

Industrial Ethernet Switches – Managed and Unmanaged

NI UES-3880, NI MES-3980 **NEW!**

Industrial Features

- -40 to 70 °C operating temperature
- Redundant dual 24 VDC power inputs
- Class I, Div 2; ATEX Class 1, Zone 2 hazardous certifications
- Metal enclosure, IP30 rated
- DIN-rail or panel mount support
- Relay output warning for power failure and port break alarm

Switching Features

- Eight 10/100BASE-T(X) RJ45 connectors
- Broadcast storm protection
- IEEE 802.3/802.3u/802.3x support
- 10/100 M full-/half-duplex, MDI/MDI-X autosensing



Overview and Applications

The National Instruments unmanaged Ethernet switch (UES) and managed Ethernet switch (MES) provide the switching you need to connect all NI Ethernet-based devices to distributed systems and incorporate Ethernet-based devices and industrial protocols from third-party suppliers into NI applications.

Unmanaged Ethernet Switch

The eight-port NI UES-3880 is an unmanaged entry-level switch for networking between NI Ethernet-based controllers and devices using standard Ethernet protocols. The UES offers industrial features for networking NI programmable automation controllers (PACs) including -40 to 70 °C operating temperatures; Class I, Div 2, and ATEX certifications for hazardous locations; and redundant dual 24 VDC power inputs.

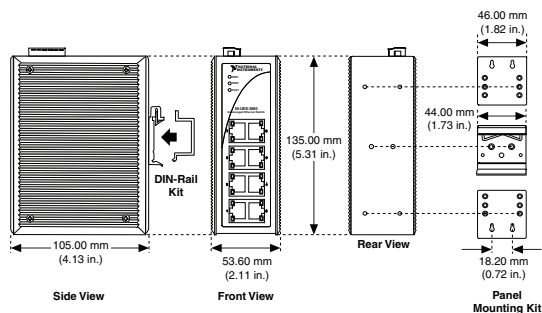


Figure 1. NI UES-3880 Dimensional Drawings

Managed Ethernet Switch

The eight-port NI MES-3980 is a fully managed switch for networking NI Ethernet-based devices. The MES offers the same industrial specifications as the unmanaged switch as well as additional network management, network monitoring and security, network redundancy, and system alarm functionality. The MES-3980 provides Web-based configuration for easy management of these features and a Windows utility for configuration. MES-3980 features include:

- Web-based and Windows configuration and management
- Ring recovery time <300 ms at full load with Turbo Ring technology
- RSTP/STP (IEEE 802.1D-2004) for Ethernet redundancy
- Quality of Service (QoS) IEEE 802.1p/1Q for network determinism
- IGMP snooping and GMRP for filtering multicast traffic
- Port trunking and LACP for optimum bandwidth limitation
- Port-based VLAN and GVRP for network planning
- RMON and SNMP v1/v2c/v3 for network monitoring and management
- IEEE 802.1X port-based network access control, https/SSL secure Web access, and port lock by MAC address for network security
- Configurable e-mail notifications
- Relay output for power failure, and port break alarms and digital inputs to integrate control systems and sensors
- Automatic backup configurator support

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Network Management

The MES-3980 provides port trunking, so you can group two or more ports together for increased bandwidth and a backup communication path. The managed switch implements the Link Aggregation Control Protocol (LACP) based on IEEE 802.3ad to provide link aggregation. It also offers port-based virtual LAN (VLAN) support for creating independent logical networks across switches or on the same switching hardware. The MES-3980 implements the Generic Attribute Registration Protocol (GARP), and, to support VLANs, it uses the GARP VLAN Registration Protocol (GVRP) based on IEEE 802.1Q. The NI managed switch, configured for the VLAN in which it is incorporated, uses the GVRP to spread necessary information and configure other switches across VLANs.

Network Monitoring and Security

Port mirroring allows one port on a switch to check the traffic sent and received by another port for network monitoring. With remote monitoring (RMON) support, network administrators can obtain network-fault diagnosis, planning, and performance-tuning data from the NI managed switch. Using these features, the MES-3980 provides a wide range of industry-standard options for network monitoring.

The MES-3980 uses the Simple Network Management Protocol (SNMP) so network management systems can access data from the switch to describe system configuration. Network management systems use SNMP to monitor devices attached to the network.

The most common concern with Ethernet is security. The NI managed switch offers MAC filtering control so you can configure a table of acceptable MAC addresses that the switch uses to filter traffic from unauthorized devices.

The NI managed switch also supports Port Lock access by MAC address so that locked ports such as those connected to the external network are not able to learn other MAC addresses and only pass traffic sent from preset MAC addresses. This helps to avoid inappropriate port usage by external devices.

Network Redundancy and Industrial Protocol Support

The MES-3980 supports the Spanning Tree Protocol (STP) and Rapid STP (RSTP) developed by Cisco and now incorporated in the IEEE 802.1D-2004 standard. In addition to STP and RSTP, the managed switch works with Turbo Ring technology, which provides ring recovery time <20 ms for Ethernet redundancy when an Ethernet network is configured using a ring topology. IT administrators typically use STP and RSTP to implement redundancy in corporate IT networks. The

MES-3980 supports RSTP and can be incorporated as part of a corporate IT networking infrastructure.

When you need to implement a private subnet, Turbo Ring offers a simple method of redundancy that the NI managed switch supports. Figure 2 shows a ring system with the backup path. If any section between two switches is broken, the ring can recover communication within 300 ms with the backup path.

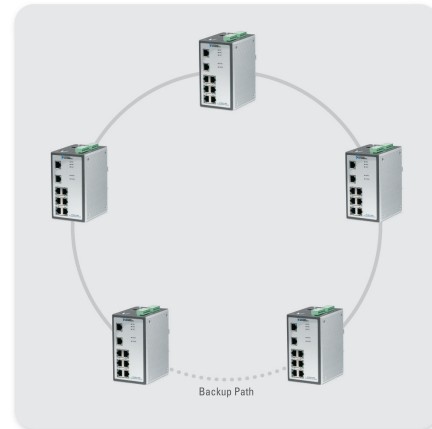


Figure 2. Ring Configuration for Communication Redundancy

NI unmanaged and managed Ethernet switches work with PC-based Ethernet standards based on the IEEE 802.3 application and transport layers of the TCP/IP protocols. Both the UES-3880 and MES-3980 are compatible with NI shared variables and industrial protocols that rely on TCP/IP protocols, including Modbus TCP/IP, UDP, and TCP.

Additional industrial protocols, including Ethernet/IP and PROFINET, add more requirements to the transport layers of TCP/IP and are supported only by the MES-3980. The NI managed switch offers Internet Group Management Protocol (IGMP) snooping and supports the GARP Multicast Registration Protocol (GMRP) that allows the managed switch to filter multicast traffic such as traffic generated from Ethernet/IP networks. For applications involving NI Ethernet-based hardware on a network with PROFINET I/O, the MES-3980 provides packet prioritization based on the Quality of Service (QoS) IEEE 802.1p/1Q standard that defines priority levels for individual packets routed on a network.

System Notification and Backup Configuration

The NI managed switch offers several features for power failure and port break detection. For system management, the MES-3980 delivers configurable e-mail notifications when an exception is detected, providing system managers with real-time alarm messages. For local alarms and notifications, the MES-3980 offers two relay contacts with a

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current capacity of 1 A at 24 V. These relay outputs can connect directly to local sensors or to digital inputs on NI PACs such as CompactRIO and Compact FieldPoint, so NI LabVIEW software can detect port failure or switch power failure. The switch also provides two digital inputs with 8 A maximum input current and two output states. NI PACs can set these digital inputs to alert the switch about events or alarm notifications.

The MES-3980 also supports backup configuration through an automatic RJ45 cable and storage device. The backup configurator stores IP address and switch management settings. Upon switch replacement, simply reboot the switch and the backup configurator updates IP address and system settings.

Web-Based Configuration

The MES-3980 is shipped with Web-based management software for configuration. Simply log in using the switch IP address and navigate to change settings and customize the switch. You can easily export or import settings to replicate to other switches or to import existing files of settings from an already configured switch.

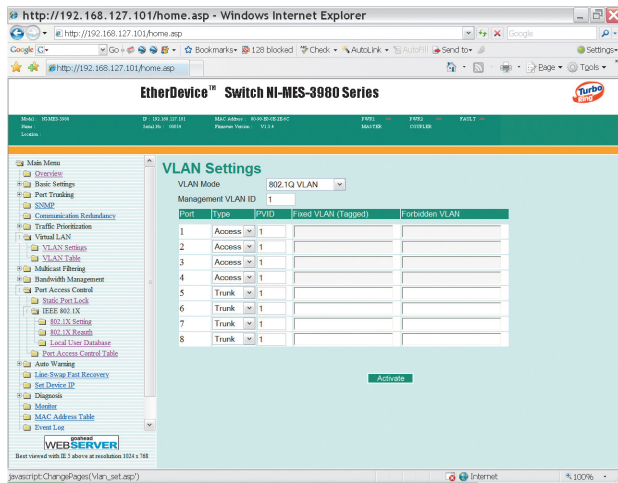


Figure 3. NI Managed Ethernet Switch Web-Based Configuration Software

Mechanical Dimensions

MES-3980 switch dimensions are shown in Figure 4. Each switch is shipped with a DIN-rail mount bracket and power connectors for redundant power inputs, relay outputs, and two digital lines.

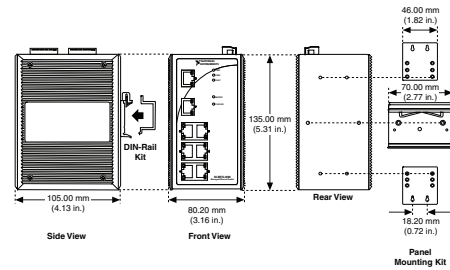


Figure 4. NI MES-3980 Dimensional Drawings

Ordering Information

NI UES-3880780038-01
 NI MES-3980780039-01

Accessory

NI PS-5 Power Supply778805-90

BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to ni.com/comm.

BUY ONLINE at ni.com or CALL 800 813 3693 (U.S.)

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Specifications

>> For complete specifications, see the *NI MES-3980 User Manual* at ni.com/manuals.

Technology

UES-3880	
Standards.....	IEEE 802.3, 802.3u, 802.3x
Processing type.....	Store and forward
Flow control.....	IEEE 802.3x back pressure
MES-3980	
Standards.....	IEEE 802.3, 802.3u, 802.3x, 802.1D, 802.1w, 802.1Q, 802.1p, 802.1X, 802.3ad
Protocols.....	IGMP v1/v2/v3 device, GVRP, SNMP v1/v2c/v3, DHCP Server/Client, DHCP Option 82, BOOTP, TFTP, SNTP, SMTP, RARP, GMRP, LACP, RMON
MIB.....	MIB-II; Ethernet-Like; P-BRIDGE; Q-BRIDGE; Bridge; RSTP; RMON groups 1, 2, 3, and 9
Flow control.....	IEEE 802.3x back pressure

Interface

UES-3880	
RJ45 ports.....	10/100BASE-T(X) autonegotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
LED indicators.....	PWR1, PWR2, Fault, 10/100M (TP port), and 100M (fiber port)
DIP switch.....	Port break alarm mask
Alarm contact.....	One relay output with current carrying capacity of 1 A @ 24 VDC
MES-3980	
RJ45 ports.....	10/100BASE-T(X) autonegotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
LED indicators.....	PWR1, PWR2, Fault, Master, Coupler, 10/100M
DIP switch.....	Turbo Ring, Master, Coupler, Reserve
Alarm contact.....	Two relay outputs with current carrying capacity of 1 A @ 24 VDC
Digital input.....	Two inputs with the same ground but electrically isolated from the electronics +13 to +30 V for state "1" -30 to +3 V for state "0"
Maximum input current.....	8 mA

Power

UES-3880	
Input voltage.....	24 VDC (12 to 48 VDC), redundant inputs
Input current.....	0.25 A @ 24 VDC
Connection.....	Removable 6-pin terminal block
Overload current protection.....	1.1 A
Reverse polarity protection.....	Present
MES-3980	
Input voltage.....	24 VDC (12 to 45 VDC), redundant dual inputs
Input current.....	0.25 A @ 24 VDC
Connection.....	2 removable 6-pin terminal blocks
Overload current protection.....	Present, can withstand 1.6 A
Reverse polarity protection.....	Present

Mechanical

UES-3880	
Casing.....	IP30 protection, metal case
Dimensions (w by h by d).....	53.6 by 135 by 105 mm (2.11 by 5.31 by 4.13 in.)
Weight.....	630 g
Installation.....	DIN-rail or panel mounting (optional kit)
MES-3980	
Casing.....	IP30 protection, aluminum case
Dimensions (w by h by d).....	80.5 by 135 by 105 mm (3.17 by 5.31 by 4.13 in.)
Weight.....	1040 g
Installation.....	DIN-rail or panel mounting (optional kit)

Environmental

UES-3880	
Operating temperature.....	-40 to 70 °C (-40 to 158 °F)
Storage temperature.....	-40 to 85 °C (-40 to 185 °F)
Ambient relative humidity.....	5 to 95% (noncondensing)
MES-3980	
Operating temperature.....	-40 to 70 °C (-40 to 158 °F) for T models
Storage temperature.....	-40 to 85 °C (-40 to 185 °F)
Ambient relative humidity.....	5 to 95% (noncondensing)

Regulatory Approvals

UES-3880	
Safety.....	UL60950-1, CSA C22.2 No. 60950-1, EN60950-1, TUV
Hazardous location.....	UL/cUL Class I, Division 2, Groups A, B, C, and D
EMI.....	FCC Part 15, CISPR (EN55022) Class A

BUY ONLINE at ni.com or CALL 800 813 3693 (U.S.)

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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
MES-3980	
Safety.....	UL60950-1, CSA C22.2 No. 60950-1, EN60950-1, TUV
Hazardous location	UL/cUL Class I, Division 2, Groups A, B, C, and D
Maritime	DNV, GL
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, EN61000-4-8, EN61000-4-11

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