

MICROSENS

**Gigabit Ethernet Switch
With 10G Uplinks**

User Manual

MS400863M

July 2019

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1 About this User Manual

This installation guide describes the commissioning of the switch (mechanical handling) incl. connecting power supply and network link, resetting to factory settings and activating the network management access.

For further documentation see the CLI reference manual and use the help function of the WEB interface.

This guide will help you with

- connecting the power supply and commissioning the device,
- understanding the status LEDs and
- accessing the network management via CLI or WEB interface

2 Introduction

2.1 Overview

The Gigabit Ethernet switch MS400863M provides 20 regular SFP slots, 4x SFP/TP combo ports and 4x 1/10G SFP+ uplink ports. The device performs a wire-speed, non-blocking switching fabric. This allows wire-speed transport of multiple packets at low latency on all ports simultaneously. Store-and-forward technology is used to ensure maximum data integrity. With this technology, the entire packet must be received into a buffer and checked for validity before being forwarded. This prevents errors from being propagated throughout the network. Additionally the device supports advanced security management capabilities and network features. This switch is easy to deploy and configure, providing stable and quality performance network services your business needs. Several management interfaces like http/https, telnet, SSH, SNMP and a local serial port are implemented.

2.2 Features

The following list summarizes the most important features:

- 24x 100/1000Base-X SFP slots
- 4x 10/100/1000Base-T RJ-45 ports (combo ports, shared with four SFP slots)
- 4x 1G/10G SFP/SFP+ slots
- Redundant power input (230 VAC and 24-48 VDC)
- Serial CLI port
- 10/100/1000Base-T management port
- 19" 1U rack mounting
- Network management via http/https, telnet, SSH, SNMP or the local CLI port
- STP/RSTP and MSTP
- VLANs (port-based, tag-based, protocol-base, GVRP...)
- QoS
- IPv6/ IPv4 dual stack
- Security features like RADIUS, TACACS+, configurable privileged levels and access management
- EPS, MEP and ERPS
- IGMP / MLD
- LLDP / LLDP-MED
- 1588 PTP master/slave
- Extensive logging, monitoring and status information
- Energy Efficient Ethernet according to IEEE 802.3az

3 Hardware

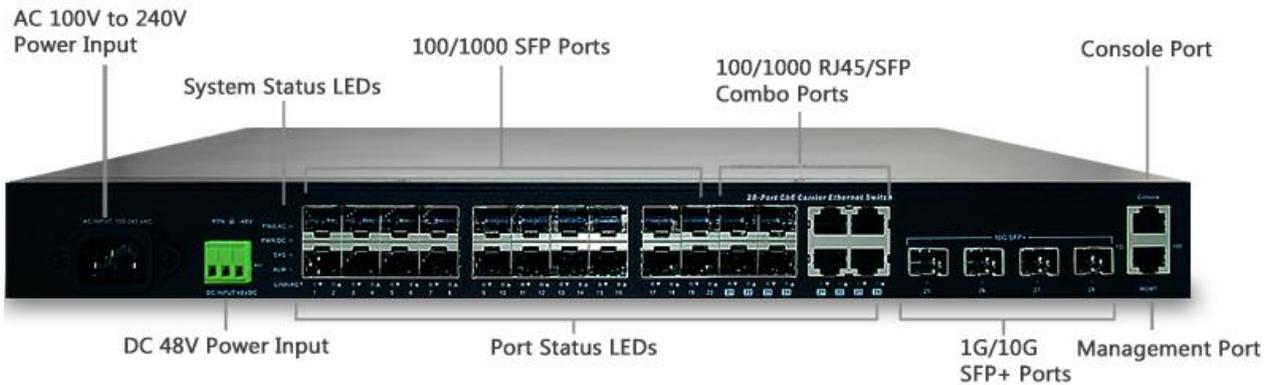


Figure 1: Front View

All connectors and LEDs are placed at the front side (figure 1); only the earth screw is placed at the rear side.

3.1 Redundant Power Interface

There are dual power inputs on the front panel of the switch for power redundancy requirement, the switch has 100~240 VAC power socket for AC power input and 48 VDC power input via terminal block.

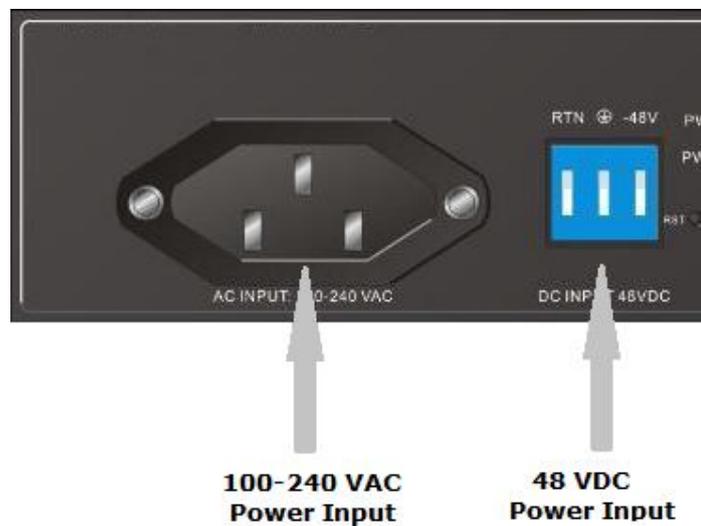


Figure 2: Power Interface

3.2 Earth Terminal

Figure 3 shows the earth screw including PE symbol.

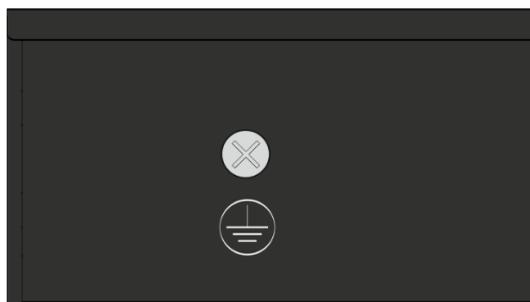


Figure 3: Earth Screw

3.3 RJ-45 Ports

The switch contains 4x 10/100/1000BASE-T RJ-45 ports. All RJ-45 ports support automatic MDI/MDI-X operation and auto-negotiation, so the optimum data rate and transmission can be selected automatically.

3.4 SFP/SFP+ Ports

MS400863M provides the Small Form Factor Pluggable (SFP) transceiver slots port 1 to port 24. The SFP slots 21-24 are shared with RJ-45 ports (combo interface RJ-45/SFP). In the default configuration, if an SFP transceiver (purchased separately) is installed in a slot and has a valid link on the port, the associated RJ-45 port is disabled. The ports 25 to 28 support 1/10GbE SFP+ transceiver slots. Generally, they are used as high performance backbone interface, but it is also possible to insert GbE SFP transceivers. Ensure that the configuration of the port speed matches with the used SFP or SFP+ module.

3.5 LEDs

The switch includes a display panel for system and port indications that simplify installation and network troubleshooting. The red marked LEDs, which are located on left hand side of the front panel for easy viewing provides general information about the switch status. Additional LEDs indicate link and activity status for each port. Details are shown below, and described in the following tables:



Figure 4: LEDs

The table below informs about the system LEDs:

LED	Color	State	Description
AC Power	Green	On	The switch is powered on correctly.
		Off	The switch is not receiving power from AC input.
DC Power	Green	On	The switch is powered on correctly.
		Off	The switch is not receiving power from DC input.
System	Green	On	The switch is ready and running ok.
		Off	The switch is not ready or failed.
		Blinking	The switch is booting.
Alarm	Red	On	An abnormal state, such as temperature, voltage or fan speed, has been detected in the switch.
		Off	The system is normal

Table 1: System LEDs

The following informs about the port LEDs:

LED	Color	State	Description
RJ-45 Ports	Green	On	The port is enabled and established a link to connected device, and the connection speed is 1000 Mbps.
	Green	Blinking	The port is transmitting/receiving packets, and the connection speed is 1000 Mbps.
	Amber	On	The port is enabled and established a link to connected device, and the connection speed is 10/100 Mbps.
	Amber	Blinking	The port is transmitting/receiving packets, and the connection speed is 10/100 Mbps.
	--	Off	The port has no active network cable connected, or it is not established a link to connected device. Otherwise, the port may have been disabled through the switch user interface.
SFP Ports	Green	On	The port is enabled and established a link to connected device, and the connection speed is 1000 Mbps.
	Green	Blinking	The port is transmitting/receiving packets, and the connection speed is 1000 Mbps.
	Amber	On	The port is enabled and established a link to connected device, and the connection speed is 100 Mbps.
	Amber	Blinking	The port is transmitting/receiving packets, and the connection speed is 100 Mbps.
	--	Off	The port has no active network cable connected, or it is not established a link to connected device. Otherwise, the port may have been disabled through the switch user interface.
SFP+ Ports	Blue	On	The port is enabled and established a link to connected device, and the connection speed is 10 Gbps.
	Blue	Blinking	The port is transmitting/receiving packets, and the connection speed is 10 Gbps.
	Green	On	The port is enabled and established a link to connected device, and the connection speed is 1 Gbps.
	Green	Blinking	The port is transmitting/receiving packets, and the connection speed is 1 Gbps.
	--	Off	The port has no active network cable connected, or it is not established a link to connected device. Otherwise, the port may have been disabled through the switch user interface.

Table 2: Port LEDs

3.6 Management Port

An additional 10/100/1000Base-T RJ-45 port is intended for IP-based management access. Per default, the port works like the other RJ-45 ports but the user can configure all needed options by defining a new IP interface and configuring VLANs. Especially it is possible to isolate the port from other data traffic.

3.7 Console Port

The device contains a serial RS-232 interface, the console port, as local management interface. For the console port, a standard RJ-45 connector is used. Nevertheless, the pinning is different. Use the attached RS-232 cable (Sub-D9 to RJ-45) to connect the console port with the COM port of a PC. Per default, the following parameters are set:

- Speed: 115200 bps
- Data bits: 8
- Stop bits: 1
- Flow control: none
- Parity bit: none

This interface can be used if the IP settings are unknown. Only login (default: admin) and password (default: microsens) must be known.

3.8 Reset Button

By pressing the reset button for a certain period of time, users can perform the following tasks:

Reset: To reboot and get the switch back to the previous configuration settings saved.

Factory Default Reset: To restore the original factory default settings back to the switch.

Note: According to the table below, users can easily judge which task is being performed by reading the LED behaviors while pressing the reset button. **Once the LED behaviors are correctly displayed, users may just release the button.**

Task to be Performed	Time Period of Pressing Button	SYS LED Behavior	Port Status LED Behavior
Reset the switch	2 ~ 7 seconds	blinking green	All LEDs are switched off
Restore to defaults	7 ~ 12 seconds	blinking green	All LEDs stay on

Table 3: Reset and Factory Default Reset

4 Installing the Switch

This chapter describes the mechanical installation, the power connection and grounding of the switch. Furthermore cabling of the Ethernet interfaces is explained.

The following precautions must be considered:

ESD Note: Circuit devices are sensitive to static electricity, which can damage their delicate electronics. Dry weather conditions or walking across a carpeted floor may cause you to acquire a static electrical charge. To protect your device, always:

- Touch the metal chassis of your computer to ground the static electrical charge before you pick up the circuit device.
- Pick up the device by holding it on the left and right edges only.

Note: The switch is an indoor device. If it is to be used with outdoor devices such as outdoor IP cameras or outdoor WiFi APs, then users are strongly suggested to install a surge protector or surge suppressor in order to protect the switch.

4.1 Mounting

The switch can be mounted in a standard 19-inch equipment rack or on a desktop or shelf. Both mounting options are explained in the following sections.

4.1.1 Rack Mounting

Step 1: Attach the mounting brackets to both sides of the chassis. Insert screws and tighten them with a screwdriver to secure the brackets.

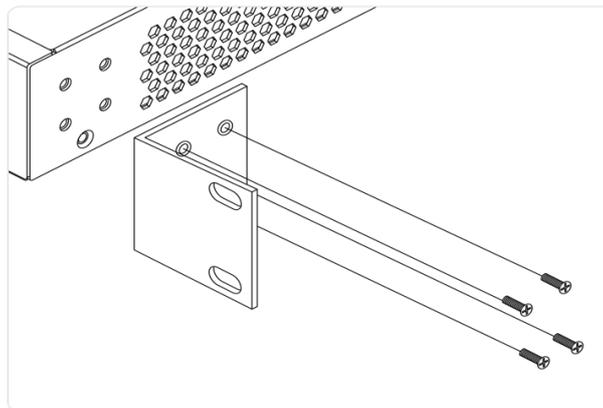


Figure 5: Attaching Brackets to the Switch

Step 2: Place the switch on a rack shelf in the rack. Push it in until the oval holes in the brackets align with the mounting holes in the rack posts.

Step 3: Attach the brackets to the posts. Insert screws and tighten them.

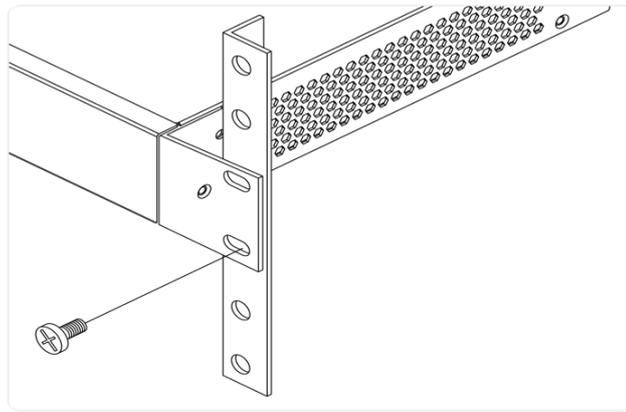


Figure 6: Mounting the Switch at the Rack Post

4.1.2 Desktop or Shelf Mounting

Step 1: Verify that the workbench is sturdy and reliably grounded.

Step 2: Attach the four adhesive rubber feet to the bottom of the switch.

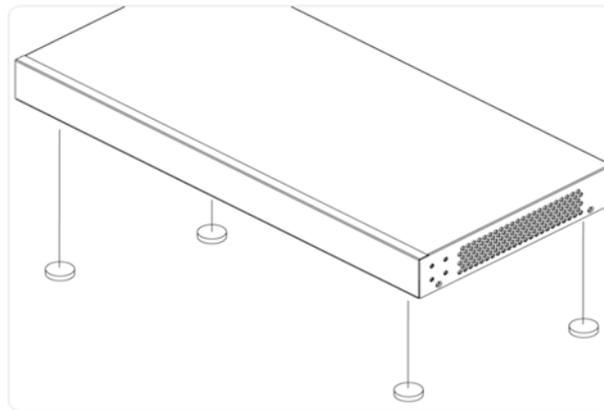


Figure 7: Attaching the Rubber Feet

4.2 Power Supply and Grounding

Before the power supply cable is connected, the device must be grounded. Connect the grounding screw at the rear side with protective earth of the buildings installation. Ensure strain-relief and defined cable routing. Any damage of the cable must be prevented.

4.2.1 AC Power Supply

Step 1: Connect the AC power cord to the AC power receptacle of switch.

Step 2: Connect the other end of the AC power cord to the AC power outlet.

Step 3: Check the system LED. If it is on, the power connection is correct.

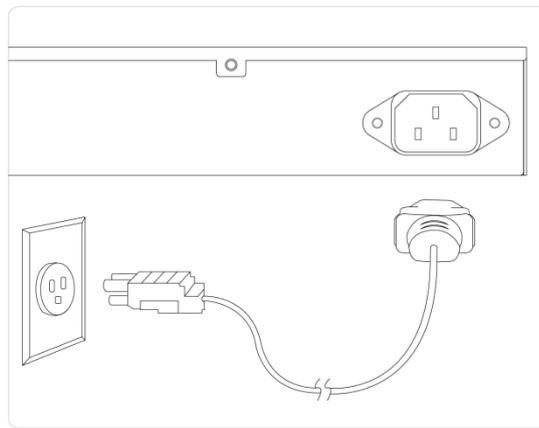


Figure 8: AC Power

4.2.2 DC Power Supply

Step 1: Insert the negative/positive DC wires into the RTN/-48V terminals, respectively.

Step 2: To keep the DC wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the terminal block connector.

Step 3: Insert the terminal block into the receptor.

Step 4: Check the system LED. If it is on, the power connection is correct.

Step 5: Ensure strain relief and defined cable routing for the RJ-45 wires.

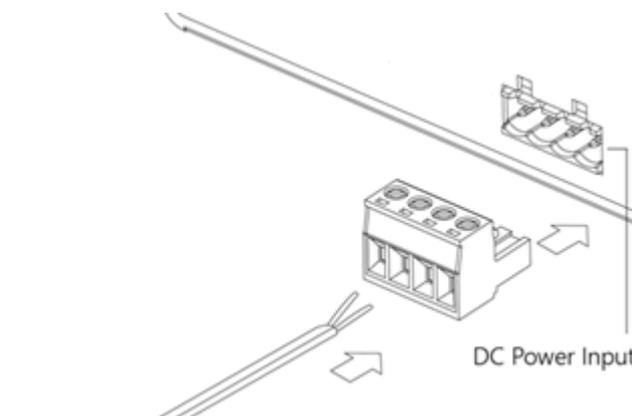


Figure 9: DC Power

Note: When wiring the DC power input, it is suggested to use AWG 20 – 26 (American Wire Gauge). Be sure to disconnect the power cord before installing and/or wiring the switch.

4.3 Network Interfaces and Cabling

4.3.1 RJ-45 Ports

Figure 10 shows a RJ-45 port and the corresponding connector. The RJ-45 ports are supporting auto-crossing. Therefore, the use of crossed or straight cables is possible. The auto-crossing function ensures that transmit lines are correctly connected with receiver lines.

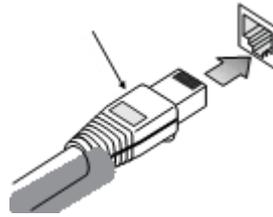


Figure 10: RJ-45 Ports

In the majority of cases category 5 UTP cables that are used for 100BASE-TX connections should also work for 1000BASE-T, providing that all four wire pairs are connected. However, it is recommended that for all critical connections, or any new cable installations, category 5e or category 6 cable should be used. The category 5e and 6 specifications include test parameters that are only recommendations for category 5. Therefore, the first step in preparing existing category 5 cabling for running 1000BASE-T is a simple test of the cable installation to be sure that it complies with the IEEE 802.3-2005 standard.

4.3.2 SFP/SFP+ Slots

Several Fast Ethernet and Gigabit Ethernet SFP transceivers for different distances are available. For 10G applications, SFP+ transceivers are used. Basically, two kinds of SFP modules are available. Single mode transceivers are used for 9/125 μm single mode fiber. While further transceiver for 50/125 or 62.5/125 μm multimode fiber are used. All SFPs require LC/PC connectors. Do not combine multimode modules with single mode fiber or with versa. That would cause increased damping, back reflections or oversteering of the receiver.

SFP modules are hot pluggable. You can install or remove a SFP from a slot without having to power off the switch.

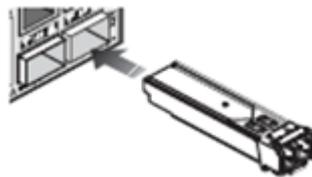


Figure 11: Installing a SFP Transceiver

Step 1: Consider network and cabling requirements to select an appropriate SFP transceiver type.

Step 2: Insert the transceiver with the optical connector facing outward and the slot connector facing down. Note that SFP transceivers are keyed so they can only be installed in one orientation.

Step 3: Slide the SFP transceiver into the slot until it clicks into place.

The following steps describe the connection with the fiber network:

Step 4: Remove and keep the LC port's rubber plug. When not connected to a fiber cable, the rubber plug should be replaced to protect the optics.

Step 5: Check that the fiber terminators are clean. You can clean the cable plugs by wiping them gently with a clean tissue or cotton ball moistened with a little ethanol. Dirty fiber terminators on fiber optic cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port.

Step 6: Connect one end of the cable to the LC port on the switch and the other end to the LC port on the other device. Since LC connectors are keyed, the cable can be attached in only one orientation.

5 Management Interfaces

The switch provides management access via http or https (enabled per default), telnet, SSH, SNMP or the local console port. All interfaces except the console port require access via the Ethernet network. For this interfaces correct IP (Internet Protocol) settings are required. The IP address, gateway and subnet mask must match with requirements of the network. Per default, DHCP is enabled. This allows the automatic configuration of all IP settings by a DHCP server. If no DHCP server is available, the IP settings must be configured via the console port, which operates as CLI (Command Line Interface). Per default, all interfaces are using the same login (**admin**) and password (**microsens**).

5.1 WEB Interface

The switch provides an http or https based WEB interface. Per default, https is enabled. Http can be enabled in the CLI or WEB interface if needed.

The WEB interface is achieved as following:

Step 1: Connect the switch with your PC via an Ethernet interface

Step 2: Open a WEB browser and enter the IP address of the switch
(You can find the IP address in the CLI interface or by checking the DHCP server)

If the IP settings are correctly, the following login appears:

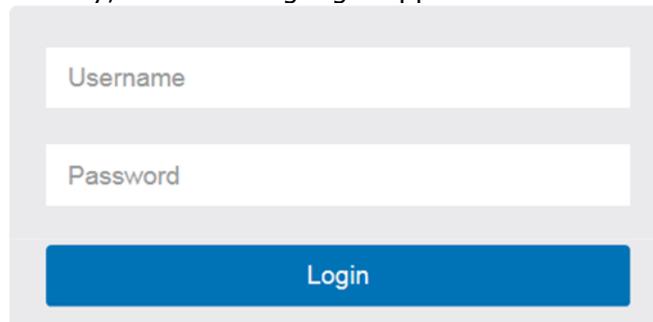


Figure 12: Login

Step 3: Enter username and password to open the WEB interface.

The following WEB page appears. On the left side you can find the configuration menu. It is divided in four main sections: configuration, monitoring, diagnostics and maintenance. Please scroll through the configuration section, open the interesting feature and configure it in detail. On each WEB page a help button "?" is shown. Press this button to open a detailed feature description. The monitoring section allows you to check extended status information of several features. Diagnostic functions like ping, traceroute and veriPhy (measuring of the cable length) are available to check network connections. The maintenance section allows firmware or configuration updates, a reset, a factory default reset or a download of a configuration file. Especially the "save running configuration" function must be considered to save applied settings permanently.

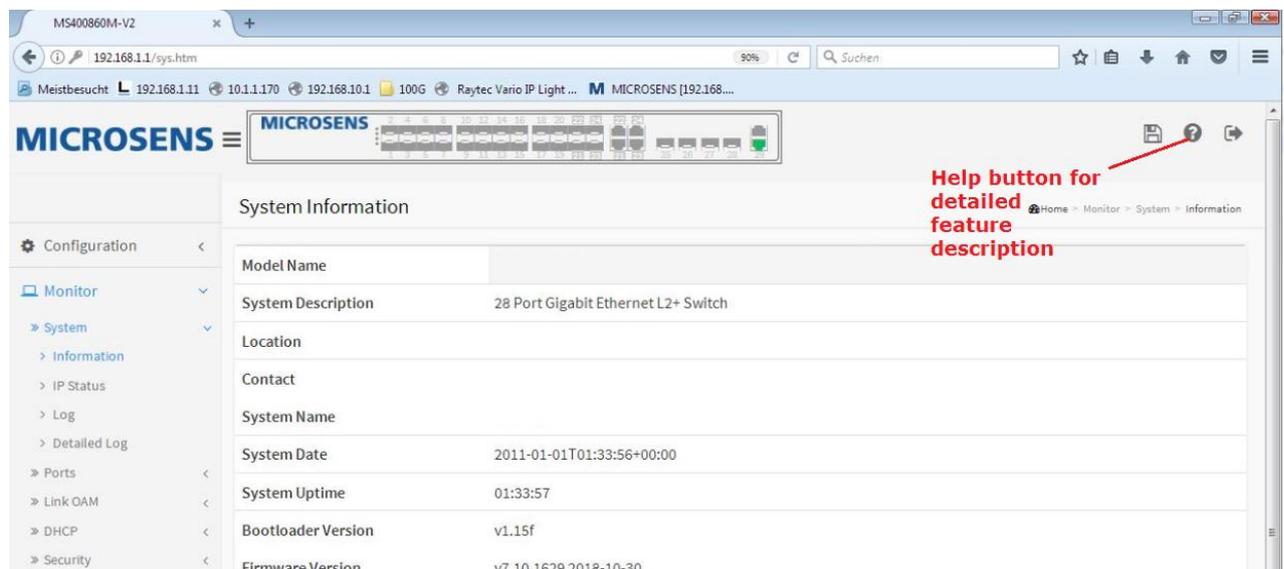


Figure 13: WEB Interface

5.2 CLI Interface

The CLI interface is available via the console port or telnet and SSH. The console port is always available, even if the network access is disturbed. The CLI reference manual explains all CLI commands in detail. The commands are for all interface identical. Below a first CLI, access via the console port is described:

Step 1: Use the RS-232 adapter cable (shipped with the device) to connect the COM port of your PC with the console port.

Step 2: Open a terminal program and configure the RS-232 settings

Step 3: Press "enter"

Now the CLI interface appears.

Step 4: Enter username and password

For a first access, the following commands are useful:

- Set IP address

```
Username: admin
Password:
MS400863M#
MS400863M# configure terminal
MS400863M(config)# interface vlan 1
MS400863M(config-if-vlan)# no ip address dhcp
MS400863M(config-if-vlan)# ip address
192.168.1.2 255.255.255.0
MS400863M(config-if-vlan)# exit
```

- Show IP interface

```
MS400863M# show ip interface brief
Vlan Address      Method  Status
----  -
1    192.168.1.1/24  Manual  DOWN
```

- Save configurations

```
MS400863M# copy running-config startup-config
```

6 Specification

Switch Characteristic

Type	Gigabit Ethernet Switch with 4x 10G Uplinks Layer 2+, IEEE 802.3 compliant
Mode of Operation	Store-and-forward
Buffer Architecture	1392 kB on-chip frame buffer
Aggregate Bandwidth	128 Gbps
Switching Database	32K MAC addresses
Throughput	130.9 mpps
Jumbo Frames	10K
Flow Control	Full Duplex: IEEE 802.3x Half Duplex: Back pressure

Twisted-pair Interface

Number	4 (part of combo ports) + 1 (management port)
Type	10/100/1000Base-T
Connector	RJ-45, shielded
Pin-out	Auto-crossing

SFP Interface

Number	24 (4 combo ports, shared with RJ-45 ports)
Type	100/1000Base-X SFP slots

SFP+ Interface

Number	4
Type	1G/10G SFP+ slots

Power Supply

DC Power Input	-24 ~ -48 VDC
AC Power Input	100 ~ 240 VAC, 50~60 Hz
Power Consumption	max. 38 W

Environmental Conditions

Operating Temperature	-20...+60° C
Humidity	10...90 % (non-condensing)

Mechanic

Size	44(H) x 442(W) x 211.2(D) mm
Weight	3.1 kg

Standards

EMC Emission	EN 55022 (CISPR 22) Class A EN 61000-3
Immunity	EN 61000-4-2/3/4/5/6/8/11, EN 55024
Safety	EN 60950
Ethernet	IEEE 802.3 (10Base-T Ethernet) IEEE 802.3u (100Base-TX Ethernet) IEEE 802.3ab (1000Base-TX Ethernet) IEEE 802.3z (1000Base-X Ethernet) IEEE 802.3ae (10GBase-SR/ER Ethernet) IEEE 802.3x (Flow Control capability) ANSI/IEEE 802.3 (Auto-negotiation) IEEE 802.1Q (VLAN) IEEE 802.1p (Class of Service) IEEE 802.1X (Access Control) IEEE 802.1D (Spanning Tree) IEEE 802.1w (Rapid Spanning Tree) IEEE 802.1s (Multiple Spanning Tree) IEEE 802.3ad (Link Aggregation Control Protocol) IEEE 802.1AB (Link Layer Discovery Protocol)

7 Disclaimer

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