

# ITS EXPRESS

A **HN** HARDENED NETWORKS BRAND

New  
Flex-Technology



## HN-3416 V3 Overview

ITS Express/ Hardened Networks switches have been specifically engineered to handle the challenging demands of extreme environmental conditions and 8k multi-cast high bandwidth video applications.

A vast array of redundancy protocols combined with dual redundant power capabilities ensure maximum uptime for mission-critical applications.

Hardened Networks provides state-of-the-art designed switches, which all feature next-generation ASICs, robust backplanes, and dependable firmware. This gives you the “best-of-breed” in environmentally challenging switch products.

- Our exciting new Flex-Technology revolutionizes speed upgrades in hardened switches!

Now you can purchase switches with any higher speed SFPs 10gig /2.5 gig and connect them to your existing slower speed 100 or 1000 optics without requiring like optics. Make your upgrade path fast, simple, and pain-free!

Ask your sales representative today!

- ▶ Exceeds NEMA TS-2 Specifications
- ▶ Hardened Base Layer 3
- ▶ (4) 10 Gb USFP+ (Ultra SFP+)
- ▶ (16) 1000Mb Copper Ports
- ▶ Static Routing
- ▶ 156 GB Back- Plane
- ▶ V3 Technology
- ▶ Advanced V3 Diagnostics, Security, and Redundancy

- Designed for heavy video use in unicast/multi-cast in extreme environments
- Layer 3 management, 802.1x authentication
- Exceeds NEMA TS-2 specifications
- 4 USFP+ ports 1Gb/10Gb (Ultra SFP+ ports)
- 16 copper ports 10Mb/100Mb/1000TX
- Remote monitoring of utilization and data flow with RMON
- Easy to configure web interface designed by ITS users
- VeriPHY (advanced real-time copper cable testing)
- Optical monitoring with mapping capabilities
- File transfer options include SFTP, FTP, SCP, TFTP, HTTP, and HTTPS
- Ring Protocols: STP, RSTP, MSTP, RPVST+, R-RVST+, ITS- Ring, Moxa/ Herschman/ Advatech Rings (PVST+ or RPVST+ Cisco compatibility)
- Fast ITS ring recovery time < 10ms over 250 units of connections
- ESFP/USFP+ mix and match all speeds single or multi-mode, dual strand (LX,EX,ZX, ZR) or single strand fiber (BX, BR) 100Mb/1000Mb/2.5Gb/10Gb
- Notifications for link up, link down, SFP power/temperature, topology change ring environment, SMTP, SNMP, and relay output
- Swapable primary and secondary software instances with multiple configuration storage
- Separate memory for forwarding plane, firmware, and startup configuration

Switch Model	HN-3416
Physical Ports	
USFP+ 1G/10GB Base-XSFP+	4
Copper TX 10Mb/100Mb/1000Mb Ports in RJ45 Auto MDI/MDIX	16
Technology	
Ethernet Standards	<ul style="list-style-type: none"> <li>-IEEE 802.3-2018 for 10/100/1000 Base- T(X), 100/1000/2.5Base- (F)X, 10G Base-R</li> <li>-IEEE 802.3ab for 1000Base-T</li> <li>-IEEE 802.3z for 1000Base-X</li> <li>-IEEE 802.3x for Flow control</li> <li>-IEEE 802.3ad for LACP (Link Aggregation Control Protocol)</li> <li>-IEEE 802.1p for COS (Class of Service)</li> <li>-IEEE 802.1Q-2014 for VLAN Tagging, STP, RSTP, and MSTP</li> <li>-IEEE 802.1w R-PVST+ Cisco natively compatible for all VLANs</li> <li>-IEEE 802.1x for Authentication</li> <li>-IEEE 802.1AB for LLDP (Link Layer Discovery Protocol)</li> </ul>
MAC Table	64k
Processing	Adaptive cut-through / store-and-forward
Priority Queues	8
Packet Buffer	64Mbits
Jumbo Frame	Up to 9k Bytes
Flash Memory	128 MB
DRAM Size	512MB
Switch Properties	<ul style="list-style-type: none"> <li>-Switching latency: 7 us</li> <li>-Switching backplane: 156Gbps</li> <li>-Mpps: port throughput (packet per second): 152 @ 64 bytes per packet</li> <li>-Maximum number of available VLANs: 4095</li> <li>-IGMP multicast groups: 256 for each VLAN</li> <li>-Port rate limiting: user definable</li> <li>-Static routing</li> </ul>
Security Features	<ul style="list-style-type: none"> <li>-Device binding security features</li> <li>-MAC based port security, device binding, alive check</li> <li>-Port based network access control (802.1x)</li> <li>-MAC-based authentication</li> <li>-MAC address limit</li> <li>-VLAN (802.1Q) to segregate and secure network traffic</li> <li>-AAA RADIUS/TACACS+ User/Password management selectable by management method</li> <li>-SNMPv3 encrypted authentication and access security</li> <li>HTTPS/SSH/SSL to encrypt network management traffic</li> <li>-Access management enabled by method with whitelisted network/ host</li> </ul>

Security Features	<ul style="list-style-type: none"> <li>-Profile based authorization (15 levels per criteria) profile assigned to user</li> <li>-IP source guard DHCP address snooping and protection</li> <li>-DOS/DDOS auto prevention</li> </ul>
Multicast Features	<ul style="list-style-type: none"> <li>-IGMP v1, 2, 3 - RFCs 1112, 2236, 4604</li> <li>-IPv6 multicast listener discovery protocol (MLDv2)</li> <li>-IGMP snooping globally or per VLAN</li> <li>-Configurable SSM range designation</li> <li>-Selectable auto mode or IGMP/MLD version per VLAN</li> <li>-IGMP snooping port group filtering profiles</li> <li>-IGMP/MLD Querier Election per VLAN</li> </ul>
Traffic Prioritization	<ul style="list-style-type: none"> <li>-TOS/Diffserv supported</li> <li>-CoS</li> <li>-Application based QoS</li> <li>-IP based bandwidth management</li> <li>-Port rate limiting: user define</li> <li>-Storm Control</li> <li>-Port Classification</li> <li>-Port Tag Remarking</li> <li>-Port DSCP</li> <li>-Port Policing</li> <li>-Queue Policing</li> <li>-Port Shaping</li> <li>-DSCP- based QOS</li> <li>-WRED (Weighted Random Early Detection) for congestion avoidance</li> </ul>
Software Features	<ul style="list-style-type: none"> <li>-Context based help available in GUI and CLI</li> <li>-Layer 3 static routing / multiple interface IPs</li> <li>-VRRP RFC 3768</li> <li>-Redundant ring (ITS Ring) with recovery time less than 30ms over 250 units</li> <li>-QOS with storm center</li> <li>-VLAN (802.1Q) with VLAN tagging</li> <li>-Port configuration, status, statistics, monitoring, security</li> <li>-DHCP Server/Client/Relay</li> <li>-Modbus TCP</li> <li>-SMTP Client</li> <li>-NTP server</li> </ul>
Network Redundancy	<ul style="list-style-type: none"> <li>-ITS-Ring</li> <li>-Express-Chain</li> <li>-Express-Ring (Express Ring now integrates with Moxa, Advantech, and Hirschmann ring protocols)</li> <li>-STP/RSTP/MSTP(IEEE 802.1 d/w/s)/ (PVST+ or RPVST+ Cisco compatibility)</li> </ul>
RS-232 Serial Console Port	RS-232 in RJ45 connector with console cable. 115200bps, 8, N, 1

LED Indicator	
System Ready Indicator (PWR)	Green: Indicates that the system ready. The LED is blinking when the system is upgrading firmware
Power Indicator (PWR1/PWR2)	Green : Power LED x 2
Ring Master Indicator (R.M.)	Green : Indicates that the system is operating in ITS Ring Master mode
ITS Ring Indicator (Ring)	-Green: Indicates that the system operating in ITS Ring mode -Green Blinking: Indicates that the ITS Ring is broken.
Fault Indicator (Fault)	Amber : Indicate unexpected event occurred
Power	
Redundant power input modular	Dual DC inputs. 12~48VDC (Max. rating : 60VDC) at terminal block
Power Consumption (Typ.)	35 Watts
Overload Current Protection	Present
Reverse Polarity Protection	Present
Fault Contact	
Relay	Relay output to carry capacity of 1A at 24VDC
Reset Button	<5 sec: system reboot; >5 sec: factory default
Physical Characteristics	
Enclosure	IP-30
Weight (lb/g)	6.17lb/2799g
Dimension (W x D x H)	115 (W) x 154 (D) x 170 (H)mm (4.53 x 6.26 x 6.06 inch)
Environmental	
Storage Temperature	-40 to 90C (-40 to 194F)
Operating Temperature	-40 to 85C (-40 to 185F)
Operating Humidity	5% to 95% Non-condensing
Regulatory Approvals	
Power Automation	IEC 61850-3, IEEE 1613
EMC	EN 55022, EN 55024(CE EMC),EN 50121-5,FCC, EN 50121-3-2(EN50155), EN 61000-6-2, EN 61000-6-4, IEC 61000-3-2 ,IEC 61000-3-3
EMI	CISPR 22, EN 55011, FCC Part 15B Class A
EMS	-EN 61000-4-2 (ESD) -EN 61000-4-3 (RS) -EN 61000-4-4 (EFT) -EN 61000-4-5 (Surge) -EN 61000-4-6 (CS) -EN 61000-4-8 (PFMF) -EN 61000-4-11 (DIP)
Shock	IEC 60068-2-27, IEC 61373 (EN50155)
Free Fall	IEC 60068-2-31 (IEC 60068-2-32)
Vibration	IEC 60068-2-6, IEC 61373(EN50155)
Safety	EN60950-1
Warranty	
	5 Years



# Other Solutions

Hardened Networks has created variety of high quality products to fit your needs. If you did not find what you needed in the HN- 3416 V3, please browse our other solutions.

## Ethernet Switches | Communications



**HN-8012-24 V3**

- 4 Ultra Fiber Ports SFP+ 100Mb/1000Mb/2.5Gb/10Gb
- 4 Enhanced Fiber Ports SFP 100Mb/1000Mb/2.5Gb
- 16 Copper Ports 10Mb/100Mb/1000Mb
- 176 GBPS Back-Plane



**HN-8042 V3**

- 2 Ultra Fiber Ports SFP+ 100Mb/1000Mb/2.5Gb/10Gb
- 2 Enhanced Fiber Ports SFP 100Mb/1000Mb/2.5Gb
- 8 Copper Ports 10Mb/100Mb/1000Mb
- 96 GBPS Back-Plane



**HN- MC-1000**

- 10Mb/100Mb/1000Mbps Ethernet BASE-T/TX to SFP (MM or SM)
- Optical port supports 100Mb or 1000Mb full duplex data



**HN-8012-24+ V3**

- 4 Ultra Fiber Ports SFP+ 100Mb/1000Mb/2.5Gb/10Gb
- 4 Enhanced Fiber Ports SFP 100Mb/1000Mb/2.5Gb
- 16 Copper Ports 10Mb/100Mb/1000Mb
- Two sets of bypass fiber ports
- 176 GBPS Back-Plane



**HN-8042+ V3**

- 2 Ultra Fiber Ports SFP+ 100Mb/1000Mb/2.5Gb/10Gb
- 2 Enhanced Fiber Ports SFP 100Mb/1000Mb/2.5Gb
- 8 Copper Ports 10Mb/100Mb/1000Mb
- Two sets of bypass fiber ports
- 96 GBPS Back-Plane



**HN- MC-100**

- 10Mb/100Mbps Ethernet BASE-T/TX to SFP (MM or SM)
- Flexible power 18-46VAC/12-60 VDC



**HN- VC-100**

- High Speed VDSL-2 Technology
- 10Mb/100Mbps Ethernet BASE-T/TX to a pair of copper cables
- Flexible power 18-46VAC/12-60 VDC

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