SIEMENS

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Using S7 CPUs as SNTP Servers

S7-1500, S7-1200, S7-400, S7-300

http://support.automation.siemens.com/WW/view/en/82203451

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Important

This document contains information on registry editing. We recommend creating a safety copy of the registry before editing it. For further information on how to create a safety copy, restore and edit the registry, please refer to the Microsoft Knowledge Base article no. 256986. Incorrect use of the Registry Editor might cause serious problems affecting the entire system and requiring new installation. Use the Registry Editor on your own responsibility.

Caution

The functions and solutions described in this entry predominantly confine themselves to the realization of the automation task. Please also take into account that corresponding protective measures have to be taken in the context of Industrial Security when connecting your equipment to other parts of the plant, the enterprise network or the Internet. For more information, please refer to entry ID 50203404.

http://support.automation.siemens.com/WW/view/en/50203404

Table of Contents

1 Library Overview

What you get

This document describes the "S7_CPU_SNTPServer" block library. This block library includes a tested code with well-defined interfaces. You can use these as basis for your projected task.

A key concern of the document is to describe

- all blocks pertaining to the block library,
- the functionalities provided by these blocks.

Furthermore, this documentation shows possible fields of application and helps you integrate the library into your STEP 7 project using step-by-step instructions.

1.1 User scenario

Introduction

The PROFINET CPUs of the S7-300, S7-400, WinAC RTX, S7-1200, and S7-1500 series can be configured as NTP clients for time synchronization as a standard feature. With regard to the firmware, the S7 CPUs are generally not designated as NTP servers. For time synchronization in an automation cell, a suitable timer system such as SICLOCK or - for synchronization using the SIMATIC process - additional hardware (communication processors) has to be used.

Possible application of the "S7_CPU_SNTPServer" library

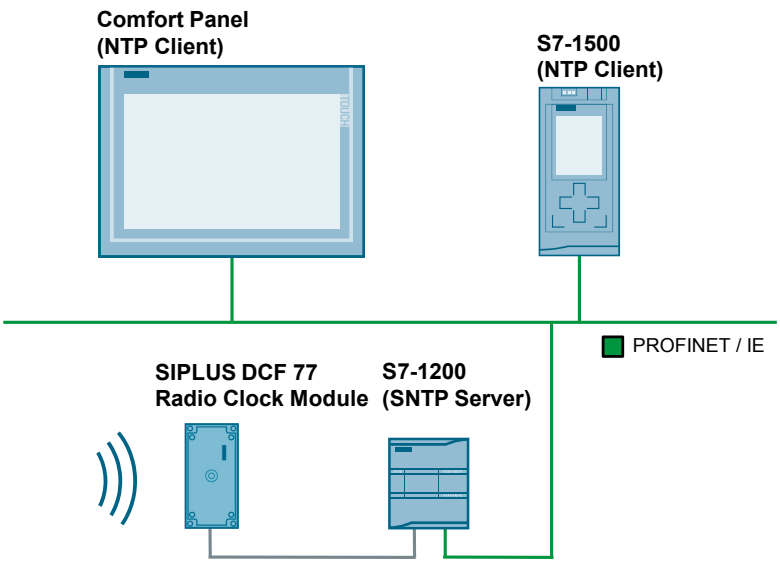
For automation cells or plant sections, the use of the exact International Atomic Time (TAI) is often secondary. It is usually sufficient to have a common time base for all automation components.

Using an S7 CPU as SNTP server allows for flexible and simple synchronization of plants and plant sections, for example, to receive meaningful time stamps for error messages and logs plant-wide.

Scenario

The following figure shows a possible sample configuration with an S7-1200 CPU as SNTP server. Here, the S7 CPU as SNTP server receives the time via a SIPLUS DCF77 module (for the coupling of the DCF77 module to S7-1200, please refer to \11\). However, any other configuration with a different timer is also possible.

Figure 1-1



Function

The library provides a function block that accomplishes the following functions:

- Receipt and analysis of an NTP message from an SNTP client.
- Creation and sending of an SNTP message to the client for time synchronization.

1.2 Hardware and software requirements

Requirements for this library

The following hardware and software requirements must be met in order to use the functionality of the library described in this document:

Hardware

The "S7_CPU_SNTPServer" library can be used with all PROFINET S7 CPUs with which Open User Communication (OUC) can be programmed.

This can be CPUs of the following series:

- S7-300 CPUs
- S7-400 CPUs
- S7-1200 CPUs
- S7-1500 CPUs
- WinAC RTX

Software

Table 1-1

Component	Order number
SIMATIC STEP 7 V5.5 SP3	6ES77810-4CC10-0YA5
SIMATIC STEP 7 PROFESSIONAL V12 SP1	6ES7822-1AA02-0YA5

1.3 Library resources

What will you learn here?

The overview below shows the main memory occupancy of the "S7_CPU_SNTPServer" library's block.

Total occupancy

The block pertaining to the "S7_CPU_SNTPServer" library occupies 4776 bytes of the main memory at the maximum (S7-300/S7-400) and 33472 kbytes of the load memory at the maximum (S7-1200/S7-1500).

Occupancy of the individual blocks

Library for S7-300 CPU (including called system blocks)

Table 1-2

Symbolic name	Load memory (bytes)	Main memory (bytes)
SNTP_Serv	2552	2046
DT_DATE	546	448
DT_TOD	312	242
EQ_DT	194	134
TCON	1234	1018
TURCV	584	472
TUSEND	526	416

Library for S7-1500 CPU

Table 1-3

Symbolic name	Load memory (bytes)	Main memory (bytes)
SNTP_Serv	33472	2289

2 Preconditions for Time Synchronization

What will you learn here?

This chapter briefly outlines the theoretical basics of time synchronization.

2.1 System time (UTC) and local time

Explanation of terms

Based on the Universal Time Coordinated (UTC), the local time is determined starting from the prime meridian, taking into account the time shift and summer/winter times, if applicable.

The Central European Time (CET) is calculated as UTC plus one hour. In the summer, the Central European Summer Time (CEST) applies, which is calculated as UTC plus two hours.

The NTP and SNTP protocols always send the UTC according to specification. If the local time is to be kept, corresponding settings or calculations are required.

S7-1500 and S7-1200

S7-1500 and S7-1200 CPUs include a system time as well as a local time.

When the time of these CPUs is synchronized via an NTP/SNTP server, the UTC is applied as system time and the local time is calculated automatically, based on the settings made (also see chapter 5.2).

S7-300 and S7-400

S7-300 and S7-400 CPUs include only a system time which is set to the UTC during synchronization via the CPU using an NTP/SNTP server.

To have also the local time available, for example, for the generation of messages, the local time has to be calculated using system-internal functions (refer to section 5.3 and the Siemens Online Support \1\ which contains many articles on the subject of time synchronization).

2.2 Time synchronization protocol

2.2.1 Network Time Protocol (NTP)

Task

NTP serves for the synchronization of clocks in a network. PCs, panels, controls, etc. can synchronize time via a (or several) server(s).

Function principle

An NTP client sends a message which is already assigned time stamps to the NTP server. The server responds to this message (by using an algorithm, for example, to consider packet runtimes) and the client then sets its clock according to the information received in the message.

An NTP client can have several time servers entered. Based on the "stratum" entered in the message and other factors, the client decides in favor of the optimal server and sends the request message to it.

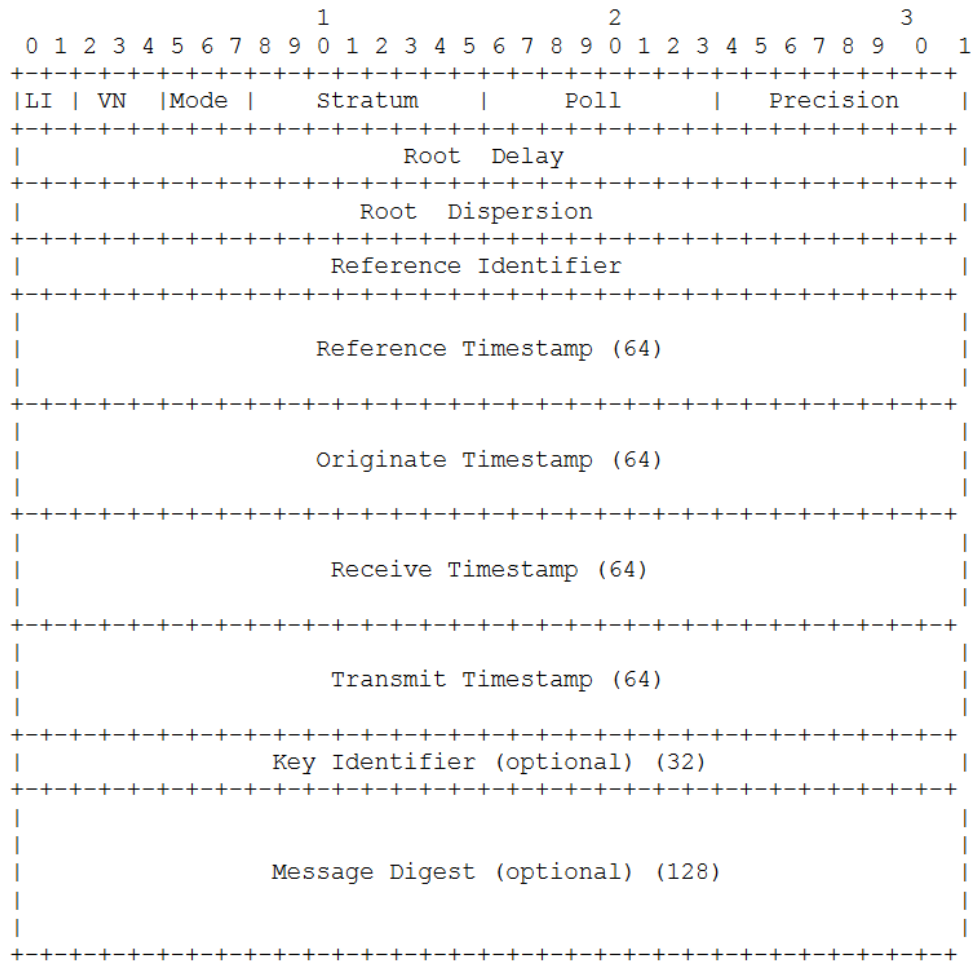
2.2.2 Simple Network Time Protocol (SNTP)

Differentiation between NTP and SNTP

SNTP is a simplified form of the NTP. Due to the simpler algorithms used, the SNTP is less accurate than the NTP. However, for the use in automation cells, the accuracy of the SNTP time synchronization is usually absolutely sufficient.

The structure of the messages is identical in both protocols, which means that NTP clients can also obtain the time from SNTP servers.

Figure 2-1 Structure of the NTP/SNTP message



For a detailed description of the SNTP, please refer to \4\.

Using SNTP

Since its implementation is easy and its accuracy is sufficient for automation technology, the SNTP is used by the "S7_CPU_SNTPServer" library.

2.3 Open User Communication

The basis of the SNTP is UDP, which is implemented with the help of Open User Communication (OUC) in the PROFINET CPUs.

3 Blocks of the Library

3.1 Block list

The "S7_CPU_SNTPServer" library consists of the "SNTP_Serv" block and the system functions called therein.

In STEP 7 V5.5, these have to be inserted separately into the user program; in STEP 7 > V12, they are inserted automatically during function block compilation.

3.2 Explanation of the blocks

What will you learn here?

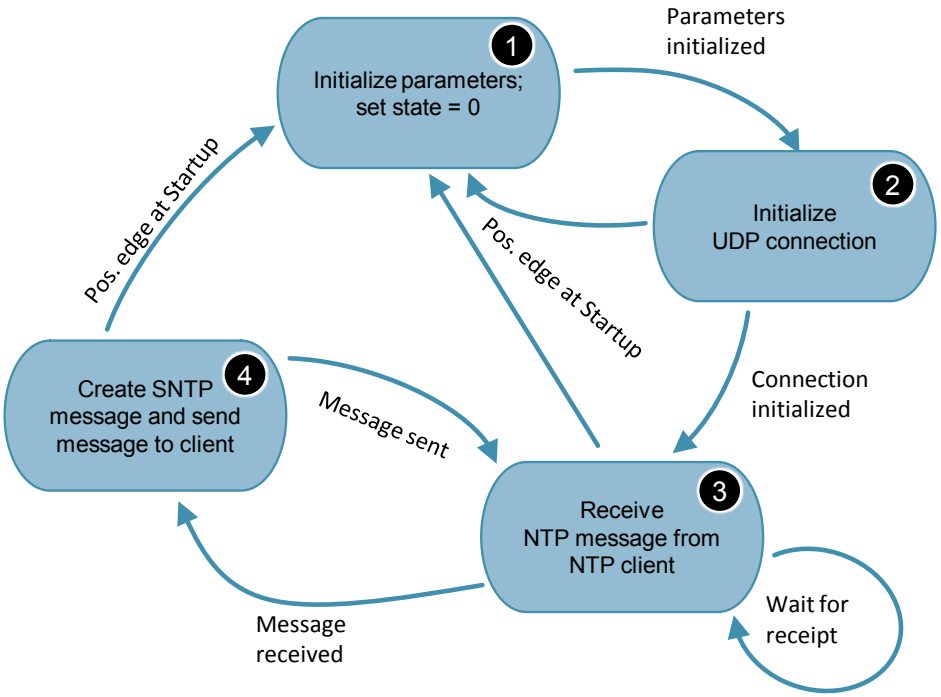
This section describes the function principle of the SNTP_Serv FB (FB 1000) as well as the calling and formal parameters of the function block for S7-300/S7-400/Win AC RTX and S7-1200/S7-1500.

3.2.1 Statuses of the SNTP_Serv FB (FB1000)

Internally, the SNTP_SERV FB (FB 1000) works as a simple state machine which is processed after an initialization.

The following figure schematically shows the successful processing of the SNTP_SERV FB (FB1000).

Figure 3-1



The following table describes an error-free time synchronization:

Table 3-1

No.	Action
1.	The FB is called with Startup = TRUE for one cycle and the parameters of the FB are initialized.
2.	The local communication access point is set up at port 123 (TCON instruction).
3.	The request message from an NTP client is awaited (TURCV instruction).
4.	When the time request from an NTP client has been detected, the response message is created and then sent to the client (TUSEND).
5.	Afterwards, a new request message is awaited again (from the same or a different client; -> status 3).

From any status it can be returned to the initialization status with another change of edge at the Startup = TRUE input.

3.2.1 Calling and parameters of the SNTP_SERV FB (FB1000) for S7-1500/S7-1200

The following figure shows the call interface of the SNTP_SERV FB (FB1000). The table describes the parameters of the function block.

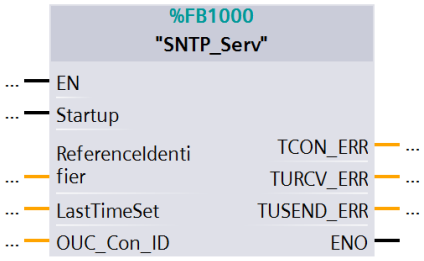


Table 3-2

Parameter	Type	Remark
Startup	IN: Bool	Upon CPU startup, the Startup parameter has to be supplied with "TRUE" for one cycle. After a positive edge at "Startup", all parameters of the SNTP_SERV FB are initialized.
ReferenceIdentifier	IN: USInt	The ReferenceIdentifier input specifies from which time source the server CPU obtains the time: • 0: uncalibrated (set "manually") • 1: primary reference (e.g., DCF 77) • 2: secondary reference (e.g., from GPS receiver) The information is forwarded to the NTP client in the SNTP protocol.

Parameter	Type	Remark
LastTimeSet	IN: DTL	If the information when the time was set last is available, this information is connected to the "LastTimeSet" input. This information is forwarded to the NTP client in the SNTP protocol.
OUC_Con_ID	IN: CONN_OUC	Is assigned with a free connection ID. The parameter is used internally by the T blocks for connection establishment, among other things.
ERROR	OUT: Bool	ERROR = TRUE as long as an error is pending in the block.
STATUS	OUT: DWord	Specifies the error signaled by ERROR = TRUE. See Table 3-3.

The table below shows the meaning of the "STATUS" output parameter.

Table 3-3 STATUS output parameter

Byte 2-3	Byte 0-1	Meaning
16#xxx1	16#xxxx	An error has occurred at the TCON instruction. Bytes 0-1 contain the status of the instruction.
16#xxx2	16#xxxx	An error has occurred at the TUSEND instruction. Bytes 0-1 contain the status of the instruction.
16#xxx3	16#xxxx	An error has occurred at the TURCV instruction. Bytes 0-1 contain the status of the instruction.

Note Interconnect the output parameters in order to recognize an error of the block and for adequate error handling.

3.2.2 Calling and parameters of the SNTP_SERV FB (FB1000) for S7-300/S7-400

The following figure shows the call interface of the SNTP_SERV FB (FB1000). The table describes the parameters of the function block.

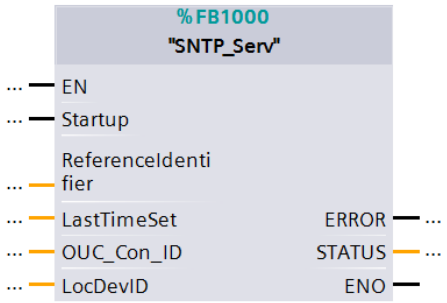


Table 3-4

Parameter	Type	Remark
Startup	IN: Bool	Upon CPU startup, the Startup parameter has to be supplied with "TRUE" for one cycle. After a positive edge at "Startup", all parameters of the SNTP_SERV FB are initialized.
ReferenceIdentifier	IN: Byte	The ReferenceIdentifier input specifies from which time source the server CPU obtains the time: • 0: uncalibrated (set "manually") • 1: primary reference (e.g., DCF 77) • 2: secondary reference (e.g., from GPS receiver) The information is forwarded to the NTP client in the SNTP protocol.
LastTimeSet	IN: Date_and_Time	If the information when the time was set last is available, this information is connected to the "LastTimeSet" input. This information is forwarded to the NTP client in the SNTP protocol.
OUC_Con_ID	IN: Word	Is assigned with a free connection ID. The parameter is used internally by the T blocks for connection establishment, among other things.
LocDevID	IN: Byte	Specifies the device ID. For more detailed information, please refer to the STEP 7 Online Help or the FAQ with the entry ID 51339682.
ERROR	OUT: Bool	ERROR = TRUE as long as an error is pending in the block.
STATUS	OUT: DWord	Specifies the error signaled by ERROR = TRUE. See Table 3-5.

The table below shows the meaning of the "STATUS" output parameter.

Table 3-5 STATUS output parameter

Byte 2-3	Byte 0-1	Meaning
16#8xxx	16#xxxx	The "LocDevID" input parameter is connected to an unaccepted value.
16#xxx1	16#xxxx	An error has occurred at the TCON instruction. Bytes 0-1 contain the status of the instruction.
16#xxx2	16#xxxx	An error has occurred at the TUSEND instruction. Bytes 0-1 contain the status of the instruction.
16#xxx3	16#xxxx	An error has occurred at the TURCV instruction. Bytes 0-1 contain the status of the instruction.

Note Interconnect the output parameters in order to recognize an error of the block and for adequate error handling.

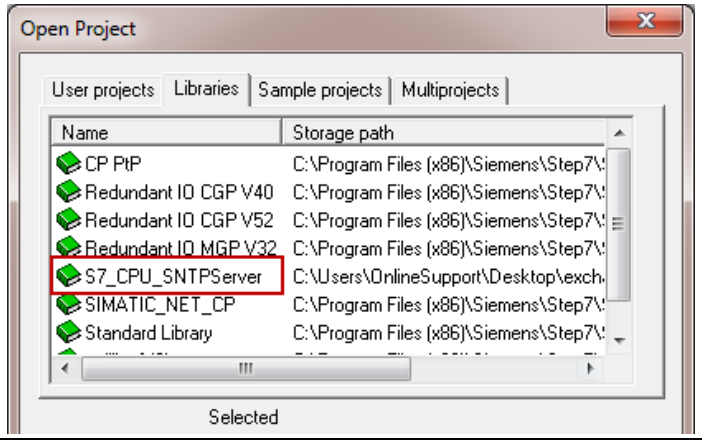
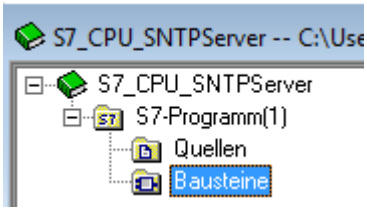
4 Working with the Library

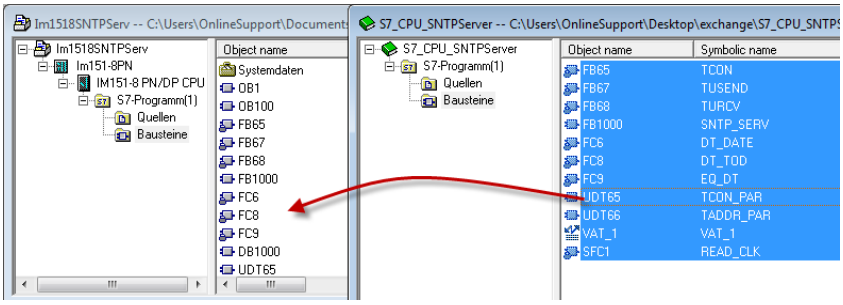
What will you learn here?

In order that the previously described library functions can be used, they must first be integrated into the configuration software. The necessary steps are listed in the following sections.

4.1 Integrating the library into STEP 7 V5.5

Table 4-1

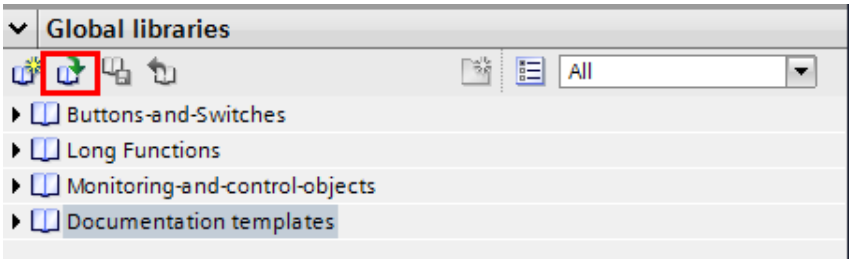
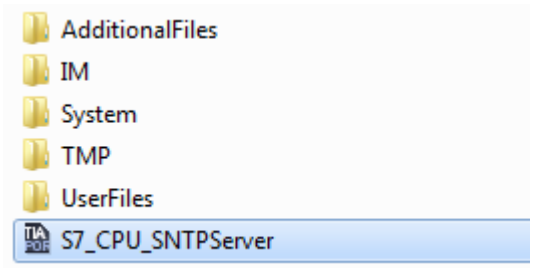
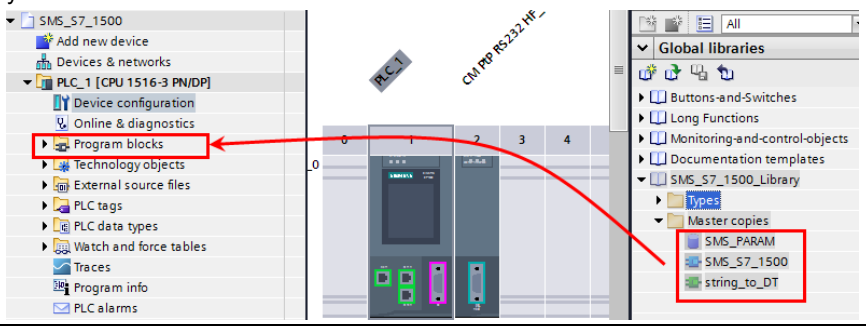
Step	Instruction
1.	The library is available on the HTML page from which you downloaded this document. Save the "S7_CPU_SNTPServer"library on your hard disk.
2.	Open the SIMATIC MANAGER and unzip the "S7_CPU_SNTPServer" STEP 7 library. "File > Retrieve..."
3.	From now on, the library is available under "Libraries". 
4.	Open an already existing STEP 7 V5.5 project.
5.	Open the library. 

Step	Instruction
6.	Select the S7 program of the library and insert it into your STEP 7 project using drag & drop. 
7.	Now you can use the blocks of the library in your user program. The other blocks apart from the SNTP_SERV FB (FB1000) are function blocks used by this block. Section 4.4 describes how to set up an S7 CPU as SNTP server in STEP 7 V12. Setup in STEP 7 V5.5 is done analogously.

4.2 Integrating the library into STEP 7 V12

In order that the previously described functions of the SMS_S7_1500 (FB18) can be used, it is necessary to integrate the library into the configuration software first. The necessary steps are listed in the following table.

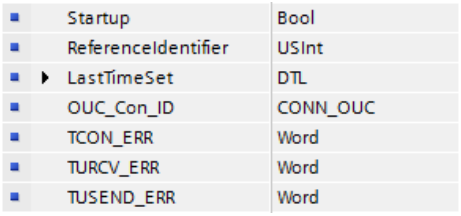
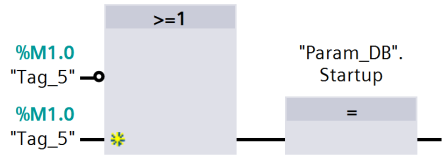
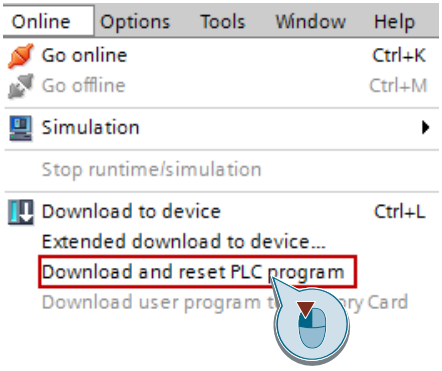
Table 4-2

No.	Instruction
1.	The library is available on the HTML page from which you downloaded this document (\1\). Save the **S7_CPU_SNTPServer_V12.zip**library on your hard disk.
2.	Unzip the library.
3.	Open your already existing STEP 7 V12 project.
4.	In the "Global Libraries" palette, click on "Open global library" in the toolbar or select "Global libraries > open library..." in the "Options" menu.  The "Open global library" dialog box opens.
5.	Select the global library "S7_CPU_SNTPServer.al12". 
6.	Depending on the CPU used, drag and drop the blocks from the "Master copies > 300/400" or "Master copies > 1200/1500" folder to the Program blocks" folder of your device. 

4.3 Setting up an S7-1500/S7-1200 CPU as SNTP server

The following table describes the procedure for setting up an S7-1500/S7-1200 CPU as SNTP server.

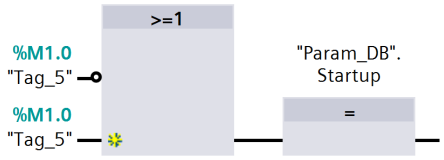
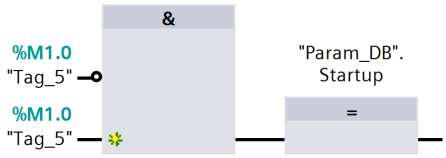
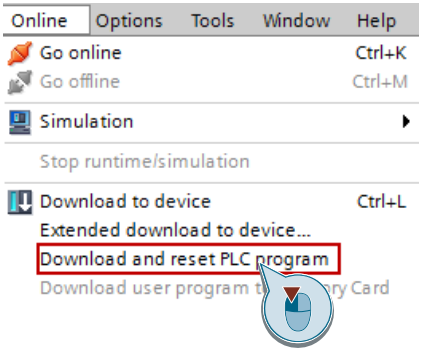
Table 4-3

No.	Instruction
1.	Create a data block for interconnecting the input and output parameters of the SNTP_SERV FB (FB 1000) with the variables shown in the screenshot. 
2.	Insert the SNTP_SERV FB (FB1000) into OB1 and interconnect the input and output parameters with the parameters of the same name of the data block created in step 1. For help, please refer to section 3.2.1. Adapt the input parameters according to your application (for example, the connection ID "OUC_Con_ID" must not yet be used in the project).
3.	Insert a startup OB (OB100) into your project and in this OB reset the "Startup" variable of the block created in step 1. 
4.	Insert a new network into OB1 and there reset the "Startup" variable of the block created in step 1. 
5.	Load your user program to the CPU and restart the CPU. The CPU then works as SNTP server. 

4.4 Setting up an S7-400/S7-300 CPU as SNTP server

The following table describes the procedure for setting up an S7-400/S7-300 CPU as SNTP server.

Table 4-4

No.	Instruction
1.	Create a data block for interconnecting the input and output parameters of the SNTP_SERV FB (FB 1000) with the variables shown in the screenshot. Startup Bool ReferenceIdentifier Byte LastTimeSet Date_And_Time OUC_Con_ID Word LocDevID Byte TCON_ERR Word TURCV_ERR Word TUSEND_ERR Word STATUS Word
2.	Insert the SNTP_SERV FB (FB1000) into OB1 and interconnect the input and output parameters with the parameters of the same name of the data block created in step 1. Adapt the input parameters according to your application. For help, please refer to section 3.2.2. • OUC_Con_ID: ID not yet occupied by another connection. • LocDevID: ID of the interface of your CPU. Please refer to the STEP 7 online help.
3.	Insert a startup OB (OB100) into your project and in this OB reset the "Startup" variable of the block created in step 1. 
4.	Insert a new network into OB1 and there reset the "Startup" variable of the block created in step 1. 
5.	Load your user program to the CPU and restart the CPU. The CPU then works as SNTP server. 

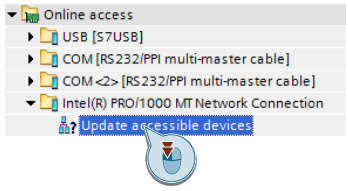
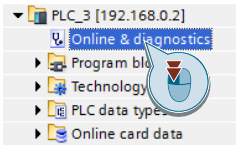
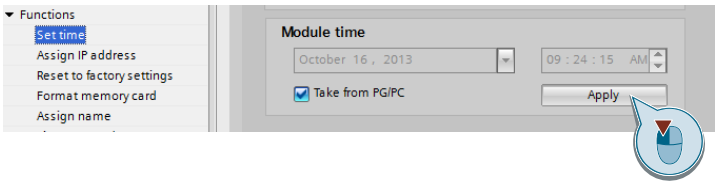
5 Notes and Support

5.1 Timer

In order to set the time of the SNTP server you can exercise one of the following options:

- Setting the CPU clock to the time of the connected PG (with the help of STEP 7). See Table 5-1.
- Using the SIPLUS DCF 77 radio clock module. For information on how to use the radio clock module, please refer to \6\ and \11\.
- Reading out the time of a commercially available GPS receiver. For information on that, please refer to the FAQ with the entry ID 42087405.

Table 5-1 Setting the time of an S7-1500 CPU with the help of STEP 7 V12

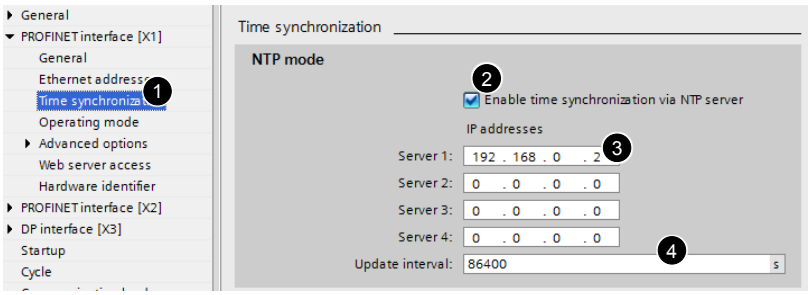
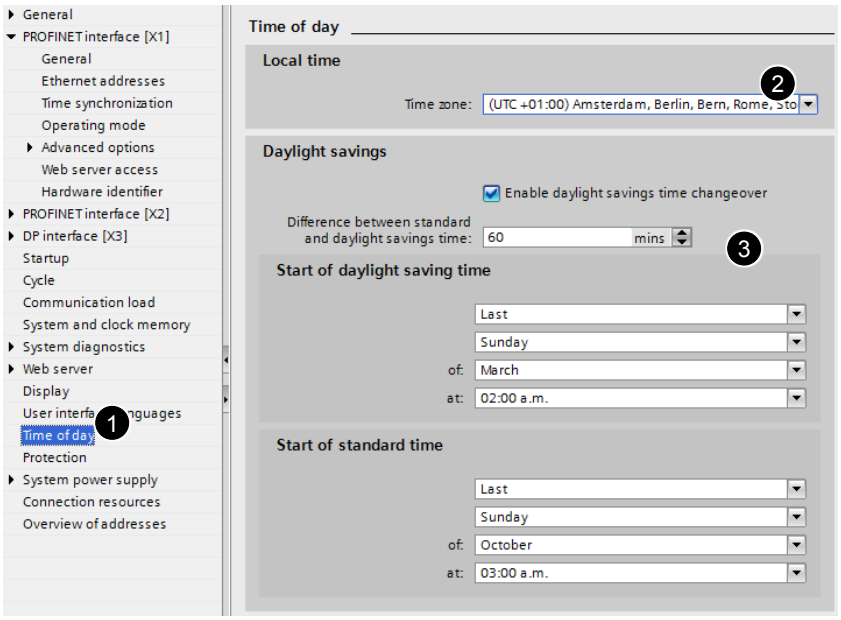
No.	Instruction
1.	In your project tree, double-click on "Online access > [YOUR_NETWORK_DEVICE] > Update accessible devices". 
2.	Select the CPU for which you want to set the time and click on "Online & diagnostics". 
3.	In the editor section, click on "Functions > Set time". Check the "Take from PG/PC" box and then click on "Apply".  Now the time of the PG/PC is applied by the S7 CPU.

5.2 Setting up an S7-1500/S7-1200 as NTP client

Hardware configuration settings (HWCN)

The following table describes how to set up the CPU as NTP client.

Table 5-2

No.	Instruction
1.	In the project navigation, select "[YOUR_PROJECT] > [YOUR_CPU] > device configuration" and in the inspector window click on the "Properties" tab.
2.	Select the PROFINET interface of the CPU and click on "Time synchronization" (❶). Check the "Enable time synchronization via NTP server" box (❷) and confirm the prompt. Then enter the IP address of the server CPU (❸) and the required update interval (❹). 
3.	Then go to the entry "Time of day" (❶) and adjust the time zone (❷) and the difference between standard and daylight savings time (❸). 

Differentiation: system time and local time

The system time of the CPU is the internal time of the CPU, in this case transferred by the NTP protocol. It is usually provided as UTC.

The local time is the time of the location of the CPU (time zone, summer/winter time) calculated dependent on the system time.

Reading out the system time

The system time can be read out with the instruction RD_SYS_T. The output parameter 'RET_VAL' of the instruction corresponds to '0' if read-out is completed successfully.

The time is written to a variable via the 'OUT' output parameter with one of the following data types:

- DT
- LDT
- DTL

Reading out the local time

The local time of the CPU can be read out with the instruction RD_LOC_T. The output parameter 'RET_VAL' of the instruction corresponds to '0' if read-out was successful. It corresponds to '1' if read-out was successful and the local time is currently set to daylight savings time.

The time is written to a variable via the 'OUT' output parameter with one of the following data types:

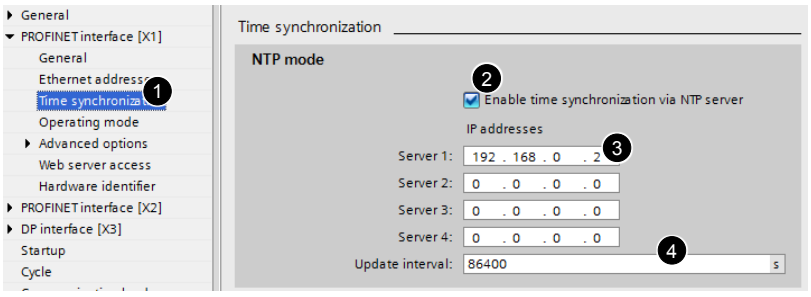
- DT
- LDT
- DTL

5.3 Setting up an S7-300/S7-400 as NTP client

Hardware configuration settings (HWCN)

The following table describes how to set up the CPU as NTP client.

Table 5-3

No.	Instruction
1.	In the project navigation, select "[YOUR_PROJECT] > [YOUR_CPU] > device configuration" and in the inspector window click on the "Properties" tab.
2.	Select the PROFINET interface of the CPU and click on "Time synchronization" (❶). Check the "Enable time synchronization via NTP server" box (❷) and confirm the prompt. Then enter the IP address of the server CPU (❸) and the required update interval (❹). 

Reading out the system time

The system time can be read out with the instruction RD_SYS_T. The output parameter 'RET_VAL' of the instruction corresponds to '0' if read-out is completed successfully.

The time is written to a variable of the Date_and_Time (DT) type via the 'OUT' output parameter.

Calculating the local time

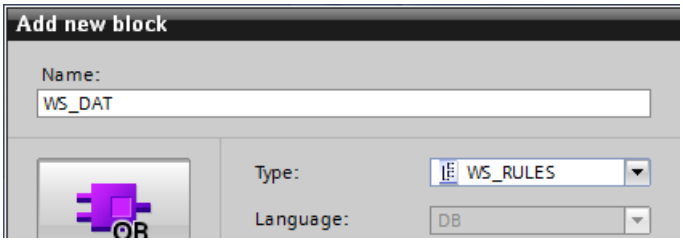
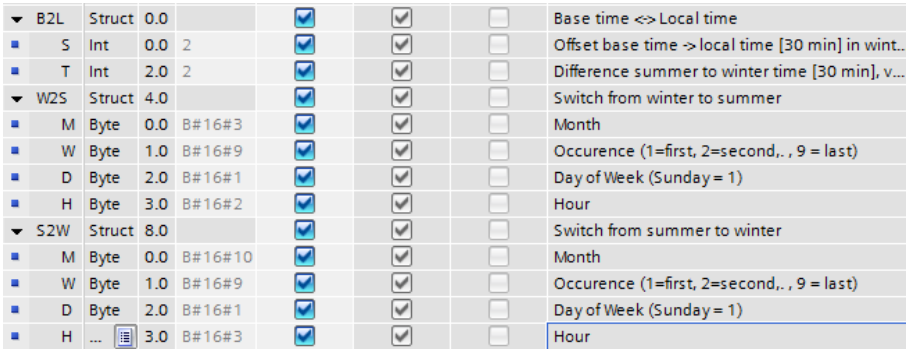
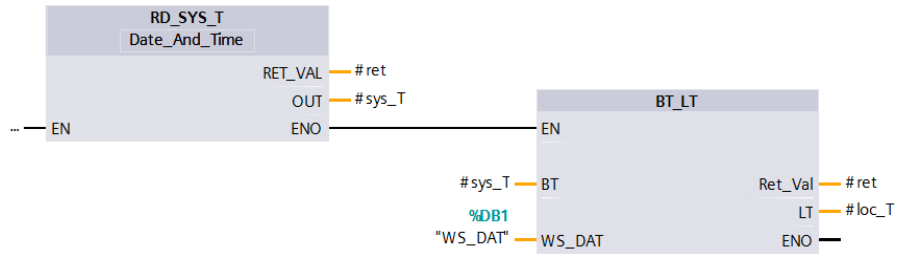
As the S7-300 and S7-400 CPUs do not automatically provide the local time in addition to the system time, the system time can be converted into the local time with the instruction BT_LT.

It might be reasonable to use the calculated local time also for the creation of messages etc.

The following table shows the calling of the BT_LT instruction in the FBD for the calculation of the current local time. The use of the instruction is also described in the FAQ under \9\.

The screenshots originate from the provided sample project.

Table 5-4

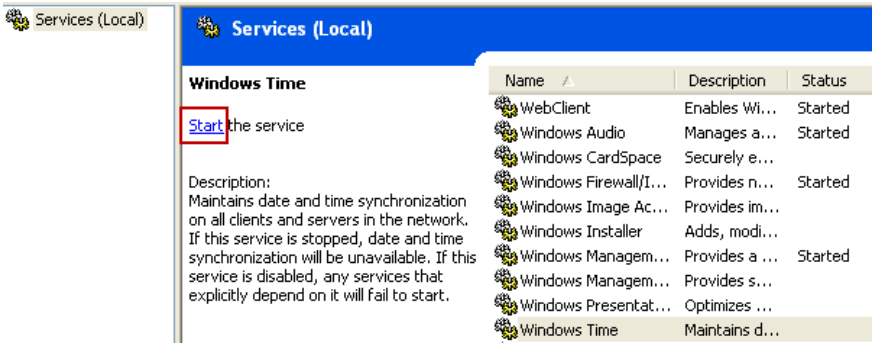
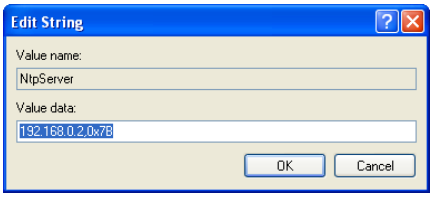
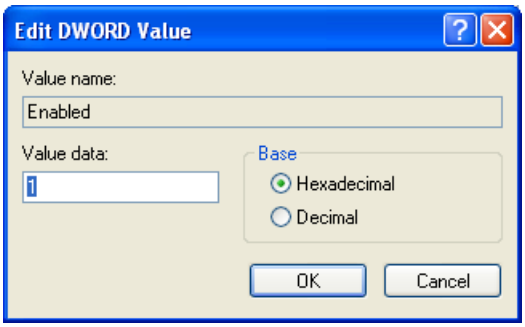
No.	Instruction
1.	Add a data block of the "WS_RULES" type to your user program. 
2.	Set the default values of the data block dependent on your time zone. When inserting the data block into STEP 7 V12, the default values are preset to CET with daylight savings time changeover. For more help on the values, please refer to the STEP 7 help. 
3.	Then first read out the system time with the RD_SYS_T block.
4.	Call the BT_LT instruction and transfer the current system time as well as the data block created in steps 1 + 2. The instruction returns the local time. Save this time in such a way that it can be accessed CPU-wide. Thus, diagnostic messages etc. can be supplied with the local time as time stamp. 

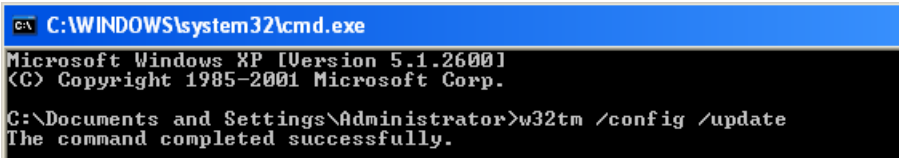
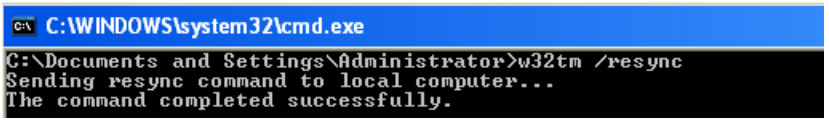
5.4 Setting up Windows PCs as NTP clients

Windows XP

The following table describes the procedure for setting up a PC as NTP client under Windows XP.

Table 5-5

No.	Instruction
1.	Go to "Start > run" and enter "services.msc" in the dialog window. Confirm with OK. A "Services" window opens.
2.	Select the "Windows Time" service and start the service via the blue link if it has not started yet. Additionally set the service to "Automatic" so that it is started automatically by the operating system upon each ramp-up. 
3.	Go to "Start > run" and enter "regedit" in the dialog window. Confirm with OK.
4.	Navigate to the "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\Parameters" folder and set the "NtpServer" key to the following value: "[IP_ADRESSE_DER_SERVER_CPU],0x7B".  Then edit the "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\TimeProviders\NtpClient\Enabled" key and set it to the value 1. 
5.	Go to "Start > run" and enter "cmd" in the dialog window. Confirm with OK.

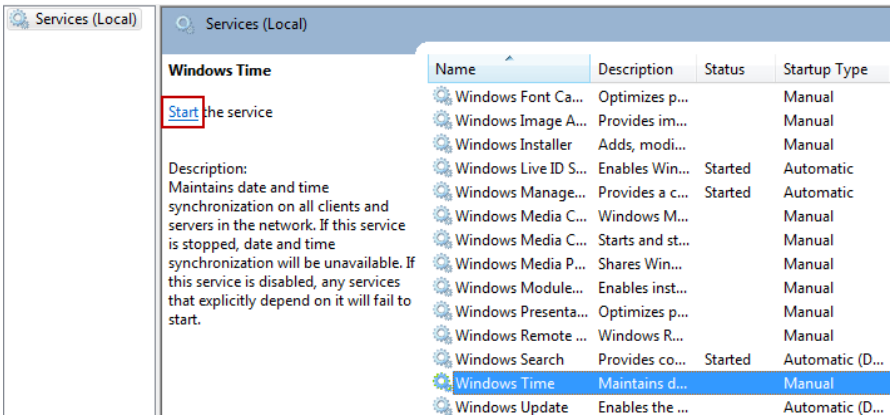
No.	Instruction
6.	Enter the command "w32tm /confg /update" in the command line and confirm with Return. Windows thus refreshes the settings. 
7.	Now enter the command "w32tm /resync" and confirm with Return. Thus, the time is requested via NTP from the server entered in step 3 for the first time. 

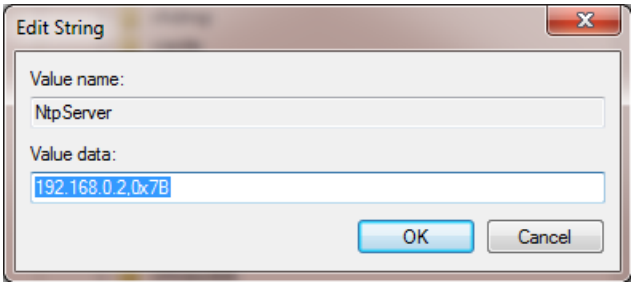
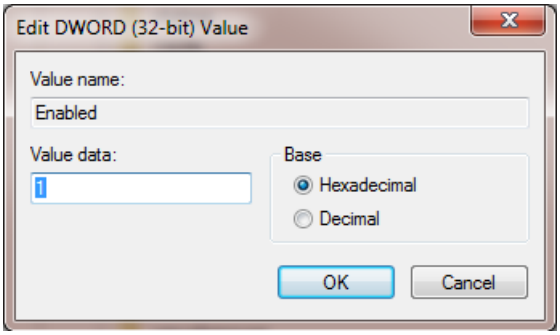
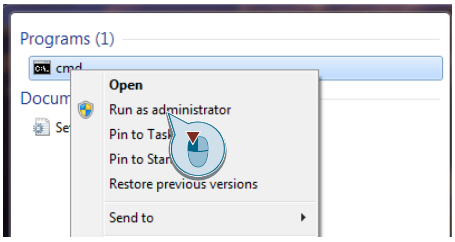
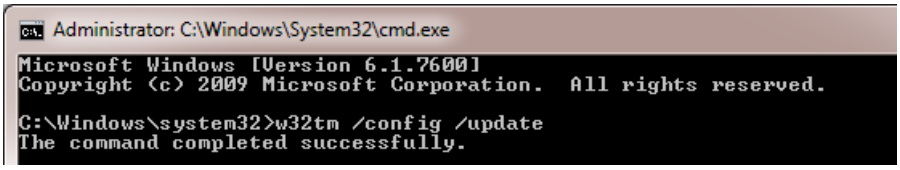
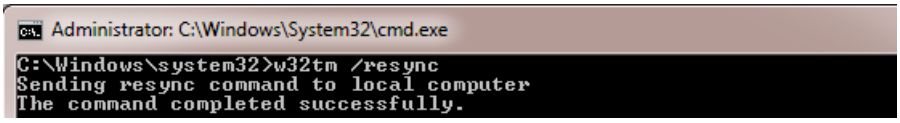
Note Make sure that port 123 is opened in the firewall of your PC.

Windows 7

The following table describes the procedure for setting up a PC as NTP client under Windows 7.

Table 5-6

No.	Instruction
1.	Go to "Start" and enter "services.msc" in the search line. Confirm with Return. A "Services" window opens.
2.	Select the "Windows Time" service and start the service via the blue link if it has not started yet. Additionally set the service to "Automatic" so that it is started automatically by the operating system upon each ramp-up. 
3.	Go to "Start" and enter "regedit" in the search line. Confirm with Return.

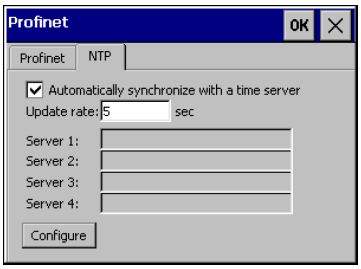
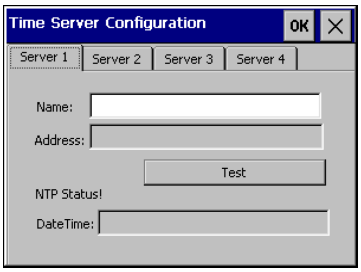
No.	Instruction
4.	Navigate to the "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\Parameters" folder and set the "NtpServer" key to the following value: "[IP_ADRESSE_DER_SERVER_CPU],0x7B".  Then edit the "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\TimeProviders\NtpClient\Enabled" key and set it to the value 1. 
5.	Go to "Start" and enter "cmd" in the search line. Execute the command line with administrator rights. Confirm with "Yes". 
6.	Enter the command "w32tm /confg /update" in the command line and confirm with Return. Windows thus refreshes the settings. 
7.	Now enter the command "w32tm /resync" and confirm with Return. Thus, the time is requested via NTP from the server entered in step 3 for the first time. 

Note Make sure that port 123 is opened in the firewall of your PC.

5.5 Setting up HMI panels as NTP clients

The following table describes the procedure for setting up an HMI panel as NTP client.

Table 5-7

No.	Instruction
1.	Open the "Control Panel".
2.	Open the "Profinet" dialog with the "PROFINET IO" icon. Go to the "NTP" tab.
3.	Activate "Automatically synchronize with a time server" and enter an update rate.  Then click on "Configure".
4.	Enter the IP address of the server CPU under "Name". In our example this is 192.168.0.2 for the S7-1500. With a click on "Test" the availability of the server is tested. 
5.	Confirm the entries with OK.

6 References

Table 6-1

	Subject	Title
\1\	Siemens Industry Online Support	http://support.automation.siemens.com
\2\	Download page of the entry	http://support.automation.siemens.com/WW/view/en/79047707
\3\	STEP 7 Professional V12.0 SP1 System Manual	http://support.automation.siemens.com/WW/view/en/77991795
\4\	Description of the SNTP Protocol	http://tools.ietf.org/html/rfc4330
\5\	Siemens Mall: SIPLUS DCF 77	https://eb.automation.siemens.com/mall/en/WW/Catalog/Product/6AG1057-1AA03-0AA0
\6\	Online Support: SIPLUS DCF 77	http://support.automation.siemens.com/WW/view/en/26339574
\7\	FAQ: "How can you determine the coordinates and synchronize the system time of the S7-1200 using a commercially available GPS receiver?"	http://support.automation.siemens.com/WW/view/en/42087405
\8\	FAQ: "Which STEP 7 standard blocks are available for time stamping and time-of-day synchronization?"	http://support.automation.siemens.com/WW/view/en/15249609
\9\	FAQ: "How can you calculate the actual local time (summer time or winter time) in the S7-300/400 CPU and then use it on the panel as system time?"	http://support.automation.siemens.com/WW/view/en/19324378
\10\	Windows Time Service Tools and Settings	http://technet.microsoft.com/pt-pt/library/cc773263(v=ws.10).aspx
\11\	FAQ: How can you set the module time of an S7-1200 CPU with the DCF77 radio clock module?	http://support.automation.siemens.com/WW/view/en/63628396

7 History

Table 7-1

Version	Date	Modifications
V1.0	11/2013	First version