

Aquam8012A-1U/Aquam8512A-1U Series Industrial Ethernet Switches Hardware Installation Manual

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KYLAND

Aquam8012A-1U/Aquam8512A-1U Series
Industrial Ethernet Switches Hardware Installation Manual

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Notice for Safety Operation

The product performs reliably as long as it is used according to the guidance. Artificial damage or destruction of the device should be avoided. Before using the device, read this manual carefully for personal and equipment safety. Please keep the manual for further reference. Kyland is not liable to any personal or equipment damage caused by violation of this notice.

- Do not place the device near water sources or damp areas. Keep the ambient relative humidity within the range from 5% to 95% (non-condensing).
- Do not place the device in an environment with high magnetic field, strong shock, or high temperature. Keep the working and storage temperatures within the allowed range.
- Install and place the device securely and firmly.
- Please keep the device clean; if necessary, wipe it with a soft cotton cloth.
- Do not place any irrelevant materials on the device or cables. Ensure adequate heat dissipation and tidy cable layout without knots.
- Wear antistatic gloves or take other protective measures when operating the device.
- Avoid any exposed metal wires because they may be oxidized or electrified.
- Install the device in accordance with related national and local regulations.
- Before power-on, make sure the power supply is within the allowed range of the device. High voltage may damage the device.
- Power connectors and other connectors should be firmly interconnected.
- Do not plug in or out the power supply with wet hands. When the device is powered on, do not touch the device or any parts with wet hands.
- Before operating a device connected to a power cable, remove all jewelry (such as rings, bracelets, watches, and necklaces) or any other metal objects, because they may cause electric shock or burns.
- Do not operate the device or connect or disconnect cables during an electrical storm.
- Use compatible connectors and cables. If you are not sure, contact our sales or technical support personnel for confirmation.
- Do not disassemble the device by yourself. When an anomaly occurs, contact our sales or technical support personnel.
- If any part is lost, contact our sales or technical support personnel to purchase the substitute. Do not purchase parts from other channels.
- Dispose of the device in accordance with relevant national provisions, preventing environmental pollution.

In the following cases, please immediately shut down your power supply and contact your Kyland representative:

- Water gets into the equipment.
- Equipment damage or shell damage.
- Equipment operation or performance has abnormally changed.
- The equipment emits odor, smoke or abnormal noise.

The following information applies when operating this device in hazardous locations:

Suitable for use in Class I, Division 2, Groups A, B, C and D Hazardous Locations, or nonhazardous locations only.

Cet appareillage est utilisable dans les emplacements de Classe I, Division 2, Groupes A, B, C et D, ou dans les emplacements non dangereux seulement.

WARNING: EXPLOSION HAZARD

- Do not disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations.
- Substitution of any component may impair suitability for Class I, Division 2.

AVERTISSEMENT: RISQUE D'EXPLOSION

- Avant de deconnecter l'equipement, couper le courant ou s'assurer que l'emplacement est designe non dangereux.
- La substitution de composants peut rendre ce materiel inacceptable pour les emplacements de Classe I, Division 2.

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1 Product Overview

Aquam8012A-1U/Aquam8512A-1U includes a series of high-performance industrial Ethernet switches developed by Kyland particularly for rail transportation industry. The series devices are applicable to PIS, CCTV, video monitoring system, train control system, and the industrial field with strict requirements on vibration, shock, and EMC compatibility due to the solid closed housing, overcurrent, overvoltage protection for power input, sound EMC protection of M12 ports. All the devices meet the requirements stipulated in the EN50155, EN50121 and other industrial standards. The series switches provide powerful network management functions. The devices can be managed through CLI, Telnet, Web, and SNMP-based network management software. Aquam8512A-1U is a layer 3 switch that supports the layer 3 routing protocol.

The switches support rack mounting. They provide up to two 10/100/1000Base-T(X) Ethernet ports, and eight 10/100Base-T(X) Ethernet ports.

Table 1 Models

Model	Aquam8012A-1U-Ports-PS1-PS2 Aquam8512A-1U-Ports-PS1-PS2
Code definition	Code option
Ports: GE, T	2GE8T, 10T
	Note: 2GE8T: two 10/100/1000Base-T(X) M12 ports; eight 10/100Base-T(X) M12 ports.
PS1-PS2: power input	H2-H2 (110VDC, redundant power input)

Table 2 Optional Accessories

Model	Description	Remarks
M12-D-4P-M	Male cable connector with M12, D-Coding, 4 Pin	10/100Base-T(X) port connector
M12-X-8P-M	Male cable connector with M12, X-Coding, 8 Pin	10/100/1000Base-T(X) port connector



Note:

We reserve the right to amend the product information listed in this table without notice. To obtain the latest information, you can contact our sales or technical support personnel.

2 Structure and Interface



Caution:

It is recommended to purchase the port dustproof shield (optional) to keep ports clean and ensure switch performance.

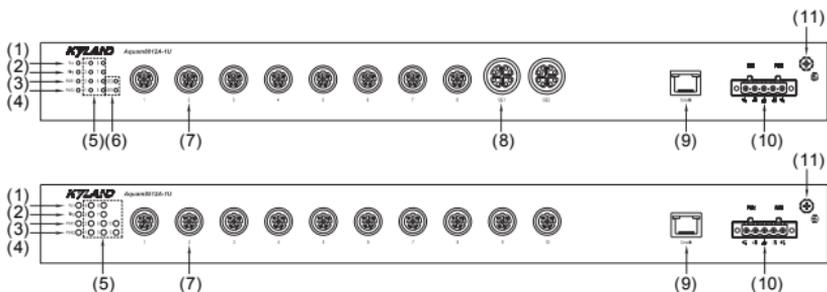


Figure 1 Front Panel

- (1) Running LED (2) Ring LED (3) Power 1 LED
(4) Power 2 LED
(5) 10/100Base-T(X) Ethernet port connection status LED
(6) 10/100/1000Base-T(X) Ethernet port connection status LED
(7) 10/100Base-T(X) Ethernet port
(8) 10/100/1000Base-T(X) Ethernet port
(9) Console port (10) Power terminal block (11) Grounding screw

3 Mounting

3.1 Dimension Drawing

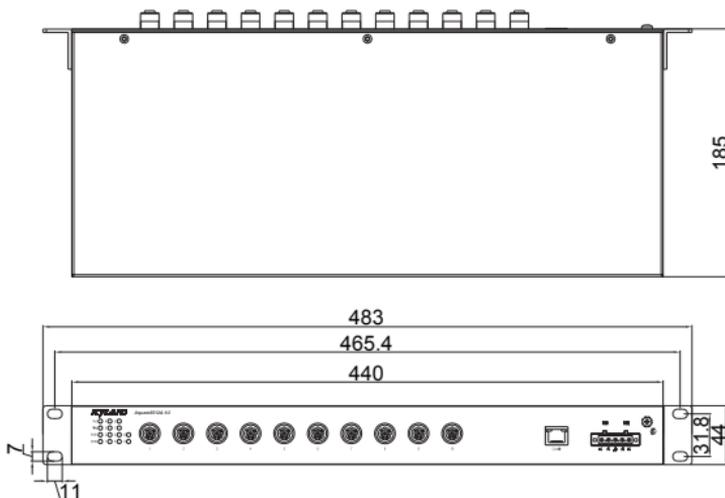


Figure 2 Dimensions(unit: mm)



Caution:

- As part of the heat dissipation system, the switch housing becomes hot during operation. Please use caution when coming in contact and avoid covering the switch housing when the switch is running.
- The figures in this manual are only for reference.

3.2 Mounting Modes and Steps

The series devices support rack mounting by front panel. Before installation, make sure that the following requirements are met.

- 1) Environment: temperature (-40°C to 75°C), ambient relative humidity (5% to 95%, non-condensing).
- 2) Power requirement: The power input is within the voltage range of the switch.
- 3) Grounding resistance: <math>< 5\Omega</math>
- 4) No direct sunlight, distant from heat source and areas with strong electro magnetic interference.
- 5) Devices are to be installed in an authority certified enclosure and accessible only by the use of a tool.
- 6) Devices should be installed and accessed by service personnel or users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.

- Installing Mounting Brackets

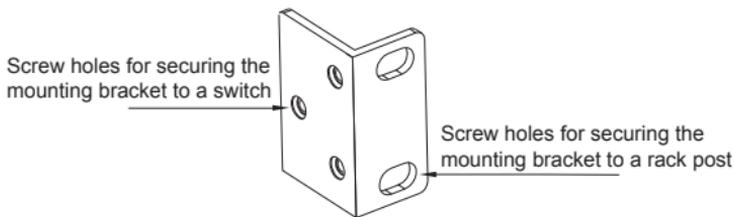


Figure 3 Mounting Bracket

You can install the mounting brackets through the screw holes for front panel mounting. If there are screws inserted in the screw holes, remove the screws and keep them for future use.

As shown in the following figure, use three screws to secure two mounting brackets to the switch respectively.

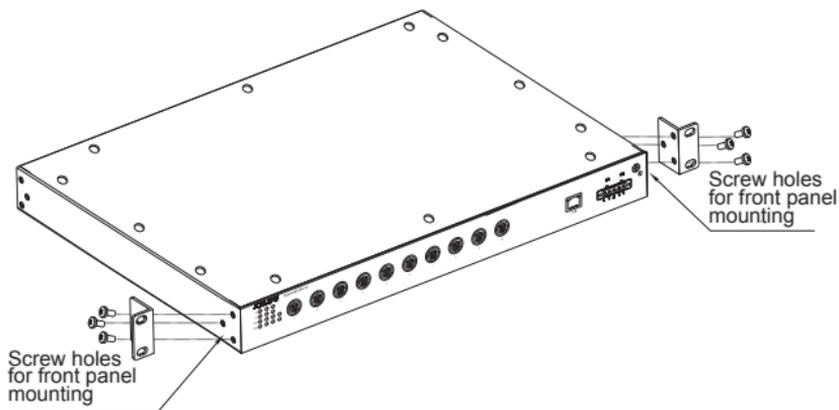


Figure 4 Installing Mounting Brackets

● Mounting

Step 1: Select the mounting position for the switch and guarantee adequate space and heat dissipation.

Step 2: Move the switch in direction 1 until the screw holes for securing the mounting brackets to rack posts are in alignment with the corresponding holes in the rack posts. Then use four screws and supporting captive nuts to secure the mounting brackets to the rack posts.

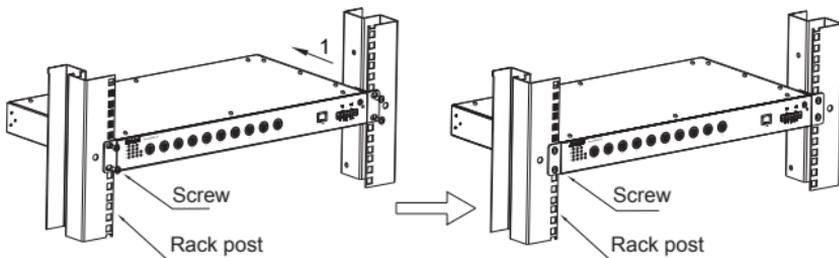


Figure 5 Mounting

● Dismounting

Step 1: Remove the four screws and supporting captive nuts securing the mounting brackets to the rack posts.

Step 2: Remove the switch from the rack posts. Then unscrew the mounting brackets to complete dismounting.



Caution:

Cut off the power and disconnect all cables before mounting, dismounting or moving the equipment.

4 Connection

10/100Base-T(X) port connector, and 10/100/1000Base-T(X) port connector are all optional (For details, see Table 2). That is, these components need to be purchased separately as required.

4.1 10/100Base-T(X) Ethernet Port

10/100Base-T(X) Ethernet port is equipped with M12 connector, which is dustproof, waterproof, and anti-vibration. The port is self-adaptive. It can automatically configure itself to work in 10M or 100M state, full or half duplex mode. The port can also adapt to MDI or MDI-X connection automatically. You can connect the port to a terminal or network device with a straight-through or cross-over cable.

- Pin Definition



Figure 6 M12 Port (female)

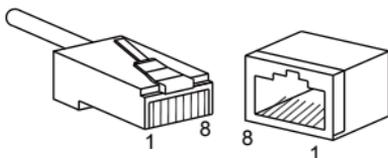


Figure 7 RJ45 Port

You can use an M12-M12 or M12-RJ45 cable to connect the port for communication. The preceding figures show the pin numbers of an M12 port and an RJ45 port. For pin definitions, see the following table.

Table 3 Pin Definitions of M12/RJ45 Port

Pin	MDI-X Signal	MDI Signal
M12 Port		
1	Receive Data+ (RD+)	Transmit Data+ (TD+)
2	Transmit Data+ (TD+)	Receive Data+ (RD+)
3	Receive Data- (RD-)	Transmit Data- (TD-)
4	Transmit Data- (TD-)	Receive Data- (RD-)
RJ45 Port		
1	Receive Data+ (RD+)	Transmit Data+ (TD+)
2	Receive Data- (RD-)	Transmit Data- (TD-)
3	Transmit Data+ (TD+)	Receive Data+ (RD+)
6	Transmit Data- (TD-)	Receive Data- (RD-)
4, 5, 7, 8	Unused	Unused
 Note: "+" and "-" indicate level polarities.		

● Wiring Sequence

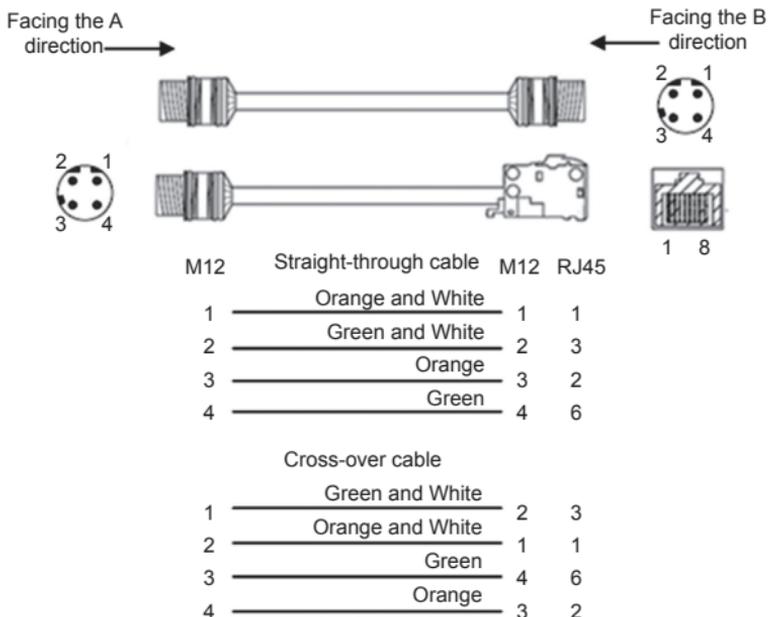


Figure 8 Connection Using Straight-through/Cross-over Cable



Note:

- The color of the cable for RJ45 connector meets the 568B standard: 1-orange and white, 2-orange, 3-green and white, 4-blue, 5-blue and white, 6-green, 7-brown and white, and 8-brown.
- The 1 and 3, 2 and 4 pins on the M12 interface are differentiated signal pins in pairs. The orange-and-white and orange pair, green-and-white and green pair, blue-and-white and blue pair, and brown-and-white and brown pair in twist pair cables must be used in correct pairs while being connected with the signal pins. For example, the above figure, the orange-and-white and orange and green-and-white and green pairs are used.

4.2 10/100/1000Base-T(X) Ethernet Port

10/100/1000Base-T(X) Ethernet port is equipped with M12 connector, which is dustproof, waterproof, and anti-vibration. The port is self-adaptive. It can automatically configure itself to work in 10M or 100M state, full or half duplex mode. The port can also adapt to MDI or MDI-X connection automatically. You can connect the port to a terminal or network device with a straight-through or cross-over cable.

- Pin Definition



Figure 9 M12 Port (female)

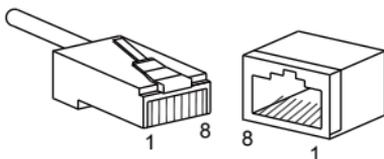


Figure 10 RJ45 Port

You can use an M12-M12 or M12-RJ45 cable to connect the port for communication. The preceding figures show the pin numbers of an M12 port and an RJ45 port. For pin definitions, see the following table.

Table 4 Pin Definitions of M12/RJ45 Port

Pin	MDI-X Signal	MDI Signal
M12 Port		
1	Transmit/Receive Data (TRD1+)	Transmit/Receive Data (TRD0+)
2	Transmit/Receive Data (TRD1-)	Transmit/Receive Data (TRD0-)
3	Transmit/Receive Data (TRD0+)	Transmit/Receive Data (TRD1+)
4	Transmit/Receive Data (TRD0-)	Transmit/Receive Data (TRD1-)
5	Transmit/Receive Data (TRD3+)	Transmit/Receive Data (TRD2+)
6	Transmit/Receive Data (TRD3-)	Transmit/Receive Data (TRD2-)
7	Transmit/Receive Data (TRD2+)	Transmit/Receive Data (TRD3+)
8	Transmit/Receive Data (TRD2-)	Transmit/Receive Data (TRD3-)
RJ45 Port		
1	Transmit/Receive Data (TRD1+)	Transmit/Receive Data (TRD0+)
2	Transmit/Receive Data (TRD1-)	Transmit/Receive Data (TRD0-)
3	Transmit/Receive Data (TRD0+)	Transmit/Receive Data (TRD1+)
4	Transmit/Receive Data (TRD3+)	Transmit/Receive Data (TRD2+)
5	Transmit/Receive Data (TRD3-)	Transmit/Receive Data (TRD2-)
6	Transmit/Receive Data (TRD0-)	Transmit/Receive Data (TRD1-)
7	Transmit/Receive Data (TRD2+)	Transmit/Receive Data (TRD3+)
8	Transmit/Receive Data (TRD2-)	Transmit/Receive Data (TRD3-)
	Note: "+" and "-" indicate level polarities.	

● Wiring Sequence

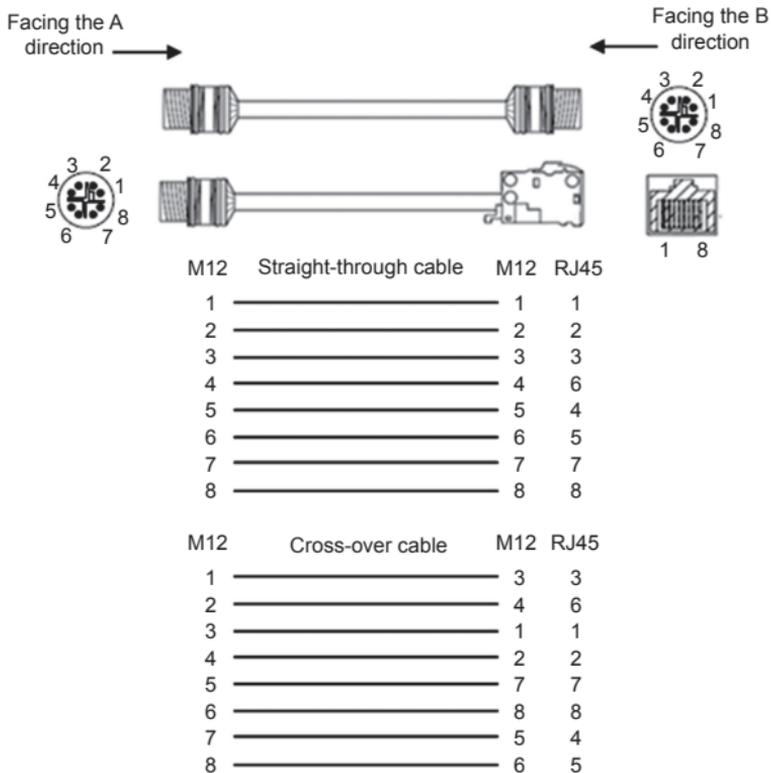


Figure 11 Connection Using Straight-through/Cross-over Cable



Note:

The color of the cable for RJ45 connector meets the 568B standard: 1-orange and white, 2-orange, 3-green and white, 4-blue, 5-blue and white, 6-green, 7-brown and white, and 8-brown.

4.3 Console Port

There is a Console port on the front panel of the switch. Connect the 9-pin serial port of a PC to the console port of the switch with a DB9-RJ45 console cable. You can configure, maintain, and manage the switch by running Hyper Terminal in the Windows OS of a computer.

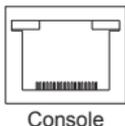


Figure 12 Console Port

● DB9-RJ45 Console Cable

One end of a DB9-RJ45 console cable is the DB9 connector to be inserted into the 9-pin serial port of a PC, and the other end is crimped RJ45 connector to be inserted into the console port of the switch.

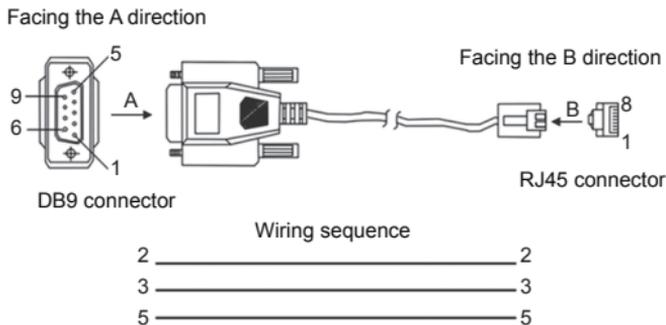


Figure13 Wiring Sequence DB9-RJ45 Console Cable

Table 5 Pin Definition of DB9 Port (9-Pin Serial Port) and RJ45 Port (Console Port)

DB9 Port (9-Pin Serial Port)		RJ45 Port (Console Port)	
Pin	Signal	Pin	Signal
2	RXD (Receive Data)	2	TXD (Transmit data)
3	TXD (Transmit Data)	3	RXD (Receive data)
5	GND (Grounding)	5	GND (Grounding)

4.4 Grounding

Grounding protects the device from lightning and interference. Therefore, you must ground the device properly. You need to ground the device before it is powered on and disconnect the grounding cable after the device is powered off.

There is a grounding screw (see Figure 1) on the front panel of the device. The screw is for chassis grounding. After crimping one end of the grounding cable to a cold pressed terminal, secure the end of the grounding cable to the grounding screw and firmly connect the other end to ground.



Note:

Cross-sectional area of the chassis grounding cable $>2.5\text{mm}^2$;
Grounding resistance $<5\Omega$.

4.5 Power Terminal Block

There is a power terminal block on the front panel of the device. You need to connect the power cable to the terminal block to provide power to the device.

The device supports redundant (PWR1 and PWR2) power supply with a 5-pin 5.08mm-spacing plug-in terminal block. When one power supply is faulty, the switch can continue operating properly, thereby improving network reliability.



Note:

- $0.75\text{mm}^2 < \text{Cross-sectional area of the power cable} < 2.5\text{mm}^2$;
grounding resistance $<5\Omega$.
- Use copper conductors only, temperature rating 75°C only.

- 5-pin 5.08mm-spacing plug-in terminal block

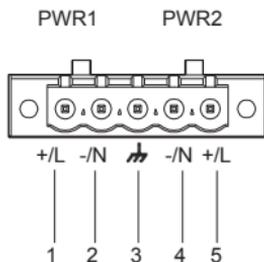


Figure 14 5-Pin 5.08mm-Spacing Plug-in Terminal Block

Table 6 Pin Definitions of 5-Pin 5.08mm-Spacing Plug-in Terminal Block

Pin	Signal	DC Wiring Definition	AC Wiring Definition
1	+/L	PWR1: +	PWR1: L
2	-/N	PWR1: -	PWR1: N
3		PGND	PGND
4	-/N	PWR2: -	PWR2: N
5	+/L	PWR2: +	PWR2: L

● Wiring and Mounting

Step 1: Ground the device properly according to section 4.4.

Step 2: Remove the power terminal block from the switch.

Step 3: Insert the power cable into the power terminal block according to Table 6 to fix the power cable.

Step 4: Insert the terminal with the connected cable into the terminal block on the device.

Step 5: Connect one end of the power cable to an external power supply system (with the allowed power range). If the power LED on the front panel of the switch turns on, the power supply is connected properly.

Wiring and mounting should meet following specifications.

Table 7 Wiring and Mounting Specifications

Terminal Type	Required Torque	Wire Range (AWG)
Terminal Block Plug	4.5-5.0 lb-in	12-24



Caution:

- Before connecting the device to power supply, make sure that the power input meets the power requirement. If connected to an incorrect power input, the device may be damaged.
- To comply with UL restrictions, this equipment must be powered from a source compliant with Class 2.



Warning:

- Do not touch any exposed conducting wire, terminal, or component with a voltage warning sign, because it may cause personal injury.
- Do not remove any part or plug in or out any connector when the device is powered on.

5 LEDs

Table 8 LEDs

LED	State	Description
Power 1 LED-PWR1	On	The power 1 is connected and operates properly.
	Off	The power 1 is not connected or operates abnormally.
Power 2 LED-PWR2	On	The power 2 is connected and operates properly.
	Off	The power 2 is not connected or operates abnormally.
Running LED-Run	On	The device is starting up
	Blinking	The CPU operates properly.
	Off	The device does not start up
Ring LED-Ring	On	Master (DT-Ring mode)/Root (DRP mode)
	Blinking	Slave (DT-Ring mode)/B-Root or Normal (DRP mode)
	Off	No ring
10/100Base-T(X), 10/100/1000Base-T(X) Ethernet port connection status LED	On	Effective port connection
	Blinking	Ongoing network activities
	Off	No effective port connection

6 Switch Access

You can access the switch in any of the following ways.

6.1 Access through Console Port

Step 1: Connect the console port of the switch to the 9-pin serial port of a PC with the DB9-RJ45 console cable.

Step 2: Open Hyper Terminal in Windows OS. On the computer's desktop, click Start → All Programs → Accessories → Communications → Hyper Terminal.

Step 3: Create a connection "Switch", as shown in the following figure.



Figure 15 Creating a Connection

Step 4: Connect the communication port in use, as shown in the following figure.



Figure 16 Selecting a Serial Port



Note:

To confirm the communication port in use, right-click [My Computer] and select [Property]. Click [Hardware] → [Device Manager] → [Port] to view the communication port.

Step 5: Set port parameters (Bits per second: 115200, Data bits: 8, Parity: None, Stop bits: 1 and Flow control: None), as shown in the following figure.

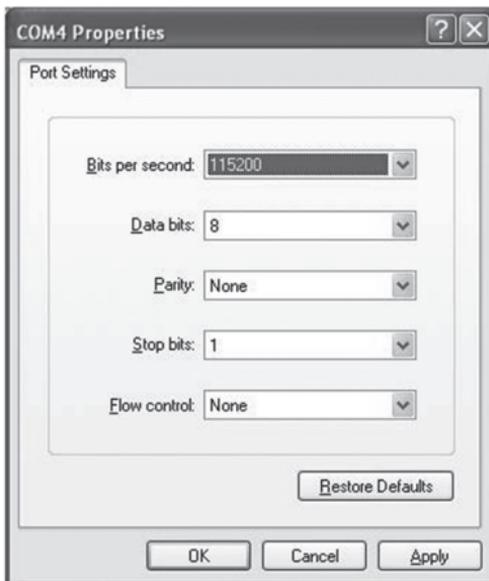


Figure 17 Setting Port Parameters

Step 6: Click OK to enter the switch CLI. Then you can run the commands in Table 9 and Table 10 to perform operations.

Table 9 CLI Commands for Aquam8012A-1U

View	Command	Description
Privileged mode	SWITCH#show interface vlan 1	Query the IP address of the switch
Privileged mode	SWITCH#show version	Query the version of the switch
Privileged mode	SWITCH#reboot	Restart the switch
Privileged mode	SWITCH#load default	Restore the factory default settings
Privileged mode	SWITCH#config terminal	Enter the configuration mode

Table 10 CLI Commands for Aquam8512A-1U

View	Command	Description
General mode	SWITCH>enable	Enter the privileged mode
Privileged mode	SWITCH#show interface vlan 1	Query the IP address of the switch
Privileged mode	SWITCH#show version	Query the version of the switch
Privileged mode	SWITCH#reboot	Restart the switch
Privileged mode	SWITCH#set default SWITCH#save	Restore the factory default settings
Privileged mode	SWITCH#config terminal	Enter the configuration mode

6.2 Access through Telnet

Step 1: Connect the network port of the PC to the Ethernet port of the device with a network cable.

Step 2: On the Windows desktop, click Start and Run. The Run Dialog box is displayed. Enter "telnet *IP-address*". For example, if the IP address of the switch is 192.168.0.2 (default IP address of a Kyland switch), enter "telnet 192.168.0.2" in the dialog box.

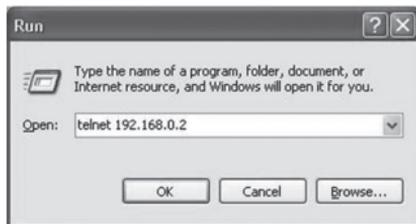


Figure 18 Access through Telnet

Step 3: Click OK. The Telnet CLI is displayed. Then you can run the commands in Table 9 and Table 10 to perform operations.

6.3 Access through Web

Step 1: Connect the network port of the PC to the Ethernet port of the device with a network cable.

Step 2: Enter the IP address of the switch in the address box of the browser. The user login interface is displayed. You can log in to the Web UI by using default user name "admin" and password "123".



Note:

- IE8.0 or a later version is recommended.
- For details about how to access the switch and other operation, refer to the Web operation manual in the delivered CD.

7 Basic Features and Specifications

Power Requirements		
Power Identifier	Rated Voltage Range	Maximum Voltage Range
H2	110VDC	77-154VDC
Power terminal	5-pin 5.08mm-spacing plug-in terminal block (with flanges)	
Rated Power Consumption		
Rated Power	Aquam8512A-1U: 13W (MAX)	
Consumption	Aquam8012A-1U: 6W (MAX)	
Physical Characteristics		
Housing	Metal, fanless	
Protection Class	IP40	
Installation	19 inch 1U rack mounting	
Dimensions(W×H×D)	440mm×44mm×185mm (excluding connectors and mounting brackets)	
Weight	3Kg	
Environmental Limits		
Ambient temperature	-40℃~+75℃	
Storage temperature	-40℃~+85℃	
Ambient relative humidity	5%~95% (non-condensing)	
MTBF		
MTBF	Aquam8512A-1U: 1576622h Aquam8012A-1U: 2299386h	
Warranty		
Warranty	Five years	

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