SIEMENS

RUGGEDCOM Modules

Catalog

For RSG2488, RSG2488F

10/2018
RC1322-EN-02

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Table of Contents

Preface

This document details RUGGEDCOM power and media modules available for use with RUGGEDCOM RSG2488/ RSG2488F switches.

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

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Alerts

The following types of alerts are used when necessary to highlight important information.

DANGER!
DANGER alerts describe imminently hazardous situations that, if not avoided, will result in death or serious injury.

WARNING!
WARNING alerts describe hazardous situations that, if not avoided, may result in serious injury and/or equipment damage.

CAUTION!
CAUTION alerts describe hazardous situations that, if not avoided, may result in equipment damage.

IMPORTANT!
IMPORTANT alerts provide important information that should be known before performing a procedure or step, or using a feature.

NOTE
NOTE alerts provide additional information, such as facts, tips and details.

Related Documents

Other documents that may be of interest include:

- **RUGGEDCOM RSG2488 Installation Guide**
  https://support.industry.siemens.com/cs/ca/en/view/82169156

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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/ruggedcom or contact a Siemens Sales representative.

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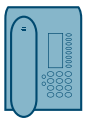
Customer support is available 24 hours, 7 days a week for all Siemens customers. For technical support or general information, contact Siemens Customer Support through any of the following methods:

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 http://www.automation.siemens.com/mcms/aspa-db/en/automation-technology/Pages/default.aspx.

Mobile App

Install the Industry Online Support app by Siemens AG 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

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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/ruggedcom.

1 Introduction

This catalog details the various power and media modules available for the RUGGEDCOM RSG2488. 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 *Installation Guide* for the device:

- **RUGGEDCOM RSG2488 Installation Guide**
  https://support.industry.siemens.com/cs/ww/en/view/82169156

IMPORTANT!
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.

CONTENTS

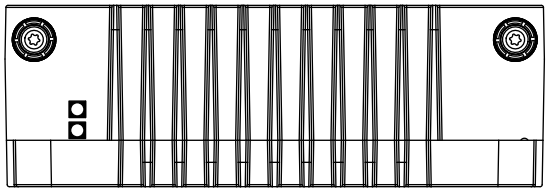
Section 1.1

Available Modules

The following is a list of all power and line modules available for use in the RUGGEDCOM RSG2488.

Power Supply Modules

RUGGEDCOM RPM2410



Specifications

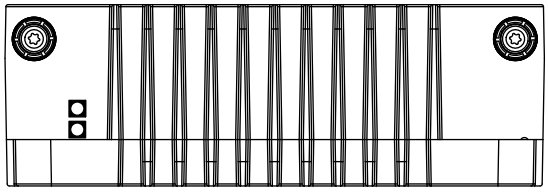
Input Range: 13 to 36 VDC

Article Numbers

6GK6000-8PS11-1EA0 (Standard)

6GK6000-8PS11-1EA1 (Conformal Coated)

RUGGEDCOM RPM2420



Specifications

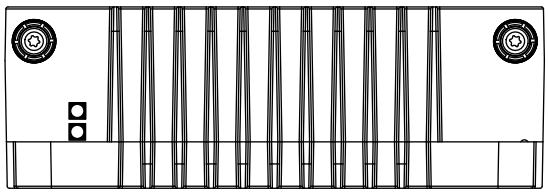
Input Range: 36 to 72 VDC

Article Numbers

6GK6000-8PS12-1EA0 (Standard)

6GK6000-8PS12-1EA1 (Conformal Coated)

RUGGEDCOM RPM2430



Specifications

Input Range: 88 to 300 VDC or 85 to 264 VAC

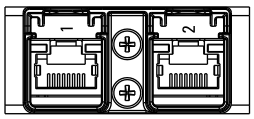
Article Numbers

6GK6000-8PS13-1EA0 (Standard)

6GK6000-8PS13-1EA1 (Conformal Coated)

Copper Ethernet Modules

RUGGEDCOM RMM2473-2FC



Specifications

Ports: 2

Port Type: FastConnect RJ45

Speed: 1000 Mbps

Interface: TX

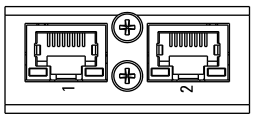
Distance: 100 m (328 ft)

Article Numbers

6GK6000-8CG02-2EA0 (Standard)

6GK6000-8CG02-2EA1 (Conformal Coated)

RUGGEDCOM RMM2473-2RJ45



Specifications

Ports: 2

Port Type: RJ45

Speed: 1000 Mbps

Interface: TX

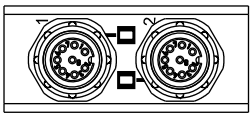
Distance: 100 m (328 ft)

Article Numbers

6GK6000-8CG01-2EA0 (Standard)

6GK6000-8CG01-2EA1 (Conformal Coated)

RUGGEDCOM RMM2473-2M12A



Specifications

Ports: 2

Port Type: M12 (8-Pin, A-Coded)

Speed: 1000 Mbps

Interface: TX

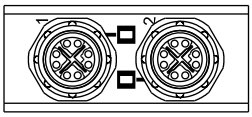
Distance: 100 m (328 ft)

Article Numbers

6GK6000-8CG03-2EA0 (Standard)

6GK6000-8CG03-2EA1 (Conformal Coated)

RUGGEDCOM RMM2473-2M12X



Specifications

Ports: 2

Port Type: M12 (8-Pin, X-Coded)

Speed: 1000 Mbps

Interface: TX

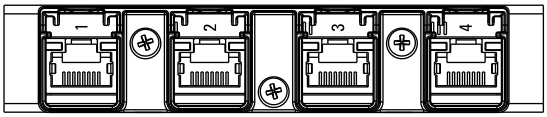
Distance: 100 m (328 ft)

Article Numbers

6GK6000-8CG04-2EA0 (Standard)

6GK6000-8CG04-2EA1 (Conformal Coated)

RUGGEDCOM RMM2473-4FC



Specifications

Ports: 4

Port Type: FastConnect RJ45

Speed: 1000 Mbps

Interface: TX

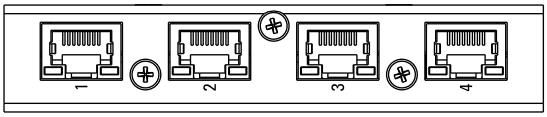
Distance: 100 m (328 ft)

Article Numbers

6GK6000-8CG02-4EA0 (Standard)

6GK6000-8CG02-4EA1 (Conformal Coated)

RUGGEDCOM RMM2473-4RJ45



Specifications

Ports: 4

Port Type: RJ45

Speed: 1000 Mbps

Interface: TX

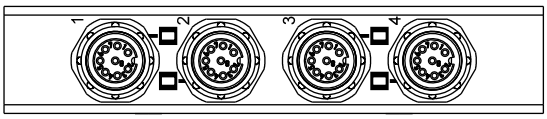
Distance: 100 m (328 ft)

Article Numbers

6GK6000-8CG01-4EA0 (Standard)

6GK6000-8CG01-4EA1 (Conformal Coated)

RUGGEDCOM RMM2473-4M12A



Specifications

Ports: 4

Port Type: M12 (8-Pin, A-Coded)

Speed: 1000 Mbps

Interface: TX

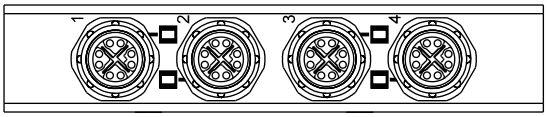
Distance: 100 m (328 ft)

Article Numbers

6GK6000-8CG03-4EA0 (Standard)

6GK6000-8CG03-4EA1 (Conformal Coated)

RUGGEDCOM RMM2473-4M12X



Specifications

Ports: 4

Port Type: M12 (8-Pin, X-Coded)

Speed: 1000 Mbps

Interface: TX

Distance: 100 m (328 ft)

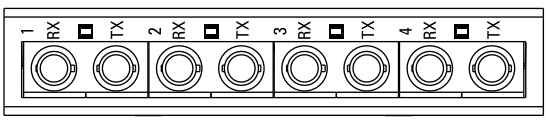
Article Numbers

6GK6000-8CG04-4EA0 (Standard)

6GK6000-8CG04-4EA1 (Conformal Coated)

Fiber Optic Ethernet Modules

RUGGEDCOM RMM2464-4ST2



Specifications

Ports: 4

Port Type: ST

Mode: MM (Multi-Mode)

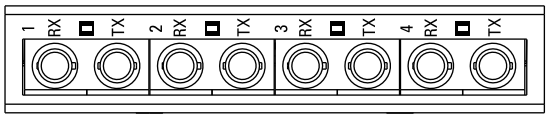
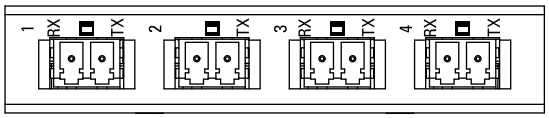
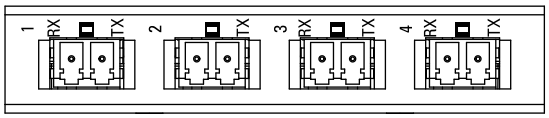
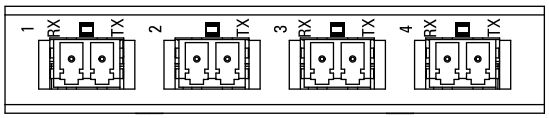
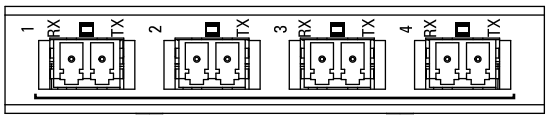
Speed: 100 Mbps

Interface: FX

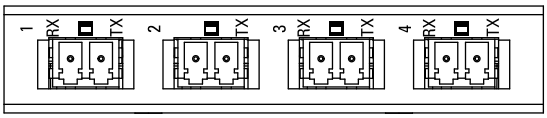
Article Numbers

6GK6000-8FX01-4EA0 (Standard)

6GK6000-8FX01-4EA1 (Conformal Coated)

	Wavelength: 1310 nm Distance: 2 km (1.2 mi)	
RUGGEDCOM RMM2465-4ST20 	**Specifications** Ports: 4 Port Type: ST Mode: SM (Single-Mode) Speed: 100 Mbps Interface: FX Wavelength: 1310 nm Distance: 20 km (12.4 mi)	**Article Numbers** 6GK6000-8FX04-4EA0 (Standard) 6GK6000-8FX04-4EA1 (Conformal Coated)
RUGGEDCOM RMM2464-4LC2 	**Specifications** Ports: 4 Port Type: LC Mode: MM (Multi-Mode) Speed: 100 Mbps Interface: FX Wavelength: 1310 nm Distance: 2 km (1.2 mi)	**Article Numbers** 6GK6000-8FX11-4EA0 (Standard) 6GK6000-8FX11-4EA1 (Conformal Coated)
RUGGEDCOM RMM2475-4LC10 	**Specifications** Ports: 4 Port Type: LC Mode: SM (Single-Mode) Speed: 100 Mbps Interface: LX Wavelength: 1310 nm Distance: 10 km (12.4 mi)	**Article Numbers** 6GK6000-8FG03-4EA0 (Standard) 6GK6000-8FG03-4EA1 (Conformal Coated)
RUGGEDCOM RMM2465-4LC20 	**Specifications** Ports: 4 Port Type: LC Mode: SM (Single-Mode) Speed: 100 Mbps Interface: FX Wavelength: 1310 nm Distance: 20 km (12.4 mi)	**Article Numbers** 6GK6000-8FX06-4EA0 (Standard) 6GK6000-8FX06-4EA1 (Conformal Coated)
RUGGEDCOM RMM2475-4LC25 	**Specifications** Ports: 4 Port Type: LC Mode: SM (Single-Mode) Speed: 1000 Mbps Interface: LX Wavelength: 1310 nm Distance: 25 km (15.5 mi)	**Article Numbers** 6GK6000-8FG05-4EA0 (Standard) 6GK6000-8FG05-4EA1 (Conformal Coated)

RUGGEDCOM RMM2465-4LC50



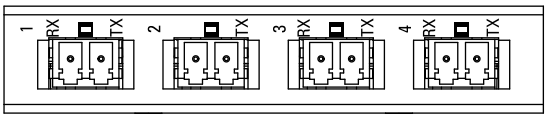
Specifications

Ports: 4
Port Type: LC
Mode: SM (Single-Mode)
Speed: 100 Mbps
Interface: FX
Wavelength: 1310 nm
Distance: 50 km (31.1 mi)

Article Numbers

6GK6000-8FX08-4EA0 (Standard)
6GK6000-8FX08-4EA1 (Conformal Coated)

RUGGEDCOM RMM2465-4LC90



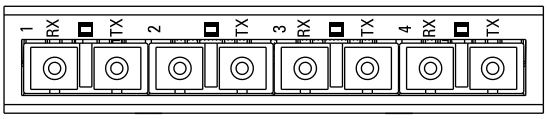
Specifications

Ports: 4
Port Type: LC
Mode: SM (Single-Mode)
Speed: 100 Mbps
Interface: FX
Wavelength: 1310 nm
Distance: 90 km (55.9 mi)

Article Numbers

6GK6000-8FX10-4EA0 (Standard)
6GK6000-8FX10-4EA1 (Conformal Coated)

RUGGEDCOM RMM2464-4SC2



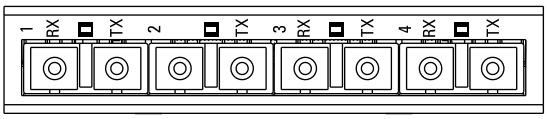
Specifications

Ports: 4
Port Type: SC
Mode: MM (Multi-Mode)
Speed: 100 Mbps
Interface: FX
Wavelength: 1300 nm
Distance: 2 km (1.2 mi)

Article Numbers

6GK6000-8FX02-4EA0 (Standard)
6GK6000-8FX02-4EA1 (Conformal Coated)

RUGGEDCOM RMM2475-4SC10



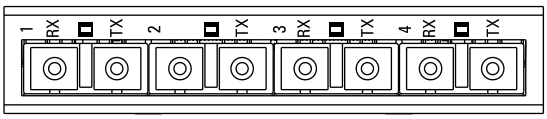
Specifications

Ports: 4
Port Type: SC
Mode: SM (Single-Mode)
Speed: 1000 Mbps
Interface: LX
Wavelength: 1310 nm
Distance: 10 km (6.2 mi)

Article Numbers

6GK6000-8FG02-4EA0 (Standard)
6GK6000-8FG02-4EA1 (Conformal Coated)

RUGGEDCOM RMM2465-4SC20



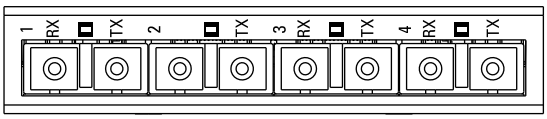
Specifications

Ports: 4
Port Type: SC
Mode: SM (Single-Mode)
Speed: 100 Mbps
Interface: FX
Wavelength: 1310 nm
Distance: 20 km (12.4 mi)

Article Numbers

6GK6000-8FX05-4EA0 (Standard)
6GK6000-8FX05-4EA1 (Conformal Coated)

RUGGEDCOM RMM2475-4SC50

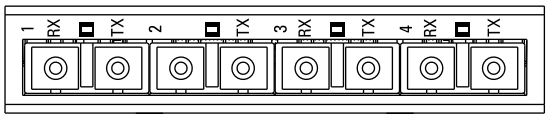
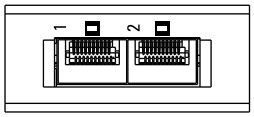
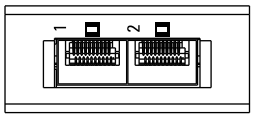
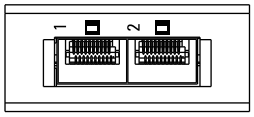
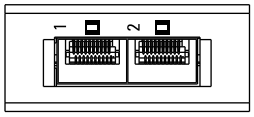
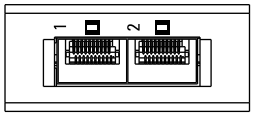
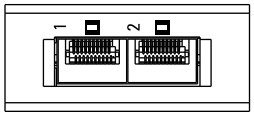


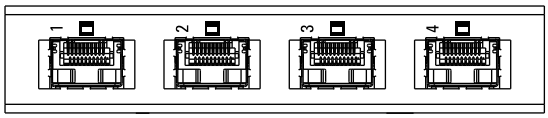
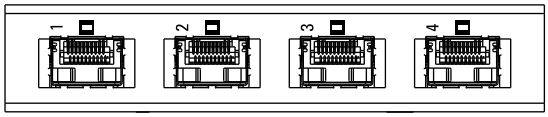
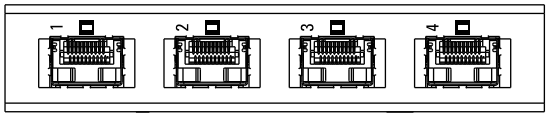
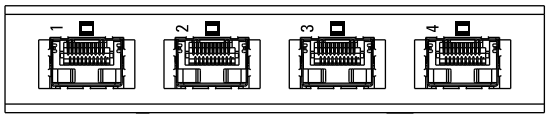
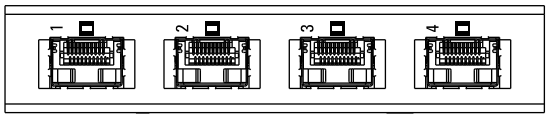
Specifications

Ports: 4
Port Type: SC
Mode: SM (Single-Mode)
Speed: 1000 Mbps

Article Numbers

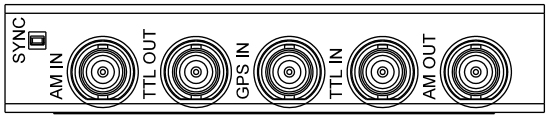
6GK6000-8FG04-4EA0 (Standard)
6GK6000-8FG04-4EA1 (Conformal Coated)

	Interface: FX Wavelength: 1310 nm Distance: 50 km (31.1 mi)	
RUGGEDCOM RMM2465-4SC90 	**Specifications** Ports: 4 Port Type: SC Mode: SM (Single-Mode) Speed: 100 Mbps Interface: FX Wavelength: 1310 nm Distance: 90 km (55.9 mi)	**Article Numbers** 6GK6000-8FX03-4EA0 (Standard) 6GK6000-8FX03-4EA1 (Conformal Coated)
RUGGEDCOM RMM2472-2SFP 	**Specifications** Sockets: 2 SFP Included: No[a]	**Article Numbers** 6GK6000-8FG50-2EA0 (Standard) 6GK6000-8FG50-2EA1 (Conformal Coated)
RUGGEDCOM RMM2474-2SFP 	**Specifications** Ports: 2 Speed: 1000 Mbps Interface: SX SFP Included: RUGGEDCOM SFP1122-1SX	**Article Numbers** 6GK6000-8FG51-2EA0 (Standard) 6GK6000-8FG51-2EA1 (Conformal Coated)
RUGGEDCOM RMM2464-2SFP2 	**Specifications** Ports: 2 Speed: 100 Mbps Interface: FX SFP Included: RUGGEDCOM SFP1121-1FX2	**Article Numbers** 6GK6000-8FX51-2EA0 (Standard) 6GK6000-8FX51-2EA1 (Conformal Coated)
RUGGEDCOM RMM2475-2SFP10 	**Specifications** Ports: 2 Speed: 1000 Mbps Interface: LX SFP Included: RUGGEDCOM SFP1132-1LX10	**Article Numbers** 6GK6000-8FG52-2EA0 (Standard) 6GK6000-8FG52-2EA1 (Conformal Coated)
RUGGEDCOM RMM2475-2SFP25 	**Specifications** Ports: 2 Speed: 1000 Mbps Interface: LX SFP Included: RUGGEDCOM SFP1132-1LX25	**Article Numbers** 6GK6000-8FG53-2EA0 (Standard) 6GK6000-8FG53-2EA1 (Conformal Coated)
RUGGEDCOM RMM2475-2SFP70 	**Specifications** Ports: 2 Speed: 1000 Mbps Interface: LX SFP Included: RUGGEDCOM SFP1132-1LX70	**Article Numbers** 6GK6000-8FG54-2EA0 (Standard) 6GK6000-8FG54-2EA1 (Conformal Coated)

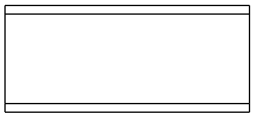
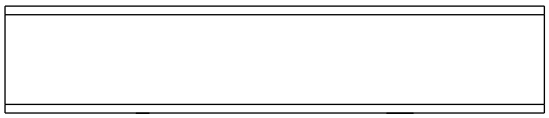
RUGGEDCOM RMM2472-4SFP 	**Specifications** Sockets: 4 SFP Included: No[a]	**Article Numbers** 6GK6000-8FG50-4EA0 (Standard) 6GK6000-8FG50-4EA1 (Conformal Coated)
RUGGEDCOM RMM2474-4SFP 	**Specifications** Ports: 4 Speed: 1000 Mbps Interface: SX SFP Included: RUGGEDCOM SFP1122-1SX	**Article Numbers** 6GK6000-8FG51-4EA0 (Standard) 6GK6000-8FG51-4EA1 (Conformal Coated)
RUGGEDCOM RMM2475-4SFP10 	**Specifications** Ports: 4 Speed: 1000 Mbps Interface: LX SFP Included: RUGGEDCOM SFP1132-1LX10	**Article Numbers** 6GK6000-8FG52-4EA0 (Standard) 6GK6000-8FG52-4EA1 (Conformal Coated)
RUGGEDCOM RMM2475-4SFP25 	**Specifications** Ports: 4 Speed: 1000 Mbps Interface: LX SFP Included: RUGGEDCOM SFP1132-1LX25	**Article Numbers** 6GK6000-8FG53-4EA0 (Standard) 6GK6000-8FG53-4EA1 (Conformal Coated)
RUGGEDCOM RMM2475-4SFP70 	**Specifications** Ports: 4 Speed: 1000 Mbps Interface: LX SFP Included: RUGGEDCOM SFP1132-1LX70	**Article Numbers** 6GK6000-8FG54-4EA0 (Standard) 6GK6000-8FG54-4EA1 (Conformal Coated)

[a] *Refer to details for a list of compatible SFPs.*

Precision Time Protocol (PTP) Modules

RUGGEDCOM RMM2431-5PTP 	**Specifications** Ports: 5 Protocols: PTP and NTP Synchronization Sources: NTP, IEEE 1588 v2, IRIG-B PWM, GPS Port Type: BNC	**Article Numbers** 6GK6000-8PT01-4EA0 (Standard) 6GK6000-8PT01-4EA1 (Conformal Coated)

Blank Modules

RUGGEDCOM RMM2431-2 	**Specifications** —	**Article Numbers** 6GK6000-8AA00-2EA0 (Standard) 6GK6000-8AA00-2EA1 (Conformal Coated)
RUGGEDCOM RMM2431-4 	**Specifications** —	**Article Numbers** 6GK6000-8AA00-4EA0 (Standard) 6GK6000-8AA00-4EA1 (Conformal Coated)

Section 1.2

Installing/Removing Modules

Always refer to the *Installation Guide* for the RUGGEDCOM RSG2488 for instructions on how to install or remove a power or media module. The *Installation Guide* cites important, chassis-specific safety warnings that should be followed to avoid damage to the module and/or device.

Additional installation/removal instructions may also be provided in this Catalog for select modules. Make sure to review all information provided for a module before installing or removing it.

Section 1.3
Dimensions

Power and line modules conform to the following dimensions:

NOTE
All dimensions are in millimeters (mm).

Power Supply Module Dimensions

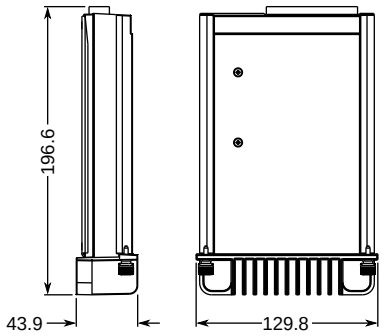


Figure 1: Power Supply Module Dimensions

Line Module Dimensions

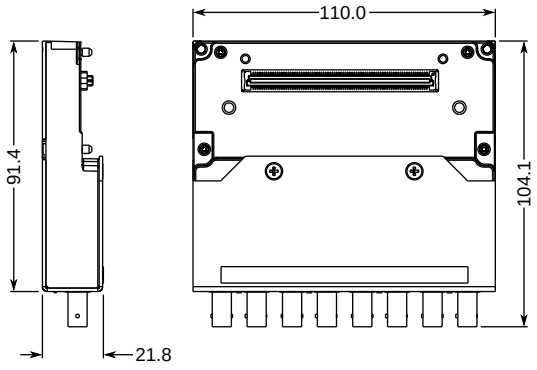


Figure 2: 4-Port Line Module Dimensions

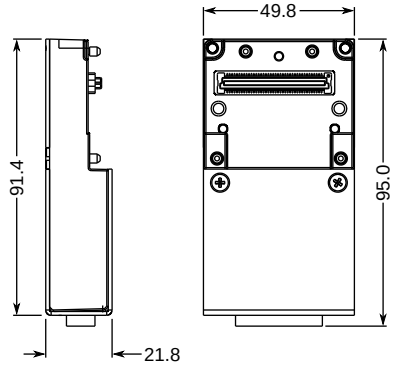


Figure 3: 2-Port Line Module Dimensions

2 Power Supply Modules

The following power supply modules are available for the RUGGEDCOM RSG2488.

CONTENTS

Section 2.1

RUGGEDCOM RPM2410

The RUGGEDCOM RPM2410 power supply module provides 24 VDC power to the device. The module accepts DC power inputs from an external power source.

LEDs indicate when the module is receiving and supplying power.

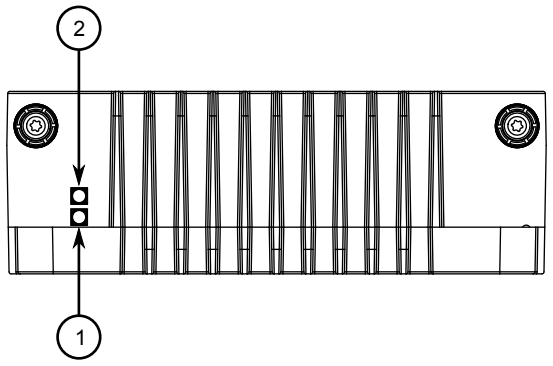


Figure 4: RUGGEDCOM RPM2410

1. O LED **2.** I LED

LED	State	Description
O	Green	The module is supplying power
I	Green	The module is receiving power

Technical Specifications

Characteristics

Input Range	13 to 36 VDC
Internal Fuse Rating	10 A
Maximum Power Consumption[a]	62 W
Maximum Cable Length[b]	9.4 m (30.8 ft)

[a] *Power consumption varies based on the device configuration.*

[b] *Based on #16 AWG wiring.*

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)

Ordering Information

Description	24VDC (13-36VDC)
Article Numbers	6GK6000-8PS11-1EA0 (Standard) 6GK6000-8PS11-1EA1 (Conformal Coated)

Section 2.2

RUGGEDCOM RPM2420

The RUGGEDCOM RPM2420 power supply module provides 48 VDC power to the device. The module accepts DC power inputs from an external power source.

LEDs indicate when the module is receiving and supplying power.

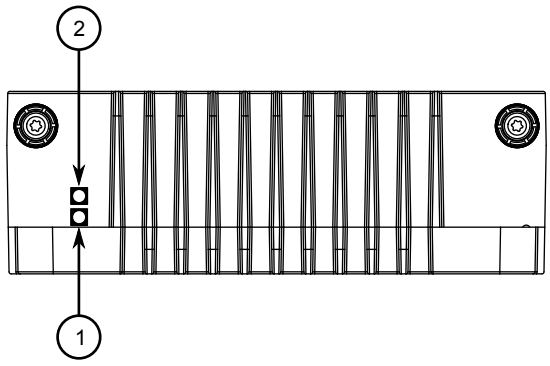


Figure 5: RUGGEDCOM RPM2420

1. O LED **2.** I LED

LED	State	Description
O	Green	The module is supplying power
I	Green	The module is receiving power

Technical Specifications

Characteristics

Input Range	36 to 72 VDC
Internal Fuse Rating	5 A
Maximum Power Consumption[c]	59 W
Maximum Cable Length[d]	44.9 m (167 ft)

[c] *Power consumption varies based on the device configuration.*

[d] *Based on #16 AWG wiring.*

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)

Ordering Information

Description	48VDC (36-72VDC)
Article Numbers	6GK6000-8PS12-1EA0 (Standard) 6GK6000-8PS12-1EA1 (Conformal Coated)

Section 2.3

RUGGEDCOM RPM2430

The RUGGEDCOM RPM2430 power supply module provides high VDC or VAC power to the device. The module accepts either AC or DC power inputs from an external power source.

LEDs indicate when the module is receiving and supplying power.

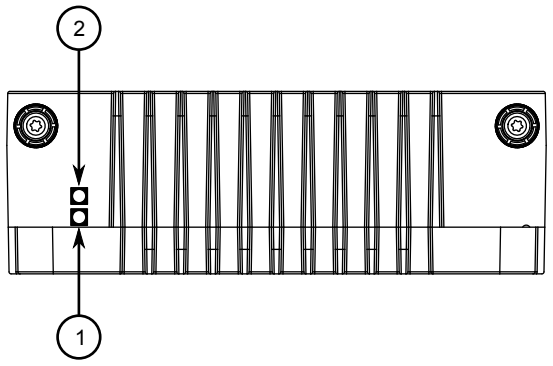


Figure 6: RUGGEDCOM RPM2430

1. O LED **2.** I LED

LED	State	Description
O	Green	The module is supplying power
I	Green	The module is receiving power

Technical Specifications

Characteristics

Input Range	88 to 300 VDC or 85 to 264 VAC
Internal Fuse Rating	3.15 A
Maximum Power Consumption[e]	66 W

[e] *Power consumption varies based on the device configuration.*

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)

Ordering Information

Description	88-300VDC or 85-264VAC
Article Numbers	6GK6000-8PS13-1EA0 (Standard) 6GK6000-8PS13-1EA1 (Conformal Coated)

3 Copper Ethernet Modules

The following copper Ethernet modules are available for the RUGGEDCOM RSG2488.

CONTENTS

Section 3.1

RUGGEDCOM RMM2473-2FC

The RUGGEDCOM RMM2473-2FC module features two 10/100/1000Base-TX copper FastConnect RJ45 Ethernet ports.

Each port features LEDs that indicate its link/activity state.

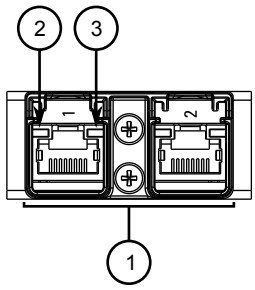


Figure 7: RUGGEDCOM RMM2473-2FC

1. Ports **2.** Speed LED **3.** Link/Activity LED

LED	State	Description
Speed	Yellow	The port is operating at 1000 Mbps
	Off	The port is operating at 10 or 100 Mbps
Link/Activity	Green (Solid)	Link established
	Green (Blinking)	Activity
	Off	No link detected

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RSG2488.

Pin-Out Description

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

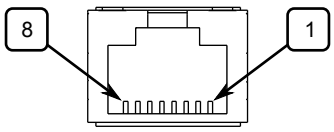


Figure 8: RJ45 Ethernet Port Pin Configuration

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

Technical Specifications

Connector	RJ45
Speed	1000 Mbps
Duplex	FDX/HDX
Cable Type	> CAT-5
Wiring Standard	TIA/EIA T568A/B
Maximum Distance	100 m (328 ft)
Isolation	1.5 kV
Operating Temperature	-40 to 85 °C (-40 to 185 °F)

Ordering Information

Description	2 x 10/100/1000Tx RJ45
Article Numbers	6GK6000-8CG02-2EA0 (Standard) 6GK6000-8CG02-2EA1 (Conformal Coated)

Section 3.2

RUGGEDCOM RMM2473-2RJ45

The RUGGEDCOM RMM2473-2RJ45 module features two 10/100/1000Base-TX copper RJ45 Ethernet ports. Each port features LEDs that indicate its link/activity state.

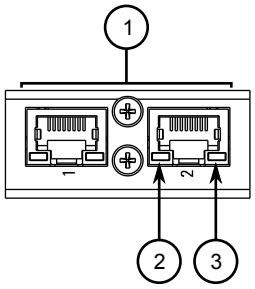


Figure 9: RUGGEDCOM RMM2473-2RJ45

1. Ports **2.** Link/Activity LED **3.** Speed LED

LED	State	Description
Speed	Yellow	The port is operating at 1000 Mbps
	Off	The port is operating at 10 or 100 Mbps
Link/Activity	Green (Solid)	Link established
	Green (Blinking)	Activity
	Off	No link detected

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RSG2488.

Pin-Out Description

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

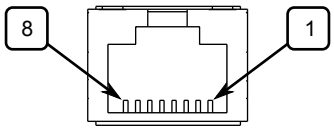


Figure 10: RJ45 Ethernet Port Pin Configuration

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

Technical Specifications

Connector	RJ45
Speed	1000 Mbps
Duplex	FDX/HDX
Cable Type	> CAT-5
Wiring Standard	TIA/EIA T568A/B
Maximum Distance	100 m (328 ft)
Isolation	1.5 kV
Operating Temperature	-40 to 85 °C (-40 to 185 °F)

Ordering Information

Description	2 x 10/100/1000Tx RJ45
Article Numbers	6GK6000-8CG01-2EA0 (Standard) 6GK6000-8CG01-2EA1 (Conformal Coated)

Section 3.3

RUGGEDCOM RMM2473-2M12A

The RUGGEDCOM RMM2473-2M12A module features two 10/100/1000Base-TX copper M12 (8-pin, A-Coded) Ethernet ports.

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

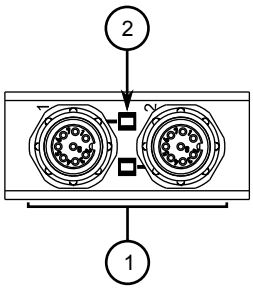


Figure 11: RUGGEDCOM RMM2473-2M12A

1. Ports **2.** LED

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 Guide* for the RSG2488.

Pin-Out Description

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

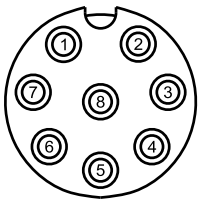


Figure 12: 8-Pin M12 A-Coded Ethernet Port Pin Configuration

Pin	Name	
	10/100Base-Tx	1000Base-Tx
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

Connector	M12 (8-Pin, A-Coded)
Speed	1000 Mbps
Duplex	FDX/HDX
Cable Type	> CAT-5
Wiring Standard	Local
Maximum Distance	100 m (328 ft)
Isolation	1.5 kV
Operating Temperature	-40 to 85 °C (-40 to 185 °F)

Ordering Information

Description	2 x 10/100/1000Tx M12 A-Coded
Article Numbers	6GK6000-8CG03-2EA0 (Standard) 6GK6000-8CG03-2EA1 (Conformal Coated)

Section 3.4

RUGGEDCOM RMM2473-2M12X

The RUGGEDCOM RMM2473-2M12X module features two 10/100/1000Base-TX copper M12 (8-pin, X-coded) Ethernet ports.

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

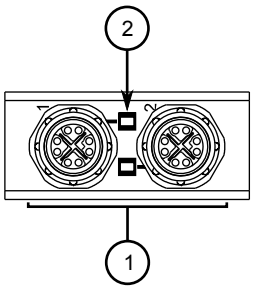


Figure 13: RUGGEDCOM RMM2473-2M12X

1. Ports **2.** LED

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 Guide* for the RSG2488.

Pin-Out Description

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

Figure 14: 8-Pin M12 X-Coded Ethernet Port Pin Configuration

Pin	Name
1	A+
2	A-
3	B+
4	B-
5	D+
6	D-
7	C+
8	C-

Technical Specifications

Connector	M12 (8-Pin, X-Coded)
Speed	1000 Mbps
Duplex	FDX/HDX

Cable Type	> CAT-5
Wiring Standard	Local
Maximum Distance	100 m (328 ft)
Isolation	1.5 kV
Operating Temperature	-40 to 85 °C (-40 to 185 °F)

Ordering Information

Description	2 x 10/100/1000Tx M12 X-Coded
Article Numbers	6GK6000-8CG04-2EA0 (Standard) 6GK6000-8CG04-2EA1 (Conformal Coated)

Section 3.5

RUGGEDCOM RMM2473-4FC

The RUGGEDCOM RMM2473-4FC module features four 10/100/1000Base-TX copper FastConnect RJ45 Ethernet ports.

Each port features LEDs that indicate its link/activity state.

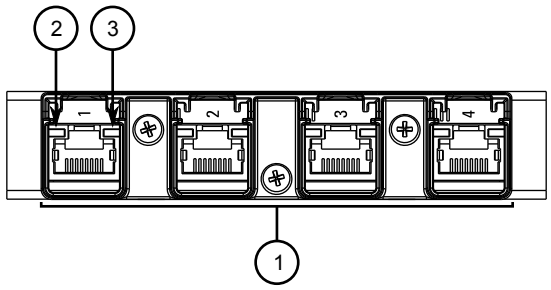


Figure 15: RUGGEDCOM RMM2473-4FC

1. Ports **2.** Speed LED **3.** Link/Activity LED

LED	State	Description
Speed	Yellow	The port is operating at 1000 Mbps
	Off	The port is operating at 10 or 100 Mbps
Link/Activity	Green (Solid)	Link established
	Green (Blinking)	Activity
	Off	No link detected

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RSG2488.

Pin-Out Description

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

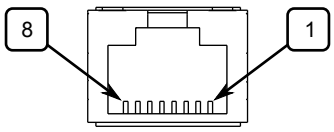


Figure 16: RJ45 Ethernet Port Pin Configuration

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

Technical Specifications

Connector	FastConnect RJ45
Speed	1000 Mbps
Duplex	FDX/HDX
Cable Type	> CAT-5
Wiring Standard	TIA/EIA T568A/B
Maximum Distance	100 m (328 ft)
Isolation	1.5 kV
Operating Temperature	-40 to 85 °C (-40 to 185 °F)

Ordering Information

Description	4 x 10/100/1000Tx FastConnect
Article Numbers	6GK6000-8CG02-4EA0 (Standard) 6GK6000-8CG02-4EA1 (Conformal Coated)

Section 3.6

RUGGEDCOM RMM2473-4RJ45

The RUGGEDCOM RMM2473-4RJ45 module features four 10/100/1000Base-TX copper RJ45 Ethernet ports. Each port features LEDs that indicate its link/activity state.

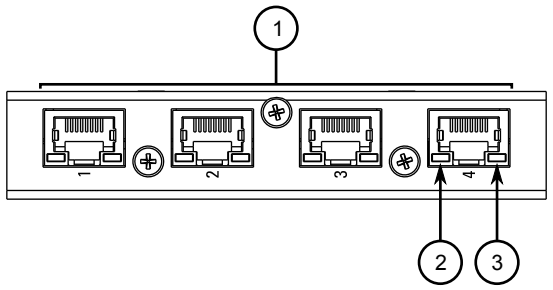


Figure 17: RUGGEDCOM RMM2473-4RJ45

1. Ports **2.** Link/Activity LED **3.** Speed LED

LED	State	Description
Speed	Yellow	The port is operating at 1000 Mbps
	Off	The port is operating at 10 or 100 Mbps
Link/Activity	Green (Solid)	Link established
	Green (Blinking)	Activity
	Off	No link detected

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RSG2488.

Pin-Out Description

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

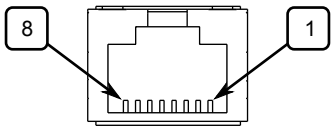


Figure 18: RJ45 Ethernet Port Pin Configuration

Pin	Name		Description
	100Base-TX	1000Base-TX	
1	RX+	BI_DB+	Receive Data+ or Bi-Directional
2	RX-	BI_DB-	Receive Data- or Bi-Directional
3	TX+	BI_DA+	Transmit Data+ or Bi-Directional
4	Reserved (Do Not Connect)	BI_DD+	Bi-Directional
5	Reserved (Do Not Connect)	BI_DD-	Bi-Directional
6	TX-	BI_DA-	Transmit Data- or Bi-Directional
7	Reserved (Do Not Connect)	BI_DC+	Bi-Directional
8	Reserved (Do Not Connect)	BI_DC-	Bi-Directional

Technical Specifications

Connector	RJ45
Speed	1000 Mbps
Duplex	FDX/HDX
Cable Type	> CAT-5
Wiring Standard	TIA/EIA T568A/B
Maximum Distance	100 m (328 ft)
Isolation	1.5 kV
Operating Temperature	-40 to 85 °C (-40 to 185 °F)

Ordering Information

Description	4 x 10/100/1000Tx RJ45
Article Numbers	6GK6000-8CG01-4EA0 (Standard) 6GK6000-8CG01-4EA1 (Conformal Coated)

Section 3.7

RUGGEDCOM RMM2473-4M12A

The RUGGEDCOM RMM2473-4M12A module features four 10/100/1000Base-TX copper M12 (8-pin, A-Coded) Ethernet ports.

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

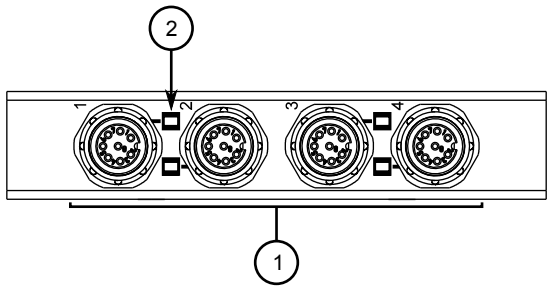


Figure 19: RUGGEDCOM RMM2473-4M12A

1. Ports **2.** LED

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 Guide* for the RSG2488.

Pin-Out Description

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

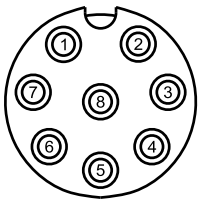


Figure 20: 8-Pin M12 A-Coded Ethernet Port Pin Configuration

Pin	Name	
	10/100Base-Tx	1000Base-Tx
1	Reserved (Do Not Connect)[b]	C+
2	Reserved (Do Not Connect)[b]	D+
3	Reserved (Do Not Connect)[b]	D-
4	TX-	A-
5	RX+	B+
6	TX+	A+
7	Reserved (Do Not Connect)[b]	C-
8	RX-	B-

[b] *Terminated at GND (Ground)*

Technical Specifications

Connector	M12 (8-Pin, A-Coded)
Speed	1000 Mbps
Duplex	FDX/HDX
Cable Type	> CAT-5
Wiring Standard	Local
Maximum Distance	100 m (328 ft)
Isolation	1.5 kV
Operating Temperature	-40 to 85 °C (-40 to 185 °F)

Ordering Information

Description	4 x 10/100/1000Tx M12 A-Coded
Article Numbers	6GK6000-8CG03-4EA0 (Standard) 6GK6000-8CG03-4EA1 (Conformal Coated)

Section 3.8

RUGGEDCOM RMM2473-4M12X

The RUGGEDCOM RMM2473-4M12X module features four 10/100/1000Base-TX copper M12 (8-pin, X-coded) Ethernet ports.

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

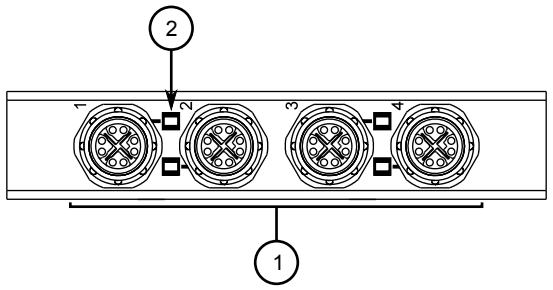


Figure 21: RUGGEDCOM RMM2473-4M12X

1. Ports **2.** LED

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 Guide* for the RSG2488.

Pin-Out Description

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

Figure 22: 8-Pin M12 X-Coded Ethernet Port Pin Configuration

Pin	Name
1	A+
2	A-
3	B+
4	B-
5	D+
6	D-
7	C+
8	C-

Technical Specifications

Connector	M12 (8-Pin, X-Coded)
Speed	1000 Mbps
Duplex	FDX/HDX

Cable Type	> CAT-5
Wiring Standard	Local
Maximum Distance	100 m (328 ft)
Isolation	1.5 kV
Operating Temperature	-40 to 85 °C (-40 to 185 °F)

Ordering Information

Description	4 x 10/100/1000Tx M12 X-Coded
Article Numbers	6GK6000-8CG04-4EA0 (Standard) 6GK6000-8CG04-4EA1 (Conformal Coated)

4 Fiber Optic Ethernet Modules

The following fiber optic Ethernet modules are available for the RUGGEDCOM RSG2488.

CONTENTS

Section 4.1

RUGGEDCOM RMM2464-4ST2

The RUGGEDCOM RMM2464-4ST2 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.

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

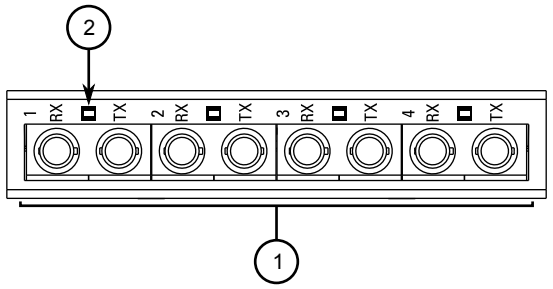


Figure 23: RUGGEDCOM RMM2464-4ST2

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	-19 to -14 dBm
Receiver Sensitivity	-32 dBm
Receiver Saturation	-14 dBm
Power Budget	12 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)

Cabling

Speed	100 Mbps
Mode	MM (Multi-Mode)
Interface	FX
Connector	ST
Cable Type	62.5/125 µm
Wavelength[a]	1310 nm
Nominal Distance[a]	2 km (1.2 mi)

[a] *Typical.*

Ordering Information

Description	4 x 100FX - Multimode, 1310nm, ST, 2 km
Article Numbers	6GK6000-8FX01-4EA0 (Standard) 6GK6000-8FX01-4EA1 (Conformal Coated)

Section 4.2

RUGGEDCOM RMM2465-4ST20

The RUGGEDCOM RMM2464-4ST20 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.

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

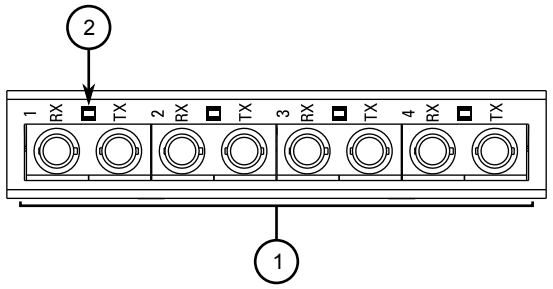


Figure 24: RUGGEDCOM RMM2465-4ST20

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	-15 to -8 dBm
Receiver Sensitivity	-34 dBm
Receiver Saturation	-3 dBm
Power Budget	17 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)

Cabling

Speed	100 Mbps
Mode	SM (Single-Mode)
Interface	FX
Connector	ST
Cable Type	9/125 µm
Wavelength[b]	1310 nm
Nominal Distance[b]	20 km (12.4 mi)

[b] *Typical.*

Ordering Information

Description	4 x 100FX - Singlemode, 1310nm, ST, 20km

Article Numbers	6GK6000-8FX04-4EA0 (Standard) 6GK6000-8FX04-4EA1 (Conformal Coated)

Section 4.3

RUGGEDCOM RMM2464-4LC2

The RUGGEDCOM RMM2464-4LC2 module features two 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.

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

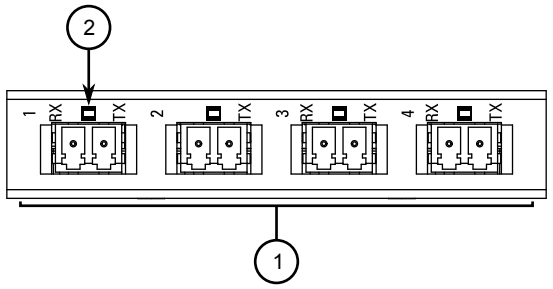


Figure 25: RUGGEDCOM RMM2464-4LC2

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	-19 to -14 dBm
Receiver Sensitivity	-32 dBm
Receiver Saturation	-14 dBm
Power Budget	13 dB

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Cabling

Speed	100 Mbps
Mode	MM (Multi-Mode)
Interface	FX
Connector	LC
Cable Type	62.5/125 µm
Wavelength[c]	1310 nm
Nominal Distance[b]	2 km (1.2 mi)

[c] *Typical.*

Ordering Information

Description	4 x 100FX - Multimode, 1310nm, LC, 2km

Article Numbers	6GK6000-8FX11-4EA0 (Standard) 6GK6000-8FX11-4EA1 (Conformal Coated)

Section 4.4

RUGGEDCOM RMM2475-4LC10

The RUGGEDCOM RMM2475-4LC10 module features four 1000Base-LX fiber optic Ethernet ports.

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

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

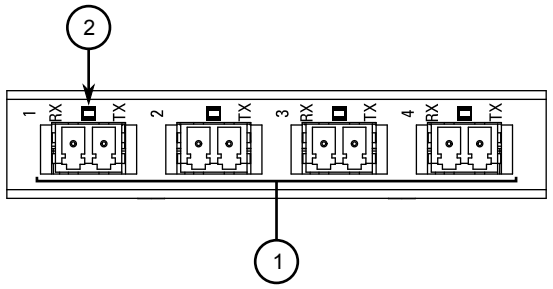


Figure 26: RUGGEDCOM RMM2475-4LC10

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	-9.5 to -3 dBm
Receiver Sensitivity	-21 dBm
Receiver Saturation	-3 dBm
Power Budget	11.5 dB

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Cabling

Speed	1000 Mbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 µm
Wavelength[d]	1310 nm
Nominal Distance[b]	10 km (6.2 mi)

[d] *Typical.*

Ordering Information

Description	4 x 100FX - Singlemode, 1310nm, LC, 10km

Article Numbers	6GK6000-8FG03-4EA0 (Standard) 6GK6000-8FG03-4EA1 (Conformal Coated)

Section 4.5

RUGGEDCOM RMM2465-4LC20

The RUGGEDCOM RMM2465-4LC20 module features four 100Base-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.

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

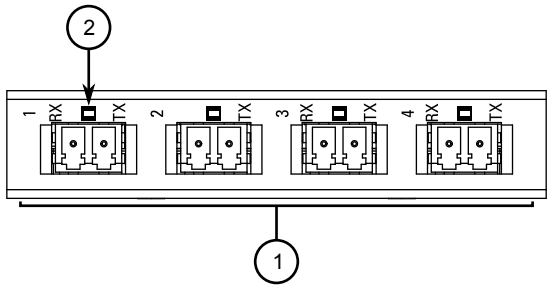


Figure 27: RUGGEDCOM RMM2465-4LC20

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	-15 to -8 dBm
Receiver Sensitivity	-34 dBm
Receiver Saturation	-3 dBm
Power Budget	19 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)

Cabling

Speed	100 Mbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 µm
Wavelength[e]	1310 nm
Nominal Distance[b]	20 km (12.4 mi)

[e] *Typical.*

Ordering Information

Description	4 x 100FX - Singlemode, 1310nm, LC, 20km

Article Numbers	6GK6000-8FX06-4EA0 (Standard) 6GK6000-8FX06-4EA1 (Conformal Coated)

Section 4.6

RUGGEDCOM RMM2475-4LC25

The RUGGEDCOM RMM2475-4LC25 module features four 1000Base-LX fiber optic Ethernet ports.

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

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

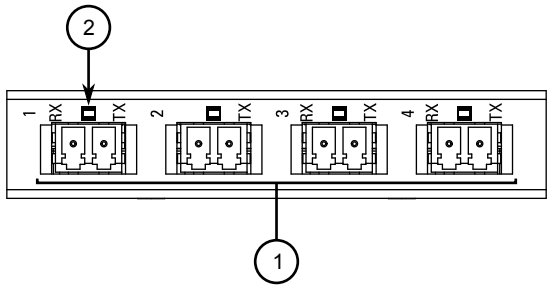


Figure 28: RUGGEDCOM RMM2475-4LC25

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	-7 to -3 dBm
Receiver Sensitivity	-24 dBm
Receiver Saturation	-3 dBm
Power Budget	17 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)

Cabling

Speed	1000 Mbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 µm
Wavelength[f]	1310 nm
Nominal Distance[b]	25 km (15.5 mi)

[f] *Typical.*

Ordering Information

Description	4 x 1000LX - Singlemode, 1310nm, LC, 25km

Article Numbers	6GK6000-8FG05-4EA0 (Standard) 6GK6000-8FG05-4EA1 (Conformal Coated)

Section 4.7

RUGGEDCOM RMM2465-4LC50

The RUGGEDCOM RMM2475-4LC50 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.

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

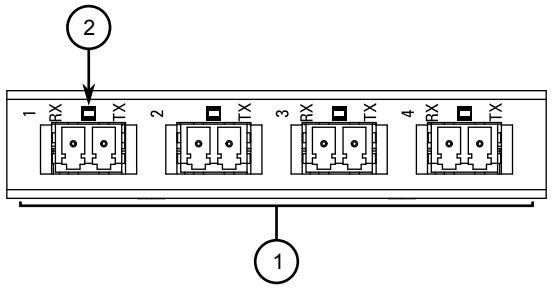


Figure 29: RUGGEDCOM RMM2465-4LC50

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	-5 to 0 dBm
Receiver Sensitivity	-35 dBm
Receiver Saturation	-3 dBm
Power Budget	30 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)

Cabling

Speed	100 Mbps
Mode	SM (Single-Mode)
Interface	FX
Connector	LC
Cable Type	9/125 µm
Wavelength[g]	1310 nm
Nominal Distance[b]	50 km (31.1 mi)

[g] *Typical.*

Ordering Information

Description	4 x 100FX - Singlemode, 1310nm, LC, 50km

Article Numbers	6GK6000-8FX08-4EA0 (Standard) 6GK6000-8FX08-4EA1 (Conformal Coated)

Section 4.8

RUGGEDCOM RMM2465-4LC90

The RUGGEDCOM RMM2465-4LC90 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.

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

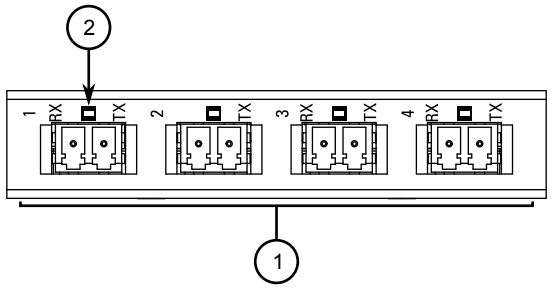


Figure 30: RUGGEDCOM RMM2465-4LC90

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	0 to 5 dBm
Receiver Sensitivity	-37 dBm
Receiver Saturation	0 dBm
Power Budget	37 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)

Cabling

Speed	100 Mbps
Mode	SM (Single-Mode)
Interface	FX
Connector	LC
Cable Type	9/125 µm
Wavelength[h]	1310 nm
Nominal Distance[b]	90 km (55.9 mi)

[h] *Typical.*

Ordering Information

Description	4 x 100FX - Singlemode, 1310nm, LC, 90km

Article Numbers	6GK6000-8FX10-4EA0 (Standard) 6GK6000-8FX10-4EA1 (Conformal Coated)

Section 4.9

RUGGEDCOM RMM2464-4SC2

The RUGGEDCOM RMM2464-4SC2 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.

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

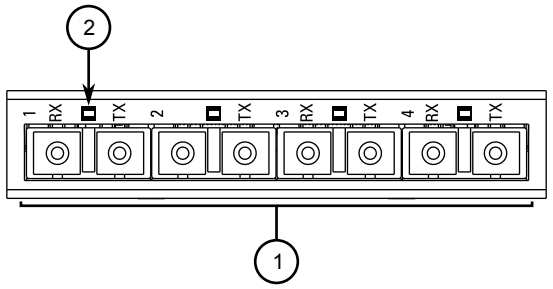


Figure 31: RUGGEDCOM RMM2464-4SC2
1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics (62.5/125 µm)

Transmit Power	-19 to -14 dBm
Receiver Sensitivity	-31 dBm
Receiver Saturation	-14 dBm
Power Budget	12 dB

Optical Characteristics (50/125 µm)

Transmit Power	-22.5 to -14 dBm
Receiver Sensitivity	-31 dBm
Receiver Saturation	-14 dBm
Power Budget	8.5 dB

Cabling (62.5/125 µm)

Speed	100 Mbps
Mode	MM (Multi-Mode)
Interface	FX
Connector	SC
Cable Type	62.5/125 µm
Wavelength[i]	1300 nm
Nominal Distance[i]	2 km (1.2 mi)

Cabling (50/125 µm)

Speed	100 Mbps
Mode	MM (Multi-Mode)
Interface	FX
Connector	SC
Cable Type	50/125 µm
Wavelength[i]	1300 nm
Nominal Distance[i]	2 km (1.2 mi)

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)

[i] *Typical.*

Ordering Information

Description	4 x 100FX - Multimode, 1300nm, SC, 2km
Article Numbers	6GK6000-8FX02-4EA0 (Standard) 6GK6000-8FX02-4EA1 (Conformal Coated)

Section 4.10

RUGGEDCOM RMM2475-4SC10

The RUGGEDCOM RMM2475-4SC10 module features four 1000Base-LX fiber optic Ethernet ports.

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

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

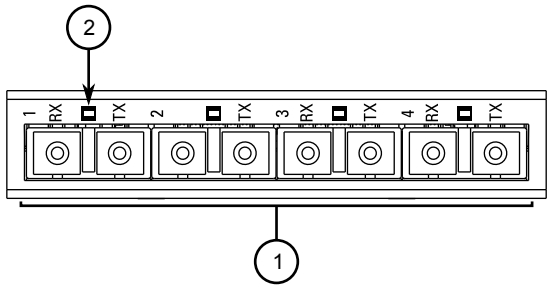


Figure 32: RUGGEDCOM RMM2475-4SC10

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	-10 to -3 dBm
Receiver Sensitivity	-20 dBm
Receiver Saturation	-3 dBm
Power Budget	10 dB

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Cabling

Speed	1000 Mbps
Mode	SM (Single-Mode)
Interface	LX
Connector	SC
Cable Type	9/125 µm
Wavelength[j]	1310 nm
Nominal Distance[b]	10 km (6.2 mi)

[j] *Typical.*

Ordering Information

Description	4 x 100FX - Singlemode, 1310nm, SC, 10km

Article Numbers	6GK6000-8FG02-4EA0 (Standard) 6GK6000-8FG02-4EA1 (Conformal Coated)

Section 4.11

RUGGEDCOM RMM2465-4SC20

The RUGGEDCOM RMM2465-4SC20 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.

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

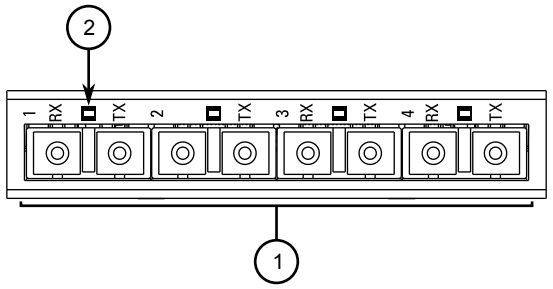


Figure 33: RUGGEDCOM RMM2465-4SC20

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	-15 to -8 dBm
Receiver Sensitivity	-31 dBm
Receiver Saturation	-7 dBm
Power Budget	16 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)

Cabling

Speed	100 Mbps
Mode	SM (Single-Mode)
Interface	FX
Connector	SC
Cable Type	9/125 µm
Wavelength[k]	1310 nm
Nominal Distance[b]	20 km (12.4 mi)

[k] *Typical.*

Ordering Information

Description	4 x 100FX - Singlemode, 1310nm, SC, 20km

Article Numbers	6GK6000-8FX05-4EA0 (Standard) 6GK6000-8FX05-4EA1 (Conformal Coated)

Section 4.12

RUGGEDCOM RMM2475-4SC50

The RUGGEDCOM RMM2475-4SC50 module features four 1000Base-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.

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

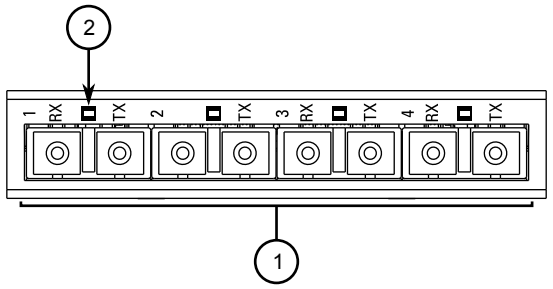


Figure 34: RUGGEDCOM RMM2475-4SC50

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	-5 to 0 dBm
Receiver Sensitivity	-34 dBm
Receiver Saturation	-3 dBm
Power Budget	29 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)

Cabling

Speed	1000 Mbps
Mode	SM (Single-Mode)
Interface	FX
Connector	SC
Cable Type	9/125 µm
Wavelength[l]	1310 nm
Nominal Distance[b]	50 km (31.1 mi)

[l] *Typical.*

Ordering Information

Description	4 x 1000FX Singlemode, 1310nm, SC, 50km

Article Numbers	6GK6000-8FG04-4EA0 (Standard) 6GK6000-8FG04-4EA1 (Conformal Coated)

Section 4.13

RUGGEDCOM RMM2465-4SC90

The RUGGEDCOM RMM2465-4SC90 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.

Each port set (transmit/receive) features a dedicated LED that indicates its link/activity state.

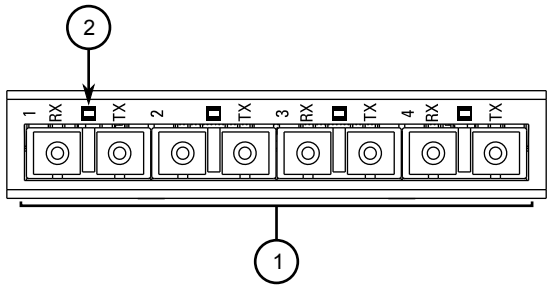


Figure 35: RUGGEDCOM RMM2465-4SC90

1. Ports **2.** LED

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 Guide* for the RSG2488.

Technical Specifications

Optical Characteristics

Transmit Power	0 to 5 dBm
Receiver Sensitivity	-37 dBm
Receiver Saturation	0 dBm
Power Budget	37 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)

Cabling

Speed	100 Mbps
Mode	SM (Single-Mode)
Interface	FX
Connector	SC
Cable Type	9/125 µm
Wavelength[m]	1310 nm
Nominal Distance[b]	90 km

[m] *Typical.*

Ordering Information

Description	4 x 100FX - Singlemode, 1310nm, SC, 90km

Article Numbers	6GK6000-8FX03-4EA0 (Standard) 6GK6000-8FX03-4EA1 (Conformal Coated)

Section 4.14

RUGGEDCOM RMM2472-2SFP

The RUGGEDCOM RMM2472-2SFP module features sockets for up to two Small Form-factor Pluggable (SFP) transceivers.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

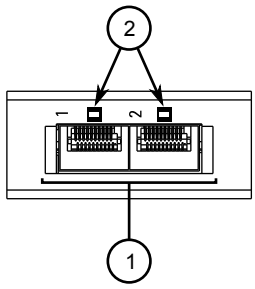


Figure 36: RUGGEDCOM RMM2472-2SFP

1. SFP Transceiver Sockets **2.** LED

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

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[n]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[n]	Nominal Distance (km)
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[n] *MM = Multi-Mode, SM = Single-Mode*

» Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RSG2488.

» Technical Specifications

Operating Temperature	*Dependent on the installed SFP transceiver.*

» Ordering Information

Description	2 x Blank SFP (no optical transceiver)
Article Numbers	6GK6000-8FG50-2EA0 (Standard) 6GK6000-8FG50-2EA1 (Conformal Coated)

Section 4.15

RUGGEDCOM RMM2474-2SFP

The RUGGEDCOM RMM2474-2SFP module features two 1000Base-SX SFP transceivers. These transceivers can be exchanged for any other transceiver supported by the RUGGEDCOM RSG2488.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

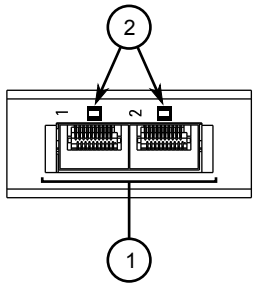


Figure 37: RUGGEDCOM RMM2474-2SFP

1. SFP Transceiver Sockets **2.** Port LED

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

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[o]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[O]	Nominal Distance (km)
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[O] *MM = Multi-Mode, SM = Single-Mode*

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RSG2488.

Technical Specifications

Operating Temperature	*Dependent on the installed SFP transceiver.*

Ordering Information

Description	2 x 1000SX SFP - Multimode, 850nm, LC, 500m
Article Numbers	6GK6000-8FG51-2EA0 (Standard) 6GK6000-8FG51-2EA1 (Conformal Coated)

Section 4.16

RUGGEDCOM RMM2464-2SFP2

The RUGGEDCOM RMM2464-2SFP2 module features two 100Base-FX SFP transceivers. These transceivers can be exchanged for any other transceiver supported by the RUGGEDCOM RSG2488.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

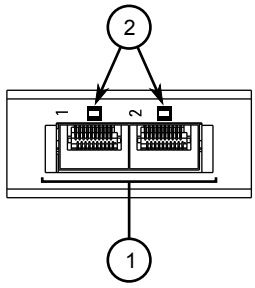


Figure 38: RUGGEDCOM RMM2464-2SFP2

1. SFP Transceiver Sockets **2.** LED

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

Pre-Installed SFP Transceivers

This module comes with two of the following SFP transcevier pre-installed:

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[p]	Nominal Distance (km)
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2

[p] *MM = Multi-Mode, SM = Single-Mode*

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[q]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[q]	Nominal Distance (km)
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[q] *MM = Multi-Mode, SM = Single-Mode*

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RSG2488.

Technical Specifications

Operating Temperature	* *Dependent on the installed SFP transceiver*

Ordering Information

Description	2 x 100FX SFP - Multimode, 1310nm, LC, 2km
Article Numbers	6GK6000-8FX51-2EA0 (Standard) 6GK6000-8FX51-2EA1 (Conformal Coated)

Section 4.17

RUGGEDCOM RMM2475-2SFP10

The RUGGEDCOM RMM2475-2SFP10 module features two 1000Base-LX SFP transceivers. These transceivers can be exchanged for any other transceiver supported by the RUGGEDCOM RSG2488.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

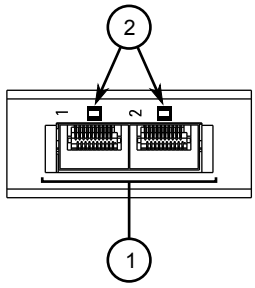


Figure 39: RUGGEDCOM RMM2475-2SFP10

1. SFP Transceiver Sockets **2.** Port LED

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

Pre-Installed SFP Transceivers

This module comes with two of the following SFP transcevier pre-installed:

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[r]	Nominal Distance (km)
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10

[r] *MM = Multi-Mode, SM = Single-Mode*

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[s]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[S]	Nominal Distance (km)
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[S] *MM = Multi-Mode, SM = Single-Mode*

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RUGGEDCOM RSG2488.

Technical Specifications

Operating Temperature	*Dependent on the installed SFP transceiver.*

Ordering Information

Description	2 x 1000LX SFP - Singlemode, 1310nm, LC, 10km
Article Numbers	6GK6000-8FG52-2EA0 (Standard) 6GK6000-8FG52-2EA1 (Conformal Coated)

Section 4.18

RUGGEDCOM RMM2475-2SFP25

The RUGGEDCOM RMM2475-2SFP25 module features two 1000Base-LX SFP transceivers. These transceivers can be exchanged for any other transceiver supported by the RUGGEDCOM RSG2488.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

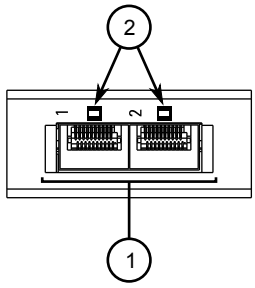


Figure 40: RUGGEDCOM RMM2475-2SFP25

1. SFP Transceiver Sockets **2.** Port LED

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

Pre-Installed SFP Transceivers

This module comes with two of the following SFP transcevier pre-installed:

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[t]	Nominal Distance (km)
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25

[t] *MM = Multi-Mode, SM = Single-Mode*

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[u]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[u]	Nominal Distance (km)
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[u] *MM = Multi-Mode, SM = Single-Mode*

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RUGGEDCOM RSG2488.

Technical Specifications

Operating Temperature	*Dependent on the installed SFP transceiver.*

Ordering Information

Description	2 x 1000LX SFP - Singlemode, 1310nm, LC, 25km
Article Numbers	6GK6000-8FG53-2EA0 (Standard) 6GK6000-8FG53-2EA1 (Conformal Coated)

Section 4.19

RUGGEDCOM RMM2475-2SFP70

The RUGGEDCOM RMM2475-2SFP70 module features two 1000Base-LX SFP transceivers. These transceivers can be exchanged for any other transceiver supported by the RUGGEDCOM RSG2488.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

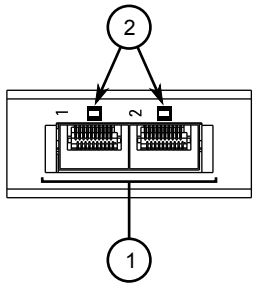


Figure 41: RUGGEDCOM RMM2475-2SFP70

1. SFP Transceiver Sockets **2.** LED

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

Pre-Installed SFP Transceivers

This module comes with two of the following SFP transcevier pre-installed:

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[v]	Nominal Distance (km)
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70

[v] *MM = Multi-Mode, SM = Single-Mode*

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[w]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[W]	Nominal Distance (km)
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[W] *MM = Multi-Mode, SM = Single-Mode*

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RUGGEDCOM RSG2488.

Technical Specifications

Operating Temperature	*Dependent on the installed SFP transceiver.*

Ordering Information

Description	2 x 1000LX SFP - Singlemode, 1550nm, LC, 70km
Article Numbers	6GK6000-8FG54-2EA0 (Standard) 6GK6000-8FG54-2EA1 (Conformal Coated)

Section 4.20

RUGGEDCOM RMM2472-4SFP

The RUGGEDCOM RMM2472-4SFP module features sockets for up to four Small Form-factor Pluggable (SFP) transceivers.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

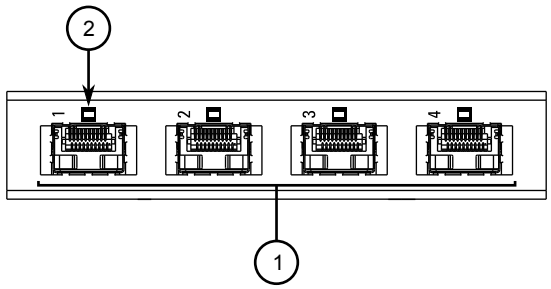


Figure 42: RUGGEDCOM RMM2472-4SFP

1. SFP Transceiver Sockets **2.** LED

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

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[x]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[x]	Nominal Distance (km)
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[x] *MM = Multi-Mode, SM = Single-Mode*

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RSG2488.

Technical Specifications

Operating Temperature	*Dependent on the installed SFP transceiver.*

Ordering Information

Description	4 x Blank SFP (no optical transceiver)
Article Numbers	6GK6000-8FG50-4EA0 (Standard) 6GK6000-8FG50-4EA1 (Conformal Coated)

Section 4.21

RUGGEDCOM RMM2474-4SFP

The RUGGEDCOM RMM2474-4SFP module features four 1000Base-SX SFP transceivers. These transceivers can be exchanged for any other transceiver supported by the RUGGEDCOM RSG2488.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

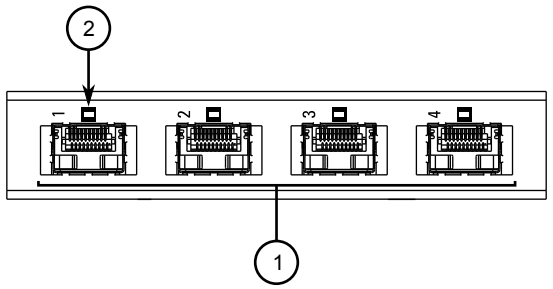


Figure 43: RUGGEDCOM RMM2474-4SFP

1. SFP Transceiver Sockets **2.** Port LED

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

Pre-Installed SFP Transceivers

This module comes with two of the following SFP transcevier pre-installed:

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[y]	Nominal Distance (km)
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5

[y] *MM = Multi-Mode, SM = Single-Mode*

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[z]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[z]	Nominal Distance (km)
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[z] *MM = Multi-Mode, SM = Single-Mode*

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RUGGEDCOM RSG2488.

Technical Specifications

Operating Temperature	*Dependent on the installed SFP transceiver.*

Ordering Information

Description	4 x 1000SX SFP - Multimode, 850nm, LC, 500m
Article Numbers	6GK6000-8FG51-4EA0 (Standard) 6GK6000-8FG51-4EA1 (Conformal Coated)

Section 4.22

RUGGEDCOM RMM2475-4SFP10

The RUGGEDCOM RMM2475-4SFP10 module features four 1000Base-LX SFP transceivers. These transceivers can be exchanged for any other transceiver supported by the RUGGEDCOM RSG2488.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

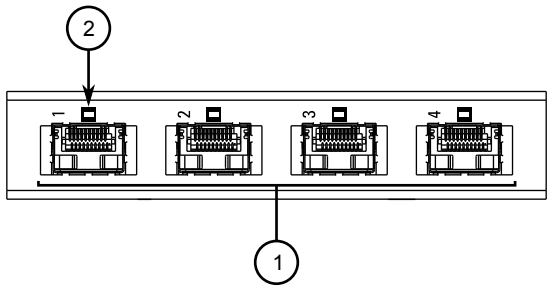


Figure 44: RUGGEDCOM RMM2475-4SFP10

1. SFP Transceiver Sockets **2.** LED

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

Pre-Installed SFP Transceivers

This module comes with two of the following SFP transcevier pre-installed:

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[aa]	Nominal Distance (km)
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10

[aa] *MM = Multi-Mode, SM = Single-Mode*

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[ab]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[ab]	Nominal Distance (km)
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[ab] *MM = Multi-Mode, SM = Single-Mode*

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RUGGEDCOM RSG2488.

Technical Specifications

Operating Temperature	*Dependent on the installed SFP transceiver.*

Ordering Information

Description	4 x 1000LX SFP - Singlemode, 1310nm, LC, 10km
Article Numbers	6GK6000-8FG52-4EA0 (Standard) 6GK6000-8FG52-4EA1 (Conformal Coated)

Section 4.23

RUGGEDCOM RMM2475-4SFP25

The RUGGEDCOM RMM2475-4SFP25 module features four 1000Base-LX SFP transceivers. These transceivers can be exchanged for any other transceiver supported by the RUGGEDCOM RSG2488.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

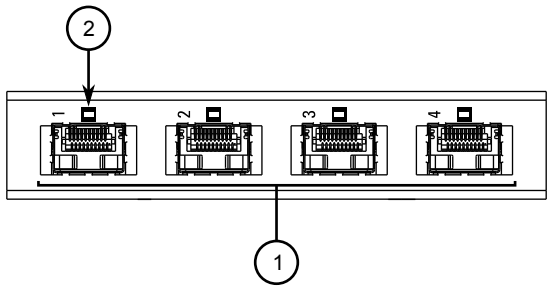


Figure 45: RUGGEDCOM RMM2475-4SFP25

1. SFP Transceiver Sockets **2.** LED

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

Pre-Installed SFP Transceivers

This module comes with two of the following SFP transcevier pre-installed:

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[ac]	Nominal Distance (km)
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25

[ac] *MM = Multi-Mode, SM = Single-Mode*

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[ad]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[ad]	Nominal Distance (km)
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[ad] *MM = Multi-Mode, SM = Single-Mode*

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RUGGEDCOM RSG2488.

Technical Specifications

Operating Temperature	*Dependent on the installed SFP transceiver.*

Ordering Information

Description	4 x 1000LX SFP - Singlemode, 1310nm, LC, 25km
Article Numbers	6GK6000-8FG53-4EA0 (Standard) 6GK6000-8FG53-4EA1 (Conformal Coated)

Section 4.24

RUGGEDCOM RMM2475-4SFP70

The RUGGEDCOM RMM2475-4SFP70 module features four 1000Base-LX SFP transceivers. These transceivers can be exchanged for any other transceiver supported by the RUGGEDCOM RSG2488.

Each transceiver socket features a dedicated LED that indicates the link/activity state of the associated SFP transceiver.

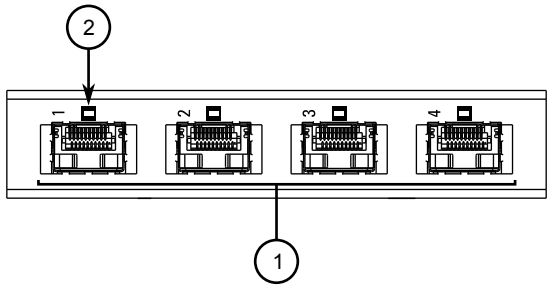


Figure 46: RUGGEDCOM RMM2475-4SFP70

1. SFP Transceiver Sockets **2.** LED

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

Pre-Installed SFP Transceivers

This module comes with two of the following SFP transcevier pre-installed:

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[ae]	Nominal Distance (km)
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70

[ae] *MM = Multi-Mode, SM = Single-Mode*

Compatible SFP Transceivers

The following SFP transceivers are compatible with this module. For more information, including specifications, installation/removal instructions, and ordering information, refer to the *RUGGEDCOM SFP Transceiver Catalog [https://support.industry.siemens.com/cs/ca/en/view/109482309]*.

IMPORTANT!

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[af]	Nominal Distance (km)
RUGGEDCOM SFP1112-1	RJ45	10/100/1000	Copper	0.1
RUGGEDCOM SFP1121-1FX2	LC	100	MM	2
RUGGEDCOM SFP1131-1FX20	LC	100	SM	20
RUGGEDCOM SFP1131-1FX50	LC	100	SM	50
RUGGEDCOM SFP1131-1FX90	LC	100	SM	90

SFP Transceiver	Connector Type	Speed (Mbps)	Mode[af]	Nominal Distance (km)
RUGGEDCOM SFP1132-1BX10R	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX10T	LC	1000	SM	10
RUGGEDCOM SFP1132-1BX40R	LC	1000	SM	40
RUGGEDCOM SFP1132-1BX40T	LC	1000	SM	40
RUGGEDCOM SFP1122-1SX	LC	1000	MM	0.5
RUGGEDCOM SFP1132-1LX10	LC	1000	SM	10
RUGGEDCOM SFP1132-1LX25	LC	1000	SM	25
RUGGEDCOM SFP1132-1LX40	LC	1000	SM	40
RUGGEDCOM SFP1132-1LX70	LC	1000	SM	70
RUGGEDCOM SFP1132-1LX100	LC	1000	SM	100
RUGGEDCOM SFP1132-1LX115	LC	1000	SM	115

[af] *MM = Multi-Mode, SM = Single-Mode*

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RUGGEDCOM RSG2488.

Technical Specifications

Operating Temperature	*Dependent on the installed SFP transceiver.*

Ordering Information

Description	4 x 1000LX SFP - Singlemode, 1310nm, LC, 70km
Article Numbers	6GK6000-8FG54-4EA0 (Standard) 6GK6000-8FG54-4EA1 (Conformal Coated)

5 Precision Time Protocol (PTP) Modules

The following Precision Time Protocol (PTP) modules are available for the RUGGEDCOM RSG2488.

CONTENTS

Section 5.1

RUGGEDCOM RMM2431-5PTP

The RUGGEDCOM RMM2431-5PTP module adds the ability for the RUGGEDCOM RSG2488 to:

- Provide time synchronization via Ethernet using the Precision Time Protocol (PTP) and Network Time Protocol (NTP)
- Provide time synchronization via BNC using IRIG-B and PPx
- Synchronize with an external IRIG-B source or GPS network

NOTE
Only one RUGGEDCOM RMM2431-5PTP module is supported per device.

The module features an LED that indicates the status of the incoming timing signal.

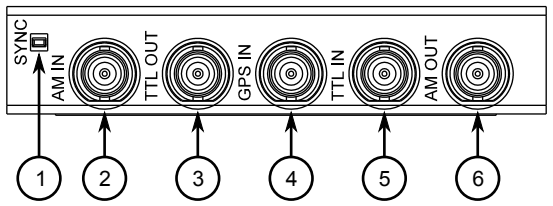


Figure 47: RUGGEDCOM RMM2431-5PTP

1. SYNC LED **2.** AM IN **3.** TTL OUT **4.** GPS IN **5.** TTL IN **6.** AM OUT

LED	State	Description
SYNC	Green	Signal locked
	Amber/Yellow	Holdover
	Red	Error
	Off	Not signal detected

Available ports include:

Port	Function
AM IN	IRIG-B AM signal input, software enabled
AM OUT	IRIG-B AM signal output, software enabled
TTL OUT	IRIG-B PWM or 1 PPx signal output, software selectable
TTL IN	IRIG-B PWM signal input
GPS IN	GPS antenna input

Supported Time Synchronization Sources

The RUGGEDCOM RMM2431-5PTP module adds additional support for the following time synchronization sources:

- IRIG-B AM
- IRIG-B PWM
- GPS

For information on other sources supported by the RUGGEDCOM RSG2488, refer to the *Installation Guide* for the RUGGEDCOM RSG2488.

Single Input

Inputs are controlled by RUGGEDCOM ROS and only one can be active at any time. For information about activating an input, refer to the *RUGGEDCOM ROS User Guide* for the RUGGEDCOM RSG2488.

Multiple Outputs

A single input can be output as an IRIG-B AM, IRIG-B PWM or 1 PPx signal.

AM and TTL OUT Ports

The RUGGEDCOM RMM2431-5PTP module provides AM (Amplitude Modulated) and TTL (Transistor-Transistor Logic) outputs.

The **AM OUT** port supports the IRIG-B AM signal format, while the **TTL OUT** port supports the IRIG-B PWM and PPS signal formats. Enabling/disabling the output ports and – in the case of **TTL OUT** – selecting the signal format is controlled through the RUGGEDCOM ROS operating system.

IMPORTANT!
The input impedance of third-party AM inputs must be 100 Ω minimum.

The number of devices that can be connected to the **AM OUT** and **TTL OUT** ports is dependent on the cabling type and length, as well as the input impedances of the devices. The following simplified circuit schematic shows the interface between an IRIG-B source and connected devices.

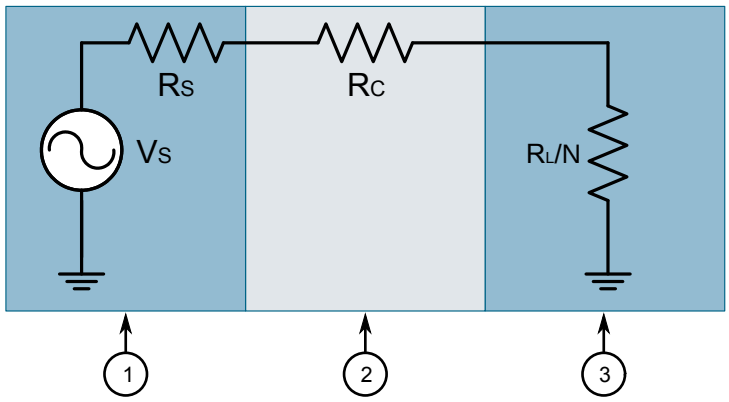


Figure 48: IRIG-B Simplified Circuit Schematic

1. Source **2.** Cabling **3.** Device

The maximum number of devices (N) that can be connected to the source is determined by checking if the source current (IS) required to drive the connected devices is less than the maximum drive current the source can provide, and verifying that the load voltage (VL) the connected devices see is greater than the minimum required voltage.

Installing the Module

To install the module, do the following:

1. Insert the module into the RUGGEDCOM RSG2488. For more information, refer to the *Installation Guide* for the RUGGEDCOM RSG2488.

2. Connect a GPS antenna.
3. Configure the PTP module. For more information, refer to the *RUGGEDCOM ROS User Guide* for the RUGGEDCOM RSG2488.

» Connecting a GPS Antenna

A GPS antenna is required when time is served from a GPS source.

NOTE
Siemens offers an antenna kit for the RUGGEDCOM RSG2488 that includes a GPS antenna, mounting bracket and coaxial cable. For more information, contact a Siemens Sales representative.

For increased signal coverage and improved performance, the GPS antenna is intended to be installed in a remote location separate from the RSG2488. The signals received from the GPS satellite network are at a frequency of 1575.42 MHz. The GPS antenna must therefore have a clear view of the sky to receive the low power signals and track the maximum number of satellites. Structures, such as rooftops, that are clear of obstructions and have a clear view of the horizon are ideal.

IMPORTANT!
A site survey is recommended prior to any installation to help determine the best location for the GPS antenna. For assistance, contact a Siemens Sales representative.

IMPORTANT!
Although it is impossible to protect the antenna from a direct lightning strike, the antenna and connected components can be protected from secondary effects through site selection and by installing protection devices.

Install the antenna at least 15 m (49 ft) away from and lower than any structures that attract lightning. GPS antenna damage is usually not the result of a direct lightning strike, but due to high currents induced by the effects of a lightning strike on a nearby structure. Lightning arrestors should also be installed in the antenna line to protect the receiver and connected devices. If a lightning arrestor is installed, it is important to make sure it has a low impedance path to ground.

NOTE
Although an active antenna has gain, depending on the length of the coaxial cable used, it may not be enough. In such a case, a line amplifier will be required as well. Most active antennas include filters. However, if there is a high potential for electromagnetic interference – such as from the near field of a radio transmitter – through the antenna system, additional antenna line filtering may be necessary.

A typical GPS system includes the following components:

- An active GPS antenna (required)
- Coaxial cables (required)
- Lightning arrestor (optional)
- Line amplifier or bandpass filter (optional)

To promote signal reception and avoid signal saturation at the receiver input, the overall GPS system requires a relative gain between 5 and 18 dBi.

Use only low loss, 50 Ω coaxial cabling when connecting the GPS and any other optional components to the RSG2488.

NOTE
Using any length of coaxial cable will add some time delay to the GPS signal, which degrades the accuracy of the calculated time and position. The time delay is dependent on the type of dielectric material in the cable and ranges from 1 to 2 ns/ft. The table below gives some examples of the delay that can be expected based on the dielectric type.

Dielectric Type	Time Delay (ns/ft)	Propagation Velocity (% of c)
Solid Polyethylene (PE)	*1.54*	*65.9*
Foam Polyethylene (FE)	*1.27*	*80.0*
Foam Polystyrene (FS)	*1.12*	*91.0*
Air Space Polyethylene (ASP)	*1.15 to 1.21*	*84 to 88*
Solid Teflon (ST)	*1.46*	*69.4*
Air Space Teflon (AST)	*1.13 to 1.20*	*85 to 90*

RUGGEDCOM ROS can compensate for the time delay if it is known. For more information, refer to the RUGGEDCOM User Guide for the RUGGEDCOM RSG2488.

To connect a GPS antenna, do the following:

IMPORTANT!
The antenna installation must be as per Article 810 of the 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*

1. If using a non-RUGGEDCOM RSG2488 antenna, select an antenna that meets the following base requirements:

   NOTE
   Best results can be achieved with a total gain of 16 dB (includes antenna gain, cable loss, lightning arrestor loss, line amplifier gain and filter loss) at the antenna input.

Polarization	Right-Hand Circular Polarized
Receive Frequency	1.57542 GHz ± 1.023 MHz
Power Supply	5 VDC
DC Current	< 10 mA at 3 VDC
Antenna Gain	Select antenna gain based on system configuration
Total Gain at GPS Input Port[a]	≤ 18 dBi
Axial Ratio	< 3 dB
Output VSWR	< 2.5

[a] *Includes antenna gain, cable loss, lightning arrestor loss, line amplifier gain and bandpass filter loss*

2. 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. Make sure 90° of the sky is visible to the antenna.

3. If required, connect the optional lightning arrestor, line amplifier or bandpass filter to the antenna.

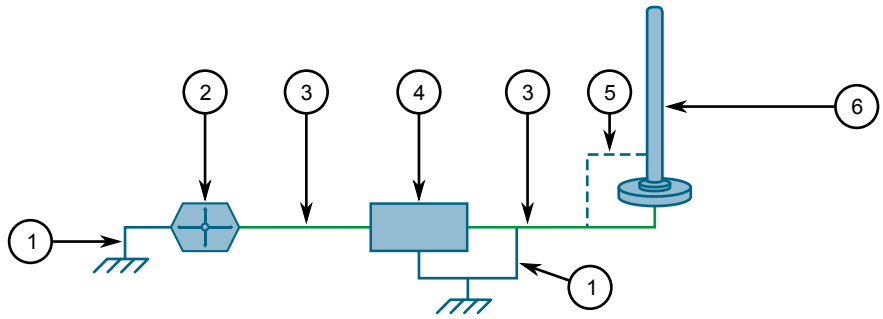


Figure 49: Antenna and Lightning Protector Assembly (Optional)

1. Drain Wire **2.** RUGGEDCOM RSG2488 **3.** Shielded Coaxial Cable **4.** Lightning Protector, Line Amplifier or Bandpass Filter **5.** Ground Wire **6.** GPS Antenna

4. Using shielded coaxial cables, connect the antenna assembly to the **GPS** port on the RUGGEDCOM RSG2488.

Technical Specifications

Operating Temperature	-40 to 85 °C (-40 to 185 °F)

Ordering Information

Description	Precision Time Protocol (PTP) Module: GPS in, IRIG-B AM/TTL in/out
Article Numbers	6GK6000-8PT01-4EA0 (Standard) 6GK6000-8PT01-4EA1 (Conformal Coated)

6 Blank Modules

The following blank modules are available for the RUGGEDCOM RSG2488.

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

CONTENTS

Section 6.1

RUGGEDCOM RMM2431-2

The RUGGEDCOM RMM2431-2 is a blank module designed to occupy empty two-port line module slots in the RUGGEDCOM RSG2488 chassis.

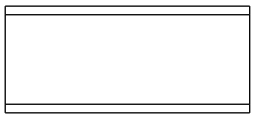


Figure 50: RUGGEDCOM RMM2431-2

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RSG2488.

Ordering Information

Description	RSG2488 2 Port Blank Assembly Module
Article Numbers	6GK6000-8AA00-2EA0 (Standard) 6GK6000-8AA00-2EA1 (Conformal Coated)

Section 6.2

RUGGEDCOM RMM2431-4

The RUGGEDCOM RMM2431-4 is a blank module designed to occupy empty four-port line module slots in the RUGGEDCOM RSG2488 chassis.

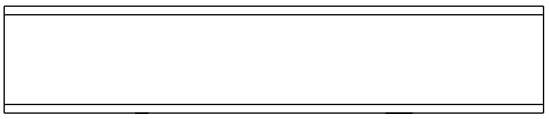


Figure 51: RUGGEDCOM RMM2431-4

Installing the Module

For information about installing this module, refer to the *Installation Guide* for the RSG2488.

Ordering Information

Description	RSG2488 4 Port Blank Assembly Module
Article Numbers	6GK6000-8AA00-4EA0 (Standard) 6GK6000-8AA00-4EA1 (Conformal Coated)