NTP time synchronization between GMSplus instruments

Document Revision

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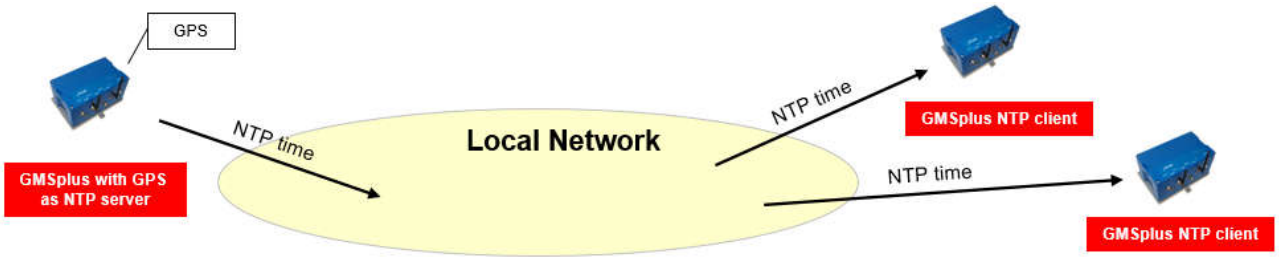
1. Introduction

This procedure describes how to setup a GMSplus as NTP server and the other instruments in the network as NTP clients for time synchronization.



The NTP protocol ensures that all instruments in the network are with common time. It is also recommended that the server itself is synchronized to GPS.

2. Setup GMSplus as NTP server

The unit acting as NTP server must have a fixed static IP address. The NTP server functionality has to be enabled in the Bootloader Menu of the GMSplus.

2.1. Set IP Address of the Instrument

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

- Switch on the instrument by press and hold the POWER button for 2 seconds.
- Press **<Ctr> +** '**Z**' as soon the following message appears on the console to enter the test mode.

```
GMSplus s/n 100582. Firmware in the Linux image: 21.07.00
################################################
###### Test and Initial Configuration Mode ######
################################################
Press Ctrl+Z to enter the test mode.....
```

The following menu will appear (see chapter 11 in the GMSplus_User_Manual for more details):

```
Press Ctrl+Z to enter the test mode.............
Instrument serial number: 100582
Instrument MAC address: 00:50:C2:77:42:93

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

- By default, no any passwords are set, so press '**U**' to enter the User Mode, and then '**N**' to enter the menu *Network setting*s.

```
==== Network Settings ====

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

- Select '***Y***' to change the settings and then select if the instrument should have a static or a dynamic IP by pressing '**1**' (Static) or '**0**' (dynamic). In case a dynamic IP is chosen, a DHCP server must be available in the network to provide the IP settings.
- In case a static IP is selected, an additional message will appear asking for the *Instrument IP address*, *Instrument network mask* and *Instrument gateway IP*. In case you don't know these parameters please ask your network administrator.

2.2. Enable NTP server functionality

- The next settings in the Bootloader Menu can be confirmed until the below appears:

```
Enable NTP server (1=YES, 0=Disable)? (0=0x0):
```

- Enable the NTP server by pressing '**1**'.
- The last setting for VPN can be confirmed
- Boot the instrument by pressing '**5**'.

2.3. Main menu configuration settings

```
Main menu:
C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trim values
T - File statistics
G - View RTC status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit
```

- Press '***C***' to edit configuration and '***C***' again to edit current configuration.

```
Main Menu
  A) Station description ..... Demo GMSplus
  B) Station code ..... DEMO
  C) Location description ..... Switzerland
  D) Seismic network code ..... CH
  E) Number of Channels ..... 3
  F) Number of Output Streams ..... 1
  G) Number of Trigger Sets ..... 1
  H) Number of Preset Triggers  ..... 1
  I) Channel Parameters ..... ->
  J) Stream Parameters ..... ->
  K) Trigger Parameters ..... ->
  L) Parameters of Preset Triggers ... ->
  M) File Storage and Policy ..... ->
  N) Communication Parameters ..... ->
  O) Miscellaneous Parameters ..... ->
```

- Press 'O' to enter the menu *Miscellaneous Parameters*

```
Main Menu | Miscellaneous
  A) Offset detection time, sec ..... 10 (0x0A)
  B) Offset correction time, sec ..... 0 (0x00)
  C) Offset correction counts ..... 1 (0x01)
  D) MiniSEED record length ..... 512
  E) Extended MiniSEED format ..... Yes
  F) State of health ..... ->

  G) Test configuration ..... ->
  H) Messaging and debugging ..... ->
  I) Time synchronization ..... ->
  J) Instrument configuration options ..... ->
  K) Time for sending daily logfile, hour ..... 0 (0x00)
  L) Time for sending daily logfile, minute ... 0 (0x00)
  M) Keep external modem always powered ..... No
  N) Startup time for analog modem ..... 2 (0x02)
  O) Startup time for cellular modem ..... 60 (0x3C)
  P) Connect time for analog modem ..... 30 (0x1E)
  Q) Connect time for cellular modem ..... 60 (0x3C)
```

- Press 'I' to enter menu *Time synchronization*

```
Main Menu | Miscellaneous | Time Synchronization
  A) Time source ..... GPS
  M) RTC watchdog timeout, sec ..... 1200 (0x4B0)
  N) Send SOH upon RTC status change ..... No
  Q) Offset to UTC, minutes ..... 0 (0x00)
```

- Make sure, Time source is set to '**GPS**'
- If not, press '**A**' until Time source shows '**GPS**'
- **Do not set any offset to UTC, otherwise the NTP functionality may not work correctly!**
- Go back to Main Menu pressing '**Esc**' and save settings as Current config pressing '**C**'.'

3. Setup GMSplus as NTP client

```
Main menu:
C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trim values
T - File statistics
G - View RTC status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit
```

- Press '***C***' to edit configuration and '***C***' again to edit current configuration.

```
Main Menu
  A) Station description ..... Demo GMSplus
  B) Station code ..... DEMO
  C) Location description ..... Switzerland
  D) Seismic network code ..... CH
```

```
  E) Number of Channels ..... 3
  F) Number of Output Streams ..... 1
  G) Number of Trigger Sets ..... 1
  H) Number of Preset Triggers  ..... 1
  I) Channel Parameters ..... ->
  J) Stream Parameters ..... ->
  K) Trigger Parameters ..... ->
  L) Parameters of Preset Triggers ... ->
  M) File Storage and Policy ..... ->
  N) Communication Parameters ..... ->
  O) Miscellaneous Parameters ..... ->
```

- Press 'O' to enter the menu *Miscellaneous Parameters*

```
Main Menu | Miscellaneous
  A) Offset detection time, sec ..... 10 (0x0A)
  B) Offset correction time, sec ..... 0 (0x00)
  C) Offset correction counts ..... 1 (0x01)
  D) MiniSEED record length ..... 512
  E) Extended MiniSEED format ..... Yes
  F) State of health ..... ->
  G) Test configuration ..... ->
  H) Messaging and debugging ..... ->
  I) Time synchronization ..... ->
  J) Instrument configuration options ..... ->
  K) Time for sending daily logfile, hour ..... 0 (0x00)
  L) Time for sending daily logfile, minute ... 0 (0x00)
  M) Keep external modem always powered ..... No
  N) Startup time for analog modem ..... 2 (0x02)
  O) Startup time for cellular modem ..... 60 (0x3C)
  P) Connect time for analog modem ..... 30 (0x1E)
  Q) Connect time for cellular modem ..... 60 (0x3C)
```

- Press 'I' to enter menu *Time synchronization*

```
Main Menu | Miscellaneous | Time Synchronization
  A) Time source ..... NTP
  B) NTP server 1 ..... 192.168.30.52
  C) NTP server 2 ..... 209.0.72.7
  D) NTP server query interval, sec ..... 20 (0x14)
  E) NTP requests in a row ..... 4 (0x04)
  F) NTP network timeout, sec ..... 3 (0x03)
  G) NTP maximum error, sec ..... 0.1
  K) RTC watchdog timeout, sec ..... 1200 (0x4B0)
  L) Send SOH upon RTC status change ..... No
  O) Offset to UTC, minutes ..... 0 (0x00)
```

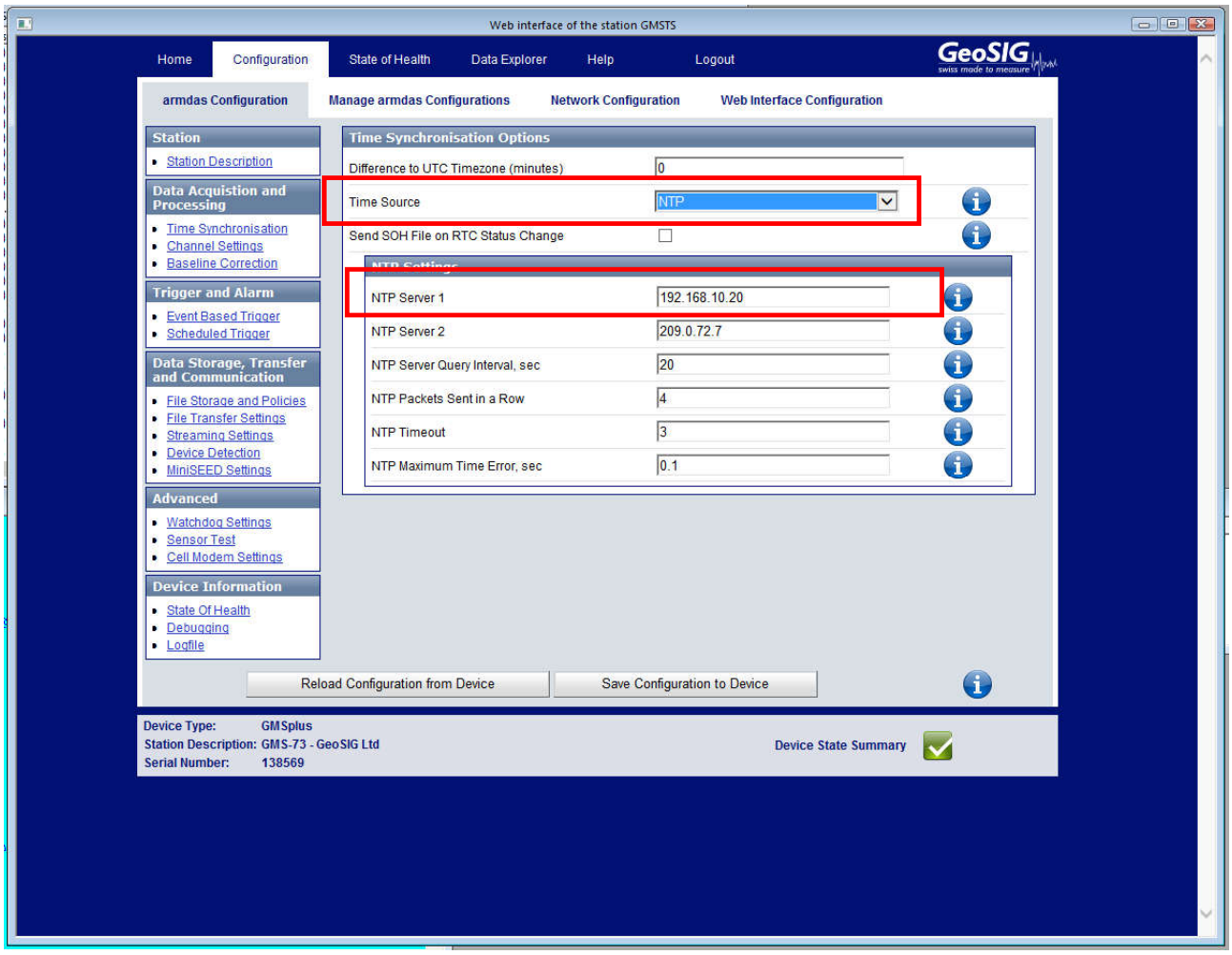
- Press "B" and set IP address of the master unit
- **Do not set any offset to UTC, otherwise the NTP functionality may not work correctly!**
- Go back to Main Menu pressing '**Esc'** and save settings as Current config pressing '**C'**.'

4. Setup through Web Interface (GeoDAS)

4.1. Setup NTP server see chapter 2.

4.2. Setup GMSplus as NTP client

Client instrument must be in the same local network as the NTP server.



- Open the webinterface either through GeoDAS or directly in a webbrowser
- Set "*Time Source*" to "*NTP*"
- Set "*NTP Server 1*" to the IP address of the Master GMS-xx / GMSplus (see chapter 2)
- Press "*Save configuration to Device*". This will store the configuration and restart the GMS-xx/ GMSplus to load the changed configuration