GarrettCom
A BELDEN BRAND

2018 Edition

# Highly Configurable Network Solutions for Full Flexibility in Harsh Industrial Sites

Cost-efficient network devices providing factory customization, simplified installation and maximized throughput for transformation to IIoT readiness.

Be certain.
Belden.

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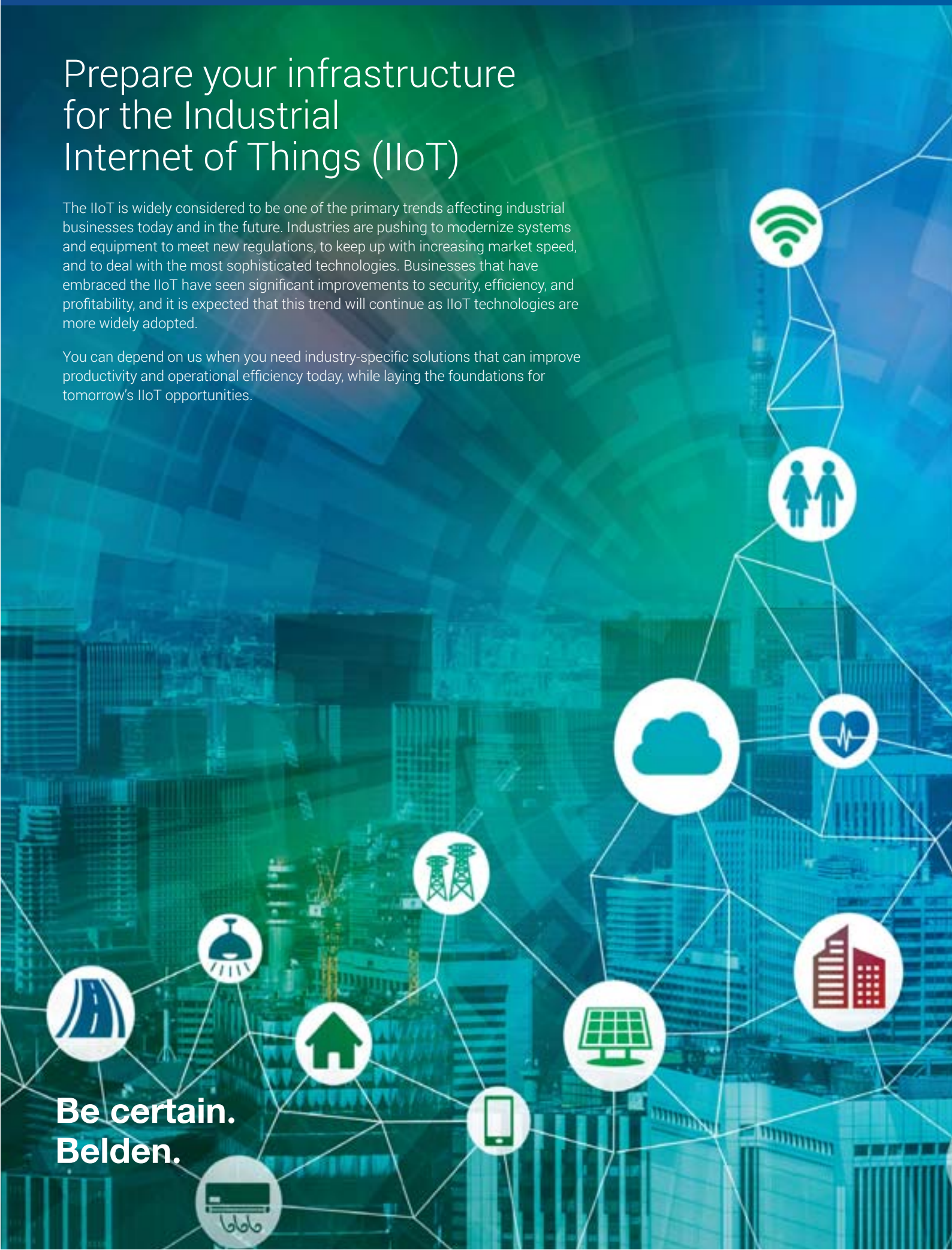
# Prepare your infrastructure for the Industrial Internet of Things (IIoT)

The IIoT is widely considered to be one of the primary trends affecting industrial businesses today and in the future. Industries are pushing to modernize systems and equipment to meet new regulations, to keep up with increasing market speed, and to deal with the most sophisticated technologies. Businesses that have embraced the IIoT have seen significant improvements to security, efficiency, and profitability, and it is expected that this trend will continue as IIoT technologies are more widely adopted.

You can depend on us when you need industry-specific solutions that can improve productivity and operational efficiency today, while laying the foundations for tomorrow's IIoT opportunities.



**Be certain.**
**Belden.**

# GarrettCom provides solutions for...

## Traffic Control/Transportation

Driving Performance Upward with Ethernet

## Power Utilities

Delivering Secure Substation Networking

## Physical Security & Surveillance

Securing Facilities with IP Technology

*More Connectivity and More Solutions for Industrial Networks in Harsh Environments and Large-scale Infrastructures*

## Belden Industrial Solutions

Belden has brought together a comprehensive line of industrial cabling, connectivity and networking devices, offering the most reliable communications solutions for your application. Whether you are networking your devices to the controllers, connecting the controllers to the control room, relaying data between the control room, the engineering department, and remote manufacturing sites – or all of the above – Belden has the products you need to seamlessly connect your communications.

From the petrochemical, automotive, pharmaceutical, power generation, pulp and paper, metals, food and beverage, or general manufacturing plant to the corporate headquarters – and everywhere in between – Belden has your signal transmission solution.

Belden offers the most dependable network and communications system performance in tough and mission-critical environments.

## Our Synergy Ensures Continuous Performance

With the GarrettCom, Hirschmann, Tofino Security and Tripwire product lines joining together our industrial solutions are uniquely positioned to provide the best network, communications, and security infrastructure possible. Belden products and systems expertise mean that you can maintain ongoing operations without interruption and costly downtime – in any environment.

Here are a few more good reasons why Belden is your best choice for industrial networking, communications and control:

- We have the expertise to integrate your industrial and commercial networks.
- Our products are engineered to perform in the harshest and most demanding environments.
- We offer the broadest selection of products, for a complete, end-to-end Ethernet solution.
- Our sales and engineering professionals can audit, recommend/design, configure and assemble the products and systems to your specific requirements.
- Our global manufacturing, distribution and support network makes our products and services available to you globally.

## Offering Comprehensive Service & Support

Belden recognizes that comprehensive expertise is necessary to ensure an optimized, homogenous solution. We also know that consultation, support and training requires more than just a general understanding of the products, technologies and market trends.

It requires a solid understanding of the application and the ability to provide the type of support that is needed – when and where it is needed. It requires the four key service and support areas that are critical to success:

- Network Design Consulting
- Training
- Technical Support
- System Performance

### Network Design Consulting

Belden eliminates your design challenges because we understand the issues surrounding the design and operation of networks in industrial and mission-critical environments.

Our engineers are available to work with you to deliver high-availability networks that meet your enterprise-wide IT needs. Whether it's designing systems for Greenfield facilities or integrating into existing IT environments, our highly-trained staff lifts the design burden from your shoulders to ours.

We will consult with you to develop a strategy – or we will develop and implement your full design – either way our staff is available to you.

### Training

Backed by years of meeting and exceeding the needs of a broad range of end-user applications, Belden is ideally suited to offer beginners and networking experts alike the opportunity to expand their understanding of mission-critical networks.

Belden has developed a series of training programs that are given by Belden-certified individuals – all experts in industrial networking and cabling.

### Technical Support

At Belden, our personnel are poised to assist our customers – ensuring maximum uptime and reliability. And with offices in North America, Asia and Europe, Belden can respond globally.

### System Performance

If Belden designs it, we guarantee performance – period. We are committed to ensuring world-class signal connectivity and to significantly improve your operational uptime.

All Belden components are "designed" to deliver optimum performance: from cable to connectors to switches and routers. Based on this comprehensive product portfolio, we have the necessary industrial solutions DNA to deliver reliability.

For more information on our service and support offering, including our warranties, please go to the Belden web site at www.belden.com to locate a Belden sales representative near you.

# GarrettCom

GarrettCom, Inc., based in Fremont, California, is a leading provider of industrial networking products for specialty and stressed applications.

GarrettCom specializes in mission-critical, customizable and durable products for extreme conditions. Solutions include premium industrial, transportation, surveillance and substation-hardened networking products such as managed or unmanaged switches, multi-protocol routers, Ethernet and serial media converters, terminal servers, cellular wireless and serial communications.

GarrettCom also offers software capabilities in the areas of cyber security, physical security and fault-tolerance for high-availability industrial networking solutions. The company has diversified sales channels with a premier customer base, including 75 percent of the top 100 power utilities in North America and top tier industrial system integrators worldwide.

## Environmental

Optimal performance in extreme environmental conditions through use of premium electronic components and effective thermal management

- Choice of Ingress Protection ratings
- Industry specific test compliances
- Fan-cooled or convection cooled
- Conformal coating options
- Extended temperature ratings for outdoors

## Highly Configurable

Large set of configuration options to meet various application needs and criteria

- Copper and fiber ports, all types
- Media speeds at 10, 100 & 1000Mb
- Eight fiber port connector types
- 8 power inputs - AC/DC, 12V to 250V
- Small, medium and large chassis sizes
- Mechanical mounting variations

## Reliability

Superior performance and high MTBF even while operating at extreme temperatures

- Designed with industrial grade components
- Hardened with all metal enclosures
- Many software redundancy features to ensure network availability

## Cyber Security

Broad router portfolio with best-in-class security and routing capabilities

- Advanced Layer 2 and Layer 3 stateful firewall
- IPSec VPN security
- Layer 2 switching and Layer 3 routing capabilities
- All around protection in accordance to latest IEC 62443, IEC 61850, NERC CIP and NIST standards

## Wide Variety of Communication Interfaces

Support for a wide variety of communication interfaces in WAN networks bridging between legacy and future IP networks

- T1/E1/DDS leased line interfaces
- Serial DB9 and RJ45 type of ports with DTE and DCE modem capabilities
- 3G/4G Cellular interfaces

## Integration with Industrial HiVision

GarrettCom managed switches and routers can be discovered, monitored and visualized using the Industrial HiVision network management software. It allows the user to configure multiple switches from both GarrettCom and Hirschmann at the same time, significantly simplifying commissioning.

## Integration with Tripwire

Tripwire can discover, monitor, apply industrial cybersecurity best practices and provide a dashboard on Belden devices such as for:

- GarrettCom
- Hirschmann
- Tofino Security

Tripwire is vendor-agnostic and can also discover and support a growing list of industrial networking devices.

## Solution Integration with Hirschmann

- Advanced software command and control-based architecture provides our devices the ability to meet some of the most complex network requirements and features relatively quickly and efficiently.
- Owing to the advanced firewall capabilities and VPN throughput, GarrettCom RX family of routers is complimentary to the Hirschmann portfolio of EAGLE Firewalls as a 19-inch rack mountable multi-gigabit firewall alternative.
- DX940 and DX940e (currently in design phase) are attractive cellular capable router devices that along with Hirschmann GECKO Secure Remote Access provide remote connectivity to customers' networks.
- GarrettCom routers support several IP Tunneling capabilities that are now becoming standard in utility and substation deployments for secure transfer of IEC61850 messages over the public network.
- All GarrettCom routers have support for T1/E1/DDS WAN and legacy serial interfaces to target all substation applications (new or upgrade) with legacy WAN requirements.

# Technologies

## Technology Topics to Industrial Networking

Hirschmann is one of the most highly experienced manufacturers of industrial network solutions based on Industrial Ethernet. As an expert in system components, accessories and unified management software with a global presence, we make available our comprehensive expertise to our clients.

### Parallel Redundancy Protocol (PRP)

The International Standard IEC 62439-3 describes the Parallel Redundancy Protocol (PRP). PRP uses 2 separate LANs for uninterrupted availability. On the path from the sender to the receiver, PRP sends 2 data packets in parallel via the 2 mutually independent LANs with arbitrary ring, mesh, star, and bus topologies. The receiver processes the first data packet received and discards the second data packet of the pair.

### Device Level Ring (DLR)

The Device Level Ring was introduced by the ODVA in 2009 providing high available networks in a ring topology. With a maximum of 50 nodes it is possible to achieve a worst case recovery time of 3 ms.

### High-availability Seamless Redundancy (HSR)

High-availability Seamless Redundancy (HSR) is like PRP described in the IEC 62439-3 Standard providing zero packet loss in case of a link failure. HSR functions primarily as a protocol for creating media redundancy based on a ring topology while PRP creates complete network redundancy.

### Time-Sensitive Networking (TSN)

TSN takes IEEE 802 Ethernet to the next level to address the requirements from today's and future automation networks. TSN offers unprecedented low end-to-end latency, as well as frame delivery precision with very low jitter that goes beyond anything that was ever possible with standardized IEEE 802.1 technology. Standardization in IEEE 802.1 and IEEE 802.3 ensures interoperability between different vendors, a broad market scope, scalability with future Ethernet speed increases and investment security.

### Precision Time Protocol (PTPv2)

PTP (Precision Time Protocol) is a procedure described in the IEEE 1588-2008 standard that provides hardware supported precise time synchronization across the devices in the network. The procedure offers a synchronization of the clocks to a degree of precision of just a few 100 ns.

### Media Redundancy Protocol

The MRP (Media Redundancy Protocol) is a protocol that allows you to set up high-availability, ringshaped network structures with recovery times of 500 ms, 200 ms, 30 ms or 10 ms . An MRP ring with Hirschmann devices is made up of up to 100 devices that support the MRP protocol according to IEC 62439-2.

### IPv6

Although the next generation of the Internet Protocol, version 6, is rarely deployed in industrial environments, the latest generation of Hirschmann devices is able to server future customer demands for IPv6 in the same way like it is required today with IPv4.

# Technologies (continued)

### PoE Powered Device (PD)

A Power over Ethernet PD (powered device) is a device which receives the required power for their operation via PoE or PoE+.

### Layer 3 – Wire-Speed Routing with standardized Routing Protocols

The Layer-3 routing functionality in Hirschmann switches focusing on maximum performance and lowest latency. Due to the hardware support of the routing functionality wire speed IP communication is provided between different IP networks offering the same delays like switched data packets. Standard Routing protocols, router redundancy mechanism as well as multicast routing protocols are part of the Layer 3 functions.

### PROFINET

PROFINET is an industrial communication standard based on Ethernet technology. It is standardized in IEC 61158 and IEC 61784. Devices with this logo are certified by the PROFIBUS & PROFINET International (PI) according to the Conformance Class B (CC-B). Therefore several requirements need to be fulfilled like the implementation of a PROFINET IO Stack.

### Power over Ethernet Plus (PoE+)

PoE+ is the further development of PoE according to the standard IEEE 802.3at supporting up to 30 Watt. While PoE requires two pairs of the twisted pair cables, PoE+ uses all 4 pairs to power end devices which require power above 15.4 Watts.

### EtherNet/IP – Conformance tested

EtherNet/IP is an industrial communication protocol standardized by the Open DeviceNet Vendor Association (ODVA) on the basis of Ethernet. It is based on the widely used transport protocols TCP/IP and UDP/IP (standard). EtherNet/IP thus provides a wide basis, supported by leading manufacturers, for effective data communication in the industry sector.

### Power over Ethernet (PoE)

PoE allows you to supply current to a powered device (PD) such as an IP camera via the twisted pair cable that is at the same time used for Ethernet communications. The PoE ports support Power over Ethernet according to IEEE 802.3af delivering a maximum 15.4 Watts per twisted pair port.

### PROFINET CC-A

PROFINET is an industrial communication standard based on Ethernet technology. It is standardized in IEC 61158 and IEC 61784. The supported functions of PROFINET IO are divided into Conformance Classes (CC). Device of the Conformance Class A (CC-A) provides basic function for PROFINET IO with Real Time (RT) communication.

### Clear Space Wireless

Clear Space, OpenBAT offers stable wireless LAN connections, because this technology reliably eliminates interfering frequencies. This markedly reduces the noise level and therefore largely prevents packet losses. The integrated ESD protection withstands electrostatic discharges while increasing the lifespan of the hardware.

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# Products at a Glance | Managed Switches

| | Max Ethernet Ports | Max Gig Copper Ports | Max 10/100 Copper ports | Max 10 Mbps Fiber ports | Max 100 Mbps Fiber ports | Max 1000Mbps Fiber ports | Max Power Supplies | L2 or L3 | Precision Timing | Max PoE ports | Mounting |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **12KX** | 16 | 16 | 16 | 0 | 16 | 16 | 2 | Optional L2 or L3 | IEEE 1588 | 4 | Rack |
| **10KG** | 32 | 8 | 16 | 16 | 16 | 8 | 2 | L2 | IEEE 1588 | 16 | Rack |
| **10KT** | 36 | 4 | 32 | 32 | 32 | 4 | 2 | L2 | IEEE 1588 | 32 | Rack |
| **6K32F** | 32 | 8 | 32 | 16 | 32 | 8 | 2 | L2 | None | 32 | Rack |
| **6K32T** | 32 | 4 | 32 | 8 | 16 | 4 | 1 | L2 | None | 16 | Rack |
| **6K25E** | 26 | 8 | 24 | 12 | 24 | 8 | 2 | L2 | Yes | 24 | Rack |
| **6K16V** | 20 | 4 | 20 | 8 | 8 | 4 | 2 | L2 | Yes | 8 | Panel or DIN |
| **6K8** | 8 | 2 | 8 | 4 | 8 | 2 | 2 | L2 | Yes | 0 | Panel or DIN |
| **6KL** | 10 | 2 | 8 | 4 | 4 | 2 | 1 | L2 | None | 8 | Rack, Panel or DIN |
| **6KM** | 10 | 2 | 10 | 0 | 0 | 2 | 1 | L2 | None | 8 | Rack, Panel or DIN |
| **6KQ**<br>**6KQE** | 16<br>8 | 2<br>2 | 12<br>8 | 4 | 12<br>3 | 2 | 1 | L2 | None | 8<br>4 | Panel or DIN |

## Common Features

- AC Auto-sensing World-use ready Power supply options
- DC Power supplies, from Low V to High V available - In many cases can be mixed and matched with other DC / AC power supplies
- Extended temperature range
- Security software optional add-on
- Different Fiber distances supported
- Different Fiber connectors supported
- MNS-6K software included on all switches
- Many accessories such as rack mounts, front or rear mount options
- Alarm Terminal-Block for software and hardware alarms

# Products at a Glance | Unmanaged Switches

| | Max Ethernet Ports | Max Gig Copper Ports | Max 10/100 Copper ports | Max 10 Mbps Fiber ports | Max 100 Mbps Fiber ports | Max 1000Mbps Fiber ports | Power Supplies | Max PoE ports | Mounting | Other Features |
|---|---|---|---|---|---|---|---|---|---|---|
| **4K24**<br>**4K16**<br>**4K8** | 24<br>16<br>8 | 0 | 24<br>16<br>8 | 0 | 2<br>2<br>1 | 0 | Dual DC | 0 | Rack | Different config oiptions |
| **ES42** | 6 | 0 | 6 | 2 | 2 | 0 | 1 | 4 | DIN Rail, Panel or rackmount tray | Dual homing, IEC 61850 and other agency certifications |
| **ESD42** | 6 | 0 | 6 | 2 | 2 | 0 | 1 | 4 | DIN rail, panel or rackmount tray | Dual homing, IEC 61850 and other agency certifications |
| **PES42** | 6 | 0 | 6 | 2 | 2 | 0 | 1 | 4 | DIN rail, panel or rackmount tray | PoE, IEC 61850 and other agency certifications |
| **PESD42** | 6 | 0 | 6 | 2 | 2 | 0 | 1 | 4 | | |
| **IPS42** | 6 | 0 | 6 | 2 | 2 | 0 | AC or Dual DC | 4 | Din rail, panel, tray or rack mount | Dual-homing, PoE, IEC 61850 and other agency certifications |

### Common Features

- DC Power supply options
- AC Auto-sensing World-use ready Power supply options
- DC Power supplies, from Low V to High V available. In many cases can be mixed and matched with other DC /AC power supplies
- Extended temperature range
- Different Fiber distances supported
- Different Fiber connectors supported
- Many accessories such as rack mounts, front or rear mount options
- Alarm Terminal-Block for software and hardware alarms
- Tray mounting

# Products at a Glance | Routers

| | Max Ethernet Ports | Max Serial Ports | Max Gig Copper Ports | Max 10/100 Copper Ports | Max 10Mbps Fiber ports | Max 100Mbps Fiber ports | Max 1000Mbps Fiber ports | Max Power Supplies | Additional Software | WAN | Secure SCADA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **5RX** | 6 | 4 | 2 | 6 | 0 | 2 | 2 | 1 | None required | 1 x T1/E1 with PPP, and Frame Relay | Yes |
| **10RX** | 10 | 32 | 10 | 10 | 10 | 10 | 10 | 2 | None required | 16 x T1/E1 with PPP, 8 x channelized T1/E1 and Frame Relay | Yes |
| **10XTS** | 8 | 32 | 0 | 8 | 0 | 8 | 0 | 2 | BGP, OSPF, Secure | 2 x T1/E1 with FR or PPP | Yes |
| **DX940** | 6 | 4 | 2 | 4 | 0 | 4 | 2 | 1 | BGP, OSPF, Secure | T1/E1 or FR or PPP and Optional Cell Support | Yes |
| **DX40** | 2 | 2 | 0 | 2 | 0 | 2 | 0 | 1 | BGP, OSPF, Secure | None | Yes |

### Common Features

- DC Power supply options
- AC Auto-sensing world-use ready Power supply options
- DC Power supplies, from Low V to High V available. In many cases can be mixed and matched with other DC /AC power supplies
- Extended temperature range
- Extended security software optional add-on
- Different Fiber distances supported
- Different Fiber connectors supported
- MNS-DX software included on all routers, DS-software for DS-series
- Many accessories such as rack mounts, front or rear mount options
- Alarm Terminal-Block for software and hardware alarms
- Tray mounting

# Products at a Glance | Serial

| | Max Ethernet Ports | Max Serial Ports | Serial Port Type | Max Gig Copper Ports | Max 10/100 Copper Ports | Max 10Mbps Fiber ports | Max 100Mbps Fiber ports | Max 1000Mbps Fiber ports | Max Power Supplies | Precision Timing | WAN | PoE ports | Additional Software | Mounting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **5RX** | 6 | 4 | Software selectable RS232/ RS422/ RS485 and DB9 and RJ45 | 2 | 6 | 0 | 2 | 2 | 1 | Future IEEE 1588 | 1 x T1/E1 with PPP, or DDS | None | None required | Rack |
| **10RX** | 10 | 32 | Software selectable RS232, RS422, RS485 - DB9, RJ45 | 10 | 10 | 10 | 10 | 10 | 2 | Future IEEE 1588 | 16 x T1/E1 with PPP, 8 x channelized T1/E1 and Frame Relay | None | None required | Rack |
| **DX940** | 6 | 4 | Software selectable RS232, RS422, RS485 - DB9 | 2 | 4 | 0 | 4 | 2 | 1 | None | T1/E1 or FR or PPP and Optional Cell Support | 0 | BGP, OSPF, Secure | Rack, Panel or DIN |
| **DX40** | 2 | 2 | Software selectable RS232, RS485 - DB9 | 0 | 2 | 0 | 2 | 0 | 1 | None | None | 0 | BGP, OSPF, Secure | Yes |
| **5843/ 5844** | 1 | 1 | RS232 | 0 | 0 | 1 | 1 | 0 | 1 | None | None | 0 | | DIN Rail |
| **5941/ 5942** | 1 | 1 | RS232 | 0 | 0 | 1 | 1 | 0 | 1 | None | None | 0 | | DIN Rail |
| **5845/ 5846** | 1 | 1 | RS422 and RS485 | 0 | 0 | 1 | 1 | 0 | 1 | None | None | 0 | | DIN Rail |

### Common Features

- AC Auto-sensing World-use ready Power supply options
- DC Power supplies, from Low V to High V available. In many cases can be mixed and matched with other DC /AC power supplies
- Conformal Coating
- Extended temperature range
- Security software optional add-on
- Different Routing protocols available as software add-on
- Serial ports are RS232 or RS 422, software configurable
- Different Fiber distances supported
- Different Fiber connectors supported
- Management software included
- Many accessories such as rack mounts, front or rear mount options
- Alarm connection for software and hardware alarms

# Products at a Glance | Media Converters

| | Max Ethernet Ports | Max Gig Copper Ports | Max 10/100 Copper ports | Max 10 Mbps Fiber ports | Max 100 Mbps Fiber ports | Max 1000Mbps Fiber ports | Power Supplies | Max PoE Ports | Mounting | Other Features |
|---|---|---|---|---|---|---|---|---|---|---|
| CSG14U | 3 | 2 | 2 | 0 | 2 | 2 | Many choices | 0 | Many choices | Compact size, media flexibility |
| CSG14 | 3 | 3 | 2 | 0 | 0 | 1 | Many choices | 0 | Many choices | Compact size, media flexibility |
| CSN14 | 3 | 0 | 2 | 0 | 1 | 0 | Many choices | 0 | Compact size, media flexibility | |
| 3340, 3350, 3344, 3354 | 3 | 0 | 2 | 1 | 0 | 0 | Many choices | 0 | DIN Rail | |
| 3440, 3450, 3442, 3452, 3444, 3454 | 3 | 0 | 2 | 0 | 1 | 0 | Many choices | 0 | DIN Rail | |
| CS14 | 3 | 0 | 2 | 0 | 1 | 0 | Many choices | 0 | Many choices | Compact size, media flexibility |

# Products at a Glance | Software

| | Description | Features |
|---|---|---|
| **MNS-DX** | Magnum™ Managed Network Software for Magnum DX family of routers (MNS-DX) provides the functionality needed by industrial routers. A full range of routing software along with security and redundancy features enable the Magnum DX routers to perform efficiently in harsh industrial environments. MNS-DX includes features needed to connect a variety of different devices and interface types to a routed network. | MNS-DX provides routing protocols such as RIP and different versions of RIP; Ethernet ports can be configured as switched ports or routed ports or combinations; serial ports can be configured as RS232 or RS485 ports; WAN configuration provides the necessary menus to configure a T1/E1 or DDS circuits; RSTP supports RSTP-2004 (802.1w) & STP (802.1d), provides resilient Ethernet networks; VRRP – Virtual Router Redundancy Protocol provides router redundancy for Ethernet LAN devices; VLANs (802.1q) supports tagged based VLANs as access VLANs or trunk ports; VLAN trunk ports allow filtering of unauthorized VLANs; Modbus interoperability over Ethernet or serial ports (RS232 or RS485); Modbus Gateway (MODBUS/TCP) and Modbus-ASCII/RTU interworking, DNP and serial-IP raw mode for serial ports; SNMP supports v1, v2 and v3 for managing the device using Network Management Systems such as HiVision; Trouble shooting is made easy with a built in protocol analyzer.<br><br>For security conscious environments, features such as VPN, banner capability and more can be added with MNS-DX-SECURE. Added routing protocols such as OSPF and BGP are added with MNS-DX-ADVAR. Please contact GarrettCom for a demo or refer to the web site for a description of functionality. |
| **MNS-6K** | Managed Network Software (MNS) combined with a Magnum 6K or Magnum 10K switch, provides power and efficiency in a managed Ethernet platform. A full range of industry-standard software functions in the MNS-6K software product enable the versatile Magnum 6K and 10K Switches to perform efficiently in a wide range of managed LAN applications, including redundant topologies. The software includes Secure Web Management with SSL, graphical user interface (GUI) as well as a command line interface for expert users. Ease of use features make it easy to use and deploy switches for the industrial environment. | Port Security, controlled access by MAC address; VLANs, Port-based, Tag-based, with GVRP; Rapid Spanning Tree Protocol (RSTP-2004), 802.1w & STP 802.1d; Link Aggregation Control Protocol (LACP) 802.3ad; QoS, multi-level 802.1p, ToS and DiffServ; IGMP Snooping, and multicast pruning; SNMP, rich commands including access control; SNMPv3, for encrypted authentication & access security; RMON with statistics, history, alarms and events and much more provide the rich functionality for MNS-6K. MNS-6K-SECURE provides the added security for security conscious environments. Please contact GarrettCom for a demo or refer to the web site for a description of functionality. |
| **Industrial HiVision** | Network Management software specifically designed for industrial environments. Unlike other network management software which are designed for IT specific environments and IT professionals, Industrial HiVision network management software includes features which users of industrial networks need. Industrial HiVision software is configured with both Hirschmann as well as GarrettCom device information and the software is ready to use after installation. Other devices can be added to Industrial HiVision allowing management of third-party devices as well. | Industrial HiVision can be easily integrated into SCADA applications and includes support for GarrettCom devices. Many devices can be configured simultaneously, minimizing time needed to conform to policies and procedures set for industrial and production environments. Similarly, many devices can be updated simultaneously with new releases, new IP address or other relevant information. Features like auto-topology make it easy to discover and add devices, making it easy to populate the relevant devices on the network. Third party MIB imports allow the definition of other devices not currently in the library of managed devices, providing a holistic view of the network and critical devices on the network. The objects discovered or added can be customized with background images, floor plans. Extensive graphics capabilities allow the different objects to be laid out in a logical manner representing the connection information as well as other relevant information. Tool-tips displays relevant information of the devices as the administrator hovers over the devices, allowing efficiencies to manage the network. A trial is available for serious users. |

# Product, Feature and Approval Matrix

| | DIN RAIL | PANEL | 19" RACK | MAXIMUM DATA SPEED | MAXIMUM PORT DENSITY | UNMANAGED | MANAGED/LAYER 2 | MANAGED ROUTING | 12 V DC | 24 V DC | 36 V DC | 48 V DC | 110/250 V DC | 110/230 V AC | REDUNDANT POWER INPUTS | PoE | PoE+ | -40 C/-40 F | -20 C/-4 F | 0 C/32 F | 50 C/122 F | 60 C/140 F | 70 C/158 F | 85 C/185 F | cUL60950 | CLASS 1 DIV 2 | DNV | IEC 61850-3 (SUBSTATION) | IEEE 1613 (SUBSTATION) | EN 50155, EN 45545(RAIL, ONBOARD) | NEMA TS 2 | NEBS Level 3 / ETSI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Unmanaged Switches** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CP80 | • | | | 100 | 9 | • | | | • | • | • | • | | | • | | | | • | • | • | • | | | • | | | | | | | |
| ES42/ESD42 | • | • | | 100 | 6 | • | | | • | • | • | • | | • | | | | • | • | • | • | • | • | | • | • | | • | • | • | • | • |
| IPS42 | • | • | | 100 | 6 | • | | | | • | • | • | • | • | • | | | • | • | • | • | • | • | | • | | | • | • | | • | • |
| PES42 | • | • | | 100 | 6 | • | | | • | • | | • | | | | • | | • | • | • | • | • | • | | • | | | • | • | • | • | • |
| S14 | • | • | | 100 | 4 | • | | | • | • | • | • | | | | | | • | • | • | • | • | • | | • | | | • | • | • | • | • |
| PS14 | • | • | | 100 | 4 | • | | | | | | • | | | | • | | • | • | • | • | • | • | | • | | | • | • | • | • | • |
| 4K8/16/24 | | | • | 100 | 24 | • | | | | • | • | • | • | • | • | | | | • | • | • | • | | | • | | | | | | | • |
| **Managed Switches** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6K8 | • | | | G | 8 | | • | | | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | | • | • |
| 6KL | • | • | | G | 10 | | • | | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • | • | • |
| 6KM | • | • | | G | 10 | | • | | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | | | • | • | • | • | • |
| 6KQ/6KQE | • | • | | G | 16 | | • | | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | | • | • | • | • | • | |
| 6K16(V) | • | • | | G | 16 | | • | | | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | | • | • | • | • | • | • |
| 6K25e | | | • | G | 26 | | • | | | | | • | • | • | • | • | | • | • | • | • | • | • | • | • | | • | • | • | • | • | • |
| 6K32T | | | • | G | 32 | | • | | | | | • | • | • | • | • | | • | • | • | • | • | • | • | • | | • | • | • | • | • | • |
| 6K32F | | | • | G | 32 | | • | | | | | • | • | • | • | • | | • | • | • | • | • | • | • | • | | • | • | • | • | • | • |
| 10KT | | | • | G | 36 | | • | | | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • | • | |
| 10KG | | | • | G | 24 | | • | | | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • | • | |
| 12KX | | | • | G | 16 | | • | • | | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | | | | | | | | |
| **Routers and Terminal Servers** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DX40 | • | | | 100 | 4 | | | • | | • | • | • | • | • | | | | • | • | • | • | • | • | • | • | • | | • | • | | | |
| DX940 | • | • | | G | 12 | | • | • | | • | • | • | • | • | | | | • | • | • | • | • | • | • | • | | | | | | | |
| 10XTS | | | • | 100 | 36 | | • | • | | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • | • | |
| 5RX | | | • | G | 11 | | • | • | | • | • | • | • | • | • | | | • | • | • | • | • | • | • | • | | | • | • | • | • | |
| 10RX | | | • | G | 34 | | • | • | | • | • | • | • | • | • | | | • | • | • | • | • | • | • | • | | | • | • | • | • | |
| **Media Converters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CS14/CSN14 | • | | | 100 | 3 | • | | | • | • | • | • | | | | | | • | • | • | • | • | • | | • | • | | • | • | • | • | • |
| CSG14/14U | • | | | G | 3 | • | | | • | • | • | • | | | | | | • | • | • | • | • | • | | • | | | • | • | | • | • |
| **Links and Stars** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Links | • | • | | 100 | 2 | • | | | | • | • | • | • | • | | | | • | • | • | • | • | • | • | • | • | | | • | | | |
| Optical Stars | | | • | 100 | 9 | • | | | | • | • | • | • | • | | | | • | • | • | • | • | • | • | • | • | | | • | | | |
| **Accessories** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MC14-TRAY | | | • | | | • | | | | | | | | | | | | • | • | • | • | • | • | | | | | | | | | |
| DIN-Rails | • | | | | | • | | | | | | | | | | | | • | • | • | • | • | • | | | | | | | | | |

# Switch and Router Software

### MNS – Managed Networks Software

GarrettCom's Magnum Managed Networks Software (MNS), combined with advanced generation of Industrial Ethernet and WAN devices, provides power and efficiency in a managed platform. A full range of industry-standard software functions in the MNS software products enables the versatile Switches and Routers to perform efficiently in a wide range of managed LAN and WAN applications, including redundant topologies.

- MNS-6K: Standard Switch Software for Magnum 6K and 10K series of Ethernet Switches
- MNS-DX: Software for Magnum DX and Magnum 10XTS Router platforms
- MNS-INOS: Software for Magnum 10RX and Magnum 5RX family of Security and Router Appliances

### Licenses

- MNS-6K-SECURE: License to enable premium security capabilities in Magnum 6K and Magnum 10K family of switches for environments demanding extra security
- MNS-DX-SECURE: License to enable premium security capabilities in Magnum DX and Magnum 10XTS family of routers for environments demanding extra security
- MNS-DX-ADVAR: License to enable advanced routing capabilities such as OSPF and BGP in Magnum DX and Magnum 10XTS family of routers

S-Ring™

# Software Functionality

| Switching | MNS-6K | MNS-DX | MNS-INOS |
|---|---|---|---|
| Fast Aging | • | | |
| Static Unicast/Multicast Address Entries | | | • |
| VLAN (802.1Q) | • | • | • |
| Independent VLAN Learning | • | | |
| GARP VLAN Registration Protocol (GVRP) | • | | • |
| IP Subnet-based VLAN | | • | • |
| QoS/Port Prioritization (802.1D/p) | • | • | • |
| TOS/DSCP Prioritization | • | • | • |
| IP Ingress DiffServ Classification and Policing | • | • | • |
| IP Egress DiffServ Classification and Policing | • | • | • |
| CoS Queue Management | • | • | • |
| Traffic Shaping | • | | • |
| Queue-Shaping/Max. Queue Bandwidth | | | • |
| GARP Multicast Registration Protocol (GMRP) | • | | |
| IGMP Snooping/Querier (v1/v2/v3) | • | | |
| Egress Broadcast Limiter per Port | • | • | • |
| Flow Control (802.3X) | • | | |
| Egress Interface Shaping | | • | • |
| Ingress Storm Protection | • | • | • |
| **Redundancy** | **MNS-6K** | **MNS-DX** | **MNS-INOS** |
| Link Aggregation with LACP | • | | |
| RSTP 802.1D-2004 (IEC62439-1) | • | • | • |
| MSTP (802.1Q) | • | | • |
| RSTP Ring Only Mode | • | | |
| VRRP | | • | • |
| VRRP Tracking | | | • |
| S-Ring | • | | |
| **Configuration** | **MNS-6K** | **MNS-DX** | **MNS-INOS** |
| Text-based Configuration File (ASCII/XML) | • | • | • |
| BOOTP/DHCP Client with Auto-Configuration | • | • | |
| DHCP Server: per Port | • | • | • |
| DHCP Server: Option 43 | • | • | • |
| DHCP Relay per Interface | • | • | |
| HiDiscovery | • | | • |
| DHCP Relay with Option 82 | • | • | • |
| Command Line Interface (CLI) | • | • | • |
| CLI Scripting | | | • |
| Full-featured MIB Support | • | • | • |
| Web-based Management | • | • | • |
| Context-sensitive Help | • | • | • |

# Software Functionality (continued)

| Management | MNS-6K | MNS-DX | MNS-INOS |
|---|---|---|---|
| LLDP (802.1AB) | • | • | • |
| LLDP-MED | • | • | • |
| SSHv1 | • | • | • |
| SSHv2 | • | • | • |
| HTTP | • | • | • |
| HTTPS | • | • | • |
| SNMP v1/v2/v3 | • | • | • |
| Traps | • | • | • |
| Telnet | • | • | • |
| TFTP | • | • | • |
| SFTP | • | • | • |
| SCP | | • | |
| DNS Client | • | | |
| Dual Software Image Support | | • | • |
| Telnet / SSH client | • | | • |
| Console Port | • | • | • |
| **Routing** | **MNS-6K** | **MNS-DX** | **MNS-INOS** |
| Loopback Interface | • | • | • |
| ICMP Filter | | | • |
| Static Unicast Routing | | • | • |
| Static Route Tracking | | | • |
| 1:1 Network Address Translation | | • | • |
| RIP v1/v2 | | • | • |
| OSPFv2 | | • | • |
| Equal Cost Multiple Path (ECMP) | | | • |
| BGPv4 | | • | • |
| Dynamic NAT | | • | • |
| Virtual Routing and Forwarding (VRF) | | | • |
| Object Tracking | | | • |
| TCP Multicast | | | • |
| GOOSE Tunneling | | • | • |
| Generic Routing Encapsulation | | • | • |
| **Multicast Routing** | **MNS-6K** | **MNS-DX** | **MNS-INOS** |
| IGMP v1, v2, v3 | • | • | |

# Software Functionality (continued)

| Security | MNS-6K | MNS-DX | MNS-INOS |
|---|---|---|---|
| MAC-based Port Security | • | • | |
| Port-based Access Control with 802.1X | • | | |
| Remote Authentication via RADIUS | • | • | • |
| Basic ACL | • | • | • |
| Ingress MAC-based ACL | | | |
| Ingress IPv4-based ACL | • | • | • |
| Egress Ipv4-based ACL | • | • | • |
| Automatic Denial-of-Service Prevention | | | • |
| CLI Logging | • | • | • |
| HTTPS Certificate Management | • | • | • |
| Access to Management restricted by VLAN | | | |
| Restricted Management Access | | • | • |
| Appropriate Use Banner | • | • | • |
| SNMP Logging | • | • | • |
| Multiple Privilege Levels | • | • | • |
| Local User Management | • | • | • |
| Configurable Password Policy | | • | • |
| Configurable Number of Login Attempts | | • | • |
| User Account Locking | | • | • |
| Stateful Firewall with DPI | | | • |
| IPSec VPN | | • | • |

| Time Synchronization | MNS-6K | MNS-DX | MNS-INOS |
|---|---|---|---|
| SNTP Client | • | • | • |
| SNTP Server | • | | |
| Buffered Real Time Clock | • | • | • |
| PTPv2 Transparent Clock Two-step | • | | |
| PTPv2 Boundary Clock | • | | |

| Industrial Profiles | MNS-6K | MNS-DX | MNS-INOS |
|---|---|---|---|
| ModbusTCP | • | • | |

* Hardware dependent

# Software Functionality (continued)

| Diagnostics | MNS-6K | MNS-DX | MNS-INOS |
|---|---|---|---|
| LEDs | • | • | • |
| Device Status Indication | • | • | • |
| TCPDump | | | • |
| Email Notification | • | | |
| Syslog | • | • | • |
| Duplex Mismatch Detection | | • | • |
| Link Speed and Duplex Monitoring | | • | • |
| RMON (1, 2, 3, 9) | • | | |
| Port Mirroring 1:1 | • | • | • |
| Port Mirroring 8:1 | • | • | • |
| Port Mirroring N:1 | • | • | • |
| System Information | • | • | • |
| SFP Management | | • | • |
| Switch Dump | | • | • |
| Snapshot Configuration Feature | | | • |
| Reboot History | | | • |
| Software Upgrade History | | | • |
| Wireshark Analyzer | | • | • |

| Miscellaneous | MNS-6K | MNS-DX | MNS-INOS |
|---|---|---|---|
| PoE (802.3AF) | • | • | |
| PoE+ (802.3AT) | • | • | |

| WAN | MNS-6K | MNS-DX | MNS-INOS |
|---|---|---|---|
| T1/E1 | | • | • |
| DDS | | • | • |
| Cellular (3G/4G) | | | • |
| Frame Relay | | • | |
| PPP/MLPPP | | | • |

| Serial | MNS-6K | MNS-DX | MNS-INOS |
|---|---|---|---|
| RS232/RS485 Protocol | | • | • |
| Serial Terminal Server | | • | • |
| Serial-over-FR | | • | • |
| Console-over-FR | | | • |
| PPP over serial | | • | |
| Bit Oriented Protocols | | | • |

* Hardware dependent

# Software Tools

## Industrial HiVision

In many industrial facilities Ethernet networks are growing and changing quickly, and it is increasingly difficult to manage and secure them. Unlike other network management solutions, Industrial HiVision is designed especially for automation networks and has been field tested at thousands of facilities around the world. Its ease-of-use and breadth of functionality greatly improves network availability and security while also making engineering teams more efficient.

Industrial HiVision integrates all SNMP-enabled devices such as switches, PLCs, I/O modules and HMI panels, from multiple vendors, into a single network management application. The network topology is recognized automatically with all network nodes and links accurately displayed on screen, including any unmanaged switches and hubs.

Using the enhanced MultiConfig™ feature, you can simultaneously configure hundreds of devices, including SNMP-enabled devices from any vendor, even while they are in operation. This not only saves time, but also reduces errors and ensures consistent configuration of the network.

Industrial HiVision can be used wherever networks have to meet high availability and security requirements. This includes the discrete manufacturing, machine building, process control and critical infrastructure industries. The software also requires no special IT knowledge. Its wizard guides you easily and systematically through the network management setup process.

**Industrial HiVision**

| Part No. | Order No. |
|---|---|
| 943 156-032 | Industrial HiVision, 32 nodes |
| 943 156-064 | Industrial HiVision, 64 nodes |
| 943 156-128 | Industrial HiVision, 128 nodes |
| 943 156-256 | Industrial HiVision, 256 nodes |
| 943 156-512 | Industrial HiVision, 512 nodes |
| 943 156-124 | Industrial HiVision, 1024 nodes |
| 943 156-248 | Industrial HiVision, 2048 nodes |
| 943 156-496 | Industrial HiVision, 4096 nodes |

## Product Features

- Setup wizard makes implementation and configuration easy
- All SNMP-enabled devices are incorporated, including any device-specific properties
- Network topology is automatically recognized and accurately visualized
- Distributed network management with hierarchical master/slave stations
- MultiConfig configures hundreds of devices from any manufacturer simultaneously – both when commissioning the system and during subsequent live operation
- Customizable Network Dashboard provides up-to-the minute visibility of key network performance and security indicators
- User roles control access to the network by granting different levels of access rights
- LDAP or RADIUS user authentication
- Audit trail for reviewing a complete history of user actions
- Event history in graphical format
- SNMP/OPC server for integrating SCADA applications
- HiMobile App for iOS, Android, and Windows devices provides convenient mobile monitoring of network health. Includes graphical topology map of the entire network
- VLAN viewer, MIB browser, edit and run mode also available
- User interface supports numerous languages
- Windows and Linux versions available

A free of charge version, with no time limit, is available from www.hivision.de. This version will support a maximum of 16 networked devices, but offers all the features of the paid version.

### HiView

HiView allows users to benefit from Hirschmann products' web interface, without any browser or Java library installed on their PCs. In addition, HiView is a portable application. It does not require any installation and does not alter any PC registry entries. It even works directly from removable media such as USB drives and SD cards, for ultimate portability. But HiView is not just a replacement for a web browser. The comfortable Selection screen shows which Hirschmann devices have been accessed recently, with the most popular listed at the top.
A single click connects to the required device. For added security, it is simple and convenient to view the security certificates of both the products and the Java library. And HiView will automatically use the most secure communication method.

### HiDiscovery

Hirschmann products are delivered without a default IP address. This ensures that there is no chance of an IP address conflict, which could have a negative impact on a network. The traditional method for configuring an IP address on a device is to use the serial port. But there will almost certainly be occasions when the correct serial cable is not available. This is where HiDiscovery comes into play. HiDiscovery will discover all Hirschmann devices on a LAN, even if they do not have an IP address. The "Signal" button will activate a device's LEDs, so you can see which device you are communicating with. You can then assign IP address information to the device, directly over the Ethernet connection. HiDiscovery even assists with fault finding, by highlighting devices with duplicate IP addresses.

### HiFusion

Manufacturers have defined various MIB variables for their devices that are not covered by standard MIBs. HiFusion allows you to integrate manufacturer-specific MIB variables for third-party devices into the Industrial HiVision network management software. To achieve this you create Product-specific Modules (PSM).

When creating a PSM you name the device, define a list of variables and assign an image to the device. The execution of the remaining processes is largely automated. Afterwards you incorporate the completed PSM into Industrial HiVision. Your third-party device will then be assigned the correct icon, and the values of the MIB variables will be displayed. HiFusion operates as a stand-alone application. It does not require Industrial HiVision to create or test the new PSM. You do not require a license for the program. The device for which you are creating the PSM must support version 1 or version 3 of the Simple Network Management Protocol (SNMP).

### HiMobile

The HiMobile app, together with Industrial HiVision network management software from Hirschmann, is the perfect client/server solution for mobile monitoring of network nodes using smartphones or tablets – for higher network availability. HiMobile allows direct and convenient access to status information on network devices from almost anywhere. The HiMobile app runs on mobile devices and supports Apple and Android operating systems as well as Windows Phone.

# Software Tools (continued)

## Secure Remote Access Solution

The Secure Remote Access Solution provides a protected cloud system that can be configured with minimal IT knowledge or assistance. Permanent internet protocol (IP) addresses are not required, and there is no need to reconfigure corporate firewalls. Thus, the system enables secure access for remote programming and diagnostics with no disruptions to existing systems.

The Secure Remote Access Solution allows customers to remotely access their sites in order to troubleshoot and fix problems. This reduces the need for travel and allows staff to work more efficiently by handling multiple systems simultaneously.

This product also helps companies embrace the Industrial Internet of Things movement by enabling a secure way for many devices to connect together and communicate.

At the core of the Secure Remote Access Solution is a cloud service to which customers can connect their remote network devices. Multiple versions of software and hardware are available to complete the system, including the ability to manage the network from personal computers (PCs) or mobile devices.

The Secure Remote Access Solution supports Ethernet communication through a three-component system, including the:

- **GateManager** – operates as a cloud service; hosted by Hirschmann or hosted by your company
- **SiteManager** – makes it possible to connect remote devices to the GateManager cloud; runs on a Windows PC or Hirschmann GECKO switch hardware
- **LinkManager** – provides secure, on-demand access to remote devices via the cloud

The network system is not only designed to be easy to install, but also provides firewall-friendly, state-of-the-art security features.

Belden and Hirschmann offer an initial Starter Package, limited to one per company, which includes:

- One SiteManager License (runs on GECKO switch hardware or Windows PC)
- One LinkManager floating software license
- LinkManager mobile software license
- GateManager Free Cloud Service with Basic Administration

This Starter Package includes everything you need to get started and test the solution. Once you are satisfied, you can upgrade your cloud service, number of licenses, and administrative level to reflect your corporate requirements.

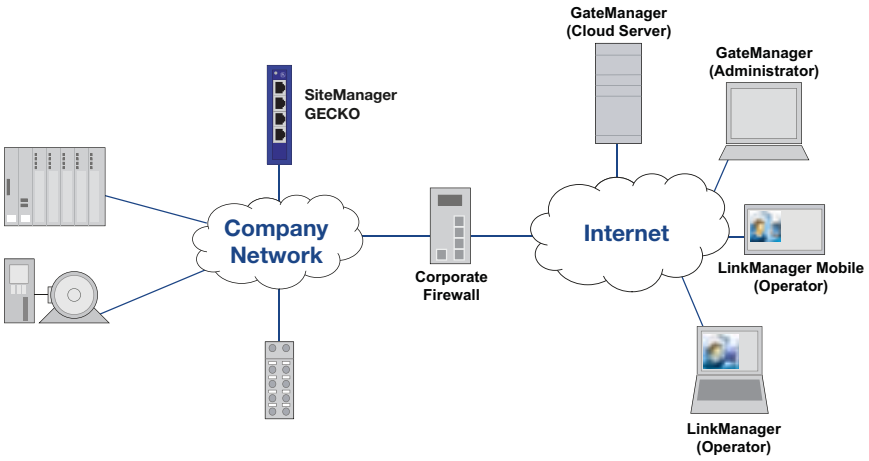
# Technical Information

**SiteManager** supports Windows XP, 7 and 8. This makes it ideal for installing on Windows based HMI panels and IPCs. It installs as a Windows Service and runs in the background. It requires only 10 Mbyte RAM and 5 Mbyte HDD. Alternatively it can be run inside a Hirschmann GECKO switch from v02.0.00 onwards.

**LinkManager** installs a virtual adapter and thus requires running on Windows. But it works fine alongside VPN clients and is designed for both 32 and 64 bit windows, and even runs inside a virtual machine such as VMWare, ESXi or HyperV.

**LinkManager Mobile** supports iPhone, iPad and Android OS.

Hirschmann Secure Remote Access Solution




## GateManager

| Product Description | Max. Number of LinkManager Licenses | Max. Number of LinkManager Mobile Licenses | Max. Number of SiteManagers |
|---|---|---|---|
| GateManager Free | 2 | 8 | 100 |
| GateManager Bronze | 4 | 50 | 300 |
| GateManager Silver | 6 | 100 | 500 |
| GateManager Gold | 8 | 250 | Unlimited |
| GateManager Platinum | Unlimited | Unlimited | Unlimited |

## SiteManager – LinkManager – GateManager – Starter Package

| Product Description | Order No. |
|---|---|
| SiteManager Basic License | 942 144 - 101 |
| SiteManager 5 Nodes License | 942 144 - 102 |
| SiteManager 10 Nodes License | 942 144 - 103 |
| LinkManager License | 942 144 - 201 |
| LinkManager Mobile License | 942 144 - 202 |
| GateManager Bronze Quarterly Fee | 942 144 - 301 |
| GateManager Silver Quarterly Fee | 942 144 - 302 |
| GateManager Gold Quarterly Fee | 942 144 - 303 |
| GateManager Platinum Quarterly Fee | 942 144 - 304 |
| GateManager Administrator Premium Upgrade | 942 144 - 601 |
| GateManager Self-hosted Server | 942 144 - 501 |
| Starter Package 5 Nodes License | 942 144 - 403 |
| Starter Package 10 Nodes License | 942 144 - 404 |

# Tripwire ICS Security Management

tripwire
CONFIDENCE: SECURED

Tripwire is part of the Belden Industrial Cyber Security solutions portfolio that delivers an end-to-end solution and helps our industrial customers meet requirements for availability, resilience and security for plants and critical infrastructure. Tripwire is vendor-agnostic which is ideal for multi-vendor industrial sites. As part of Belden, Tripwire now integrates with GarrettCom, Hirschmann and Tofino Security.

Tripwire can be viewed as the SCADA for industrial cyber security from a plant perspective. The instrumented security technology involves assessing risk, determining what assets are on the network, what configurations exist and which ones are vulnerable to exploit. Tripwire can assist industrial organizations in figuring out what 20% of their efforts can yield an 80% gain in the quest to increase security, efficiency, availability and safety/security.

**Tripwire's solutions deliver:**

- A non-invasive, "No-Touch" hybrid approach to monitoring ICS and SCADA cyber security, changes of interest, malware/ransomware or other cyber threats
- Passive logging of system events and activity to drill down to the most meaningful activities occurring in the environment related to industrial cyber security
- Support for availability and service level agreements regarding plant uptime, resilience and cyber security
- Visibility to assets and security status across the entire industrial and plant infrastructure, including corporate assets
- Built-in industrial best practices and industry-standard security policies relevant to industrial control systems
- Time-saving and efficient integrations with Hirschmann, GarrettCom and Tofino Security
- Identification of systems whose configurations need to be hardened and guidance for what is needed
- Integrated ICS-CERT and vendor alerts to keep operations teams aware of systems that are vulnerable and what they need to do about it
- Ability to discover industrial assets such as firewalls, routers, switches, databases, web servers, process application servers, asset management systems, engineering workstations, Active Directory, HMIs, Data Historians, Domain Services, non-IP addressable Tofino Xenon assets, and many others, regardless of vendors in the environment.


EMEA +44 1614983728 ■ garrettcom.com ■ US 1-510-438-9071

# ES42 Edge Switch

## The Magnum ES42, a versatile family of small Edge Switches, uses the latest networking technology and innovative product packaging features to serve edge-of-the-network applications

Magnum ES42 Edge Switches go out where the action is. In heavy-duty industrial applications, Ethernet LANs increasingly are used where small groups of nodes at the edge need to be connected into larger LAN structures. The Magnum ES42 , a versatile family of small Edge Switches, uses the latest networking technology and innovative product packaging features to serve edge-of-the-network applications.

The compact ES42 Edge Switch design delivers 6 Ethernet ports. The base models have either two 100 Mb fiber and 4 10/100 copper ports, or one fiber and five copper ports, or 6 copper ports. Fiber port choices cover all multi-mode and single-mode fiber connector types. Power input selections include AC or DC (or both) with 12V, 24V and 48V DC terminal block models for all industrial application environments.

Extending the range of the popular Magnum CS14 Converter Switches, the Magnum ES42 Edge Switches are similarly available in Hardened (factory floor), and Premium-rated (outdoor) versions. This selection of models and fiber port types offers the best price-to-value ratio for each installation.

The Magnum Edge Switches include Link-Loss-Learn (LLL), enabling them to be used in self-healing and redundant LAN structures. The LLL feature causes ES42 Switches to sense Link Loss or standard STP / RSTP reconfiguration signals on designated ports, flush internal address buffers to permit a change in LAN packets flow, and pass the reconfiguration signal down the line to other products in the redundant network structure. Magnum Edge Switches, combined with managed switches running STP or RSTP or S-Ring, can often provide high availability redundant LANs at lower total cost than was previously possible.

The compact ES42 Edge Switch design delivers six Ethernet ports. The base models have either two 100 Mb fiber and 4 10/100 copper ports, or one fiber and five copper ports, or 6 copper ports. Fiber port choices cover all multi-mode and single-mode fiber connector types.

## Features

- Provides six switch ports, one or two of which may be 100 Mb fiber, others are 10/100 copper
- Two models for two application environments:
  - Factory Floor
  - Outdoors
- AC power for all models, Factory floor and Outdoor models also have integral DC terminal blocks and Power Alarm Relay
- Includes Link-Loss-Learn (LLL) feature for use in selfhealing LAN structures or Dual-Homing on ports 1 & 2.
- Packaging and mounting options are similar to the popular Magnum 14-Series Converter Switches

# GarrettCom Edge Switches Magnum ES42 Series

Ethernet LANs increasingly are used where small groups of high-availability nodes at the network edge need to be connected into larger LAN structures. The Magnum ESD42-Series, a versatile family of small Edge Switches, use new dual-homing unmanaged switch networking technology and innovative product packaging to serve redundant edge-of-the-network applications.

What is Dual-Homing? In Ethernet LANs, dual-homing is a network topology that adds reliability by allowing a device to be connected to the network by way of two independent connection points (points of attachment). One connection point is the operating connection, and the other is a standby or back-up onnection that is activated in the event of a failure of the operating connection.

The Magnum ES42 family are designed and manufactured in the USA and backed by a three-year warranty.

*The ES42 Includes Link-Loss-Learn (LLL), Enabling it to be used in Selfhealing LAN Structures.*

**Hardened for Factory Floor**

The orange-label Magnum ES42H Hardened units are for factory floor applications.

**Premium-rated for Outdoors**

The red-label Magnum ES42P Premium-rated units are for temperature un-controlled applications, typically located outdoors. Both models are built with high-grade components and are constructed using special thermal techniques (patent pending) and metal cases for heavy duty industrial and outdoor jobs. The ambient temperature ratings for the "H" and "P" models are for industrial and outdoor uses, respectively. No internal air flow is required for cooling, so they resist dust, dirt, moisture, smoke and insects. Mounting options include stand-alone panel-mounting, DIN-Rail, or rack-mount tray.

# Product Specifications

| Type | ES42H | ES42P | ESD42H | ESD42P |
|---|---|---|---|---|
| Product Description | Magnum 6-port hardened Edge Switch, four 10/100 RJ45 ports plus two ports which may be 100Mb fiber, or regular 10/100 copper, or one each type. Compact industrial-grade metal case, rated for factory floor environments. Includes -48V DC terminal block for power input, an alarm contact for status monitoring, and panelmount brackets. DIN-Rail mounting bracket optional. | Same as ES42H-ff-48VDC, but with Premium-rated for temperature un-controlled (outdoor) environments | Same as ES42H-ff-48VDC, but with Dual-Homing redundancy on Ports 1 and 2. | Same as ES42P-ff-48VDC, but with Dual-Homing redundancy on Ports 1 and 2. |
| Port Type and Quantity | 6 x 10/100BASE-TX | | | |
| **RJ45 Port Connectors** | | | | |
| RJ45 with auto-cross, 100BASE-TX and 10BASE-T | Shielded 8-Pin female. Supports shielded (STP) and unshielded (UTP) Cat. 3, 4, 5. | | | |
| **Network Standards** | | | | |
| Ethernet | Ethernet IEEE 802.3, IEEE 802.3u; 100BASE-TX, 10BASE-T, 100BASE-FX | | | |
| Link-Loss-Learn (LLL) | Non-Dual-Homing Models. Factory default for LLL is Activated on Ports 1 and 2. | | | |
| Dual-Homing Models | Port 1 is primary; Port 2 is back-up. On Activated Ports, when a Loss of Link or reconfiguration BPDU for STP or RSTP is detected, the EDS42 will flush internal address buffers and will pass the signal to other LLL Activated ports. This enables the ESD42 to change the direction of packets flow and propagate the self-healing reconfiguration signal down the line. | | | |
| **Performance** | | | | |
| Fiber Ports | 100Mb, all types of connectors for m-m and single-mode. Fiber ports are factory set for FDX. RFQ for internal settings at HDX | | | |
| RJ45 Ports Data Rate | 10 / 100 Mbps, FDX and HDX modes. Auto-negotiation and auto-cross MDI-MDIX on all RJ45 ports. Occurs at LINK-enable. No cross-over cables required. | | | |
| Non-blocking Switching | 128KB packet buffer memory | | | |
| Address Buffer Storage | 2K addresses | | | |
| Address Buffer Age-out Time | 300 seconds (see also LLL) | | | |

# Product Specifications (continued)

| Power | | | | |
|---|---|---|---|---|
| **Power Supplies for AC (External)** | Power input DC jack (8 to 15V) is 2.5mm, center +ve, with 6ft. DC cord Input: 95-125vac at 60 Hz for "-d" models, 215-240vac at 50 Hz for "-i" models that have IEC power connector in the ext power unit. Input: 100-240vac at 47-63 Hz for "-Hd", "Hi" models, see footnote 1. Input: 100-240vac at 47-63 Hz for "-Pd", "Pi" models, see footnote 2 | | | |
| **DC Input Options** | 12V DC, internal (range of 8.0 to 15V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>24V DC internal (range of 10 to 36V DC) built-in screw terminal for +, -, ground. The DC jack is also present, see footnote 3<br>-48V DC internal (range of 30 to 60V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>Note1: the 12V DC jack can be used for dual source DC power input, Note2: internal DC power floats, user may ground + or – if desired. | | | |
| **Power Consumption** | All models: 7.0 Watts typical. 9 Watts max. | | | |
| **LED Indicators (dual, top front and in end)** | | | | |
| **Power** | ON for power applied | | | |
| **10/100 Per RJ45 Port** | Steady ON for 100 Mb, OFF for 10 Mb speed | | | |
| **LK/ACT Per Port** | Steady ON for LINK with no traffic, blinking for Activity | | | |
| **F/H Per Port** | Steady ON for F/D mode, OFF for H/D mode | | | |
| **Alarm Terminal Block (two screw terminals)** | | | | |
| **Internal 60VA Relay Contact** | Open for Power Off, Closed for Power On | | | |
| **Operating Environment** | **ES42H** | **ES42P** | **ESD42H** | **ESD42P** |
| **Ambient Temp. Rating** | -25°C to 60°C long term per independent agency tests (UL 60950), or –40°C to 85°C short term per Type Tests (IEC 60068) | -40°C to 75°C long term per independent agency tests (UL 60950), or –50°C to 100°C short term per Type Tests (IEC 60068) | -25°C to 60°C long term per independent agency tests (UL 60950), or –40°C to 85°C short term per Type Tests (IEC 60068) | -40°C to 75°C long term per independent agency tests (UL 60950), or –50°C to 100°C short term per Type Tests (IEC 60068) |
| **Cold Start** | -20°C | -40°C | -20°C | -40°C |
| **Storage Temperature** | -40° to 185°F (-40°to 85°C) | | | |
| **Ambient Relative Humidity** | 5% - 95% (non-condensing) | | | |
| **Altitude** | -200 to 50,000 ft. (-60 to 15,000m) | | | |
| **Conformal Coating** | Optional | | | |
| **NEBS Compliance** | Yes - including vibration, shock, and altitude. | | | |
| **Packaging** | | | | |
| **Enclosure** | Robust sheet metal (aluminum) | | | |
| **H&P Models** | IEC 529 rated IP40 | | | |
| **Dimensions** | 3.6 in H x 3.0 in W x 1.7 in D (9.2 cm x 7.6 cm x 4.3 cm) | | | |
| **Weight** | 9.5 oz (270g) | | | |
| **Colling Method** | Case used as heat sink | | | |
| **Mounting** | | | | |
| **Metal Panel Mounting Clips** | Included | | | |
| **DIN-Rail Mounting Option** | Model # DIN-RAIL-LATCH | | | |
| **Rack-mount Option** | Model MC14-TRAY, Depth: 6.0", Width 17", Height 2.25"(15 cm D x 43cm W x 5.7cm H) | | | |
| **Agency Standards Approval and Compliance** | | | | |
| **UL Listing** | UL 60950, cUL, CE, Emissions meet FCC Part 15, Class A (see footnote). | | | |
| **EN 300 386** | EMC and Operating Conditions Class C for Power Substations | | | |
| **Class 1 Div 2** | Environmental Standard for Electric Power Substations) | | | |

Footnote: 1: External 12V1A power supply, wall plug or power cord for North America AC receptacles. Temperature rating same as ES42H, see above. (North America: for spare, order Model PSH-12V1A-Hd. Intl: order Model PSH-12V1A-Hi with IEC plug). 2: External 12V1A power supply, rated for outdoor temperatures same as ES42P, see above. Universal AC input with recessed IEC plug. (North America: for spare, order Model PSP-12V1A-Pd, Intl: order Model PSP-12V1A-Pi with IEC plug). 3: For dual source 24V power input to DC jack, order Model DUAL-SRC-24KIT. 4: These products are tested are approved under IEC61850 for use in Class C sheltered locations where neither temperature nor humidity is controlled. The equipment needs to be protected against solar radiation, rainfall, other precipitations, and wind. UL has not approved these products for Annex-T outdoor use.

| Warranty | |
|---|---|
| **Warranty** | Three Years |

# Magnum ES42 Configuration Guide

**Base Model (w/ fixed 4x 10/100 RJ45 Ports)**
**ES42** = Edge Switch with Panel Clips
**ESD42** = Edge Switch with Dual Homing with Panel Clips

**Variation**
**H** = Hardened for the Factory Floor (-25° to +60° C)
**P** = Premium Rated for Outdoors (-40° to +75° C)

**Mounting**
**R** = DIN-Rail

**Number of Fiber Ports**
**0** = No Fiber Ports
**1** = 1 Fiber Ports
**2** = 2 Fiber Ports

**Fiber Port Connectors**
**SC** = 100BASE-FX-SC: fiber optic multi-mode, SC type, 2 km.
**ST** = 100BASE-FX-ST: fiber optic multi-mode , ST type, 2 km.
**MTRJ** = 100BASE-FX-MTRJ: fiber optic multi-mode, MTRJ type, 2 km.
**MLC** = 100BASE-FX-MLC: fiber optic multi-mode, LC type, 2Km.
**SSC** = 100BASE-FX-SSC: fiber optic single-mode, SC type, 20 km.
**SSCL** = 100BASE-FX-SSCL: fiber optic single-mode, SC type, "Long Reach" 40 km.
**SST** = 100BASE-FX-SST: fiber optic single-mode, ST type , 20 km.
**SLC** = 100BASE-FX-SLC: fiber optic single-mode, LC type , 20 km.
**Blank** = No Fiber port option

**Power Supply Options**
**Hd** = External 100-240V AC at 50-60Hz (w/ H models only)
**Hi** = External 100-240V AC at 50-60Hz international (w/ H models only)
**Pd** = External 100-240V AC at 50-60Hz (w/ P models only)
**Pi** = External 100-240V AC at 50-60Hz international (w/ P models only)
**24VDC** = 24V DC power
**12VDC** = 12V DC power
**48VDC** = 48V DC power

# ES42 Accessories

| Model No. | Description |
|---|---|
| DIN-RAIL-MC2 | DIN-Rail mounting hardware for "14-series" CS or MC or ES42/ ESD42 Switches |
| DUAL-SRC-24KIT | Cable kit for 24VDC input to the DC power input jack of one ES42/ESD42, any 24VDC model. |
| MC14-TRAY | Rack-mount tray for "14-series" CS or MC or ES42/ESD42 Switches, 2.25"H, up to 16 units mix-match. |
| MC14-TR+PS9 | Same as MC14-TRAY, but includes the 9vdc PS and ten connectors for CS14, CSN14, 14E, ES42/ESD42 types. The power supply is autoranging 110-240vac, 50-60Hz, rated at 40 watts and 50°C. |

# ESD42 Dual-Homing Edge Switches

## Bringing redundancy to the network edge.

The Magnum ESD42-Series, a versatile family of small Edge Switches, uses new dual-homing unmanaged switch networking technology and innovative product packaging to serve redundant edge-of-the-network applications.

The compact ESD42 Dual-Homing Edge Switch design delivers 6 Ethernet ports, two of which (ports 1 and 2 for dual-homing) may be either fiber or copper and are reserved for use in connecting the ESD42 into the upstream network. The other four ports are regular auto-negotiating auto-cross RJ45 ports. These ports may be PoE ports for attachment of PoE devices. In either case, the nodes attached gain a high-availability network connection. Fiber port choices cover all multi-mode and single-mode fiber connector types.

The Dual-Homing PESD42P provides high availability for small clusters of PoE devices such as cameras and badge readers, using a primary and a back-up link to the network upstream. This unique method of achieving redundancy in the network improves physical security solutions using IP protocols.

In Ethernet LANs, dual-homing is a network topology that adds reliability by allowing a device to connect to a network via two independent connection points (points of attachment). One connection point is the operating connection, and the other is a standby or back-up connection that is activated in the event of a failure of the operating connection.

## Features

- Dual-Homing on Ports 1 and 2 provide a redundant upstream connection
- Four copper switch ports for connection of local nodes. PoE power sourcing models optional
- Three models for three application environments:
  - Office, wiring closet
  - Factory floor
  - Outdoors
- Factory floor and Outdoor models have integral DC terminal blocks and Power Alarm Relay. AC also available.
- Packaging and mounting options are the same as the popular Magnum ES42 Edge Switch Series.

# Applications

**Office and Wiring Closet**

The Magnum ESD42 regular units are for office and indoor wiring closet environments. These are the economical base units in the ESD42 Switch family. An external AC power supply for either North America (-d, 115vac 60Hz) or international (-i, 230vac, 50Hz) is included. The ambient temperature rating is 0°C to 40°C, office grade.

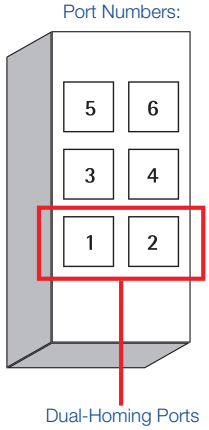
**Hardened for Factory Floor**

The Magnum ESD42H Hardened units are for factory floor applications. The ESD42H models are built with high-grade components and are constructed using special thermal techniques for cooling. In addition to a Hardened AC power option and jack, terminals for internal DC power choices at 8 to 15V, 24V or -48V DC are included. Two terminals provide connections to monitor an internal power-sense relay. The ambient temperature rating is for industrial use. No internal air flow is required for cooling, so it resists dust, dirt, moisture, smoke and insects.

**Premium-rated for Outdoors**

The Magnum ESD42P Premium-rated units are for temperature uncontrolled sheltered applications, typically located outdoors. The ESD42P models are built with premium-grade extended temperature components, and use special thermal techniques as the ESD42H Hardened units. In addition to a Premium-rated AC power option and jack, terminals for the power-sense relay and for internal DC power choices at 8 to 15V, 24V or -48V DC are included. When used outdoors, the ESD42P should be sheltered from the elements.

# Technical Information




| | ESD42 | ESD42H | ESD42P PESD42P |
|---|---|---|---|
| **Performance** | | | |
| **RJ45 Ports** | Data Rate: 10 / 100 Mbps, FDX and HDX modes<br>Auto-negotiation and auto-cross MDI-MDIX on all RJ45 ports occurs at LINK-enable<br>No cross-over cables required | | |
| **Fiber Ports** | 100Mb, all types of connectors for m-m, sgl-m<br>Fiber ports are factory set for FDX. RFQ for HDX internal settings | | |
| **Address Buffer Storage** | 2K addresses | | |
| **Network Standards** | | | |
| **Compliance With** | Ethernet IEEE 802.3, IEEE 802.3u; 100BASE-TX, 10BASE-T, 100BASE-FX | | |
| **Dual-Homing** | | | |
| **Description** | Dual-Homing operation is plug-and-play. Ports 1 and 2 are peers<br><br>When the ESD42 is powered up, port 1 is initially used for upstream traffic providing that it can establish a Link signal<br><br>When there is a loss of Link on Port 1, all upstream traffic is moved to port 2 and port 1 becomes the standby port (after upstream fault repair)<br><br>Port 2 will stay in operation indefinitely...until it experiences a loss of Link, whereupon the ESD42 will move all of the upstream traffic to port 1<br><br>Dual-Homing switch-over time is about 300 milliseconds | | |
| **Operating Environment** | | | |
| **Ambient Temperature Ratings** | 0°C to 40°C | IEC 60068 Operating Temp. per "Type Test" -40° to 85°C<br>UL 60950 "Component Parts" temperature rating: -25° to 60°C | IEC 60068 Operating Temp. per "Type Test" -50° to 100°C<br>UL 60950 "Component Parts" temperature rating: -40° to 75°C |
| **Storage Temperature** | -40°F to 185°F (-40°C to 85°C) | | |
| **Cold Start** | | -20°C | -40°C |
| **Ambient Relative Humidity** | 5% - 95% (non-condensing)<br>Conformal coating (humidity protection) optional, request quote | | |
| **Altitude** | -200 to 50,000 ft. (-60 to 15,000m) | | |

# Technical Information (continued)

| | ESD42 | ESD42H | ESD42P PESD42P |
|---|---|---|---|
| **Packaging** | | | |
| **Enclosure** | Robust sheet metal (steel) | | |
| **Unit Dimensions** | 3.6 in H x 3.0 in W x 1.7 in D (9.2 cm x 7.6 cm x 4.3 cm) | | |
| **Weight** | ESD42 and PESD42P Switch Units: 13 oz (370g) | | |
| **Power Supply** | d, i: 5.8 oz (165g) | Hd, Hi: 5.8 oz (165g) | Pd, Pi: 7.9 oz (225g) |
| **Cooling Method** | Convection | Convection, case used as a heat sink | |
| **Connectors** | | | |
| **Fiber Port (for dual-homing ports 1, 2)** | "ff" selections of the "fiber flavor" (see table below):<br>Use 2ff for a 2-fiber 4-copper model, 1ff for 1-fiber 5-copper model<br>No entry in the "ff" field designates a 6-copper port ESD42 Switch.<br>"1SC" or "2SC"= 100BASE-FX-SC: FO multi-mode with SC type, 2 km<br>"1ST" or "2ST"= 100BASE-FX-ST: FO multi-mode with ST type, 2 km<br>"1MTRJ" or 2MTRJ" = 100BASE-FX-MTRJ: FO m-mode w/ MTRJ, 2 km<br>"1MLC" or "2MLC" = 100BASE-FX-MLC: FO multi-mode with LC, 2Km<br>"1SSC" or "2SSC" = 100BASE-FX-SSC: FO single-mode with SC, 20 km<br>"1SSCL" or "2SSCL"= 100BASE-FX-SSCL: sgl-m SC Long Reach 40 km<br>"1SST" or "2SST" = 100BASE-FX-SST: FO single-mode with ST, 20 km<br>"1SLC" or "2SLC" = 100BASE-FX-SLC: FO sgl-m with LC-type, 15 km<br>For other fiber connector types, request quote | | |
| **RJ45 Port** | RJ45 with auto-cross, 100BASE-TX and 10BASE-T: shielded 8-Pin female<br>Supports shielded (STP) and unshielded (UTP) Cat. 3, 4, 5 | | |
| **LED Indicators (dual, top front, in end)** | | | |
| **Power** | ON for power applied | | |
| **10/100 per RJ45 Port** | Steady ON for 100 Mb, OFF for 10 Mb speed | | |
| **LK/ACT per Port** | Steady ON for LINK with no traffic, blinking for Activity | | |
| **F/H per Port In End** | Steady ON for F/D mode, OFF for H/D mode | | |
| **PoE Ports 3,4,5.6** | ON when delivering power (yellow area of label) | | |
| **Power** | | | |
| **Power Supplies for AC (External)** | Power input DC jack (8 to 15V) is 2.5mm, center +ve, with 6ft. DC cord<br>Input: 95-125vac at 60 Hz for "-d" models, 215-240vac at 50 Hz<br>for "-i" models that have IEC power connector in the ext power unit.<br>Input: 100-240vac at 47-63 Hz for "-Hd", "Hi" models, see footnote 1<br>Input: 100-240vac at 47-63 Hz for "-Pd", "Pi" models, see footnote 2 | | |
| **Power Input Options for DC** | 12V DC, internal (range of 8.0 to 15V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>24V DC internal (range of 10 to 36V DC) built-in screw terminal for +, -, ground. The DC jack is also present, see footnote 3<br>-48V DC internal (range of 30 to 60V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>Note1: the 12V DC jack can be used for dual source DC power input<br>Note2: internal DC power floats, user may ground + or – if desired.<br>For PoE: Total power input required = 66 watts max or 1.4a @48VDC | | |
| **Power Consumption** | 7.0 Watts typical. 9 Watts max | | |
| **Alarm Terminal Block** | | | |
| **H and P Models, two screw terminals** | Internal 60VA relay contact: Open for Power Off, Closed for Power On | | |
| **Approvals/Standards Compliance** | | | |
| **All Models** | UL listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A. (see footnote 4)<br>NEBS L3 and ETSI compliant, including vibration, shock, and altitude | | |
| **H and P Models** | | IEEE 1613 Env. Std for Electric Power Substations IEC61850 EMC and Operating Conditions Class C for Power Substations | |
| **P Model** | | | NEMA TS-2 and TEES for traffic control equipment<br>Designed for above-the-ceiling (plenum) installation |
| **Warranty** | | | |
| **Made in USA** | Three [3] years | | |
| **Mounting** | | | |
| **Metal Panel Mounting** | Clips included | | |
| **DIN-Rail Mounting** | Model # DIN-RAIL MC2 | | |
| **Rack-Mount** | Model MC14-TRAY.<br>Depth: 6.0", Width 17", Height 2.25"(15 cm D x 43cm W x 5.7cm H) | | |

1: External 12V1A power supply, wall plug or power cord for North America AC receptacles. Temperature rating same as ESD42H, see above. (North America: for spare, order Model PSH-12V1A-Hd.

Intl: order Model PSH-12V1A-Hi with IEC plug).

2: External 12V1A power supply, rated for outdoor temperatures same as ESD42P, see above. Universal AC input with recessed IEC plug. (North America: for spare, order Model PSP-12V1A-Pd,

Intl: order Model PSP-12V1A-Pi with IEC plug).

3: For dual source 24V power input to DC jack, order Model DUAL-SRC-24KIT.

4: These products are tested are approved under IEC61850 for use in Class C sheltered locations where neither temperature nor humidity is controlled. The equipment needs to be protected against solar radiation, rainfall, other precipitations, and wind. UL has not approved these products for Annex-T outdoor use.

# Fiber Port Connectors

Office & Wiring Closet | Factory Floor | Outdoors

| Model Number | Ambient Temperature | | | Alarm Contact | Power Input | | | | | | Mounting |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0°C to 40°C | -25°C to +60°C | -40°C to +75°C | 2 position term block | d, i AC external | Hd, Hi AC external +12V T.B. | Pd, Pi AC external +12V T.B. | 12V DC Term Block | 24V DC Term Block | -48V DC Term Block | Panel Clips Included or DIN Rail |
| ESD42-ff-d, i | • | | | | • | | | | | | • |
| ESD42H-ff-Hd, Hi | | • | | • | | • | | • | | | • |
| ESD42H-ff-12VDC | | • | | • | | | | • | | | • |
| ESD42H-ff-24VDC | | • | | • | | | | | • | | • |
| ESD42HR-ff-24VDC | | • | | • | | | | | • | | DIN-Rail |
| ESD42H-ff-48VDC | | • | | • | | | | | | • | • |
| ESD42P-ff-Pd, Pi | | | • | • | | | • | • | | | • |
| ESD42P-ff-12VDC | | | • | • | | | | • | | | • |
| ESD42P-ff-24VDC | | | • | • | | | | | • | | • |
| ESD42PR-ff-24VDC | | | • | • | | | | | • | | DIN-Rail |
| ESD42P-ff-48VDC | | | • | • | | | | | | • | • |
| PES42P-ff-48VDC | | | • | • | | | | | | • | • |

# PES42 PoE Edge Switches

## The Magnum PES42 family PoE Power-Source Edge Switch combines standard 802.3af Power over Ethernet (PoE) with a small heavy-duty six-port Ethernet Switch.

The Magnum PES42 family PoE Power-Source Edge Switch combines standard 802.3af Power over Ethernet (PoE) with a small heavy-duty 6-port Ethernet Switch. Using an external -48VDC power source, four of the PES42's Ethernet ports can provide power as well as 10/100 Mb data transmission over the interconnecting Ethernet cables. Data and power for the attached devices can be transmitted over a single Ethernet twisted-pair cable to each, cost-reducing installation and maintenance in an industrial facility. The other PES42 ports may be 100Mb fiber for distance, noise immunity, ground-isolation and high bandwidth.

The compact PES42 Edge Switch design delivers six Ethernet ports. Four ports are always RJ45 for PoE. The PES42 base models have either two 100 Mb fiber and 4 10/100 PoE copper ports, or one fiber and five copper ports, or 6 copper ports, 4 of which are PoE.

The PES42 switches are Power Sourcing Equipment (PSE), and are compatible with Powered Devices (PD) that comply with the IEEE 802.3af PoE standard. The PES42 Switch ports have an auto-sensing algorithm so that they provide power only to attached 802.3af PD devices. If proprietary PoE and non-PoE equipment is attached, it will not be damaged. The PES42 ports discontinue supplying power when the PoE devices are disconnected, and support the PSE standard for overcurrent protection, under-current detection and fault protection.

The PES42 includes Link-Loss-Learn (LLL), enabling it to be used in self-healing LAN structures. The LLL feature causes PES42 switches to sense Link Loss or standard STP / RSTP reconfiguration signals, change LAN packets flow, and pass the reconfiguration signal down the line to other products in the redundant network structure. Magnum PES42 switches, combined with managed switches running RSTP or S-Ring, can incorporate PoE devices and often provide high availability redundant LANs at lower total cost than was previously possible.

The PES42 Switches are Power Sourcing Equipment (PSE), and are Compatible with Powered Devices (PD) that Comply with the IEEE 802.3af PoE Standard.

## Features

- Industrial PoE Edge Switch with 100Mb Fiber ports and 4 Power-Sourcing RJ45 PoE ports per IEEE 802.3af
- Ideal for PoE used in industrial IP video surveillance, wireless-access, VOIP phones, badge readers and support of similar hardened PoE devices
- Two models for two application environments:
  - Factory Floor
  - Outdoors
- Includes Link-Loss-Learn (LLL) feature for use in selfhealing LAN structures or Dual-Homing on ports 1 & 2.
- Packaging and mounting options are similar to the popular Magnum ES42-Series Edge Switches.

# GarrettCom PoE Edge Switches - Magnum PES42

The Dual-Homing PESD42 family provides high availability for small clusters of PoE devices such as cameras and badge readers, using a primary and a backup link to the network upstream. This unique method of achieving redundancy in the network improves physical security solutions using IP protocols. The PES42 is a standards-compliant way to power and connect Industrial Ethernet devices at the edge of a network where AC power is either not available or not cost-effective. The Magnum PES42 family are designed and manufactured in the USA and backed by a three-year warranty.

*The PES42 Includes Link-Loss-Learn (LLL), Enabling it to be used in Selfhealing LAN Structures.*

**Hardened for Factory Floor**

The orange-label Magnum PES42H Hardened units are for factory floor applications.

**Premium-rated for Outdoors**

The red-label Magnum PES42P Premium-rated units are for temperature un-controlled applications, typically located outdoors. Both models are built with high-grade components and are constructed using special thermal techniques (patent pending) and metal cases for heavy duty industrial and outdoor jobs. The ambient temperature ratings for the "H" and "P" models are for industrial and outdoor uses, respectively. No internal air flow is required for cooling, so they resist dust, dirt, moisture, smoke and insects. Mounting options include stand-alone panel-mounting, DIN-Rail, or rack-mount tray.

# Product Specifications

| Type | PES42H | PES42P | PESD42H | PESD42P |
|---|---|---|---|---|
| **Product Description** | Magnum 6-port hardened PoE Power-Sourcing Edge Switch, four 10/100 RJ45 PoE ports plus two non-PoE ports which may be 100Mb fiber, or regular 10/100 copper, or one each type. See "ff" above for fiber port type choices. Compact industrial-grade metal case, rated for factory floor environments. All four PoE RJ45 Ethernet ports support Power Source PoE per the IEEE 802.3af standard. Includes -48V DC terminal block for power input, an alarm contact for status monitoring, and panelmount brackets. DIN-Rail mounting bracket optional. | Same as PES42H-ff-48VDC, but with Premium-rated for temperature un-controlled (outdoor) environments | Same as PES42H-ff-48VDC, but with Dual-Homing redundancy on Ports 1 and 2. | Same as PES42P-ff-48VDC, but with Dual-Homing redundancy on Ports 1 and 2. |
| **Port Type and Quantity** | 6 x 10/100BASE-TX | | | |
| **Order Number** | Magnum PES42H-ff-48VDC | Magnum PES42P-ff-48VDC | Magnum PESD42H-ff-48VDC | Magnum PESD42P-ff-48VDC |
| **RJ45 Port Connectors** | | | | |
| **RJ45 with auto-cross, 100BASE-TX and 10BASE-T** | Shielded 8-Pin female. Supports shielded (STP) and unshielded (UTP) Cat. 5 and higher. PoE power is delivered to the data pairs of the twisted-pair port pins. | | | |
| **Network Standards** | | | | |
| **Ethernet** | IEEE 802.3, IEEE 802.3u; IEEE 802.1p, IEEE 802.3af for PoE, 100BASE-TX, 10BASE-T, 100BASE-FX | | | |
| **Link-Loss-Learn (LLL)** | Non-Dual-Homing Models. Factory default for LLL is Activated on Ports 1 and 2, the non-PoE ports. | | | |
| **Dual-Homing Models** | Port 1 is primary; Port 2 is back-up. On Activated Ports, when a Loss of Link or reconfiguration BPDU for STP or RSTP is detected, the PES42 will flush internal address buffers and will pass the signal to other LLL Activated ports. This enables the PES42 to change the direction of packets flow and propagate the self-healing reconfiguration signal down the line. | | | |

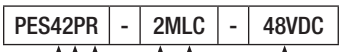
# Product Specifications (continued)

| | | | | |
|---|---|---|---|---|
| **Performance** | | | | |
| **Fiber Ports** | 100Mb, all types of connectors for m-m and single-mode. Fiber ports are factory set for FDX. RFQ for internal settings at HDX | | | |
| **RJ45 Ports Data Rate** | 10 / 100 Mbps, FDX and HDX modes. Auto-negotiation and auto-cross MDI-MDIX on all RJ45 ports. Occurs at LINK-enable. No cross-over cables required. | | | |
| **PoE Ports** | Ports 3, 4, 5, and 6. | | | |
| **Non-blocking Switching** | 128KB packet buffer memory | | | |
| **Address Buffer Storage** | 2K addresses | | | |
| **Address Buffer Age-out Time** | 300 seconds (see also LLL) | | | |
| **Power Input** | | | | |
| **Total Power Consumption** | For 4 PoE ports, 66 watts max. or 1.4A @ 48VDC, (15.4 watts/port) plus 7 watts typical for the PES42 unit. Terminal Block for -48V DC input (range of 46 to 60V DC), built-in for +, -, ground. The 8-15V DC jack is also present, but can only be used to power the PES42 unit when no PoE devices are attached. Internal DC power floats, user may ground + or – if desired. | | | |
| **LED Indicators (dual, top front and in end)** | | | | |
| **Power** | ON for -48VDC input power applied to the unit 10/100 per RJ45 port: Steady ON for 100 Mb, OFF for 10 Mb speed | | | |
| **10/100 Per RJ45 Port** | Steady ON for 100 Mb, OFF for 10 Mb speed | | | |
| **LK/ACT Per Port** | Steady ON for LINK with no traffic, blinking for Activity | | | |
| **F/H Per Port** | Steady ON for F/D mode, OFF for H/D mode | | | |
| **PoE Ports 3, 4, 5 and 6** | ON when delivering power (yellow area of label) | | | |
| **Alarm Terminal Block (two screw terminals)** | | | | |
| **Internal 60VA Relay Contact** | Open for Power Off, Closed for Power On | | | |
| **Operating Environment** | **PES42H** | **PES42P** | **PESD42H** | **PESD42P** |
| **Ambient Temp. Rating** | -25°C to 60°C long term per independent agency tests (UL 60950), or –40°C to 85°C short term per Type Tests (IEC 60068) | -40°C to 75°C long term per independent agency tests (UL 60950), or –50°C to 100°C short term per Type Tests (IEC 60068) | -25°C to 60°C long term per independent agency tests (UL 60950), or –40°C to 85°C short term per Type Tests (IEC 60068) | -40°C to 75°C long term per independent agency tests (UL 60950), or –50°C to 100°C short term per Type Tests (IEC 60068) |
| **Cold Start** | -20°C | -40°C | -20°C | -40°C |
| **Storage Temperature** | -40° to 185°F (-40°to 85°C) | | | |
| **Ambient Relative Humidity** | 5% - 95% (non-condensing) | | | |
| **Altitude** | -200 to 50,000 ft. (-60 to 15,000m) | | | |
| **Conformal Coating** | Optional | | | |
| **NEBS Compliance** | Yes - including vibration, shock, and altitude. | | | |
| **Packaging** | | | | |
| **Enclosure** | Robust sheet metal (aluminum) | | | |
| **H&P Models** | IEC 529 rated IP40 | | | |
| **Dimensions** | 3.6 in H x 3.0 in W x 1.7 in D (9.2 cm x 7.6 cm x 4.3 cm) | | | |
| **Weight** | 9.5 oz (270g) | | | |
| **Colling Method** | Case used as heat sink | | | |
| **Mounting** | | | | |
| **Metal Panel Mounting Clips** | Included | | | |
| **DIN-Rail Mounting Option** | Model # DIN-RAIL-LATCH | | | |
| **Rack-mount Option** | Model MC14-TRAY, Depth: 6.0", Width 17", Height 2.25"(15 cm D x 43cm W x 5.7cm H) | | | |
| **Agency Approval and Standards Compliance** | | | | |
| **UL Listing** | UL 60950, cUL, CE, Emissions meet FCC Part 15, Class A (see footnote). | | | |
| **EN 300 386** | Yes - EMC and Operating Conditions Class C for Power Substations | | | |
| **Class 1 Div 2** | Yes - Environmental Standard for Electric Power Substations) | | | |

Footnote: These products are tested are approved under IEC61850 for use in Class C sheltered locations where neither temperature nor humidity is controlled. The equipment needs to be protected against solar radiation, rainfall, other precipitations, and wind. UL has not approved these products for Annex-T outdoor use.

| | |
|---|---|
| **Warranty** | |
| **Warranty** | Three Years |

# Magnum PES42 Configuration Guide




**Base Model (w/ fixed 4x 10/100 RJ45 PoE Ports)**
**PES42** = Edge Switch with Panel Clips\

**Variation**
**H** = Hardened for the Factory Floor (-25° to +60° C)
**P** = Premium Rated for Outdoors (-40° to +75° C)

**Mounting**
**R** = DIN-Rail

**Number of Fiber Ports**
**0** = No Fiber Ports
**1** = 1 Fiber Ports
**2** = 2 Fiber Ports

**Fiber Port Connectors**
**SC** = 100BASE-FX-SC: fiber optic multi-mode, SC type, 2 km.
**ST** = 100BASE-FX-ST: fiber optic multi-mode , ST type, 2 km.
**MTRJ** = 100BASE-FX-MTRJ: fiber optic multi-mode, MTRJ type, 2 km.
**MLC** = 100BASE-FX-MLC: fiber optic multi-mode, LC type, 2Km.
**SSC** = 100BASE-FX-SSC: fiber optic single-mode, SC type, 20 km.
**SSCL** = 100BASE-FX-SSCL: fiber optic single-mode, SC type, “Long Reach” 40 km.
**SST** = 100BASE-FX-SST: fiber optic single-mode, ST type , 20 km.
**SLC** = 100BASE-FX-SLC: fiber optic single-mode, LC type , 20 km.
**Blank** = No Fiber port option

**Power Supply Options**
**48VDC** = 48V DC power

# PES42 Accessories

| Model No. | Description |
|---|---|
| **DIN-RAIL-MC2** | DIN-Rail mounting hardware for “14-series" CS or MC or ES42/ ESD42 Switches |
| **DUAL-SRC-24KIT** | Cable kit for 24VDC input to the DC power input jack of one ES42/ESD42, any 24VDC model. |
| **MC14-TRAY** | Rack-mount tray for “14-series" CS or MC or ES42/ESD42 Switches, 2.25"H, up to 16 units mix-match. |
| **MC14-TR+PS9** | Same as MC14-TRAY, but includes the 9vdc PS and ten connectors for CS14, CSN14, 14E, ES42/ESD42 types. The power supply is autoranging 110-240vac, 50-60Hz, rated at 40 watts and 50°C. |

# IPS42

## Internal Power Supplies for the Edge Switch Family

Magnum IPS42 Internal Power Supplies are ready for reliable service in the harshest environments. For example, choose an AC/DC model of the IPS42 for 110V DC power with IEC 61850 rating and maximum (4KV) surge suppression to complement any ES42 Series Edge Switch. This unit is ready for duty in power utility substations … the only such high-voltage AC/DC Ethernet unit on the market that is UL-listed for user safety. Or, use the AC model IPS42 along with a 48V DC PES42 model for a Power over Ethernet (PoE) Edge Switch that plugs into your AC power source. Also offered are high-availability IPS42 units with DC dual-source input at 125V or 48V or 24V.

ES42 Series models cover the broadest range of Ethernet edge connectivity. There are Hardened and Premium ratings for temperature extremes, even outdoors. There are all-fiber port flavors at 100Mb, Dual-Homing for edge redundancy, Link-Loss-Learn for ring resilience, and PoE Power Source support for low cost installation of modern PoE industrial devices. All have relay alarm for input power-loss and are convection cooled (using the case as a heat sink) for use in dirty and dusty industrial environments.

Combine any of hundreds of ES42H and P Edge Switch models with any of five models of the Magnum IPS42 Internal Power Supply to yield a hardened Edge Switch device configured with big-switch power input.

## Features

- For AC/DC models, 100 to 250V range, 2KV surge protected
- For 125V DC, 48V DC and 24V DC models, dual-source power input for high availability
- For AC models, worldwide AC power input with standard IEC 320 recessed male power plug
- For all models, UL-listed and tested for safety
- IEC 61850 rated for EMC and EMI, rugged metal case, IEC 60068 tested for extreme temperature

Functional View

IPS42 for DIN Rail

IPS42 for Panel-Mount

# Technical Information–Magnum IPS42 + ES42

| | |
|---|---|
| **Operating Environment** | |
| **IEC 60068 "Type Test"** | Exceeds -40°F to 185°F (-40°C to 85°C) |
| **Storage Temperature** | -60°F to 212°F (-50°C to 100°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing)<br>For conformal coating (humidity protection) option: request quote |
| **Altitude** | -200 to 13,000 ft (-60 to 4000 m) |
| **UL 60950 "Component Parts" Rating** | -40°F to 140°F (-40°C to 60°C) |
| **RELAY CONTACT FOR ALARMS** | |
| **Form C** | One NC indicating internal power |
| **Power Supply** | |
| **AC/DC Power Supply (Model IPS42-AC/DC)** | Power Input:<br>DC: 100 - 250V DC or<br>AC: 100 - 250V AC, 47 to 63 Hz, auto ranging<br>Surge Rating: IEC 61000-4-3, Class 3/ 4 (2kV for DC)<br>Std. Recessed Terminal Block: "-, GND, +", UL-Listed<br>Power Consumption: 10 watts typical for a 4+2-port fiber model |
| **DC for Dual-Source Models of IPS42** | Magnum IPS42 DualSRC models have Dual DC power input, for continuity of operation when either of the DC input sources is interrupted.<br>Available for 125V DC, 48V DC or 24V DC |
| **DC Power Supplies for Dual-Source DC** | 125V DC: Input 100 to 250V DC nominal<br>48V DC: Input, 44 to 57V DC<br>24V DC: Input, 20 to 36V DC<br>Surge Rating: IEC 61000-4-3, Class 3/ 4 (2kV for DC)<br>Std. Terminal Block for DualSRC: A: "-, GND, +", B: "-, GND, +",<br>Power Consumption: 10 watts typical for a 4+2-port fiber model |
| **AC Power Supply (Model ISP42-AC)** | AC Power Connector: standard IEC 320, male, recessed<br>Power Input: 100 - 250V AC, 47 to 63 Hz, auto ranging<br>Power Consumption: 10 watts typical for a 4+2-port fiber model |
| **Mechanical** | |
| **Enclosure** | High-strength metal (aluminum), case used as a heat sink |
| **Mounting** | Panel-mounting, metal mounting brackets included<br>DIN-rail mounting, order Model #DIN-RAIL-MC2 optional |
| **Enclosure Ingress Protection Rating** | IP52, protects against dust particles and liquids per IEC 60529 and NEMA-3, 3X |
| **Cooling Method** | Convection case used as a heat sink<br>Designed for vertical mounting, no fans |
| **Dimensions** | 6 in H x 5.5 in W x 1.7 in D<br>(15.2 cm H x 14.0 cm W x 4.3 cm D) |
| **Weight** | 1.5 lb. (0.68 kg) |
| **Agency Approvals and Standards Compliance** | |
| **All Models** | UL Listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A.<br>IEC 61850 EMC and Operating Conditions Class C for Power Substations<br>IEEE 1613 Env. Standard for Electric Power Substations<br>NEBS L3 and ETSI compliant including vibration, shock, altitude<br>NEMA TS-2 and TEES for traffic control equipment |
| **Warranty** | |
| **Made in USA** | Three [3] years |

# Ordering Information

| Product | Description |
|---|---|
| **Magnum IPS42-AC/DC** | Internal Power Supply chassis for use with any ES42H or ES42P Series Edge Switch<br>Requires simultaneous ordering of an ES42 (without external power supply) as a separate line item<br>Rated 100 to 25V, AC or DC<br>Power input via recessed terminal block, UL Listed and surge protected<br>Includes internal auto-ranging power supply, cooling fan and metal brackets for rack mounting<br>LEDs and user ports are in the front, power input is in the rear<br>Units with DC input are available |
| **Magnum IPS42-125VDC-DualSRC** | Internal Power Supply chassis for use with any ES42H or ES42P Series Edge Switch<br>Requires simultaneous ordering of an ES42 (without external power supply) as a separate line item<br>Rated 100 to 250V DC, Dual Source<br>Power input via recessed terminal block, UL Listed and surge protected |
| **Magnum IPS42-48VDC-DualSRC** | Internal Power Supply chassis for use with any ES42H or ES42P Series Edge Switch<br>Requires simultaneous ordering of an ES42 (without external power supply) as a separate line item<br>Rated 44 to 57V DC, Dual Source<br>Power input via recessed terminal block, UL Listed and surge protected |
| **Magnum IPS42-24VDC-DualSRC** | Internal Power Supply chassis for use with any non-PoE ES42H or ES42P Series Edge Switch<br>Requires simultaneous ordering of an ES42 (without external power supply) as a separate line item<br>Rated 20 to 36V DC, Dual Source<br>Power input via recessed terminal block, UL Listed and surge protected |
| **Magnum IPS42-AC** | Internal Power Supply chassis for use with any ES42H or ES42P Series Edge Switch<br>Requires simultaneous ordering of an ES42 (without external power supply) as a separate line item.<br>Standard worldwide AC power input via standard IEC 320 recessed male connector<br>UL Listed and surge protected |
| **DIN-RAIL-MC2** | DIN-Rail mounting hardware for one IPS42 |

AC/DC Model with Power Cord installed

Dual-Source Model with Power Cords installed

AC Power Model

AC/DC Power Model, Recessed Terminal Block, shown prior to cord connection

Safety Cover

To change the power cord, unplug incoming power to unit. Then, unscrew metal safety cover to expose terminal block and unscrew incoming power wires from terminal block. Next, remove strain relief grommet and replace existing power cord with your new power cord. Finally, reinstall strain relief grommet and reattach wires to terminal block and screw on metal safety cover.

Strain Relief Grommet

# CP80 Series Hardened Industrial Switch

## The Magnum CP80-Series Hardened Ethernet switches provide modern Ethernet connectivity for a variety of factory automation and SCADA applications.

Ideally Suited for Factory Automation Systems. In factory automation control systems, fieldbus control systems are giving way to IP-based networks. The Magnum CP80-Series Hardened Ethernet switches provide modern Ethernet connectivity for a variety of factory automation and SCADA applications.

Ethernet networks in factory control systems provide interoperability and bandwidth with universal connectivity via 10/100 RJ-45 ports, all at an economical cost. In control system cabinets, a small group of IEDs, PLCs, sensors, WAPs and control devices are co-located and connected into the network using twisted-pair copper cabling. Then, this group of devices is linked into the overall industrial network, typically with a fiber cable for noise immunity and distance. The Magnum CP80-Series Hardened Ethernet Switches are ideal for these applications.

The CP80-Series Industrial Grade Switch is DC-powered by 12VDC and 24VDC for Factory Floor or 48VDC for Tariffed Carrier Field Facilities, has a Rugged Metal Case and Metal Mounting Brackets Suitable for Panel Mounting.

## Features

- Provides eight hardened 10/100 switched RJ-45 ports
- One additional 100Mb fiber backbone port of any type
- Hardened for industrial use, UL rated -25° C to 60° C
- DC power input, 12 VDC, 24 VDC and -48 VDC, DIN-Rail mounting. Dual-Source optional
- Ideal for factory automation and telecom (NEBS-compliant)

### Copper and Fiber Mix

Magnum CP80F switches provide eight 10/100 copper ports and one 100Mb fiber up-link port. They are hardened to withstand the stress of industrial environments, highly reliable (over 25 years MTBF) and easily fit into industrial and telecom control cabinets. Operation is "plug-and-play." Front-mounted LEDs provide status information on each port. Multiple CP80-Series switches can be linked in a cascaded or "daisychain" manner for expansion of the network.

The fiber port is available with a 2KM multi-mode ST, SC, LC, or MTRJtype connector, or with a single-mode LC, ST, and SC-type to support 20 and 40 kilometers distance. (Other special fiber port types are available on request). The 100Mb fiber port of the Magnum CP80F supports full distance fiber LAN cabling to a switch upstream.

### Power Options

The CP80-Series industrial grade switch is
DC-powered by 12VDC and 24VDC for factory floor or 48VDC for tariffed carrier field facilities, has a rugged metal case and metal mounting brackets suitable for panel mounting. Models with a DIN-Rail mounting bracket included are available.

### Warranty

Three years.

# Product Specifications

| Type | CP80 |
|---|---|
| **Product Description** | Magnum CP80-Series Hardened Industrial Switch. |
| **Performance** | |
| **Fiber Ports** | 100 Mb FDX, all connector types, multi-mode or single-mode RJ-45 Ports: 10 / 100 Mb, FDX and HDX modes. Auto-negotiation and auto-cross MDI-MDIX on RJ-45 ports occur at LINK-enable. No cross-over cables required. |
| **Processing Type** | Store and Forward, with IEEE 802.3x full duplex, flow control non-blocking. |
| **System Aggregate Forwarding and Filtering Rate** | 1190K pps @ 100BASE-TX / FX (All ports at 100 Mb full speed). 1536 bytes max packet size. |
| **Packet Buffers** | 256KB, Address Table size: 4K nodes. |
| **Latency** | Less than 5ms (not including packet time). |
| **VLANs Support** | |
| Data packets that have the 4 bytes tagged VLAN field (IEEE 802.1q) inserted in them are received and transmitted unchanged by all CP80-series switches. | |
| **Network Standards** | |
| **Ethernet** | IEEE 802.3u, 100Base-TX, FX; IEEE 802.3, 10Base-T. |
| **Auto Negotiation and Auto-Cross** | IEEE 802.3u occurs at LINK enable, for each port. All 10 Mb ports obey the rules for configuring 10 Mb Ethernet, all 100 Mb ports use Fast Ethernet rules. |
| **Network Cable Connectors** | |
| **RJ45** | Category 5 UTP/STP, 10 Mb: Cat. 3,4, 5 UTP. |
| **Fiber** | 100 Mb, 100BASE-FX, all port connector types. |
| **Power Supply (Internal)** | |
| **12V DC** | Internal (range of 9 to 15V DC) built-in screw terminal for +, -, ground. |
| **24V DC** | Internal (range of 18 to 36V DC) built-in screw terminal for +, -, ground. |
| **-48V DC** | Internal (range of 36 to 60V DC), built-in screw terminal block for +, -, ground. |
| Dual Source DC power input for redundancy is a configuration option at 12V, 24V, and -48VDC | |
| **Power Supply Rating** | 0.6A @ 12V; 0.3A @ 24V; 0.15A at 48V. |
| **Power Input** | 8 watts typical, 9 max. |
| **Surge Rating** | IEC61000-4-3, Class 3/ 4 (4KV for DC). |

# Product Specifications (continued)

| | |
|---|---|
| **Operating Environment** | |
| **Ambient Temperature** | -25°C to 60°C. |
| **Storage Temperature** | -50°C to 75°C |
| **Ambient Relative Humidity** | 10% - 95% (non-condensing) |
| **Conformal Coating (humidity protection)** | Request quote |
| **Mechanical** | |
| **Enclosure** | Rugged high-strength sheet metal. Models with either DIN-Rail bracket included or with metal panel-mount brackets included are available. |
| **Dimensions** | 1.25 in H x 6.6 in W x 6.0 in D (3.18 cm x 16.36 cm x 15.24 cm). |
| **Weight** | 1.0 lb (454 g.) |
| **Cooling Method** | Convection. |
| **LED Indicators on Chassis (LEDs are viewed coincident with the port connectors).** | |
| **Power** | Steady on when power applied. |
| **LED Indicators Per Port** | |
| **Speed** | ON = 100 Mb; OFF = 10 Mb (with LINK ON (RJ-45 ports). |
| **Link/Act** | Steady ON for LINK w/ no traffic, blinking indicates port is transmitting & receiving. |
| **F/H** | ON for full-duplex mode, OFF for half-duplex. |
| **Agency Approval** | |
| **UL Listed** | cUL, CE, Emissions meet FCC Part 15, Class A. |
| **Emissions** | Pending |
| **Warranty** | |
| **Warranty** | Three Years |

# Magnum CP80 Configuration Guide

| CP80 | - | MLC | - | 24VDC |
|---|---|---|---|---|

**Base Model (w/ fixed 8x 10/100 RJ45 Ports)**
**CP80** = Panel Clips
**CP80R** = DIN-Rail
**CP80F** = Panel Clips w/ additional fiber port
**CP80FR** = DIN-Rail w/ additional fiber port

**Fiber Port Connectors (only with CP80F variants)**
**MSC** = 100BASE-FX-SC: fiber optic multi-mode, SC type, 2 km.
**MST** = 100BASE-FX-ST: fiber optic multi-mode , ST type, 2 km.
**MTRJ** = 100BASE-FX-MTRJ: fiber optic multi-mode, MTRJ type, 2 km.
**MLC** = 100BASE-FX-MLC: fiber optic multi-mode, LC type, 2Km.
**SSC** = 100BASE-FX-SSC: fiber optic single-mode, SC type, 20 km.
**SSCL** = 100BASE-FX-SSCL: fiber optic single-mode, SC type, “Long Reach” 40 km.
**SST** = 100BASE-FX-SST: fiber optic single-mode, ST type , 20 km.
**SLC** = 100BASE-FX-SLC: fiber optic single-mode, LC type , 20 km.
**SLCL** = 100BASE-FX-SLCL: fiber optic single-mode LC type, “Long Reach” 40 km
**Blank** = No Fiber port option

**Power Supply Options**
**24VDC** = 24V DC power
**12VDC** = 12V DC power
**48VDC** = 48V DC power

# CP80 Accessories

| Model No. | Description |
|---|---|
| **DUAL-SOURCE-CP80** | Dual Source DC power input for redundancy is a configuration option at 12V, 24V, and -48VDC |

# S14 4-port 10/100 Mb Convenient Switch

## Providing edge access Ethernet ports in a convenient and compact package

For any user who needs a small chunk of Ethernet connectivity, a 4-port “go anywhere” Magnum S14 Switch is a versatile and handy solution. It provides edge access Ethernet ports it in a convenient and compact package.

All S14 Convenient Switch models come with two (2) sets of LED indicators. One set is on the front for viewing convenience when the unit is wall-mounted, and one LED set is mounted in the end adjacent to three of the RJ45 ports for easy viewing when units are in a rack-mount tray. The Magnum S14 family of Convenient Switches and other Magnum products are designed and manufactured in the USA and backed by a three-year warranty.

This switch family covers the full range of application environments, with Regular (office), Hardened (factory floor) and Premium-rated (outdoor) versions. Offers the best price-to-value for each user and installation.

## Features

- Adds convenient network connections anywhere
- Supports IEEE 802.3u auto-negotiation and MDI / MDIX auto-cross to enable attaching a 10 Mb or a 100 Mb device on any port
- AC power for all models; factory-floor and outdoor models also have integral DC power terminal blocks
- Extra features for heavy-duty and extended temperature operation ranges included selectively in the factory floor and outdoor models
- Same mounting options and packaging as the Magnum 14-series Media Converters

# Applications

**Office and Wiring Closet**

The yellow-label Magnum S14 regular units are for office and indoor wiring closet environments. These are the economical base units in the S14 Switch family. An external AC power supply for either North America (-d, 115vac 60Hz) or international (-i, 230vac, 50Hz) is included. The ambient temperature rating is 0° to 40°C, office grade.

**Hardened for Factory Floor**

The orange-label Magnum S14H Hardened units are for factory floor applications. The S14H models are built with high-grade components and are constructed using special thermal techniques and a metal case for heavy duty industrial jobs. In addition to a Hardened AC power option and jack, terminals for internal DC power choices at 8 to15V, 24V or -48V DC are included. The ambient temperature rating is for industrial use. No internal air flow is required for cooling, so it resists dust, dirt, moisture, smoke and insects.

**Premium-rated for Outdoors**

The red-label Magnum S14P Premium-rated units are for temperature uncontrolled sheltered applications, typically located outdoors. The S14P models are built with premium-grade extended temperature components, and use similar thermal techniques as the S14H Hardened units. In addition to a Premium-rated AC power option and jack, terminals for internal DC power choices at 8 to 15V, 24V or -48V DC are included. When used outdoors, the S14P should be sheltered from elements.

# Technical Information

| | S14 | S14H | S14P |
|---|---|---|---|
| **Performance** | | | |
| Data Rate | 10 / 100 Mbps, FDX and HDX modes on all 4 ports<br>Auto-negotiation and auto-cross MDI-MDIX on all RJ45 ports occurs at LINK-enable<br>No cross-over cables required | | |
| Non-blocking Switching | 128KB packet buffer memory | | |
| Address Buffer Storage | 2K addresses | | |
| Address Buffer Age-out Time | 300 seconds | | |
| **Network Standards** | | | |
| Compliance With | Ethernet IEEE 802.3, IEEE 802.3u, 802.1p; 100BASE-TX, 10BASE-T, Data packets that have the 4 bytes tagged VLAN field (IEEE 802.1q) inserted in them are received and transmitted unchanged by all S14s | | |
| **Operating Environment** | | | |
| Ambient Temperature Ratings | 0°C to 40°C | –25°C to 60°C long term per independent agency tests (UL), or –40°C to 85°C short term per IEC Type Tests | –40°C to 75°C long term per independent agency tests (UL), or –50°C to 100°C short term per IEC Type Tests. |
| Storage Temperature | -40°F to 185°F (-40°C to 85°C) | | |
| Cold Start | -20°C | | -40°C |
| Ambient Relative Humidity | 5% - 95% (non-condensing)<br>Conformal coating (humidity protection) optional, request quote | | |
| Altitude | -200 to 50,000 ft. (-60 to 15,000m) | | |
| NEBS Compliance | | Yes–including vibration, shock, altitude | |

# Technical Information (continued)

| | S14 | S14H | S14P |
|---|---|---|---|
| **Packaging** | | | |
| **Enclosure** | Robust sheet metal (steel) | | |
| **Unit Dimensions** | 3.5 in H x 3.0 in W x 1.0 in D (8.9 cm x 7.6 cm x 2.5 cm) | | |
| **Weight** | S14 Switch Units: 8.6 oz (243g) | | |
| **Power Supply** | d, i: 5.9 oz (170g) | Hd, Hi: 5.8 oz (165g) | Pd, Pi: 7.9 oz (225g) |
| **Cooling Method** | Convection | Convection, case used as a heat sink | |
| **Connectors** | | | |
| **RJ45 with auto-cross, 100BASE-TX and 10BASE-T** | Shielded 8-pin female<br>Supports shielded (STP) and unshielded (UTP) Cat. 3, 4, 5<br>For PoE Pass-through option on H and P models, request quote | | |
| **LED Indicators (dual, top front, in end)** | | | |
| **Power** | ON for power applied | | |
| **10/100 per Port** | Steady ON for 100 Mb, OFF for 10 Mb speed | | |
| **LK/ACT per Port** | Steady ON for LINK with no traffic, blinking for Activity | | |
| **F/H per Port 1,2,3 In End** | Steady ON for F/D mode, OFF for H/D mode | | |
| **Power** | | | |
| **Power Supplies for AC (External)** | 115V AC at 60 Hz for "-d" models,<br>230V AC at 50 Hz<br>for "-i" models that have IEC power connector in the PS unit | 100-240V AC at 47-63 Hz for "-Hd" and "Hi" models, see footnote 1 | 100-240V AC at 47-63 Hz for "-Pd" and "Pi" models, see footnote 2 |
| | Power input DC jack (8 to 15V) is 2.5mm, center +ve, with 6ft. DC cord | | |
| **Power Input Options for DC** | 12V DC, internal (range of 8.0 to 15V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>24V DC internal (range of 10 to 36V DC) built-in screw terminal for +, -, ground. The DC jack is also present, see footnote 3<br>-48V DC internal (range of 30 to 60V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br><br>Note1: the 12V DC jack can be used for dual source DC power input<br>Note2: internal DC power floats, user may ground + or – if desired. For PoE: Total power input required = 66 watts max or 1.4a @48VDC | | |
| **Power Consumption** | 3 Watts typical. 4 Watts max | | |
| **Approvals/Standards Compliance** | | | |
| **All Models** | UL listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A. (see footnote 4)<br>NEBS L3 and ETSI compliant, including vibration, shock, and altitude<br>Compliant with EN50155 Railway Applications Standard<br>IEC61850 EMC and Operating Conditions Class C for Power Substations | | |
| **H and P Models** | | IEEE 1613 Env. Std for Electric Power Substations | |
| **P Model** | | | NEMA TS-2 and TEES for traffic control equipment<br>Designed for above-the-ceiling (plenum) installation |
| **Warranty** | | | |
| **Made in USA** | Three [3] years | | |
| **Mounting** | | | |
| **Metal Panel Mounting** | Clips included | | |
| **DIN-Rail Mounting** | Model # DIN-RAIL MC2 | | |
| **Rack-Mount** | Model MC14-TRAY.<br>Depth: 6.0", Width 17",<br>Height 2.25"(15 cm D x 43cm W x 5.7cm H) | | |

1: External 12V1A power supply, wall plug or power cord for North America AC receptacles. Temperature rating same as S14H, see above. (North America: for spare, order Model PSH-12V1A-Hd Intl: order Model PSH-12V1A-Hi with IEC plug).

2: External 12V1A power supply, rated for outdoor temperatures same as S14P, see above. Universal AC input with recessed IEC plug. (North America: for spare, order Model PSP-12V1A-Pd, Intl: order Model PSP-12V1A-Pi with IEC plug).

# Magnum S14 Configuration Guide

**Base Model (w/ fixed 4x 10/100 RJ45 Ports)**
**S14** = Convenient Switch with Panel Clips

**Variation**
**Blank** = Temperature rated for office and wiring closet environments
**H** = Hardened for the Factory Floor (-25° to +60° C)
**P** = Premium Rated for Outdoors (-40° to +75° C)

**Mounting**
**R** = DIN-Rail

**Power Supply Options**
**d** = External 100-240V AC at 50-60Hz (w/ standard models only)
**i** = External 100-240V AC at 50-60Hz international (w/ standard models only)
**Hd** = External 100-240V AC at 50-60Hz (w/ H models only)
**Hi** = External 100-240V AC at 50-60Hz international (w/ H models only)
**Pd** = External 100-240V AC at 50-60Hz (w/ P models only)
**Pi** = External 100-240V AC at 50-60Hz international (w/ P models only)
**24VDC** = 24V DC power
**12VDC** = 12V DC power
**48VDC** = 48V DC power

# S14 Accessories

| Model No. | Description |
|---|---|
| DIN-RAIL-MC2 | DIN-Rail mounting hardware for "14-series" CS or MC or ES42/ ESD42 Switches |
| DUAL-SRC-24KIT | Cable kit for 24VDC input to the DC power input jack of one ES42/ESD42, any 24VDC model. |
| MC14-TRAY | Rack-mount tray for "14-series" CS or MC or ES42/ESD42 Switches, 2.25"H, up to 16 units mix-match. |
| MC14-TR+PS9 | Same as MC14-TRAY, but includes the 9vdc PS and ten connectors for CS14, CSN14, 14E, ES42/ESD42 types. The power supply is autoranging 110-240vac, 50-60Hz, rated at 40 watts and 50°C. |

# PS14 PoE Power Source Switches

## The Magnum PS14 PoE Power Source Convenient Switches combine standard 802.3af Power over Ethernet (PoE) with small heavy-duty four-port Switches.

The Magnum PS14 PoE Power Source Convenient Switches combine standard 802.3af Power over Ethernet (PoE) with small heavy-duty four-port Switches. Using an external -48VDC power source, all four of the PS14's Ethernet ports can provide power as well as 10/100 Mb data transmission over the inter-connecting Ethernet cables. Now, data and power for attached devices can be transmitted over a single Ethernet twisted-pair cable.

The PS14 switches are Power Sourcing Equipment (PSE), and are fully compatible with Powered Devices (PD) that comply with the IEEE 802.3af PoE standard. The PS14 Switch ports have an auto-sensing algorithm so that they provide power only to attached 802.3af end devices. If proprietary PoE and non-PoE equipment is attached, it will not be damaged. The PS14 ports discontinue supplying power when the PoE devices are disconnected, and support the PSE standard for over-current protection, under-current detection and fault protection.

The Magnum PS14 PoE Power Source Switches are Ideally Suited for VOIP Phone, PoE Powered Digital Clock, Outdoor PoE Video Cameras into A Secure LAN and Much More

## Features

- Four PoE ports in a small heavy-duty Ethernet switch
- The switch and attached PoE devices are powered from an integral -48V DC terminal block
- Two models for two application environments:
  - PS14H Hardened for the Factory Floor
  - PS14P Premium-rated for Outdoors
- RJ45 ports support standard auto-negotiation and auto-cross to enable attaching any 10 Mb or a 100 Mb device, regular or PoE

# Applications

The PS14 is a standards-compliant way to power and connect a few small Ethernet devices at the edge of a network where AC power is either not available or not cost-effective. Increasingly, small powered devices (PD) such as IP phones, video cameras, wireless access points, digital clocks, special purpose radios, IP phones, industrial sensors and laptop computers benefit with increased installation flexibility from the PS14's PoE-PSE capabilities. Traditionally, a mid-span patch panel device could have been connected to a standard Ethernet switch, and insert power onto a PD device — a configuration requiring two devices to achieve PoE. The PS14 integrates both the Ethernet switch and the PoE power functions into one unit, saving costs and space, and increasing reliability for the application.

- Connect a VOIP phone, a PoE powered digital clock, and an IP badge reader in an outdoor guard station into an indoors LAN using standard Ethernet twisted-pair copper cabl
- Connect an IP wireless access point in a warehouse into the factory LAN
- For surveillance, connect a couple of outdoor PoE video cameras into a secure LAN
- Same as previous, but combine with a Magnum CS14P-48VDC for a fiber optic up-link

**Hardened for Factory Floor**

The orange-label Magnum PS14H Hardened units are for factory floor applications. The PS14H models are built with high-grade components and are constructed using special thermal techniques (patent pending) and a metal case for heavy duty industrial jobs. The ambient temperature rating is for industrial use. No internal air flow is required for cooling, so it resists dust, dirt, moisture, smoke and insects. Mounting options include stand-alone panel-mounting, DIN-Rail, or rack-mount tray.

**Premium-rated for Outdoors**

The red-label Magnum PS14P Premium-rated units are for temperature uncontrolled applications, typically located outdoors. The PS14P models are built with premium-grade extended temperature components, and use special thermal techniques (patent pending). When used outdoors, the PS14P should be protected from falling rain. Mounting options include stand-alone panel-mounting, DIN-rail, or rack-mount tray.

A 4-port "go anywhere" Magnum PS14 Switch is a versatile and handy PoE solution. The PS14 provides edge access Ethernet ports in a convenient and compact package. For fiber connectivity or additional non-PoE ports, simply add a Magnum CS14 Converter Switch (two RJ45 and one fiber) or an ES42 Edge Switch (6 ports) with all fiber port types available.

The Magnum PS14 family of Power Source Convenient Switches are designed and manufactured in the USA and backed by a three-year warranty.

PS14 terminal block area, shown with panel mount bracket.

PS14 DIN-RAIL-LATCH illustrated here.

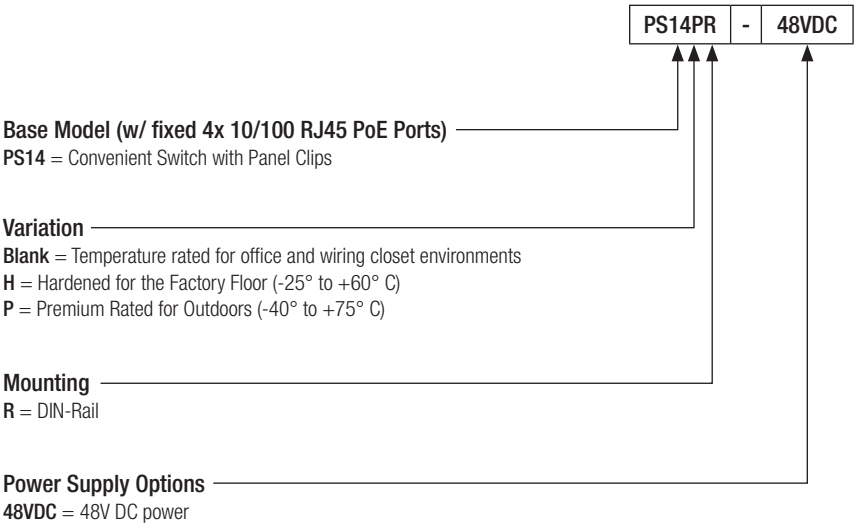
# Product Information - Magnum PS14

| Type | PS14H | PS14P |
|---|---|---|
| Product Description | Magnum Hardened PoE Power Source Convenient Switch, four 10/100 RJ45 ports in a compact package, rated for factory floor environments. All four RJ45 Ethernet ports support Power Source PoE per the IEEE 802.3af standard. Includes integral -48V DC terminal block for power input. | Magnum Premium-rated PoE Power Source Convenient Switch, four 10/100 RJ45 ports in a compact package, rated for temperature un-controlled (outdoor) environments. All four RJ45 Ethernet ports support Power Source PoE per the IEEE 802.3af standard. Includes integral -48V DC terminal block for power input. |
| Port Type and Quantity | 4 x 10/100BASE-TX | 4 x 10/100BASE-TX |
| Order Number | PS14H | PS14P |
| Port Connectors | RJ45 with Auto-Cross 100BASETX and 10abase-T. Shielded 8-Pin female. Supports shielded (STP) & unshielded (UTP) Cat. 5 and higher. PoE power is delivered to the unused (spare) twisted-pair pins. | |
| **Network Standards** | | |
| Ethernet IEEE 802.3af PoE | Yes | |
| IEEE 802.3 | Yes | |
| IEEE 802.3u | Yes | |
| IEEE 802.1p | Yes | |
| 100BASE-TX | Yes | |
| 10BASE-T | Yes | |
| NOTE: Data packets that have the 4-bytes tagged VLAN field (IEEE 802.1q) inserted in them are received and transmitted unchanged by all PS14's. | | |
| **Performance** | | |
| Date Rate | 10/100 Mb, FDX and HDX modes on all 4 ports | |
| Auto-negotiation and Auto-cross | MDI-MDIX on all 4 RJ45 ports. Occurs at LINK-enabled. No cross-over cable required. | |
| Non-blocking switching | 128KB packet buffer memory | |
| Address Buffer Storage | 2K addresses | |
| Address Buffer Age-out Time | 300 seconds | |
| **Power Input** | | |
| Total Power Consumption | 66 watts max. (1.4A @48VDC). Terminal block for -48V DC input (range of 46 to 60V DC), built-in for +, -, ground. The 8-15V DC jack is also present, but can only be used to power the PS14 unit when no PoE devices are attached. | |
| **Power Output (PoE available on all four RJ45 ports via Ethernet twisted pair cabling on port pins 4, 5(+), 7,8(-) Uses spare pairs, not data pairs)** | | |
| 802.3af Power Consumption | 61.6 watts max. (15.4/port) | |
| PoE Ports Output Voltage | 44 to 57 VDC Over-current Protection, per port: resettable fuse | |
| **LED Indicators (dual, front and end, port 4 front only)** | | |
| Power | On for 48V power applied to the PS14 unit | |
| PoE Ports | 1,2,3,4: ON when delivering power | |
| 10/100 Per Port | Steady ON for 100 Mb speed, OFF for 10 Mb speed | |
| LK/ACT Per Port | Steady ON for LINK w/no traffic, blinking for Activity | |
| F/H Per Port | 1,2,3 in end: Steady ON for F/D mode, OFF for H/D mode. | |
| **VLANs Support** | | |
| Data packets that have the 4 bytes tagged VLAN field (IEEE 802.1q) inserted in them are received and transmitted unchanged by all CS14 Converter Switches. | | |
| **Operating Environment** | | |
| Ambient Temp. Range (UL 60950) | -25°C to 60°C (long term per independent agency tests - UL 60950) | -40°C to 75°C (long term per independent agency tests - UL 60950) |
| Ambient Temp. Range (IEC 60068) | –40°C to 85°C (short per type tests - IEC60068) | –50°C to 100°C (short per type tests - IEC60068) |
| Cold Start | -20°C | -40°C |
| Storage Temperature | -40° to 185°F (-40°to 85°C) | |
| Ambient Relative Humidity | 5% - 95% (non-condensing) | |
| Altitude | -200 to 50,000 ft. | |
| Conformal Coating | Optional | |

# Product Information - Magnum PS14 (continued)

| | |
|---|---|
| **Packaging** | |
| **Enclosure** | Robust sheet metal (steel) IEC 529 rated IP40 |
| **Dimensions** | 3.5 in H x 3.0 in W x 1.0 in D (8.9 cm x 7.6 cm x 2.5 cm) |
| **Weight** | 9.6 oz (272g) |
| **Colling Method** | Case used as a heat sink |
| **Mounting** | |
| **Metal Panel Mounting Clips** | Included |
| **DIN-Rail Mounting Option** | Model # DIN-RAIL-LATCH |
| **Rack-mount Option** | Model MC14-TRAY, Depth: 6.0", Width 17", Height 2.25"(15 cm D x 43cm W x 5.7cm H) |
| **Agency Approval and Standards Compliance** | |
| **UL Listing** | UL 60950, cUL, CE, Emissions meet FCC Part 15, Class A (see footnote). |
| **Class 1 Div 2** | Yes - Environmental Standard for Electric Power Substations) |
| **EN 300 386** | Yes - EMC and Operating Conditions Class C for Power Substations |
| Footnote: These products are tested and approved under IEC61850 for use in Class C sheltered locations where neither temperature nor humidity are controlled. The equipment needs to be protected against solar radiation, rainfall, other precipitations, and wind. UL has not approved these products for Annex-T outdoor use. | |
| **Warranty** | |
| **Warranty** | Three Years |

# Magnum PS14 Configuration Guide




# PS14 Accessories

| Model No. | Description |
|---|---|
| **DIN-RAIL-MC2** | DIN-Rail mounting hardware for "14-series" CS or MC or ES42/ ESD42 Switches |
| **DUAL-SRC-24KIT** | Cable kit for 24VDC input to the DC power input jack of one ES42/ESD42, any 24VDC model. |
| **MC14-TRAY** | Rack-mount tray for "14-series" CS or MC or ES42/ESD42 Switches, 2.25"H, up to 16 units mix-match. |
| **MC14-TR+PS9** | Same as MC14-TRAY, but includes the 9vdc PS and ten connectors for CS14, CSN14, 14E, ES42/ESD42 types. The power supply is autoranging 110-240vac, 50-60Hz, rated at 40 watts and 50°C. |

# 4K8 8-port Ethernet 10/100 Switch, 4K-Series

## Boosting the performance of Ethernet LANs with the flexibility of both twisted-pair and a bonus configurable

Magnum Model 4K8 Ethernet 10/100 Switches boost the performance of Ethernet LANs, with the flexibility of both twisted-pair and a bonus fiber port. The fiber port, an additional or 9th port, may be configured from a variety of user-selected fiber connector and fiber cable types. The twisted-pair ports are 10/100 auto-negotiating.

The “future-proof” fiber port is normally 100Mb speed with factory default setting to operate in full-duplex mode. 100Mb fiber connector types available include multi-mode ST, SC, MV45 and MTRJ, and single-mode 20km or single-mode 40km “long reach” SC. Alternatively, for 10 Mb fiber, a multi-mode half-duplex ST-type port option is available. The optional fiber port is normally configured and tested with the Magnum 4K8 unit in the factory, but may be configured in the field.

Magnum 4K8 Switches are easy to install and use. Addresses of attached nodes are automatically learned and maintained, adapting the switching services to network changes and expansions to provide plug-and-play operation. “Reverse” models with front-mounted ports and LEDs, or with front-mounted LEDs, rear ports and power connection, are available.

The Magnum 4K-Series, with store-and-forward switching, filter all faulty packets to minimize traffic congestion and are non-blocking. Magnum Model 4K8 Switches come in a convenient rack-mountable package; have a rugged metal case and an auto-ranging power supply for operation with AC power worldwide. “Carrier Class” and “Industrial Strength” models with optional DC input power features are also available. The 4KSeries and all Magnum products are made in the USA and are backed by a three-year warranty.

Magnum 4K8 Switches provide eight 10/100 RJ45 ports plus a configurable 100 Mb fiber port. All ports are switching and support full- and half-duplex as well as auto-negotiation on
TP ports. Plus, they areeasy to install and use.

## Features

- High performance non-blocking operation, plug-and-play installation for switching services, transparent to system software
- Has a compact 1U package for installation in rack cabinets, with metal case and auto-ranging internal power supply
- Available options include -48VDC, 24VDC, and 125VDC power, dual-source, NEBS and ETSI certification, “Reverse” rack-mount, ETSI and 23” Telco brackets, Class B EMI and extended temperature range operation

# Applications

In common applications, groups of standard dual-speed 10/100 hubs, 10 Mb hubs, or 100 Mb hubs and switches would form a series of subnets for workgroups or multi-system power users. Each subnet would be served by a separate switched port on a Magnum 4K-Series, and each of these subnets would have full 100Mb or 10Mb bandwidth, operating in either half-or full-duplex mode. Local traffic on one subnet, either 100 Mb or 10 Mb, is switch-isolated from the other subnets for high overall network performance.

# Technical Information

| | |
|---|---|
| **Performance** | |
| **Ports 1-8** | 100 or 10 Mb, full- or half-duplex mode per port, individually determined<br>10/100 auto-negotiating<br>Internal jumper can select 100-only |
| **Port 9** | Optional 100 Mb Fiber Bonus Port: (multi- or single-mode) based on fiber connector part.<br>FDX or HDX (default is FDX mode – internal jumper can select FDX-only)<br>10 Mb fiber also available |
| **All Ports** | Processing type: Non-blocking, Store and Forward with IEEE 802.3x full-duplex flow control<br>System aggregate forwarding rate: 1.2M pps (packets per second)<br>System (8p) aggregate filter rate: 1.2M pps for all ports<br>Address table: 16K nodes, self-learning, with address aging<br>Packet buffers: 1MB dynamic<br>Latency: 5µs + packet time max (TX - TX, TX - FX, FX - FX)<br>PDV: 50BT |
| **Network Standards** | |
| **All Ports** | IEEE 802.3u: 100BASE-TX, -FX, IEEE 802.3: 10BASE-T<br>Auto-negotiation on TP, IEEE 802.3u |
| **All 10 Mb Ports** | Obey the rules for configuring 10Mb Ethernet |
| **All 100 Mb Ports** | Use Fast Ethernet rules |
| **Operating Environment** | |
| **Ambient Temperature** | 25°F to 140°F (-5°C to 60°C), optional extended range |
| **Storage Temperature** | -40°F to 185°F (-40°C to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing)<br>For conformal coating (humidity protection) option: request quote |
| **Altitude** | -200 to 13,000 ft (-60 to 4000 m) |
| **Up-Link, Port #1** | |
| **Description** | Thumb-operated slide switch, converts Port #1 from a regular (= position) port to a crossover (X position) Up-Link for on/off connection to an upstream or cascaded hub or switch |
| **Network Cable Connectors** | |
| **RJ45 Ports** | Shielded, female |
| **100 Mb** | Category 5 UTP/STP |
| **10 Mb** | Cat. 3,4, 5 UTP |
| **Fiber Ports** | Zero, One or Two / unit |
| **Connector Options** | Multi-mode FX-ST, SC, MTRJ; single-mode 20Km SC, and 40Km "long reach" single-mode SC |
| **Power Supply** | |
| **AC Power Supply (Internal)** | AC Power Connector: IEC-type, male recessed, ON/OFF switch.<br>Power Input Voltage: 100 - 240V AC (auto ranging)<br>Power Input Frequency: 47 to 63 Hz<br>Power Consumption: 10 Watts typical, 14 Watts max with FPM |
| **DC Power Supply** | -48V DC: Input -36 to -70V DC<br>24V DC: Input 20 to 40V DC<br>125V DC: Input 120 to 160V DC<br>Std. Terminal Block: "-, GND, +"<br>Power Consumption: Same as AC |
| **Dual Power Source (optional)** | Magnum 4K8 may be ordered with optional Dual DC power input for continuity of operation when either one of the DC input sources is interrupted<br>Available for -48V DC, 24V DC and 125V DC input types |

# Technical Information (continued)

| | |
|---|---|
| **Mechanical** | |
| **Enclosure** | Rugged high-strength sheet metal, suitable for stand- alone or 1U rack mounting |
| **Dimensions** | 1.75 in H x 17.0 in W x 9.0 in D<br>(4.45 cm H x 43.2 cm W x 22.9 cm D) |
| **Weight** | 3.1 lb. (1.4kg) |
| **Mounting** | Rack-mounting brackets: 19" included<br>ETSI and 23" Telco optional |
| **Cooling Method** | Fan cooled, internal, on chip |
| **Switches on Chassis, Manual** | |
| **Standard AC Models** | Power ON/OFF |
| **Fiber Ports** | Full/half duplex |
| **LED Indicators on Chassis** | |
| **Power** | Steady ON when power applied |
| **ERR** | Self-test at power-up failed |
| **Reverse Model Option** | Designed with the LED indicators in front and all wiring and power connections in rear, normally rack-mounted |
| **LED Indicators Per Port** | |
| **LINK/Act** | Steady ON for LINK with no traffic, blinking indicates port is transmitting and receiving |
| **Speed** | ON=100 Mb, OFF=10 Mb |
| **F/H** | Steady ON for Full duplex, OFF for Half duplex |
| **Agency Approvals** | |
| **All Models** | UL Listed (UL60950), cUL, CE<br>Emissions meet FCC Part 15, Class B |
| **Optional** | ETSI and NEBS L3 Certified |
| **Warranty** | |
| **Made in USA** | Three [3] years |

# Magnum 4K8 Configuration Guide

| 4K8R | - | FPM-MSC | - | 24VDC |
|---|---|---|---|---|

**Base Model**
**4K8** = Fixed 8x 10/100 RJ45 ports

**Mounting**
**R** = Reverse Model

**Bonus Port Modules**
**FPM-MSC** = 100 Mb multi-mode FX SC connector
**FPM-MST** = 100 Mb multi-mode FX ST connector
**FPM-MTRJ** = 100 Mb multi-mode FX MTRJ small form factor connector
**FPM-SSC** = 100 Mb 20Km single-mode FX SC connector
**FPM-SSCL** = 100 Mb 40Km "Long Reach" single-mode FX SC connector
**K8PM-RJ45** = RJ45 Port 100 Mb fixed speed, full- or half-duplex, up-link push button (not useable in 8000X)
**FPM10-MST** = 10 Mb multi-mode FL ST connector – half duplex (default) or full-duplex
**FPM-BLNK** =Blank module with no fiber port, included in 4K switch unit when no fiber port option is selected or configured

**Power Supply Options**
**24VDC** = 24V DC power
**48VDC** = 48V DC power
**125VDC** = 125V DC power
**AC** = AC power

# 4K16 16-port Ethernet 10/100 Switch

## Boosting the performance of medium sized Ethernet LANs with the flexibility of both twisted-pair and fiber-switched ports

Magnum Model 4K16 Switches boost the performance of medium-sized Ethernet LANs, with the flexibility of both twisted-pair and fiber switched ports. Fiber ports may number zero, one or two, and a variety of user selected fiber connector types may be configured. The Magnum 4K-Series provides the switching speed and the reliability to smoothly support multiple workgroups, each with its own switched 100Mb or 10 Mb domain, for increased network performance.

The Magnum 4K16 Switch offers application flexibility with a series of optional fiber connector types. Users may choose a fiber port type (100 Mb FX-ST, SC, MTRJ) and fiber cable mode (multi-mode and single-mode) which are configurable using a family of 1- or 2-port modules. The twisted-pair ports are 10/100 auto-negotiating.

Magnum 4K16 Switches are easy to install and use. Addresses of attached nodes are automatically learned and maintained, adapting the switching services to network changes and expansions to provide plug-and-play operation. LEDs provide status information on each port. “Reverse” models with front-mounted ports and LEDs, or with front-mounted LEDs, rear ports and power connections, are also available.

The Magnum Model 4K16 Switches are non-blocking on all 16-ports, and include large 2 MB packet buffers for advanced performance, even with unbalanced loads. The dynamic 2K-node address table allows the 16-port Magnum 4K16 to support medium-sized networks. The entire Magnum 4KSeries, with store-and-forward switching, filters all faulty packets to minimize traffic congestion.

Magnum Model 4K16 Switches are provided in a rack-mountable package and have a rugged metal case and an auto-ranging power supply for operation with standard AC power worldwide. “Carrier Class” and “Industrial Strength” models with optional DC input power features are also available. The 4K-Series and all other Magnum products are designed and manufactured in the USA and backed by a three-year warranty

Magnum 4K16 Switches provide 16 switched ports, with two ports that can be up to 100 Mb fiber. All ports are switching and support full- and half-duplex as well as auto-negotiation on TP ports. Plus, they are easy to install and use.

## Features

- High performance non-blocking operation, plug-and-play installation for switching services, transparent to system software
- Has a compact 1U package for installation in rack cabinets, with metal case and auto-ranging internal power supply
- Available options include -48VDC, 24VDC, and 125VDC power, dual-source, NEBS and ETSI certification, “Reverse” rack-mount, ETSI and 23” Telco brackets, Class B EMI and extended temperature range operation

# Applications

In a common application, groups of standard dual-speed 10/100 hubs, 10 Mb hubs, or 100 Mb hubs and switches would form a series of subnets for workgroups or multi-system power users. A separate switched port on a Magnum 4K-Series Switch would serve each subnet, and each of these subnets would have full 100 Mb or 10 Mb bandwidth, operating in either half- or full-duplex mode. Local traffic on one subnet, either 100 Mb or 10 Mb, is switch-isolated from the other subnets for high overall network performance.

# Technical Information

| | |
|---|---|
| **Performance** | |
| **RJ45 Ports** | 100 or 10 Mb, full- or half-duplex mode per port, individually determined<br>10/100 auto-negotiating, FDX/HDX<br>Internal jumper can select 100-only |
| **Fiber Ports** | Optional multi-mode and single-mode<br>100 Mb speed per port, based on the fiber connector part<br>FDX or HDX selection, default is FDX |
| **All Ports** | Processing type: Non-blocking, Store and Forward with IEEE 802.3x full-duplex flow control<br>System aggregate forwarding rate: 2.3M pps (all ports 100 Mb speed)<br>System (16p) aggregate filter rate: 2.3M pps for all ports |
| **Address Table** | 32K nodes, self-learning, with address aging |
| **Packet Buffers** | 2 MB dynamic |
| **Latency** | 5µs + packet time max (TX – TX, TX – FX, FX – FX), PDV: 50BT |
| | |
| **All Ports** | IEEE 802.3u: 100BASE-TX, -FX, IEEE 802.3: 10BASE-T<br>Auto-negotiation on TP, IEEE 802.3u |
| **All 10 Mb Ports** | Obey the rules for configuring 10Mb Ethernet |
| **All 100 Mb Ports** | Use Fast Ethernet rules |
| **Operating Environment** | |
| **Ambient Temperature** | 25°F to 140°F (-5°C to 60°C), optional extended range |
| **Storage Temperature** | -40°F to 185°F (-40°C to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing)<br>For conformal coating (humidity protection) option: request quote |
| **Altitude** | -200 to 13,000 ft (-60 to 4000 m) |
| **Up-Link, Port #1** | |
| **Description** | Thumb-operated slide switch, converts Port #1 from a regular (= position) port to a crossover (X position) Up-Link for on/off connection to an upstream or cascaded hub or switch |
| **Network Cable Connectors** | |
| **RJ45 Ports** | Shielded, female |
| **100 Mb** | Category 5 UTP/STP |
| **10 Mb** | Cat. 3,4, 5 UTP |
| **Fiber Ports** | Zero, One or Two / unit |
| **Connector Options** | Multi-mode FX-ST, SC, MTRJ; single-mode 20Km SC, and 40Km "long reach" single-mode SC |
| **Power Supply** | |
| **AC Power Supply (Internal)** | AC Power Connector: IEC-type, male recessed, ON/OFF switch.<br>Power Input Voltage: 100 - 240V AC (auto ranging)<br>Power Input Frequency: 47 to 63 Hz<br>Power Consumption: 19 Watts typical, 25 Watts max with FKM |
| **DC Power Supply** | -48V DC: Input -36 to -70V DC<br>24V DC: Input 20 to 40V DC<br>125V DC: Input 120 to 160V DC<br>Std. Terminal Block: "-, GND, +"<br>Power Consumption: Same as AC |
| **Dual Power Source (optional)** | Magnum 4K16 may be ordered with optional Dual DC power input for continuity of operation when either one of the DC input sources is interrupted<br>Available for -48V DC, 24V DC and 125V DC input types |

# Technical Information (continued)

| | |
|---|---|
| **Mechanical** | |
| **Enclosure** | Rugged high-strength sheet metal, suitable for stand- alone or 1U rack mounting |
| **Dimensions** | 1.75 in H x 17.0 in W x 9.0 in D<br>(4.45 cm H x 43.2 cm W x 22.9 cm D) |
| **Weight** | 3.2 lb. (1.5kg) |
| **Mounting** | Rack-mounting brackets: 19" included<br>ETSI and 23" Telco optional |
| **Cooling Method** | Fan cooled, internal, on chip |
| **Switches on Chassis, Manual** | |
| **Standard AC Models** | Power ON/OFF |
| **Fiber Ports** | Full/half duplex |
| **LED Indicators on Chassis** | |
| **Power** | Steady ON when power applied |
| **ERR** | Self-test at power-up failed |
| **Reverse Model Option** | Designed with the LED indicators in front and all wiring and power connections in rear, normally rack-mounted |
| **LED Indicators Per Port** | |
| **LINK/Act** | Steady ON for LINK with no traffic, blinking indicates port is transmitting and receiving |
| **Speed** | ON=100 Mb, OFF=10 Mb |
| **F/H** | Steady ON for Full duplex, OFF for Half duplex |
| **Fiber Ports** | When present, the 1 or 2 fiber ports render the corresponding copper ports inoperative.<br>LEDs for fiber ports have the same meaning as for copper ports. |
| **Agency Approvals** | |
| **All Models** | UL Listed (UL60950), cUL, CE<br>Emissions meet FCC Part 15, Class B |
| **Optional** | ETSI and NEBS L3 Certified |
| **Warranty** | |
| **Made in USA** | Three [3] years |

# Magnum 4K16 Configuration Guide

| 4K16R | - | FPM-MSC | - | 24VDC |
|---|---|---|---|---|

**Base Model**
**4K16** = Fixed 16x 10/100 RJ45 ports

**Mounting**
**R** = Reverse Model

**Bonus Port Modules**
**FKM-1SC** = 100 Mb multi-mode FX SC connector
**FKM-1ST** = 100 Mb multi-mode FX ST connector
**FKM-1MTRJ** = 100 Mb multi-mode FX MTRJ small form factor connector
**FKM-1SSC** = 100 Mb 20Km single-mode FX SC connector
**FKM-1SSCL** = 100 Mb 40Km "Long Reach" single-mode FX SC connector
**FKM-2SC** = 2x 100 Mb multi-mode FX SC connectors
**FKM-2ST** = 2x 100 Mb multi-mode FX ST connectors
**FKM-2MTRJ** = 2x 100 Mb multi-mode FX MTRJ small form factor connectors
**FKM-2SSC** = 2x 100 Mb 20Km single-mode FX SC connectors.
**FKM-2SSCL** = 2x 100 Mb 40Km "long reach" single-mode FX SC connectors
**FKM-BLNK** = Blank module with no fiber port, included in 4K switch unit when no fiber port option is selected or configured

**Power Supply Options**
**24VDC** = 24V DC power
**48VDC** = 48V DC power
**125VDC** = 125V DC power
**AC** = AC power

# 4K24 24-port Ethernet 10/100 Switch, 4K-Series

## Boosting the performance of large Ethernet LANs with the flexibility of both twisted-pair and fiber-switched ports

Magnum 24-port 4K24F switches offer application flexibility with a seris of optional fiber connector types. All applicable fiber port types (100 Mb FX-ST, SC, MTRJ) and fiber cable modes (multi- and single-mode) are configurable using a family of 1-or 2-port modules. The 22 twisted-pair ports are 10/100 auto-negotiating. The 1 or 2 fiber ports, when present, render the corresponding two copper ports inoperative.

Magnum 4K24 switches are easy to install and use. Addresses of attached nodes are automatically learned and maintained, adapting the switching services to network changes and expansions to provide plug-and-play operation. LEDs provide status information on each port. Models with front-mounted ports and LEDs , or with front-mounted LEDs, rear ports and power connection, are available.

Magnum 4K24 switches are non-blocking on all 24 ports and include large 1 MB packet buffers for advanced performance, even with unbalanced loads. The dynamic 2K-node address table allows the 24-port Magnum 4K24F and 4K24C models to support large networks.

Magnum 4K24 switches provided high port density in a rack-mountable package; have a rugged metal case and an auto-ranging power supply for operation with standard AC power worldwide. Models with optional DC input power are available. The 4K-Series and all other Magnum products are designed and manufactured in the USA and backed by a three-year warranty.

Magnum 4K-Series provides the switching speed and reliability needed to smoothly support multiple workgroups, each with its own switched 100 Mb or 10 Mb domain, for increased network performance

## Features

- 24 switched ports – up to two of them may be 100 Mb fiber
- High performance non-blocking operation, plug-and-play installation for switching services, transparent to system software
- All ports are switching and support full- and half-duplex; auto-negotiation on TP ports
- Has a compact 1U package for installation in rack cabinets, with metal case and auto-ranging internal power supply
- Available options include -48VDC, 24VDC, and 125VDC power, dual-source, NEBS and ETSI certification, “Reverse” rack-mount, ETSI and 23” Telco brackets, Class B EMI and extended temperature range operation

# Applications

These switches are designed for use in organizations with multiple workgroups, remote offices and network traffic centers. In a common application, the 4K24 would be at the center of a departmental LAN, with high performance users and servers connected to most ports. In addition, groups of 10 Mb hubs and switches would form a series of subnets of other users. Local traffic on one subnet or port, either 100 Mb or 10 Mb, is switch-isolated from the other subnets for high overall network performance.

# Technical Information

| | |
|---|---|
| **Performance** | |
| **RJ45 Ports** | 100 or 10 Mb / second speed, full- or half-duplex mode per port, individually determined<br>10/100 auto-negotiating<br>FDX/HDX – Internal jumper can select 100-only |
| **Fiber Ports (multi-mode and single-mode)** | 100 Mb speed per port based on the fiber connector part<br>FDX or HDX (default is FDX, internal jumper can select FDX only) |
| **All Ports** | Processing type: Store and Forward with IEEE 802.3x full-duplex flow control, non-blocking<br>System aggregate forward and filter rate: 3.6M pps, all ports 100 Mb full speed |
| **Address Table** | 2K nodes, self-learning, with address aging |
| **Packet Buffers** | 1 MB dynamic |
| **Latency** | Less than 5µs not including packet time (TX - TX, TX - FX, FX - FX) |
| **PDV** | 50BT |
| **Network Standards** | |
| **All Ports** | IEEE 802.3u: 100BASE-TX, -FX, IEEE 802.3: 10BASE-T<br>Auto-negotiation on TP, IEEE 802.3u |
| **All 10 Mb Ports** | Obey the rules for configuring 10Mb Ethernet |
| **All 100 Mb Ports** | Use Fast Ethernet rules |
| **Operating Environment** | |
| **Ambient Temperature** | 25°F to 140°F (-5°C to 60°C), optional extended range |
| **Storage Temperature** | -40°F to 185°F (-40°C to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing)<br>For conformal coating (humidity protection) option: request quote |
| **Altitude** | -200 to 13,000 ft (-60 to 4000 m) |
| **Up-Link, Port #1** | |
| **Description** | Uses the first RJ45 port, which has two connectors (only one can be used at a time). Plug into #1 for use as a regular user segment port or into #1X for use as a crossover (X position) up-link port for connection to another switch or hub |
| **Network Cable Connectors** | |
| **RJ45 Ports** | Shielded, female |
| **100 Mb** | Category 5 UTP/STP |
| **10 Mb** | Cat. 3,4, 5 UTP |
| **Fiber Ports** | Zero, One or Two / unit |
| **Connector Options** | Multi-mode FX-ST, SC, MTRJ; single-mode 20Km SC, and 40Km "long reach" single-mode SC |
| **Power Supply** | |
| **AC Power Supply (Internal)** | AC Power Connector: IEC-type, male recessed, ON/OFF switch.<br>Power Input Voltage: 100 - 240V AC (auto ranging)<br>Power Input Frequency: 47 to 63 Hz<br>Power Consumption: 16 Watts typical, 20 Watts max |
| **DC Power Supply** | -48V DC: Input -36 to -70V DC<br>24V DC: Input 20 to 40V DC<br>125V DC: Input 120 to 160V DC<br>Std. Terminal Block: "-, GND, +"<br>Power Consumption: Same as AC |
| **DC Dual Power Source (optional)** | Magnum 4K24 may be ordered with optional Dual DC power input for continuity of operation when either one of the DC input sources is interrupted<br>Available for -48V DC, 24V DC and 125V DC input types |

# Technical Information (continued)

| | |
|---|---|
| **Mechanical** | |
| **Enclosure** | Rugged high-strength sheet metal, suitable for stand- alone or 1U rack mounting |
| **Dimensions** | 1.75 in H x 17.0 in W x 9.0 in D<br>(4.45 cm H x 43.2 cm W x 22.9 cm D) |
| **Weight** | 3.3 lb. (1.5kg) |
| **Mounting** | Rack-mounting brackets: 19" included<br>ETSI and 23" Telco optional |
| **Cooling Method** | Fan cooled, internal @ 7 cfm |
| **Reverse Model Option** | |
| **Available by Request** | Designed with the LED indicators in the front and all wiring and power connections in the rear, normally rack-mounted |
| **Switches on Chassis, Manual** | |
| **Standard AC Models** | Power ON/OFF |
| **Fiber Ports** | Full/half duplex |
| **LED Indicators on Chassis** | |
| **Power** | Steady ON when power applied |
| **LED Indicators Per Port** | |
| **FDX/Col** | Steady ON for FDX, blinking for HDX collisions |
| **LINK/Act** | Steady ON with LINK enabled, blinking for RX port activity |
| **Speed** | ON=100 Mb, OFF=10 Mb or no link |
| **Fiber Ports** | When present, the 1 or 2 fiber ports render the corresponding copper ports inoperative.<br>LEDs for fiber ports have the same meaning as for copper ports |
| **Agency Approvals** | |
| **All Models** | UL Listed (UL1950), cUL, CE |
| **All Models** | Emissions meet FCC Part 15, Class B |
| **Optional** | ETSI and NEBS L3 Certified |
| **Warranty** | |
| **Made in USA** | Three [3] years |

# Magnum 4K24 Configuration Guide

| 4K24FR | - | FPM-MSC | - | 24VDC |
|---|---|---|---|---|

**Base Model**
**4K24F** = Fixed 22x 10/100 RJ45 ports + 2 user selectable FX ports
**4K24C** = Fixed 24x 10/100 RJ45 "Copper" ports

**Mounting**
**R** = Reverse Model

**Bonus Port Modules**
**FKM-1SC** = 100 Mb multi-mode FX SC connector
**FKM-1ST** = 100 Mb multi-mode FX ST connector
**FKM-1MTRJ** = 100 Mb multi-mode FX MTRJ small form factor connector
**FKM-1SSC** = 100 Mb 20Km single-mode FX SC connector
**FKM-1SSCL** = 100 Mb 40Km "Long Reach" single-mode FX SC connector
**FKM-2SC** = 2x 100 Mb multi-mode FX SC connectors
**FKM-2ST** = 2x 100 Mb multi-mode FX ST connectors
**FKM-2MTRJ** = 2x 100 Mb multi-mode FX MTRJ small form factor connectors
**FKM-2SSC** = 2x 100 Mb 20Km single-mode FX SC connectors.
**FKM-2SSCL** = 2x 100 Mb 40Km "long reach" single-mode FX SC connectors
**FKM-BLNK** = Blank module with no fiber port, included in 4K switch unit when no fiber port option is selected or configured

**Power Supply Options**
**24VDC** = 24V DC power
**48VDC** = 48V DC power
**125VDC** = 125V DC power
**AC** = AC power

# Magnum 6KL Industrial Ethernet Managed Edge Switch

The high performance 6KL base unit comes with four 10/100 copper ports (either regular or PoE). Up to four 100Mb fiber ports or up to four more 10/100 copper ports, or combinations, may also be configured.

### High Performance

The Magnum 6KL Managed Edge Switches incorporate reliability and security for harsh environments, especially "edge" applications on the periphery of the network where industrial devices are connected. The high performance 6KL base unit comes with four 10/100 copper ports (either regular or standard 802.3af PoE). Up to 4 100Mb fiber ports or up to four more 10/100 copper ports, or combinations, may also be configured. Two Gb ports may be configured as SFP ports or as 10/100/1000 copper ports.

### Network Software

The Magnum 6KL comes with the best-of-breed MNS-6K managed networks software, proven in tens of thousands of hardened applications over 10 years of service. It features GUI ease of use, Secure Web Management, SNMPv2,v3 management, 802.1p QoS Prioritization, Tag-based VLANs, IGMP Snooping and IGMP-L2 multicast management, port security, and a choice of software redundancy options including RSTP-2004 with industry leading fault recovery times in rings and meshes, and GarrettCom's S-Ring product which supports unmanaged switches as part of resilient rings. MNS-6K-SECURE adds more security features such as SSH, RADIUS and TACACS+ support, SFTP, DHCP Server, Syslog events, TFTP and SNTP Server. See the MNS-6K datasheet for more information.

The Magnum 6KL is Ideal for Building a Switched, Hardened Ethernet Network Infrastructure and Connecting Edge Devices such as PLCs and LEDs with Upstream Switches or Routers

## Features

- Entry-level Heavy Duty Managed Switch for industrial networking applications
- Full-featured MNS-6K software in a small Edge Switch package, DIN-Rail or panel mounting
- Configurable, all 100Mb fiber port types, 10/100 copper ports, Gb with SFPs
- Metal case used as a heat sink (no fans), rated IP52
- DC power: 12V, 24V, 48V, 125V, 250VDC, Dual-Source; Universal
- PoE+ (802.3at) possible on four port.

### Applications

Magnum 6KLs are ideal for building a switched, hardened Ethernet network infrastructure, connecting edge devices such as PLCs and IEDs with upstream switches or routers. Designed for use in industrial and heavy duty outdoor applications such as industrial video surveillance systems with PoE, power utility substations, traffic control and transportation facilities, tariffed carrier field facilities, or oil and gas, the hardened Magnum 6KL handles stressful workloads.

### Heat Sink Metal Casing

The 6KL's sealed metal case serves as a heat sink, enabling the 6KL to operate in the harshest industrial grade environments and achieves high EMI noise immunity. The 6KL is available with Conformal Coating options and is rated IP52 for dust and water resistance.

### Power Supplies

The 6KL can be configured with the user's choice of DC power supplies: 12V and 24V for factory floor, 48V for tariffed carrier field facilities and for PoE-powered applications such as IP video surveillance, and 125V or 250V for substations. An internal AC power supply may also be chosen, universal AC for use worldwide.

### Agency Approvals and Compliance

The Magnum 6KL Managed Edge Switch has all appropriate agency approvals and compliance certifications, including third-party UL testing for safety and temperature rating, NEBS L3 compliance, IEC 61850 & IEEE 1613 for power utilities, and NEMA TS-2 for use in transportation systems outdoors.

### Warranty

Three years.

# Product Specifications

| Type | 6KL |
|---|---|
| **Product Description** | Magnum 6KL Configurable Managed Edge Switch, base unit with DC power supply and four 10/100 copper ports. May be configured with a variety of 10/100/1000 Mb fiber and copper port connector types via selection from a family of 6KL port modules per this 6KL Configuration Guide. 10 ports max. Heavy duty fully enclosed metal case used as a heat sink, rated IP52 for environmental protection, no fans. For licensed network management software information (MNS-6K, MNS-6K-SECURE, and S-Ring), see their respective data sheets. |
| **Mechanical** | |
| **Enclosure** | Steel case. Vertical panel-mounting brackets included. Console port: RJ-45 serial interface |
| **Console Port** | RJ-45 serial interface |
| **DIN-Rail Mounting** | Model # DIN-Rail-6KL, optional |
| **Enclosure Ingress Protection Rating** | IP52, per IEC 60529, and NEMA-3,3X. |
| **Cooling Method** | Convection, fully-enclosed ribbed-surface aluminum case used as a heat sink, designed for vertical mounting, no fans. |
| **Dimensions** | 8.0 in H x 1.75 in W x 6.0 in D in vertical panel-mount position. (20.3cm H x 4.4cm W x 15.2cm D) |
| **Weight** | 2.1 lbs (.95 kg) |
| **Network Standards** | |
| **Ethernet** | IEEE 802.3, 802.3ab, 802.1p:10BASE-FL;100BASE-TX,FX;1000BASE-SX,LX,ZX |
| **Auto-negotiation and Auto-Cross** | 10/100 TP and PoE, IEEE 802.3u. |
| All 100 Mb ports use Fast Ethernet rules. 1000 Mb ports use Gigabit rules. | |
| **Performance** | |
| **Gigabit Ports, 1000 Mb** | Configurable, standard 10/100/1000Mb copper or SFF transceiver modules for SX, ESX, LX, ZX , up to 2 Gigabit ports. |
| **Fiber Ports, 100 Mb** | SFF-FX (LC or MTRJ), multi-mode and single-mode for each type, max of three 100Mb fiber |
| **RJ-45 Ports** | 100 or 10 Mb speed, full- or half-duplex mode, per port, individual determined. 10/100 auto-negotiating & auto-cross, up to eight ports. PoE Ports, RJ-45 Power Sourcing per IEEE 802.3af, power on data pair. |
| **Processing Types** | Store and Forward with IEEE 802.3p QOS and IEEE 802.3x. |
| **All Ports Non-Blocking** | System aggregate forward and filter rate 4.17M pps.<br>Address table: 4K nodes, with address aging time of 300 seconds typical.<br>Packet buffers: 240 KB for 10/100 and 120KB for 1000 Mb<br>Latency: 6µs + packet time max (TX - TX, TX - FX, FX - FX, TX-G, G-G) |
| **AC Power Supply (Internal)** | |
| **AC Power Connector** | IEC-type, male recessed. |
| **Power Input AC** | 100 to 240 VAC, 47 to 63 Hz (auto ranging). |

# Product Specifications (continued)

| | |
|---|---|
| **DC Power Supply (Internal, floating ground for internal PCBs)** | |
| **Power Input** | 12V nominal (10 to 15V) 24V nominal (18 to 36V), 48V nominal (36 to 60V), 125V nominal (88 to 150V) 250V nominal (160 to 300V). |
| **Power Input for PoE** | Add up to 15 watts per PoE port to base unit power draw |
| **Power Consumption** | 20 watts typical for a fully-loaded fiber model with 2Gb, 15 watts typical for eight port copper and 100 Mb fiber model. |
| **Standard Terminal Block** | "-, GND, +" |
| **Dual Source** | -A, -B, +A, +B, chassis ground. |
| **DC Dual Power Source (Optional)** | |
| All Magnum 6KL DC models (12, 24, 48, 125, and 250 VDC) may be ordered with optional Dual-Source DC power input, for continuity of operation when either one of the DC input sources is interrupted. | |
| **LED Indicators (two sets) per RJ-45 Port** | |
| **LK** | Steady ON when twisted-pair link is operational. |
| **ACT** | ON with port activity 100/10 ON = 100Mb speed, OFF = 10Mb (Port-side LED set only). |
| **F/H** | ON for full-duplex, OFF for half-duplex (PoE only, port-side only) |
| **PoE** | ON for power to PD device. Note: LK/ACT port becomes steady ON for Link, blinking for activity. |
| **LED Indicators (two sets) per 100Mb Fiber Ports** | |
| **LK** | Steady ON when fiber link is operational. |
| **ACT** | ON with port activity |
| **LED Indicators per Gb Port** | |
| **LK** | Steady ON when link is operational. |
| **ACT** | ON with port activity 1000Mb ON = Gb speed (Top-side LED set only, copper only)100/10 ON = 100Mb speed,OFF=10Mb (Port-side LED set only, copper only) 3 LEDs indicate Gb,100Mb or 10Mb. |
| **Relay Contacts for Alarms** | |
| Form C, one NC indicating internal power, one NC software controllable. | |
| **Operating Environment** | |
| **Operating Temperature** | IEC 60068 Operating temp. per "Type Test" -40° to 195°F (-40° to 85°C). |
| **Temperature Rating (components)** | UL 60950 -40° to 140°F (-40° to 60°C). |
| **Storage Temperature** | -60° to 210°F (-50°to 100°C). |
| **Relative Humidity** | 5% to 95% (non-condensing). |
| **Altitude** | -200 to 13000ft (-60 to 4000m). |
| **Conformal Coating (humidity protection)** | Request quote. |
| **Network Cable Connectors** | |
| **1000 Mb Fiber Ports** | All standard Gb SFP Transceiver types supported. |
| **1000 Mb Copper Ports** | 10/100/1000Mb auto-negotiating, Cat5e & 6 UTP/STP. |
| **100 Mb Copper and PoE Ports** | Category 5 UTP/STP; 10 Mb: Cat. 3, 4, 5 UTP/STP. |
| **100 Mb Fiber Ports** | Multi-mode and single-mode FX-MTRJ, LC. |
| **Agency Standards Approval and Compliance** | |
| **UL/cUL 60950** | cUL, CE, Emissions meet FCC Part 15, Class B. |
| **IEC61850** | EMC and Operating Conditions Class C for Power Substations. |
| **IEEE 1613 Class 2** | Environmental Standard for Electric Power Substations. |
| **NEBS** | Level 3 and ETSI Compliant. |
| **EN50155** | Compliant. |
| **NEMA TS-2 & TEES** | For DC-powered and PoE-powered traffic control equipment. |
| **EN61000** | EN61000-4-1, -4-2, -4-3, -4-4, -4-5 Compliant |
| **Warranty** | |
| **Warranty** | Three Years. |

# Magnum 6KL Configuration Guide

| 6KLP-48VDC | - | 6KL-2GSFP I PP6KL4-RJ45 |
|---|---|---|

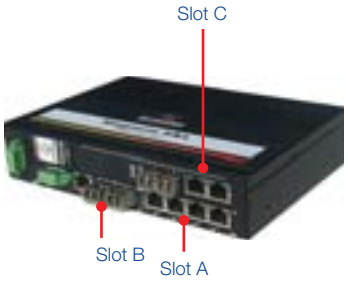
**Power Supply with Slot A Options**
**6KL-24VDC** = 24V (18-36) DC power, slot A has 4x 10/100 Ports
**6KL-12VDC** = 12V (10-15) DC power, slot A has 4x 10/100 Ports
**6KL-48VDC** = 48V (44-57) DC power, slot A has 4x 10/100 Ports
**6KLP-48VDC** = 48V (44-57) DC power, slot A has 4x (802.3af) PoE 10/100 ports
**6KL-125VDC** = 125V (88-150) DC power, slot A has 4x 10/100 Ports
**6KL-250VDC** = 250V (160-300) DC power, slot A has 4x 10/100 ports
**6KL-AC** = 100 to 240 VAC, 47 to 63 Hz, slot A has 4x 10/100 ports

**Slot B (gigabit ports only)**
**6KL-2GCU** = 2x 10/100/1000Mb RJ45 ports
**6KL-2GSFP** = 2x 1000Mb SFP ports
**XX** = Blank Slot

**Slot C**
**6KL4-RJ45** = 4x 10/100Mb RJ45
**6KL4-2MLC2RJ** = 2x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**6KL4-2SLC2RJ** = 2x 10/100Mb RJ45 + 2x 100Mb FX LC SM 20Km
**6KL4-4SLCL** = 4x 100Mb FX LC SM 40Km
**6KL4-4MT** = 4x 100Mb FX MTRJ MM
**6KL4-4MSC** = 2x 100Mb FX SC MM
**6KL4-4MST** = 2x 100Mb FX ST MM
**6KL4-2SLC2MLC** = 2x 100Mb FX LC SM + 2x 100Mb FX LC MM
**6KL4-1MLC3RJ** = 3x 10/100Mb RJ45 + 1x 100Mb FX LC MM
**6KL4-1SLCL3RJ** = 3x 10/100Mb RJ45 + 1x 100Mb FX LC SM 40Km
**6KL1-1MLC** = 1x 100Mb FX LC MM
**6KL4-1SLCL** = 1x 100Mb FX LC SM 40Km
**6KL4-2SL2MLC** = 2x 100Mb FX LC MM + 2x 100Mb FX LC SM 20km
**6KL4-4SSC** = 2x 100Mb FX SC SM 20Km
**6KL4-2FX2FLMST** = 1x 10Mb FX SC MM 2Km + 1x 100Mb FX ST MM
**6KL4-1ML1SLC2RJ** = 2x 10/100Mb RJ45 + 1x 100Mb FX LC SM 20Km + 1x 100Mb FX LC MM
**6KL4-4MLC** = 4x 100Mb FX LC MM
**6KL4-4SLC** = 4x 100Mb FX LC SM 20Km
**6KL4-2SST2RJ** = 2x 10/100Mb RJ45 + 2x 100Mb FX ST SM 20Km
**6KL4-2SLCL2RJ** = 2x 10/100Mb RJ45 + 2x 100Mb FX LC SM 40Km
**6KL4-2MT2RJ** = 2x 10/100Mb RJ45 + 2x 100Mb FX MTRJ MM
**6KL4-2MSC2RJ** = 2x 10/100Mb RJ45 + 1x 100Mb FX SC MM
**6KL4-2MST2RJ** = 2x 10/100Mb RJ45 + 1x 100Mb FX ST MM
**6KL4-1MT3RJ** = 3x 10/100Mb RJ45 + 1x 100Mb FX MTRJ MM
**6KL4-1SLC3RJ** = 3x 10/100Mb RJ45 + 1x 100Mb FX LC SM 20Km
**6KL1-1MT** = 1x 100Mb FX MTRJ MM
**6KL1-1SLC** = 1x 100Mb FX LC SM 20Km
**6KL4-1SL3MLC** = 1x 100Mb FX LC SM + 3x 100Mb FX LC MM
**6KL4-2SSC2RJ** = 2x 10/100Mb RJ45 + 1x 100Mb FX SC SM 20Km
**6KL4-4SSCL** = 2x 100Mb FX SC SM 40Km
**6KL4-4FLST** = 2x 10Mb FX ST MM

**OR**

**PoE Option** (only with 6KLP-48VDC models)
**P6KL4-RJ45** = 4x 10/100Mb RJ45 w/ PoE
**PoE+** Option (only with 6KLP-48VDC models)
**PP6KL4-RJ45** = 4x 10/100Mb RJ45 w/ PoE+
**OR**
**XX** = Blank Slot




# 6KL Accessories

| Model No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-GTP | Gb Copper |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| CONFORM05-CRM | Conformal coating, 5 mil, for moisture protection |
| CONFORM08-CRM | |

| Model No. | Description |
|---|---|
| MNS-6K-SECURE-LIC1 | Optional, licensed per switch for extra security |
| S-RING-KEY | Software, optional self-healing redundant ring management |
| DIN-Rail-6KL | DIN-Rail mount for 6KL |
| KL-2TRAY | Rack-mount tray for two 6KL for 19" mounting |
| DUAL-SRC | Two separate power inputs (12/24/48/125/250V) |
| KQ-CABLE-BKT | Bracket for cable tie-wrap attachment |

# 6KQ Series Industrial Ethernet Managed Field Switch

## The fiber-rich 6KQ series can be configured with up to twelve 100Mb fiber ports and two Gigabit ports.

### Maximized Configurability

Magnum 6KQ Managed Field Switches provide maximum configurability in their class. The fiber-rich 6KQ can be configured with up to 12 100Mb fiber ports and two Gigabit ports. For 10/100 copper, regular or PoE-equipped 10/100 RJ-45 or 10/100/1000 copper ports may be configured to a maximum of 12 at 10/100 and two Gig ports.

The 6KQE base unit comes with four 10/100 copper ports (which may be either regular or PoE). Up to three 100Mb fiber ports or up to four more 10/100 copper ports, or combinations, may also be configured.

In addition, one or two Gb ports may be configured as 10/100/1000 copper or SFP fiber in any 6KQE base unit.

### Managed Networks Software

Magnum 6KQ series comes with the best-of-breed MNS-6K managed networks software. Software features include:

- GUI ease of use, Secure Web Management
- SNMPv2,v3 management
- 802.1p QoS Prioritization
- Tag-based VLANs,
- IGMP Snooping and IGMP-L2 multicast management
- Port security

A choice of software redundancy options including RSTP-2004 with industry-leading fault recovery times in rings and meshes, and GarrettCom's S-Ring product which supports unmanaged switches as part of resilient rings.

MNS-6K-SECURE adds more security features such as SSH, RADIUS and TACACS+ support, SFTP, DHCP Server, Syslog events, and SNTP Server. Over 10 years of field use in industrial networking applications assures maturity and stability. See the MNS-6K and MNS-6K-SECURE datasheets for more information.

The Magnum 6KQ Series Switch is Ideal for Building a Switched, Hardened Ethernet Network Infrastructure, Connecting Edge Devices such as PLCs and IEDs with Upstream Switches or Routers.

## 6KQ Features

- Heavy Duty Field Switch for industrial networking applications
- Full-featured MNS-6K software in a small factory-floor package
- Highly configurable, all fiber port types, up to 12 100Mb, 10 Mb, Gb with SFPs
- Advanced thermal design with metal case used as a heat sink (no fans)
- DC power at 12, 24, 48, 125, 250V; Dual-Source, PoE, Panel or DIN-Rail mounting

## 6KQ Features

Same as 6KQ except with a maximum of ten ports and has Universal AC power option

## Applications

The Magnum 6KQ series are ideal for building a switched, hardened Ethernet network infrastructure, connecting edge devices such as PLCs and IEDs with upstream switches or routers. It is designed for use in industrial applications such as factory floors and control cabinets, industrial video surveillance systems with PoE, power utility substations, tariffed carrier field facilities, or transportation and oil and gas.

## Thermal Design

Advanced patent pending thermal design techniques use the 6KQ series metal case as a heat sink. The unique ribbed-surface aluminum case offers maximum heat dissipation without fans to keep internal components cool and reliable. This sealed-case design enables the unit to operate in the harshest industrial grade environments and achieves high EMI noise immunity. The 6KQ is available with Conformal Coating options and rated IP52 for dust and water resistance.

## Power Supplies

The 6KQ series can be configured with the user's choice of DC power supplies: 12V and 24V for factory floor, 48V for tariffed carrier field facilities and for PoE-powered applications such as video surveillance, and 125V or 250V for power utility substations and AC power within the 6KQE base unit. External AC power supplies are optional for the 6KQ.

## Agency Approvals and Compliance

Like all Magnum products, the 6KQ series has all appropriate agency approvals and compliance certifications, including: third-party UL testing for safety and temperature rating, IEC 61850 & IEEE 1613 for power utilities, NEMA TS-2 for use outdoors and EN50155 for railways.

## Warranty

Three years.

# Product Specifications

| Type | 6KQ | 6KQE |
|---|---|---|
| **Product Description** | Base unit with four 10/100 copper ports. May be configured with a variety of 10/100/1000 Mb fiber and copper port connector types from a family of port modules. Heavy duty metal case used as heat sink, IP52 for environmental protection, no fans. | Base unit with DC power supply and four 10/100 copper ports. May be configured with a variety of 10/100/1000 Mb fiber and copper port connector types via selection from a family of 6KQE port modules per this 6KQE Configuration Guide. Heavy duty metal case used as heat sink, IP52 for environmental protection, no fans. |
| **Mechanical** | | |
| **Enclosure** | High-strength extruded aluminum for heat-sinking. Vertical panelmounting brackets included. | |
| **Console Port** | RJ-45 serial interface. | DB9 |
| **DIN-Rail Mounting** | Model # DIN-Rail-6KQ, optional. | |
| **Enclosure Ingress Protection Rating** | IP52, per IEC 60529, and NEMA-3,3X. | |
| **Cooling Method** | Convection, fully-enclosed ribbed-surface aluminum case used as a heat sink, designed for vertical mounting, no fans. | |
| **Dimensions** | 6.85 in H x 7.50 in W x 2.0 in D in vertical panel-mount position. (17.4cm H x 19.1cm W x 5.08cm D) | |
| **Weight** | 3 lbs. (1.3 kg). | |
| **Network Standards** | | |
| **Ethernet** | IEEE 802.3, 802.3ab, 802.1p:10BASE-FL;100BASE-TX,FX;1000BASE-SX,LX,ZX | |
| **Auto-negotiation and Auto-Cross** | 10/100 TP and PoE, IEEE 802.3u. | |
| See MNS-6K datasheet for software network standards and software features. All 10 Mb ports obey the rules for configuring 10 Mb Ethernet. All 100 Mb ports use Fast Ethernet rules. 1000 Mb ports use Gigabit rules. | | |
| **Performance** | | |
| **Gigabit Ports, 1000 Mb** | Configurable, standard 10/100/1000Mb copper or SFP transceiver modules for SX, ESX, LX, ZX , up to 2 Gigabit ports. | |
| **Fiber Ports, 100 Mb (multi-mode and single-mode)** | Configurable SC, ST, LC and MTRJ, multi-mode and single-mode for each type, max of 12 fiber. | SFF-FX (LC or MTRJ), multi-mode and single-mode for each type, max of three 100Mb fiber |
| **Fiber Ports, 10 Mb** | Configurable, ST, up to 4 fiber mm ports, each FDX or HDX, default is HDX mode. | |
| **RJ-45 Ports** | 100 or 10 Mb speed, full- or half-duplex mode, per port, individ. determined. 10/100 auto-negotiating & auto-cross, up to 12 ports. PoE Ports, RJ-45 Power Sourcing per IEEE 802.3af, power on data pair, configurable up to 8 PoE ports. | 100 or 10 Mb speed, full- or half-duplex mode, per port, individual determined. 10/100 auto-negotiating & auto-cross, up to eight ports. PoE Ports, RJ-45 Power Sourcing per IEEE 802.3af, power on data pair. |
| **Processing Types** | Store and Forward with IEEE 802.3p QOS and IEEE 802.3x | |
| **All Ports Non-Blocking** | System aggregate forward and filter rate 4.76M pps.<br>Address table: 4K nodes, with address aging time of 300 seconds typical.<br>Packet buffers: 240 KB for 10/100 and 120KB for 1000 Mb<br>Latency: 6µs + packet time max (TX - TX, TX - FX, FX - FX, TX-G, G-G) | |
| **AC Power Supply (Internal)** | | |
| **AC Power Connector** | IEC-type, male recessed, ON/OFF switch (optional). | |
| **Power Input AC** | 100 to 240 VAC, 47 to 63 Hz (auto ranging). | |
| **Power Consumption** | 60 watts typical for a fully-loaded fiber model 30 watts typical for copper-only models. | |

# Product Specifications (continued)

| | |
|---|---|
| **DC Power Supply (Internal, floating ground for internal PCBs)** | |
| **Power Input** | 12V nominal (10 to 15V) 24V nominal (18 to 36V), 48V nominal (36 to 60V), 125V nominal (88 to 150V) 250V nominal (160 to 300V) |
| **Power Input for PoE** | Add up to 15 watts per PoE port to base unit power draw |
| **Power Consumption** | 35 watts typical for a fully-loaded fiber model, 20 watts typical for 4 port copper-only model. |
| **Standard Terminal Block** | "-, GND, +" |
| **Dual Source** | -A, -B, +A, +B, chassis ground. |
| **DC Dual Power Source (Optional)** | |
| Magnum 6KQ series: 24VDC, 48VDC, 125VDC may be ordered with optional dual-source DC power input, for continuity of operation when either one of the DC input sources is interrupted. | |
| **LED Indicators (two sets) per RJ-45 Port** | |
| **LK** | Steady ON when twisted-pair link is operational. |
| **ACT** | ON with port activity 100/10 ON = 100Mb speed, OFF = 10Mb (Port-side LED set only). |
| **F/H** | ON for full-duplex, OFF for half-duplex (PoE only, port-side only) |
| **PoE** | ON for power to PD device. Note: LK/ACT port becomes steady ON for Link, blinking for activity. |
| **LED Indicators (two sets) per 100Mb and 10Mb Fiber Ports** | |
| **LK** | Steady ON when fiber link is operational. |
| **ACT** | ON with port activity (Port-side LED set only). |
| **F/H** | ON for full-duplex, OFF for half-duplex. |
| **LED Indicators per Gb Port** | |
| **LK** | Steady ON when link is operational. |
| **ACT** | ON with port activity 1000Mb ON = Gb speed (Top-side LED set only, copper only) 100/10 ON = 100Mb speed, OFF = 10Mb (Port-side LED set only). |
| **F/H** | ON for full-duplex, OFF for half-duplex (Port-side LED set only, copper only) 3 LEDs indicate Gb, 100Mb or 10Mb speed. |
| **Relay Contacts for Alarms** | |
| Form C, one NC indicating internal power, one NC software controllable. | |
| **Port Specific Settings** | |
| Port-specific user settings (such as FDX or HDX, copper 10/100 speed) can be set using software commands. (The RJ-45 copper ports are auto-negotiating auto-crossover, there are no user controls for auto-crossover). | |
| **Operating Environment** | |
| **Operating Temperature** | IEC 60068 Operating temp. per "Type Test" -60° to 195°F (-50° to 85°C). |
| **Temperature Rating (components)** | UL 60950 -40° to 140°F (-40° to 60°C). |
| **Storage Temperature** | -60° to 210°F (-50°to 100°C). |
| **Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 13000ft (-60 to 4000m) |
| **Conformal Coating (humidity protection)** | Request quote |
| **Network Cable Connectors** | |
| **1000 Mb Fiber Ports** | All standard Gb SFP Transceiver types supported. |
| **1000 Mb Copper Ports** | 10/100/1000Mb auto-negotiating, Cat5e & 6 UTP/STP. |
| **100 Mb Copper and PoE Ports** | Category 5 UTP/STP; 10 Mb: Cat. 3, 4, 5 UTP/STP. |
| **100 Mb Fiber Ports** | Multi-mode FX-MTRJ, LC, ST, SC; single-mode 15Km LC, 20Km SC and ST, and 40Km "long reach" single-mode SC |
| **10 Mb Fiber Port Options** | Multi-mode ST, 10BASE-FL. |
| For other port types and port connector types, request quote. | |
| **Agency Standards Approval and Compliance** | |
| **UL/cUL 60950** | cUL, CE, Emissions meet FCC Part 15, Class A |
| **IEC61850** | EMC and Operating Conditions Class C for Power Substations |
| **IEEE 1613 Class 2** | Environmental Standard for Electric Power Substations |
| **NEMA TS-2 & TEES** | For DC-powered and PoE-powered traffic control equipment. |
| **EN50155** | Railways |
| **DNV** | Marine |
| **Warranty** | |
| **Warranty** | Three Years |

# Magnum 6KQ Configuration Guide

| 6KQ-250V | - | 6KQ4-RJ45 I 6KQF-4MLC I 6KQ-2GSFP |
|---|---|---|

**Power Supply with Slot A Options**

**6KQ-12V** = 12V DC power, slot A has 4x 10/100 Ports
**6KQ-24V** = 24V (18-36) DC power, slot A has 4x 10/100 Ports
**6KQ-48VDC** = 48V (44-57) DC power, slot A has 4x 10/100 Ports
**6KQP-48V** = 48V (44-57) DC power, slot A has 4x (802.3af) PoE 10/100 ports
**6KQ-125V** = 125V (88-150) DC power, slot A has 4x 10/100 Ports
**6KQ-250V** = 250V (160-300) DC power, slot A has 4x 10/100 ports

**Slot B**

**6KQ4-RJ45** = 4x 10/100Mb RJ45
**6KQ4-RJMLC** = 2x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**6KQ3-RJMSC** = 2x 10/100Mb RJ45 + 1x 100Mb FX SC MM
**6KQ2-MST** = 2x 100Mb FX ST MM
**6KQ2-SSC** = 2x 100Mb FX SC SM 20Km
**6KQ4-MT** = 4x 100Mb FX MTRJ MM
**6KQ4-SLC** = 4x 100Mb FX LC SM 20Km
**XX** = Blank Slot
**6KQ4-RJMT** = 2x 10/100Mb RJ45 + 2x 100Mb FX MTRJ MM
**6KQ4-RJSLC** = 2x 10/100Mb RJ45 + 2x 100Mb FX LC SM 20Km
**6KQ2-10ST** = 2x 10Mb FX ST MM
**6KQ2-MSC** = 2x 100Mb FX SC MM
**6KQ2-SSCL** = 2x 100Mb FX SC SM 40Km
**6KQ4-MLC** = 4x 100Mb FX LC MM
**P6KQ4-RJ45** = 4x 10/100Mb RJ45 w/ PoE (w/ 6KQP-48V only)

**Slot C**

**6KQF-2MST** = 2x 100Mb FX ST MM
**6KQF-2MSC** = 2x 100Mb FX SC MM
**6KQF-2SSC** = 2x 100Mb FX SC SM 20Km
**6KQF-2SSCL** = 2x 100Mb FX SC SM 40Km
**6KQF-4MT** = 4x 100Mb FX MTRJ MM
**6KQF-4MLC** = 4x 100Mb FX LC MM
**6KQF-4SLC** = 4x 100Mb FX LC SM 20Km
**XX** = Blank Slot
**6KQF-1MST** = 1x 100Mb FX ST MM
**6KQF-1MSC** = 1x 100Mb FX SC MM
**6KQF-1SSC** = 1x 100Mb FX SC SM 20Km
**6KQF-1SSCL** = 1x 100Mb FX SC SM 40Km
**6KQF-2MT** = 2x 100Mb FX MTRJ MM
**6KQF-4MLC** = 2x 100Mb FX LC MM
**6KQF-2SLC** = 2x 100Mb FX LC SM 20Km

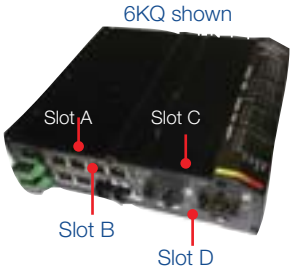
**Slot D**

**Pick from Slot B options (choose non-PoE module only)**

**OR**

**Choose Gigabit ports from below**

**6KQ-2GSFP** = 2x 1000Mb SFP ports
**6KQ-1GSFP** = 1x 1000Mb SFP port
**6KQ-2GSFPCU** = 1x 1000Mb SFP port + 1x 10/100/1000Mb RJ45 port
**XX** = Blank Slot
**6KQ-2GCU** = 2x 10/100/1000Mb RJ45 ports
**6KQ-1GCU** = 1x 10/100/1000Mb RJ45 port




# 6KQ Accessories

| Model No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-GTP | Gb Copper |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| CONFORM05-CRM | Conformal coating, 5 mil, for moisture protection |

| Model No. | Description |
|---|---|
| CONFORM08-CRM | Conformal coating, 8 mil, for corrosive environments |
| MNS-6K-SECURE-LIC1 | Optional, licensed per switch for extra security |
| S-RING-KEY | Software, optional self-healing redundant ring management |
| DIN-Rail-6KQ | DIN-Rail mount for 6KQ |
| 6KQ-BLNK | Blank cover for one unused module slot |
| KL-2TRAY | Rack-mount tray for two 6KL for 19" mounting |
| DUAL-SRC | Two separate power inputs (12/24/48/125 DC) |
| KQ-CABLE-BKT | Bracket for cable tie-wrap attachment |
| PSAC-24V60 | AC to 24VDC, 60 watts, panel or DIN-Rail |
| PSAC-48V150 | AC to 48VDC, 150 watts, panel or DIN-Rail |

# Magnum 6KQE Configuration Guide

| 6KQE-AC | - | 6KQE4-RJ45 I 6KQE-2GSFP |
|---|---|---|

**Power Supply with Slot A Options**

**6KQE-12V** = 12V DC power, slot A has 4x 10/100 Ports
**6KQE-24V** = 24V (18-36) DC power, slot A has 4x 10/100 Ports
**6KQE-48VDC** = 48V (44-57) DC power, slot A has 4x 10/100 Ports
**6KQEP-48V** = 48V (44-57) DC power, slot A has 4x (802.3af) PoE 10/100 ports
**6KQE-125V** = 125V (88-150) DC power, slot A has 4x 10/100 Ports
**6KQE-250V** = 250V (160-300) DC power, slot A has 4x 10/100 ports
**6KQE-AC** = 100 to 240 VAC, 47 to 63 Hz, slot A has 4x 10/100 ports

**Slot B**

**There is no Slot B in Magnum 6KQE**

**Slot C (If PoE is selected for Slot A, a maximum of two fiber ports are allowed in Slot C)**

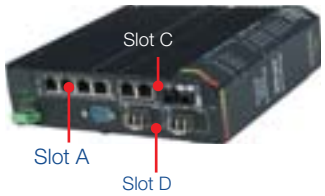
**6KQE4-RJ45** = 4x 10/100Mb RJ45
**6KQE4-1MMRJ** = 3x 10/100Mb RJ45 + 1x 100Mb FX MTRJ MM
**6KQE4-2MMRJ** = 2x 10/100Mb RJ45 + 2x 100Mb FX MTRJ MM
**6KQE4-3MMRJ** = 1x 10/100Mb RJ45 + 3x 100Mb FX MTRJ MM
**6KQE4-1MLC** = 3x 10/100Mb RJ45 + 1x 100Mb FX LC MM
**6KQE4-2MLC** = 2x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**6KQE4-3MLC** = 1x 10/100Mb RJ45 + 3x 100Mb FX LC MM
**6KQE4-1SLC** = 3x 10/100Mb RJ45 + 1x 100Mb FX LC SM 20Km
**6KQE4-2SLC** = 2x 10/100Mb RJ45 + 2x 100Mb FX LC SM 20Km
**6KQE4-3SLC** = 1x 10/100Mb RJ45 + 3x 100Mb FX LC SM 20Km
**6KQE4-1SLCL** = 3x 10/100Mb RJ45 + 1x 100Mb FX LC SM 40Km
**6KQE4-2SLCL** = 2x 10/100Mb RJ45 + 2x 100Mb FX LC SM 40Km
**6KQE4-3SLCL** = 1x 10/100Mb RJ45 + 3x 100Mb FX LC SM 40Km
**XX** = Blank Slot

**Slot D (Gigabit Slot)**

**6KQE-**2GSFP = 2x 1000Mb SFP ports
**6KQE-**1GSFP = 1x 1000Mb SFP port
**XX** = Blank Slot

**6KQE-2GCU** = 2x 10/100/1000Mb RJ45 ports
**6KQE-1GCU** = 1x 10/100/1000Mb RJ45 port

6KQE shown




# 6KQE Accessories

| Model No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-GTP | Gb Copper |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| CONFORM05-CRM | Conformal coating, 5 mil, for moisture protection |

| Model No. | Description |
|---|---|
| CONFORM08-CRM | Conformal coating, 8 mil, for corrosive environments |
| MNS-6K-SECURE-LIC1 | Optional, licensed per switch for extra security |
| S-RING-KEY | Software, optional self-healing redundant ring management |
| DIN-Rail-6KQ | DIN-Rail mount for 6KQ |
| 6KQ-BLNK | Blank cover for one unused module slot |
| KL-2TRAY | Rack-mount tray for two 6KL for 19" mounting |
| DUAL-SRC | Two separate power inputs (12/24/48/125 DC) |
| KQ-CABLE-BKT | Bracket for cable tie-wrap attachment |
| PSAC-24V60 | AC to 24VDC, 60 watts, panel or DIN-Rail |
| PSAC-48V150 | AC to 48VDC, 150 watts, panel or DIN-Rail |

# 6KM Mobile Ethernet Switch

## First industrial-grade switches purpose-built for mobile networking applications

The high performance Magnum 6KM base unit comes with four 10/100 M12 copper ports (either regular or PoE). Up to four 100Mb fiber ports or up to four more 10/100 M12 copper ports, or combinations, may also be configured. Two Gigabit ports may also be configured with 10/100/1000 M12 copper ports or LC-type fiber.

Magnum 6KM Mobile Ethernet Switches come with the best-of-breed MNS-6K managed networks software, proven in tens of thousands of hardened applications over 10 years of service. It features GUI ease of use, Secure Web Management, SNMPv2,v3 management, 802.1p QoS Prioritization, Tag-based VLANs, IGMP Snooping and IGMP-L2 multicast management, port security, and a choice of software redundancy options including RSTP-2004 with industry-leading fault recovery times in rings and meshes. MNS-6K-SECURE adds more security features such as SSH, RADIUS and TACACS+ support, SFTP, DHCP Server, Syslog events, TFTP and SNTP Server.

The 6KM's sealed metal case serves as a heat sink, enabling it to operate in the harshest mobile environments and achieves high EMI noise immunity. The 6KM is available with optional Conformal Coating for moisture resistance and is rated IP52 for protection against dust and dirt. The 6KM can be configured with the user's choice of power input, including DC at 12V, 24V, 48V, 110V, 125V, 250V, and Dual-Source for each, as well as universal AC.

Where mission-critical networks are vehicular and subject to continuous motion and vibration, Magnum 6KMs are designed to travel in style. Built with military-strength M12 connectors, 6KMs withstand the harshest of mobile operating conditions without the excessive cost of mil-spec waterproof products.

## Features

- Heavy Duty Managed Switches for mobile networking applications
- Uses M12 connectors (in lieu of RJ45) to withstand shock and vibration
- Configurable ports for 10/100 copper, PoE, fiber, and Gb copper or fiber
- Full-featured MNS-6K software in a small rugged package
- Power choices: DC at 110V for railways, 12V, 24V, 48V, 125V, 250V, Dual-Source; Universal AC

# Applications

Magnum 6KMs are ideal for mobile networks such as on passenger railways, public service and emergency vehicles, shipboard, mining equipment and military vehicles. Applications include in-carriage networking of IP-enabled infotainment systems, security and surveillance systems and mobile network devices on trains, light rail and buses, as well as passenger accommodation technology in a variety of mobile scenarios. The 6KM Mobile Ethernet Switch has the appropriate agency approvals, including EN50155 and EN50121-4 Railway Applications Standards, IEC61373 for shock and vibration, NEMA TS-2 for transportation systems outdoors and DNV certification for shipboard and other marine applications. Additional certifications include third-party UL testing for safety, NEBS L3 compliance and IEC 61850 and IEEE 1613 for power utilities.

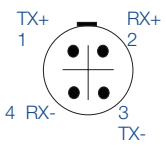
# Technical Information

| | |
|---|---|
| **Performance** | |
| **M12 Copper, 100 or 10 Mb Speed** | Full- or half-duplex mode per port, individually determined<br>10/100 auto-negotiating, up to 8 ports<br>Up to 8 PoE ports, power sourcing per IEEE 802.3af, power on data pair |
| **M12 Copper Gb Speed** | Two standard 10/100/1000Mb copper |
| **Fiber Ports, 100 Mb** | Fiber LC-type, multi- and single-mode, max of four 100 Mb fiber |
| **Fiber Ports, Gb** | Two fiber LC-type, multi- or single-mode |
| **All Ports** | Processing type: Store and Forward with IEEE 802.3p QOS and IEEE 802.3x, non-blocking<br>System aggregate forward and filter rate: 4.17M pps, all ports 100 Mb full speed |
| **Address Table** | 8K nodes |
| **Packet Buffers** | 128 KB total |
| **Latency** | 6µs + packet time max (TX - TX, TX - FX, FX – FX, TX-G, G-G) |
| **Network Standards** | |
| **All Ports** | IEEE 802.3, 802.3ab, 802.1p: 100BASE-TX, -FX<br>Auto-negotiation and auto-cross on 10/100 TP and PoE, IEEE 802.3u<br>See MNS-6K & MNS-6K-SECURE datasheets for software network standards |
| **All 100 Mb Ports** | Use Fast Ethernet rules |
| **All 1000 Mb Ports** | Use Gigabit rules |
| **Operating Environment** | |
| **IEC 60068 Operating Temperature** | per "Type Test" -40°F to 195°F (-40°C to 85°C) |
| **UL 60950 and "Component Parts" Rating** | -40°F to 140°F (-40°C to 60°C) |
| **Storage Temperature** | -60°F to 210°F (-50°C to 100°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing)<br>For conformal coating (humidity protection) option: request quote |
| **Altitude** | -200 to 13,000 ft (-60 to 4000 m) |
| **Network Cable Connectors** | |
| **10/100 Mb Copper and PoE** | 4-pin D-coded M12 connectors, female |
| **100 Mb Fiber Ports** | LC-type connectors, multi-mode and single-mode |
| **Gb Copper Ports** | 8-pin M12 connectors, female |
| **Gb Fiber Ports** | LC-type connectors, multi-mode and single-mode |
| **Power Supply** | |
| **AC Power Supply (internal)** | Power Input Voltage: 100 - 240V AC (auto ranging)<br>Power Input Frequency: 47 to 63 Hz<br>AC Power Connector: RD 24 locking, Male |
| **DC Power Supply (internal, floating ground for internal PCBs)** | Power Input: 12V nominal (10 to 15V) 24V nominal (18 to 36V), 48V nominal (36 to 60V), 110V nominal (77-137V) 125V nominal (88 to 150V) 250V nominal (160 to 300V)<br>Power Input for PoE: add up to 15 watts per PoE port to base unit power draw<br>Power Consumption: 15 watts typical for a fully-loaded fiber model with 2Gb, 10 watts typical for 8 port copper and 100 Mb fiber model.<br>DC Power Connector: RD 24 locking, Male |
| **DC Dual Power Source (optional)** | All Magnum 6KM DC models (12, 24, 48, 110, 125, and 250 V DC) may be ordered with optional Dual-Source DC power input, for continuity of operation when either one of the DC input sources is interrupted. |

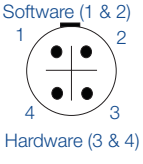
# Technical Information (continued)

| | |
|---|---|
| **Relay Contacts for Alarms** | |
| **M12 port, Form C** | One NC indicating internal power, one NC software controllable |
| **Mechanical** | |
| **Enclosure** | Steel case |
| **Console Port** | M12 interface, male, cable available from GCI |
| **Dimensions** | 9.0 in H x 2.2 in W x 6.0 in D in vertical panel-mount position<br>(22.7cm H x 5.5cm W x 15.2cm D) |
| **Weight** | 2.1 lbs. (.95 kg) |
| **Mounting** | Panel-mounting brackets included<br>DIN-Rail mounting: Model # DIN-Rail-6KL, optional |
| **Enclosure Ingress Protection Rating** | IP52, per IEC 60529, and NEMA-3,3X |
| **Cooling Method** | Convection, fully-enclosed steel case used as a heat sink, designed for panel mounting, no internal fans |
| **LED Indicators** | |
| **Per M12 10/100 Mb Port** | L/A: Steady ON for Link, blinking for activity<br>PoE: ON for power to PD device |
| **Per Fiber Port** | L/A: Steady ON for Link, blinking for activity<br>F/H: ON = Full Duplex |
| **Per M12 Gb Port** | 1000 Mb ON = Gb speed<br>10 Mb ON = 10 Mb speed<br>Both ON = 100Mb |
| **Agency Approvals** | |
| **All Models** | UL Listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A |
| | Shock: IEC61373, IEC 60068-2-27 |
| | ETSI and NEBS L3 Certified |
| | Vibration: IEC61373, IEC 60068-2-6 FC |
| | EN50155 and EN50121-4 Railway Applications Standards |
| | NEMA TS-2 & TEES for DC-powered and PoE-powered traffic control equipment |
| | IEC 61850 EMC and Operating Conditions Class C for Power Substations |
| | IEEE 1613 Class 2 Environmental Standard for Electric Power Substations |
| | NEBS L3 and ETSI compliant |
| **Warranty** | |
| **Made in USA** | Three [3] years |

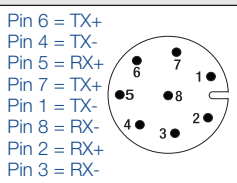
**D-Coded 4-Pin M12 10/100Mb Port**



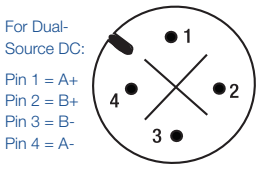

**D-Coded 4-Pin M12 ALARM Port**



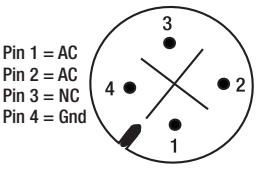

**A-Coded 8-Pin M12 Port for Gb Data Port**




**Male DC Power Connector**




**Male AC Power Connector**



# Magnum 6KM Configuration Guide

| 6KM-48VDC | - | 6KM-2GM12 I 6KM4-4M12 |
|---|---|---|

**Power Supply with Slot A Options**

**6KM-24VDC** = 24V (18-36) DC power, slot A has 4x 10/100 M12 Ports
**6KM-12VDC** = 12V (10-15) DC power, slot A has 4x 10/100 M12 Ports
**6KM-48VDC** = 48V (44-57) DC power, slot A has 4x 10/100 M12 Ports
**6KMP-48VDC** = 48V (44-57) DC power, slot A has 4x (802.3af) PoE 10/100 M12 ports
**6KM-125VDC** = 125V (88-150) DC power, slot A has 4x 10/100 M12 Ports
**6KM-110VDC** = 110V (77-137) DC power, slot A has 4x 10/100 M12 Ports
**6KM-250VDC** = 250V (160-300) DC power, slot A has 4x 10/100 M12 ports
**6KM-AC** = 100 to 240 VAC, 47 to 63 Hz, slot A has 4x 10/100 M12 ports

**Slot B (gigabit ports only)**

**6KM-2GM12** = 2x 10/100/1000Mb M12 ports
**6KM-2GSLC** = 2x 100Mb FX LC SM 20Km
**XX** = Blank Slot
**6KM-2GMLC** = 2x 100Mb FX LC MM
**6KM-2GSLCL** = 2x 100Mb FX LC SM 40Km

**Slot C**

**6KM4-4M12** = 4x 10/100Mb M12
**6KM4-4SLC** = 4x 100Mb FX LC SM 20Km
**6KM4-2MLC2RJ** = 2x 10/100Mb M12 + 2x 100Mb FX LC MM
**6KM4-2SLCL2RJ** = 2x 10/100Mb M12 + 2x 100Mb FX LC SM 40Km
**6KM4-4MLC** = 4x 100Mb FX LC MM
**6KM4-4SLCL** = 4x 100Mb FX LC SM 40Km
**6KM4-2SLC2RJ** = 2x 10/100Mb M12 + 2x 100Mb FX LC SM 20Km

**OR**

**PoE Option** (only with 6KMP-48VDC models)
**P6KM4-4M12** = 4x 10/100Mb M12 w/ PoE

**OR**

**XX** = Blank Slot

# 6KM Accessories

| Model No. | Description |
|---|---|
| CONSOLE-CBLM | Gb SX, 850nm wavelength, 550 meters |
| CONFORM05-CRM | Gb SX, 1310nm wavelength, 2km |
| CONFORM08-CRM | Gb LX, 1310nm wavelength, 25km |

| Model No. | Description |
|---|---|
| MNS-6K-SECURE-LIC1 | Optional, licensed per switch for extra security |
| S-RING-KEY | Software, optional self-healing redundant ring management |
| DIN-Rail-6KM | DIN-Rail mount for 6KM |
| DUAL-SRC | Two separate power inputs (12/24/48/125V) |

# 6K16 Series Modular Managed Switch

## 16-port, Configurable Managed Fiber Switch. Magnum 6K16 is for mounting in 19”or ETSI or 23” Telco racks with front-to-rear fan cooling and Magnum 6K16V model is designed for vertical or DIN-Rail mounting with no fans.

Tested for high availability Telco & Industrial applications, NEBS and ETSI compliant and IEEE 1613 and IEC 61850 standards for electric power substations

### Configurable and Reliable

Magnum™ 6K16 Series Managed Fiber Switches provide modularity of fiber and copper ports, 10Mb 100Mb and Gigabit speed ports, and comprehensive management software in a compact industrial-grade package.

Setting a new standard for Industrial and Carrier Class applications, heavy duty Ethernet Switch jobs are readily accommodated with an extended temperature rating of -40°C to 60°C by the UL Component Parts method, or -50°C to 95°C by the IEC 60068 Type Test method. With options such as all popular DC power input types, worldwide AC power, and DIN-Rail mounting, the hardened Magnum 6K16 Series Switch is a “go-anywhere do-anything” Industrial Ethernet Switch.

The large family of port modules offer the choice of all fiber media (all connector types, multi- and single-mode) and 10/100 Mb autonegotiating RJ-45 ports. Standard GBIC ports can be configured for a variety of Gigabit cabling types and distances.

High performance features include non-blocking speed on all ports and 802.1p QoS Traffic Prioritization. The Magnum 6K16 series are “plug-and-play” ready for use as backbone switches where a mix of bursty data traffic and priority streaming traffic for VoIP and audio/video applications is present.

The Magnum 6K16 Managed Ethernet Switches provide configurability for fiber and copper ports, 10 Mb, 100 Mb and Gigabit speed ports, with comprehensive management software in a compact, rack-mount (two units side-by-side) or vertical mount package.

## Features

- Magnum 6K16 Industrial Managed Ethernet Switch for mounting in 19”or ETSI or 23” Telco racks with front-to-rear fan cooling and Magnum 6K16V model designed for vertical or DIN-Rail mounting with no fans
- Provides 2 modular slots for user selection of 100Mb, 10 Mb, Gigabit fiber ports, and copper 10/100, Gigabit ports
- Choose from a family of 20 port modules for almost unlimited configuration flexibility
- Options include -48VDC, 24VDC, 125VDC, dual source, or AC power

# 6K16 Series Switch

The Magnum 6K16 series switches are designed for use in telecom equipment systems, industrial process plants, power utilities, transportation and traffic control systems and video surveillance jobs with segments requiring Gigabit backbone interconnections, the Magnum 6K16 series switch is easy to install and operate.

The next generation of industrial applications will need advanced managed network software, operation at extended temperatures, fiber ports modularity, support for self-healing ring structures, and gigabit backbone configurability.

### Management Software

Magnum 6K16 series switches are provided with LAN management software including SNMP, Tag- and Port-based VLANs, IGMP Snooping and Port Security, control via command line interface. For high availability LANs using ring topologies, Spanning Tree Protocol, Link-Loss-Learn™ and S-Ring™ are available.

### Design

Magnum 6K16 Series Managed Switches have heavy duty metal cases and auto-ranging power supplies for operation with standard AC power worldwide. Internal DC power supplies are optional. The 6K16 series switch is designed and manufactured in the USA and backed by a three year warranty..

# Product Specifications

| Type | 6K16 | 6K16V |
|---|---|---|
| **Product Description** | Magnum 6K16 Managed Switch, base unit for horizontal mounting. May be configured with a variety of 10/100/1000 Mb fiber and copper port connector types from a family of port modules. 16 ports max. AC and DC power types. Wire speed filtering and forwarding across all ports, 802.3x flow control, 802.1p priority packet processing, 4K node address table, 240KB packet buffers | Magnum 6K16V Managed Fiber Switch, base unit for vertical mounting. May be configured with a variety of 10/100/1000 Mb fiber and copper port connector types from a family of port modules. 16 ports max. 4K node address table, 240KB packet buffers |
| **Mechanical** | | |
| **Enclosure** | High-strength metal. Panel-mount brackets for secure horizontal mounting included | High-strength metal. For vertical panel or DIN-Rail mounting. |
| **Rack-mounting Brackets** | Model K16-RMB for one unit in a 1U rack space<br>Model K16-2TRAY for 2 units side-by-side in a 1.5U rack space | DIN-Rail mounting: Model DIN-Rail-VRM, optional |
| **Cooling Method** | Fan cooled, 3 fans each rated 3 cfm,rear-mounted w/front-to-rear air flow | Convection, designed for vertical mounting, no fans |
| **Dimensions** | 1.75 in H x 8.75 in W x 10.0 in D (4.4 cm H x 22.2 cm W x 25.4 cm D) | 9.50 in H x 8.75 in W x 1.75 in D (24.1 cm H x 22.2 cm W x 4.4 cm D) |
| **Weight** | 4.0 lbs. (1.8 kg) | 4.2 lbs. (1.9 kg) |
| **Network Standards** | | |
| **Ethernet** | IEEE 802.3z, 802.3ab, 802.1p: 10BASE-FL, 100BASE-TX, -FX, 1000BASE-SX, -LX | |
| **Auto-negotiation and Auto-crossover** | TP, IEEE 802.3u | |
| **Performance** | | |
| **Fiber Ports, 100 Mb (multi-mode and single-mode)** | Configurable SC, ST, LC, MTRJ, Small Form Factor (SFF) is featured for high fiber port density | |
| **Gigabit Ports, 1000 Mb** | Configurable, standard GBIC transceiver modules, up to 4 Gigabit ports | |
| **RJ-45 Ports** | 100 or 10 Mb speed, full- or half-duplex mode, per port, individually determined. 10/100 auto-negotiating and auto-cross, up to 16 ports. | |
| **All Ports Non-Blocking** | Store and Forward with IEEE 802.3x full-duplex flow control.<br>System aggregate forward and filter rate 6.0 Mpps.<br>Address table: 4K nodes, with address aging time of 155 seconds typical<br>Packet buffers: 240 KB for 10/100 and 120KB for 1000 Mb<br>Latency: 6µs + packet time max (TX - TX, TX - FX, FX - FX, TX-G, G-G) | |
| **AC (IEC-type, Male Recessed)** | | |
| **Power Input, AC** | 100 to 240 VAC, 47 to 63 Hz (auto ranging) | |
| **Power Consumption** | 50 watts typical for a fully-loaded fiber model, 30 watts typical for 16 port copper-only models. | |

# Product Specifications (continued)

| DC Dual Power Source (optional) | |
|---|---|
| The Magnum 6K16 Series may be ordered with optional Dual DC power input, for continuity of operation when either one of the DC input sources is interrupted.<br>Available for -48VDC, 24VDC or 125VDC | |
| **DC Power Supply Options** | |
| **-48VDC** | Input -36 to -70VDC (PoE input range: -44 to -57VDC) |
| **24VDC** | Input 20 to 40VDC |
| **125VDC and 110VDC nominal** | Input 88 to 300VDC |
| Std. Terminal Block: "-, GND, +", Power Consumption: Same as AC | |
| **LED Indicators, 100 Mb and 10Mb Fiber Ports** | |
| **LK** | Steady on when twisted-pair link is operational. |
| **ACT** | On with port activity |
| **F/H** | ON = full-duplex mode, OFF = half-duplex mode. ON = full-duplex mode, OFF = half-duplex mode. 100/10 ON = 100Mb speed, OFF = 10Mb |
| **LED Indicators, per RJ-45 Port** | |
| **LK** | Steady on when fiber link is operational. |
| **ACT** | On with port activity |
| **F/H** | ON = full-duplex mode, OFF = half-duplex mode. |
| **Relay Contacts for Alarms (except PoE version)** | |
| **Alarm Contact** | Form C, one NC indicating internal power, one NC software controllable |
| **Operating Environment** | |
| **Operating Temperature** | IEC 60068 Operating temp. per "Type Test" -60° to 205°F (-50° to 95°C) |
| **Temperature Rating (components)** | UL 60950 140°F (60°C) |
| **Storage Temperature** | -60° to 210°F (-50°to 100°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 13000ft (-60 to 4000m) |
| **Conformal Coating (humidity protection)** | Request quote |
| **Network Cable Connectors** | |
| **1000 Mb Ports** | Standard SFPs and GBICs supported, see modules description |
| **100 Mb Fiber Ports** | Multi-mode FX-MTRJ, LC, ST, SC; single-mode 20km LC, SC and ST, and 50km "long reach" single-mode LC, SC. |
| **100 Mb Copper Ports** | Category 5 UTP/STP; 10 Mb: Cat. 3,4, 5 UTP/STP |
| **Agency Standards Approval and Compliance** | |
| **UL/cUL 60950, EN55022 FCC Part 15** | CE, EMC & ENV |
| **IEC61850-3** | EMC and Operating Conditions Class C for Power Substations |
| **IEEE 1613 Class 2** | Environmental Standard for Electric Power Substations |
| **NEBS L3 and ETSI** | Telecommunications |
| **NEMA TS-2 and TEES** | Traffic Control |
| **EN50155** | Railways |
| **DNV** | Marine |
| **Warranty** | |
| **Warranty** | Three Years |

# Magnum 6K16V Configuration Guide

| 6K16V-125V | - | 6KP8-RJ45 \| 6KP8-MLC |
|---|---|---|

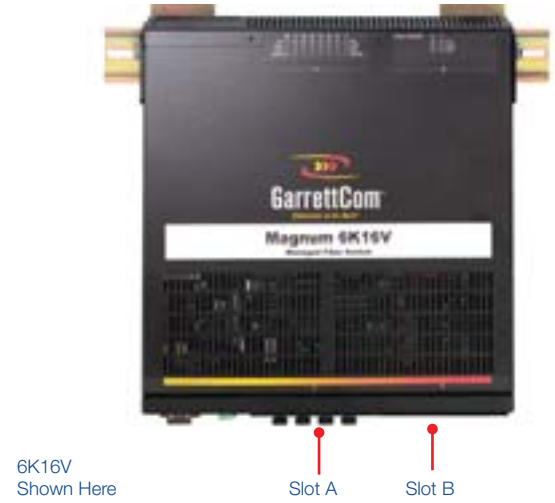
**Power Supply Options**
**6K16V-24V** = 24V (18-36) DC power
**6K16V-48V** = 48V (44-57) DC power
**6K16V-125V** = 125V (88-300) DC power
**6K16V-AC** = 100 to 240 VAC, 47 to 63 Hz

**Slot A**
**6KP8-RJ45** = 8x 10/100Mb RJ45
**6KP8-45-2SLC** = 6x 10/100Mb RJ45 + 2x 100Mb FX LC SM 40Km
**6KP6-RJMST** = 4x 10/100Mb RJ45 + 2x 100Mb FX ST MM
**6KP6-RJSSC** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC SM 20Km
**6KP8-45MT** = 4x 10/100Mb RJ45 + 4x 100Mb FX MTRJ MM
**6KP8-45SLC** = 4x 10/100Mb RJ45 + 4x 100Mb FX LC SM 20Km
**6KP4-FLSTFX** = 2x 10Mb FX SC MM + 2x 100Mb FX SC MM
**6KP4-FXSC** = 4x 100Mb FX SC MM
**6KP8-MTRJ** = 8x 100Mb FX MTRJ MM
**6KP8-4SLC** = 8x 100Mb FX LC SM 20Km
**6KP8-45-2MT** = 6x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**6KP6-RJ10ST** = 4x 10/100Mb RJ45 + 2x 10Mb FX SC MM
**6KP6-RJMSC** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC MM
**6KP6-RJSSCL** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC SM 40Km
**6KP8-45MLC** = 4x 10/100Mb RJ45 + 4x 100Mb FX LC MM
**6KP4-F10ST** = 4x 10Mb FX SC MM
**6KP4-FXST** = 4x 100Mb FX SC MM
**6KP6-MT10ST** = 2x 10Mb FX SC MM + 4x 100Mb FX MTRJ MM
**6KP8-MLC** = 8x 100Mb FX LC MM

**Or Choose from Gigabit Ports**
**6KP2-2GSX** = 2x 1000Mb FX SX
**6KP2-2GCU** = 2x 10/100/1000Mb RJ45
**6KP3-1CU2FXT** = 1x 10/100/1000Mb RJ45 + 2x 100Mb FX ST MM
**6KP5-1CU4RJ** = 1x 10/100/1000Mb RJ45 + 1x 10/100Mb RJ45
**6KP7-1G2RJ4MLC** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC MM
**6KP7-1G2RJ4SLC** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC SM 20Km
**6KP7-1G2RJ4SLCL** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC SM 40Km
**6KP7-1GSFP6RJ** = 1x 1000Mb SFP + 6x 10/100Mb RJ45
**6KP2-2GSFP** = 2x 1000Mb SFP
**6KP2-1GSFP1CU** = 1x 1000Mb SFP + 1x 10/100/1000Mb RJ45
**6KP1-1GSFP** = 1x 1000Mb SFP
**6KP1-1GCU** = 1x 10/100/1000Mb RJ45

**OR Choose from PoE Port Options (only with 6K16V-48V)**
**P6KP7V-1GSFP6RJ** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 1x 1000Mb SFP
**P6KP8V-RJ45** = 8x 10/100Mb RJ45 PoE
**P6KP8V-45-2MT** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**P6KP8V-45-2SLC** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 2x 100Mb FX LC SM 40Km
**P6KP6V-RJ10ST** = 4x 10/100Mb RJ45 PoE + 2x 10Mb FX SC MM
**P6KP6V-RJMST** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX ST MM
**P6KP6V-RJMSC** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC MM
**P6KP6V-RJSSC** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC SM 20Km
**P6KP6V-RJSSCL** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC SM 40Km
**P6KP8V-45RJ** = 8x 10/100Mb RJ45 PoE
**P6KP8V-45MT** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX MTRJ MM
**P6KP8V-45MLC** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX LC MM
**P6KP8V-45SLC** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX LC SM 20Km
**XX** = Blank Slot

**Slot B (Pick from Slot A options)**




# 6K16V Accessories

| Model No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-GTP | Gb Copper |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| CONFORM05-RMOD | Conformal coating, 5 mil, for moisture protection |

| Model No. | Description |
|---|---|
| CONFORM08-RMOD | Conformal coating, 8 mil, for corrosive environments |
| MNS-6K-SECURE-LIC1 | Optional, licensed per switch for extra security |
| S-RING-KEY | Software, optional self-healing redundant ring management |
| DUAL-SRC | Two separate power inputs (24/48/125V) |
| 6KM-BLNK | Blank cover for 1 unused (A) module slot |
| DIN-RAIL-VRM | DIN-Rail mounting brackets for one 6K16V |
| DIN-VM16-KIT | Variable-height DIN-Rail mounting kit for 6K16V |

# 6K25e Configurable Managed Switch

## High-capacity, high-performance Ethernet switching services in a robust 1U rack-mount package designed for demanding Industrial Networking and Carrier Class applications

Magnum 6K25e enhanced Managed Switches provide greater configurability in a rack-mount package. The port modules allow user-selection of mixed-media fiber (all connector types, multi- and single-mode) and 10/100 Mb RJ45 ports, even Power-over-Ethernet (PoE). Standard SFP ports can be configured for a variety of Gigabit fiber cabling types and distances,as well as 10/100/1000 copper.

High performance hardware features include non-blocking speed on all ports and 802.1p QoS Traffic Prioritization. Software includes comprehensive security for network access and for data traffic, GarrettCom's IGMP-L2 multicast traffic management, and a choice of redundancy options. Magnum 6K25e's are "plug-and-play" ready for use as backbone switches where a mix of bursty data traffic and priority streaming traffic for video surveillance, VoIP and even attached PoE devices are present.

The Magnum 6K25e Switches are provided with LAN software support including SNMP management control via command line interface, RMON, SNMPc and Openview for Windows, Secure Web Management GUI, and many security features. See the Managed Networks Software (MNS) datasheet for additional details on the comprehensive set of software packages and options.

Magnum 6K25e Managed Switches have rugged metal cases and Internal AC or DC power supplies, with DC dual source and dual power supply optional. The 6K25e's and all other Magnum products are designed and manufactured in the USA and backed by a three year warranty.

Ideal for core Ethernet services in Industrial Networks, Magnum 6K25e Switches provide flexible configuration, with up to 8 Gigabit ports and/or choices of both 100 Mb fiber and copper ports or 10 Mb fiber and copper ports.

## Features

- Provides 4 modular slots for user-selection of 100 Mb, 10 Mb, Gigabit ports and 10/100 copper ports with optional PoE
- Up to 8 Gigabit ports, choice of SFP or auto-negotiating copper connectors
- Compact 1U rack-mount package, metal case, regular or "reverse" case
- Options include 24V DC, -48V DC, 125V DC, and 250V DC power, dual source, dual power supplies, or AC
- Feature-rich MNS-6K managed switch software with choice of GUI or CLI

# Applications

A group of Magnum 6K25e Switches are ideal for the core Ethernet services in Industrial Networks. The advanced software with security and redundancy and ease-of-use serves applications that include other networking products such as WAN routers, small edge switches, and Serial Device Routers. Designed for use in industrial plant-wide LAN centers with numerous fiber segments requiring Gigabit backbone interconnections among network centers, the Magnum 6K25e is easy to install and operate.

# Technical Information

| | |
|---|---|
| **Performance** | |
| **Gigabit Ports, 1000 Mb** | Configurable, selection of standard SFP or fixed copper or fiber transceiver modules, up to 8 ports total |
| **Fiber Ports, 100 Mb** | Multi-mode and single-mode: Configurable in modules, up to 24 ports total<br>Each port may be FDX or HDX. Default is FDX mode |
| **Fiber Ports, 10 Mb** | Configurable, 4 ST ports per slot<br>Each port may be FDX or HDX, default is HDX mode up to 12 ports total |
| **RJ45 Ports, 100 or 10 Mb** | Full- or half-duplex mode, per port, individually determined<br>10/100 auto-negotiating and auto-cross, 24 max |
| **PoE RJ45 Ports, 100 or 10 Mb** | Full- or half-duplex mode, per port, individually determined<br>PoE is per IEEE 802.3af<br>With AC or 125V DC, 4 PoE ports max<br>With -48V DC, 24 PoE ports max |
| **All Ports, Non-blocking** | Processing type: Store and Forward with IEEE 802.3x FDX flow control<br>System aggregate forward and filter rate 11.9Mpps (24 ports @ 100 Mb speed, 8 ports @ Gb) |
| **Address Table** | 4K nodes, self-learning, with address aging |
| **Packet Buffers** | 240 KB for 10/100 and 120 KB for 1000 Mb |
| **Latency** | 6µs + packet time max (TX - TX, TX - FX, FX – FX, TX-G, G-G) |
| **Network Standards** | |
| **All Ports** | IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX<br>Auto-negotiation on TP, IEEE802.3af on PoE<br>See MNS-6K datasheet for software network standards and features |
| **Operating Environment** | |
| **IEC 60068 Operating Temperature** | Per "Type Test" -40°F to 185°F (-40°C to 85°C) |
| **UL 60950 and "Component Parts" Temperature Rating** | 130°F (55°C) |
| **Storage Temperature** | -40°F to 185°F (-40°C to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing)<br>For conformal coating (humidity protection) option: request quote |
| **Altitude** | -200 to 13,000 ft (-60 to 4000 m) |
| **Network Cable Connectors** | |
| **1000 Mb Ports** | All standard SFP and fixed types supported |
| **100 Mb Copper Ports** | Category 5 UTP/STP; 10 Mb: Cat. 3,4, 5 UTP/STP |
| **100 Mb Fiber Ports** | Multi-mode FX-MTRJ, LC, ST, SC<br>Single-mode LC, 20Km SC, and 40Km "long reach" single-mode SC |
| **10 Mb Fiber Ports** | Multi-mode ST |
| **Power Supply** | |
| **AC Power Supply (internal)** | AC Power Connector: IEC-type, male recessed, ON/OFF switch (optional)<br>Power Input, AC: 100 to 240V AC, 47 to 63 Hz (auto ranging)<br>Power Consumption: 60 watts typical for a fully-loaded fiber model<br>30 watts typical for copper-only models |
| **DC Power Supply** | -48V DC: Input -36 to -70V DC (PoE input range: -44 to -57V DC)<br>24V DC: Input 20 to 40V DC<br>125V DC, 250V DC, and 110V DC nominal: Input 88 to 300V DC<br>Std. Terminal Block: "-, GND, +"<br>Power Consumption: Same as AC |
| **DC Dual Power Source (optional)** | Magnum 6K25e models may be ordered with optional Dual DC power input for continuity of operation when either one of the DC input sources is interrupted; available for -48V, 24V, 125V or 250V. |
| **Power Supplies For PoE (optional)** | AC: same as AC internal but with 60 watts output @48V DC for PoE<br>125DC: same as 125DC internal but w/ 60 watts output @48V DC for PoE |
| **Dual Power Supplies (optional)** | Magnum 6K25e/6K25Re models with 48V DC, 125V DC,110V DC, 250V DC, and AC power input may be ordered with dual power supplies, load-sharing with software monitoring, for continuity of operation when either one of the two power supplies or their associated power input is inoperative |

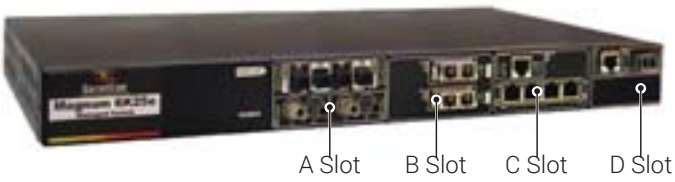
# Technical Information (continued)

| | |
|---|---|
| **Relay Contact for Alarms (Optional)** | |
| **Form C** | One NC indicating internal power, one NC software controllable |
| **Mechanical** | |
| **Enclosure** | Rugged high-strength sheet metal<br>Suitable for 1U rack-mounting or stand-alone |
| **Rack-mounting Brackets** | 19" included; ETSI and 23" Telco optional |
| **Dimensions** | 1.70in H x 17.0in W x 9.0in D (4.32cm H x 43.2cm W x 22.9cm D) |
| **Weight** | Rack-mount 5.0 lbs. (2.2 kg) |
| **Cooling Method** | Fan cooled, internal @ 25cfm |
| **LED Indicators** | |
| **Per RJ45 Port** | LK: ON when twisted-pair link is operational<br>ACT: Blinking with port activity<br>FDX/HDX: ON = full-duplex mode, OFF = half-duplex mode<br>100/10 ON = 100 Mb speed, OFF = 10 Mb |
| **Per 100 Mb and 10 Mb Fiber Port** | LK: Steady ON when fiber link is operational<br>ACT: ON with port activity, FDX/HDX |
| **Agency Approvals** | |
| **All Models** | UL Listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A |
| | IEC 61850 EMC and Operating Conditions Class C for Power Substations |
| | IEEE 1613 Class 2 Environmental Standard for Electric Power Substations |
| | NEBS L3 and ETSI compliant |
| | NEMA TS-2 for traffic control |
| | EN50155 compliant, DNV certified |
| **Warranty** | |
| **Made in USA** | Three [3] years |

# 6K25e Accessories

| Model No. | Description |
|---|---|
| **SFP-SX** | Gb SX, 850nm wavelength, 550 meters |
| **SFP-ESX** | Gb SX, 1310nm wavelength, 2km |
| **SFP-LX25** | Gb LX, 1310nm wavelength, 25km |
| **SFP-ZX40** | Gb ZX, 1550nm wavelength, 40km |
| **SFP-ZX70** | Gb ZX, 1550nm wavelength, 70km |
| **SFP-GTP** | Gb Copper |
| **SFP-LX10** | Gb LX, 1310nm wavelength, 10km |
| **CONSOLE-CBL** | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| **CONSOLE-USB** | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| **CONFORM05-CRM** | Conformal coating, 5 mil, for moisture protection |
| **CONFORM08-CRM** | Conformal coating, 8 mil, for corrosive environments |

| Model No. | Description |
|---|---|
| **MNS-6K-SECURE-LIC1** | Optional, licensed per switch for extra security |
| **S-RING-KEY** | Software, optional self-healing redundant ring management |
| **DUAL-SRC** | Two separate power inputs (24/48/125V) |
| **6KM-BLNK** | Blank cover for 1 unused (A) module slot |
| **ALARM-TERMBLK** | Alarm contacts, 1 power and 1 software |
| **RMB-23W** | 23" 'Telco' rack-mount kit (1U) |
| **RMB-ETSI** | ETSI rack-mount kit (1U) |



# Magnum 6K25e Configuration Guide

**6K25e-125VDC | - | 6KP8-RJ45 | 6KP8-MLC | 6KP8-MLC | 6KE-2GCU**

## Mounting
**6K25e** = Front mount w/ AC
**6K25Re** = Reverse mount w/ AC

## Power Supply Options
**24VDC** = 24V (18-36) DC
**125VDC** = 125V (88-300) DC
**2AC** = 2 internal AC power supplies (with Reverse Mount only)
**2DC125** = 2 internal 125 DC (with Reverse Mount only)
**2DC250** = 2 internal 250 DC (with Reverse Mount only)
**48VDC** = 48V (44-57) DC
**250VDC** = 250V (88-300) DC

## Slot A
**6KP8-RJ45** = 8x 10/100Mb RJ45
**6KP8-45-2SLC** = 6x 10/100Mb RJ45 + 2x 100Mb FX LC SM 40Km
**6KP6-RJMST** = 4x 10/100Mb RJ45 + 2x 100Mb FX ST MM
**6KP6-RJSSC** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC SM 20Km
**6KP8-45MT** = 4x 10/100Mb RJ45 + 4x 100Mb FX MTRJ MM
**6KP8-45SLC** = 4x 10/100Mb RJ45 + 4x 100Mb FX LC SM 20Km
**6KP4-FLSTFX** = 2x 10Mb FX SC MM + 2x 100Mb FX SC MM
**6KP6-RJSSCL** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC SM 40Km
**6KP8-MLC** = 8x 100Mb FX LC MM
**6KP6-MT10ST** = 2x 10Mb FX SC MM + 4x 100Mb FX MTRJ MM
**6KP8-45-2MT** = 6x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**6KP6-RJ10ST** = 4x 10/100Mb RJ45 + 2x 10Mb FX SC MM
**6KP6-RJMSC** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC MM
**6KP8-4SLC** = 8x 100Mb FX LC SM 20Km
**6KP8-45MLC** = 4x 10/100Mb RJ45 + 4x 100Mb FX LC MM
**6KP4-F10ST** = 4x 10Mb FX SC MM
**6KP4-FXST** = 4x 100Mb FX SC MM
**6KP4-FXSC** = 4x 100Mb FX SC MM
**6KP8-MTRJ** = 8x 100Mb FX MTRJ MM

## Or Choose from Gigabit Ports
**6KP2-2GSX** = 2x 1000Mb FX SX
**6KP7-1GSFP6RJ** = 1x 1000Mb SFP + 6x 10/100Mb RJ45
**6KP2-1GSFP1CU** = 1x 1000Mb SFP + 1x 10/100/1000Mb RJ45
**6KP1-1GCU** = 1x 10/100/1000Mb RJ45
**6KP3-1CU2FXT** = 1x 10/100/1000Mb RJ45 + 2x 100Mb FX ST MM
**6KP5-1CU4RJ** = 1x 10/100/1000Mb RJ45 + 1x 10/100Mb RJ45
**6KP7-1G2RJ4MLC** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC MM
**6KP7-1G2RJ4SLC** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC SM 20Km
**6KP7-1G2RJ4SLCL** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC SM 40Km
6KP2-2GCU = 2x 10/100/1000Mb RJ45
6KP2-2GSFP = 2x 1000Mb SFP
6KP1-1GSFP = 1x 1000Mb SFP

## OR Choose from PoE Port Options (only with 48VDC Models). For AC or 125 VDC model please see Note 1
**P6KP7-1GSFP6RJ** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 1x 1000Mb SFP
**P6KP8-RJ45** = 8x 10/100Mb RJ45 PoE
**P6KP8-45-2MT** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**P6KP8-45-2SLC** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 2x 100Mb FX LC SM 40Km
**P6KP6-RJ10ST** = 4x 10/100Mb RJ45 PoE + 2x 10Mb FX SC MM
**P6KP6-RJMST** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX ST MM
**P6KP6-RJMSC** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC MM
**P6KP6-RJSSC** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC SM 20Km
**P6KP6-RJSSCL** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC SM 40Km
**P6KP8-45RJ** = 8x 10/100Mb RJ45 PoE
**P6KP8-45MT** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX MTRJ MM
**P6KP8-45MLC** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX LC MM
**P6KP8-45SLC** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX LC SM 20Km
**XX** = Blank Slot

## Slot B (Pick from Slot A options)

## Slot C (Pick from Slot A options)

## Slot D
**6KE-2GSFP** = 2x 1000Mb SFP
**6KE-2GCUSFP** = 1x 1000Mb SFP + 1x 10/100/1000Mb RJ45
**6KE**-1GCU = 1x 10/100/1000Mb RJ45
**6KE-2GCU** = 2x 10/100/1000Mb RJ45
**6KE-1GSFP** = 1x 1000Mb SFP
**XX** = Blank Slot

**Note 1:** For configuring full rack-width 6K Switches having AC or 125V DC input only choose a power-inside power supply just for PoE power. Model **P6KP8-RJ45** is not available for AC or 125V DC.

**6KAC-PoE-PS** = Power Supply for PoE to 4 ports, 60 watts, mounts inside of a rack-mount 6K Switch (6K25, 25e, 25R, 25Re) w/ AC
**6K125VDCPoE-PS** = Power Supply for PoE to 4 ports, 60 watts, mounts inside of a rack-mount 6K Switch (6K25, 25e, 25R, 25Re ) w/ 125VDC

# 6K32T Series 32-Port Managed Switches

## 32-ports in a 1U rack-mount package, ideal for heavy duty and Industrial applications that require high port density to save in cost and rack space.

Designed for Use in Industrial Ethernet Networks with Segments Requiring Multiple Gigabit Backbone Interconnections.

### Flexible Design

The Magnum 6K32T Series of industrial managed switches provides a total of 32 managed ports of which 16 are fixed 10/100 RJ-45 ports and two optional port module slots may be configured with a selection of 10/100/1000 Mb fiber and copper connector types, eight ports max., each slot. The standard model – 6K32T is front facing unit meaning all connections and indicators are on the front of the model, where the 6K32TR model has the connections and indicators (LEDs) on the rear (reverse) and LEDs on the front.

The 6K32TRC model has the same characteristics as the 6K32TR model except this model is a convection-cooled (no fans) design for heavy duty industrial applications where the presence of dust and dirt may inhibit normal cooling. New static thermal design techniques (patent pending) enable the 6K32TRC model to deliver high reliability even at extended temperatures.

## 6K32T

- Provides 16 fixed copper ports and two modular slots for configuration flexibility of up to 4 GB ports or 32 total ports
- Dense 1U rack-mount package, NEBS compliant member of Magnum 6K family
- "Reverse Rack-mount" with or without convection-cooled unit (not fans)
- Two modular slots for combinations of Gigabit, fiber at 100Mb and 10 Mb, and more 10/100 copper ports
- Non-blocking wire speed performance on all ports, 802.1p QoS prioritization
- Options include 24VDC, -48VDC, 125VDC, and 250VDC power, dual source, or AC

## 6K32TR

Same as 6K32T, except user ports and the power input connectors are in the rear (reverse model type). Two sets of LED's (both rear and front) provide duplicate status data for viewing from either side.

## 6K32TRC

Same as 6K32TR except energy-efficient thermal design enables operation at extended temperatures with high reliability

# Magnum 6K32T Series

### 6K32TRC Rack-mount Cooling Techniques

- Internal heat barriers contain heat to areas where it is least detrimental
- Large power supply heat sinks to dissipate the power heat loss
- Aluminum case material used for efficient heat conduction & distribution
- Perforated case areas enable some vertical air flow via convection
- Cooling space above and below the unit in the rack, 1/2U top and bottom
- Multiple heat sinks distribute heat from internal electronic components
- Premium high-efficiency components used to minimize heat generation.

### Software

LAN software support including SNMP management, SNMPcTM and OpenviewTM for Windows, Secure Web Management, redundant LANs support, and many network management security and ease-of-use features. The See the Managed Networks Software (MNS-6K) datasheet for additional details on the comprehensive set of software packages and options that are used across the Magnum 6K Switches family of products.

### Hardware

High performance hardware non-blocking wire speed on all ports and 802.1p QoS Traffic Prioritization, "plug-and-play" ready for use as backbone switches where a mix of bursty data traffic and priority streaming traffic for VoIP and audio/video applications is present. Fan cooling (6K32T and 6K32TR) provides long operating life and increased system availability, where as the convection cooling (no fans) of the 6K32TCR provides optimal performance in heavy-duty environments.

### Applications

Ideal for building a switched network infrastructure when used in applications connected to communications computers, routers, hubs, or other switches. Designed for use in Carrier Ethernet and Industrial networks with segments requiring multiple Gigabit backbone interconnections among network centers, the switches are easy to install and operate. Addresses of attached nodes are automatically learned and maintained, adapting the switching services to network changes and expansions to provide plug-and-play operation.

### Power Supplies

Rugged metal cases and auto-ranging power supplies for operation with standard AC power worldwide. Internal DC power supplies are optional.

### Warranty

Three years.

# Product Specifications

| Type | 6K32T | 6K32TR | 6K32TRC |
|---|---|---|---|
| Product Description | Magnum 6K32T Managed Switch, base unit. Provides 16 fixed 10/100 RJ-45 ports and two optional ports module slot which may be configured with a selection of 10/100/1000 Mb fiber and copper connector types, eight ports max. each slot. For licensed management software, see applicable MNS-6K datasheet. | "Reverse" model, same as Model 6K32T except user ports and the power input connectors are in the rear. Two sets of LEDs (both rear and front) provide duplicate status data for viewing from either side. | "Reverse" model, same as Model 6K32TR except convection cooled (no fans). |
| **Mechanical** | | | |
| Enclosure | Rugged high-strength sheet metal. Suitable for 1U rackmounting or stand-alone | | |
| Rack-mounting Brackets | 19" included; ETSI and 23" Telco optional. | | |
| Cooling Method | Fan cooled, internal @ 25cfm | | |
| Dimensions | 1.70inHx17.0inWx9.0inD (4.32cmHx 43.2cmW x 22.9cmD) | | |
| Weight | Rack-mount 5.0 lbs. (2.0 kg) | | |
| **Network Standards** | | | |
| Ethernet | IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX | | |
| Auto-negotiation and Auto-crossover | TP, IEEE 802.3u | | |
| Software | See MNS-6K/MNS-6K-SECURE datasheet for software network standards, network security, redundant LANs management and other software features | | |
| **Performance** | | | |
| Fiber Ports, 100 mB (multi-mode and single-mode) | Configurable in the module, SFF (Small Form Factor) featured for high fiber port density, up to 8 total per module, each FDX or HDX, default is FDX mode | | |
| Fiber Ports, 10 mB | Configurable, up to 4 ST ports max. per module, multimode or single-mode. Each port may be FDX or HDX, default is HDX | | |
| Gigabit Ports, 1000 Mb | Configurable, std. See selection of modules | | |
| RJ-45 Ports | 100 or 10 Mb speed, full- or half-duplex mode, per port, individually determined.10/100 auto-negotiating & auto-cross, 32 ports max. | | |
| All Ports Non-Blocking | Processing type: Store and Forward with IEEE 802.3x full-duplex flow control<br>System aggregate forward and filter rate: 8.3Mpps (16 ports @ 100Mb speed FDX and 4 ports @ Gb speed FDX)<br>Address table: 4K nodes, self-learning, with address aging<br>Packet buffers: 480KB + 120KB for 1000 Mb<br>Latency: 6µs + packet time max (TX - TX, TX - FX, FX - FX, TX-G, G-G) | | |

# Product Specifications (continued)

| | |
|---|---|
| **AC Power Supply (internal)** | |
| **AC Power Connector** | IEC-type, male recessed, ON/OFF switch (optional) |
| **Power Input AC** | 100 to 240 VAC, 47 to 63 Hz (auto ranging) |
| **Power Consumption** | 45 watts typical with two fully-loaded fiber modules, 30 watts typical for a copper-only 24-port model |
| **DC Power Supply Options** | |
| **-48VDC** | Input -36 to -70VDC (PoE input range: -44 to -57VDC) |
| **24VDC** | Input 20 to 40VDC |
| **125VDC, 250VDC, and 110VDC nominal** | Input 88 to 300VDC |
| **Std. Terminal Block** | "-, GND, +", Power Consumption: Same as AC |
| **DC Dual Power Source (optional)** | |
| **Magnum 6K32T and 6K32TR models may be ordered with optional Dual DC power input, for continuity of operation when either one of the DC input sources is interrupted. Available for -48V, 24V, 125V, or 250V.** | |
| **LED Indicators, 100 Mb and 10 Mb Fiber Ports** | |
| **LK** | Steady on when fiber link is operational |
| **ACT** | On with port activity, FDX/HDX |
| **LED Indicators, per RJ-45 Port** | |
| **LK** | On when twisted-pair link is operational |
| **ACT** | Blinking with port activity. LK and ACT combined on fixed ports. |
| **FDX/HDX** | ON = full-duplex mode, OFF = half-duplex mode. 100/10 ON = 100Mb speed, OFF = 10Mb |
| **Port-Specification Settings** | |
| Port-specific user settings (such as FDX or HDX, and copper 10/100 speed) can be set using software commands. The RJ-45 copper ports are auto-negotiating and auto-crossover, there are no user controls for auto-crossover. | |
| **Relay Contacts for Alarms (optional)** | |
| **Form C** | One NC indicating internal power, one NC software controllable. |
| **Operating Environment** | |
| **Operating Temperature** | IEC 60068 per "Type Test" -40° to 185°F (-40° to 85°C) |
| **Temperature Rating (components)** | UL 60950: 130°F (55°C) |
| **Storage Temperature** | -40° to 185°F (-40°to 85°C), |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 13000ft (-60 to 4000m) |
| **Conformal Coating (humidity protection)** | Request quote |
| **Network Cable Connectors** | |
| **1000 Mb Ports** | Standard GBICs supported, see modules description |
| **100 Mb Fiber Ports** | multi-mode FX-MTRJ, LC, ST, SC; single-mode LC, 20Km SC, and 40Km "long reach" single-mode SC |
| **10 Mb Fiber Ports** | multi-mode and single-mode ST |
| **100 Mb Copper Ports** | Category 5 UTP/STP; 10 Mb: Cat. 3,4, 5 UTP/STP |
| **Agency Standards Approval and Compliance** | |
| **UL/cUL 60950, EN55022 FCC Part 15** | CE, EMC & ENV |
| **IEC61850-3** | EMC and Operating Conditions Class C for Power Substations |
| **IEEE 1613 Class 2** | Environmental Standard for Electric Power Substations |
| **NEBS L3 and ETSI** | Telecommunications |
| **NEMA TS-2** | Traffic Control |
| **EN50155** | Railways |
| **DNV** | Marine |
| **Warranty** | |
| **Warranty** | Three Years |

# Magnum 6K32T Configuration Guide

| 6K32T-125V | - | 6KP8-RJ45 I 6KP8-MLC |
|---|---|---|

**Mounting (base unit provides fixed 16x 10/100 RJ45 ports)**
**6K32** = Rack-mount with AC Power
**6K32TR** = Reverse-mount with AC Power
**6K32TRC** = Reverse-mount with AC Power (standard IEC connector)

**Power Supply Options**
**24V** = 24V (18-36) DC
**48V** = 48V (44-57) DC
**125V** = 125V (88-300) DC
**AC/DC** = Reverse-mount with AC Pwr (100-240V AC /110-250V DC w/pwr via 3 pin terminal block)

**Slot A**
**6KP8-RJ45** = 8x 10/100Mb RJ45
**6KP8-45-2SLC** = 6x 10/100Mb RJ45 + 2x 100Mb FX LC SM 40Km
**6KP6-RJMST** = 4x 10/100Mb RJ45 + 2x 100Mb FX ST MM
**6KP6-RJSSC** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC SM 20Km
**6KP8-45MT** = 4x 10/100Mb RJ45 + 4x 100Mb FX MTRJ MM
**6KP8-45SLC** = 4x 10/100Mb RJ45 + 4x 100Mb FX LC SM 20Km
**6KP4-FLSTFX** = 2x 10Mb FX SC MM + 2x 100Mb FX SC MM
**6KP6-RJSSCL** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC SM 40Km
**6KP8-MLC** = 8x 100Mb FX LC MM
**6KP6-MT10ST** = 2x 10Mb FX SC MM + 4x 100Mb FX MTRJ MM
**6KP8-45-2MT** = 6x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**6KP6-RJ10ST** = 4x 10/100Mb RJ45 + 2x 10Mb FX SC MM
**6KP6-RJMSC** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC MM
**6KP8-4SLC** = 8x 100Mb FX LC SM 20Km
**6KP8-45MLC** = 4x 10/100Mb RJ45 + 4x 100Mb FX LC MM
**6KP4-F10ST** = 4x 10Mb FX SC MM
**6KP4-FXST** = 4x 100Mb FX SC MM
**6KP4-FXSC** = 4x 100Mb FX SC MM
**6KP8-MTRJ** = 8x 100Mb FX MTRJ MM

**Or Choose from Gigabit Ports**
**6KP7-1GSFP6RJ** = 1x 1000Mb SFP + 6x 10/100Mb RJ45
**6KP7-1G2RJ4MLC** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC MM
**6KP7-1G2RJ4SLC** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC SM 20Km
**6KP7-1G2RJ4SLCL** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC SM 40Km
**6KP5-1CU4RJ** = 1x 10/100/1000Mb RJ45 + 1x 10/100Mb RJ45
**6KP2-2GSFP** = 2x 1000Mb SFP
**6KP2-1GSFP1CU** = 1x 1000Mb SFP + 1x 10/100/1000Mb RJ45
**6KP1-1GSFP** = 1x 1000Mb SFP
**6KP1-1GCU** = 1x 10/100/1000Mb RJ45
**6KP2-2GCU** = 2x 10/100/1000Mb RJ45
**6KP3-1CU2FXT** = 1x 10/100/1000Mb RJ45 + 2x 100Mb FX ST MM

**OR Choose from PoE Port Options (only with 48VDC Models).**
**P6KP7-1GSFP6RJ** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 1x 1000Mb SFP
**P6KP8-RJ45** = 8x 10/100Mb RJ45 PoE
**P6KP8-45-2MT** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**P6KP8-45-2SLC** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 2x 100Mb FX LC SM 40Km
**P6KP6-RJ10ST** = 4x 10/100Mb RJ45 PoE + 2x 10Mb FX SC MM
**P6KP6-RJMST** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX ST MM
P6KP6-RJMSC = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC MM
**P6KP6-RJSSC** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC SM 20Km
**P6KP6-RJSSCL** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC SM 40Km
**P6KP8-45RJ** = 8x 10/100Mb RJ45 PoE
**P6KP8-45MT** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX MTRJ MM
**P6KP8-45MLC** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX LC MM
**P6KP8-45SLC** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX LC SM 20Km
**XX** = Blank Slot

**Slot B (Pick from Slot A options)**

# 6K32T Accessories

| Model No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-GTP | Gb Copper |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| CONSOLE-CBL | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-USB | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| CONFORM05-CRM | Conformal coating, 5 mil, for moisture protection |
| CONFORM08-CRM | Conformal coating, 8 mil, for corrosive environments |

| Model No. | Description |
|---|---|
| MNS-6K-SECURE-LIC1 | Optional, licensed per switch for extra security |
| S-RING-KEY | Software, optional self-healing redundant ring management |
| DUAL-SRC | Two separate power inputs (24/48/125V) |
| 6KM-BLNK | Blank cover for 1 unused (A) module slot |
| ALARM-TERMBLK | Alarm contacts, 1 power and 1 software |
| RMB-23W | 23" 'Telco' rack-mount kit (1U) |
| RMB-ETSI | ETSI rack-mount kit (1U) |

# 6K32F Series Fiber configurable Industrial Managed Switch

## Highly configurable fiber switch with convection or fan-cooled options

**Flexible Design**

Magnum 6K32F Series 32-port Fiber Managed Switches provide maximum fiber-port configurability in a rack-mount package, with up to 8 gigabit ports and up to 32 100 Mb fiber and copper ports or 10 Mb fiber and copper ports.

High-capacity and high-performance Ethernet switching services are delivered in a robust 1U rack-mount package designed for the most demanding Industrial Networking applications.

Designed for use in industrial networks with numerous fiber segments requiring Gigabit backbone interconnections among network centers, the Magnum 6K32F Series are easy to install and operate. Fiber media is the industrial networking media choice for noise-immunity, for distance, for bandwidth, for preventing ground loops, and for overall reliability.

The Magnum 6K32F Series Fiber Switch delivers industry-leading fiber media flexibility and capacity. High performance hardware features include non-blocking speed on all ports and 802.1p QoS Traffic Prioritization. Moisture- and corrosionprotecting Conformal Coating is optional.

- Rack-mount Space Efficiency and Rich Fiber
- Port Configurability with Optional Convection-cooled Base Unit (no fans) for Heavy-duty Industrial Applications.

### 6K32F

- Provides four modular slots for configuration flexibility of up to 8 Gb ports or 16 standard fiber ports or 32 copper ports (some PoE)
- Choice of Regular or “Reverse” case designs provide power and port cables in the front or in the rear
- Power input choices: 24VDC, -48VDC, 110-250VDC power, DC Dual Source, universal AC

### 6K32FR

Same as 6K32F, except user ports and the power input connectors are in the rear (reverse model type). Two sets of LED’s (both rear and front) provide duplicate status data for viewing from either side.

### 6K32FC

Same as 6K32F, except, convection-cooled in 1U rack-mount package, for dusty and dirty industrial environments

### 6K32FRC

Same as 6K32FR, except, convection-cooled in 1U rack-mount package, for dusty and dirty industrial environments.

# GarrettCom Magnum 6K32F Series

### Configurable for Flexibility

The four configuration slots in the Magnum 6K32F series provide the flexibility for network designers to configure up to sixteen 100 Mb standard ST or SC fiber ports, and/or some 10 Mb fiber ports, and/or one to 8 Gigabit ports, or some copper ports, or combinations including 100Mb SFF fiber ports. SFP, GBIC, and fixed gigabit ports can be configured for a variety of Gigabit fiber and copper cabling types and distances. Copper ports can optionally be Power-Sourcing PoE. There are over 30 modules for various port types and combinations to choose from.

### Software

Magnum 6K32F Series Managed Switches come with LAN software support including SNMP management, Secure Web Management, IGMP, graphical user interface (GUI), redundant LANs support, and many network management security and ease-of-use features.

### Applications

The Magnum 6K32FC Series are ideal for building a fiber-rich industrial network for use in harsh industrial applications in power utilities, plants and factories and mines, transportation, telecommunications, video surveillance and oil & gas facilities. The networks commonly include industrial IEDs, RTUs, HMI computers, routers, video surveillance cameras, smaller field switches, and other managed switches for multiple Gigabit backbone interconnections or redundancy.

### Design

Magnum 6K32F Series Managed Switches have rugged metal cases for regular or “Reverse” rack-mounting, and auto-ranging power supplies for operation with standard AC power worldwide, or internal DC power supply choices.

The 6K32F Series are designed and manufactured in the USA and have a three year warranty.

# Product Specifications

| Type | 6K32F | 6K32FR | 6K32FC | 6K32FRC |
|---|---|---|---|---|
| Product Description | Magnum 6K32F Managed Switch, 4-slot base unit. May be configured with a selection of 10/100/1000 Mb fiber and copper connector types, 32 ports max or 8 gig ports max. A family of port modules are available for essentially unlimited configuration flexibility. Wirespeed filtering and forwarding across all ports | “Reverse” model, same as Model 6K32F except user ports and the power input connectors are in the rear. Two sets of LEDs (both rear and front) provide duplicate status data for viewing from either side. | Magnum 6K32FC Fiber-configurable Convection-cooled Managed Switch, base unit. Provides four port module slots which may be configured with a selection of 10/100/1000 Mb fiber and copper connector types, 8 ports max. each slot. | “Reverse” model, same as Model 6K32FC except user ports and the power input connectors are in the rear. Two sets of LEDs (both rear and front) provide duplicate status data for viewing from either side. |
| **Mechanical** | | | | |
| Enclosure | Rugged high-strength sheet metal. Suitable for 1U rackmounting or stand-alone. | | | |
| Rack-mounting Brackets | 19” included; ETSI and 23” Telco optional. | | | |
| Cooling Method | Free convection, special (patent pending) thermal techniques | | | |
| Dimensions | 1.70in H x 17.0in Wx 9.0in D (4.32cm H x 43.2cm W x 22.9cm D) | | | |
| Weight | Rack-mount 5.0 lbs. (2.2 kg) | | | |
| **Network Standards** | | | | |
| Ethernet | IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX | | | |
| Auto-negotiation and Auto-crossover | TP, IEEE 802.3u | | | |
| Software | See MNS-6K/MNS-6K-SECURE datasheet for software, network security, redundant LANs management, GUI and other software features. | | | |
| **Performance** | | | | |
| Fiber Ports, 100 Mb (multi-mode and single-mode) | Configurable in modules. Regular ST or SC at 4/module, or SFF (Small Form Factor) for high fiber port density, 8 per module. Each FDX or HDX, default is FDX mode | | | |
| Fiber Ports, 10 Mb | Configurable in modules. Regular ST or SC at 4/module, or SFF (Small Form Factor) for high fiber port density, 8 per module. Each FDX or HDX, default is FDX mode | | | |
| Gigabit Ports, 1000 Mb | Configurable, std. See selection of modules. | | | |
| RJ-45 Ports | 100 or 10 Mb speed, full- or half-duplex mode, per port, individually determined.10/100 auto-negotiating & auto-cross, 32 ports max. | | | |
| All Ports Non-Blocking | Processing type: Store and Forward with IEEE 802.3x full-duplex flow control<br>System aggregate forward and filter rate: 11.9Mpps.<br>Address table: 4K nodes, self-learning, with address aging<br>Packet buffers: 240 KB for 10 and 100Mb, 120KB for Gb<br>Latency: 6µs + packet time max (TX - TX, TX - FX, FX - FX, TX-G, G-G) | | | |

# Product Specifications (continued)

| | |
|---|---|
| **AC Power Supply (internal)** | |
| **AC Power Connector** | IEC-type, male recessed, ON/OFF switch (optional) |
| **Power Input AC** | 100 to 240 VAC, 47 to 63 Hz (auto ranging) |
| **Power Consumption** | 45 watts typical with 16 fully-loaded fiber ports, 30 watts typical for a copper-only 32-port model. |
| **DC Power Supply Options** | |
| **-48VDC** | Input -36 to -70VDC (PoE input range: -44 to -57VDC) |
| **24VDC** | Input 20 to 40VDC |
| **125VDC, 250VDC, and 110VDC nominal** | Input 88 to 300VDC |
| **Std. Terminal Block** | "-, GND, +", Power Consumption: Same as AC |
| **DC Dual Power Source (optional)** | |
| Magnum 6K32F Series may be ordered with optional Dual DC power input, for continuity of operation when either one of the DC input sources is interrupted. Available for -48VDC, 24VDC, 125VDC or 250VDC. | |
| **Dual Power Supplies (optional)** | |
| Magnum 6K32FC models with 125VDC, 250VDC and 110VDC nominal power input may be ordered with Dual Power Supplies, load-sharing with software monitoring, for continuity of operation when either one of the two power supplies or their associated power input is inoperative. | |
| **LED Indicators, 100 Mb and 10 Mb Fiber Ports** | |
| **LK** | Steady on when fiber link is operational |
| **ACT** | On with port activity, FDX/HDX |
| **LED Indicators, per RJ-45 Port** | |
| **LK** | On when twisted-pair link is operational |
| **ACT** | Blinking with port activity. LK and ACT combined on fixed ports. |
| **FDX/HDX** | ON = full-duplex mode, OFF = half-duplex mode. 100/10 ON = 100Mb speed, OFF = 10Mb |
| **Relay Contacts for Alarms (optional)** | |
| **Form C** | One NC indicating internal power, one NC software controllable |
| **Operating Environment** | |
| **Operating Temperature** | IEC 60068 per "Type Test" -40° to 185°F (-40° to 85°C) |
| **Temperature Rating (components)** | 140°F (60°C) |
| **Storage Temperature** | -40° to 185°F (-40°to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 13000ft (-60 to 4000m) |
| **Conformal Coating (humidity protection)** | Request quote |
| **Network Cable Connectors** | |
| **1000 Mb Ports** | Standard SFPs and GBICs supported, see modules description |
| **100 Mb Fiber Ports** | Multi-mode FX-MTRJ, LC, ST, SC; single-mode 20km LC, SC and ST, and 50km "long reach" single-mode LC, SC |
| **10 Mb Fiber Ports** | Multi-mode and single-mode ST |
| **100 Mb Copper Ports** | Category 5 UTP/STP; 10 Mb: Cat. 3,4, 5 UTP/STP |
| **Agency Standards Approval and Compliance** | |
| **UL/cUL 60950, EN55022 FCC Part 15** | CE, EMC & ENV |
| **IEC61850-3** | EMC and Operating Conditions Class C for Power Substations |
| **IEEE 1613 Class 2** | Environmental Standard for Electric Power Substations |
| **NEBS L3 and ETSI** | Telecommunications |
| **NEMA TS-2** | Traffic Control |
| **EN50155** | Railways |
| **DNV** | Marine |
| **Warranty** | |
| **Warranty** | Three Years |

# Magnum 6K32F Configuration Guide

| 6K32F-125V | - | 6KP8-RJ45 \| 6KP8-MLC \| 6KP8-MLC \| 6KP1-1GCU |
|---|---|---|

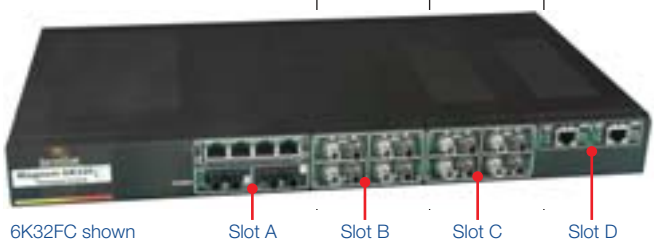
**Mounting**
**6K32F** = Front mount, AC Power
**6K32FR** = Reverse mount, AC Power
**6K32FC** = Front mount, AC Power, convection cooled
**6K32FRC** = Reverse mount, AC Power, convection cooled

**Power Supply Options**
**24V** = 24V (18-36) DC
**48V** = 48V (44-57) DC
**125V** = 125V (88-300) DC
**2AC** = 2 internal AC power supplies (with 6K32FRC models only)
**2DC125** = 2 internal 125 DC (with 6K32FRC models only)

**Slot A**
**6KP8-RJ45** = 8x 10/100Mb RJ45
**6KP8-45-2SLC** = 6x 10/100Mb RJ45 + 2x 100Mb FX LC SM 40Km
**6KP6-RJMST** = 4x 10/100Mb RJ45 + 2x 100Mb FX ST MM
**6KP6-RJSSC** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC SM 20Km
**6KP8-45MT** = 4x 10/100Mb RJ45 + 4x 100Mb FX MTRJ MM
**6KP8-45SLC** = 4x 10/100Mb RJ45 + 4x 100Mb FX LC SM 20Km
**6KP4-FLSTFX** = 2x 10Mb FX SC MM + 2x 100Mb FX SC MM
**6KP6-RJSSCL** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC SM 40Km
**6KP8-MLC** = 8x 100Mb FX LC MM
**6KP6-MT10ST** = 2x 10Mb FX SC MM + 4x 100Mb FX MTRJ MM
**6KP8-45-2MT** = 6x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**6KP6-RJ10ST** = 4x 10/100Mb RJ45 + 2x 10Mb FX SC MM
**6KP6-RJMSC** = 4x 10/100Mb RJ45 + 2x 100Mb FX SC MM
**6KP8-4SLC** = 8x 100Mb FX LC SM 20Km
**6KP8-45MLC** = 4x 10/100Mb RJ45 + 4x 100Mb FX LC MM
**6KP4-F10ST** = 4x 10Mb FX SC MM
**6KP4-FXST** = 4x 100Mb FX SC MM
**6KP4-FXSC** = 4x 100Mb FX SC MM
**6KP8-MTRJ** = 8x 100Mb FX MTRJ MM

**Or Choose from Gigabit Ports**
**6KP7-1GSFP6RJ** = 1x 1000Mb SFP + 6x 10/100Mb RJ45
**6KP7-1G2RJ4MLC** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC MM
**6KP7-1G2RJ4SLC** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC SM 20Km
**6KP7-1G2RJ4SLCL** = 1x 1000Mb SFP + 2x 10/100Mb RJ45 + 4x 100Mb FX LC SM 40Km
**6KP5-1CU4RJ** = 1x 10/100/1000Mb RJ45 + 1x 10/100Mb RJ45
**6KP2-2GSFP** = 2x 1000Mb SFP
**6KP2-1GSFP1CU** = 1x 1000Mb SFP + 1x 10/100/1000Mb RJ45
**6KP1-1GSFP** = 1x 1000Mb SFP
**6KP1-1GCU** = 1x 10/100/1000Mb RJ45
**6KP2-2GCU** = 2x 10/100/1000Mb RJ45
**6KP3-1CU2FXT** = 1x 10/100/1000Mb RJ45 + 2x 100Mb FX ST MM

**OR Choose from PoE Port Options (only with 48VDC Models).**
**P6KP7-1GSFP6RJ** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 1x 1000Mb SFP
**P6KP8-RJ45** = 8x 10/100Mb RJ45 PoE
**P6KP8-45-2MT** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 2x 100Mb FX LC MM
**P6KP8-45-2SLC** = 4x 10/100Mb RJ45 PoE + 2x 10/100Mb RJ45 + 2x 100Mb FX LC SM 40Km
**P6KP6-RJ10ST** = 4x 10/100Mb RJ45 PoE + 2x 10Mb FX SC MM
**P6KP6-RJMST** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX ST MM
**P6KP6-RJMSC** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC MM
**P6KP6-RJSSC** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC SM 20Km
**P6KP6-RJSSCL** = 4x 10/100Mb RJ45 PoE + 2x 100Mb FX SC SM 40Km
**P6KP8-45RJ** = 8x 10/100Mb RJ45 PoE
**P6KP8-45MT** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX MTRJ MM
**P6KP8-45MLC** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX LC MM
**P6KP8-45SLC** = 4x 10/100Mb RJ45 PoE + 4x 100Mb FX LC SM 20Km
**XX** = Blank Slot




**Slot B (Pick from Slot A options)**

**Slot C (Pick from Slot A options)**

**Slot D (Pick from Slot A options)**

# 6K32F Accessories

| Model No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-GTP | Gb Copper |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| CONSOLE-CBL | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-USB | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| CONFORM05-CRM | Conformal coating, 5 mil, for moisture protection |
| CONFORM08-CRM | Conformal coating, 8 mil, for corrosive environments |

| Model No. | Description |
|---|---|
| MNS-6K-SECURE-LIC1 | Optional, licensed per switch for extra security |
| S-RING-KEY | Software, optional self-healing redundant ring management |
| DUAL-SRC | Two separate power inputs (24/48/125V) |
| 6KM-BLNK | Blank cover for 1 unused (A) module slot |
| ALARM-TERMBLK | Alarm contacts, 1 power and 1 software |
| RMB-23W | 23" 'Telco' rack-mount kit (1U) |
| RMB-ETSI | ETSI rack-mount kit (1U) |

# 10KT Configurable Managed Switch with Timing

## Next Generation 36 Port industrial switch with dual hot-swappable power supplies in 1U or 1.5U rack-mount package.

### Configurable and Reliable

The Magnum10KT Switch provides rack-mount space efficiency and advanced port configurability for heavy duty industrial applications where maximum fiber port count and diversity are required. New advanced thermal design techniques (patent pending) enable the 10KT to deliver high reliability and configurability even at extended operating temperatures. Special optional rack-mount cooling features include Thermal Fins for extra heat dissipation and internal heat transfer techniques that use the case as a heat sink. Cooler operation of internal electronic components leads to longer life-time and increased reliability.

### Smart Grid Optimization

Next Generation industrial switch features, especially for power utility facilities in the Smart Grid, importantly include high precision IEEE 1588v2 timing synchronization with precision as low as single-digit nanoseconds. The Magnum 10KT provides a new advanced level of 1588v2 timing features and accuracy, using integrated hardware and software. Advanced timing is supported on 100Mb and Gb ports, and is configurable on both fiber and copper port types.

The Magnum 10KT Switch Provides Rack-mount Space Efficiency and Advanced Port Configurability for Heavy Duty Industrial Applications where Maximum Fiber Port Count and Diversity are Required.

## Features

- Next Generation 36 port industrial switch with configurability and reliability
- Optional dual hot-swappable power supplies in a 1U or 1.5U rack-mount package
- Precision timing, full IEEE 1588v2 implementation
- Energy-efficient thermal design for maximum reliability
- Substation-Hardened, IEEE 1613 and IEC 61850-3 complian

# GarrettCom Magnum 10KT Configurable Managed Switch with Timing

### Hot-Swappable Power Supplies

The Magnum 10KT also offers configurable Dual Hot-Swappable power supplies for redundancy and increased reliability. Both high voltage AC/DC and low voltage DC hot-swappable power supplies are configurable in the Magnum 10KT. Different power supply types may be selected for each of the two hot-swappable slots. Software monitors each power supply, and can signal when a power supply module swap is needed. The swap-out can readily be done while the 10KT Switch continues in operation.

### Power-Sourcing PoE

The ten port configuration slots in the Magnum 10KT provide the flexibility for network designers to configure up to four fiber or copper Gb ports and up to thirty-two 100 Mb SFF fiber or copper ports. Copper ports can optionally be Power-Sourcing PoE. Modules may be configured for regular port types, IEEE 1588 v2 timing, or combinations.

### Secure Management Software

Magnum 10KT Managed Switches come with field-proven MNS-6K and optional MNS-6K-SECURE Management Software. MNS-6K features include LAN software support including SNMP management, IPv6, Secure Web Management, IGMP, graphical user interface (GUI), redundant LANs support, and many network management security and ease-of-use features.

### Rugged Design

Magnum 10KT Managed Switches have rugged metal cases for regular or "Reverse" rack-mounting, and auto-ranging power supplies for operation with standard AC power worldwide, or internal DC power supply choices. Moisture and corrosion-protecting Conformal Coating is optional. The Magnum 10KTs are designed and manufactured in the USA and have a five year warranty.

# Product Specifications

| Type | 10KT |
|---|---|
| Product Description | Magnum 10KT Managed Switch, base unit is configurable hardened managed switch. Provides ten modular slots for configuration flexibility of up to four Gb ports and 32 fiber or copper ports with optional dual hot-swap power supplies. |
| **Mechanical** | |
| Enclosure | Rugged high-strength sheet metal. 1U and 1.5U (with thermal fins) rack-mounting or stand alone |
| Rack-mounting Brackets | 19" included |
| Cooling Method | Free convection, special (patent pending) thermal techniques |
| Dimensions | 2.63in H (with thermal fins) x17.5in W x 12.in D (4.3cm H x 44.5cm W x 30.7cm D) |
| Weight | 14.2 lbs. (6.5 kg) |
| **Network Standards** | |
| Ethernet | IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX |
| Auto-negotiation and Auto-crossover | TP, IEEE 802.3u |
| IEEE 1588v2 | Compliant |
| IPv6 | Compliant |
| **Performance** | |
| Fiber Ports, 100 Mb (multi-mode and single-mode) | Configurable in modules. Regular ST or SC at 2/module, or SFF (Small Form Factor) for high fiber port density, four per module. Each FDX or HDX, default is FDX mode |
| Gigabit Ports, 1000 Mb | Configurable, standard. See configuration guide, below for selection of modules |
| RJ-45 Ports | 100 or 10 Mb speed, full- or half-duplex mode, per port, individually determined.10/100 auto-negotiating & auto-cross, 32 ports maximum |
| All Ports Non-Blocking | Processing type: Store and Forward with IEEE 802.3x full-duplex flow control<br>System aggregate forward and filter rate: 11.9Mpps.<br>Address table: 8K nodes, self-learning, with address aging<br>Packet buffers: 512KB for 10 and 100Mb, 128KB for Gb<br>Latency: 6µs + packet time max (TX - TX, TX - FX, FX - FX, TX-G, G-G) |
| **AC (IEC-type, Male Recessed)** | |
| Power Input, AC | 100 to 240 VAC, 47 to 63 Hz (auto ranging) |
| Power Consumption | 30 watts typical with 32 fully-loaded copper ports, 60 watts typical with 32 fully-loaded fiber ports |

# Product Specifications (continued)

| | |
|---|---|
| **DC Dual Power Source (optional)** | |
| When non-Hot-Swappable power supplies are ordered, the Magnum 10KT may be ordered with optional Dual DC power input, for continuity of operation when either one of the DC input sources is interrupted. Available for -48VDC and 24VDC. | |
| **Hot-Swappable Power Supply Options (Up to 2 of the following may be chosen)** | |
| **High (H) Nominal** | Input 90 to 250V AC/DC |
| **Low (L) Nominal** | Input 22 to 60VDC |
| | (Standard Terminal Block: "-, GND, +", Power Consumption: 55 watts when fully loaded with 4 Gb ports and 16 100Mb fiber and 16 10/100 copper. |
| **LED Indicators, 100 Mb Fiber Ports** | |
| **L/A** | Steady on when fiber link is operational and blinking for data traffic |
| **F/H** | ON = full-duplex mode, OFF = half-duplex mode |
| **LED Indicators, per RJ-45 Port** | |
| **L/A** | Steady on when fiber link is operational and blinking for data traffic |
| **F/H** | ON = full-duplex mode, OFF = half-duplex mode |
| **Relay Contacts for Alarms (except PoE version)** | |
| **Two Alarm Contact** | HW & SW alarms are normally open until the unit is powered & software started. Under normal operation they are closed. Form C HW alarm will be opened w/ 1) any power supply loss, 2) fan failures Form C SW alarm will be opened when any pre-defined SW event occurs |
| **Operating Environment** | |
| **Operating Temperature** | IEC 60068 Operating temperature per "Type Test" -40° to 185°F (-40° to 85°C) |
| **Temperature Rating (components)** | UL 60950 140°F (60°C) |
| **Storage Temperature** | -40° to 185°F (-40°to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 13000ft (-60 to 4000m) |
| **Conformal Coating (humidity protection)** | Request quote |
| **Network Cable Connectors** | |
| **1000 Mb Ports** | Standard SFPs and GBICs supported, see modules description |
| **100 Mb Fiber Ports** | Multi-mode FX-MTRJ, LC, ST, SC; single-mode 20km LC, SC and ST, and 50km "long reach" single-mode LC, SC. |
| **100 Mb Copper Ports** | Category 5 UTP/STP; 10 Mb: Cat. 3,4, 5 UTP/STP |
| **Agency Standards Approval and Compliance** | |
| **UL/cUL 60950, EN55022 FCC Part 15** | CE, EMC & ENV |
| **IEC61850-3** | EMC and Environmental Operating Conditions Class C for Power Substations |
| **IEEE 1613 Class 2** | Environmental Standard for Electric Power Substations |
| **NEMA TS-2** | Traffic Control |
| **EN50155** | Railways |
| **Warranty** | |
| **Warranty** | Five Years |

# Magnum 10KT Configuration Guide

| 10KT-HH-TF | - | XX \| XX | - | 10K2T-2GCU \| XX \| 10K4-RJ45 \| 10K4-MLC \| 10K4-MLC \| XX \| XX \| XX \| XX \| XX |
|---|---|---|---|---|

**Mounting**
**10KT** = Front Mount
**10KTR** = Reverse Mount
**10KTP** = Front Mount with PoE+ (w/ L, LL, HSPLL only)
**10KTPR** = Reverse Mount with PoE+ (w/ L, LL, HSPLL only)

**PS1 and PS2**
**AC** = 1x 100-250VAC, IEC 320 plug
**H** = Fixed, 1x 100-250VAC/DC
**HH** = Fixed, 2x 100-250VAC/DC
**L** = Fixed, 1x 24/48VDC
**LL** = Fixed, 2x 24/48VDC
**HL** = Fixed, 1x 100-250VAC/DC and 1x 24/48 VDC
**HSPLL** = Hot-swap, 2x 24/48VDC
**HSPHH** = Hot-swap, 2x 100-250VAC/DC
**HSPHL** = Hot-swap, 1x 100-250VAC/DC + 1x 24/48VDC

**Cooling**
**TF** = Thermal Fins
**X** = No Options

**HSP Module 1 (only with Hot-swap models)**
**HSPM-H** = 1x AC or DC power (90-250V)
**HSPM-L** = 1x 24/48VDC power (22-60V)
**HSPM-HF** = 1x AC or DC power (90-250V) w/ Fans
**HSPM-LF** = 1x 24/48VDC power (22-60V) w/ Fans
**10K-PSBLNK** = Blank cover for power supply
**XX** = No HSP Module

**HSP Module 2 (Pick from HSP Module 1 options)**

**Slot A**
**10K2-2GCU** = 2x RJ45 GbE ports
**10K2-2GSFP** = 2x SFP GbE ports

**OR Choose from below Ports with 1588 Timing**

**10K2T-2GCU** = 2x RJ45 GbE ports
**10K2T-2GSFP** = 2x SFP GbE ports
**OR XX** = Blank Slot A

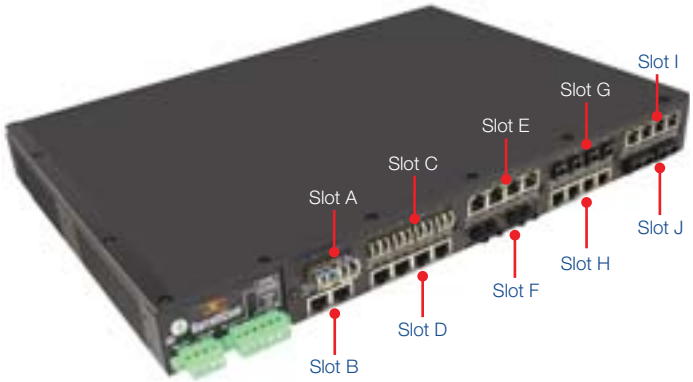
**Slot B (Pick from Slot A options)**
If Slot A is Timing, Slot B should be timing or blank

**Slot C (max 32 PoE or 16 PoE+ are allowed)**
**10K4-RJ45**= 4x 10/100Mb RJ45
**10K4-SLC** = 4x 100Mb FX LC SM 20Km
**10K4-MTRJ** = 4x 100Mb FX MTRJ MM
**10K2-SSC** = 2x 100Mb FX SC SM 20Km
**10K2-MST** = 2x 100Mb FX ST MM
**10K2-F10ST** = 2x 10Mb FX ST MM
**10K4P-RJ45** = 4x 10/100Mb RJ45 w/ PoE
**10K4-MLC** = 4x 100Mb FX LC MM
**10K4-SLCL** = 4x 100Mb FX LC SM 40Km
**10K2-MSC** = 2x 100Mb FX SC MM
**10K2-SSCL** = 2x 100Mb FX SC SM 40Km
**10K2-SST** = 2x 100Mb FX ST SM 20Km
**10K4-FXSFP** = 4x 100Mb SFP Transceiver
**10K4PX-RJ45**= 4x 10/100Mb RJ45 w/ PoE

**OR with 1588 Timing Options**

**10K4T-RJ45** = 4x 10/100Mb RJ45
**10K4T-SLC** = 4x 100Mb FX LC SM 20Km
**10K4T-MTRJ** = 4x 100Mb FX MTRJ MM
**10K2T-SSC** = 2x 100Mb FX SC SM 20Km
**10K2T-SST** = 2x 100Mb FX ST SM 20Km
**10K4T-MLC** = 4x 100Mb FX LC MM
**10K4T-SLCL** = 4x 100Mb FX LC SM 40Km
**10K2T-MSC** = 2x 100Mb FX SC MM
**10K2T-MST** = 2x 100Mb FX ST MM
**XX** = Blank Slot

**Slot D** (Pick from Slot C options. If it is Timing, Slot D should be timing or blank)
**Slot E** (Pick from Slot C options)
**Slot F** (Pick from Slot C options. If Slot E is Timing, Slot F should be timing or blank)
**Slot G** (Pick from Slot C options)
**Slot H** (Pick from Slot C options. If Slot G is Timing, Slot F should be timing or blank)
**Slot I** (Pick from Slot C options)
**Slot J** (Pick from Slot C options. If Slot I is Timing, Slot J should be timing or blank




# 10KT Accessories

| Model No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-GTP | Gb Copper |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| SFP100P-RJ45 | 100Mb Copper SFP transceiver, 10/100 auto-negotiating |
| SFP100P-FXMM2 | 100FX Fiber Optic SFP transceiver, multimode, 2Km |
| SFP100P-FXSM20 | 100FX Fiber Optic SFP transceiver, singlemode, 20Km. |
| SFP100P-FXSM40 | 100FX Fiber Optic SFP transceiver, singlemode, 40Km. |
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| CONFORM05-RMOD | Conformal coating, 5 mil, for moisture protection |
| CONFORM08-RMOD | Conformal coating, 8 mil, for corrosive environments |

| Model No. | Description |
|---|---|
| KT-RFAN | Optional cooling fan for thermal-fin (TF) units |
| MNS-6K-SECURELIC1 | Optional, licensed per switch for extra security |
| S-RING-KEY | Software, optional self-healing redundant ring management |
| DUAL-SRC-L | Provides two separate 24/48VDC power inputs (the unit will operate from either or both) to accommodate redundant 24/48V installations for increased availability and ease of DC power source maintenance. Includes internal diode protection to prevent feedback. Order this option as a line item, for factory configuration as part of the 10-series units, which will have its model number changed to append "-DSRC". ONLY available on "L", "LL" or "HSPLL" chassis options. Note - not needed for "LL" PoE chassis which are inherently dual-source. |

Additional Hot Swappable Power Supply modules (if required)

| Model No. | Description |
|---|---|
| HSPM-H | AC or DC power (90-250V) |
| HSPM-HF | AC or DC power (90-250V) w/internal cooling fan |
| HSPM-L | 24/48 DC power (22-60V) Note: for PoE at -48VDC: Input should be -44 to -57VDC. |
| HSPM-LF | 24/48 DC power (22-60V) w/ internal cooling fan; Note: for PoE at -48VDC: Input should be -44 to -57VDC. |
| 10K-PSBLNK | Blank cover for one hot-swap power supply slot |

# 10KG Configurable Managed Switch with Timing

## Next Generation industrial switch offers up to eight Gb ports and 16 100Mb ports with configurability and reliability.

### Configurable and Reliable

The Magnum10KG Switch provides the bandwidth and advanced port configurability for data-intensive utility and industrial applications such as the Smart Grid. New advanced thermal design techniques (patent pending) enable the 10KG to deliver high reliability and configurability even at extended operating temperatures. Special rack-mount cooling features include Thermal Fins for extra heat dissipation and internal heat transfer techniques that use the case as a heat sink. Cooler operation of internal electronic components leads to longer life-time and increased reliability.

### Smart Grid Optimization

Next Generation industrial switch features, especially for power utility facilities in the Smart Grid, importantly include high precision IEEE 1588v2 timing synchronization with precision as low as single-digit nanoseconds. The Magnum 10KG provides a new advanced level of 1588v2 timing features and accuracy, using integrated hardware and software. Advanced timing is supported on 100Mb and Gb ports, and is configurable on both fiber and copper
port types.

The Magnum 10KG Switch Provides the Bandwidth and Advanced Port Configurability For Data-intensive Utility and Industrial Applications Such as the Smart Grid.

## Features

- Next Generation industrial switch offers up to eight Gb ports and 16 100Mb ports with configurability and reliability
- Dual hot-swappable power supplies in a 1U or 1.5U rack-mount package
- Precision timing, full IEEE 1588v2 implementation
- Energy-efficient thermal design for maximum reliability
- Substation-Hardened, IEC 61850-3 compliant

# 10KG - Configurable Managed Switch

### Hot-Swappable Power Supplies

The Magnum 10KG also offers configurable dual hot-swappable power supplies for redundancy and increased reliability. Both high voltage AC/DC and low voltage DC hot-swappable power supplies are configurable in the Magnum 10KG. Different power supply types may be selected for each of the two hotswappable slots. Software monitors each power supply, and can signal when a power supply module swap is needed. The swap-out can readily be done while the 10KG Switch continues in operation.

### Power-Sourcing PoE

The eight port configuration slots in the Magnum 10KG provide the flexibility for network designers to configure up to eight fiber or copper Gb ports and up to 16 100 Mb SFF fiber or copper ports. Copper ports can optionally be Power- Sourcing PoE. Modules may be configured for regular port types, IEEE 1588 v2 timing, or combinations.

Secure Management Software

Magnum 10KG Managed Switches come with field-proven MNS-6K and MNS-6K-SECURE Management Software. MNS-6K features include LAN software support including SNMP management, IPv6, Secure Web Management, IGMP, graphical user interface (GUI), redundant LANs support, and many network management security and ease-of-use features.

### Rugged Design

Magnum 10KG Managed Switches have rugged metal cases for regular or “Reverse” rack-mounting, and auto-ranging power supplies for operation with standard AC power worldwide, or internal DC power supply choices. Moisture and corrosion-protecting Conformal Coating is optional. The Magnum 10KG is designed and manufactured in the USA and is backed by a five year warranty.

# Product Specifications

| Type | 10KG |
|---|---|
| **Product Description** | Magnum 10KG Fiber-configurable Convection-cooled Managed Switch, base unit. Provides 10 modular slots for configuration flexibility of up to eight Gb ports and 16 copper or fiber ports. Includes 2 slots for Hot-Swap Power Supplies; Case with thermal fins. |
| **Mechanical** | |
| **Enclosure** | Rugged high-strength sheet metal. 1U and 1.5U (with thermal fins) rack-mounting or stand alone |
| **Rack-mounting Brackets** | 19" included |
| **Cooling Method** | Free convection, special (patent pending) thermal techniques |
| **Dimensions** | 2.63in H (with thermal fins) x17.5in W x 12.in D (4.3cm H x 44.5cm W x 30.7cm D) |
| **Weight** | 14.2 lbs. (6.5 kg) |
| **Network Standards** | |
| **Ethernet** | IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX |
| **Auto-negotiation and Auto-crossover** | TP, IEEE 802.3u |
| **IEEE 1588v2** | Compliant |
| **IPv6** | Compliant |
| **Performance** | |
| **Fiber Ports, 100 Mb (multi-mode and single-mode)** | Configurable in modules. Regular ST or SC at 2/module, or SFF (Small Form Factor) for high fiber port density, 4 per module. Each FDX or HDX, default is FDX mode |
| **Gigabit Ports, 1000 Mb** | Configurable, std. See configuration guide for selection of modules |
| **RJ-45 Ports** | 100 or 10 Mb speed, full- or half-duplex mode, per port, individually determined.10/100 auto-negotiating & auto-cross, 16 ports max. |
| **All Ports Non-Blocking** | Processing type: Store and Forward with IEEE 802.3x full-duplex flow control<br>System aggregate forward and filter rate: 11.9Mpps.<br>Address table: 8K nodes, self-learning, with address aging<br>Packet buffers: 512KB for 10 and 100Mb, 128KB for Gb<br>Latency: 6µs + packet time max (TX - TX, TX - FX, FX - FX, TX-G, G-G) |
| **AC (IEC-type, Male Recessed)** | |
| **Power Input, AC** | 100 to 240 VAC, 47 to 63 Hz (auto ranging) |
| **Power Consumption** | 30 watts typical when fully loaded |

# Product Specifications (continued)

| | |
|---|---|
| **DC Dual Power Source (optional)** | |
| When non-hot-swappable power supplies are ordered, the Magnum 10KG may be ordered with optional dual DC power input, for continuity of operation when either one of the DC input sources is interrupted. Available for 24/48VDC. | |
| **Hot-Swappable Power Supply Options (Up to 2 of the following may be chosen)** | |
| **High (H) Nominal** | Input 90 to 250V AC/DC |
| **Low (L) Nominal** | Input 22VDC to 60VDC |
| | (Standard Terminal Block: "-, GND, +", Power Consumption: 55 watts when fully loaded with 8 Gb ports and 16 100Mb fiber. |
| **LED Indicators, 100 Mb and 10 Mb Fiber Ports** | |
| **L/H** | Steady on when fiber link is operational and blinking for data traffic |
| **F/H** | ON = full-duplex mode, OFF = half-duplex mode |
| **LED Indicators, per RJ-45 Port** | |
| **L/A** | Steady on when fiber link is operational and blinking for data traffic |
| **F/H** | ON = full-duplex mode, OFF = half-duplex mode |
| **Relay Contacts for Alarms (except PoE version)** | |
| **Two Alarm Contact** | HW & SW alarms are normally open until the unit is powered and software started. Under normal operation they are closed. Form C hardware alarm will be opened with 1) any power supply loss and 2) fan failures. Form C software alarm will be opened when any pre-defined software event occurs. For PoE versions: One software controllable Form C alarm with NC/NO. |
| **Operating Environment** | |
| **Operating Temperature** | IEC 60068 Operating temp. per "Type Test" -40° to 185°F (-40° to 85°C) |
| **Temperature Rating (components)** | UL 60950 140°F (60°C) |
| **Storage Temperature** | -40° to 185°F (-40°to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 13000ft (-60 to 4000m) |
| **Conformal Coating (humidity protection)** | Request quote |
| **Network Cable Connectors** | |
| **1000 Mb Ports** | Standard SFPs and GBICs supported, see modules description |
| **100 Mb Fiber Ports** | Multi-mode FX-MTRJ, LC, ST, SC; sgl-mode 20km LC, SC and ST, and 50km "long reach" sgl-mode LC, SC |
| **10 Mb Fiber Ports** | Multi-mode and single-mode ST |
| **100 Mb Copper Ports** | Category 5 UTP/STP; 10 Mb: Cat. 3,4, 5 UTP/STP |
| **Agency Standards Approval and Compliance** | |
| **UL/cUL 60950, EN55022 FCC Part 15** | CE, EMC & ENV |
| **IEC61850-3** | EMC and Environmental Operating Conditions Class C for Power Substations |
| **IEEE 1613 Class 2** | Environmental Standard for Electric Power Substations |
| **NEMA TS-2** | Traffic Control |
| **EN50155** | Railways |
| **Warranty** | |
| **Warranty** | Five Years |

# Magnum 10KG Configuration Guide

| 10KG-HH-TF | - | XX \| XX | - | 10-2RJSFP \| 10-2RJSFP \| XX \| XX \| 10K4-MLC \| 10K4-MLC \| 10K4-MLC \| XX |
|---|---|---|---|---|

**Mounting**
**10KG** = Front Mount
**10KGR** = Reverse Mount
**10KGP** = Front Mount with PoE+ (w/ L, LL, HSPLL only)
**10KGPR** = Reverse Mount with PoE+ (w/ L, LL, HSPLL only)

**PS1 and PS2**
**AC** = 1x 100-250VAC, IEC 320 plug
**H** = Fixed, 1x 100-250VAC/DC
**HH** = Fixed, 2x 100-250VAC/DC
**L** = Fixed, 1x 24/48VDC
**LL** = Fixed, 2x 24/48VDC
**HL** = Fixed, 1x 100-250VAC/DC and 1x 24/48 VDC
**HSPLL** = Hot-swap, 2x 24/48VDC
**HSPHH** = Hot-swap, 2x 100-250VAC/DC
**HSPHL** = Hot-swap, 1x 100-250VAC/DC + 1x 24/48VDC

**Cooling**
**TF** = Thermal Fins
**X** = No Options

**HSP Module 1 (only with Hot-swap models)**
**HSP Module 1** (only with Hot-swap models)
**HSPM-H** = 1x AC or DC power (90-250V)
**HSPM-L** = 1x 24/48VDC power (22-60V)
**HSPM-HF** = 1x AC or DC power (90-250V) w/ Fans
**HSPM-LF** = 1x 24/48VDC power (22-60V) w/ Fans
**10K-PSBLNK** = Blank cover for power supply
**XX** = No HSP Module

**HSP Module 2 (Pick from HSP Module 1 options)**

**Slot A**
**10-2RJSFP** = 2x auto RJ45/SFP GbE port ()
**XX** = Blank Slot

**Slot B (Pick from Slot A options)**

**Slot C (Pick from Slot A options)**

**Slot D (Pick from Slot A options)**

**Slot E (max 16 PoE+ ports are allowed)**
**10K4-RJ45** = 4x 10/100Mb RJ45
**10K4-MLC** = 4x 100Mb FX LC MM
**10K4-SLC** = 4x 100Mb FX LC SM 20Km
**10K4-SLCL** = 4x 100Mb FX LC SM 40Km
**10K4-MTRJ** = 4x 100Mb FX MTRJ MM
**10K2-MSC** = 2x 100Mb FX SC MM
**10K2-SSC** = 2x 100Mb FX SC SM 20Km
**10K2-SSCL** = 2x 100Mb FX SC SM 40Km
**10K2-MST** = 2x 100Mb FX ST MM
**10K2-SST** = 2x 100Mb FX ST SM 20Km
**10K2-F10ST** = 2x 10Mb FX ST MM
**10K4-FXSFP** = 4x 100Mb SFP Transceiver

**OR PoE+ Option (only with PoE models)**
**10K4PX-RJ45** = 4x 10/100Mb RJ45 w/ PoE+

**OR w/ 1588 PTP Timing Options**
**10K4T-RJ45** = 4x 10/100Mb RJ45
**10K4T-MLC** = 4x 100Mb FX LC MM
**10K4T-SLC** = 4x 100Mb FX LC SM 20Km
**10K4T-SLCL** = 4x 100Mb FX LC SM 40Km
**10K4T-MTRJ** = 4x 100Mb FX MTRJ MM
**10K2T-MSC** = 2x 100Mb FX SC MM
**10K2T-SSC** = 2x 100Mb FX SC SM 20Km
**10K2T-MST** = 2x 100Mb FX ST MM
**10K2T-SST** = 2x 100Mb FX ST SM 20Km
**XX** = Blank Slot

**Slot F (Pick from Slot E options. If it is Timing, Slot F should be timing or blank)**

**Slot G (Pick from Slot E options)**

**Slot H (Pick from Slot E options. If Slot G is Timing, Slot H should be timing or blank)**

# 10KG Accessories

| Model No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-GTP | Gb Copper |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| SFP100P-RJ45 | 100Mb Copper SFP transceiver, 10/100 auto-negotiating |
| SFP100P-FXMM2 | 100FX Fiber Optic SFP transceiver, multimode, 2Km |
| SFP100P-FXSM20 | 100FX Fiber Optic SFP transceiver, singlemode, 20Km. |
| SFP100P-FXSM40 | 100FX Fiber Optic SFP transceiver, singlemode, 40Km. |
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| CONFORM05-RMOD | Conformal coating, 5 mil, for moisture protection |
| CONFORM08-RMOD | Conformal coating, 8 mil, for corrosiveenvironments |

| Model No. | Description |
|---|---|
| KT-RFAN | Optional cooling fan for thermal-fin (TF) units |
| MNS-6K-SECURELIC1 | Optional, licensed per switch for extra security |
| S-RING-KEY | Software, optional self-healing redundant ring management |
| DUAL-SRC-L | Provides two separate 24/48VDC power inputs (the unit will operate from either or both) to accommodate redundant 24/48V installations for increased availability and ease of DC power source maintenance. Includes internal diode protection to prevent feedback. Order this option as a line item, for factory configuration as part of the 10-series units, which will have its model number changed to append "-DSRC". ONLY available on "L", "LL" or "HSPLL" chassis options. Note - not needed for "LL" PoE chassis which are inherently dual-source. |

**Additional Hot Swappable Power Supply modules (if required)**

| Model No. | Description |
|---|---|
| HSPM-H | AC or DC power (90-250V) |
| HSPM-HF | AC or DC power (90-250V) w/internal cooling fan |
| HSPM-L | 24/48 DC power (22-60V) Note: for PoE at -48VDC: Input should be -44 to -57VDC. |
| HSPM-LF | 24/48 DC power (22-60V) w/ internal cooling fan; Note: for PoE at -48VDC: Input should be -44 to -57VDC. |
| 10K-PSBLNK | Blank cover for one hot-swap power supply slot |

# 12KX Gigabit Managed Switch

## Provides 16 Gigabit ports with built-in SFPs – allowing a choice of fixed 10/100/1000 RJ-45 connectivity or fiber SFPs.

### Substation-Hardened

The GarrettCom Magnum 12KX Gigabit Managed Switch provides 16 Gigabit ports with built-in SFPs – allowing a choice of fixed 10/100/1000 RJ-45 connectivity or fiber SFPs. The substation-hardened Magnum 12KX has a non-blocking switching fabric to provide wire-speed performance on all ports.

### Flexible Design

The Magnum 12KX is synchronized via SNTP or with precision timing using IEEE 1588 v2 PTP on all ports, which assures timing accuracy within 30ns. The unit is well-suited for different needs with environmental certifications including IEC 61850, RoHS compliancy, high and low voltage power supply options, and optional PoE ports. Surveillance and security applications leverage the speed, PoE, multicast capabilities, media flexibility, power supply flexibility and more. Similarly, power utilities can further leverage the timing synchronization as well as dual power supplies and redundancy capabilities available in the software.

Surveillance and Security Applications Leverage the Speed, PoE, Multicast Capabilities, Media Flexibility, Power Supply Flexibility and More.

## Features

- Gigabit Ethernet switch, 16 RJ45+SFP fiber “combo” ports
- Substation hardened, with IEEE 1588 Timing
- Layer 2 or Layer 3 software, MNS-12KS
- Four PoE ports (optional)
- Dual or single internal power supplies

# Magnum 12KX Gigabit Managed Switch

### For Use in Harsh Environments

Upholding GarretCom's product line of time-tested robust products, the 12KX switch is designed for heavy-duty industrial applications in harsh environments, with a temperature rating of -40° C to +85° C. Additionally the unit is convection-cooled (no fans), has redundant power supplies, is vibration resistant, ESD-resistant, and is available with optional conformal coating.

### Software

Layer 3 software for the Magnum 12KX includes full wire speed RIP based routing, port-based routing interfaces, static routing, VLAN-based router interface definitions, double VLAN tagging, protocol-based VLANs Multicast Routing (DVMRP), IGMPv1/v2/v3, and much more. Also, environments using OSPF can use OSPF v2 capabilities included in the software.

The GarrettCom Magnum 12KX Gigabit managed switch along with the Magnum 10KT managed switch and Magnum 10ETS managed terminal server allow network architects to create networks encompassing features such as precision time synchronization, high-availability layer 2 as well as layer 3 devices, serial and Ethernet connectivity, routing flexibility such as RIP or OSPF, and more.

For networks that do not need the layer 3 software capability, the Magnum 12KX Gigabit managed switch is available with layer 2-only software offering simplicity and affordability.

### Power Supplies and Warranty

Magnum 12KX Gigabit Managed Switches have H and L industrial grade power supplies for worldwide use, and are backed by a five year warranty.

# Product Specifications

| Type | 12KX |
|---|---|
| **Product Description** | Magnum 12KX Managed Switch, a Gigabit switch with 16 combo ports for copper and/or fiber ports and optional Layer 3 switching software. Substation hardened with IEEE 1588 timing. Four optional 802.3af PoE ports are available. Single or dual internal power supplies. Front or reverse mount. |
| **Performance** | |
| **16 Ports** | Auto-negotiating 10/100/1000BASE TX RJ45 OR FE/Gb-SFP slot per port. All ports non-blocking. SFP fiber modules available for GigE or 100Mbps (multi-mode or single mode). |
| **Console** | One V.24 RJ-11 interface. Use console cable CONSOLE12-CBL-12KX for connectivity. |
| **USB** | USB to connect the Auto Configuration Adapter ACA21-USB-12KX memory for configuration backup and easy swap-out. |
| **Other** | Non-blocking fabric, wire speed switching. MAC address table size: 16K addresses. |
| **Network Standards** | |
| **Ethernet** | IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX Autonegotiation and auto-crossover on TP, IEEE 802.3u, IEEE 1588v2. |
| **Layer 2** | MSTP, RSTP 802.1w, MRP and RSTP, log file, syslog, RMON, port mirroring, address conflict detection, network error detection, SFP diagnostics (temperature, optical power), port security, SNMP V1/V2, authentication (802.1x), QoS 4 queues (8 levels or classes), port priority (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), unknown multicast detection, broadcast/unicast/multicast limiter, GMRP IEEE 802.1D, flow control 802.3x. |
| **Layer 3** | Full wire speed IPv4 routing with lowest latency Multi-netting (Aliasing), Net directed broadcasts, Port-based router interfaces, Proxy ARP, Static routing with ECMP (Equal Cost Multiple Path), VLAN-based router interfaces, CIDR (Classless Inter Domain Routing), ICMP Router Discovery (IRDP), SSH, SNMP v3, Double VLAN Tagging, Protocol based VLANs Multicast Routing (DVMRP, IGMPv1/v2/v3, Multicast routing and IGMP Unknown Multicast Filtering, PIM Dense & Sparse Mode), Router Redundancy (VRRP, VRRP tracking, Interface Tracking), OSPFv2, Ping Tracking, RIPv1, RIPv2, Tracking of static routes. |
| **IEEE 1588v2** | Compliant as master, boundary or transparent clock. Sync accuracy of 30ns or less. Timing capability software configurable. |
| **Diagnostics** | LEDs, log-file, syslog, relay contact, RMON, port mirroring 1:1 and n:1, topology discovery 802.1AB, cable tester (TX), address conflict detection, network error detection, SFP diagnostic (temperature, optical input and output power), trap for configuration saving and changing, duplex mismatch detection. |
| **Configuration** | Command line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, easy device exchange with auto-configuration adapter ACA21-USB (automatic software and/or configuration upload), integrated DHCP server per port, automatic invalid configuration undo. |
| **Time Synchronization** | SNTP server, PTP IEEE 1588-v2 hardware timestamp with accuracy of 30 ns, real-time clock. |

# Product Specifications (continued)

| | |
|---|---|
| **Operating Environment** | |
| **Operating Temperature** | IEC 60068 Operating temp. "Type Test" -40° to 185°F (-40° to 85°C). |
| **Temperature Rating (components)** | UL 60950 "Component Parts" temperature rating: 158°F (70°C). |
| **Storage Temperature** | -40° to 185°F (-40°to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 6500ft (-60 to 2000m) |
| **Conformal Coating (humidity protection)** | Request quote |
| **Power Supply (User choice of dual or single internal)** | |
| **Low** | 24/36/48 VDC |
| **High** | 110/230V AC/DC |
| PoE ports available for dual power supply models only. PoE for ports 1-4 only. PoE switch requires one "High" power supply. | |
| **Power Consumption** | |
| 110 mA (26 W) max., if all ports are equipped with SFP (100 W PoE option). | |
| **Cooling Method** | |
| Convection cooled (no fans) | |
| **Power Output** | |
| 90 Btu(IT)h; 350 Btu(IT)h with PoE. | |
| **Mechanical** | |
| **Weight** | 5.6 Kg (12.4 lb) |
| **Dimensions** | 17.5"x13.6"x1.73" (445mmx44mmx345mm) 1RU. |
| **Mounting** | Includes 19" RETMA rack mount brackets |
| **Agency Approval and Standards Compliance** | |
| **IEC 61850-3, IEEE 1613** | KEMA Certified |
| **UL508, UL1604** | Class 1 Div 2, cUL |
| **IEC 60068-2-27 (shock)** | 15 g, 11 ms duration, 18 shocks |
| **IEC 60068-2-6 (vibration)** | 1 mm, 2 Hz-13.2 Hz, 90 min.; 0.7g, 13.2 Hz-100 Hz, 90 min.; 3.5 mm, 3 Hz-9 Hz, 10 cycles, 1 octave/min.; 1 g, 9 Hz-150 Hz, 10 cycles, 1 octave/min. |
| **EN 61000-4-2 (electrostatic discharge - ESD)** | 8 kV contact discharge, 15 kV air discharge. |
| **EN 61000-4-3 EM (field)** | 35 V/m (80-2700 MHz); 1 kHz, 80% AM. |
| **EN 61000-4-4 (fast transients - burst)** | 4 kV power, 4 kV data. |
| **EN 61000-4-5 (surge voltage power line)** | 2 kV (line/earth), 1 kV (line/line), 1 kV data line. |
| **IEEE1613** | Power line 5 kV (line/earth). |
| **EN 61000-4-6 (conducted immunity)** | 30V, 50Hz; 300V, 50Hz 1s. |
| **EN 61000-4-16 (mains frequency voltage)** | 30V, 50Hz; 300V, 50Hz 1s. |
| **FCC CFR47 Part 15** | FCC 47 CFR Part 15 Class A |
| **EN 55022** | EN 55022 Class A |
| **Warranty** | |
| **Warranty** | Five Years |

# Magnum 12KX Configuration Guide

## Magnum 12KX Managed Switch

Gigabit switch with 16 combo ports for copper and/or fiber ports and optional Layer 3 switching software. Substation hardened with IEEE 1588 timing. Four optional 802.3af PoE ports are available. Single or dual internal power supplies. Front or reverse mount.

**Step 1. Choose 12KX chassis with dual, single, or PoE power supplies. If dual power supplies, go to Step 1A. If Single power, Go to Step 1B. If PoE is desired, go to Step 1C.**

**Step 1A. For dual power supply models, choose from below:**

| Model No. | Base Unit Description |
|---|---|
| 12KX-2H | Front mount, with two AC/DC "high" 110/230 internal power supplies. |
| 12KXR-2H | Reverse mount, with two AC/DC "high" 110/230 internal power supplies. |
| 12KX-2L | Front mount, with two "low" 24-48VDC internal power supplies. |
| 12KXR-2L | Reverse mount, with two "low" 24-48VDC internal power supplies. |

**Step 1B. For single power supply models, choose from below:**

| Model No. | Base Unit Description |
|---|---|
| 12KX-1H | Front mount, with one AC/DC "high" 110/230 internal power supply. |
| 12KXR-1H | Reverse mount, with one AC/DC "high" 110/230 internal power supply. |
| 12KX-1L | Front mount, with one "low" 24-48VDC internal power supply. |
| 12KXR-1L | Reverse mount, with one "low" 24-48VDC internal power supply. |

**Step 1C. For Models with one PoE power supply for four PoE ports and one power supply for the switch, choose from below. (Note, the four 10/100/1000 PoE ports are available for ports 1-4.):**

| Model No. | Base Unit Description |
|---|---|
| 12KX-1H1POE | Front mount, with one AC/DC "high" power supply for the switch and one "high" power supply for the four PoE ports. |
| 12KXR-1H1POE | Reverse mount, with one AC/DC "high" power supply for the switch and one "high" power supply for the four PoE ports. |
| 12KX-1L1POE | Front mount, with one "low" power supply for the switch and one "high" power supply for the four PoE ports. |
| 12KXR-1L1POE | Reverse mount, with one "low" power supply for the switch and one "high" power supply for the four PoE ports. |

**Step 2. Choose 12KX Managed Network Switch Software:**

| Model No. | Software Description |
|---|---|
| MNS-12KS-L2-LIC | MNS-12KS licensed Layer 2 software for use on one Magnum 12KX Switch. License included with each Magnum 12KX as a default choice. Factory installed. |
| MNS-12KS-L3-LIC | MNS-12KS licensed Layer 3 software option at extra cost, for use on one Magnum 12KX Switch. Factory installed. |

**Step 3. Choose auxiliary options & convenience items:**

**Gigabit Fiber SFPs (small form-factor pluggable) Transceivers**

| Model No. | Description |
|---|---|
| SFP12KX-SX | Gb fiber SFP transceiver for 12KX, rated -40 to 85°C, GB SX, 850nm wavelength, 550m distance nominal, 2km per pwr budget. |
| SFP12KX-LX25 | Gb fiber SFP transceiver for 12KX, rated -40 to 85°C, GB LX, 1310nm wavelength, 25km distance nominal. |
| SFP12KX-ZX40 | Gb fiber SFP transceiver for 12KX, rated -40 to 85°C, GB ZX, 1310nm wavelength, 40km distance. |
| SFP12KX-ZX70 | Gb fiber SFP transceiver for 12KX, rated -40 to 85°C, GB ZX, 1550nm wavelength, 70km distance. |

**100Mb Fiber SFPs (small form-factor pluggable) Transceivers**

| Model No. | Description |
|---|---|
| SFP12KX-FXMM2 | 100FX fiber SFP transceiver for 12KX, rated -40° to 85°C, multi-mode, 2km distance. |
| SFP12KX-FXSM25 | 100FX fiber SFP transceiver for 12KX, rated -40° to 85°C, single-mode, 25km distance. |
| SFP12KX-FXSM100 | 100FX fiber SFP transceiver for 12KX, rated -40° to 85°C, single-mode, 100km distance. |
| SFP12KX-BIDI-A-20 | 100FX Fiber Optic SFP transceiver for Magnum 12KX, 20km with 9u singlemode, LC socket , -40 ºC to +85 ºC. Requires SFP12KX-BIDI-B-20 on opposite end of fiber |
| SFP12KX-BIDI-A-70 | 100FX Fiber Optic SFP transceiver for Magnum 12KX, 70km with 9u singlemode long haul, LC socket, -40 ºC to +85 ºC. Requires SFP12KX-BIDI-B-70 on opposite end of fiber |
| SFP12KX-BIDI-AB-20 | 100FX Fiber Optic SFP transceiver for Magnum 12KX, 20km with 9u singlemode, LC socket, -40 ºC to +85 ºC. Type A/B kit |
| SFP12KX-BIDI-AB-70 | 100FX Fiber Optic SFP transceiver for Magnum 12KX, 70km with 9u singlemode long haul, LC socket, -40 ºC to +85 ºC. Type A/B kit |
| SFP12KX-BIDI-B-20 | 100FX Fiber Optic SFP transceiver for Magnum 12KX, 20km with 9u singlemode, LC socket, -40 ºC to +85 ºC. Requires SFP12KX-BIDI-A-20 on opposite end of fiber |
| SFP12KX-BIDI-B-70 | 100FX Fiber Optic SFP transceiver for Magnum 12KX, 70km with 9u singlemode long haul, LC socket, -40 ºC to +85 ºC. Requires SFP12KX-BIDI-A-70 on opposite end of fiber |

**Other Options**

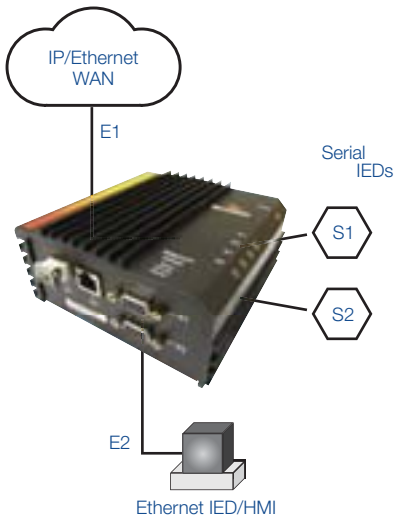
| Model No. | Description |
|---|---|
| CONSOLE-CBL-12KX | 12KX console attachment cable, serial configuration cable. |
| ACA21-USB-12KX | 12KX USB auto-configuration adapter for local configuration management. |
| CONFORM05-12KX | Conformal coating, 5 mil, for moisture protection. |

# DX40 Serial Device Router

## Combining the features of a Serial device server, Ethernet switch and IP router in a single product.

The DX40's dual-serial, dual-Ethernet configuration supports several flexible configurations. It provides resilient dual fiber-based extension from a core Ethernet network to serial device distributed across a large facility. It services as a multi-protocol concentration and access point for a fiber-based Ethernet wide area network (WAN) connection to a small site.

Encrypted per-session SSL and IPsec VPN capabilities, along with other IP firewall and port security features, assure cyber security protections will extend cost effectively all the way to end-point devices and small facilities.




The Magnum DX40 provides a rugged and secure solution for extending fiber-based connectivity to remote devices in harsh environments, such as power utility substations.

## Features

- Hardened for harsh industrial environments
- Complies with IEEE1613 / IEC 61850-3 standards
- Serial and Ethernet interfaces

  - 2 RS232/RS485 ports software selectable

  - 2 Ethernet ports 10/100 BaseTX RJ45 OR 100FX SFP/SFF multi/ single-mode
- Supports multiple protocols
  - Async and SCADA to TCP/IP
  - Ethernet, TCP/IP
  - IP routing
  - Network resiliency / RSTP
  - Serial multipoint and multimaster topologies
- Cyber Security protection:
  - Serial SSL lkjslkslj lsdjlsjls lfljsjjl sdlksdlj
  - Secure HTTP
  - IPSec encrypted VPNs
  - Ethernet port security
  - TCP/IP firewall
  - Serial port SSL
  - Per-serial port VLANs
- Offers wide range of AC and DC power options
- Trouble-free maintenance – no fans or moving parts

# Applications

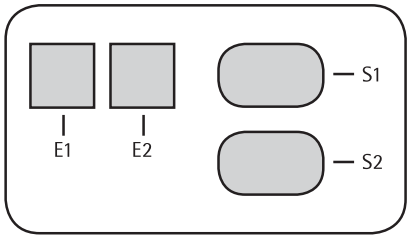
The Magnum DX40 is ideal for any setting where the network must cover multiple facilities or remote locations. It is especially well suited to power utility substations.

# Technical Information

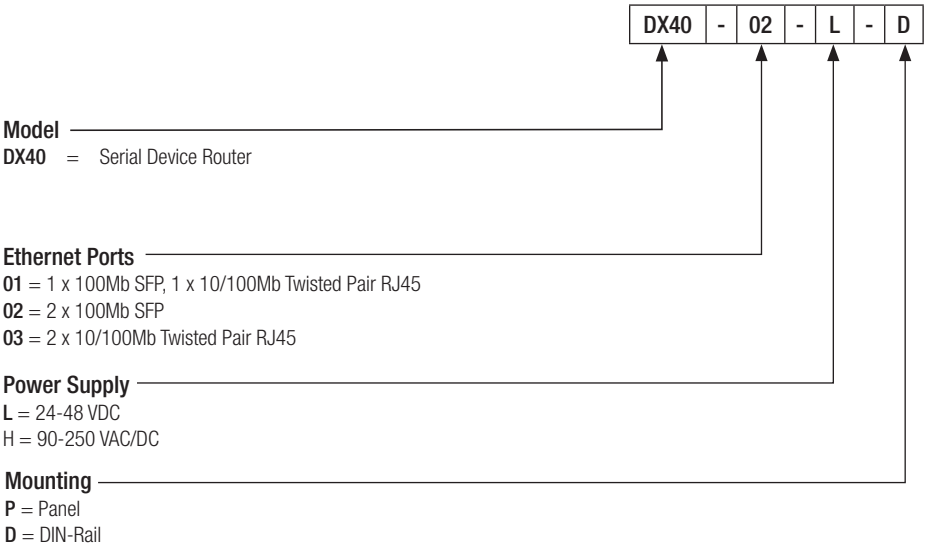
| Serial Interface | |
|---|---|
| **Physical Interface** | 2 ports, RS232 or RS485, S/W selectable<br>DB9 female connector<br>Serial data rate from 300 bps to 230.4 kbps<br>Data length: 1-32 bits support |
| **Protocols/Features** | Async to TCP/IP<br>DNP, Modbus, Telnet<br>TCP/IP to serial terminal server, reverse terminal server<br>Serial multipoint and multimaster topologies<br>Select SCADA bit oriented protocols* |
| **Ethernet Interface** | |
| **Physical Interface** | 2 copper or fiber ports<br>Full Duplex, Half Duplex<br>RJ45 modular connector ports<br>10/100 Base TX, auto-sensing or fixed speed<br>100FX Ethernet SFF or SFP modules<br>Single-mode 8µ cable up to 40km<br>Multi-mode 62.5µ /125 cable up to 2km |
| **Protocols/Features** | Ethernet, TCP/IP<br>IEEE 802.3x flow control<br>Prioritization per IEEE 802.1p*<br>VLANs per 802.1Q<br>Port rate limiting<br>Rapid Spanning Tree per IEEE 802.1w<br>Support for 1024 MAC addresses |
| **IP Routing Functions & Features** | |
| **Description** | IP routing, RIP, RIP II, Static Routes<br>Per VLAN routing<br>ICMP, ARP<br>OSPF<br>Block / Allow / IP or PORT addresses<br>DiffServ, traffic prioritization |
| **Security** | |
| **Description** | TCP/IP firewall<br>Serial port SSL with AES/3DES<br>IP VPN using IPSec<br>Secure HTTP (HTTPS)<br>Serial port VLANs<br>Ethernet port security<br>RSA/Radius Support<br>Multilevel passwords with enforcement and aging<br>Management activity logging and alarms |
| **Management & Diagnostics** | |
| **Description** | Web-based Graphical User Interface (GUI)<br>CLI access via remote TELNET connection<br>Powerful built-in protocol analyzer to monitor traffic on any port<br>Comprehensive layer 1 through 3 statistics<br>SNMP MIB II and SNMP traps<br>PING and TELNET diagnostic functions<br>Syslog event logging<br>Proprietary Enterprise MIB<br>XML-based config file |

| Environmental | |
|---|---|
| **Operating Temperature** | -40°C to +85°C, no fans |
| **Storage Temperature** | -40°C to +85°C |
| **Humidity** | 95% non-condensing |
| **Industrial** | IEEE 1613<br>IEC 61850-3<br>IEC 61000-6-5 |
| **Emissions** | EN55022A, FCC Part 15A |
| **Immunity** | EN55024<br>EN61000-6-2<br>EN61000-4-2 (ESD)<br>EN61000-4-3 (RF)<br>EN61000-4-4 (EFT)<br>EN61000-4-5 (SURGE)<br>EN61000-4-6 (CRF)<br>EN61000-4-10 (MAG FIELD)<br>EN61000-4-11 (VDI)<br>EN61000-4-12 (OSCILLATION)<br>EN61000-4-16 (CCM)<br>EN61000-4-17 (RIPPLE)<br>EN61000-4-29 (VDI) |
| **Safety** | UL60950-1<br>EN60950-1<br>CSA C22.2 |
| **Power Options** | |
| **High Voltage (H)** | 90-250V AC or DC, 50-60Hz<br>0.2A, 18 watts |
| **Low Voltage DC (L)** | 24-48V DC<br>0.75A, 18 watts |
| **Mechanical** | |
| **Dimensions** | 5.6" W x 5.1" D x 2.5"H (14.2 cm x 12.95 cm x 6.35 cm) |
| **Weight** | 2.75 lbs (1.25 kg) |
| **Mounting** | Panel mount and DIN Rail options |

## DX40 Port Configuration



# DX40 Configuration Guide




# DX40 Accessories

| Model No. | Description |
|---|---|
| SFP100P-RJ45 | 100Mb Copper SFP transceiver, 10/100 auto-negotiating |
| SFP100P-FXMM2 | 100FX Fiber Optic SFP transceiver, multimode, 2Km |
| SFP100P-FXSM20 | 100FX Fiber Optic SFP transceiver, singlemode, 20Km. |
| SFP100P-FXSM40 | 100FX Fiber Optic SFP transceiver, singlemode, 40Km. |

| Model No. | Description |
|---|---|
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| MNS-DX-SECURE-LIC1 | Optional, licensed per router for extra security |
| MNS-DX-ADVAR-LIC1 | Optional, licensed per router for advanced routing |

# DX940

## Industrial Router with Cellular, T1/E1 or DDS WAN interface and configurable with six Ethernet ports and four serial ports.

### Secure and Reliable

High speed data access over cellular communications is a new choice for reaching the local networks in remote industrial facilities. This cellular technology is used to transfer data in the Magnum DX940 Industrial Router.

The Cellular WAN interface in the DX940 provides a secure and reliable way to provide connectivity over a cellular network to utility substations, roadside traffic controls, energy generation locations, transportation depots, and other locations where cellular signals are readily available.

The Magnum DX940 uses the proven 3G EVDO REV A, EVDO, CDMA technology for cellular access. 3G cellular infrastructure sends data on a public network. Using the VPN capabilities in the DX940's software allows for secure, NERC-CIP-compliant data transfer on a public network.

### Secure and Reliable

Besides a cellular WAN interface, the DX940 can be configured with six Ethernet ports, and four serial ports. Ethernet port options include Gb and 100Mb copper and fiber. In addition to the celllular port, a WAN port can be configured for T1/E1 or DDS circuits. The unit supports T1 to cellular fall back for WAN redundancy. The DX940 is purpose-built to be deployed and located in harsh environments.

The DX940 Provides a Secure and Reliable Way to Provide Connectivity Over a Cellular Network to Utility Substations, Roadside Traffic Controls, Energy Generation Facilities, Transportation Depots and Other Locations Where Cellular Signals are Readily Available.

## Features

- Configurable network Interfaces of 4 types:
  - Cellular Wireless
  - Ethernet ports
  - T1/E1 or DDS WAN
  - Serial RS232/RS485
- Substation hardened, -40° to +85° C, no fans
- Modbus TCP ASCII/RTU internetworking
- Cyber security: IPsec, VPN, SSL and firewall
- Panel, DIN-Rail or rack mounting

# GarrettCom Magnum DX940 Configurable Router with Cellular

### Secure Management Software

The Magnum DX940 includes MNS-DX software for the necessary handshakes and authentications which are required for configuring cellular access. MNS-DX also includes IP routing, Ethernet switching, Serial-to-IP terminal services, and network security features. With the use of MNS-DX, the Magnum DX940 router can be easily installed and be up and running in a couple of hours compared to days or weeks for setting up leased line or dial-up connections.

Extra security features such as IPSec/VPN (including GRE tunnels for VPN), stateful firewall, RADIUS, syslog, Secure Seal SSL, SSH port forwarding and other security capabilities can be added via an MNS-DX-SECURE license key.

MNS-DX-SECURE also provides IP firewall features including address/port inspection/filtering, VPN connectivity over IPsec with strong 3DES, AES encryption, and both shared key (PSK) and X.509 certificates. Advanced routing capability for OSPF and BGP networks is enabled using the MNS-DX-ADVAR software license key.

Optional serial ports enable Serial-IP terminal services via RS232, RS485, and RS422 serial interfaces as well as protocols such as DNP, telnet, and Modbus, including Modbus-ASCII/RTU to Modbus-TCP interworking. MNS-DX-SECURE also enables serial devices to transmit data securely using Serial-SSL connections.

### Rugged Design

The DX940 operates at -40°C to +85°C without open vent holes or fans, and meets IP52 rating.

Hard metal packaging is standard and conformal coating for protection against moisture and corrosion is also available.

# Product Specifications

| Type | DX940 |
|---|---|
| **Product Description** | DX940 base unit with configurable four 100Mb SFP Ethernet or 10/100 RJ45 ports. Other additions: 4 serial, 2 gig fiber/copper, choice of two WAN access ports (Cellular, T1/E1, DDS WAN). Includes IP routing, Ethernet switching and secure management. MNS-DX software license included. Panel mount. Other mounting options and conformal coating are also available. |
| **Specifications** | |
| **Serial Protocols** | Async to TCP/IP – including Modbus gateway for connectivity to serial Modbus devices and to other Modbus Ethernet devices; TCP/IP to serial/reverse terminal server, Serial Multipoint & Multimaster Topologies; PPP with authentication. |
| **Performance** | |
| **Serial DB9 Ports** | RS232/RS485 software selectable DB9 interface. Serial data rate from 300 bps to 230.4 kbps. Data length - 1-32 bits. |
| **RJ-45 Ports** | 100 or 10 Mb speed, full- or half-duplex mode, per port, individually determined. 10/100 auto-negotiating & auto-cross |
| **Fiber Ports (multi-mode and single-mode)** | Configurable in modules. at 2/module, or SFF (Small Form Factor) for high fiber port density, 4 per module. Each FDX or HDX, default is FDX mode. |
| **Gigabit Ports, 1000 Mb** | Configurable, std. See configuration guide for selection of modules |
| **Cellular WAN Ports** | 3G EVDO REV A, EVDO, CDMA,; Frequency – 1900MHz/800 MHz; supports antenna diversity. Cellular Antennas - optional high gain external antennas available. Used when the cellular signal is weak or not available due to enclosed areas. |
| **WAN Ports** | DDS: 56/64 kbps OR T1/E1: 1.544 Mbps / 2.048 Mbps G.703; Full rate and fractional (N*56/64kbps); Integral CSU/DSU |
| **Network Standards** | |
| **Auto-Negotiation on TP** | IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX |
| **Flow Control & Prioritization** | TP, IEEE 802.3u |
| **VLANs** | Compliant |
| **Spanning Tree** | Compliant |
| **DiffServ** | IEEE 802.1p: DiffServ, traffic prioritization for routed IP flows/ports |
| **Software** | |
| MNS-DX and MNS-DX-SECURE licensed software | |

# Product Specifications (continued)

| | |
|---|---|
| **Management & Diagnostics** | |
| **Ease-of-Use** | Web-based Graphical User Interface (GUI) or CLI access remote SSH or TELNET connection. Powerful built-in protocol analyzer to assist with troubleshooting. |
| **Other** | Comprehensive statistics, SNMP MIB II and SNMP Traps, Routing Information, DHCP, ARP and other tables. |
| **Operating Environment** | |
| **Operating Temperature** | IEC 60068 Operating temp. per "Type Test" -40° to 185°F (-40° to 85°C) |
| **Temperature Rating (components)** | UL 60950 "Component Parts" temperature rating: 140°F (60°C) |
| **Storage Temperature** | -40° to 185°F (-40°to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 13000ft (-60 to 4000m) |
| **Conformal Coating (humidity protection)** | Request quote |
| **Mechanical** | |
| **Enclosure** | Rugged high-strength sheet metal |
| **Mounting** | 19" ETSI and 23" Rack, Panel Mount and DIN-Rail |
| **Cooling Method** | Convection. |
| **Dimensions** | 9.5" W x 9.0" D x 1.75" H (24.13 cm x 22.86cm x 4.45 cm); 1 RU |
| **Weight** | 5 lbs (2.3 kg) |
| **Power Supply Options** | |
| **High Voltage** | 90-250V AC or DC, 50-60Hz, 0.2A, 18 watts |
| **Low Voltage** | 24-48V DC, 0.75A, 18 watts |
| **Serial LED Indicators Per DB-9 or RJ45 Port** | |
| One LED/port indicating active connection. | |
| **Ethernet LED Indicators Per RJ45 or Fiber Port** | |
| **L/A** | One LED/port indicating Link (solid green) and Activity (blinks to indicate activity). |
| **Agency Standards Approval and Compliance** | |
| ETL, UL 60950, EN55022, EN55024 FCC Part 15 I CE, EMC & ENV | |
| **Warranty** | |
| **Warranty** | Three Years |

# DX940 Configuration Guide

| DX940-4RJ-H | - | DXC-2GCU | - | DXC-DDS | - | DXC-4SERIAL | - | SA | - | XX |
|---|---|---|---|---|---|---|---|---|---|---|

**Product Family**
**DX940-4RJ-H** = 90-250V DC/AC, 4x 10/100Mb RJ45 ports
**DX940-4RJ-L** = 24-48V DC, 4x 10/100Mb RJ45 ports
**DX940-4FXSFP-H** = 90-250V DC/AC, 4x 100Mb SFP ports
D**X940-4FXSFP-L** = 24-48V DC, 4x 100Mb SFP ports

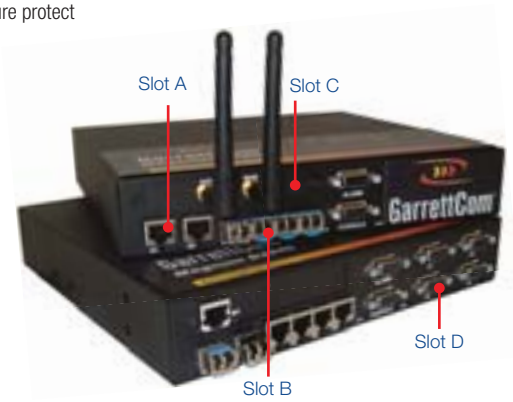
**Slot A (Gigabit Port)**
**DXC-2GCU** = 2x 10/100/1000Mb RJ45 ports
**DXC-2GSFP** = 2x 1000Mb SFP ports
**XXXX** = Blank Slot

**Slot C (WAN Port)**
**DXC-CW** = 1 EVDO 3G cellular
**DXC-CW-DDS** = 1 EVDO 3G cellular + 1 DDS
**DXC-CW-T1E1** = 1 EVDO 3G cellular + 1 E1/T1
**DXC-DDS** = 1 DDS WAN port
**DXC-T1E1**= 1 T1/E1 WAN port
**XXX** = Blank Slot

**Slot D (Serial Port)**
**DXC-4SERIAL** = 4 DB9-DTE Serial ports
**XX** = Blank Slot

**Software**
**DX** = Standard MNS-DX Software
**AD** = MNS-DX ADVAR License
**SE** = MNS-DX Secure License
**SA** = Both Secure and ADVAR

**Conformal Coating**
**CONFORM05-CRM** = 5 mil, for moisture protect
**XX** = No Conformal Coating
**CONFORM08-CRM** = 8 mil, for moisture protect




# DX940 Accessories

| Module No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-GT | Gb Copper |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| SFP100P-RJ45 | 100Mb Copper SFP transceiver, 10/100 auto-negotiating |
| SFP100P-FXMM2 | 100FX Fiber Optic SFP transceiver, multimode, 2Km |
| SFP100P-FXSM20 | 100FX Fiber Optic SFP transceiver, singlemode, 20Km. |
| SFP100P-FXSM40 | 100FX Fiber Optic SFP transceiver, singlemode, 40Km. |

| Module No. | Description |
|---|---|
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| ACC-DX-00-PM | Panel Mount bracket spares |
| ACC-DX-00-DM | Set of two DIN-Rail holders for vertical mount |
| ACC-DX-00-RM | Rack-mount brackets for 19" rack mounting |
| ACC-DX-00-RRM | Rack-mount brackets for 19" Reverse rack mounting |
| RMB-ETSI | Brackets to extend width from 19" to ETSI width; Prerequisite: ACC-DX-00-RM or ACC-DX-00-RRM |
| RMB-23W | Brackets to extend width from 19" to 23" Telco width; Prerequisite: ACCDX-00-RM or ACC-DX-00-RRM |

# 10XTS Configurable Router Terminal Server

## Magnum 10XTS Router Terminal Server offers T1/E1 routing as well as advanced serial and Ethernet port configurability for heavy duty industrial applications where maximum port count and diversity are required.

### Configurable and Reliable

The Magnum 10XTS Router Terminal Server offers T1/E1 routing as well as advanced serial and Ethernet port configurability for heavy duty industrial applications where maximum port count and diversity are required. The Magnum 10XTS is ideal for large substation installations with large numbers of serial and Ethernet instruments and the need for high-speed WAN access.

The Magnum 10XTS offers two WAN ports via a T1/E1 card, up to eight Ethernet ports or 28 serial ports and IRIG-B time coding. The 10XTS provides configurability, reliability, and functionality in a 1U hardened rack-mount package. The 10XTS also offers the flexibility of switching or routing on all of the Ethernet ports. Each 10XTS Router Terminal Server includes advanced thermal design techniques that result in cooler operation of internal electronic components, leading to longer life-time and increased reliability.

### Next Generation Technology

The Magnum 10XTS offers next generation reliability and configurable redundancy, with high voltage AC/DC and low voltage DC hot-swappable power supplies. Software monitors each power supply, and detects power supply faults and signal when a power supply module swap is needed. The swap-out can readily be done while the 10XTS continues in operation.

Ideal for Large Substation Installations with Large Numbers of Serial and Ethernet Instruments and the Need for High-speed WAN Access.

## Features

- Configurable Router Terminal Server with dual T1/ E1 WAN port and up to eight Ethernet ports or 28 serial ports
- Dual hot-swappable power supplies in a 1U rack-mount package
- Configurable IRIG-B Timing Modules available for precision timing to Protection & SCADA devices
- MNS-DX Software Supports Switching or Routing on all Ethernet Ports
- Substation-hardened, IEC 61850-3 compliant, no fans

# 10XTS Configurable Router Terminal Server

Next Generation industrial terminal server features, for mission-critical control devices such as those found in power utility facilities in the Smart Grid, importantly include IRIG-B timing synchronization. Each Magnum 10XTS may be configured with an IRIG-B Timing Card and a selection of IRIG-B port modules to provide time synchronization for Protection, SCADA and other devices.

The ten configuration slots in the Magnum 10XTS provide the flexibility for network designers to configure up to eight 100Mb Ethernet ports in different fiber and copper combinations and up to 28 serial ports. Both DB-9 and RJ45 serial connector types are available. Modules may be configured for regular port types, IRIG-B timing, or combinations.

### Software and Secuirty

The configurability of Magnum 10XTS extends to MNS-DX software features as well. A licensed software key unlocks additional features for extra security. Extra security features such as IPSec/VPN, firewall, RADIUS, syslog and other security capabilities can be added to MNS-DX via MNS-DX-SECURE, which also provides IP firewall features including address/port inspection/filtering; VPN connectivity over IPsec with strong 3DES and AES encryption and both shared key (PSK) and X.509 certificates.

VPNs comply to various IPSec/VPN standards and have proven interoperability with other industry standard VPN devices. Cyber security capabilities cover both electronic perimeter protection for remote sites and management security for the 10XTS. Advanced statistics and event recording are available with downloadable local logs, SNMP MIBs and traps, and syslog remote logging. Advanced routing capability for OSPF and BGP networks is enabled using the MNS-DX-ADVAR software license key.

### Rugged Design

Magnum 10XTS Managed Terminal Servers have rugged metal cases for regular or "Reverse" rack-mounting, and auto-ranging power supplies for operation with standard AC power worldwide, or internal DC power supply choices. Moisture- and corrosion-protecting Conformal Coating is optional. The Magnum 10XTS unit is designed and manufactured in the USA.

### Warranty

Five Years.

# Product Specifications

| Type | 10XTS |
|---|---|
| **Description** | Magnum 10XTS base unit, configurable substation hardened, managed router/terminal server/Ethernet switch. Each unit offers up to 8 Ethernet or 28 serial ports as well as two E1/T1 WAN ports. Offers dual hot-swap power supplies. |
| **Serial Protocols** | |
| Async to TCP/IP – including Modbus gateway for connectivity to serial Modbus devices and to other Modbus Ethernet devices; TCP/IP to serial/reverse terminal server, Serial Multipoint & Multimaster Topologies; PPP with authentication. | |
| **Performance** | |
| **WAN Ports** | T1/E1: 1.544 Mbps / 2.048 Mbps G.703 |
| **Serial DB9 Ports** | RS232/RS485 software selectable DB9 interface. Serial data rate from 300 bps to 230.4 kbps.<br>See the user guide pinout details and supported interfaces. |
| **Serial RJ45 Ports** | Same functionality as DB-9 ports (RJ45 pinout conforms to EIA-561 DTE standard)<br>See the user guide pinout details and supported interfaces. |
| **RJ45 Ports** | 100 or 10 Mb speed, full- or half-duplex mode, per port, individually determined.10/100 auto-negotiating & auto-cross |
| **Fiber Ports, 100 Mb (multi-mode and single-mode)** | Configurable in modules at 2/module, or SFF (Small Form Factor) for high fiber port density, 4 per module. Each FDX or HDX, default is FDX mode |
| **Network Standards** | |
| IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX | |
| IEEE 802.3u: Auto-negotiation on TP | |
| IEEE 802.3x, 802.1p: flow control and prioritization | |
| IEEE 802.1Q: VLANs, maximum 32 VLANs | |
| IEEE 8021.1d, 802.1w: Spanning Tree, Rapid Spanning Tree including | |
| RSTP 2004 extensions providing sub-second hop on rings | |
| IEEE 802.1p: DiffServ, traffic prioritization for routed IP flows/ports | |
| **Software** | |
| MNS-DX and MNS-DX-SECURE licensed software | |
| **Management & Diagnostics** | |
| Ease of use: Web-based Graphical User Interface (GUI) or CLI access remote SSH or TELNET connection Powerful built-in protocol analyzer to assist with trouble shooting Other: Comprehensive statistics, SNMP MIB II and SNMP Traps, Routing Information, DHCP, ARP and other tables. | |

# Product Specifications (continued)

| Operating Environment | |
|---|---|
| **IEC 60068 Operating Temperature** | per "Type Test" -40° to 185°F (-40° to 85°C) |
| **UL 60950 "Component Parts" Temperature Rating** | 140°F (60°C) |
| **Storage** | -40° to 185°F (-40°to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 13000ft (-60 to 4000m) |
| **Conformal coating (humidity protection) Option** | Request quote |
| **Mechanical** | |
| **Enclosure** | Rugged high-strength sheet metal. 1U rack-mounting |
| **Rack-Mounting Brackets** | 19" included |
| **Cooling Method** | Convection |
| **Dimensions** | 1.7in H x17.5in W x 12.in D (4.3cm H x 44.5cm W x 30.7cm D) |
| **Weight** | Rack-mount 10.6 lbs. (4.8 kg) |
| **Hot Swappable Power Supply Options** | |
| Magnum 10XTS may be ordered with hot swappable power supplies. Up to two of the following supplies in matching pairs may be chosen: | |
| **High (H) Nominal** | Input 90 to 250V AC/DC |
| **Low (L) nominal** | Input 18 to 60VDC |
| **Terminal Block** | "-, GND, +" |
| **Power Consumption** | 20 watts (for fully populated unit) |
| **Fixed Power Supply Options** | |
| **High (H) Nominal** | 90-250V AC/DC; Terminal Block: "-, GND, +" |
| **Low (L) nominal** | Input 22VDC to 60VDC |
| **AC** | IEC-type, male recessed |
| **Power Input, AC** | 100 to 240 VAC, 47 to 63 Hz (auto ranging) |
| **Serial LED Indicators Per DB-9 or RJ45 Port** | |
| One LED/port indicating active connection | |
| **Ethernet LED Indicators Per RJ45 or Fiber Port** | |
| **L/A** | One LED/port indicating Link (solid green) and Activity (blinks to indicate activity) |
| **Relay Contacts for Alarms (except PoE version)** | |
| Two alarm contact: HW & SW alarms are normally open until the unit is powered & software started. Under normal operation they are closed. | |
| Form C HW alarm will be opened wtih either 1) any power supply loss, 2) fan failures | |
| Form C SW alarm will be opened when any pre-defined SW event occurs | |
| **Agency Standards Approval and Compliance** | |
| **UL/cUL 60950, EN55022 FCC Part 15** | CE, EMC & ENV |
| **IEC61850-3** | EMC and Environmental Operating Conditions Class C for Power Substations |
| **IEEE 1613 Class 2** | Environmental Standard for Electric Power Substations |
| **NEMA TS-2** | Traffic Control |
| **EN50155** | Railways |
| **Warranty** | |
| Five years. | |

# 10XTS Configuration Guide

| 10XTS-HH | - | XX IXX | - | 10TS2-RJ45 I XX I 10K4-RJ45 I 10TS4-RJ45 I XX I XX I XX I XX I XX I XX |
|---|---|---|---|---|

**Mounting**
**10XTS** = Front Mount
**10XTSR** = Reverse Mount
**10XTSP** = Front Mount with PoE+ (w/ L, LL, HSPLL only)
**10XTSPR** = Reverse Mount with PoE+ (w/ L, LL, HSPLL only)

**PS1 and PS2**
**AC** = 1x 100-250VAC, IEC 320 plug
**H** = Fixed, 1x 100-250VAC/DC
**HH** = Fixed, 2x 100-250VAC/DC
**L** = Fixed, 1x 24/48VDC
**LL** = Fixed, 2x 24/48VDC
**HL** = Fixed, 1x 100-250VAC/DC and 1x 24/48 VDC
**HSPLL** = Hot-swap, 2x 24/48VDC
**HSPHH** = Hot-swap, 2x 100-250VAC/DC
**HSPHL** = Hot-swap, 1x 100-250VAC/DC + 1x 24/48VDC

**HSP Module 1** (only with Hot-swap models)
**HSPM-H** = 1x AC or DC power (90-250V)
**LHSPL-L** = 1x 24/48VDC power (22-60V)
**10K-PSBLNK** = Blank cover for power supply
**XX** = No HSP Module

**HSP Module 2** (Pick from HSP **Module 1**options)

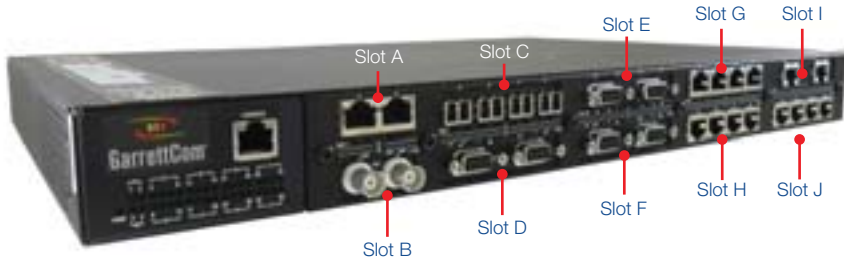
**Slot A**
**10TS2-RJ45** = 2x 10/100Mb RJ45 ports
**XX** = Blank Slot
**10TS2-HSFP** = 2x 100Mb SFP Ports

**Slot B**
Pick from slot A options **OR**
**IRIGB-TMODULE** = Timing module for IRIG-B

**Slot C**
**10K4-RJ45** = 4x 10/100Mb RJ45 ports
**10K4-MLC** = 4x 100Mb LC MM FX
**10K4-SLCL** = 4x 100Mb LC SM 40Km FX
**10K2-MST** = 2x 100Mb ST MM FX
**10K2-SSC** = 2x 100Mb SC SM 20Km FX
**10K2-F10ST** = 2x10Mb ST FX
**10TS2-DB9-DCE** = 2 port DB-9-DCE serial
**10K4PX-RJ45** = 4x 10/100Mb RJ45 PoE+
**10K4-SLC** = 4x 100Mb LC SM 20Km FX
**10K4-MTRJ** = 4x100Mb MTRJ MM FX
**10K2-MSC** = 2x 100Mb SC MM FX
**10K2-SSCL** = 2x 100Mb SC SM 40Km FX
**10TS2-DB9-DTE** = 2 port DB-9-DTE serial ()
**10TS4-RJ45** = 4 port RJ45 serial
**Timing Options** (only with IRIGB-TMODULE in Slot B)
**10TS2-DB9-DTE-IRIGB** = 2 port DB-9-DTE serial w/ IRIG-B
**10TS2-DB9-DCE-IRIGB** = 2 port DB-9-DCE serial w/ IRIG-B
**10TS4-RJ45-IRIGB** = 4 port RJ45 serial w/ IRIG-B
**10TS2-DB9-X-IRIGB** = 2 port DB-9-X serial w/IRIG-B

**Slot D (choose IRIG ports only with I1 in Slot B)**
**10TS2-DB9-DTE** = 2 port DB-9-DTE serial
**10TS4-RJ45** = 4 port RJ45 serial
**10TS2-DB9-DCE-IRIGB** = 2 port DB-9-DCE serial w/ IRIG-B
**10TS4-RJ45-IRIGB** = 4 port RJ45 serial w/ IRIG-B
**10TS2-DB9-X-IRIGB** = 2 port DB-9-X serial w/ IRIG-B
**XX** = Blank Slot
**10TS2-DB9-DCE** = 2 port DB-9-DCE serial
**10TS2-DB9-DTE-IRIGB** = 2 port DB-9-DTE serial w/ IRIG-B

**Slot E** (Pick from **slot D** options)
**Slot F** (Pick from **slot D** options)
**Slot G** (Pick from **slot D** options)
**Slot H** (Pick from **slot D** options)
**Slot I** (Pick from **slot D** options **OR 10-2T1E1** = Dual T1/E1 WAN)
**Slot J** (Pick from slot D options)




# 10XTS Accessories

| Model No. | Description |
|---|---|
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| CONFORM05-RMOD | Conformal coating, 5 mil, for moisture protection |
| CONFORM08-RMOD | Conformal coating, 8 mil, for corrosive environments |

| Model No. | Description |
|---|---|
| DUAL-SRC-L | Provides two separate 24/48VDC power inputs (the unit will operate from either or both) to accommodate redundant 24/48V installations for increased availability and ease of DC power source maintenance. Includes internal diode protection to prevent feedback. Order this option as a line item, for factory configuration as part of the 10-series units (not available for 10C), which will have its model number changed to append "-DSRC". ONLY available on "L", or "HSPLL" chassis options for the 10RX. |
| MNS-DX-SECURE-LIC1 | Optional, licensed per router for extra security |
| MNS-DX-ADVAR-LIC1 | Optional, licensed per router for advanced routing |

# 10RX Configurable Router and Security Appliance

The Magnum 10RX Configurable Router and Security Appliance offers advanced layer 3 networking protocols, firewall, and secure virtual private networking for heavy duty industrial applications where high performance and security are required.

### Configurable and Reliable

The Magnum 10RX is a configurable router and security appliance offering terminal server functionality and high performance routing of gigabit Ethernet, T1/E1 or DDS, and advanced serial protocols. The Magnum 10RX complies with IEC 61850 and is ideal for large substation installations or similar applications where hardness, performance, security, quality of service and diverse protocols are required.

The hardware and software versatility of the Magnum 10RX provides flexibility in interworking legacy serial and WAN protocols with high performance Gigabit Ethernet and TCP/IP technology. The Magnum 10RX supports up to 10 Ethernet ports (Gigabit) and 16 WAN connections, as well as hot-swappable dual power supplies. Each Magnum 10RX router / security appliance includes advanced thermal design techniques that result in cooler operation of internal electronic components, leading to longer lifetime and increased availability.

Next Generation Technology

The Magnum 10RX offers reliability and configurable redundancy with high voltage AC/DC and low voltage DC hot-swappable power supplies. The software monitors each power supply and detects power supply faults and signal when a power supply module swap is needed. The swapping can readily be done without interruption to the system.

Ideal for Large Substation Installations with Multiprotocol and Tight Security Requirements, as well as the Need to Support Mixed TCP/IP and Legacy Interfaces.

## Features

- Configurable WAN Router with up to 10 Ethernet ports (Gigabit), 16 WAN ports, or 32 serial connections.
- Next generation hardware and software architecture to provide maximum speed and flexibility
- Advance firewall and security features provide high level of network protection
- Protocol support for both current and legacy network technologies
- Substation-hardened, IEC61850-3 compliant, choice of fan-cooled or convection-cooled options
- Dual hot-swappable power supplies in a 1U or 1.5U rack-mount package

# Magnum10RX Configurable Router

The Magnum 10RX is a high performance router and security appliance designed for mission critical applications such as power utility substations and smart grid deployments. By combining a high function router with firewall and secure virtual private network (VPN) capabilities, the Magnum10RX provides the WAN connectivity and security functions needed to provide highly reliable interworking between substations, or other mission critical network elements.

The ten configuration slots in the Magnum 10RX provide the flexibility for network designers to configure up to ten Ethernet ports (Gigabit) using modules that support both copper and SFP ports, as well as up to 16 T1/E1 or DDS ports and up to 32 serial ports.

### Software and Secuirty

The Magnum 10RX is highly configurable utilizing the advanced Industrial Network Operating System (INOS) and supports a wide range of routing protocols including RIP, OSPF, and BGP. The integrated firewall ensures maximum perimeter protection with features such as address/port inspection and filtering as well as secures VPN connections with strong 3DES and AES encryption.

The VPN's comply to various IPsec/ VPN standards and have proven interoperability with other industry standard VPN devices. Cyber security capabilities cover both electronic perimeter protection for remote sites and management security for the Magnum 10RX. Advanced statistics and event recording are available with downloadable local logs, SNMP MIBs and traps, and syslog remote logging.

### Hardened Design

The Magnum 10RX has a hardened metal case for regular or reverse rack mounting, auto-ranging power supplies for operation with standard AC power (worldwide), or internal DC power supply choices. For moisture and corrosion protection, conformal coating is optional.

### Design for Performance

The Magnum10RX Router and Security Appliance has integrated hardware assist for encryption to maximize the number of secure VPN channels available to network designers. In addition, the platform uses next generation hardware and software architecture to deliver maximum performance for critical tasks. Finally, the integration of advanced thermal management and dual hot-swappable power supplies provides for maximum uptime and reliability.

# Product Specifications

| Type | 10RX |
|---|---|
| **Description** | The Magnum 10RX is a configurable, hardened managed router with integrated firewall and secure VPN server. |
| **Serial Protocols** | |
| Async to TCP/IP; TCP/IP to serial/reverse terminal server, Serial Multipoint & Multimaster Topologies; PPP with authentication. | |
| **Performance** | |
| **WAN Ports** | T1/E1: 1.544 Mbps / 2.048 Mbps G.703 or DDS: 56/64 kbps |
| **Serial DB9 Ports** | RS232/RS485 software selectable DB9 interface. Serial data rate from 300 bps to 230.4 kbps. See the user guide pinout details and supported interfaces. |
| **Serial RJ45 Ports** | Same functionality as DB-9 ports (RJ45 pinout conforms to EIA-561 DTE standard) See the user guide pinout details and supported interfaces. |
| **RJ45 Ports** | 10/100/1000 Mbps RJ45/SFP auto media ports. |
| **Fiber Ports, via SFP (multi-mode and single-mode)** | |
| **Network Standards** | |
| IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX | |
| IEEE 802.3u: Auto-negotiation on TP | |
| IEEE 802.3x, 802.1p: flow control and prioritization | |
| IEEE 802.1Q: VLANs | |
| IEEE 8021.1d, 802.1w: Spanning Tree, Rapid Spanning Tree including | |
| RSTP 2004 extensions providing sub-second hop on rings | |
| IEEE 802.1p: DiffServ, traffic prioritization for routed IP flows/ports | |
| **Software** | |
| Industrial Network Operating System (INOS) | |

# Product Specifications (continued)

| Management & Diagnostics | |
|---|---|
| Ease of use: Web-based Graphical User Interface (GUI) or CLI access remote SSH or TELNET connection Powerful built-in protocol analyzer to assist with trouble shooting Other: Comprehensive statistics, SNMP MIB II and SNMP Traps, Routing Information, DHCP, ARP and other tables. | |
| **Operating Environment** | |
| **IEC 60068 Operating Temperature** | per "Type Test" -40° to 185°F (-40° to 85°C) |
| **UL 60950 "Component Parts" Temperature Rating** | 140°F (60°C) |
| **Storage** | -40° to 185°F (-40°to 85°C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 13000ft (-60 to 4000m) |
| **Conformal coating (humidity protection) Option** | Request quote |
| **Mechanical** | |
| **Enclosure** | Rugged high-strength sheet metal. 1U and 1.5U (with thermal fins) rack-mounting or stand alone |
| **Rack-Mounting Brackets** | 19" included |
| **Cooling Method** | Free convection, special thermal techniques |
| **Dimensions** | 2.63in H (with thermal fins) x17.5in W x 12.in D (4.3cm H x 44.5cm W x 30.7cm D) |
| **Weight** | 14.2 lbs. (6.5 kg) |
| **Hot Swappable Power Supply Options** | |
| Magnum 10RX may be ordered with hot swappable power supplies. Up to two of the following power supplies may be chosen: | |
| **High (H) Nominal** | Input 90 to 250V AC/DC |
| **Low (L) nominal** | Input 22 to 60VDC |
| **Terminal Block** | "-, GND, +" |
| **Power Consumption** | 40 watts (for fully populated unit) |
| **Fixed Power Supply Options** | |
| **High (H) Nominal** | 90-250V AC/DC; Terminal Block: "-, GND, +" |
| **Low (L) nominal** | Input 22VDC to 60VDC |
| **AC** | IEC-type, male recessed, 100 to 240 VAC, 47 to 63 Hz (auto ranging) |
| **Serial LED Indicators Per DB-9 or RJ45 Port** | |
| One LED/port indicating active connection | |
| **Ethernet LED Indicators Per RJ45 or Fiber Port** | |
| **Link/Activity** | One LED/port indicating Link (solid green) and Activity (blinks to indicate activity) |
| **Relay Contacts for Alarms (except PoE version)** | |
| Two alarm contact: HW & SW alarms are normally open until the unit is powered & software started. Under normal operation they are closed. | |
| Form C HW alarm will be opened wtih either 1) any power supply loss, 2) fan failures | |
| Form C SW alarm will be opened when any pre-defined SW event occurs | |
| **Agency Standards Approval and Compliance** | |
| **UL/cUL 60950, EN55022 FCC Part 15** | CE, EMC & ENV |
| **IEC61850-3** | EMC and Environmental Operating Conditions Class C for Power Substations |
| **IEEE 1613 Class 2** | Environmental Standard for Electric Power Substations |
| **NEMA TS-2** | Traffic Control |
| **EN50155** | Railways |
| **Warranty** | |
| Five years. | |

# 10RX Configuration Guide

| 10RX-HH-F | - | XX \|XX | - | 10-1RJSFP \| 10-2RJSFP-RX \| 10TS4-RJ45 \| XX \| XX \| XX \| XX \| XX \| XX \| XX |
|---|---|---|---|---|

**Mounting**
**10RX** = Front Mount
**10RXR** = Reverse Mount

**PS1 and PS2**
**AC** = 1x 100-250VAC, IEC 320 plug
**H** = Fixed, 1x 100-250VAC/DC
**HH** = Fixed, 2x 100-250VAC/DC
**L** = Fixed, 1x 24/48VDC
**LL** = Fixed, 2x 24/48VDC
**HL** = Fixed, 1x 100-250VAC/DC and 1x 24/48 VDC
**HSPLL** = Hot-swap, 2x 24/48VDC
**HSPHH** = Hot-swap, 2x 100-250VAC/DC
**HSPHL** = Hot-swap, 1x 100-250VAC/DC + 1x 24/48VDC

**Chassis Cooling**
**F** = Fans **TF** = Thermal Fins **X** = No Options

**HSP Module 1 (only with Hot-swap models)**
**HSPM-H** = 1x AC or DC power (90-250V)
**LHSPL-L** = 1x 24/48VDC power (22-60V)
**HSPM-HF** = 1x AC or DC power (90-250V) w/ Fans
**HSPM-LF** = 1x 24/48VDC power (22-60V) w/ Fans
**10K-PSBLNK** = Blank cover for power supply
**XX** = No HSP Module

**HSP Module 2 (Pick from HSP Module 1 options)**

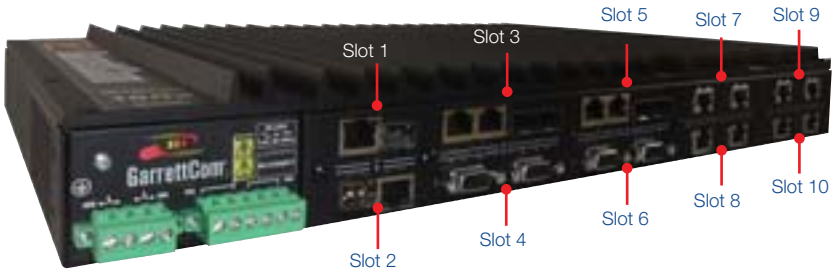
**Slots 1**
**10-1RJSFP** = One auto RJ45/SFP GbE port
**XX** = Blank Slots

**Slots 2**
**10-1RJSFP** = One auto RJ45/SFP GbE port
XX = Blank Slots

**Slots 3**
**10-2T1E1** = Dual T1/E1 WAN
**10TS2-DB9-DTE** = 2 port DB9-DTE serial
**10TS2-DB9-DCE** = 2 port DB9-DCE serial
**XX** = Blank Slot
**10-2DDS** = Dual DDS WAN
**10TS4-RJ45** = 4 port RJ45 serial
**10-2RJSFP-RX** = Dual auto RJ45/SFP GbE ports

**Slots 4**
**10-2T1E1** = Dual T1/E1 WAN
**10TS2-DB9-DTE** = 2 port DB-9-DTE serial
**10TS2-DB9-DCE** = 2 port DB-9-DCE serial
**10-2DDS** = Dual DDS WAN
**10TS4-RJ45** = 4 port RJ45 serial
**XX** = Blank Slot

**Slot 5** (Pick from **slot 3** options)
**Slot 6** (Pick from **slot 4** options)
**Slot 7** (Pick from **slot 3** options)
**Slot 8** (Pick from **slot 4** options)
**Slot 9** (Pick from **slot 3** options)
**Slot 10** (Pick from **slot 4** options)




# 10RX Accessories

| Module No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-GT | Gb Copper |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| SFP100P-RJ45 | 100Mb Copper SFP transceiver, 10/100 auto-negotiating |
| SFP100P-FXMM2 | 100FX Fiber Optic SFP transceiver, multimode, 2Km |
| SFP100P-FXSM20 | 100FX Fiber Optic SFP transceiver, singlemode, 20Km. |
| SFP100P-FXSM40 | 100FX Fiber Optic SFP transceiver, singlemode, 40Km. |
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |

| Module No. | Description |
|---|---|
| CONFORM05-RMOD | Conformal coating, 5 mil, for moisture protection\ |
| CONFORM08-RMOD | Conformal coating, 8 mil, for corrosive environments\ |
| KT-RFAN | Optional cooling fan for thermal-fin (TF) units |
| DUAL-SRC-L | Provides two separate 24/48VDC power inputs (the unit will operate from either or both) to accommodate redundant 24/48V installations for increased availability and ease of DC power source maintenance. Includes internal diode protection to prevent feedback. Order this option as a line item, for factory configuration as part of the 10-series units (not available for 10C), which will have its model number changed to append"-DSRC". ONLY available on "L", or "HSPLL" chassis options for the 10RX. |

**Additional Hot Swappable Power Supply modules (if required)**

| Model No. | Description |
|---|---|
| HSPM-H | AC or DC power (90-250V) |
| HSPM-HF | AC or DC power (90-250V) w/internal cooling fan |
| HSPM-L | 24/48 DC power (22-60V) Note: for PoE at -48VDC: Input should be -44 to -57VDC. |
| HSPM-LF | 24/48 DC power (22-60V) w/ internal cooling fan; Note: for PoE at -48VDC: Input should be -44 to -57VDC. |
| 10K-PSBLNK | Blank cover for one hot-swap power supply slot |

# 5RX Fixed Configuration Security Router

## Belden has introduced a new device that combines routing with network security – the Magnum 5RX Security Router – to meet the mid-level needs of the power transmission and distribution industry.

The Magnum 5RX Security Router is designed for industrial applications where hardened and industrial-grade solutions are required to deliver high-performance routing while ensuring network security.

### Applications

The new Magnum 5RX Security Router has a comprehensive set of features designed for use in power transmission and distribution settings, especially in distributed substations. Providing maximum substation protection and compliance with IEC 61850-3 standards, this compact router is well suited for deployments at the edge of the network where modular solutions are expensive and not required.

The Magnum 5RX Security Router is also a key solution for other industrial sectors, including oil and gas, water and wastewater, mining, wind power, solar power and power generation.

### Customer Benefits

The Magnum 5RX Security Router is the most cost-effective, mid-level routing and security solution available for industrial applications. The router's fixed configuration reduces total infrastructure costs by combining functionalities; reduces flair ups and potential failure points; and makes overall management and monitoring easier. Its low cost is especially important when working on a highly distributed network with a volume of substations in the field.

The Magnum 5RX Security Router offers a comprehensive set of features essential for a highly secured and reliable communication network in the energy and utility industries. The router comes with best-in-class firewall protection and VPN security along with Layer 2 functionalities, as well as advanced Layer 3 routing capabilities.

The new security router also provides both current and legacy WAN interfaces and communication support – offering a valuable migration path to the new generation of network backbones.

The new Magnum 5RX Security Router offers advanced routing and security capabilities in a single, cost-efficient platform. The support for legacy wide area network (WAN) protocols and serial interface make it a natural migration path for customers moving to next generation, high-performance technologies..

## Features

- Two-in-one platform – routing and security functionalities in a single, fixed-configuration device. The Magnum 5RX Security Router helps build cost-effective systems, especially in highly distributed network deployment scenarios.
- Optimal performance – cutting-edge software offers Layer 3 advanced routing capability, along with best-in-class firewall protection and virtual private network (VPN) security, to address growing security concerns.
- Total network solution – complete, integrated network solution when using the new Magnum 5RX Security Router at the edge of the network and the legacy Magnum 10RX Configurable Router with Security Appliance at the core of the network.

# Magnum 5RX Security Router

Offering a comprehensive set of features and functionalities essential for success in the field, the router is available in the following physical interfaces with four possible configurations: four Gigabit copper RJ45 ports (fixed), two Gigabit auto-media combo ports (fixed), eight DB9 serial ports (fixed), high or low voltage power supply and one T1/E1 or DDS WAN port. The router is 19-inch rack mountable with convection cooling.

*The Magnum 5RX Security Router guarantees ultimate performance and reliability with its two-in-one approach to routing and network security.*

### Benefits at a glance

- Legacy protocol and communication support for both current and legacy networks
- Two-in-one solution offering both routing and security capabilities
- Fixed configuration for cost efficiency
- Fanless design with conventional cooling
- Supports a comprehensive set of routing protocols, such as RIP, OSPF and BGP
- Virtual Router Redundancy Protocol (VRRP) for improved network redundancy
- GOOSE and GRE tunneling support to facilitate management and network communication between central workstation and multiple remote substations
- Frame relay service over Ethernet with IP over FR (RFC 1490), Serial Over FR, FR Switching, Backup and Shunt functionality over T1/E1/DDS interfaces
- Generic Routing Encapsulation (GRE) allows network traffic to travel across the internet securely via a virtual point-to-point connection
- Hardened for substations
- IEC 61850-3, IEEE 1613 Class 2, NEMA TS-2 and EN50155 compliant
- Operating environment of -40˚C to +85˚C
- Five-year warranty included

# Technical Information

| Product Description | |
|---|---|
| **Type** | **Magnum 5RX** |
| **Description** | The Magnum 5RX is a hardened security router with fixed configuration, and comes with integrated firewall and secure VPN server. |
| **Serial Protocols** | |
| Async to TCP/IP; TCP/IP to serial/reverse terminal server, Serial Multipoint & Multimaster Topologies; PPP with authentication. | |
| **Performance** | |
| **WAN Ports** | T1/E1: 1.544 Mbps / 2.048 Mbps G.703 or DDS: 56/64 kbps |
| **Serial DB9 Ports** | RS232/RS485 software selectable DB9 interface. Serial data rate from 300 bps to 230.4 kbps.<br>See the user guide pinout details and supported interfaces. |
| **Serial RJ45 Ports** | Same functionality as DB-9 ports (RJ45 pinout conforms to EIA-561 DTE standard)<br>See the user guide pinout details and supported interfaces. |
| **RJ45 Ports** | 10/100/1000 Mbps RJ45 Ports or 100 or 1000 Mbps Fiber Ports via SFP auto-media. |
| **Fiber Ports, via SFP (multi-mode and single-mode)** | |

# Technical Information (continued)

| Network Standards |
|---|
| IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX |
| IEEE 802.3u: Auto-negotiation on TP |
| IEEE 802.3x, 802.1p: flow control and prioritization |
| IEEE 802.1Q: VLANs |
| IEEE 8021.1d, 802.1w: Spanning Tree, Rapid Spanning Tree including |
| RSTP 2004 extensions providing sub-second hop on rings |
| IEEE 802.1p: DiffServ, traffic prioritization for routed IP flows/ports |
| **Software Industrial Network Operating System (INOS)** |
| Comprehensive L2 features such as LLDP, VLAN, QoS, VLAN Trunking, Spanning Tree (STP, RSTP, MSTP) and etc. |
| Advanced L3 features including IP, ICMP, ARP, Frame Relay, PPP/MLPPP, PPP over WAN and more. |
| Essential L4 features such as TCP/UDP, routing (RIP, OSPF, and BGP) and etc. |
| Useful System Management and monitoring capabilities including port mirroring, GRE, VRRP, Object tracking, Protocol Analyzer and much more. |
| Enhanced Security features such as Firewall/NAT and IPSec VPN. |
| Features that support Industrial Applications such as GOOSE and Bit Oriented Protocol. |
| **Management & Diagnostics** |
| Ease of use: Web-based Graphical User Interface (GUI) or CLI access remote SSH or TELNET connection Powerful built-in protocol analyzer to assist with trouble shooting.<br>Other: Comprehensive statistics, SNMP MIB II and SNMP Traps, Routing Information, DHCP, ARP and other tables. |

| Operating Environment | |
|---|---|
| **IEC 60068 Operating Temperature** | per "Type Test" -40 °F to 185 °F (-40 °C to +85 °C) |
| **UL 60950 "Component Parts" Temperature Rating** | 140 °F (60 °C) |
| **Storage** | -40 °F to 185 °F (-40 °C to +85 °C) |
| **Ambient Relative Humidity** | 5% to 95% (non-condensing) |
| **Altitude** | -200 to 13000 ft (-60 to 4000 m) |
| **Conformal coating (humidity protection) Option** | Request quote |
| **Mechanical** | |
| **Enclosure** | Rugged high-strength sheet metal. 1.5U (with thermal fins) rack-mounting or stand alone |
| **Rack-Mounting Brackets** | 19" included |
| **Cooling Method** | Free convection, special thermal techniques |
| **Dimensions** | 2.63 in H (with thermal fins) x 17.5 in W x 12. in D (4.3 cm H x 44.5 cm W x 30.7 cm D) |
| **Weight** | 14.2 lbs. (6.5 kg) |
| **Fixed Power Supply Options** | |
| **High (H) Nominal** | 90-250 V AC/DC; Terminal Block: "-, GND, +" |
| **Low (L) Nominal** | Input 22 V DC to 60 V DC |
| **Power Consumption** | 50 Watts (for fully populated unit) |

| Serial LED Indicators Per DB-9 or RJ45 Port |
|---|
| One LED/port indicating active connection |

| Ethernet LED Indicators Per RJ45 or Fiber Port | |
|---|---|
| **Link/Activity** | One LED/port indicating Link (solid green) and Activity (blinks to indicate activity) |

| Relay Contacts for Alarms (except PoE version) |
|---|
| Two alarm contact: HW & SW alarms are normally open until the unit is powered & software started. Under normal operation they are closed.<br>Form C HW alarm will be opened with any power supply loss.<br>Form C SW alarm will be opened when any pre-defined SW event occurs. |

| Agency Standards Approval and Compliance | |
|---|---|
| **UL/cUL 60950, EN55022 FCC Part 15** | CE, EMC & ENV |
| **IEC61850-3** | EMC and Environmental Operating Conditions Class C for Power Substations |
| **IEEE 1613 Class 2** | Environmental Standard for Electric Power Substations |
| **NEMA TS-2** | Traffic Control |
| **EN50155** | Railways |
| **Reliability** | |
| **Warranty** | 5 years (standard) |

# 5RX Configuration Guide

| 5RX | - | H | - | T1E1 |
|---|---|---|---|---|

**Model**
**5RX** = Fixed Configuration Security Router with 2 x 10/100/1000 Combo, 4 x 10/100/1000 TX, 8 x Serial Ports

**Power Supply**
**L** = 24/48 V DC
**H** = 90-250 V AC/DC

**WAN Port**
**T1E1** = 1x T1E1 WAN port
**DDS** = 1x DDS WAN port

# 5RX Accessories

| Model No. | Description |
|---|---|
| SFP-SX | Gb SX, 850nm wavelength, 550 meters |
| SFP-ESX | Gb SX, 1310nm wavelength, 2km |
| SFP-LX25 | Gb LX, 1310nm wavelength, 25km |
| SFP-ZX40 | Gb ZX, 1550nm wavelength, 40km |
| SFP-ZX70 | Gb ZX, 1550nm wavelength, 70km |
| SFP-LX10 | Gb LX, 1310nm wavelength, 10km |
| SFP100P-FXMM2 | 100FX Fiber Optic SFP transceiver, multimode, 2Km |
| SFP100P-FXSM20 | 100FX Fiber Optic SFP transceiver, singlemode, 20Km. |
| SFP100P-FXSM40 | 100FX Fiber Optic SFP transceiver, singlemode, 40Km. |

| Model No. | Description |
|---|---|
| CONSOLE-CBLQD | Console attachment cable serial null Modem (aka X-modem) cable with DB9 connectors |
| CONSOLE-CBLQU | Console attachment cable serial null Modem (aka X-modem) cable with a USB connector |
| CONFORM05-RMOD | Conformal coating, 5 mil, for moisture protection |
| CONFORM08-RMOD | Conformal coating, 8 mil, for corrosive environments |

# CS14 Converter Switch with 100 Mb Fiber

## Flexible, edge-of-network Ethernet product with multi-mode and single-mode fiber connectors plus AC or DC power inputs

Combine a 100 Mb Fiber Media Converter and a two-port 10/100 copper Switch, and you have the Converter Switch, a new flexible edge-of-the-network Ethernet product. Add in fiber port choices for all multi-mode and single-mode fiber connector types plus AC or DC input power selection and multiple application environments, and you have the Magnum CS14 Converter Switch. Where a Media Converter might traditionally have been used, a Converter Switch now offers a better value. The compact package is ideal for network edge installations, and is able to be conveniently mounted to suit any application.

All CS14 Converter Switch models come with two (2) sets of LED indicators. One set is on the front for viewing convenience when the unit is wall-mounted, and one LED set is mounted in the end adjacent to the ports for easy viewing when units are in a rackmount tray. The Magnum CS14 family of Converter Switches and other Magnum products are designed and manufactured in the USA and backed by a three-year warranty.

This switch family covers the full range of application environments, with Regular (office), Hardened (factory floor) and Premium-rated (outdoor) versions. Offers the best price-to-value for each user and installation.

## Features

- Provides one 100 Mb fiber port and two (2) 10/100 copper switch ports
- Two RJ45 ports support IEEE 802.3u to enable attaching any 10 Mb or 100 Mb device
- AC power for all models, Factory Floor and Outdoor models also have integral DC terminal blocks
- Same packaging and mounting options as the popular Magnum 14-Series Media Converters

# Applications

**Office and Wiring Closet**

The Magnum CS14 regular units are for office and indoor wiring closet environments. These are the economical base units in the CS14 Switch family. An external AC power supply for either North America (-d, 115vac 60Hz) or international (-i, 230vac, 50Hz) is included. The ambient temperature rating is 0° to 40°C, office grade.

**Hardened for Factory Floor**

The Magnum CS14H Hardened units are for factory floor applications. The CS14H models are built with high-grade components and are constructed using special thermal techniques and a metal case for heavy duty industrial jobs. In addition to a Hardened AC power option and jack, terminals for internal DC power choices at 8 to15V, 24V or -48V DC are included. The ambient temperature rating is for industrial use. No internal air flow is required for cooling, so it resists dust, dirt, moisture, smoke and insects.

**Premium-rated for Outdoors**

The Magnum CS14P Premium-rated units are for temperature uncontrolled sheltered applications, typically located outdoors. The CS14P models are built with premium-grade extended temperature components, and use similar thermal techniques as the S14H Hardened units. In addition to a Premium-rated AC power option and jack, terminals for internal DC power choices at 8 to 15V, 24V or -48V DC are included. When used outdoors, the S14P should be sheltered from elements.

# Technical Information

| | CS14 | CS14H | CS14P |
|---|---|---|---|
| **Performance** | | | |
| Fiber Port | 100 Mb HDX / FDX, all types of connectors for multi-mode or single-mode | | |
| RJ45 Ports Data Rate | 10 / 100 Mbps, FDX and HDX modes<br>Auto-negotiation and auto-cross MDI-MDIX on all RJ45 ports occurs at LINK-enable<br>No cross-over cables required | | |
| Non-blocking Switching | 128KB packet buffer memory | | |
| Address Buffer Storage | 2K addresses | | |
| Address Buffer Age-out Time | 300 seconds | | |
| **Network Standards** | | | |
| Compliance With | Ethernet IEEE 802.3, IEEE 802.3u, 802.1p; 100BASE-TX, 10BASE-T, 100BASE-FX | | |
| **VLANs Support** | | | |
| Description | Data packets that have the 4 bytes tagged VLAN field (IEEE 802.1q) inserted in them are received and transmitted unchanged by all CS14 Converter Switches | | |
| **Operating Environment** | | | |
| Ambient Temperature Ratings | 0°C to 40°C | –25°C to 60°C long term per independent agency tests (UL), or –40°C to 85°C short term per IEC Type Tests | –40°C to 75°C long term per independent agency tests (UL), or –50°C to 100°C short term per IEC Type Tests. |
| Storage Temperature | -40°F to 185°F (-40°C to 85°C) | | |
| Cold Start | | -20°C | -40°C |
| Ambient Relative Humidity | 5% - 95% (non-condensing)<br>Conformal coating (humidity protection) optional, request quote | | |
| Altitude | -200 to 50,000 ft. (-60 to 15,000m) | | |
| NEBS Compliance | | Yes–including vibration, shock, altitude | |

# Technical Information (continued)

| | CS14 | CS14H | CS14P |
|---|---|---|---|
| **Switches** | | | |
| Fiber Port | Manual selection of HDX or FDX (default is FDX) | | |
| **Packaging** | | | |
| Enclosure | Robust sheet metal (steel) | | |
| Unit Dimensions | 3.5 in H x 3.0 in W x 1.0 in D (8.9 cm x 7.6 cm x 2.5 cm) | | |
| Weight | CS14 Switch Units: 4.6 oz (130g) | | |
| Power Supply | d, i: 5.8 oz (165g) | Hd, Hi: 5.8 oz (165g) | Pd, Pi: 7.9 oz (225g) |
| Cooling Method | Convection | Convection, case used as a heat sink | |
| Rated For | | IEC 529<br>IP40 | IEC 529<br>IP40 |
| **Connectors** | | | |
| Fiber Ports<br>"ff" selections of the "fiber flavor" | "SC"= 100BASE-FX-SC: fiber optic multi-mode with SC type, 2 km<br>"ST"= 100BASE-FX-ST: fiber optic multi-mode with ST type, 2 km<br>"MTRJ"= 100BASE-FX-MTRJ: fiber optic multi-mode w/ MTRJ, 2 km<br>"MLC"= 100BASE-FX-MLC: FO multi-mode with LC, 2Km<br>"SSC"= 100BASE-FX-SSC: fiber optic single-mode with SC, 20 km<br>"SSCL"= 100BASE-FX-SSCL: fib. op. sgl-m SC, "Long Reach" 40 km<br>"SST"= 100BASE-FX-SST: fiber optic single-mode with ST type , 20 km<br>"SLC"- 100BASE-FX-SLC: fiber optic sgl-m with LC-type , 15 km<br>For other fiber connectors, request quote | | |
| RJ45 Ports | RJ45 with auto-cross, 100BASE-TX and 10BASE-T: shielded 8-Pin female. Supports shielded (STP) and unshielded (UTP) Cat. 3, 4, 5.<br>For PoE Pass-through option on H and P models, request quote | | |
| **LED Indicators (dual, top front, in end)** | | | |
| Power | ON for power applied | | |
| 10/100 per RJ45 Port | Steady ON for 100 Mb, OFF for 10 Mb speed | | |
| LK/ACT per Port | Steady ON for LINK with no traffic, blinking for Activity | | |
| F/H per Port In End | Steady ON for F/D mode, OFF for H/D mode | | |
| **Power** | | | |
| Power Supplies for AC (External) | 95-125V AC at 60 Hz for "-d" models, 215-240vac at 50 Hz for "-i" models that have IEC power connector in the ext power unit | 100-240V AC at 47-63 Hz for "-Hd", "Hi" models, see footnote 1 | 95-260V AC at 47-63 Hz for "-Pd", "Pi" models, see footnote 2 |
| | Power input DC jack (8 to 15V) is 2.5mm, center +ve, with 6ft. DC cord | | |
| Power Input Options for DC | 12V DC, internal (range of 8.0 to 15V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>24V DC internal (range of 10 to 36V DC) built-in screw terminal for +, -, ground. The DC jack is also present.<br>-48V DC internal (range of 30 to 60V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br><br>Note1: the 12V DC jack can be used for dual source DC power input<br>Note2: internal DC power floats, user may ground + or – if desired. For PoE: Total power input required = 66 watts max or 1.4a @48VDC | | |
| Power Consumption | 4.8 Watts typical. 6 Watts max | | |
| **Approvals/Standards Compliance** | | | |
| All Models | UL listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A | | |
| | NEBS L3 and ETSI compliant, including vibration, shock, and altitude | | |
| | Compliant with EN50155 Railway Applications Standard | | |
| | IEC61850 EMC and Operating Conditions Class C for Power Substations | | |
| H and P Models | | IEEE 1613 Env. Std for Electric Power Substations | |
| P Model | | | NEMA TS-2 and TEES for traffic control equipment<br>Designed for UL 2043 above-the-ceiling installation |
| **Warranty** | | | |
| Made in USA | Three [3] years | | |
| **Mounting** | | | |
| Metal Panel Mounting | Clips included | | |
| DIN-Rail Mounting | Model # DIN-RAIL MC2 | | |
| Rack-Mount | Model MC14-TRAY.<br>Dept h: 6.0", Width 17",<br>Height 2.25"(15 cm D x 43cm W x 5.7cm H) | | |

# Magnum CS14 Configuration Guide

**Base Model (w/ fixed 2x 10/100 RJ45 Ports)**
**CS14** = Converter Switch

**Variation**
**Blank** = Standard Unit (0° to 40°C)
**H** = Hardened for the Factory Floor (-25° to +60° C)
**P** = Premium Rated for Outdoors (-40° to +75° C)

**Mounting**
**R** = DIN-Rail

**Fiber Port Connectors**
**SC** = 100BASE-FX-SC: fiber optic multi-mode, SC type, 2 km.
**ST** = 100BASE-FX-ST: fiber optic multi-mode , ST type, 2 km.
**MTRJ** = 100BASE-FX-MTRJ: fiber optic multi-mode, MTRJ type, 2 km.
**MLC** = 100BASE-FX-MLC: fiber optic multi-mode, LC type, 2Km.
**SSC** = 100BASE-FX-SSC: fiber optic single-mode, SC type, 20 km.
**SSCL** = 100BASE-FX-SSCL: fiber optic single-mode, SC type, "Long Reach" 40 km.
**SST** = 100BASE-FX-SST: fiber optic single-mode, ST type , 20 km.
**SLC** = 100BASE-FX-SLC: fiber optic single-mode, LC type , 20 km.
**Blank** = No Fiber port option

**Power Supply Options**
**Hd** = External 100-240V AC at 50-60Hz (w/ H models only)
**Hi** = External 100-240V AC at 50-60Hz international (w/ H models only)
**Pd** = External 100-240V AC at 50-60Hz (w/ P models only)
**Pi** = External 100-240V AC at 50-60Hz international (w/ P models only)
**24VDC** = 24V DC power
**12VDC** = 12V DC power
**48VDC** = 48V DC power

# CSG14 Gigabit Converter Switch

## High-speed, flexible, edge-of-network Ethernet product for Gigabit connectivity applications in industrial networks

Combine a Gb Fiber Media Converter and a two-port 10/100/1000 copper Switch, and you have the Magnum CSG14 Converter Switch™, a new high-speed flexible edge-of-the-network industrial Ethernet product. Add in Gb fiber port choices for all multi-mode and single-mode Gb fiber connector types plus DC or AC input power selection, and the metal case and configuration choices you expect from Magnum products, and you have the answer to many Gigabit connectivity applications in industrial networks.

The Magnum CSG14 family of Gb Converter Switches provide

a) fixed Gb fiber ports for short distance SX fiber

b) fixed Gb fiber ports for 2km multi-mode

c) fixed LC-type transceivers for robust single-mode Gb fiber

d) SFP ports (Small Form-factor Pluggable) for flexible choices of the transceiver distance needed.

All CSG14 Converter Switch models come with two (2) sets of LED indicators. One set is on the front for viewing convenience when the unit is DIN-Rail or panel-mounted, and one LED set is mounted in the end adjacent to the ports for easy viewing when units are in a rack-mount tray. The Magnum CSG14 and CS14 family of Converter Switches and other Magnum products are designed and manufactured in the USA and backed by a three-year warranty.

This switch family covers the full range of Gb fiber port choices, with a compact design that is ideal for industrial network edge installations. Provides excellent value compared to a traditional Gb Media Converter.

## Features

- Provides one Gb fiber port and two (2) 10/100/1000 copper switch ports
- Two RJ45 ports are triple speed auto-negotiating to enable attaching any 10 Mb or 100 Mb or 1000 Mb (Gb) device
- Two models for heavy-duty application environments:
  - Hardened for Factory Floor
  - Premium-rated for -40 ºC to 85ºC and Outdoors
- Integral terminal blocks for DC power input, external AC power supply optional
- Same packaging and mounting options as popular Magnum 14-Series Converter Switches and Media Converters

# Applications

**Hardened for Factory Floor**

The Magnum CSG14H Hardened units are for factory floor applications. The CSG14H models are built with high grade components and are constructed using special thermal techniques and a metal case for heavy duty industrial jobs. In addition to a Hardened AC power option and jack, terminals for internal DC power choices at 12V, 24V or -48V DC are included. The ambient temperature rating is for industrial use. No internal air flow is required for cooling, so it resists dust, dirt, moisture, smoke and insects.

**Premium-rated for Outdoors**

The Magnum CSG14P Premium-rated units are for temperature uncontrolled applications, typically located outdoors. The CSG14P models are built with premium grade extended temperature components, and use similar thermal techniques as the CSG14H Hardened units. In addition to a Premium-rated AC power option and jack, terminals for internal DC power choices at 12V, 24V or -48V DC are included. The ambient temperature rating is -40°C to 85°C. When used outdoors, the CSG14P should be protected from falling rain.

# Technical Information

| | CSG14H | CSG14P |
|---|---|---|
| **Performance** | | |
| Fiber Port | 1000 Mb, all types of connectors for multi-mode or single-mode | |
| RJ45 Ports Data Rate | 10 / 100 / 1000 Mbps, FDX and HDX modes.<br>Auto-negotiation and auto-cross MDI-MDIX on both RJ45 ports | |
| Non-blocking Switching | 64KB packet buffer memory | |
| Address Buffer Storage | 1K addresses | |
| Address Buffer Age-out Time | 300 seconds | |
| **Network Standards** | | |
| Compliance With | Ethernet IEEE 802.3, IEEE 802.3u & ab, 802.1p; 1000BASE-TX, 1000 BASE-SX, -LX, -ZX | |
| **VLANs Support** | | |
| Description | Data packets that have the 4 bytes tagged VLAN field (IEEE 802.1q) inserted in them are received and transmitted unchanged by all by all CSG14 Converter Switches | |
| **Operating Environment** | | |
| Ambient Temperature Ratings | –25°C to 60°C long term per independent agency tests (UL),<br>or –40°C to 85°C short term per IEC Type Tests | –40°C to 75°C long term per independent agency tests (UL),<br>or –40°C to 85°C short term per IEC Type Tests. |
| Storage Temperature | -40°F to 212°F (-40°C to 100°C) | |
| Cold Start | -20°C | -40°C |
| Ambient Relative Humidity | 5% - 95% (non-condensing)<br>Conformal coating (humidity protection) optional, request quote | |
| Altitude | -200 to 50,000 ft. (-60 to 15,000m) | |
| NEBS Compliance | Yes–Including vibration, shock, altitude | |

# Technical Information (continued)

| | CSG14H | CSG14P |
|---|---|---|
| **Packaging** | | |
| Enclosure | Robust sheet metal (steel), IEC 529 rated IP 40 | |
| Unit Dimensions | 3.5 in H x 3.0 in W x 1.0 in D (8.9 cm x 7.6 cm x 2.5 cm) | |
| Weight | CSG14 Switch Units: 4.6 oz (130g) | |
| Power Supply—Hd, Hi | 5.8 oz (165g) | |
| Power Supply—Pd, Pi | 7.9 oz (225g) | |
| Cooling Method | Convection, case used as a heat sink | |
| **Switches** | | |
| Fiber Ports | Default is FDX | |
| RJ45 Ports | Triple speed, auto-negotiating | |
| **Connectors** | | |
| Fiber Ports<br>"ff" selections of the "fiber flavor" | "SX"= 1000BASE-SX-SC: fiber optic 850nm multimode with SC type, 550 m. nom.,2 km per Power Budget<br>"ESX"= 1000BASE-SX Extended, fiber optic 1310nm multimode with SC, 2 km nom.,3 km per Power Budget<br>"LX10"= 1000BASE-LX-SLC: fiber optic 1310nm single-mode with LC type, 10 km nom.,22 km per Power Budget<br>"LX25"= 1000BASE-LX-SLC: fiber optic 1310nm single-mode with LC type, 25 km nom.,40 km per Power Budget<br>"ZX40"= 1000BASE-ZX-SLC: fiber optic 1550nm single-mode with LC type, 40 km nom.,60 km per Power Budget<br>"ZX70"= 1000BASE-ZX-SLC: fiber optic 1550nm single-mode with LC type, 70 km nom.,90 km per Power Budget<br>"SFP"= open SFP transceiver slot in the fiber position. (Order SFP as a separate item)<br>"SFP-SX"=1000BASE-SX-LC: fiber optic 850 nm multimode SFP, 550 m. nominal, 2km per Power Budget<br>"SPF-ESX"= 1000BASE-ESX-LC Extended, fiber optic 1310nm multimode w/ LC, 2 km nom.,3 km per Pwr Budget<br>"SFP-LX10"= 1000BASE-LX-SLC: fiber optic 1310nm single-mode SFP, 10 km nominal, 22km per Power Budget<br>"SFP-LX25"= 1000BASE-LX-SLC: fiber optic 1310nm single-mode SFP, 25 km nominal, 40km per Power Budget<br>"SFP-ZX40"= 1000BASE-ZX-SLC: fiber optic 1550nm single-mode SFP, 40 km nominal, 60km per Power Budget<br>"SFP-ZX70"= 1000BASE-ZX-SLC: fiber optic 1550nm single-mode SFP, 70 km nominal, 90km per Power Budget<br>For other Gb fiber connectors or distances, request quote | |
| RJ45 Ports | Triple-speed 10/100/1000 auto-negotiation and auto-cross: shielded 8-Pin female<br>Supports shielded (STP) and unshielded (UTP) twisted pair cables | |
| **LED Indicators (dual: top front, in end)** | | |
| Power | ON for power applied | |
| Gb per RJ45 Port | Steady ON for Gb, OFF for 100 or 10 Mb speed | |
| LK/ACT per Port | Steady ON for LINK with no traffic, blinking for Activity | |
| 10/100 and Gb per Port In End | Steady ON for 100 Mb, OFF or 10 Mb, ON/OFF for Gb | |
| **Power** | | |
| Power Supplies for AC (External) | 100-240V AC at 47-63 Hz for "-Hd", "Hi" models, see footnote 1,2 | 95-260V AC at 47-63 Hz for "-Pd", "Pi" models, see footnote 1,2 |
| | Power input DC jack (8 to 15V) is 2.5mm, center +ve, with 6ft. DC cord | |
| Power Input Options for DC | 12V DC, internal (range of 8.0 to 15V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>24V DC internal (range of 10 to 36V DC) built-in screw terminal for +, -, ground. The DC jack is also present.<br>-48V DC internal (range of 30 to 60V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>Note1: the 12V DC jack can be used for dual source DC power input<br>Note2: internal DC power floats, user may ground + or – if desired. For PoE: Total power input required = 66 watts max or 1.4a @48VDC | |
| Power Consumption | 4 Watts typical. 5 Watts max | |
| **Approvals/Standards Compliance** | | |
| All Models | UL listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A | |
| | NEBS L3 and ETSI compliant, including vibration, shock, and altitude | |
| | IEEE 1613 Environtmental Standard for Electric Power Substations | |
| | IEC61850 EMC and Operating Conditions Class C for Power Substations | |
| P Models | | NEMA TS-2 and TEES for traffic control equipment |
| **Warranty** | | |
| Made in USA | Three [3] years | |
| **Mounting** | | |
| Metal Panel Mounting | Clips included | |
| DIN-Rail Mounting | Model # DIN-RAIL MC2 | |
| Rack-Mount | Model MC14-TRAY.<br>Depth: 6.0", Width 17",<br>Height 2.25"(15 cm D x 43cm W x 5.7cm H) | |

1: External 12V1A power supply, wall plug or power cord for North America AC receptacles. Temperature rating same as S14H, see above. (North America: for spare, order Model PSH-12V1A-Hd. Intl: order Model PSH-12V1A-Hi with IEC plug).

2: External 12V1A power supply, rated for outdoor temperatures same as S14P, see above. Universal AC input with recessed IEC plug. (North America: for spare, order Model PSP-12V1A-Pd, Intl: order Model PSP-12V1A-Pi with IEC plug).

# Magnum CSG14 Configuration Guide

| CSG14PR | - | ESX | - | 24VDC |
|---|---|---|---|---|

**Base Model (w/ fixed 2x 10/100 RJ45 Ports)**
**CSG14** = Gigabit Converter Switch

**Variation**
**H** = Hardened for the Factory Floor (-25° to +60° C)
**P** = Premium Rated for Outdoors (-40° to +75° C)

**Mounting**
**R** = DIN-Rail

**Fiber Port Connectors**
**SX** = 1000BASE-SX-SC: fiber optic 850nm multimode with SC type, 550 m. nom.,2 km per Power Budget
**ESX** = 1000BASE-SX Extended, fiber optic 1310nm multimode with SC, 2 km nom.,3 km per Power Budget
**LX10** = 1000BASE-LX-SLC: fiber optic 1310nm single-mode with LC type, 10 km nom.,22 km per Power Budget
**LX25** = 1000BASE-LX-SLC: fiber optic 1310nm single-mode with LC type, 25 km nom.,40 km per Power Budget
**ZX40** = 1000BASE-ZX-SLC: fiber optic 1550nm single-mode with LC type, 40 km nom.,60 km per Power Budget
**ZX70** = 1000BASE-ZX-SLC: fiber optic 1550nm single-mode with LC type, 70 km nom.,90 km per Power Budget
**SFP** = open SFP transceiver slot in the fiber position. (Order SFP as a separate item)
**SFP-SX** =1000BASE-SX-LC: fiber optic 850 nm multimode SFP, 550 m. nominal, 2km per Power Budget
**SPF-ESX** = 1000BASE-ESX-LC Extended, fiber optic 1310nm multimode w/ LC, 2 km nom.,3 km per Pwr Budget
**SFP-LX10** = 1000BASE-LX-SLC: fiber optic 1310nm single-mode SFP, 10 km nominal, 22km per Power Budget
**SFP-LX25** = 1000BASE-LX-SLC: fiber optic 1310nm single-mode SFP, 25 km nominal, 40km per Power Budget
**SFP-ZX40** = 1000BASE-ZX-SLC: fiber optic 1550nm single-mode SFP, 40 km nominal, 60km per Power Budget
**SFP-ZX70** = 1000BASE-ZX-SLC: fiber optic 1550nm single-mode SFP, 70 km nominal, 90km per Power Budget
**Blank** = No Fiber port option

**Power Supply Options**
**Hd** = External 100-240V AC at 50-60Hz (w/ H models only)
**Hi** = External 100-240V AC at 50-60Hz international (w/ H models only)
**Pd** = External 100-240V AC at 50-60Hz (w/ P models only)
**Pi** = External 100-240V AC at 50-60Hz international (w/ P models only)
**24VDC** = 24V DC power
**12VDC** = 12V DC power
**48VDC** = 48V DC power

# CSG14U Universal Gigabit Converter Switch

## Truly universal, high-speed, flexible, edge-of-network industrial Ethernet product that can handle any Gb fiber type (single-mode or multi-mode)s

**Convert anything to anything.**

The latest technology of SFP fiber transceivers has been integrated into the Magnum Gb Converter Switch package to produce the Magnum CSG14U Universal Converter Switch. It can handle any Gb fiber type – multi-mode and single-mode – and fiber media distance with a selection of Gb SFP fiber transceivers, up to two of which can be plugged in. It can also handle any 100Mb fiber media type and distance in the same way, with a selection of 100Mb SFP fiber transceivers that similarly plug in. And, for copper media attachment, there is a 10/100/1000 auto-negotiating RJ45 port. Where Gb Ethernet is in use, the CSG14U converts all media combinations.It is Universal.

The CSG14U is a high-speed flexible edge-of-the-network industrial Ethernet product. The compact package is ideal for industrial network edge installations. It features 12V, 24V or 48V DC power input terminal blocks, or AC input via industrial grade external power supplies. It has the metal case and DIN-Rail or panel-mounting choices you expect from Magnum industrial grade products.

All CSG14U Universal Converter Switch models come with two (2) sets of LED indicators. One set is on the front for viewing convenience when the unit is DIN-Rail or panel-mounted, and one LED set is mounted in the end adjacent to the ports for easy viewing when units are in a rack-mount tray. The Magnum CSG14U and CSG14 family of Gb Converter Switches and other Magnum products are designed and manufactured in the USA and backed by a three-year warranty.

Integrated with the latest technology for easy, plug-in SFP fiber transceivers, this versatile switch covers any Gb or 100 Mb fiber media type and distance. For copper media attachment, use the 10/100/100 auto-negotiating RJ45 port.

## Features

- Provides two SFP open transceiver fiber switch ports and one 10/100/1000 copper switch port
- Each SFP port accepts either Gb or 100 Mb fiber SFP transceivers
- Two models for heavy-duty application environments:
  - Hardened for Factory Floor
  - Premium-rated for -40ºC to 85ºC and Outdoors
- Integral terminal blocks for 12V, 24V, 48V DC power input, external AC power supply optional
- Same packaging and mounting options as popular Magnum CSG14-Series Gb Converter Switches

# Applications

**Hardened for Factory Floor**

The Magnum CSG14UH Universal Hardened units are for factory floor applications. The CSG14UH models are built with high-grade components and are constructed using special thermal techniques and a metal case for heavy duty industrial jobs. The ambient temperature rating is for industrial use. No internal air flow is required for cooling, so it resists dust, dirt, moisture, smoke and insects.

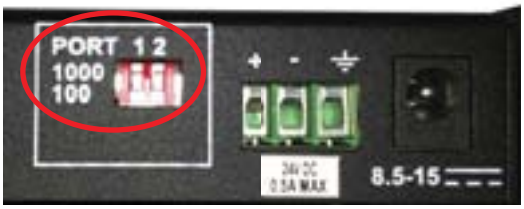
**Premium-rated for Outdoors**

The Magnum CSG14UP Universal Premium-rated units are for temperature un-controlled applications, typically located outdoors. The CSG14UP models are built with premium-grade extended temperature components, and use similar thermal techniques as the CSG14UH Hardened units. The ambient temperature rating is -40°C to 85°C. When used outdoors, the CSG14UP should be protected from falling rain.

# Technical Information

| | CSG14UH | CSG14UP |
|---|---|---|
| **Performance** | | |
| Fiber Ports | Two Industry standard SFP (Small Form-factor Pluggable) FDX open transceiver ports that accept 1000 Mb and 100Mb SFPs<br>User switch selection of Gb or 100Mb speed, per port. | |
| RJ45 Port Data Rate | 10 / 100 / 1000 Mbps, FDX and HDX modes.<br>Auto-negotiation and auto-cross MDI-MDIX | |
| Non-blocking Switching | 64KB packet buffer memory | |
| Address Buffer Storage | 1K addresses | |
| Address Buffer Age-out Time | 300 seconds | |
| **Network Standards** | | |
| Compliance With | Ethernet IEEE 802.3, IEEE 802.3u & ab, 802.1p; 1000BASE-TX, 1000 BASE-SX, -LX, -ZX, 100BASE-FX | |
| **VLANs Support** | | |
| Description | Data packets that have the 4 bytes tagged VLAN field (IEEE 802.1q) inserted in them are received and transmitted unchanged by all CSG14U Universal Converter Switches | |
| **Operating Environment** | | |
| Ambient Temperature Ratings | –25°C to 60°C long term per independent agency tests (UL), or –40°C to 85°C short term per IEC Type Tests | –40°C to 75°C long term per independent agency tests (UL), or –40°C to 85°C short term per IEC Type Tests. |
| Storage Temperature | -40°F to 212°F (-40°C to 100°C) | |
| Cold Start | -20°C | -40°C |
| Ambient Relative Humidity | 5% - 95% (non-condensing)<br>Conformal coating (humidity protection) optional, request quote | |
| Altitude | -200 to 50,000 ft. (-60 to 15,000m) | |
| **Packaging** | | |
| Enclosure | Robust sheet metal (steel), IEC 529 rated IP 40 | |
| Unit Dimensions | 3.5 in H x 3.0 in W x 1.0 in D (8.9 cm x 7.6 cm x 2.5 cm) | |
| Weight | CSG14 Switch Units: 6.1 oz (173g) | |
| Power Supply—Hd, Hi | Hd, Hi: 5.8 oz (165g) | Pd, Pi: 7.9 oz (225g) |
| Cooling Method | Convection, case used as a heat sink | |

# Technical Information (continued)

| | CSG14UH | CSG14UP |
|---|---|---|
| **SFP Speed Selection Switches** | | |
| Each SFP Port | Factory-set to Gb speed<br>Users may select 100 Mb via DIP switches on back of unit<br>Individually speed-selectable<br>After changing speed switch setting, power down the unit |  |
| **Connectors** | | |
| Gb SFP Fiber Transceivers | "SFP-SX"=1000BASE-SX-LC: fiber optic 850 nm multimode SFP, 550 m. nominal, 2km per Power Budget<br>"SFP-ESX"= 1000BASE-SX Extended, fiber optic 1310nm multimode with LC, 2 km nom.,3 km per Power Budget<br>"SFP-LX10"= 1000BASE-LX-SLC: fiber optic 1310nm single-mode SFP, 10 km nominal, 22km per Power Budget<br>"SFP-LX25"= 1000BASE-LX-SLC: fiber optic 1310nm single-mode SFP, 25 km nominal, 40km per Power Budget<br>"SFP-ZX40"= 1000BASE-ZX-SLC: fiber optic 1550nm single-mode SFP, 40 km nominal, 60km per Power Budget<br>"SFP-ZX70"= 1000BASE-ZX-SLC: fiber optic 1550nm single-mode SFP, 70 km nominal, 90km per Power Budget | |
| 100 Mb SFP Fiber Transceivers | "SFP100P-FXMM2"=100FX SFP-LC Premium MM plug-in, multi-mode, 2Km distance (formerly "XSFPLXMM")<br>"SFP100P-FXSM20"= 100FX SFP-LC Premium SM-20 plug-in, single-mode, 20Km distance (formerly "XSFPLXSM")<br>"SFP100P-FXSM40"= 100FX SFP-LC Premium SM-40 plug-in, single-mode, 40Km distance (formerly "XSFPEXSM") | |
| For Other Gb Fiber Connectors | Request quote | |
| RJ45 Port | Triple-speed 10/100/1000 auto-negotiation and auto-cross: shielded 8-Pin female<br>Supports shielded (STP) and unshielded (UTP) twisted pair cables | |
| **LED Indicators (dual: top front, in end)** | | |
| Power | ON for power applied | |
| Gb per Port | Steady ON for Gb, OFF for 100 or 10 Mb speed | |
| LK/ACT per Port | Steady ON for LINK with no traffic, blinking for Activity | |
| **Power** | | |
| Power Supplies for AC (External) | 100-240V AC at 47-63 Hz for "-Hd", "Hi" models, see footnote 1,2 | 95-260V AC at 47-63 Hz for "-Pd", "Pi" models, see footnote 1,2 |
| | Power input DC jack (8 to 15V) is 2.5mm, center +ve, with 6ft. DC cord | |
| Power Input Options for DC | 12V DC, internal (range of 8.0 to 15V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>24V DC internal (range of 10 to 36V DC) built-in screw terminal for +, -, ground. The DC jack is also present.<br>-48V DC internal (range of 30 to 60V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>Note1: the 12V DC jack can be used for dual source DC power input<br>Note2: internal DC power floats, user may ground + or – if desired. For PoE: Total power input required = 66 watts max or 1.4a @48VDC | |
| Power Consumption | 4 Watts typical. 5 Watts max | |
| **Approvals/Standards Compliance** | | |
| All Models | UL listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A.<br>NEBS L3 and ETSI compliant, including vibration, shock, and altitude<br>IEEE 1613 Environmental Standard for Electric Power Substations<br>IEC61850 EMC and Operating Conditions Class C for Power Substations | |
| P Models | | NEMA TS-2 and TEES for traffic control equipment |
| **Warranty** | | |
| Made in USA | Three [3] years | |
| **Mounting** | | |
| Metal Panel Mounting | Clips included | |
| Rack-Mount | Model MC14-TRAY.<br>Depth: 6.0", Width 17",<br>Height 2.25"(15 cm D x 43cm W x 5.7cm H) | |
| DIN-Rail Mounting | Model # DIN-RAIL MC2 | |

1: External 12V1A power supply, wall plug or power cord for North America AC receptacles. Temperature rating same as S14H, see above. (North America: for spare, order Model PSH-12V1A-Hd. Intl: order Model PSH-12V1A-Hi with IEC plug).

2: External 12V1A power supply, rated for outdoor temperatures same as S14P, see above. Universal AC input with recessed IEC plug. (North America: for spare, order Model PSP-12V1A-Pd, Intl: order Model PSP-12V1A-Pi with IEC plug).

# Magnum CSG14U Configuration Guide

**Base Model (w/ fixed 1x 10/100 RJ45 Ports)**
**CSG14U** = Gigabit Universal Converter Switch

**Variation**
**H** = Hardened for the Factory Floor (-25° to +60° C)
**P** = Premium Rated for Outdoors (-40° to +75° C)

**Mounting**
**R** = DIN-Rail

**Fiber Port Connectors (2x FX connectors)**
**SFP-SX** =1000BASE-SX-LC: fiber optic 850 nm multimode SFP, 550 m. nominal, 2km per Power Budget
**SPF-ESX** = 1000BASE-ESX-LC Extended, fiber optic 1310nm multimode w/ LC, 2 km nom.,3 km per Pwr Budget
**SFP-LX10** = 1000BASE-LX-SLC: fiber optic 1310nm single-mode SFP, 10 km nominal, 22km per Power Budget
**SFP-LX25** = 1000BASE-LX-SLC: fiber optic 1310nm single-mode SFP, 25 km nominal, 40km per Power Budget
**SFP-ZX40** = 1000BASE-ZX-SLC: fiber optic 1550nm single-mode SFP, 40 km nominal, 60km per Power Budget
**SFP-ZX70** = 1000BASE-ZX-SLC: fiber optic 1550nm single-mode SFP, 70 km nominal, 90km per Power Budget
**SFP100P-FXMM2** =100FX SFP-LC Premium MM plug-in, multi-mode, 2Km distance (formerly "XSFPLXMM")
**SFP100P-FXSM20** = 100FX SFP-LC Premium SM-20 plug-in, single-mode, 20Km distance (formerly "XSFPLXSM")
**SFP100P-FXSM40** = 100FX SFP-LC Premium SM-40 plug-in, single-mode, 40Km distance (formerly "XSFPEXSM")

**Power Supply Options**
**Hd** = External 100-240V AC at 50-60Hz (w/ H models only)
**Hi** = External 100-240V AC at 50-60Hz international (w/ H models only)
**Pd** = External 100-240V AC at 50-60Hz (w/ P models only)
**Pi** = External 100-240V AC at 50-60Hz international (w/ P models only)
**24VDC** = 24V DC power
**12VDC** = 12V DC power
**48VDC** = 48V DC power

# CSN14 Converter Switch with 10 Mb Fiber

## Versatile solution for any application requiring a 10 Mb fiber link connected to one or two 10/100 copper devices

**Convert anything to anything.**

For any user who needs a 10 Mb fiber link connected to one or two 10/100 copper devices, the "go anywhere" Magnum CSN14 Converter Switch is a versatile and handy solution.

The Magnum CSN14 family of Converter Switches, with a 10 Mb Fiber port built in covers the full range of application environments with regular (office), Hardened (factory floor), and Premium-rated (outdoor) versions. Extra features for heavy-duty and extended temperature operation ranges are included selectively in the Hardened factory-floor and Premium-rated outdoor models. This selection of models offers the best price-to-value ratio for each user and installation. The compact package is ideal for "edge of the network" installation, and can be conveniently mounted to suit any application.

This switch family covers the full range of application environments, with Regular (office), Hardened (factory floor) and Premium-rated (outdoor) versions. Compact design makes these switches ideal for edge-of-network use.

## Features

- Provides one 10 Mb fiber port and two (2) 10/100 copper switch ports
- Two RJ45 ports support IEEE 802.3u to enable attaching any 10 Mb or 100 Mb device
- AC power for all models, Factory Floor and Outdoor models also have integral DC terminal blocks
- Same packaging and mounting options as the popular Magnum 14-Series
  Media Converters

# Applications

**Office and Wiring Closet**

The Magnum CSN14 regular-package units are for office and indoor wiring closet environments. These are the economical base units in the CSN14 Switch family. An external AC power supply for either North America (-d, 115vac 60Hz) or international (-I, 230vac, 50Hz) is included. The ambient temperature rating is 0° to 40°C, office grade. A robust metal case with convection cooling is featured.

**Hardened for Factory Floor**

The Magnum CSN14H Hardened units are for factory floor applications. The CSN14H models are built with high-grade components and are constructed using special thermal techniques and a metal case for heavy duty industrial jobs. In addition to a Hardened AC power option and jack, terminals for internal DC power choices at 8 to15V, 24V or -48V DC are included. The ambient temperature rating is for industrial use. No internal air flow is required for cooling, so it resists dust, dirt, moisture, smoke and insects.

**Premium-rated for Outdoors**

The Magnum CSN14P Premium-rated units are for temperature uncontrolled sheltered applications, typically located outdoors.
The CSN14P models are built with premium-grade extended temperature components, and use similar thermal techniques as the CSN14H Hardened units. In addition to a Premium-rated AC power option and jack, terminals for internal DC power choices at 8 to15V, 24V or -48V DC are included. When used outdoors, the CSN14P should be sheltered from the elements.

# Technical Information

| | CSN14 | CSN14H | CSN14P |
|---|---|---|---|
| **Performance** | | | |
| Fiber Port | 10 Mb HDX/FDX, ST connectors for multi-mode or single-mode | | |
| RJ45 Ports Data Rate | 10 / 100 Mb, FDX and HDX modes<br>Auto-negotiation and auto-cross MDI-MDIX on both RJ45 ports occurs at LINK-enable<br>No crossover cables required | | |
| Non-blocking Switching | 128KB packet buffer memory | | |
| Address Buffer Storage | 2K addresses | | |
| Address Buffer Age-out Time | 300 seconds | | |
| **Network Standards** | | | |
| Compliance With | Ethernet IEEE 802.3, IEEE 802.3u, 802.1p; 100BASE-TX, 10BASE-T, 10BASE-FL | | |
| **VLANs Support** | | | |
| Description | Data packets that have the 4 bytes tagged VLAN field (IEEE 802.1q) inserted in them are received and transmitted unchanged by all CSN14 Converter Switches | | |
| **Operating Environment** | | | |
| Ambient Temperature Ratings | 0°C to 40°C | –25°C to 60°C long term per independent agency tests (UL), or –40°C to 85°C short term per IEC Type Tests | –40°C to 75°C long term per independent agency tests (UL), or –50°C to 100°C short term per IEC Type Tests. |
| Cold Start | | -20°C | -40°C |
| Ambient Relative Humidity | 5% - 95% (non-condensing)<br>Conformal coating (humidity protection) optional, request quote | | |
| Altitude | -200 to 50,000 ft. (-60 to 15,000m) | | |
| NEBS Compliance | | Yes<br>Including vibration, shock, altitude | |

# Technical Information (continued)

| | CSN14 | CSN14H | CSN14P |
|---|---|---|---|
| **Packaging** | | | |
| Enclosure | Robust sheet metal (steel); H&P models: IEC 529 rated IP40 | | |
| Unit Dimensions | 3.5 in H x 3.0 in W x 1.0 in D (8.9 cm x 7.6 cm x 2.5 cm) | | |
| Weight | CSN14 Switch Units: 8.6 oz (243g) | | |
| Power Supply | d, i: 5.8 oz (165g) | Hd, Hi: 5.8 oz (165g) | Pd, Pi: 7.9 oz (225g) |
| Cooling Method | Convection | Convection, case used as a heat sink | |
| **Switches** | | | |
| Fiber Port | Manual selection of HDX or FDX (default is HDX) | | |
| **Connectors** | | | |
| RJ45 with auto-cross, 100BASE-TX and 10BASE-T | Shielded 8-pin female<br>Supports shielded (STP) and unshielded (UTP) Cat. 3, 4, 5 | | |
| **LED Indicators (dual, top front, in end)** | | | |
| Power | ON for power applied | | |
| 10/100 per RJ45 Port | Steady ON for 100 Mb, OFF for 10 Mb speed | | |
| LK/ACT per Port | Steady ON for LINK with no traffic, blinking for Activity | | |
| F/H per Port In End | Steady ON for F/D mode, OFF for H/D mode | | |
| **Power** | | | |
| Power Supplies for AC (External) | 95-125V AC at 60 Hz for "-d" models, 215-240V AC at 50 Hz for "-i" models that have IEC power connector in the ext. power unit | 100-240V AC at 47-63 Hz for "-Hd" and "Hi" models, see footnote 1 | 100-240V AC at 47-63 Hz for "-Pd" and "Pi" models, see footnote 2 |
| | Power input DC jack (8 to 15V) is 2.5mm, center +ve, with 6ft. DC cord | | |
| Power Input Options for DC | 12V DC, internal (range of 8.0 to 15V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>24V DC internal (range of 10 to 36V DC) built-in screw terminal for +, -, ground. The DC jack is also present, see footnote 3<br>-48V DC internal (range of 30 to 60V DC), built-in screw terminal block for +, -, ground. The 12V DC jack is also present.<br>Note1: the 12V DC jack can be used for dual source DC power input<br>Note2: internal DC power floats, user may ground + or – if desired. | | |
| Power Consumption | 5 Watts typical. 6 Watts max | | |
| **Approvals/Standards Compliance** | | | |
| All Models | UL listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A<br>NEBS L3 and ETSI compliant, including vibration, shock, and altitude<br>Compliant with EN50155 Railway Applications Standard<br>IEC 61850 EMC and Operating Conditions Class C for Power Substations | | |
| H and P Models | | IEEE 1613 Env. Std for Electric Power Substations | |
| P Model | | | NEMA TS-2 and TEES for traffic control equipment<br>Designed for above-the-ceiling (plenum) installation |
| **Warranty** | | | |
| Made in USA | Three [3] years | | |
| **Mounting** | | | |
| Metal Panel Mounting | Clips included | | |
| Rack-Mount | Model MC14-TRAY.<br>Depth: 6.0", Width 17",<br>Height 2.25"(15 cm D x 43cm W x 5.7cm H) | | |
| DIN-Rail Mounting | Model # DIN-RAIL MC2 | | |

1: External 12V1A power supply, wall plug or power cord for North America AC receptacles. Temperature rating same as S14H, see above. (North America: for spare, order Model PSH-12V1A-Hd. Intl: order Model PSH-12V1A-Hi with IEC plug).

2: External 12V1A power supply, rated for outdoor temperatures same as S14P, see above. Universal AC input with recessed IEC plug. (North America: for spare, order Model PSP-12V1A-Pd, Intl: order Model PSP-12V1A-Pi with IEC plug).

# Magnum CSN14 Configuration Guide

**Base Model (w/ fixed 2x 10/100 RJ45 Ports)**
**CSN14** = 10Mb Fiber Converter Switch

**Fiber Port Type**
**S** = single-mode 10 Mb fiber port
**Blank** = (default) multi-mode 10 Mb fiber port

**Variation**
Blank = Standard Unit (0° to 40°C)
**H** = Hardened for the Factory Floor (-25° to +60° C)
**P** = Premium Rated for Outdoors (-40° to +75° C)

**Mounting**
**R** = DIN-Rail

**Power Supply Options**
**Hd** = External 100-240V AC at 50-60Hz (w/ H models only)
**Hi** = External 100-240V AC at 50-60Hz international (w/ H models only)
**Pd** = External 100-240V AC at 50-60Hz (w/ P models only)
**Pi** = External 100-240V AC at 50-60Hz international (w/ P models only)
**24VDC** = 24V DC power
**12VDC** = 12V DC power
**48VDC** = 48V DC power

# Dymec Series

## Dymec Ethernet and Serial media converters and Dymec Fiber Optical Stars for the networking of multiple serial devices are Certified to IEEE 1613 and Class 1 Div2 for use in hazardous locations.Convert anything to anything.

### Dymec Ethernet Links 3340/3350 & 3344/3354

DYMEC models 3340, 3350, 3344 and 3354 are hardened fiber optic links that convert 10Base-T Ethernet from twisted pair copper to 10Base-FL or Single-mode fiber optics.

DYMEC models 3440, 3450, 3442, 3452, 3444 and 3454 are hardened fiber optic links that convert 100Base-T Ethernet from twisted pair copper to 100Base-FX, 100Base-SX or Single-mode fiber optics.

These links are stand-alone mounted and require no programming or set up. Simply mount the Link in an appropriate location and connect power.

DYMEC Links are powered from various sources. The standard models accept 90 to 250 Volts ac or dc. Optionally, these Links can also be ordered for 12 or 24 to 48 Volts dc. The power supplies are surge withstand protected to both IEC 63000 and IEEE C37.90 standards.

- EEE 802.3 compatible
- 2 RJ45 connectors eliminates the worry over crossover or straight cables
- Automatic Polarity detection and correction
- Auto adapts to Half or Full Duplex mode

Dymec Models operate as Links and Repeaters, optically connecting different formats and eliminating the need for converters. Optical Stars operate with multi-mode and/or single-mode optics, providing a full optical budget for each port.

## Features

- Operates reliably at temperatures of –40°C to 85°C with no fans
- Packaged in rugged, industrial quality Galva Neal and powder coated shells
- Powered from Station Battery Bus
- Multiple Mounting choices with built-in and optional mounting brackets
- Extended distances of 5km over Multi-mode fiber and 30km over Single-mode fiber Diagnostic LEDs for easier debug of installation
- Certified to IEEE 1613 and Class 1 Div2
- 5 year warrantys

### Dymec 5843 and 5844

Dymec models 5843 and 5844 are hardened fiber optic Link/Repeaters that convert RS232 or TTL level copper to amplitude based fiber output. Supports data rates from dc to 250k bps, DCE or DTE port configuration and a diagnostic/test mode that allows testing of the copper and fiber connections before the connected IED is active in the network.

By simply setting a few switches, the Dymec 5843 and 5844 Link/Repeaters can be configured for point-to-point, star, optical bus, or loop networks, and permit quick, easy connection of devices. For example, an extensive multi-drop network—where two or more intelligent electrical devices are connected and communicating can be constructed simply by connecting the devices through Link/Repeaters.

Dymec 5843 and 5844 Link/Repeaters may optically connect devices of different formats, eliminating the need for format converters. For example, an RS232 IED may be connected to a model 5844 which is optically connected to a model 5846, which, in turn, can communicate electrically to its IED in EIA 485.

### Dymec 5845 and 5846

Dymec model 5845 and 5846 Serial Fiber Links are link/repeaters for EIA 422 and 485 data connections. The 5845/5846 Links provide reliable serial data connectivity over fiber optic facilities in harsh environments where immunity and signal isolation are critical. Optical connectivity provides flexibility, extended distance, operational safety, reduced equipment outages due to electrical surges, and improved signal quality and network performance.

5845/5846 Links support signal rates from DC to 2 Mbps and operate either full- or half-duplex over single- or multimode fiber. Links are easily field configurable for point-to-point, master/slave, loop, bus or star topologies.

The 5845/5846 also interoperate with 5843/5844 RS232 Links, the Dymec Network Integration System and Optical Star products to costeffectively create highly scaleable data networks with minimum electrical signal exposure.

Dymec Links are substation-hardened to IEEE 1613 specifications. They operate in an extended temperature range and optionally take DC power directly from station battery. Flexible mounting options, diagnostic LEDs and integrated optical and electrical signal test features make turning up Link networks simple.

### Dymec Links 5941 and 5942

Dymec 5941 and 5942 Data Links are designed as full duplex four channel devices. Four channels have bandwidth of DC to 64k bps (D4 version), and on the (D1 version) three of the channels have bandwidth of DC to 4k bps.

Used in point-to-point RS232 application, 5941 and 5942 Data Links are designed to pass handshaking or flow control signals along with data. These links do not utilize the flow signals for their operation.

Like all Dymec digital-to-fiber optic products, they are passive to all software protocols, and simply send the communications signals from one node to the other.

- Sending four RS232 non-handshaking signals together on a single pair of fibers (provided at least three of the signals are at 4000 baud or slower for the D1 version).
- Interfacing RTUs to radios that require push-to talk control
- Passing up four contacts bi-directionally or KYZ meter contacts.
- Transmitting data and IRIG-B timing signals with a single Link.
- 1 or 2 Synchronous data ports (D4 model only). 5941 and 5942 Data Links feature a power-on light, a “SYNC” LED, and eight diagnostic
- LEDs.the celllular port, a WAN port can be configured for T1/E1 or DDS circuits.

### Optical Stars

OS9HRT Optical Stars provide network designers with a convenient “hub and spoke” topology capability. Optical Stars are available with nine ports, with multi-mode and/or single-mode optics providing a full optical budget on each port. To further provide flexibility the Master port (port one) can be configured with an RS232 copper interface. The OpticalStar can in addition support Master/Slave or Peer-to-Peer mode and be cascaded by simply connecting a port from one Optical Star to a port of the next (in Master/Slave mode it must be a slave port connected to the next master).

DYMEC Optical Stars are ideal for Master/Slave polling applications such as multiple meters, relays and other statistical devices as well as broadcasting IRIG-B to multiple devices where fiber offers extended range and isolation from interference. Optical Stars also allow you to take one or more devices out of service while all others continue to operate. This is invaluable in most applications.

Optical Stars are passive to all software protocols, and ports cannot be addressed by software. Data rates from dc to 2M bps are supported. Optical Stars are optically compatible with DYMEC models 5843, 5844, 5845 and 5846, as well as all 3900 Chassis serial cards and all serial optical ports of the DynaStar products. Optical Stars are also compatible with most IEDs with embedded optical ports using amplitude modulation. These units are available in 19-inch rack mount and can be configured for panel mounting.

# Product Specifications

| Optical Paramaters | 3340/3350 | 3440/3450 | 5843/5844 | 5845/5846 | 5941/5942 | 0S9 |
|---|---|---|---|---|---|---|
| **Optical Budget Typical** | | | | | | |
| **Multi-mode** | 13.5 dB (min) | 9.0 dB (min) | 19.5dB | | | 19.5 dB |
| **Single-mode** | 8.6 dB (min) | 8.6 dB (min) | 19dB | | | 18 dB |
| **Output Power Typical** | | | | | | |
| **Multi-mode** | -16 dB | -19 dB | -10.5 dBm peak | | | -10.5 dBm peak |
| **Single-mode** | -19.9 dB | -19.9 dB | -14.5 dBm peak | | | -11.5 dBm peak |
| **Receiver Sensitivity Typical** | | | | | | |
| **Multi-mode** | | | -30 dBm peak | | | -30 dBm peak |
| **Single-mode** | | | -33.5 dBm peak | | | -33.5 dBm peak |
| **Wavelength** | | | | | | |
| **Multi-mode** | 850nm | 1310nm | 850nm (62.5µ/125) | | | |
| **Single-mode** | 1310nm (9µ/125) | | | | | |
| **Connector Type** | ST | | | | | |
| **Compatible Fiber Type** | | | | | | |
| **Multi-mode** | | | 50-200µm | | | |
| **Single-mode** | | | 9-13µm | | | |
| **Configuration (Switches)** | Link Pass-Through/ Link Fail | | DTE/DCE<br>AC/DC Coupled<br>Link/Repeat<br>Pin 8 Drive Current<br>Pin 6 +5 Vdc (DSR or CTS pull up)<br>Diagnostic Mode | Half/Full Duplex<br>AC/DC Coupled<br>Link/Repeat<br>Biasing Resistors In/Out<br>Data Inversion Mode<br>Enable Holdover<br>Diagnostic Mode | Channel 3 IRIG-B Output/ Standard<br>Channel 3 Drive Current Select<br>Channel 4 Sync Indicator/ Data Out | Master/Slave or Peer to Peer |
| **Data Rate** | 10Mbs | 100Mbs | DC to 250kbps | DC to 2M bps | DC to 64kbps Channel 1, DC to 4kbps Channels 2,3,4 (D1) DC to 64kbps all 4 channels (D4) | DC to 2M bps<br>DC to 250kbps (RS232 Copper Master Port) |
| **Data Transmission** | Half or Full Duplex | | Asynchronous, simplex or Full Duplex | | Asynchronous, simplex Half or Full Duplex | Asynchronous, simplex or Half Duplex |
| **Transmission Distance** | | | | | | |
| **Multi-mode** | Up to 2000 meters (62.5µ/125 Cable@3dB/km) | | Up to 5000 meters (62.5µ/125 Cable@3dB/km) | | | |
| **Single-mode** | Up to 10K meters (9µ/125 Cable@.5dB/km) | | Up to 30K meters (9µ/125 Cable@.5dB/km) | | | |
| **Bit Rate Error** | 10-E9 Max. | | | | | |
| **Point to Point Latency** | 500 nsec Max | | 4µS | 500 nsec Max | 100µS Channels 2,3,4 (D1)<br>1µS<br>12µS Channels 2,3,4 (D4) | 300 nsec Max |
| **Repeat Latency** | | | 400 nsec Max | | | |

# Product Specifications (continued)

| Electrical Paramaters | 3340/3350 | 3440/3450 | 5843/5844 | 5845/5846 | 5941/5942 | OS9 |
|---|---|---|---|---|---|---|
| I/O Data Format | 802.3 Ethernet | 802.3 Ethernet | EIA RS232; CCITT v.24 | EIA 422/485 | EIA RS232; CCITT v.24 | |
| Data Connector | 2 RJ45 | 2 RJ45 | 9 pin D-Type Female | | | 9 Pin D-Type Female Fixed DCE only |
| Input Impedance | | | >3000Ohms | 750Ohms | >3000Ohms | >3000Ohms |
| Input voltage | | | +/-30 Volts Max | +12 to -7 Volts Max referenced to signal common +/-6 Volts differential Max | +/-30 Volts Max | +/-30 Volts Max |
| Output Impedance | | | >300Ohms | >250 Ohms | >300Ohms | >300Ohms |
| Driver Output | | | +/-5Volts into 3000Ohms | 50 mA | +/-5Volts into 3000Ohms | +/-5Volts into 3000Ohms |
| Pin 8 Output | | | 0 to 5V 67 or 207 Ohm Source Impedance | n/a | n/a | n/a |
| Channel 3 | | | n/a | n/a | 0 to 2.5V @10mA 0 to 3V @ 20mA | n/a |
| **Ambient Temperature** | | | | | | |
| Operating Temperature | | | | | | |
| Multi-mode | -40°c to +85°c | | | | | |
| Single-mode | -40°c to +70°c | | | | | |
| Storage Temperature | -40°c to +85°c | | | | | |
| **Power Required** | | | | | | |
| Multi-mode | 4.0 Watts 333 mA @ 12Vdc / 5.4 Watts 60 mA @ 90-250V 300 mA @ 18-60V | | 3.0 Watts 250mA @ 12Vdc / 4.0 Watts 35 mA @ 90-250V 250 mA @ 18-60V | 3.0 Watts 250mA @ 12Vdc / 6.0 Watts 45 mA @ 90-250V 250 mA @ 18-60V | 2.4 Watts 200mA @ 12Vdc / 2.4 Watts 35 mA @ 90-250V 170 mA @ 18-60V | ~27.5 Watts 250 mA @ 90-250V 1.25 A @ 18-60V |
| Single-mode | 4.0 Watts 333 mA @ 12Vdc / 5.4 Watts 60 mA @ 90-250V 300 mA @ 18-60V | | 4.1 Watts 340mA @ 12Vdc / 5.5 Watts 50 mA @ 90-250V 340 mA @ 18-60V | 4.0 Watts 340mA @ 12Vdc / 8.0 Watts 60mA @ 90-250V 3400mA @ 18-60V | 3.0 Watts 250mA @ 12Vdc / 3.6 Watts 40 mA @ 90-250V 200 mA @ 18-60V | |
| Power Dissipation | | | | | | |
| Multi-mode | 13.7 BTU / 18.4 BTU | | 8.2 BTU/hr / 10.9 BTU/hr | 10 BTU/hr / 20 BTU/hr | 8.2 BTU/hr / 10.2 BTU/hr | 9 BTU |
| Single-mode | 13.7 BTU / 18.4 BTU | | 10.2 BTU/hr / 12.3 BTU/hr | 14 BTU/hr / 27 BTU/hr | 10.9 BTU/hr / 12.3 BTU/hr | 9 BTU |
| **Physical Parameters** | | | | | | |
| Weight | 9 oz. / 17 oz. | | | | | ~11 lbs |
| Dimensions (Inches) | 2.0W x 5.1L X 1.3H / 4.1W x 5.1L X 1.3H | | | | | 19W X 9D X 3.5H |
| Indicators | Power Fiber Link Electrical Link Fiber Data Electrical Data | | Power Transmit Fiber Transmit Electrical Receive Fiber Receive Electrical | | Power Sync Status Transmit Each Ch Receive Each Ch | Power Data Collision Master/Slave Mode Peer to Peer Mode Master Port Transmit Each Port Receive Each Port |

# Dymec Series Ordering Information

3340/3350

| Model | Input | Fiber Type | Input Power | 802.3 Standard |
|---|---|---|---|---|
| 3340HRT R | 10 Base-T | Multi-mode | 9 - 15VDC | 10Base-FL |
| 3350HRT-H R | 10 Base-T | Multi-mode | 90-250V AC/ DC | 10Base-FL |
| 3350HRT-L R | 10 Base-T | Multi-mode | 24 to 48VDC | 10Base-FL |
| 3344HRT R | 10 Base-T | Single-Mode | 9 - 15VDC | Single-Mode |
| 3354HRT-H R | 10 Base-T | Single-Mode | 90-250V AC/ DC | Single-Mode |
| 3354HRT-L R | 10 Base-T | Single-Mode | 24 to 48VDC | Single-Mode |

3440/3450

| Model | Input | Fiber Type | Input Power | 802.3 Standard |
|---|---|---|---|---|
| 3440HRT R | 100 Base-TX | Multi-mode | 9 - 15VDC | 100Base-SX |
| 3450HRT-H R | 100 Base-TX | Multi-mode | 90-250V AC/ DC | 100Base-SX |
| 3450HRT-L R | 100 Base-TX | Multi-mode | 24 to 48VDC | 100Base-SX |
| 3442HRT R | 100 Base-TX | Multi-mode | 9 - 15VDC | 100Base-SX |
| 3452HRT-H R | 100 Base-TX | Multi-mode | 90-250V AC/ DC | 100Base-SX |
| 3452HRT-L R | 100 Base-TX | Multi-mode | 24 to 48VDC | 100Base-FX |
| 3444HRT R | 100 Base-TX | Single-Mode | 9 - 15VDC | Single-Mode |
| 3454HRT-H R | 100 Base-TX | Single-Mode | 90-250V AC/ DC | Single-Mode |
| 3454HRT-L R | 100 Base-TX | Single-Mode | 24 to 48VDC | Single-Mode |

5941/5942

| Model | Input | Fiber Type | Input Power | 64K Baud Data Rate |
|---|---|---|---|---|
| 5941D1HRT R | RS232/TTL | Multi-Mode | 9-15 Vdc | 1 Channel |
| 5942D1HRT-H R | RS232/TTL | Multi-Mode | 90-250V AC/ DC | 1 Channel |
| 5942D1HRT-L R | RS232/TTL | Multi-Mode | 24-48 Vdc | 1 Channel |
| 5941SD1HRT R | RS232/TTL | Single-Mode | 9-15 Vdc | 1 Channel |
| 5942SD1HRT-H R | RS232/TTL | Single-Mode | 90-250V AC/ DC | 1 Channel |
| 5942SD1HRT-L R | RS232/TTL | Single-Mode | 24-48 Vdc | 1 Channel |
| 5941D4HRT R | RS232/TTL | Multi-Mode | 9-15 Vdc | 4 Channels |
| 5942D4HRT-H R | RS232/TTL | Multi-Mode | 90-250V AC/ DC | 4 Channels |
| 5942D4HRT-L R | RS232/TTL | Multi-Mode | 24-48 Vdc | 4 Channels |
| 5941SD4HRT R | RS232/TTL | Single-Mode | 9-15 Vdc | 4 Channels |
| 5942SD4HRT-H R | RS232/TTL | Single-Mode | 90-250V AC/ DC | 4 Channels |
| 5942SD4HRT-L R | RS232/TTL | Single-Mode | 24-48 Vdc | 4 Channels |

5845/5846

| Model | Input | Fiber Type | Input Power |
|---|---|---|---|
| 5845HRT R | RS-422/485 | Multi-Mode | 9 - 15VDC |
| 5846HRT-H R | RS-422/485 | Multi-Mode | 90-250V AC/DC |
| 5846HRT-L R | RS-422/485 | Multi-Mode | 24 to 48VDC |
| 5845SHRT R | RS-422/485 | Single-Mode | 9 - 15VDC |
| 5846SHRT-H R | RS-422/485 | Single-Mode | 90-250V AC/DC |
| 5846SHRT-L R | RS-422/485 | Single-Mode | 24 to 48VDC |

OS9

| Model | Ports | Input Power |
|---|---|---|
| OS9HRT-H-1M R | 1 MM . 8 SM | 90-250V AC/DC |
| OS9HRT-H-9M R | 9 MM | 90-250V AC/DC |
| OS9HRT-H-9S R | 9 SM | 90-250V AC/DC |
| OS9HRT-H-CM R | 1 RS232 / 8MM | 90-250V AC/DC |
| OS9HRT-H-CS | 1 RS232 / 8SM | 90-250V AC/DC |
| OS9HRT-L-1M R | 1 MM / 8 SM | 24 to 48VDC |
| OS9HRT-L-1S | 8 MM / 1 SM | 24 to 48VDC |
| OS9HRT-L-9M R | 9 MM | 24 to 48VDC |
| OS9HRT-L-9S R | 9 SM | 24 to 48VDC |
| OS9HRT-L-CM R | 1 RS232 / 8 MM | 24 to 48VDC |
| OS9HRT-L-CS R | 1 RS232 / 8 SM | 24 to 48VDC |

Choose Options and Extras

| Model | Description |
|---|---|
| ACC-LCS | Link Cantilever Mounting Bracket |
| ACC-CBL1 | DB9 Male/Tinned Lead 10 Foot Cable/Pigtail |
| ACC-CBL2 | DB9 Male/4 DB9 Female 1 X 4 Interface Cable 1 Foot |
| ACC-SWMB | Optional Wall Mount Bracket for OS9 |
| ACC-SRMB | Rack Mount Bracket for OS9 |

5843/5844

| Model | Input | Fiber Type | Input Power |
|---|---|---|---|
| 5843HRT R | RS232/TTL | Multi-Mode | 9 - 15VDC |
| 5844HRT-H R | RS232/TTL | Multi-Mode | 90-250V AC/DC |
| 5844HRT-L R | RS232/TTL | Multi-Mode | 24 to 48VDC |
| 5843SHRT R | RS232/TTL | Single-Mode | 9 - 15VDC |
| 5844SHRT-H R | RS232/TTL | Single-Mode | 90-250V AC/DC |
| 5844SHRT-L R | RS232/TTL | Single-Mode | 24 to 48VDC |

# Magnum MC14-TRAY Rack-Mount Tray for Media Converters

## Rack-mount, rugged tray that holds all Magnum converter switches, media converters and ES42-series edge switches

The MC14-TRAY is a rack-mount (19" RETMA) tray of rugged metal construction. The MC14 holds all Magnum converter switches, media converters and ES42-series edge switches and is designed for rack-mounting for up to 16 Magnum converter switches or 14-Series media converters or 8 ES42 edge switches or combinations. The rear space of the rack holds power strips/power supplies.

A typical MC14-TRAY will be populated with a mix of Gigabit, 100 Mb and 10 Mb units. The tray's two-in-one design provides the flexibility, modularity and reliability of individual Magnum media converters and edge switches.

Optional versions with power supplies and power cables may be selected – 90-260V AC 50-60Hz input.

Combining the flexibility of single-unit media converters with the convenience of rack-mounting, the Magnum MC14-TRAY offers a hardened, low-cost unit that allows you to mix-and-match Gigabit, 100 Mb and 10 Mb switches

## Features

- Combines the flexibility of single-unit media converters with the convenience of rack mounting
- Low entry cost where only a handful of MC units are needed initially
- Rugged metal construction holds media converters in front for easy cable access and status LED viewing; power supplies in the rear
- Mix and match Gigabit, 100 Mb 10 Mb CS and MC units, regular and/or hardened
- Models with built-in common power supply available

MC14-TRAY for easy, convenient rack-mounting

Mix-and-match Gigabit, 100 Mb and 10 Mb units on one versatile rack

MC14-TR+PS9 model, side view, illustrated with ten 14Es

MC14-TRAY+9PS provides power for up to 10 fiber media converters (shown here with two Magnum 14Es)

MC14-TR+PS9X2 model with two power supplies to serve eight MC units each; shown here with two Magnum 14Es per power supply

# Technical Information

| Mechanical | |
|---|---|
| **Construction** | Rugged high-strength sheet metal. Includes brackets for 19" rack mounting |
| **Dimensions** | 1.75 in H x 17.0 in W x 9.0 in D<br>(4.45 cm H x 43.2 cm W x 22.9 cm) |
| **Height of unit with PS and MCs** | 3.75 inches (9.5cm) |
| **Weight** | 1.9 lb. (0.9 kg) empty, 9.0 lbs (4.1kg) when loaded with ten 14-Series MCs |
| **Operating Environment** | |
| **Ambient Temperature** | Regular and/or Hardened ES, CS, or MCs:<br>32°F to 120°F (0°C to 50°C)<br>Hardened DC power MCs, MC14-TRAY (w/o AC PS):<br>-40°F to 175°F (-40°C to 75°C) |
| **Storage Temperature** | -40°C to 85°C |
| **Ambient Relative Humidity** | 10% to 95% (non-condensing) |
| **Altitude** | -200 to 13,000 ft (-60 to 4000 m) |
| **Power Supply** | |
| **MC14-TR+PS9** | Rated at 40 watts, 9 V DC output + or - 5% regulation<br>Auto-ranging (100-240V AC, 47-63 Hz) AC input<br>MCs use 4 watts each, so 10 units need about 40 watts operating at 50°C |

Note: The power supply is nameplate-rated at 54 watts at 40°C, and de-rated for a higher 50°C ambient temperature.

# Ordering Information

| Product | Description |
|---|---|
| **MC14-TRAY** | Rack-mount tray holds up to 16 units of converter switches or 16 units 14-Series media converters or 8 ES42 edge switches or combinations |
| **MC14-TR+PS9** | Rack-mount tray supports up to 10 units of converter switches or 14-Series media converters or combinations<br>Includes the power supply unit and connectors to power up to 10 units at 9V DC as required.<br>Auto-ranging AC input to the power supply for use worldwide |
| **MC14-TR+PS9X2** | Rack-mount tray supports up to 16 units of the converter switches or 14-Series media converters or combinations<br>Includes the power supply units and connectors to power up to 16 media converters at 9V DC in two groups of eight units per power supply<br>Auto-ranging AC input to the power supplies |

# DIN-Rail

Many Magnum products such as the 6KL, 6KQ, ES42, and CS14 are designed for use in a “factory floor” industrial environment or other harsh or outdoor environment where DIN-Rail is often used. These units are available with an optional DIN-Rail bracket to mount securely—often in a metal enclosure, and maintained vertically for proper convection cooling. These Magnum switches require one DIN-Rail bracket for secure mounting.

Each DIN-Rail bracket features four screws for connecting to the back of the Magnum unit and a spring-loaded latch for easy connection to and from the din-rail. Some products such as the Magnum 6K16V feature two unique din-rail brackets (Model # DIN-VM16-KIT).

## Features

- Efficient DIN-Rail Mounting for Edge Switches & Converters, DIN-RAIL-LATCH for use with Magnum Converter Switches and Edge Switches
- Mounting Available for 6KQ, and 6KQE, Model # DIN-Rail-6KQ shown above with Magnum 6KQ and 6KQE Switches
- Mounting for Larger 6K16V Available, Optional Model # DIN-VM16-KIT for variable height DIN-Rail mounting of Magnum 6K16V Managed Switches
- DIN-Rail Bracket Flexibility, DIN-RAIL-LATCH may also be used to DIN-Rail mount Magnum 6KL Managed Switches

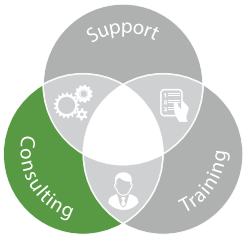
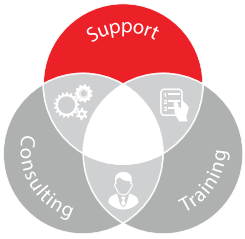
# Technical Information

| DIN-Rail Bracket |
| --- |
| Metal, mounted to bottom of Magnum unit |
| **Screws** |
| Four threaded holes provided on the bottom of the Magnum unit for mounting purposes<br><br>Required four screws are included with the DIN-Rail bracket<br><br>Screws are No. 4-40 x 9/32 PHIL. PAN Head |
| **Rail Clip** |
| Spring-loaded with pull-up latch at top for easy “snap-on” attachment and removal<br><br>To install the Magnum product with the DIN-Rail bracket installed, hold the unit in the side vertical position with the bottom out, and with the top moved in toward the DINRail. Position the DIN bracket over the top of the DIN-Rail. Then, snap the bracket into holding position by moving the bottom of the unit inwards to a vertical position. The DIN-Rail bracket is heavy duty, and will hold the Magnum unit securely in position, even with cabling attached to the unit. |

# Belden Competence Center

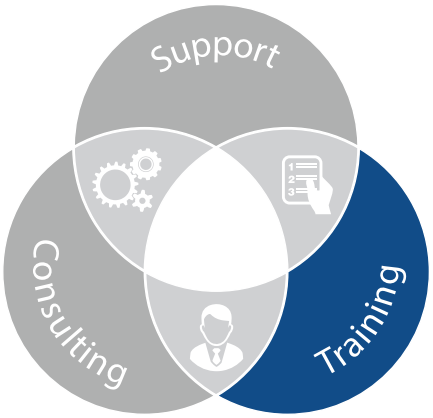
As the complexity of communication and connectivity solutions has increased, so have the requirements for design, implementation and maintenance of these solutions. For users, acquiring and verifying the latest expert knowledge plays a decisive role in this. As a reliable partner for end-to-end solutions, Belden offers expert consulting, design, technical support, as well as technology and product training courses, from a single source: Belden Competence Center. In addition, we offer you the right qualification for every area of expertise through the world's first certification program for industrial networks. Up-to-date manufacturer's expertise, an international service network and access to external specialists guarantee you the best possible support for products. Irrespective of the technology you use, you can rely on our full support – from implementation to optimization of every aspect of daily operations.

# What we can do for you – and how

| | Optimal Network Solution | Know-how for Reliable Operation | Protection Against Downtimes | Lasting Cost Control |
|---|---|---|---|---|
|   | • Individual consultation,design, project management<br>• Network design and migrationconcepts<br>• Compatibility testing<br>• On-site wireless site survey | • Training plans<br>• Documentation<br>• Maintenance concepts<br>• Security concepts (network security) | • Integration of redundancy<br>• Spare parts store concept<br>• Emergency concepts | • Service planning<br>• Complete costing |
| | • Technology and product training courses for network designers<br>• Introduction courses for decision makers | • Individual user training courses<br>• Security training<br>• Workshops | • Qualification/certification of your employees and external service providers | • Update training for technologies and product |
|   | • Pre-configuration and pre-assembly of systems<br>• On-site commissioning<br>• Application tests | • Network monitoring and support by in-house experts or partners<br>• Network security audit<br>• Network baselining | • 24 x 7 support hotline<br>• On-site support<br>• Remote service<br>• Replacement hardware services | • Warranty extension<br>• Individual, product-related service packages |

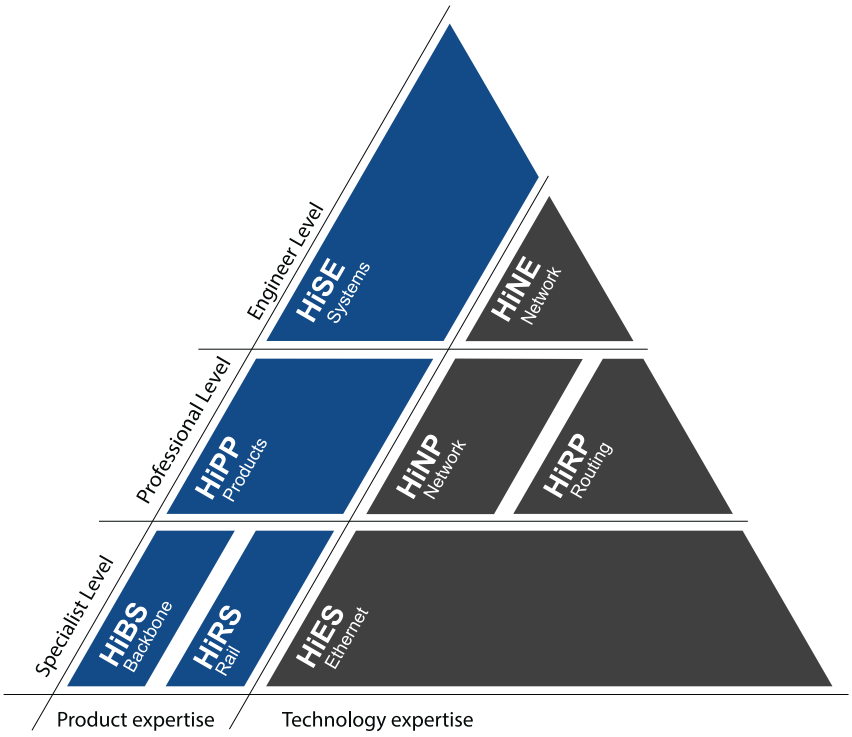
# The Belden Certification Scheme – Unique Proof of Competence

## Why a Certification?

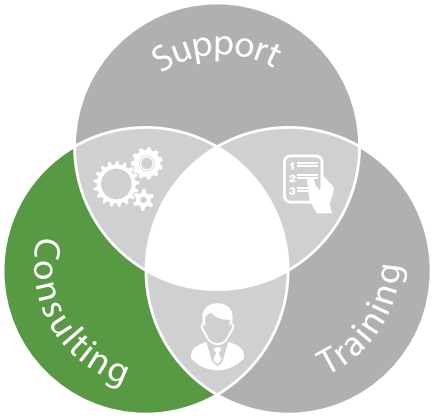



The best form of protection against expensive downtime in a modern industrial network is the assurance of on-site specialists and external service providers qualified to quickly rectify faults or to prevent them from ever happening in the first place. Not every self-proclaimed “expert” is up to the task. A certification from Belden confirms that the skillset needed is validated and relevant to the most current needs and techniques of modern industrial networks, servers and systems and control systems. Certification training covers industrial Ethernet, routing, systems, network architecture, security and other related topics.

hat qualifications would you like to demonstrate? At Belden you have a menu of choices to amplify your hands-on experience.




The Hirschmann Certification program provides training options for multiple fields of expertise and levels of experience.




# Consulting

## Leverage our Experience

Whether it is network designing or network optimization – the result is what counts. We make sure our solution matches your ideas and your processes. Through the provision of customized services, we are with you from the initial consultation to the final system.

At every point in the process you receive exactly the amount of support you require. It makes sense to include Hirschmann in your plans right from the beginning. Good advice is only expensive when it comes too late.

## Consultation

Which network technology best suits your applications? Which communications media and products? We assist you during system appraisals and technology selection, prepare migration concepts, and advise you on the suitable deployment of management tools. An emphasis is also placed on the optimum network security solution.

## Design

Correctly designing or optimizing a network is more than just a question of technology. In addition to on-site network design, either cabled or wireless, we prepare an individual program for employee training and system maintenance. Right from the beginning you have comprehensive information about all stages of the process, presented in the way you want it.

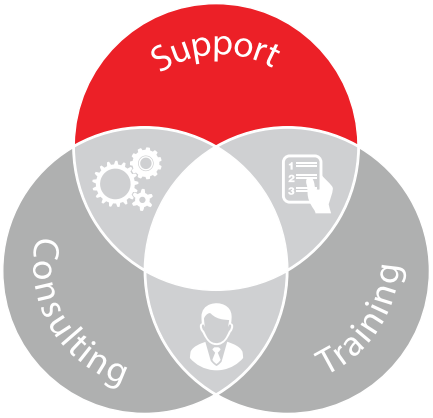
## Project Management

Together with our regional partners we also provide specialized support during the implementation of your network projects. In the Hirschmann/GarrettCom test laboratory we can verify the compatibility of system components you have chosen. Critical functions can be simulated in a test environment.

At the commissioning stage we will provide you with complete technical documentation, as well as product familiarization for your employees.

# Support

## On Demand and in Demand




Time is money. A lot of money, when a network is out of service. Therefore our internal and external support specialists make sure that from day one your system is functioning perfectly – and stays that way. Through long-term technical advice and if necessary, through short-term troubleshooting. Ask us about our services.

## Commissioning

The Belden Support Team is at your disposal at any time for professional installation and configuration of your equipment. We will support you and your employees during on-site commissioning – or undertake the complete installation. All GarrettCom components are delivered pre-configured.

## Help Desk

To bring your network back into operation again with the minimum of delay, contact our central Support Desk via the Hirschmann Service Hotline. Our experts are waiting for your call: for technical questions and problems, or if you need a replacement device. Subject to contract, direct problem diagnosis and rectification is available from our Help Desk around the clock.

## Maintenance

Mission critical networks cannot afford downtime. We can help you to maximize the availability and lifetime of your network. We can design a maintenance concept tailored exactly to your needs, and if required can implement the concept in cooperation with our specially trained and certified partners. This is where the network services cycle closes. Inevitably the time will come when it is once more necessary to optimize your network. No problem, when you can rely on the unparalleled consulting competence from Belden.

# Five Leading Brands, One Reliable Partner

Belden is a partner that is committed to help you achieve your targets. By combining the strength and integration of our powerful brands Belden, GarrettCom, Hirschmann, Tofino Security and Tripwire, we are able to deliver the solutions you need for securing industrial networks, endpoints and control systems.

*Through ongoing research and development, we are committed to providing you with the best solutions.*

### Belden

Belden designs, manufactures and markets a comprehensive portfolio of high-speed electronic cables, connectivity products and related items for the specialty electronics and data networking markets. All products are designed to be used in the harshest environments and mission-critical applications. We add value through design, engineering, excellence in manufacturing, product quality and customer service.

### GarrettCom

As the most highly configurable industrial networking and connectivity solution for full flexibility in harsh industrial sites, GarrettCom solutions solve customer requirements for customizable connectivity solutions. Especially known for serial support which allows customers to manage their IP migration pace, GarrettCom equipment gives room and options for future Industrial IoT connectivity needs.

### Hirschmann

As the technology and market leader in industrial networking, Hirschmann develops innovative solutions that are geared towards customers' requirements in terms of performance, safety, productivity, efficiency and investment reliability. Hirschmann offers a complete, integrated structure for data communication.

### Tofino Security

Tofino Security provides practical and effective industrial network security products that are simple to implement and that do not require plant shutdowns. The Tofino Industrial Security Appliance protects industrial networks from external cyber threats and internal network incidents. It facilitates the implementation of Plug-n-Protect zones of security for equipment with common safety requirements, as recommended in ANSI/ISA-99/IEC 62443 standards. Tofino Security products are used by energy, process control, SCADA, manufacturing and automation industries.

### Tripwire

Tripwire is a global leader in delivering advanced cyber security and compliance software solutions used by over 9,000 organizations worldwide, including over 50% of the Fortune 500. Tripwire enables our industrial and corporate enterprise customers to achieve highly available and secure networks, endpoints (such as servers, databases, engineering workstations, HMIs, FTP servers, data historians etc) and control systems. As a Belden brand, Tripwire now has integrations with GarrettCom, Hirschmann and Tofino Security to increase availability, visibility and cyber security without disruption.

Our global product brands enable us to provide complete network solutions from a single source, with worldwide market access and delivery.

BELDEN

GarrettCom
A BELDEN BRAND

HIRSCHMANN
A BELDEN BRAND

TOFINO SECURITY
A BELDEN BRAND

tripwire
CONFIDENCE: SECURED

## Customized Solutions

We have a vast product portfolio for effective signal transmission solutions. If a standard design is insufficient for one of your applications, we develop a customized solution that will do the job. This is what we mean with "strategic partnership": being flexible and responsive, while using our expertise to develop a solution that meets your requirements. With the specific customization teams, R&D expertise and production technology in place, we can realize cost-effective customized solutions with short turnaround times and high quality standards.

## Demand Driven Innovation

Your needs drive our innovation. That's not merely a promise; our continuous investment in innovation is clearly demonstrated by our numerous patents. Through ongoing research and development, we are committed to providing you with the best solutions. As a market leader, we also play an active role in key industry associations around the world – thus helping to develop standardization for global applications and products. We are active in IEC, IEEE, ODVA, PNO, EPSG, as well as numerous manufacturer-independent organizations. All this with just one goal: being able to deliver you that specific solution you need – today as well as tomorrow.

## Durable Solution: GreenChoice

A perfect example of market driven innovation is GreenChoice, our answer to the increasing demand for greener and more sustainable solutions. Focusing on reducing the ecological impact of our products has led to our most durable product range ever. Numerous Belden products are now available as GreenChoice products, giving you the opportunity to make responsible choices.

## Partner Network

Working with us means working with our committed partner network, across all Belden brands. We combine our resources, intelligence and skills to take Belden products and solutions to the next level.

## 10 Clear Benefits and Promises

At Belden every new project is considered unique, whether a standard solution is sufficient or a customized solution is needed. Whenever necessary, we adapt our products and services to your requirements and demands. Although flexibility is key, there are always 10 clear benefits that you can rely on. They underlie the way we work, regardless of a project's size or nature. These are our 10 most important benefits to you:

1. Wide range of standard and tailored signal transmission solutions from one single source
2. Hassle-free and secure signal transmissions under the toughest conditions
3. Reducing total cost of ownership
4. Best-in-class products with proven superior performance
5. Reliability for maximum uptime and minimum maintenance
6. Fast delivery of solutions and ease of installation
7. Local technical support backed by extensive global resources
8. Belden, GarrettCom, Hirschmann, Tofino Security and Tripwire: brands with a long history and excellent reputation
9. Design support and innovation
10. Continued analysis of market needs for continuous development of effective solutions

## Get in Touch – or Better Yet – Challenge Us

We invite you to put us to the test. Let us make your next challenge your next success. We're looking forward to providing you with a superior solution that will open a whole new range of opportunities, both technological and business-wise. Please call or mail your contact person at Belden and we'll be certain to make an appointment.

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BELDEN
SENDING ALL THE RIGHT SIGNALS

# About Belden

Belden Inc., a global leader in high quality, end-to-end signal transmission solutions, delivers a comprehensive product portfolio designed to meet the mission-critical network infrastructure needs of industrial, enterprise and broadcast markets. With innovative solutions targeted at reliable and secure transmission of rapidly growing amounts of data, audio and video needed for today's applications, Belden is at the center of the global transformation to a connected world. Founded in 1902, the company is headquartered in St. Louis, USA, and has manufacturing capabilities in North and South America, Europe and Asia.

**For more information, visit us at:**
**www.belden.com**
**www.beldensolutions.com**
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