

Industrial Ethernet Switches

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Industrial Ethernet Switches



Managed Ethernet Switches

	Managed Rackmount Switches		Managed DIN-Rail Switches					
								
	IKS-6726	IKS-6726-PoE	EDS-828	EDS-728	EDS-608	EDS-G509	EDS-518A	EDS-510A
Supported Modules								
Gigabit Ethernet Modules	√	√	√	√	---	---	---	---
Fast Ethernet Modules	√	√	√	√	√	---	---	---
SFP Gigabit Ethernet Modules	√	√	√	√	---	√	√	√
SFP Fast Ethernet Modules	√	√	---	---	---	√	---	---
Number of Ports								
Max. Number of Ports	26	26	28	28	8	9	18	10
Gigabit Ethernet, 10/100/1000 Mbps	up to 2	up to 2	up to 4	up to 4	---	9	2	3
Fast Ethernet, 10/100 Mbps	up to 24	up to 24	up to 24	up to 24	8	---	16	7
Available Power Supplies								
3.3 VDC	---	---	---	---	---	---	---	---
24 VDC	√	√	√	√	---	---	√	√
24 VAC	---	---	---	---	---	---	---	---
48 VDC	√	√	---	---	---	---	---	---
12/24/48 VDC	---	---	---	---	√	√	---	---
88-300 VDC or 85-264 VAC, isolated	√	√	---	---	---	---	---	---
Installation Options								
DIN-Rail Mounting	---	---	√	√	√	√	√	√
Panel Mounting	---	---	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Rack Mounting	√	√	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Supported Operating Temperatures								
0 to 60°C	---	---	√	√	√	√	√	√
-10 to 60°C	---	---	---	---	---	---	---	---
-40 to 75°C	√	√	---	---	√	√	√	√
Redundancy and Backup Options								
Turbo Ring (Recovery Time < 20 ms)	√	√	√	√	√	√	√	√
STP/RSTP	√	√	√	√	√	√	√	√
Automatic Backup Configurator (ABC-01)	√	√	√	√	√	√	√	√
Network Management and Control								
Layer 3 Switching	---	---	√	---	---	---	---	---
IPv6	√	√	---	√	√	√	√	√
DHCP Option 66/67/82	√	√	√	√	√	√	√	√
IEEE 1588 PTP	√	√	√	√	√	√	√	√
LLDP	√	√	√	√	√	√	√	√
Modbus/TCP	√	√	√	√	√	√	√	√
IGMP/GMRP	√	√	√	√	√	√	√	√
Port Trunking	√	√	√	√	√	√	√	√
IEEE 802.1X	√	√	√	√	√	√	√	√
Port Lock	√	√	√	√	√	√	√	√
SNMP/RMON	√	√	√	√	√	√	√	√
VLAN	√	√	√	√	√	√	√	√
QoS	√	√	√	√	√	√	√	√
Relay Warning	√	√	√	√	√	√	√	√
Regulatory Approvals								
CE/FCC	√	√	√	√	√	√	√	√
UL/cUL 60950-1	Pending	Pending	Pending	Pending	---	---	√	√
UL508	---	---	Pending	Pending	Pending	Pending	√	√
UL/cUL Class I, Div. 2; ATEX Class I, Zone 2	---	---	Pending	Pending	Pending	Pending	Pending	√
DNV/GL	Pending	Pending	Pending	Pending	Pending	Pending	√	√
NEMA TS2	√	√	---	---	---	---	---	---
EN50155/EN50121-4	√	√	---	---	---	---	---	---

Managed Ethernet Switches

	Managed DIN-Rail Switches						
							
	EDS-505A	EDS-508A	EDS-516A	EDS-405A	EDS-408A	EDS-P510	EOM-104
Supported Modules							
Gigabit Ethernet Modules	---	---	---	---	---	---	---
Fast Ethernet Modules	---	---	---	---	---	---	---
SFP Gigabit Ethernet Modules	---	---	---	---	---	√	---
SFP Fast Ethernet Modules	---	---	---	---	---	√	---
Number of Ports							
Max. Number of Ports	5	8	16	5	8	10	4
Gigabit Ethernet, 10/100/1000 Mbps	---	---	---	---	---	3	---
Fast Ethernet, 10/100 Mbps	5	8	16	5	8	7 (4 PoE)	4
Available Power Supplies							
3.3 VDC	---	---	---	---	---	---	√
24 VDC	√	√	√	√	√	---	---
24 VAC	---	---	---	---	---	---	---
48 VDC	---	---	---	---	---	√	---
12/24/48 VDC	---	---	---	---	---	---	---
88-300 VDC or 85-264 VAC, isolated	---	---	---	---	---	---	---
Installation Options							
DIN-Rail Mounting	√	√	√	√	√	√	---
Panel Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	---
Rack Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	---
Supported Operating Temperatures							
0 to 60°C	√	√	√	√	√	√	---
-10 to 60°C	---	---	---	---	---	---	---
-40 to 75°C	√	√	√	√	√	√	√
Redundancy and Backup Options							
Turbo Ring (Recovery Time < 20 ms)	√	√	√	√	√	√	√
STP/RSTP	√	√	√	√	√	√	√
Automatic Backup Configurator (ABC-01)	√	√	√	√	√	√	---
Network Management and Control							
Layer 3 Switching	---	---	---	---	---	---	---
IPv6	√	√	√	√	√	√	---
DHCP Option 66/67/82	√	√	√	√	√	√	---
IEEE 1588 PTP	√	√	√	---	---	√	---
LLDP	√	√	√	√	√	√	---
Modbus/TCP	√	√	√	√	√	√	---
IGMP/GMRP	√	√	√	---	---	√	---
Port Trunking	√	√	√	---	---	√	---
IEEE 802.1X	√	√	√	---	---	√	---
Port Lock	√	√	√	---	---	√	---
SNMP/RMON	√	√	√	√	√	√	√
VLAN	√	√	√	√	√	√	---
QoS	√	√	√	√	√	√	---
Relay Warning	√	√	√	√	√	√	---
Regulatory Approvals							
CE/FCC	√	√	√	√	√	√	√
UL/cUL 60950-1	√	√	√	√	√	---	---
UL508	√	√	√	√	√	Pending	---
UL/cUL Class I, Div. 2; ATEX Class I, Zone 2	√	√	Pending	√	√	Pending	---
DNV/GL	√	√	√	√	√	Pending	---
NEMA TS2	---	---	---	---	---	---	---
EN50155/EN50121-4	---	---	---	---	---	---	---

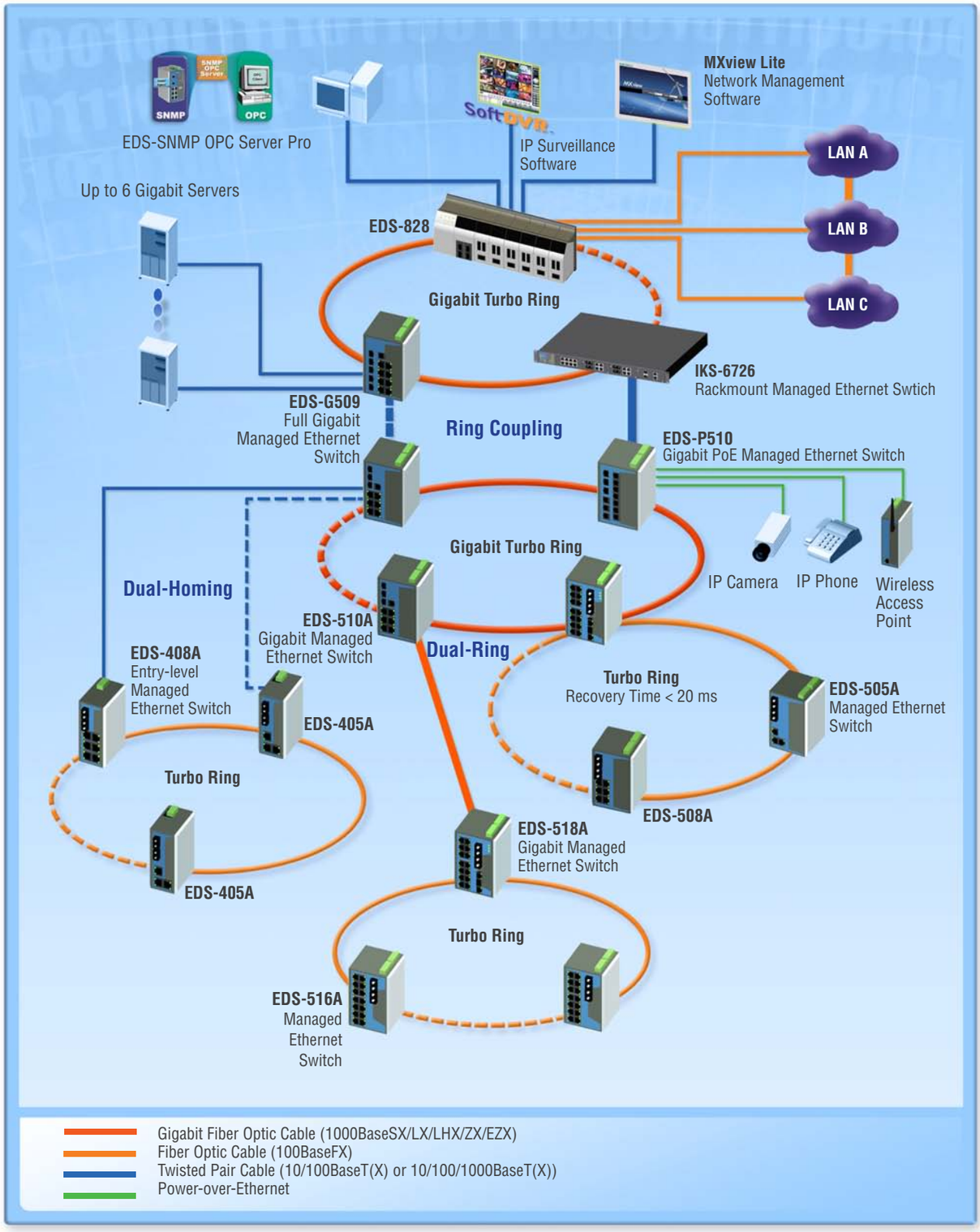
Unmanaged Ethernet Switches

	Unmanaged Rackmount Switches	Unmanaged DIN-Rail Switches					
							
	IKS-6324	EDS-G205	EDS-G308	EDS-305	EDS-308	EDS-309	EDS-316
Supported Modules							
Gigabit Ethernet Modules	√	---	---	---	---	---	---
Fast Ethernet Modules	√	---	---	---	---	---	---
SFP Gigabit Ethernet Modules	√	---	√	---	---	---	---
SFP Fast Ethernet Modules	---	---	√	---	---	---	---
Number of Ports							
Max. Number of Ports	24	5	8	5	8	9	16
Gigabit Ethernet, 10/100/1000 Mbps	Up to 2	5	8	---	---	---	---
Fast Ethernet, 10/100 Mbps	Up to 24	---	---	5	8	9	16
Available Power Supplies							
24 VDC	---	---	---	√	√	√	√
24 VAC	---	---	---	---	---	---	---
48 VDC	---	---	---	---	---	---	---
12/24/48 VDC	√	√	√	---	---	---	---
88-300 VDC or 85-264 VAC, isolated	√	---	---	---	---	---	---
Installation Options							
DIN-Rail Mounting	---	√	√	√	√	√	√
Panel Mounting	---	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Rack Mounting	√	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Supported Operating Temperatures							
0 to 60°C	---	√	√	√	√	√	√
-10 to 60°C	---	---	---	---	---	---	---
-40 to 75°C	√	√	√	√	√	√	√
Regulatory Approvals							
CE/FCC	√	√	√	√	√	√	√
UL/cUL 60950-1	Pending	---	---	√	√	√	√
UL508	---	Pending	Pending	√	√	√	√
UL/cUL Class I, Div. 2; ATEX Class I, Zone 2	---	Pending	Pending	√	√	√	Pending
DNV/GL	Pending	Pending	Pending	√	√	√	√
NEMA TS2	√	---	---	---	---	---	---
EN50155/EN50121-4	√	---	---	---	---	---	---

Unmanaged Ethernet Switches

	Unmanaged DIN-Rail Switches				
					
	EDS-205A	EDS-208A	EDS-205	EDS-208	EDS-P308
Supported Modules					
Gigabit Ethernet Modules	---	---	---	---	---
Fast Ethernet Modules	---	---	---	---	---
SFP Gigabit Ethernet Modules	---	---	---	---	---
SFP Fast Ethernet Modules	---	---	---	---	---
Number of Ports					
Max. Number of Ports	5	8	5	8	8
Gigabit Ethernet, 10/100/1000 Mbps	---	---	---	---	---
Fast Ethernet, 10/100 Mbps	5	8	5	8	8 (4 PoE)
Available Power Supplies					
24 VDC	---	---	√	√	---
24 VAC	√	√	√	√	---
48 VDC	---	---	---	---	√
12/24/48 VDC	√	√	---	---	---
88-300 VDC or 85-264 VAC, isolated	---	---	---	---	---
Installation Options					
DIN-Rail Mounting	√	√	√	√	√
Panel Mounting	w/ optional kit	w/ optional kit	---	---	w/ optional kit
Rack Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Supported Operating Temperatures					
0 to 60°C	---	---	---	---	√
-10 to 60°C	√	√	√	√	---
-40 to 75°C	√	√	---	---	√
Regulatory Approvals					
CE/FCC	√	√	√	√	√
UL/cUL 60950-1	---	---	---	√	---
UL508	√	√	√	√	√
UL/cUL Class I, Div. 2; ATEX Class I, Zone 2	Pending	Pending	---	---	Pending
DNV/GL	Pending	Pending	---	---	Pending
NEMA TS2	---	---	---	---	---
EN50155/EN50121-4	---	---	---	---	---

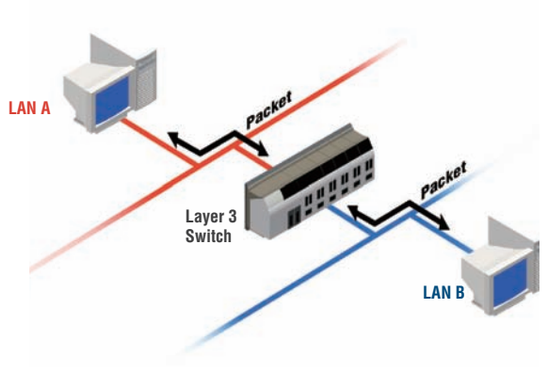
Introduction to Managed Ethernet Switches



Intelligent Layer 3 Network Control

What is a Layer 3 Switch?

Layer 3 switches use the IP address to make switching decisions, just like a router, but use hardware optimized to transmit data just as fast as Layer 2 switches. The 802.1Q VLAN of a Layer 2 switch allows network operators to configure and maintain their network more effectively, but cross VLAN communication still relies on traditional Layer 3 routers. Both routers and Layer 3 switches use a routing protocol and routing table to determine the best path. However, compared to routers, which are usually software-based, Layer 3 switches are relatively faster and less expensive. This is due to their built-in switching hardware with optimized chips and full-wire speed IP frame forwarding performance suitable for interconnecting VLANs. Moxa's Layer 3 switches can be used to partition a large-scale LAN into multiple subnets for better network performance.



Static Routing

Instead of using MAC tables in the way that Layer 2 Ethernet switches them, the EDS-828 has a built-in IP routing table to support the forwarding of IP frames. Network administrators need to configure and maintain this IP routing table manually, and if changes are made to the network topology, the network administrator will need to reconfigure the routing table.

Routing Information Protocol (RIP)

In addition to static routing, the EDS-828 has a built-in IP routing table that can be set up and updated dynamically by RIP (routing information protocol). RIP is an often used routing protocol that relies on the Bellman-Ford algorithm and "hop count" measurement to determine how packets should be routed from one network to another.

Open Shortest Path First (OSPF)

The EDS-828 also supports OSPF (open shortest path first), which uses "Link State" instead of "hop count" to determine the network route. OSPF is more complicated than RIP. However, compared to RIP, OSPF has faster network convergence and results in less network traffic. Both RIP and OSPF are usually referred to as Interior Gateway Protocols (IGP).

Distance Vector Multicast Routing Protocol (DVMRP)

The EDS-828 supports Distance Vector Multicast Routing Protocol (DVMRP), which is used to share information between routers to transport IP multicast packets between networks. DVMRP resembles RIP, but is extended for multicast delivery to forward packets. The router generates a routing table with the multicast group for which it knows the corresponding distances. When a multicast packet is received by a router, it is forwarded by the routing interfaces specified in the routing table.

Protocol Independent Multicast—Dense Mode (PIM-DM)

The EDS-828 supports the Protocol Independent Multicast—Dense Mode (PIM-DM), which is designed mainly for multicast LAN applications with high bandwidth. PIM-DM is optimized to guarantee delivery of multicast packets so as not to reduce overhead. The PIM-DM multicast routing protocol assumes that all downstream routers would like to receive multicast messages, and relies upon explicit pruning messages from downstream routers to remove branches from the multicast delivery tree that do not contain multicast group members. PIM-DM is an efficient protocol since most receivers are interested in the multicast data, but does not scale well across larger domains in which most receivers are not interested in the data.

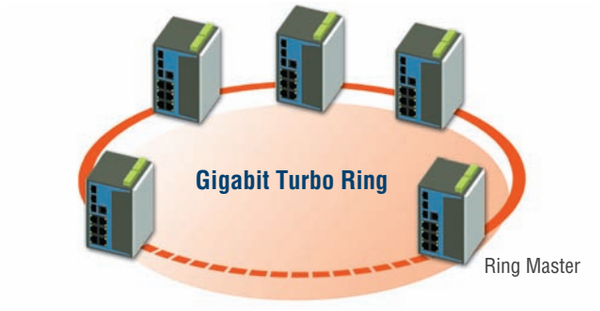
Static versus Dynamic

The EDS-828's built-in IP routing table can be updated and maintained both statically and dynamically. If the network is small and fixed, the network administrator may decide to configure the IP routing table manually. However, any change in the network topology will require the network administrator to reconfigure the settings manually. If the network is extended or the network topology is changed frequently, using dynamic routing provides an efficient way to enhance network stability and reduce the time it takes to effect network convergence. Dynamic routing protocol allows devices to detect and respond to network changes automatically. In this case, network administrators do not need to reconfigure the settings after the network changes.

Advanced Layer 2 Network Management

Gigabit Ethernet Redundant Ring

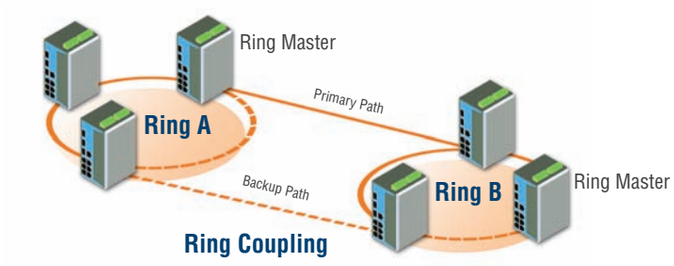
Ethernet is becoming the default data communication medium for industrial automation applications. In fact, it's not uncommon for video, voice, and high-rate industrial application data transfers to be integrated into one network. Moxa's EDS-G509, EDS-510A/518A, EDS-P510, and IKS-6726, which come equipped with a redundant Gigabit Ethernet protocol called Gigabit Turbo Ring, gives system maintainers a convenient means of setting up a versatile yet stable Gigabit Ethernet network. With Gigabit Turbo Ring, if any segment of the network is disconnected, your automation system will be back to normal in few milliseconds.

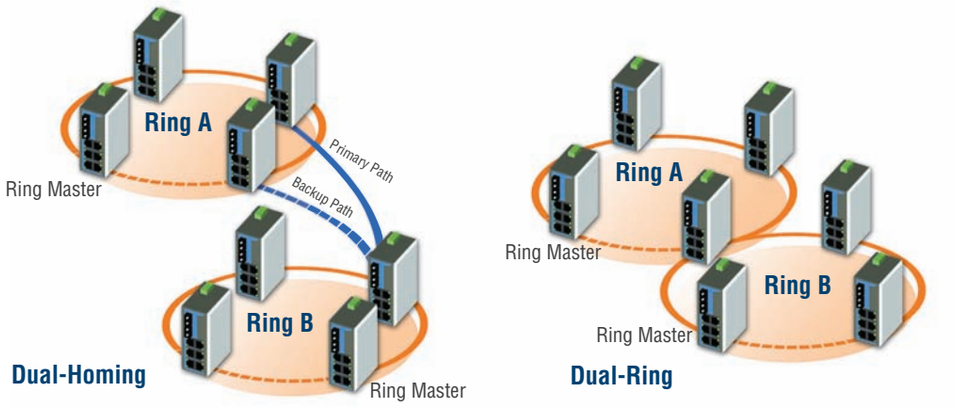


Coupling Several Turbo Rings for Distributed Applications

For some systems, it may not be convenient to connect all devices in the system to create one BIG redundant ring, since some devices could be located at a remote site. Turbo Ring's "Ring Coupling" function helps you separate those distributed devices into different smaller redundant rings, without any control line, but in such a way that the smaller rings will still be able to communicate with each other.

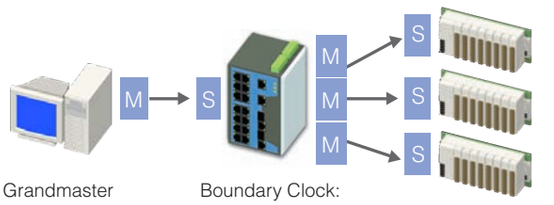
The advanced coupling technology allows you to diversify the connection to Turbo Ring and fit various installation environments. You can configure the network for "Dual-Homing," which involves coupling two separate rings with a single Moxa managed Ethernet switch connecting to two independent connection points. The back-up path will be activated if the operating connection (primary path) fails, and the "Dual-Ring" function adds reliability by allowing a single Moxa managed Ethernet switch to connect two separate rings for applications that present cabling difficulties.





IEEE 1588 PTP Enhances Time Synchronization

IEEE 1588, also known as Precision Time Protocol (PTP), is designed to synchronize real-time clocks located at the nodes of a distributed system that communicates over a network. Moxa's managed Ethernet switches (not including the EDS-400A) are well suited for applications, such as motion control, that require distributed clocks to be synchronized with high accuracy.



Grandmaster Clock: Determines the time base for the system

Boundary Clock: Slave to the grandmaster clock and master to its slave

Ordinary Clock: Slave to its master

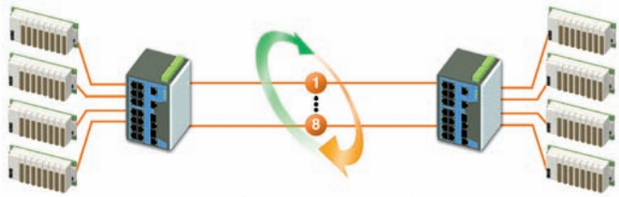
IPv6 for Next Generation Networking

IPv6 is the next generation protocol for Internet networking. Since IPv4 addresses will be completely used up in the near future, support for IPv6 (128-bit IP addresses) is important to secure the future of your network. Moxa's managed Ethernet switches support IPv6 to offer better addressing and security for large networks, and to protect your future investments.



Port Trunking for Flexible Network Connections

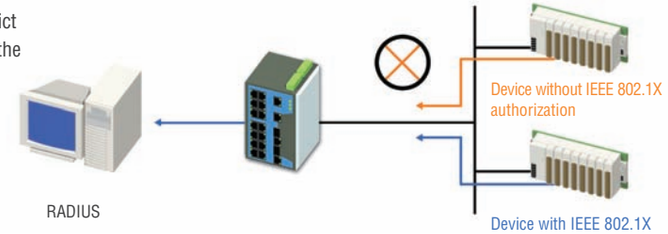
IEEE 802.3ad (LACP, Link Aggregation Control Protocol) provides flexible network connections and a redundant path for critical devices. For example, the EDS-G509 and EDS-500A allow users to set up a wider communication path by aggregating a trunk group. A maximum of eight ports can be assigned to one trunk group to optimize your network connection and redundant paths. When selected ports are grouped for trunking, LACP will exchange information to determine whether or not the ports selected in a group can be trunked together.



Up to 8 ports can be assigned to one trunk group

IEEE 802.1X Enhances User Authentication

Moxa's managed Ethernet switches (not including the EDS-400A) support IEEE 802.1X (Port-based Network Access Control) to restrict port access to authorized users only. Authentication is done using the local user database or an external RADIUS (Remote Authentication Dial In User Service) server.



HTTPS and SSH Enhance Network Security

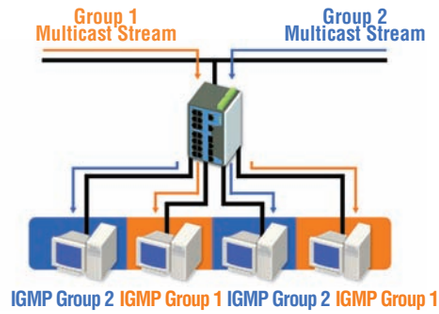
In order to protect data from being intercepted, Moxa's managed Ethernet switches (not including the EDS-400A) support the HTTPS and SSH protocols for transferring data over the Internet in an encrypted form. If you are changing the configuration of an Ethernet switch online, be sure to use HTTPS and SSH to keep your data secure.



HTTPS/SSH

IGMP Snooping and GMRP for Filtering Multicast Traffic

Moxa's managed Ethernet switches (not including the EDS-400A) support IEEE 802.1D-1998 GMRP (GARP Multicast Registration Protocol) and IGMP snooping, which provide the ability to prune multicast traffic so that it travels only to those end destinations that require this kind of traffic. The overall effect is to reduce the amount of traffic on the Ethernet LAN.

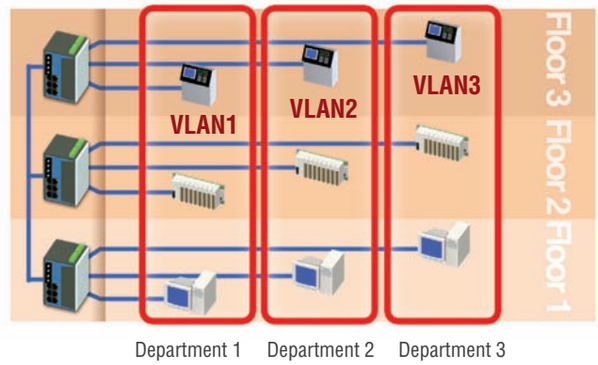


RMON for Efficient Network Monitoring and Proactive Capability

RMON (Remote Network Monitoring) is an Internet Engineering Task Force (IETF) standard monitoring specification that allows various network agents and console systems to exchange network monitoring data. RMON provides you with comprehensive network fault diagnosis, planning, and performance-tuning information, and helps you manage your network in a more proactive manner. If configured correctly, RMON probes deliver information before problems occur. This means that you can take action before the problems affect users.

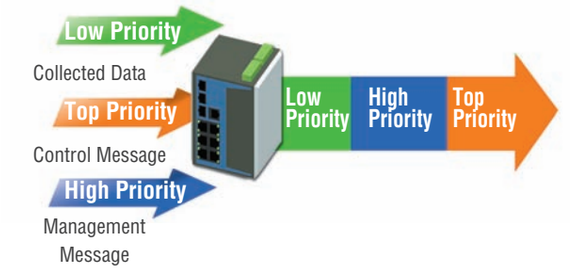
VLAN Eases Network Planning

A VLAN is a group of devices that can be located anywhere on a network, but which communicate as if they are on the same physical segment. VLANs can be used to segment your network without being restricted by physical connections—a limitation imposed by traditional network design. Besides, since all automation systems incorporate sensitive devices that must be protected from unauthorized access, it is very important to have some type of authentication system set up that only allows authorized users to access the system. If devices belong to different VLANs, they cannot communicate with each other, providing extra security and protection from unwanted invasion or traffic. The IEEE 802.1Q standard and GVRP protocol can exchange the same interoperable parameters to keep consistent VLAN settings over the entire network.



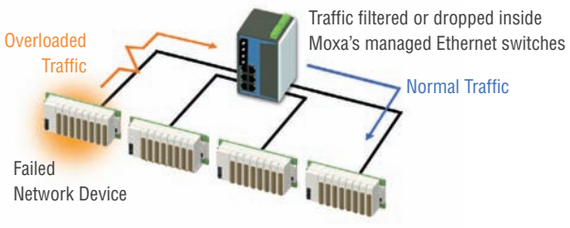
QoS Increases Determinism

Quality of Service (QoS) provides a traffic prioritization capability to ensure that important data is delievered consistently and predictably. Moxa's managed Ethernet switches can inspect IEEE 802.1p/1Q layer 2 CoS tags, and even layer 3 TOS information, to provide a consistent classification of the entire network. The QoS capability of the managed Ethernet switches improve your industrial network's performance and determinism for mission-critical applications.



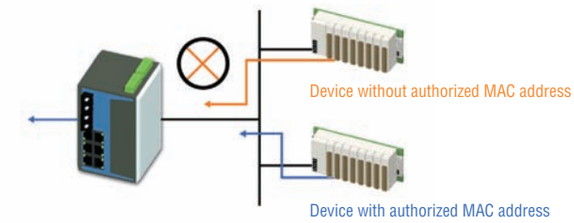
Bandwidth Management Prevents Unpredictable Network Status

Unlimited bandwidth should not be given to any single device on a network, particularly in light of what could happen if the device malfunctions. The most well-known problem is the broadcast storms caused by setting up the wrong topology, or by devices that malfunction. Moxa's managed Ethernet switches not only prevent broadcast storms, but in addition, the ingress/egress rate of unicast/multicast/broadcast packets can also be configured to give administrators full control of limited bandwidth to prevent unpredictable faults.



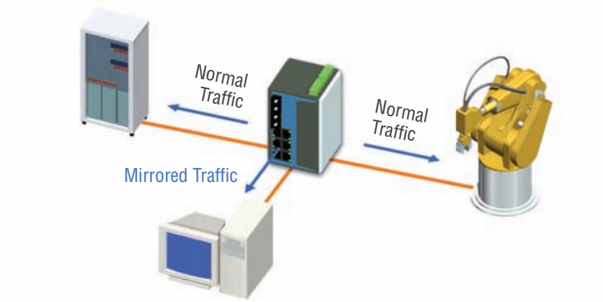
Port Lock Limits Access by MAC Address

Moxa's managed Ethernet switches (not including the EDS-400A) can use the Port Lock function to assign protected static MAC addresses to specific ports. Locked ports will not be able to learn other addresses, but only allow traffic that comes from the preset static MAC address, helping block unwanted invasion and usage.



Port Mirroring for Online Monitoring

In some cases, a network is so large that it is difficult to achieve the expected level of communications. Industrial communications applications use more of a command-response style than the file-transfer style used in office network environments. This means that when first setting up an industrial Ethernet network, control engineers may need to use a second port to monitor the actual activity between their devices and computer host. The mirroring port function on Moxa's managed Ethernet switches helps ensure that the system behaves as expected.



Automatic Warning by Event

Since industrial Ethernet devices are often located at remote parts of a network, it may be hard for system administrators to keep track of the status of such devices. The traditional method used to determine the status of devices is to poll devices periodically, but this is not "real-time" enough for many modern applications, and also wastes precious computing resources. A more modern solution to this problem is to use industrial Ethernet switches that provide system maintainers with real-time alarm messages almost instantaneously when exceptions occur. In other words, warning messages are triggered actively when the events occur. In order to handle these requirements, industrial Ethernet switches need a number of important features, as described below.

Warning by e-mail

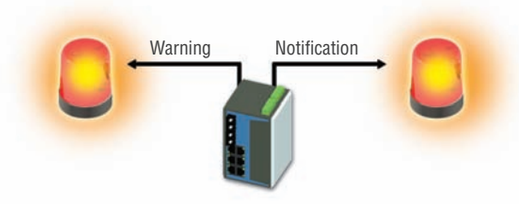
Moxa's managed Ethernet switches send out a warning e-mail when an exception is detected, providing system managers with real-time alarm messages.

Switch Events		Port Events
Cold Start	Warm Start	Link On
Power On/Off	Authentication Failure	Link Off
Topology Change	Configuration Change	Traffic Overload



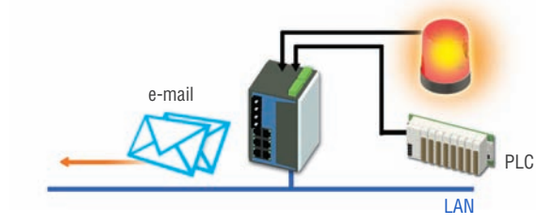
Warning by Relay Output

The managed Ethernet switches provide relay outputs that can be configured to indicate the importance of events when notifying or warning engineers in the field. In response, engineers can respond quickly and with the appropriate emergency maintenance procedures to higher priority messages.



DI for Integrating Other Important Sensors

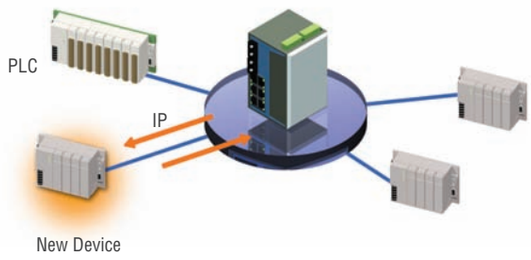
Moxa's managed Ethernet switches (not including the EDS-400A or IKS series switches) have two digital inputs for integrating sensors into the Ethernet switches' automatic alarm mechanism. This is done by redirecting warning messages to an IP network by e-mail notification.

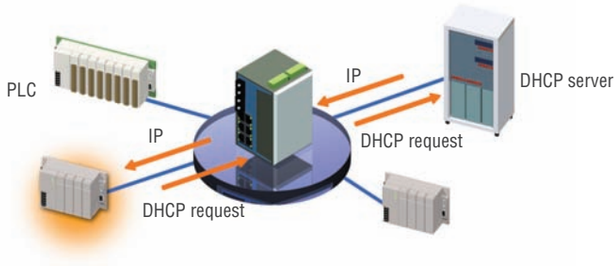


Replacing Faulty Devices

To reduce the effort required to configure IP addresses, Moxa's managed Ethernet switches support DHCP/BootP server and RARP protocols, which are used to automatically configure the IP addresses of Ethernet-enabled devices.

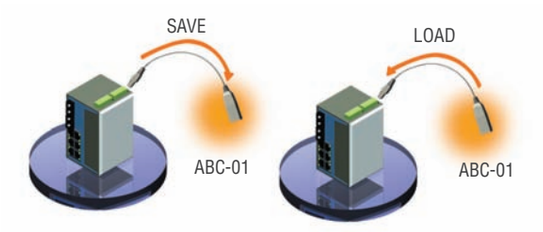
In addition, Moxa's managed Ethernet switches can also play the role of DHCP relay agent (with Option 82 support) to forward DHCP requests and provide information details (such as the slot ID, port number, and VLAN ID) for the authentication of DHCP servers.





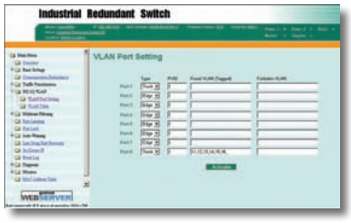
ABC-01 Provides a Seamless Backup Solution

Moxa's ABC-01 is designed to save and load the configuration of a Moxa managed Ethernet switch. Simply plug the ABC-01 into the Ethernet switch's RS-232 console port, and then use the Ethernet switch's HMI utility to save or load the configuration. The ABC-01 makes it easy to manage your network, particularly when you need to back up or replace an Ethernet switch. You can quickly reinstall a substitute Ethernet switch (of the same model) or recover the entire system configuration if an Ethernet switch failure occurs.



Easy Browser-based Configuration

Moxa's managed Ethernet switches can be configured easily over the network by web browser, Telnet console, or a Windows utility provided by Moxa. In addition, it is simple to back up configuration parameters and update firmware in the managed Ethernet switches with these user-friendly tools.



Network Management with Moxa's SNMP OPC Server Software

The Moxa SNMP OPC Server Pro software package can convert SNMP into OPC format. The vertical integration of SNMP management information into existing OPC-based SCADA packages gives the customer the ability to establish an Ethernet network management application that is integrated with existing visualization and control applications.



Modular Design, Maximum Flexibility

Innovative Modular Design

Scalable Gigabit Modular Solution

A bandwidth 100 Mbps is not enough to meet the requirements posed by industrial Ethernet applications that involve transmitting both voice and video. The EDS-728/828 and IKS-6726 Ethernet switches, which support Gigabit Ethernet ports and Gigabit Turbo Ring, can be used to create a reliable, high performance network backbone. Select Gigabit modules that meet your current needs, or to set up your system for future requirements.

Flexible Fast Ethernet Module

Up to 24 Fast Ethernet ports can be installed in the EDS-728/828 and IKS-6726 Ethernet switches. Select from a variety of Fast Ethernet interface modules wtih a combination of 10/100BaseT(X) (RJ45 connectors) and 100BaseFX (single/multi-mode, SC/ST connectors) ports. Long-haul single mode optical fiber can be used to provide 100 Mbps transmission over a distance of 40 km or 80 km.