

Edition

02/2025

Reference Manual

SIMATIC NET

Networking components

RUGGEDCOM Modules

For MX5000RE

<https://www.siemens.com/ruggedcom>

SIMATIC NET

Networking components RUGGEDCOM Modules

Reference Manual

For MX5000RE

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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.

Proper use of Siemens products

Note the following:

WARNING

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 Canada Ltd.. 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.

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Preface

This document details RUGGEDCOM power and media modules available for use with devices in the RUGGEDCOM MX5000RE series of multi-service routers and switches.

It is intended for use by network technical support personnel responsible for the installation, commissioning and maintenance of routers and switches. It is also recommended for use by network and system planners, system programmers, and line technicians.

Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity 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 cybersecurity 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 cybersecurity measures that may be implemented, please visit <https://www.siemens.com/cybersecurity-industry>.

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 customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under <https://www.siemens.com/cert>.

Supplementary documentation

Documentation related to RUGGEDCOM MX5000RE is available on the Siemens Industry Online Support website at .

For specific documents, search the following:

- **Product notes**
- **Manuals**

- **FAQs**
- **Application examples**
- **Catalogs/brochures**
- **Certificates**
- **Downloads**

Other documents that may be of interest include:

- **SINEC NMS Operating Instructions**
<https://support.industry.siemens.com/cs/ww/en/ps/25518/man>
- **SINEC PNI Operating Instructions**
<https://support.industry.siemens.com/cs/ww/en/ps/26672>

Accessing documentation

The latest user documentation for RUGGEDCOM MX5000RE is available online at <https://support.industry.siemens.com>. To request or inquire about a user document, contact Siemens Customer Support.

SIMATIC NET glossary

The SIMATIC NET glossary describes special terms that may be used in this document.

The glossary is available online via Siemens Industry Online Support (SIOS) at:

<https://support.industry.siemens.com/cs/ww/en/view/50305045>

Registered trademarks

The following and possibly other names not identified by the registered trademark sign ® are registered trademarks of Siemens Canada Ltd.:

- RUGGEDCOM
- ROS
- RCDP
- Discovery Protocol

Linux® is the registered trademark of Linus Torvalds in the United States and other countries.

The registered trademark Linux® is used pursuant to a sublicense from LMI, the exclusive licensee of Linus Torvalds, owner of the mark on a world-wide basis.

Other designations in this manual might be trademarks whose use by third parties for their own purposes would infringe the rights of the owner.

Training

Siemens offers a wide range of educational services ranging from in-house training of standard courses on networking, Ethernet switches and routers, to on-site customized courses tailored to the customer's needs, experience and application.

Siemens' Educational Services team thrives on providing our customers with the essential practical skills to make sure users have the right knowledge and expertise to understand the various technologies associated with critical communications network infrastructure technologies.

Siemens' unique mix of IT/Telecommunications expertise combined with domain knowledge in the utility, transportation and industrial markets, allows Siemens to provide training specific to the customer's application.

For more information about training services and course availability, visit <https://www.siemens.com> or contact a Siemens Sales representative.

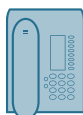
Customer support

Customer support is available 24 hours, 7 days a week for all Siemens customers. For technical support or general information, contact Siemens Customer Support through any of the following methods:



Online

Visit <http://www.siemens.com/automation/support-request> to submit a Support Request (SR) or check on the status of an existing SR.



Telephone

Call a local hotline center to submit a Support Request (SR). To locate a local hotline center, visit https://w3.siemens.com/aspa_app/?lang=en.



Mobile app

Install the Industry Online Support app by Siemens Aktiengesellschaft on any Android, Apple iOS or Windows mobile device and be able to:

- Access Siemens' extensive library of support documentation, including FAQs and manuals
- Submit SRs or check on the status of an existing SR
- Contact a local Siemens representative from Sales, Technical Support, Training, etc.
- Ask questions or share knowledge with fellow Siemens customers and the support community

Contacting Siemens

Address	Siemens Canada Ltd. Digital Industries Process Automation 300 Applewood Crescent
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	Concord, Ontario Canada, L4K 5C7
Telephone	Toll-free: 1 888 264 0006 Tel: +1 905 856 5288 Fax: +1 905 856 1995
E-Mail	info.ruggedcom@siemens.com
Web	https://www.siemens.com

Ordering RUGGEDCOM products

Use the RUGGEDCOM Configurator to select and configure RUGGEDCOM products and accessories. Once selected, an item(s) can be transferred to the Siemens Industry Mall and ordered.



RUGGEDCOM Configurator

<http://www.siemens.com/ruggedcom-configurator>

Introduction

This Reference Manual details the various power and media modules available for the RUGGEDCOM MX5000RE. Modules allow network designers to quickly and cost effectively adjust their communications infrastructure to the needs of the facilities and the network.

It is intended to be used as a supplement to the "Equipment Manual" for the device.

NOTICE

Only qualified personnel should be allowed to install and work on this equipment. Qualified persons in the sense of the safety-related notices in this manual are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

1.1 Available modules

The following is a list of all power and media modules available for use in the RUGGEDCOM MX5000RE.

Note

All modules are conformal coated.

Power supply modules

RUGGEDCOM MX5000REPN PS MHIF	Input range	88 to 300 VDC or 85 to 264 VAC
	Terminal type	Terminal located on chassis
	Article numbers	6GK6050-0RL16-0AA1

Copper Ethernet modules

RUGGEDCOM MX5000REPN LM M4CG02	Ports	4
	Speed	1000 Mbps
	Interface	TX
	Connector	Micro-D
	Article numbers	6GK6050-0ML20-0FD1 (Module)

1.1 Available modules

RUGGEDCOM MX5000REPN LM M8TX02		6GK6050-0RL20-0FD1 (Module with Patch Panel and Cables) 6GK6050-0AR00-4RD0 (Patch Panel and Cables)
	Ports	8
	Speed	100 Mbps
	Interface	TX
	Connector	Micro-D
	Article numbers	6GK6050-0ML20-0ND1 (Module) 6GK6050-0RL20-0ND1 (Module with Patch Panel and Cables) 6GK6050-0AR00-8RD0 (Patch Panel and Cables)
RUGGEDCOM MX5000REPN LM M12TX02	Ports	12
	Speed	100 Mbps
	Interface	TX
	Connector	RJ45
	Article numbers	6GK6050-0ML20-0NB1 (Module) 6GK6050-0RL20-0NE1 (Module with Patch Panel and Cables) 6GK6050-0AR00-6RR0 (Patch Panel and Cables)

Fiber optic Ethernet modules

RUGGEDCOM MX5000REPN LM M8FX11	Mode	MM
	Speed	100 Mbps
	Interface	FX
	Ports	8
	Connector	LC
	Distance	2 km (1.2 mi)
	Article numbers	6GK6050-0ML20-0BD1 (Module) 6GK6050-0RL20-0BD1 (Module with Patch Panel and Cables) 6GK6050-0AR00-8MM0 (Patch Panel and Cables)
RUGGEDCOM MX5000REPN LM M4FX11	Mode	MM
	Speed	100 Mbps
	Interface	FX
	Ports	4
	Connector	LC
	Distance	2 km (1.2 mi)
	Article numbers	6GK6050-0ML20-0BH1 (Module) 6GK6050-0RL20-0BH1 (Module with Patch Panel and Cables)

RUGGEDCOM MX5000REPN LM M4FG01		6GK6050-0AR00-4MM0 (Patch Panel and Cables)
	Mode	MM
	Speed	1000 Mbps
	Interface	SX
	Wavelength	850 nm
	Ports	4
	Connector	LC
	Distance	500 m (1640 ft)
RUGGEDCOM MX5000REPN LM M4FG03	Article numbers	6GK6050-0ML20-0BK1 (Module) 6GK6050-0RL20-0BK1 (Module with Patch Panel and Cables) 6GK6050-0AR00-4MM0 (Patch Panel and Cables)
	Mode	SM
	Speed	1000 Mbps
	Interface	LX
	Wavelength	1310 nm
	Ports	4
	Connector	LC
	Distance	10 Km (6 mi)
	Article numbers	6GK6050-0ML20-0CR1 (Module) 6GK6050-0RL20-0CR1 (Module with Patch Panel and Cables) 6GK6050-0AR00-4SM0 (Patch Panel and Cables)

Serial modules

RUGGEDCOM MX5000REPN LM MS01	Standard	RS232/RS422/RS485
	Ports	8
	Connector	DB9
	Article numbers	6GK6050-0ML20-0KB1 (Module) 6GK6050-0RL20-0KB1 (Module with Patch Panel and Cables) 6GK6050-0AR00-8DR0 (Patch Panel and Cables)

Control modules

RUGGEDCOM MX5000REPN MCM01 L3SEL3HW	Type	Layer 3 Standard Edition, Layer 3 Hardware
	Article numbers	6GK6050-0ML30-0BA1 (Module) 6GK6050-0RL30-0BA1 (Module with Patch Panel and Cables)

RUGGEDCOM MX5000REPN MCM01 L3SECL3HW	Type	6GK6050-0AR00-1CP0 (Patch Panel and Cables) Layer 3 Security Edition, Layer 3 Hardware
	Article numbers	6GK6050-0ML30-0CA1 (Module) 6GK6050-0RL30-0CA1 (Module with Patch Panel and Cables) 6GK6050-0AR00-1CP0 (Patch Panel and Cables)

Switch modules

RUGGEDCOM MX5000REPN MSM36	Mode	SM
	Speed	1000 Mbps
	Interface	LX
	Wavelength	1310 nm
	Ports	2
	Connector	LC
	Distance	10 Km (6 mi)
	Article numbers	6GK6050-0ML40-0RA1 (Module) 6GK6050-0RL40-0RA1 (Module with Patch Panel and Cables) 6GK6050-0AR00-1SP0 (Patch Panel and Cables)
RUGGEDCOM MX5000REPN MSM61	Network layer	Layer 3
	Article numbers	6GK6050-0ML40-0VA1 (Module) 6GK6050-0RL40-0VA1 (Module with Patch Panel and Cables) 6GK6050-0AR00-0XF0 (Patch Panel and Cables)
RUGGEDCOM MX5000REPN MSM70	Ports	2
	Speed	10 Gbps
	Network layer	Layer 3
	Article numbers	6GK6050-0ML40-0XA1 (Module) 6GK6050-0RL40-0WA1 (Module with Patch Panel and Cables) 6GK6050-0AR00-1SP0 (Patch Panel and Cables)

Network redundancy modules

RUGGEDCOM MX5000REPN LM MPRP	Ports	2
	Speed	1000 Mbps
	Interface	LX
	Connector	RJ45
	Distance	10 km (6.2 mi)

Protocol	PRP
Article numbers	6GK6050-0ML20-0PR1 (Module)
	6GK6050-0RL20-0PR1 (Module with Patch Panel and Cables)
	6GK6050-0AR00-2PRO (Patch Panel and Cables)

Blank modules

RUGGEDCOM MX5000REPN PS XX	Article number	6GK6050-0RL10-0AA1
RUGGEDCOM MX5000REPN LM XX	Article number	6GK6050-0RL20-0AA1

1.2 Installing/removing modules

Always refer to the associated "Equipment Manual" for the device for instructions on how to install or remove a power or media module. The "Equipment Manual" cites important, chassis-specific safety warnings that should be followed to avoid damage to the module and/or device.

Where needed, additional installation/removal instructions are provided in this Reference Manual for select modules. Make sure to review all information provided before installing or removing a module.

Note

When hot swapping modules, wait at least three seconds before re-inserting the module into the chassis.

NOTICE

Equipment hazard – risk of damage to the device/module

Some modules are affixed with one or more thermal gap pads. Do not remove gap pads or their protective film.

1.3 Dimensions

Power and media modules conform to the following dimensions:

Note

All dimensions are in millimeters (mm).

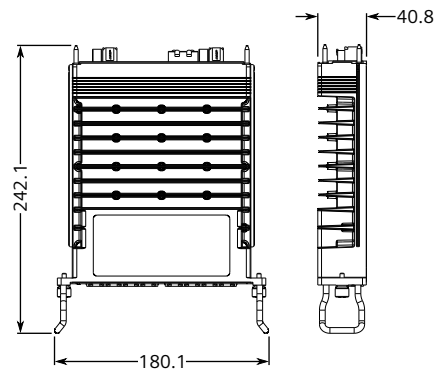


Figure 1.1 Power and Media Module Dimensions

Power supply modules

The following power supply modules are available.

RUGGEDCOM MX5000REPN PS MHIF

"RUGGEDCOM MX5000REPN PS
MHIF" (Page 8)

2.1 RUGGEDCOM MX5000REPN PS MHIF

The RUGGEDCOM MX5000REPN PS MHIF power supply module provides high VDC or VAC power to the RUGGEDCOM MX5000RE and features a failsafe relay to protect against critical error conditions. The module accepts either AC or DC power inputs from an external power supply.

 **NOTICE**

The required power input for the RUGGEDCOM MX5000REPN PS MHIF is located on the chassis. For more information about the RUGGEDCOM MX5000RE chassis options, refer to Article Number 6GK6050-0MB00-0AG1 and 6GK6050-0MB00-0AG2.

Description

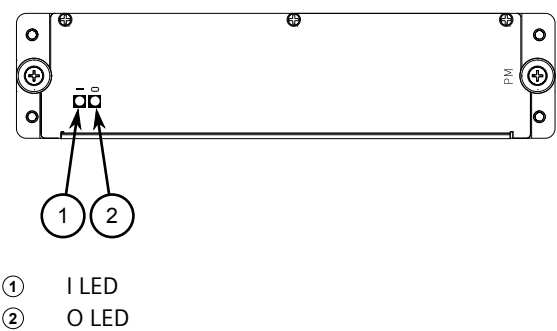


Figure 2.1 RUGGEDCOM MX5000REPN PS MHIF

Port LEDs	LEDs indicate when the module is receiving and supplying power.		
	LED	State	Description
	O	Green	The module is supplying power
	I	Green	The module is receiving power

Installing the module

For information about installing this module, refer to the "Installation Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Ingress Protection	IP30
Power	Input Range	88 to 300 VDC or 85 to 264 VAC
	Internal Fuse Rating	6.3 A, 250 V(T) ^a
	Maximum Power Consumption ^b	110 W ^c
	Insulation	2800 VDC for 1 minute
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)

Operating relative humidity	5 to 95% (non-condensing)
Storage temperature	-40 to 85 °C (-40 to 185 °F)

^a (T) denotes time-delay fuse. Internal fuse is not user-replaceable.

^b Power consumption varies based on the device configuration.

^c Rating at 85 °C (185 °F) ambient temperature at worst-case load.

Certification

This module has been certified to comply with the requirements of the following standards.

CSA

This module meets the requirements of the following Canadian Standards Association (CSA) standards:

- **CAN/CSA-C22.2 No. 62368-1**
Information Technology Equipment – Safety – Part 1: General Requirements (Bi-National Standard, with UL 62368-1)
- **UL 62368-1**
Information Technology Equipment – Safety – Part 1: General Requirements

The module is marked with a CSA symbol that indicates compliance with both Canadian and U.S. requirements.



RoHS

This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment:

- **EU RoHS directives (EU) 2011/65 and (EU) 2015/863**
European Directive for Restriction of Hazardous Substances
- **China RoHS (relating to SJ/T 11364)**
Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products

Declarations of conformity for each directive are available online via [Siemens Industry Online Support \[https://support.industry.siemens.com/\]](https://support.industry.siemens.com/).

Ordering information

Description	88-300VDC or 85 264VAC, supports terminal block on front.
Article numbers	6GK6050-0RL16-0AA1

Copper Ethernet modules

The following copper Ethernet modules are available.

RUGGEDCOM MX5000REPN LM M4CG02	"RUGGEDCOM MX5000REPN LM M4CG02" (Page 12)
RUGGEDCOM MX5000REPN LM M8TX02	"RUGGEDCOM MX5000REPN LM M8TX02" (Page 15)
RUGGEDCOM MX5000REPN LM M12TX02	"RUGGEDCOM MX5000REPN LM M12TX02" (Page 18)

3.1 RUGGEDCOM MX5000REPN LM M4CG02

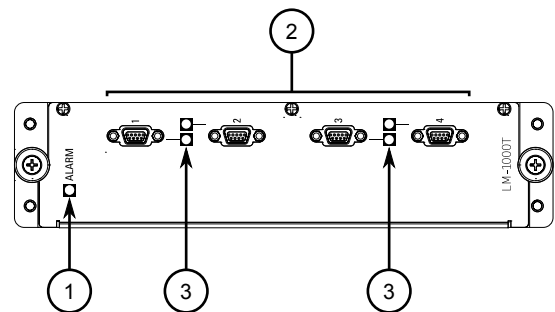
The RUGGEDCOM MX5000REPN LM M4CG02 module features four 10/100/1000Base-TX Micro-D ports.

Requirements/restrictions

Required modules	This module must be installed alongside the following modules: RUGGEDCOM MX5000REPN SM 61 (Page 48)
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Description

Each port features a dedicated LED that indicates its Link/activity state.



- ① ALARM LED
- ② Micro-D ports
- ③ Port LEDs

Figure 3.1 RUGGEDCOM MX5000REPN LM M4CG02

Micro-D Ports	Fixed 10/100/1000Base-TX Micro-D ports.	
Port LEDs	Each port features a dedicated LED that indicates its Link/activity state.	
	State	Description
	Green (Solid)	Link established
	Green (Blinking)	Activity
	Off	No link detected
ALARM LED	Illuminates when an alarm condition exists.	

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Pin-out description

The following are the pin-out descriptions for the Micro-D ports:

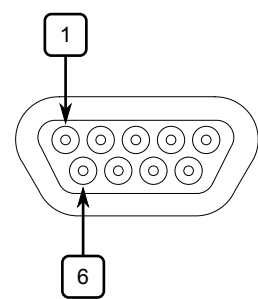


Figure 3.2 Micro-D 10/100Base-TX port pin configuration

Pin	10/100Base-TX	1000Base-TX
1	TX+	B+
2	Reserved (Do not connect)	D+
3	Reserved (Do not connect)	
4	Reserved (Do not connect)	C+
5	RX+	A+
6	TX-	B-
7	Reserved (Do not connect)	D-
8	Reserved (Do not connect)	C-
9	RX-	A-

Technical specifications

General	Ingress protection	IP40
	Power consumption	7.2 W
Interface/cable	Cable type	> CAT-5
	Speed	10/100/1000 Mbps
	Interface	TX
	Connector	Micro-D
	Duplex	FDX/HDX
	Wiring standard	TIA/EIA T568A/B
	Nominal distance	100 m (328.1 ft)
	Isolation	1.5 kV
Optical characteristics	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	4 x 10/100/1000TX Micro-D
	Article number	6GK6050-0ML20-0FD1
Module with patch panel and cables	Description	4 x 10/100/1000TX Micro-D
	Article number	6GK6050-0RL20-0FD1
Patch panel and cables	Description	4 x Micro-D connectors to RJ45 connectors
	Article number	6GK6050-0AR00-4RD0

3.2 RUGGEDCOM MX5000REPN LM M8TX02

The RUGGEDCOM MX5000REPN LM M8TX02 module features eight 10/100Base-TX Micro-D ports.

Description

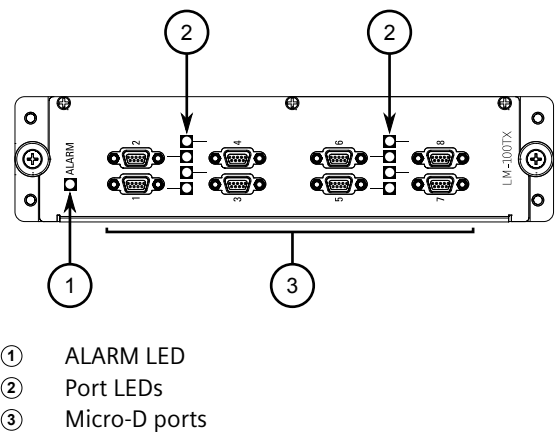


Figure 3.3 RUGGEDCOM MX5000REPN LM M8TX02

Micro-D Ports	Fixed 10/100Base-TX Micro-D ports.									
Port LEDs	Each port features a dedicated LED that indicates its Link/activity state.									
	<table><tr><th>State</th><th>Description</th></tr><tr><td>Green (Solid)</td><td>Link established</td></tr><tr><td>Green (Blinking)</td><td>Activity</td></tr><tr><td>Off</td><td>No link detected</td></tr></table>		State	Description	Green (Solid)	Link established	Green (Blinking)	Activity	Off	No link detected
State	Description									
Green (Solid)	Link established									
Green (Blinking)	Activity									
Off	No link detected									
ALARM LED	Illuminates when an alarm condition exists.									

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Pin-out description

The following are the pin-out descriptions for the Micro-D ports:

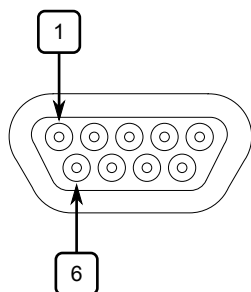


Figure 3.4 Micro-D 10/100Base-TX port pin configuration

Pin	10/100Base-TX	1000Base-TX
1	TX+	B+
2	Reserved (Do not connect)	D+
3	Reserved (Do not connect)	
4	Reserved (Do not connect)	C+
5	RX+	A+
6	TX-	B-
7	Reserved (Do not connect)	D-
8	Reserved (Do not connect)	C-
9	RX-	A-

Technical specifications

General	Ingress protection	IP40
	Power consumption	3.6 W
Interface/cable	Cable type	> CAT-5
	Speed	10/100 Mbps
	Interface	TX
	Connector	Micro-D
	Duplex	FDX/HDX
	Wiring standard	TIA/EIA T568A/B
	Nominal distance	100 m (328.1 ft)
	Isolation	1.5 kV
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	8 x 10/100Base-TX Micro-D
	Article number	6GK6050-0ML20-0ND1
Module with patch panel and cables	Description	8 x 10/100Base-TX Micro-D
	Article number	6GK6050-0RL20-0ND1
Patch panel and cables	Description	8 x Micro-D connectors to RJ45 connectors
	Article number	6GK6050-0AR00-8RD0

Pin-out description

The following are the pin-out descriptions for the RJ45 ports:

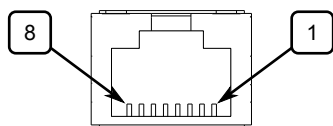


Figure 3.6 RJ45 Ethernet port pin configuration

Pin	Name		Description
	10/100Base-TX	1000Base-TX	
1	RX+	BI_DB+	Receive Data+ or Bi-Directional
2	RX-	BI_DB-	Receive Data- or Bi-Directional
3	TX+	BI_DA+	Transmit Data + or Bi-Directional
4	Reserved (Do not connect)		
5	Reserved (Do not connect)		
6	TX-	BI_DA-	Transmit Data- or Bi-Directional
7	Reserved (Do not connect)		
8	Reserved (Do not connect)		

Technical specifications

General	Ingress protection	IP40
	Power consumption	4.2 W
Interface/cable	Cable type	> CAT-5
	Speed	10/100 Mbps
	Interface	TX
	Connector	RJ45
	Duplex	FDX/HDX
	Wiring standard	TIA/EIA T568A/B
	Nominal distance	100 m (328.1 ft)
	Isolation	1.5 kV
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	16 x 10/100Base-TX RJ45
	Article number	6GK6050-0ML20-0NB1
Module with patch panel and cables	Description	12 x 10/100Base-TX RJ45
	Article number	6GK6050-0RL20-0NE1
Patch panel and cables	Description	12 x RJ45 connectors to RJ45 connectors
	Article number	6GK6050-0AR00-6RR0

Fiber optic Ethernet modules

The following fiber optic Ethernet modules are available.

RUGGEDCOM MX5000REPN LM M4FG01	"RUGGEDCOM MX5000REPN LM M4FG01" (Page 22)
RUGGEDCOM MX5000REPN LM M4FG03	"RUGGEDCOM MX5000REPN LM M4FG03" (Page 25)
RUGGEDCOM MX5000REPN LM M4FX11	"RUGGEDCOM MX5000REPN LM M4FX11" (Page 28)
RUGGEDCOM MX5000REPN LM M8FX11	"RUGGEDCOM MX5000REPN LM M8FX11" (Page 30)

4.1 RUGGEDCOM MX5000REPN LM M4FG01

The RUGGEDCOM MX5000REPN LM M4FG01 module features four 1000Base-SX fiber optic Ethernet ports.

Note

When connecting cables, make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

Requirements/restrictions

Required modules	This module must be installed alongside the following modules: - RUGGEDCOM MX5000REPN SM MSM61 (Page 48) - RUGGEDCOM MX5000REPN SM MSM70 (Page 50)
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Description

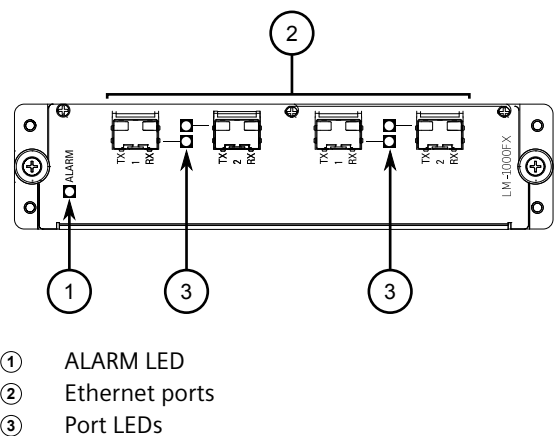


Figure 4.1 RUGGEDCOM MX5000REPN LM M4FG01

Ethernet ports	Fixed 1000Base-SX fiber optic Ethernet ports.								
Port LEDs	Each port set (transmit/receive) features a dedicated LED that indicates its Link/activity state. <table><thead><tr><th>State</th><th>Description</th></tr></thead><tbody><tr><td>Green (Solid)</td><td>Link established</td></tr><tr><td>Green (Blinking)</td><td>Activity</td></tr><tr><td>Off</td><td>No link detected</td></tr></tbody></table>	State	Description	Green (Solid)	Link established	Green (Blinking)	Activity	Off	No link detected
State	Description								
Green (Solid)	Link established								
Green (Blinking)	Activity								
Off	No link detected								
ALARM LED	Illuminates when an alarm condition exists.								

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Ingress protection	IP40
	Power consumption	7.2 W
Interface/cable	Cable type	50/125 µm 62.5/125 µm
	Speed	1 Gbps
	Mode	MM (Multi-Mode)
	Interface	SX
	Connector	LC
	Wavelength ^a	850 nm
	Nominal distance ^a	0.5 km (0.3 mi)
Optical characteristics	Transmit power	-9 to -2.5 dBm
	Receiver sensitivity	-20 dBm
	Receiver saturation	0 dBm
	Power budget	11 dB
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

^a Typical.

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	4 x 1000SX, Multimode, 850nm, LC, 500m
	Article number	6GK6050-0ML20-0BK1
Module with patch panel and cables	Description	4 x 1000SX, Multimode, 850nm, LC, 500m
	Article number	6GK6050-0RL20-0BK1

4.1 RUGGEDCOM MX5000REPN LM M4FG01

Patch panel and cables	Description	4 x Multi Mode Military Circular Fiber Connectors with LC connectors
	Article number	6GK6050-0AR00-4MM0

4.2 RUGGEDCOM MX5000REPN LM M4FG03

The RUGGEDCOM MX5000REPN LM M4FG03 module features four 1000Base-LX fiber optic Ethernet ports.

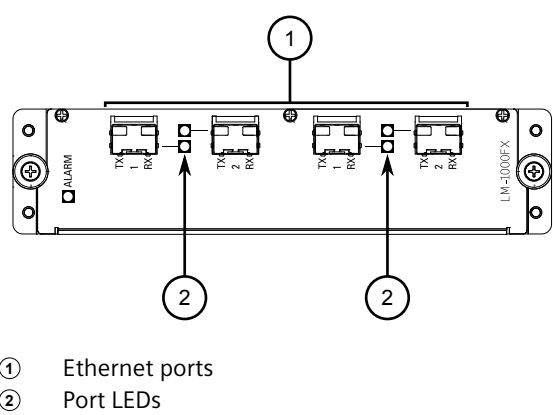
Note

When connecting cables, make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

Requirements/restrictions

Required modules	This module must be installed alongside the following modules: - RUGGEDCOM MX5000REPN SM MSM61 (Page 48) - RUGGEDCOM MX5000REPN SM MSM70 (Page 50)
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Description



- ① Ethernet ports
- ② Port LEDs

Figure 4.2 RUGGEDCOM MX5000REPN LM M4FG03

Ethernet ports	Fixed 1000Base-LX fiber optic Ethernet ports.									
Port LEDs	Each port features a dedicated LED that indicates its Link/activity state.									
	<table><tr><th>State</th><th>Description</th></tr><tr><td>Green (Solid)</td><td>Link established</td></tr><tr><td>Green (Blinking)</td><td>Activity</td></tr><tr><td>Off</td><td>No link detected</td></tr></table>	State	Description	Green (Solid)	Link established	Green (Blinking)	Activity	Off	No link detected	
State	Description									
Green (Solid)	Link established									
Green (Blinking)	Activity									
Off	No link detected									

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Ingress protection	IP40
	Power consumption	7.2 W
Interface/cable	Cable type	9/125 µm
	Speed	1000Base-LX
	Mode	Single-Mode
	Interface	LC
	Wavelength ^a	1310 nm
	Nominal distance ^a	10 km (6.2 mi)
Optical characteristics	Transmit power	-9.5 to -3 dBm
	Receiver sensitivity	-21 dBm
	Receiver saturation	-3 dBm
	Power budget	11.5 dB
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

^a Typical.

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	4x 1000LX Singlemode, 1310nm, LC, 10km
	Article number	6GK6050-0ML20-OCR1
Module with patch panel and cables	Description	4x 1000LX Singlemode, 1310nm, LC, 10km
	Article number	6GK6050-0RL20-OCR1
Patch panel and cables	Description	4 x Single Mode Military Circular Fiber Connectors with LC connectors

Article number

6GK6050-0AR00-4SM0

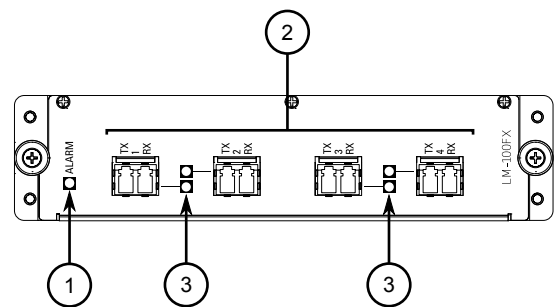
4.3 RUGGEDCOM MX5000REPN LM M4FX11

The RUGGEDCOM MX5000REPN LM M4FX11 module features four 100Base-FX fiber optic Ethernet ports.

Note

When connecting cables, make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

Description



- ① ALARM LED
- ② Ethernet ports
- ③ Port LEDs

Figure 4.3 RUGGEDCOM MX5000REPN LM M4FX11

Ethernet ports	Fixed 100Base-FX fiber optic Ethernet ports.								
Port LEDs	Each port features a dedicated LED that indicates its Link/activity state. <table><tr><th>State</th><th>Description</th></tr><tr><td>Green (Solid)</td><td>Link established</td></tr><tr><td>Green (Blinking)</td><td>Activity</td></tr><tr><td>Off</td><td>No link detected</td></tr></table>	State	Description	Green (Solid)	Link established	Green (Blinking)	Activity	Off	No link detected
State	Description								
Green (Solid)	Link established								
Green (Blinking)	Activity								
Off	No link detected								
ALARM LED	Illuminates when an alarm condition exists.								

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Ingress protection	IP40
	Power consumption	7.8 W
Interface/cable	Cable type	50/125 μ m

		62.5/125 µm
	Speed	100 Mbps
	Mode	MM (Multi-Mode)
	Interface	FX
	Connector	LC
	Wavelength ^a	1300 nm
	Nominal distance ^a	2 km (1.2 mi)
Optical characteristics	Transmit power	-19 to -14 dBm
	Receiver sensitivity	-32 dBm
	Receiver saturation	-14 dBm
	Power budget	13 dB
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

^a Typical.

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	4 x 100FX, Multimode, 1300nm, LC, 2km
	Article number	6GK6050-0ML20-0BH1
Module with patch panel and cables	Description	4 x 100FX, Multimode, 1300nm, LC, 2km
	Article number	6GK6050-ORL20-0BH1
Patch panel and cables	Description	4 x Multi Mode Military Circular Fiber Connectors with LC connectors
	Article number	6GK6050-OAR00-4MM0

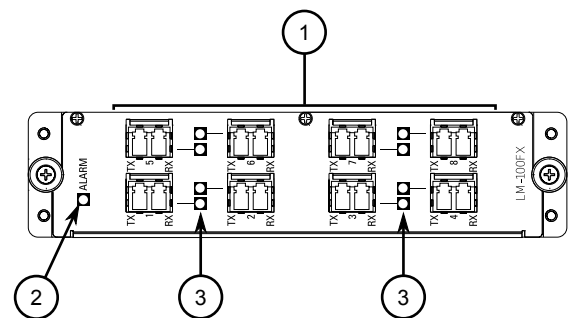
4.4 RUGGEDCOM MX5000REPN LM M8FX11

The RUGGEDCOM MX5000REPN LM M8FX11 module features eight 100Base-FX fiber optic Ethernet ports.

Note

When connecting cables, make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

Description



- ① Ethernet ports
- ② ALARM LED
- ③ Port LEDs

Figure 4.4 RUGGEDCOM MX5000REPN LM M8FX11

Ethernet ports	Fixed 100Base-FX fiber optic Ethernet ports.									
Port LEDs	Each port features a dedicated LED that indicates its Link/activity state.									
	<table><tr><th>State</th><th>Description</th></tr><tr><td>Green (Solid)</td><td>Link established</td></tr><tr><td>Green (Blinking)</td><td>Activity</td></tr><tr><td>Off</td><td>No link detected</td></tr></table>		State	Description	Green (Solid)	Link established	Green (Blinking)	Activity	Off	No link detected
State	Description									
Green (Solid)	Link established									
Green (Blinking)	Activity									
Off	No link detected									
ALARM LED	Illuminates when an alarm condition exists.									

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Ingress protection	IP40
	Power consumption	13.8 W
Interface/cable	Cable type	50/125 μ m

		62.5/125 µm
	Speed	100 Mbps
	Mode	MM (Multi-Mode)
	Interface	FX
	Connector	LC
	Wavelength ^a	1300 nm
	Nominal distance	2 km (1.2 mi)
Optical characteristics	Transmit power	-19 to -14 dBm
	Receiver sensitivity	-32 dBm
	Receiver saturation	-14 dBm
	Power budget	13 dB
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

^a Typical.

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	8 x 100FX, Multimode, 1300nm, LC, 2km
	Article number	6GK6050-0ML20-0BD1
Module with patch panel and cables	Description	8 x 100FX, Multimode, 1300nm, LC, 2km
	Article number	6GK6050-ORL20-0BD1
Patch panel and cables	Description	8 x Multi Mode Military Circular Fiber Connectors with LC connectors
	Article number	6GK6050-OAR00-8MM0

Serial modules

The following serial modules are available.

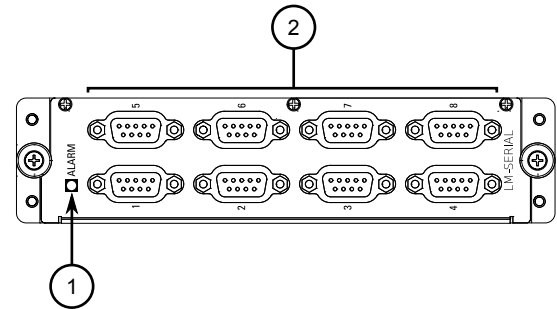
RUGGEDCOM MX5000REPN LM MS01

"RUGGEDCOM MX5000REPN LM MS01" (Page 34)

5.1 RUGGEDCOM MX5000REPN LM MS01

The RUGGEDCOM MX5000REPN LM MS01 module features eight serial DB9 ports that may be used with a null modem (crossover) serial cable.

Description



- ① ALARM LED
- ② Serial Ports

Figure 5.1 RUGGEDCOM MX5000PN LM MS01

Serial Ports	Fixed serial DB9 ports.
ALARM LED	Illuminates when an alarm condition exists.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Operating modes

Each serial port can be run in **RS232**, **RS485** or **RS422** mode.

On initial power-up, all serial ports default to RS485 mode. However, each port can be individually set to RS232, RS485 or RS422 mode via RUGGEDCOM MX5000RE. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the RUGGEDCOM MX5000RE.

Pin-out description

The following are the pin-outs for the DB9 connectors:

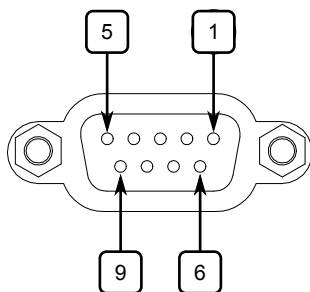


Figure 5.2 DB9 Serial Port

Pin	Function		
	RS232 Mode	RS422 Mode	RS485 Mode
1		RX-	
2	RX	TX+	TX+/RX+
3	TX	RX+	
4	Reserved (Do Not Connect)		
5	COM (Isolated GND)		
6	COM (Isolated GND)		
7		TX-	TX-/RX-
8	Reserved (Do Not Connect)		
9	COM (Isolated GND)		
Body	Chassis GND ^a		
Screws	Chassis GND ^a		

^a Connected internally.

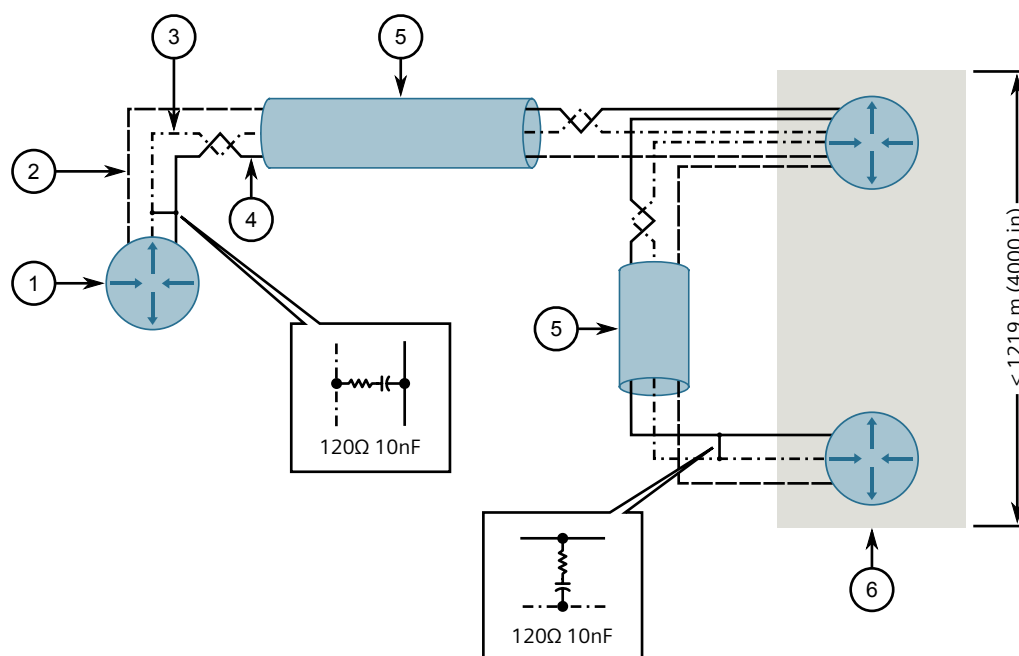
Connecting to RS485 devices

Each RS485 port can communicate with multiple RS485 devices by wiring devices together in sequence over a single twisted pair with transmit and receive signals on the same two wires (half duplex). For reliable, continuous communication, adhere to the following guidelines:

- To minimize the effects of ambient electrical noise, use shielded cabling.
- The correct polarity must be observed throughout a single sequence or ring.
- The number of devices wired should not exceed 32, and total distance should be less than 1219 m (4000 ft) at 100 kbps.
- The Common terminals should be connected to the common wire inside the shield.
- The shield should be connected to earth ground at a single point to avoid loop currents.

- The twisted pair should be terminated at each end of the chain.

The following shows the recommended RS485 wiring.



- ① RUGGEDCOM MX5000RE Device
- ② Common (Isolated Ground)
- ③ Negative
- ④ Positive
- ⑤ Shield to Earth (Connected At a Single Point)
- ⑥ RS485 Devices (32 Total)

Figure 5.3 Recommended RS485 wiring

Technical specifications

General	Baud Rate	1200 to 230400 kbps
	Connector	DB9
	Isolation	2.5 kV
	Ingress Protection	IP40
	Power consumption	4.8 W
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	8 x RS232/RS422/RS485 via DB9 Serial Media Module
	Article number	6GK6050-0ML20-0KB1
Module with patch panel and cables	Description	8 x RS232/RS422/RS485 via DB9 Serial Media Module
	Article number	6GK6050-0RL20-0KB1
Patch panel and cables	Description	Panels for MX5000RE Serial Media Module.
	Article number	6GK6050-0AR00-8DR0

Control modules

Control modules are the central processing engine for the device. The RUGGEDCOM MX5000RE operating system running on the module controls and coordinates the functions of all modules installed in the system.

Each control module is equipped with an RS232 serial console port for initial management functions, and a locally connected 10/100Base-T Ethernet port for system management out-of-band from the switch fabric.

Other features include:

- Alarm LED to indicate the system status
- Removable 1 GB Compact Flash (CF) card, which contains active and fallback installations of the RUGGEDCOM MX5000RE operating system, the configuration database, and other system data
- A failsafe alarm relay, activated by the operating system to indicate a critical alarm.
- A lamp test and alarm cutoff button
- A utility USB port for uploading/downloading files

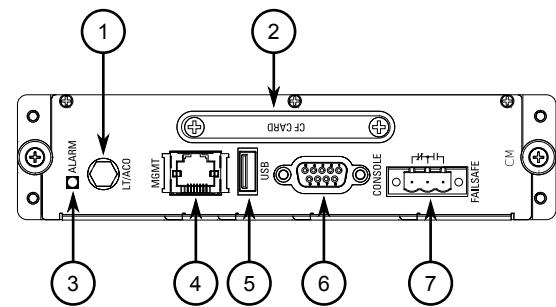
The following control modules are available.

RUGGEDCOM MX5000REPN LM L3SEL3HW	"RUGGEDCOM MX5000REPN MCM01 L3SEL3HW" (Page 40)
RUGGEDCOM MX5000REPN LM L3SECL3HW	"RUGGEDCOM MX5000REPN CM01 L3SECL3HW" (Page 43)

6.1 RUGGEDCOM MX5000REPN MCM01 L3SEL3HW

The RUGGEDCOM MX5000REPN MCM01 L3SEL3HW control module features Layer 3 hardware and is pre-configured with RUGGEDCOM MX5000RE Layer 3 Standard Edition.

Description



- ① LT/ACO Button
- ② CF Card Slot
- ③ ALARM LED
- ④ MGMT port
- ⑤ Utility USB Port
- ⑥ RS-232 Serial Console Port
- ⑦ Failsafe Alarm Relay

Figure 6.1 RUGGEDCOM MX5000REPN MCM01 L3SEL3HW

Lamp Test/Alarm Cut-Off (LT/ACO) Button.	This button performs two functions: • Press and hold this button to test all LEDs • Press and release this button to acknowledge an active alarm
Compact Flash (CF) Card Port	Houses the CompactFlash (CF) card that contains active and backup installations of RUGGEDCOM MX5000RE, along with the configuration database and other system data. For more information, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.
ALARM LED	Illuminates when an alarm condition exists.
MGMT port	This 10/100Base-T Ethernet port is used for system management that is out-of-band from the switch fabric.
Utility USB Port	Use the USB port to upgrade the RUGGEDCOM MX5000RE software or install files, such as configuration files and feature key files. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the RUGGEDCOM MX5000RE.
RS-232 Serial Console Port	The serial console port is for interfacing directly with the device and accessing initial management functions. For more information, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.
Failsafe Alarm Relay	The failsafe alarm relay can be configured to latch based on alarm conditions.

For more information, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Power consumption	7.8 W
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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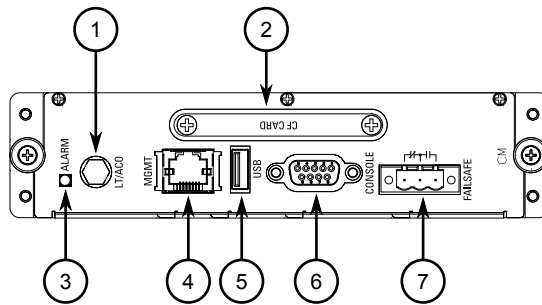
Ordering information

Module	Description	Control module with Layer 3 Standard Edition Layer 3 hardware
	Article number	6GK6050-0ML30-0BA1
Module with patch panel and cables	Description	Control module with Layer 3 Standard Edition Layer 3 hardware
	Article number	6GK6050-0RL30-0BA1
Patch panel and cables	Description	Panels for MX5000RE Control Module
	Article number	6GK6050-0AR00-1CP0

6.2 RUGGEDCOM MX5000REPN CM01 L3SECL3HW

The RUGGEDCOM MX5000REPN CM01 L3SECL3HW control module features Layer 3 hardware and is pre-configured with RUGGEDCOM MX5000RE Layer 3 Security Edition.

Description



- ① LT/ACO Button
- ② CF Card Slot
- ③ ALARM LED
- ④ MGMT port
- ⑤ Utility USB Port
- ⑥ RS-232 Serial Console Port
- ⑦ Failsafe Alarm Relay

Figure 6.2 RUGGEDCOM MX5000REPN CM01 L3SECL3HW

Lamp Test/Alarm Cut-Off (LT/ACO) Button.	This button performs two functions: - Press and hold this button to test all LEDs - Press and release this button to acknowledge an active alarm
Compact Flash (CF) Card Port	Houses the CompactFlash (CF) card that contains active and backup installations of RUGGEDCOM MX5000RE, along with the configuration database and other system data. For more information, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.
ALARM LED	Illuminates when an alarm condition exists.
MGMT port	This 10/100Base-T Ethernet port is used for system management that is out-of-band from the switch fabric.
Utility USB Port	Use the USB port to upgrade the RUGGEDCOM MX5000RE software or install files, such as configuration files and feature key files. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the RUGGEDCOM MX5000RE.
RS-232 Serial Console Port	The serial console port is for interfacing directly with the device and accessing initial management functions. For more information, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.
Failsafe Alarm Relay	The failsafe alarm relay can be configured to latch based on alarm conditions.

For more information, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Power consumption	7.8 W
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	Control module with Layer 3 Security Edition Layer 3 hardware
	Article number	6GK6050-0ML30-0CA1
Module with patch panel and cables	Description	Control module with Layer 3 Security Edition Layer 3 hardware
	Article number	6GK6050-0RL30-0CA1
Patch panel and cables	Description	Panels for MX5000RE Control Module
	Article number	6GK6050-0AR00-1CP0

Switch modules

Switch modules connect devices together on a computer network by using packet switching to receive, process and forward data to the destination device.

The following switch modules are available.

RUGGEDCOM MX5000REPN LM MSM36	"RUGGEDCOM MX5000REPN SM MSM36" (Page 46)
RUGGEDCOM MX5000REPN LM MSM61	"RUGGEDCOM MX5000REPN SM MSM61" (Page 48)
RUGGEDCOM MX5000REPN LM MSM70	"RUGGEDCOM MX5000REPN SM MSM70" (Page 50)

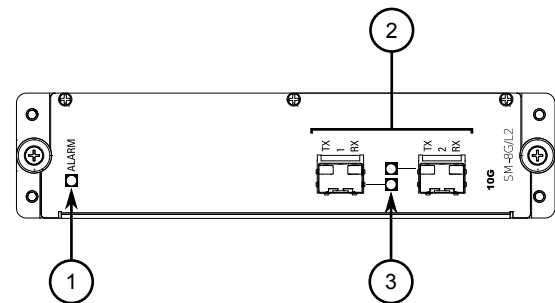
7.1 RUGGEDCOM MX5000REPN SM MSM36

The RUGGEDCOM MX5000REPN SM MSM36 module features two 1000Base-LX fiber optic Ethernet ports.

Note

When connecting cables, make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

Description



- ① ALARM LED
- ② Ethernet ports
- ③ Port LEDs

Figure 7.1 RUGGEDCOM MX5000REPN SM MSM36

Ethernet ports	Fixed 1000Base-LX copper RJ45 Ethernet ports.									
Port LEDs	Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.									
	<table><tr><th>State</th><th>Description</th></tr><tr><td>Green (Solid)</td><td>Link established</td></tr><tr><td>Green (Blinking)</td><td>Activity</td></tr><tr><td>Off</td><td>No link detected</td></tr></table>	State	Description	Green (Solid)	Link established	Green (Blinking)	Activity	Off	No link detected	
State	Description									
Green (Solid)	Link established									
Green (Blinking)	Activity									
Off	No link detected									
ALARM LED	Illuminates when an alarm condition exists.									

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Power consumption	6.6 W
Interface/cable	Cable type	9/125 μ m
	Speed	1 Gbps

Optical characteristics	Mode	SM (Single-Mode)
	Interface	LX
	Connector	LC
	Wavelength ^a	1310 nm
	Nominal distance ^a	10 km (6.2 mi)
	Transmit power	-10 to -3 dBm
	Receiver sensitivity	-20 dBm
	Receiver saturation	-3 dBm
	Power budget	10 dB
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

^a Typical.

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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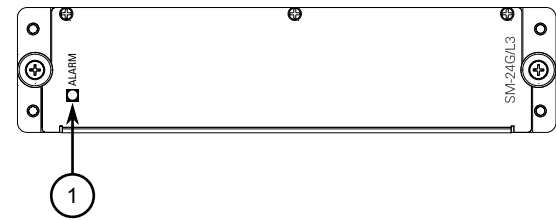
Ordering information

Module	Description	2x 1000LX singlemode, 1310nm, LC, 10km
	Article number	6GK6050-0ML40-ORA1
Module with patch panel and cables	Description	2x 1000LX singlemode, 1310nm, LC, 10km
	Article number	6GK6050-ORL40-ORA1
Patch panel and cables	Description	2 x Singlemode Military Circular Fiber Connectors with LC connectors
	Article number	6GK6050-OAR00-1SP0

7.2 RUGGEDCOM MX5000REPN SM MSM61

The RUGGEDCOM MX5000REPN SM MSM61 is a Layer 3/88 Gigabit throughput switch module that enables Gigabit throughput for up to 24 fiber optic Ethernet ports.

Description



① ALARM LED

Figure 7.2 RUGGEDCOM MX5000REPN SM MSM61

ALARM LED	Illuminates when an alarm condition exists.
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Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Power consumption	12 W
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products
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Declarations of conformity for each directive are available online via [Siemens Industry Online Support \[https://support.industry.siemens.com/\]](https://support.industry.siemens.com/).

Ordering information

Module	Description	Layer 3/88 Gigabit Throughput, no uplink ports
	Article number	6GK6050-0ML40-0VA1
Module with patch panel and cables	Description	Layer 3/88 Gigabit Throughput, no uplink ports
	Article number	6GK6050-0RL40-0VA1
Patch panel and cables	Description	Full Blank Panel
	Article number	6GK6050-0AR00-0XF0

7.3 RUGGEDCOM MX5000REPN SM MSM70

The RUGGEDCOM MX5000REPN SM MSM70 is a Layer 3/88 Gigabit throughput switch module that enables Gigabit throughput for up to 24 fiber optic Ethernet ports.

Note

When connecting cables, make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

Description

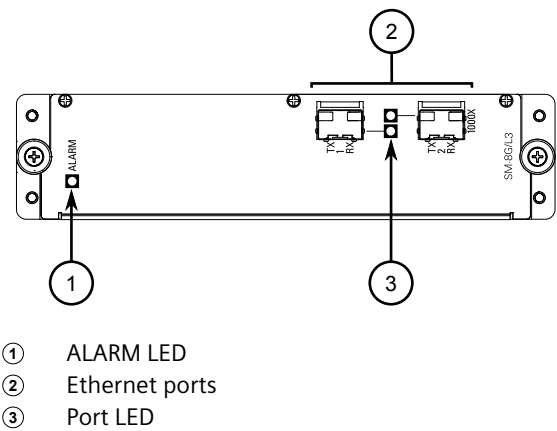


Figure 7.3 RUGGEDCOM MX5000REPN SM MSM70

Ethernet ports	Fixed 10Base-LR Gigabit Ethernet ports.								
Port LEDs	Each port features a dedicated LED that indicates its link/activity state. <table><tr><th>State</th><th>Description</th></tr><tr><td>Green (Solid)</td><td>Link established</td></tr><tr><td>Green (Blinking)</td><td>Activity</td></tr><tr><td>Off</td><td>No link detected</td></tr></table>	State	Description	Green (Solid)	Link established	Green (Blinking)	Activity	Off	No link detected
State	Description								
Green (Solid)	Link established								
Green (Blinking)	Activity								
Off	No link detected								
ALARM LED	Illuminates when an alarm condition exists.								

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Power consumption	15 W
Interface/cable	Cable type	9/125 μm

Optical characteristics	Speed	10 Gbps
	Mode	SM (Single-Mode)
	Interface	LR
	Connector	LC
	Wavelength	1310 nm
	Nominal distance	10 km (6.2 mi)
	Transmit power	-8.2 to 0.5 dBm
	Tx Minimum OMA	-5.2
	Minimum Extinction Ratio	3.5
	Receiver Sensitivity OMA (dBm)	-12.6
	Stressed RX Sensitivity (dBm)	-10.3
	Receiver Saturation (dBm)	0.5
	Power Budget (dB)	4.4
	Channel Insertion Loss (dB)	5.1
	Allocation for Penalties (dB)	2.3
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	0 to 85% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	Layer 3/88 Gigabit Throughput, 2x 10G
	Article number	6GK6050-0ML40-0XA1
Module with patch panel and cables	Description	Layer 3/88 Gigabit Throughput, 2x 10G
	Article number	6GK6050-0RL40-0WA1

7.3 RUGGEDCOM MX5000REPN SM MSM70

Patch panel and cables	Description	2 x Singlemode Military Circular Fiber Connectors with LC connectors
	Article number	6GK6050-0AR00-1SP0

Network redundancy modules

The following network redundancy modules are available.

RUGGEDCOM MX5000REPN LM MPRP

"RUGGEDCOM MX5000REPN LM MPRP" (Page 54)

8.1 RUGGEDCOM MX5000REPN LM MPRP

The RUGGEDCOM MX5000REPN LM MPRP module enables the device the interact with a redundancy network using the Parallel Redundancy Protocol (PRP). The module features individual Ethernet ports for connecting to each side of the network.

Note

For more information about PRP, refer to the "RUGGEDCOM ROX Configuration Manual" for the RUGGEDCOM MX5000RE.

Description

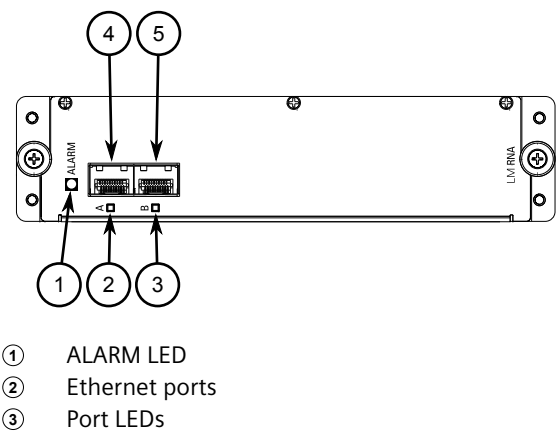


Figure 8.1 RUGGEDCOM MX5000REPN LM MPRP

Ethernet ports	Fixed 10Base-LR Gigabit Ethernet ports.								
Port LEDs	Each port features a dedicated LED that indicates its link/activity state. <table><tr><th>State</th><th>Description</th></tr><tr><td>Green (Solid)</td><td>Link established</td></tr><tr><td>Green (Blinking)</td><td>Activity</td></tr><tr><td>Off</td><td>No link detected</td></tr></table>	State	Description	Green (Solid)	Link established	Green (Blinking)	Activity	Off	No link detected
State	Description								
Green (Solid)	Link established								
Green (Blinking)	Activity								
Off	No link detected								
ALARM LED	Illuminates when an alarm condition exists.								

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Technical specifications

General	Power consumption	7.8 W
Interface/cable	Cable type	9/125 μm

	Speed	1 Gbps
	Mode	SM (Single-Mode)
	Interface	LX
	Connector	LC
	Wavelength	1310 nm
	Nominal distance	10 km (6.2 mi)
	Nominal distance	10 km (6.2 mi)
Optical characteristics	Transmit power	-9.5 to -3.0 dBm
	Receiver sensitivity	-19.0 to -3.0 dBm
	Power budget	9.5 dB
Environment	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 85 °C (-40 to 185 °F)

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Module	Description	1x Pair (A/B) Gigabit PRP with 2x single-mode LC 10km Conformal Coating
	Article number	6GK6050-OML20-OPR1
Module with patch panel and cables	Description	1x Pair (A/B) Gigabit PRP with 2x single-mode LC 10km Conformal Coating
	Article number	6GK6050-ORL20-OPR1
Patch panel and cables	Description	Panels for MX500RE PRP module
	Article number	6GK6050-OAR00-2PRO

Blank modules

The following blank modules are available.

RUGGEDCOM MX5000REPN PS XX	"RUGGEDCOM MX5000REPN PS XX" (Page 58)
RUGGEDCOM MX5000REPN LM XX	"RUGGEDCOM MX5000REPN LM XX" (Page 59)

NOTICE

Blank modules should be installed in empty slots to prevent the ingress of dirt or debris in the chassis.

9.1 RUGGEDCOM MX5000REPN PS XX

The RUGGEDCOM MX5000REPN PS XX is a blank module designed to occupy empty power supply module slots in the RUGGEDCOM MX5000RE chassis.

Description

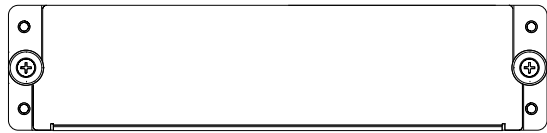


Figure 9.1 RUGGEDCOM MX5000REPN PS XX

Installing the module

For information about installing this module, refer to the "Installation Manual" for the RUGGEDCOM MX5000RE.

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Description	Power Supply Blank Module, Full Panel
Article numbers	6GK6050-0RL10-0AA1

9.2 RUGGEDCOM MX5000REPN LM XX

The RUGGEDCOM MX5000REPN LM XX is a blank module designed to occupy empty media module slots in the RUGGEDCOM MX5000RE chassis.

Description

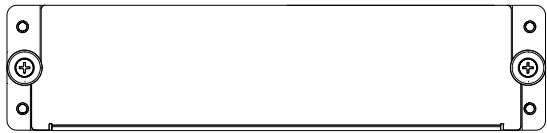


Figure 9.2 RUGGEDCOM MX5000REPN LM XX

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the RUGGEDCOM MX5000RE.

Certification

This module has been certified to comply with the requirements of the following standards.

RoHS	This module is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment: • EU RoHS directives (EU) 2011/65 and (EU) 2015/863 European Directive for Restriction of Hazardous Substances • China RoHS (relating to SJ/T 11364) Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Declarations of conformity for each directive are available online via Siemens Industry Online Support [https://support.industry.siemens.com/].
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Ordering information

Description	Blank Module
Article numbers	6GK6050-0RL20-0AA1

For more information

Siemens RUGGEDCOM
<https://www.siemens.com/ruggedcom>

Industry Online Support (service and support)
<https://support.industry.siemens.com>

Industry Mall
<https://mall.industry.siemens.com>

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