SIEMENS

SIMATIC NET

Industrial Remote Communication -TeleControl MODEM MD720

Operating Instructions

Preface

Application and functions	1
Installation and connecting	2
Configuration	3
Program block libraries SINAUT MICRO	4
Commissioning and operation	5
Diagnostics and upkeep	6
Technical specifications	7
Certification	A
Accessories	В
Supported AT commands	С
Documentation references	D

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

indicates that death or severe personal injury will result if proper precautions are not taken.

indicates that death or severe personal injury may result if proper precautions are not taken.

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by [®] are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Preface

Scope of this manual

This manual is valid for the following product:

MODEM MD720 Hardware product version 1 Firmware version 2.1 Article number: 6NH9720-3AA01-0XX0



Figure 1 MODEM MD720

On the side of the housing, you will see the firmware version and the hardware product version printed as a placeholder "X". If the printed text is, for example, "X 2 3 4", "X" would be the placeholder for hardware product version 1.

Compatibility with predecessor modules

The MD720 MODEM is the successor to the SINAUT MD720-3 modem.

The MD720 MODEM is functionally largely compatible with the predecessor module SINAUT MD720-3. For deviations, refer to the section Compatibility with the predecessor module MD720-3 (Page 12).

Abbreviations/acronyms and terminology

• MD720

In the remainder of the text, the MODEM MD720 is also simply known as the "MD720".

The short form MD720 is not used for the predecessor module SINAUT MD720-3.

• TCSB / Telecontrol server

In the remainder of the manual, the "TeleControl Server Basic" (version V3) software is abbreviated to "TCSB".

TCSB is installed on a PC connected to the telecontrol network. The PC on which the TCSB software is installed is known as the "telecontrol server". For the manual see /2/ (Page 118).

Use of the MD720

The MD720 is a GPRS/GSM modem for industrial applications.

It is intended for use in SIMATIC S7 stations that are part of a telecontrol or remote maintenance system and for communication with other stations in the network or an OPC server in the master station. Depending on the configuration, the control center can be either TeleControl Server Basic, SINAUT ST7cc, SINAUT ST7sc or SINAUT MICRO SC.

The MD720 supports the following types of communication:

- IP-based communication with the control center using GPRS and the MSC protocol or the MSCsec secure protocol
- SMS messages from or to a mobile telephone
- CSD communication for maintenance and for data connections

Purpose of the manual

This manual describes the properties of this device and supports you when installing, and commissioning and operating the device.

New in this issue

- New ATEX/IECEx approval
- Bugs fixed

Replaced documentation

This manual replaces the manual edition 05/2016.

Required experience

To install, commission and operate the device, you require experience in the following areas:

- Mobile wireless technology
- IP-based communication
- AT commands

Current manual version and further information on the Internet

You will find the current version of this documentation and further information (e.g. FAQs) on the Internet pages of Siemens Industry Online Support:

Link: (https://support.industry.siemens.com/cs/ww/en/ps/21820/man)

Sources of information and other documentation

You will find an overview of further reading and references in the Appendix of this manual.

License conditions

Note

Open source software

Read the license conditions for open source software carefully before using the product.

You will find the license conditions on the supplied information sheet.

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit

Link: (http://www.siemens.com/industrialsecurity)

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no

longer supported, and failure to apply the latest updates may increase customers' exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under Link: (http://www.siemens.com/industrialsecurity)

Firmware

The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.

SIMATIC NET glossary

Explanations of many of the specialist terms used in this documentation can be found in the SIMATIC NET glossary.

You will find the SIMATIC NET glossary here:

SIMATIC NET Manual Collection or product DVD

The DVD ships with certain SIMATIC NET products.

On the Internet under the following address:

Link: (https://support.industry.siemens.com/cs/ww/en/view/50305045)

Training, Service & Support

You will find information on training, service and support in the multilanguage document "DC support 99.pdf" on the Internet pages of Siemens Industry Online Support:

Link: (https://support.industry.siemens.com/cs/ww/en/view/38652101)

Table of contents

	Preface.		
1	Application	on and functions	9
	1.1	Communications functions	9
	1.2	Compatibility with the predecessor module MD720-3	12
	1.3	Requirements	12
	1.4	Configuration examples	14
	1.5	Connectors, LEDs, operator controls	16
2	Installatio	on and connecting up	19
	2.1 2.1.1 2.1.2 2.1.3 2.1.4	Important notes on using the device Warning overvoltage protection Notices on use in hazardous areas Notices regarding use in hazardous areas according to ATEX Notices regarding use in hazardous areas according to UL HazLoc	
	2.2 2.2.1	SIM card	21
	2.2.2	Changing a SIM card and PIN	
	2.3		22
	2.4		
	2.5	Connecting the antenna	
~	2.6	Connecting the power supply	
3	Configura		
	3.1	Configuration of the MD/20	27
	3.2	Storage of data	
4	Program	block libraries SINAUT MICRO	
	4.1	Block libraries for communication with the MD720	
	4.2	Use of the MSC and MSCsec protocols in control centers	
	4.3 4.3.1 4.3.2 4.3.3 4.3.4 4.3.5 4.3.6	SINAUT MICRO SC SINAUT MICRO SC block library Program block WDC_INIT Program block WDC_INIT_2 Program block WDC_SEND Program block WDC_RECEIVE Program block WDC_CONTROL	
	4.4 4.4.1 4.4.2 4.4.3 4.4.4	SINAUT MICRO SC SEC SINAUT MICRO SC SEC block library Program block WDC_INIT_2 Program block WDC_SEND Program block WDC_RECEIVE	

	4.4.5	.4.5 Program block WDC_CONTROL					
	4.5	Error numbers	51				
5	Commission	ning and operation	53				
	5.1	Modes	53				
	5.2	Commissioning	53				
	5.3	Transparent phase, command phase	54				
	5.4	Changing the operating mode	55				
	5.5 5.5.1 5.5.2 5.5.3	OPC mode Functions in OPC mode Enabling OPC mode PIN in OPC mode	56 56 57 58				
	5.6 5.6.1 5.6.2 5.6.3 5.6.4 5.6.5 5.6.6 5.6.7	Terminal mode Functions in terminal mode Activating terminal mode Operation in terminal mode PIN in terminal mode Service PC with terminal program Working with AT commands Composite AT commands (initialization strings)	50 59 59 59 59 60 61 62 63				
6	Diagnostics	and upkeep	65				
	6.1	Diagnostics and maintenance functions	65				
	6.2 6.2.1 6.2.2 6.2.3	LEDs Meaning of the LEDs in OPC mode Meaning of the LEDs in terminal mode SIM card not detected or wrong PIN entered	65 65 65 65				
	6.3	Functions of the SET button	65				
	6.4	Local service access via the X1 interface	65				
	6.5	Establishing a remote service connection	65				
6.6	Reading our	t settings	65				
	6.7	Reading out the log	65				
	6.8	Updating firmware	65				
	6.9	Resetting to factory settings	65				
7	Technical s	pecifications	65				
Α	Certification		65				
В	Accessories		65				
	B.1	Antennas	65				
	B.2	Connecting cable	65				
С	Supported A	AT commands	65				
D	Documenta	tion references	65				
	Index		65				

Application and functions

1.1 Communications functions

Communications functions

The MD720 supports the following extra functions:

Modes

The MD720 is set to one of the following two modes depending on the type of communication required:

- OPC mode
- Terminal mode
- OPC mode

In OPC mode, there is productive data exchange with the control center using GPRS.

Terminal mode

In terminal mode, the MD720 uses CSD communication for the following functions:

- Sending and receiving SMS messages
- Diagnostics and maintenance functions
- Transfer of configuration data
- Communication with a control center

In OPC mode, an MD720 connected to an S7 station communicates with a control center via a TCP connection. For the data transfer, the GSM network is used with the GPRS service. Either the MSC protocol or the MSCsec protocol is used (see below).

• Sending and receiving SMS messages

The locally connected application (SIMATIC) can transfer data for an SMS message to the MD720 using AT commands. The MD720 sends the SMS message to a subscriber in the GSM network (mobile wireless telephone) or when using a gateway, to a remote fax machine.

SMS messages received by the MD720 can be queried by the local application using AT commands.

1.1 Communications functions

• CSD communication

Service data calls via remote connections in CSD format are used for the following purposes:

- Remote configuration of the MD720
- Diagnostics and maintenance functions using AT commands
- Process data connections between stations with TIM modules

The partner for the remote connection can be an analog modem, an ISDN modem or a GSM modem.

Controlling the MD720 using AT commands

You can control the MD720 from a locally connected application or manually with a terminal program connected locally.

MSC protocol

Proprietary protocol used for productive communication via TCP connections in OPC mode. The MSC allows authentication of the communications partner and simple encryption. The MSC protocol is supported by the following control center applications:

- TeleControl Server Basic (TCSB)
- SINAUT MICRO SC
- MSCsec protocol

Proprietary protocol used for productive communication via TCP connections in OPC mode. In addition to the MSC protocol, it also allows authentication of the messages using an HMAC with the help of a symmetrical encryption method (with pre-shared key). The MSCsec protocol is supported by the following control center applications:

- TeleControl Server Basic (TCSB)

SIMATIC S7 systems that can be connected locally

The following SIMATIC S7 systems can be connected to the GSM network via the MD720:

- SIMATIC S7- 200 via SINAUT PPI modem cable (6NH9701-0AD)
- SIMATIC S7-1200 via CP 1243-8 IRC / TS Module RS232
- SIMATIC S7- 300 via Ethernet TIM module (using GPRS)
- SIMATIC S7- 400 via TIM 4R IE (using GPRS)
- SIMATIC S7-300/400 via classic or Ethernet TIM module (only using CSD)

For project-specific solutions for connecting a SIMATIC S7-300 to the GSM network, please contact Siemens Industry Online Support. You will find an examples of applications with the corresponding documentation on the following Internet page:

Link: (https://support.industry.siemens.com/cs/ww/en/ps/21771/ae)

1.1 Communications functions

Possible partners of the MD720

The MD720 can communicate with the following partners.

- Communications partners of the MD720 installed in an S7-200:
 - PC with TeleControl Server Basic (TCSB)
 - PC with SINAUT MICRO SC
 - S7-200 with MD720 (inter-station communication)

The messages are forwarded by TCSB or SINAUT MICRO SC in the master station. The MD720 operates in OPC mode.

• Communications partners of the MD720 installed in an S7-300/400:

Station with Ethernet TIM (e.g. central CPU or control system SINAUT ST7cc/ST7sc)
 The MD720 operates in OPC mode.

- Communications partners of the MD720 for SMS messages:
 - Mobile phone
 - Fax machine (when using a gateway)

The MD720 operates in terminal mode.

- Communications partners of the MD720 installed in an S7-200:
 - Engineering station with STEP 7-Micro/WIN

(via GSM network, ISDN network, analog dial-up network)

The MD720 operates in terminal mode.

- Communications partners of the MD720 installed in an S7-300/400 with TIM:
 - SIMATIC S7-300/400 with TIM module (including classic)

(via GSM network, ISDN network, analog dial-up network)

The MD720 operates in terminal mode.

Connection resources

• Active connections at runtime

At runtime, the MD720 can connect to 1 communications partner. The connection partner is configured in the program blocks. 1.2 Compatibility with the predecessor module MD720-3

1.2 Compatibility with the predecessor module MD720-3

Differences between MD720 and the predecessor module

The differences in operation between the "MODEM MD720" and its predecessor module
"SINAUT MD720-3" are listed in the following table.

AT command / function	Predecessor module	MODEM MD720		
	SINAUT MD720-3			
MSC / MSCsec	Supports only the MSC protocol	The device supports the protocols MSC and MSCsec.		
Underscore "_" in an SMS	The device forwards strings with an	The device converts the underscore to "\11".		
message	underscore unchanged.	It is therefore advisable not to use underscores.		
AT+CMGD=1,4	Deletes all SMS messages.	The command is not supported. SMS messages must be deleted individually with the command AT+CMGD= <i><index></index></i> .		
AT+CMGR= <i><index></index></i>	If there is no SMS message in the <i><in-< i=""> <i>dex></i> memory space the device sends the reply +CMGR:ERROR</in-<></i>	If there is no SMS message in the <i><index></index></i> memory space the device sends the reply +CMGR:0,,0.		
AT+CPMS="ME","ME","ME"	Memory assignment possible in this form.	 Up to firmware < V2.1 <p>When the third memory space was set to "ME", the MD720 returned an error message. </p> As of firmware V2.1 AT+CPMS="ME","ME","ME" is set internally to the option "ME","ME","MT". Received SMS messages are stored on the SIM card. When internal memory is full, received SMS messages are stored on the device instead of being discarded 		

1.3 Requirements

Requirements for the station with MD720 in OPC mode

The following requirements must be met to use the MD720 in OPC mode:

- SIM card of a GSM network operator with activated GPRS service
- Availability of a GSM network

Requirements for the partner in OPC mode

• Fixed IP address or dynamically assigned IP address

To allow the MD720 to establish a connection actively, the partner must have a fixed IP address or a dynamically assigned IP address.

A fixed IP address can be obtained in the following ways:

- Fixed IP address with dedicated line to the GSM network operator

The partner is connected directly to the GSM network operator over a leased dedicated line. In this case, the network operator then normally assigns a fixed IP address.

- Fixed IP address of the Internet service provider

The partner is available over the Internet and a fixed IP address has been assigned to it by the Internet service provider. This can be applied for with some providers.

Many Internet service providers, however, assign the IP addresses dynamically; in other words, the IP addresses of the computers or networks with access to the Internet change (dynamic DNS).

• Internet connection via DSL router

Requirements for the station with MD720 in terminal mode

The following requirements must be met to use the MD720 in terminal mode:

- SIM card of a GSM network provider with activated CSD data service 9600 bps
- Extra call number for data calls
- Availability of a GSM network

Requirements for the partner in terminal mode

Partner is an engineering station with STEP 7-Micro/WIN

Network attachment of the PC of the engineering station alternatively via:

- MODEM MD720 (communication via GSM network)
- Modem MD3 (communication via analog dial-up network)
- MODEM MD4 (communication via ISDN network)
 Note: The MD4 modem is no longer available.
- Partner is SIMATIC S7-300/400 with TIM module (including classic) Network attachment of the S7 station alternatively via:
 - MODEM MD720 (communication via GSM network)
 - Modem MD3 (communication via analog dial-up network)
 - MODEM MD4 (communication via ISDN network)
 Note: The MD4 modem is no longer available.

1.4 Configuration examples

1.4 Configuration examples

Communication between S7-200 with MD720 and control center

The following example shows a configuration in which an S7-200 is connected to the master station with an OPC server via the MD720 MODEM. The OPC server can be TeleControl Server Basic or SINAUT MICRO SC. Communication is via the GSM network with GPRS and via the Internet.



Figure 1-1 Example of a configuration for MODEM MD720 in S7-200

Communication between S7-300 with MD720 and control center

The following example shows a configuration in which an S7-300 is connected to the master station via a TIM module and the MD720 MODEM. Communication is via the GSM network with GPRS and via the Internet.



Figure 1-2 Example of a configuration for MODEM MD720 in S7-300

1.5 Connectors, LEDs, operator controls

1.5 Connectors, LEDs, operator controls

Connectors, display and operator control elements





Front of the device

Rear of the device

- 1 X3: Connector for the 24 VDC power supply (underside of the device)
- 2 X2: SMA socket for connecting the antenna
- 3 LEDs
- 4 SET button
- 5 X1: Serial interface (RS-232) for connection of the local application (SIMATIC) or the service PC
- 6,9 Holder for DIN rail/switching panel mounting
- 7 SIM card compartment with slide for the SIM card
- 8 Button for ejecting the SIM card slide

Meaning of the LEDs

The MD720 has three LEDs that are used to indicate the device status. The meaning of the displays is different in terminal and OPC mode. You will find the description in the following sections:

- LEDs in terminal mode: Section Meaning of the LEDs in terminal mode (Page 67)
- LEDs in OPC mode: Section Meaning of the LEDs in OPC mode (Page 66)

1.5 Connectors, LEDs, operator controls

Connectors

• Power supply (X3)

On the underside of the device, there is a terminal block for connecting the 24 VDC power supply.

• Serial interface (X1)

The X1 interface is a serial interface complying with the RS-232 standard and is used to connect the local application or the service PC.

The interface is designed as a socket. A suitable gender changer is supplied.

• Antenna connector (X2)

The antenna connector is used to connect an external antenna for indoor use in buildings.

You will find detailed information about the connectors in the section Installation and connecting up (Page 19) and the section Technical specifications (Page 79).

SET button

The SET button is used to output the current settings on the X1 interface and to reset to the factory settings. You will find details in the section Functions of the SET button (Page 69).

1.5 Connectors, LEDs, operator controls

Installation and connecting up

Safety notices on the use of the device

Note the following safety notices when setting up and operating the device and during all associated work such as installation, connecting up or replacing the device.

2.1 Important notes on using the device

2.1.1 Warning overvoltage protection

Overvoltage protection

NOTICE

Protection of the external power supply

If power is supplied to the module or station over longer power cables or networks, the coupling in of strong electromagnetic pulses onto the power supply cables is possible. This can be caused, for example by lightning strikes or switching of higher loads.

The connector of the external power supply is not protected from strong electromagnetic pulses. To protect it, an external overvoltage protection module is necessary. The manufacturers of industrial overvoltage protection devices produce suitable modules.

2.1.2 Notices on use in hazardous areas

EXPLOSION HAZARD

DO NOT OPEN WHEN ENERGIZED.

2.1 Important notes on using the device

The equipment is designed for operation with Safety Extra-Low Voltage (SELV) by a Limited Power Source (LPS).

This means that only SELV / LPS complying with IEC 60950-1 / EN 60950-1 / VDE 0805-1 must be connected to the power supply terminals. The power supply unit for the equipment power supply must comply with NEC Class 2, as described by the National Electrical Code (r) (ANSI / NFPA 70).

If the equipment is connected to a redundant power supply (two separate power supplies), both must meet these requirements.



EXPLOSION HAZARD

DO NOT CONNECT OR DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

EXPLOSION HAZARD

SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 OR ZONE 2.

When used in hazardous environments corresponding to Class I, Division 2 or Class I, Zone 2, the device must be installed in a cabinet or a suitable enclosure.

2.1.3 Notices regarding use in hazardous areas according to ATEX

Requirements for the cabinet/enclosure

To comply with EU Directive 94/9 (ATEX95), the enclosure or cabinet must meet the requirements of at least IP54 in compliance with EN 60529.

WARNING

If the cable or conduit entry point exceeds 70 °C or the branching point of conductors exceeds 80 °C, special precautions must be taken. If the equipment is operated in an air ambient in excess of 50 °C, only use cables with admitted maximum operating temperature of at least 80 °C.

Take measures to prevent transient voltage surges of more than 40% of the rated voltage. This is the case if you only operate devices with SELV (safety extra-low voltage).

2.1.4 Notices regarding use in hazardous areas according to UL HazLoc

EXPLOSION HAZARD

DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS.

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or non-hazardous locations only.

This equipment is suitable for use in Class I, Zone 2, Group IIC or non-hazardous locations only.

2.2 SIM card

2.2.1 Inserting the SIM card

NOTICE

Static charges

Static charges can damage the device. To protect the MD720, take the following precautionary measures before inserting/changing the SIM card or attaching/removing connectors:

- Disconnect the device from the power supply.
- Discharge any electrical charge from your body.

You can do this by touching an grounded surface, for example an unvarnished part of the cabinet housing.

2.3 Installing the device

SIM card

Insert the SIM card in the device before you install it.

Use a mini SIM card 15 x 25 mm.

Inserting the SIM card

To insert the SIM card, follow the steps below:

- 1. Turn off the power supply to the station.
- 2. Remove the MD720 from the DIN rail.
- 3. Release the slide for the SIM card on the back of the MD720 by gently pressing the release button.

Refer to numbers (7) and (8) in the picture of the rear of the device in the section Connectors, LEDs, operator controls (Page 16).

- 4. Remove the slide from the housing.
- 5. Insert the SIM card in the slide.
- 6. Push the slide back into the housing, where it locks gently in place.

2.2.2 Changing a SIM card and PIN

Changing the SIM card and the PIN

If you change the SIM card, remember to change the PIN in the program blocks to the PIN of the new SIM card.

If you use a lot of SIM cards it can be helpful to set all PINs to the same PIN number for example using a normal mobile phone. You should, however keep to your company's security regulations relating to SIM cards.

PIN-less SIM cards

The device also operates with SIM cards for which the PIN query has been deactivated. In this case, the PIN query is skipped during connection establishment.

2.3 Installing the device

DIN rail mounting, switching panel installation

The MD720 can be mounted on a DIN rail (35 mm) complying with EN 60715 in a cabinet or on a switching panel.

Use the pull-out DIN rail mounting clips on the rear if the device to secure it to the rail. These mounting clips also lock into place when they are extended to allow the device to be installed in a switching panel.

The inner dimension of the hole for the DIN rail mounting clips is 4.3 mm.

Installation location

NOTICE

Installation location

During installation, make sure that the upper and lower ventilation slits of the module are not obstructed and good ventilation is possible. Above and below the device, there must be a clearance of 25 mm to allow air to circulate and prevent overheating.

Remember that the permitted temperature ranges depend on the position of the installed device.

Permitted temperature ranges:

- Horizontal installation of the rack (device vertical): -20 °C to 60 °C
- Vertical installation of the rack (device horizontal): -20 °C to 50 °C

2.4 Connecting the X1 interface

Use of the serial X1 interface

The MD720 is connected to the local application via the serial X1 interface (RS-232). The following two alternatives can be used.

Connection to a SIMATIC station

Connection to a SIMATIC controller is intended for the productive data transfer between the SIMATIC station and the control center.

You will find the connection options of the various SIMATIC families in the section Communications functions (Page 9).

• Connection to service PC

Connection to a service PC is intended for service purposes.

For information on the functions, refer to the section Diagnostics and upkeep (Page 65).

Cable for connecting the X1 interface of the MD720

Different cables are required depending on the connected application:

SIMATIC S7-200

PPI modem cable 6NH9701-0AD

• Service PC or TIM module

Connecting cable 6NH7701-5AN

Connect the PC via its serial interface COM interface.

If your application has a different interface, a commercially available interface converter can be used.

The connecting cable does not ship with the MD720.

2.4 Connecting the X1 interface

Pinout of the X1 interface (socket) of the MD720

1	6
2 •	7
3 •	8
4 •	q
5 •	J

RS-232 signals (signal direction DCE)						
Pin 1	Output	DCD				
Pin 2	Output	RxD				
Pin 3	Input	TxD				
Pin 4	Input	DTR				
Pin 5	Signal ground	GND				
Pin 6	Output	DSR				
Pin 7	Input	RTS				
Pin 8	Output	CTS				
Pin 9	Output	RI				

Pin assignment of the connecting cables

- Pin assignment of PPI modem cable 6NH9701-0AD
- Pin assignment of the connecting cable 6NH7701-5AN



The "RI" wire is optional.

Settings for the PPI modem cable 6NH9701-0AD

When connecting the MD720 to a SIMATIC S7-200 via the PPI modem cable 6NH9701-0AD, you will need to make the following settings for the PPI adapter in STEP 7-Micro/WIN:

- Character format: 8N1
- Number: 10 bits
- Transmission speed: 57600 bps
- DIP switch: Set the DIP switch according to the following table.

2.5 Connecting the antenna

Switch number	1	2	3	4	5	6	7	8
Position	1	1	1	0	0	1	1	0

You will find further information on the PPI modem cable on the Internet pages of Siemens Industry Online Support:

Link: (https://support.industry.siemens.com/cs/ww/en/ps/15948)

2.5 Connecting the antenna

RF exposure

The emission limits as recommended by the Commission on Radiological Protection of September 13/14 2001 must be kept to.

When servicing the antenna, or working at distances closer than those listed below, make sure that the transmitter has been disabled.

The antennas used with this mobile device must be at a distance of at least 25 cm from all persons. The antanna must not be positioned or used so that it operates in conjunction with any other antenna or transmitter.

The antennas from the range of Siemens SINAUT/telecontrol accessories operate with 0 dB gain in all directions when connected to the transmitter of the MD720. Using this antenna, the total composite power in PCS mode (1900 MHz) is less than 1 W ERP.

NOTICE

Installation only within buildings

Mount the antenna only within a building.

The MD720 has not been approved for connection of antennas outdoors.

NOTICE

Antenna type

Only use antennas from the range of Siemens SINAUT/telecontrol accessories intended for the MD720 (refer to the appendix of this manual). Other antennas may have detrimental effects on the device characteristics and may even cause damage.

The impedance of the antenna including cable should be approximately 50 ohms.

Connecting the antenna

At the top front of the MD720, there is an SMA socket (X2 interface). Connect the antenna there.

2.6 Connecting the power supply

Protect the antenna connector using suitable overvoltage protection equipment if the antenna cable is longer than 30 m.

If you install several modem close to each other, keep to a minimum clearance of 50 cm between the antennas.

2.6 Connecting the power supply

For information on connecting the supply voltage, refer to the section Important notes on using the device (Page 19).

NOTICE

Attachment to battery or rechargeable battery

When connecting the MD720 to a battery or rechargeable battery, include an all-pole disconnect switch (main battery switch) with adequate breaking capacity (at least 3 A at 32 V) and a fuse between the MD720 and battery.

Connecting the power supply

The terminal block for the 24 VDC power supply is located on the underside of the device (X3 interface).

You will find the permitted voltage values in the section Technical specifications (Page 79).



- The two screw terminals at the back "L+" (24 V) are interconnected.
- The two front screw terminals "M" (0 V) are interconnected.

Connect the power supply to the terminals of the X3 interface.

Startup

The MD720 starts up automatically as soon as it is supplied with power.

Device replacement

If you replace an older SINAUT MD720-3 modem with the MD720 MODEM, replace the connector with the screw terminals since this is different on these two devices.

Configuration

3.1 Configuration of the MD720

Automatic configuration of the MD720 in OPC mode

In OPC mode, the MD720 is configured automatically for GPRS communication by the program blocks called on the connected S7-200 CPU.

As soon as the MD720 is supplied with power and the program blocks on the connected CPU are called, the MD720 establishes a permanent TCP connection to the communications partner.

For more information on the functions of the program blocks, refer to the section Block libraries for communication with the MD720 (Page 29).

You will find information about operating the MD720 in OPC mode in the section OPC mode (Page 56).

Controlling the MD720 in terminal mode

In terminal mode the MD720 operates as a GSM modem that is controlled by AT commands.

You will find information about operating the MD720 in terminal mode in the section Terminal mode (Page 59).

3.2 Storage of data

All configured data is stored in non-volatile memory on the MD720. After restarting the device or following a power down, the MD720 runs with the last settings to be used.

Only exception: A PIN transferred to the MD720 in terminal mode is not stored permanently on the MD720.

Configuration

3.2 Storage of data

Program block libraries SINAUT MICRO

4.1 Block libraries for communication with the MD720

Block libraries for S7-200

The program blocks for GPRS communication are called on the S7-200 CPU to which the MD720 is connected. Using the blocks, the S7-200 can communicate with other S7 stations or with an OPC server TCSB or SINAUT MICRO SC.

Depending on whether the MSC or MSCsec protocol is used for GPRS transfer, one of the following block libraries is used:

Using the MSC protocol

Using the program block libraries:

- SINAUT MICRO SC V2.0

File name: sinautmicrosc.mwl

Using the MSCsec protocol

Using the program block library:

- SINAUT MICRO SC SEC V2.0

File name: sinautmicrosc_sec.mwl

Note

Compared with the SINAUT MICRO SC library, the SINAUT MICRO SC SEC library provides greater security with encrypted transmission.

You will find the description of the individual parameters of the program blocks sinautmicrosc.mwl and sinautmicrosc_sec.mwl in the following sections.

You will find information on the SINAUT MICRO SC S7- 200 program blocks and a link to the current version of the block library on the Internet pages of Siemens Industry Online Support:

Link: (https://support.industry.siemens.com/cs/ww/en/view/99522310)

New functions as of version V2.0

The new program blocks as of version V2.0 provide the following new functions:

- The checksum function (as of TCSB version V3) provides greater data consistency.
- With the initialization block INIT_2, you can, for example, initialize the modem without restarting the CPU.

4.2 Use of the MSC and MSCsec protocols in control centers

Compatibility and memory requirements of the program blocks

Note

Note the differing memory requirements of the various versions of the program block libraries.

Library	Compatible v	vith modem	Memory re	quirements
	SINAUT MD720-3	MODEM MD720	With WDC_INIT	With WDC_INIT_2
SINAUT MICRO SC V1.16	х	-	5835 bytes	-
SINAUT MICRO SC V2.0	х	х	6566 bytes	6571 bytes
SINAUT MICRO SC SEC V2.0	-	x	-	6529 bytes

You should also note the compatibility of the protocols and block libraries with the various OPC server versions.

Block libraries for S7-300

You can find information on block library MSC300_Library for operating a SIMATIC S7-300 with MODEM MD720 on Telecontrol Server Basic on the web pages of Siemens Industry Online Support:

Link: (https://support.industry.siemens.com/cs/ww/en/view/109476468)

4.2 Use of the MSC and MSCsec protocols in control centers

Support of the transfer protocols MSC and MSCsec

The two protocols are supported by the following control center applications:

• MSC

Is supported by:

- TeleControl Server Basic
- TeleControl Server Basic as of version V3
- SINAUT MICRO SC
- MSCsec

Is supported by:

- TeleControl Server Basic as of version V3

4.3 SINAUT MICRO SC

4.3.1 SINAUT MICRO SC block library

For wireless communication using GPRS, the S7-200 controller is connected to a GSM/GPRS modem. The modem is configured and controlled by the program blocks of the S7-200. The PLC library SINAUT MICRO SC provides the option of communicating with OPC servers SINAUT MICRO SC / TCSB (TELECONTROL SERVER BASIC version V2) and with other controllers using GPRS.

Block library SINAUT MICRO SC

The program blocks can be executed on the S7-200 CPUs 224, 224XP and 226.

The block library always uses interface 0 of the PLC.

Blocks

The block library provides the following blocks for handling GPRS communication:

WDC_INIT

Initialization of the communication using the program blocks

• WDC_INIT_2

Initialization of the communication using program blocks - with an additional reinitialization input

• WDC_SEND

Handling send jobs

• WDC_RECEIVE:

Processing of received data

WDC_CONTROL

Control of the communication mode (terminal or OPC mode)

• WDC_CHECKSUM

The WDC_CHECKSUM block is not a user block but must exist in the user program. It is called by the WDC_SEND block.

Comparison of the checksum of a sent and received message. If there are different checksums between the sender and recipient, there has been a transmission error. In this case, a message sent by the modem is discarded by TCSB.

4.3 SINAUT MICRO SC

4.3.2 Program block WDC_INIT

Significance and how it works

The block initializes the block library, the serial interface of the PLC and the GPRS modem.

To reduce the memory requirements of the CPU, link either the WDC_INIT or the WDC_INIT_2 block into the program.

The block must be called once per cycle by the user program.

Specifying parameters as a string

Many of the parameters must be specified as a string. These strings must be defined in the data block of MicroWIN.

The first byte of the string contains the number of characters, the bytes that follow contain the individual characters. The parameters are transferred to the block by specifying the reference to the relevant string (& operator and memory address of the string).

Example:

Name of the modem at the address VB730.

Data block:

VB730	6
VB731	m
VB731	о
VB731	d
VB731	е
VB731	m
VB731	1

Calling WDC_INIT



Explanation of the formal parameters

Parameter	Declaration	Data type	Value/meaning	Description
EN	INPUT	BOOL	0: Block execution blocked 1: Block execution ena- bled	Enable input for block execution
IP_ADDRESS_CS	INPUT	DWORD		IP address or host name of the server (communications partner). Entry as string.
DESTPORT_CS	INPUT	DWORD		TCP/IP port of the server. Entry as string.
MODEM_NAME	INPUT	DWORD		Name for registering the GPRS modem on the server. Entry as string. Max. length: 255 characters. *
				The name should be structured as fol- lows; otherwise, no connection to TCSB and Micro SC is possible: <mo- dem>+consecutive number</mo-
				Example: Modem_Name VB730 = mo- dem5
				Note on TCSB: The automatically assigned consecutive number of the block parameter "MODEM_NAME" is configured in TCSB as the station number of the connection. In TCSB, enter the MODEM_NAME con- figured here as the station name. Keep to the permitted TCSB syntax.
MODEM_PASSWORD	INPUT	DWORD		Password for registering the GPRS mo- dem on the server. Entry as string. Max. length: 255 characters. * Note on TCSB:
				Keep to the permitted TCSB syntax.
PIN	INPUT	DWORD		PIN for enabling the SIM card. Entry as string.
APN	INPUT	DWORD		APN name of the GSM network provider (APN - Access Point Name). Entry as string.
AP_USER	INPUT	DWORD		User name for logging on with the APN. Entry as string.
AP_PASSWORD	INPUT	DWORD		Password for logging in with the APN. Entry as string.
DNS	INPUT	DWORD		IP addresses of 1 or 2 domain name servers of the GSM network provider. Entry as string. If two DNS servers are specified, these are separated by a semicolon, for exam-
				ple "192.168.1.1;192.168.1.2".

The following table explains the formal parameters:

4.3 SINAUT MICRO SC

Parameter	Declaration	Data type	Value/meaning	Description
CLIP	INPUT	DWORD		List of the phone numbers authorized for dialing in to the station and for transfer of SMS messages. Only partners with an authorized phone number have access to the MD720. 6 numbers must be assigned in the following order:
				3 numbers for service data connec- tions
				Enter at least one phone number if you want to access the station via a remote connection for example to change the configuration or to transfer new software.
				• 3 numbers for data connections Entry as a string, individual entries sepa- rated by a semicolon (;). Example:
				+4912345*;NONE;NONE;+49123123;NO NE;NONE
				Enter NONE for empty entries.
				Enter a * (asterisk) as the placeholder character for call number groups.+4912345* for example authoriz- es all call numbers that begin with +4912345.
BUSY	OUTPUT	BOOL	0: Block execution not yet started, completed or aborted	Condition code of the execution status of the block
			1: Block currently execut- ing	
DONE	OUTPUT	BOOL	0: Error in block execution. See ERROR.	Indicates whether the block executed without errors.
			1: Block executed error- free.	
ABORTED	OUTPUT	BOOL	1: Block execution aborted due to an error	Shows the block execution abort.
ERROR	OUTPUT	WORD		Error code. For the meaning of the value, refer to the section Error numbers (Page 51).

* When using the maximum length of MODEM_NAME and MODEM_PASSWORD, make sure that the memory areas do not overlap.

If, for example, you specify "VB730" as the memory address of the string for MODEM_NAME and "VB740" for MODEM_PASSWORD, you only have 10 bytes for MODEM_NAME: 9 characters + 1 byte length information.

4.3.3 Program block WDC_INIT_2

Significance and how it works

The block initializes the block library, the serial interface of the PLC and the GPRS modem. Compared with the WDC_INIT block, it also has the additional re-initialization input INIT_START.

To reduce the memory requirements of the CPU, link either the WDC_INIT or the WDC_INIT_2 block into the program.

The block must be called once per cycle by the user program.

Specifying parameters as a string

Many of the parameters must be specified as a string. These strings must be defined in the data block of MicroWIN.

The first byte of the string contains the number of characters, the bytes that follow contain the individual characters. The parameters are transferred to the block by specifying the reference to the relevant string (& operator and memory address of the string).

Example:

Name of the modem at the address VB730.

Data block:

VB730	6
VB731	m
VB731	0
VB731	d
VB731	е
VB731	m
VB731	1

4.3 SINAUT MICRO SC

Calling WDC_INIT_2



Explanation of the formal parameters

The following table explains the formal parameters:

Parameter	Declaration	Data type	Value/meaning	Description
EN	INPUT	BOOL	0: Block execution blocked	Enable input for block execution
			1: Block execution ena- bled	
INIT_START	INPUT	BOOL	1, 0	Input for re-initialization of the modem
				On a positive edge $0 \rightarrow 1$, the software of the modem is reset to the factory settings without the CPU changing to STOP.
STATION_NUMBER	INPUT	WORD		Logical address of the local station
IP_ADDRESS_CS	INPUT	DWORD		IP address or host name of the server (communications partner). Entry as string.
DESTPORT_CS	INPUT	DWORD		TCP/IP port of the server. Entry as string.
4.3 SINAUT MICRO SC

Parameter	Declaration	Data type	Value/meaning	Description
MODEM_NAME	INPUT	DWORD		Name for registering the GPRS modem on the server. Entry as string. Max. length: 255 characters. *
				The name should be structured as fol- lows; otherwise, no connection to TCSB and Micro SC is possible: <mo- dem>+consecutive number</mo-
				Example: Modem_Name VB730 = mo- dem5
				Note on TCSB: The automatically assigned consecutive number of the block parameter "MODEM_NAME" is configured in TCSB as the station number of the connection. In TCSB, enter the MODEM_NAME con- figured here as the station name. Keep to the permitted TCSB syntax.
MODEM_PASSWORD	INPUT	DWORD		Password for registering the GPRS mo- dem on the server. Entry as string. Max. length: 255 characters. *
				Note on TCSB: Keep to the permitted TCSB syntax.
PIN	INPUT	DWORD		PIN for enabling the SIM card. Entry as string.
APN	INPUT	DWORD		APN name of the GSM network provider (APN - Access Point Name). Entry as string.
AP_USER	INPUT	DWORD		User name for logging on with the APN. Entry as string.
AP_PASSWORD	INPUT	DWORD		Password for logging in with the APN. Entry as string.
DNS	INPUT	DWORD		IP addresses of 1 or 2 domain name servers of the GSM network provider. Entry as string.
				If two DNS servers are specified, these are separated by a semicolon, for example "192.168.1.1;192.168.1.2".

4.3 SINAUT MICRO SC

Parameter	Declaration	Data type	Value/meaning	Description
CLIP	INPUT	DWORD		List of the phone numbers authorized for dialing in to the station and for transfer of SMS messages. Only partners with an authorized phone number have access to the MD720. 6 numbers must be assigned in the following order:
				3 numbers for service data connec- tions
				Enter at least one phone number if you want to access the station via a remote connection for example to change the configuration or to transfer new software.
				• 3 numbers for data connections
				Entry as a string, individual entries sepa- rated by a semicolon (;). Example:
				+4912345*;NONE;NONE;+49123123;NO NE;NONE
				Enter NONE for empty entries.
				Enter a * (asterisk) as the placeholder character for call number groups.+4912345* for example authoriz- es all call numbers that begin with +4912345.
BUSY	OUTPUT	BOOL	0: Block execution not yet started, completed or aborted	Condition code of the execution status of the block
			1: Block currently execut- ing	
DONE	OUTPUT	BOOL	0: Error in block execution. 1: Block executed error- free.	Indicates whether the block executed without errors.

* When using the maximum length of MODEM_NAME and MODEM_PASSWORD, make sure that the memory areas do not overlap.

If, for example, you specify "VB730" as the memory address of the string for MODEM_NAME and "VB740" for MODEM_PASSWORD, you only have 10 bytes for MODEM_NAME: 9 characters + 1 byte length information.

4.3.4 Program block WDC_SEND

Significance and how it works

The block handles send jobs initiated by the user program (START parameter). A new send job is only accepted if no other job is active (BUSY must be 0). Within the framework of a send job, a block of data can be sent to a remote station or to the OPC server by specifying the start index and the length.

While BUSY is set, the parameters of the block must not be changed.

The block must be called once per cycle by the user program.

Explanation of the formal parameters

Parameter	Declaration	Data type	Value / meaning	Description
EN	INPUT	BOOL	0: Block execution blocked 1: Block execution ena- bled	Enable input for block execution
START	INPUT	BOOL	0, 1	A positive edge $0 \rightarrow 1$ starts a new send job.
REMOTESTATIONAD DRESS	INPUT	WORD		Logical address of the remote station to which data will be sent or from which data will be read.
DATA_START	INPUT	WORD		Index of the first data byte to be sent or read. Example: "1500" for VB1500
DATA_LENGTH	INPUT	BYTE	0 230	Number of bytes to be sent
COMMAND	INPUT	WORD	1: Send data to partner 2: Query data from partner	Specifies the direction of the data ex- change with the communications partner
CURRENTTIME	INPUT	DWORD		Start address of the 8 byte time-of-day buffer with the current time in the Sie- mens S7-200 BCD format (see standard block READ_RTC).
				If no real-time clock is available, 0 can be specified here.
BUSY	OUTPUT	BOOL	0: Block execution not yet started, completed or aborted	Condition code of the execution status of the block
			1: Block currently execut- ing	
DONE	OUTPUT	BOOL	0: Error in block execution. See ERROR.	Indicates whether the block executed without errors.
			1: Block executed error- free.	
ABORTED	OUTPUT	BOOL	1: Block execution aborted due to an error	Shows the block execution abort.
ERROR	OUTPUT	WORD		Error code. For the meaning of the value, refer to the section Error numbers (Page 51).

4.3 SINAUT MICRO SC

4.3.5 Program block WDC_RECEIVE

Significance and how it works

The block monitors the receive buffer. If a new message has arrived, this is evaluated. Received data is copied to the specified address. The receipt of data is signaled via the DATA_START and DATA_LENGTH outputs.

The block must be called once per cycle by the user program.

Explanation of the formal parameters

Parameter	Declaration	Data type	Value / meaning	Description
EN	INPUT	BOOL	0: Block execution blocked 1: Block execution ena- bled	Enable input for block execution
NEWTIME	INPUT	DWORD		Start address of an 8-byte time-of-day buffer in which the received system time will be copied (Siemens S7-200 BCD format, see READ_RT standard block).
				stamps are discarded.
RECVBUFFER_STAR T	INPUT	WORD		Start index of the memory area enabled for receipt of data.
RECVBUFFER_LENG TH	INPUT	WORD		Length of the data area enabled for re- ceipt of data [bytes].
REMOTESTATIONAD DRESS	OUTPUT	WORD		Logical address of the remote station (PLC or OPC server) that sent the mes- sage.
DATA_START	OUTPUT	WORD		Start index of the received data.
DATA_LENGTH	OUTPUT	BYTE	0: If no data was received. n: Number of received bytes if data was received.	Length of the transferred data [bytes]
NEWTIME_RECEIVE D	OUTPUT	BOOL		The parameter signals the receipt of a new system time.
				This bit and the value of NEWTIME should be used in the user program as the parameter of SET_RTC to synchro- nize the real-time clock. If a new system time is received, the bit remains set for the duration of one cycle. If no real-time clock is available, the bit can be ignored.

4.3.6 Program block WDC_CONTROL

Significance and how it works

The block allows the mode of the modem to be changed over (terminal mode/OPC mode) and indicates the current mode of the modem.

After operating the modem in terminal mode, for example for a remote programming session using CSD dial-up, the block allows the return to normal operation (OPC mode) using the ACT_GPRS_SERVICE parameter.

If the CSD connection is terminated, the GPRS modem returns automatically to OPC mode. The controller cannot, however, recognize the end of a dial-up connection. To be able to return to GPRS communication nevertheless, prior to the end of the connection a timedelayed changeover to OPC mode must be initiated using the WDC_CONTROL block from the variable table of MicroWin. To achieve this, the delay time must be specified in DELAY_TIME_GPRS and the changeover activated with ACT GPRS SERVICEACT AT MODE.

To ensure return to OPC mode, a maximum time can be specified for the terminal mode (i.e. INT_MODE 1) (MAX_TIME_AT). After this time, the modem is switched back to OPC mode if the controller is in RUN mode.

The block must be called once per cycle by the user program.

Explanation of the formal parameters

Parameter	Declaration	Data type	Value/meaning	Description
EN	INPUT	BOOL	0: Block execution blocked 1: Block execution ena- bled	Enable input for block execution
ACT_GPRS_SERVICE	INPUT	BOOL	0: No changeover to OPC mode 1: Changeover to OPC mode	Changeover to OPC mode A positive edge 0 → 1 activates the OPC mode and the free port mode of interface 0 taking into account DELAY_TIME_GPRS.
ACT_AT_MODE	INPUT	BOOL	0: No changeover to ter- minal mode 1: Changeover to terminal mode	Changeover to terminal mode A positive edge $0 \rightarrow 1$ activates the termi- nal mode of the modem, for example to be able to access the modem directly using AT commands from within the user program.

4.3 SINAUT MICRO SC

Parameter	Declaration	Data type	Value/meaning	Description
DELAY_TIME_GPRS	INPUT	WORD	1 65535	Delay time in seconds between a positive edge $0 \rightarrow 1$ at ACT_GPRS_SERVICE and switching over to OPC mode. The delay time is used to allow commands in termi- nal mode to be completed before switch- ing over to OPC mode. The value must be higher than 0 (zero) and is limited by the value of MAX_TIME_AT.
MAX_TIME_AT	INPUT	WORD	1 65535	Maximum time in seconds after which the modem is switched back to OPC mode at the latest. If the value is 0 (zero), it does not switch over to OPC mode.
INT_MODE	OUTPUT	WORD	 0: The mode is currently being changed or the interface is not yet initial- ized (status after turning on). 1: Productive mode. Mo- dem in OPC mode. Inter- face in free port mode. 2: Initialization. Modem in OPC mode during initiali- zation (see Program block WDC_INIT (Page 32) or Program block WDC_INIT_2 (Page 35)). Interface in free port mode. 3: AT command mode. Modem in terminal mode and AT command mode (for example for send- ing/receiving SMS mes- sages). Interface in free port mode. 4: CSD communication. Modem in terminal mode with CSD communication. Interface in PPI mode. 	Display of mode, type of communication and interface mode
BUSY	OUTPUT	BOOL	0: Block execution not yet started, completed or aborted 1: Block currently execut-	Condition code of the execution status of the block
DONE	OUTPUT	BOOL	0: Error in block execution. See ERROR. 1: Block executed error- free.	Indicates whether the block executed without errors.

Parameter	Declaration	Data type	Value/meaning	Description
ABORTED	OUTPUT	BOOL	1: Block execution aborted due to an error	Shows the block execution abort.
ERROR	OUTPUT	WORD		Error code. For the meaning of the value, refer to the section Error numbers (Page 51).

4.4 SINAUT MICRO SC SEC

4.4.1 SINAUT MICRO SC SEC block library

For wireless communication using GPRS, the S7-200 CPU is connected to a GSM/GPRS modem. The modem is configured and controlled by the program blocks of the S7-200. The SINAUT MICRO SC block library provides the option of communication with TCSB (TeleControl Server Basic version V3 or higher) and with other controllers using GPRS.

Block library SINAUT MICRO SC SEC

The program blocks can be executed on the S7-CPU 224, 224XP, CPU224XPSi and 226.

The block library always uses interface 0 of the CPU.

Blocks

The block library provides the following blocks for handling GPRS communication:

WDC_INIT_2

Initialization of the communication using program blocks - with an additional reinitialization input

WDC_SEND

Handling send jobs

• WDC_RECEIVE:

Processing of received data

WDC_CONTROL

Control of the communication mode (terminal or OPC mode)

• WDC_CHECKSUM

The WDC_CHECKSUM block is not a user block but must exist in the user program. It is called by the WDC_SEND block.

Comparison of the checksum of a sent and received message. If there are different checksums between the sender and recipient, there has been a transmission error. In this case, a message sent by the modem is discarded by TCSB.

4.4.2 Program block WDC_INIT_2

Significance and how it works

The block initializes the block library, the serial interface of the PLC and the GPRS modem. Compared with the WDC_INIT block, it also has the additional re-initialization input INIT_START.

To reduce the memory requirements of the CPU, link either the WDC_INIT or the WDC_INIT_2 block into the program.

The block must be called once per cycle by the user program.

Specifying parameters as a string

Many of the parameters must be specified as a string. These strings must be defined in the data block of MicroWIN.

The first byte of the string contains the number of characters, the bytes that follow contain the individual characters. The parameters are transferred to the block by specifying the reference to the relevant string (& operator and memory address of the string).

Example:

Name of the modem at the address VB730.

Data block:

VB730	6
VB731	m
VB731	0
VB731	d
VB731	е
VB731	m
VB731	1

Calling WDC_INIT_2



Explanation of the formal parameters

Parameter	Declaration	Data type	Value/meaning	Description
EN	INPUT	BOOL	0: Block execution blocked	Enable input for block execution
			1: Block execution ena- bled	
INIT_START	INPUT	BOOL	1, 0	Input for re-initialization of the modem
				On a positive edge $0 \rightarrow 1$, the software of the modem is reset to the factory settings without the CPU changing to STOP.
STATION_NUMBER	INPUT	WORD		Logical address of the local station
IP_ADDRESS_CS	INPUT	DWORD		IP address or host name of the server (communications partner). Entry as string.
DESTPORT_CS	INPUT	DWORD		TCP/IP port of the server. Entry as string.

Parameter	Declaration	Data type	Value/meaning	Description
MODEM_NAME	INPUT	DWORD		Name for registering the GPRS modem on the server. Entry as string. Max. length: 255 characters. *
				The name should be structured as fol- lows; otherwise, no connection to TCSB and Micro SC is possible: <mo- dem>+consecutive number</mo-
				Example: Modem_Name VB730 = mo- dem5
				Note on TCSB: The automatically assigned consecutive number of the block parameter "MODEM_NAME" is configured in TCSB as the station number of the connection. In TCSB, enter the MODEM_NAME con- figured here as the station name. Keep to the permitted TCSB syntax.
MODEM_PASSWORD	INPUT	DWORD		Password for registering the GPRS mo- dem on the server. Entry as string. Max. length: 255 characters. *
				Note on TCSB: Keep to the permitted TCSB syntax.
PIN	INPUT	DWORD		PIN for enabling the SIM card. Entry as string.
APN	INPUT	DWORD		APN name of the GSM network provider (APN - Access Point Name). Entry as string.
AP_USER	INPUT	DWORD		User name for logging on with the APN. Entry as string.
AP_PASSWORD	INPUT	DWORD		Password for logging in with the APN. Entry as string.
DNS	INPUT	DWORD		IP addresses of 1 or 2 domain name servers of the GSM network provider. Entry as string.
				If two DNS servers are specified, these are separated by a semicolon, for example "192.168.1.1;192.168.1.2".

Parameter	Declaration	Data type	Value/meaning	Description
CLIP	INPUT	DWORD		List of the phone numbers authorized for dialing in to the station and for transfer of SMS messages. Only partners with an authorized phone number have access to the MD720. 6 numbers must be assigned in the following order:
				3 numbers for service data connec- tions
				Enter at least one phone number if you want to access the station via a remote connection for example to change the configuration or to transfer new software.
				• 3 numbers for data connections
				Entry as a string, individual entries sepa- rated by a semicolon (;). Example:
				+4912345*;NONE;NONE;+49123123;NO NE;NONE
				Enter NONE for empty entries.
				Enter a * (asterisk) as the placeholder character for call number groups.+4912345* for example authoriz- es all call numbers that begin with +4912345.
BUSY	OUTPUT	BOOL	0: Block execution not yet started, completed or aborted	Condition code of the execution status of the block
			1: Block currently execut- ing	
DONE	OUTPUT	BOOL	0: Error in block execution.1: Block executed error- free.	Indicates whether the block executed without errors.

* When using the maximum length of MODEM_NAME and MODEM_PASSWORD, make sure that the memory areas do not overlap.

If, for example, you specify "VB730" as the memory address of the string for MODEM_NAME and "VB740" for MODEM_PASSWORD, you only have 10 bytes for MODEM_NAME: 9 characters + 1 byte length information.

4.4.3 Program block WDC_SEND

Significance and how it works

The block handles send jobs initiated by the user program (START parameter). A new send job is only accepted if no other job is active (BUSY must be 0). Within the framework of a send job, a block of data can be sent to a remote station or to the OPC server by specifying the start index and the length.

While BUSY is set, the parameters of the block must not be changed.

The block must be called once per cycle by the user program.

Explanation of the formal parameters

Parameter	Declaration	Data type	Value / meaning	Description
EN	INPUT	BOOL	0: Block execution blocked 1: Block execution ena- bled	Enable input for block execution
START	INPUT	BOOL	0, 1	A positive edge $0 \rightarrow 1$ starts a new send job.
REMOTESTATIONAD DRESS	INPUT	WORD		Logical address of the remote station to which data will be sent or from which data will be read.
DATA_START	INPUT	WORD		Index of the first data byte to be sent or read. Example: "1500" for VB1500
DATA_LENGTH	INPUT	BYTE	0 230	Number of bytes to be sent
COMMAND	INPUT	WORD	1: Send data to partner 2: Query data from partner	Specifies the direction of the data ex- change with the communications partner
CURRENTTIME	INPUT	DWORD		Start address of the 8 byte time-of-day buffer with the current time in the Sie- mens S7-200 BCD format (see standard block READ_RTC).
				If no real-time clock is available, 0 can be specified here.
BUSY	OUTPUT	BOOL	0: Block execution not yet started, completed or aborted	Condition code of the execution status of the block
			1: Block currently execut-	
DONE	OUTPUT	BOOL	0: Error in block execution. See ERROR.	Indicates whether the block executed without errors.
			1: Block executed error- free.	
ABORTED	OUTPUT	BOOL	1: Block execution aborted due to an error	Shows the block execution abort.
ERROR	OUTPUT	WORD		Error code. For the meaning of the value, refer to the section Error numbers (Page 51).

4.4.4 Program block WDC_RECEIVE

Significance and how it works

The block monitors the receive buffer. If a new message has arrived, this is evaluated. Received data is copied to the specified address. The receipt of data is signaled via the DATA_START and DATA_LENGTH outputs.

The block must be called once per cycle by the user program.

Explanation of the formal parameters

Parameter	Declaration	Data type	Value / meaning	Description
EN	INPUT	BOOL	0: Block execution blocked 1: Block execution ena- bled	Enable input for block execution
NEWTIME	INPUT	DWORD		Start address of an 8-byte time-of-day buffer in which the received system time will be copied (Siemens S7-200 BCD format, see READ_RT standard block). If "0" is specified here, received time
				stamps are discarded.
RECVBUFFER_STAR T	INPUT	WORD		Start index of the memory area enabled for receipt of data.
RECVBUFFER_LENG TH	INPUT	WORD		Length of the data area enabled for re- ceipt of data [bytes].
REMOTESTATIONAD DRESS	OUTPUT	WORD		Logical address of the remote station (PLC or OPC server) that sent the message.
DATA_START	OUTPUT	WORD		Start index of the received data.
DATA_LENGTH	OUTPUT	BYTE	0: If no data was received. n: Number of received bytes if data was received.	Length of the transferred data [bytes]
NEWTIME_RECEIVE D	OUTPUT	BOOL		The parameter signals the receipt of a new system time.
				This bit and the value of NEWTIME should be used in the user program as the parameter of SET_RTC to synchro- nize the real-time clock. If a new system time is received, the bit remains set for the duration of one cycle. If no real-time clock is available, the bit can be ignored.

4.4.5 Program block WDC_CONTROL

Significance and how it works

The block allows the mode of the modem to be changed over (terminal mode/OPC mode) and indicates the current mode of the modem.

After operating the modem in terminal mode, for example for a remote programming session using CSD dial-up, the block allows the return to normal operation (OPC mode) using the ACT_GPRS_SERVICE parameter.

If the CSD connection is terminated, the GPRS modem returns automatically to OPC mode. The controller cannot, however, recognize the end of a dial-up connection. To be able to return to GPRS communication nevertheless, prior to the end of the connection a timedelayed changeover to OPC mode must be initiated using the WDC_CONTROL block from the variable table of MicroWin. To achieve this, the delay time must be specified in DELAY_TIME_GPRS and the changeover activated with ACT_GPRS_SERVICEACT_AT_MODE.

To ensure return to OPC mode, a maximum time can be specified for the terminal mode (i.e. INT_MODE 1) (MAX_TIME_AT). After this time, the modem is switched back to OPC mode if the controller is in RUN mode.

The block must be called once per cycle by the user program.

Explanation of the formal parameters

Parameter	Declaration	Data type	Value/meaning	Description
ACT_GPRS_SERVIC E	INPUT	BOOL	0: No changeover to OPC mode 1: Changeover to OPC	Changeover to OPC mode A positive edge $0 \rightarrow 1$ activates the OPC mode and the free port mode of interface 0 taking into account DELAX_TIME_CPPS
ACT_AT_MODE	INPUT	BOOL	0: No changeover to terminal mode 1: Changeover to terminal mode	Changeover to terminal mode A positive edge $0 \rightarrow 1$ activates the terminal mode of the modem, for example to be able to access the modem directly using AT com- mands from within the user program.
DELAY_TIME_GPRS	INPUT	WORD	1 65535	Delay time in seconds between a positive edge $0 \rightarrow 1$ at ACT_GPRS_SERVICE and switching over to OPC mode. The delay time is used to allow commands in terminal mode to be completed before switching over to OPC mode. The value must be higher than 0 (zero) and is
				limited by the value of MAX_TIME_AT.
MAX_TIME_AT	INPUT	WORD	1 65535	Maximum time in seconds after which the modem is switched back to OPC mode at the latest. If the value is 0 (zero), it does not switch over to OPC mode.

4.5 Error numbers

Parameter	Declaration	Data type	Value/meaning	Description
INT_MODE	OUTPUT	WORD	0: The mode is cur- rently being changed or the interface is not yet initialized (status after turning on).	Display of mode, type of communication and interface mode
			1: Productive mode. Modem in OPC mode. Interface in free port mode.	
			2: Initialization. Modem in OPC mode during initialization (see Pro- gram block WDC_INIT_2 (Page 44)). Interface in free port mode.	
			3: AT command mode. Modem in terminal mode and AT com- mand mode (for ex- ample for sending/receiving SMS messages). Interface in free port mode.	
			4: CSD communica- tion. Modem in termi- nal mode with CSD communication. Inter- face in PPI mode.	
BUSY	OUTPUT	BOOL	0: Block execution not yet started, completed or aborted 1: Block currently executing	Condition code of the execution status of the block
DONE	OUTPUT	BOOL	0: Error in block exe- cution. See ERROR. 1: Block executed error-free.	Indicates whether the block executed without errors.
ABORTED	OUTPUT	BOOL	1: Block execution aborted due to an error	Shows the block execution abort.
ERROR	OUTPUT	WORD		Error code. For the meaning of the value, refer to the section Error numbers (Page 51).

4.5 Error numbers

The program blocks return error numbers if errors have occurred to be able to describe the problem in greater detail.

4.5 Error numbers

The following table explains the error numbers to be evaluated by the user program and their significance.

Error n	umber	er Meaning	
dec.	hex.		
0	0000	No error	
1	0001	General error not specified in greater detail	
2	0002	Timeout	
		There was a timeout when executing a function.	
11	000B	Invalid start address	
		The specified start address of the user data is invalid.	
12	000C	Invalid length information	
		The specified length of the user data is invalid (too long).	
13	000D	Function not supported	
		The requested function (FunctionCode) is not supported.	

Commissioning and operation

5.1 Modes

Modes of the MD720

The MD720 always operates in one of the two following modes:

OPC mode

In OPC mode, there is productive data exchange with the OPC server in the control center using GPRS.

Transmission speed: 9600 bps

• Terminal mode

The terminal mode is for data communication between TIM modules for diagnostics and maintenance functions and for direct control of the MD720 using AT commands.

Transmission speed: 19200 bps

To send and receive SMS messages, the MD720 is also changed to the terminal mode.

5.2 Commissioning

Startup and commissioning

The MD720 starts up automatically as soon as it is supplied with power.

Startup in OPC mode

When the MD720 connected to an S7-200 is supplied with power and the program blocks on the connected CPU are called, the MD720 establishes a permanent TCP connection to the communications partner.

Startup in terminal mode

In conjunction with a TIM module, the MD720 is initialized automatically for communication with various remote partners.

It is also possible to initialize manually in terminal mode. You will find the initialization strings in the section Composite AT commands (initialization strings) (Page 63).

Only use of the data service CSD

In its basic setting, the MD720 expects the configuration data of a GPRS service provider.

5.3 Transparent phase, command phase

If you want to use the MD720 without using the packet-oriented GPRS data service, in other words only as a GSM modem using the CSD service, you need to disable the reading out of the relevant configuration data. To do this, enter the following AT commands:

1. AT^PARSTART<CR>

Enables the AT parameter assignment mode.

2. AT^PE08=NONE<CR>

Turns off reading out of the remote configuration port.

3. AT^PAREND<CR>

Ends the AT parameter assignment mode.

If you do not enter this command, the modem attempts in vain to establish a GPRS connection because the necessary data does not exist. This causes regular restarts of the modem.

Connection costs

Note

Please note that when establishing and re-establishing a connection, when attempting to connect to the partner and to obtain a connection, data packets are exchanged that may be subject to charges.

Make sure that the server of the communications partner is always reachable and that the destination address is correctly configured.

5.3 Transparent phase, command phase

Transparent phase

In the transparent phase, the MD720 sends all data it receives via the X1 interface transparently to the remote partner using GPRS or CSD. Commands received by the MD720 via the X1 interface during the transparent phase are also forwarded to the partner.

With the "ATO" command, you switch the MD720 from the command phase to the transparent phase.

Command phase

In the command phase, the MD720 receives AT commands. It does not forward data received via the X1 interface to the remote partner.

To be able to address the MD720 with commands, the MD720 must be switched from the transparent phase to the command phase with the "+++" command, see section Changing the operating mode (Page 55).

In the command phase the connection to the remote partner is retained, however no data is transferred using GPRS or CSD.

5.4 Changing the operating mode

Mode set in the factory

The MD720 ships from the factory with the terminal mode enabled.

Automatic changeover to OPC mode

If the MD720 is operated with an S7-200 CPU connected and the MICRO SC program blocks are called, OPC mode is enabled automatically.

Note

Changeover to terminal mode

If the MD720 is in OPC mode and is switched over to terminal mode to send/receive an SMS message or to establish a service connection, the productive connection to the control center is interrupted as long as the MD720 is in terminal mode.

Manual changeover

The mode can be changed manually using AT commands. This requires a service PC with a terminal program connected to the MD720 via the X1 interface or a remote connection, see section Service PC with terminal program (Page 61).

To change the mode in the terminal program, enter the following commands:

1. +++

Activates the AT command interface and interrupts the data transfer.

2. AT^PARSTART<CR>

Activates the AT parameter assignment command.

3. AT*PARSET="TERMINAL","MODE","DISABLE"<CR>

Selects the OPC mode with MSC protocol.

or

AT^PARSET="TERMINAL","MODE","SECURED"<CR>

Selects the OPC mode with MSCsec protocol.

or

AT^PARSET="TERMINAL","MODE","SUPERVISED" <CR>

Selects the terminal mode.

4. AT^PAREND<CR>

Deactivates the parameter assignment commands and causes a restart of the MD720. The MD720 starts in the selected mode. 5.5 OPC mode

5.5 OPC mode

5.5.1 Functions in OPC mode

GPRS modem

In OPC mode, an MD720 connected to an S7 station communicates via a TCP connection with a communications partner. For the data transfer, the GSM network is used with the GPRS service.

In OPC mode, the MD720 is configured by program blocks of the connected S7-200.

As soon as the MD720 is supplied with power and the program blocks on the connected CPU are called, the MD720 establishes a permanent TCP connection to the communications partner. The communications partner is an OPC server in the control center, see section Communications functions (Page 9).

Secure communication

For the GPRS communication, the MD720 uses one of the two following protocols:

MSC protocol

The MSC allows authentication of the communications partner and simple encryption. The MSC protocol is supported by the following control center applications:

- TeleControl Server Basic
- SINAUT MICRO SC
- MSCsec protocol

In addition to the MSC protocol, the MSCsec protocol also allows authentication of the messages using an HMAC with the help of a symmetrical encryption method (with preshared key). The MSCsec protocol is supported by the following control center applications:

- TeleControl Server Basic

The protocol is specified using the program blocks of the S7-200, see the section Use of the MSC and MSCsec protocols in control centers (Page 30), or using suitable applications with a TIM module, see the section Configuration examples (Page 14).

SMS adapter

With the user program of the connected S7-200, it is possible to send SMS messages to the MD720 using an AT command for forwarding to a recipient via the GSM network. Recipients can be:

- Other subscribers in the GSM network (mobile phones)
- Fax machines (when using a gateway)

The MD720 can also receive SMS messages from the GSM network. Received SMS messages can be queried by the application using AT commands.

Note

No underscore in SMS messages

An under score ("_") in an incoming SMS message is converted to "\11". This can lead to errors in the target application. It is therefore advisable not to use underscores. See also section Compatibility with the predecessor module MD720-3 (Page 12).

During the transfer of SMS messages between the S7 CPU and MD720, the MD 720 changes to terminal mode and the GPRS connection to the OPC server is briefly interrupted. Following transfer of the message, the connection to the OPC server is re-established automatically.

Receiving data calls as a GSM modem

During productive operation as a GPRS modem, the MD720 can receive connection requests from analog modems, ISDN modems or GSM modems. These can be connections for performing diagnostics and maintenance functions or for transferring configuration data from a remote engineering station.

You will find details of the new functions in the section Diagnostics and maintenance functions (Page 65).

5.5.2 Enabling OPC mode

Terminal mode is the factory setting

The MD720 ships from the factory with the terminal mode enabled.

Automatic changeover by the PLC

As soon as the MD720 is supplied with power and the program blocks on the connected CPU are called, the MD720 establishes a permanent TCP connection to the communications partner.

Manual changeover

For information on changing the mode, refer to the section Changing the operating mode (Page 55).

5.5 OPC mode

5.5.3 PIN in OPC mode

Configuring the PIN

If the "STATUS" LED flashes slowly (once per second), the MD720 waits for the PIN to be entered.

The PIN is stored in the WDC_INIT or WDC_INIT2 program block on the CPU and transferred automatically to the MD720 in OPC mode when it starts up. You will find the description in the section Program block libraries SINAUT MICRO (Page 29).

5.5.4 Connection establishment attempts

After it is turned on and the transfer of configuration data by the CPU or after a connection abort, the MODEM MD720 immediately starts in OPC mode to connect to the OPC server (T eleControl Server Basic or SINAUT MICRO SC).

The connection establishment attempts are according to the following scheme:

- Turn on (startup in approx. 35 seconds)
- 3 connection establishment attempts one directly after the other if the first and second attempt are unsuccessful (takes approx. 90 seconds)

If connection establishment fails, there are further connection establishment attempts following the sequence described below.

- 2 minutes waiting time
- 3 attempts in succession
- 4 minutes waiting time
- Restart (requires approx. 1 ... 3 minutes)
- 3 attempts in succession
- 15 minutes waiting time
- Restart
- 3 attempts in succession
- 15 minutes waiting time

...

The last three steps are repeated until connection establishment is successful.

5.6 Terminal mode

5.6.1 Functions in terminal mode

In terminal mode the MD720 operates as a GSM modem that is controlled by AT commands.

The following are supported:

- Incoming and outgoing data connection at 9600 bps with other modems in to the GSM network, the ISDN or the analog telephone network
- Sending of SMS messages

5.6.2 Activating terminal mode

Terminal mode is the factory setting

The MD720 ships from the factory with the terminal mode enabled. The MD720 is in the command phase.

Switching from OPC mode to terminal mode

For information on changing the mode, refer to the section Changing the operating mode (Page 55).

5.6.3 Operation in terminal mode

The MD720 is controlled by AT commands that are entered either by the connected application or manually using a terminal program.

Control by applications

Usually the application or the application program that you run on a connected PC will control the MD720. This means that the commands to establish or terminate a data connection via the GSM network are sent to the device by the application. The application and the device communicate using AT commands just like other types of modem. The same applies to the sending of SMS messages.

Direct control using AT commands

You can also enter AT commands directly so that it executes the required functions. In this case use any terminal program to enter the AT commands. For more detailed information, refer to section Working with AT commands (Page 62).

Or you write your own communication program that tailored to your requirements.

5.6 Terminal mode

Entering the PIN before AT commands

Enter the PIN of the SIM card you are using before any other AT commands. See section PIN in terminal mode (Page 60).

Until a PIN has been entered, most AT commands will be responded to with ERROR.

5.6.4 PIN in terminal mode

PIN not stored in terminal mode

To operate the device the PIN of the inserted SIM card must be known. In terminal mode the PIN is not stored in the MD720. The PIN must be set again every time the device is turned-on.

In terminal mode, the PIN is set using AT commands.

If you use a PIN-less SIM card the PIN request is skipped.

Entering the PIN

If the LED S flashes slowly (once per second), the MD720 then waits for the PIN to be entered.

Follow the steps below to enter the PIN:

1. Connect the service PC to the X1 interface of the MD720.

See section Service PC with terminal program (Page 61).

- 2. Start the terminal program.
- 3. Enter the PIN with the AT command "AT+CPIN".

Example of entering PIN 0000:

Command: at+cpin="0000" // Entry of the PIN with quotes (" ") Output: OK

Note

Locking of the PIN after entering the wrong PIN

The number of permitted attempts to enter the PIN is limited by the SIM card. Normally a maximum of three attempts are permitted.

After entering the wrong pin three times, the SIM card PUK is locked. In this case, the SIM card can only be unblocked by entering the PUK.

5.6.5 Service PC with terminal program

Functions of the service PC

For the following functions, you require a service PC:

- Control of the MD720
 - Controlling the MD720 using AT commands
- Configuration
 - Setting the PIN in terminal mode
 - Setting call numbers of permitted subscribers for data calls via a remote connection
- Diagnostics and maintenance functions
 - Reading out settings
 - Reading out the log
 - Updating firmware

Connecting the service PC

You have the following options for connecting the service PC to the MD720:

• Local connection via the X1 interface of the MD720

For details, see section Local service access via the X1 interface (Page 69).

• Remote connection via the wireless interface of the MD720

For details, see section Establishing a remote service connection (Page 70).

Terminal program on the service PC

To be able to access the MD720 for service purposes, a terminal program needs to be installed on the service PC.

You can use an installed terminal program of the Windows operating system or install a different terminal program.

Description of the terminal program

Work with the following settings for the terminal program:

Interface of the PC for connecting to the MD720	COM interface
Transmission speed	19200 bps *
Character format	8N1
Data bits	8
Parity	None
Stop bits	1
Dependence on direction	Full duplex
XON/XOFF control	Enabled (only when updating the firmware)

* You set the transmission speed of 19200 bps using the AT command "AT+IPR". See section AT+IPR: Set the transmission speed of the X1 interface (Page 114) for information on this.

5.6 Terminal mode

5.6.6 Working with AT commands

Syntax

The AT command language is a standard for controlling modems. It is line-oriented. Each command line begins with AT (for ATtention), followed by the actual command, and ends by pressing the Enter key.

- Example: ATD444444
- Meaning: Dial (D for Dial) 444444

There are only two exceptions to this rule:

- The "+++" command for changing to the command phase (see below)
- The "A/" command for repeating the last entered command line

With these two commands, there is no need to press the enter key.

Command phase, transparent phase

The device accepts AT commands only when it is in the command phase. See section Transparent phase, command phase (Page 54) for information on this.

Enabling/disabling local echo

To see your entries on the screen, enable the local data echo with the command ATE1. You can disable the local data echo again with the ATE0 command.

Commonly used AT commands

Below, you will find the syntax for a selection of commonly used AT commands.

Table 5-1	Entering the PIN
-----------	------------------

Command:	at+cpin="0000"
Output:	ОК

Table 5-2 Querying the network status

Command:	at+creg?
Output:	+CREG: 0,1

Table 5-3 Querying the firmware version

Command:	ati3
Output:	SIE3171 MODEM MD720 V.1.7.00 19.05.2006

Table 5- 4	CSD call outgoing
------------	-------------------

Command:	atd0123456789
Output:	CONNECT

Table 5-5 CSD call incoming

Output:	RING
Command:	ata
Output:	CONNECT

Table 5-6 Sending SMS messages

Command:	at+cmgf=1
Output:	ОК
Command:	at+cmgs="Call number", 145
Command:	>Text of the SMS message , max. 160 characters. Completion and transfer with: Ctrl Z
Output:	+CMGS: 251 // The number is an example.
	ОК

Description of the supported AT commands

The description of the AT commands supported by the MD720 can be found in the appendix Supported AT commands (Page 87).

5.6.7 Composite AT commands (initialization strings)

Composite AT commands

The following commands are required to initialize the MD720 in terminal mode to ensure CSD communication with the required remote partner.

The initialization strings below are accepted by the MD720. The individual commands are implemented accordingly.

5.6 Terminal mode

Communications partner is a TIM module with MD720

• Initialization string: ATE0S0=1&D2+CBST=71,0,1;+CRC=1;&W+IPR=19200

The string is made up of the following individual commands:

- ATE0S0

Turning off the local echo in register 0 and the option "Hang up if no DTR signal is detected".

– +CBST

Selection of the bearer service type

- +CRC

Cellular result codes with storage (&W)

– +IPR

Setting the maximum data transmission speed (19200 bps)

Communications partner is S7-200

• Initialization string: ATE0S0=0+IPR=9600

The string is made up of the following individual commands:

- ATE0S0

Turning off the local echo in register 0

+IPR

Setting the maximum data transmission speed (9600 bps)

Communications partner is mobile phone (sending SMS messages)

Initialization string: AT+CMGF=1+CSMP=17,0,0,0+CSCA="+AAAAAAAAAAAA"

The string is made up of the following individual commands:

– +CMGF

MS format

- +CSMP

Parameter for SMS text mode

– +CSCA

SMSC address

• Initialization string: AT+CMGS="+BBBBBBBBBB",145

The "AT+CMGS" initiates the sending of an SMS message.

Sending in text mode specifying the call number (in quotes) and the information "with country code"

Diagnostics and upkeep

6.1 Diagnostics and maintenance functions

Diagnostics and maintenance functions

The MD720 provides the following diagnostics and maintenance functions via a service PC:

- Diagnostics functions:
 - LEDs

The LEDs provide information about the current status of the MD720. The LED displays differ in OPC and terminal mode.

- Reading out settings

With this function, you read out the most important settings of the MD720 in terminal mode.

- Reading out the log

The MD720 logs important events in an internal log. The log can be read out in terminal mode.

- Maintenance functions:
 - Updating firmware

With this function, you download a new firmware file to the MD720.

- Resetting to factory settings

With this function, you reset all the current settings to the factory settings as when the device ships.

You will find details of all the functions in the following sections.

Access via two serial interfaces

Access from the service PC to the MD720 for diagnostics and maintenance purposes is supported by the following interfaces of the MD720:

- X1 interface
 - Reading out settings
 - Reading out the log
 - Updating firmware
- Wireless interface
 - Reading out the log
 - Updating firmware

6.2 LEDs

6.2.1 Meaning of the LEDs in OPC mode

The device has 3 LEDs that indicate the current operating status:

- STATUS
- QUALITY
- CONNECT

The LEDs have different flashing frequencies. The meaning of the flashing frequency of the display is as follows:

- Flashes slowly: once per second
- Flashes fast: 4 times per second

LED	Status	Meaning
All together	Flash on and off in sequence (fast)	Device startup
	Synchronized slow flashing of all LEDs	Service mode
	Flash on and off in sequence (slow)	Loading a firmware file
	Synchronized fast flashing of all LEDs	Error
STATUS	Flashing slowly	Waiting for PIN input
	Flashing quickly	PIN error/ SIM error *
	OFF	No GPRS connection
	ON	GPRS connection exists
QUALITY	Flashing slowly (regularly)	Dial-in to the GSM network
	Flashes once followed by pause	Field strength inadequate
	Flashes twice followed by pause	Field strength adequate
	Flashes three times followed by pause	Field strength good
	ON	Field strength very good
	OFF	Waiting for PIN
CONNECT	OFF	No connection to the server
	Flashing slowly	Connection to the OPC server being established
	ON	Connection to the OPC server es- tablished
	Flashes irregularly	Data transfer (LED flashes at the same time as the data stream)

* You will find information on what to do in the case of PIN errors / SIM errors in the section SIM card not detected or wrong PIN entered (Page 67).

6.2.2 Meaning of the LEDs in terminal mode

The device has 3 LEDs that indicate the current operating status:

- STATUS
- QUALITY
- CONNECT

The LEDs have different flashing frequencies. The meaning of the flashing frequency of the display is as follows:

- Flashes slowly: once per second
- Flashes fast: 4 times per second

LED	Status	Meaning
All together	Flash on and off in sequence (fast)	Device startup
	Synchronized slow flashing of all LEDs	Service mode
	Flash on and off in sequence (slow)	Loading a firmware file
	Synchronized fast flashing of all LEDs	Error
STATUS	Flashing slowly	Waiting for PIN input
	Flashing quickly	PIN error/ SIM error *
QUALITY	Flashing slowly (regularly)	Dial-in to the GSM network
	Flashes once followed by pause	Field strength inadequate
	Flashes twice followed by pause	Field strength adequate
	Flashes three times followed by pause	Field strength good
	ON	Field strength very good
	OFF	Waiting for PIN
CONNECT	Flashing (regularly)	Terminal mode activated

* You will find information on what to do in the case of PIN errors / SIM errors in the section SIM card not detected or wrong PIN entered (Page 67).

6.2.3 SIM card not detected or wrong PIN entered

The STATUS LED flashes quickly

If the "STATUS" LED flashes quickly (4 times per second), either the SIM card was not detected or the SIM card's PUK is blocked, because the wrong PIN has been transferred too often.

Remedy:

- 1. Please check, whether the SIM card was inserted correctly into the device, see the section Inserting the SIM card (Page 21).
- 2. Check whether the SIM card's PUK is blocked.

To do this, insert the SIM card into a normal mobile phone. The phone will display whether or not the SIM card's PUK is blocked. If the SIM card's PUK is blocked, please enter the PUK and then a PIN. Once again, it is best to use a mobile phone for this.

3. Check whether the correct PIN is stored in the program blocks.

Identify the reason for the SIM card PUK being blocked before you insert the SIM card in the MD720 again.

- 4. Check the SIMSTATE parameter of the MD720 and, if necessary, delete an incorrect value, see following section.
- 5. Then insert the SIM card in the MD720 again.

Checking the SIMSTATE parameter and deleting an incorrect value

The SIMSTATE parameter is displayed when you read out the settings of the MD720 via the X1 interface, see section Reading out settings (Page 71).

The values of the SIMSTATE parameter have the following significance:

SIMSTATE=SIM_OKReady for operationSIMSTATE=SIM_ERRORWrong PIN; one previous failed attemptSIMSTATE=SIM_PROBLEMWrong PIN; two previous failed attempts or no SIM detected.

If SIMSTATE=SIM_ERROR or SIMSTATE=SIM_PROBLEM, follow the steps below:

- 1. Make sure, that the correct PIN PLC program block is entered.
- 2. Correct the value of the SIMSTATE parameter in terminal mode.

To do this, enter the following AT commands:

- AT^PARSTART
- AT^PARCSE
- AT^PAREND

Afterwards the device will restart and is ready for operation again.

As an alternative:

Reset the MD720 to the factory settings, see section Resetting to factory settings (Page 77).

Note: All settings are reset.

6.3 Functions of the SET button

By pressing the SET button for different lengths of time, you can trigger various diagnostics and maintenance functions during operation:

Time the SET button is pressed	LED reaction	Function
Shorter than 2 seconds	"STATUS" LED lit.	Output of the current settings and values of the MD720 on the X1 interface
		You will find detailed information about the function in the section Reading out settings (Page 71).
Longer than 4 seconds	"CONNECT" LED lit.	Resetting the MD720 to factory settings
		You will find detailed information about the function in the section Resetting to factory settings (Page 77).

6.4 Local service access via the X1 interface

Establishing a service connection via the X1 interface

Set up a local service access to the MD720 for diagnostics and maintenance purposes as follows:

- 1. Connect the service PC (with terminal program) via the COM interface to the X1 interface of the MD720 using an RS-232 cable.
- 2. Start the terminal program.
- 3. Select the COM interface of the PC.
- 4. Make settings compatible with the MD720.

For information on the settings, refer to the section Service PC with terminal program (Page 61).

- 5. Enable the parameter assignment mode of the MD720 with the following command: AT^PARSTART
- 6. Start the required function (refer to the next section).
- 7. Finally disable the parameter assignment mode of the MD720 again with the following command:

AT^PAREND

6.5 Establishing a remote service connection

6.5 Establishing a remote service connection

Establishing a remote connection for the terminal mode via the wireless interface

For the following applications, you can establish a data remote connection via the GSM network:

• Diagnostics and maintenance

Some of the diagnostics and maintenance functions can be used via a remote connection to the MD720.

• Transfer of S7-200 configuration data

To change the configuration data of the S7-200, you can establish a remote connection from the engineering station as a data call via the GSM network to the remote S7-200 with MD720.

The remote connection is established from a service PC with a terminal program, see also section Service PC with terminal program (Page 61).

To establish the remote connection, the MD720 must be called by an analog modem, an ISDN modem or GSM modem connected to the service PC.

The call number of the modem that establishes the service data connection to the MD720 must already have been configured in program block WDC_INIT.

On the remote connection you can use AT commands to access the MD720 in terminal mode.

Configuring call numbers for remote access

To be able to establish a remote connection to the MD720 from a telephone connection, its call number must already be configured in the MD720.

- 1. Connect locally via the X1 interface of the MD720.
- 2. Start the terminal program.
- Enable the parameter assignment mode of the MD720 with the following command: AT^PARSTART

- 4. Enter the service call numbers of 1 to 3 telephone connections from which you want to establish remote connections to the MD720:
 - AT^Pn00 = service call number 1, e.g.:

AT^Pn00=+4912345678

– AT^Pn01 = service call number 2, e.g.:

AT^Pn01=+49123456*

- AT^Pn02 = service call number 3, e.g.:

AT^Pn02=+49123457*

The * character can be used as a placeholder for any digits.

 Disable the parameter assignment mode of the MD720 with the following command: AT^PAREND

At the same time, the command stores the previously entered values.

6.6 Reading out settings

Reading out the settings of the MD720

By pressing the SET button (for less than 2 seconds), the most important communications settings of the MD720 are output on the X1 interface. In terminal mode, the settings can be read out with a service PC.

Requirement: Local connection via the X1 interface

To be able to output the settings, you require a service PC with a terminal program connected locally to the X1 interface of the MD720, see section Local service access via the X1 interface (Page 69).

To display the settings in the terminal program, you do not need to enable the parameter assignment mode of the MD720.

Displayed settings

The following settings are displayed.

Display in the terminal program (exam- ples)	Meaning
^PA00: "0"	Address of the OPC server (TCSB, MICRO SC)
^PA01: "0"	
^PA02: 26863	Port of the OPC server (TCSB, MICRO SC)
^PA03: 26863	

6.6 Reading out settings

Display in the terminal program (exam- ples)	Meaning	
^PA06: 3 ^PA08: 2,4,6,10,15,15,15,15,15,15 ^PB00: MSC ^PB01: LL	Internal device parameters; reserved	
^PB03: NONE	Login name for OPC server (TCSB, MICRO SC), MSC user name from SINAUT engineering software	
^PB04: "PW0"	Password (not displayed when it is read out)	
^PB05: NONE ^PB06: "PW0" ^PB07: NONE ^PB09: 0 ^PE01: NONE	Internal device parameters; reserved Rekeying interval with the MSCsec protocol (1 unit = 45 s)	
^PE07: 8082 ^PE08: 8081 or NONE ^PG00: 1	Remote GPRS configuration port	
^PH00: NONE	Access Point Name (APN)	
^PH01: "guest"	GPRS login name	
^PH02: "guest"	GPRS login password	
^PH03: NONE	Primary domain name server (DNS1)	
^PH04: NONE	Secondary domain name server (DNS2)	
^PI00: OFF	Internal device parameter; reserved	
^PI01: NONE	PIN of the SIM card	
^PI02: NONE	New PIN	
^PJ00: OFF ^PJ01: 0 ^PJ02: ON	Internal device parameters; reserved	
^PJ03: 9600	Transmission speed on the X1 interface in OPC mode	
^PJ04: 8N1	Character format on the local interface	
^PJ05: 19200	Transmission speed on the X1 interface in terminal mode	
^PL00: "SIE3171"	Product identifier	
^PL02: 24	Interval for periodic restarts (h)	
^PM00: SUPERVISED	"Terminal mode" (19200 bps)	
^PM00: DISABLED	"OPC mode" (9600 bps)	
^PM09: SECURED	MSC variant	
^PN00: "*" ^PN01: NONE ^PN02: NONE	Call number for a CLIP check with a service data connection	
^PO00: "*" ^PO01: NONE ^PO02: NONE	Call number for a CLIP check with an X1 data connection	
6.7 Reading out the log

Display in the terminal program (exam- ples)	Meaning
[^] PQ00: 1 [^] PQ01: 500 [^] PQ02: NONE [^] PQ09: 0 [^] PR03: ON [^] PS00: NONE [^] PS01: NONE [^] PS02: NONE [^] PT01: NONE [^] PT02: NONE [^] PT02: NONE [^] PT02: NONE [^] PZ0000: "T-Mobile Deutschland" [^] PZ0001: "26201" [^] PZ0002: "internet.t-d1.de"	Internal device parameters; reserved
^PZ0003: "gast"	GPRS login name (network operator 1)
^PZ0004: "gast" ^PZ0006: NONE ^PZ0007: NONE	Internal device parameters; reserved
^PZ0100: "Vodafone Deutschland"	Free text network operator 2
^PZ0001: "26202"	Identifier (MNC/MCC) network operator 2
^PZ0102: "web.vodafone.de"	APN network operator 2
^PZ0103: "gast"	GPRS login name (network operator 2)
^PZ0104: "gast"	GPRS login password (network operator 2)
^PZ0106: NONE	DNS 1 (network operator 2)
^PZ0107: NONE	DNS 2 (network operator 2)

6.7 Reading out the log

Reading out the log

The events logged in the MD720 log can be read out with a service PC in terminal mode.

Setting a time stamp

To be able to establish a relationship between the count of the operating seconds counter and the actual time-of-day, it is possible to generate a log entry in which both a transferred time-of-day as well as the count of the operating seconds counter at the time of transfer can be stored (see event "time stamp set").

The relevant (optional) AT commands can be found in the following section "Procedure".

6.7 Reading out the log

Requirement

The log can only be read out if you have connected a service PC either locally to the X1 interface of the MD720 or have established a remote connection to the MD720 from the service PC.

The procedure is described in the sections that follow:

- Local service access via the X1 interface (Page 69)
- Establishing a remote service connection (Page 70)

There must be a valid SIM card inserted in the device.

Procedure

Status: The modem is in OPC mode and a local service PC is connected.

If you want to read out the log via a remote connection, first establish a connection as described in the section Establishing a remote service connection (Page 70).

1. Switch the MD720 to the terminal mode with the command +++.

The transmission speed is then 9600 bps (maximum speed in the GSM network).

Note: With some terminal programs you need to wait approximately half a second after entering a character before entering the next.

2. Optional: Establish the relationship between the count of the operating seconds counter and the actual time-of-day with the following entry:

AT^PLTIME=YY/MM/DD,hh:mm:ss

3. Read out the log entries.

The log is divided into various sections that can be read out selectively:

- Enter AT^PLOG0 to read all sections.
- Enter AT^PLOG1 to read only the latest section.
- Enter AT^PLOG12 to read only the oldest section.
- 4. If you are connected to the MD720 via a remote connection, (no local service PC connected): End the terminal mode with AT^PAREND.

The MD720 restarts.

5. If applicable, close the service data connection with ATH.

Log format

The log entries are formatted as follows:

<OSC>;<event code>;<optional extra info>

 <OSC>: Count of the operating seconds counter at the time of the entry (optional, see above)

As soon as the MD720 is ready for operation, it increments its operating seconds counter at one second intervals. Each time you reset to the factory settings, 900 seconds are added to the last stored count.

- <event code>: Shows the logged event as a hexadecimal code number.
- <optional extra info>: Outputs additional information about individual events, see table.

Logged events

The following events are logged:

Event code	Meaning	Additional information
0x0000	Restart	Mode
0x0101	Output of the IMEI	IMEI
0x0102	Output of the IMSI	IMSI
0x0201	Setting PIN successful	
0x0202	Setting PIN failed	
0x0203	PIN error	
0x0300	Registration in GSM network started	
0x0301	Registration in GSM network successful	Network ID
0x0302	Registration in GSM network failed	Network ID
0x0303	Registration in GSM network lost	Info = network ID
0x0400	Registration with GPRS service started	
0x0401	Registration with GPRS service successful	
0x0402	Registration with GPRS service failed	
0x0403	Registration with GPRS service lost	
0x0501	IP address exists	
0x0502	IP address does not exist	
0x0600	MSC connection establishment started	
0x0601	MSC connection establishment successful	
0x0602	MSC connection establishment failed	
0x0603	MSC connection interrupted	
0x0604	MSC connection terminated locally	
0x0605	MSC connection terminated by partner	
0x0606	MSC watchdog: Exchange successful	
0x0607	MSC watchdog: Exchange failed	
0x0900	CSD connection establishment started (outgoing)	
0x0901	CSD connection established (outgoing)	
0x0902	CSD connection establishment failed (outgoing)	
0x0903	CSD connection interrupted (outgoing)	
0x0910	CSD connection establishment started (incoming)	

6.8 Updating firmware

Event code	Meaning	Additional information
0x0911	CSD connection established (incoming)	
0x0912	CSD connection establishment failed (incoming)	
0x0913	CSD connection interrupted (incoming)	
0x0A01	Mode changed	Mode
0x0B00	Periodic entry with field strength	Field strength
0x0B01	Periodic entry with cell ID	ID of the wireless cell
0x0B02	Periodic entry with mode	Mode
0x0C01	Parameter assignment mode started	
0x0C02	Parameter assignment mode ended	
0x0C03	Factory settings loaded	
0x0C04	SET button pressed	
0x0D00	Loading of firmware started	
0x0D01	Loading of firmware successful	
0x0D02	Loading of firmware failed	
0x0D11	Firmware signature check successful	
0x0D12	Firmware signature check failed	
0x0D20	Firmware activation started	
0x0D21	Firmware activation successful	
0x0D22	Firmware activation failed	
0x0E01	Time stamp set	UTC time stamp (YY/MM/DD,hh:mm:ss)

6.8 Updating firmware

New firmware version

If a new firmware version is available for the MD720, you can download this to the MD720 from a service PC. You can download the firmware file to the MD720 locally via the X1 interface or via a service data connection.

Requirements for downloading a firmware file

- You have saved the firmware file on the service PC.
- The service PC with the terminal program is connected to the MD720 locally or via a remote connection.

Note the settings of the terminal program for updating the firmware in the section Service PC with terminal program (Page 61).

Procedure

To download the firmware to the MD720, follow these steps:

Note

Recommendation when connected locally: Reset

Before updating the firmware. reset the MD720 to the factory settings via the X1 interface (see section Functions of the SET button (Page 69)). This puts the MD720 into a defined status and ensures that the mode and transmission speed are set correctly.

Note that resetting, resets all the settings on the MD720. If the MD720 is connected to an S7-200, the settings made in the program blocks will be loaded on the MD720 when it restarts following the firmware update.

- 1. Switch the MD720 to the terminal mode with the command +++, if you did not previously reset the MD720 to the factory settings.
- 2. Enter AT^PFWDL in the terminal program.

The MD720 outputs "C" in the terminal program.

- 3. In the terminal program select file transfer with the following options:
 - XMODEM
 - 1K
- 4. Select the firmware file in the file system and start the transfer.
- 5. After successful transfer, the MD720 outputs "OK".
- 6. Enter AT^PUPDATE and then wait a while.
 - The firmware is decrypted and the signature of the firmware is checked.
 - If the signature check is successful, the MD720 outputs "OK" and activates the new firmware.
 - The MD720 restarts.

(There is also a restart if the signature check was not successful.)

6.9 Resetting to factory settings

Reset all settings of the MD720 to the defaults set in the factory by pressing the SET button for longer than 4 seconds.

6.9 Resetting to factory settings

After you have pressed the button for 4 seconds, the "CONNECT" LED starts to light up.

Note

Consequences of resetting to factory settings

OPC mode:

Communication with the remote partner is interrupted. The MD720 is re-initialized and configured by the program blocks of the CPU.

- The connection to the configured communications partner is re-established.
- Terminal mode:

An established connection is interrupted.

The MD720 starts again in terminal mode.

The PIN of the SIM card is deleted. Reading out the log is no longer possible.

Technical specifications

Technical specifications

Technical specifications		
Connection to Industrial Etherne	ət	
X1 interface	Number:	1
	Implementation:	D-sub 9-pin, female
	Characteristics:	RS-232
		Control using AT commands
	Transmission speed:	19200 bps
		Permitted range: 300 57600 bps
Wireless interface		
Antenna connector	Number:	1
	Implementation:	SMA socket
	Impedance:	50 Ω nominal
Frequency bands	GPRS / CSD:	Quad band: 850, 900, 1800, 1900 MHz
Maximum transmit power	GSM 850:	2 W
	GSM 900:	2 W
	DCS 1800:	1 W
	PCS 1900:	1 W
GPRS	Characteristics:	Maximum of 5 time slots at the same time, of which:
		Up to 2 uplinks
		Up to 4 downlinks
	Transmission speed	Gross values:
	• Uplink (modem → Internet)	Max. 42 kbps
	• Downlink (Internet → modem)	Max. 54 kbps
		The net values (user data) are approximately 30% lower.
CSD	Characteristics:	MTC (Mobile Terminated Call)
	Transmission speed:	9600 bps
SMS (TX)	Characteristics:	Text mode
Electrical data		
Power supply	Power supply:	24 VDC
	Permitted range:	12 30 V
	Implementation:	Terminal block, 4 terminals

Technical specifications		
Current consumption with an active connection with data exchange	At 12 V:	 In = 280 mA I_{Burst} = 355 mA
	At 24 V:	 In = 135 mA I_{Burst} = 215 mA
	At 30 V:	 I_n = 110 mA I_{Burst} = 195 mA
Current consumption without connec-	At 12 V:	I _n = 58 mA
tion	At 24 V:	I _n = 36 mA
	At 30 V:	I _n = 35 mA
Effective power loss	• typical:	• 3.4 W
	• maximum:	• 3.8 W
Permitted ambient conditions		
Ambient temperature	During operation:	-20°C +60°C
	During storage:	-25°C +85°C
Relative humidity	During operation:	≤ 95% at 25 °C, no condensation
Design, dimensions and weight		
Module format	Compact design for wall or DIN rail m	ounting
Degree of protection	IP30	
Weight	150 g	
Dimensions (W x H x D)	30 x 100 x 90 mm	
Draduct functions *		

Product functions *

* You will find additional properties and performance data in the section Application and functions (Page 9).

Certification

Approvals issued

Note

Issued approvals on the type plate of the device

The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

EC declaration of conformity

(6

The device meets the requirements and safety objectives of the following EC directives and it complies with the harmonized European standards (EN) for programmable logic controllers which are published in the official documentation of the European Union.

• 2014/34/EU (ATEX explosion protection directive)

Directive of the European Parliament and the Council of 26 February 2014 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres, official journal of the EU L96, 29/03/2014, pages. 309-356

• 1999/5/EC (R&TTE)

Directive of the European Parliament and of the Council of 9 March 1999 on Radio Equipment and Telecommunications Terminal Equipment and the mutual recognition of their conformity

• 2011/65/EU (RoHS)

Directive of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

The EC Declaration of Conformity is available for all responsible authorities at:

Siemens Aktiengesellschaft Process Industries and Drives Process Automation DE-76181 Karlsruhe Germany

You can find the EC Declaration of Conformity and additional certificates for this product on the Internet at the following address:

Link: (<u>https://support.industry.siemens.com/cs/ww/en/ps/21820/cert</u>) Certificate type: "EC declaration of conformity"

IECEx

The product meets the requirements of explosion protection according to IECEx. IECEx classification:

• Ex nA IIC T4 Gc

Certificate: IECEx DEK 14.0087X

Applied standards:

- EN 60079-0 Explosive atmospheres Part 0: Equipment General requirements
- EN 60079-15 Explosive atmospheres Part 15: Equipment protection by type of protection 'n'
- Ex ec IIC T4 Gc

Certificate: IECEx DEK 18.0019X

Applied standards:

- EN 60079-0 Explosive atmospheres Part 0: Equipment General requirements
- EN 60079-7 Explosive Atmospheres Part 7: Equipment protection by increased safety 'e'

The current versions of the standards can be seen in the current version of the IECEx certificate .

Over and above this, the following conditions must be met for the safe deployment of the device according to the section Notices regarding use in hazardous areas according to ATEX (Page 20).

You should also note the information in the document "Use of subassemblies/modules in a Zone 2 Hazardous Area" that you will find on the Internet at the following address:

Link: (http://support.automation.siemens.com/WW/view/en/78381013)

ATEX approval



The product meets the requirements of the EU directive 2014/34/EU "Equipment and Protective Devices for Use in Potentially Explosive Atmospheres".

ATEX approval:

• II 3 G Ex nA IIC T4 Gc

Type Examination Certificate: KEMA 03ATEX1229X

Applied standards:

- EN 60079-0 Explosive atmospheres Part 0: Equipment General requirements
- EN 60079-15 -Explosive atmospheres Part 15: Equipment protection by type of protection 'n'

• II 3 G Ex ec IIC T4 Gc

Type Examination Certificate: DEKRA 18ATEX0027X

Applied standards:

- EN 60079-0 Explosive atmospheres Part 0: Equipment General requirements
- EN 60079-7 Explosive Atmospheres Part 7: Equipment protection by increased safety 'e'

Ta = 60 °C

The current versions of the standards can be seen in the certificate.

Over and above this, the following conditions must be met for the safe deployment of the device according to the section Notices regarding use in hazardous areas according to ATEX (Page 20).

You should also note the information in the document "Use of subassemblies/modules in a Zone 2 Hazardous Area" that you will find on the Internet at the following address:

Link: (http://support.automation.siemens.com/WW/view/en/78381013)

R&TTE

The RTU meets the requirements of the EC directive 1999/5/EC "Radio equipment and telecommunications terminal equipment" according to the requirements of article 3 (1) a, 3 (1) b and 3 (2).

Article 3 (1) a - Health and Safety

Harmonized standards:

EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013

Information technology equipment - Safety - Part 1: General requirements

• EN 62479

Assessment of the basic limit values of electromagnetic fields - safety

Article 3 (1) b - EMC

Harmonized standards:

• ETSI EN 301 489-1 V1.9.2

Electromagnetic compatibility and radio spectrum matters (ERM) - Electromagnetic compatibility for radio equipment and services - Part 1 : Common technical requirements

• ETSI EN 301 489-7 V1.3.1

Electromagnetic compatibility and radio spectrum matters (ERM) - Electromagnetic compatibility for radio equipment and services - Part 7 : Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)

- EN 55022 (class B) Radio interference characteristics
- EN 55024 Immunity characteristics

• EN 61000-6-4+A1

Emission - industrial area

• EN 61000-6-2

Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

Article 3 (2) Measures for efficient use of the frequency spectrum

Harmonized standards:

• ETSI EN 301 511 V9.0.2

Global system for mobile communication (GSM). Harmonized standard for mobile phones in the GSM 900 and GSM 1800 bands covering essential requirements of article 3.2 of the R&TTE directive.

Maximum antenna gain

Users and installers must be provided with antenna installation instructions and transmitter operating conditions that must be followed to avoid exceeding the permitted RF exposure.

In this respect, note the technical specifications of the antenna, see appendix Antennas (Page 85).

RoHS

The device meets the requirements of the EC directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Applied standard:

• EN 50581

cULus



Underwriters Laboratories, Inc.

Certificate Number: 20130809-E301659, File E301826

- UL / IEC /EN 60950-1 (Information Technology Equipment Safety Part 1: General Requirements)
- CSA C22.2 No. 60950-1-07 (Information Technology Equipment Safety Part 1: General Requirements)

FM certification



Factory Mutual Research (FM): Approval Standard Class Number 3611 Class I, Division 2, Group A, B, C, D, Temperature Class T4, Ta = 60 °C Approved for use in: - Class I, Division 2, Group A, B, C, D and non-hazardous areas

- Class I, Zone 2, Group IIC non-hazardous areas

Accessories

B.1 Antennas

The following antennas are available for use in mobile wireless networks and can be installed both indoors and outdoors. The antennas must be ordered separately.

Antenna ANT794-4MR



Figure B-1 Antenna ANT794-4MR

Short name	Order no.	Explanation
ANT794-4MR	6NH9 860-1AA00	Omnidirectional antenna for LTE networks (4G), GSM networks (2G) and UMTS networks (3G); weatherproof for indoor and outdoor areas; 5 m connecting cable connected permanently to the antenna, SMA connector, including installation bracket, screws, wall plugs.

You will find detailed information in the documentation of the device. You will find this on the Internet on the pages of Siemens Industrial Automation Customer Support under the following entry ID:

Link: (https://support.industry.siemens.com/cs/ww/en/view/23119005)

B.2 Connecting cable

Flat antenna ANT794-3M



Figure B-2 Flat antenna ANT794-3M

Short name	Order no.	Explanation
ANT794-3M	6NH9 870-1AA00	Flat antenna for GSM networks (2G), for tri-band 900 / 1800 / 1900 MHz; weatherproof for indoor and outdoor areas; 1.2 m connecting cable connected permanently to the antenna; SMA connector, includ- ing adhesive mounting tape.

You will find detailed information in the documentation of the device. You will find this on the Internet on the pages of Siemens Industrial Automation Customer Support under the following entry ID:

Link: (https://support.industry.siemens.com/cs/ww/en/view/48729835)

B.2 Connecting cable

Connecting cable for the X1 interface

Cables suitable for connecting the X1 interface of the MD720:

• Connection of a SIMATIC S7-200:

PPI modem cable

Siemens article number: 6NH9701-0AD

- Connection of a service PC or a TIM module:
 - Serial connecting cable with D-sub male connector and female connector, e.g.:

Connecting cable 6NH7701-5AN

or

- Serial connecting cable with two D-sub male connectors, e.g.:

Connecting cable 6NH7701-4AL

You can use this cable if you make use of the gender changer supplied with the MD720.

If your application has a different interface, a commercially available interface converter can be used.

The connecting cable does not ship with the MD720.

Supported AT commands

AT commands that are not supported

All AT commands not listed below will be responded to with OK, even if the command will not be executed.

Supported AT commands in terminal mode

The following commands are supported:

- +++: Change from transparent phase to command phase (Page 89)
- A/: Repeat last command line (Page 89)
- ATA: Answer call (Page 89)
- ATD: Dial and connection establishment (Page 90)
- ATE: Local echo on/off (Page 90)
- ATH: Terminate existing connection (Page 90)
- ATI: Output identification (Page 91)
- ATO: Return from command phase to transparent phase (Page 91)
- ATQ: Display result codes on/off (Page 91)
- ATV: Set result code format (Page 92)
- ATX: Set CONNECT result code format and call monitoring (Page 92)
- ATZ: Restart and reset to user settings (Page 93)
- ATS0?: Display of the setting of the S0 register, set as with ATS0=<n> (Page 93)
- ATS0: Configure automatic answering (Page 93)
- AT\Q: Hardware flow control on/off (Page 94)
- AT&C: Set the DCD function (Page 94)
- AT&D: Set the DTR function (Page 94)
- AT&F: Load factory settings (Page 95)
- AT&K: Configure local flow control (Page 95)
- AT&W: Save current profile (Page 96)
- AT&V: Display current configuration (Page 95)
- AT+CBST: Selection of the bearer service type (Page 96)
- AT+CCLK: Clock (Page 97)
- AT+CGSN: Query IMEI (Page 98)

- AT+CGDCONT: Specify the PDP context (Page 97)
- AT+CIMI. Query the IMSI (Page 99)
- AT+CMGD: Deletes precisely one SMS message (Page 99)
- AT+CMGF: Select SMS message format (Page 99)
- AT+CMGL: List SMS messages in preferred storage (Page 100)
- AT+CMGR: Read SMS message (Page 101)
- AT+CMGS: Send SMS message (Page 102)
- AT+CMGW: Store SMS message (Page 103)
- AT+CNMI: Display new SMS message (Page 104)
- AT+CNUM: Subscriber phone number (Page 105)
- AT+COPS: Network operator selection (Page 106)
- AT+CPAS: Activity status (Page 107)
- AT+CPIN: PIN entry (Page 108)
- AT+CPMS: Preferred SMS storage (Page 108)
- AT+CPOL: List of preferred network operators (Page 110)
- AT+CRC: Set cellular result codes for incoming calls (Page 110)
- AT+CREG: Network registration (Page 111)
- AT+CRLP: Radio link protocol (Page 112)
- AT+CSCA: SMSC address (Page 112)
- AT+CSMP: Set parameter for SMS text mode (Page 113)
- AT+CSQ: Query the signal quality (Page 114)
- AT+IPR: Set the transmission speed of the X1 interface (Page 114)

Further commands for initializing the MD720

You will find further commands for initializing the MD720 in terminal mode in the section Composite AT commands (initialization strings) (Page 63).

Further information

You will find further information on AT commands in the "AT Command Set for GSM Mobile Equipment (ME)" specification of the ETSI, see /3/ (Page 118).

C.1 +++: Change from transparent phase to command phase

+++	Change from transparent phase to command phase
Effective comm	nand
Command:	+++
Response:	ОК
Parameter:	-
Note:	The +++ command is only available during data calls in OPC mode (the device is in the transparent phase). The +++ character sequence does not need to end with <cr><lf>. When making entries, make sure that you leave approximately 500 ms between individual characters.</lf></cr>
	The character string +++ ends the transfer of data to the remote partner via GPRS and switches from the transparent phase to the command phase. It is then possible to enter AT commands. During the command phase the connection to the remote partner in the background is retained.
	To return to the transparent phase, use the ATO command.

C.2 A/: Repeat last command line

A	Repeat last command line
Effective command	
Command:	A
Response:	Depend on the previous command.
Parameter:	-
Note:	The A/ character sequence does not need to end with <cr><lf>.</lf></cr>

C.3 ATA: Answer call

ΑΤΑ	Answer call	
Effective comm	and	
Command:	ATA	
Response:	CONNECT[<text>]</text>	Data connection established
	ОК	Voice connection established or command abort
	NO CARRIER	Connection not established
Parameter:	-	
Note:	See ATX for the CONN	ECT messages.

C.4 ATD: Dial and connection establishment

C.4 ATD: Dial and connection establishment

ATD	Dial and connection establishment
Effective comm	and
Command:	ATD[<n>]</n>
Response:	If connection establishment fails: NO DIALTONE BUSY NO CARRIER NO ANSWER If a data connection is established successfully: CONNECT[<text>]</text>
Parameter:	<n>:</n>
	String of dialing digits (0-9) and optionally V.25ter special dialing digits (*, #, +, A, B, C)

C.5 ATE: Local echo on/off

ATE	Local echo on/off
Effective comm	and
Command:	ATE[<value>]</value>
Response:	ОК
Parameter:	<value>:</value>
	0: Local echo off
	1: Local echo on <factory default="" set=""></factory>
Note:	This setting determines whether or not the device echoes characters received from the locally connected device during the command phase.

C.6 ATH: Terminate existing connection

ATH	Terminate existing connection		
Effective comm	Effective command		
Command:	ATH		
Response:	ОК		
Parameter:	-		
Note:	After entering this command, all existing connections are terminated.		
	If a connection exists, you will first need to change to the command phase with +++ before entering com- mands.		

C.7 ATI: Output identification

ATI	Output identification		
Query	Query		
Command:	ATI[<value>]</value>		
Response:	<text> (depends on <value>)</value></text>		
	ОК		
Parameter:	<value></value>		
	none:	Product name and firmware version	
	0:	Product name and firmware version	
	1:	Product name, interface, mode	
	3:	Product name and firmware version	
Note:	<text> may cover more than one line.</text>		

C.8 ATO: Return from command phase to transparent phase

ΑΤΟ	Return from command phase to transparent phase	
Effective comm	Effective command	
Command:	ATO[n]	
Response:	Device returns from the command phase to the transparent phase: CONNECT <text></text>	
	If the transparent phase cannot be successfully resumed: NO CARRIER	
Parameter:	<n>:</n>	
	0: Return from command phase to transparent phase	
Note:	ATO corresponds to the +++ character sequence.	

C.9 ATQ: Display result codes on/off

ATQ	Display result codes on/off		
Effective comm	Effective command		
Command:	ATQ[n]		
Response:	OK	(if <n> = 0)</n>	
	None	(if <n> = 1)</n>	
Parameter:	<n>:</n>		
	0: Result codes are output <factory default="" set=""></factory>		
	1: Result codes are not output		
Note:	The command specifies whether or not the device outputs result codes. Output of information text is not affected by the command.		

C.10 ATV: Set result code format

C.10 ATV: Set result code format

ATV	Set result code format				
Effective command					
Command:	ATV[<	ATV[<value>]</value>			
Response:	0	(When "numeric code" was	activated	(k	
	OK	(When "verbose code" was	(When "verbose code" was activated)		
Parameter:	<valu< td=""><td>e>:</td><td></td><td></td></valu<>	e>:			
	0:	Information		<text><cr><lf></lf></cr></text>	
		Result code (short format):		<numeric code=""><cr></cr></numeric>	
	1:	Information		<cr><lf><text><cr><lf></lf></cr></text></lf></cr>	
		Result code (long format):		<cr><lf><verbose code=""><cr></cr></verbose></lf></cr>	
		(factory set default)			
Note:	This parameter setting determines the contents of the header and trailer transmitted with the result codes				
	and responses.				
	Text messages and numeric messages:				
	ОК		0	Command executed, no error, device was restarted.	
	CON	NECT	1	Connection established	
	RING		2	RING signal detected	
	NO C	ARRIER	3	Connection not established or aborted	
	ERRC)R	4	Invalid command	
	NO D	IALTONE	6	No dialing tone, dialing not possible, wrong mode	
	BUSY	/	7	Remote station busy	
	CONNECT 2400/RLP		1	Connection at 2400 bps and Radio Link protocol	
	CON	NECT 4800/RLP	1	Connection at 4800 bps and Radio Link protocol	
	CON	NECT 9600/RLP	1	Connection at 9600 bps and Radio Link protocol	

C.11 ATX: Set CONNECT result code format and call monitoring

ATX	Set CONNECT result code format and call monitoring		
Effective command			
Command:	ATX[<value>]</value>		
Response:	ОК		

C.12 ATZ: Restart and reset to user settings

ATX	Set CONNECT result code format and call monitoring
Parameter:	<n>:</n>
	0: CONNECT is reported, dialing tone and busy tone detection are disabled.
	<factory default=""></factory>
	1: CONNECT <text> is reported, dialing tone and busy tone detection are disabled.</text>
	2: same as 1
	3: same as 1
	4: same as 1
Note:	The term "tone" originates from analog telephones. The status "No dialing tone" will usually not appear, as soon as the device is logged on with the GSM network. A busy message is forwarded.

C.12 ATZ: Restart and reset to user settings

ATZ	Restart and reset to user settings
Effective command	
Command:	ATZ
Response:	OK
Parameter:	
Note:	Loading the user settings for ATE, ATQ, ATV, ATX, AT&C, AT&D, AT\Q und ATS0 stored earlier with AT&W
	Restarting

C.13 ATS0?: Display of the setting of the S0 register, set as with ATS0=<n>

ATS0?	Display of the setting of the S0 register, set as with ATS0= <n></n>
Query	
Command:	ATS0?
Response:	<n></n>
	ОК
Parameter:	See also ATS0= <n></n>

C.14 ATS0: Configure automatic answering

ATS0	Configure automatic answering		
Effective command			
Command:	ATS0= <n></n>		

Supported AT commands

C.15 ATIQ: Hardware flow control on/off

ATS0	Configure automatic answering		
Response:	OK		
Parameter:	<n>:</n>		
	0:	Automatic answering disabled <factory default="" set=""></factory>	
	1-255:	Number of RING signals before automatically answering the incoming call.	
Note:	GSM networks usually generate only 8-12 RING signals. If S0 is set to a higher value, this can lead to a call not being answered.		

C.15 AT\Q: Hardware flow control on/off

AT\Q	Hardware flow control on/off	
Effective command		
Command:	AT\Q <n></n>	
Response:	ОК	
Parameter:	<n>:</n>	
	0: Hardware flow control (RTS/CTS) off	
	3: Hardware flow control (RTS/CTS) on	

C.16 AT&C: Set the DCD function

AT&C	Set the DCD function		
Effective comm	Effective command		
Command:	AT&C[<value>]</value>		
Response:	ОК		
Parameter:	<value>:</value>		
	0: DCD signal is always on. 1: CONNECT <text> is reported, dialing tone and busy tone detection are disabled.</text>		
	1: DCD signal is on while a connection exists <factory default="" set="">.</factory>		

C.17 AT&D: Set the DTR function

AT&D	Set the DTR function		
Effective command			
Command:	AT&D[<value>]</value>		

C.18 AT&F: Load factory settings

AT&D	Set the DTR function
Response:	ОК
Parameter:	<value>:</value>
	0: Device ignores DTR signal of the connected device (default setting)
	2: ON→OFF of DTR signal: Termination of the connection, change to command phase. As long as DTR = OFF, automatic answering is disabled.

C.18 AT&F: Load factory settings

AT&F	Load factory settings		
Effective comm	Effective command		
Command:	AT&F		
Response:	ОК		
Parameter:	<value>:</value>		
	0: Restoring the factory settings		
Note:	Restores the factory setting of the commands: ATE, ATQ, ATV, ATX, AT&C, AT&D, AT\Q and ATS0.		

C.19 AT&K: Configure local flow control

AT&K	Configure local flow control			
Effective command				
Command:	AT&K <n></n>			
Response:	OK			
Parameter:	<n>:</n>	<n>:</n>		
	Without:	Local flow control (RTS/CTS) off		
	0:	Local flow control (RTS/CTS) off		
	3:	Local flow control (RTS/CTS) on		

C.20 AT&V: Display current configuration

AT&V	Display current configuration	
Effective command		
Command:	AT&V[<value>]</value>	
Response:	ACTIVE PROFILE: <current configuration=""> OK</current>	

C.21 AT&W: Save current profile

AT&V	Display current configuration
Parameter:	<value>:</value>
	0: only active profile
Note:	The configuration is displayed as a text string on multiple lines as shown in the example below. The exact length depends on the particular setting and cannot be predicted precisely.

C.21 AT&W: Save current profile

AT&W	Save current profile		
Effective command			
Command:	AT&W <n></n>		
Response:	OK		
Parameter:	<n>:</n>		
	Without:	Save in profile 0	
	0:	Save in profile 0	
Note:	This command saves the current user profile of the commands ATE, ATQ, ATV, ATX, AT&C, AT&D, AT\Q and ATS0. it can be reloaded with ATZ. Before saving the profile the first time with AT&W the saved user profile is the same as the factory configuration.		

C.22 AT+CBST: Selection of the bearer service type

AT+CBST	Selection of the bearer service type			
Query				
Command:	AT+CB	ST=?		
Response:	+CBST: (list of supported <speed>s),(list of supported <name>s),(list of supported <ce>s)</ce></name></speed>			
	ОК	OK		
Effective commar	nd			
Command:	AT+CB	ST=[<speed> [,<name>[,<ce>]]]</ce></name></speed>		
Response:	OK			
Parameter:	<speed>:</speed>			
	4:	2400 bps (V.22bis)		
	6:	4800 bps (V.32)		
	7:	9600 bps (V.32)		
	68:	2400 bps (V.110 or X.31 flag stuffing)		
	70:	4800 bps (V.110 or X.31 flag stuffing)		
	71:	9600 bps (V.110 or X.31 flag stuffing)		
	<name>:</name>			
	0:	Data connection asynchronous (UDI or 3.1 kHz modem)		
	1:	Not supported		
	<ce>:</ce>			

C.23 AT+CCLK: Clock

AT+CBST	Selection of the bearer service type	
	0:	Transparent
	1:	non-transparent
Note:	The effective command selects the bearer service <name> the transmission speed <speed>, and the connection element <ce> for outgoing connections.</ce></speed></name>	

C.23 AT+CCLK: Clock

AT+CCLK	Clock			
Test				
Command:	+CCLK=	+CCLK=?		
Response:	OK			
Query				
Command:	+CCLK=	-?		
Response:	+CCLK:	<time></time>		
Effective comm	nand			
Command:	AT+CCLK= <time></time>			
Response:	OK +CME ERROR: <err></err>			
Parameter:	<time>: string va</time>	<time>: string variable: the format is "vv/MM/dd hh:mm:ss±tz", where</time>		
	yy:	Year		
	MM:	Month		
	dd:	Day		
	hh:	Hours		
	mm:	Minutes		
	ss:	seconds		
	ZZ:	Time zone, the difference between the local time and GMT, given in 15 minute divisions; the range of values is between -47 and +48. Example: 6 May, 1994, 22:10:00 GMT+2 hours corresponds to "94/05/06,22:10:00+08"		

C.24 AT+CGDCONT: Specify the PDP context

AT+CGDCONT	Specify the PDP context	
Test		
Command:	AT+CGDCONT=?	
Response:	+CGDCONT: (Range of supported <cid>s), <pdp_type>, (List of supported <d_comp>s), (List of supported <h_comp>s)</h_comp></d_comp></pdp_type></cid>	
Query:		
Command:	AT+CGDCONT?	

C.25 AT+CGSN: Query IMEI

AT+CGDCONT	Specify the PDP context		
Response:	<i>If +CGDCONT is set:</i> +CGDCONT: <cid>, <pdp_type>, <apn>,<pdp_addr>, <d_comp>, <h_comp></h_comp></d_comp></pdp_addr></apn></pdp_type></cid>		
	If +CGDCONT is not set: OK		
Effective comman	id:		
Command:	+CGDCONT= <cid> ,<pdp_type> ,<apn> ,<pdp_addr> ,<d_comp> ,<h_comp></h_comp></d_comp></pdp_addr></apn></pdp_type></cid>		
Response:	ОК		
Parameter:	<cid>:</cid>	(Local) context identification parameter	
	<pdp_type>:</pdp_type>	Packet Data Protocol type	
	A string variable t is supported.	hat specifies the type of packet data protocol. Only IP (Internet Protocol - IETF STD 5)	
	<apn>:</apn>	Access point name	
	Access Point Name - A string variable with a logical name that is used to specify the GGSN for IP net- works outside the GPRS.		
	<pdp_address>:</pdp_address>		
	A string parameter that specifies the MT in the address space for the PDP. As only IP is currently sup- ported, this will be an IP address.		
	If the value is zero an error a dynami	o ("0.0.0.0" or 0), the value can be supplied device during startup. Otherwise, if there is ic address will be requested.	
The request continues to return the zero string even if an address has been assigned startup. It is possible that the assigned address can be read using the +CGPADDR <pre></pre>		nues to return the zero string even if an address has been assigned during the PDP ible that the assigned address can be read using the +CGPADDR command.	
	A numeric parameter that controls PDP data compression.		
	0: Off (default and only value supported: no PDP data compression)		
	<h_comp>:</h_comp>		
	A numeric parameter that controls PDP header compression.		
	0: Off (default and	d only value supported: no PDP data compression)	
Note:	The effective command specifies the PDP context parameter values for a PDP context identified by the (local) context identification parameter <cid>. The number of PDP contexts that can be in a defined status at the same time is specified by the range returned in response to the Test command.</cid>		
	The special form number <cid>.</cid>	of the +CGDCONT= <cid> command results in values not being defined for the context</cid>	

C.25 AT+CGSN: Query IMEI

AT+CGSN	Query IMEI	
Test		
Command:	AT+CGSN=?	
Response:	ОК	
Query:		
Command:	AT+CGSN	

C.26 AT+CIMI. Query the IMSI

AT+CGSN	Query IMEI
Response:	<sn> (identification text for determining of the individual device)</sn>
Parameter:	-

C.26 AT+CIMI. Query the IMSI

AT+CIMI	Request IMSI
Test	
Command:	AT+CIMI=?
Response:	ОК
Query:	
Command:	AT+CIMI
Response:	<imsi> (International Mobile Subscriber Identity)</imsi>
	ОК
Parameter:	-

C.27 AT+CMGD: Deletes precisely one SMS message

AT+CMGD	Delete an SMS	
Test		
Command:	AT+CMGD=?	
Response:	OK or +CMS ERROR: <err></err>	
Effective command		
Command:	+CMGD= <index></index>	
Response:	OK or +CMS ERROR: <err></err>	
Parameter:	<index>:</index>	
	1 – n:	Storage location on the SIM card; n depends on the storage capacity of the SIM card.
	<err>:</err>	Error code
Note:	With the predecessor modem SINAUT MD720-3 all SMS messages could be deleted with the command AT+CMGD=1,4. The parameter "1,4" is no longer available with the MODEM MD720. The SMS messages must be deleted individually with the command AT+CMGD= <i><index></index></i> .	

C.28 AT+CMGF: Select SMS message format

AT+CMGF	Select SMS message format
Test	
Command:	AT+CMGF=?

C.29 AT+CMGL: List SMS messages in preferred storage

AT+CMGF	Select SMS message format	
Response:	+CMGF: (list of supported <mode>s)</mode>	
	ОК	
Query		
Command:	AT+CMGF?	
Response:	+CMGF: <mode></mode>	
	ОК	
Effective command		
Command:	AT+CMGF=[<mode>]</mode>	
Response:	ОК	
Parameter:	<mode>:</mode>	
	0: PDU mode	
	1: Text mode	

C.29 AT+CMGL: List SMS messages in preferred storage

AT+ CMGL	List SMS messages in preferred storage		
Test			
Command:	AT+CMGL=?		
Response:	+CMGL: (list of supported variables <stat>)</stat>		
	ОК		
Effective commar	d		
Command:	AT+CMGL[= <stat>]</stat>		
Response:	In text mode (+CMGF=1) and with a successfully executed command and SMS-SUBMITs and/or with SMS-DELIVERs:		
	If <stat> = "REC READ" or "REC UNREAD"</stat>		
	+CMGL: <index>,<stat>,<oa da="">,<scts>,<length></length></scts></oa></stat></index>		
	<cr><lf><data><cr><lf></lf></cr></data></lf></cr>		
	[+CMGL: <index>,<stat>,<oa da="">,<scts>,<length><cr><lf><data></data></lf></cr></length></scts></oa></stat></index>		
	<cr><lf>[]]</lf></cr>		
	If <stat> = "STO UNSENT" or "STO SENT"</stat>		
	+CMGL: <index>,<stat>,<oa da="">,<length></length></oa></stat></index>		
	<cr><lf><data><cr><lf></lf></cr></data></lf></cr>		
	[+CMGL: <index>,<stat>,<oa da="">,<length><cr><lf><data></data></lf></cr></length></oa></stat></index>		
	<cr><lf>[]]</lf></cr>		
	Misc.		
	+CMS ERROR: <err></err>		
	In PDU mode (+CMGF=0) and with successfully executed command:		
	[+CMGL: <index>,<stat>,[<alpha>],<length><cr><lf><pdu></pdu></lf></cr></length></alpha></stat></index>		
	[<cr><lf>+CMGL:<index>,<stat>,[<alpha>],<length><cr><lf><pdu></pdu></lf></cr></length></alpha></stat></index></lf></cr>		
	[]]]		
	ОК		

C.30 AT+CMGR: Read SMS message

AT+ CMGL	List SMS messages in p	referred storage	
Parameter:	<index>:</index>		
	Integer variable; value from the available storage space area		
	<stat>:</stat>		
	Integer variable; specifie	s the status of the messages in storage based on defined values:	
	0: "REC UNREAD"	Message received, unread (e.g. new message)	
	1: "REC READ"	Message received, read	
	2: "STO UNSENT"	Message stored, unsent (only with SMS)	
	3: "STO SENT"	Message stored, sent (only with SMS)	
	4: "ALL"	All messages (only with +CMGL command)	
	<oa da="">:</oa>		
	GSM 03.40: TP-Originating-Address / TP-Destination-Address; Address value field as string variable		
	<scts>:</scts>		
	GSM 03.40: TP-Service-Centre-Time-Stamp as string variable		
	<length>:</length>		
	Integer variable indicating the length in characters of the message text (message body) in variable <da- ta></da- 		
	<data>:</data>		
	GSM 03.40: Message text (TP-User-Data) in text mode responses		
Note:	The effective command	returns the status <stat> of the preferred SMS storage <mem1>.</mem1></stat>	

C.30 AT+CMGR: Read SMS message

AT+CMGR	Read SMS message		
Test			
Command:	AT+CMGR=?		
Response:	ОК		
Effective command			
Command:	AT+CMGR= <index></index>		
Response:	In text mode (+CMGF=1)		
	If command is successful and "SMS-DELIVER":		
	+CMGR: <stat>,<oa>,<scts>,<length></length></scts></oa></stat>		
	<cr><lf><data><cr><lf></lf></cr></data></lf></cr>		
	If command is successful and "SMS-SUBMIT":		
	+CMGR: <stat>,<da>,<length></length></da></stat>		
	<cr><lf><data><cr><lf></lf></cr></data></lf></cr>		
	Misc.		
	+CMS ERROR: <err></err>		
	In PDU mode (+CMGF=0) and successfully executed command:		
	+CMGR: <stat>,[<alpha>],<length><cr><lf><pdu></pdu></lf></cr></length></alpha></stat>		
	ОК		

C.31 AT+CMGS: Send SMS message

AT+CMGR	Read SMS message
Parameter:	Refer to +CMGL
Note:	Effective command returns message from storage <index> from preferred message storage <mem1>. Status of the message and entire message content <pdu> is output. If the status of the message is 'received unread', the status changes to 'received read' and the message content is no longer output. If there is no SMS message in the <index> memory space the output depends on the firmware version</index></pdu></mem1></index>
	of the device.
	Predecessor module SINAUT MD720-3 The device sends the reply +CMGR:ERROR.
	MODEM MD720 The device sends the reply +CMGR:0,,0.

C.31 AT+CMGS: Send SMS message

AT+CMGS	Sending messages by SMS		
Test			
Command:	AT+CMGS=?		
Response:	ОК		
Effective command			
Command:	In text mode (+CMGF=1):		
	+CMGS= <da>,<toda><cr></cr></toda></da>		
	> Enter text <ctrl-z esc=""></ctrl-z>		
	In PDU mode (+CMGF=0):		
	AT+CMGS= <length><cr> SMS-Text <ctrl+z esc=""></ctrl+z></cr></length>		
Response:	In text mode (+CMGF=1) after sending successfully:		
	+CMGS: 0		
	If sending fails:		
	+CMS ERROR: <err></err>		
	In PDU mode (+CMGF=0) after sending successfully:		
	+CMGS: <mr>[,<ackpdu>]</ackpdu></mr>		
	ОК		
Parameter:	<da>:</da>		
	Enter phone number (with quotes " ")		
	<toda>:</toda>		
	145: Enter phone number incl. country code, e.g. +49xxxxx for Germany		
	129: Enter phone number without country code		
	<mr>:</mr>		
	Reference number of the SMS (TP Message Reference) as integer variable; consecutive number.		
	<ackpdu></ackpdu>		
	Optional return value (network-dependent); integer variable		
	RP-User-Data - Element of the RP-ACK PDU; the format is the same as for the <pdu> (SMS content) only without the SMSC address field.</pdu>		

C.32 AT+CMGW: Store SMS message

AT+CMGS	Sending messages by SMS			
	<length></length>			
	Integer variable that specifies the length of the text body <data> (or <cdata> in characters in text mode (+CMGF=1). In PDU mode (+CMGF=0), specifies the length of the actual TP data unit in bytes (the RP layer SMSC address octets are not counted)</cdata></data>			
Note:	• The device sends 4 characters <cr><lf><greater than=""><space> (IRA 13, 10, 62, 32) after command is completed with <cr>. After that the PDU data can be transferred from the connected the device.</cr></space></greater></lf></cr>			
	The DCD signal is active while PDU data is being transferred.			
	the local echo is controlled with ATE.			
	• In PDU mode, the SMS text is entered in a line in hexadecimal format. The device converts this coding into PDU octets.			
	• When the length octet of the SMSC address (transferred in the PDU) equals zero, the SMSC address defined with the +CSCA command is used.			
	• The key combination <ctrl+z> (IRA 26) is used to identify the end of the SMS text (in the PDU for- mat).</ctrl+z>			
	Sending can be canceled with <esc> (IRA 27).</esc>			

C.32 AT+CMGW: Store SMS message

AT+CMGW	Store SMS message		
Effective comman	nd		
Command:	In text mode (+CMGF=1):		
	AT+CMGW= <oa>/<da>[, [<tooa>/<toda>][, <stat>]]<cr></cr></stat></toda></tooa></da></oa>		
	Text can be entered. <ctrl-z>/<esc></esc></ctrl-z>		
	In PDU mode (+CMGF=0):		
	AT+CMGW= <length>[, <stat>]<cr></cr></stat></length>		
	PDU can be entered. <ctrl-z>/<esc></esc></ctrl-z>		
Response:	In text mode (+CMGF=1):		
	+CMGW: <index1></index1>		
	ОК		
	If the action fails:		
	ERROR +CMS ERROR: <err></err>		
	In PDU mode (+CMGF=0) after sending successfully:		
	+CMGW: <index1></index1>		
	ОК		
Parameter:	<oa da="">:</oa>		
	TP-Originating-Address / TP-Destination-Address;		
	Address value field as string variable		
	<tooa></tooa>		
	Type of originating address (string variable)		
	For the default, see <toda>.</toda>		

C.33 AT+CNMI: Display new SMS message

AT+CMGW	Store SMS message			
	<toda>:</toda>			
	Type of destination address (string variable)			
	145: Enter phone number incl. country code, e.g. +49xxxxx for Germany			
	129: Enter phone number without country code			
	<stat>:</stat>			
	Integer variable Specifies the status of the messages in storage based on defined values:			
	2: "STO UNSENT" Message stored, unsent (only with SMS)			
	3: "STO SENT" Message stored, sent (only with SMS) <length> Integer variable</length>			
	Specifies the length of the text body <data> (or <cdata> in characters in text mode (+CMGF=1).</cdata></data>			
	In PDU mode (+CMGF=0), specifies the length of the actual TP data unit in bytes (the RP layer SMSC address bytes are not counted in the length).			
Note:	The command saves an SMS message entered by the local application in memory. After saving, the memory location <index> is output.</index>			
	The status of the message is set to "stored unsent" as default.			

C.33 AT+CNMI: Display new SMS message

AT+CNMI	Display new SMS message			
Test				
Command:	AT+C	NMI=?		
Response:	+CNM ported	II: (list of supported <mode>s), (list of supported <mt>s), (list of supported <bm>s), (list of sup- d <ds>s), (list of supported <bfr>s) 2.</bfr></ds></bm></mt></mode>		
Query				
Command:	AT+C	NMI?		
Response:	+CNM	1I: <mode>,<mt>,<bm>,<ds>,<bfr>,OK</bfr></ds></bm></mt></mode>		
Effective comman	ld			
Command:	AT+C	NMI=[<mode>][,<mt>][,<bm>][,<ds>][,<bfr>]</bfr></ds></bm></mt></mode>		
Response:	ОК			
Parameter:	<mod< td=""><td colspan="3"><mode>:</mode></td></mod<>	<mode>:</mode>		
	0:	Spontaneous notifications are stored temporarily on the device. If the buffer for spontaneous notifications is full, the notifications can be stored elsewhere or the oldest notifications are discarded and replaced by the new notifications.		
	1:	Notifications are discarded and new spontaneous notifications about newly received SMS mes- sages are rejected if the connection between the device and the connected application is already busy, for example when there is an established data connection. Otherwise the notifications are forwarded directly to the connected application.		
	2:	Spontaneous notifications are buffered on the device if the connection between the device and the connected application is busy, for example when there is an established data connection. and flush them to the connected application after reservation. Otherwise the notifications are forward-ed directly to the connected application.		
	3:	Not supported		

C.34 AT+CNUM: Subscriber phone number

AT+CNMI	Display new SMS message		
	<mt>:</mt>		
	0:	No SMS-DELIVER notifications are forwarded to the connected application.	
	1:	If SMS-DELIVER notifications are stored on the device, information about the storage location is forwarded to the connected application with the spontaneous notification +CMTI: <mem>,<index>.</index></mem>	
	<bm>:</bm>		
	0:	No CBM notifications are forwarded to the connected application.	
	<ds>:</ds>		
	0:	No SMS STATUS REPORTs are forwarded to the connected application	
	<bfr>:</bfr>		
	0:	The stored notifications are sent.	

C.34 AT+CNUM: Subscriber phone number

AT+CNUM	Subscriber phone number	
Test		
Command:	AT+CNUM=?	
Response:	ОК	
Effective commar	nd	
Command:	AT+CNUM	
Response:	+CNUM: [<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]]</itc></service></speed></type1></number1></alpha1>	
	[<cr><lf>+CNUM: [<alpha2>],<number2>,<type2>[,<speed>,<service></service></speed></type2></number2></alpha2></lf></cr>	
	[, <itc>]]</itc>	
	[]]	
	ОК	

C.35 AT+COPS: Network operator selection

AT+CNUM	Subscriber phone number				
Parameter:	<alpha>:</alpha>				
	optional alphanumeric string related to <number>.</number>				
	<number>:</number>				
	Phone number as	string in the format specified by <type>.</type>			
	<type>:</type>				
	Type of the addre	ss octet as integer variable (see also GSM 04.08 [8], 10.5.4.7)			
	<speed></speed>				
	<service>:</service>				
	Services related t	o the subscriber phone number			
	0: Asynchronous	modem			
	1: Synchronous modem				
	2: PAD access (asynchronous)				
	3: Packet access	(synchronous)			
	4: voice				
	5: fax				
	<itc>:</itc>				
	Method used to transfer information				
	0: 3.1 kHz				
	1: UDI				
Note:	e: Effective command returns the MSISDNs (Mobile Subscriber ISDN Number) of the information can be stored on the device or on the SIM.				
	The AT+CNUM? request returns ERROR.				
	Example:				
	AT+CNUM	+CNUM: "TEL","0612345678",129			
		+CNUM: "","",255			
		+CNUM: "","",255			
		+CNUM: "","",255			
		ОК			

C.35 AT+COPS: Network operator selection

AT+COPS	Network operator selection			
Query				
Command:	AT+CO	AT+COPS?		
Response:	+COPS:	+COPS: <mode>[,<format>,<oper>[,< AcT>]]</oper></format></mode>		
	OK			
Effective comman	nd			
Command:	AT+COPS=[<mode>[,<format>[,<oper>[,<stat>[,< AcT>]]]]]</stat></oper></format></mode>			
Response:	ОК			
Parameter:	<mode>:</mode>			
	0	Automatic (<oper> parameter is ignored)</oper>		

C.36 AT+CPAS: Activity status

AT+COPS	Network operator selection				
	1	Manual (<oper> parameter must be set. Setting of <act> is optional.)</act></oper>			
	2	Not used			
	3	Setting of the read format; used with <format>.</format>			
	4	Manual/automatic (<oper> parameter must be set).</oper>			
		If manual selection fails, automatic selection is used (<mode>=0).</mode>			
	<format></format>				
	Indicates	s whether the read format is alphanumeric or numeric.			
	See " <o< th=""><th>per>" parameter.</th></o<>	per>" parameter.			
	0	Long format alphanumeric			
	1	Short format alphanumeric			
	2	Numeric			
	<oper></oper>				
	String in the " <format>" format that identifies the network operator.</format>				
	<stat>:</stat>				
	Status of the network operator				
	0	Unknown			
	1	Available			
	2	Currently used			
	3	Forbidden			
	<act>:</act>	<act>:</act>			
	Selected access technology				
	0	GSM			
	1	GSM Compact			
	2	UTRAN			
Note:	The AT+	COPS? read command the current settings for the network operator selection.			
	With the write command, the criteria for selecting the network operator can be specified with the dial-				

C.36 AT+CPAS: Activity status

AT+CPAS	Activity status		
Test			
Command:	AT+CPAS=?		
Response:	+CPAS: (list of supported <pas>s)</pas>		
	OK		
Query:			
Command:	AT+CPAS		
Response:	+CPAS: <pas></pas>		
	OK		
Parameter:	<pre><pas>:</pas></pre>		
	0: ready	Entry of commands possible	

C.37 AT+CPIN: PIN entry

AT+CPAS	Activity status		
	1:	unavailable	(No entry of commands possible)
	2: unknown (status unknown) 3: ringing (Entry of commands possible, incoming call)		(status unknown)
			(Entry of commands possible, incoming call)
	4:	call in progress	(Entry of commands possible, active connection)

C.37 AT+CPIN: PIN entry

AT+CPIN	Enter PIN			
Test				
Command:	AT+CPIN=?			
Response:	ОК			
Query				
Command:	AT+CPIN=?			
Response:	+CPIN: <code></code>			
Effective comm	and			
Command:	AT+CPIN= <pin< td=""><td>> [,<newpin></newpin></td></pin<>	> [, <newpin></newpin>		
Response:	ОК			
Parameter:	<code>:</code>			
	READY:	Device does not expect a password.		
	SIM PIN:	Device is waiting for entry of the SIM PIN.		
	SIM PUK:	Device is waiting for the entry of the SIM PUK. A second pin <newpin> can also be used to replace the old PIN in the SIM and can be entered.</newpin>		
	SIM PIN2:	Device is waiting for the entry of PIN2 of the SIM. (It is advisable to return this code >code> only when the last output command led to a PIN2 authentication error (for example CME ERROR: 17); it is advisable that the device does not block this operation, in case the PIN2 is not entered correctly after this error.)		
	SIM PUK2:	Device is waiting for the entry of the SIM PUK2 of the SIM. (It is advisable to return this code >code> only when the last output command led to a PUK2 authentication error (for example CME ERROR: 18); it is advisable that the device does not block this operation, in case the PUK2 and the new PIN2 are not entered correctly after this error.) A second PIN <newpin> is used to replace the old PIN in the SIM and should be supplied.</newpin>		
	PH-NET PIN:	The device waits for the entry of the password		
	String variable (8 characters max.)			

C.38 AT+CPMS: Preferred SMS storage

AT+CGATT	Attach to / detach from GPRS
Test	
Command:	AT+CPMS=?
C.38 AT+CPMS: Preferred SMS storage

AT+CGATT	Attach to / detach from GPRS					
Response:	+CPMS: (list of supported <mem1>s),(list of supported <mem2>s),(list of supported <mem1>s),</mem1></mem2></mem1>					
	ОК					
Query:						
Command:	AT+CPMS?					
Response:	+CPMS	+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3></total3></used3></mem3></total2></used2></mem2></total1></used1></mem1>				
	ОК					
Effective comman	nd:					
Command:	AT+CPI	MS= <mem1></mem1>	, <mem2>,<mem3></mem3></mem2>			
Response:	e: +CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3></total3></used3></total2></used2></total1></used1>					
	ОК					
Parameter:	The effe	ective comman	nd selects the SMS memory <mem<x>> used to read, write, etc.</mem<x>			
	<mem1< td=""><td>></td><td></td></mem1<>	>				
	Memory	area used fo	r listing, reading and deleting messages:			
	"SM"	Message sto	prage on the SIM card			
	"ME"	message sto	prage on device			
	"MT" Total message storage on SIM card and device					
	<mem2< td=""><td>></td><td></td></mem2<>	>				
	Memory area used for writing and sending messages:					
	"SM"	"SM" Message storage on the SIM card				
	"ME"	message storage on device				
	"MT"	MT" Total message storage on SIM card and device				
	<mem3></mem3>					
	Memory area used for temporary storage of received messages, if forwarding to the connected applica- tion is not possible. Refer to AT command AT+CNMI with parameter <mt>=2</mt>					
	"SM"	Message storage on the SIM card				
	"MT"	Total messa	ge storage on SIM card and device			
	<usedx></usedx>					
	Number of messages currently stored in <memx>.</memx>					
	<totalx></totalx>					
	Number of messages that can be stored in <memx>.</memx>					
Examples:	AT+CPMS=?		+CPMS: ("ME","SM","MT")			
			ОК			
	AT+CPMS?		+CPMS: "ME",0,100, "SM",0,10, "MT",0,110			
			ОК			
	AT+CPMS="ME"		+CPMS: 0,100,0,10,0,110			
			ОК			

C.39 AT+CPOL: List of preferred network operators

AT+CGATT	Attach to / detach from GPRS		
Note:	The predecessor module supported the option "ME", "ME", "ME" as the preferred SMS memory.		
	The MODEM MD720 does not support the command AT+CPMS="ME","ME","ME due to a different memory management.		
	 Behavior up to firmware version < V1.2 		
	When the third memory space was set to "ME", the MD720 returned an error message.		
	Behavior as of firmware version V1.2		
	AT+CPMS="ME","ME","ME" is set internally to the option "ME","ME","MT".		
	Received SMS messages are stored on the SIM card.		
	When internal memory is full, received SMS messages are stored on the device instead of being discarded.		

C.39 AT+CPOL: List of preferred network operators

AT+CPOL	List of preferred network operators		
Query			
Command:	AT+CPOL?		
Response:	+CPOL: <index>, <format>, <operator></operator></format></index>		
	+CPOL:		
	ОК		
Effective comman	nd		
Command:	AT+CPOL: <index>, <format>, <operator></operator></format></index>		
Response:	ОК		
Parameter:	<index>:</index>		
	(Consecutive) number of the network operator in the list		
	<format>:</format>		
	Format of the output (always 2 = numeric)		
	<operator></operator>		
	Numeric identifier of the network operator (MCC/MNC)		
Note:	As a query, AT+CPOL returns the list of GSM network operators into whose networks the MD720 can dial in.		
	As effective command, AT+CPOL edits the GSM network operator into whose network the MD720 dials in.		

C.40 AT+CRC: Set cellular result codes for incoming calls

AT+CRC	Set cellular result codes for incoming calls
Test	
Command:	AT+CRC=?

C.41 AT+CREG: Network registration

AT+CRC	Set cellular result codes for incoming calls		
Response:	+CRC: (list of <mode>)</mode>		
Query			
Command:	AT+CRC?		
Response:	+CRC: <mode></mode>		
Effective command			
Command:	AT+CRC=[<mode>]</mode>		
Response:	ОК		
Parameter:	<mode>:</mode>		
	0: Expanded output disabled		
	1: Expanded output enabled		
Note:	When extended output is enabled, the output is in the format:		
	+CRING: <type> with <type> : FAX, DATA or VOICE</type></type>		

C.41 AT+CREG: Network registration

AT+CREG	Network registration			
Test				
Command:	AT+C	AT+CREG=?		
Response:	+CRE	G: (list of supported <n>s)</n>		
	ОК			
Query				
Command:	AT+CREG?			
Response:	+CRE	CREG: <n>,<stat>[,<lac>,<ci>]</ci></lac></stat></n>		
	ОК	Ж		
Effective commar	nd			
Command:	AT+C	\T+CREG= <n>,<stat></stat></n>		
Response:	OK	ЭК		
Parameter:	<n>:</n>			
	0:	No output of spontaneous messages for network registration		
	1:	Output of spontaneous messages for network registration +CREG: <stat></stat>		
2: Output of spontaneous messages for network registration with location informat <stat>[,<lac>,<ci>]</ci></lac></stat>		Output of spontaneous messages for network registration with location information +CREG: <stat>[,<lac>,<ci>]</ci></lac></stat>		
	<stat>:</stat>			
	0:	Not registered. The device is not currently searching for a new network to register with.		
	1:	Registered, home network		
	2:	Not registered. The device is currently searching for a new network to register with.		
	3:	Attachment denied		
	4:	Status unknown		
	5:	Attached, roaming		

C.42 AT+CRLP: Radio link protocol

AT+CREG	Network registration		
	<lac>:</lac>		
	String variable; two byte "location area code" in hexadecimal format (e.g. "00C3" equals 195 in decimal).		
	<ci>:</ci>		
	String variable; two byte "cell ID" in hexadecimal format.		
Note:	Effective command controls the presentation of an spontaneous messages:		
	+CREG: <stat> when <n>=1 and there is a change in the device network registration status, or</n></stat>		
	+CREG: <stat>[,<lac>,<ci>] when <n>=2 and there is a change of the network cell</n></ci></lac></stat>		

C.42 AT+CRLP: Radio link protocol

AT+CRLP	Radio link protocol			
Test				
Command:	+CRLP=?	+CRLP=?		
Response:	+CRLP:			
	(list of supported <iws>s), (list of supported <mws>s), (list of supported <t1>s), (list of supported <n2>s),<ver1>, (list of supported <t4>s)</t4></ver1></n2></t1></mws></iws>			
Query				
Command:	+CRLP?			
Response:	+CRLP: <iws>,<mws>,<t1>,<n2>,<ver1>,<t4></t4></ver1></n2></t1></mws></iws>			
Effective comm	Effective command			
Command:	AT+CRLP= <iws>[,<mws>[,<t1>[,<n2>[,<ver>[,<t4>]]]]]</t4></ver></n2></t1></mws></iws>			
Response:	ОК			
Parameter:	<ver>:</ver>	RLP version number as integer variable; version display 0 means "RLP version display not available"		
	<iws>:</iws>	Window size IWF to MS		
	<mws>:</mws>	Window size MS to IWF		
	< T1>:	Confirmation timer T1		
	<n2></n2> :	Retransmission attempts N2		
	< T4>:	Re-sequencing period T4 as integer variable		
Note:	Basic sett	ings and value ranges depend on the RLP Version; see GSM 04.22 [18].		
	T1 and T4 are specified in units of 10 ms.			

C.43 AT+CSCA: SMSC address

AT+CSCA	Short Message Service Center address
Test	
Command:	AT+CSCA=?
Response:	ОК
Query	

C.44 AT+CSMP: Set parameter for SMS text mode

AT+CSCA	Short Message Service Center address		
Command:	AT-CSCA?		
Response:	+CSCA: <sca>,<tosca></tosca></sca>		
Effective commar	nd		
Command:	AT+CSCA= <sca>[,<tosca>]</tosca></sca>		
Response:	ОК		
Parameter:	<sca>:</sca>		
	Telephone number of the SMSC entered with quotes " "		
	<tosca>:</tosca>		
	145: Enter phone number incl. country code, e.g. +49xxxxx for Germany		
	129: Enter phone number without country code		
Note:	The effective command updates the SMSC via which SMS messages from the device are sent. In PDU mode, the SMSC entered here is also used if the length for the SMSC address entered in the PDU is zero.		

C.44 AT+CSMP: Set parameter for SMS text mode

AT+CSMP	Set parameter for SMS text mode		
Test			
Command:	AT+CSMP=?		
Response:	+CSMP: (list of	f <fo>),(list of <vp>),(list of <pid>),(list of <dcs>)</dcs></pid></vp></fo>	
	ОК		
Query			
Command:	AT+CSMP?		
Response:	+CSMP: <fo>,<</fo>	<vp>,<pid>,<dcs></dcs></pid></vp>	
	ОК		
Effective commar	Effective command		
Command:	AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]</dcs></pid></vp></fo>		
Response:	OK		
Parameter:	<fo>:</fo>		
	17		
	<vp>:</vp>		
	Specifies how long short messages will be stored in the SMSC (see also note).		
	0 to 143:	(<vp> + 1) * 5 minutes (e.g. 5 minutes interval up to 12 hours)</vp>	
	144 through 167	12 hours + ((<vp> - 143) * 30 minutes)</vp>	
	168 through 196	(<vp> - 166) * 1 day</vp>	
	197 through 255	(<vp> - 192) * 1 week</vp>	

C.45 AT+CSQ: Query the signal quality

AT+CSMP	Set parameter for SMS text mode		
	<pid>:</pid>		
	0:		
	<dcs>:</dcs>		
	0:		
Note:	The values 71, 167, 173 and 255 are supported for <vp>.</vp>		
	In the composite AT command AT+CMGF=1+CSMP=17,0,0,0+CSCA=" +AAAAAAAAAAAA" the value 0 for <vp> will be accepted, but will be replaced by the value 71.</vp>		

C.45 AT+CSQ: Query the signal quality

AT+CSQ	Query signal field strength quality		
Test			
Command:	AT+CSQ=?		
Response:	+CSQ: (list of supported <rssi>),(list of supported <ber>) OK</ber></rssi>		
Response:			
Command:	AT+CSQ		
Response:	+CSQ: <rssi>,<ber> OK</ber></rssi>		
Parameter:	<rssi>:</rssi>		
	0:	113 dBm or less	
	1:	111 dBm	
	230:	109 53 dBm	
	31:	51 dBm or more	
	99:	Unknown or not measurable	
	<ber>:</ber>		
	07:	According to RxQual values in the table in GSM 05.08 [20], 8.2.4	
	99:	Unknown or not measurable	
Note:	The read command AT+CSQ? results in "ERROR".		

C.46 AT+IPR: Set the transmission speed of the X1 interface

AT+IPR	Set the transmission speed of the X1 interface		
Test			
Command:	AT+IPR=?		
Response:	+ IPR (list of the supported fixed transmission speeds)		
Query			
Command:	AT+IPR?		
Response:	+IPR: <rate> OK</rate>		

C.46 AT+IPR: Set the transmission speed of the X1 interface

AT+IPR	Set the transmission speed of the X1 interface		
Effective command			
Command:	AT+IPR= <rate></rate>		
Response:	ОК		
Parameter:	<rate> (bps) 1200 2400 4800 9600 19200 38400 57600</rate>		

C.46 AT+IPR: Set the transmission speed of the X1 interface

Documentation references

Where to find Siemens documentation

• Article numbers

You will find the article numbers for the Siemens products of relevance here in the following catalogs:

- SIMATIC NET Industrial Communication / Industrial Identification, catalog IK PI
- SIMATIC Products for Totally Integrated Automation and Micro Automation, catalog ST 70

You can request the catalogs and additional information from your Siemens representative. You will also find the product information in the Siemens Industry Mall at the following address:

Link: (https://mall.industry.siemens.com)

• Manuals on the Internet

You will find SIMATIC NET manuals on the Internet pages of Siemens Industry Online Support:

Link: (https://support.industry.siemens.com/cs/ww/en/ps/15247/man)

Go to the required product in the product tree and make the following settings:

Entry type "Manuals"

• Manuals on the data medium

You will find manuals of SIMATIC NET products on the data medium that ships with many of the SIMATIC NET products.

/1/

SIMATIC NET SINAUT MICRO SC system manual Siemens AG Link: (https://support.industry.siemens.com/cs/ww/en/view/23119827)

|2|

/2/

SIMATIC NET TeleControl Server Basic (Version V3) Operating Instructions Siemens AG Link: (https://support.industry.siemens.com/cs/ww/en/ps/15918/man)

/3/

ETSI TS 100 916 Digital cellular telecommunications system (Phase 2+) AT Command set for GSM Mobile Equipment (ME) (3GPP TS 07.07 version 7.8.0 Release 1998)

(http://www.etsi.org/deliver/etsi_ts/100900_100999/100916/07.08.00_60/ts_100916v070800p .pdf)

See also: ETSI (<u>http://www.etsi.org</u>) ETSI search (<u>http://webapp.etsi.org/workprogram/SimpleSearch/QueryForm.asp</u>)

Index

Α

Abbreviations/acronyms, 4 Article number, 3

С

Compatibility, predecessor module, 3 Connection attempts (MD720), 58 Connection resources, 11

D

Device replacement, 26

F

Firmware version, 3

G

Glossary, 6

Η

Hardware product version, 3

I

Inter-station communication, 11

Μ

MSC protocol Functions, 56 Setting, 29 MSCsec Support of the protocol, 30 MSCsec protocol Functions, 56 Setting, 29

Ρ

Predecessor module, compatibility, 3

R

Redial delay, 58

S

S7 systems, connectable, 10 S7-300, 30 Safety notices, 19 Service & Support, 6 Service call number, 70 SIM card without PIN, 22 SIMATIC NET glossary, 6 Starting up the MD720, 26 Starting the MD720, 26

Т

TCSB, 4 Terminal program, 61 Training, 6