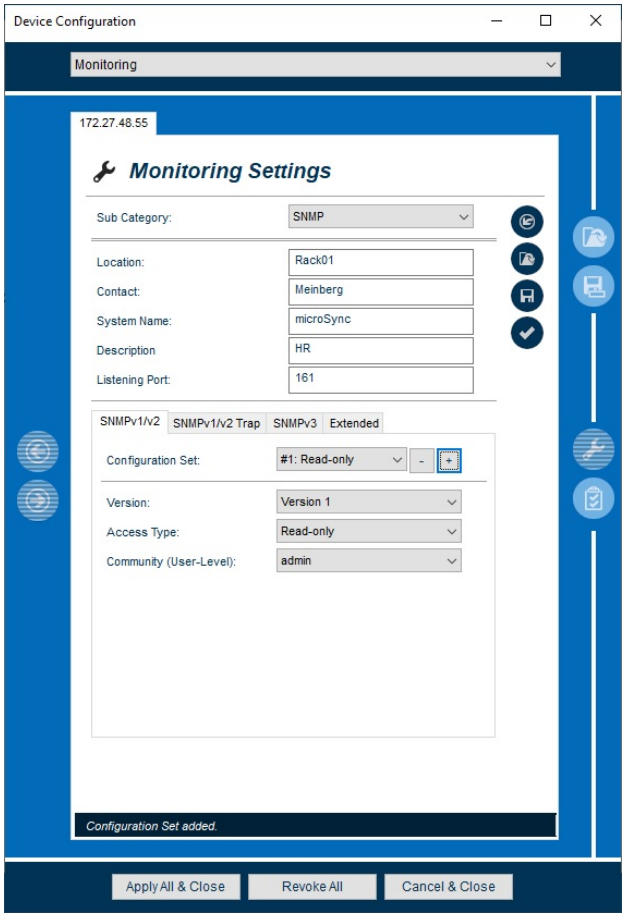


Figure 94: Monitoring - Configuration (SNMP v1/v2)

The individual configuration options are explained below.

Parameter	Value
Configuration Set You can select up to four "Configuration Sets".	Open the dropdown menu and select a Configuration Set. By clicking on **+** you can add further Configuration Sets or remove them by clicking on **-**. These can also be selected in the dropdown menu then.
Version Specifies the SNMP version. However, versions 1 and 2c offer almost no security mechanisms.	Open the dropdown menu and select the desired version.
Access Type By configuring this parameter, you define the access rights to your module/building block.	Open the dropdown menu and select: **Read-write:** Each monitoring device can read and write **Read Only:** Each monitoring device can only read.

Parameter	Value
Community (User Level)  A community is always bound to the configured rights of a user level, not a USER. Based on these rights, the remote (monitoring) system has access to certain SNMP objects.	Open the dropdown menu and select the User-Level whose rights you want to use for the trap receiver. ▪ admin ▪ info ▪ status

SNMPv1/v2 Trap

Description

This tab allows you to configure the network protocols SNMP v1 Trap and SNMP v2 Trap.

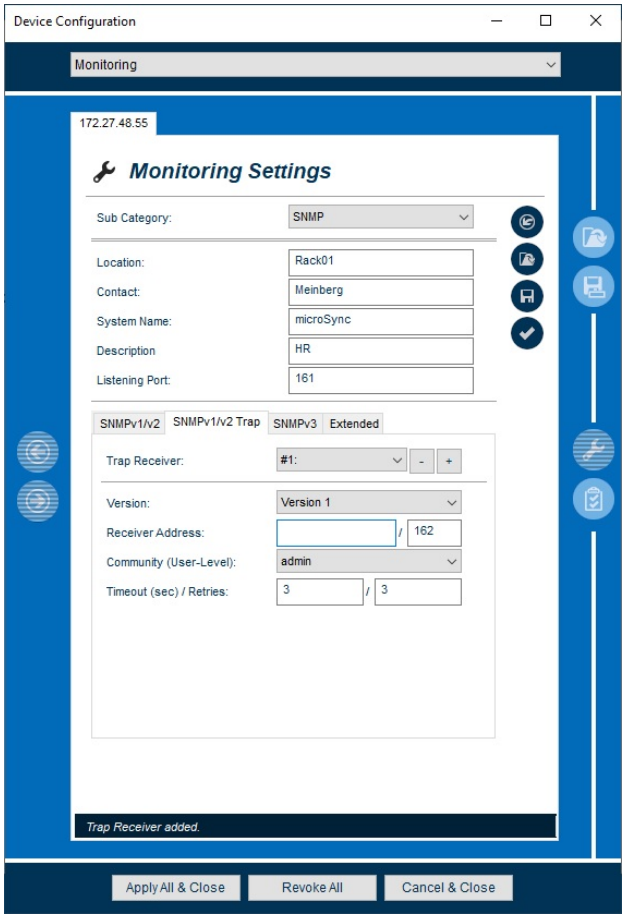


Figure 95: Monitoring - Configuration (SNMP v1/v2 Trap)

The individual configuration options are explained below.

Parameter	Value
Trap Receiver You can select up to four "Trap Receivers".	Open the drop-down menu and select a Trap Receiver. Click **+** to add more Trap Receivers or click **-** to remove them. These can then also be selected from the drop-down menu.
Version Displays the SNMP version. The community in version 1/2c is ALWAYS sent unencrypted and offers almost no security mechanisms. Therefore, it can be very easy for unauthorized persons to get SNMP access.	Open the dropdown menu and select the version you want to use.

Parameter	Wert
Receiver Address To specify which (monitoring) system the trap should be sent to, the Receiver Address or Hostname of the system must be entered in the field. The destination port of the (monitoring) system must be entered after the slash.	The field is initially grayed out. 1. Activate the field by clicking on **+**. 2. Enter a Receiver Address (IPv4, IPv6) e.g.: 172.79.51.102 / 45
Community (User Level) A community is always bound to the configured rights of a user level, **not a User**. Based on these rights, the remote (monitoring) system has access to certain SNMP objects.	Open the dropdown menu and select the user level whose rights you want to use for the trap receiver. ▪ admin ▪ info ▪ status
Timeout (sec) / Retries **Timeout:** Number of seconds to wait after a failed transmission until another attempt is made to send the trap. **Retries:** Number of maximum repetitions. The factor Timeout times Retries is the maximum waiting time.	Enter the timeout as well as the "Retries" into the fields.

SNMPv3

Description

This tab allows you to configure the SNMP v3 network protocol. Security features such as username and password, as well as data transmission encryption, increase security enormously.

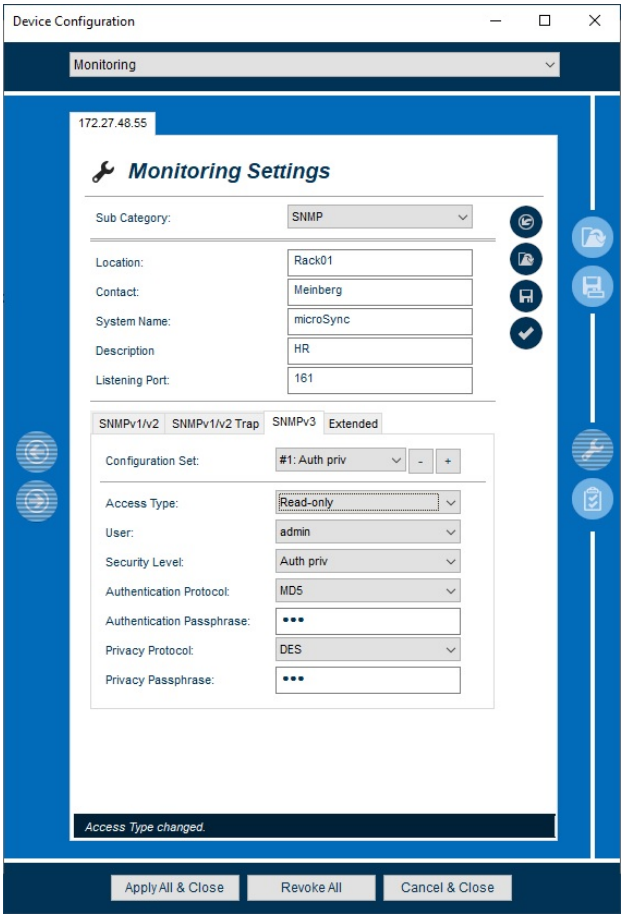


Figure 96: Monitoring - Configuration (SNMP v3)

The individual configuration options are explained below.

Parameter	Value
Configuration Set You have the possibility to select up to four "Configuration Sets.	Open the drop-down menu and select a **Configuration Set**. Click on **+** to add more Configuration Sets or click on on **-** remove. These can then also be selected in the dropdown menu.
Access Type By configuration of this parameter you determine the access rights to your module/assembly.	Open the dropdown menu and choose: **Read-write:** Each monitoring device can read and write. **Read Only:** Each monitoring device can read only.

Parameter	Value
User With SNMPv3, the rights are bound to an actual user on the system (see User Management). Not bound to a user level like SNMPv1/2c.	Open the drop-down menu and select: ▪ admin ▪ info ▪ status
Security level **No Auth no Priv (Insecure):** There is only an authorization based on the user, who in turn is in plain text in the package. **Auth no priv (Secure):** Authorization of the user by name and password. More secure, e.g. because the password is hashed, but the package is still sent in plain text. **Auth priv:** Like "Auth no priv", but the packet content is encrypted by an additional password using symmetric encryption. The target system must also know the key used.	Open the drop-down menu and select: ▪ No Auth no priv ▪ Auth no priv ▪ Auth priv
Authentication Protocol Hash function for the "Authentication Passphrase" for the security levels "Auth no priv" and "Auth priv".	Open the drop-down menu and select the desired authentication protocol
Authentication Passphrase User password for authentication	Enter a password for authentication.
Privacy Protocol Encryption method for "Privacy Passphrase" for the security level "Auth priv".	Open the drop-down menu and select the desired privacy protocol.
Privacy Passphrase Password to encrypt the package.	Enter a password for the privacy protocol.

Extended

Description

Manual, additional configuration of the SNMP daemon, which will be attached to the default configuration.

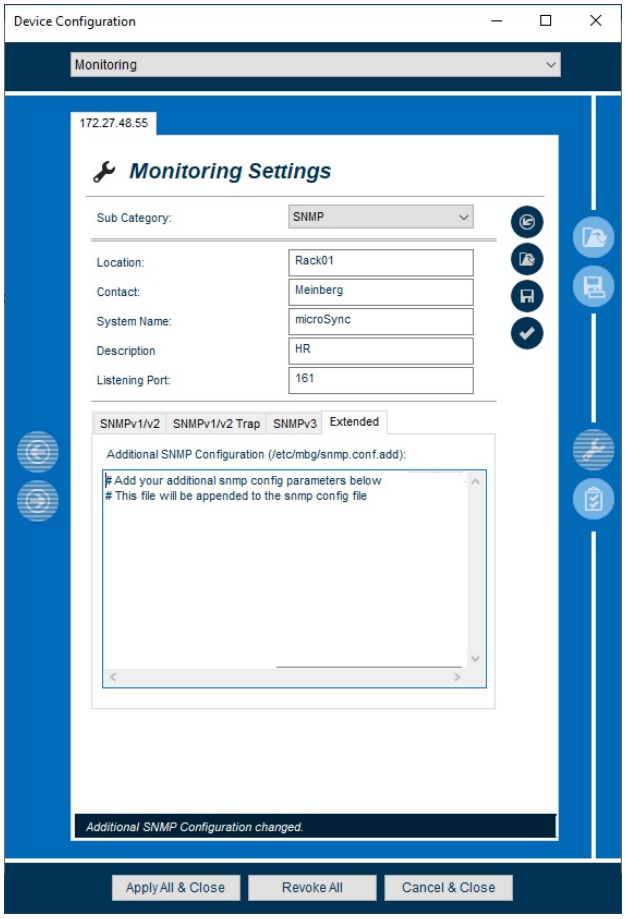


Figure 97: Monitoring - Configuration (Extended)

The individual configuration options are explained below.

Parameter	Value
Input field Input field for manual, additional configuration of the SNMP daemon.	See SNMPD manpage

32.1.2 Subcategory Syslog

Description

This category allows you to configure external Syslog servers. In this way you can collect the syslog messages of your Meinberg systems on a central server.

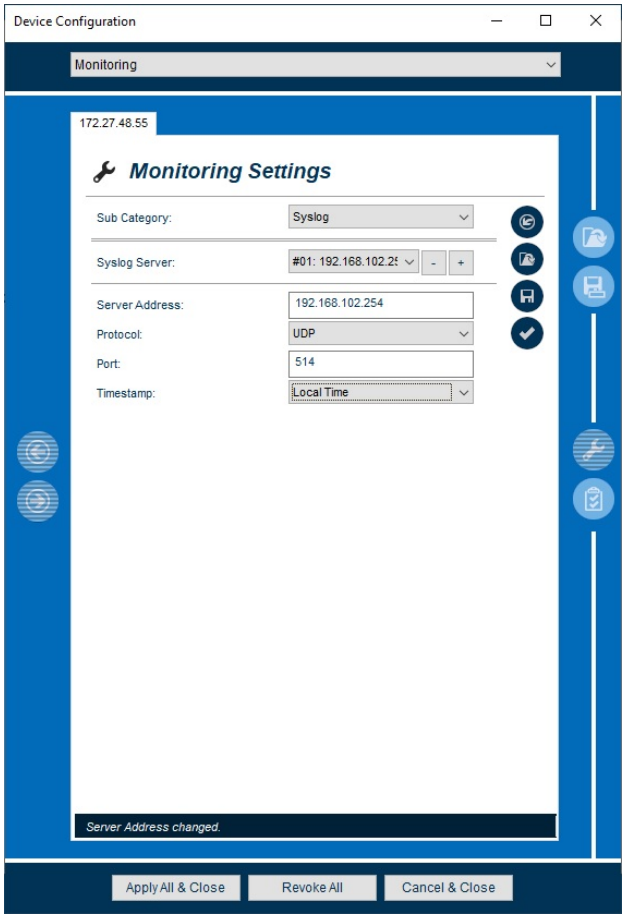


Figure 98: Monitoring - Configuration (Syslog)

The individual configuration options are explained below.

Parameter	Value
Syslog Server Configure up to four syslog servers.	Open the drop-down menu and select a **Syslog server**. Click **+** to add more Syslog servers or click **-** to remove them. These are then also selectable in the dropdown menu.
Server Address The address for your previously selected Syslog server.	Enter a valid IPv4, IPv6 address or a host name if a DNS server has been configured.
Protocol/Transport-Protocol **UDP** – connectionless transfer **TCP** - connection-oriented	Open the drop-down menu and select a **protocol**.

Parameter	Value
Port Configuration of the network port to be used. By default, IANA has registered port 514 for syslog messages.	Enter a valid port.
Timestamp **Local Time** The device that sends the syslog message uses its local timestamp.	Open the dropdown menu and select the desired timestamp: **Local Time**

32.1.3 Subcategory Events

Description

In the Events category, you can activate or deactivate the triggers to be used for all events supported by the device. This allows you to individually control which events you want to be informed for example via SNMP.

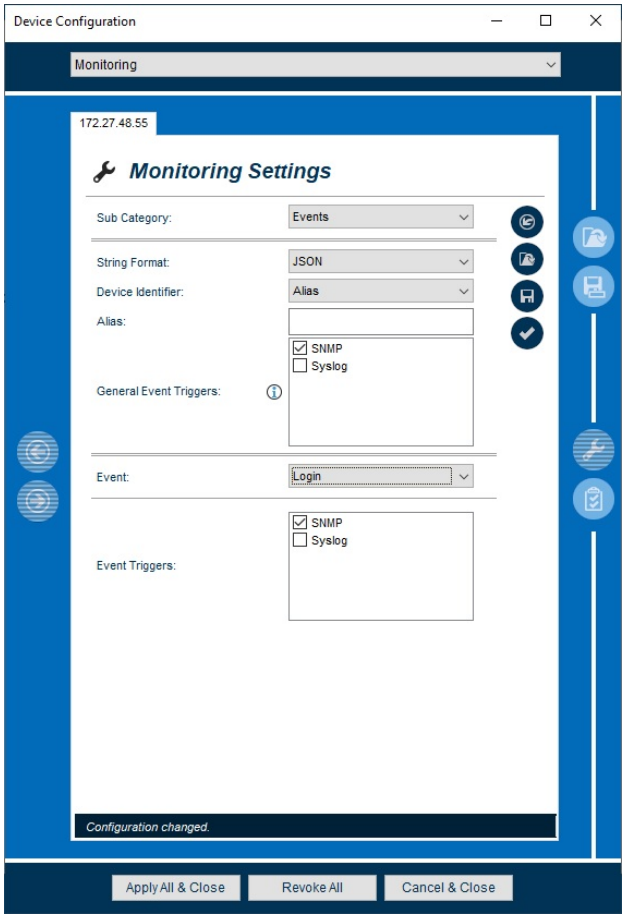


Figure 99: Monitoring - Configuration (Events)

The individual configuration options are explained below.

Parameter	Value
String Format The transfer format JSON (JavaScript Object Notation) with which the event is transferred.	Open the dropdown menu and select the string format you want.
Device Identifier When sending an event, a UID (User ID) is sent. You can choose to use either the serial number of the system or an alias as the UID.	Open the dropdown menu and select a device identifier.
Alias You have the possibility to enter a free text or alias (e.g. "DE-HH-MARIA7") which will be sent with the event.	Enter a user-defined text or alias. This can have a maximum length of 16 characters.
General Event Triggers You can select simultaneously for all events which channel (e.g. SNMP, Syslog) they should be sent on when they are triggered.	Select a channel.

Parameter	Value
Event Depending on the module/assembly you can choose between different event types.	Open the dropdown menu and select the event you want to record.
Event Interval (sec) Some events are not triggered by the incoming of an event but can be sent periodically. For example, a heartbeat event is triggered periodically and not by a specific event.	Enter an interval in seconds.
Event Triggers For each event, you can individually define which channel (e.g. SNMP, Syslog) it should be sent via when it is triggered.	Click on the checkbox to select the channel you want to use.

Description of the event types

It is important for all events to know which system/module in which slot the event has been triggered in order to ensure clear event assignment. This information can be found in the event at "device".

Event	Translation
Login Sent at login by user. ▪ Username ▪ Numerical value ▪ Translation of the numerical value	0 = „login failed “ 1 = „login success “
Configuration Sent when changing the meinbergOS Deamon configuration. ▪ Numerical value ▪ Translation of the numerical value	0 = changed
Heartbeat The system reports periodically whether it is still active.	no data

Event	Translation
Master reference changed Sent when changing a reference source with which the system has primarily synchronized.	no data
Reboot Once only when rebooting the system.	no data
Memory Sent when the free working memory (RAM) cannot be read or exceeds or falls below a certain warning level.	0 = "Free RAM >/= 10%" 2 = "Free RAM < 10% 3 = "Failed to read data" 4 = "Free RAM < 5%"
CPU load Sent when the CPU load cannot be defined or exceeds or falls below a certain warning level. ▪ Numerical value ▪ Translation of the numerical value	0 = "Average CPU utilization < 80%" 2 = "Average CPU utilization >= 80%" 3 = "Failed to read data" 4 = "Average CPU utilization >= 90%"
Temperature Transmitted when the average value of the temperature sensors installed in the system cannot be determined or when it exceeds or falls below a certain warning level. ▪ Numerical value ▪ Translation of the numerical value	0 = "Temperature < 55-degree Celsius" 2 = "Temperature >= 55-degree Celsius" 3 = "Failed to read data" 4 = "Temperature >= 65-degree Celsius"
Power Supply State Sent when the status of one in the system installed power supply changes. ▪ Description of the Power Supply (Power Supply Name) ▪ Numerical value ▪ Translation of the numerical value	0 = "Power supply ok" 1 = "Power supply not connected" 3 = "Power supply failure" 4 = "Power supply detection error"
NTP Status Sent when NTP status changes. ▪ Numerical value ▪ Translation of the numerical value	0 = "NTP service initializing “ 1 = "NTP service synchronized" 2 = "NTP service not synchronized" 3 = "NTP service stopped"

Event	Translation
PTP state (Instc. 1) Sent when the status of a running PTP instance changes. ▪ Numerical value ▪ Translation of the numerical value Textual description of the instance (instance name)	2 = "Unconfigured" 1 = "Stopped" 0 = "Uninitialized" 1 = "Initializing" 2 = "Faulty" 3 = "Disabled" 4 = "Listening" 5 = "Pre-Master" 6 = "Master" 7 = "Passive" 8 = "Uncalibrated" 9 = "Slave"
PTP State (Instc. 2) Sent when the status of a running PTP instance changes. ▪ Numeric value ▪ Translation of the numerical value Textual description of the instance (instance name)	**see PTP state (Instc. 1)**
Network link (lan0) Sent when the link status of the network interface (lan0) changes. ▪ Textual description of the instance (instance name) ▪ Numeric Index of the interfaces ▪ Numeric value ▪ Translation of the numerical value	0 = "down" 1 = "up"
Network link (lan1) Sent when the link status of the network interface (lan1) changes. ▪ Textual description of the instance (instance name) ▪ Numeric Index of the interfaces ▪ Numeric value ▪ Translation of the numerical value	0 = "down" 1 = "up"

Event	Translation
Receiver State Sent when the status of the receiver module changes. ▪ Numerical value ▪ Translation of the numerical value	0 = "No data" 1 = "Waiting for data..." 2 = "Antenna short circuit" 3 = "Antenna disconnected" 4 = "Cold boot" 5 = "Warm boot" 6 = "Synchronized"
Leap Second Sent when the status of a leap second announcement changes. I.e. a leap second is announced or cancelled after (successful) execution. ▪ Numerical value ▪ Translation of the numerical value	0 = "No data" 1 = "Not Announced" 2 = "Announced"
Watchdog Sent after the watchdog had to restart the Deamon (e.g. after a crash). ▪ Numeric numeric value with the absolute number of previous restarts. ▪ **Text:** „Deamon has been restarted by watchdog”	no data

32.2 Monitoring Status

After selecting the menu, you reach the main page of the **Monitoring Status.**

Description

This menu contains all important status messages for each event.

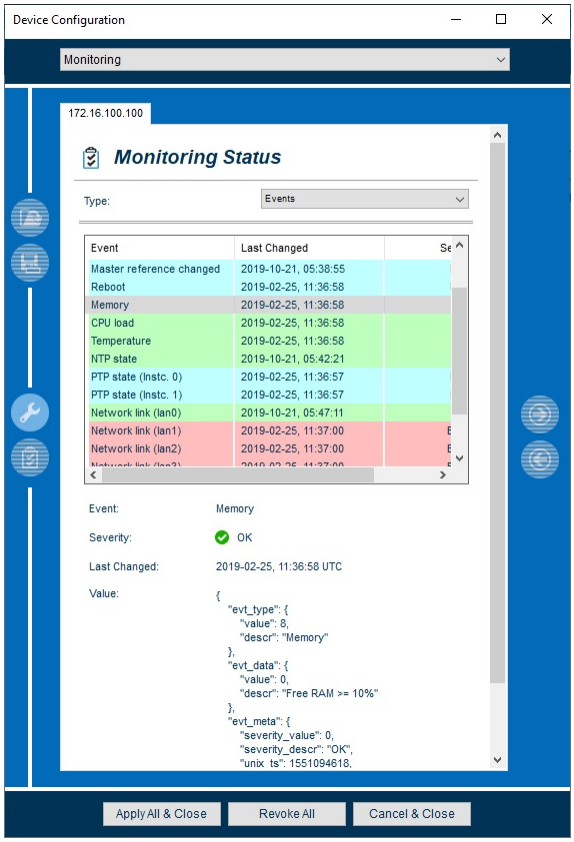


Figure 100: Monitoring – Status monitoring

The individual options of status monitoring are explained below.

Parameter	Value
Event	Displays the type of the currently selected event.
Severity	Displays the "severity" of the current status, e.g. Warning, Info, Critical, etc.
Last Changed	Indicates when the event occurred last.
Value	Displays the value of the currently selected event.
Extended (JSON) Value	Click on the arrow to display the transmitted data in JSON format.

33. Services

33.1 Services configuration

After selecting the menu, you reach the main page of the **Services Settings.**

Description

This menu offers you the possibility to start, stop and restart manually services such as NTP or SNMP.

> Except for testing, Meinberg advises not to control a service manually, in order not to affect the integrity of the device.

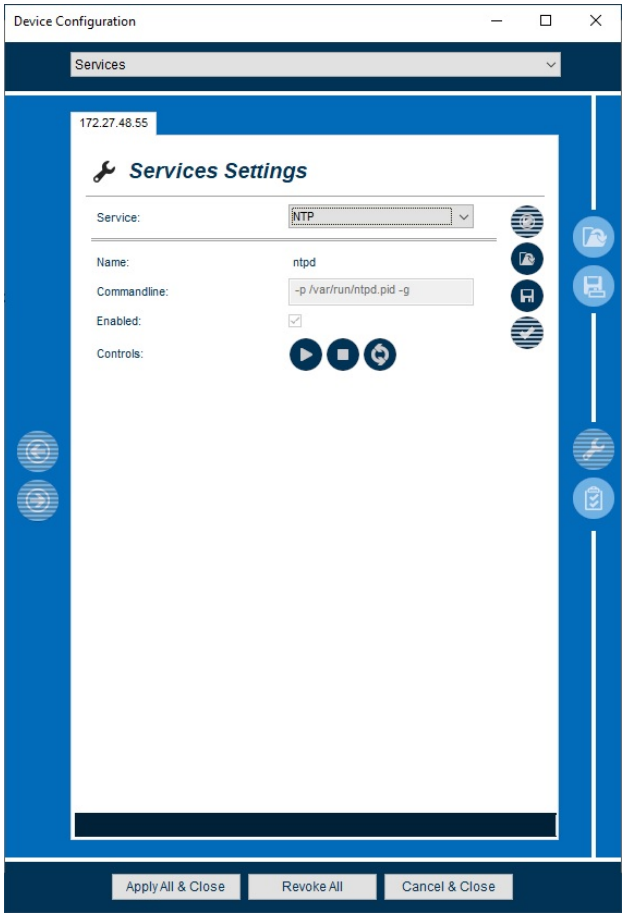


Figure 101: Services – Configuration (NTP)

Individual configuration options re explained below.

Parameter	Value
Name	Type of the previously selected service
Commandline	This is sent to the service while starting up.
Enabled	Check the box to enable the service or uncheck it to disable the service.
Controls	Click on: To start the service To stop the service To restart the service

33.2 Services Status

After selecting the menu, you reach the main page of the **Services Status.**

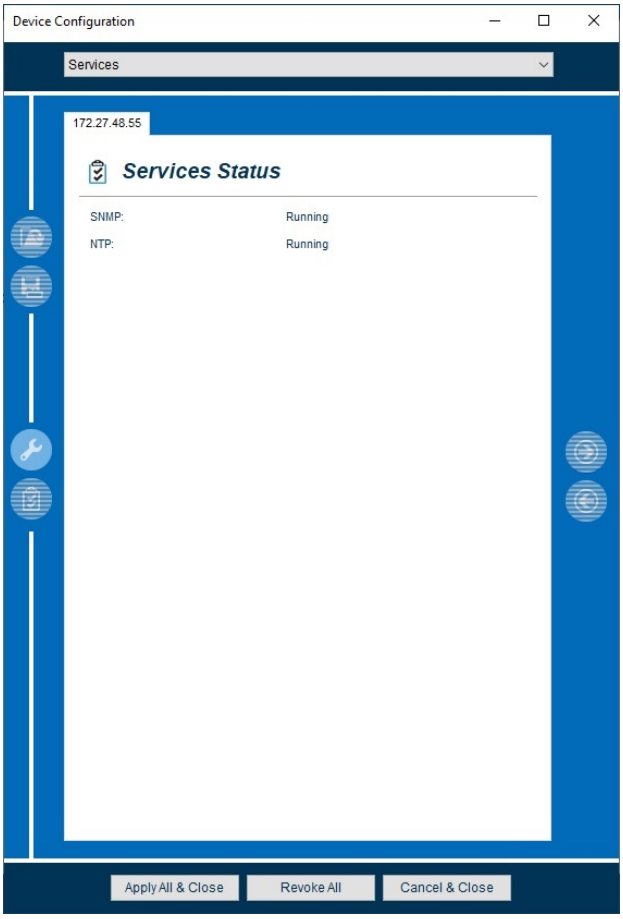


Figure 102: Services – Status monitoring

Description

This menu offers you the possibility to get important information about the status messages of the services.

Individual options of the Status Monitoring are explained below:

Parameter	Value
NTP	Displays the current status of the NTP service. **Running:** The NTP service is active. **Stopped:** The NTP service is not active.
SNMP	Displays the current status of the SNMP service. **Running:** The SNMP service is active. **Stopped:** Der SNMP-Service is not active

34. Users

34.1 Users configuration

After selecting the menu, you reach the main page of the **Users Settings.**

Description

This menu offers you the possibility to customize the user configuration of your module/ assembly group.

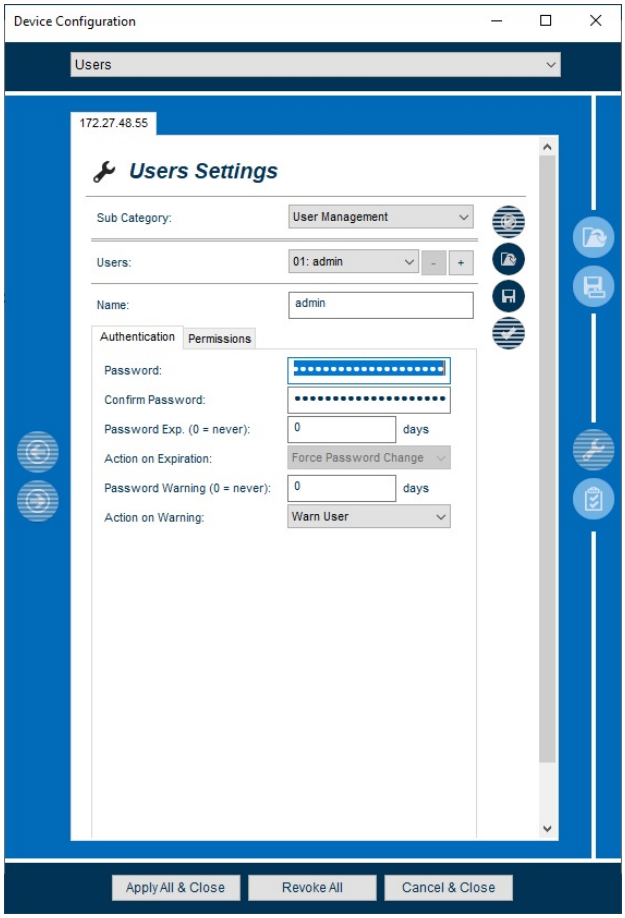


Figure 103: Users - Configuration

Subcategories

User Management

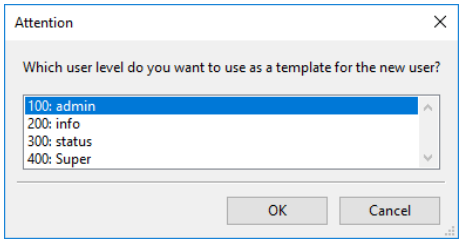
Allows to generate, edit and delete users and their rights of the selected module/ assembly group.

User Level Management

User levels are used as templates for new users. For each user level, you can configure the scope of user rights (Read, Write, Status, All) for the individual menus.

34.1.1 User Management

Parameter	Value
Users	Open the drop-down menu and select a user. Click on + to add further user levels which can be then customized. Click on - to delete them. The user level is only used as a template for the user's initial rights. The rights can be adjusted individually for each user.
Name	Enter an individual name for the user (e.g. admin)



Authentication

You have the possibility to configure various authentication parameters.

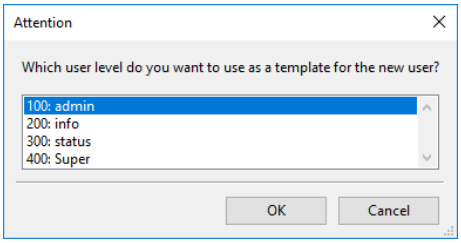
Parameter	Value
Password	Enter an individual password for the user.
Confirm Password	Confirm the previously assigned password with a new entry.
Password Exp. (0 = never)	Enter a time (in days) after the expiry of which the password you have given will be invalid.
Action on Expiration	Open the drop-down menu and select an action which has to be carried out after the expiration of the previously set time.
Password Warning (0= never)	Enter a time (in days) after the expiry of which a warning for the still valid password is given.
Action on Warning	Open the drop-down menu and select an action to warn you before the password expires.

Permission

This submenu offers you the possibility to assign various rights for righting, reading and status monitoring of the available feature menus.

Parameter	Value
Allow Multiple Sessions	Select the checkbox to allow a user to have multiple sessions running in parallel on the system.
Channels	Select the network channels which have to be used.
Permissions You can assign several user rights to the available feature menus of a module/ assembly group.	Check the corresponding box to activate the user rights or uncheck the box to deactivate them. **Write** Write rights for the configuration **Read** Read rights for the configuration **Status** Read rights for the current status

34.1.2 User-Level Management

Parameter	Value
User Levels 	Open the drop-down menu and select a user level. Click on + to add further user levels which can be then customized. Click on - to delete them.
Name	Enter an individual name for the user level
Level-ID	Assign a level ID for the new user level.
Channels	Select the network channels which have to be used.

34.2 Users Status

After selecting the menu, you reach the main page of the **Users Status.**

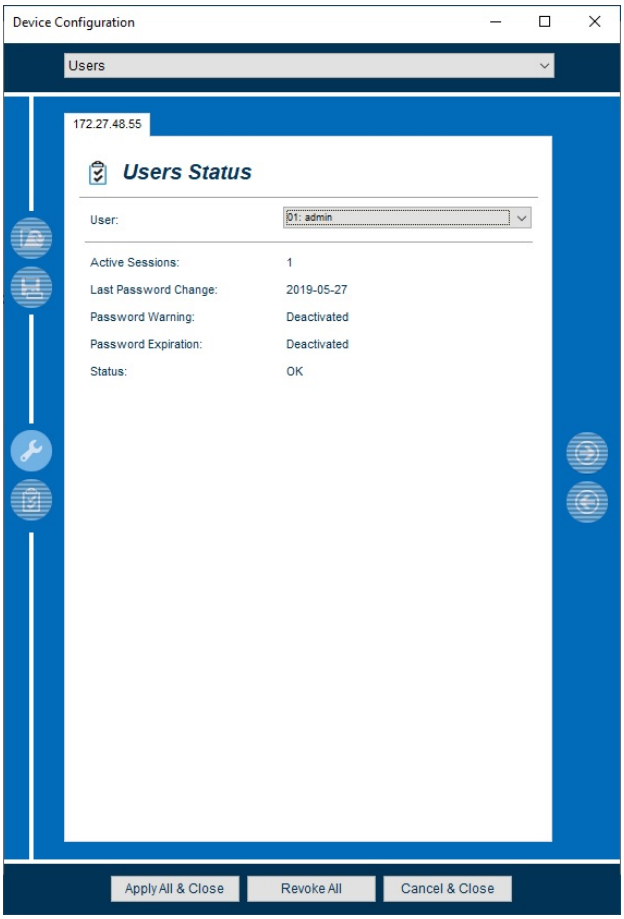


Figure 104: Users – Status

Parameter	Value
User	Open the drop-down menu and select a user to view information about its status
Active Sessions	Displays the currently active sessions of the previously selected user.
Last Password Change	Displays the time of the last password change.
Password Warning	Displays the status of the previously configured password warning. **Activated:** Password warning is activated **Deactivated:** Password warning is deactivated

Parameter	Value
Password Expiration	Displays the previously established expiry date of the password.
Status	Displays the current status of the user account: **Ok** The user account is currently active and may be used. **Disabled (Password Expiration)** The user account was temporarily disabled due to an expired password. **Disabled (x failed logins)** The user account was disabled due to x consecutive failed login attempts.

35. Firmware

35.1 Firmware configuration

After selecting the menu, you reach the main page of the **Firmware** menu.

Description

This menu offers you the possibility to update the firmware via the network connection of the selected MeinbergOS module/ assembly group. In addition, you can obtain information about the current installed firmware.

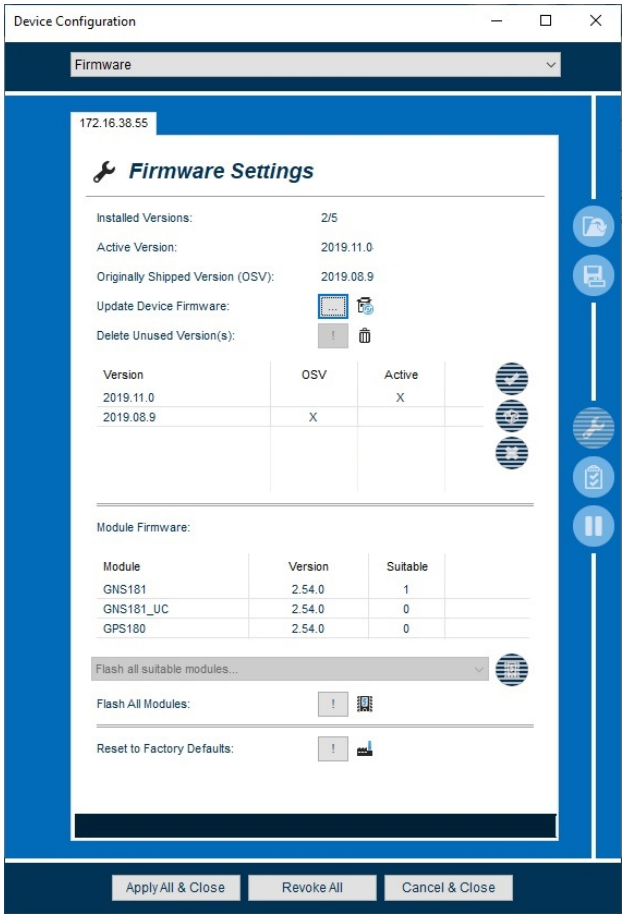


Figure 105: Firmware - Configuration

Parameter	Value
Installed Versions	The number of the installed firmware versions.
Active Version	The currently activated firmware version on the module/ assembly group.
Original Shipped Version (OSV)	The firmware version installed at the time of the module's/ assembly group's shipment.
Update Device Firmware	Click on the button and upload the appropriate file (UFU-Datei).
Delete unused Firmware	Click on the button to delete all unused firmware versions which are e.g. not OSV or currently inactive.

Parameter	Value
Version	Lists the currently installed firmware versions.

Set the selected firmware version to active by clicking on the button,
After clicking on the button, the system will be restarted.

Delete the selected firmware version by clicking on the button.

Module Firmware

The firmware UFU file also contains flash files for recipients. In addition to the firmware update of the microSync, the firmware of the receiver can also be flashed.

By selecting an already uploaded UFU file, the flash files of the recipient modules, as well as their version, are listed.

1. First, click on the module you want to receive an update. If the module is part of your microSync assembly, the adjacent icon becomes active.
2. In the drop-down menu, select the installed receiver.
3. Click the button to flash the recipient with the update file.

Flash All Modules	Simultaneous flashing of all modules
Reset to Factory Defaults	All configurations are reset to factory settings and installed firmware versions are deleted.

36. Event Log

After selecting the menu, you reach the main page of the **Event Log.**

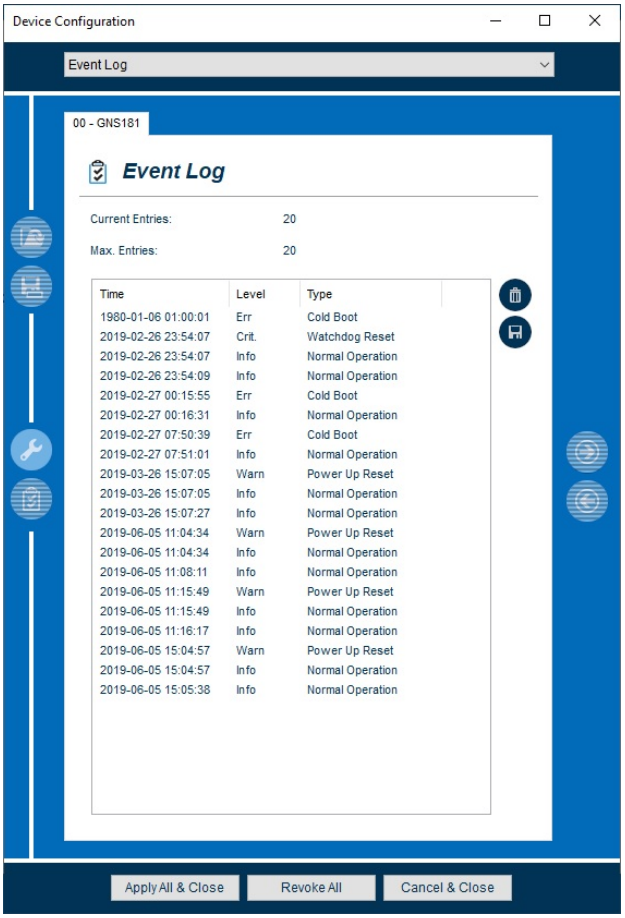


Figure 106: Event Log

Description

This menu offers you the possibility to log the events of the previously selected module/ assembly group and to record every modification.

.

Short description of the basic functions

Symbol	Button	Function
	Clear Event Log	All displayed Event Logs will be deleted.
	Save Event Log	Event Logs can be saved as a text file.

Table 25: Event Log – Basic functions

Parameter	Value
Current Entries	The number of the currently displayed event entries
Max. Entries	The maximal number of the event entries

The Event Log

Column	Description
Time	Displays the time and date (of the receiver) when the event was triggered.
Level	Displays the level of the events **Info** Informative Event, e.g. Antenna ok. **Crit** Critical Event e.g. Antenna disconnect **Error** Error Event e.g. Warm Boot **Warn** Warn Event e.g. Power up reset
Type	Displays the name/ the type of the triggered event.

Table 26: Event Log - Events

37. Sensors

After selecting the menu, you reach the main page of the **Sensors status.**

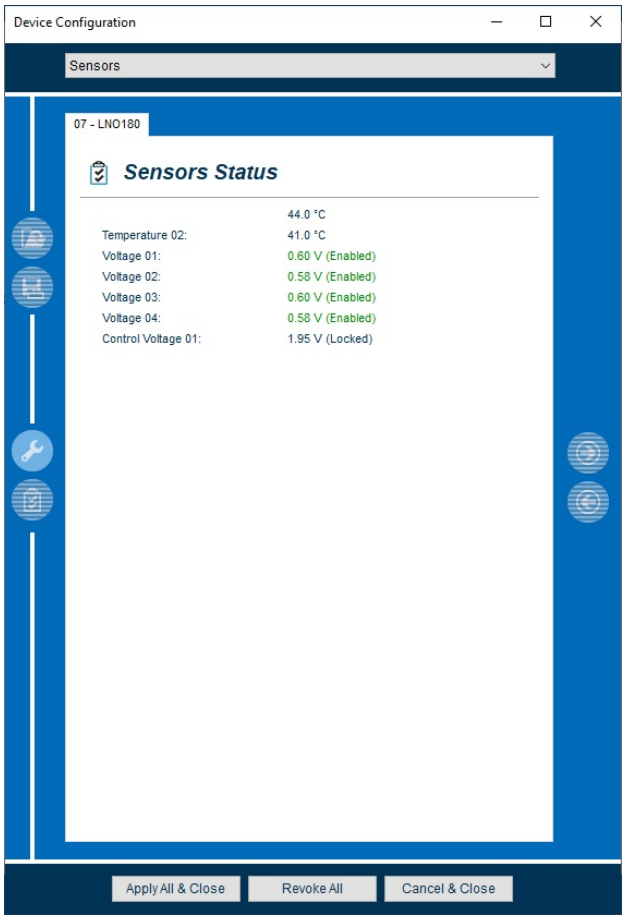


Figure 107: Sensors

Description

Due to the sensors incorporated in each module (fig. 89 shows a LNO180), you have an overview of various parameters, such as the temperature and the output voltage.

Parameter	Value
Temperature 01	Displays the temperature measured at sensor 01.
Temperature 02	Displays the temperature measured at sensor 02.
Voltage 01	Displays the output voltage of the respective LNO port.
Control Voltage	Displays the PLL voltage for the frequency control.

38. GNSS Satellite Statistics

After selecting the menu, you reach the main page of the **GNSS Satellite Statistics**.

If the module/ assembly group supports the GNSS Satellite Statistics, detailed status information and statistics of the GNSS satellite systems GPS, GLONASS, Galileo and BeiDou will be displayed.

1. Click on the button to open the **GNSS Satellite Statistics** menu. Select from the drop-down menu the module/ assembly group you want.

2. Depending on the size of the data set to be evaluated, it can take a few seconds for the dialog to open.

If the following dialog window is displayed, then the module/ assembly group will not support the GNSS satellite statistics.

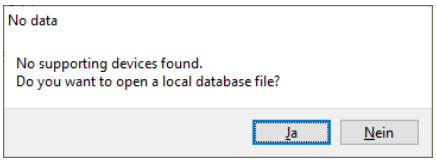


Figure 108: GNSS Satellite Statistics

Short description of the basic functions

The Status menu provides following basic functions:

No.	Symbol	Button	Function
1	---	Drop-down menu	Selecting the assembly group
2	---	Drop-down menu	Selecting the module
3		Reload Database	Updating the information about the satellites
4		Clear Database on Device	Deleting all recorded statistics
5		Export Database to local file	Saving the statistics as a mbgdb file
6		Apply Test Begin/Test End	Applying the configured test begin and test end
7		Enlarge Satellite Orbit Map	Enlarging the displayed data
8		Save Satellite Orbit Map	Saving the satellite data as a bmp file
9		Show/Hide Grit	Showing or hiding the grit pattern
10		Change Background Colour	Changing the background color
11		Switch to not locked satellites/switch to locked satellites	Displaying on the map the satellites used/ not used for synchronization.
12		Create Report (PDF)	Creating a report. This builds all the statistics which were recorded in the previously defined period.

Table 27: GNSS Statistic – Basic functions

38.1 Export and import of recorded data

38.1.1 Export

After testing the antenna location, for example, you can export the recorded statistical data set and save it as an mbgdb file.

After a reset of the satellites, further tests can be conducted at other locations.

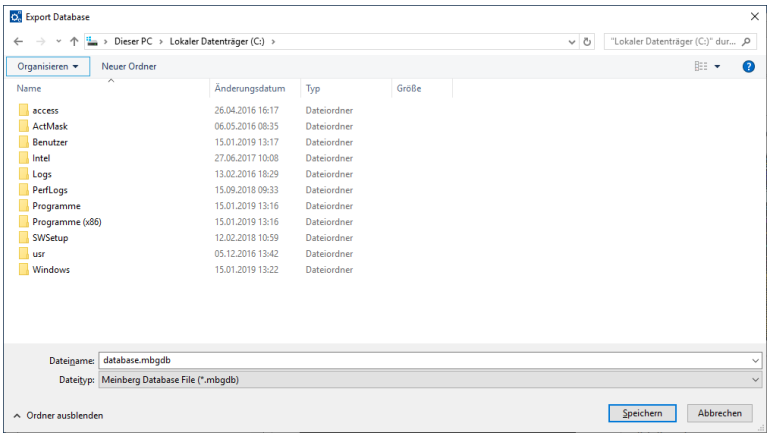


Figure 109: GNSS Satellite Statistic – Export

38.1.2 Import

Import a statistical data record to display it again graphically and evaluate it.

1. First select "Import local database..." from the dropdown menu.

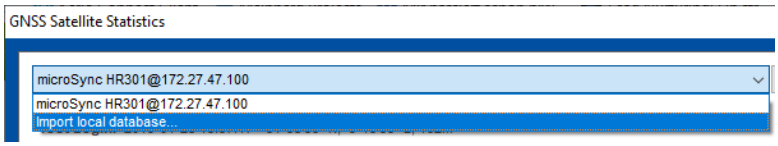


Figure 110: GNSS Satellite Statistic - Import

2. Select the record you want to import and click on **open**.

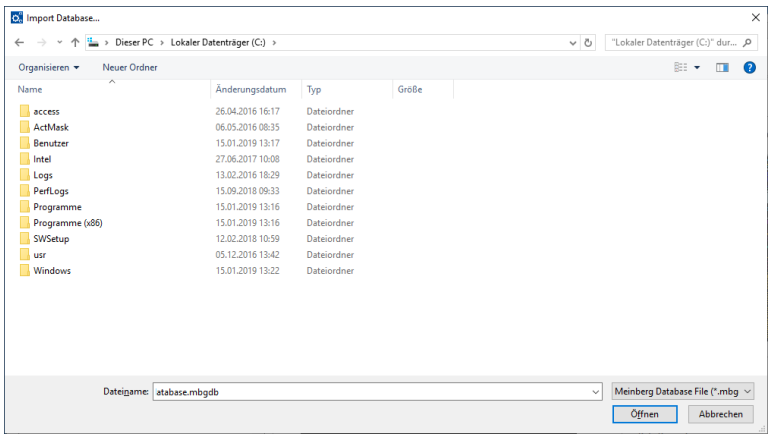


Figure 111: GNSS Satellite Statistic – Import file

38.2 **A** Test Begin/Test End

Use the two faders to define the period in which the statistics are to be evaluated.

Parameter	Value
Test Begin Here you have the option of specifying at what point the statistical data is to be evaluated.	By dragging the fader, you select the start time.
Test End Here you have the option of specifying up to which point the statistical data is to be evaluated.	By dragging the fader, you select the end time.

38.3 **B** Satellite systems

Parameter	Value
Satellite systems Here you can select the satellite systems from which statistics are to be recorded.	Click on the checkbox to select the satellite system you want to monitor.

38.4 **C** Logged Satellites

Parameter	Value
GNSS	Satellites of the previously selected satellite systems are listed here.
SVNO	Displays the index number (ID) of the satellite.
Last Status	Displays the last status of the satellite. **Locked** The satellite is used for synchronization **No Signal** The satellite is not available **Searching** The satellite is being searched **Unusable** The satellite is not usable for synchronization.
Last Locked	The time at which the receiver synchronized to the satellite for the last time.

38.5 **D** Locked SV History

This diagram creates a graphical representation of the number of satellites for the selected satellite systems over the previously selected time period.

From this diagram you can see the satellite systems (highlighted). You have the possibility to move the mouse pointer anywhere over the timeline to display detailed information.

38.6 **E** Satellite Orbit Map

To display detailed information on the individual satellites, move the mouse pointer over the points (satellites) displayed on the **Satellite Orbit Map**.

The required details will now be displayed on the right part of this status page.

38.7 **F** Carrier-to-noise-density ratio (C/NO)

In this section, the signal quality carrier-to-noise-density ratio (C/NO) of all available satellites is displayed as a bar graph. The height of the bars indicates the satellite's reception quality.

By dragging the fader, you can display the satellite data (C/NO) in the previously defined time period.

38.8 G Summary

Parameter	Value
Overall Log Duration	Displays the total time of the recorded satellite data.
Log Interval	Displays the interval at which the satellite data is recorded.
Last Status	Displays the summary of recorded datasets.
Overall SVs in View.	Displays the summary of visible satellites.
Overall Locked SVs.	Displays the summary of satellites used for synchronization.
Max. Locked SVs.	Displays the maximum number of satellites used for synchronization.
Min Locked SVs.	Displays the minimum number of satellites used for synchronization.
Antenna Position Score (APS)	Shows the total score, from the values of the respective satellite system.
Total Antenna Position Score (APS)	Shows the total score, from the values of all satellite systems.

39. Oszillator Calibration

The “**Oscillator Calibration”** button is to be found in the menu bar.

Some MEINBERG devices have an incorporated oscillator. This menu offers you the possibility to calibrate the oscillator by entering the DAC values manually.

The calibration of the DAC value is not available for modules which don’t have an own oscillator. The **DAC Cal** window is not active und it is not possible to enter any value.

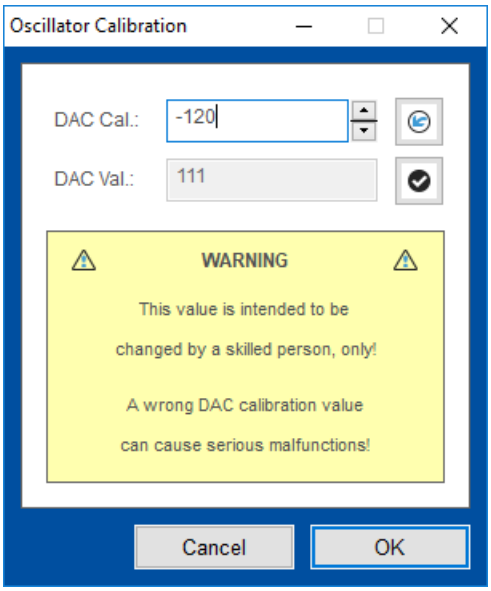


Figure 112: Oscillator Calibration

Please note that the DAC value should be configured only by trained personnel. A wrong calibration value can cause serious malfunction to the assembly group concerned.

Parameter	Value
DAC Cal.:	Enter the approximate DAC value.
DAC Val.:	The DAC value is preset and may **not** be configured

40. Firmware Update

The **Firmware Update** button is to be found in the menu bar.

You have the possibility to update the firmware of your module/assembly group via a serial port.

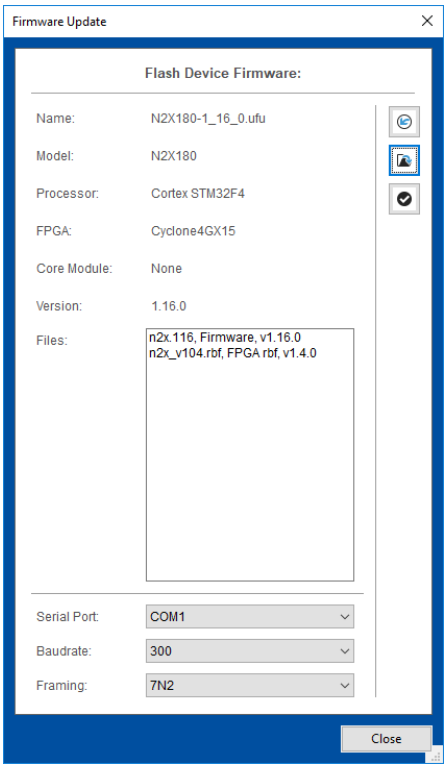


Figure 113: Firmware Update

40.1 Load Firmware File

The serial connection parameters must be configured before the module/assembly can be updated. This is explained in the lower part of this chapter.

1. To load the firmware -file click on the button.

Detailed information about the programmable logic devices used on your module as well as the loaded files are now displayed in the Files field.

2. Install the loaded files onto your module by clicking the button.

To erase the loaded firmware-file click the button.

Parameter	Value
Serial Port Select the serial COM port of your module to which you will connect the PC.	Open the drop-down menu and select the serial port to be connected.
COM x Baud Rate The baud rate is the data transmission rate of the serial time string.	Open the drop-down menu and select the requested baud rate
COM x Framing The framing is the format of the data to be transmitted.	Open the drop-down menu and select the requested framing.

41. Reboot Device

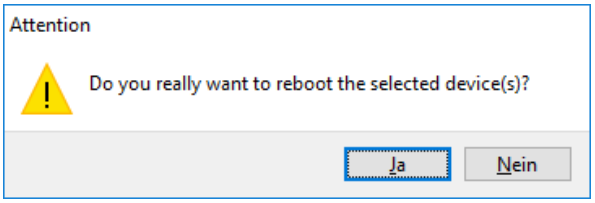
The **Reboot Device** button is to be found in the menu bar.

The selected module/ assembly group can be restarted manually. This can be necessary, for example, after updating a module, in order to apply the new settings correctly.

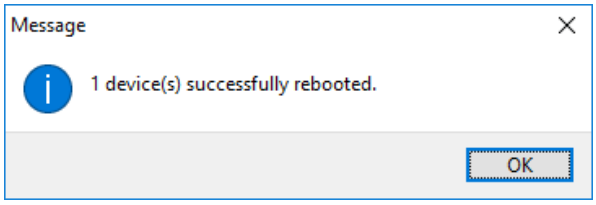
Rebooting the module/assembly group

1. To reboot the module/assembly group, click on the following button. The following window will open.

2. Confirm the reboot by clicking on ***"Yes"*** or click on ***"No"*** to reject the reboot of the device.



3. A successful reboot will be displayed in the following window:



42. User Preferences

The **User Preferences** button is to be found in the menu bar.

Description

You have possibility to configure the MEINBERG device manager according to your preferences.

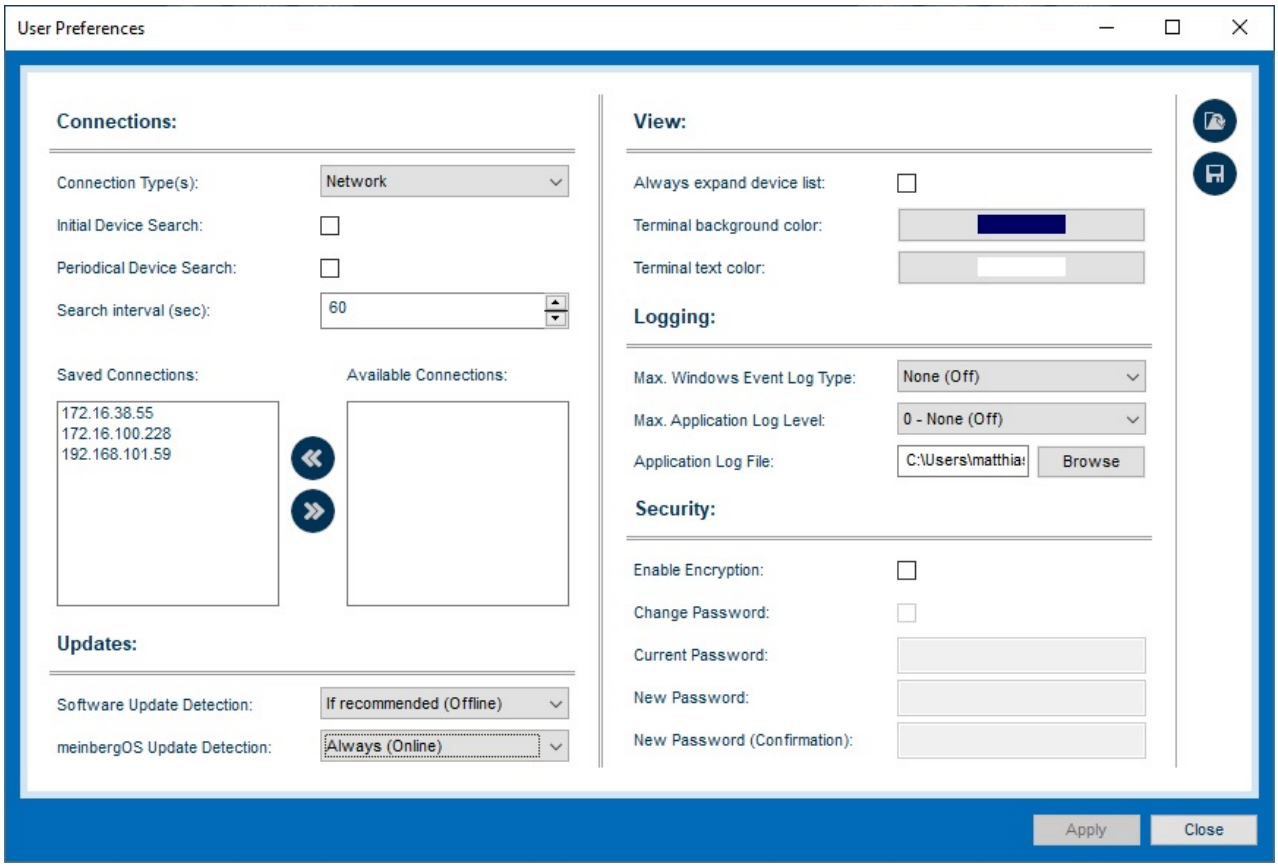


Figure 114: User Preferences

42.1 Import – Export Function

Use the Import function to import saved settings of a Device Manager to e.g. a newer version of the Device Manager or another System.

Save your custom settings in json file format.

This file is saved in the following memory location:
C:\Users***windows username***\AppData\Local\Meinberg\mbgdevman

Storage of user data:

Your custom configurations are retained as a file after you delete the Device Manager application. For security reasons, we recommend that you encrypt the file with a password or delete it if no longer needed.

42.2 Connections

Parameter	Value
Connection Type(s) The preferred type of connection for the Device Manager with the modules/ assembly groups.	Open the drop-down menu and select the preferred connection type.
Initial Device Search When the program is started, connected modules/assemblies are initially searched and displayed in the start screen.	Check the box to activate this function.
Periodically search devices The periodical search/ update of the connected module/assembly groups can be activated here.	Check the box to activate this function.
Search interval (sec) Enter the interval for the periodical search/update.	Enter the interval in seconds.
Saved connections The saved connections such as IP addresses and serial parameters of the modules and assembly groups are displayed in a list.	To delete the saved connections, click on the following button. 
Available connections The current connections such as IP addresses and serial parameters of the modules and assembly groups are displayed in a list.	To save the current connections, click on the following button. 

42.3 Updates

Parameter	Value
Software update detection Configure, when you should be notified about an update for the Meinberg Device Manager.	Open the drop-down menu and select one of the following options:

Option	Explanation
Never	Update detection is inactive
If recommended (offline, via the local network connection)	Your meinbergOS based system recommends installing Device Manager updates. This ensures that your device manager supports all features of the respective system.
Always (online)	Periodically check and report available updates via the Internet.

Meinberg OS update detection Configure when you should be notified about a firmware update for connected modules/assembly groups.	Open the drop-down menu and select one of the following options:

Option	Explanation
Never	Update detection is inactive
Always (online)	Periodically check and report available updates via the Internet.

42.4 View

Parameter	Value
Always expand device list If this function is activated, all modules of the assembly group will be displayed on the start page in a list.	**Terminal background colour** You have the possibility to change the background color of the terminal.
Check the box to activate this function.	Open the menu and select the preferred color and confirm your choice by clicking on ***OK***.
Terminal text colour You have the possibility to change the text color of the terminal.	Open the menu and select the preferred color and confirm your choice by clicking on ***OK***

42.5 Logging

Parameter	Value
Max. Windows Event Log Type Use this parameter to specify at which "Log Level" the logged events are to be written into the "Windows Event Log". For example, with "1 - Error" only “Error-Events” are written and with "0 - None (Off)" no event log is written.	Select the maximum log type: 0 (None/off) 1 (Error) 2 (Warning) 4 (Information)
Max. Application Log Level Use this parameter to specify at which "Log Level" the logged events are to be written into the "Application Log". At log level "5 - Trace" all messages are written, at "1 - Error" only “Error-events” and at "0 - None (Off)" no event log is written.	Select the maximum log type: 0 (None/off) 1 (Error) 2 (Warning) 3 (Information) 4 (Debug) 5 (Trace)
Log File Save the Log File as text file (txt).	Click „Browse„ and select a location to store the file.

42.6 Security

Encryption of user data

When starting Meinberg Device Manager version 4.0 for the first time, the dialog window opens.

If you select "Yes", your sensitive user data will be encrypted in the future.

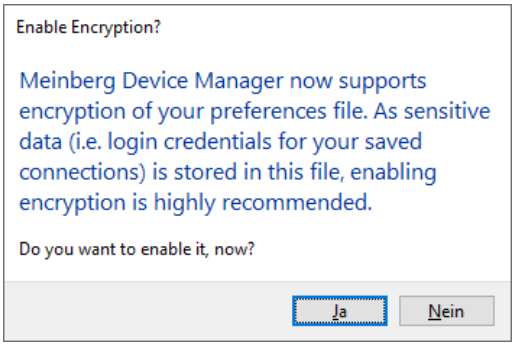


Figure 115: Encryption of user data

Parameter	Wert
Enable Encryption You have the possibility to encrypt your user settings, e.g. login data and saved connections.	Check the box to activate encryption.
Change Passwort	Activate the checkbox to change the current password.
Current Password	Enter the current password.
New Password	Enter a new password for the encryption of your user settings.
New Password (Confirmation)	Confirm the new password by entering it again and confirm the changes with a click on **Apply**.

43. Closing words

This user manual is intended to assist you in handling the Meinberg Device Manager in providing you with useful information for the configuration and status monitoring of your Meinberg module/ assembly group. You are a part in the continuous improvement of the information contained in this manual.

44. Meinberg Support Services

For suggestions and recommendations relevant to the manual, or if you have technical questions, please contact our technical support team.

Meinberg – Technical Support

Telefon: +49 (0) 5281 – 9309- 888

E-Mail: techsupport@meinberg.de