SIEMENS

SIMATIC NET

S7-1500 - PROFINET CM 1542-1

Manual

07/2014

C79000-G8976-C355-02

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.

⚠DANGER

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

⚠WARNING

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

⚠CAUTION

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.

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Note the following:

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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.

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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.

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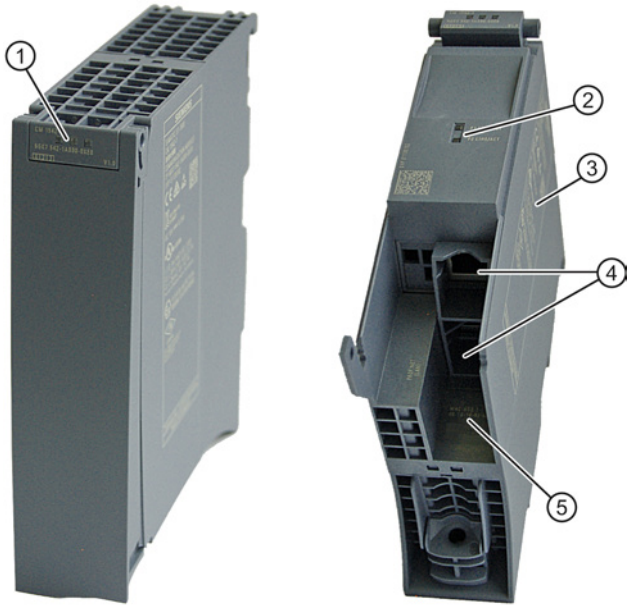
Preface

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 V1.0
CM 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
③ 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).

Names

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

Structure of the documentation

The following documents supplement these operating instructions for the CM 1542-1, see also Documentation references (Page 41):

Table 1 Documentation for the CM 1542-1

Topic	Documentation	Most important contents
System description	System manual: S7-1500 Automation System	• Application planning • Installation • Connecting up • Commissioning
Module properties	Power supplies manual	• Connecting up • Parameter assignment/addressing • Interrupts, error messages, diagnostics and system alarms • Technical specifications • Dimension drawing
	Signal modules manual	
System diagnostics	System diagnostics function manual	• Overview • Diagnostics evaluation for hardware/software
Communication	Communication function manual	• Overview
	PROFINET with STEP 7 V13 function manual	• PROFINET basics • PROFINET functions • PROFINET 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

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 under the following entry ID:

80582078 (http://support.automation.siemens.com/WW/view/en/80582078)

CM documentation in the 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.

An up-to-date version of this document can be found at on the Internet under the entry ID:

9836605 (http://support.automation.siemens.com/WW/view/en/9836605)

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 entry ID:

  50305045 (http://support.automation.siemens.com/WW/view/en/50305045)

License conditions

Note

Open source software

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

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

- DOC_OSS-S7CMCP_74.pdf
- DOC_OSS-CM1542-1_76.pdf

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"):

80582078 (http://support.automation.siemens.com/WW/view/en/80582078)

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered. For more information about industrial security, visit http://www.siemens.com/industrialsecurity.

To stay informed about product updates as they occur, sign up for a product-specific newsletter. For more information, visit http://support.automation.siemens.com.

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SIMATIC NET, CM 1542-1

Table of contents

Properties and functions

1

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

  – Isochronous real time

- **Open communication**

  Open 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 over UDP connection

    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). The CM returns the content of certain MIB objects according to the MIB II standard and Automation System MIB.

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.

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 41)

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 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:

(http://www.siemens.com/automation/pd)

1.4 Connection resources

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

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.

1.5 Characteristic data of open communication

Open communication provides access to communication via ISOonTCP, 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 generated by the CM per protocol data unit(TPDU = transport protocol data unit)	• For sending – ISO-on-TCP, TCP: 1452 bytes / TPDU • 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 /3/ (Page 42).

Restrictions for UDP

- Transfer is not confirmed

  The transfer of UDP frames is unconfirmed, in other words the loss of messages is not detected or displayed by the send program block.

- UDP frame buffering

  Length of the frame buffer:

  ≥ 7360 bytes

  Following a buffer overflow, newly arriving frames are discarded.

1.6 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 / PDU • for 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.

1.7 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 bytes • Outputs: 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.

Requirements for use 2

2.1 Configuration limits

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 41)

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.

2.2 Project engineering

Configuration and 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.

The following version of STEP 7 is required:

STEP 7 version	Functions of the CM
STEP 7 Professional V13	The full functionality of the CM 1542-1 (6GK7 542-1AX00-0XE0) can be configured

2.3 Programming

Program blocks

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

Table 2- 1 Instructions for communications services

Protocol	Program block (instruction)	System data type
TCP	Establish connection and send/receive data via: • TSEND_C/TRCV_C or • TCON, TSEND/TRCV (termination of the connection using TDISCON possible)	• TCON_IP_v4 • TCON_Configured
ISO-on-TCP		• TCON_IP_RFC
UDP	• TCON, TUSEND/TURCV (termination of the connection using TDISCON possible)	• TCON_IP_v4

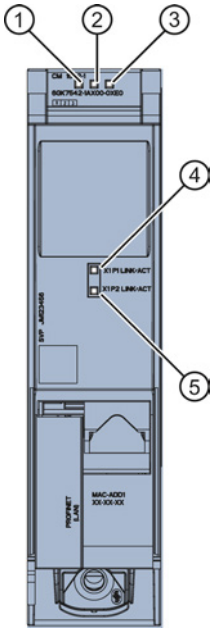
Table 2- 2 Instructions for configuration tasks

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

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

LED display

3



① RUN/STOP LED
② ERROR LED
③ MAINT LED
④ X1 P1 LINK/ACT LED
⑤ X1 P2 LINK/ACT LED

Figure 3-1 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 LED (one-color LED: green)
- ERROR LED (one-color LED: red)
- MAINT LED (one-color LED: yellow)

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

Table 3- 1 Meaning of the LEDs

RUN/STOP LED	ERROR LED	MAINT LED	Meaning
LED off	LED off	LED off	No supply voltage on the CM or supply voltage too low
LED lit green	LED lit red	LED lit yellow	LED test during startup
LED lit green	LED lit red	LED off	CM startup
LED lit green	LED off	LED off	CM is in RUN mode. No disruptions.
LED lit green	LED flashing red	LED off	A diagnostics event has occurred.
LED lit green	LED off	LED lit yellow	Maintenance is demanded.
LED lit green	LED off	LED flashing yellow	• Maintenance is required • Downloading the user program
LED lit green	LED flashing red	-	Duplicate IP address detected. Ethernet interface unreachable.
LED flashing green	LED off	LED off	• No CM configuration exists • Loading firmware
LED flashing green	LED flashing red	LED flashing yellow	Module fault (LEDs flashing synchronized)

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

The port has an LED that indicates the following information:

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

Connection exists / data is being transferred (two-color LED: green/yellow)

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

Table 3- 2 Meaning of the LEDs

X1 P1 LINK/ACT / X1 P2 LINK/ACT LED		Meaning
green off	yellow off	No connection to PROFINET 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.
flashing green	yellow off	The "node flash test" is being performed.
green on	yellow off	Connection to PROFINET exists 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.

Connecting up and commissioning

4

4.1 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.

WARNING

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).

4.1.1 Notices on use in hazardous areas

WARNING

EXPLOSION HAZARD

DO NOT OPEN WHEN ENERGIZED.

WARNING

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.

WARNING

EXPLOSION HAZARD

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

WARNING

EXPLOSION HAZARD

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

WARNING

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.

4.1.2 General notices on use in hazardous areas according to ATEX

WARNING

Requirements for the cabinet/enclosure

To comply with EU Directive 94/9 (ATEX95), this enclosure 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.

WARNING

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).

4.1.3 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.

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

4.2 Installing and commissioning the CM 1542-1

Installation and commissioning

WARNING
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 41)).
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

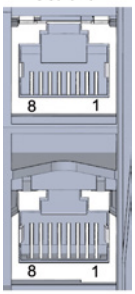
Step	Execution	Notes and explanations
1	When installing and connecting up, keep to the procedures described for installing I/O modules in the system manual "S7-1500 Automation System".	
3	Connect the CM to Industrial Ethernet via the RJ45 jack. Where necessary, connect another component to the remaining free RJ45 jack.	Underside of the CM
4	Turn on the power supply.	
5	Close the front covers of the module and keep them closed during operation.	
6	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"

4.3 Terminal assignment

PROFINET interface X1 with 2-port switch

The table below shows the pin assignment of the ports of the PROFINET interface. The assignment corresponds to the Ethernet standard for an RJ45 plug.

Table 4- 1 Pin assignment of the PROFINET interface with 2-port switch

View	No.	Terminal	Designation
X1 P1  X1 P2	1	TD	Transmit data +
	2	TD_N	Transmit data -
	3	RD	Receive data +
	4	GND	Ground
	5	GND	Ground
	6	RD_N	Receive data -
	7	GND	Ground
	8	GND	Ground

Configuration and operation 5

5.1 Network settings

5.1.1 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.

5.2 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.

5.3 IP configuration

5.3.1 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.

5.3.2 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.

5.4 Time-of-day synchronization

General rules

The CM supports the following mode for timeofday synchronization:

- NTP mode (NTP: Network Time Protocol)

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.

Note

Special feature of time-of-day synchronization in NTP mode

If the option "Accept time of the non-synchronized NTP server" is not selected, the response is as follows

If an NTP frame is detected by the CM as "not exact" (example: NTP server is not synchronized externally), there is no forwarding. If this problem occurs, none of the NTP servers is displayed as “NTP master" in the diagnostics; but rather all NTP servers are displayed only as being "accessible".

Configuration

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

5.5 SNMP agent

SNMP (Simple Network Management Protocol)

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

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

The CM supports data queries using SNMP in version V1 (standard). The CM returns the content of certain MIB objects according to the MIB II standard and Automation System MIB.

Further information

For more detailed information on using MIB files, refer to the documentation of the SNMP client you are using (example of an SNMP client: SNMP OPC server from SIMATIC NET).

MIB files are available using the following entry ID: 67637278
(http://support.automation.siemens.com/WW/view/en/67637278)

Supported MIBs

The CM supports the following groups of MIB objects of the MIB II standard according to RFC 1213:

- System
- Interfaces
- IP (IPv4)
- ICMP
- TCP
- UDP
- SNMP
- Address Translation (AT)

The other groups of the MIB II standard are not supported:

- EGP
- Transmission

The CM still supports the following MIBs:

- LLDP
- MRP Monitoring
- Siemens Automation
- Automation System

Exceptions / restrictions:

- Write access is permitted only for the following MIB objects of the system group:
  - sysContact
  - sysLocation
  - sysName

  For all other MIB objects / MIB object groups, only read access is possible for security reasons.
- Traps are not supported by the CM.

"Interfaces" MIB group

The "Interfaces" MIB object provides status information about the CM interfaces.

Access permissions using community name

The CM uses the following community names to control the access rights in the SNMP agent:

Table 5- 1 Access rights in the SNMP agent

Type of access	Community name *)
Read access	public
Read and write access	private

*) Note the use of lowercase letters!

Diagnostics and upkeep

6

6.1 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 LED display (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.

6.2 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.

6.3 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.

Technical specifications

7

Note the information in the System description of SIMATIC S7-1500 (Page 41).

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

Table 7- 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, autocrossover, 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 ℃ to +60 ℃
• During operation with the rack installed vertically	• 0 ℃ to +40 ℃
• During storage	• -40 ℃ to +70 ℃
• During transportation	• -40 ℃ to +70 ℃
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 Marine/Trailing/Flexible/FRNC/Festoon/Food Cable with IE FC RJ45 Plug 180 • Max. 75 m IE FC TP Marine/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
Product functions **	

* 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

8

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.

Approvals for shipbuilding are not printed on the device type plate.

Current approvals on the Internet

You will also find the current approvals for the product on the Internet pages of Siemens Automation Customer Support under the following entry ID:

80582078 (http://support.automation.siemens.com/WW/view/en/80582078)
→ "Entry list" tab, entry type "Certificates"

Approvals for SIMATIC NET products

You will find an overview of the approvals for SIMATIC NET products including approvals for shipbuilding on the Internet pages of Siemens Automation Customer Support under the following entry ID:

57337426 (http://support.automation.siemens.com/WW/view/en/57337426)

CE mark

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:

- EC Directive 2004/108/EC "Electromagnetic Compatibility" (EMC Directive)
  - Immunity - EN 61000-6-2
  - Emission - EN 61000-6-4 +A1

  The device is designed for use in an industrial environment.
- EC directive 94/9/EC "Equipment and protective systems intended for use in potentially explosive atmospheres" (ATEX Explosion Protection Directive)
  - EN 60079-0: Potentially explosive atmosphere - general requirements
  - EN 60079-15: Type of protection 'n'
- EC directive 2006/95/EC "Electrical Equipment Designed for Use within Certain Voltage Limits" (Low Voltage Equipment Directive)
  - EN 61131–2 / IEC 61131–2 (programmable logic controllers, part 2: equipment requirements and verifications)

The EC Declaration of Conformity is available for the responsible authorities according to the above-mentioned EC Directive at the following address:

Siemens Aktiengesellschaft
Industry Automation
Industrielle Kommunikation SIMATIC NET
Postfach 4848
D-90327 Nürnberg

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

80582078 (http://support.automation.siemens.com/WW/view/en/80582078)

ATEX approval

ATEX approval: II 3 G Ex nA IIC T4 Gc

Test number: DEKRA 12 ATEX 0240X

Relevant standards:

- EN 60079-0:2009: Potentially explosive atmosphere - general requirements
- EN 60079-15:2010: Electrical apparatus for explosive gas atmospheres; type of protection 'n'

The device is suitable for use in environments with pollution degree 2.

The device is suitable for use only in environments that meet the following conditions:

- Class I, Division 2, Group A, B, C, D and areas where there is no risk of explosion
- Class I, Zone 2, Group IIC and areas where there is no risk of explosion

Note

When using (installing) SIMATIC NET products in hazardous area zone 2, make absolutely sure that the associated conditions are adhered to!

You will find these conditions here:

- The notes in the section Important notes on using the device (Page 23)
- In the SIMATIC NET Manual Collection under
  "All Documents" > "Use of subassemblies/modules in a Zone 2 Hazardous Area"

UL approval

UL Recognition Mark Underwriters Laboratories (UL): UL 508:

Report E 85972

cULus Approval, Hazardous Location

cULus Listed 7RA9 IND. CONT. EQ. FOR HAZ. LOC.

Underwriters Laboratories Inc. complying with

- UL 508 (Industrial Control Equipment)
- CSA C22.2 No. 142 (Pocess Control Equipment)
- ANSI ISA 12.12.01, CSA C22.2 No. 213-M1987 (Hazardous Location)
- CSA–213 (Hazardous Location)

APPROVED for Use in

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

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

CSA approval

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

Certification Record 063533–C-000

FM approval

Factory Mutual Approval Standard Class Number 3611

Class I, Division 2, Group A, B, C, D, T3...T6 or

Class I, Zone 2, Group IIC, T3...T6.

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

Notices for 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.

Notice for Australia - C-TICK

AS/NZS 2064 (Class A)

Approval for Korea - approval

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.

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기바라며 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

Documentation references

A

Where to find Siemens documentation

- 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 find SIMATIC NET manuals on the Internet pages of Siemens Automation Customer Support:

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

  Enter the entry ID of the relevant manual as the search item. The ID is listed below some of the reference entries in brackets.

  As an alternative, you will find the SIMATIC NET documentation on the pages of Product Support:

  10805878 (http://support.automation.siemens.com/WW/view/en/10805878)

  Go to the required product group and make the following settings:

  "Entry list" tab, Entry type "Manuals / Operating Instructions"
- You will find the documentation for the SIMATIC NET products relevant here on the data medium that ships with some products:
  - Product CD / product DVD or
  - SIMATIC NET Manual Collection

A.1 System description

/1/

SIMATIC
S7-1500 Automation System
System Manual
Siemens AG

(SIMATIC NET Manual Collection)

On the Internet under the following entry ID:

59191792 (http://support.automation.siemens.com/WW/view/en/59191792)

A.2 System diagnostics

/2/

SIMATIC

SIMATIC S7-1500, ET 200MP, ET 200SP System Diagnostics
Function manual
Siemens AG

(SIMATIC NET Manual Collection)

On the Internet under the following entry ID:
59192926 (http://support.automation.siemens.com/WW/view/en/59192926)

A.3 Communication

/3/

SIMATIC
SIMATIC S7-1500, ET 200MP, ET 200SP Communication

Function manual
Siemens AG
(SIMATIC NET Manual Collection)

On the Internet under the following entry ID:
59192925 (http://support.automation.siemens.com/WW/view/en/59192925)

/4/

SIMATIC
SIMATIC PROFINET with STEP 7 V13
Function manual
Siemens AG

(SIMATIC NET Manual Collection)

On the Internet under the following entry ID:
49948856 (http://support.automation.siemens.com/WW/view/en/49948856)

/5/

SIMATIC
SIMATIC S7-1500 Web Server
Function manual
Siemens AG

(SIMATIC NET Manual Collection)

On the Internet under the following entry ID:
59193560 (http://support.automation.siemens.com/WW/view/en/59193560)

A.4 Interference-free installation of control systems

/6/

SIMATIC
SIMATIC S7-1500, ET 200MP, ET 200SP Designing interference-free controllers
Function manual
Siemens AG

(SIMATIC NET Manual Collection)

On the Internet under the following entry ID:
59193566 (http://support.automation.siemens.com/WW/view/en/59193566)

A.5 Memory concept

/7/

SIMATIC S7-1500
Structure and Use of the CPU Memory

Function manual
Siemens AG

(SIMATIC NET Manual Collection)

On the Internet under the following entry ID:
59193101 (http://support.automation.siemens.com/WW/view/en/59193101)

A.6 Cycle and response times

/8/

SIMATIC
SIMATIC S7-1500, ET 200MP, ET 200SP Cycle and response times

Function manual
Siemens AG
(SIMATIC NET Manual Collection)

On the Internet under the following entry ID:
59193558 (http://support.automation.siemens.com/WW/view/en/59193558)

Index

S

T

U

V

W