

Edition

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Reference Manual

SIMATIC NET

Networking components

RUGGEDCOM Modules

For RX1500, RX1501, RX1510, RX1511, RX1512, RX1524, RX1536

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

SIMATIC NET

Networking components RUGGEDCOM Modules

Reference Manual

Preface

Introduction

1

Power supply modules

2

Copper Ethernet modules

3

Fiber optic Ethernet modules

4

SFP/SFP+ modules

5

Serial modules

6

WAN modules

7

Cellular modem modules

8

RUGGEDCOM APE modules

9

Blank modules

10

For RX1500, RX1501, RX1510, RX1511, RX1512,
RX1524, RX1536

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.

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.

Table of contents

Preface	vii
Cybersecurity information	vii
Supplementary documentation	vii
SIMATIC NET glossary	viii
Accessing documentation	viii
Registered trademarks	viii
Training	ix
Customer support	ix
Contacting Siemens	ix
Ordering RUGGEDCOM products	x
1 Introduction	1
1.1 Available modules	1
1.2 Supported modules by device	16
1.3 Installing/removing modules	19
1.4 Dimensions	19
1.5 Decommissioning and disposal	20
2 Power supply modules	23
2.1 RUGGEDCOM RX1500PN PS 12	24
2.2 RUGGEDCOM RX1500PN PS 12P	26
2.3 RUGGEDCOM RX1500PN PS 24	28
2.4 RUGGEDCOM RX1500PN PS 24P	30
2.5 RUGGEDCOM RX1500PN PS 48	32
2.6 RUGGEDCOM RX1500PN PS 48P	34
2.7 RUGGEDCOM RX1500PN PS HI	36
2.8 RUGGEDCOM RX1500PN PS HIP	39
3 Copper Ethernet modules	41
3.1 RUGGEDCOM RX1500PN LM CG01	42
3.2 RUGGEDCOM RX1500PN M12 CG03	45
3.3 RUGGEDCOM RX1500PN M12 CG03B	48
3.4 RUGGEDCOM RX1500PN M12 X CG04	51
3.5 RUGGEDCOM RX1500PN M12 X CG04B	54
3.6 RUGGEDCOM RX1500PN M12 4TX03	57
3.7 RUGGEDCOM RX1500PN M12 4TX03B	60
3.8 RUGGEDCOM RX1500PN M12 4TX04	63

3.9	RUGGEDCOM RX1500PN M12 4TX04B	65
3.10	RUGGEDCOM RX1500PN LM 6TX01	68
4	Fiber optic Ethernet modules	71
4.1	RUGGEDCOM RX1500PN LM 4FX11	72
4.2	RUGGEDCOM RX1500PN LM FL01	74
4.3	RUGGEDCOM RX1500PN LM FG03	76
4.4	RUGGEDCOM RX1500PN LM FG51	78
4.5	RUGGEDCOM RX1500PN LM FX51	80
4.6	RUGGEDCOM RX1500PN LM 6FX51	82
5	SFP/SFP+ modules	85
5.1	RUGGEDCOM RX1500PN LM FG50	86
5.2	RUGGEDCOM RX1500PN LM FX50	88
5.3	RUGGEDCOM RX1500PN LM 6FX50	90
6	Serial modules	93
6.1	RUGGEDCOM RX1500PN LM S01	94
7	WAN modules	99
7.1	RUGGEDCOM RX1500PN LM TC1	100
7.2	RUGGEDCOM RX1500PN LM TC2	103
7.3	RUGGEDCOM RX1500PN LM TC4	106
7.4	RUGGEDCOM RX1500PN LM E02	109
7.5	RUGGEDCOM RX1500PN LM D02	111
8	Cellular modem modules	115
8.1	RUGGEDCOM RX1500PN LM W11	116
8.2	RUGGEDCOM RX1500PN LM W12	124
8.3	RUGGEDCOM RX1500PN LM W21	132
8.4	RUGGEDCOM RX1500PN LM W22	140
8.5	RUGGEDCOM RX1500PN LM W32	148
8.6	RUGGEDCOM RX1500PN LM W41	156
8.7	RUGGEDCOM RX1500PN LM W51	165
8.8	RUGGEDCOM RX1500PN LM W61	176
8.9	RUGGEDCOM RX1500PN LM W81	185
8.10	RUGGEDCOM RX1500PN LM W91	194
8.11	RUGGEDCOM RX1500PN LM W92	203
9	RUGGEDCOM APE modules	211

9.1	RUGGEDCOM RX1500PN LM APE1402 (Obsolete)	212
9.2	RUGGEDCOM RX1500PN LM APE1402W7 (Obsolete)	215
9.3	RUGGEDCOM RX1500PN LM APE1404 (Obsolete)	218
9.4	RUGGEDCOM RX1500PN LM APE1404 ADM (Obsolete)	221
9.5	RUGGEDCOM RX1500PN LM APE1404W7 (Obsolete)	224
9.6	RUGGEDCOM RX1500PN LM APE1404CKP (Obsolete)	227
9.7	RUGGEDCOM RX1500PN LM APE1808LNX	230
9.8	RUGGEDCOM RX1500PN LM APE1808W10	233
9.9	RUGGEDCOM RX1500PN LM APE1808CKP	236
9.10	RUGGEDCOM RX1500PN LM APE1808ADM	239
9.11	RUGGEDCOM RX1500PN LM APE1808SAM-L	242
9.12	RUGGEDCOM RX1500PN LM APE1808ELAN	245
9.13	RUGGEDCOM RX1500PN LM APE1808CConn	248
9.14	RUGGEDCOM RX1500PN LM APE1808NOZ	251
10	Blank modules	255
10.1	RUGGEDCOM RX1500PN PS XXP	256
10.2	RUGGEDCOM RX1500PN LM Blank	257

Preface

This document details RUGGEDCOM power and media modules available for use with devices in the RUGGEDCOM RX1500/RX1501/RX1510/RX1511/RX1512/RX1524/RX1536 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 RX1500 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:

- **RUGGEDCOM SFP Transceivers Reference Manual**
<https://support.industry.siemens.com/cs/us/en/ps/29769/man>

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>

Accessing documentation

The latest user documentation for RUGGEDCOM RX1500 is available online at <https://support.industry.siemens.com>. To request or inquire about a user document, contact Siemens Customer Support.

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- RUGGEDCOM
- ROS
- RCDP
- Discovery Protocol

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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.

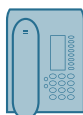
Customer support

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



RUGGEDCOM Selector

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

For more information, refer to <https://www.siemens.com>.

Introduction

This Reference Manual details the various power and media modules available for the RUGGEDCOM RX1500/RX1501/RX1510/RX1511/RX1512/RX1524/RX1536. 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 device.

Power supply modules

RUGGEDCOM RX1500PN PS 12 (shipped until 2019)	Input range	9 to 15 VDC
	Maximum power consumption	67 W
	Terminal type	Non-removable Screw
	Article numbers	6GK6015-0AL17-0AA0 (Standard) 6GK6015-0AL17-0AA1 (Conformal coated)
RUGGEDCOM RX1500PN PS 12 (shipped from 2019 on)	Input range	9 to 15 VDC
	Maximum power consumption	67 W
	Terminal type	Removable Screw
	Article numbers	6GK6015-0AL17-0AA0 (Standard) 6GK6015-0AL17-0AA1 (Conformal coated)
RUGGEDCOM RX1500PN PS 12P	Input range	9 to 15 VDC
	Maximum power consumption	67 W
	Terminal type	European-style (Euroblock)
	Article numbers	6GK6015-0AL18-0AA0 (Standard)

1.1 Available modules

RUGGEDCOM RX1500PN PS 24 (shipped until 2019)		6GK6015-0AL18-0AA1 (Conformal coated)
	Input range	13 to 36 VDC
	Maximum power consumption	63.5 W
	Terminal type	Non-removable Screw
RUGGEDCOM RX1500PN PS 24 (shipped from 2019 on)	Article numbers	6GK6015-0AL11-0AA0 (Standard)
		6GK6015-0AL11-0AA1 (Conformal coated)
	Input range	13 to 36 VDC
	Maximum power consumption	63.5 W
RUGGEDCOM RX1500PN PS 24P	Terminal type	Removable Screw
	Article numbers	6GK6015-0AL11-0AA0 (Standard)
		6GK6015-0AL11-0AA1 (Conformal coated)
	Input range	13 to 36 VDC
RUGGEDCOM RX1500PN PS 48 (shipped until 2019)	Maximum power consumption	63.5 W
	Terminal type	European-style (Euroblock)
	Article numbers	6GK6015-0AL14-0AA0 (Standard)
		6GK6015-0AL14-0AA1 (Conformal coated)
RUGGEDCOM RX1500PN PS 48 (shipped from 2019 on)	Input range	36 to 72 VDC
	Maximum power consumption	60 W
	Terminal type	Non-removable Screw
	Article numbers	6GK6015-0AL12-0AA0 (Standard)
RUGGEDCOM RX1500PN PS 48P		6GK6015-0AL12-0AA1 (Conformal coated)
	Input range	36 to 72 VDC
	Maximum power consumption	60 W
	Terminal type	Removable Screw
RUGGEDCOM RX1500PN PS HI (shipped until 2019)	Article numbers	6GK6015-0AL12-0AA0 (Standard)
		6GK6015-0AL12-0AA1 (Conformal coated)
	Input range	36 to 72 VDC
	Maximum power consumption	60 W
RUGGEDCOM RX1500PN PS 48P	Terminal type	European-style (Euroblock)
	Article numbers	6GK6015-0AL15-0AA0 (Standard)
		6GK6015-0AL15-0AA1 (Conformal coated)
	Input range	88 to 300 VDC or 85 to 264 VAC
RUGGEDCOM RX1500PN PS HI (shipped until 2019)	Maximum power consumption	65 W

RUGGEDCOM RX1500PN PS HI (shipped from 2019 on)	Terminal type	Non-removable Screw
	Article numbers	6GK6015-0AL13-0AA0 (Standard) 6GK6015-0AL13-0AA1 (Conformal coated)
	Input range	88 to 300 VDC or 85 to 264 VAC
	Maximum power consumption	65 W
RUGGEDCOM RX1500PN PS HIP	Terminal type	Removable Screw
	Article numbers	6GK6015-0AL13-0AA0 (Standard) 6GK6015-0AL13-0AA1 (Conformal coated)
	Input range	88 to 300 VDC or 85 to 264 VAC
	Maximum power consumption	65 W
RUGGEDCOM RX1500PN PS HIP	Terminal type	European-style (Euroblock)
	Article numbers	6GK6015-0AL16-0AA0 (Standard) 6GK6015-0AL16-0AA1 (Conformal coated)
	Input range	88 to 300 VDC or 85 to 264 VAC
	Maximum power consumption	65 W

Copper Ethernet modules

RUGGEDCOM RX1500PN LM CG01	Power Consumption	4 W
	Ports	2
	Speed	1000 Mbps
	Interface	TX
	Port Type	RJ45
	Distance	100 m (328 ft)
	Article numbers	6GK6015-0AL20-0FC0 (Standard) 6GK6015-0AL20-0FC1 (Conformal coated)
RUGGEDCOM RX1500PN LM CG03	Power Consumption	4 W
	Ports	2
	Speed	1000 Mbps
	Interface	TX
	Port Type	M12 (8-Pin, A-Coded)
	Distance	100 m (328 ft)
	Article numbers	6GK6015-0AL20-0PB0 (Standard) 6GK6015-0AL20-0PB1 (Conformal coated)
RUGGEDCOM RX1500PN LM CG03B	Power Consumption	4 W
	Ports	2
	Speed	1000 Mbps
	Interface	TX

	Port Type	M12 (8-Pin, A-Coded, Controlled Bypass)
	Distance	100 m (328 ft)
	Article numbers	6GK6015-0AL20-OPE0 (Standard) 6GK6015-0AL20-OPE1 (Conformal coated)
RUGGEDCOM RX1500PN LM X CG04	Power Consumption	4 W
	Ports	2
	Speed	1000 Mbps
	Interface	TX
	Port Type	M12 (8-pin, X-Coded)
	Distance	100 m (328 ft)
	Article numbers	6GK6015-0AL20-OPH0 (Standard) 6GK6015-0AL20-OPH1 (Conformal coated)
RUGGEDCOM RX1500PN LM X CG04B	Power Consumption	4 W
	Ports	2
	Speed	1000 Mbps
	Interface	TX
	Port Type	M12 (8-pin, X-Coded, Controlled Bypass)
	Distance	100 m (328 ft)
	Article numbers	6GK6015-0AL20-OPJ0 (Standard) 6GK6015-0AL20-OPJ1 (Conformal coated)
RUGGEDCOM RX1500PN LM 4TX03	Power Consumption	5 W
	Ports	4
	Speed	100 Mbps
	Interface	TX
	Port Type	M12 (4-Pin, A-Coded)
	Distance	100 m (328 ft)
	Article numbers	6GK6015-0AL20-OPC0 (Standard) 6GK6015-0AL20-OPC1 (Conformal coated)
RUGGEDCOM RX1500PN LM 4TX03B	Power Consumption	5 W
	Ports	4
	Speed	100 Mbps
	Interface	TX
	Port Type	M12 (8-Pin, A-Coded, Controlled Bypass)
	Distance	100 m (328 ft)
	Article numbers	6GK6015-0AL20-OPF0 (Standard) 6GK6015-0AL20-OPF1 (Conformal coated)

RUGGEDCOM RX1500PN LM 4TX04	Power Consumption	5 W
	Ports	4
	Speed	100 Mbps
	Interface	TX
	Port Type	M12 (4-Pin, D-Coded)
	Distance	100 m (328 ft)
	Article numbers	6GK6015-0AL20-OPD0 (Standard) 6GK6015-0AL20-OPD1 (Conformal coated)
RUGGEDCOM RX1500PN LM 4TX04B	Power Consumption	5 W
	Ports	4
	Speed	100 Mbps
	Interface	TX
	Port Type	M12 (4-Pin, A-Coded, Controlled Bypass)
	Distance	100 m (328 ft)
	Article numbers	6GK6015-0AL20-OPG0 (Standard) 6GK6015-0AL20-OPG1 (Conformal coated)
RUGGEDCOM RX1500PN LM 6TX01	Power Consumption	5 W
	Ports	6
	Speed	100 Mbps
	Interface	TX
	Port Type	RJ45
	Distance	100 m (328 ft)
	Article numbers	6GK6015-0AL20-0NB0 (Standard) 6GK6015-0AL20-0NB1 (Conformal coated)

Fiber optic Ethernet modules

RUGGEDCOM RX1500PN LM 4FX11	Power Consumption	4 W
	Mode	MM
	Speed	100 Mbps
	Interface	FX
	Wavelength	1300 nm
	Ports	4
	Port Type	LC
	Distance	2 km (1.2 mi)
	Article numbers	6GK6015-0AL20-0BC0 (Standard) 6GK6015-0AL20-0BC1 (Conformal coated)

1.1 Available modules

RUGGEDCOM RX1500PN LM FL01	Power Consumption	5 W
	Mode	MM
	Speed	10/100 Mbps
	Interface	FL/SX
	Wavelength	820 nm
	Ports	3
	Port Type	ST
	Distance	2 km (1.2 mi)
	Article numbers	6GK6015-0AL20-0BD0 (Standard) 6GK6015-0AL20-0BD1 (Conformal coated)
RUGGEDCOM RX1500PN LM FG03	Power Consumption	5 W
	Mode	SM
	Speed	1000 Mbps
	Interface	LX
	Wavelength	820 nm
	Ports	4
	Port Type	LC
	Distance	10 km (6.2 mi)
	Article numbers	6GK6015-0AL20-0EC0 (Standard) 6GK6015-0AL20-0EC1 (Conformal coated)
RUGGEDCOM RX1500PN LM FG50	Power Consumption	7 W
	SFP sockets	2
	Speed	1000 Mbps
	Article numbers	6GK6015-0AL20-0JB0 (Standard) 6GK6015-0AL20-0JB1 (Conformal coated)
RUGGEDCOM RX1500PN LM FG51	Power Consumption	4 W
	Mode	MM
	Speed	1000 Mbps
	Interface	SX
	Wavelength	820 nm
	Ports	2
	Port Type	LC
	Distance	500 m (1640 ft)
	Article numbers	6GK6015-0AL200-DC0 (Standard) 6GK6015-0AL200-DC1 (Conformal coated)
RUGGEDCOM RX1500PN LM FX50	Power Consumption	5 W
	SFP sockets	4
	Speed	100 Mbps

	Article numbers	6GK6015-0AL20-0JC0 (Standard) 6GK6015-0AL20-0JC1 (Conformal coated)
RUGGEDCOM RX1500PN LM FX51	Power Consumption	5 W
	Mode	SM
	Speed	100 Mbps
	Interface	FX
	Wavelength	1310 nm
	Ports	2
	Port Type	LC
	Distance	2 km (1.2 mi)
	Article numbers	6GK6015-0AL20-0BJ0 (Standard) 6GK6015-0AL20-0BJ1 (Conformal coated)
RUGGEDCOM RX1500PN LM 6FX50	Power Consumption	7 W
	SFP sockets	6
	Speed	100 Mbps
	Article numbers	6GK6015-0AL20-0JD0 (Standard) 6GK6015-0AL20-0JD1 (Conformal coated)
RUGGEDCOM RX1500PN LM 6FX51	Power Consumption	7 W
	Mode	MM
	Speed	100 Mbps
	Interface	FX
	Wavelength	1310 nm
	Ports	6
	Port Type	LC
	Distance	2 km (1.2 mi)
	Article numbers	6GK6015-0AL20-0BK0 (Standard) 6GK6015-0AL20-0BK1 (Conformal coated)

WAN Modules

RUGGEDCOM RX1500PN LM S01	Power Consumption	3 W
	Standard	RS232/RS422/RS485
	Ports	6
	Port Type	RJ45
	Article numbers	6GK6015-0AL20-0KB0 (Standard) 6GK6015-0AL20-0KB1 (Conformal coated)
RUGGEDCOM RX1500PN LM TC1	Power Consumption	3 W
	Interface	T1/E1
	Ports	1

RUGGEDCOM RX1500PN LM TC2	Port Type	RJ48C
	Article numbers	6GK6015-0AL20-0MB0 (Standard) 6GK6015-0AL20-0MB1 (Conformal coated)
	Power Consumption	3 W
	Interface	T1/E1
	Ports	2
RUGGEDCOM RX1500PN LM TC4	Port Type	RJ48C
	Article numbers	6GK6015-0AL20-0MC0 (Standard) 6GK6015-0AL20-0MC1 (Conformal coated)
	Power Consumption	3 W
	Interface	T1/E1
	Ports	4
RUGGEDCOM RX1500PN LM E02	Port Type	RJ48C
	Article numbers	6GK6015-0AL20-0MD0 (Standard) 6GK6015-0AL20-0MD1 (Conformal coated)
	Power Consumption	3 W
	Interface	E1
	Ports	2
RUGGEDCOM RX1500PN LM D02	Port Type	BNC (75 Ω)
	Article numbers	6GK6015-0AL20-0HC0 (Standard) 6GK6015-0AL20-0HC1 (Conformal coated)
	Power Consumption	3 W
	Speed	56 kbps (Master/Slave) or 64 kbps (Slave)
	Ports	1
RUGGEDCOM RX1500PN LM W11 (Obsolete)	Port Type	RJ48S
	Article numbers	6GK6015-0AL20-0LB0 (Standard) 6GK6015-0AL20-0LB1 (Conformal coated)
	Power Consumption	7 W
	Services	GSM/EDGE/HSPA+
	Region	North America (AT&T)
RUGGEDCOM RX1500PN LM D02	Port Type	50 Ω SMA
	Antennas	1 x GSM/EDGE/HSPA+, 1 x Receive Diversity (Secondary)

Cellular Modem Modules

RUGGEDCOM RX1500PN LM W11 (Obsolete)	Power Consumption	7 W
	Services	GSM/EDGE/HSPA+
	Region	North America (AT&T)
	Port Type	50 Ω SMA
	Antennas	1 x GSM/EDGE/HSPA+, 1 x Receive Diversity (Secondary)

	SIM	Dual Mini-SIM (2FF)
	Article numbers	6GK6015-0AL20-0WB0 (Standard) 6GK6015-0AL20-0WB1 (Conformal coated)
RUGGEDCOM RX1500PN LM W12 (Obsolete)	Power Consumption	7 W
	Services	GSM/EDGE/HSPA+
	Region	North America (AT&T), European Union, Australia
	Port Type	50 Ω SMA
	Antennas	2 x GSM/EDGE/HSPA+, 2 x Receive Diversity (Secondary)
	SIM	Dual Mini-SIM (2FF)
	Article numbers	6GK6015-0AL20-0WC0 (Standard) 6GK6015-0AL20-0WC1 (Conformal coated)
RUGGEDCOM RX1500PN LM W21 (Obsolete)	Power Consumption	7 W
	Services	EVDO Rev A
	Region	North America (Verizon)
	Port Type	50 Ω SMA
	Antennas	1 x EVDO Rev A, 1 x Receive Diversity (Secondary)
	SIM	Dual Mini-SIM (2FF)
	Article numbers	6GK6015-0AL20-0WDO (Standard) 6GK6015-0AL20-0WD1 (Conformal coated)
RUGGEDCOM RX1500PN LM W22 (Obsolete)	Power Consumption	7 W
	Services	EVDO Rev A
	Region	North America (Verizon)
	Port Type	50 Ω SMA
	Antennas	2 x EVDO Rev A, 2 x Receive Diversity (Secondary)
	SIM	Dual Mini-SIM (2FF)
	Article numbers	6GK6015-0AL20-0WE0 (Standard) 6GK6015-0AL20-0WE1 (Conformal coated)
RUGGEDCOM RX1500PN LM W32 (Obsolete)	Power Consumption	7 W
	Services	EVDO Rev A
	Region	North America (Verizon)
	Port Type	50 Ω SMA
	Antennas	1 x GSM/EDGE/HSPA+, 1 x EVDO Rev A, 2 x Receive Diversity (Secondary)

RUGGEDCOM RX1500PN LM W41 (Obsolete)	SIM	Dual Mini-SIM (2FF)
	Article numbers	6GK6015-0AL20-0WF0 (Standard) 6GK6015-0AL20-0WF1 (Conformal coated)
	Power Consumption	7 W
	Services	4G LTE/HSPA+/HSDPA/HSUPA/DC-HSPA+/UMTS/WCDMA/EDGE/GPRS/GSM/GNSS
	Region	European Union
	Port Type	50 Ω SMA
	Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
	SIM	Dual Mini-SIM (2FF)
	Article numbers	6GK6015-0AL20-0WG0 (Standard) 6GK6015-0AL20-0WG1 (Conformal coated)
RUGGEDCOM RX1500PN LM W51 (Obsolete)	Power Consumption	7 W
	Services	4G LTE/HSPA+/HSDPA/HSUPA/DC-HSPA+/UMTS/WCDMA/EDGE/GPRS/GSM/CDMA/EVDO/GNSS
	Region	North America (AT&T, Rogers, Bell, Telus)
	Port Type	50 Ω SMA
	Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
	SIM	Dual Mini-SIM (2FF)
	Article numbers	6GK6015-0AL20-0WH0 (Standard) 6GK6015-0AL20-0WH1 (Conformal coated)
RUGGEDCOM RX1500PN LM W61 (Obsolete)	Power Consumption	7 W
	Services	4G LTE/HSPA+/CDMA/EVDO/GPS/GNSS
	Region	North America (Verizon, Sprint)
	Port Type	50 Ω SMA
	Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
	SIM	Dual Mini-SIM (2FF)
	Article numbers	6GK6015-0AL20-0WJ0 (Standard) 6GK6015-0AL20-0WJ1 (Conformal coated)
RUGGEDCOM RX1500PN LM W81 (Obsolete)	Power Consumption	7 W
	Services	4G LTE/HSPA+/EDGE/GPRS/GSM/UMTS/GNSS
	Region	Asia-Pacific

RUGGEDCOM RX1500PN LM W91	Port Type	50 Ω SMA
	Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
	SIM	Dual Mini-SIM (2FF)
	Article numbers	6GK6015-0AL20-0WK0 (Standard) 6GK6015-0AL20-0WK1 (Conformal coated)
	Power Consumption	7 W
	Services	4G LTE/HSPA+/EDGE/GPRS/GSM/UMTS/GNSS
	Region	North America (AT&T, Verizon, Rogers, Telus, Bell)
	Port Type	50 Ω SMA
	Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
	SIM	Dual Mini-SIM (2FF)
RUGGEDCOM RX1500PN LM W92	Article numbers	6GK6015-0AL20-0WM0 (Standard) 6GK6015-0AL20-0WM1 (Conformal coated)
	Power Consumption	7 W
	Services	4G LTE/HSPA+/EDGE/GPRS/GSM/UMTS/GNSS
	Region	Europe/Asia-Pacific
	Port Type	50 Ω SMA
	Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
	SIM	Dual Mini-SIM (2FF)
	Article numbers	6GK6015-0AL20-0WN0 (Standard) 6GK6015-0AL20-0WN1 (Conformal coated)

RUGGEDCOM APE Modules

RUGGEDCOM RX1500PN LM APE1402 (Obsolete)	Power Consumption	10 W
	Operating System	Debian Linux®
	Processor	Intel Atom E660 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	8 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D

RUGGEDCOM RX1500PN LM APE1402W7 (Obsolete)	Article numbers	6GK6015-0AL20-0GB0 (Standard) 6GK6015-0AL20-0GB1 (Conformal coated)
	Power Consumption	10 W
	Operating System	Windows® Embedded Standard 7
	Processor	Intel Atom E660 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	8 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D
	Article numbers	6GK6015-0AL20-0GC0 (Standard) 6GK6015-0AL20-0GC1 (Conformal coated)
RUGGEDCOM RX1500PN LM APE1404 (Obsolete)	Power Consumption	10 W
	Operating System	Debian Linux®
	Processor	Intel Atom E660T 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	16 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D
	Article numbers	6GK6015-0AL20-0GD0 (Standard) 6GK6015-0AL20-0GD1 (Conformal coated)
RUGGEDCOM RX1500PN LM APE1404 ADM (Obsolete)	Power Consumption	12 W
	Operating System	Debian Linux® and CROSSBOW ADM
	Processor	Intel Atom E660T 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	16 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D

RUGGEDCOM RX1500PN LM APE1404W7 (Obsolete)	Article numbers	6GK6015-0AL20-0GG0 (Standard) 6GK6015-0AL20-0GG1 (Conformal coated)
	Power Consumption	10 W
	Operating System	Windows® Embedded Standard 7
	Processor	Intel Atom E660T 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	16 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D
	Article numbers	6GK6015-0AL20-0GE0 (Standard) 6GK6015-0AL20-0GE1 (Conformal coated)
RUGGEDCOM RX1500PN LM APE1404CKP (Obsolete)	Power Consumption	10 W
	Operating System	Check Point GAI™ OS
	Processor	Intel Atom E660T 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	16 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D
	Article numbers	6GK6015-0AL20-0GF0 (Standard) 6GK6015-0AL20-0GF1 (Conformal coated)
RUGGEDCOM RX1500PN LM APE1808LNX	Power Consumption	12 W
	Operating System	Debian Linux® 10
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 32-bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port

RUGGEDCOM RX1500PN LM APE1808W10	Article numbers	6GK6015-0AL20-0GH0 (Standard) 6GK6015-0AL20-0GH1 (Conformal coated)
	Power Consumption	12 W
	Operating System	Windows® 10 Enterprise 2019 LTSC
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 32- bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port
	Article numbers	6GK6015-0AL20-0GJ0 (Standard) 6GK6015-0AL20-0GJ1 (Conformal coated)
RUGGEDCOM RX1500PN LM APE1808ADM (Obsolete)	Power Consumption	12 W
	Operating System	Debian Linux® 10 + RUGGEDCOM CROSSBOW ADM
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 32- bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port
	Article numbers	6GK6015-0AL20-0GL0 (Standard) 6GK6015-0AL20-0GL1 (Conformal coated)
RUGGEDCOM RX1500PN LM APE1808CKP	Power Consumption	12 W
	Operating System	Check Point GAI™ OS
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 32- bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port

RUGGEDCOM RX1500PN LM APE1808SAM-L	Article numbers	6GK6015-0AL20-0GK0 (Standard) 6GK6015-0AL20-0GK1 (Conformal coated)
	Power Consumption	12 W
	Operating System	Debian Linux® 10 + RUGGEDCOM CROSSBOW SAM-L
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 32- bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port
	Article numbers	6GK6015-0AL20-0GN0 (Standard) 6GK6015-0AL20-0GN1 (Conformal coated)
RUGGEDCOM RX1500PN LM APE1808ELAN	Power Consumption	12 W
	Operating System	Siemens ELAN
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 32- bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port
	Article numbers	??? (Standard) ??? (Conformal coated)
RUGGEDCOM RX1500PN LM APE1808CConn	Power Consumption	12 W
	Operating System	Siemens CloudConnect
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 32- bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port

1.2 Supported modules by device

Article numbers	6GK6015-0AL20-0GM0 (Standard)
	6GK6015-0AL20-0GM1 (Conformal coated)

^a Maximum combined USB device power consumption is 500 mA at 5 V.

Blank modules

RUGGEDCOM RX1500PN PS XXP	Article numbers	6GK6015-0AL10-0AA0 (Standard)
		6GK6015-0AL10-0AA1 (Conformal coated)
RUGGEDCOM RX1500PN LM Blank	Article numbers	6GK6015-0AL20-0AA0 (Standard)
		6GK6015-0AL20-0AA1 (Conformal coated)

1.2 Supported modules by device

Most devices in the RUGGEDCOM RX1500 product family support most, if not all available modules. Restrictions exist for some.

Before selecting/installing a module, verify first if it is supported by the target device.

Power supply modules

Module	RX1500	RX1501	RX1510	RX1511	RX1512 ^a	RX1524	RX1536
RUGGEDCOM RX1500PN PS 12	•	•	•	•		•	•
RUGGEDCOM RX1500PN PS 12P	•	•	•	•		•	•
RUGGEDCOM RX1500PN PS 24	•	•	•	•		•	•
RUGGEDCOM RX1500PN PS 24P	•	•	•	•		•	•
RUGGEDCOM RX1500PN PS 48	•	•	•	•		•	•
RUGGEDCOM RX1500PN PS 48P	•	•	•	•		•	•
RUGGEDCOM RX1500PN PS HI	•	•	•	•		•	•
RUGGEDCOM RX1500PN PS HIP	•	•	•	•		•	•

^a The RUGGEDCOM RX1512 features a built-in power supply.

Copper Ethernet modules

Module	RX1500	RX1501	RX1510	RX1511	RX1512	RX1524	RX1536
RUGGEDCOM RX1500PN LM CG01	•	•	•	•	•	•	•

Module	RX1500	RX1501	RX1510	RX1511	RX1512	RX1524	RX1536
RUGGEDCOM RX1500PN LM CG03	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM CG03B	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM X CG04	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM X CG04B	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM 4TX03	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM 4TX03B	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM 4TX04	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM 4TX04B	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM 6TX01	•	•	•	•	•	•	•

Fiber optic Ethernet modules

Module	RX1500	RX1501	RX1510	RX1511	RX1512	RX1524	RX1536
RUGGEDCOM RX1500PN LM 4FX11	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM FL01	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM FG03	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM FG50	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM FG51	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM FX50	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM FX51	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM 6FX50	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM 6FX51	•	•	•	•	•	•	•

Serial server modules

Module	RX1500	RX1501	RX1510	RX1511	RX1512	RX1524	RX1536
RUGGEDCOM RX1500PN LM S01	•	•	•	•	•	•	•

WAN modules

Module	RX1500	RX1501	RX1510	RX1511	RX1512	RX1524	RX1536
RUGGEDCOM RX1500PN LM TC1	•	•	•	•	•		
RUGGEDCOM RX1500PN LM TC2	•	•	•	•	•		

1.2 Supported modules by device

Module	RX1500	RX1501	RX1510	RX1511	RX1512	RX1524	RX1536
RUGGEDCOM RX1500PN LM TC4	•	•	•	•	•		
RUGGEDCOM RX1500PN LM E02	•	•	•	•	•		
RUGGEDCOM RX1500PN LM D02	•	•	•	•	•		

Cellular modem modules

Module	RX1500	RX1501	RX1510	RX1511	RX1512	RX1524	RX1536
RUGGEDCOM RX1500PN LM W11 (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM W12 (Obsolete)	•	•	•	•	•		
RUGGEDCOM RX1500PN LM W21 (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM W22 (Obsolete)	•	•	•	•	•		
RUGGEDCOM RX1500PN LM W32 (Obsolete)	•	•	•	•	•		
RUGGEDCOM RX1500PN LM W41 (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM W51 (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM W61 (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM W81 (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM W91	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM W92	•	•	•	•	•	•	•

RUGGEDCOM APE modules

Module	RX1500	RX1501	RX1510	RX1511	RX1512	RX1524	RX1536
RUGGEDCOM RX1500PN LM APE1402 (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM APE1402W7 (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM APE1404 (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM APE1404 ADM (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM APE1404W7 (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM APE1404CKP (Obsolete)	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM APE1808LNX	•	•	•	•		•	•
RUGGEDCOM RX1500PN LM APE1808W10	•	•	•	•		•	•
RUGGEDCOM RX1500PN LM APE1808ADM (Obsolete)	•	•	•	•		•	•
RUGGEDCOM RX1500PN LM APE1808CKP	•	•	•	•		•	•
RUGGEDCOM RX1500PN LM APE1808CConn	•	•	•	•		•	•
RUGGEDCOM RX1500PN LM APE1808SAML	•	•	•	•		•	•
RUGGEDCOM RX1500PN LM APE1808ELAN	•	•	•	•		•	•

Blank modules

Module	RX1500	RX1501	RX1510	RX1511	RX1512	RX1524	RX1536
RUGGEDCOM RX1500PN PS XXP	•	•	•	•	•	•	•
RUGGEDCOM RX1500PN LM Blank	•	•	•	•	•	•	•

1.3 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.

1.4 Dimensions

Power and media modules conform to the following dimensions:

Note

All dimensions are in millimeters (mm).

Power Supply Module Dimensions

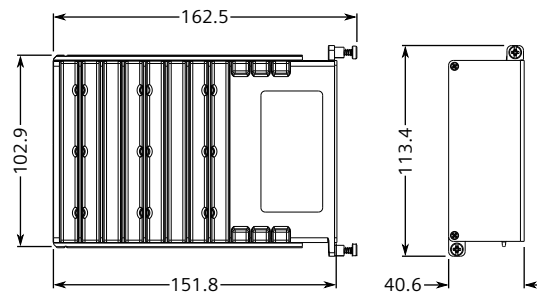


Figure 1.1 Power Supply Module Dimensions

Media Module Dimensions

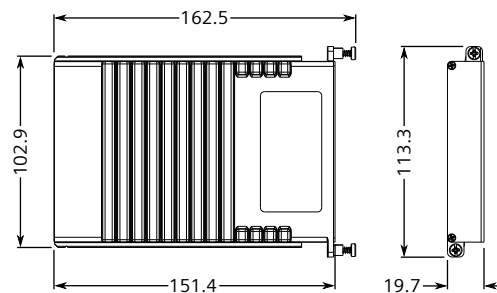


Figure 1.2 Media Module Dimensions

1.5 Decommissioning and disposal

Proper decommissioning and disposal of this product is important to prevent malicious users from obtaining proprietary information and to protect the environment.

Decommissioning

This product may include sensitive, proprietary data. Before taking the product out of service, either permanently or for maintenance by a third-party, make sure it has been fully decommissioned.

For more information, refer to the RUGGEDCOM ROX Configuration Manual associated with the installed software release.

Recycling and disposal

This product is low in pollutants, can be recycled, and meets the requirements of the WEEE directive 2012/19/EU for the disposal of electrical and electronic equipment.

Do not dispose of electronics at public disposal sites.

For environmentally friendly recycling and the disposal of electronics, contact a certified disposal company for electronic scrap or your Siemens representative.

For more information, refer to <https://support.industry.siemens.com/cs/ww/en/view/109479891>.

Note the different national regulations.



Power supply modules

The following power supply modules are available, excluding the RUGGEDCOM RX1512.

Note

The RUGGEDCOM RX1512 features a built-in power supply.

RUGGEDCOM RX1500PN PS 12	"RUGGEDCOM RX1500PN PS 12" (Page 24)
RUGGEDCOM RX1500PN PS 12P	"RUGGEDCOM RX1500PN PS 12P" (Page 26)
RUGGEDCOM RX1500PN PS 24	"RUGGEDCOM RX1500PN PS 24" (Page 28)
RUGGEDCOM RX1500PN PS 24P	"RUGGEDCOM RX1500PN PS 24P" (Page 30)
RUGGEDCOM RX1500PN PS 48	"RUGGEDCOM RX1500PN PS 48" (Page 32)
RUGGEDCOM RX1500PN PS 48P	"RUGGEDCOM RX1500PN PS 48P" (Page 34)
RUGGEDCOM RX1500PN PS HI	"RUGGEDCOM RX1500PN PS HI" (Page 36)
RUGGEDCOM RX1500PN PS HIP	"RUGGEDCOM RX1500PN PS HIP" (Page 39)

2.1 RUGGEDCOM RX1500PN PS 12

The RUGGEDCOM RX1500PN PS 12 power supply module provides 12 VDC power to the host device and features a failsafe relay to protect against critical error conditions. It is equipped with a removable screw terminal block and a failsafe relay terminal block. The module accepts DC power inputs from an external power supply.

Description

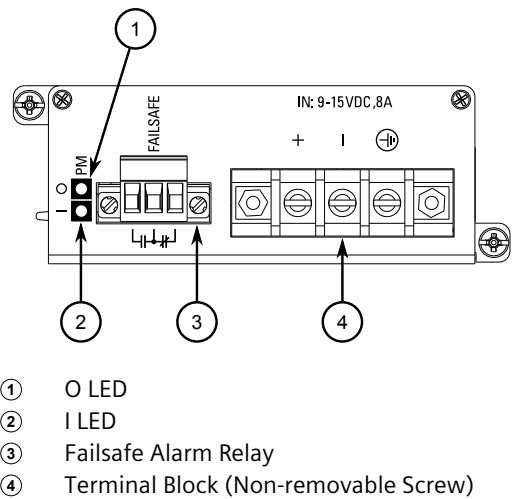


Figure 2.1 RUGGEDCOM RX1500PN PS 12 (shipped until 2019)

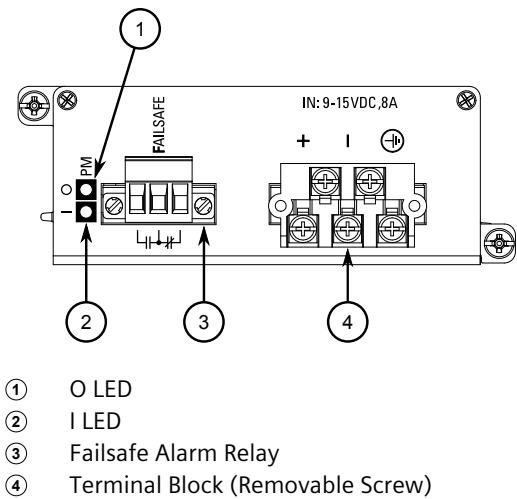


Figure 2.2 RUGGEDCOM RX1500PN PS 12 (shipped from 2019 on)

Terminal Block	A removable screw terminal block. For information about connecting power to the module, refer to the "Equipment Manual" for the RUGGEDCOM RX1500.		
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 RX1500.		
O/I 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 "Equipment Manual" for the host device.

Technical specifications

Power	Input Range	9 to 15 VDC
-------	-------------	-------------

	Internal Fuse Rating	10 A(T) ^a
	Maximum Input Power Consumption ^b	67 W
	Maximum Cable Length ^c	5.5 m (18 ft)
	Insulation	1500 VAC or 2121 VDC for 1 minute
Environmental	Operating temperature	-40 to 85 °C (-40 to 185 °F)

^a (T) denotes time-delay fuse.

^b Power consumption varies based on the device configuration.

^c Based on #16 AWG wiring.

Certification

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

European Union (EU)

This module is marked with a CE marking and can be used throughout the European community.



A copy of the CE Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page ix).

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	12VDC (9-15VDC), screw terminal block
Article numbers	6GK6015-0AL17-0AA0 (Standard) 6GK6015-0AL17-0AA1 (Conformal coated)

Technical specifications

Power	Input Range	9 to 15 VDC
	Internal Fuse Rating	10 A(T) ^a
	Maximum Input Power Consumption ^b	67 W
	Maximum Cable Length ^c	5.5 m (18 ft)
	Insulation	1500 VAC or 2121 VDC for 1 minute
Environmental	Operating temperature	-40 to 85 °C (-40 to 185 °F)

^a (T) denotes time-delay fuse.

^b Power consumption varies based on the device configuration.

^c Based on #16 AWG wiring.

Certification

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

European Union (EU)	This module is marked with a CE marking and can be used throughout the European community. A copy of the CE Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page ix).
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/].

Ordering information

Description	12VDC (9-15VDC), European-style (Euroblock) terminal block
Article numbers	6GK6015-0AL18-0AA0 (Standard) 6GK6015-0AL18-0AA1 (Conformal coated)

2.3 RUGGEDCOM RX1500PN PS 24

The RUGGEDCOM RX1500PN PS 24 power supply module provides 24 VDC power to the host device and features a failsafe relay to protect against critical error conditions. It is equipped with a removable screw terminal block and a failsafe relay terminal block. The module accepts DC power inputs from an external power supply.

 **NOTICE**

The RUGGEDCOM RX1500PN PS 24 comes with a safety cover that must be removed to connect power to the module, and then reinstalled once the wiring is complete.

Description

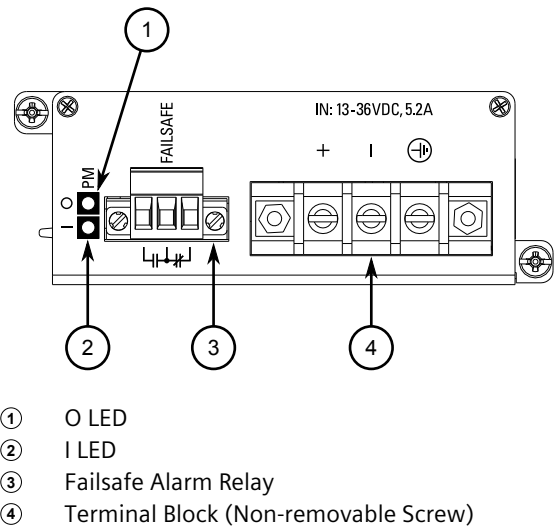


Figure 2.6 RUGGEDCOM RX1500PN PS 24 with (shipped until 2019)

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 "Equipment Manual" for the host device.

Technical specifications

Power	Input Range	13 to 36 VDC
	Internal Fuse Rating	10 A(T) ^a

	Maximum Input Power Consumption ^b	63.5 W
	Maximum Cable Length ^c	9.4 m (30.8 ft)
	Insulation	1500 VDC for 1 minute
Environmental	Operating temperature	-40 to 85 °C (-40 to 185 °F)

^a (T) denotes time-delay fuse.

^b Power consumption varies based on the device configuration.

^c Based on #16 AWG wiring.

Certification

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

European Union (EU)	This module is marked with a CE marking and can be used throughout the European community. A copy of the CE Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page ix).
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/].

Ordering information

Description	24VDC (15-36VDC), screw terminal block
Article numbers	6GK6015-0AL11-0AA0 (Standard) 6GK6015-0AL11-0AA1 (Conformal coated)

2.4 RUGGEDCOM RX1500PN PS 24P

The RUGGEDCOM RX1500PN PS 24P power supply module provides 24 VDC power to the host device and features a failsafe relay to protect against critical error conditions. It is equipped with a 3-position European-style (Euroblock) terminal block and a failsafe relay terminal block. The module accepts DC power inputs from an external power supply.

Description

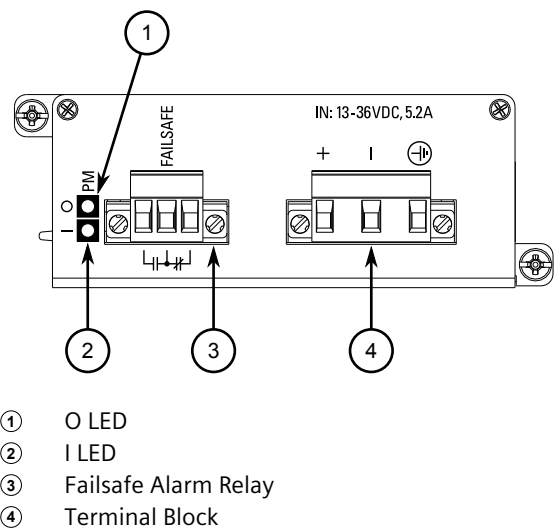


Figure 2.8 RUGGEDCOM RX1500PN PS 24P

Terminal Block	A 3-position European-style (Euroblock) terminal block. For information about connecting power to the module, refer to the "Equipment Manual" for the RUGGEDCOM RX1500.		
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 RX1500.		
O/I 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 "Equipment Manual" for the host device.

Technical specifications

Power	Input Range	13 to 36 VDC
	Internal Fuse Rating	10 A(T) ^a
	Maximum Input Power Consumption ^b	63.5 W
	Maximum Cable Length ^c	9.4 m (30.8 ft)
	Insulation	1500 VDC for 1 minute
Environmental	Operating temperature	-40 to 85 °C (-40 to 185 °F)

^a (T) denotes time-delay fuse.

^b Power consumption varies based on the device configuration.

^c Based on #16 AWG wiring.

Certification

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

European Union (EU)	This module is marked with a CE marking and can be used throughout the European community.
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A copy of the CE Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page ix).

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	24VDC (15-36VDC), European-style (Euroblock) terminal block
Article numbers	6GK6015-0AL14-0AA0 (Standard) 6GK6015-0AL14-0AA1 (Conformal coated)

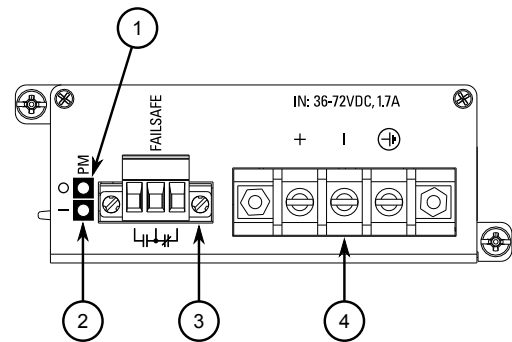
2.5 RUGGEDCOM RX1500PN PS 48

The RUGGEDCOM RX1500PN PS 48 power supply module provides 48 VDC power to the host device and features a failsafe relay to protect against critical error conditions. It is equipped with a removable screw terminal block and a failsafe relay terminal block. The module accepts DC power inputs from an external power supply.

 **NOTICE**

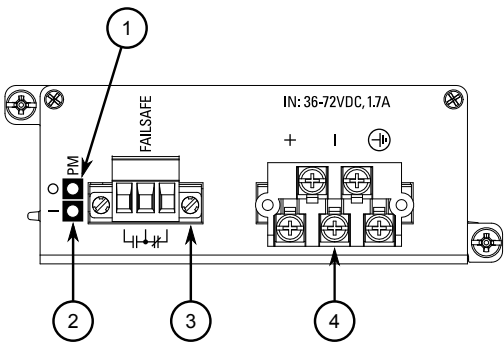
The RUGGEDCOM RX1500PN PS 48 comes with a safety cover that must be removed to connect power to the module, and then reinstalled once the wiring is complete.

Description



- ① O LED
- ② I LED
- ③ Failsafe Alarm Relay
- ④ Terminal Block (Non-removable Screw)

Figure 2.10 RUGGEDCOM RX1500PN PS 48 (shipped until 2019)



- ① O LED
- ② I LED
- ③ Failsafe Alarm Relay
- ④ Terminal Block (Removable Screw)

Figure 2.11 RUGGEDCOM RX1500PN PS 48 (shipped from 2019 on)

Terminal Block	A removable screw terminal block. For information about connecting power to the module, refer to the "Equipment Manual" for the RUGGEDCOM RX1500.		
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 RX1500.		
O/I 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 "Equipment Manual" for the host device.

Technical specifications

Power	Input Range	36 to 72 VDC
	Internal Fuse Rating	3.15 A(T) ^a
	Maximum Input Power Consumption ^b	60 W
	Maximum Cable Length ^c	45.5 m (149 ft)
	Insulation	1500 VDC for 1 minute
Environmental	Operating temperature	-40 to 85 °C (-40 to 185 °F)

^a (T) denotes time-delay fuse.

^b Power consumption varies based on the device configuration.

^c Based on #16 AWG wiring.

Certification

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

European Union (EU)	This module is marked with a CE marking and can be used throughout the European community.
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A copy of the CE Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page ix).

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	48VDC (36-72VDC), screw terminal block
Article numbers	6GK6015-0AL12-0AA0 (Standard) 6GK6015-0AL12-0AA1 (Conformal coated)

2.6 RUGGEDCOM RX1500PN PS 48P

The RUGGEDCOM RX1500PN PS 48P power supply module provides 48 VDC power to the host device and features a failsafe relay to protect against critical error conditions. It is equipped with a 3-position European-style (Euroblock) terminal block and a failsafe relay terminal block. The module accepts DC power inputs from an external power supply.

Description

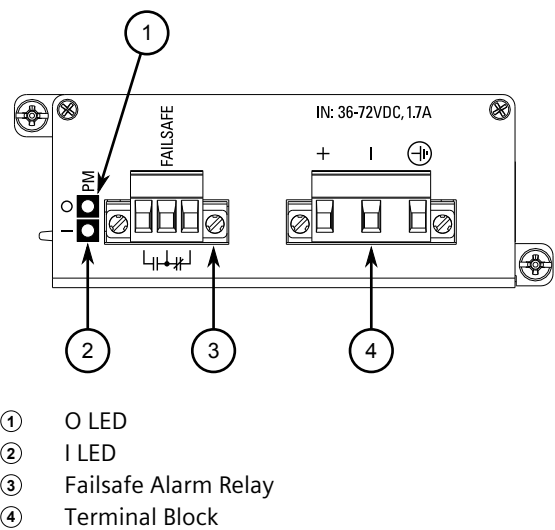


Figure 2.13 RUGGEDCOM RX1500PN PS 48P

Terminal Block	A 3-position European-style (Euroblock) terminal block. For information about connecting power to the module, refer to the "Installation Manual" for the RUGGEDCOM RX1500.		
Failsafe Alarm Relay	The failsafe alarm relay can be configured to latch based on alarm conditions. For more information, refer to the "Installation Manual" for the RUGGEDCOM RX1500.		
O/I 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 host device.

Technical specifications

Power	Input Range	36 to 72 VDC
	Internal Fuse Rating	3.15 A(T) ^a
	Maximum Input Power Consumption ^b	60 W
	Maximum Cable Length ^c	45.5 m (149 ft)
	Insulation	1500 VDC for 1 minute
Environmental	Operating temperature	-40 to 85 °C (-40 to 185 °F)

^a (T) denotes time-delay fuse.

^b Power consumption varies based on the device configuration.

^c Based on #16 AWG wiring.

Certification

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

European Union (EU)	This module is marked with a CE marking and can be used throughout the European community.
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A copy of the CE Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page ix).

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	48VDC (36-72VDC), European-style (Euroblock) terminal block
Article numbers	6GK6015-0AL15-0AA0 (Standard) 6GK6015-0AL15-0AA1 (Conformal coated)

2.7 RUGGEDCOM RX1500PN PS HI

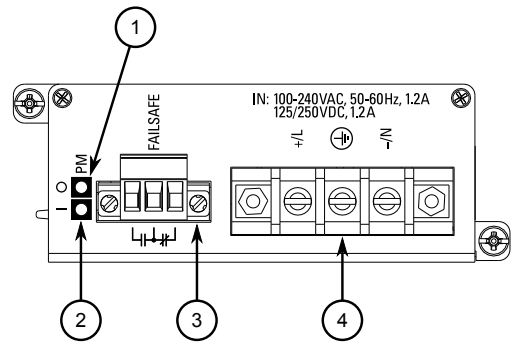
The RUGGEDCOM RX1500PN PS HI power supply module provides high VDC or VAC power to the host device and features a failsafe relay to protect against critical error conditions. It is equipped with a removable screw terminal block and a failsafe relay terminal block. The module accepts either AC or DC power inputs from an external power supply.



NOTICE

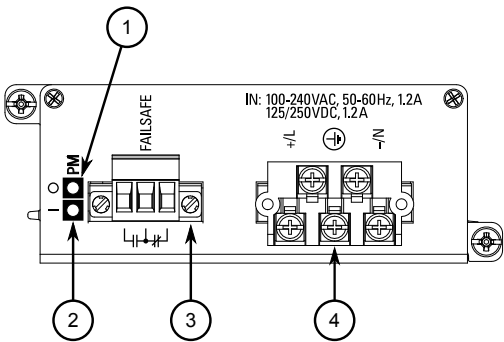
The RUGGEDCOM RX1500PN PS HI comes with a safety cover that must be removed to connect power to the module, and then reinstalled once the wiring is complete.

Description



- ① O LED
- ② I LED
- ③ Failsafe Alarm Relay
- ④ Non-Removable Terminal Block

Figure 2.15 RUGGEDCOM RX1500PN PS HI (shipped until 2019)



- ① O LED
- ② I LED
- ③ Failsafe Alarm Relay
- ④ Terminal Block (Removable Screw)

Figure 2.16 RUGGEDCOM RX1500PN PS HI (shipped from 2019 on)

Terminal Block	A removable screw terminal block. For information about connecting power to the module, refer to the "Equipment Manual" for the RUGGEDCOM RX1500.		
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 RX1500.		
O/I 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 "Equipment Manual" for the host device.

Technical specifications

Power	Input Range	88 to 300 VDC or 85 to 264 VAC
	Internal Fuse Rating	3.15 A(T) ^a
	Maximum Input Power Consumption ^b	65 W
	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.

^b Power consumption varies based on the device configuration.

Certification

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

European Union (EU)	This module is marked with a CE marking and can be used throughout the European community.
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A copy of the CE Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page ix).

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

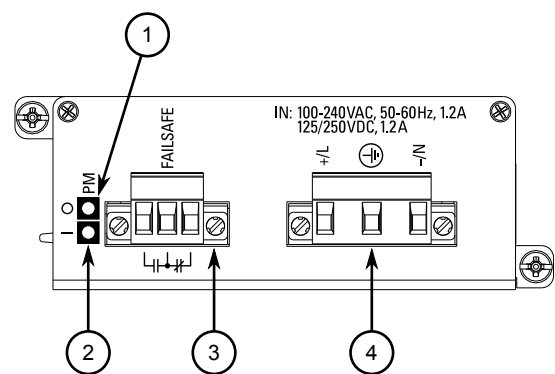
Description	88-300VDC or 85-264VAC, screw terminal block
Article numbers	6GK6015-0AL13-0AA0 (Standard)

6GK6015-0AL13-0AA1 (Conformal coated)

2.8 RUGGEDCOM RX1500PN PS HIP

The RUGGEDCOM RX1500PN PS HIP power supply module provides high VDC or VAC power to the host device and features a failsafe relay to protect against critical error conditions. It is equipped with a 3-position European-style (Euroblock) terminal block and a failsafe relay terminal block. The module accepts either AC or DC power inputs from an external power supply.

Description



- ① O LED
- ② I LED
- ③ Failsafe Alarm Relay
- ④ Terminal Block

Figure 2.18 RUGGEDCOM RX1500PN PS HIP

Terminal Block	A 3-position European-style (Euroblock) terminal block. For information about connecting power to the module, refer to the "Equipment Manual" for the RUGGEDCOM RX1500.		
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 RX1500.		
O/I 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 "Equipment Manual" for the host device.

Technical specifications

Power	Input Range	88 to 300 VDC or 85 to 264 VAC
	Internal Fuse Rating	3.15 A(T) ^a
	Maximum Input Power Consumption ^b	65 W
	Insulation	2800 VDC for 1 minute
Environmental	Operating temperature	-40 to 85 °C (-40 to 185 °F)

^a (T) denotes time-delay fuse.

^b Power consumption varies based on the device configuration.

Certification

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

European Union (EU)	This module is marked with a CE marking and can be used throughout the European community. A copy of the CE Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page ix).
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/].

Ordering information

Description	88-300VDC or 85-264VAC, European-style (Euroblock) terminal block
Article numbers	6GK6015-0AL16-0AA0 (Standard) 6GK6015-0AL16-0AA1 (Conformal coated)

Copper Ethernet modules

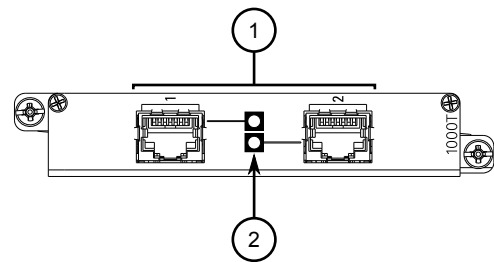
The following copper Ethernet modules are available.

RUGGEDCOM RX1500PN LM CG01	"RUGGEDCOM RX1500PN LM CG01" (Page 42)
RUGGEDCOM RX1500PN LM CG03	"RUGGEDCOM RX1500PN M12 CG03" (Page 45)
RUGGEDCOM RX1500PN LM CG03B	"RUGGEDCOM RX1500PN M12 CG03B" (Page 48)
RUGGEDCOM RX1500PN LM CG04	"RUGGEDCOM RX1500PN M12 X CG04" (Page 51)
RUGGEDCOM RX1500PN LM CG04B	"RUGGEDCOM RX1500PN M12 X CG04B" (Page 54)
RUGGEDCOM RX1500PN LM 4TX03	"RUGGEDCOM RX1500PN M12 4TX03" (Page 57)
RUGGEDCOM RX1500PN LM 4TX03B	"RUGGEDCOM RX1500PN M12 4TX03B" (Page 60)
RUGGEDCOM RX1500PN LM 4TX04	"RUGGEDCOM RX1500PN M12 4TX04" (Page 63)
RUGGEDCOM RX1500PN LM 4TX04B	"RUGGEDCOM RX1500PN M12 4TX04B" (Page 65)
RUGGEDCOM RX1500PN LM 6TX01	"RUGGEDCOM RX1500PN LM 6TX01" (Page 68)

3.1 RUGGEDCOM RX1500PN LM CG01

The RUGGEDCOM RX1500PN LM CG01 module features two 10/100/1000Base-TX copper RJ45 Ethernet ports.

Description



- ① Ethernet ports
- ② Port LEDs

Figure 3.1 RUGGEDCOM RX1500PN LM CG01

Ethernet ports	Fixed 10/100/1000Base-TX copper RJ45 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 host device.

Pin-out description

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

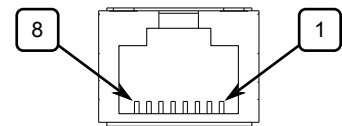


Figure 3.2 RJ45 Ethernet port pin configuration

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

Technical specifications

General	Power consumption	4 W
Interface/cable	Connector	RJ45
	Speed	1000 Mbps
	Interface	TX
	Duplex	FDX/HDX
	Cable type	> CAT-5
	Wiring standard	TIA/EIA T568A/B
	Maximum Distance	100 m (328 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 \[https://support.industry.siemens.com/\]](https://support.industry.siemens.com/).

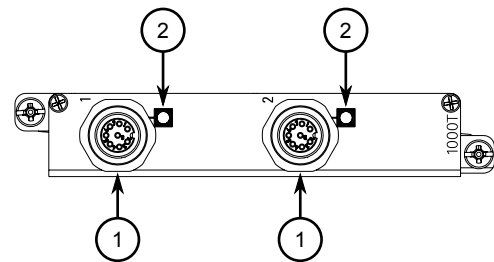
Ordering information

Description	2 x 10/100/1000TX RJ45
Article numbers	6GK6015-0AL20-0FC0 (Standard)
	6GK6015-0AL20-0FC1 (Conformal coated)

3.2 RUGGEDCOM RX1500PN M12 CG03

The RUGGEDCOM RX1500PN M12 CG03 module features two 10/100/1000Base-TX copper M12 (8-pin, A-coded) Ethernet ports.

Description



- ① M12 port
- ② Port LED

Figure 3.3 RUGGEDCOM RX1500PN M12 CG03

Ethernet ports	Fixed 10/100/1000Base-TX copper M12 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 host device.

Pin-out description

The following are the pin-out descriptions for the M12 ports:

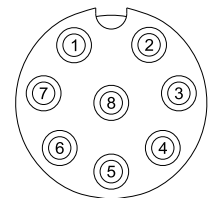


Figure 3.4 8-pin M12 A-coded Ethernet port pin configuration

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

^a Terminated at GND (Ground)

Technical specifications

General	Power consumption	4 W
Interface/cable	Connector	M12 (8-Pin, A-Coded)
	Speed	1000 Mbps
	Interface	TX
	Duplex	FDX/HDX
	Cable type	> CAT-5
	Wiring standard	TIA/EIA T568A/B
	Maximum Distance	100 m (328 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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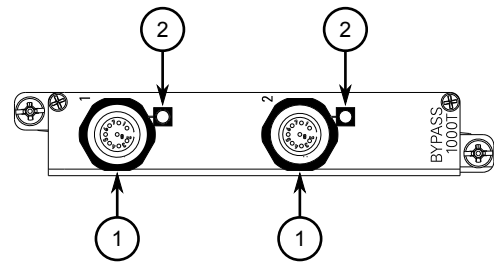
Ordering information

Description	2 x 10/100/1000TX 8-pin M12
Article numbers	6GK6015-0AL20-0PB0 (Standard)
	6GK6015-0AL20-0PB1 (Conformal coated)

3.3 RUGGEDCOM RX1500PN M12 CG03B

The RUGGEDCOM RX1500PN M12 CG03B module features two 10/100/1000Base-TX copper M12 (8-pin, A-coded) Ethernet ports. Both ports can be utilized as bypass ports to protect the network from power disruptions.

Description



- ① M12 port
- ② Port LED

Figure 3.5 RUGGEDCOM RX1500PN M12 CG03B

Ethernet ports	Fixed 10/100/1000Base-TX copper M12 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 host device.

Pin-out description

The following are the pin-out descriptions for the M12 ports:

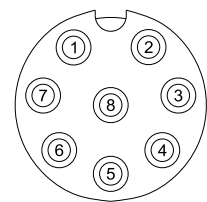


Figure 3.6 8-pin M12 A-coded Ethernet port pin configuration

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

^a Terminated at GND (Ground)

Technical specifications

General	Power consumption	4 W
Interface/cable	Connector	M12 (8-Pin, A-Coded, Controlled Bypass)
	Speed	1000 Mbps
	Interface	TX
	Duplex	FDX/HDX
	Cable type	> CAT-5
	Wiring standard	TIA/EIA T568A/B
	Maximum Distance	100 m (328 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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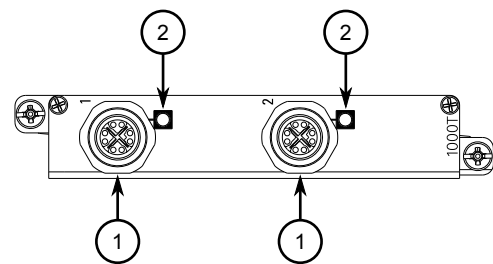
Ordering information

Description	2 x 10/100/1000TX 8-pin M12 with Controlled Bypass
Article numbers	6GK6015-0AL20-OPE0 (Standard)
	6GK6015-0AL20-OPE1 (Conformal coated)

3.4 RUGGEDCOM RX1500PN M12 X CG04

The RUGGEDCOM RX1500PN M12 X CG04 module features two 10/100/1000Base-TX copper M12 (8-pin, X-coded) Ethernet ports.

Description



- ① M12 port
- ② Port LED

Figure 3.7 RUGGEDCOM RX1500PN M12 X CG04

Ethernet ports	Fixed 10/100/1000Base-TX copper M12 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 host device.

Pin-out description

The following are the pin-out descriptions for the M12 ports:

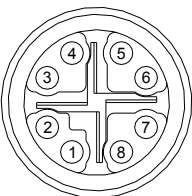


Figure 3.8 8-pin M12 X-coded Ethernet port pin configuration

Pin	10/100/1000Base-Tx Signal
1	A+
2	A-
3	B+
4	B-
5	D+
6	D-
7	C-
8	C+

Technical specifications

General	Power consumption	4 W
Interface/cable	Connector	M12 (8-Pin, X-Coded)
	Speed	1000 Mbps
	Interface	TX
	Duplex	FDX/HDX
	Cable type	> CAT-5
	Wiring standard	TIA/EIA T568A/B
	Maximum Distance	100 m (328 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

Description	2 x 10/100/1000TX 8-pin M12 X-Coded
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Article numbers

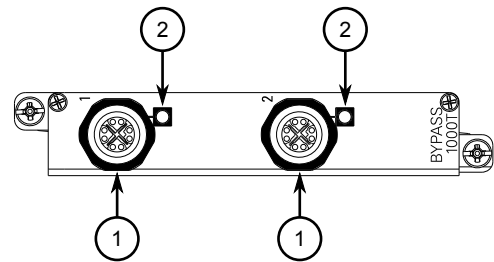
6GK6015-0AL20-0PH0 (Standard)

6GK6015-0AL20-0PH1 (Conformal coated)

3.5 RUGGEDCOM RX1500PN M12 X CG04B

The RUGGEDCOM RX1500PN M12 X CG04B module features two 10/100/1000Base-TX copper M12 (8-pin, X-coded) Ethernet ports. Both ports can be utilized as bypass ports to protect the network from power disruptions.

Description



- ① M12 port
- ② Port LED

Figure 3.9 RUGGEDCOM RX1500PN M12 X CG04B

Ethernet ports	Fixed 10/100/1000Base-TX copper M12 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 host device.

Pin-out description

The following are the pin-out descriptions for the M12 ports:

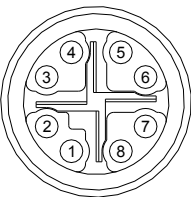


Figure 3.10 8-pin M12 X-coded Ethernet port pin configuration

Pin	10/100/1000Base-Tx Signal
1	A+
2	A-
3	B+
4	B-
5	D+
6	D-
7	C-
8	C+

Technical specifications

General	Power consumption	4 W
Interface/cable	Connector	M12 (8-Pin, X-Coded, Controlled Bypass)
	Speed	1000 Mbps
	Interface	TX
	Duplex	FDX/HDX
	Cable type	> CAT-5
	Wiring standard	TIA/EIA T568A/B
	Maximum Distance	100 m (328 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

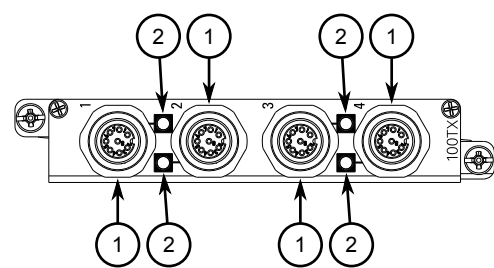
Description	2 x 10/100/1000TX 8-pin M12 X-Coded with Controlled Bypass
Article numbers	6GK6015-0AL20-0PJ0 (Standard)
	6GK6015-0AL20-0PJ1 (Conformal coated)

3.6

RUGGEDCOM RX1500PN M12 4TX03

The RUGGEDCOM RX1500PN M12 4TX03 module features four 10/100Base-TX copper M12 (8-pin, A-Coded) Ethernet ports.

Description



- ① M12 Port
- ② Port LED

Figure 3.11 RUGGEDCOM RX1500PN M12 4TX03

Ethernet ports	Fixed 10/100Base-TX copper M12 Ethernet ports.	
Port LEDs	Each port features a dedicated LED that indicates its link/activity state.	
	</	

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Pin-out description

The following are the pin-out descriptions for the M12 ports:

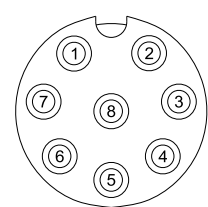


Figure 3.12 8-pin M12 A-coded Ethernet port pin configuration

Pin	Signal
1	Reserved (Do not connect) ^a
2	Reserved (Do not connect) ^a
3	Reserved (Do not connect) ^a
4	TX-
5	RX+
6	TX+
7	Reserved (Do not connect) ^a
8	RX-

^a Terminated at GND (Ground)

Technical specifications

General	Power consumption	5 W
Interface/cable	Connector	M12 (8-Pin, A-Coded)
	Speed	100 Mbps
	Interface	TX
	Duplex	FDX/HDX
	Cable type	> CAT-5
	Wiring standard	TIA/EIA T568A/B
	Maximum Distance	100 m (328 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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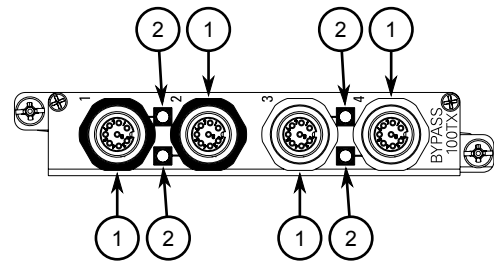
Ordering information

Description	4 x 10/100TX 8-pin M12
Article numbers	6GK6015-0AL20-0PC0 (Standard)
	6GK6015-0AL20-0PC1 (Conformal coated)

3.7 RUGGEDCOM RX1500PN M12 4TX03B

The RUGGEDCOM RX1500PN M12 4TX03B module features four 10/100Base-TX copper M12 (8-pin, A-coded) Ethernet ports. Two of the available ports can be utilized as bypass ports to protect the network from power disruptions.

Description



- ① M12 Port
- ② M12 Port with Controlled Bypass
- ③ Port LED

Figure 3.13 RUGGEDCOM RX1500PN M12 4TX03B

Ethernet ports	Fixed 10/100Base-TX copper M12 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 host device.

Pin-out description

The following are the pin-out descriptions for the M12 ports:

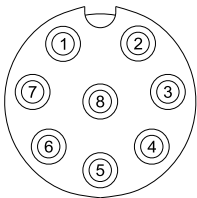


Figure 3.14 8-pin M12 A-coded Ethernet port pin configuration

Pin	Signal
1	Reserved (Do not connect) ^a
2	Reserved (Do not connect) ^a
3	Reserved (Do not connect) ^a
4	TX-
5	RX+
6	TX+
7	Reserved (Do not connect) ^a
8	RX-

^a Terminated at GND (Ground)

Technical specifications

General	Power consumption	5 W
Interface/cable	Connector	M12 (8-Pin, A-Coded, Controlled Bypass)
	Speed	100 Mbps
	Interface	TX
	Duplex	FDX/HDX
	Cable type	> CAT-5
	Wiring standard	TIA/EIA T568A/B
	Maximum Distance	100 m (328 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
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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/).

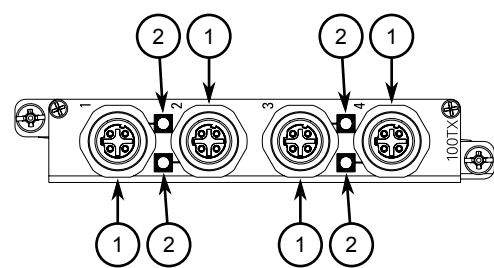
Ordering information

Description	4 x 10/100TX 8-pin M12 with Controlled Bypass
Article numbers	6GK6015-0AL20-0PF0 (Standard)
	6GK6015-0AL20-0PF1 (Conformal coated)

3.8 RUGGEDCOM RX1500PN M12 4TX04

The RUGGEDCOM RX1500PN M12 4TX04 module features four 10/100Base-TX copper M12 (4-pin, D-coded) Ethernet ports.

Description



- ① M12 Port
- ② Port LED

Figure 3.15 RUGGEDCOM RX1500PN M12 4TX04

Ethernet ports	Fixed 10/100Base-TX copper M12 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 host device.

Pin-out description

The following are the pin-out descriptions for the M12 ports:

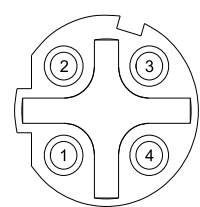


Figure 3.16 4-pin M12 D-coded Ethernet port pin configuration

Pin	Signal
1	TX+
2	RX+
3	TX-
4	RX-

Technical specifications

General	Power consumption	5 W
Interface/cable	Connector	M12 (4-Pin, D-Coded)
	Speed	100 Mbps
	Interface	TX
	Duplex	FDX/HDX
	Cable type	> CAT-5
	Wiring standard	TIA/EIA T568A/B
	Maximum Distance	100 m (328 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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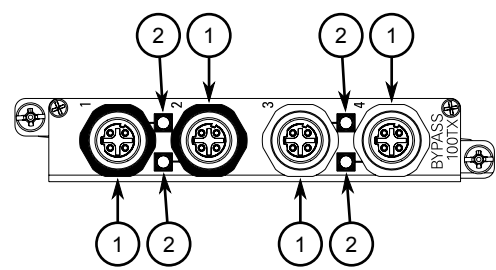
Ordering information

Description	4 x 10/100TX 4-pin M12
Article numbers	6GK6015-0AL20-0PD0 (Standard)
	6GK6015-0AL20-0PD1 (Conformal coated)

3.9 RUGGEDCOM RX1500PN M12 4TX04B

The RUGGEDCOM RX1500PN M12 4TX04B module features four 10/100Base-TX copper M12 (4-pin, D-coded) Ethernet ports. Two of the available ports can be utilized as bypass ports to protect the network from power disruptions.

Description



- ① M12 Port
- ② M12 Port with Controlled Bypass
- ③ Port LED

Figure 3.17 RUGGEDCOM RX1500PN M12 4TX04B

Ethernet ports	Fixed 10/100Base-TX copper M12 Ethernet 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

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Pin-out description

The following are the pin-out descriptions for the M12 ports:

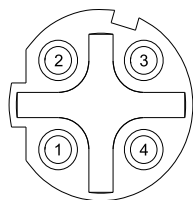


Figure 3.18 4-pin M12 D-coded Ethernet port pin configuration

Pin	Signal
1	TX+
2	RX+
3	TX-
4	RX-

Technical specifications

General	Power consumption	5 W
Interface/cable	Speed	100 Mbps
	Interface	TX
	Connector	M12 (4-Pin, D-Coded, Controlled Bypass)
	Duplex	FDX/HDX
	Cable type	> CAT-5
	Wiring standard	TIA/EIA T568A/B
	Maximum Distance	100 m (328 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
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- **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/).

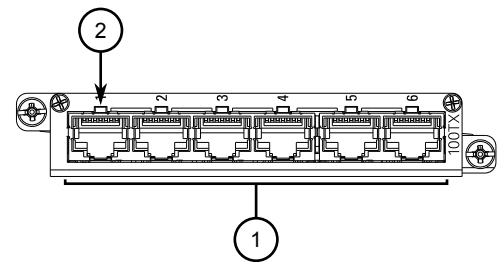
Ordering information

Description	4 x 10/100TX 4-pin M12 with Controlled Bypass
Article numbers	6GK6015-0AL20-0PG0 (Standard)
	6GK6015-0AL20-0PG1 (Conformal coated)

3.10 RUGGEDCOM RX1500PN LM 6TX01

The RUGGEDCOM RX1500PN LM 6TX01 module features six 10/100Base-TX copper RJ45 Ethernet ports.

Description



- ① Ethernet ports
- ② Port LEDs

Figure 3.19 RUGGEDCOM RX1500PN LM 6TX01

Ethernet ports	Fixed 10/100Base-TX copper RJ45 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 host device.

Pin-out description

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

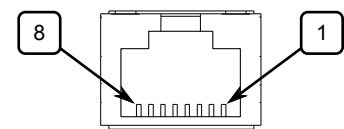


Figure 3.20 RJ45 Ethernet port pin configuration

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

Technical specifications

General	Power consumption	5 W
Interface/cable	Connector	RJ45
	Speed	100 Mbps
	Interface	TX
	Duplex	FDX/HDX
	Cable type	> CAT-5
	Wiring standard	TIA/EIA T568A/B
	Maximum Distance	100 m (328 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
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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

Description	6 x 10/100TX RJ45
Article numbers	6GK6015-0AL20-0NB0 (Standard)
	6GK6015-0AL20-0NB1 (Conformal coated)

Fiber optic Ethernet modules

The following fiber optic Ethernet modules are available.

RUGGEDCOM RX1500PN LM 4FX11	"RUGGEDCOM RX1500PN LM 4FX11" (Page 72)
RUGGEDCOM RX1500PN LM FL01	"RUGGEDCOM RX1500PN LM FL01" (Page 74)
RUGGEDCOM RX1500PN LM FG03	"RUGGEDCOM RX1500PN LM FG03" (Page 76)
RUGGEDCOM RX1500PN LM FG51	"RUGGEDCOM RX1500PN LM FG51" (Page 78)
RUGGEDCOM RX1500PN LM FX51	"RUGGEDCOM RX1500PN LM FX51" (Page 80)
RUGGEDCOM RX1500PN LM 6FX51	"RUGGEDCOM RX1500PN LM 6FX51" (Page 82)

4.1 RUGGEDCOM RX1500PN LM 4FX11

The RUGGEDCOM RX1500PN LM 4FX11 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

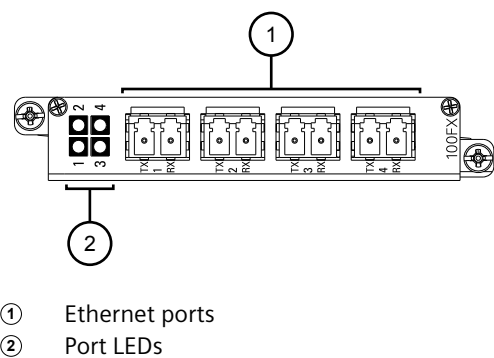


Figure 4.1 RUGGEDCOM RX1500PN LM 4FX11

Ethernet ports	Fixed 100Base-FX fiber optic 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								

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Technical specifications

General	Power consumption	4 W
Interface/cable	Cable type	50/125 μm
		62.5/125 μm
	Speed	100 Mbps
	Interface	FX
	Mode	MM (Multi-Mode)

Optical characteristics	Connector	LC
	Wavelength ^a	1300 nm
	Nominal distance ^a	2 km (1.2 mi)
	Transmit power	-22.5 to -14 dBm
	Receiver sensitivity	-31 dBm
	Receiver saturation	-14 dBm
	Power budget	8.5 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

Description	4 x 100FX - Multimode 1300nm LC connectors 2km
Article numbers	6GK6015-0AL20-0BC0 (Standard)
	6GK6015-0AL20-0BC1 (Conformal coated)

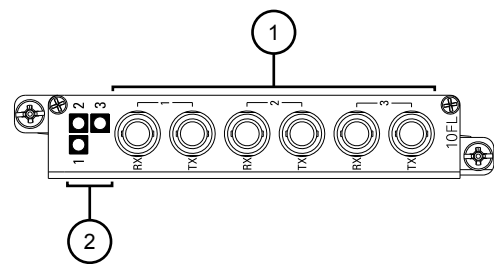
4.2 RUGGEDCOM RX1500PN LM FL01

The RUGGEDCOM RX1500PN LM FL01 module features three 10Base-FL/100Base-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.

Description



- ① Ethernet ports
- ② Port LEDs

Figure 4.2 RUGGEDCOM RX1500PN LM FL01

Ethernet ports	Fixed 10Base-FL/100Base-SX fiber optic 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									

Installing the module

For information about installing this module, refer to the "Installation Manual" for the host device.

Technical specifications

General	Power consumption	5 W
Interface/cable	Cable type	50/125 μ m 62.5/125 μ m
	Speed	10 Mbps (FL) 100 Mbps (SX)
	Mode	MM (Multi-Mode)

Optical characteristics	Interface	FL/SX
	Connector	ST
	Wavelength ^a	820
	Nominal distance ^a	2 km (1.2 mi)
	Transmit power	-19.8 to -12.8 dBm (50/125 µm) -16 to -9 dBm (62.5/125 µm)
	Receiver sensitivity	-34 dBm
	Receiver saturation	-11.2 dBm
	Power budget	14.2 dB (50/125 µm) 18 dB (62.5/125 µm)
	Operating temperature	-40 to 85 °C (-40 to 185 °F)
	Operating relative humidity	5 to 95% (non-condensing)
Environment	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

Description	3 x 10FL/100SX, Multimode, 850nm, ST, 2km
Article numbers	6GK6015-0AL20-0BD0 (Standard) 6GK6015-0AL20-0BD1 (Conformal coated)

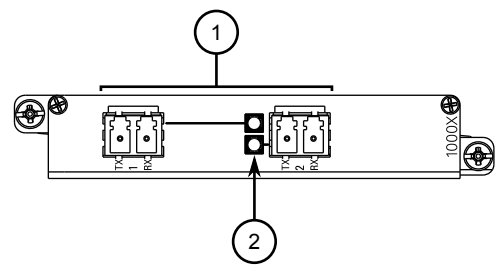
4.3 RUGGEDCOM RX1500PN LM FG03

The RUGGEDCOM RX1500PN LM FG03 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 Ethernet ports
- ② Port LEDs

Figure 4.3 RUGGEDCOM RX1500PN LM FG03

Ethernet ports	Fixed 1000Base-LX fiber optic 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								

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Technical specifications

General	Power consumption	5 W
Interface/cable	Cable type	9/125 μm
	Speed	1000 Mbps
	Interface	LX
	Mode	SM (Single-Mode)
	Connector	LC

Optical characteristics	Wavelength ^a	1300 nm
	Nominal distance ^a	10 km (6.2 mi)
	Transmit power	-9.5 to -3.0 dBm
	Receiver sensitivity	-21 dBm
	Receiver saturation	-3 dBm
Environment	Power budget	11.5 dB
	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

Description	2 x 1000LX Singlemode 1300 nm LC, 10km
Article numbers	6GK6015-0AL20-OEC0 (Standard) 6GK6015-0AL20-OEC1 (Conformal coated)

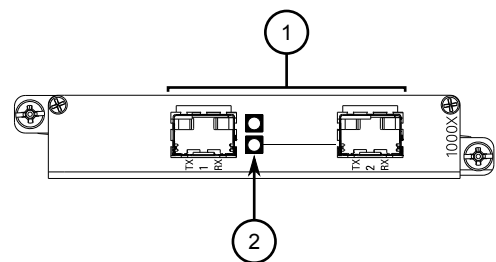
4.4 RUGGEDCOM RX1500PN LM FG51

The RUGGEDCOM RX1500PN LM FG51 module features two 1000Base-SX fiber optic SFP 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 SFP Ethernet ports
- ② Port LED

Figure 4.4 RUGGEDCOM RX1500PN LM FG51

Ethernet ports	1000Base-SX fiber optic SFP 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								

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Technical specifications

General	Power consumption	4 W
Interface/cable	Cable type	50/125 μ m 62.5/125 μ m
	Speed	1000 Mbps
	Mode	MM (Multi-Mode)
	Interface	SX

	Connector	LC
	Wavelength ^a	850 nm
	Nominal distance ^a	300 m (984 mi) (50/125 µm) 500 m (1640 ft) (62.5/125 µm)
Optical characteristics	Transmit power	-9 to -2.5 dBm
	Receiver sensitivity	-20 to -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

Description	2 x 1000SX SFP, Multimode, 850nm, LC, 500m
Article numbers	6GK6015-0AL20-0DC0 (Standard)
	6GK6015-0AL20-0DC1 (Conformal coated)

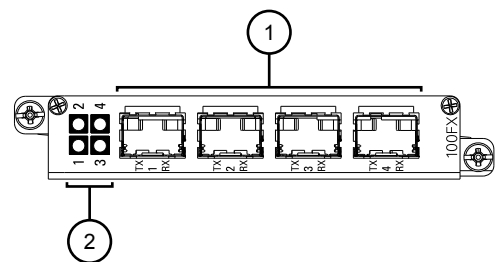
4.5 RUGGEDCOM RX1500PN LM FX51

The RUGGEDCOM RX1500PN LM FX51 module features four 100Base-FX fiber optic SFP 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 SFP Ethernet ports
- ② Port LEDs

Figure 4.5 RUGGEDCOM RX1500PN LM FX51

Ethernet ports	100Base-FX fiber optic SFP 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								

Installing the module

For information about installing this module, refer to the "Installation Manual" for the host device.

Technical specifications

General	Power consumption	5 W
Interface/cable	Cable type	50/125 μ m 62.5/125 μ m
	Speed	100 Mbps
	Mode	MM (Multi-Mode)
	Interface	FX

Optical characteristics	Connector	LC
	Wavelength ^a	1310 nm
	Nominal distance ^a	2 km (1.2 mi)
	Transmit power	-20 to -14 dBm(62.5/125 μm) -23.5 to -14 dBm (50/125 μm)
	Receiver sensitivity	-23 to -3 dBm(62.5/125 μm) -31 to -3 dBm (50/125 μm)
	Power budget	11 dB(62.5/125 μm) 7.5 dB (50/125 μm)
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

Description	4 x 100FX SFP, Multimode, 1310nm, LC, 2km
Article numbers	6GK6015-0AL20-0BJ0 (Standard)
	6GK6015-0AL20-0BJ1 (Conformal coated)

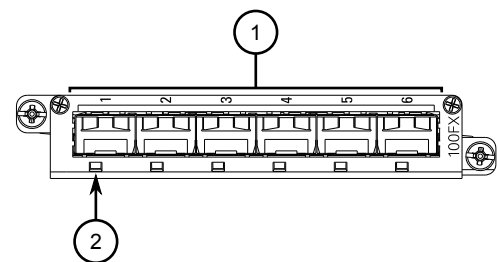
4.6 RUGGEDCOM RX1500PN LM 6FX51

The RUGGEDCOM RX1500PN LM 6FX51 module features six 100Base-FX fiber optic SFP 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 SFP Ethernet ports
- ② Port LED

Figure 4.6 RUGGEDCOM RX1500PN LM 6FX51

Ethernet ports	100Base-FX fiber optic SFP Ethernet ports.	
Port LEDs	Each port set (transmit/receive) 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 host device.

Technical specifications

General	Power consumption	7 W
Interface/cable	Cable type	50/125 μ m 62.5/125 μ m
	Speed	100 Mbps
	Mode	MM (Multi-Mode)

Optical characteristics	Interface	FX
	Connector	LC
	Wavelength ^a	1310 nm
	Nominal distance ^a	2 km (1.2 mi)
	Transmit power	-23.5 to -14 dBm (50/125 µm) -20 to -14 dBm (62.5/125 µm)
	Receiver sensitivity	-31 to -3 dBm (50/125 µm) -23 to -3 dBm (62.5/125 µm)
	Power budget	7.5 dB (50/125 µm) 11 dB (62.5/125 µm)
	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

Description	6 x 100FX SFP, Multimode, 1310nm, LC, 2km
Article numbers	6GK6015-0AL20-0BK0 (Standard) 6GK6015-0AL20-0BK1 (Conformal coated)

SFP/SFP+ modules

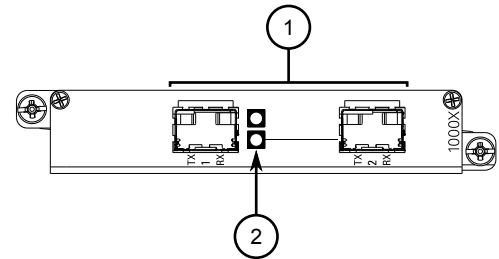
The following SFP/SFP+ modules are available.

RUGGEDCOM RX1500PN LM FG50	"RUGGEDCOM RX1500PN LM FG50" (Page 86)
RUGGEDCOM RX1500PN LM FX50	"RUGGEDCOM RX1500PN LM FX50" (Page 88)
RUGGEDCOM RX1500PN LM 6FX50	"RUGGEDCOM RX1500PN LM 6FX50" (Page 90)

5.1 RUGGEDCOM RX1500PN LM FG50

The RUGGEDCOM RX1500PN LM FG50 module features sockets for up to two Small Form-factor Pluggable (SFP) transceivers.

Description



- ① SFP transceiver sockets
- ② Port LED

Figure 5.1 RUGGEDCOM RX1500PN LM FG50

SFP transceiver sockets	Sockets available for up to two SFP transceivers. For information about which SFP transceivers are compatible with this module, as well as instructions for ordering and installation/removal, refer to the "RUGGEDCOM SFP Transceiver Reference Manual [https://support.industry.siemens.com/cs/ca/en/view/109482309]".								
Port LEDs	Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver. <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 host device.

Technical specifications

General	Power consumption	7 W
Environment	Operating temperature	Dependent on the installed SFP transceiver.

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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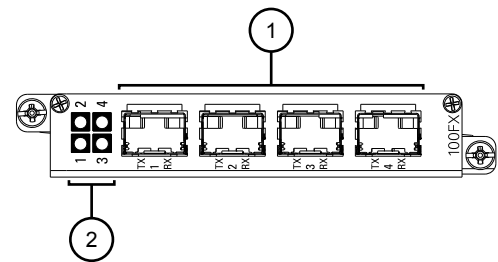
Ordering information

Description	2 x 1000LX SFP Blank (no optical transceiver)
Article numbers	6GK6015-0AL20-0JB0 (Standard) 6GK6015-0AL20-0JB1 (Conformal coated)

5.2 RUGGEDCOM RX1500PN LM FX50

The RUGGEDCOM RX1500PN LM FX50 module features sockets for up to four Small Form-factor Pluggable (SFP) transceivers.

Description



- ① SFP transceiver sockets
- ② Port LED

Figure 5.2 RUGGEDCOM RX1500PN LM FX50

SFP transceiver sockets	Sockets available for up to four SFP transceivers. For information about which SFP transceivers are compatible with this module, as well as instructions for ordering and installation/removal, refer to the "RUGGEDCOM SFP Transceiver Reference Manual [https://support.industry.siemens.com/cs/ca/en/view/109482309]".								
Port LEDs	Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver. <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 host device.

Technical specifications

General	Power consumption	5 W
Environment	Operating temperature	Dependent on the installed SFP transceiver.

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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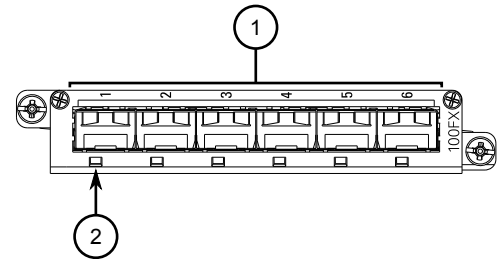
Ordering information

Description	4 x 100FX SFP Blank (no optical transceiver)
Article numbers	6GK6015-0AL20-0JC0 (Standard) 6GK6015-0AL20-0JC1 (Conformal coated)

5.3 RUGGEDCOM RX1500PN LM 6FX50

The RUGGEDCOM RX1500PN LM 6FX50 module features sockets for up to six Small Form-factor Pluggable (SFP) transceivers.

Description



- ① SFP transceiver sockets
- ② Port LED

Figure 5.3 RUGGEDCOM RX1500PN LM 6FX50

SFP transceiver sockets	Sockets available for up to six SFP transceivers. For information about which SFP transceivers are compatible with this module, as well as instructions for ordering and installation/removal, refer to the "RUGGEDCOM SFP Transceiver Reference Manual [https://support.industry.siemens.com/cs/ca/en/view/109482309]".								
Port LEDs	Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver. <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 host device.

Technical specifications

General	Power consumption	7 W
Environment	Operating temperature	Dependent on the installed SFP transceiver.

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	6 x 100FX SFP Blank (no optical transceiver)
Article numbers	6GK6015-0AL20-0JD0 (Standard) 6GK6015-0AL20-0JD1 (Conformal coated)

Serial modules

The following serial modules are available.

RUGGEDCOM RX1500PN LM S01**"RUGGEDCOM RX1500PN LM S01" (Page 94)**

Pin-out description

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

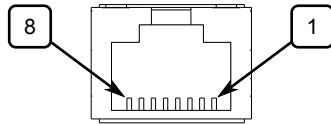


Figure 6.2 Serial RJ45 port

Pin	RS232 Mode	RS485 Mode	RS422 Mode
1			RX- (Receive Negative)
2	Reserved (Do Not Connect)		
3 ^a	Common (Isolated) Ground		
4 ^a			
5	RX (Receive)		RX+ (Receive Positive)
6	TX (Transmit)	TX/RX+ (Transmit/Receive Positive) ^b	TX+ (Transmit Positive)
7	Note ^c	TX/RX- (Transmit/Receive Negative) ^d	TX- (Transmit Negative)
8	Note ^c	TX/RX- (Transmit/Receive Negative) ^d	TX- (Transmit Negative)
Shield	Chassis Ground		

^a Pins 3 and 4 are connected together internally.

^b 15 kΩ pull-up resistor present on board.

^c Pins 7 and 8 are connected together internally to simulate RTS-CTS hardware flow control for the user.

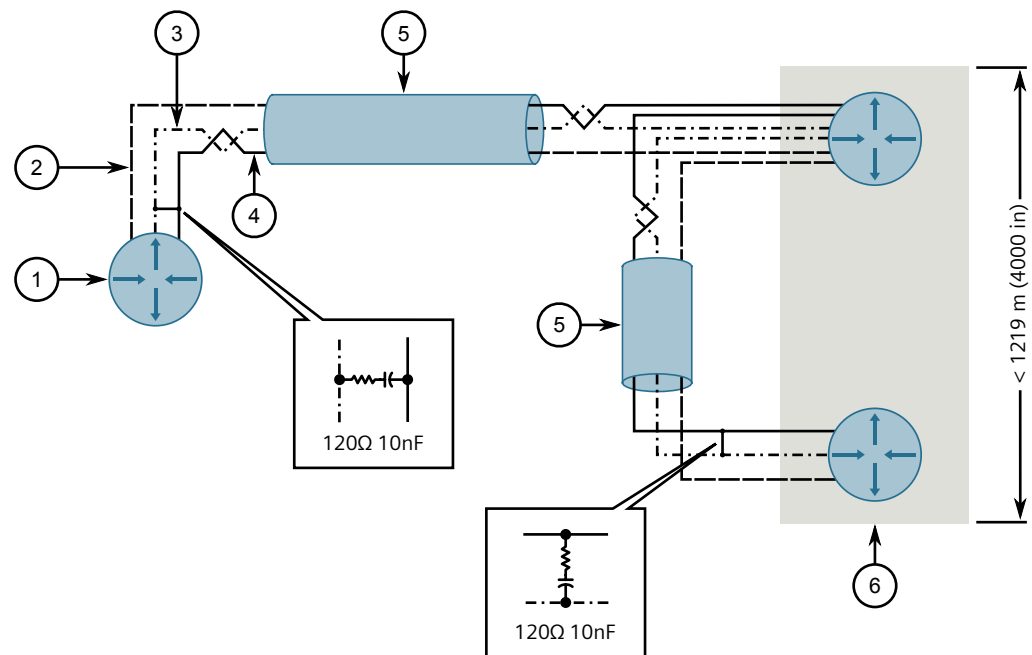
^d In noisier environments, external pull-down resistors may be required for the negative terminal.

Connecting to RS485 devices

When in RS485 mode, each port in the module 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 illustration demonstrates the recommended RS485 wiring scheme:



- ① RUGGEDCOM RX1500PN LM S01 Module and Host Device
- ② Common (Isolated Ground)
- ③ Negative
- ④ Positive
- ⑤ Shield to Earth (Connected At a Single Point)
- ⑥ RS485 Devices (32 Total)

Figure 6.3 Recommended RS485 wiring

Note

A 15 kΩ pull-up resistor is present on-board for the positive terminal.
In noisy environments, additional pull-down resistors may be required for the negative terminal.

Technical specifications

General	Baud Rate	1200 to 230400 kbps
	Connector	RJ45
	Isolation	2500 VDC for 1 minute
	Ingress Protection	IP40
	Power consumption	3 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 \[https://support.industry.siemens.com/\]](https://support.industry.siemens.com/).

Ordering information

Description	6 x RS232/RS422/RS485 RJ45 Serial Media Module
Article numbers	6GK6015-0AL20-0KB0 (Standard) 6GK6015-0AL20-0KB1 (Conformal coated)

WAN modules

The following Wireless Area Network (WAN) modules are available.

TC1	"RUGGEDCOM RX1500PN LM TC1" (Page 100)
TC2	"RUGGEDCOM RX1500PN LM TC2" (Page 103)
TC4	"RUGGEDCOM RX1500PN LM TC4" (Page 106)
E02	"RUGGEDCOM RX1500PN LM E02" (Page 109)
D02	"RUGGEDCOM RX1500PN LM D02" (Page 111)

7.1 RUGGEDCOM RX1500PN LM TC1

The RUGGEDCOM RX1500PN LM TC1 module features a single T1/E1 RJ48C port for connection to a Wide Area Network (WAN).

Requirements/restrictions

Chassis	Only one T1/E1 module is permitted per device.
---------	--

Description

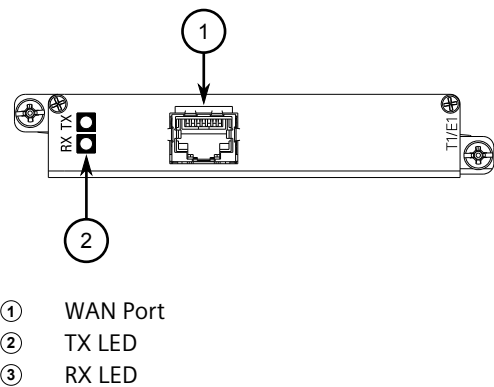


Figure 7.1 RUGGEDCOM RX1500PN LM TC1

WAN Port	T1/E1 RJ48C port.	
TX/RX LEDs	The port features a dedicated set of TX and RX LEDs to indicate the link/activity state.	
LED	State	Description
Rx	Green	Connection established.
Rx	Yellow	The interface is receiving an OOF (Out of Frame) alarm.
Rx	Red	The interface is receiving an ALOS (Alarm Loss of Signal) or Red alarm (e.g. corruption or loss of signal, connectivity loss, or no knowledge of connectivity).
Rx	Off	The interface is disabled.
Tx	Green	Connection established
Tx	Yellow	The interface is in loopback mode.
Tx	Red	The interface is receiving or transmitting an RAI (Remote Alarm Indication) or AIS (Alarm Indication Signal) alarm.
Tx	Off	The interface is disabled.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Pin-out description

The following is the pin-out for the RJ48C port:

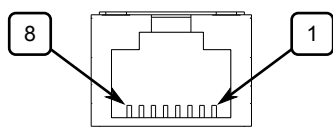


Figure 7.2 RJ48C Pin Configuration

Pin	Name	Description
1	RRING	Receive Negative
2	RTIP	Receive Positive
3	Reserved (Do Not Connect)	
4	TRING	Transmit Negative
5	TTIP	Transmit Positive
6	Reserved (Do Not Connect)	
7	Reserved (Do Not Connect)	
8	Reserved (Do Not Connect)	

Technical specifications

General	Power consumption	3 W
Interface/cable	Interface	T1/E1 (Channelized/ Unchannelized)
	Connector	RJ48C
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.

Industry Canada	This module is certified under IC CS-03 Part II, Issue 9. The product ID is listed on the label affixed to the module.
ACTA	This module is certified under Part 68 (subpart B) of the FCC Rules. The product ID is listed on the label affixed to the module. If requested, this information must be provided to the telephone company.

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	1 x T1/E1 RJ48 (Channelized/Unchannelized)
Article numbers	6GK6015-0AL20-0MB0 (Standard)
	6GK6015-0AL20-0MB1 (Conformal coated)

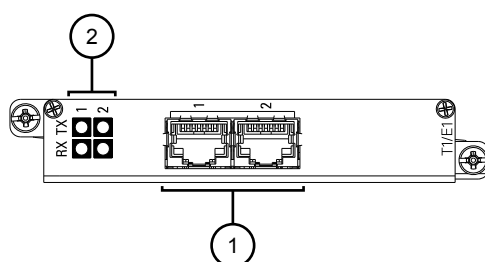
7.2 RUGGEDCOM RX1500PN LM TC2

The RUGGEDCOM RX1500PN LM TC2 module features two T1/E1 RJ48C ports for connection to a Wide Area Network (WAN).

Requirements/restrictions

Chassis	Only one T1/E1 module is permitted per device.
----------------	--

Description



- ① WAN Ports
- ② TX LED
- ③ RX LED

Figure 7.3 RUGGEDCOM RX1500PN LM TC2

WAN Ports	T1/E1 RJ48C ports.
TX/RX LEDs	Each port features a dedicated set of TX and RX LEDs to indicate the link/activity state.

LED	State	Description
Rx	Green	Connection established.
Rx	Yellow	The interface is receiving an OOF (Out of Frame) alarm.
Rx	Red	The interface is receiving an ALOS (Alarm Loss of Signal) or Red alarm (e.g. corruption or loss of signal, connectivity loss, or no knowledge of connectivity).
Rx	Off	The interface is disabled.
Tx	Green	Connection established
Tx	Yellow	The interface is in loopback mode.
Tx	Red	The interface is receiving or transmitting an RAI (Remote Alarm Indication) or AIS (Alarm Indication Signal) alarm.
Tx	Off	The interface is disabled.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Pin-out description

The following is the pin-out for the RJ48C ports:

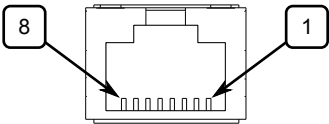


Figure 7.4 RJ48C Pin Configuration

Pin	Name	Description
1	RRING	Receive Negative
2	RTIP	Receive Positive
3	Reserved (Do Not Connect)	
4	TRING	Transmit Negative
5	TTIP	Transmit Positive
6	Reserved (Do Not Connect)	
7	Reserved (Do Not Connect)	
8	Reserved (Do Not Connect)	

Technical specifications

General	Power consumption	3 W
	Interface	T1/E1 (Channelized/ Unchannelized)
Interface/cable	Connector	RJ48C
	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.

Industry Canada	This module is certified under IC CS-03 Part II, Issue 9. The product ID is listed on the label affixed to the module.
ACTA	This module is certified under Part 68 (subpart B) of the FCC Rules. The product ID is listed on the label affixed to the module. If requested, this information must be provided to the telephone company.

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	2 x T1/E1 RJ48 (Channelized/Unchannelized)
Article numbers	6GK6015-0AL20-0MC0 (Standard)
	6GK6015-0AL20-0MC1 (Conformal coated)

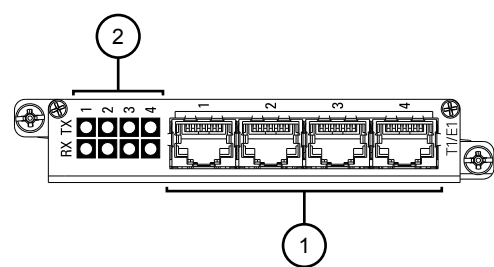
7.3 RUGGEDCOM RX1500PN LM TC4

The RUGGEDCOM RX1500PN LM TC4 module features four T1/E1 RJ48C ports for connection to a Wide Area Network (WAN).

Requirements/restrictions

Chassis	Only one T1/E1 module is permitted per device.
---------	--

Description



- ① WAN Ports
- ② TX LED
- ③ RX LED

Figure 7.5 RUGGEDCOM RX1500PN LM TC4

WAN Ports	T1/E1 RJ48C ports.		
TX/RX LEDs	Each port features a dedicated set of TX and RX LEDs to indicate the link/activity state.		
LED	State	Description	
Rx	Green	Connection established.	
Rx	Yellow	The interface is receiving an OOF (Out of Frame) alarm.	
Rx	Red	The interface is receiving an ALOS (Alarm Loss of Signal) or Red alarm (e.g. corruption or loss of signal, connectivity loss, or no knowledge of connectivity).	
Rx	Off	The interface is disabled.	
Tx	Green	Connection established	
Tx	Yellow	The interface is in loopback mode.	
Tx	Red	The interface is receiving or transmitting an RAI (Remote Alarm Indication) or AIS (Alarm Indication Signal) alarm.	
Tx	Off	The interface is disabled.	

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Pin-out description

The following is the pin-out for the RJ48C ports:

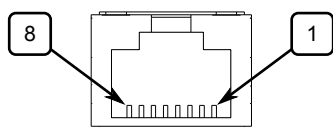


Figure 7.6 RJ48C Pin Configuration

Pin	Name	Description
1	RRING	Receive Negative
2	RTIP	Receive Positive
3	Reserved (Do Not Connect)	
4	TRING	Transmit Negative
5	TTIP	Transmit Positive
6	Reserved (Do Not Connect)	
7	Reserved (Do Not Connect)	
8	Reserved (Do Not Connect)	

Technical specifications

General	Power consumption	3 W
Interface/cable	Interface	T1/E1 (Channelized/ Unchannelized)
	Connector	RJ48C
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.

European Union (EU)	This module is marked with a CE marking and can be used in any EU member state.
Industry Canada	This module is certified under IC CS-03 Part II, Issue 9. The product ID is listed on the label affixed to the module.
ACTA	This module is certified under Part 68 (subpart B) of the FCC Rules. The product ID is listed on the label affixed to the module.

If requested, this information must be provided to the telephone company.

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/).

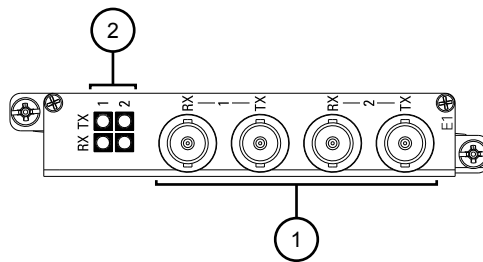
Ordering information

Description	4 x T1/E1 RJ48 (Channelized/Unchannelized)
Article numbers	6GK6015-0AL20-0MD0 (Standard)
	6GK6015-0AL20-0MD1 (Conformal coated)

7.4 RUGGEDCOM RX1500PN LM E02

The RUGGEDCOM RX1500PN LM E02 module features two sets of E1 BNC ports for connection to a Wide Area Network (WAN).

Description



- ① E1 BNC Ports
- ② Port LEDs

Figure 7.7 RUGGEDCOM RX1500PN LM E02

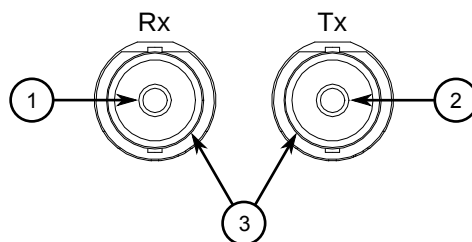
WAN Ports	Fixed E1 BNC ports.								
Port LEDs	Each receive (RX) and transmit (TX) port features a dedicated LED that indicates the link/activity state.								
<table border="1"> <thead> <tr> <th>State</th><th>Description</th></tr> </thead> <tbody> <tr> <td>Green (Solid)</td><td>Link established</td></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								

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Pin-out description

The following is the pin-out for the BNC ports:



- ① RTIP

- ② TTIP
- ③ Chassis

Figure 7.8 BNC pin configuration

Technical specifications

General	Power consumption	3 W
Interface/cable	Interface	E1 (Channelized/unchannelized) Supports 2 Mbps G.703 with 75 Ω coaxial cables
	Connector	BNC (75 Ω)
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

Description	2 x E1 75 Ohms BNC (Channelized/unchannelized)
Article numbers	6GK6015-0AL20-0HC0 (Standard)
	6GK6015-0AL20-0HC1 (Conformal coated)

7.5 RUGGEDCOM RX1500PN LM D02

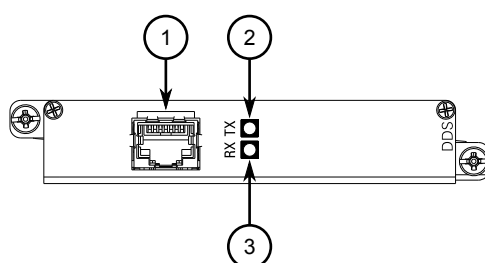
The RUGGEDCOM RX1500PN LM D02 module features a single Digital Data Services (DDS) port that supports line rates of 56 kbps (Master/Slave) and 64 kbps (Slave).

Note

This module is not RoHS certified. It must be purchased separately from any RUGGEDCOM RX1500 series device.

Any RUGGEDCOM RX1500 series device equipped with this module does not meet the requirements for a CE declaration of conformity.

Description



- ① DDS Port
- ② TX LED
- ③ RX LED

Figure 7.9 RUGGEDCOM RX1500PN LM D02

DDS Ports	Fixed DDS RJ48S port.		
Port LEDs	LEDs indicate the link/activity state of the port.		
LED	State	Description	
Rx	Green	Connection established	
Rx	Yellow	The interface is receiving an OOF (Out of Frame) alarm.	
Rx	Red	The interface is receiving an ALOS (Alarm Loss of Signal) or Red alarm (e.g. corruption or loss of signal, connectivity loss, or no knowledge of connectivity).	
Rx	Off	The interface is disabled.	
Tx	Green	Connection established	
Tx	Yellow	The interface is in loopback mode.	
Tx	Red	The interface is receiving or transmitting an RAI (Remote Alarm Indication) or AIS (Alarm Indication Signal) alarm.	
Tx	Off	The interface is disabled.	

Standards and Operating Modes

The module is compatible with the following standards:

- AT&T PUB 62310 (Standard DDS)
- BELLCORE TA-TSY-000077
- BELLCORE TR-TSY-000458
- ANSI T1.410

It also supports the following operating modes, which are configurable via the operating system for the host device:

Operating Mode	Line Rate
DDS-PRI	56 kbps
CC-64K	72 kbps

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Pin-out description

The following is the pin-out for the RJ48S ports:

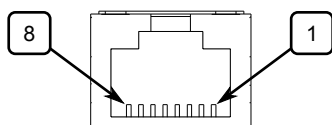


Figure 7.10 DDS RJ48S Pin

Pin	Name	Description
1	R1	Transmit data to network (Ring 1)
2	T1	Transmit data to network (Tip 1)
3		Reserved (Do Not Connect)
4		Reserved (Do Not Connect)
5		Reserved (Do Not Connect)
6		Reserved (Do Not Connect)
7	T	Receive data from network (Ring)
8	R	Receive data from network (Tip)

Technical specifications

General	Power consumption	3 W
Interface/cable	Speed	56 kbps (Master/Slave) or 64 kbps (Slave)

	Connector	RJ48
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

Description	1k DDS RJ48 (56k Master/Slave, 64 Slave)
Article numbers	6GK6015-0AL20-0LB0 (Standard)
	6GK6015-0AL20-0LB1 (Conformal coated)

Cellular modem modules

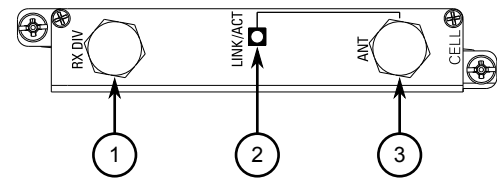
The following cellular modem modules are available.

RUGGEDCOM RX1500PN LM W11	"RUGGEDCOM RX1500PN LM W11" (Page 116)
RUGGEDCOM RX1500PN LM W12	"RUGGEDCOM RX1500PN LM W12" (Page 124)
RUGGEDCOM RX1500PN LM W21	"RUGGEDCOM RX1500PN LM W21" (Page 132)
RUGGEDCOM RX1500PN LM W22	"RUGGEDCOM RX1500PN LM W22" (Page 140)
RUGGEDCOM RX1500PN LM W32	"RUGGEDCOM RX1500PN LM W32" (Page 148)
RUGGEDCOM RX1500PN LM W41	"RUGGEDCOM RX1500PN LM W41" (Page 156)
RUGGEDCOM RX1500PN LM W51	"RUGGEDCOM RX1500PN LM W51" (Page 165)
RUGGEDCOM RX1500PN LM W61	"RUGGEDCOM RX1500PN LM W61" (Page 176)
RUGGEDCOM RX1500PN LM W81	"RUGGEDCOM RX1500PN LM W81" (Page 185)
RUGGEDCOM RX1500PN LM W91	"RUGGEDCOM RX1500PN LM W91" (Page 194)

8.1 RUGGEDCOM RX1500PN LM W11

The RUGGEDCOM RX1500PN LM W11 module offers GSM/EDGE/HSPA+ capabilities for wireless remote access to the 3G (third generation) networks in North America (AT&T). It supports a single primary antenna and an optional diversity antenna to improve radio signal strength.

Description



- ① RX DIV port
- ② LINK/ACT LED
- ③ ANT port

Figure 8.1 RUGGEDCOM RX1500PN LM W11

RX DIV ports	Port for the diversity (secondary) antennas.
ANT ports	Port for the primary antennas.
LINK/ACT LED	Port ANT features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

⚠ WARNING
Radio interference hazard – risk of death, serious personal injury or equipment damage.
Do not operate the cellular modem in the following areas:
• Areas where explosives are actively used • In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc. • Near medical or life support equipment or devices • In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

 WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installation requirements

The cellular modem module is approved for modular use in mobile applications. The module, as part of the RUGGEDCOM RX1500, can be integrated into a final product without additional certification from the Federal Communications Commission (FCC) or Industry Canada (IC) if the application meets the following requirements:

Note

If this module is integrated into a portable device, separate approval related to the Specific Absorption Rate (SAR) requirements of FCC Part 2.1093 and IC RSS-102 is required.

- Persons in the area must be kept at least 20 cm (8 in) from the antenna at all times.
- The antenna gain, including cable loss, must not exceed the maximum allowable gain specified for the module.
- The cellular modem and antenna must not be next to or operate in conjunction with another transmitter or antenna within a host device.
- A label must be affixed to the end product that indicates the FCC and Industry Canada IDs for the cellular modem.
- The user documentation for the end product must clearly indicate the operating requirements and conditions that comply with current FCC and IC radio frequency exposure guidelines.
- The end product must comply with the unintentional emission testing requirements of FCC Part 15.

If the application does not meet these requirements, further certification is required.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card.
2. Insert the module into the host device. For more information, refer to the "Equipment Manual" for the device.
3. Connect an antenna.

Installing SIM cards

The media module requires at least one active mini-SIM card (2FF size format) for the primary antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install one or more SIM cards, do the following:

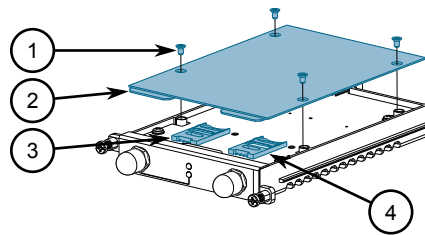
**NOTICE****Static electricity hazard – risk of damage to equipment**

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. Remove the media module from the chassis. For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

Figure 8.2 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis. For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 3G multi-band antenna, do the following:

Note

Primary and diversity (secondary) antennas must be separated by a minimum distance of 20 cm (7.9 in).

Note

A specific brand of antenna is not specified.

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

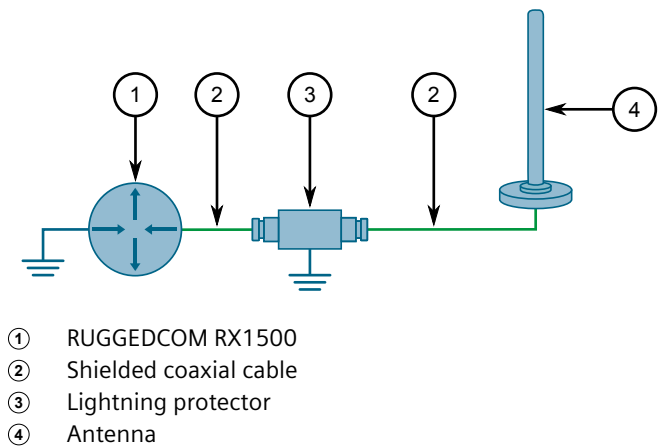


Figure 8.3 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the module.
 - If the antenna is a primary antenna, connect the cable to the **ANT** port
 - If the antenna is a diversity (secondary) antenna, connect the cable to the **RX DIV** port

Technical specifications

General

Services	/EDGE/HSPA+
Region	North America (AT&T)
Connector	50 Ω SMA
Antennas	1 x GSM/EDGE/HSPA+, 1 x Receive Diversity (Secondary)
SIM	Dual Mini-SIM (2FF)
Power consumption	7 W

Conducted Tx (Transmit) power tolerances

System/ Operating Band	Frequency Band (MHz)	Conducted Tx Power (dBm)	Comment
-850 and GSM-900	850/900	+32 ± 1	GMSK mode, connectorized (class 4)
		+27 ± 1	8PSK mode, connectorized (class E2)
DCS-1800 and PCS-19001	1800/1900	+29 ± 1	GMSK mode, connectorized (class 1)
		+26 ± 1	8PSK mode, connectorized (class E2)
Band I	2100	+23 ± 1	AMR 12.2 kbps, connectorized (class 3)
Band II, V, VI and VIII	800, 850, 900 and 1900		

Supported HSPA+ frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
1	2100	1920 to 1980	2110 to 2170
2	1900	1850 to 1910	1930 to 1990
5	850	824 to 849	869 to 894
6	–	830 to 840	875 to 885
8	900	880 to 915	925 to 960

Supported GSM/EDGE frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
GSM	GSM850	824 to 849	869 to 894
GSM	GSM900	890 to 915	935 to 960
EDGE	E-GSM 900	880 to 915	925 to 960
GSM	DCS1800	1710.2 to 1784.8	1805.2 to 1879.8
GSM	GSM1900	1850 to 1910	1930 to 1990

Supported WCDMA frequency bands

Band	Frequency range			
	Tx (MHz)	VSWR	Rx (MHz)	VSWR
Band I WCDMA 2100	1920 to 1980	< 2.5:1	2110 to 2170	< 3.5:1
Band II WCDMA 1900	1850 to 1910	< 2.5:1	1930 to 1990	< 2.5:1
Band VIII WCDMA 900	880 to 915	< 2.5:1	925 to 960	< 3.5:1
Band V WCDMA 850	824 to 849	< 2.5:1	869 to 894	< 3.5:1
Band VI WCDMA 800	830 to 840	< 2.5:1	875 to 885	< 3.5:1
GSM 850	824 to 849	< 2.5:1	869 to 894	< 3.5:1

Band	Frequency range			
	Tx (MHz)	VSWR	Rx (MHz)	VSWR
E-GSM 900	880 to 915	< 2.5:1	925 to 960	< 3.5:1
GSM 1800	1710 to 1785	< 2.5:1	1805 to 1880	< 3.5:1
GSM 1900	1850 to 1910	< 2.5:1	1930 to 1990	< 2.5:1

RX diversity support and maximum allowable gain per WCDMA frequency band

Band	RX diversity support	Maximum allowable gain (dBi)
Band I WCDMA 2100	✓	4
Band II WCDMA 1900	✓	4
Band VIII WCDMA 900	✓	5
Band V WCDMA 850	✓	5
Band VI WCDMA 800	✓	5
GSM 850	✗	5
E-GSM 900	✗	5
GSM 1800	✗	4
GSM 1900	✗	4

Operating temperature

Operating temperature	Compliance
-25 to 60 °C (-13 to 140 °F)	Full Radio Frequency (RF) compliance
60 to 75 °C (140 to 167 °F)	Reduced Radio Frequency (RF) performance

Certification

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

FCC	This module is certified under Part 15 (subpart B) of the FCC Rules and has been assigned the product ID N7NMC8705.
Industry Canada	This module is certified under IC CS-03 Part II, Issue 9 and has been assigned the product ID 2417C-MC8705.
AT&T	This module has been assigned the FCC product ID N7NMC8705. This module has been assigned the Industry Canada product ID 2417C-MC8705.
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/).

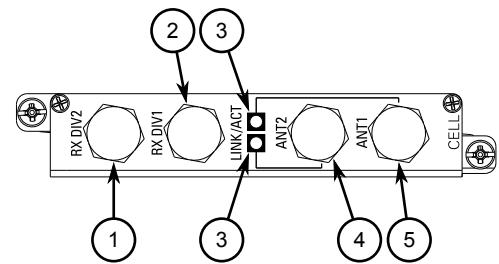
Ordering information

Description	1 x GSM/EDGE/HSPA
Article numbers	6GK6015-0AL20-0WB0 (Standard)
	6GK6015-0AL20-0WB1 (Conformal coated)

8.2 RUGGEDCOM RX1500PN LM W12

The RUGGEDCOM RX1500PN LM W12 module offers GSM/EDGE/HSPA+ capabilities for wireless remote access to 3G (third generation) networks in North America (AT&T), Europe and Australia. It supports dual primary antennas and optional diversity antennas to improve radio signal strength.

Description



- ① RX DIV 1 port
- ② RX DIV 2 port
- ③ LINK/ACT LED
- ④ ANT1 port
- ⑤ ANT2 port

Figure 8.4 RUGGEDCOM RX1500PN LM W12

RX DIV 1/RX DIV 2 ports	Ports for the diversity (secondary) antennas.
ANT1/ANT2 ports	Ports for the primary antennas.
LINK/ACT LED	Port ANT1 features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

 **WARNING**

Radio interference hazard – risk of death, serious personal injury or equipment damage.

Do not operate the cellular modem in the following areas:

- Areas where explosives are actively used
- In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc.
- Near medical or life support equipment or devices

- In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

 WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installation requirements

The cellular modem module is approved for modular use in mobile applications. The module, as part of the RUGGEDCOM RX1500, can be integrated into a final product without additional certification from the Federal Communications Commission (FCC) or Industry Canada (IC) if the application meets the following requirements:

Note

If this module is integrated into a portable device, separate approval related to the Specific Absorption Rate (SAR) requirements of FCC Part 2.1093 and IC RSS-102 is required.

- Persons in the area must be kept at least 20 cm (8 in) from the antenna at all times.
- The antenna gain, including cable loss, must not exceed the maximum allowable gain specified for the module.
- The cellular modem and antenna must not be next to or operate in conjunction with another transmitter or antenna within a host device.
- A label must be affixed to the end product that indicates the FCC and Industry Canada IDs for the cellular modem.
- The user documentation for the end product must clearly indicate the operating requirements and conditions that comply with current FCC and IC radio frequency exposure guidelines.
- The end product must comply with the unintentional emission testing requirements of FCC Part 15.

If the application does not meet these requirements, further certification is required.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card for each network carrier.
2. Insert the module into the host device. For more information, refer to the "Equipment Manual" for the device.
3. Connect antennas.

Installing SIM cards

The media module requires at least one active mini-SIM card (2FF size format) for the primary antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install one or more SIM cards, do the following:

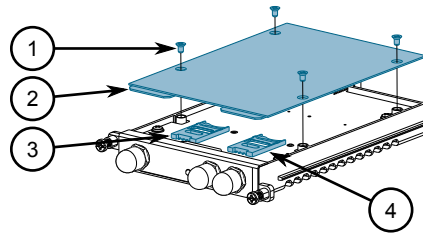
**NOTICE****Static electricity hazard – risk of damage to equipment**

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. Remove the media module from the chassis. For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

Figure 8.5 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis. For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 3G multi-band antenna, do the following:

⚠ NOTICE

If two antennas are to be installed, the antennas must be separated by a minimum distance of 20 cm (7.9 in).

Note

A specific brand of antenna is not specified.

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

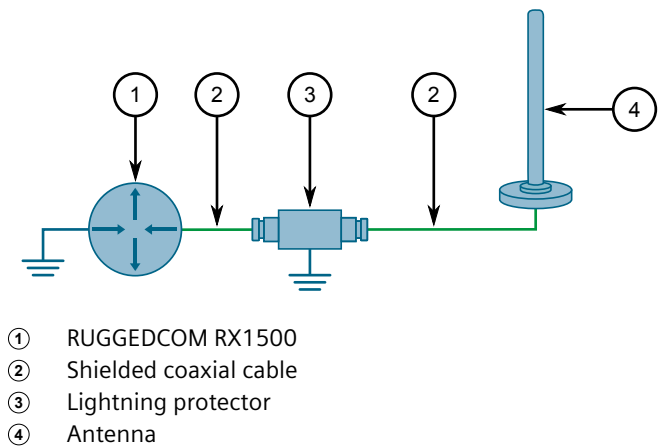


Figure 8.6 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the module.
 - If the antenna is a primary antenna, connect the cable to the **ANT 1** or **ANT 2** port
 - If the antenna is a diversity (secondary) antenna, connect the cable to the **RX DIV 1** or **RX DIV 2** port

Technical specifications

General

Services	/EDGE/HSPA+
Region	North America (AT&T), European Union, Australia
Connector	50 Ω SMA
Antennas	2 x GSM/EDGE/HSPA+, 2 x Receive Diversity (Secondary)
SIM	Dual Mini-SIM (2FF)
Power consumption	7 W

Conducted Tx (Transmit) power tolerances

System/ Operating Band	Frequency Band (MHz)	Conducted Tx Power (dBm)	Comment
-850 and GSM-900	850/900	+32 ± 1	GMSK mode, connectorized (class 4)
		+27 ± 1	8PSK mode, connectorized (class E2)
DCS-1800 and PCS-19001	1800/1900	+29 ± 1	GMSK mode, connectorized (class 1)
		+26 ± 1	8PSK mode, connectorized (class E2)
Band I	2100	+23 ± 1	AMR 12.2 kbps, connectorized (class 3)
Band II, V, VI and VIII	800, 850, 900 and 1900		

Supported HSPA+ frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
1	2100	1920 to 1980	2110 to 2170
2	1900	1850 to 1910	1930 to 1990
5	850	824 to 849	869 to 894
6	–	830 to 840	875 to 885
8	900	880 to 915	925 to 960

Supported GSM/EDGE frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
GSM	GSM850	824 to 849	869 to 894
GSM	GSM900	890 to 915	935 to 960
EDGE	E-GSM 900	880 to 915	925 to 960
GSM	DCS1800	1710.2 to 1784.8	1805.2 to 1879.8
GSM	GSM1900	1850 to 1910	1930 to 1990

Supported WCDMA frequency bands

Band	Frequency range			
	Tx (MHz)	VSWR	Rx (MHz)	VSWR
Band I WCDMA 2100	1920 to 1980	< 2.5:1	2110 to 2170	< 3.5:1
Band II WCDMA 1900	1850 to 1910	< 2.5:1	1930 to 1990	< 2.5:1
Band VIII WCDMA 900	880 to 915	< 2.5:1	925 to 960	< 3.5:1
Band V WCDMA 850	824 to 849	< 2.5:1	869 to 894	< 3.5:1
Band VI WCDMA 800	830 to 840	< 2.5:1	875 to 885	< 3.5:1
GSM 850	824 to 849	< 2.5:1	869 to 894	< 3.5:1

Band	Frequency range			
	Tx (MHz)	VSWR	Rx (MHz)	VSWR
E-GSM 900	880 to 915	< 2.5:1	925 to 960	< 3.5:1
GSM 1800	1710 to 1785	< 2.5:1	1805 to 1880	< 3.5:1
GSM 1900	1850 to 1910	< 2.5:1	1930 to 1990	< 2.5:1

RX diversity support and maximum allowable gain per WCDMA frequency band

Band	RX diversity support	Maximum allowable gain (dBi)
Band I WCDMA 2100	✓	4
Band II WCDMA 1900	✓	4
Band VIII WCDMA 900	✓	5
Band V WCDMA 850	✓	5
Band VI WCDMA 800	✓	5
GSM 850	✗	5
E-GSM 900	✗	5
GSM 1800	✗	4
GSM 1900	✗	4

Operating temperature

Operating temperature	Compliance
-25 to 60 °C (-13 to 140 °F)	Full Radio Frequency (RF) compliance
60 to 75 °C (140 to 167 °F)	Reduced Radio Frequency (RF) performance

Certification

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

FCC	This module is certified under Part 15 (subpart B) of the FCC Rules and has been assigned the product ID N7NMC8705.
Industry Canada	This module is certified under IC CS-03 Part II, Issue 9 and has been assigned the product ID 2417C-MC8705.
AT&T	This module has been assigned the FCC product ID N7NMC8705. This module has been assigned the Industry Canada product ID 2417C-MC8705.
ACMA	This module complies with the Level 1, 2 and 3 requirements defined by the Australian Communications and Media Authority (ACMA) under the Radiocommunications Act 1992 and the Telecommunications Act 1997.
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	2 x GSM/EDGE/HSPA
Article numbers	6GK6015-0AL20-0WC0 (Standard)
	6GK6015-0AL20-0WC1 (Conformal coated)

8.3 RUGGEDCOM RX1500PN LM W21

The RUGGEDCOM RX1500PN LM W21 module offers EVDO Rev A capabilities for wireless remote access to 3G (third generation) networks in North America (Verizon), Europe and Australia. It supports a single primary antenna and an optional diversity antenna to improve radio signal strength.

Description

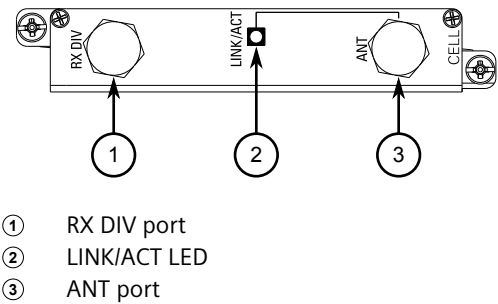


Figure 8.7 RUGGEDCOM RX1500PN LM W21

RX DIV ports	Port for the diversity (secondary) antennas.
ANT ports	Port for the primary antennas.
LINK/ACT LED	Port ANT features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

 **WARNING**

Radio interference hazard – risk of death, serious personal injury or equipment damage.

Do not operate the cellular modem in the following areas:

- Areas where explosives are actively used
- In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc.
- Near medical or life support equipment or devices
- In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

 WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installation requirements

The cellular modem module is approved for modular use in mobile applications. The module, as part of the RUGGEDCOM RX1500, can be integrated into a final product without additional certification from the Federal Communications Commission (FCC) or Industry Canada (IC) if the application meets the following requirements:

Note

If this module is integrated into a portable device, separate approval related to the Specific Absorption Rate (SAR) requirements of FCC Part 2.1093 and IC RSS-102 is required.

- Persons in the area must be kept at least 20 cm (8 in) from the antenna at all times.
- The antenna gain, including cable loss, must not exceed the maximum allowable gain specified for the module.
- The cellular modem and antenna must not be next to or operate in conjunction with another transmitter or antenna within a host device.
- A label must be affixed to the end product that indicates the FCC and Industry Canada IDs for the cellular modem.
- The user documentation for the end product must clearly indicate the operating requirements and conditions that comply with current FCC and IC radio frequency exposure guidelines.
- The end product must comply with the unintentional emission testing requirements of FCC Part 15.

If the application does not meet these requirements, further certification is required.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card.
2. Insert the module into the host device. For more information, refer to the "Equipment Manual" for the device.
3. Connect an antenna.

Installing SIM cards

The media module requires at least one active mini-SIM card (2FF size format) for the primary antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install one or more SIM cards, do the following:

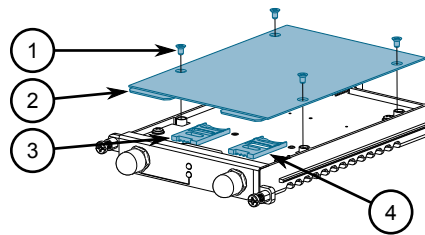
**NOTICE****Static electricity hazard – risk of damage to equipment**

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. Remove the media module from the chassis. For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

Figure 8.8 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis. For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 3G multi-band antenna, do the following:

NOTICE
Configuration hazard – risk of reduced performance
Each antenna and connecting cable must have a nominal impedance of 50 Ω with a return loss of better than 10 dB across each frequency band. If the nominal impedance is different, Radio Frequency (RF) performance will be reduced.

Note

- Antenna installation must be as per Article 810 of the National Electric Code (NEC). Specifically, the grounding conductor must not be less than 10 AWG (Cu). The scheme should be either:
 - in accordance with UL 96 and 96A Lightning Protection Components and Installation Requirements for Lightning Protection Systems (LPS)
 - tested in accordance with UL 50 and UL 497
- A Radio Frequency (RF) site survey is recommended prior to any installation to help determine the best location for the LTE and GPS antennas. For assistance, contact a Siemens Sales representative.
- The cellular modem supports SISO (Single Input Single Output) and MIMO (Multiple Input Multiple Output) modes. At minimum, a single antenna connected to the ANT1 port is required for SISO mode and to support lower generation wireless standards, such as GSM or EDGE. A separate diversity (secondary) antenna is required for MIMO performance.
- For mobile and fixed operating configurations, in accordance with RED Directive 2014/53/EU, the maximum antennae gain is 3 dBi for 900 MHz, 1800 MHz, 2100 MHz and 2600 MHz.
- For mobile and fixed operating configurations, in accordance with FCC 47 CFR, section 2.1091, the antenna gain, including cable loss must not exceed:
 - 9.0 dBi at 700 MHz
 - 6.5 dBi at 800/850 MHz
 - 6.0 dBi at 1700 MHz
 - 3.0 dBi at 1900 MHz

Under no conditions may an antenna gain be used that would exceed the ERP and/or EIRP power limits specified in FCC 47 CFR Parts 22, 24, 27 and 90.

- If the device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.
 - If two or more antennas are to be installed, the antennas must be separated by a minimum distance of 20 cm (7.9 in).
-

Note

A specific brand of antenna is not specified.

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

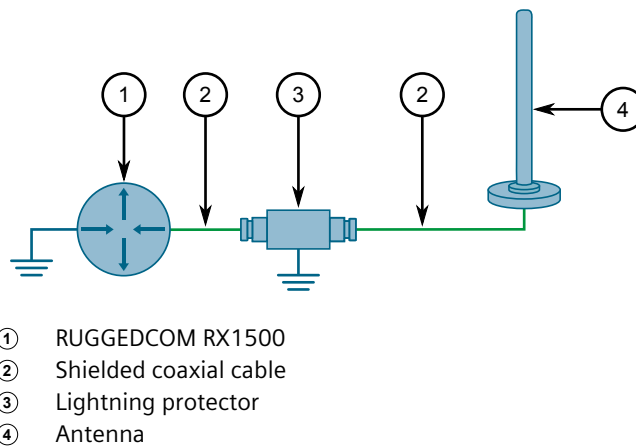


Figure 8.9 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the module.
 - If the antenna is a primary antenna, connect the cable to the **ANT** port
 - If the antenna is a diversity (secondary) antenna, connect the cable to the **RX DIV** port

Technical specifications

General

Services	EVDO Rev. A
Region	North America (Verizon)
Connector	50 Ω SMA
Antennas	1 x EVDO Rev A, 1 x Receive Diversity (Secondary)
SIM	Dual Mini-SIM (2FF)
Power consumption	7 W

Typical Radio Frequency (RF)

System/ Operating Band	Frequency Band (MHz)		Conducted Tx Power (dBm)
	Transmit (Tx)	Receive (Rx)	
PCS	1851 to 1910	1930 to 1990	23 to 25
Cellular	824 to 849	869 to 894	

Supported EVDO Rev A frequency bands

Frequency	Tx (MHz)	Rx (MHz)
800	824 to 849	869 to 894
1900	1850 to 1910	1930 to 1990

Supported WCDMA frequency bands

Band	Frequency range			
	Tx (MHz)	VSWR	Rx (MHz)	VSWR
Band I WCDMA 2100	1920 to 1980	< 2.5:1	2110 to 2170	< 3.5:1
Band II WCDMA 1900	1850 to 1910	< 2.5:1	1930 to 1990	< 2.5:1
Band VIII WCDMA 900	880 to 915	< 2.5:1	925 to 960	< 3.5:1
Band V WCDMA 850	824 to 849	< 2.5:1	869 to 894	< 3.5:1
Band VI WCDMA 800	830 to 840	< 2.5:1	875 to 885	< 3.5:1
GSM 850	824 to 849	< 2.5:1	869 to 894	< 3.5:1
E-GSM 900	880 to 915	< 2.5:1	925 to 960	< 3.5:1
GSM 1800	1710 to 1785	< 2.5:1	1805 to 1880	< 3.5:1
GSM 1900	1850 to 1910	< 2.5:1	1930 to 1990	< 2.5:1

RX diversity support and maximum allowable gain per WCDMA frequency band

Band	RX diversity support	Maximum allowable gain (dBi)
Band I WCDMA 2100	✓	4
Band II WCDMA 1900	✓	4
Band VIII WCDMA 900	✓	5
Band V WCDMA 850	✓	5
Band VI WCDMA 800	✓	5
GSM 850	✗	5
E-GSM 900	✗	5
GSM 1800	✗	4
GSM 1900	✗	4

Operating temperature

Operating temperature	Compliance
-30 to 60 °C (-22 to 140 °F)	Full Radio Frequency (RF) compliance
60 to 75 °C (140 to 167 °F)	Reduced Radio Frequency (RF) performance

Certification

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

Verizon Wireless	This module is certified by Verizon Wireless in North America under Open Development Certification Agreement MA-004198-2012.
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/].

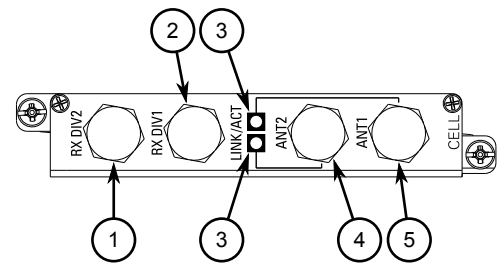
Ordering information

Description	1 x EVDO rev A Verizon US
Article numbers	6GK6015-0AL20-0WD0 (Standard)
	6GK6015-0AL20-0WD1 (Conformal coated)

8.4 RUGGEDCOM RX1500PN LM W22

The RUGGEDCOM RX1500PN LM W22 module offers EVDO Rev A capabilities for wireless remote access to 3G (third generation) networks in North America (Verizon), Europe and Australia. It supports dual primary antennas and optional diversity antennas to improve radio signal strength.

Description



- ① RX DIV 1 port
- ② RX DIV 2 port
- ③ LINK/ACT LED
- ④ ANT1 port
- ⑤ ANT2 port

Figure 8.10 RUGGEDCOM RX1500PN LM W22

RX DIV 1/RX DIV 2 ports	Ports for the diversity (secondary) antennas.
ANT1/ANT2 ports	Ports for the primary antennas.
LINK/ACT LED	Port ANT1 features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

 **WARNING**

Radio interference hazard – risk of death, serious personal injury or equipment damage.

Do not operate the cellular modem in the following areas:

- Areas where explosives are actively used
- In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc.
- Near medical or life support equipment or devices

- In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

 WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installation requirements

The cellular modem module is approved for modular use in mobile applications. The module, as part of the RUGGEDCOM RX1500, can be integrated into a final product without additional certification from the Federal Communications Commission (FCC) or Industry Canada (IC) if the application meets the following requirements:

Note

If this module is integrated into a portable device, separate approval related to the Specific Absorption Rate (SAR) requirements of FCC Part 2.1093 and IC RSS-102 is required.

- Persons in the area must be kept at least 20 cm (8 in) from the antenna at all times.
- The antenna gain, including cable loss, must not exceed the maximum allowable gain specified for the module.
- The cellular modem and antenna must not be next to or operate in conjunction with another transmitter or antenna within a host device.
- A label must be affixed to the end product that indicates the FCC and Industry Canada IDs for the cellular modem.
- The user documentation for the end product must clearly indicate the operating requirements and conditions that comply with current FCC and IC radio frequency exposure guidelines.
- The end product must comply with the unintentional emission testing requirements of FCC Part 15.

If the application does not meet these requirements, further certification is required.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card for each network carrier.
2. Insert the module into the host device. For more information, refer to the "Equipment Manual" for the device.
3. Connect antennas.

Installing SIM cards

The media module requires at least one active mini-SIM card (2FF size format) for the primary antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install one or more SIM cards, do the following:

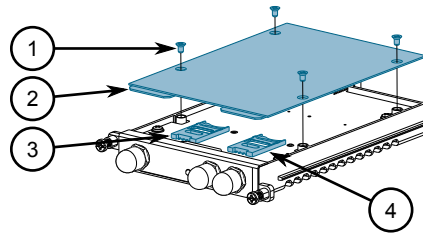
**NOTICE****Static electricity hazard – risk of damage to equipment**

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. Remove the media module from the chassis. For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

Figure 8.11 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis. For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 3G multi-band antenna, do the following:

NOTICE

Configuration hazard – risk of reduced performance

Each antenna and connecting cable must have a nominal impedance of 50 Ω with a return loss of better than 10 dB across each frequency band. If the nominal impedance is different, Radio Frequency (RF) performance will be reduced.

Note

- Antenna installation must be as per Article 810 of the National Electric Code (NEC). Specifically, the grounding conductor must not be less than 10 AWG (Cu). The scheme should be either:
 - in accordance with UL 96 and 96A Lightning Protection Components and Installation Requirements for Lightning Protection Systems (LPS)
 - tested in accordance with UL 50 and UL 497
- A Radio Frequency (RF) site survey is recommended prior to any installation to help determine the best location for the LTE and GPS antennas. For assistance, contact a Siemens Sales representative.
- The cellular modem supports SISO (Single Input Single Output) and MIMO (Multiple Input Multiple Output) modes. At minimum, a single antenna connected to the ANT1 port is required for SISO mode and to support lower generation wireless standards, such as GSM or EDGE. A separate diversity (secondary) antenna is required for MIMO performance.
- For mobile and fixed operating configurations, in accordance with RED Directive 2014/53/EU, the maximum antennae gain is 3 dBi for 900 MHz, 1800 MHz, 2100 MHz and 2600 MHz.
- For mobile and fixed operating configurations, in accordance with FCC 47 CFR, section 2.1091, the antenna gain, including cable loss must not exceed:
 - 9.0 dBi at 700 MHz
 - 6.5 dBi at 800/850 MHz
 - 6.0 dBi at 1700 MHz
 - 3.0 dBi at 1900 MHz

Under no conditions may an antenna gain be used that would exceed the ERP and/or EIRP power limits specified in FCC 47 CFR Parts 22, 24, 27 and 90.

- If the device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.
 - If two or more antennas are to be installed, the antennas must be separated by a minimum distance of 20 cm (7.9 in).
-

Note

A specific brand of antenna is not specified.

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

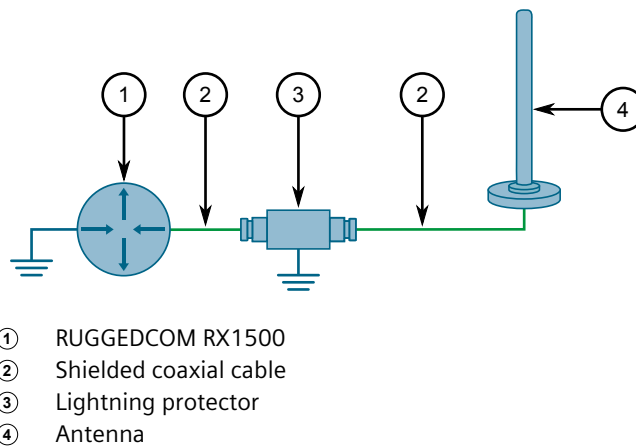


Figure 8.12 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the module.
 - If the antenna is a primary antenna, connect the cable to the **ANT 1** or **ANT 2** port
 - If the antenna is a diversity (secondary) antenna, connect the cable to the **RX DIV 1** or **RX DIV 2** port

Technical specifications

General

Services	EVDO Rev. A
Region	North America (Verizon)
Connector	50 Ω SMA
Antennas	2 x EVDO Rev A, 2 x Receive Diversity (Secondary)
SIM	Dual Mini-SIM (2FF)
Power consumption	7 W

Typical Radio Frequency (RF)

System/ Operating Band	Frequency Band (MHz)		Conducted Tx Power (dBm)
	Transmit (Tx)	Receive (Rx)	
PCS	1851 to 1910	1930 to 1990	23 to 25
Cellular	824 to 849	869 to 894	

Supported EVDO Rev A frequency bands

Frequency	Tx (MHz)	Rx (MHz)
800	824 to 849	869 to 894
1900	1850 to 1910	1930 to 1990

Supported WCDMA frequency bands

Band	Frequency range			
	Tx (MHz)	VSWR	Rx (MHz)	VSWR
Band I WCDMA 2100	1920 to 1980	< 2.5:1	2110 to 2170	< 3.5:1
Band II WCDMA 1900	1850 to 1910	< 2.5:1	1930 to 1990	< 2.5:1
Band VIII WCDMA 900	880 to 915	< 2.5:1	925 to 960	< 3.5:1
Band V WCDMA 850	824 to 849	< 2.5:1	869 to 894	< 3.5:1
Band VI WCDMA 800	830 to 840	< 2.5:1	875 to 885	< 3.5:1
GSM 850	824 to 849	< 2.5:1	869 to 894	< 3.5:1
E-GSM 900	880 to 915	< 2.5:1	925 to 960	< 3.5:1
GSM 1800	1710 to 1785	< 2.5:1	1805 to 1880	< 3.5:1
GSM 1900	1850 to 1910	< 2.5:1	1930 to 1990	< 2.5:1

RX diversity support and maximum allowable gain per WCDMA frequency band

Band	RX diversity support	Maximum allowable gain (dBi)
Band I WCDMA 2100	✓	4
Band II WCDMA 1900	✓	4
Band VIII WCDMA 900	✓	5
Band V WCDMA 850	✓	5
Band VI WCDMA 800	✓	5
GSM 850	✗	5
E-GSM 900	✗	5
GSM 1800	✗	4
GSM 1900	✗	4

Operating temperature

Operating temperature	Compliance
-30 to 60 °C (-22 to 140 °F)	Full Radio Frequency (RF) compliance
60 to 75 °C (140 to 167 °F)	Reduced Radio Frequency (RF) performance

Certification

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

Verizon Wireless	This module is certified by Verizon Wireless in North America under Open Development Certification Agreement MA-004198-2012.
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/].

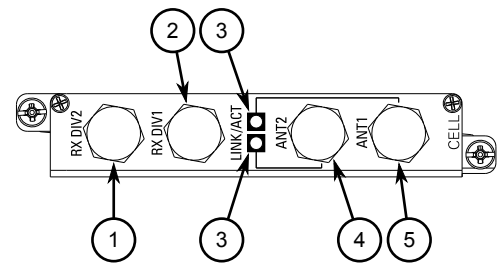
Ordering information

Description	2 x EVDO rev A Verizon US
Article numbers	6GK6015-0AL20-0WE0 (Standard) 6GK6015-0AL20-0WE1 (Conformal coated)

8.5 RUGGEDCOM RX1500PN LM W32

The RUGGEDCOM RX1500PN LM W32 module offers GSM/EDGE/HSPA+ and EVDO Rev A capabilities for wireless remote access to the 3G (third generation) networks in North America (AT&T and Verizon). It supports dual primary antennas and optional diversity antennas to improve radio signal strength.

Description



- ① RX DIV 1 port (GSM/EDGE/HSPA+)
- ② RX DIV 2 port (EVDO Rev A)
- ③ LINK/ACT LED
- ④ ANT1 port (GSM/EDGE/HSPA+)
- ⑤ ANT2 port (EVDO Rev A)

Figure 8.13 RUGGEDCOM RX1500PN LM W32

RX DIV 1/RX DIV 2 ports	Ports for the GSM/EDGE/HSPA+ and EVDO Rev A diversity (secondary) antennas.
ANT1/ANT2 ports	Ports for the primary and diversity (secondary) antennas.
LINK/ACT LED	Port ANT1 features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

 **WARNING**

Radio interference hazard – risk of death, serious personal injury or equipment damage.

Do not operate the cellular modem in the following areas:

- Areas where explosives are actively used
- In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc.

- Near medical or life support equipment or devices
- In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

 WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installation requirements

The cellular modem module is approved for modular use in mobile applications. The module, as part of the RUGGEDCOM RX1500, can be integrated into a final product without additional certification from the Federal Communications Commission (FCC) or Industry Canada (IC) if the application meets the following requirements:

Note

If this module is integrated into a portable device, separate approval related to the Specific Absorption Rate (SAR) requirements of FCC Part 2.1093 and IC RSS-102 is required.

- Persons in the area must be kept at least 20 cm (8 in) from the antenna at all times.
- The antenna gain, including cable loss, must not exceed the maximum allowable gain specified for the module.
- The cellular modem and antenna must not be next to or operate in conjunction with another transmitter or antenna within a host device.
- A label must be affixed to the end product that indicates the FCC and Industry Canada IDs for the cellular modem.
- The user documentation for the end product must clearly indicate the operating requirements and conditions that comply with current FCC and IC radio frequency exposure guidelines.
- The end product must comply with the unintentional emission testing requirements of FCC Part 15.

If the application does not meet these requirements, further certification is required.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card for each network carrier.
2. Insert the module into the host device. For more information, refer to the "Equipment Manual" for the device.
3. Connect antennas.

Installing SIM cards

The media module requires at least one active mini-SIM card (2FF size format) for the primary antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install one or more SIM cards, do the following:

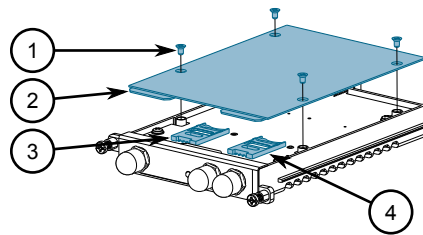
**NOTICE****Static electricity hazard – risk of damage to equipment**

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. Remove the media module from the chassis. For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

Figure 8.14 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis. For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 3G multi-band antenna, do the following:

Note

If two antennas are to be installed, the antennas must be separated by a minimum distance of 20 cm (7.9 in).

Note

A specific brand of antenna is not specified.

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

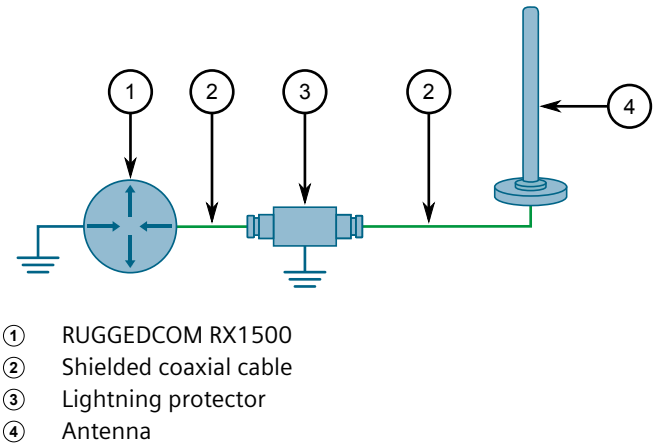


Figure 8.15 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the module.
 - For a primary GSM/EDGE/HSPA+ antenna, connect the cable to the **ANT1** port
 - For a primary EVDO Rev A antenna, connect the cable to the **ANT 2** port
 - For a GSM/EDGE/HSPA+ diversity (secondary) antenna, connect the cable to the **RX DIV 1** port
 - For a EVDO Rev A diversity (secondary) antenna, connect the cable to the **RX DIV 2** port

Technical specifications

General

Services	GSM/EDGE/HSPA+ and EVDO Rev. A
Region	North America (AT&T and Verizon)
Connector	50 Ω SMA
Antennas	1 x GSM/EDGE/HSPA+, 1 x EVDO Rev A, 2 x Receive Diversity (Secondary)
SIM	Dual Mini-SIM (2FF)

Power consumption 7 W

Conducted Tx (Transmit) power tolerances

System/ Operating Band	Frequency Band (MHz)	Conducted Tx Power (dBm)	Comment
GSM-850 and GSM-900	850/900	+32 ± 1	GMSK mode, connectorized (class 4)
		+27 ± 1	8PSK mode, connectorized (class E2)
DCS-1800 and PCS-19001	1800/1900	+29 ± 1	GMSK mode, connectorized (class 1)
		+26 ± 1	8PSK mode, connectorized (class E2)
Band I	2100	+23 ± 1	AMR 12.2 kbps, connectorized (class 3)
Band II, V, VI and VIII	800, 850, 900 and 1900		

Typical Radio Frequency (RF)

System/ Operating Band	Frequency Band (MHz)		Conducted Tx Power (dBm)
	Transmit (Tx)	Receive (Rx)	
PCS	1851 to 1910	1930 to 1990	23 to 25
Cellular	824 to 849	869 to 894	

Supported HSPA+ frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
1	2100	1920 to 1980	2110 to 2170
2	1900	1850 to 1910	1930 to 1990
5	850	824 to 849	869 to 894
6	–	830 to 840	875 to 885
8	900	880 to 915	925 to 960

Supported GSM/EDGE frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
GSM	GSM850	824 to 849	869 to 894
GSM	GSM900	890 to 915	935 to 960
EDGE	E-GSM 900	880 to 915	925 to 960
GSM	DCS1800	1710.2 to 1784.8	1805.2 to 1879.8
GSM	GSM1900	1850 to 1910	1930 to 1990

Supported EVDO Rev A frequency bands

Frequency	Tx (MHz)	Rx (MHz)
800	824 to 849	869 to 894
1900	1850 to 1910	1930 to 1990

Supported WCDMA frequency bands

Band	Frequency range			
	Tx (MHz)	VSWR	Rx (MHz)	VSWR
Band I WCDMA 2100	1920 to 1980	< 2.5:1	2110 to 2170	< 3.5:1
Band II WCDMA 1900	1850 to 1910	< 2.5:1	1930 to 1990	< 2.5:1
Band VIII WCDMA 900	880 to 915	< 2.5:1	925 to 960	< 3.5:1
Band V WCDMA 850	824 to 849	< 2.5:1	869 to 894	< 3.5:1
Band VI WCDMA 800	830 to 840	< 2.5:1	875 to 885	< 3.5:1
GSM 850	824 to 849	< 2.5:1	869 to 894	< 3.5:1
EGSM 900	880 to 915	< 2.5:1	925 to 960	< 3.5:1
GSM 1800	1710 to 1785	< 2.5:1	1805 to 1880	< 3.5:1
GSM 1900	1850 to 1910	< 2.5:1	1930 to 1990	< 2.5:1

RX diversity support and maximum allowable gain per WCDMA frequency band

Band	RX diversity support	Maximum allowable gain (dBi)
Band I (WCDMA 2100)	✓	4
Band II (WCDMA 1900)	✓	4
Band VIII (WCDMA 900)	✓	5
Band V (WCDMA 850)	✓	5
Band VI (WCDMA 800)	✓	5
GSM 850	✗	5
EGSM 900	✗	5
GSM 1800	✗	4
GSM 1900	✗	4

Operating temperature

Radio	Operating temperature	Compliance
First	-25 to 60 °C (-13 to 140 °F)	Full Radio Frequency (RF) compliance
	60 to 75 °C (140 to 167 °F)	Reduced Radio Frequency (RF) performance
Second	-30 to 60 °C (-22 to 140 °F)	Full Radio Frequency (RF) compliance
	60 to 75 °C (140 to 167 °F)	Reduced Radio Frequency (RF) performance

Certification

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

FCC	This module is certified under Part 15 (subpart B) of the FCC Rules and has been assigned the product IDs N7NMC8705 and N7N-MC5728.
Industry Canada	This module is certified under IC CS-03 Part II, Issue 9 and has been assigned the product IDs 2417C-MC8705 and 2417C-MC5728.
AT&T	This module has been assigned the FCC product ID N7N-MC8705 and N7N-MC5728. This module has been assigned the Industry Canada product IDs 2417C-MC8705 and 2417C-MC5728.
Verizon Wireless	This module is certified by Verizon Wireless in North America under Open Development Certification Agreement MA-004198-2012.
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/].

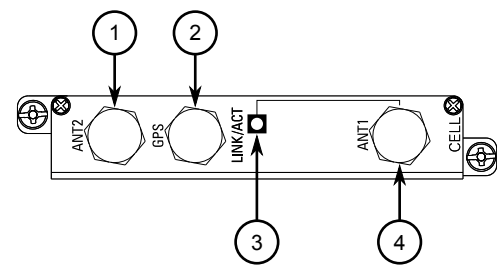
Ordering information

Description	2 x GSM/EDGE/HSPA and EVDO rev A Verizon US
Article numbers	6GK6015-0AL20-0WF0 (Standard) 6GK6015-0AL20-0WF1 (Conformal coated)

8.6 RUGGEDCOM RX1500PN LM W41

The RUGGEDCOM RX1500PN LM W41 module offers 4G LTE, HSPA+, HSDPA, HSUPA, DC-HSPA+, UMTS/WCDMA, EDGE, GPRS, GSM and GNSS capabilities for wireless remote access to 4G (fourth generation) LTE (Long Term Evolution) networks in European Union countries. It supports dual 4G LTE antennas and a single GPS antenna.

Description



- ① ANT2 port
- ② GPS port
- ③ LINK/ACT LED
- ④ ANT1 port

Figure 8.16 RUGGEDCOM RX1500PN LM W41

ANT1/ANT2 ports	Ports for the primary and diversity (secondary) antennas.
GPS port	Port for the GPS antenna.
LINK/ACT LED	Port ANT1 features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

 **WARNING**

Radio interference hazard – risk of death, serious personal injury or equipment damage.

Do not operate the cellular modem in the following areas:

- Areas where explosives are actively used
- In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc.
- Near medical or life support equipment or devices

- In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

 WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card for each network carrier.

Note

The host device must have RUGGEDCOM ROX v2.13.3 or higher installed.

2. Insert the module into the host device. For more information, refer to the "Equipment Manual" for the device.
3. Connect antennas.
4. Configure the LTE modem and GPS settings. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Installing/removing the SIM card

The media module requires at least one active mini-SIM card (2FF size format) for each antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install or remove a SIM card, do the following:

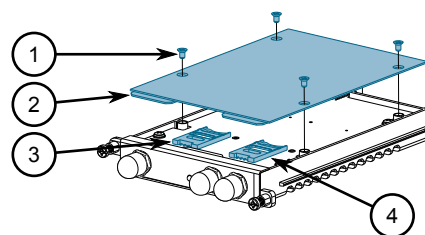
⚠ NOTICE**Static electricity hazard – risk of damage to equipment**

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. If necessary, remove the media module from the chassis. For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

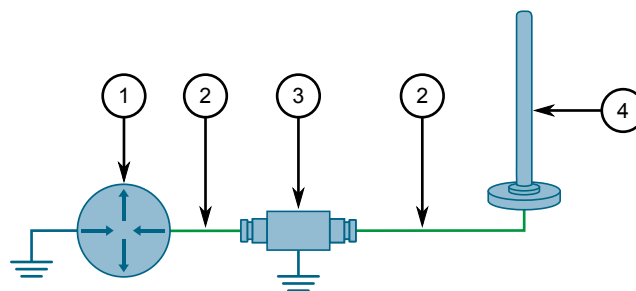
Figure 8.17 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis. For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 4G LTE multi-band or GPS antenna to the cellular modem line module, do the following:

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).



- ① RUGGEDCOM RX1500
- ② Shielded coaxial cable
- ③ Lightning protector
- ④ Antenna

Figure 8.18 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the device:
 - For a primary antenna, connect the cable to the **ANT1** port
 - For a diversity (secondary) antenna, connect the cable to the **ANT2** port
 - For the GPS antenna, connect the cable to the **GPS** port

Technical specifications

General

Services	4G LTE/HSPA+/HSDPA/HSUPA/DC-HSPA+/UMTS/WCDMA/EDGE/GPRS/GSM/GNSS
Region	European Union
Connector	50 Ω SMA
Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
SIM	Dual Mini-SIM (2FF)
Power consumption	7 W

Supported LTE channel bandwidths

Band	Channel bandwidths (MHz)					
	1.4	3	5	10	15	20
Band 1	✗	✗	✓	✓	✓	✓
Band 3	✓	✓	✓	✓	✓	✓
Band 7	✗	✗	✓	✓	✓	✓
Band 8	✓	✓	✓	✓	✗	✗
Band 20	✗	✗	✓	✓	✓	✓

Supported LTE frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
1	2100	1920 to 1980	2110 to 2170
3	1800	1710 to 1785	1805 to 1880
7	2600	2500 to 2570	2620 to 2690
8	900	880 to 915	925 to 960
20	800	832 to 862	791 to 821

Supported HSPA+ frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
1	2100	1920 to 1980	2110 to 2170
3	1800	1710 to 1785	1805 to 1800
8	900	880 to 915	925 to 960

Supported GSM/EDGE frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
EDGE	E-GSM 900	880 to 915	925 to 960
GSM	DCS 1800	1710.2 to 1784.8	1805.2 to 1879.8

Supported WCDMA frequency bands

Band	Frequencies (MHz)	
	Transmit (Tx)	Receive (Rx)
Band 1 (WCDMA 2100)	1920 to 1980	2110 to 2170
Band 2 (WCDMA 1900)	1850 to 1910	1930 to 1990
Band 5 (WCDMA 850)	824 to 849	869 to 894
Band 6 (WCDMA 800)	830 to 840	875 to 885
Band 8 (WCDMA 900)	880 to 915	925 to 960

GNSS specifications

Satellite channels	12 channel, continuous tracking
Protocols	NMEA 0183 v3.0
Acquisition time	- Hot start: 1 s - Warm start: 29 s - Cold start: 32 s
Accuracy	- Horizontal: < 2 m 6.6 ft (50 %), < 5 m or 16.4 ft (90 %) - Altitude: < 4 m or 13.1 (50 %), < 8 m or 26.2 (90 %) - Velocity: < 0.2 m/s or 0.7 ft/s
Sensitivity	- Tracking: -161 dBm^a - Acquisition (Assisted, Non-LTE): -158 dBm^b - Acquisition (Assisted, LTE): -153 dBm - Acquisition (Standalone): -145 dBm
Operational limits	Altitude < 6000 m (3.7 mi) or velocity < 100 m/s (328 ft/s) ^c

^a The lowest GNSS signal level at which the device can detect an in-view satellite 50% of the time when in sequential tracking mode.

^b The lowest GNSS signal level at which the device can detect an in-view satellite 50% of the time.

^c Either limit may be exceeded, but not both

GNSS standalone antenna requirements

Frequency range	- Narrow-Band GPS: 1572.42 MHz $\pm$ 2 MHz minimum - Wide-Band GPS and GLONASS: 1565 to 1606 MHz recommended
Field of View (FoV)	- Omni-directional in azimuth -45° to 90° in elevation
Polarization (average Gv/Gh)	> 0 dB ^a
Free space average gain (Gv + Gh) over FoV	> -3 (preferred) or -6 dBi ^b
Gain	- Maximum gain and uniform coverage in the high elevation angle and zenith - Gain in azimuth plane is not desired
Average 3D gain	> -5 dBi
Isolation between GNSS and LTE Main (Primary)	> 10 dB in all uplink bands
Typical VSWR	< 2:5:1

Polarization	Any other than LHCP (Left-Hand Circular Polarized) is acceptable.
---------------------	---

^a Vertical linear polarization is sufficient.

^b Gv and Gh are measured and averaged over -45 to 90° in elevation, and ± 180° in azimuth.

Conducted Rx (Receive) sensitivity for LTE bands

Band	Conducted Rx Sensitivity (dBm)			
	Primary (Typical)	Secondary (Typical)	SIMO (Typical)	SIMO (Worst Case)
Band 1	-98.7	-97.8	-101.1	-96.3
Band 3	-99.5	-97.3	-101.6	-93.3
Band 7	-98.0	-97.5	-100.5	-94.3
Band 8	-99.3	-98.5	-102.0	-93.3
Band 20	-99.6	-98.4	-99.8	-93.3

Conducted Rx (Receive) sensitivity for UMTS bands

Band	Error Rate ^a	Conducted Rx Sensitivity (dBm)		
		Primary (Typical)	Secondary (Typical)	Primary/ Secondary (Worst Case)
Band 1 (UMTS 2100)	0.1% BER	-111.4	-109.8	-106.7
Band 2 (UMTS 1900)		-110.8	-108.9	-104.7
Band 5 (UMTS 850)		-111.4	-111.2	-104.7
Band 8 (UMTS 900)		-111.8	-111.0	-103.7

^a Measured at 12.2 kbps

Conducted Rx (Receive) sensitivity for GSM/EDGE bands

Band	Error Rate	Modulation	Conducted Rx Sensitivity (dBm)	
			Typical	Worst Case
GSM 850	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-104	-98
EGSM 900	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-104	-98
DCS 1800	2 % BER	CS ^a	-110	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-105	-98
PCS 1900	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-104	-98

^a Circuit Switched

Conducted Tx (Transmit) power tolerances

Standard	Band	Conducted Tx Power
LTE	Band 1	+23 dBm $\pm$ 1 dB
	Band 3	
	Band 7	+22 dBm $\pm$ 1 dB
	Band 8	+23 dBm $\pm$ 1 dB
	Band 20	
UMTS	Band 1 (IMT 2100 12.2 kbps)	+23 dBm $\pm$ 1 dB ^a
	Band 2 (UMTS 1900 12.2 kbps)	
	Band 5 (UMTS 850 12.2 kbps)	
	Band 8 (UMTS 900 12.2 kbps)	
GSM/EDGE	GSM 850 CS	+ 32 dBm $\pm$ 1 dB ^b
	EGSM 900 CS	+ 27 dBm $\pm$ 1 dB ^c
	DCS 1800 CS	+ 29 dBm $\pm$ 1 dB ^d
	PCS 1900 CS	+ 26 dBm $\pm$ 1 dB ^e

^a Connectorized (Class 3)^b GMSK mode, connectorized (Class 4, 2 W, 33 dBm)^c 8PSK mode, connectorized (Class E2, 0.5 W, 27 dBm)^d GMSK mode, connectorized (Class 1, 1 W, 30 dBm)^e 8PSK mode, connectorized (Class E2, 0.4 W, 26 dBm)**Operating temperature**

Operating temperature	Compliance
-30 to 70 °C (-22 to 158 °F)	Class A (3GPP Compliant)
-40 to 85 °C (-40 to 185 °F)	Class B (Operational, Non-3GPP Compliant)

Certification

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

European Union (EU)

This module is marked with a CE marking and notified body number, and can be used throughout the European community.

CE 0680

A copy of the EU Declaration of Conformity is available from Siemens Canada Ltd. at:

<https://support.industry.siemens.com/cs/ww/en/view/109810680>

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/).

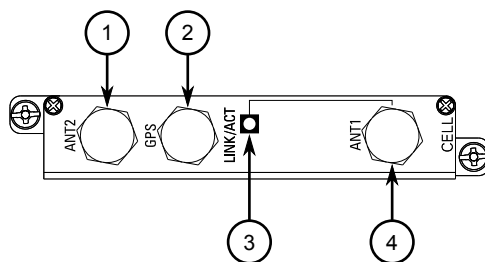
Ordering information

Description	1 x 4G/LTE European Union (EU)
Article numbers	6GK6015-0AL20-0WG0 (Standard)
	6GK6015-0AL20-0WG1 (Conformal coated)

8.7 RUGGEDCOM RX1500PN LM W51

The RUGGEDCOM RX1500PN LM W51 module offers 4G LTE, HSPA+, HSDPA, HSUPA, DC-HSAP+, UMTS/WDCAM, EDGE, GPRS, GSM, CDMA, EVDO and GNSS capabilities for wireless remote access to 4G (fourth generation) LTE (Long Term Evolution) networks in North America. It supports dual 4G LTE antennas and a single GPS antenna.

Description



- ① ANT2 port
- ② GPS port
- ③ LINK/ACT LED
- ④ ANT1 port

Figure 8.20 RUGGEDCOM RX1500PN LM W51

ANT1/ANT2 ports	Ports for the primary and diversity (secondary) antennas.
GPS port	Port for the GPS antenna.
LINK/ACT LED	Port ANT1 features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

WARNING

Radio interference hazard – risk of death, serious personal injury or equipment damage.

Do not operate the cellular modem in the following areas:

- Areas where explosives are actively used
- In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc.
- Near medical or life support equipment or devices

- In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

 WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installation requirements

The cellular modem module is approved for modular use in mobile applications. The module, as part of the RUGGEDCOM RX1500, can be integrated into a final product without additional certification from the Federal Communications Commission (FCC) or Industry Canada (IC) if the application meets the following requirements:

Note

If this module is integrated into a portable device, separate approval related to the Specific Absorption Rate (SAR) requirements of FCC Part 2.1093 and IC RSS-102 is required.

- Persons in the area must be kept at least 20 cm (8 in) from the antenna at all times.
- The antenna gain, including cable loss, must not exceed the maximum allowable gain specified for the module.
- The cellular modem and antenna must not be next to or operate in conjunction with another transmitter or antenna within a host device.
- A label must be affixed to the end product that indicates the FCC and Industry Canada IDs for the cellular modem.
- The user documentation for the end product must clearly indicate the operating requirements and conditions that comply with current FCC and IC radio frequency exposure guidelines.
- The end product must comply with the unintentional emission testing requirements of FCC Part 15.

If the application does not meet these requirements, further certification is required.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card for each network carrier.

Note

The host device must have RUGGEDCOM ROX v2.13.3 or higher installed.

2. Insert the module into the host device. For more information, refer to the "Equipment Manual" for the device.
3. Connect antennas.
4. Configure the LTE modem and GPS settings. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Installing/removing the SIM card

The media module requires at least one active mini-SIM card (2FF size format) for each antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install or remove a SIM card, do the following:

⚠ NOTICE

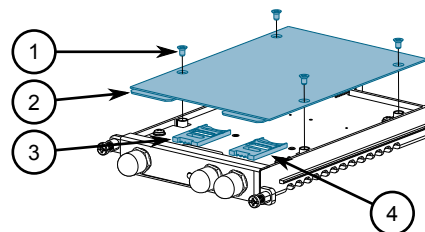
Static electricity hazard – risk of damage to equipment

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. If necessary, remove the media module from the chassis. For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

Figure 8.21 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis. For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 4G LTE multi-band or GPS antenna to the cellular modem line module, do the following:

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

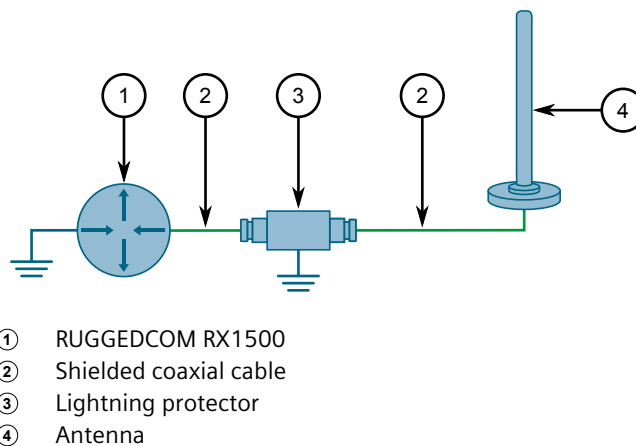


Figure 8.22 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the device:
 - For a primary antenna, connect the cable to the **ANT1** port
 - For a diversity (secondary) antenna, connect the cable to the **ANT2** port
 - For the GPS antenna, connect the cable to the **GPS** port

Technical specifications

General

Services	4G LTE/HSPA+/HSDPA/HSUPA/DC-HSAP+/UMTS/WDCAM/EDGE/GPRS/GSM/CDMA/EVDO/GNSS
Region	North America (Bell, Rogers, AT&T, Telus)
Connector	50 Ω SMA
Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
SIM	Dual Mini-SIM (2FF)
Power consumption	7 W

Supported RF Bandwidths

Standard	Bands	Notes	Data Rates
LTE	- Band 2 (1900 MHz) - Band 4 (AWS 1700/2100 MHz) - Band 5 (850 MHz) - Band 13 (700 MHz) - Band 17 (700 MHz) - Band 25 (1900 MHz G Block)	MIMO support	Category 3 Downlink 100 Mbps (20 MHz bandwidth) 50 Mbps (10 MHz bandwidth) Uplink 50 Mbps (20 MHz bandwidth) 25 Mbps (10 MHz bandwidth)
CDMA EVDO Release 0 or EVDO Release A	- Band Class 0 (Cellular 800 MHz) - Band Class 1 (PCS 1900 MHz) - Band Class 10 (Secondary 800 MHz)	Diversity support	CDMA IS-856 (1xEVDO Release A) - Up to 3.1 Mbps forward channel - Up to 1.8 Mbps reverse channel CDMA IS-2000 - Up to 153 kbps, simultaneous forward and reverse channel Circuit-Switched Data Bearers - Up to 14.4 kbps
UMTS (WCDMA) HSDPA HSUPA HSPA+ DC-HSPA+	- Band 1 (2100 MHz) - Band 2 (1900 MHz) - Band 4 (AWS 1700/2100 MHz) - Band 5 (850 MHz) - Band 8 (900 MHz)	Diversity support	Downlink - Up to 42 Mbps (category 24) Uplink - Up to 5.76 Mbps (category 6)
GSM GPRS EDGE	- GSM 850 (850 MHz) - EGSM 900 (900 MHz) - DCS 1800 (1800 MHz) - PCS 1900 (1900 MHz)	–	EDGE Throughput Up to 236 kbps
GNSS	- GPS (1575.42 MHz) - GLONASS (1602 MHz)	–	–

Supported LTE channel bandwidths

Band	Channel bandwidths (MHz)					
	1.4	3	5	10	15	20
Band 2	✓	✓	✓	✓	✓	✓
Band 4 (AWS)	✓	✓	✓	✓	✓	✓
Band 5	✓	✓	✓	✓	✗	✗

Band	Channel bandwidths (MHz)					
	1.4	3	5	10	15	20
Band 13	✗	✗	✓	✓	✗	✗
Band 17	✗	✗	✓	✓	✗	✗
Band 25	✓	✓	✓	✓	✓	✓

Supported LTE frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
Band 2	1900	1850 to 1910	1930 to 1990
Band 4 (AWS)	1700	1710 to 1755	2110 to 2155
Band 5	850	824 to 849	869 to 894
Band 12	700	699 to 716	729 to 746

Supported HSPA+ frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
2	1900	1850-1910	1930-1990
4	1700	1710-1755	2110-2155
5	850	824-849	869-894

Supported GSM frequency bands

Band	Frequencies (MHz)	
	Transmit (Tx)	Receive (Rx)
GSM 850	824 to 849	869 to 894
E-GSM 900	880 to 915	925 to 960
DCS 1800	1710 to 1785	1805 to 1880
PCS 1900	1850 to 1910	1930 to 1990

Supported WCDMA frequency bands

Band	Frequencies (MHz)	
	Transmit (Tx)	Receive (Rx)
Band 1 (WCDMA 2100)	1920 to 1980	2110 to 2170
Band 2 (WCDMA 1900)	1850 to 1910	1930 to 1990
Band 4 (AWS 1700/2100)	1710 to 1755	2110 to 2155
Band 5 (WCDMA 850)	824 to 849	869 to 894
Band 8 (WCDMA 900)	880 to 915	925 to 960

Supported CDMA frequency bands

Band	Frequencies (MHz)	
	Transmit (Tx)	Receive (Rx)
Band Class 0 (Cellular 800 MHz)	824 to 849	869 to 894
Band Class 1 (PCS 1900 MHz)	1850 to 1910	1930 to 1990

Band	Frequencies (MHz)	
	Transmit (Tx)	Receive (Rx)
Band Class 10 (Secondary 800 MHz) ^a	817 to 824	861 to 869

^a Subclass 2 and 3 are supported

GNSS specifications

Satellite channels	12 channel, continuous tracking
Protocols	NMEA 0183 v3.0
Acquisition time	- Hot start: 1 s - Warm start: 29 s - Cold start: 32 s
Accuracy	- Horizontal: < 2 m 6.6 ft (50 %), < 5 m or 16.4 ft (90 %) - Altitude: < 4 m or 13.1 (50 %), < 8 m or 26.2 (90 %) - Velocity: < 0.2 m/s or 0.7 ft/s
Sensitivity	- Tracking: -161 dBm^a - Acquisition (Assisted, Non-LTE): -158 dBm^b - Acquisition (Assisted, LTE): -153 dBm - Acquisition (Standalone): -145 dBm
Operational limits	Altitude < 6000 m (3.7 mi) or velocity < 100 m/s (328 ft/s) ^c

^a The lowest GNSS signal level at which the device can detect an in-view satellite 50% of the time when in sequential tracking mode.

^b The lowest GNSS signal level at which the device can detect an in-view satellite 50% of the time.

^c Either limit may be exceeded, but not both

GNSS standalone antenna requirements

Frequency range	- Narrow-Band GPS: 1572.42 MHz $\pm$ 2 MHz minimum - Wide-Band GPS and GLONASS: 1565 to 1606 MHz recommended
Field of View (FoV)	- Omni-directional in azimuth -45° to 90° in elevation
Polarization (average Gv/Gh)	> 0 dB ^a
Free space average gain (Gv + Gh) over FoV	> -3 (preferred) or -6 dBi ^b
Gain	- Maximum gain and uniform coverage in the high elevation angle and zenith - Gain in azimuth plane is not desired
Average 3D gain	> -5 dBi
Isolation between GNSS and LTE Main (Primary)	> 10 dB in all uplink bands
Typical VSWR	< 2:5:1
Polarization	Any other than LHCP (Left-Hand Circular Polarized) is acceptable.

^a Vertical linear polarization is sufficient.

^b Gv and Gh are measured and averaged over -45 to 90° in elevation, and $\pm$ 180° in azimuth.

Conducted Rx (Receive) sensitivity for LTE bands

LTE Band	Conducted Rx Sensitivity (dBm)			
	Primary (Typical)	Secondary (Typical)	SIMO (Typical)	SIMO (Worst Case)
LTE Band 2	-99.1	-98.2	-101.6	-94.3
LTE Band 4	-99.7	-98.9	-102.4	-96.3
LTE Band 5	-98.0	-99.1	-101.5	-94.3
LTE Band 13	-98.7	-99.1	-101.9	-96.3
LTE Band 17	-99.7	-99.0	-101.1	-93.3
LTE Band 25	-99.8	-98.1	-101.4	-92.8

Conducted Rx (Receive) sensitivity for UMTS bands

Band	Error Rate ^a	Conducted Rx Sensitivity (dBm)		
		Primary (Typical)	Secondary (Typical)	Primary/Secondary (Worst Case)
Band 1 (UMTS 2100)	0.1% BER	-111.0	-110.4	-106.7
Band 2 (UMTS 1900)		-111.4	-110.5	-104.7
Band 4 (AWS 1700/2100)		-112.1	-110.6	-106.7
Band 5 (UMTS 850)		-110.8	-111.7	-104.7
Band 8 (UMTS 900)		-111.8	-111.5	-103.7

^a Measured at 12.2 kbps**Conducted Rx (Receive) sensitivity for GSM/EDGE bands**

Band	Error Rate	Modulation	Conducted Rx Sensitivity (dBm)	
			Typical	Worst Case
GSM 850	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-111	-104
		EDGE (MCS5)	-102	-98
EGSM 900	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-111	-104
		EDGE (MCS5)	-102	-98
DCS 1800	2 % BER	CS ^a	-108	-102
	10 % BLER	GMSK (CS1)	-111	-104
		EDGE (MCS5)	-101	-98
PCS 1900	2 % BER	CS ^a	-108	-102
	10 % BLER	GMSK (CS1)	-111	-104
		EDGE (MCS5)	-101	-98

^a Circuit Switched

Conducted Rx (Receive) sensitivity for CDMA bands

Band	Standard	Error Rate	Conducted Rx Sensitivity (dBm)	
			Typical	Worst Case
Band Class 0 (Cellular 800 MHz)	CDMA 1x	0.5% FER	-109.6	-104.0
	EVDO Rev A	0.5% PER	-109.8	-105.5
Band Class 1 (PCS 1900 MHz)	CDMA 1x	0.5% FER	-110.8	-104.0
	EVDO Rev A	0.5% PER	-110.6	-105.5
Band Class 10 (Secondary 800 MHz)	CDMA 1x	0.5% FER	-110.3	-104.0
	EVDO Rev A	0.5% PER	-110.7	-105.5

Conducted Tx (Transmit) power tolerances

Standard	Band	Conducted Tx Power
LTE	Band 2	+23 dBm $\pm$ 1 dB
	Band 4	
	Band 5	
	Band 13	
	Band 17	
	Band 25	
UMTS	Band 1 (IMT 2100 12.2 kbps)	+23 dBm $\pm$ 1 dB ^a
	Band 2 (UMTS 1900 12.2 kbps)	
	Band 4 (AWS 1700/2100 12.2 kbps)	
	Band 5 (UMTS 850 12.2 kbps)	
	Band 8 (UMTS 900 12.2 kbps)	
GSM/EDGE	GSM 850 CS	+ 32 dBm $\pm$ 1 dB ^b
	EGSM 900 CS	+ 27 dBm $\pm$ 1 dB ^c
	DCS 1800 CS	+ 29 dBm $\pm$ 1 dB ^d
	PCS 1900 CS	+ 26 dBm $\pm$ 1 dB ^e
CDMA	Band Class 0 (Cellular)	+24 dBm +0.5/-1 dB
	Band Class 1 (PCS)	
	Band Class 10 (Cellular)	

^a Connectorized (Class 3)^b GMSK mode, connectorized (Class 4, 2 W, 33 dBm)^c 8PSK mode, connectorized (Class E2, 0.5 W, 27 dBm)^d GMSK mode, connectorized (Class 1, 1 W, 30 dBm)^e 8PSK mode, connectorized (Class E2, 0.4 W, 26 dBm)**Operating temperature**

Operating temperature	Compliance
-30 to 70 °C (-22 to 158 °F)	Class A (3GPP Compliant)
-40 to 85 °C (-40 to 185 °F)	Class B (Operational, Non-3GPP Compliant)

Certification

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

FCC	This module is certified under Part 15 (subpart B) of the FCC Rules and has been assigned the product ID N7NMC7355.
Industry Canada	This module is certified under IC CS-03 Part II, Issue 9 and has been assigned the product ID 2417C-MC7355.
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/].

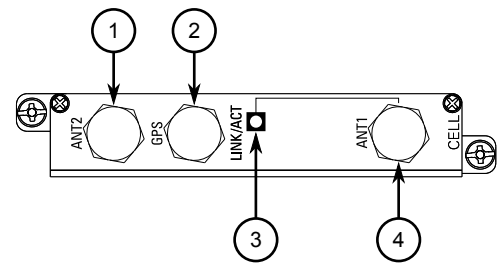
Ordering information

Description	1 x 4G/LTE ATT/Rogers/Telus/Bell
Article numbers	6GK6015-0AL20-0WH0 (Standard) 6GK6015-0AL20-0WH1 (Conformal coated)

8.8 RUGGEDCOM RX1500PN LM W61

The RUGGEDCOM RX1500PN LM W61 module offers 4G LTE, HSPA+, CDMA, EVDO, GPS and GNSS capabilities for wireless remote access to 4G (fourth generation) LTE (Long Term Evolution) networks in North America. It supports dual 4G LTE antennas and a single GPS antenna.

Description



- ① ANT2 port
- ② GPS port
- ③ LINK/ACT LED
- ④ ANT1 port

Figure 8.23 RUGGEDCOM RX1500PN LM W61

ANT1/ANT2 ports	Ports for the primary and diversity (secondary) antennas.
GPS port	Port for the GPS antenna.
LINK/ACT LED	Port ANT1 features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

 **WARNING**

Radio interference hazard – risk of death, serious personal injury or equipment damage.

Do not operate the cellular modem in the following areas:

- Areas where explosives are actively used
- In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc.
- Near medical or life support equipment or devices

- In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

 WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installation requirements

The cellular modem module is approved for modular use in mobile applications. The module, as part of the RUGGEDCOM RX1500, can be integrated into a final product without additional certification from the Federal Communications Commission (FCC) or Industry Canada (IC) if the application meets the following requirements:

Note

If this module is integrated into a portable device, separate approval related to the Specific Absorption Rate (SAR) requirements of FCC Part 2.1093 and IC RSS-102 is required.

- Persons in the area must be kept at least 20 cm (8 in) from the antenna at all times.
- The antenna gain, including cable loss, must not exceed the maximum allowable gain specified for the module.
- The cellular modem and antenna must not be next to or operate in conjunction with another transmitter or antenna within a host device.
- A label must be affixed to the end product that indicates the FCC and Industry Canada IDs for the cellular modem.
- The user documentation for the end product must clearly indicate the operating requirements and conditions that comply with current FCC and IC radio frequency exposure guidelines.
- The end product must comply with the unintentional emission testing requirements of FCC Part 15.

If the application does not meet these requirements, further certification is required.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card for each network carrier.

Note

The host device must have RUGGEDCOM ROX v2.13.3 or higher installed.

2. Insert the module into the host device. For more information, refer to the "Equipment Manual" for the device.
3. Connect antennas.
4. Configure the LTE modem and GPS settings. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Installing/removing the SIM card

The media module requires at least one active mini-SIM card (2FF size format) for each antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install or remove a SIM card, do the following:

⚠ NOTICE

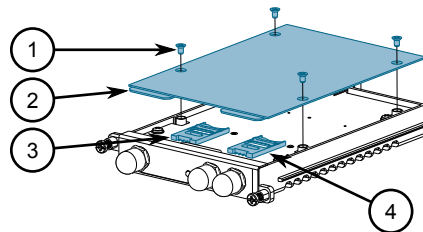
Static electricity hazard – risk of damage to equipment

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. If necessary, remove the media module from the chassis. For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

Figure 8.24 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis. For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 4G LTE multi-band or GPS antenna to the cellular modem media module, do the following:

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

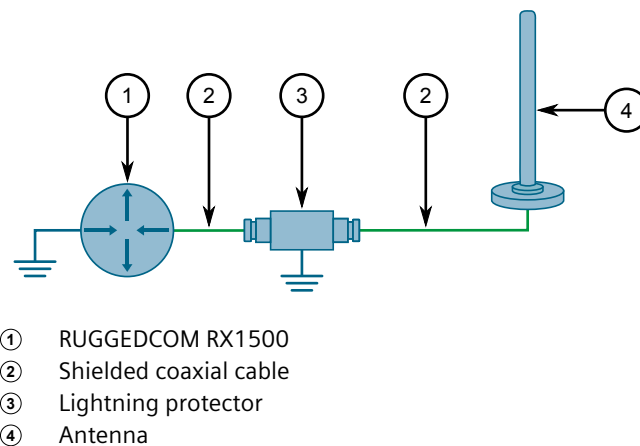


Figure 8.25 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the device:
 - For a primary antenna, connect the cable to the **ANT1** port
 - For a diversity (secondary) antenna, connect the cable to the **ANT2** port
 - For the GPS antenna, connect the cable to the **GPS** port

Technical specifications

General

Services	4G LTE/HSPA+/CDMA/EVDO/GPS/GNSS
Region	North America (Verizon, Sprint)
Connector	50 Ω SMA
Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
SIM	Dual Mini-SIM (2FF)
Power consumption	7 W

Supported LTE channel bandwidths

Band	Channel bandwidths (MHz)					
	1.4	3	5	10	15	20
Band 4 (AWS)	✓	✓	✓	✓	✓	✓
Band 13	✗	✗	✓	✓	✗	✗
Band 25	✓	✓	✓	✓	✓	✓

Supported LTE frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
Band 2	1900	1710 to 1755	2110 to 2155
Band 4 (AWS)	1700	1710 to 1755	2110 to 2155
Band 5	850	824 to 849	869 to 894
Band 13	700	777 to 787	746 to 756

Supported CDMA frequency bands

Band	Frequencies (MHz)	
	Transmit (Tx)	Receive (Rx)
Band Class 0 (Cellular 800 MHz)	824 to 849	869 to 894
Band Class 1 (PCS 1900 MHz)	1850 to 1910	1930 to 1990
Band Class 10 (Secondary 800 MHz) ^a	816 to 824	861 to 869

^a Subclass 2 and 3 are supported

GNSS specifications

Satellite channels	12 channel, continuous tracking
Protocols	NMEA 0183 v3.0
Acquisition time	- Hot start: 1 s - Warm start: 29 s - Cold start: 32 s
Accuracy	- Horizontal: < 2 m or 6.6 ft (50 %), < 5 m or 16.4 ft (90 %) - Altitude: < 4 m or 13.1 (50 %), < 8 m or 26.2 (90 %) - Velocity: < 0.2 m/s or 0.7 ft/s
Sensitivity	- Tracking: -161 dBm^a - Acquisition (Assisted, Non-LTE): -158 dBm^b - Acquisition (Assisted, LTE): -153 dBm - Acquisition (Standalone): -145 dBm
Operational limits	Altitude < 6000 m (3.7 mi) or velocity < 100 m/s (328 ft/s) ^c

^a The lowest GNSS signal level at which the device can detect an in-view satellite 50% of the time when in sequential tracking mode.

^b The lowest GNSS signal level at which the device can detect an in-view satellite 50% of the time.

^c Either limit may be exceeded, but not both

GPS and GNSS standalone antenna requirements

Frequency range	Narrow-Band GPS: 1572.42 MHz ± 2 MHz minimum
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	Wide-Band GPS and GLONASS: 1565 to 1606 MHz recommended
Field of View (FoV)	- Omni-directional in azimuth -45° to 90° in elevation
Polarization (average Gv/Gh)	> 0 dB ^a
Free space average gain (Gv + Gh) over FoV	> -3 (preferred) or -6 dBi ^b
Gain	- Maximum gain and uniform coverage in the high elevation angle and zenith - Gain in azimuth plane is not desired
Average 3D gain	> -5 dBi
Isolation between GNSS and LTE Main (Primary)	> 10 dB in all uplink bands
Typical VSWR	< 2.5:1
Polarization	Any other than LHCP (Left-Hand Circular Polarized) is acceptable.

^a Vertical linear polarization is sufficient.

^b Gv and Gh are measured and averaged over -45 to 90° in elevation, and ± 180° in azimuth.

Conducted Rx (Receive) sensitivity 3GPP for LTE frequency bands

Band	Limit (dBm)	Room typical (dBm)	Class A (dBm)	
			Extreme	Limit
Band 4	-96.3	-101	-100	-97.5
Band 13	-93.3	-100	-100	-97.5
Band 25	-93.3	-100	-100	-94.5

Conducted Rx (Receive) sensitivity SISO for LTE frequency bands

Band	Room typical (dBm)		Class A extreme (dBm)	
	Primary	Secondary	Primary	Secondary
Band 4	-98	-98	-97	-96.5
Band 13	-97	-97	-96	-95.5
Band 25	-97	-97	-96	-95.5

VzW conducted Rx (Receive) sensitivity SIMO for LTE frequency bands

Band	Limit (dBm)	Room typical (dBm)	Class A (dBm)	
			Extreme	Limit
Band 4	-96.3	-99	-99	-97.5
Band 13	-96.3	-98	-98	-97.5

VzW conducted Rx (Receive) sensitivity SISO for LTE frequency bands

Band	Limit (dBm)	Room typical (dBm)	Class A (dBm)	
			Extreme	Limit
Band 4 (Primary)	-93.3	-97	-96.5	-96
Band 4 (Secondary)	-93.3	-97	-96.5	-96

Band	Limit (dBm)	Room typical (dBm)	Class A (dBm)	
			Extreme	Limit
Band 13 (Primary)	-93.3	-96	-95	-94.5
Band 13 (Secondary)	-93.3	-96.5	-96	-95.5

Conducted Rx (Receive) sensitivity for CDMA frequency bands

Band	Standard	Limit (dBm)	Room typical (dBm)	Class A (dBm)		Notes
				Extreme	Limit	
Band Class 0	CDMA 1X	-104	-108	-107	-106.5	CDMA 1 x 0.5% FER, SO2
	EVDO	-105.5	-109.5	-108.5	-108	EVDO rev A 0.5% PER, DRC4
Band Class 1	CDMA 1X	-104	-109	-108	-107.5	CDMA 1 x 0.5% FER, SO2
	EVDO	-105.5	-109.5	-109	-108	EVDO rev A 0.5% PER, DRC4
Band Class 10	CDMA 1X	-104	-108.5	-108	-107.5	CDMA 1 x 0.5% FER, SO2
	EVDO	-105.5	-109.5	-109	-108	EVDO rev A 0.5% PER, DRC4

Conducted Tx (Transmit) maximum output power tolerances for LTE frequency bands

Band	Limit (dBm)	Room typical (dBm)	Class A extreme (dBm)
Band 4	23 + 2.7/1.7 dB	23 ± 1 dB	23 ± 1 dB
Band 13	23 + 2.7/1.7 dB	23 ± 1 dB	23 ± 1 dB
Band 25	23 + 2.7 dB	23 ± 1 dB	23 ± 1 dB

Conducted Tx (Transmit) maximum output power tolerances for CDMA frequency bands

Band	Room (dBm)	Class A extreme (dBm)
Band Class 0	24 ± 1 dB	24 ± 1 dB
Band Class 1	24 ± 1 dB	24 ± 1 dB
Band Class 10	24 ± 1 dB	24 ± 1 dB

Operating temperature

Operating temperature	Compliance
-30 to 70 °C (-22 to 158 °F)	Class A (3GPP Compliant)
-40 to 85 °C (-40 to 185 °F)	Class B (Operational, Non-3GPP Compliant)

Certification

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

FCC	This module is certified under Part 15 (subpart B) of the FCC Rules and has been assigned the product ID N7NMC7350.
Industry Canada	This module is certified under IC CS-03 Part II, Issue 9 and has been assigned the product ID 2417C-MC7350.
Verizon Wireless	This module is certified by Verizon Wireless in North America under Open Development Certification Agreement MA-004198-2012.
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/].

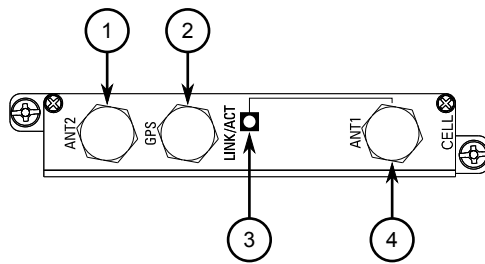
Ordering information

Description	1 x 4G/LTE Verizon
Article numbers	6GK6015-0AL20-0WJ0 (Standard) 6GK6015-0AL20-0WJ1 (Conformal coated)

8.9 RUGGEDCOM RX1500PN LM W81

The RUGGEDCOM RX1500PN LM W81 module offers GSM, EDGE, GPRS, UMTS, HSPA +, 4G LTE and GNSS capabilities for wireless remote access to 4G (fourth generation) LTE (Long Term Evolution) networks in the Asia-Pacific region. It supports dual 4G LTE antennas and a single GPS antenna.

Description



- ① ANT2 port
- ② GPS port
- ③ LINK/ACT LED
- ④ ANT1 port

Figure 8.26 RUGGEDCOM RX1500PN LM W81

ANT1/ANT2 ports	Ports for the primary and diversity (secondary) antennas.
GPS port	Port for the GPS antenna.
LINK/ACT LED	Port ANT1 features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

WARNING

Radio interference hazard – risk of death, serious personal injury or equipment damage.

Do not operate the cellular modem in the following areas:

- Areas where explosives are actively used
- In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc.
- Near medical or life support equipment or devices

- In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

 WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installation requirements

The cellular modem module is approved for modular use in mobile applications. The module, as part of the RUGGEDCOM RX1500, can be integrated into a final product without additional certification from the Federal Communications Commission (FCC) or Industry Canada (IC) if the application meets the following requirements:

Note

If this module is integrated into a portable device, separate approval related to the Specific Absorption Rate (SAR) requirements of FCC Part 2.1093 and IC RSS-102 is required.

- Persons in the area must be kept at least 20 cm (8 in) from the antenna at all times.
- The antenna gain, including cable loss, must not exceed the maximum allowable gain specified for the module.
- The cellular modem and antenna must not be next to or operate in conjunction with another transmitter or antenna within a host device.
- A label must be affixed to the end product that indicates the FCC and Industry Canada IDs for the cellular modem.
- The user documentation for the end product must clearly indicate the operating requirements and conditions that comply with current FCC and IC radio frequency exposure guidelines.
- The end product must comply with the unintentional emission testing requirements of FCC Part 15.

If the application does not meet these requirements, further certification is required.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card for each network carrier.

Note

The host device must have RUGGEDCOM ROX v2.13.3 or higher installed.

2. Insert the module into the host device. For more information, refer to the "Equipment Manual" for the device.
3. Connect antennas.
4. Configure the LTE modem and GPS settings. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Installing/removing the SIM card

The media module requires at least one active mini-SIM card (2FF size format) for each antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install or remove a SIM card, do the following:

⚠ NOTICE

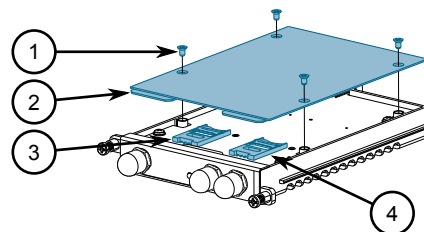
Static electricity hazard – risk of damage to equipment

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. If necessary, remove the media module from the chassis. For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

Figure 8.27 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis. For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 4G LTE multi-band or GPS antenna to the cellular modem media module, do the following:

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

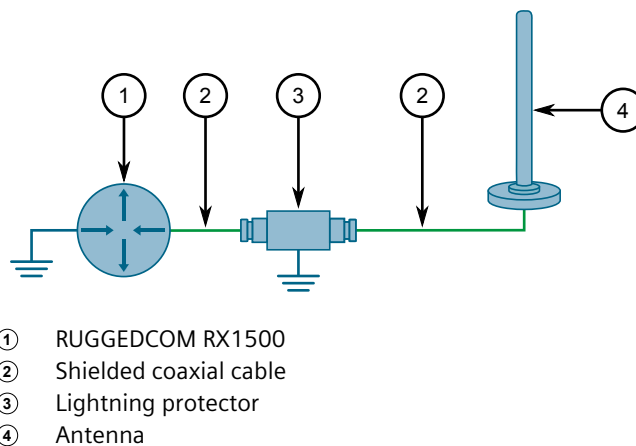


Figure 8.28 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the device:
 - For a primary antenna, connect the cable to the **ANT1** port
 - For a diversity (secondary) antenna, connect the cable to the **ANT2** port
 - For the GPS antenna, connect the cable to the **GPS** port

Technical specifications

General

Services	GSM/EDGE/GPRS/UMTS/HSPA+/LTE/GNSS
Region	Asia-Pacific
Connector	50 Ω SMA
Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
SIM	Dual Mini-SIM (2FF)
Power consumption	7 W

Supported LTE channel bandwidths

Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Band 1	✗	✗	✓	✓	✓	✓

Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Band 3	✓	✓	✓	✓	✓	✓
Band 7	✗	✗	✓	✓	✓	✓
Band 8	✓	✓	✓	✓	✗	✗
Band 20	✗	✗	✓	✓	✓	✓

Supported LTE frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
1	2100	1920 to 1980	2110 to 2170
3	1800	1710 to 1785	1805 to 1880
5	850	824 to 849	869 to 894
8	900	880 to 915	925 to 960
28	700	703 to 748	758 to 803

Supported HSPA+ frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
1	2100	1920 to 1980	2110 to 2170
5	850	824 to 849	869 to 894
8	900	880 to 915	925 to 960

Supported WCDMA frequency bands

Band	Frequencies (MHz)	
	Transmit (Tx)	Receive (Rx)
Band 1 (WCDMA 2100)	1920 to 1980	2110 to 2170
Band 2 (WCDMA 1900)	1850 to 1910	1930 to 1990
Band 5 (WCDMA 850)	824 to 849	869 to 894
Band 6 (WCDMA 800)	830 to 840	875 to 885
Band 8 (WCDMA 900)	880 to 915	925 to 960

GNSS specifications

Satellite channels	12 channel, continuous tracking
Protocols	NMEA 0183 v3.0
Acquisition time	- Hot start: 1 s - Warm start: 29 s - Cold start: 32 s
Accuracy	- Horizontal: < 2 m 6.6 ft (50 %), < 5 m or 16.4 ft (90 %) - Altitude: < 4 m or 13.1 (50 %), < 8 m or 26.2 (90 %) - Velocity: < 0.2 m/s or 0.7 ft/s
Sensitivity	- Tracking: -161 dBm - Acquisition (Assisted, Non-LTE): -158 dBm - Acquisition (Assisted, LTE): -153 dBm - Acquisition (Standalone): -145 dBm

Operational limitsAltitude < 6000 m (3.7 mi) or velocity < 100 m/s (328 ft/s)^a^a Either limit may be exceeded, but not both**GNSS standalone antenna requirements**

Frequency range	- Narrow-Band GPS: 1572.42 MHz $\pm$ 2 MHz minimum -Band GPS and GLONASS: 1565 to 1606 MHz recommended
Field of View (FoV)	- Omni-directional in azimuth -45° to 90° in elevation
Polarization (average Gv/Gh)	> 0 dB ^a
Free space average gain (Gv + Gh) over FoV	> -3 (preferred) or -6 dBi ^b
Gain	- Maximum gain and uniform coverage in the high elevation angle and zenith - Gain in azimuth plane is not desired
Average 3D gain	> -5 dBi
Isolation between GNSS and LTE Main (Primary)	> 10 dB in all uplink bands
Typical VSWR	< 2:5:1
Polarization	Any other than LHCP (Left-Hand Circular Polarized) is acceptable.

^a Vertical linear polarization is sufficient.^b Gv and Gh are measured and averaged over -45 to 90° in elevation, and $\pm$ 180° in azimuth.**Conducted Rx (Receive) sensitivity for LTE frequency bands**

Band	Conducted Rx Sensitivity (dBm)			
	Primary	Secondary	SIMO (Typical)	SIMO (Worst Case)
Band 1	-98.7	-97.8	-101.1	-96.3
Band 3	-99.5	-97.3	-101.6	-93.3
Band 7	-98.0	-97.5	-100.5	-94.3
Band 8	-99.3	-98.5	-102.0	-93.3
Band 20	-99.6	-98.4	-99.8	-93.3

Conducted Rx (Receive) sensitivity for UMTS bands

Band	Error Rate ^a	Conducted Rx Sensitivity (dBm)		
		Primary (Typical)	Secondary (Typical)	Primary/Secondary (Worst Case)
Band 1 (UMTS 2100)	0.1% BER	-111.4	-109.8	-106.7
Band 2 (UMTS 1900)		-110.8	-108.9	-104.7
Band 5 (UMTS 850)		-111.4	-111.2	-104.7
Band 8 (UMTS 900)		-111.8	-111.0	-103.7

^a Measured at 12.2 kbps

Conducted Rx (Receive) sensitivity for GSM/EDGE bands

Band	Error Rate	Modulation	Conducted Rx Sensitivity (dBm)	
			Typical	Worst Case
GSM 850	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-104	-98
EGSM 900	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-104	-98
DCS 1800	2 % BER	CS ^a	-110	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-105	-98
PCS 1900	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-104	-98

^a Circuit Switched**Conducted Tx (Transmit) power tolerances**

Standard	Band	Conducted Tx Power
LTE	Band 1	+23 dBm ± 1 dB
	Band 3	
	Band 7	+22 dBm ± 1 dB
	Band 8	+23 dBm ± 1 dB
	Band 20	
UMTS	Band 1 (IMT 2100 12.2 kbps)	+23 dBm ± 1 dB ^a
	Band 2 (UMTS 1900 12.2 kbps)	
	Band 5 (UMTS 850 12.2 kbps)	
	Band 8 (UMTS 900 12.2 kbps)	
GSM/EDGE	GSM 850 CS	+ 32 dBm ± 1 dB ^b
	EGSM 900 CS	+ 27 dBm ± 1 dB ^c
	DCS 1800 CS	+ 29 dBm ± 1 dB ^d
	PCS 1900 CS	+ 26 dBm ± 1 dB ^e

^a Connectorized (Class 3)^b GMSK mode, connectorized (Class 4, 2 W, 33 dBm)^c 8PSK mode, connectorized (Class E2, 0.5 W, 27 dBm)^d GMSK mode, connectorized (Class 1, 1 W, 30 dBm)^e 8PSK mode, connectorized (Class E2, 0.4 W, 26 dBm)**Operating temperature**

Operating temperature	Compliance
-30 to 70 °C (-22 to 158 °F)	Class A (3GPP Compliant)
-40 to 85 °C (-40 to 185 °F)	Class B (Operational, Non-3GPP Compliant)

Certification

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

ACMA

This module complies with the regulations set forth by the Australian Communications and Media Authority (ACMA). As such, the module is marked with the Regulatory Compliance Mark (RCM) and is authorized for use in Australia.



A copy of the Declaration of Conformity is available via Siemens Industry Online Support at <https://support.industry.siemens.com/cs/ww/en/view/109748643>

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/).

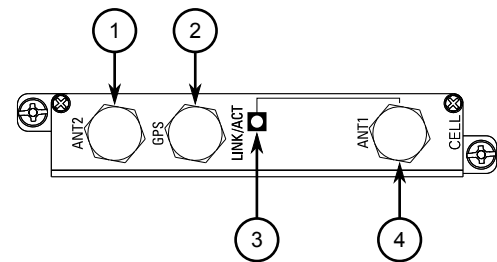
Ordering information

Description	1 x 4G/LTE Asia Pacific
Article numbers	6GK6015-0AL20-0WK0 (Standard) 6GK6015-0AL20-0WK1 (Conformal coated)

8.10 RUGGEDCOM RX1500PN LM W91

The RUGGEDCOM RX1500PN LM W91 module offers GSM, EDGE, GPRS, UMTS, HSPA +, 4G LTE and GNSS capabilities for wireless remote access to 4G (fourth generation) LTE (Long Term Evolution) networks in North American (AT&T, Verizon, Rogers, Telus, Bell). It supports dual 4G LTE antennas and a single GPS antenna.

Description



- ① ANT2 port
- ② GPS port
- ③ LINK/ACT LED
- ④ ANT1 port

Figure 8.30 RUGGEDCOM RX1500PN LM W91

ANT1/ANT2 ports	Ports for the primary and diversity (secondary) antennas.
GPS port	Port for the GPS antenna.
LINK/ACT LED	Port ANT1 features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

 **WARNING**

Radio interference hazard – risk of death, serious personal injury or equipment damage.

Do not operate the cellular modem in the following areas:

- Areas where explosives are actively used
- In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc.
- Near medical or life support equipment or devices

- In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

⚠ WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

⚠ WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

⚠ WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installation requirements

The cellular modem module is approved for modular use in mobile applications. The module, as part of the RUGGEDCOM RX1500, can be integrated into a final product without additional certification from the Federal Communications Commission (FCC) or Industry Canada (IC) if the application meets the following requirements:

Note

If this module is integrated into a portable device, separate approval related to the Specific Absorption Rate (SAR) requirements of FCC Part 2.1093 and IC RSS-102 is required.

- Persons in the area must be kept at least 20 cm (8 in) from the antenna at all times.
- The antenna gain, including cable loss, must not exceed the maximum allowable gain specified for the module.
- The cellular modem and antenna must not be next to or operate in conjunction with another transmitter or antenna within a host device.
- A label must be affixed to the end product that indicates the FCC and Industry Canada IDs for the cellular modem.
- The user documentation for the end product must clearly indicate the operating requirements and conditions that comply with current FCC and IC radio frequency exposure guidelines.
- The end product must comply with the unintentional emission testing requirements of FCC Part 15.

If the application does not meet these requirements, further certification is required.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card for each network carrier.

Note

The host device must have RUGGEDCOM ROX v2.13.3 or higher installed.

2. Insert the module into the host device. For more information, refer to the "Equipment Manual" for the device.
3. Connect antennas.
4. Configure the LTE modem and GPS settings. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Installing/removing the SIM card

The media module requires at least one active mini-SIM card (2FF size format) for each antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install or remove a SIM card, do the following:

⚠ NOTICE

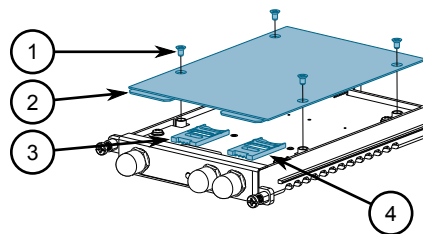
Static electricity hazard – risk of damage to equipment

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. If necessary, remove the media module from the chassis. For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

Figure 8.31 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis. For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards. For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 4G LTE multi-band or GPS antenna to the cellular modem media module, do the following:

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

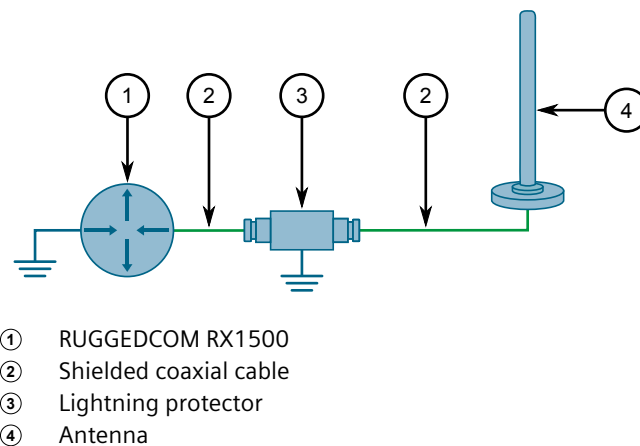


Figure 8.32 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the device:
 - For a primary antenna, connect the cable to the **ANT1** port
 - For a diversity (secondary) antenna, connect the cable to the **ANT2** port
 - For the GPS antenna, connect the cable to the **GPS** port

Technical specifications

General

Services	/EDGE/GPRS/UMTS/HSPA+/LTE/GNSS
Region	North America (AT&T, Verizon, Rogers, Telus, Bell)
Connector	50 Ω SMA
Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
SIM	Dual Mini-SIM (2FF)
Power consumption	7 W

Supported LTE channel bandwidths

Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Band 1	✗	✗	✓	✓	✓	✓

Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Band 3	✓	✓	✓	✓	✓	✓
Band 7	✗	✗	✓	✓	✓	✓
Band 8	✓	✓	✓	✓	✗	✗
Band 20	✗	✗	✓	✓	✓	✓

Supported LTE frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
2	1900	1850-1910	1930-1990
4	1700	1710-1755	2110-2155
5	850	824-849	869-894
12	700	699-716	729-746
13	700	777-787	746-756
14	700	788-798	758-768
66	1700	1710-1780	2210-2200
71	600	663-698	617-652

Supported HSPA+ frequency bands

Band	Frequency	Tx (MHz)	Rx (MHz)
2	1900	1850-1910	1930-1990
4	1700	1710-1755	2110-2155
5	850	824-849	869-894

Supported GSM frequency bands

Band	Frequencies (MHz)	
	Transmit (Tx)	Receive (Rx)
GSM 850	824 to 849	869 to 894
E-GSM 900	880 to 915	925 to 960
DCS 1800	1710 to 1785	1805 to 1880
PCS 1900	1850 to 1910	1930 to 1990

Supported WCDMA frequency bands

Band	Frequencies (MHz)	
	Transmit (Tx)	Receive (Rx)
Band 1 (WCDMA 2100)	1920 to 1980	2110 to 2170
Band 2 (WCDMA 1900)	1850 to 1910	1930 to 1990
Band 5 (WCDMA 850)	824 to 849	869 to 894
Band 6 (WCDMA 800)	830 to 840	875 to 885
Band 8 (WCDMA 900)	880 to 915	925 to 960

GNSS specifications

Satellite channels	12 channel, continuous tracking
Protocols	NMEA 0183 v3.0
Acquisition time	- Hot start: 1 s - Warm start: 29 s - Cold start: 32 s
Accuracy	- Horizontal: < 2 m 6.6 ft (50 %), < 5 m or 16.4 ft (90 %) - Altitude: < 4 m or 13.1 (50 %), < 8 m or 26.2 (90 %) - Velocity: < 0.2 m/s or 0.7 ft/s
Sensitivity	- Tracking: -161 dBm - Acquisition (Assisted, Non-LTE): -158 dBm - Acquisition (Assisted, LTE): -153 dBm - Acquisition (Standalone): -145 dBm
Operational limits	Altitude < 6000 m (3.7 mi) or velocity < 100 m/s (328 ft/s) ^a

^a Either limit may be exceeded, but not both

GNSS standalone antenna requirements

Frequency range	- Narrow-Band GPS: 1572.42 MHz $\pm$ 2 MHz minimum -Band GPS and GLONASS: 1565 to 1606 MHz recommended
Field of View (FoV)	- Omni-directional in azimuth -45° to 90° in elevation
Polarization (average Gv/Gh)	> 0 dB ^a
Free space average gain (Gv + Gh) over FoV	> -3 (preferred) or -6 dBi ^b
Gain	- Maximum gain and uniform coverage in the high elevation angle and zenith - Gain in azimuth plane is not desired
Average 3D gain	> -5 dBi
Isolation between GNSS and LTE Main (Primary)	> 10 dB in all uplink bands
Typical VSWR	< 2:5:1
Polarization	Any other than LHCP (Left-Hand Circular Polarized) is acceptable.

^a Vertical linear polarization is sufficient.

^b Gv and Gh are measured and averaged over -45 to 90° in elevation, and $\pm$ 180° in azimuth.

Conducted Rx (Receive) sensitivity for LTE frequency bands

Band	Conducted Rx Sensitivity (dBm)			
	Primary	Secondary	SIMO (Typical)	SIMO (Worst Case)
Band 1	-98.7	-97.8	-101.1	-96.3
Band 3	-99.5	-97.3	-101.6	-93.3
Band 7	-98.0	-97.5	-100.5	-94.3
Band 8	-99.3	-98.5	-102.0	-93.3
Band 20	-99.6	-98.4	-99.8	-93.3

Conducted Rx (Receive) sensitivity for UMTS bands

Band	Error Rate ^a	Conducted Rx Sensitivity (dBm)		
		Primary (Typical)	Secondary (Typical)	Primary/Secondary (Worst Case)
Band 1 (UMTS 2100)	0.1% BER	-111.4	-109.8	-106.7
Band 2 (UMTS 1900)		-110.8	-108.9	-104.7
Band 5 (UMTS 850)		-111.4	-111.2	-104.7
Band 8 (UMTS 900)		-111.8	-111.0	-103.7

^a Measured at 12.2 kbps**Conducted Rx (Receive) sensitivity for GSM/EDGE bands**

Band	Error Rate	Modulation	Conducted Rx Sensitivity (dBm)	
			Typical	Worst Case
GSM 850	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-104	-98
EGSM 900	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-104	-98
DCS 1800	2 % BER	CS ^a	-110	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-105	-98
PCS 1900	2 % BER	CS ^a	-109	-102
	10 % BLER	GMSK (CS1)	-112	-104
		EDGE (MCS5)	-104	-98

^a Circuit Switched**Conducted Tx (Transmit) power tolerances**

Standard	Band	Conducted Tx Power
LTE	Band 1	+23 dBm ± 1 dB
	Band 3	
	Band 7	+22 dBm ± 1 dB
	Band 8	+23 dBm ± 1 dB
	Band 20	
UMTS	Band 1 (IMT 2100 12.2 kbps)	+23 dBm ± 1 dB ^a
	Band 2 (UMTS 1900 12.2 kbps)	
	Band 5 (UMTS 850 12.2 kbps)	
	Band 8 (UMTS 900 12.2 kbps)	
GSM/EDGE	GSM 850 CS	+ 32 dBm ± 1 dB ^b
	E-GSM 900 CS	+ 27 dBm ± 1 dB ^c
	DCS 1800 CS	+ 29 dBm ± 1 dB ^d

Standard	Band	Conducted Tx Power
	PCS 1900 CS	+ 26 dBm $\pm$ 1 dB ^e

^a Connectorized (Class 3)

^b GMSK mode, connectorized (Class 4, 2 W, 33 dBm)

^c 8PSK mode, connectorized (Class E2, 0.5 W, 27 dBm)

^d GMSK mode, connectorized (Class 1, 1 W, 30 dBm)

^e 8PSK mode, connectorized (Class E2, 0.4 W, 26 dBm)

Operating temperature

Operating temperature	Compliance
-30 to 70 °C (-22 to 158 °F)	Class A (3GPP Compliant)
-40 to 85 °C (-40 to 185 °F)	Class B (Operational, Non-3GPP Compliant)

Certification

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

ACMA

This module complies with the regulations set forth by the Australian Communications and Media Authority (ACMA). As such, the module is marked with the Regulatory Compliance Mark (RCM) and is authorized for use in Australia.



A copy of the Declaration of Conformity is available via Siemens Industry Online Support at <https://support.industry.siemens.com/cs/ww/en/view/109748643>

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	1 x 4G/LTE NAM ATT/VZW/RGRS/TLS/BLL
Article numbers	6GK6015-0AL20-0WM0 (Standard) 6GK6015-0AL20-0WM1 (Conformal coated)

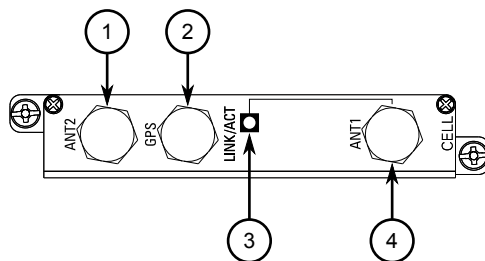
8.11 RUGGEDCOM RX1500PN LM W92

The RUGGEDCOM RX1500PN LM W92 module offers GSM, EDGE, GPRS, UMTS, HSPA +, 4G LTE and GNSS capabilities for wireless remote access to 4G (fourth generation) LTE (Long Term Evolution) networks in the European Union (RED) and Asia-Pacific (RCM) regions. It supports dual 4G LTE antennas and a single GPS antenna.

Requirements/restrictions

Host OS version	RUGGEDCOM ROX v2.16.3 or higher
-----------------	---------------------------------

Description



- ① ANT2 port
- ② GPS port
- ③ LINK/ACT LED
- ④ ANT1 port

Figure 8.34 RUGGEDCOM RX1500PN LM W92

ANT1/ANT2 ports	Ports for the primary and diversity (secondary) antennas.
GPS port	Port for the GPS antenna.
LINK/ACT LED	Port ANT1 features a dedicated LED that indicates its link/activity state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

General safety notices

⚠ WARNING Radio interference hazard – risk of death, serious personal injury or equipment damage. Do not operate the cellular modem in the following areas: Areas where explosives are actively used

- In explosive atmospheres, such as refueling stations, fuel depots, chemical plants, underground mining operations, etc.
- Near medical or life support equipment or devices
- In any aircraft, whether in flight or on the ground (unless permitted by the aircraft operator)

In such areas, the cellular modem must be disabled via host device's operating system. Otherwise the cellular modem can transmit signals that may interfere with nearby equipment that is susceptible to radio interference.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

 WARNING

Radiation hazard – risk of Radio Frequency (RF) exposure

The device must be placed at a distance of at least 20 cm (8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

 WARNING

Communication disruption hazard – risk of serious personal injury, equipment damage, or data loss

Wireless communications are susceptible to disruptions that may result in the delay, corruption or loss of data. While cellular disruptions are uncommon when using a Siemens cellular modem, avoid using the cellular modem in applications where a communication failure could result in damage to equipment or personal injury to persons in the area. Siemens accepts no responsibility for any damages that may result due to wireless disruptions.

Note

If the host device is intended for use in a portable device, separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 and IC RSS-102.

Installation requirements

The cellular modem module is approved for modular use in mobile applications. The module, as part of the RUGGEDCOM RX1500, can be integrated into a final product

without additional certification from the Federal Communications Commission (FCC) or Industry Canada (IC) if the application meets the following requirements:

Note

If this module is integrated into a portable device, separate approval related to the Specific Absorption Rate (SAR) requirements of FCC Part 2.1093 and IC RSS-102 is required.

- Persons in the area must be kept at least 20 cm (8 in) from the antenna at all times.
- The antenna gain, including cable loss, must not exceed the maximum allowable gain specified for the module.
- The cellular modem and antenna must not be next to or operate in conjunction with another transmitter or antenna within a host device.
- A label must be affixed to the end product that indicates the FCC and Industry Canada IDs for the cellular modem.
- The user documentation for the end product must clearly indicate the operating requirements and conditions that comply with current FCC and IC radio frequency exposure guidelines.
- The end product must comply with the unintentional emission testing requirements of FCC Part 15.

If the application does not meet these requirements, further certification is required.

Installing the module

To install the module, do the following:

1. Open the module and install a mini-SIM card for each network carrier.
2. Insert the module into the host device.
For more information, refer to the "Equipment Manual" for the host device.
3. Connect antennas.
4. Configure the LTE modem and GPS settings.

For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Installing/removing the SIM card

The media module requires at least one active mini-SIM card (2FF size format) for each antenna to connect with the associated network carrier. A second SIM card can be installed for redundancy if needed.

To install or remove a SIM card, do the following:

⚠ NOTICE

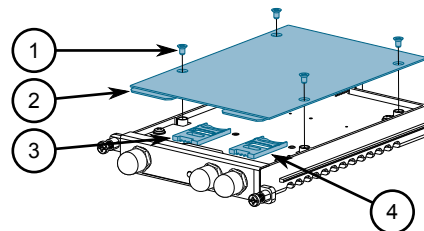
Static electricity hazard – risk of damage to equipment

Make sure to take appropriate anti-static precautions before opening the cellular modem module.

Note

The module only supports mini-SIM cards (2FF size format).

1. If necessary, remove the media module from the chassis.
For more information, refer to the "Equipment Manual" for the host device.
2. On the smooth side of the module, remove the four screws and separate the cover from the module housing.



- ① Screw
- ② Cover
- ③ SIM card cage 2
- ④ SIM card cage 1

Figure 8.35 SIM card assembly

3. Open cage 1 by sliding the silver catch towards the front face of the module and then flip the cage up.
4. If necessary, remove the existing SIM card.
5. Insert a new mini-SIM card into the cage.
6. Flip the cage down and slide the silver catch back to its original position.
7. [Optional] Repeat the steps above to install a second SIM card in cage 2.
8. Place the cover on the module housing and install the four screws removed previously.
9. Install the module back into the chassis.
For more information, refer to the "Equipment Manual" for the host device.
10. Configure the SIM cards.
For more information, refer to the "RUGGEDCOM ROX Configuration Manual" for the host device.

Connecting antennas

To connect a 4G LTE multi-band or GPS antenna to the cellular modem media module, do the following:

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
2. Using shielded coaxial cables, connect the antenna to the lightning protector. Make sure the cables are routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

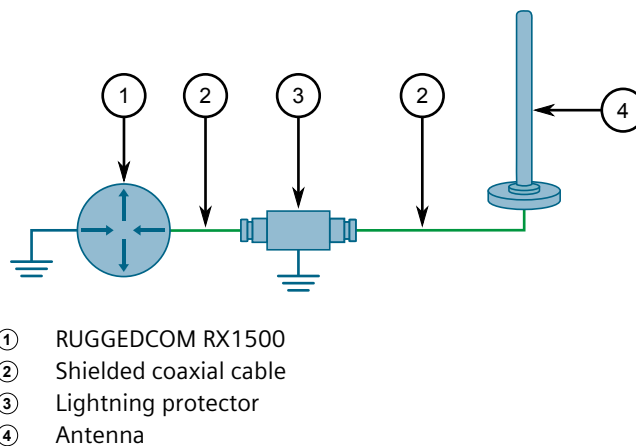


Figure 8.36 Antenna and lightning protector assembly

3. Connect the lightning protector to the appropriate antenna port on the device:
 - For a primary antenna, connect the cable to the **ANT1** port
 - For a diversity (secondary) antenna, connect the cable to the **ANT2** port
 - For the GPS antenna, connect the cable to the **GPS** port

Technical specifications

General

Services	/EDGE/GPRS/UMTS/HSPA+/LTE/GNSS
Region	Europe/Asia-Pacific
Connector	50 Ω SMA
Antennas	1 x LTE Main, 1 x LTE MIMO, 1 x GPS
SIM	Dual Mini-SIM (2FF)
Power consumption	7 W

Available frequency bands

Region	Frequency bands		
	2G	3G	4G
Worldwide	2, 3, 5, 8	1, 2, 4, 5, 6, 8, 19	1, 2, 3, 4, 5, 7, 8, 9, 12, 13, 14, 18, 19, 20, 25, 26, 28

RX sensitivity

Mode	Primary	Diversity	SIM0	3GPP
PCS 1900	-107.0	-	-	-102
DCS 1800	-106.5	-	-	-102
GSM 850	-108.0	-	-	-102
EGSM 900	-107.0	-	-	-102
WCDMA 2100 – B1	-108.5	-109.5	-111.0	-106.7
WCDMA 1900 – B2	-109.0	-110.0	-111.5	-104.7
WCDMA 1800 – B3	-107.0	-109.0	-109.0	-103.7
WCDMA AWS – B4	-109.0	-109.5	-111.5	-106.7
WCDMA 850 – B5	-109.5	-110.5	-112.0	-104.7
WCDMA 850 – B6	-109.5	-110.5	-112.0	-106.7
WCDMA 850 – B19	-109.5	-110.5	-112.0	-106.7
WCDMA 900 – B8	-109.0	-110.0	-111.5	-103.7
TDS CDMA 2000 – B34	-109.5	-	-	-105
TDS CDMA 1900 – B39	-109.5	-	-	-105
LTE 2100 – B1	-97.5	-98.0	-100.0	-96.3
LTE 1900 – B2	-96.5	-98.5	-98.5	-94.3
LTE 1800 – B3	-97.0	-99.0	-99.0	-93.3
LTE AWS – B4	-97.5	-98.5	-100.0	-96.3
LTE 850 – B5	-98.5	-100.0	-101.0	-94.3
LTE 2600 – B7	-97.0	-97.0	-99.0	-94.3
LTE 900 – B8	-98.0	-99.0	-100.5	-93.3
LTE 1800 – B9	-97.5	-98.5	-100.0	-95.3
LTE 700a – B12	-98.0	-99.0	-100.5	-93.3
LTE 700c – B13	-98.0	-99.0	-100.5	-93.3
LTE 700PS – B14	-97.5	-99.0	-100.0	-93.3
LTE 700b – B18	-98.5	-99.5	-101.0	-96.3
LTE 800 – B19	-98.5	-99.0	-101.0	-96.3
LTE 800 – B20	-98.5	-98.5	-101.0	-93.3
LTE 1900+ – B25	-96.0	-98.0	-98.0	-92.8
LTE 850+ – B26	-98.5	-99.5	-101.0	-93.8
LTE 700 – B28A/B	-98.0	-100.0	-101.0	-94.8
LTE AWS-3 – B66	-97.5	-98.5	-100.0	-95.8
LTE600 – B71	-97.5	-97.0	-100.0	-93.5

Mode	Primary	Diversity	SIM0	3GPP
LTE TDD 2600 – B38	-97.5	-98.0	-100.0	-96.3
LTE TDD 1900 – B39	-98.0	-99.0	-100.5	-96.3
LTE TDD 2300 – B40	-96.5	-98.0	-99.0	-96.3
LTE TDD 2500 – B41M	-96.5	-97.5	-99.0	-94.3

TX output power

Technology	Power (dBm)
2G LB	32.5
2G HB	29.5
3G/TD-SCDMA	23.5
4G FDD	22.5 @1RB

Operating temperature

Operating temperature	Compliance
20 to 55 °C (68 to 131 °F)	Class A (3GPP Compliant)
-40 to 85 °C (-40 to 185 °F)	Class B (Operational, Non-3GPP Compliant)

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	1x4G/LTE Worldwide. Supports European Union (RED), APAC (RCM), 2G/3G/4G/LTE networks
Article numbers	6GK6015-0AL20-0WN0 (Standard) 6GK6015-0AL20-0WN1 (Conformal coated)

RUGGEDCOM APE modules

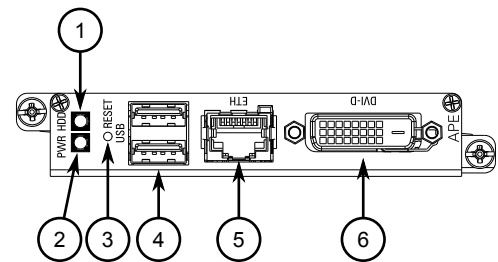
The following RUGGEDCOM Application Processing Engine (APE) modules are available.

RUGGEDCOM RX1500PN LM APE1402	"RUGGEDCOM RX1500PN LM APE1402 (Obsolete)" (Page 212)
RUGGEDCOM RX1500PN LM APE1402W7	"RUGGEDCOM RX1500PN LM APE1402W7 (Obsolete)" (Page 215)
RUGGEDCOM RX1500PN LM APE1404	"RUGGEDCOM RX1500PN LM APE1404 (Obsolete)" (Page 218)
RUGGEDCOM RX1500PN LM APE1404 ADM	"RUGGEDCOM RX1500PN LM APE1404 ADM (Obsolete)" (Page 221)
RUGGEDCOM RX1500PN LM APE1404W7	"RUGGEDCOM RX1500PN LM APE1404W7 (Obsolete)" (Page 224)
RUGGEDCOM RX1500PN LM APE1404CKP	"RUGGEDCOM RX1500PN LM APE1404CKP (Obsolete)" (Page 227)
RUGGEDCOM RX1500PN LM APE1808LNX	"RUGGEDCOM RX1500PN LM APE1808LNX" (Page 230)
RUGGEDCOM RX1500PN LM APE1808W10	"RUGGEDCOM RX1500PN LM APE1808W10" (Page 233)
RUGGEDCOM RX1500PN LM APE1808CKP	"RUGGEDCOM RX1500PN LM APE1808CKP" (Page 236)
RUGGEDCOM RX1500PN LM APE1808ADM	"RUGGEDCOM RX1500PN LM APE1808ADM" (Page 239)
RUGGEDCOM RX1500PN LM APE1808SAM-L	"RUGGEDCOM RX1500PN LM APE1808SAM-L" (Page 242)
RUGGEDCOM RX1500PN LM APE1808ELAN	"RUGGEDCOM RX1500PN LM APE1808ELAN" (Page 245)
RUGGEDCOM RX1500PN LM APE1808CConn	"RUGGEDCOM RX1500PN LM APE1808CConn" (Page 248)
RUGGEDCOM RX1500PN LM APE1808NOZ	"RUGGEDCOM RX1500PN LM APE1808NOZ" (Page 251)

9.1 RUGGEDCOM RX1500PN LM APE1402 (Obsolete)

The RUGGEDCOM RX1500PN LM APE1402 module is a 32-bit computer with Debian Linux® pre-installed and an 8 GB solid-state drive.

Description



- ① HDD LED
- ② PWR LED
- ③ RESET Button
- ④ USB Port
- ⑤ ETH port
- ⑥ DVI-D Video Port

Figure 9.1 RUGGEDCOM RX1500PN LM APE1402

HDD LED	Indicates when the module is active.
PWR LED	Indicates when the module is powered on.
RESET Button.	Reboots/resets the module.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
ETH port	An RJ45 Gigabit Ethernet (GbE) port.
DVI-D Video Port	A display port for connecting a monitor.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

Each RUGGEDCOM APE module is powered on automatically when power is supplied to the chassis, but can be powered down independently using the **Power** button. This button also allows users to reboot the module.

⚠ NOTICE
Whenever possible, power down or reboot the RUGGEDCOM APE through the RUGGEDCOM RX1500 operating system instead of forcing a shutdown or reboot

with the **Power** button. This helps protect against improper shutdowns and protect data integrity.

Note

The **Power** button is recessed and can only be reached using either a pin, unfolded paper clip, or a thin screwdriver.

Powering down the module

To fully power down the module, press the **Power** button and hold for 4 to 5 seconds.

Rebooting the module

To reboot the module, quickly press and release the **Power** button.

Technical specifications

General	Operating system	Debian Linux®
	Processor	Intel Atom E660 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	8 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D
	Power requirements	12 W with no USB load, 14.5 W with full USB load
	Power consumption	10 W
Environment	Operating temperature	-40 to 70 °C (-40 to 158 °F)

^a Maximum combined USB device power consumption is 500 mA at 5 V.

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/).

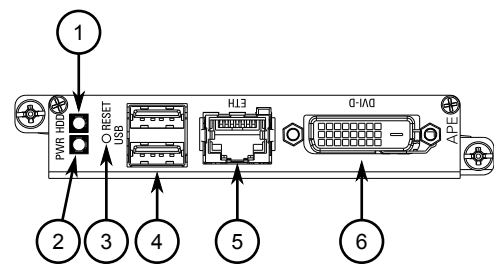
Ordering information

Description	APE, 1.3GHz, 2GB RAM, 8GB SATA, Video, USB, Linux
Article numbers	6GK6015-0AL20-0GB0 (Standard)
	6GK6015-0AL20-0GB1 (Conformal coated)

9.2 RUGGEDCOM RX1500PN LM APE1402W7 (Obsolete)

The RUGGEDCOM RX1500PN LM APE1402W7 module is a 32-bit computer with Windows® Embedded Standard 7 pre-installed and an 8 GB solid-state drive.

Description



- ① HDD LED
- ② PWR LED
- ③ RESET Button
- ④ USB Port
- ⑤ ETH port
- ⑥ DVI-D Video Port

Figure 9.2 RUGGEDCOM RX1500PN LM APE1402W7

HDD LED	Indicates when the module is active.
PWR LED	Indicates when the module is powered on.
RESET Button.	Reboots/resets the module.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
ETH port	An RJ45 Gigabit Ethernet (GbE) port.
DVI-D Video Port	A display port for connecting a monitor.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

Each RUGGEDCOM APE module is powered on automatically when power is supplied to the chassis, but can be powered down independently using the **Power** button. This button also allows users to reboot the module.

 **NOTICE**

Whenever possible, power down or reboot the RUGGEDCOM APE through the RUGGEDCOM RX1500 operating system instead of forcing a shutdown or reboot

with the **Power** button. This helps protect against improper shutdowns and protect data integrity.

Note

The **Power** button is recessed and can only be reached using either a pin, unfolded paper clip, or a thin screwdriver.

Powering down the module

To fully power down the module, press the **Power** button and hold for 4 to 5 seconds.

Rebooting the module

To reboot the module, quickly press and release the **Power** button.

Technical specifications

General	Operating system	Windows® Embedded Standard 7
	Processor	Intel Atom E660 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	8 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D
	Power requirements	12 W with no USB load, 14.5 W with full USB load
	Power consumption	10 W
Environment	Operating temperature	-40 to 70 °C (-40 to 158 °F)

^a Maximum combined USB device power consumption is 500 mA at 5 V.

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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9.2 RUGGEDCOM RX1500PN LM APE1402W7 (Obsolete)

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

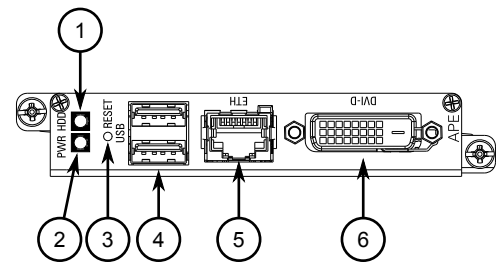
Ordering information

Description	APE, 1.3GHz, 2GB RAM, 8GB SATA, Video, USB, Windows 7 Embedded
Article numbers	6GK6015-0AL20-0GC0 (Standard) 6GK6015-0AL20-0GC1 (Conformal coated)

9.3 RUGGEDCOM RX1500PN LM APE1404 (Obsolete)

The RUGGEDCOM RX1500PN LM APE1404 module is a 32-bit computer with Debian Linux® pre-installed and a 16 GB solid-state drive.

Description



- ① HDD LED
- ② PWR LED
- ③ RESET Button
- ④ USB Port
- ⑤ ETH port
- ⑥ DVI-D Video Port

Figure 9.3 RUGGEDCOM RX1500PN LM APE1404

HDD LED	Indicates when the module is active.
PWR LED	Indicates when the module is powered on.
RESET Button.	Reboots/resets the module.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
ETH port	An RJ45 Gigabit Ethernet (GbE) port.
DVI-D Video Port	A display port for connecting a monitor.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

Each RUGGEDCOM APE module is powered on automatically when power is supplied to the chassis, but can be powered down independently using the **Power** button. This button also allows users to reboot the module.

 **NOTICE**

Whenever possible, power down or reboot the RUGGEDCOM APE through the RUGGEDCOM RX1500 operating system instead of forcing a shutdown or reboot

with the **Power** button. This helps protect against improper shutdowns and protect data integrity.

Note

The **Power** button is recessed and can only be reached using either a pin, unfolded paper clip, or a thin screwdriver.

Powering down the module

To fully power down the module, press the **Power** button and hold for 4 to 5 seconds.

Rebooting the module

To reboot the module, quickly press and release the **Power** button.

Technical specifications

General	Operating system	Debian Linux®
	Processor	Intel Atom E660 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	16 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D
	Power requirements	12 W with no USB load, 14.5 W with full USB load
	Power consumption	10 W
Environment	Operating temperature	-40 to 70 °C (-40 to 158 °F)

^a Maximum combined USB device power consumption is 500 mA at 5 V.

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/).

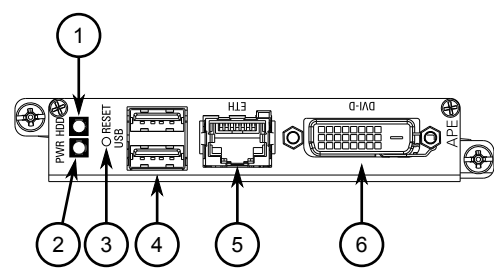
Ordering information

Description	APE, 1.3GHz, 2GB RAM, 16GB SATA, Video, USB, Linux
Article numbers	6GK6015-0AL20-0GD0 (Standard)
	6GK6015-0AL20-0GD1 (Conformal coated)

9.4 RUGGEDCOM RX1500PN LM APE1404 ADM (Obsolete)

The RUGGEDCOM RX1500PN LM APE1404 ADM module is a 32-bit computer with Debian Linux® and CROSSBOW ADM pre-installed. It also features a 16 GB solid-state drive.

Description



- ① HDD LED
- ② PWR LED
- ③ RESET Button
- ④ USB Port
- ⑤ ETH port
- ⑥ DVI-D Video Port

Figure 9.4 RUGGEDCOM RX1500PN LM APE1404

HDD LED	Indicates when the module is active.
PWR LED	Indicates when the module is powered on.
RESET Button.	Reboots/resets the module.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
ETH port	An RJ45 Gigabit Ethernet (GbE) port.
DVI-D Video Port	A display port for connecting a monitor.

CROSSBOW ADM

The CROSSBOW Asset Discovery and Management Agent (ADM) is a security feature used to discover and monitor the activity of network connected devices. This information is collected and reported to the Secure Access Manager (SAM). Operators using CROSSBOW are then made aware of any devices added to the operational environment within minutes of activation, with the exact time of activation and a running account of the most recent activity.

Purposefully deployed devices can be identified and vetted for inclusion, whereas rogue devices can be quickly identified and isolated.

The ADM is designed to be deployed on the network where devices are to be discovered and monitored. The ADM must be reachable from the CROSSBOW External Database Integration Service (EDIS).

For more information about CROSSBOW ADM, refer to the RUGGEDCOM CROSSBOW user documentation available through Siemens Customer Support.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

Each RUGGEDCOM APE module is powered on automatically when power is supplied to the chassis, but can be powered down independently using the **Power** button. This button also allows users to reboot the module.

 NOTICE
Whenever possible, power down or reboot the RUGGEDCOM APE through the RUGGEDCOM RX1500 operating system instead of forcing a shutdown or reboot with the Power button. This helps protect against improper shutdowns and protect data integrity.

Note

The **Power** button is recessed and can only be reached using either a pin, unfolded paper clip, or a thin screwdriver.

Powering down the module

To fully power down the module, press the **Power** button and hold for 4 to 5 seconds.

Rebooting the module

To reboot the module, quickly press and release the **Power** button.

Technical specifications

General	Operating system	Debian Linux®
	Processor	Intel Atom E660 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	16 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D
	Power requirements	12 W with no USB load, 14.5 W with full USB load
	Power consumption	10 W

9.4 RUGGEDCOM RX1500PN LM APE1404 ADM (Obsolete)

Environment	Operating temperature	-40 to 70 °C (-40 to 158 °F)
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^a Maximum combined USB device power consumption is 500 mA at 5 V.

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	APE, 1.3 GHz, 2 GB RAM, 16 GB SATA, Video, USB, Linux + CROSSBOW ADM
Article numbers	6GK6015-0AL20-0GG0 (Standard) 6GK6015-0AL20-0GG1 (Conformal coated)

9.5 RUGGEDCOM RX1500PN LM APE1404W7 (Obsolete)

The RUGGEDCOM RX1500PN LM APE1404W7 module is a 32-bit computer with Windows® Embedded Standard 7 pre-installed and a 16 GB solid-state drive.

Requirements/restrictions

Chassis	This module is only compatible with the following chassis. • RUGGEDCOM RX1500 • RUGGEDCOM RX1501 • RUGGEDCOM RX1510 • RUGGEDCOM RX1511
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Description

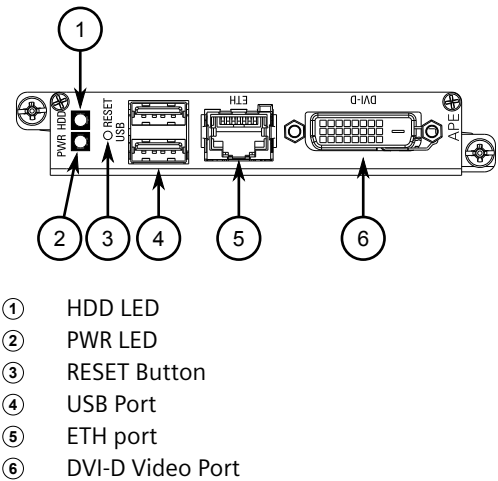


Figure 9.5 RUGGEDCOM RX1500PN LM APE1404W7

HDD LED	Indicates when the module is active.
PWR LED	Indicates when the module is powered on.
RESET Button.	Reboots/resets the module.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
ETH port	An RJ45 Gigabit Ethernet (GbE) port.
DVI-D Video Port	A display port for connecting a monitor.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

Each RUGGEDCOM APE module is powered on automatically when power is supplied to the chassis, but can be powered down independently using the **Power** button. This button also allows users to reboot the module.

NOTICE

Whenever possible, power down or reboot the RUGGEDCOM APE through the RUGGEDCOM RX1500 operating system instead of forcing a shutdown or reboot with the **Power** button. This helps protect against improper shutdowns and protect data integrity.

Note

The **Power** button is recessed and can only be reached using either a pin, unfolded paper clip, or a thin screwdriver.

Powering down the module

To fully power down the module, press the **Power** button and hold for 4 to 5 seconds.

Rebooting the module

To reboot the module, quickly press and release the **Power** button.

Technical specifications

General	Operating system	Windows® Embedded Standard 7
	Processor	Intel Atom E660 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	16 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D
	Power requirements	12 W with no USB load, 14.5 W with full USB load
	Power consumption	10 W
Environment	Operating temperature	-40 to 70 °C (-40 to 158 °F)

^a Maximum combined USB device power consumption is 500 mA at 5 V.

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
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9.5 RUGGEDCOM RX1500PN LM APE1404W7 (Obsolete)

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/).

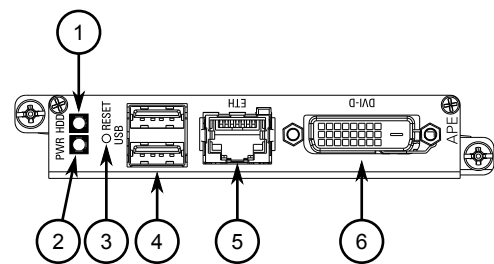
Ordering information

Description	APE, 1.3GHz, 2GB RAM, 16GB SATA, Video, USB, Windows 7 Embedded
Article numbers	6GK6015-0AL20-0GE0 (Standard) 6GK6015-0AL20-0GE1 (Conformal coated)

9.6 RUGGEDCOM RX1500PN LM APE1404CKP (Obsolete)

The RUGGEDCOM RX1500PN LM APE1404CKP module is a 32-bit computer with Check Point GaiA™ OS pre-installed and a 16 GB solid-state drive.

Description



- ① HDD LED
- ② PWR LED
- ③ RESET Button
- ④ USB Port
- ⑤ ETH port
- ⑥ DVI-D Video Port

Figure 9.6 RUGGEDCOM RX1500PN LM APE1404CKP

HDD LED	Indicates when the module is active.
PWR LED	Indicates when the module is powered on.
RESET Button.	Reboots/resets the module.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
ETH port	An RJ45 Gigabit Ethernet (GbE) port.
DVI-D Video Port	A display port for connecting a monitor.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

Each RUGGEDCOM APE module is powered on automatically when power is supplied to the chassis, but can be powered down independently using the **Power** button. This button also allows users to reboot the module.

 **NOTICE**

Whenever possible, power down or reboot the RUGGEDCOM APE through the RUGGEDCOM RX1500 operating system instead of forcing a shutdown or reboot

with the **Power** button. This helps protect against improper shutdowns and protect data integrity.

Note

The **Power** button is recessed and can only be reached using either a pin, unfolded paper clip, or a thin screwdriver.

Powering down the module

To fully power down the module, press the **Power** button and hold for 4 to 5 seconds.

Rebooting the module

To reboot the module, quickly press and release the **Power** button.

Technical specifications

General	Operating system	Check Point GAI™ OS
	Processor	Intel Atom E660 1.3 GHz, 512 KB L2 Cache
	RAM	2 GB DDR2, 800 MHz, 32-bit
	Disk	16 GB SATA, Solid State
	Networking	Realtek RTL8111, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 2.0 ^a
	Video	Intel 4108 Graphics Processor, DVI-D
	Power requirements	12 W with no USB load, 14.5 W with full USB load
	Power consumption	10 W
Environment	Operating temperature	-40 to 70 °C (-40 to 158 °F)

^a Maximum combined USB device power consumption is 500 mA at 5 V.

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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9.6 RUGGEDCOM RX1500PN LM APE1404CKP (Obsolete)

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

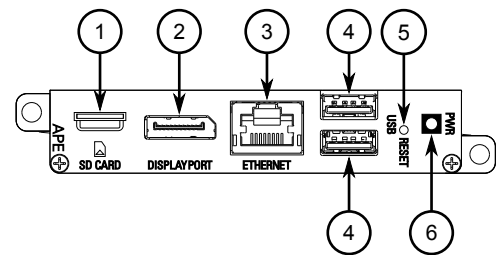
Ordering information

Description	APE, 1.3GHz, 2GB RAM, 16GB SATA, Video, 2xUSB, Checkpoint FW
Article numbers	6GK6015-0AL20-0GF0 (Standard)
	6GK6015-0AL20-0GF1 (Conformal coated)

9.7 RUGGEDCOM RX1500PN LM APE1808LNX

The RUGGEDCOM RX1500PN LM APE1808LNX module is a 64-bit computer with 8 GB RAM, and a 80 GB solid-state drive. It is pre-configured with Debian Linux® 10 (Buster).

Description



- ① SD Card Slot
- ② Display Port
- ③ Ethernet port
- ④ USB Ports
- ⑤ RESET Button
- ⑥ PWR LED

Figure 9.7 RUGGEDCOM RX1500PN LM APE1808LNX

SD Card Slot	A slot for a UHS-I SD card.
Display Port	A display port for connecting a monitor.
Ethernet Port	An RJ45 Gigabit Ethernet (GbE) port.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
RESET Button.	Reboots/resets the module.
PWR LED	Indicates when the module is powered on.

Requirements/restrictions

Host device	This module is only supported by the following RUGGEDCOM RX1500-series devices: • RUGGEDCOM RX1500 • RUGGEDCOM RX1501 • RUGGEDCOM RX1510 • RUGGEDCOM RX1511 • RUGGEDCOM RX1524 • RUGGEDCOM RX1536
Host operating system	The RUGGEDCOM RX1500-series chassis must have RUGGEDCOM ROX v2.12.4 or higher installed.
DHCP server	The RUGGEDCOM RX1500 module's backplane interface (ETH0) obtains its IP address automatically from a DHCP server.

For information about how to configure the host RUGGEDCOM RX1500-series device to connect to a DHCP server, refer to the associated "RUGGEDCOM ROX Configuration Manuals" for the host device.

USB storage devices	USB storage devices used with the RUGGEDCOM RX1500 must have USB 3.0 Interfaces. Other peripheral devices, such as keyboards and mice, may have USB 2.0 or 3.0 interfaces.
SD card usage	Use UHS-I type SD cards whenever possible.
eMMC speed limitation	The maximum speed of the on-board eMMC primary permanent storage device is limited to DDR50 by the BIOS. Any BIOS settings suggesting an eMMC speed higher than DDR50 take no effect.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

NOTICE

Electrical hazard – risk of damage to the device

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

- **Powering down the module**
To fully power down the module, power down the host device.
- **Rebooting the module**
To reboot the module, access the CLI and enter `reboot`.

Configuring the module

For information about how to configure the RUGGEDCOM RX1500PN LM APE1808LNX module, refer to the "[RUGGEDCOM APE1808 Configuration Manual](https://support.industry.siemens.com/cs/ww/en/ps/21683/man) [<https://support.industry.siemens.com/cs/ww/en/ps/21683/man>]"

Technical specifications

General	Operating system	Debian Linux® 10
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 64-bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0

	Video	Intel HD Graphics Processor, Display Port
	Power consumption	12 W
Environment	Operating temperature	-40 to 75 °C (-40 to 167 °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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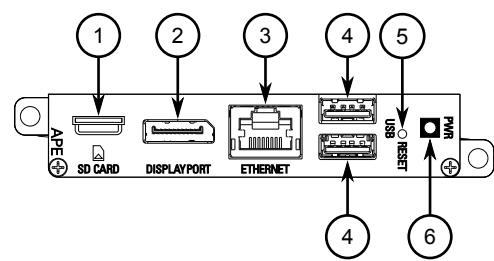
Ordering information

Description	Application Processing Engine, Atom x5-E3940, 8GB RAM, 64GB eMMC, DisplayPort, uSD, USB, Linux
Article numbers	6GK6015-0AL20-0GH0 (Standard) 6GK6015-0AL20-0GH1 (Conformal coated)

9.8 RUGGEDCOM RX1500PN LM APE1808W10

The RUGGEDCOM RX1500PN LM APE1808W10 module is a 64-bit computer with 8 GB RAM, and a 80 GB solid-state drive. It is pre-configured with Microsoft Windows® 10 Enterprise 2021 LTSC.

Description



- ① SD Card Slot
- ② Display Port
- ③ Ethernet port
- ④ USB Ports
- ⑤ RESET Button
- ⑥ PWR LED

Figure 9.8 RUGGEDCOM RX1500PN LM APE1808W10

SD Card Slot	A slot for a UHS-I SD card.
Display Port	A display port for connecting a monitor.
Ethernet Port	An RJ45 Gigabit Ethernet (GbE) port.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
RESET Button.	Reboots/resets the module.
PWR LED	Indicates when the module is powered on.

Requirements/restrictions

Host device	This module is only supported by the following RUGGEDCOM RX1500-series devices: • RUGGEDCOM RX1500 • RUGGEDCOM RX1501 • RUGGEDCOM RX1510 • RUGGEDCOM RX1511 • RUGGEDCOM RX1524 • RUGGEDCOM RX1536
Host operating system	The RUGGEDCOM RX1500-series chassis must have RUGGEDCOM ROX v2.12.4 or higher installed.
USB storage devices	USB storage devices used with the RUGGEDCOM RX1500 must have USB 3.0 Interfaces. Other peripheral devices, such as keyboards and mice, may have USB 2.0 or 3.0 interfaces.

DHCP server	The RUGGEDCOM RX1500 module's backplane interface (ETH0) obtains its IP address automatically from a DHCP server. For information about how to configure the host RUGGEDCOM RX1500-series device to connect to a DHCP server, refer to the associated "RUGGEDCOM ROX Configuration Manuals" for the host device.
SD card usage	Use UHS-I type SD cards whenever possible.
eMMC speed limitation	The maximum speed of the on-board eMMC primary permanent storage device is limited to DDR50 by the BIOS. Any BIOS settings suggesting an eMMC speed higher than DDR50 take no effect.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

 NOTICE
Electrical hazard – risk of damage to the device
When hot swapping this module, wait three seconds before re-inserting the module into the chassis.

- **Powering down the module**
To fully power down the module, power down the host device.
- **Rebooting the module**
To reboot the module, access the CLI and enter `reboot`.

Configuring the module

For information about how to configure the RUGGEDCOM RX1500PN LM APE1808W10 module, refer to the "[RUGGEDCOM APE1808 Configuration Manual](https://support.industry.siemens.com/cs/ww/en/ps/21683/man) [<https://support.industry.siemens.com/cs/ww/en/ps/21683/man>]"

Technical specifications

General	Operating system	Windows® 10 Enterprise 2021 LTSC
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 64-bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0

	Video	Intel HD Graphics Processor, Display Port
	Power consumption	12 W
Environment	Operating temperature	-40 to 75 °C (-40 to 167 °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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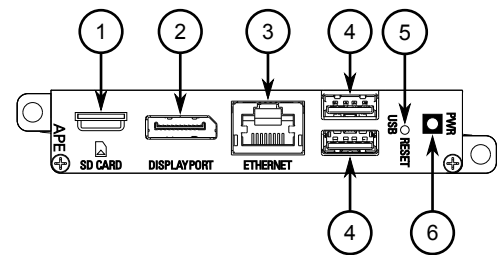
Ordering information

Description	Application Processing Engine, Atom x5-E3940, 8GB RAM, 64GB eMMC, DisplayPort, uSD, USB, Windows 10
Article numbers	6GK6015-0AL20-0GJ0 (Standard) 6GK6015-0AL20-0GJ1 (Conformal coated)

9.9 RUGGEDCOM RX1500PN LM APE1808CKP

The RUGGEDCOM RX1500PN LM APE1808CKP module is a 64-bit computer with 8 GB RAM, and a 80 GB solid-state drive. It is pre-configured with Check Point GAIATM running on a Debian Linux® 10 (Buster) host operating system.

Description



- ① SD Card Slot
- ② Display Port
- ③ Ethernet port
- ④ USB Ports
- ⑤ RESET Button
- ⑥ PWR LED

Figure 9.9 RUGGEDCOM RX1500PN LM APE1808CKP

SD Card Slot	A slot for a UHS-I SD card.
Display Port	A display port for connecting a monitor.
Ethernet Port	An RJ45 Gigabit Ethernet (GbE) port.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
RESET Button	Reboots/resets the module.
PWR LED	Indicates when the module is powered on.

Requirements/restrictions

Host device	This module is only supported by the following RUGGEDCOM RX1500-series devices: • RUGGEDCOM RX1500 • RUGGEDCOM RX1501 • RUGGEDCOM RX1510 • RUGGEDCOM RX1511 • RUGGEDCOM RX1524 • RUGGEDCOM RX1536
Host operating system	The RUGGEDCOM RX1500-series chassis must have RUGGEDCOM ROX v2.12.4 or higher installed.
DHCP server	The RUGGEDCOM RX1500 module's backplane interface (ETH0) obtains its IP address automatically from a DHCP server.

	For information about how to configure the host RUGGEDCOM RX1500-series device to connect to a DHCP server, refer to the associated "RUGGEDCOM ROX Configuration Manuals" for the host device.
USB storage devices	USB storage devices used with the RUGGEDCOM RX1500 must have USB 3.0 Interfaces. Other peripheral devices, such as keyboards and mice, may have USB 2.0 or 3.0 interfaces.
SD card usage	Use UHS-I type SD cards whenever possible.
eMMC speed limitation	The maximum speed of the on-board eMMC primary permanent storage device is limited to DDR50 by the BIOS. Any BIOS settings suggesting an eMMC speed higher than DDR50 take no effect.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

NOTICE

Electrical hazard – risk of damage to the device

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

- **Powering down the module**
To fully power down the module, power down the host device.
- **Rebooting the module**
To reboot the module, access the CLI and enter `reboot`.

Configuring the module

For information about how to configure Check Point GAiA on the APE1808CKP, refer to the "RUGGEDCOM APE1808 Configuration Manual [<https://support.industry.siemens.com/cs/ww/en/ps/21683/man>]"

Technical specifications

General	Operating system	Check Point GAiA™ OS
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 64-bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0

	Video	Intel HD Graphics Processor, Display Port
	Power consumption	12 W
Environment	Operating temperature	-40 to 75 °C (-40 to 167 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 75 °C (-40 to 167 °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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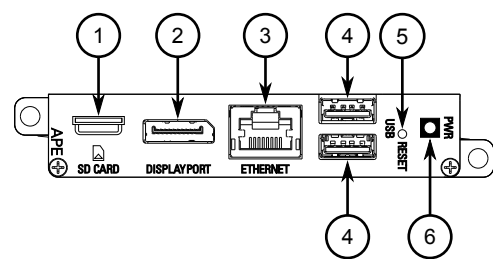
Ordering information

Description	Application Processing Engine, Atom x5-E3940, 8GB RAM, 64GB eMMC, DisplayPort, uSD, USB, Checkpoint FW (Requires Checkpoint License)
Article numbers	6GK6015-0AL20-0GK0 (Standard) 6GK6015-0AL20-0GK1 (Conformal coated)

9.10 RUGGEDCOM RX1500PN LM APE1808ADM

The RUGGEDCOM RX1500PN LM APE1808ADM module is a 64-bit computer with 8 GB RAM, and a 80 GB solid-state drive. It is pre-configured with RUGGEDCOM CROSSBOW ADM running on a Debian Linux® 10 (Buster) host operating system.

Description



- ① SD Card Slot
- ② Display Port
- ③ Ethernet port
- ④ USB Ports
- ⑤ RESET Button
- ⑥ PWR LED

Figure 9.10 RUGGEDCOM RX1500PN LM APE1808ADM

SD Card Slot	A slot for a UHS-I SD card.
Display Port	A display port for connecting a monitor.
Ethernet Port	An RJ45 Gigabit Ethernet (GbE) port.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
RESET Button	Reboots/resets the module.
PWR LED	Indicates when the module is powered on.

Requirements/restrictions

Host device	This module is only supported by the following RUGGEDCOM RX1500-series devices: • RUGGEDCOM RX1500 • RUGGEDCOM RX1501 • RUGGEDCOM RX1510 • RUGGEDCOM RX1511 • RUGGEDCOM RX1524 • RUGGEDCOM RX1536
Host operating system	The RUGGEDCOM RX1500-series chassis must have RUGGEDCOM ROX v2.12.4 or higher installed.
DHCP server	The RUGGEDCOM RX1500 module's backplane interface (ETH0) obtains its IP address automatically from a DHCP server.

	For information about how to configure the host RUGGEDCOM RX1500-series device to connect to a DHCP server, refer to the associated "RUGGEDCOM ROX Configuration Manuals" for the host device.
USB storage devices	USB storage devices used with the RUGGEDCOM RX1500 must have USB 3.0 Interfaces. Other peripheral devices, such as keyboards and mice, may have USB 2.0 or 3.0 interfaces.
SD card usage	Use UHS-I type SD cards whenever possible.
eMMC speed limitation	The maximum speed of the on-board eMMC primary permanent storage device is limited to DDR50 by the BIOS. Any BIOS settings suggesting an eMMC speed higher than DDR50 take no effect.

RUGGEDCOM CROSSBOW ADM

The RUGGEDCOM CROSSBOW Asset Discovery and Management Agent (ADM) is a security feature used to discover and monitor the activity of network connected devices. This information is collected and reported to the Secure Access Manager (SAM). Operators using RUGGEDCOM CROSSBOW are then made aware of any devices added to the operational environment within minutes of activation, with the exact time of activation and a running account of the most recent activity.

Purposefully deployed devices can be identified and vetted for inclusion, whereas rogue devices can be quickly identified and isolated.

The ADM is designed to be deployed on the network where devices are to be discovered and monitored. The ADM must be reachable from the CROSSBOW External Database Integration Service (EDIS).

For more information about RUGGEDCOM CROSSBOW ADM, refer to the RUGGEDCOM CROSSBOW user documentation available through Siemens Customer Support.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

 **NOTICE**

Electrical hazard – risk of damage to the device

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

- **Powering down the module**
To fully power down the module, power down the host device.
- **Rebooting the module**
To reboot the module, access the CLI and enter `reboot`.

Configuring the module

For information about how to configure the RUGGEDCOM RX1500PN LM APE1808LNX module, refer to the "[RUGGEDCOM APE1808 Configuration Manual](https://support.industry.siemens.com/cs/ww/en/ps/21683/man) [<https://support.industry.siemens.com/cs/ww/en/ps/21683/man>]"

Technical specifications

General	Operating system	Debian Linux® 10 + RUGGEDCOM CROSSBOW ADM
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 64-bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port
	Power consumption	12 W
Environment	Operating temperature	-40 to 75 °C (-40 to 167 °F)
	Operating relative humidity	5 to 95% (non-condensing)
	Storage temperature	-40 to 75 °C (-40 to 167 °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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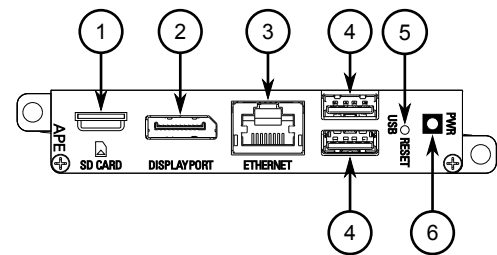
Ordering information

Description	Application Processing Engine, Atom x5-E3940, 8GB RAM, 64GB eMMC, DisplayPort, uSD, USB, CROSSBOW ADM agent software
Article numbers	6GK6015-0AL20-0GL0 (Standard)
	6GK6015-0AL20-0GL1 (Conformal coated)

9.11 RUGGEDCOM RX1500PN LM APE1808SAM-L

The RUGGEDCOM RX1500PN LM APE1808SAM-L module is a 64-bit computer with 8 GB RAM, and a 80 GB solid-state drive. It is pre-configured with RUGGEDCOM CROSSBOW SAM-L running on a Debian Linux® 10 (Buster) host operating system.

Description



- ① SD Card Slot
- ② Display Port
- ③ Ethernet port
- ④ USB Ports
- ⑤ RESET Button
- ⑥ PWR LED

Figure 9.11 RUGGEDCOM RX1500PN LM APE1808SAM-L

SD Card Slot	A slot for a UHS-I SD card.
Display Port	A display port for connecting a monitor.
Ethernet Port	An RJ45 Gigabit Ethernet (GbE) port.
USB Ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
RESET Button.	Reboots/resets the module.
PWR LED	Indicates when the module is powered on.

Requirements/restrictions

Host device	This module is only supported by the following RUGGEDCOM RX1500-series devices: • RUGGEDCOM RX1500 • RUGGEDCOM RX1501 • RUGGEDCOM RX1510 • RUGGEDCOM RX1511 • RUGGEDCOM RX1524 • RUGGEDCOM RX1536
Host operating system	The RUGGEDCOM RX1500-series chassis must have RUGGEDCOM ROX v2.12.4 or higher installed.
DHCP server	The RUGGEDCOM RX1500 module's backplane interface (ETH0) obtains its IP address automatically from a DHCP server.

	For information about how to configure the host RUGGEDCOM RX1500-series device to connect to a DHCP server, refer to the associated "RUGGEDCOM ROX Configuration Manuals" for the host device.
USB storage devices	USB storage devices used with the RUGGEDCOM RX1500 must have USB 3.0 Interfaces. Other peripheral devices, such as keyboards and mice, may have USB 2.0 or 3.0 interfaces.
SD card usage	Use UHS-I type SD cards whenever possible.
eMMC speed limitation	The maximum speed of the on-board eMMC primary permanent storage device is limited to DDR50 by the BIOS. Any BIOS settings suggesting an eMMC speed higher than DDR50 take no effect.

RUGGEDCOM CROSSBOW SAM-L

The RUGGEDCOM CROSSBOW Secure Access Manager - Local (SAM-L) is a functionally-limited version of the CROSSBOW SAM-P. Its purpose is to allow local connectivity and perform special operations on behalf of the SAM-P on the devices in that facility. The SAM-L is installed on a device physically located within the facility and acts as a local version of the RUGGEDCOM CROSSBOW server.

For more information about CROSSBOW SAM-L, refer to the RUGGEDCOM CROSSBOW user documentation available through Siemens Customer Support.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

NOTICE

Electrical hazard – risk of damage to the device

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

- **Powering down the module**
To fully power down the module, power down the host device.
- **Rebooting the module**
To reboot the module, access the CLI and enter `reboot`.

Configuring the module

For information about how to configure RUGGEDCOM CROSSBOW SAM-L on the APE1808SAM-L, refer to the "[RUGGEDCOM APE1808 Configuration Manual \[https://support.industry.siemens.com/cs/ww/en/ps/21683/man\]](https://support.industry.siemens.com/cs/ww/en/ps/21683/man)".

Technical specifications

General	Operating system	Debian Linux® 10 + RUGGEDCOM CROSSBOW SAM-L
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 64-bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port
	Power consumption	12 W
Environment	Operating temperature	-40 to 75 °C (-40 to 167 °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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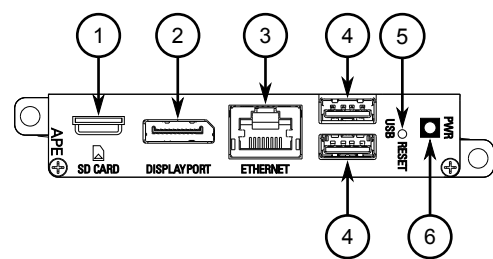
Ordering information

Description	Application Processing Engine, Atom x5-E3940, 8GB RAM, 64GB eMMC, DisplayPort, uSD, USB, CROSSBOW SAM-L FW
Article numbers	6GK6015-0AL20-0GN0 (Standard) 6GK6015-0AL20-0GN1 (Conformal coated)

9.12 RUGGEDCOM RX1500PN LM APE1808ELAN

The RUGGEDCOM RX1500PN LM APE1808ELAN module is a 64-bit computer with 8 GB RAM, and a 80 GB solid-state drive. It is pre-configured with RUGGEDCOM ELAN running on a Debian Linux® 10 host operating system.

Description



- ① SD card slot
- ② Display port
- ③ Ethernet port
- ④ USB ports
- ⑤ RESET button
- ⑥ PWR LED

Figure 9.12 RUGGEDCOM RX1500PN LM APE1808ELAN

Ethernet port	An RJ45 Gigabit Ethernet (GbE) port.
SD card slot	A slot for a UHS-I SD card.
Display port	A display port for connecting a monitor.
USB ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
RESET button.	Reboots/resets the module.
PWR LED	Indicates when the module is powered on.

Requirements/restrictions

Host device	This module is only supported by the following RUGGEDCOM RX1500-series devices: • RUGGEDCOM RX1500 • RUGGEDCOM RX1501 • RUGGEDCOM RX1510 • RUGGEDCOM RX1511 • RUGGEDCOM RX1524 • RUGGEDCOM RX1536
Host operating system	The RUGGEDCOM RX1500-series chassis must have RUGGEDCOM ROX v2.12.4 or higher installed.
DHCP server	The RUGGEDCOM RX1500 module's backplane interface (ETH0) obtains its IP address automatically from a DHCP server.

For information about how to configure the host RUGGEDCOM RX1500-series device to connect to a DHCP server, refer to the associated "RUGGEDCOM ROX Configuration Manuals" for the host device.

USB storage devices	USB storage devices used with the RUGGEDCOM RX1500 must have USB 3.0 Interfaces. Other peripheral devices, such as keyboards and mice, may have USB 2.0 or 3.0 interfaces.
SD card usage	Use UHS-I type SD cards whenever possible.
eMMC speed limitation	The maximum speed of the on-board eMMC primary permanent storage device is limited to DDR50 by the BIOS. Any BIOS settings suggesting an eMMC speed higher than DDR50 take no effect.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

NOTICE

Electrical hazard – risk of damage to the device

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

- **Powering down the module**
To fully power down the module, power down the host device.
- **Rebooting the module**
To reboot the module, access the CLI and enter `reboot`.

Configuring the module

For information about how to configure ELAN on the APE1808ELAN, refer to the "RUGGEDCOM APE1808 Configuration Manual [<https://support.industry.siemens.com/cs/ww/en/ps/21683/man>]".

Technical specifications

General	Operating system	Debian Linux® 10 + RUGGEDCOM ELAN
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 64-bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0

	Video	Intel HD Graphics Processor, Display Port
	Power consumption	12 W
Environment	Operating temperature	-40 to 75 °C (-40 to 167 °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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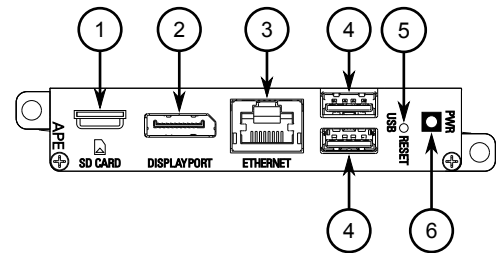
Ordering information

Description	Application Processing Engine, Atom x5-E3940, 8GB RAM, 64GB eMMC, DisplayPort, uSD, USB, ELAN FW
Article numbers	6GK6015-0AL20-0GP0 (Standard) 6GK6015-0AL20-0GP1 (Conformal coated)

9.13 RUGGEDCOM RX1500PN LM APE1808CConn

The RUGGEDCOM RX1500PN LM APE1808CConn module is a 64-bit computer with 8 GB RAM, and a 80 GB solid-state drive. It is pre-configured with Siemens CloudConnect.

Description



- ① SD card slot
- ② Display port
- ③ Ethernet port
- ④ USB ports
- ⑤ RESET button
- ⑥ PWR LED

Figure 9.13 RUGGEDCOM RX1500PN LM APE1808CConn

Ethernet port	An RJ45 Gigabit Ethernet (GbE) port.
SD card slot	A slot for a UHS-I SD card.
Display port	A display port for connecting a monitor.
USB ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
RESET button.	Reboots/resets the module.
PWR LED	Indicates when the module is powered on.

Requirements/restrictions

Host device	This module is only supported by the following RUGGEDCOM RX1500-series devices: • RUGGEDCOM RX1500 • RUGGEDCOM RX1501 • RUGGEDCOM RX1510 • RUGGEDCOM RX1511 • RUGGEDCOM RX1524 • RUGGEDCOM RX1536
Host operating system	The RUGGEDCOM RX1500-series chassis must have RUGGEDCOM ROX v2.12.4 or higher installed.
USB storage devices	USB storage devices used with the RUGGEDCOM RX1500 must have USB 3.0 Interfaces. Other peripheral devices, such as keyboards and mice, may have USB 2.0 or 3.0 interfaces.

SD card usage	Use UHS-I type SD cards whenever possible.
eMMC speed limitation	The maximum speed of the on-board eMMC primary permanent storage device is limited to DDR50 by the BIOS. Any BIOS settings suggesting an eMMC speed higher than DDR50 take no effect.

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

NOTICE

Electrical hazard – risk of damage to the device

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

- **Powering down the module**
To fully power down the module, power down the host device.
- **Rebooting the module**
To reboot the module, access the CLI and enter `reboot`.

Configuring the module

For information about how to configure the RUGGEDCOM RX1500PN LM APE1808CConn module, refer to:

- "RUGGEDCOM APE1808 Configuration Manual [<https://support.industry.siemens.com/cs/ww/en/ps/21683/man>]"
- "Getting Started with RUGGEDCOM CloudConnect APE1808 [<https://support.industry.siemens.com/cs/us/en/view/109800967>]"

Technical specifications

General	Operating system	Siemens CloudConnect
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 64-bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port
	Power consumption	12 W

Environment	Operating temperature	-40 to 75 °C (-40 to 167 °F)
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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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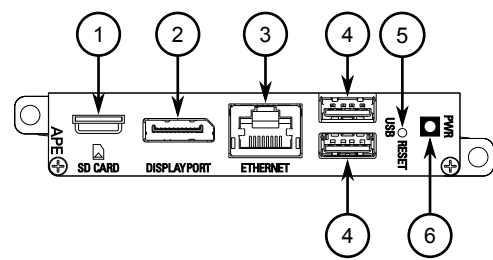
Ordering information

Description	Application Processing Engine, Atom x5-E3940, 8GB RAM, 64GB eMMC, DisplayPort, uSD, USB, CloudConnect FW
Article numbers	6GK6015-0AL20-0GM0 (Standard) 6GK6015-0AL20-0GM1 (Conformal coated)

9.14 RUGGEDCOM RX1500PN LM APE1808NOZ

The RUGGEDCOM RX1500PN LM APE1808NOZ module is a 64-bit computer with 8 GB RAM, and a 80 GB solid-state drive. It is pre-configured with Nozomi Guardian.

Description



- ① SD card slot
- ② Display port
- ③ Ethernet port
- ④ USB ports
- ⑤ RESET button
- ⑥ PWR LED

Figure 9.14 RUGGEDCOM RX1500PN LM APE1808NOZ

Ethernet port	An RJ45 Gigabit Ethernet (GbE) port.
SD card slot	A slot for a UHS-I SD card.
Display port	A display port for connecting a monitor.
USB ports	USB ports for connecting accessories, such as storage media, a mouse, a keyboard, etc.
RESET button	Reboots/resets the module.
PWR LED	Indicates when the module is powered on.

Requirements/restrictions

Host device	This module is only supported by the following RUGGEDCOM RX1500-series devices: • RUGGEDCOM RX1500 • RUGGEDCOM RX1501 • RUGGEDCOM RX1510 • RUGGEDCOM RX1511 • RUGGEDCOM RX1524 • RUGGEDCOM RX1536
Host operating system	The RUGGEDCOM RX1500-series chassis must have RUGGEDCOM ROX v2.12.4 or higher installed.
USB storage devices	USB storage devices used with the RUGGEDCOM RX1500 must have USB 3.0 Interfaces. Other peripheral devices, such as keyboards and mice, may have USB 2.0 or 3.0 interfaces.
SD card usage	Use UHS-I type SD cards whenever possible.

eMMC speed limitation	The maximum speed of the on-board eMMC primary permanent storage device is limited to DDR50 by the BIOS. Any BIOS settings suggesting an eMMC speed higher than DDR50 take no effect.
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Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

Rebooting/powering down the module

 **NOTICE**

Electrical hazard – risk of damage to the device

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

- **Powering down the module**
To fully power down the module, power down the host device.
- **Rebooting the module**
To reboot the module, access the CLI and enter `reboot`.

Configuring the module

For information about how to configure Nozomi Guardian on the RUGGEDCOM RX1500PN LM APE1808NOZ module, refer to the "[RUGGEDCOM APE1808NOZ Configuration Manual \[https://support.industry.siemens.com/cs/ww/en/ps/21683/man\]](https://support.industry.siemens.com/cs/ww/en/ps/21683/man)".

Technical specifications

General	Operating system	Nozomi Guardian OS
	Processor	Intel x5-E3940 1.8 GHz, 2 MB L2 Cache
	RAM	8 GB DDR3 ECC, 1600 MHz, 64-bit
	Disk	80 GB, Solid State
	Networking	Intel I210, RJ45 Gigabit Ethernet Interface
	USB	2 x USB 3.0
	Video	Intel HD Graphics Processor, Display Port
	Power consumption	12 W
Environment	Operating temperature	-40 to 75 °C (-40 to 167 °F)

Certification

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

RRA

This module has been registered by the Korean Radio Research Agency (RRA) under Clause 3, Article 58-2 of the Radio Waves Act. As such, the device is marked with a KC symbol and can be used in the Republic of Korea (South Korea) as a Class A product in a commercial, industrial or business environment.



R-R-S14-APE1808

A copy of the KC Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page ix).

Notices specific to the RRA:



WARNING

Class A Equipment (Industrial Broadcasting and Communication Equipment)

This device complies with the limits of a Class A electromagnetic wave device and is intended for use outside of a residential environment. The seller or user must be aware.



경고

A급 기기 (업무용 방송통신기자재)

이 기기는 업무용(B급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

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/).

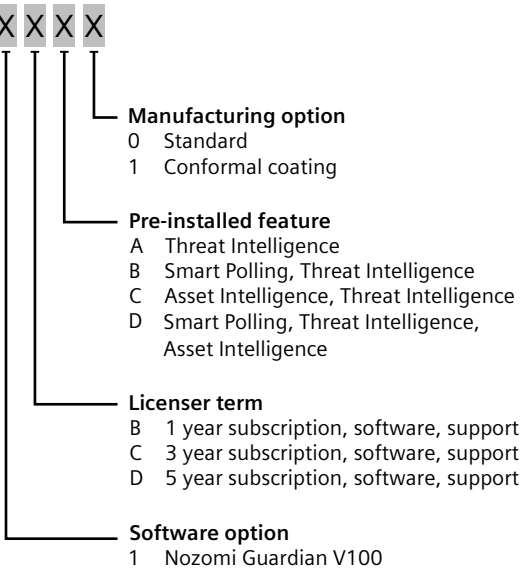
Ordering information

Description

Application Processing Engine, Atom x5-E3940, 8GB RAM, 64GB eMMC, DisplayPort, uSD, USB, Nozomi Guardian FW

Article number

6GK6015-0SA00-XXXX



Blank modules

The following blank modules are available.

RUGGEDCOM RX1500PN PS XXP	"RUGGEDCOM RX1500PN PS XXP" (Page 256)
RUGGEDCOM RX1500PN LM Blank	"RUGGEDCOM RX1500PN LM Blank" (Page 257)

NOTICE

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

10.1 RUGGEDCOM RX1500PN PS XXP

The RUGGEDCOM RX1500PN PS XXP is a blank module designed to occupy empty power supply module slots in the RUGGEDCOM RX1500 chassis.

Description

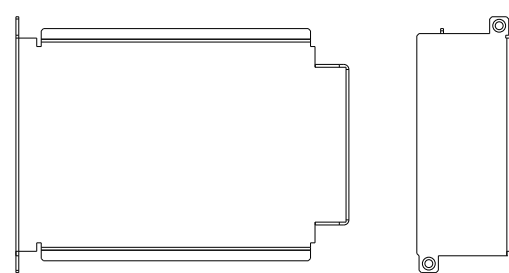


Figure 10.1 RUGGEDCOM RX1500PN PS XXP

Installing the module

For information about installing this module, refer to the "Equipment Manual" for the host device.

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 Power Supply
Article numbers	6GK6015-0AL10-0AA0 (Standard) 6GK6015-0AL10-0AA1 (Conformal coated)

10.2 RUGGEDCOM RX1500PN LM Blank

The RUGGEDCOM RX1500PN LM Blank is a blank module designed to occupy empty media module slots in the RUGGEDCOM RX1500 chassis.

Description

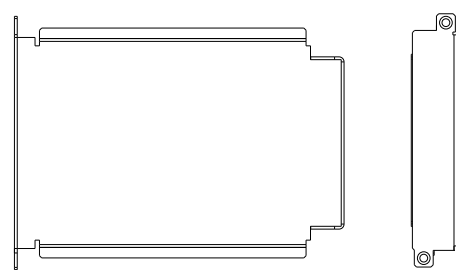


Figure 10.2 RUGGEDCOM RX1500PN LM Blank

Installing the module

For information about installing this module, refer to the "Installation Manual" for the host device.

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	6GK6015-0AL20-0AA0 (Standard) 6GK6015-0AL20-0AA1 (Conformal coated)

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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