

# N-TRON

**THE INDUSTRIAL NETWORK COMPANY**



# Non-Stop



Plants depend on ***N-TRON***

# N-TRON Manufactures High Performance Hardened Switches.

N-TRON® manufactures a family of industrial hardened Level II Ethernet Switches designed specifically for industrial, marine, utility, and military users requiring high reliability, superior performance, and exceptional noise immunity in a hardened enclosure.

N-TRON Switches use store-and-forward architecture and are designed to operate in applications needing extended temperatures (ranging from -40°C to 85°C), high shock and vibration specifications, elevated RFI/EMI environments, and are UL Listed and TUV Certified and can be used in Class I, Division 2 Hazardous areas. Our products feature wide ranging (10 to 30 VDC) redundant power supply inputs, and can be DIN-Rail, panel, or rack mounted. N-TRON offers both IEEE 802.3 10/100BaseTX twisted pair copper and 100BaseFX fiber optic ports. Our multimode fiber models are capable of driving in excess of 2km of multimode fiber optic cable. The FXE models are able to extend distances ranging from 15km to 80km of singlemode fiber optic cable. For faster communications, the 7000 Series offers two optional SFP Gigabit LC style transceivers and the 9000 Series offers an optional dual Gigabit LC style fiber interface.

N-TRON's N-View™ OPC Server Software can be used with the N-TRON 200, 300, 400, 500, and 900, Series Switches with the N-View firmware option. N-View is also available as a standard feature on all 7000 and 9000 Series Switches. N-View OPC Software allows switch and port status information for all N-View capable switches, to be displayed using popular OPC client HMI Software Packages. N-View is currently available for the Windows NT, XP, 2000, and 2003 Server operating systems.

## Standard Features

- Steel Enclosures for High Noise Environments
- DIN-Rail Mount, Panel Mount, & Rackmount Available
- Store-and-forward Wire Speed Technology
- Redundant Power Inputs (10 to 30 VDC)
- Low Current Requirements
- All TX Ports Support Unshielded Twisted Pair (UTP) or Shielded Twisted Pair (STP) Cabling
- Wide Range of Fiber Optic Transceivers 2km, 15km, 40km, or 80km
- ESD Overvoltage Protection Diodes on all I/O Ports

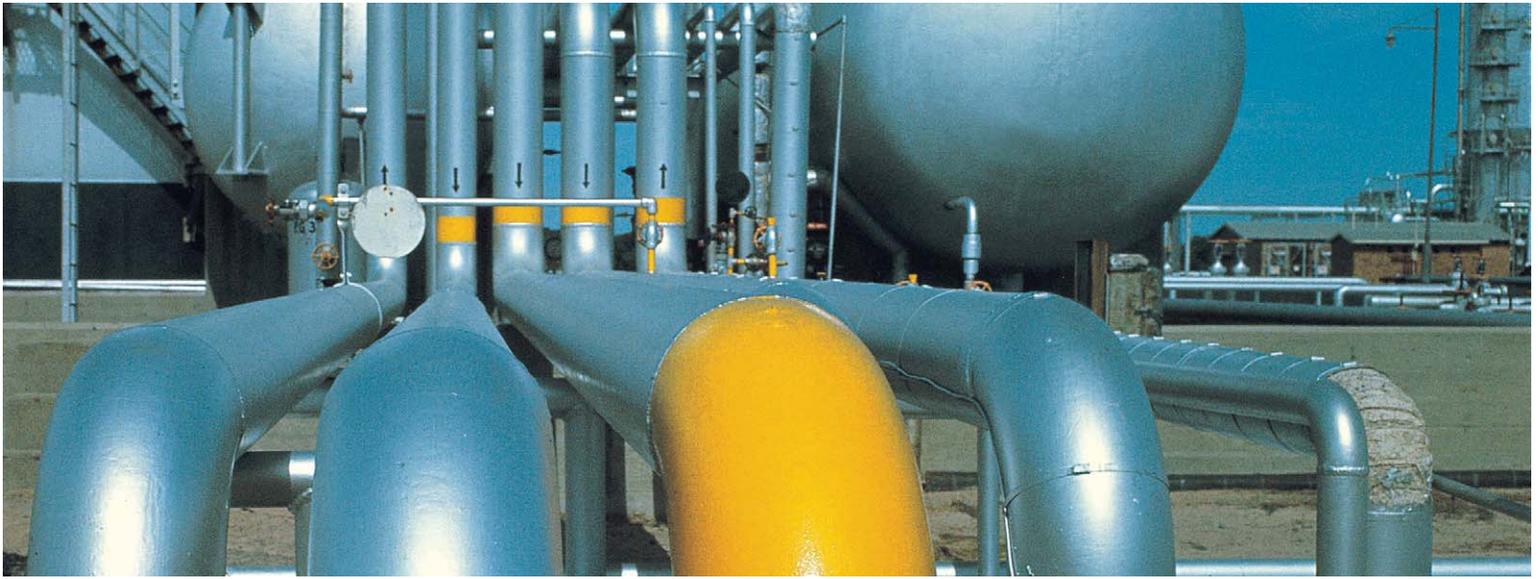
## Specifications

- 1 to 2 Million Hours Mean Time Between Failure
- Shock: 200g for 10ms
- Seismic Triaxial: 50g, 5-200Hz, 15 sec.
- Operating Temperatures
  - -20° to 70°C (Standard)
  - -40° to 85°C (500 Series)
- FCC Part 15 Class A
- TUV Certified CE: EN61000-6-2,4, EN55011, EN61000-4-2,3,4,5,6
- UL 1604 C Listed (US, Canada) Class I, Div. 2 Hazardous Location
- ATEX Zone 2, Category 3G, EEx Mark (500 Series)
- Our 300, 500, and 9000 Series also received the following approvals:
  - IEEE 1613 Compliance (Electric Utility Substation)
  - NEMA TS1/TS2 Compliance (Traffic Control)
  - American Bureau of Shipping (ABS) Type Approval

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N-TRON Corp. is located in Mobile, Alabama. N-TRON products are available from N-TRON's worldwide network of distributors, and our products are made in the U.S.A..

For a distributor near you, contact N-TRON at (251) 342-2164 or visit us on the web @ [www.n-tron.com](http://www.n-tron.com).



## 102RAS

- One RJ-45 10/100BaseTX Copper Port
- One RJ-11WAN/Phone Line Port with V92/56K Modem
- Provides Connectivity to Industrial LAN via Modem
- Web Browser Configuration
- Provides Multiple Security and Callback Options
- Physical Dimensions (3.4" h x 1.5" w x 3.6" d, .70 lbs.)
- -20°C to 70°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Redundant Power Inputs 10-30 VDC, 221 mA @ 24V
- Hardened ESD Protection Diodes on RJ-45 Port
- Surge Protection Diodes on Power Inputs
- Order Part #102RAS

## 104TX

- Four RJ-45 10/100BaseTX Copper Ports
- Compact Size provides a Smaller Footprint
- Unmanaged Operation
- Full Wire Speed Communications
- Supports Full/Half Duplex Operation
- Physical Dimensions (2.8" h x 1.5" w x 3.5" d, .54 lbs.)
- -40°C to 80°C Operating Temperature
- Hardened Metal DIN-Rail Enclosure
- Redundant Power Inputs 10-30 VDC, 215 mA @ 24V
- Hardened ESD Protection Diodes on all Ports
- Surge Protection Diodes on Power Inputs
- Order Part #104TX

## 105TX

- Five RJ-45 10/100BaseTX Copper Ports
- Compact Size provides a Smaller Footprint
- Unmanaged Operation
- Full Wire Speed Communications
- Supports Full/Half Duplex Operation
- Physical Dimensions (2.8" h x 1.5" w x 3.5" d, .54 lbs.)
- -40°C to 80°C Operating Temperature
- Hardened Metal DIN-Rail Enclosure
- Redundant Power Inputs 10-30 VDC, 215 mA @ 24V
- Hardened ESD Protection Diodes on all Ports
- Surge Protection Diodes on Power Inputs
- Order Part #105TX

# Affordable, Entry-Level Industrial Ethernet Products.

The N-TRON 100 Series, provides economical, entry-level switches and peripheral products designed to expand your Industrial Ethernet network. This flexible line is ideal for data acquisition, control, and Ethernet I/O applications needing unmanaged, affordable products. For remote connectivity, the 102RAS Server provides a secure remote connection to an industrial LAN via an integrated V.92/56K modem, and can be placed alongside other industrial equipment. Our 104TX, 105TX, and 108TX copper switches complement the 100 Series family, offering compact, unmanaged Ethernet switches ideal for increasing network bandwidth and determinism. These units are UL Listed, TUV Certified, and can be used in Class I, Division 2 Hazardous locations.



## 108TX

- Eight RJ-45 10/100BaseTX Copper Ports
- Compact Size provides a Smaller Footprint
- Unmanaged Operation
- Full Wire Speed Communications
- Supports Full/Half Duplex Operation
- Physical Dimensions (3.5" h x 1.5" w x 4.2" d, .64 lbs.)
- -40°C to 70°C Operating Temperature
- Hardened Metal DIN-Rail Enclosure
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- Hardened ESD Protection Diodes on all Ports
- Surge Protection Diodes on Power Inputs
- Order Part #108TX

## 102MC

- One RJ-45 10/100BaseTX Copper Port
- One 100BaseFX Fiber Port
- Unmanaged Media Converter
- Full Wire Speed Communications
- RJ-45 Port Supports Full/Half Duplex Operation
- Physical Dimensions (2.8" h x 1.5" w x 3.5" d, .49 lbs.)
- -40°C to 80°C Operating Temperature
- Hardened Metal DIN-Rail Enclosure
- Redundant Power Inputs 10-30 VDC, 140 mA @ 24V
- Hardened ESD Protection Diodes on RJ-45 Port
- Surge Protection Diodes on Power Inputs
- Order MM Part #102MC-XX  
Order SM Part #102MCE-XX-YY

**Ordering Key:** MM = multimode fiber, SM = singlemode fiber, "XX" = ST or SC for fiber style connector, "E" = singlemode fiber, "YY" = 15, 40, or 80 for 15km, 40km, or 80km SM fiber length.

# Rugged Unmanaged Switches. IP67 Rated for Harsh Environments.

Ideal for mission critical data acquisition, control, and Ethernet I/O applications with environmental challenges, *N-TRON's* 105M12 and 108M12 unmanaged Ethernet Switches are IP67 rated for protection against dust, low & high pressure water jets, and temporary immersion in water. These units come with standard M12 D-Coded connectors for either five or eight 10/100BaseTX copper ports and carry extended operating temperatures, specifications, and a high MTBF for unbeatable reliability. The 105M12 and 108M12 are UL listed, TUV certified, and can be used in Class I, Division 2 Hazardous locations.



## 105M12

- Five 10/100BaseTX Copper Ports with M12 D-Coded Female 4 Pin Connectors
- Unmanaged Operation
- IP67 Rated Hardened Metal Enclosure Bulkhead Mountable (DIN-Rail Mounting Option Available)
- Protected Against Low/High Pressure Water Jets and Temporary Immersion in Water
- Totally Protected Against Dust Ingress
- Physical Dimensions (5" h x 4.32" w x 2.1" d, 1.8 lbs.)
- -40°C to 80°C Operating Temperature
- Supports up to 2,000 MAC Addresses
- Full/Half Duplex Operation Auto Sensing Speed and Flow Control
- ESD Protection Diodes on all Ports Surge Protection Diodes on Power Inputs
- Redundant Power Inputs 10-30 VDC, 215mA @ 24V
- Order Part #105M12

## 108M12

- Eight 10/100BaseTX Copper Ports with M12 D-Coded Female 4 Pin Connectors
- Unmanaged Operation
- IP67 Rated Hardened Metal Enclosure Bulkhead Mountable (DIN-Rail Mounting Option Available)
- Protected Against Low/High Pressure Water Jets and Temporary Immersion in Water
- Totally Protected Against Dust Ingress
- Physical Dimensions (6.6" h x 6.6" w x 2.1" d, 3.25 lbs.)
- -40°C to 70°C Operating Temperature
- Supports up to 2,000 MAC Addresses
- Full/Half Duplex Operation Auto Sensing Speed and Flow Control
- ESD Protection Diodes on all Ports Surge Protection Diodes on Power Inputs
- Redundant Power Inputs 10-30 VDC, 250mA @ 24V
- Order Part #108M12

# Hardened Switches with Class I, Div. 2 Hazardous Location Certification.

Designed for the demands of the harsh industrial environment, the *N-TRON* 200 and 400 Series are housed in a ruggedized steel enclosure, and can be DIN-Rail mounted horizontally or vertically, alongside Ethernet I/O or other industrial equipment. Rackmount and panel mount options are also available. These three products provide high throughput and minimum downtime, ideal for use in mission critical data acquisition, control, and Ethernet I/O applications. All ports support full/half duplex operation using “state of the art” Ethernet switching technology. All 200 and 400 series switches are UL Listed and TUV Certified and can be used in Class I, Division 2 Hazardous locations.



## 202MC

- One RJ-45 10/100BaseTX Port
- One 100BaseFX ST or SC Duplex Port
- Physical Dimensions (2" h x 5" w x 3.1" d, 1.25 lbs.)
- -20°C to 70°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- RJ-45 Port Auto Negotiates Speed, Duplex, and MDIX
- UL Listed Class I, Div 2 Hazardous Location Certified
- N-View OPC Monitoring Option
- > 2M Hours MTBF
- Order MM Part #202MC-N-XX  
Order SM Part #202MCE-N-XX-YY

## 405TX

- Five RJ-45 10/100BaseTX Ports
- Plug & Play Unmanaged Operations
- Physical Dimensions (2" h x 5" w x 3.1" d, 1.25 lbs.)
- -20°C to 70°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- Auto Negotiates Speed, Duplex, and MDIX
- UL Listed Class I, Div 2 Hazardous Location Certified
- N-View OPC Monitoring Option
- > 2M Hours MTBF
- Order Part #405TX-N

## 405FX

- Four RJ-45 10/100BaseTX Ports
- One 100BaseFX ST or SC Duplex Port
- Physical Dimensions (2" h x 5" w x 3.1" d, 1.25 lbs.)
- -20°C to 70°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- RJ-45 Ports Auto Negotiate Speed, Duplex, and MDIX
- UL Listed Class I, Div 2 Hazardous Location Certified
- N-View OPC Monitoring Option
- > 2M Hours MTBF
- Order MM Part #405FX-N-XX  
Order SM Part #405FXE-N-XX-YY

**Ordering Key:** MM = multimode fiber, SM = singlemode fiber, “E” = singlemode fiber, “-N” = N-View OPC Switch Monitoring, leave blank for no monitoring option, “XX” = ST or SC for fiber style connector, “YY” = 15, 40, or 80 for 15km, 40km, or 80km SM fiber length.

# Compact. Reliable. Economical.

The *N-TRON* 300 Series of hardened industrial Ethernet switches offer high reliability and full wire speed communications, in a compact size, ideal for use in mission critical, industrial, data acquisition, control, and Ethernet I/O applications. These DIN-Rail mounted switches are designed to exceed the most demanding industrial communications needs and environmental conditions, while providing high throughput and minimum downtime. The 300 Series switches configured with the N-View option, can be monitored using standard OPC compliant HMI software in order to provide complete network monitoring and performance alarms. Handling up to 4,000 MAC addresses, these products support extremely sophisticated and complex network architectures. The 300 Series products keep the network affordable, while providing the simplicity of a plug and play auto sensing switch. All 300 Series switches are supplied with the following regulatory approvals: FCC Part 15 Class A, TUV Certified (CE Mark), UL 1604 C Listed (U.S. & Canada), Class I, Div. 2 Hazardous Location Certified, IEEE 1613 Compliance (Electric Utility Substation), ABS Type Approval (Shipboard), and NEMA TS1/TS2 Compliance (Traffic Control).



## 304TX

- Four RJ-45 10/100BaseTX Ports
- Supports UTP or STP Cabling
- Compact Size, Small Footprint (3" h x 2" w x 3.4" d, 0.75 lbs.)
- -20°C to 70°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- Auto Negotiates Speed, Duplex, and MDIX
- UL Listed Class I, Div 2 Hazardous Location Certified
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order Part #304TX-N

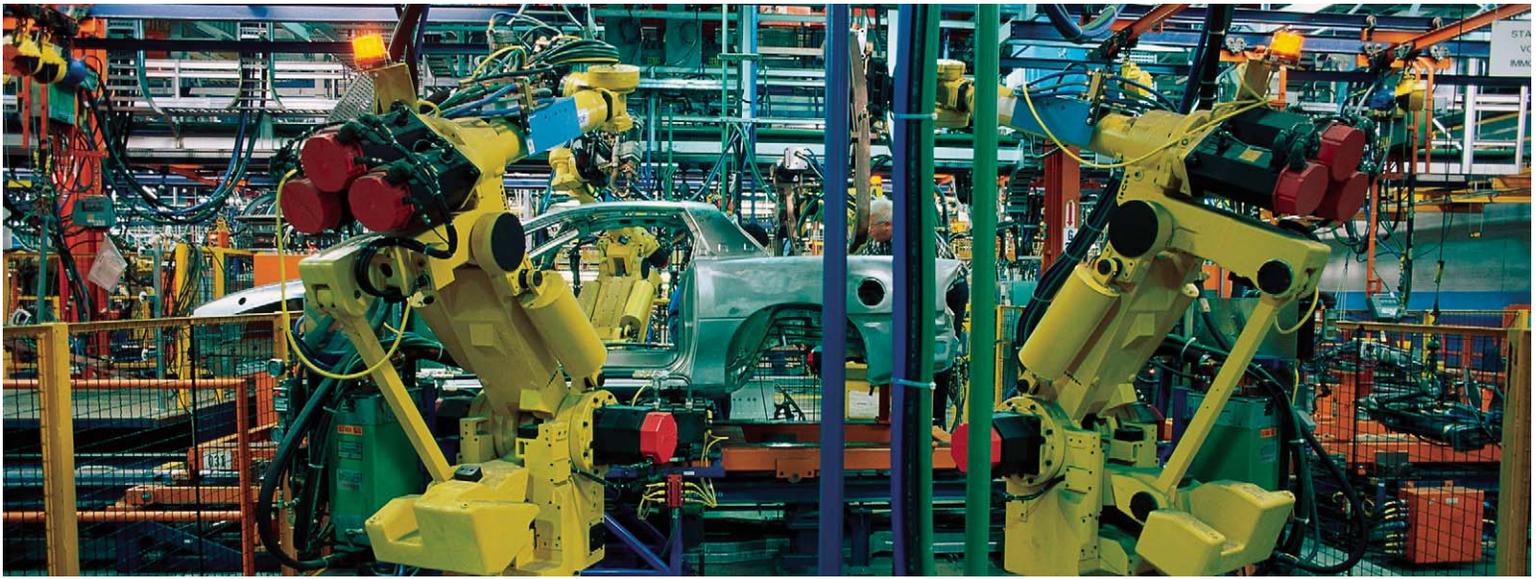
## 306TX

- Six RJ-45 10/100BaseTX Ports
- Supports UTP or STP Cabling
- Compact Size, Small Footprint (3" h x 2" w x 3.4" d, 0.75 lbs.)
- -20°C to 70°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- Auto Negotiates Speed, Duplex, and MDIX
- UL Listed Class I, Div 2 Hazardous Location Certified
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order Part #306TX-N

## 308TX

- Eight RJ-45 10/100BaseTX Ports
- Supports UTP or STP Cabling
- Compact Size, Small Footprint (3.5" h x 2" w x 3.4" d, 0.75 lbs.)
- -20°C to 70°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- Auto Negotiates Speed, Duplex, and MDIX
- UL Listed Class I, Div 2 Hazardous Location Certified
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order Part # 308TX-N

**Ordering Key:** "-N" = N-View OPC Switch Monitoring, leave blank for no monitoring option.



## 302MC

- One RJ-45 10/100BaseTX Port
- One 100BaseFX ST or SC Full Duplex Port
- Compact Size, Small Footprint (3" h x 2" w x 3.2" d, 0.75 lbs.)
- -20°C to 70°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- RJ-45 Port Auto Negotiates Speed, Duplex, and MDIX
- UL Listed Class I, Div 2 Hazardous Location Certified
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order MM Part #302MC-N-XX  
Order SM Part #302MCE-N-XX-YY

## 305FX

- Four RJ-45 10/100BaseTX Ports
- One 100BaseFX ST or SC Full Duplex Port
- Compact Size, Small Footprint (3.5" h x 2" w x 3.4" d, 0.75 lbs.)
- -20°C to 70°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- RJ-45 Ports Auto Negotiate Speed, Duplex, and MDIX
- UL Listed Class I, Div 2 Hazardous Location Certified
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order MM Part #305FX-N-XX  
Order SM Part #305FXE-N-XX-YY

## 306FX2

- Four RJ-45 10/100BaseTX Ports
- Two 100BaseFX ST or SC Full Duplex Ports
- Compact Size, Small Footprint (3.5" h x 2" w x 3.4" d, 0.75 lbs.)
- -20°C to 70°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- RJ-45 Ports Auto Negotiate Speed, Duplex, and MDIX
- UL Listed Class I, Div 2 Hazardous Location Certified
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order MM Part #306FX2-N-XX  
Order SM Part #306FXE2-N-XX-YY

**Ordering Key:** MM = multimode fiber, SM = singlemode fiber, "E" = singlemode fiber, "N" = N-View OPC Switch Monitoring, leave blank for no monitoring option, "XX" = ST or SC for fiber style connector, "YY" = 15, 40, or 80 for 15km, 40km, or 80km SM fiber length.

# N-TRON Peripherals and Accessories

## Power Supplies



NTPS-24-1.3

<b>NTPS-24-1.3</b>	DIN-Rail Power Supply for <i>N-TRON</i> 's 100, 200, 300, 400, 500*, 600, 900*, and 7000 Series Products. 1.3 Amp @ 24 VDC (*When operating two or more 900 Series fiber modules, or 526FX2, use NTPS-24-3)
<b>NTPS-24-3</b>	DIN-Rail Power Supply for <i>N-TRON</i> 's Products, especially suited for 526FX2 and 900 Series. 3.0 Amp @ 24 VDC
<b>NTPS-24-5</b>	DIN-Rail Power Supply for <i>N-TRON</i> 's Products, especially suited for 9000 Series. 5.0 Amp @ 24 VDC
<b>NTPS-24-TT-XXX</b>	Table Top Power Supply for <i>N-TRON</i> 's 100, 200, 300, 400, 500, and 600 Series Products. Amperage varies per Series, Pre-Terminated, ~12ft. (-XXX = <i>N-TRON</i> series # receiving power)
<b>NTPS-24-WA-XXX</b>	Wall Adaptor Power Supply for <i>N-TRON</i> 's 100, 200, 300, 400, 500, and 600 Series Products. Amperage varies per Series, Pre-Terminated, ~6ft. (-XXX = <i>N-TRON</i> series # receiving power)
<b>NTSA-CAT5e</b>	In-Line, DIN-Rail Cat5e Surge Arrester effective for all wiring schemes.

## Cables



CAT5E / RJ-45 Style Connector



ST Style Connector



SC Style Connector



M12 Style Connector

<b>CAT5E-X</b>	Cat5e Shielded Twisted Pair Cable, RJ-45 Connectors with Strain Relief Boots, Shielded
<b>CAT5E-M12-M12-X</b>	Cat5e Shielded Twisted Pair with Straight M12 to Straight M12 Connectors, Shielded
<b>CAT5E-M12-RJ45-X</b>	Cat5e Shielded Twisted Pair with Straight M12 to RJ-45 Connectors, Shielded
<b>CAT5E-M12-X</b>	Cat5e Shielded Twisted Pair with Straight M12 Connector to Bare End, Shielded
<b>CAT5E-RM12-M12-X</b>	Cat5e Shielded Twisted Pair with 90° M12 to Straight M12 Connectors, Shielded
<b>CAT5E-RM12-RM12-X</b>	Cat5e Shielded Twisted Pair with 90° M12 to 90° M12 Connectors, Shielded
<b>CAT5E-RM12-RJ45-X</b>	Cat5e Shielded Twisted Pair with 90° M12 to RJ-45 Connectors, Shielded
<b>CAT5E-RM12-X</b>	Cat5e Shielded Twisted Pair with 90° M12 Connector to Bare End, Shielded
<b>2ZR6AA-X</b>	Multimode Duplex Fiber Optic Cable, 62.5/125um, 1310nm, ST-ST Connectors
<b>2ZR6AB-X</b>	Multimode Duplex Fiber Optic Cable, 62.5/125um, 1310nm, ST-SC Connectors
<b>2ZR6AC-X</b>	Multimode Duplex Fiber Optic Cable, 62.5/125um, 850nm, ST-LC Connectors
<b>2ZR6BB-X</b>	Multimode Duplex Fiber Optic Cable, 62.5/125um, 1310nm, SC-SC Connectors
<b>2ZR6BC-X</b>	Multimode Duplex Fiber Optic Cable, 62.5/125um, 850nm, SC-LC Connectors
<b>2ZR6CC-X</b>	Multimode Duplex Fiber Optic Cable, 62.5/125um, 850nm, LC-LC Connectors
<b>2ZR8AA-X</b>	Singlemode Duplex Fiber Optic Cable, 8.3/125um, 1310nm, ST-ST Connectors
<b>2ZR8AB-X</b>	Singlemode Duplex Fiber Optic Cable, 8.3/125um, 1310nm, ST-SC Connectors
<b>2ZR8AC-X</b>	Singlemode Duplex Fiber Optic Cable, 8.3/125um, 1310nm, ST-LC Connectors
<b>2ZR8BB-X</b>	Singlemode Duplex Fiber Optic Cable, 8.3/125um, 1310nm, SC-SC Connectors
<b>2ZR8BC-X</b>	Singlemode Duplex Fiber Optic Cable, 8.3/125um, 1310nm, SC-LC Connectors
<b>2ZR6CC-X</b>	Singlemode Duplex Fiber Optic Cable, 8.3/125um, 1310nm, LC-LC Connectors
<b>06AR6-X</b>	Multimode, 6 Strand Fiber Optic Cable, 62.5/125um, 1310nm, Armored ST-ST Connectors
<b>PWR-M12-A-X</b>	Power Cable, Straight M12 A-coded Female Connector to Bare End, Shielded
<b>PWR-RM12-A-X</b>	Power Cable, 90° M12 A-coded Female Connector to Bare End, Shielded

## Mounting Kits



900-RM

<b>300-PM</b>	Panel Mount Kit for use with <i>N-TRON</i> 100*, and 300 Series Products. Converts Switch from DIN-Rail to Panel Mount. (*102MC-FL and 102PC-SE only)
<b>500-UTA89</b>	Metal DIN-Rail Clip for use with <i>N-TRON</i> 508TX, 508FX2, and 509FX Switches.
<b>900-PM</b>	Universal Panel Mount Kit for use with <i>N-TRON</i> 200, 300, 400, 500*, and 900 Series Products. Converts Switch DIN-Rail to Panel Mount. (*Excluding 524TX, and 526FX2)
<b>900-RM</b>	19" Rackmount Kit for use with <i>N-TRON</i> 100, 200, 300, 400, 500*, 600, 900, 7000, and 9000 Series. Allows DIN-Rail Switches to be Rack mounted. (*19" Rackmount included on 524TX, and 526FX2)
<b>7000-UTA89</b>	Metal DIN-Rail Clip for use with <i>N-TRON</i> 7014TX and 7014FX2 to allow horizontal mounting in smaller spaces.
<b>9000-PM</b>	Panel Mount Kit for use with <i>N-TRON</i> 9000BP Chassis. Converts Switch from DIN-Rail to Panel Mount.
<b>9000-UTA107</b>	Metal DIN-Rail Clip for use with <i>N-TRON</i> 9000BP Chassis. One clip included with 9000BP Chassis. Two additional clips may be installed per Chassis for a more secure mounting.



9000-PM



# N-TRON Advanced Management Features

*Ordering Tip: Must Specify 500-A, 7000, or 9000 Series models to receive Advanced Management Features*

Several advanced management features are offered as an optional item on the **500-A Series**, and as a standard item on the **7000** and **9000 Series** Switches. The **500-A** Switches are configured using the serial COM port, and the **7000** and **9000** Switches are configured using a Web Browser, Telnet or COM port. Must order -A option with 500 Series Switches to get advanced management features.

**IGMP Snooping** - Internet Group Management Protocol is a feature that allows the IGMP capable switches to forward multicast traffic based on learned group addresses. IGMP and query auto detect modes are enabled by default, and key enhancements include dynamic router discovery and master/slave redundancy for query detection. These features allow for the automatic detection of bi-directional router ports needed for the seamless formation of IGMP groups across multiple switches in an **N-TRON** network, and will reduce or eliminate the Command Line Interface switch configuration requirements for most Ethernet control networks.

**VLAN** - Virtual Local Area Network allows the segmentation of the switch in order to create two or more separate or overlapping local area network domains.

The Industrial Ethernet switches with the advanced management features, can be setup for IEEE 802.1Q dynamic tagged VLAN, or pre-determined port VLAN.

**QoS** - The Quality of Service feature provides prioritization of network traffic in order to provide better network service. The primary goal of QoS is to improve the latency of prioritized Ethernet packets required for ring management, real-time and other interactive applications.

**Trunking** - Also know as link aggregation, enables multiple physical ports to be linked together and function as one uplink to another Trunking capable switch configured in the same manner. The Trunking feature will increase the bandwidth between two switches and will also provide media redundancy.

**Port Mirroring** - This function allows the traffic on one port to be duplicated and sent to a designated mirror port. Port mirroring can be used to monitor Ethernet traffic on the designated source port using the assigned mirror port.

**Port Control** - **N-TRON** Switch ports may be individually configured for full or half duplex, 10Mb/s or 100Mb/s, and can be enabled or disabled.

**Rapid Spanning Tree** - This feature permits the **7000** or **9000 Series** switches to be configured in a Ring or Mesh topology, and provides support for redundant path communications with rapid healing.

# High Performance Ethernet Switches with Advanced Features (-A option) for Control.



The *N-TRON* 500 Series, with the -A option, is well suited for connecting Ethernet equipped industrial control applications and comes with advanced Ethernet communication management features, like VLAN, IGMP Snooping, Port Trunking, QoS, and Mirroring. IGMP and query auto detect modes are enabled by default, and key enhancements include multiple router support as well as dynamic router discovery and master/slave redundancy for query detection. The 500 Series products are designed to withstand the extremes of industrial environments and come standard with extended temperature ratings, extended shock, noise, and vibration specifications, redundant power inputs and a high MTBF. All 500 Series switches are supplied with the following regulatory approvals: FCC Part 15 Class A, TUV Certified (CE Mark), UL 1604 C Listed (U.S. & Canada): Class I, Div. 2 Hazardous Location Certified, ATEX Zone 2, Category 3G (EEx Mark), IEEE 1613 Compliance (Electric Utility Substation), ABS Type Approval (Shipboard), and NEMA TS1/TS2 Compliance (Traffic Control).



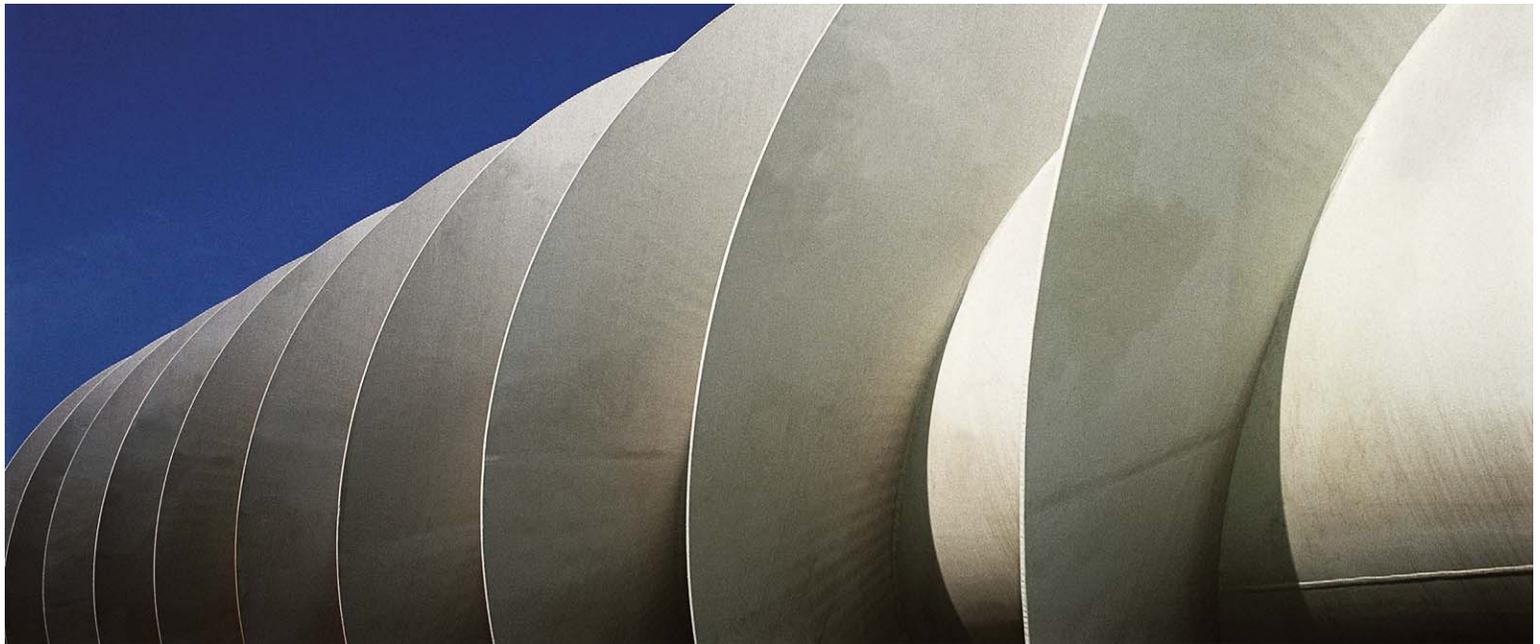
## 508TX

- Eight RJ-45 10/100BaseTX Ports
- Supports UTP or STP Cabling
- Physical Dimensions (2.3" h x 5.6" w x 3.4" d, 1.58 lbs.)
- -40°C to 85°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 200 mA @ 24V
- Auto Negotiates Speed, Duplex, and MDIX
- Advanced Management Features (Optional)
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order Part #508TX-A

## 516TX

- Sixteen RJ-45 10/100BaseTX Ports
- Supports UTP or STP Cabling
- Physical Dimensions (2.3" h x 7.6" w x 3.4" d, 1.75 lbs.)
- -40°C to 85°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 400 mA @ 24V
- Auto Negotiates Speed, Duplex, and MDIX
- Advanced Management Features (Optional)
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order Part # 516TX-A

**Ordering Key:** "-A" = -A for Adv. Mgmt. Features (includes N-View), or -N for N-View OPC Switch monitoring, leave blank for Unmanaged Switch option.



## 508FX2

- Six RJ-45 10/100BaseTX Ports
- Two 100BaseFX ST or SC Duplex Ports
- Physical Dimensions (2.3" h x 5.9" w x 3.8" d, 1.58 lbs.)
- -40°C to 85°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- RJ-45 Ports Auto Negotiate Speed, Duplex, and MDIX
- Advanced Management Features (Optional)
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order MM Part #508FX2-A-XX-S  
Order SM Part #508FXE2-A-XX-YY

## 509FX

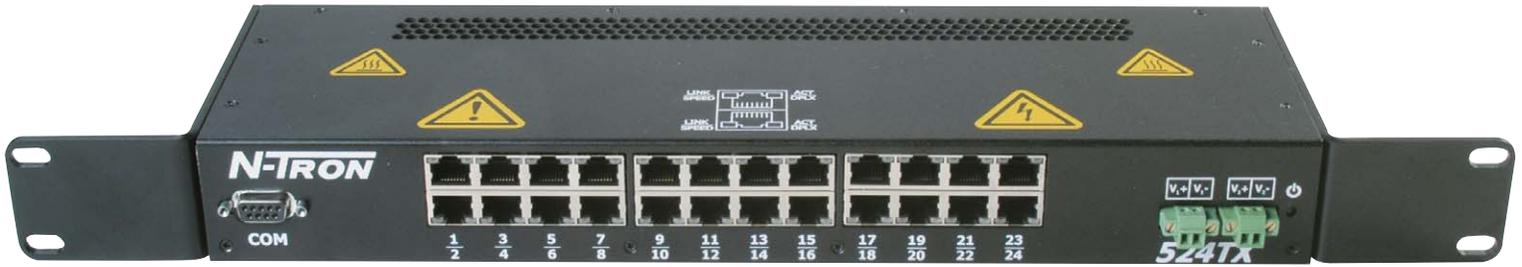
- Eight RJ-45 10/100BaseTX Ports
- One 100BaseFX ST or SC Duplex Port
- Physical Dimensions (2.3" h x 5.6" w x 3.4" d, 1.58 lbs.)
- -40°C to 85°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 200 mA @ 24V
- RJ-45 Ports Auto Negotiate Speed, Duplex, and MDIX
- Advanced Management Features (Optional)
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order MM Part #509FX-A-XX-S  
Order SM Part #509FXE-A-XX-YY

## 517FX

- Sixteen RJ-45 10/100BaseTX Ports
- One 100BaseFX ST or SC Duplex Port
- Physical Dimensions (2.3" h x 7.6" w x 3.4" d, 1.75 lbs.)
- -40°C to 85°C Operating Temperature
- Rugged Industrial DIN-Rail Enclosure
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 400 mA @ 24V
- RJ-45 Ports Auto Negotiate Speed, Duplex, and MDIX
- Advanced Management Features (Optional)
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order MM Part #517FX-A-XX-S  
Order SM Part #517FXE-A-XX-YY

**Ordering Key:** MM = multimode fiber, SM = singlemode fiber, "E" = singlemode fiber, "XX" = ST or SC for fiber style connector, "-S" = -S for -20°C to 70°C Operating Temp., leave blank for -40°C to 85°C Operating Temp., "YY" = 15, 40, or 80 for 15km, 40km, or 80km SM fiber length.

# Built to Withstand the Extremes of Industrial Environments.



N-TRON Industrial Ethernet products come standard with extended temperature ratings, extended shock, noise and vibration specifications, redundant power inputs, and a high MTBF. Our Products are made in the U.S.A.

## One Year Warranty

All N-TRON products come with a full 1 year warranty.

Call (251) 342-2164 for more details.

## 524TX

- Twenty-four RJ-45 10/100BaseTX Ports
- Supports UTP or STP Cabling
- Physical Dimensions (1.75" h x 19" w x 4.34" d, 3.7 lbs.)
- -40°C to 85°C Operating Temperature
- Rugged Industrial Rackmount Enclosure
- Up to 2.6 Gb/s Throughput
- Redundant Power Inputs 10-30 VDC, 800 mA @ 24V
- Auto Negotiates Speed, Duplex, and MDIX
- Advanced Management Features (Optional)
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order Part #524TX-A

## 526FX2

- Twenty-four RJ-45 10/100BaseTX Ports
- Two 100BaseFX ST or SC Duplex Ports
- Physical Dimensions (1.75" h x 19" w x 4.34" d, 3.7 lbs.)
- -40°C to 85°C Operating Temperature
- Rugged Industrial Rackmount Enclosure
- Up to 2.6 Gb/s Throughput
- Redundant Power Inputs 10-30 VDC, 1 A @ 24V
- RJ-45 Ports Auto Negotiate Speed, Duplex, and MDIX
- Advanced Management Features (Optional)
- N-View OPC Monitoring Option
- Hardened ESD Port Protection
- Order MM Part #524FX2-A-XX-S  
Order SM Part #524FXE2-A-XX-YY

**Ordering Key:** "-A" = -A for Adv. Mgmt. Features (includes N-View), or -N for N-View OPC Switch monitoring, leave blank for Unmanaged Switch option. MM = multimode fiber, SM = singlemode fiber, "E" = singlemode fiber, "XX" = ST or SC for fiber style connector, "-S" = -S for -20°C to 70°C Operating Temp., leave blank for -40°C to 85°C Operating Temp., "YY" = 15, 40, or 80 for 15km, 40km, or 80km SM fiber length.



# N-Ring Health Diagnostics Chart

N-Ring OK!!					
N-Ring Status View					
Switch is an N-Ring Manager.					
Switch No	MAC Address	IP Address	Subnet Mask	Name	Ports
RM	<a href="#">00:07:af:ff:f6:e0</a>	192.168.1.136	255.255.255.0	N-TRON Switch	A2 A1
1	<a href="#">00:07:af:ff:f6:40</a>	192.168.1.131	255.255.255.0	N-TRON Switch	A1 A2
2	<a href="#">00:07:af:ff:f6:60</a>	192.168.1.132	255.255.255.0	N-TRON Switch	A2 A1
3	<a href="#">00:07:af:ff:f6:80</a>	192.168.1.133	255.255.255.0	N-TRON Switch	A1 A2
4	<a href="#">00:07:af:ff:f6:a0</a>	192.168.1.134	255.255.255.0	N-TRON Switch	A2 A1
5	<a href="#">00:07:af:ff:f6:c0</a>	192.168.1.135	255.255.255.0	N-TRON Switch	A1 A2

*N-Ring™* is an exclusive feature of *N-TRON's 7000* and *9000* Series Ethernet Switches offering detailed diagnostics, expanded ring size capacity, and ~30ms ring healing time. When using *N-TRON's* fully managed switches in a ring topology, a detailed ring map will appear on the Ring Manager's web browser to identify the health status of the ring. The order of switches and ports is dynamically generated when using *N-TRON's* fully managed switches to create the ring. The chart to the left shows a healthy ring status view indicating that all of the switches in the ring are communicating and no breaks have been detected.

The map to the right shows an *N-Ring* fault status view indicating that a fault has been detected in the *N-TRON* fully managed network. This fault map shows a communication error has occurred between the A2 port of Switch 1 and the A2 port of Switch 2. In this case the Ring manager declared a fault and converted the ring to a fiber optic backbone within ~30ms, allowing communication of the ring to continue until the declared switches and cable segments can be evaluated and repaired in the field.

N-Ring Fault!!					
N-Ring Status View					
Switch is an N-Ring Manager.					
Switch No	MAC Address	IP Address	Subnet Mask	Name	Ports
RM	<a href="#">00:07:af:ff:f6:e0</a>	192.168.1.136	255.255.255.0	N-TRON Switch	A2 A1
1	<a href="#">00:07:af:ff:f6:40</a>	192.168.1.131	255.255.255.0	N-TRON Switch	A1 A2
2	<a href="#">00:07:af:ff:f6:60</a>	192.168.1.132	255.255.255.0	N-TRON Switch	A2 A1
3	<a href="#">00:07:af:ff:f6:80</a>	192.168.1.133	255.255.255.0	N-TRON Switch	A1 A2
4	<a href="#">00:07:af:ff:f6:a0</a>	192.168.1.134	255.255.255.0	N-TRON Switch	A2 A1
5	<a href="#">00:07:af:ff:f6:c0</a>	192.168.1.135	255.255.255.0	N-TRON Switch	A1 A2

# Gigabit Capable, Fully Managed Industrial Ethernet Switches

Ideal for use as either a fully managed fiber optic Ring Manager, or Ring Member, the *N-TRON* 7000 Series, gigabit capable, industrial Ethernet switches carry *N-TRON's* exclusive *N-Ring™* technology with detailed fault diagnostics, expanded ring size capacity, and ~30ms ring healing. When using all *N-TRON* fully managed switches in a ring, a detailed ring map and fault location chart will be provided on the Ring Manager's web browser and OPC Server to identify the health status of the ring. Up to 250 fully managed, or 50 unmanaged monitored *N-TRON* switches can participate in the *N-Ring* topology. In addition to *N-Ring*, the 7000 Series offers fully managed features such as IGMP Snooping, VLAN, QoS, Port Mirroring, Port Trunking, and 802.1D-2004 fast RSTP. *N-TRON's* N-View OPC Server Software also comes standard on all 7000 Series Switches. N-View can be combined with popular HMI software packages to add network traffic monitoring, trending, and alarming to any application using *N-TRON* switches. For added speed and flexibility, our 7000 Series provides two optional pluggable SFP Gigabit LC style transceivers that can be installed in our factory at the time of purchase, or upgraded later in the field.



Products Shown with Optional Gigabit SFP Transceivers installed

## 7014TX

- Twelve 10/100BaseTX RJ-45 Copper Ports
- Two Optional 1000BaseSX/LX SFP Gigabit Transceivers with LC Style Connectors
- Rugged Industrial DIN-Rail Enclosure
- Physical Dimensions (2.5" h x 7.40" w x 4.10" d, 2.10 lbs.)
- -20°C to 70°C Operating Temperature
- Fiber Optic Ring Manager using *N-TRON's* *N-Ring* Technology offers a Standard Healing Time of ~30ms
- Up to 250 Fully Managed or 50 Unmanaged Monitored *N-TRON* Switches can Participate in *N-Ring* Topology
- Web Browser Management with Detailed Ring Map and Fault Location Charting
- N-View OPC Monitoring with Fault Status for Ring Managers
- Advanced Features: IGMP Snooping, VLAN, QoS, Trunking, Mirroring, 802.1D-2004 RSTP, DHCP, SNMP, and *N-Ring*
- Redundant Power Inputs 10-30 VDC, 1A @ 24V
- Order Part #7014TX
- Order MM Gigabit SFP Transceiver Part #NTSFP-SX  
Order SM Gigabit SFP Transceiver Part #NTSFP-LX-ZZ

## 7014FX2

- Ten 10/100BaseTX RJ-45 Copper Ports
- Two 100BaseFX Fiber Optic Ports
- Two Optional 1000BaseSX/LX SFP Gigabit Transceivers with LC Style Connectors
- Physical Dimensions (2.5" h x 7.40" w x 4.10" d, 2.10 lbs.)
- -20°C to 70°C Operating Temperature
- Fiber Optic Ring Manager using *N-TRON's* *N-Ring* Technology offers a Standard Healing Time of ~30ms
- Up to 250 Fully Managed or 50 Unmanaged Monitored *N-TRON* Switches can Participate in *N-Ring* Topology
- Web Browser Management with Detailed Ring Map and Fault Location Charting
- N-View OPC Monitoring with Fault Status for Ring Managers
- Advanced Features: IGMP Snooping, VLAN, QoS, Trunking, Mirroring, 802.1D-2004 RSTP, DHCP, SNMP, and *N-Ring*
- Redundant Power Inputs 10-30 VDC, 1A @ 24V
- Order MM Part #7014FX2-XX  
Order SM Part #7014FXE2-XX-YY
- Order MM Gigabit SFP Transceiver Part #NTSFP-SX  
Order SM Gigabit SFP Transceiver Part #NTSFP-LX-ZZ

# Fully Managed GbE Modular Switch, with RSTP and N-Ring Capability.

The fully managed *N-TRON* 9000 Series Gigabit Ethernet capable industrial Ethernet switch offers superior performance and ease of use for Ethernet enabled industrial and security equipment.

With management features like IGMP Snooping, VLAN, QoS, Port Mirroring, Port Trunking, and, 802.1w Rapid Spanning Tree Protocol (RSTP), the 9000 Series is designed to increase efficiency in the network performance. All management features can be configured using a Web Browser, Telnet, or COM port.

The 9000 Series is an industrial four slot modular switch, offering two optional Gigabit ports, up to sixteen fiber optic ports, and up to twenty-four RJ-45 copper ports.

The Rapid Spanning Tree Protocol function allows the switch to be configured in a Ring or Mesh topology, and provides support for redundant path communications with rapid healing.

Used as a fiber optic Ring Manager, the 9000 Series switch, with *N-TRON's* *N-Ring* technology, offers expanded ring size capacity, detailed fault diagnostics, and a standard healing time of ~30ms.

For managing, detecting and restoring ring breaks, the *N-TRON N-Ring* Manager sends out "Self Health" packets and "Ring Control" packets periodically around the fiber optic ring. If these packets are successfully routed around the ring within the allocated time window, the ring is intact. However, if the ring is broken and the Ring Manager stops receiving these health check packets, it times out and converts the ring to a fiber optic backbone within ~30ms. As a additional diagnostic tool, when using all *N-TRON* fully managed switches in the ring, a detailed ring map and fault location chart will also be provided on the Ring Manager's web browser to identify the health status of the ring.

## *N-TRON's* 9000 Series switches meet the following regulatory approvals:

- **UL 1604 C Listed (U.S. & Canada): Class I, Div. 2 HazLoc**
- **TUV Certified (CE Mark) EN6100-6-2,4, EN55011, EN6100-4-2,3,4,5,6**
- **ABS Type Approval (Shipboard)**
- **IEEE 1613 Compliance (Electric Utility Substation)**
- **FCC Part 15 Class A**
- **NEMA TS1/TS2 Compliance (Traffic Control)**



## 9000BP

- 9000BP High Speed Backplane with Four Slot DIN-Rail Modular Switch Chassis
- 9000CPU\* Module
- 9002CPU\* Module (Same as 9000CPU, but with Two Optional 1000BaseSX/LX Gigabit Ports, LC Style)
- Fully Managed Features: IGMP Snooping, VLAN, QoS, Trunking, Port Mirroring and 802.1w Rapid Spanning Tree (RSTP)
- Full SNMP, Web Browsing, and N-View Switch Monitoring
- 9000 Series can be configured as *N-TRON's* *N-Ring* Manager to Create a Fiber Optic Ring with ~30ms Standard Healing
- Physical Dimensions (5.10" h x 8.98" w x 5.5" d, 5 lbs. fully populated)
- -20°C to 70°C Operating Temperature  
-40°C to 85°C Storage Temperature
- >1 Million Hours MTBF
- Redundant Power Inputs: 10-30 VDC, 1.1 A @ 24V with 9000BP & 9002CPU *N-TRON* NTPS-24-5 Power Supply recommended
- Order Backplane & Chassis Part #9000BP  
\*Either 9000CPU or 9002CPU is required to be installed in CPU slot of 9000BP
- Order CPU Part #9000CPU (for no Gigabit)  
Order Gigabit CPU Part #9002CPU-SX (for MM), or #9002CPU-LX-ZZ (for SM)

**Ordering Key:** MM = multimode fiber, SM = singlemode fiber,  
Where "ZZ" = 10, 40, 70, for 10km, 40km, or 70km SM Gigabit fiber length.



## 9006TX

- Six Port 10/100BaseTX Copper Module
- Slide in module for 9000BP Backplane & Four Slot Chassis
- Auto Sensing Full/Half Duplex, Speed, and MDIX
- Full IEEE 802.3 and 1613 Compliance
- Full Wire Speed Communications
- Hardened ESD Port Protection
- Physical Dimensions (5.10" h x 1.65" w x 5.25" d, .41 lbs.)
- -20°C to 70°C Operating Temperature
- -40°C to 85°C Storage Temperature
- Redundant Power Inputs 10-30 VDC, 0.35A @ 24V
- >1 Million Hours MTBF
- Order Part #9006TX

## 9002FX

- Two Port 100BaseFX Module ST or SC Duplex
- Slide in module for 9000BP Backplane & Four Slot Chassis
- Multimode or Singlemode Fiber Available
- Full IEEE 802.3 and 1613 Compliance
- Full Wire Speed Communications
- Hardened ESD Port Protection
- Physical Dimensions (5.10" h x 1.65" w x 5.25" d, .43 lbs.)
- -20°C to 70°C Operating Temperature
- -40°C to 85°C Storage Temperature
- Redundant Power Inputs 10-30 VDC, 0.15A @ 24V
- >1 Million Hours MTBF
- Order MM Part #9002FX-XX  
Order SM Part #9002FXE-XX-YY

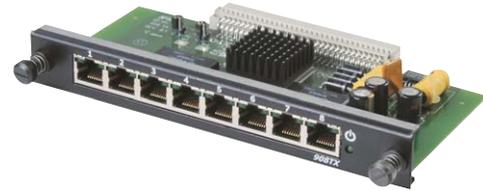
## 9004FX

- Four Port 100BaseFX Module ST or SC Duplex
- Slide in module for 9000BP Backplane & Four Slot Chassis
- Multimode or Singlemode Fiber Available
- Full IEEE 802.3 and 1613 Compliance
- Full Wire Speed Communications
- Hardened ESD Port Protection
- Physical Dimensions (5.10" h x 1.65" w x 5.25" d, .53 lbs.)
- -20°C to 70°C Operating Temperature
- -40°C to 85°C Storage Temperature
- Redundant Power Inputs 10-30 VDC, 0.25A @ 24V
- >1 Million Hours MTBF
- Order MM Part #9004FX-XX  
Order SM Part #9004FXE-XX-YY

**Ordering Key:** MM = multimode fiber, SM = singlemode fiber, "E" = singlemode fiber, "XX" = ST or SC for fiber style connector, "YY" = 15, 40, or 80 for 15km, 40km, or 80km SM fiber length.

# Mix & Match Copper and Fiber Modular Switches to fit your needs.

Perfect for connecting Ethernet enabled industrial equipment, such as PLC's, industrial PC's, Ethernet I/O and data acquisition equipment, the 900 Series Modular Industrial Ethernet Switches offer outstanding performance, ease of use, and flexible expansion options. Three module slots are available for the installation of the *N-TRON* 900 Series expansion modules, providing maximum flexibility. Mix and match fiber ports with twisted pair ports. Up to twenty-four twisted pair 10/100BaseTX or twelve 100BaseFX fiber ports can be installed with multiple combinations available. All 900 series switches are UL Listed and TUV Certified and can be used in Class I, Division 2 Hazardous locations. The 900B Chassis draws less than 1.5 Amps of input current at 24 volts, when fully populated.



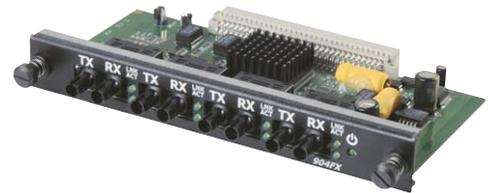
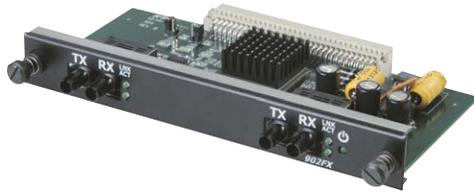
## 900B

- 3 Slot Chassis for optional expansion modules
- Rugged Industrial DIN-Rail Enclosure
- Physical Dimensions (3.2" h x 7.1" w x 4.1" d, 3.0 lbs.)
- Plug & Play Unmanaged Operation
- -20°C to 70°C Operating Temperature
- Hardened 16 Gauge Steel Construction
- UL Listed Class I, Div 2 Hazardous Location Certified
- Up to 2.6 Gb/s Aggregate Bandwidth
- Redundant Power Inputs 10-30 VDC, 200 mA @ 24V
- N-View OPC Monitoring Option
- > 2M Hours MTBF
- Order Chassis Part #900B-N  
Order Filler Panel Part #900B-FP

## 908TX

- Slide in Module for 900 Series Chassis
- Eight RJ-45 10/100BaseTX Ports
- Physical Dimensions (1" h x 7" w x 4" d, 1.0 lbs.)
- Plug & Play Unmanaged Operation
- -20°C to 70°C Operating Temperature
- Auto Negotiates Speed, Duplex, and MDIX
- 4,000 MAC Addresses Per Module
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 250 mA @ 24V
- Supports UTP or STP Cabling
- > 2M Hours MTBF
- Order Part #908TX

**Ordering Key:** -N for N-View OPC Switch monitoring, leave blank for no monitoring options.



## 902FX

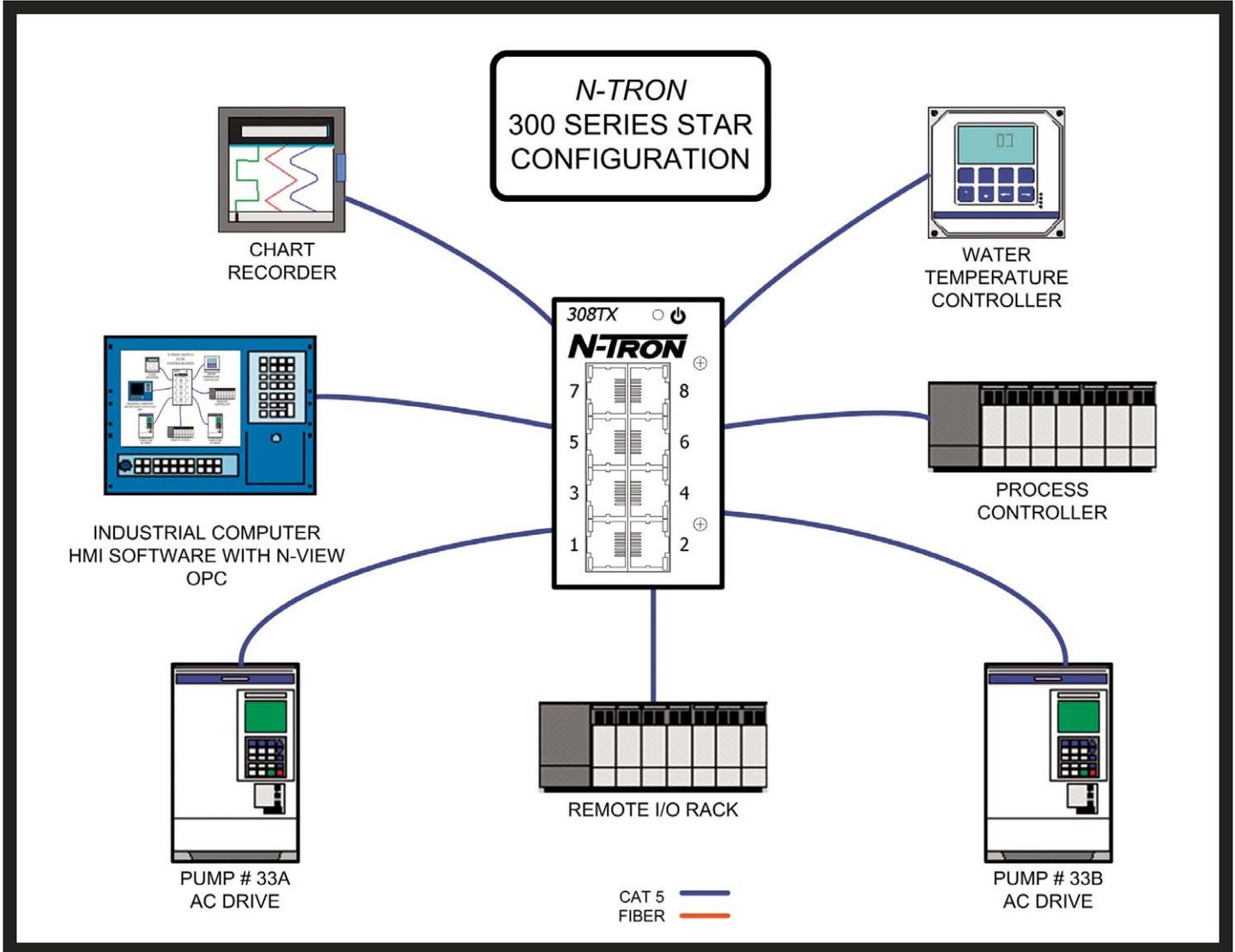
- Slide in Module for 900 Series Chassis
- Two 100BaseFX ST or SC Duplex Ports
- Physical Dimensions (1" h x 7" w x 4" d, 1.0 lbs.)
- Plug & Play Unmanaged Operation
- -20°C to 70°C Operating Temperature
- 100BaseFX Full Duplex Operation
- 4,000 MAC Addresses Per Module
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 400 mA @ 24V
- 15, 40, or 80km Fiber Length Available
- > 2M Hours MTBF
- Order MM Part #902FX-XX  
Order SM Part #902FXE-XX-YY

## 904FX

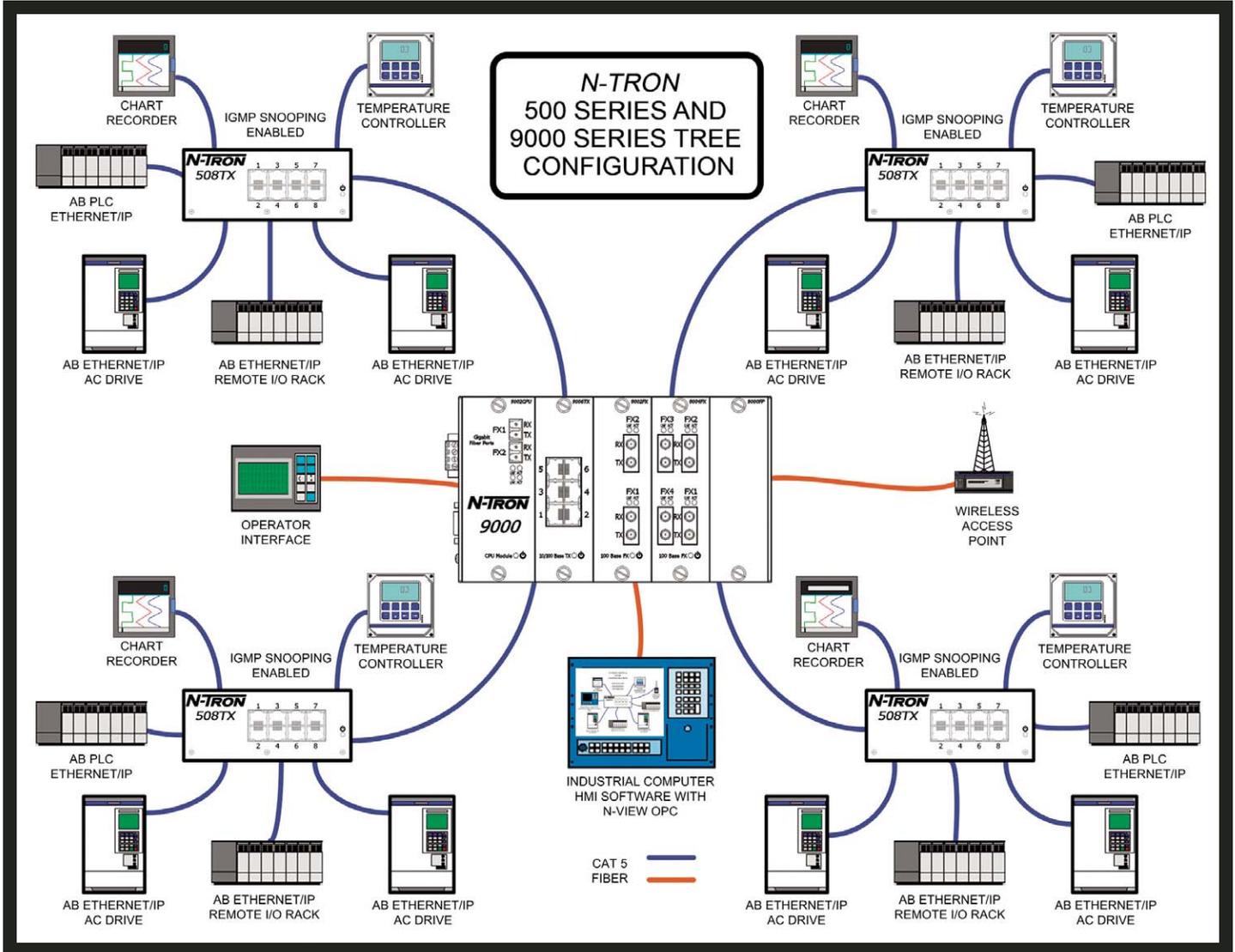
- Slide in Module for 900 Series Chassis
- Four 100BaseFX ST or SC Duplex Ports
- Physical Dimensions (1" h x 7" w x 4" d, 1.0 lbs.)
- Plug & Play Unmanaged Operation
- -20°C to 70°C Operating Temperature
- 100BaseFX Full Duplex Operation
- 4,000 MAC Addresses Per Module
- Full Wire Speed Communications
- Redundant Power Inputs 10-30 VDC, 400 mA @ 24V
- 15, 40, or 80km Fiber Length Available
- > 2M Hours MTBF
- Order MM Part #904FX-XX  
Order SM Part #904FXE-XX-YY

**Ordering Key:** MM = multimode fiber, SM = singlemode fiber, "E" = singlemode fiber, "XX" = ST or SC for fiber style connector, "YY" = 15, 40, or 80 for 15km, 40km, or 80km SM fiber length.

# Star

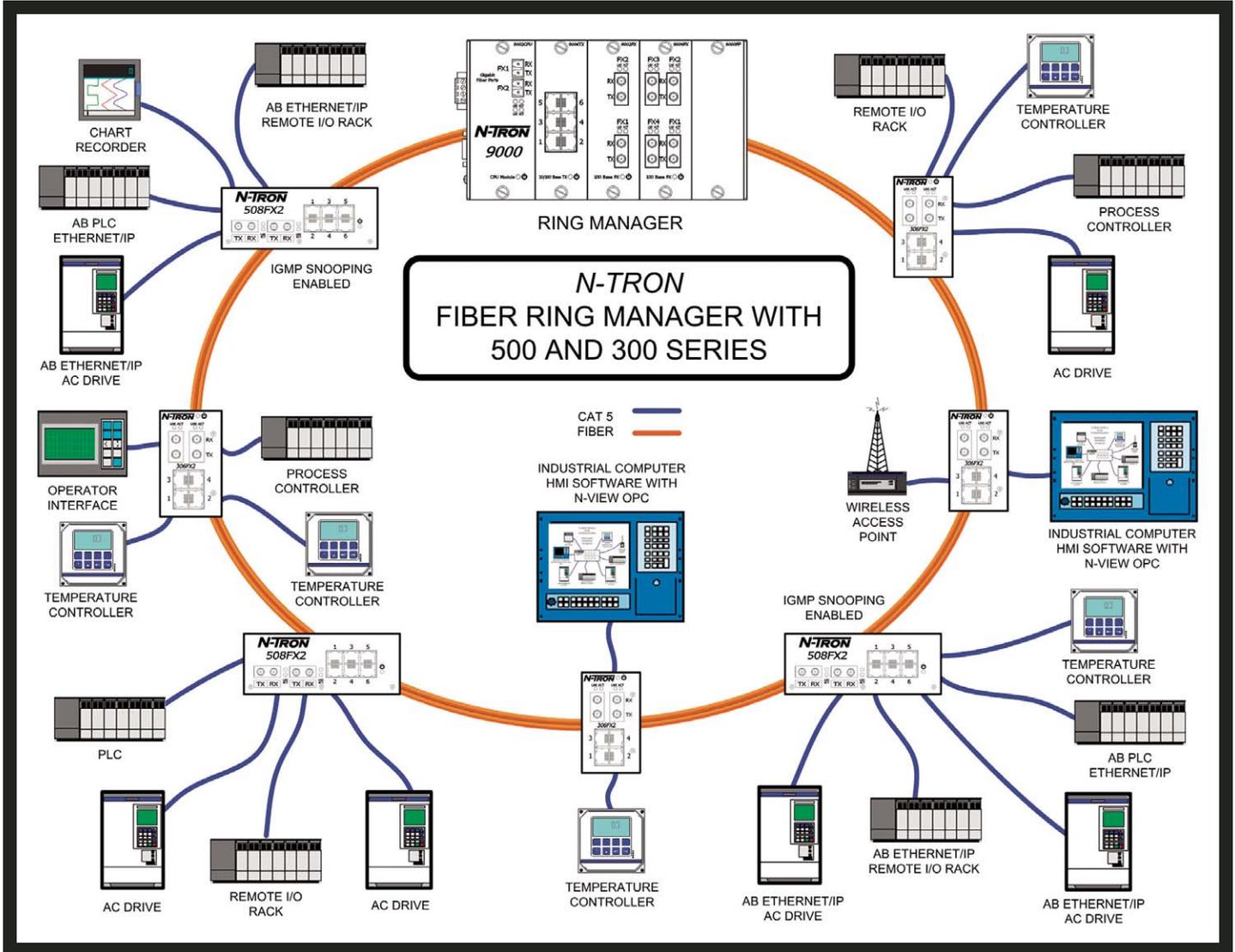


The star is the most efficient network topology for data acquisition and control systems. Because the MTBF of an *N-TRON* industrial switch is in excess of 2M hours, the likelihood of a switch failure, or media failure is remote. All *N-TRON* switches offer dual power supply inputs to eliminate the possibility of a single power supply failure bringing the network down. The star topology also allows for the utilization of lower cost layer 2 switches and an order of magnitude speed improvement over ring topology. The star topology can easily be implemented with fiber and/or copper. This network is simple to maintain and troubleshoot. The N-View option will add remote monitoring capability to your control system network. The N-View OPC Server, when combined with any standard OPC client HMI software package, will provide full network monitoring and alarming capability. N-View is available on our 200, 300, 400, 500, 900, 7000, and 9000 Series switches.



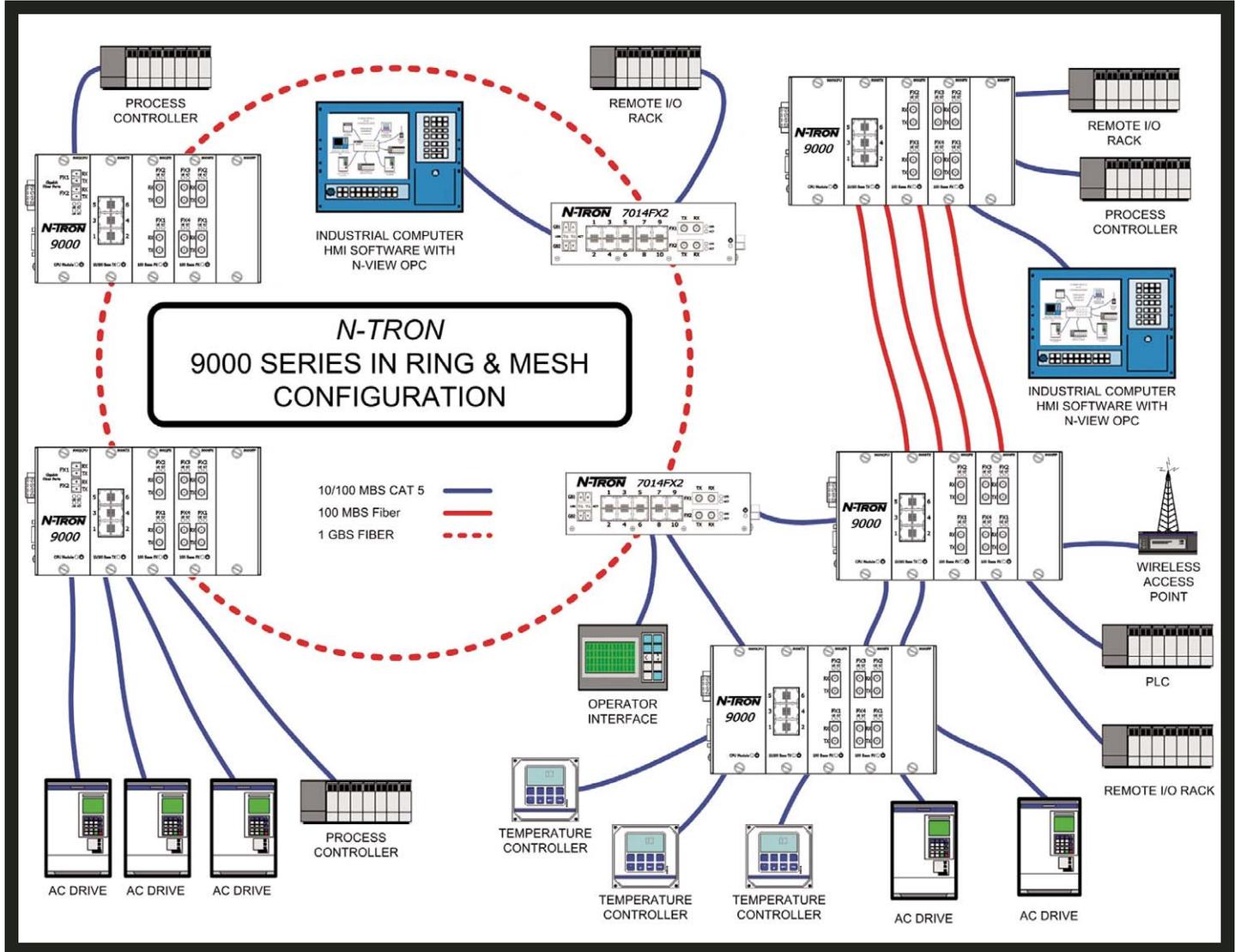
The tree topology is a combination of several switches to form a single network. This topology provides the most efficient method of interconnecting multiple control systems. This diagram highlights the Internet Group Management Protocol (IGMP). IGMP is frequently used by control systems to route multicast packets for communication between control devices. The routing of the IGMP multicast packets is essential to prevent multicast traffic from adversely affecting upstream network devices such as routers, wireless access points, RS232/485 to Ethernet converters, or any other network device which can not transmit or process packets at full wire speed. This feature allows the IGMP capable switches to forward multicast packets based on learned group addresses. Each switch will transmit copies of a specific multicast message only to ports that have joined that multicast group. These addresses are learned by detecting group join packets sent by devices connected to the switch without the need of an expensive router.

# Dual Redundant Fiber Ring



The performance of a dual redundant fiber ring network can be greatly enhanced by implementing various *N-TRON* products to create a fast healing ring using *N-TRON*'s *N-Ring™* technology. As shown above, the 9000 Series switch serves as the Ring Manager. When configured as the *N-Ring* Manager, it sends out "Self Health" and "Ring Control" packets periodically around the fiber ring. If these packets are successfully routed around the ring within the allocated time window, the ring is declared to be intact. However, if the ring is broken and the Ring Manager stops receiving these health check packets, it times out and converts the ring to a fiber optic backbone within ~30ms. When using all *N-TRON* fully managed switches in the ring, a detailed ring map and fault location chart will also be provided on the Ring Manager's web browser to identify the health status of the ring. *N-TRON*'s 7000 Series switches can also be used in this same topology as the fiber optic Ring Manager.

# Ring and Mesh



Ring and Mesh Topology is required for many applications. *N-TRON's* 7000 and 9000 Series switches combine all the advanced functions found on the 500 Series Switches with capabilities found on standard commercial switches. These functions include two Gigabit fiber ports, Simple Network Management Protocol (SNMP), Remote Monitoring (RMON), and WEB Browser Control. The 7000 and 9000 Series Switches will also run Rapid Spanning Tree Protocol (RSTP), IEEE 802.1D-2004 or 802.1w. Standard layer two switches connected in a loop will cause the network to be overloaded and fail due to endlessly circulating broadcast and multicast packets in the loop (known as broadcast storm). RSTP is used to allow switches to be connected in multiple loops known as Mesh Topology. Switches using Spanning Tree will calculate the optimum path through the "Mesh" to all other nodes in the network and will block all other paths to prevent message packets from circulating. RSTP uses Bridge Protocol Data Unit Packets (BPDU) to detect and calculate optimum paths in the network. If any active connection fails, Spanning Tree will recalculate a new optimum route through the network for all nodes using the BPDU packets. The time required to reform the network is about 1-2 seconds using RSTP.

# N-View OPC Server Software

**N-ViewOPC**

Selected Network Card (Adapter)  
Intel® Pro/100 VE Network Connection

Save & Close    Close, Don't Save

**Current Switches**

Each switch that is not shown in the right side list must be mapped to a switch model in the box below

516TX    Map

To Change the switch alias select the switch in the right side list type in the new alias name in the box below and press '>>'.  
 STA # 023    >>

To delete a switch highlight it and press '<<'.    <<

Switch	Alias Name
00.07.AF.00.06.09	MCC # 001
00.07.AF.00.06.10	MCC # 002
00.07.AF.00.06.11	MCC # 003
00.07.AF.00.06.12	MCC # 004
00.07.AF.00.06.13	BLG # 001
00.07.AF.00.06.14	BLG # 004
00.07.AF.00.06.15	BLG # 037
00.07.AF.00.06.0A	STA # 023

Switch Details    Data Format  
 String  
 Integer

The *N-TRON* N-View™ OLE for Process Control (OPC) Server Software will work with industry standard OPC Client software and most popular Human Machine Interface (HMI) packages to provide complete remote network traffic and status monitoring for *N-TRON* 200, 300, 400, 500, and 900 Series Industrial Switches with the N-View Firmware option. N-View is also available as a standard feature on all 7000, and 9000 Series Switches.

The N-View OPC Server in combination with one or more of our industrial switches will add complete network visibility to an HMI Control and Monitoring application.

**Ports**

Adapter: Intel® Pro/100 VE Network Connection    Close

Switch: STA # 023

Ports:

- PLC # 001
- DRV # 001
- DRV # 002
- DRV # 003
- DRV # 004
- DRV # 005
- DRV # 006
- HMI # 001
- HMI # 002
- PLC # 002
- PORT 11
- PORT 12
- PORT 13
- PORT 14
- PORT 15
- PORT 16

Hide Port

To Change the switch alias select the switch in the right side list type in the new alias name in the box below and press '>>' Button.  
 DRV # 007    >>

Select the port then check the box. Hidden port will not be visible in the item list of the N-Tron OPC Server.

View Switch    View Ports

## N-View Switch Firmware

*N-TRON* Switches with the N-View firmware upgrade (part numbers with -A or -N extensions) will autocast a small Ethernet packet periodically containing a port-by-port status of the switch. This information includes 5 switch level data points and 41 data points per port. This data is captured by the N-View OPC Server Software and can be displayed by application software running in the same Windows environment with OPC Client capability.

## Ease of Use

The *N-TRON* N-View Software includes the OPC Server and a configuration and monitoring software utility. This utility will automatically search the network for all N-View enabled switches using the unique IEEE MAC addresses to identify each switch. The switch MAC address can be selected and assigned an 80 character alias name. Meaningful alias names can also be added to all ports using the configuration software. The switch and port alias names can be saved and used by the N-View OPC Server as part of the switch variable names. The alias names can be used to help identify the location of the switch and the areas or equipment connected to the ports.

Switch: STA # 023

Ports:	Links:	Speed:	Duplex:
PLC # 001	UP	100	FULL
DRV # 001	DOWN	NA	NA
DRV # 002	UP	100	FULL
DRV # 003	UP	100	FULL
DRV # 004	UP	100	FULL
DRV # 005	UP	100	FULL
DRV # 006	DOWN	NA	NA
HMI # 001	UP	10	HALF
HMI # 002	UP	10	HALF
PLC # 002	UP	100	FULL
I/O # 001	UP	100	FULL
I/O # 002	DOWN	NA	NA
DRV # 007	UP	100	FULL
DRV # 008	UP	100	FULL
I/O #003	UP	100	FULL
CAM # 003	UP	10	HALF

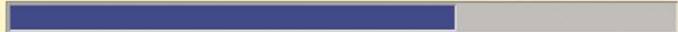
## N-View OPC Data Variables

N-View OPC Server data variables can be accessed by the N-View monitoring utility, or by most popular HMI or other application software packages with OPC client capability. These variables can be divided into three general categories. **Status variables** indicate the operating condition of the switch or port. **Traffic variables** count the number of OCTETS (BYTES) of a specific type of ethernet packet that have passed through a port since the start of the switch. **Error variables** count the number of packet errors seen at each port since the start of the switch. HMI software packages can convert these variables to the data type required for display, alarming, and trending during the data scan update process.

Switch: STA # 023

Port: DRV # 007  
Speed: 100  
Duplex: Full

Link: Up  
Enable: Yes

Usage: 0  100%

68.95%

Tx Octets	4052024	Rx Octets	39844501556
Tx Dropped Packets	0	Rx Dropped Packets	0
Tx Broadcast Packets	568	Rx Broadcast Packets	0
Tx Multicast Packets	14346	Rx Multicast Packets	9
Tx Unicast Packets	2992	Rx Unicast Packets	17890849
Tx Collisions	0	Rx Undersize Packets	0
Tx Single Collision	0	Rx Oversize Packets	0
Tx Mutiple Collision	0	Rx Jabbers	0
Tx Deferred	0	Rx Alignment Errors	0
Tx Late Collision	0	Rx Good Octets	3984501780
Tx Excessive	0	Rx SA Changes	0
Tx Frame In Disc	0	Rx FCS Errors	0
Tx Pause Packets	0	Rx Pause Packets	0
64 Packets	264937	Rx Fragments	0
65 to 127 Packets	2545888	RX Excessive Disc Size	101606610
128 to 255 Packets	10160661	Rx Symbol Errors	0
256 to 511 Packets	1442929	1024 to 1522 Packets	0
512 to 1023 Packets	3740131		

Select the port from the list below:

- PLC # 001
- DRV # 001
- DRV # 002
- DRV # 003
- DRV # 004
- DRV # 005
- DRV # 006
- HMI # 001
- HMI # 002
- PLC # 002
- I/O # 001
- I/O # 002
- DRV # 007**
- DRV # 008
- I/O #003
- CAM # 003

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