



- Graphical User Interface (GUI) and CLI
- Cyber Security features: firewall, IPSec, VPN, authentication and encryption
- Redundancy features: routing, RSTP, VRRP, BGP, OSPF
- Built-in protocol analyzer for easy trouble shooting
- Supports all Magnum DX platforms and configurations

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 includes capabilities such as

- **Ethernet** ports can be configured as switched ports or routed ports or combinations
- **Serial ports** can be software configurable as RS232 or RS485 ports
- **WAN** configuration provides the necessary menus to configure a T1/E1 or DDS circuits
- **Cellular** Wireless Data Access over 3G EVDO cellular networks
- **RSTP** supports RSTP-2004 (802.1w) & STP (802.1d), provides resilient Ethernet networks
- **Routing** features support RIP and RIP-II for routed ports and VLANs. OSPF and BGP is in MNS-DX ADVAR
- **VRRP** – Virtual Router Redundancy Protocol provides router redundancy for Ethernet LAN devices
- **DHCP Server and Client** – provides DHCP services or queries for IP addresses
- **Remote Access** for secure administration is via SSH and optionally via telnet
- **VLANs** (802.1q) supports tagged based VLANs as access VLANs or trunk ports. Trunk ports allow filtering of unauthorized VLANs
- **SNMP** supports v1, v2 and v3 – for managing the device using Network Management Systems
- **Event log** locally stored provides a log of the most recent events. Syslog is in MNS-DX-SECURE
- **SNTP** provides time synchronization with NTP/SNTP servers
- **PPP** allows an asynchronous dial in backup connection over an analog modem or framing for DDS
- **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
- **QoS** prioritization to traffic using QoS and DiffServ tags across a network, and across a WAN port
- **Maintenance:** MNS-DX stores different configuration files locally or on a remote server which allows falling back to a different configuration easily
- **Trouble shooting** is made easy with a built in protocol analyzer

MNS-DX-SECURE adds extra security features such as IPSec, VPN, firewall, encryption and authentication needed for industrial cyber security. Extra Security features are unlocked via a licensed software key. IP firewall includes address/port inspection/filtering. VPN connectivity over IPSec with strong industry standard encryption with shared keys (PSK) and X.509 certificates provide robust secure access. VPN's comply to IPSec standards and have proven interoperability with industry standard VPN devices. Management security includes encrypted interfaces multilevel userIDs with strong-form passwords and authentication via RADIUS. Serial data is encrypted using Serial SSL capabilities included in MNS-DX-SECURE.

MNS-DX-SECURE features include

- **VPN and Key Management** - proven interoperability and conformance to industry standards
- **Firewall** provides stateful firewall rules for traffic flows or for IP streams or ports
- **RADIUS** provides management authentication via a RADIUS Server
- **Login Banner** configurable banner message before login to deter unauthorized users
- **Secure Serial SSL** connectivity allows serial devices to encrypt data
- **Syslog** enables logs to be collected by syslog servers for security analysis
- **TACACS+** Terminal Access Controller Access - Control System Plus
- **SSH Port Forwarding** allows secure access to less secure devices on the network
- **Security certificate** management allows a user to manage signed certificates

MNS-DX-ADVAR adds advanced routing options such as OSPF, BGP. Advanced Routing features are unlocked via a licensed software key.

MNS-DX provides the reliability, security and robustness needed in industrial routers. To complement the Magnum DX substation-hardened hardware capabilities, MNS-DX provides industrial strength software capabilities for reliable, secure industrial networks.

Ease-of-use features: GUI operations and simple to use GUI configuration options, e.g. User accounts, Export configurations, load new image, time synchronization etc. The ease of use features include wizards

Serial Ports: Async to TCP/IP – including Modbus, terminal services and PPP with authentication

WAN Ports: MNS-DX supports the necessary WAN configurations options for configuring DDS and T1/E1

Cellular: Provides the necessary configuration for Wireless Data Access over 3G EVDO cellular networks

IP Routing: RIP, RIP II as per RFC 1058, RFC 1388, Sec 3.3 RFC 1723, RFC 2453

CLI (Command Line Interface): CLI for the Magnum DX's console port, offers a rich set of commands, including Tab Key Help feature, through a VT100 character terminal or equivalent emulation

VRRP (Virtual Router Redundancy Protocol): VRRP defines a virtual router as the default router for a LAN segments. MNS-DX supports VRRP as per RFC 3768

NAT/PAT: NAT and PAT allow different devices to communicate using a single or multiple IP addresses. NAT/PAT as per RFC 1631 and RFC 2663

DHCP Server: DHCP Server manager IP address space for devices requesting IP address using DHCP. DHCP server as per RFC 2131

DHCP Client: DHCP client makes a request for IP address and other IP information from DHCP servers present on the network. DHCP client as per RFC 2131

STP (Spanning Tree Protocol), IEEE 802.1d: Provides interoperable support for redundant paths and connections while preventing loops in the network

RSTP (Rapid Spanning Tree Protocol), IEEE 802.1w: RSTP includes RSTP-2004. Similar to STP(IEEE 802.1d) but faster in changing interconnection direction. Used in conjunction with Magnum 6K switches for redundant rings and meshes of managed switches and routers. Industry standard compliant for interoperability.

VLANs, IEEE 802.1q: Users may configure VLANs for traffic segmentation. MNS-DX provides capabilities for the DHCP server to assign IP addresses to segments defined by VLANs. Physical ports can be defined as access ports or trunk ports. Trunk ports can filter out unauthorized VLANs

SNTP (Simple Network Time Protocol): Automatically synchronizes the Magnum DX's internal clocks with other devices on the LAN, handling time-zones worldwide as well as time changes for Daylight Savings. SNTP is per RFC 1769 and RFC 2030

Event Log: System events are recorded in a log locally, enabling the system manager to track and analyze what has happened within the Magnum DX system operations

Modbus: MNS-DX implements the Modbus specifications for connecting Modbus devices – whether they are over a serial connection on Magnum DX Serial ports or other Modbus devices on Ethernet. MNS-DX implements the Modbus gateway functionality

SNMP (Simple Network Management Protocol) v1, v2, v3: Provides basic network management by using agent software in the Magnum 6K that collects and saves pre-defined data, and responds to queries and commands from a network manager station. v1 is implemented per RFC1155, RFC1157, RFC1212, RFC1213 (MIB II), Bridge MIB RFC1493, and RFC1757 plus security enhancements. v2 is per RFC 1901-08. v3 provides encrypted authentication & access security and is per RFC 2271-75. All are supported by TCP/IP and UDP/IP

PPP (Point to Point Protocol): PPP allows a modem to initiate a connection to remote networks using a dial up line. PPP over WAN provides framing services for DDS circuits. PPP compliant to RFC 1334 and RFC 1661

MNS-DX-SECURE – Extra Security – licensed software features for MNS-DX or MNS-DX-ADVAVR

MNS-DX-SECURE includes all the capabilities of MNS-DX, plus

VPN: VPN provides a secure connection to another remote location over a public network such as the Internet. Magnum DX router IPSec VPN has proven interoperability with other VPN devices. VPN implementation as per RFC 2401- 2410, RFC 4302, RFC 4303, RFC 2451, RFC 3602, RFC 4868. Encryption methods include Diffie-Hellman Groups 1,2,5,14 crypto; DHE with PFS; DES; 3DES; Blowfish-CBC; AES-128; AES-192 and AES-256. Authentication mechanisms include HMAC-MD5-128, HMAC-SHA1-160, MD5, SHA1, SHA-224, SHA-256, SHA-384, SHA-512. Multiple tunnels can be setup for multiple source-destination pairs. VPN tunnels conform to the IPSec protocol.

RADIUS: Provides authentication to Magnum DX router via a RADIUS server. RADIUS conforms to RFC 2865 and RFC 2866

Security Certificates: allows management of security certificates

Key Management: Internet Key Exchange (IKE) and Pre-shared Keys (PSK) conform to RFC 2409

Serial SSL connectivity: Serial Port SSL VPN provide secure communications for devices connected to serial ports.

SSH port forwarding for secure access to other less secure devices using SSH tunnels

Syslog: Syslog provides log centralization using the Syslog protocol. Syslog is conformant to RFC 3164

MNS-DX-ADVAVR – Advanced Routing – licensed software features for MNS-DX or MNS-DX-SECURE

MNS-DX-ADVAVR includes all the capabilities of MNS-DX plus

BGP (Border Gateway Protocol): BGP is a core routing protocol commonly used by large networks to manage routing and other policies based on IP blocks. BGP as per RFC 4271

OSPF (Open Shortest Path First): OSPF is a dynamic routing protocol used by routers and provides fast recovery. OSPF as per RFC 2328

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Ordering Information

MNS-DX – Included with all Magnum DX routers

MNS-DX-SECURE – includes all features of MNS-DX and adds extra security features

MNS-DX-ADVAVR – includes all features of MNS-DX and adds advanced routing features

MNS-DX-MAINT – Annual maintenance for software updates for one Magnum-DX router for one year. Includes MNS-DX, MNS-DX-SECURE and MNS-DX-ADVAVR as applicable



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