SIEMENS

SIMATIC NET

S7-1500 - PROFINET CM 1542-1

Operating Instructions

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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.

A DANGER

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

AWARNING

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

ACAUTION

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:

AWARNING

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

Validity of this manual

This document contains information on the following product:

Communications module CM 1542-1 Article number 6GK7 542-1AX00-0XE0 Hardware product version 1 Firmware version V2.0

Communications module for SIMATIC S7-1500

View of the CM



- ① LEDs for status and error displays
- 2 LED display of the Ethernet ports X1 P1 and X1 P2
- Type plate
- 4 PROFINET interface: 2 x 8-pin RJ-45 jack
- (5) Label with MAC address

Figure 1 View of the CM 1542-1 with closed (left) and open (right) front cover

Address label: Unique MAC address preset for the CM

When supplied, the CM has a total of 3 default MAC addresses with the following assignment:

• PROFINET interface

The MAC address of the PROFINET interface is printed on the housing. (visible in STEP 7 if nodes are reachable)

One MAC address for each of the 2 Ethernet ports of the PROFINET interface

The MAC addresses of the Ethernet ports are required only for detection and evaluation of neighborhood and topology relations (LLDP).

Abbreviations and names

CP

In this document, the term "CP" is also used instead of the full product name.

STEP 7

The name STEP 7 is used to mean the STEP 7 Professional configuration tool.

Purpose of the manual

These Operating Instructions supplement the S7-1500 system manual.

With the information in this manual and the system manual, you will be able to commission the CM.

New in this release

New ATEX/IECEx approval

Replaced edition

Edition 01/2017

Current manual release on the Internet

You will also find the current version of these operating instructions on the Internet pages of Siemens Automation Customer Support

Link: (https://support.industry.siemens.com/cs/ww/en/ps/15341/man):

Structure of the documentation

The following documents supplement these operating instructions for the CM 1542-1. You will find links to the documents on the Internet in the appendix Documentation references (Page 49).

Table 1 Documentation for the CM 1542-1

Topic	Documentation	Most important contents
System description	System manual: S7-1500 Automation System	Application planningInstallationConnecting upCommissioning
Module properties	Power supplies manual Signal modules manual	Connecting up Parameter assignment/addressing Interrupts, error messages, diagnostics and system alarms Technical specifications Dimension drawing
System diagnostics	System diagnostics function manual	Overview Diagnostics evaluation for hardware/software
Communication	Communication function manual Function manual PROFINET with STEP 7	Overview PROFINET basics
	Professional	PROFINET functionsPROFINET diagnostics
	Web Server function manual	Function Operation
Interference-free installation of control systems	Interference-free installation of control systems function manual	 Basics Electromagnetic compatibility Lightning protection Housing selection
Memory concept	Structure and Use of the CPU Memory function manual	Structure How it works Use
Cycle and response times	Cycle and response times	Basics Calculations

CM documentation in the SIMATIC NET Manual Collection (article number A5E00069051)

The "SIMATIC NET Manual Collection" DVD contains the device manuals and descriptions of all SIMATIC NET products current at the time it was created. It is updated at regular intervals.

Version History / Current Downloads for the SIMATIC NET S7 CPs

The "Version History/Current Downloads for SIMATIC NET S7 CPs" provides information on all CPs available up to now for SIMATIC S7 (Industrial Ethernet, PROFIBUS) and IE/PB Link.

The current version of these documents can be found on the Internet at the following address:

Link: (https://support.industry.siemens.com/cs/ww/en/view/109474421)

License conditions

Note

Open source software

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

You will find license conditions in the following document on the supplied data medium:

OSS_CM15421_86.pdf

Firmware

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

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)

FAQs on the Internet

You will find detailed information (FAQs) on using the CM described here on the Internet at the following address (entry type "FAQ"):

Link: (https://support.industry.siemens.com/cs/ww/en/ps/15341/faq)

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 on the Internet at the following address:

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

Recycling and disposal



The product is low in pollutants, can be recycled and meets the requirements of the WEEE directive 2012/19/EU "Waste Electrical and Electronic Equipment".

Do not dispose of the product at public disposal sites. For environmentally friendly recycling and the disposal of your old device contact a certified disposal company for electronic scrap or your Siemens contact.

Keep to the local regulations.

You will find information on returning the product on the Internet pages of Siemens Industry Online Support:

Link: (https://support.industry.siemens.com/cs/ww/en/view/109479891)

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Properties and functions

1.1 Communication services

The CM supports the following communications services:

PROFINET IO

PROFINET IO allows direct access to IO devices over Industrial Ethernet.

- Real-Time communication (RT)
- Isochronous Real-Time communication (IRT)
- Media redundancy MRP
- Device replacement without exchangeable storage medium
- IO controller
- IO device (iDevice, Shared Device, Prioritized startup)
- Isochronous real time

Open User Communication

Open User Communication supports the following communications services via the CM using programmed or configured communications connections:

 TCP (complying with RFC 793), ISO-on-TCP (complying with RFC 1006) and UDP (complying with RFC 768)

With the interface via TCP connections, the CM supports the socket interface to TCP/IP available on practically every end system.

- Multicast with UDP

The multicast mode is made possible by selecting a suitable IP address when configuring connections. A maximum of six multicast groups are supported via UDP.

S7 communication

- PG communication
- Operator control and monitoring functions (HMI communication)
- Data exchange over S7 connections

1.2 Further functions

Timeofday synchronization over Industrial Ethernet using the NTP mode (NTP: Network Time Protocol)

The CM sends timeofday queries at regular intervals to an NTP server and synchronizes its local time of day.

The time is also be forwarded automatically to the CPU modules in the S7 station allowing the time to be synchronized in the entire S7 station.

Media redundancy (MRP)

Within an Ethernet network with a ring topology, the CM supports the media redundancy protocol MRP. You can assign the role of "Client" or "Manager (Auto)" to the CM.

Addressable with the factoryset MAC address

To assign the IP address to a new CM (direct from the factory), it can be accessed using the preset MAC address on the interface being used. Online address assignment is made in STEP 7.

SNMP agent

The CM supports data queries using SNMP in version V1 (Simple Network Management Protocol).

For details, see section SNMP (Page 37).

IP configuration - IPv4

The essential features of IP configuration for the CM:

- The CM supports the use of IP addresses according to IPv4.
- You can configure how and with which method the CM is assigned the IP address, the subnet mask and the address of a gateway.
- The IP configuration and the connection configuration (IPv4) can also be assigned to the CM by the user program (for program blocks refer to the section Programming (Page 18)).

Note: Does not apply to S7 connections.

IP routing

The CM supports static IP routing (IPv4) to other CM 1542-1 V2.0 / CP 1543-1 V2.0 in an S7-1500 system.

For details, see section IP routing (Page 31).

1.3 Configuration limits and performance data

Access to the Web server of the CPU

Via the LAN interface of the CM, you have access to the Web server of the CPU. With the aid of the Web server of the CPU, you can read out module data from a station.

Note the special description of the Web server; refer to the section Documentation references (Page 49)

Note

Web server access using the HTTPS protocol

The Web server of a SIMATIC S7-1500 station is located in the CPU. For this reason, when there is secure access (HTTPS) to the Web server of the station using the IP address of the CM 1542-1, the SSL certificate of the CPU is displayed.

1.3 Configuration limits and performance data

1.3.1 Transmission and reaction times

Measured values on the Internet

Note

Measured values of transmission and reaction times in PROFINET networks for a series of configurations can be found on the Internet at the following address:

Link: (https://support.industry.siemens.com/cs/ww/en/view/25209605)

1.3.2 Connection resources

Characteristic	Explanation / values
Total number of freely usable connec-	64 configurable connections, 1 PG connection
tions on Industrial Ethernet	The value applies to the total number of connections of the following types:
	Connections for open communications services

13

1.3 Configuration limits and performance data

Note

Connection resources CPU dependent

Depending on the CPU type, different numbers of connection resources are available. The number of connection resources is the decisive factor for the number of configurable connections. This means that the values that can actually be achieved may be lower than specified in this section "Properties and functions" describing the CM.

1.3.3 Characteristic data Open User Communication incl. e-mail

Open User Communication (OUC) provides access to communication over TCP, ISO-on-TCP and UDP connections.

Characteristic	Explanation / values	
Number of connections	Max. number of connections in total (configured and programmed:	
	(ISO-on-TCP + TCP + UDP + e-Mail) ≤ 64	
	of which:	
	- TCP connections: 0 64 ¹⁾	
	- ISO-on-TCP connections: 0 64	
	 Total number of UDP connections (specified and free) that can be configured: 0 64 	
	- Connection for e.mail: 0 64;	
	only one e-mail can be processed at any one time	
	Notes:	
	1) Avoid overload at receiving end	
	The flow control on TCP connections cannot control permanent overload of the recipient. You should therefore make sure that the processing capabilities of a receiving CM are not permanently exceeded by the sender (approximately 150 200 messages per second).	
Maximum data length for program blocks	Program blocks allow the transfer of user data in the following lengths:	
	1. ISO-on-TCP, TCP: 1 - 64 kbytes	
	2. UDP: 1 - 1452 bytes	
	3. E-mail (job header + user data): 1 - 256 bytes e-mail attachment: ≤ 64 kbytes	
LAN interface max. data field length generat-	For sending	
ed by the CM per protocol data unit(TPDU =	- ISO-on-TCP, TCP: 1452 bytes / TPDU	
transport protocol data unit)	For receiving	
	- ISO-on-TCP: 512 bytes / TPDU	
	- TCP: 1452 bytes / TPDU	

Note

Connection resources of the CPU

Depending on the CPU type, different numbers of connection resources are available. The number of connection resources is the decisive factor for the number of configurable connections. This means that the values that can actually be achieved may be lower than specified in this section describing the CM.

You will find detailed information on the topic of connection resources in the function manual /4/ (Page 50).

Restrictions for UDP

Restrictions UDP broadcast / multicast

To avoid overloading the CP due to high broadcast / multicast frame traffic, the receipt of UDP broadcast / multicast on the CP is limited

UDP frame buffering

Length of the frame buffer: At least 7360 bytes

Following a buffer overflow, newly arriving frames that are not fetched by the user program are discarded.

1.3.4 Characteristics of S7 communication

S7 communication provides data transfer via the ISO-on-TCP protocol.

Characteristic	Explanation / values
Total number of freely usable S7 connections on Industrial Ethernet	Max. 64
LAN interface - data field length generated by CM per protocol data unit (PDU = protocol data unit)	for sending: 480 bytes / PDUfor receiving: 480 bytes / PDU

Note

Maximum values for an S7-1500 station

Depending on the CPU you are using, there are limit values for the S7-1500 station. Note the information in the relevant documentation.

1.3.5 PROFINET IO characteristic data

Configuration limits of the CM as an IO controller

The CM supports the following maximum configuration as a PROFINET IO controller:

Characteristic	Explanation / values
Number of operable PROFINET IO devices	128, of which:
	Max. 64 IRT devices
Size of the input area over all PROFINET IO devices *)	Max. 8192 bytes
Size of the output area over all PROFINET IO devices	Max. 8192 bytes
Size of the IO data area per submodule of a module in an IO device	Inputs: 256 bytesOutputs: 256 bytes
Size of the consistency area for a submodule	256 bytes

^{*)} The diagnostics addresses of the PROFINET IO devices cannot be used as an input on the IO controller. The data area of the inputs is reduced by the diagnostics addresses used.

1.3.6 Rack components

When using the CM type described here, the following limits apply:

• The number of CMs that can be operated in a rack depends on the CPU type being used.

By operating several CMs, you can increase the configuration limits listed in the section Properties and functions (Page 11) for the station as the whole. The CPU does, however, have set limits for the entire configuration.

Note the information in the documentation of the CPU, refer to the section Documentation references (Page 49)

Note

Power supply via the CPU adequate or additional power supply modules required

You can operate a certain number of modules in the S7-1500 station without an additional power supply. Make sure that you keep to the specified power feed to the backplane bus for the particular CPU type. Depending on the configuration of the S7-1500 station you may need to provide additional power supply modules.

1.4 Requirements for use

1.4.1 Project engineering

Software for configuration and online functions

To configure the CP, the following configuration tool is required:

STEP 7 version	Functions of the CM
STEP 7 Professional V13	Most functions of the CM can be configured.
STEP 7 Professional V14	The full functionality of the CM can be configured with the new functions of the firmware version according to Preface (Page 3).

Downloading the configuration data

When there is a download to the CPU, the CM is supplied with the relevant configuration data. The configuration data can be downloaded to the CPU via a memory card or any Ethernet/PROFINET interface of the S7-1500 station.

1.4 Requirements for use

1.4.2 Programming

Program blocks

For communications services, there are preprogrammed program blocks (instructions) available as the interface in your STEP 7 user program.

Table 1- 1 Instructions for communications services

Protocol	Program block (instruction)	System data type
TCP	send/receive data via: TCON_Co TSEND_C / TRCV_C or TCON_QD	TCON_IP_v4TCON_ConfiguredTCON_QDN
ISO-on-TCP		TCON_IP_RFC
UDP	TCON, TUSEND/TURCV (Termination of the connection possible using TDISCON)	TCON_IP_v4 TCON_QDN
E-mail	TMAIL_C	TMail_V4 TMAIL_FQDN

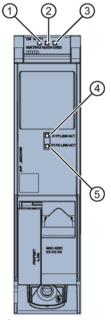
Table 1-2 Instructions for configuration tasks

Function	Program block (instruction)	System data type
Configuration of the Ethernet interface	T_CONFIG	CONF_DATA

For more detailed information, refer to section Program blocks for OUC (Page 34).

Refer to the documentation of the program blocks in the online help of STEP 7.

LEDs 2



- ① RUN/STOP
- 2 ERROR
- ③ MAINT
- 4 X1 P1 LINK/ACT
- S X1 P2 LINK/ACT

Figure 2-1 LED display of the CM 1542-1 (without front cover)

Meaning of the LED displays

The CM 1542-1 has 3 LEDs to display the current operating status and the diagnostics status and these have the following meanings:

- RUN/STOP (single color green)
- ERROR (single color red)
- MAINT (single color yellow)

The following table shows the meaning of the various combinations of colors of the RUN, ERROR and MAINT LEDs.

Table 2- 1 Meaning of the LEDs

RUN/STOP	ERROR	MAINT	Meaning
	0	0	No supply voltage on the CM or
LED off	LED off	LED off	supply voltage too low
•		_	LED test during startup
LED lit green	LED lit red	LED lit yellow	

RUN/STOP	ERROR	MAINT	Meaning	
			CM startup	
LED lit green	LED lit red	LED off		
			CM is in RUN mode. No disrup-	
LED lit green	LED off	LED off	tions.	
•	渋		A diagnostics event has occurred.	
LED lit green	LED flashing red	LED off		
		_	Maintenance is demanded.	
LED lit green	LED off	LED lit yellow		
		崇	Maintenance is required	
LED lit green	LED off	LED flashing yellow	Downloading the user program	
	浜	-	Duplicate IP address detected.	
LED lit green	LED flashing red		Ethernet interface unreachable.	
※			No CM configuration exists	
LED flashing green	LED off	LED off	Loading firmware	
浜	浜	浜	Module fault	
LED flashing green	LED flashing red	LED flashing yellow	(LEDs flashing synchronized)	

Meaning of the LED displays of the PROFINET ports: X1 P1 / X1 P2

To signal whether a connection exists and data is being transferred each port has a two-color LED (green/yellow):

- X1 P1 LINK/ACT
- X1 P2 LINK/ACT

The following table shows the meaning of the various color combinations of the LEDs X1 P1 and X1 P2.

Table 2-2 Meaning of the LEDs

X1 P1 LINK/ACT / X1 P2 LINK/ACT		Meaning	
		No connection to PROFINET	
green off	yellow off	There is no Ethernet connection between the Ethernet interface of the CM and the communications partner. At the current time, there is no data being received/sent via the Ethernet interface.	
崇		The "node flash test" is being performed.	
flashing green	yellow off		
		Connection to PROFINET exists	
green on	yellow off	There is an Ethernet connection between the Ethernet interface of the CM and a communications partner.	
green on	yellow flickers	At the current time, data is being received/sent via the Ethernet interface of the Ethernet device of a communications partner on Ethernet.	

Installation, connecting up, commissioning, operation

3

3.1 Important notes on using the device

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.



LAN attachment

A LAN or LAN segment with the attachments belonging to it should be within a single low-voltage supply system and within a single building. Make sure that the LAN is in an of type A environment according to IEEE 802.3 or in a type 0 environment according to IEC TR 62101.

Never establish a direct electrical connection to TNV networks (telephone network) or WANs (Wide Area Network).

3.1.1 Notices on use in hazardous areas



EXPLOSION HAZARD

DO NOT OPEN WHEN ENERGIZED.

MARNING

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.

3.1 Important notes on using the device



EXPLOSION HAZARD

Do not connect or disconnect cables to or from the device when a flammable or combustible atmosphere is present.



EXPLOSION HAZARD

Replacing components may impair suitability for Class 1, 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.

3.1.2 Notices on use in hazardous areas according to ATEX / IECEx



WARNING

Requirements for the cabinet/enclosure

To comply with EC Directive 2014/34 EU (ATEX 114) or the conditions of IECEx, this enclosure or cabinet must meet the requirements of at least IP54 (in compliance with EN 60529) according to EN 60079-7.



WARNING

Cable

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

3.1.3 Notices regarding use in hazardous areas according to UL HazLoc

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.



EXPLOSION HAZARD

You may only connect or disconnect cables carrying electricity when the power supply is switched off or when the device is in an area without inflammable gas concentrations.

3.1.4 Notices on use in hazardous areas according to FM



EXPLOSION HAZARD

You may only connect or disconnect cables carrying electricity when the power supply is switched off or when the device is in an area without inflammable gas concentrations.

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.



EXPLOSION HAZARD

The equipment is intended to be installed within an ultimate enclosure. The inner service temperature of the enclosure corresponds to the ambient temperature of the module. Use installation wiring connections with admitted maximum operating temperature of at least 30 °C higher than maximum ambient temperature.

3.2 Installing and commissioning the CM 1542-1

Installation and commissioning



Read the system manual "S7-1500 Automation System"

Prior to installation, connecting up and commissioning, read the relevant sections in the system manual "S7-1500 Automation System" (see section Documentation references (Page 49)).

Make sure that the power supply is turned off when installing/uninstalling the devices.

NOTICE

No plugging and pulling during operation

The CM must not be pulled or plugged during operation.

Configuration

One requirement for the commissioning of the CM is the completeness of the STEP 7 project data.

Procedure for installation and commissioning

Step	Execution	Notes and explanations
1	When installing and connecting up, keep to the procedures described for installing I/O modules in the system manual "S7-1500 Automation System".	
2	Connect the CM to Industrial Ethernet via the RJ45 jack.	Underside of the CM
	Where necessary, connect another component to the remaining free RJ45 jack.	
3	Turn on the power supply.	
4	Close the front covers of the module and keep them closed during operation.	
5	The remaining steps in commissioning involve downloading the STEP 7 project data.	The STEP 7 project data of the CM is transferred when you download to the station. To load the station, connect the engineering station on which the project data is located to the Ethernet interface of the CPU.
		You will find more detailed information on loading in the following sections of the STEP 7 online help:
		"Compiling and loading project data"
		"Using online and diagnostics functions"

3.3 Terminal assignment

PROFINET interface X1 with 2-port switch

The table below shows the pin assignment of the ports of the PROFINET interface (RJ-45 jack). The assignment corresponds to the Ethernet standard IEEE 802.3.

View No. **Terminal** Designation 1 TD Transmit Data + X1 P1 2 TD_N Transmit Data -3 RD Receive Data + 4 **GND** Ground 5 **GND** Ground 6 RD_N Receive Data -**GND** 7 Ground

GND

Ground

Table 3-1 Pin assignment of the PROFINET interface with 2-port switch

8

3.4 Mode of the CPU - effect on the CM

You can change the mode of the CPU between RUN and STOP using the STEP 7 configuration software. Depending on the operating status of the CPU, the CM behaves as described below.

Changing the CPU from RUN to STOP

When the CPU is in STOP mode, the CM remains in RUN mode.

3.4 Mode of the CPU - effect on the CM

Configuration, programming

4.1 Security recommendations

Keep to the following security recommendations to prevent unauthorized access to the system.

General

- You should make regular checks to make sure that the device meets these recommendations and other internal security guidelines if applicable.
- Evaluate your plant as a whole in terms of security. Use a cell protection concept with suitable products.
- Do not connect the device directly to the Internet. Operate the device within a protected network area.
- Keep the firmware up to date. Check regularly for security updates of the firmware and use them.
- Check regularly for new features on the Siemens Internet pages.
 - Here you can find information on Industrial Security:
 Link: (http://www.siemens.com/industrialsecurity)
 - Here you can find information on security industrial communication:
 Link: (http://w3.siemens.com/mcms/industrial-communication/en/ie/industrial-ethernet-security/Seiten/industrial-security.aspx)
 - You can find a publication on the topic of network security (6ZB5530-1AP02-0BA5) here:

Link:

(http://w3app.siemens.com/mcms/infocenter/content/en/Pages/order_form.aspx?node Key=key_518693&infotype=brochures)

Enter the following filter: 6ZB5530

Physical access

Restrict physical access to the device to qualified personnel.

Network attachment

Do not connect the CM directly to the Internet. If a connection from the CM to the Internet is required, arrange for suitable protection before the CM, for example a SCALANCE S with firewall.

4.1 Security recommendations

Security functions of the product

Use the options for security settings in the configuration of the station. These includes among others:

Protection levels

Configure access to the CPU under "Protection and Security".

- Security function of the communication
 - Use the secure protocol variant HTTPS when accessing the Web server of the CPU
 - If you doe not require access to the Web server, leave access to the Web server of the CPU (CPU configuration) and to the Web server of the CP disabled.
- Protection of the passwords for access to program blocks

Protect the passwords stored in data blocks for the program blocks from being viewed. You will find information on the procedure in the STEP 7 information system under the keyword "Know-how protection".

Passwords

- Define rules for the use of devices and assignment of passwords.
- Regularly update the passwords to increase security.
- Only use passwords with a high password strength. Avoid weak passwords for example "password1", "123456789" or similar.
- Make sure that all passwords are protected and inaccessible to unauthorized personnel.
 See also the preceding section for information on this.
- Do not use one password for different users and systems.

Protocols

Secure and non-secure protocols

- Only activate protocols that you require to use the system.
- Use secure protocols when access to the device is not prevented by physical protection measures.

Table: Meaning of the column titles and entries

The following table provides you with an overview of the open ports on this device.

Protocol / function

Protocols that the device supports.

Port number (protocol)

Port number assigned to the protocol.

Default of the port

- Open

The port is open at the start of the configuration.

Closed

The port is closed at the start of the configuration.

Port status

- Open

The port is always open and cannot be closed.

Open after configuration

The port is open if it has been configured.

- Open (login, when configured)

As default the port is open. After configuring the port, the communications partner needs to log in.

- Open with block call

The port is only opened when a suitable program block is called.

Authentication

Specifies whether or not the protocol authenticates the communications partner during access.

Protocol / function	Port number (protocol)	Default of the port	Port status	Authentication
DCP	93 (UDP)	Open	Open	No
S7 communication	102 (TCP)	Open	Open	No
HTTP	80 (TCP)	Closed	Open after configuration	No
SNMP	161 (UDP)	Open	Open	No
PROFINET	34964 (UDP)	Open	Open	No

Ports of communication partners and routers

Make sure that you enable the required client ports in the corresponding firewall on the communications partners and in intermediary routers.

These can be:

- DHCP / 67, 68 (UDP)
- DNS / 53 (UDP)
- NTP / 123 (UDP)
- SMTP / 25 (TCP) Open in CP on block call (outgoing only)

4.2 Network settings

4.2 Network settings

4.2.1 Fast Ethernet

Automatic setting

Only "Automatic" for automatic detection and "TP 100 Mbps full duplex" can be set for the transmission rate of the connection.

The Ethernet interface of the CM is set to autosensing as default.

Note

In normal situations, the basic setting ensures troublefree communication.

Autocrossing mechanism

With the integrated autocrossing mechanism, it is possible to use a standard cable to connect the PC/PG. A crossover cable is not necessary.

Note

Connecting a switch

To connect a switch, that does not support the autocrossing mechanism, use a crossover cable.

4.3 IP configuration

4.3.1 Points to note about IP configuration

Configured S7 and OUC connections cannot be operated if the IP address is assigned using DHCP

Note

If you obtain the IP address using DHCP, any S7 and OUC connections you may have configured will not work. Reason: The configured IP address is replaced by the address obtained via DHCP during operation.

4.3.2 Restart after detection of a duplicate IP address in the network

To save you timeconsuming troubleshooting in the network, during startup the CM detects double addressing in the network.

Behavior when the CM starts up

If double addressing is detected when the CM starts up, the CM changes to RUN and cannot be reached via the Ethernet interface. The ERROR LED flashes.

4.3.3 Remove retentive storage of the IP address if there are duplicate addresses

The IP address and the device name of the CM 1542-1 remain installed retentively:

If, for example during startup, the CM detects a duplicate address in another network, the CM is not connected to the network. The CM changes to RUN and cannot be reached via the Ethernet interface.

To be able to connect the CM to the network, you can remove the retentively stored IP address as follows:

- 1. Remove the memory card of the CPU.
- 2. Using DCP with the Primary Setup Tool (PST) and with the CPU in STOP, set the IP address of the CM to 0.0.0.0 without configuration.

You have removed the retentively stored IP address of the CM. The CM can be connected into the network.

3. Insert the memory card in the CPU again.

4.3.4 IP routing

IP routing via the backplane bus

The CM supports static IP routing (IPv4) to other CM 1542-1 / CP 1543-1 as of firmware version V2.0.

You can use IP routing, for example, for Web server access by lower-level modules.

With IP routing, he data throughput is limited to 1Mbps. Remember this in terms of the number of modules involved and the expected data traffic via the backplane bus.

Configuration

IP routing must be activated in at least 2 modules of a station.

IP routing runs via the configured default router. If you use several CMs/CPs in a station, of the modules in the station only one may be configured as a router.

4.3.5 CM in multiple use IO systems (standard machines)

Multiple use IO system in standard machines

In PROFINET IO controller mode, the CM can be used in standard machines of the same type.

After configuration, the address parameters of the CM are adapted to the required settings. With suitable configuration of the CM, the lower-level IO devices adopt the address parameters from the CM.

Requirements in the configuration

In terms of configuration it is assumed that the standard machine is delivered with a configured PROFINET IO system and the CM is the IO controller to which several IO devices are assigned in the PROFINET IO system.

The following requirements must be met in the configuration:

PROFINET IO system

In the configuration of the PROFINET IO system, the option "Multiple use IO system" was activated in the "General" tab. This makes the IO system a standard machine project in the STEP 7 project.

- IO controller (CM) > PROFINET interface
 - In the Ethernet addresses of the CM, the following option is activated under "PROFINET": "PROFINET device name is set directly at the device"
 - In the advanced options the following option is activated in the interface options:
 "Permit overwriting of device names of all assigned IO devices"
- IO devices > PROFINET interface

With the lower-level IO devices there are also some settings to be made that are described in the STEP 7 information system.

Help in the STEP 7 information system

You will find the required information in the STEP 7 information system with the following search term:

Creating a standard machine project

Changing address parameters at runtime

After the standard machine has started up, you can adapt the preset address parameters using the following methods:

- Using the following STEP 7 commissioning tools:
 - Primary Setup Tool (PST)
 - PRONETA
- From the user program using the program block "IP_CONFIG"
- Using the program block "T_CONFIG"

4.4 Media redundancy

You can use the CM in a ring topology with media redundancy.

For more detailed information on configuration, refer to the STEP 7 online help of the "Media redundancy" parameter group.

4.5 Time-of-day synchronization

Note

Recommendation for setting the time

Synchronization with a external clock at intervals of approximately 10 seconds is recommended. This achieves as small a deviation as possible between the internal time and the absolute time.

Procedure

The CM supports the following mode for time-of-day synchronization:

• NTP (NTP: Network Time Protocol)

Configuration

For information on configuration, refer to the STEP 7 online help of the "Time-of-day synchronization" parameter group.

Accept time of day from non-synchronized NTP servers

The paramter has the following effect:

- If the option is enabled, the CP also accepts the time-of-day from non-synchronized NTP servers with stratum 16.
- If the option is disabled, the response is as follows: If the CP receives a time of day frame from an unsynchronized NTP server with stratum 16, the time of day is not set according to the frame. In this case, none of the NTP servers is displayed as "NTP master" in the diagnostics; but rather only as being "reachable".

4.6 Program blocks for OUC

Programming Open User Communication (OUC)

The instructions (program blocks) listed below are required for the following communication services via Ethernet:

- TCP
- ISO-on-TCP
- UDP (Multicast)
- E-mail

For this, create suitable program blocks. The program block can be found in STEP 7 in the "Instructions > Communication > Open user communication" window.

You will find details on the program blocks in the information system of STEP 7.

Note

Different program block versions

Note that in STEP 7 you cannot use different versions of a program block in a station.

Supported program blocks for OUC

The following instructions in the specified minimum version are available for programming Open User Communication:

TSEND_C V3.1 / TRCV_C V3.1

Compact blocks for connection establishment/termination and for sending and receiving data

or

TCON V4.0 / TDISCON V2.1

Connection establishment / connection termination

TUSEND V4.0 / TURCV V4.0

Sending and receiving data via UDP

• TSEND V4.0 / TRCV V4.0

Sending and receiving data via TCP or ISOonTCP

TMAIL_C V4.0

Sending e-mails

Note the description of TMAIL_C as of version V4.0 in the STEP 7 information system.

Connection establishment and termination

Connections are established using the program block TCON. Note that a separate program block TCON must be called for each connection.

A separate connection must be established for each communications partner even if identical blocks of data are being sent.

After a successful transfer of the data, a connection can be terminated. A connection is also terminated by calling "TDISCON".

Note

Connection abort

If an existing connection is aborted by the communications partner or due to disturbances on the network, the connection must also be terminated by calling TDISCON. Make sure that you take this into account in your programming.

Connection descriptions in system data types (SDTs)

For the connection description, the blocks listed above use the parameter CONNECT (or MAIL_ADDR_PARAM with TMAIL_C). The connection description is stored in a data block whose structure is specified by the system data type (SDT).

Creating an SDT for the data blocks

You create the SDT required for every connection description as a data block. You generate the SDT type in STEP 7 by entering the name (e.g. "TCON_IP_V4") in the "Data type" box manually in the declaration table of block instead of selecting an entry from the "Data type" drop-down list. The corresponding SDT is then created with its parameters.

The following SDTs can be used.

- Configured connections:
 - TCON_Configured

For transferring frames via TCP

- Programmed connections:
 - TCON_IP_V4

For transferring frames via TCP or UDP

TCON_QDN

For transferring frames via TCP or UDP

- TCON_IP_RFC

For transferring frames via ISO-on-TCP

- TMail_V4

For transferring e-mails addressing the e-mail server using an IPv4 address

- TMail_FQDN

For transferring e-mails addressing the e-mail server using the host name

You will find the description of the SDTs with their parameters in the STEP 7 information system under the relevant name of the SDT.

4.6 Program blocks for OUC

Diagnostics and upkeep

5.1 Diagnostics options

Diagnostics options

You have the following diagnostics options available for the module:

• The LEDs of the module

For information on the LED displays, refer to the section LEDs (Page 19).

• STEP 7: The "Diagnostics" tab in the Inspector window

Here, you can obtain the following information on the selected module:

- Information on the online status of the module
- STEP 7: Diagnostics functions in the "Online > Online and diagnostics" menu

Here, you can obtain static information on the selected module:

- General information on the module
- Diagnostics status
- Information on the PROFINET interface

You will find further information on the diagnostics functions of STEP 7 in the STEP 7 online help.

Web diagnostics

With the aid of Web diagnostics of the CPU, you read the diagnostics data from an S7 station via the Web browser on the PG/PC.

Display of the CPU

Using the CPU display, read out diagnostics data from an S7 station on the PG/PC. You can only use diagnostics via the CPU display if the S7 station is suitably configured.

5.2 SNMP

SNMP (Simple Network Management Protocol)

SNMP is a protocol for diagnostics and managing networks and nodes in the network. To transmit data, SNMP uses the connectionless UDP protocol.

The information on the properties of SNMP-compliant devices is entered in MIB files (MIB = Management Information Base).

5.2 SNMP

You will find detailed information on SNMP and the Siemens Automation MIB in the manual "Diagnostics and Configuration with SNMP" that you will find on the Internet: /3/ (Page 50)

Range of performance of the CM

The CM supports the following SNMP versions:

SNMPv1

Traps are not supported by the CP.

The CM supports the following MIBs:

MIB II (acc. to RFC1213)

The CM supports the following groups of MIB objects:

- System
- Interfaces
- IP
- ICMP
- TCP
- UDP
- SNMP
- LLDP MIB
- MRP Monitoring
- Siemens Automation MIB

Write permissions

Write access is permitted only for the following MIBs and MIB objects:

Siemens Automation MIB, group "System"

The group returns status information about the CM interfaces.

Write access is permitted only for the following MIB objects:

- sysContact
- sysLocation
- sysName

A set sysName is sent as the host name using DHCP option 12 to the DHCP server to register with a DNS server.

MRP Monitoring, object "mrpDomainResetRoundTripDelays"

A write command "resetDelays(1)" to the object sets the values of "mrpDomainRoundTripDelayMax" and "mrpDomainRoundTripDelayMin" to zero.

For all other MIB groups and objects, only read access is possible for security reasons.

Access permissions using community names

The CM uses the following community strings to control the rights for authentication of the access to its SNMP agent via SNMPv1:

Table 5-1 Access rights and authentication in the SNMP agent

Type of access	Community string for authentication *)
Read access	public
Read and write access	private

^{*)} Note the use of lowercase letters!

Note

Security of the access

For security reasons, change the generally known strings "public" and "private".

5.3 Replacing a module without a programming device

General procedure

The configuration data of the CM is stored on the CPU. This makes it possible to replace this module with a module of the same type (identical article number) without a PG.

5.3 Replacing a module without a programming device

Technical specifications

6

Note the information in the System description of SIMATIC S7-1500 (Page 49).

In addition to the information in the system description, the following technical specifications apply to the module.

Table 6-1 Technical specifications of the CM 1542-1

Technical specifications	
Article number	6GK7 542-1AX00-0XE0
Attachment to Industrial Ethernet	
Number	1
Design	PROFINET interface with 2port switch, 2 x RJ-45 jack
Properties	100BASE-TX, IEEE 802.3-2005, half duplex/full duplex, auto-crossover, autonegotiation, galvanically isolated
Transmission speed	10 / 100 Mbps
Aging time	5 minutes
Special features of the ports X1 P1 and X1 P2	Integration in ring topology / MRP possible
Electrical data	
Power supply	
via S7-1500 backplane bus	15 V
Current consumption	
From backplane bus	220 mA maximum
Effective power loss	3.3 W
Insulation tested with	707 VDC (type test)
Permitted ambient conditions	
Ambient temperature	
During operation with the rack installed horizontally	• 0 °C to +60 °C
During operation with the rack installed vertically	• 0 °C to +40 °C
During storage	• -40 °C to +70 °C
During transportation	• -40 °C to +70 °C
Relative humidity	
During operation	• ≤ 95% at 25 °C, no condensation
Contaminant concentration	Acc. to ISA-S71.04 severity level G1, G2, G3
Design, dimensions and weight	
Module format	Compact module S7-1500, single width

Technical specifications		
Degree of protection	IP20	
Weight	400 g	
Dimensions (W x H x D)	35 x 142 x 129 mm	
Installation options	Mounting in an S7-1500 rack	
Permitted cable lengths	(Alternative combinations per length range) *	
0 55 m	 Max. 55 m IE TP Torsion Cable with IE FC RJ45 Plug 180 Max. 45 m IE TP Torsion Cable with IE FC RJ45 + 10 m TP Cord via IE FC RJ45 Outlet 	
0 85 m	Max. 85 m IE FC TP Ma- rine/Trailing/Flexible/FRNC/Festoon/Food Cable with IE FC RJ45 Plug 180	
	 Max. 75 m IE FC TP Ma- rine/Trailing/Flexible/FRNC/Festoon/Food Cable + 10 m TP Cord via IE FC RJ45 Outlet 	
0 100 m	 Max. 100 m IE FC TP Standard Cable with IE FC RJ45 Plug 180 	
	 Max. 90 m IE FC TP Standard Cable + 10 m TP Cord via IE FC RJ45 Outlet 	

^{*} For details, refer to the IK PI catalog, cabling technology

^{**} You will find the product functions in the section Properties and functions (Page 11).

Approvals

Approvals issued

Note

Issued approvals on the type plate of the device

The specified approvals - with the exception of the certificates for shipbuilding - have only been obtained when there is a corresponding mark on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate. The approvals for shipbuilding are an exception to this.

Certificates for shipbuilding and national approvals

The device certificates for shipbuilding and special national approvals can be found in Siemens Industry Online Support on the Internet:

Link: (https://support.industry.siemens.com/cs/ww/en/ps/15341/cert)

EC declaration of conformity



The product 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

• 2014/30/EU (EMC)

EMC directive of the European Parliament and of the Council of February 26, 2014 on the approximation of the laws of the member states relating to electromagnetic compatibility; official journal of the EU L96, 29/03/2014, pages. 79-106

• 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 Division Process Industries and Drives Process Automation 76181 Karlsruhe Germany

You will find the EC Declaration of Conformity on the Internet at the following address:

Link: (https://support.industry.siemens.com/cs/ww/en/ps/15341/cert)

The current versions of the standards can be seen in the EC Declaration of Conformity and in the certificates.

IECEx

The product meet the requirements of explosion protection according to IECEx.

IECEx classification:

Ex nA IIC T4 Gc

Certificate: IECEx DEK 14.0089X

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'

You can see the current versions of the standards in the IECEx certificate that you can find on the Internet at the following address:

Link: (https://support.industry.siemens.com/cs/ww/en/ps/15341/cert)

The conditions must be met for the safe deployment of the product according to the section Notices on use in hazardous areas according to ATEX / IECEx (Page 22).

You should also note the information in the document "Use of subassemblies/modules in a Zone 2 Hazardous Area" that you can find on the Internet at the following address: Link: (https://support.industry.siemens.com/cs/ww/en/view/78381013)

ATEX



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

ATEX approval:

• II 3 G Ex nA IIC T4 Gc

Type Examination Certificate: DEKRA 12 ATEX 0240X

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 18 ATEX 0027X

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 EC Declaration of Conformity, see above.

The conditions must be met for the safe deployment of the product according to the section Notices on use in hazardous areas according to ATEX / IECEx (Page 22).

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

- In the SIMATIC NET Manual Collection under
 "All documents" >"Use of subassemblies/modules in a Zone 2 Hazardous Area"
- On the Internet at the following address:
 Link: (https://support.industry.siemens.com/cs/ww/en/view/78381013)

EMC

Until 19.04.2016 the product meets the requirements of the EC Directive 2014/30/EU "Electromagnetic Compatibility" (EMC directive).

Applied standards:

EN 61000-6-4

Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

• EN 61000-6-2

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

RoHS

The product 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

c(UL)us



Applied standards:

- Underwriters Laboratories, Inc.: UL 61010-1 (Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements)
- IEC/UL 61010-2-201 (Safety requirements for electrical equipment for measurement, control and laboratory use. Particular requirements for control equipment)
- Canadian Standards Association: CSA C22.2 No. 142 (Process Control Equipment)

Report / UL file: E 85972 (NRAG, NRAG7)

cULus Hazardous (Classified) Locations



Underwriters Laboratories, Inc.: cULus IND. CONT. EQ. FOR HAZ. LOC.

Applied standards:

- ANSI ISA 12.12.01
- CSA C22.2 No. 213-M1987

APPROVED for Use in:

- Cl. 1, Div. 2, GP. A, B, C, D T3...T6
- Cl. 1, Zone 2, GP. IIC T3...T6

Ta: Refer to the temperature class on the type plate of the CP

Report / UL file: E223122 (NRAG, NRAG7)

Note the conditions for the safe deployment of the product according to the section Notices regarding use in hazardous areas according to UL HazLoc (Page 23).

Note

For devices with C-PLUG memory: The C-PLUG memory module may only be inserted or removed when the power is off.

CSA



CSA Certification Mark Canadian Standard Association (CSA) nach Standard C 22.2 No. 142:

Certification Record 063533-C-000

FΜ



Factory Mutual Approval Standards:

- Class 3600
- Class 3611
- Class 3810
- ANSI/ISA 61010-1

Report Number 3049847

Class I, Division 2, Group A, B, C, D, T4

Class I, Zone 2, Group IIC, T4

You will find the temperature class on the type plate on the module.

Australia - RCM



The product meets the requirements of the AS/NZS 2064 standards (Class A).

Canada

This class A digital device meets the requirements of the Canadian standard ICES-003.

AVIS CANADIEN

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

MSIP 요구사항 - For Korea only



A급 기기(업무용 방송통신기자재)

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Note that in terms of the emission of interference, this device corresponds to limit class A. This device can be used in all areas except for residential environments.

Current approvals

SIMATIC NET products are regularly submitted to the relevant authorities and approval centers for approvals relating to specific markets and applications.

If you require a list of the current approvals for individual devices, consult your Siemens contact or check the Internet pages of Siemens Industry Online Support:

Link: (https://support.industry.siemens.com/cs/ww/en/ps/15341/cert)

Documentation references



A.1 Introduction to the documentation

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.

A.2 System manual S7-1500

/1/

SIMATIC S7-1500 Automation System System Manual Siemens AG

Link: (https://support.industry.siemens.com/cs/ww/en/view/59191792)

A.3 Diagnostics

A.3 Diagnostics

/2/

SIMATIC

SIMATIC S7-1500, ET 200MP, ET 200SP, ET 200AL, ET 200pro

Diagnostics

Function Manual Siemens AG

Link: (https://support.industry.siemens.com/cs/ww/en/view/59192926)

/3/

SIMATIC NET

Diagnostics and configuration with SNMP

Diagnostics manual

Siemens AG

Link: (https://support.industry.siemens.com/cs/ww/en/ps/15392/man)

A.4 Communication

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SIMATIC

SIMATIC S7-1500, ET 200MP, ET 200SP, ET 200AL, ET 200pro

Communication Function Manual Siemens AG

Link: (https://support.industry.siemens.com/cs/ww/en/view/59192925)

/5/

SIMATIC

SIMATIC PROFINET with STEP 7 V14

Function Manual Siemens AG

Link: (https://support.industry.siemens.com/cs/ww/en/view/49948856)

/6/

SIMATIC

SIMATIC S7-1500, ET 200SP, ET 200pro

Web Server Function Manual Siemens AG

Link: (https://support.industry.siemens.com/cs/ww/en/view/59193560)

A.5 Interference-free installation of control systems

/7/

SIMATIC
SIMATIC S7-1500, ET 200MP, ET 200SP, ET 200AL
Interference-free Installation of Control Systems
Function Manual
Siemens AG
Interference-free installation of control systems
(https://support.industry.siemens.com/cs/ww/en/view/59193566)

A.6 Memory concept

/8/

SIMATIC S7-1500, ET 200SP, ET 200pro Structure and Use of the CPU Memory Function Manual Siemens AG

Link: (https://support.industry.siemens.com/cs/ww/en/view/59193101)

A.7 Cycle and response times

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SIMATIC SIMATIC S7-1500, ET 200SP, ET 200pro Cycle and Response Times Function Manual Siemens AG

Link: (https://support.industry.siemens.com/cs/ww/en/view/59193558)

A.7 Cycle and response times

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