ALAXALA compact gigabit multi-layer switch

AX3650S Series

1. Overview

The AX3650S series of ALAXALA compact gigabit multilayer switches are available in the following three models. The AX3650S series consists of a redundant power supply (W) model that can be used with AC and DC power and supports hot-swap power supply redundancy.

Figure 1 to Figure 3 are photos of the AX3650S series models.



Figure 1: AX3650S-24T6XW



Figure 2: AX3650S-20S6XW



Figure 3: AX3650S-48T4XW

1.1 Product Concept

The AX3600S series offers compact, box-type, multilayer switches. They inherit the carrier-grade switch technology (which has been developed to implement "guaranteed networks", ALAXALA's main focus) with a good balance of function, switching performance, and cost-effectiveness required by corporate networks.

The AX3650S series offers stack functionality that connects multiple devices and operates them logically as a single device, and network partitioning that enables network integration and separation through virtualization. This allows you to create low-cost and highly-reliable virtual networks.

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1.2 Usage Examples

As core switches for enterprise or small to medium-size networks or user grouping switches for providers, the AX3600S series models are appropriate for a wide range of uses.

As part of the product line, the AX3650S series offers high-grade models for ISPs, the public sector (owned operated networks), and the educational market, supporting stack functionality, network partitioning (VRF functionality), power saving functionality, and expanded capacity limits.

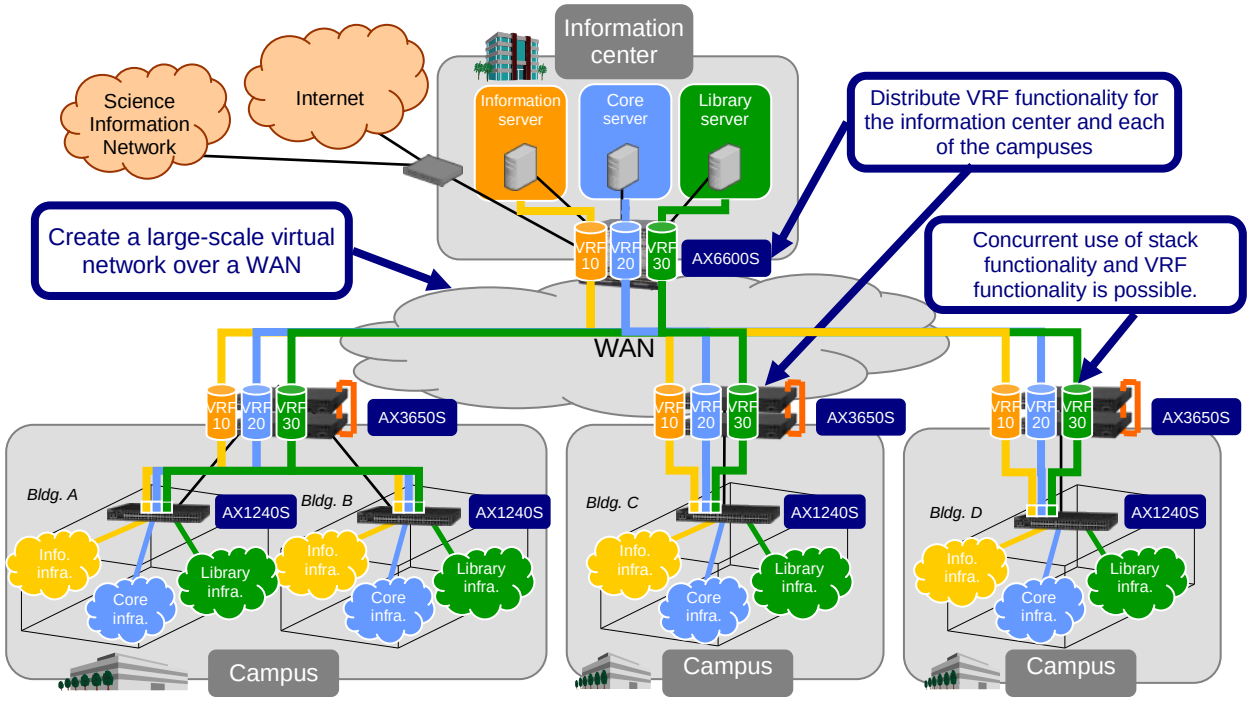


Figure 4: Example of using switches in a campus network

Table 1: Switch Usage Example

Switch usage example		Point
(1) Site-connecting network	Customer edge	- Integration of different networks by using network partitioning - Stable operation of OSPF and other routing protocols - Support for IPv6, multicasts, and other advanced functionality - High reliability (VRRP polling and GSRP) - Compact chassis. 1U size for all models.
(2) Large-size local-area network	Distribution switch	- Line redundancy by using stack functionality - 10-G system - Security functionality (flow monitoring, authentication, quarantine) - TCO reduction (power consumption and operation manageability) - Compact chassis. 1U size for all models.
(3) Small/medium-size local-area network	Core switch	- Capability of having a large number of ports and switch redundancy by using stack functionality - Medium-size core switch for housing wireless AP and IP phones - Security functionality (flow monitoring, authentication, quarantine) - TCO reduction (power consumption and operation manageability) - Compact chassis. 1U size for all models
(4) Server farm	Server grouping switch	- Server teaming by using stack functionality - Multiple 1-G ports - 10-G uplink - TCO reduction (power consumption and operation manageability) - Compact chassis. 1U size for all models

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2. Features

2.1 Features of the AX3650S Series

(1) Network partitioning

- Horizontal and vertical network integration reduces costs.
  - By using the VRF functionality, which virtually combines logically separated switches into a single switch, networks that were once physically separate entities can exist within one physical network.
  - Networks can be easily constructed and managed by placing Layer 3 switches at a central location and then connecting them to Layer 2 switches at individual offices and sites.
  - Deploying Layer 3 box switches with VRF support in each location makes it possible to virtualize a wide-area network with many locations.

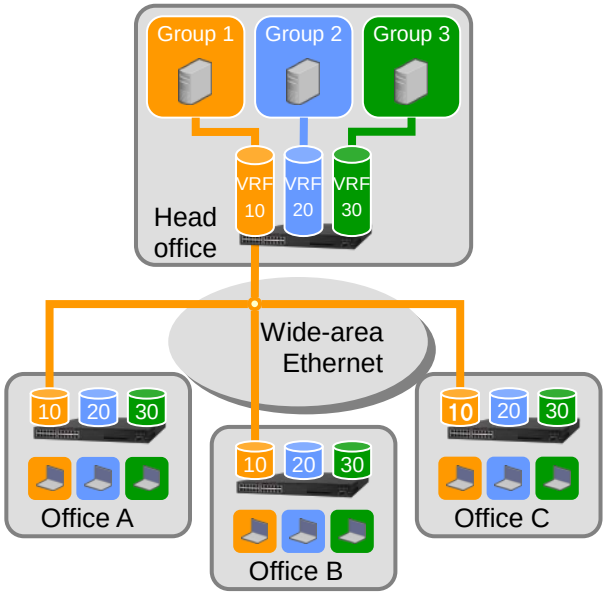


Figure 5: Network Partitioning

(2) Stack functionality that enables fault-tolerant switches

- Highly scalable fault-tolerant switches
  - By configuring a device consisting of multiple devices, communication can continue even if a partial fault occurs.
  - By adding devices, the number of available ports can be increased.
- Traffic forwarding that is not dependent on the bandwidth of stack ports
  - If traffic is forwarded to a link aggregation where ports are on multiple member switches, the traffic can be forwarded from the link aggregation port of the member switch containing the line that received the traffic.
- Non-stop software update
  - Software can be updated without interrupting network communication by switching between the master and backup switches.
- Reduction in costs through centralized management
  - By using multiple devices as a single device, centralized management is possible.
- Display of stack information by using a system operation panel

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(3) Proven routing functionality
- Sophisticated and stable routing
  - Each model provides a site-to-site connection based on wide-area Ethernet and IP-VPN services with reliable routing based on OSPF and BGP functionality and load distribution based on multipaths.
- Excellent support for IPv4 routing protocols
  - Supports a wealth of proven IPv4 routing protocols (Static, RIP, OSPF, BGP4, PIM-SM/SSM, and IGMP)
- Policy-based routing
  - Supports policy-based routing in which optimal routes are selected according to the status of a forwarding destination.

(4) Excellent support for IPv6 functionality
- IPv6 multicast support
  - The same peak performance for both IPv4 and IPv6
- IPv6 routing at full-wire speed over 10-G Ethernet
- Wealth of IPv6 routing protocols (static, RIPng, OSPFv3, BGP4+, PIM-SM, PM-SSM, and MLD) for building flexible IPv6 networks of every description
- Supports a variety of functionalities such as IPv4/v6 dual stack, network management (SNMP over IPv6), and authentication management (RADIUS over IPv6) in IPv6-only environments.
- Support for IPv6 Ready Logo Ph.2
  - In addition to phase 1 functionality, phase 2 functionality is supported to provide practical IPv6 that more strictly conforms to specifications.

(5) High reliability for configuring mission-critical networks
- High product quality
  - High reliability assured through exacting component selection and strict design and testing standards
  - Adding an additional power supply (for a total of two) provides power supply redundancy.
  - Stable routing through inheritance of software proven through use by carriers and ISPs
- Variety of redundant network configurations
  - High-speed path switching
    Autonomous Extensible Ring Protocol, Rapid Spanning Tree Protocols (IEEE 802.1w, IEEE 802.1s), Uplink Redundant, GSRP (Note 1), Link Aggregation (IEEE 802.3ad), Hot Standbys (VRRP), Static/VRRP Polling (Note 2), and more
  - Load balancing
    Equal traffic balancing at the IP level based on OSPF equal-cost multipath routing
- L2 loop avoidance
  - The UDLD functionality prevents loops at the spanning tree or frame loss at link aggregation.
  - The L2 loop detection functionality prevents loops by detecting improperly connected devices on the network.

(Note 1) GSRP (Gigabit Switch Redundancy Protocol)
For more information, see the manual on our website.
(Note 2) A monitoring functionality that uses polling to check access on a specified route for rerouting by dynamically interlocking VRRP and static routing.

(6) Power saving
- Power saving functionality
  - Ability to control power supply to ports, LEDs, and the switch according to your particular operating conditions.
- Scheduling
  - The switch can control power supply to ports and the switch itself according to specified schedules for long holidays, Saturdays, Sundays, public holidays, or nighttime. Power supply control can also be automatically disabled.
- Graphic power consumption information
  - Consumed power and total consumption display with operation commands and MIBs.
- Low power consumption
  - Low power consumption-oriented architecture design and part selection, thereby contributing to TCO reduction after installation.

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(7) Supporting 10-G uplinks
- By combining the AX3800S, AX6300S, AX6600S, or AX6700S series in a local area network, the series models provide a high-performance 10-G network.
- For 10-G Ethernet, SFP+ is used as the optical transceiver. SFP/SFP+ ports allow smooth transition from 1-G Ethernet to 10-G Ethernet.

(8) Easy-to-operate user interface (configuration commands)
- Industry-standard command line interface is supported.
  - Same format is used for the input commands and configuration information for improved ease of operation.
  - Copying and pasting of configuration information is supported.

(9) Excellent network management, maintenance, and operation
- CFM (Connectivity Fault Management) (Ether OAM)
  - Connectivity monitoring and failure management are available at the Layer 2 level by performing continuity checks (CC), loopbacks, and linktraces.
- In addition to the basic MIB-II, many other MIBs including IPv6-MIB and RMON are supported.
- The mirror port functionality can be used to monitor and analyze traffic (at both of the receiving and sending ports).
- Online maintenance
  - It is possible to continue communication through partial reboot at the time of configuration change.
- Support for SD memory cards
  - Users can easily back up the configuration and save error information.
  - Maintenance tasks are simplified.
- Device cooling system fit for stable operation
  - Each model has an intake at the front and an exhaust hole at the rear; when mounted in a rack, it is less likely to be affected by the exhaust heat from the other devices, offering stabler operation.
- sFlow allows detailed flow statistic information to be retrieved.

(10) Guaranteed communication quality by using powerful hardware-based QoS functionality
- High-performance hardware-based QoS processing
- Precise QoS control by specification of detailed parameters (Layer 2/3/4 headers)
- Variety of QoS control functionality
  - L2-QoS (including IEEE 802.1p, bandwidth controls, priority controls, and discard controls) and IP-QoS (including Diff-Serv, bandwidth controls, priority controls, and discard controls)

(11) Robust security
- Advanced and fine-grained packet filtering
  - Hardware-based high-performance filtering processes are available.
  - With the outbound filtering functionality, each model can efficiently consolidate security rules on a destination network basis.
  - Partial specification of Layer 2/3/4 headers
  - Scalability with multiple conditions acceptable
    The maximum numbers of filter entries can be defined as 4096 for IN per device and 1024 for OUT per device.
- Layer 2 VPN based on VLAN tunneling
- IEEE 802.1X, which provides a high level of operation security, is supported.
- Various VLANs are supported (Port VLANs, protocol VLANs, MAC VLANs, and VLAN tags).
- It is possible to use RADIUS or TACACS+ to restrict issuable commands for each log-in password authentication and user.
- Unauthorized DHCP servers and terminals with fixed IP addresses are excluded from networks.
  - Each model provides robust security by eliminating unauthorized DHCP servers and terminals with fixed IP addresses using DHCP snooping.

(12) Network authentication
- Eliminating unauthorized users
  - Brought-in PCs and other devices without the capability to be managed via security measures cannot be connected to a network.
  - Preventing outsiders from accessing the network
- Protecting server information
  - Department servers installed without authorization are not properly made inaccessible to unauthorized users (password protected) in many cases; such servers are disabled and cannot be

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connected to a network (unlimited use of servers that are not properly made inaccessible to unauthorized users may lead to information leaks; information leaks are prevented on the network side.)
  - Access to servers by users without access rights is limited (dynamic VLANs are used).
- Protecting client PCs
  - Client PCs, which are likely to not be properly blocked to unauthorized users, are protected from unauthorized access to prevent information leaks.
- Problem occurrence traceability
  - Based on the unsuccessful authentication history, when and by whom unauthorized access occurs is checked.
  - When improper network use is discovered, when and by whom the network access occurs is checked based on the successful authentication history.
- Authentication under an environment where different types of computers coexist
  - Even in a mixed network of different types of computers, the series models can perform network authentication by supporting three different authentic methods: the IEEE 802.1X functionality, Web authentication, and MAC-based authentication.
- Significant reduction in total cost
  - It is possible to perform network authentication even when access is made via an island hub in an environment where no terminal is directly housed in the floor switches. It is possible to increase user capacity at a low cost by using island hubs.

(13) Quarantine network
- Security checks
  - The network prevents information leaks by quarantining PCs that violate the security policy, including PCs with unauthorized software installed or unpatched PCs.
  - The network prohibits access from infected PCs that may compromise information systems on business networks.
  - Quarantine networks reduce the operation cost by letting the quarantine server centrally manage the security policy for terminals.
- The network can work together with many quarantine systems:
  - Microsoft NAP
  - NOSiDE (NTT Data)
  - JP1 (Hitachi, Ltd.)
  - InfoCage (NEC)

(14) High-performance, high-density and compact design
- Maximum switch capacity of 176 Gbits/s (AX3650S-48T4XW)
  - Multi ports like gigabit Ethernet can be accommodated.
- Excellent performance
  - Distribution for large networks, core switches for small to medium-size networks, and multilayer switches for customer edge switches
- Compact chassis
  - High port density supporting 48 ports maximum of 10BASE-T / 100BASE-TX / 1000BASE-T
  - 26 ports maximum of 1000BASE-X (SFP) are supported (AX3650S-20S6XW).
  - Compact sizes with the depth of 50.0 cm and height of 4.3 cm (1 U)

(15) Excellent support for Layer 2 functionality
- Variety of VLAN functionality
  - Port VLAN, protocol VLAN, MAC VLAN, and VLAN tag implemented
  - Enables purpose-built VLANs
- Various Spanning Tree Protocols supported
  - STP (IEEE 802.1D), Rapid STP (IEEE 802.1w), PVST+, and MSTP (IEEE 802.1s) implemented
- Ring protocol
  - Autonomous Extensible Ring Protocol implemented, allowing a variety of ring network configurations. Fast and stable Layer 2 redundancy.

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3. Specifications

3.1 Switch Specifications

The AX3650S series offers the following models, which are based on a unified architecture.

The AX3650S series only includes a redundant power supply model, and allows you to achieve power system redundancy by installing two power supplies.

Table 2 shows the specifications of AX3650S series switches.

Table 2: Switch specifications

Specifications								
Model name			AX3650S-24T6XW		AX3650S-20S6XW		AX3650S-48T4XW	
Maximum switching capacity			168 Gbit/s		168 Gbit/s		176 Gbit/s	
Packet processing performance (M packets/s) (Note 1)	Maximum packet relay performance		125.0		125.0		131.0	
Number of network interfaces	10GBASE-SR/LR/ER (SFP+)		6 (Note 2)		6 (Note 2)		4 (Note 2)	
	10GBASE-CU (SFP+)							
	1000BASE-SX/SX2 (Note 5)/ LX/BX/LH/LHB (SFP)		6 (Note 3)		26 (Note 4)(Note 6)		4 (Note 3)	
	10BASE-T/100BASE-TX/ 1000BASE-T (SFP)		--		20 (Note 7)		--	
	100BASE-FX (SFP)		--		20 (Note 7)		--	
	10BASE-T/100BASE-TX/ 1000BASE-T [no PoE]		24		4		48	
Standard memory size			1024 MB					
Number of memory card slots			SD memory card x 1					
Redundancy			AC or DC power supply					
Power supply requirements			AC power	DC power	AC power	DC power	AC power	DC power
	Voltage	Rated input voltage (V)	100 to 120 AC/ 200 to 240 AC	- 48 DC	100 to 120 AC/ 200 to 240 AC	- 48 DC	100 to 120 AC/ 200 to 240 AC	- 48 DC
		Variation range (V) (Note 8)	90 to 127.2 AC/ 180 to 254.4 AC (Note 9)	-40 to -57 DC	90 to 127.2 AC/ 180 to 254.4 AC (Note 9)	-40 to -57 DC	90 to 127.2 AC/ 180 to 254.4 AC (Note 9)	-40 to -57 DC
	Frequency (Hz)		50/60	--	50/60	--	50/60	--
	Maximum input current (A)		1.1@ 100 V AC 0.6@ 200 V AC	2.2@ -48 V DC	1.2@ 100 V AC 0.6@ 200 V AC	2.5@ -48 V DC	1.2@ 100 V AC 0.6@ 200 V AC	2.4@ -48 V DC
	Maximum power consumption (W)		105		120		115	
Calorific power (kJ/h)			378		432		414	
Equipment requirements	External dimensions W x D x H (mm) (height [U])		445 x 500 x 43 (1U)					
	Weight (kg) (power unit included)		No more than 9.0					
Environmental requirements (Note 11)	Temperature	Acceptable operating range	-10°C to 50°C (Note 12)(Note 13)					
		When not operating (not energized)	-10°C to 50°C					
		During storage and transportation	-25°C to 65°C					
	Relative humidity	Acceptable operating range	10% to 90% (non-condensing)					
		When not operating (not energized)	8% to 90% (non-condensing)					
		During storage and transportation	5% to 90% (non-condensing)					
	Suspended particulates		Suspended particulates smaller than approx. 10 microns: 0.15 mg/ m^3					
	Vibration (m/s^2)		No more than 2.45					
Applicable standards	EMI standard		VCCI Class A					
	Harmonic current emission standard		JIS C61000-3-2					
	EMS standard		JEITA IT-3001					
	Safety standard		UL60950-1 compliant					

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(Note 1) The measurement conditions are as follows:
- Physical media: 1000BASE-T, 1000BASE-X, 10GBASE-R
- Packet type: Layer 2 forwarding without flooding
- Packet length: 64 bytes
- QoS and filtering: not set

(Note 2) The number of available ports is reduced by the number of shared SFP/SFP+ port used for 1000BASE-X (SFP).
(Note 3) As these network interfaces are provided by using shared SFP/SFP+ ports, the number of available ports is reduced by the number of shared SFP/SFP+ port used for 10GBASE-R (SFP+).
(Note 4) Six of the ports are shared SFP/SFP+ port. Therefore, the number of available ports is reduced by the number of shared SFP/SFP+ port used for 10GBASE-R (SFP+).
(Note 5) Only supported by AX3650S-20S6XW switches.
(Note 6) For SFP-SX2, this value is 20.
(Note 7) Only fixed 1000BASE-X (SFP) ports are supported.
(Note 8) This is the range within which normal operation is guaranteed.
(Note 9) Specifications for input voltage of 200 V AC.
(Note 10) Assumes use of the optional ALAXALA 200 V AC power cable. 200 V AC power cables are not provided with the devices. Please purchase optional cables separately.
(Note 11) Do not install the switch in the following locations. Failure to observe this caution might shorten the life of the switch.
- Locations where the switch is exposed to hydrogen sulfide (as in a hot spring area) or salt (as in a sea shore area).

(Note 12) 0°C to 50°C when the Switch is started.
(Note 13) 0°C to 50°C when an SFP-BX1U/1D or SFP-BX4U/4D is used.

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3.2 Functionality

Table 3 shows the functionality supported along with the relevant standards.
It should be noted that the functionality supported vary depending on the software.

L3S advanced software
OSPF, BGP, IS-IS (Note 1), VRF, and policy-based routing (Note 10) are supported.

L3S light software
OSPF, BGP, IS-IS, VRF, and policy-based routing are not supported.

Table 3: AX3650S series functionality

Category	Functionality		Relevant standards	Remarks
LAN	Ethernet	10BASE-T/100BASE-TX/ 1000BASE-T	IEEE 802.3 IEEE 802.3u IEEE 802.3ab	
		10BASE-T/100BASE-TX/ 1000BASE-T (SFP)	IEEE 802.3 IEEE 802.3u IEEE 802.3ab	
		100BASE-FX (SFP)	IEEE 802.3 IEEE 802.3u	
		1000BASE-X (SX/LX)	IEEE 802.3z	
		1000BASE-X (SX2/BX (40 km supporting version) LH/LHB)	--	
		1000BASE-X (BX)	IEEE 802.3ah	
		10GBASE-R (SR/LR) (SFP+)	IEEE 802.3ae	
		10GBASE-R (ER) (SFP+)		
		10GBASE-CU (SFP+)	--	
		Flow control	IEEE 802.3x	
	IEEE 802.3ad link aggregation		IEEE 802.3ad	(Note 12)
	Jumbo frame		--	
Layer 2 functionality	Transparent bridge		--	
	VLAN	Port VLAN	IEEE 802.1Q	
		VLAN tagging	IEEE 802.1Q	
		Protocol VLAN	--	
		MAC VLAN	--	(Note 11)
		Tag translation	--	
		VLAN debounce	--	
	VLAN tunneling		--	
	Inter-port relay blocking functionality		--	
	Layer 2 relay blocking functionality		--	
	Spanning Tree Protocol	STP	IEEE 802.1D IEEE 802.1t	(Note 11)
		RSTP	IEEE 802.1w	
		MSTP	IEEE 802.1s	
		PVST+	--	
		BPDU filter	--	
		Loop guard	--	
		Root guard	--	
	Autonomous Extensible Ring Protocol		--	(Note 11)
	Uplink redundant functionality		--	(Note 11)
	DHCP snooping		RFC 2131	(Note 11)
	IGMP/MLD snooping	IGMPv2 snooping	RFC 4541	(Note 11)
		IGMPv3 snooping		
		IGMP snooping instant leave		
		MLDv1 snooping		
		MLDv2 snooping		
	Storm control		--	(Note 11)
	IEEE 802.3ah/UDLD		IEEE 802.3ah	(Note 2)
	L2 loop detection		--	
	CFM (Connectivity Fault Management) (Ether OAM)		IEEE 802.1ag	(Note 11)
	Flush Request frame (VRRP) receiving functionality		--	(Note 11)
	Flush control frame (uplink redundancy) receiving functionality		--	(Note 11)

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Category	Functionality		Relevant standards	Remarks
Layer 3 functionality	IPv4	IP, ARP, ICMP	RFC 791 RFC 792 RFC 826 RFC 922 RFC 950 RFC 1027 RFC 1122 RFC 1519 RFC 1812 RFC 2644	
		RIP, RIP2	RFC 1058 RFC 1519 RFC 2453	
		VRF-enabled	--	Advanced software only
		RIPv2 authentication	RFC 4822	
		OSPF	RFC 1519 RFC 2328 RFC 3101 RFC 5309	Advanced software only
		Stub router	RFC 3137	Advanced software only
		VRF-enabled	--	Advanced software only
		Static routing	--	
		VRF-enabled	--	Advanced software only
		Null interface	--	
		Local Proxy ARP	--	
	IPv6	IPv6, NDP, ICMPv6	RFC 2373 RFC 2460 RFC 2461 RFC 2462 RFC 2463 RFC 2710 RFC 3587 RFC 5095	
		RIPng	RFC 2080	
		VRF-enabled	--	Advanced software only
		OSPFv3	RFC 2740 RFC 5309	Advanced software only
		Stub router	RFC 3137	Advanced software only
		VRF-enabled	--	Advanced software only
		Static routing	--	
		VRF-enabled	--	Advanced software only
		Null interface	--	
	BGP4, BGP4+	EBGP, IBGP peering	RFC 1519 RFC 1771 RFC 2385 RFC 2842 RFC 2858 RFC 2918 RFC 3392 RFC 4271 RFC 4760 RFC 5492 draft-ietf-idr-avoid-transition-04.txt	Advanced software only
		Community	RFC 1997	Advanced software only
		Route reflection	RFC 2796 RFC 4456	Advanced software only
		Confederation	RFC 1965 RFC 3065 RFC 5065	Advanced software only
		Route flap dampening	RFC 2545	Advanced software only
		BGP Maximum Prefix	--	Advanced software only
		VRF-enabled	--	Advanced software only
	IS-IS		--	Advanced software only (Note 1)
	IPv4 multicasts	IGMP	RFC 2236	
		IGMP ver2		
		IGMP ver3	RFC 3376	
		VRF-enabled (IGMPv2, v3, static)	--	Advanced software only
		PIM-SM/-SSM	RFC 2362	
			RFC 4601 draft-ietf-pim-sm-bsr-07.txt	Only the Generation ID related part of the PIM-Hello option is followed
			draft-ietf-pim-sm-v2-new-05.txt	Only the description about PIM-SSM is followed
		VRF-enabled	--	Advanced software only
	IPv6 multicasts	MLD ver1 ver2	RFC 2710 RFC 3810	(Note 11)
		VRF-enabled (MLDv1, v2, static)	--	Advanced software only (Note11)
		PIM-SM/-SSM	RFC 2362	(Note 11)
			RFC 4601 draft-ietf-pim-sm-bsr-07.txt	Only the Generation ID related part of the PIM-Hello option is followed
			draft-ietf-pim-sm-v2-new-03.txt draft-ietf-pim-sm-v2-new-05.txt	Only the descriptions about IPv6 and PIM-SSM is followed

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Category	Functionality			Relevant standards	Remarks
			VRF-enabled	--	Advanced software only (Note11)
	DHCP or BOOTP relay agent functionality			RFC 1542 RFC 1812 RFC 2131	
			VRF-enabled	--	Advanced software only
	IPv6 DHCP relay			RFC 3315	(Note 8)(Note 11)
	IPv4 DHCP server functionality			RFC 2131 RFC 2136 RFC 3679	(Note 11)
				RFC 2132	DHCP option
	IPv6 DHCP server functionality (Prefix Delegation)			RFC 3315 RFC 3319 RFC 3633 RFC 3646 RFC 3736 RFC 4075	(Note 11)
	Multipath (Load balancing)	IPv4		--	
			VRF-enabled	--	Advanced software only
		IPv6		--	
			VRF-enabled	--	Advanced software only
	Policy-based routing	IPv4		--	Advanced software only (Note 11)
			Tracking functionality	--	Advanced software only (Note 11)
			VRF-enabled	--	Advanced software only (Note 11)
	Layer 3 isolation functionality			--	
Additional functionality	Filter			--	
	Flow detection conditions	Layer 2 conditions		--	
		Layer 3 conditions		--	
		Layer 4 conditions		--	
	QoS / Diff-serv	Contract bandwidth monitoring (UPC)		--	
		DSCP marking		RFC 2474 RFC 2475 RFC 2597 RFC 3246 RFC 3260	
		CoS mapping		--	
		Output priority control		RFC 2597 RFC 3246 RFC 3260	
		WFQ		--	
		Equal assurance		--	
		PQ + DRR		--	DRR: weighted (number of bytes) round robin
		PQ + WRR		--	WRR: weighted (number of frames) round robin
		WRR		--	
		Tail drop		--	
	Layer 2 authentication	IEEE 802.1X	Port-based authentication (static)	IEEE 802.1X RFC 2865 RFC 2866 RFC 2868 RFC 2869 RFC 3162 RFC 3579 RFC 3580 RFC 3748	(Note 11)
			VLAN-based authentication (static)		
			VLAN-based authentication (dynamic)		
		Web authentication	Fixed VLAN mode	--	(Note 3)(Note 11)
			URL redirection		
			Keep Alive functionality		
			Dynamic VLAN mode		
			URL redirection		
			Legacy mode		
		MAC-based authentication	Fixed VLAN mode	--	(Note 11)
			Dynamic VLAN mode	--	(Note 11)
		Common to authentication	Limited number of authentications	--	(Note 6)(Note 11)
			Forced authentication	--	(Note 7)(Note 11)
	Port mirroring	Local		--	
Network functionality	Network partitioning			--	Advanced software only (Note 13)
Stack	Stack	Cross-switch LA		--	

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Category	Functionality				Relevant standards	Remarks
	functionality	Stack port	Ethernet		--	(Note 17)
			Grouping		--	
		Central management	Stack management IP address		--	
			Switch MAC address		--	
			Configuration		--	
			Remote command		--	
		Availability	Update	Non-stop update	--	
		Operation and maintenance	Status display in the system operation panel		--	[NEW]
Reliability	Environmental monitoring				--	
	Self diagnosis				--	
	Redundant configuration (power supply)				--	
	Hot standby (VRRP)	IPv4			RFC 3768	(Note 11)
			VRF-enabled		--	Advanced software only (Note 11)
		IPv6			draft-ietf-vrrp-ipv6-spec-07.txt draft-ietf-vrrp-ipv6-spec-02.txt	(Note 11)
			VRF-enabled		--	Advanced software only (Note 11)
	Redundancy switchover functionality on switch (GSRP)	Layer 2			--	(Note 4)(Note 11)
		Layer 3				
		VLAN group-only control functionality			--	(Note 11)
		GSRP aware			--	
	Graceful Restart (Helper functionality/receiving router functionality)					Advanced software only
					RFC 3623	OSPF/OSPFv3
					RFC 2370	OSPF
					RFC 3847	IS-IS (Note 1)
					draft-kompella-ospf-opaque v2-00.txt draft-ietf-ospf-ospfv3-graceful-restart-0.4.txt	OSPFv3
					draft-ietf-idr-restart-13.txt	BGP4/BGP4+
			VRF-enabled		--	Advanced software only

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Category	Functionality		Relevant standards	Remarks
Network management	SNMP (v1/v2c/v3)		RFC 1155 RFC 1157 RFC 1901 RFC 1902 RFC 1903 RFC 1904 RFC 1905 RFC 1906 RFC 1907 RFC 1908 RFC 2578 RFC 2579 RFC 2580 RFC 3410 RFC 3411 RFC 3412 RFC 3413 RFC 3414 RFC 3415 RFC 3416 RFC 3417 RFC 3418 RFC 3584	
		VRF-enabled	--	Advanced software only
	MIB-II, RMON, IP Forwarding MIB, Interface MIB		RFC 1158 RFC 1213 RFC 1354 RFC 1757 RFC 2233	(Note 14)
	IPv6 MIB		RFC 2452 RFC 2454 RFC 2465 RFC 2466	
	Private MIB	Statistical information	--	
		Related to L2 (VLAN,FDB,GSRP)	--	
		Related to neighborhood information (LLDP, OADP)	--	
		Related to Filter/QoS	--	(Note 15)
		Related to various protocols (OSPF, etc.)	--	
		System information (Boot information, login)	--	
		Switch information	--	(Note 15)
		Related to sFlow	--	(Note 11)
		Related to VRF	--	Advanced software only
	dot1dBridge MIB		RFC 1493 RFC 2674	
	Ethernet MIB		RFC 1643 RFC 3621	
	IPv4 PIM MIB		RFC 2934	
	MIBs for various protocols (OSPF, BGP, etc.)		RFC 1657 RFC 1850 draft-ietf-ospf-ospfv3-mib-03.txt	
	VRRP MIB	IPv4	RFC 2787	(Note 11)
		IPv6	draft-ietf-vrrp-unifid-mib-04	(Note 11)
	CFM-MIB		IEEE 802.1ag	(Note 11)
	LLDP		IEEE 802.1AB/D6.0	(Note 11)
	OADP (Octpower Auto Discovery Protocol)		--	(Note 11)
	CDP (Cisco Discovery Protocol)		--	(Note 5) (Note 11)
	sFlow		RFC 3176	(Note 11)
Operation and maintenance	Connection with operation terminals	Serial (console)	--	
	Configuration	CLI	--	
	Security	Login authentication (password/host address/RADIUS or TACACS+)	RFC 2865 RFC 2866 RFC 3162	RADIUS relevant standards
			draft-grant-tacacs-02-txt	TACACS+ relevant standards
		SSH (Ver. 2)	draft-ietf-secsh-architecture-12.txt draft-ietf-secsh-connect-15.txt draft-ietf-secsh-dh-group-exchange-02.txt draft-ietf-secsh-transport-14.txt draft-ietf-secsh-publickeyfile-03.txt draft-ietf-secsh-userauth-15.txt draft-ylonen-ssh-protocol-00.txt	
		VRF-enabled	--	Advanced software only
	Collection of management information	Display of switch/interface status	--	
		Operation message log	--	
		Statistical information on a line-by-line basis	--	
	NTP		RFC 1305	

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Category	Functionality			Relevant standards	Remarks
			VRF-enabled (IPv4 only)	--	Advanced software only
	Command-free maintenance functionality			--	
	Power saving functionality	Dynamic power saving	Port power OFF	--	(Note 16)
			Switch sleep	--	(Note 11)
			Power saving for ports in the link-down status	--	(Note 9)(Note 11)
			LED brightness control functionality	--	(Note 11)
		Power consumption information indication		--	

[Legends] -: No relevant standards

(Note 1) IS-IS will be supported in the future.
(Note 2) Only Information OAMPDU is supported.
(Note 3) Encrypted communication based on SSL (Secure Socket Layer) is also available.
(Note 4) For more information, see the instruction manual provided on our website.
(Note 5) Only reception is supported.
(Note 6) IEEE 802.1X, MAC-based authentication, and Web authentication are supported.
(Note 7) MAC-based authentication and Web authentication are supported.
(Note 8) To use IPv6 DHCP relay, the optional license OP-DH6R must be used.
(Note 9) Applicable only to the ports on which 10BASE-T, 100BASE-TX, or 1000BASE-T is running.
(Note 10) Policy-based routing is supported in Ver.11.7 and later.
(Note 11) This functionality does not work when stack functionality is used.
(Note 12) LACP is not supported when stack functionality is used.
(Note 13) Linkage with Layer 2 functionality is not supported when stack functionality is used.
(Note 14) RMON is not supported when stack functionality is used.
(Note 15) This functionality is partially supported when stack functionality is used.
(Note 16) Suspending power supply to port by using shutdown is supported. Scheduling is not supported.
(Note 17) Flow control and port mirroring are not enabled.

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4. Ordering Information

Table 4 shows the ordering information for the AX3650S series.

Table 4: Ordering Information for the AX3650S Series

No.	Model Name	Abbreviated Name	Basic specifications
LAN Switch			
1	AX-3650-24T6XW-LX	3FL-24T6XW	AX3650S-24T6XW light model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 30 ports ((24 ports for fixed 10/100/1000BASE-T + 6 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 6 ports (6 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S light software (without OSPF, BGP, VRF (network partitioning), or policy-based routing). - SSH supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support) Supported in Ver. 11.7 and later
2	AX-3650-20S6XW-LX	3FL-20S6XW	AX3650S-20S6XW light model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 30 ports ((20 ports for fixed 1000BASE-X (SFP) + 4 ports for fixed 10/100/1000BASE-T + 6 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 6 ports (6 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S light software (without OSPF, BGP, VRF (network partitioning), or policy-based routing). - SSH supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support) Supported in Ver. 11.7 and later
3	AX-3650-48T4XW-LX	3FL-48T4XW	AX3650S-48T4XW light model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 52 ports ((48 ports for fixed 10/100/1000BASE-T + 4 ports for fixed 10/100/1000BASE-T + 4 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 4 ports (4 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S light software (without OSPF, BGP, VRF (network partitioning), or policy-based routing). - SSH supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support) Supported in Ver. 11.7 and later
4	AX-3650-24T6XW-YX	3FY-24T6XW	AX3650S-24T6XW light model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 30 ports ((24 ports for fixed 10/100/1000BASE-T + 6 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 6 ports (6 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S light software (without OSPF, BGP, VRF (network partitioning), or policy-based routing). - SSH not supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support) Supported in Ver. 11.7 and later
5	AX-3650-20S6XW-YX	3FY-20S6XW	AX3650S-20S6XW light model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 30 ports (20 ports for fixed 1000BASE-X (SFP) + 4 ports for fixed 10/100/1000BASE-T + 6 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 6 ports (6 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S light software (without OSPF, BGP, VRF (network partitioning), or policy-based routing). - SSH not supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support) Supported in Ver. 11.7 and later

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No.	Model Name	Abbreviated Name	Basic specifications
6	AX-3650-48T4XW-YX	3FY-48T4XW	AX3650S-48T4XW light model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 52 ports ((48 ports for fixed 10/100/1000BASE-T + 4 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 4 ports (4 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S light software (without OSPF, BGP, VRF (network partitioning), or policy-based routing). - SSH not supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support) Supported in Ver. 11.7 and later
7	AX-3650-20S6XW-AX	3FA-20S6XW	AX3650S-20S6XW advanced model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 30 ports (20 ports for fixed 1000BASE-X (SFP) + 4 ports for fixed 10/100/1000BASE-T + 6 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 6 ports (6 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S advanced software (with OSPF, BGP, VRF (network partitioning), or policy-based routing (Note 1)). - SSH supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support)
8	AX-3650-24T6XW-AX	3FA-24T6XW	AX3650S-24T6XW advanced model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 30 ports ((24 ports for fixed 10/100/1000BASE-T + 6 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 6 ports (6 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S advanced software (with OSPF, BGP, VRF (network partitioning), or policy-based routing (Note 1)). - SSH supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support)
9	AX-3650-48T4XW-AX	3FA-48T4XW	AX3650S-48T4XW advanced model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 52 ports ((48 ports for fixed 10/100/1000BASE-T + 4 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 4 ports (4 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S advanced software (with OSPF, BGP, VRF (network partitioning), or policy-based routing (Note 1)). - SSH supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support)
10	AX-3650-24T6XW-ZX	3FZ-24T6XW	AX3650S-24T6XW advanced model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 30 ports ((24 ports for fixed 10/100/1000BASE-T + 6 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 6 ports (6 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S advanced software (with OSPF, BGP, VRF (network partitioning), or policy-based routing (Note 1)). - SSH not supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support)
11	AX-3650-20S6XW-ZX	3FZ-20S6XW	AX3650S-20S6XW advanced model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 30 ports (20 ports for fixed 1000BASE-X (SFP) + 4 ports for fixed 10/100/1000BASE-T + 6 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 6 ports (6 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S advanced software (with OSPF, BGP, VRF (network partitioning), or policy-based routing (Note 1)). - SSH not supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support)

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No.	Model Name	Abbreviated Name	Basic specifications
12	AX-3650-48T4XW-ZX	3FZ-48T4XW	AX3650S-48T4XW advanced model (with no power supply unit, fan, or blank panel) - Gigabit Ethernet: Up to 52 ports ((48 ports for fixed 10/100/1000BASE-T + 4 ports for either 1000BASE-X (SFP) or 10GBASE-R (SFP+)) - 10-gigabit Ethernet: Up to 4 ports (4 ports for either 10GBASE-R (SFP+) or 1000BASE-X (SFP)) - Equipped with L3S Advanced software (with OSPF, BGP, VRF (network partitioning), or policy-based routing (Note 1)). - SSH not supported. - Power supply unit slot x 2 (for internal power supply redundancy, hot-swap support) - Fan slot x 1 (hot-swap support)
Common Option			
1	AX-F0110-SD1GX	SD1G	SD memory card (1GB) (Note 2)
2	AX-F0110-3D1CU30CX	SFPP-CU30C	30 m direct attach cable for 10GBASE-CU Supported in Ver. 11.9.A
3	AX-F0110-3D1CU1MX	SFPP-CU1M	1 m direct attach cable for 10GBASE-CU
4	AX-F0110-3D1CU3MX	SFPP-CU3M	3 m direct attach cable for 10GBASE-CU
5	AX-F0110-3D1CU5MX	SFPP-CU5M	5 m direct attach cable for 10GBASE-CU
6	AX-F2430-PSA03X	PS-A03	100/200 V AC power supply for the AX3650S/AX3800S with hot-swap support (for front air intake and rear air exhaust only)
7	AX-F2430-PSD03X	PS-D03	−48 V DC power supply for the AX3650S/AX3800S with hot-swap support (for front air intake and rear air exhaust only) Supported in Ver. 11.7 and later
8	AX-F2430-FAN03X	FAN-03	Fan unit for the AX3650S with hot-swap support
9	AX-F2430-BPNL01X	BPNL-01	Blank panel for the AX3650S/AX3800S power supply unit
Optical Transceiver			
1	AX-F6244-3S1TX	SFP-T	SFP for 10BASE-T/100BASE-TX/1000BASE-T (UTP: 100 m) Specifically designed for AX3650S-20S6XW (Note 3)
2	AX-F6244-3S1SX	SFP-SX	SFP for 1000BASE-SX (MMF: 2 m to 550 m)
3	AX-F6244-3S1S2X	SFP-SX2	SFP for 1000BASE-SX2 (MMF: 2 m to 2 km) Specifically designed for AX3650S-20S6XW (Note 3)
4	AX-F6244-3S1LX	SFP-LX	SFP for 1000BASE-LX (MMF: 2 m to 550 m) (SMF: 2 m to 5 km)
5	AX-F6244-3SB1UX	SFP-BX1U	SFP for 1000BASE-BX10-U, with single-core, bidirectional, single-mode optical fibers (Upstream) (SMF: 0.5 m to 10 km)
6	AX-F6244-3SB1DX	SFP-BX1D	SFP for 1000BASE-BX10-D, with single-core, bidirectional, single-mode optical fibers (Downstream) (SMF: 0.5 m to 10 km)
7	AX-F6244-3SB4UX	SFP-BX4U	SFP for 1000BASE-BX40-U, with single-core, bidirectional, single-mode optical fibers (Upstream) (SMF: 0.5 m to 40 km)
8	AX-F6244-3SB4DX	SFP-BX4D	SFP for 1000BASE-BX40-D, with single-core, bidirectional, single-mode optical fibers (Downstream) (SMF: 0.5 m to 40 km)
9	AX-F6244-3S1LHX	SFP-LH	SFP for 1000BASE-LH (SMF: 2 m to 70 km)
10	AX-F6244-3S1FX	SFP-FX	SFP for 100BASE-FX (MMF: 2 m to 2 km) Specifically designed for AX3650S-20S6XW (Note 3).
11	AX-F0110-3P1SX	SFPP-SR	SFP+ for 10GBASE-SR (MMF: 2 m to 300 m)
12	AX-F0110-3P1LX	SFPP-LR	SFP+ for 10GBASE-LR (SMF: 2 m to 10 km)
13	AX-F0110-3P1EX	SFPP-ER	SFP+ for 10GBASE-ER (SMF: 2 m to 40 km) Supported in Ver. 11.6 and later
Software			
1	AX-P3650-32AUX	OS-L3SA-U	L3 functionality upgrade software for AX3650S (SSH supported) - Software for upgrading the L3S light software to the L3S advanced software Supported in Ver. 11.7 and later
2	AX-P3650-31AUX	OS-L3SA-AU	L3 functionality upgrade software for AX3650S (SSH not supported) - Software for upgrading the L3S light software to the L3S advanced software Supported in Ver. 11.7 and later
3	AX-P3650-32VX	OS-L3S-V	SSH functionality upgrade software for the AX3650S - To upgrade software without SSH to software with SSH
4	AX-P3630-F9X	OP-DH6R	IPv6 DHCP relay functionality license for AX3630S/AX3640S/AX3650S/AX3800S

(Note 1) IS-IS will be supported in the future. Policy-based routing is supported in Ver. 11.7 and later.
(Note 2) The memory card does not include software such as switching software or scripts.
(Note 3) Only fixed 1000BASE-X (SFP) ports are supported.

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