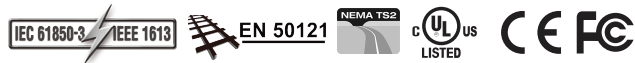


# PT-7828 Series

## IEC 61850-3 / EN 50155 24+4G-port Layer 3 Gigabit modular managed rackmount Ethernet switches



- > IEC 61850-3, IEEE 1613 (power substations) and EN 50121-4 (railway applications) compliant
- > Complies with a portion of EN 50155 specifications
- > Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy
- > Up to 12 ports with M12 connectors
- > Isolated redundant power supplies with universal 24 VDC, 48 VDC, or 110/220 VDC/VAC power supply range
- > Supports multicast routing protocols PIM-DM/DVMRP
- > -40 to 85°C operating temperature range



### Introduction

The PT-7828 switches are high performance Layer 3 Ethernet switches that support Layer 3 routing functionality to facilitate the deployment of applications across networks. The PT-7828 switches are also designed to meet the strict demands of power substation automation systems (IEC 61850-3, IEEE 1613), and railway applications (EN 50121-4). The PT-7828 Series also features critical packet prioritization (GOOSE, SMVs, and PTP).

The PT-7828's Gigabit and Fast Ethernet backbone, redundant ring, and 24 VDC, 48 VDC, or 110/220 VDC/VAC dual isolated redundant power supplies increase the reliability of your communications and save on cabling and wiring costs. The modular design of the PT-7828 makes network planning easy, and allows greater flexibility by letting you install up to 4 Gigabit ports and 24 Fast Ethernet ports. Optional front or rear wiring makes the PT-7828 switches suitable for a variety of applications.

### Features and Benefits

- Layer 3 switching functionality to divide a large network into hierarchical subnets and allow data and information to communicate across networks
- Command Line Interface (CLI) for quickly configuring major managed functions
- Software-based IEEE 1588v2 PTP (Precision Time Protocol) for time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- EtherNet/IP and Modbus/TCP industrial Ethernet protocols supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy
- Supports multicast routing protocols PIM-DM/DVMRP
- Supports advanced VLAN capability with Q-in-Q tagging
- IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
- IEEE 802.3ad, LACP for optimum bandwidth utilization
- Bandwidth management prevents unpredictable network status
- Multi-port mirroring for online debugging
- Automatic warning by exception through email and relay output
- RMON for efficient network monitoring and proactive capability
- Automatic recovery of connected device's IP addresses
- Line-swap fast recovery
- Configurable by web browser, Telnet/serial console, CLI Windows utility, and ABC-01 automatic backup configurator

### Cybersecurity Features

- User passwords with multiple levels of security protect against unauthorized configuration
- SSH/HTTPS is used to encrypt passwords and data
- Lock switch ports with 802.1X port-based network access control so that only authorized clients can access the port
- Disable one or more ports to block network traffic
- 802.1Q VLAN allows you to logically partition traffic transmitted between selected switch ports
- Secure switch ports so that only specific devices and/or MAC addresses can access the ports
- RADIUS/TACACS+ allows you to manage passwords from a central location
- SNMPv3 provides encrypted authentication and access security

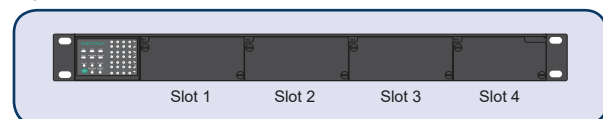
### Specifications

#### Technology

#### Standards:

- IEEE 802.3 for 10BaseT
- IEEE 802.3u for 100BaseT(X) and 100BaseFX
- IEEE 802.3ab for 1000BaseT(X)
- IEEE 802.3z for 1000BaseX
- IEEE 802.3x for Flow Control
- IEEE 802.1D-2004 for Spanning Tree Protocol
- IEEE 802.1s for Multiple Spanning Tree Protocol
- IEEE 802.1w for Rapid STP

### Layer 3 Modular Rackmount Ethernet Switch System, PT-7828



IEEE 802.1Q for VLAN Tagging  
 IEEE 802.1p for Class of Service  
 IEEE 802.1X for Authentication  
 IEEE 802.3ad for Port Trunk with LACP

**Software Features**

**Management:** IPv4, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, DHCP Option 66/67/82, LLDP, Flow Control, Back Pressure Flow Control, SNMP Inform, Port Mirror, Syslog

**Filter:** IGMPv1/v2/v3, GMRP, GVRP, 802.1Q, Q-in-Q VLAN

**Redundancy Protocols:** STP/RSTP, MSTP, Turbo Ring v1/v2, Turbo Chain, Link Aggregation, VRRP

**Security:** RADIUS, TACACS+, SSL, SSH, Port Lock, Broadcast Storm Protection, Access Control Lists

**Unicast Routing:** Static routing, RIP V1/V2, OSPF

**Multicast Routing:** DVMRP and PIM-DM

**Time Management:** SNTP, NTP Server/Client, IEEE 1588v2 PTP

**Industrial Protocols:** EtherNet/IP, Modbus/TCP

**MIB:** MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Groups 1, 2, 3, 9

**Power Substation:** IEC 61850 QoS

**Switch Properties**

**Priority Queues:** 4

**Max. Number of VLANs:** 64

**VLAN ID Range:** VID 1 to 4094

**IGMP Groups:** 256

**Interface**

**Fast Ethernet:** Slots 1, 2, and 3 for combinations of 2, 4, 6, or 8-port PM-7200 Fast Ethernet modules with 10/100BaseT(X) (TP/M12 interface), 100BaseFX (SC/ST/MTRJ connector), or 100BaseSFP

**Gigabit Ethernet:** Slot 4 for 2 or 4-port PM-7200 Gigabit Ethernet combo module, 10/100/1000BaseT(X) or 1000BaseSFP

**Console Port:** RS-232 (RJ45)

**Alarm Contact:** 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

**Power Requirements**

**Input Voltage:**

- 24 VDC
- 48 VDC
- 110/220 VDC/VAC

**Operating Voltage:**

- 18 to 36 V (24 VDC)
- 36 to 72 V (48 VDC)
- 88 to 300 VDC, 85 to 264 VAC (110/220 VDC/VAC)

**Input Current:** (all ports are equipped with fiber)

- Max. 2.38 A @ 24 VDC
- Max. 1.12 A @ 48 VDC
- Max. 0.59/0.30 A @ 110/220 VDC
- Max. 0.49/0.26 A @ 110/220 VAC

**Overload Current Protection:** Present

**Connection:** 10-pin terminal block

**Reverse Polarity Protection:** Present

**Physical Characteristics**

**Housing:** Aluminum alloy

**IP Rating:** IP30 protection

**Dimensions:** 440 x 44 x 325 mm (17.32 x 1.73 x 12.80 in)

**Weight:** 5900 g (13.11 lb)

**Installation:** 19-inch rack mounting

**Environmental Limits**

**Operating Temperature:** -40 to 85°C (-40 to 185°F), cold start requires min. of 100 VAC at -40°C

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

**Ambient Relative Humidity:** 5 to 95% (non-condensing)

**Standards and Certifications**

**Safety:** UL 60950-1

**EMI:** FCC Part 15 Subpart B Class A, EN 55032 Class A

**EMS:**

IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV

IEC 61000-4-3 RS: 80 MHz to 1 GHz: 35 V/m

IEC 61000-4-4 EFT: Power: 4 kV; Signal: 4 kV

IEC 61000-4-5 Surge: Power: 4 kV; Signal: 4 kV

IEC 61000-4-6 CS: 10 V

IEC 61000-4-8

IEC 61000-4-11

**Electrical Substation:** IEC 61850-3, IEEE 1613

**Rail Traffic:** EN 50155\*, EN 50121-4

\*Complies with a portion of EN 50155 specifications. Please contact Moxa or a Moxa distributor for details.

Note: Check Moxa's website for the most up-to-date certification status.

**Transportation:** NEMA TS2

**MTBF (mean time between failures)**

**Time:** 393,828 hrs

**Standard:** Telcordia SR332

**Warranty**

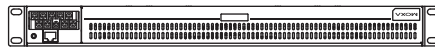
**Warranty Period:** 5 years

**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

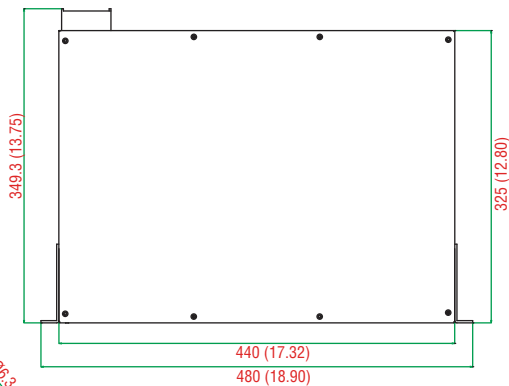
**Dimensions**

Unit: mm (inch)

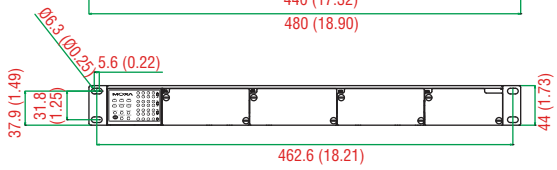
Rear View



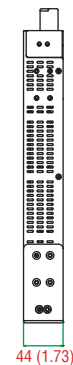
Top View



Front View



Side View



## Ordering Information

Step 1: Select Ethernet switch system

Step 2: Select interface modules

PT-7828 with power supply



PM-7200 module  
(Gigabit or Fast Ethernet)

Note: The PT-7828 Ethernet switch system is delivered without interface modules. See the PM-7200/7500 Series datasheet to choose PM-7200 interface modules.

### PT-7828 Layer 3 Modular Rackmount Ethernet Switch System

The PT-7828 switch system consists of 16 Layer 3 modular managed rackmount Ethernet switch systems, each with 3 slots for Fast Ethernet modules, and 1 slot for a Gigabit Ethernet module. A total of 28 or 24+4G ports can be installed, and the switch can be used in temperatures ranging from -40 to 85°C.

Available Models		Power Supply					
Front Cabling, Front Display	Rear Cabling, Front Display	Isolated Power Supply 1			Isolated Power Supply 2		
		24 VDC	48 VDC	HV: 110/220 VDC/VAC	24 VDC	48 VDC	HV: 110/220 VDC/VAC
PT-7828-F-24	PT-7828-R-24	1	-	-	-	-	-
PT-7828-F-24-24	PT-7828-R-24-24	1	-	-	1	-	-
PT-7828-F-24-HV	PT-7828-R-24-HV	1	-	-	-	-	1
PT-7828-F-48	PT-7828-R-48	-	1	-	-	-	-
PT-7828-F-48-48	PT-7828-R-48-48	-	1	-	-	1	-
PT-7828-F-48-HV	PT-7828-R-48-HV	-	1	-	-	-	1
PT-7828-F-HV	PT-7828-R-HV	-	-	1	-	-	-
PT-7828-F-HV-HV	PT-7828-R-HV-HV	-	-	1	-	-	1

Note: The PT-7828 Layer 3 Ethernet switch systems provide combinations of 1 slot for a Gigabit Ethernet interface module, 3 slots for Fast Ethernet interface modules. See the PM-7200/7500 Series datasheet to select PM-7200 Gigabit Ethernet and Fast Ethernet interface modules for your own application.

PT-7828-F series  
(Front Cabling, Front Display)



PT-7828-R series  
(Rear Cabling, Front Display)



### Gigabit/Fast Ethernet Modules for the PT-7828

	Interface Modules																							
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MISC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-8SFP	PM-7200-4M12	PM-7200-8MTRJ	PM-7200-4TX-PTP	PM-7200-4MST-PTP	PM-7200-4MSC-PTP	PM-7200-16NG2MST-PTP
Slot 1	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Slot 2	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Slot 3	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Slot 4	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

### Optional Accessories (can be purchased separately)

**MXview:** Moxa industrial network management software with 50, 100, 250, 500, 1000, or 2000 nodes

**EDS-SNMP OPC Server Pro:** OPC server software that works with all SNMP devices

**ABC-01 Series:** Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

### Package Checklist

- PT-7828 switch
- Serial Cable: CN20070
- Protective caps for unused ports
- 2 rackmount ears
- Documentation and software CD
- Hardware installation guide
- Warranty card

# PM-7200/7500 Series

*Gigabit and Fast Ethernet modules for PT series rackmount Ethernet switches*

## Specifications

### Gigabit Ethernet Interface Modules, PM-7200/7500-2G/4G Series



#### Interface

**RJ45 Ports:** 10/100/1000BaseT(X) auto negotiation speed, and auto MDI/MDI-X connection

**Fiber Ports:** 1000BaseSFP slots

**Note:** The PM-7200/7500-2G/4G series Gigabit Ethernet combo modules support 2 or 4 SFP slots. See the SFP-1G datasheet to select the SFP-1G series Gigabit Ethernet modules for your application.

See the Moxa Ethernet SFP Transceiver Product Compatibility Matrix datasheet (at the end of this document) for more information.

### Fast Ethernet Interface Modules, PM-7200/7500 Series



\*Note: See the SFP-1FE datasheet to select SFP-1FE series Fast Ethernet modules for your application.

### Interface

**RJ45 Ports:** 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection

**Fiber Ports:** 100BaseFX ports (SC/ST/MTRJ or SFP LC connector)

**M12 Ports:** 10/100BaseT(X) auto negotiation speed, and auto MDI/MDI-X connection

**BNC Ports:** Time clock signal PPS (pulses per second) output for IEEE 1588 time synchronization

### Optical Fiber

		100BaseFX		
		Multi-Mode		Single-Mode
Fiber Cable Type		OM1	50/125 $\mu$ m 800 MHz*km	G.652
Typical Distance		4 km	5 km	40 km
Wave-length	Typical (nm)	1300		1310
	TX Range (nm)	1260 to 1360		1280 to 1340
	RX Range (nm)	1100 to 1600		1100 to 1600
Optical Power	TX Range (dBm)	-10 to -20		0 to -5
	RX Range (dBm)	-3 to -32		-3 to -34
	Link Budget (dB)	12		29
	Dispersion Penalty (dB)	3		1

Note: When connecting a single-mode fiber transceiver, we recommend using an attenuator to prevent damage caused by excessive optical power. Note: Compute the "typical distance" of a specific fiber transceiver as follows: Link budget (dB) > dispersion penalty (dB) + total link loss (dB).

## Ordering Information

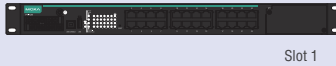
### Rackmount Ethernet Switch System and Interface Module Compatibility Chart

#### Modular Rackmount Ethernet Switch System:

PT-7828/PT-7728-PTP/  
PT-7728



PT-7528-24TX



PT-7710



		IEEE 1588 Interface Modules						Interface Modules																						
		PM-7200-4TX-PTP	PM-7200-4MSC-PTP	PM-7200-4MST-PTP	PM-7200-1BNC2MST-PTP	PM-7200-4GTX-PHR-PTP	PM-7200-4GTFP-PHR-PTP	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7500-2GTXSFP	PM-7500-4GTXSFP	PM-7200-1MSC/2MSC	PM-7200-1MST/2MST	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-8SFP*	PM-7200-4M12	PM-7200-8MTRJ	PM-7500-2MSC/4MSC	PM-7500-2MST/4MST	PM-7500-2SSC/4SSC
PT-7828 PT-7728	Slots 1 to 3	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
	Slot 4	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PT-7728-PTP	Slots 1 to 3	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
	Slot 4	-	-	-	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PT-7528-24TX	Slot 1	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
PT-7710	Slot 1	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
	Slot 2	-	-	-	-	-	-	✓	-	-	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*Note: See the SFP-1FE datasheet to select SFP-1FE series Fast Ethernet modules for your application.

### Gigabit Ethernet Modules, PM-7200/7500-2G/4G Series

Available Models	Port Interface	
	Combo Port, 10/100/1000BaseT(X) or 1000BaseSFP*	
PM-7200-2GTXSFP	2	
PM-7200-4GTXSFP	4	
PM-7500-2GTXSFP	2	
PM-7500-4GTXSFP	4	

\*The PM-7200/7500-2G/4G series Gigabit Ethernet combo modules support 2 or 4 SFP slots.

### Gigabit PRP/HSR Ethernet Modules, PM-7200-PHR-PTP Series:

Available Models	Port Interface			
	100/1000BaseT(X) (supports PRP/HSR)	100/1000BaseSFP (supports PRP/HSR)	10/100/1000BaseT(X)	100/1000BaseSFP
PM-7200-4GTX-PHR-PTP	2	–	2	–
PM-7200-4GSFP-PHR-PTP	–	2	–	2

### Fast Ethernet Modules, PM-7200/7500 Series

Available Models	Port Interface									
	10/100BaseT(X)		10BaseFX	100BaseFX					100BaseSFP	PPS output, BNC connector
	TP	M12	Multi-mode, ST Connector	Multi-mode, SC Connector	Multi-mode, ST Connector	Multi-mode, MTRJ Connector	Single-mode, SC Connector	Single-mode, SC Connector, 80 km		
PM-7200-8TX	8	–	–	–	–	–	–	–	–	–
PM-7200-6MSC	–	–	–	6	–	–	–	–	–	–
PM-7200-6MST	–	–	–	–	6	–	–	–	–	–
PM-7200-6SSC	–	–	–	–	–	–	6	–	–	–
PM-7200-4MSC2TX	2	–	–	4	–	–	–	–	–	–
PM-7200-4MST2TX	2	–	–	–	4	–	–	–	–	–
PM-7200-4SSC2TX	2	–	–	–	–	–	4	–	–	–
PM-7200-2MSC4TX	4	–	–	2	–	–	–	–	–	–
PM-7200-2MST4TX	4	–	–	–	2	–	–	–	–	–
PM-7200-2SSC4TX	4	–	–	–	–	–	2	–	–	–
PM-7200-2MSC	–	–	–	2	–	–	–	–	–	–
PM-7200-2MST	–	–	–	–	2	–	–	–	–	–
PM-7200-2SSC	–	–	–	–	–	–	2	–	–	–
PM-7200-1MSC	–	–	–	1	–	–	–	–	–	–
PM-7200-1MST	–	–	–	–	1	–	–	–	–	–
PM-7200-8SFP*	–	–	–	–	–	–	–	–	8	–
PM-7200-4M12	–	4	–	–	–	–	–	–	–	–
PM-7200-8MTRJ	–	–	–	–	–	8	–	–	–	–
PM-7200-4TX-PTP	4	–	–	–	–	–	–	–	–	–
PM-7200-4MSC-PTP	–	–	–	4	–	–	–	–	–	–
PM-7200-4MST-PTP	–	–	–	–	4	–	–	–	–	–
PM-7200-1BNC2MST-PTP	–	–	–	–	2	–	–	–	–	1
PM-7500-2MSC	–	–	–	2	–	–	–	–	–	–
PM-7500-2MST	–	–	–	–	2	–	–	–	–	–
PM-7500-2SSC	–	–	–	–	–	–	2	–	–	–
PM-7500-4MSC	–	–	–	4	–	–	–	–	–	–
PM-7500-4MST	–	–	–	–	4	–	–	–	–	–
PM-7500-4SSC	–	–	–	–	–	–	4	–	–	–

\*Note: See the SFP-1FE datasheet to select SFP-1FE series Fast Ethernet modules for your application.

#### Package Checklist

- PM-7200/7500 interface modules
- Warranty card



# SFP-1G Series

## 1-port Gigabit Ethernet SFP modules



- > Digital Diagnostic Monitor Function
- > -40 to 85°C operating temperature range (T models)
- > IEEE 802.3z compliant
- > Differential LVPECL inputs and outputs
- > TTL signal detect indicator
- > Hot pluggable LC duplex connector
- > Class 1 laser product, complies with EN 60825-1



### Specifications

#### Interface

Ethernet Ports: 1

Connectors: Duplex LC Connector or Simplex LC Connector (WDM-type only)

#### Optical Fiber

		Gigabit Ethernet SFP									
		SFP-SX		SFP-LSX		SFP-LX	SFP-LH	SFP-LHX	SFP-ZX	SFP-EZX	SFP-EZX-120
Transceiver Type		Multi-Mode		Multi-Mode		Single-Mode	Single-Mode	Single-Mode	Single-Mode	Single-Mode	Single-Mode
Fiber Cable Type		OM1	OM2	OM2	OM1	G.652	G.652	G.652	G.652	G.652	G.652
Typical Distance		300 m	550 m	1 km	2 km	10 km	30 km	40 km	80 km	110 km	120 km
Wave-length	Typical (nm)	850		1310		1310	1310	1310	1550	1550	1550
	TX Range (nm)	830 to 860		1270 to 1355		1280 to 1355	1280 to 1355	1280 to 1340	1530 to 1570	1530 to 1570	1530 to 1570
	RX Range (nm)	770 to 860		1260 to 1610		1260 to 1610	1260 to 1610	1260 to 1610	1260 to 1610	1260 to 1610	1100 to 1600
Optical Power	TX Range (dBm)	-4 to -9.5		-1 to -9		-3 to -9	-3 to -8	+3 to -4	+5 to 0	+5 to 0	+3 to -2
	RX Range (dBm)	0 to -18		-1 to -19		-3 to -21	-3 to -23	-1 to -24	-1 to -24	-9 to -30	-8 to -33
	Link Budget (dB)	8.5		10		12	15	20	24	30	31
	Dispersion Penalty (dB)	4.3	3.6	5	5	2	1	1	1	1	2

Note: When connecting the SFP-LHX, ZX, EZX, or EZX-120, we recommended using an attenuator to prevent the transceiver from being damaged by excessive optical power.

		WDM Gigabit Ethernet SFP							
		SFP-10A		SFP-10B		SFP-20B		SFP-40B	
Transceiver Type		Single-Mode		Single-Mode		Single-Mode		Single-Mode	
Fiber Cable Type		G.652		G.652		G.652		G.652	
Typical Distance		10 km		20 km		40 km		40 km	
Wave-length	Typical (nm)	TX 1310, RX 1550	TX 1550, RX 1310	TX 1310, RX 1550	TX 1550, RX 1310	TX 1310, RX 1550	TX 1550, RX 1310	TX 1310, RX 1550	TX 1550, RX 1310
	TX Range (nm)	1270 to 1355		1530 to 1570		1270 to 1355		1530 to 1570	
	RX Range (nm)	1480 to 1580		1260 to 1360		1480 to 1580		1260 to 1360	
Optical Power	TX Range (dBm)	-3 to -9		-2 to -8		-2 to -8		+2 to -3	
	RX Range (dBm)	-3 to -21		-2 to -23		-2 to -23		-1 to -23	
	Link Budget (dB)	12		15		15		20	
	Dispersion Penalty (dB)	2		3		3		1	

Note: WDM-type SFP modules must be used in pairs (e.g., SFP-1G10ALC and SFP-1G10BLC)

Note: When connecting the SFP-40A and 40B, we recommend using an attenuator to prevent damage caused by excessive optical power.

**Typical Distance:** To reach the typical distance of specified fiber transceiver, please refer to formula: Link budget(dB) > dispersion penalty(dB) + total link loss(dB).

### Power Requirements

Power Consumption: Max. 1 W

### Environmental Limits

Operating Temperature:

Standard Models: 0 to 60°C (32 to 140°F)

Wide Temp. Models: -40 to 85°C (-40 to 185°F)

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

Ambient Relative Humidity: 5 to 95% (non-condensing)

### Standards and Certifications

Safety: CE, FCC, TÜV (EN 60825), UL 60950-1

Marine: DNV, GL

### Warranty

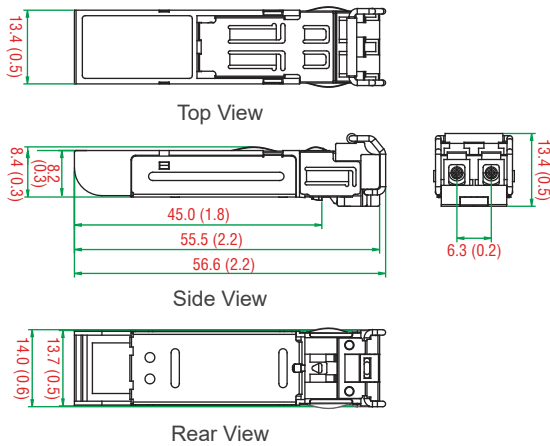
Warranty Period: 5 years

Details: See [www.moxa.com/warranty](http://www.moxa.com/warranty)

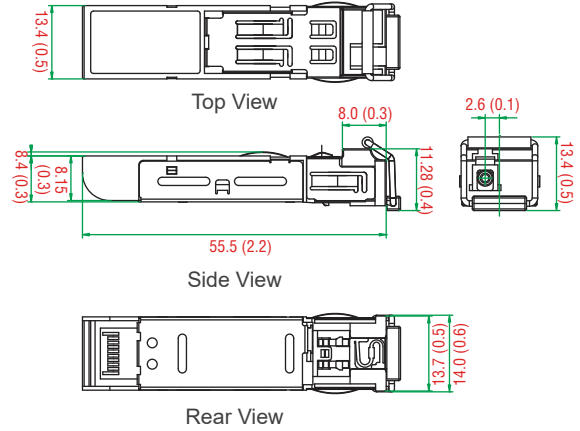
### Dimensions

Unit: mm (inch)

#### SFP-1G Series



#### SFP-1G Series (WDM Type)



## Ordering Information

Gigabit Ethernet SFP Models				WDM Gigabit Ethernet SFP Models			
Standard Temperature Models (0 to 60°C)	Wide Temperature Models (-40 to 85°C)	Transceiver Type	Typical Distance	Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 85°C)	Transceiver Type	Typical Distance
SFP-1GSXLC	SFP-1GSXLC-T	Multi-Mode	300/550 m	SFP-1G10ALC	SFP-1G10ALC-T	Single-Mode	10 km
SFP-1GLSXLC	SFP-1GLSXLC-T	Multi-Mode	1/2 km	SFP-1G10BLC	SFP-1G10BLC-T	Single-Mode	10 km
SFP-1GLXLC	SFP-1GLXLC-T	Single-Mode	10 km	SFP-1G20ALC	SFP-1G20ALC-T	Single-Mode	20 km
SFP-1GLHLC	SFP-1GLHLC-T	Single-Mode	30 km	SFP-1G20BLC	SFP-1G20BLC-T	Single-Mode	20 km
SFP-1GLHXLC	SFP-1GLHXLC-T	Single-Mode	40 km	SFP-1G40ALC	SFP-1G40ALC-T	Single-Mode	40 km
SFP-1GZXLC	SFP-1GZXLC-T	Single-Mode	80 km	SFP-1G40BLC	SFP-1G40BLC-T	Single-Mode	40 km
SFP-1GEZXLC	-	Single-Mode	110 km	-	-	-	-
SFP-1GEZXLC-120	-	Single-Mode	120 km	-	-	-	-

#### Package Checklist

- SFP-1G module
- Warranty card



# SFP-1FE Series

## 1-port Fast Ethernet SFP modules



- > Digital Diagnostic Monitor Function
- > IEEE 802.3u compliant
- > Differential PECL inputs and outputs
- > TTL signal detect indicator
- > Hot pluggable LC duplex connector
- > Class 1 laser product; complies with EN 60825-1



### Specifications

#### Interface

Ethernet Ports: 1

Connectors: Duplex LC Connector

#### Optical Fiber

	Fast Ethernet SFP			
	SFP-M		SFP-S	SFP-L
Transceiver Type	Multi-Mode		Single-Mode	
Fiber Cable Type	OM1/OM2	62.5/125, 50/125 μm	G.652	G.652
		800 MHz* km		
Typical Distance	2 km	4 km	40 km	80 km
Wave-length	Typical (nm)	1310	1310	1550
	TX Range (nm)	1280 to 1340	1280 to 1340	1530 to 1570
	RX Range (nm)	1100 to 1650	1100 to 1600	1100 to 1600
Optical Power	TX Range (dBm)	-8 to -18	0 to -5	0 to -5
	RX Range (dBm)	-3 to -32	-3 to -34	-3 to -34
	Link Budget (dB)	14	29	29
	Dispersion Penalty (dB)	2	3	1

Note: When connecting the SFP-S or L, we recommend using an attenuator to prevent damage caused by excessive optical power.

#### Power Requirements

Power Consumption: Max. 1 W

#### Environmental Limits

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

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

Ambient Relative Humidity: 5 to 95% (non-condensing)

#### Standards and Certifications

Safety: CE, FCC, TÜV, UL 60950-1

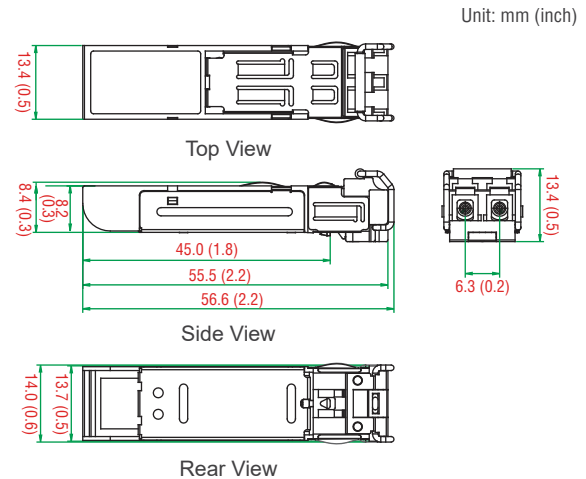
Marine: DNV, GL

#### Warranty

Warranty Period: 5 years

Details: See [www.moxa.com/warranty](http://www.moxa.com/warranty)

#### Dimensions



### Ordering Information

Available Models	Port Interface		
	100BaseFX, Multi-Mode, LC Connector, 4 km	100BaseFX, Single-Mode, LC Connector, 40 km	100BaseFX, Single-Mode, LC Connector, 80 km
SFP-1FEMLC-T	1	-	-
SFP-1FESLC-T	-	1	-
SFP-1FELLC-T	-	-	1

#### Package Checklist

- SFP-1FE module
- Warranty card