PowerTrans PT-7728-PTP switches are designed to meet the demands of power substation automation systems (IEC 61850-3, IEEE 1613). The PT-7728-PTP's Gigabit and fast Ethernet backbone, redundant ring, and 24/48 VDC or 110/220 VDC/VAC dual isolated redundant power supplies increase the reliability of your communications and save on cabling/wiring costs.

Moxa's PT-7728-PTP IEC 61850-3 fast Ethernet switches support the latest version of IEEE 1588 v2 technology to fulfill precision time synchronization requirements for protection and control applications.

**IEEE 1588 PTP Features**

- IEE 1588 PTP V2 (Precision Time Protocol) with hardware time stamping for precise time synchronization of networks
- Support for both IEEE 1588 Boundary Clock and Transparent Clock

**General Features and Benefits**

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- DHCP Option 82 for IP address assignment with different policies
- EtherNet/IP* and Modbus/TCP industrial Ethernet protocols supported
- Turbo Ring, Turbo Chain, RSTP/STP, and MSTP* for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
- Supports advanced VLAN capability with Q-in-Q tagging*
- 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, 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

**Cyber-security 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 port
- Radius/TACACS+ allows you to manage passwords from a central location (available in Q1 2011)
- SNMPv3 provides encrypted authentication and access security

*Available in Q3, 2011

These Ethernet switches guarantee time-stamping accuracy within 1 μs for the IEC 61850 process layer. They can be configured for IEEE 1588 fast Ethernet switch operation as a Master, Boundary Clock, and Transparent Clock. The modular design of the PT-7728-PTP also makes network planning easy, and allows greater flexibility by letting you install up to 4 Gigabit ports, 24 fast Ethernet ports, and up to 14 IEEE 1588 fast Ethernet ports. Along with a choice of either front or rear wiring, these features together make the PT-7728-PTP suitable for a variety of industrial applications.
## Technology

**Standards:**
- IEEE 802.3 for 10BaseT
- IEEE 802.3u for 100BaseT(X) and 10Base FX
- IEEE 802.3ab for 1000BaseT(X)
- IEEE 802.3z for 1000BaseX
- IEEE 802.1x for Flow Control
- IEEE 802.1D for Spanning Tree Protocol
- IEEE 802.1w for Rapid STP
- 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

**Protocols:**
- IGMPv1/v2, GMRP, GVRP, SNMP/v1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNMP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, DHCP Option 66/67/82, LLDP, Modbus/TCP, IEEE 1588 PTP, IPv6, SNMP Inform

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

**Flow Control:**
- IEEE 802.3x flow control, back pressure flow control

## Switch Properties

**Priority Queues:** 4

**Max. Number of Available VLANs:** 64

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

**Interface**

- **Fast Ethernet:**
  - Slots 1, 2, and 3 for combinations of 4, 6, 7, or 8-port PM-7200 fast Ethernet modules with 10/100BaseT(X) (TP/M12 interface), 100BaseFX (SC/ST/MTRJ connector), or 100BaseSFP
  - Slot 4 for BNC port

- **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)

**System LED Indicators:**
- STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL

**Mode LED Indicators:**
- LNK/ACT, FXD/HDX, RING/CHAIN PORT, COUPLER PORT, SPEED

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

**IEEE 1588 PTP:**
- Up to 12 10/100BaseT(X) or 14 100BaseFX (Multi-mode ST or SC connector) IEEE 1588 ports with hardware time stamping

## Power Requirements

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

**Input Current:**
- Max. 2.58 A @ 24 VDC
- Max. 1.21 A @ 48 VDC
- Max. 0.64/0.33 A @ 110/220 VDC
- Max. 0.53/0.28 A @ 110/220 VAC

**Overload Current Protection:** Present

**Connection:**
- 10-pin terminal blocks

**Reverse Polarity Protection:** Present

## Physical Characteristics

**Housing:**
- IP30 protection

**Dimensions:**
- 440 x 44 x 325 mm (17.32 x 1.73 x 12.80)
- Weight: 5900 g

**Installation:**
- 19” 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, CSA C22.2 No. 60950-1, EN 60950-1

**EMI:**
- FCC Part 15 Subpart B Class A, EN 55022 Class A

**Power Automation:**
- IEC 61850-3, IEEE 1613

**Note:** Please check Moxa’s website for the most up-to-date certification status.

## Warranty

**Warranty Period:** 5 years

**Details:**
- See www.moxa.com/warranty

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### Modular Rackmount Ethernet Switch System, PT-7728-PTP

![Modular Rackmount Ethernet Switch System, PT-7728-PTP](image)

**Power Requirements**

**Input Voltage:**
- 24 VDC (18 to 36 V)
- 48 VDC (36 to 72 V)

**Input Current:**
- 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)

**Overload Current Protection:** Present

**Connection:**
- 10-pin terminal blocks

**Reverse Polarity Protection:** Present

**Physical Characteristics**

**Housing:**
- IP30 protection

**Dimensions:**
- 440 x 44 x 325 mm (17.32 x 1.73 x 12.80)
- Weight: 5900 g

**Installation:**
- 19” 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, CSA C22.2 No. 60950-1, EN 60950-1

**EMI:**
- FCC Part 15 Subpart B Class A, EN 55022 Class A

**Power Automation:**
- IEC 61850-3, IEEE 1613

**Note:** Please check Moxa’s website for the most up-to-date certification status.

**Warranty**

**Warranty Period:** 5 years

**Details:**
- See www.moxa.com/warranty

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### Dimensions

**Unit:** mm (inch)

- **Rear View:**
  - 440.0 (17.3)
  - 460.0 (18.9)

- **Top View:**
  - 44.0 (1.7)
  - 120.0 (4.7)

- **Front View:**
  - 400.0 (15.7)

- **Side View:**
  - 440.0 (17.3)
PT-7728-PTP Modular Rackmount Ethernet Switch System

The PT-7728-PTP switch system consists of 18 modular managed rackmount Ethernet switch systems with 3 slots for fast Ethernet modules, 1 slot for a Gigabit Ethernet module, or 4 slots for fast Ethernet modules. A total of 28 or 24+4G ports can be installed, and the switch can be used in a temperature range from -40 to 85°C.

### Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Front Cabling, Front Display</th>
<th>Rear Cabling, Front Display</th>
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<tr>
<td>PT-7728-PTP-F-24</td>
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</table>

### Power Supply

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<th>Isolated Power Supply 2</th>
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<td>24 VDC (18 to 36 V)</td>
<td>24 VDC (18 to 36 V)</td>
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<tr>
<td>48 VDC (36 to 72 V)</td>
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<td>48 VDC (36 to 72 V)</td>
</tr>
<tr>
<td>HV: 88 to 300 VDC and 85 to 264 VAC</td>
<td>HV: 88 to 300 VDC and 85 to 264 VAC</td>
<td>HV: 88 to 300 VDC and 85 to 264 VAC</td>
</tr>
</tbody>
</table>

### Note

- The PT-7728-PTP Ethernet switch systems provide combinations of 1 slot for a Gigabit Ethernet interface module, 3 slots for fast Ethernet interface modules, or 4 slots for fast Ethernet interface modules. See page 2-42 to select the PM-7200 Gigabit Ethernet and fast Ethernet interface modules that you need for your own application.

### Optional Accessories

- **MXview**: Moxa industrial network management software with 50, 100, 250, 500, or 1000 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-7728-PTP series switch
- RJ45-to-DB9 console port cable
- Protective caps for unused ports
- 2 rackmount ears
- Documentation and software CD
- Hardware installation guide
- Warranty card