ALAXALA Fast Ethernet Layer 2 switches

AX1250S Series

1. Overview

The ALAXALA AX1250S series of Fast Ethernet Layer 2 switches offers the following model:

Figure 1 AX1250S-24T2CH

1.1 Product concept

The AX1250S series switch is used as an access switch resistant to heat, dripping water, and dust for use under severe environment, such as in factories, railroads, and roads.

- Low-end model in the AX series product lineup, covering network edges
- Features incorporated from the high-end AX series; system interoperability (functional consistency); unified interconnectivity and operability
- High reliability, high security, and high operability based on a guaranteed network

1.2 Usage examples

The following example shows the use of the switches as floor switches for large- or medium-size local-area network.

Figure 2 shows an example configuration and the switch usage when switches are used with an AX6300S series switch in a local-area network.

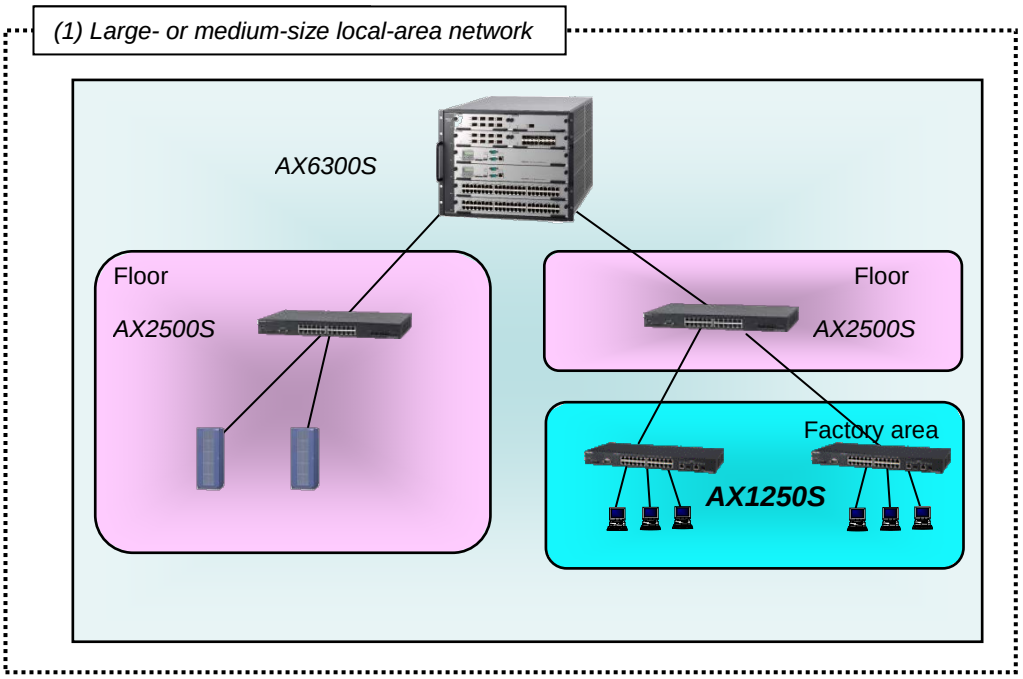

Figure 2 Example of using switches in a large- or medium-size local-area network

Table 1 Switch usage example

Target market	Switch usage example	Points
Large-size local-area network (Under severe environment of temperature requirements)	• Workgroup switch for terminal connections • Switch that concentrates network lines on a floor for which Fast Ethernet is appropriate	• Operability unified by AX series lineup • Rich security and authentication functionality (IEEE 802.1X, Web authentication, MAC-based authentication) • Stable operation and enhanced highly available functionality (Autonomous Extensible Ring Protocol (transit nodes), GSRP-aware, link aggregation, RSTP, etc.) • IPv6 support (MLD snooping)
Medium- and small-size local-area networks (Under severe environment of temperature requirements)	• Core switch (Connected to base routers which are connected to the center router) • Floor switch • Workgroup switch	

2. Features

2.1 Features of the AX1250S series

(1) Enhanced operating conditions
- High-quality devices
  - Dripping water resistant
    Designed with IP31 ingress protection defined in IEC 60529.
  - Using carefully selected parts expand the operating conditions to 50℃
  - Fanless design, while being compatible 50℃, can reduce the problems caused due to dust sucked into devices.
  - High reliability through strict design and inspection requirements

(2) Various optical transceivers
- Multi-mode optical fiber
  - 100BASE-FX, 1000BASE-SX, and 1000BASE-SX2 are supported.
    FDDI can also be replaced (Note 1).
- Gigabit uplink
  - Two ports can be used simultaneously in combination with 1000BASE-T ports or in combination with 1000BASE-X (SX, SX2, LX, BX, LH) ports to support various network environments.

(Note 1) The maximum cable length for 1000BASE-SX is 550 m. Note on the distance connecting each node when replacing.

(3) Robust security
- Authentication and quarantine solutions
  - Authentication methods such as IEEE 802.1X, Web authentication, and MAC-based authentication enable individual PCs to be authenticated and placed into a VLAN, while maintaining the freedom of the physical configuration of network edges.
  - IEEE 802.1X port-based authentication (static) restricts and releases communicable packets by using status monitoring, which gives permission for full access communication only to terminals that conform to a security policy.
  - Web authentication by using the RSA SecurID (Note 2) one-time password authentication functionality can improve network access security. PIN code initial registration and token code re-entry are also supported (Note 3).
  - Devices such as printers can be authenticated by using MAC-based authentication.
  - Fixed-IP address terminals also can be authenticated by using the fixed VLAN modes of MAC-based authentication and Web authentication. Moreover, port trunking allows wireless terminals or similar terminals that have both untagged frames and tagged frames to be authenticated.
  - Multistep authentication (Note 4), which performs terminal authentication and user authentication in two steps, is supported as the network authentication functionality.
- Secure Wake-on-LAN
  - This functionality allows access to your PC from outside the company, whether you are at home or on a business trip. You can use a Web browser to access a switch and, via the in-house network, turn on or off the power to a desktop PC within the company (Note 5).
- Unauthorized DHCP servers and terminals with fixed IP addresses are excluded from networks.
  - Robust security measures can be provided via DHCP snooping, which eliminates unauthorized DHCP servers and terminals with fixed IP addresses.

(Note 2) RSA, the RSA logo, and SecurID are trademarks or registered trademarks of RSA Security Inc. in the United States and other countries.
(Note 3) For this functionality, you must purchase an optional software license separately.
(Note 4) In this authentication, user authentication (IEEE 802.1X or Web authentication) is performed after terminal authentication (MAC-based authentication) is completed.
(Note 5) For this functionality, you must purchase an optional software license separately.

(4) High reliability for configuring mission-critical networks

- Variety of redundant network configurations
  - High-speed path switching
    Standard features such as Autonomous Extensible Ring Protocol (transit nodes), link aggregation (IEEE 802.3ad), and Rapid Spanning Tree Protocol, and proprietary features such as GSRP-aware allow a redundant high-reliability network to be built. Uplink redundancy, which can build redundant configurations without using Spanning Tree Protocol, is supported.
  - QoS, which gives priority to important packets and audio packets, is supported.
- Layer 2 loop avoidance
  - The UDLD functionality prevents loops at the spanning tree or frame loss at link aggregation.
  - The Layer 2 loop detection functionality detects improperly connected devices on a network, which helps prevent loops.

(5) Excellent network management, maintenance, and operation

- CFM (Connectivity Fault Management) (Ether OAM)
  Continuity checks (CC), loopback, and link traces can perform connectivity monitoring and failure management at the Layer 2 level.
- In addition to the basic MIB-II, many other MIBs, including RMON are supported.
- Improved configuration compatibility with the AX2400S and AX3600S series simplifies the operation of the entire system.
- SD memory cards
  - Log information storage and software update are supported.
- Console ports are located on the front panel.

(6) Compact design and low environmental impact

- Compact chassis
  - Compact design with a depth of 25.0 cm and a height of 6.5 cm (1.5U)
- RoHS is applied, and the environmental impact is reduced.

(7) IPv6 support

- MLD snooping is supported, which can control the distribution of IPv6 multicast packets.

(8) Precise QoS

- While functioning as Layer 2 switches, the AX1250S series of switches can identify Layer 2 flows, Layer 3 flows, and Layer 4 flows, and then can control priority and bandwidth. ToS or CoS marking and mapping are supported, and enable optimal QoS processing and distribution of packets according to the features of applications such as IP telephone.

(9) Power saving

- LED operation is controlled in three steps: normal brightness, power saving brightness (operation with lower brightness than normal), and disabled.
  - LEDs can be set to blink or turn on in normal brightness when consoles are connected to the switches, ports are in the link-up state, and SD memory cards are inserted. The settings can be also changed so that LEDs automatically turn off after operations are completed.
- Port power saving
  - To achieve power saving, the power to a port is shut off when a link-down state is detected, or when a port is blocked (that is, a port for which the `shutdown` setting is configured by using configuration commands) (Note 6).
- Scheduling
  - The switches can switch automatically to a sleep state, and be woken up from the sleep state, in accordance with the schedule settings for long holidays, Saturdays, Sundays, public holidays, and evenings.
  - The above LED operation and port power saving also can be set up by schedule settings.

(Note 6) The SFP port supports port power saving only when a port is blocked.

3. Specifications

3.1 Switch specifications

Table 2 Switch specifications

Specifications				
Name				AX1250S-24T2CH
Switching capacity				8.8 Gbit/s
Frame processing performance (Mpacket/s) (Note 1)		Ethernet (Layer 2 forwarding)		6.5
Number of network interfaces	10BASE-T, 100BASE-TX, 1000BASE-T or 100BASE-FX, 1000BASE-SX, SX2, LX, BX, LH (SFP) (Note 2)			2
	10BASE-T, 100BASE-TX			24
Number of memory card slots				SD memory card x 1
Power supply requirements	Voltage	Rated input voltage (V)		100 to 120 AC/ 200 to 240 AC
		Variation range (V) (Note 3)		90 to 132 AC/ 180 to 264 AC
	Frequency (Hz)			50/60
	Maximum input current (A)			0.18 at 100 V AC
				0.10 at 200 V AC
	Maximum power consumption (W)			18/21 (Note 4)
Calorific power (kJ/h)				65/76 (Note 4)
Items of Law Regarding the Rationalization of Energy Use (Note 6)	Energy efficiency (W/(Gbit/s))			Class A 3.9 (Reference value: 4.1)
	Maximum effective transmission speed			4.4 Gbit/s
	Speed and number of ports when measuring		1 Gbit/s	2
			100 Mbit/s	24
Equipment requirements	External dimensions W x D x H (mm) (height [U])			477 x 250 x 65 (1.5U)
	Weight (kg) (main unit only)			3.0
Environmental requirements	Ingress protection (IEC 65029)			IP31
	Temperature	Acceptable operating range		−10ºC to 50ºC (0 to 50ºC when active) (Note 5)
		When not operating (not energized)		−10ºC to 50ºC
		During storage and transportation		−25ºC to 65ºC
	Relative humidity	Acceptable operating range		10% to 90% (no condensation)
		When not operating (not energized)		8% to 90% (no condensation)
		During storage and transportation		5% to less than 100% (no condensation)
	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

(Note 1) Measurement conditions are as follows:
- Physical media: 1000BASE-T and 1000BASE-X
- Frame type: Layer 2 forwarding. No flooding.
- Frame length: 64 bytes
- QoS and filters: Not set

(Note 2) Combo port (10BASE-T/100BASE-TX/1000BASE-T, 100BASE-FX/1000BASE-X) x 2 ports. Used exclusively per combo port (cannot be used simultaneously).
(Note 3) This is the range within which normal operation is guaranteed.
(Note 4) When two 1000BASE-LH (SFP) ports are used, the values are those written on the right.
(Note 5) The acceptable operating range when SFP transceivers used is shown in Table 3. If two types of SFP transceivers are used, the range that meets the acceptable operating ranges for both types becomes the actual acceptable operating range.
(Note 6) Values measured by using methods specified by the Law Regarding the Rationalization of Energy Use.

Table 3 Acceptable operating range applying when SFP transceivers are used

SFP to be used (abbreviated name)	Acceptable operating range
SFP-SX	−10ºC to 50ºC
SFP-LX	−10ºC to 50ºC
SFP-LH	−10ºC to 50ºC
SFP-BX1U	0ºC to 50ºC
SFP-BX1D	0ºC to 50ºC
SFP-BX4U	0ºC to 50ºC
SFP-BX4D	0ºC to 50ºC
SFP-SX2	−10ºC to 50ºC
SFP-FX	−10ºC to 50ºC

3.2 Functionality

Table 4 List of functionality

Category	Functionality			Relevant standards	Remarks
LAN	Ethernet	10BASE-T, 100BASE-TX		IEEE 802.3, IEEE 802.3u	
		10BASE-T, 100BASE-TX, 1000BASE-T		IEEE 802.3, IEEE 802.3u IEEE 802.3ab	
		100BASE-FX		IEEE 802.3, IEEE 802.3u	
		1000BASE-X (SX, LX)		IEEE 802.3z	
		1000BASE-X (SX2)		--	
		1000BASE-X (BX)		IEEE 802.3ah	
		1000BASE-X (BX (40 km support version))		--	
		1000BASE-X (LH)		--	
		Flow control		IEEE 802.3x	
	Auto negotiation extended functionality	10BASE-T, 100BASE-TX, 1000BASE-T down shift		--	(Note 1)
	IEEE 802.3ad link aggregation			IEEE 802.3ad	
	Jumbo frame			--	
Layer 2 functionality	Transparent bridge			--	
	VLAN	Port VLAN		IEEE 802.1Q	
				IEEE 802.1u	
				IEEE 802.1v	
		VLAN tagging		IEEE 802.1Q	
		Protocol VLAN		--	
		MAC VLAN		--	
	Inter-port relay blocking functionality			--	
	Spanning Tree Protocol	STP		IEEE 802.1D, IEEE 802.1t	
		RSTP		IEEE 802.1w	
		MSTP		IEEE 802.1s	
		PVST+		--	
		BPDU filter		--	
		Loop guard		--	
		Root guard		--	
	Uplink redundancy			--	
	Autonomous Extensible Ring Protocol			--	Only transit nodes are supported.
	IGMP/MLD snooping			draft-ietf-magma-snoop-12.txt	
	Storm control			--	
	IEEE 802.3ah, UDLD			IEEE 802.3ah	
	L2 loop detection			--	
	CFM (Connectivity Fault Management) (Ether OAM)			IEEE 802.1ag	
Additional functionality	Filter	Flow detection	Layer 2 conditions	--	
			Layer 3 conditions (IPv4)	--	
			Layer 4 conditions	--	
	QoS	Flow detection	Layer 2 conditions	--	
			Layer 3 conditions (IPv4)	--	
			Layer 4 conditions	--	
		Marker	User priority updating	--	
			DSCP updating	--	
		Priority determination	CoS mapping	--	
		Discard control	Tail drop	--	

Category	Functionality				Relevant standards	Remarks
		Shaper	Scheduling	PQ	--	
				WRR	--	
				WFQ	--	
				PQ +WRR	--	
			Port bandwidth control		--	
	Diff-Serv				--	
	Layer 2 authentication	IEEE 802.1X	Port-based authentication (static)		IEEE 802.1X, RFC 2865, RFC 2866, RFC 2868, RFC 2869, RFC 3579, RFC 3580, RFC 3748	
			Port-based authentication (dynamic)			
			VLAN-based authentication (dynamic)			
		Web authentication	Fixed VLAN mode		--	
				URL redirection	--	
				Keep Alive functionality	--	
				Internal DB	--	
				RADIUS linkage	--	
			Dynamic VLAN mode		--	
				URL redirection	--	
				Internal DB	--	
				RADIUS linkage	--	
			Legacy mode		--	
				Internal DB	--	
				RADIUS linkage	--	
			One-time password authentication		--	(Note 5)
			DHCP server		RFC 2131 RFC 2132	DHCP option
		MAC-based authentication	Fixed VLAN mode		--	
				Internal DB	--	
				RADIUS linkage	--	
			Dynamic VLAN mode		--	
				Internal DB	--	
				RADIUS linkage	--	
			Legacy mode		--	
				Internal DB	--	
				RADIUS linkage	--	
		Mixed authentication on a port	IEEE 802.1X, Web authentication, MAC-based authentication		--	
		Common to authentication	Limited number of authentications		--	(Note 6)
			Forced authentication functionality		--	(Note 4)
		Multistep authentication			--	
	Secure Wake-on-LAN				--	(Note 5)
	DHCP snooping				--	
	Port mirroring		Local		--	Only one port can be specified for the mirror port.
Reliability	Environmental monitoring				--	
	Self diagnosis (MD)				--	
	Redundancy switchover linkage function		GSRP-aware		--	
Network management	SNMP	v1, v2c			RFC 1155, RFC 1157, RFC 1901, RFC 1902, RFC 1903, RFC 1904, RFC 1905, RFC 1906, RFC 1907, RFC 1908	
	MIB-II, Interface MIB				RFC 1213, RFC 2233, RFC 2863 (some MIBs only)	
	Ethernet MIB				RFC 1493 (some MIBs only), RFC 1643 (some MIBs only), RFC 3621	
	CFM-MIB				IEEE 802.1ag	
	RMON				RFC 1757	
	Private MIB				--	(Note 2)

Category	Functionality				Relevant standards	Remarks
Operation and maintenance	Connection with operation terminals	Serial (Console)			--	
	Configuration		CLI		--	
	Security	Login authentication	Password		--	
			Host address		--	
			RADIUS		RFC 2865	
			One-time password authentication		--	(Note 5)
		SSH (Ver.1/Ver.2)			RFC4251(Supported partially) RFC4252(Supported partially) RFC4253(Supported partially) RFC4254(Supported partially) RFC4716(Supported partially)	(Note 8)
	Collection of management information	Display of switch/interface status			--	
		Operation message log			--	
		LLDP			IEEE 802.1AB, D6.0	
		Statistical information on a line-by-line basis			--	
	NTP				RFC 2030	(Note 3)
	Command-free maintenance functionality				--	
	Power saving functionality	LED automatic brightness change			--	
		Port power saving			--	(Note 7)
		Dynamic power saving	Switch sleep		--	
			Port power saving		--	(Note 7)
			LED brightness control		--	

(Note 1) Software-based execution
(Note 2) The differences from the AX2400S and AX3600S series are as follows:
- axsDHCP group
- axsGSRPMIB group
- axsOADP group
- axsFLOW group
- axs2430sManagement
- ICMP group (HP private MIB)

(Note 3) Only the SNTP client functionality is supported.
(Note 4) This feature is enabled only for RADIUS authentication.
(Note 5) You must purchase optional software licenses separately.
(Note 6) Only Web authentication and MAC-based authentication are supported.
(Note 7) The SFP port supports the port power saving only when a port is blocked.
(Note 8) SSH is not supported in OS-LT3-A.

4. Ordering Information

Table 5 Ordering information

No.	Model name	Abbreviated name	Basic specifications
LAN switch			
1	AX-1250-24T2CH-XX	12V-24T2CH	AX1250S-24T2CH Model that supports box-type Fast Ethernet and that provides greater resistance to heat and water (up to 50℃, fanless, IP31 supported) - Fast Ethernet: 24 ports (10/100BASE-TX x 24) - Gigabit Ethernet: 2 ports (10/100/1000BASE-T or 1000BASE-X (SFP) used with exclusion (port basis) x 2) - Equipped with L2 software (OS-LT3-A: SSH not supported.) - SD card slot x 1 - Supports AC power supply
2	AX-1250-24T2CH-BX	12D-24T2CH	AX1250S-24T2CH Model that supports box-type Fast Ethernet and that provides greater resistance to heat and water (up to 50℃, fanless, IP31 supported) - Fast Ethernet: 24 ports (10/100BASE-TX x 24) - Gigabit Ethernet: 2 ports (10/100/1000BASE-T or 1000BASE-X (SFP) used with exclusion (port basis) x 2) - Equipped with L2 software (OS-LT3: SSH supported.) - SD card slot x 1 - Supports AC power supply
Option			
1	AX-F0110-SD1GX	SD1G	1 GB SD memory card (Note 1)
Optical transceiver			
1	AX-F6244-3S1SX	SFP-SX	SFP for 1000BASE-SX (MMF: 2 m to 550 m)
2	AX-F6244-3S1S2X	SFP-SX2	SFP for 1000BASE-SX2 (MMF: 2 m to 2 km)
3	AX-F6244-3S1LX	SFP-LX	SFP for 1000BASE-LX (MMF: 2 m to 550 m) (SMF: 2 m to 5 km)
4	AX-F6244-3SB1UX	SFP-BX1U	SFP for 1000BASE-BX10-U, single core bidirectional single-mode optical fiber (upstream) (SMF: 0.5 m to 10 km)
5	AX-F6244-3SB1DX	SFP-BX1D	SFP for 1000BASE-BX10-D, single core bidirectional single-mode optical fiber (downstream) (SMF: 0.5 m to 10 km)
6	AX-F6244-3SB4UX	SFP-BX4U	SFP for 1000BASE-BX40-U, single core bidirectional single-mode optical fiber (upstream) (SMF: 0.5 m to 40 km)
7	AX-F6244-3SB4DX	SFP-BX4D	SFP for 1000BASE-BX40-D, single core bidirectional single-mode optical fiber (downstream) (SMF: 0.5 m to 40 km)
8	AX-F6244-3S1LHX	SFP-LH	SFP for 1000BASE-LH (SMF: 2 m to 70 km)
9	AX-F6244-3S1FX	SFP-FX	SFP for 100BASE-FX (MMF: 2 m to 2 km)
Optional software license			
1	AX-P1240-F1X	OP-WOL	Secure Wake-on-LAN license for AX1240S/AX1250S series
2	AX-P1240-F2X	OP-OTP	RSA SecurID linkage license for AX1240S/AX1250S series

(Note 1) The software and script are not installed when shipped from the factory.

[Editions History]
July 2012 (Ver. 2.4: Edition 1)
August 2013 (Ver. 2.4: Edition 2)

Note 1: SSH functionality is subject to export control regulations, and might be unavailable for use with exported products.
Note 2: The company names, product names, and names of company-specific features that are included in this document are the registered trademarks or trademarks of their respective owners.
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