

SIEMENS

Catalog

SIMATIC NET

Networking Components

RUGGEDCOM SFP Transceivers

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Networking Components RUGGEDCOM SFP Transceivers

Catalog

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Legal Information

Warning Notice System

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER

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

 WARNING
--

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

 CAUTION
--

indicates that minor personal injury can result if proper precautions are not taken.
--

NOTICE

indicates that property damage can result if proper precautions are not taken.
--

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper Use of Siemens Products

Note the following:

 WARNING
--

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.
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Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Preface

This document details the available SFP transceivers, including compatibility with the RUGGEDCOM product line, technical specifications, installation/removal instructions, and ordering information.

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

Disclaimer of Liability

Siemens has verified the contents of this document against the hardware and/or software described. However, deviations between the product and the documentation may exist.

Siemens shall not be liable for any errors or omissions contained herein or for consequential damages in connection with the furnishing, performance, or use of this material.

The information given in this document is reviewed regularly and any necessary corrections will be included in subsequent editions. We appreciate any suggested improvements. We reserve the right to make technical improvements without notice.

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

Training

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

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

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

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

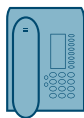
Customer Support

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



Online

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



Telephone

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



Mobile App

Install the Industry Online Support app by Siemens 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

Ordering RUGGEDCOM Products

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



RUGGEDCOM-Selector

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

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

Contacting Siemens

Address	Siemens AG Industry Sector
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Telephone	Toll-free: 1 888 264 0006 Tel: +1 905 856 5288 Fax: +1 905 856 1995
E-Mail	ruggedcom.info.i-ia@siemens.com
Web	https://www.siemens.com

Introduction

Siemens offers a wide range of convenient and cost-effective Fast Ethernet Small Form-Factor Pluggable (SFP) transceivers for select RUGGEDCOM routers and switches. SFP transceivers offer a variety of options for speed, distance and interfaces to extend the reach and functionality of networks.

NOTICE

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.

NOTICE

SFP transceivers contain no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void.

Changes or modifications not expressly approved by Siemens could invalidate specifications, test results, and agency approvals, and void the user's authority to operate the product.

Note

All SFP transceivers are compatible with the Small Form-Factor Pluggable 20-pin Multi-Source Agreement (MSA).

Note

Maximum segment length is greatly dependent on factors such as fiber quality and the number of patches and splices. Consult a Siemens sales associate when determining maximum segment lengths.

Note

All optical power numbers are listed as dBm averages.

1.1 Selecting an SFP Transceiver

The following process for selecting an SFP transceiver is recommended:

1. Determine the basic application requirements, such as SFP type, link speed and operating distance, and then select an SFP transceiver.
2. Determine which RUGGEDCOM product(s) support the chosen SFP transceiver.
3. If the chosen SFP transceiver will be connected a fixed port or to a non-RUGGED-COM device, review the full technical specifications for the SFP transceiver to make sure it is compatible with the other end of the link.

For a list of available SFP transceivers and general specifications, refer to "[Available SFP Transceivers \(Page 3\)](#)".

If assistance is required to select the appropriate SFP transceiver for the application, contact Siemens Customer Support.

1.2 Available SFP Transceivers

Each available SFP transceiver has been tested for compatibility with the following RUGGEDCOM routers and switches. Use in any other RUGGEDCOM or third-party router/switch is not supported or recommended by Siemens.

Note

Compatibility with some RUGGEDCOM routers/switches may contain restrictions. For more information about product-specific deviations, refer to the detailed description of the relevant SFP transceiver(s) in this catalog.

1.2 Available SFP Transceivers

Type	Media	Distance (km)	SFP Name	Article Number	RS900G	RS900GP	RS940G	RSL910	RS908C	RS910C	RS920P	RS92100(P)	RS92200	RS92288	RS92300(P)	RS92488	RS950G	RSG907R	RSG909R	RX1400	RST2228(P)	RX15xx	RX5000	
Copper	RJ45	0.1	SFP112-1	6GK6000-8CG01-0AA0	●																Modules	FX50/6FX50	SM09/SM39	
			SFP112-1SX	6GK6000-8FG51-0AA0																			Ports 1-4	FG50
100 Mbps Active	MM	2	SFP1121-1FX2A	6GK6000-8FE50-0AA0	●																			
			SFP1131-1FX10A	6GK6000-8FE60-0AA0																				
100 Mbps	SM	40	SFP1131S-1FX40A	6GK6000-8FE62-0AA0																				
			SFP1121-1FX2	6GK6000-8FE51-0AA0																				
100 Mbps	SM	50	SFP1131-1FX20	6GK6000-8FE52-0AA0																				
			SFP1131-1FX50	6GK6000-8FE53-0AA0																				
1 Gbps Single-fiber Bidirectional	SM	10	SFP1131-1FX90	6GK6000-8FE54-0AA0																				
			SFP1132-1BX10R	6GK6000-8FB51-0AA0																				
1 Gbps	MM	40	SFP1132-1BX10T	6GK6000-8FB52-0AA0																				
			SFP1132-1BX40R	6GK6000-8FB53-0AA0																				
10 Gbps	SM	115	SFP1132-1BX40T	6GK6000-8FB54-0AA0																				
			SFP1122-1SX	6GK6000-8FG51-0AA0																				
10 Gbps	MM	2	SFP1122-1SX2	6GK6000-8FE58-0AA0																				
			SFP1132-1LX10	6GK6000-8FG52-0AA0																				
10 Gbps	SM	40	SFP1132-1LX25	6GK6000-8FG53-0AA0																				
			SFP1132-1LX40	6GK6000-8FG57-0AA0																				
10 Gbps	MM	0.4	SFP1132-1LX70	6GK6000-8FG54-0AA0																				
			SFP1132-1LX100	6GK6000-8FG55-0AA0																				
10 Gbps	SM	80	SFP1132-1LX115	6GK6000-8FE56-0AA0																				
			SFP2123-1SR	6GK6000-8FT50-0AA0																				
10 Gbps	SM	40	SFP2133-1LR10	6GK6000-8FT51-0AA0																				
			SFP2133-1ER40	6GK6000-8FT53-0AA0																				
10 Gbps	SM	80	SFP2133-1ZR80	6GK6000-8FT52-0AA0																				
			SFP2133-1ZR80	6GK6000-8FT52-0AA0																				

Copper SFP Transceivers

The following copper triple-speed SFP transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to "[Available SFP Transceivers \(Page 3\)](#)".

2.1 RUGGEDCOM SFP1112-1

Siemens' RUGGEDCOM SFP1112-1 is a 1 Gbps copper SFP transceiver that operates within a wide temperature range (0 to 70 °C or 32 to 158 °F) and provides high performance Gigabit Ethernet communication up to 100 m (328.1 ft).

Note

This SFP transceiver is not recommended for use with IEEE 1588.

Highlights

- Compliant with SFP MSA and IEEE 802.3ab for 10/100/1000Base-T
- Transmission distance up to 100 m (328.1 ft)
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Characteristics

Speed	10/100/1000 Mbps
Connector	RJ-45
Cable Type	> CAT-5e
Duplex	FDX/HDX
Wiring Standard	TIA/EIA T568A/B
Nominal Distance	100 m (328.1 ft)
Isolation	1.5 kV

Environment

Operating Temperature	0 to 70 °C (32 to 158 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Product-Specific Deviations

The RUGGEDCOM SFP1112-1 supports the following ratings when installed in the specified Siemens RUGGEDCOM routers and/or switches:

Product(s)	Specification	Rating
RUGGEDCOM RSG907R, RSG909R	Speed	Supports only 1000 Mbps on the coupler port on RUGGEDCOM ROS v5.2 firmware versions
RUGGEDCOM RSG908C, RSG910C	Speed	Supports only 1000 Mbps on RUGGEDCOM ROS v5.2 firmware versions

Regulator Compliance

The RUGGEDCOM SFP1112-1 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class A, CE Class A, VCCI Class A, C-Tick	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8CG01-0AA0	RUGGEDCOM SFP1112-1	1000Base-T SFP – RJ45, 100 m

Fast Ethernet SFP Transceivers

The following Fast Ethernet SFP transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to "[Available SFP Transceivers \(Page 3\)](#)".

3.1 RUGGEDCOM SFP1121-1FX2

Siemens' RUGGEDCOM SFP1121-1FX2 industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 2 km (1.2 mi) using multi-mode fiber.

Highlights

- Compliant with SFP MSA and IEEE 802.3ab for 100Base-FX
- Transmission distance up to 2 km (1.2 mi)
- LC duplex connector optical interface
- Operates with 50/125 μm and 62.5/125 μm multi-mode fiber
- Supports Smart SFP functionality
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power (50/125 μm)	-23.5 to -14.0 dBm
Transmit Power (62.5/125 μm)	-20.0 to -14.0 dBm
Receiver Sensitivity	-31.0 to -3.0 dBm
Power Budget (50/125 μm)	7.5 dB
Power Budget (62.5/125 μm)	11 dB

Cabling

Speed	100 Mbps ^a
Mode	MM (Multi-Mode)
Interface	FX
Connector	LC
Cable Type	50/125 or 62.5/125 μm
Wavelength (Tx)	1270 to 1380 nm
Wavelength (Rx)	1270 to 1380 nm
Nominal Distance	2 km (1.2 mi)

^a When Smart SFP mode is enabled, the RUGGEDCOM SFP1121-1FX2 can be used with Gigabit modules in RUGGEDCOM RX1500, RX1501, RX1510, RX1511, RX1512, and RX5000 devices. For more information, refer to the *RUGGEDCOM ROX II User Guide*.

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Storage Temperature	-40 to 100 °C (-40 to 212 °F)

Regulator Compliance

The RUGGEDCOM SFP1121-1FX2 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C	HBM 2 kV
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	Variation of IEC 61000-4-2	Compliant
Electromagnetic Interference (EMI)	CENELEC CEN55022 Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Eye Safety	AEL Class 1 EN 60825-1 (+A11)	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE51-0AA0	RUGGEDCOM SFP1121-1FX2	100Base-FX SFP – MM, 1310 nm, LC, 2 km

3.2 RUGGEDCOM SFP1131-1FX20

Siemens' RUGGEDCOM SFP1131-1FX20 industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 20 km (12.4 mi) using single-mode fiber.

Note

Maximum distance is 15 km (9.3 mi) in OC-3 mode.

Highlights

- Compliant with SFP MSA for 100Base-FX
- Transmission distance up to 20 km (12.4 mi)
- LC duplex fiber connector
- Supports Smart SFP functionality
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-15 to -8 dBm
Receiver Sensitivity	-31 to -8 dBm
Power Budget	16 dB

Cabling

Speed	100 Mbps ^a
Interface	FX
Mode	SM (Single-Mode)
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1261 to 1360 nm
Wavelength (Rx)	1260 to 1600 nm
Nominal Distance	20 km (12.4 mi)

^a When Smart SFP mode is enabled, the RUGGEDCOM SFP1131-1FX20 can be used with Gigabit modules in RUGGEDCOM RX1500, RX1501, RX1510, RX1511, RX1512, and RX5000 devices. For more information, refer to the *RUGGEDCOM ROX II User Guide*.

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Regulator Compliance

The RUGGEDCOM SFP1131-1FX20 complies with the following regulatory requirements when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C, Method 3015.4 JEDEC/EIA JESD22-A114-A	Class 2 (2000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	Bellcore GR1089-CORE	25 kV Air Discharge 10 Zaps at 8 kV (contact discharge) on the electrical face-plate on panel
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Eye Safety	US FDA CDRH AEL Class 1 IEC/EN 60825-1 and 60825-2 EN 60950 Class 1	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE52-0AA0	RUGGEDCOM SFP1131-1FX20	100Base-FX SFP – SM, 1300 nm, LC, 20 km

3.3 RUGGEDCOM SFP1131-1FX50

Siemens' RUGGEDCOM SFP1131-1FX50 industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 50 km (31.1 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA and SFF 8074i for 100Base-FX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Compliant with ITU-T G957 STM-1 L1.1 Optical Interface
- Compliant with Telcordia GR253 OC3 LR-1 Optical Interface
- Transmission distance up to 50 km (31.1 mi)
- Supports Smart SFP functionality
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

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

Cabling

Speed	100 Mbps ^a
Mode	SM (Single-Mode)
Interface	FX
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1263 to 1360 nm
Wavelength (Rx)	1260 to 1600 nm
Nominal Distance	50 km (31.1 mi)

^a When Smart SFP mode is enabled, the RUGGEDCOM SFP1131-1FX50 can be used with Gigabit modules in RUGGEDCOM RX1500, RX1501, RX1510, RX1511, RX1512, and RX5000 devices. For more information, refer to the *RUGGEDCOM ROX II User Guide*.

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	0 to 85% (non-condensing)

Storage Temperature	-40 to 85 °C (-40 to 185 °F)
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Regulator Compliance

The RUGGEDCOM SFP1131-1FX50 complies with the following regulatory requirements when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C, Method 3015.4 JEDEC/EIA JESD22-A114-A	Class 2 (2000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	Bellcore GR1089-CORE	25 kV Air Discharge 10 Zaps at 8 kV (contact discharge) on the electrical face-plate on panel
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Eye Safety	US FDA CDRH AEL Class 1 IEC/EN 60825-1 and 60825-2 EN 60950 Class 1	Class 1
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE53-0AA0	RUGGEDCOM SFP1131-1FX50	100Base-FX SFP – SM, 1300 nm, LC, 50 km

3.4 RUGGEDCOM SFP1131-1FX90

Siemens' RUGGEDCOM SFP1131-1FX90 industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 90 km (55.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 100Base-FX
- Transmission distance up to 90 km (55.9 mi)
- LC duplex fiber connector
- Supports Smart SFP functionality
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-5 to -0 dBm
Receiver Sensitivity	-34 to -10 dBm
Power Budget	29

Cabling

Speed	100 Mbps ^a
Mode	SM (Single-Mode)
Interface	FX
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1480 to 1580 nm
Wavelength (Rx)	1260 to 1600 nm
Nominal Distance	90 km (55.9 mi)

^a When Smart SFP mode is enabled, the RUGGEDCOM SFP1131-1FX90 can be used with Gigabit modules in RUGGEDCOM RX1500, RX1501, RX1510, RX1511, RX1512, and RX5000 devices. For more information, refer to the *RUGGEDCOM ROX II User Guide*.

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Regulator Compliance

The RUGGEDCOM SFP1131-1FX90 complies with the following regulatory requirements when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Laser Eye Safety	IEC/EN 60825	Class 1
Electrical Safety	IEC/EN 60950	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE54-0AA0	RUGGEDCOM SFP1131-1FX90	100Base-FX SFP – SM, 1550 nm, LC, 90 km

Active 100 Mbps SFP Transceivers

The following active 100 Mbps Ethernet SFP transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to ["Available SFP Transceivers \(Page 3\)"](#).

4.1 RUGGEDCOM SFP1121-1FX2A

Siemens' RUGGEDCOM SFP1121-1FX2A industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 2 km (1.2 mi) using multi-mode fiber.

Note

This SFP transceiver is not recommended for use with IEEE 1588.

Highlights

- Compliant with SFP MSA and IEEE 802.3 for 100Base-FX
- Transmission distance up to 2 km (1.2 mi)
- LC duplex connector optical interface
- Operates with 50/125 μm and 62.5/125 μm multi-mode fiber
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-20 to -14 dBm
Receiver Sensitivity	-31.5 to -8 dBm
Power Budget	11.5 dB

Cabling

Speed	100 Mbps
Mode	MM (Multi-Mode)
Interface	FX
Connector	LC
Cable Type	50/125 or 62.5/125 μm
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1260 to 1570 nm
Nominal Distance	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)

Regulator Compliance

The RUGGEDCOM SFP1121-1FX2A meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Laser Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2011/65/EU	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE50-OAA0	RUGGEDCOM SFP1121-1FX2A	100Base-FX SFP – MM, 1310 nm, LC, 2 km

4.2 RUGGEDCOM SFP1131-1FX10A

Siemens' RUGGEDCOMSFP1131-1FX10A industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 10 km (6.2 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 100Base-FX
- Transmission distance up to 10 km (6.2 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-15 to -8 dBm
Receiver Sensitivity	-31.5 to -8 dBm
Power Budget	16.5

Cabling

Speed	100 Mbps
Interface	FX
Mode	SM (Single-Mode)
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1260 to 1570 nm
Nominal Distance	10 km (6.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Regulator Compliance

The RUGGEDCOM SFP1131-1FX10A complies with the following regulatory requirements when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant

Feature	Standard	Performance
	GR-1089-CORE	
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2011/65/EU	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE60-0AA0	RUGGEDCOM SFP1131-1FX10A	100Base-LX SFP – SM, 1310 nm, LC, 10 km

4.3 RUGGEDCOM SFP1131S-1FX40A

Siemens' RUGGEDCOMSFP1131S-1FX40A industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-5 to 70 °C or 23 to 158 °F) and provides high performance Fast Ethernet communication up to 40 km (24.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 100Base-FX
- Transmission distance up to 40 km (24.9 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-5 to 0 dBm
Receiver Sensitivity	-23 to 0 dBm
Power Budget	18

Cabling

Speed	100 Mbps
Interface	FX
Mode	SM (Single-Mode)
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1260 to 1580 nm
Nominal Distance	40 km (24.9 mi)

Environment

Operating Temperature	-5 to 70 °C (23 to 158 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-5 to 70 °C (23 to 158 °F)

Regulator Compliance

The RUGGEDCOM SFP1131S-1FX40A complies with the following regulatory requirements when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant

Feature	Standard	Performance
	GR-1089-CORE	
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2011/65/EU	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE62-0AA0	RUGGEDCOM SFP1131S-1FX40A	100Base-LX SFP – SM, 1310 nm, LC, 40 km

Gigabit Ethernet SFP Transceivers

The following Gigabit Ethernet SFP transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to "[Available SFP Transceivers \(Page 3\)](#)".

5.1 RUGGEDCOM SFP1122-1SX

Siemens' RUGGEDCOM SFP1122-1SX industrial grade 1 Gbps fiber optic SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to either 0.5 km (0.3 mi) or 0.3 km (0.2 mi) using multi-mode fiber, depending on the cable type in use.

Highlights

- Compliant with SFP MSA and IEEE 802.3 for 1000Base-SX
- Transmission distance up to 0.5 km (0.3 mi) or 0.3 km (0.2 mi)
- LC duplex connector optical interface
- Operates with 50/125 μm and 62.5/125 μm multi-mode fiber
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-9 to -2.5 dBm
Receiver Sensitivity	-20 to 0 dBm
Power Budget	11 dB

Cabling

Speed	1 Gbps
Mode	MM (Multi-Mode)
Interface	SX
Connector	LC
Cable Type	50/125 or 62.5/125 μm
Wavelength (Tx)	830 to 860 nm
Wavelength (Rx)	770 to 860 nm
Nominal Distance (50/125 μm)	0.5 km (0.3 mi)
Nominal Distance (62.5/125 μm)	0.3 km (0.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 100 °C (-40 to 212 °F)

Regulator Compliance

The RUGGEDCOM SFP1122-1SX meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Laser Eye Safety	IEC/EN 60825	Class 1
Electrical Safety	IEC/EN 60950	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG51-0AA0	RUGGEDCOM SFP1122-1SX	1000Base-SX SFP – MM, 850 nm, LC, 0.5 km

5.2 RUGGEDCOM SFP1122-1SX2

Siemens' RUGGEDCOM SFP1122-1SX2 industrial grade 1 Gbps fiber optic SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 2 km (1.2 mi) using multi-mode fiber.

Highlights

- Compliant with SFP MSA and IEEE 802.3z for 1000Base-SX
- Transmission distance up to 2 km (1.2 mi)
- LC duplex connector optical interface
- Operates with 50/125 μm and 62.5/125 μm multi-mode fiber
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-9 to 1 dBm
Receiver Sensitivity	-23 to -3 dBm
Power Budget	14 dB

Cabling

Speed	1 Gbps
Mode	MM (Multi-Mode)
Interface	SX
Connector	LC
Cable Type	50/125 or 62.5/125 μm
Wavelength (Tx)	1280 to 1355 nm
Wavelength (Rx)	1270 to 1620 nm
Nominal Distance	2 km (1.2 mi)

Environment

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

Regulator Compliance

The RUGGEDCOM SFP1122-1SX2 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Laser Eye Safety	IEC/EN 60825	Class 1
Electrical Safety	IEC/EN 60950	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE58-0AA0	RUGGEDCOM SFP1122-1SX2	1000Base-SX SFP – MM, 1310 nm, LC, 2 km

5.3 RUGGEDCOM SFP1132-1LX10

Siemens' RUGGEDCOM SFP1132-1LX10 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 10 km (6.2 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA and IEEE 802.3 for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 10 km (6.2 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-9.5 to -3.0 dBm
Receiver Sensitivity	-19.0 to -3.0 dBm
Power Budget	9.5 dB

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1270 to 1355 nm
Wavelength (Rx)	1265 to 1600 nm
Nominal Distance	10 km (6.2 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)

Regulator Compliance

The RUGGEDCOM SFP1132-1LX10 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C, Method 3015.4 JEDEC/EIA JESD22-A114-A	Class 2 (> 2000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	Bellcore GR1089-CORE	Compliant
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Eye Safety	US FDA CDRH AEL Class 1 IEC/EN 60825-1 and 60825-2 EN 60950 Class 1	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG52-0AA0	RUGGEDCOM SFP1132-1LX10	1000Base-LX SFP – SM, 1310 nm, LC, 10 km

5.4 RUGGEDCOM SFP1132-1LX25

Siemens' RUGGEDCOM SFP1132-1LX25 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 25 km (15.5 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 25 km (15.5 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-7.0 to -3.0 dBm
Receiver Sensitivity	-23.0 to -3.0 dBm
Power Budget	16 dB

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1260 to 1610 nm
Nominal Distance	25 km (15.5 mi)

Environment

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

Regulator Compliance

The RUGGEDCOM SFP1132-1LX25 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant

Feature	Standard	Performance
Eye Safety	IEC/EN 60825-1	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG53-0AA0	RUGGEDCOM SFP1132-1LX25	1000Base-LX SFP – SM, 1310 nm, LC, 25 km

5.5 RUGGEDCOM SFP1132-1LX40

Siemens' RUGGEDCOM SFP1132-1LX40 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 40 km (24.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 40 km (24.9 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-6.0 to 0.0 dBm
Receiver Sensitivity	-23.0 to -3.0 dBm
Power Budget	17 dB

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1540 to 1570 nm
Wavelength (Rx)	1270 to 1600 nm
Nominal Distance	40 km (24.9 mi)

Environment

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

Regulator Compliance

The RUGGEDCOM SFP1132-1LX40 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Eye Safety	IEC/EN 60825-1	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG57-0AA0	RUGGEDCOM SFP1132-1LX40	1000Base-LX SFP – SM, 1550 nm, LC, 40 km

5.6 RUGGEDCOM SFP1132-1LX70

Siemens' RUGGEDCOM SFP1132-1LX70 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 70 km (43.5 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 70 km (43.5 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-0.0 to 5.0 dBm
Receiver Sensitivity	-23.0 to -3.0 dBm
Power Budget	23 dB

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1540 to 1570 nm
Wavelength (Rx)	1270 to 1600 nm
Nominal Distance	70 km (43.5 mi)

Environment

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

Regulator Compliance

The RUGGEDCOM SFP1132-1LX70 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant

Feature	Standard	Performance
Eye Safety	IEC/EN 60825-1	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG54-0AA0	RUGGEDCOM SFP1132-1LX70	1000Base-LX SFP – SM, 1550 nm, LC, 70 km

5.7 RUGGEDCOM SFP1132-1LX100

Siemens' RUGGEDCOM SFP1132-1LX100 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (0 to 70 °C or 32 to 158 °F) and provides high performance Gigabit Ethernet communication up to 100 km (62.1 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA and IEE 802.3 for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 100 km (62.1 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-0.0 to 5.0 dBm
Receiver Sensitivity	-30.0 to -8.0 dBm
Power Budget ^a	30 dB

^a Assumes the same SFP transceiver is used on both ends of the connection.

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1540 to 1570 nm
Wavelength (Rx)	1270 to 1600 nm
Nominal Distance:	100 km (62.1 mi)

Environment

Operating Temperature	0 to 70 °C (32 to 158 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1LX100 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Eye Safety	IEC/EN 60825-1	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG55-0AA0	RUGGEDCOM SFP1132-1LX100	1000Base-LX SFP – SM, 1550 nm, LC, 100 km

5.8 RUGGEDCOM SFP1132-1LX115

Siemens' RUGGEDCOM SFP1132-1LX115 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (-10 to 70 °C or 14 to 158 °F) and provides high performance Gigabit Ethernet communication up to 115 km (71.5 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000Base-LX
- Transmission distance up to 115 km (71.5 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	0 to 5 dBm
Receiver Sensitivity	-30 to -9 dBm
Power Budget	30 dB

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1540 to 1570 nm
Wavelength (Rx)	1270 to 1600 nm
Nominal Distance	115 km (71.5 mi)

Environment

Operating Temperature	-10 to 70 °C (14 to 158 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1LX115 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Laser Eye Safety	IEC/EN 60825	Class 1

Feature	Standard	Performance
Electrical Safety	IEC/EN 60950	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE56-0AA0	RUGGEDCOM SFP1132-1LX115	1000Base-LX SFP – SM, 1550 nm, LC, 115 km

Bidirectional Gigabit Ethernet SFP Transceivers

The following Bidirectional (BiDi) SFP transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to "[Available SFP Transceivers \(Page 3\)](#)".

6.1 RUGGEDCOM SFP1132-1BX10R

Siemens' RUGGEDCOM SFP1132-1BX10R industrial grade 1 Gbps fiber optic bi-directional SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 10 km (6.2 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000BASE-BX10-U
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 10 km (6.2 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-9.0 to -3.0 dBm
Receiver Sensitivity	-19.5 to -3.0 dBm
Power Budget ^a	10.5 db

^a Assumes an SFP1132-1BX10T is used at the other end of the connection.

Cabling

Speed	1000 Mbit/s
Mode	SM
Interface	BX
Connector	LC
Cable Type (µm)	9/125
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1480 to 1500 nm
Nominal Distance	10 km (6.2 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)

Regulator Compliance

The RUGGEDCOM SFP1132-1BX10R meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Laser Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2 EN 60950	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2011/65/EU	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FB51-0AA0	RUGGEDCOM SFP1132-1BX10R	1000Base-BX SFP – SM, 1310/1490 nm, LC, 10 km

6.2 RUGGEDCOM SFP1132-1BX10T

Siemens' RUGGEDCOM SFP1132-1BX10T industrial grade 1 Gbps fiber optic bi-directional SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 10 km (6.2 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000BASE-BX10-D
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 10 km (6.2 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-9.0 to -3.0 dBm
Receiver Sensitivity	-19.5 to -3.0 dBm
Power Budget ^a	10.5 dB

^a Assumes an SFP1132-1BX10R is used at the other end of the connection.

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	BX
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1480 to 1500 nm
Wavelength (Rx)	1260 to 1360 nm
Nominal Distance	10 km (6.2 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)

Regulator Compliance

The RUGGEDCOM SFP1132-1BX10T meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Laser Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2 EN 60950	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2011/65/EU	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FB52-0AA0	RUGGEDCOM SFP1132-1BX10T	1000Base-BX SFP – SM, 1490/1310 nm, LC, 10 km

6.3 RUGGEDCOM SFP1132-1BX40R

Siemens' RUGGEDCOM SFP1132-1BX40R industrial grade 1 Gbps fiber optic bi-directional SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 40 km (24.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA and IEEE 802.3ah for 1000Base-BX40-U
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 40 km (24.9 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-2.0 to 3.0 dBm
Receiver Sensitivity	-23.0 to -3.0 dBm
Power Budget ^a	21 dB

^a Assumes an SFP1132-1BX40T is used at the other end of the connection.

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	BX
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1480 to 1500 nm
Nominal Distance	40 km (24.9 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)

Regulator Compliance

The RUGGEDCOM SFP1132-1BX40R meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Laser Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2 EN 60950	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2011/65/EU	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FB53-0AA0	RUGGEDCOM SFP1132-1BX40R	1000Base-BX SFP – SM, 1310/1490 nm, LC, 40 km

6.4 RUGGEDCOM SFP1132-1BX40T

Siemens' RUGGEDCOM SFP1132-1BX40T industrial grade 1 Gbps fiber optic bi-directional SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 40 km (24.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA and IEEE 802.3ah for 1000Base-BX-D
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 40 km (24.9 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-2.0 to 3.0 dBm
Receiver Sensitivity	-23.0 to -3.0 dBm
Power Budget ^a	21 dB

^a Assumes an SFP1132-1BX40R is used at the other end of the connection.

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	BX
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1480 to 1500 nm
Wavelength (Rx)	1260 to 1360 nm
Nominal Distance	40 km (24.9 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)

Regulator Compliance

The RUGGEDCOM SFP1132-1BX40T meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Laser Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2 EN 60950	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2011/65/EU	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FB54-0AA0	RUGGEDCOM SFP1132-1BX40T	1000Base-BX SFP – SM, 1490/1310 nm, LC, 40 km

10-Gigabit Ethernet SFP+ Transceivers

The following 10-Gigabit Ethernet SFP+ transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to "[Available SFP Transceivers \(Page 3\)](#)".

7.1 RUGGEDCOM SFP2123-1SR

Siemens' RUGGEDCOM SFP2123-1SR industrial grade 10 Gbps fiber optic long reach SFP+ transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 400 m (1312 ft) using multi-mode fiber.

Highlights

- Compliant with SFP+ MSA and IEEE 802.3ae for 10GBase-SR
- Compliant with SFF-8431 (Rev 2)
- Compliant with SFF-8432 (Rev 4.3)
- Transmission distance up to 400 m (1312 ft)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-5.0 to -1.0 dBm
Tx Typical OMA	-1.5
Minimum Extinction Ratio	3.0
Rx Sensitivity OMA (dBm)	-11.1
Stressed RX Sensitivity (dBm)	-7.5
Rx Saturation (dBm)	0.5

Cabling

Speed	10 Gbps
Mode	MM (Multi-Mode)
Interface	SR
Connector	LC
Cable Type	50/125 or 62.5/125 μm
Wavelength (Tx)	840 to 860 nm
Wavelength (Rx)	840 to 860 nm
Nominal Distance	400 m (1312 ft)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Regulator Compliance

The RUGGEDCOM SFP2123-1SR meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1	Class 1
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FT50-0AA0	RUGGEDCOM SFP2123-1SR	10GBase-SR SFP – SM, 850 nm, LC, 400 m

7.2 RUGGEDCOM SFP2133-1LR10

Siemens' RUGGEDCOM SFP2133-1LR10 industrial grade 10 Gbps fiber optic long reach SFP+ transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 10 km (6.2 mi) using single-mode fiber.

Highlights

- Compliant with SFP+ MSA and IEEE 802.3ae for 10GBase-LR/LW
- Compliant with SFF-8431 (Rev 2)
- Compliant with SFF-8432 (Rev 4.3)
- Transmission distance up to 10 km (6.2 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-8.2 to 0.5 dBm
Tx Minimum OMA	-5.2
Minimum Extinction Ratio	3.5
Rx Sensitivity OMA (dBm)	-12.6
Stressed RX Sensitivity (dBm)	-10.3
Rx Saturation (dBm)	0.5
Power Budget (dB)	4.4
Channel Insertion Loss (dB)	5.1
Allocation for Penalties (dB)	2.3

Cabling

Speed	10 Gbps
Mode	SM (Single-Mode)
Interface	LR
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1260 to 1355 nm
Wavelength (Rx)	1260 to 1600 nm
Nominal Distance	10 km (6.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Product-Specific Deviations

The RUGGEDCOM SFP2133-1LR10 supports the following ratings when installed in the specified Siemens RUGGEDCOM routers and/or switches:

Product(s)	Specification	Rating
RUGGEDCOM RX5000	Operating Temperature	-40 to 80 °C (-40 to 176 °F)
RUGGEDCOM MX5000	Operating Temperature	-40 to 80 °C (-40 to 176 °F)

Regulator Compliance

The RUGGEDCOM SFP2133-1LR10 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1	Class 1
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FT51-0AA0	RUGGEDCOM SFP2133-1LR10	10GBase-LR SFP – SM, 1310 nm, LC, 10 km

7.3 RUGGEDCOM SFP2133-1ER40

Siemens' RUGGEDCOM SFP2133-1ER40 industrial grade 10 Gbps fiber optic extended reach SFP+ transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 40 km (24.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP+ MSA and IEEE 802.3ae for 10GBase-ER/EW
- Compliant with SFF-8431 (Rev 2)
- Compliant with SFF-8432 (Rev 4.3)
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface (Rev 10.4)
- Transmission distance up to 40 km (24.9 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-4.4 to 4.0 dBm
Tx Minimum OMA	-1.7
Minimum Extinction Ratio	8.2
Rx Sensitivity OMA (dBm)	-14.1
Stressed RX Sensitivity (dBm)	-11.3
Rx Saturation (dBm)	-1.0
Power Budget (dB)	9.4
Channel Insertion Loss (dB)	10.9
Allocation for Penalties (dB)	4.1

Cabling

Speed	10 Gbps
Mode	SM (Single-Mode)
Interface	ER
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1530 to 1565 nm
Wavelength (Tx)	1530 to 1565 nm
Nominal Distance	40 km (24.9 mi)

Environment

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

Regulator Compliance

The RUGGEDCOM SFP2133-1ER40 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FT53-0AA0	RUGGEDCOM SFP2133-1ER40	10GBase-ER SFP – SM, 1550 nm, LC, 40 km

7.4 RUGGEDCOM SFP2133-1ZR80

Siemens' RUGGEDCOM SFP2133-1ZR80 industrial grade 10 Gbps fiber optic extended reach SFP+ transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 80 km (49.7 mi) using single-mode fiber.

Highlights

- Compliant with SFP+ MSA and OC-192/STM-64 for 10GBase-ZR/ZW
- Compliant with SFF-8431 (Rev 2)
- Compliant with SFF-8432 (Rev 4.3)
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface (Rev 10.4)
- Transmission distance up to 80 km (49.7 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-1.0 to 4.0 dBm
Minimum Extinction Ratio	9.0
Rx Sensitivity OMA (dBm)	-23.0
Rx Saturation (dBm)	-7.0
Power Budget (dB)	22.0

Cabling

Speed	10 Gbps
Mode	SM (Single-Mode)
Interface	ZR
Connector	LC
Cable Type	9/125 μm
Wavelength (Tx)	1520 to 1565 nm
Wavelength (Rx)	1530 to 1565 nm
Nominal Distance	80 km (49.7 mi)

Environment

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

Regulator Compliance

The RUGGEDCOM SFP2133-1ZR80 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
RoHS	EU RoHS Directive 2002/95/EC	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FT52-0AA0	RUGGEDCOM SFP2133-1ZR80	10GBase-ZR SFP – SM, 1550 nm, LC, 80 km

Installation/Removal

All SFP transceivers are hot swappable, making it possible to install or remove them while the router/switch is in operation.

NOTICE

SFP transceivers can only be hot swapped with SFPs supported by the router/switch. To determine compatibility, refer to " Available SFP Transceivers (Page 3) ".
--

8.1 Handling SFP Transceivers

Before handling an SFP transceiver, note the following:

 **WARNING**

Radiation hazard – risk of serious personal injury.

SFP transceivers are equipped with a Class 1 laser. When installed, each SFP emits invisible radiation even when a cable is not connected. Avoid exposure to laser radiation and do not stare into open SFP ports.

 **CAUTION**

Electrical hazard – risk of damage to equipment.

Use only components certified by Siemens with RUGGEDCOM products. Damage to the router/switch may occur if compatibility and reliability have not been properly assessed.

 **CAUTION**

Static electricity hazard – risk of damage to equipment.

SFP transceivers are sensitive to static electricity. An electrostatic discharge (ESD) can cause serious damage to the component once it is outside the chassis. Make sure to wear an ESD-preventive wrist strap connected to the chassis to prevent an electrostatic discharge (ESD).

 **CAUTION**

Dirt/debris hazard – risk of damage to equipment.

SFP transceivers and sockets are sensitive to the ingress of dirt/debris. Always install a dust plug in both the SFP transceiver and the socket on the router/switch after removing the SFP. Do not remove the plugs until inserting the SFP.

 **CAUTION**

Mechanical hazard – risk of damage to equipment.

Do not install/remove SFP transceivers more than necessary. Repeated installation/removal can reduce the life of the transceiver.

NOTICE

Only permit trained and qualified personnel to install and remove SFP transceivers.

8.2 Required Tools

The following tools are required for installing/removing SFP transceivers:

- An ESD-preventive wrist trap or other personal grounding device
- An anti-static mat or foam to set the transceiver on

8.3 Installation

To install an SFP transceiver, do the following:

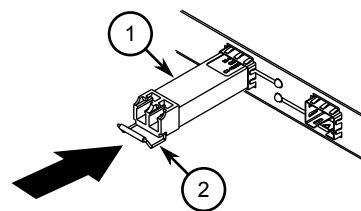
<p>⚠ WARNING</p> <p>Explosion hazard – risk of serious personal injury and/or equipment damage.</p> <p>Do not install or remove SFP transceivers when an explosive atmosphere is present.</p>

<p>NOTICE</p> <p>Only install SFP transceivers that are compatible with the RUGGEDCOM router/switch. For information about which RUGGEDCOM routers/switches are compatible with an SFP transceiver, refer to "Available SFP Transceivers (Page 3)".</p>
--

1. Make sure all potential electrostatic build-up has been properly discharged to prevent an electrostatic discharge (ESD). This can be accomplished by wearing an ESD-preventive wrist trap connected to either the chassis ground connector or a bare metal surface on the router/switch.
2. Remove the SFP transceiver from its packaging.

<p>⚠ CAUTION</p> <p>Mechanical hazard – risk of component damage. SFP transceivers are designed to insert in only one orientation. Do not force the SFP transceiver into the socket.</p>

3. Remove the dust plug from the socket and store for future use.
4. Insert the SFP transceiver into the socket, and then swing the bail-latch on the SFP transceiver up and push it in to lock the transceiver in place.



- ① SFP Transceiver
- ② Bail-Latch

Figure 8.1 Installing an SFP Transceiver (Typical)

<p>NOTICE</p> <p>Only remove the dust plug when ready to connect a cable to the SFP transceiver.</p>

5. Remove the dust plug from the SFP transceiver and store for future use.

6. Remove the dust cap from the cable and immediately connect it to the SFP transceiver.
7. Connect the cable to a network and observe the LED associated with the SFP transceiver.

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

8.4 Removal

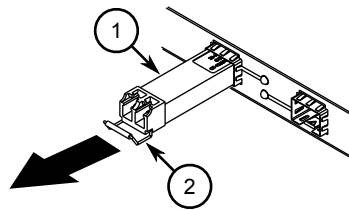
To remove an SFP transceiver, do the following:

⚠ WARNING

Explosion hazard – risk of serious personal injury and/or equipment damage.

Do not install or remove SFP transceivers when an explosive atmosphere is present.

1. Make sure all potential electrostatic build-up has been properly discharged to prevent an electrostatic discharge (ESD). This can be accomplished by wearing an ESD-preventive wrist trap connected to either the chassis ground connector or a bare metal surface on the router/switch.
2. Disconnect the cable from the SFP transceiver and install the dust cap to the cable end.
3. Pull the bail-latch out and down on the SFP transceiver, and then immediately insert a dust plug into the SFP transceiver port.
4. Remove the transceiver from the socket and then immediately insert a dust plug into the socket.



- ① SFP Transceiver
- ② Bail-Latch

Figure 8.2 Removing an SFP Transceiver (Typical)

Note

Refer to the specifications for the specific SFP transceiver to determine the required storage temperature range.

5. Store the SFP port in an ESD-safe bag or other suitable ESD-safe environment, free from moisture and stored at the proper temperature.
6. Insert a dust plug into the socket opening to prevent the ingress of dust and dirt.

Further Information

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

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

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

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