MEINBERG
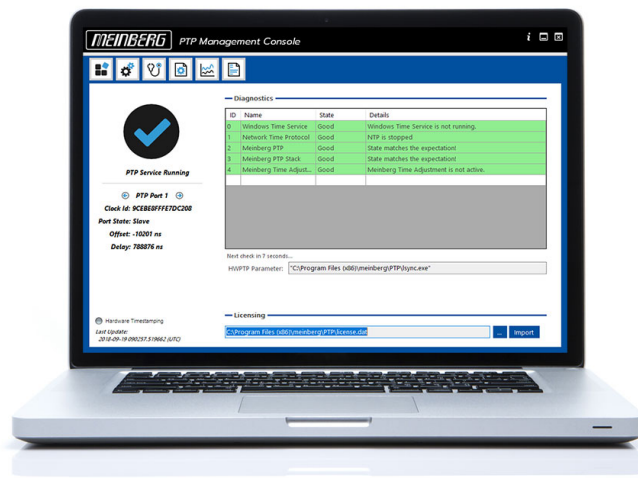
The Synchronization Experts.

# MANUAL

## Meinberg PTP-Client

### Software for Windows and Linux

26th September 2019

Meinberg Funkuhren GmbH & Co. KG

# Table of Contents

# 1 Imprint

**Meinberg Funkuhren GmbH & Co. KG**
Lange Wand 9, 31812 Bad Pyrmont / Germany

Phone:      + 49 (0) 52 81 / 93 09 – 0
Fax:        + 49 (0) 52 81 / 93 09 – 230

Internet:   https://www.meinbergglobal.com
Mail:       info@meinberg.de

Date:       2019-09-24

# 2 Meinberg PTP Client for Windows and Linux - End User License Agreement (EULA)

IMPORTANT: PLEASE READ THE TERMS AND CONDITIONS OF THIS LICENSE AGREEMENT CARE-
FULLY BEFORE INSTALLING, COPYING OR USING THE SOFTWARE

### § 1 Parties
This License agreement is entered into between (a) Meinberg Funkuhren GmbH & Co. KG, with an office at
Lange Wand 9, 31812 Bad Pyrmont, GERMANY, referred to as the "Licensor" and (b) customer of Licensor
who bought a Licensed product directly at Licensor or one of Licensor's official distributors, referred to as the
"Licensee".

### § 2 Definitions
In this License agreement, unless the context is otherwise required, the following expressions will have the
following meanings:

(a) "Effective Date" means the commencement date of this License with respect to specific Licensed Materials.

(b) "Intellectual Property Rights" means patent, copyright, design rights (whether registered or unregistered),
confidential information and any other intellectual property rights or howsoever described or, where the
context so admits or requires, and one or more of the foregoing.
(c) "Licensed Materials" means the Meinberg PTP Client Software license.
(d) "Licensed Products" means the an Ethernet adapter card with a specific MAC Address.
(e) "Permitted Use" means use by the Licensee of the Licensed Materials in accordance with Section § 3 below.
(f) "Specifications" means the Licensor's published specifications for the Licensed Materials.

### § 3 License
Upon execution of the Quotation and payment of the fees set forth therein, Licensor hereby grants the Licensee
a non-exclusive, non-transferable license to use the Licensed Materials internally solely in combination with
the Licensed Product(s).

### § 4 Restrictions on Use
(i) Licensee shall not reproduce the Licensed Materials other than to the extent necessary for its authorized
use of the Licensed Materials (per § 3 above), and for archival and back-up purposes, provided always that
Licensee will at all times and in each instance, reproduce all copyright notices and proprietary legends on
each copy in the same manner as such notices and legends appeared on the original.
(ii) Licensee shall not distribute or provide Licensed Materials to a third party.
(iii) Licensee shall not decrypt, decompile, reverse-engineer, disassemble, or otherwise reduce to a human-
perceivable form, the Licensed Materials.
(iv) Licensee shall not hypothecate, rent, lease, loan, lend, time-share, sublicense or otherwise transfer the
Licensed Materials.
(v) Licensee shall not use the Licensed Materials other than in combination with Licensed Products.
(vi) The Licensed Materials are not designed, intended, or authorized for use in components of systems intended
for, or in relation to the operation of, weapons, weapons systems, nuclear installations, means of mass
transportation, aviation, life-support computers or equipment (including resuscitation equipment and surgical
implants), pollution control, hazardous substances management, or for any other application in which the
failure of the Licensed Product(s) could create a situation where personal injury or death may occur.

Should Licensee provide any Licensed Product for any such unintended or unauthorized application, Licensee
shall indemnify and hold Licensor and its officers, employees, subsidiaries, affiliates, and distributors

harmless against all claims, costs, damages, expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury, death, or other damages associated with such unintended or unauthorized use, even if such claim alleges that Licensor was negligent regarding the design of the Licensed Materials.

### § 5 Intellectual Property Rights

Licensee acknowledges that all Intellectual Property Rights in the Licensed Materials are and will remain the sole property of Licensor or its licensors, if any. The Licensee may not modify or prepare derivative works of the Licensed Materials in whole or in part, except with respect to development and Maintenance of the Licensed Products. Nothing contained in this License will be construed as conferring by implication, estoppels or otherwise upon either party any license or other right except the licenses and rights expressly granted hereunder to a party hereto.

### § 6 Copying

This License allows the Licensee to copy the Licensed Materials only to the extent necessary for the Licensee's authorized use of the Licensed Materials, and for archival and back-up purposes, provided always that the Licensee will at all times and in each instance, reproduce all copyright notices and proprietary legends on each copy in the same manner as such notices and legends appeared on the original. No other copies may be made without the Licensor's prior written consent.

### § 7 Termination

This License will commence upon the Effective Date and will remain effective until terminated. This License will terminate upon the Termination Date if specified. The Licensee may terminate this License at any time by destroying the Licensed Materials and all copies thereof. This License will terminate immediately without notice from Licensor if the Licensee fails to comply with any provision of this License, provided that any payment obligations accruing prior to such termination will remain due and owing. This License will terminate immediately in case of insolvency of the Licensee.Upon termination of this License, the licenses, rights and covenants granted hereunder and the obligations imposed hereunder will cease, except as otherwise expressly provided for herein, and the Licensee will destroy the Licensed Materials, including all copies and all relevant documentation. The provisions of Sections § 2, § 5 and § 13 will survive the termination of this License.Upon termination of this License contract, the License for License Materials being part of License Products already sold to end users will remain in full force and effect.

### § 8 Limited Remedy and Disclaimer

Licensor represents that for a period of one (1) year from shipment of the Licensed Materials to Licensee the Licensed Materials shall, in all material respects, conform to the Specifications and that it shall have no severe malfunction or defect severely affecting its functionality. Licensor's sole liability and the Licensee's exclusive remedy with respect of breach of the foregoing limited representation will be limited to error correction or replacement, or if neither is in the Licensor's opinion commercially feasible, termination of this License and refund of any license fee received by the Licensor from the Licensee in respect of the relevant item of Licensed Materials. In case of a failure or defect covered by the warranty set forth above in this section Licensor will, at its own expenses correct in due course the failure or defect reported is writing by the Licensee during the period of one (1) year.Except as specifically stated above, the Licensed Materials licensed hereunder are provided "AS IS" without and further warranty of any kind, either expressed, implied or statutory, including without limitation, any warranty with respect to noninfringement, merchantability or fitness for any particular purpose. Except as specifically stated above, Licensor does not warrant that the functions contained in any of the Licensed Materials will meet any or all of Licensee's particular requirements, or that the operation of the Licensed Materials will be uninterrupted or error free, or that all programming errors in the Licensed Product can be found in order to be corrected. All warranties provided in this Agreement are solely for the benefit of, and may not be transferred by, Licensee, to any third party.Furthermore, Licensor does not warrant or make any representations regarding use or the results of the use of the Licensed Materials in terms of correctness, accuracy, reliability or otherwise.

### § 9 Limitation of Liability

The entire liability of Licensor in respect of any breach of its contractual obligations arising under this License and any representation, statement or tortuous act or omission including negligence arising under or in connection with this License (together an "event of default") shall be limited to damages in an amount equal to all license fees paid by Licensee to Licensor in the preceding 12 months for the applicable Licensed Materials. Notwithstanding the foregoing, Licensor will not be liable to Licensee in respect of any event of default for loss

of data, profits, goodwill or any type of special, indirect or consequential loss (including loss or damage suffered by Licensee as a result of any action brought by a third party) even if such loss was reasonably foreseeable or Licensor had been advised of the possibility of Licensee incurring the same. This limitation shall apply notwithstanding the failure of the essential purpose of any limited remedies herein. Nothing in this section will confer any right or remedy upon Licensee to which it would not otherwise be legally entitled.

### § 10 Export Restriction

Licensee agrees that it will not export or re-export the Licensed Materials, reference images or accompanying documentation in any form without the appropriate governmental licenses. Licensee's failure to comply with this provision is a material breach of this License.

### § 11 Third Party Beneficiary

The Licensee understands that portions of the Licensed Materials and related documentation may have been licensed to Licensor from third parties and that such third parties are intended third party beneficiaries of the provisions of this License.

### § 12 Non-Transferable

The Licensee may not provide information including, source code or internal program documentation, to a third party without prior written approval from Licensor. Licensee may provide binary files to third parties without prior approval in order to support the product into which the Licensed Products have been incorporated.

### § 13 Non-Disclosure

Except as otherwise expressly permitted in this License, Licensee will hold in confidence the Licensed Materials and all other information received hereunder from Licensor which is marked as Licensor's proprietary information. Without limiting the generality of the preceding sentence, Licensee agrees that the Licensed Materials and documentation furnished hereunder will be treated as proprietary trade secrets of Licensor, and the Licensee will not make the Licensed Materials or the documentation available in any form to any person other than to his employees, and contractors subject to restrictions no less stringent than those contained herein, with a need to know and located on his premises. The Licensee hereby represent to Licensor that he maintains a system consistent with semiconductor industry standards to protect his own confidential business information, including written agreements with his employees, and that the Licensed Materials and documentation will be protected by such a system to the same extent.

### § 14 Non-Assignment

Without Licensor's prior written consent, neither this License nor any interest herein or part hereof will be transferable or assignable by Licensee, by operation of law or otherwise.

### § 15 Governing Law

This License shall be governed by the laws of Germany, without reference to conflict of laws principles. Nothing in this License will be interpreted or construed so as to limit or exclude the rights or obligations of either party (if any) which it is unlawful to limit or exclude under the relevant national laws and, where applicable, the laws of any Member State of the European Union which implement relevant European Communities Council Directives.

### § 16 General

(a)     Unenforceability. If for any reason a court of competent jurisdiction finds any provision of this License, or portion thereof, to be unenforceable, that provision of the License shall be replaced to the maximum extent permissible so as to effectuate the intent of the parties, and the remainder of this License shall continue in full force and effect.

(b)     Headings. Save as otherwise provided herein, references to sections and schedules are to those contained in this License. Headings are inserted for convenience only and do not affect the construction of this License.

(c)     Construction. Unless the context otherwise requires, words importing the singular include the plural and vice versa, words importing the masculine include the feminine and words importing persons include corporations.

(d)     Waiver. No failure or delay on the part of either party in the exercise of any power, right or privilege hereunder will operate as a waiver thereof, nor will any single or partial exercise of any such power, right or privilege preclude any other or further exercise thereof, or of any other right, power or privilege.

(e)     Entire Agreement. This License and the applicable Quotation contain the entire agreement and understanding between the parties with respect of the subject matter of such Quotation and supersede all prior agreements, understandings and representations. No addition or modification to this License is valid unless made in writing and signed by Licensor and Licensee. The printed terms and conditions of any other Quotation form issued by Licensee will not modify or be a part of this License.

(f)     This License may be executed in counterparts, and all executed counterparts shall be deemed to be the original executed License. In witness whereof, the parties have executed this Core Site License Agreement as of the Effective Date by their duly authorized representatives.

# 3 Introduction

The Meinberg PTP client software enables Microsoft Windows and Linux servers and desktop PCs to synchronize time by implementing an IEEE 1588-2008 PTP stack with software and hardware timestamping support. The PTP client provides a comprehensive PTP feature set that is available for the two major operating systems by using the Oregano Systems PTP stack as its core. Users can configure the software to work with any PTPv2 Grandmaster Clock or PTP-enabled network infrastructure by supporting most PTP configuration options and operating modes listed in the PTP standard.

The software supports Default, Enterprise, Power, Telecom, Broadcast and AVB/TSN profiles. Software timestamping can be used on any of the supported operating systems with any Ethernet adapter supported by the operating system. IEEE 1588 hardware timestamping is currently supported on Windows for Oregano network cards that are PTPv2 enabled. For Linux systems, hardware timestamps can be enabled besides the Oregano PCI card for all PTP-capable network cards that use the standard PTP kernel framework (PHC).

The PTP client software has been tested on a wide range of Linux distributions and is available as an installation package that can be used with the distribution's package manager to install, update or remove the PTP client from any system. For Microsoft Windows, an installation program is provided that can be used to install the software interactively or in an automatic, unattended setup. Tests with different Linux and Windows systems were conducted on both physical machines and virtualized environments and showed excellent synchronization performance. For example, the system time of a Windows 2016-based server can be maintained with less than 100 microseconds deviation from UTC time.

The license for the Meinberg PTP Client Software is always bound to a MAC address of a network port that is to be used for PTP synchronization. If the PTP Client is running without a valid license file, the demo mode is activated and the system time corrections are deactivated after 72 hours.

# 4 Technical Details

**Operating Systems**

**Windows-Versions:**
Installation software (supports unattended installation) with the PTP client service and a graphical user inter–face is available for the following Windows versions:

- Windows 7 SP1 | 32 & 64 bit
- Windows 10 | 32 & 64 bit
- Windows Server 2016 | 64 bit

**Linux-Versions:**

- Centos 6 | 32 & 64 bit
- Centos 7 | 64 bit
- Debian 9 | 32 & 64 bit
- Fedora 25 | 32 & 64 bit
- Fedora 26 | 32 & 64 bit
- Fedora 27 | 32 & 64 bit
- RHEL 6 | 32 & 64 bit
- RHEL 7 | 64 bit
- SLE12 | 64 bit
- SLE12-SP1 | 64 bit
- SLE12-SP2 | 64 bit
- SLE12-SP3 | 64 bit
- openSuse 42.1 | 64 bit
- openSuse 42.2 | 64 bit
- openSuse 42.3 | 64 bit
- Ubuntu 16.10 | 32 & 64 bit
- Ubuntu 17.04 | 32 & 64 bit
- Ubuntu 17.10 | 64 bit

**Supported Network Protocols:**

- Layer 2 / Ethernet IEEE 802.3
- Layer 3 / IPv4
- Layer 3 / IPv6

**Communication Model:**

- Unicast
- Multicast
- Hybrid Multicast/Unicast

**Delay Mechanism:**

- End-to-End (E2E)
- Peer-to-Peer (P2P)

**Message Rates:**

- From 1/128s to 128/s for sync and delay request/response messages

**Supported PTP Profiles:**

| | |
|---|---|
| Default: | IEEE 1588v2 PTPv2 Default Profile |
| Enterprise: | Hybrid unicast / multicast mode according to Enterprise Profile Draft RFC |
| Power: | IEEE C37.238-2011 |
| Power: | IEEE C37.238-2017 |
| Telecom: | ITU-T G.8265.1 Frequency synchronization |
| Telecom: | ITU-T G.8275.1 Phase/Time with Full Timing Support from the Network |
| Telecom: | ITU-T G.8275.2 Phase/Time with Partial Timing Support from the Network |
| Broadcast: | SMPTE ST 2059-2 for IP-based TV Studio Environments |
| AVB/TSN: | IEEE 802.1AS Profile for Audio/Video Bridging and TSN (Time Sensitive Networks) |

# 5 Use under Windows

## 5.1 Program Installation

To install the PTP Client, execute the installation file and follow the instructions of the setup program:

The installation includes the actual PTP services as well as the "PTP Management Console" interface for configuration and status display. During the installation, Windows services are registered with the display names "Meinberg PTP" and "Meinberg PTP Hardware Timestamping". The "Meinberg PTP" service is automatically started by default at system startup. The "Meinberg PTP Hardware Timestamping" service is started automatically if hardware timestamping is activated by configuration.

The desired installation path can be set during installation.
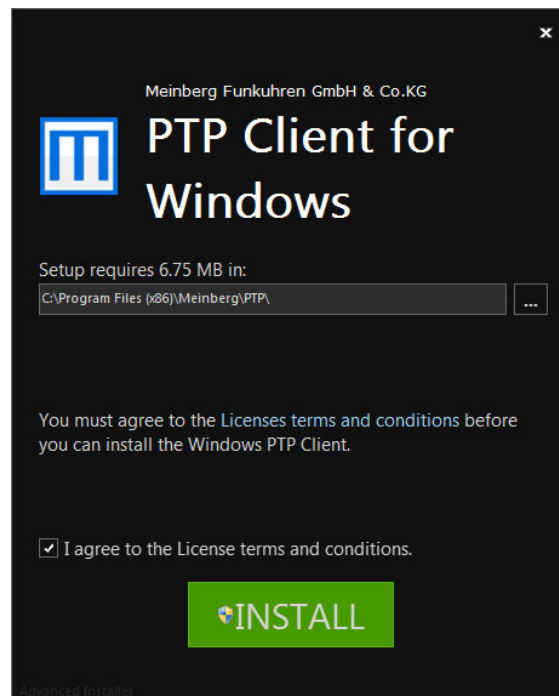
## 5.2 License Installation

When starting the service, a valid license is automatically searched for in the installation directory. The license file contains an encrypted list of licensed MAC addresses. The installation of the license can be done manually or with the included program.

## 5.2.1 Installation via the graphical user interface

To install a license via the program, you can use the "Import" function of the supplied program. To do this, open the "Diagnostics & Licensing" tab in the program (step 1 in the picture).

There you use the "Import" function of the program mentioned above. The successful procedure will be acknowledged with a corresponding message.
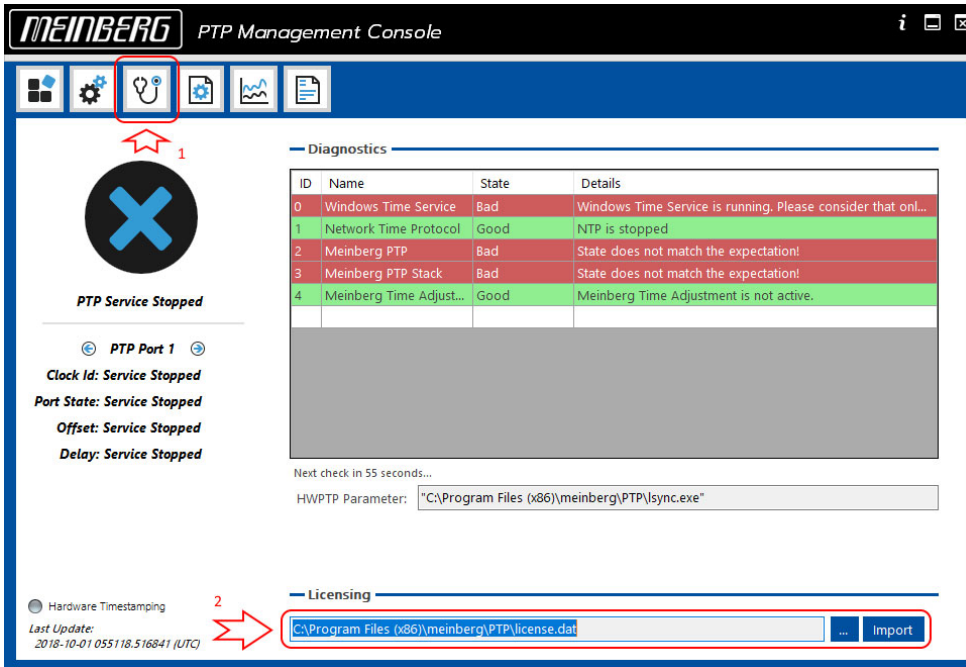


## 5.2.2 Manual Installation

You can simply copy the license file to the installation directory via Explorer or command line.
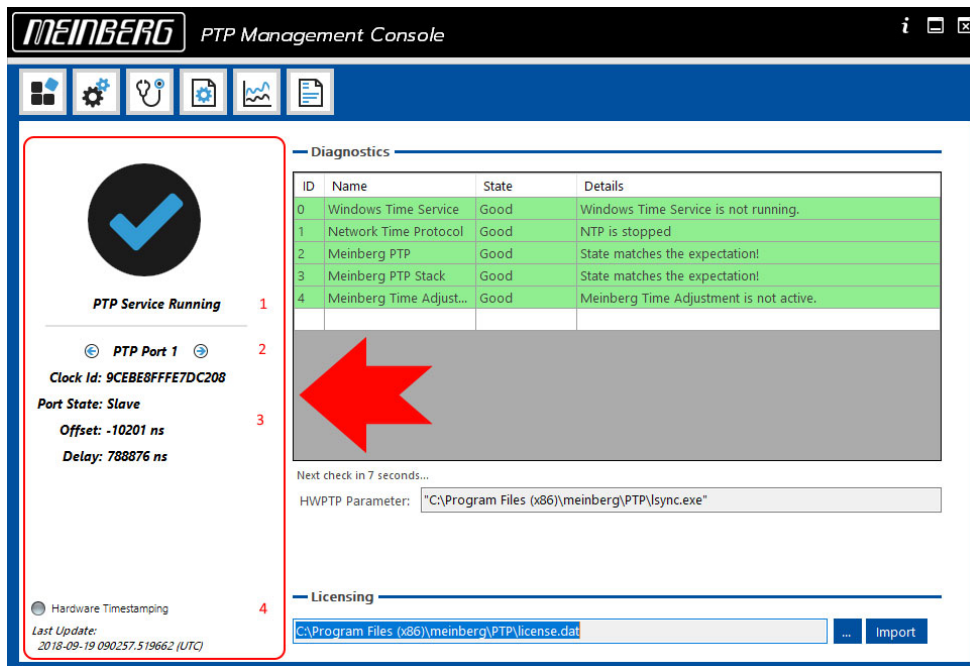
**Please note:**
The file name of the license file must be 'license.dat' for the service to recognize the license.

## 5.3 Configuration and Status

The following chapters describe the individual submenus of the PTP Management console, which can be reached via the navigation (see figure).



The current status of the PTP port is always displayed in the left half of the screen.



The following information is visualized:

1)  Current PTP service status
2)  Currently selected PTP port
3)  PTP Port Status
4)  Hardware timestamp indicator

If more than one PTP port is active on the system, you can select the port whose status you want to have visualized using the blue arrows (no. 2 in the figure). The currently displayed PTP status (no.3 in the figure) includes the current port status (e.g. slave), the offset to the grandmaster and the determined path delay. The "Hardware Timestamping" indicator (No.4 in the figure) gives a quick indication of the current state of the hardware timestamp function, which is as follows:

- Gray: The port does not use hardware timestamps.
- Yellow: state is unknown or is determined
- Green: Hardware timestamp is active and is applied correctly to the selected port
- Red: There is an error. Further information can be found in the log of the service.

## 5.3.1 Main Window



The main page provides control of the installed PTP service in the category "PTP Service Control" (No.1 in the figure). The service can be started, stopped or restarted using the appropriate buttons. The path to the application directory is also displayed.

The category "PTP Port State Information" gives detailed information about the PTP port. The determined information always refers to the currently selected PTP port (see Configuration and Status). Depending on the selection made, extended information about the current Grandmaster or the PTP domain can be determined. A PTP packet counter is also available. The desired information is displayed in area no.3 of the figure. The Packet Counter can be seen as an example in the figure.

⚠ To display information about the current Grandmaster, the PTP port must be located in the "Port State: Slave" must be located.

### 5.3.2 Program Settings
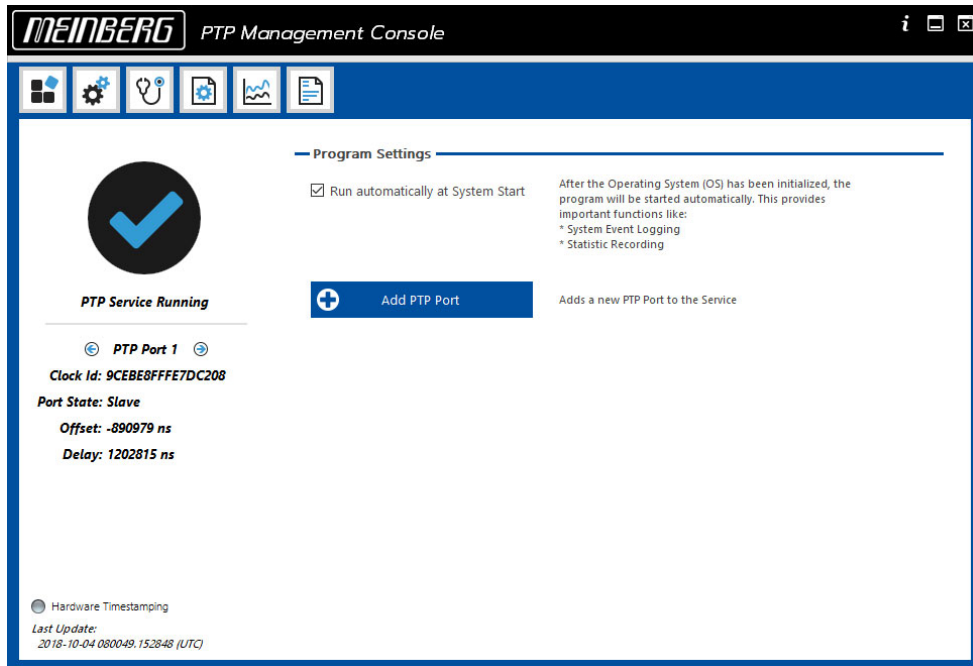


The program settings can be used to configure whether the program should be started automatically at system startup and minimized to the system tray. The following figure shows the corresponding icon.



With the button "Add PTP Port" another PTP port can be added, which can also be configured with this program.
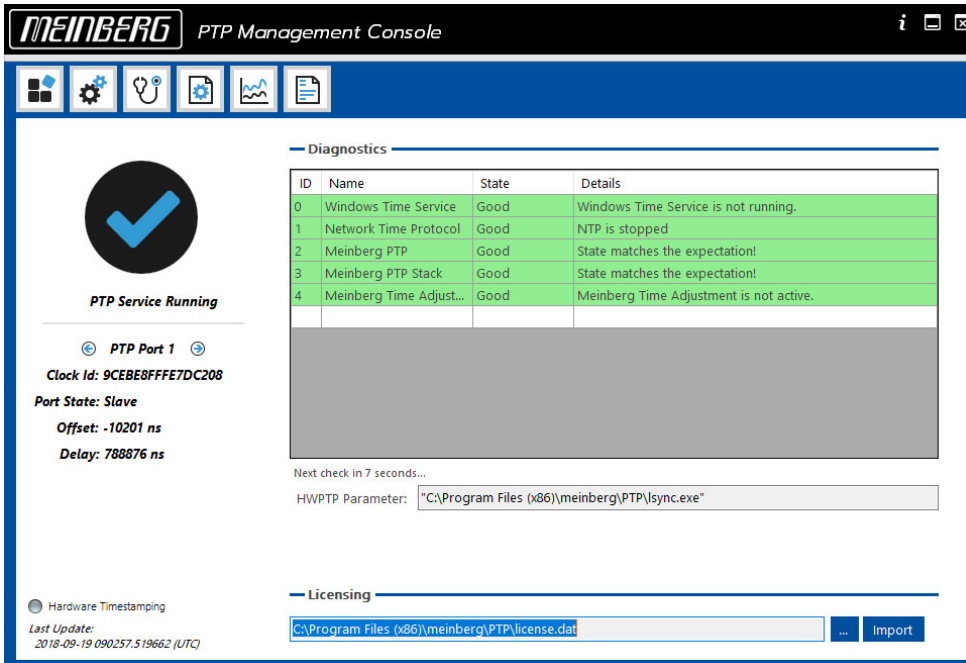
There are global restrictions on the maximum number of possible PTP ports. This is visualized by the program with a corresponding message.
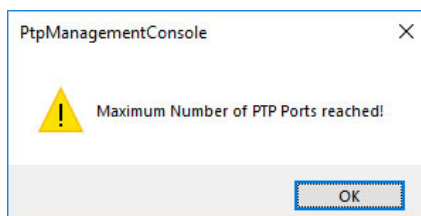
### 5.3.3 Diagnostics & Licensing

To assist the user in troubleshooting, the program provides a set of diagnostic checkpoints that provide a rough overview of the state of time synchronization on the system.



The "Diagnostics" section has a tabular structure. Each ID indexes a single checkpoint. The status of the individual checkpoints is indicated by the signal colors green ($\rightarrow$ OK!) and red ($\rightarrow$ Error). In the "Details" column you get a short description about the status. The description varies depending on the state of the checkpoints.

Example using the Windows Time Services W32Time:

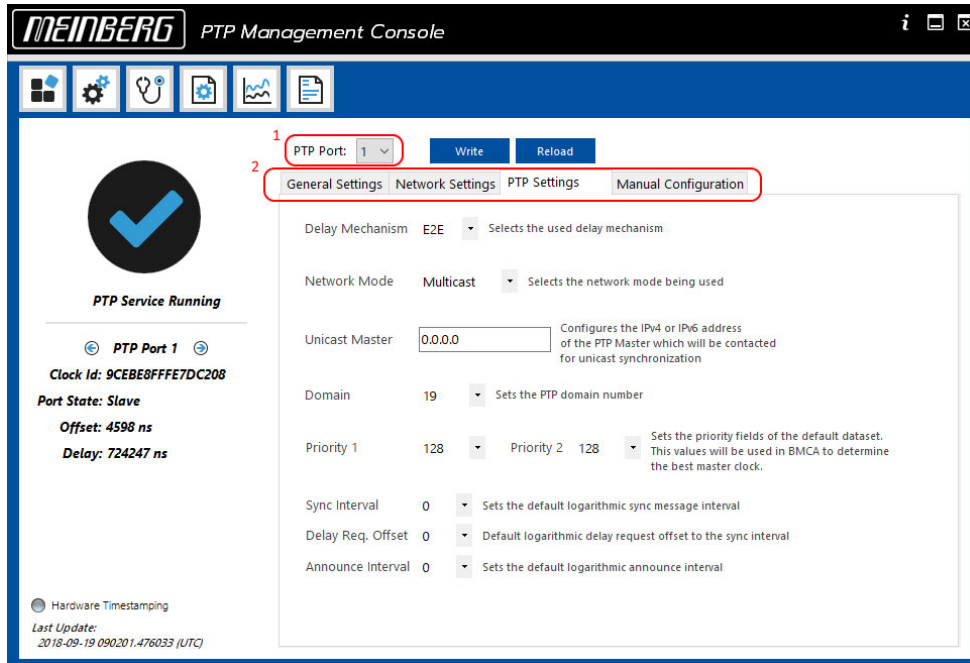**Status OK**

```
Windows Time Service is not running.
```

**Error State**

```
Windows Time Service is running.  Please consider that only one service
should adjust the system time!
```

A review of the checkpoints is done every 60 seconds.

## 5.4 PTP Configuration



The menu "PTP Configuration" allows you to configure the created PTP ports and to save the configuration. Each port can be configured separately. The PTP port to be configured must be selected in the corresponding drop-down field (number 1 in the figure).

The PTP configuration is divided into 4 different chapters, which can be accessed via the navigation and the corresponding tabs (number 2 in the figure).

- General Settings
- Network Settings
- PTP Settings
- Manual Configuration

Help on the available configuration parameters for "General Settings", "Network Settings" and "PTP Settings" can be found directly in the program.

Please note: If you make a change under "Manual Configuration", changes that were previously made on other tabs without saving will not be taken into account during the saving process.

Changes under "Manual Configuration" should only be made by skilled personnel or on the instructions of a Meinberg employee. Faulty parameterization can lead to incorrect behavior of the PTP service.

## 5.5 Statistics

As long as the program is active, statistics are logged continuously. The statistics are written daily in files, which can be found in the installation directory of the program. The file name has the following format:

*ptp_client_stats_YYYY_DDD*

YYYY          describes the year.
DDD           describes the day of the year, beginning with 1.

```
06:30:25        0.000000000     0.000000000     Listening
06:30:42        -0.000006698    -0.001300566    Slave
06:30:58        -0.001638914    0.002401017     Slave
06:34:42        -0.001716686    0.002235555     Slave
```

The columns describe the following values:

1. Time stamp
2. Offset to the Grandmaster
3. Determined path delay
4. PTP port status

The data in the file can be visualized via the program.
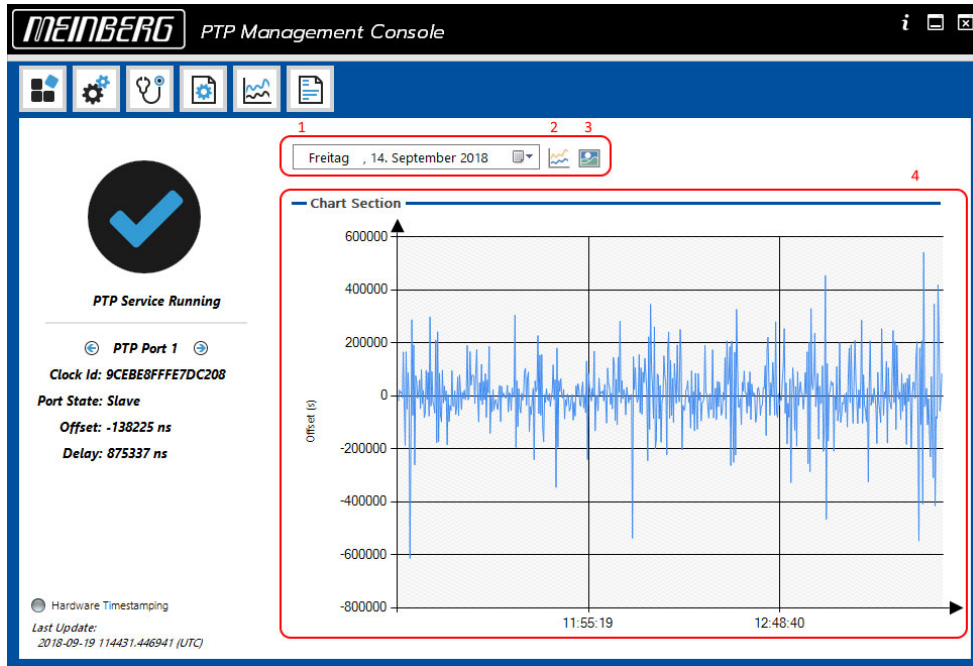


To do this, select the desired day from the calendar (number 1 in the figure). If available, you can use the "Create Chart" function (number 2 in the figure) to create a graph that visualizes the values from the log file for the respective day. Number 4 in the figure shows an example of a graph. The X–axis shows the time, the Y–axis the offset in nanoseconds. If desired, you can save the currently displayed graph as an image file in the file system of your PC (section 3 in the figure). If no statistics are available for the selected day, this will be reported by the program.

## 5.6 Events

The PTP Management Console provides its own logging, which writes detailed information to the Windows Event Viewer.

The events can be viewed via the program or alternatively via the Windows Event Viewer. Events are written to the log file *"Windows logs/application"*.

**The following event IDs are written:**

0       – General Information
10     – PTP service was started
11     – PTP service was stopped
98     – Warning
99     – Critical error
110    – service for hardware time stamping was started
111    – Hardware time stamping service stopped
510    – PTP port status change
510    – Status change at the PTP Grandmaster
199    – Debug



The events in the program are displayed in two steps. After a click on the button "Load Events" (number 3 in the figure) an overview of all service related events is generated in tabular order (number 1 in the figure). If a single event is now selected, the details are loaded in the corresponding text box at the bottom of the graphical user interface (number 2 in the figure).

The service writes additional logs, independent of the graphical program, which are not recorded in the Windows Event Viewer. This log file can be read and visualized by clicking on "Show Service Log" (number 4 in the figure).

# 6 Use under Linux

## 6.1 Installation and Configuration

Extract the appropriate installation package for your Linux distribution from the provided archive and install it with the package manager of your Linux distribution. For rpm based distributions like openSuse, Suse Linux Enterprise (SLE), Red Hat Enterprise Linux (RHEL), CentOS, Fedora or Oracle Linux you can use the low level tool rpm, or one of the appropriate package managers like yum, dnf or zypper. For Linux distributions based on Debian, the low level tool dpkg or package manager such as apt, apt-get or aptitude can be used.

The Meinberg PTP service is installed in the */etc/mbgptp/* directory. To start the service you need a configuration file named *service.cfg*. This file is not available after the installation to prevent starting the service with a default configuration. Copy the default configuration file */etc/mbgptp/default.cfg* and save it under the name **service.cfg** in the same directory. Then open the file with an editor. The file contains all available configuration parameters including explanations. It is important to first specify the name of the network interface to be used for PTP synchronization in the interface parameter.

**Example:**

```
# interface:
# The IP-Address (IPv4 or IPv6; windows and linux) or interface name
# (IPv4 or Layer2; linux only) of the desired
# of the Port you want to configure.
          interface          eth5
```

By default the service is configured as Multicast Slave, Layer 3, End to End Delay mechanism and PTP Domain 0. The default settings can be changed via the corresponding configuration parameters, for example:

```
# domain:  (uint8_t) [0]
# Sets the PTP domain number.
          domain              0

...

# delay_mechanism:  (E2E,P2P,None) [E2E]
# Selects the used delay mechanism:
# E2E...End to End delay measurement
# P2P...Peer to Peer delay measurement
# None..No delay measurement (syntonization)
          delay_mechanism     E2E
```

On Linux systems with **SysVinit** as the init system, the service is stopped after installation. The following commands can be used to start/stop and check the status:

```
service mbgptp status
service mbgptp start
service mbgptp stop
```

For Linux systems with **systemd** as the init system, please note that the **mbgptp** service must first be enabled after installation, since according to the systemd policy, services installed subsequently may not be started by default. Execute the following command with root rights:

```
systemctl enable mbgptp
```

The command creates the appropriate link so that the service can be started via **systemd**. The following commands can be used to start/stop and check the status:

```
systemctl status mbgptp
systemctl start mbgptp
systemctl stop mbgptp
```

On both Init systems a status file is written under */var/run/mbgptp.status* after successful start of the service, which is updated every second. The following example shows the status file of a system running as multicast slave in PTP domain 84:

```
[root@vm-centos-6-64 mbgptp]# cat /var/run/mbgptp.status
mbgptp Status
---------

Host name               :   vm-centos-6-64
Status Created          :   2018-02-28 13:56:54.291529 (UTC)
Domain number           :   84
Network Protocol        :   L3 (UDP/IPv4)
Delay Mechanism         :   E2E
Port State              :   Slave
Local ClockIdentity     :   00:0C:29:FF:FE:68:5B:01

Parent ClockIdentity    :   EC:46:70:FF:FE:00:69:4A/1
GM ClockIdentity        :   EC:46:70:FF:FE:00:69:4A
GM Priority1            :   128
GM Clock Class          :   6
GM Clock Accuracy       :   ← 250 ns (0x22)
GM Clock Variance       :   13056
GM Priority2            :   128
Announce ival           :   0
Sync ival               :   -2
DelayReq ival           :   -2
PDlyReq ival            :   0
Announce Rec Tout       :   3

Offset from GM          :   -0.000005661 s
Mean Path Delay         :   0.000151881 s
Steps removed           :   1

UTC offset              :   37 s
Flags                   :   UTC   valid:  Y, Time traceable:  Y,
                                  Freq traceable:  Y, leap61:  N,
                                  leap59:  N (hex:  0x3C)

Time Src                :   GPS (0x20)

Packet Counter:
Announce Msg RX         :   108 (1.00/s)
Announce Msg TX         :   0 (0.00/s)
Sync Msg RX             :   420 (4.00/s)
Sync Msg TX             :   0 (0.00/s)
FollowUp Msg RX         :   0 (0.00/s)
FollowUp Msg TX         :   0 (0.00/s)
DelayReq Msg RX         :   0 (0.00/s)
DelayReq Msg TX         :   409 (4.00/s)
DelayResp Msg RX        :   409 (4.00/s)
DelayResp Msg TX        :   0 (0.00/s)
PDelayReq Msg RX        :   0 (0.00/s)
PDelayReq Msg TX        :   0 (0.00/s)
PDelayResp Msg RX       :   0 (0.00/s)
PDelayResp Msg TX       :   0 (0.00/s)
Signalling Msg RX       :   0 (0.00/s)
Signalling Msg TX       :   0 (0.00/s)
RX total                :   949 (9.00/s)
TX total                :   409 (4.00/s)
```

If the packet counter in the status file will not display any PTP packets, although a PTP Grandmaster is active in the network, please check the firewall settings of your Linux system.

## 6.2 License Installation

A license for the Meinberg PTP Client Software is always bound to a MAC address of a network port. When starting the software, a valid license file named *license.dat* must be available in the */etc/mbgptp/service.cfg* directory for the interface configured in the */etc/mbgptp/service.cfg* configuration file. If the PTP client is executed without a valid license file, the demo mode is activated. After the demo mode has expired, the port state changes to DISABLED and no more system time corrections are performed.

After starting the service, you can check in the log file whether a valid license for the configured interface is available or whether the service is running in demo mode. If a valid license exists, the following line is written to the log file:

```
(1) mbgptp syn1588(R) PTP Stack full licensed version
```

If no valid license is available and the service is running in demo mode, the following line appears in the log file:

```
(1) mbgptp syn1588(R) PTP Stack protected evaluation version
```

The service does not write a log file by default configuration. However, this can be configured via the parameters filelog and loglevel (1, 2, 3, 4, where 4 provides the most detailed output) in the configuration file */etc/mbgptp/service.cfg*.