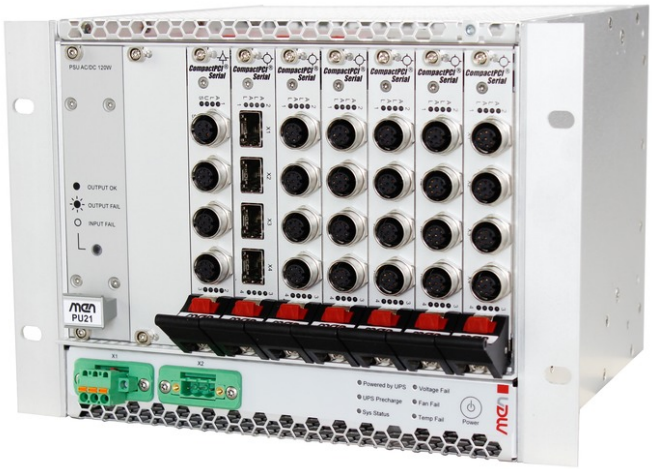
NH30

Rugged Fully Managed 29 Gbit/s Ethernet Switch

Modular Embedded Switch for Industrial Automation & Railway Transport

- *Compact 4U, 40 HP turn-key Layer 2/3 switch solution*
- *Rack-mounted or wall-mounted*
- *Fanless operation or forced-air cooling*
- *Single or redundant power supply (AC or DC)*
- *Up to six slots for RJ45, M12 (A or X-Coded) or SFP line cards*
- *PoE+ / non-PoE power sourcing Ethernet ports in mixed configuration*
- *System supervision (temperature, fan, power supply) optional*
- *EN 50155 compliant (railways)*



The NH30 is a modular turn-key network switch with carrier grade Layer 2 and Layer 3 VLAN routing capabilities with a seamless throughput of 29 Gbit/s. It is designed for use in trains, trams or industrial environments.

Flexible Built-to-Order I/O Configuration

The high-performance switch device is a modular 4U, 40 HP CompactPCI Serial system. Its build-to-order concept offers a wide range of configuration options, resulting in low NRE costs and fast time-to-market. The main switch board occupies one slot, while six option boards configure front-panel connectivity. This concept allows the NH30 to come with M12 A-coded (X-coded variants in preparation), RJ45 and SFP interfaces in mixed fiber/copper configurations. It supports a total of 25 ports. Using high-speed SFP interfaces ensures robustness against any type of interference signal or other conducted emissions like bursts or flashes. This makes the switch suitable for uplink scenarios or backbone solutions in harsh environments.

Standard Protocols and Various Power Supply Options

As an option all copper-based port line cards can act as PoE+ (PoE class 4) power supplies with a maximum of 60 W per card. The NH30 supports IEEE1588v2 and SyncE (as future extension) timing protocols and EEE as a standard on all ports. Two PSU slots, each with its own power source, ensure reliability and redundancy. Single or redundant AC or DC power supplies can be implemented. This hardens the system against power fluctuations or power failures.

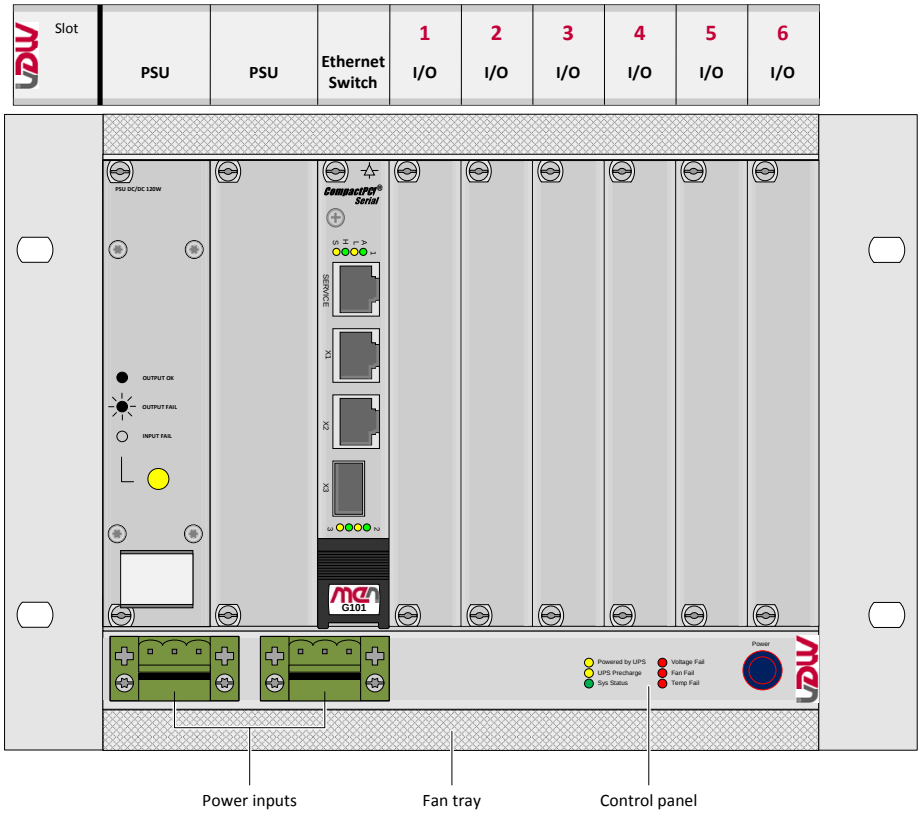
External Monitoring with an Optional Shelf Controller

A shelf controller rounds out the switch's self-control and self-monitoring capabilities. It manages life-time information about the shelf fans, power supplies and can be used for manual shutdown. For security and monitoring purposes, the shelf controller data is available via network interfaces and CLI.

Mounting and Cooling Options

The NH30 switch can be wall or rack-mounted and is cooled by natural convection or, when no PoE supply is necessary, using an additional fan tray at the bottom of the system. Cooling is independent of the mounting position.

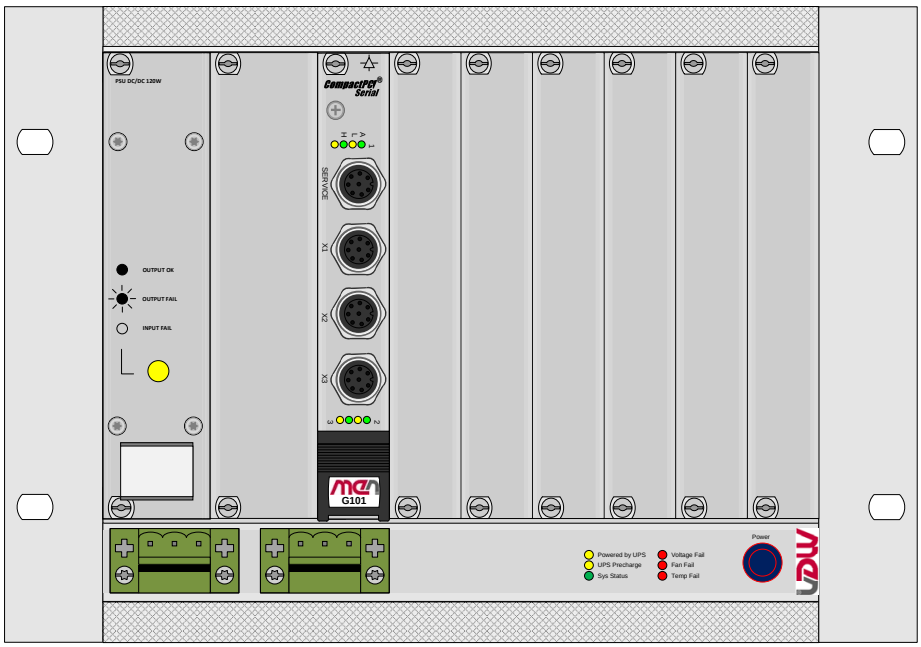
Data Sheet



NH30 Configuration Example 1

Basic configuration with RJ45 and SFP plug on switch front panel

The control panel is only available with the optional shelf controller



NH30 Configuration Example 2

Basic configuration with M12 on switch front panel

The control panel is only available with the optional shelf controller

Diagram

General System Characteristics

- Modular design, built-to-order configuration
- Slot and backplane set-up of the system
  - 2 PSU slots
  - 1 CompactPCI Serial based system slot (Switch Board)
  - 6 CompactPCI Serial based peripheral slots
  - All peripheral slots are capable of supporting a mix of various types of connectors (RJ45, M12, SFP)
  - All peripheral slots offer additional PoE+ support
- Please contact MEN sales for component combination possibilities.

Ethernet Switch

- CPCI 3U Board
- Configurable: yes
- Fully Managed 29 GBit/s Industrial Ethernet Switch, -40 to +85°C
  - More information on the G101 Managed Industrial Ethernet Switch
- Possible Configurations
  - 25-Ports, 2x RJ45 + 1x SFP 2.5 Gbps on front, 10x GE + 3x QSGMII links on backplane
  - 24-Ports, 3x M12 A-coded on front, 9x GE + 3x QSGMII links on backplane

Gigabit Ethernet SFP Line Card

- CPCI 3U Board
- Configurable: no
- Possible in I/O slots: 1, 2 and 3
- 4 HP Gigabit Ethernet PHY Line Card with four Gigabit Ethernet ports on SFP cages, QSGMII to 4 x SFP 1GB line card EEE and Sync-E support, -40 to +85°C
  - More information on the GP2 4-Port Gigabit SFP PHY Line Card

Gigabit Ethernet Copper PHY Line Card

- CPCI 3U Board
- Configurable: yes
- Possible in I/O slots: 1, 2 and 3
- Possible Configurations
  - 4 x Gigabit Ethernet RJ45 ports, QSGMII, no PoE, EEE and Sync-E support, -40 to +85°C
  - 4 x Gigabit Ethernet RJ45 ports, QSGMII, PoE+ PSE, EEE and Sync-E support, -40 to +85°C
  - 4 x Gigabit Ethernet M12 A-coded ports, QSGMII, no PoE, EEE and Sync-E support, -40 to +85°C, conformal coating
  - 4 x Gigabit Ethernet M12 A-coded ports, QSGMII, PoE+ PSE, EEE and Sync-E support, -40 to +85°C, conformal coating

Gigabit Ethernet Copper Line Card

- CPCI 3U Board
- Configurable: yes
- Possible in I/O slots: 4, 5 and 6
- Possible Configurations
  - 4 x Gigabit Ethernet RJ45 ports, passive, no PoE, -40 to +85°C
  - 4 x Gigabit Ethernet RJ45 ports, passive, PoE+, -40 to +85°C
  - 4 x Gigabit Ethernet M12 A-coded ports, passive, no PoE, -40 to +85°C, conformal coating
  - 4 x Gigabit Ethernet M12 A-coded ports, passive, PoE+, -40 to +85°C, conformal coating

Power Supply

- PSU 3U
- Configurable: yes
- Possible Configurations:
  - 120 W, 3U 6 HP PSU, wide range input 24 to 110 V DC, 24 V DC nom., output 12 V / 5 V / 3.3 V DC, -40..+85°C, conformal coating
  - 120 W, 3U 6 HP PSU, wide range input 100 to 240 V AC, output 12 V / 5 V / 3.3 V DC, -40..+85°C, conformal coating
- Two separate power inlet connectors
- Normal operation if at least one external voltage is present

Supervision and Control (Option)

- Dedicated shelf controller monitors power, CPU status, temperature; controls fan; provides status LEDs and power button
  - More information on AF2 Shelf Controller for CompactPCI Systems

System Management

- Remote management: Switch is managable remotely via Ethernet and USB console
- Watchdog
- CPU temperature: mirrored through Switch firmware to SNMP table space, readable through management interfaces

Switch Key Features

- Switching Matrix
  - 29 Gbit/s switching matrix for seamless throughput on all ports
  - MAC address table size: 8192 max.
  - Switching algorithm: Store-and-Forward with TCAM support
  - TCAM high-speed switching (Ternary Content-Addressable Memory)
- General Network Support
  - IPv4
  - IPv6 Ready
  - IPv6 Ready Phase 2
- Protocols and Functionality
  - DHCP Option 82
  - DHCP Server/Client
  - DNS Client (RFC 2136)
  - DNS Proxy (RFC 5625)
- Ports and Port Control
  - Energy Efficient Ethernet (IEEE 802.3az)
  - ETH Signal Equalization and Power Control
  - Port state (admin), speed, duplex mode and flow control
  - Port frame size (Jumbo Frames: 9216 bytes/packet max.)
  - Port status (link monitoring) and statistics (MIB counters)
  - Port VeriPHY (cable diagnostics), ActiPHY and PerfectReach
  - Inband management (VRAP)
- User Configuration Interfaces
  - HTTP/HTTPS
  - CLI
  - Telnet
  - Console
- For more information on the switch firmware features see the firmware product page.

Electrical Specifications

- Supply voltage
  - 24 V, 36 V, 48 V, 72 V, 96 V, 110 V DC nominal; 14.4 to 154 V max. (EN 50155)
  - Power interruption class S2 (10 ms) (EN 50155)
- Power Consumption
  - The power consumption depends on the selected PSU configuration
  - Less than 30 W in default configuration
  - Less than 100 W without PSU
  - Less than 550 W in max. PoE load condition (depending on used PSUs)
  - Less than 100 W with 6 line cards without PoE
  - For example, when used together with two PU20 (or PU21) PSUs, the maximum PoE power of about 120 W can be expected.

Mechanical Specifications

- Dimensions
  - 210 x 175 x 225 mm max. without brackets
  - 4U, 40 HP
- Mounting Possibilities
  - Wall-mount
  - Rack-mount in 19" cabinet
  - Two systems side-by-side to build a single 19" chassis

Product Compliance: Rail - Rolling Stock

- Operating temperature: -40 °C to +85 °C (EN 50155, class TX) in base configuration and when equipped with GE1, GP1 and GP2 cards, without activated PoE supply
  - With fan if the line cards have been configured with the PoE option
  - Without fan if the line cards have been configured without the PoE option
- Storage temperature: -40 °C to +85 °C
- Altitude: -300 m to +3000 m
- Humidity: +55 °C and +25 °C, 90 % to 100 % (EN 50155:2007)
- Shock: EN 50155: Rolling stock, vehicle body class B
- Vibration: EN 50155: Rolling stock, vehicle body class B
- Electrical Safety
  - EN 60950-1: Class I equipment
- Fire Protection
  - EN 45545, hazard class tbd.
- Flammability (PCBs)
  - UL 94 V-0
- EMC
  - EN 55022, EN 50121-3-2, class B (radiated emission)
  - EN 55024, EN 50121-3-2, class A

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