

MOXA EtherDevice™ Switch

EDS-508A/505A Hardware Installation Guide

First Edition, June 2006



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Package Checklist

MOXA EDS-508A/505A is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- 1 MOXA EtherDevice Switch (EDS-508A or EDS-505A)
- Hardware Installation Guide
- CD-ROM with User's Manual and Windows Utility
- MOXA Product Warranty Statement
- RJ45 to DB9 Console port cable
- Protective caps for unused ports
- Panel Mounting Kit (optional—must be ordered separately)

Features

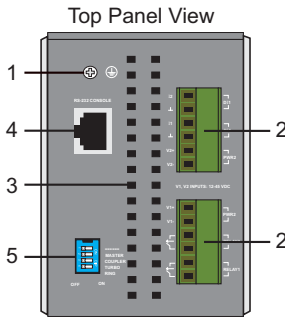
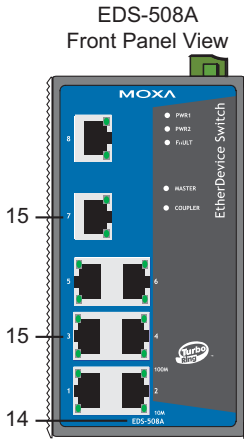
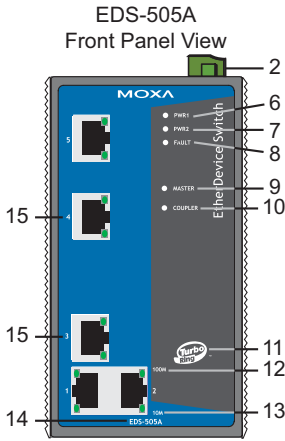
➤ **Advanced Industrial Networking Capability**

- Plug-n-Play, Redundant Ethernet Ring (recovery time < 300 ms at full load) and RSTP/STP (IEEE802.1W/D)
- IGMP Snooping and GMRP for filtering multicast traffic from Industrial Ethernet
- Supports port-based VLAN, IEEE802.1Q VLAN and GVRP protocol to ease network planning
- Supports QoS-IEEE802.1p/1Q and TOS/DiffServ to increase determinism
- Supports 802.3ad, LACP for optimum bandwidth utilization
- Port Trunking for optimum bandwidth utilization
- RMON for efficient network monitoring and proactive capability
- SNMP V1/V2c/V3 for different levels of network management security
- Supports IEEE802.1X and https/SSL to enhance network security

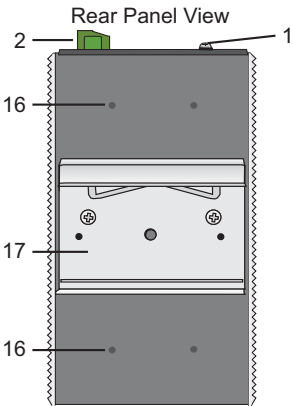
➤ **Designed for Industrial Applications**

- Bandwidth management to prevent unpredictable network status
- Port mirroring for online debugging
- Lock port for authorized MAC address access
- Digital inputs to integrate sensors and alarms with IP networks
- Automatic warning by exception through email, relay output
- Automatic recovery of IP addresses from connected devices
- Line-swap fast recovery (patent pending)
- Redundant, dual DC power inputs
- -40 to 75°C operating temperature range
- IP30, rugged high-strength case
- DIN-Rail or panel mounting ability
- Long-haul transmission distance of 40 km or 80 km.

Panel Layout of EDS-508A/505A (Standard)

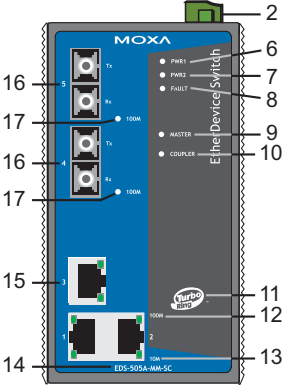


1. Grounding screw
2. Terminal block for power input PWR1/PWR2 and relay output
3. Heat dissipation orifices
4. Console port
5. DIP switches
6. Power input PWR1 LED
7. Power input PWR2 LED
8. Fault LED
9. Master LED
10. Coupler LED
11. Turbo Ring logo
12. TP port's 100 Mbps LED
13. TP port's 10 Mbps LED
14. Model Name
15. 10/100BaseT(X) ports
16. Screw hole for wall mounting kit
17. DIN-Rail kit

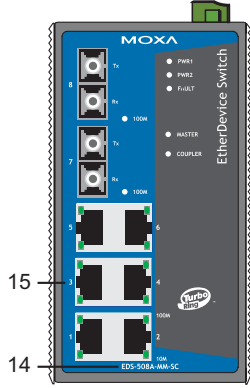


Panel Layout of EDS-508A/505A (SC-type)

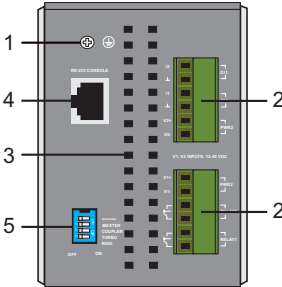
EDS-505A-MM-SC
Front Panel View



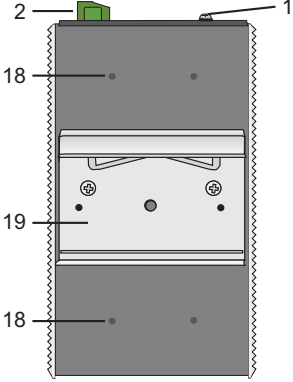
EDS-508A-MM-SC
Front Panel View



Top Panel View



Rear Panel View

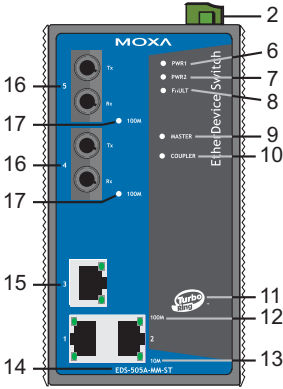


NOTE: The appearance of EDS-505A-SS-SC is identical to that of EDS-505A-MM-SC.
The appearance of EDS-508A-SS-SC is identical to that of EDS-508A-MM-SC.

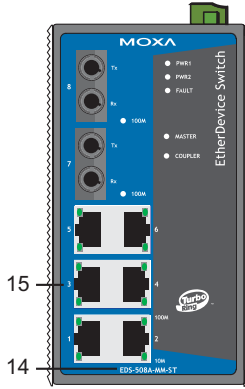
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15. 10/100BaseT(X) ports
16. 100BaseFX ports
17. FX port's 100 Mbps LEDs
18. Screw hole for wall mounting kit
19. DIN-Rail kit

Panel Layout of EDS-508A/505A (ST-type)

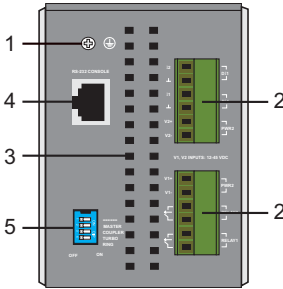
EDS-505A-MM-ST
Front Panel View



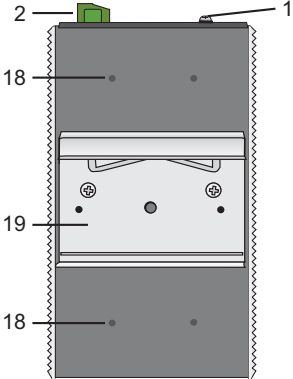
EDS-508A-MM-ST
Front Panel View



Top Panel View

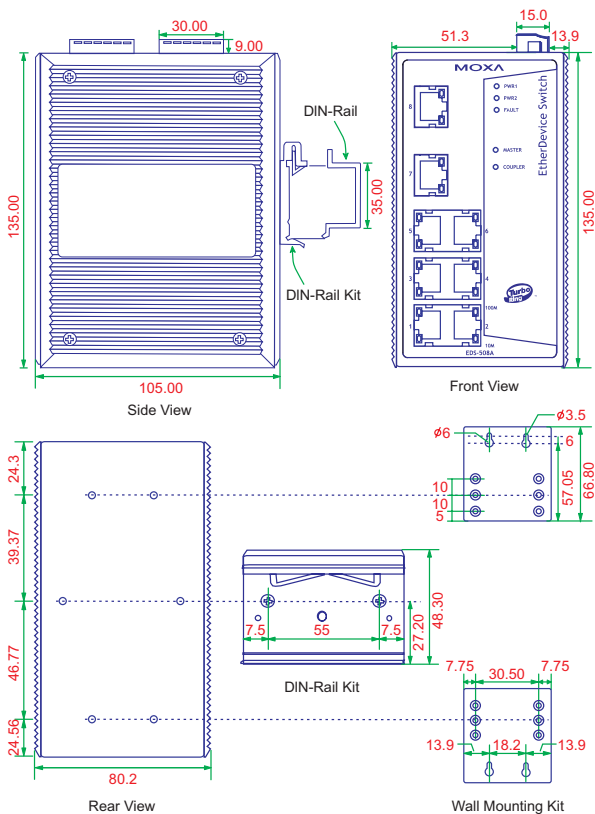


Rear Panel View



1. Grounding screw
2. Terminal block for power input PWR1/PWR2 and relay output
3. Heat dissipation orifices
4. Console port
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Mounting Dimensions (unit = mm)

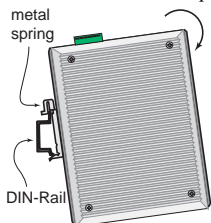


DIN-Rail Mounting

The aluminum DIN-Rail attachment plate should already be fixed to the back panel of EDS-508A/505A when you take it out of the box. If you need to reattach the DIN-Rail attachment plate, make sure the stiff metal spring is situated towards the top, as shown by the following figure.

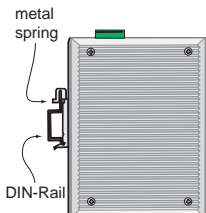
STEP 1:

Insert the top of the DIN-Rail into the slot just below the stiff metal spring.



STEP 2:

The DIN-Rail attachment unit will snap into place as shown.

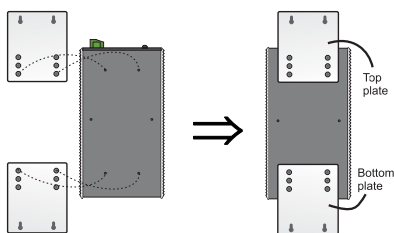


To remove EDS-508A/505A from the DIN-Rail, simply reverse Steps 1 and 2.

Wall Mounting (optional)

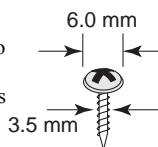
For some applications, you will find it convenient to mount EDS-508A/505A on the wall, as depicted by the following illustrations.

STEP 1: Remove the aluminum DIN-Rail attachment plate from EDS-508A/505A's rear panel, and then attach the wall mount plates, as shown by the figures at the right.



STEP 2:

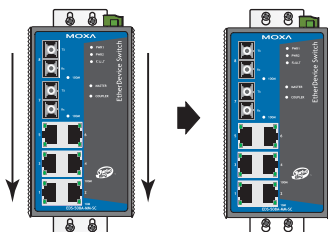
Mounting EDS-508A/505A on the wall requires 4 screws. Use the switch, with wall mount plates attached, as a guide to mark the correct locations of the 4 screws. The heads of the screws should be less than 6.0 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown by the figure at the right.



NOTE Before tightening the screws into the wall, make sure the screw head and shank size are suitable by inserting the screw into one of the keyhole-shaped apertures of the Wall Mounting Plates.

Do not screw the screws in completely—leave 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 on the wall, insert the four screw heads through the large parts of the keyhole-shaped apertures, and then slide EDS-508A/505A downwards, as indicated. Tighten the four screws for added stability.



Wiring Requirements



WARNING

The power for this product is intended to be supplied by a Listed Power Unit, with output marked LPS, and rated to deliver 12 to 45 VDC at a maximum of 600 mA.



WARNING

Safety First!

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 pay attention to the following important 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 through the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
- 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.
- It is strongly advised that you label wiring to all devices in the system, when necessary.

Grounding MOXA EtherDevice Switch

Grounding and wire routing help 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.

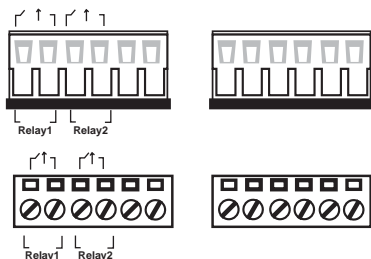


ATTENTION

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

Wiring the Relay Contact

EDS-508A/505A has two sets of relay output—relay 1 and relay 2. Each relay contact consists of two contacts of the terminal block on EDS-508A/505A's top panel. 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. The meaning of the two contacts used to connect the relay contacts is illustrated below.



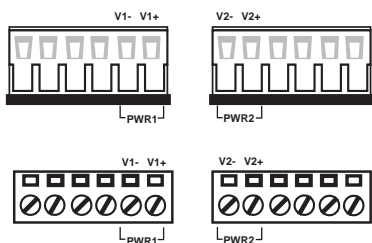
The fault circuit will open if::

1. A relay warning event is triggered, OR
2. The EDS-508A/505A is the Master of this Turbo Ring, and the Turbo Ring is broken, OR
3. Start-up failure.

If none of these three conditions is satisfied, the fault circuit will remain closed.

Wiring the Redundant Power Inputs

EDS-508A/505A have two sets of power inputs—power input 1 and power input 2. The top two contacts and the bottom two contacts of the 6-pin terminal block connector on the top panel are used for EDS's two digital inputs. Top and front views of one of the terminal block connectors are shown here.



Take the following steps to wire the redundant power inputs:

STEP 1: Insert the negative/positive DC wires into the V-/V+ terminals.

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

STEP 3: Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on EDS's top panel.

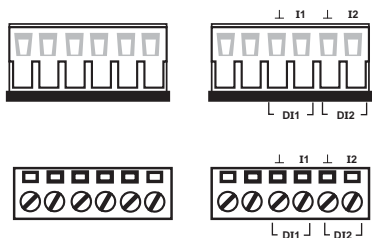


ATTENTION

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

Wiring the Digital Inputs

EDS-508A/505A has two sets of digital inputs, DI 1 and DI 2. Each DI consists of two contacts of the 6-pin terminal block connector on EDS's top panel. The remaining contacts are used for EDS's two DC inputs. Top and front views of one of the terminal block connectors are shown here.



Take the following steps to wire the digital inputs:

STEP 1: Insert the negative (ground)/positive DI wires into the ⊥/I1 terminals.

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

STEP 3: Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on EDS-508A/505A's top panel.

Communication Connections

EDS-508A models have 8 or 6 10/100BaseT(X) Ethernet ports, and 0 (zero) or 2 100BaseFX (SC/ST-type connector) fiber ports. EDS-505A models have 5 or 3 10/100BaseT(X) Ethernet ports, and 0 (zero) or 2 100 BaseFX (SC/ST-type connector) fiber ports.

10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on EDS's front panel are used to connect to Ethernet-enabled devices.

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

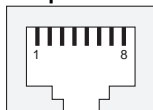
MDI Port Pinouts

| Pin | Signal |
|-----|--------|
| 1 | Tx+ |
| 2 | Tx- |
| 3 | Rx+ |
| 6 | Rx- |

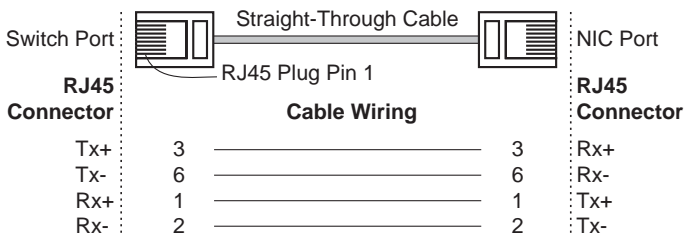
MDI-X Port Pinouts

| Pin | Signal |
|-----|--------|
| 1 | Rx+ |
| 2 | Rx- |
| 3 | Tx+ |
| 6 | Tx- |

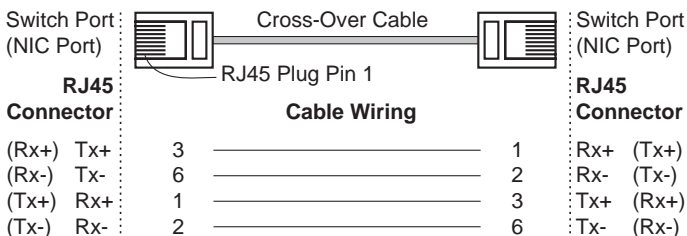
8-pin RJ45



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



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

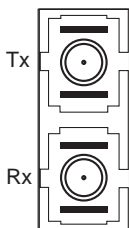


100BaseFX Ethernet Port Connection

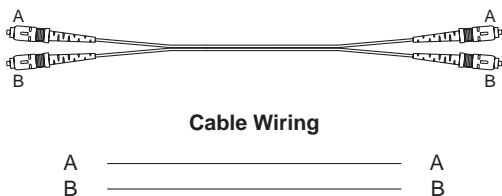
The concept behind the SC/ST port and cable is quite straightforward. Suppose that you are connecting devices I and II; contrary to electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to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

Remember 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 make 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).

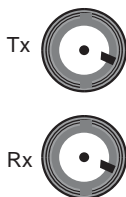
SC-Port Pinouts



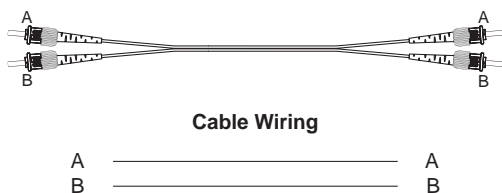
SC-Port to SC-Port Cable Wiring



ST-Port Pinouts



ST-Port to ST-Port Cable Wiring



ATTENTION

This is a Class 1 Laser/LED product. To avoid causing serious damage to your eyes, do not stare directly into the Laser Beam.

Relay Contact

MOXA EtherDevice switch has two relay contacts located on the top panel. For detailed instructions on how to connect the relay contact power wires to the two middle contacts of the 6-contact terminal block connector, see the **Wiring the Relay Contact** section on page 7. 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.

The Relay Contact has two terminals that form a fault circuit for connecting to an alarm system. The two wires attached to the fault contacts form an open circuit when (1) a relay warning event is triggered, (2) EDS-508A/505A is the Master of this Turbo Ring, and the Turbo Ring is broken, or (3) start-up failure.

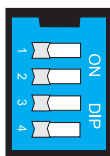
If none of these three conditions occur, the fault circuit will be closed.

Turbo Ring DIP Switch Settings

EDS-508A/505A series are plug-and-play managed redundant Ethernet switches. The proprietary Turbo Ring protocol was developed by MOXA to provide better network reliability and faster recovery time. MOXA Turbo Ring's recovery time is less than 300 ms-compared to a 3- to 5-minute recovery time for commercial switches-decreasing the possible loss caused by network failures in an industrial setting. There are 4 Hardware DIP Switches for Turbo Ring on the top panel of EDS-508A/505A that can be used to set up the Turbo Ring easily within seconds.

NOTE If you do not want to use a hardware DIP switch to set up the Turbo Ring, you can use a web browser, Telnet, or console to disable this function.

EDS-508A/505A Series DIP Switches



 MASTER
 COUPLER
 TURBO
 RING

The default setting for each DIP Switch is OFF. The following table explains the effect of setting the DIP Switches to the ON positions.

| DIP Switch | Setting | Description |
|-------------------|---------|---|
| ----- | | Serves no function (reserved for future use). |
| MASTER | ON | Enables the EDS-508A/505A to be the Ring Master in a Turbo Ring topology, and enables the Turbo Ring break warning. If the EDS-508A/505A is the Master of this Turbo Ring, and the Turbo Ring is broken, the relay will form an open circuit. |
| | OFF | Disables the EDS-508A/505A from being the Ring Master in a Turbo Ring topology, and disables the Turbo Ring break warning. |
| COUPLER | ON | Enables the Turbo Ring Coupling function. Use port 5 and 6 of EDS-508A (port 2 and 3 of EDS-505A) to form the Ring Coupler path. |
| | OFF | Disables the Turbo Ring coupling function. |
| TURBO RING | ON | Enables plug-and-play Turbo Ring redundancy. Ports 7 and 8 of EDS-508A (ports 4 and 5 of EDS-505A) are used to form a Turbo Ring. |
| | OFF | Disables the plug-and-play Turbo Ring redundancy function. |

NOTE You must enable the Turbo Ring function first before using the DIP switch to activate the Master and Coupler functions.

NOTE If you do not enable any of the EDS-508A/505A switches to be the Ring Master, the Turbo Ring protocol will automatically choose the EDS-508A/505A with the smallest MAC address range to be the Ring Master. If you accidentally enable more than one EDS-508A/505A to be the Ring Master, these EDS-508A/505A switches will auto-negotiate to determine which one will be the Ring Master.

LED Indicators

The front panel of the MOXA EtherDevice switch contains several LED indicators. The function of each LED is described in the following table.

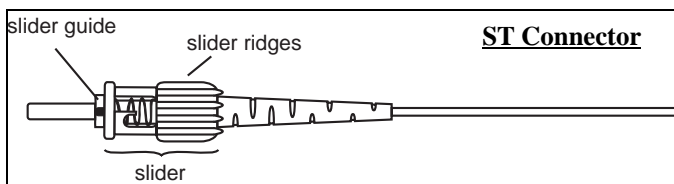
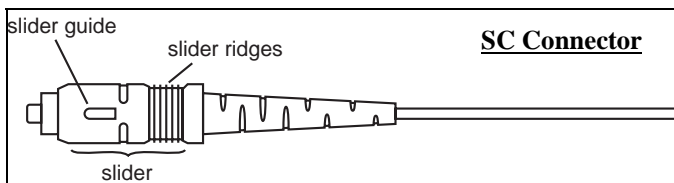
| LED | Color | State | Description |
|-----------|-------|----------|--|
| PWR1 | AMBER | On | Power is being supplied to power input PWR1 |
| | | Off | Power is not being supplied to power input PWR1 |
| PWR2 | AMBER | On | Power is being supplied to power input PWR2 |
| | | Off | Power is not being supplied to power input PWR2 |
| FAULT | RED | On | When (1) a relay warning event is triggered, (2) EDS-508A/505A is the Master of this Turbo Ring, and the Turbo Ring is broken, or (3) start-up failure |
| | | Off | When a relay warning event is not triggered |
| MASTER | GREEN | On | When the EDS-508A/505A is the Master of this Turbo Ring |
| | | Blinking | When the EDS-508A/505A is the Ring Master of this Turbo Ring and the Turbo Ring is broken |
| | | Off | When the EDS-508A/505A is not the Master of this Turbo Ring |
| COUPLER | GREEN | On | When the EDS-508A/505A enables the coupling function to form a backup path |
| | | Off | When the EDS-508A/505A is not the Ring Coupler of this Turbo Ring |
| 10M (TP) | GREEN | On | TP port's 10 Mbps link is active |
| | | Blinking | Data is being transmitted at 10 Mbps |
| | | Off | TP Port's 10 Mbps link is inactive |
| 100M (TP) | GREEN | On | TP port's 100 Mbps link is active |
| | | Blinking | Data is being transmitted at 100 Mbps |
| | | Off | TP Port's 100 Mbps link is inactive |
| 100M (FX) | GREEN | On | FX port's 100 Mbps is active |
| | | Blinking | Data is being transmitted at 100 Mbps |
| | | Off | FX port's 100 Mbps is inactive |

Auto MDI/MDI-X Connection

The Auto MDI/MDI-X function allows users to connect the EDS-508A/505A's 10/100BaseTX ports to any kind of Ethernet device, without needing to pay attention to the type of Ethernet cable being used for the connection. This means that you can use either a *straight-through* cable or *cross-over* cable to connect EDS-508A/505A to Ethernet devices.

Fiber Ports

MOXA EDS-508A/505A's fiber ports operate at a fixed 100 Mbps speed and full-duplex mode to provide excellent performance. The fiber ports are factory-built as either multi-mode or single-mode SC/ST connectors. Therefore, you should use fiber cables that have SC/ST connectors at both ends. When plugging the connector into the port, make sure the slider guide is positioned to the right side such that it fits snugly into the port.



The 100 Mbps fiber ports are switched ports and perform as a domain to provide a high bandwidth backbone connection that supports long fiber cable distances (up to 5 km for multi-mode, and 40 km and 80 km for single-mode) for installation flexibility.

Specifications

Technology

| | |
|-------------------------------|--|
| Standards | IEEE802.3, 802.3u, 802.3x, 802.1D, 802.1w, 802.1Q, 802.1p, 802.1X, 802.3ad |
| Protocols | IGMP V1/V2/V3 device, GVRP, GMRP, SNMP V1/V2c/V3, DHCP Server/Client, BootP, RMON, TFTP, SNTP, SMTP, RARP and EDS-SNMP OPC server Pro (Optional) |
| MIB | MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1,2,3,9 |
| Forwarding and Filtering Rate | 148810 pps |
| Processing Type | Store and Forward |
| Flow Control | IEEE802.3x flow control, back pressure flow control |

Interface

| | |
|----------------|---|
| RJ45 Ports | 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection |
| Fiber Ports | 100BaseFX ports (SC/ST connector) |
| Console | RS-232 (RJ45) |
| LED Indicators | PWR1, PWR2, FAULT, 10/100M (TP port), 100M (Fiber Port), MASTER and COUPLER |
| Relay Contact | Two relay outputs with current carrying capacity of 1A @ 24 VDC |
| DIP Switches | Master, Coupler, Turbo Ring, Reserve |
| Digital Input | Two inputs with the same ground, but electrically isolated from the electronics <ul style="list-style-type: none">• For state “1”: +13 to +30V• For state “0”: -30 to +3V• Max. input current: 8 mA |

Optical Fiber

| | Multi mode | Single mode, 40 | Single mode, 80 |
|---|------------|-----------------|-----------------|
| Distance, km | 5 | 40 | 80 |
| Wavelength, nm | 1300 | 1310 | 1550 |
| Min. TX Output, dBm | -20 | -5 | -5 |
| Max. TX Output, dBm | -14 | 0 | 0 |
| Sensitivity, dBm | -34 to -30 | -36 to -32 | -36 to -32 |
| Recommended Diam. (Core/Cladding) μm | 50/125 | 9/125 | 9/125 |

(1 dB/km, 800 MHz \times km)

Power

| | |
|-----------------------------|---|
| Input Voltage | 12 to 45 VDC, redundant inputs |
| Input Current (@24V) | Max. 0.29A: (EDS-508A/505A) Max. 0.43A: (EDS-508A/505A-MM, EDS-508A/505A-SS) |
| Connection | Two removable 6-pin terminal blocks |
| Overload Current Protection | Present |
| Reverse Polarity Protection | Present |

Mechanical

| | |
|--------------|---|
| Casing | IP30 protection, metal case |
| Dimensions | 80.5 \times 135 \times 105 mm (W \times H \times D) |
| Weight | 1.04 kg |
| Installation | DIN-Rail, Wall Mounting (optional kit) |

Environmental

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

Regulatory Approvals

| | |
|--------------------|---|
| Safety | UL60950 (E212360), UL 508, CSA C22.2 No. 60950, EN60950 (pending) |
| Hazardous Location | UL/cUL Class I, Division 2, Groups A, B, C, and D (E238559) (pending) ATEX Class I, Zone 2, EEx nC IIC (03CA24537) (pending) |
| EMI | FCC Part 15, CISPR (EN55022) class A |
| EMS | EN61000-4-2 (ESD), Level 2 EN61000-4-3 (RS), Level 3 EN61000-4-4 (EFT), Level 3 EN61000-4-5 (Surge), Level 3 EN61000-4-6 (CS), Level 3 EN61000-4-8 EN61000-4-11 EN61000-4-12 |
| Shock | IEC60068-2-27 |
| Freefall | IEC60068-2-32 |
| Vibration | IEC60068-2-6 |
| WARRANTY | 5 years |

MOXA Internet Services

Customer satisfaction is our primary concern, and to ensure that customers receive the full benefit of using our products, we have established on-line support services to provide technical support, driver updates, product information, and user's manual updates.

E-mail for technical support:

support@moxanet.com

(Worldwide)

support@moxa.com

(The Americas)

Website for up-to-date product information:

www.moxa.com