NETGEAR
ProSafe

ProSafe® 24- and 48-port Stackable Gigabit PoE L2+ Managed Switches Data Sheet

GSM7228PS, GSM7252PS

NETGEAR Stackable, PoE Managed Gigabit Switches GSM7228PS and GSM7252PS allow the most flexible and easy-to-deploy Gigabit Power over Ethernet infrastructure. All the 24 and 48 ports of 10/100/1000 Mbps interfaces support 802.3af PoE standard with a comfortable 384 Watts total budget. The first 8 ports support high power 802.3at PoE+, with up to 30 Watts per port. Four (SFP) Gigabit interfaces provide optional fiber connectivity for longer reach Gigabit Ethernet requirements. Two built-in 10 Gigabit Ethernet SFP+ interfaces on the front, reserved for network uplinks or servers and storage devices, and two 10 Gigabit module bays on the rear, permitting both uplinks and local/distant stacking, provide versatile 10 Gigabit deployment possibilities.

Enterprise-class L2+

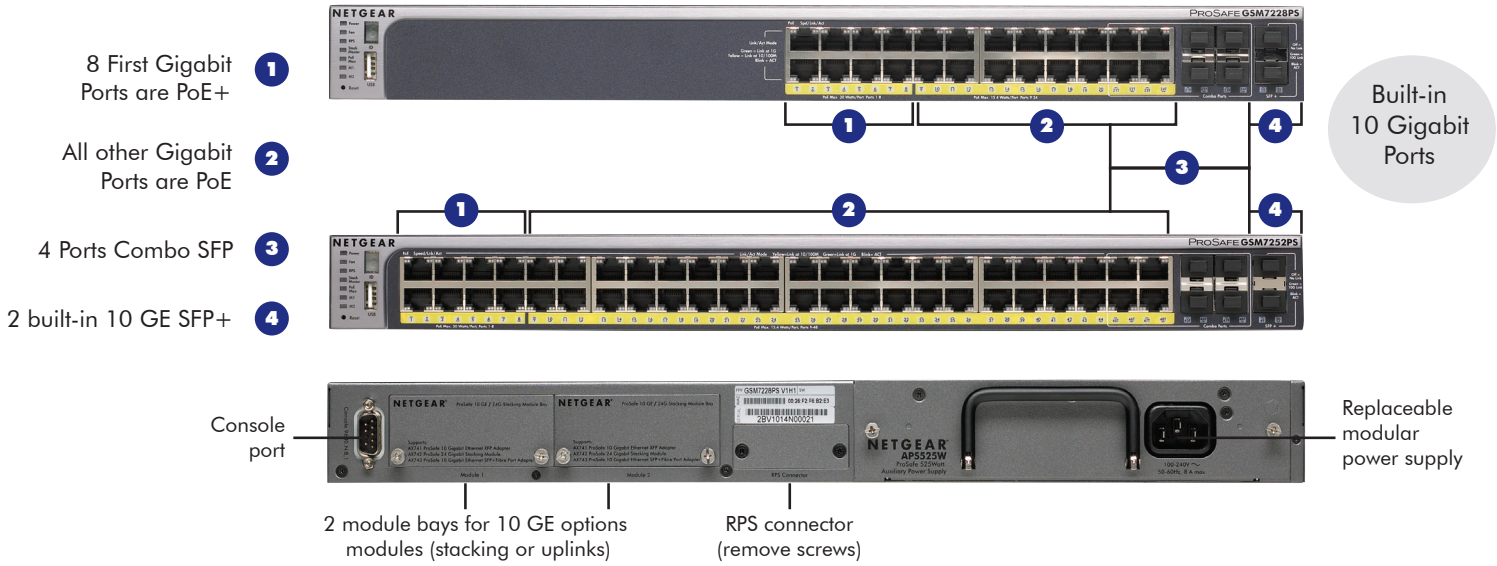
Combining superior resiliency, enterprise-class security and non-blocking performance, NETGEAR Stackable PoE Managed Gigabit Switches GSM7228PS and GSM7252PS offer a full set of Layer 2 management features, as well as Layer 2+ (Layer 3 lite – IPv4 routing) with unsurpassed affordability. Together with VLAN routing, voice-class prioritization, and chassis-like stack even with local or distant non-PoE Layer 3 Gigabit Managed Switches GSM7328S / GSM7352S / GSM7328FS, the GSM7228PS and GSM7252PS series can be deployed at enterprise edge, remote branch offices and closer to the core of small and medium businesses' growing networks.

L3 Scalability

Layer 3 license upgrades GSM7228PL and GSM7252PL unlock IPv4/IPv6 dynamic routing capabilities of GSM7228PS and GSM7252PS. Designed for Enterprise networks and core/aggregation levels of SMB networks, L3 upgraded GSM7228PS and GSM7252PS provide advanced routing protocols such as OSPF, VRRP and multicast for converged applications.

High Availability

NETGEAR Stackable, PoE Managed Gigabit Switches GSM7228PS and GSM7252PS come with a removable power module for the main power supply. In the event of a power supply failure, the switch can immediately shift to an external RPS device while the internal power module is replaced for 100% uptime. Like all NETGEAR ProSafe Managed Switches, the GSM7228PS and GSM7252PS are backed by the NETGEAR ProSafe Lifetime Warranty†, including ProSupport 24x7 Advanced Technical Support, and 3-Year Next Business Day Onsite Hardware Replacement**.



Layer 3 license upgrade, see details on page 14:

- Ordering part number (24-port): GSM7228PL-10000S
- Ordering part number (48-port): GSM7252PL-10000S
- RIP, OSPF, VRRP and Multicast routing
- GSM7328S/GSM7352S feature set elevation

24/7 TECHNICAL SUPPORT*

1-888-NETGEAR (638-4327)
Email: info@NETGEAR.com

NETGEAR ProSafe LIFETIME WARRANTY*

Lifetime Tech Support

NBD* 3-year on-site service

Features at a Glance

GSM7228PS

GSM7252PS

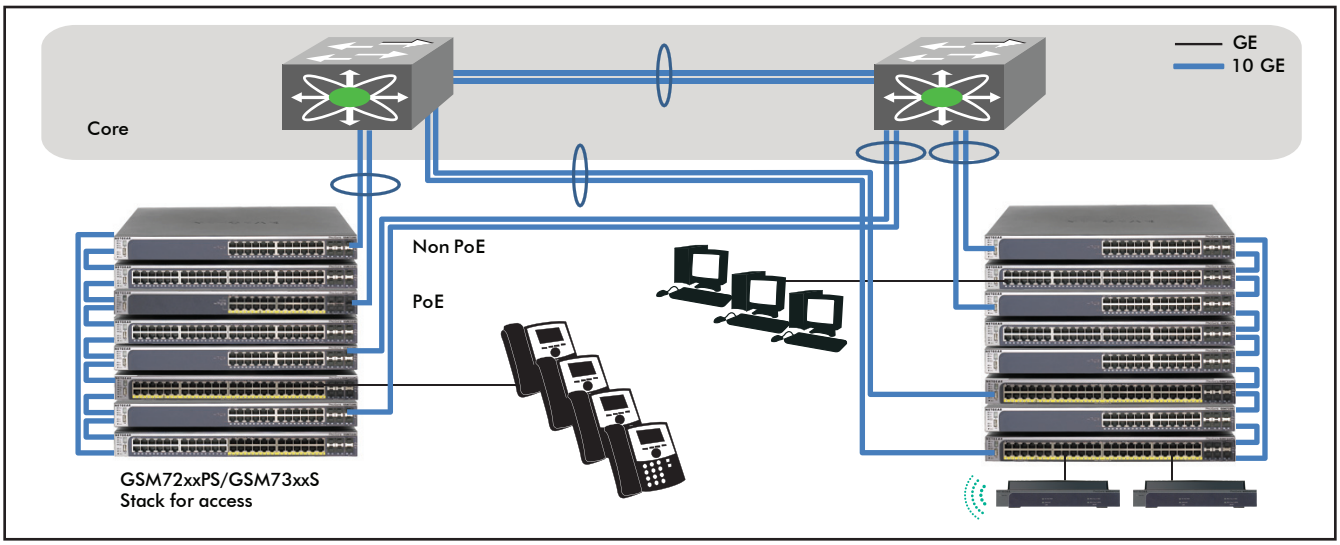
Hardware Main Features	Benefits
24/48-port Gigabit 802.3af PoE	• Gigabit performance for growing networks • Comfortable 384W budget for IP Phones, APs, IP cameras, etc.
8 first ports 802.3at PoE+ (30W)	• Ready for high-powered new PoE+ devices
4 shared SFP (Gigabit fiber) interfaces	• Fiber SX/LX connectivity for longer reach requirements • Accept Fast Ethernet 100FX SFP
2 built-in 10 Gigabit SFP+ (front)	• Dramatically lower the cost of 10 Gigabit deployments • Flexible 10 GE network uplinks, server/storage • Accept short direct-attach SFP+ copper cables
2 additional 10 Gigabit module bays (rear)	• For stacking or other 10 GE network uplinks
Physical stacking up to 8 switches/384 ports	• Chassis-like unique GUI/CLI • High speed 12 x 4 = 48 GE overall stacking performance • Single IP address management • Hot swappable, automatic unit replacement • Distributed redundant trunking, any-to-any port mirroring
Stack also with non-PoE GSM73xxS series	• Versatile local or distant L3 10 Gigabit deployments with GSM7328S, GSM7352S and GSM7328FS
Removable power supply + RPS option	• 100% uptime even in case of power supply failure • APS525W power supply can be replaced without any service interruption when used with one external RPS

Software Main Features	Benefits
Layer 2+ (Layer 3 lite – IPv4 routing)	• Unsurpassed affordability for edge VLAN/subnet routing
Multiple STP, 802.3ad LACP, RPS support	• Superior resiliency for highly available networks
Fabric (24/48-port) 144 / 192 Gbps Performance 107.1 / 142.8 Mpps	• Non-blocking performance for critical applications • Ideal for large voice/video deployments
L2, L3, L4 ACL (access control lists)	• Enterprise-class security • Network protection based on user profile • Network protection based on trusted application
L2, L3, L4 QoS (8 priority queues, DiffServ)	• Voice-class prioritization • Traffic prioritization based on user profile or application • More queues for VoIP, video & critical applications
IGMP snooping v2, v3 IGMP proxy, IGMP querier	• Easier multicast for IP surveillance, IPTV • Multicast traffic reaches only the interested receivers, even without a dedicated external multicast router
8,000 MAC – 1,024 VLANs – 1,024 MC groups 64 trunks 8-port each – DHCP server/relay 224 IP routes – 128 IP interfaces	• Deployable at enterprise edge, remote branch offices or closer to the core of SMB networks

L3 License Upgrade Features	Benefits
Layer 3 - IPv4 (RIPv1/v2, OSPFv1/v2, VRRP) Layer 3 - IPv6 (OSPFv3)	• Advanced routing capabilities for converged applications • Ideal for IPv4 /IPv6 transitioning networks
Multicast routing - IPv4/IPv6 Multicast L2 - IPv6 (MLD)	• Advanced routing of multicast streams (PIM, sparse, dense) • Simplify IPTV & video large deployments
IPv6 L2, L3, L3 ACL (access control lists) IPv6 L2, L3, L4 QoS (8 priority queues)	• Enforces advanced security for IPv6 networks (user profile, applications) • IPv6 traffic prioritization (user profile, VoIP, video & critical applications)

Target Applications

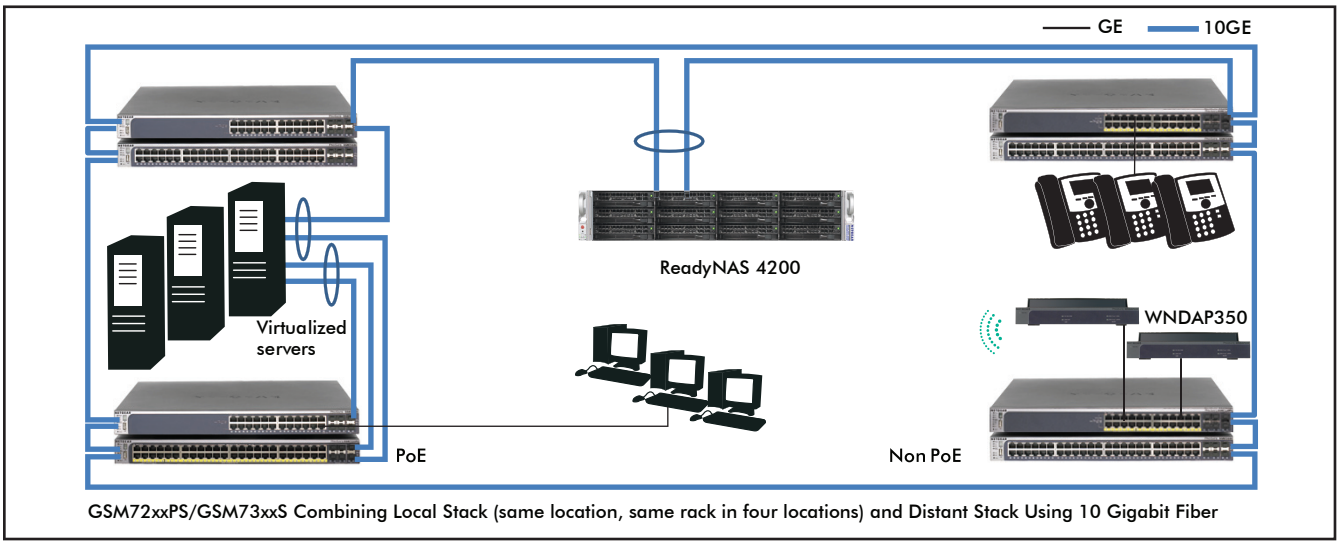
Unified PoE and Non-PoE Edge in Large Networks



GSM72xxPS/GSM73xxS Stack for Access

Stacking with L3 Gigabit GSM7328S, GSM7352S and GSM7328FS Managed Switches, the GSM7228PS and GSM7252PS add Power over Ethernet access for LAN telephony, wireless access points or IP cameras in a cost-effective solution: the built-in 10 Gigabit SFP+ ports on the front authorize high performance distributed trunks to the core and management is simplified. In this configuration, each stack acts as a single routing switch, with only one GUI/CLI and multiple distributed link aggregations.

SMB Network Deployments



GSM72xxPS/GSM73xxS Combining Local Stack (same location, same rack in four locations) and Distant Stack Using 10 Gigabit Fiber

GSM72xxPS/GSM73xxS Unique Stack

With GSM7328S, GSM7352S and GSM7328FS Managed Switches, the GSM7228PS and GSM7252PS simplify and lower the cost of medium-sized 10 Gigabit deployments. In this configuration, 8 stacked switches build a 384 Gigabit ports network with 16 available 10 Gigabit ports for servers and high-end storage. The hardware stacking dual-ring topology provides one unique CLI/GUI platform, simple management, network and servers/storage perfect resiliency, as well as intelligent load balancing.

NETGEAR Hardware Stacking

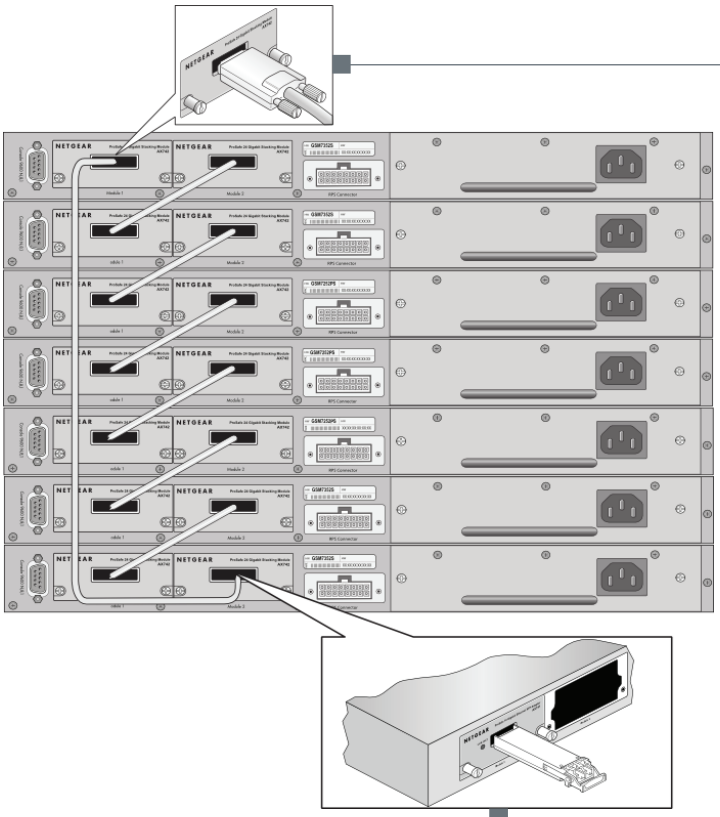
Local and Distant Stack Topology

Local Stack Topology

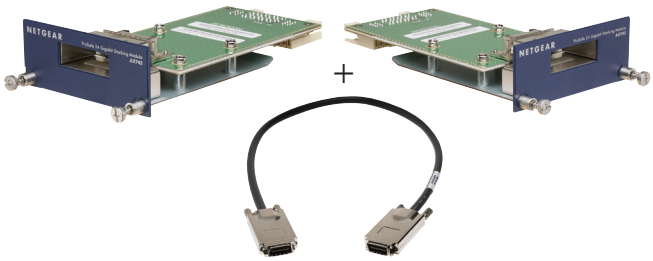
When the switches are deployed in the same rack, one AX742 kit per switch is required for dual-ring topology, providing higher resiliency and intelligent load balancing.

Each ring speed is 12 Gbps half duplex (24 Gbps full duplex).

Dual ring overall speed is 24 Gbps half duplex (48 Gbps full duplex).



AX742
24 Gbps Stacking Kit



- Each AX742 kit contains 2 stacking modules+ 1 stacking cable
- One AX742 kit per switch recommended for full 48 Gbps bandwidth and complete redundancy

Distant Stack Topology

When the switches are deployed in several locations, two AX743 SFP+ host modules are required per switch, with the SFP+ optics (AXM761, AXM762 or AXM763) for this hardware dual-ring topology, providing highest resiliency and intelligent load balancing.

Each ring speed is 10 Gbps half duplex (20 Gbps full duplex).

Dual ring overall speed is 20 Gbps half duplex (40 Gbps full duplex).

Local and distant stack can be combined for maximum flexibility (example: "SMB Network Deployments" application, Page 3).

Built-in SFP+ and Stacking Note

AX743 and rear module bays are preferred for fiber stacking - rear bays are pre-configured for automatic Stacking mode. Just interconnect switches using rear module bays for zero-touch local and/or distant stacking.

Starting with v8.0.3 software release, the two built-in SFP+ ports on the front may also be used for stacking, although they are pre-configured for regular Ethernet mode. Configuration can be changed to enable front Stacking mode.

AX743
SFP+ Host Module

AXM761, AXM762 or AXM763
SFP+ 10GBase-SR, LR or LRM optics

- AX743 + AXM761/AXM762/AXM763 optics in each rear slot
- Two SFP+ modules are recommended for full 40 Gbps bandwidth and complete redundancy

NETGEAR Hardware Stacking

Features	Benefits
Single IP address management	• Stack up to 8 switches as a single "chassis" logical unit • One GUI and one CLI managing the whole stack • The stack acts as a single switch in the network • The other switches in the network also see the stack as a single switch • Growth is easy, adding a switch to the stack is as simple as connecting the new unit to the stack (configuration is instantly updated)
Bi-directional architecture 48 Gigabit local stacking capacity per switch using AX742 stacking kit 40 Gigabit distant stacking capacity using AX743 + AXM761/AXM762/AXM763 (SFP+ optics)	• Higher stacking throughput capacity with lower latency and jitter for VoIP and video traffic • Each switch in the stack understands the shortest path to forward traffic, bi-directionally both up and down • Vertical/local stacking and horizontal/distant stacking can be mixed for convenient 10 Gigabit deployments (core, distribution layer, edge)
Stack resiliency Automatic unit replacement (AUR)	• Dual ring architecture ensures that if a switch fails within the stack all the other switches can still communicate with one another • Adding a new switch to the stack or replacing a failed unit requires no service interruption, the configuration file is pushed automatically by the stack
Distributed trunking across the stack (link aggregation groups, LACP)	• Increased performance with distributed trunks to the core • Greater redundancy using trunking as several switches are connected to the trunk (up to 8 ports per trunk – 64 trunks are allowed)
Many-to-one port mirroring across the stack	• More flexibility for device troubleshooting • As for a chassis, port mirroring is available from every port to every port across the stack
VLANs automatic propagation across the stack	• As for a chassis, VLAN port tagging or private groups are available everywhere across the stack as for a single switch (Unit 1, Port 2; Unit 2, Port 3, etc.) • No configuration required for the VLAN propagation between the switches
Flexible stacking with non-PoE switches	• Stacking with GSM7328S/GSM7352S/GSM7328FS • Mixing PoE and non-PoE ports into a single logical unit • Versatile deployment options

Stacking with GSM7328S/GSM7352S/GSM7328FS Note

Stackable, PoE L2+ Managed Gigabit Switches GSM7228PS and GSM7252PS are flexible enough to integrate GSM73xxS stack configurations in full Layer 3 mode without L3 License Upgrade.

When integrating a GSM73xxS stack, the GSM7228PS/GSM7352PS will benefit from the Layer 3 stack full feature set, as slaves within the stack.

Only the stack master determines the stack configuration/feature set. If the stack master is a GSM73xxS then the entire stack profits from the master L3 configuration.

Without Layer 3 license upgrade, if a GSM7228PS/GSM7252PS becomes the master, then the entire stack will downgrade to Layer 2+ feature set. Unless Layer 2+ is the preferred feature set, it is advised to determine in advance which other Layer 3 GSM73xxS slave would become the stack master in case of the stack master failure, by specifying the secondary stack master settings in the stack configuration.

With a Layer 3 license upgrade, a GSM7228PS/GSM7252PS can become the master and handle the full stack L3 configuration.

Associated Modules and Optics

SFPs (optics)

AXM761/AXM762/AXM763 10Gigabit SFP+ GBIC

- 10 Gigabit Ethernet fiber connectivity - LC duplex connector
- Fits into the two built-in 10 GE SFP+ interfaces (front) or AX743 (rear bays)
- 5-year warranty
- AXM761 10GBase-SR "short-reach multimode"
  - 50/125µm OM3 multimode: up to 300m
  - 62.5/125µm OM1 multimode: up to 33m
  - Ordering part number: AXM761-10000S
- AXM763 10GBase-LRM "long reach multimode" (802.3aq)
  - 62.5/125µm OM1 multimode: up to 220m
  - 50/125µm OM3 multimode: up to 260m
  - Ordering part number: AXM763-10000S
- AXM762 10Gase-LR "long-reach single mode"
  - 9/125µm SMF single mode: up to 10 km
  - Ordering part number: AXM762-10000S

AGM731F/AGM732F Gigabit SFP GBIC

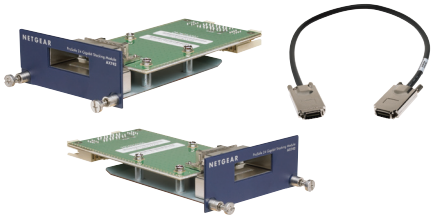
- Gigabit Ethernet fiber connectivity - LC duplex connector
- Fits into the four shared SFP interfaces (front)
- 5-year warranty
- AGM731F 1000SX "short reach multimode"
  - 50/125µm OM3 multimode: up to 550m
  - 62.5/125µm OM1 multimode: up to 275m
  - Ordering part number: AGM731F
- AGM732F 1000LX "long reach single or multimode"
  - 50/125µm or 62.5/125µm multimode: up to 550m
  - 9/125µm SMF single mode: up to 10 km
  - Ordering part number: AGM732F

AFM735 Fast Ethernet SFP GBIC

- Fast Ethernet connectivity - LC duplex connector
- Fits into the four shared SFP interfaces (front)
- 5-year warranty
- AFM735 100BaseFX IEEE 802.3
  - 50/125µm or 62.5/125µm multimode: up to 2km
  - Ordering part number: AFM735-1000S

Modules for the Rear Bays

AX742 ProSafe 24Gigabit Stacking Kit



- Each kit contains two stacking modules and one stacking cable
- Each module speed is 12 Gbps (half duplex)/24 Gbps (full duplex)
- Configured in a resilient ring topology, delivers 48 Gbps of stacking bandwidth
- One kit per switch recommended for full bandwidth and redundancy
- 5-year warranty
- Ordering part number: AX742

AX743 ProSafe 10Gigabit SFP+ adapter module

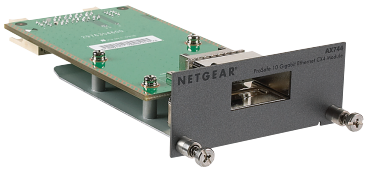
- Interoperates with SFP+ optics GBICs such as AXM761/AXM762/AXM763
- Also interoperates with standard direct attach SFP+ cables (short copper cables with "SFP+ like" connectors)
- 5-year warranty
- Ordering part number: AX743-10000S

See 10Gigabit XFP Note on the following page

Associated Modules and Optics

Modules for the Rear Bays

AX744 ProSafe 10Gigabit CX4 module



- Adds 10 Gigabit Ethernet "InfiniBand" CX4 connectivity
- Fully compliant with CX4 10-GbE (IEEE 802.3ak Type 10Gbase-CX4) standard
- Connect any servers, ReadyNAS® or switches with 10 Gigabit CX4 interface
- 5-year warranty
- Ordering part number: AX744-10000S

10Gigabit XFP Note

The previous 10Gigabit XFP modules are compatible with GSM7228PS and GSM7252PS. XFP Host Module AX741 and XFP Optics AXM751/AXM752 (10GBase-SR/LR) can equip the rear bays. XFP optics are interoperable with newer SFP+ optics: for instance, an XFP-equipped switch can connect with another SFP+-equipped switch, this is the same 10GBaseSR/LR standard and the same fiber. Only the module form factors are different.

SFP+ and XFP Direct Attach Cables

AXC761, AXC763, AXC753 Direct Attach Cables

- Direct Attach copper cable (10GSFP+Cu)
- Drives 10 Gigabit Ethernet
- 5-year Warranty
- Ordering part number:

  SFP+ to SFP+ (1m version) AXC761-10000S
  SFP+ to SFP+ (3m version) AXC763-10000S
  SFP+ to XFP (3m version) AXC753-10000S

Modular Power Supply

APS525W ProSafe Auxiliary Power Supply

- Provides a replaceable power supply
- When an RPS (redundant power supply) is used, the power supply can be replaced without stopping the switch or requiring a reboot (hot swap)
- 5-year warranty
- Ordering part number: APS525W-10000S

RPS5412 Optimal Power® External Redundant Power Supply

- Optimal Power® RPS unit certified by NETGEAR
- Includes the DC power cable for the Switch RPS connector (rear)
- Provides seemless redundant power to the Switch
- 3-year warranty
- Ordering part number:

  RPS5412-100NAS (Americas)
  RPS5412-100EUS (Europe)
  RPS5412-100AJS (Asia)

GSM7228PS

GSM7252PS

TECHNICAL SPECIFICATIONS	
PHYSICAL INTERFACES	
Front • 24 auto-sensing RJ45 10/100/1000 ports • 4 shared SFP ports for Gigabit fiber uplinks (shared with the last 4 RJ45 ports) • 2 independent 10 Gigabit SFP+ ports • USB port (config/firmware files storage) Rear • 2 additional 10 Gigabit I/O module bays (for 10 Gigabit uplinks or hardware stacking) • Serial RS-232 port for console Total • 24 x Gigabit ports + 4 x 10 Gigabit ports • Same hardware platform as GSM7328S-200	Front • 48 auto-sensing RJ45 10/100/1000 ports • 4 shared SFP ports for Gigabit fiber uplinks (shared with the last 4 RJ45 ports) • 2 independent 10 Gigabit SFP+ ports • USB port (config/firmware files storage) Rear • 2 additional 10 Gigabit I/O module bays (for 10 Gigabit uplinks or hardware stacking) • Serial RS-232 port for console Total • 48 x Gigabit ports + 4 x 10 Gigabit ports • Same hardware platform as GSM7352S-200
POE	
• All 24 Gigabit RJ45 ports are PoE • IEEE® 802.3af (up to 15.4 Watts/port)	• All 48 Gigabit RJ45 ports are PoE • IEEE 802.3af (up to 15.4 Watts/port)
POE+	
• The first 8 Gigabit RJ45 ports are PoE+ • IEEE 802.3at (up to 30 Watts/port) Layer 2 (LLDP) method	• The first 8 Gigabit RJ45 ports are PoE+ • IEEE 802.3at (up to 30 Watts/port) Layer 2 (LLDP) method
TOTAL POE BUDGET	
• 384 Watts	• 384 Watts
PROCESSOR / MEMORY	
• Processor: MPC8633 @ 666 MHz • System memory: 256 MB (RAM) • Packet buffer memory: 6 Mb per switch • Code storage (flash): 32 MB	• Processor: MPC8633 @ 666 MHz • System memory: 256 MB (RAM) • Packet buffer memory: 12 Mb per switch • Code storage (flash): 32 MB
HARDWARE STACKING	
• GSM7228PS/GSM7252PS • GSM7328S/GSM7352S • GSM7328FS • Stack height: 8 switches/384 ports	• GSM7228PS/GSM7252PS • GSM7328S/GSM7352S • GSM7328FS • Stack height: 8 switches/384 ports
PERFORMANCE SUMMARY	
• Switching fabric: 144 Gbps • Throughput: 107.1 Mpps • Forwarding mode: Store-and-forward • Latency (64-byte frames, 10 to 100 Mbps): <35.2µs • Latency (64-byte frames, 1 Gbps): <4.1µs • Latency (64-byte frames, 10 Gbps): <2.0µs • Addressing: 48-bit MAC address • Address database size: 8,000 MAC addresses • Number of VLANs: 1,024 (IEEE 802.1Q) simultaneously out of 4,096 VLAN IDs • Number of multicast groups filtered: 1,024 • Number of trunks: 64 trunks, 8-port per trunk • Number of hardware queues for QoS: 8 • Number of static routes: 224 • Number of IP interfaces: 128 • Jumbo frame support: up to 9K packet size • Acoustic noise (ANSI-S10.12): 44 dB @ 25°C ambient temperature • Heat dissipation: 260.49 Btu/hr • Mean time between failures (MTBF): 211,069 hours (~24.1 years) @ 25 °C and 98,705 hours (~11.3 years) @ 55 °C ambient temperature	• Switching fabric: 192 Gbps • Throughput: 142.8 Mpps • Forwarding mode: Store-and-forward • Latency (64-byte frames, 10 to 100 Mbps): <35.5µs • Latency (64-byte frames, 1 Gbps): <4.1µs • Latency (64-byte frames, 10 Gbps): <2.0µs • Addressing: 48-bit MAC address • Address database size: 8,000 MAC addresses • Number of VLANs: 1,024 (IEEE 802.1Q) simultaneously out of 4,096 VLAN IDs • Number of multicast groups filtered: 1,024 • Number of trunks: 64 trunks, 8-port per trunk • Number of hardware queues for QoS: 8 • Number of static routes: 224 • Number of IP interfaces: 128 • Jumbo frame support: up to 9K packet size • Acoustic noise (ANSI-S10.12): 44 dB @ 25°C ambient temperature • Heat dissipation: 389.20 Btu/hr • Mean time between failures (MTBF): 169,522 hours (~19.4 years) @ 25 °C and 83,550 hours (~9.5 years) @ 55 °C ambient temperature
L3 SERVICES – ROUTING	
• L2+ static routing (Subnets, VLANs) • 224 IP routes (L3-capable hardware) • 128 IP interfaces (L3-capable hardware) • IP Source Guard	• L2+ static routing (Subnets, VLANs) • 224 IP routes (L3-capable hardware) • 128 IP interfaces (L3-capable hardware) • IP Source Guard
L3 SERVICES - DHCP	
• DHCP server (1,024 clients) • DHCP L2 relay, DHCP snooping	• DHCP server (1,024 clients) • DHCP L2 relay, DHCP snooping

	GSM7252PS
L3 SERVICES - MULTICAST	
• IGMP querier	• IGMP querier
L2 SERVICES – SWITCHING	
• MAC Address table: 8,000 • ARP cache size: 1,664 • Proxy ARP, Dynamic ARP Inspection	• MAC Address table: 8,000 • ARP cache size: 1,664 • Proxy ARP, Dynamic ARP Inspection
L2 SERVICES – VLANS	
• IEEE 802.1Q static VLAN (up to 1,024 VLANs) out of 4,096 VLAN IDs • IEEE 802.1v Protocol VLAN • Port-based VLAN • MAC-based VLAN • IP subnet-based VLAN • Protocol-based VLAN • Voice VLAN (based on IP phones OUIs) • Guest VLAN with IEEE 802.1x • Auto VLAN Assignment via RADIUS • IEEE 802.1 Q-in-Q (Double-VLAN tagging) • GARP with GVRP/GMRP (automatic registration for membership in VLANs or in multicast groups) • Private VLAN groups	• IEEE 802.1Q static VLAN (up to 1,024 VLANs) out of 4,096 VLAN IDs • IEEE 802.1v Protocol VLAN • Port-based VLAN • MAC-based VLAN • IP subnet-based VLAN • Protocol-based VLAN • Voice VLAN (based on IP phones OUIs) • Guest VLAN with IEEE 802.1x • Auto VLAN assignment via RADIUS • IEEE 802.1 Q-in-Q (double-VLAN tagging) • GARP with GVRP/GMRP (automatic registration for membership in VLANs or in multicast groups) • Private VLAN groups
L2 SERVICES - AVAILABILITY	
• IEEE 802.3ad Link Aggregation (Static or LACP) up to 64 trunks per stack and up to 8 ports per trunk • User selectable LAG hashing algorithm • IEEE 802.1D Spanning Tree Protocol • IEEE 802.1w Rapid Spanning Tree • IEEE 802.1s Multiple Spanning Tree	• IEEE 802.3ad Link Aggregation (Static or LACP) up to 64 trunks per stack and up to 8 ports per trunk • User selectable LAG hashing algorithm • IEEE 802.1D Spanning Tree Protocol • IEEE 802.1w Rapid Spanning Tree • IEEE 802.1s Multiple Spanning Tree
L2 SERVICES – MULTICAST	
• IGMP v1, v2, v3 snooping support • IGMP querier mode support • Static multicast filtering (1,024 multicast groups)	• IGMP v1, v2, v3 snooping support • IGMP querier mode support • Static multicast filtering (1,024 multicast groups)
L2/L3/L4 SERVICES – QOS	
• L2/L3/L4 QoS: MAC, IP, TCP/UDP ports • IEEE 802.1p Class of Service (CoS) • DiffServ QoS (RFC 2998) • Weighted round robin (WRR) queue technology • Strict priority queue technology • Ingress rate limit in 1 Kbps increments • Egress traffic shaping	• L2/L3/L4 QoS: MAC, IP, TCP/UDP ports • IEEE 802.1p Class of Service (CoS) • DiffServ QoS (RFC 2998) • Weighted round robin (WRR) queue technology • Strict priority queue technology • Ingress rate limit in 1 Kbps increments • Egress traffic shaping
L2/L3/L4 SERVICES – SECURITY	
• Access control lists (ACL) L2/L3/L4: MAC, IP, TCP • MAC-based source/destination ACL • IP subnet-based source/destination ACL • Protocol-based source/destination ACL • ACL over VLAN • Dynamic ACLs • 1,024 ACLs • Network storm protection including broadcast multicast and unicast traffic • DoS • ICMP throttling • Protected ports • Port locking • MAC filtering • Port security • DHCP snooping • IP Source Guard • Dynamic ARP inspection • RADIUS (RFC 2865) • RADIUS accounting (RFC 2866) • IEEE 802.1x port access authentication (RADIUS) • Network access control: Captive portal with internal authentication or external RADIUS authentication • Possible configuration of 10 captive portals • TACACS+	• Access control lists (ACL) L2/L3/L4: MAC, IP, TCP • MAC-based source/destination ACL • IP subnet-based source/destination ACL • Protocol-based source/destination ACL • ACL over VLAN • Dynamic ACLs • 1,024 ACLs • Network storm protection including broadcast multicast and unicast traffic • DoS • ICMP throttling • Protected ports • Port locking • MAC filtering • Port security • DHCP snooping • IP Source Guard • Dynamic ARP inspection • RADIUS (RFC 2865) • RADIUS accounting (RFC 2866) • IEEE 802.1x port access authentication (RADIUS) • Network access control: Captive portal with internal authentication or external RADIUS authentication • Possible configuration of 10 captive portals • TACACS+

GSM7252PS

IEEE NETWORK PROTOCOLS	
• IEEE 802.3 Ethernet • IEEE 802.3i 10BASE-T • IEEE 802.3u 100BASE-T • IEEE 802.3ab 1000BASE-T • IEEE 802.3z Gigabit Ethernet 1000BASE-SX/LX • IEEE 802.3ae 10-Gigabit Ethernet • IEEE 802.3af Power over Ethernet • IEEE 802.3at Enhanced Power over Ethernet Layer 2 (LLDP) method • IEEE 802.3ad Trunking (LACP) • IEEE 802.1AB LLDP with ANSI/TIA-1057 (LLDP-MED) • IEEE 802.1D Spanning Tree (STP) • IEEE 802.1s Multiple Spanning Tree (MSTP) • IEEE 802.1w Rapid Spanning Tree (RSTP) • IEEE 802.1p Quality of Service • IEEE 802.1Q VLAN tagging • IEEE 802.1v protocol-based VLAN • IEEE 802.1X Radius Network Access Control • IEEE 802.3x flow control	• IEEE 802.3 Ethernet • IEEE 802.3i 10BASE-T • IEEE 802.3u 100BASE-T • IEEE 802.3ab 1000BASE-T • IEEE 802.3z Gigabit Ethernet 1000BASE-SX/LX • IEEE 802.3ae 10-Gigabit Ethernet • IEEE 802.3af Power over Ethernet • IEEE 802.3at Enhanced Power over Ethernet Layer 2 (LLDP) method • IEEE 802.3ad Trunking (LACP) • IEEE 802.1AB LLDP with ANSI/TIA-1057 (LLDP-MED) • IEEE 802.1D Spanning Tree (STP) • IEEE 802.1s Multiple Spanning Tree (MSTP) • IEEE 802.1w Rapid Spanning Tree (RSTP) • IEEE 802.1p Quality of Service • IEEE 802.1Q VLAN tagging • IEEE 802.1v protocol-based VLAN • IEEE 802.1X Radius Network Access Control • IEEE 802.3x flow control
IETF RFC STANDARDS – SYSTEM FACILITIES	
• RFC 768 UDP • RFC 783 TFTP • RFC 791 IP • RFC 792 ICMP • RFC 793 TCP • RFC 826 Ethernet ARP • RFC 894 transmission of IP datagrams over Ethernet networks • RFC 896 congestion control in IP/TCP networks • RFC 951 BOOTP • RFC 1321 message-digest algorithm • RFC 1534 interoperation between BOOTP and DHCP • RFC 2131 DHCP client/server • RFC 2132 DHCP options & BOOTP vendor extensions • RFC 2030 Simple Network Time Protocol (SNTP) version 4 for IPv4, IPv6 and OSI • RFC 2865 RADIUS Client (both switch and management access) • RFC 2866 RADIUS Accounting • RFC 2868 RADIUS attributes for Tunnel Protocol support • RFC 2869 RADIUS Extensions • RFC2869bis RADIUS support for Extensible Authentication Protocol (EAP) • RFC 3164 The BSD Syslog Protocol • RFC 3580 802.1X RADIUS usage guidelines (VLAN assignment via RADIUS, dynamic VLAN)	• RFC 768 UDP • RFC 783 TFTP • RFC 791 IP • RFC 792 ICMP • RFC 793 TCP • RFC 826 Ethernet ARP • RFC 894 transmission of IP datagrams over Ethernet networks • RFC 896 congestion control in IP/TCP networks • RFC 951 BOOTP • RFC 1321 message-digest algorithm • RFC 1534 interoperation between BOOTP and DHCP • RFC 2131 DHCP client/server • RFC 2132 DHCP options & BOOTP vendor extensions • RFC 2030 Simple Network Time Protocol (SNTP) version 4 for IPv4, IPv6 and OSI • RFC 2865 RADIUS Client (both switch and management access) • RFC 2866 RADIUS Accounting • RFC 2868 RADIUS attributes for Tunnel Protocol support • RFC 2869 RADIUS Extensions • RFC2869bis RADIUS support for Extensible Authentication Protocol (EAP) • RFC 3164 The BSD Syslog Protocol • RFC 3580 802.1X RADIUS usage guidelines (VLAN assignment via RADIUS, dynamic VLAN)
IETF RFC STANDARDS – SWITCHING MIB	
• RFC 1213 MIB-II • RFC 1493 Bridge MIB • RFC 1643 Ethernet-like MIB • RFC 2233 The Interfaces Group MIB using SMI v2 • RFC 2674 VLAN MIB • RFC 2613 SMON MIB • RFC 2618 RADIUS Authentication Client MIB • RFC 2620 RADIUS Accounting MIB • RFC 2737 Entity MIB version 2 • RFC 2819 RMON Groups 1,2,3 & 9 • IEEE 802.1X MIB (IEEE 802.1-PAE-MIB 2004 Revision) • IEEE 802.1AB – LLDP MIB • ANSI/TIA 1057 – LLDP-MED MIB • Private Enterprise MIBs supporting switching features	• RFC 1213 MIB-II • RFC 1493 Bridge MIB • RFC 1643 Ethernet-like MIB • RFC 2233 The Interfaces Group MIB using SMI v2 • RFC 2674 VLAN MIB • RFC 2613 SMON MIB • RFC 2618 RADIUS Authentication Client MIB • RFC 2620 RADIUS Accounting MIB • RFC 2737 Entity MIB version 2 • RFC 2819 RMON Groups 1,2,3 & 9 • IEEE 802.1X MIB (IEEE 802.1-PAE-MIB 2004 Revision) • IEEE 802.1AB – LLDP MIB • ANSI/TIA 1057 – LLDP-MED MIB • Private Enterprise MIBs supporting switching features

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IETF RFC STANDARDS – QOS	
• RFC 2474 definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 headers • RFC 2475 an architecture for differentiated services • RFC 2597 Assured Forwarding PHB Group • RFC 3246 An Expedited Forwarding PHB (Per-Hop Behavior) • RFC 3260 New Terminology and Clarifications for DiffServ • RFC 3289 Management Information Base for the Differentiated Services Architecture (read-only) • Private MIBs for full configuration of DiffServ, ACL and CoS functionality	• RFC 2474 definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 headers • RFC 2475 an architecture for differentiated services • RFC 2597 Assured Forwarding PHB Group • RFC 3246 An Expedited Forwarding PHB (Per-Hop Behavior) • RFC 3260 New Terminology and Clarifications for DiffServ • RFC 3289 Management Information Base for the Differentiated Services Architecture (read-only) • Private MIBs for full configuration of DiffServ, ACL and CoS functionality
IETF RFC STANDARDS – MANAGEMENT	
• RFC 854 Telnet • RFC 855 Telnet Option • RFC 1155 SMI v1 • RFC 1157 SNMP • RFC 1212 Concise MIB Definitions • RFC 1867 HTML/2.0 Forms with file upload extensions • RFC 1901 Community-based SNMP v2 • RFC 1908 Coexistence between SNMP v1 & SNMP v2 • RFC 2068 HTTP/1.1 protocol as updated by draft-ietf-http-v11-spec-rev-03 • RFC 2271 SNMP Framework MIB • RFC 2295 Transparent Content Negotiation • RFC 2296 Remote Variant Selection; RSVA/1.0 State Management "cookies" – draft-ietf-http-state-mgmt-05 • RFC 2576 Coexistence between SNMP v1, v2 and v3 • RFC 2578 SMI v2 • RFC 2579 Textual Conventions for SMI v2 • RFC 2580 Conformance statements for SMI v2 • RFC 3410 Introduction and Applicability Statements for Internet Standard Management Framework • RFC 3411 An Architecture for Describing SNMP Management Frameworks • RFC 3412 Message Processing & Dispatching • RFC 3413 SNMP Applications • RFC 3414 User-based Security Model • RFC 3415 View-based Access Control Model • RFC 3416 Version 2 of SNMP Protocol Operations • RFC 3417 Transport Mappings • RFC 3418 Management Information Base(MIB) for the Simple Network Management Protocol (SNMP) • SSL 3.0 and TLS 1.0 - RFC 2246 The TLS Protocol, Version 1.0 - RFC 2818 HTTP over TLS - RFC 2346 AES Ciphersuites for Transport Layer Security • SSH 1.5 and 2.0 - RFC 4253 SSH Transport Layer Protocol - RFC 4252 SSH Authentication Protocol - RFC 4254 SSH Connection Protocol - RFC 4251 SSH Protocol Architecture - RFC 4716 SECSH Public Key File Format - RFC 4419 Diffie-Hellman Group Exchange for the SSH - Transport Layer Protocol	• RFC 854 Telnet • RFC 855 Telnet Option • RFC 1155 SMI v1 • RFC 1157 SNMP • RFC 1212 Concise MIB Definitions • RFC 1867 HTML/2.0 Forms with file upload extensions • RFC 1901 Community-based SNMP v2 • RFC 1908 Coexistence between SNMP v1 & SNMP v2 • RFC 2068 HTTP/1.1 protocol as updated by draft-ietf-http-v11-spec-rev-03 • RFC 2271 SNMP Framework MIB • RFC 2295 Transparent Content Negotiation • RFC 2296 Remote Variant Selection; RSVA/1.0 State Management "cookies" – draft-ietf-http-state-mgmt-05 • RFC 2576 Coexistence between SNMP v1, v2 and v3 • RFC 2578 SMI v2 • RFC 2579 Textual Conventions for SMI v2 • RFC 2580 Conformance statements for SMI v2 • RFC 3410 Introduction and Applicability Statements for Internet Standard Management Framework • RFC 3411 An Architecture for Describing SNMP Management Frameworks • RFC 3412 Message Processing & Dispatching • RFC 3413 SNMP Applications • RFC 3414 User-based Security Model • RFC 3415 View-based Access Control Model • RFC 3416 Version 2 of SNMP Protocol Operations • RFC 3417 Transport Mappings • RFC 3418 Management Information Base(MIB) for the Simple Network Management Protocol (SNMP) • SSL 3.0 and TLS 1.0 - RFC 2246 The TLS Protocol, Version 1.0 - RFC 2818 HTTP over TLS - RFC 2346 AES Ciphersuites for Transport Layer Security • SSH 1.5 and 2.0 - RFC 4253 SSH Transport Layer Protocol - RFC 4252 SSH Authentication Protocol - RFC 4254 SSH Connection Protocol - RFC 4251 SSH Protocol Architecture - RFC 4716 SECSH Public Key File Format - RFC 4419 Diffie-Hellman Group Exchange for the SSH - Transport Layer Protocol

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MANAGEMENT	
• SNMP v1, v2c, v3 with multiple IP addresses • Port mirroring support (many-to-one) • Flow-based mirroring • Syslog • TFTP, SFTP, HTTP, SCP, or local USB flash for Configuration files and firmware upgrades • Runtime image download (TFTP) • Port description • sFlow® • Web-based graphic user interface (GUI) • Command Line interface (CLI) • IPv6 Management • Cable Test • SSLv3/TLSv1.0 Web security for the GUI • Secure Shell (SSHv1, v2) for CLI • Telnet sessions for management CPU (5 sessions) • Configurable management VLAN • Auto Install • Admin access control via RADIUS or TACACS+	• SNMP v1, v2c, v3 with multiple IP addresses • Port mirroring support (many-to-one) • Flow-based mirroring • Syslog • TFTP, SFTP, HTTP, SCP, or local USB flash for Configuration files and firmware upgrades • Runtime image download (TFTP) • Port description • sFlow® • Web-based graphic user interface (GUI) • Command line interface (CLI) • IPv6 Management • Cable Test • SSLv3/TLSv1.0 Web security for the GUI • Secure Shell (SSHv1, v2) for CLI • Telnet sessions for management CPU (5 sessions) • Configurable management VLAN • Auto Install • Admin access control via RADIUS or TACACS+
LEDS	
• Per port: Speed, link, activity • Per device: Power, fan status, stack ID, • RPS, master	• Per port: Speed, link, activity • Per device: Power, fan status, stack ID, • RPS, master
PHYSICAL SPECIFICATIONS	
• Dimensions (w x d x h): 440 x 391 x 43 mm (17.3 x 15.4 x 1.7 in) • Weight: 6.3 kg (13.89 lb)	• Dimensions (w x d x h): 440 x 391 x 43 mm (17.3 x 15.4 x 1.7 in) • Weight: 6.8 kg (14.99 lb)
POWER CONSUMPTION	
• 545W maximum 100–240V AC, 50–60 Hz universal input when PoE output 384W (all ports used)	• 570W maximum 100–240V AC, 50–60 Hz universal input when PoE output 384W (all ports used)
ENVIRONMENTAL SPECIFICATIONS	
Operating: • temperature: 32° to 122°F (0° to 50°C) • humidity: 90% maximum relative humidity, non-condensing • altitude: 10,000 ft (3,000 m) maximum Storage: • temperature: – 4° to 158°F (–20° to 70°C) • humidity: 95% maximum relative humidity, non-condensing • altitude: 10,000 ft (3,000 m) maximum	Operating: • temperature: 32° to 122°F (0° to 50°C) • humidity: 90% maximum relative humidity, non-condensing • altitude: 10,000 ft (3,000 m) maximum Storage: • temperature: – 4° to 158°F (–20° to 70°C) • humidity: 95% maximum relative humidity, non-condensing • altitude: 10,000 ft (3,000 m) maximum
ELECTROMAGNETIC EMISSIONS AND IMMUNITY	
• CE mark, commercial • FCC Part 15 Class A, VCCI Class A • Class A EN 55022 (CISPR 22) Class A • Class A C-Tick • EN 50082-1 • EN 55024	• CE mark, commercial • FCC Part 15 Class A, VCCI Class A • Class A EN 55022 (CISPR 22) Class A • Class A C-Tick • EN 50082-1 • EN 55024
SAFETY	
• CE mark, commercial • CSA certified (CSA 22.2 #950) • UL listed (UL 1950)/cUL IEC 950/EN 60950	• CE mark, commercial • CSA certified (CSA 22.2 #950) • UL listed (UL 1950)/cUL IEC 950/EN 60950
PACKAGE CONTENT	
• ProSafe® 24-port Stackable, Gigabit PoE L2+ Managed Switch (GSM7228PS) • Power cord • Rubber footpads for tabletop installation • Rubber caps for the SFP and SFP+ sockets • Rack-mounting kit • Null-modem serial cable (RS-232) with 9-pin connector • Resource CD • ProSafe NMS100 Network Management System 30-day trial CD-ROM	• ProSafe® 48-port Stackable, Gigabit PoE L2+ Managed Switch (GSM7252PS) • Power cord • Rubber footpads for tabletop installation • Rubber caps for the SFP and SFP+ sockets • Rack-mounting kit • Null-modem serial cable (RS-232) with 9-pin connector • Resource CD • ProSafe NMS100 Network Management System 30-day trial CD-ROM

GSM7228PS	GSM7252PS
WARRANTY AND SUPPORT	
• ProSafe Lifetime Warranty†	• ProSafe Lifetime Warranty†
• ProSupport Lifetime 24x7 Advanced Technical Support*	• ProSupport Lifetime 24x7 Advanced Technical Support*
• Next business day onsite hardware replacement support, 3 years (included)**	• Next business day onsite hardware replacement support, 3 years (included)**
MODULES & ACCESSORIES	
• AFM735 100BASE-FX SFP GBIC	• AFM735 100BASE-FX SFP GBIC
• AGM731F 1000BASE-SX SFP GBIC	• AGM731F 1000BASE-SX SFP GBIC
• AGM732F 1000BASE-LX SFP GBIC	• AGM732F 1000BASE-LX SFP GBIC
• AXM761 10GBASE-SR SFP+ GBIC	• AXM761 10GBASE-SR SFP+ GBIC
• AXM762 10GBASE-LR SFP+ GBIC	• AXM762 10GBASE-LR SFP+ GBIC
• AXM763 10GBASE-LRM SFP+ GBIC (Long Reach Multimode)	• AXM763 10GBASE-LRM SFP+ GBIC (Long Reach Multimode)
• AX742 24Gigabit Stacking Kit	• AX742 24Gigabit Stacking Kit
• AX743 10Gigabit SFP+ Adapter Module	• AX743 10Gigabit SFP+ Adapter Module
• AX744 10Gigabit CX4 Module	• AX744 10Gigabit CX4 Module
• APS525W Power Supply Spare Module	• APS525W Power Supply Spare Module
• RPS5412 Optimal Power® External Redundant Power Supply	• RPS5412 Optimal Power® External Redundant Power Supply
ORDERING INFORMATION	
Americas • GSM7228PS-100NAS Europe • GSM7228PS-100EUS Asia • GSM7228PS-100AJS	Americas • GSM7252PS-100NAS Europe • GSM7252PS-100EUS Asia • GSM7252PS-100AJS
PROSUPPORT™ SERVICE PACKS	
• XPressHW, Category 3: PRR0333 (3-year next-business day hardware replacement contract, applicable where next business day onsite hardware replacement is not available)	• XPressHW, Category 4: PRR0334 (3-year next-business day hardware replacement contract, applicable where next business day onsite hardware replacement is not available)
LAYER 3 LICENCE UPGRADES	
All regions * GSM7228PL-10000S (See details Page 14)	All regions * GSM7252PL-10000S (See details Page 14)

	GSM7228PS + GSM7228PL	GSM7252PS + GSM7252PL
ADDITIONAL TECHNICAL SPECIFICATIONS, WITH LAYER 3 LICENSE UPGRADE		
L3 SERVICES – ROUTING		
	• IPv4/IPv6 unicast dynamic routing • RIP v1/v2 (IPv4) • OSPF v2/v3 (IPv4) • OSPFv3 (IPv6) • OSPF equal-cost multi-path (4 - ECMP routes) • VRRP 64 instances (IPv4) • IPv6 tunnel support • ICMPv6	• IPv4/IPv6 unicast dynamic routing • RIP v1/v2 (IPv4) • OSPF v2/v3 (IPv4) • OSPFv3 (IPv6) • OSPF equal-cost multi-path (4 - ECMP routes) • VRRP 64 instances (IPv4) • IPv6 tunnel support • ICMPv6
L3 SERVICES – DHCP		
	• IPv6 DHCP Server (1,024 clients) • IPv6 DHCP/ BOOTP Relay • IPv6 DHCP Snooping • DNSv6 support	• IPv6 DHCP Server (1,024 clients) • IPv6 DHCP/ BOOTP Relay • IPv6 DHCP Snooping • DNSv6 support
L3 SERVICES - MULTICAST		
	• IPv4/IPv6 multicast streams routing between VLANs, subnets or different networks • IPv4/IPv6 PIM-SM (sparse Mode) • IPv4/IPv6 PIM-DM (dense Mode) • Distance Vector Multicast Routing Protocol (DVMRP) • Neighbor discovery	• IPv4/IPv6 multicast streams routing between VLANs, subnets or different networks • IPv4/IPv6 PIM-SM (sparse Mode) • IPv4/IPv6 PIM-DM (dense Mode) • Distance Vector Multicast Routing Protocol (DVMRP) • Neighbor discovery
L2 SERVICES – MULTICAST		
	• IPv6: MLD v1, v2 snooping support • MLD proxy	• IPv6: MLD v1, v2 snooping support • MLD proxy
L2/L3/L4 SERVICES – QOS		
	• IPv6 L2/L3/L4 QoS: MAC, IP, TCP/UDP ports	• IPv6 L2/L3/L4 QoS: MAC, IP, TCP/UDP ports
L2/L3/L4 SERVICES – SECURITY		
	•IPv6 Access Control Lists (ACL) L2/L3/L4: MAC, IP, TCP	• IPv6 Access Control Lists (ACL) L2/L3/L4: MAC, IP, TCP
IETF RFC STANDARDS – IPV4 ROUTING		
	• RFC 1027 Using ARP to implement Transparent Subnet Gateways (Proxy ARP) • RFC 1256 ICMP Router Discovery Messages • RFC 1765 OSPF Database Overflow • RFC 1812 Requirements for IP Version 4 Routers • RFC 2082 RIP-2 MD5 Authentication • RFC 2131 DHCP Relay • RFC 2328 OSPF Version 2 • RFC 2370 The OSPF Opaque LSA Option • RFC 2453 RIP v2 • RFC 3046 DHCP Relay Agent Information Option • RFC 3101 The OSPF "Not So Stubby Area" (NSSA) Option • RFC 3137 OSPF Stub Router Advertisement • RFC 3768 VRRP – Virtual Router Redundancy Protocol • Route Redistribution across RIP, OSPF and BGP • VLAN Routing	• RFC 1027 Using ARP to implement Transparent Subnet Gateways (Proxy ARP) • RFC 1256 ICMP Router Discovery Messages • RFC 1765 OSPF Database Overflow • RFC 1812 Requirements for IP Version 4 Routers • RFC 2082 RIP-2 MD5 Authentication • RFC 2131 DHCP Relay • RFC 2328 OSPF Version 2 • RFC 2370 The OSPF Opaque LSA Option • RFC 2453 RIP v2 • RFC 3046 DHCP Relay Agent Information Option • RFC 3101 The OSPF "Not So Stubby Area" (NSSA) Option • RFC 3137 OSPF Stub Router Advertisement • RFC 3768 VRRP – Virtual Router Redundancy Protocol • Route Redistribution across RIP, OSPF and BGP • VLAN Routing
IETF RFC STANDARDS – IPV4 ROUTING MIB		
	• RFC 1724 RIP v2 MIB Extension • RFC 1850 OSPF MIB • RFC 2096 IP Forwarding Table MIB • RFC 2787 VRRP MIB • Private Enterprise MIB supporting Routing features	• RFC 1724 RIP v2 MIB Extension • RFC 1850 OSPF MIB • RFC 2096 IP Forwarding Table MIB • RFC 2787 VRRP MIB • Private Enterprise MIB supporting Routing features
IETF RFC STANDARDS – MULTICAST		

GSM7228PS + GSM7228PL	GSM7252PS + GSM7252PL
• RFC 1112 Host Extensions for IP Multicasting • RFC 2236 Internet Group Management Protocol, Version 2 • RFC 2365 Administratively Scoped IP Multicast • RFC 2710 Multicast Listener Discovery (MLD) for IPv6 • RFC 3376 Internet Group Management Protocol, Version 3 • RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6 • RFC 3973 Protocol Independent Multicast - Dense Mode (PIM-DM) • RFC 4601 Protocol Independent Multicast - Sparse Mode (PIM-SM) • draft-ietf-idmr-dvmrp-v3-10 Distance Vector Multicast Routing Protocol • draft-ietf-magma-igmp-proxy-06 IGMP/MLD-based Multicast Forwarding ("IGMP/MLD Proxying") • draft-ietf-magma-igmpv3-and-routing-05 IGMPv3/MLDv2 and Multicast Routing Protocol Interaction • draft-ietf-pim-sm-bsr-05 Bootstrap Router (BSR) Mechanism for PIM	• RFC 1112 Host Extensions for IP Multicasting • RFC 2236 Internet Group Management Protocol, Version 2 • RFC 2365 Administratively Scoped IP Multicast • RFC 2710 Multicast Listener Discovery (MLD) for IPv6 • RFC 3376 Internet Group Management Protocol, Version 3 • RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6 • RFC 3973 Protocol Independent Multicast - Dense Mode (PIM-DM) • RFC 4601 Protocol Independent Multicast - Sparse Mode (PIM-SM) • draft-ietf-idmr-dvmrp-v3-10 Distance Vector Multicast Routing Protocol • draft-ietf-magma-igmp-proxy-06 IGMP/MLD-based Multicast Forwarding ("IGMP/ MLD Proxying") • draft-ietf-magma-igmpv3-and-routing-05 IGMPv3/MLDv2 and Multicast Routing Protocol Interaction • draft-ietf-pim-sm-bsr-05 Bootstrap Router (BSR) Mechanism for PIM
IETF RFC STANDARDS – MULTICAST MIB	
• RFC 2932 IPv4 Multicast Routing MIB • RFC 5060 Protocol Independent Multicast MIB • draft-ietf-idmr-dvmrp-mib-11 Distance-Vector Multicast Routing Protocol MIB • draft-ietf-magma-mgmd-mib-05 Multicast Group Membership Discovery MIB • draft-ietf-pim-bsr-mib-06 PIM Bootstrap Router MIB • Private Enterprise MIB supporting Multicast features	• RFC 2932 IPv4 Multicast Routing MIB • RFC 5060 Protocol Independent Multicast MIB • draft-ietf-idmr-dvmrp-mib-11 Distance-Vector Multicast Routing Protocol MIB • draft-ietf-magma-mgmd-mib-05 Multicast Group Membership Discovery MIB • draft-ietf-pim-bsr-mib-06 PIM Bootstrap Router MIB • Private Enterprise MIB supporting Multicast features
IETF RFC STANDARDS – IPV6 ROUTING	
• RFC 1981 – Path MTU for IPv6 • RFC 2460 – IPv6 Protocol Specification • RFC 2461 – Neighbor Discovery • RFC 2462 – Stateless Auto configuration • RFC 2464 – IPv6 over Ethernet • RFC 2711 – IPv6 Router Alert • RFC 2740 – OSPFv3 • RFC 3056 – Connection of IPv6 Domains via IPv4 Clouds • RFC 3315 – DHCPv6 (stateless + relay) • RFC 3484 – Default Address Selection for IPv6 • RFC 3493 – Basic Socket Interface for IPv6 • RFC 3542 – Advanced Sockets API for IPv6 • RFC 3587 – IPv6 Global Unicast Address Format • RFC 3736 – Stateless DHCPv6 • RFC 4213 – Basic Transition Mechanisms for IPv6 • RFC 4291 – Addressing Architecture for IPv6 • RFC 4443 – ICMPv6	• RFC 1981 – Path MTU for IPv6 • RFC 2460 – IPv6 Protocol Specification • RFC 2461 – Neighbor Discovery • RFC 2462 – Stateless Auto configuration • RFC 2464 – IPv6 over Ethernet • RFC 2711 – IPv6 Router Alert • RFC 2740 – OSPFv3 • RFC 3056 – Connection of IPv6 Domains via IPv4 Clouds • RFC 3315 – DHCPv6 (stateless + relay) • RFC 3484 – Default Address Selection for IPv6 • RFC 3493 – Basic Socket Interface for IPv6 • RFC 3542 – Advanced Sockets API for IPv6 • RFC 3587 – IPv6 Global Unicast Address Format • RFC 3736 – Stateless DHCPv6 • RFC 4213 – Basic Transition Mechanisms for IPv6 • RFC 4291 – Addressing Architecture for IPv6 • RFC 4443 – ICMPv6
IETF RFC STANDARDS – IPV6 ROUTING MIB	
• RFC 2465 – IPv6 MIB • RFC 2466 – ICMPv6 MIB	• RFC 2465 – IPv6 MIB • RFC 2466 – ICMPv6 MIB

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