

# Gigabit Routing Switches

## PT-3750E-S Series

### Overview

The PT-3750E-S series is a new-generation L3 10GbE switch designed by Opzoon to offer high performance, advanced security, great reliability, and multi-service to your network. The PT-3750E-S series can act as an aggregation layer of a large campus network, a core layer of small to medium-sized campus network, and the access layer of IDC Datacenter. The PT-3750E-S series switch supports up to four 10GbE ports to meet bandwidth requirements. This series provides hardware support for IPv4/IPv6 switching and Opzoon unique expansion features to meet the requirements of the coming IPv6 era.



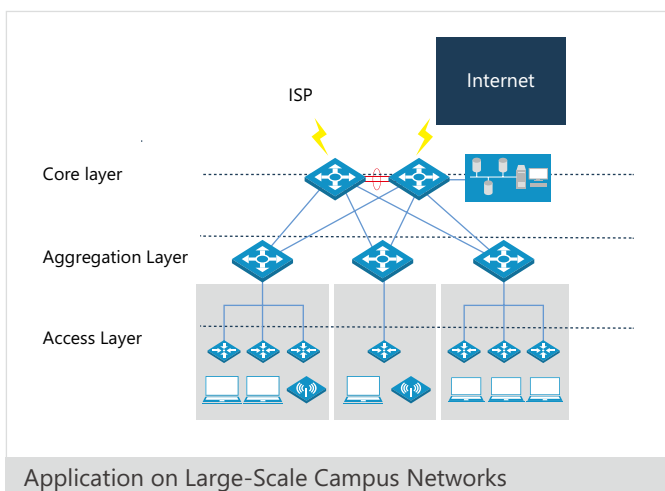
### Product Highlights

#### Performance

- Up to 176Gbps throughput
- Up to 130.9Mpps forwarding
- Support High port density for 10GbE
- Wire-speed L2/L3 forwarding

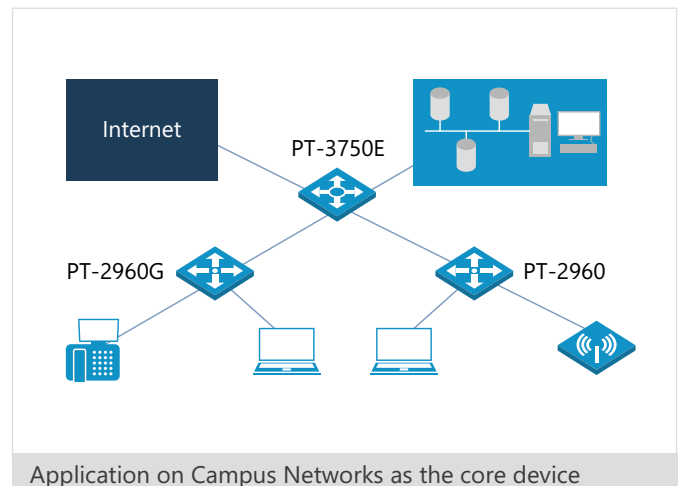
### Support IPv6 Features

The PT-3750E-S series provides hardware support for IPv4/IPv6 switching at line rate and supports various IPv6 functions including basic IPv6 host features, IPv6 ACL, QoS, DHCPv6, MLD Snooping, IPv6 Multicast VLAN, IPv6 sFlow ...etc., and various security technologies to guarantee the reliability.



### Multi-service Capability

The PT-3750E-S series supports flexible Q-in-Q function expanding VLAN range to realize the agile packets forwarded by different services, users, priorities, and traffic flows.



### Enhanced Security Protection

The PT-3750E-S series supports complete ARP intrusion detection and anti-spoofing attack functions, such as ARP-scan, ARP guard, ARP/Port binding, ARP rate-limiting, and DHCP Snooping binding ARP...etc.. All these effectively prevent lots kind of ARP packet attacks.

It also provides multiple features of effective authentication by MAC security and extensive packet filtering from L2 to L7 by hardware ACL to protect the network and become more secure and stable.

## PT-3750E-S Series

### Efficient IEEE802.1x for AAA Solution

The PT-3750E-S series provides standard and proprietary 802.1x features for the customer who requires AAA (Authentication, Authorization, Accounting) solution to accomplish the user account control.

Unauthorized user can be blocked by Port, MAC, traffic flow, and specific time; moreover, to reduce management overhead, the supports of Anti-BT, IP Conflict Prevention, Trust View, Free Resource, Auto VLAN, and Guest VLAN features provide secured and flexible way of user identification regardless of networks which customers connect to.

### Guarantee for Major Services

For the customers who operate the network services running a variety of applications with critical traffics, the PT-3750E-S switch provides comprehensive QoS mechanisms to guarantee those critical traffics can be transmitted with high priority, sufficient bandwidth, and controllable latency. Meanwhile, the guaranteeing critical traffics do not cause other traffics fail. The PT-3750E-S supports QoS features including:

- Up to 8 queues per port
- 802.1p based classification
- DSCP based classification and remarking
- QoS interface trust (COS / DSCP)
- Strict priority queuing
- Deficit Weighted Round Robin (DWRR) Scheduling
- ACL based DSCP Marking
- ACL based Policing
- Policing/Shaping
- Rate limiting

### High Reliability

The PT-3750E-S series supports STP, RSTP, MSTP and Smart Link to ensure rapid convergence and network stability. Moreover, the PT-3750E-S series supports Fast Ethernet ring network protection and UDLD to keep the communication continuous and reliable ensuring network stability.

### High-performance Power Supply Capacity

The PT-3750E-S series has the "P" Model that supports Power over Ethernet (PoE) feature for providing DC power through Ethernet connection to PDs (Powered Device)such as IP Phone, IP camera, and wireless AP. The power supply system can reduce the power cable layout and maintenance cost for PDs. The PT-3750E-S supports the IEEE802.3af and IEEE802.3at (PoE+) power-supply standards which is compatible with the non-standard PDs.This series can provide up to 30W per port and supports the PD detection function to discover standard or non-standard PDs.

### Simple and Convenient Management

With plenty of secure management functions, the PT-3750E-S series can be easily managed through SNMPv1/v2/v3, WEB, SSH, Syslog, TELNET, and SHELL to complete the configuration, management, access, and monitoring by different levels of administrators for system operation to avoid the risk of unauthorized reconfiguration by non-trusted users.

### Ideal Design for Efficient IT architecture

The PT-3750E-S series adopts the leading processor to increase efficiency and utility; the intelligent power supplies and fans provide not only real-time monitoring and dynamic alert but also automatic adjustment to reach the concept of energy efficiency.

### Standards Compliance

- 802.1D Bridging and Spanning Tree
- 802.1p QoS/COS
- 802.1Q VLAN Tagging
- 802.1w Rapid Spanning Tree
- 802.1s Multiple Spanning Tree Protocol
- 802.1AB Link Layer Discovery Protocol
- 802.3 10BASE-T Ethernet
- 802.3u 100BASE-TX Fast Ethernet
- 802.3ab 1000BASE-T Gigabit Ethernet
- 802.3z 1000BASE-X Gigabit Ethernet
- 802.3ae 10 Gigabit Ethernet
- 802.3ad Link Aggregation (LACP)
- 802.3x Flow control
- RFC 2460 IPv6
- RFC 2461 Neighbor Discovery for IP Version 6 (IPv6)
- RFC 2462 IPv6 Stateless Address Autoconfiguration
- RFC 2463 Internet Control Message Protocol (ICMPv6)
- RFC 2021 RMON2 probes
- RFC 2037 ENTITY-MIB
- RFC 2096 IP-FORWARD-MIB
- RFC 2233 IF-MIB
- RFC 2466 MIB for IPv6: ICMPv6 Group
- RFC 2674 Q-BRIDGE-MIB
- LLDP-MIB
- LLDP-EXT-DOT1-MIB
- LLDP-EXT-DOT3-MIB

### SNMP MIBs

- RFC 783 TFTP
- RFC 854 Telnet
- RFC 1156 TCP/IP-MIB
- RFC 1157 SNMPv1
- RFC 1212 MIB definitions
- RFC 1213 SNMP MIB II
- RFC 1493 BRIDGE-MIB
- RFC 1650 EtherLike-MIB
- RFC 1724 RIPv2 MIB
- RFC 1757 RMON MIB
- RFC 1907 SNMPv2-MIB

# Gigabit Routing Switches

opzoon

## PT-3750E-S Series

### Specifications

Product	PT-3750E-28T-S	PT-3750E-52T-S	PT-3750E-28F-S	PT-3750E-28P-S
Ports	24 x 10/100/1000 BASE-T ports, 2 x 10GbE SFP+ ports, 1USB 2.0, 1RJ-45 console port	48 x 10/100/1000 BASE-T ports, 2 x 10GbE SFP+ ports, 1USB 2.0, 1RJ-45 console port	24 x GbE ports, 2 x 10GbE SFP+ ports, 1 USB 2.0, 1 RJ-45 console port	24x 10/100/1000 BASE-T (PoE+) ports, 2 x 10GbE SFP+ ports, 1 USB 2.0, 1 RJ-45 console port
Expansion Slots	1	1	1	1
Expansion module	2 x 10GbE SFP+ module for Uplink	2 x 10GbE SFP+ module for Uplink	2 x 10GbE SFP+ module for Uplink	2 x 10GbE SFP+ module for Uplink
Switching Capacity	128Gbps	176Gbps	128Gbps	128Gbps
Package Forwarding Rate	95.2Mpps	130.9Mpps	95.2Mpps	95.2Mpps
PoE	/	/	/	802.3af standard (max 15.4w) 802.3at standard(max 30w)
Jumbo frame	12KB	12KB	12KB	12KB
<b>Hardware configuration</b>				
RPS	Support(External)	Support(External)	Support(External)	Support(External)
Dimension(W*H*D mm)	440*43.4*318	440*43.4*396	440*43.4*318	440*43.4*318
Working Humidity	5%~95% Non-condensing	5%~95% Non-condensing	5%~95% Non-condensing	5%~95% Non-condensing
Working Temperature	0°C~50°C	0°C~50°C	0°C~50°C	0°C~50°C
Storage Temperature	-40°C~70°C	-40°C~70°C	-40°C~70°C	-40°C~70°C
Power Supply	AC:100-240V, 50-60 Hz	AC:100-240V, 50-60 Hz	AC:100-240V, 50-60 Hz	AC:100-240V, 50-60 Hz
Power Consumption	≤65W	≤90W	≤90W	≤530W(PoE)

VLAN	<ul style="list-style-type: none"><li>• Up to 4096 VLANs</li><li>• Support Protocol based VLAN</li><li>• Support basic QinQ</li><li>• Support port isolation</li><li>• Support GVRP</li></ul>
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MAC Address Table	<ul style="list-style-type: none"><li>• Up to 16K unicast MAC addresses</li><li>• Up to 4K multicast MAC address</li><li>• Support black hole MAC addresses<ul style="list-style-type: none"><li>- Source address based MAC filter</li><li>- Destination address based MAC filter</li></ul></li><li>• Support dynamic MAC management</li><li>• Support MAC-binding based on source MAC addresses</li><li>• Support MAC quantity control<ul style="list-style-type: none"><li>- Port based MAC quantity control</li><li>- VLAN based MAC quantity control</li></ul></li></ul>
Reliability	<ul style="list-style-type: none"><li>• Support IEEE 802.1d Spanning Tree Protocol (STP)</li><li>• Support IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)</li><li>• Support IEEE 802.1s Multiple Spanning Tree Protocol instances (MSTP)</li><li>• Support STP Root Guard</li><li>• Support BPDU Guard</li><li>• Support SmartLink/Monitor Link</li><li>• Support Fast Ethernet ring network protection technology-OPRP</li></ul>
Port Mirroring	<ul style="list-style-type: none"><li>• Support one-to-one mirroring</li><li>• Support many-to-one mirroring</li><li>• Support flow-based mirroring</li><li>• Support RSPAN</li></ul>
Flow control	<ul style="list-style-type: none"><li>• Support IEEE802.3x flow control and back pressure</li><li>• Support Storm control</li></ul>
Link aggregation	<ul style="list-style-type: none"><li>• Support LACP(802.3ad)<ul style="list-style-type: none"><li>- 8 ports</li><li>- 32 groups per system</li></ul></li><li>• Support Static link aggregation</li></ul>

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### Layer 3 feature

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| IPv4 | <ul style="list-style-type: none"><li>• Support ARP<ul style="list-style-type: none"><li>- ARP basic function and static ARP</li><li>- Anti ARP packet attack</li><li>- ARP re-certification</li><li>- ARP and Layer port binding, ARP binding</li><li>- Anti ARP scan</li><li>- ARP guard</li><li>- Gratuitous ARP</li></ul></li><li>• Support IP Routing<ul style="list-style-type: none"><li>- Support static routing</li><li>- Support RIPv1/v2</li><li>- Support routing between different processes into one another</li><li>- Support routing convergence</li></ul></li><li>• Support ICMP<ul style="list-style-type: none"><li>- ICMP basic function</li></ul></li><li>• Support LOOPBACK Interface</li><li>• Support Multi-neting</li><li>• Support Anti IP packet DOS attack</li><li>• Support CIDR</li></ul> |
| IPv6 | <hr/> <ul style="list-style-type: none"><li>• Support IPv4/IPv6 Dual Protocol Stack</li><li>• Support ICMPv6, ND,ND SNOOPING</li><li>• Support IPv6 Routing<ul style="list-style-type: none"><li>- Support IPv6 static routing</li><li>- Support RIPng</li></ul></li><li>Support IPv6 routing convergence</li></ul>   |
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DHCP	<ul style="list-style-type: none"><li>• Support DHCPv4<ul style="list-style-type: none"><li>- DHCP Server</li><li>- DHCP Client/BOOTP</li><li>- DHCP Relay /DHCP Relay option82</li><li>- DHCP Snooping<ul style="list-style-type: none"><li>&gt; Support binding user IP and MAC / binding ARP entries / prevent illegal DHCP server / DHCP packets dos attack prevention/DHCP snooping option82</li></ul></li></ul></li><li>• Support DHCPv6<ul style="list-style-type: none"><li>- DHCPv6 Server</li><li>- DHCPv6 Client</li><li>- DHCPv6 Relay /DHCPv6 Relay option37/38</li><li>- DHCPv6 Snooping<ul style="list-style-type: none"><li>&gt; Support binding user IP and MAC / binding ND entries / prevent illegal DHCP server / DHCP packets Dos attack prevention</li></ul></li></ul></li></ul>
DNS	<ul style="list-style-type: none"><li>• Support DNS Client</li><li>• Support DNS Proxy</li></ul>
<b>Multicast</b>	
Multicast	<ul style="list-style-type: none"><li>• Support IGMP snooping v1/v2/v3</li><li>• Support MLD snooping v1/v2</li><li>• Support Multicast VLAN and Controlled Multicast for IPv4 and IPv6</li></ul>
<b>Security</b>	
Security / Authentication	<ul style="list-style-type: none"><li>• Support IP source guard</li><li>• Support 802.1x<ul style="list-style-type: none"><li>- Support dot1x packet Transparent Transmission(pass through)</li><li>- Support port based, MAC based and based on user (Port,MAC) authentication</li><li>- Support EAP ( TLS, PEAP, MD5 )</li><li>- Support windows XP standard dot1x CPE</li><li>- Support guest VLAN and auto VLAN</li><li>- Support time-based or traffic-base billing</li></ul></li><li>• Support TACACS+</li><li>• Support RADIUS</li></ul>
Protection	<ul style="list-style-type: none"><li>• CPU protection</li><li>• Software watchdog<ul style="list-style-type: none"><li>- Support tasks anomaly detection / memory error detection / CPU utilization monitoring / stack anomaly detection / uplink port up / down monitoring</li></ul></li><li>• Hardware watchdog<ul style="list-style-type: none"><li>- After the complete collapse of the software or the CPU status is abnormal, the hardware watchdog will automatically reset.</li></ul></li></ul>

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ACL	<ul style="list-style-type: none"><li>• Support standard and extended ACL</li><li>• Support dynamic ACL</li></ul>
<hr/> <b>Management/ Maintenance</b> <hr/>	
Management	<ul style="list-style-type: none"><li>• Support image upgrading through FTP, TFTP<ul style="list-style-type: none"><li>- Support TFTP/FTP server</li><li>- Support TFTP/FTP client</li></ul></li><li>• Support System configuration with<ul style="list-style-type: none"><li>- WEB (HTTP,HTTPs and SSL)</li><li>- SNMP v1/v2c /v3</li><li>- CLI by console port, Telnet and SSH</li></ul></li><li>• Support standard centralized network management software and OPManager basic network infrastructure management suite</li><li>• Support SNTP and NTP</li></ul>
Maintenance	<ul style="list-style-type: none"><li>• Support RMON (Remote Monitoring) v1/v2/v3/v9 groups of MIBs</li><li>• Support Syslog</li><li>• Support Virtual Cable Test(VCT)</li><li>• Support LLDP</li><li>• Support UDLD</li><li>• Support port loop detection</li><li>• Support DDM (Digital Diagnose Monitor)</li><li>• Support sFlow for IPv4 and IPv6</li><li>• Support network diagnose<ul style="list-style-type: none"><li>- Ping</li><li>- Trace route</li></ul></li></ul>
<hr/> <b>Quality of Service (QoS)</b> <hr/>	
QoS	<ul style="list-style-type: none"><li>• Up to 8 queues per port</li><li>• Support Queue scheduling algorithms including SP(Strict Priority), DWRR(Deficit Weighted Round Robin), SDWRR(SP+DWRR)</li><li>• Support 802.1p, DiffServ for traffic classification</li><li>• Support the use of ACL for traffic classification</li><li>• Support Traffic Shaping</li><li>• Support priority Mark / Remark</li></ul>

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### Ordering Information

Model Name	Description
PT-3750E-28T-S	Gigabit IPv6 routing switches, 24 x 10/100/1000BASE-T + 2 x SFP+ interfaces + 1 extender slot
PT-3750E-52T-S	Gigabit IPv6 routing switches, 48 x 10/100/1000BASE-T + 2 x SFP+ interfaces + 1 extender slot
PT-3750E-28F-S	Gigabit IPv6 routing switches, 24 x GbE SFP + 2 x SFP+ interfaces + 1 extender slot
PT-3750E-28P-S	Gigabit IPv6 routing switches, 24 10/100/1000BASE-T (PoE+) + 2 x SFP+ interfaces + 1 extender slot
MPT-3750E-2SFP+	2 x 10GbE SFP+ extender module for PT-3750E Series and PT-3750E-S Series
SFP-SX	1000BASE-SX SFP Transceiver(850nm,MMF,550m), LC Connector
SFP-LX	1000BASE-LX SFP Transceiver(1310nm,SMF,10km or MMF,550m), LC Connector
SFP-LX-20	1000BASE-LX SFP Transceiver(1310nm,SMF,20km),LC Connector
SFP-LX-40	1000BASE-LX SFP Transceiver(1310nm,SMF,40km),LC Connector
SFP-LX-80	1000BASE-LX SFP Transceiver(1550nm,SMF,80km),LC Connector
SFP-GT	1000BASE-T SFP Transceiver,RJ-45 Connector
SFPP-SR	SFPP-SR 10GbE-SR SFP+ MMF Transceiver(850nm,62.5µm MMF 32m,50µm 500MHz/km MMF 85m,50µm 2000MHz/km MMF 300m),LC Connector, compatible with all SFP+ Module
SFPP-LR	SFPP-LR 10GbE-LR SFP+ SMF Transceiver(1310nm,SMF,10km),LC Connector, compatible with all SFP+ Module
SFPP-ER	SFPP-ER 10GbE-ER SFP+ SMF Transceiver(1550nm,SMF,40km),LC Connector, compatible with all SFP+ Module
SFPP-80	SFPP-ER 10GbE-ER SFP+ SMF Transceiver(1550nm,SMF,80km),LC Connector, compatible with all SFP+ Module
SFPP-AOC-1M	1m AOC 10GbE Cable, with 2 SFP+ module, compatible with all SFP+ connector
SFPP-AOC-2M	2m AOC 10GbE Cable, with 2 SFP+ module, compatible with SFP+ connector
SFPP-AOC-3M	3m AOC 10GbE Cable, with 2 SFP+ module, compatible with SFP+ connector
SFPP-DAC-1M	1m DAC 10GbE Cable, with 2 SFP+ module, compatible with SFP+ connector
SFPP-DAC-2M	2m DAC 10GbE Cable, with 2 SFP+ module, compatible with SFP+ connector
SFPP-DAC-3M	3m DAC 10GbE Cable, with 2 SFP+ module, compatible with SFP+ connector

#### Beijing Headquarters

10-11th floor, Tower B, Yintai Center, 2 Jianguomenwai St., Beijing, China 100022

#### Taipei Global Office

6F.-5, No.408, Ruiguang Rd., Neihu Dist., Taipei City 114, Taiwan  
+886-2-7736-9808

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[www.opzoon.com](http://www.opzoon.com)

#### Support

[global.support@opzoon.com](mailto:global.support@opzoon.com)

#### Sales

[global.sales@opzoon.com](mailto:global.sales@opzoon.com)

#### Version

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