

Moxa EtherDevice Server

Hardware Installation Guide

Fourth Edition, June 2008



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Moxa EtherDevice Server (EDS) Hardware Installation Guide

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Welcome to Moxa EtherDevice Server™, the redundant and intelligent 8-port Industrial Ethernet Switch.

The following topics are covered in this chapter:

- **Inside the Future of Industrial Ethernet Technology**
- **Moxa EtherDevice Server™**
- **Package Checklist**
- **Features**
- **Specifications**
- **Top/Front/Rear Panel Views of ED6008**
- **Top/Front/Rear Panel Views of ED6008-M-SC**
- **Top/Front/Rear Panel Views of ED6008-S-SC**
- **Top/Front/Rear Panel Views of ED6008-MM-SC**
- **Top/Front/Rear Panel Views of ED6008-SS-SC**

Inside the Future of Industrial Ethernet Technology

The trend in industrial communications and automation applications

As the world's network and information technology becomes more mature, the trend is to use Ethernet as the major communications interface in many industrial communications and automation applications. In fact, a whole new industry has sprung up to provide Ethernet products that comply with the requirements of demanding industrial applications.

Industrial vs. Commercial

Users have found that when moving Ethernet from the comfortable office environment to the harsh and less predictable industrial environment, the commercial Ethernet equipment available in today's market simply cannot meet the high reliability requirements demanded by industrial applications. This means that a more robust type of network equipment, commonly referred to as industrial Ethernet equipment, is required for these applications.

Informative vs. Passive

Since industrial Ethernet devices are often located at the endpoints of a system, such devices cannot always know what's happening elsewhere on the network. This means that industrial Ethernet communication equipment that connects these devices must take responsibility for providing system maintainers with real-time alarm messages.

Moxa EtherDevice Server™

Moxa EtherDevice Server comes with a suite of useful maintenance and monitoring functions, and is designed to provide smooth and reliable operation in harsh industrial environments. You will find that Moxa EtherDevice Server establishes a new industrial Ethernet benchmark. It is excellent for keeping automation systems running continuously, is ideal for sending status reports to help prevent system damages and losses, is a great tool for mastering your industrial Ethernet networks, and is well-suited for use with industrial device control networks.

These products have a wide operating temperature range, from -40 to 75°C, and are designed to withstand a high degree of vibration and shock. The rugged hardware design makes ED6008 Series perfect for ensuring that your Ethernet equipment can withstand critical industrial applications, such as in hazardous locations (Class 1 Division 2/ Zone 2), and complies with FCC, TÜV, UL, and CE Standards.

NOTE *Throughout this User's Manual, we often use **EDS** as an abbreviation for Moxa EtherDevice Server:*

EDS = Moxa EtherDevice Server

Package Checklist

Moxa EtherDevice Server is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- Moxa EtherDevice Server
- Hardware Installation Guide and User's Manual
- Moxa Product Warranty booklet
- Panel mounting kit
- Console port cable (RJ45 to DB9)
- Protective caps for unused ports

Features

Excellent for keeping automation systems running continuously

- Line-Swap fast recovery (patent pending)
- Redundant Ethernet Ring capability
- Redundant power inputs
- Hardened design for harsh environments
 - ❖ Operating temperature ranges from 0 to 60°C, or extended operating temperature from -40 to 75°C for (-T) models
 - ❖ IP 30, rugged high-strength case
 - ❖ Fanless design
 - ❖ DIN-Rail or panel mounting ability
- Watch-dog self-saver™

Dynamically know the status of networked industrial devices

- Automatically sends warning e-mail when an exception is detected
- Automatically sends warning e-mail when Ethernet traffic builds up
- Signals the system administrator via a Digital Output (DO) line when a malfunction occurs

Key management functions let you easily master your industrial Ethernet network

- Set up a mirror port for better online data monitoring
- Assign IP addresses to connected devices
- Send ping commands to identify network segment integrity
- Easily test cable wiring

Specifications

Interface

RJ45 Ports	10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Fiber Ports	100BaseFX ports (SC connector)
LED Indicators	Power, Faults, ACT, LNK, 10/100
Alarm Contact	One relay output, current carrying capacity of 1A @ 24 VDC

Technology

Standards	IEEE802.3, 802.3u, 802.3x, 802.1D
Forward and Filtering Rate	148810 pps
Packet Buffer Memory	256 KB
Processing Type	Store and Forward, with IEEE802.3x full duplex, non-blocking flow control
Address Table Size	4K uni-cast addresses
Management	SNMP V1.2c, MIB-II, Ethernet-like MIB, EDS-SNMP OPC Server (Optional)

Optical Fiber

Distance	Single mode fiber for 15 km, Multi mode fiber for 2 km
Wavelength	1310 nm
Min. TX Output	-15 dBm (Single), -20 dBm (Multi)
Max. TX Output	-6 dBm (Single), -14 dBm (Multi)
Sensitivity	-36 ~ -32 dBm (Single), -34 ~ -30 dBm (Multi)

Power

Input Voltage	Dual redundant inputs 9 to 32 VDC, previous Rev. 12 to 48 VDC, Rev. 2.0 & 2.1 or later
Input Current (@24V)	0.35A (ED6008) 0.45A (ED6008-M-SC, ED6008-S-SC) 0.55A (ED6008-MM-SC, ED6008-SS-SC)
Connection	Removable Terminal Block (maximum cable diameter = 1.5 mm)
Overload Current Protection	Present, can withstand 3.75A
Reverse Polarity Protection	Present

Mechanical

Casing	IP30 protection, aluminum case
Dimensions	51.8 × 136.7 × 101.2 mm (W × H × D)
Weight	0.57 kg
Installation	DIN-Rail, Wall Mounting

Environment

Operating Temperature	0°C to 60°C (32°F to 140°F) -40°C to 75°C (-40°F to 167°F) -T
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Ambient Relative Humidity	5% to 95% (non-condensing)

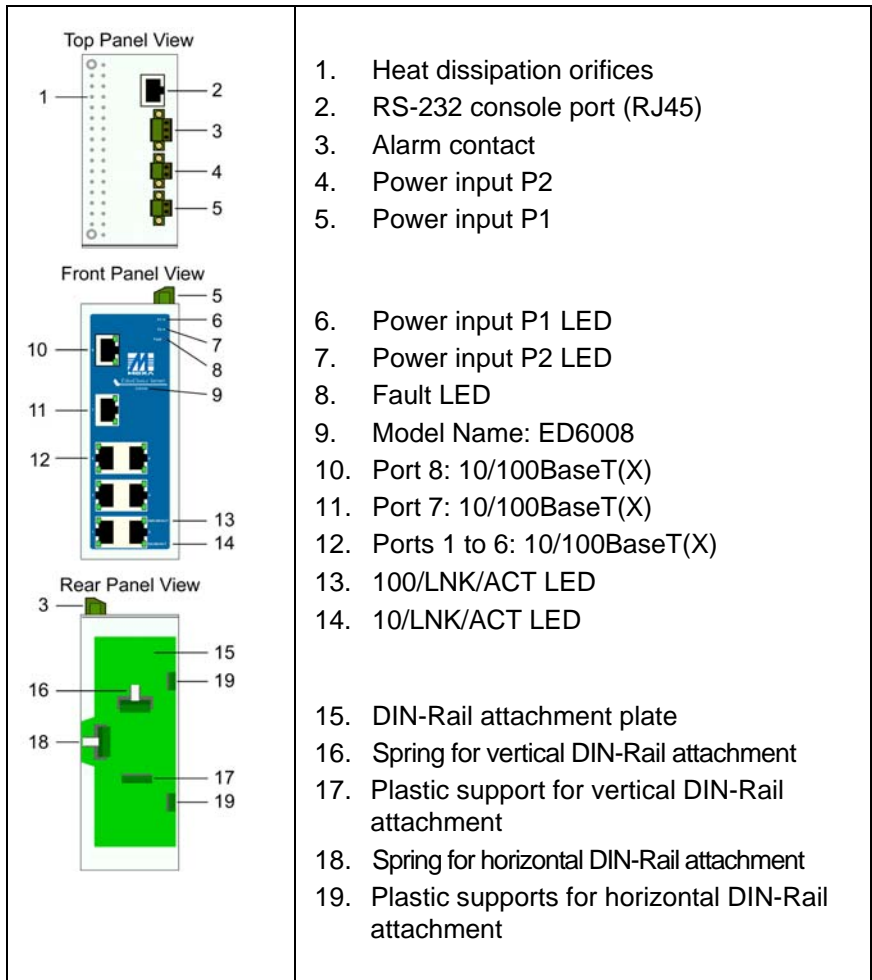
ATTENTION

Before connecting ED6008 to 12 to 48 VDC power inputs, verify the ED6008 Rev. is **2.0 & 2.1** or later on the side label..

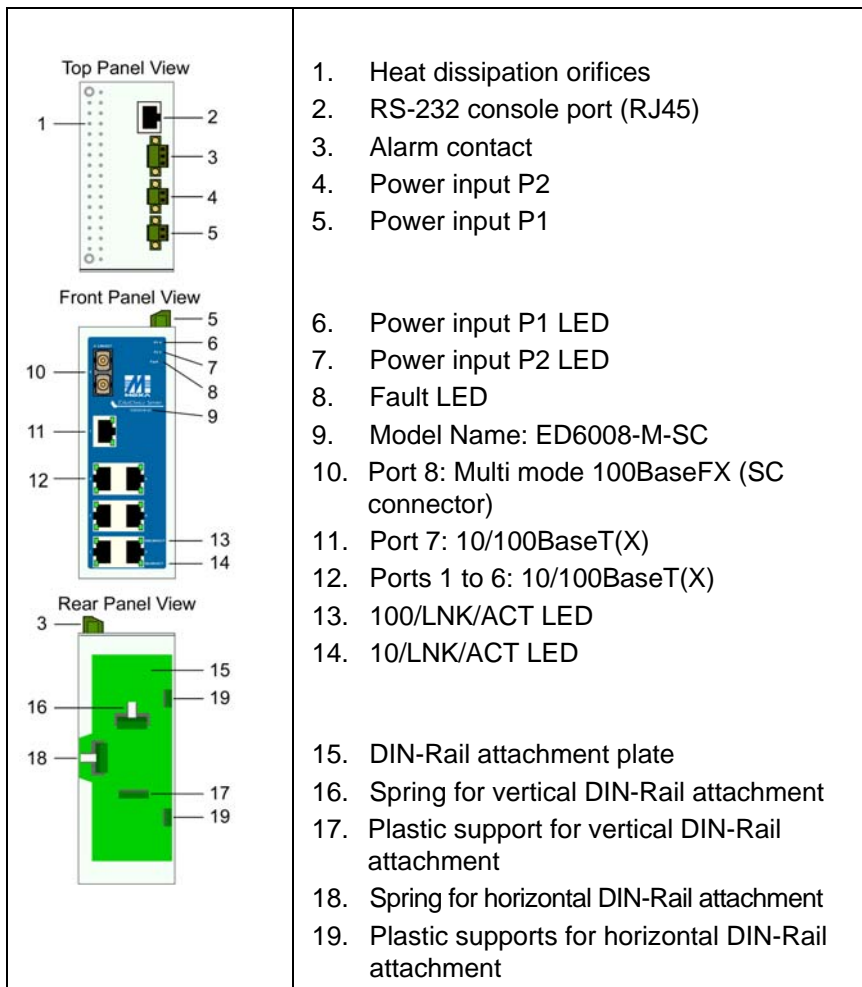
Regulatory Approvals

Safety	UL60950, UL 508, CSA C22.2 No. 60950, EN60950
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D ATEX Class I, Zone 2, EEx nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A
EMS	EN61000-4-2 (ESD), Level 3 EN61000-4-3 (RS), Level 3 EN61000-4-4 (EFT), Level 3 EN61000-4-5 (Surge), Level 3 EN61000-4-6 (CS), Level 3
Laser Protection	Class 1, complies with EN60825
Shock	IEC 60068-2-27
Free Fall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF	230,000 hours
WARRANTY	5 years

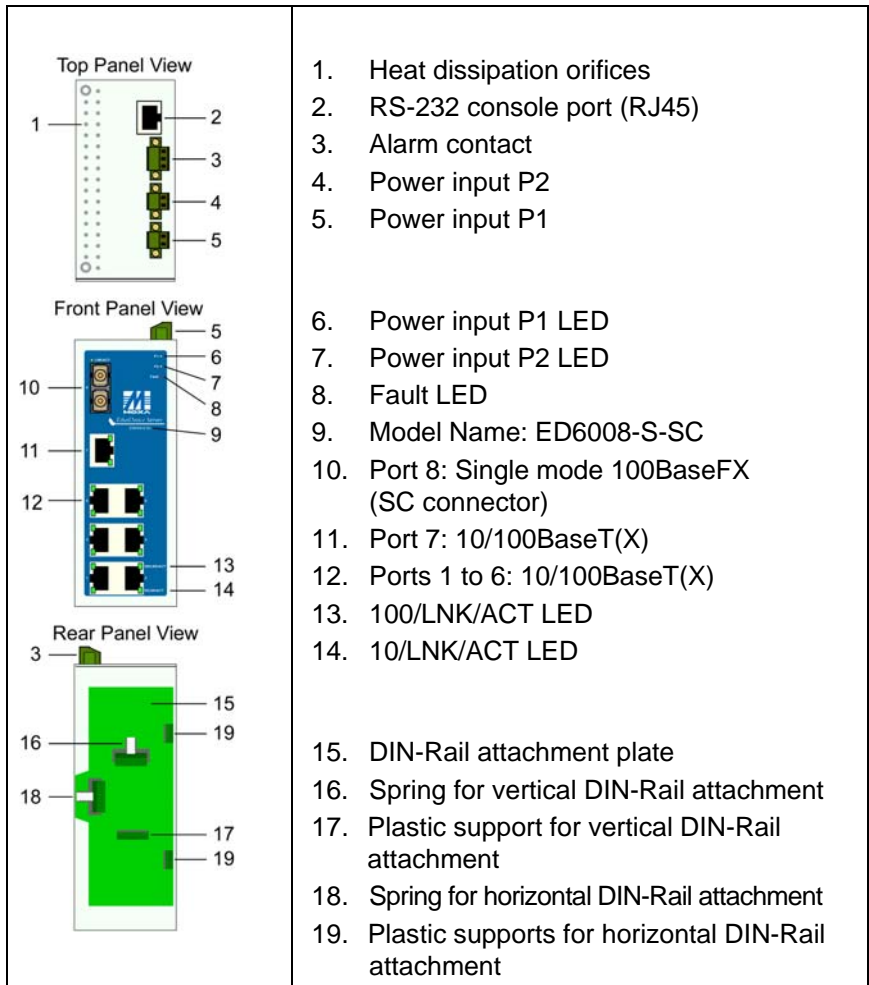
Top/Front/Rear Panel Views of ED6008



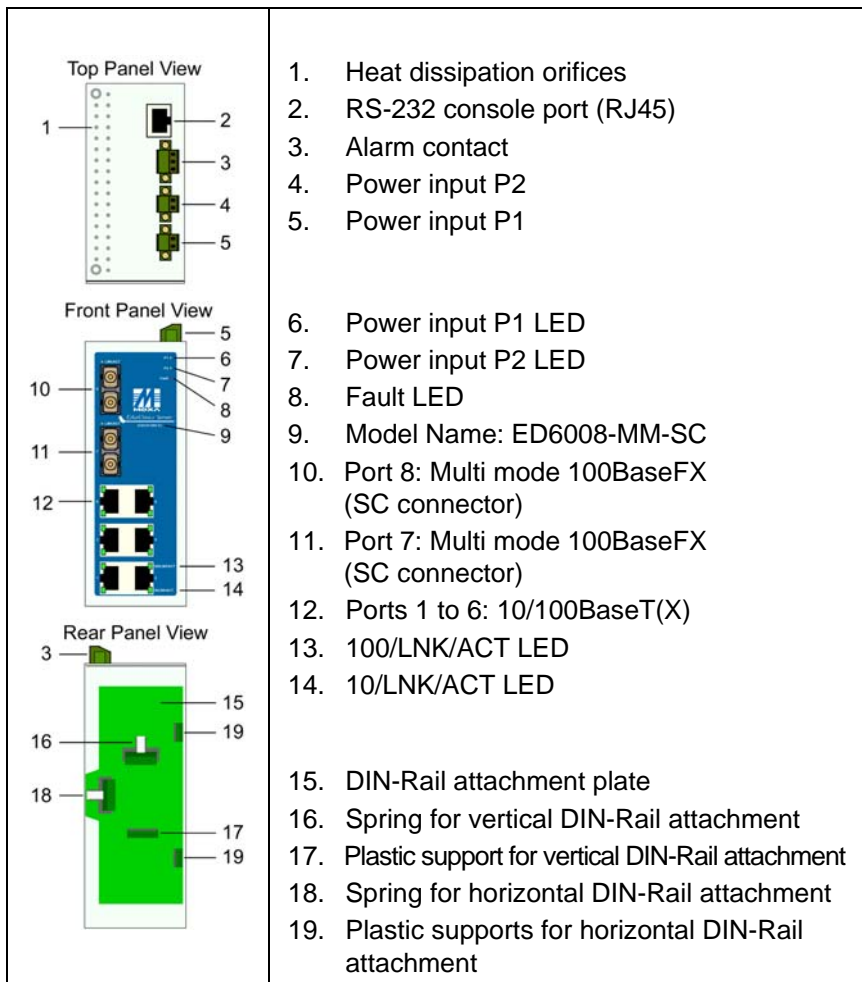
Top/Front/Rear Panel Views of ED6008-M-SC



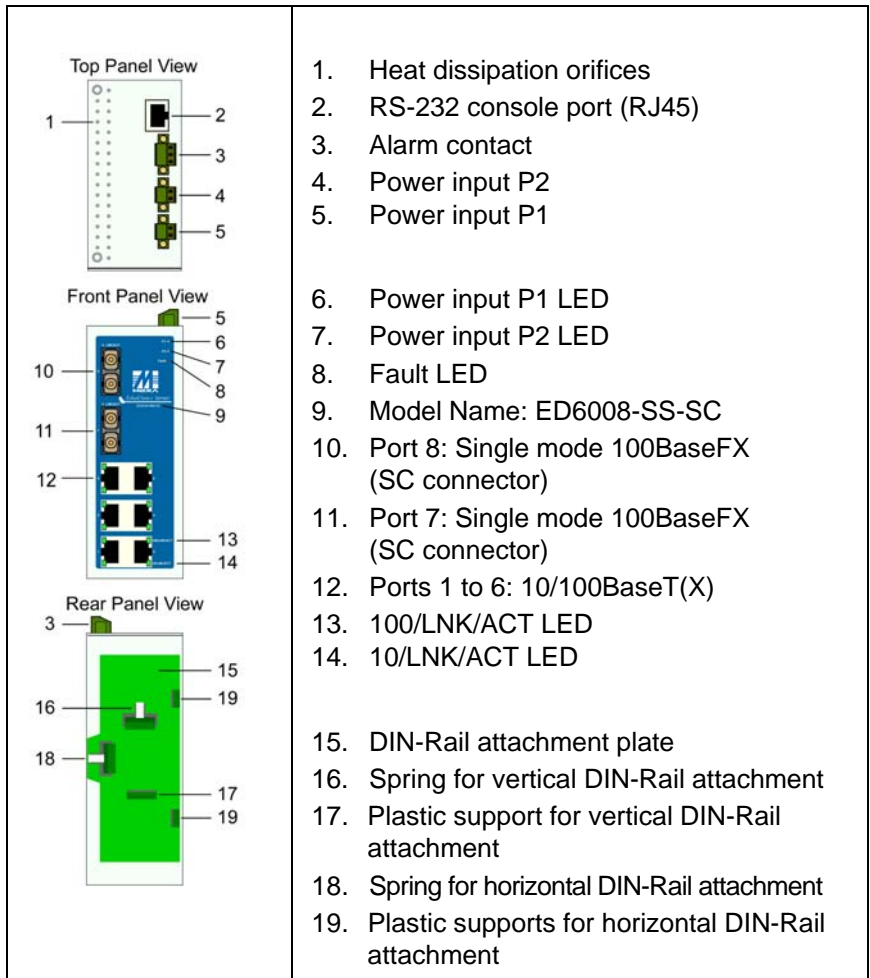
Top/Front/Rear Panel Views of ED6008-S-SC



Top/Front/Rear Panel Views of ED6008-MM-SC



Top/Front/Rear Panel Views of ED6008-SS-SC

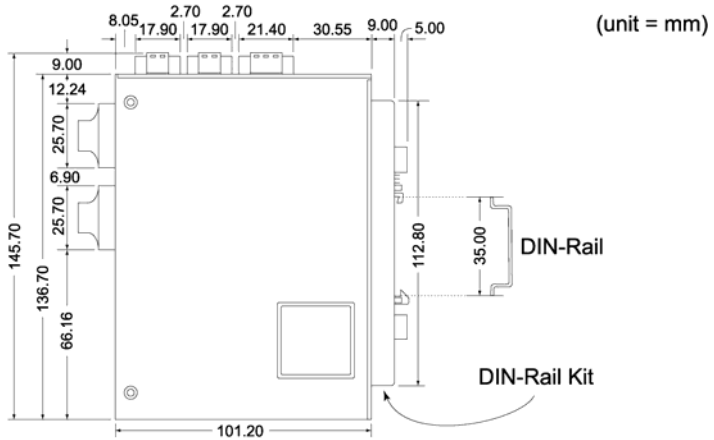


Installing Moxa EtherDevice Server

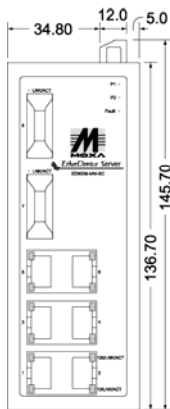
This chapter includes information about installing Moxa EtherDevice Server. The following topics are covered:

- **Mounting Dimensions**
- **DIN-Rail Mounting**
- **Wall Mounting**

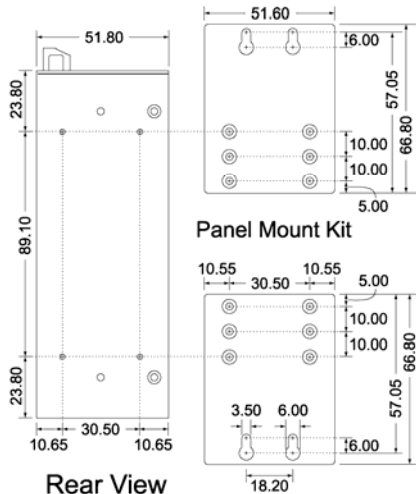
Mounting Dimensions



Side View



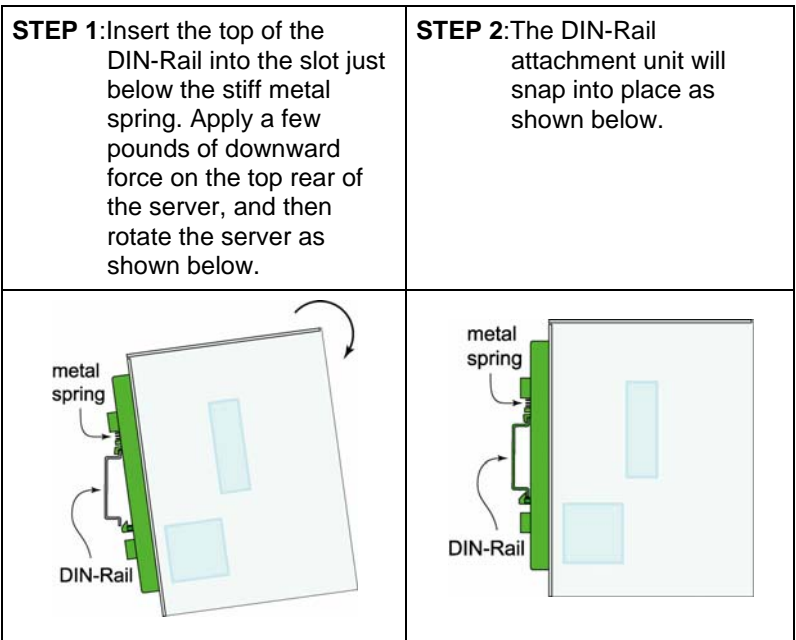
Front View



Rear View

DIN-Rail Mounting

For many industrial applications, you will find it convenient to attach Moxa EtherDevice Server to a DIN-Rail, as described below. The green plastic DIN-Rail attachment plate should already be fixed to the back panel of EDS when you take it out of the box. If you need to reattach the DIN-Rail attachment plate to EDS, be sure the stiff metal spring is situated towards the top, as shown in the figures below.

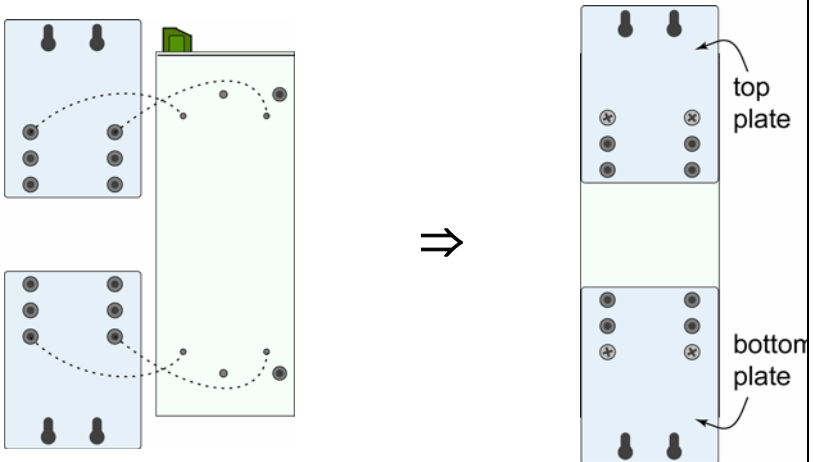


To remove Moxa EtherDevice Server from the DIN-Rail, simply reverse Steps 1 and 2 above. Grasp EDS with both hands, apply a slight amount of downwards force at the top rear of the server, and then rotate the bottom of the server towards its front panel. When the bottom of the DIN-Rail loses contact with the attachment plate, simply lift the server up and away from the DIN-Rail.

Wall Mounting

For some applications, you will find it convenient to mount Moxa EtherDevice Server on the wall, as illustrated below.

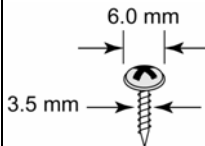
STEP 1: Remove the green plastic DIN-Rail attachment plate from Moxa EtherDevice Server's rear panel, and then attach the wall mount plates, as shown in the diagram below. Note that each plate has three rows of two screw holes—use whichever row of screw holes is most appropriate for your application. You should also differentiate between the *top plate* and *bottom plate*, as indicated below. Once the plates are attached, the keyhole shaped apertures should be such that the large part of the hole is at the bottom of the keyhole.



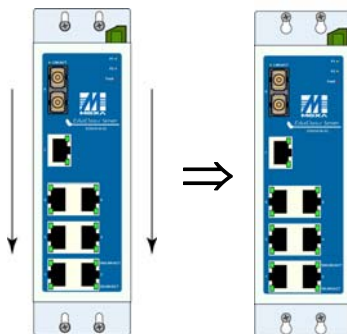
STEP 2: Mounting Moxa EtherDevice Server on the wall requires 4 screws. Use the server, with wall mount plates attached, as a guide to mark the correct locations of the 4 screws. The heads of the screws should be less than 6.0 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown in the figure to the right.

NOTE Test the screw head and shank size by inserting the screw into one of the keyhole shaped apertures of the Wall Mounting Plates, before it is screwed into the wall.

Do not screw the screws in all the way—leave a space of about 2 mm to allow room for sliding the wall mount panel between the wall and the screws.



STEP 3: Once the screws are fixed in the wall, insert the four screw heads through the large parts of the keyhole shaped apertures, and then slide Moxa EtherDevice Server downwards, as indicated below. Tighten the four screws for added stability.



Wiring Moxa EtherDevice Server

This chapter includes technical information about connecting Moxa EtherDevice Server to an external power source and to an external alarm system, and shows you what types of cables you should use for the Console port, Ethernet ports, and optical fiber ports. The following topics are covered:

- **Wiring Requirements**
- **Grounding Moxa EtherDevice Server**
- **Wiring the Alarm Contact**
- **Wiring the Redundant Power Inputs**
- **Communication Connections**
 - RS-232 Connection
 - 10/100BaseTx Ethernet Port Connection
 - 100BaseFx Ethernet Port Connection

Wiring Requirements

Warning



Do not disconnect modules or wires unless the power supply has been switched off or the area is known to be nonhazardous.

The devices may only be connected to the supply voltage shown on the type plate.

The devices are designed for operation with a safety extra-low voltage. Thus, they may only be connected to the supply voltage connections and to the signal contact with the safety extra-low voltages (SELV) in compliance with IEC950/ EN60950/ VDE0805.

Warning




Substitution of components may impair suitability for Class I, Division 2 and Zone 2.

These devices must be supplied by a SELV source as defined in the Low Voltage Directive 73/23/EEC and 93/68/EEC.

Warning



This equipment has been evaluated as EEx nC IIC T4 equipment under DEMKO Certificate No. 03 ATEX 0324537U. Each module is marked  II 3G and is suitable for use in Zone 2 Explosive Atmospheres. The device must be installed in a minimum IP 54 enclosure as defined in IEC 60529 and EN 60529.

ATTENTION



This unit is a building-in type. The installation into a certain end equipment shall comply with fire enclosure request of IEC 60950/EN60950 or similar sentence.

Safety First!

ATTENTION



Be sure to disconnect the power cord before installing and/or wiring your Moxa EtherDevice Switch.

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

You should also pay attention to the following points:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

NOTE: Do not run signal or communications wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

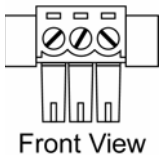
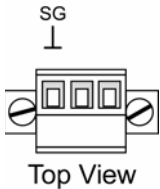
- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- Where necessary, it is strongly advised that you label wiring to all devices in the system.

Grounding Moxa EtherDevice Server

Grounding and wire routing helps limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices.

ATTENTION

This product is intended to be mounted to a well-grounded mounting surface such as a metal panel.

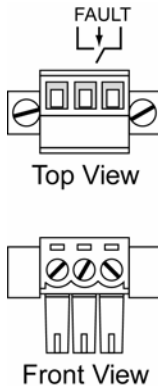


SG: The *Shielded Ground* (sometimes called *Protected Ground*) contact is the left most contact of the 3-terminal Alarm Contact terminal block connector when viewed from the angle shown here. Connect the SG wire to an appropriate grounded metal surface.

Wiring the Alarm Contact

The Alarm Contact terminal block connector is similar to the power terminal block connector discussed in the next section. You may refer to the next section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor.

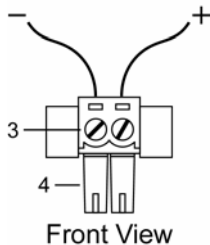
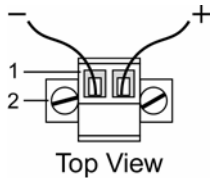
In this section, we explain the meaning of the two contacts used to connect the Alarm Contact.



FAULT: The two right-most contacts of the 3-terminal terminal block connector form a closed circuit when Moxa EtherDevice Server is receiving power from both DC power inputs. The circuit opens if power to one of the power inputs is cut off, or the Moxa EtherDevice Server self-test fails.

Wiring the Redundant Power Inputs

Moxa EtherDevice Server has two DC inputs located on the top panel. Top and front views of one of the terminal block connectors used to connect to a DC power source are shown here. Note that when viewed from this angle, the negative DC wire goes in the terminal block connector's left terminal, and the positive DC wire goes in the right terminal.



STEP 1: Insert the negative/positive DC wires into the left/right terminals (1) on the top of the terminal block connector.

STEP 2: To keep the DC wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws (3) on the front of the terminal block connector.

STEP 3: Insert the plastic terminal block connector prongs (4) into the terminal block receptor, which is permanently fixed to Moxa EtherDevice Server's top panel.

STEP 4: Use a small flat-blade screwdriver to tighten the two screws (2) on the top of the terminal block connector to fix it to the terminal block receptor.

ATTENTION



Before connecting EDS to the DC power inputs, make sure the DC power source voltage is stable.

An unstable DC power source voltage could cause EDS to consume too much inrush current, preventing the system from booting up.

Before connecting ED6008 to 12 to 48 VDC power inputs, verify the ED6008 Rev. is **2.0 & 2.1** or later on the side label.

Communication Connections

All models of Moxa EtherDevice Server have one RJ45 console port (RS-232 interface), and between six and eight 10/100BaseTX Ethernet ports. Some models also have one or two 100BaseFX (SC-type connector) fiber ports.

In this section, we present two types of diagrams—Pinout Diagrams and Cable Wiring Diagrams—to convey information about the ports and the cables used to connect Moxa EtherDevice Server to other devices:

Pinouts The meaning of the “Pinouts” diagrams is straightforward—the diagrams simply display the type of signal passing through each of the port’s pins.

Cable Wiring Diagrams labeled “Cable Wiring” present standard cable wiring schemes for cables used to connect Moxa EtherDevice Server’s ports to other devices. These diagrams display three pieces of information:

1. When building your own cable, refer to the “pin-to-pin” Cable Wiring information displayed between the two vertical dashed lines to learn which pin of the left connector should be connected to which pin of the right connector.
2. The information to the left of the left vertical dashed lines gives the pinouts of the relevant Moxa EtherDevice Server port.
3. The information to the right of the right vertical dashed line gives the pinouts of the opposing device’s port.

NOTE

1. The pin numbers for male DB9 and DB25 connectors, and hole numbers for female DB9 and DB25 connectors are labeled *on the connector*. However, the numbers are typically quite small, so you may need to use a magnifying glass to see the numbers clearly.
 2. The pin numbers for both 8-pin and 10-pin RJ45 connectors (and ports) are typically *not* labeled on the connector (or port). Refer to the Pinout and Cable Wiring diagrams below to see how RJ45 pins are numbered.
-

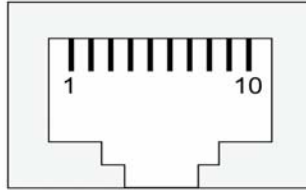
RS-232 Connection

Moxa EtherDevice Server has one RS-232 (10-pin RJ45) console port, located on the top panel. Use either an RJ45-to-DB9 or RJ45-to-DB25 cable (see the cable wiring diagrams below) to connect Moxa EtherDevice Server's console port to your PC's COM port. You may then use a console terminal program, such as Moxa PComm Terminal Emulator, to access Moxa EtherDevice Server's console configuration utility.

RJ45 (10-pin) Console Port Pinouts

10-Pin Description

1	DCD
2	DSR
3	RTS
4	GND
5	TxD
6	RxD
7	GND
8	CTS
9	DTR
10	----



RJ45 (10-pin) to DB9 (F) Cable Wiring

MOXA
EtherDevice
Server



RJ45 Plug Pin 1

COM Port

**RJ45
Connector**

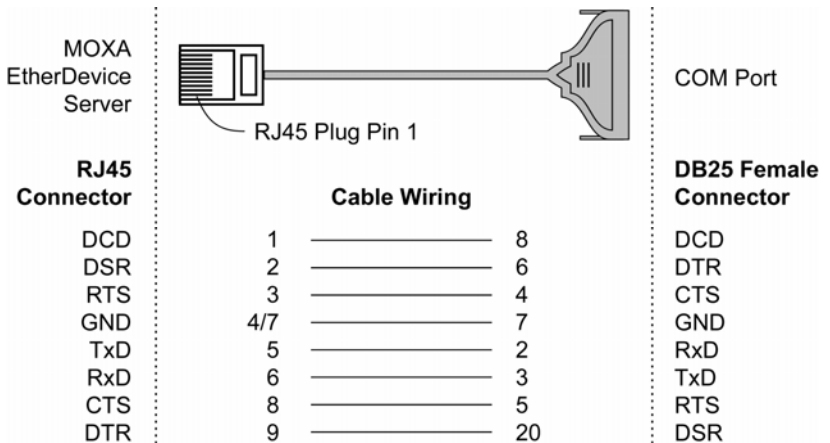
DCD
DSR
RTS
GND
TxD
RxD
CTS
DTR

		Cable Wiring	
1	_____	1	
2	_____	6	
3	_____	7	
4/7	_____	5	
5	_____	3	
6	_____	2	
8	_____	8	
9	_____	4	

**DB9 Female
Connector**

DCD
DTR
CTS
GND
RxD
TxD
RTS
DSR

RJ45 (10-pin) to DB25 (F) Cable Wiring



10/100BaseTx Ethernet Port Connection

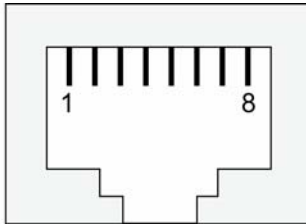
The 10/100BaseTX ports located on Moxa EtherDevice Server's front panel are used to connect to Ethernet-enabled devices. Most users will choose to configure these ports for *Auto MDI/MDI-X* mode, in which case the port's pinouts are automatically adjusted depending on the type of Ethernet cable used (straight-through or cross-over), and the type of device (NIC-type or HUB/Switch-type) connected to the port.

In what follows, we give pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports. We also give cable wiring diagrams for straight-through and cross-over Ethernet cables.

RJ45 (8-pin, MDI) Port Pinouts

8-Pin Description

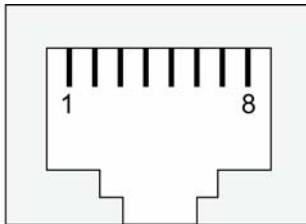
1	Tx+
2	Tx-
3	Rx+
6	Rx-



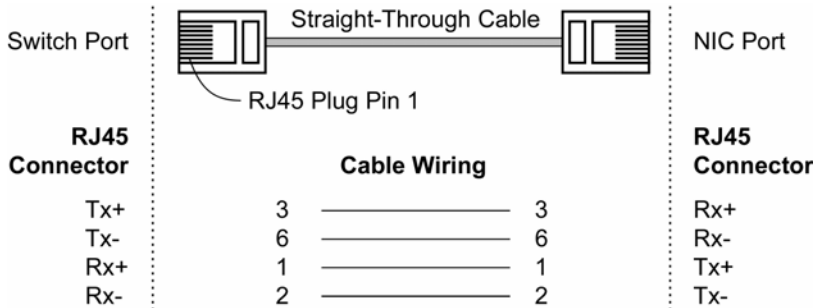
RJ45 (8-pin, MDI-X) Port Pinouts

8-Pin Description

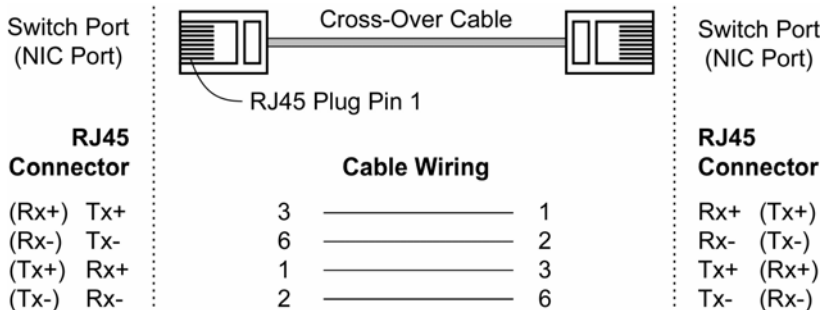
1	Rx+
2	Rx-
3	Tx+
6	Tx-



RJ45 (8-pin) to RJ45 (8-pin) Straight-Through Cable Wiring



RJ45 (8-pin) to RJ45 (8-pin) Cross-Over Cable Wiring

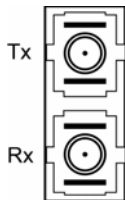


100BaseFx Ethernet Port Connection

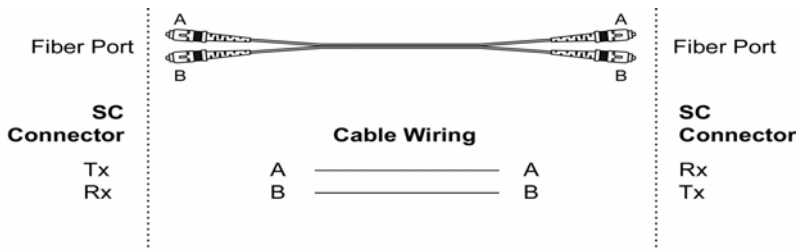
The concept behind the SC port and cable is quite straightforward. Suppose you are connecting devices I and II. Contrary to electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to device II, and the other optical line is used transmit data from device II to device I, for full-duplex transmission.

All you need to remember is to connect the Tx (transmit) port of device I to the Rx (receive) port of device II, and the Rx (receive) port of device I to the Tx (transmit) port of device II. If you are making your own cable, we suggest labeling the two sides of the same line with the same letter (A-to-A and B-to-B, as shown below, or A1-to-A2 and B1-to-B2).

SC-Port Pinouts



SC-Port to SC-Port Cable Wiring



Hardware Overview

This chapter is an overview of Moxa EtherDevice Server's various hardware features. The following topics are discussed:

- ❑ Redundant Power Inputs
- ❑ Alarm Contact
- ❑ LED Indicators
- ❑ Auto MDI/MDI-X Connection
- ❑ Fiber Ports
- ❑ Dual Speed Functionality and Switching
- ❑ Switching, Filtering, and Forwarding
- ❑ Switching and Address Learning
- ❑ Auto-Negotiation and Speed Sensing

Redundant Power Inputs

Moxa EtherDevice Server has two DC power inputs located on its top panel. For detailed instructions on how to connect the power wires to the terminal block connector, see the *Wiring the Redundant Power Inputs* section from Chapter 3.

From the user's point of view, the function of the redundant power inputs is quite straightforward. Both inputs can be connected simultaneously to live DC power sources. If one power source fails, the other live source acts as a backup, and automatically supplies all of Moxa EtherDevice Server's power needs.

Alarm Contact

Moxa EtherDevice Server has one Alarm Contact located on the top panel. For detailed instructions on how to connect the Alarm Contact power wires to the 3-terminal terminal block connector, see the *Wiring the Alarm Contact* section from Chapter 3.

The Alarm Contact has two terminals that form a Fault circuit for connecting to an alarm system. These two contacts form a closed circuit when Moxa EtherDevice Server is receiving power from both DC power inputs. The circuit opens if power to one of the power inputs is cut off, or if the Moxa EtherDevice Server self-test fails, alerting the user to check either the power supply or function of the Server.

A typical scenario would be to connect the Fault circuit to a warning light located in the control room. The light can be set up to switch on when a fault is detected.

LED Indicators

The front panel of Moxa EtherDevice Server contains several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
P1	AMBER	On	Power is being supplied to power input P1
		Off	Power is not being supplied to power input P1
P2	AMBER	On	Power is being supplied to power input P2
		Off	Power is not being supplied to power input P2
Fault	RED	On	Moxa EtherDevice Server's self-test failed or power to one of the power inputs is cut off.
		Off	Moxa EtherDevice Server's self-test was successful
10/LNK/ACT	GREEN	On	10 Mbps link has been established
		Blinking	Data is being transmitted at 10 Mbps
		Off	Port's 10 Mbps link is inactive

100/LNK/ACT	GREEN	On	100 Mbps link has been established
		Blinking	Data is being transmitted at 100 Mbps
		Off	Port's 100 Mbps link is inactive
LNK/ACT	AMBER	On	100BaseFX port is active
		Blinking	Data is being transmitted at 100 Mbps
		Off	100BaseFX port is inactive

Auto MDI/MDI-X Connection

The Auto MDI/MDI-X function allows users to connect Moxa EtherDevice Server's 10/100BaseTX ports to any kind of Ethernet device, without paying attention to the type of Ethernet cable being used for the connection. To understand the meaning of this statement, you simply need to remember that there are two types of Ethernet ports, and two types of Ethernet cables. See the *10/100BaseTX Ethernet Port Connection* section from Chapter 3 for detailed Pinout and Cable Wiring diagrams. In this section, we give a short primer of the terminology, and indicate which cable should be used to connect which types of ports.

There are two types of Ethernet port in use. The first type is called an MDI (Medium Dependant Interface) port, and is what you find on your PC's NIC (Network Interface Card). The second type is called an MDI-X (Medium Dependant Interface, Crossover) port, and is the type of port found in a standard HUB or switch. For this reason, we often refer to an MDI port as being *NIC-type*, and an MDI-X port as being *HUB/Switch-type*.

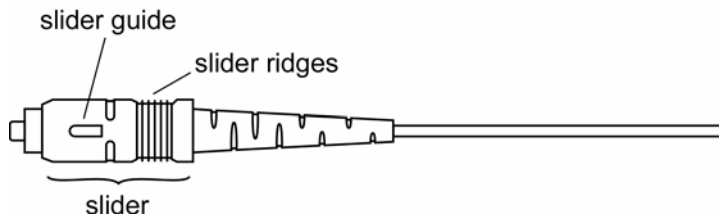
There are also two types of Ethernet cable in use. The first type is a straight-through cable, and the second type is a cross-over cable. The general connection rules are:

- A *straight-through* cable is used to connect unlike ports:
MDI ↔ MDI-X.
- A *cross-over* cable is used to connect like ports:
MDI ↔ MDI or MDI-X ↔ MDI-X.

For example, you should use a straight-through cable to connect your computer's Ethernet NIC to a HUB or switch, but use a cross-over cable to connect your computer's Ethernet NIC to another computer's Ethernet NIC.

Fiber Ports

Moxa EtherDevice Server's fiber switched ports operate at a fixed 100 Mbps speed and full-duplex mode to provide the best performance. The fiber ports are factory-built as either a multi-mode or single-mode SC connector. Consequently, you should use fiber cables that have SC connectors at both ends. When plugging the connector into the port, make sure the slider guide is positioned to the right side so that it fits snugly into the port.



The 100 Mbps fiber ports are switched ports, and perform as a domain, providing a high bandwidth backbone connection that supports long fiber cable distances (up to 2 km for multi-mode, and 15 km for single-mode) for installation versatility.

Dual Speed Functionality and Switching

Moxa EtherDevice Server's 10/100 Mbps RJ45 switched ports can be configured for 10 Mbps operation, 100 Mbps operation, or to auto-negotiate with the connected device for the fastest data transmission rate supported by both devices.

All models of Moxa EtherDevice Server are plug-and-play devices, so that software configuration is not required at installation, or during maintenance. The half/full duplex mode for the switched RJ45 ports is user dependent and changes (by auto-negotiation) to full or half duplex, depending on which transmission speed is supported by the attached device.

Switching, Filtering, and Forwarding

Each time a packet arrives at one of the switched ports, a decision is made to either filter or forward the packet. Packets with source and destination addresses belonging to the same port segment will be filtered, constraining those packets to one port, and relieving the rest of the network from the need to process them. A packet with destination address on another port segment will be forwarded to the appropriate port, and will not be sent to the other ports where it is not needed. Packets that are used in maintaining the operation of the network (such as the occasional multi-cast packet) are forwarded to all ports.

Moxa EtherDevice Server operates in the store-and-forward switching mode, which eliminates bad packets and enables peak performance to be achieved when there is heavy traffic on the network.

Switching and Address Learning

Moxa EtherDevice Server has an address table that can hold up to 4K node addresses, which makes it suitable for use with large networks. The address tables are self-learning, so that as nodes are added or removed, or moved from one segment to another, Moxa EtherDevice Server automatically keeps up with new node locations.

An address-aging algorithm causes the least-used addresses to be deleted in favor of newer, more frequently used addresses. To reset the address buffer, power down the unit and then power it back up.

Auto-Negotiation and Speed Sensing

All of Moxa EtherDevice Server's RJ45 Ethernet ports independently support auto-negotiation for speeds in the 10BaseT and 100BaseTX modes, with operation according to the IEEE 802.3u standard. This means that some nodes could be operating at 10 Mbps, while at the same time, other nodes are operating at 100 Mbps.

Auto-negotiation takes place when an RJ45 cable connection is made, and then each time a LINK is enabled. Moxa EtherDevice Server advertises its capability for using either 10 Mbps or 100 Mbps transmission speeds, with the device at the other end of the cable expected to similarly advertise. Depending on what type of device is connected, this will result in agreement to operate at a speed of either 10 Mbps or 100 Mbps.

If a Moxa EtherDevice Server RJ45 Ethernet port is connected to a non-negotiating device, it will default to 10 Mbps speed and half-duplex mode, as required by the IEEE 802.3u standard.