

Wireless Data Communication with S7-1200 via GPRS

SIMATIC S7-1200, SINAUT MD720-3, SINAUT MICRO SC

[Library Description](#) • June 2011

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Wireless Data Communication with S7-1200 via GPRS

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1 Overview of the Library

The software SINAUT Micro SC offers wireless data communication between S7-200, S7-300 and S7-1200 stations, as well as communication with a Control Center.

This document includes a description of the libraries available for download which provide a solution for S7-1200-based applications.

In any case, we recommend using the documents listed in Table 5-1 as supplementary literature to this document.

1.1 Program blocks

Table 1-1

Library	Group	Program block	Number
sinautmicrosc	sinautmicrosc_com	Function data block: com	[FB144]
		Instance data block: specific name	[DB-specific number]
		Global data block: data_DB	[DB144]
	sinautmicrosc_chart	chart_cmd-return	-
		chart_rs232blocks	-

In order to use the scope of functions offered by MD720-3, the **function block "com"** must be called cyclically.

When the function block "com" is called, an **instance data block** will be created. We recommend to name this data block "com_DB", so as to make use of the watch tables described further below.

The **global data block** "data_DB" is used as a pool for the sending and reception of process values.

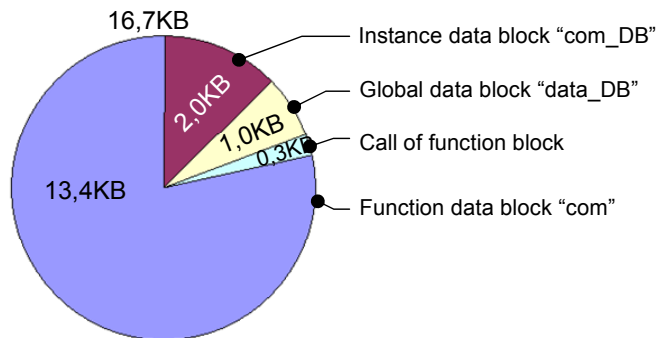
The **watch table** "chart_cmd-return" enables direct access to the input and output parameters of the function block "com".

With the help of the **watch table** "chart_rs232blocks", the point-to-point communication blocks required by the RS232 communication module can be monitored.

1.2 Library resources

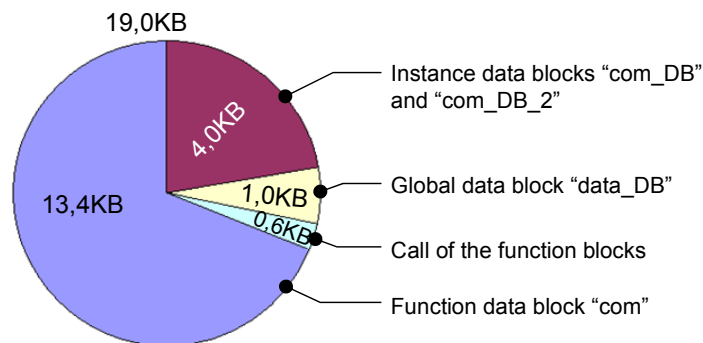
Each program block in the main memory is approx. 16.7 Kbytes in size. These blocks are made up as follows:

Figure 1-1



If function block "com" is called twice, it requires approx. 19 Kbytes in the main memory.

Figure 1-2



When the function block is called next time, the memory of a second instance data block of type "com" will be used.

Note The main memory required for calling the function data block "com" varies according to the length of the parameters used at the inputs of the function data block "com".

Note In order to free up memory space, the size of the global data block "data_DB" may be modified as described in chapter 1.5.2.

1.3 Hardware / software requirements for this library

The table below shows the minimum hardware and software requirements of the Remote Station.

Products

Table 1-2

No.	Order number	Qty.	Component
1.	6EP1332-1SH71	1	SIMATIC S7-1200, PM 1207, 2,5A
2.	6ES7211-1AD30-0XB0	1	SIMATIC S7-1200 CPU 1211C
3.	6ES7241-1AH30-0XB0	1	SIMATIC S7-1200 CM 1241, RS232
4.	6NH9720-3AA00	1	SINAUT MD720-3, GSM/GPRS modem
5.	6NH9860-1AA00	1	SINAUT ANT 794-4MR, antenna
6.	6NH7701-5AN	1	SINAUT ST7 connecting cable, RS232, 1:1, or a similar "modem cable"
7.	6XV1870-3QH20	1	Ethernet cable for configuration, 2 meters, or a similar cable

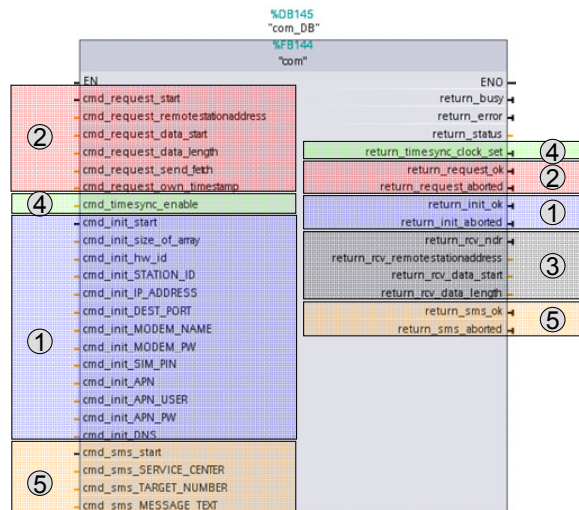
Configuration software / tools

Table 1-3

No.	Order number	Qty.	Component
1.	6ES7822-0AA01-0YA0	1	SIMATIC STEP 7 BASIC V11

1.4 The functions block "com" in detail

Figure 1-3



On the following pages the meaning of the individual parameters is described in further detail.

Table 1-4

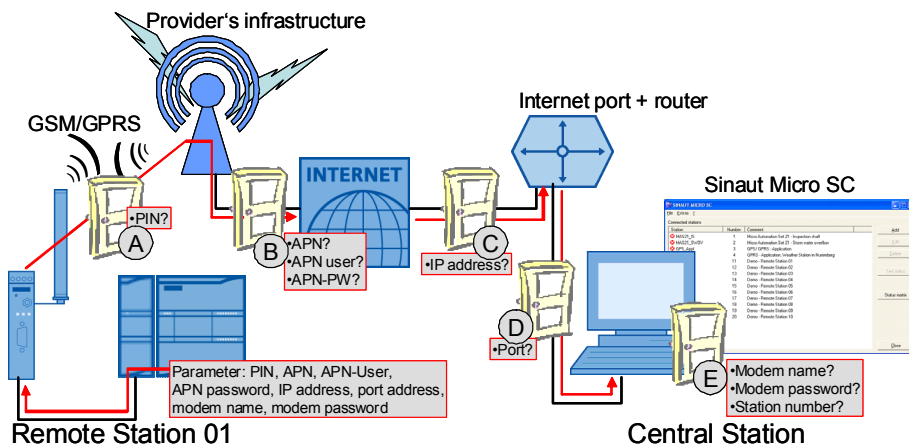
Group	Chapter
①	Chapter 1.4.1
②	Chapter 1.4.2
③	Chapter 1.4.3
④	Chapter 1.4.4
⑤	Chapter 1.4.5

1.4.1 Initiating the GPRS communication platform

Note

Before process data can be exchanged with the central station¹ or other remote stations², the modem parameters are to be defined. This is effected with the help of the input and output parameters, see Figure 1-3 (1). For a detailed description on how to select the specific parameters, please refer to chapter 3.1.

Figure 1-4



Modem login to SINAUT Micro SC

Table 1-5

Digit	Description
A	If the PIN number of the inserted SIM card has been accepted as valid, the modem logs in automatically to the provider's GSM network.
B	The modem logs in to the GPRS access point of the mobile network operator by means of the APN address , the APN user name and the APN user password . Then, an IP address from the provider's address range is assigned to the modem. The modem is now accessible over the Internet and can also send IP-based requests to all other communication partners connected to the Internet.
C	The modem sends a connection query to the Central Station. To do so, it requires the static IP address of the internet port used for communication with the Central Station. As an option, this can also be effected with a combination of DNS name server (in the form of an IP address) and host address (in the form of an URL).
D	The connection query has been received by the router of the Central Station's local IT network. On the basis of the port number, the router forwards the query to the Central Station PC.
E	The SINAUT Micro SC software checks the connection query sent by the modem. It checks the transmitted modem name and modem password in combination with the station number configured in SINAUT Micro SC . If this combination is accepted as valid, the SINAUT Micro SC software updates the internal routing chart entry with regard to the station number and the associated IP address of the modem currently valid.

The transparent data connection between Remote Station and Central Station is active now. This connection will later be used for all communication paths between

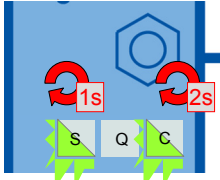
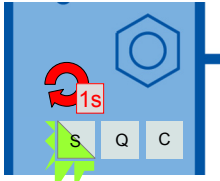
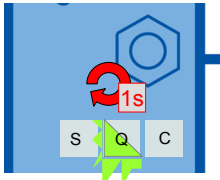
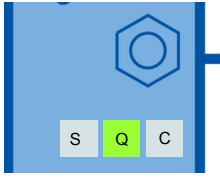
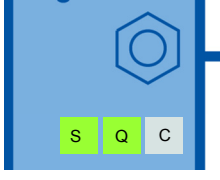
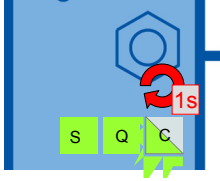
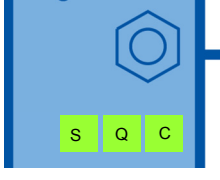
¹ (CS) refers to the platform (e.g. the PC) on which the software for this remote solution is installed

² (RS) refers to the remote SIMATIC PLC with a connected MD720-3

- RS $\leftarrow \rightarrow$ RS
- RS $\leftarrow \rightarrow$ CS

Monitoring Remote Station login by means of the LEDs on the MD720-3

Table 1-6

No.	Instructions	Note
1.	After activation of the voltage supply, the LEDs S and C start blinking at one- or two-second intervals.	
2.	After initialization has been triggered, the modem performs a parameter check.	
3.	The modem attempts to build up a GSM connection.	
4.	The modem logged in successfully in the provider's GSM network.	
5.	The modem has successfully established the GPRS connection.	
6.	The modem attempts to login to the Central Station.	
7.	The modem has successfully logged in to the Central Station.	

1.4.2 Control of the process data transfer in the Remote Station

With this remote solution, the transfer of process data can be initiated by different communication partners and executed in different directions. With the help of the input and output parameters Figure 1-3 (2) the local Remote Station can initiate the following communications:

- Remote Station sends data to Central Station
- Remote Station sends data to another Remote Station
- Remote Station requests data from another Remote Station

For further details on how these functions are executed, please refer to chapter 0.

Figure 1-5

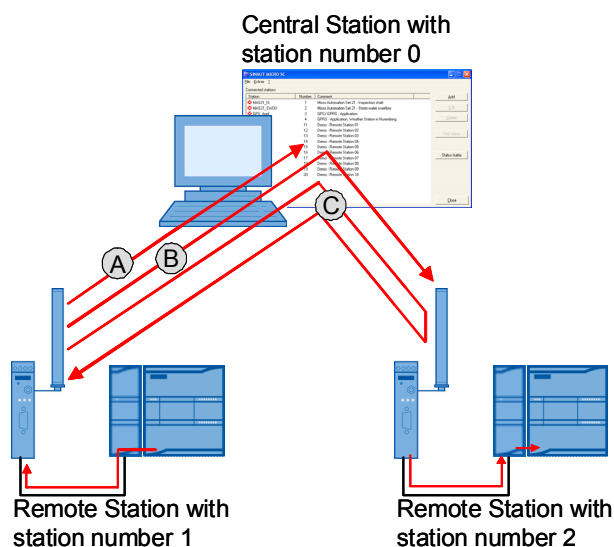


Table 1-7

Digit	Description
A	• Remote Station 1 sends a telegram with process values to the Central Station • Directly after receipt of the process values, the CS returns a response telegram to RS 1
B	RS 1 sends a telegram with process values to RS 2 • The process values are first sent to the CS • The receiving station is determined with the help of a routing chart, then the data is forwarded to RS 2 • RS 2 receives the telegram with the process values and transfers them to the global data block "data_DB[DB144]" • A response telegram is generated and returned to RS 1 via the CS
C	RS 1 requests process values from RS 2 • RS 1 sends a retrieve telegram to RS 2 via the CS • RS 2 evaluates the telegram and compiles the requested process values in a telegram • The response telegram with the requested process values is returned to RS 1 via the CS

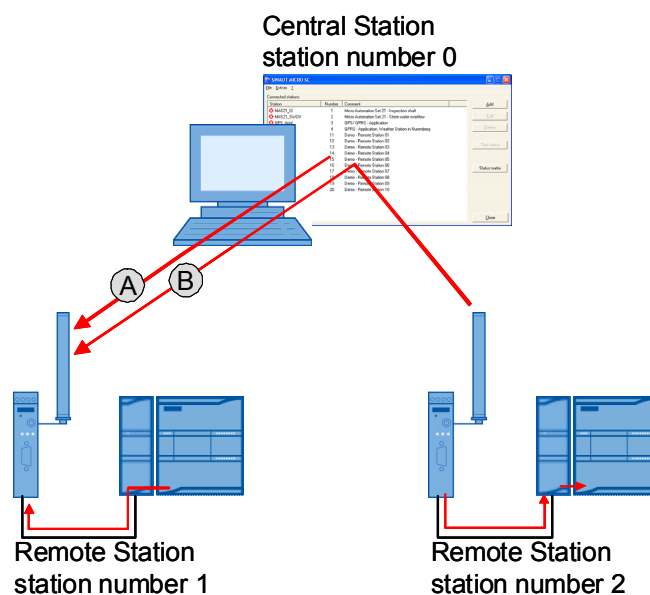
1.4.3 Analysis of process data received in the Remote Station

All process data received are stored in the global data block "data_DB[DB144]". The output parameter Figure 1-3 (3) is used to identify by whom and how many data has been stored in the global data block. The process values received can originate from different stations.

- A distant Remote Station sends data to the local Remote Station
- The Central Station sends data to the local Remote Station

For details on the meaning of the response values, please refer to chapter 3.3.

Figure 1-6



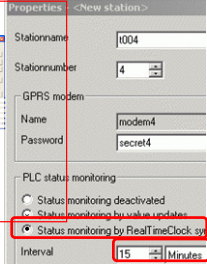
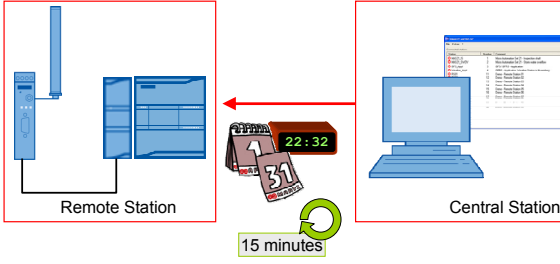
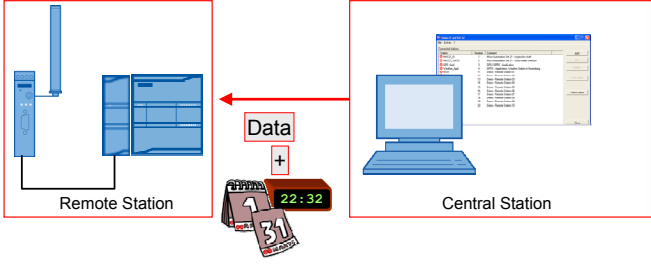
1.4.4 Updating the clock time in the Remote Station

The UTC system clock in the Remote Station can be set from the Central Station. To do so, the Central Station continuously transmits its own system clock information.

This procedure enables time synchronization throughout the system.

Time synchronization can be initiated by two telegrams.

Table 1-9

No.	Description
1.	 In the Software SINAUT Micro SC of the Central Station a time synchronization interval can be specified for each station. Based on this specification, a time synchronization telegram will be sent at the specified time.
2.	 Each time when process values are transmitted from the Central Station to the Remote Station, the system clock of the Remote Station will be set anew.

In order to make use of this feature, the relevant parameter of the Remote Station must be defined as described in chapter 3.4.

1.4.5 Sending short messages

Function data block "com[FB144]" can be used to transmit short messages, provided the relevant parameters have been set as described in chapter 3.5.

As long as short messages are being transmitted, no process values can be sent or received via GPRS.

The transmission of short messages includes the following steps.

Table 1-10

No.	Description	Comment/Illustration
1.	The Remote Station is logged in. Exchange of process data via GPRS is possible.	GPRS / server connection is active OPC mode Remote Station Central Station
2.	After a command for the transmission of a short message has been issued at function data block "com[FB144]", the GPRS connection to the server will be deactivated.	No GPRS / server connection OPC mode Remote Station Central Station
3.	The modem switches over to the AT-compatible mode, so that AT commands can be received in the S7-1200 and analyzed.	No GPRS / server connection AT mode Remote Station Central Station
4.	Transmission of the short message.	SMS AT mode Remote Station
5.	After successful transmission of the short message or after unsuccessful termination, the modem will be initialized anew (see chapter 1.4.1). In the course of initialization, the modem switches back to OPC mode and re-establishes its GPRS connection to the Central Station. Now, the exchange of process data via GPRS possible again.	GPRS / server connection is active OPC mode Remote Station Central Station

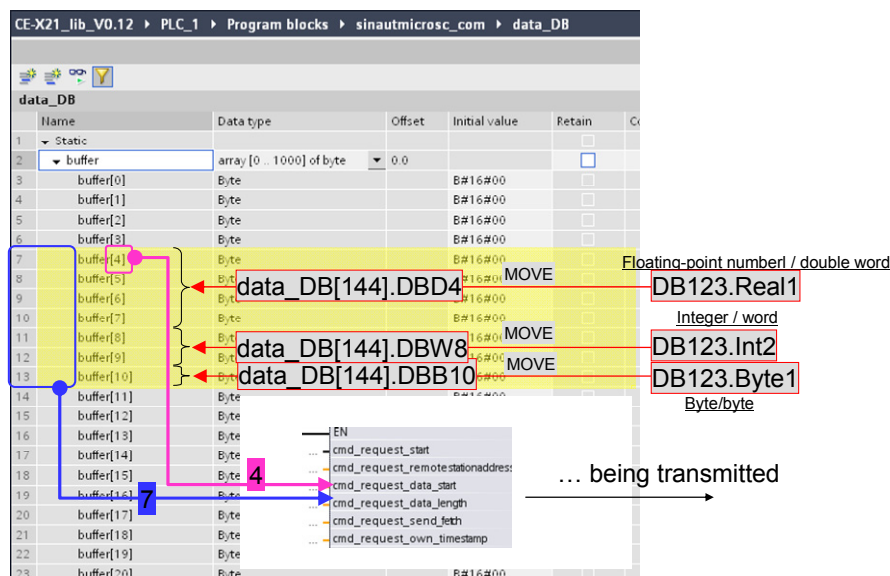
1.5 The global data block "data_DB" in detail

1.5.1 Function principle of "data_DB" for the storage of process values

The global data block "data_DB" is used to store all process data received so that the desired data can be retrieved from there if process data are to be sent. For conceptual reasons, the areas for the sending process and the receiving process should be kept separated. There is no check for cross-references or data consistency of the process values.

Example of a send process

Figure 1-7



In the above example, three variables are to be transmitted. This data includes the data types floating-point number (double word), integer (word) and byte (byte). With the STEP 7 Basic V11 command "MOVE", the values of these variables are moved to an absolutely addressed position in the global data block "data_DB[144]". Now, the "start address" and "length" information required by function block "com[FB144]" can be read with the help of the array structure in the global data block "data_DB[144]".

Figure 1-8

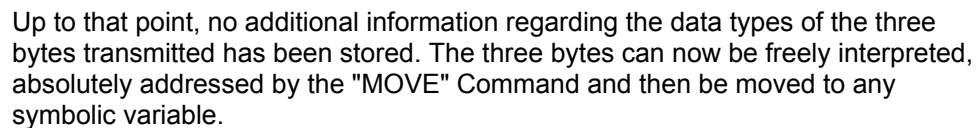


Figure 1-9

Excerpt from the S7-200 System Manual, Appendix A

Table A-4 CPU Specifications

CE-X21_lib_V0.12 ▸ PLC_1 ▸ Program blocks ▸ sinautmicrosc_com ▸ data_DB

data_DB

	Name	Data type	Offset	Initial value	Retain
1	Static				
2	buffer	array [0 .. 8192] of byte	0.0		☐

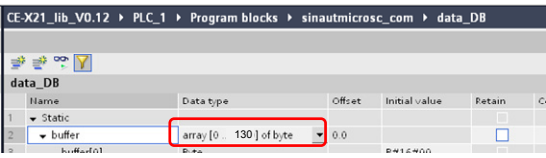
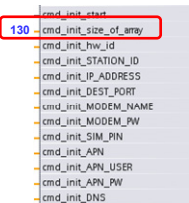
For 100% compatibility with a S7-200 CPU 224, the array field of the S7-1200 would require a size of 8192 bytes.

This, however, should not be the objective of array field dimensioning. Actually, it should include the maximum number of bytes to be sent and received, so that the global data block "data_DB[DB144]" can be kept at a minimum.

1.5.2 Changing the size of the global data block

The size of the global data block "data_DB[DB144]" can be modified in two steps.

Table 1-11

No.	Description
1.	 • Change the size of the array field as desired.
2.	 • Enter the value in the input parameter "cmd_init_size_of_array" of function block "com_DB[DB145]".

Note

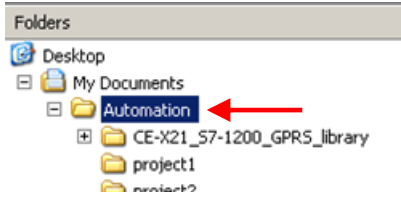
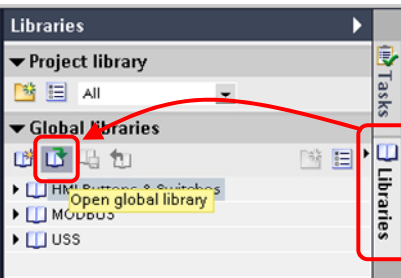
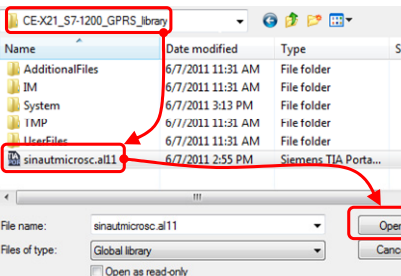
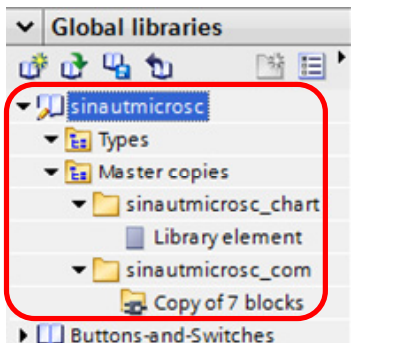
The default value for the array field size, as well as the start value for the input parameter "cmd_init_size_of_array" of function block "com_DB[DB145]" is "1000". If this start value shall be retained, none of the above settings should be modified.

2 Working with the Library

2.1 Integrating the library into STEP 7 Basic V11

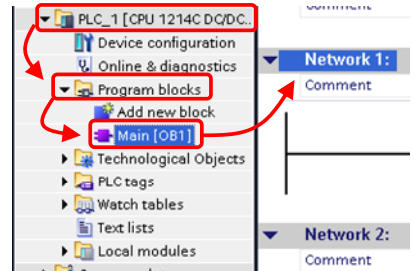
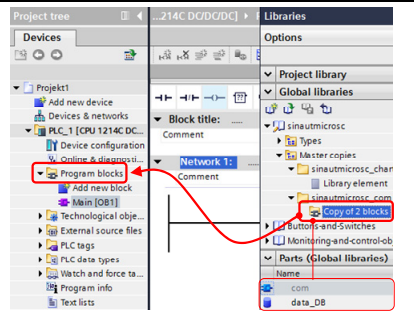
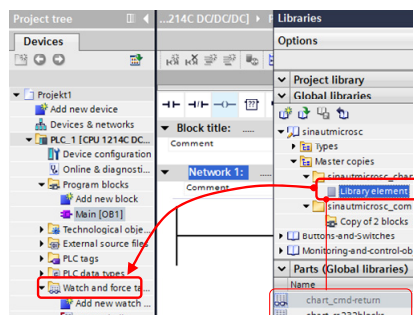
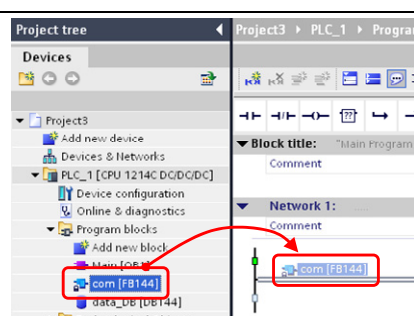
In order to use the library functions described above, they have to be integrated into the configuration software. The necessary steps are listed in the table below.

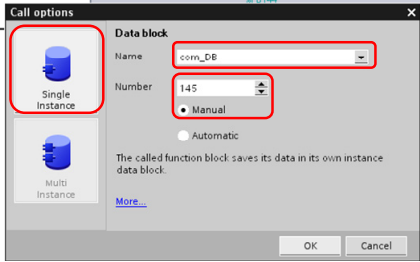
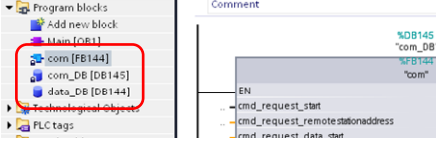
Table 2-1

Steps	Function	Figure/Comment
1.	The library is available on the HTML page from where you have downloaded this document. Save the library to your hard disk. CE-X21_S7-1200_GPRS_library.zip	We recommend to file all STEP 7 Basic V11 projects and libraries in the "Automation" directory. 
2.	Open STEP 7 Basic V11.	
3.	- Open the "Libraries" tab - Click the "Open global library" button	
4.	- Navigate to the folder where the library file with the filename extension *.al11 is stored - Select this file and click "Open" to confirm your selection	
5.	The library is being loaded and will, from now on, be available in the "Global libraries" folder	

2.2 Using library blocks

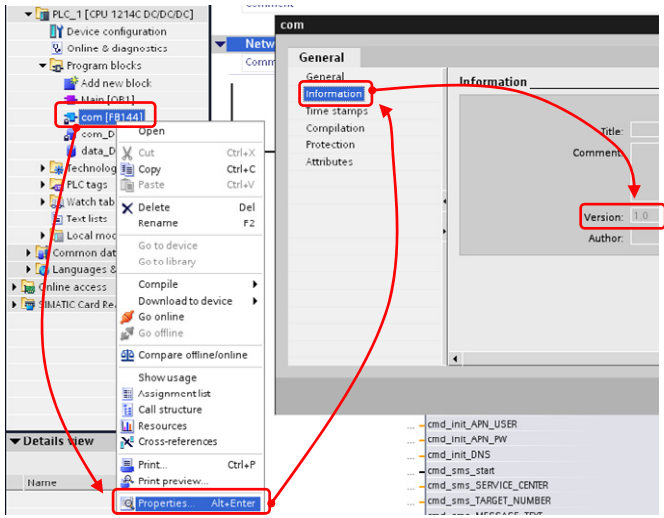
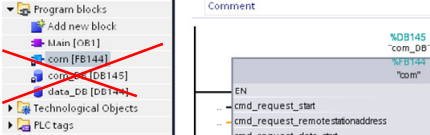
Table 2-2

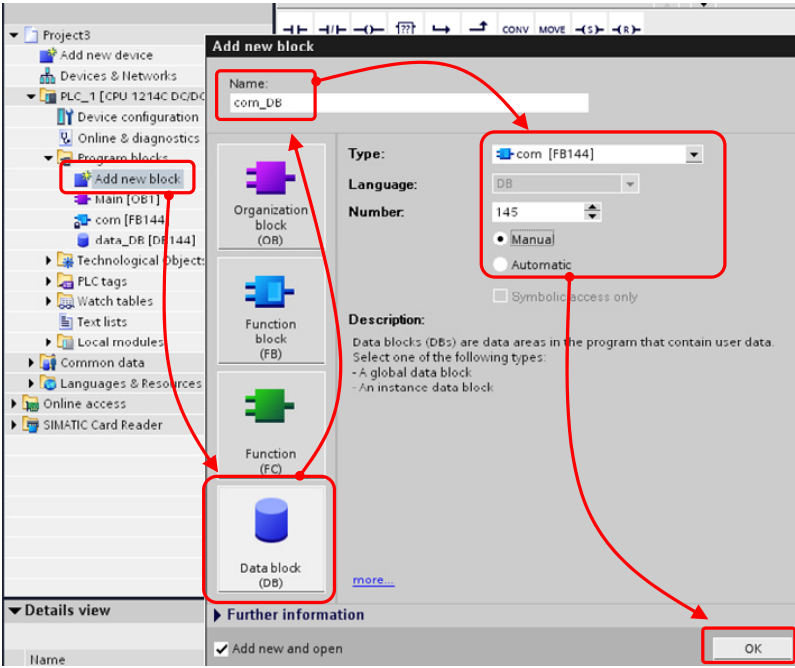
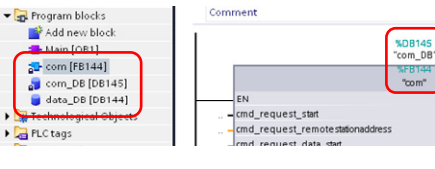
Step	Function	Figure/Comment
1.	- Open STEP 7 Basic V11 and create a new project - Select "Add new device " to add the desired S7-1200 PLC	This library can be used in combination with all controller types of the S7-1200 series
2.	- Navigate to the "Program blocks" folder - Open the "organization block" OB1	
3.	- Navigate to the library group "sinautmicrosc_com" in the opened library "sinautmicrosc" - Drag&drop the "Library elements" of this group into the "Program blocks" folder	
4.	- Navigate to the library group "sinautmicrosc_chart" in the open library "sinautmicrosc" - Drag&drop the "Library elements" of this group to the "Watch tables" folder	
5.	Now drag&drop the function block "com[FB144]" to any network in the previously opened OB1	

Step	Function	Figure/Comment
6.	- Enter the relevant "Name" and "Number" to select an instance data block - Click "OK" to confirm your entries	
7.	The numbers and symbolic names of the library blocks can be freely selected.	

2.3 Check and update of the library version

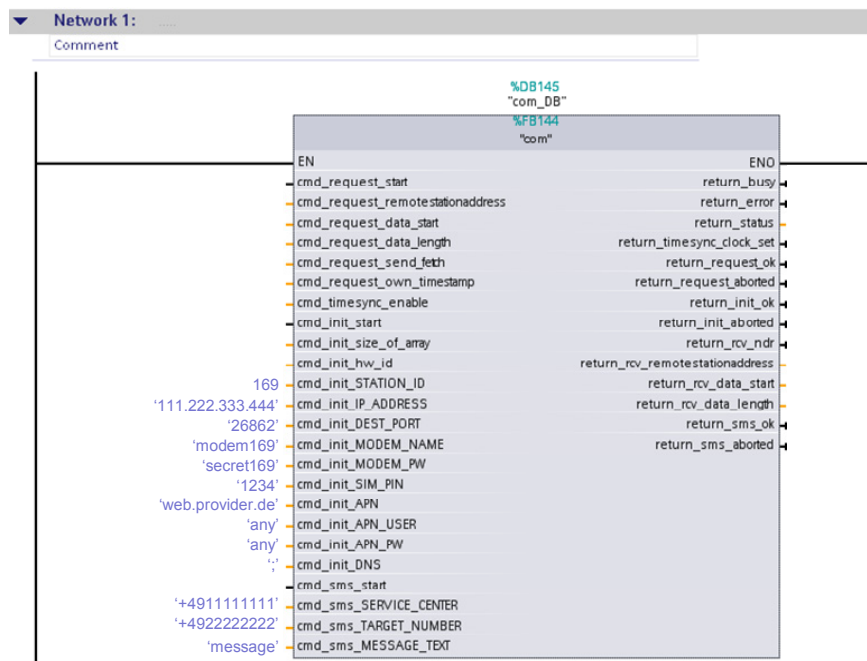
Table 2-3

Step	Function	Figure/Comment
1.		
2.	Perform the following steps for each element of the library. - Click the function or data block with your right mouse button and select the item "Properties" from the context menu. - In the Properties dialog window, select the "Information" menu. - Compare the current version number in the "Version" field with the latest version available in the Service&Support Portal.	
3.	If you wish to update your library, download and integrate the latest library version as described in chapter 3.1 .	
4.	- Delete all relevant elements in the "Program blocks" folder. - Do not delete the function block call command in OB1.	
5.	Add the new library elements as described in chapter 3.2 up to step no. 3.	
6.	The updated block elements have now been integrated. The previous call of function block "com[FB144]", however, still shows a missing instance data block.	

Step	Function	Figure/Comment
7.		
8.	Add the instance data block manually. • Doubleclick "Add new block" • Select "Data block" as block type and define a name. • Select the instance data block "com" as data block type. • Click "OK" to confirm your entries	
9.	The library update is now completed. 	

3 Library Interface Description

Figure 3-1



3.1 Parameter for initialization: _init_

Figure 3-2

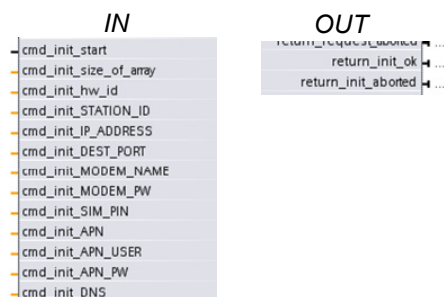


Table 3-1

No.	Designation	Transfer	Data type	Description/Comment
1.	cmd_init_start	IN	Bool	- Activates the initialization process - Reacts to a positive edge - The start trigger is cached when the Function Block "com" is currently busy. <u>Only one</u> start trigger can be cached if it cannot be processed immediately. - If the initialization process is terminated with error the routine is re-triggered automatically after five seconds. This becomes an endless loop until the process finished successfully.

No.	Designation	Transfer	Data type	Description/Comment
2.	cmd_init_start_auto	IN	Time	- Activates the initialization process if no GPRS communication was detected during the specified time - Is activated with ≥ 5m (minutes) - Is deactivated with < 5m (minutes) - Consider the note at the end of the table
3.	cmd_init_size_of_array	IN	Int	- Enter the size of the array in the global data block "data_DB[144]" - Default value: 1000; no entry required, if the global data block is not modified
4.	cmd_init_hw_id	IN	PORT	- HW-ID of the RS232 communication module - Default value: 269; - Check hardware ID in device information/RS232_1-Properties/RS232 interface/I/O addresses hardware ID
5.	cmd_init_STAT ION_ID	IN	Int	- Specific and unique station number - Admissible values: from 1 to 256 - Corresponds to the station number allocated in the SINAUT Micro SC software
6.	cmd_init_IP_A DDRESS	IN	String	- Static IP address of the Internet connection to the Central Station <u>or</u> host name, if DynDNS is used - Admissible value: max. 50 characters
7.	cmd_init_DEST _PORT	IN	String	- Port number used for routing to the Central Station - Corresponds to the port number allocated in the SINAUT Micro SC software - Admissible value: max. 6 characters
8.	cmd_MODEM_ NAME	IN	String	- Modem name for authentication - Corresponds to the modem name used in the SINAUT Micro SC software - Admissible value: max. 16 characters
9.	cmd_MODEM_ PW	IN	String	- Modem password for authentication - Corresponds to the modem password used in the SINAUT Micro SC software - Admissible value: max. 16 characters
10.	cmd_init_SIM_ PIN	IN	String	- PIN number of the SIM card used in the modem - If the PIN number is deactivated, enter "0000"
11.	cmd_init_APN	IN	String	- GPRS access point address of the relevant provider - Allocated by the provider - Admissible value: max. 30 characters - List: http://www.unlocks.co.uk/gprs_settings.php
12.	cmd_init_APN_ USER	IN	String	- User name for login to GPRS, allocated by the provider - Admissible value: max. 30 characters

No.	Designation	Transfer	Data type	Description/Comment
13.	cmd_init_APN_PW	IN	String	- User password for login to GPRS, allocated by the provider - Admissible value: max. 30 characters
14.	cmd_init_DNS	IN	String	- DNS name server of the provider in the form of IP addresses - Up to two IP addresses, separated by a semicolon - Only relevant in combination with a host address instead of a static IP address (see Table 4-1 No. 5) - Example: IP1;IP2
15.	return_init_ok	OUT	Bool	- Gives feedback, if modem initialization has been <u>successfully</u> completed. - This does <u>not</u> imply, that the PLC is also logged in to SINAUT Micro SC - After this output has been set, it takes at least 20 seconds until the station will be logged in to SINAUT Micro SC - Remains set to TRUE until initialization is triggered anew. - Default setting: TRUE
16.	return_init_aborted	OUT	Bool	- Gives feedback, if modem initialization was terminated with <u>error</u>. See Table 4-6 No. 3 - Remains set to TRUE until initialization is triggered anew - Default setting: FALSE

Note When selecting the APN address, please note that the provider makes a distinction between APN access points for WAP and for the "real" Internet. WAP access point will not function with this system.

Note With the solution based on this S7-1200 PLC, a teleservicing function cannot be realized. For this reason, the parameter "CLIP", as known from the GPRS solution based on the S7-200 unit, has been omitted.

Note Parameter „cmd_start_init_auto“

Running the complete initialization process of the modem will cause a new assigned IP-address and a new connection to the Central Station. This can help in rare situation when there are some problems with the provider's network.

When the connection to the server breaks down normally no new initialization of the GPRS-Modem MD720-3 is not required. The modem tries to re-establish the connection by itself.

3.2 Parameter for data transfer: `_request_`

Figure 3-3

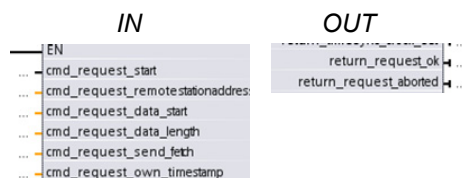


Table 3-2

No.	Designation	Transfer	Data type	Description/Comment
1.	cmd_request_start	IN	Bool	- Starts the send or request process - Reacts to a positive edge - The start trigger is cached when the Function Block "com" is currently busy. <u>Only one</u> start trigger can be cached if it cannot be processed immediately.
2.	cmd_request_remotestationaddress	IN	Int	- Addresses the desired recipient of the send or retrieve request - Value: 0 → Central Station - Value: from 1 to 256 → other Remote Station - Admissible values: from 0 to 256 - Corresponds to the station number in the SINAUT Micro SC software for the station to be accessed
3.	cmd_request_data_start	IN	Word	- Specifies from which address onwards (from which array element) of the global data block "data_DB[144]" the data shall be retrieved or stored - This entry corresponds to the array index and the absolute address. Example: value 77 = array element buffer[77] = DB144.DBB77 - Admissible value: not larger than the size of the array in the global data block "data_DB[144]" (see Table 4-1 No. 2)
4.	cmd_request_data_length	IN	Byte	- Specifies how many bytes (as from the start address, see Table 4-2 No. 3) shall be retrieved or stored - Admissible values: from 1 to 239; summed up with the start address it must not be larger than the array in the global data block "data_DB[144]" (see Table 4-1 No. 2)
5.	cmd_request_send_fetch	IN	Int	- Specifies whether data shall be sent or retrieved to or from a distant station. - Default value: 1 - Admissible values: 1, 2 or 3 1: <u>Send</u> data <u>to</u> a distant station (CS or RS) incl. a <u>system-internal time stamp</u> from the PLC 2: <u>Retrieve</u> data <u>from</u> a distant station 3: <u>Send</u> data <u>to</u> a distant station (CS or RS) incl. <u>the own time stamp</u>, see Table 4-2 No. 6

No.	Designation	Transfer	Data type	Description/Comment
6.	cmd_request_own_timestamp	IN	DTL	- Offers the opportunity to enter an external time stamp, so as to enable transmission of historic data and their correct chronological sorting in the Central Station - The "nano seconds" component will not be considered for transmission
7.	return_request_ok	Out	Bool	- Gives feedback, if the last send or retrieve job has been <u>successfully</u> terminated³ - Remains set to TRUE until the next job is triggered - Default setting: FALSE
8.	return_request_aborted	OUT	Bool	- Gives feedback, if the last send or retrieve job has <u>not</u> been <u>successfully</u> terminated⁴ - Relevant in combination with Table 4-6 No. 3 - Remains set to TRUE until the next job is triggered - Default setting: TRUE

³ This means that this local Remote Station has not only successfully sent its own telegram, but has also received a response telegram from the distant station that matches the telegram sent from this Remote Station.

⁴ This means that the response telegram from the distant station did not match with our request telegram, or that no response telegram at all has been received within a period of 10 seconds.

3.3 Parameter for the receipt of data: return_rcv_

Figure 3-4

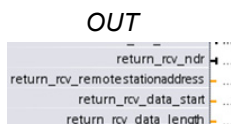


Table 3-3

No.	Designation	Transfer	Data type	Description/Comment
1.	return_rcv_ndr	OUT	Bool	- Gives feedback, if data from a distant station (RS or CS) have been received - Gives no feedback, if data has been received which has been sent in response to a request from the local station (retrieve job). - Set to TRUE for one cycle and will then be reset automatically - The subsequent parameters (see Table 4-3 Nos. 2-4) are to be considered immediately after this output has been set
2.	return_rcv_remotestationaddress	OUT	Int	- Specifies the station from where data has been received - Value: 0 → Central Station - Value: from 1 to 256 → other Remote Station - Possible values: from 0 to 256
3.	return_rcv_data_start	OUT	Word	- Specifies from which address onward (array element) writing to the global data block "data_DB[144]" starts - The value corresponds to the array index and the absolute address. Example: value 77 = array element buffer[77] = DB144.DBB77
4.	return_rcv_data_length	OUT	Byte	- Specifies how many bytes (as of the start address, see Table 4-3 No. 3) were received and written to the data block "data_DB[144]" - Possible value: from 1 to 239

Note

When a telegram is received from a CS or another RS and if the total of start address (Table 4-3 No.3) and length (Table 4-3 No.4) exceeds the array in the global data block "data_DB[144]" (see Table 4-1 No. 2), the telegram will automatically be rejected. There won't be any information at the return_rcv_ parameters for data reception.

3.4 Parameter for clock time synchronization: `_timesync_`

Figure 3-5



Table 3-4

No.	Designation	Transfer	Data type	Description/Comment
1.	<code>cmd_timesync_enable</code>	IN	Int	- Default value: 1 - Admissible value: 1 or 2 1: Activates clock time synchronization. The CS is authorized to set the controller-internal system clock by the following means: "status monitoring clock time synchronization" (see. Table 6-1 No. 1, chapter 6.1) - send request to the RS 2: Deactivates the clock time synchronization function
2.	<code>return_timesync_c_clock_set</code>	IN	Bool	- Gives feedback after the internal system clock has been set - Set to TRUE for one cycle and will then be reset automatically

3.5 Parameter for sending SMS messages: `_sms_`

Figure 3-6

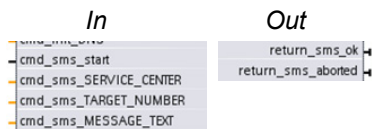


Table 3-5

No.	Designation	Transfer	Data type	Description/Comment
1.	cmd_sms_start	IN	Bool	- Starts the SMS transmission process - Reacts to a positive edge - The start trigger is cached when the Function Block "com" is currently busy. <u>Only one</u> start trigger can be cached if it cannot be processed immediately.
2.	cmd_sms_SERVICE_CENTER	IN	String	- Enter the short message center of your provider here - Example: +49123456789 - Admissible value: max. 20 characters
3.	cmd_sms_TARGET_NUMBER	IN	String	- Calling number of the receiving device to which the SMS shall be sent - Example: +49123456789 - Admissible value: max. 20 characters
4.	cmd_sms_MESSAGE_TEXT	IN	String	- Content of the SMS to be sent - Admissible value: max. 160 characters
5.	return_sms_ok	OUT	Bool	- Gives feedback when the last SMS send job has been <u>successfully</u> terminated - Remains set to TRUE until the next job is triggered anew - Default setting: FALSE
6.	return_sms_aborted	OUT	Bool	- Gives feedback, if the last SMS job for data transmission has <u>not</u> been <u>successfully</u> terminated - Relevant in combination with Table 4-6 No. 3 - Remains set to TRUE until the next job is triggered anew - Default setting: TRUE

Note

This SMS send block has been designed exclusively for the use with a SINAUT Micro SC Central Station. If the SMS function is used without connection to the Central Station, the data volume will increase as a result of failed connection trials after SMS transmission.

3.6 Return parameter: return_

Figure 3-7

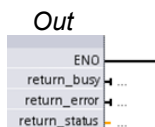


Table 3-6

No.	Designation	Transfer	Data type	Description/Comment
1.	return_busy	OUT	Bool	- Signals if the block "com[FB144]" is busy with a routine operation - Changes over to TRUE after a "cmd_" command has been triggered - May also change over to TRUE, if telegrams from distant stations (CS or RS) are being processed internally. If so, no "cmd_" command has been actively triggered. - Changes over to FALSE as soon as the routine is terminated
2.	return_error	OUT	Bool	- Gives feedback, if an error occurred in the course of a routine operation - Always relevant in combination with Table 4-6 No. 3
3.	return_status	OUT	Int	- Returns status information after an error, so that the cause of the error can be localized - Always to be considered in combination with the status list in Chapter 5

4 Library Status Words

If a routine cannot be terminated successfully, each routine of the function data block "com[FB144]" provides information about the error cause by means of a common status word. The symbolic address of this variable is "return_status".

The status word is issued in the form of a decimal number and can be allocated as shown in the table below.

Table 4-1

Status	Meaning	Tips for help/Comment
1000	Buffer in the RS232 communication module could not be cleared	- Read out the diagnostic buffer of the controller - Read out the variable "com_DB[DB145].rst_rcv_status" and compare it with Table 6-1 No.2 Chapter 8.6.7
1010	The presently relevant AT command or telegram could not be transmitted from the RS232 communication module to the MD720-3	- Read out the diagnostic buffer of the controller - Check the cable connection between the RS232 communication module and the MD720-3 (use a modem cable, <u>not</u> a null modem cable) - Read out the variable "com_DB[DB145].ptp_send_status" and compare it with Table 6-1 No.2 Chapter 8.6.5
3000	Incorrect termination of the port configuration: PORT_CFG	Read out the variable "com_DB[DB145].cfg_port_status" and compare it with Table 6-1 No.2 Chapter 8.6.2
3010	Incorrect termination of the configuration for character reception: RCV_CFG	Read out the variable "com_DB[DB145].cfg_rcv_status" and compare it with Table 6-1 No.2 Chapter 8.6.4
3020	Incorrect termination of the configuration for character transmission: SEND_CFG	Read out the variable "com_DB[DB145].cfg_send_status" and compare it with Table 6-1 No.2 Chapter 8.6.3
3999	Timeout during configuration of the RS232 module.	Transfer of wrong hardware ID at the input of block "com_DB[DB145]" (see Table 4-1 No. 3)
4160	Provider class could not be set	Check MD720-3 with regard to the latest firmware version
4200	IP address could not be transferred	Check the relevant parameters
4240	Port number could not be transferred	
4280	Modem name could not be transferred	
4320	Modem password could not be transferred	
4360	PIN number could not be transferred	
4400	APN address could not be transferred	
4440	APN user name could not be transferred	
4480	APN user password could not be transferred	- Check the parameters - If not relevant, enter a semicolon
4520	First DNS address could not be transferred	
4560	Second DNS address could not be transferred	
4900	Terminal mode stop command could not be transferred	Start initialization anew

Status	Meaning	Tips for help/Comment
4940	Parameter mode could not be left	Reset the modem to factory settings
4999	Timeout during modem initialization	- Check connectivity between the S7-1200 PLC and the MD720-3 - Check whether the cable used is a modem cable (serial standard cable), <u>not</u> a null modem cable (see. http://de.wikipedia.org/wiki/Nullmodem-Kabel)
6090	A write request from the local station has not been answered with a plausible acknowledgement. - different sequence number - incorrect function code (e.g. read instead of write acknowledgement)	Send the write request again
6100	A read request from the local station has not been answered with a plausible acknowledgement. - different sequence number - Incorrect function code (e.g. write instead of read acknowledgement)	Send the read request again
6990	The acknowledgement to be sent from this station was not accepted by the modem.	- Check each of the possible communication directions - If a fault was found in a specific communication path, check the relevant parameters
6999	Timeout while the function block processed telegrams received from the CS or from another RS	- Check cable connection of all communication partners - Check status of the Central Station
7000	Override of global data block "data_DB"	- The total of "com_DB[DB145].cmd_request_data_start" and "com_DB[DB145].cmd_request_data_length" exceeds the size of the array in the global data block "data_DB" - Check the actual size of the array in the global data block "data_DB" in comparison to the parameter "com_DB[DB145].cmd_init_size_of_array"
7990	The telegram to be sent from this station was not accepted by the modem	- The parameter "com_DB[DB145].cmd_request_data_length" must have a value ≥ 239 - The parameter "com_DB[DB145].cmd_request_send_fetch" must include the value 1,2 or 3. Any other values are not admissible
7999	Time-out while the function block was processing a write or fetch job.	
7998	The acknowledge on our Write- or Read-request was not received within 10 seconds from the remote Central Station or from an other Remote Station.	- Check the parameter „com_DB[DB145].cmd_request_remotestation address“ - Try again (maybe a telegram got lost)
8120	The active modem connections could not be terminated quickly enough or not at all.	Make a further attempt

Status	Meaning	Tips for help/Comment
8160	Short message center of the provider could not be transferred.	Check "com_DB[DB145].cmd_sms_SERVICE_CENTRAL"
8200	Target number of the receiving device could not be transferred.	Check "com_DB[DB145].cmd_sms_TARGET_NUMBER"
8240	Message text could not be transferred	- Check "com_DB[DB145].cmd_sms_MESSAGE_TEXT" - Do not use any control characters in a message text
8999	Timeout while the function block was processing the transmission of an SMS	- Check all SMS-relevant parameters - Use a mobile phone to test transmission of an SMS with the same SIM card
10001	An error message from SINAUT Micro SC has been received	General error, not specified in detail
10002		Timeout while a function was being processed
10010		Unknown communication partner. The station stated in "com_DB[DB145].cmd_request_remotestation address" cannot be identified by the SINAUT Micro SC software
10011		Invalid start address. The start address for the user data is invalid
10012		Invalid length. The number of user data is invalid (i.e. it is too large)
10013		Function not supported. The required function is not supported

Note With regard to trouble-shooting, please refer to the document listed in Table 5-1 No. 1 Chapter 10 in any case.

Note For assistance in problem elimination, please make also use of our technical forum in the Service&Support Portals.

<http://www.siemens.de/forum-configuration-example>

Note If these instruments for problem elimination do not lead to the desired result, it may be helpful to reset the MD720-3 to the factory settings. This can be done with a paper clip. Press the SET button until the "C" LED lights up, then remove the paper clip. Wait until the boot process is completed and the modem is in a status as shown in Table 1-5 No. 1.

5 Literature

Table 5-1

Nr.	Document / Link
1.	SINAUT Micro SC System Manual http://support.automation.siemens.com/WW/view/en/23119827
2.	SIMATIC S7-1200 System Manual http://support.automation.siemens.com/WW/view/en/36932465
3.	S7-300 based application example with a remote control system http://support.automation.siemens.com/WW/view/en/27038105
4.	MD720-3 system manual http://support.automation.siemens.com/WW/view/en/23117745

6 History

Table 6-1

Version	Date	Revisions
V1.5	06/2011	New library version V1.5 - Library adapted to STEP 7 V11 - No changes in functionality
V1.3	01/2011	New library version V1.3 - Enhanced start conditions for the initialization routine, see Table 3-1 Nr.1, Nr.2 - Modified default values for the return parameters of the initialization routine, see Table 3-1 Nr.15, Nr.16 - Status 9998 is now described, see Table 4-1 The application code (second download on the HTML page) based on this library is not adapted to the library version V1.3.
V1.1	04/2010	New library version V1.2. - Changes in Table 3-1 Nr. 1, Table 3-2 Nr. 1 and Table 3-5 Nr. 1 concerning the starting behavior - Patched problem concerning switching between AT-compatible Mode and OPC-Mode (see Chapter 1.4.5) during SMS sending process
V1.0	02/2010	First edition