

Gigabit Ethernet Switch Module

1x 10/100/1000Base-T, 7x 10/100Base-TX, 2x SFP-Slots

MICROSENS

General

Ethernet has been used in the controlling level of industrial applications for many years. Ethernet is continuing to beat the field bus technologies used to date in coupling equipment controls, sensors and actors. Process error-tolerant network components are absolutely essential because the network availability has a direct effect on production. It is precisely to prevent this that MICROSENS has developed a mechanism for which a patent is pending that enables the Ethernet network to be reconfigured within milliseconds if an error occurs.

The switches can be configured and monitored either by SNMP or a PC-based management tool (Device Manager). In addition to the Device Manager all statuses are displayed web based using an integrated HTTP server.

In addition to the two SFP ports, which can be operated with Fast Ethernet or Gigabit Ethernet SFPs, the MICROSENS industrial switches also offer seven 10/100Base-TX connections for linking such Ethernet terminals as machine controls, network uplinks, consoles and other network participants and one 10/100/1000Base-T port for a central uplink connection.

This switch module for the MICROSENS 19" Access Platform offers the central concentration of the industrial fiber optic ring products.

Features

- Gigabit Ethernet Switch Module 7x 10/100Base-TX, 1x 10/100/1000Base-T and 2x SFP slots
- Non-blocking architecture, 1 MBit memory
- Max. 4096 Mac addresses, 5 minutes aging
- Configurable SFP slot for Fast Ethernet or Gigabit Ethernet SFPs
- Redundant Ring Functionality
- Compatible to the industrial switches with ring function
Reconfiguration in < 20 ms
- Central power supply with redundancy option
(110 - 230V AC, 48V DC or 24V DC)
- Integrated agent for network management via PC-Tool, Web, SNMP - or Telnet-Interface
- Full VLAN functionality
- Data prioritisation according to IEEE_802.1q
- Potential free alarm contact (Relay Contact)
- Full compatibility with all modules of the access family

Technical Specifications

Typ	Manageable Gigabit Ethernet Switch module with 2 x SFP slots, 1x 10/100/1000Base-T and 7x 10/100Base-TX ports for fault tolerant fiber rings
Fiber type (SFP based)	Multimode 62,5/125 or 50/125µm, Single mode 9/125µm, duplex (optional)
Cable type	Shielded Twisted Pair Kabel, 100 Ohm, Categorie 5, Pinout RJ45 port auto crossover
Data rate	10, 100 and 1000 Mbps
LED displays	Power ready for operation Lnk/Act Link status/Data traffic each Port Ring Switch is configured into ring mode RM Switch is ring master Alarm Fiber uplink interrupted, ring failure or power supply failure
Power Supply	Standard: 18...36 V DC via backplane Optional: 36...72 V DC via backplane for PoE Option
Fuse	1 A, slow (internal)
Power consumption	8 Watt (typ.)
Dimensions	50 x 108 x 116 mm (w x d x h)
Operating temp.	-20°C to 60°C
Storage temp.	-20°C to 80°C
Rel. humidity	5% to 90% non condensing
Management	- Configuration with PC based management tool (not included) - Support of SNMP-Traps, TELNET, HTTP
Ring function	Suitable for master and slave mode, no limitation in number of ring node, no max. delay

Construction

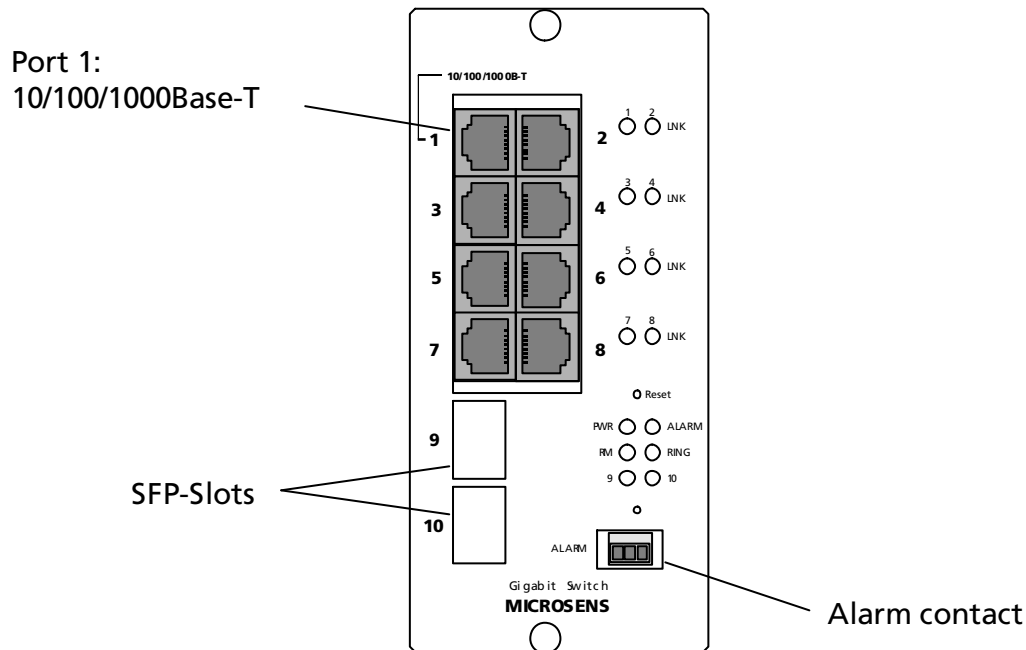
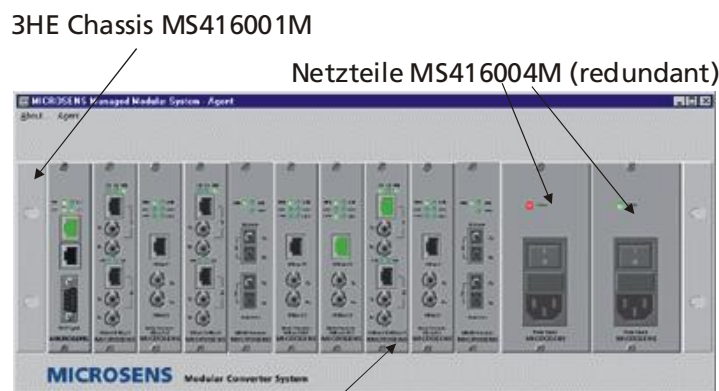


Fig.: Displays and ports

Installation Options

The Optical Crossbar converter module is intended for the installation into a MICROSENS modular system. It can be combined with all other converter modules of the same series freely. The current supply is made from a central power supply via backplane. Together with the power supply (MS416004 and/or MS416004M - manageable version) maximally 12 modules can be installed into 3HU chassis (MS416001M) or up to 20 into 4HU chassis front and back (MS416010M).

Optionally a second power supply (MS416004M) for redundancy can be installed. In this case 10 modules can be used for MS416001M or 18 for MS416010M. During a partial assembly the unused slots are covered with blind covers (MS416100). The blind covers do not belong to the scope of supplied with the modular chassis.



Alarm contact (Relay Contact)

The alarm contact allows the connection of any external alarm system in order to monitor the operation status. The contact is a 3-pin plug connector at the front of the switch module. There are both pins, normally open (NO) and normally closed (NC) available.

The contact is switched in case of a power loss. If the switch is configured into ring mode the contact is also switched if the fiber ring is broken in one segment.
Geschaltet wird bei Ausfall der Hauptstromversorgungsspannung. Ist der Switch für den Ringbetrieb konfiguriert, so wird zusätzlich die Unterbrechung der Glasfaser-Verbindung signalisiert.

ATTENTION: The maximum power level for this contact is 0.5 A at 60 V DC. It is NOT allowed to connect devices with 230 V AC power there.

Transmission Speed

The Twisted Pair ports of the switches are selecting automatically the highest possible speed by using autonegotiation. The LEDs are indicating the selected mode.

The LEDs are showing the following information.

LED	Function
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Port 1...8	Link- (on) and activity (blinking) for each copper port
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Port 9..10	Link- (on) und activity (blinking) for the two SFP slots
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Ring	Switch configured into ring mode
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RM	Ring-Master (only if ring mode is activated)
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Alarm	Alarm contact released
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Twisted Pair Connections

The integrated auto-crossing function of all Twisted-Pair ports makes the use of crossed patch cables unnecessary. The switch automatically detects the pinout of the connected cable and adapts the port accordingly. For all connections standard 1:1 Twisted Pair cables can be used.

The Autonegotiation mechanism detects automatically the speed and transmission mode (full or half duplex) between connected ports. A manual configuration is not required but possible via the integrated management.

Management

The integrated http server offers to show status information by using a standard internet browser. A special configuration is not necessary. Additional to the web based management the switch offers a MIB to be used in all standardized Network Management Systems (NMS) supporting SNMPv1 protocol.

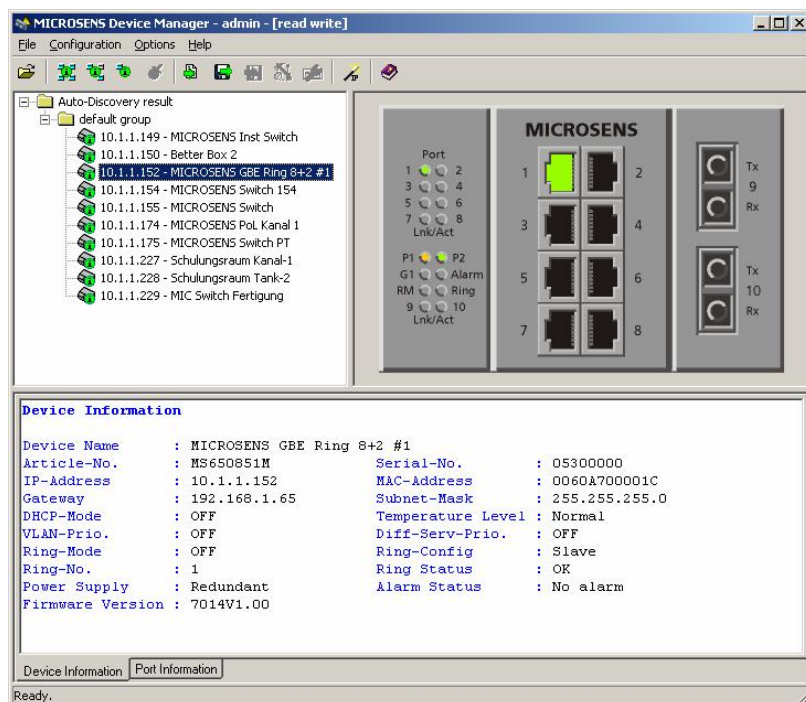
With the PC based management tool Device Manager it is possible to configure all ports of the switch manually. Please refer to the online manual for the Device manager on the disk.

With this tool it is also possible to do the initial TCP/IP setting (IP address, Gateway etc.). This configuration can be changed afterwards using the TCP/IP protocol.

Attention: The description for the initial settings can be found in the online manual!

The management information are available inside of the network (inband management). A special connection is not necessary. Due to this all four twisted pair ports are available to connect other devices.

With the deactivation of the autonegotiation function of the twisted pair ports the configuration of the speed to 10 or 100 Mbit/s and full or half duplex mode is done manually.

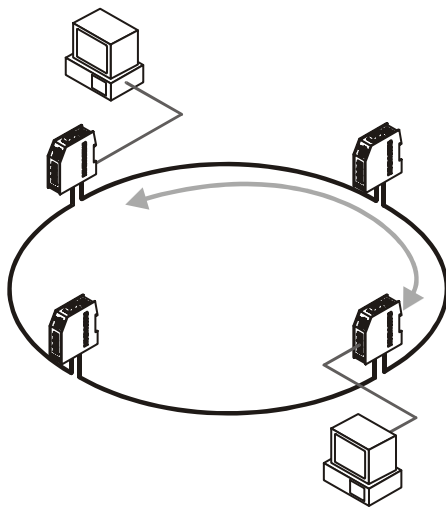


Ring Function

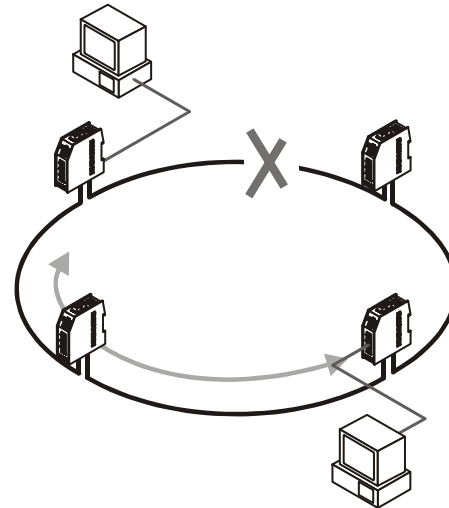
The two main SFP ports of the device can be used to build up a ring structure. Ring structures are commonly used in industrial and telecommunication environments as they give redundant protection against failures at minimum cabling expense.

In normal operation the ring connection is logically interrupted by monitoring device (switch configured for Ring Master mode). In case of failure (broken connection or switch damage) the logically interrupted connection is activated by Ring Master.

A big advantage of this solution is, that no additional central device is necessary for the redundancy feature. Even if the ring master itself fails, the interruption of the ring stays at this location.



Normal operation status



Data transmission in failure status

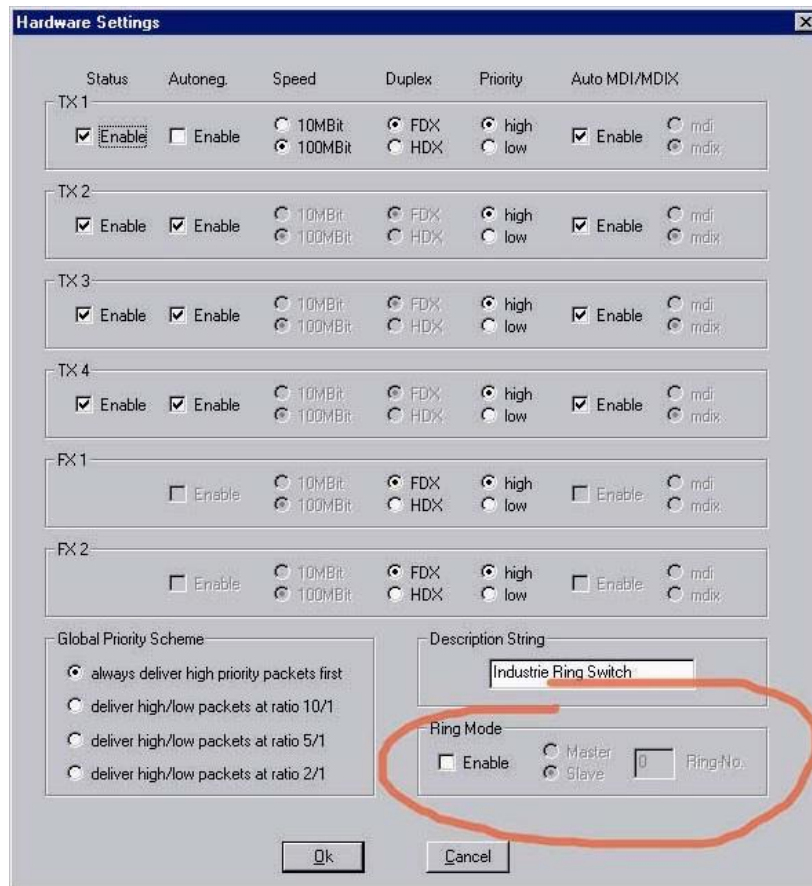
Ring Mechanism

The from MICROSENS patented protection mechanism supports the fast reconfiguration of the data transmission in case of failure of one fiber segment. This function is a fixed feature of the industrial switch. During this operation one switch is having the manager function, all other switches are normal ring switches.

Each switch is monitoring the status of the connected fiber segment. In case of failure the connected switch forwards this information to the ring manager. The ring manager terminates the interruption of the ring immediately. The data is transmitted in all directions then. This fast signaling a fast failure detection within a few milliseconds (depending on the ring size).

Ring Configuration

The configuration of the operating mode for the ring application is done with the network management.



At the menu point Hardware Setting it is possible to select the two modes master or slave. The switch which is configured in master mode is doing the ring manager functions to avoid the multiplication of the data.

If one connection or one device fails this information is forwarded to the ring manager (master) by a special protocol. The ring manager keeps the operation of the complete segment up.

Advantage of this solution is that the ring manager itself has not to be redundant, because if the manager fails the data can not be multiplied. The segments stays under operation.

To avoid that the signaling in case of failure has no affect on other rings, it is possible to define different rings with numbers from 0 to 255 by the network management.

All switches with ring functionality are having the management features included and are offering the detection and signaling of any failure.

With this concept a limitation in regards to the maximum ring length is not given.

Safety Notes

WARNING: Infrared radiation as used for data transmission within the fiber optic, although invisible to the human eye, can nevertheless cause damage. To avoid damage to the eyes:

- never look straight into the output of fiber optic components – danger of blinding!
- cover all unused optical connections with caps.
- commission the transmission link only after completing all connections.

The active laser components used with this product comply with the provisions of **Laser Class 1**.

DANGER: Conductive components of power and telecommunications networks can carry dangerously high voltage. To avoid electric shock:

- Do not carry out installation or maintenance work during lightning storms.
- All electric installations must be carried out in accordance with local regulations.

Order Information

Art.-No.	Description	Connectors
MS415259M	10 Port Switch Module, 1x10/100/1000T or 1000BaseX (auto detect), 7x10/100TX, Ring-Redundancy, 2x SFP Ports, manageable SNMP/web/CLI, VLANs, QoS	8x RJ-45 2x SFP-Slot 1x Alarm Contact

Accessories

Art.-No.	Description	Connectors
MS100193*	SFP, Fast Ethernet 1310 nm Multimode Transceiver, max. 155 Mbps	LC duplex
MS100010	SFP, Fast Ethernet 1310 nm Single Mode Transceiver, max. 155Mbps, min. 25 km	LC duplex
MS100200	SFP, Gigabit Ethernet 850 nm Multimode Transceiver, max. 1,25Gbps	LC duplex
MS100210	SFP, Gigabit Ethernet 1310 nm Single Mode Transceiver, max. 1,25Gbps, min. 10km	LC duplex

Further versions on request.

Software

Art.-No.	Description	Data Medium
MS200150	Device Manager PC-Software V3.x, universal MICROSENS Switch Management	CD-ROM

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