

NH30 – Rugged Half 19" Modular Managed Gigabit Ethernet Switch

- Compact 25 Port, 40TE managed rugged Layer 2/3 Gigabit Ethernet switch solution
- Rack-mounted or wall-mounted
- 29 Gbit/s carrier grade TCAM switching matrix and firmware
- Fanless operation or forced-air cooling (depending on configuration)
- Single or redundant power supplies or uninterruptible power supply (AC or DC)
- Support for up-to six line cards with Fiber, RJ45 or M12 connectors
- PoE+ / non-PoE power sourcing Ethernet ports in mixed configuration
- One "Alive" relay output port
- Standard Ring and Protection Switching/Ring Protocols
- System supervision (temperature, fan, power supply) optional
- -40 to +85°C with qualified components
- EN 50155 class TX compliant (railways)



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

Flexible Built-to-Order Configuration

The high-performance switch device is a modular half 19" 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 define the front-panel connectivity. This concept allows the NH30 to come with M12, RJ45 and SFP interfaces in mixed fiber/copper configurations. It supports a total of 25 ports. The switch firmware is already installed and is ready for operation.

Powerful and Robust Networking

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, e.g., for uplink scenarios or backbone solutions in harsh environments. 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 PSUs for AC/DC and USP

Two PSU slots, each with its own power source, ensure reliability and redundancy. Single or redundant AC or DC power supplies or an uninterruptible power supply (USP) can be implemented. This hardens the system against power fluctuations or power failures.

Monitoring and Control Functions

The switch comes with three relay outputs. Output 1 drives a "switch alive" signal intended to inform an external monitoring system, e.g., on board a train, about the health of the switch.

An optional shelf controller rounds out the switch's self-control and self-monitoring capabilities. It manages life-time information about, e.g., 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.

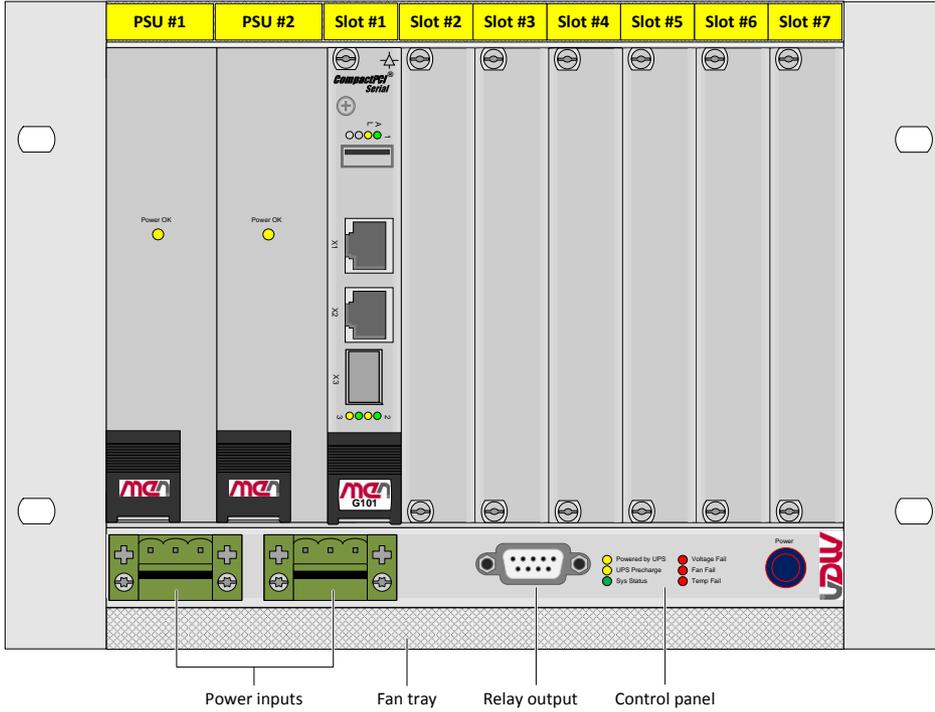
Mounting and Cooling as Needed

The NH30 switch can be wall or rack-mounted and is cooled by natural convection or using an additional fan tray at the bottom of the system. Cooling is independent of the mounting position.



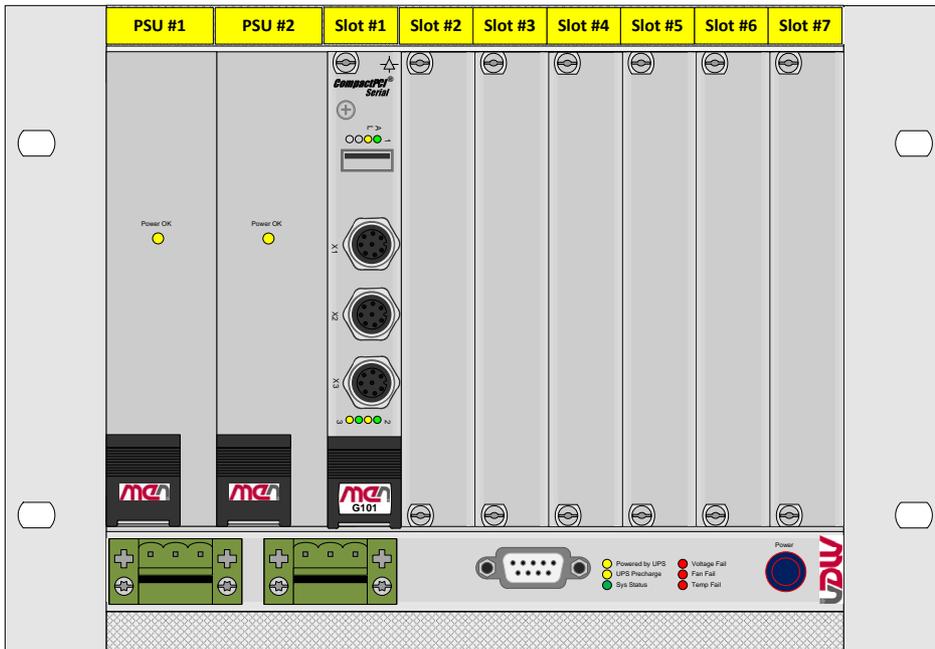
Diagram

Slot	1	2	3	4	5	6	7	8	9	10	11
HP	1	5	9	13	17	21	25	29	33	37	41



NH30 Configuration Example 1

Basic configuration with RJ45 and SFP uplink on switch front panel



NH30 Configuration Example 2

Basic configuration with M12 on switch front panel

Technical Data

General System Characteristics	<ul style="list-style-type: none">■ As the configuration of the system is modular, it is always built to order.■ In the following all possible functions are described. Contact MEN sales to ask how they can be combined. The system consists of the following slots:<ul style="list-style-type: none">■ 2 slots for PSU■ 1 CompactPCI® Serial slot for a network CPU board (Switch Board)■ 6 CompactPCI® Serial peripheral slots
Configuration Options	<ul style="list-style-type: none">■ G101 - 3U CompactPCI® Serial Managed Industrial Ethernet Switch with the following configurations:<ul style="list-style-type: none">□ RJ45: 12x 1 Gbps + 1x 2.5 Gbps (2x 1 Gbps + 1x 2.5 Gbps on front) with "on-the-Fly" SFP detection support (Model: 02G101-00)□ M12: 12x 1 Gbps CU Ports (3x 1 Gbps M12 on front) (Model: 02G101-01)■ Supports up to 6 line cards, depending on configuration, with optional PoE as follows:<ul style="list-style-type: none">□ Option slots 1, 2 and 3 can be populated with SFP or copper based line cards□ Option slots 4, 5 and 6 can be populated with passive line cards□ All option slots are capable of supporting a mix of various types of connectors (RJ45, M12, SFP)□ All option slots offer additional PoE+ support■ Shelf Management Controller<ul style="list-style-type: none">□ Control panel□ Two fans
System Management	<ul style="list-style-type: none">■ Remote management: Switch is manageable remotely via Ethernet and USB console■ Watchdog■ CPU temperature: mirrored through Switch firmware to SNMP table space, readable through management interfaces
Shelf Controller	<ul style="list-style-type: none">■ System Management<ul style="list-style-type: none">□ Power supply status□ UPS shutdown: standby mode in the absence of external voltage and low charging level□ UPS start: System start delay until charging level has reached minimum level□ UPS status: indicates charging/discharging status and level□ Temperature monitoring□ Fan control and monitoring□ Heat-up delay
General System Control	<ul style="list-style-type: none">■ Reset button■ Bower button startup■ Power status LEDs<ul style="list-style-type: none">□ Power OK LED on front for each power supply unit■ Ethernet LEDs<ul style="list-style-type: none">□ Activity/Link status LED on front for each Ethernet port■ CPU status LED

Technical Data

System Control Panel Option (Requires the Shelf Controller)

- Assembled in bottom tray
- Provides system status
- Includes a power button
- Sys status LED to indicate system status behavior
 - Slow blinking for soft-off or waiting to reach start condition
 - On for normal operation
 - Off if shelf controller is powered off
- UPS Precharge LED
 - Blinks to indicate delayed start due to low IPS charging level
- Powered by UPS LED
 - On if system is powered by UPS
- Voltage Fail LED
 - Indicates a possible power supply problem to the system
- Fan Fail LED
 - Indicates the event of a fan failure
- Temp Fail LED
 - Blinks if the system temperature is too low
 - On if the system temperature is too high
- Power Button Hard Shutdown
 - Hard system shutdown by pressing and holding the power button
 - Power supplies are on standby after shutdown is complete

Switching Matrix

- 29 Gbit/s switching matrix for seamless throughput on all ports
- TCAM Switching
 - TCAM High-Speed switching (Ternary Content-Addressable Memory)

Protocols and Functionality

- General Network Support
 - IPv4 support for transport and management
 - IPv6 support for transport and management
- DHCP
 - DHCP Option 82
 - DHCP Proxy
 - DHCP snooping
- DNS
 - DNS Client
 - DNS Proxy

Ports and Port Control

- Energy Efficient Ethernet (IEEE 802.3az) on all ports
- Audio Video Bridging (AVB) as a future extension
 - Hardware support included (additional software required)

Switch Management and Monitoring

- SNMP v1, v2c and v3 configuration
- RMON 1, 2, 3 and 9 configuration
- LLDP
 - IEEE 802.10AB-2005 Link Layer Discovery
 - TIA 1057 LLDP-MED extension
- sFlow Agent for real time statistics collection
- OAM
 - IEEE 802.30ah Link and Flow OAM
 - IEEE 802.1ag
 - ITU-T Y.1731 Up- and Down-MEP and MIB
- HTTP/HTTPS
 - Fully Web manageable through HTTP and HTTPS protocol

Technical Data

Redundancy and Flow Control	<ul style="list-style-type: none"> ■ Spanning Tree (STP) <ul style="list-style-type: none"> □ Spanning Tree, Multiple Spanning Tree and Rapid Spanning Tree with filter tables □ BPDU Guard and Restrict Role ■ Loop Protection <ul style="list-style-type: none"> □ Loop detection as configuration option ■ Protection Switching <ul style="list-style-type: none"> □ Secure Ring Protocols: ITU-T G.8031: 1+1; 1:1: 1:N Ethernet Linear Protection Switching and □ G.8032v2/Y.1344: Ring and Multiple Ring Protection Switching <50 ms ■ Ethernet Virtual Connections <ul style="list-style-type: none"> □ BP EVC Services E-Line, E-Lane, E-Tree ■ Link Aggregation <ul style="list-style-type: none"> □ Static and IEEE 802.3ad Link Aggregation
Security	<ul style="list-style-type: none"> ■ Single and Multiple IEEE 802.1X ■ MAC based ■ RADIUS ■ TACACS+ ■ ACL based security protocols
VLAN	<ul style="list-style-type: none"> ■ Port and IP subnet based VLAN routing, tagging, re-tagging and priority management ■ VLAN Trunking, GARP VLAN Registration (GVRP) ■ Multicast VLAN Registration (MVR) ■ Voice over IP <ul style="list-style-type: none"> □ VOICE VLAN and Auto Voice over IP prioritization
Multicast/IPMC	<ul style="list-style-type: none"> ■ VLAN an Port based IGMP/MLD Multicast and Multicast Proxy for IPv4 and IPv6 ■ SSM filtering ■ IPMCv4 and IPMCv6 flood suppression ■ IGMP Querier ■ Explicit Router port handling
QoS	<ul style="list-style-type: none"> ■ Port, Queue, MEF, VCAP, EVC policers ■ Port and Queue ingress and egress shapers ■ Diffserv marking and remarking
Synchronization	<ul style="list-style-type: none"> ■ IEEE 1588v2 Precision Time Protocol <ul style="list-style-type: none"> □ 1588v2/PTP support on ports 1 to 12 with one and two-step clocks □ 1588v2/PTP support on ports 13 to 25 (depending on line card variant) ■ SyncE <ul style="list-style-type: none"> □ SyncE Slave on all ports planned as a future extension ■ Time Protocols <ul style="list-style-type: none"> □ NTP Client, PTP Client
Provider Bridging	<ul style="list-style-type: none"> ■ IEEE 802.1d, 802.1ad and 802.10d Q-in-Q Provider Bridging
Layer 3 Support	<ul style="list-style-type: none"> ■ Layer 3 classification for i.e. SIP, IP Prot, SProt and DProt based protocols,
Relay Outputs and Control (Requires an SA-Adapter)	<ul style="list-style-type: none"> ■ Alive Signal Output <ul style="list-style-type: none"> □ Relay output 1 set when the switch is running under normal conditions □ Watchdog and Power controlled

Technical Data

Power Supply

- Power input
 - Power inlet connector for each PSU slot
 - Type: 3 pole Phoenix® Combicon
 - Lockable
 - Mechanically codeable
 - Suitable for up to 230 VAC
- Primary Power Supply
 - 100 to 240 VAC or 24 to 110 VDC (UC-Option)
- Secondary Power Supply
 - None, 100 to 240 VAC, 24 to 110 VDC or UPS (UC-Option).
- Power Supply Redundancy

Electrical Specifications

- Supply voltage (when using a 24 to 110 VDC PSU)
 - 24 VDC to 110 VDC
 - Nominal voltages 24, 36, 48, 72, 96 and 110V VDC, according to EN50155
 - Power interruption class S2 (10 ms)
- Power Consumption (Max. power available depends on used PSUs)
 - Less than 30 W in base configuration
 - Less than 100 W with 6 line cards without PoE

Mechanical Specifications

- Half 19" system (4U, 40HP)
- 1/2 19" rack-mount standard
- 3U card vertical
- Dimensions: max. 210 x 175 x 225 mm without brackets
- Mounting Possibilities
 - Wall-mount
 - Rack-mount in 19" cabinet
 - Two systems side-by-side to build a single 19" chassis
- Cooling Possibilities
 - Natural convection
 - Fan tray at system bottom when PoE is not required
- Air Flow
 - If bottom and top not covered, air flow from bottom to top outlets
 - If bottom and top covered, air flow from bottom front to top front outlets

Environmental Specifications

- Temperature range (operation)
 - EN 50155 class TX in base configuration and when equipped with GE01, GP01 and GP02 cards
 - 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
- Temperature range (storage): -40..+85°C according to IEC 60068-2-1, IEC 60068-2-2
- Relative humidity (operation): according to EN 60068-2-30, EN 50155
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300 m to +3000 m
- Shock: according to EN50155
- Vibration: according to EN50155
- Compliant to protection class IP20

EMC Conformity

- EN 550022, EN 50121-3-2, class B (radiated emission)
- EN 550022, EN 50121-3-2, class B
- EN 55024, EN 50121-3-2, class A

Software Support

- Firmware for configuration and management included

Ordering Information

Standard NH30 Models	19NH30-B0	4U 40HP build-to-order modular managed Gigabit Ethernet Switch. Half 19" basic system including backplane and mounting rails, -40 to +85°C
Related Hardware	02G101-00	25-Port Gigabit Ethernet Managed Switch, 2x RJ45 + 1x SFP 2.5 Gbps on front, 10x GE + 3x QSGMII links on backplane, -40 to +85°C with qualified components
	02G101-01	24-Port Gigabit Ethernet Managed Switch, 3x M12 on front, 9x GE + 3x QSGMII links on backplane, -40 to +85°C with qualified components
	02GE01-00	3U, 4-port Gigabit Ethernet passive extension card with RJ45 connectors on front, no PoE, -40 to +85°C
	02GE01-01	SemiCus: 3U, 4-port Gigabit Ethernet passive extension card with RJ45 connectors on front, PoE+, -40 to +85°C
	02GE01-02	3U, 4-port Gigabit Ethernet passive extension card with M12 connectors on front, no PoE, -40 to +85°C, conformal coating
	02GE01-03	SemiCus: 3U, 4-port Gigabit Ethernet passive extension card with M12 connectors on front, PoE+, -40 to +85°C, conformal coating
	02GP01-00	SemiCus: 3U, 4-port QSGMII Gigabit Ethernet extension card with RJ45 connectors on front, no PoE, EEE and Sync-E support, -40 to +85°C screened
	02GP01-01	3U, 4-port QSGMII Gigabit Ethernet extension card with RJ45 connectors on front, PoE+, EEE and Sync-E support, -40 to +85°C screened
	02GP01-02	SemiCus: 3U, 4-port QSGMII Gigabit Ethernet extension card with M12 connectors on front, no PoE, EEE and Sync-E support, -40 to +85°C screened, conformal coating
	02GP01-03	3U, 4-port QSGMII Gigabit Ethernet extension card with M12 connectors on front, PoE+, EEE and Sync-E support, -40 to +85°C screened, conformal coating
	02GP02-00	3U, 4-port QSGMII Gigabit Ethernet extension card with SFP cages on front, EEE and Sync-E support, -40 to +85°C screened
	17PU20-00	120 W, 3U 6HP PSU, wide range input 24 to 110 VDC, 24 VDC nom., output 12, 5 and 3.3 VDC, -40 to +85°C with qualified components, conformal coating
	17PU21-00	120 W, 3U 6HP PSU, wide range input 100 to 240VAC, output 12, 5, 3.3 VDC, -40 to +85°C with qualified components, conformal coating

Contact Information

Germany

MEN Mikro Elektronik GmbH
Neuwieder Straße 3-7
90411 Nuremberg
Phone +49-911-99 33 5-0
Fax +49-911-99 33 5-901

info@men.de
www.men.de

France

MEN Mikro Elektronik SAS
18, rue René Cassin
ZA de la Châtelaine
74240 Gaillard
Phone +33 (0) 450-955-312
Fax +33 (0) 450-955-211

info@men-france.fr
www.men-france.fr

USA

MEN Micro Inc.
860 Penllyn Blue Bell Pike
Blue Bell, PA 19422
Phone (215) 542-9575
Fax (215) 542-9577

sales@menmicro.com
www.menmicro.com

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