

PT-7528 Series

IEC 61850-3 28-port Layer 2 managed rackmount Ethernet switches



- > IEC 61850-3, IEEE 1613 (power substations) compliant
- > Built-in MMS server based on IEC 61850-90-4 switch data modeling for Power SCADA
- > Noise Guard™ wire speed zero packet loss technology
- > Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy
- > Isolated redundant power supplies with universal 24/48 VDC or 110/220 VDC/VAC power supply range
- > -40 to 85°C operating temperature range



Introduction

The PT-7528 Series is designed for power substation automation applications that operate in extremely harsh environments. The PT-7528 Series supports Moxa's Noise Guard technology, is compliant with IEC 61850-3, and its EMC immunity exceeds IEEE 1613 Class 2 standards to ensure zero packet loss while transmitting at wire speed. The PT-7528 Series also features critical packet prioritization (GOOSE, SMVs, and PTP), a built-in MMS server, and a configuration wizard designed specifically for substation automation. With Gigabit Ethernet,

redundant ring, and 110/220 VDC/VAC isolated redundant power supplies, the PT-7528 Series further increases the reliability of your communications and saves cabling/wiring costs. The wide range of PT-7528 models available support multiple types of port configuration, with up to 28 copper or 24 fiber ports, and with up to 4 Gigabit ports. Taken together, these features allow greater flexibility, making the PT-7528 suitable for a variety of industrial applications.

Features and Benefits

- Built-in MMS server for integration with power SCADA systems
- Switch data modeling based on the IEC 61850-90-4 standard
- Fiber Check™ provides monitoring and diagnosis functions on MST/MSC/SSC/SFP fiber ports
- Noise Guard™ provides a high level of EMC immunity for critical applications, exceeding IEEE 1613 Class 2
- Software-based IEEE 1588v2 PTP (Precision Time Protocol) for time synchronization of networks
- VLAN Unaware: Supports priority-tagged frames to be received by specific IEDs
- 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
- 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
- Multiport 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-02 automatic backup configurator

Cybersecurity Features

- User passwords with multiple levels of security to 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 for Spanning Tree Protocol / MAC bridges
 IEEE 802.1w for Rapid Spanning Tree Protocol
 IEEE 802.1s for Multiple Spanning Tree Protocol
 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/IPv6, SNMPv1/v2c/v3, DHCP Server/ Client, BootP, TFTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, DHCP Option 66/67/82, LLDP, Flow Control, Back Pressure, SNMP Inform, Port Mirror, Fiber Check, Syslog
Filter: IGMPv1/v2, GMRP, GVRP, 802.1Q VLAN, VLAN Unaware, Port-Based VLAN, GVRP

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

Security: RADIUS, TACACS+, SSL, SSH, Port Lock, Broadcast Storm Protection, Rate Limit

Time Management: SNTP, NTP Server/Client, IEEE 1588v2 PTP (software-based)

Industrial Protocols: EtherNet/IP, Modbus/TCP

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

Power Substation: MMS, IEC 61850 QoS, Configuration Wizard

Switch Properties

Priority Queues: 4

Max. Number of VLANs: 256

VLAN ID Range: VID 1 to 4094

IGMP Groups: 256

Jumbo Frame Size: 9728 bytes

Switching Capacity: 12.8 Gbps

Forwarding Capacity: 12.8 Gbps

Interface

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

Fiber Ports: 100/1000BaseSFP slot, 100BaseFX Multi-mode ST/SC Connector

Console Port: USB console port (Type B connector)

Storage Port: USB storage port (Type A connector)

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

Optical Fiber

	100BaseFX		
	Multi-mode	Single-mode	Single-mode, 80 km
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km ^a 4 km ^b	40 km ^c	80 km ^d
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 μ m, 800 MHz*km fiber optic cable
 b. 62.5/125 μ m, 500 MHz*km fiber optic cable
 c. 9/125 μ m single-mode fiber optic cable
 d. 9/125 μ m single-mode fiber optic cable (80 km)

Power Requirements

Input Voltage:

- WV: 24/48 VDC
- HV: 110/220 VDC/VAC

Operating Voltage:

- WV: 18 to 72 V
- HV: 88 to 300 VDC and 85 to 264 VAC

Input Current: For models with fewer than 8 fiber ports:

- Max. 0.741 A @ 24 VDC
- Max. 0.364 A @ 48 VDC
- Max. 0.147/0.077 A @ 110/220 VDC
- Max. 0.283/0.19 A @ 110/220 VAC

For models with 8 or more fiber ports:

- Max. 1.428 A @ 24 VDC
- Max. 0.735 A @ 48 VDC
- Max. 0.313/0.167 A @ 110/220 VDC
- Max. 0.586/0.382 A @ 110/220 VAC

Overload Current Protection: Present

Connection: 10-pin terminal block

Reverse Polarity Protection: Present

Physical Characteristics

Housing: Aluminum alloy

IP Rating: IP40 protection (based on IEC 60529)

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

Weight: 4900 g (10.89 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 508

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 Class 2 (models with MGS and SSC fiber ports are compliant with IEEE 1613 Class 1)

Rail Traffic: EN 50121-4

Transportation: NEMA TS2

MTBF (mean time between failures)

Time: 422,912 hrs

Standard: Telcordia TR/SR

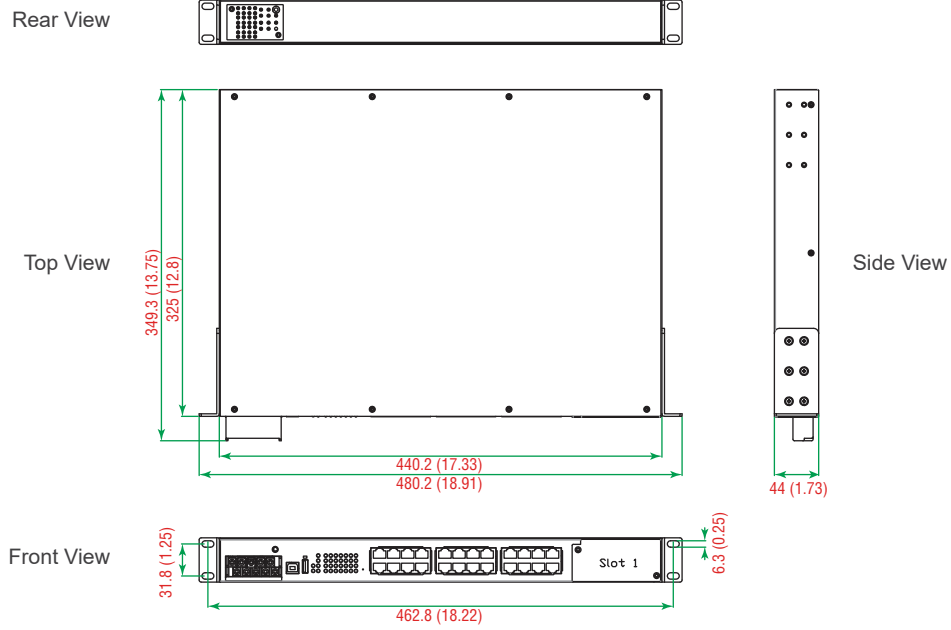
Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)



Ordering Information

Available Models	Port Interface						Power Supply			
	Gigabit Ethernet	Fast Ethernet				Slot for PM-7500 Series	Isolated Power Supply 1		Isolated Power Supply 2	
		1000BaseX SFP Slot	100BaseFX Multi-mode, ST Connector	100BaseFX Multi-mode, SC Connector	100BaseFX Single-mode, SC Connector		10/100BaseT(X) RJ45	WV: 24/48 VDC	HV: 110/220 VDC/VAC	WV: 24/48 VDC
PT-7528-24TX-WV	-	-	-	-	24	1	✓	-	-	-
PT-7528-24TX-HV	-	-	-	-	24	1	-	✓	-	-
PT-7528-24TX-WV-WV	-	-	-	-	24	1	✓	-	✓	-
PT-7528-24TX-WV-HV	-	-	-	-	24	1	✓	-	-	✓
PT-7528-24TX-HV-HV	-	-	-	-	24	1	-	✓	-	✓
PT-7528-8MST-16TX-4GSFP-WV	4	8	-	-	16	-	✓	-	-	-
PT-7528-8MST-16TX-4GSFP-WV-WV	4	8	-	-	16	-	✓	-	✓	-
PT-7528-8MST-16TX-4GSFP-HV	4	8	-	-	16	-	-	✓	-	-
PT-7528-8MST-16TX-4GSFP-HV-HV	4	8	-	-	16	-	-	✓	-	✓
PT-7528-12MST-12TX-4GSFP-WV	4	12	-	-	12	-	✓	-	-	-
PT-7528-12MST-12TX-4GSFP-WV-WV	4	12	-	-	12	-	✓	-	✓	-
PT-7528-12MST-12TX-4GSFP-HV	4	12	-	-	12	-	-	✓	-	-
PT-7528-12MST-12TX-4GSFP-HV-HV	4	12	-	-	12	-	-	✓	-	✓
PT-7528-16MST-8TX-4GSFP-WV	4	16	-	-	8	-	✓	-	-	-
PT-7528-16MST-8TX-4GSFP-WV-WV	4	16	-	-	8	-	✓	-	✓	-
PT-7528-16MST-8TX-4GSFP-HV	4	16	-	-	8	-	-	✓	-	-
PT-7528-16MST-8TX-4GSFP-HV-HV	4	16	-	-	8	-	-	-	-	✓
PT-7528-20MST-4TX-4GSFP-WV	4	20	-	-	4	-	✓	-	-	-
PT-7528-20MST-4TX-4GSFP-WV-WV	4	20	-	-	4	-	✓	-	✓	-
PT-7528-20MST-4TX-4GSFP-HV	4	20	-	-	4	-	-	✓	-	-
PT-7528-20MST-4TX-4GSFP-HV-HV	4	20	-	-	4	-	-	✓	-	✓
PT-7528-8MSC-16TX-4GSFP-WV	4	-	8	-	16	-	✓	-	-	-
PT-7528-8MSC-16TX-4GSFP-WV-WV	4	-	8	-	16	-	✓	-	✓	-

Available Models Rackmount, Front Cabling, Front & Rear Display	Port Interface						Power Supply			
	Gigabit Ethernet 1000BaseX SFP Slot	Fast Ethernet				Slot for PM-7500 Series	Isolated Power Supply 1		Isolated Power Supply 2	
		100BaseFX Multi-mode, ST Connector	100BaseFX Multi-mode, SC Connector	100BaseFX Single-mode, SC Connector	10/100BaseT(X) RJ45		WV: 24/48 VDC	HV: 110/220 VDC/VAC	WV: 24/48 VDC	HV: 110/220 VDC/VAC
PT-7528-8MSC-16TX-4GSFP-HV	4	–	8	–	16	–	–	✓	–	–
PT-7528-8MSC-16TX-4GSFP-HV-HV	4	–	8	–	16	–	–	✓	–	✓
PT-7528-12MSC-12TX-4GSFP-WV	4	–	12	–	12	–	✓	–	–	–
PT-7528-12MSC-12TX-4GSFP-WV-WV	4	–	12	–	12	–	✓	–	✓	–
PT-7528-12MSC-12TX-4GSFP-HV	4	–	12	–	12	–	–	✓	–	–
PT-7528-12MSC-12TX-4GSFP-HV-HV	4	–	12	–	12	–	–	✓	–	✓
PT-7528-16MSC-8TX-4GSFP-WV	4	–	16	–	8	–	✓	–	–	–
PT-7528-16MSC-8TX-4GSFP-WV-WV	4	–	16	–	8	–	✓	–	✓	–
PT-7528-16MSC-8TX-4GSFP-HV	4	–	16	–	8	–	–	✓	–	–
PT-7528-16MSC-8TX-4GSFP-HV-HV	4	–	16	–	8	–	–	✓	–	✓
PT-7528-20MSC-4TX-4GSFP-WV	4	–	20	–	4	–	✓	–	–	–
PT-7528-20MSC-4TX-4GSFP-WV-WV	4	–	20	–	4	–	✓	–	✓	–
PT-7528-20MSC-4TX-4GSFP-HV	4	–	20	–	4	–	–	✓	–	–
PT-7528-20MSC-4TX-4GSFP-HV-HV	4	–	20	–	4	–	–	✓	–	✓
PT-7528-8SSC-16TX-4GSFP-WV-WV	4	–	–	8	16	–	✓	–	✓	–
PT-7528-8SSC-16TX-4GSFP-HV-HV	4	–	–	8	16	–	–	✓	–	✓

Note:
 PT-7528-24TX high density copper port models have a slot reserved for PM-7500 series modules for fiber and gigabit extension. A selection table of PM-7500 interface modules is included towards the end of this datasheet.
 Models with mixed WV and HV power and models with mixed Multi-mode and Single-mode fiber are available by request on a project basis.
 See the Moxa Ethernet SFP Transceiver Product Compatibility Matrix datasheet (at the end of this document) for more information.

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-02 Series:** Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

Package Checklist

- PT-7528 switch
- USB Cable: CBL-USBA/B-100
- 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 μ 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

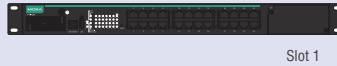
Rackmount Ethernet Switch System and Interface Module Compatibility Chart

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)		1310		1310	1310	1310	1550	1550	1550
	TX Range (nm)		1270 to 1355		1280 to 1355	1280 to 1355	1280 to 1340	1530 to 1570	1530 to 1570	1530 to 1570
	RX Range (nm)		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)		-1 to -9		-3 to -9	-3 to -8	+3 to -4	+5 to 0	+5 to 0	+3 to -2
	RX Range (dBm)		-1 to -19		-3 to -21	-3 to -23	-1 to -24	-1 to -24	-9 to -30	-8 to -33
	Link Budget (dB)		10		12	15	20	24	30	31
	Dispersion Penalty (dB)		4.3	3.6	5	5	2	1	1	1

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-20A	SFP-20B	SFP-40A	SFP-40B	
Transceiver Type	Single-Mode			Single-Mode		Single-Mode		
Fiber Cable Type	G.652			G.652		G.652		
Typical Distance	10 km			20 km		40 km		
Wave-length	Typical (nm)		TX 1550, RX 1310		TX 1550, RX 1310		TX 1550, RX 1310	
	TX Range (nm)		1530 to 1570		1530 to 1570		1290 to 1330	
	RX Range (nm)		1260 to 1360		1480 to 1580		1480 to 1580	
Optical Power	TX Range (dBm)		-3 to -9		-2 to -8		+2 to -3	
	RX Range (dBm)		-3 to -21		-2 to -23		-1 to -23	
	Link Budget (dB)		12		15		20	
	Dispersion Penalty (dB)		2		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

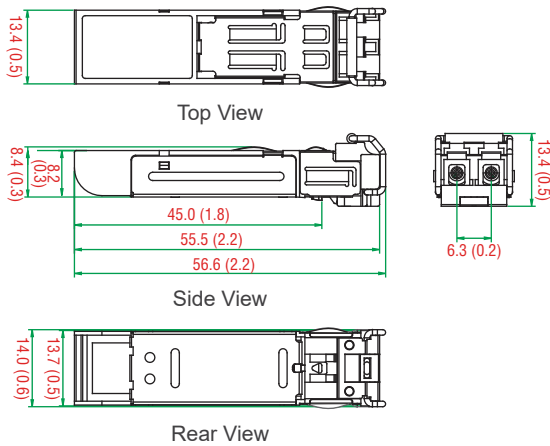
Warranty Period: 5 years

Details: See www.moxa.com/warranty

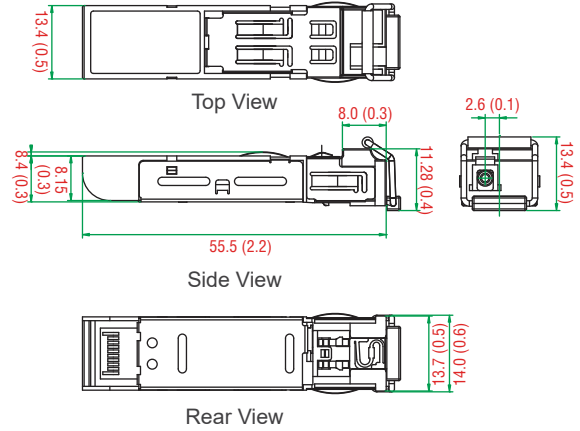
Dimensions

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)	Tranceiver Type	Typical Distance	Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 85°C)	Tranceiver 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 μ m	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

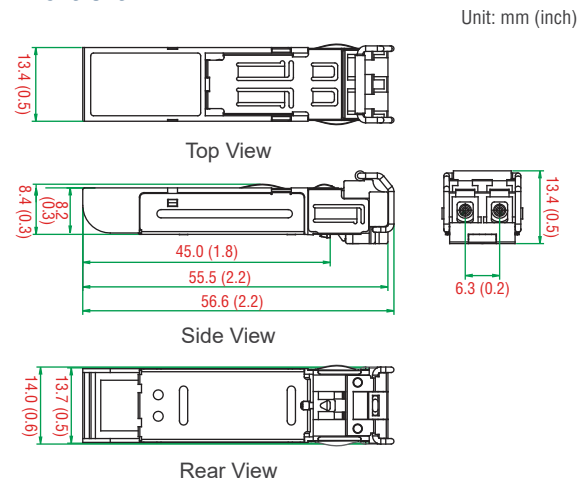
Marine: DNV, GL

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

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

Moxa Ethernet SFP Transceiver Product Compatibility Matrix

Refer to the product compatibility matrix below to determine which SFP modules are compatible with which product models. For more specification information about an SFP module, please refer to the module's datasheet.

Model	SFP-1GE Series	SFP-1G Series	SFP-1G Copper Series	SFP-10G Series
Industrial 10Gb Core Switches				
ICS-G7850A/G7852A Series	–	✓	✓	✓
ICS-G7750A/G7752A Series	–	✓	✓	✓
ICS-G7826A/G7828A Series	✓	✓	✓	✓
ICS-G7526A/G7528A Series	✓	✓	✓	✓
IM-G7000A-4GSFP	✓	✓	✓	–
Rackmount Ethernet Switches				
IKS-G6524A/G6824A Series	✓	✓	✓	–
IKS-6726A/6728A Series	✓	✓	–	–
IKS-6728A-8PoE Series	✓	✓	–	–
IM-6700A-8SFP	✓	–	–	–
DIN-Rail Ethernet Switches				
EDS-611/619 Series	✓	✓	–	–
EDS-G516E Series	✓	✓	✓	–
EDS-G512E Series	✓	✓	✓	–
EDS-G509 Series	✓	✓	–	–
EDS-518E/528E Series	✓	✓	–	–
EDS-510E Series	✓	✓	–	–
EDS-518A Series	–	✓	–	–
EDS-510A Series	–	✓	–	–
EDS-G308-2SFP Series	✓	✓	✓	–
EDS-G205-1GTXSFP Series	✓	✓	–	–
EDS-210A Series	✓	✓	✓	–
IM-2GSFP	–	✓	–	–
Industrial Secure Router				
EDR-G903/G902 Series	✓	✓	–	–
EDR-810 Series	–	✓	✓	–
Industrial PoE Switches				
EDS-G512E-8PoE Series	✓	✓	✓	–
EDS-P510A-8PoE Series	✓	✓	–	–
EDS-P510 Series	✓	✓	–	–
EDS-G205A-4PoE Series	✓	✓	–	–

Model	SFP-1FE Series	SFP-1G Series	SFP-1G Copper Series	SFP-10G Series
IEC61850-3 Ethernet Switches				
PT-G7509 Series	✓	✓	–	–
PT-7528 FX Series	–	✓	✓	–
PT-G503	✓	✓	–	–
PM-7200-4GSFP-PRP-HSR	✓	✓	–	–
PT-G7728	✓	✓	*✓	–
PT-G7828	✓	✓	*✓	–
LM-7000H-4GSFP	✓	✓	*✓	–
PM-7500-2G/4GTXSFP	✓	✓	–	–
PM-7200-2G/4GTXSFP	–	✓	–	–
PM-7200-8SFP Series	✓	–	–	–
Industrial Media Converter				
IMC-21GA	✓	✓	–	–
IMC-101G Series	–	✓	–	–

Note: For 10Gb core switches, the 10G SFP port slot can only support a 10G SFP transceiver.

*Note: The IEEE 1588v2 accuracy is not guaranteed when using the SFP-1G Copper Series.